

DESIGN DATA				
Traffic	Average Daily			
Current 2024	Pass: 2980	Trucks: 450	Total: 3430	
Forecast 2044	Pass: 3695	Trucks: 585	Total: 4280	
Clear Zone Distance: 26'		Design Speed: 45mph		
Minimum Sight Dist. for Stopping: 360'		Bridges: HL-93		
Sight Dist. for No Passing Zone: 700'				
Pavement Design Life 20 (years)				
Design Accumulated One-way flexible ESALs: 1,416,615				

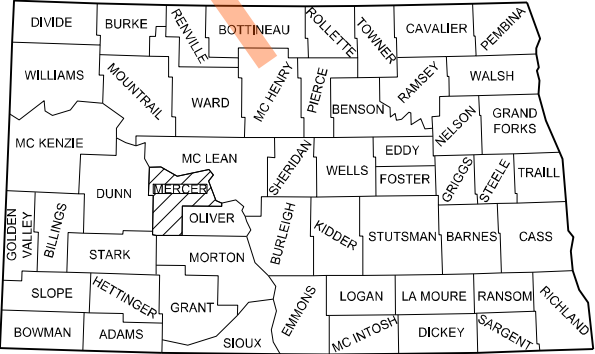
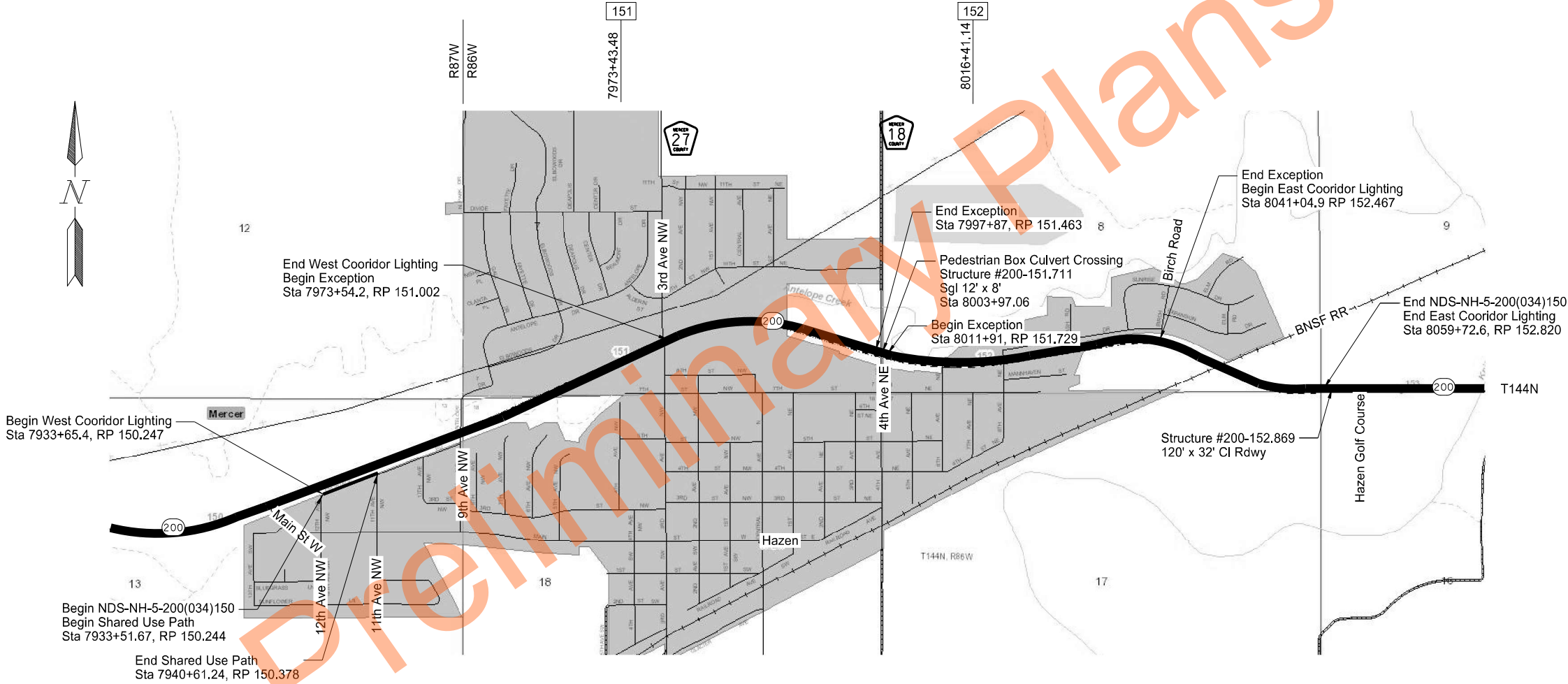
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

NDS-NH-5-200(034)150
Mercer County
Main St W - Hazen Golf Course
Lighting, Bikeway/Walkway, Pedestrian Box Culvert

STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	NDS-NH-5-200(034)150	22938	1	1

GOVERNING SPECIFICATIONS	Date Published and Adopted by the North Dakota Department of Transportation
Standard Specifications	7/1/2024
Supplemental Specifications	NONE

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
NDS-NH-5-200(034)150	1.377	2.576



DESIGNER Austin Becker
DESIGNER Stacy Flaten
DESIGNER Dylan Weber

ND DEPARTMENT OF TRANSPORTATION OFFICE OF PROJECT DEVELOPMENT	Jonathan Ketterling 09/01/26
--	---------------------------------

Ackerman-Estvold

REGISTERED PROFESSIONAL ENGINEER
AUSTIN T. BECKER
PE-27997
DATE 09/01/26
NORTH DAKOTA

TABLE OF CONTENTS

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	2	1

PLAN SECTIONS		
Section	Page(s)	Description
1	1	Title Sheet
2	1 - 2	Table of Contents
4	1	Scope of Work
6	1 - 3	Notes
6	4	Environmental Notes
8	1 - 2	Quantities
10	1	Basis of Estimate
11	1	Earthwork Summary
20	1 - 4	Details
30	1 - 2	Typical Sections
40	1 - 2	Removals
50	1	Culvert Hydraulic Data
50	2	Manhole Summary
51	1	Allowable Pipe List
60	1 - 5	Plan & Profile
75	1 - 9	Wetland Impacts
76	1 - 2	Temporary Erosion Control
77	1 - 2	Permanent Erosion Control
80	1	Fencing
80	2	Curb Ramp Layout
81	1	Survey Coordinate and Curve Data
82	1 - 3	Survey Data Layout
100	1 - 13	Work Zone Traffic Control
110	1 - 4	Signing & Pavement Marking
140	1 - 18	Lighting
150	1	Flashing Beacon Removal
170	1 - 10	Pedestrian Underpass
200	1 - 11	Cross Sections-Shared Use Path-PR12SW
200	12 - 15	Cross Sections-ND 200
200	16 - 19	Cross Sections-Shared Use Path-PR200SW
200	20 - 29	Cross Sections-Shared Use Path-PR5SW
200	30 - 35	Cross Sections-Levee-PR1LEVEE

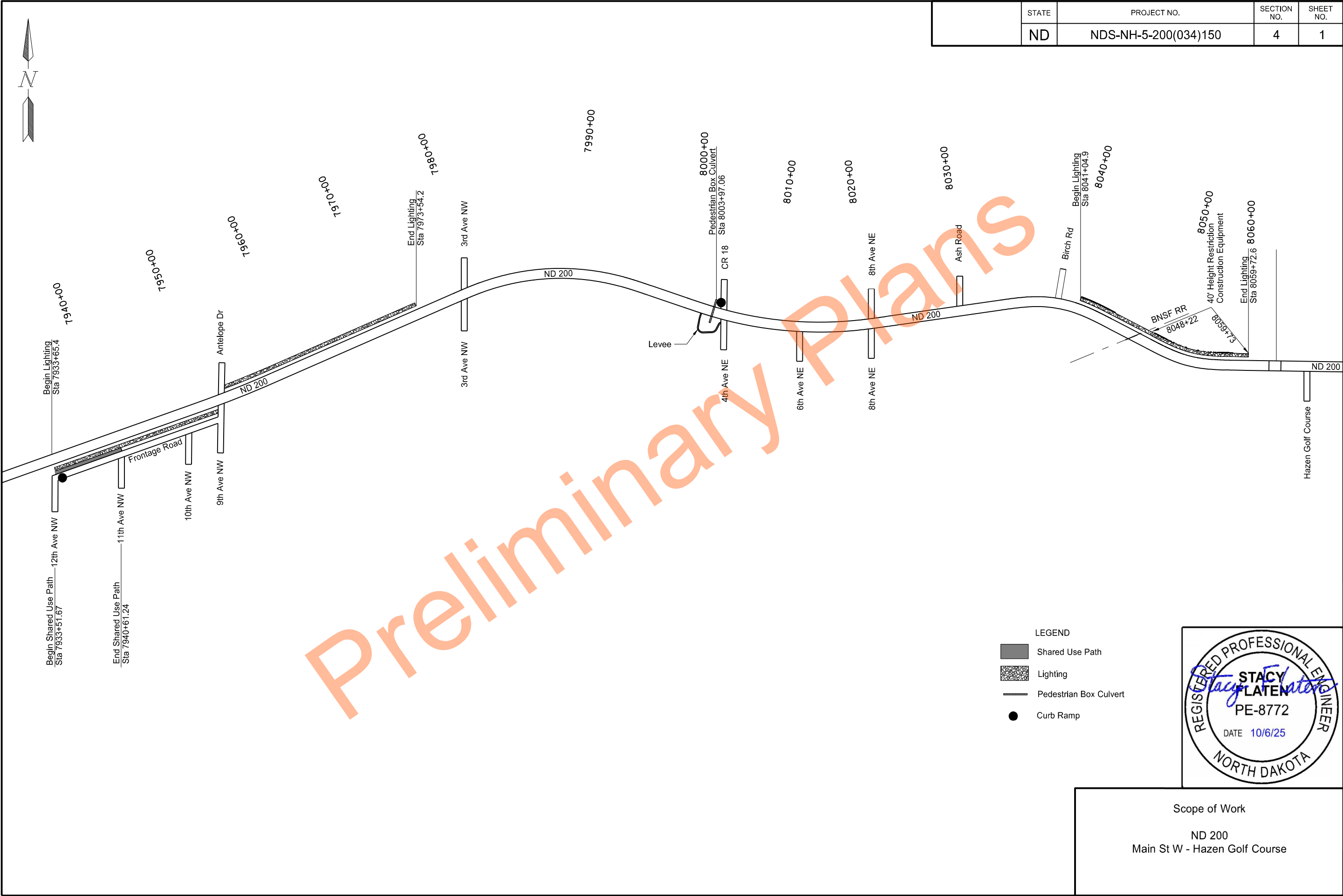
SPECIAL PROVISIONS	
Number	Description
SSP 1	Temporary Erosion and Sediment Best Management Practices
SSP 3	Local Agency Contracts
SSP 4	Longitudinal Joint Density
SSP 10	E-Ticketing
PSP 27(24)	Permits and Environmental Considerations
SP 251(24)	Utility Coordination
SP 253(24)	Temporary Pedestrian Facilities
SP 366(24)	Structural and Channel Excavation Foundation Fill and Preparation
SP 664(24)	Airport Coordination

TABLE OF CONTENTS
LIST OF STANDARD DRAWINGS

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	2	2

Number	Description	Number	Description
D-101-1, 2, 3, 4	NDDOT Abbreviations	D-754-28, 31	Sign Punching, Stringer and Support Location Details Regulatory, Warning and Guide Signs
D-101-10	NDDOT Utility Company and Organization Abbreviations	D-754-59	Sign Punching, Stringer and Support Location Details - Route Marker Signs
D-101-20, 21	Line Styles	D-754-87	Sign Punching, Stringer And Support Location Details For Street Name Signs And 911 Signs
D-101-30, 31, 32, 33	Symbols	D-762-1	Pavement Marking Message Details
D-101-40	Cross Section Legend	D-762-4	Pavement Marking
D-203-8	Standard Rural Approaches	D-770-1	Concrete Foundations (Traffic Signals & Highway Lighting)
D-255-2	Erosion And Siltation Control - Erosion Control Blanket Installation	D-770-2	Feed Points (Roadway Lighting)
D-261-1	Erosion Control - Fiber Roll Placement Details	D-770-3	Pull Box Details
D-704-1	Attenuation Device	D-770-4	Lighting And Signal Details
D-704-2	Traffic Control For Coring Of Hot Bituminous Pavement	D-770-5	Light Standard Details
D-704-7	Breakaway Systems For Construction Zone Signs - Perforated Tube		
D-704-8	Breakaway Systems For Construction Zone Signs - U-Channel Post		
D-704-9	Construction Sign Details - Terminal And Guide Signs		
D-704-10	Construction Sign Details - Regulatory Signs		
D-704-11, 11A	Construction Sign Details - Warning Signs		
D-704-12	Shoulder Closure Tapers		
D-704-13	Barricade And Channelizing Device Details		
D-704-14	Construction Sign Punching And Mounting Details		
D-704-15	Road Closure Layouts		
D-704-20	Terminal And Seal Coat Sign Layouts		
D-704-22	Construction Truck And Temporary Detour Layouts		
D-704-24	Shoulder Closures And Bridge Painting Layouts		
D-704-26	Miscellaneous Sign Layouts		
D-704-27	Mobile Operation (Pavement Marking)		
D-704-50	Portable Sign Support Assembly		
D-704-51	Portable Precast Concrete Median Barrier (Temporary Usage)		
D-706-1	Bituminous Laboratory		
D-714-1	Reinforced Concrete Pipe Culverts And End Sections (Round Pipe)		
D-714-4	Round Corrugated Steel Pipe Culverts And End Sections		
D-714-16	Jacked and Bored Pipe		
D-714-22	Concrete Pipe, Cattle Pass, or Precast Concrete Box Culvert Ties		
D-714-27	Pipe Installation Detail for Longitudinal Mainline Pipe or Pipe Not Under the Roadway		
D-720-1	Standard Monuments And Right Of Way Markers		
D-722-5	Manhole Details		
D-748-1	Curb & Gutter And Valley Gutter		
D-750-2	Sidewalk		
D-750-3	Curb Ramp Retrofit Details		
D-750-4	Curb Ramp Retrofit Transitional Area Details		
D-752-3	Standard Woven Wire Fence		
D-754-21B	Reflectorized Delineators - Two-Lane Two-Way Highway		
D-754-21C	Type A Reflectorized Delineator Spacing - Two-Lane Two-Way Highway		
D-754-23	Perforated Tube Assembly Details		
D-754-24, 25	Mounting Details Perforated Tube		
D-754-24A	Breakaway Coupler System For Perforated Tubes		

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	4	1



- LEGEND
- Shared Use Path
 - Lighting
 - Pedestrian Box Culvert
 - Curb Ramp



Scope of Work
ND 200
Main St W - Hazen Golf Course

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NDS-NH-5-200(034)150	6	1

NOTES

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 circumstance, 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 Panel", 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.

107-P02 HEIGHT RESTRICTION FOR CONSTRUCTION EQUIPMENT: Between Sta 8048+22 and Sta 8059+73, construction equipment is restricted to a height of 40 feet or less due to the Airport restrictions. Equipment height will be measured from the centerline of the roadway and will include the extended height of the construction equipment.

202-P01 REMOVAL OF PAVEMENT: Removal of pavement includes removing bituminous pavement and aggregate base.

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.

203-P01 LEVEE FILL: On-site clay, free of organic material, is to be used as embankment for the levee construction. However, Atterberg limits and gradation testing of the soil will be conducted by the Engineer at the time of construction for verification of the geotechnical analysis. Place embankment in lifts not to exceed 8 inches of loose material. Compact material to at least 95 percent of the maximum dry density as determined according to ND T-99 with moisture content no less than 3.0 percentage points below the optimum moisture, and no more than 3.0 percentage points above the optimum moisture. The Engineer will collect material and conduct compaction testing at random sample locations at a rate of 1 test per 8" lift. Include all costs for placing, drying, and compacting the material in the unit price for "Common Excavation – Type A".

704-200 STATE FURNISHED MEDIAN BARRIER: Obtain (29) 22.5" x 12.5' concrete barriers. They can be picked up and returned to the Belfield yard at 801 1st Ave NE in Belfield ND 58622. Contact the Dickinson District office at 701-227-6500 to facilitate the exchanges.

If returning barriers with connection components, coordinate the delivery location for the connecting components with the Engineer. Some 4 inch x 4 inch boards are available at the return location. Provide any additional 4 inch x 4 inch boards necessary to stack barriers. The boards will become property of the Department.

Include all costs associated with median barriers in the contract unit price for "State Furnished Median Barrier".

704-P01 TRAFFIC CONTROL FOR BITUMINOUS PAVEMENT: Provide traffic control consisting of a temporary road closure, flagging, and shoulder closures.

- Standard D-704-15, layout A: To be used any time conditions exist.
- Standard D-704-15, layout B: For temporary bypass for box culvert installations.
- Standard D-704-20, layout G as the basis of the Terminal Signing
- Standard D-704-22, layouts K and L: For construction trucks hauling material.
- Standard D-704-24, layouts R and S: For shoulder work.
- Standard D-704-26, layouts BB, CC, EE, and GG: For paving operations.
- Standard D-704-26, layout JJ: For box culvert installation.

714-P01 FLAP GATE: Install a 24" Watermain F-10 Cast Iron Drainage Gate Flatback with Taper Setting Collar.



NOTES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NDS-NH-5-200(034)150	6	2

754-P01 STOP SIGNS - REFLECTIVE STRIPS: Install 2 inch wide red reflective strips on the side of the sign support that faces the same direction as the sign. Begin the strip at the bottom of the sign face and stop the strip 2 feet above the sign support base.

Use reflective material that meets the requirements of Section 894.02 E, "Type XI Retroreflective Sheeting".

Install the strips on STOP signs at the following locations: 8004+77 Lt

Include the cost of furnishing and installing retroreflective strips in the contract unit price for "Steel Galvanized Posts – Telescoping Perforated Tube".

754-P02 REMOVE SIGN FOUNDATION: Remove City of Hazen sign and foundation at 8004+47 Rt. Include the cost of removal and disposal of sign and foundation in contract unit price for "Remove Sign Foundation".

772-009 PADLOCKS: Obtain padlocks for feed points from the City of Hazen:
Dave Brousseau, City of Hazen Public Works Director
146 Main St E
Hazen, ND 58545
701-880-0473
hazennd_pw@westriv.com

772-P01 REMOVE FLASHING BEACON: Include the cost of disconnecting the electrical wires and removing the wood pole, flasher cabinet, feed point, and meter at 8006+00 Rt in the contract unit price for "Remove Flashing Beacon".

894-050 ALUMINUM HARDWARE FOR SIGNS: The chromate seal specified in Section 894.03 A.1, "General" for aluminum hardware is not required.

970-320 TRASH RECEPTACLE: Remove the existing trash receptacle located along the shared use path at 8004+08 – 57' Lt and reset it along the shared use path at 8004+43 – 49' Lt. All costs associated with removal and resetting of the existing trash receptacle will be included in the price bid for "Trash Receptacle".



NOTES

770-P01 FEED POINT-PEDESTRIAN LIGHTING: Provide a 120/240 Volt Feed Point cabinet for the pedestrian underpass tunnel. The feed point will provide two (2) circuits to the underpass tunnel: one operating 24 hours/day for some lights, the other turning on the remaining lights during daytime hours and off at night. Provide all controls and/or contactors required for a fully functioning underpass lighting system.

770-P02 ORNAMENTAL LIGHT STANDARD 13FT MT HT: 10' extruded aluminum 5" pole with 17" round base, total overall lighting unit height to be 13' from grade to top of luminaire, paint finish black. Duct seal all conduit stubs in concrete foundations. Provide poles from the list below or approved equal.

Decorative Pole	Catalog Number
Holophane Wadsworth	WDA 10 F5J 17D C03 BK ABG BABA RFD355000
Sternberg	Augusta 4210FP5-.188/BK
PEMCO	PLB112510F188T300NBK

770-P03 LED LUMINAIRE: Provide post-top luminaires that meet the following:

Light Source	LED
Light Output	5,000 lm to 5,400 lm
Wattage	50W to 60W
Color Temperature	4000K ± 300K
Operating Temperature Range	-40°C to +40°C
Luminaire Housing	Die Cast Aluminum
Vibration Testing	ANSI/NEMA C136.31 Level 2, 3G
Surge Suppression Rating	ANSI/IEEE C62.41 Cat C
Outdoor rating for housing, wiring, drivers	ANSI C136.25 IP-65
Tool-less access	Yes

Ensure Effective Projected Area of the luminaire does not exceed the capacity of the light standard.

The lighting system for the trail that will be using this LED luminaire was designed using these values:

Roadway Classification	Pedestrian and Bicycle Way
Average Maintained Illuminance	2.0 foot-candles
Illuminance Uniformity Ratio	3.0:1
Light Loss Factor	0.81

Provide LED luminaires from the list below, or approved equal, for ornamental light standards along the trail.

LED Luminaire	Catalog Number
AEL American Revolution	247L P153 ZT MVOLT 40K R2 AY BK PR7 SH SCC TL BAA
Cooper Lighting	BABA-UTLD-PA1-50W-740-U-T2U-BK
PEMCO	HER1WA50W4KU2YNPCR7BK

Include all costs associated with the LED lighting system in the contract unit price for "Lighting System A".

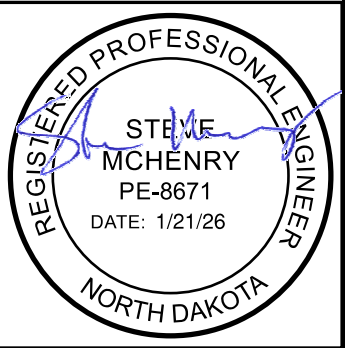
770-P04 UNDERPASS LIGHT UNIT CEILING MTD – 50 WATT: Provide LED luminaires for the pedestrian underpass below and according to the plans. Use the luminaires listed below or approved equal.

LED Luminaire	Catalog Number
Holophane Wall Pack	W4PLED_10C700_40K_T3M
Cooper Lighting	WPSLED15S
Hubbell Killark	KWPL434

The lighting system was designed using these values:

ANSI/IES RP-8-18 Guidelines	Pedestrian Underpass
Average Maintained Illuminance – Daytime	9.3 foot-candles, EV min 4.6
Average Maintained Illuminance – Nighttime	3.4 foot-candles, EV, min 1.9
Illuminance Uniformity Ratio	3.0:1
Light Loss Factor	0.81

Include all costs associated with the LED lighting system in the contract unit price for "Lighting System A".



ENVIRONMENTAL NOTES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NDS-NH-5-200(034)150	6	4

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>).

Permits Required:

Conditional Letter of Map Revision (CLOMR) –Federal Emergency Management Agency (FEMA)
Letter of Map Revision (LOMR) - Federal Emergency Management Agency (FEMA)
Construction Permit - ND Department of Water Resources
Discharge Storm Water Permit – ND Department of Health
Floodplain Permit – ND State Water Commission

Preliminary Plans



Estimated Quantities

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	8	1

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY	TOTAL
103	0100	CONTRACT BOND	L SUM	1	1
201	0330	CLEARING & GRUBBING	L SUM	1	1
202	0114	REMOVAL OF CONCRETE PAVEMENT	SY	129	129
202	0130	REMOVAL OF CURB & GUTTER	LF	14	14
202	0132	REMOVAL OF BITUMINOUS SURFACING	SY	188	188
202	0136	REMOVAL OF PAVEMENT	TON	1092	1092
202	0169	REMOVAL OF END SECTION-ALL TYPES & SIZES	EA	1	1
202	0312	REMOVE EXISTING FENCE	LF	438	438
203	0101	COMMON EXCAVATION-TYPE A	CY	2597	2597
203	0109	TOPSOIL	CY	1531	1531
210	0050	BOX CULVERT EXCAVATION	EA	1	1
210	0210	FOUNDATION FILL	CY	1925	1925
210	0250	BOX CULVERT FOUNDATION AGGREGATE	CY	140	140
210	0405	FOUNDATION PREPARATION-BOX CULVERT	EA	1	1
216	0100	WATER	M GAL	98	98
251	0200	SEEDING CLASS II	ACRE	2.13	2.13
251	2000	TEMPORARY COVER CROP	ACRE	2.13	2.13
253	0201	HYDRAULIC MULCH	ACRE	4.26	4.26
255	0102	ECB TYPE 2	SY	60	60
261	0112	FIBER ROLLS 12IN	LF	3556	3556
261	0113	REMOVE FIBER ROLLS 12IN	LF	1851	1851
261	0120	FIBER ROLLS 20IN	LF	70	70
261	0121	REMOVE FIBER ROLLS 20IN	LF	30	30
302	0120	AGGREGATE BASE COURSE CL 5	TON	1509	1509
430	0043	SUPERPAVE FAA 43	TON	525	525
430	1000	CORED SAMPLE	EA	11	11
602	1131	CLASS AE-3 CONCRETE-BOX CULVERT	CY	146	146
612	0114	REINFORCING STEEL-GRADE 60-BOX CULVERT	LBS	30711	30711
624	0124	PEDESTRIAN FENCE	LF	53	53
702	0100	MOBILIZATION	L SUM	1	1
704	0100	FLAGGING	MHR	700	700
704	1000	TRAFFIC CONTROL SIGNS	UNIT	2958	2958
704	1039	ATTENUATION DEVICE-TYPE B-45	EA	1	1
704	1052	TYPE III BARRICADE	EA	10	10
704	1054	SIDEWALK BARRICADE	EA	6	6
704	1058	PEDESTRIAN WALKWAY	LF	195	195
704	1060	DELINEATOR DRUMS	EA	64	64
704	1067	TUBULAR MARKERS	EA	92	92
704	1080	STACKABLE VERTICAL PANELS	EA	71	71
704	1500	OBLITERATION OF PAVEMENT MARKING	SF	1740	1740
704	2108	TEMPORARY CURB RAMP	EA	1	1
704	3511	STATE FURNISHED MEDIAN BARRIER	LF	360	360
706	0500	AGGREGATE LABORATORY	EA	1	1
706	0550	BITUMINOUS LABORATORY	EA	1	1
706	0600	CONTRACTOR'S LABORATORY	EA	1	1
709	0100	GEOSYNTHETIC MATERIAL TYPE G	SY	210	210
714	4106	PIPE CONDUIT 24IN-APPROACH	LF	112	112

Estimated Quantities

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	8	2

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY	TOTAL
714	4125	PIPE CONDUIT 48IN	LF	28	28
714	4165	PIPE CONDUIT 24IN-JACKED OR BORED	LF	82	82
714	5055	PIPE CORR STEEL .064IN 48IN	LF	4	4
714	9912	FLAP GATE 24IN	EA	1	1
720	0110	RIGHT OF WAY MARKERS	EA	6	6
720	0130	IRON PIN R/W MONUMENTS	EA	6	6
722	0200	MANHOLE 108IN	EA	1	1
722	1200	MANHOLE RISER 108IN	LF	7.72	7.72
748	0140	CURB & GUTTER-TYPE I	LF	14	14
750	0115	SIDEWALK CONCRETE 4IN	SY	1319	1319
750	0150	SIDEWALK TRENCH DRAIN	EA	1	1
750	2115	DETECTABLE WARNING PANELS	SF	36	36
752	0700	FENCE WOVEN WIRE	LF	599	599
752	0993	FENCE TERMINAL	EA	4	4
752	2995	CORNER ASSEMBLY-WOOD POST	EA	1	1
752	3120	CORNER ASSEMBLY WOVEN WIRE	EA	1	1
754	0110	FLAT SHEET FOR SIGNS-TYPE XI REFL SHEETING	SF	17	17
754	0112	FLAT SHEET FOR SIGNS-TYPE IV REFL SHEETING	SF	3	3
754	0155	DELINEATORS-TYPE A-DOUBLE SIDED	EA	2	2
754	0206	STEEL GALV POSTS-TELESCOPING PERFORATED TUBE	LF	53	53
754	0592	RESET SIGN PANEL	EA	2	2
754	1104	REMOVE SIGN FOUNDATION	EA	1	1
762	0111	EPOXY PVMT MK 12IN LINE	LF	869	869
762	0112	EPOXY PVMT MK MESSAGE	SF	128	128
762	0114	EPOXY PVMT MK 6IN LINE	LF	7250	7250
762	0117	EPOXY PVMT MK 24IN LINE	LF	60	60
770	0003	LIGHTING SYSTEM A	EA	1	1
770	4540	RELOCATE LIGHT STANDARD	EA	1	1
772	3150	REMOVE FLASHING BEACON SYSTEM	EA	1	1
930	8230	SHORING	EA	2	2
970	0320	TRASH RECEPTACLE	EA	1	1

BASIS OF ESTIMATE

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NDS-NH-5-200(034)150	10	1

Water
25 MGal/Mile for Dust Palliative
20 Gal/Ton for Aggregates
10 Gal/CY for Embankment

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

Pavement
Aggregate Base Course CL 5 @1.875 Ton/CY
Tack Coat @ 0.05 Gal/SY - incidental
Superpave FAA 43 @ 2 Ton/CY
PG 58S-28 Asphalt Cement @ 6% - incidental

HMA Cored Samples							
	A	B		C			
Specification Section	Distance (Ft)÷1000	Lanes	Joints	Lifts	Quantity (A x B x C)	Quantity (1 per mile)	Unit
430.04 I.2.b(1), "General"	194 / 1000=1	4	N/A	2	8	N/A	EA
SSP 4 Longitudinal Joint Density in HMA Pavements (Centerline)	194 / 1000=1	N/A	1	2	2	N/A	EA
430.04 I.2.b(2),"Pavement Thickness Determination Cores"					N/A	1	EA
Total					10	1	EA

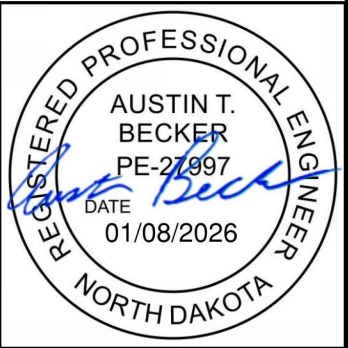


Earthwork Summary

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NDS-NH-5-200(034)150	11	1

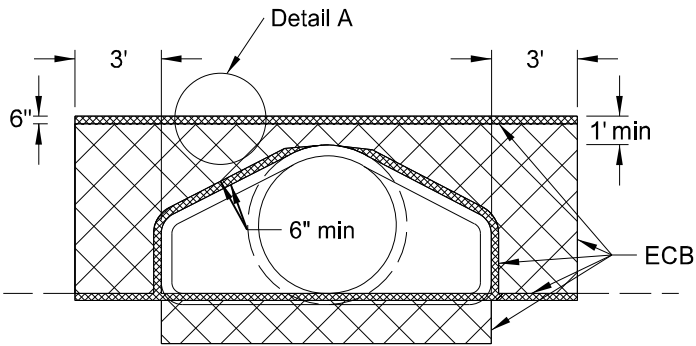
Location	Excavation Volume	Embankment Volume	Compacted Volume	Common Excavation – Type A (Pay Item)	Borrow Excavation (2)	Topsoil (Pay Item)
	(CY)	(CY)	(CY)	(CY)	(CY)	(CY)
	A	B	C = B * 1.25	D = A	E = C – A	
Frontage Road	100	1	2	100	-98	195
ND 200 Pedestrian Box Culvert & Levee	2,497	3,299	4,124	2,497	1,627	1336
Box Culvert Excavation (1)	1,985	-	-	Note (1)	-1,985	
			Total	2,597	-456 (3)	1531

- (1) Box Culvert Excavation quantities for informational purposes only. Excavated material to be utilized on site to construct levee and shared used path embankment. Excavation required for box culvert installation per detail shown on Section 170 sheet 3 to be paid under Bid Item 210-0050 Box Culvert Excavation.
- (2) Borrow excavation needed to construct levee and shared use path embankment to be generated from the excavation for the box culvert.
- (3) A net of 456 CY of excess material is expected. Any excess material not utilized to be removed and all costs included under Bid Item 210-0050 Box Culvert Excavation.

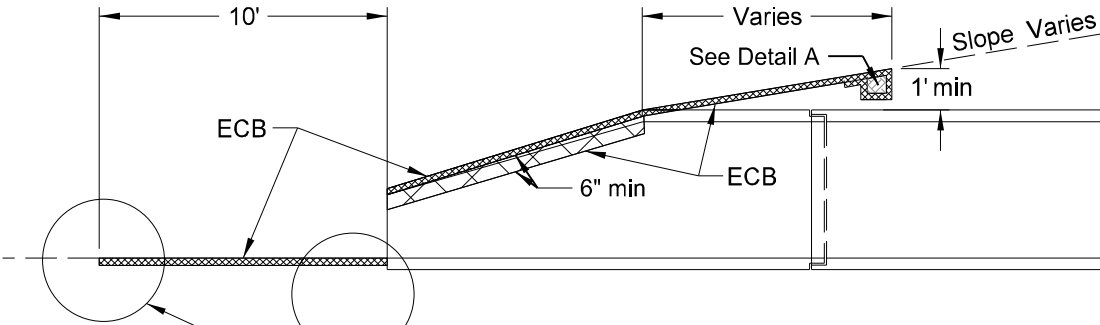


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	20	1

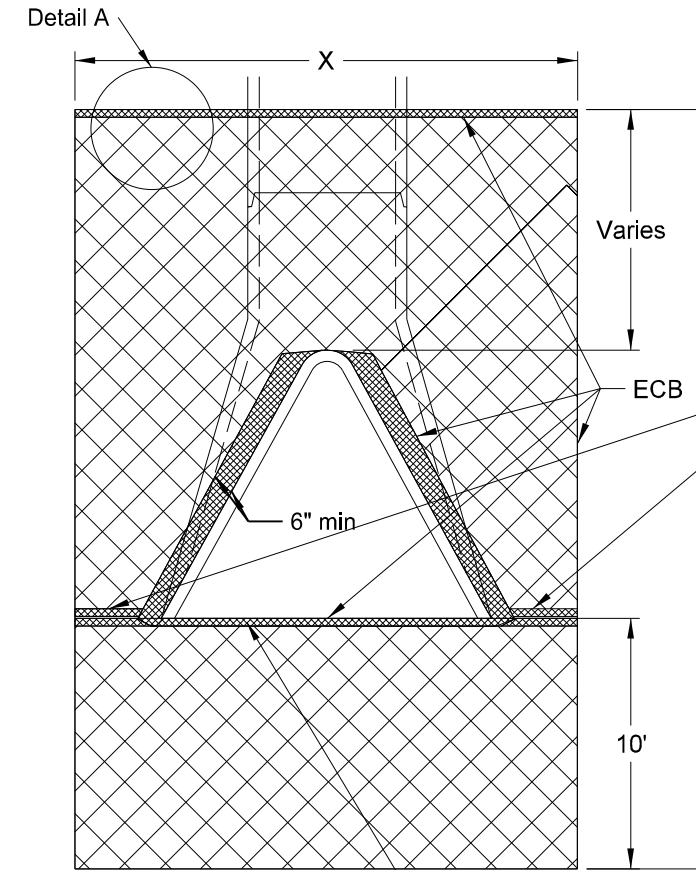
Location to be Protected	Culvert Type Appr/CL	Pipe Diam. (inch)	No.	Unit Quantity (SY)	Total Quantity
Station					ECB Type 2 (SY)
8004+11 Lt	Appr	24	1	20	20
8005+02 Rt	Appr	48	1	27	27
Total =					47



FRONT VIEW



SIDE VIEW

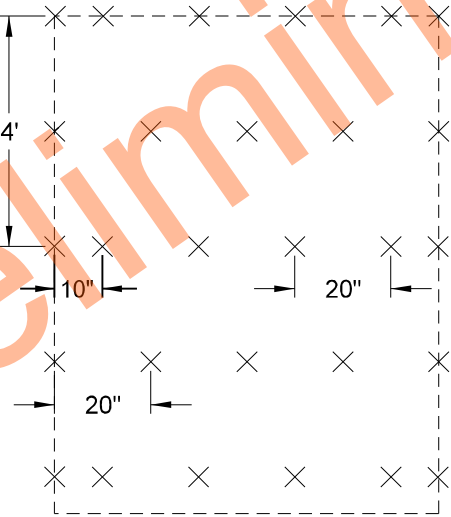


TOP VIEW

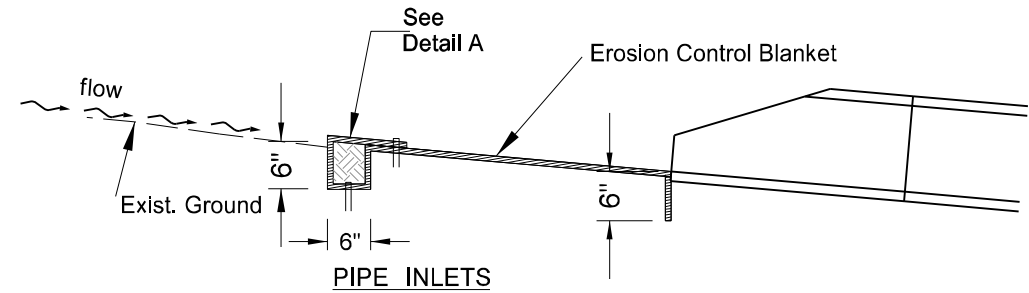
Inlet side - see applicable detail for pipe inlet.
Outlet side - see applicable detail for pipe outlet.

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

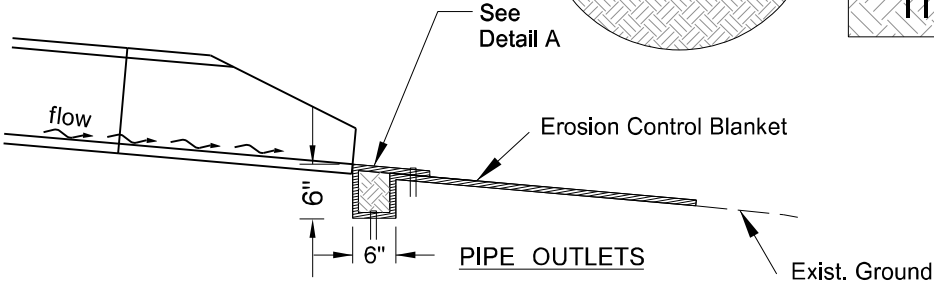
Tuck this end a minimum of 6" into the embankment.



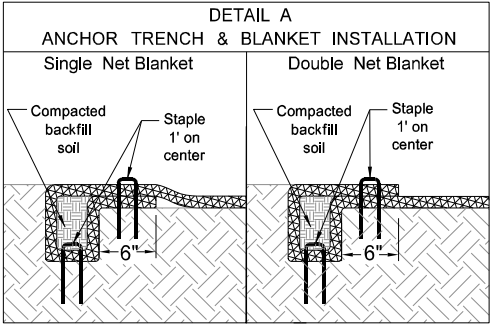
STAPLE PATTERN



PIPE INLETS



PIPE OUTLETS

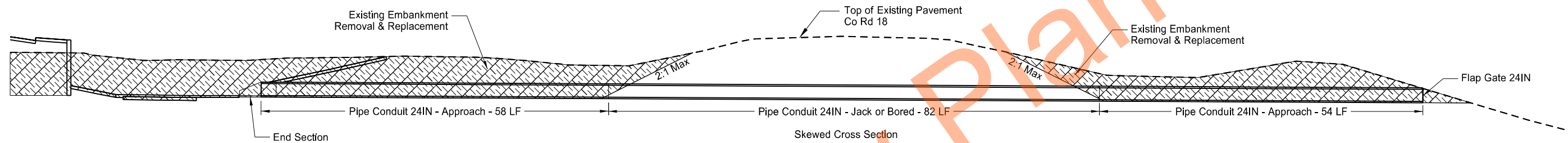


Details

ND 200
Main St W-Hazen Golf Course

Erosion Control at Culvert Flared End Sections

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	20	2



Note: See Standard Drawing D-714-16



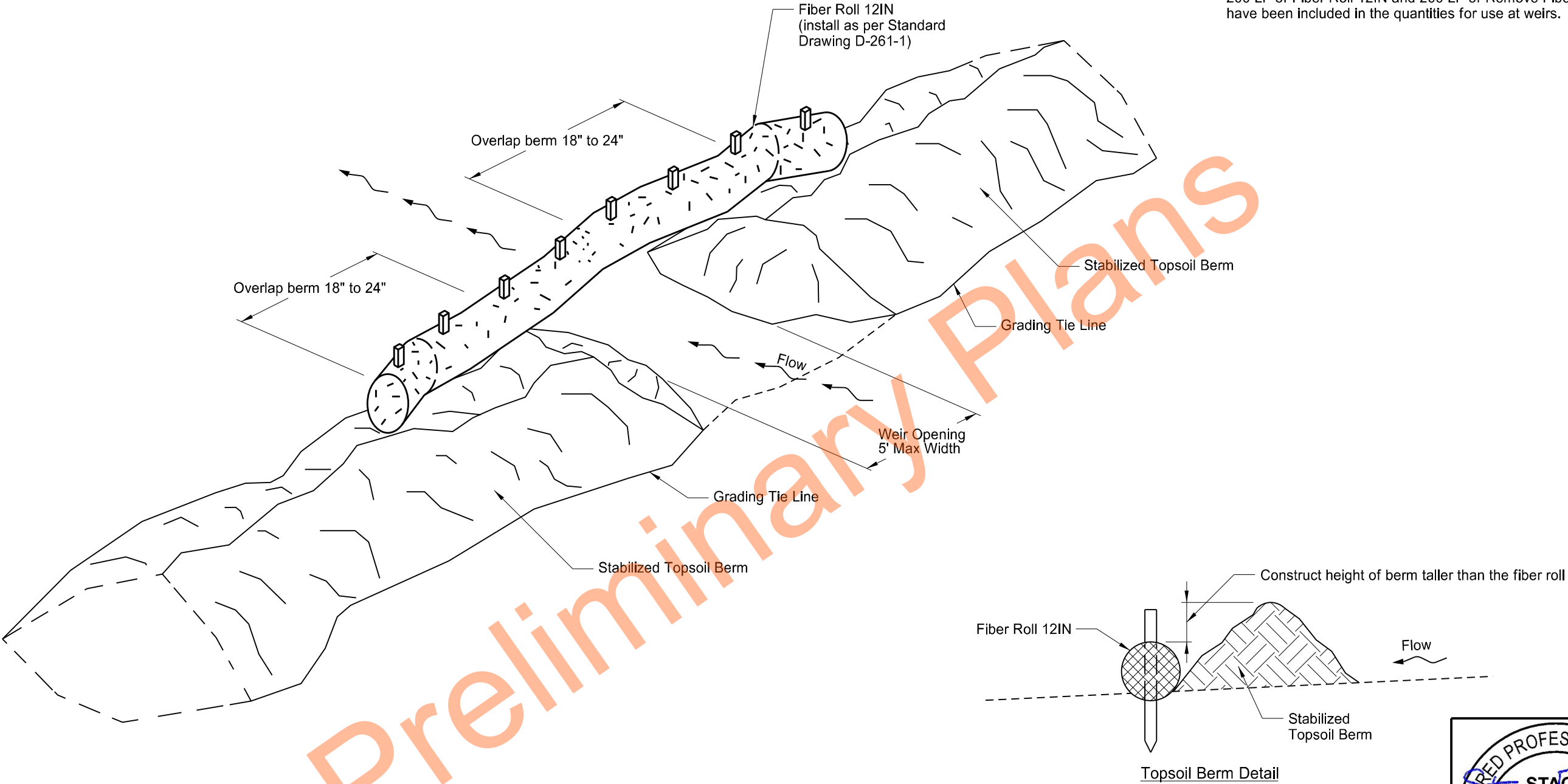
Details

ND 200
Main St W - Hazen Golf Course

Jack or Bored Pipe
Co Rd 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	20	3

200 LF of Fiber Roll 12IN and 200 LF of Remove Fiber Roll 12IN have been included in the quantities for use at weirs.



- Notes:
1. Windrow the existing topsoil from the foreslope to create a berm at the grading tie line.
 2. Stabilize berms in accordance with the Construction General Permit.
 3. Place weirs intermittently throughout the length of the berm to allow stormwater to drain through the berm.
 4. Avoid placing weirs adjacent to waterbodies.
 5. Install fiber rolls as the weirs are created in the topsoil berm.
 6. The Engineer will measure and pay for fiber rolls separately.
 7. The Engineer will measure and pay for removal of fiber rolls separately when required by the specifications.
 8. The Engineer will measure and pay for hydraulic mulch and temporary cover crop separately.
 9. Include the costs to create, maintain, and dismantle the berm in the unit price bid for "Topsoil".



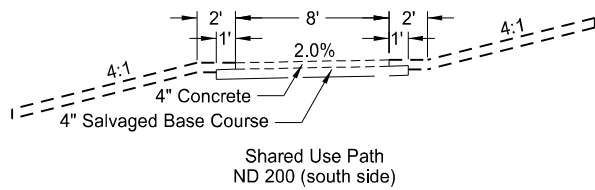
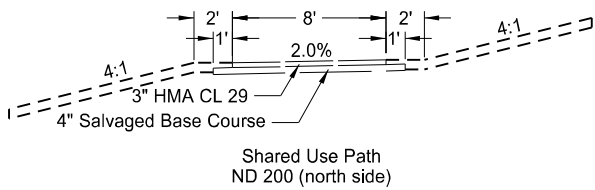
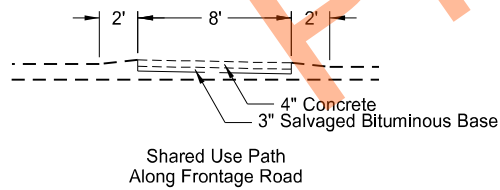
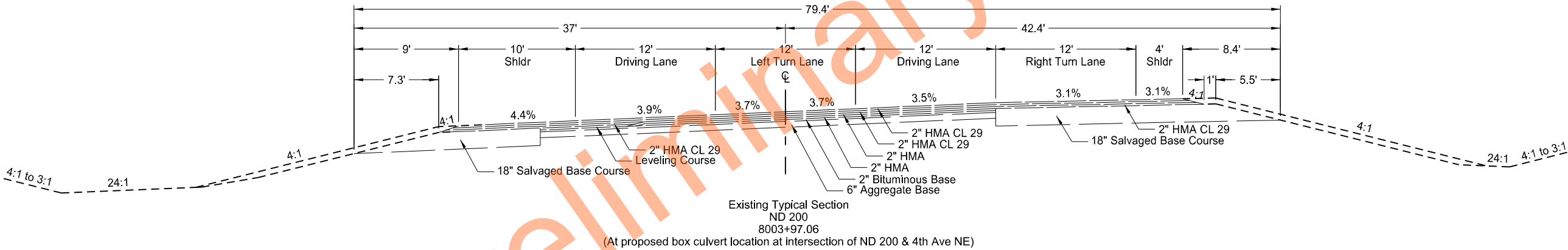
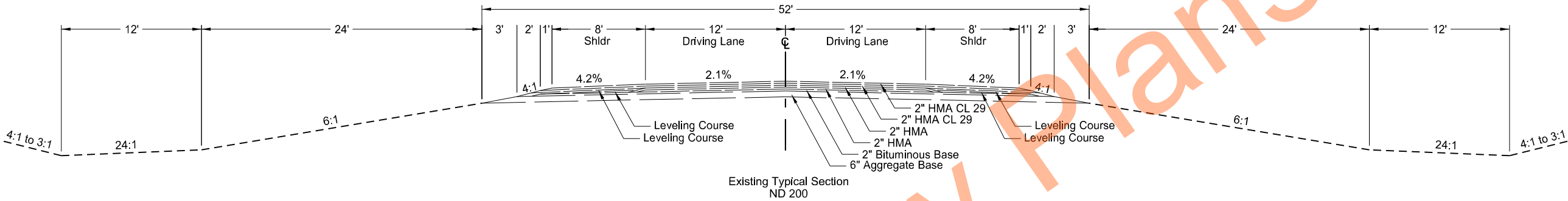
Details

ND 200

Main St W - Hazen Golf Course

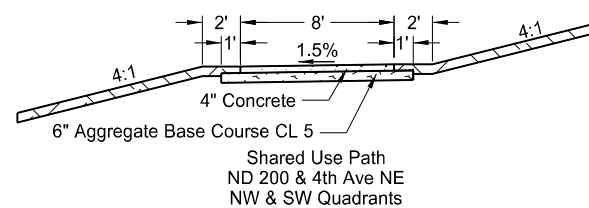
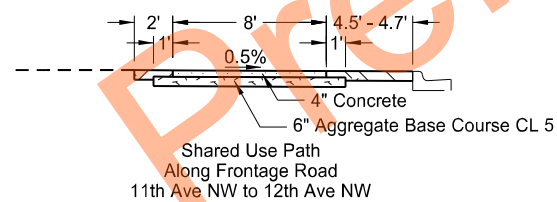
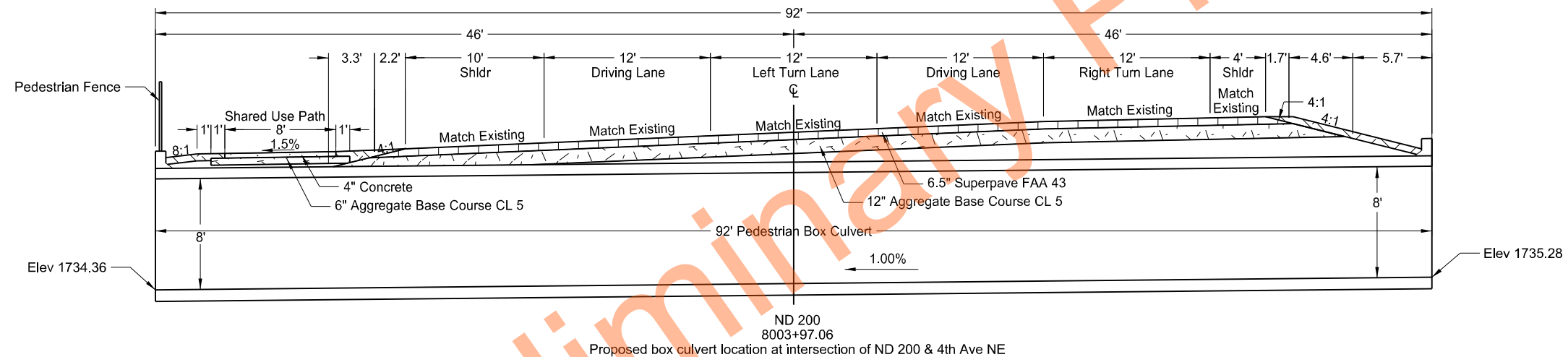
Temporary Topsoil Berm and Weir Detail

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NDS-NH-5-200(034)150	30	1

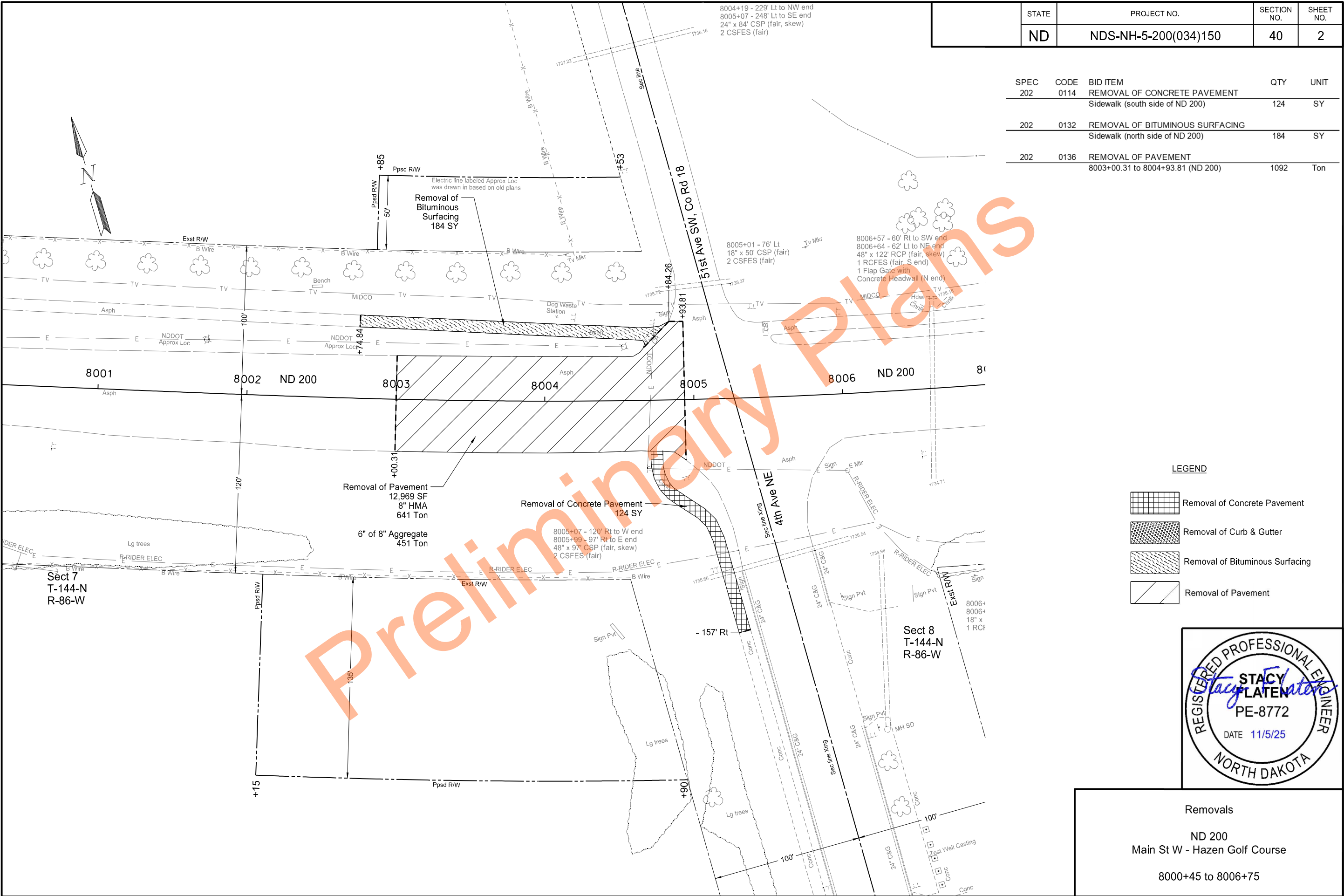


Existing Typical Section
ND 200
Main St W - Hazen Golf Course

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	30	2



Proposed Typical Section
ND 200
Main St W - Hazen Golf Course



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NDS-NH-5-200(034)150	40	2

SPEC	CODE	BID ITEM	QTY	UNIT
202	0114	REMOVAL OF CONCRETE PAVEMENT Sidewalk (south side of ND 200)	124	SY
202	0132	REMOVAL OF BITUMINOUS SURFACING Sidewalk (north side of ND 200)	184	SY
202	0136	REMOVAL OF PAVEMENT 8003+00.31 to 8004+93.81 (ND 200)	1092	Ton

LEGEND

- Removal of Concrete Pavement
- Removal of Curb & Gutter
- Removal of Bituminous Surfacing
- Removal of Pavement

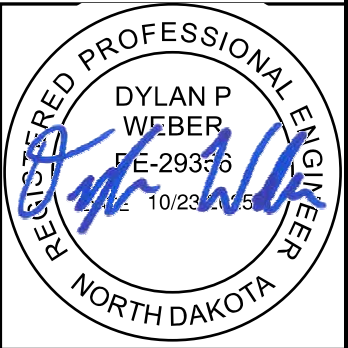
REGISTERED PROFESSIONAL ENGINEER
STACY FLATEN
PE-8772
DATE 11/5/25
NORTH DAKOTA

Removals
ND 200
Main St W - Hazen Golf Course
8000+45 to 8006+75

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NDS-NH-5-200(034)150	50	1

HYDRAULIC DATA FOR Project NDS-NH-5-200(034)150									
STATION	EXISTING PIPE	PROPOSED PIPE SIZE	DRAINAGE AREA (ACRES)	25-YEAR DATA				100-YEAR DATA	
				DESIGN DISCHARGE (CFS)	DESIGN HEADWATER (FT)	DESIGN VELOCITY (FPS)	DESIGN STAGE (NAVD 88)	100-YEAR DISCHARGE (CFS)	100-YEAR STAGE (NAVD 88)
8005+00 Lt	-	24" RCP	4.1	11.7	1.75	3.43	1735.83	17.9	1736.52

Preliminary Plans



Culvert Hydraulic Data

ND 200
Main St W – Hazen Golf Course

MANHOLE SUMMARY

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NDS-NH-5-200(034)150	50	2

Manhole No. 1 – 108 In.
Sta 8004+99.50 – 122’ Rt
Top Elev. 1745.00
Base Elev. 1735.28
Invert Elev. 1735.66
Riser 7.72 ft

48 In CSP E 1735.66
48 In Conduit S 1735.73

Preliminary Plans



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)	(*) End Sections		Applicable Backfill
												Begin	End	
				In	Bid Item	LF	In	Type		In	SY	EA	EA	
8004+11.14	70' Lt	8004+59.96	103' Lt	24	Pipe Conduit - Approach	58	Reinforced Concrete Pipe - Class III (barrel length = 56 LF)	24				FES		Specification 714.04 A
							Corrugated Steel Pipe	24	Z, A, P	2				
8004+59.96	103' Lt	8005+30.45	148' Lt	24	Jack or Bored Pipe Conduit	82	Reinforced Concrete Pipe - Class III (barrel length = 82 LF)	24						Section 20 Sheet 2
							Smooth Walled Steel	24		0.312				
8005+30.45	148' Lt	8005+77.82	178' Lt	24	Pipe Conduit - Approach	54	Reinforced Concrete Pipe - Class III (barrel length = 54 LF)	24					Flap Gate	Specification 714.04 A
							Corrugated Steel Pipe	24	Z, A, P	2				
8004+99.88	126' Rt	8005+02.20	154' Rt	48	Pipe Conduit	28	Reinforced Concrete Pipe - Class III (barrel length = 24 LF)	48					FES	Standard D-714-27
							Corrugated Steel Pipe	48	Z, A, P	2, 3, 5				
							Spiral Rib Steel Pipe	48	Z, A, P	3/4, 1				
8005+03.72	121' Rt	8005+07.47	120' Rt	48	Pipe Corr. Steel (Extension)	4	Corrugated Steel Pipe	48	Z, A, P	2	0.064			Specification 714.04 A

Corrugations: 2 = 2-2/3"x1/2"
3 = 3"x1"
5 = 5"x1"

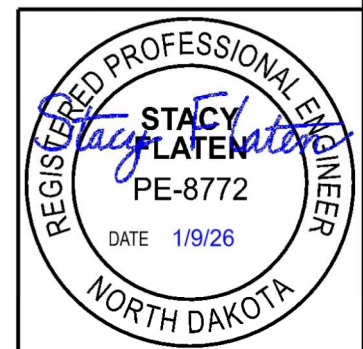
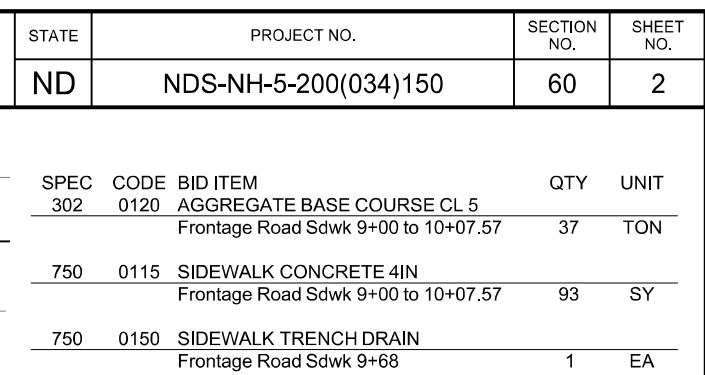
Coatings: Z = Zinc
A = Aluminum
P = Polymeric (over Zinc or Aluminum)

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 200
Main St W – Hazen Golf Course



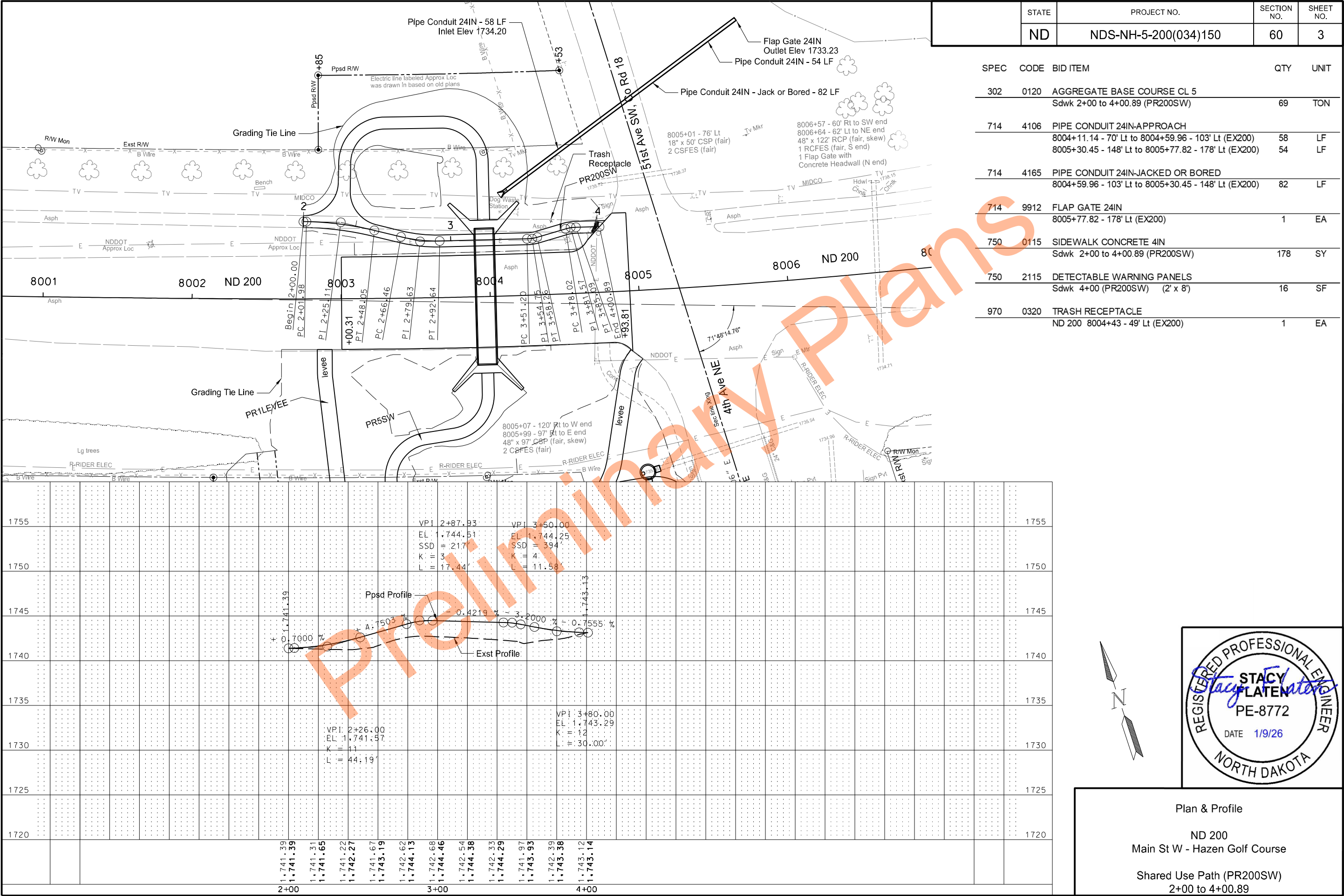
Plan & Profile

ND 200

Main St W - Hazen Golf Course

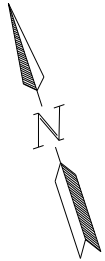
Frontage Road Shared Use Path

9+00 to 10+07.57



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NDS-NH-5-200(034)150	60	3

SPEC	CODE	BID ITEM	QTY	UNIT
302	0120	AGGREGATE BASE COURSE CL 5 Sdwb 2+00 to 4+00.89 (PR200SW)	69	TON
714	4106	PIPE CONDUIT 24IN-APPROACH 8004+11.14 - 70' Lt to 8004+59.96 - 103' Lt (EX200)	58	LF
		8005+30.45 - 148' Lt to 8005+77.82 - 178' Lt (EX200)	54	LF
714	4165	PIPE CONDUIT 24IN-JACKED OR BORED 8004+59.96 - 103' Lt to 8005+30.45 - 148' Lt (EX200)	82	LF
714	9912	FLAP GATE 24IN 8005+77.82 - 178' Lt (EX200)	1	EA
750	0115	SIDEWALK CONCRETE 4IN Sdwb 2+00 to 4+00.89 (PR200SW)	178	SY
750	2115	DETECTABLE WARNING PANELS Sdwb 4+00 (PR200SW) (2' x 8')	16	SF
970	0320	TRASH RECEPTACLE ND 200 8004+43 - 49' Lt (EX200)	1	EA



Wetland Impact Table																				
Wetland Number	Location	Wetland Feature	USACE Jurisdictional Wetlands ¹	Wetland Impacts Acre(s)		USFWS Easement Impacts Acre(s)		Wetland Mitigation												
								Mitigation Required			USACE/11990 Bank		11990 Bank		USFWS Bank		Onsite			
				Temp.	Perm.	Temp.	Perm.	EO 11990	USACE	USFWS	Location	Acre(s)	Location	Acre(s)	Location	Acre(s)	Location	Acre(s)	Mitigation Location; Ratio	Acre(s)
1	Sec.13, T144N, R87W	Created	No	0	0	0	0	N	N	N										
2	Sec. 13, T144N, R87W	Created	No	0	0	0	0	N	N	N										
3	Sec.8, T144N, R86W	Created	Yes	0	0	0	0	N	N	N										
				0	0	0	0					0		0		0		0		0

Other Waters Impact Table															
Other Waters								Other Water Mitigation							
Number	Location	Type	Size		Feature	USACE Jurisdictional ¹	Impacts to Other Waters				Mitigation Required			Mitigation Location; ratio	Method
			Acre(s)	Linear Feet			Acre(s)		Linear Feet		EO 11990	USACE	USFWS		
OW 1a	Sec.18 & 7, T144N, R86W	Stream	0.03	38	Natural	Yes	0	0	0	0	N	N	N	NA	NA
OW 1b	Sec. 7, T144N, R86W	Stream	0.01	19	Natural	Yes	0	0	0	0	N	N	N	NA	NA
Totals			0.04	57			0	0	0	0					

Other Water - Drainages Impact Table															
Other Waters								Other Water Mitigation							
Number	Location	Type	Size		Feature	USACE Jurisdictional ¹	Impacts to Other Waters				Mitigation Required			Mitigation Location; ratio	Method
			Acre(s)	Linear Feet			Acre(s)		Linear Feet		EO 11990	USACE	USFWS		
OW 2-D	Sec.8, T144N, R86W	Constructed discharge channel with rill	0.02	71	Natural	Yes	0	0	0	0	N	N	N	NA	NA
Totals			0.02	71			0	0	0	0					

¹ A wetland Jurisdictional Determination was issued by the USACE on 12/2/2021; NWO-2007-03831-BIS.



Wetlands Mitigation and Environmental

ND 200

Main St W – Hazen Golf Course

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		

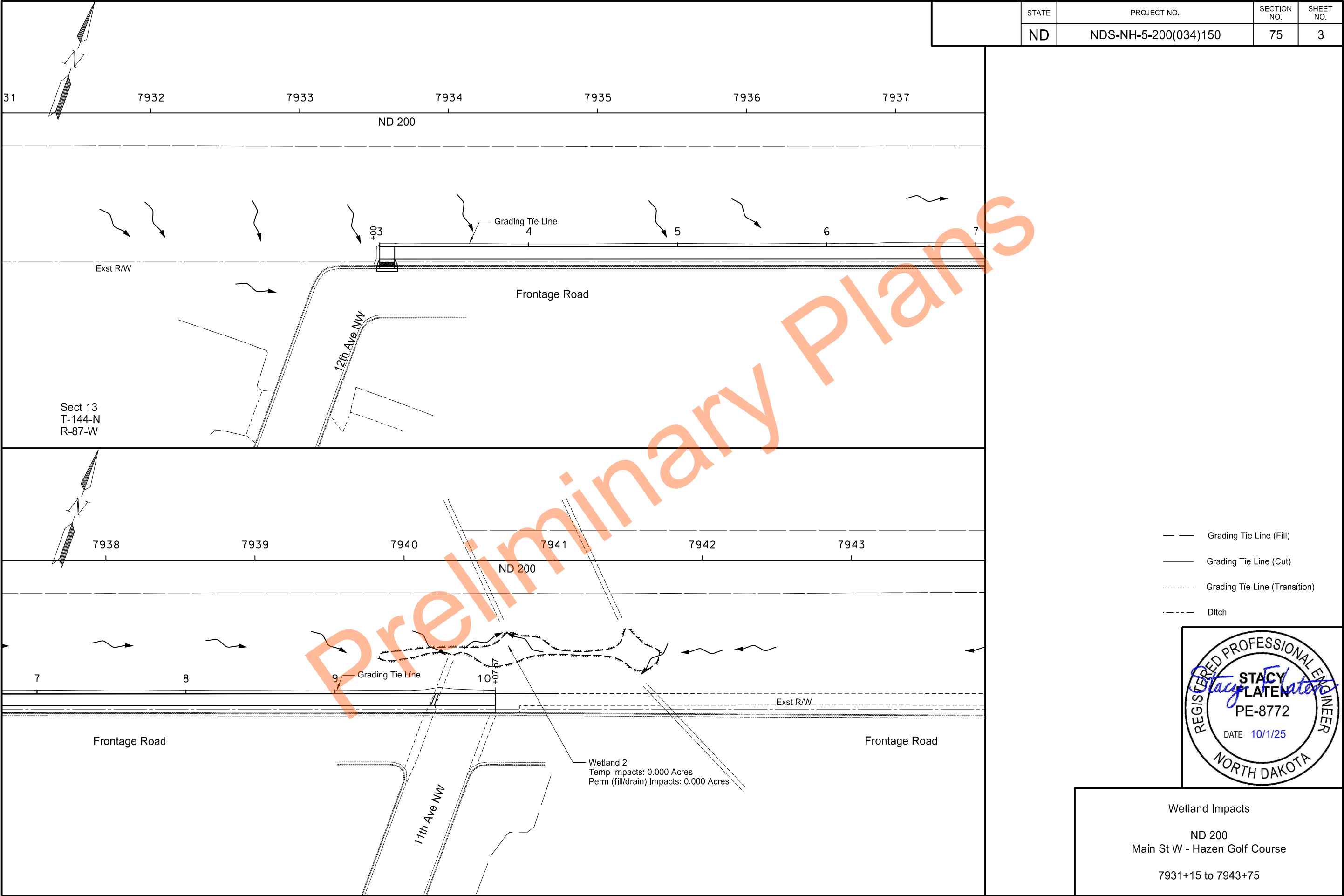
Mitigation Summary Table						
	Location	Ditch Shift Acre(s)	Onsite Acre(s)	11990 Bank Acre(s)	USACE/11990 Bank Acre(s)	USFWS Bank Acre(s)
USACE Only						
EO 11990 Only						
USACE/11990						
USFWS						
Total		0	0	0	0	0

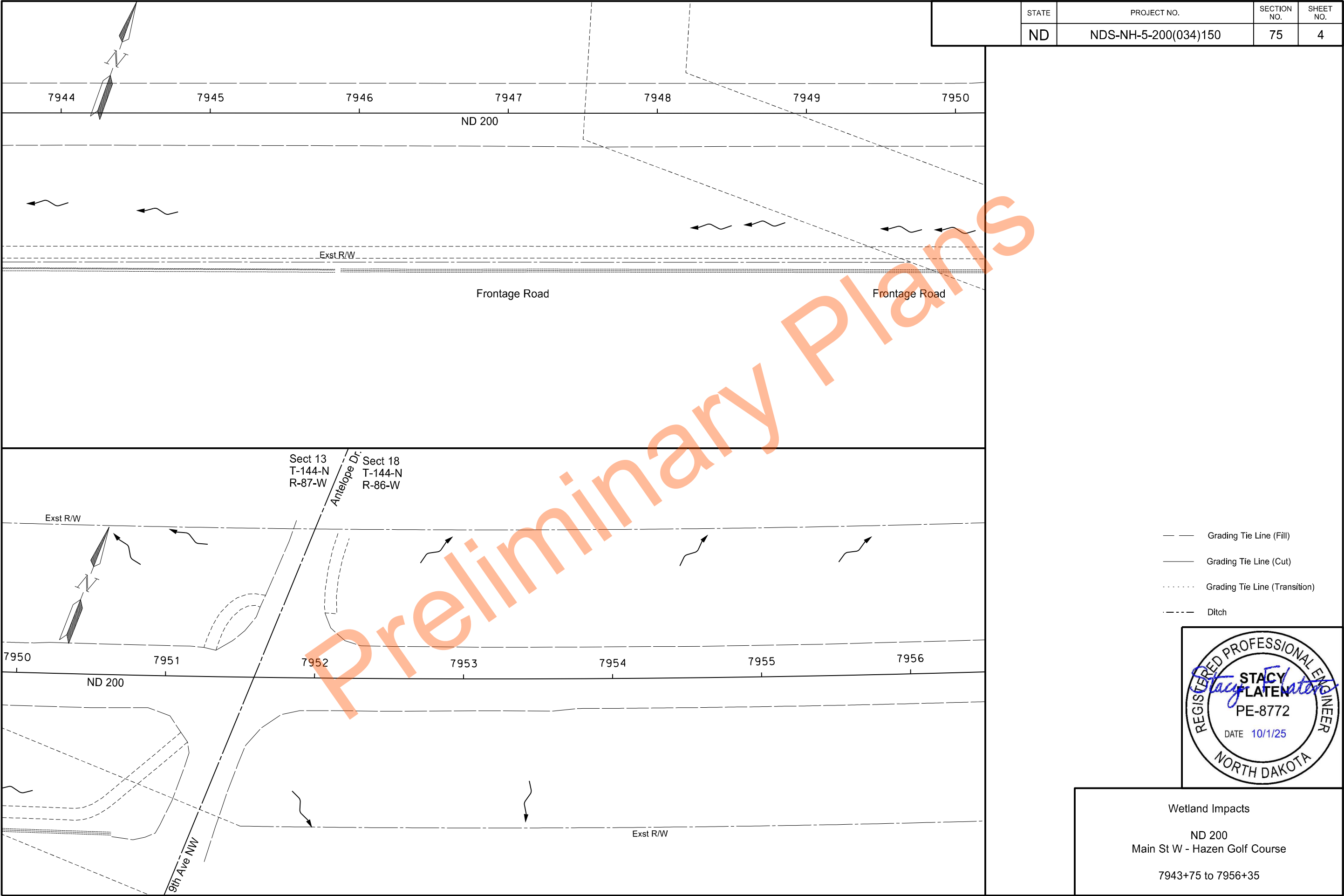


Wetlands Mitigation and Environmental

ND 200

Main St W – Hazen Golf Course





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NDS-NH-5-200(034)150	75	4

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Ditch

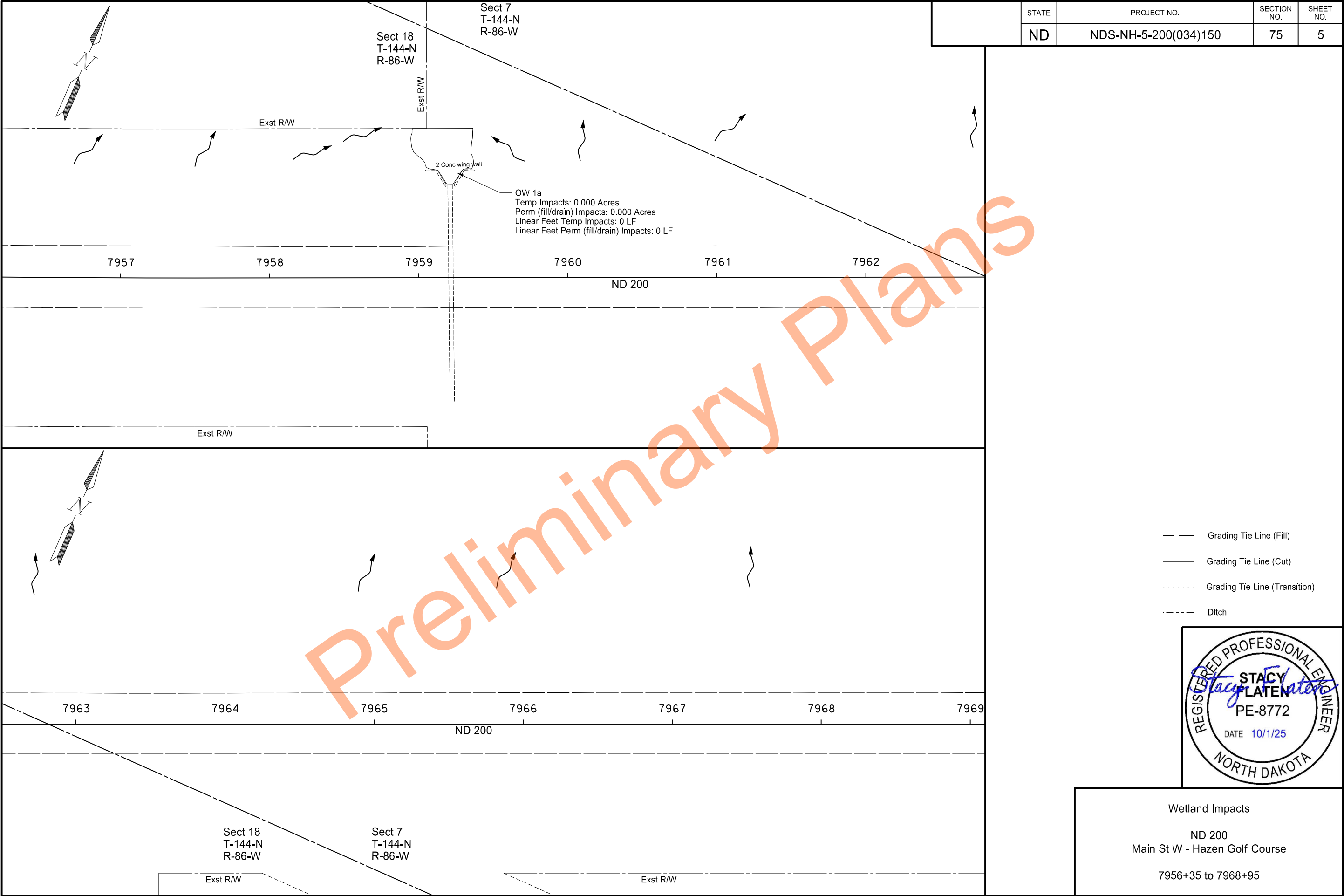


Wetland Impacts

ND 200

Main St W - Hazen Golf Course

7943+75 to 7956+35



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NDS-NH-5-200(034)150	75	5

- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Ditch

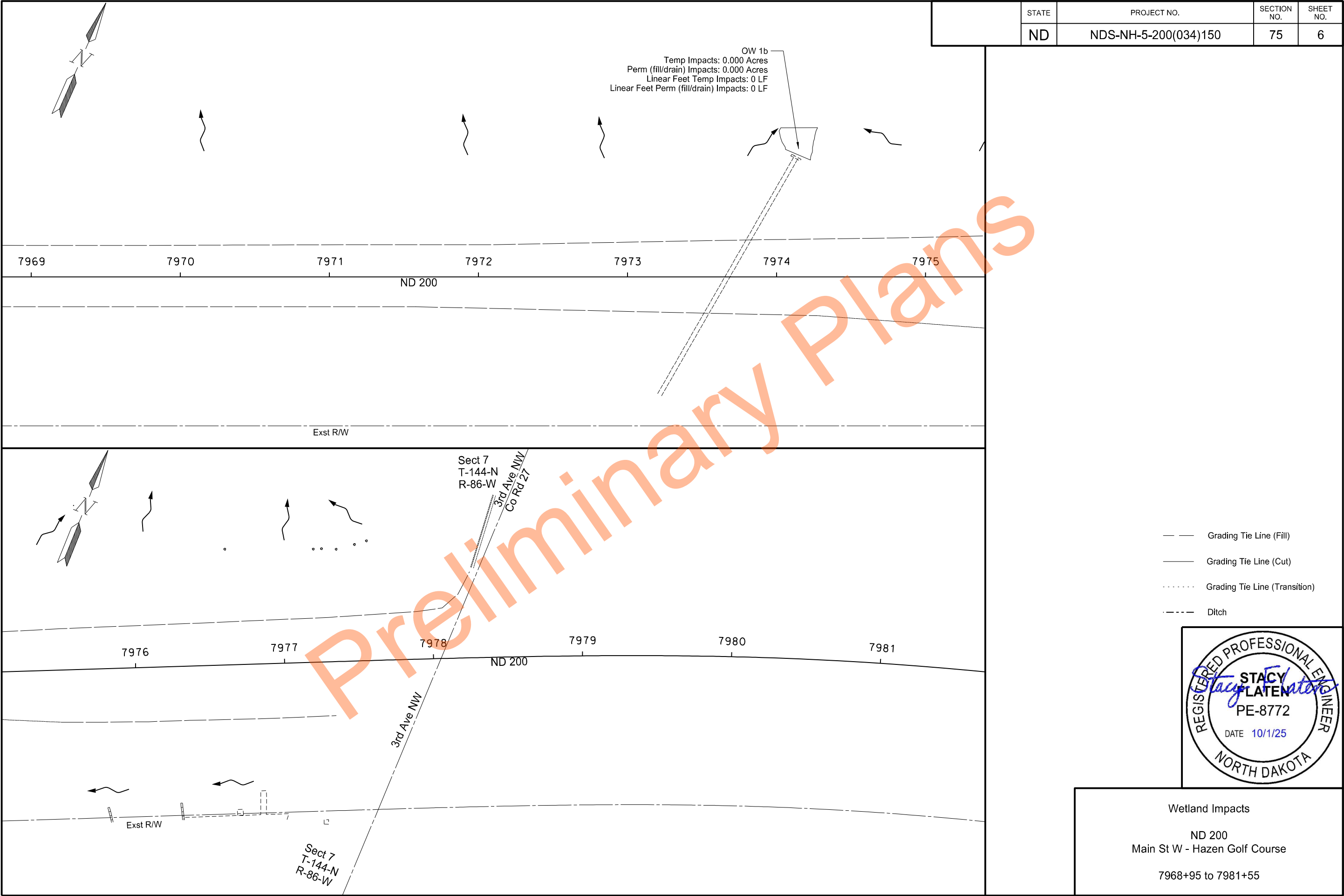


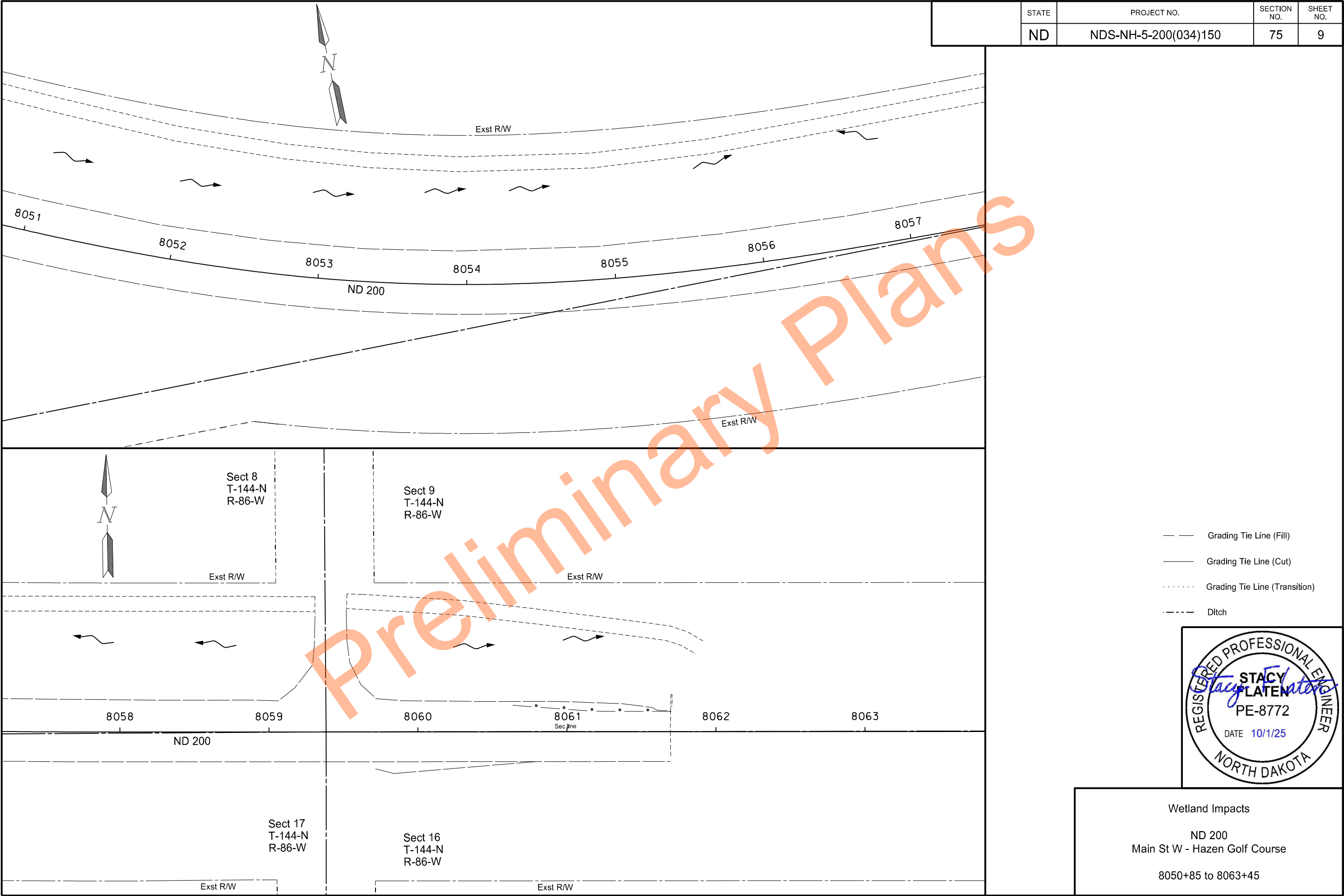
Wetland Impacts

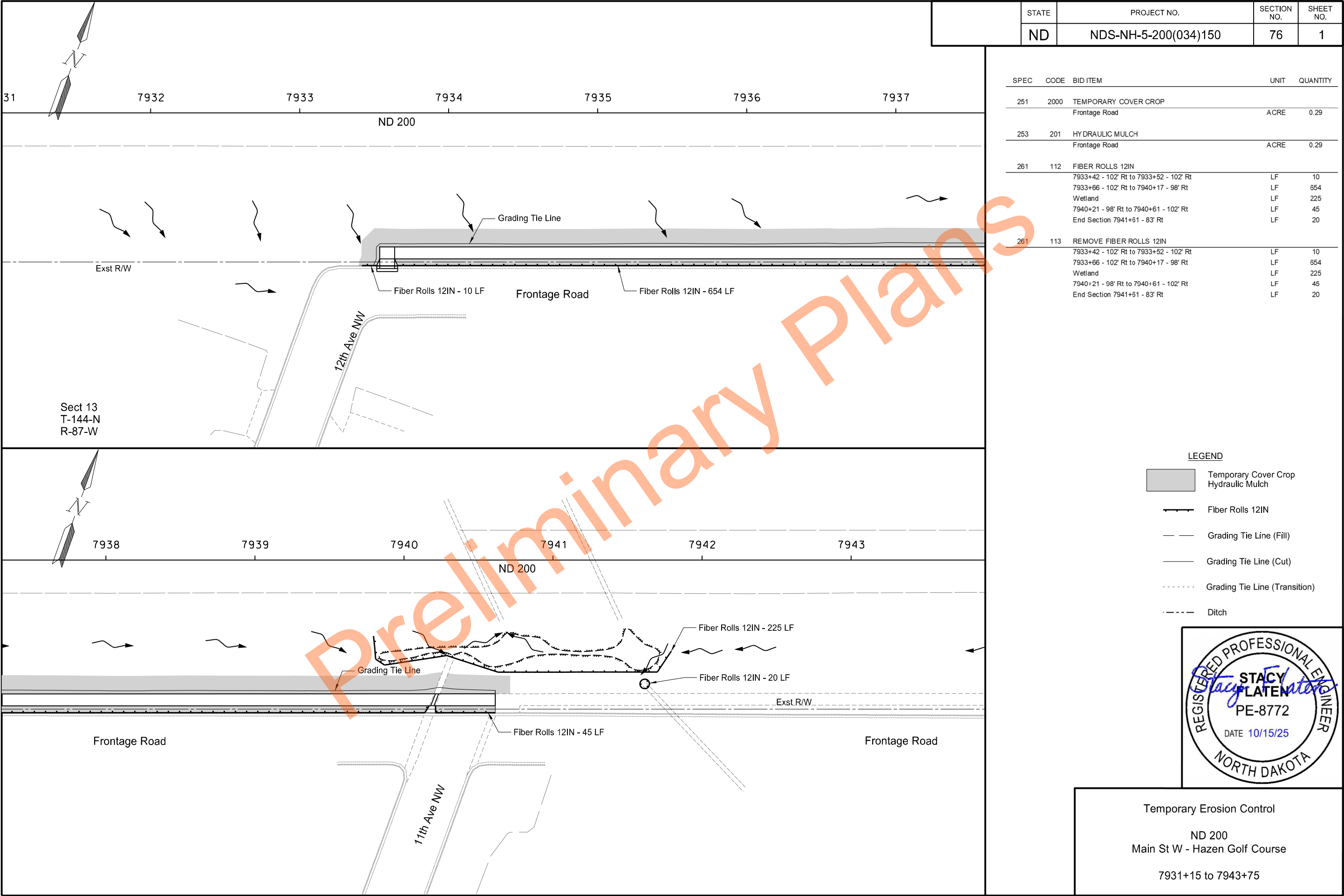
ND 200

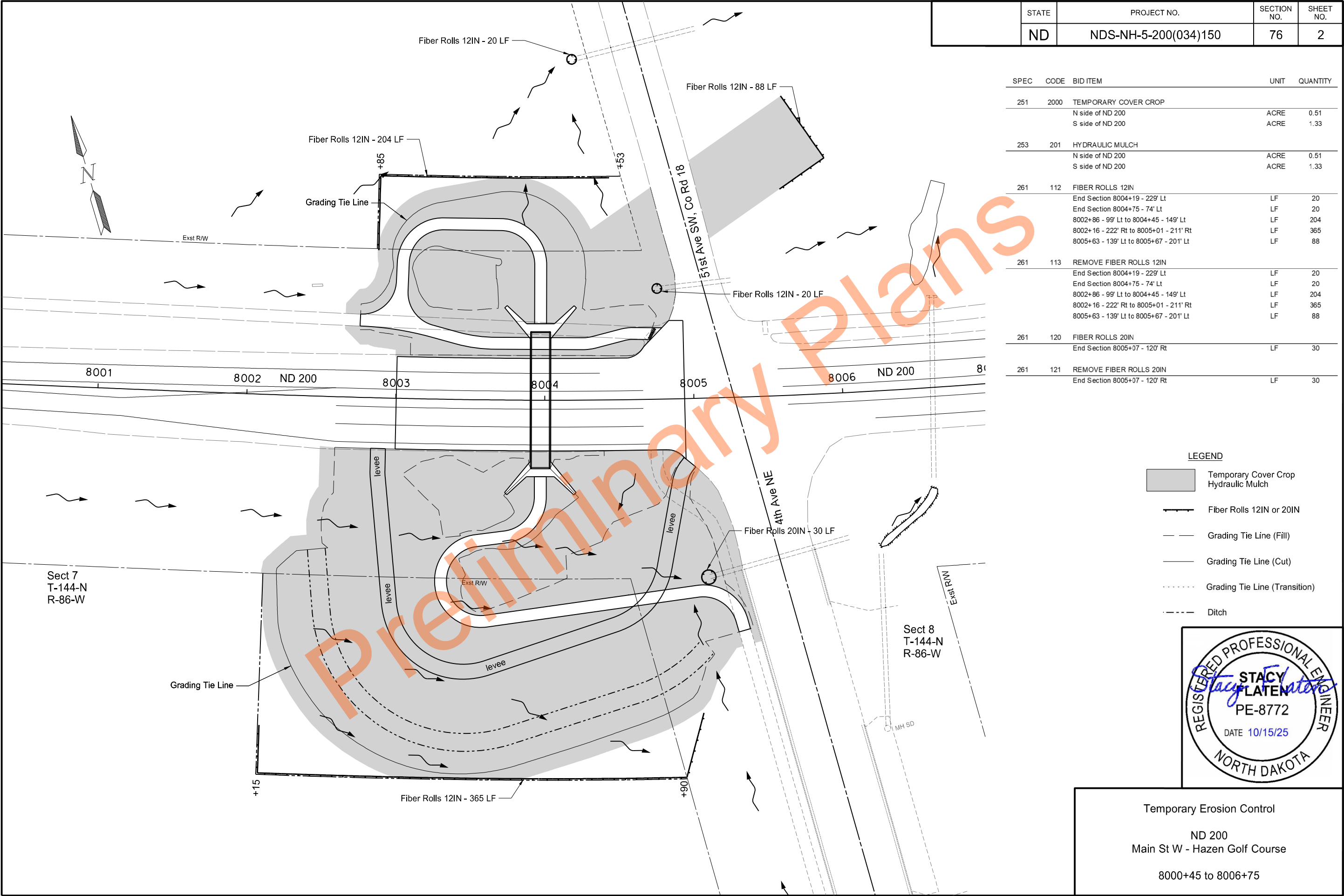
Main St W - Hazen Golf Course

7956+35 to 7968+95









STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NDS-NH-5-200(034)150	76	2

SPEC	CODE	BID ITEM	UNIT	QUANTITY
251	2000	TEMPORARY COVER CROP		
		N side of ND 200	ACRE	0.51
		S side of ND 200	ACRE	1.33
253	201	HYDRAULIC MULCH		
		N side of ND 200	ACRE	0.51
		S side of ND 200	ACRE	1.33
261	112	FIBER ROLLS 12IN		
		End Section 8004+19 - 229' Lt	LF	20
		End Section 8004+75 - 74' Lt	LF	20
		8002+86 - 99' Lt to 8004+45 - 149' Lt	LF	204
		8002+16 - 222' Rt to 8005+01 - 211' Rt	LF	365
		8005+63 - 139' Lt to 8005+67 - 201' Lt	LF	88
261	113	REMOVE FIBER ROLLS 12IN		
		End Section 8004+19 - 229' Lt	LF	20
		End Section 8004+75 - 74' Lt	LF	20
		8002+86 - 99' Lt to 8004+45 - 149' Lt	LF	204
		8002+16 - 222' Rt to 8005+01 - 211' Rt	LF	365
		8005+63 - 139' Lt to 8005+67 - 201' Lt	LF	88
261	120	FIBER ROLLS 20IN		
		End Section 8005+07 - 120' Rt	LF	30
261	121	REMOVE FIBER ROLLS 20IN		
		End Section 8005+07 - 120' Rt	LF	30

LEGEND

- Temporary Cover Crop
- Hydraulic Mulch
- Fiber Rolls 12IN or 20IN
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Ditch

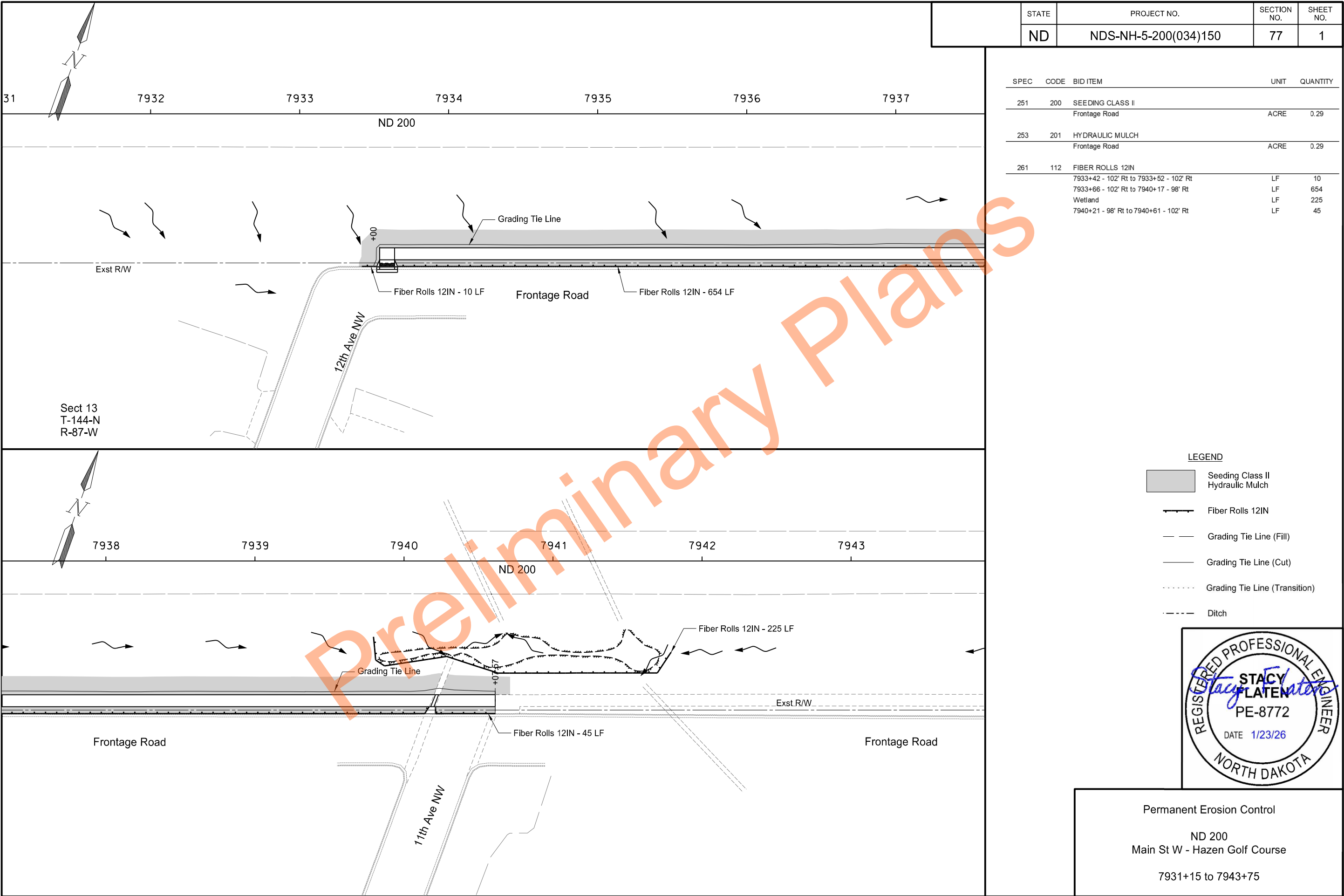


Temporary Erosion Control

ND 200

Main St W - Hazen Golf Course

8000+45 to 8006+75



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NDS-NH-5-200(034)150	77	1

SPEC	CODE	BID ITEM	UNIT	QUANTITY
251	200	SEEDING CLASS II		
		Frontage Road	ACRE	0.29
253	201	HYDRAULIC MULCH		
		Frontage Road	ACRE	0.29
261	112	FIBER ROLLS 12IN		
		7933+42 - 102' Rt to 7933+52 - 102' Rt	LF	10
		7933+66 - 102' Rt to 7940+17 - 98' Rt	LF	654
		Wetland	LF	225
		7940+21 - 98' Rt to 7940+61 - 102' Rt	LF	45

LEGEND

- Seeding Class II
- Hydraulic Mulch
- Fiber Rolls 12IN
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Ditch

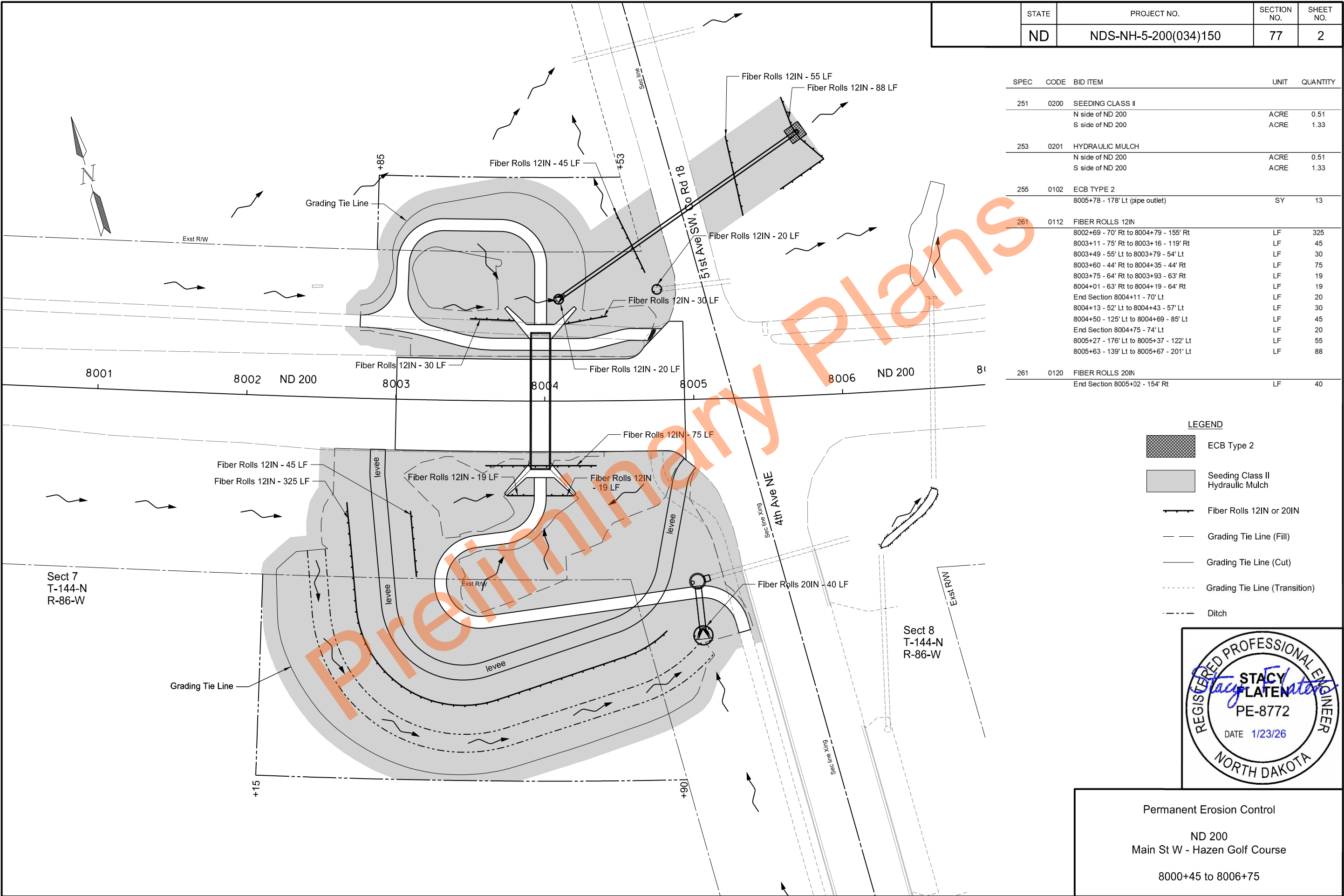


Permanent Erosion Control

ND 200

Main St W - Hazen Golf Course

7931+15 to 7943+75



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NDS-NH-5-200(034)150	77	2

SPEC	CODE	BID ITEM	UNIT	QUANTITY
251	0200	SEEDING CLASS II		
		N side of ND 200	ACRE	0.51
253	0201	HYDRAULIC MULCH		
		S side of ND 200	ACRE	1.33
255	0102	ECB TYPE 2		
		8005+78 - 178' Lt (pipe outlet)	SY	13
261	0112	FIBER ROLLS 12IN		
		8002+69 - 70' Rt to 8004+79 - 155' Rt	LF	325
		8003+11 - 75' Rt to 8003+16 - 119' Rt	LF	45
		8003+49 - 55' Lt to 8003+79 - 54' Lt	LF	30
		8003+60 - 44' Rt to 8004+35 - 44' Rt	LF	75
		8003+75 - 64' Rt to 8003+93 - 63' Rt	LF	19
		8004+01 - 63' Rt to 8004+19 - 64' Rt	LF	19
		End Section 8004+11 - 70' Lt	LF	20
		8004+13 - 52' Lt to 8004+43 - 57' Lt	LF	30
		8004+50 - 125' Lt to 8004+69 - 85' Lt	LF	45
		End Section 8004+75 - 74' Lt	LF	20
		8005+27 - 176' Lt to 8005+37 - 122' Lt	LF	55
		8005+63 - 139' Lt to 8005+67 - 201' Lt	LF	88
261	0120	FIBER ROLLS 20IN		
		End Section 8005+02 - 154' Rt	LF	40

- LEGEND
- ECB Type 2
 - Seeding Class II Hydraulic Mulch
 - Fiber Rolls 12IN or 20IN
 - Grading Tie Line (Fill)
 - Grading Tie Line (Cut)
 - Grading Tie Line (Transition)
 - Ditch



Permanent Erosion Control

ND 200

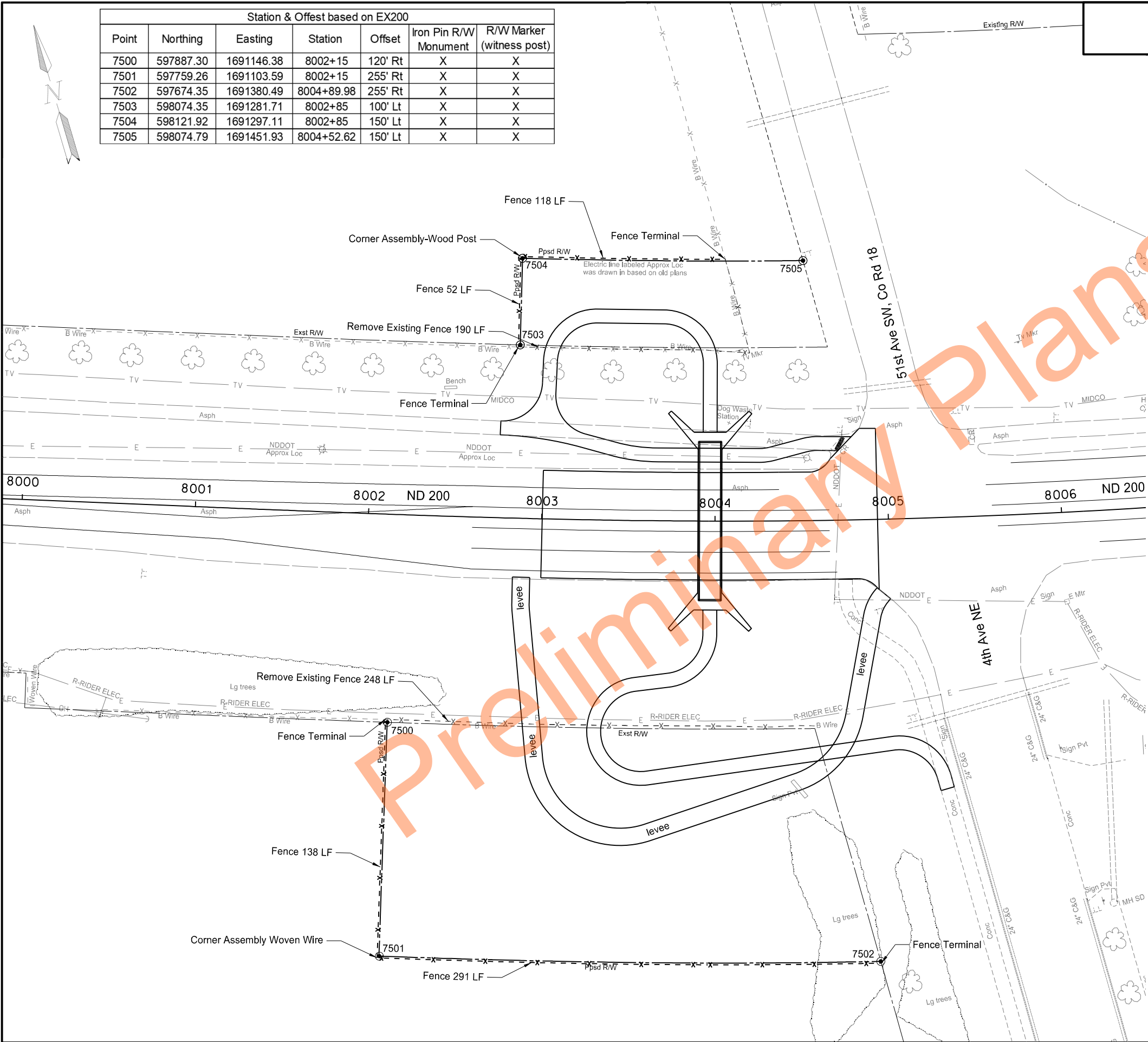
Main St W - Hazen Golf Course

8000+45 to 8006+75

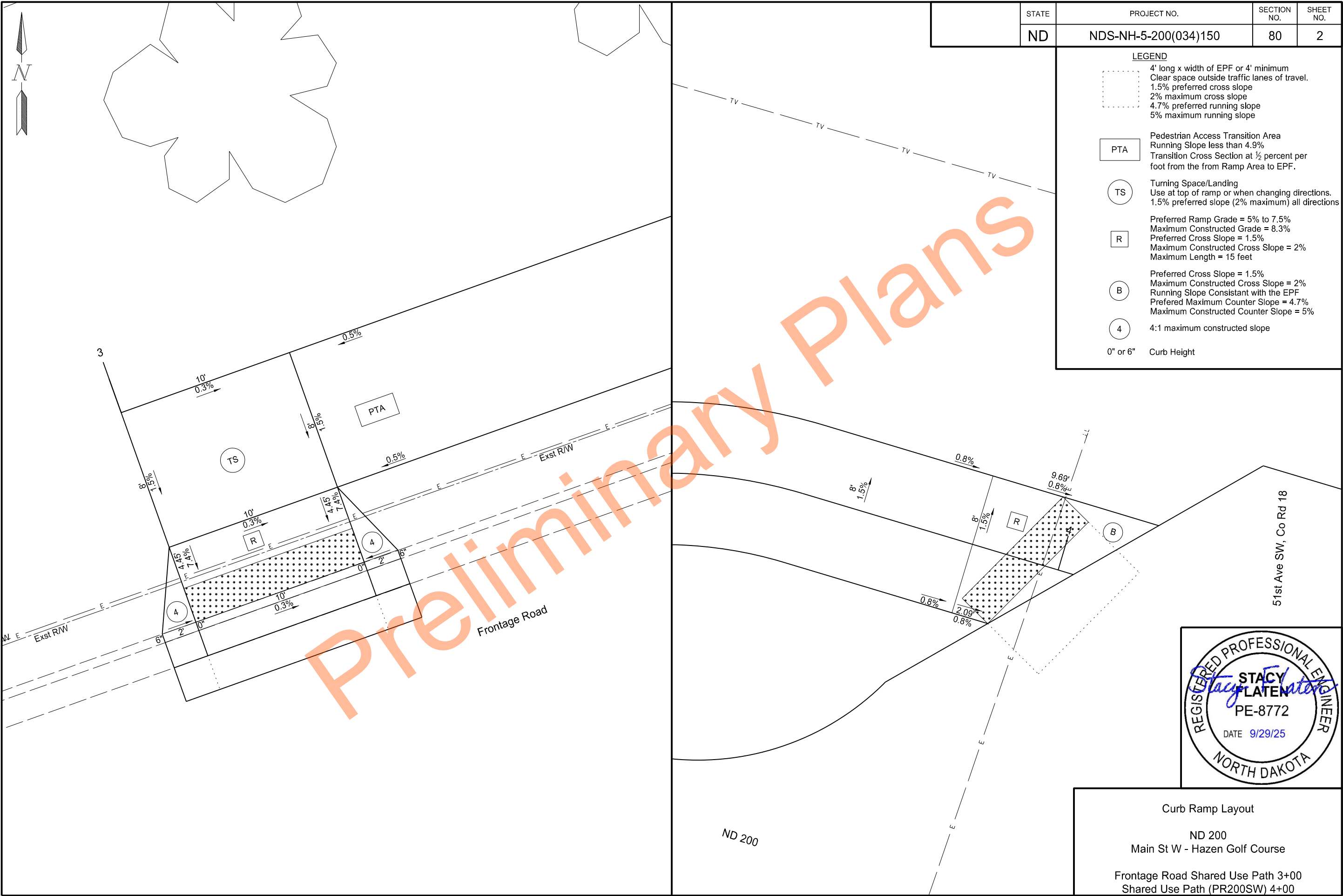
Station & Offset based on EX200						
Point	Northing	Easting	Station	Offset	Iron Pin R/W Monument	R/W Marker (witness post)
7500	597887.30	1691146.38	8002+15	120' Rt	X	X
7501	597759.26	1691103.59	8002+15	255' Rt	X	X
7502	597674.35	1691380.49	8004+89.98	255' Rt	X	X
7503	598074.35	1691281.71	8002+85	100' Lt	X	X
7504	598121.92	1691297.11	8002+85	150' Lt	X	X
7505	598074.79	1691451.93	8004+52.62	150' Lt	X	X

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NDS-NH-5-200(034)150	80	1

SPEC	CODE	BID ITEM	QTY	UNIT
202	0312	REMOVE EXISTING FENCE		
		8002+84 - 99' Lt to 8004+06 - 151' Lt	190	LF
		8002+14 - 118' Rt to 8004+56 - 118' Rt	248	LF
720	0110	RIGHT OF WAY MARKERS		
		8002+15 - 120' Rt	1	EA
		8002+15 - 255' Rt	1	EA
		8002+85 - 100' Lt	1	EA
		8002+85 - 150' Lt	1	EA
		8004+52.62 - 150' Lt	1	EA
		8004+89.98 - 255' Rt	1	EA
720	0130	IRON PIN R/W MONUMENTS		
		8002+15 - 120' Rt	1	EA
		8002+15 - 255' Rt	1	EA
		8002+85 - 100' Lt	1	EA
		8002+85 - 150' Lt	1	EA
		8004+52.62 - 150' Lt	1	EA
752	0700	FENCE WOVEN WIRE		
		8002+14 - 118' Rt to 8004+90 - 256' Rt	429	LF
		8002+84 - 99' Lt to 8004+06 - 151' Lt	170	LF
752	0993	FENCE TERMINAL		
		8002+84 - 99' Lt	1	EA
		8002+14 - 118' Rt	1	EA
		8004+06 - 151' Lt	1	EA
		8004+90 - 256' Rt	1	EA
752	2995	CORNER ASSEMBLY-WOOD POST		
		8002+84 - 151' Lt	1	EA
752	3120	CORNER ASSEMBLY WOVEN WIRE		
		8002+14 - 256' Rt	1	EA

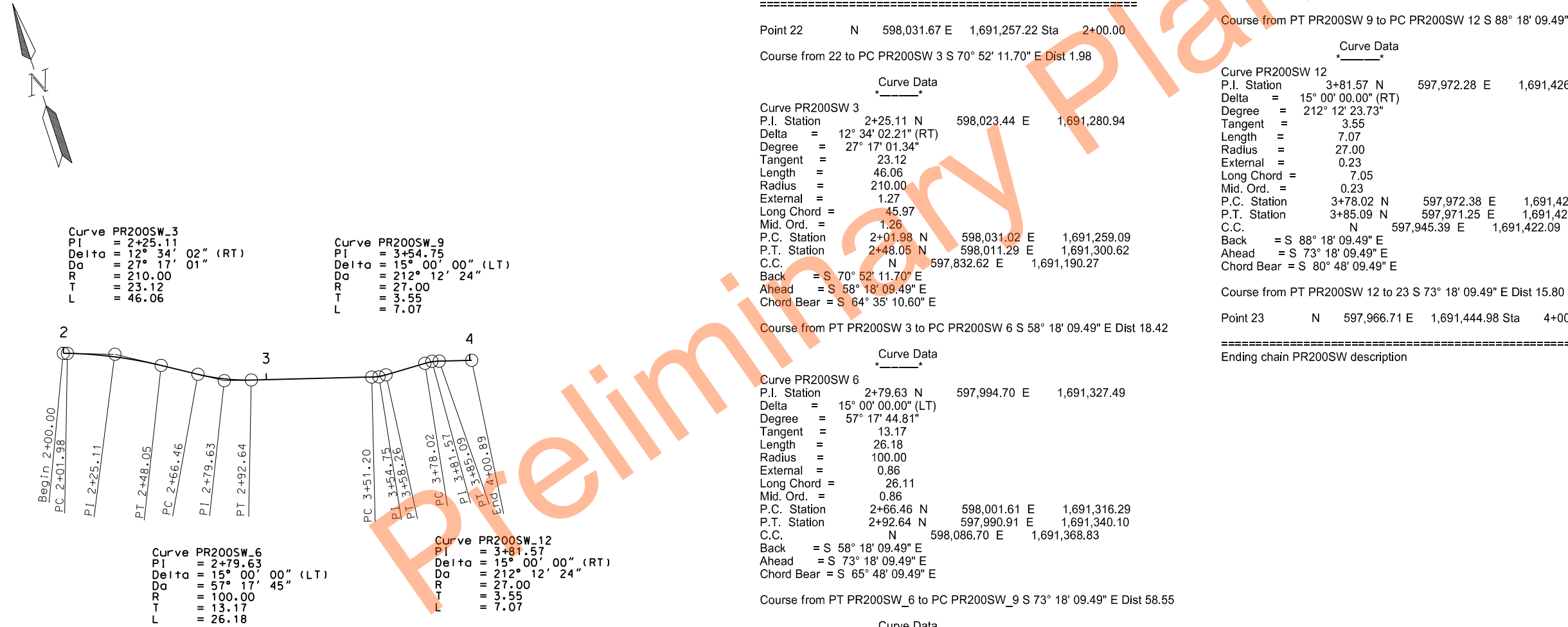
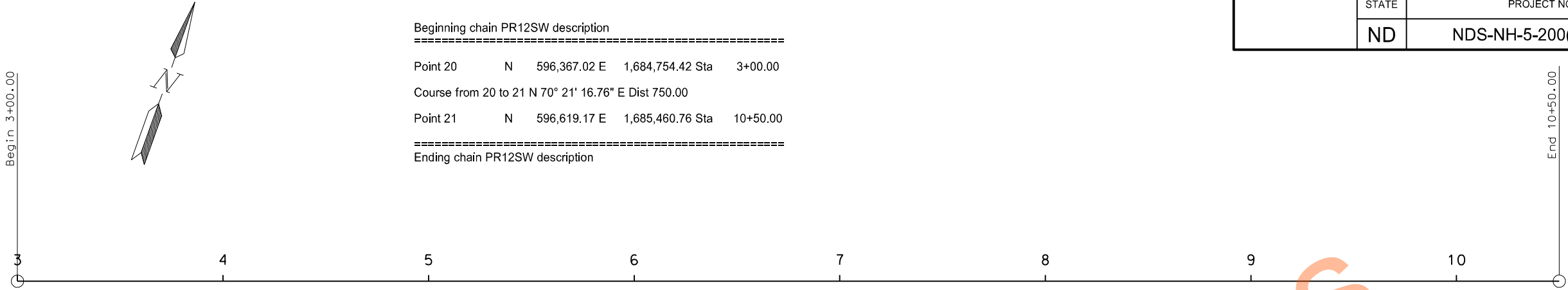


Fencing
ND 200
Main St W - Hazen Golf Course
ND 200 & 4th Ave NE



PRELIMINARY SURVEY COORDINATE AND CURVE DATA - ND 200, Main St W - Hazen Golf Course											STATE	PROJECT NO.			SECTION NO.	SHEET NO.
										ND	NDS-NH-5-200(034)150			81	1	
HORIZONTAL ALIGNMENT				CURVE DATA		US PUBLIC LAND SURVEY DATA				SURVEY CONTROL POINTS						
PNT	STATION	NORTHING	EASTING	ARC DEFINITION		DESC.	SEC-TWP-RGE	NORTHING	EASTING	PNT	NORTHING	EASTING	ELEV	STATION	OFFSET	
ND 200 (Chain EX200)				Curve ND2001	Curve ND2003	W Qtr Cor	Sec 7 T-144-N R-86-W	600127.72	1686469.75	CONTROL POINT DESCRIPTION						
BEG	7922+32.18	596,075.14	1,683,667.84	PI = 7953+46.53	PI = 8011+63.88	C Sec	Sec 7 T-144-N R-86-W	600105.31	1688878.30							
Qtr line	7923+52.52	596,115.55	1,683,781.20	Delta = 4° 01' 52" (LT)	Delta = 27° 00' 17" (LT)	E Qtr Cor	Sec 7 T-144-N R-86-W	600080.17	1691507.16	PRIMARY CONTROL						
PC	7949+43.25	596,985.53	1,686,221.49	Da = 0° 30' 00"	Da = 1° 30' 00"	E Qtr Cor	Sec 8 T-144-N R-86-W	600026.82	1696760.39	GPS 100	598301.65	1691515.47	1746.97	8004+52	386' Lt	
Sec line	7951+58.53	597,057.83	1,686,424.29	R = 11,459.16'	R = 3,819.72'	NW Sec Cor	Sec 13 T-144-N R-87-W	597558.74	1681167.87	Rebar with aluminum cap marked "GPS Control". 400' north of intersection of ND 200 & 4th Ave NE. On south side of approach, east of 4th Ave NE.						
PI	7953+46.53	597,120.95	1,686,601.35	T = 403.28'	L = 1,500.31'	N Qtr Cor	Sec 13 T-144-N R-87-W	597520.65	1683802.32	GPS 101	595821.04	1682923.15	1760.63	N/A	N/A	
PT	7957+49.49	597,282.75	1,686,970.76	L = 806.24'	Ls = 300.00'	NE Sec Cor	Sec 13 T-144-N R-87-W	597502.27	1686431.43	Rebar with aluminum cap marked "GPS Control". 1260' west of intersection of ND 200 & Main St W. East side of approach, south of ND 200.						
Sec line	7962+81.19	597,496.06	1,687,457.80			Sc	Sec 7 T-144-N R-86-W	597487.65	1688846.04	GPS 102	597486.29	1697326.25	1732.67	8065+27	94' Lt	
TS	7977+28.25	598,076.61	1,688,783.30	Curve ND2002	Ts = 1,067.43'	SE Sec Cor	Sec 7 T-144-N R-86-W	597460.24	1691478.13	Rebar with aluminum cap marked "GPS Control". Across from Hazen Golf Course Entrance. On the west side of approach, north of ND 200.						
Qtr line	7978+05.08	598,107.43	1,688,853.68	PI = 7987+69.63			S Qtr Cor	Sec 8 T-144-N R-86-W	597430.17	1694120.06						
SC	7980+28.25	598,190.92	1,689,060.61	Delta = 42° 29' 00" (RT)			SE Sec Cor	Sec 8 T-144-N R-86-W	597402.32	1696736.25						
PI	7987+69.63	598,494.40	1,689,737.20	Da = 2° 30' 01"			C Sec	Sec 13 T-144-N R-87-W	594883.27	1683762.67						
CS	7994+27.40	598,248.86	1,690,436.91	R = 2,291.58'	Curve ND2004	E Qtr Cor	Sec 13 T-144-N R-87-W	594863.41	1686389.05							
ST	7997+27.40	598,158.27	1,690,722.84	L = 1,399.15'	PI = 8039+16.25	E Qtr Cor	Sec 18 T-144-N R-86-W	594817.10	1691434.05							
TS	8000+96.45	598,039.15	1,691,072.14	Ls = 300.00'	Delta = 35° 43' 27" (RT)	E Qtr Cor	Sec 17 T-144-N R-86-W	594720.82	1696693.30							
SC	8003+96.45	597,946.05	1,691,357.30	Sc = 3° 45' 01"	Da = 5° 00' 00"	S Qtr Cor	Sec 9 T-144-N R-86-W	597361.82	1699327.03	REFERENCE MARKERS						
Sec line	8005+29.95	597,899.04	1,691,482.99	Ts = 1,041.38'	R = 1,145.92'					R Mkr #	Northing	Easting	Station	Offset		
PI	8011+63.88	597,694.61	1,692,082.43			L = 314.49'					150	595974.85	1683469.36	N/A	N/A	
CS	8018+96.76	597,807.61	1,692,841.54			Ls = 400.00'					151	597890.32	1688444.84	7973+43	35' Rt	
ST	8021+96.76	597,846.37	1,693,139.01			Sc = 10° 00' 00"					152	597752.37	1692587.96	8016+41	37' Rt	
TS	8033+45.29	598,009.67	1,694,275.87			Ts = 570.95'										
SC	8037+45.29	598,043.38	1,694,673.91													
PI	8039+16.25	598,090.84	1,694,841.03													
CS	8040+59.78	597,990.62	1,694,982.93			Curve ND2005										
ST	8044+59.78	597,826.76	1,695,347.24			PI = 8053+55.98										
TS	8048+84.06	597,630.52	1,695,723.40			Delta = 26° 35' 17" (LT)										
SC	8052+84.06	597,466.66	1,696,087.71			Da = 5° 00' 00"										
PI	8053+55.98	597,412.24	1,696,141.82			R = 1,145.92'										
CS	8054+15.82	597,434.23	1,696,215.34			L = 131.76'										
ST	8058+15.82	597,404.32	1,696,613.68			Ls = 400.00'										
Sec line	8059+38.91	597,402.25	1,696,736.75			Sc = 10° 00' 00"										
Glidepath	8079+60.64	597,369.54	1,698,758.22			Ts = 471.93'										
Qtr line	8085+50.70	597,359.99	1,699,348.20													
NOTES: Sheet 1 of 1 Alignment from project NH-5-200(017)152, PCN 16162						☐ Assumed Coordinates				INITIALIZING BENCH MARK NDGPS Stations (OPUS)						
						☒ 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) = 0.9998690				☒ NAVD-88 ☐ NGVD-29 ☐ GEOID 09 ☒ GEOID 12B ☐ GEOID 12A						
				Date Survey Completed 07/14/21						DIGITAL SIGNATURE JASON E. MAIN 2025.09.23 14:06:01 -05'00						
										All coordinates and measurements on this document derived from the International Foot definition.						
																

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	82	1



Survey Data Layout

ND 200
Main St W - Hazen Golf Course

PR12SW
PR200SW

Beginning chain PR1LEVEE description

Point 44 N 597,945.66 E 1,691,244.15 Sta 1000+00.00

Course from 44 to PC PR1LEVEE 3 S 17° 49' 11.81" W Dist 14.48

Curve Data

Curve PR1LEVEE 3
P.I. Station 1000+17.33 N 597,929.16 E 1,691,238.85
Delta = 6° 30' 54.36" (LT)
Degree = 114° 35' 29.61"
Tangent = 2.85
Length = 5.69
Radius = 50.00
External = 0.08
Long Chord = 5.68
Mid. Ord. = 0.08
P.C. Station 1000+14.48 N 597,931.87 E 1,691,239.72
P.T. Station 1000+20.17 N 597,926.37 E 1,691,238.29
C.C. N 597,916.57 E 1,691,287.32
Back = S 17° 49' 11.81" W
Ahead = S 11° 18' 17.45" W
Chord Bear = S 14° 33' 44.63" W

Course from PT PR1LEVEE 3 to PC PR1LEVEE 6 S 11° 18' 17.45" W Dist 84.40

Curve Data

Curve PR1LEVEE 6
P.I. Station 1001+67.90 N 597,781.50 E 1,691,209.33
Delta = 103° 25' 32.76" (LT)
Degree = 114° 35' 29.61"
Tangent = 63.34
Length = 90.26
Radius = 50.00
External = 30.70
Long Chord = 78.49
Mid. Ord. = 19.02
P.C. Station 1001+04.56 N 597,843.61 E 1,691,221.75
P.T. Station 1001+94.82 N 597,783.84 E 1,691,272.63
C.C. N 597,833.81 E 1,691,270.78
Back = S 11° 18' 17.45" W
Ahead = N 87° 52' 44.70" E
Chord Bear = S 40° 24' 28.92" E

Course from PT PR1LEVEE 6 to PC PR1LEVEE 9 N 87° 52' 44.70" E Dist 90.61

Curve Data

Curve PR1LEVEE 9
P.I. Station 1003+15.00 N 597,788.29 E 1,691,392.73
Delta = 61° 12' 09.93" (LT)
Degree = 114° 35' 29.61"
Tangent = 29.57
Length = 53.41
Radius = 50.00
External = 8.09
Long Chord = 50.91
Mid. Ord. = 6.96
P.C. Station 1002+85.43 N 597,787.20 E 1,691,363.18
P.T. Station 1003+38.84 N 597,814.71 E 1,691,406.01
C.C. N 597,837.16 E 1,691,361.33
Back = N 87° 52' 44.70" E
Ahead = N 26° 40' 34.77" E
Chord Bear = N 57° 16' 39.73" E

Course from PT PR1LEVEE 9 to PC PR1LEVEE 12 N 26° 40' 34.77" E Dist 58.33

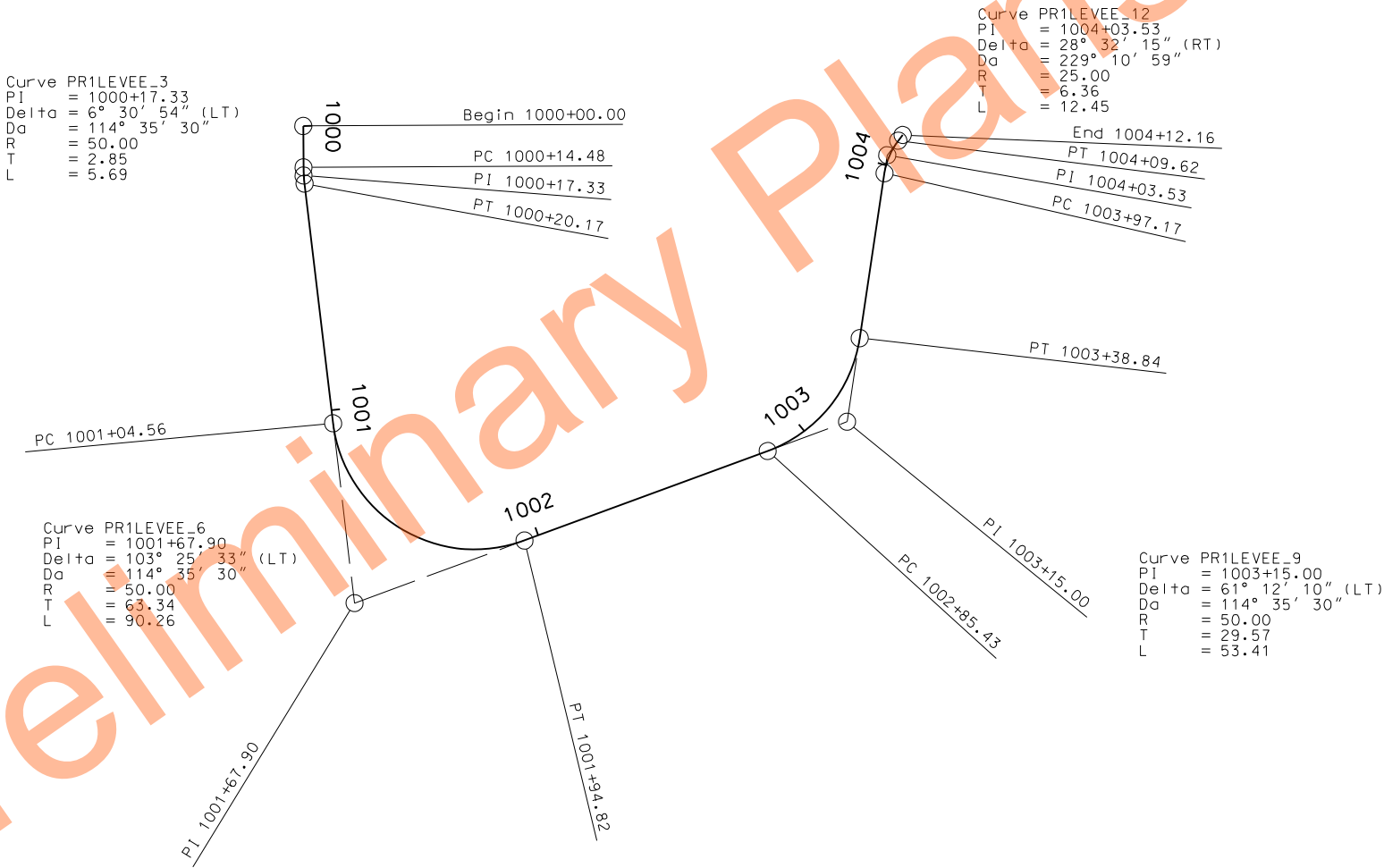
Curve Data

Curve PR1LEVEE 12
P.I. Station 1004+03.53 N 597,872.52 E 1,691,435.05
Delta = 28° 32' 14.77" (RT)
Degree = 229° 10' 59.22"
Tangent = 6.36
Length = 12.45
Radius = 25.00
External = 0.80
Long Chord = 12.32
Mid. Ord. = 0.77
P.C. Station 1003+97.17 N 597,866.84 E 1,691,432.19
P.T. Station 1004+09.62 N 597,876.15 E 1,691,440.27
C.C. N 597,855.61 E 1,691,454.53
Back = N 26° 40' 34.77" E
Ahead = N 55° 12' 49.54" E
Chord Bear = N 40° 56' 42.15" E

Course from PT PR1LEVEE 12 to 45 N 55° 12' 49.54" E Dist 2.53

Point 45 N 597,877.59 E 1,691,442.35 Sta 1004+12.16

Ending chain PR1LEVEE description



Survey Data Layout

ND 200
Main St W - Hazen Golf Course

PR1LEVEE

Beginning chain PR5SW description
=====

Point 47 N 597,758.96 E 1,691,445.69 Sta 1+00.00

Course from 47 to PC PR5SW 3 N 0° 36' 33.94" E Dist 7.15

Curve Data

Curve PR5SW 3
P.I. Station 1+30.71 N 597,789.66 E 1,691,446.01
Delta = 82° 12' 34.55" (LT)
Degree = 212° 12' 23.73"
Tangent = 23.56
Length = 38.74
Radius = 27.00
External = 8.83
Long Chord = 35.50
Mid. Ord. = 6.66
P.C. Station 1+07.15 N 597,766.10 E 1,691,445.76
P.T. Station 1+45.89 N 597,793.10 E 1,691,422.71
C.C. N 597,766.39 E 1,691,418.76
Back = N 0° 36' 33.94" E
Ahead = N 81° 36' 00.61" W
Chord Bear = N 40° 29' 43.34" W

Course from PT PR5SW 3 to PC PR5SW 6 N 81° 36' 00.61" W Dist 143.14

Curve Data

Curve PR5SW 6
P.I. Station 3+22.95 N 597,818.97 E 1,691,247.54
Delta = 102° 57' 56.22" (RT)
Degree = 212° 12' 23.73"
Tangent = 33.92
Length = 48.52
Radius = 27.00
External = 16.36
Long Chord = 42.25
Mid. Ord. = 10.19
P.C. Station 2+89.03 N 597,814.01 E 1,691,281.10
P.T. Station 3+37.55 N 597,850.56 E 1,691,259.90
C.C. N 597,840.72 E 1,691,285.05
Back = N 81° 36' 00.61" W
Ahead = N 21° 21' 55.61" E
Chord Bear = N 30° 07' 02.50" W

Course from PT PR5SW 6 to PC PR5SW 9 N 21° 21' 55.60" E Dist 0.50

Curve Data

Curve PR5SW 9
P.I. Station 3+59.88 N 597,871.35 E 1,691,268.04
Delta = 77° 54' 23.62" (RT)
Degree = 212° 12' 23.73"
Tangent = 21.83
Length = 36.71
Radius = 27.00
External = 7.72
Long Chord = 33.95
Mid. Ord. = 6.00
P.C. Station 3+38.05 N 597,851.02 E 1,691,260.08
P.T. Station 3+74.76 N 597,867.83 E 1,691,289.58
C.C. N 597,841.19 E 1,691,285.23
Back = N 21° 21' 55.61" E
Ahead = S 80° 43' 40.77" E
Chord Bear = N 60° 19' 07.42" E

Course from PT PR5SW 9 to PC PR5SW 12 S 80° 43' 40.77" E Dist 19.80

Curve Data

Curve PR5SW 12
P.I. Station 4+18.32 N 597,860.82 E 1,691,332.57
Delta = 82° 42' 01.01" (LT)
Degree = 212° 12' 23.73"
Tangent = 23.76
Length = 38.97
Radius = 27.00
External = 8.97
Long Chord = 35.68
Mid. Ord. = 6.73
P.C. Station 3+94.56 N 597,864.64 E 1,691,309.12
P.T. Station 4+33.53 N 597,883.59 E 1,691,339.35
C.C. N 597,891.29 E 1,691,313.47
Back = S 80° 43' 40.77" E
Ahead = N 16° 34' 18.22" E
Chord Bear = N 57° 55' 18.73" E

Course from PT PR5SW 12 to PC PR5SW 15 N 16° 34' 18.22" E Dist 155.78

Curve Data

Curve PR5SW 15
P.I. Station 6+16.01 N 598,058.49 E 1,691,391.39
Delta = 89° 21' 29.86" (LT)
Degree = 212° 12' 23.73"
Tangent = 26.70
Length = 42.11
Radius = 27.00
External = 10.97
Long Chord = 37.97
Mid. Ord. = 7.80
P.C. Station 5+89.32 N 598,032.90 E 1,691,383.78
P.T. Station 6+31.42 N 598,066.40 E 1,691,365.89
C.C. N 598,040.60 E 1,691,357.90
Back = N 16° 34' 18.22" E
Ahead = N 72° 47' 11.64" W
Chord Bear = N 28° 06' 26.71" W

Course from PT PR5SW 15 to PC PR5SW 18 N 72° 47' 11.64" W Dist 38.23

Curve Data

Curve PR5SW 18
P.I. Station 6+95.78 N 598,085.44 E 1,691,304.42
Delta = 88° 07' 47.52" (LT)
Degree = 212° 12' 23.73"
Tangent = 26.13
Length = 41.53
Radius = 27.00
External = 10.58
Long Chord = 37.56
Mid. Ord. = 7.60
P.C. Station 6+69.65 N 598,077.71 E 1,691,329.38
P.T. Station 7+11.18 N 598,060.74 E 1,691,295.87
C.C. N 598,051.92 E 1,691,321.39
Back = N 72° 47' 11.64" W
Ahead = S 19° 05' 00.84" W
Chord Bear = S 63° 08' 54.60" W

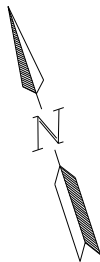
Course from PT PR5SW 18 to PC PR5SW 21 S 19° 05' 00.84" W Dist 18.94

Curve Data

Curve PR5SW 21
P.I. Station 7+51.74 N 598,022.41 E 1,691,282.61
Delta = 77° 23' 10.33" (LT)
Degree = 212° 12' 23.73"
Tangent = 21.63
Length = 36.47
Radius = 27.00
External = 7.59
Long Chord = 33.76
Mid. Ord. = 5.93
P.C. Station 7+30.12 N 598,042.85 E 1,691,289.68
P.T. Station 7+66.58 N 598,011.05 E 1,691,301.01
C.C. N 598,034.02 E 1,691,315.20
Back = S 19° 05' 00.84" W
Ahead = S 58° 18' 09.49" E
Chord Bear = S 19° 36' 34.32" E

=====

Ending chain PR5SW description



Curve PR5SW_18
PI = 6+95.78
Delta = 88° 07' 48" (LT)
Da = 212° 12' 24"
R = 27.00
T = 26.13
L = 41.53

Curve PR5SW_21
PI = 7+51.74
Delta = 77° 23' 10" (LT)
Da = 212° 12' 24"
R = 27.00
T = 21.63
L = 36.47

Curve PR5SW_9
PI = 3+59.88
Delta = 77° 54' 24" (RT)
Da = 212° 12' 24"
R = 27.00
T = 21.83
L = 36.71

Curve PR5SW_6
PI = 3+22.95
Delta = 102° 57' 56" (RT)
Da = 212° 12' 24"
R = 27.00
T = 33.92
L = 48.52

Curve PR5SW_15
PI = 6+16.01
Delta = 89° 21' 30" (LT)
Da = 212° 12' 24"
R = 27.00
T = 26.70
L = 42.11

Curve PR5SW_12
PI = 4+18.32
Delta = 82° 42' 01" (LT)
Da = 212° 12' 24"
R = 27.00
T = 23.76
L = 38.97

Curve PR5SW_3
PI = 1+30.71
Delta = 82° 12' 35" (LT)
Da = 212° 12' 24"
R = 27.00
T = 23.56
L = 38.74



Survey Data Layout

ND 200
Main St W - Hazen Golf Course

PR5SW

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NDS-NH-5-200(034)150	100	1

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED		TOTAL AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
			BY PHASE NO.				
			1	2			
E5-1-48	48"x48"	EXIT GORE				35	
G20-1-60	60"x24"	ROAD WORK NEXT ____ MILES	2	2	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	2	2	26	52
G20-4-36	36"x18"	PILOT CAR FOLLOW ME (Mounted to back of pilot car)				18	
G20-4b-36	36"x30"	WAIT FOR PILOT CAR				18	
G20-50a-72	72"x36"	ROAD WORK NEXT ____ MILES RT & LT ARROWS	5	5	5	43	215
G20-52a-72	72"x24"	ROAD WORK NEXT ____ MILES RT or LT ARROW	1	1	1	36	36
G20-55-96	96"x48"	SPEED LIMIT ENFORCED - MINIMUM FEE \$150 WHEN WORKERS PRESENT	2	2	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	1	1	1	32	32
R1-2-60	60"x60"	YIELD				29	
R2-1-36	36"x48"	SPEED LIMIT ____ (Portable only)	8	8	8	30	240
R2-1-48	48"x60"	SPEED LIMIT ____	8	8	8	39	312
R2-1aP-24	24"x18"	MINIMUM FEE \$150 (Mounted on Speed Limit post)	8	8	8	10	80
R3-2-48	48"x48"	NO LEFT TURN				35	
R4-1-48	48"x60"	DO NOT PASS	2	2	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	
R10-6-24	24"x36"	STOP HERE ON RED				16	
R11-2-48	48"x30"	ROAD CLOSED (Mounted on barricade)	2	2	2	12	24
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	4	4	4	35	140
W1-4b-48	48"x48"	TWO LANE REVERSE CURVE RIGHT or LEFT				35	
W1-6-48	48"x24"	ONE DIRECTION LARGE ARROW	2	2	2	26	52
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	4	4	4	35	140
W3-5-48	48"x48"	SPEED REDUCTION AHEAD	8	8	8	35	280
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	2	2	2	35	70
W8-3-48	48"x48"	PAVEMENT ENDS				35	
W8-7-48	48"x48"	LOOSE GRAVEL				35	
W8-11-48	48"x48"	UNEVEN LANES	2	2	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	2	2	35	70
W8-55-48	48"x48"	TRUCKS CROSSING AHEAD or ____ FT or ____ MILE	2	2	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"x48"	NO PASSING ZONE				28	
W16-2P-30	30"x24"	____ FEET PLAQUE (Mounted on warning sign post)				10	
W20-1-48	48"x48"	ROAD WORK AHEAD or ____ FT or ____ MILE	8	8	8	35	280
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				35	
W20-5-48	48"x48"	RIGHT or CENTER or LEFT LANE CLOSED AHEAD or ____ FT or ____ MILE				35	
W20-7-48	48"x48"	FLAGGER	4	4	4	35	140
W20-8-18	18"x18"	STOP - SLOW PADDLE Back to Back	4	4	4	5	20
W20-52P-54	54"x12"	NEXT ____ MILES (Mounted on warning sign post)	2	2	2	12	24
W21-1-48	48"x48"	WORKERS				35	
W21-2-48	48"x48"	FRESH OIL	2	2	2	35	70
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or ____ FT or ____ MILE				35	
W21-5-48	48"x48"	SHOULDER WORK	2	2	2	35	70
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED				35	
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or ____ FT or ____ MILE				35	

[illegible][illegible]

SPEC & CODE			
704-1000	TRAFFIC CONTROL SIGNS	TOTAL UNITS	2958

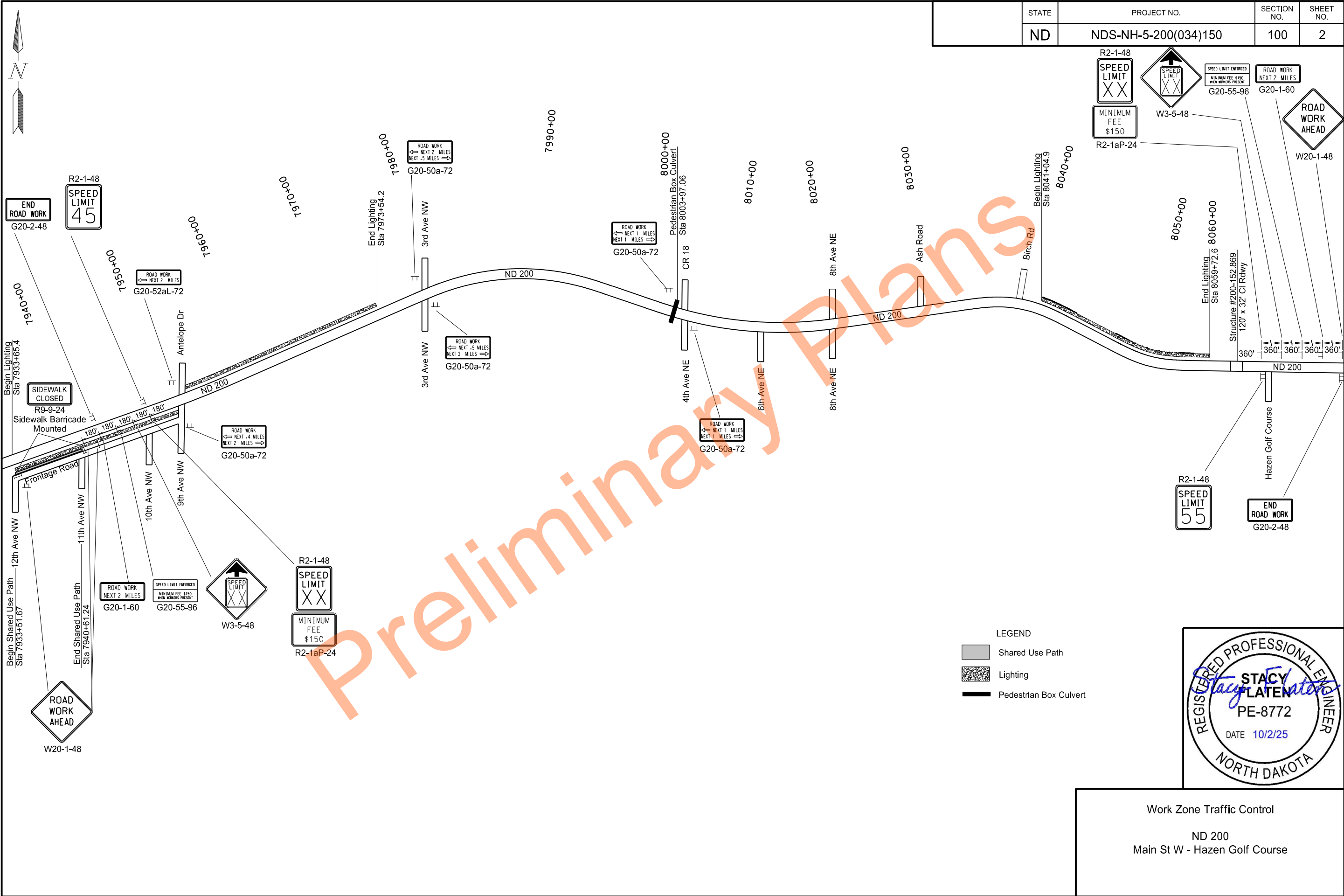
[illegible]

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 200
Main St W - Hazen Golf Course

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NDS-NH-5-200(034)150	100	2



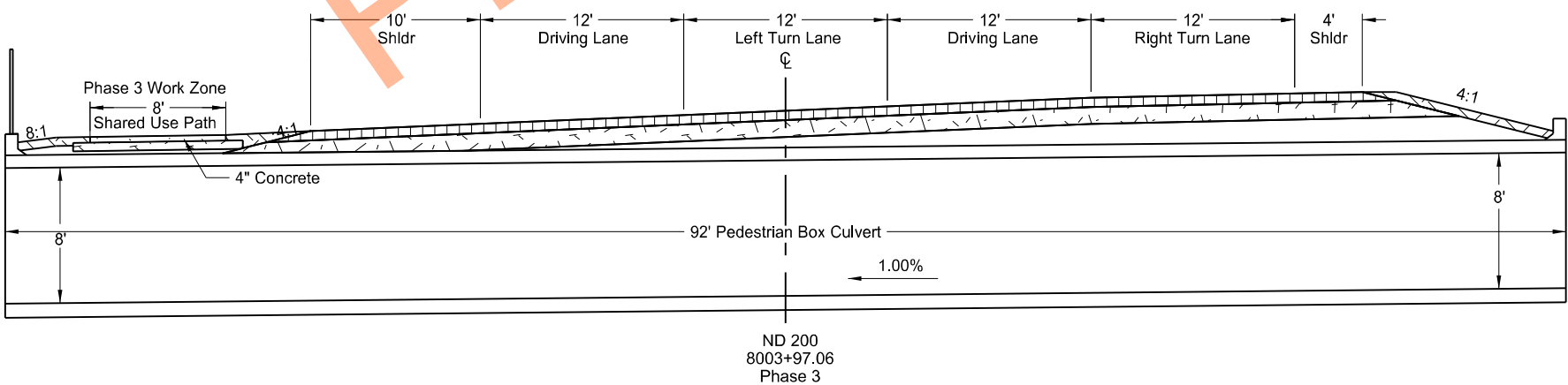
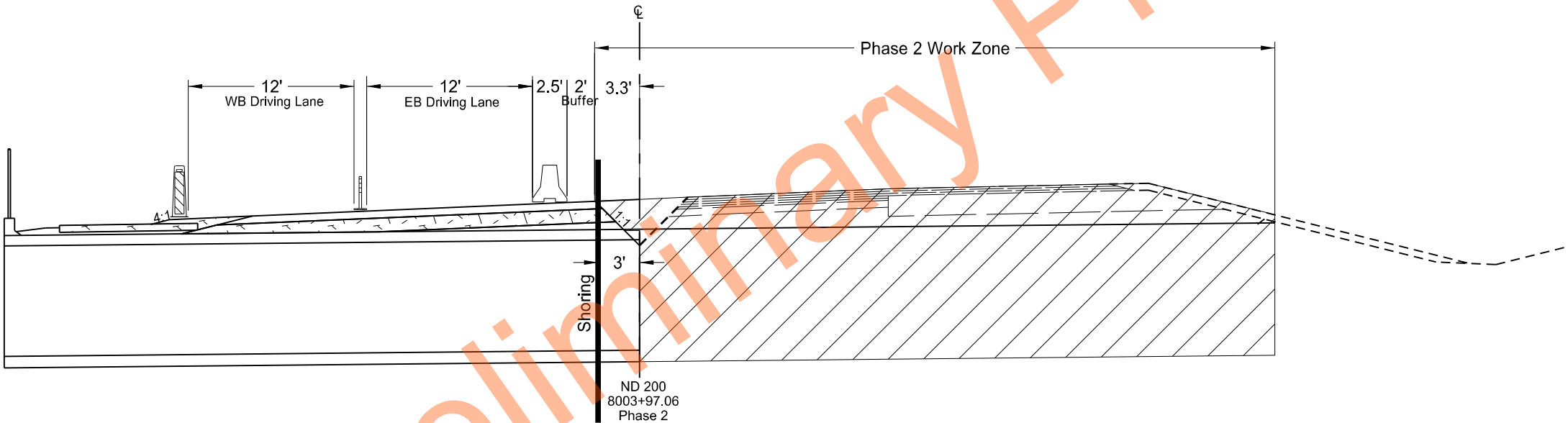
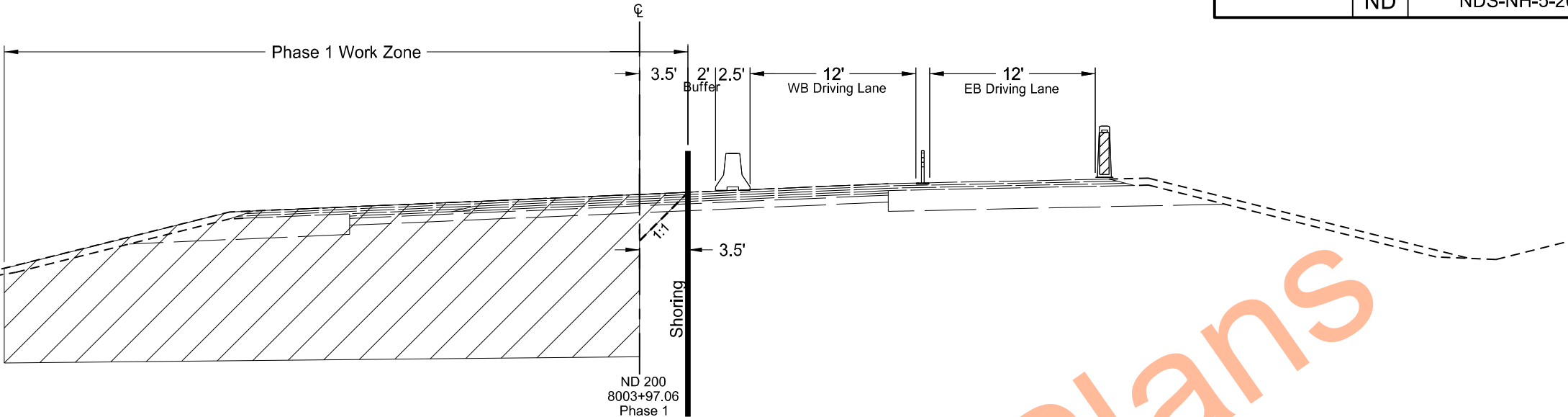
- LEGEND
- Shared Use Path
 - Lighting
 - Pedestrian Box Culvert



Work Zone Traffic Control

ND 200
Main St W - Hazen Golf Course

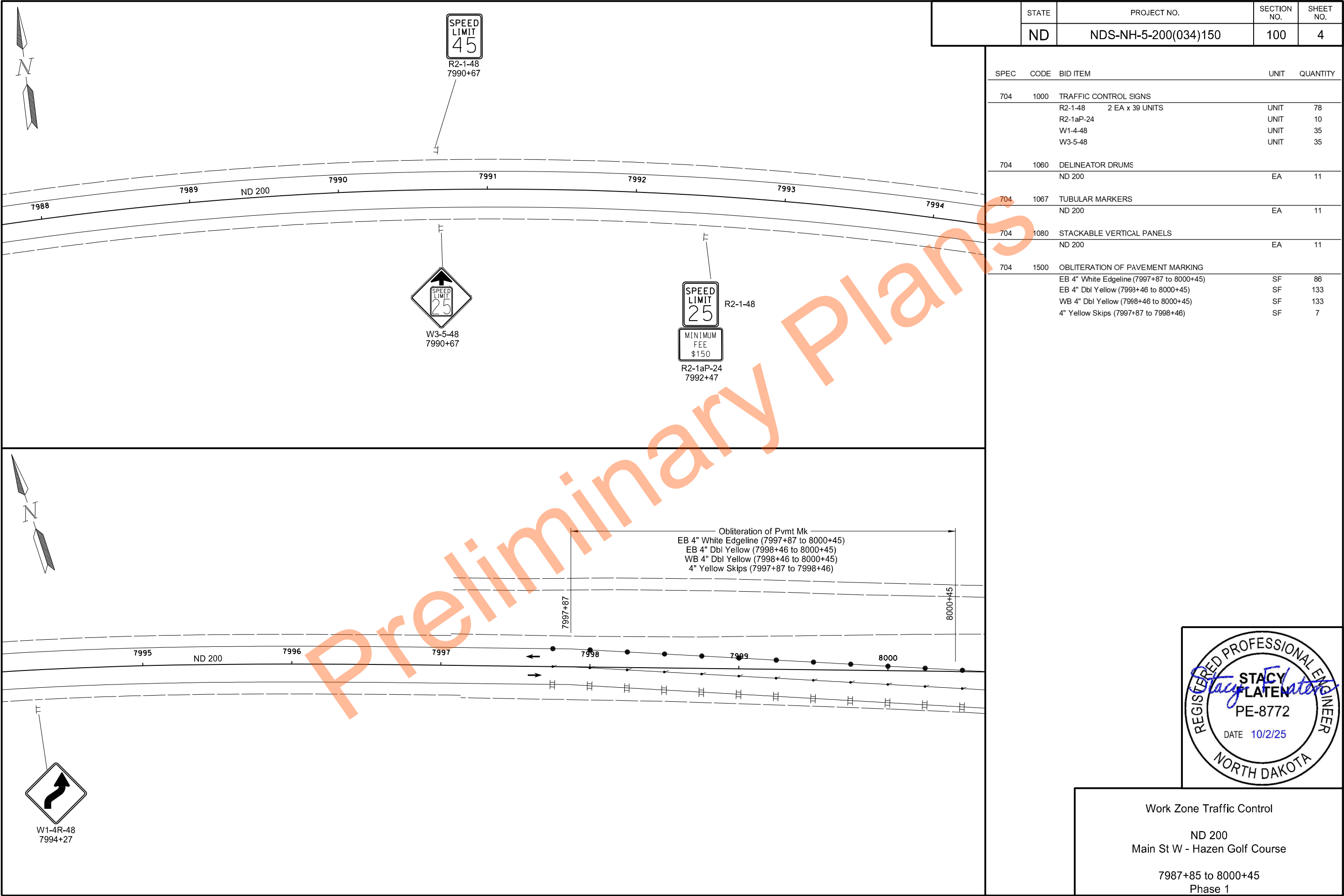
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	100	3



Work Zone Traffic Control

ND 200
Main St W - Hazen Golf Course

Structure 200-151.711 Phasing
8003+97.06



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	100	4

SPEC	CODE	BID ITEM	UNIT	QUANTITY
704	1000	TRAFFIC CONTROL SIGNS		
		R2-1-48 2 EA x 39 UNITS	UNIT	78
		R2-1aP-24	UNIT	10
		W1-4-48	UNIT	35
		W3-5-48	UNIT	35
704	1060	DELINEATOR DRUMS		
		ND 200	EA	11
704	1067	TUBULAR MARKERS		
		ND 200	EA	11
704	1080	STACKABLE VERTICAL PANELS		
		ND 200	EA	11
704	1500	OBLITERATION OF PAVEMENT MARKING		
		EB 4" White Edgeline (7997+87 to 8000+45)	SF	86
		EB 4" Dbl Yellow (7993+46 to 8000+45)	SF	133
		WB 4" Dbl Yellow (7998+46 to 8000+45)	SF	133
		4" Yellow Skips (7997+87 to 7998+46)	SF	7



Work Zone Traffic Control

ND 200

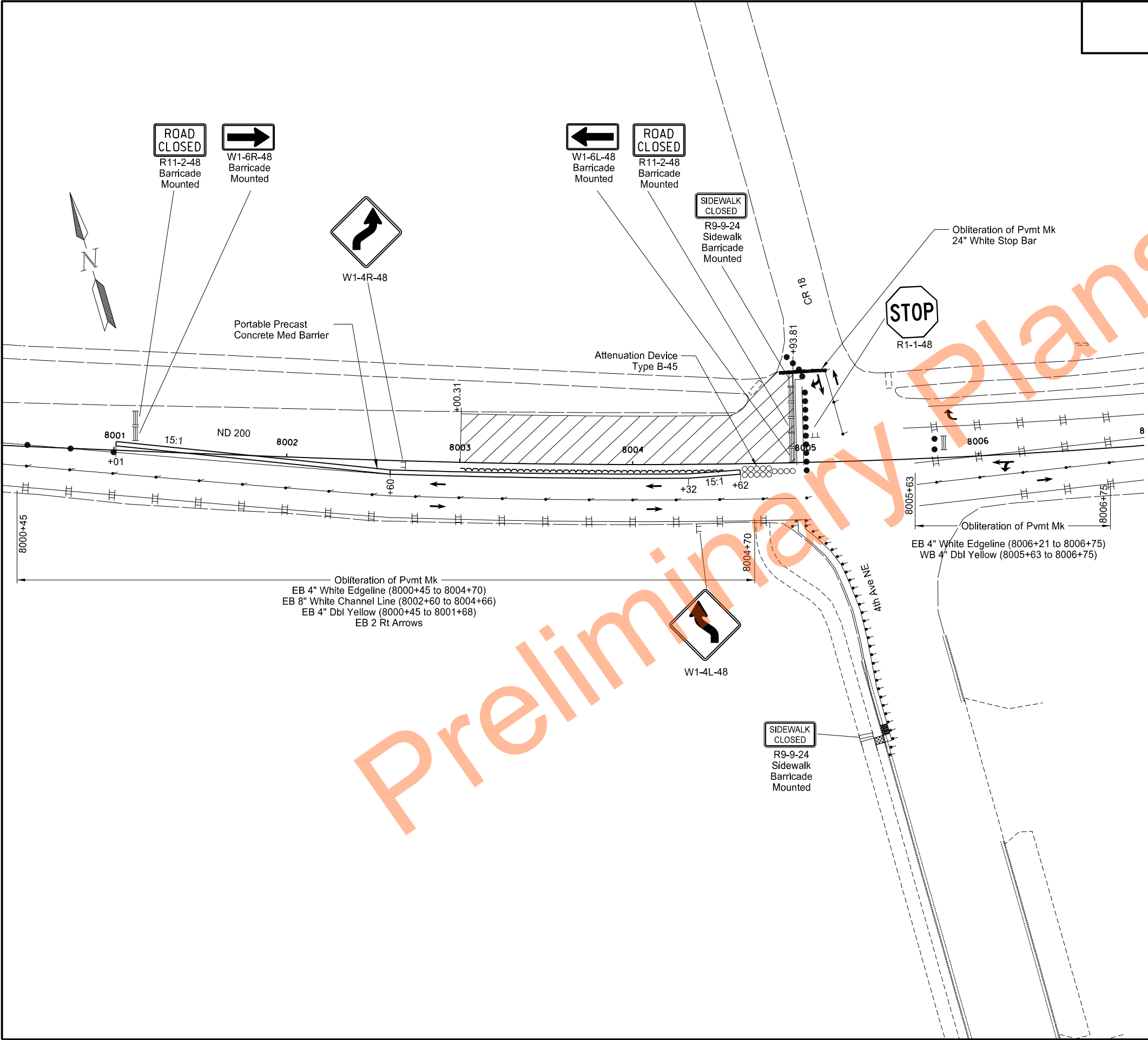
Main St W - Hazen Golf Course

7987+85 to 8000+45

Phase 1

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NDS-NH-5-200(034)150	100	5

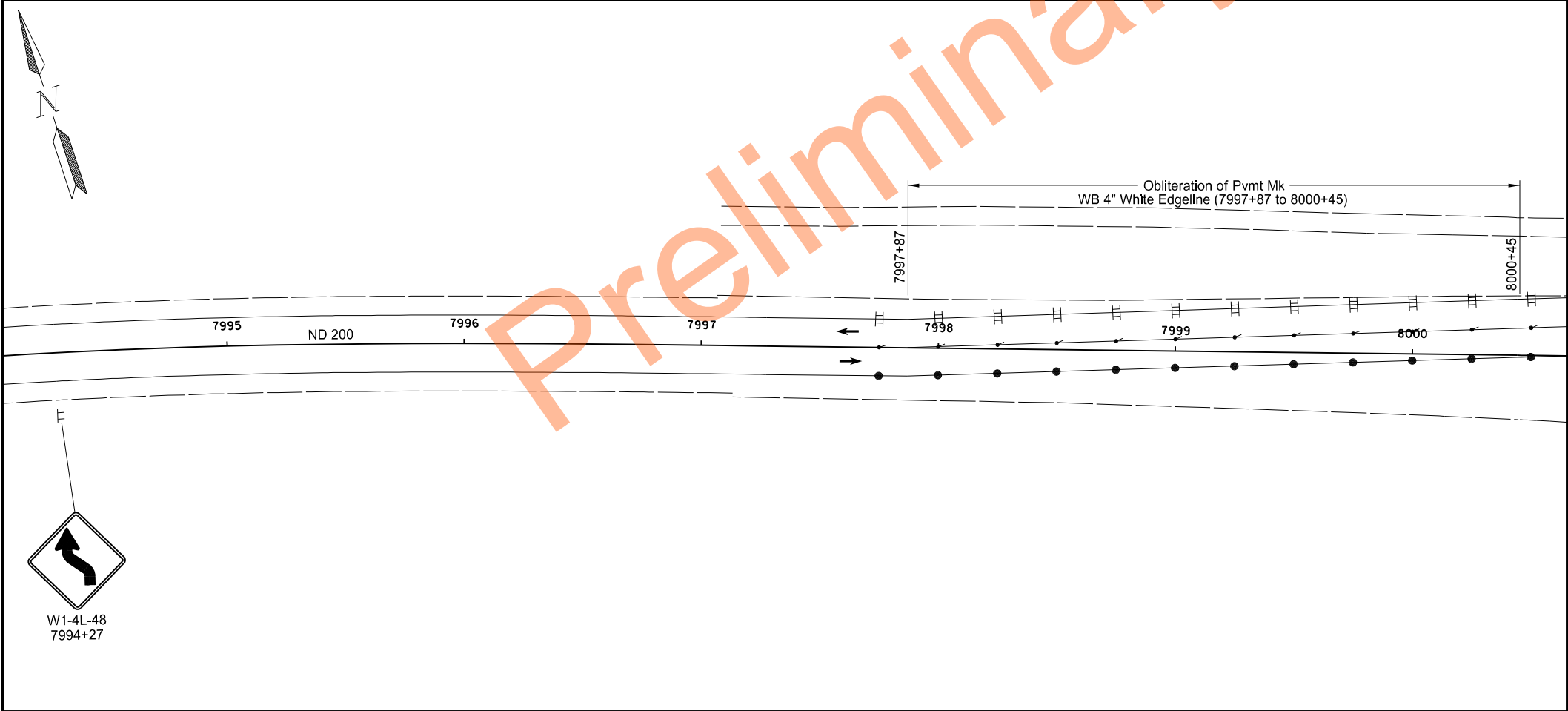
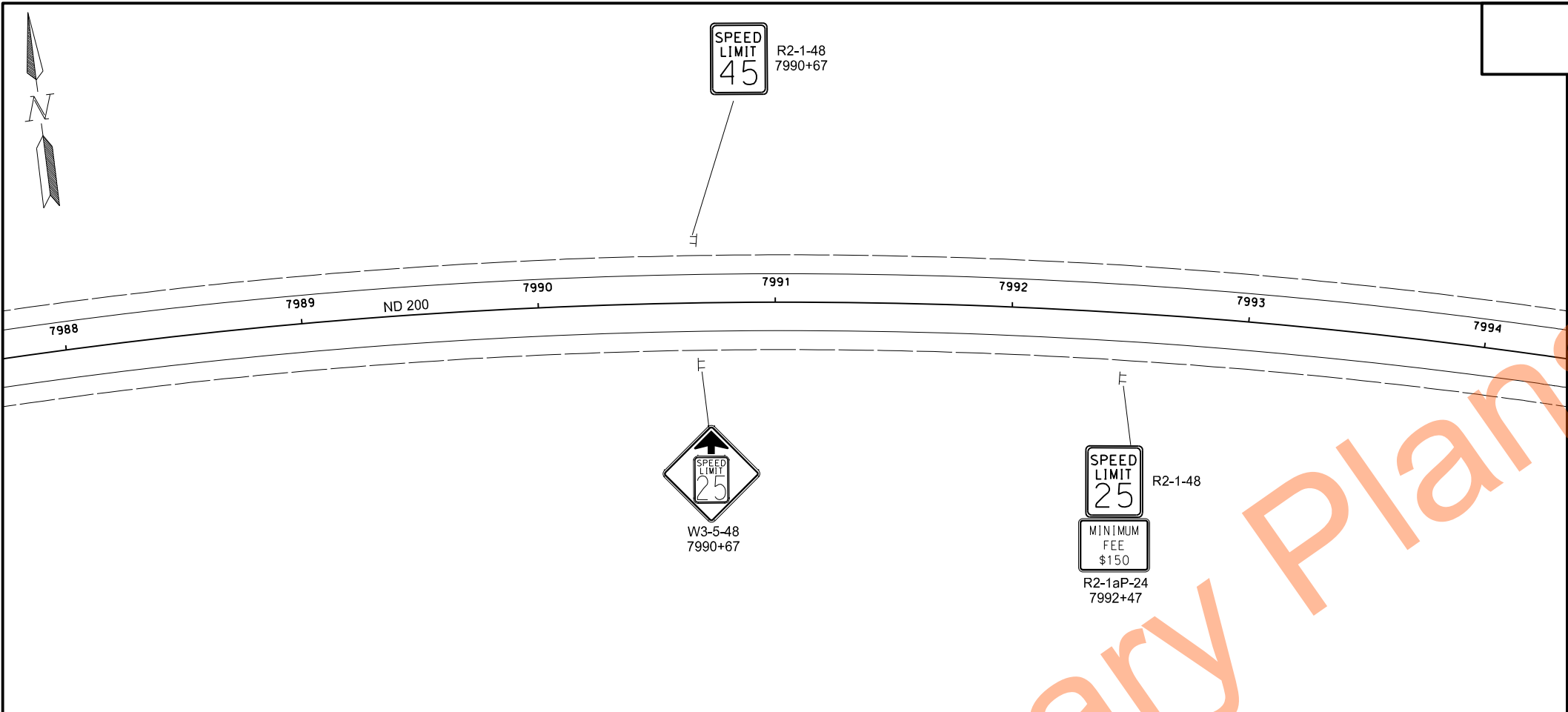
SPEC	CODE	BID ITEM	UNIT	QUANTITY
704	1000	TRAFFIC CONTROL SIGNS		
		R1-1-48	UNIT	32
		R9-9-24 2 EA x 3 UNITS	UNIT	6
		R11-2-48 2 EA x 2 UNITS	UNIT	24
		W1-4-48 2 EA x 35 UNITS	UNIT	70
		W1-6-48 2 EA x 26 UNITS	UNIT	52
704	1039	ATTENUATION DEVICE-TYPE B-45		
		8004+62	EA	1
704	1052	TYPE III BARRICADE		
		ND 200	EA	8
704	1054	SIDEWALK BARRICADE		
		4th Ave NW	EA	2
704	1058	PEDESTRIAN WALKWAY		
		CR 18	LF	50
		4th Ave NE	LF	145
704	1060	DELINEATOR DRUMS		
		ND 200	EA	5
		CR 18	EA	14
704	1067	TUBULAR MARKERS		
		ND 200	EA	27
		4th Ave NE (pedestrian walkway)	EA	33
704	1080	STACKABLE VERTICAL PANELS		
		ND 200	EA	31
704	1500	OBLITERATION OF PAVEMENT MARKING		
		EB 4" White Edgeline (8000+45 to 8004+70)	SF	142
		EB 8" White Channel Line (8002+60 to 8004+66)	SF	138
		EB 4" Dbl Yellow (8000+45 to 8001+68)	SF	82
		EB Rt Arrows (2EA x 16SF)	SF	32
		EB 4" White Edgeline (8006+21 to 8006+75)	SF	18
		WB 4" Dbl Yellow (8005+63 to 8006+75)	SF	75
		4th Ave NE, 24" White Stop Bar	SF	56
704	2108	TEMPORARY CURB RAMP		
		4th Ave NE	EA	1
704	3511	STATE FURNISHED MEDIAN BARRIER		
		ND 200	LF	360



Work Zone Traffic Control

ND 200
Main St W - Hazen Golf Course

8000+45 to 8006+75
Phase 1



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NDS-NH-5-200(034)150	100	7

SPEC	CODE	BID ITEM	UNIT	QUANTITY
704	1000	TRAFFIC CONTROL SIGNS		
		R2-1-48 2 EA x 39 UNITS	UNIT	78
		R2-1aP-24	UNIT	10
		W1-4-48	UNIT	35
		W3-5-48	UNIT	35
704	1060	DELINEATOR DRUMS		
		ND 200	EA	11
704	1067	TUBULAR MARKERS		
		ND 200	EA	11
704	1080	STACKABLE VERTICAL PANELS		
		ND 200	EA	11
704	1500	OBLITERATION OF PAVEMENT MARKING		
		WB 4" White Edgeline (7997+87 to 8000+45)	SF	86

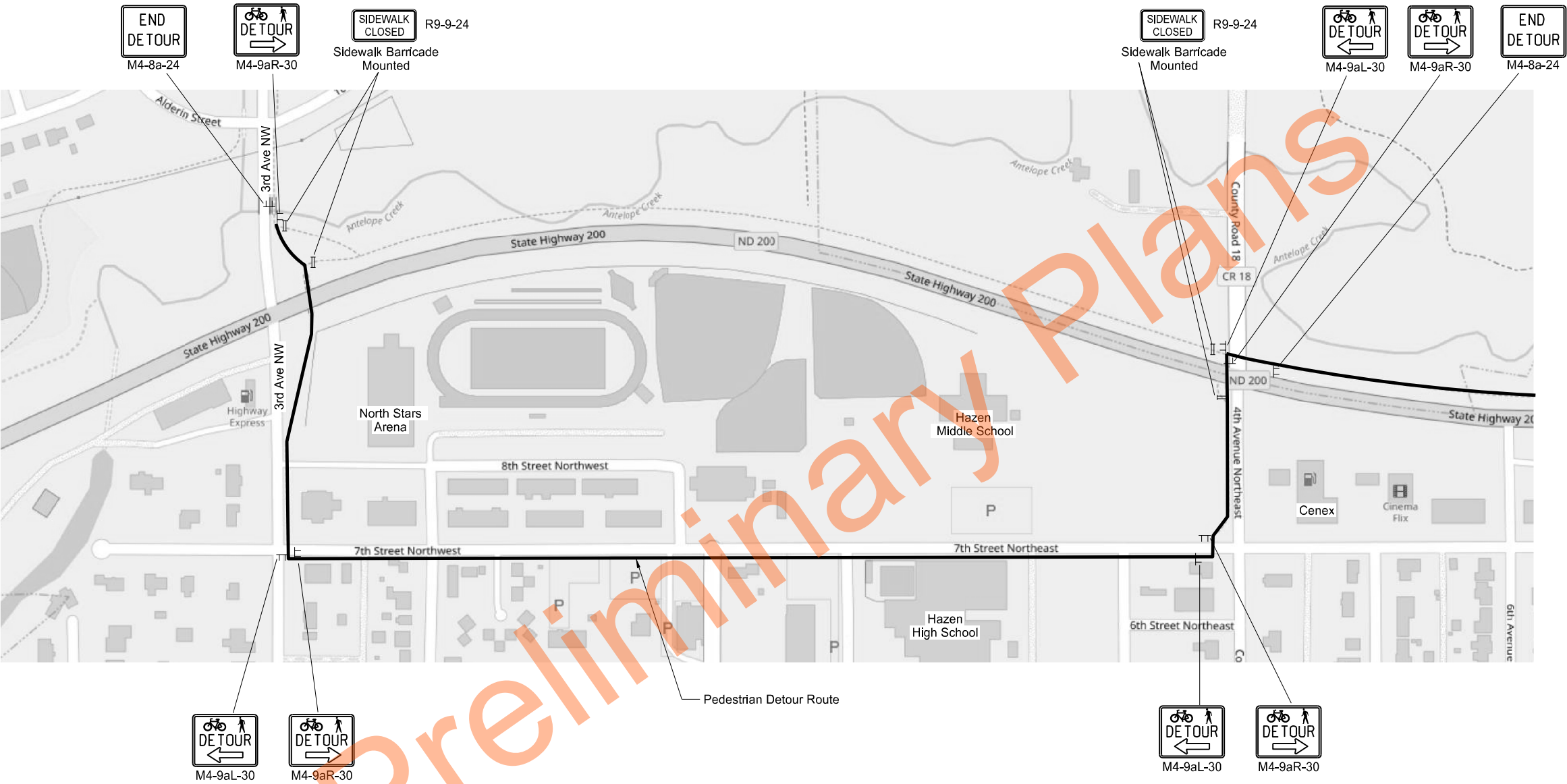


Work Zone Traffic Control

ND 200
Main St W - Hazen Golf Course

7987+85 to 8000+45
Phase 2

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	100	10



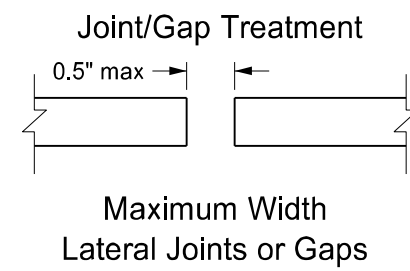
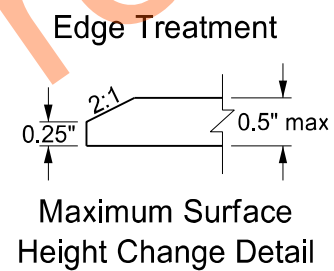
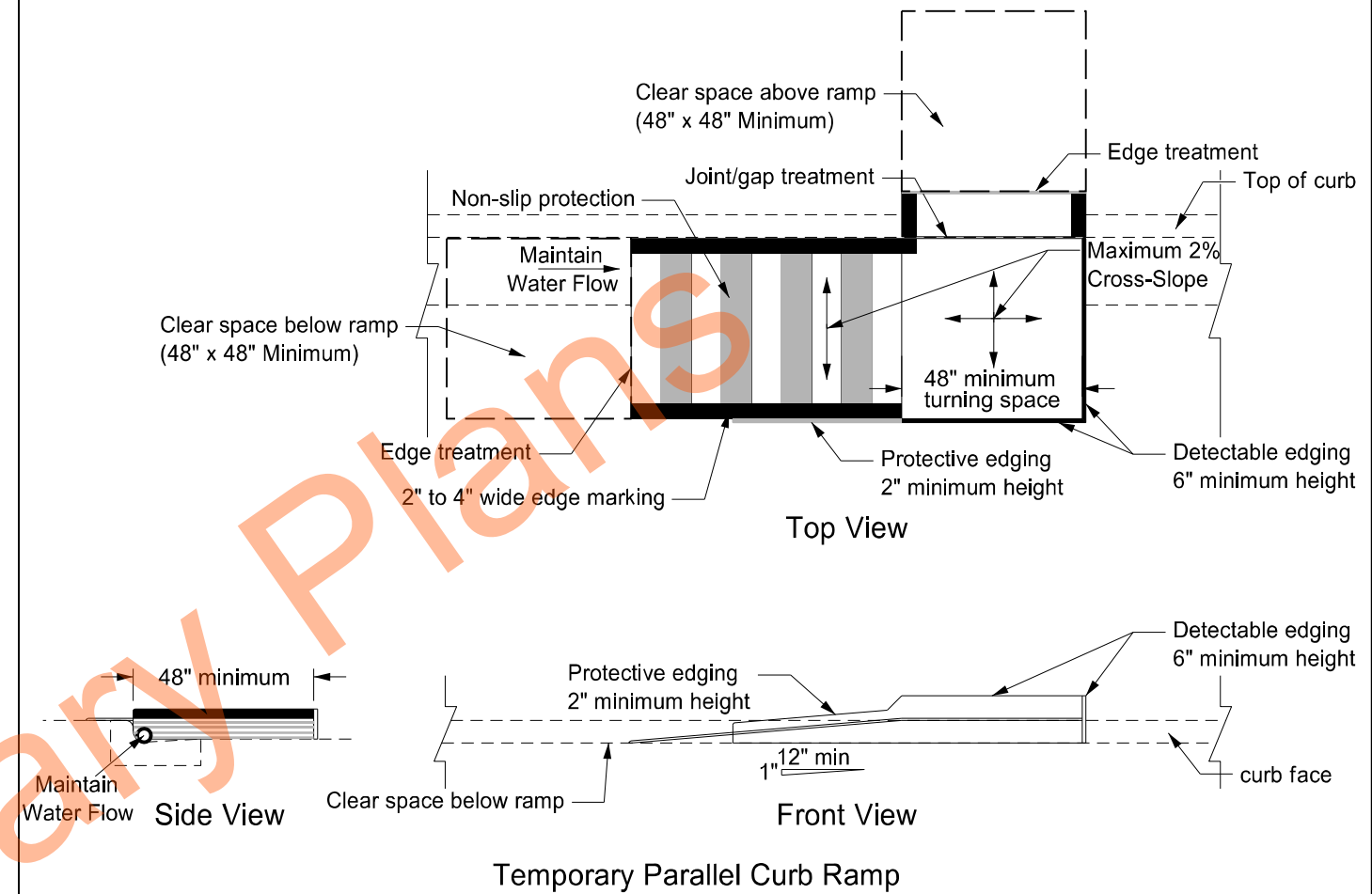
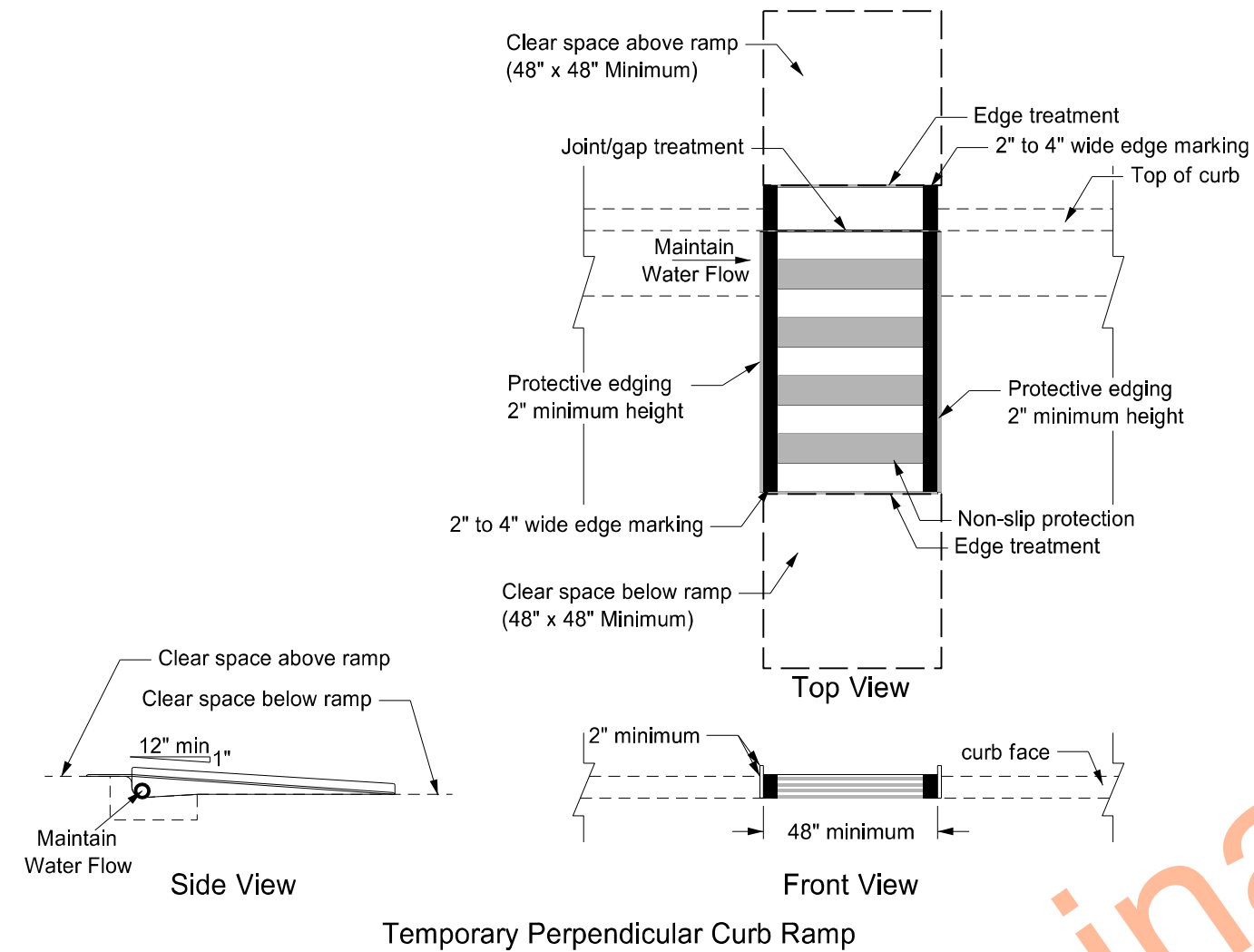
Work Zone Traffic Control

ND 200

Main St W - Hazen Golf Course

Pedestrian Detour

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	100	11



Work Zone Traffic Control

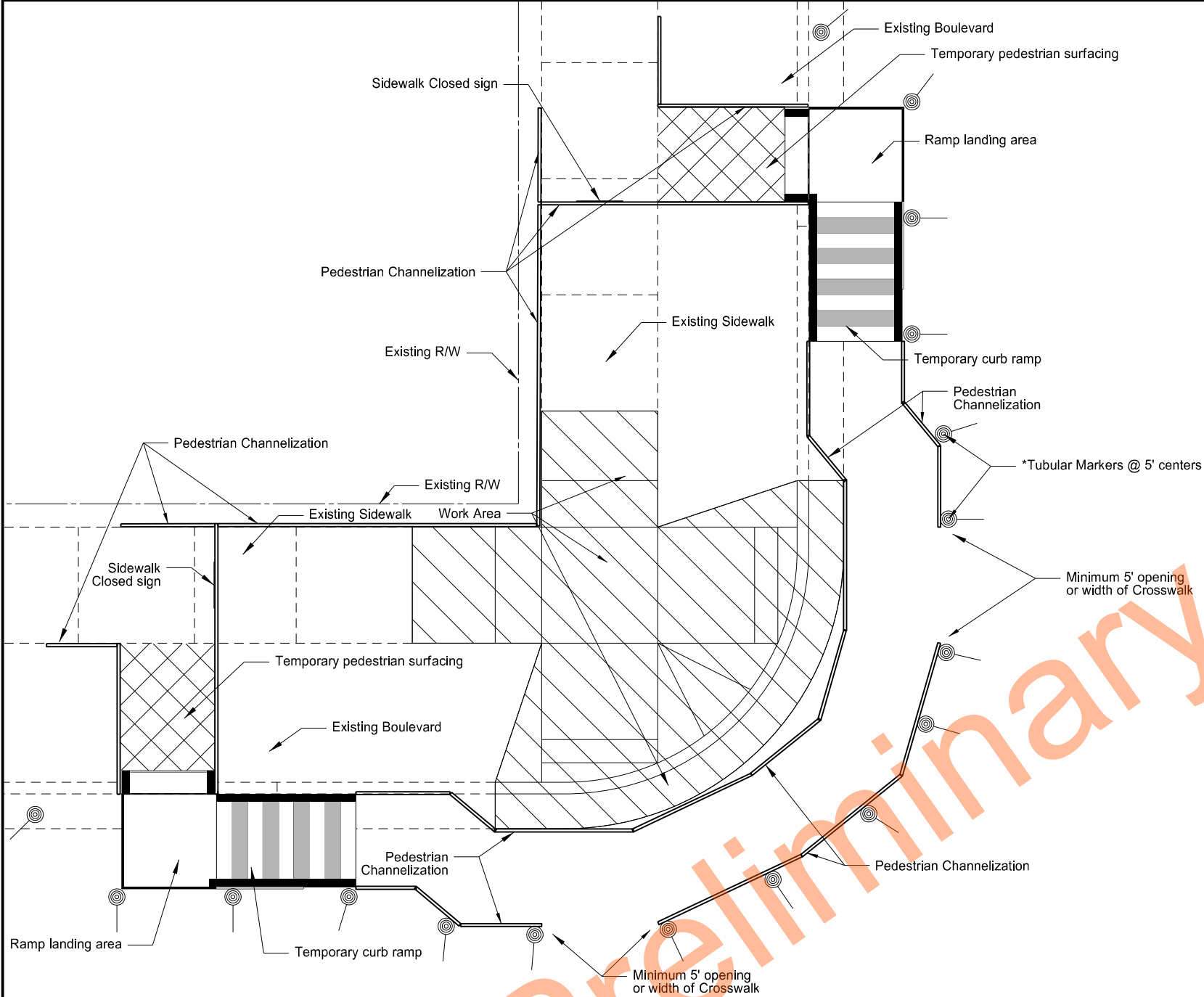
ND 200

Main St W - Hazen Golf Course

Temporary Pedestrian Curb Ramp Details

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	100	12

*NOTE: Eliminate tubular markers if pedestrian channelization is retro-reflective



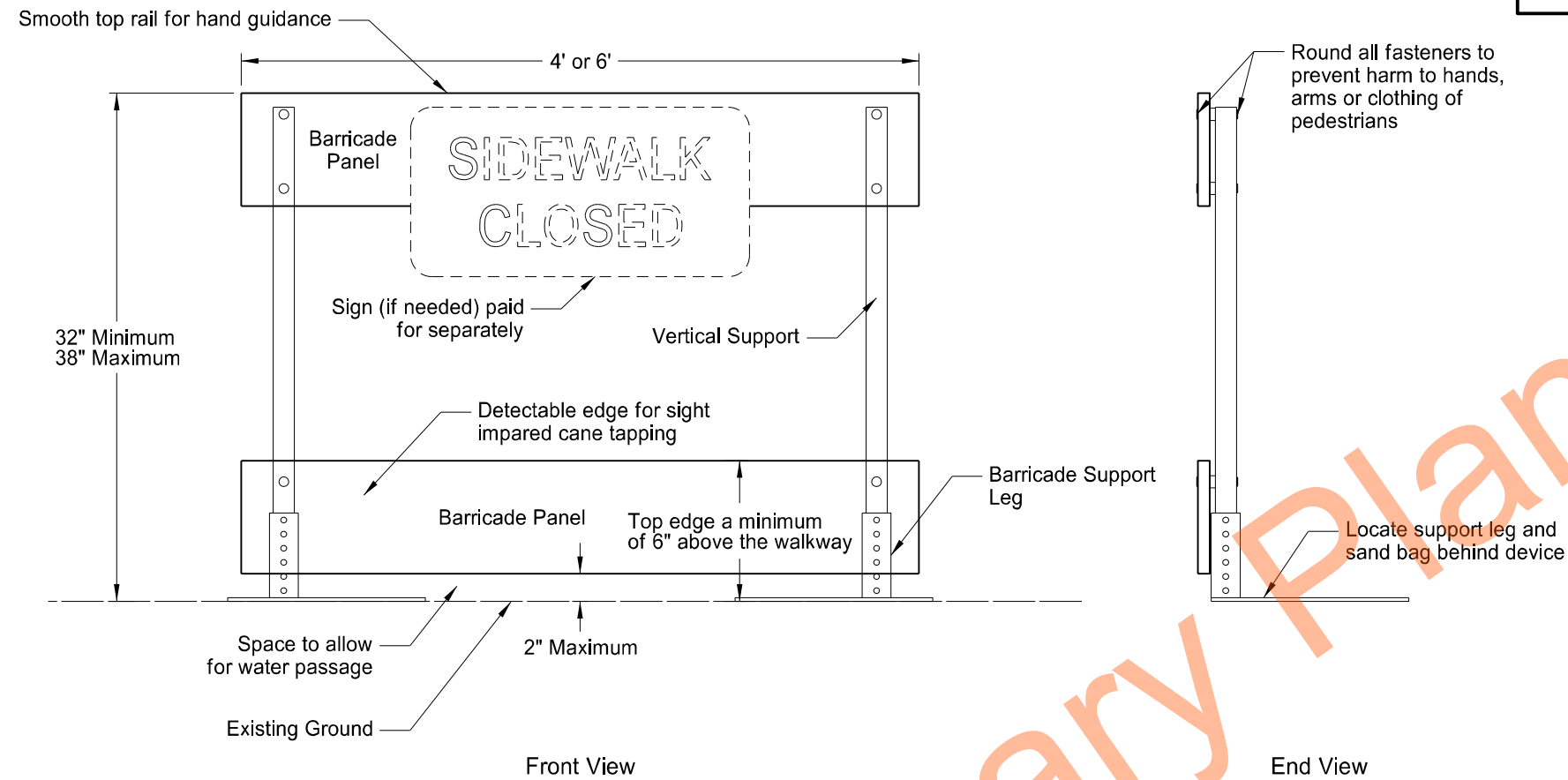
Details

ND 200

Main St W - Hazen Golf Course

Temporary Pedestrian Access Route

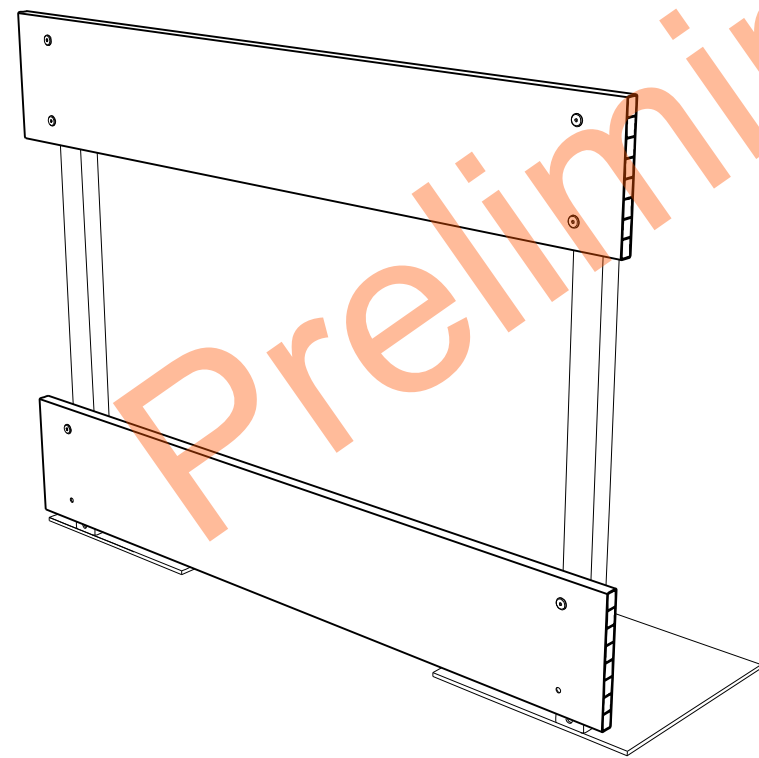
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	100	13



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



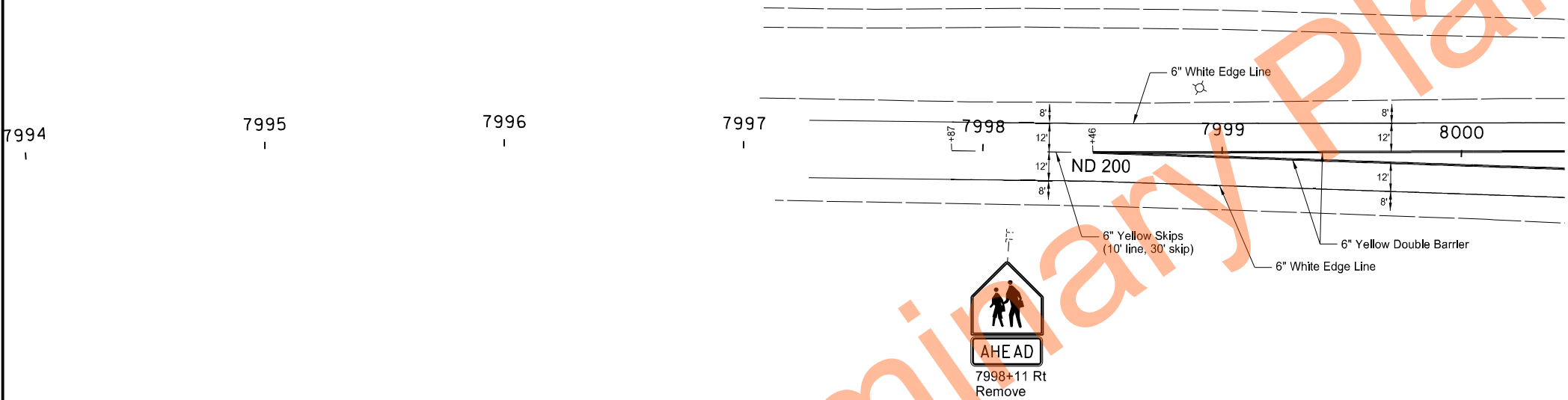
Work Zone Traffic Control

ND 200
Main St W - Hazen Golf Course

Sidewalk Barricade

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	110	2

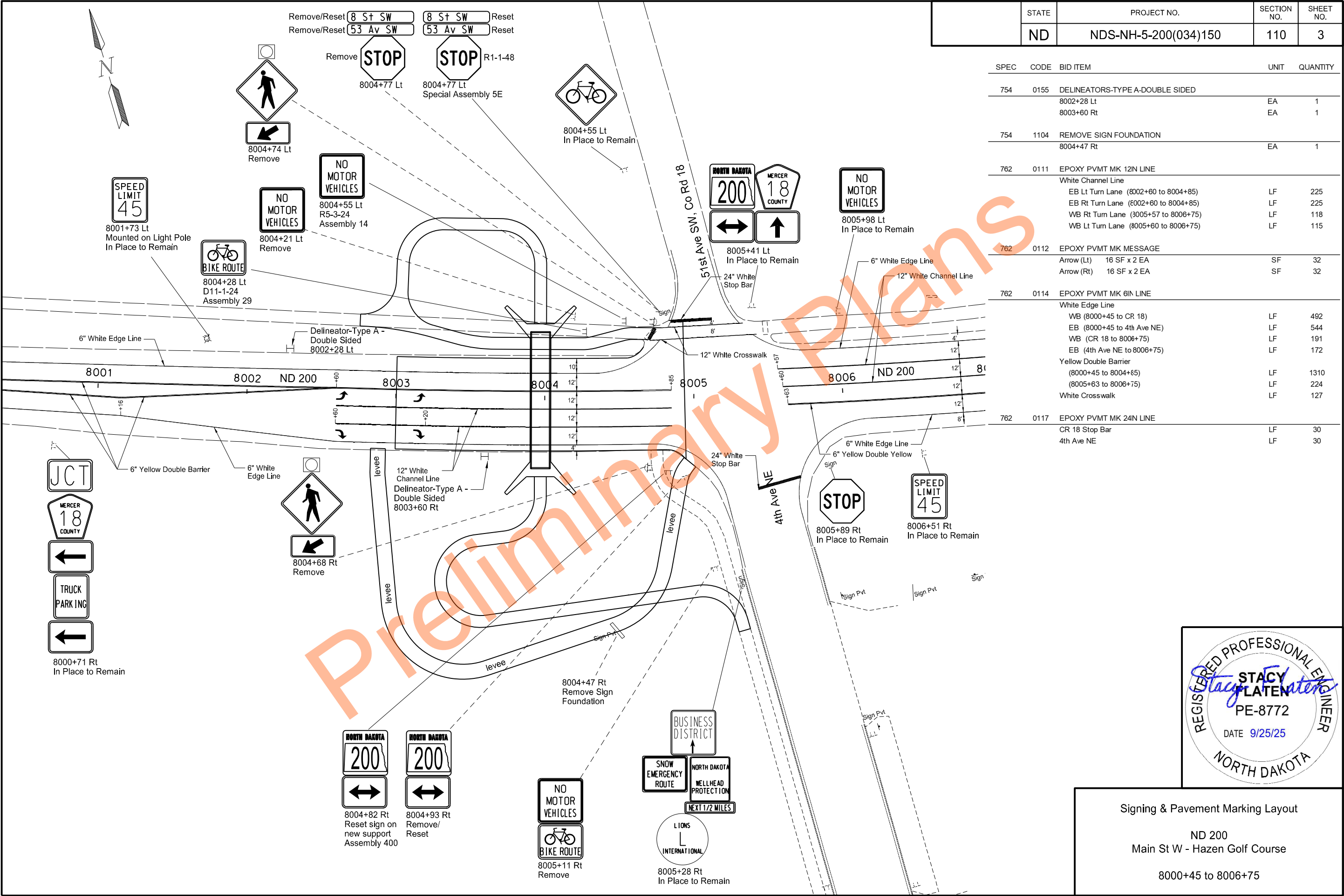
SPEC	CODE	BID ITEM	UNIT	QUANTITY
762	0114	EPOXY PVMT MK 6IN LINE		
		White Edge Line (WB & EB, 7997+87 to 8000+45)	LF	516
		Yellow Skips (7997+87 to 7998+46)	LF	20
		Yellow Double Barrier (WB & EB 7998+46 to 8000+45)	LF	796



Signing & Pavement Marking Layout

ND 200
Main St W - Hazen Golf Course

7994+15 to 8000+45



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	110	3

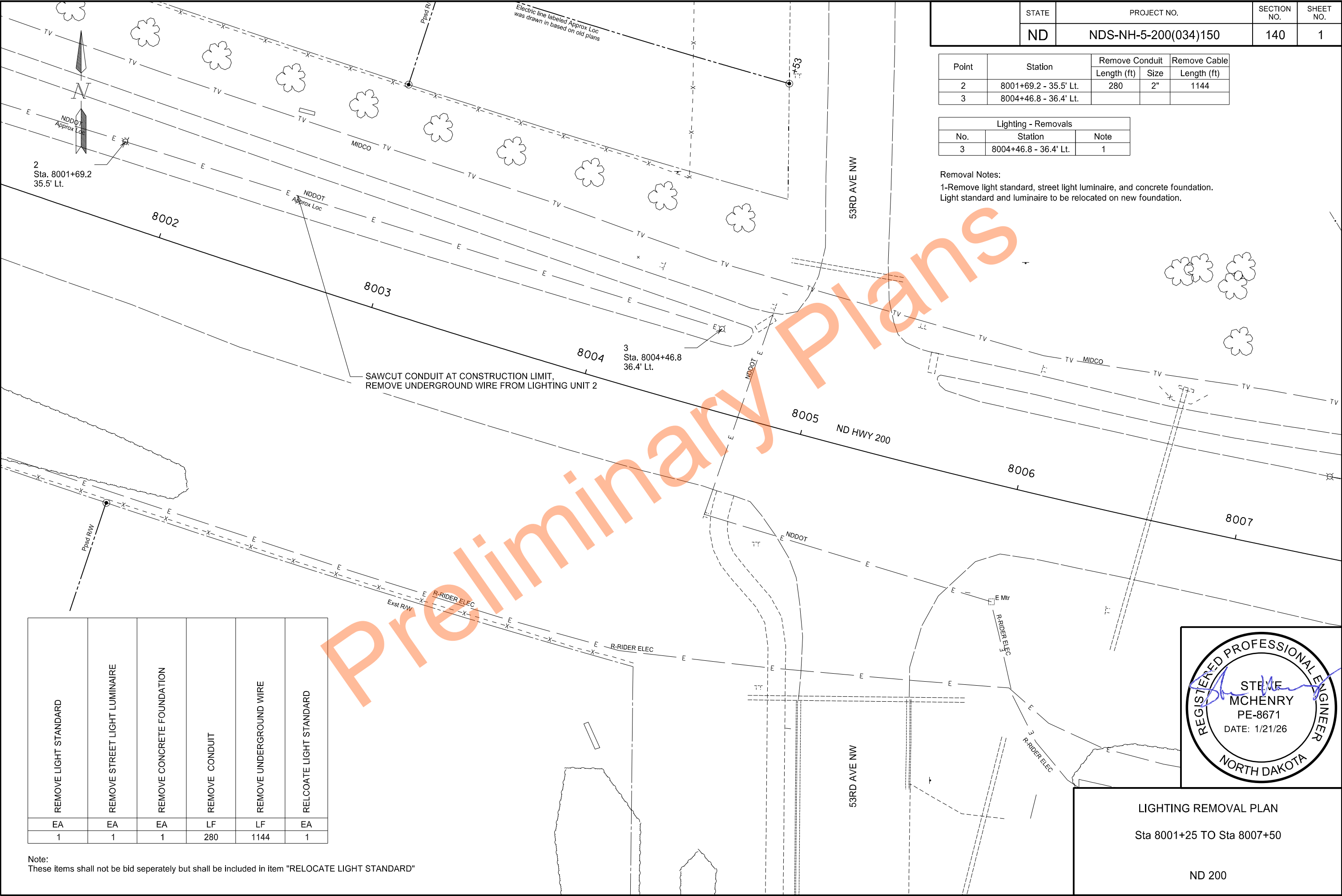
SPEC	CODE	BID ITEM	UNIT	QUANTITY
754	0155	DELINEATORS-TYPE A-DOUBLE SIDED		
		8002+28 Lt	EA	1
		8003+60 Rt	EA	1
754	1104	REMOVE SIGN FOUNDATION		
		8004+47 Rt	EA	1
762	0111	EPOXY PVMT MK 12IN LINE		
		White Channel Line		
		EB Lt Turn Lane (8002+60 to 8004+85)	LF	225
		EB Rt Turn Lane (8002+60 to 8004+85)	LF	225
		WB Rt Turn Lane (3005+57 to 8006+75)	LF	118
		WB Lt Turn Lane (8005+60 to 8006+75)	LF	115
762	0112	EPOXY PVMT MK MESSAGE		
		Arrow (Lt) 16 SF x 2 EA	SF	32
		Arrow (Rt) 16 SF x 2 EA	SF	32
762	0114	EPOXY PVMT MK 6IN LINE		
		White Edge Line		
		WB (8000+45 to CR 18)	LF	492
		EB (8000+45 to 4th Ave NE)	LF	544
		WB (CR 18 to 8006+75)	LF	191
		EB (4th Ave NE to 8006+75)	LF	172
		Yellow Double Barrier (8000+45 to 8004+85)	LF	1310
		(8005+63 to 8006+75)	LF	224
		White Crosswalk	LF	127
762	0117	EPOXY PVMT MK 24IN LINE		
		CR 18 Stop Bar	LF	30
		4th Ave NE	LF	30



Signing & Pavement Marking Layout

ND 200
Main St W - Hazen Golf Course

8000+45 to 8006+75



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	140	1

Point	Station	Remove Conduit		Remove Cable
		Length (ft)	Size	Length (ft)
2	8001+69.2 - 35.5' Lt.	280	2"	1144
3	8004+46.8 - 36.4' Lt.			

Lighting - Removals		
No.	Station	Note
3	8004+46.8 - 36.4' Lt.	1

Removal Notes:
1-Remove light standard, street light luminaire, and concrete foundation.
Light standard and luminaire to be relocated on new foundation.

REMOVE LIGHT STANDARD	REMOVE STREET LIGHT LUMINAIRE	REMOVE CONCRETE FOUNDATION	REMOVE CONDUIT	REMOVE UNDERGROUND WIRE	RELCOATE LIGHT STANDARD
EA	EA	EA	LF	LF	EA
1	1	1	280	1144	1

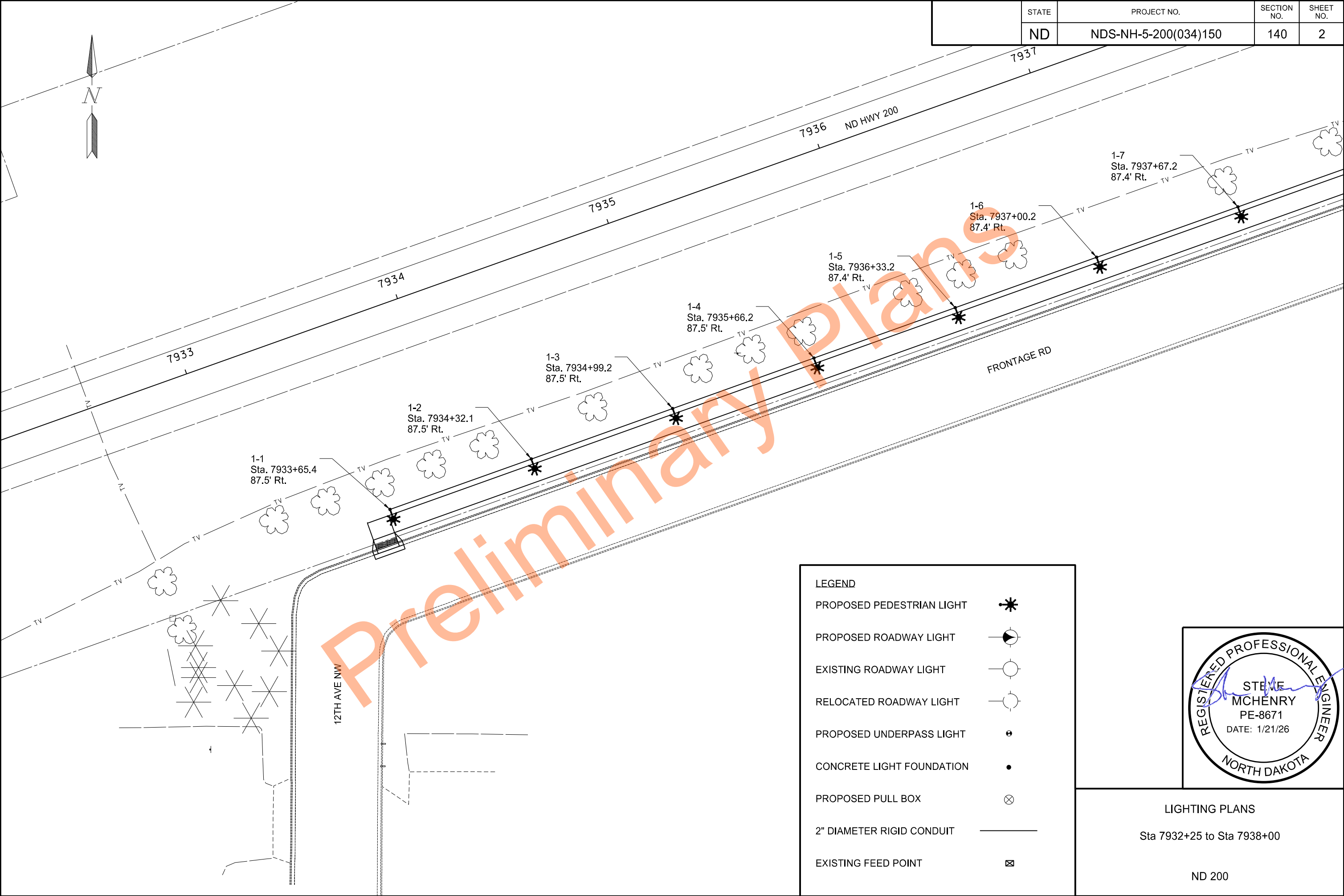
Note:
These items shall not be bid seperately but shall be included in item "RELOCATE LIGHT STANDARD"

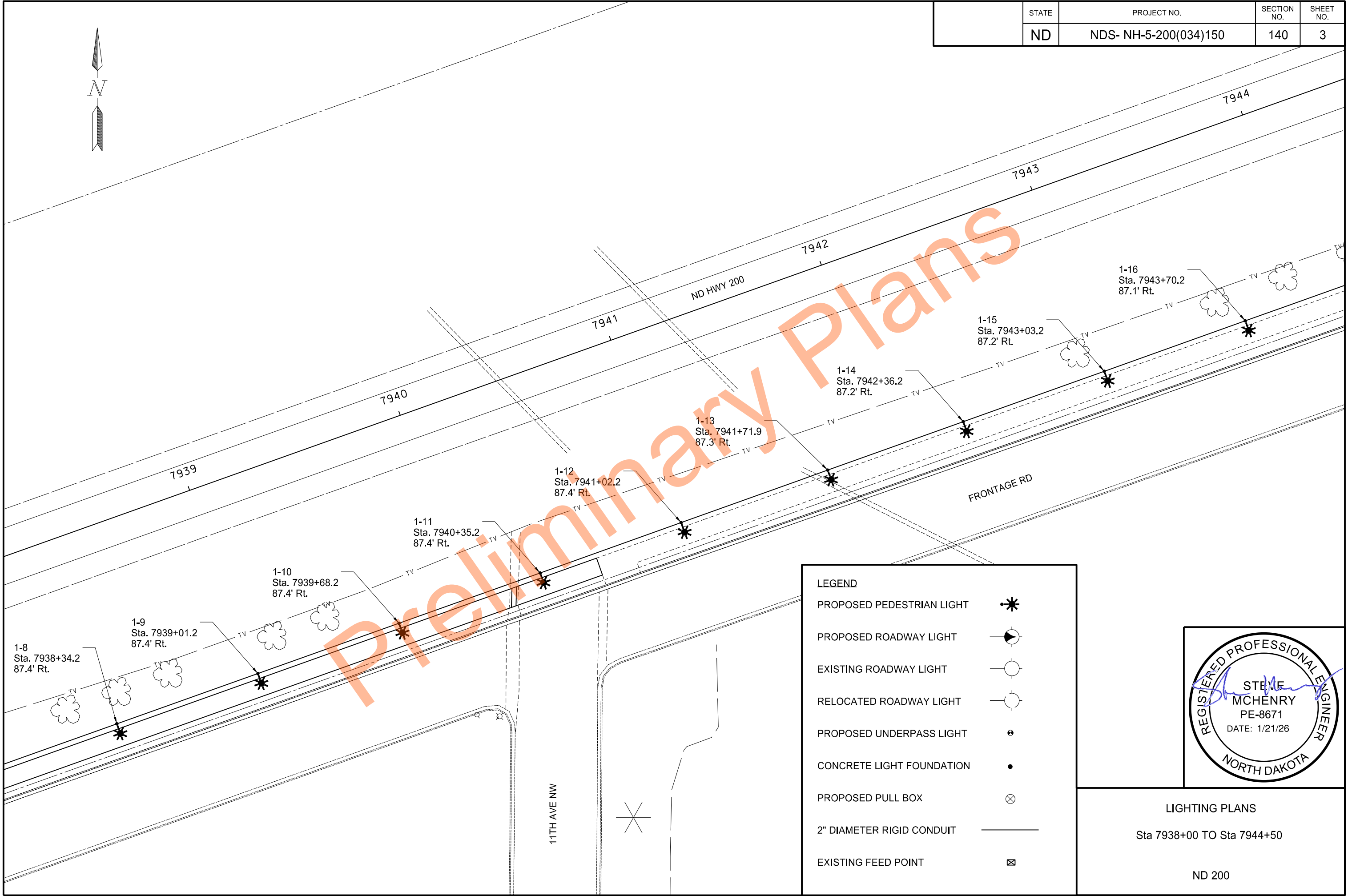


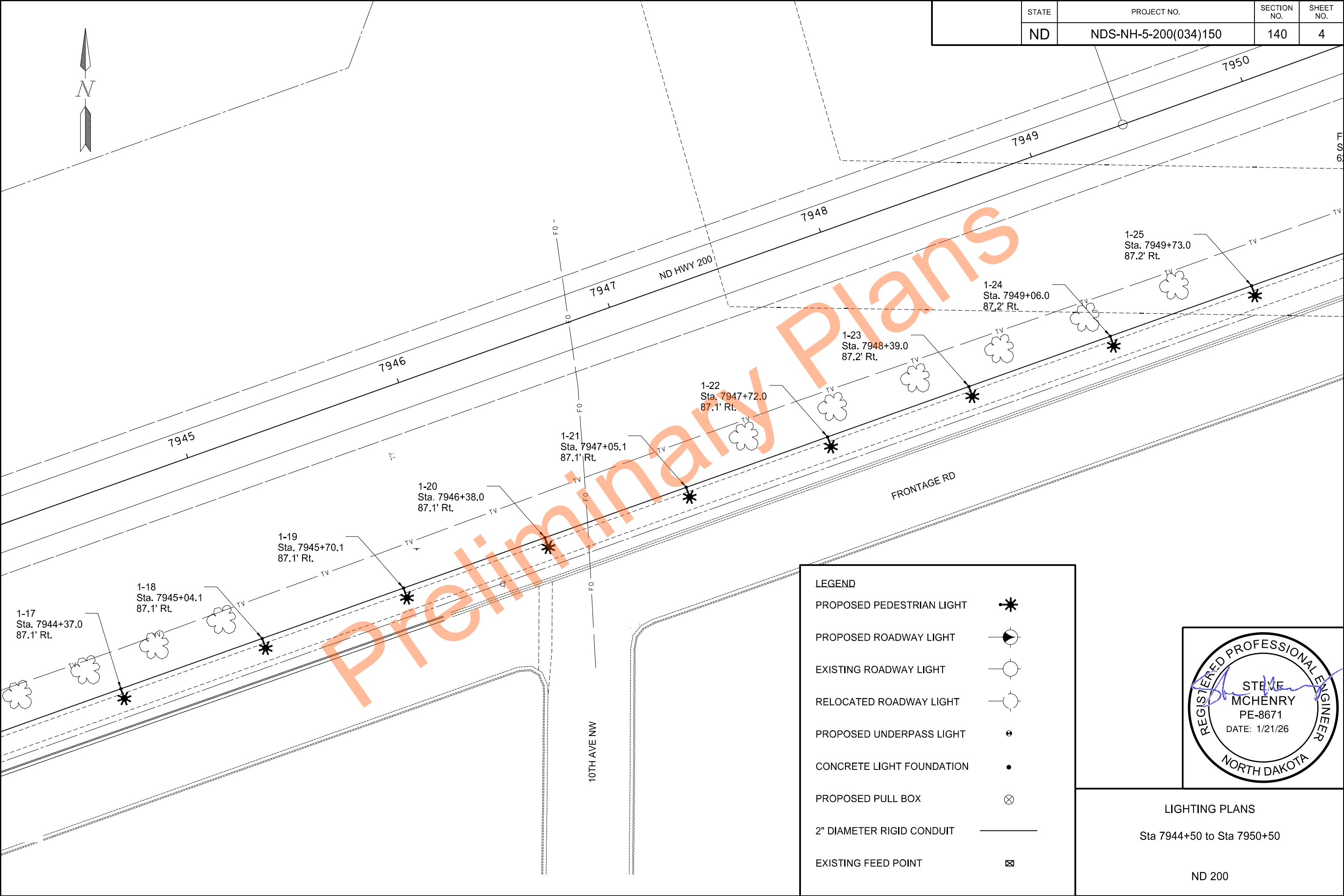
LIGHTING REMOVAL PLAN

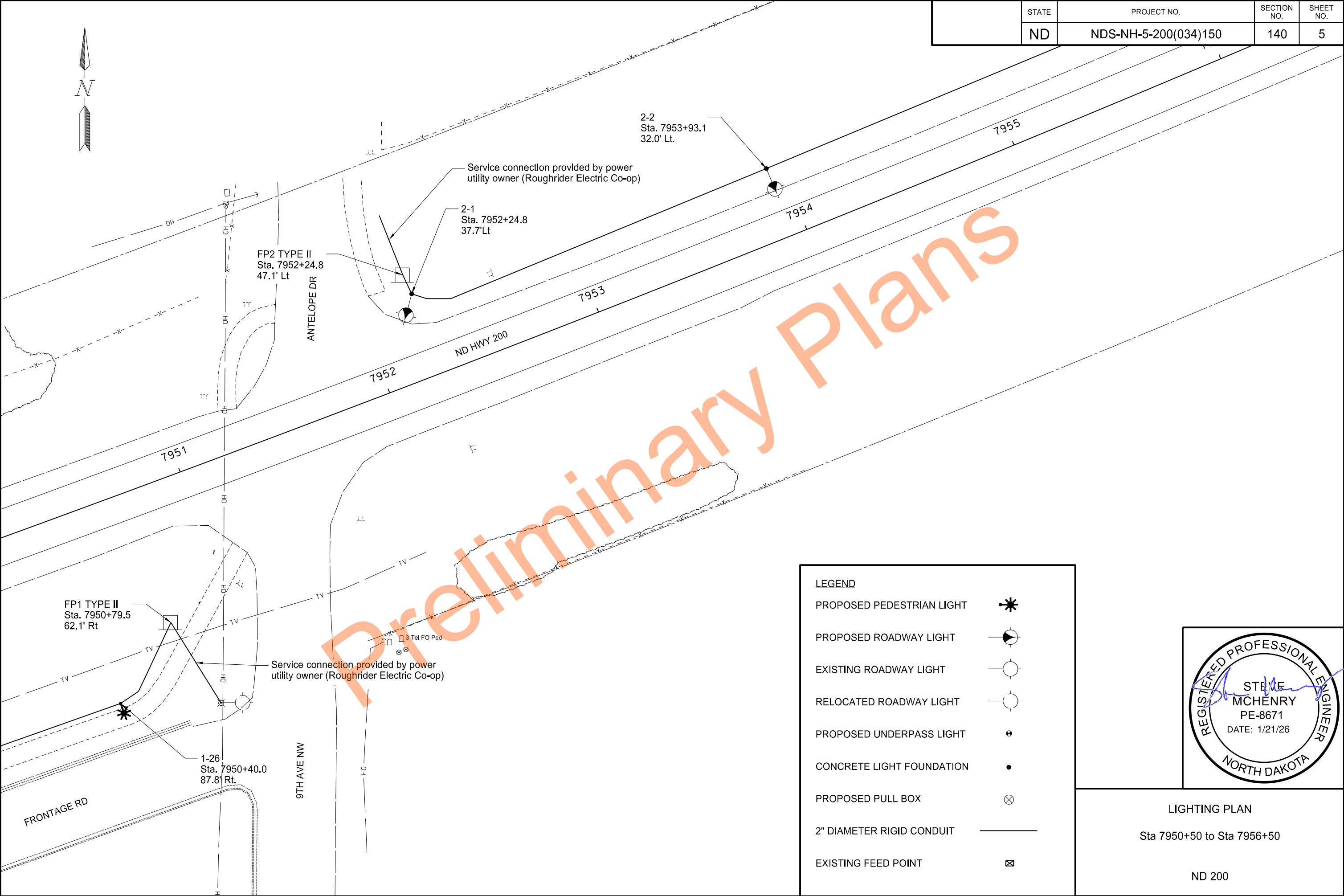
Sta 8001+25 TO Sta 8007+50

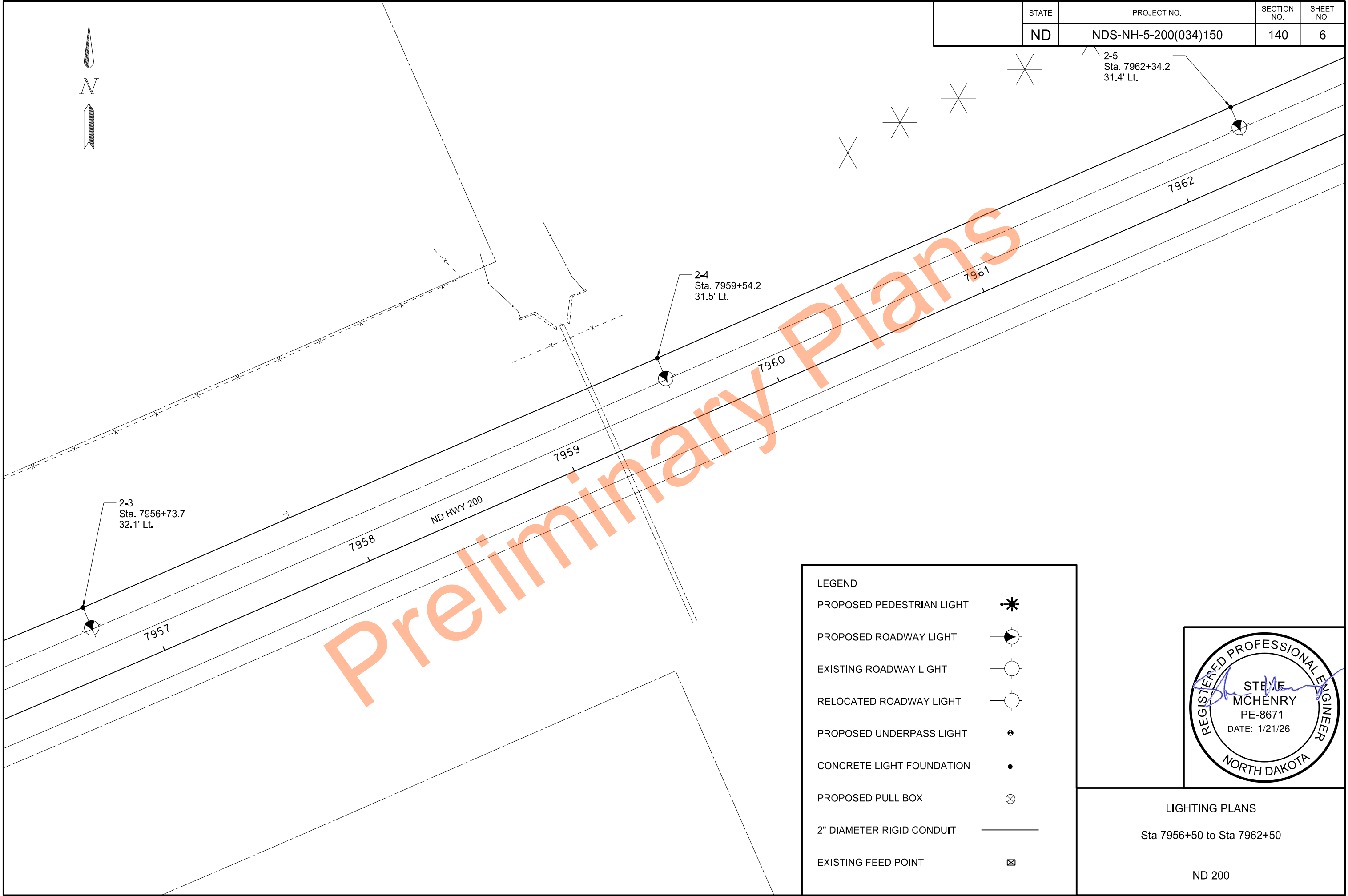
ND 200





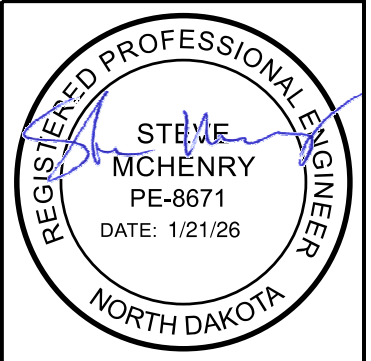




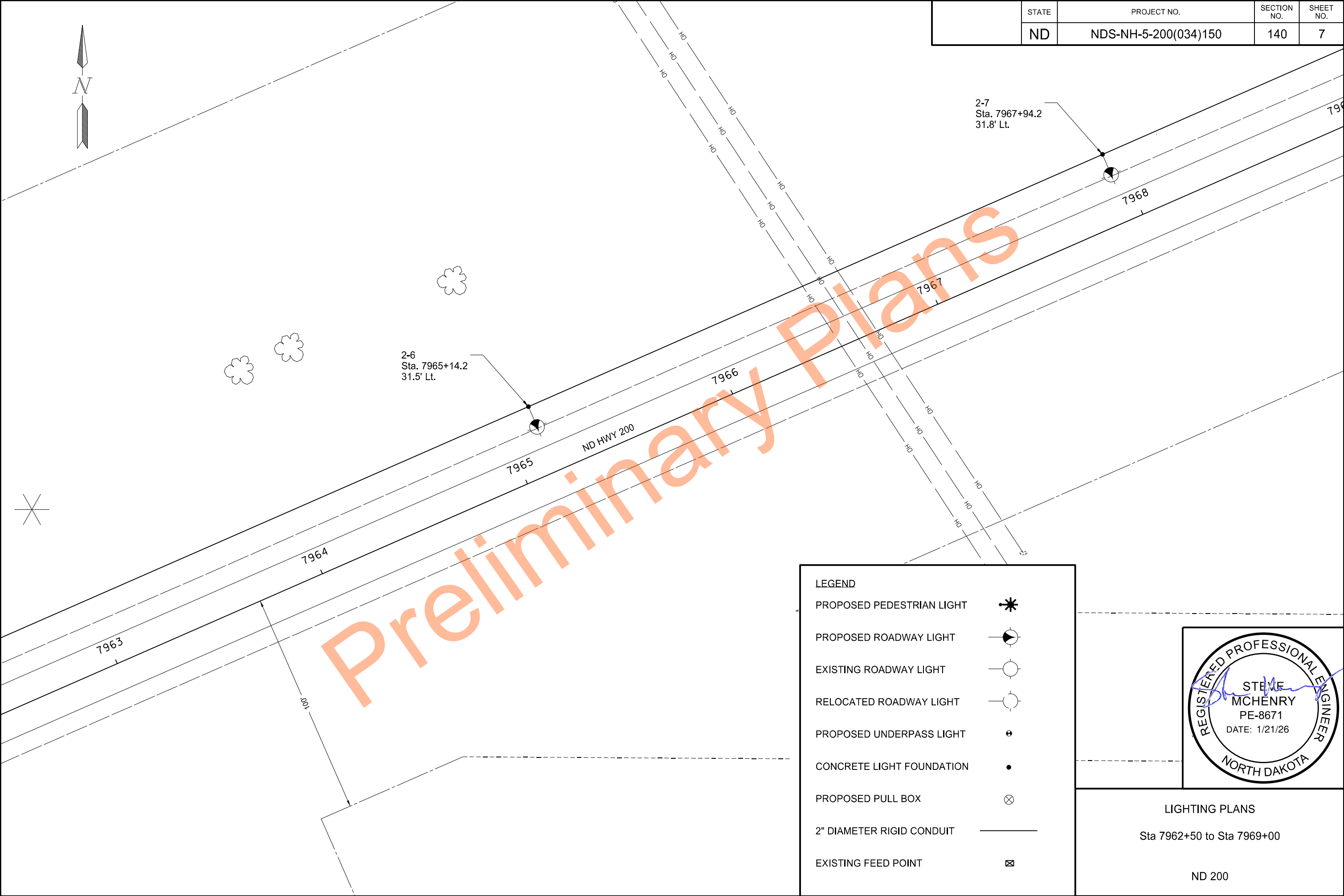


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	140	6

LEGEND	
PROPOSED PEDESTRIAN LIGHT	
PROPOSED ROADWAY LIGHT	
EXISTING ROADWAY LIGHT	
RELOCATED ROADWAY LIGHT	
PROPOSED UNDERPASS LIGHT	
CONCRETE LIGHT FOUNDATION	
PROPOSED PULL BOX	
2" DIAMETER RIGID CONDUIT	
EXISTING FEED POINT	

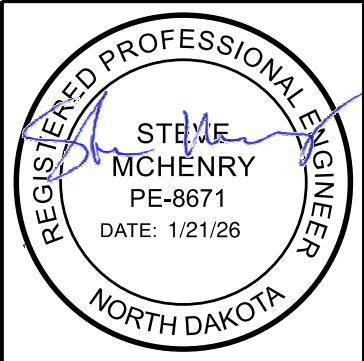


LIGHTING PLANS
Sta 7956+50 to Sta 7962+50
ND 200



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	140	7

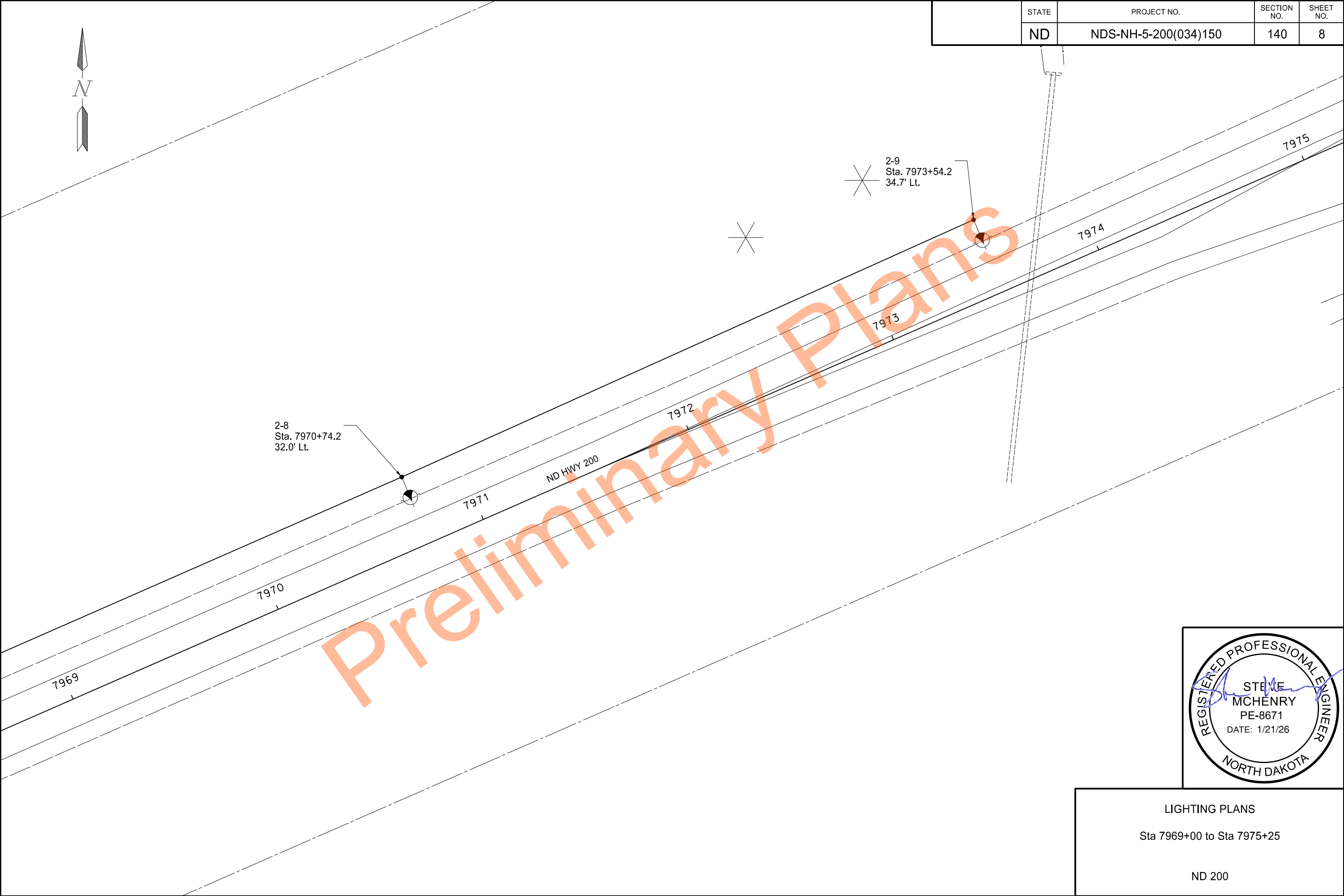
LEGEND	
PROPOSED PEDESTRIAN LIGHT	
PROPOSED ROADWAY LIGHT	
EXISTING ROADWAY LIGHT	
RELOCATED ROADWAY LIGHT	
PROPOSED UNDERPASS LIGHT	
CONCRETE LIGHT FOUNDATION	
PROPOSED PULL BOX	
2" DIAMETER RIGID CONDUIT	
EXISTING FEED POINT	



LIGHTING PLANS

Sta 7962+50 to Sta 7969+00

ND 200

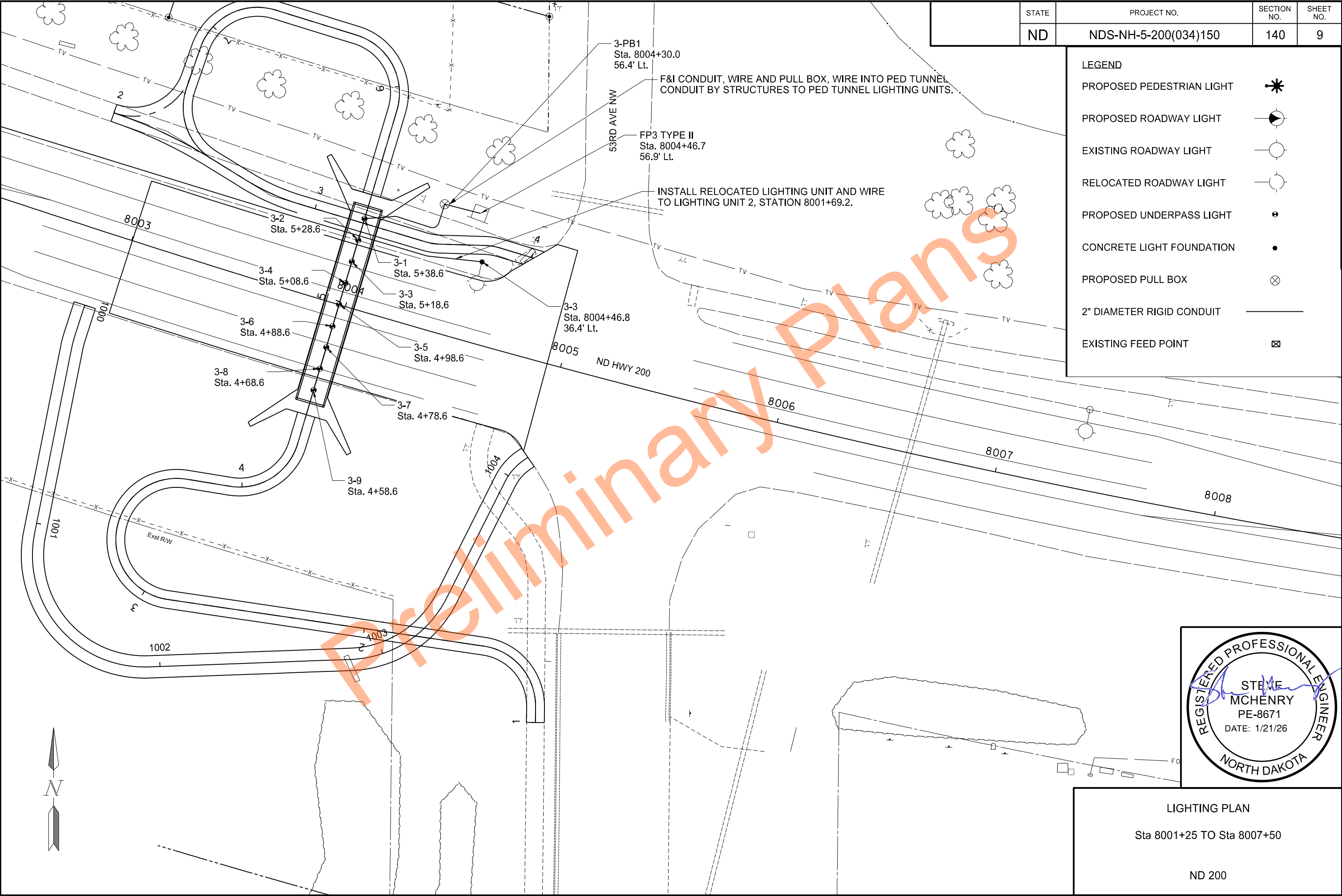


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	140	8



LIGHTING PLANS
Sta 7969+00 to Sta 7975+25

ND 200



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NDS-NH-5-200(034)150	140	9

LEGEND

PROPOSED PEDESTRIAN LIGHT

PROPOSED ROADWAY LIGHT

EXISTING ROADWAY LIGHT

RELOCATED ROADWAY LIGHT

PROPOSED UNDERPASS LIGHT

CONCRETE LIGHT FOUNDATION

PROPOSED PULL BOX

2" DIAMETER RIGID CONDUIT

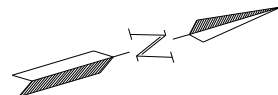
EXISTING FEED POINT



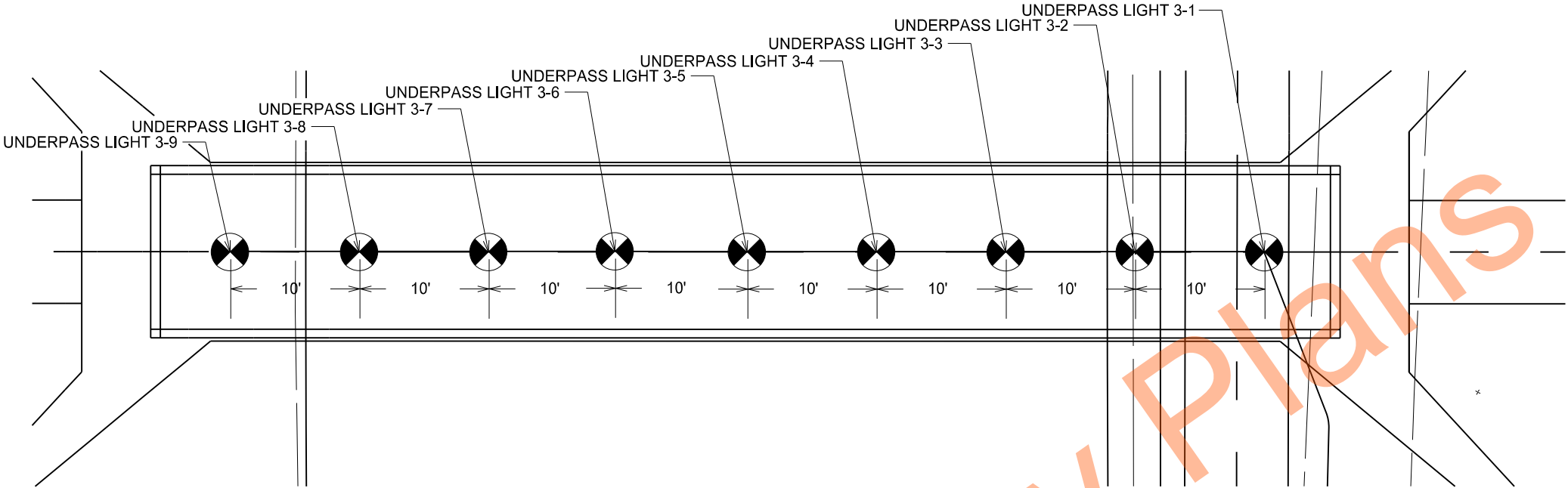
LIGHTING PLAN

Sta 8001+25 TO Sta 8007+50

ND 200



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	140	10

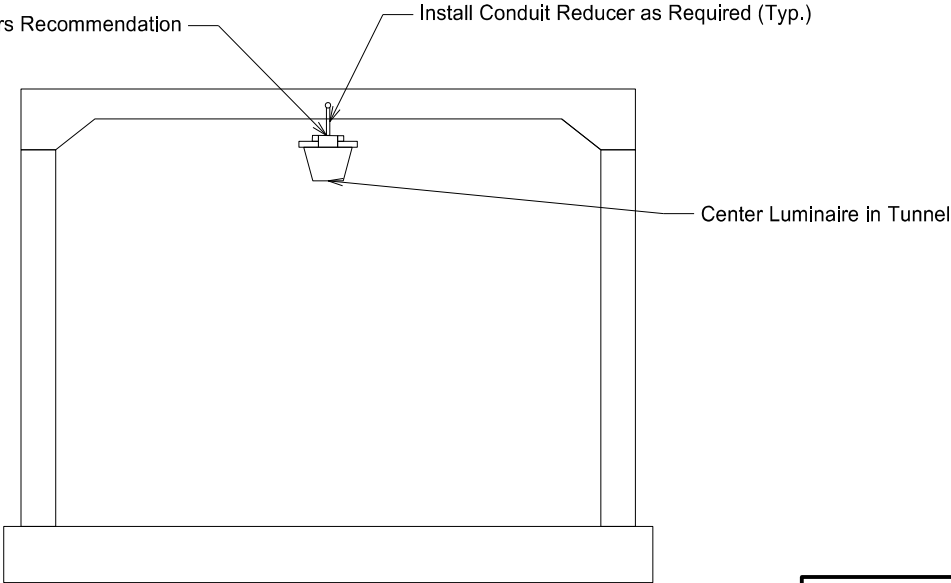


Pedestrian Underpass Lighting Layout Detail

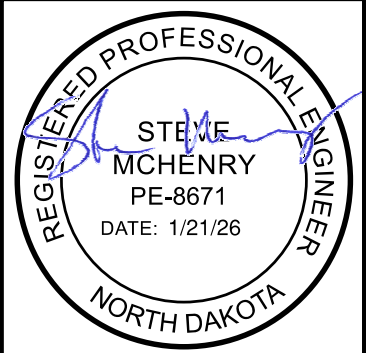
Point	Station	Conduit Runs		Cable Runs	
		Length (ft)	Size	Length (ft)	Type
FP3	8004+46.7 - 56.9' Lt.	17	2"	177	6 - NO 10 TYPE RHW
3-PB1	8004+30.0 - 56.4' Lt.			59	2 - NO 12 TYPE THW
3-PB1	8004+30.0 - 56.4' Lt.	48	3/4"	162	3 - NO 10 TYPE RHW
3-1	5+38.6			54	1 - NO 12 TYPE THW
3-1 to 3-3	5+38.6 5+18.6	20	3/4"	78 26	3 - NO 10 TYPE RHW 1 - NO 12 TYPE THW
3-3 to 3-5	5+18.6 4+98.6	20	3/4"	78 26	3 - NO 10 TYPE RHW 1 - NO 12 TYPE THW
3-5 to 3-7	4+98.6 4+78.6	20	3/4"	78 26	3 - NO 10 TYPE RHW 1 - NO 12 TYPE THW
3-7 to 3-9	4+78.6 4+58.6	20	3/4"	78 26	3 - NO 10 TYPE RHW 1 - NO 12 TYPE THW
3-PB1 to 3-2	8004+30.0 - 56.4' Lt. 5+28.6	58	3/4"	192 64	3 - NO 10 TYPE RHW 1 - NO 12 TYPE THW
3-2 to 3-4	5+28.6 5+08.6	20	3/4"	78 26	3 - NO 10 TYPE RHW 1 - NO 12 TYPE THW
3-4 to 3-6	5+08.6 4+88.6	20	3/4"	78 26	3 - NO 10 TYPE RHW 1 - NO 12 TYPE THW
3-6 to 3-8	4+88.6 4+68.6	20	3/4"	78 26	3 - NO 10 TYPE RHW 1 - NO 12 TYPE THW

Mount per Manufacturers Recommendation

Install Conduit Reducer as Required (Typ.)



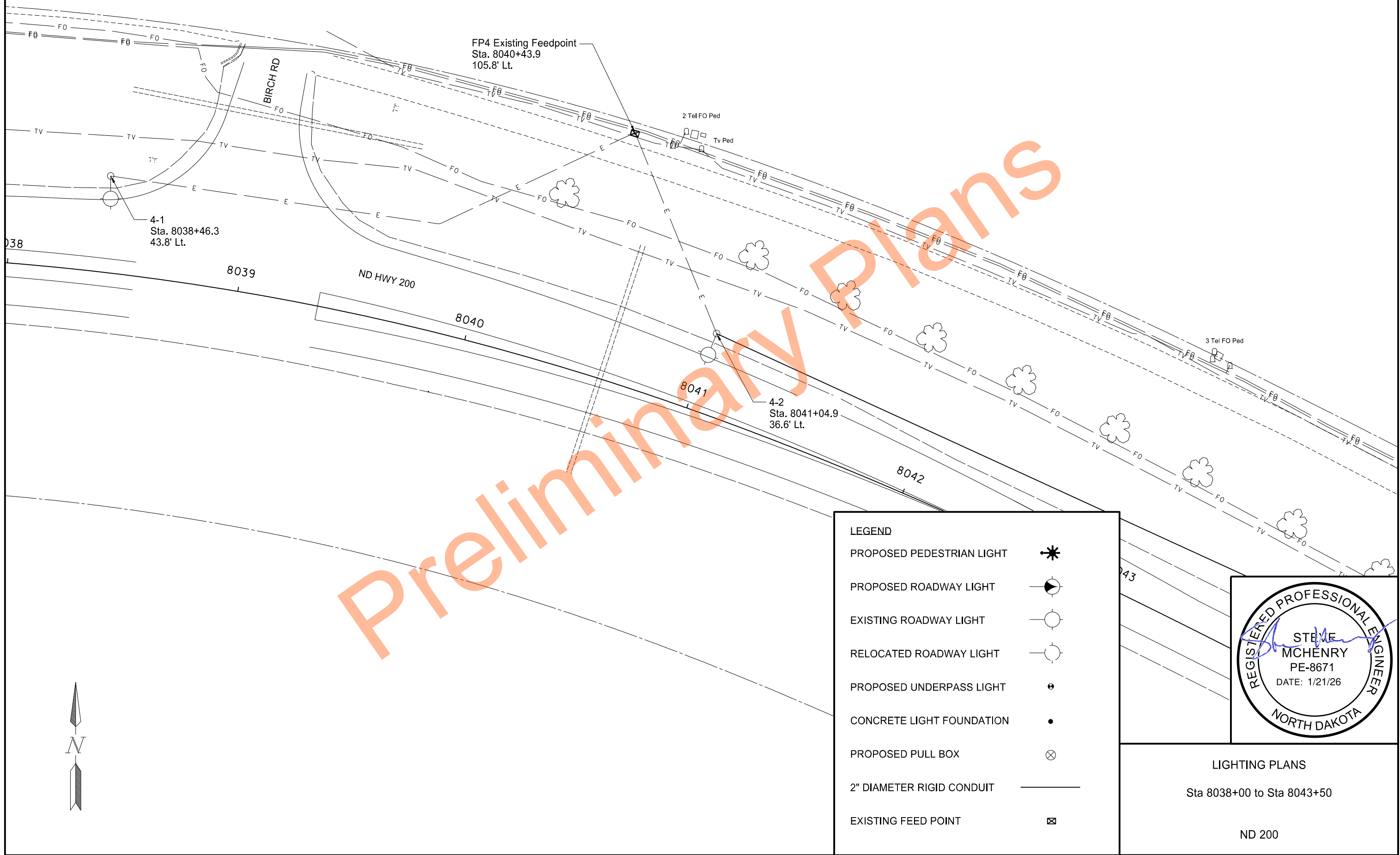
Pedestrian Underpass Lighting North Elevation Detail

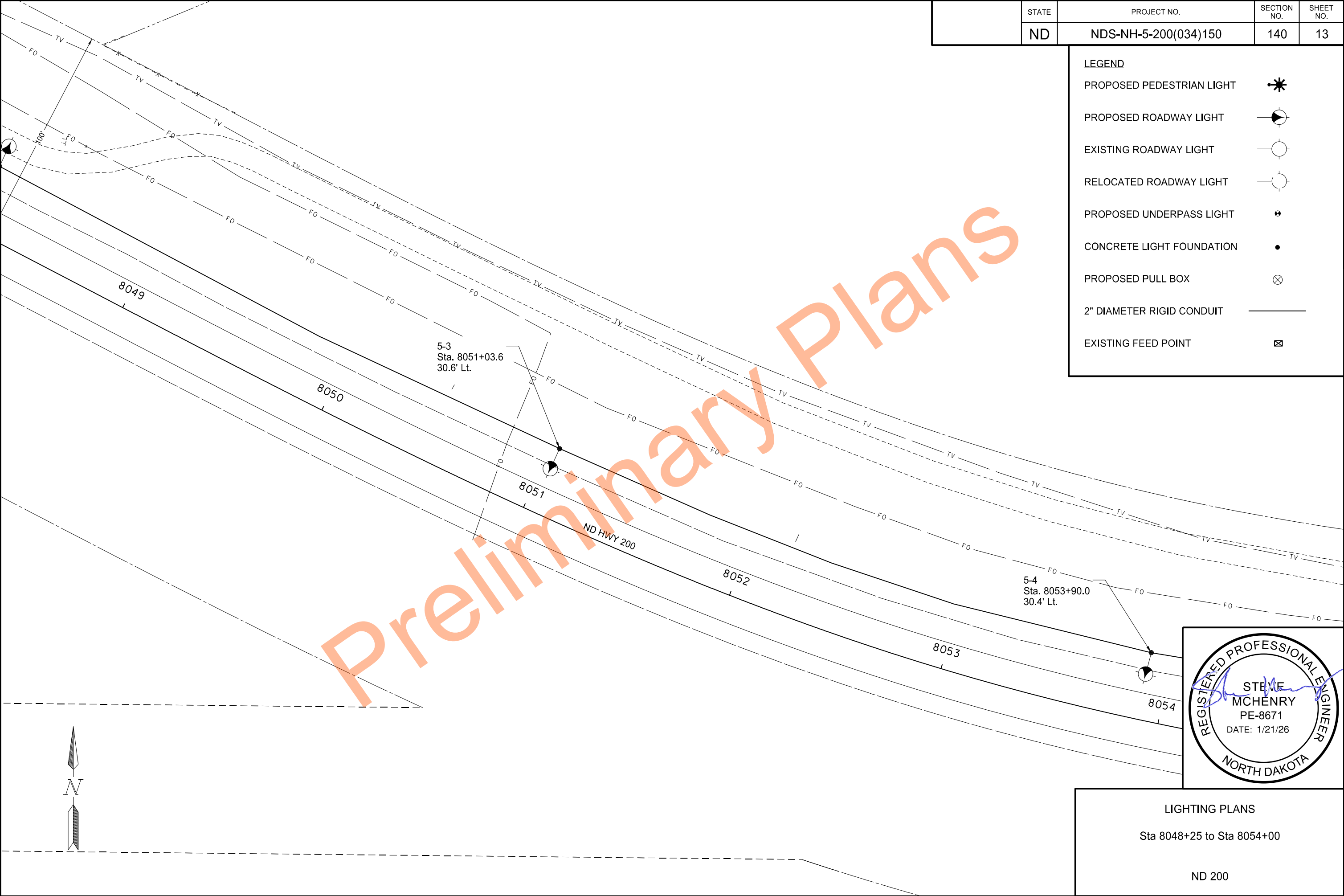


LIGHTING LAYOUTS
PEDESTRIAN UNDERPASS

ND 200

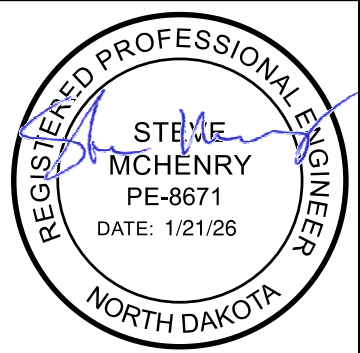
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	140	11





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	140	13

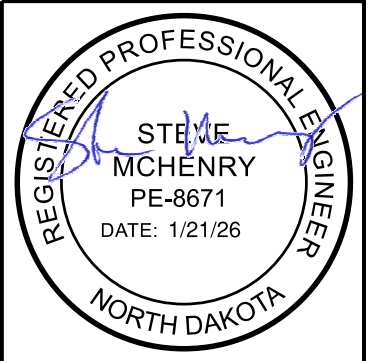
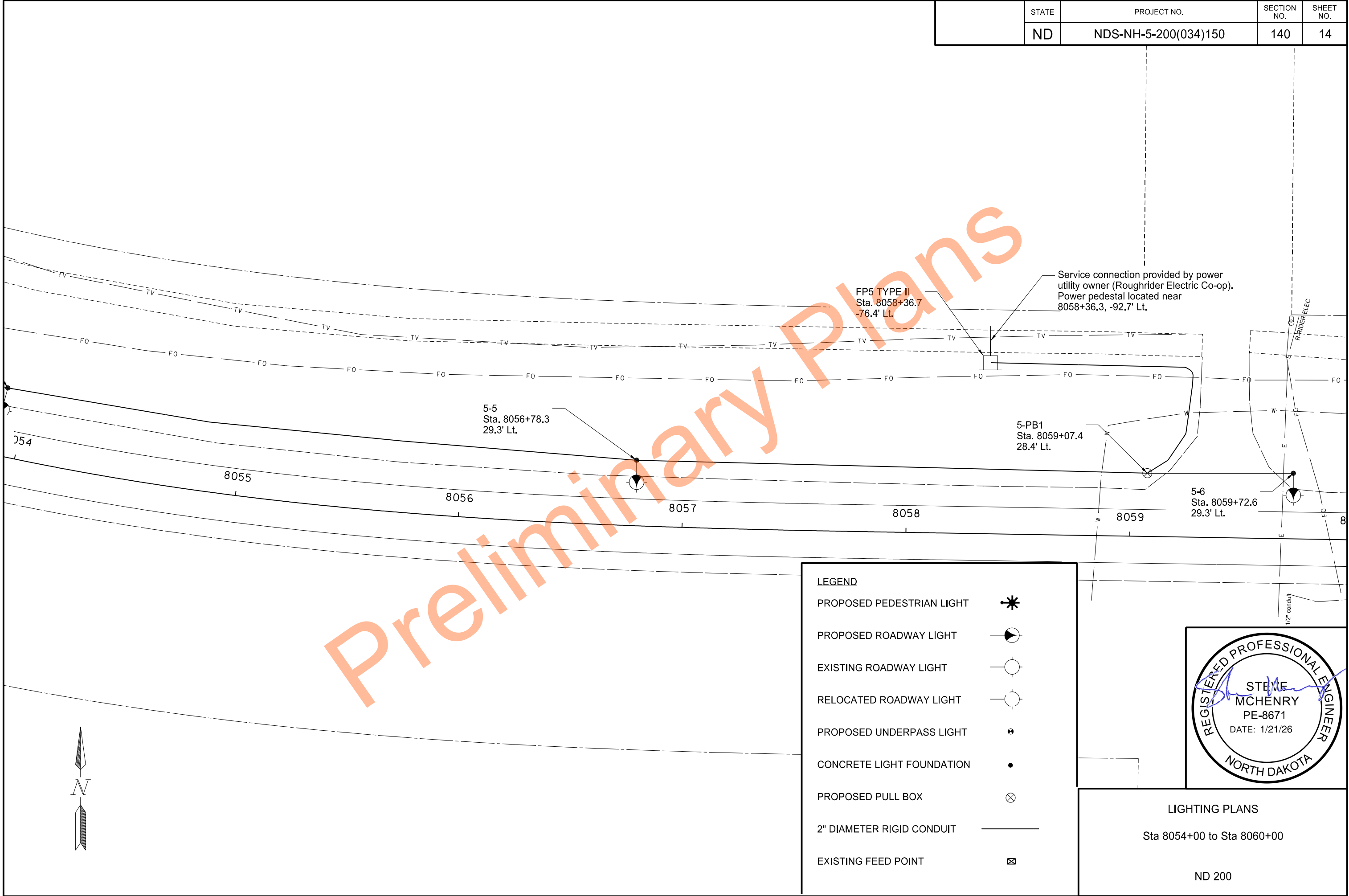
LEGEND	
PROPOSED PEDESTRIAN LIGHT	
PROPOSED ROADWAY LIGHT	
EXISTING ROADWAY LIGHT	
RELOCATED ROADWAY LIGHT	
PROPOSED UNDERPASS LIGHT	
CONCRETE LIGHT FOUNDATION	
PROPOSED PULL BOX	
2" DIAMETER RIGID CONDUIT	
EXISTING FEED POINT	



LIGHTING PLANS
Sta 8048+25 to Sta 8054+00

ND 200

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	140	14



LIGHTING PLANS

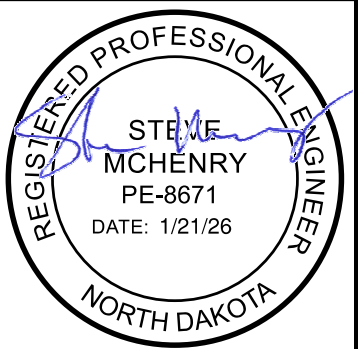
Sta 8054+00 to Sta 8060+00

ND 200

Point	Station	Conduit Runs		Cable Runs	
		Length (ft)	Size	Length (ft)	Type
1-1 to	7933+65.4 - 87.5' Rt.	67	2"	219	3 - NO 4 TYPE RHW
1-2	7934+32.1 - 87.5' Rt.			73	1 - NO 6 TYPE THW
1-2 to	7934+32.1 - 87.5' Rt.	67	2"	219	3 - NO 4 TYPE RHW
1-3	7934+99.2 - 87.5' Rt.			73	1 - NO 6 TYPE THW
1-3 to	7934+99.2 - 87.5' Rt.	67	2"	219	3 - NO 4 TYPE RHW
1-4	7935+66.2 - 87.5' Rt.			73	1 - NO 6 TYPE THW
1-4 to	7935+66.2 - 87.5' Rt.	68	2"	222	3 - NO 4 TYPE RHW
1-5	7936+33.2 - 87.4' Rt.			74	1 - NO 6 TYPE THW
1-5 to	7936+33.2 - 87.4' Rt.	67	2"	219	3 - NO 4 TYPE RHW
1-6	7937+00.2 - 87.4' Rt.			73	1 - NO 6 TYPE THW
1-6 to	7937+00.2 - 87.4' Rt.	68	2"	222	3 - NO 4 TYPE RHW
1-7	7937+67.2 - 87.4' Rt.			74	1 - NO 6 TYPE THW
1-7 to	7937+67.2 - 87.4' Rt.	68	2"	222	3 - NO 4 TYPE RHW
1-8	7938+34.2 - 87.4' Rt.			74	1 - NO 6 TYPE THW
1-8 to	7938+34.2 - 87.4' Rt.	68	2"	222	3 - NO 4 TYPE RHW
1-9	7939+01.2 - 87.4' Rt.			74	1 - NO 6 TYPE THW
1-9 to	7939+01.2 - 87.4' Rt.	68	2"	222	3 - NO 4 TYPE RHW
1-10	7939+68.2 - 87.4' Rt.			74	1 - NO 6 TYPE THW
1-10 to	7939+68.2 - 87.4' Rt.	67	2"	219	3 - NO 4 TYPE RHW
1-11	7940+35.2 - 87.4' Rt.			73	1 - NO 6 TYPE THW
1-11 to	7940+35.2 - 87.4' Rt.	67	2"	219	3 - NO 4 TYPE RHW
1-12	7941+02.2 - 87.4' Rt.			73	1 - NO 6 TYPE THW
1-12 to	7941+02.2 - 87.4' Rt.	70	2"	228	3 - NO 4 TYPE RHW
1-13	7941+71.9 - 87.3' Rt.			76	1 - NO 6 TYPE THW
1-13 to	7941+71.9 - 87.3' Rt.	65	2"	213	3 - NO 4 TYPE RHW
1-14	7942+36.2 - 87.2' Rt.			71	1 - NO 6 TYPE THW
1-14 to	7942+36.2 - 87.2' Rt.	68	2"	222	3 - NO 4 TYPE RHW
1-15	7943+03.2 - 87.2' Rt.			74	1 - NO 6 TYPE THW
1-15 to	7943+03.2 - 87.2' Rt.	67	2"	219	3 - NO 4 TYPE RHW
1-16	7943+70.2 - 87.1' Rt.			73	1 - NO 6 TYPE THW
1-16 to	7943+70.2 - 87.1' Rt.	68	2"	222	3 - NO 4 TYPE RHW
1-17	7944+37.0 - 87.1' Rt.			74	1 - NO 6 TYPE THW
1-17 to	7944+37.0 - 87.1' Rt.	68	2"	222	3 - NO 4 TYPE RHW
1-18	7945+04.1 - 87.1' Rt.			74	1 - NO 6 TYPE THW
1-18 to	7945+04.1 - 87.1' Rt.	67	2"	219	3 - NO 4 TYPE RHW
1-19	7945+70.1 - 87.1' Rt.			73	1 - NO 6 TYPE THW
1-19 to	7945+70.1 - 87.1' Rt.	68	2"	222	3 - NO 4 TYPE RHW
1-20	7946+38.0 - 87.1' Rt.			74	1 - NO 6 TYPE THW

Point	Station	Conduit Runs			Cable Runs	
		Length (ft)	Dir Bore Length (ft)	Size	Length (ft)	Type
1-20 to	7946+38.0 - 87.1' Rt.	68		2"	222	3 - NO 4 TYPE RHW
1-21	7947+05.1 - 87.1' Rt.				74	1 - NO 6 TYPE THW
1-21 to	7947+05.1 - 87.1' Rt.	68		2"	222	3 - NO 4 TYPE RHW
1-22	7947+72.0 - 87.1' Rt.				74	1 - NO 6 TYPE THW
1-22 to	7947+72.0 - 87.1' Rt.	67		2"	219	3 - NO 4 TYPE RHW
1-23	7948+39.0 - 87.2' Rt.				73	1 - NO 6 TYPE THW
1-23 to	7948+39.0 - 87.2' Rt.	68		2"	222	3 - NO 4 TYPE RHW
1-24	7949+06.0 - 87.2' Rt.				74	1 - NO 6 TYPE THW
1-24 to	7949+06.0 - 87.2' Rt.	68		2"	222	3 - NO 4 TYPE RHW
1-25	7949+73.0 - 87.2' Rt.				74	1 - NO 6 TYPE THW
1-25 to	7949+73.0 - 87.2' Rt.	67		2"	219	3 - NO 4 TYPE RHW
1-26	7950+40.0 - 87.8' Rt.				73	1 - NO 6 TYPE THW
1-26 to	7950+40.0 - 87.8' Rt.	44		2"	171	3 - NO 4 TYPE RHW
FP1	7950+79.5 - 62.1' Rt				57	1 - NO 6 TYPE THW

FP2	7952+24.8 - 47.1' Lt.	10	2"	69	3 - NO 4 TYPE RHW
2-1	7952+24.8 - 37.7' Lt			23	1 - NO 6 TYPE THW
2-1	7952+24.8 - 37.7' Lt	171	2"	531	3 - NO 4 TYPE RHW
2-2	7953+93.1 - 32.0' Lt.			177	1 - NO 6 TYPE THW
2-2	7953+93.1 - 32.0' Lt.	280	2"	858	3 - NO 4 TYPE RHW
2-3	7956+73.7 - 32.1' Lt.			286	1 - NO 6 TYPE THW
2-3	7956+73.7 - 32.1' Lt.	280	2"	858	3 - NO 4 TYPE RHW
2-4	7959+54.2 - 31.5' Lt.			286	1 - NO 6 TYPE THW
2-4	7959+54.2 - 31.5' Lt.	280	2"	858	3 - NO 4 TYPE RHW
2-5	7962+34.2 - 31.4' Lt.			286	1 - NO 6 TYPE THW
2-5	7962+34.2 - 31.4' Lt.	281	2"	861	3 - NO 4 TYPE RHW
2-6	7965+14.2 - 31.5' Lt.			287	1 - NO 6 TYPE THW
2-6	7965+14.2 - 31.5' Lt.	280	2"	858	3 - NO 4 TYPE RHW
2-7	7967+94.2 - 31.8' Lt.			286	1 - NO 6 TYPE THW
2-7	7967+94.2 - 31.8' Lt.	281	2"	861	3 - NO 4 TYPE RHW
2-8	7970+74.2 - 32.0' Lt.			287	1 - NO 6 TYPE THW
2-8	7970+74.2 - 32.0' Lt.	281	2"	861	3 - NO 4 TYPE RHW
2-9	7973+54.2 - 34.7' Lt.			287	1 - NO 6 TYPE THW



LIGHTING PLAN

Quantities

ND 200

Quantities - (A)																		
CONCRETE FOUNDATION-HIGHWAY LIGHTING	CONCRETE FOUNDATION-FEED POINT-TYPE B	PULL BOX	3/4 IN DIAMETER RIGID CONDUIT	2IN DIAMETER RIGID CONDUIT	UNDERGROUND CONDUCTOR NO4-TYPE RHW	UNDERGROUND CONDUCTOR NO10-TYPE RHW	UNDERGROUND CONDUCTOR NO6-TYPE THW	UNDERGROUND CONDUCTOR NO12-TYPE THW	FEED POINT-PEDESTRIAN LIGHTING	FEED POINT-TYPE II-PAD MOUNTED	LT STD 8FT MA 40FT MT HT	LT STD TWIN 8FT MA 40FT MT HT	ORNAMENTAL LT STD 13FT MT HT	LED LUMINAIRE	LED LUMINAIRE - TYPE A	UNDERPASS LIGHT UNIT CEILING MTD - 50 WATT	RELOCATE LIGHT STANDARD	LIGHTING SYSTEM A
EA	EA	EA	LF	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA	EA	LF	EA	EA
43	4	2	246	5833	18480	1077	6160	359	1	3	14	2	26	26	18	9	1	1

(A) DO NOT BID SEPERATELY BUT INCLUDE ALL IN THE ITEM "LIGHTING SYSTEM A"

Point	Station	Conduit Runs		Cable Runs	
		Length (ft)	Size	Length (ft)	Type
4-2	8041+04.9 - 36.6' Lt.	256	2"	786	3 - NO 4 TYPE RHW
4-3	8043+53.8 - 31.0' Lt.			262	1 - NO 6 TYPE THW
4-3	8043+53.8 - 31.0' Lt.	252	2"	774	3 - NO 4 TYPE RHW
4-4,5	8046+04.3 - 31.1' Lt.			258	1 - NO 6 TYPE THW

Point	Station	Conduit Runs		Cable Runs	
		Length (ft)	Size	Length (ft)	Type
EX-2	8001+69.2 - 35.5' Lt.	280	2"	858	3 - NO 4 TYPE RHW
EX-3	8004+46.8 - 36.4' Lt.			286	1 - NO 6 TYPE THW

Point	Station	Conduit Runs			Cable Runs	
		Length (ft)	Dir Bore Length (ft)	Size	Length (ft)	Type
5-1,2	8048+22.1 - 30.5' Lt.	280		2"	858	3 - NO 4 TYPE RHW
5-3	8051+03.6 - 30.6' Lt.				286	1 - NO 6 TYPE THW
5-3	8051+03.6 - 30.6' Lt.	281		2"	861	3 - NO 4 TYPE RHW
5-4	8053+90.0 - 30.4' Lt.				287	1 - NO 6 TYPE THW
5-4	8053+90.0 - 30.4' Lt.	282		2"	864	3 - NO 4 TYPE RHW
5-5	8056+78.3 - 29.3' Lt.				288	1 - NO 6 TYPE THW
5-5	8056+78.3 - 29.3' Lt.	229		2"	705	3 - NO 4 TYPE RHW
5-PB1	8059+07.4 - 28.4' Lt.				235	1 - NO 6 TYPE THW
5-PB1	8059+07.4 - 28.4' Lt.		66	2"	216	3 - NO 4 TYPE RHW
5-6	8059+72.6 - 29.3' Lt.				72	1 - NO 6 TYPE THW
5-PB1	8059+07.4 - 28.4' Lt.	79		2"	255	3 - NO 4 TYPE RHW
FP5	8058+36.7 - 76.4' Lt.				85	1 - NO 6 TYPE THW



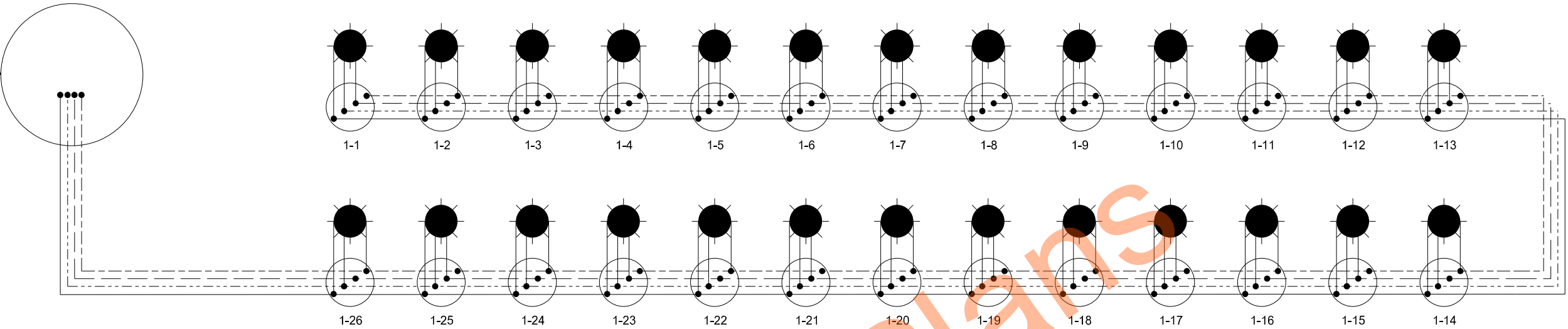
LIGHTING PLAN

Quantities

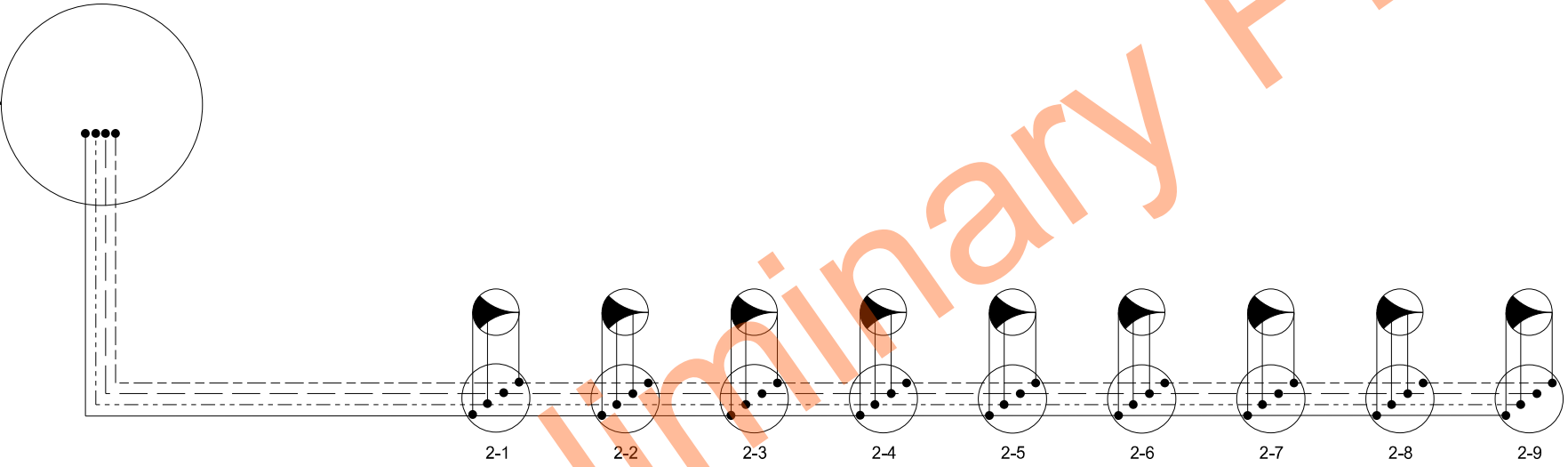
ND 200

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NDS-NH-5-200(034)150	140	17

Feed Point FP1 Type II
120/240V
Sta. 7950+79.5 - 62.1' Rt
Pad Mounted



Feed Point FP2 Type II
120/240V
Sta. 7952+24.8 - 47.1' Lt.
Pad Mounted



Wiring Schematic Legend

Proposed Luminaire, 40' MH



Proposed Luminaire, Underpass



Proposed Luminaire, 13' MH



Proposed Light Standard



Existing Luminaire



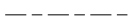
Existing Light Standard



Proposed Conductor Connection



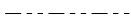
Proposed Conductor Phase 1



Proposed Conductor Phase 2



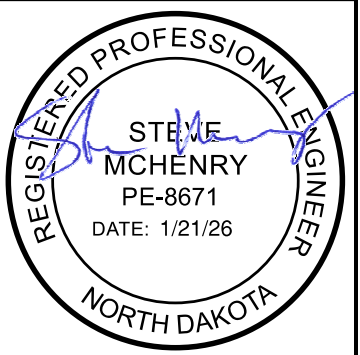
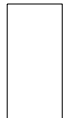
Proposed Conductor Phase 3



Proposed Conductor Ground



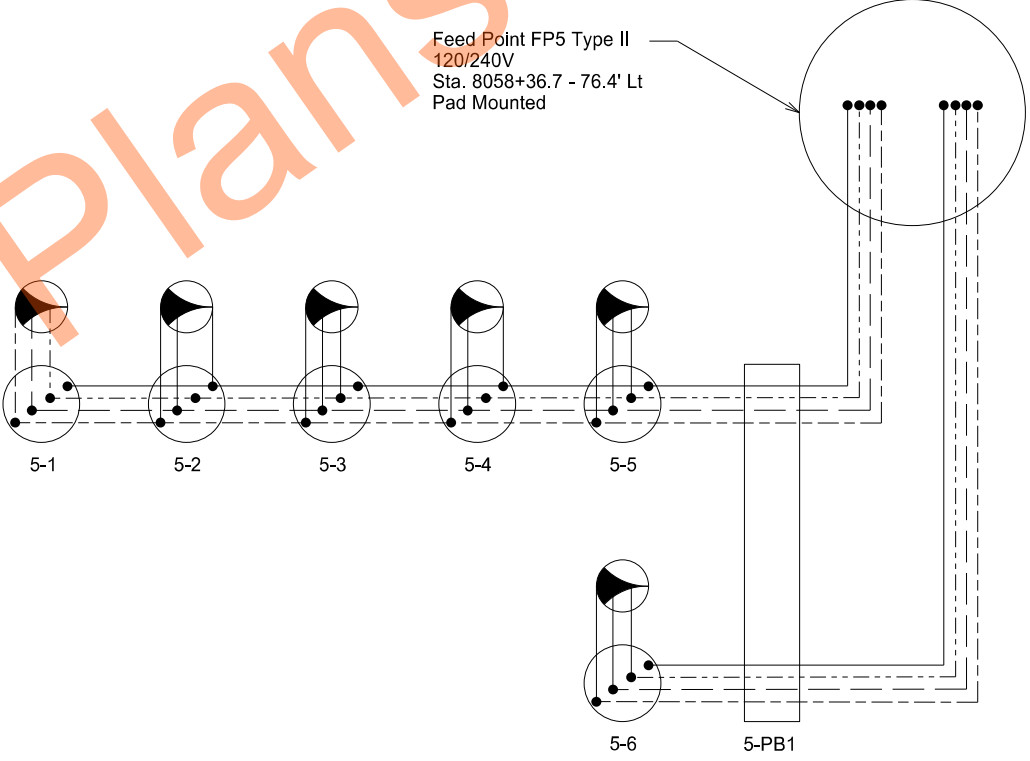
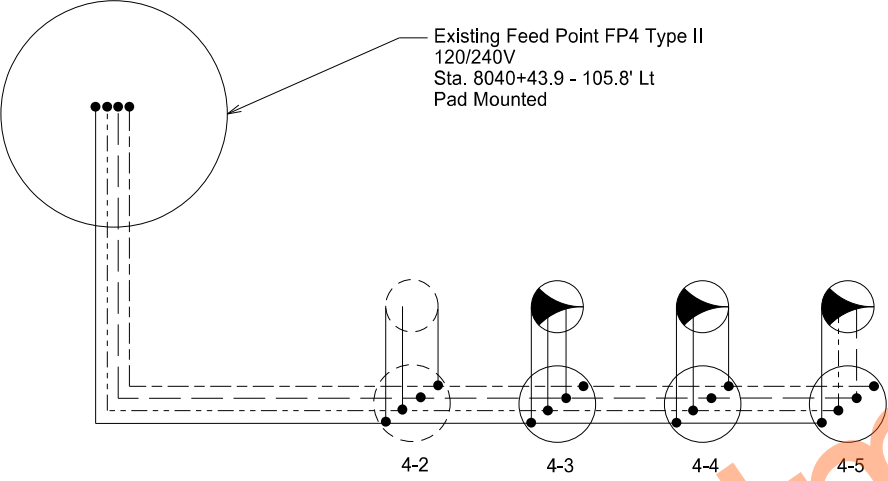
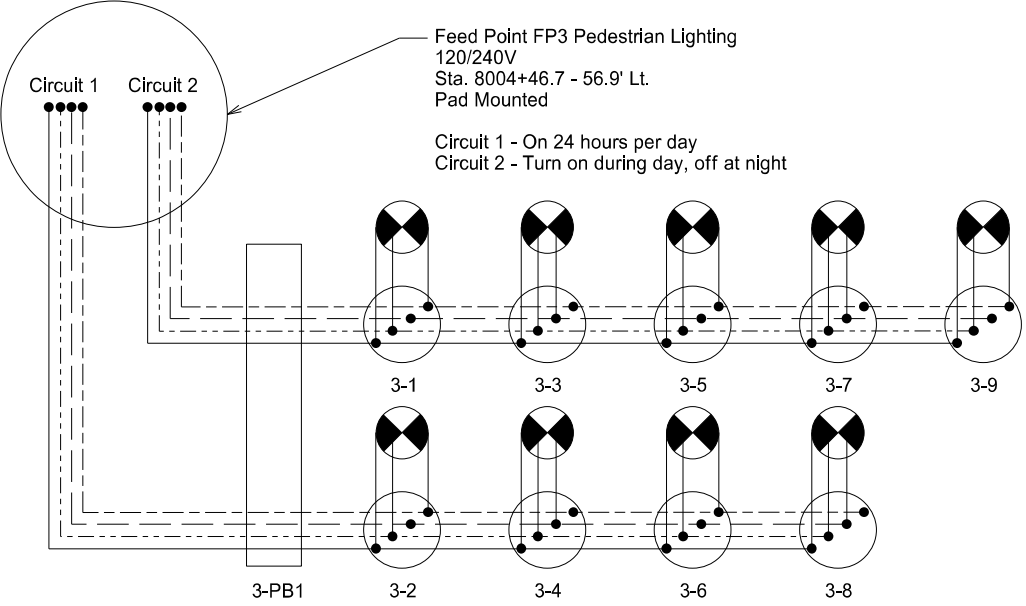
Proposed Pull Box



WIRING SCHEMATIC - FP1, FP2

ND 200

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	140	18



Wiring Schematic Legend

Proposed Luminaire, 40' MH



Proposed Luminaire, Underpass



Proposed Luminaire, 13' MH



Proposed Light Standard



Existing Luminaire



Existing Light Standard



Proposed Conductor Connection



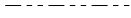
Proposed Conductor Phase 1



Proposed Conductor Phase 2



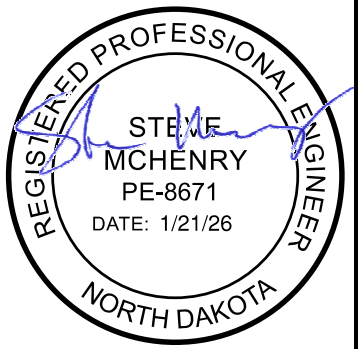
Proposed Conductor Phase 3



Proposed Conductor Ground

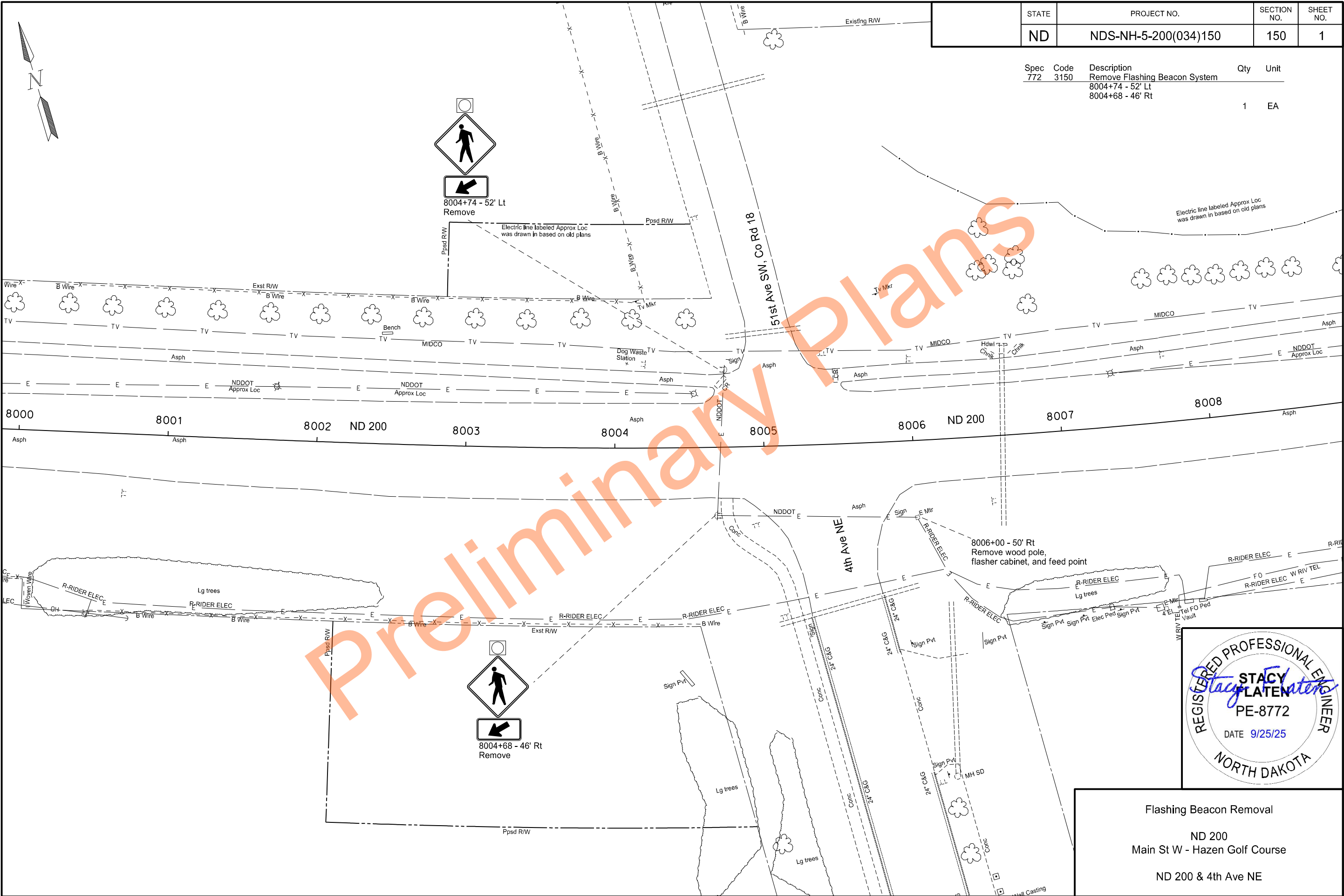


Proposed Pull Box



WIRING SCHEMATIC - FP3, FP4, FP5

ND 200



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NDS-NH-5-200(034)150	150	1

Spec	Code	Description	Qty	Unit
772	3150	Remove Flashing Beacon System		
		8004+74 - 52' Lt		
		8004+68 - 46' Rt	1	EA



Flashing Beacon Removal

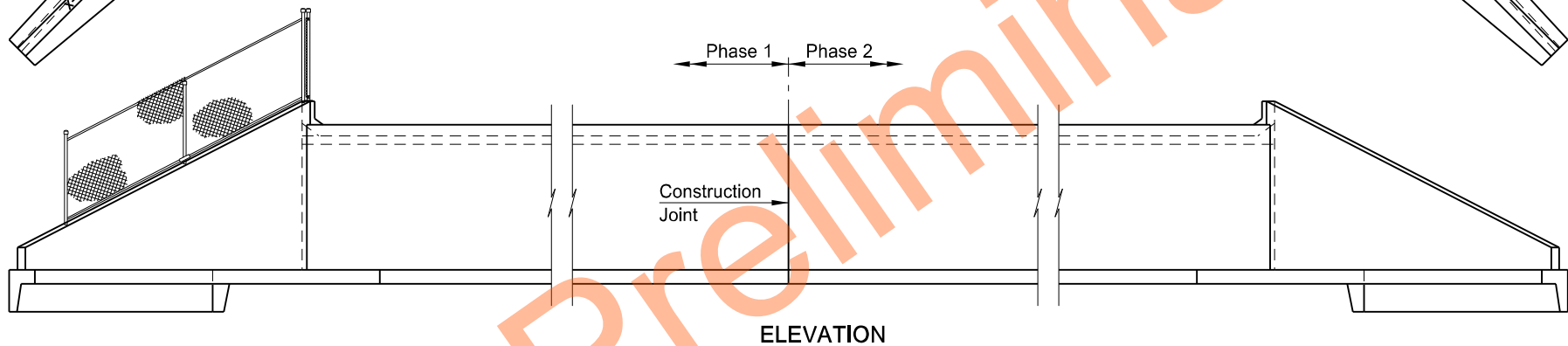
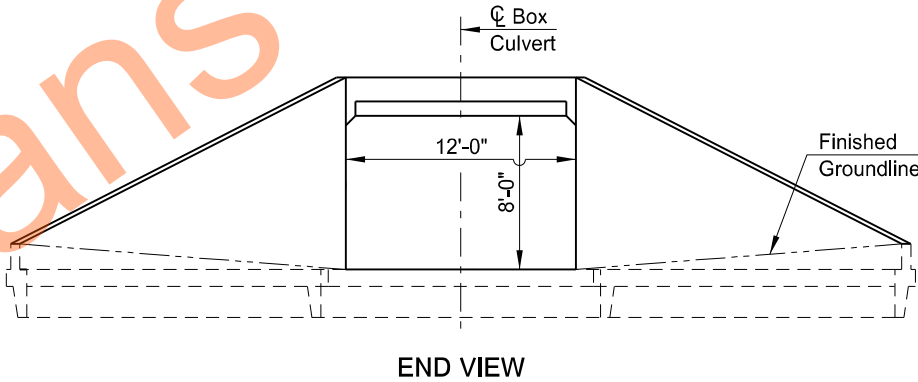
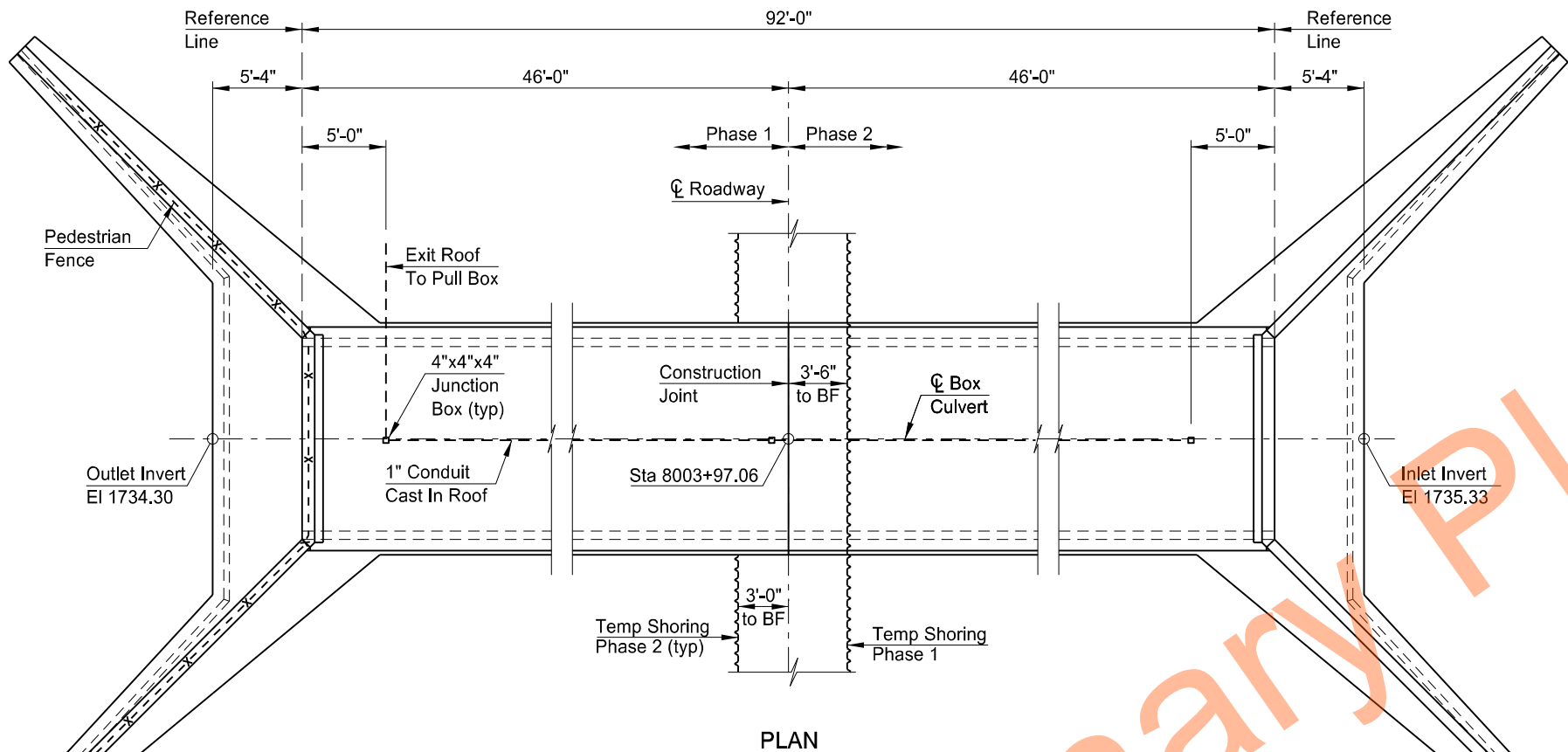
ND 200

Main St W - Hazen Golf Course

ND 200 & 4th Ave NE

23 U.S.C. 407
NDDOT Reserves All Objections

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	NDS-NH-5-200(034)150	170	1



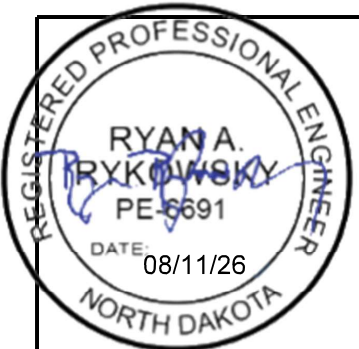
DESIGN STRENGTHS:

f'c = 4,000 psi ~ Class AE-3 Concrete
fy = 60,000 psi ~ Reinforcing Steel

Load & Resistance Factor Design

BOX CULVERT BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
210	0050	BOX CULVERT EXCAVATION	EA	1
210	0210	FOUNDATION FILL	CY	1,925
210	0250	BOX CULVERT FOUNDATION AGGREGATE	CY	140
210	0405	FOUNDATION PREPARATION-BOX CULVERT	EA	1
602	1131	CLASS AE-3 CONCRETE-BOX CULVERT	CY	146.0
612	0114	REINFORCING STEEL-GRADE 60-BOX CULVERT	LBS	30,711
624	0124	PEDESTRIAN FENCE	LF	53.0
709	0100	GEOSYNTHETIC MATERIAL TYPE G	SY	210
930	8230	SHORING	EA	2



SPECIAL PROVISIONS	
SP 366(24)	EXCAVATION & FOUNDATION FILL
HL-93 DESIGN LOADING	
PEDESTRIAN UNDERPASS HAZEN, ND CLEAR SPAN 1 x 12' CLEAR HEIGHT 8' MAX FILL 6' MIN FILL 1' STATION 8003+97.06 REINFORCED CONCRETE SINGLE BOX CULVERT LAYOUT	
ND DEPARTMENT OF TRANSPORTATION BRIDGE DIVISION Jason Thorenson 08/11/26	

23 U.S.C. 407 NDDOT Reserves All Objections			STATE	PROJECT NO.	SECTION NO.	SHEET NO.
			ND	NDS-NH-5-200(034)150	170	2

NOTES

100

SCOPE OF WORK: Work at this site consists of building a new single barrel 12' x 8' x 92'-0" reinforced concrete box culvert. Construction of the box culvert will take place in two phases. Phase 1 includes the 46'-0" south segment of the structure and Phase 2 includes the remainder of the structure.

602

CLASS AE-3 CONCRETE: Design a mix that meets Section 802 and will attain a minimum compressive strength of 4,000 psi at 28-days. A mix design meeting Section 802 using a Well Graded or Optimized combined gradation will be permitted.

The Engineer will verify the mix design using materials that are to be used on the project.

Supply samples of materials as specified in the table below. Provide additional materials upon request.

Material	Sample Size
Cement	100 lbs
SCM	35 lbs
Aggregate	1000 lbs
Admixtures	½ pint each

Deliver the samples and the mix design, including the test results, to the Materials and Research Division a minimum of 14 calendar days before placing concrete. Attach a tag to all samples identifying the Department's project number and the type of material. On the day the material is delivered, provide the Engineer with a copy of the mix design and test results, and notify the Engineer the samples have been delivered.

Cast the following elements of each section in one continuous run:

1.

Floor slab and wing footings

2.

Each sidewall up to the bottom of fillets with its adjacent wings complete to the top

3.

Roof slab and parapets

Allow the concrete in the walls to set at least two hours before the roof slab is poured.

602

WATERPROOFING MEMBRANE: Wrap a waterproofing membrane that meets the requirements of Section 602.03 B around the exterior surface of the sidewalls and the roof slab. Center the waterproof membrane (1'-0" minimum width) on the construction joint.

602

SURFACE FINISH "D": Apply Surface Finish "D" on the inside walls, ceiling, and exposed areas of the wings. Use sand surface finish color number 33578 meeting Aerospace Material Specification (AMS) Standard 595. Include this work in the price bid for Class AE-3 Concrete-Box Culvert.

612

REINFORCING STEEL: When the distance between end bars is not evenly divisible by bar spacing, adjust the odd distance by a few irregular spaces near the center, not at the ends of the culvert.

Place bolsters and bar supports for the roof steel at a maximum of 4 foot spacing.

Dimensions of bent bars are given out to out.

930

SHORING: Temporary shoring is required as shown on the Box Culvert Layout Sheet. The Contractor is responsible to design, construct, maintain, and remove the shoring.

Design shoring in accordance with the AASHTO Guide Design Specifications for Temporary Works, or other design standard as approved by the Engineer. Submit design calculations certified by a professional engineer registered in the state of North Dakota to the Engineer and allow one week for review.

Include all labor, equipment, and material needed for this work in the bid item, "Shoring". A quantity of 1 EA will be paid for each construction phase.

REGISTERED PROFESSIONAL ENGINEER

RYAN A. RYKOWSKI

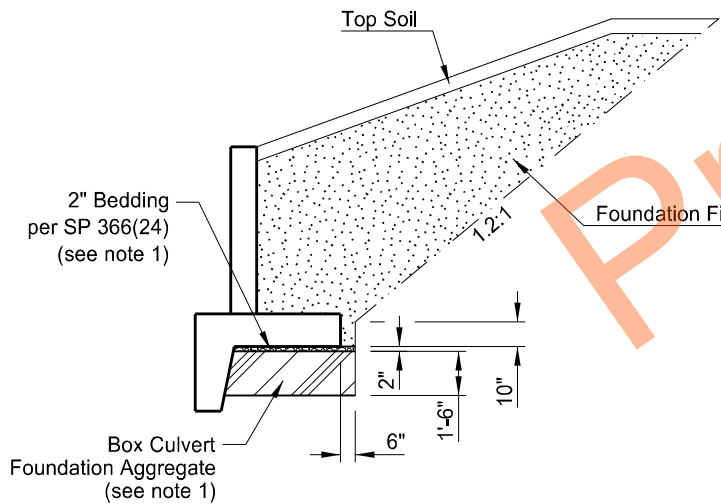
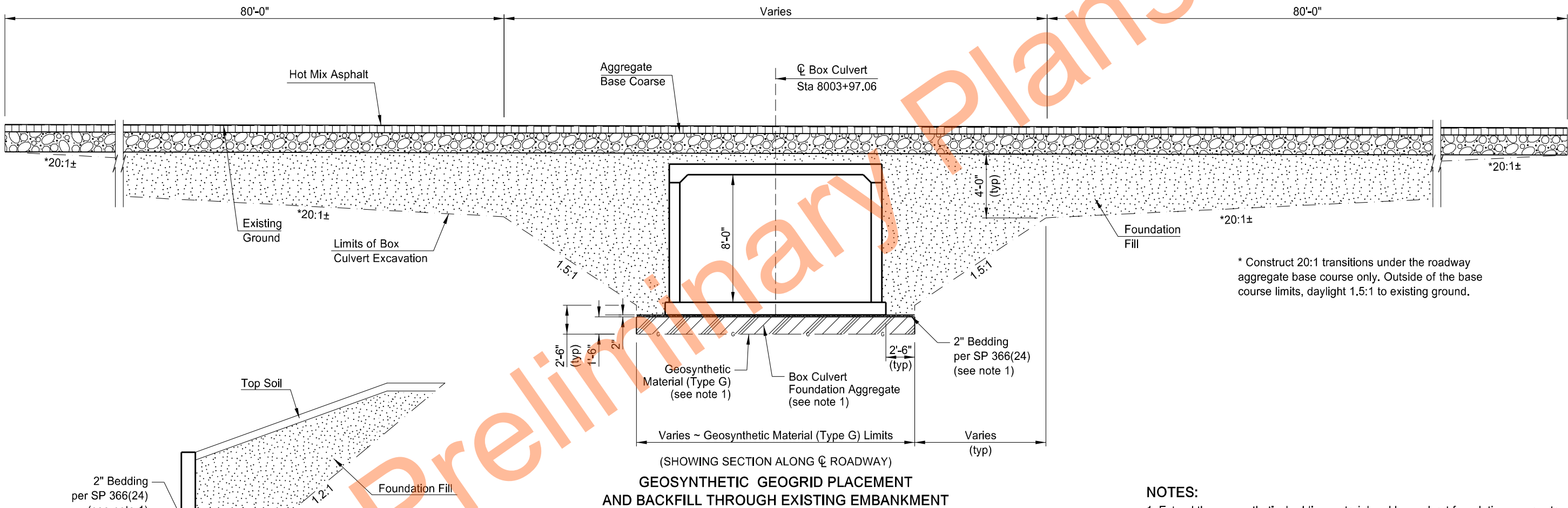
PE 6691

DATE: 08/11/26

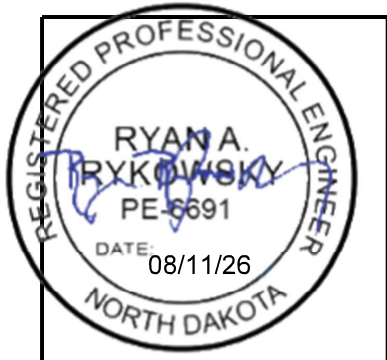
NORTH DAKOTA

23 U.S.C. 407
NDDOT Reserves All Objections

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	NDS-NH-5-200(034)150	170	3



- NOTES:**
1. Extend the geosynthetic, bedding material and box culvert foundation aggregate material below the box culvert to the end of the apron.

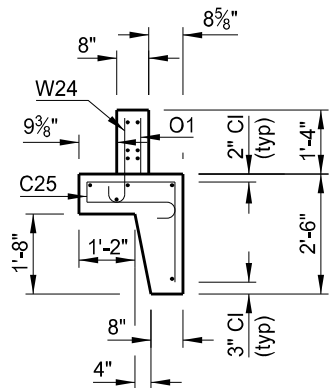


PEDESTRIAN UNDERPASS
HAZEN, ND

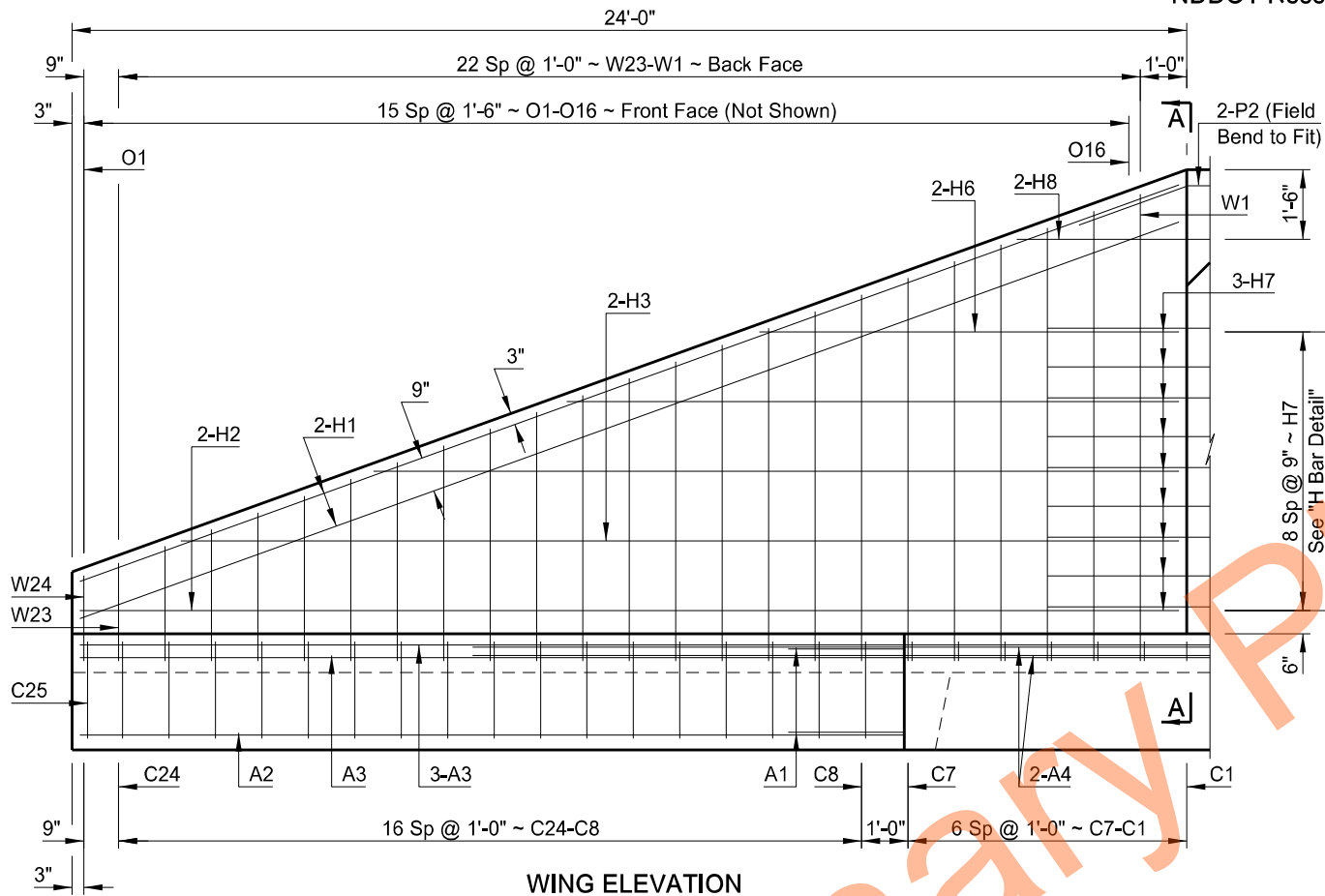
EXCAVATION & BACKFILL DETAIL

23 U.S.C. 407
NDDOT Reserves All Objections

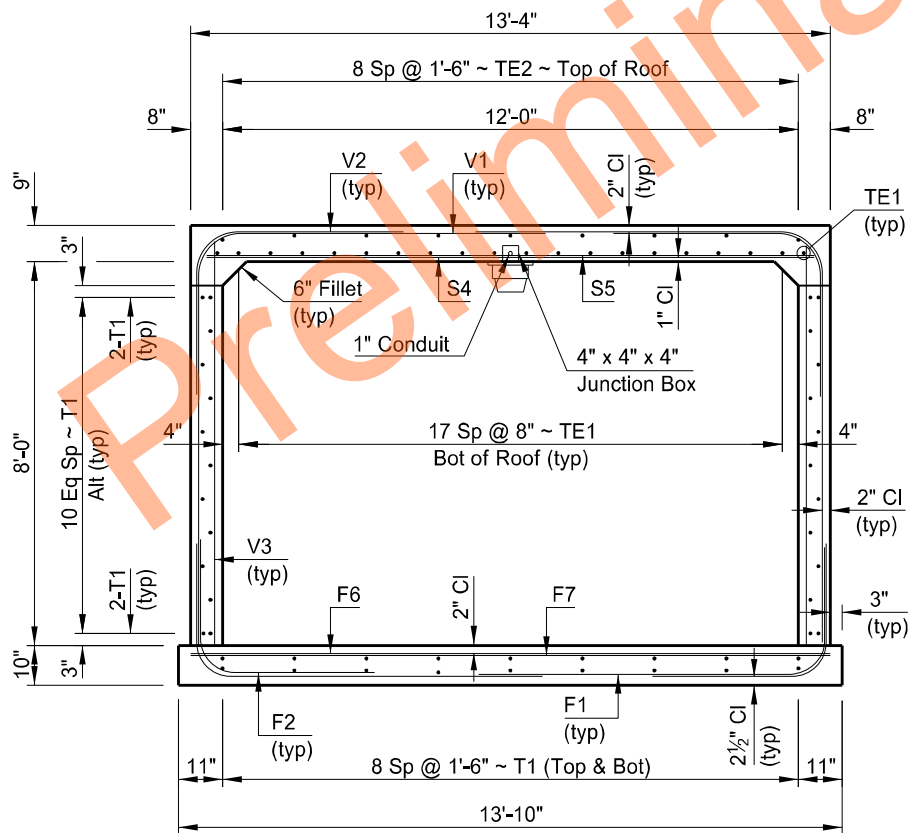
STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	NDS-NH-5-200(034)150	170	4



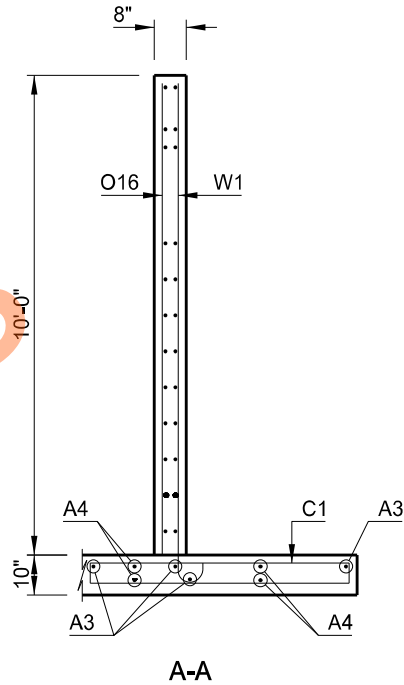
END VIEW



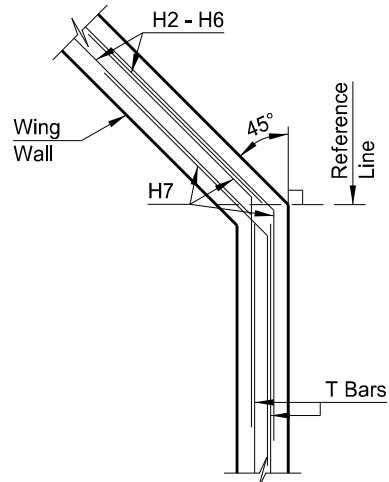
WING ELEVATION



SECTION OF BARREL

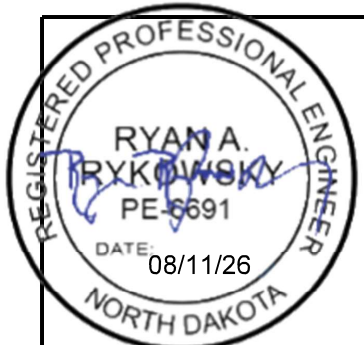


A-A



H BAR DETAIL

NOTE:
The electrical boxes shall be 4" x 4" x 4" NEMA Type 1 enclosures made from 16 gage galvanized steel. The cover shall be screwed to the box. The conduit shall be Type 40-heavy wall PVC. Pull wire shall be installed in the conduit. All material and labor to install the conduit, pull wire and electrical boxes shall be included in the Bid Item "Class AE-3 Concrete-Box Culvert".

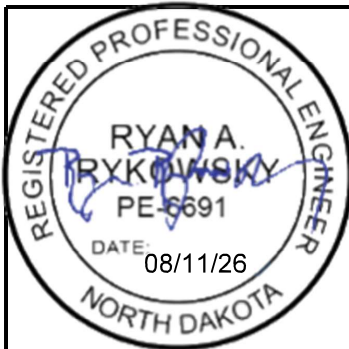
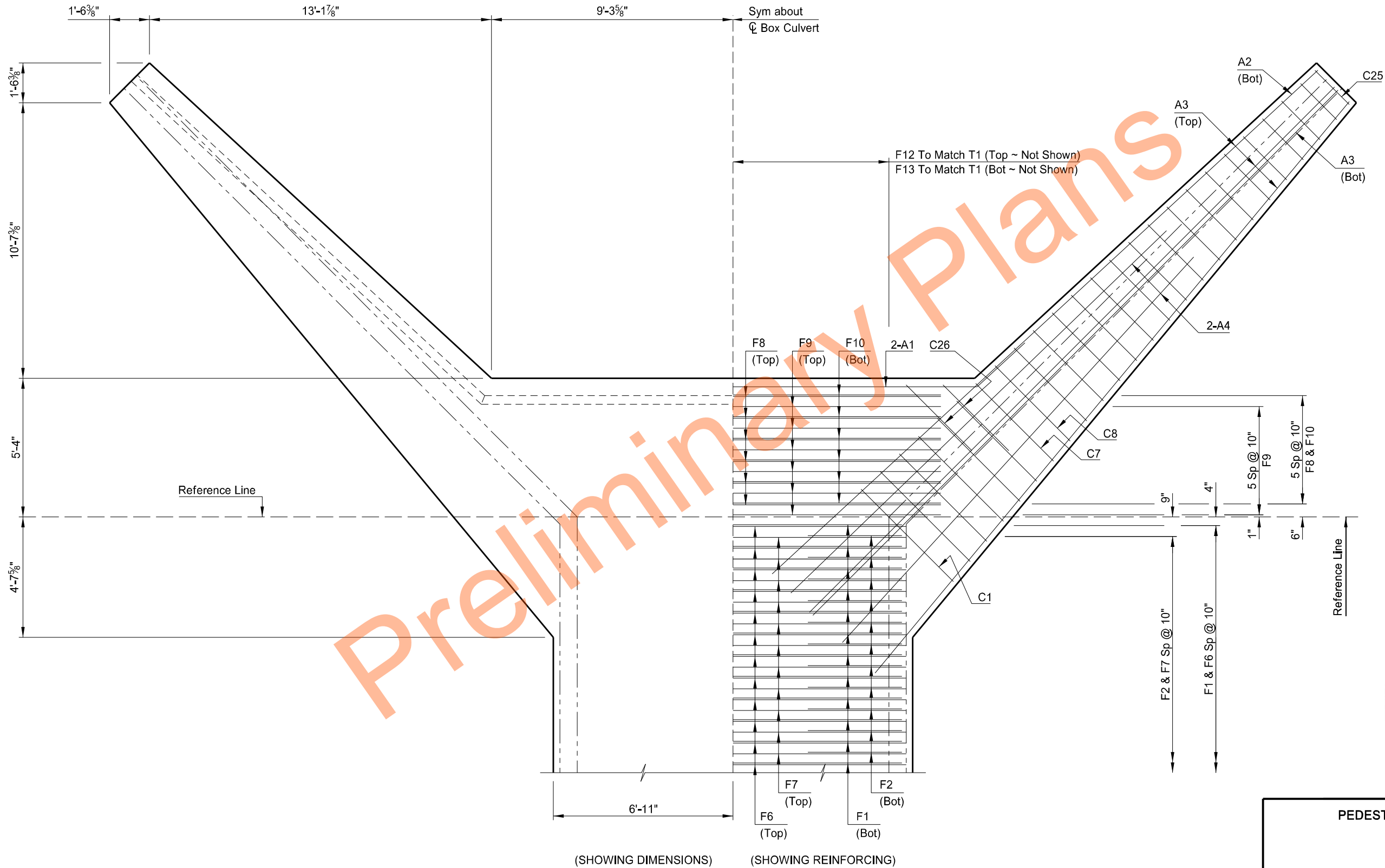


PEDESTRIAN UNDERPASS
HAZEN, ND

BARREL SECTION &
WING DETAILS

23 U.S.C. 407
NDDOT Reserves All Objections

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	NDS-NH-5-200(034)150	170	5

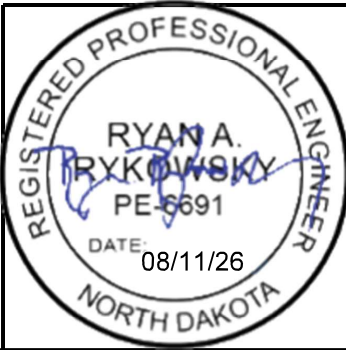
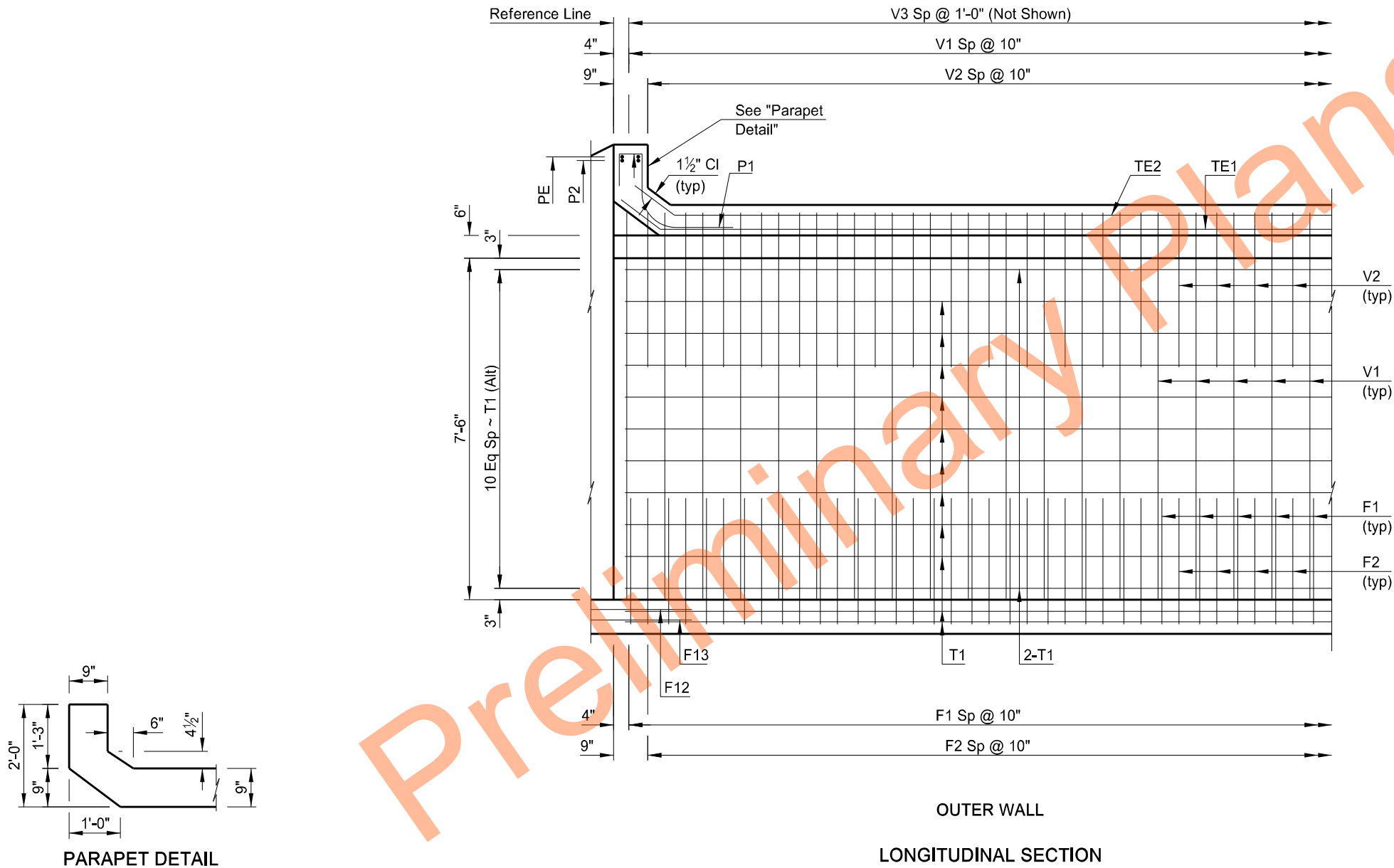


PEDESTRIAN UNDERPASS
HAZEN, ND

FLOOR DETAIL

23 U.S.C. 407
NDDOT Reserves All Objections

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	NDS-NH-5-200(034)150	170	6

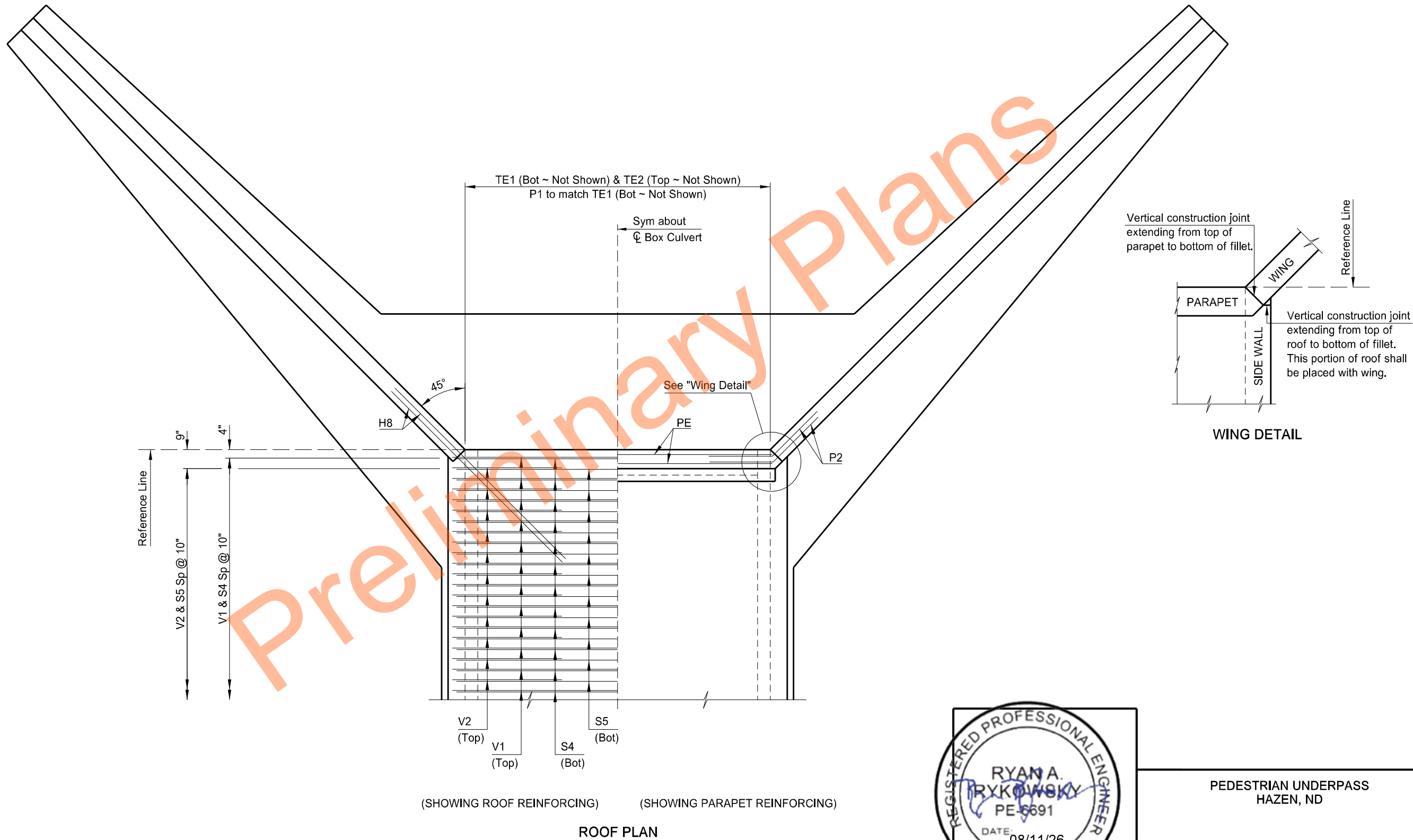


PEDESTRIAN UNDERPASS
HAZEN, ND

WALL DETAILS &
PARAPET DETAIL

23 U.S.C. 407
NDDOT Reserves All Objections

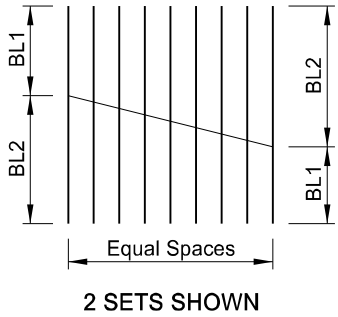
STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	NDS-NH-5-200(034)150	170	7



BAR LIST (CONSTANT)					BAR LIST (CONSTANT)					BAR LIST (VARIABLE)					23 U.S.C. 407 NDDOT Reserves All Objections			STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.						
MARK	SIZE	NO	LENGTH	SHAPE	MARK	SIZE	NO	LENGTH	SHAPE	MARK	SIZE	NO	LENGTH	SHAPE				ND	NDS-NH-5-200(034)150			170	8				
W1	7	4	10'-10"	BENT	H8	6	8	9'-6"	STR.	V1	6	220	15'-5"	BENT	Preliminary Plans												
W2	7	4	10'-5"	BENT						V2	4	220	7'-4"	BENT													
W3	7	4	10'-1"	BENT	O1-O16	4	4	84'-8"	STR.	V3	4	184	8'-5"	STR.													
W4	7	4	9'-9"	BENT																							
W5	7	4	9'-4"	BENT	A1	6	8	12'-10"	BENT	F1	6	220	9'-8"	BENT													
W6	7	4	9'-0"	BENT	A2	6	4	17'-11"	STR.	F2	4	220	6'-1"	BENT													
W7	7	4	8'-8"	BENT	A3	6	16	28'-7"	STR.	F6	6	110	13'-4"	STR.													
W8	7	4	8'-3"	BENT	A4	6	16	20'-1"	STR.	F7	6	110	13'-4"	STR.													
W9	6	4	7'-10"	BENT																							
W10	6	4	7'-6"	BENT	P1	4	26	4'-7"	BENT	S4	6	110	12'-8"	STR.													
W11	6	4	7'-1"	BENT	P2	6	8	5'-0"	BENT	S5	6	110	12'-8"	STR.													
W12	5	4	6'-8"	BENT	PE	6	8	7'-0"	STR.																		
W13	5	4	6'-4"	BENT						T1	4	44	92'-9"	STR.													
W14	4	4	5'-10"	BENT	F8	6	12	16'-0"	STR.																		
W15	4	4	5'-6"	BENT	F9	6	12	16'-0"	STR.	TE1	4	20	93'-5"	BENT													
W16	4	4	5'-2"	BENT	F10	4	12	16'-0"	STR.	TE2	4	9	92'-9"	BENT													
W17	4	4	4'-9"	BENT	F12	4	18	8'-7"	BENT																		
W18	4	4	4'-5"	BENT	F13	4	18	6'-7"	STR.																		
W19	4	4	4'-1"	BENT																							
W20	4	4	3'-8"	BENT																							
W21	4	4	3'-4"	BENT																							
W22	4	4	3'-0"	BENT																							
W23	4	4	2'-7"	BENT																							
W24	4	4	2'-4"	BENT																							
C1	5	4	11'-6"	BENT																							
C2	5	4	11'-2"	BENT																							
C3	5	4	11'-0"	BENT																							
C4	5	4	10'-8"	BENT																							
C5	5	4	10'-6"	BENT																							
C6	5	4	10'-2"	BENT																							
C7	5	4	9'-10"	BENT																							
C8	4	4	11'-2"	BENT																							
C9	4	4	10'-10"	BENT																							
C10	4	4	10'-8"	BENT																							
C11	4	4	10'-4"	BENT																							
C12	4	4	10'-0"	BENT																							
C13	4	4	9'-10"	BENT																							
C14	4	4	9'-6"	BENT																							
C15	4	4	9'-4"	BENT																							
C16	4	4	9'-0"	BENT																							
C17	4	4	8'-8"	BENT																							
C18	4	4	8'-6"	BENT																							
C19	4	4	8'-2"	BENT																							
C20	4	4	8'-0"	BENT																							
C21	4	4	7'-8"	BENT																							
C22	4	4	7'-4"	BENT																							
C23	4	4	7'-2"	BENT																							
C24	4	4	6'-10"	BENT																							
C25	4	4	6'-8"	BENT																							
C26	4	8	5'-8"	BENT																							
H1	7	16	25'-2"	STR.																							
H2	4	8	23'-8"	STR.																							
H3	4	8	21'-6"	STR.																							
H4	4	8	17'-4"	STR.																							
H5	4	8	13'-2"	STR.																							
H6	4	8	9'-0"	STR.																							
H7	4	108	6'-0"	BENT																							
															CONCRETE QUANTITIES (ONE PHASE) <table><tr><td>ENTIRE FLOOR</td><td>30.4 CY</td></tr><tr><td>TWO OUTSIDE WALLS & TWO WINGS</td><td>23.7 CY</td></tr><tr><td>ENTIRE ROOF</td><td>18.9 CY</td></tr><tr><td>TOTAL</td><td>73.0 CY</td></tr></table>					ENTIRE FLOOR	30.4 CY	TWO OUTSIDE WALLS & TWO WINGS	23.7 CY	ENTIRE ROOF	18.9 CY	TOTAL	73.0 CY
ENTIRE FLOOR	30.4 CY																										
TWO OUTSIDE WALLS & TWO WINGS	23.7 CY																										
ENTIRE ROOF	18.9 CY																										
TOTAL	73.0 CY																										
															REGISTERED PROFESSIONAL ENGINEER RYANA A. TRYKOWSKY PE 6691 DATE: 08/11/26 NORTH DAKOTA												
															QUANTITIES <table><tr><td>CLASS AE-3 CONCRETE</td><td>146.0 CY</td></tr><tr><td>REINFORCING STEEL</td><td>30,711 LBS</td></tr></table>					CLASS AE-3 CONCRETE	146.0 CY	REINFORCING STEEL	30,711 LBS				
CLASS AE-3 CONCRETE	146.0 CY																										
REINFORCING STEEL	30,711 LBS																										
															PEDESTRIAN UNDERPASS HAZEN, ND												
															REINFORCING BAR LIST												

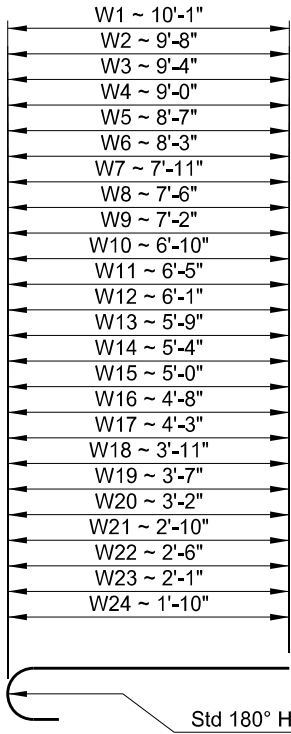
23 U.S.C. 407
NDDOT Reserves All Objections

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	NDS-NH-5-200(034)150	170	9

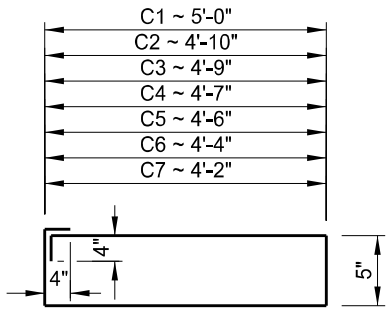


MARK	LENGTH 1 SET	BL1	BL2	SPACES
O1-O16	84'-8"	1'-3"	9'-4"	15

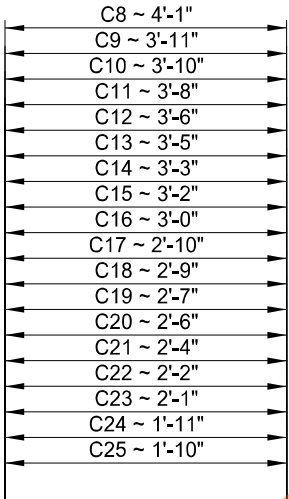
BAR CUTTING DETAILS



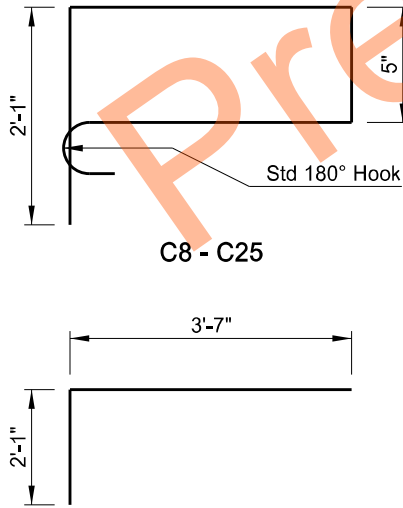
W1 - W24



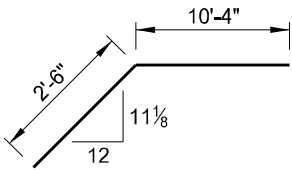
C1 - C7



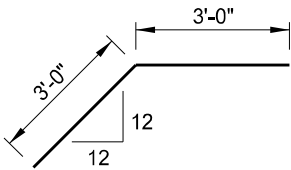
C8 - C25



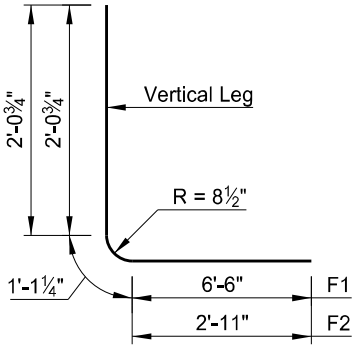
C26



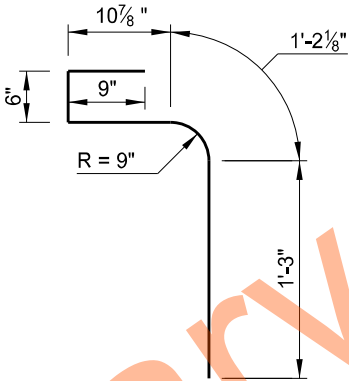
A1



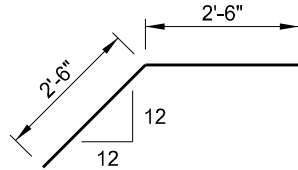
H7



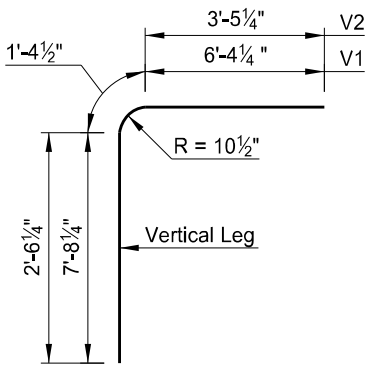
F1 & F2



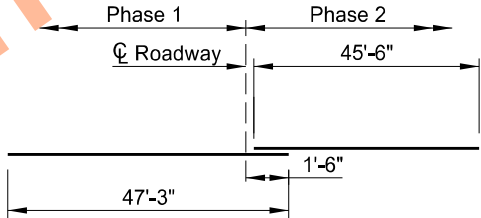
P1



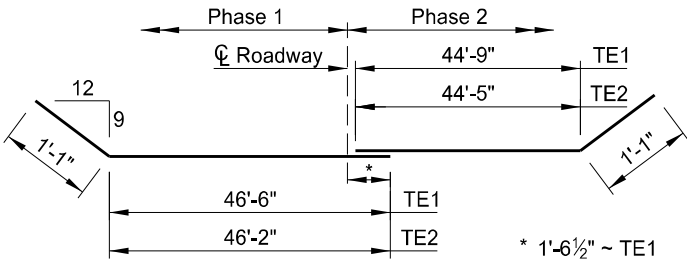
P2



V1 & V2

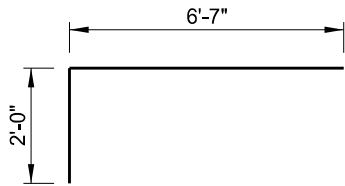


T1

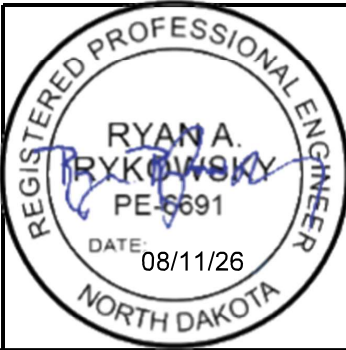


TE1 & TE2

* 1'-6 1/2" ~ TE1
1'-6" ~ TE2



F12

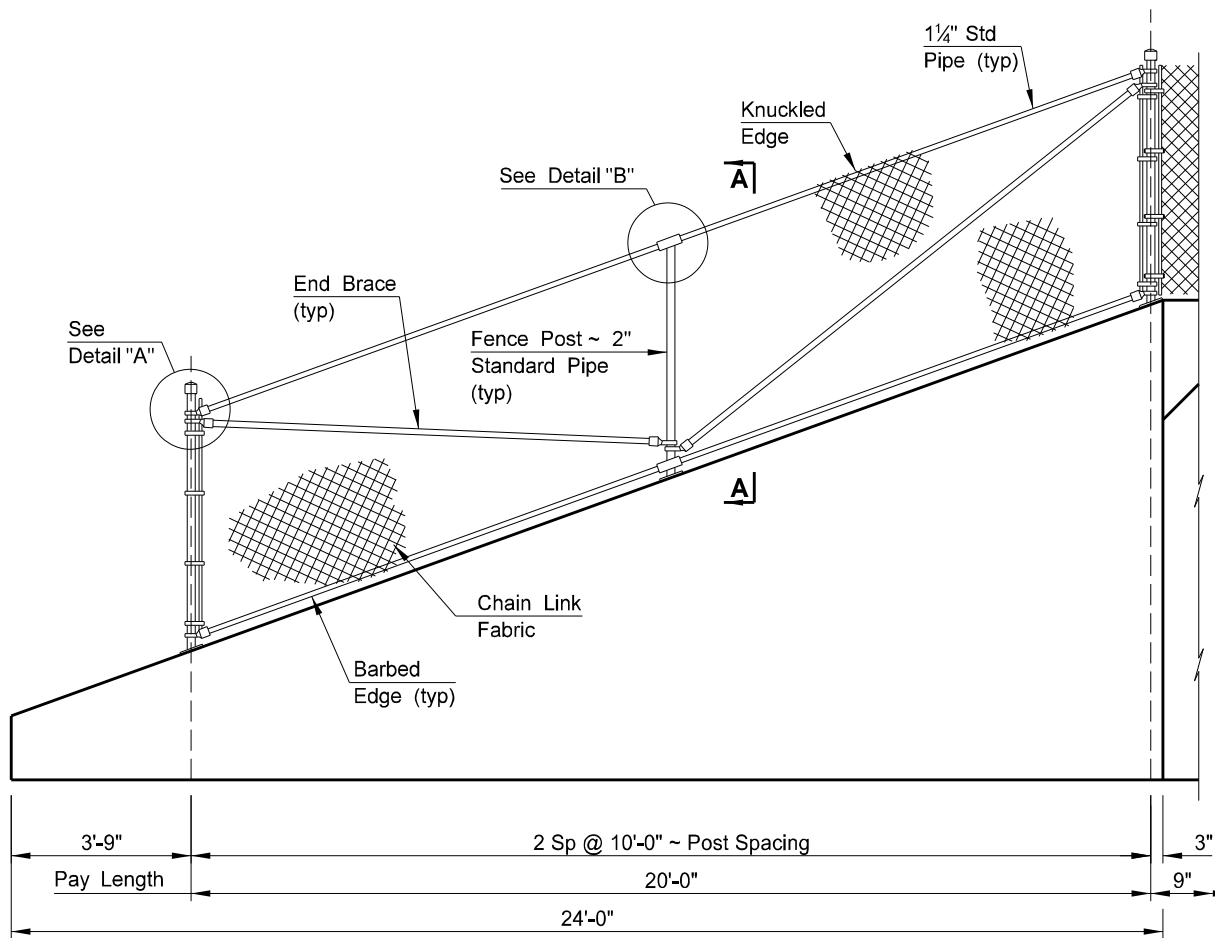


PEDESTRIAN UNDERPASS
HAZEN, ND

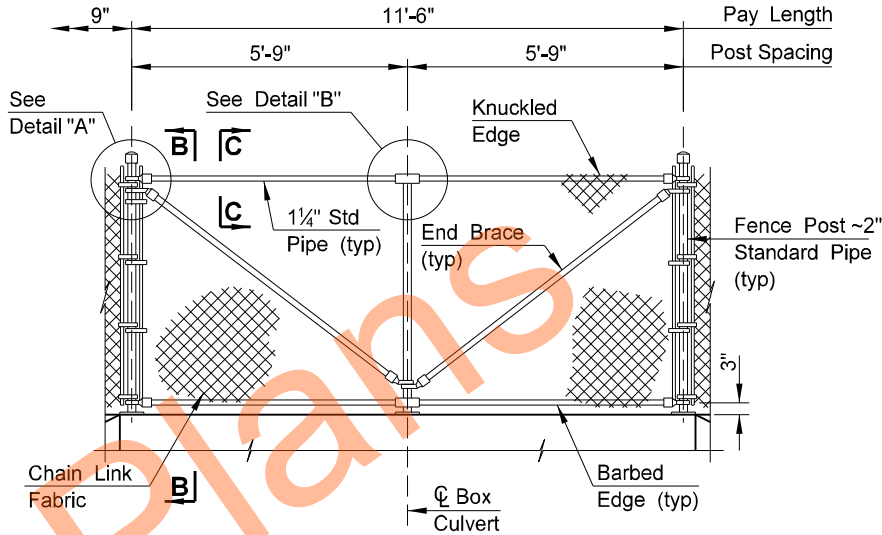
BAR DETAILS

23 U.S.C. 407
NDDOT Reserves All Objections

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	NDS-NH-5-200(034)150	170	10



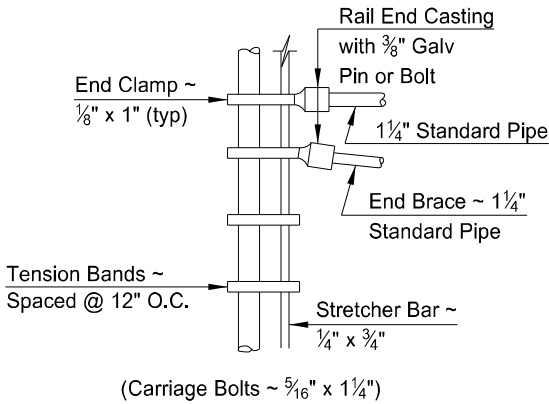
WING WALL ELEVATION



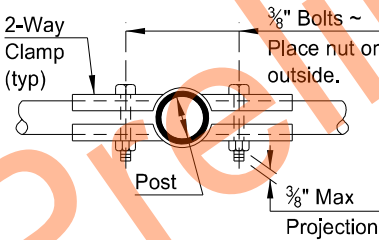
PARAPET ELEVATION

NOTES:

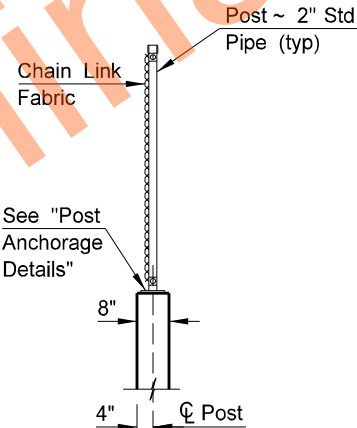
- Provide fabric meeting AASHTO M 181 Type IV, Class B with 9 gage wire, 2 inch mesh, 60 inches high and the bottom selvage barbed.
- Supply posts, pipe rail and fittings meeting AASHTO M 181 Grade 1.
- Furnish anchorage plates meeting ASTM A36. Hot-dip galvanize anchorage plates in accordance with Section 854 of the Standard Specifications. Use 100% bonded black vinyl coated fence fabric, pipe, posts, fittings, ties and hardware.
- Anchor the base plates by either epoxying in 1/2" ø anchor bolts or placing them in the concrete during pouring. If the Contractor elects to drill the bolt holes, exercise caution to avoid damaging the concrete parapet or wing wall, and position the base plates as shown in the "ELEVATION" views. Ensure each anchor bolt has a minimum pullout capacity of 10,000 pounds and a minimum embedment of 8". Provide anchor bolts and nuts that conform to ASTM F1554 Grade 36 and ASTM A563 Grade A Hex, respectively. Supply washers that meet ASTM F436, Type 1. Hot-dip galvanize all bolts, nuts, and washers in accordance with AASHTO M 111 or AASHTO M 232, as applicable.



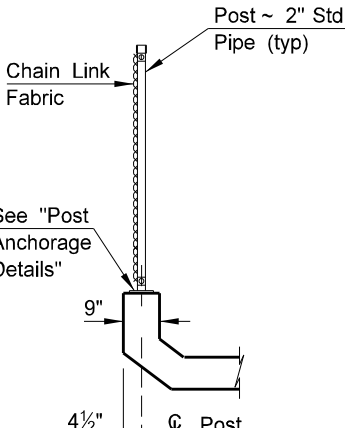
DETAIL "A"



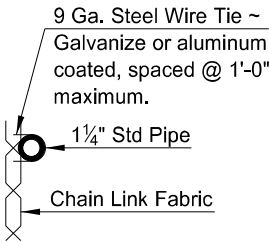
DETAIL "B"



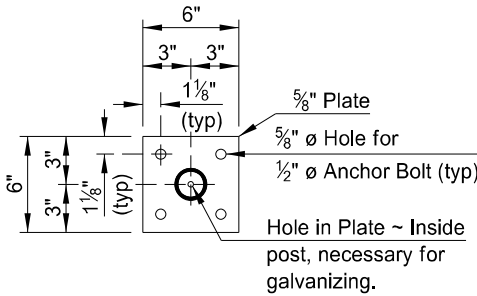
A-A



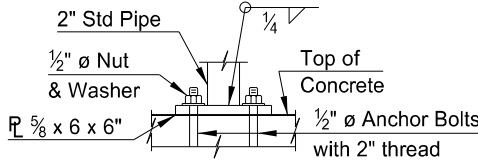
B-B



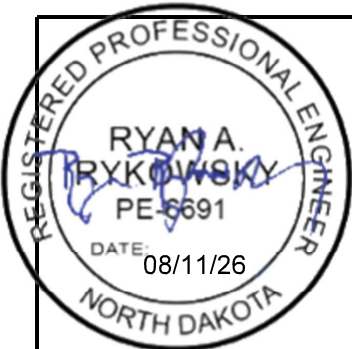
TYPICAL FABRIC ATTACHMENT
C-C



BASE PLATE PLAN

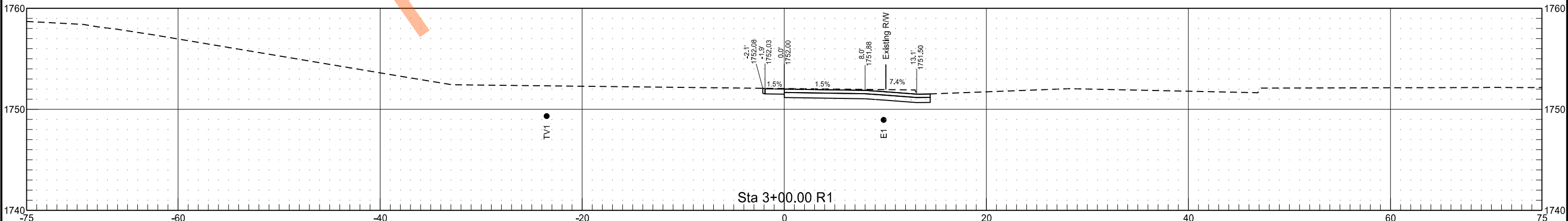
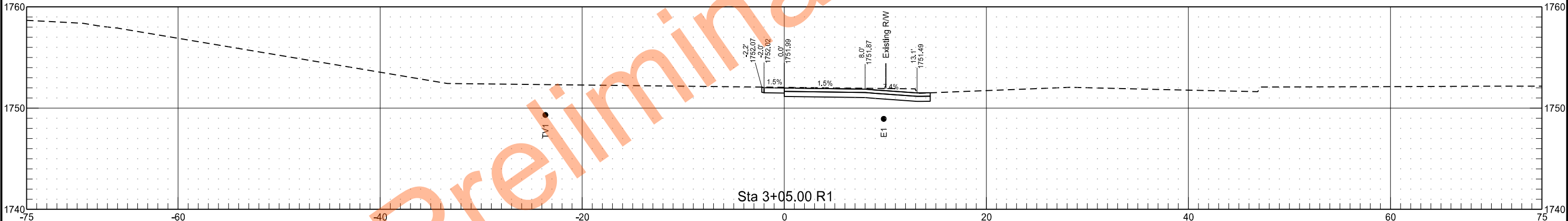
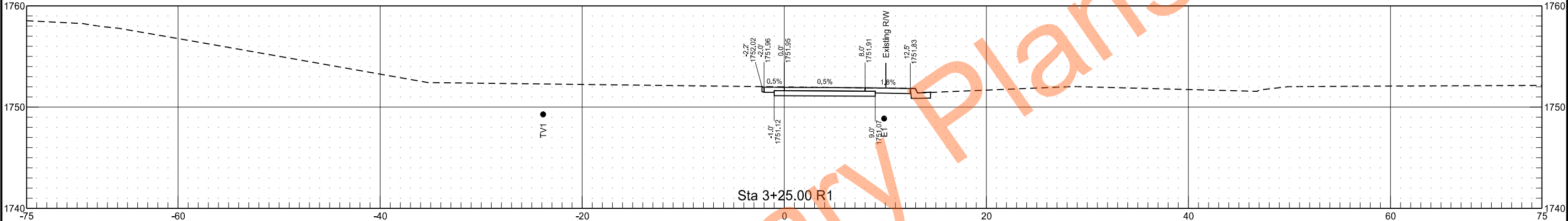


ELEVATION
FENCE POST ANCHORAGE DETAILS

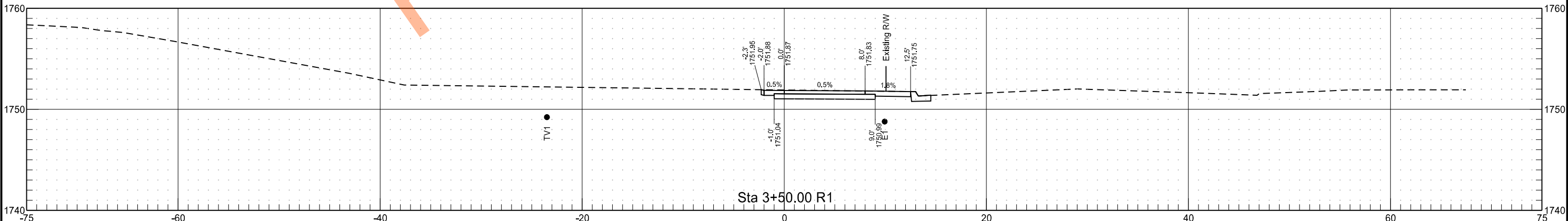
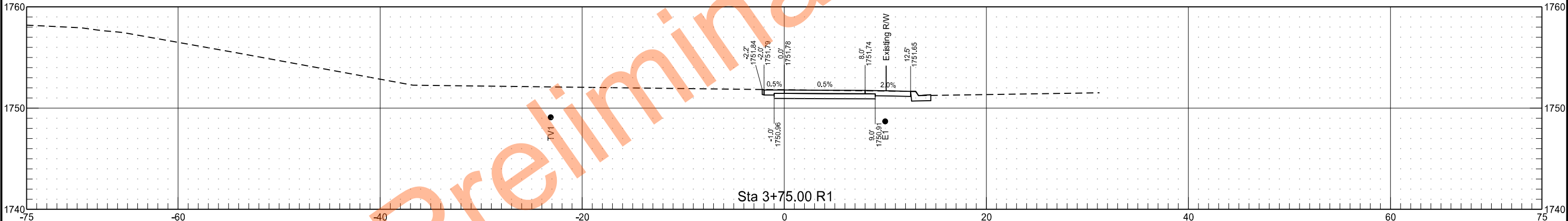
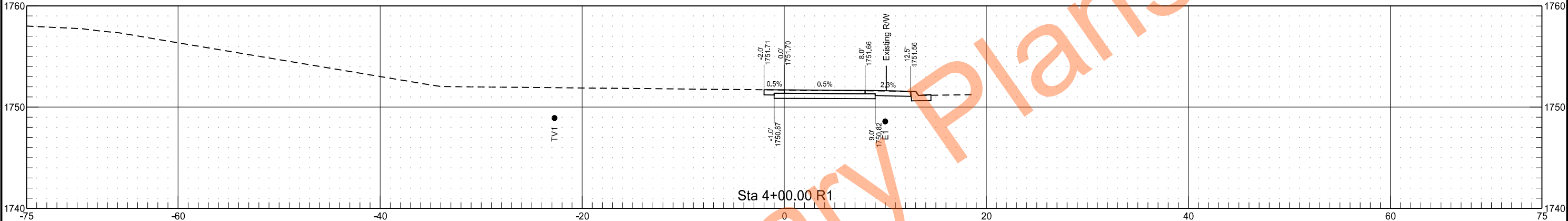


QUANTITIES	
PEDESTRIAN FENCE	53.0 LF
PEDESTRIAN UNDERPASS HAZEN, ND	
PEDESTRIAN FENCE DETAILS	

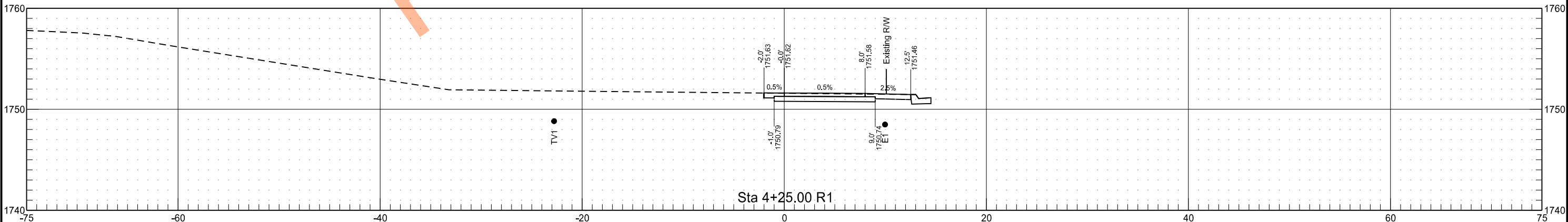
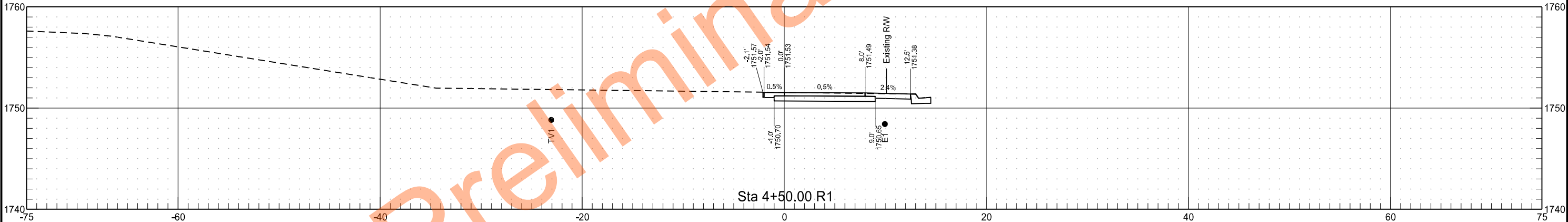
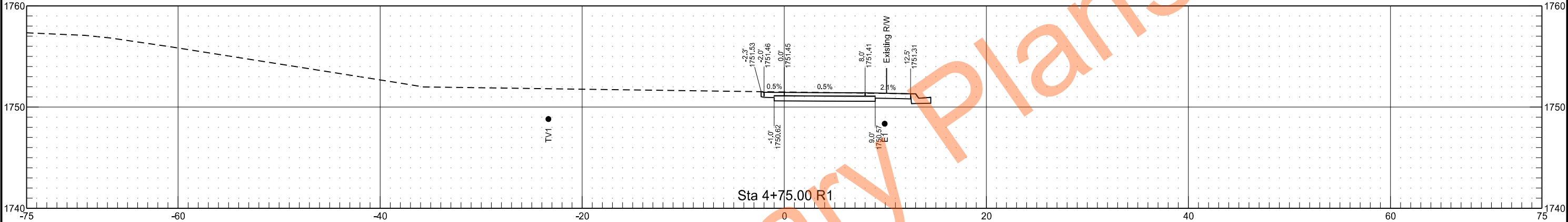
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	200	1



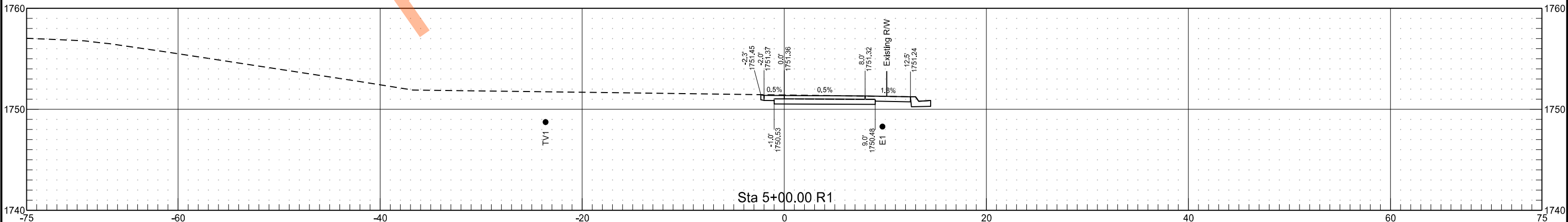
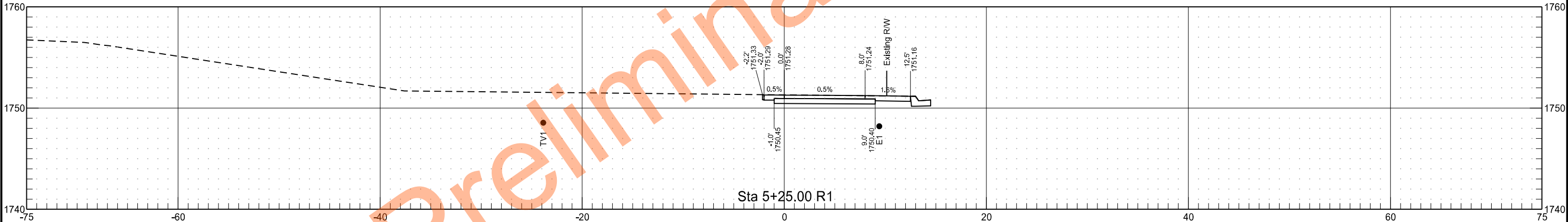
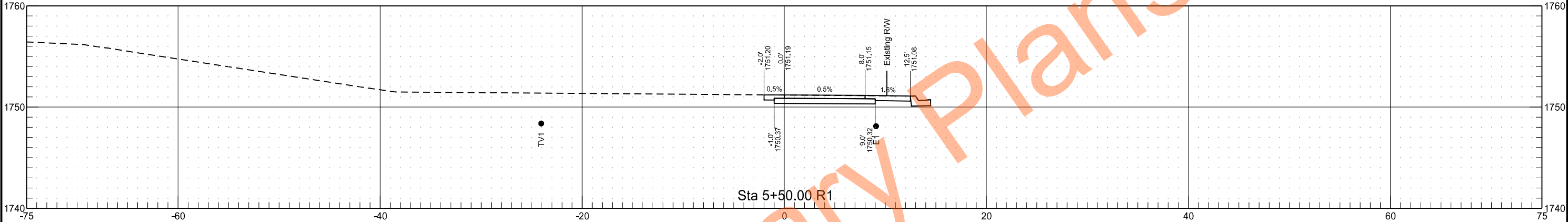
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	200	2



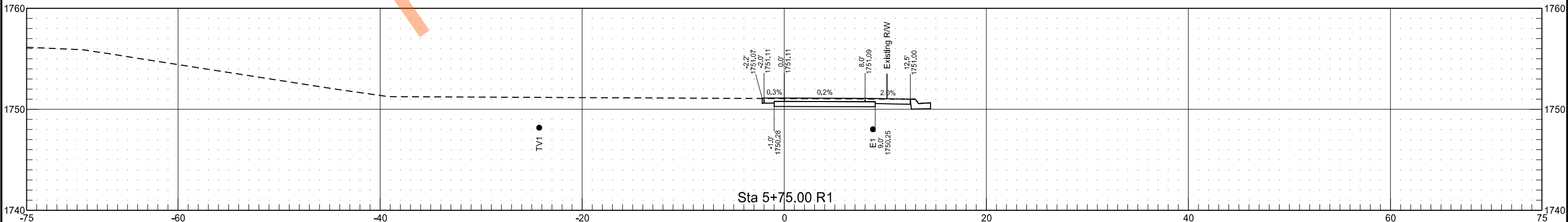
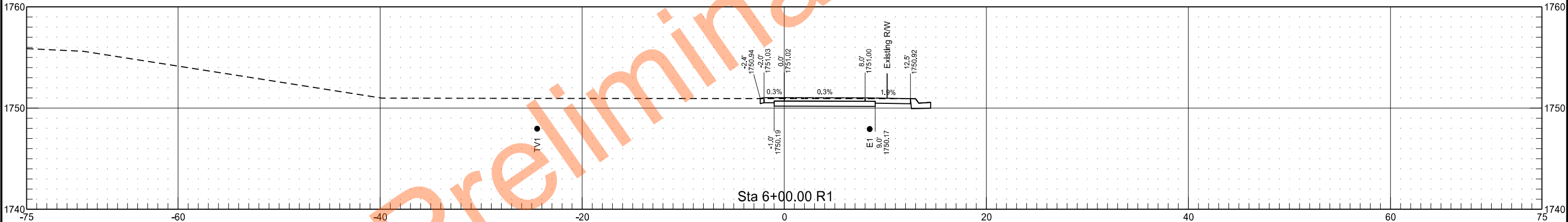
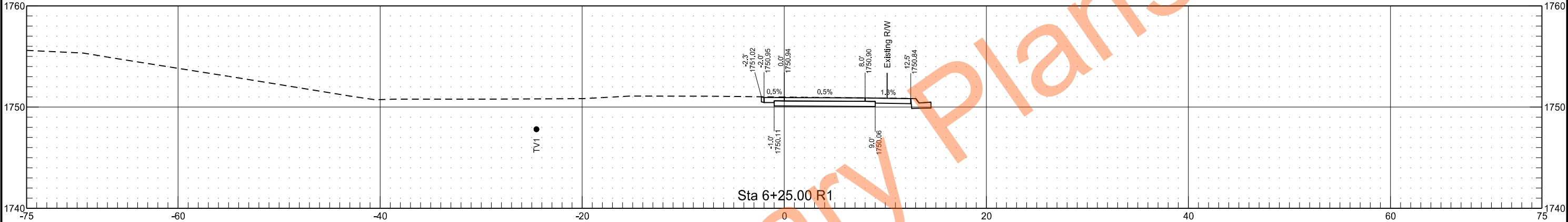
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	200	3



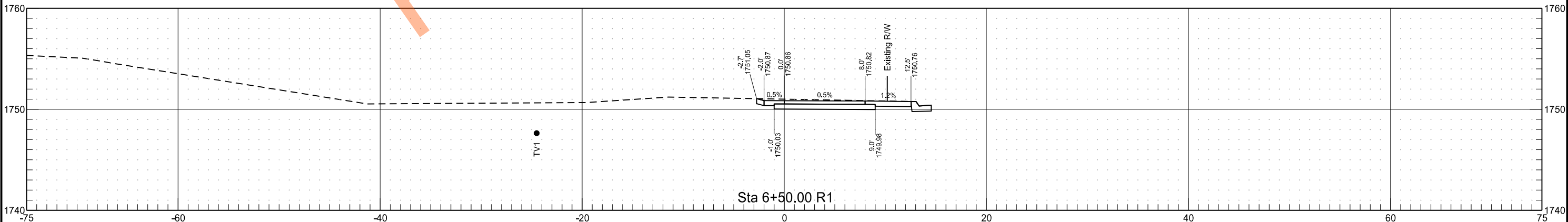
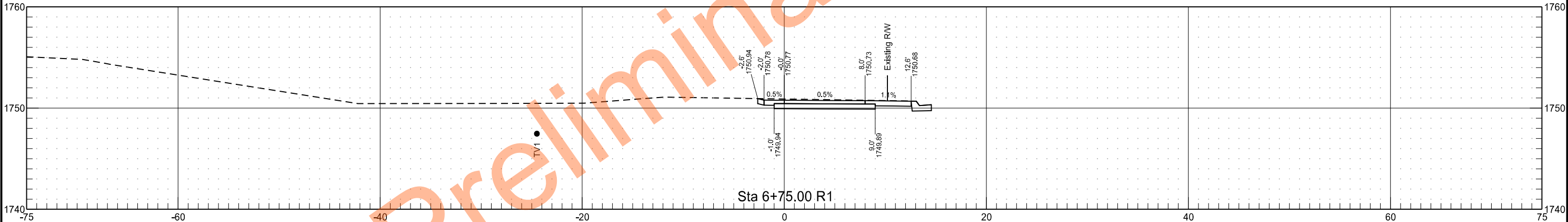
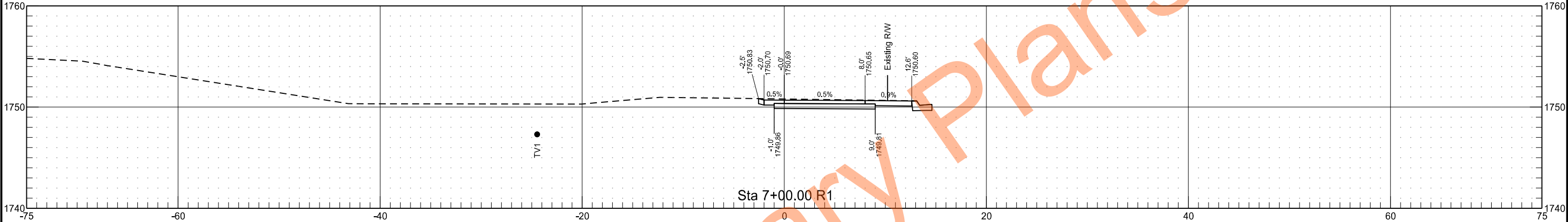
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NDS-NH-5-200(034)150	200	4



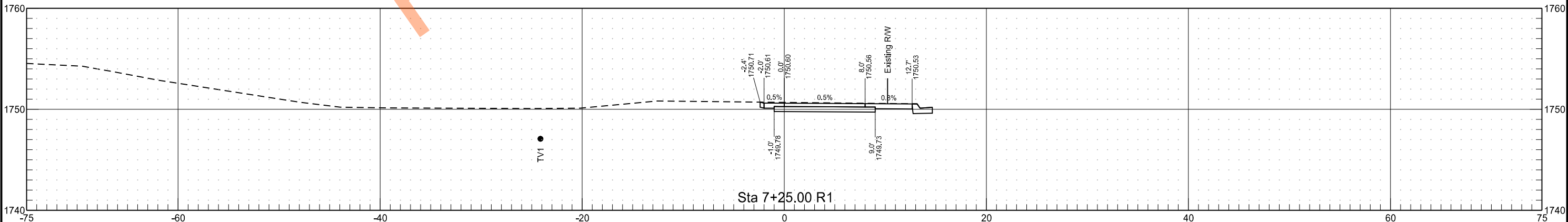
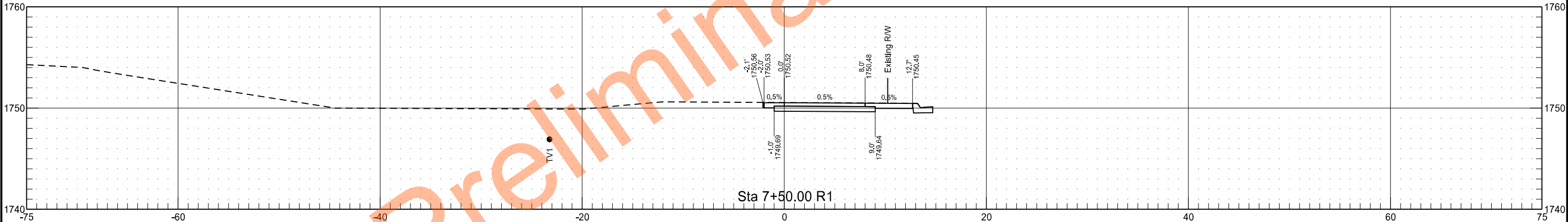
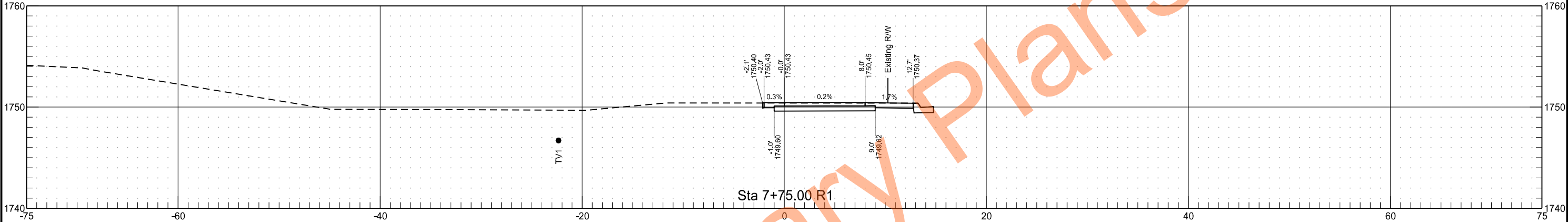
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NDS-NH-5-200(034)150	200	5



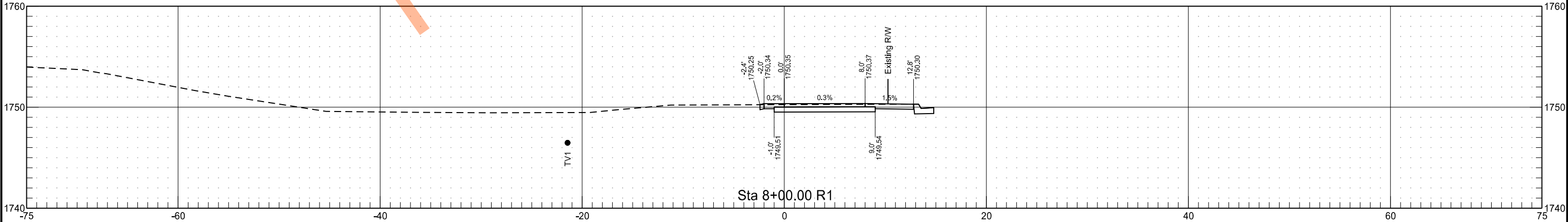
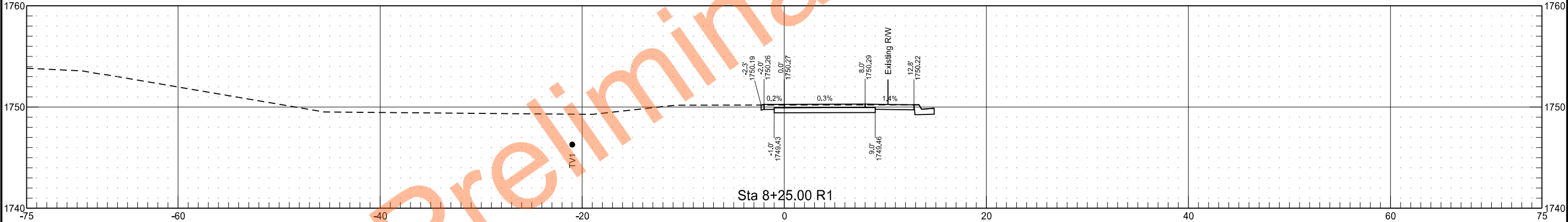
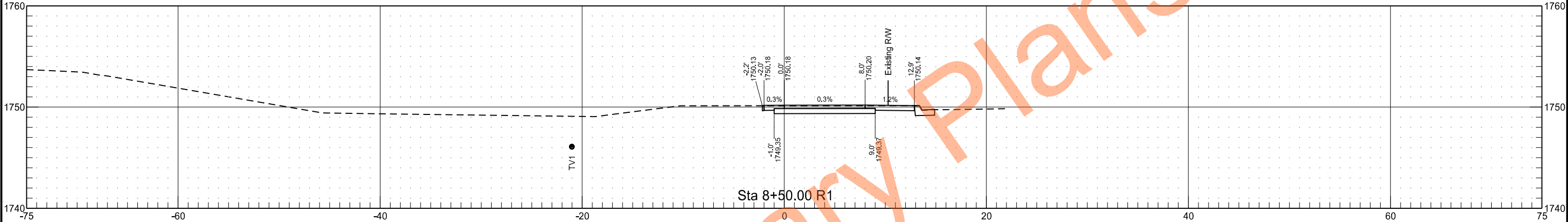
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	200	6



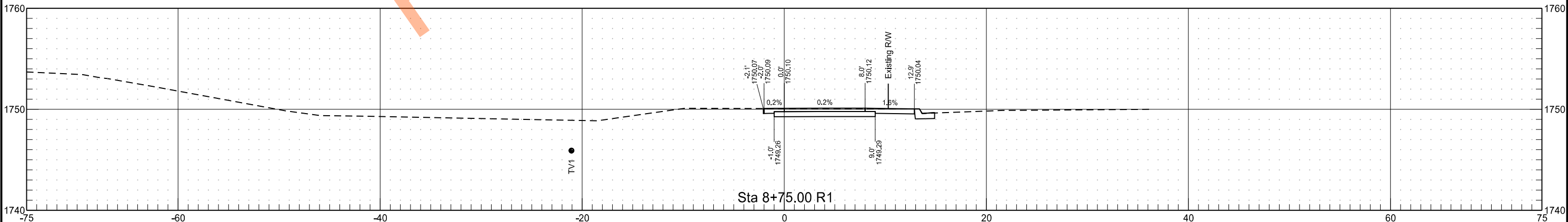
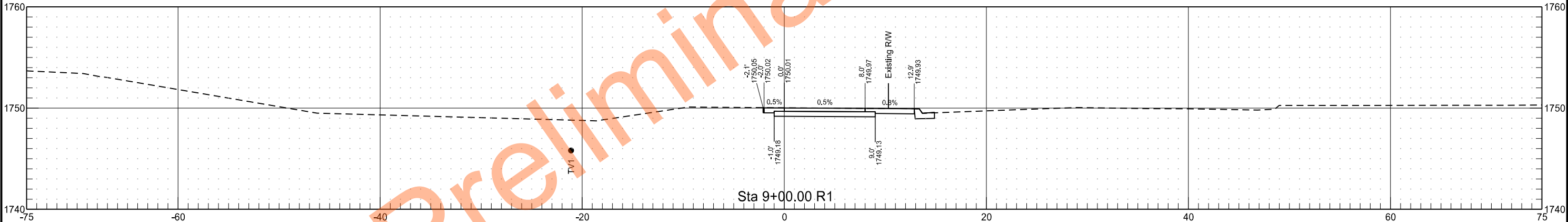
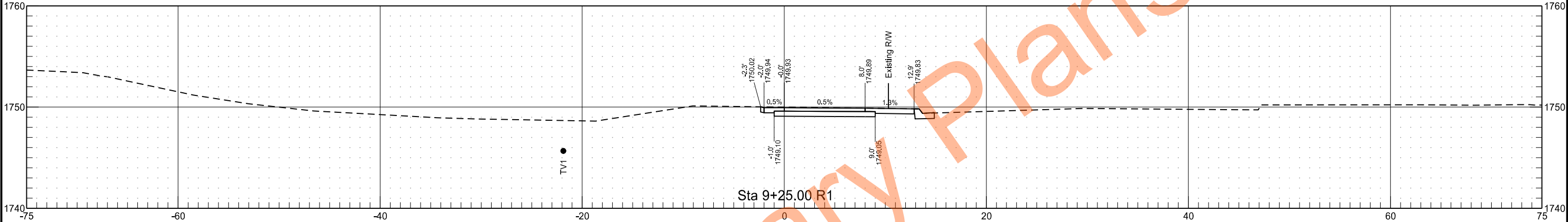
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	200	7

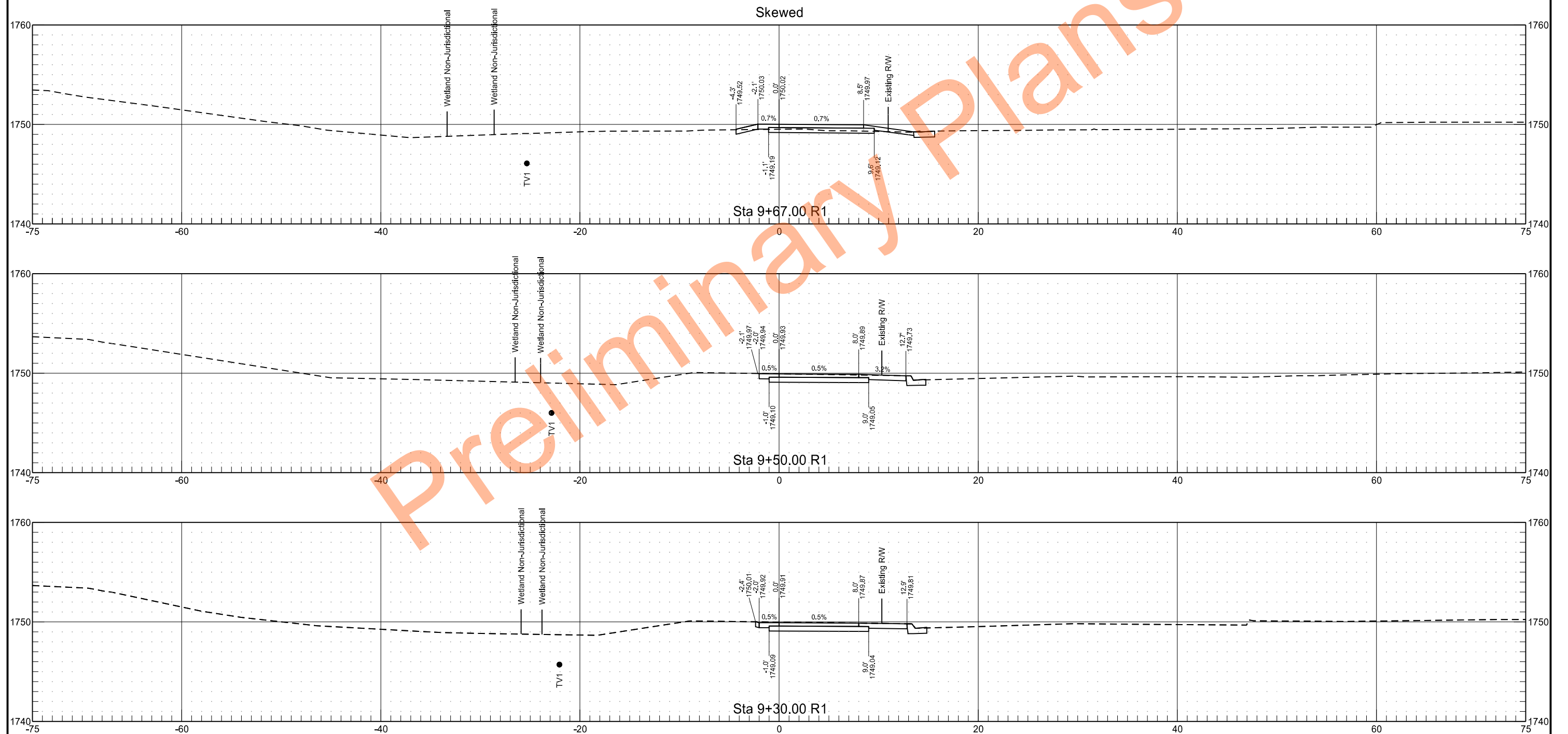


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	200	8

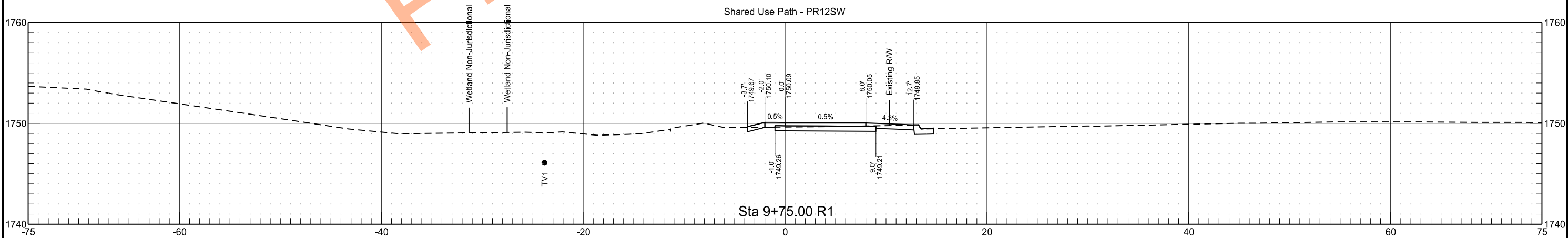
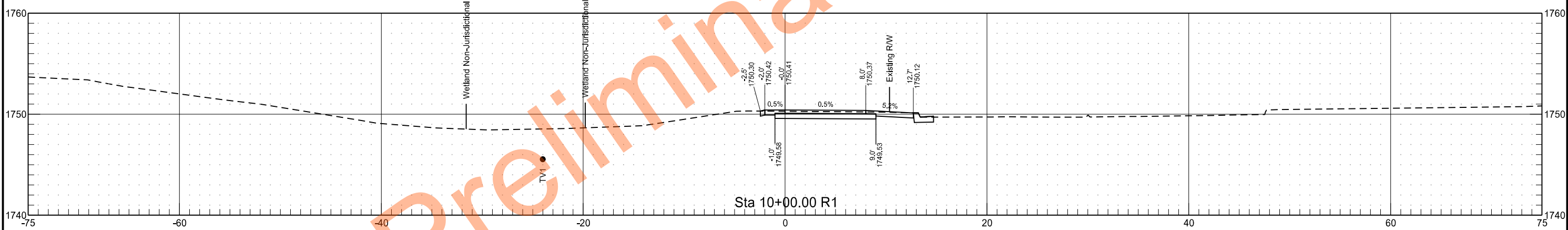
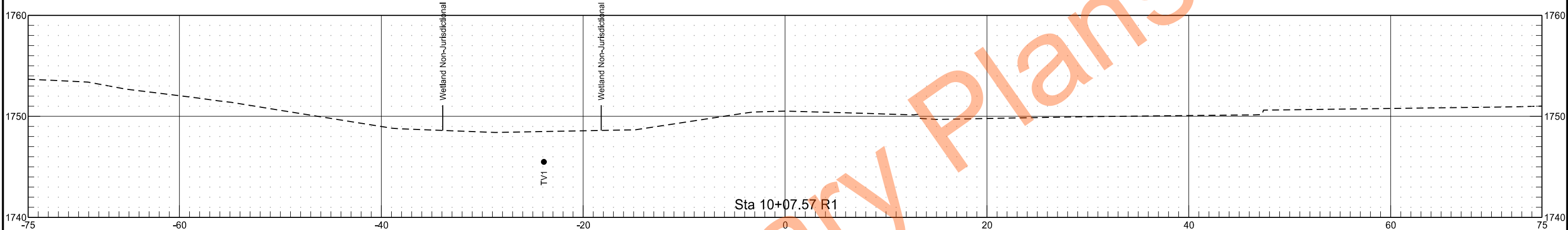


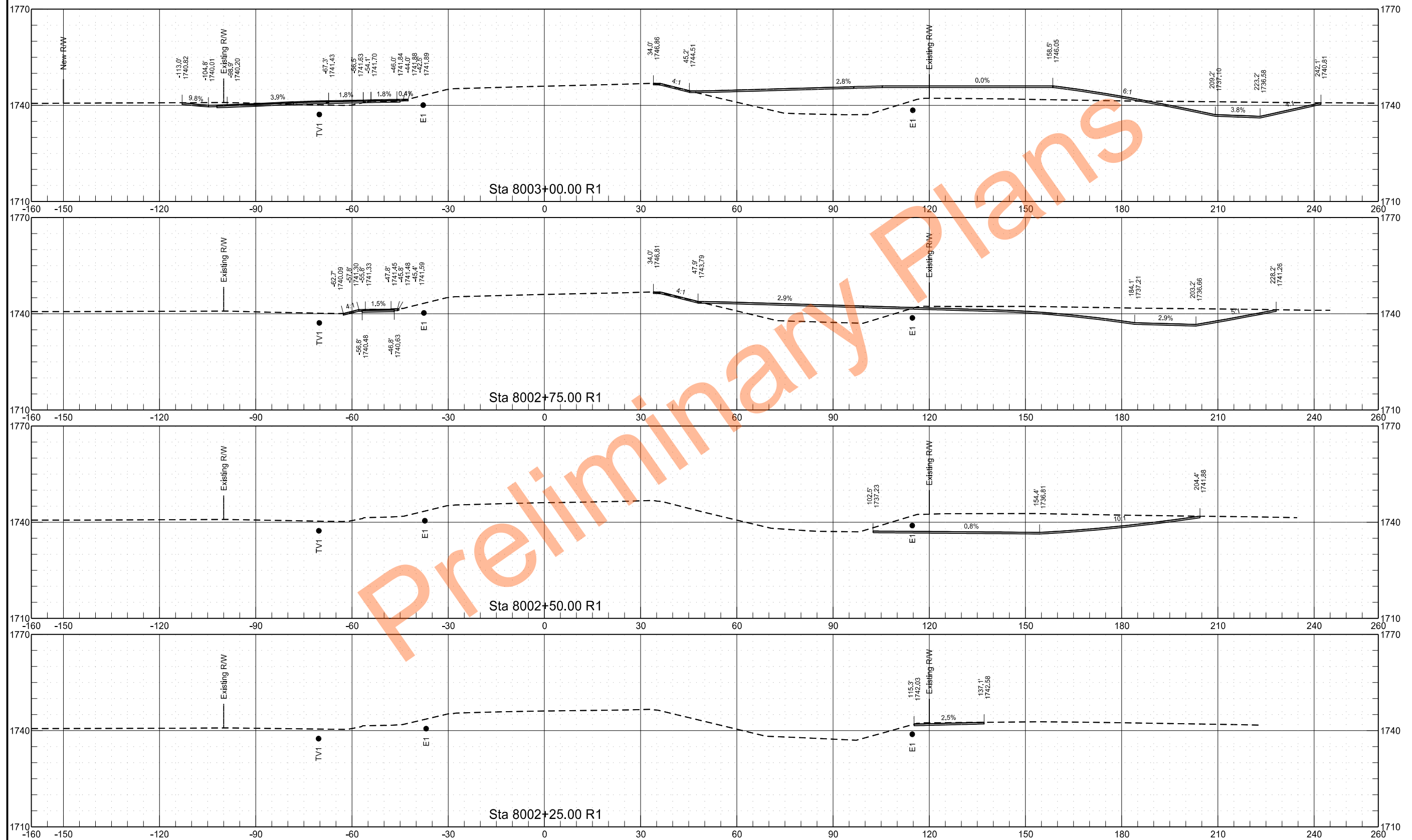
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	200	9

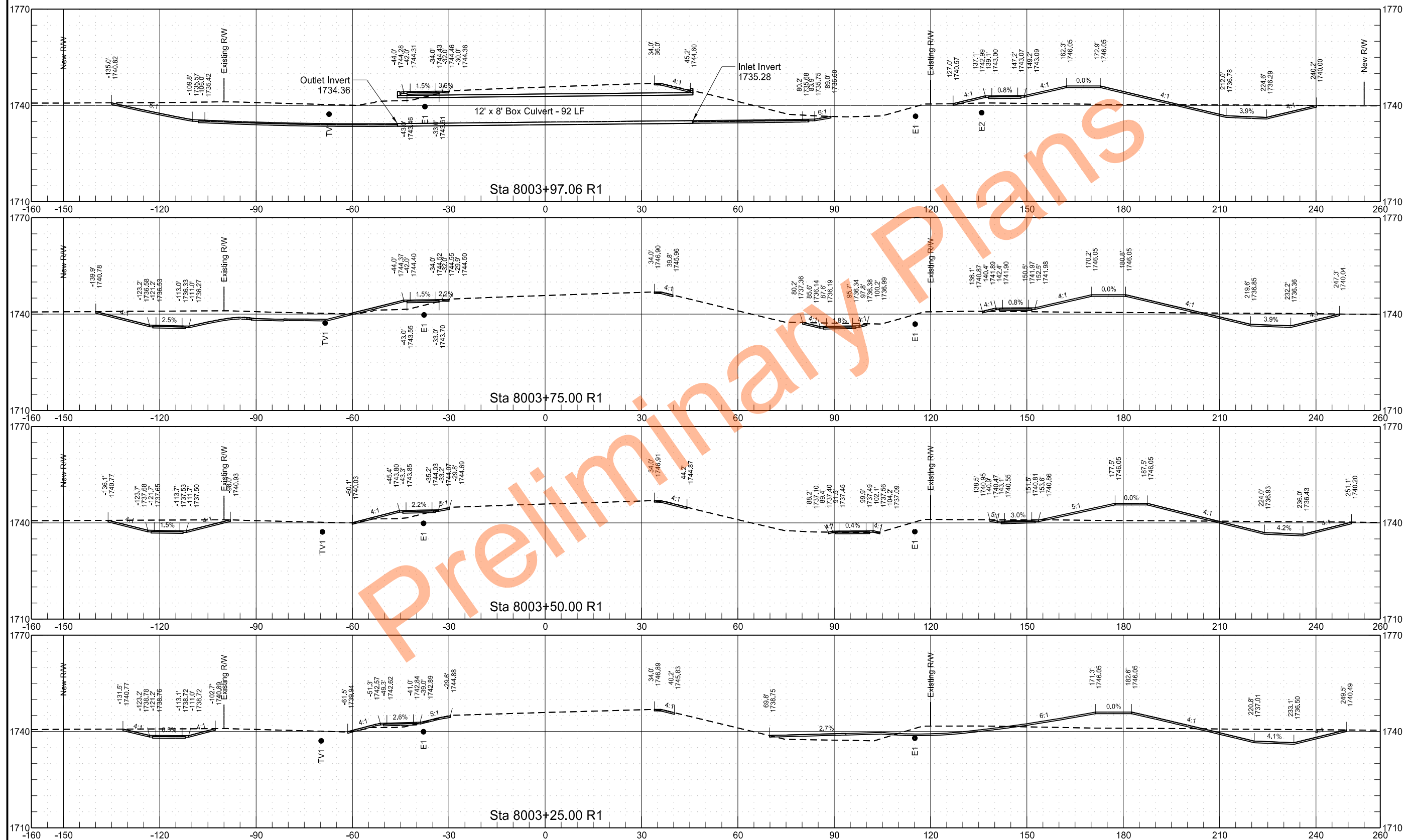




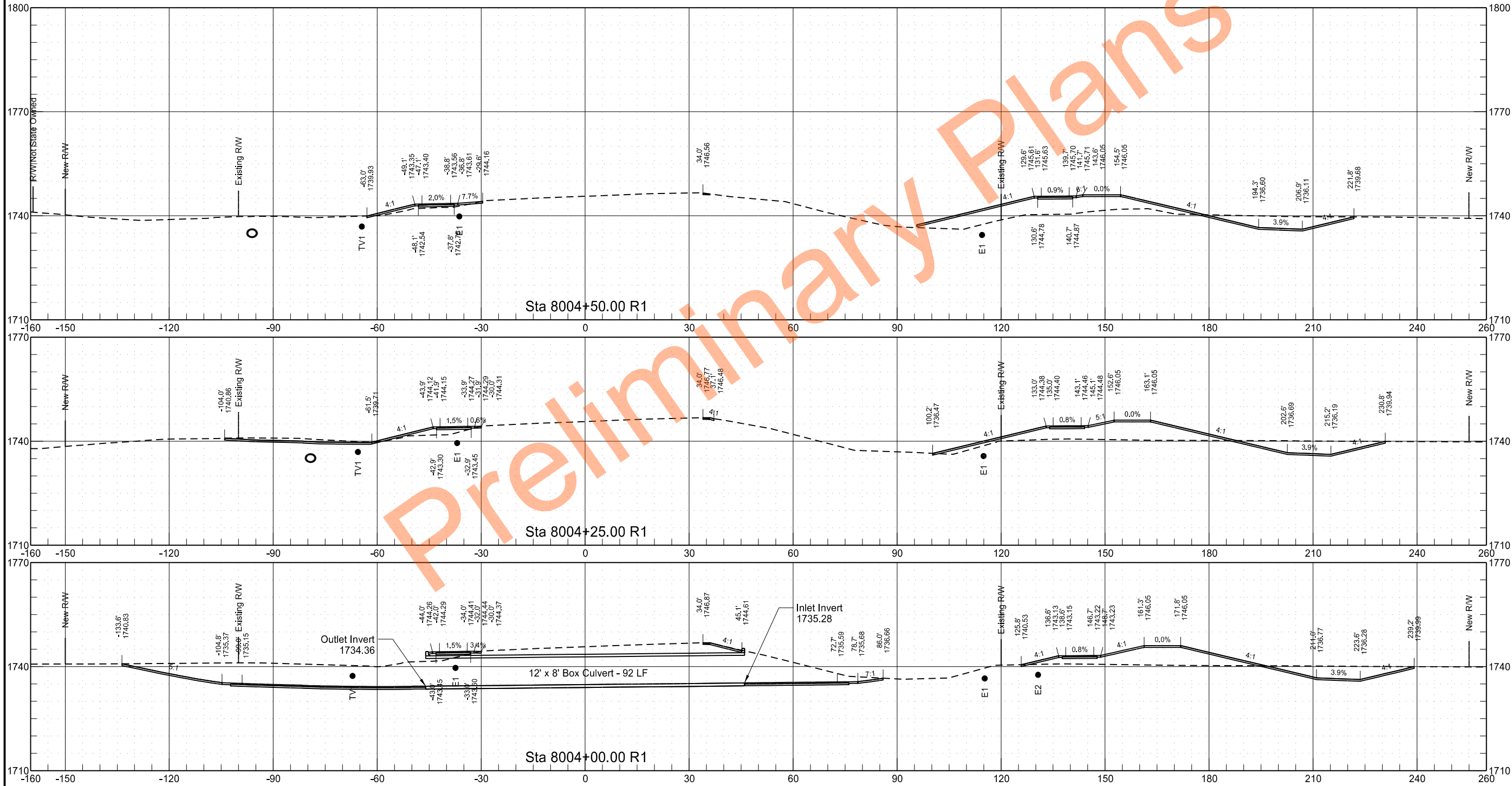
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	200	11



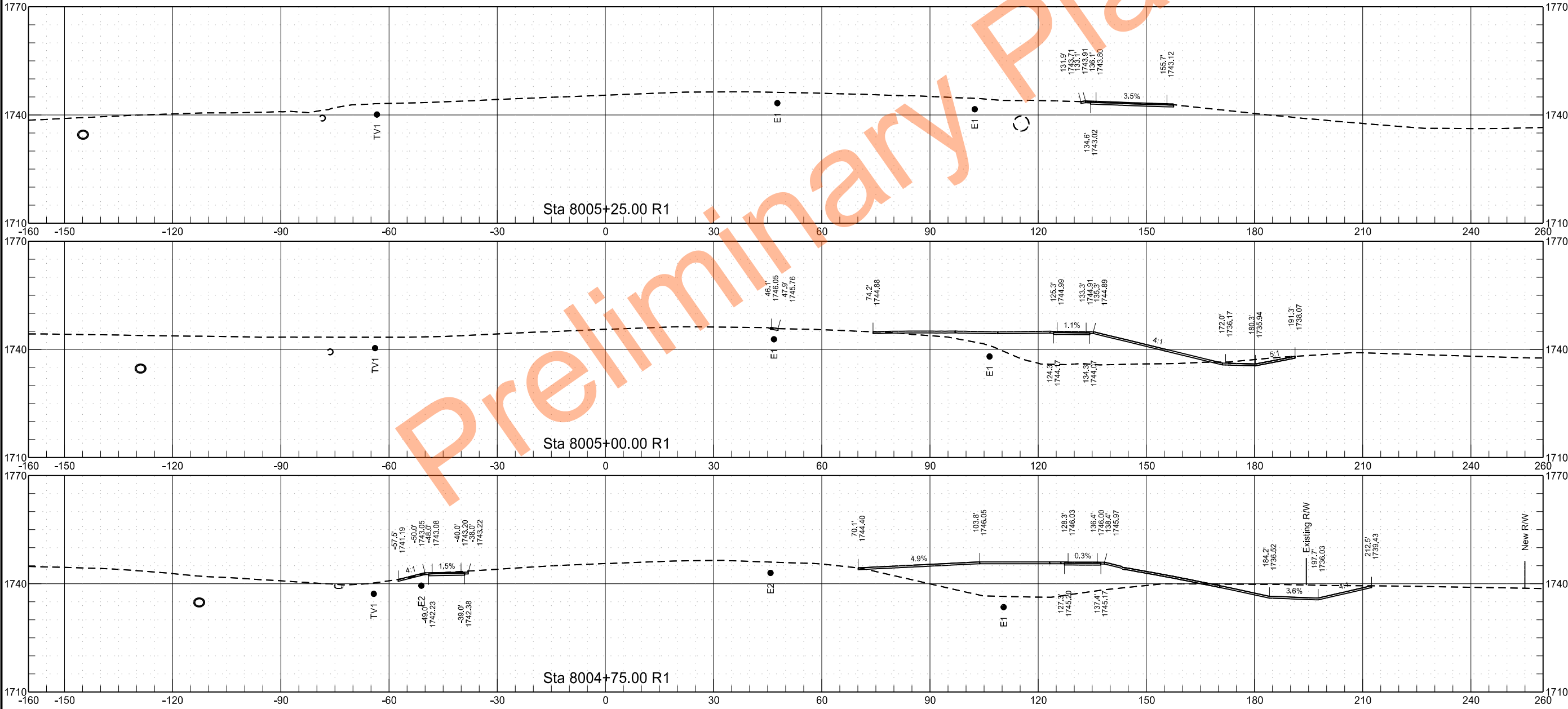


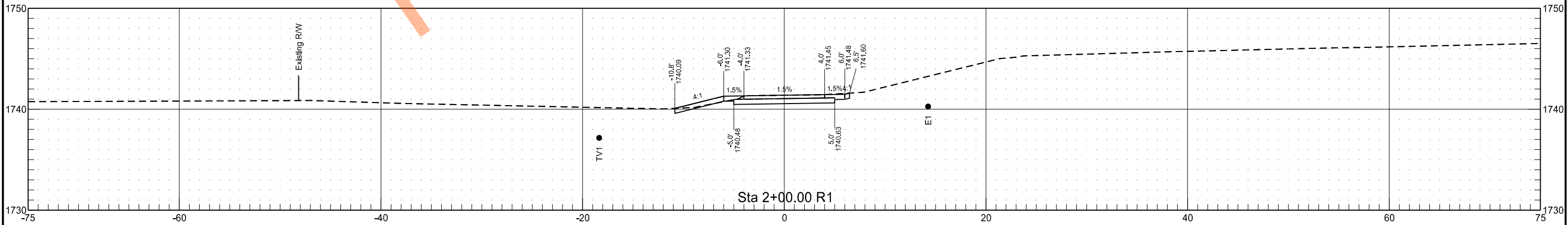
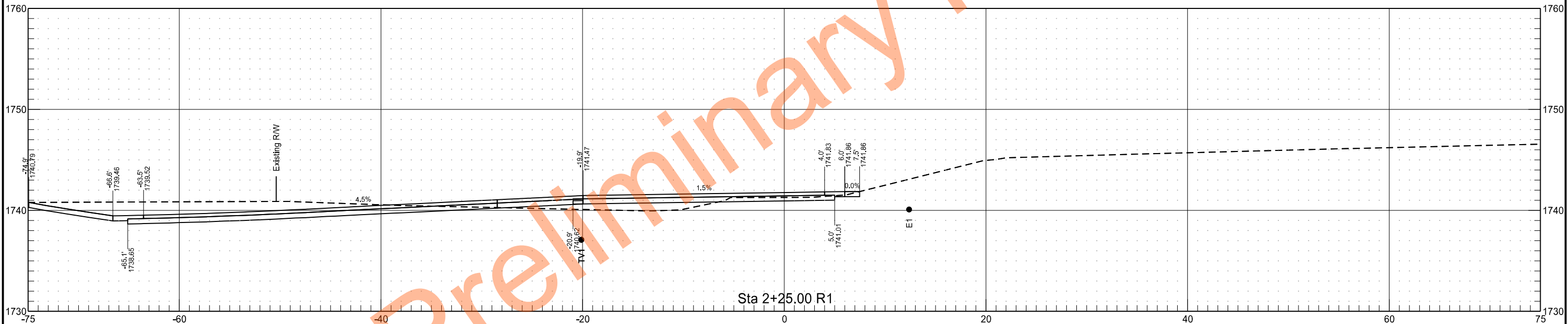
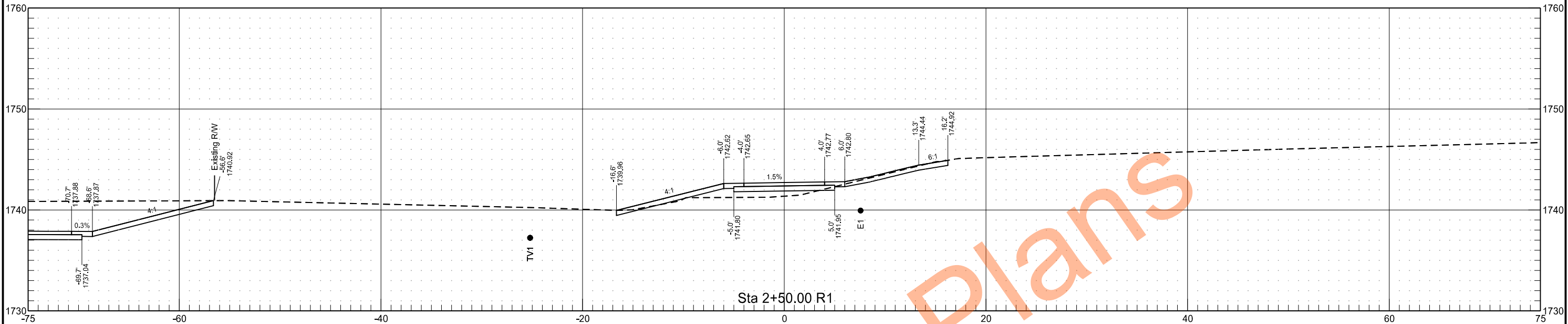


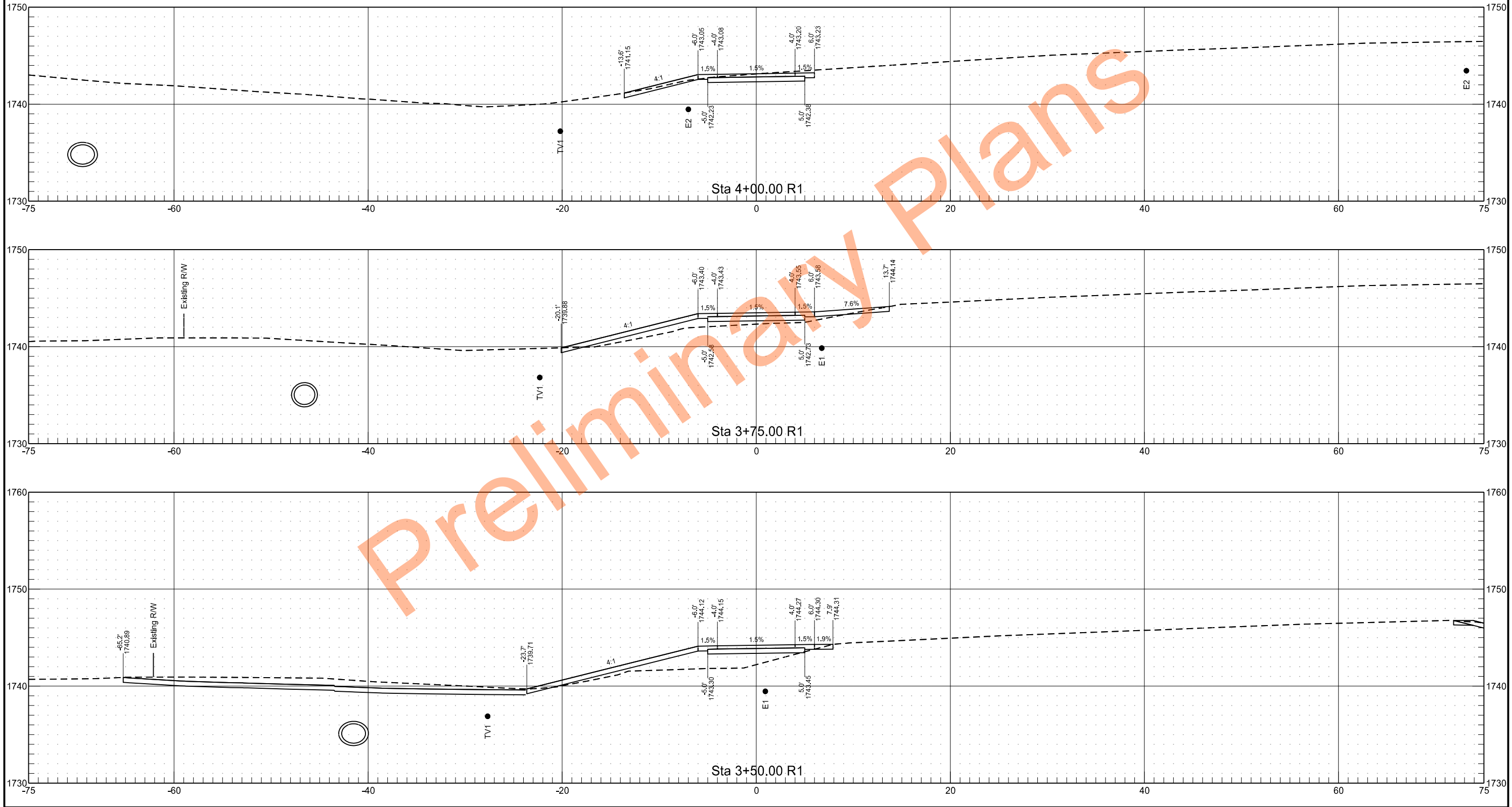
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NDS-NH-5-200(034)150	200	14



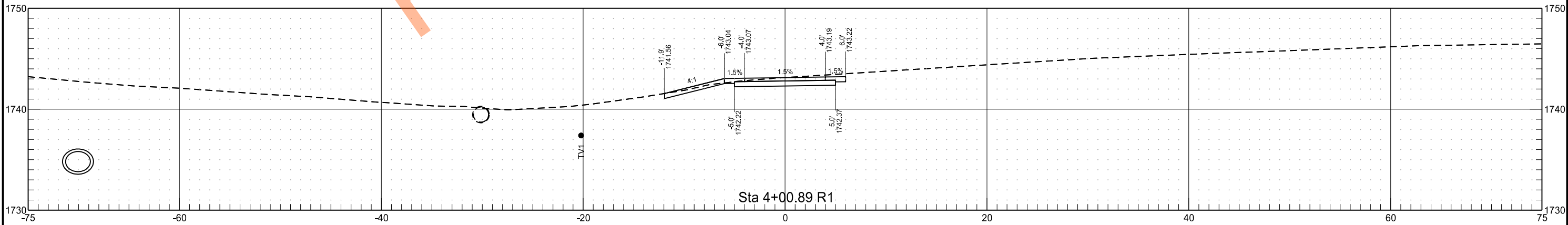
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NDS-NH-5-200(034)150	200	15



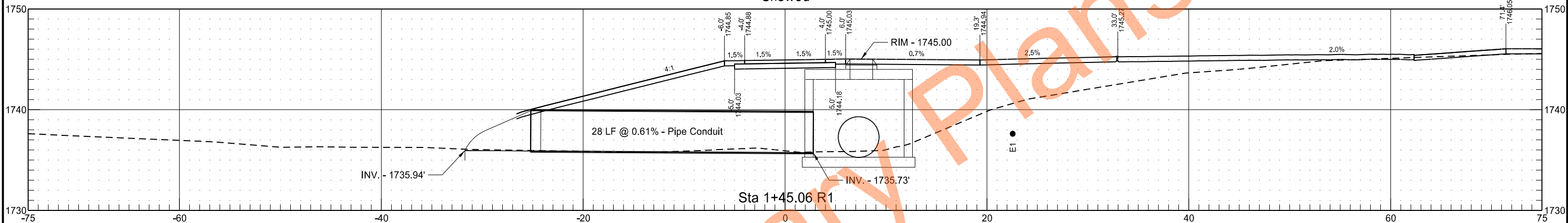




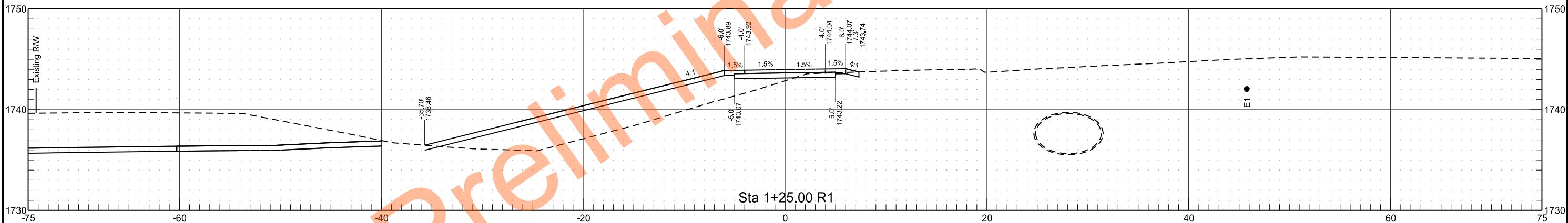
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	200	19



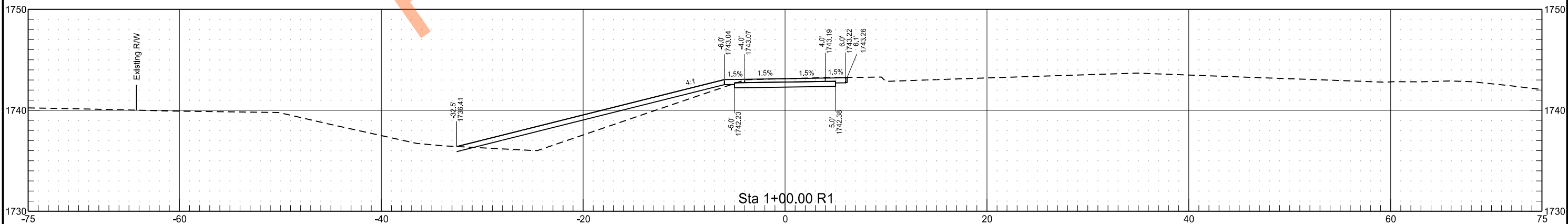
Skewed



Sta 1+45.06 R1

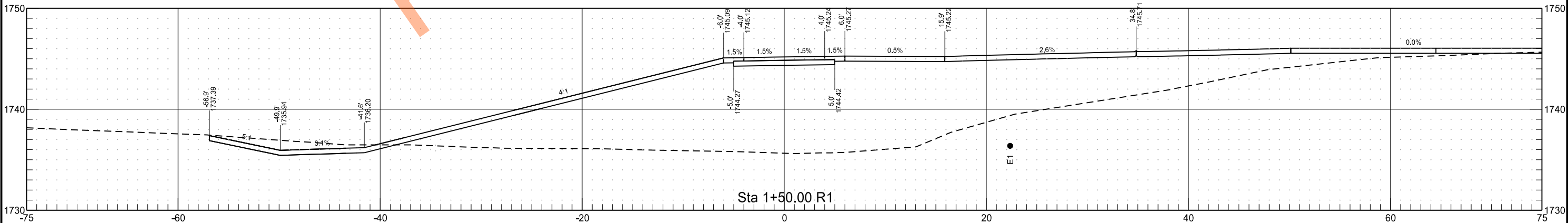
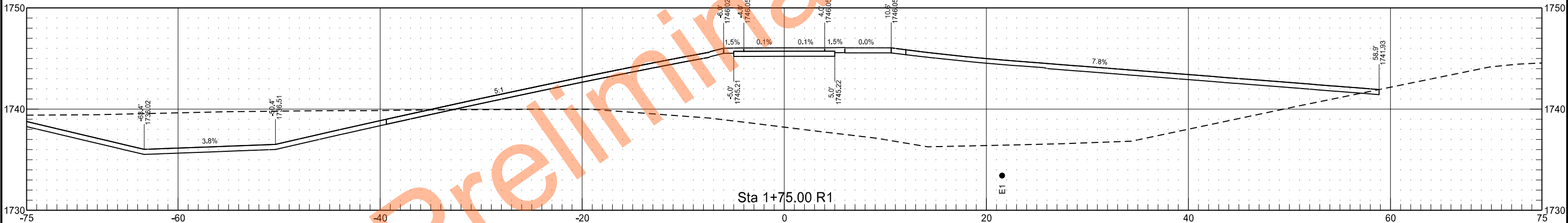
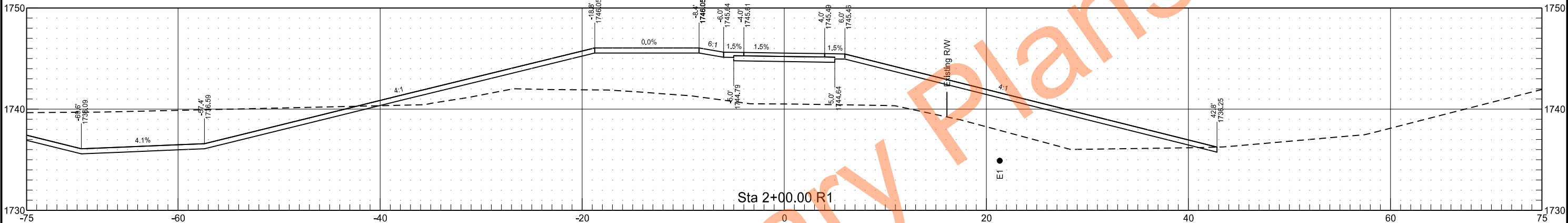


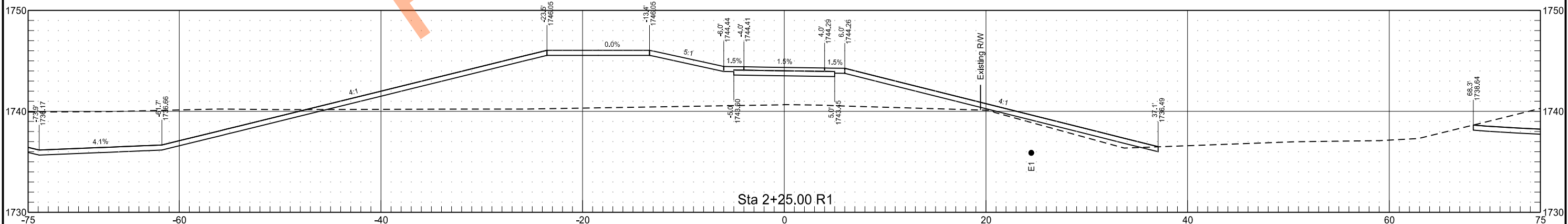
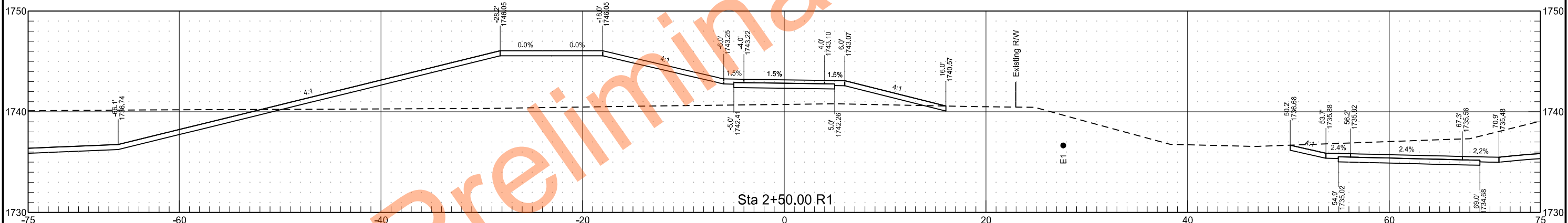
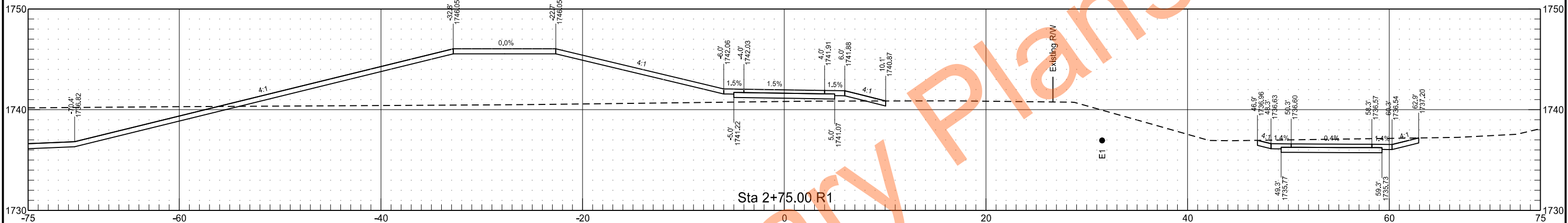
Sta 1+25.00 R1



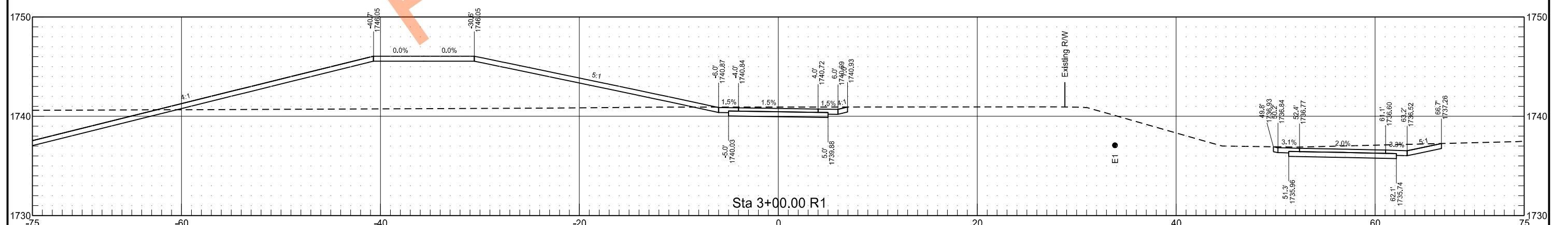
Sta 1+00.00 R1

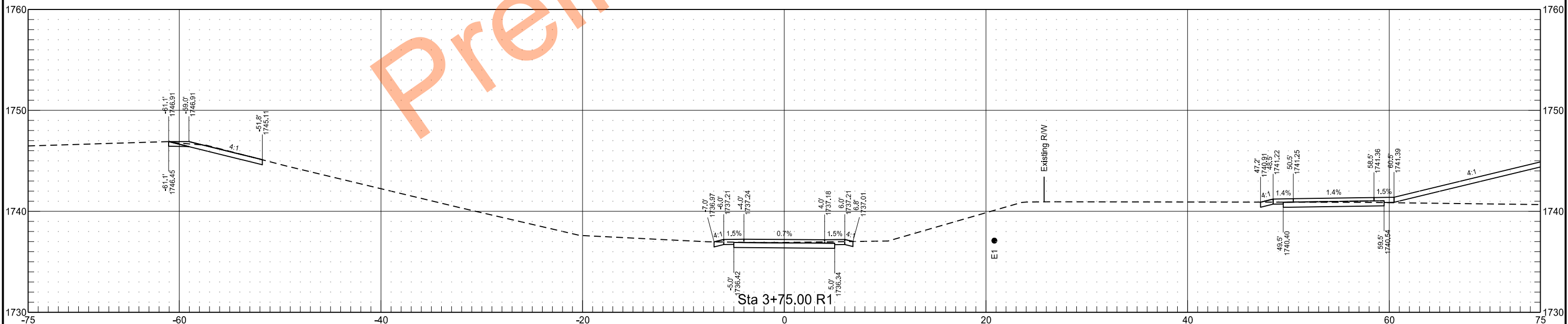
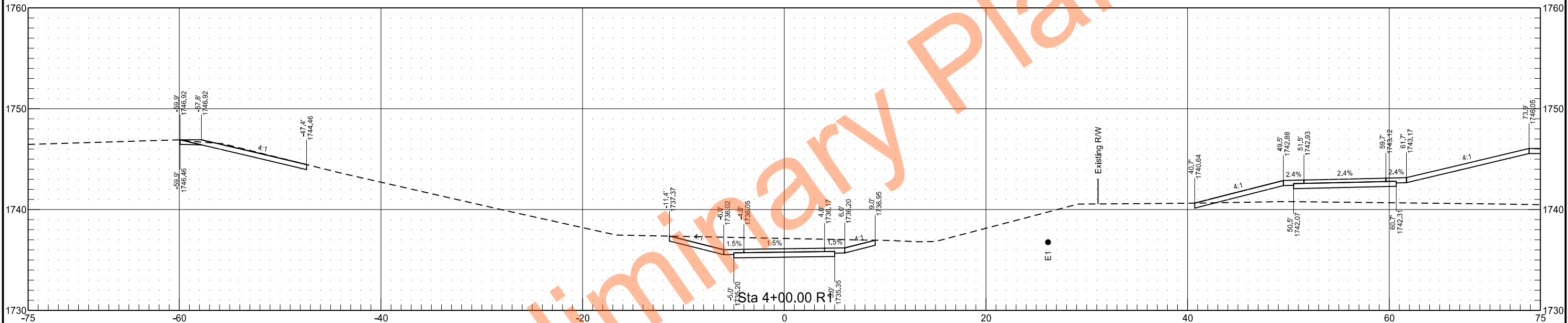
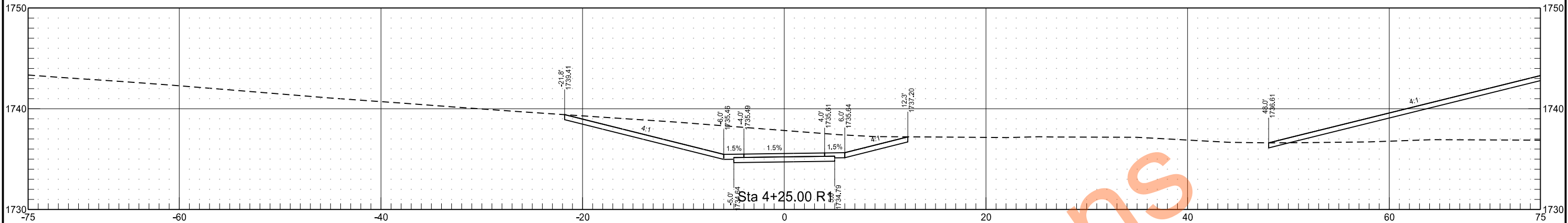
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	200	21



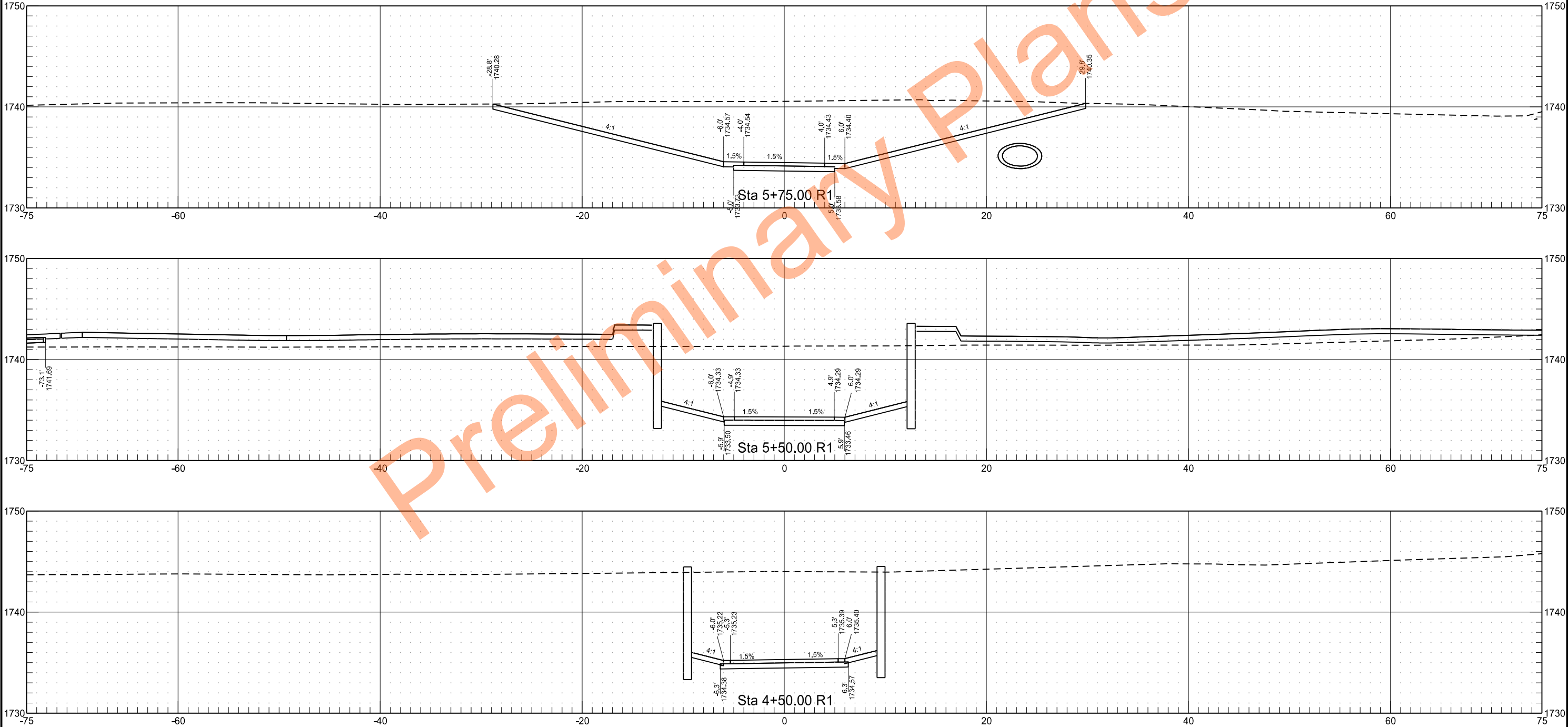


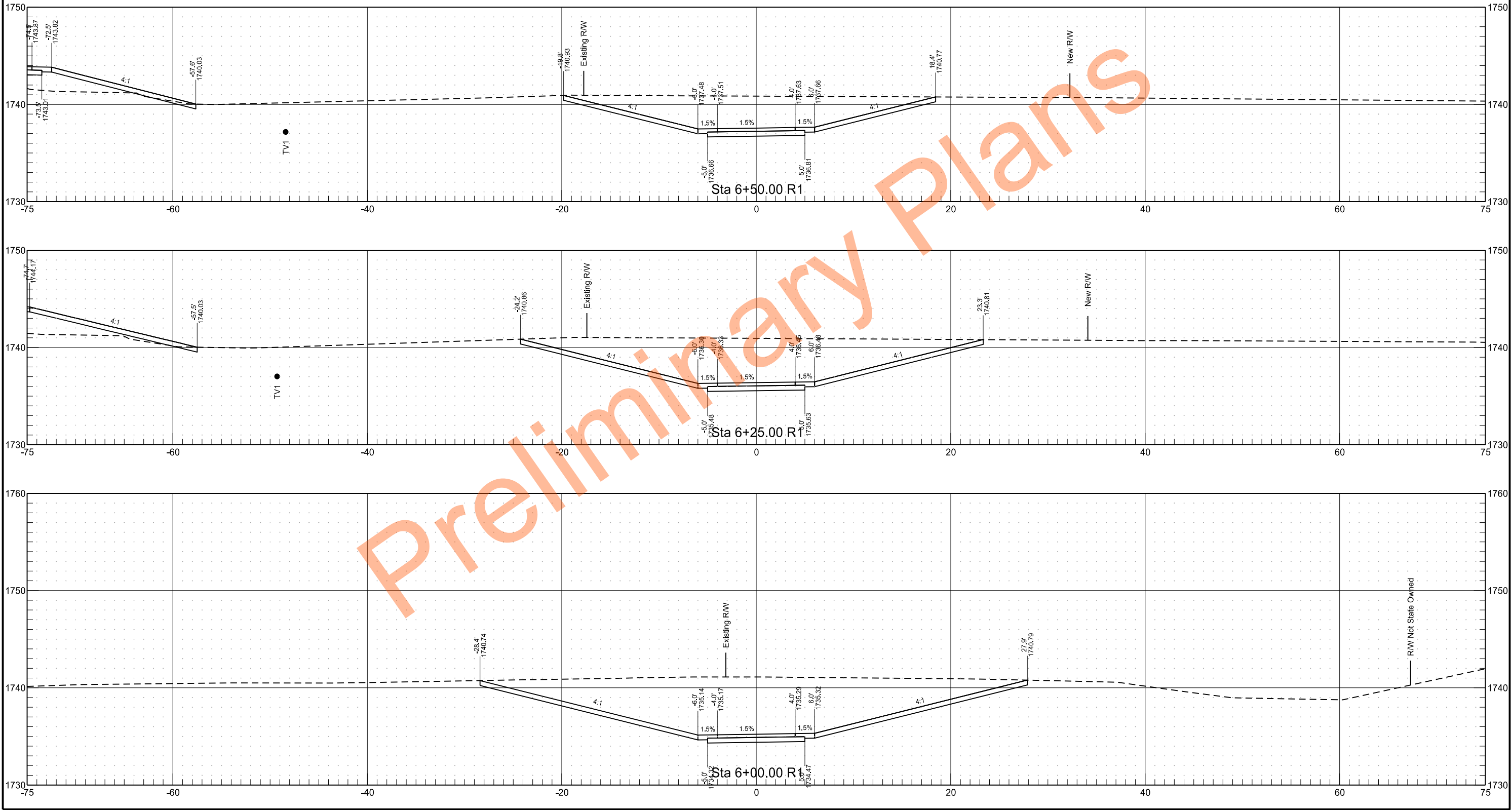
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	200	23



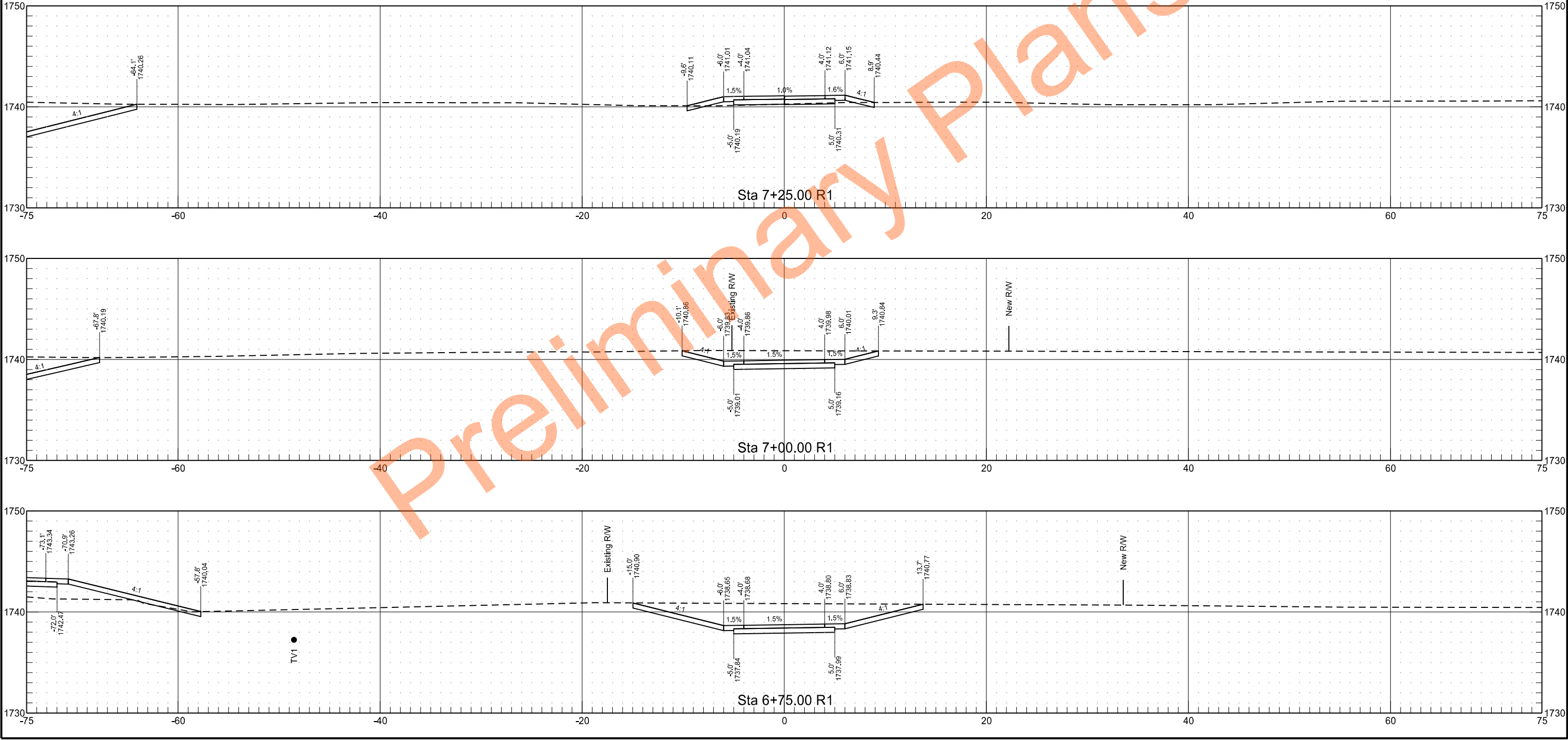


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	200	25

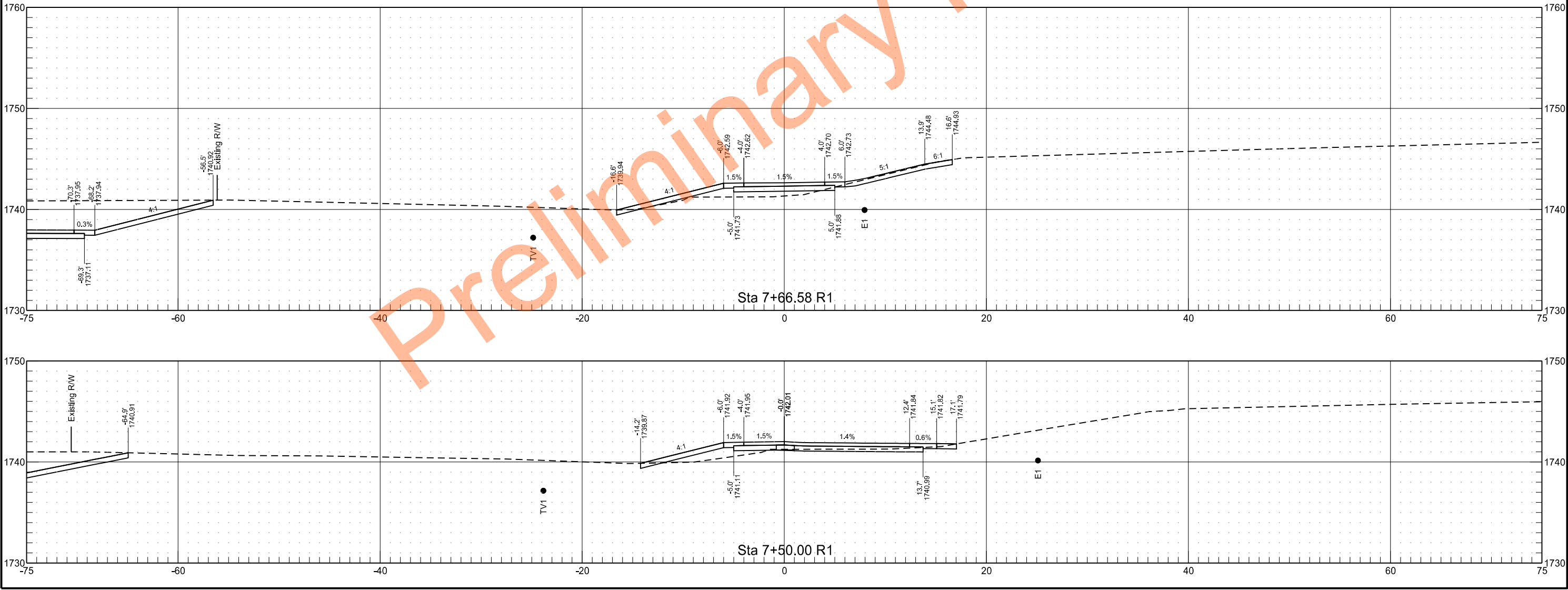




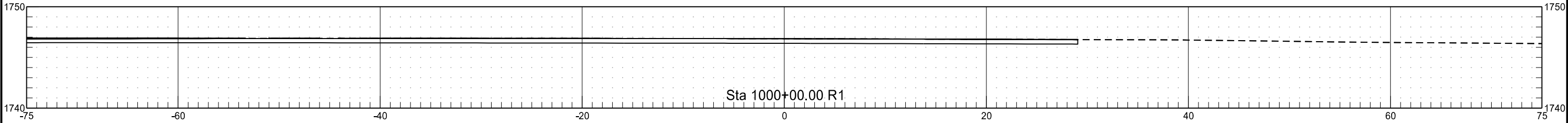
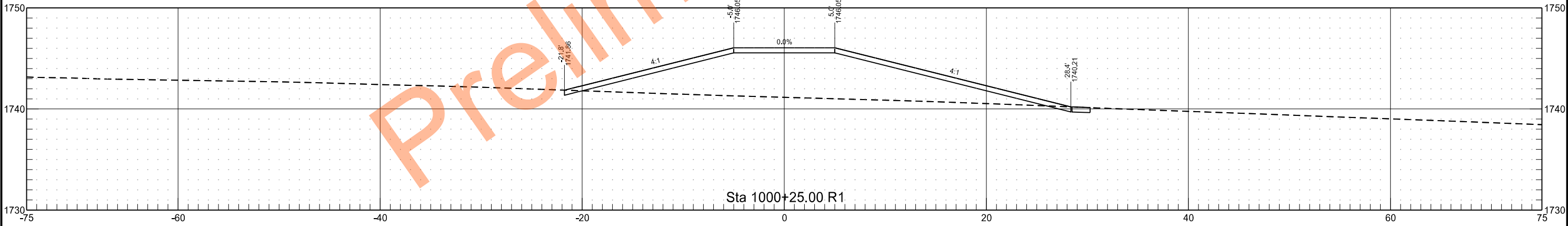
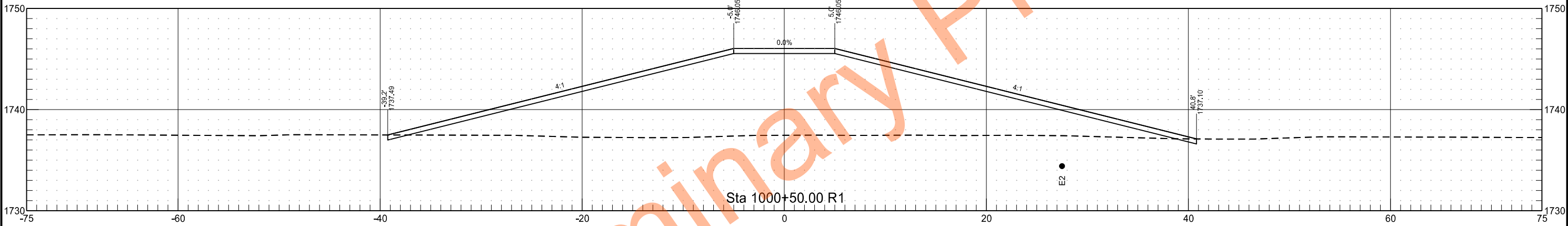
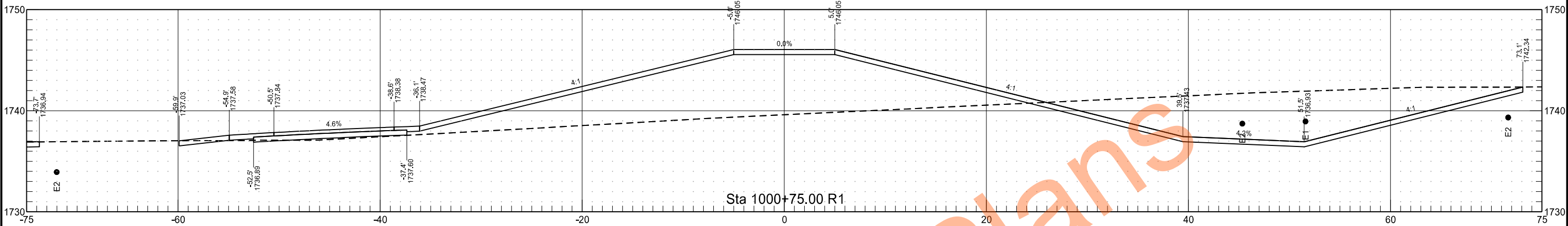
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	200	27



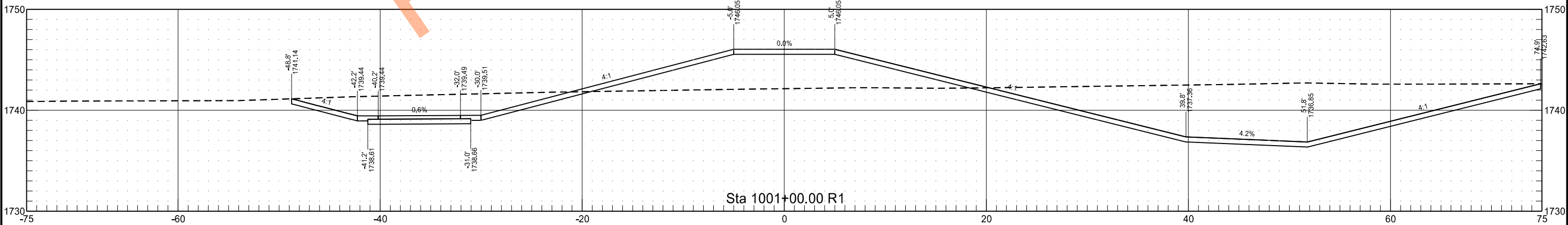
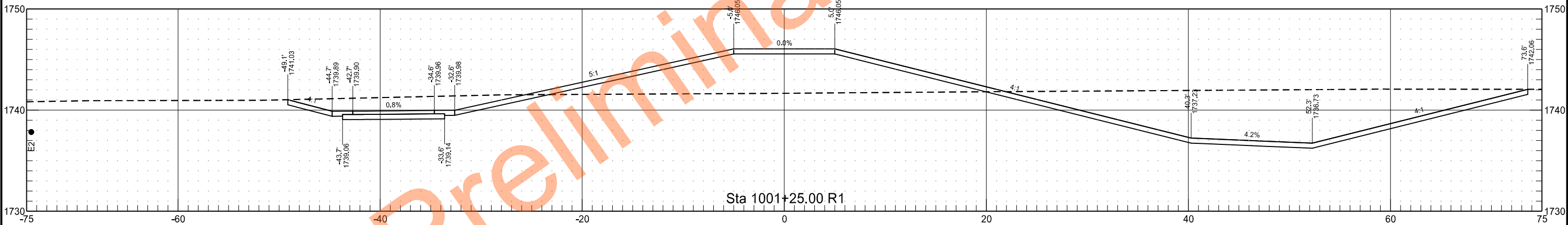
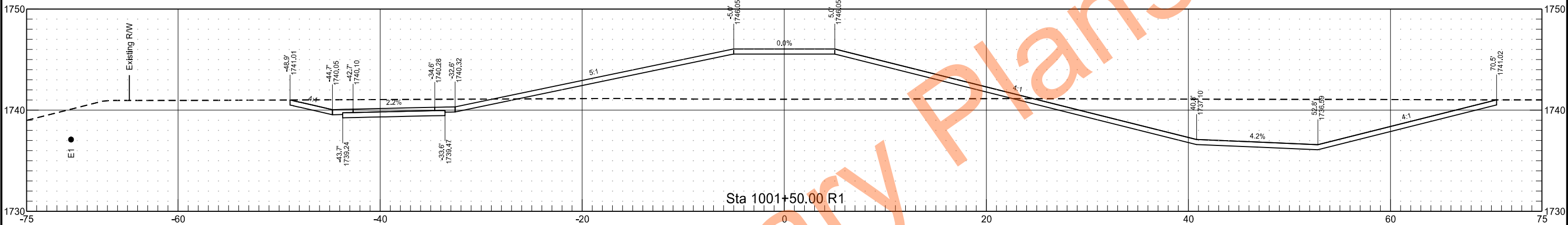
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	200	28



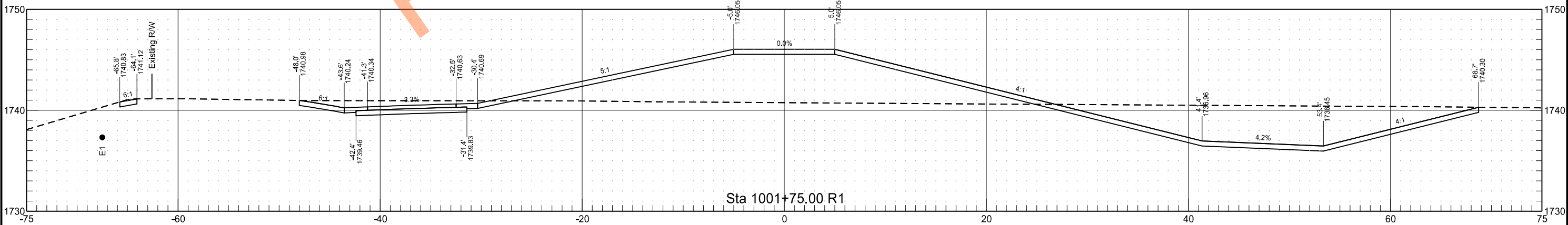
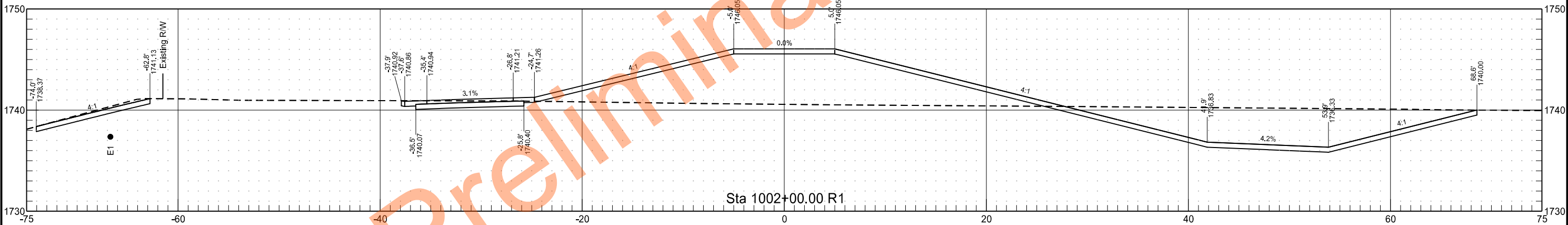
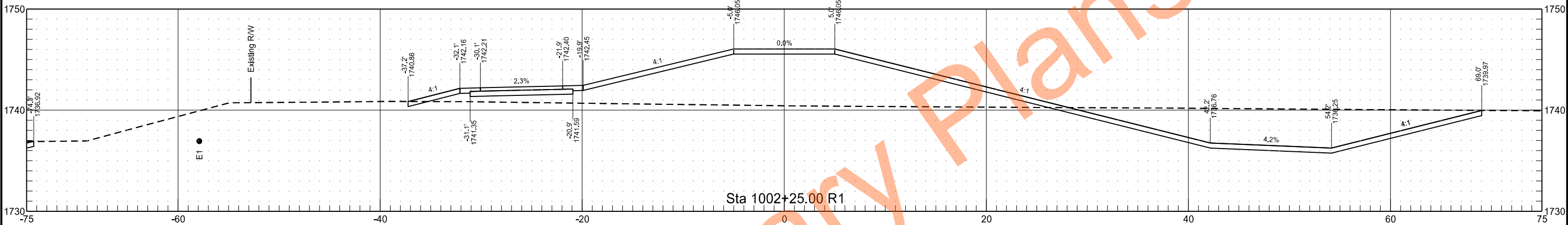
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	200	30



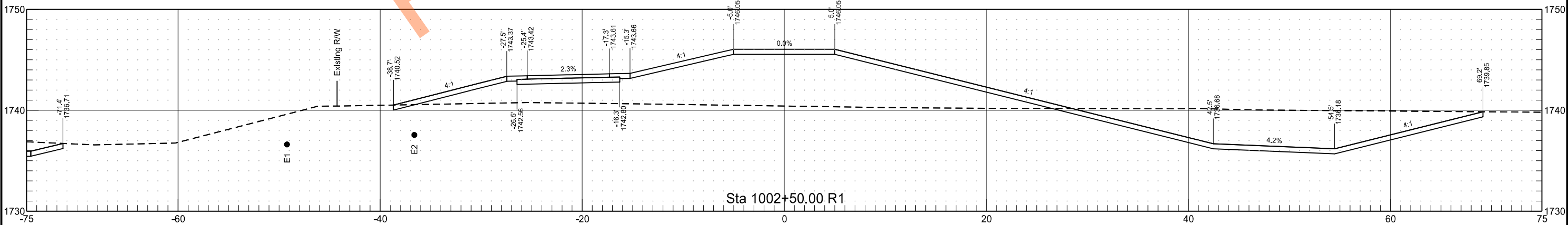
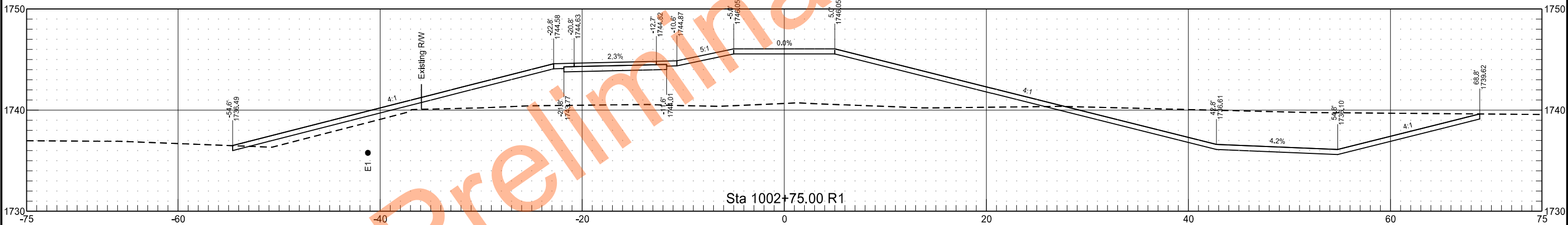
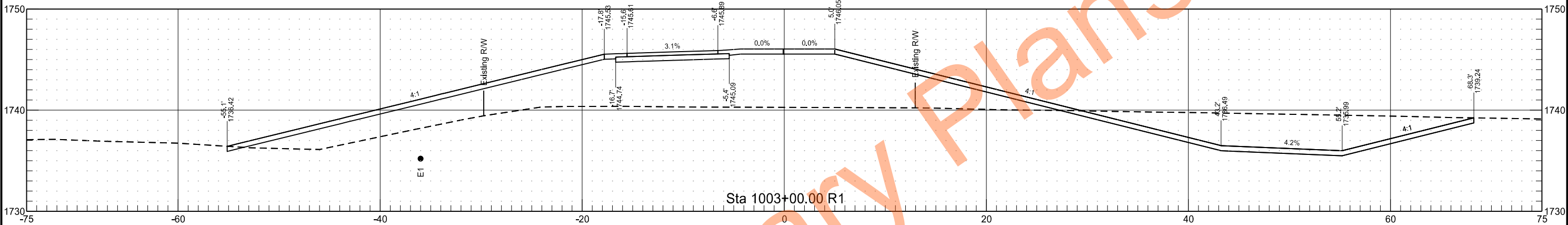
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	200	31



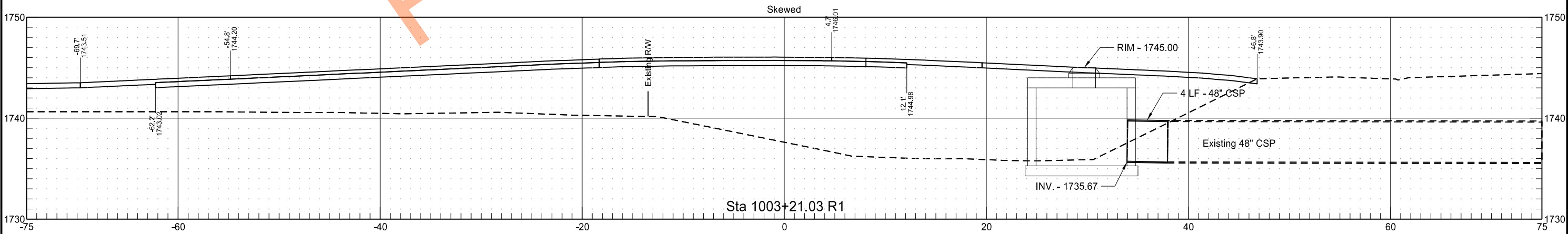
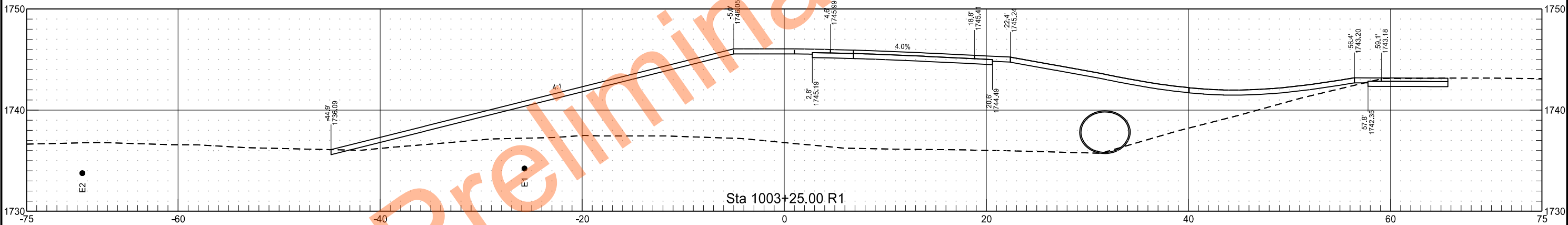
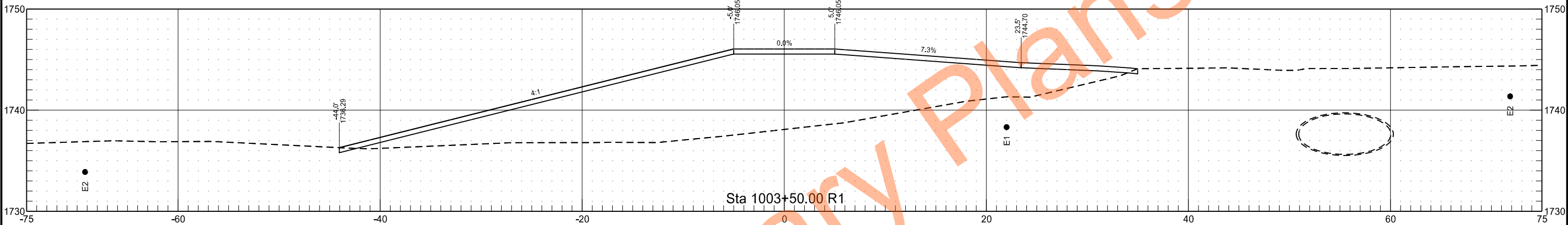
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	200	32



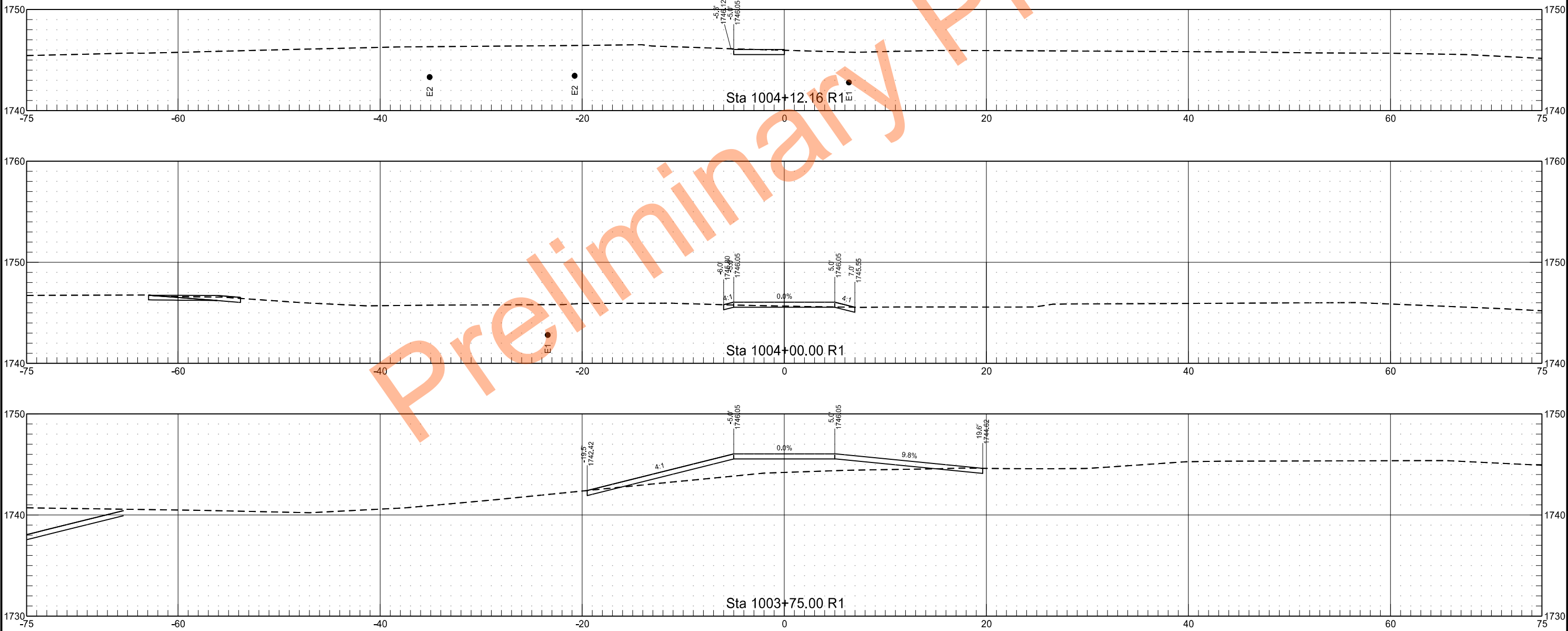
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	200	33



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NDS-NH-5-200(034)150	200	34



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NDS-NH-5-200(034)150	200	35



NDDOT ABBREVIATIONS

D-101-1

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

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
04-14-25	General Revisions



NORTH DAKOTA	
DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
08-03-15	General Revisions
04-23-18	General Revisions
12-18-20	General Revisions
08-16-22	General Revisions
04-14-25	General Revisions

NDDOT ABBREVIATIONS

D-101-3

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

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
04-14-25	General Revisions



NDDOT ABBREVIATIONS

D-101-4

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
CC	closing corner
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
MC	meander corner
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
SC	standard corner
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
WC	witness corner
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
4-14-25	- Continued from D-101-3 General Revisions



NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

702COM
ACCENT
AGASSIZ WU
AGC
ALL PL
ALL SEAS WU
AMOCO PI
AMRDA HESS
AT&T
B PAW
BAKER ELEC
BASIN ELEC
BEK TEL
BELLE PL
BLM
BNSF
BOEING
BRNS RWD
BURK-DIV ELEC
BURL WRD
CABLE ONE
CABLE SERV
CAP ELEC
CASS CO ELEC
CASS RWU
CAV ELEC
CBLCOM
CENEX PL
CENT PL WATER DIST
CENT PWR ELEC
CENTURYLINK
COE
CONS COMM
CONS TELCOM
CONT RES
CPR
D O E
DAK CARR
DAK CENT TEL
DAK RWD
DGC
DICKY R NET
DICKY WRD
DICKY TEL
DNRR
DOME PL
DVELEC
DVMW
E CENT REG WD
ENBRDG
ENVENTIS
EQUINOR
FALK MNG
FHWA
G FKS-TRL WD
GETTY TRD & TRAN
GLDN W ELEC

702 Communications
Accent Communications
Agassiz Water Users District
Associated General Contractors of America
Alliance Pipeline
All Seasons Water Users District
Amoco Pipeline Company
Amerada Hess Corporation
AT&T Corporation
Bear Paw Energy Incorporated
Baker Electric
Basin Electric Cooperative Incorporated
Bek Communications Cooperative
Belle Fourche Pipeline Company
Bureau of Land Management
Burlington Northern Santa Fe Railway
Boeing
Barnes Rural Water District
Burke-Divide Electric Cooperative
Burleigh County Water Resource District
Cable One
Cable Services
Capital Electric Cooperative Incorporated
Cass County Electric Cooperative
Cass Rural Water Users District
Cavalier Rural Electric Cooperative
Cablecom Of Fargo
Cenex Pipeline
Central Pipe Line Water District
Central Power Electric Cooperative
CenturyLink
Corps of Engineers
Consolidated Communications
Consolidated Telcom
Continental Resource Inc
Canadian Pacific Railway
Department Of Energy
Dakota Carrier Network
Dakota Central Telephone
Dakota Rural Water District
Dakota Gasification Company
Dickey Rural Networks
Dickey County Water Resource District
Dickey Telephone
Dakota Northern Railroad
Dome Pipeline Company
Dakota Valley Electric Cooperative
Dakota, Missouri Valley & Western
East Central Water District
Enbridge Pipelines Incorporated
Enventis Telephone
Equinor Pipeline
Falkirk Mining Company
Federal Highway Administration
Grand Forks-traill Water District
Getty Trading & Transportation
Golden West Electric Cooperative

GTR RAMSEY WD
GT PLNS NAT GAS
HALS TEL
IDEA1
INT-COMM TEL
KANEB PL
KEM ELEC
KOCH GATH SYS
LKHD PL
LWR YELL R ELEC
LUMEN
MCKNZ CON
MCKNZ ELEC
MCKNZ WRD
MCLEOD
MCLN ELEC
MCLN-SHRDN R WAT
MDU
MIDCO
MIDSTATE TEL
MINOT CABLE
MINOT TEL
MISS VALL COMM
MISS W W S
MNMOTA PWR
MOR-GRAN-SOU ELEC
MOUNT-WILLI ELEC
MLGC
MUNICIPAL
MUNICIPAL
N CENT ELEC
N PRAIR REG WD
ND PKS & REC
ND TEL
NDDOT
NE REG WD
NDSU SOIL SCI DEPT
NEMONT TEL
NODAK R ELEC
NOON FRMS TEL
NPR
NSP
NTHN BRDR PL
NTHN PLNS ELEC
NTHWSTRN REF
NW COMM
NWRWD
ONEOK
OSHA
OTTR TL PWR
PAAP
P L E M
POLAR COM
PVT ELEC
QWEST
R&T REG WD

Greater Ramsey Water District
Great Plains Natural Gas Company
Halstad Telephone Company
Idea1
Inter-Community Telephone Company
Kaneb Pipeline Company
Kem Electric Cooperative Incorporated
Koch Gathering Systems Incorporated
Lakehead Pipeline Company
Lower Yellowstone Rural Electric
Lumen Technologies Incorporated
McKenzie Consolidated Telcom
McKenzie Electric Cooperative
McKenzie County Water Resource District
McLeod USA
McLean Electric Cooperative
McLean-Sheridan Rural Water District
Montana-dakota Utilities
MidContinent Communications
Midstate Telephone Company
Minot Cable Television
Minot Telephone Company
Missouri Valley Communications Incorporated
Missouri West Water System
Minnkota Power
Mor-gran-sou Electric Cooperative
Mountrail-williams Electric Cooperative
Moore & Liberty - Griggs County
City Water And Sewer
City Of '.....'
North Central Electric Cooperative
North Prairie Regional Water District
North Dakota Parks And Recreation
North Dakota Telephone Company
North Dakota Department of Transportation
Northeast Regional Water District
NDSU Soil Science Department
Nemont Telephone
Nodak Rural Electric Cooperative
Noonan Farmers Telephone Company
Northern Plains Railroad
Northern States Power
Northern Border Pipeline
Northern Plains Electric Cooperative Incorporated
Northwestern Refinery Company
Northwest Communication Cooperation
Northwest Rural Water District
Oneok gas
Occupational Safety and Health Administration
Otter Tail Power Company
Plains All American Pipeline
Praieliands Energy Marketing
Polar Communications
Private Electric
Qwest Communications
R & T Water District

RED RIV COMM
RESVTN TEL
ROBRTS TEL
R-RIDER ELEC
RRVW
S CENT REG WD
SE W U
SCOTT CABLE
SHERDN ELEC
SHEYN VLY ELEC
SKYTECH
SLOPE ELEC
SOURIS RIV TELCOM
ST WAT COMM
STATE LN WATER
STER ENG
STUT RWD
SW PL PRJ
SWWA
SUNOCO
T M C
TCI
TESORO GHG PLNS PL
TRI-CNTY WU
TRL CO WRD
UNTD TEL
UPPR SOUR WD
US SPRINT
USAF MSL CABLE
USFWS
USW COMM
VRNDRY ELEC
W RIV TEL
WAPA
WAWSA
WEB
WILLI WRD
WILSTN BAS PL
WLSH RWD
WOLVRTN TEL
XLENER
YSVR

Red River Communications
Reservation Telephone
Roberts Company Telephone
Roughrider Electric Cooperative
Red River Valley & Western Railroad
South Central Regional Water District
Southeast Water Users Incorporated
Scott Cable Television Dickinson
Sheridan Electric Cooperative
Sheyenne Valley Electric Cooperative
Skyland Technologies Incorporated
Slope Electric Cooperative Incorporated
Souris River Telecommunications
State Water Commission
State Line Water Cooperative
Sterling Energy
Stutsman Rural Water District
Southwest Pipeline Project
Southwest Water Authority
Sunoco LP
Turtle Mountain Communications
TCI of North Dakota
Tesoro High Plains Pipeline
Tri-County Water Users Incorporated
Traill County Water Resource District
United Telephone
Upper Souris Water District
U.S. Sprint
U.S.A.F. Missile Cable
US Fish and Wildlife Service
U.S. West Communications
Verendrye Electric Cooperative
West River Telephone Incorporated
Western Area Power Administration
Western Area Water Supply Authority
W. E. B. Water Development Association
Williams County Water Resource District
Williston Basin Interstate Pipeline Company
Walsh Water Rural Water District
Wolverton Telephone
Xcel Energy
Yellowstone Valley Railroad

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
04-14-25	General Revisions



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

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

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

DATE	CHANGE
09-23-16	Added and Revised Items, Organized by Functional Groups General Revisions
12-18-20	

KIRK J. HOFF

REGISTERED

PROFESSIONAL

PE-4683

ENGINEER

NORTH DAKOTA

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

Kirk J. Hoff
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
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

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	
DATE	CHANGE
12-18-20	General Revisions



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

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

Cross Section Legend

D-101-40

Description

Longitudinal
Parallel to Roadway

Transverse
Perpendicular to Roadway*

Cable Line

●

CBL1

●

CBL2

Conduit Line

●

CDU1

●

CDU2

Electric Line

●

E1

●

E2

Fiber Optic Line

●

F1

●

F2

Gas Main Line

●

GM1

●

GM2

Gas Service Line

●

GS1

●

GS2

Gas Transmission Line

●

GT1

●

GT2

Fuel Pipeline

●

PL1

●

PL2

Sanitary Sewer
Force Main

●

SSF1

●

SSF2

Sanitary Sewer

●

SS1

●

SS2

Steam Line

●

STE1

●

STE2

Storm Drain
(Assumed Depth)

●

SD1

●

SD2

Telephone Line

●

T1

●

T2

TV Line

●

TV1

●

TV2

Water Main Line

●

WM1

●

WM2

Water Service Line

●

WS1

●

WS2

Description

Longitudinal
Parallel to Roadway

Transverse
Perpendicular to Roadway*

Overhead Power
Transmission Line

↑

OHT1

↑

OHT2

Overhead Line

↑

OH1

↑

OH2

Manhole - Multiple Variations

Electric

Fiber Optic

Gas

Inlet

Sanitary Force Main

Sanitary

Sanitary with Valve

Steam

Storm

Storm Force Main

Storm with Valve

Telephone

Water

Water with Meter

Water with Valve

Water with Air Release Valve

Light Standard - Multiple Variations

Concrete

Steel

Wood

with Traffic Signal

Pole - Multiple Variations

Utility

Brace

Feed Point

Guy

Power

Power Structure

Power with Light

Power with Transformer

Anchor

High Tension Cable Guardrail

Connection to infer that
probably will not be displayed

E2

E2

When storm drain invert elevations are NOT used to draw pipe, they will
appear as shown to the left. When invert elevations are used to draw
pipe, they will be a cross section similar to the graphics shown below.

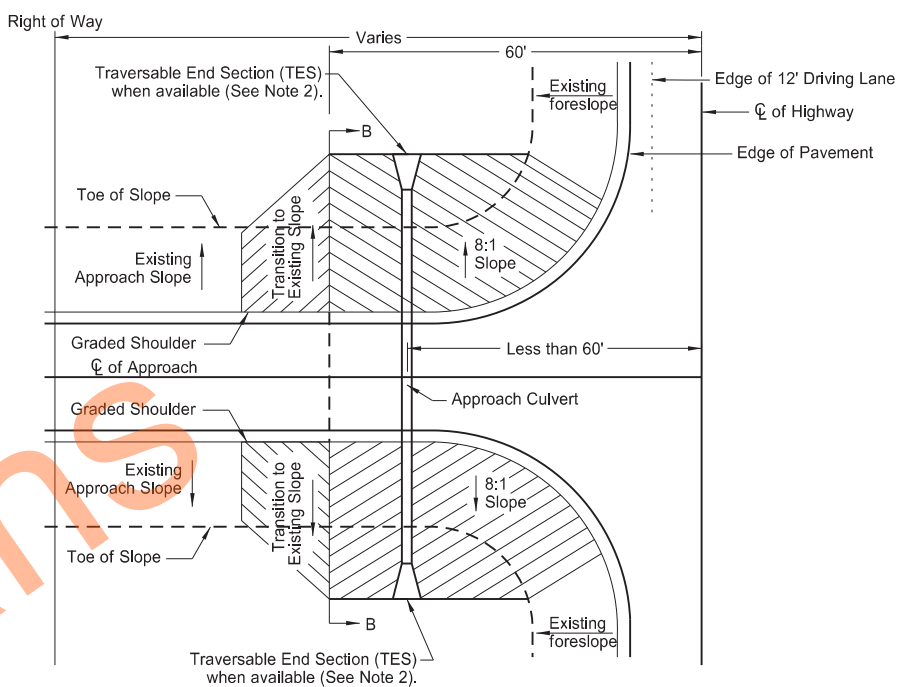
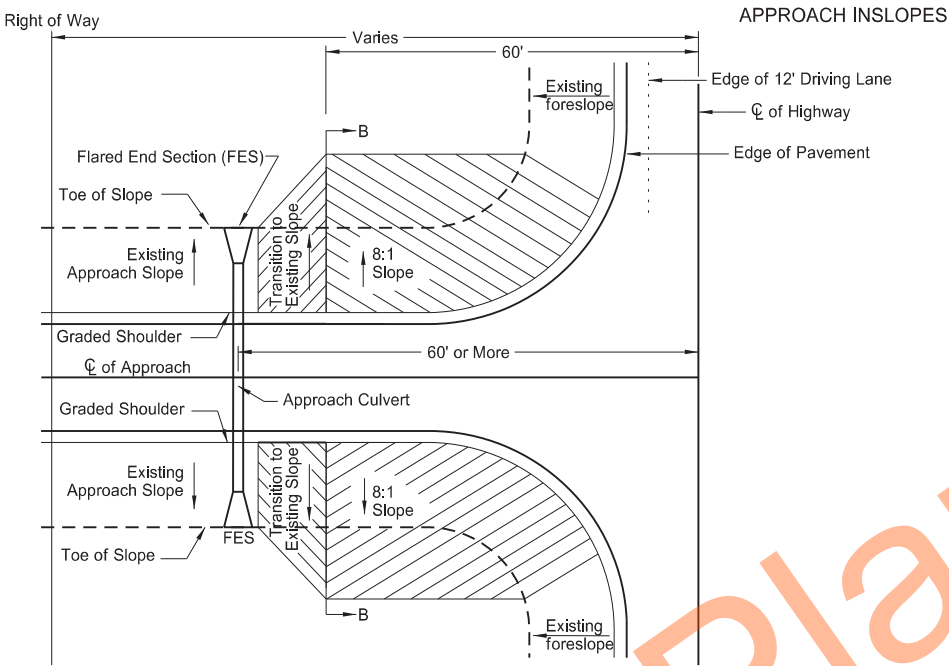
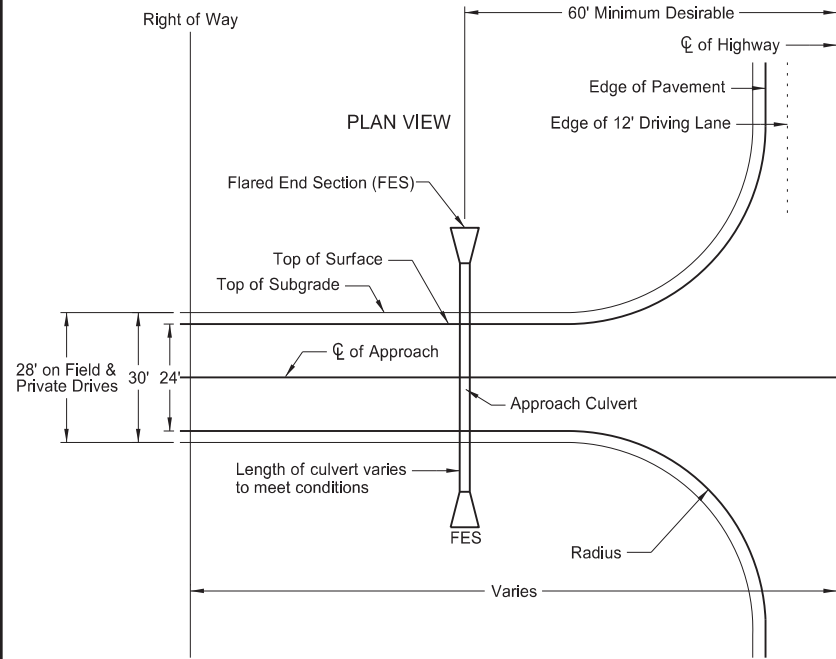
○

○

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION		KIRK J. HOFF REGISTERED PROFESSIONAL PE-4683 ENGINEER NORTH DAKOTA 06/14/23
9-20-18		
REVISIONS		
DATE	CHANGE	
6/14/2023	CADD Standards Update	

STANDARD RURAL APPROACHES

D-203-8



CASE 1
APPROACH PIPE LOCATED
60' OR MORE FROM C

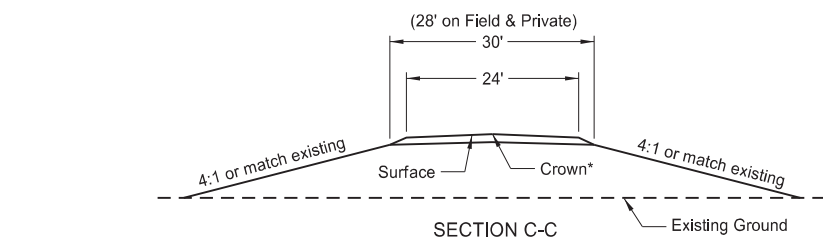
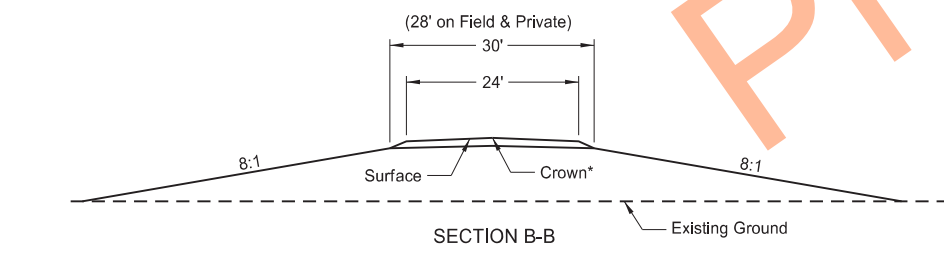
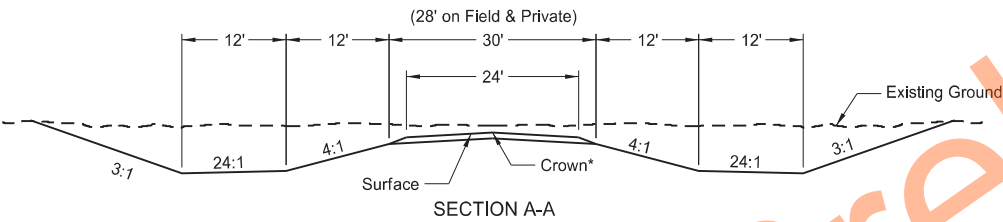
CASE 2
APPROACH PIPE LOCATED
LESS THAN 60' FROM C

Approach Pipe Traversable End Sections (TES)

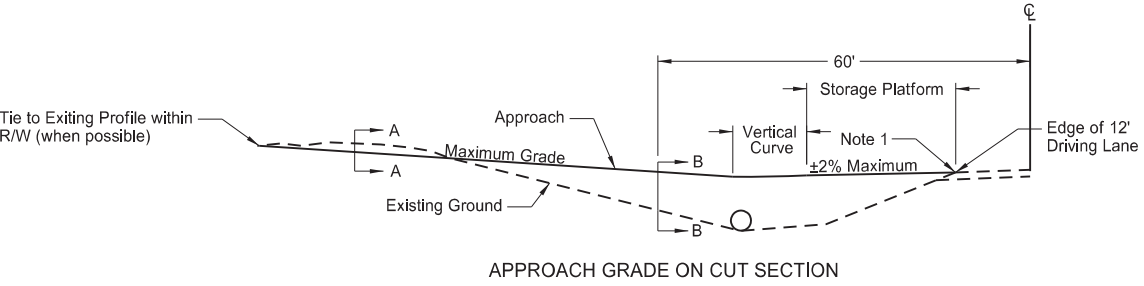
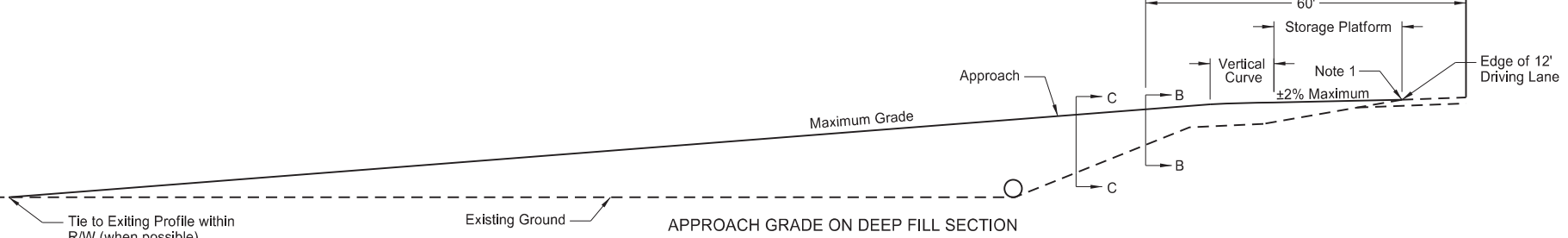
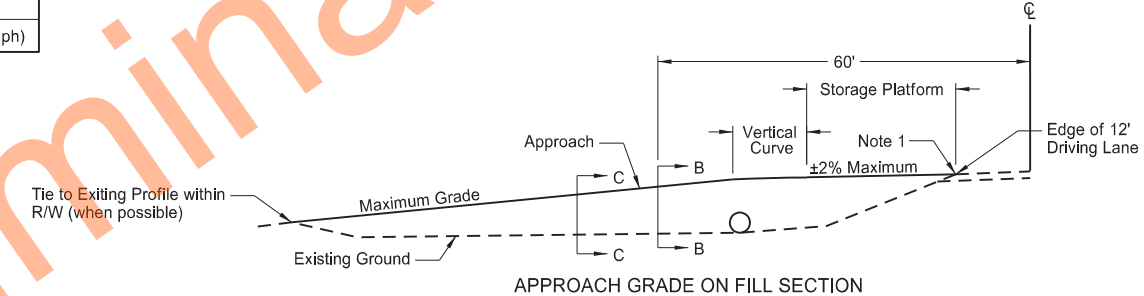
RCP	CSP	CSP Arch
15"	15"	
18"	18"	21"x15"
		24"x18"
24"	24"	28"x20"

CRITERIA FOR RURAL APPROACH TYPES

	Field Drives	Private Drives	Low Volume Public Roads
Radius	R=40 ft	R=40 ft	R=50 ft
Maximum Grade	10%	7%	7%
Storage Platform	24 ft	24 ft	50 ft
Vertical Curve Length	10 ft	10 ft	Varies (Min. 20 mph)



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

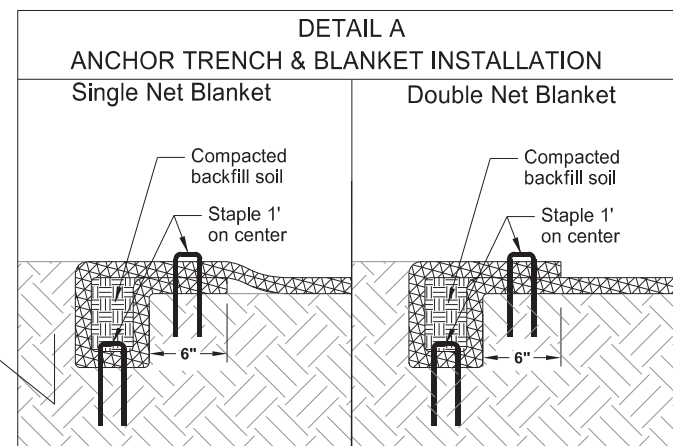


- NOTES:
- 5% Max Rollover between approach storage platform and highway.
 - Approach pipes up to 24" diameter are acceptable (with traversable end sections) for Case 2. Install approach pipes larger than 24" diameter in accordance with Case 1.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-25-14	
REVISIONS	
DATE	CHANGE
06-30-17	Revised Radius, Storage Platform, Inslope dimensions, and Note 1
10-25-19	Changed "Inslope" to "Foreslope"
06-29-22	Added "TES", Table, and Note 2

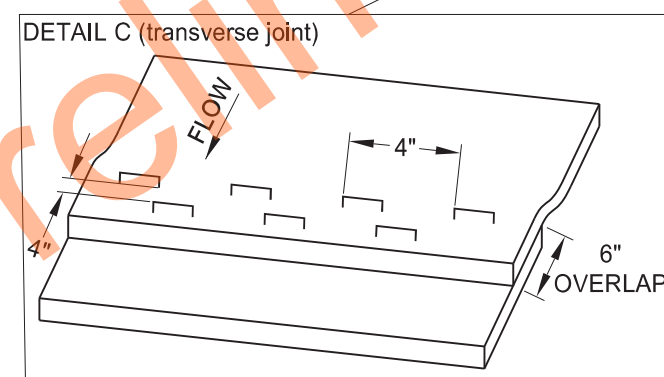


06/29/22



DETAIL B (longitudinal joint)

The diagram illustrates a longitudinal joint between two concrete slabs. The joint is characterized by a 4-inch overlap of the top surface and a 6-inch overlap of the bottom surface. Arrows indicate the direction of flow, which is perpendicular to the joint line.

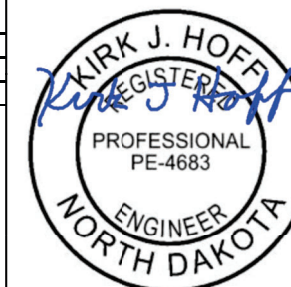


A diagram showing a 6x6 grid of points (represented by 'X' marks). The grid is 6 units wide and 6 units high. Dimensions are indicated by arrows: the width of the grid is 20" (from the left edge to the right edge), and the height is 4" (from the bottom edge to the top edge). The points are arranged in a regular pattern, with one point at each intersection of the grid lines.

Diagram illustrating the detail of a pipe outlet. The diagram shows the transition from the pipe to the ground. Key components and labels include:

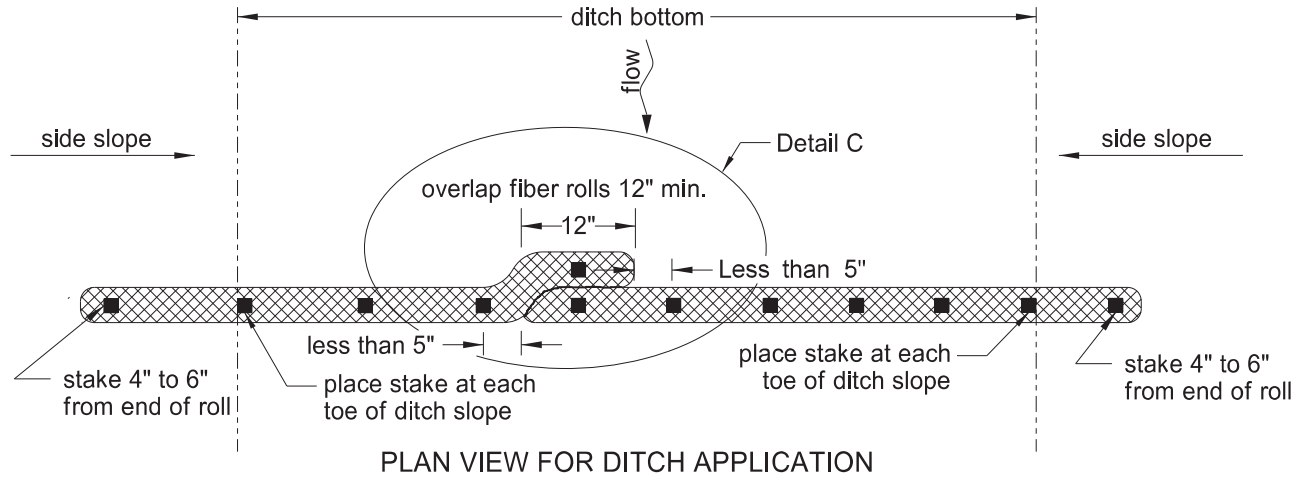
- flow**: Indicated by an arrow pointing right.
- PIPE OUTLETS**: The section of the pipe leading to the outlet.
- PIPE ENDS**: The termination point of the pipe.
- See Detail A**: Points to the connection detail between the pipe and the ground.
- Erosion control blanket**: A layer applied to the ground surface downstream of the pipe end.
- Existing ground**: The natural ground surface.
- Dimensions**: Two 6" dimensions are shown, indicating the vertical offset of the pipe end and the horizontal distance from the pipe end to the start of the erosion control blanket.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
06-26-14	Changed standard drawing number from D-708-6 to D-255
07-27-15	Changed installation details such as trench depth and overlap dimensions
08-27-19	New Design Engineer PE Stamp
08-27-25	Revised minor details for clarity

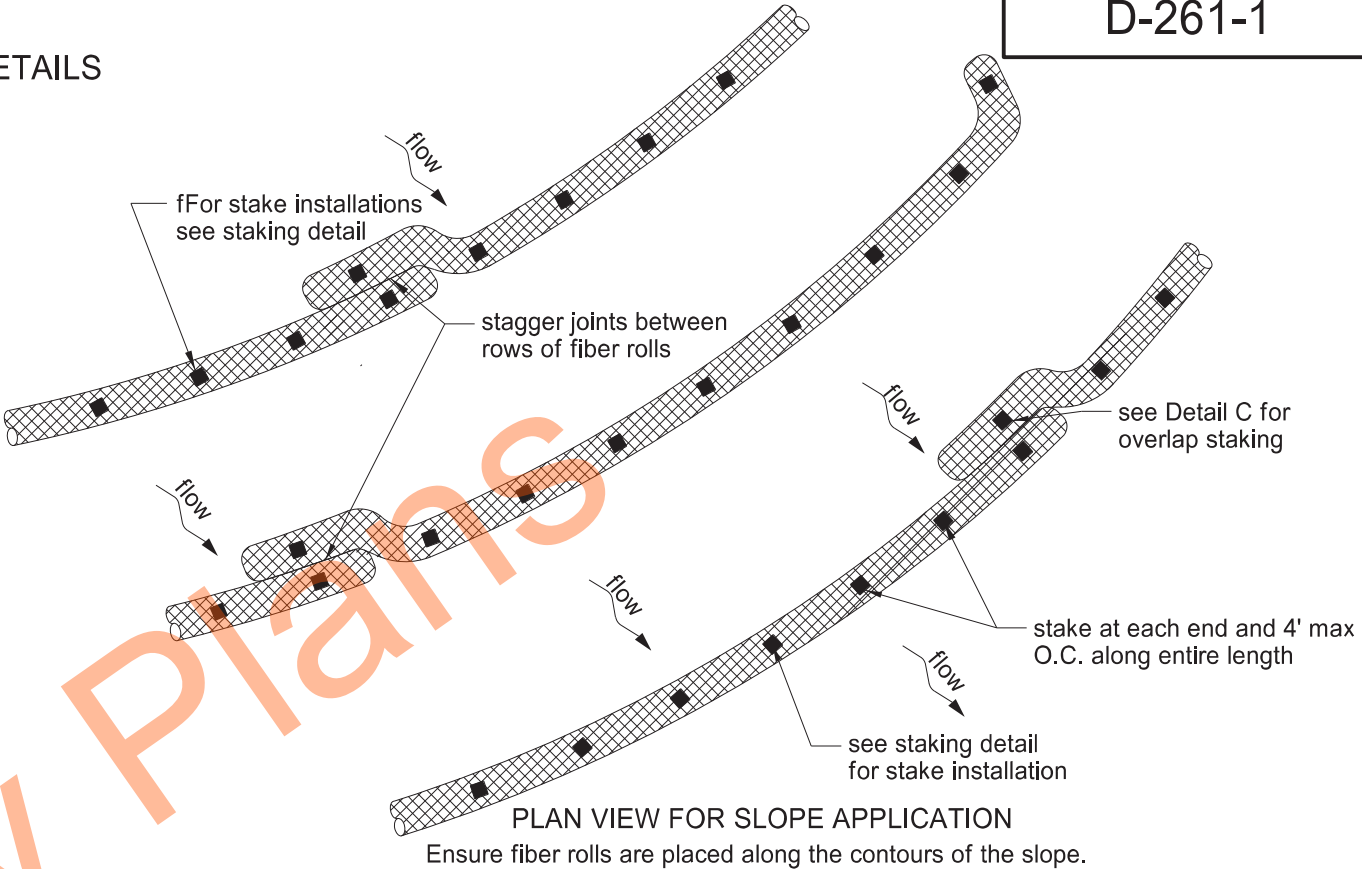


08/27/25

EROSION CONTROL
FIBER ROLL PLACEMENT DETAILS

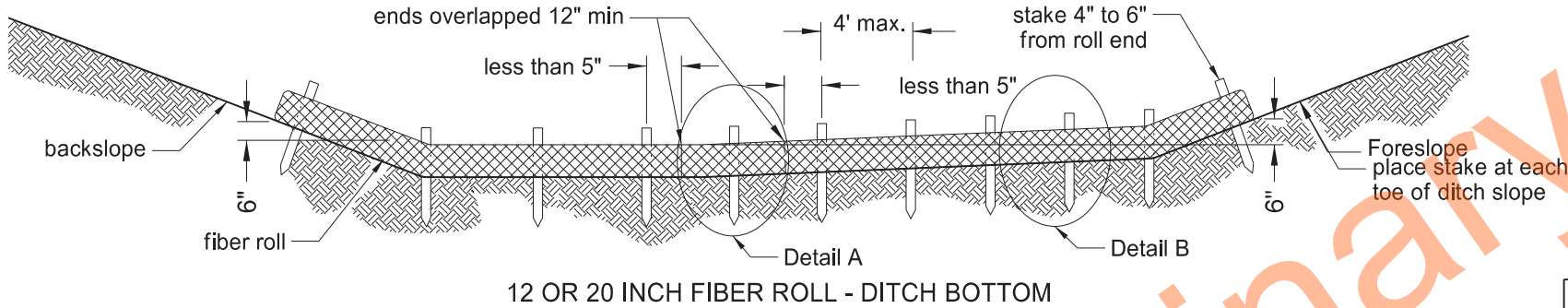


PLAN VIEW FOR DITCH APPLICATION

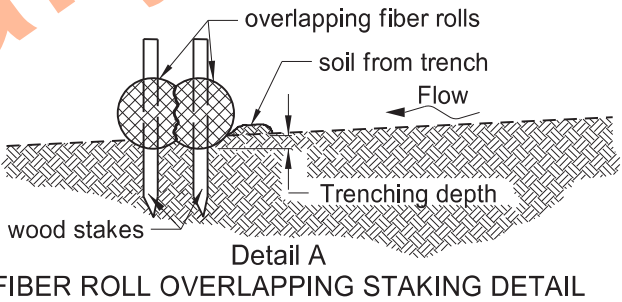


PLAN VIEW FOR SLOPE APPLICATION

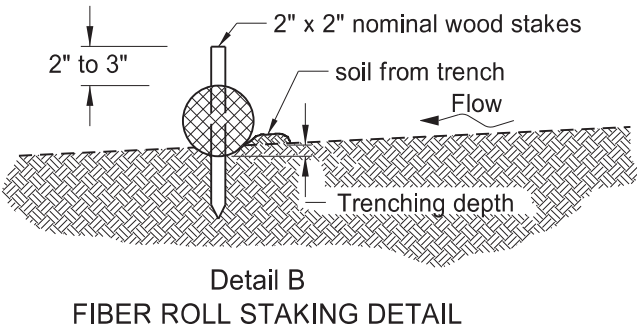
Ensure fiber rolls are placed along the contours of the slope.



12 OR 20 INCH FIBER ROLL - DITCH BOTTOM

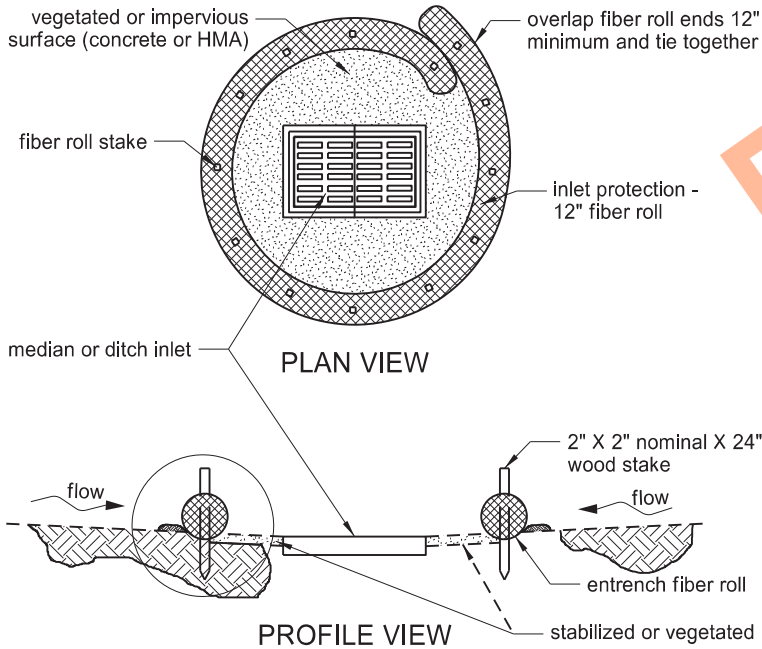


Detail A
FIBER ROLL OVERLAPPING STAKING DETAIL

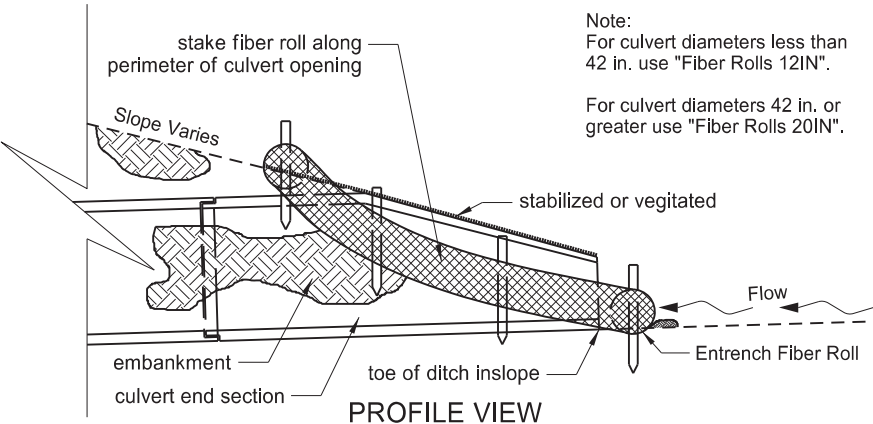


Detail B
FIBER ROLL STAKING DETAIL

NOTE: Do not allow runoff to run under or around roll.

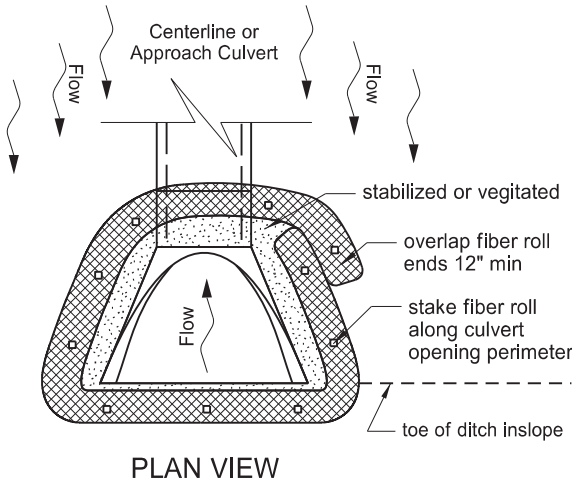


FIBER ROLL PROTECTION (MEDIAN OR DITCH INLET)



FIBER ROLL PROTECTION (INLET OF CULVERT)

Note:
For culvert diameters less than 42 in. use "Fiber Rolls 12IN".
For culvert diameters 42 in. or greater use "Fiber Rolls 20IN".



PLAN VIEW

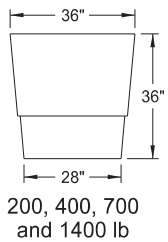
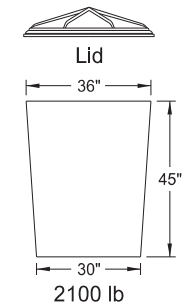
FIBER ROLL DIAMETER	NOMINAL STAKE SIZE	MINIMUM STAKE LENGTH	TRENCH DEPTH	
			MINIMUM	MAXIMUM
12"	2" x 2"	24"	2"	3"
20"	2" x 2"	36"	3"	5"

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.
04-22-24	Slope Plan View-overlap change.
03-13-25	Added D-708-6 Culvert Inlet detail.
09-02-25	Added D-708-6 Inlet detail.



09/02/25

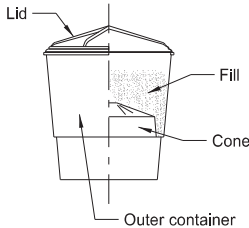
ATTENUATION DEVICE



Outer Containers

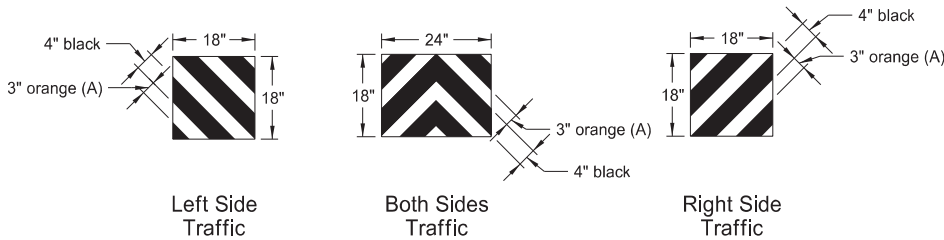


Cones



Typical Assembly

Typical Module Construction Detail

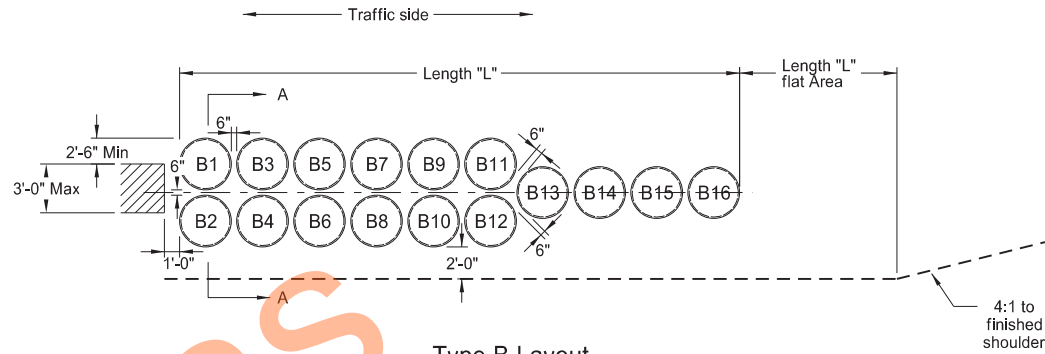


Reflective Sheet Detail

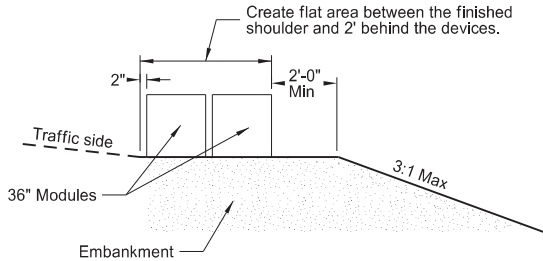
Note:
Apply Type IV reflective sheeting (as specified in the NDDOT Standard Specifications) directly to the outer container of the last attenuation device facing traffic, following the details above.
Or apply the sheet to a metallic sheet and attach it to the container with approved fasteners.

(A) Use 3" orange sheeting for temporary installations, and 3" yellow sheeting for permanent installations.

Fill Chart					
	Module Weights (LBS)				
	200	400	700	1400	2100
Distance from top edge	8½"	5"	4"	3"	0"



Note:
Angle attenuation devices 10 degrees towards traffic when placed at piers offset from roadway.



Type B Attenuation Device												
Module Number	Dash Number											
	80	75	70	65	60	55	50	45	40	35	30	25
	Module Weights (LBS)											
B1	2100	2100										
B2	2100	2100										
B3	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100		
B4	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	
B5	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
B6	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
B7	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
B8	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
B9	700	700	700	700	700	700	700	700	700	700	700	700
B10	700	700	700	700	700	700	700	700	700	700	700	700
B11	700	700	700	700	700	700	700	700	700	700	700	700
B12	700	700	700	700	700	700	700	700	700	700	700	700
B13	700	700	700	700	700	700	700	700	700	700	700	700
B14	400	400	400	400	400	400	400	400	400	400	400	400
B15	400	400	400	400	400	400	400	400	400	400	400	400
B16	200	200	200	200	200	200	200	200	200	200	200	200
Length (L)	34.2'	34.2'	30.7'	30.7'	30.7'	30.7'	30.7'	30.7'	30.7'	30.7'	27.2'	27.2'
Module Weights (LBS)	Replacement Module											
	1	1	1	1	1	1	1	1	1	1	1	1
2100	1	1	1	1	1	1	1	1	1	1	1	1
1400	1	1	1	1	1	1	1	1	1	1	1	1
700	2	2	2	2	2	2	2	2	2	2	2	2
400	1	1	1	1	1	1	1	1	1	1	1	1
200	2	2	2	2	1	1	1	1	1	1	1	1

Notes:

- Materials
 - Use modules manufactured from frangible polyethylene material which shatters upon impact.
 - Fill modules with class 43 aggregate meeting NDDOT Standard Specifications aggregate requirements. Use fill with a unit weight of at least 100 pounds per cubic foot. Use fill with a moisture content of 2% or less when left over winter.
- Modules
 - Provide three components for 2, 4, or 7 cubic foot module containers:
 - A 14 C.F., yellow outer container.
 - A black lid securely locking over the top lip of the container.
 - A variable cone-shaped supporting insert capable of supporting 200, 400, or 700 pounds of sand mass to allow for three sizes of modules. Place cone inserts inside the 14 cubic foot container.
 - Provide two components for the 14 cubic foot module container:
 - A 14 C.F., yellow outer container.
 - A black lid securely locking over the top lip of the container.
 - Provide two components for the 21 cubic foot module container:
 - A 36" height X 36" width yellow outer container.
 - A black lid which locks securely over the top of the container.
- For temporary installations use Energite or Fitch attenuation barrels manufactured by Energy Absorption Systems of Chicago, IL, TrafFix barrels manufactured by TrafFix Devices, Inc. of San Clemente, CA, or approved equal modules. As an option, place attenuation devices on 3½" maximum thickness pallets to facilitate maintenance.
- For permanent installations use Barrel Attenuation Device consisting of one-piece outer sand container modules with separate detachable lid. Energite attenuation barrels manufactured by Energy Absorption Systems of Chicago, IL, TrafFix barrels manufactured by TrafFix Devices, Inc. of San Clemente, CA, or approved equal meet these requirements.
- The Typical Module Construction Detail and Type B Layout are based on the Energite Crash Cushion manufactured by Energy Absorption. Provide any required layouts and details from other sand filled attenuation module manufacturers which differ from those shown here.

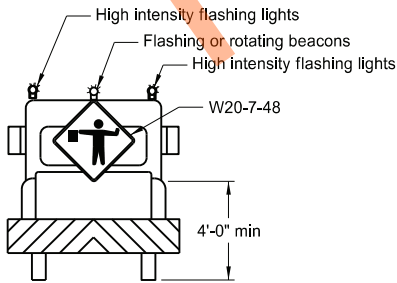
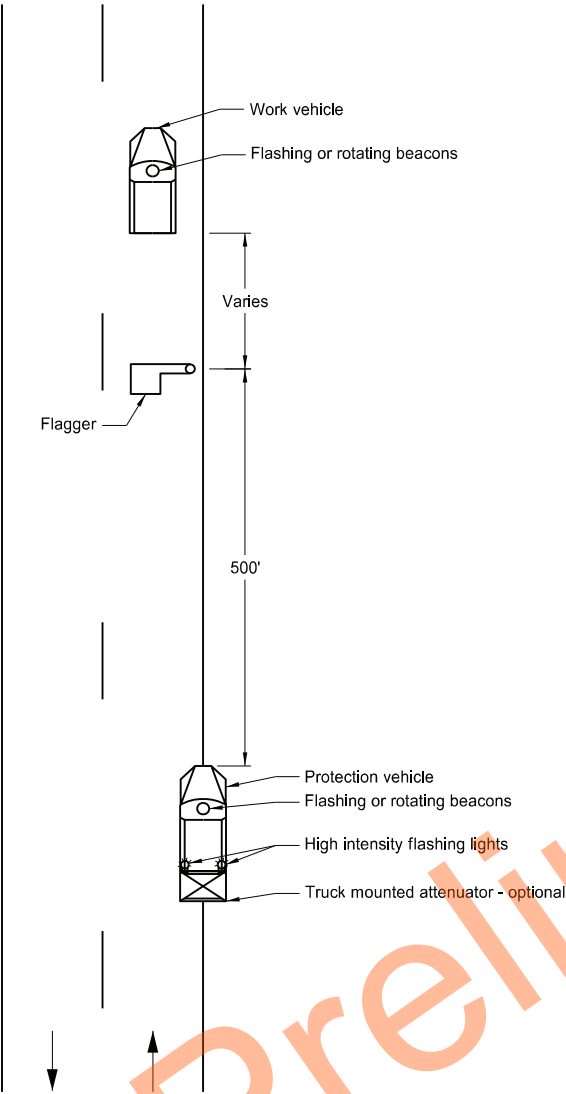
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-25-12	
REVISIONS	
DATE	CHANGE
07-18-14	Revised sheeting in reflective sheet detail
09-27-17	Update to active voice
10-03-19	New Design Engr PE Stamp
08-01-24	Electronic Stamp/Signature
06-30-25	Legislative Changes



TRAFFIC CONTROL FOR CORING OF HOT BITUMINOUS PAVEMENT

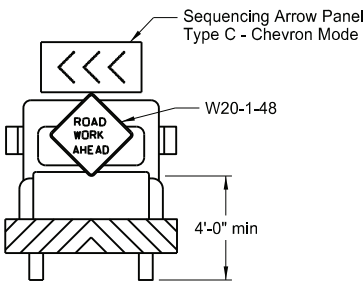
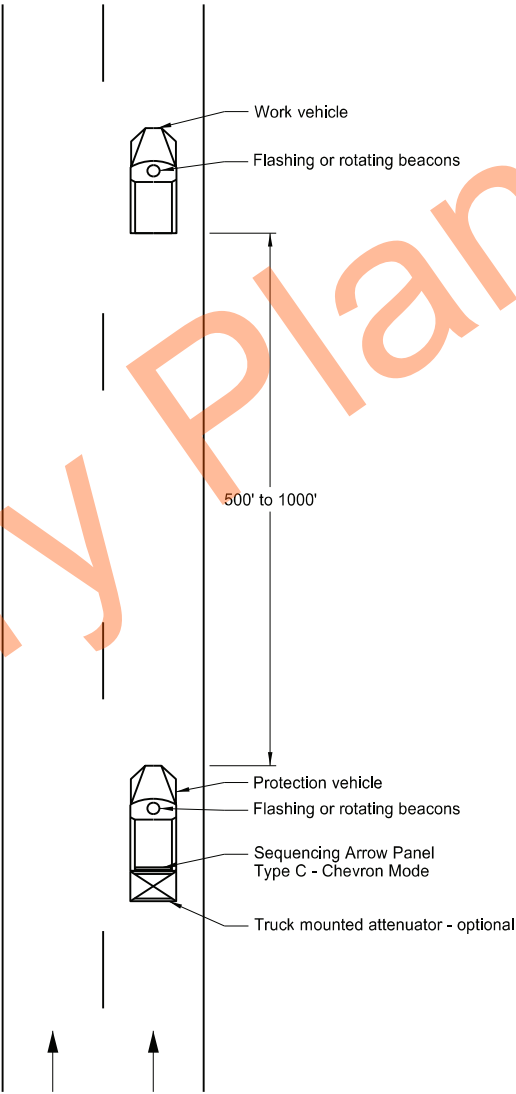
D-704-2

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.

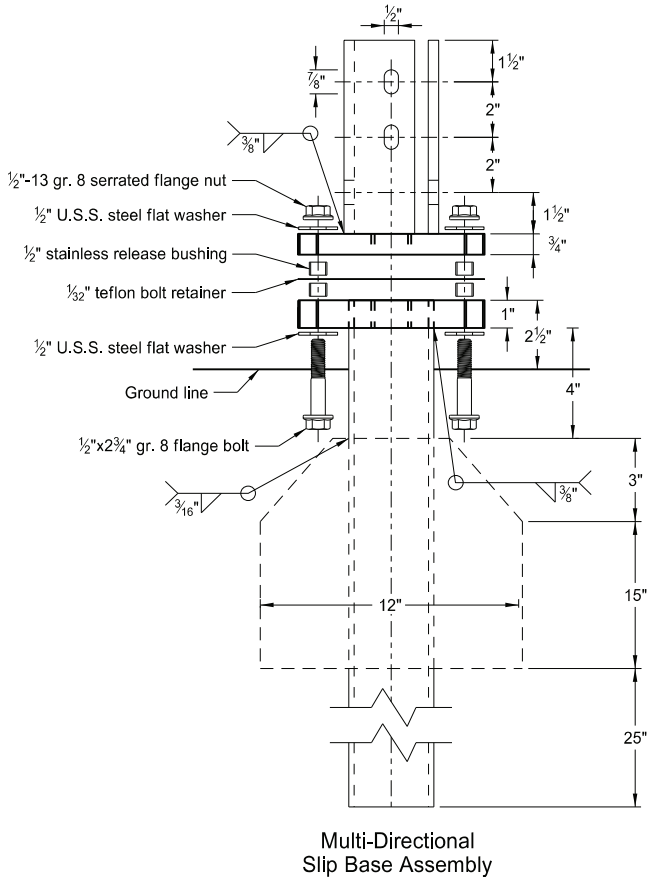
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-25-12	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
10-03-19	New Design Engr PE Stamp
8-01-24	Electronic Stamp/Signature



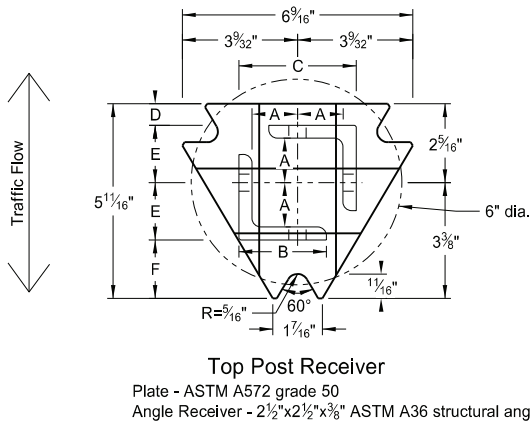
08/01/24

BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-7



Perforated Tube



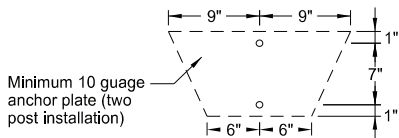
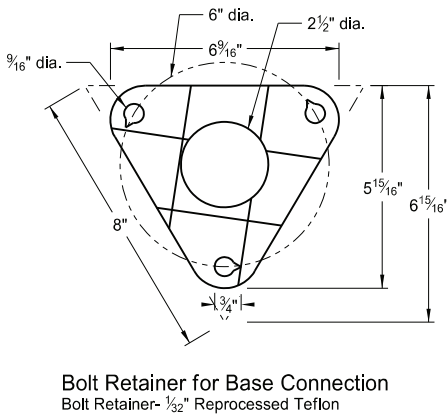
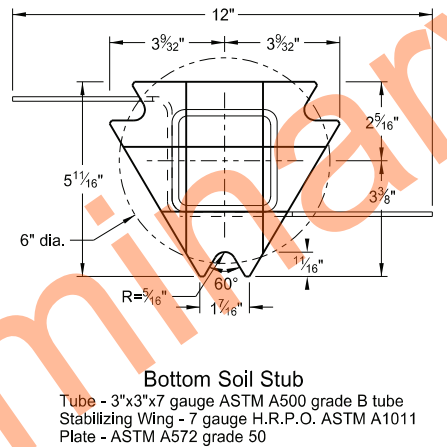
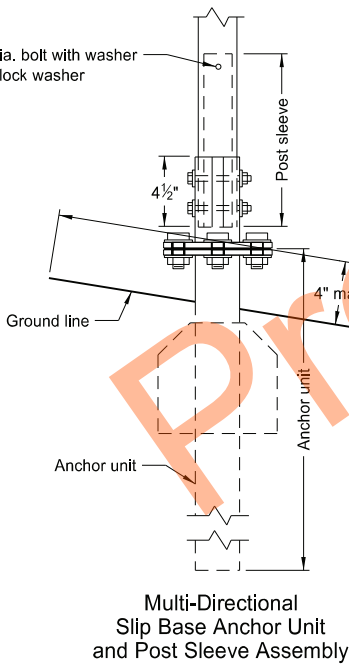
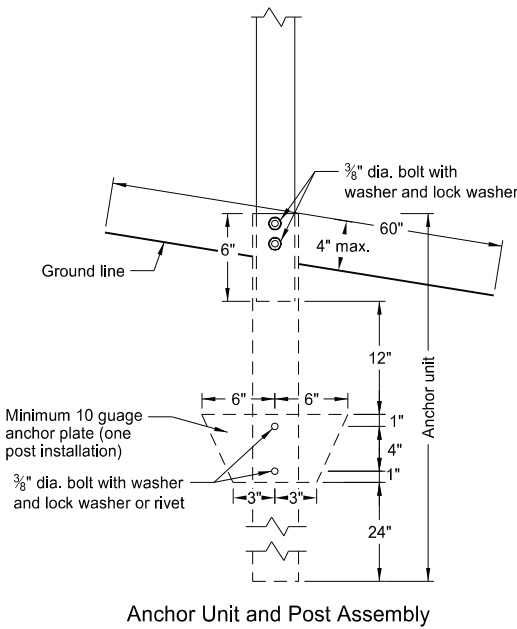
- Notes:
1. Torque slip base bolts as specified by manufacturer.
 2. Use anchor with 43.9 KSI yield strength and 59.3 KSI tensile strength.
 3. Provide 4" vertical clearance for anchor or breakaway base. Measure the 4"x60" measurement above and below post location and back and ahead of post.
 4. In concrete 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 Thickness Gauge	Sleeve Size in.	Wall Thickness Gauge	Slip Base	Anchor Size without Slip Base in.
1	2	12			No	2 1/4
1	2 1/4	12			No	2 1/2
1	2 1/2	12			(A)	3
1	2 1/2	10			Yes	
1	2 1/4	12	2	12	Yes	
1	2 1/2	12	2 1/4	12	Yes	
2	2	12			No	2 1/4
2	2 1/4	12			No	2 1/2
2	2 1/2	12			Yes	
2	2 1/2	12			Yes	
2	2 1/4	10	2	12	Yes	
2	2 1/2	12	2 1/4	12	Yes	
3 & 4	2 1/2	12			Yes	
3 & 4	2 1/2	10			Yes	
3 & 4	2 1/2	12	2 1/4	12	Yes	
3 & 4	2 1/4	12	2	12	Yes	
3 & 4	2 1/2	10	2 3/16	10	Yes	

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

Top Post Receiver Data Table						
Square Post Sizes (B)	A	B	C	D	E	F
2 3/16"x10 ga.	1 5/16"	2 1/2"	3 1/32"	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 3/16"x10 ga. into 2 1/2"x10 ga.



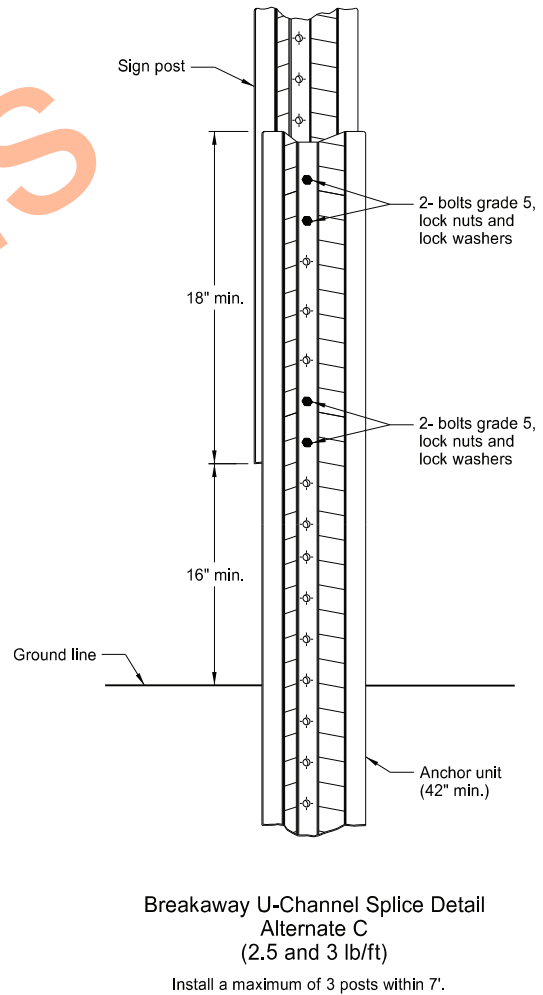
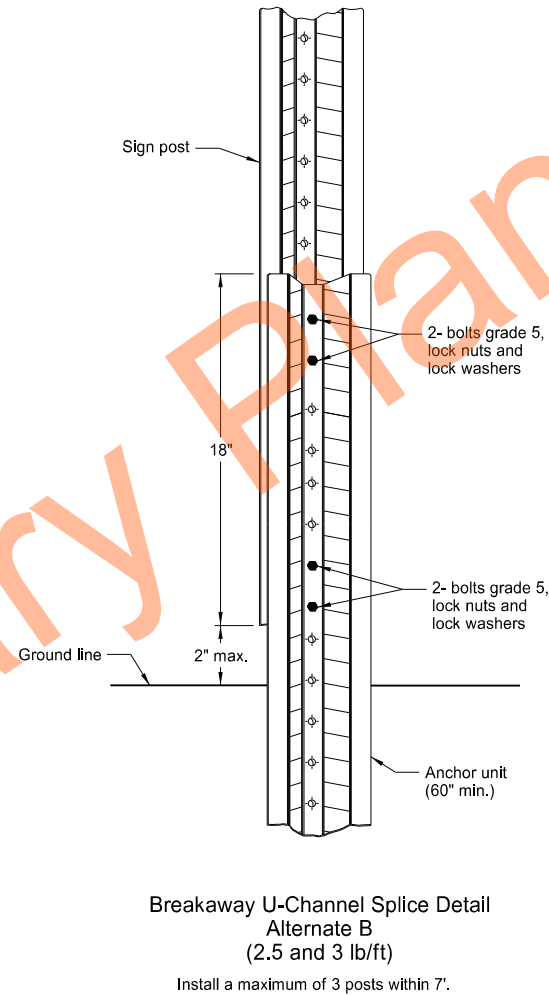
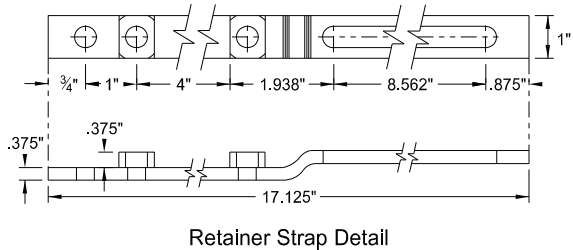
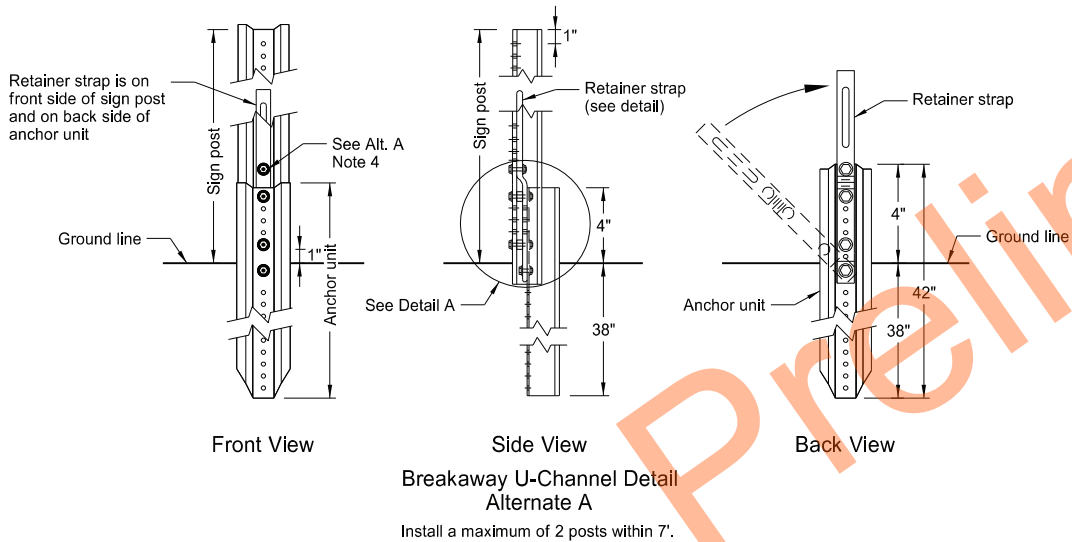
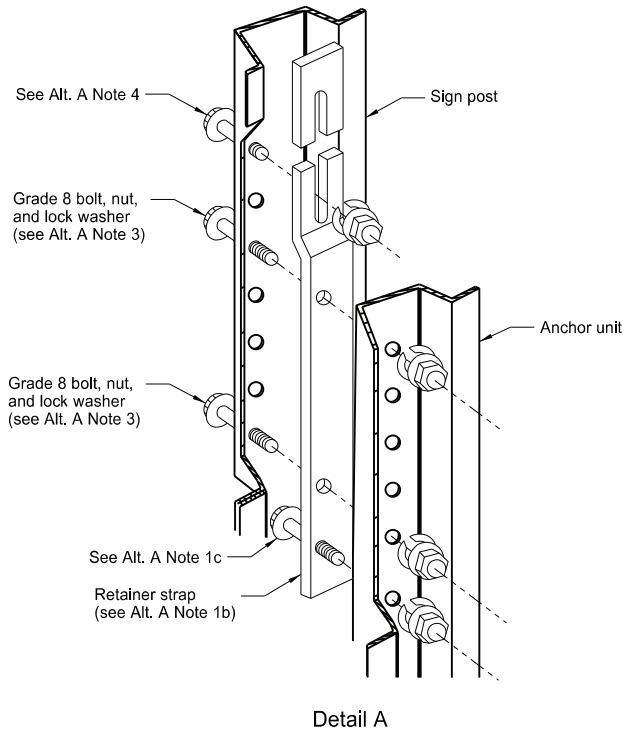
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
10-03-19	New Design Engr PE Stamp
8-01-24	Electronic Stamp/Signature



BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

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	Updated to active voice
10-03-19	New Design Engr PE Stamp
8-01-24	Electronic Stamp/Signature

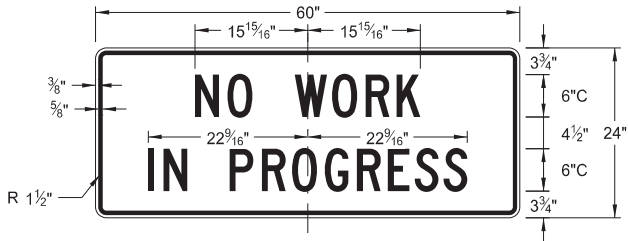


08/01/24

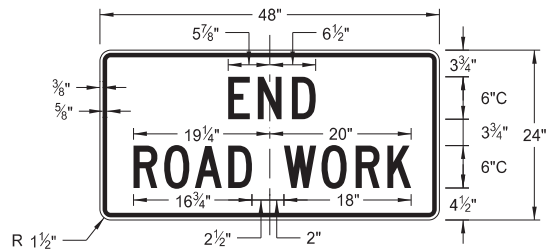
CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS



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



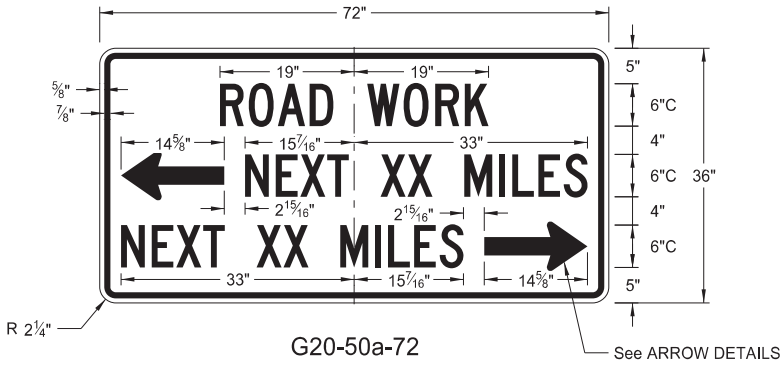
G20-1b-60
Legend: black (non-refl)
Background: orange



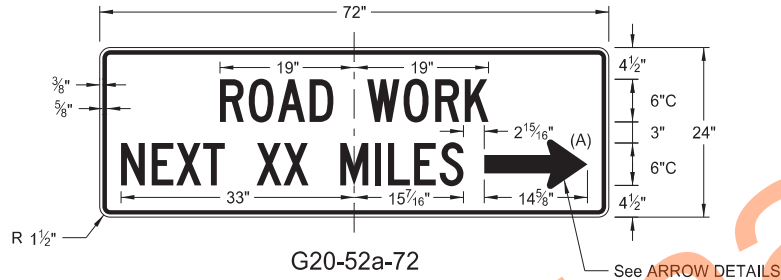
G20-2-48
Legend: black (non-refl)
Background: orange



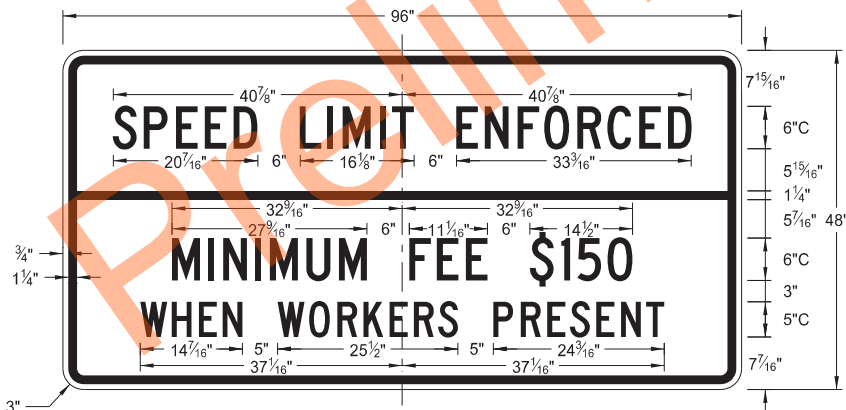
G20-4b-36
Legend: black (non-refl)
Background: orange



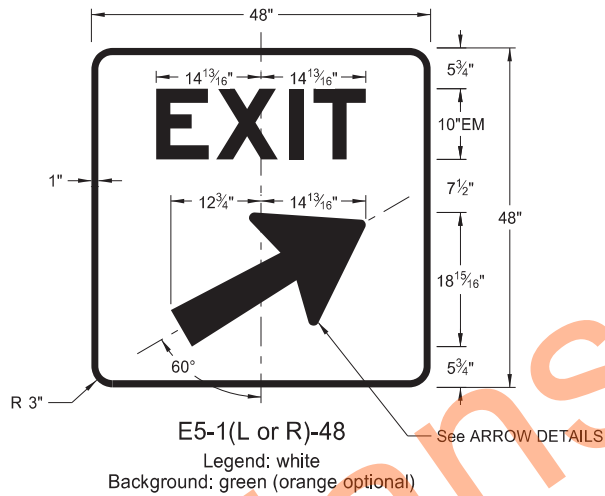
G20-50a-72
Legend: black (non-refl)
Background: orange



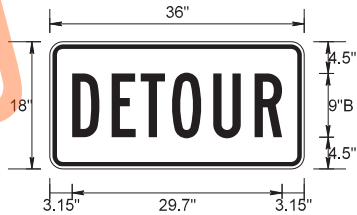
G20-52a-72
Legend: black (non-refl)
Background: orange



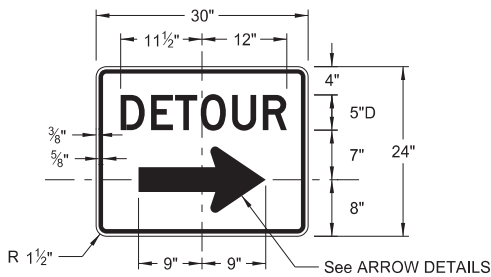
G20-55-96
Legend: black (non-refl)
Background: orange



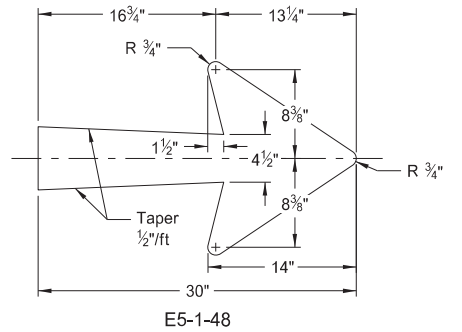
E5-1(L or R)-48
Legend: white
Background: green (orange optional)



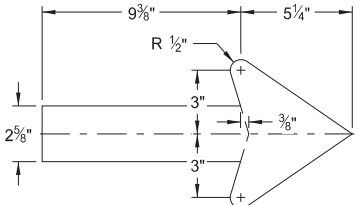
M4-8-36
Legend: black (non-refl)
Background: orange



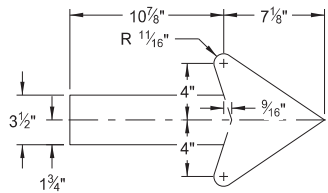
M4-9(L or R)-30 &
M4-9-30
Legend: black (non-refl)
Background: orange



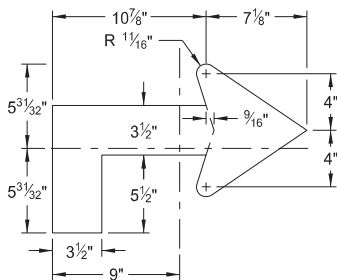
E5-1-48



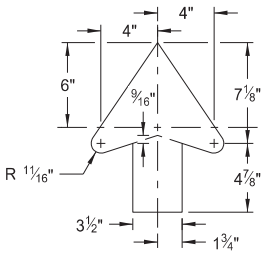
G20-50a-72
G20-52a-72



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

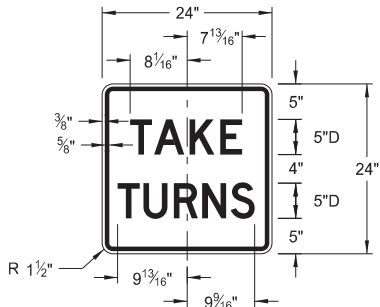
NOTES:

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

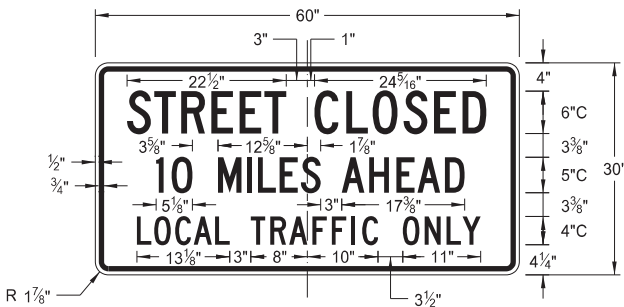
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
08-17-17	Added sign & background color
10-03-19	New Design Engineer PE Stamp
08-01-24	Electronic Stamp/Signature
06-30-25	Legislative Changes



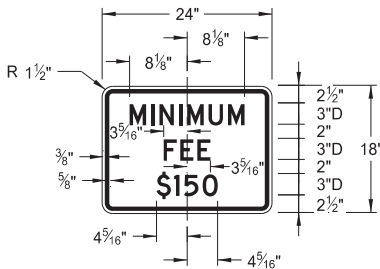
CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS



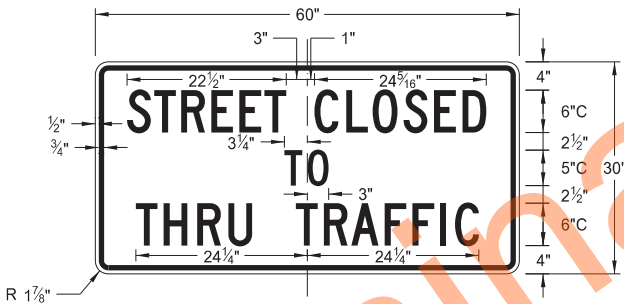
R1-50P-24
Legend: black (non-refl)
Background: white



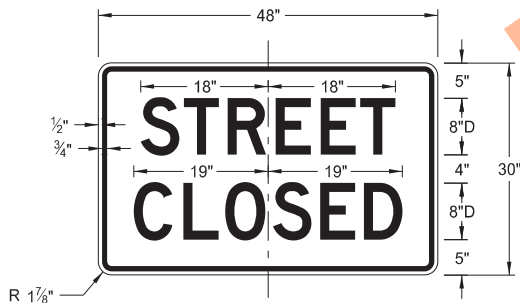
R11-3c-60
Legend: black (non-refl)
Background: white



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



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



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

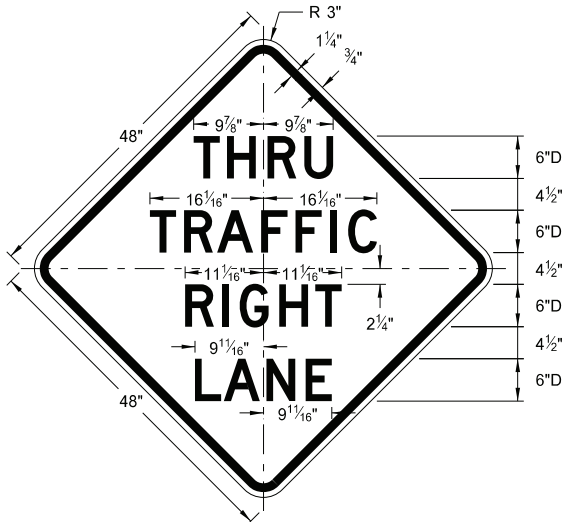
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
08-17-17	Revised sign number
10-03-19	New Design Engineer PE Stamp
08-01-24	Electronic Stamp/Signature
06-30-25	Legislative Changes



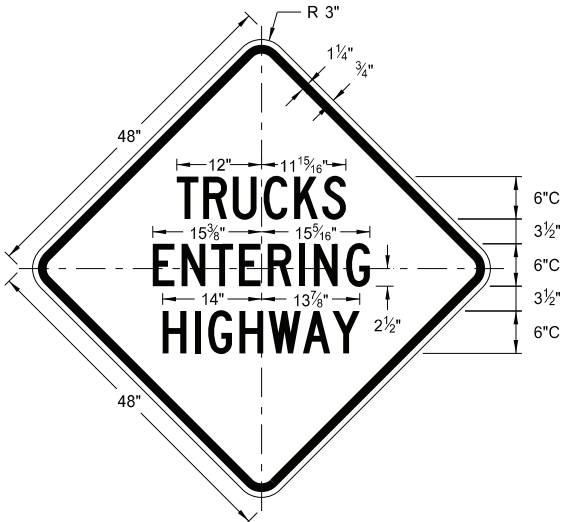
CONSTRUCTION SIGN DETAILS
WARNING SIGNS

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

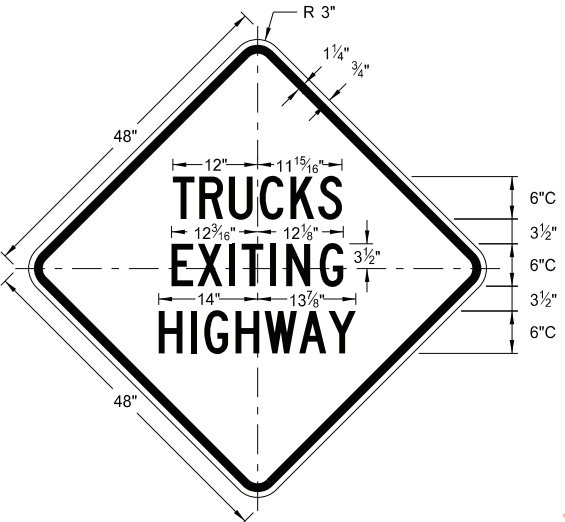
* DISTANCE MESSAGES



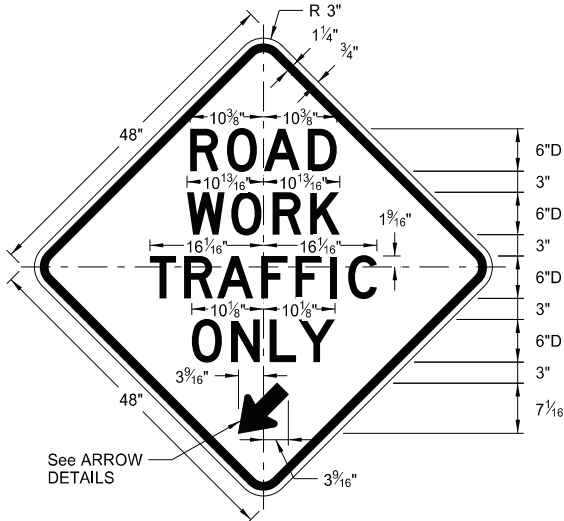
W5-8-48
Legend: black (non-refl)
Background: orange



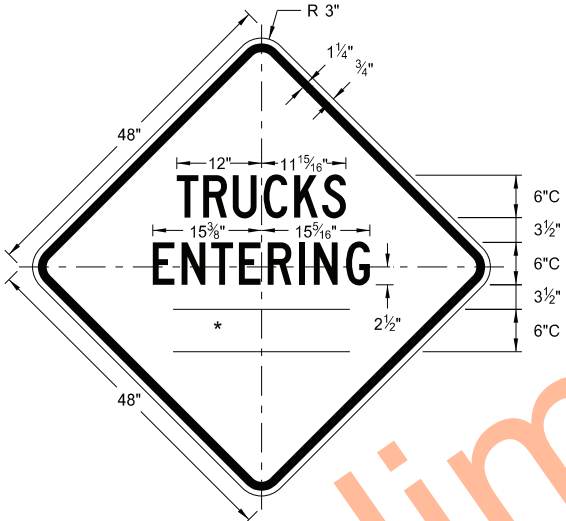
W8-53-48
Legend: black (non-refl)
Background: orange



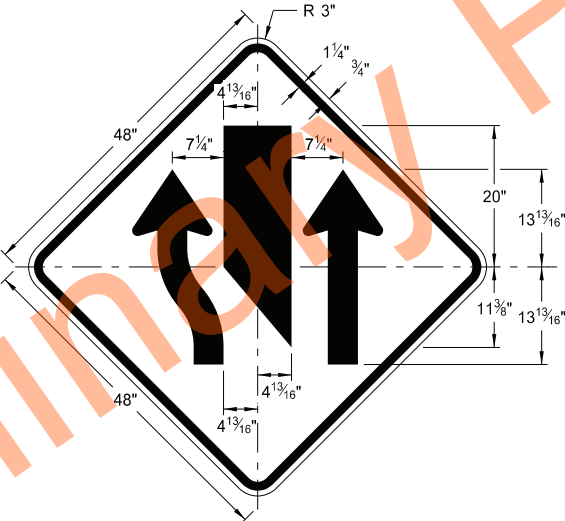
W8-56-48
Legend: black (non-refl)
Background: orange



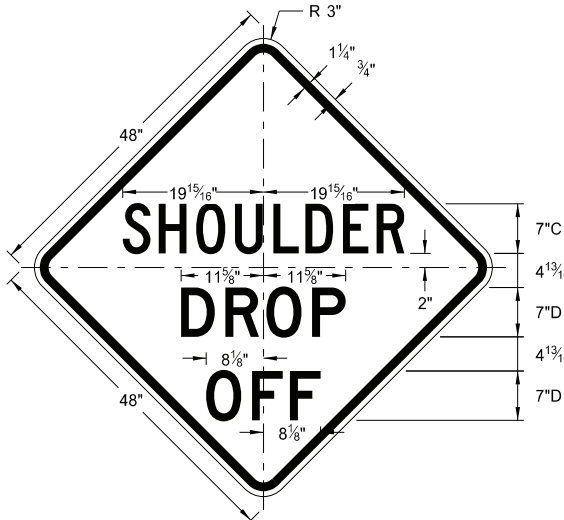
W5-9-48
Legend: black (non-refl)
Background: orange



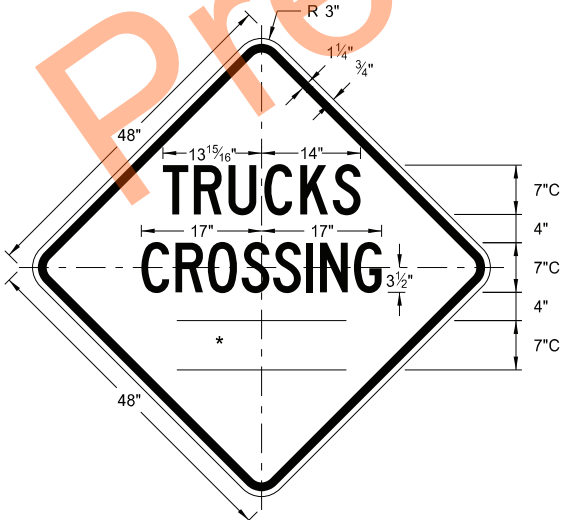
W8-54-48
Legend: black (non-refl)
Background: orange



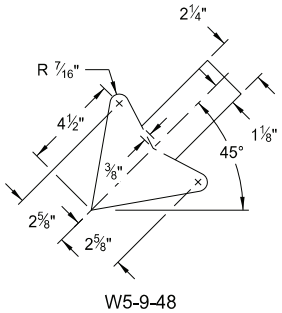
W9-3a-48
Legend: black (non-refl)
Background: orange



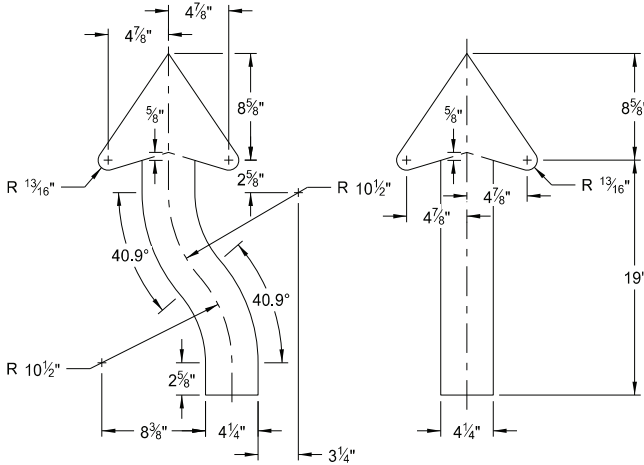
W8-9a-48
Legend: black (non-refl)
Background: orange



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



W5-9-48



W9-3a-48

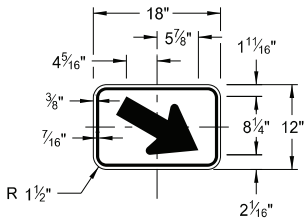
ARROW DETAILS

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
8-01-24	Electronic Stamp/Signature



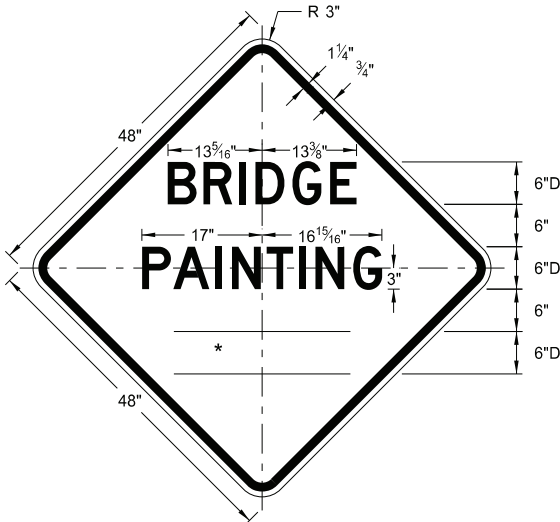
08/01/24

CONSTRUCTION SIGN DETAILS
WARNING SIGNS



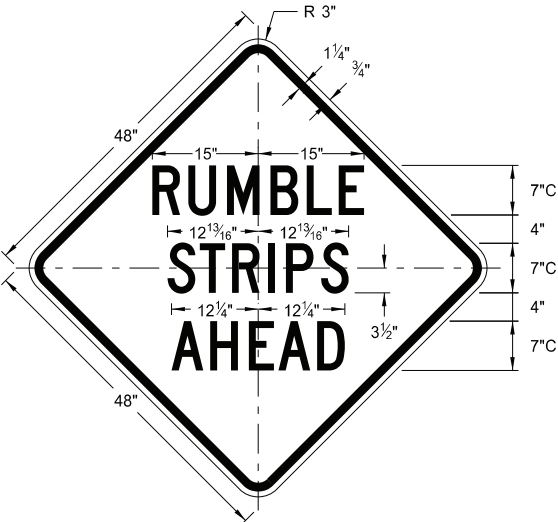
W16-7aP-18

Legend: black (non-refl)
Background: orange



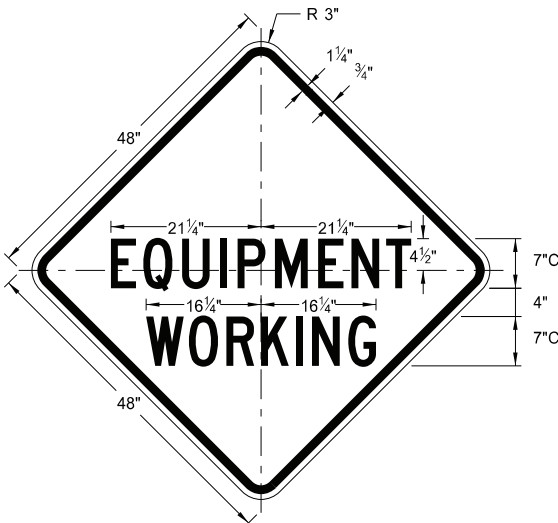
W21-50-48

Legend: black (non-refl)
Background: orange



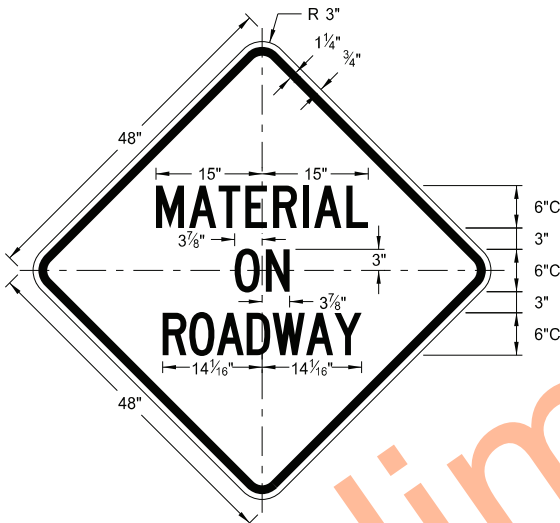
W21-53-48

Legend: black (non-refl)
Background: orange



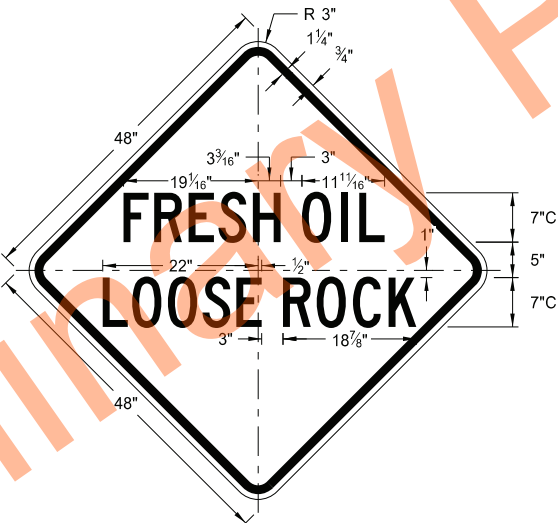
W20-51-48

Legend: black (non-refl)
Background: orange



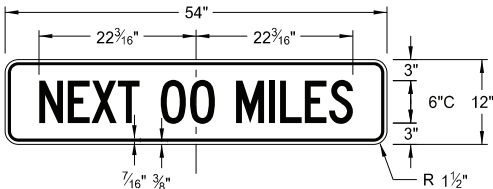
W21-51-48

Legend: black (non-refl)
Background: orange



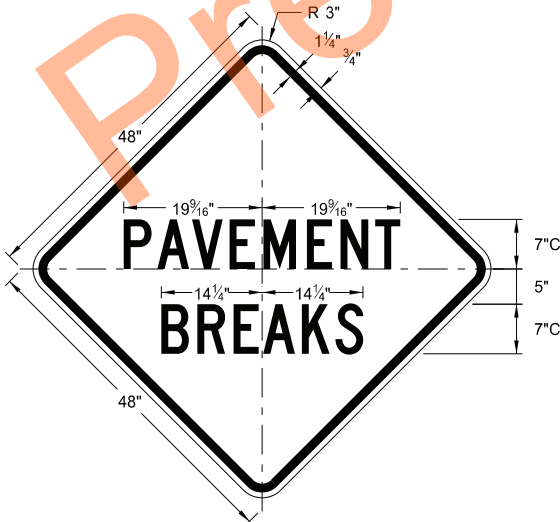
W22-8-48

Legend: black (non-refl)
Background: orange



W20-52P-54

Legend: black (non-refl)
Background: orange

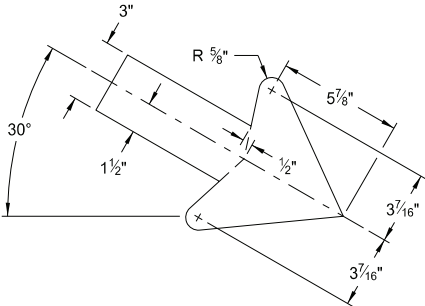


W21-52-48

Legend: black (non-refl)
Background: orange

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

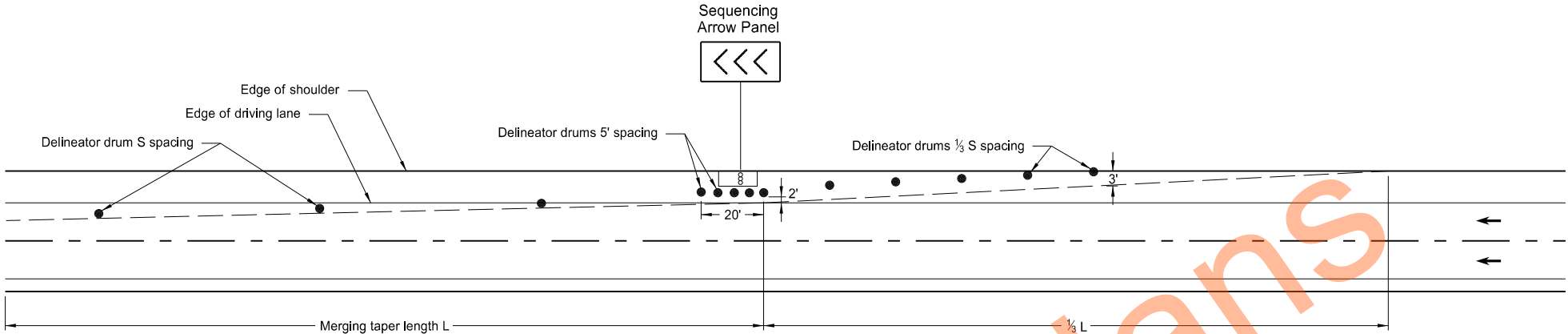
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
5-31-18	
REVISIONS	
DATE	CHANGE
11-01-19	Added details for sign W16-7aP-18.
8-01-24	Electronic Stamp/Signature.



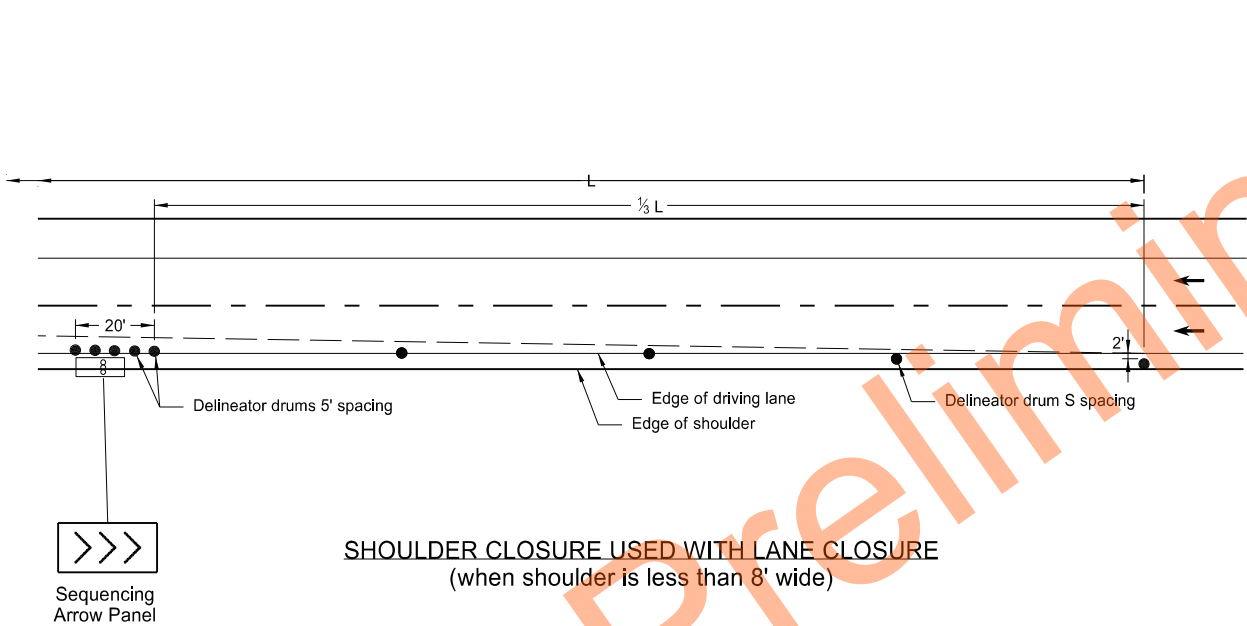
08/01/24

SHOULDER CLOSURE TAPERS

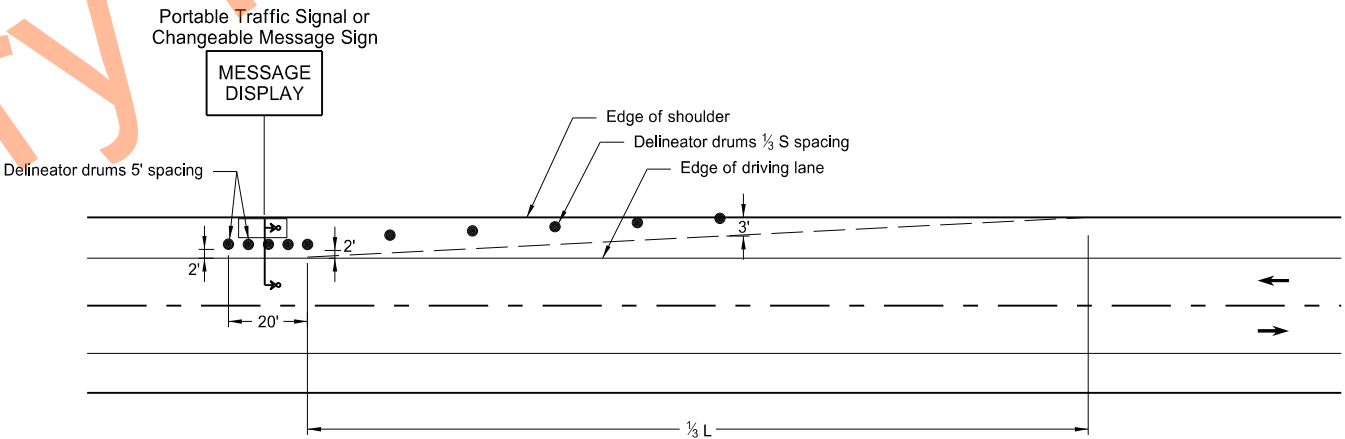
D-704-12



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
- Message Display
- ∞ Sequencing Arrow Panel
- ↳ Portable Traffic Signal

Notes:

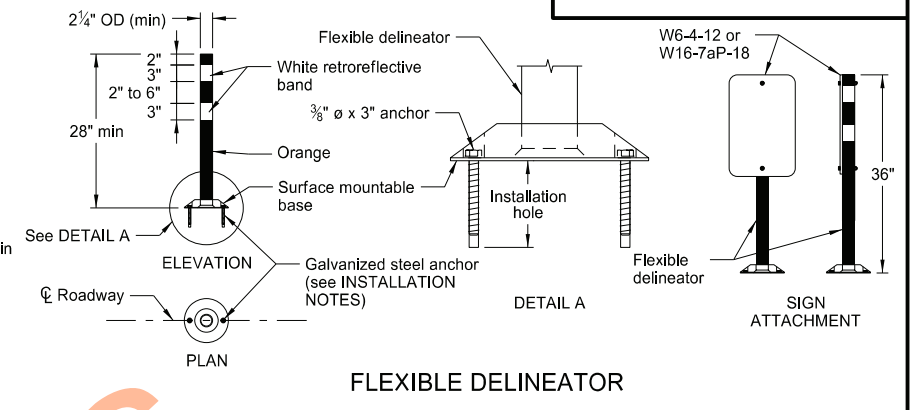
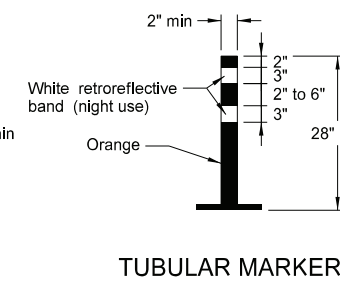
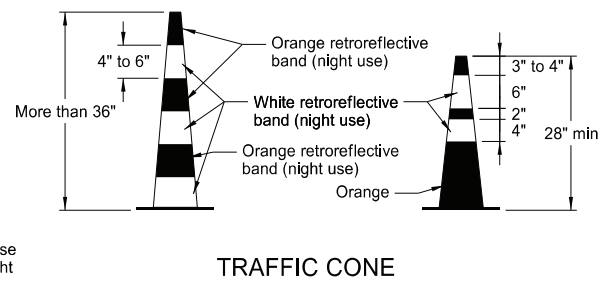
- S = Posted Speed Limit in mph
W = Width of offset in feet
L = Taper length in feet
L = WS²/60 (40mph or less)
L = WS (45mph or more)
- If a shoulder taper is used, use a length of approximately 1/3 L. If a shoulder is used as a travel lane, use a normal merging or shifting taper.
- When paved shoulders of 8 foot width or more are closed, use channelizing devices to close shoulder in advance, to delineate beginning of work space, and to direct vehicular traffic to remain within the traveled way.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
10-25-19	Added L dimension to detail
8-01-24	Electronic Stamp/Signature



08/01/24

D-704-13

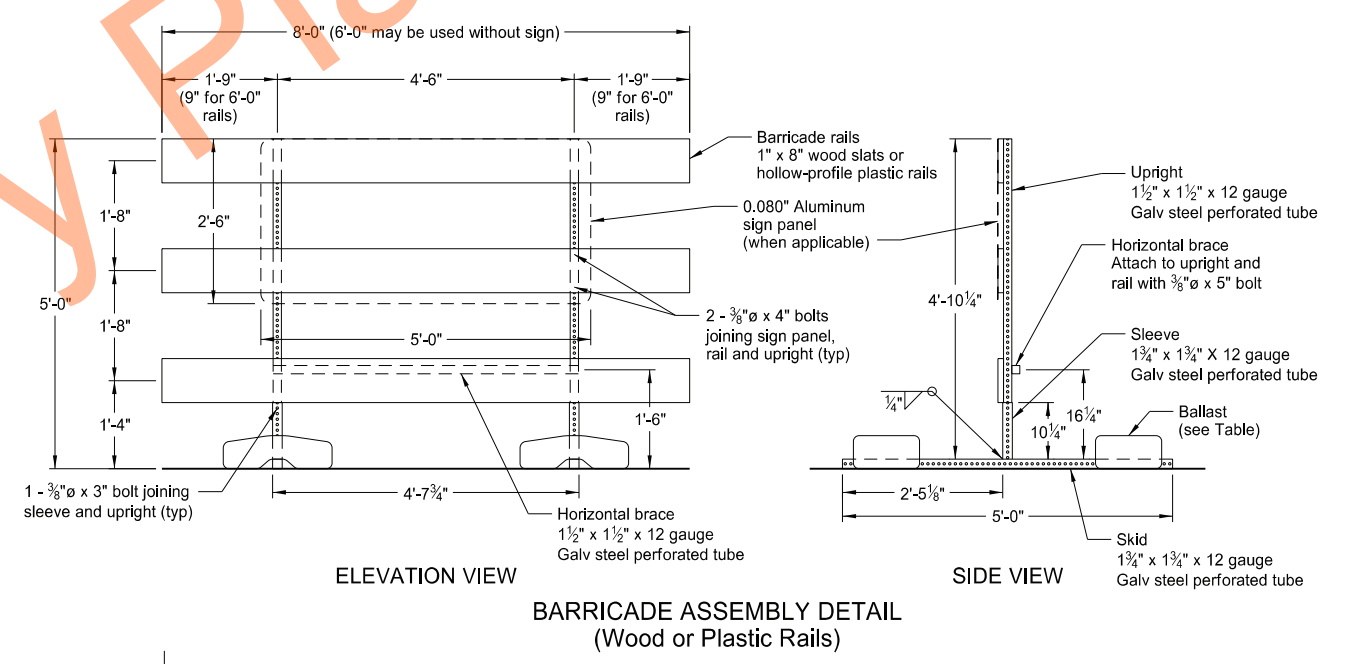
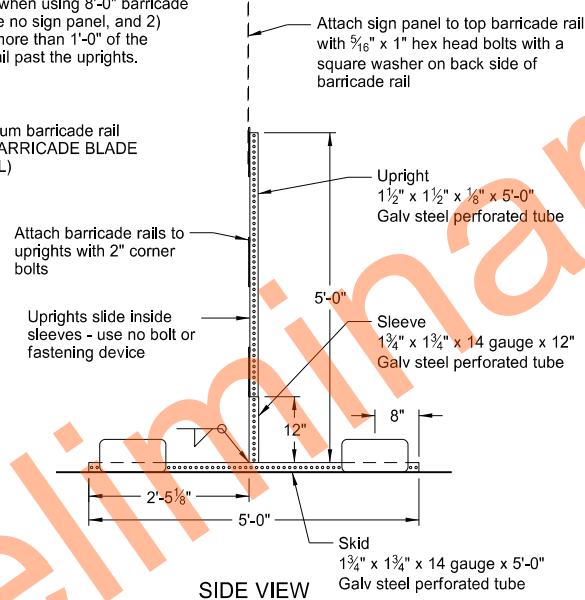


Provide alternating orange and white retroreflective stripes, sloping downward in direction vehicular traffic is to pass. Place retroreflective sheeting on both sides of panel with a minimum of 270 square inches of retroreflective area facing vehicular traffic. Where the height of the retroreflective 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 ASSEMBLY DETAIL (Wood or Plastic Rails)

BARRICADE BLADE DETAIL

ELEVATION VIEW

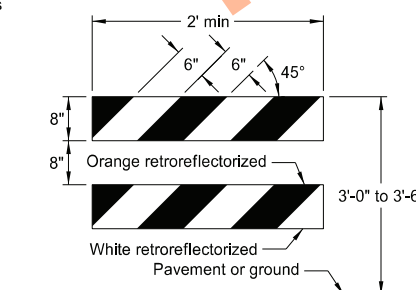
BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)

SIDE VIEW

Diagram illustrating the dimensions and materials for a standard traffic warning sign:

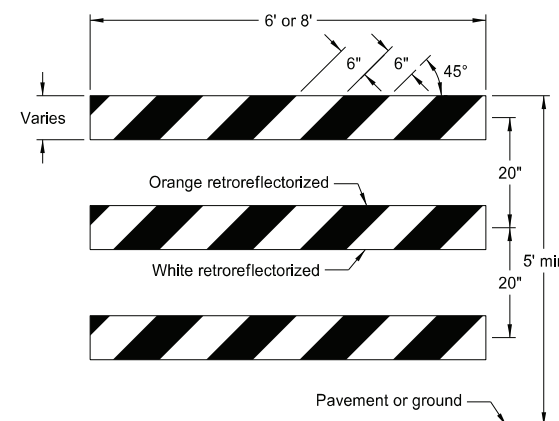
- Overall length: 6' to 10'
- Overall height: 8"
- Sign face height: 3'-0" to 3'-6"
- Materials: Orange retroreflectORIZED and White retroreflectORIZED
- Angles: 45° and 6"
- Mounting: Pavement or ground

TYPE I BARRICADE

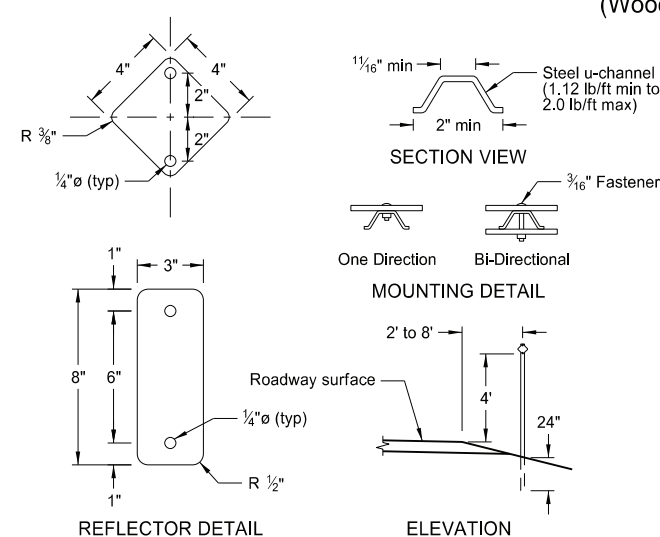


TYPE II BARRICADE

BARRICADE RAIL DETAILS



TYPE III BARRICADE



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.

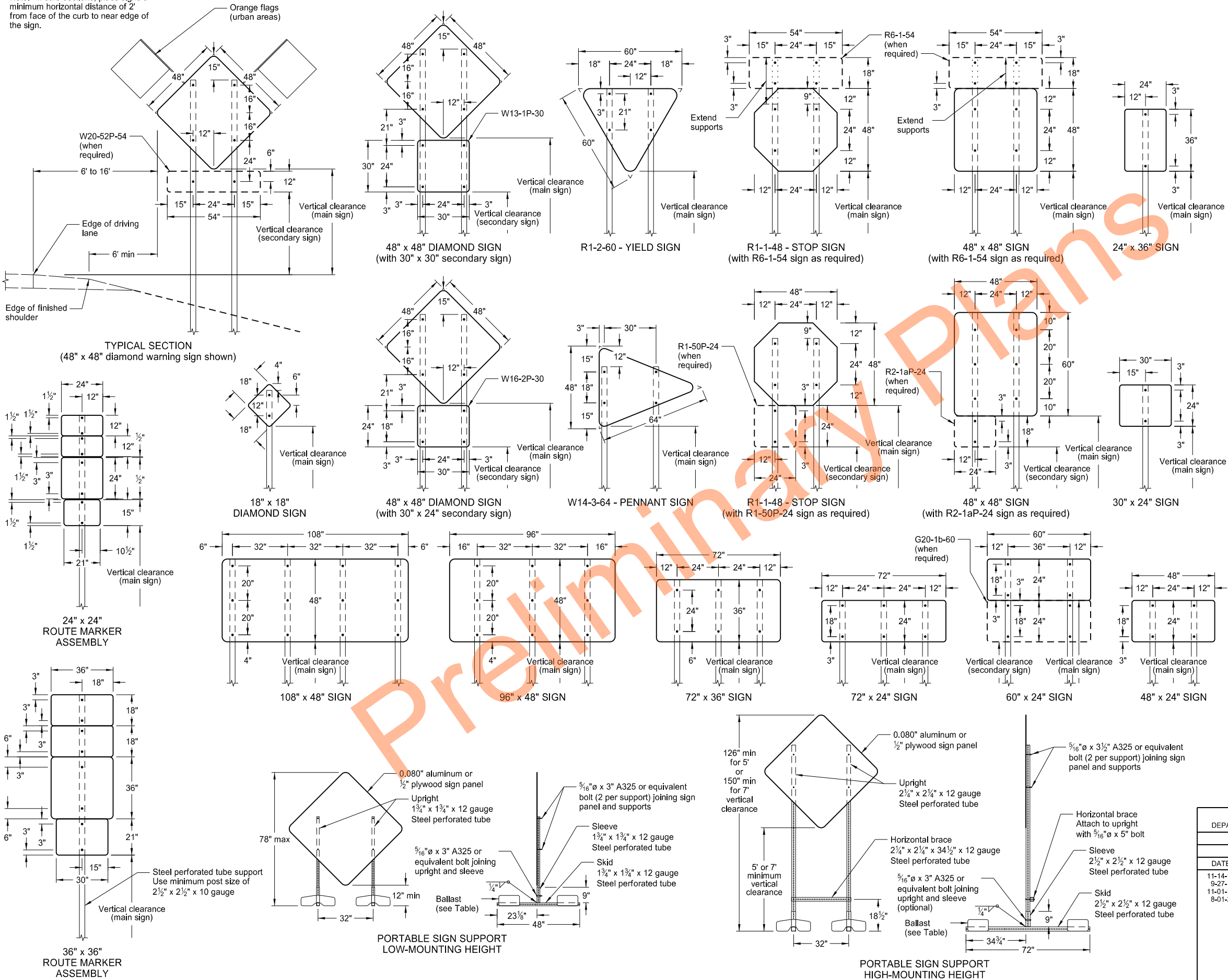
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
11-01-19	Revised details for Flexible Delineator
8-01-24	Electronic Stamp/Signature



08/01/24

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.



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 ⅜" 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

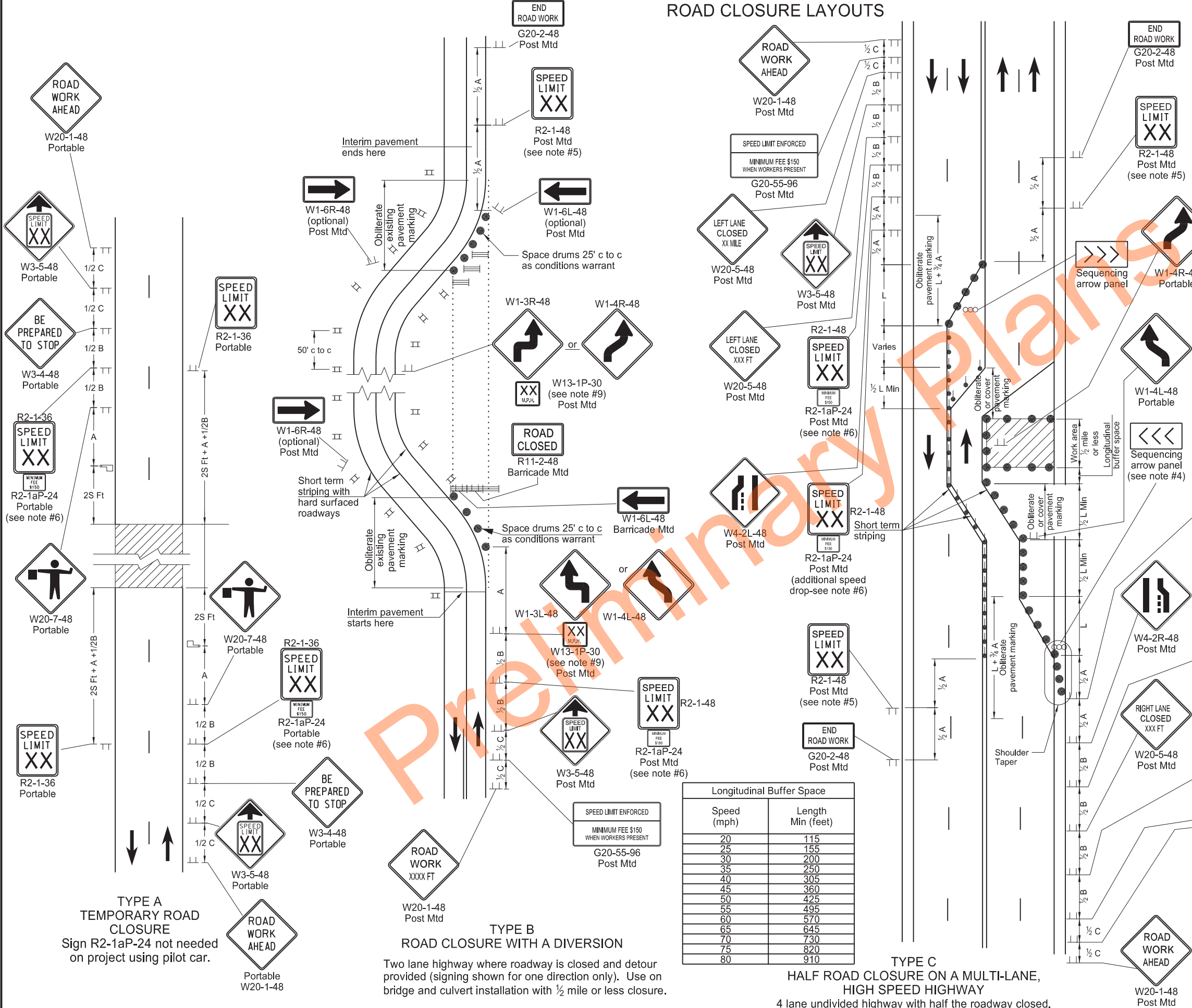
Note: The number of sandbags are based on a wind speed of 55 MPH. Place sandbags at or near the ends of skids.

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
8-01-24	Electronic Stamp/Signature



08/01/24

ROAD CLOSURE LAYOUTS



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

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 80 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

KEY

Type III barricade

Sign

Delineator drum

Tubular markers

Work area

Flagger

Sequencing arrow panel

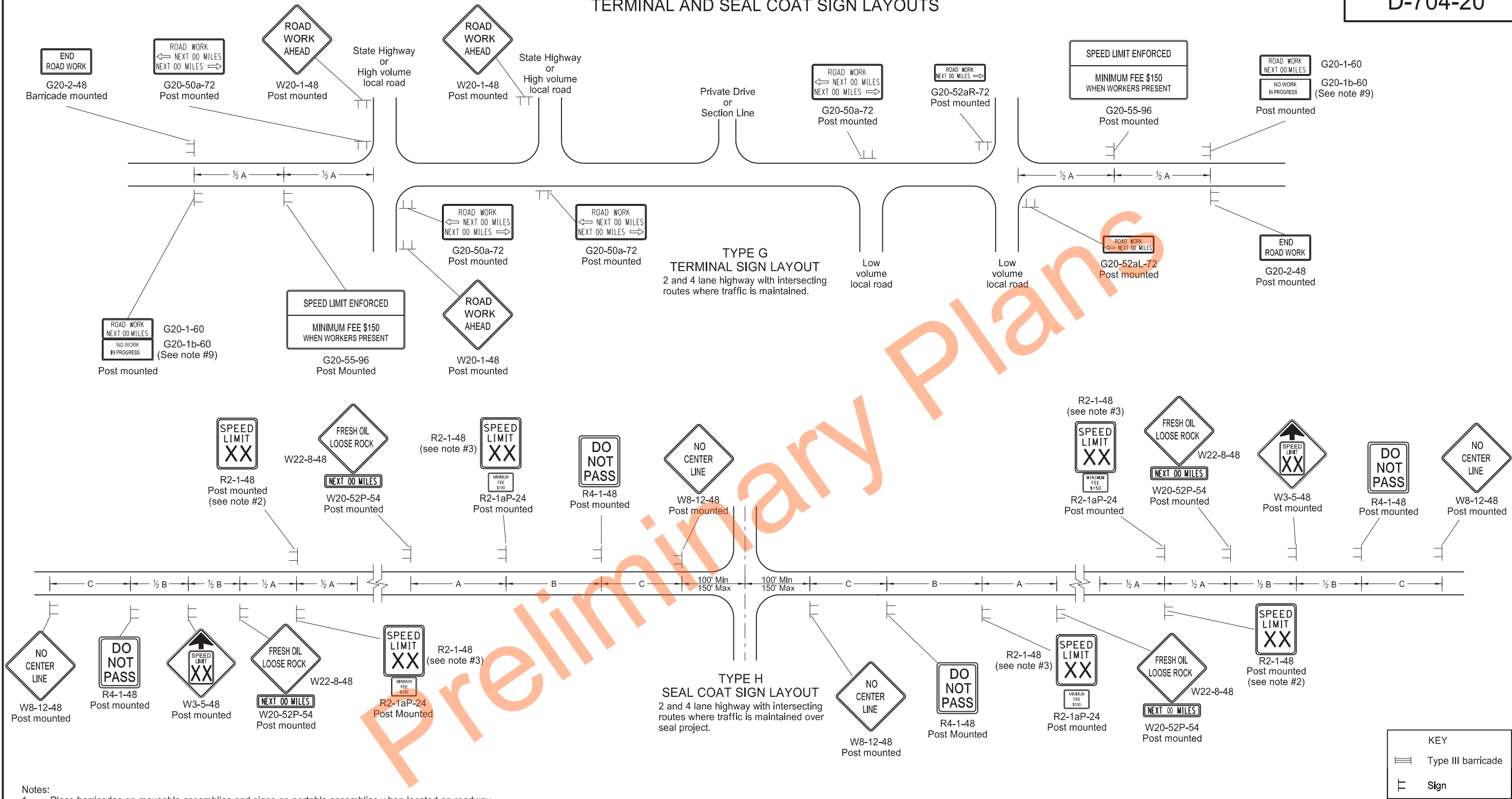
Vertical panels back to back

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
08-17-17	Updated Notes & Spd Limit signs
11-01-19	Sign, Notes, & Pmnt Mk updates
12-08-21	Switched order of Road Work Ahead and Spd Limit Enforced & added Dollars At Work
11-29-22	Removed Dollars At Work
06-30-25	Legislative Changes



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.

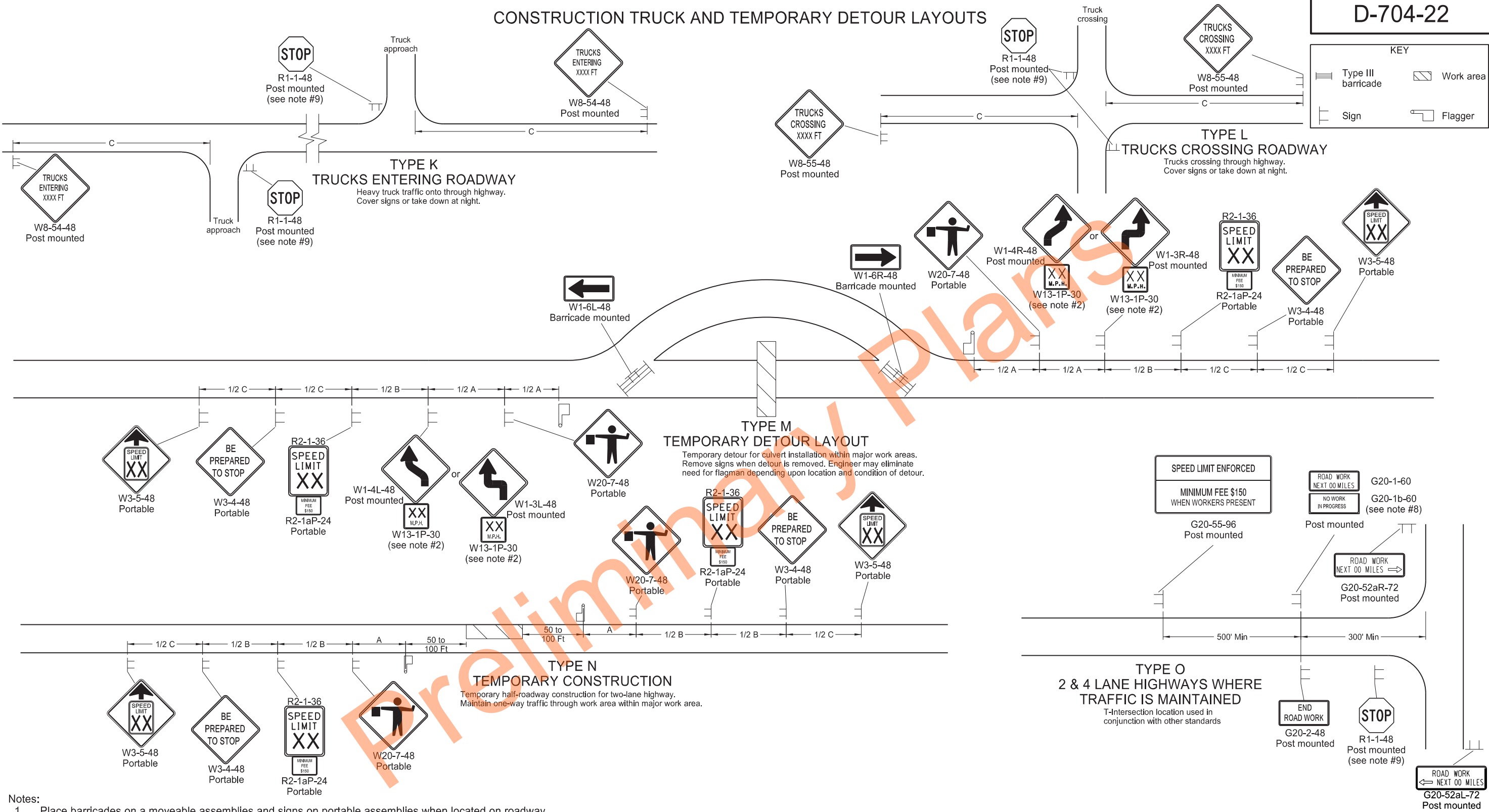
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs		
	Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 80 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
06-30-25	Legislative Changes



CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

D-704-22



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.

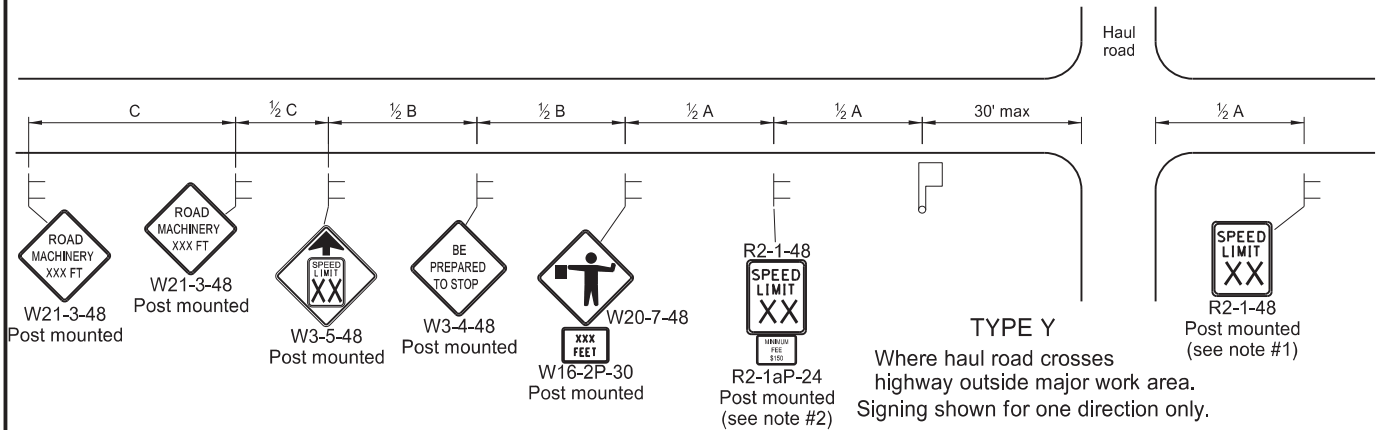
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 80 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
06-30-25	Legislative Changes

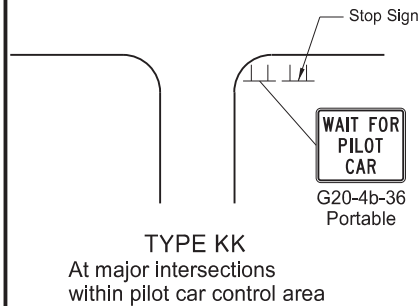
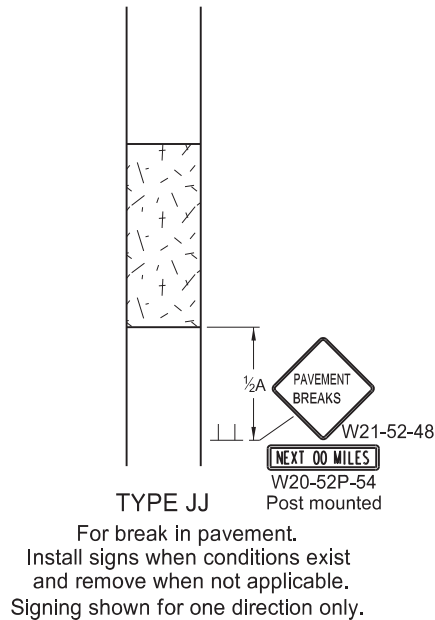
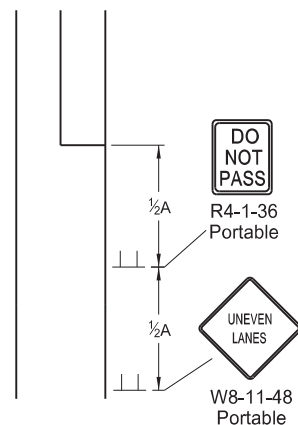
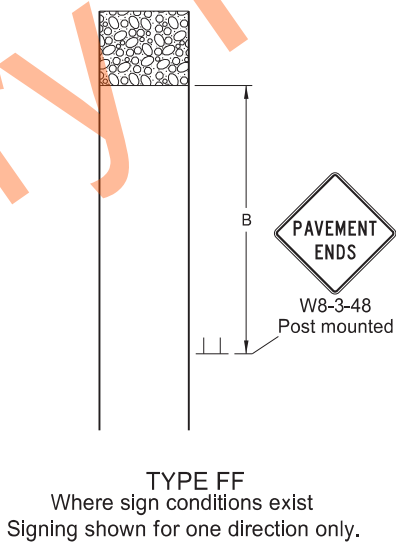
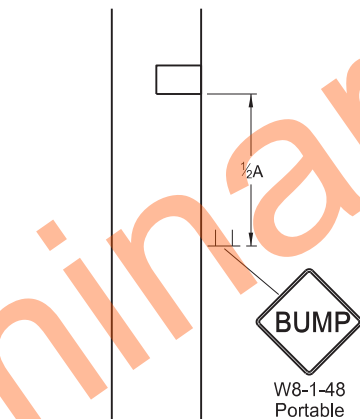
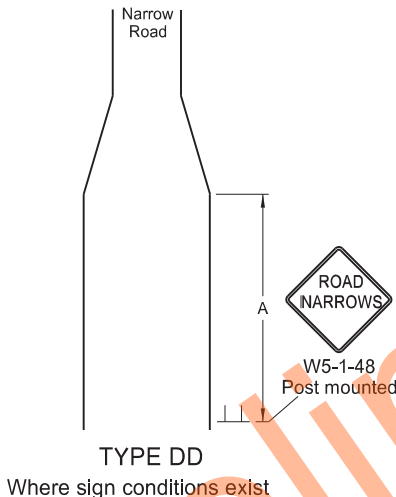
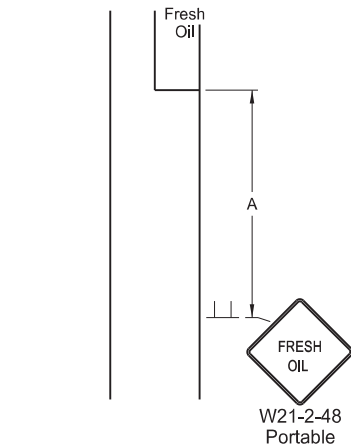
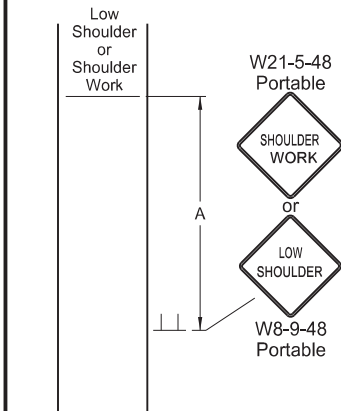
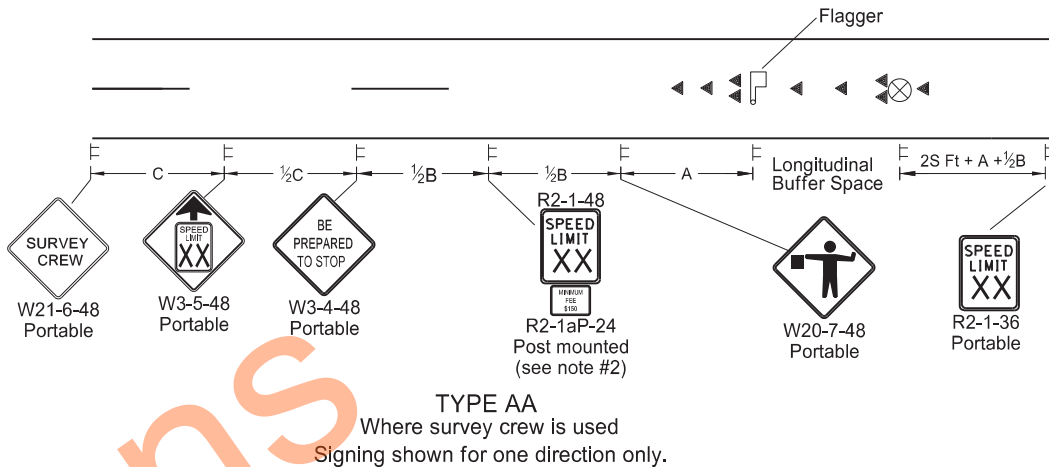
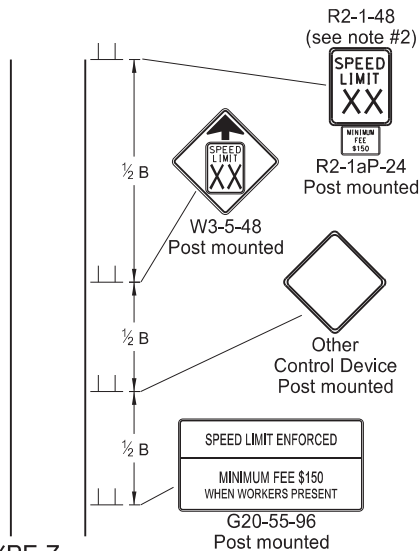


MISCELLANEOUS SIGN LAYOUTS

D-704-26



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



- 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 80 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
80	910

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

KEY

Flagger

Sign

Cones

Survey Equipment

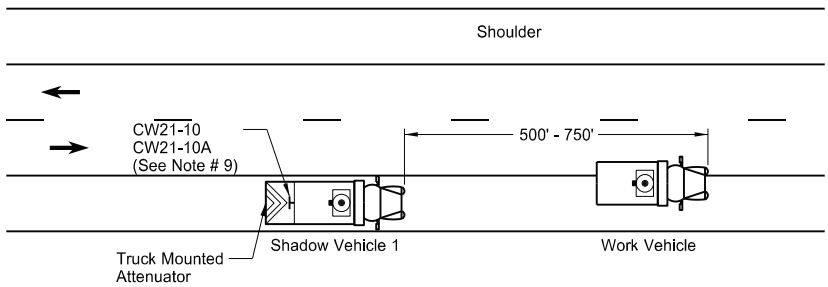
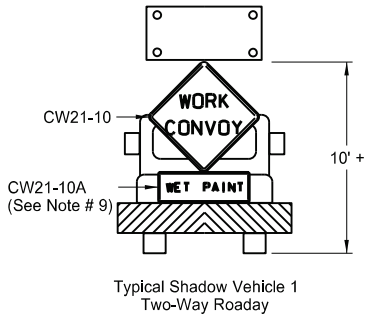
S = Numerical value of speed limit or 85th percentile.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
08-17-17	Added speed limit signs. Updated notes & sign numbers
11-01-19	Revised note 5 & sign numbers
02-23-23	Revised distance & removed signs
06-30-25	Legislative Changes

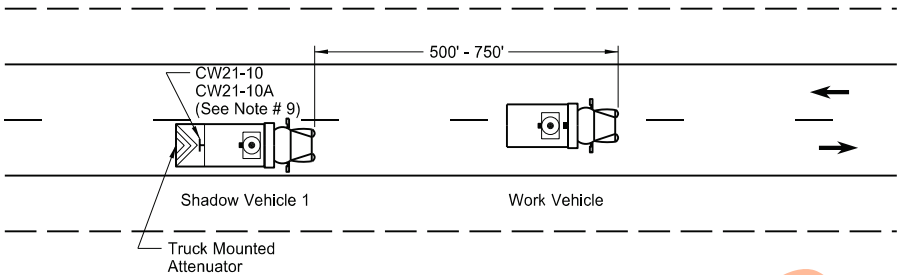


MOBILE OPERATION
(PAVEMENT MARKING)

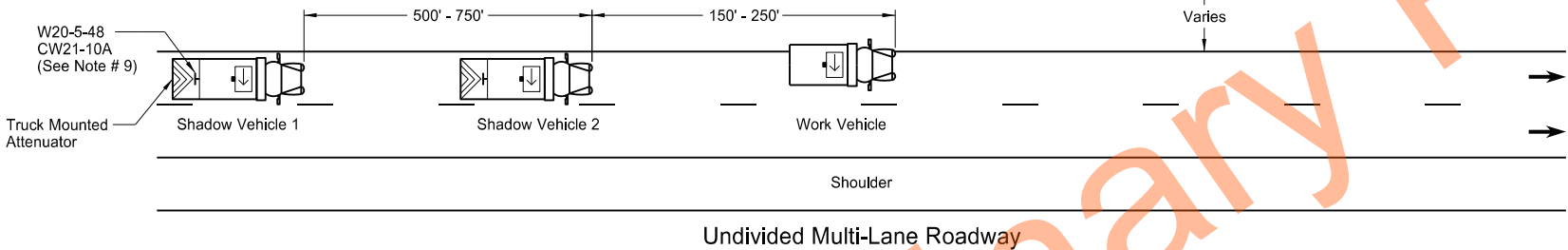
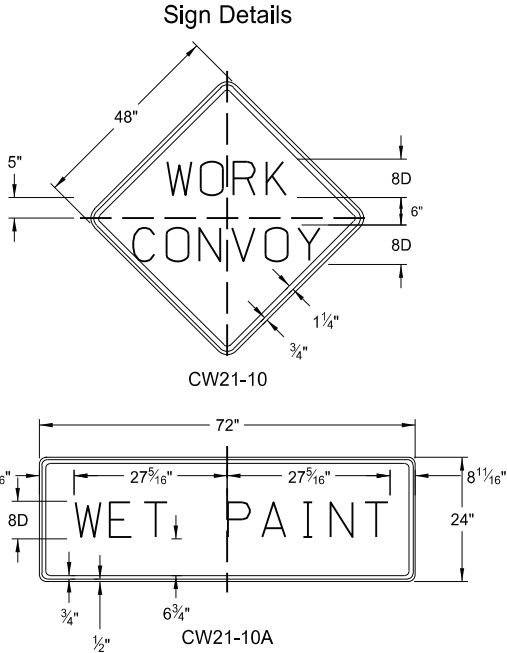
D-704-27



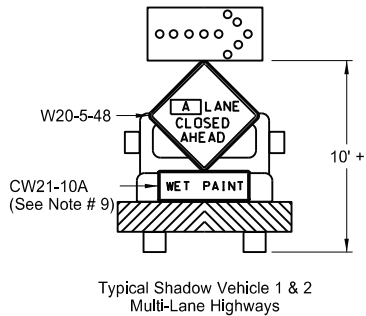
Two-Way Roadway with Paved Shoulders



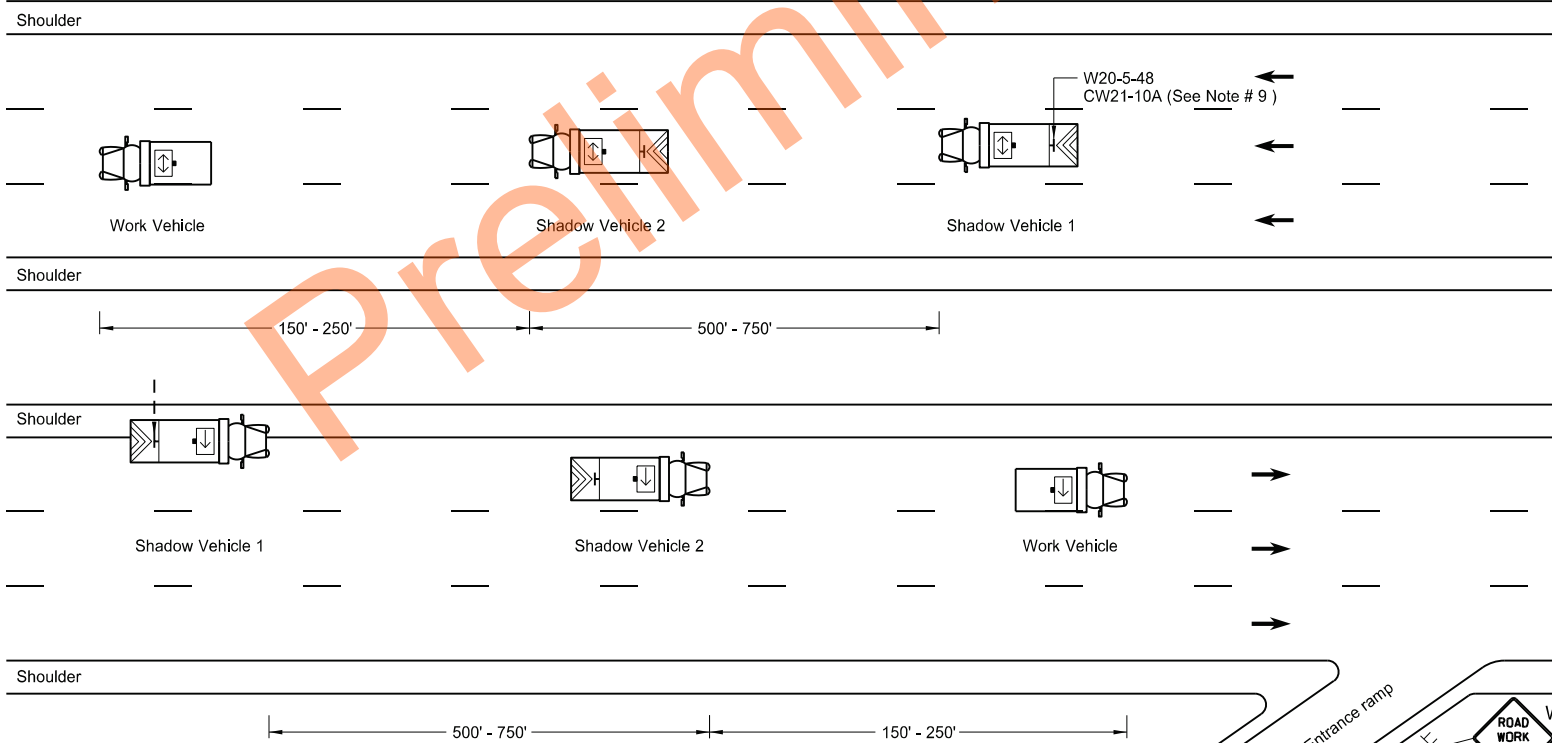
Two-Way Roadway without Paved Shoulders



Undivided Multi-Lane Roadway

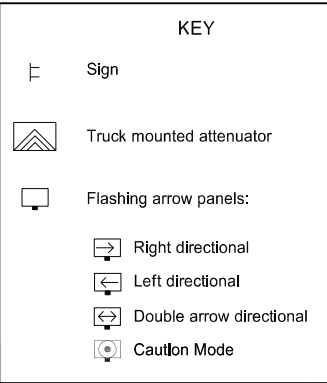


A = Left Right Center



Divided Multi-Lane Highway

- 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.



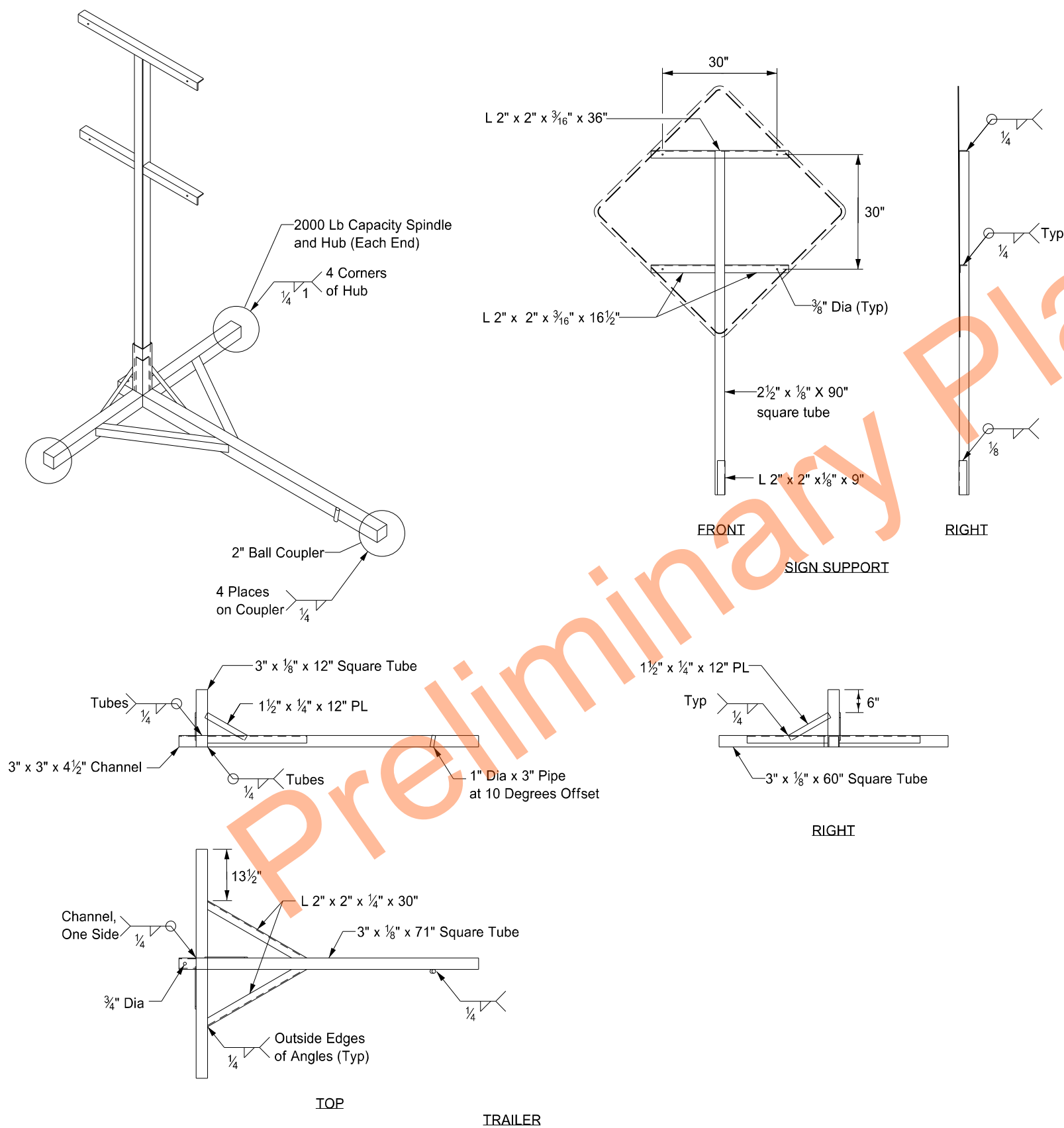
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
6-18-14	Removed shadow vehicle 2 on two lane roadways
9-27-17	Updated to active voice
11-08-19	Changed Standard Heading
6-02-24	Electronic Stamp/Signature.



08/02/24

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.

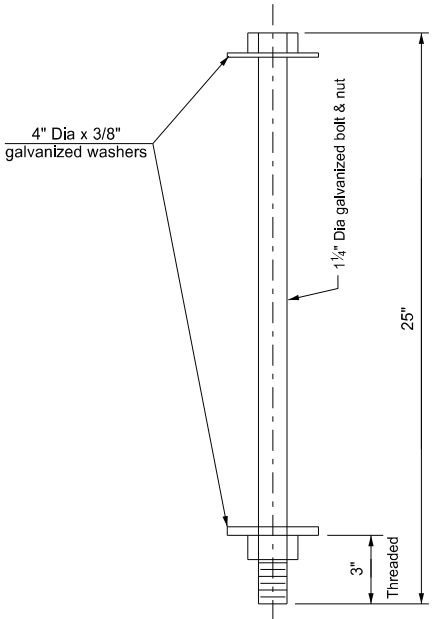
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
12 02 2020

CONCRETE MEDIAN BARRIER
(TEMPORARY USAGE)

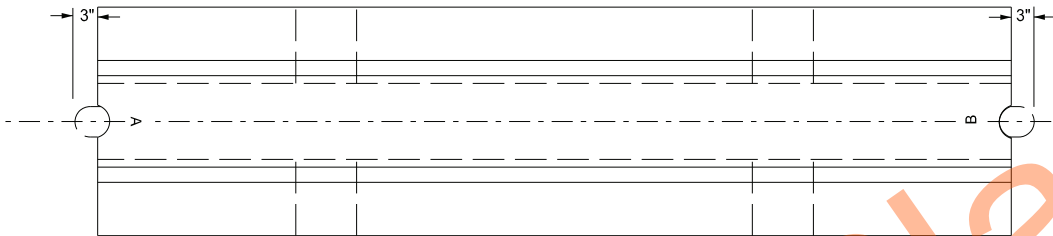
D-704-51

Notes:

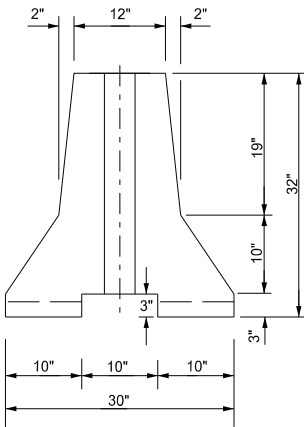
- Barrier ends imprinted with 4 inch letters A and B. Field match A end with B end.
- Place barrier markers at the center of the barrier at 20' centers.
- Connect barrier sections with 1 1/4" Dia A-307 double hex connecting bolt. Maintain bottom nut and washer connection for duration of barrier installation.
- Place barrier to minimize openings between individual sections.



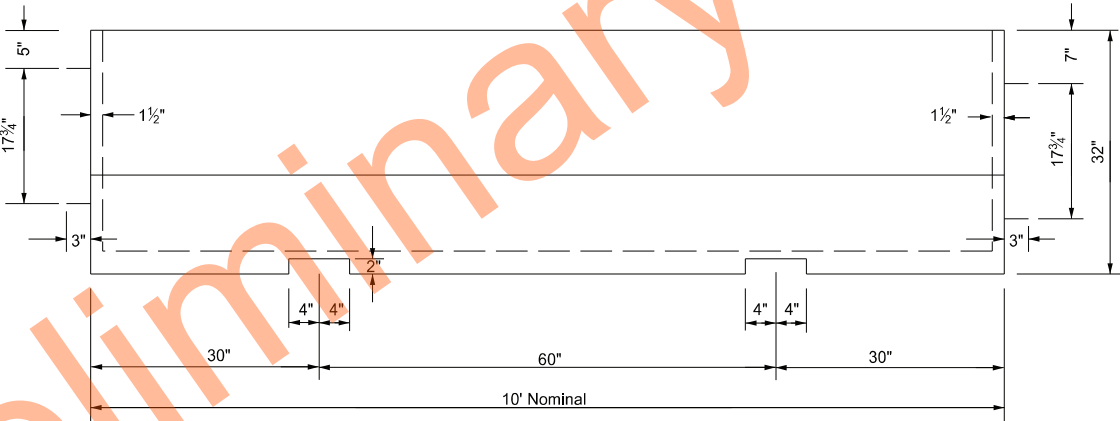
Connecting Bolt Detail
(One per 10 Ft section)



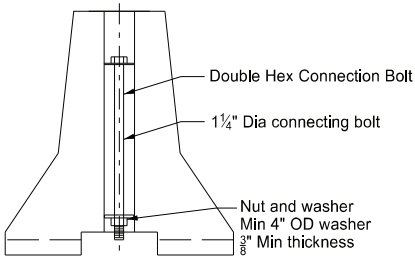
Plan View



End View



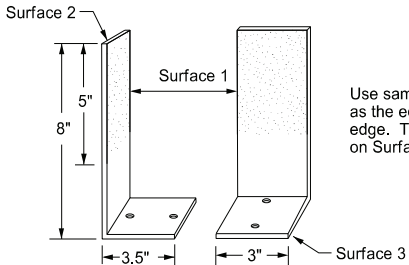
Side View



Bolt Connection Detail

Marker Body
Use high impact, weatherable engineering thermo-plastic material conforming to the following:

Property	Result	ASTM Test Method
Thickness (min)	.090"	—
Tensile strength (min psi) @ yield	5,500	D638
Impact strength @ -20°F (ft-lbs/in of notch)	3.2	D256 Method A
Impact strength @ 73°F (ft-lbs/in of notch)	14.0	D256 Method A
Flexural strength, PSI 1/4" @ 73°F	8,000	D790
Flexural modulus, PSI 1/4" @ 73°F	300,000	D790
Elongation @ yield	30%	D638



Barrier Marker Detail

Use same color reflective faces as the edge line along barrier edge. Two way reflective on Surface 1 & 2.

Reflective Tape
Use retroreflective, acrylic microprism material with acrylic backing, 3" wide, providing the following minimum optical performance with an observation angle of 0.1° measured in candlepower for the reflector:

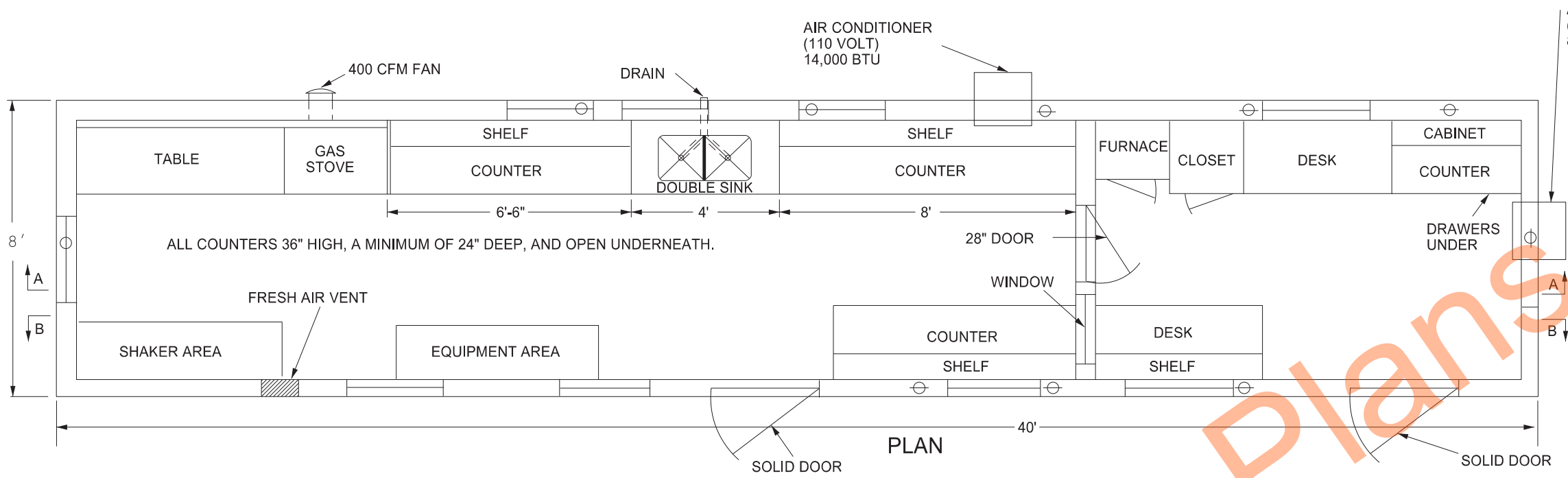
Entrance Angle	Specific Intensity
Yellow - 4"	136
White - 4"	200

Adhesive
Use factory applied solid butyl rubber 1/8" thick, 2" wide on 2 1/4" wide release paper on surface 3 to temporarily mount markers to portable concrete barrier.

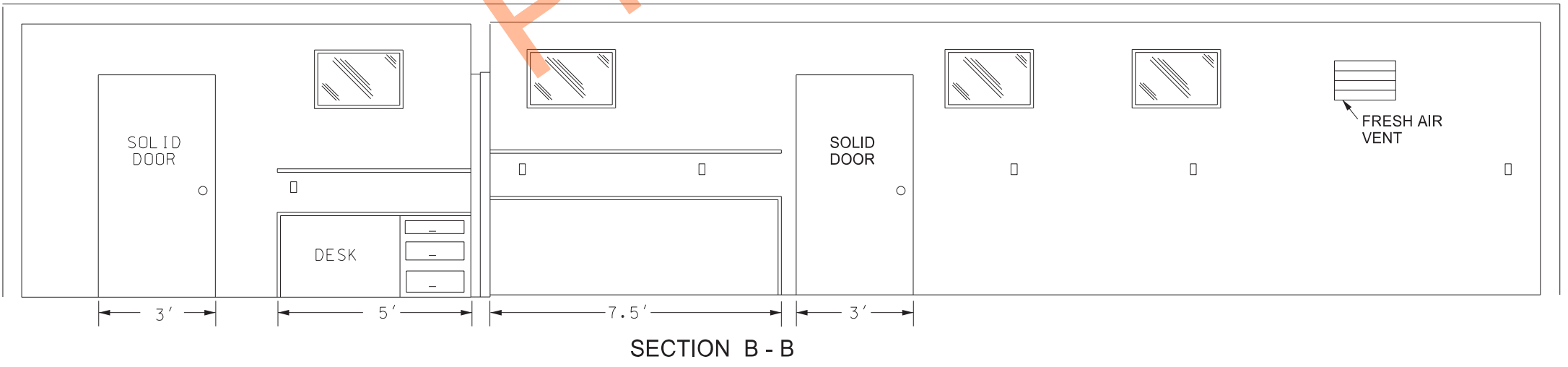
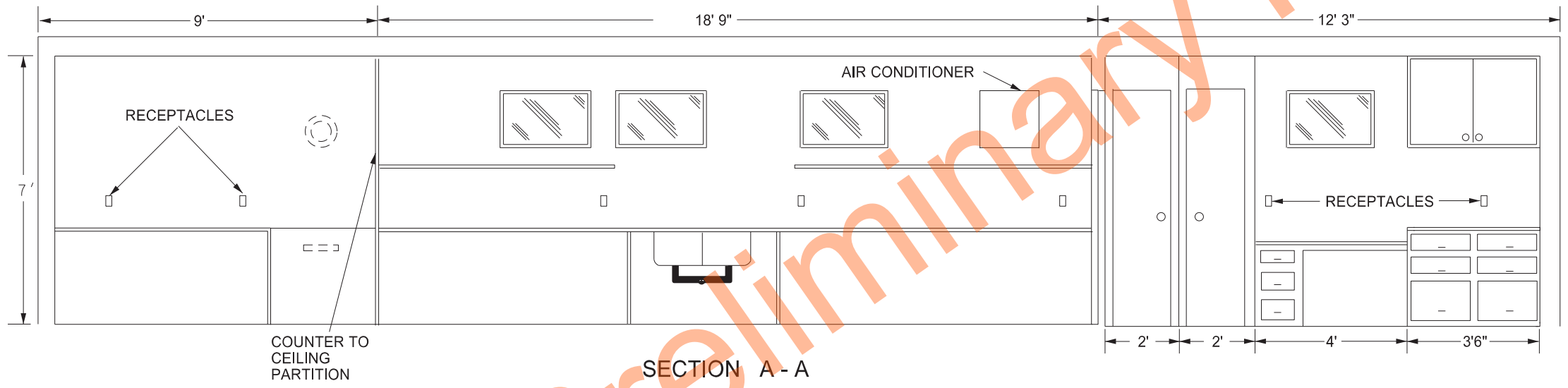
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-20-12	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
11-01-19	New Design Engr PE Stamp
8-21-24	Removed Fabrication Info



08/21/24



- 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 ½ 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
08-09-24	Electronic Stamp/Signature.

KIRK J. HOFF

REGISTERED

PROFESSIONAL

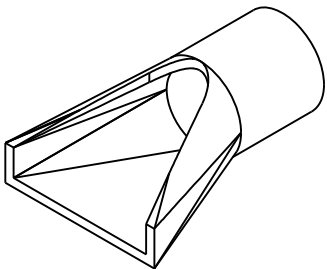
PE-4683

ENGINEER

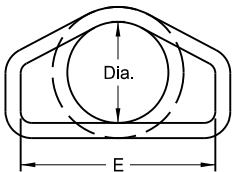
NORTH DAKOTA

08/09/24

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 / ₄ "
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 "

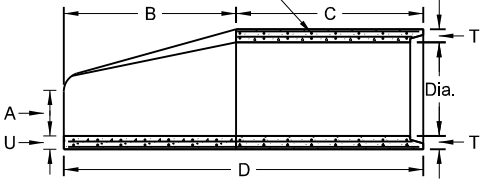


PERSPECTIVE

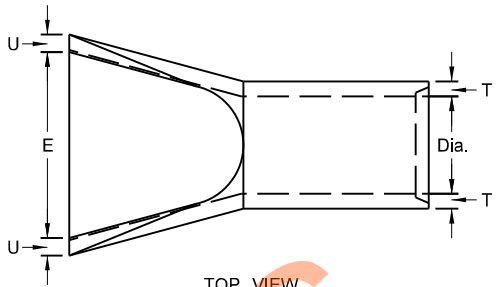


END VIEW

Standard Reinforcement for Class III pipe reinforced as per AASHTO M170



SIDE VIEW



TOP VIEW

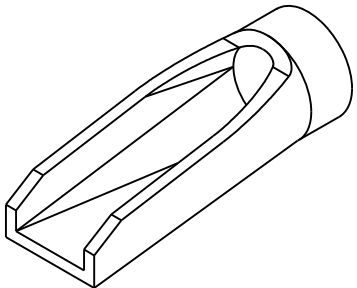
NOTES:

- All reinforcing steel shall meet AASHTO M170 requirements.
- 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.
- Laying length of pipe: 12" to 66" (incl.) = not less than 4 feet
66" to 108" (incl.) = not less than 6 feet
- Joints shall be sealed with rubber gaskets or with sealer approved by the engineer whenever pipe are specified for storm drain or sanitary sewers.
- 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.

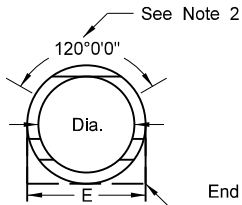
REINFORCED CONCRETE PIPE - FLARED END SECTION

Reinforcement to be equivalent to Class III RCP

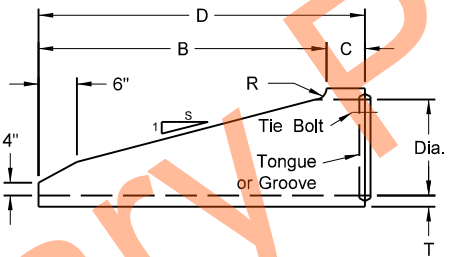
TRAVERSABLE END SECTION						
DIA	B	C	D	E	R	S
15"	4'	9"	4'-9"	1'-7 ¹ / ₂ "	3"	6
18"	5'-9"	9"	6'-6"	1'-11"	3"	6
24"	6'	1'	7'	2'-6"	3"	4
30"	7'-6"	1'	8'-6"	3'-1"	3 ¹ / ₂ "	4
36"	7'-3"	15"	8'-6"	3'-8"	3"	4



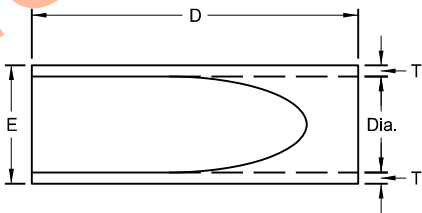
PERSPECTIVE



END VIEW



SIDE VIEW



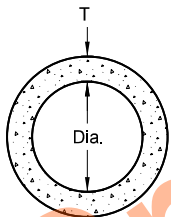
TOP VIEW

NOTES (Traversable End Section):

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

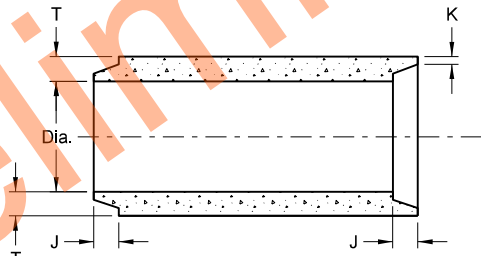
REINFORCED CONCRETE PIPE - TRAVERSABLE END SECTION

Reinforcement to be equivalent to Class III RCP

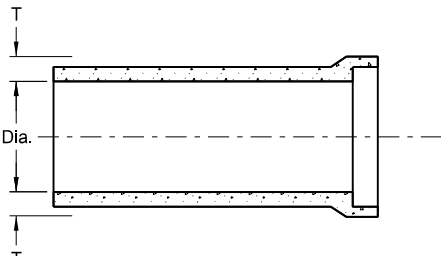


END VIEW

CIRCULAR PIPE

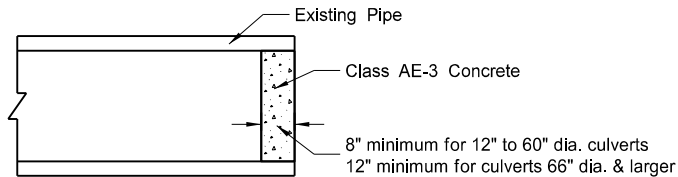


TONGUE & GROOVE JOINT



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 / ₂	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 ³ / ₄ -4 ³ / ₄	1 ³ / ₄	4 ¹ / ₂	
48	12.57	685	3 ³ / ₄ -4 ³ / ₄	1 ³ / ₄	5	
54	15.90	1070	4 ¹ / ₂ -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 ³ / 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	

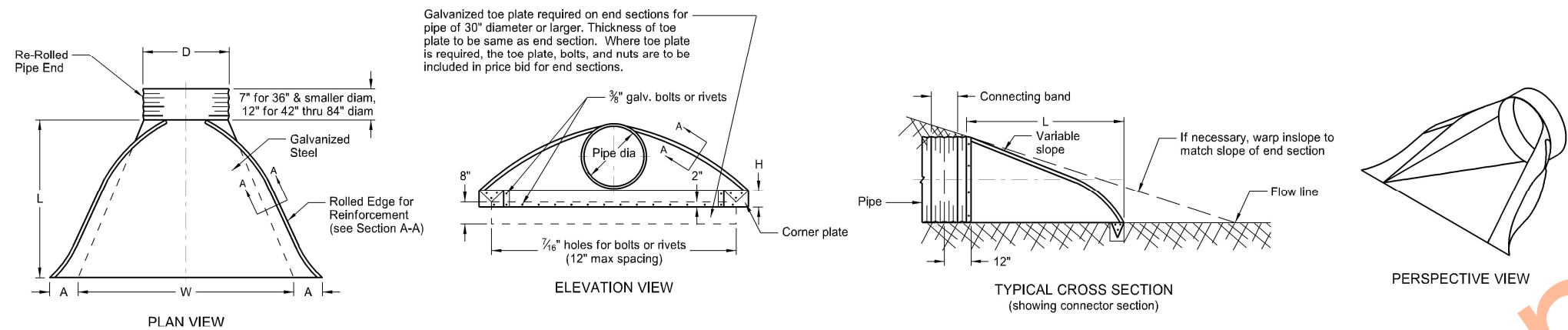
SEE STANDARD DRAWING D-714-22 FOR DETAILS OF CONCRETE PIPE TIES (TIE BOLTS).

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

ROUND CORRUGATED STEEL PIPE CULVERTS AND END SECTIONS

D-714-4



PIPE DIA.	GALVANIZED THICKNESS	END SECTION DIMENSIONS						APPROX. SLOPE RATE	BODY
		A	B	H	L	W			
15	0.064 - 0.079	7	8	6	26	30	2 1/2:1	1	
18	0.064 - 0.109	8	10	6	31	36	2 1/2:1	1	
24	0.064 - 0.109	10	13	6	41	48	2 1/2:1	1	
30	0.064 - 0.109	12	16	8	51	60	2 1/2:1	1 or 2	
36	0.064 - 0.109	14	19	9	60	72	2 1/2:1	2	
42	0.064 - 0.138	16	22	11	69	84	2 1/2:1	2	
48	0.064 - 0.168	18	27	12	78	90	2 1/2:1	2	
54	0.064 - 0.168	18	30	12	84	102	2:1	2	
* 60	0.064 - 0.168	18	33	12	87	114	1 1/2:1	3	
* 66	0.064 - 0.168	18	36	12	87	120	1 1/2:1	3	
* 72	0.064 - 0.168	18	39	12	87	126	1 1/2:1	3	
* 78	0.064 - 0.168	18	42	12	87	132	1 1/2:1	3	
* 84	0.064 - 0.168	18	45	12	87	138	1 1/2:1	3	

* These sizes have 0.109" sides and 0.138" center panels.

** Pipe diameter is equal to dimension "D" of end section.

Manufacturers tolerances of above dimensions will be allowed.

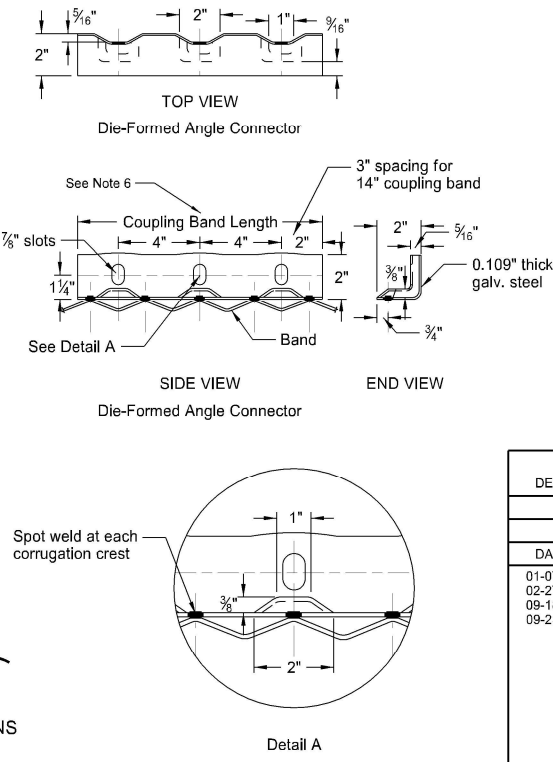
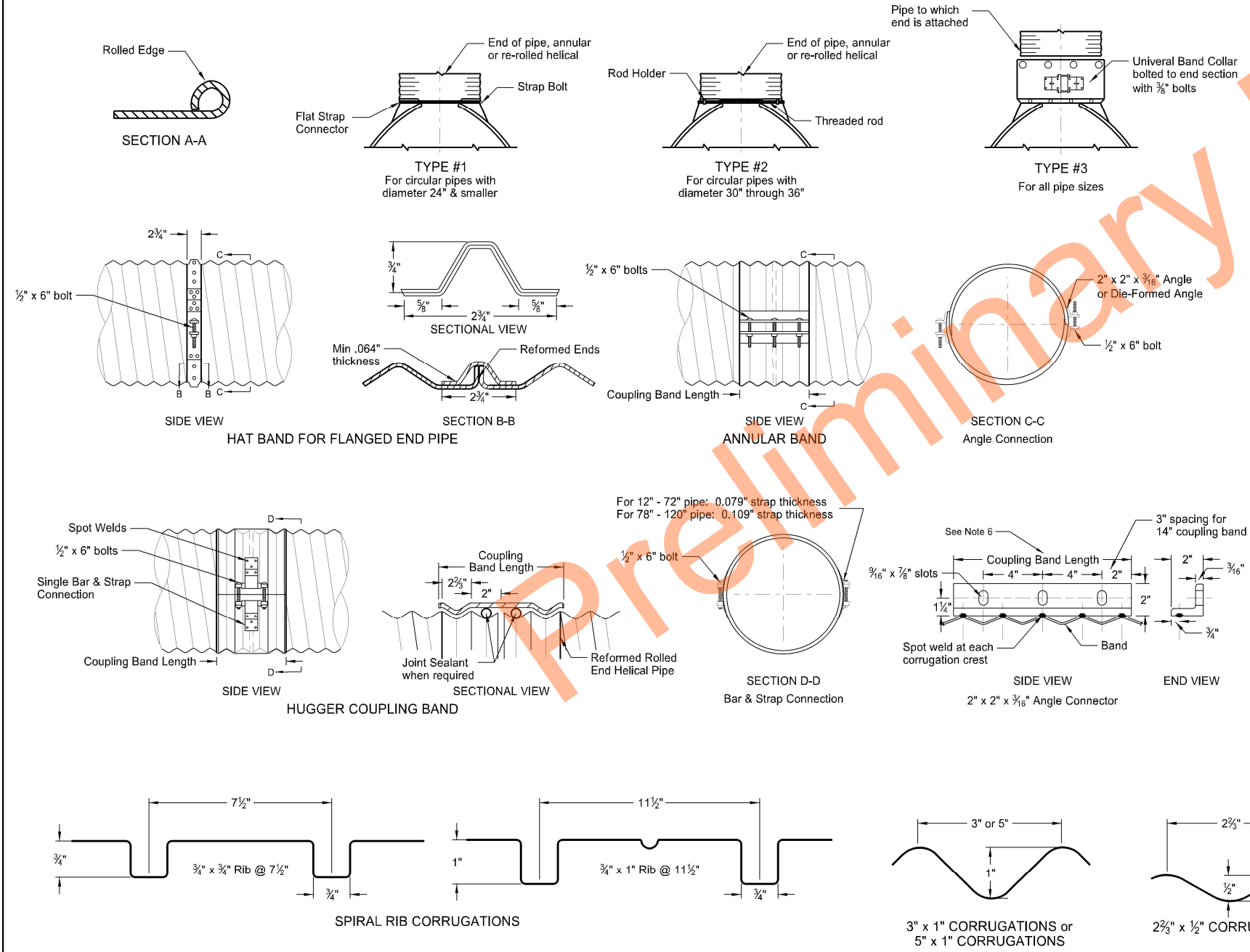
Splices to be the lap riveted type.

Multiple panel bodies shall have lap seams which are to be tightly joined with 3/8" dia. galv. bolts or rivets. Nuts to be torqued to 25 foot-lbs ±.

NOTES:

- Pipes and connecting bands shall conform to applicable sections of NDDOT Standard Specifications and to AASHTO M-36.
- Top edge of all end sections to have rolled edges for reinforcement (see Section A-A). The reinforced edges are to be supplemented with 2" x 2" x 1/4" galv. angle for 60" through 72" dia. and 2 1/2" x 2 1/2" x 1/4" galv. angle for 78" and 84" dia.. Angles are to be attached by galv. 3/8" dia. bolts and nuts. Angles are to extend from pipe to the corner wing bend.
- Elongated pipes shall be factory preformed so that the vertical diameter shall be 5% greater and the horizontal diameter 5% less than a circular pipe.
- Coupling bands shall be two-piece for pipes larger than 36" as shown in Section C-C & D-D details. For pipes 36" and smaller, a one-piece band is acceptable.
- 1/2" x 8" bolts may be used as a substitute for the 1/2" x 6" bolts shown in the details.
- Coupling bands wider than 14" may be used if a minimum of four 1/2" bolts with maximum spacing of 5 1/2" are used for the connection.
- Length of spot welds shall be minimum 1/2".

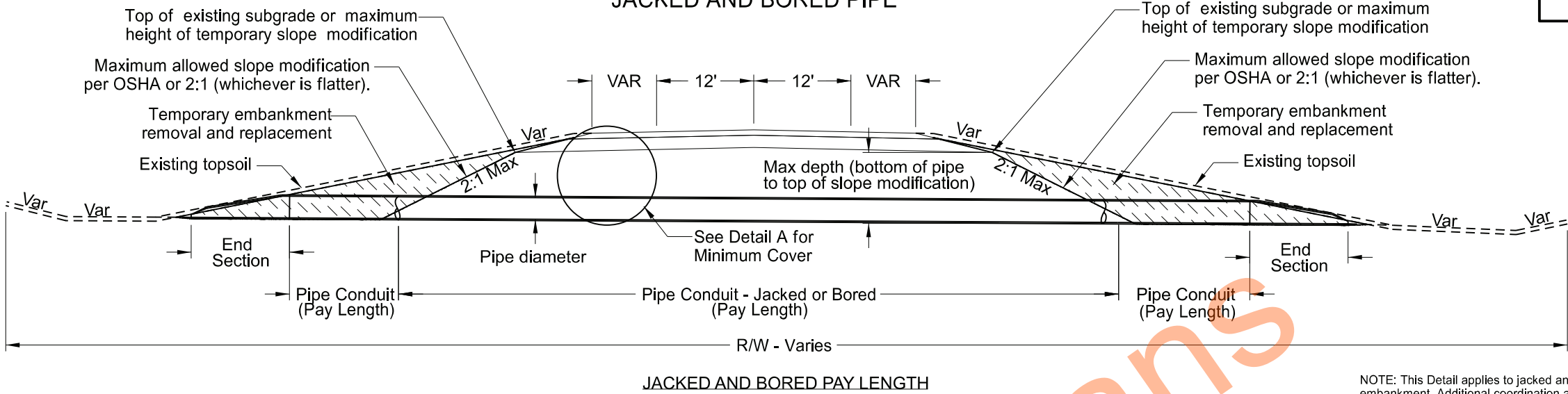
COUPLING BAND DIMENSIONS				
COUPLING TYPE	CORRUGATION PITCH x DEPTH	PIPE SIZE	COUPLING BAND LENGTH	MIN. BAND THICKNESS
Hat Band	2 3/8" x 1/2"	12" - 48"	2 3/4"	.064"
		12" - 72"	12"	.052"
Annular Band	2 3/8" x 1/2"	78" - 84"	12"	.079"
		48" - 120"	14"	.052"
Hugger Band	2 3/8" x 1/2" Rerolled End	12" - 72"	10 1/2"	.052"
		78" - 84"	10 1/2"	.079"
		48" - 120"	10 1/2"	.052"
	5" x 1" Rerolled End	48" - 120"	12"	.064"



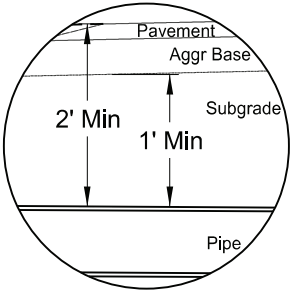
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
08-16-13	
REVISIONS	
DATE	CHANGE
01-07-14	End Section Plan View
02-27-14	3" x 1" Corrugation Detail
09-18-19	Added Perspective View Detail
09-23-22	Galvanized Thickness Table

Professional Engineer Seal for Nathan D Kettering, PE-4684, State of North Dakota. The seal is circular with the text "NORTH DAKOTA" and "ENGINEER" around the perimeter. The name "NATHAN D KETTERING" and "PE-4684" are in the center. The date "09/23/22" is written below the seal.

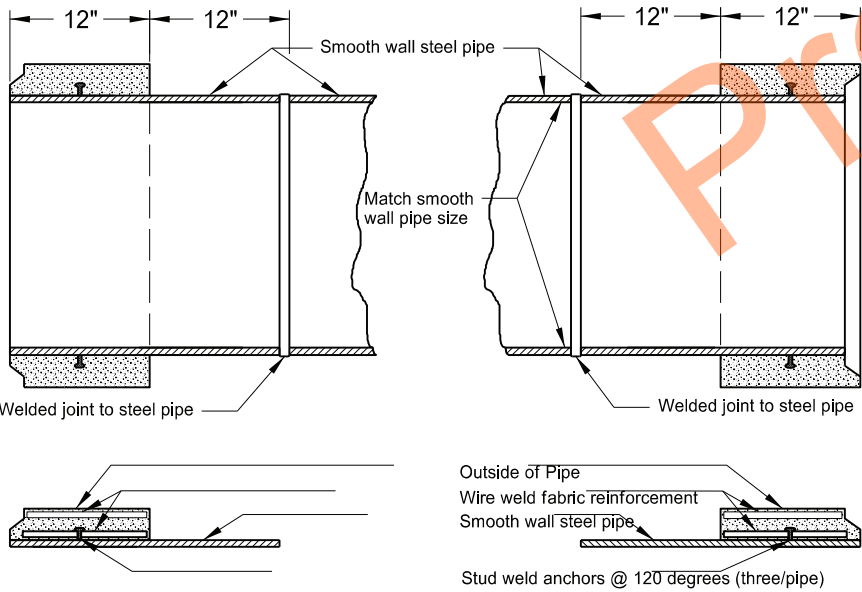
JACKED AND BORED PIPE



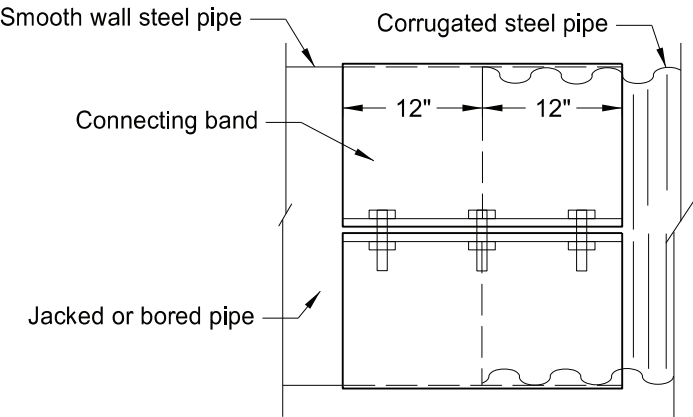
NOTE: This Detail applies to jacked and bored pipe under a roadway embankment. Additional coordination and design are needed for railroad embankments.



Detail A - Minimum Cover
2' Top of Pavement to Top of Pipe,
and 1' Top of Subgrade to Top of Pipe



DETAIL FOR JOINING SMOOTH WALL
STEEL PIPE TO REINFORCED CONCRETE PIPE



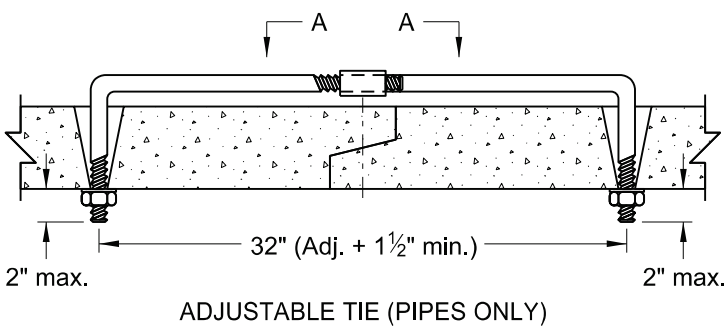
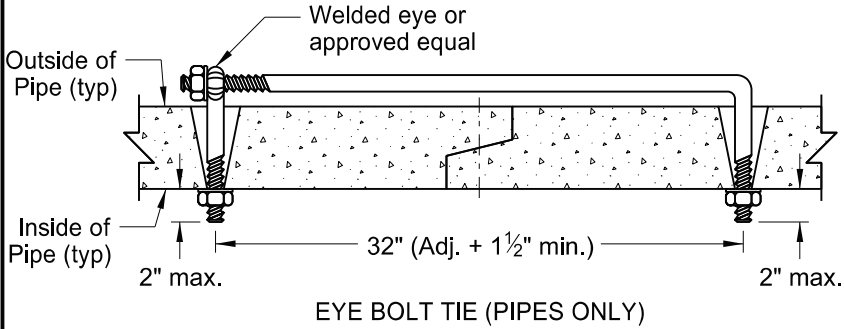
CONNECTING BAND FOR JOINING SMOOTH
WALL STEEL PIPE TO CORRUGATED PIPE

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-15-2022	
REVISIONS	
DATE	CHANGE
08-31-2023	Corrected spelling of corrugated.



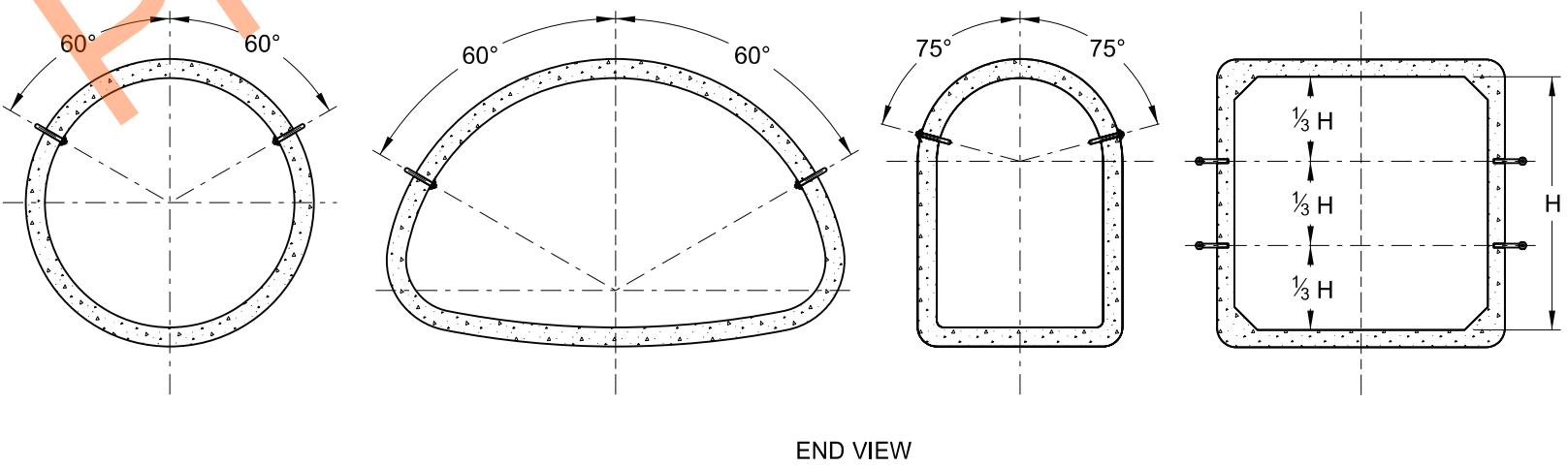
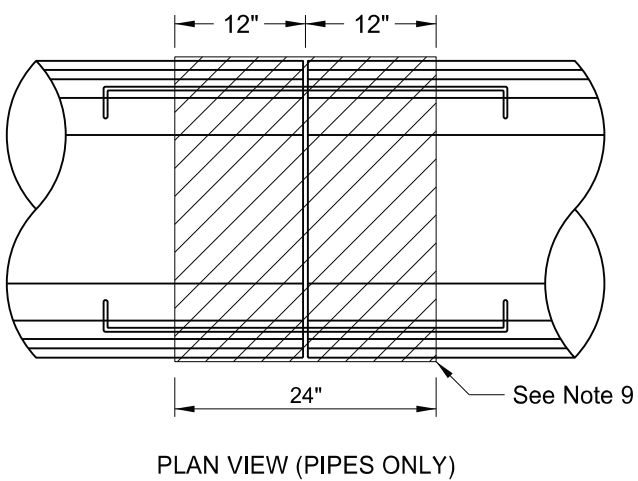
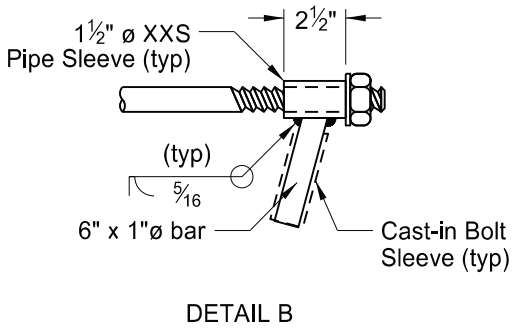
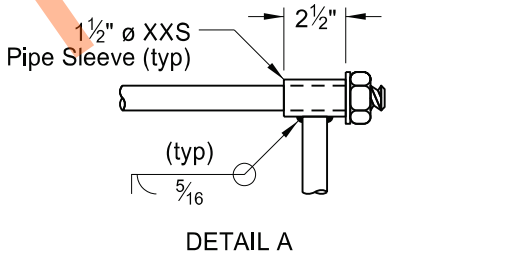
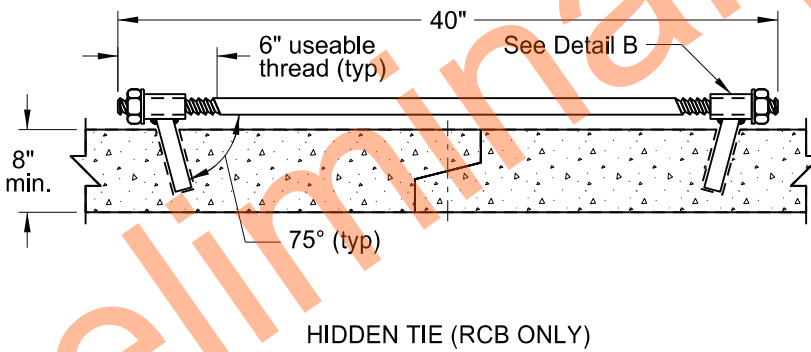
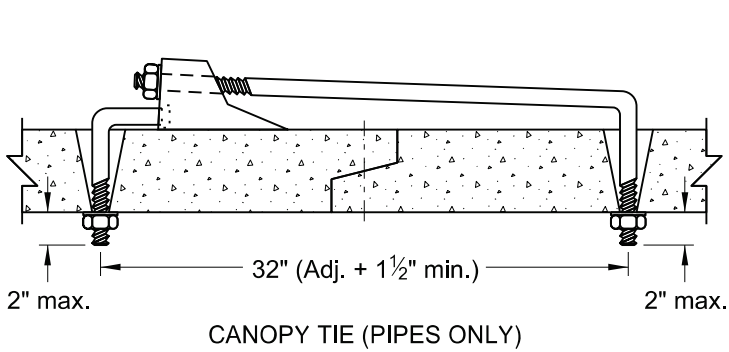
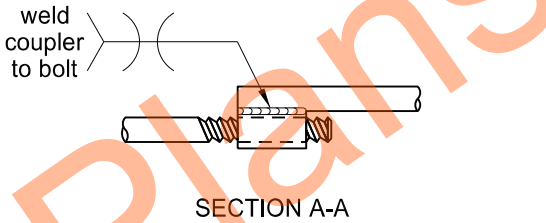
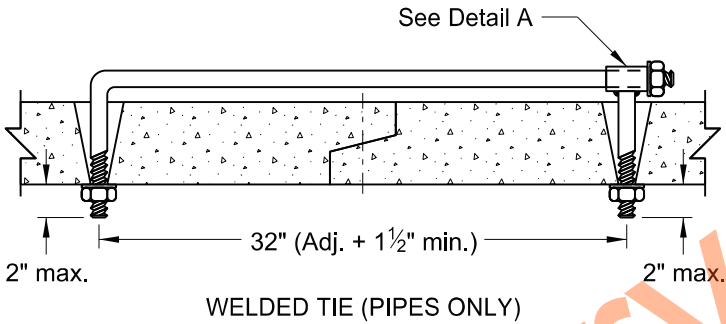
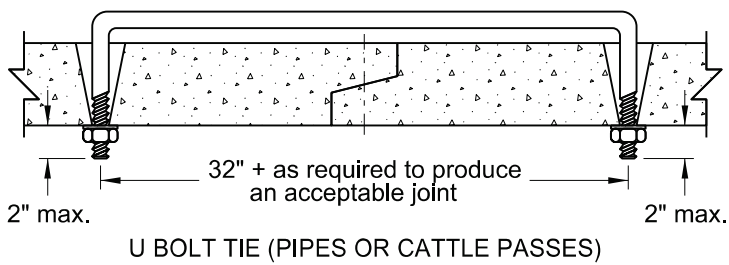
08/31/23

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



REQUIRED SIZE OF TIE BOLTS		
PIPE SIZE	THREAD Ø	XXS PIPE SLEEVE INNER Ø
18" - 24"	5/8"	3/4"
30" - 66"	3/4"	1"
72" - 120"	1"	1 1/4"
RCB/CATTLE PASS	1"	1 1/4"

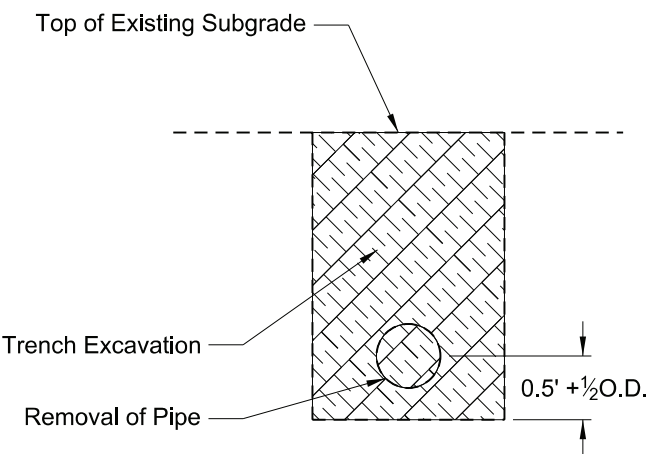
- NOTES:
- The pipe size listed is the inside diameter of round pipe or the equivalent diameter of pipe arch.
 - Insert pipe ties from the inside of the pipes and grout into place for Cattle Pass and Jacked and Bored pipes. Jacked and bored pipes with a diameter of 24" or less do not require pipe ties.
 - 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 will be precast. Tapered holes are permitted. Use holes that have a diameter 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 1/4".
 - Include the cost of precasting 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 all joints including the end sections 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, use Type S2 geotextile fabric and overlap the joint by 12" in both directions. For box culverts, use a waterproof membrane that meets ASTM C990. 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.
 - Provide lock washers or burr threads of concrete box ties after installation and tightening to prevent nut rotation.
 - Tie RCB's as noted in the plans.



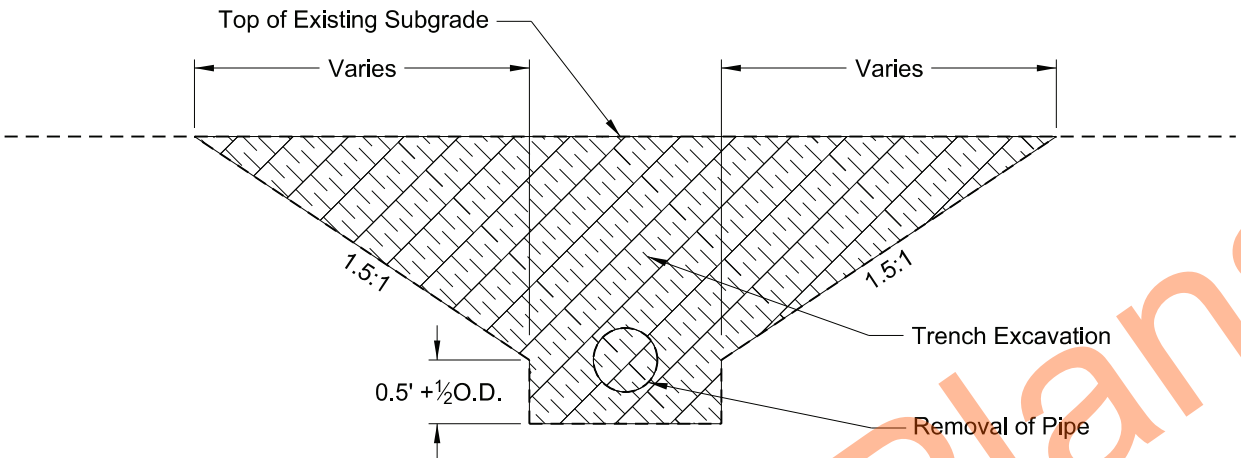
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
3-18-14	
REVISIONS	
DATE	CHANGE
7-21-15	Note 8
6-6-17	Notes 2-11 Table, Title, Labels
8-11-21	Notes 2-12 Table, Label
01-17-25	Notes 9-13 Table, Labels Section A-A, End View



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



EXCAVATION DETAIL A



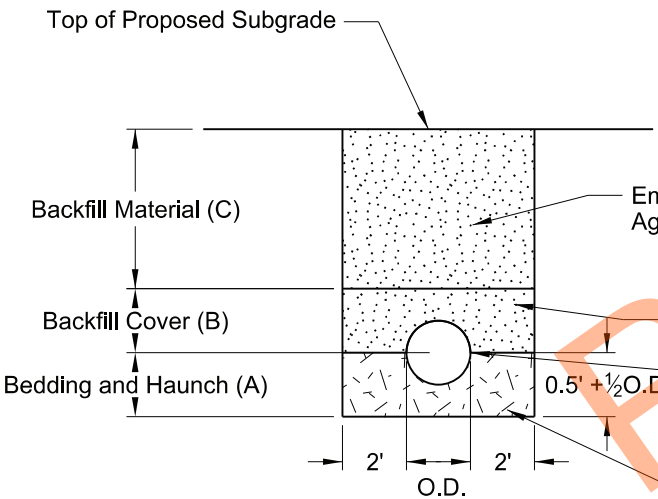
EXCAVATION DETAIL B

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

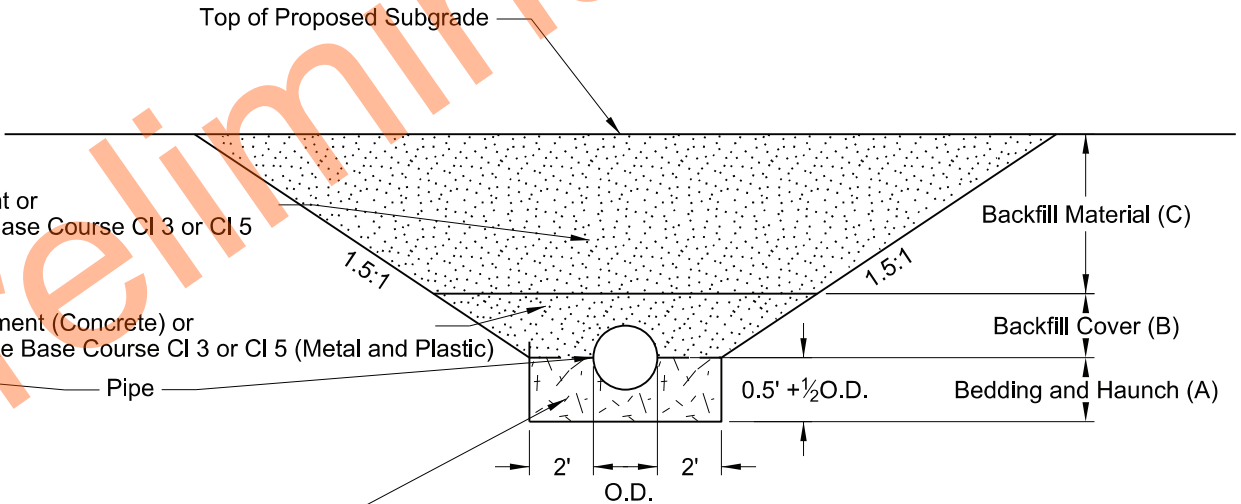
*Included in Pipe Pay Item
1) Pipe
2) Trench excavation
3) Aggregate base course CI 3 or CI 5
4) Embankment

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

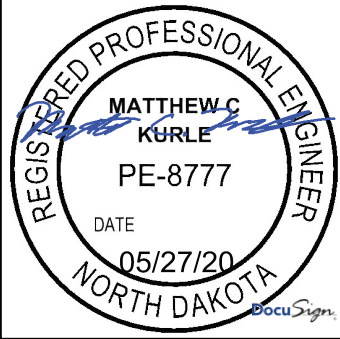


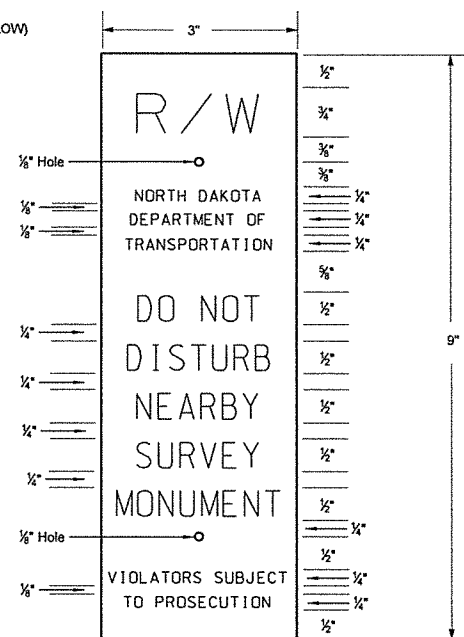
BACKFILL DETAIL A



BACKFILL DETAIL B

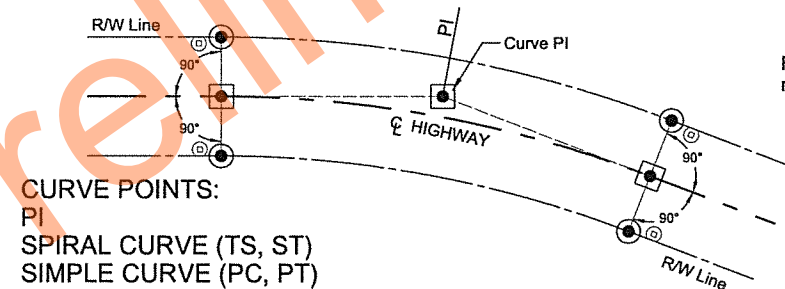
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
7-26-13	
REVISIONS	
DATE	CHANGE
10-15-13	Label Formatting
1-21-15	Nomenclature
12-10-15	Added Plastic Pipe
5-27-20	Changed bedding depth and updated table





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

VARIOUS MONUMENT AND MARKER PLACEMENTS



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

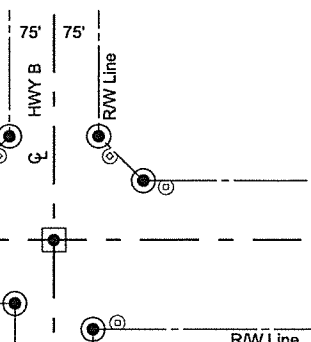


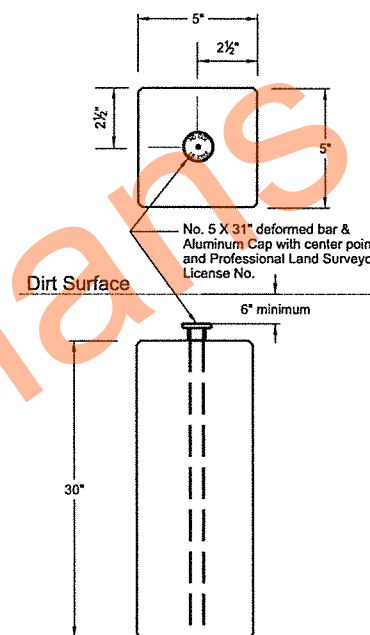
Diagram illustrating the assembly of a monument base and HBP (High Boundary Point) cap:

- Aluminum cap with center point and Professional Land Surveyor's License No.**: The top component, labeled with a height of $2\frac{1}{2}''$.
- Fill cavity with HBP flush to roadway surface or place monument prior to final HBP lift(s).**: The space between the cap and the base.
- Finished Road Surface**: The top horizontal line of the assembly.
- HBP**: The High Boundary Point layer, shown as a shaded area.
- Base**: The bottom layer of the assembly.
- Pre-drill through road surface to achieve a tight fit.**: A vertical line indicating the drilling process.
- No. 5 X 18" reformed bar**: The vertical reinforcement bar, labeled with a height of $18''$.

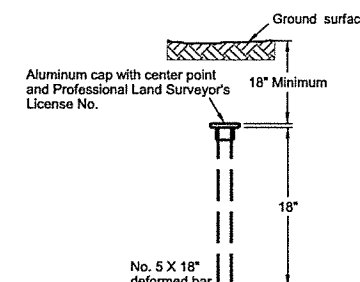
Diagram illustrating the cross-section of a concrete curb with reinforcement details:

- Aluminum cap with center point and Professional Land Surveyor's License No.
- Epoxy rebar and cap into roadway surface.
- Finished Road Surface
- Concrete
- Base
- 18"
- Pre-drill through road surface to achieve a tight fit.
- No. 5 X 18" deformed bar

IRON PIN (Within Finished Roadway Surface)	PRECAST CONCRETE (Outside Finished Roadway Surface) (Inside R/W Limits)
---	---

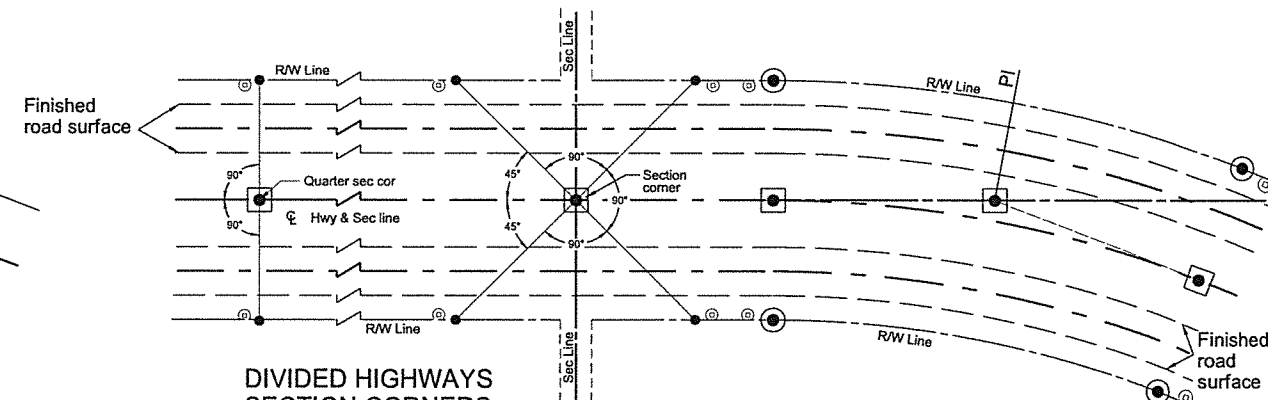


PRECAST CONCRETE
Inside Finished Roadway Surface
(Inside R/W Limits)



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

R/W MARKERS (WITNESS POST) WITHIN DRIVEWAYS: If a single iron Pin R/W or Reference Monument is within a driveway, place right of way marker (witness post) 50 feet back, in stationing, from the Iron Pin Monument along the R/W line. If R/W break is within a driveway, place right of way markers (witness posts) 50 feet back, or ahead from respective Iron Pin R/W Monuments along the R/W lines. Maintain Iron Pin R/W or Reference Monument original position within driveway.



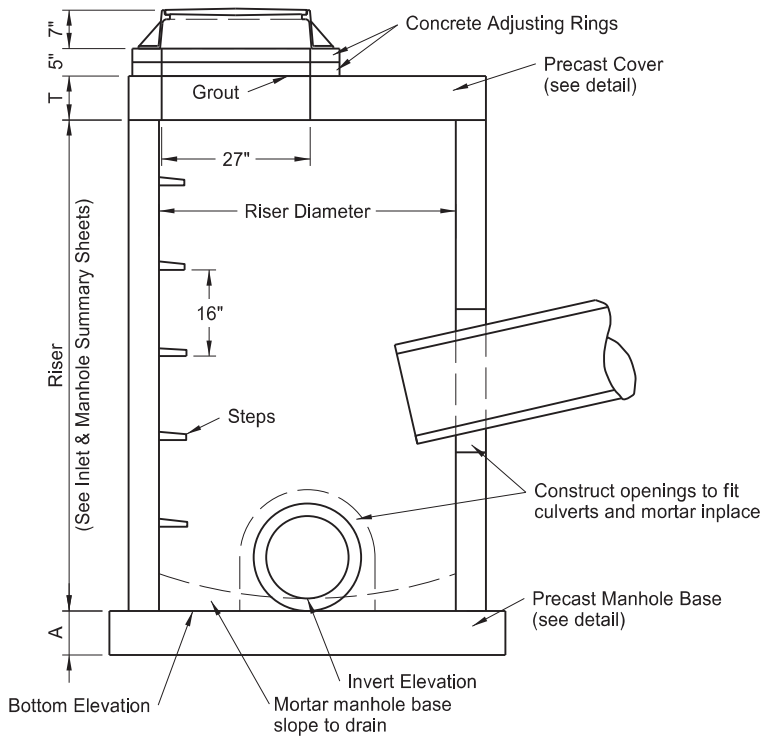
DIVIDED HIGHWAYS SECTION CORNERS QUARTER CORNERS

A circular professional engineer seal for Kirk J. Hoff, North Dakota. The seal contains the text: KIRK J. HOFF, REGISTERED, PROFESSIONAL, PE 4683, 5/27/2019, ENGINEER, and NORTH DAKOTA. There is a handwritten signature across the seal.

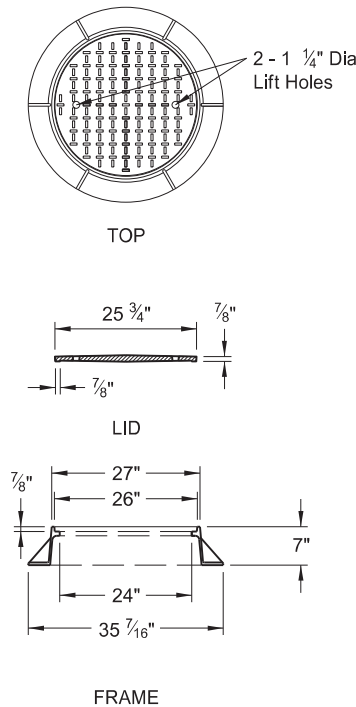
- LEGEND**
- Iron Pin Reference Monument
 - (W) R/W Marker (witness post)
 - Alignment Monument
 - ⦿ Iron Pin R/W Monument

MANHOLE DETAILS

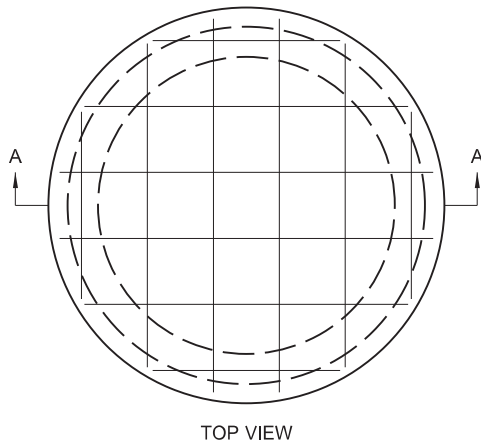
D-722-5



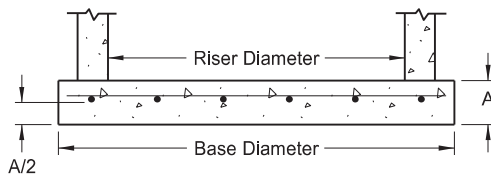
ELEVATION



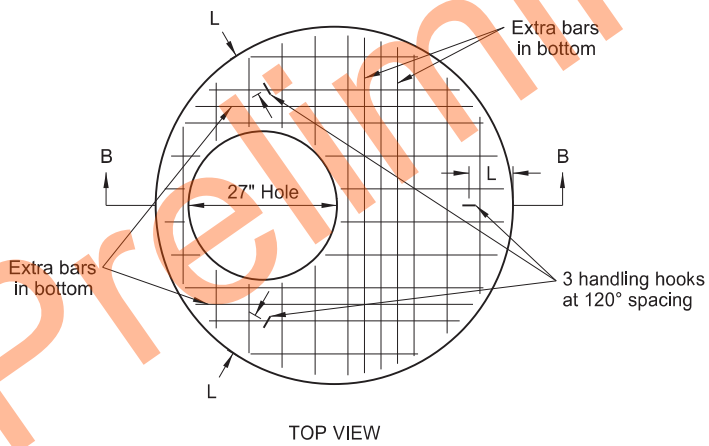
MANHOLE CAST IRON RING & COVER



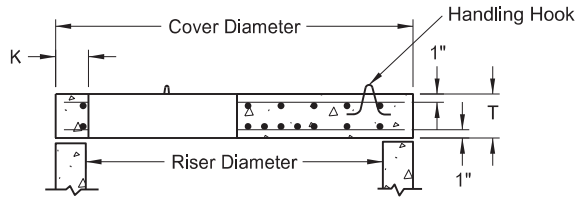
TOP VIEW



SECTION A-A
PRECAST MANHOLE BASE



TOP VIEW



SECTION B-B
PRECAST 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.

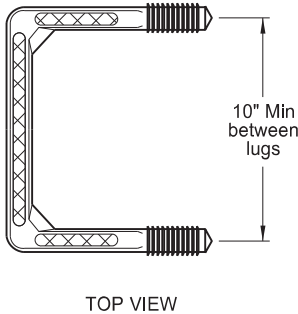
MANHOLE BASES

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"

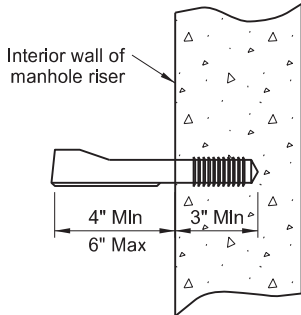
* - Place reinforcement listed in each direction.

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.
11. Pipe shall be installed to extend a minimum of 2 inches beyond the inside face of the structure wall at each end. Payment will be based on the actual installed length of pipe between structures, measured end-to-end and rounded to the nearest whole foot.



TOP VIEW

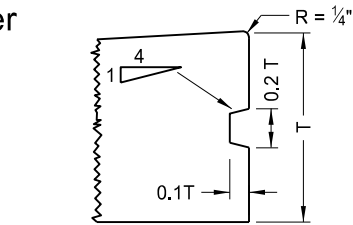
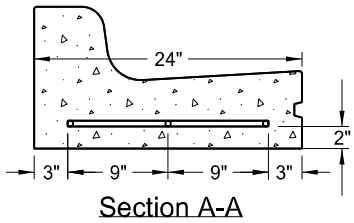
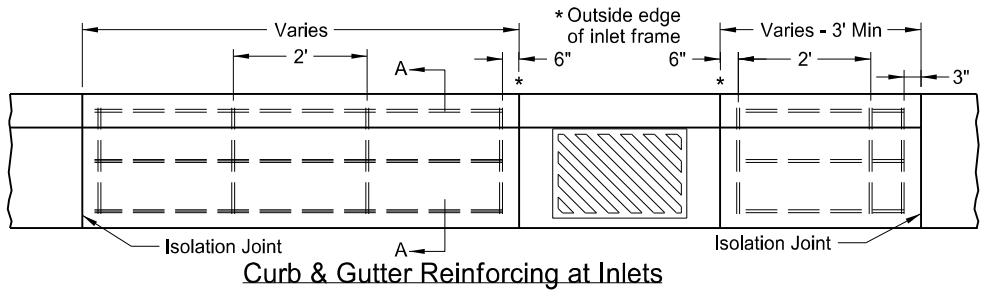


STEP DETAIL

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.
07-24-25	Note Revisions

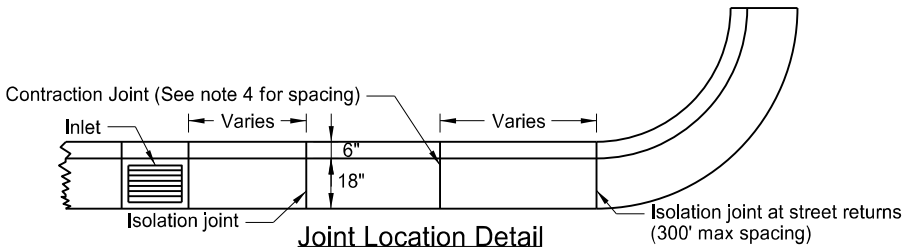


Curb & Gutter and Valley Gutter

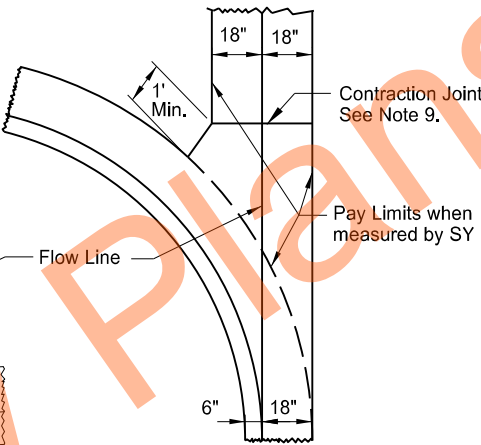


Keyway Detail for Curb & Gutter
(To be used with PCC Pavement and Drives)

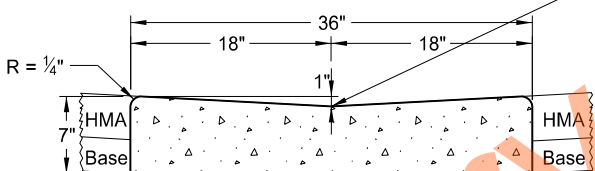
T= Thickness of pavement unless otherwise noted on plans.



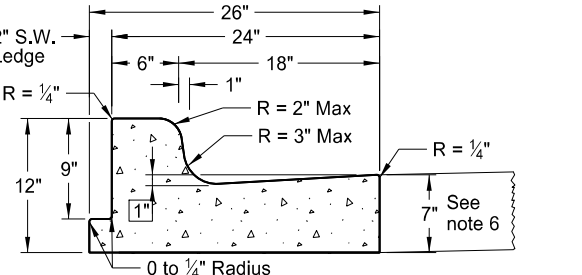
Joint Location Detail



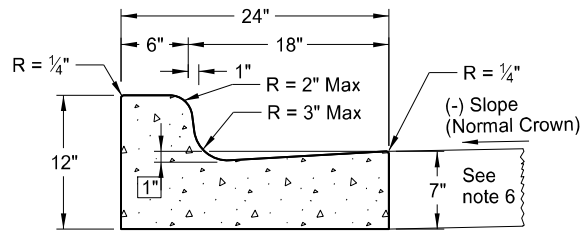
36" Concrete Valley Gutter Plan



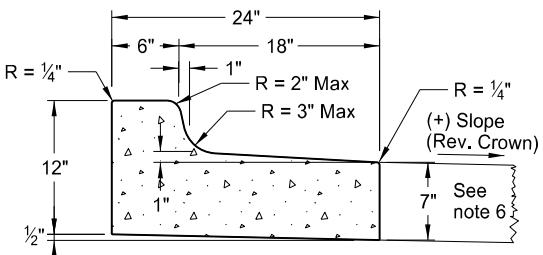
36" Concrete Valley Gutter Detail



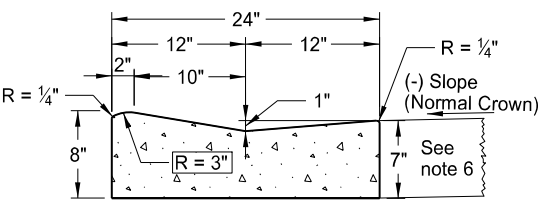
Curb & Gutter Type 1 (Sec. A & B)
Adjacent to Concrete Sidewalk, Median,
or Parking Lot. (Sec. A shown. See
Sec B for additional details.)



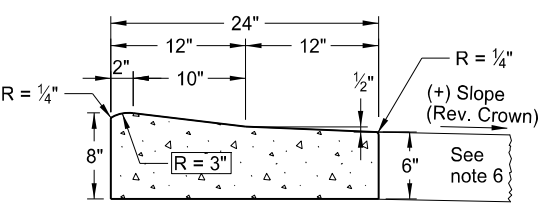
Curb & Gutter Type 1 (Sec. A)



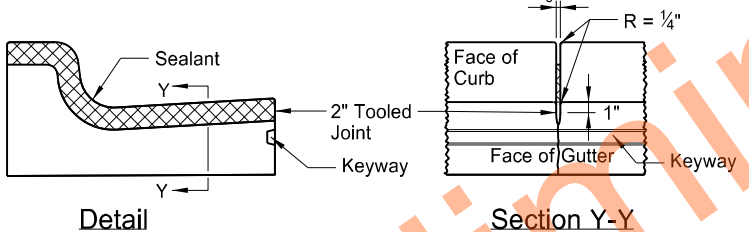
Curb & Gutter Type 1 (Sec. B)



Mountable Curb & Gutter Type 1 (Sec. A)



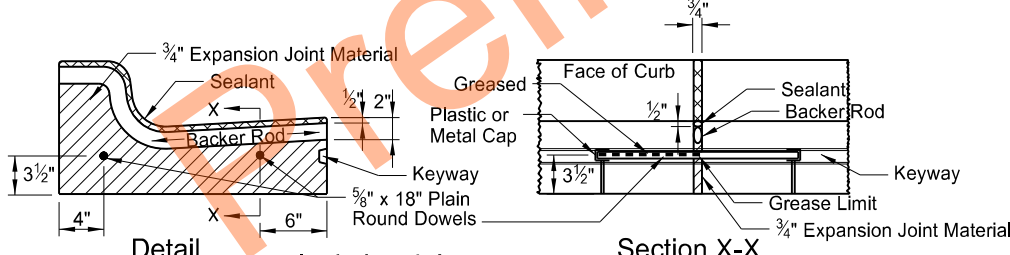
Mountable Curb & Gutter Type 1 (Sec. B)



Detail

Contraction Joint

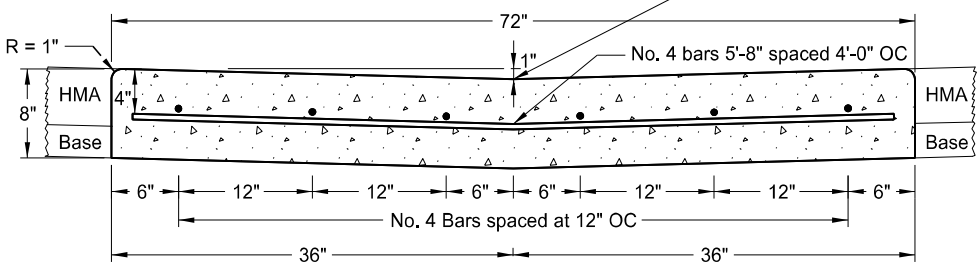
Section Y-Y



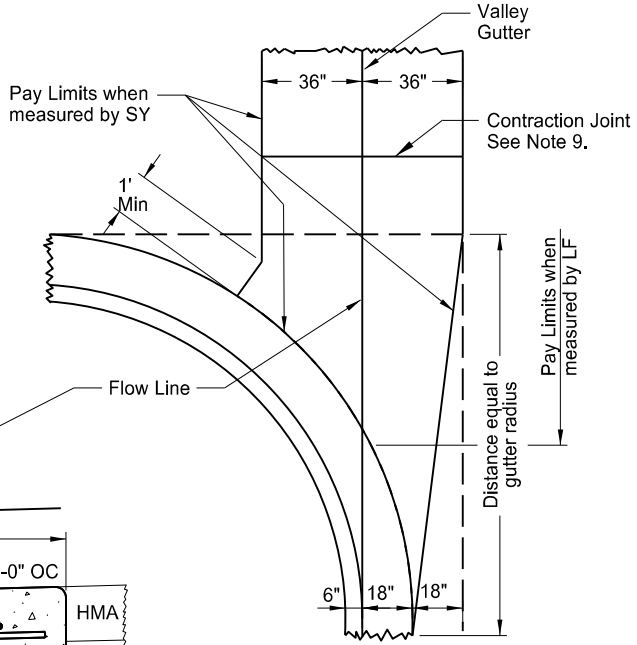
Detail

Isolation Joint

Section X-X



72" Concrete Valley Gutter Detail



72" 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 material for isolation joints. 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 mix asphalt 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: For contraction joint, use joint sealant 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. Curb & Gutter-Pavement Interface: For hot mix asphalt pavement use gutter depth shown. For PCC pavements, either match gutter depth to adjacent pavement depth or construct gutter depth shown.
7. Tie curb and gutter to abutting PCC pavement with No. 4 bars, 2'-0" in length, spaced at 3'-9" centers for 15' joint spacing (maximum spacing of 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) with an 18" plain round 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.
10. Reinforcing at Inlets: Use #4 deformed reinforcing bars without splices. Include all costs for reinforcing bars at inlets (even inlets located on radii) in the price bid for "Curb & Gutter - Type 1" or "Curb & Gutter Mountable - Type 1." Extend reinforcement to the second joint (with rebar placed through the first joint) in cases where the 3' minimum panel length can't be obtained.

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.
10-30-24	Revised bar size & notes.



10/30/24

SIDEWALK

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.

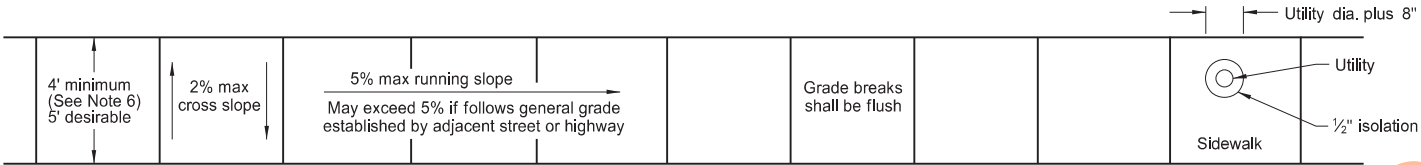
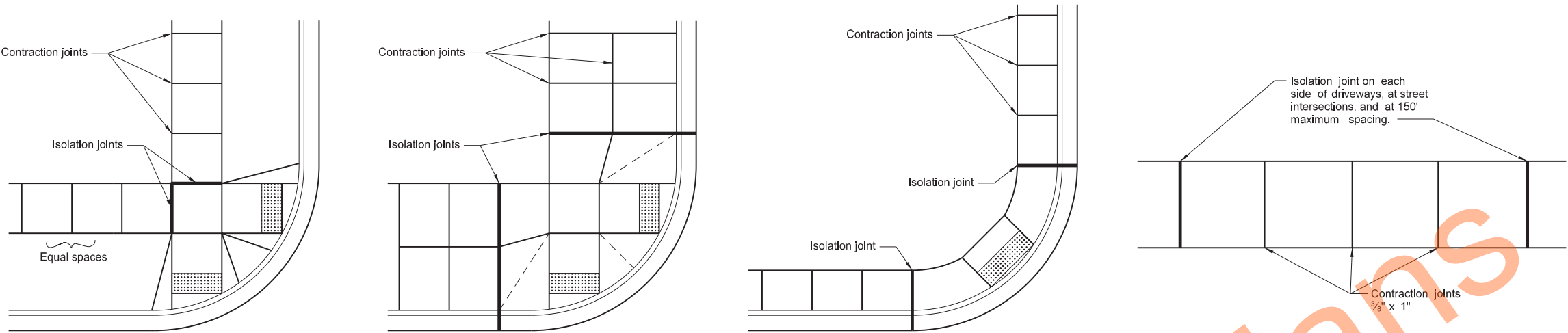
Saw or groove contraction joints to a minimum depth of 1/3 the depth of the concrete.

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

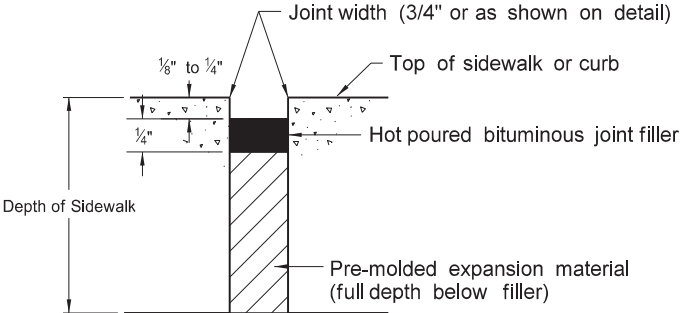
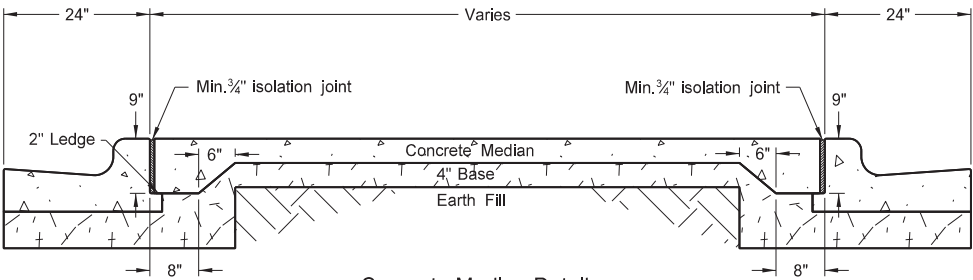
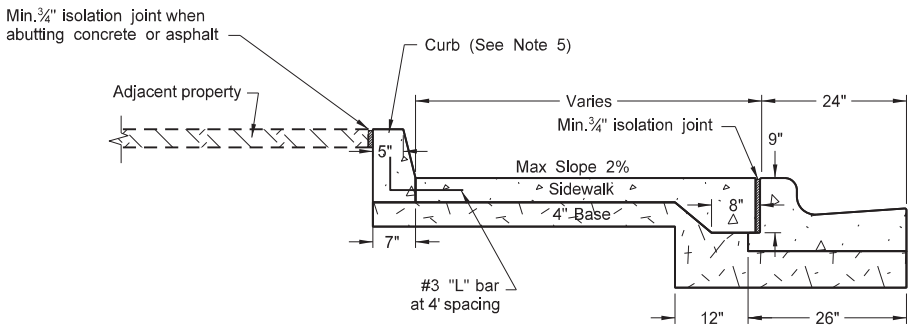
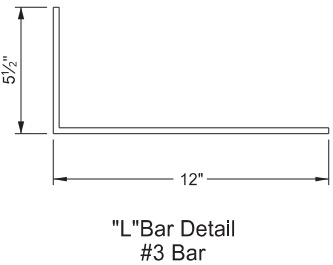
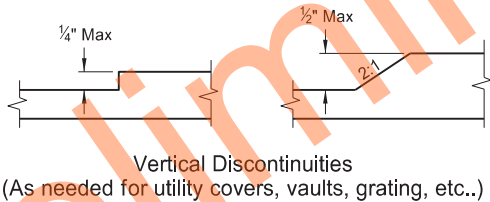
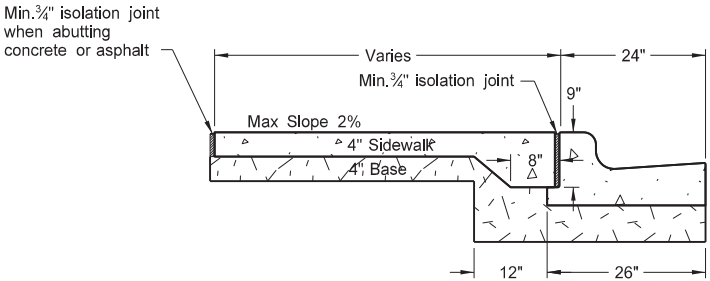
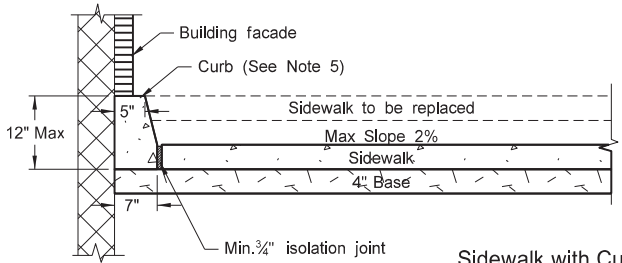
Use isolation joints between separate concrete pours, or between old and new concrete.
3. Include all costs for labor, equipment, and material necessary to construct contraction and isolation joints in the price bid for sidewalk concrete.
4. Use 4" sidewalk concrete thickness unless otherwise specified.
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'.



Utility Blockout



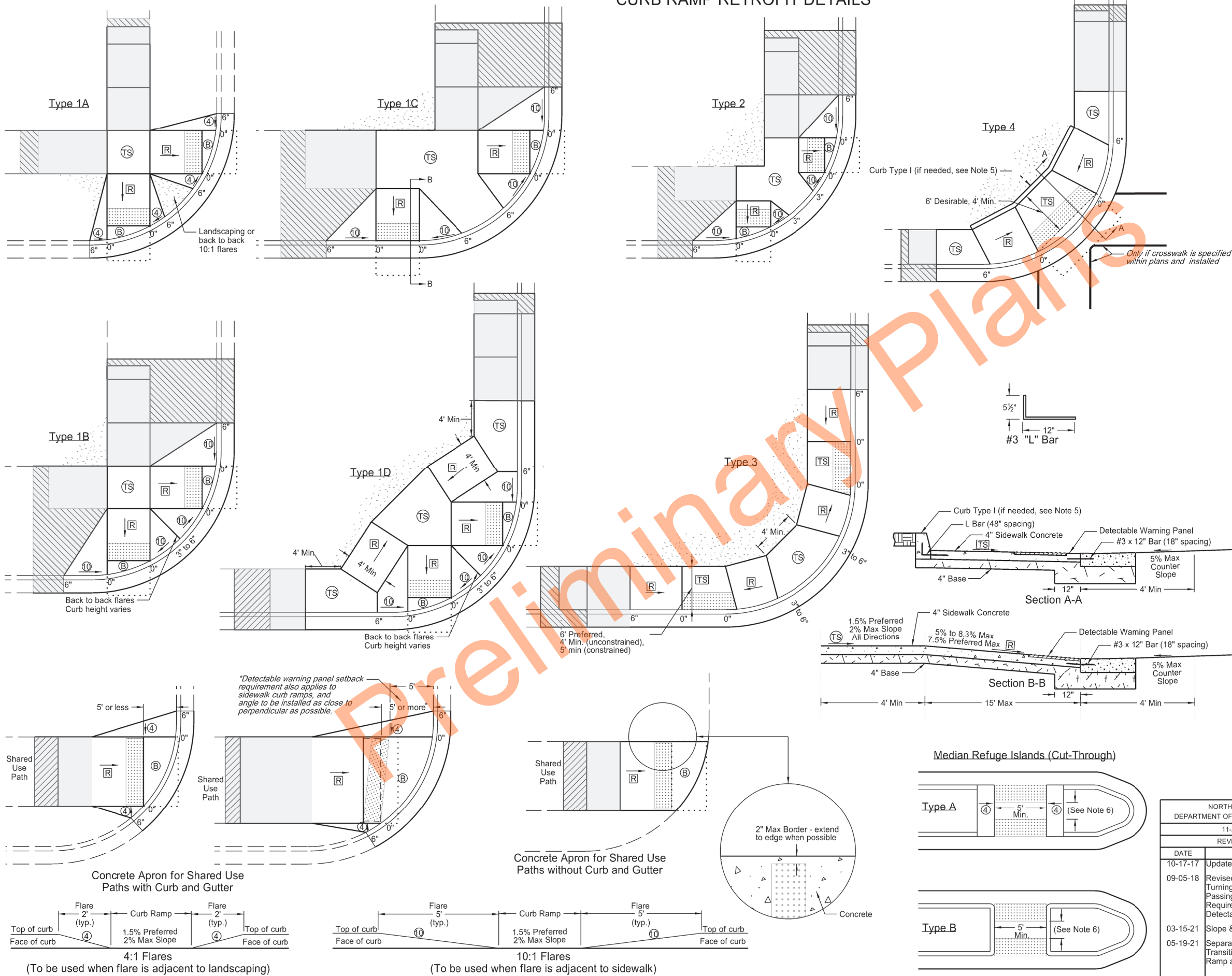
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-26-13	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
09-05-18	Added sidewalk details for width & grade & passing lane requirements.
08-27-19	New Design Engineer PE Stamp.
08-09-24	Electronic Stamp/Signature.



08/09/24

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.

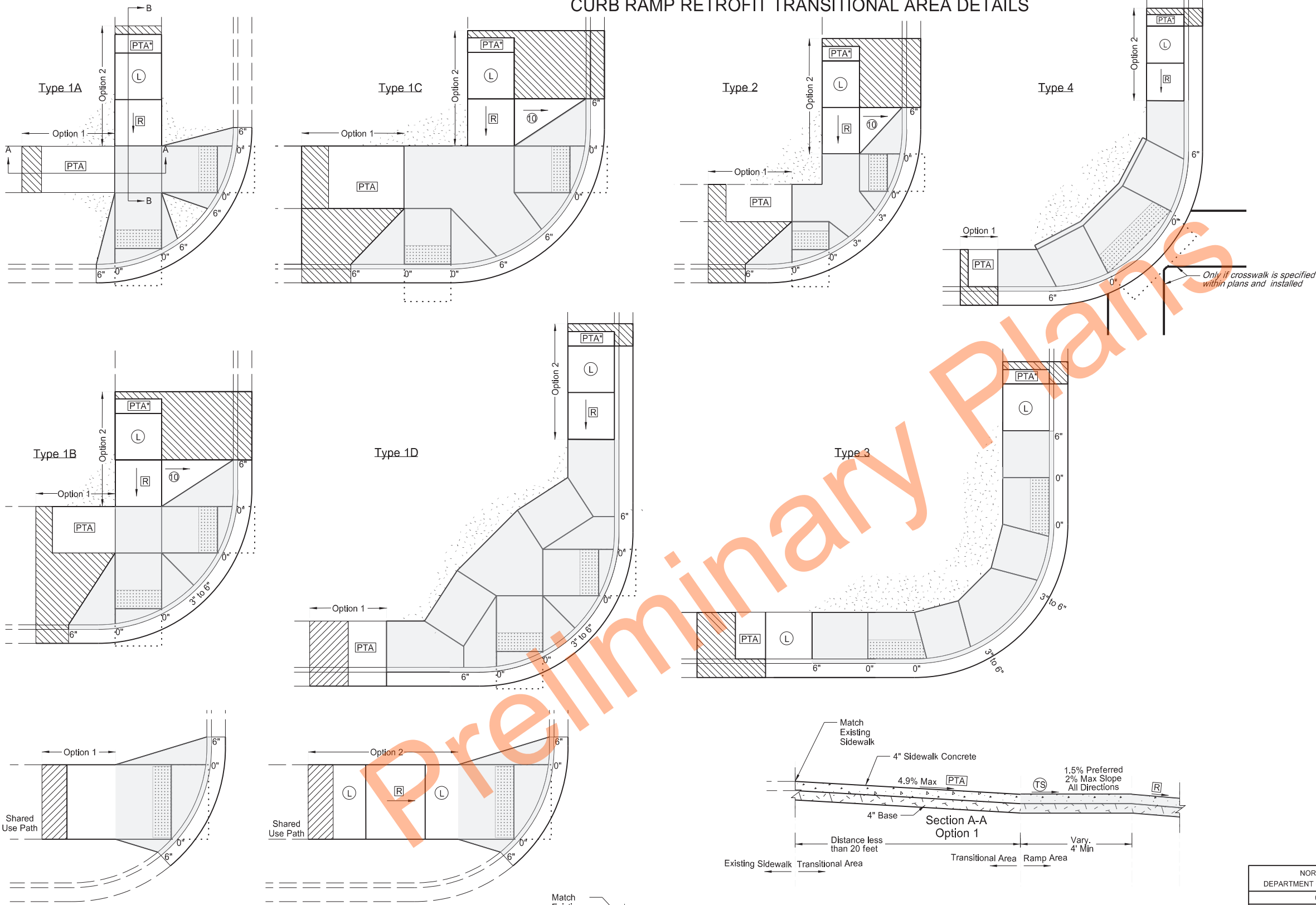
- LEGEND:
- Detectable Warning Panel.
 - Landscaping.
 - Transitional tie-in to nearest joint, if needed.
 - Curb Ramp Retrofit Transitional Area (See Standard Drawing D750-4)
 - 4' long x width of EPF or 4' minimum Clear space outside traffic lanes of travel. 1.5% preferred cross slope 2% maximum cross 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.

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

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

CURB RAMP RETROFIT TRANSITIONAL AREA DETAILS

D-750-4



Transition Areas for Shared Use Paths

- NOTES:
- 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.
 - 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.
 - 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).
 - Transitional Areas for Shared Use Paths can be concrete or asphalt.
 - See Curb Ramp Retrofit Details Standard D-750-3 for additional information.

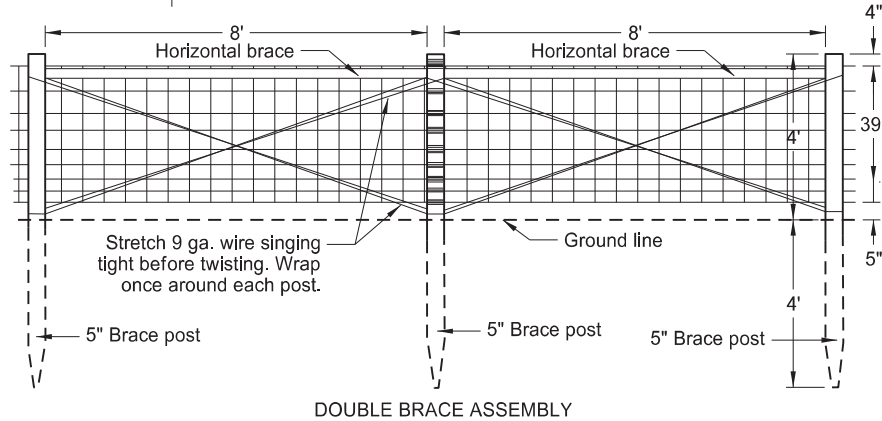
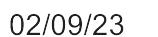
- LEGEND:
- Detectable Warning Panel.
 - Landscaping.
 - Transitional tie-in to nearest joint, if needed.
 - Curb Ramp Retrofit Area (See Standard Drawing D750-3)
 - 4' long x width of EPF or 4' minimum Clear space outside traffic lanes of travel.
1.5% preferred cross slope
2% maximum cross slope
4.7% 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.

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

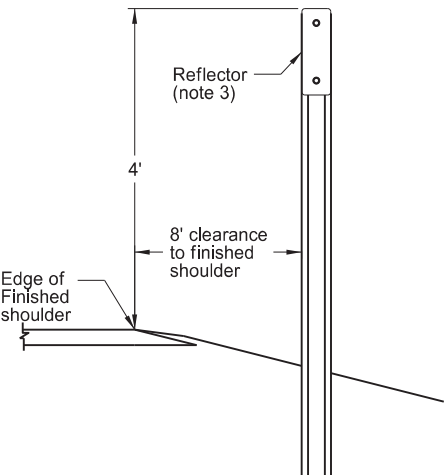


05 19 2021

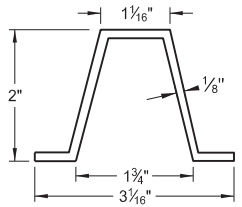
D-752-3



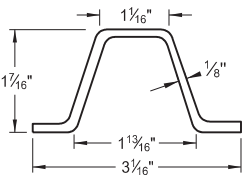
REFLECTORIZED DELINEATORS - TWO-LANE TWO-WAY HIGHWAY



Installation
(Type A and C)



Aluminum Post Detail
Approx. 0.88 lbs/ft



Steel Post Detail
Approx. 2.0 lbs/ft

Delineator Details

Type A and C

Installation: Install posts along the right shoulder line, in the direction of travel, unless shown otherwise on the plans.

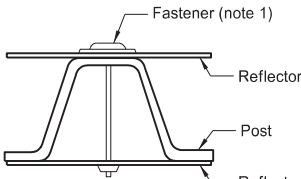
Reflectors: Use reflector of the same color as the adjacent pavement marking with a 0.080 inch minimum thickness sign backing material.

(1) Use fasteners that are a minimum 1/4" diameter. Use double headed rivet or other non-rust vandal resistant fastener.

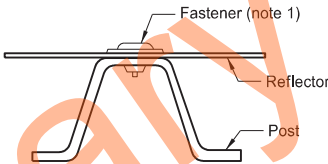
(2) Drill only those holes required to attach the number of reflectors on that post, or drill all the posts the same so that any number of reflectors may be added.

(3) Mount reflector facing traffic at an angle of 90° away from oncoming traffic.

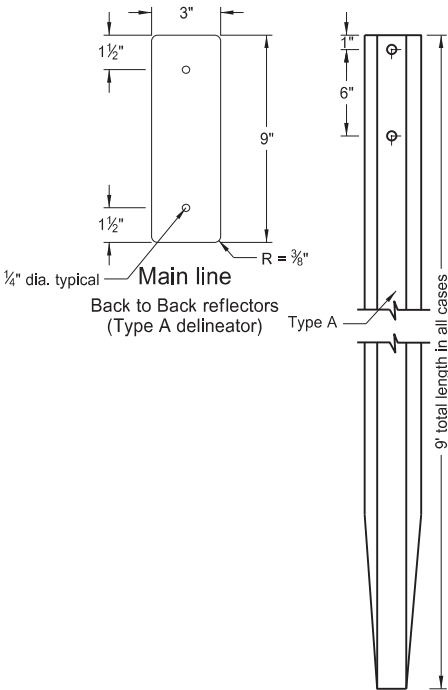
(4) Include all costs for materials, labor, and equipment to install double sided type A delineators in the unit price bid for "Delineators-Type A-Double Sided." Include all costs for materials, labor, and equipment to install type C delineators in the unit price bid for "Delineators-Type C."



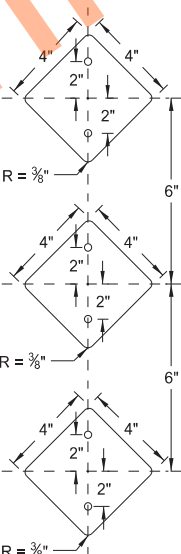
Delineators-Type A-Double Sided Attachment Detail



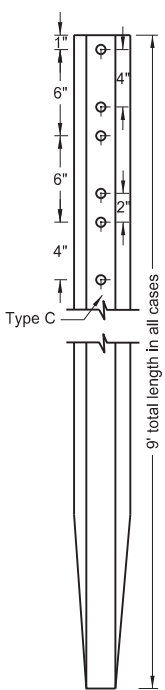
Delineators-Type C Attachment Detail



U-type Post
(Delineators-Type A-Double Sided)



Narrow Bridges
Three reflectors
(Type C delineator)



U-type Post
(Delineators-Type C)

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12/16/22	
REVISIONS	
DATE	CHANGE



12/16/22

TYPE A REFLECTORIZED DELINEATOR SPACING - TWO-LANE TWO-WAY HIGHWAY

D-754-21C

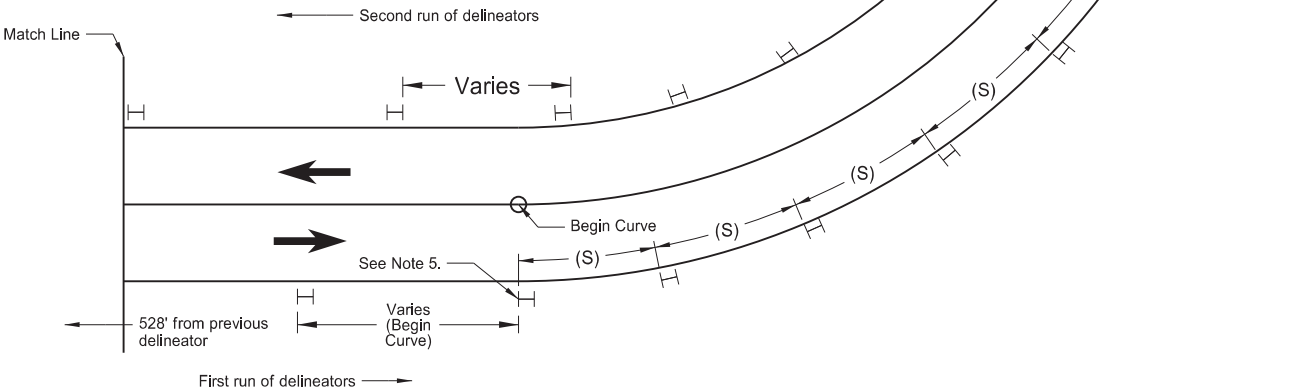
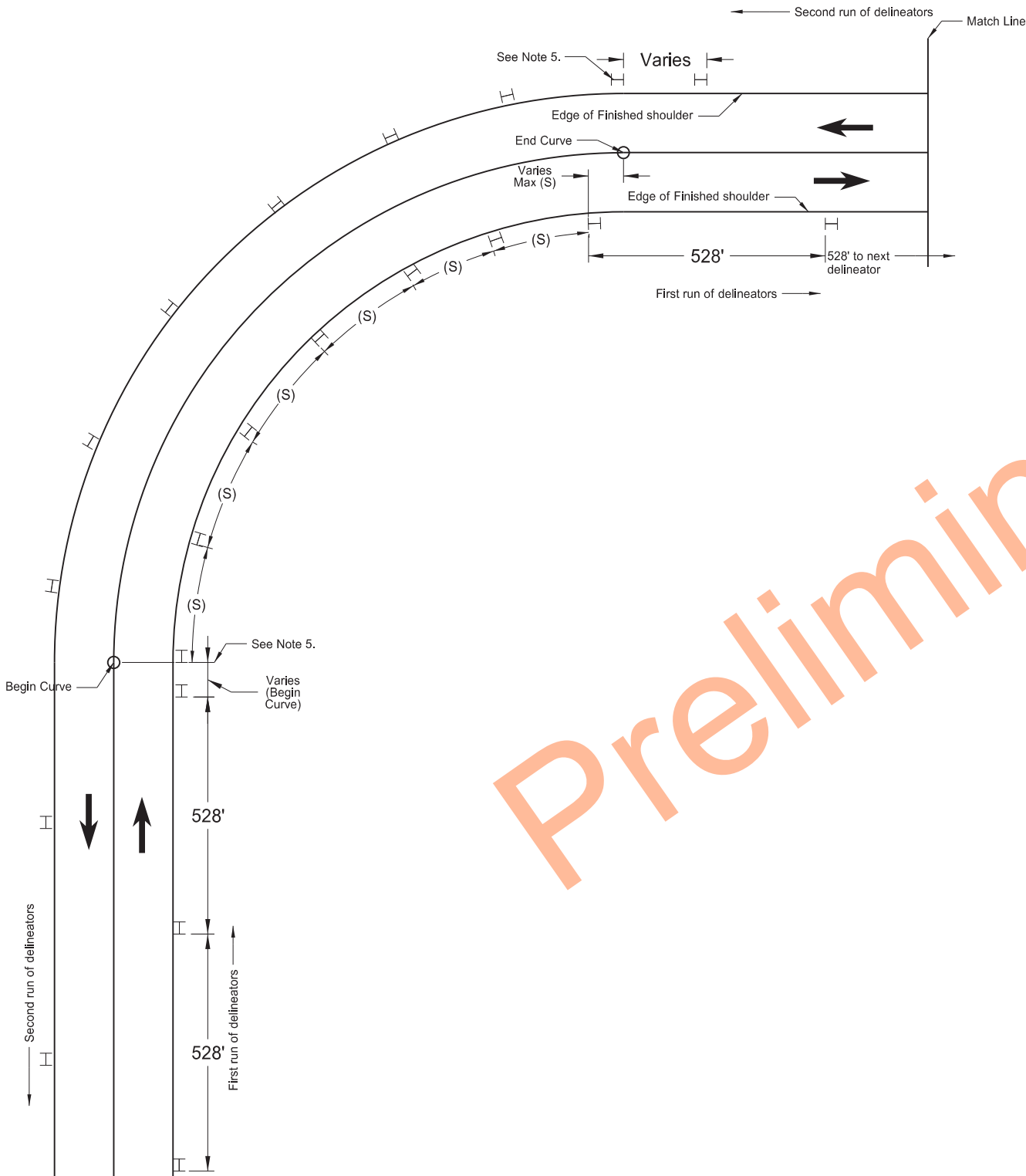
Spacing:

Curve Radius	Spacing (S) on Center
$R > 11,500'$	528'
$11,500' \geq R > 1,200'$	264'
$1,200' \geq R$	See table below

Radius (R) of Curve	Approx. Spacing (S) on Curve
$1,200' \geq R > 1,000'$	90'
$1,000' \geq R > 800'$	80'
$800' \geq R > 500'$	65'
$500' \geq R > 300'$	50'
$300' \geq R > 180'$	35'
$180' \geq R > 50'$	20'

Notes:

- Do not place delineators within 100' of a railroad crossing. Shift delineators in either direction to minimize impact to uniform spacing. Reestablish uniform spacing based on the last delineator location.
- For delineators that land within approaches, shift delineators in either direction a distance not exceeding $\frac{1}{4}$ of the uniform spacing. Eliminate delineators that still fall within approaches.
- Eliminate delineators landing within guardrail. Reestablish uniform spacing based on last delineator.
- Do not place delineators within $\frac{1}{4}$ of the uniform spacing of a reference point marker. Adjust the delineators on the opposite side to maintain an even spacing between opposing sides.
- Install Type A delineators at the start of each curve in the adjacent lane's direction of travel.
- Place the second run of delineators on the opposite side of the road midpoint between delineators placed during the first run.
- Discontinue delineators on outside of curve where chevrons exist. Place delineators on inside of curve, at those locations, as provided on basis of estimate.



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-16-22	
REVISIONS	
DATE	CHANGE



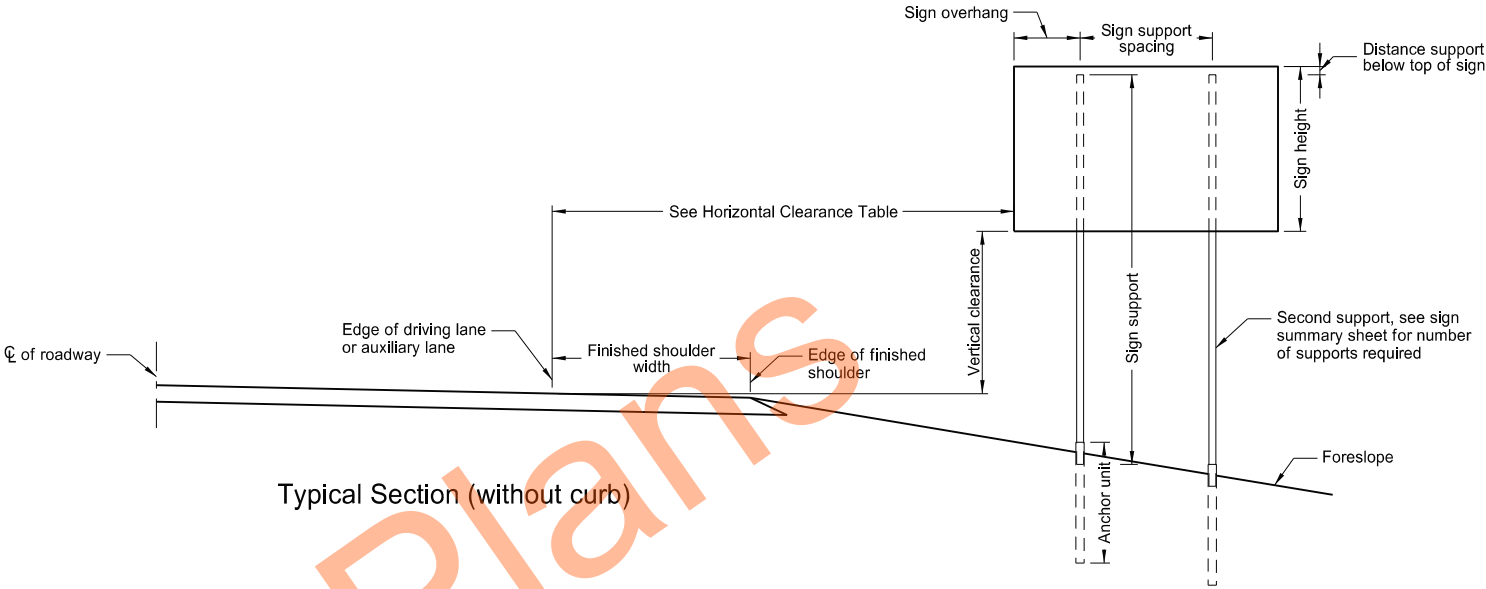
12/16/22

PERFORATED TUBE ASSEMBLY DETAILS

D-754-23

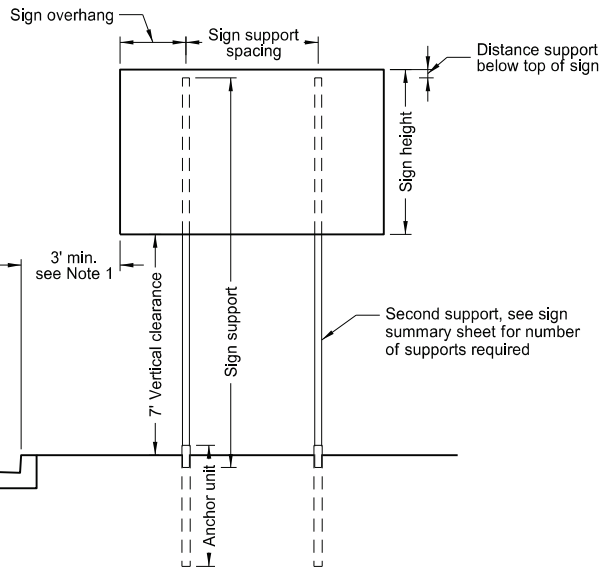
Notes:

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'.

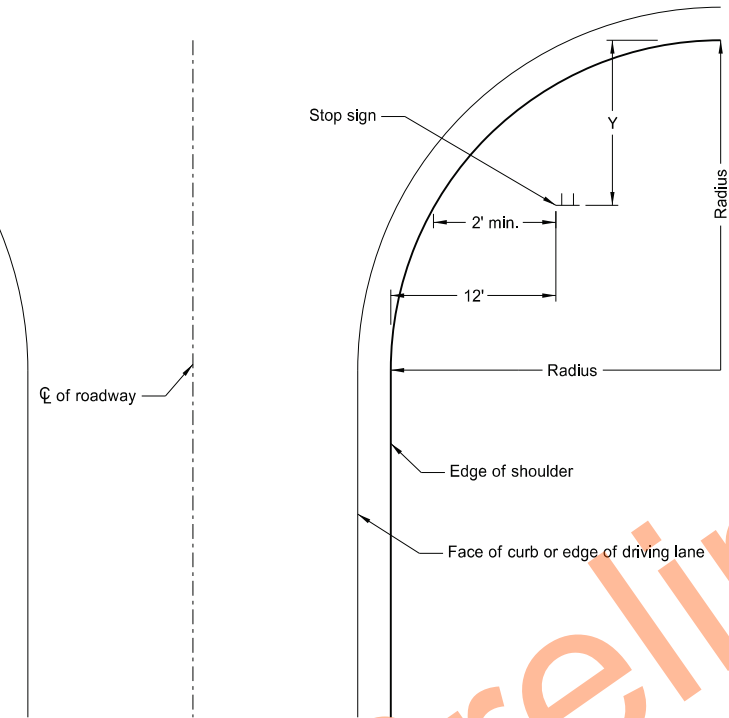


Typical Section (without curb)

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

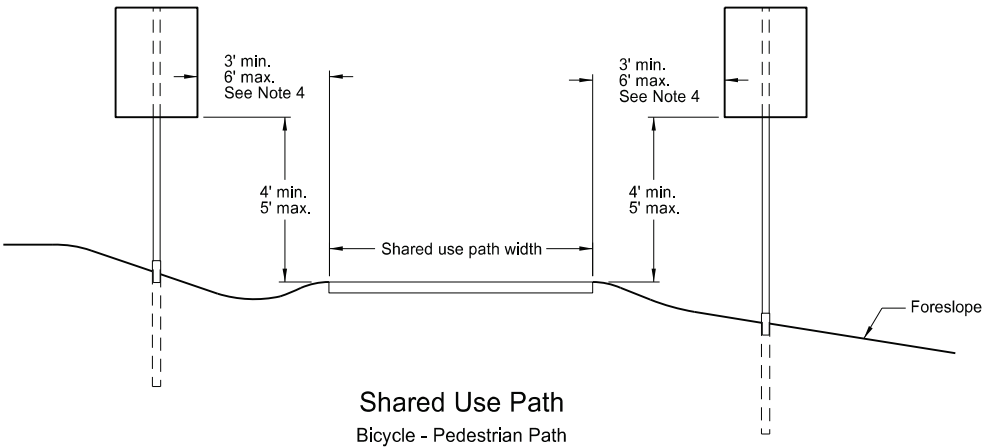


Typical Section (with curb)
Residential or Business District



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



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.
8-05-24	Electronic Stamp/Signature.



08/05/24

Breakaway Coupler System
for Perforated Tubes

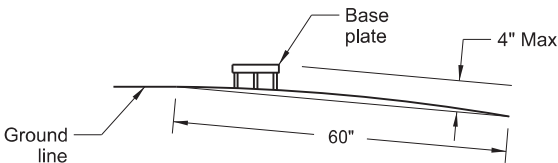
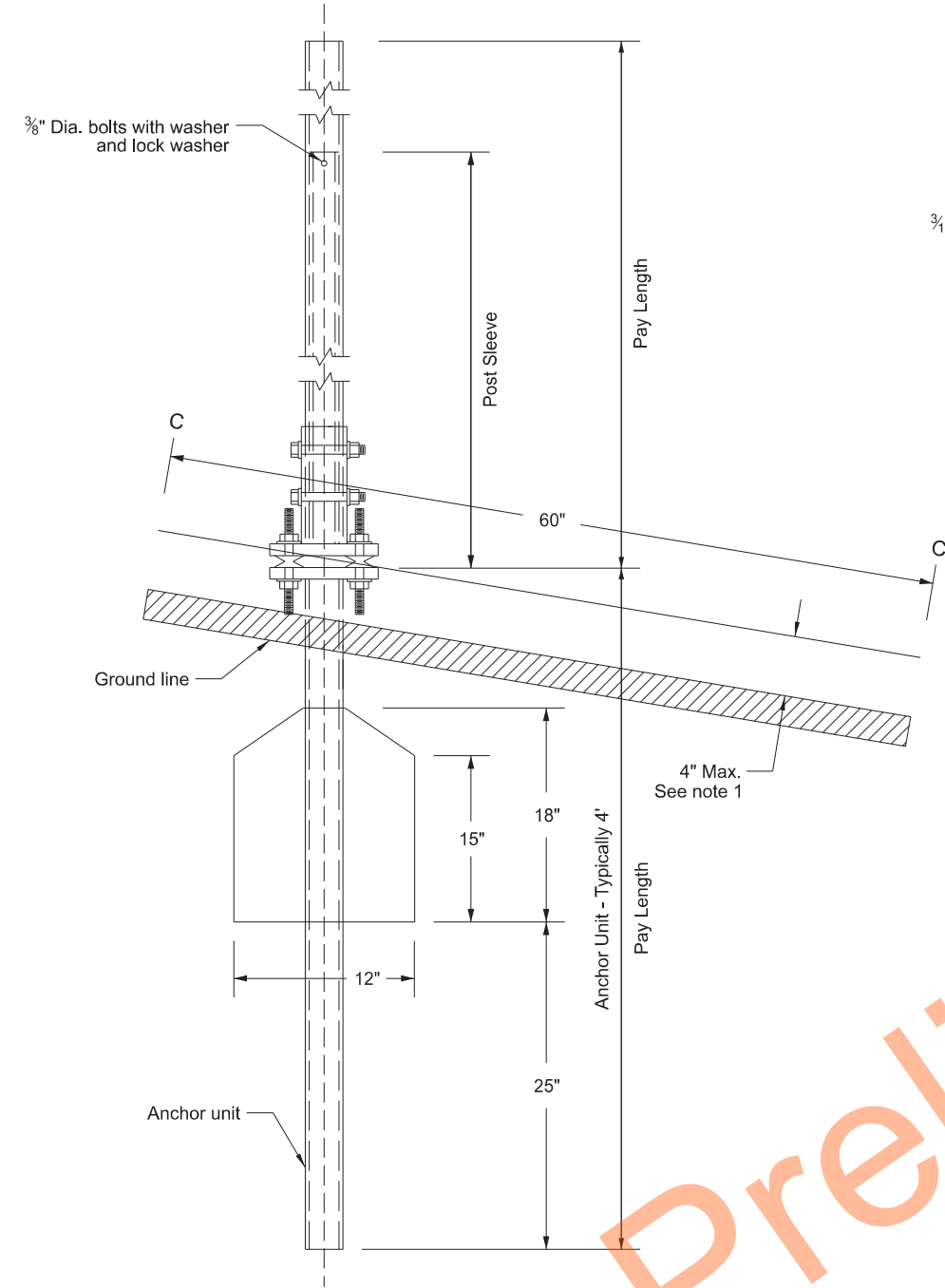
Notes:

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.

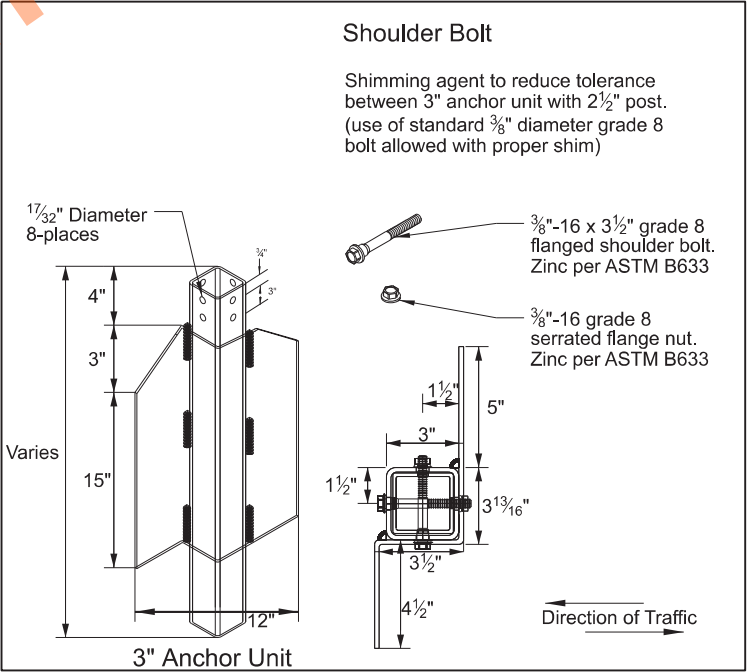
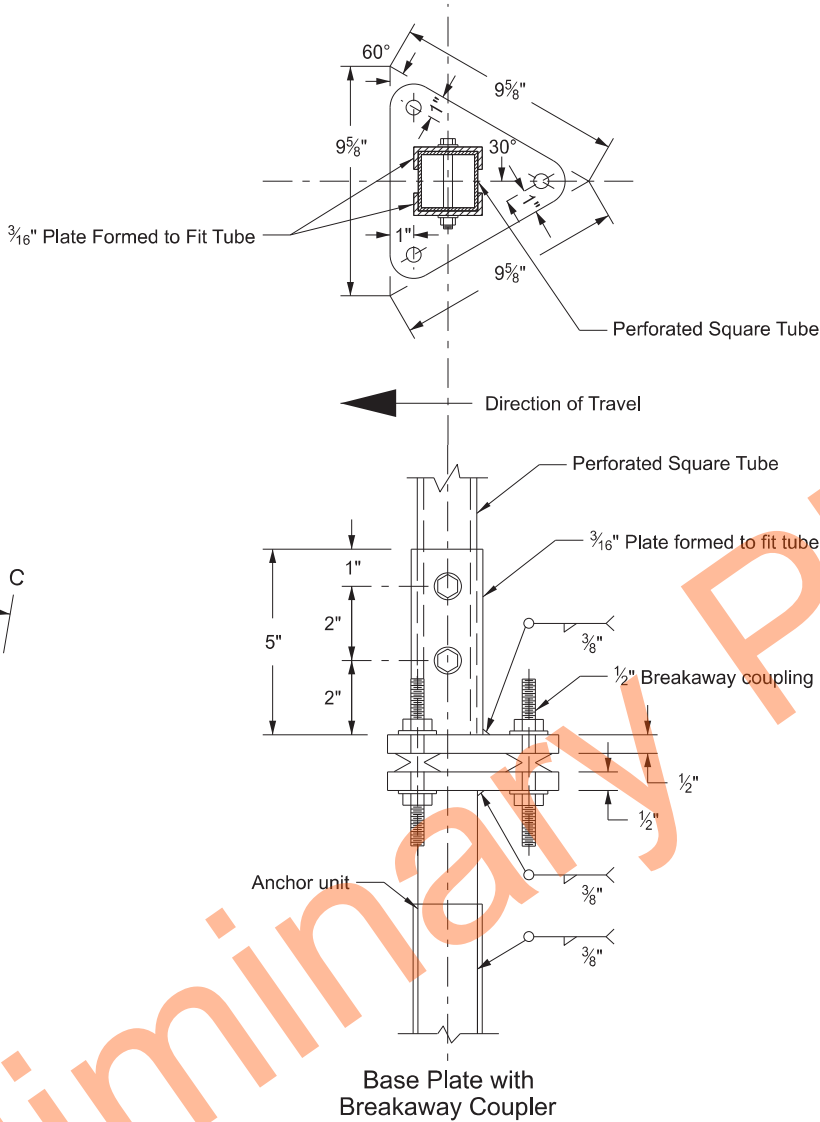
Number of Posts	Telescoping Perforated Tube						
	Post Size In.	Wall Thick-ness Gauge	Sleeve Size In.	Wall Thick-ness Gauge	Slip Base	Anchor Size Without Slip Base In.	Anchor Wall Thickness Gauge
1	2	12			No	2¼	12
1	2¼	12			No	2½	12
1	2½	12			(B)	3(C)	7
1	2½	10			Yes		7
1	2¼	12	2	12	Yes		7
1	2½	12	2¼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

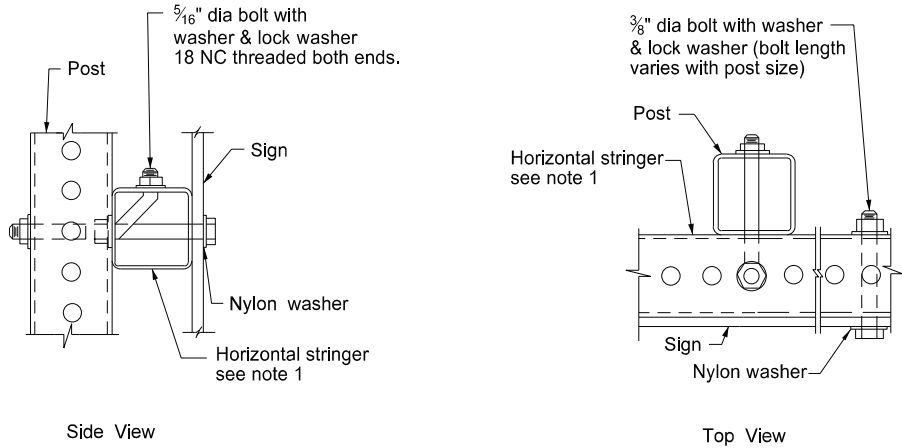


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-2013	
REVISIONS	
DATE	CHANGE
08-30-18	Updated notes to active voice.
08-30-19	New Design Engr PE Stamp.
08-05-24	Electronic Stamp/Signature.
07-22-25	Corrected "typo" in C-C note.

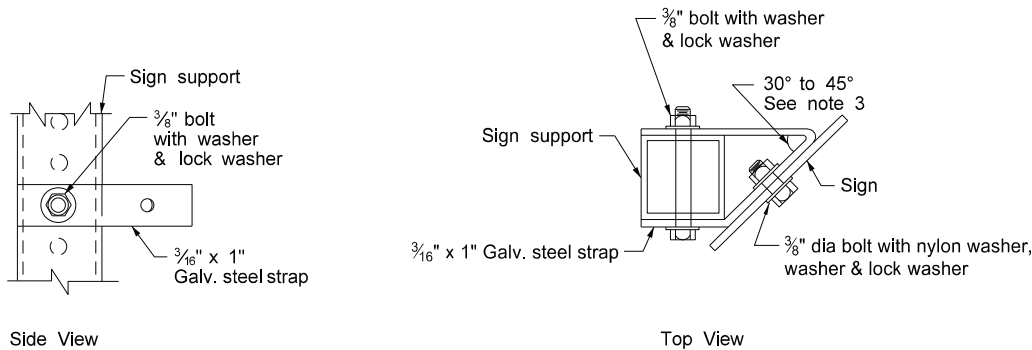


07/22/25

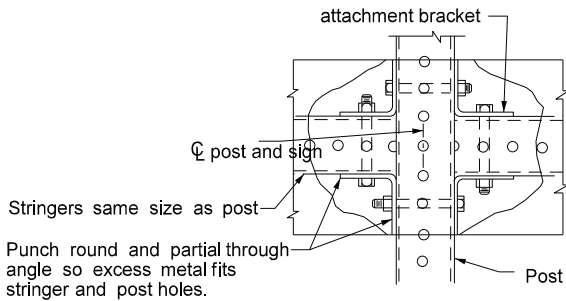
Mounting Details Perforated Tube



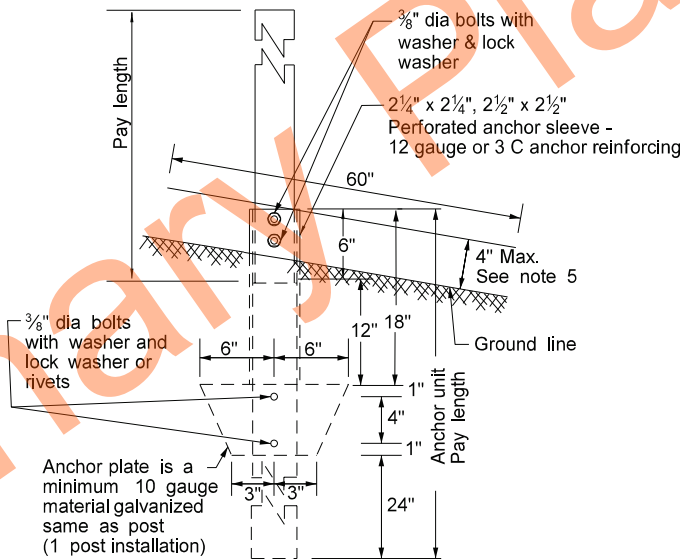
STRINGER MOUNTING
(WITH STRINGER IN FRONT OF POST)



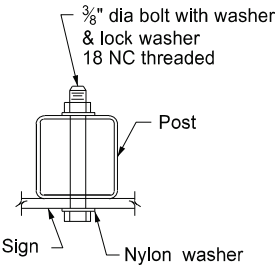
STRAP DETAIL



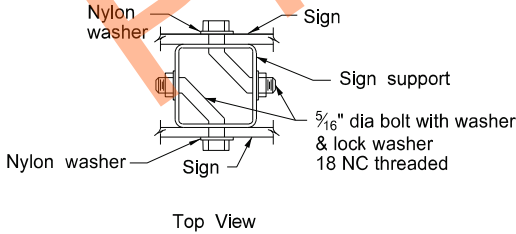
STREET NAME SIGNS AND ONE WAY SIGNS
SINGLE POST ASSEMBLY
ONE STRINGER OR BACK TO BACK MOUNTING



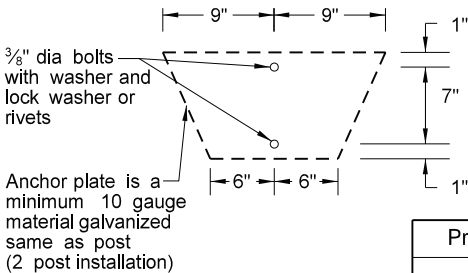
ANCHOR UNIT AND POST ASSEMBLY



BOLT MOUNTING



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	
1 1/2 x 1 1/2	0.105	12	1.702	0.129	0.380	0.172	
2 x 2	0.105	12	2.416	0.372	0.590	0.372	
2 1/4 x 2 1/4	0.105	12	2.773	0.561	0.695	0.499	
2 3/16 x 2 3/16	0.135	10	3.432	0.605	0.841	0.590	
2 1/2 x 2 1/2	0.105	12	3.141	0.804	0.803	0.643	
2 1/2 x 2 1/2	0.135	10	4.006	0.979	1.010	0.783	

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

Note:

- Horizontal stringers - Use perforated tubes or 1 3/4" x 3/16" thick, 1.08 lbs./ft aluminum or 3.16 lbs./ft steel z bar stringers.
- Use minimum outside diameter 15/16" ± 1/16" and 10 gauge thick metal washers on sign face.
- 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.
- 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.
- 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.

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 Thick-ness Gauge
1	2	12			No	2 1/4	12
1	2 1/4	12			No	2 1/2	12
1	2 1/2	12			(B)	3(C)	7
1	2 1/2	10			Yes		7
1	2 1/4	12	2 1/2(D)	12	Yes		7
1	2 1/2	12	2 1/4	12	Yes		7
2	2 1/2	10			Yes		7
2	2 1/4	12	2 1/2(D)	12	Yes		7
2	2 1/2	12	2 1/4	12	Yes		7
3 & 4	2 1/2	12			Yes		7
3 & 4	2 1/2	10			Yes		7
3 & 4	2 1/2	12	2 1/4	12	Yes		7
3 & 4	2 1/4	12	2 1/2(D)	12	Yes		7
3 & 4	2 1/2	10	2 3/16	10	Yes		7

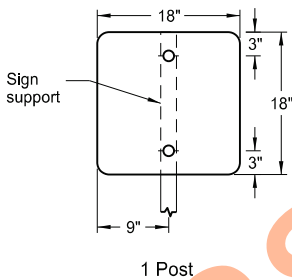
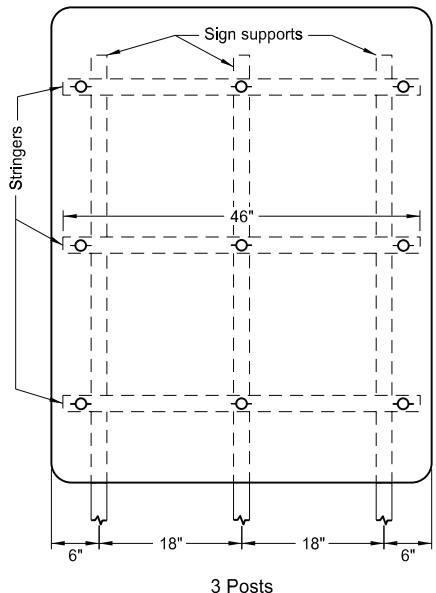
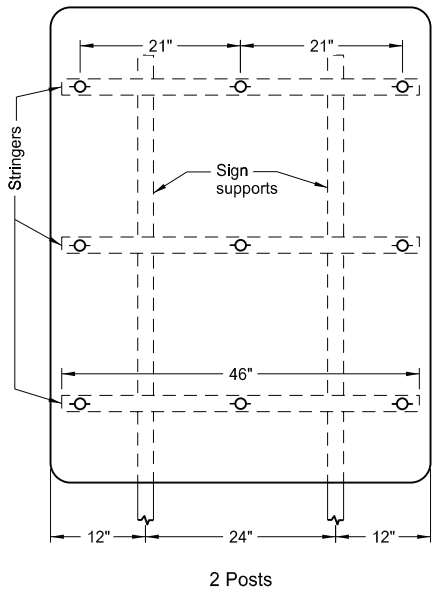
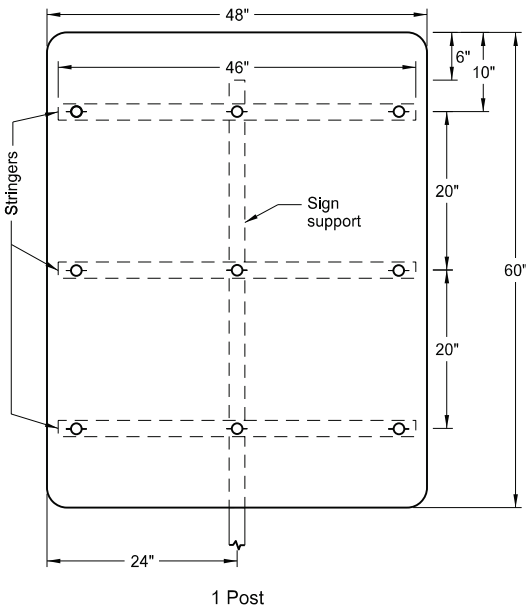
(B) - When placing 2 1/2", 12 gauge posts in standard soils without breakaway bases, provide a shim as specified by the manufacturer. Provide breakaway base when placing the support in weak soils. Engineer will determine if soils are weak. Weak soils are classified as boggy, wet, or loose soil areas.
(C) - 3" anchor unit
(D) - 2 1/2" x 12 ga. x 18" minimum length external sleeve required.

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.
8-05-24	Electronic Stamp/Signature.

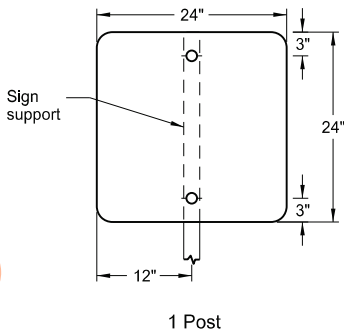


08/05/24

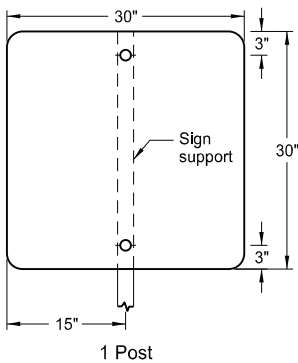
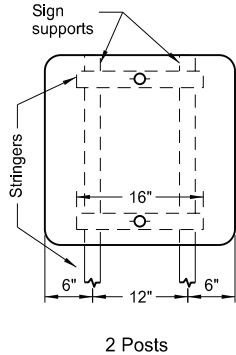
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION
DETAILS REGULATORY, WARNING AND GUIDE SIGNS



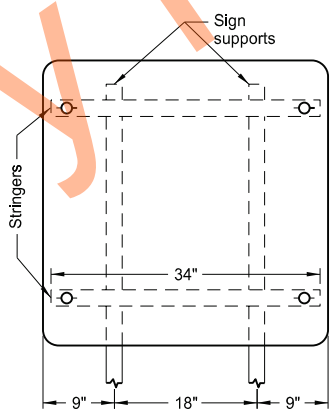
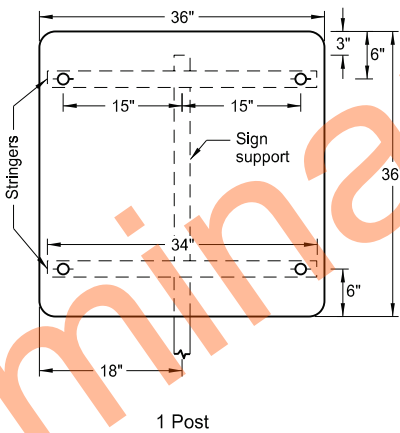
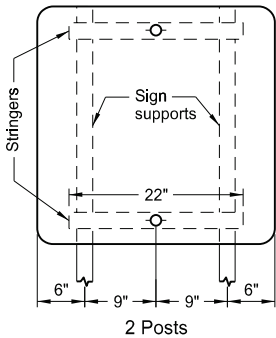
Assembly No. 13



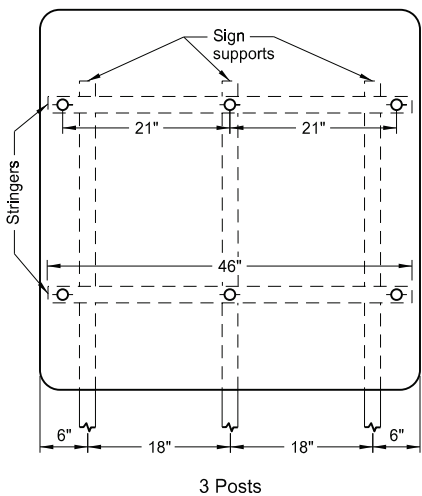
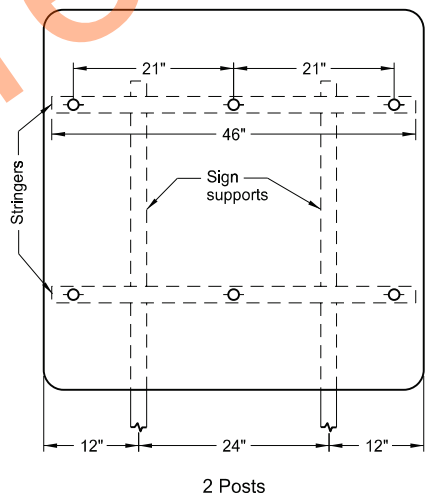
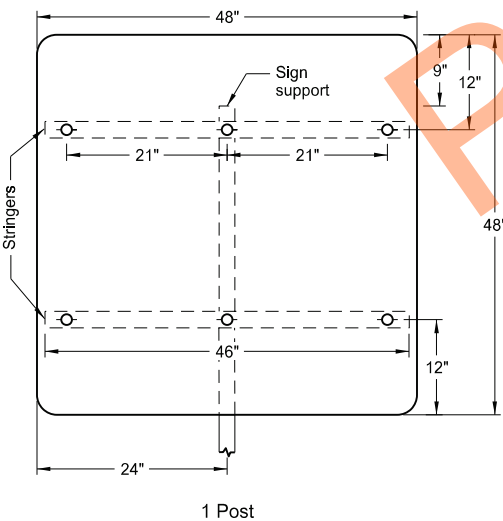
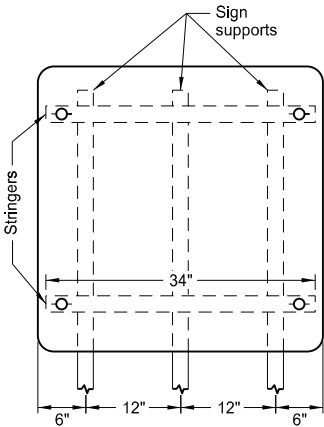
Assembly No. 14



Assembly No. 15



Assembly No. 16



- 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.

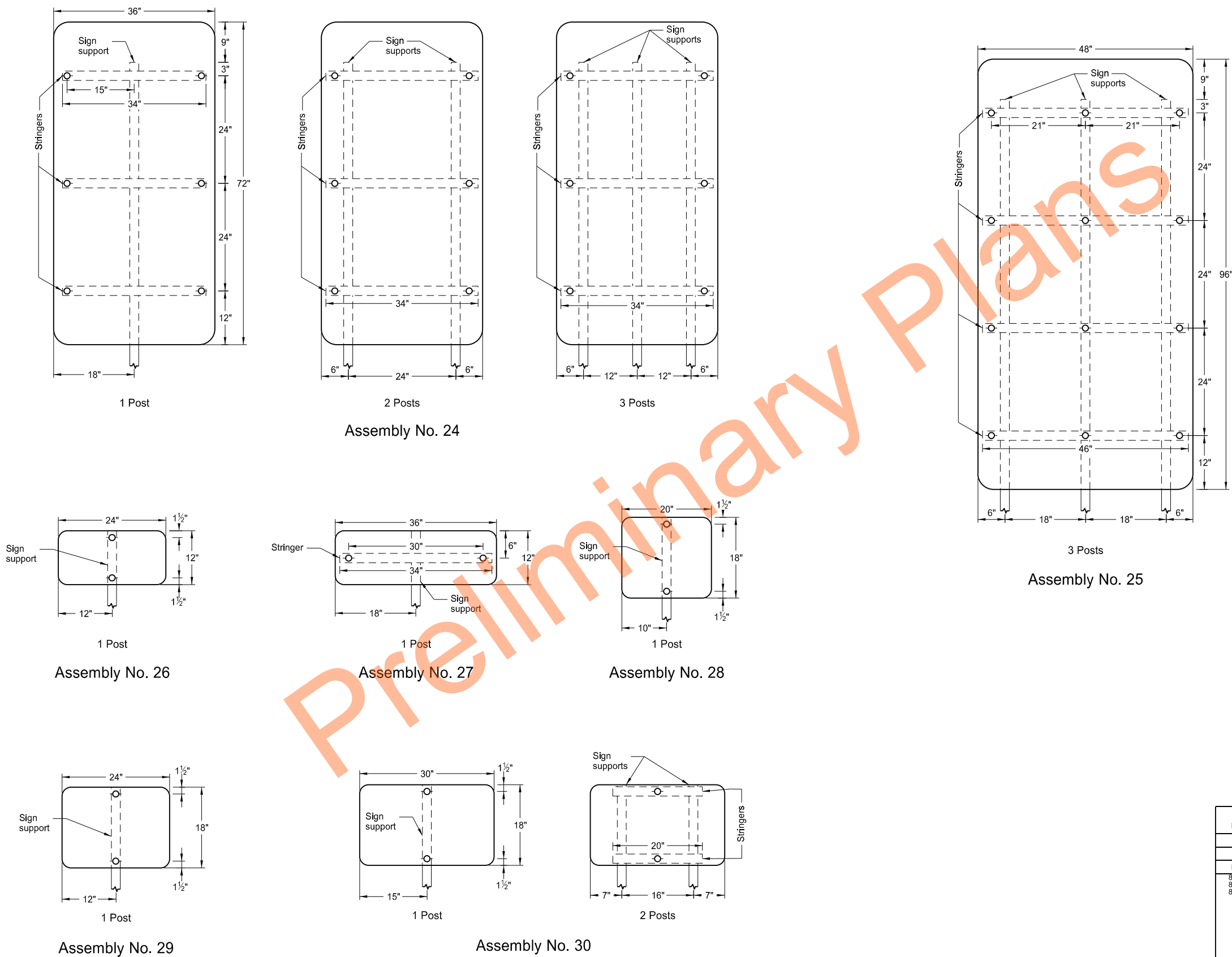
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
8-30-18	Updated to active voice & changed
8-30-19	Assembly 16 post spacing.
8-06-24	New Design Engineer PE Stamp, Electronic Stamp/Signature.



08/06/24

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

D-754-31



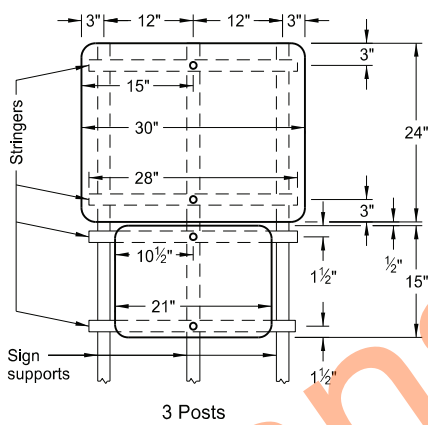
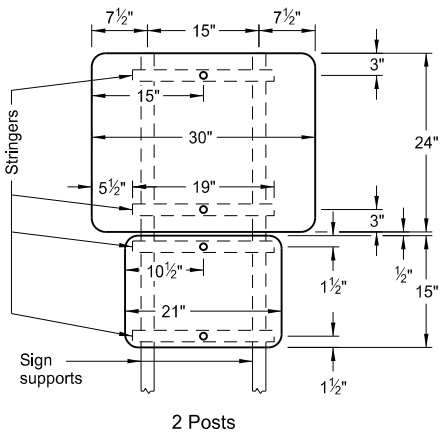
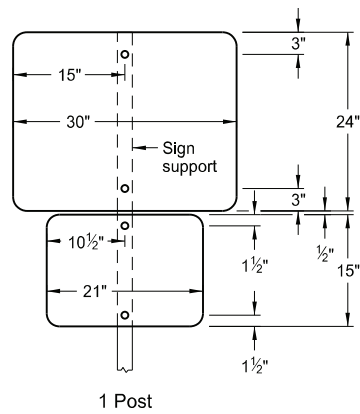
- Notes:
1. Use 0.100 inch minimum thickness sign backing material.
 2. Use 1 1/2" x 1 1/2" perforated square tube stringers.
 3. Punch holes round for 3/8" bolt.

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.
8-06-24	Electronic Stamp/Signature.



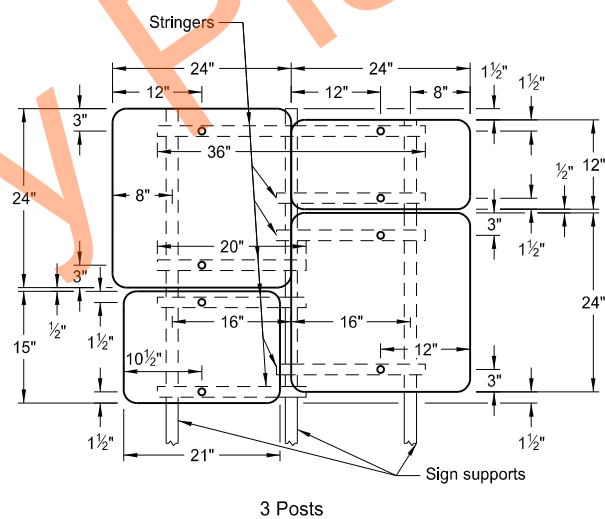
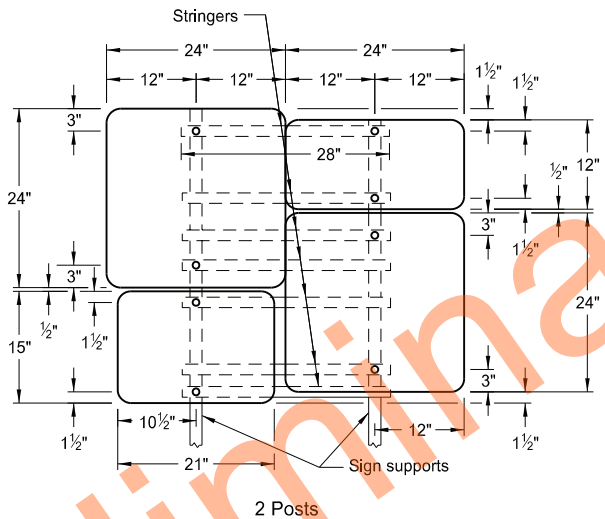
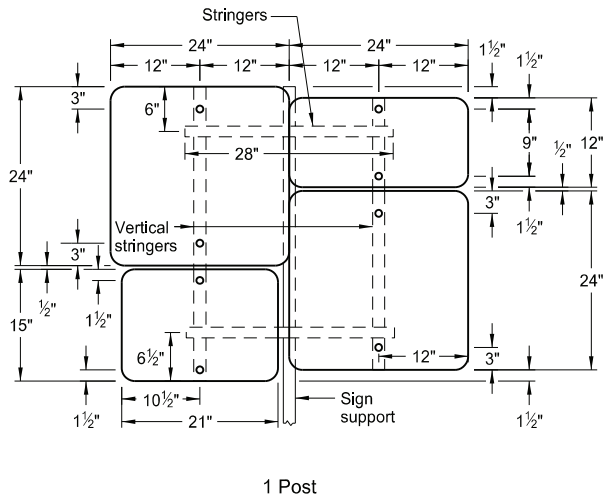
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS - ROUTE MARKER SIGNS

D-754-59

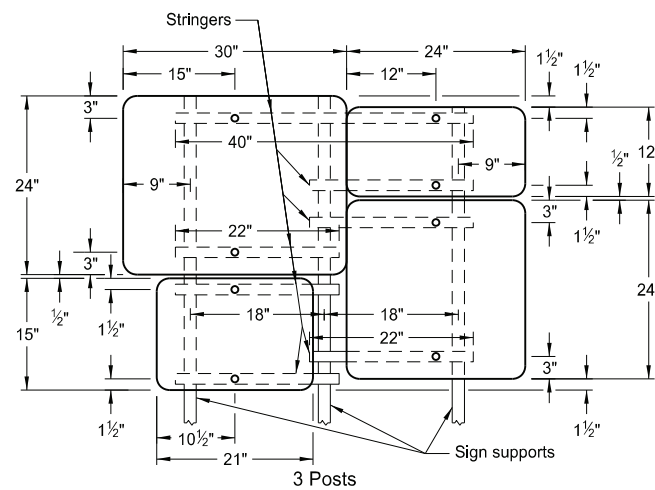
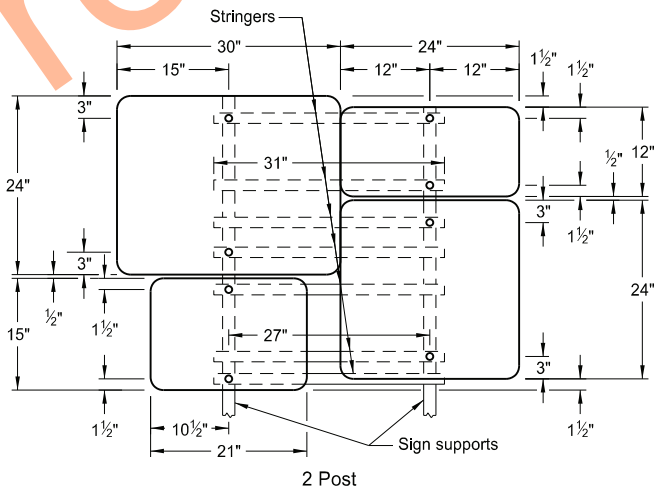
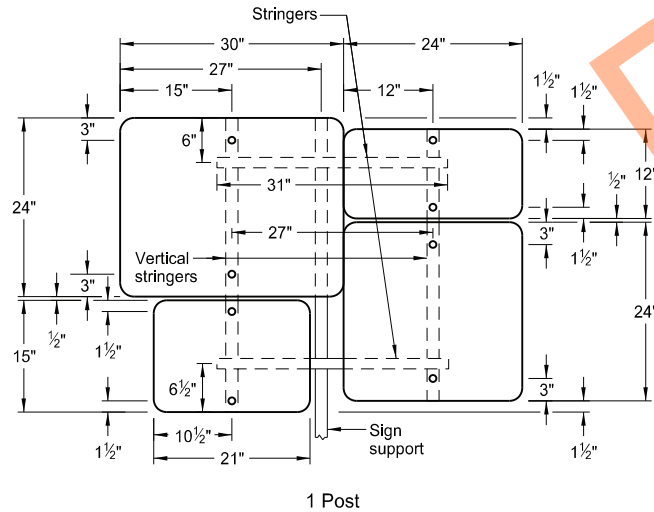


- Notes:
1. Use 0.100 inch minimum thickness sign backing material.
 2. Use 1 1/2"x1 1/2" perforated square tube stringers.
 3. Punch holes round for 3/8" bolt.

ASSEMBLY NO. 400



ASSEMBLY NO. 401



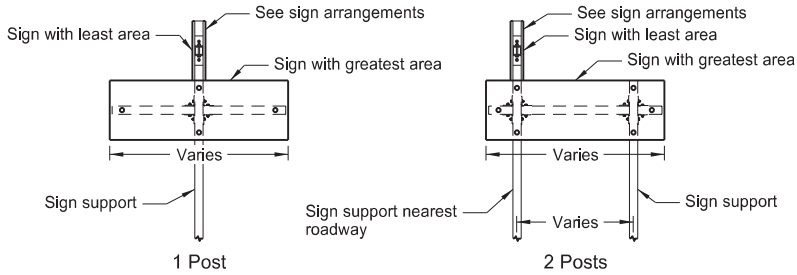
ASSEMBLY NO. 402

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-22-12	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice.
9-04-19	New Design Engineer PE Stamp.
8-07-24	Electronic Stamp/Signature.

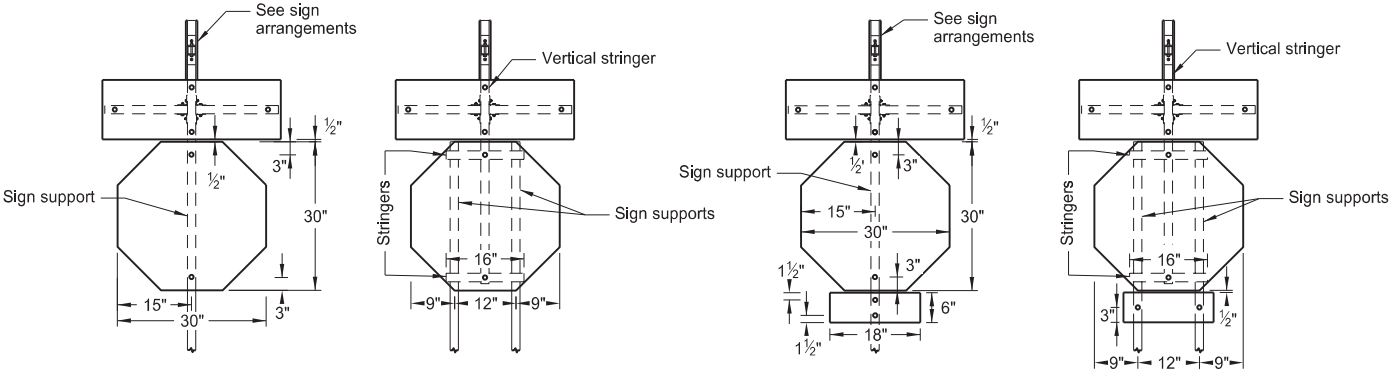


SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS
FOR STREET NAME SIGNS AND 911 SIGNS

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

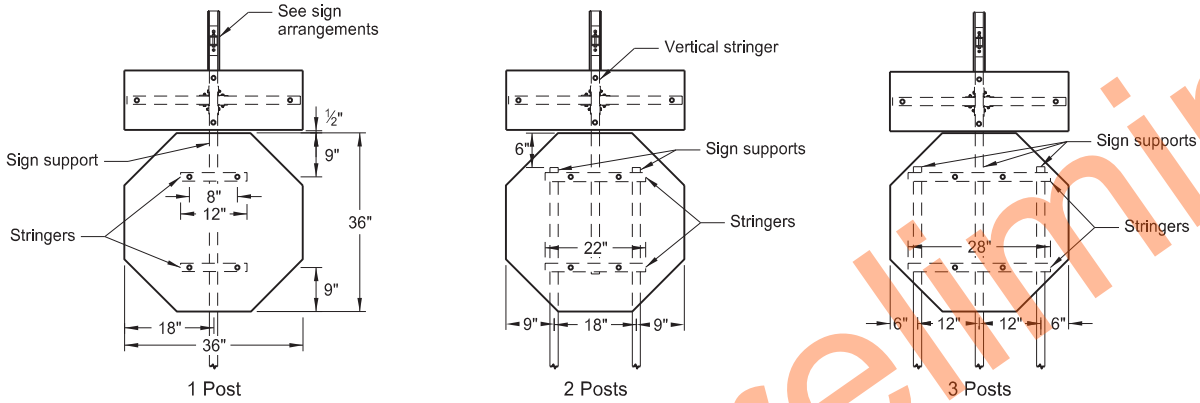


Special Assembly 1 (A, B, C, D or E)

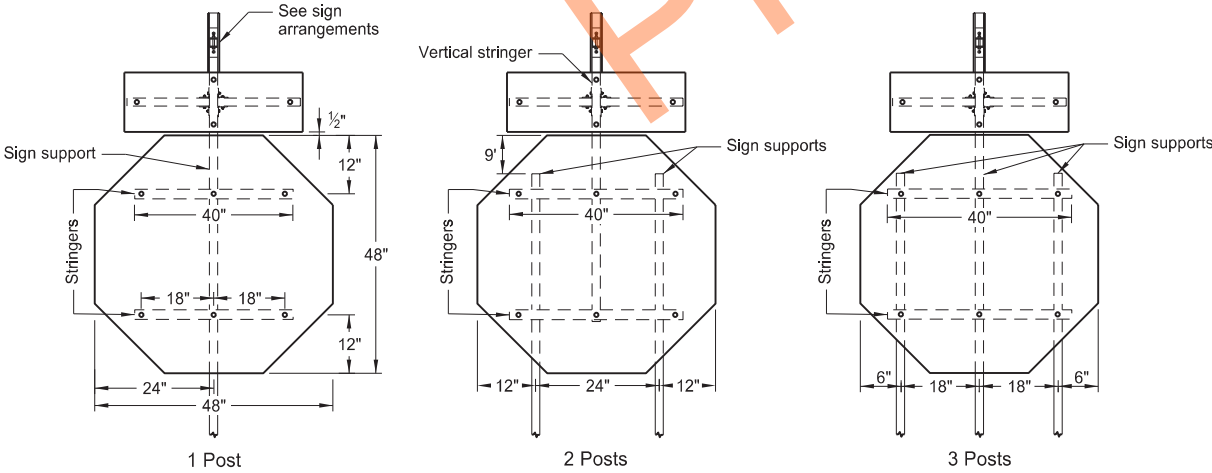


Special Assembly 2 (A, B, C, D or E)

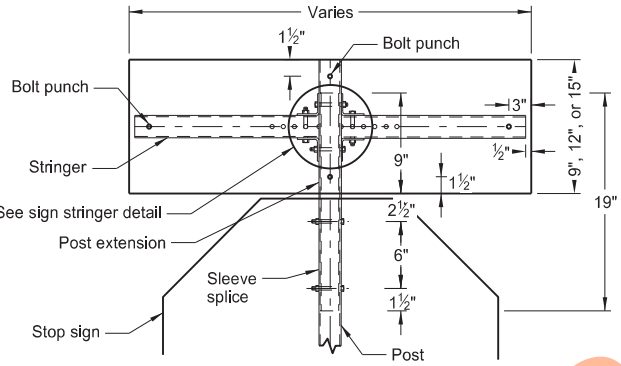
Special Assembly 3 (A, B, C, D or E)



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

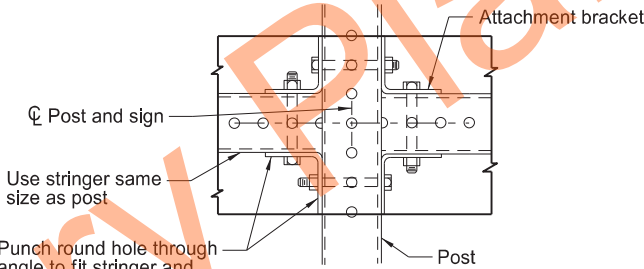


Special Assembly 5 (A, B, C, D or E)



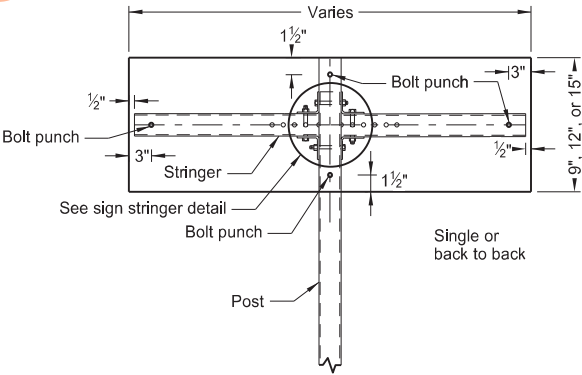
Front View
Sleeve Splice Detail

Note: Only use splice method with approval of engineer.

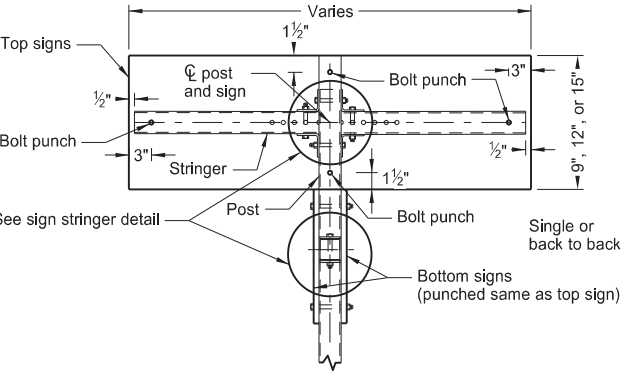


Punch round hole through angle to fit stringer and post holes.

Sign Stringer Detail

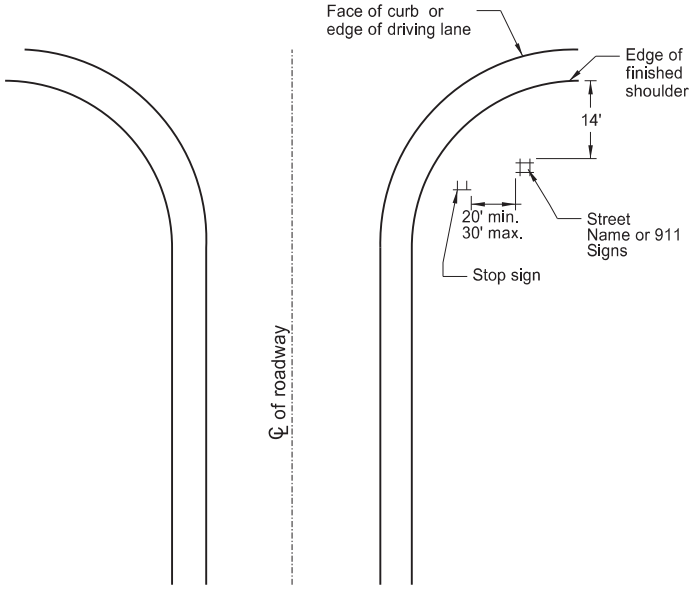


Detail A or B



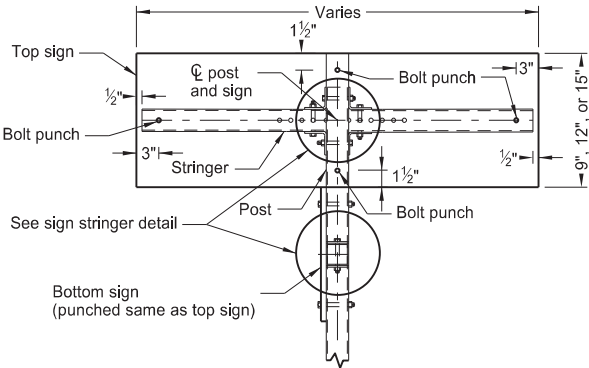
Detail D or E

Note: See Standard Drawing D-754-86 for 911 support information and sign layout details.



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.
8-08-24	Electronic Stamp/Signature.



08/08/24

Technical drawing of a complex shape with dimensions and radii. The drawing includes the following dimensions and features:

- Overall width: 11'-8"
- Overall height: 8'-4"
- Top horizontal segments: 3'-0" and 8"
- Left vertical segments: 2'-8" and 3'-8"
- Right vertical segments: 2'-4" and 1'-8"
- Bottom horizontal segments: 5'-4", 1'-0", and 5'-4"
- Internal vertical segments: 1'-8" and 2'-8"
- Internal horizontal segments: 4" and 8"
- Radius callouts: $R = 3'-4"$ and $R \approx 2'-4"$

Technical drawing of a mechanical part with the following dimensions and features:

- Overall width: 6'-4"
- Overall height: 5'-4"
- Top horizontal segment: 3'-0"
- Top horizontal offset: 8"
- Top horizontal offset: 2'-4"
- Top horizontal offset: 1'-8"
- Top horizontal offset: 3'-8"
- Top horizontal offset: 1'-8"
- Top horizontal offset: 4"
- Top horizontal offset: 8"
- Top horizontal offset: 1'-0"
- Radius $R = 3'-4"$
- Radius $R = 2'-4"$

Technical drawing of a complex geometric shape, likely a piece of machinery or a structural component, showing dimensions in inches. The drawing includes a large overall width of 7'-6" and a total height of 12'-9". Key dimensions include:

- Overall width: 7'-6"
- Overall height: 12'-9"
- Left side height segments: 8'-0", 5'-4", 7'-5"
- Top right height segments: 5'-0", 7'-9"
- Internal horizontal dimensions: 3'-0", 8", 1'-2", 3'-4", 1'-0", 4", 1'-0"
- Internal vertical dimensions: 2'-4", 1'-8", 3'-8", 1'-6"
- Curved sections: R=3'-4", R=2'-4"

[illegible]

Technical drawing of a sign for "SHERWOOD". The sign is 9'-8" wide and 8'-0" high. The letters are outlined in black. Dimensions are provided for the overall size and the spacing between the letters. The overall width is 9'-8" and the overall height is 8'-0". The spacing between the letters is 4" for the first three letters (S, H, E) and 16" for the last three letters (R, W, O). The letter "S" has a height of 4" and a width of 16". The letter "H" has a height of 4" and a width of 16". The letter "E" has a height of 4" and a width of 16". The letter "R" has a height of 4" and a width of 16". The letter "W" has a height of 4" and a width of 16". The letter "O" has a height of 4" and a width of 16". The letter "D" has a height of 4" and a width of 16". The letter "S" has a height of 4" and a width of 16". The letter "H" has a height of 4" and a width of 16". The letter "E" has a height of 4" and a width of 16". The letter "R" has a height of 4" and a width of 16". The letter "W" has a height of 4" and a width of 16". The letter "O" has a height of 4" and a width of 16". The letter "D" has a height of 4" and a width of 16".

[illegible]

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'

Diagram illustrating a road cross-section with a 10' wide travel lane and a 30' wide shoulder, both defined by edge lines.

4 S. F.

22 S. F.

34.5 S. F.

Shldr, if present

6" yellow center line (See Notes)

4" space between lines

Bands at right angles to pavement

6" yellow barrier stripe (See Notes)

2'

3.3'

6.6'

16"

1.6'

6'

20'

16'

60'

See Advanced Placement Distance table at right

26' to nearest rail

Stop line 8' from gate, if present

W10-1 

R15-1

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

*Stop Bar nearest crossing 8' from gate or 26' to

Diagram illustrating the layout of a 12-foot wide roadway, showing various markings and their widths:

- 12" min to 30" max**: Top section of the roadway.
- 24"**: Width of the first blacked-out section.
- 24"**: Width of the second blacked-out section.
- 2'x6", 2'x8", 2'x10" or 2'x12" white line**: Width of the white line section.
- 24"**: Width of the third blacked-out section.
- Wheel track**: Width of the wheel track section.
- 30"**: Width of the wheel track section.
- 24"**: Width of the fourth blacked-out section.
- 12" min to 30" max**: Width of the section below the fourth blacked-out section.
- 24"**: Width of the fifth blacked-out section.
- Wheel track**: Width of the wheel track section.
- 30" max**: Width of the wheel track section.
- 24"**: Width of the sixth blacked-out section.
- 6" min to 15" max**: Bottom section of the roadway.
- Centerline of Roadway**: Indicated by a dashed line.

NOTES:

1. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits ≥ 40 mph.
2. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits ≤ 40 mph.

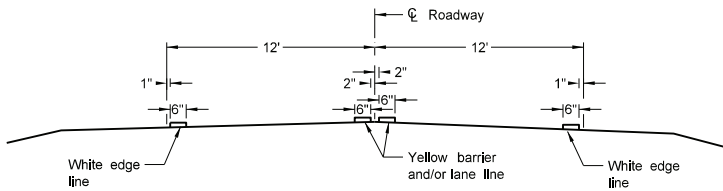
Advance Placement Distance for Railroad Warning Signs	
Posted or 85th Percentile Speed	Advance Distance
20 mph	min. 100 ft
25 mph	min. 100 ft
30 mph	min. 100 ft
35 mph	min. 100 ft
40 mph	125 ft
45 mph	175 ft
50 mph	250 ft
55 mph	325 ft
60 mph	400 ft
65 mph	475 ft
70 mph	550 ft

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-6-11	
REVISIONS	
DATE	CHANGE
10-17-17 08-27-19 01-28-2020 11-22-2023	Updated to active voice. New Design Engineer PE Stamp. Revised min Stop Bar distance to rail Revised pavement marking widths.

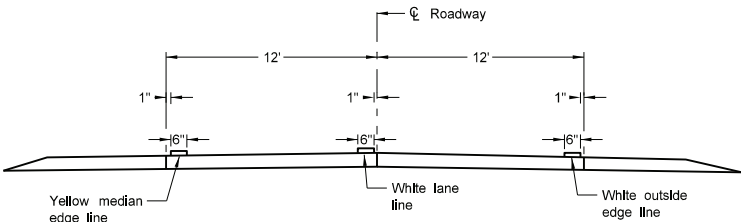


PAVEMENT MARKING

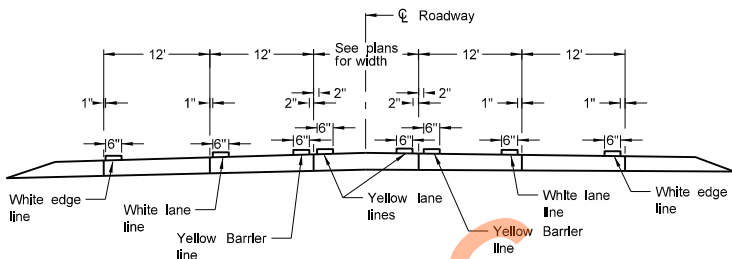
D-762-4



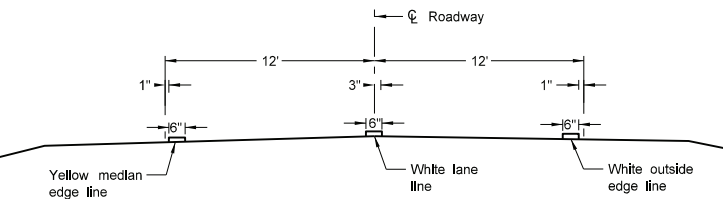
Two Lane Two Way
RURAL ROADWAY



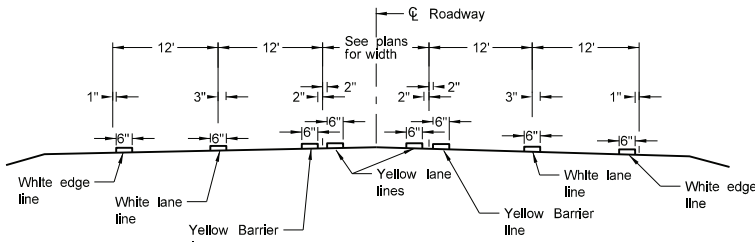
Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



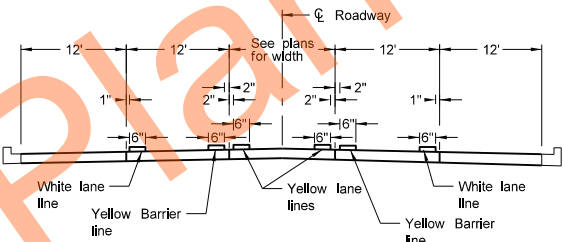
RURAL FIVE LANE ROADWAY
Concrete Section



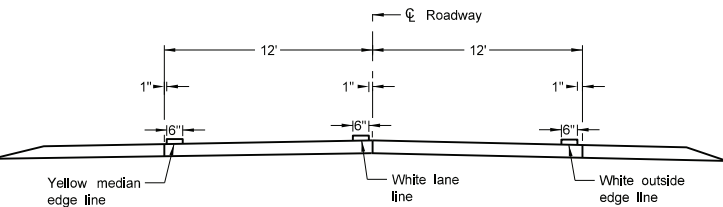
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



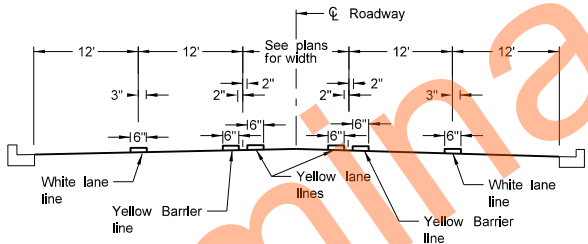
RURAL FIVE LANE ROADWAY
Asphalt Section



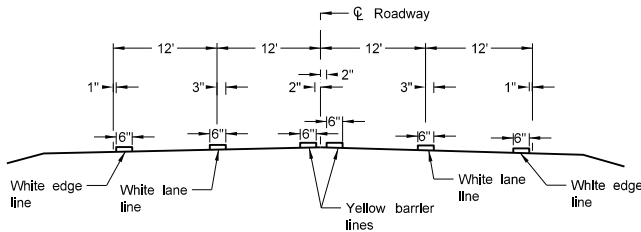
URBAN FIVE LANE SECTION
Concrete Section



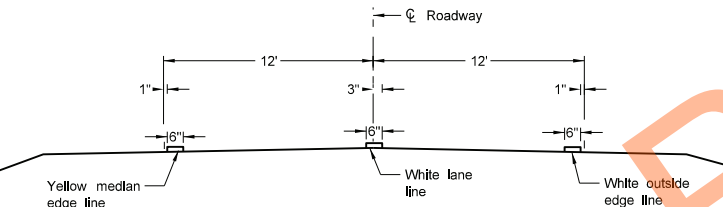
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Concrete Section



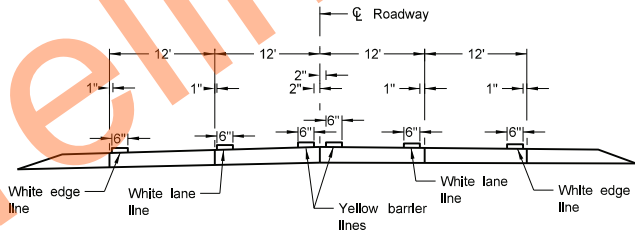
URBAN FIVE LANE SECTION
Asphalt Section



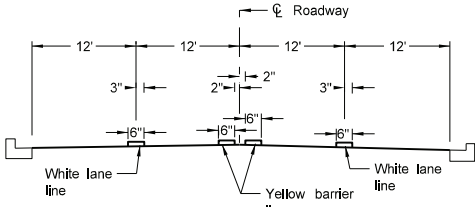
RURAL FOUR LANE ROADWAY
Asphalt Section



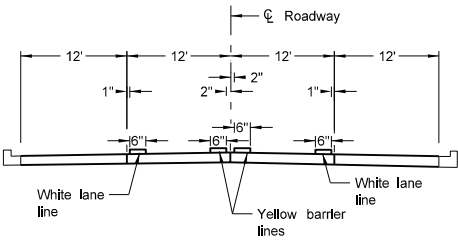
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



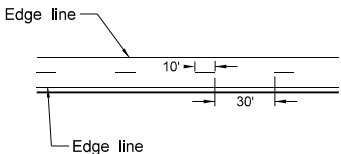
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

- NOTES:
1. Continue edge lines through private drives and field drives. Break edge lines for intersections.
 2. For section lines, county roads, and street approaches, stripe the radii and edge lines of the paved surface within the right of way except where curb and gutter is present.
 3. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph.
 3. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits < 40 mph.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
08-27-19	New Design Engineer PE Stamp.
11-22-23	Revised pavement marking widths.
07-09-24	Modified Note 1.



CONCRETE FOUNDATIONS
(TRAFFIC SIGNALS & HIGHWAY LIGHTING)

NOTES:

LIGHT & SIGNAL STANDARD FOUNDATIONS:
See plans for conduit size, number of bends and correct position for each foundation. When conduit does not continue beyond the foundation, conduit with a 105° bend and bushings on both ends may be substituted for the 90° bends shown. See plans for correct size & location of foundations. The grade and exact location shall be established by the Engineer in the field. All reinforcing shall be Grade 60. Tie bars shall have a minimum of a 12" lap. Reinforcing may be omitted for Type I, II, V, VI & VII signal standard foundations if the anchor bolts extend to within 3" to 6" above the bottom of the foundation. A minimum of 6 anchor bolts shall be used for cantilevered structures.

CONTROLLER CABINET FOUNDATION PAD MOUNT
FOUNDATION: See plans for the number of 90° bends per foundation and correct positioning. The foundation for Pad Mounted Controller Cabinet shall be of sufficient size so that there is a minimum of 3" of clearance from the outside edge of cabinet to the outside edge of the foundation on any side. The contractor shall ensure a water-tight seal between the controller cabinet and the foundation by caulking, except for V-groove.

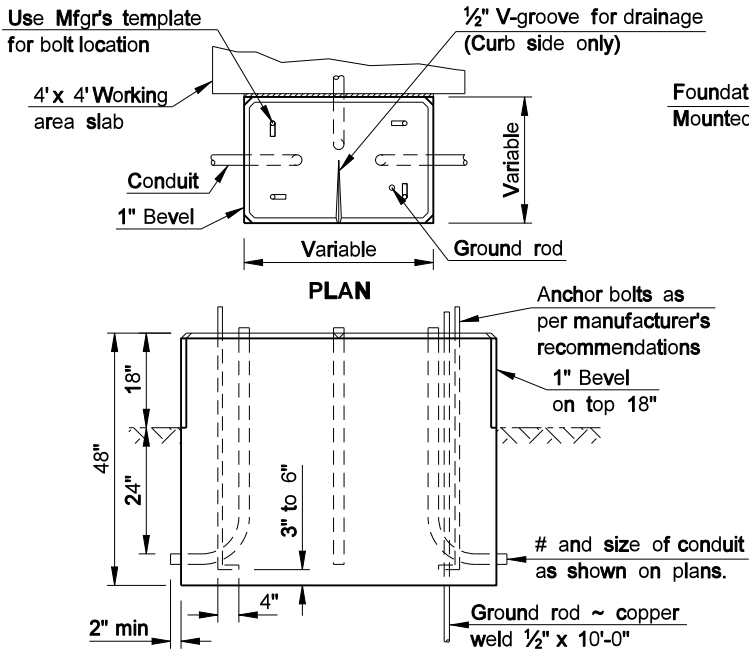
WORKING AREA SLAB: The materials and preparation of this slab shall be as approved by the Engineer in the field.

TRANSFORMER & FEED POINT CABINET FOUNDATION PAD MOUNTED: The foundation shall have a wood float finish. All conduits shown shall be installed. Conduit that is not used at this time shall be plugged with an expandable plug.

FEED POINT CABINET FOUNDATION PAD MOUNTED: The foundation shall have a wood float finish. All conduits shown shall be installed. Conduit that is not used at this time shall be plugged with an expandable plug.

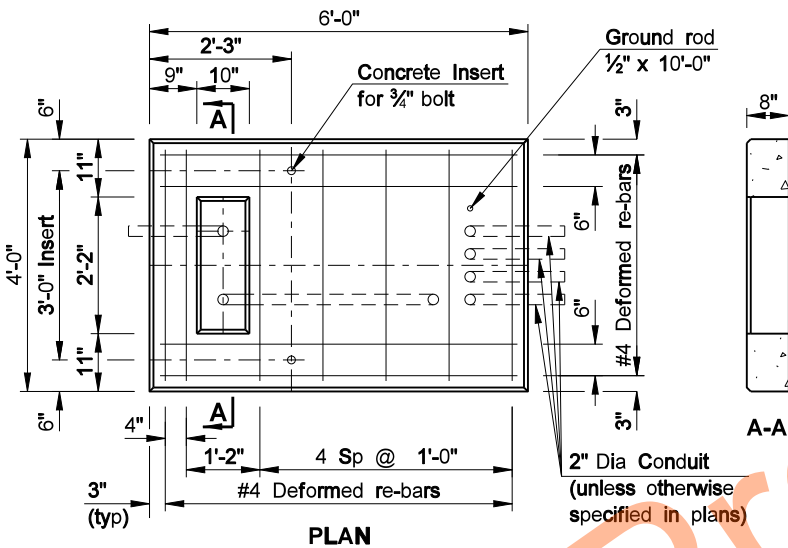
LIGHT & SIGNAL FOUNDATION TABLE	
FOOTING DEPTH (ft)	LONGITUDINAL REINFORCING
≤ 12	8 - #5
13 - 14	8 - #6
15 - 16	8 - #7
17 - 19	8 - #8

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION		This document was originally issued and sealed by Terrence R. Udland Registration Number PE- 2674 , on 6/15/10 and the original document is stored at the North Dakota Department of Transportation
6-15-10		
REVISIONS		
DATE	CHANGE	



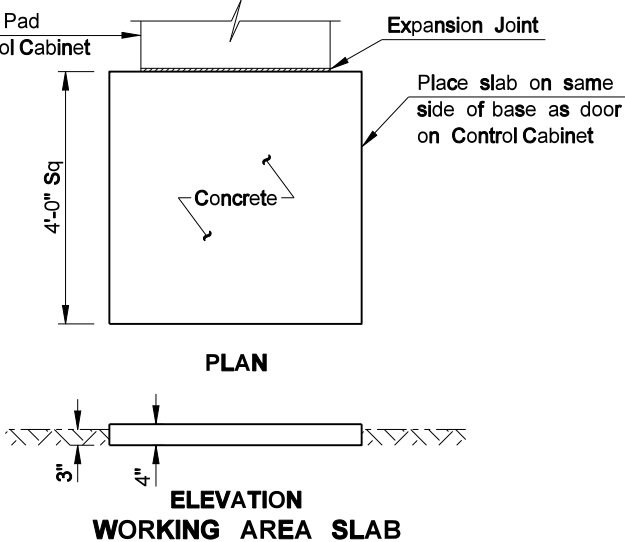
CONTROLLER CABINET FOUNDATION PAD MOUNT

The Controller Cabinet Foundation shall be bid as Concrete Foundation - Traffic Signals.

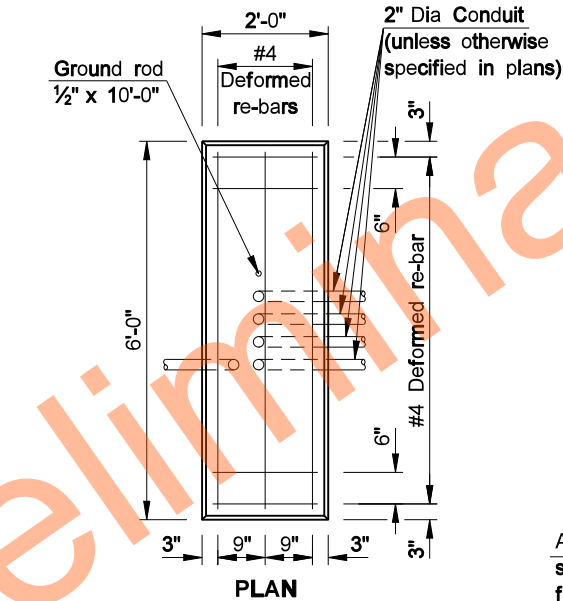


TRANSFORMER & FEED POINT
CABINET FOUNDATION PAD MOUNT

The Transformer & Feed Point Cabinet Foundation Pad Mount shall be bid as Concrete Foundation ~ Feed Point ~ Type A.

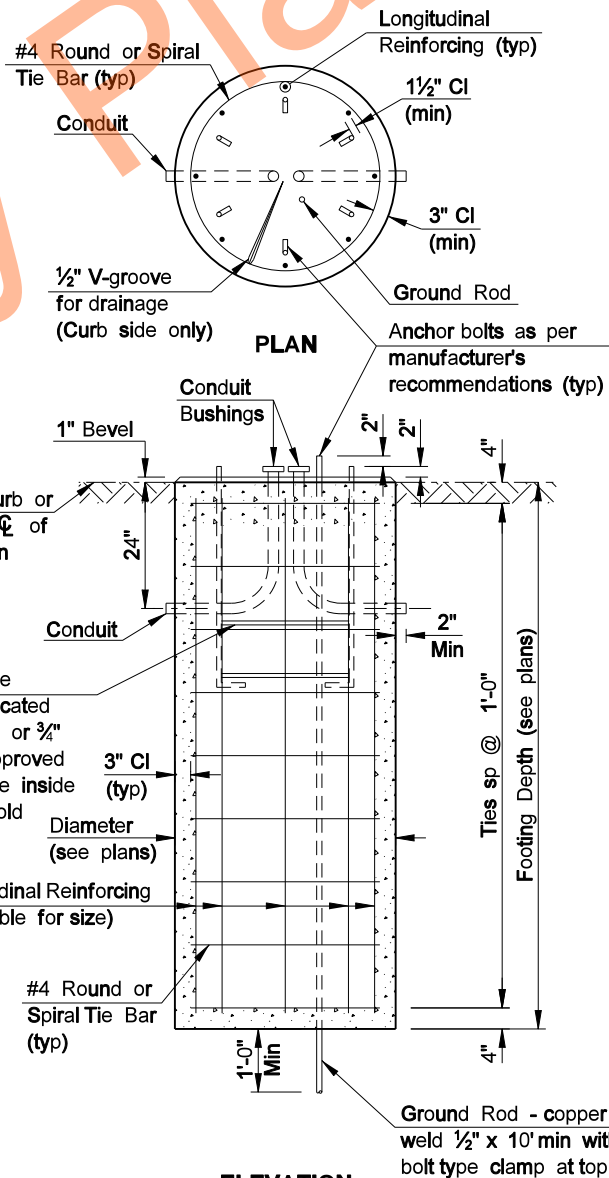
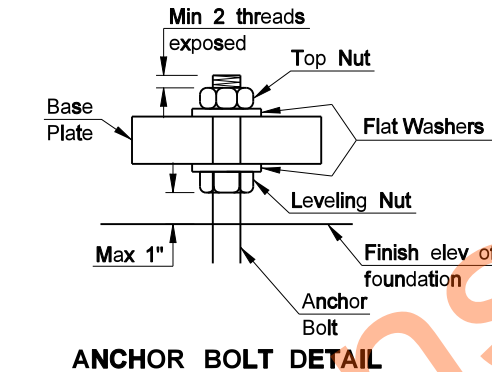


The Working Area Slab shall be installed where shown on the plans and shall not be bid separately but shall be included in the price bid for Concrete Foundation - Traffic Signals.



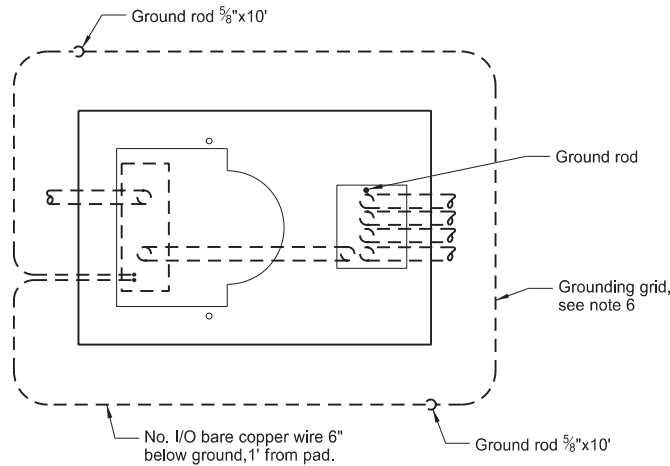
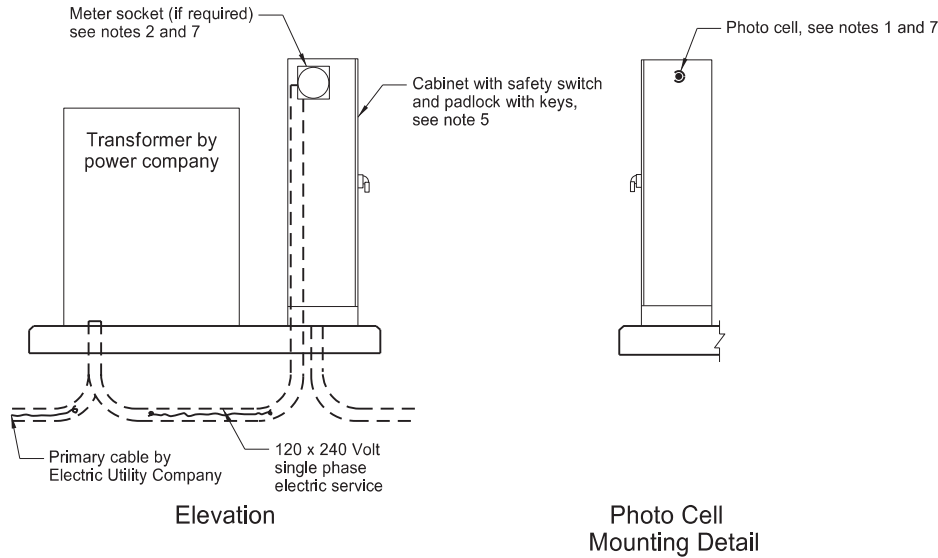
FEED POINT CABINET
FOUNDATION PAD MOUNT

The Feed Point Cabinet Foundation Pad Mount shall be bid as Concrete Foundation ~ Feed Point ~ Type B.

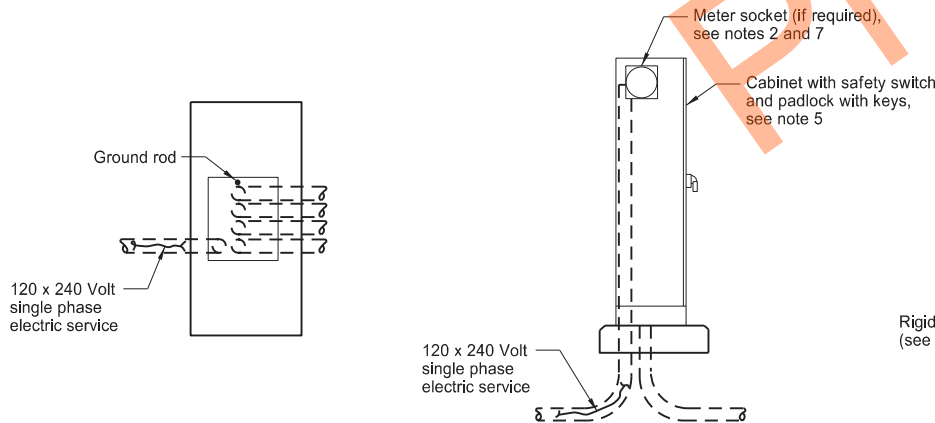


LIGHT & SIGNAL STANDARD FOUNDATION

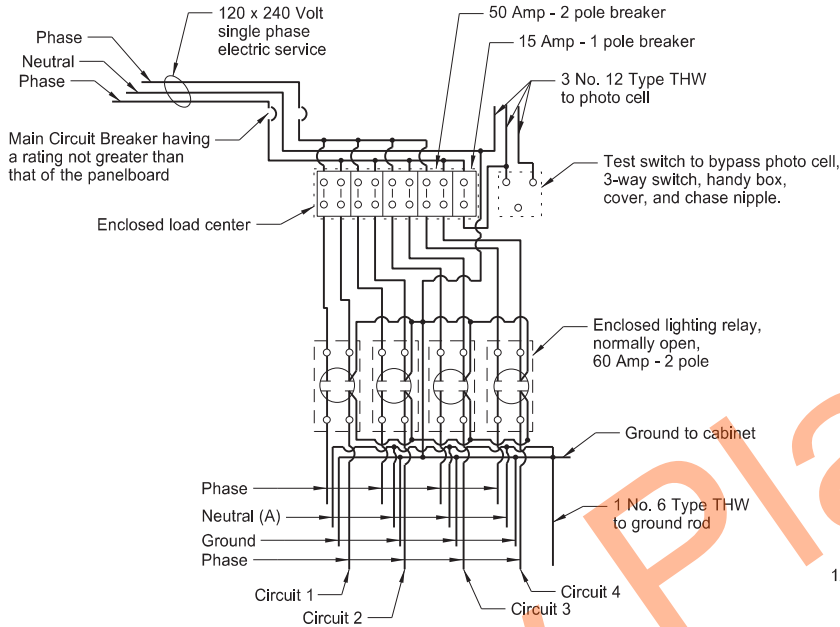
FEED POINTS
(ROADWAY LIGHTING)



Plan
Transformer and Feed Point Cabinet Pad Mounted



Plan
Elevation
Feed Point Cabinet Pad Mounted



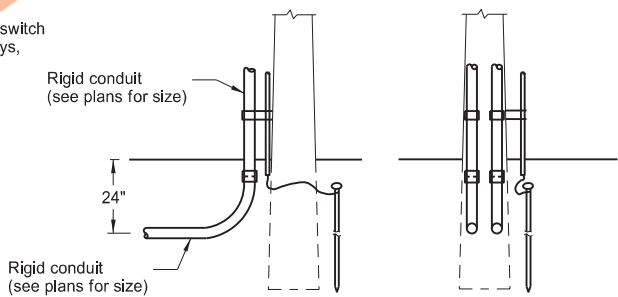
Feed Point Type IV

Provide Type I feed point similar to Type IV, except with one electrical circuit, one 50 Amp - 2 pole breakers, and one lighting relay, normally open.

Provide Type II feed point similar to Type IV, except with two electrical circuit, two 50 Amp - 2 pole breakers, and two lighting relays, normally open.

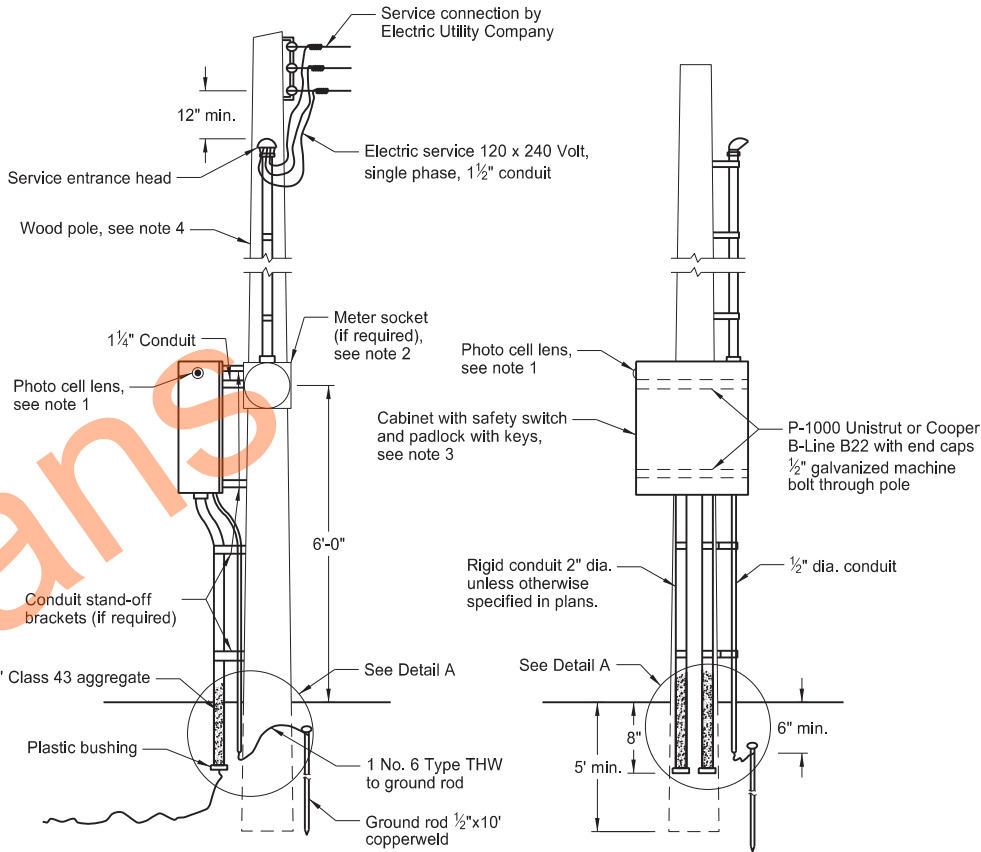
Provide Type III feed point similar to Type IV, except with three electrical circuits, three 50 Amp - 2 pole breakers, and three lighting relays, normally open.

(A) Install when festoon circuit is required.



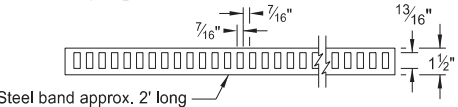
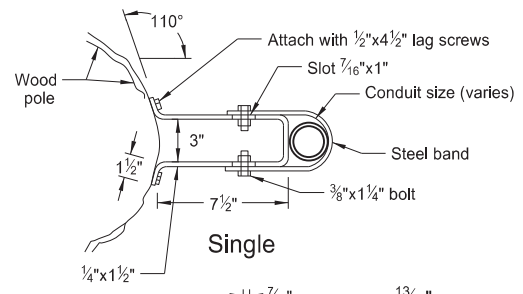
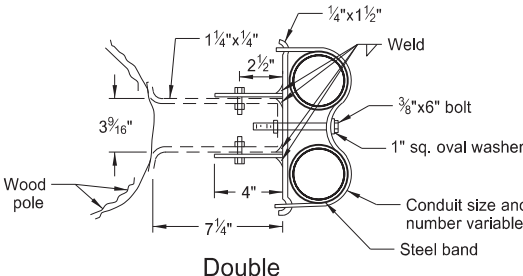
Detail A

Use this detail for a continuous run of conduit from the feed point to the first light standard.



Feed Point Pole Mounted

- Notes:
- Photo Cell: Furnish and install the photoelectric cell. Face photo lens north.
 - Meter Socket: Install meter socket and trim if the meter is required by local Utility Company. Meter furnished and installed by Utility Company.
 - Pole Mounted Cabinet: Provide cabinet with lock drip shield, factory installed steel backing, stainless steel hardware, and side hinge door. Shop coat cabinet with one coat of primer and two coats of exterior gray enamel.
- Provide 30" high x 24" wide x 8" deep Type I and II feed points. Provide 30" high x 42" wide x 10" deep or 36" high x 36" wide x 10" deep Type III and IV feed points.
- Wood Pole: Provide minimum 20' Class VII full length penta pressure treated wood pole. (if required, see layout sheets)
 - Pad Mounted Cabinet: Provide 56" high x 26" wide x 14" deep weatherproof cabinet. Minimum 12 gauge steel or aluminum with provisions for padlock.
 - Grounding Grid: Provide grounding grid with a maximum ground resistance of 25 ohms, using one or more 5/8"x10' copperweld ground rods in parallel or series at two corners. Provide a minimum distance between ground unit assemblies of 6'0".
 - Meter Location: Do not mount the meter (if required) on the same side of the cabinet as the photo cell.



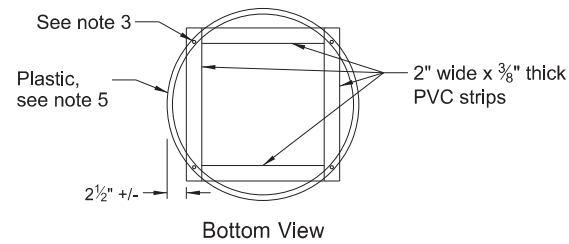
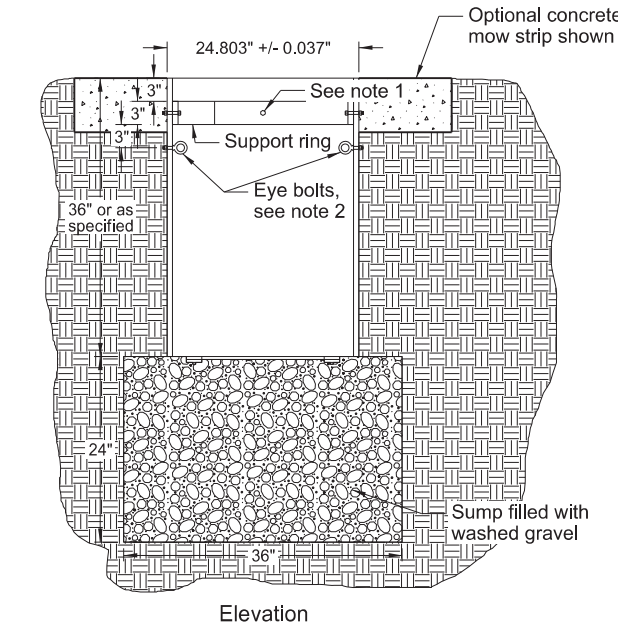
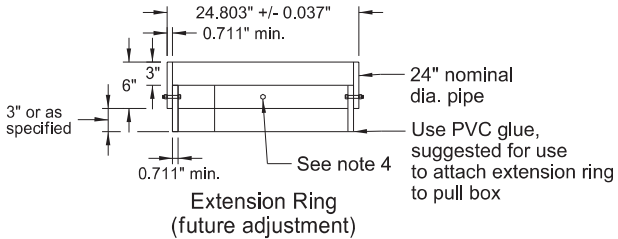
Conduit Standoff Bracket

Omission of conduit standoff brackets allowed when not required by local utility company.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-8-13	
REVISIONS	
DATE	CHANGE
07-08-14	Revised note 3
10-17-17	Updated to active voice
08-28-19	New Design Engineer PE Stamp
11-01-24	Revised note 5
09-12-25	Revised date to match



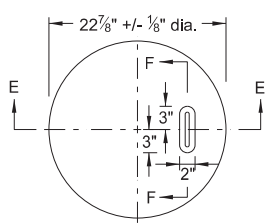
PULL BOX & TRENCHING DETAILS



PVC Pull Box

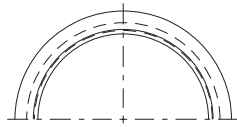
PVC Pull Box Notes:

1. Attach split 24" nominal diameter PVC cover support ring with four 3/8" dia. x 2" long stainless steel hex head bolts with nuts at 90 degrees apart.
2. Two type 2 shoulder eye bolts, 3/8" dia. x 1 1/4" shank length with hex nuts 180 degrees apart (for lifting pull box and supporting electric cable).
3. Four 1/4" x 1 1/4" long galvanized lag screws. Screw assembly together.
4. Attach split 24" nominal diameter PVC cover support extension ring with four 3/8" dia. x 2" long stainless steel hex head bolts with nuts at 90 degrees apart.
5. Bolt assembly together.
6. Size conduit holes located in barrel section no more than 1" larger than size of conduit being used.
7. After pull box and conduit installation, install water tight seal for inside walls and cover.
8. PVC pipe to meet requirements of ASTM F679 or equal.
9. Provide Austenitic Stainless Steel Hex Head bolts and nuts. Other fasteners to be galvanized as per ASTM A153.
10. Install an epoxy coating on the top and sides of the concrete cover. Provide an epoxy protective coating that is light gray, clear, or neutral in color and apply as recommended by the pull box manufacturer. Before application, clean with a wire brush and dry the surfaces of the concrete to which the epoxy protective coating is applied.
11. If a Cast Iron cover is provided, use grey iron as per AASHTO M 306.

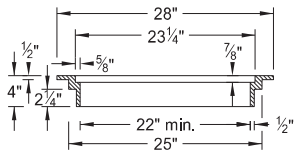


Top View

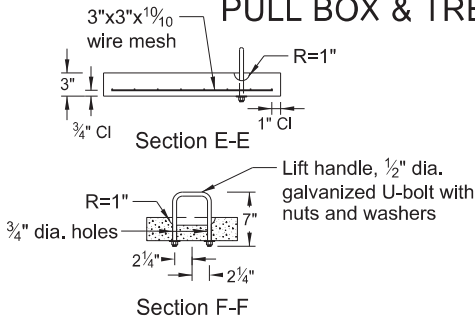
Concrete Cover



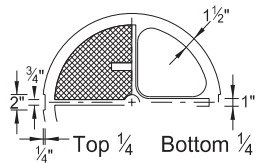
Half Top View



Section Frame

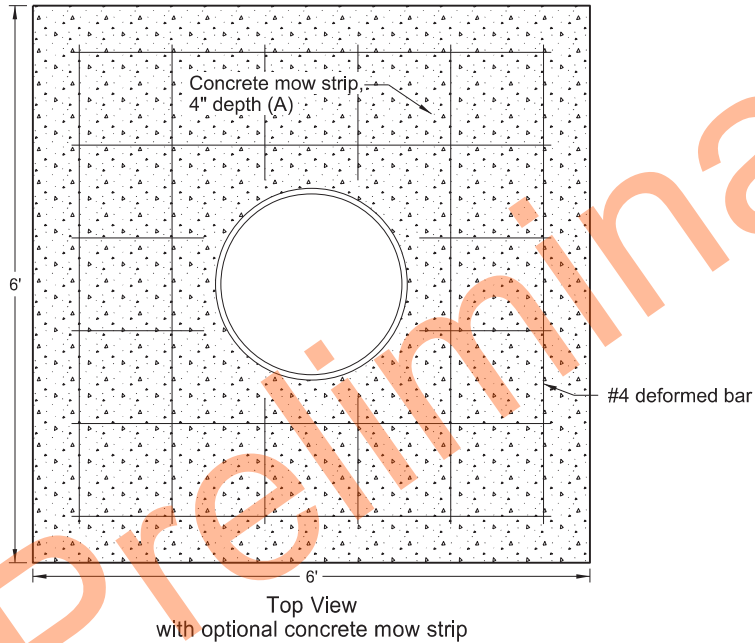


Section F-F



Section Cover

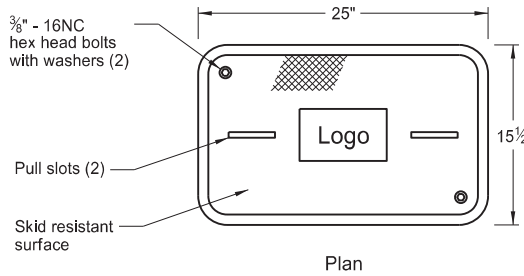
Cast Iron Frame and Cover



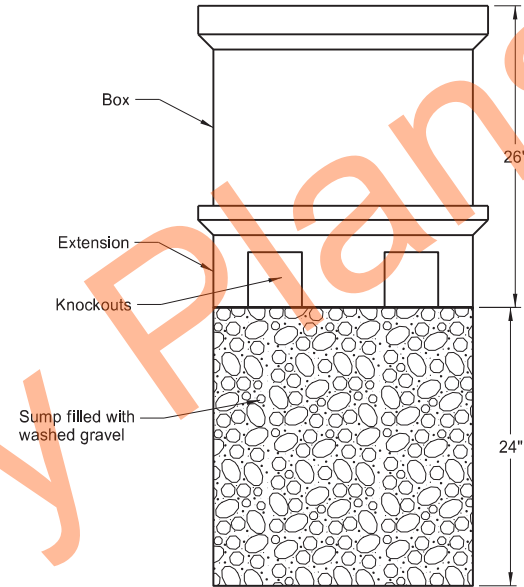
Top View with optional concrete mow strip

General Pull Box Notes:

1. Duct seal all conduits entering and exiting pull boxes.
2. Ensure all pull boxes are UL listed.

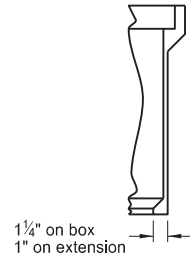
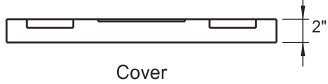
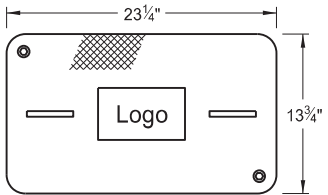


Plan



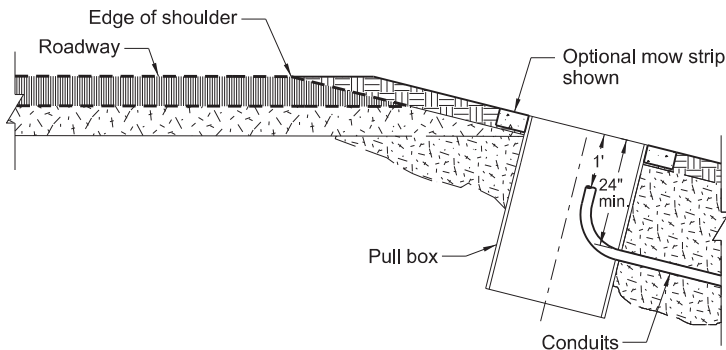
Elevation

Polymer Concrete Pull Box



Polymer Concrete Pull Box Notes:

1. Place top of pull box flush with surfaced area and approximately one inch above earth or sodded areas on level surfaces.
2. Provide at least one knockout per side in pull box.
3. Provide Polymer Concrete pull box meeting Tier 22 as per ANSI / SCTE 77.
4. Ensure the pull box constructed of polymer concrete reinforced by a heavy weave fiberglass.



Pull Box Installation Details

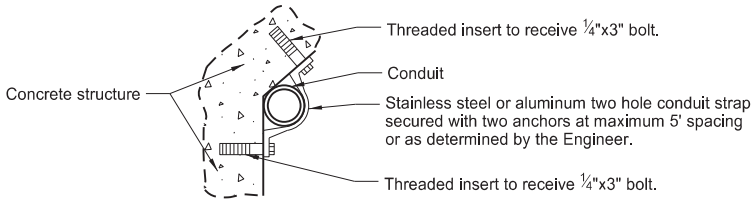
Note: The location of pull box will vary, refer to layout sheets for actual location.

When required, install a mow strip around the pull box. Place expansion material between the foundation and the mow strip. Ensure the mow strip is 4" depth and 2' width from the foundation. Use #4 deformed bars in the mow strip. Space the bars 6" from the outside edge. Place the bars in a grid pattern at 1' apart.

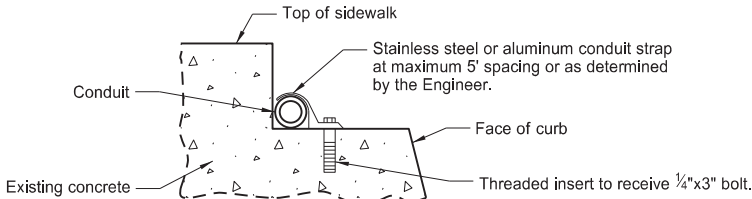
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-8-13	
REVISIONS	
DATE	CHANGE
11-01-24 09-12-25	Updated PVC pull box, trenching Revised date to match



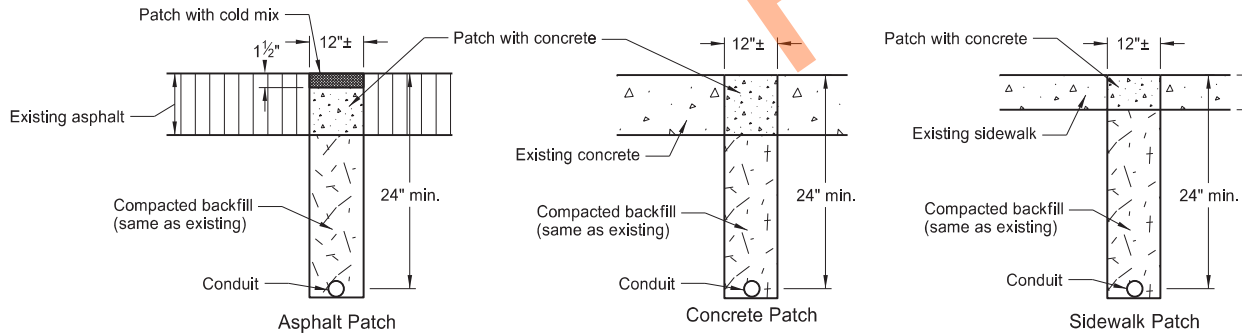
LIGHTING AND SIGNAL DETAILS



Bridge Mounted Conduit Hanger

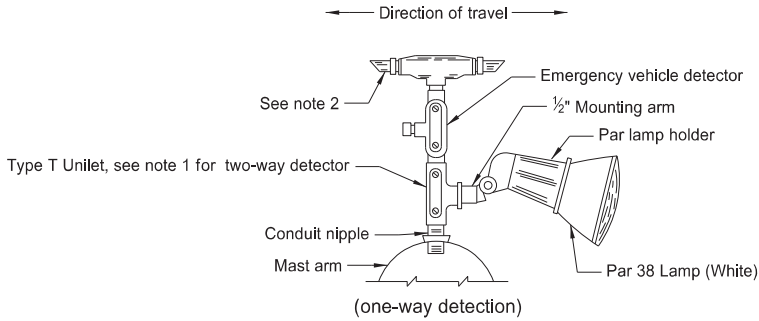


Bridge Curb Mounted Conduit

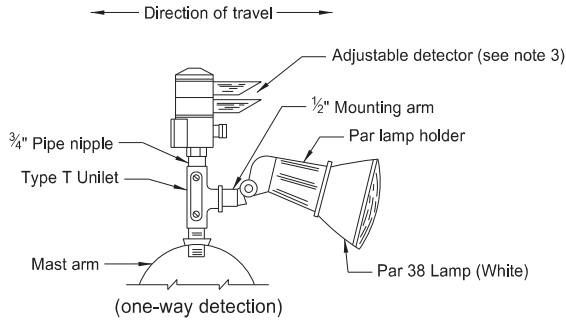


Surface Patch Details

Note: Saw cut trenches. Use PCC pavement for replacement concrete with the coarse aggregate gradation, maximum size and method of curing as approved by the Engineer. Immediately prior to pouring replacement concrete, paint all surfaces with an approved epoxy compound.

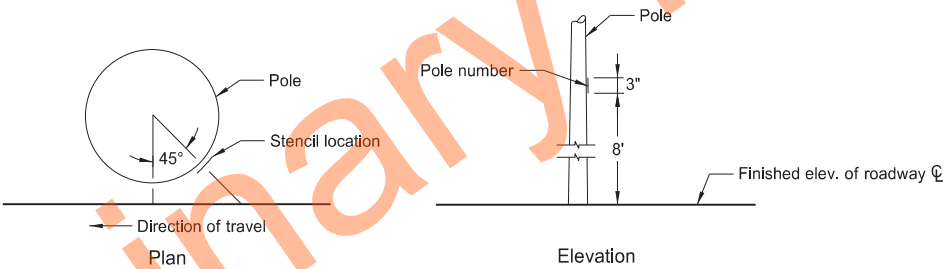


Emergency Vehicle Detector Detail



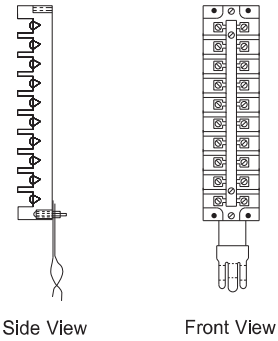
Alternate Emergency Vehicle Detector Detail (adjustable)

- Notes:
1. Use Type X Unilet with two Par lamp holders and lamps for Two-way Detectors. (one in each direction).
 2. Plug unused end of One-way Detector with metal pipe plug.
 3. Rotate detector lens to face direction of travel on Two-way Detectors.

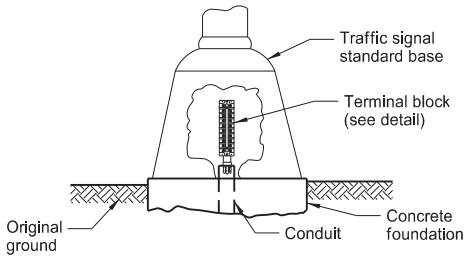


Light Standard Numbering

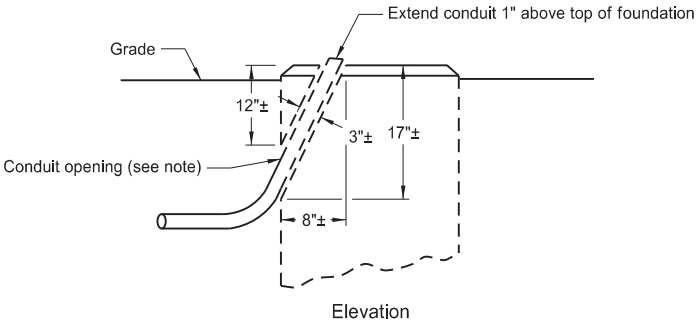
Note: On the roadway side of each light standard, stencil the pole number using contrasting color paint or an adhesive coated plastic such as Scotchcal by 3M or as approved by the Engineer. See layout sheets for pole numbers.



Terminal Block Detail

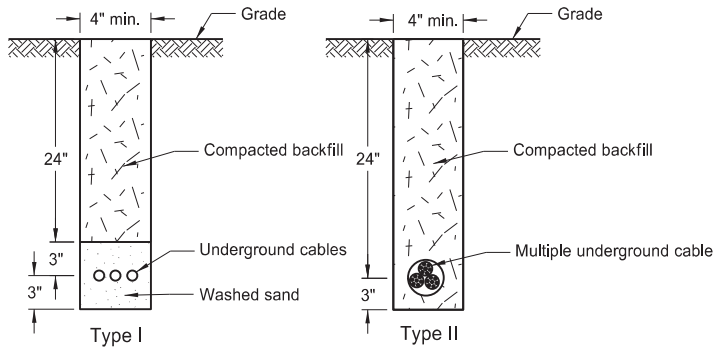


Terminal Block (rigid mounted)



Revise Concrete Foundation

Note: Jackhammer or drill to remove material and provide a location for conduit. Make opening no larger than necessary. Place conduit, fill with concrete and finish foundation to original appearance.



Cable Trench

Note: Seed entire area disturbed by trenching.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-8-13	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice
10-25-19	Removed conduit under RR detail
11-01-24	Updated bridge hanger detail
09-12-25	Revised date to match

KIRK J. HOFF

REGISTERED

PROFESSIONAL

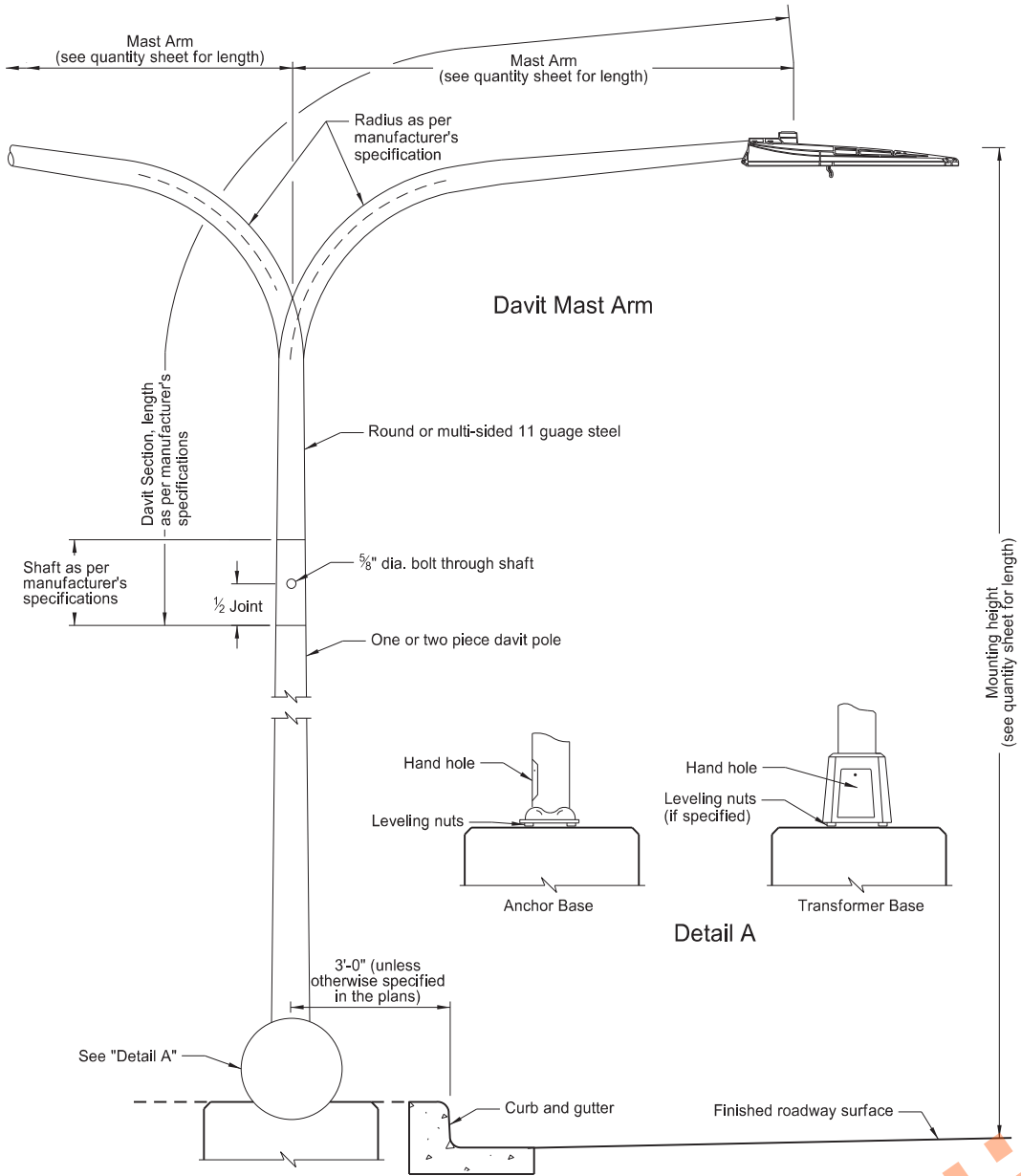
PE-4683

09/12/25

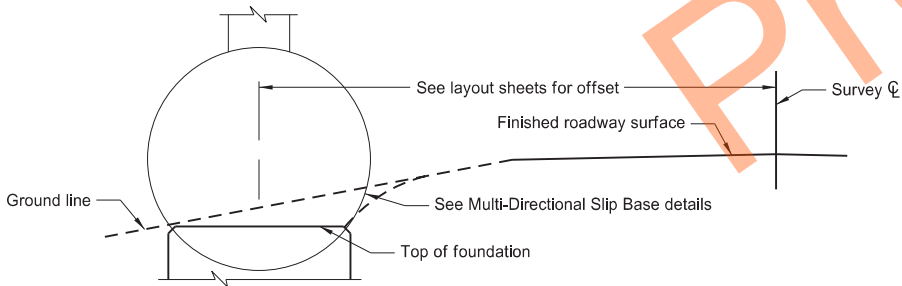
ENGINEER

NORTH DAKOTA

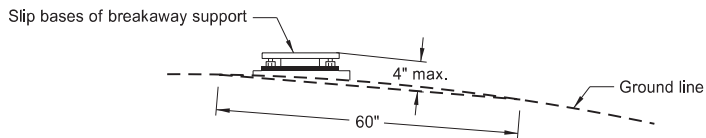
LIGHT STANDARD DETAILS



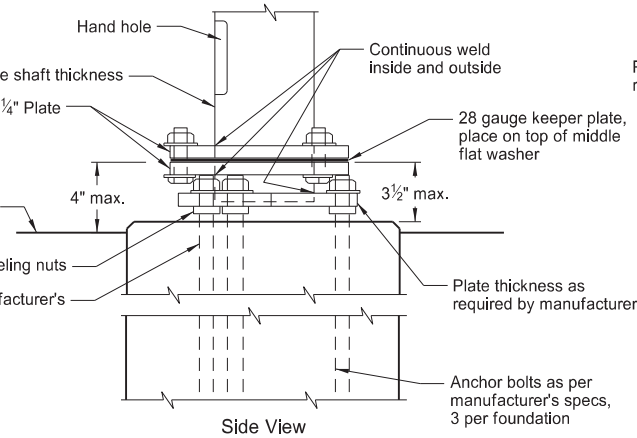
Light Standard Details



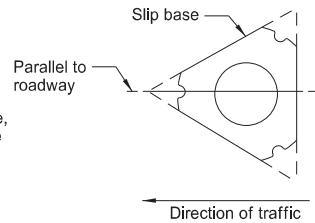
Concrete Foundation Location



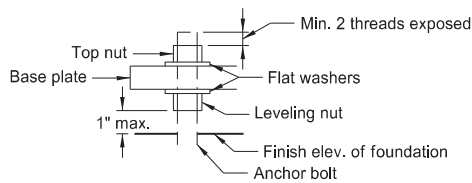
Breakaway Support Stub Clearance Diagram



Steel Base Detail

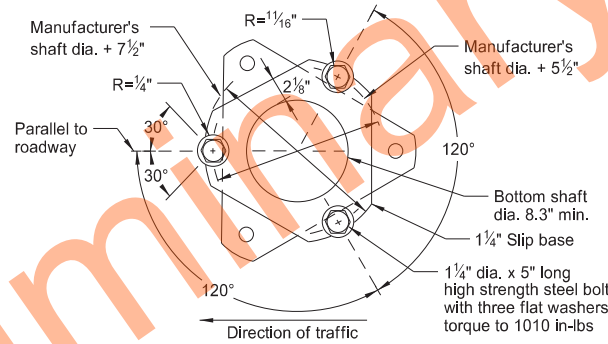


Slip Base Placement Detail

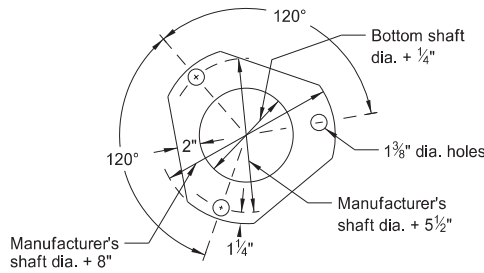


Anchor Bolt Detail

Multi-Directional Slip Base



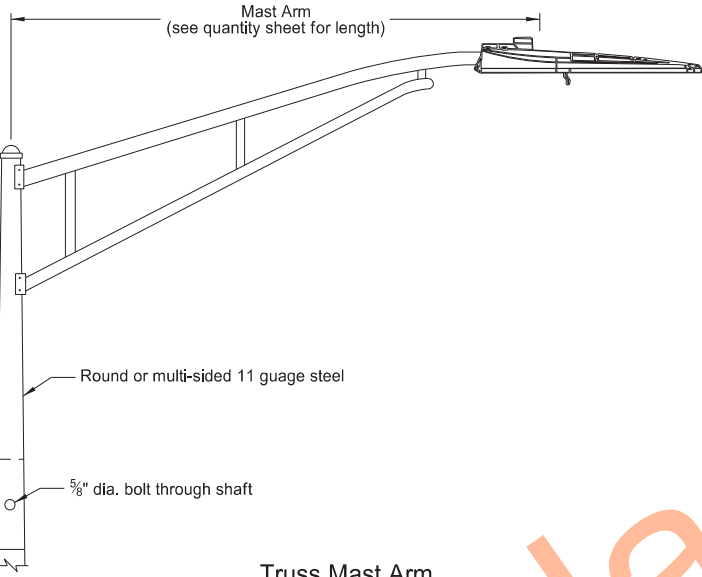
Top View



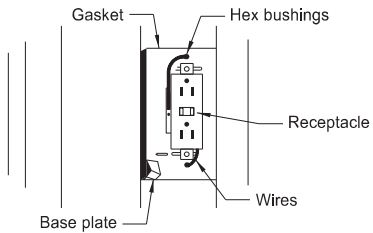
Plan View

Keeper Plate Detail (A)

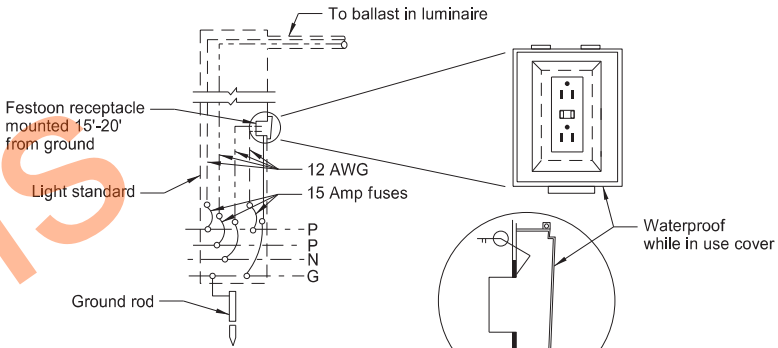
(A) ASTM A446 Grade "A" 28 gauge keeper plate on top of middle flat washer. Galvanize Keeper plate after fabrication.



Truss Mast Arm



Optional: Festoon receptacle mounted on multi-sided pole.



Pole Wiring Diagram

Receptacle Mounting Detail (B)

(B) Mount receptacle on side of pole that faces the street. Install Festoon Receptacle only when specified in the plans.

Notes:

Light Standard Locations: The minimum offset distance from the curb face is 3 feet. Offset light standards at least 3 feet in urban areas and where speeds are less than 30 mph. Where speeds are 30 mph or more, place light standards at least 16 feet from the driving lane.

Steel Standards: Touch up marred or scratched areas after erection.

Luminaire: Use internal ballast-constant wattage 120x240 voltage. See layout sheets for type of luminaire, wattage, I.E.S. distribution, and operating system.

Fusing: Fusing in base, see specifications.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-8-13	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice
08-28-19	New Design Engineer PE Stamp
11-01-24	Revised luminaire details/notes
09-12-25	Revised date to match

