DocuSign Envelope ID: 5DA403F6-101C-4B4F-96D6-1286BF0ADAB4

DESIGN DATA				
Traffic	Average Daily			
Current 2021	Pass: 580	Trucks: 165	Total: 745	
Forecast 2041	Pass: 725	Trucks: 210	Total: 935	
Clear Zone Distance: 30 ft		Design Speed: 65		
Minimum Sight Dist. for Stopping: 645 ft		Bridges: N/A		
Sight Dist. for No Passing Zone: 1100 ft				
Pavement Design Life 20(years)				
Design Accumulated One-way Flexible ESALs: 548,609				

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NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

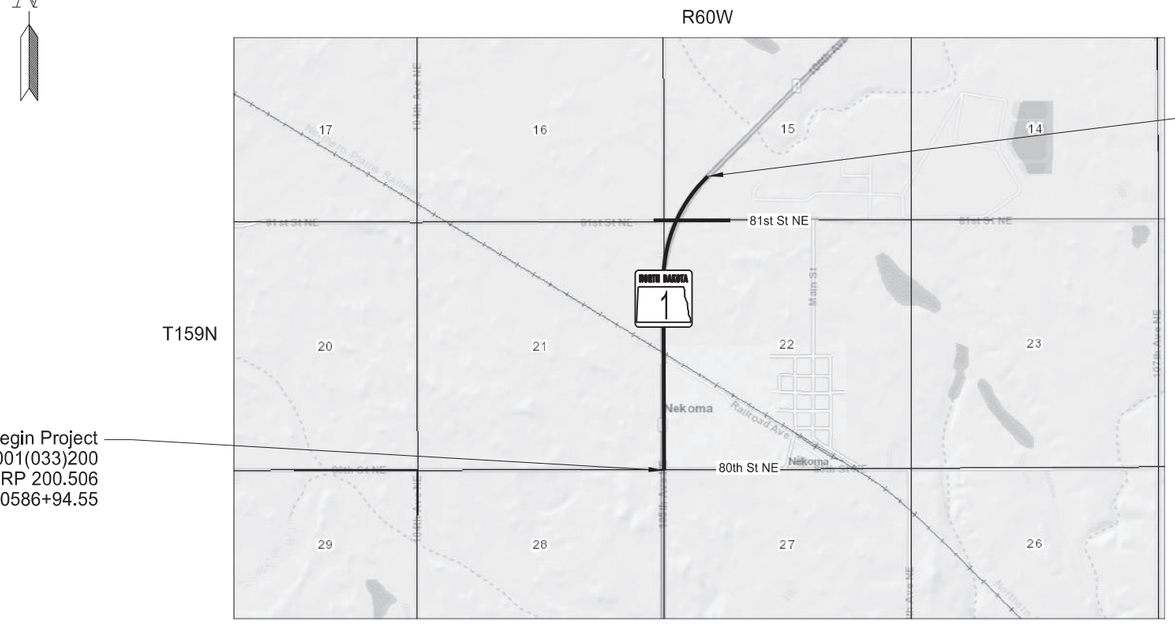
NH-3-001(033)200

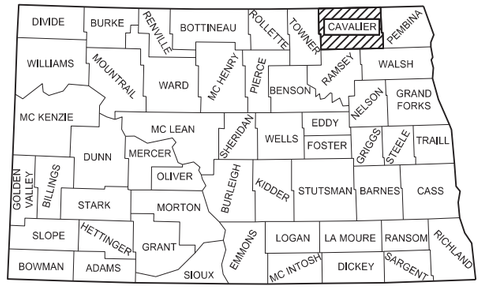
Cavalier County
Nekoma to Nekoma Spur

Major Rehabilitation
Mill & Overlay,Widening
Intersection Reconstruction

GOVERNING SPECIFICATIONS	Date Published and Adopted by the North Dakota Department of Transportation
Standard Specifications	1/1/2022
Supplemental Specifications	NONE

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
NH-3-001(033)200	1.267	1.267





STATE COUNTY MAP

DESIGNER
Ryan Schuehle
DESIGNER
Sam Westlund
DESIGNER
Ryan Mlekoday
DESIGNER
James Butler

ND DEPARTMENT OF TRANSPORTATION
OFFICE OF PROJECT DEVELOPMENT

Kirk Hoff
11/30/23

SRF CONSULTING GROUP INC.

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 11/30/23
NORTH DAKOTA

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82	1 - 10	Survey Data Layouts
90	1 - 4	Paving Layouts
100	1 - 12	Work Zone Traffic Control
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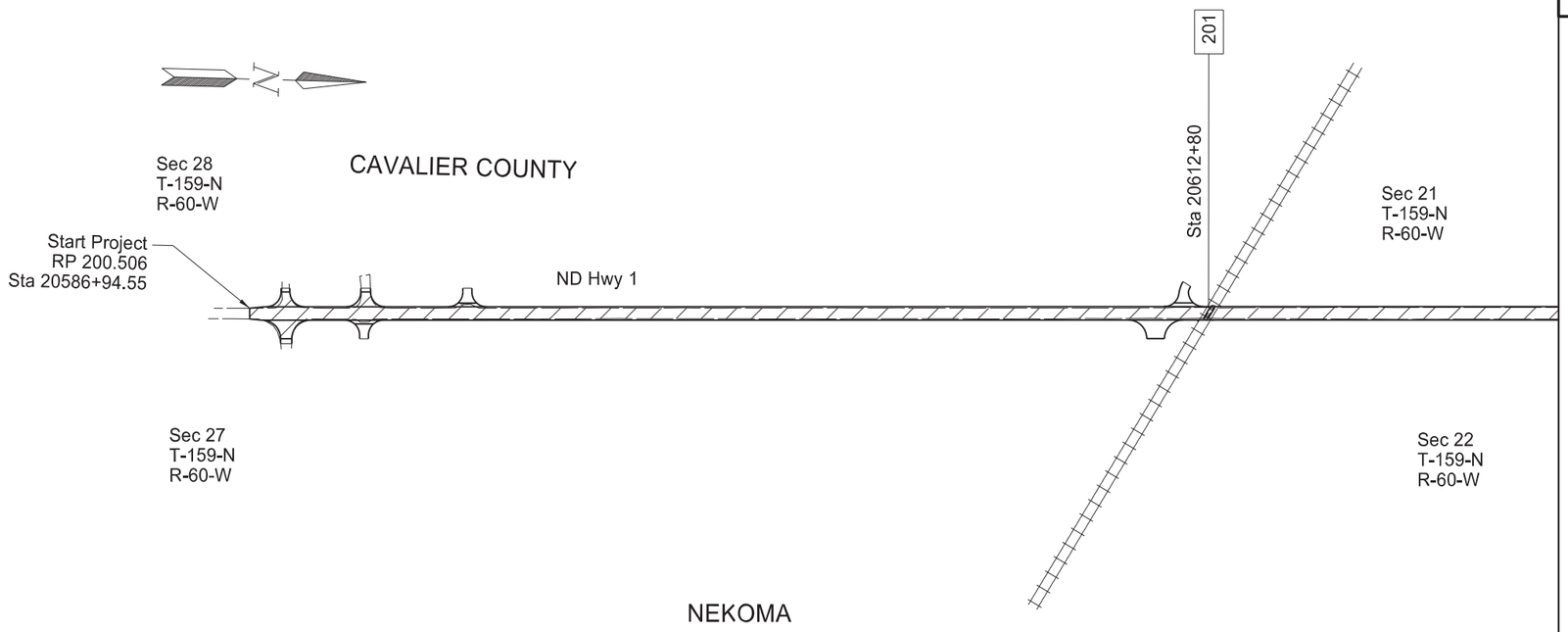
SPECIAL PROVISIONS

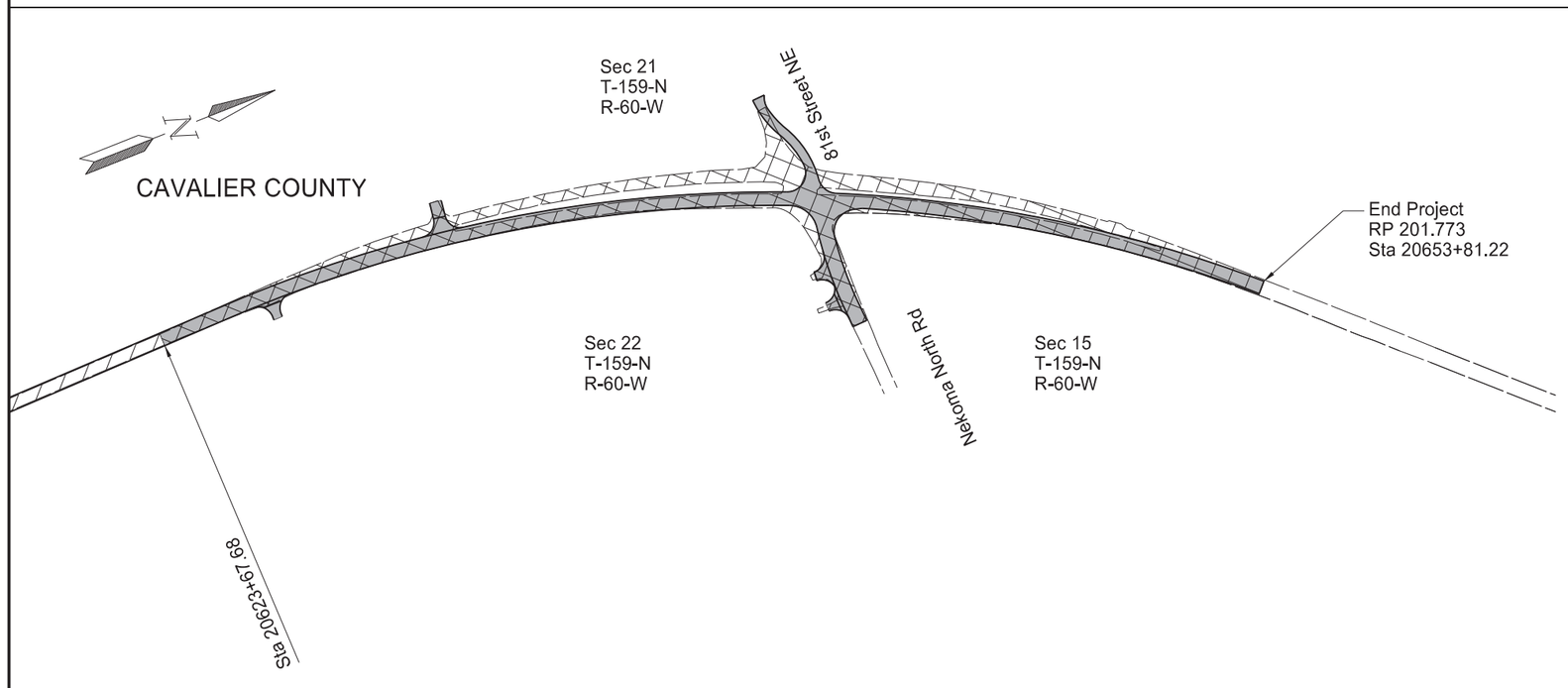
Number	Description
PSP 71(22)	Permits and Environmental Considerations
SP 294(22)	Railroad Requirements (Northern Plains Railroad)
SP 295(22)	Flexible Pavement Surface Tolerance
SP 329(22)	Utility Coordination
SP 532(22)	E-Ticketing (Mandatory)
SSP 01	Temporary Erosion and Sediment Best Management Practices
SSP 04	Longitudinal Joint Density

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Number	Description
D-101-1, 2,3,4	NDDOT Abbreviations
D-101-10	NDDOT Utility Company and Organization Abbreviations
D-101-20, 21	Line Styles
D-101-30, 31,32,33	Symbols
D-101-40	Cross Section Legend
D-203-5	Standard 90 Degree Flared Intersection - (No Center Left Turn Lane on Major Road)
D-203-8	Standard Rural Approaches
D-255-2	Erosion And Siltation Control - Erosion Control Blanket Installation
D-261-1	Erosion Control - Fiber Roll Placement Details
D-704-2	Traffic Control For Coring Of Hot Bituminous Pavement
D-704-7	Breakaway Systems For Construction Zone Signs - Perforated Tube
D-704-9	Construction Sign Details - Terminal And Guide Signs
D-704-11, 11A	Construction Sign Details - Warning Signs
D-704-13	Barricade And Channelizing Device Details
D-704-14	Construction Sign Punching And Mounting Details
D-704-17	Sign Layout For One Lane Closure Two Lane Roadway
D-704-19	Road Closure And Lane Closure On A Two Way Road Layouts
D-704-20	Terminal And Seal Coat Sign Layouts
D-704-22	Construction Truck And Temporary Detour Layouts
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D-704-33	Two-Lane Roadway Portable Rumble Strips
D-706-1	Bituminous Laboratory
D-708-6	Erosion And Siltation Controls - Median Or Ditch Inlet Protection
D-714-1	Reinforced Concrete Pipe Culverts And End Sections (Round Pipe)
D-714-4	Round Corrugated Steel Pipe Culverts And End Sections
D-714-25	Transverse Mainline Pipe Installation Detail - Pipes More Than 4 Feet Below Top of Subgrade
D-714-26	Transverse Mainline Pipe Installation Detail - Pipes 4 Feet or Less Below Top of Subgrade
D-754-9	Letter and Arrow Details
D-754-11	State Highway Route Shield Detail
D-754-19	(Conventional Use) Reference Markers
D-754-23	Perforated Tube Assembly Details
D-754-24, 25	Mounting Details Perforated Tube
D-754-24A	Breakaway Coupler System For Perforated Tubes
D-754-26, 29,33,40	Sign Punching, Stringer and Support Location Details Regulatory, Warning and Guide Signs
D-754-47	Sign Punching, Stringer and Support Location Details For Variable Length Signs
D-754-51, 74	Sign Punching, Stringer and Support Location Details - Route Marker Signs
D-754-87	Sign Punching, Stringer And Support Location Details For Street Name Signs And 911 Signs
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D-762-1	Pavement Marking Message Details
D-762-4	Pavement Marking
D-762-5	Pavement Marking for Standard 90 Degree Flared Intersection-(No Center Left Turn Lane on Major Road)
D-762-11	Short-Term Pavement Marking
D-766-1	Mailbox Location Details
D-900-2	Pavement Details At Railroad Crossing

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- Widening and Overlay
- Removal of Existing Intersection
- Proposed Intersection Reconstruction
- NPR Railroad

Scope of Work

Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

REGISTERED PROFESSIONAL ENGINEER
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PE-10772
DATE: 10/24/23
NORTH DAKOTA

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NOTES

GENERAL NOTES

105-P01 PLAN STATIONING: All project stations and offsets are measured from the Design ND HWY 1 alignment (OCL_ND1) unless otherwise noted.

Right of Way limits are measured from ND HWY 1 alignment (EX_ND1).

107-113 RAILROAD PROTECTIVE LIABILITY INSURANCE: This project crosses the Northern Plains Railroad at RP 200.99. The type of work that will be performed within the railroad right of way is earthwork, base work, and paving. Direct inquiries regarding protective liability insurance to:

Jesse Chalich
Vice President Operations
Northern Plains Railroad
P.O. Box 38
Fordville, ND 58231
701-229-3330
jesse_chalich@nprail.com

Obtain information regarding crossing number 698320E from the Federal Railroad Administration website: http://safetydata.fra.dot.gov/Officeofsafety/

107-P01 MAINTAINING TRAFFIC_DROP OFFS: 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 E.4, “Compaction Control Type C.”

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

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

The Engineer will not measure material used to construct the wedge. Include the cost of materials, equipment, labor, and incidentals required for this operation in the price bid for “Aggregate Base Course Cl 5” or “Common Excavation – Type B”.

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.

The requirements of Section 704.04 O, “Traffic Control for Uneven Pavement” apply to drop-offs created by milling or the placement of hot mix asphalt.

108-100 WEEKLY PLANNING & REPORTING MEETING: A weekly planning and reporting meeting is required.

202-P01 REMOVE OF AGGREGATE BASE & SURFACING: The tonnage of “Remove Aggregate Base & Surfacing” is based on the existing sections shown in Section 30. The tonnage includes the entire bituminous surfacing and the entire aggregate base except the bottom two inches. The quantity of “Remove Aggregate Base & Surfacing” has been deducted from the excavation quantity within the reconstruction limits. This work consists of removing the existing bituminous surfacing and aggregate base. Include all costs for removing, loading, hauling in the price bid for “Remove Aggregate Base & Surfacing.”

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 COMPACTION AND DENSITY CONTROL: Construct embankment in accordance with Section 203.04 G. 2, “Compaction Control, Type A”.

302-P01 TRAFFIC SERVICE AGGREGATE: Construct temporary traffic service aggregate wedges at both ends of the project and all approaches to provide a smooth transition from the existing pavement to the top of the new milled section, reclaimed section or aggregate base section.

Use material meeting requirements for Aggregate Base Course Class 5 for surfacing during Temporary Traffic Control Operations.

A quantity of 500 tons of traffic service aggregate has been provided for this use. Maintain transitions until paved. Include all costs to install, remove, and maintain these wedges in the unit price for “Traffic Service Aggregate”.

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

Place a longitudinal joint at the centerline of the roadway.
Construct each lane and the adjoining shoulder using a single pass or a hot seam.
A hot seam is defined as follows:

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

704-100 TRAFFIC CONTROL SUPERVISOR: Provide a Traffic Control Supervisor.

704-255 TRAFFIC CONTROL FOR SHOULDER DROP-OFF: If the shoulder and adjacent driving lane are not even at the end of the day, the following criteria will apply:

Place the following sign assembly at the locations listed below.

Sign Assembly: Sign No. W8-17-48 "Shoulder Drop Off" and supplemental plate Sign No. W20-52P-54 to identify the distance.

Locations:

- In advance of the drop off;
- Spaced at each mile from the advance sign; and
- At major intersections (CMC routes, state and US highways, and Interstate Ramps).

If the difference in elevation between the shoulder and the driving lane is 2" or greater, construct a slough on the driving lane that is 4:1 or flatter.

If the difference in elevation between the shoulder and driving lane is less than 2", no slough is required.

Sign assemblies will be measured and paid for according to Section 704 "Temporary Traffic Control".

704-500 PORTABLE RUMBLE STRIPS (PRS): Use PRS made of rubber or engineered polymers.

Install PRS as part of the temporary traffic control when the following signs are also part of the required traffic control set up:

- "Be Prepared to Stop" (W3-4); and
- "Flagger" symbol (W20-7)

Install PRS that meet the following criteria:

- Have no adhesives or fasteners required for placement;
- Have a manufacture's speed rating that meets or exceeds the posted speed limit; and
- Each strip in the array must weigh a minimum of 100 pounds.

Use individual PRS constructed in one of the following manners:

- A single piece;
- Interlocking segments; or
- Two pieces hinged at the midpoint.

An installed array of PRS consists of a minimum of 3 individual strips.

Move rumble strips with the flagging operation. Do not place rumble strips on horizontal curves.

The Engineer will count and measure each array as one unit. Include the cost of providing, installing, maintaining, and relocating PRS in the unit price bid for "Portable Rumble Strips"

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

Traffic control device quantities are estimated based on a 1.5-mile lane closure and the list below. The Department will pay for all necessary deployed devices, regardless of the length of the lane closure.

1. Standard D-704-19 Type F, Lane closure on a Two-Lane Road Using Flaggers
2. Standard D-704-20, layout G, basis of the Terminal Signing and Intersecting Routes – signing will be required at junctions: 80th St NE, Railroad Ave, 81st St NE.
3. Standard D-704-22, layouts K and L;
4. Standard D-704-26, layouts Y, BB, CC, DD, EE, FF and GG as needed.
5. Standard D-704-37, layout for reclaimed roadway two lane.

The required traffic control signs and devices are included in the “Traffic Control Devices List” and will be measured and paid at the contract unit price for each device.

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706-P01 FIELD OFFICE: Provide a field office which meets the following requirements:

1. Be completely insulated and weather tight.
2. Minimum total area of 450 square feet.
3. Indoor bathroom facilities, sewer and potable water.
4. Have a dependable source of electricity for power and lights with a minimum of 6 electrical outlets spaced throughout the building and light fixtures spaced to uniformly light the entire interior (lumens required 110 foot-candles).
5. Be wired for DSL Broadband internet with wireless Wi-Fi and have the capability to allow for hard wiring the computer. Include the cost of the installation and monthly fees.
6. A heating and cooling system that is capable of maintaining the temperature between 65°F and 78°F year around.
7. A minimum of 3 desks and 3 desk chairs, 3 extra chairs, a drawer file cabinet with at least two drawers, one table minimum of 2.5 ft x 5 ft.
8. Photocopy machine/Printer capable of 11x17 photocopies/prints and toner to last the duration of the project. Engineer will provide paper. Other features to include digital coping & scanning. (Fax capabilities can be included but not necessary).
9. The location of the field office will be on, or as close to the project as possible and approved by the Engineer. Any rental fees will be paid by the Contractor.
10. Make the field office available for occupancy one week before the start of the project and remain through project completion.
11. Heat, electric, internet service, sewer, and water hookups to be furnished by contractor, contractor to pay utility bill.

714-P01 PIPE EXTENSIONS: If the Contractor encounters silted-in pipes at locations where pipes are to be extended, remove the silted-in material from the ditch bottom to re-establish the flow line to the extended pipe invert elevation. Include the cost of removing the silt in the price bid for pipe pay items.

754-P01 OBJECT MARKERS - CULVERTS: Remove existing object markers located at culvert end sections that are impacted by earthwork activities and pipe replacements. Include the cost for removal and disposal in the price bid for “Object Markers – Culverts”.

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

766-P01 MAILBOXES: Notify affected mailbox owners in advance of disturbing the existing mailboxes and supports. Provide written notifications 30 days in advance of disturbance and provide copies of the notifications to the Engineer. Just prior to removing the existing mailbox and support, coordinate verbally with the mailbox owner to discuss resetting the existing mailbox on a new support. Contact the U.S. Postal Service for the mailbox owners’ contact information.

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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ENVIRONMENTAL NOTES

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:

EN-1 AQUATIC NUISANCE SPECIES (ANS): Equipment that was last used outside of North Dakota or within a Class I infested waterbody (identified on the North Dakota Game and Fish Department (NDGFD) website) requires an inspection by NDGFD. Notify the NDGFD at least 10 business days prior to pumps, watercraft, or any equipment entering a public water to allow the NDGFD sufficient time to inspect any and all such equipment for ANS. Contact the NDGFD ANS Coordinator, Ben Holen by e-mail - bholen@nd.gov for equipment inspections. Supply one of the following to the engineer as proof of compliance prior to work taking place in the water: (1) the NDGFD inspection report, (2) documented NDGFD correspondence (email or signed letter).

EN-2 TEMPORARY WETLAND IMPACT: Temporary impact areas within wetlands and or other waters are incorporated into the plans for this project. Remove temporary fill placed and sedimentation in wetlands or other waters. Restore these wetlands to preconstruction contours.

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Estimated Quantities

SPEC	CODE	ITEM DESCRIPTION	UNIT	Mainline				TOTAL
103	0100	CONTRACT BOND	L SUM	0.5				0.5
107	0104	RAILWAY PROTECTION INSURANCE-SITE 2	EA	1				1
109	1000	E-TICKETING	L SUM	0.5				0.5
202	0021	REMOVE AGGREGATE BASE & SURFACING	TON	19050				19050
202	0169	REMOVAL OF END SECTION-ALL TYPES & SIZES	EA	19				19
202	0170	REMOVAL OF CULVERTS-ALL TYPES & SIZES	LF	278				278
203	0101	COMMON EXCAVATION-TYPE A	CY	21570				21570
203	0109	TOPSOIL	CY	6574				6574
203	0113	COMMON EXCAVATION-WASTE	CY	16407				16407
203	0119	TOPSOIL-IMPORTED	CY	828				828
216	0100	WATER	M GAL	388				388
230	0165	SUBGRADE PREPARATION-TYPE A-12IN	STA	9				9
251	0200	SEEDING CLASS II	ACRE	10.7				10.7
251	2000	TEMPORARY COVER CROP	ACRE	10.7				10.7
253	0101	STRAW MULCH	ACRE	21.4				21.4
255	0102	ECB TYPE 2	SY	696				696
261	0112	FIBER ROLLS 12IN	LF	3360				3360
261	0113	REMOVE FIBER ROLLS 12IN	LF	3360				3360
302	0050	TRAFFIC SERVICE AGGREGATE	TON	500				500
302	0120	AGGREGATE BASE COURSE CL 5	TON	13911				13911
401	0050	TACK COAT	GAL	1676				1676
401	0060	PRIME COAT	GAL	5394				5394
401	0160	BLOTTER MATERIAL CL 44	TON	132				132
411	0100	MILLING PAVEMENT SURFACE	TON	1510				1510
430	0042	SUPERPAVE FAA 42	TON	6457				6457
430	1000	CORED SAMPLE	EA	36				36
430	5815	PG 58S-34 ASPHALT CEMENT	TON	390				390
702	0100	MOBILIZATION	L SUM	0.5				0.5
704	0100	FLAGGING	MHR	500				500
704	1000	TRAFFIC CONTROL SIGNS	UNIT	1330				1330
704	1048	PORTABLE RUMBLE STRIPS	EA	2				2
704	1052	TYPE III BARRICADE	EA	15				15
704	1060	DELINEATOR DRUMS	EA	119				119
704	1067	TUBULAR MARKERS	EA	46				46
704	1185	PILOT CAR	HR	180				180
704	1500	OBLITERATION OF PAVEMENT MARKING	SF	770				770
706	0400	FIELD OFFICE	EA	0.2				0.2
706	0500	AGGREGATE LABORATORY	EA	0.2				0.2
706	0550	BITUMINOUS LABORATORY	EA	0.2				0.2
706	0600	CONTRACTOR'S LABORATORY	EA	0.2				0.2
709	0100	GEOSYNTHETIC MATERIAL TYPE G	SY	11460				11460
714	0615	PIPE CONC REINF 24IN CL III	LF	70				70
714	3023	END SECT-TRAVERSABLE REINF. CONC.24IN	EA	6				6
714	4105	PIPE CONDUIT 24IN	LF	89				89
714	4120	PIPE CONDUIT 42IN	LF	98				98
714	5035	PIPE CORR STEEL .064IN 24IN	LF	74				74
714	5810	END SECT CORR STEEL .064IN 18IN	EA	2				2

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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Estimated Quantities

SPEC	CODE	ITEM DESCRIPTION	UNIT	Mainline				TOTAL
714	5820	END SECT CORR STEEL .064IN 24IN	EA	5				5
714	6506	END SECT-TRAVERSABLE METAL 24IN	EA	1				1
714	9660	REMOVE & RELAY END SECTION-ALL TYPE & SIZES	EA	5				5
720	0125	ALIGNMENT MONUMENTS	EA	2				2
754	0110	FLAT SHEET FOR SIGNS-TYPE XI REFL SHEETING	SF	66.1				66.1
754	0112	FLAT SHEET FOR SIGNS-TYPE IV REFL SHEETING	SF	7.5				7.5
754	0206	STEEL GALV POSTS-TELESCOPING PERFORATED TUBE	LF	209.4				209.4
754	0592	RESET SIGN PANEL	EA	6				6
754	0596	RESET MILE POST	EA	1				1
754	0805	OBJECT MARKERS - CULVERTS	EA	26				26
760	0025	SINUSOIDAL RUMBLE STRIP - ASPHALT SHOULDER	MILE	2.494				2.494
760	0027	SINUSOIDAL RUMBLE STRIP - ASPHALT CENTERLINE	MILE	1.247				1.247
762	0103	PVMT MK PAINTED-MESSAGE	SF	130				130
762	0432	SHORT TERM 6IN LINE-TYPE NR	LF	12191				12191
762	1106	PVMT MK PAINTED 6IN LINE	LF	19227				19227
762	1112	PVMT MK PAINTED 12IN LINE	LF	120				120
762	1124	PVMT MK PAINTED 24IN LINE	LF	96				96
766	0100	MAILBOX-ALL TYPES	EA	2				2
990	0400	PIPE CLEANOUT	EA	1				1

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BASIS OF ESTIMATE

PAVING TABLES

		Mill & Overlay, Widening			Reconstruction		
		Nekoma to Nekoma Spur			Nekoma to Nekoma Spur (Mainline)		
		Sta 20585+94.55 to Sta 20623+67.68			Sta 20623+67.68 to Sta 20653+81.22		
		37.732 Sta			30.135 Sta		
Material	Unit	Width (ft)	Quantity per Station	Total	Width (ft)	Quantity per Station	Total
Aggregate Cl 5 @ 1.875 Ton/CY	Ton	5.0 - 5.0	62.81	2370.00	39.0	282.43	8510.93
Prime Coat @ 0.25 Gal/SY	Gal	5.0 - 5.0	26.79	1011.00	39.0	115.35	3476.05
Blotter Material Cl 44 @ 12 lbs/SY	Ton	5.0 - 5.0	0.66	25.00	39.0	2.79	84.07
Tack Coat @ 0.05 Gal/SY (1 Lift)	Gal	37.5	20.88	788.00	37.5	21.58	650.42
Superpave FAA 42 @ 2 Ton/CY (Base Lift)	Ton	5.0 - 5.0	14.24	537.41	39.0	52.87	1593.14
Superpave FAA 42 @ 2 Ton/CY (Top Lift)	Ton	37.5	44.07	1662.76	37.5	50.79	1530.67
PG 58S-34 Asphalt Cement @ 6% - Superpave FAA 42 (Base Lift)	Ton	5.0 - 5.0	0.85	32.24	39.0	3.17	95.59
PG 58S-34 Asphalt Cement @ 6% - Superpave FAA 42 (Top Lift)	Ton	37.5	2.64	99.77	37.5	3.05	91.84

		Reconstruction			Reconstruction		
		Nekoma to Nekoma Spur (Nekoma North Rd)			Nekoma to Nekoma Spur (County Road 26)		
		Sta 101+28.40 to Sta 104+11.59			Sta 105+13.75 to Sta 108+00		
		2.832 Sta			2.863 Sta		
Material	Unit	Width (ft)	Quantity per Station	Total	Width (ft)	Quantity per Station	Total
Aggregate Cl 5 @ 1.875 Ton/CY	Ton	27.3	242.74	736.71	43.3	357.62	1179.08
Prime Coat @ 0.25 Gal/SY	Gal	27.3	101.70	308.66	43.3	146.75	483.82
Blotter Material Cl 44 @ 12 lbs/SY	Ton	27.3	2.44	7.41	43.3	3.52	11.61
Tack Coat @ 0.05 Gal/SY	Gal	25.6	18.29	55.50	41.6	27.70	91.33
Superpave FAA 42 @ 2 Ton/CY (Base Lift)	Ton	27.3	44.69	135.64	43.3	69.73	229.91
Superpave FAA 42 @ 2 Ton/CY (Top Lift)	Ton	25.6	41.25	125.21	41.6	64.37	212.22
PG 58S-34 Asphalt Cement @ 6% - Superpave FAA 42 (Base Lift)	Ton	27.3	2.68	8.14	43.3	4.18	13.79
PG 58S-34 Asphalt Cement @ 6% - Superpave FAA 42 (Top Lift)	Ton	25.6	2.48	7.51	41.6	3.86	12.73

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 6/20/24
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-001(033)200	10	2

BASIS OF ESTIMATE

REMOVAL/MILLING

Bituminous Pavement @ 2.0 Ton/CY
Aggregate @ 1.875 Ton/CY

		Mill & Overlay, Widening			Reconstruction		
		Nekoma to Nekoma Spur			Nekoma to Nekoma Spur (Mainline)		
		Sta 20585+94.55 to Sta 20623+67.68			Sta 20623+67.68 to Sta 20653+81.22		
		37.732 Sta			30.135 Sta		
Material	Unit	Width (ft)	Quantity per Station	Total	Width (ft)	Quantity Per Station	Total
Milling Pavement Surface - 2"	Ton	26	40.02	1510	-	-	-
Removal Aggregate Base & Surfacing Mainline Surfacing	Ton	-	-	-	33	632.16	19050
Total Milling Pavement Surface	Ton	1510					
Total Removal Aggregate Base & Surfacing	Ton	19050					
Total Removals	Ton	20560					

WATER

216 0100 Water			
Material	**Basis**	**Basis Quantity**	**Quantity (Mgal)**
Dust Palliative	25 Mgal/Mile	1.267 Mile	32
Aggregates	20 gal/Ton	14411 Ton	289
Embankment	10 gal/CY	6692 CY	67
		Total:	388

RUMBLE STRIPS - SHOULDERS

760 0025 Rumble Strips – Sinusoidal Asphalt Shoulders			
Begin Station	End Station	Basis	Quantity (mi)
20587+77.28	20653+61.57	10560 LF/Mile	2.494

RUMBLE STRIPS - CENTERLINE

760 0027 Rumble Strips – Sinusoidal Asphalt Centerline			
Begin Station	End Station	Basis	Quantity (mi)
20587+77.28	20653+61.57	5280 LF/Mile	1.247

SUBGRADE PREPARATION

230 165 SUBGRADE PREPARATION - TYPE A - 12IN		
Begin Station	End Station	Quantity (STA)
20636+72.58	20645+72.58	9

MAILBOXES

766 0100 Mailbox- All Types		
Station	Type	Work
20642+57 - RT	Single	Replace Support
20631+52 - LT	Single	Replace Support

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-001(033)200	10	3

BASIS OF ESTIMATE

SHORT TERM PAVMENT MARKING

Short Term Pavement Marking (Short Term Line-Type NR)				
Mainline - Sta 20586+94.55 to Sta 20623+67.70	Basis	Amount	Applications (1)	Total
Centerline – 6” Yellow (10' Line, 30' Skip)	1320 LF/Mile	0.571 Miles	2 EA	1508 LF
Mainline - Sta 20623+67.70 to Sta 20653+81.22	Basis	Amount	Applications (2)	Total
Centerline - 6" Yellow (10' Line, 30' Skip)	1320 LF/Mile	0.696 Miles	3 EA	2757 LF
Flared Intersection - Nekoma RD N/81st St NE (D-762-5) Sta 101+28.37 to Sta 108+00.00	Basis	Amount	Applications (2)	Total
Mainline Centerline - 6" Yellow Barrier	1290 LF/EA	1 EA	3 EA	3870 LF
Sideroad Centerline - 6" Double Yellow Barrier	10560 LF/Mile	0.128 Miles	3 EA	4056 LF

(1) Application of temporary pavement marking on milled surface, and top lift.
(2) Application of temporary pavement marking on primed surface, base lift, and top lift.

PERMANENT PAVEMENT MARKING

Permanent Pavement Marking (Painted Pvmt Mk)			
Mainline - Sta 20586+94.55 to Sta 20653+81.22	Basis	Amount	Total
Centerline - 6" Yellow (10' Line, 30' Skip)	1320 LF/Mile	1.267 Miles	1673 LF
Edge Line - 6" White	10560 LF/Mile	1.267 Miles	13380 LF
Railroad Crossing (D-762-1)	Basis	Amount	Total
Railroad Cross & RR Message	65 SF/EA	2 EA	130 SF
24" White Line	36 LF/EA	2 EA	72 LF
Flared Intersection - Nekoma RD N/81st St NE (D-762-5) Sta 101+28.37 to Sta 108+00.00	Basis	Amount	Total
Mainline Centerline - 6" Yellow Barrier	1290 LF/EA	1 EA	1290 LF
Sideroad Centerline - 6" Double Yellow Barrier	10560 LF/Mile	0.128 Miles	1352 LF
Sideroad Edge Line - 6" White	10560 LF/Mile	0.128 Miles	1352 LF
6" White Line (Around Cross Hatch)	90 LF/EA	2 EA	180 LF
12" White Cross Hatch Line	60 LF/EA	2 EA	120 LF
24" White Stop Bar	12 LF/EA	2 EA	24 LF

SUMMARY OF PAVEMENT MARKING QUANTITIES

SPEC	CODE	BID ITEM	QTY	UNIT
762	0103	PVMT MK PAINTED-MESSAGE	130	SF
762	1106	PVMT MK PAINTED 6IN LINE	19227	LF
762	1112	PVMT MK PAINTED 12IN LINE	120	LF
762	1124	PVMT MK PAINTED 24IN LINE	96	LF
762	0432	SHORT TERM 6IN LINE-TYPE NR	12191	LF

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-001(033)200	10	4

BASIS OF ESTIMATE

CORE SAMPLES

430 1000 HMA Cored Samples

Specification Section	Location	Begin Station	End Station	A	B		C	Quantity (AxBxC)	Quantity (1 per mile)	Unit
				Distance (FT) ÷1000	Lanes	Joints	Lifts			
430.04 I.2b(1), "General"	ND 1 Mainline	20586+94.55	20623+67.70	4	2	N/A	1	8	N/A	EA
	ND 1 Mainline	20623+67.70	20653+81.22	3	2	N/A	2	12	N/A	EA
	81st ST NE	101+28.37	108+00.00	1	2	N/A	2	4	N/A	EA
SSP 4 Longitudinal Joint Density in HMA Pavements (Centerline)	ND 1 Mainline	20586+94.55	20623+67.70	4	N/A	1	1	4	N/A	EA
	ND 1 Mainline	20623+67.70	20653+81.22	3	N/A	1	2	6	N/A	EA
430.04 I.2b(2), "Pavement Thickness Determination Cores"								N/A	2	EA
							Total	34	2	EA

CORE DATA

Core Data

Mile Point	RT. Or LT.	Depth (inches)
200.75	RT	7.375
201	LT	8.25
201.25	RT	13
201.5	LT	11.5
201.75	RT	12.5

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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203	101	Common Excavation-Type A	21450 CY
203	109	Topsoil	6574 CY
203	113	Common Excavation-Waste	16287 CY
203	119	Topsoil-Imported	828 CY

Earthwork Summary			
Location	Common Excavation - Type A (CY) (Pay Item)	Embankment (1) (CY)	Common Excavation - Waste (CY) (Pay Item)
	A	B	C = A-B
ND Hwy 1	16,660	4,567	12,093
81st Street NE	3,958	239	3,719
Co Road 26 (Nekoma Rd North)	832	357	475
Totals:	21,450	5,163	16,287

Notes:
(1) SHRINKAGE: 25% additional volume is included for shrinkage in earth embankment.

Topsoil Summary				
Location	Topsoil Excavation (CY)	Topsoil Required (CY)	Topsoil (CY) (Pay Item)	Topsoil-Imported (CY) (Pay Item)
Project Area	A	B	A	C = B-A
Totals:	6,574	7,402	6,574	828

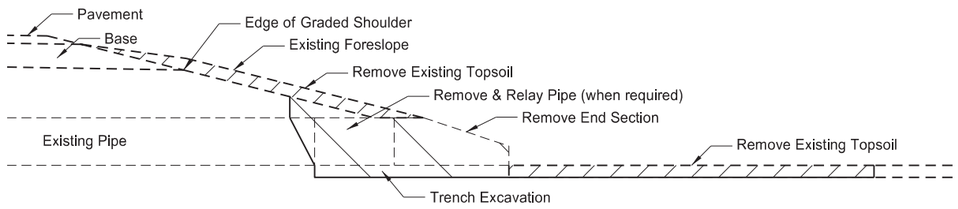
Data Tables

Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

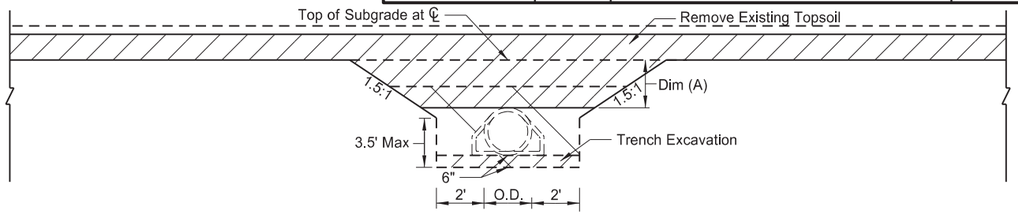
REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 10/24/23
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	20	1



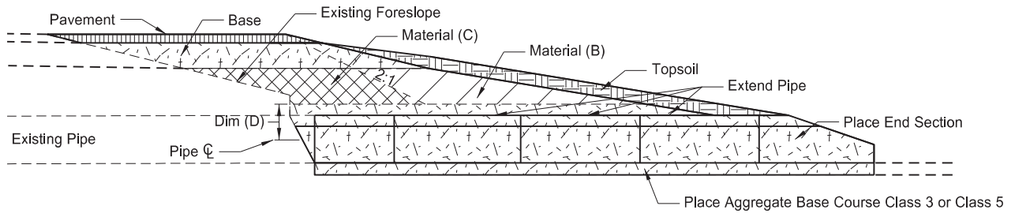
Removal Section

Cross Section View



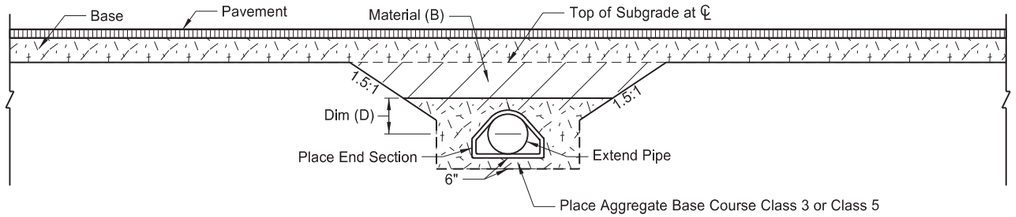
Removal Detail

Side View



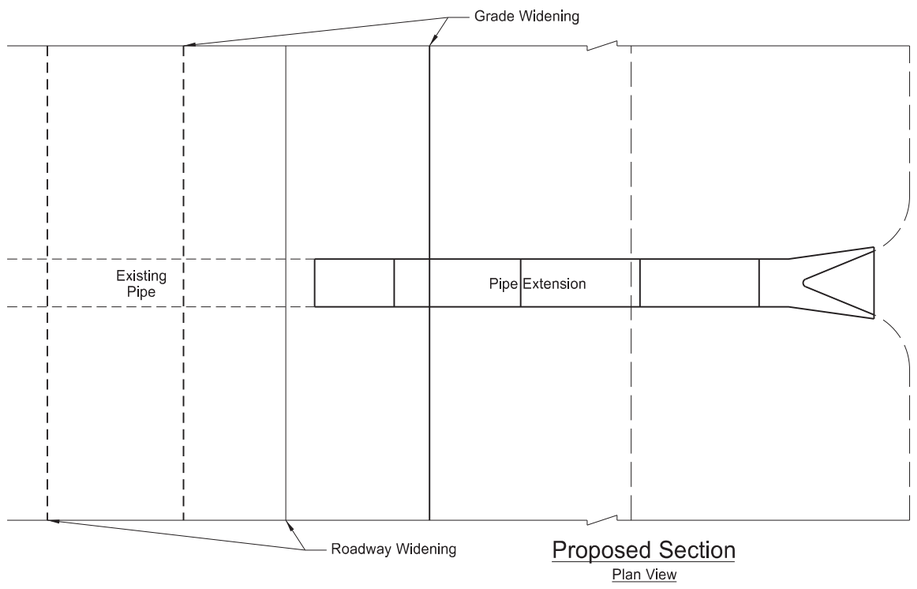
Proposed Section

Cross Section View



Backfill Detail

Side View (Topsoil not shown)



Proposed Section

Plan View

Pay Items
1) Pipe*
2) Remove & Relay Pipe - All Types & Sizes (when required)
3) Remove & Reset End Section or
   Remove End Section and Place New End Section
4) Borrow Excavation or Common Excavation
5) Topsoil
6) Seeding
7) Mulching

*Included in Pipe Pay Item
1) Pipe
2) Trench excavation
3) Aggregate Base Course Class 3 or Class 5

Pipe Materials	Dim (A)<=4 Feet		Backfill Dimension
	Material (B)	Material (C)	Dim (D)
Concrete	Embank or Aggr	Aggregate	0.5 O.D.
Metal	Embank or Aggr	Aggregate	0.5 O.D.+1 Foot

Pipe Materials	Dim (A)>4 Feet		Backfill Dimension
	Material (B)	Material (C)	Dim (D)
Concrete	Embankment	Embankment	0.5 O.D.
Metal	Embankment	Embankment	0.5 O.D.+1 Foot

NOTES:
1. Embankment may be either Borrow Excavation or Common Excavation

2. Aggregate may be either Class 3 or Class 5 Aggregate Base Course.

Mainline Widening CL Pipe Extension Detail

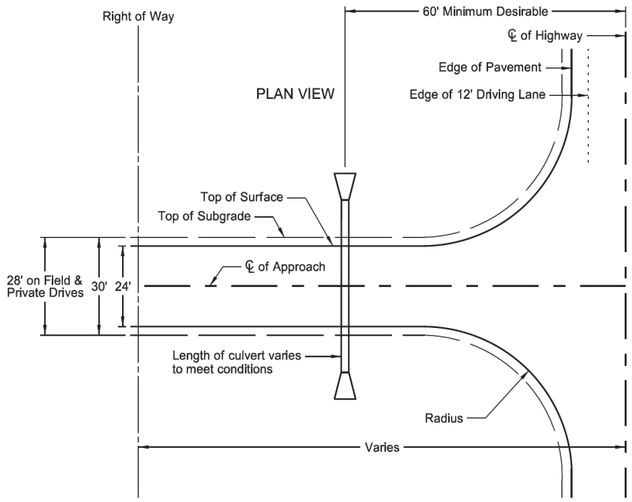
Major Rehabilitation
ND Hwy 1

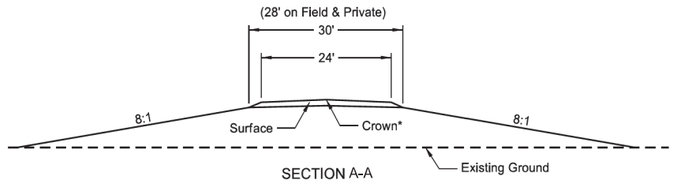
Nekoma to Nekoma Spur

REGISTERED PROFESSIONAL ENGINEER
SAMUEL NOAH WESTLUND
PE-10795
DATE: 10-24-23
NORTH DAKOTA

STANDARD RURAL APPROACHES

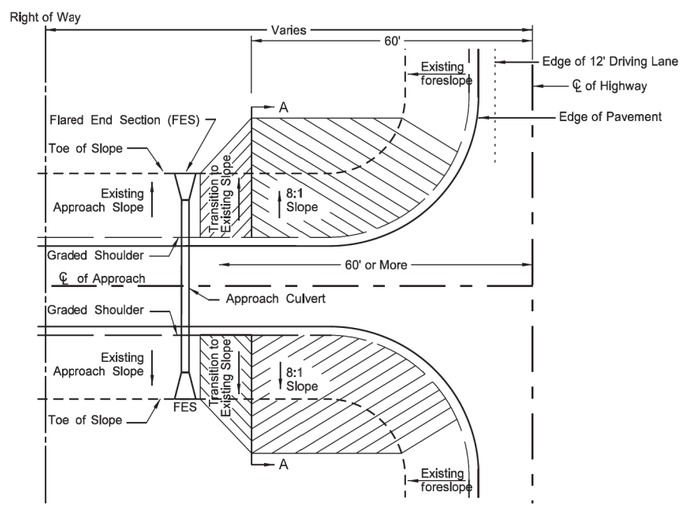
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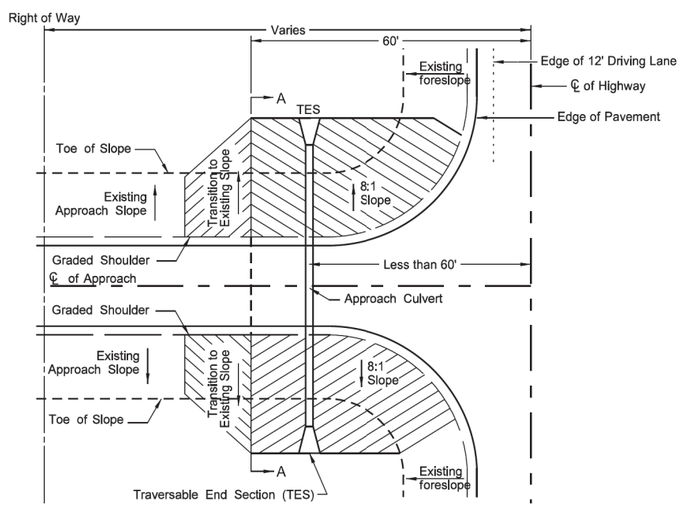
SECTION A-A

APPROACH INSLOPES



CASE 1

APPROACH PIPE LOCATED
60' OR MORE FROM ℄



CASE 2

APPROACH PIPE LOCATED
LESS THAN 60' FROM ℄

Approach Description		
Station	Alignment	Type
20587+94 LT	OCL_ND1	Gravel Section Line (80th St NE)
20587+94 RT	OCL_ND1	Paved Section Line (80th St NE) with 24" CSP
20590+03 LT	OCL_ND1	Gravel Private Drive with 24" CSP
20590+08 RT	OCL_ND1	Field Drive with 24" CSP
20592+81LT	OCL_ND1	Field Drive with 24" CSP
20611+42 RT	OCL_ND1	Gravel Private Drive with 24" CSP
20612+10.5 LT	OCL_ND1	Field Drive
20626+73 RT	OCL_ND1	Field Drive with 24" CSP
20631+68 LT	OCL_ND1	Gravel Private Drive with 18" CSP
20640+54.6 LT	OCL_ND1	Paved Section Line (81st St NE)
20641+92.4 RT	OCL_ND1	Paved Section Line (81st St NE)
106+41.9 RT	PR81ST	Paved Private Drive
107+24.3 RT	PR81ST	Field Drive

Note: Topsoil, embankment, and pipe quantities are included in other plan sections

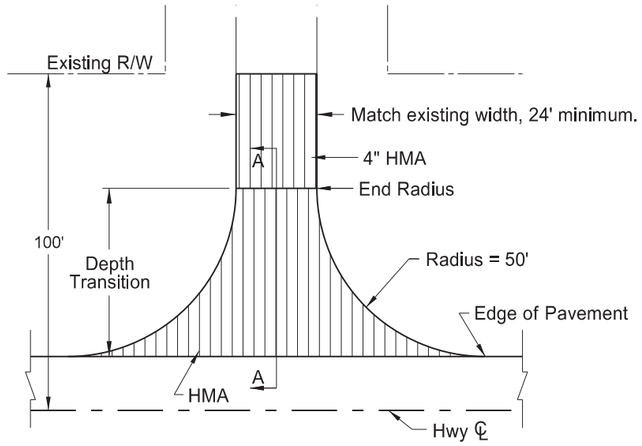
Approach Slope Flattening Detail

Major Rehabilitation
ND Hwy 1

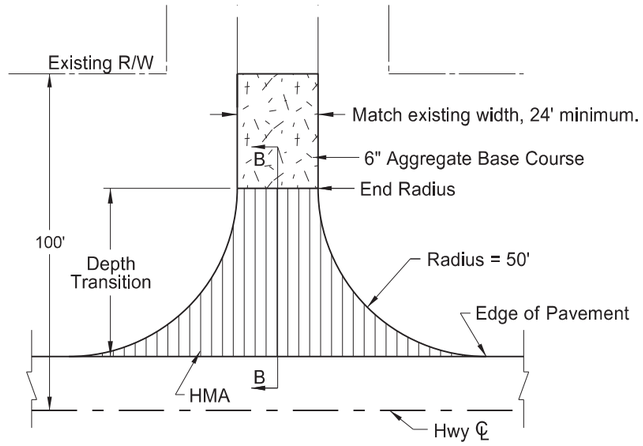
Nekoma to Nekoma Spur

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 10/24/23
NORTH DAKOTA

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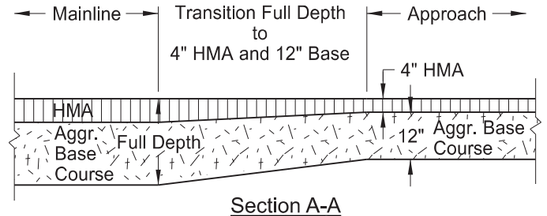
(1) Paved Section Line, County Road, or Street Approach



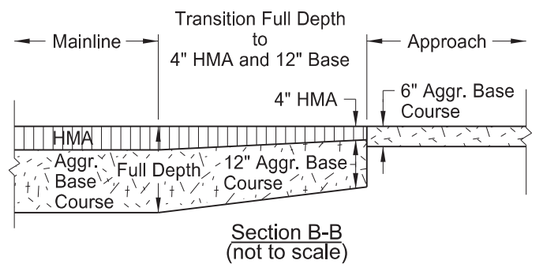
(2) Gravel Section Line, County Road, or Street Approach

Notes:

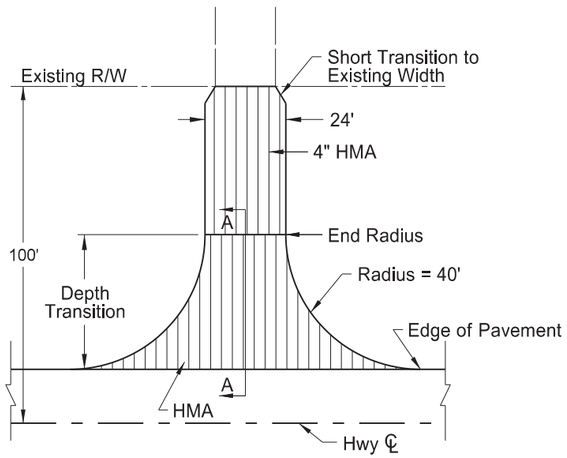
1. Actual HMA paving and aggregate base course locations may vary in the field, as approved by the Engineer.
2. Quantity totals have been included in the bid items of the "Estimate of Quantities" of the plans.



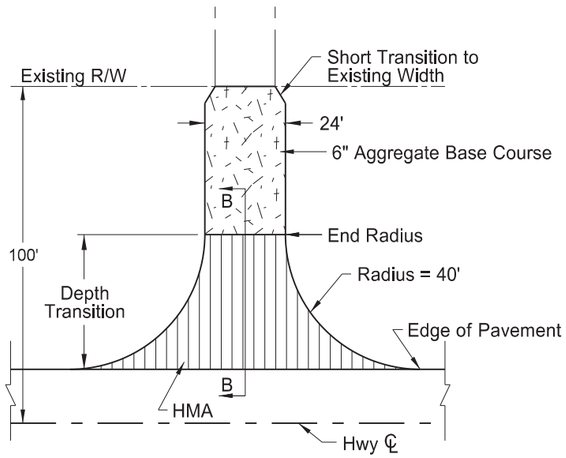
Section A-A
(not to scale)



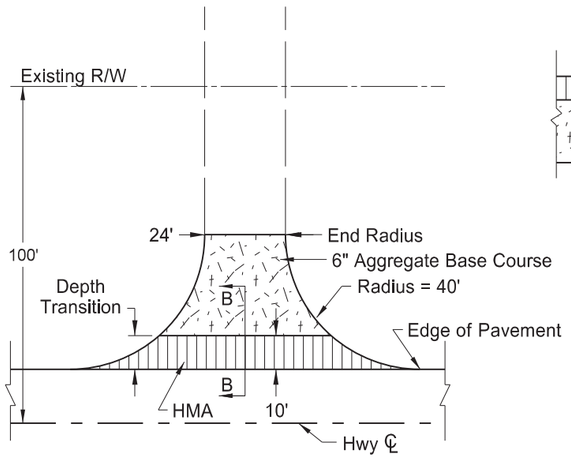
Section B-B
(not to scale)



(3) Paved Private Drive Approach



(4) Gravel Private Drive Approach



(5) Field Drive Approach

BASIS OF ESTIMATE		(1)	(2)	(3)	(4)	(5)	
ITEM	UNIT	Paved Section Line	Gravel Road	Paved Private Drive	Gravel Private Drive	Field Drive	TOTALS
Number of Locations	#	1	1	1	3	5	
Aggregate Base Course CL 5 @ 1.875 Ton/CY	TON	238	76	72	340	388	1114
Tack Coat @ 0.05 Gal/SY	GAL	14	9	9	40	19	91
Prime Coat @ 0.25 Gal/SY	GAL	71	0	43	0	0	114
Blotter Material CL 44 @ 12 lbs/SY	TON	2	0	1	0	0	3
Superpave FAA 42 @ 2 Ton/CY	TON	65	42	59	179	84	429
PG 58S-34 Asphalt Cement @ 6.0%	TON	4	2	4	11	5	26

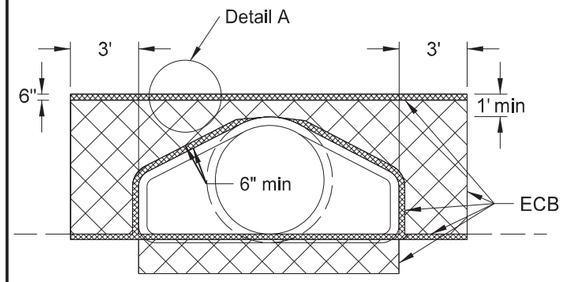
Approach Paving Details for
New or Regrading Rural Approaches
(Approach Grading)

Major Rehabilitation
ND Hwy 1

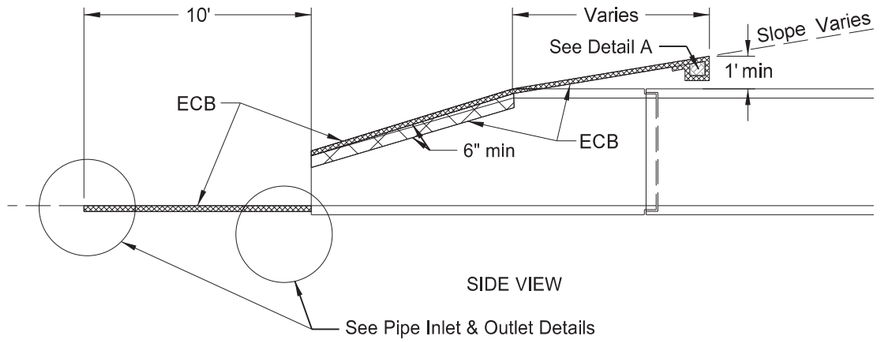
Nekoma to Nekoma Spur

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 10/24/23
NORTH DAKOTA

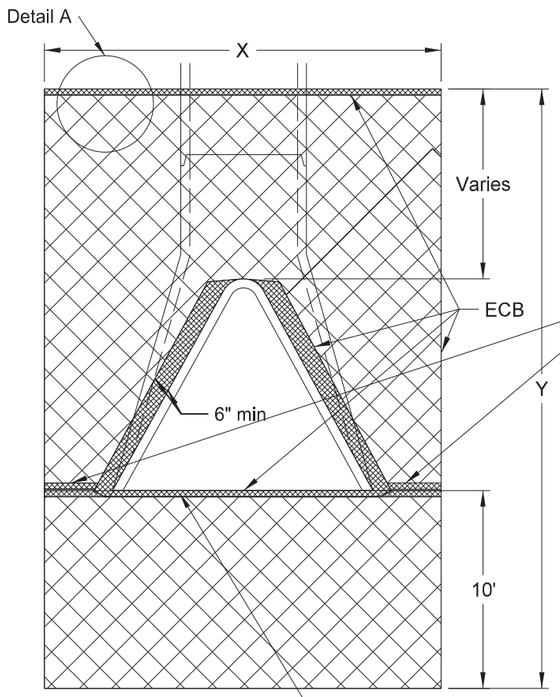
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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FRONT VIEW



SIDE VIEW

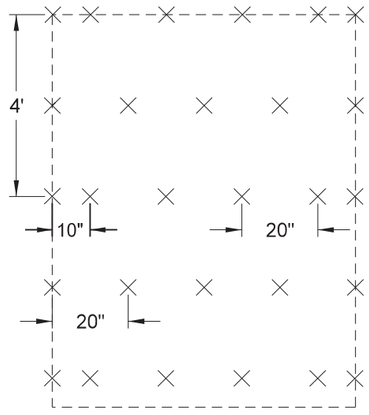


TOP VIEW

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

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.



STAPLE PATTERN

Location to be Protected	Culvert Type Appr/CL	Pipe Diam (Inch)	No	Unit Quantity	Total Quantity			
					Type 1	Type 2	Type 3	Type 4
Station					(SY)	(SY)	(SY)	(SY)
20587+94 Rt	Appr	24	2	24		48		
20587+94 Lt	Appr	24	2	24		48		
20590+03 Rt	Appr	24	2	24		48		
20590+08 Lt	Appr	24	2	24		48		
20592+81 Lt	Appr	24	2	24		48		
20597+64	CL	24	2	22		44		
20611+42 Rt	Appr	24	2	24		48		
20612+20	CL	24	2	22		44		
20613+40	CL	24	2	22		44		
20626+73 Rt	Appr	18	2	22		44		
20631+68 Lt	Appr	18	2	22		44		
20640+40	CL	42	2	28		56		
105+45	CL	24	2	22		44		
106+39 Rt	Appr	18	2	22		44		
107+25 Rt	Appr	18	2	22		44		
Total (SYs)						696		

APPROACH CULVERTS

DIA	X	Y	Surface area to be protected	ECB
In	Ft	Ft	SF	SY
15	9.0	20.0	176.0	20
18	9.5	20.7	190.7	22
21	9.5	21.0	190.9	22
24	10.5	21.6	214.1	24
27	11.0	22.0	226.3	25
30	11.6	22.5	241.5	27
36	12.7	23.3	268.8	30
42	13.3	23.3	279.7	31
48	13.8	24.0	293.2	33
54	14.5	23.4	300.6	34
60	15.0	23.0	307.5	35
66	15.6	24.0	325.6	37
72	16.2	24.5	340.6	38

Note: Quantities based on 8:1 slope.

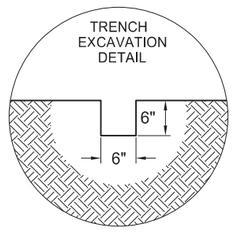
CENTERLINE CULVERTS

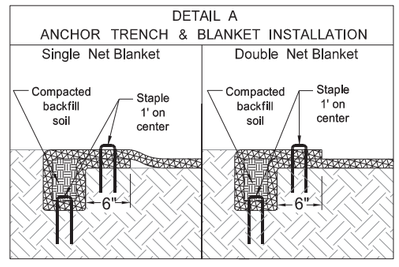
DIA	X	Y	Surface area to be protected	ECB
In	Ft	Ft	SF	SY
24	10.5	19.6	193.1	22
27	11.0	20.0	204.3	23
30	11.6	20.5	218.3	25
36	12.7	21.2	242.1	27
42	13.3	21.2	251.8	28
48	13.8	22.0	265.6	30
54	14.5	21.5	273.7	31
60	15.0	21.0	278.3	31
66	15.6	22.0	295.7	33
72	16.2	22.5	309.2	35

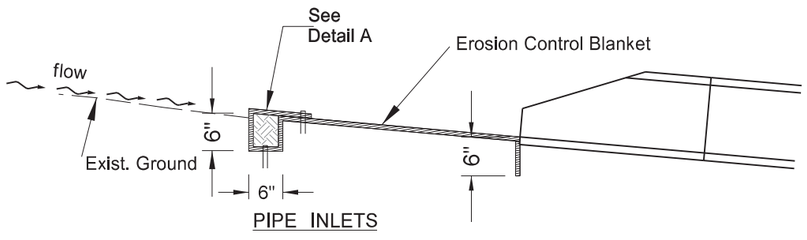
Note: Quantities based on 6:1 slope.

DIA	X	Y	Surface area to be protected	ECB
In	Ft	Ft	SF	SY
24	10.5	17.6	172.1	20
27	11.0	18.0	182.3	21
30	11.6	18.5	195.1	22
36	12.7	19.2	216.7	24
42	13.3	19.2	225.2	25
48	13.8	20.0	238.0	27
54	14.5	19.5	244.7	28
60	15.0	19.0	248.3	28
66	15.6	20.0	264.5	30
72	16.2	20.5	276.8	31

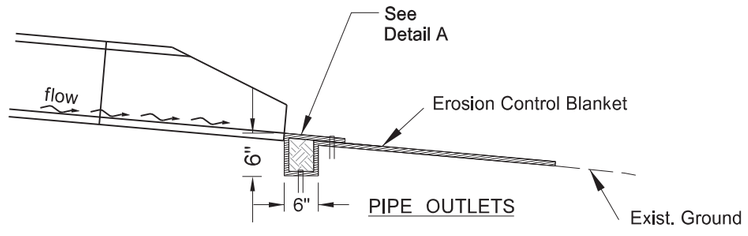
Note: Quantities based on 4:1 slope.







PIPE INLETS



PIPE OUTLETS

Erosion Control at Culvert Flared End Section

Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

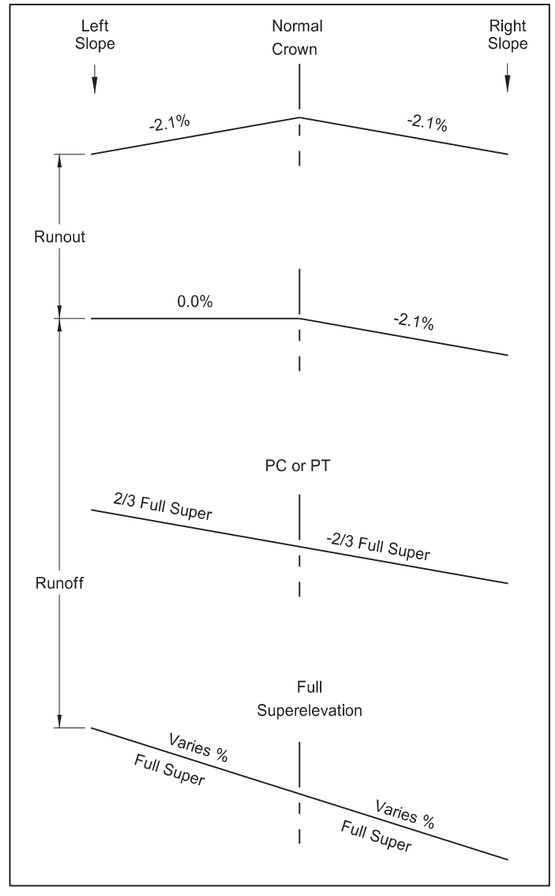
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PE-10772
DATE: 10/24/23
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	20	5

P.C. Station	20625+66.27
P.I. Station	20640+80.27
Delta =	44° 43' 33.60" (RT)
Degree =	01° 33' 25.20"
Tangent =	1513.998
Length =	2872.651
Radius =	3680.000
External =	299.270
P.T. Station	20654+38.93

Station	Left Slope	Right Slope
PC - 165'	-2.1	-2.1
PC - 94'	0.0	-2.1
PC	2.8	-2.8
PC + 47'	4.2	-4.2
PT - 47'	4.2	-4.2
PT	2.8	-2.8
PT + 94'	0.0	-2.1
PT + 165'	-2.1	-2.1

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



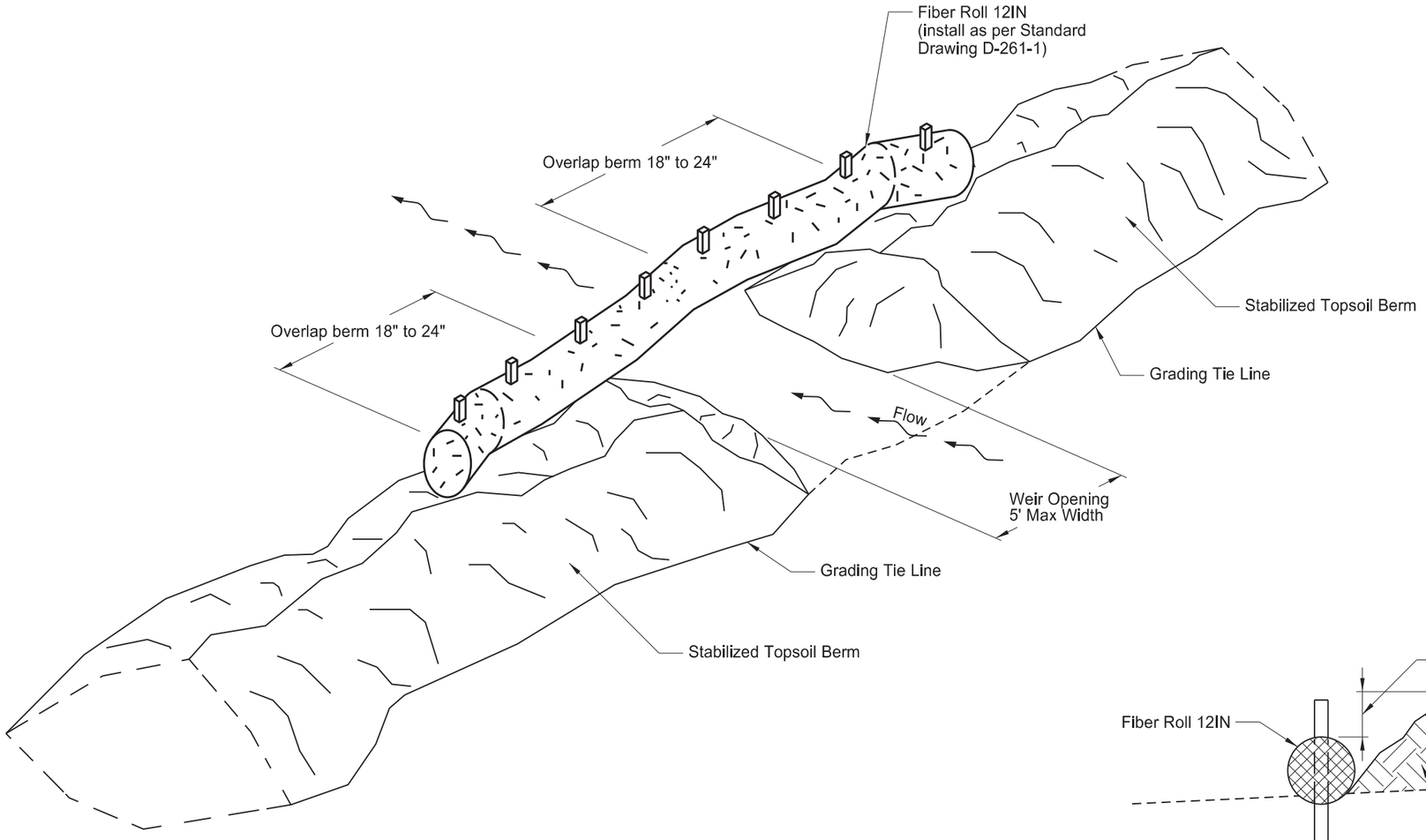
Superelevation Table

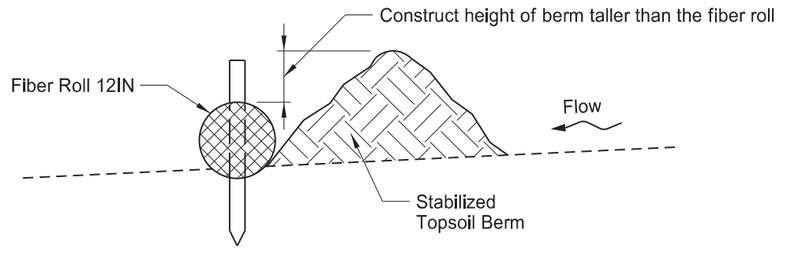
Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

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NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	20	6





Topsoil Berm Detail

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. Include costs to create, stabilize, maintain, and dismantle the berm in the unit price bid for "Topsoil".
7. Include costs for fiber rolls in the unit price bid for "Fiber Rolls 12IN".

Temporary Topsoil Berm and Weir Detail

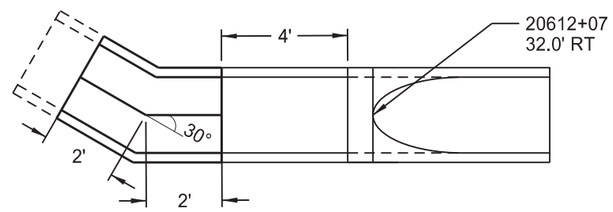
Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

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	ND	NH-3-001(033)200	20	7

Note: All costs to construct pipe bends shall be included in the price bid for "Pipe Conc Reinf __IN CL III". The length of the pipe bend has been included in the total extension length.



Sta. 20612+07 - CL - East Extension
30° Bend
24IN RCP

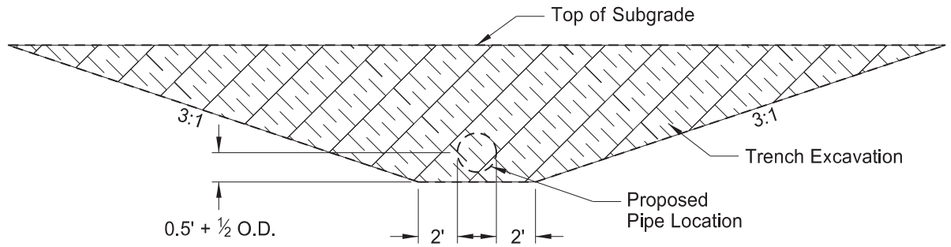
Horizontal Pipe Bend Detail

Major Rehabilitation
ND Hwy 1

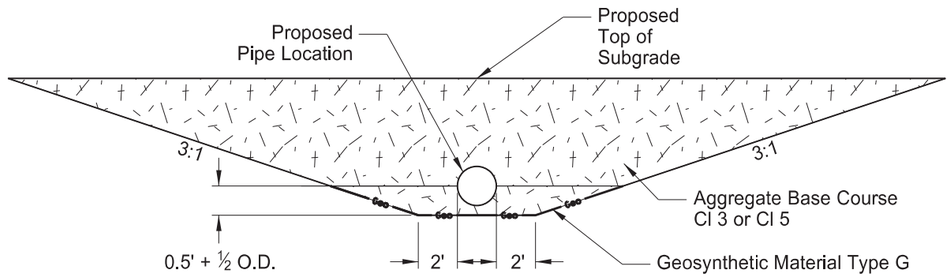
Nekoma to Nekoma Spur

REGISTERED PROFESSIONAL ENGINEER
SAMUEL NOAH WESTLUND
PE-10795
DATE: 10-24-23
NORTH DAKOTA

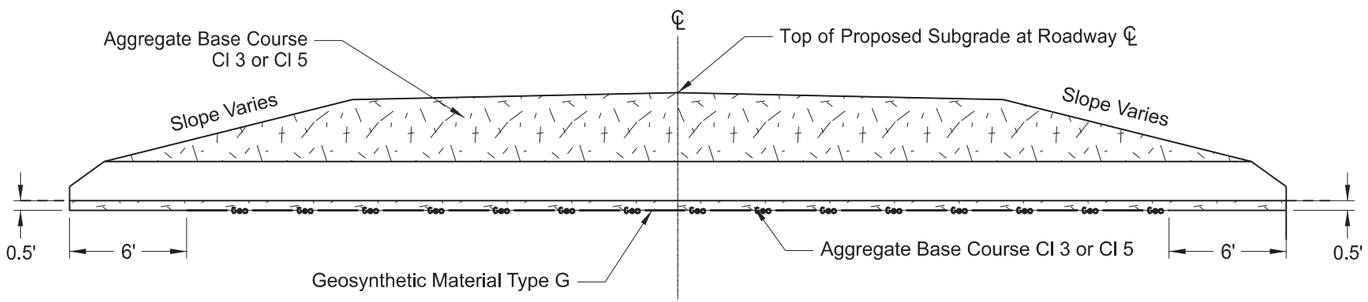
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	20	8



TRENCH EXCAVATION DETAIL



INSTALLATION DETAIL



CROSS SECTION

Pay Items
1) Pipe*
2) Removal of pipe (if required)
3) Geosynthetic Material Type G

*Included in Pipe Pay Item
1) Pipe
2) Trench Excavation
3) Aggregate Base Course Cl 3 or Cl 5

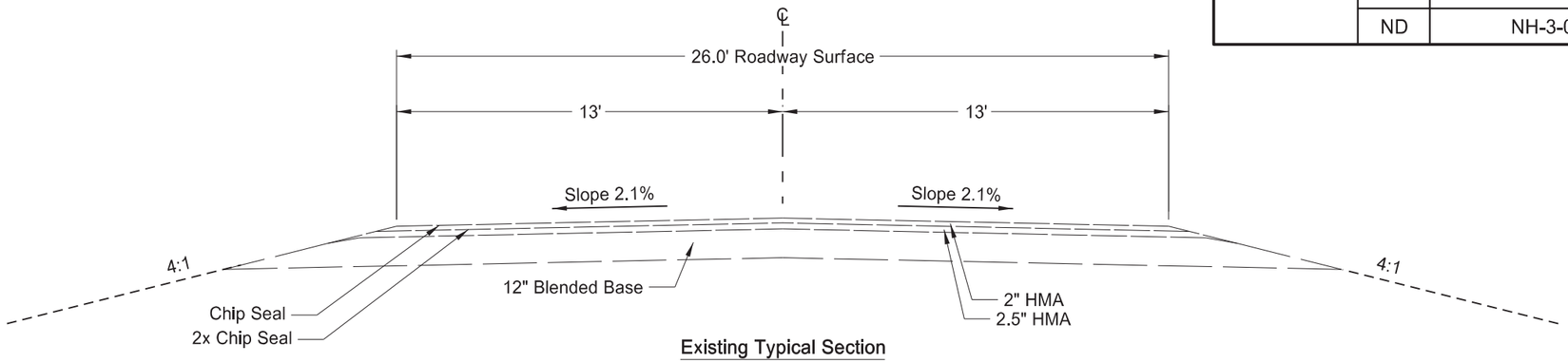
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PE-10795
DATE: 10-24-23
NORTH DAKOTA

Centerline Pipe Backfill Detail

Major Rehabilitation
ND Hwy 1

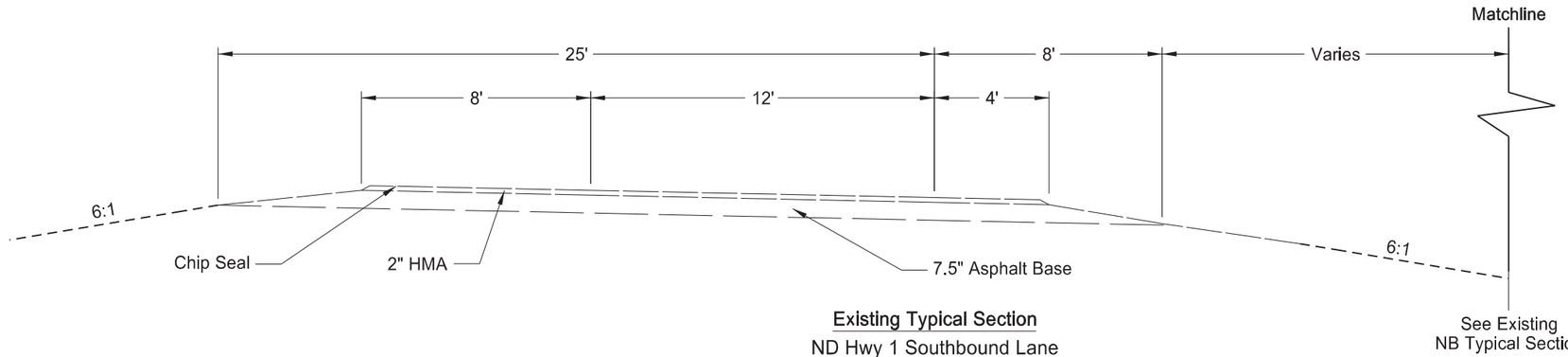
Nekoma to Nekoma Spur

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	30	1



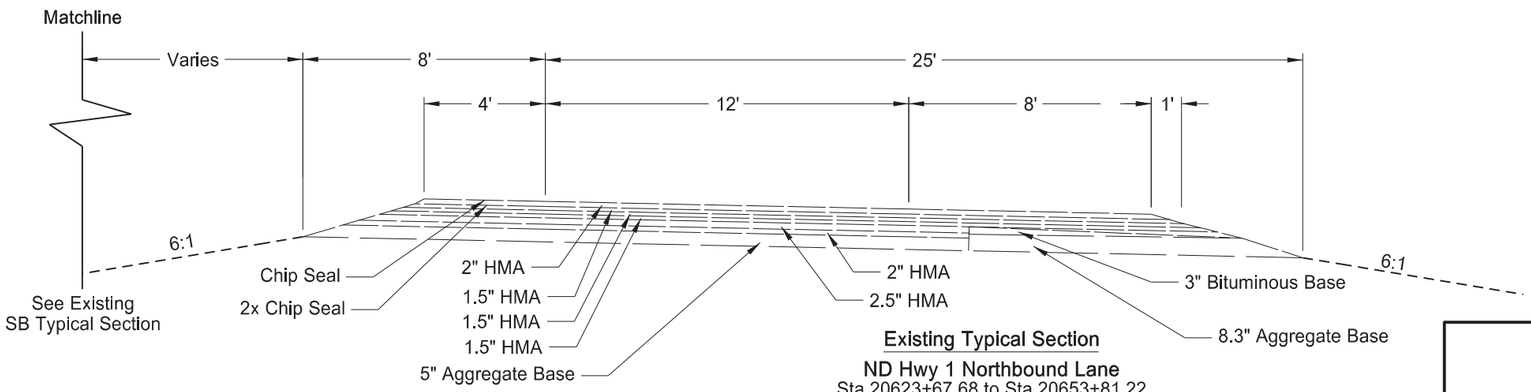
Existing Typical Section

ND Hwy 1
Sta 20587+93.59 to Sta 20623+67.68
See Sec 10 - Core Data Sheet for additional information on existing bituminous pavement thickness



Existing Typical Section

ND Hwy 1 Southbound Lane
Sta 20623+67.68 to Sta 20653+81.22
See Sec 10 - Core Data Sheet for additional information on existing bituminous pavement thickness



Existing Typical Section

ND Hwy 1 Northbound Lane
Sta 20623+67.68 to Sta 20653+81.22
See Sec 10 - Core Data Sheet for additional information on existing bituminous pavement thickness

Note:
Existing pavement depth varies. Average pavement depths are as follows:
7.81" from Sta 20587+77.28 to Sta 20623+67.68 with a standard deviation of 0.62"

12.33" from Sta 20623+67.68 to Sta 20653+61.44 with a standard deviation of 0.76"

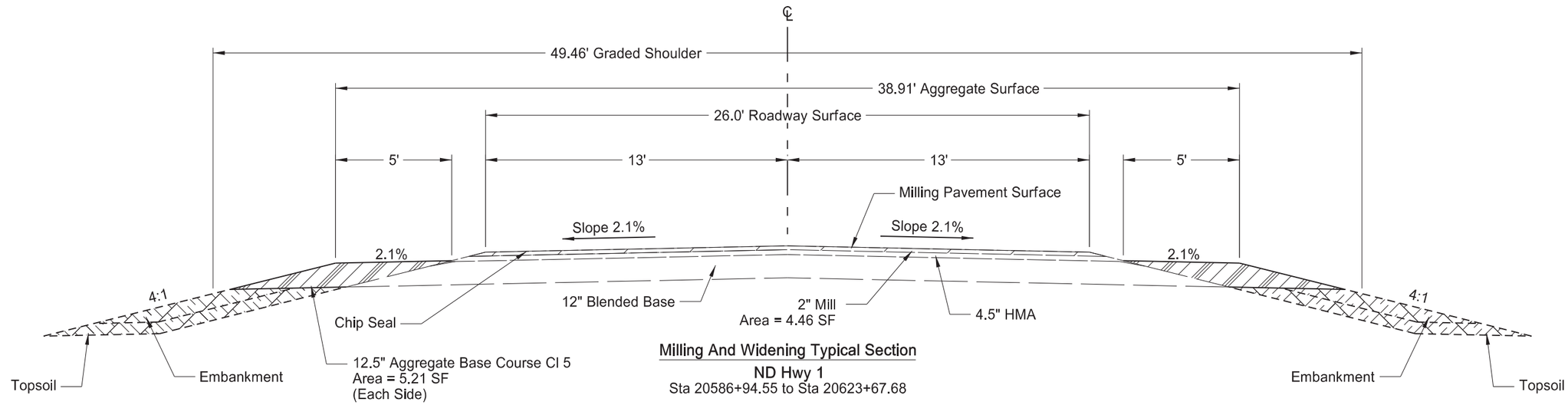
Existing Typical Sections

Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 10/24/23
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	30	2



Milling And Widening Typical Section
ND Hwy 1
Sta 20586+94.55 to Sta 20623+67.68

Note: Finished Milling will be at a 2.1% slope across roadway

Milling and Widening Typical Section

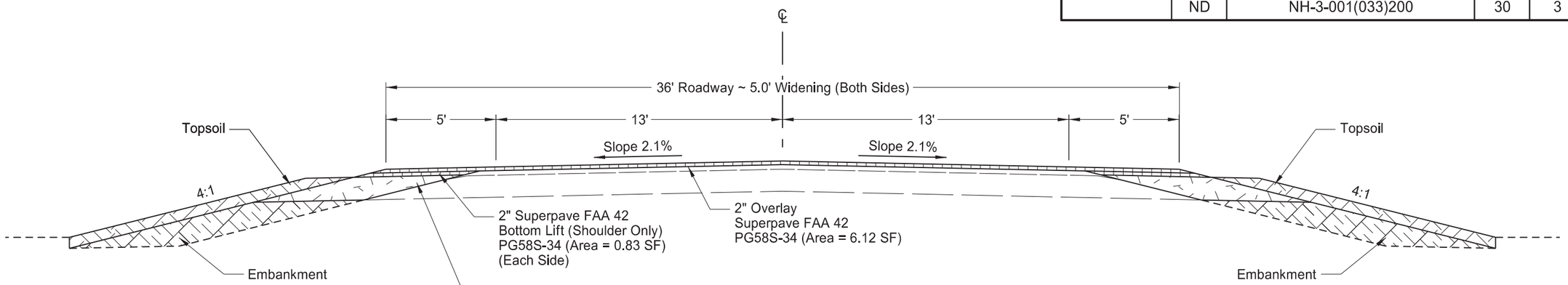
Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

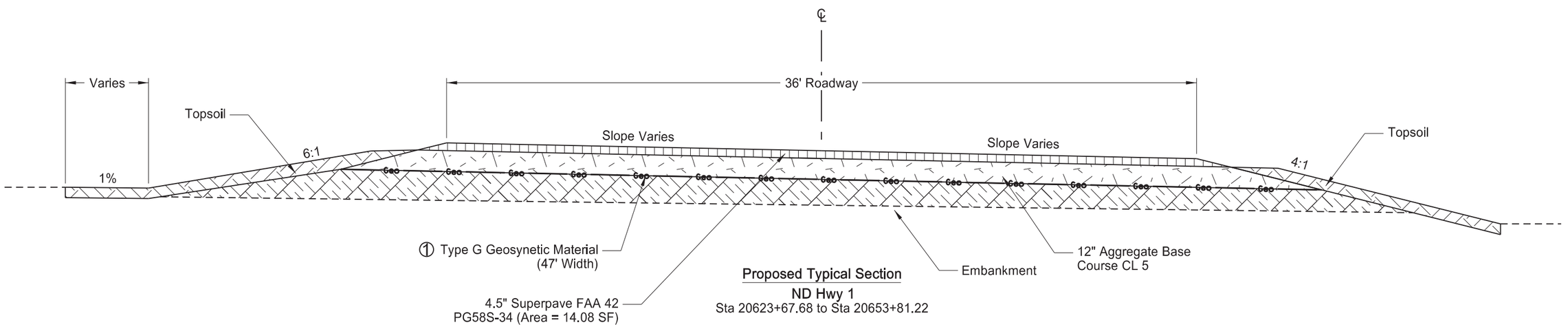
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PE-10772
DATE: 10/24/23
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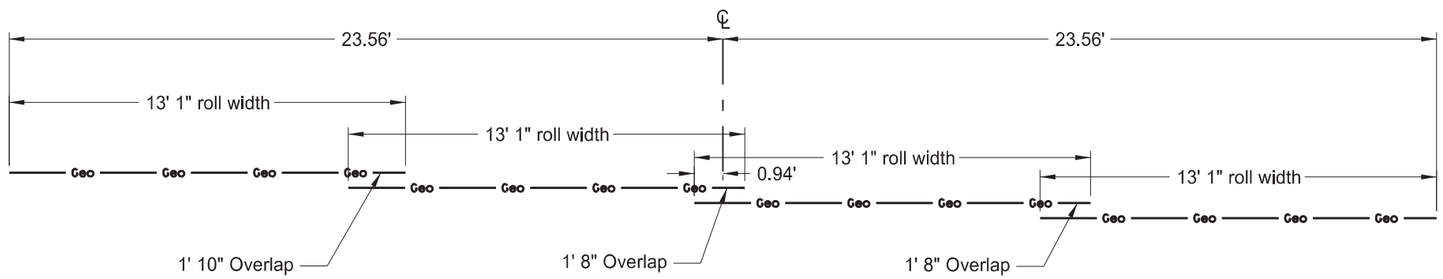
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	30	3



Proposed Typical Section
ND Hwy 1
Sta 20586+94.55 to Sta 20623+67.68



Proposed Typical Section
ND Hwy 1
Sta 20623+67.68 to Sta 20653+81.22



① Geosynthetic Geogrid
Sta 20623+67.68 to Sta 20636+36.73 & Sta 20645+47.29 to 20653+81.22

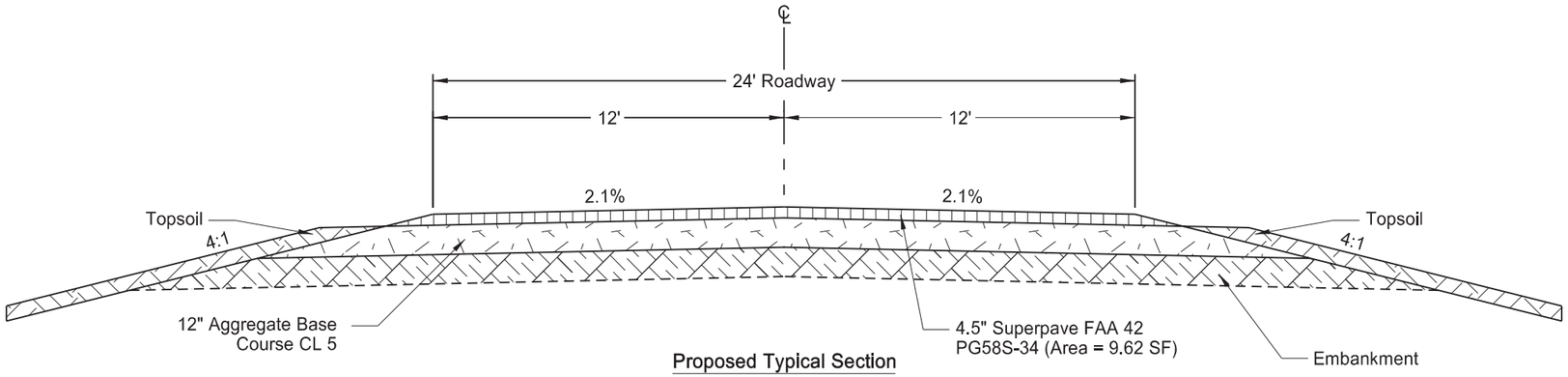
Proposed Typical Sections

Major Rehabilitation
ND Hwy 1

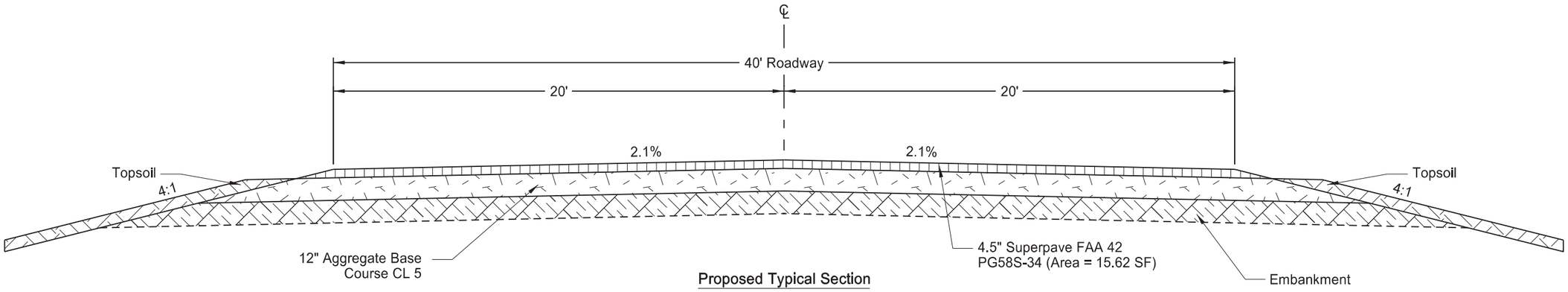
Nekoma to Nekoma Spur

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DATE: 10/24/23
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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	30	4



Proposed Typical Section
Nekoma North Rd / 81st St NE
Sta 101+28.37 to Sta 104+11.59



Proposed Typical Section
County Road 26 / 81st ST NE
Sta 105+13.75 to Sta 108+00.00

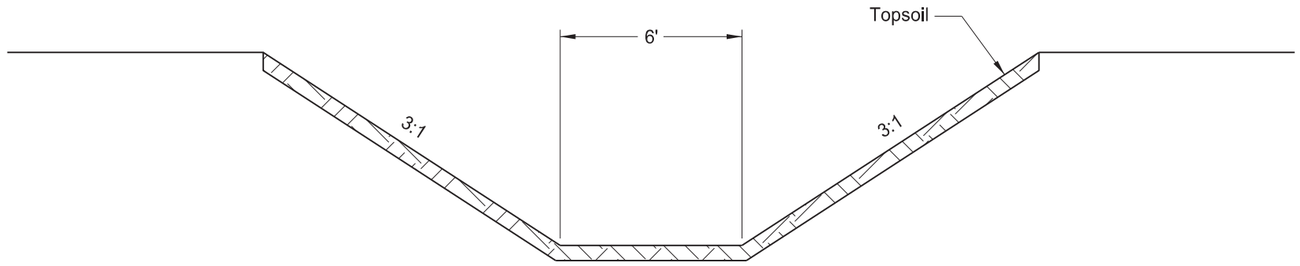
Proposed Typical Section
81st St NE

Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	30	5



Proposed Typical Section
Swale
Sta 100+30 to Sta 101+15.50

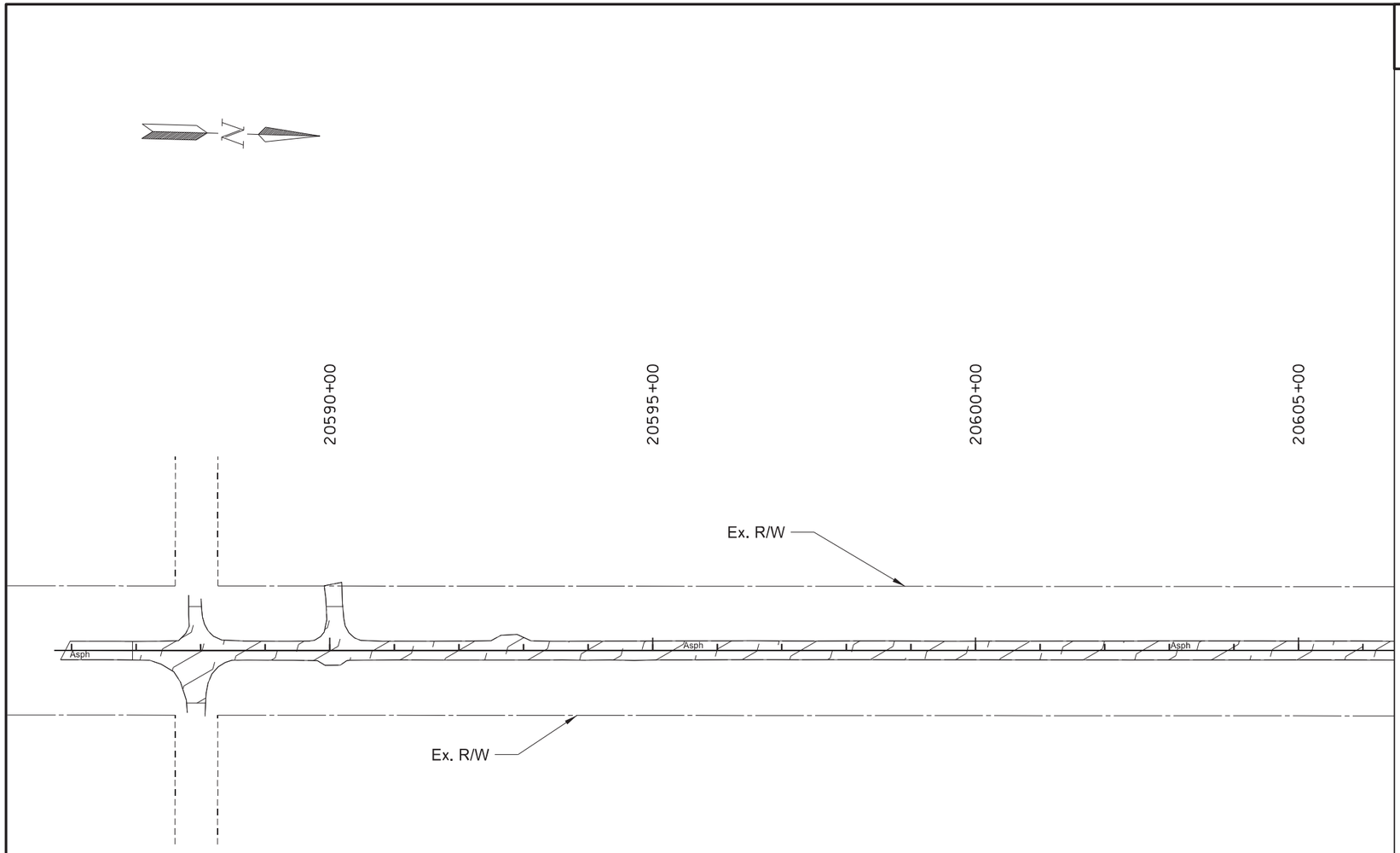
Proposed Typical Section
Swale

Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

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PE-10772
DATE: 10/24/23
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-001(033)200	40	1



SPEC	CODE	BID ITEM	QTY	UNIT
411	0100	MILLING PAVEMENT SURFACE		
		20586+00 to 20606+00		
		Milling Pavement Surface	786	TON
		Total	786	TON

Legend

Milling Pavement Surface
(Depth of 2")

Remove Aggregate base and Surfacing
Surfacing (Depth 7.81")
Aggregate base (Depth 10")

Remove Aggregate base and Surfacing
Surfacing (Depth 9.5")

Remove Aggregate base and Surfacing
Surfacing (Depth 11")
Aggregate base (Depth 3")

Remove Aggregate Base &
Surfacing - Approaches
(Depth of 10")

Removals

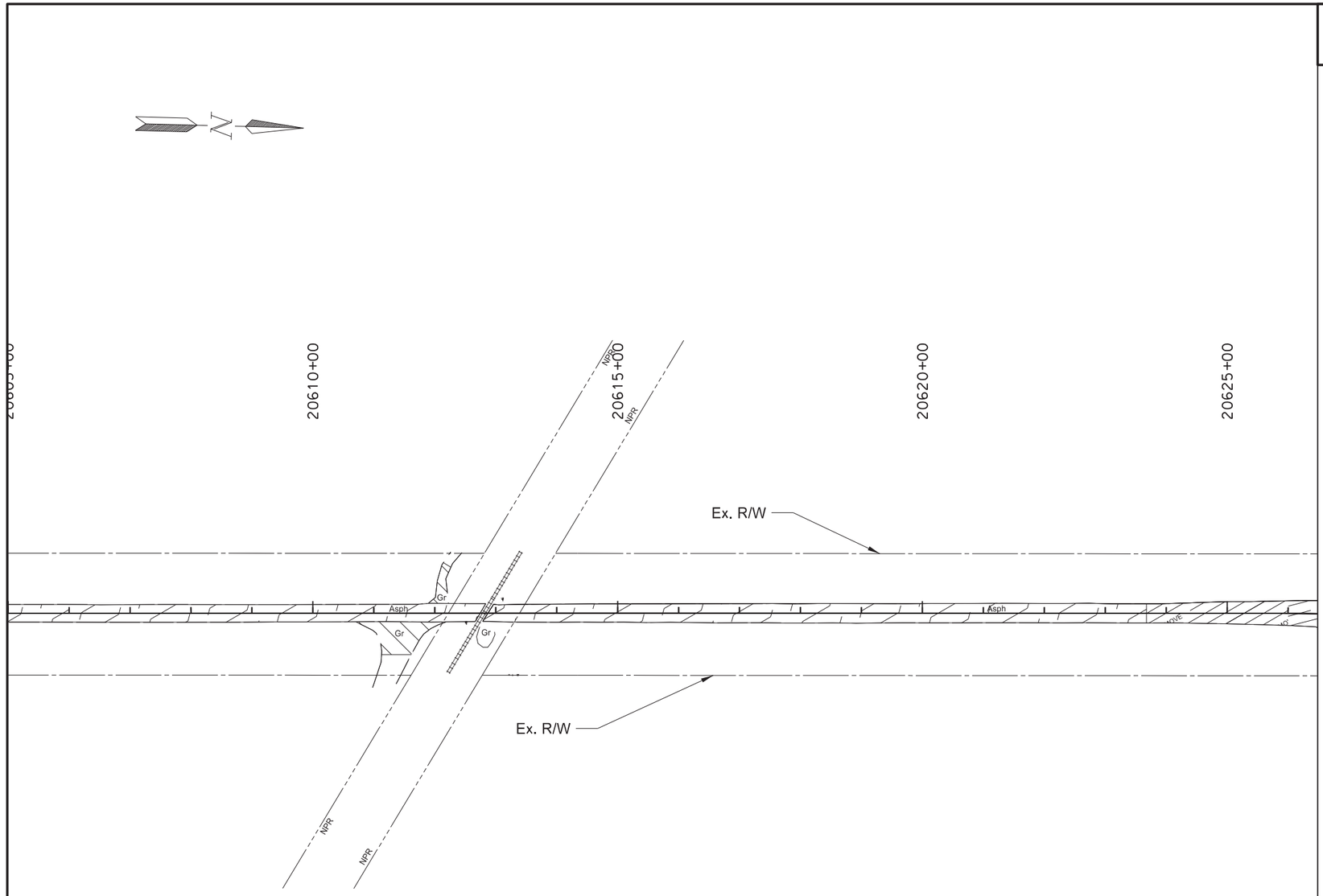
Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	40	2



SPEC	CODE	BID ITEM	QTY	UNIT
202	0021	REMOVE AGGREGATE BASE & SURFACING		
		20623+67.68 to 20626+00		
		Mainline Base Surfacing. (Avg. Depth = 7.81")	397	TON
		Approach Base Aggr. (Avg. Depth = 10")	310	TON
		Mainline Base Aggr. (Avg. Depth = 10")	477	TON
		Total	1184	TON
411	0100	MILLING PAVEMENT SURFACE		
		20606+00 to 20623+67.68		
		Milling Pavement Surface	724	TON
		Total	724	TON

Legend

Milling Pavement Surface
(Depth of 2")

Remove Aggregate base and Surfacing
Surfacing (Depth 7.81")
Aggregate base (Depth 10")

Remove Aggregate base and Surfacing
Surfacing (Depth 9.5")

Remove Aggregate base and Surfacing
Surfacing (Depth 11")
Aggregate base (Depth 3")

Remove Aggregate Base &
Surfacing - Approaches
(Depth of 10")

Removals

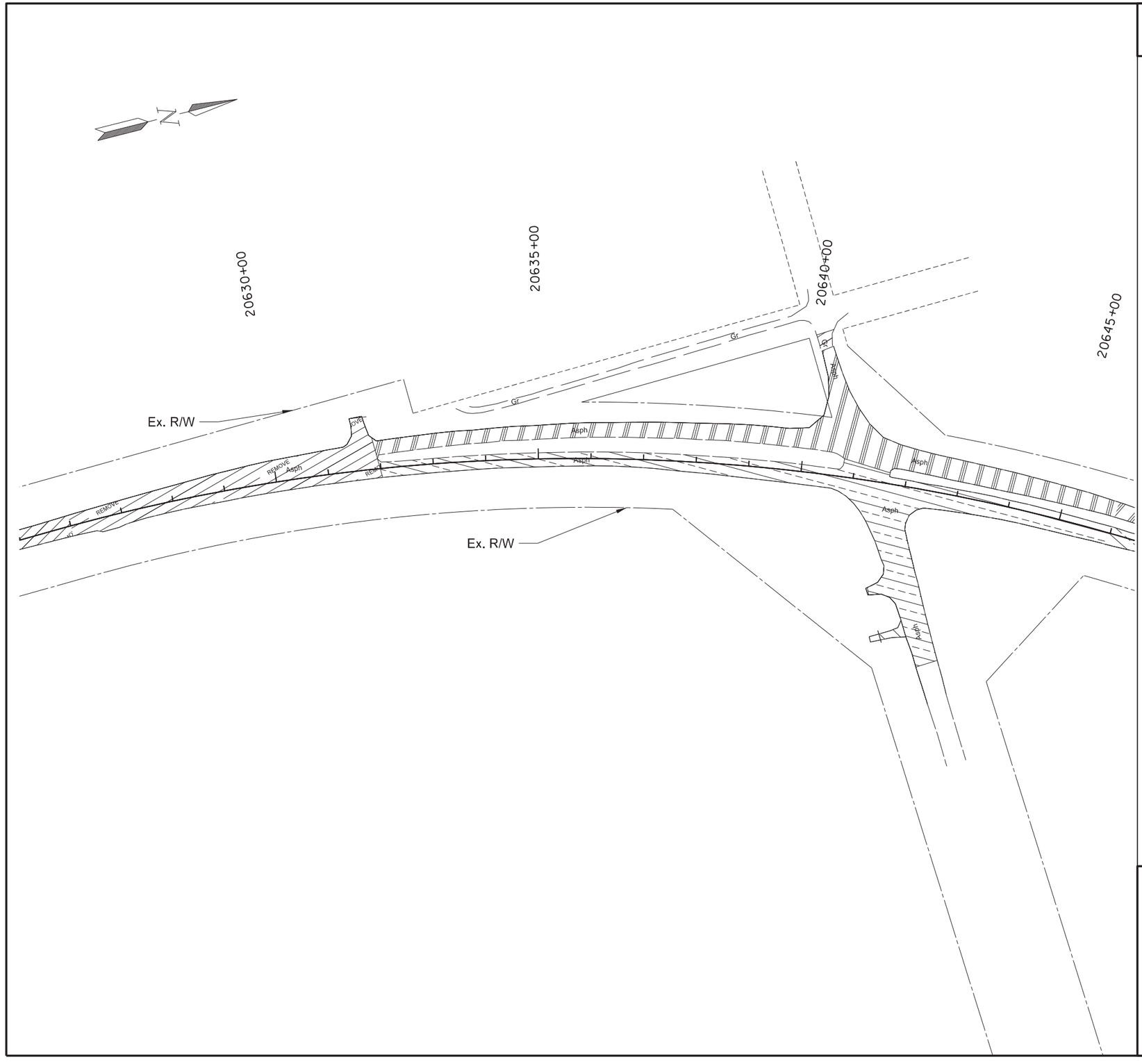
Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

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PE-10772
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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	40	3



SPEC	CODE	BID ITEM	QTY	UNIT
202	0021	REMOVE AGGREGATE BASE & SURFACING		
		20626+00 to 20646+00		
		Mainline Base Surfacing. (Avg. Depth = 12.33")	2631	TON
		Approach Base Aggr. (Avg. Depth = 10")	46	TON
		Mainline Base Aggr. (Avg. Depth = 10")	2001	TON
		NB lane		
		Mainline Base Surfacing. (Avg. Depth = 11")	4743	TON
		Mainline Base Aggr. (Avg. Depth = 3")	1213	TON
		SB Lane		
		Mainline Base Surfacing. (Avg. Depth = 9.5")	3409	TON
		Total	14043	TON

Legend

Milling Pavement Surface (Depth of 2")

Remove Aggregate base and Surfacing Surfacing (Depth 7.81") Aggregate base (Depth 10")

Remove Aggregate base and Surfacing Surfacing (Depth 9.5")

Remove Aggregate base and Surfacing Surfacing (Depth 11") Aggregate base (Depth 3")

Remove Aggregate Base & Surfacing - Approaches (Depth of 10")

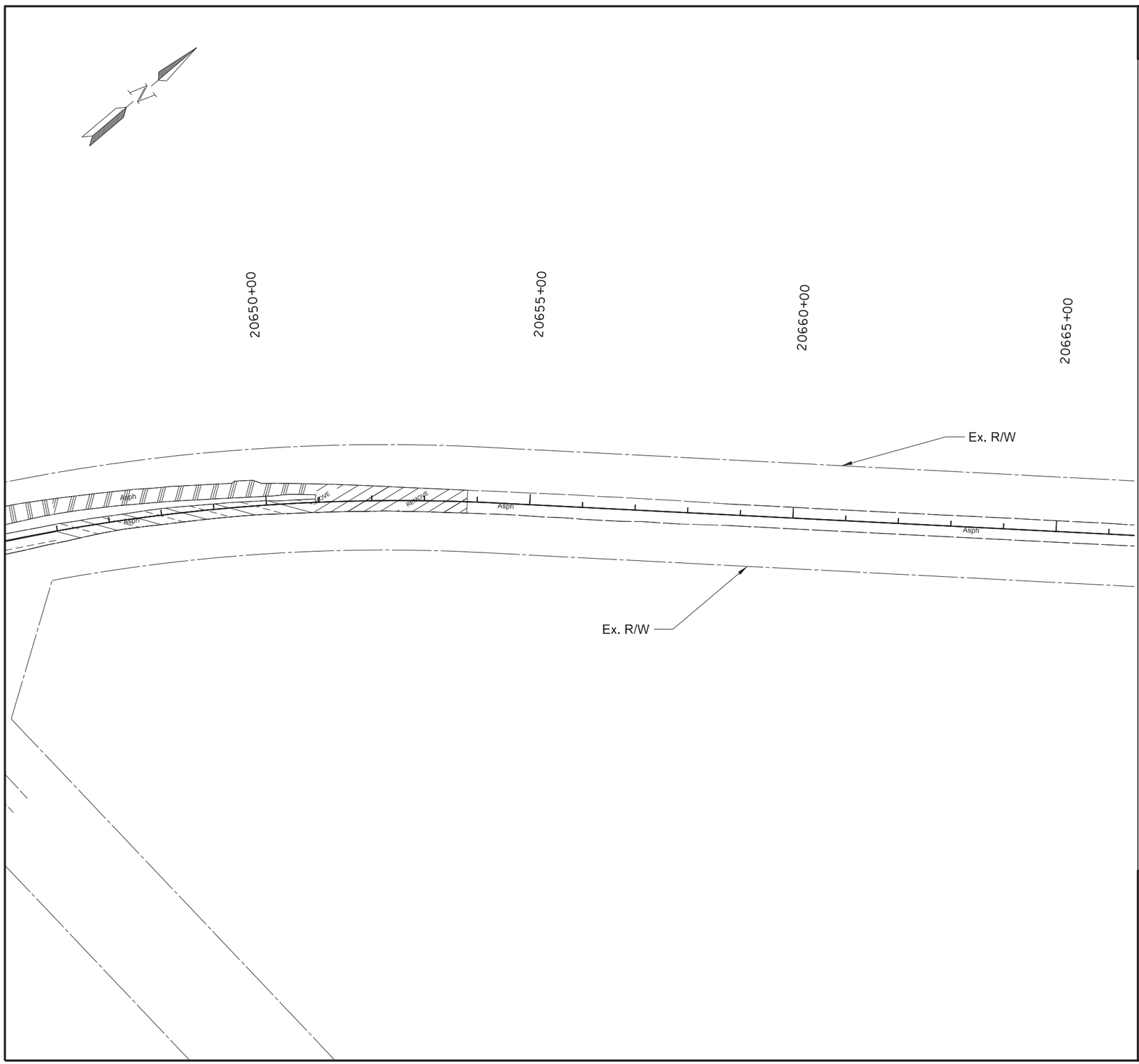
Removals

Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	40	4

SPEC	CODE	BID ITEM	QTY	UNIT
202	0021	REMOVE AGGREGATE BASE & SURFACING		
		20646+00 to 20653+61		
		Mainline Base Surfacing. (Avg. Depth = 7.81")	1041	TON
		Mainline Base Aggr. (Avg. Depth = 10")	792	TON
		NB lane		
		Mainline Base Surfacing. (Avg. Depth = 11")	950	TON
		Mainline Base Aggr. (Avg. Depth = 3")	243	TON
		SB Lane		
		Mainline Base Surfacing. (Avg. Depth = 9.5")	797	TON
		Total	3823	TON

Legend

Milling Pavement Surface (Depth of 2")

Remove Aggregate base and Surfacing
Surfacing (Depth 7.81")
Aggregate base (Depth 10")

Remove Aggregate base and Surfacing
Surfacing (Depth 9.5")

Remove Aggregate base and Surfacing
Surfacing (Depth 11")
Aggregate base (Depth 3")

Remove Aggregate Base &
Surfacing - Approaches
(Depth of 10")

Removals

Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	50	1

Hydraulic Data for NH-3-001(033)200
(A)

Alignment	Station	Existing Pipe	Proposed Pipe Size (IN)	Drainage Area (AC)	25-Year Data				100-Year Data		Notes
					Design Discharge (CFS)	Design Headwater (FT)	Design Velocity (FPS)	Design Stage (NAVD 88)	100-Year Discharge (CFS)	100-Year Stage (NAVD 88)	
ND 1	20640+40	24IN x 178FT RCP	42	96.7	57.3	3.9	8.3	1622.11	77.8	1623.14	
81st	105+45	24IN x 100FT RCP	24	1.6	11.7	2.1	5.8	1620.58	14.4	1620.90	

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

Centerline Culvert Hydraulic Data

Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

REGISTERED PROFESSIONAL ENGINEER
SAMUEL NOAH WESTLUND
PE-10795
DATE: 10-24-23
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	51	1

Begin Alignment	Begin Station/ Location	Begin Offset	End Alignment	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	(*) End Treatments		Geogrid Type G (Pay Item)	Applicable Backfill Detail	Notes
						IN	Bid Item	LF		IN	Type	IN	IN	Begin EA	End EA	SY		
ND 1	20597+65	35.8' LT	ND 1	20597+64	25.8' LT	24	Pipe Conc. Reinf. CL III (extension)	10	Reinforced Concrete Pipe - Class III (Barrel Length = 10 LF)	24				TES			Sec. 20 Sheet 1	
ND 1	20597+64	21.3' RT	ND 1	20597+64	37.3' RT	24	Pipe Conc. Reinf. CL III (extension)	16	Reinforced Concrete Pipe - Class III (Barrel Length = 16 LF)	24					TES		Sec. 20 Sheet 1	
ND 1	20612+07	31' RT	ND 1	20612+08	23.3' RT	24	Pipe Conc. Reinf. CL III (extension)	8	Reinforced Concrete Pipe - Class III (Barrel Length = 8 LF)	24				TES			Sec. 20 Sheet 1	(A)
ND 1	20612+37	26.1' LT	ND 1	20612+43	36.4' LT	24	Pipe Conc. Reinf. CL III (extension)	12	Reinforced Concrete Pipe - Class III (Barrel Length = 12 LF)	24					TES		Sec. 20 Sheet 1	
ND 1	20613+21	34.4' RT	ND 1	20613+27	24.1' RT	24	Pipe Conc. Reinf. CL III (extension)	12	Reinforced Concrete Pipe - Class III (Barrel Length = 12 LF)	24				TES			Sec. 20 Sheet 1	
ND 1	20613+57	26.6' LT	ND 1	20613+63	37' LT	24	Pipe Conc. Reinf. CL III (extension)	12	Reinforced Concrete Pipe - Class III (Barrel Length = 12 LF)	24					TES		Sec. 20 Sheet 1	
ND 1	20640+64	42.3' RT	ND 1	20640+16	43.2' LT	42	Pipe Conduit	98	Reinforced Concrete Pipe - Class III (Barrel Length = 92 LF)	42				FES	FES	260	Sec. 20 Sheet 8	
									Spiral Rib Steel Pipe		P	3/4, 1	0.064					
									Corrugated Steel Pipe	48	A, P	2, 3, 5	0.168					
81st	105+45	47.6' LT	81st	105+46	41.4' RT	24	Pipe Conduit	89	Reinforced Concrete Pipe - Class III (Barrel Length = 84 LF)	24				FES	FES	160	Sec. 20 Sheet 8	
									Spiral Rib Steel Pipe		Z, A, P	3/4, 1	0.064					
									Corrugated Steel Pipe			2	0.064					

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"

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

(*) The price bid for "Pipe Conduit" bid items includes end treatments.
FES = Flared End Section

Notes: (A) Includes pipe bend. See detail on Section 20 Sheet 7.

Allowable Pipe List
Centerline

Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

REGISTERED PROFESSIONAL ENGINEER
SAMUEL NOAH WESTLUND
PE-10795
DATE: 10-24-23
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	51	2

Begin Alignment	Begin Station/ Location	Begin Offset	End Alignment	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	(*) End Treatments		Geogrid Type G (Pay Item)	Applicable Backfill Detail	Notes
						IN	Bid Item	LF		IN	Type	Type	IN	Begin EA	End EA	SY		
ND 1	20588+36	43.6' RT	ND 1	20588+31	43.6' RT	24	Pipe Corr. Steel (Extension)	5	Corrugated Steel Pipe	24	Z, A, P	2	0.064	Remove & Relay			Spec. 714.04.A	
ND 1	20587+45	43.7' RT	ND 1	20587+42	43.7' RT	24	Pipe Corr. Steel (Extension)	3	Corrugated Steel Pipe	24	Z, A, P	2	0.064		FES		Spec. 714.04.A	
ND 1	20588+32	44.1' LT	ND 1	20588+27	44.2' LT	24	Pipe Corr. Steel (Extension)	5	Corrugated Steel Pipe	24	Z, A, P	2	0.064	FES			Spec. 714.04.A	
ND 1	20587+59	44.7' LT	ND 1	20587+43	44.8' LT	24	Pipe Corr. Steel (Extension)	16	Corrugated Steel Pipe	24	Z, A, P	2	0.064		FES		Spec. 714.04.A	(A)
ND 1	20589+76	42.7' RT	ND 1	20589+81	43' RT	24	Pipe Corr. Steel (Extension)	5	Corrugated Steel Pipe	24	Z, A, P	2	0.064	Remove & Relay			Spec. 714.04.A	
ND 1	20590+25	45.1' RT	ND 1	20590+34	45.6' RT	24	Pipe Corr. Steel (Extension)	9	Corrugated Steel Pipe	24	Z, A, P	2	0.064		FES		Spec. 714.04.A	
ND 1	20589+75	44.3' LT	ND 1	20589+81	44.2' LT	24	Pipe Corr. Steel (Extension)	6	Corrugated Steel Pipe	24	Z, A, P	2	0.064	Remove & Relay			Spec. 714.04.A	
ND 1	20590+35	43.3' LT	ND 1	20590+42	43.2' LT	24	Pipe Corr. Steel (Extension)	7	Corrugated Steel Pipe	24	Z, A, P	2	0.064		Remove & Relay		Spec. 714.04.A	
ND 1	20592+49	41.5' LT	ND 1	20592+53	41.5' LT	24	Pipe Corr. Steel (Extension)	4	Corrugated Steel Pipe	24	Z, A, P	2	0.064	TES			Spec. 714.04.A	
ND 1	20593+10	42.3' LT	ND 1	20593+17	42.4' LT	24	Pipe Corr. Steel (Extension)	8	Corrugated Steel Pipe	24	Z, A, P	2	0.064		Remove & Relay		Spec. 714.04.A	
ND 1	20611+01	47.9' RT	ND 1	20610+95	46.7' RT	24	Pipe Corr. Steel (Extension)	6	Corrugated Steel Pipe	24	Z, A, P	2	0.064		FES		Spec. 714.04.A	

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

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

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

FES = Flared End Section
TES = Traversable End Section

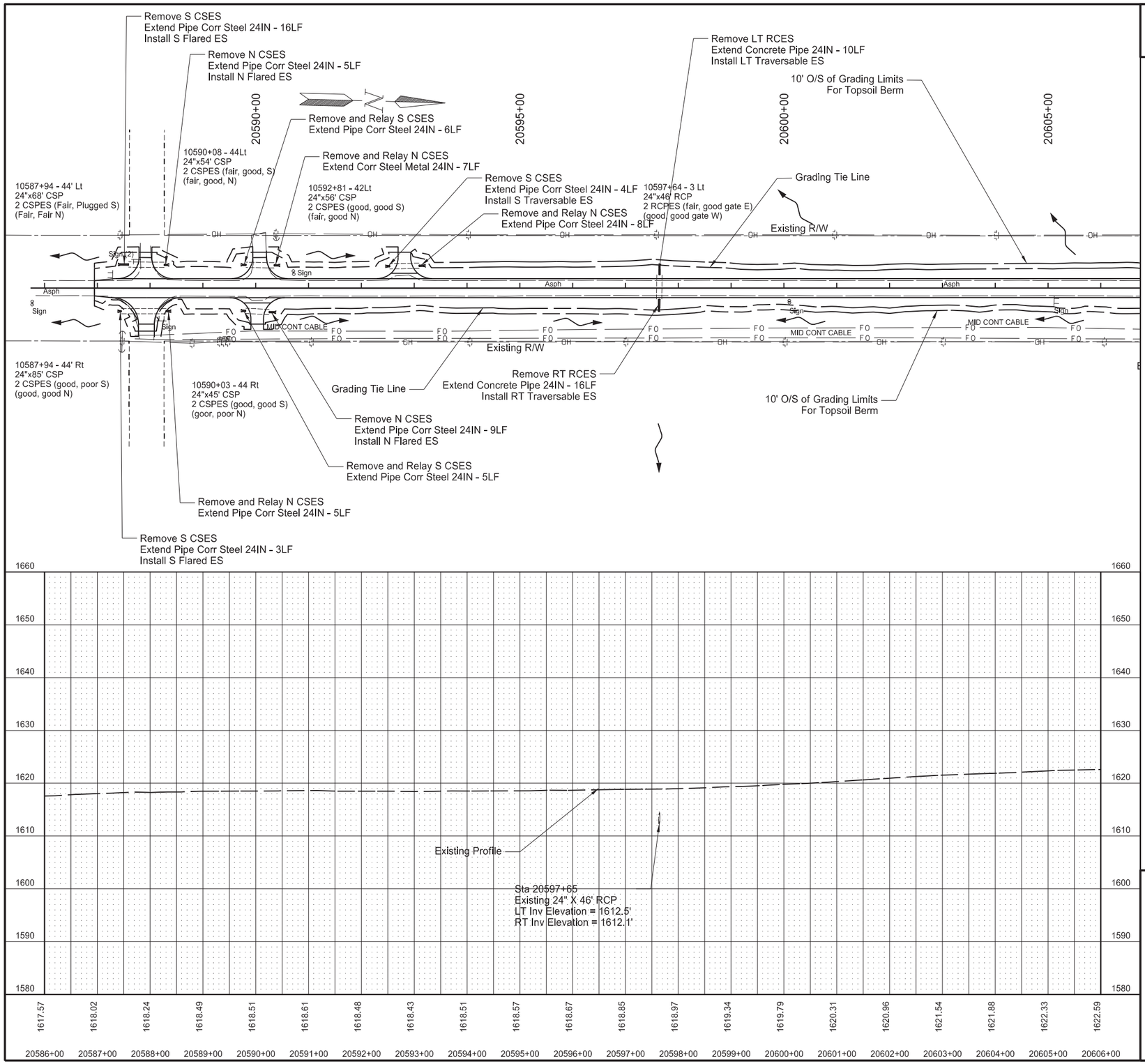
Notes: (A) Clean out the entire pipe to the satisfaction of the Engineer.

Allowable Pipe List
Approach

Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

REGISTERED PROFESSIONAL ENGINEER
SAMUEL NOAH WESTLUND
PE-10795
DATE: 10-24-23
NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	60	1

Spec	Code	Item Description	QTY	Unit
202	0169	Removal of End Section-All Types & Sizes		
		20587+88 - 43.7' RT - S	1	EA
		20587+93 - 44.5' LT - N & S	2	EA
		20590+03 - 44.1' RT - N	1	EA
		20592+82 - 41.9' LT - S	1	EA
		20597+64 - CL - LT & RT	2	EA
		Total:	7	EA
714	0615	Pipe Conc Reinf 24IN CL III		
		20597+65 - 35.8' LT to 20597+64 - 25.8' LT	10	LF
		20597+64 - 21.3' RT to 20597+64 - 37.3' RT	16	LF
		Total:	26	LF
714	3023	End Sect-Traversable Conc Reinf 24IN		
		20597+64 - CL - LT & RT	2	EA
714	5035	Pipe Corr Steel .064IN 24IN		
		20588+36 - 43.6' RT to 20588+31 - 43.6' RT	5	LF
		20587+45 - 43.7' RT to 20587+42 - 43.7' RT	3	LF
		20588+32 - 44.1' LT to 20588+27 - 44.2' LT	5	LF
		20587+59 - 44.7' LT to 20587+43 - 44.8' LT	16	LF
		20589+76 - 42.7' RT to 20589+81 - 43.0' RT	5	LF
		20590+25 - 45.1' RT to 20590+34 - 45.6' RT	9	LF
		20589+75 - 44.3' LT to 20589+81 - 44.2' LT	6	LF
		20590+35 - 43.3' LT to 20590+42 - 43.2' LT	7	LF
		20592+49 - 41.5' LT to 20592+53 - 41.5' LT	4	LF
		20593+10 - 42.3' LT to 20593+17 - 42.4' LT	8	LF
		Total:	68	LF
714	5820	End Sect Corr Steel .064IN 24IN		
		20587+88 - 43.7' RT - S	1	EA
		20587+93 - 44.5' LT - N & S	2	EA
		20590+03 - 44.1' RT - N	1	EA
		Total:	4	EA
714	6506	End Sect-Traversable Metal 24IN		
		20592+82 - 41.9' LT - S	1	EA
714	9660	Remove & Relay End Section-All Types & Sizes		
		20587+88 - 43.7' RT - N	1	EA
		20590+03 - 44.1' RT - S	1	EA
		20590+08 - 43.7' LT - N & S	2	EA
		20592+82 - 41.9' LT - N	1	EA
		Total:	5	EA
754	0805	Object Markers - Culverts		
		20587+88 - 43.7' RT - N & S	2	EA
		20587+93 - 44.5' LT - N & S	2	EA
		20590+03 - 44.1' RT - N & S	2	EA
		20590+08 - 43.7' LT - N & S	2	EA
		20592+82 - 41.9' LT - N & S	2	EA
		20597+64 - CL - LT & RT	2	EA
		Total:	12	EA
990	400	Pipe Cleanout		
		20587+93 - 44.5' LT	1	EA

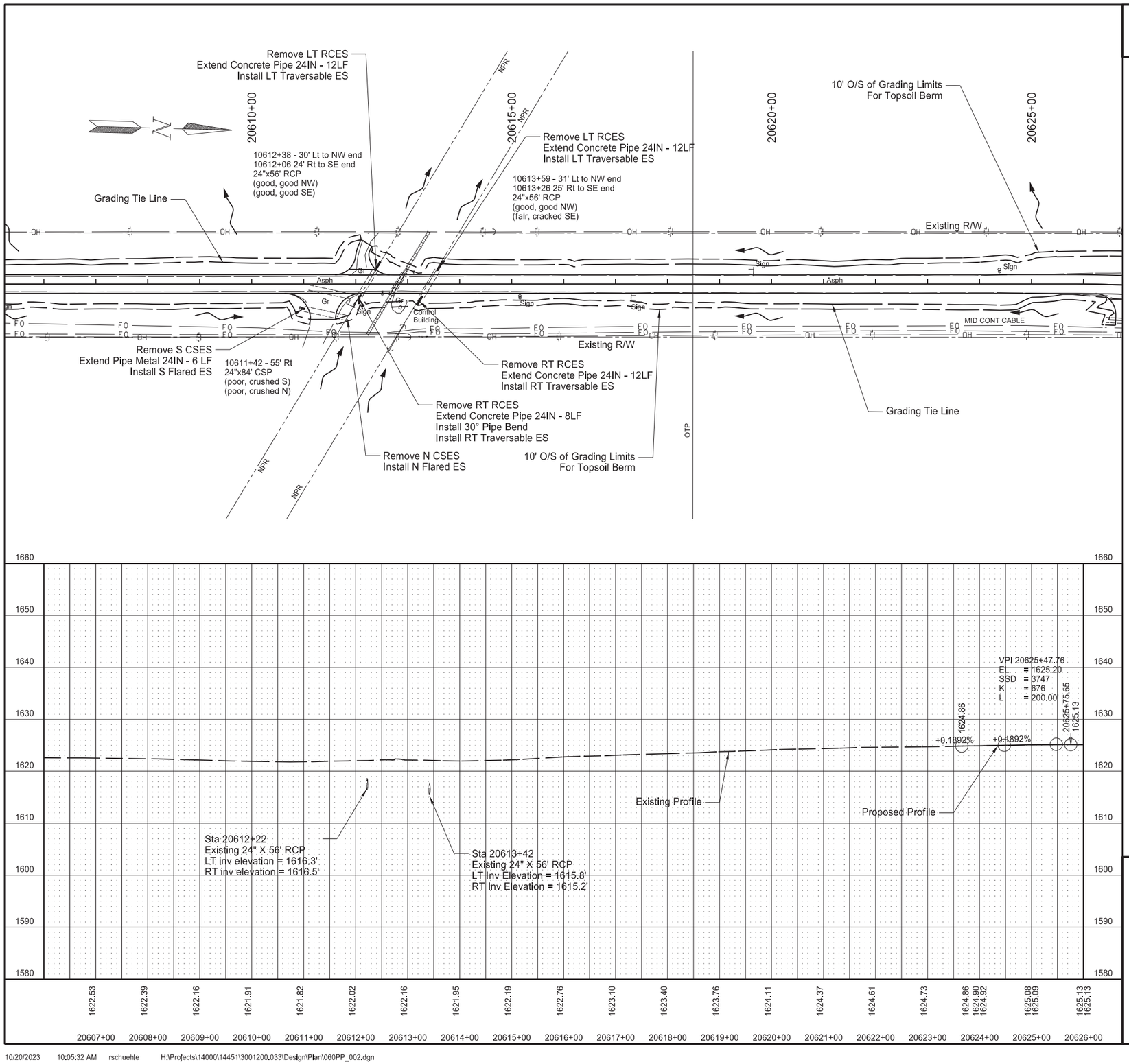
Plan & Profile

Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 10/24/23
NORTH DAKOTA

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	60	2

Spec	Code	Item Description	QTY	Unit
202	0169	Removal of End Section-All Types & Sizes		
		20611+42 - 56.7' RT - N & S	2	EA
		20612+22 - CL - LT & RT	2	EA
		20613+41 - CL - LT & RT	2	EA
		Total:	6	EA
714	0615	Pipe Conc Reinf 24IN CL III		
		20612+07 - 31.0' RT to 20612+08 - 23.3' RT	8	LF
		20612+37 - 26.1' LT to 20612+43 - 36.4' LT	12	LF
		20613+21 - 34.4' RT to 20613+27 - 24.1' RT	12	LF
		20613+57 - 26.6' LT to 20613+63 - 37.0' LT	12	LF
		Total:	44	LF
714	5035	Pipe Corr Steel .064IN 24IN		
		20611+0147.9' RT to 20610+95 - 46.7' RT	6	LF
714	5820	End Sect Corr Steel .064IN 24IN		
		20611+01 - 56.7' RT - S	1	EA
714	3023	End Sect-Traversable Conc Reinf 24IN		
		20612+22 - CL - LT & RT	2	EA
		20613+41 - CL - LT & RT	2	EA
		Total:	4	EA
754	0805	Object Markers - Culverts		
		20611+42 - 56.7' RT - N & S	2	EA
		20612+22 - CL - LT & RT	2	EA
		20613+41 - CL - LT & RT	2	EA
		Total:	6	EA

Plan & Profile

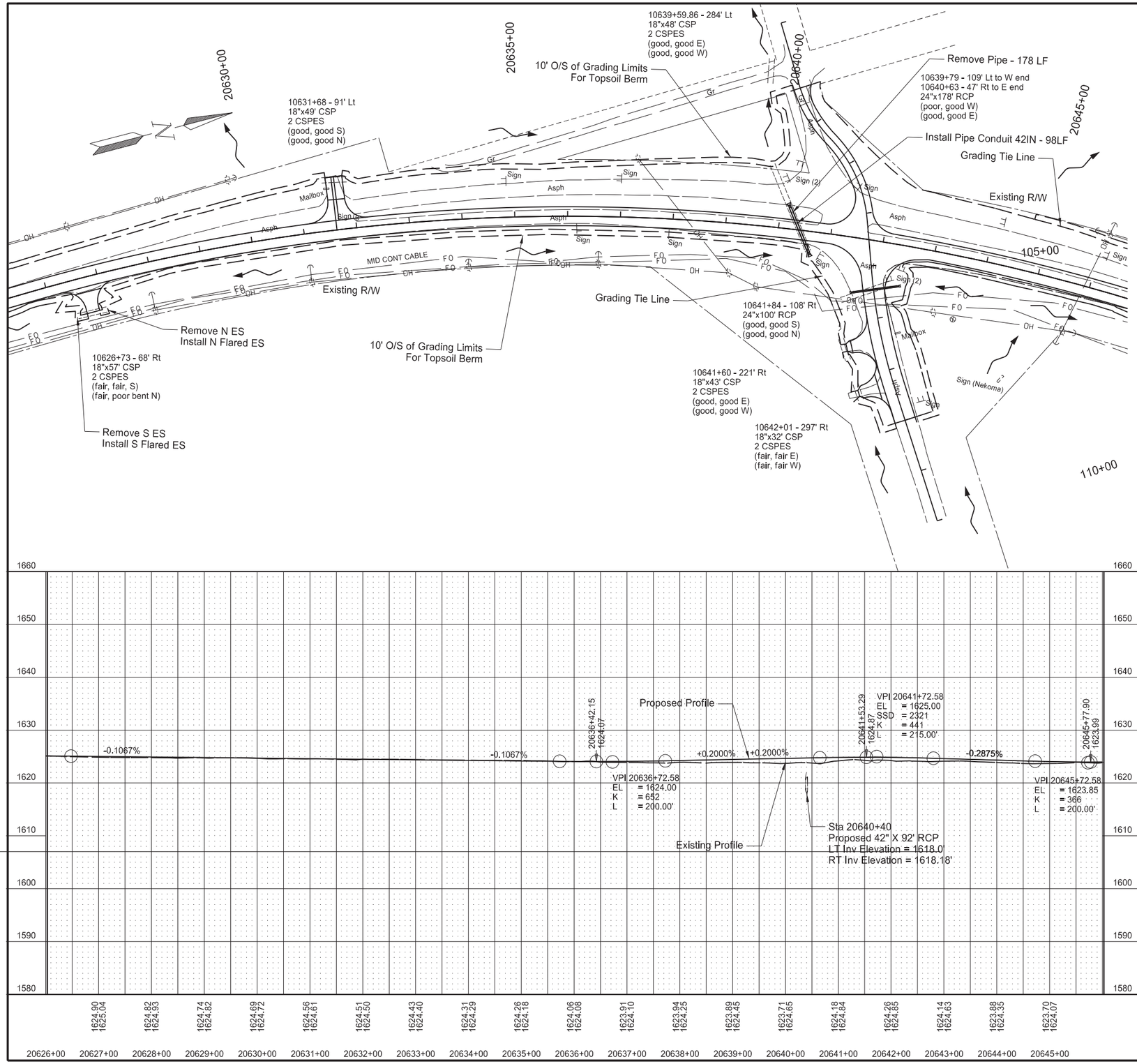
Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 10/24/23
NORTH DAKOTA

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	60	3



Spec	Code	Item Description	QTY	Unit
202	0169	Removal of End Section-All Types & Sizes		
		20626+74 - 69.0' RT - N & S	2	EA
		20640+40 - CL - LT & RT	2	EA
		Total:	4	EA
202	0170	Removal of Culverts-All Types & Sizes		
		20640+40 - CL	178	LF
709	100	Geosynthetic Material Type G		
		20640+40 - CL	260	SY
714	4120	Pipe Conduit 42IN		
		20640+40 - CL	98	LF
714	5810	End Sect Corr Steel .064IN 18IN		
		20626+74 - 69.0' RT - N & S	2	EA
754	0805	Object Markers - Culverts		
		20626+74 - 69.0' RT - N & S	2	EA
		20631+67 - 94.8' LT - N & S	2	EA
		20640+40 - CL - LT & RT	2	EA
		Total:	6	EA

Plan & Profile

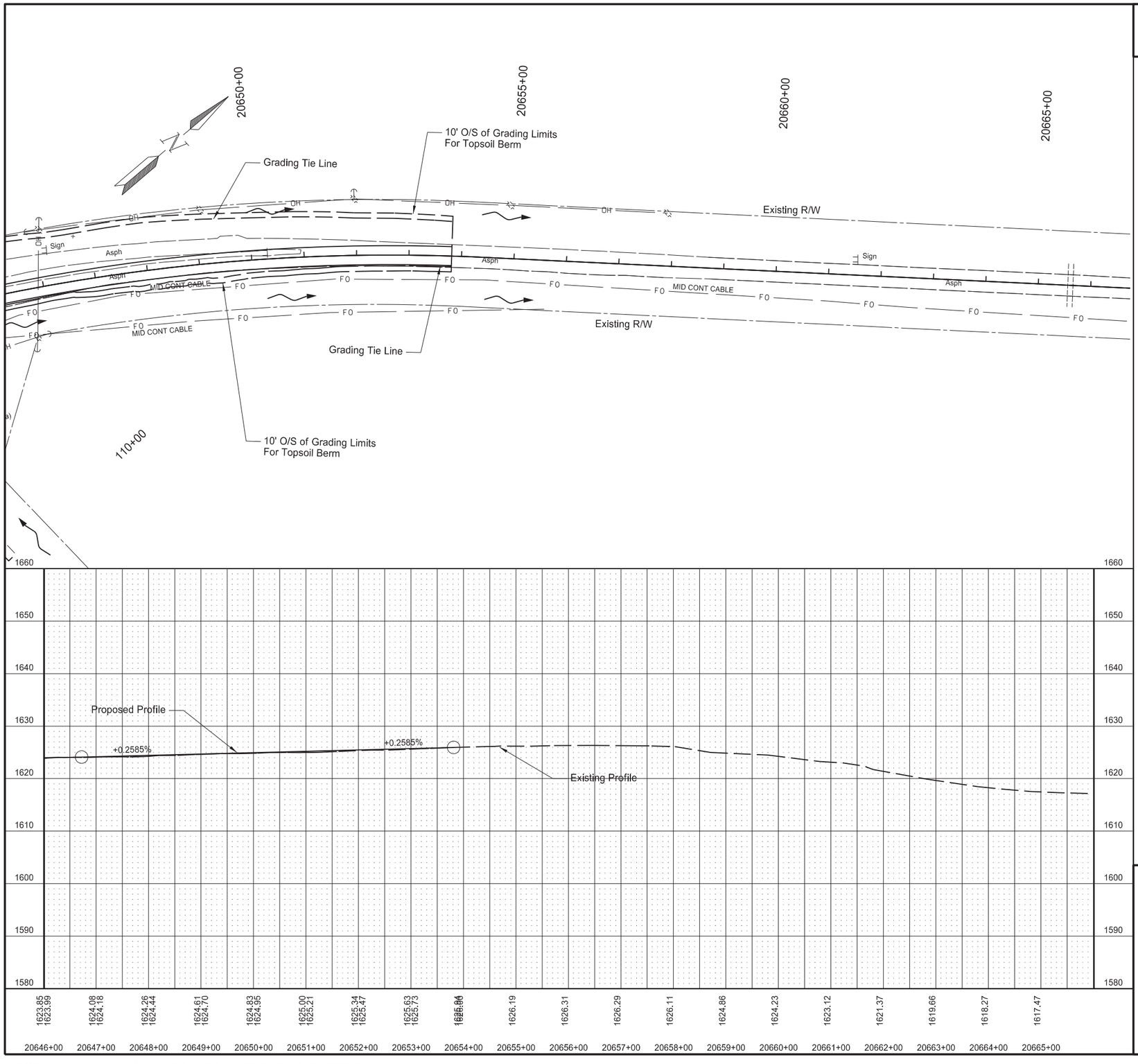
Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

REGISTERED PROFESSIONAL ENGINEER
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DATE: 10/24/23
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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	60	4



Plan & Profile

Major Rehabilitation
ND Hwy 1

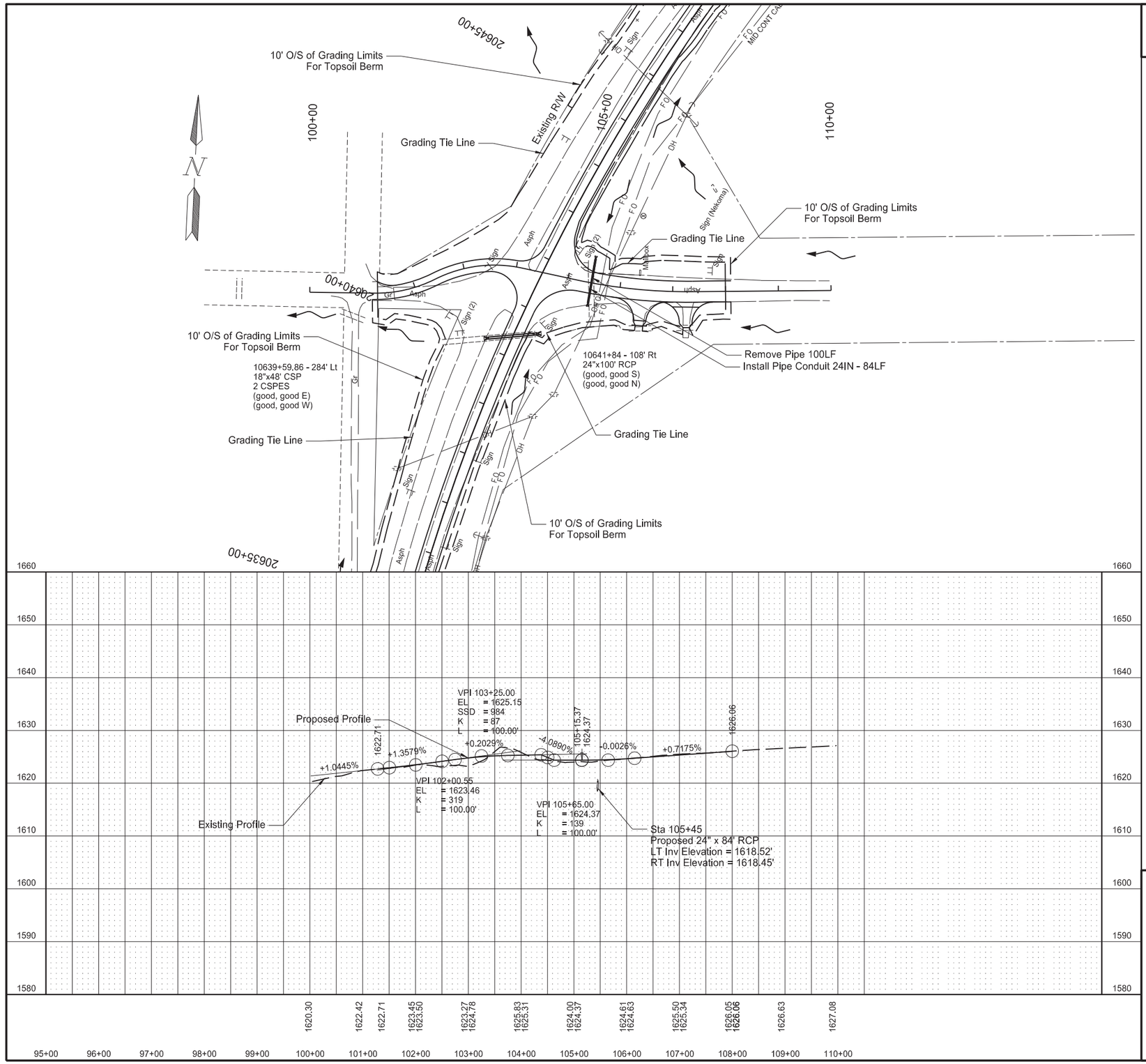
Nekoma to Nekoma Spur

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PE-10772
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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-001(033)200	60	5

Spec	Code	Item Description	QTY	Unit
202	0169	Removal of End Section-All Types & Sizes		
		105+45 - CL - N & S	2	EA
202	0170	Removal of Culverts-All Types &		
		105+45 - CL	100	LF
709	100	Geosynthetic Material Type G		
		105+45 - CL	160	SY
714	4105	Pipe Conduit 24IN		
		105+45 - CL	89	LF
754	0805	Object Markers - Culverts		
		105+45 - CL - N & S	2	EA



Plan & Profile

Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

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PE-10772
DATE: 10/24/23
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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-001(033)200	75	1

Wetland Impact Table

Wetland Number	Location	Wetland Type	Wetland Feature	USACE Jurisdictional Wetlands[1]	Wetland Impact					Wetland Mitigation					
					Wetland Impacts Acre(s)			USFWS Easement Impacts Acre(s)		Mitigation Proposed			Onsite Mitigation Method		
					Temp.	Perm. (Fill/Drain)	Perm. (Cut)	Temp.	Perm.	EO 11990	USACE	USFWS	Mitigation Location; Ratio	Ditch Shift Acre(s)	Onsite Acre(s)
1a	Sec.27, T159N, R60W	Ditch	Created	YES	-	-									
1b	Sec.22, T159N, R60W	Ditch	Created	YES	0.056	0.026					N				
2	Sec.21, T159N, R60W	Ditch	Created	YES	0.020	0.003					N				
3	Sec.22, T159N, R60W	Ditch	Created	YES	-	-									
4	Sec.22, T159N, R60W	Ditch	Created	YES	0.110	0.014					N				
5	Sec.21, T159N, R60W	Ditch	Created	YES	-	-									
6a	Sec.22, T159N, R60W	Ditch	Created	YES	0.015	0.001					N				
6b	Sec.21, T159N, R60W	Ditch	Created	YES	0.009	0.013					N				
7a	Sec.22, T159N, R60W	Ditch	Created	YES	0.016	0.006					N				
7b	Sec.21, T159N, R60W	Ditch	Created	YES	0.009	0.003					N				
8	Sec.22, T159N, R60W	Ditch	Created	YES	0.010	-									
9a	Sec.22, T159N, R60W	Ditch	Created	YES	0.039	-					N				
9b	Sec.15, T159N, R60W	Ditch	Created	YES	0.041	0.014					N				
10a	Sec.22, T159N, R60W	Ditch	Created	YES	0.004	-									
10b	Sec.21, T159N, R60W	Ditch	Created	YES	-	-									

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 10/24/23
NORTH DAKOTA

Wetlands Mitigation and Environmental

Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-001(033)200	75	2

Wetland Impact Table

Wetland Number	Location	Wetland Type	Wetland Feature	USACE Jurisdictional Wetlands[1]	Wetland Impact					Wetland Mitigation					
					Wetland Impacts Acre(s)			USFWS Easement Impacts Acre(s)		Mitigation Proposed			Onsite Mitigation Method		
					Temp.	Perm. (Fill/Drain)	Perm. (Cut)	Temp.	Perm.	EO 11990	USACE	USFWS	Mitigation Location; Ratio	Ditch Shift Acre(s)	Onsite Acre(s)
11	Sec.16, T159N, R60W	Ditch	Created	YES	-	-									
12	Sec.15, T159N, R60W	Ditch	Created	YES	-	-									
14	Sec.15, T159N, R60W	Ditch	Created	YES	0.029	-									
15	Sec.15, T159N, R60W	Ditch	Created	YES	0.012	-									
				Totals	**0.370**	**0.080**								**0.000**	**0.000**

[1] A wetland Jurisdictional Determination was issued by the USACE on 4/15/2022; NWO-2021-02025-BIS.

Impact Summary Table

Permanent Impact Summary		Temporary Impacts and additional information	
Wetland Type	Total Acre(s)	WaterType	Total Acre(s)
Natural/JD (Fill/Drain)	0.000	Temporary Wetland JD	0.370
Natural/Non-JD (Fill/Drain)	0.000	Non-JD Wetland Temporary	0.000
Artificial/JD (Fill/Drain)	0.080		
Artificial /Non-JD (Fill/Drain))	0.000	Permanent OW	0.000
Total	**0.080**	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**		

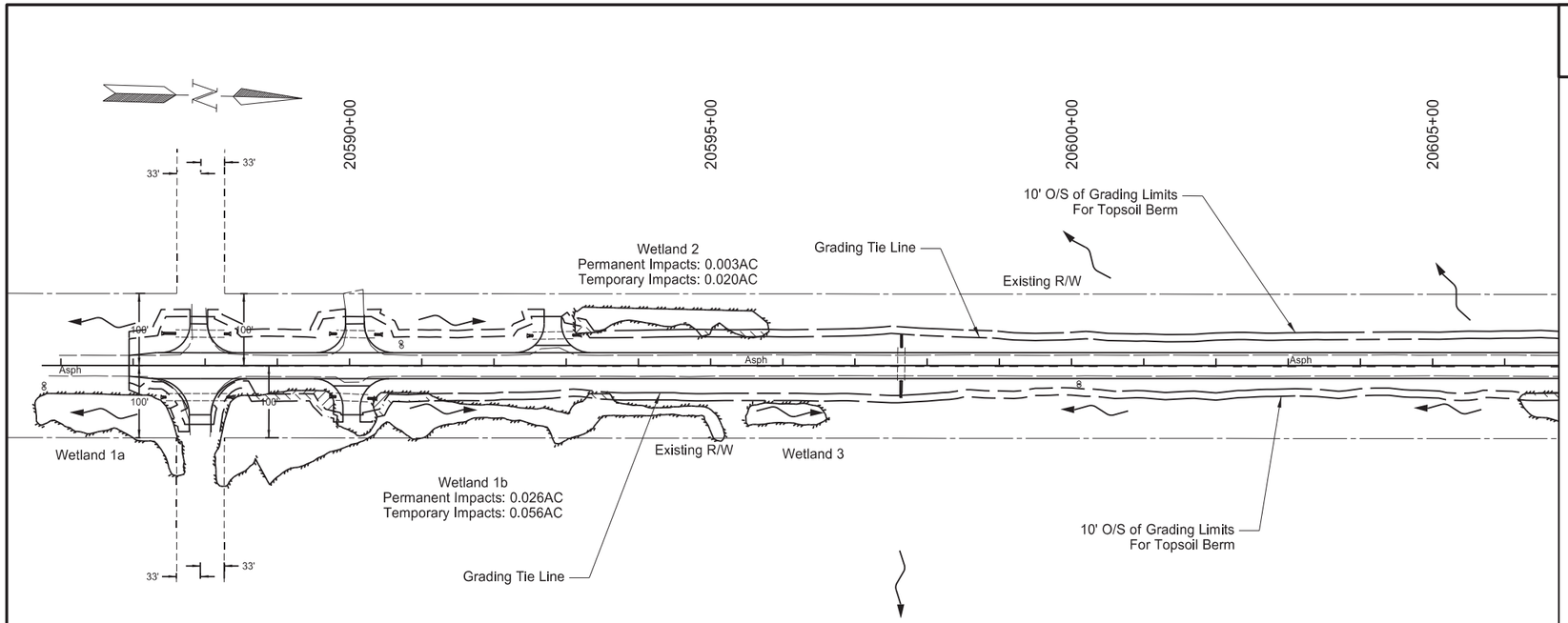
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PE-10772
DATE: 10/24/23
NORTH DAKOTA

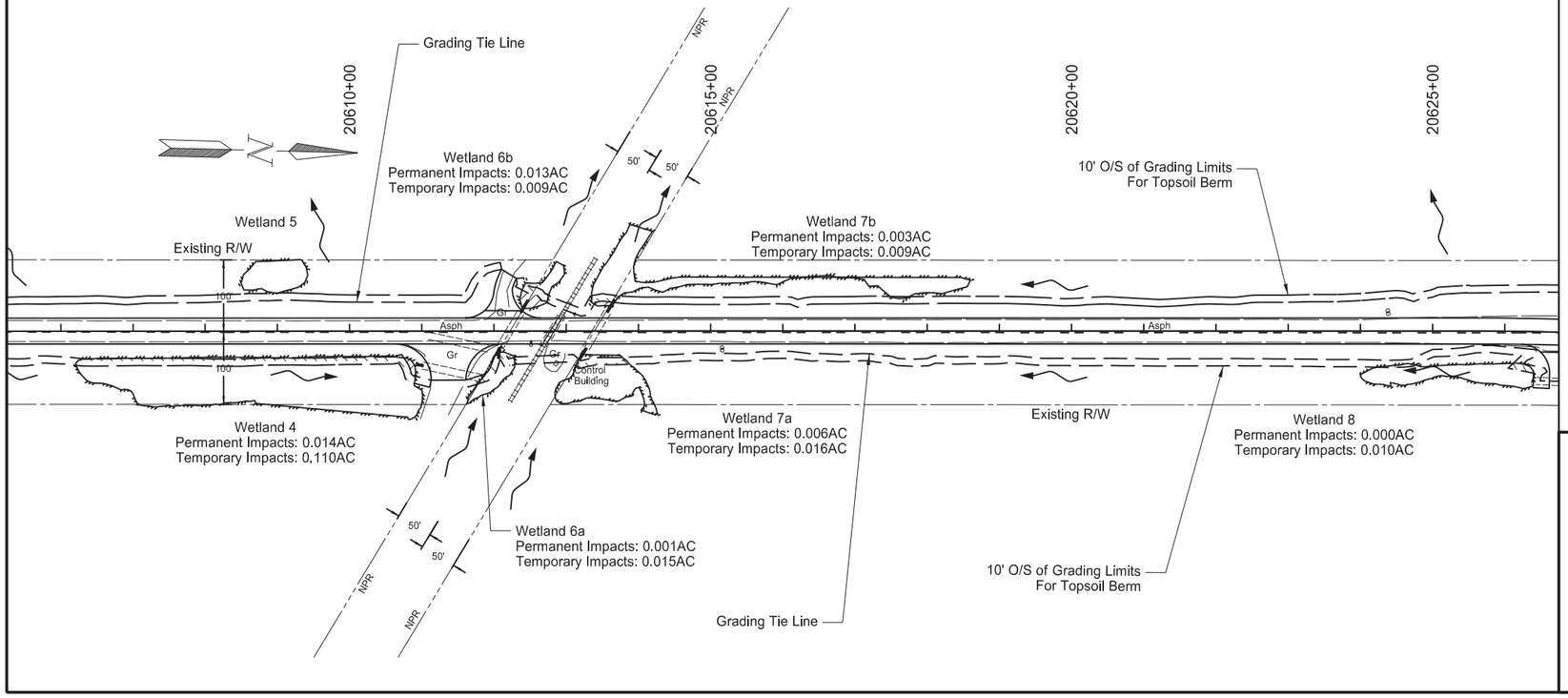
Wetlands Mitigation and Environmental

Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-001(033)200	75	3





Legend

- Temporary Wetland Impact
- Permanent Wetland Impact
- Exst Delineated Wetland

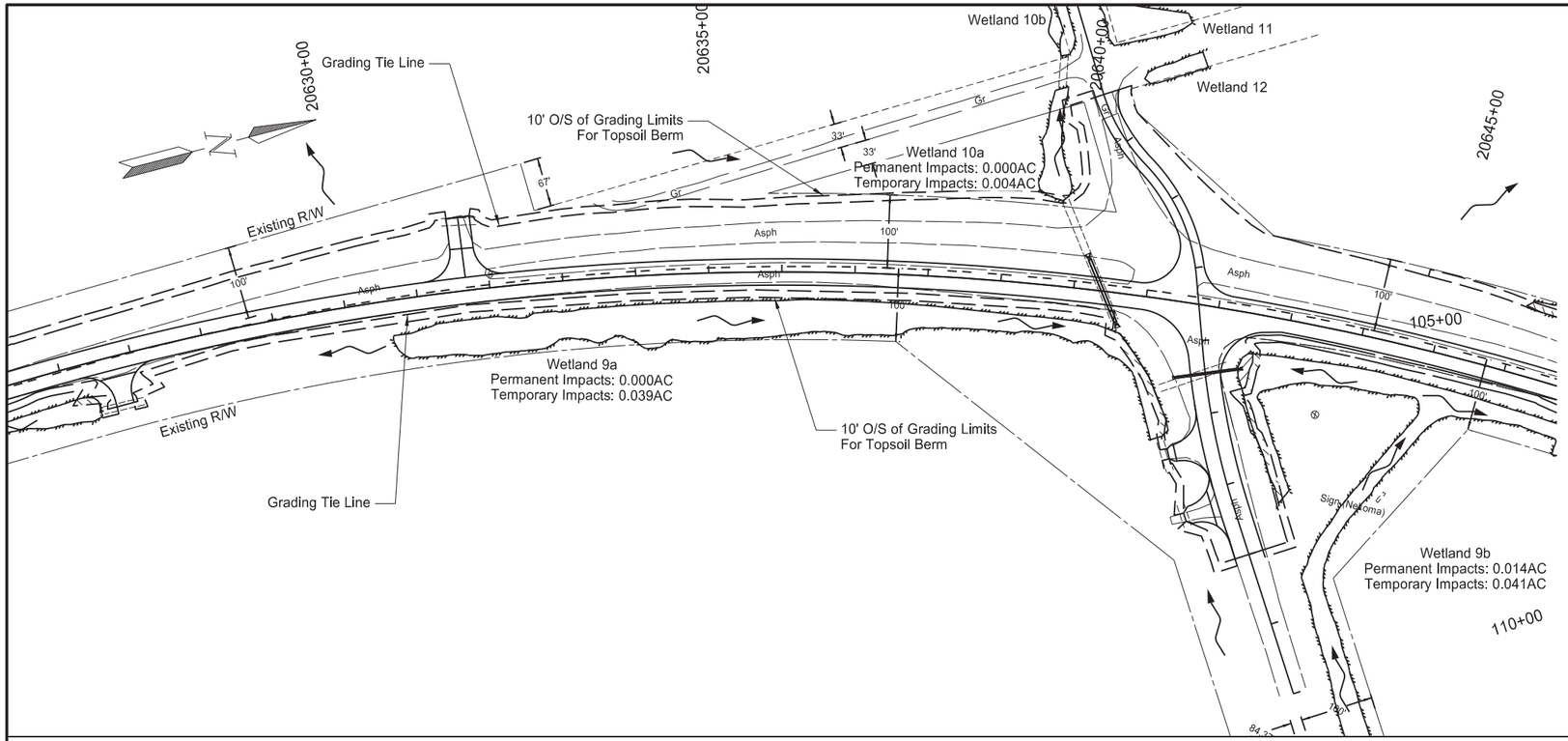
Wetland Impacts

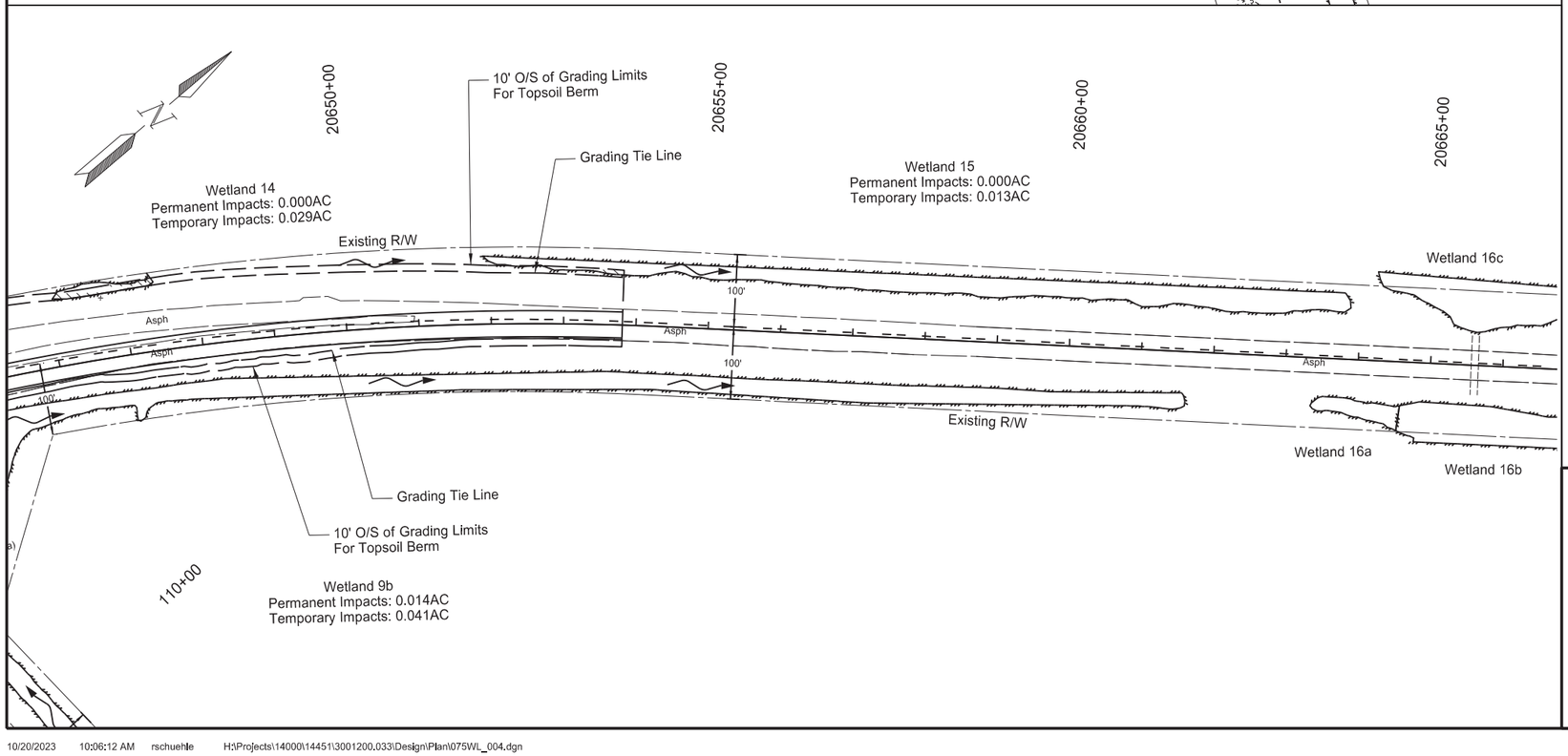
Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 10/24/23
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-001(033)200	75	4





Legend

- Temporary Wetland Impact
- Permanent Wetland Impact
- Exst Delineated Wetland

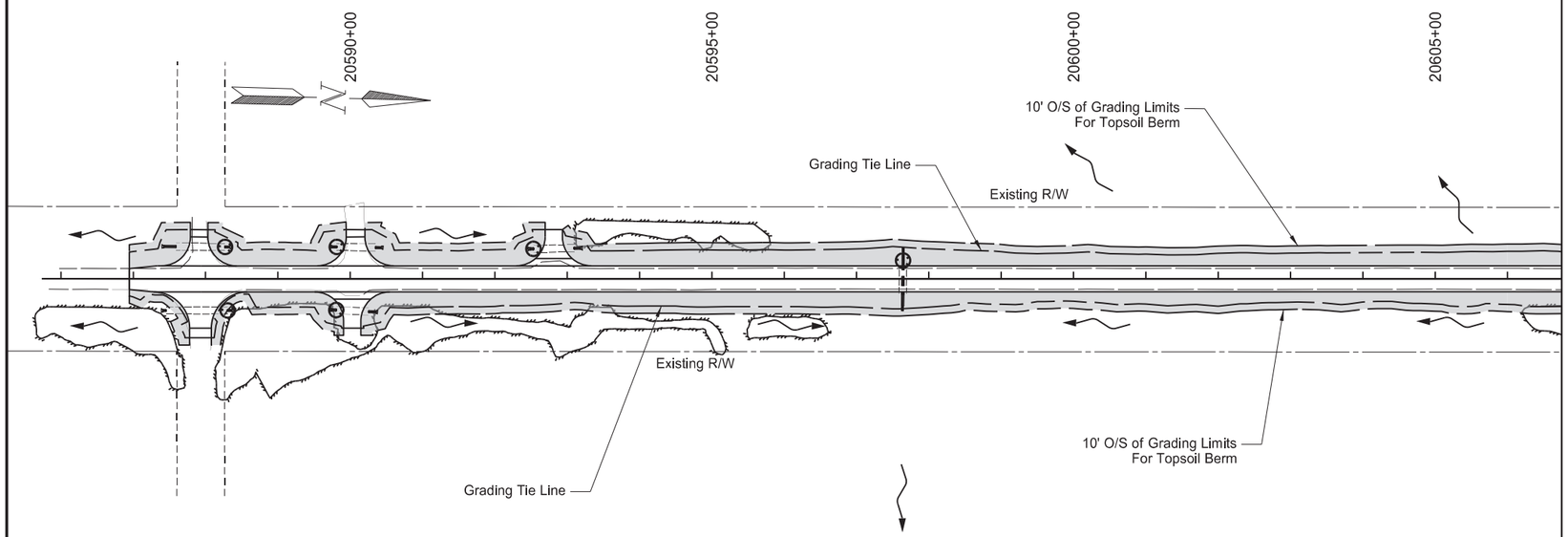
Wetland Impacts

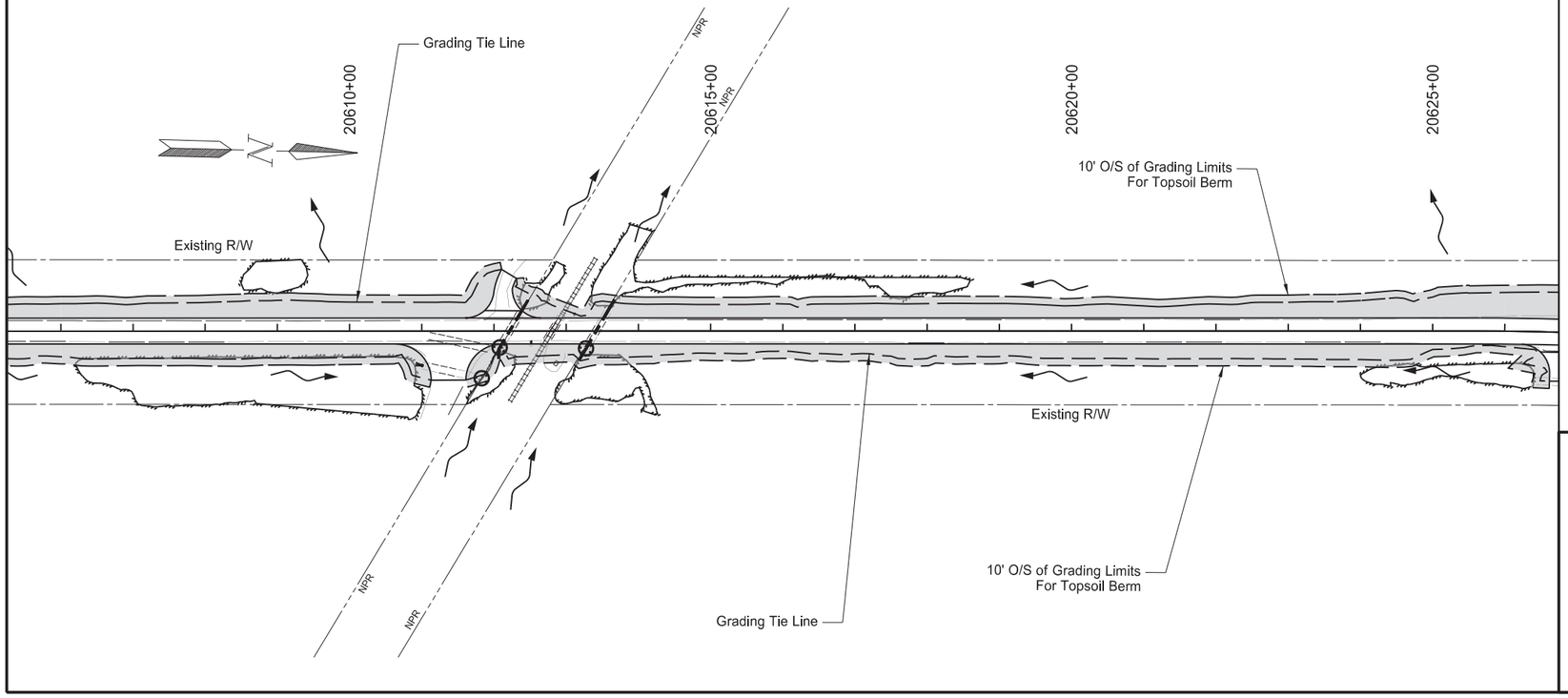
Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 10/24/23
NORTH DAKOTA

10/20/2023 10:06:12 AM rschuehle H:\Projects\14000\14451\3001200.033\Design\Plan\075WL_004.dgn





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	76	1

Spec	Code	Item Description	QTY	Unit
251	2000	Temporary Cover Crop		
		Sta 20586+94.55 to Sta 20626+00	5.30	Acre
253	0101	Straw Mulch		
		Sta 20586+94.55 to Sta 20626+00	5.30	Acre
261	0112	Fiber Rolls 12 IN		
		Sta 20588+27 LT - Culvert End	32	LF
		Sta 20588+31 RT - Culvert End	32	LF
		Sta 20589+81 RT - Culvert End	32	LF
		Sta 20589+81 LT - Culvert End	32	LF
		Sta 20592+53 LT - Culvert End	32	LF
		Sta 20597+64 LT - Culvert End	32	LF
		Sta 20611+83 RT - Culvert End	32	LF
		Sta 20612+08 RT - Culvert End	32	LF
		Sta 20613+27 RT - Culvert End	32	LF
		Temporary Topsoil Berm and Weir	780	LF
		Total	1068	LF
261	0113	Remove Fiber Rolls 12 IN		
		Sta 20588+27 LT - Culvert End	32	LF
		Sta 20588+31 RT - Culvert End	32	LF
		Sta 20589+81 RT - Culvert End	32	LF
		Sta 20589+81 LT - Culvert End	32	LF
		Sta 20592+53 LT - Culvert End	32	LF
		Sta 20597+64 LT - Culvert End	32	LF
		Sta 20611+83 RT - Culvert End	32	LF
		Sta 20612+08 RT - Culvert End	32	LF
		Sta 20613+27 RT - Culvert End	32	LF
		Temporary Topsoil Berm and Weir	780	LF
		Total	1068	LF

See detail Section 20 Temporary Topsoil Berm and Weir Detail

Legend

- Temporary Cover Crop/Mulch
- Fiber Rolls 12IN
- Exst Delineated Wetland

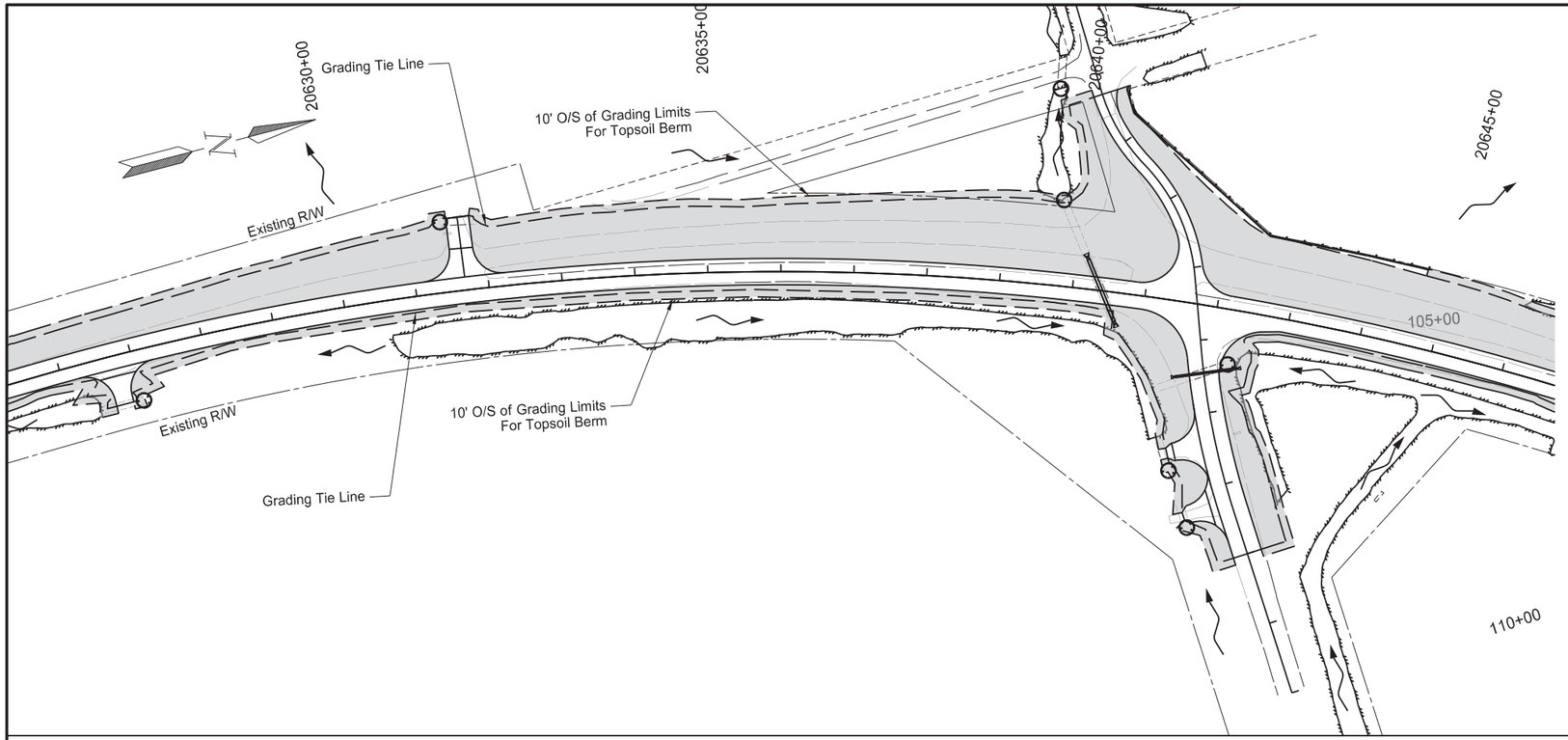
Temporary Erosion & Sediment Control

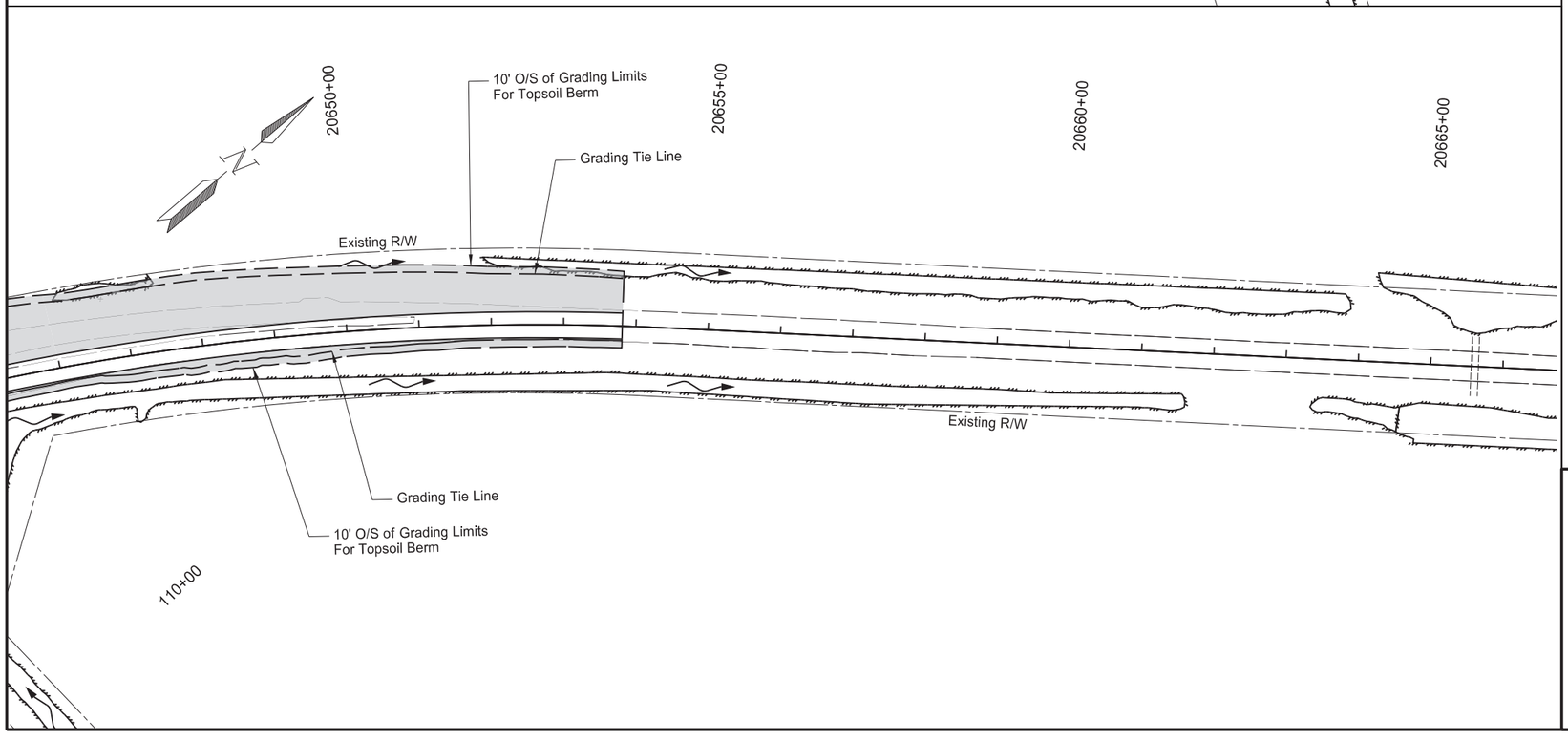
Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 10/24/23
NORTH DAKOTA

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	76	2

Spec	Code	Item Description	QTY	Unit
251	2000	Temporary Cover Crop		
		Sta 20626+00 to Sta 20653+81.22	5.40	Acre
253	0101	Straw Mulch		
		Sta 20626+00 to Sta 20653+81.22	5.40	Acre
261	0112	Fiber Rolls 12 IN		
		Sta 20627+02 RT - Culvert End	32	LF
		Sta 20631+44 LT - Culvert End	32	LF
		Sta 20639+58 LT - Culvert End	32	LF
		Sta 20639+76 LT - Culvert End	32	LF
		Sta 20641+69 RT - Culvert End	32	LF
		Sta 20642+09 RT - Culvert End	32	LF
		Sta 20642+27 RT - Culvert End	32	LF
		Sta 20640+43 LT to Sta 20644+72	514	LF
		Temporary Topsoil Berm and Weir	560	LF
		Total	1266	LF
261	0113	Remove Fiber Rolls 12 IN		
		Sta 20627+02 RT - Culvert End	32	LF
		Sta 20631+44 LT - Culvert End	32	LF
		Sta 20639+58 LT - Culvert End	32	LF
		Sta 20639+76 LT - Culvert End	32	LF
		Sta 20641+69 RT - Culvert End	32	LF
		Sta 20642+09 RT - Culvert End	32	LF
		Sta 20642+27 RT - Culvert End	32	LF
		Sta 20640+43 LT to Sta 20644+72	514	LF
		Temporary Topsoil Berm and Weir	560	LF
		Total	1266	LF

See detail Section 20 Temporary Topsoil Berm and Weir Detail

Legend

- Temporary Cover Crop/Mulch
- Fiber Rolls 12IN
- Exst Delineated Wetland

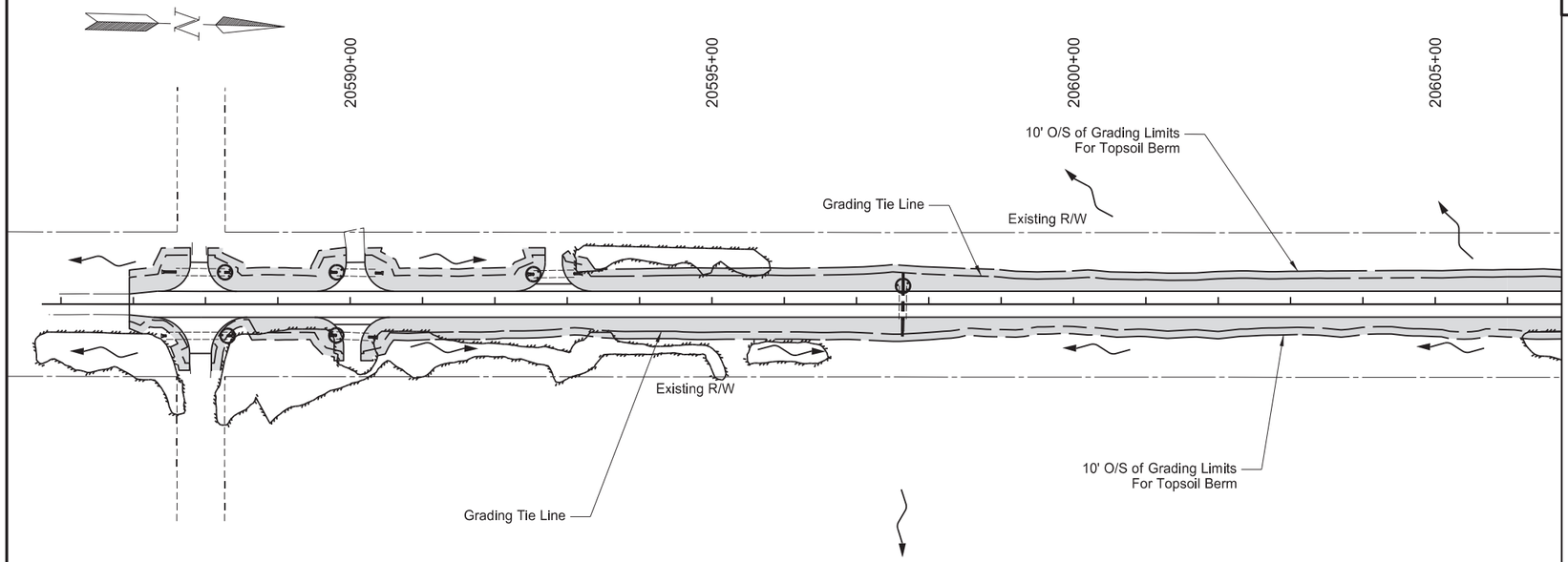
Temporary Erosion & Sediment Control

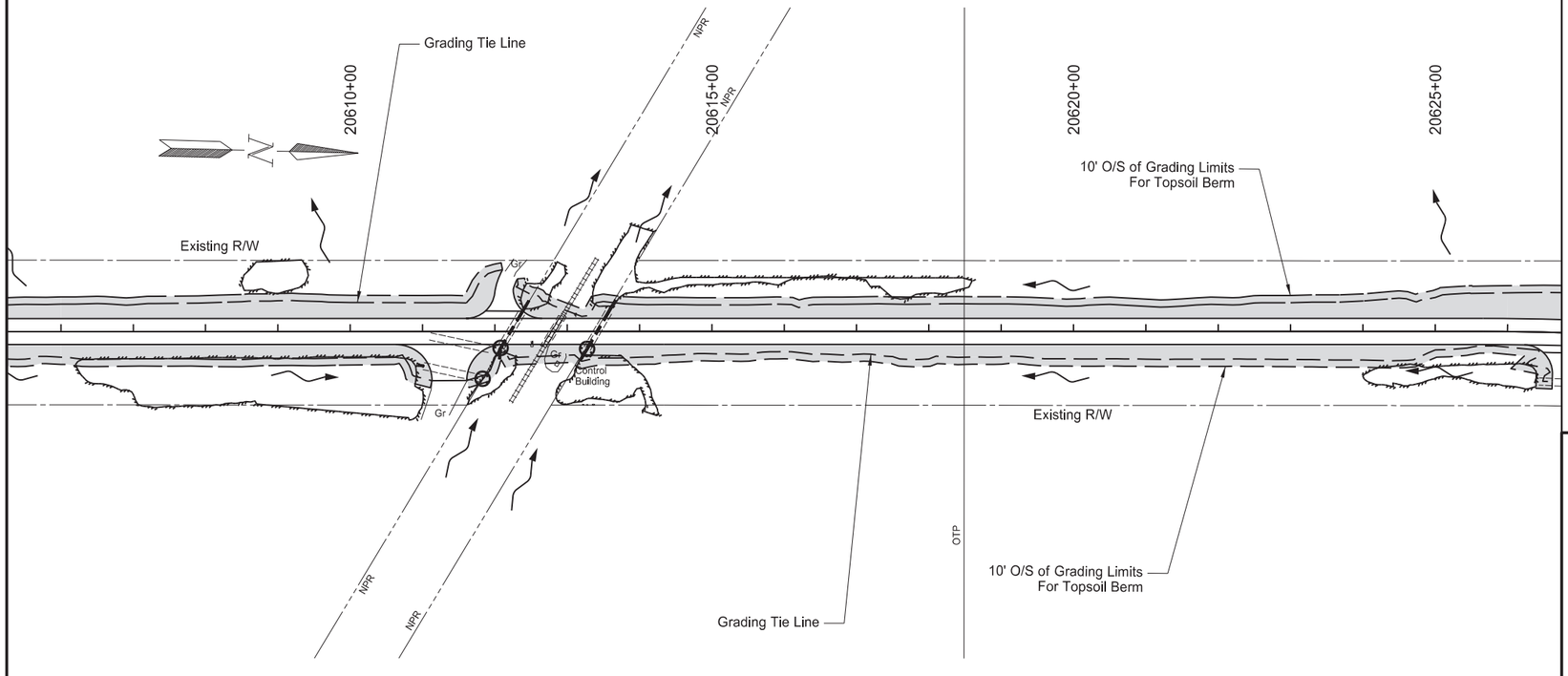
Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 10/24/23
NORTH DAKOTA

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	77	1

Spec	Code	Item Description	QTY	Unit
251	0200	Seeding Class II		
		Sta 20586+94.55 to Sta 20626+00	5.30	Acre
253	0101	Straw Mulch		
		Sta 20586+94.55 to Sta 20626+00	5.30	Acre
261	0112	Fiber Rolls 12 IN		
		Sta 20588+27 LT - Culvert End	32	LF
		Sta 20588+31 RT - Culvert End	32	LF
		Sta 20589+81 RT - Culvert End	32	LF
		Sta 20589+81 LT - Culvert End	32	LF
		Sta 20592+53 LT - Culvert End	32	LF
		Sta 20597+64 LT - Culvert End	32	LF
		Sta 20611+83 RT - Culvert End	32	LF
		Sta 20612+08 RT - Culvert End	32	LF
		Sta 20613+27 RT - Culvert End	32	LF
		Total	288	LF
261	0113	Remove Fiber Rolls 12 IN		
		Sta 20588+27 LT - Culvert End	32	LF
		Sta 20588+31 RT - Culvert End	32	LF
		Sta 20589+81 RT - Culvert End	32	LF
		Sta 20589+81 LT - Culvert End	32	LF
		Sta 20592+53 LT - Culvert End	32	LF
		Sta 20597+64 LT - Culvert End	32	LF
		Sta 20611+83 RT - Culvert End	32	LF
		Sta 20612+08 RT - Culvert End	32	LF
		Sta 20613+27 RT - Culvert End	32	LF
		Total	288	LF

Legend

- Seeding Class II/Mulch
- Fiber Rolls 12IN
- Exst Delineated Wetland

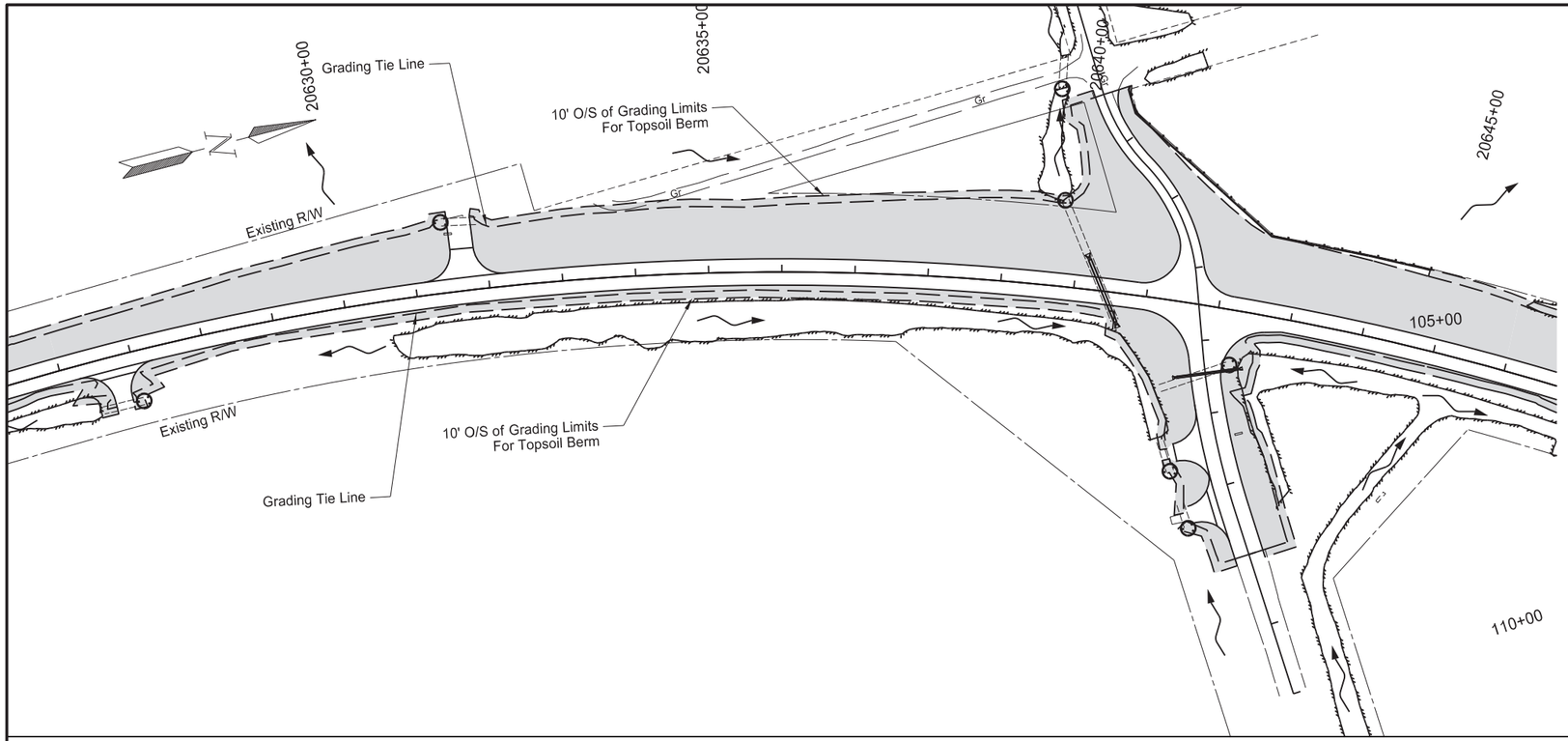
Permanent Erosion & Sediment Control

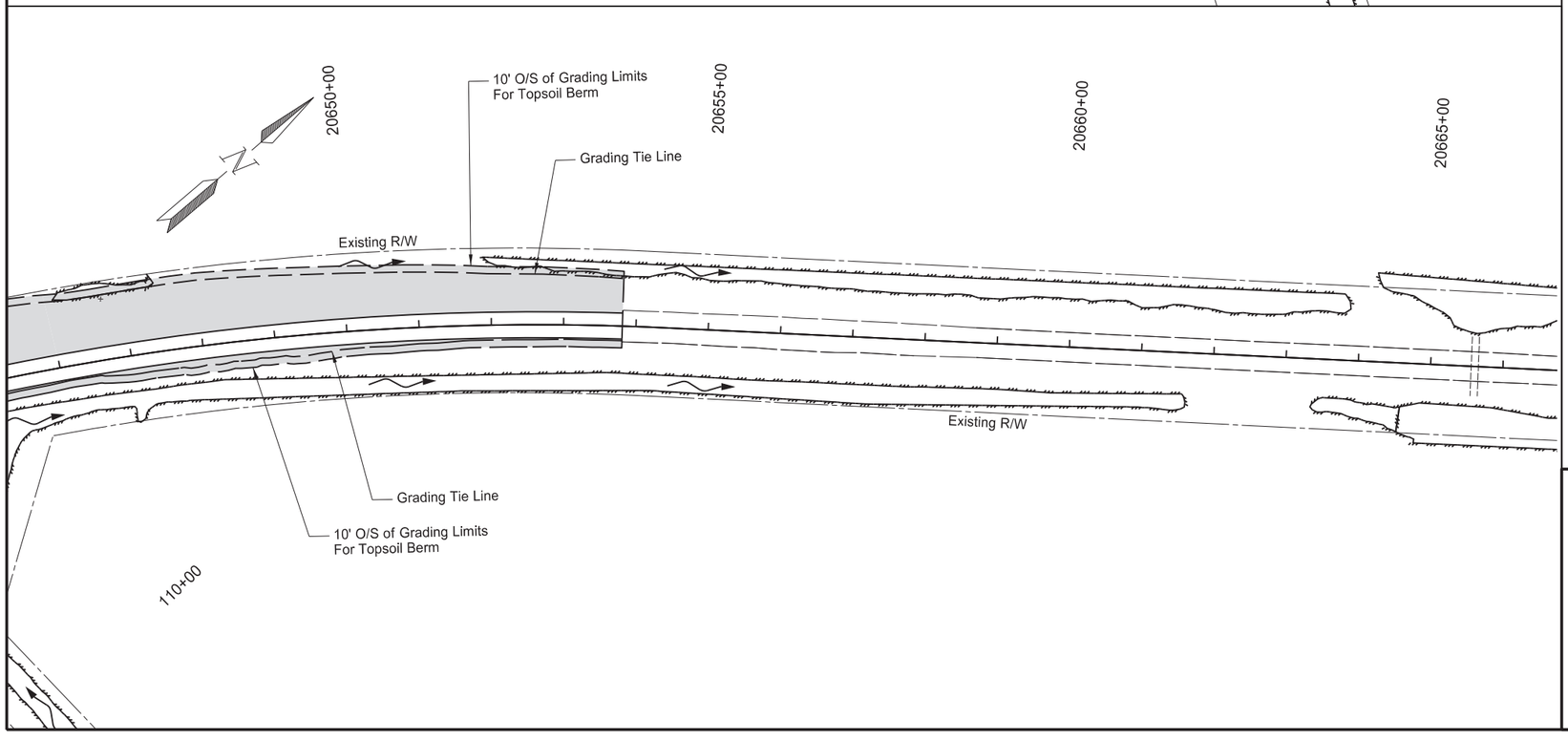
Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 10/24/23
NORTH DAKOTA

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	77	2

Spec	Code	Item Description	QTY	Unit
251	0200	Seeding Class II		
		Sta 20626+00 to Sta 20653+81.22	5.40	Acre
253	0101	Straw Mulch		
		Sta 20626+00 to Sta 20653+81.22	5.40	Acre
261	0112	Fiber Rolls 12 IN		
		Sta 20627+02 RT - Culvert End	32	LF
		Sta 20631+44 LT - Culvert End	32	LF
		Sta 20639+58 LT - Culvert End	32	LF
		Sta 20639+76 LT - Culvert End	32	LF
		Sta 20641+69 RT - Culvert End	32	LF
		Sta 20642+06 RT - Culvert End	32	LF
		Sta 20642+27 RT - Culvert End	32	LF
		Sta 20640+43 LT to Sta 20644+72	514	LF
		Total	738	LF
261	0113	Remove Fiber Rolls 12 IN		
		Sta 20627+02 RT - Culvert End	32	LF
		Sta 20631+44 LT - Culvert End	32	LF
		Sta 20639+58 LT - Culvert End	32	LF
		Sta 20639+76 LT - Culvert End	32	LF
		Sta 20641+69 RT - Culvert End	32	LF
		Sta 20642+06 RT - Culvert End	32	LF
		Sta 20642+27 RT - Culvert End	32	LF
		Sta 20640+43 LT to Sta 20644+72	514	LF
		Total	738	LF

Legend

- Seeding Class II/Mulch
- Fiber Rolls 12IN
- Exst Delineated Wetland

Permanent Erosion & Sediment Control

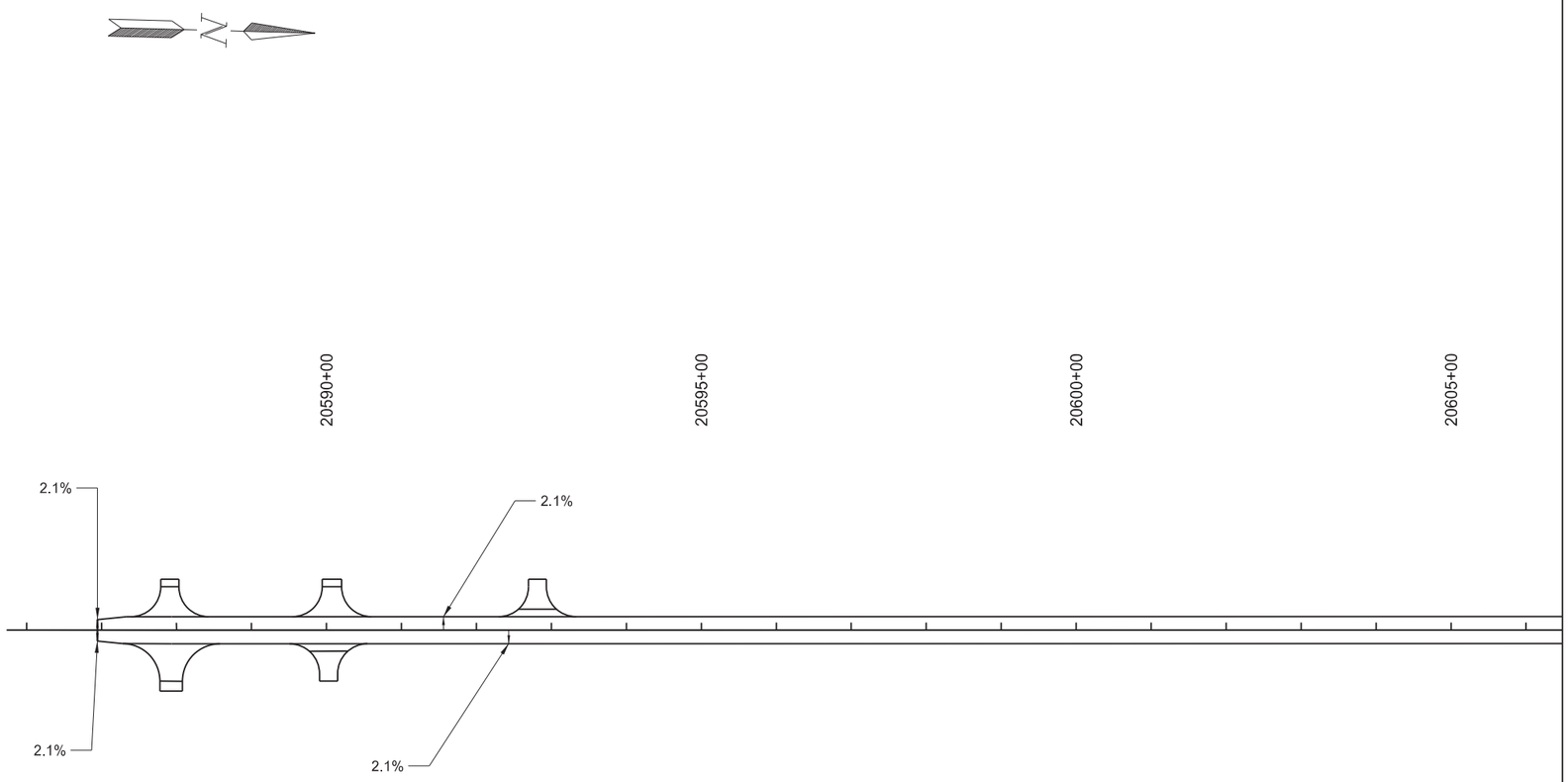
Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 10/24/23
NORTH DAKOTA

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	80	1



Legend

Pavement Slope Transition

Superelevation Details

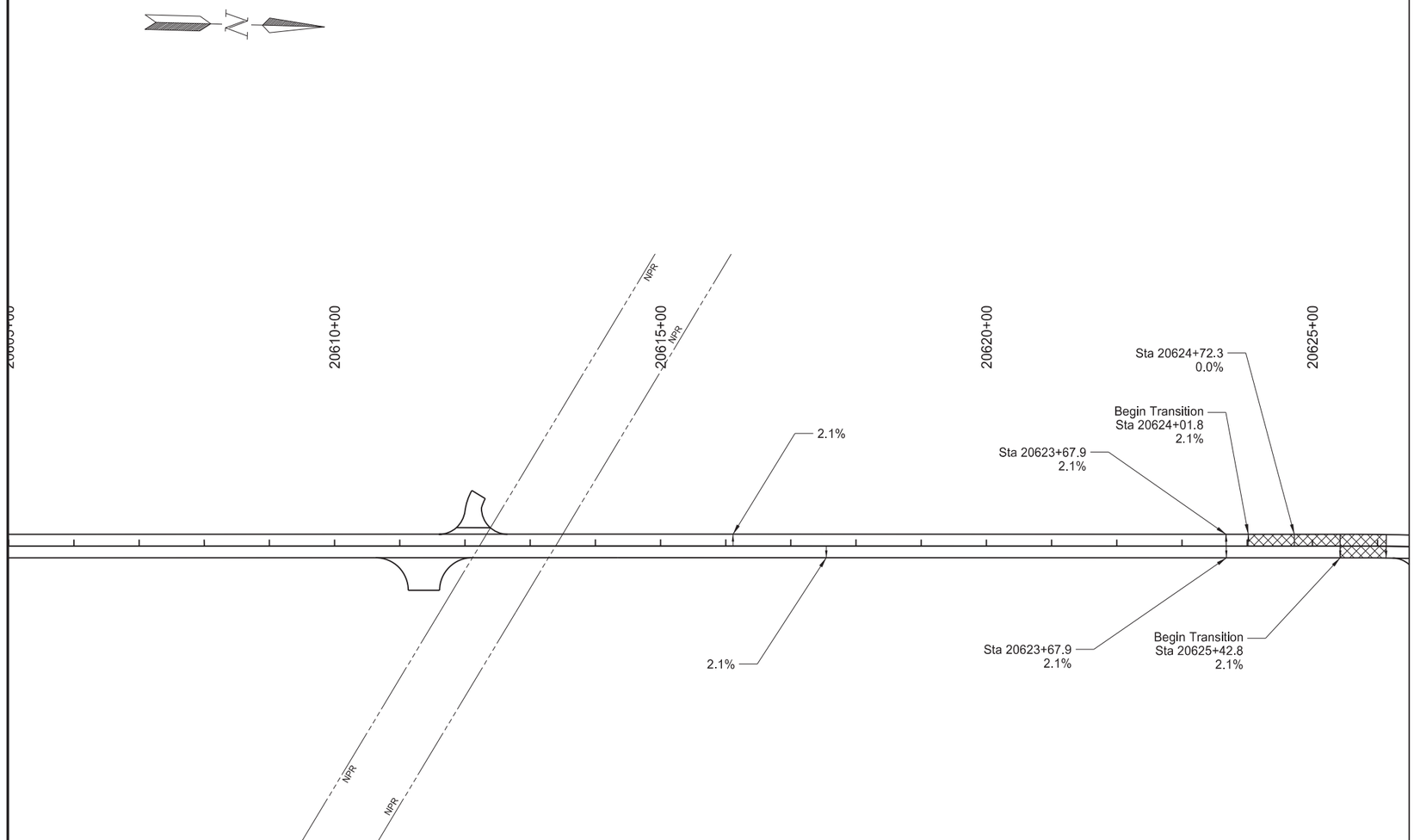
Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 10/24/23
NORTH DAKOTA

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	80	2



Legend

Pavement Slope Transition

Superelevation Details

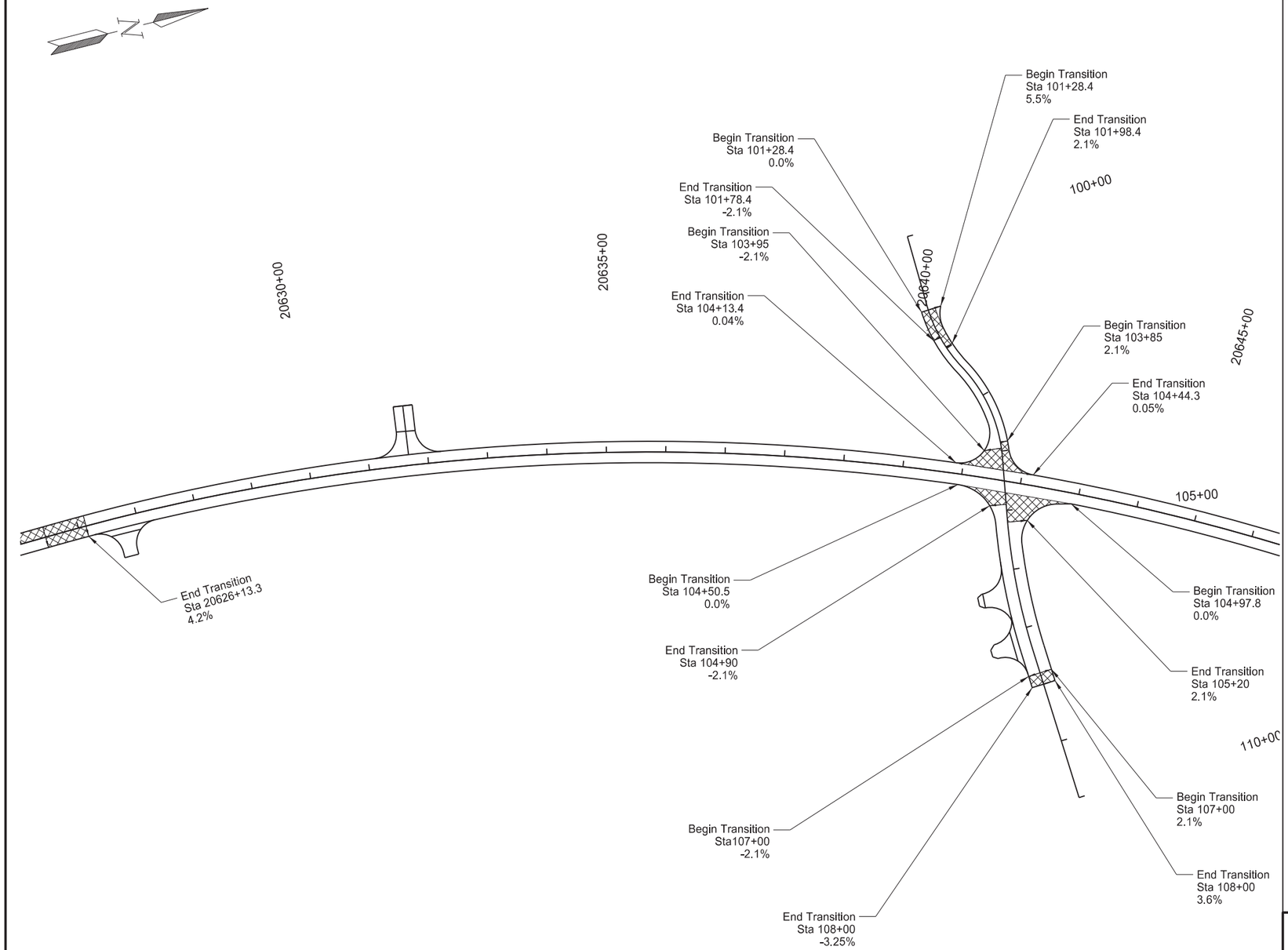
Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 10/24/23
NORTH DAKOTA

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-001(033)200	80	3



Legend

Pavement
Slope Transition

Superelevation Details

Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 10/24/23
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	80	4



Legend

Pavement
Slope Transition

Superelevation Details

Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 10/24/23
NORTH DAKOTA

PRELIMINARY SURVEY COORDINATE AND CURVE DATA - ND1 NEKOMA TO JCT 5 LANGDON

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-001(033)200	81	1

HORIZONTAL ALIGNMENT

PNT	STATION	NORTHING	EASTING
Chain EX_ND1			
Begin/Sec Line	10587+93.59	580728.4431	2480981.9539
1/4 SC	10614+34.09	583368.0333	2480912.8034
PC C10	10626+17.76	584551.3015	2480881.9742
PI C10	10640+92.56	586025.6039	2480843.5623
PT C10	10654+15.76	587099.3809	2481854.5262
PC C20	10697+82.30	590278.5811	2484847.7519
PI C20	10714+12.76	591465.6834	2485965.4119
PT C20	10728+75.02	593095.5233	2485920.7674
1/4 SC	10738+85.13	594105.2460	2485893.1091
Sec Line	10765+21.60	596740.7369	2485821.1263
1/4 SC	10791+69.15	599387.3006	2485749.0245
PI	10810+18.31	602035.4797	2485676.7164
PI	10818+19.20	602036.3694	2485676.6921
Sec Line	10818+44.20	602061.3601	2485676.0097
1/4 SC	10844+84.27	604700.5243	2485606.7532
Sec Line	10871+24.60	607339.9375	2485537.1996
1/4 SC	10897+65.29	609979.5697	2485462.4896
Sec Line	10924+05.71	612618.9289	2485387.8127
1/4 SC	10950+49.71	615261.9403	2485315.5769
Sec Line	10976+92.87	617904.1107	2485243.2512
1/4 SC	11003+28.78	620539.0596	2485172.0035
Sec Line	11029+63.77	623173.0915	2485100.9718
1/4 SC	11056+09.11	625817.3720	2485026.0928
Sec Line	11082+53.94	628461.1465	2484951.4309
PC C30	11107+75.65	630982.0347	2484887.1237
PI C30	11115+03.88	631710.0284	2484868.5528
PT C30	11122+14.84	632380.1253	2484583.4436
PC C40	11130+02.21	633104.6464	2484275.1784
PI C40	11137+22.78	633767.6993	2483993.0663
PT C40	11144+26.62	634487.9611	2483971.9032
1/4 SC	11163+75.55	636436.0548	2483914.6635
Sec Line	11190+14.28	639073.8189	2483843.4398
1/4 SC	11216+54.23	641712.7021	2483768.4438

CURVE DATA

ARC DEFINITION

C10

PI Sta = 10640+92.56

Delta = 44° 00' 00" (RT)

Da = 1° 36' 00"

R = 3,581.0959

T = 1,474.8027

L = 2,798.0024

C20

PI Sta = 10714+12.76

Delta = 44° 50' 36" (LT)

Da = 1° 27' 00"

R = 3,951.5401

T = 1,630.4526

L = 3,092.7221

C30

PI Sta = 11115+03.88

Delta = 21° 35' 14" (LT)

Da = 1° 30' 00"

R = 3,819.8292

T = 728.2305

L = 1,439.1909

C40

PI Sta = 11137+22.78

Delta = 21° 21' 56" (RT)

Da = 1° 30' 00"

R = 3,819.8305

T = 720.5737

L = 1,424.4088

US PUBLIC LAND SURVEY DATA

CORNER	IRN	NORTHING	EASTING
T-159-N R-60-W			
SE Cor Sec 21	7-J	580728.44	2480981.95
E 1/4 Cor Sec 21	7-H	583368.03	2480912.80
SW Cor Sec 15	7-G	586013.80	2480843.87
S 1/4 Cor Sec 15	8-G	586095.51	2483475.04
SE Cor Sec 15	9-G	586177.52	2486106.31
E 1/4 Cor Sec 15	9-F	588823.48	2486035.81
SE Cor Sec 10	9-E	591469.45	2485965.31
E 1/4 Cor Sec 10	9-D	594105.25	2485893.11
SE Cor Sec 3	9-C	596740.74	2485821.13
E 1/4 Cor Sec 3	9-B	599387.30	2485749.02
T-160-N R-60-W			
SE Cor Sec 34	9-N	602061.36	2485676.01
E 1/4 Cor Sec 34	9-M	604700.52	2485606.75
SE Cor Sec 27	9-L	607339.94	2485537.20
E 1/4 Cor Sec 27	9-K	609979.57	2485462.49
SE Cor Sec 22	9-J	612618.93	2485387.81
E 1/4 Cor Sec 22	9-H	615261.94	2485315.58
SE Cor Sec 15	9-G	617904.11	2485243.25
E 1/4 Cor Sec 15	9-F	620539.06	2485172.00
SE Cor Sec 10	9-E	623173.09	2485100.97
E 1/4 Cor Sec 10	9-D	625817.37	2485026.09
SE Cor Sec 3	9-C	628461.15	2484951.43
E 1/4 Cor Sec 3	9-B	631101.88	2484884.07
NE Cor Sec 3	9-A	633807.95	2484813.89

SURVEY CONTROL POINTS

PNT	NORTHING	EASTING	ELEV	STATION	OFFSET
MONUMENT DESCRIPTION					

PRIMARY CONTROL

GPS 100	578628.05	2480981.16	1609.69	Outside of alignment	
#5 Rebar W / Pink Cap Stamped "WSN Control"					
GPS 101	593449.52	2485841.37	1638.81	10732+31.06	69.68 Lt
#5 Rebar W / Pink Cap Stamped "WSN Control"					
GPS 102	610015.35	2485384.09	1632.03	10898+03.27	77.36 Lt
#5 Rebar W / Pink Cap Stamped "WSN Control"					
GPS 103	625752.74	2484950.03	1620.86	11055+46.65	77.86 Lt
#5 Rebar W / Pink Cap Stamped "WSN Control"					
GPS 104	642162.57	2483830.40	1630.57	11221+02.14	74.73 Rt
#5 Rebar W / Pink Cap Stamped "WSN Control"					
GPS 105	650503.05	2483607.34	1611.13	Outside of alignment	
#5 Rebar W / Pink Cap Stamped "WSN Control"					

REFERENCE MARKERS

R Mkr #	NORTHING	EASTING	STATION	O/S	ALIGNMENT
R MKR 201	583239.33	2480941.32	10613+04.68	25' RT	EX_ND1
R MKR 202	587919.79	2482677.41	10665+77.16	37' RT	EX_ND1
R MKR 203	592095.86	2485856.60	10718+75.71	35' RT	EX_ND1
R MKR 204	597371.71	2485837.51	10771+51.89	34' RT	EX_ND1
R MKR 205	602635.92	2485694.48	10824+18.08	34' RT	EX_ND1
R MKR 206	607926.34	2485556.43	10877+10.22	36' RT	EX_ND1
R MKR 207	613186.82	2485405.59	10929+72.90	33' RT	EX_ND1
R MKR 208	618463.22	2485261.44	10982+51.28	33' RT	EX_ND1
R MKR 209	623742.02	2485117.37	11035+32.00	32' RT	EX_ND1
R MKR 210	629014.56	2484970.18	11088+06.69	33' RT	EX_ND1
R MKR 211	634147.05	2484027.34	11140+81.05	30' RT	EX_ND1
R MKR 213	644705.78	2483716.69	11246+47.60	33' RT	EX_ND1

NOTES: Sheet 1 of 2

This is part of project #3-001(031)201 and 3-001(033)200

Date Survey Completed 9 /29/21

☐ Assumed Coordinates

☒ All coordinates on this sheet are Cavalier County ground coordinates. They are derived from the NAD83(2011) reference frame; North Dakota North Zone Combination Factor (cf) = 0.9999340

All coordinates and measurements on this document derived from the International Foot definition.

INITIALIZING BENCH MARK
NDGPS Stations (VRS)

☒ NAVD-88

☐ _____

☐ GEOID12B ☐ _____

☒ GEOID18

Christopher D. Jordheim, PLS, VP

Digitally signed by Christopher D. Jordheim, PLS, VP
DN: C=US, E=chris.jordheim@widseth.com, O=Widseth, CN="Christopher D. Jordheim, PLS, VP"
Reason: I attest to the accuracy and integrity of this document
Date: 2023.02.22 09:38:47-06'00'

PRELIMINARY SURVEY COORDINATE AND CURVE DATA - ND1 NEKOMA TO JCT 5 LANGDON

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-001(033)200	81	2

HORIZONTAL ALIGNMENT

PNT	STATION	NORTHING	EASTING
Sec Line	11242+94.09	644351.4942	2483693.3249
1/4 SC	11269+31.50	646987.9122	2483621.1281
End / Sec Line (Calc)	11295+68.93	649624.3732	2483549.6393

CURVE DATA

ARC DEFINITION

US PUBLIC LAND SURVEY DATA

CORNER	IRN	NORTHING	EASTING
T-161-N R-60-W			
SE Cor Sec 35	11-N	633786.61	2483992.51
E 1/4 Cor Sec 35	11-M	636436.05	2483914.66
SE Cor Sec 26	11-L	639073.82	2483843.44
E 1/4 Cor Sec 26	11-K	641712.70	2483768.44
SE Cor Sec 23	11-J	644351.49	2483693.32
E 1/4 Cor Sec 23	11-H	646987.91	2483621.13
NE Cor Sec 23	11-G	649624.37	2483549.64

SURVEY CONTROL POINTS

PNT	NORTHING	EASTING	ELEV	STATION	OFFSET	MONUMENT DESCRIPTION

NOTES: Sheet 2 of 2

This is part of project #3-001(031)201 and 3-001(033)200

Date Survey Completed 9 /29/21

☐ Assumed Coordinates

☒ All coordinates on this sheet are Cavalier County ground coordinates. They are derived from the NAD83(2011) reference frame; North Dakota North Zone Combination Factor (cf) = 0.9999340

All coordinates and measurements on this document derived from the International Foot definition.

INITIALIZING BENCH MARK
NDGPS Stations (VRS)

☒ NAVD-88

☐ _____

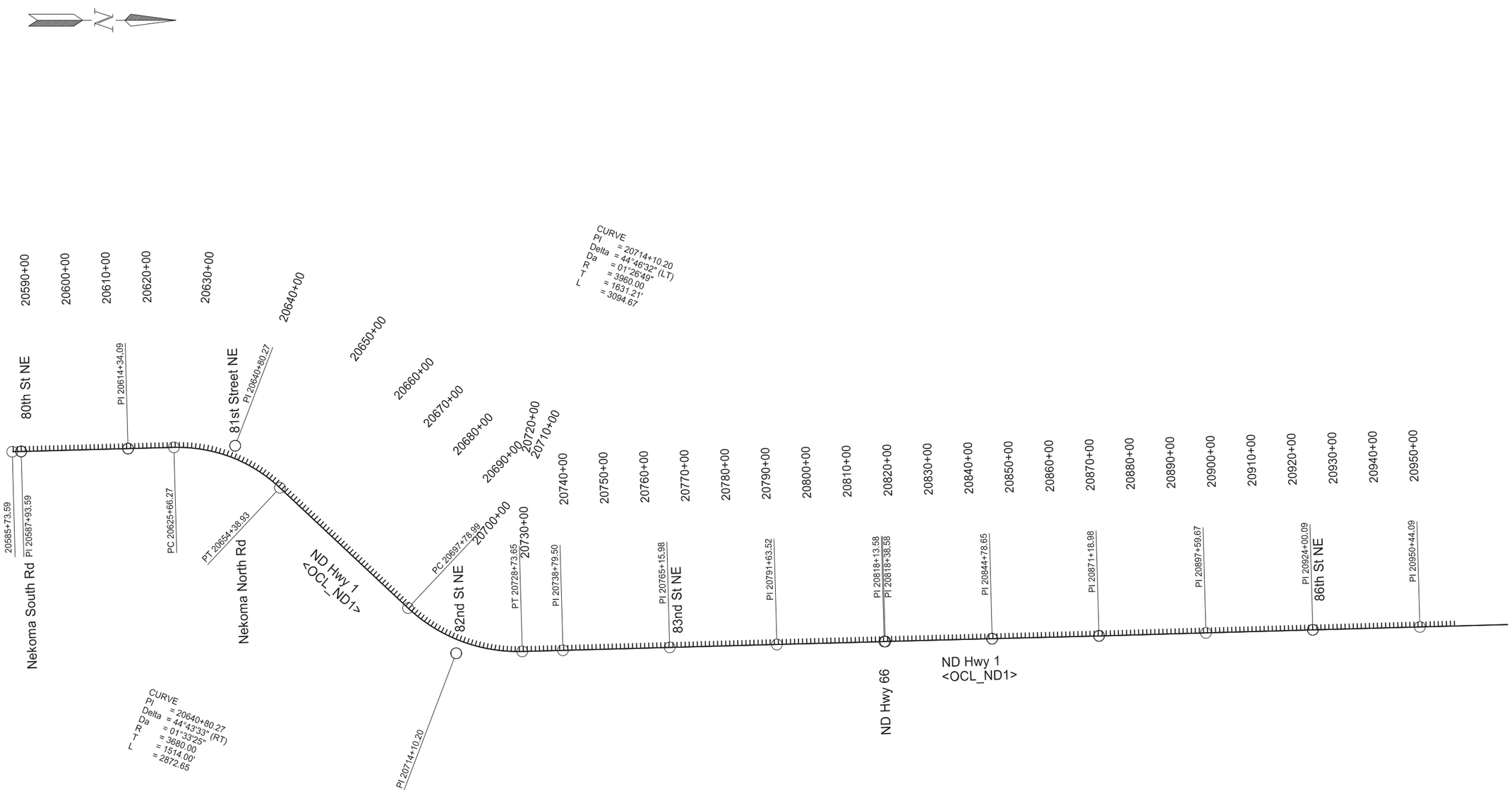
☐ GEOID12B ☐ _____

☒ GEOID18

Christopher D. Jordheim, PLS, VP

Digitally signed by Christopher D. Jordheim, PLS, VP
DN: C=US, E=chris.jordheim@widseth.com, O=Widseth, CN="Christopher D. Jordheim, PLS, VP"
Reason: I attest to the accuracy and integrity of this document
Date: 2023.02.22 09:39:10-06'00'

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	82	1



Design Alignment Description
OCL_ND1

Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 10/24/23
NORTH DAKOTA

10/20/2023 10:08:08 AM rschuehle H:\Projects\14000\14451\3001200.033\Design\Plan\082SD_001.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	82	2

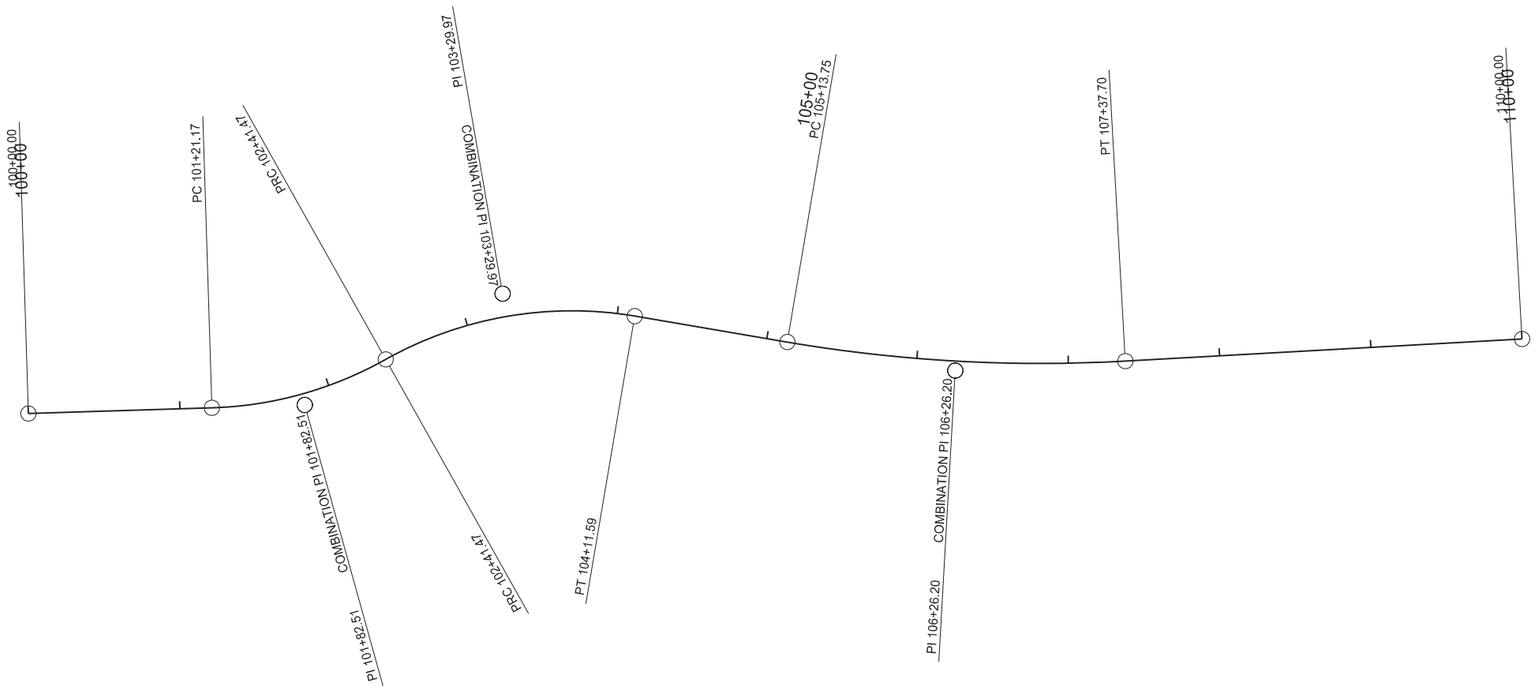
Design Alignment Description
OCL_ND1

Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 10/24/23
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	82	3



Alignment PR81ST

Element	Point	Station	Northing	Easting
Line	POB	10000.000 R1	586006.379	2480745.878
Curve	PC	10121.172 R1	586010.139	2480866.992
	PI	10182.508 R1	586012.043	2480928.298
Curve	PRC	10241.468 R1	586042.105	2480981.762
	PI	10329.972 R1	586085.482	2481058.907
Line	PT	10411.592 R1	586070.660	2481146.161
Curve	PC	10513.747 R1	586053.551	2481246.873
	PI	10626.196 R1	586034.718	2481357.734
Line	PT	10737.705 R1	586040.977	2481470.009
	POE	11000.000 R1	586055.576	2481731.898

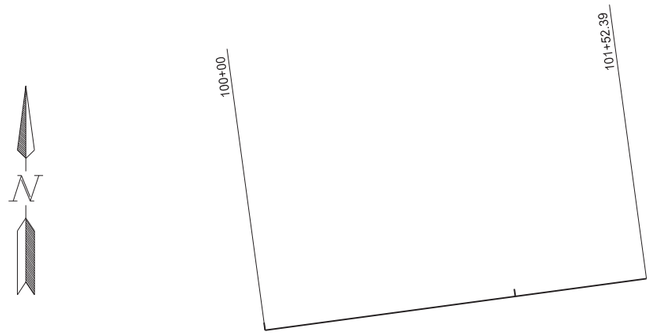
Design Alignment Description
81st St NE

Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 10/24/23
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	82	4



Alignment Swale

Element	Point	Station	Northing	Easting
Line	POB	10000.000 R1	585918.305	2480962.355
	POE	10152.389 R1	585938.707	2481113.372

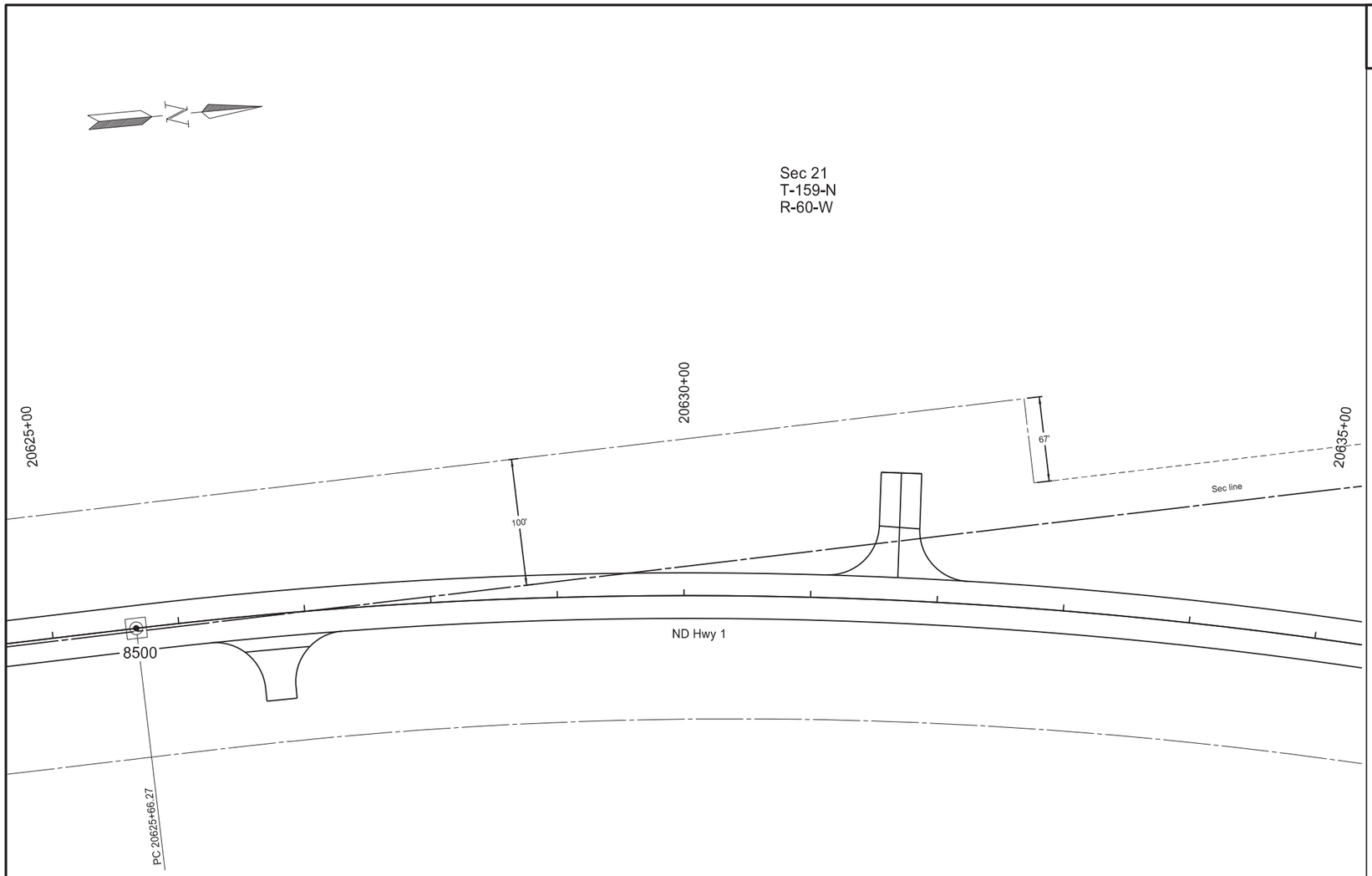
Design Alignment Description
Swale

Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 10/24/23
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	82	5



SPEC	CODE	BID ITEM	QTY	UNIT
720	0125	ALIGNMENT MONUMENTS		
		20625+00 to 20635+00		
		Alignment Monuments	1	EA
		Total	1	EA

Point	Northing	Easting	Station	Offset	Description
8500	584499.7722	2480880.8126	20625+66.27	0.00	ALIGN MON

Note:
Coordinate data and Station/Offset on this sheet are based off of Design Alignment "OCL_ND1" as shown in Section 82 Sheet 1 and 2.

Legend

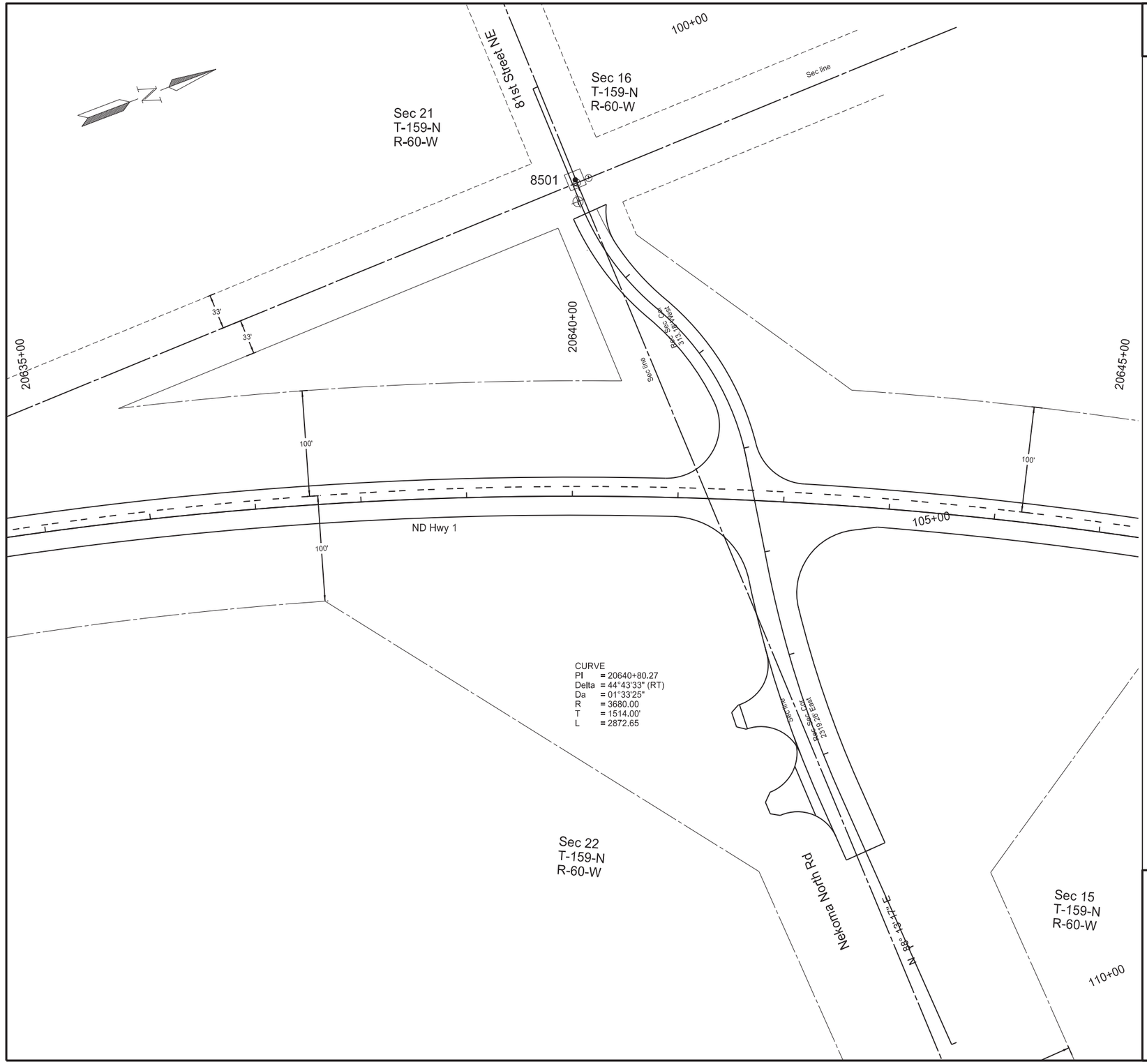
⊡ Alignment Monument

Design Alignment Monuments

Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 10/24/23
NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	82	6

SPEC	CODE	BID ITEM	QTY	UNIT
720	0125	ALIGNMENT MONUMENTS		
		20635+00 to 20645+00		
		Alignment Monuments	1	EA
		Total	1	EA

Point	Northing	Easting	Station	Offset	Description
8501	586013.2379	2480840.6736	20640+02.60	-299.27	ALIGN MON

Note:
Coordinate data and Station/Offset on this sheet are based off of Design Alignment "OCL_ND1" as shown in Section 82 Sheet 1 and 2.

Legend

⊡ Alignment Monument

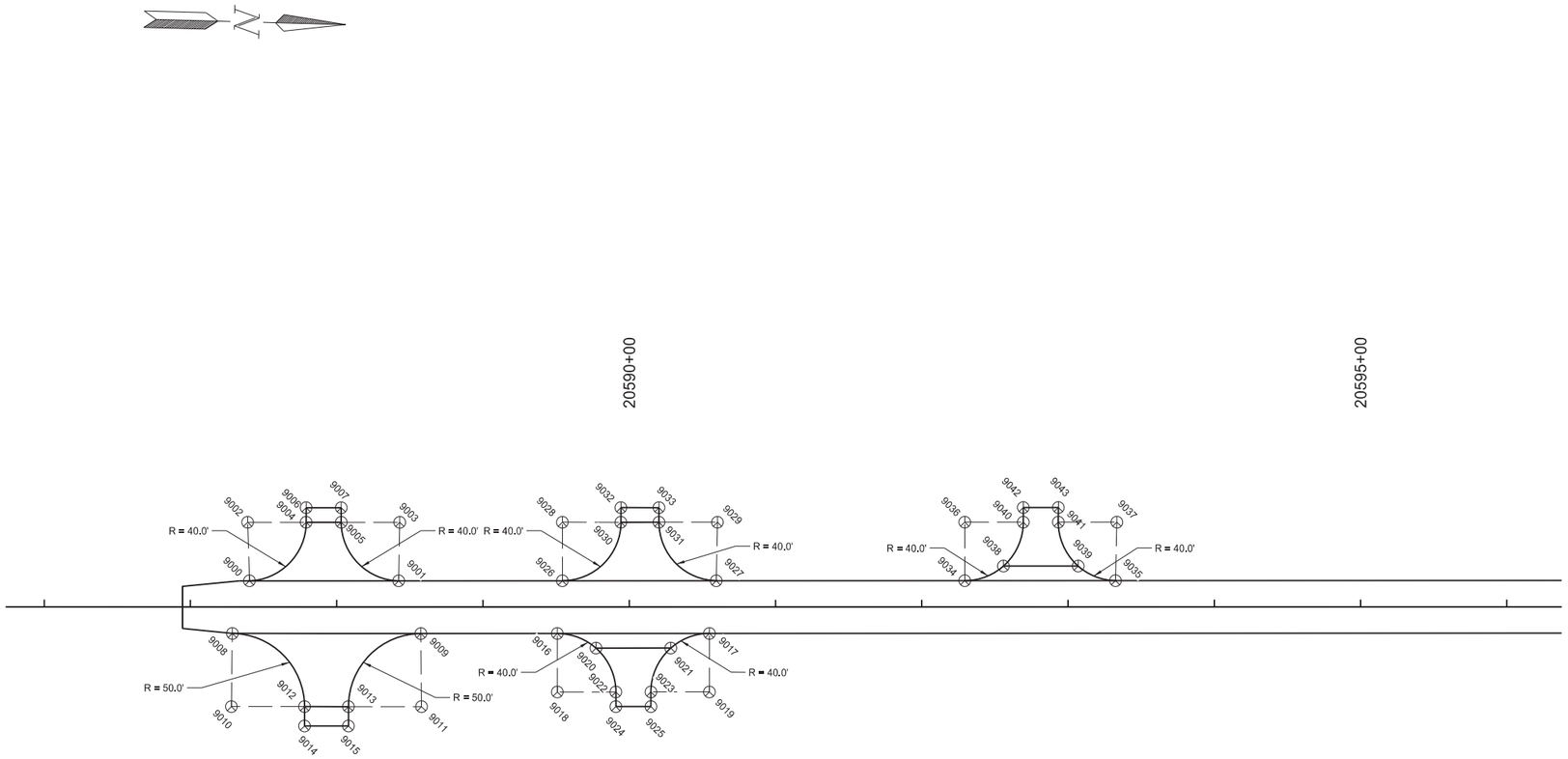
Design Alignment Monuments

Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 10/24/23
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	82	7



Point	Northing	Easting	Station	Offset	Description
9000	580674.7109	2480965.332	20587+40.30	-18.00	RAD PC
9001	580776.6967	2480962.647	20588+42.35	-18.00	RAD PC
9002	580672.3985	2480925.399	20587+39.02	-57.98	CENTER OF RADIUS
9003	580776.3621	2480922.649	20588+43.09	-57.99	CENTER OF RADIUS
9004	580712.3842	2480924.330	20587+79.02	-58.02	ASP-GRV*PT
9005	580736.3764	2480923.717	20588+03.09	-58.00	ASP-GRV*PT
9006	580712.1224	2480914.334	20587+79.02	-68.02	TIE
9007	580736.1145	2480913.720	20588+03.10	-68.00	TIE
9008	580663.9763	2481001.620	20587+28.64	18.00	RAD PC
9009	580792.8176	2480998.226	20588+57.50	18.00	RAD PC
9010	580664.6518	2481051.615	20587+28.03	68.00	CENTER OF RADIUS
9011	580794.6068	2481048.194	20588+57.95	68.00	CENTER OF RADIUS
9012	580714.6340	2481050.280	20587+78.03	67.95	ASP-GRV*PT
9013	580744.6246	2481049.529	20588+07.95	67.99	ASP-GRV*PT
9014	580714.9893	2481063.583	20587+78.04	81.26	TIE
9015	580744.9786	2481062.782	20588+07.94	81.24	TIE
9016	580886.0723	2480995.713	20589+50.79	18.00	RAD PC
9017	580990.0345	2480992.912	20590+54.79	18.00	RAD PC
9018	580887.1497	2481035.699	20589+50.79	58.00	CENTER OF RADIUS
9019	580991.1120	2481032.897	20590+54.79	58.00	CENTER OF RADIUS
9020	580912.7895	2481004.997	20589+77.25	28.00	ASP-GRV*PC
9021	580963.8560	2481003.621	20590+28.33	28.00	ASP-GRV*PC
9022	580927.1355	2481034.630	20589+90.79	58.01	RAD PT
9023	580951.1263	2481033.965	20590+14.79	57.99	RAD PT
9024	580927.4022	2481044.617	20589+90.79	68.00	TIE
9025	580951.3936	2481043.976	20590+14.79	68.00	TIE
9026	580888.5935	2480959.632	20589+54.28	-18.00	RAD PC
9027	580993.7293	2480956.799	20590+59.46	-18.00	RAD PC
9028	580887.5250	2480919.630	20589+54.29	-58.02	CENTER OF RADIUS
9029	580993.4872	2480916.800	20590+60.29	-57.99	CENTER OF RADIUS
9030	580927.5113	2480918.583	20589+94.29	-57.99	ASP-GRV*PT
9031	580953.5010	2480917.8473	20590+20.29	-58.02	ASP-GRV*PT
9032	580927.2487	2480908.560	20589+94.30	-68.01	TIE
9033	580953.2398	2480907.879	20590+20.30	-67.99	TIE
9034	581163.5987	2480952.222	20592+29.39	-18.00	RAD PC
9035	581266.6128	2480949.446	20593+32.44	-18.00	RAD PC
9036	581162.5302	2480912.223	20592+29.40	-58.01	CENTER OF RADIUS
9037	581266.4932	2480909.446	20593+33.40	-57.99	CENTER OF RADIUS
9038	581189.7826	2480941.503	20592+55.85	-28.01	ASP-GRV*PC
9039	581240.8363	2480940.134	20593+06.92	-28.00	ASP-GRV*PC
9040	581202.5165	2480911.176	20592+69.40	-57.98	RAD PT
9041	581226.5069	2480910.494	20592+93.40	-58.02	RAD PT
9042	581202.2539	2480901.152	20592+69.41	-68.01	TIE
9043	581226.2457	2480900.524	20592+93.41	-67.99	TIE

Design Survey Data Layout

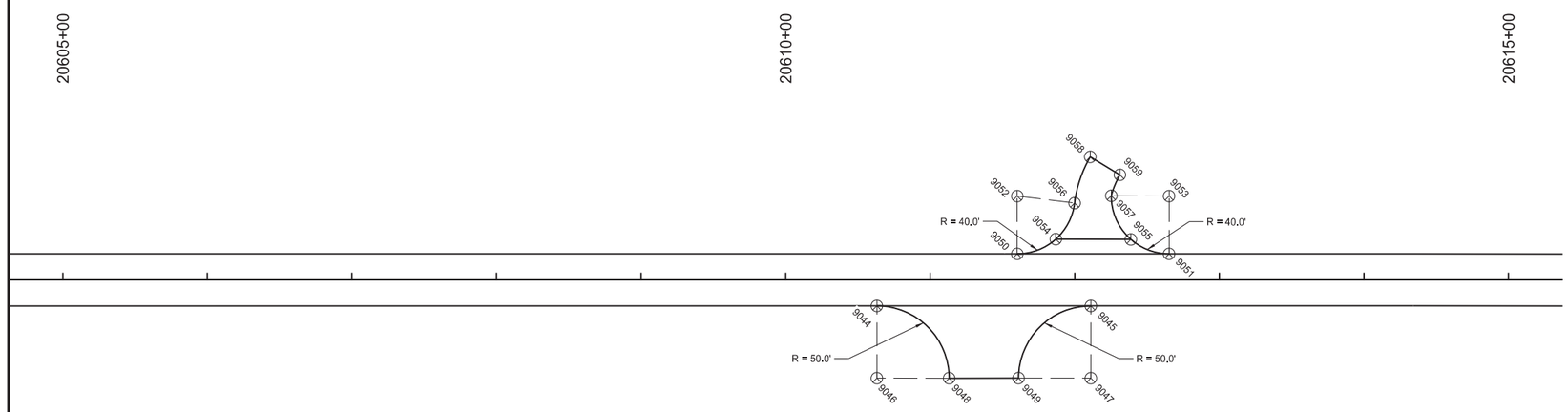
Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 10/24/23
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	82	8

Point	Northing	Easting	Station	Offset	Description
9044	582997.6110	2480938.816	20610+63.10	18.00	RAD PC
9045	583145.5696	2480934.829	20612+11.11	18.00	RAD PC
9046	582998.9578	2480988.798	20610+63.10	68.00	CENTER OF RADIUS
9047	583146.9047	2480984.829	20612+11.10	68.02	CENTER OF RADIUS
9048	583048.9407	2480987.488	20611+13.10	68.04	GRV-ASP*PT
9049	583096.9218	2480986.138	20611+61.10	67.98	GRV-ASP*PT
9050	583093.6839	2480900.214	20611+60.17	-18.00	RAD PC
9051	583198.7165	2480897.384	20612+65.25	-18.00	RAD PC
9052	583092.6064	2480860.228	20611+60.17	-58.00	CENTER OF RADIUS
9053	583197.6390	2480857.398	20612+65.25	-58.00	CENTER OF RADIUS
9054	583120.0578	2480889.322	20611+86.83	-28.18	GRV-ASP*PC
9055	583171.9992	2480888.100	20612+38.79	-28.00	GRV-ASP*PC
9056	583132.4255	2480864.028	20611+99.88	-53.13	RAD PT
9057	583157.6481	2480858.250	20612+25.25	-58.23	RAD PT
9058	583142.3642	2480831.740	20612+10.68	-85.14	TIE
9059	583163.2127	2480843.638	20612+31.20	-72.68	TIE



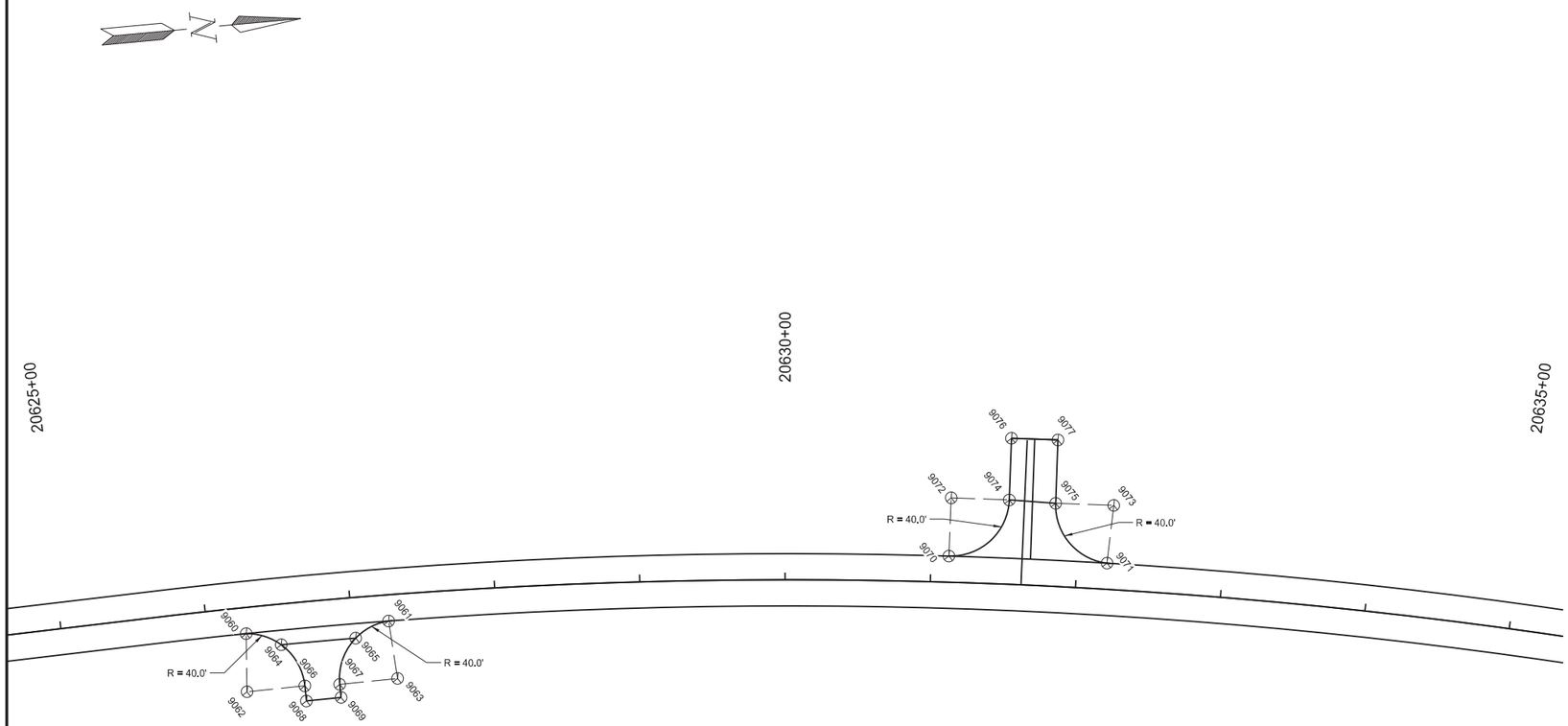
Design Survey Data Layout

Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 10/24/23
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	82	9



Point	Northing	Easting	Station	Offset	Description
9060	584560.2551	2480897.707	20626+26.59	18.00	RAD PC
9061	584658.6965	2480898.033	20627+25.52	18.00	RAD PC
9062	584557.1847	2480937.589	20626+23.06	57.85	CENTER OF RADIUS
9063	584661.1936	2480937.955	20627+28.73	57.87	CENTER OF RADIUS
9064	584583.5896	2480907.542	20626+50.00	28.00	ASP-GRV*PC
9065	584635.0204	2480907.707	20627+01.82	28.00	ASP-GRV*PC
9066	584597.1827	2480937.187	2026+63.69	57.67	RAD PT
9067	584621.1957	2480938.357	2026+88.10	58.76	RAD PT
9068	584597.2878	2480947.655	20626+63.80	68.14	TIE
9069	584621.2866	2480947.414	20626+88.25	67.82	TIE
9070	585046.8525	2480888.942	20631+12.29	-18.00	RAD PC
9071	585154.7801	2480903.776	20632+20.70	-18.00	RAD PC
9072	585052.0959	2480849.190	20631+12.65	-58.09	CENTER OF RADIUS
9073	585163.0319	2480864.636	20632+22.93	-57.94	CENTER OF RADIUS
9074	585091.7700	2480854.285	20631+52.03	-58.08	ASP-GRV*PT
9075	585123.3578	2480859.541	20631+83.55	-57.18	ASP-GRV*PT
9076	585097.1798	2480812.163	20631+51.83	-100.55	TIE
9077	585128.9191	2480816.239	20631+82.98	-100.84	TIE

Design Survey Data Layout

Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
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DATE: 10/24/23
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	82	10



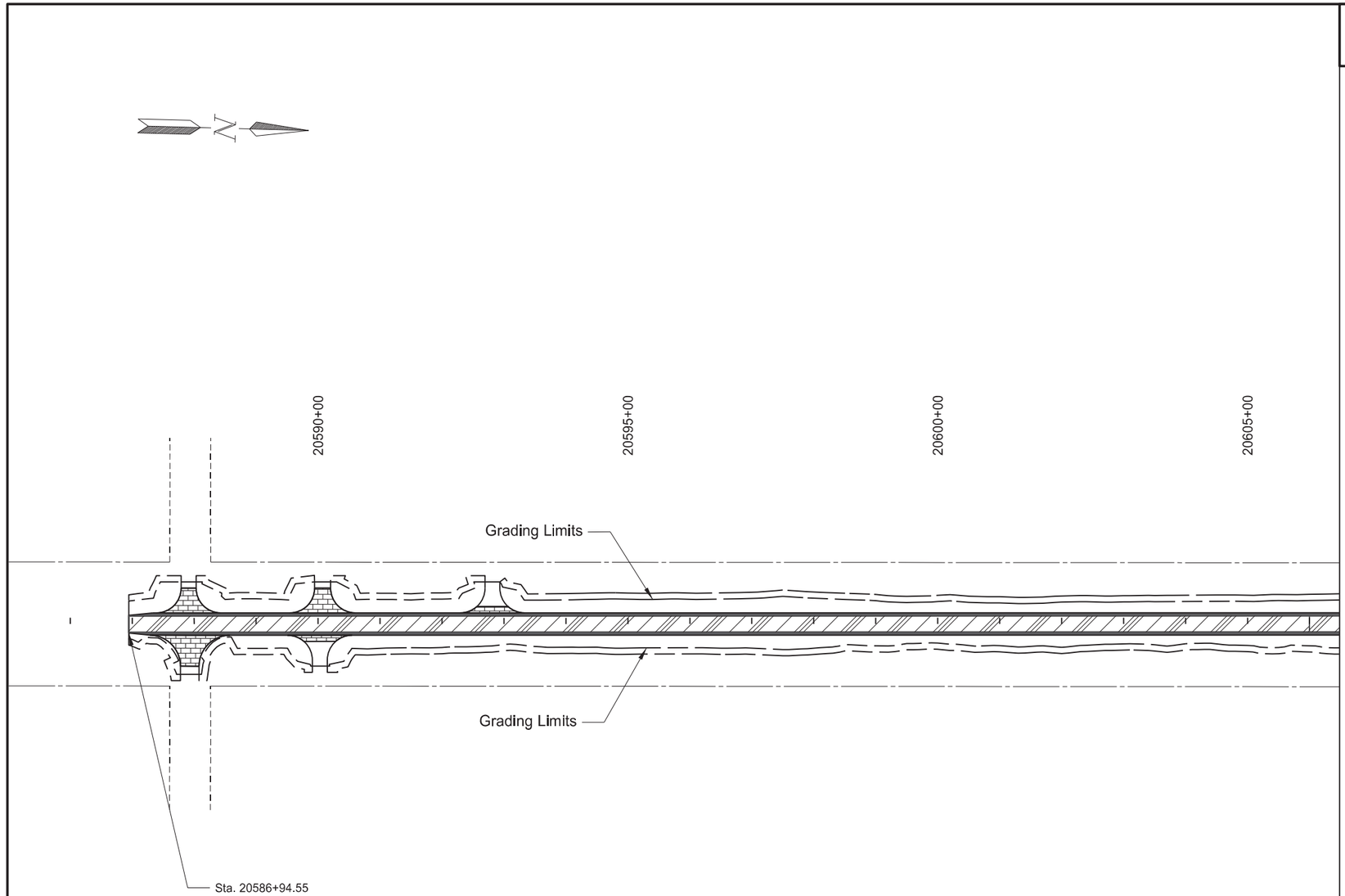
Point	Northing	Easting	Station	Offset	Description
9078	585992.6657	2481134.864	20640+87.64	-18.00	RAD PC
9079	586011.5317	2481088.560	20640+87.64	-68.00	CENTER OF RADIUS
9080	586061.3563	2481084.376	20641+31.13	-90.94	RAD PT
9081	585986.7360	2481171.332	20640+95.95	18.00	RAD PC
9082	585958.2802	2481240.724	20640+95.95	93.00	CENTER OF RADIUS
9083	586032.3314	2481252.616	20641+70.51	75.17	RAD PT
9084	586084.3689	2481135.138	20641+71.47	-53.32	RAD PC
9085	586134.0212	2481141.025	20642+18.49	-68.00	CENTER OF RADIUS
9086	586113.5211	2481186.629	20642+18.49	-18.00	RAD PT
9087	586066.7600	2481294.691	20642+20.19	99.73	RAD PC
9088	586126.3110	2481302.017	20642+78.80	81.52	CENTER OF RADIUS
9089	586140.6079	2481243.745	20642+66.91	22.67	RAD PT
9090	586163.6550	2481249.400	20642+90.31	18.00	TAPER
9091	586023.4730	2481323.592	105+92.92	20.00	RAD PC
9092	586019.4689	2481423.587	106+91.07	20.00	RAD PC
9093	585983.6317	2481320.032	105+92.92	60.00	CENTER OF RADIUS
9094	585979.4705	2481423.949	106+91.07	60.00	CENTER OF RADIUS
9095	585982.0358	2481360.000	106+30.66	58.79	ASP-GRV*PT
9096	585981.0664	2481383.981	106+53.33	58.80	ASP-GRV*PT
9097	585972.5763	2481364.258	106+35.10	68.03	TIE
9098	585972.0023	2481378.633	106+48.57	68.02	TIE
9099	586019.4473	2481407.934	106+75.73	20.00	RAD PC
9100	586023.0376	2481507.529	107+74.17	20.00	RAD PC
9101	585979.4481	2481407.682	106+75.73	60.00	CENTER OF RADIUS
9102	585983.2468	2481511.614	107+76.03	59.96	CENTER OF RADIUS
9103	586010.3495	2481433.081	107+00.22	29.25	ASP-GRV*PC
9104	586012.1839	2481483.998	107+50.07	29.53	ASP-GRV*PC
9105	585981.1415	2481447.646	107+13.47	58.81	RAD PT
9106	585981.5533	2481471.650	107+36.13	59.42	RAD PT
9107	585972.2169	2481455.185	107+20.26	67.99	TIE
9108	585972.7028	2481466.947	107+31.28	68.02	TIE

Design Survey Data Layout

Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	90	1

SPEC	CODE	BID ITEM	QTY	UNIT
302	0120	AGGREGATE BASE COURSE CL 5		
		20586+00 to 20606+00		
		Widening Base Course CL 5 (depth 12.5")	1182	TON
401	0050	Tack Coat		
		20586+00 to 20606+00		
		Tack Coat @ 0.05 Gal/SY (1 Lift)	407	Gal
401	0060	Prime Coat		
		20586+00 to 20606+00		
		Prime Coat @ 0.25 Gal/SY	526	Gal
401	0160	Blotter Material CL 44		
		20586+00 to 20606+00		
		Blotter Material CL 44 @ 12 lbs/SY	13	TON
430	0042	SUPERPAVE FAA 42		
		20586+00 to 20606+00		
		Superpave FAA 42 (Mainline 2" shoulders 4")	1139	TON
430	5815	PG 58S-34 ASPHALT CEMENT		
		20586+00 to 20606+00	69	TON

Legend

- 2" Overlay
- 4.5" of HMA, 12" of Aggregate Base
- 4" of HMA, 12.5" of Aggregate Base
- Geosynthetic Material Type G
- Superpave FAA 42 on Approaches (see Section 20)

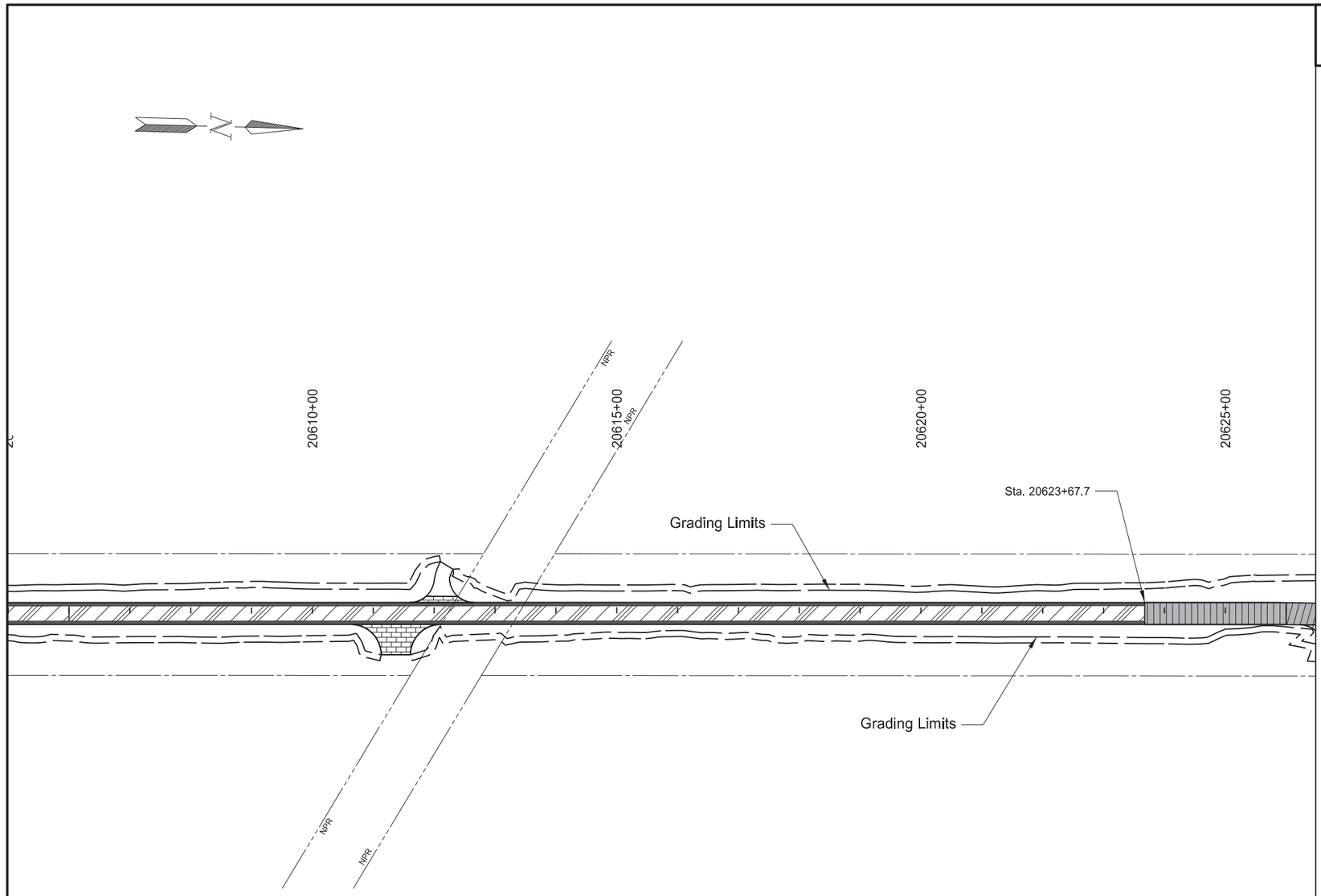
Paving Layout

Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 10/24/23
NORTH DAKOTA

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	90	2

SPEC	CODE	BID ITEM	QTY	UNIT
302	0120	AGGREGATE BASE COURSE CL 5		
		20606+00 to 20623+67.68		
		Mainline Aggregate Base Course CL 5 (depth 12.5")	1188	TON
		20623+67.68 to 20626+00		
		Mainline Aggregate Base Course CL 5 (depth 12")	663	TON
		Total	1851	TON
401	0050	Tack Coat		
		20606+00 to 20623+67.68		
		Tack Coat @ 0.05 Gal/SY (1 Lift)	381	Gal
		20623+67.68 to 20626+00		
		Tack Coat @ 0.05 Gal/SY (1 Lift)	51	Gal
		Total	431	Gal
401	0060	Prime Coat		
		20606+00 to 20623+67.68		
		Prime Coat @ 0.25 Gal/SY	485	Gal
		20623+67.68 to 20626+00		
		Prime Coat @ 0.25 Gal/SY	272	Gal
		Total	757	Gal
401	0160	Blotter Material CL 44		
		20606+00 to 20623+67.68		
		Blotter Material CL 44 @ 12 lbs/SY	12	TON
		20623+67.68 to 20626+00		
		Blotter Material CL 44 @ 12 lbs/SY	7	TON
		Total	19	TON
430	0042	SUPERPAVE FAA 42		
		20606+00 to 20623+67.68		
		Superpave FAA 42 (Mainline 2" shoulders 4")	1062	TON
		20623+67.68 to 20626+00		
		Superpave FAA 42 (Depth 4.5")	242	TON
		Total	1304	TON
430	5815	PG 58S-34 ASPHALT CEMENT		
		20606+00 to 20623+67.68	64	TON
		20623+67.68 to 20626+00	15	TON
		Total	79	TON
709	100	Geosynthetic Material Type G		
		20626+00 to 20646+00	1215	SY

Legend

- 2" Overlay
- 4.5" of HMA, 12" of Aggregate Base
- 4" of HMA, 12.5" of Aggregate Base
- Geosynthetic Material Type G
- Superpave FAA 42 on Approaches (see Section 20)

Paving Layout

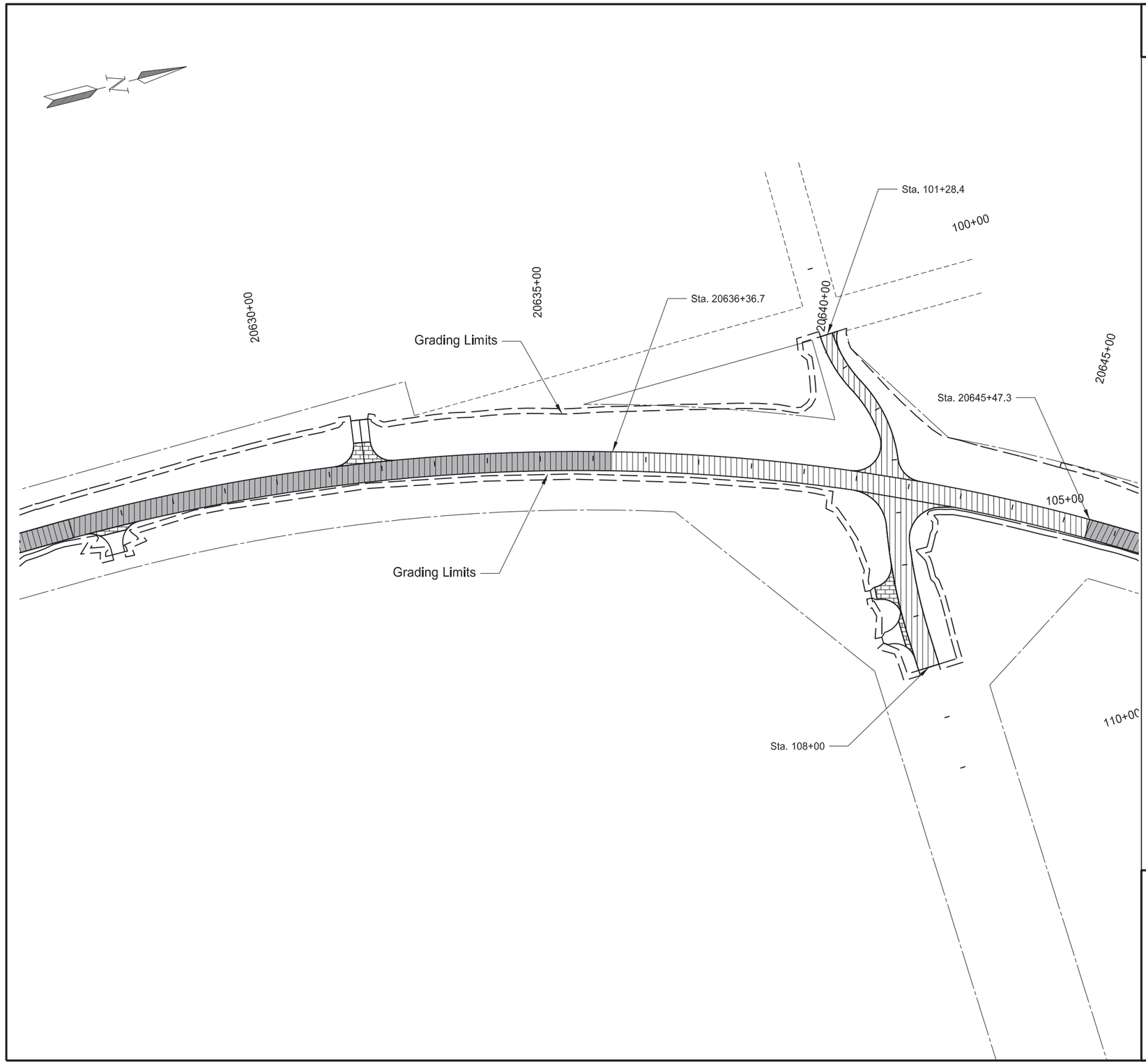
Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 10/24/23
NORTH DAKOTA

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	90	3



SPEC	CODE	BID ITEM	QTY	UNIT
302	0120	AGGREGATE BASE COURSE CL 5		
		20626+00 to 20646+00		
		Mainline Aggregate Base Course CL 5 (depth 12")	7535	TON
401	0050	Tack Coat		
		20626+00 to 20646+00		
		Tack Coat @ 0.05 Gal/SY (1 Lift)	577	Gal
401	0060	Prime Coat		
		20626+00 to 20646+00		
		Prime Coat @ 0.25 Gal/SY	3085	Gal
401	0160	Blotter Material CL 44		
		20626+00 to 20646+00		
		Blotter Material CL 44 @ 12 lbs/SY	75	TON
430	0042	SUPERPAVE FAA 42		
		20626+00 to 20646+00		
		Superpave FAA 42 (Depth 4.5")	2773	TON
430	5815	PG 58S-34 ASPHALT CEMENT		
		20626+00 to 20646+00	167	TON
709	100	Geosynthetic Material Type G		
		20626+00 to 20646+00	5602	SY

Legend

- 2" Overlay
- 4.5" of HMA, 12" of Aggregate Base
- 4" of HMA, 12.5" of Aggregate Base
- Geosynthetic Material Type G
- Superpave FAA 42 on Approaches (see Section 20)

Paving Layout

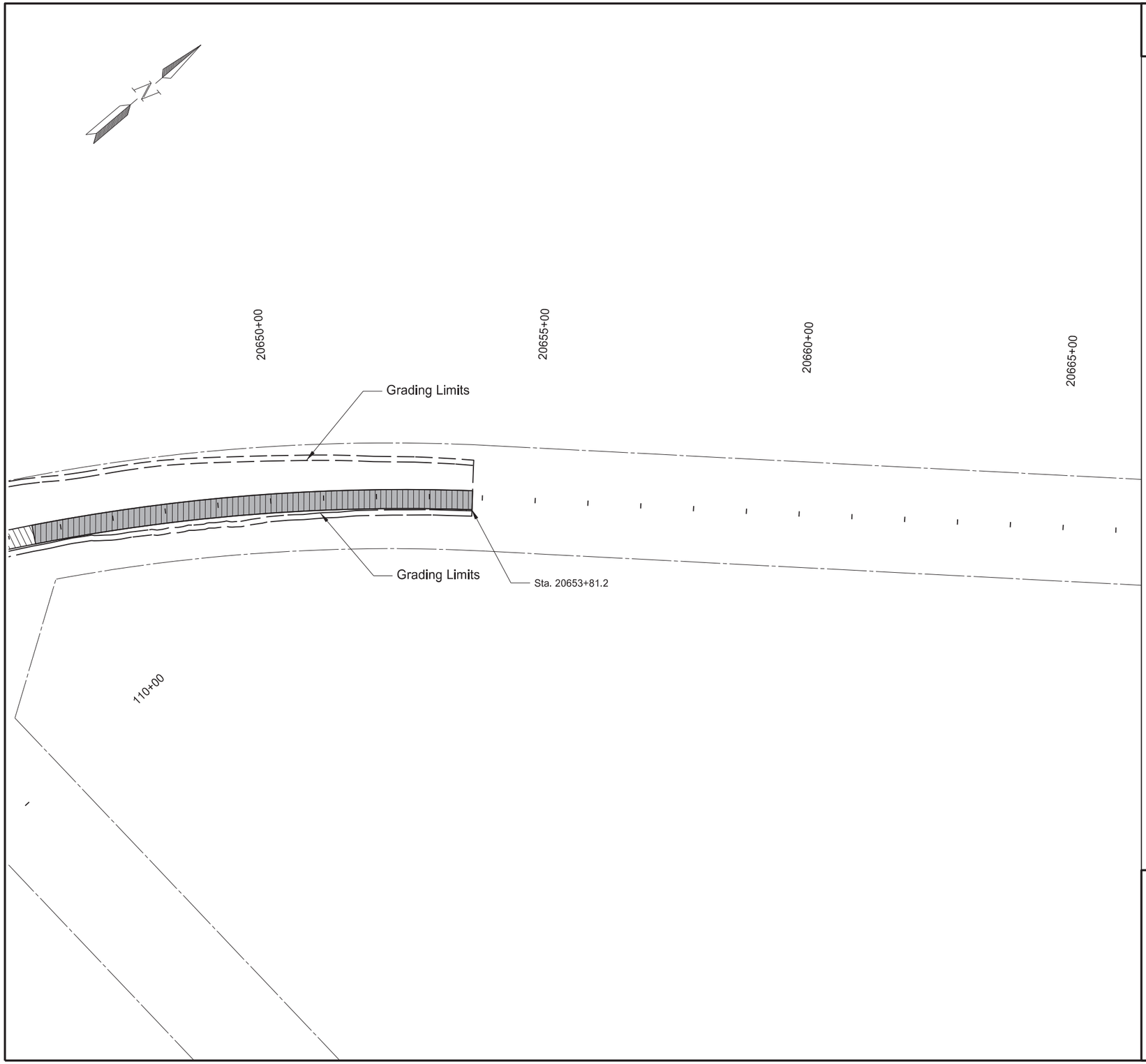
Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	90	4



SPEC	CODE	BID ITEM	QTY	UNIT
302	0120	AGGREGATE BASE COURSE CL 5		
		20646+00 to 20666+00		
		Mainline Aggregate Base Course CL 5 (depth 12")	2229	TON
401	0050	Tack Coat		
		20646+00 to 20666+00		
		Tack Coat @ 0.05 Gal/SY (1 Lift)	170	Gal
401	0060	Prime Coat		
		20646+00 to 20666+00		
		Prime Coat @ 0.25 Gal/SY	912	Gal
401	0160	Blotter Material CL 44		
		20646+00 to 20666+00		
		Blotter Material CL 44 @ 12 lbs/SY	22	TON
430	0042	SUPERPAVE FAA 42		
		20646+00 to 20666+00		
		Superpave FAA 42 (Depth 4.5")	812	TON
430	5815	PG 58S-34 ASPHALT CEMENT		
		20646+00 to 20666+00	49	TON
709	100	Geosynthetic Material Type G		
		20626+00 to 20646+00	4223	SY

Legend

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- 4" of HMA, 12.5" of Aggregate Base
- Geosynthetic Material Type G
- Superpave FAA 42 on Approaches (see Section 20)

Paving Layout

Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-001(033)200	100	1

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
E5-1-48	48"x48"	EXIT GORE		35	
G20-1-60	**60"x24"**	**ROAD WORK NEXT __ MILES**	**1**	**28**	**28**
G20-1b-60	**60"x24"**	**NO WORK IN PROGRESS (Sign and installation only)**	**2**	**18**	**36**
G20-2-48	**48"x24"**	**END ROAD WORK**	**1**	**26**	**26**
G20-4-36	36"x18"	PILOT CAR FOLLOW ME (Mounted to back of pilot car)		18	
G20-10-108	108"x48"	CONTRACTOR SIGN		70	
G20-50a-72	**72"x36"**	**ROAD WORK NEXT __ MILES RT & LT ARROWS**	**5**	**43**	**215**
G20-52a-72	72"x24"	ROAD WORK NEXT ___ MILES RT or LT ARROW		36	
G20-55-96	96"x48"	SPEED LIMIT ENFORCED - MINIMUM FEE $80 WHEN WORKERS PRESENT		59	
G20-55-96	**96"x48"**	**SPEED LIMIT ENFORCED - MINIMUM FEE $150 WHEN WORKERS PRESENT**	**1**	**59**	**59**
I2-5-96	96"x48"	YOUR HIGHWAY DOLLARS AT WORK		59	
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)		10	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)		10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)		10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)		7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)		7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)		7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)		7	
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)		7	
M4-9-30	30"x24"	DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT		15	
M4-10-48	48"x18"	DETOUR (INSIDE ARROW) RIGHT or LEFT (Mounted on barricade)		7	
M5-1-21	21"x15"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)		7	
M5-1-30	30"x21"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)		9	
M6-1-21	21"x15"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		7	
M6-1-30	30"x21"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		9	
M6-3-21	21"x15"	DIRECTIONAL ARROW UP (Mounted on route marker post)		7	
R1-1-48	48"x48"	STOP		32	
R1-2-60	60"x60"	YIELD		29	
R2-1-36	36"x48"	SPEED LIMIT __ (Portable only)		30	
R2-1-48	**48"x60"**	**SPEED LIMIT __**	**4**	**39**	**156**
R2-1a9-24	**24"x18"**	**MINIMUM FEE $150 (Mounted on Speed Limit post)**	**2**	**10**	**20**
R2-1aP-24	24"x18"	MINIMUM FEE $80 (Mounted on Speed Limit post)		10	
R3-2-48	48"x48"	NO LEFT TURN		35	
R4-1-36	**36"x48"**	**DO NOT PASS (Portable only)**	**2**	**30**	**60**
R4-1-48	48"x60"	DO NOT PASS		39	
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)		12	
R11-2a-48	48"x30"	STREET CLOSED (Mounted on barricade)		12	
R11-3a-60	60"x30"	ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-3c-60	60"x30"	STREET CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC (Mounted on barricade)		15	
W1-3-48	48"x48"	REVERSE TURN RIGHT or LEFT		35	
W1-4-48	48"x48"	REVERSE CURVE RIGHT or LEFT		35	
W1-4b-48	48"x48"	TWO LANE REVERSE CURVE RIGHT or LEFT		35	
W1-6-48	48"x24"	ONE DIRECTION LARGE ARROW		26	
W3-1-48	48"x48"	STOP AHEAD		35	
W3-3-48	48"x48"	SIGNAL AHEAD		35	
W3-4-48	48"x48"	BE PREPARED TO STOP		35	
W3-5-48	**48"x48"**	**SPEED REDUCTION AHEAD**	**2**	**35**	**70**
W4-2-48	48"x48"	LANE ENDS RIGHT or LEFT		35	
W5-1-48	**48"x48"**	**ROAD NARROWS**	**1**	**35**	**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**	**35**	**70**
W8-3-48	**48"x48"**	**PAVEMENT ENDS**	**1**	**35**	**35**
W8-7-48	48"x48"	LOOSE GRAVEL		35	
W8-11-48	**48"x48"**	**UNEVEN LANES**	**2**	**35**	**70**
W8-12-48	48"x48"	NO CENTER LINE		35	
W8-17-48	48"x48"	SHOULDER DROP-OFF SYMBOL		35	
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY		35	
W8-54-48	48"x48"	TRUCKS ENTERING AHEAD or __FT or _ MILE		35	
W8-55-48	48"x48"	TRUCKS CROSSING AHEAD or __FT or _ MILE		35	
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)**	**2**	**10**	**20**
W20-1-48	**48"x48"**	**ROAD WORK AHEAD or _FT or _ MILE**	**5**	**35**	**175**
W20-2-48	48"x48"	DETOUR AHEAD or __FT or _ MILE		35	
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or __FT or _ MILE		35	
W20-4-48	**48"x48"**	**ONE LANE ROAD AHEAD or __ FT or _ MILE**	**2**	**35**	**70**
W20-5-48	48"x48"	RIGHT or CENTER or LEFT LANE CLOSED AHEAD or __FT or _ MILE		35	
W20-7-48	**48"x48"**	**FLAGGER**	**2**	**35**	**70**
W20-8-18	**18"x18"**	**STOP - SLOW PADDLE Back to Back**	**2**	**5**	**10**
W20-52P-54	54"x12"	NEXT __ MILES (Mounted on warning sign post)		12	
W21-1-48	48"x48"	WORKERS		35	
W21-2-48	**48"x48"**	**FRESH OIL**	**2**	**35**	**70**

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or __ FT or _ MILE		35	
W21-5-48	**48"x48"**	**SHOULDER WORK**	**1**	**35**	**35**
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	
W21-6-48	48"x48"	SURVEY CREW		35	
W21-50-48	48"x48"	BRIDGE PAINTING AHEAD or __ FT		35	
W21-51-48	48"x48"	MATERIAL ON ROADWAY		35	
W21-52-48	48"x48"	PAVEMENT BREAKS		35	
W21-53-48	48"x48"	RUMBLE STRIPS AHEAD		35	
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK		35	

SPECIAL SIGNS

SPEC & CODE

704-1000	**TRAFFIC CONTROL SIGNS**	**TOTAL UNITS**	**1330**

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
704-0100	**FLAGGING**	**MHR**	**500**
704-1048	**PORTABLE RUMBLE STRIPS**	**EACH**	**2**
704-1050	TYPE I BARRICADES	EACH	
704-1052	**TYPE III BARRICADES**	**EACH**	**15**
704-1060	**DELINEATOR DRUMS**	**EACH**	**119**
704-1065	TRAFFIC CONES	EACH	
704-1067	**TUBULAR MARKERS**	**EACH**	**46**
704-1070	DELINEATOR	EACH	
704-1072	FLEXIBLE DELINEATORS	EACH	
704-1080	STACKABLE VERTICAL PANELS	EACH	
704-1081	VERTICAL PANELS - BACK TO BACK	EACH	
704-1085	SEQUENCING ARROW PANEL - TYPE A	EACH	
704-1086	SEQUENCING ARROW PANEL - TYPE B	EACH	
704-1087	SEQUENCING ARROW PANEL - TYPE C	EACH	
704-1185	**PILOT CAR**	**HR**	**180**
704-1500	**OBLITERATION OF PVMT MK**	**SF**	**770**
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF	
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH	
762-0200	RAISED PAVEMENT MARKERS	EACH	
762-0420	SHORT TERM 4IN LINE - TYPE R	LF	
762-0430	SHORT TERM 4IN LINE - TYPE NR	LF	

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/

REGISTERED PROFESSIONAL ENGINEER
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DATE: 8/20/2025
NORTH DAKOTA

Traffic Control Devices List
Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-001(033)200	100	2

N

83rd St NE

82nd St NE

81st St NE

Nekoma North Rd

80th St NE

ND 1

Nekoma

ROAD WORK AHEAD
W20-1-48

ROAD WORK
⇦ NEXT 00 MILES
NEXT 00 MILES ⇨
G20-50a-72

SPEED LIMIT ENFORCED
MINIMUM FEE $80
WHEN WORKERS PRESENT
G20-55-96

END ROAD WORK
G20-2-48

ROAD WORK
NEXT 00 MILES
G20-1-60

NOTE: North of Section A-A refer to project number NH-3-001(031)201

Construction Sign Layout

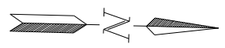
Major Rehabilitation
ND Hwy 1

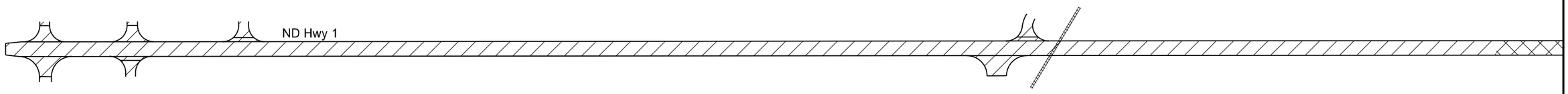
Nekoma to Nekoma Spur

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	100	3





Stage One:
Intersection Reconstruction

Stage Two:
Major Rehabiliation
Widening

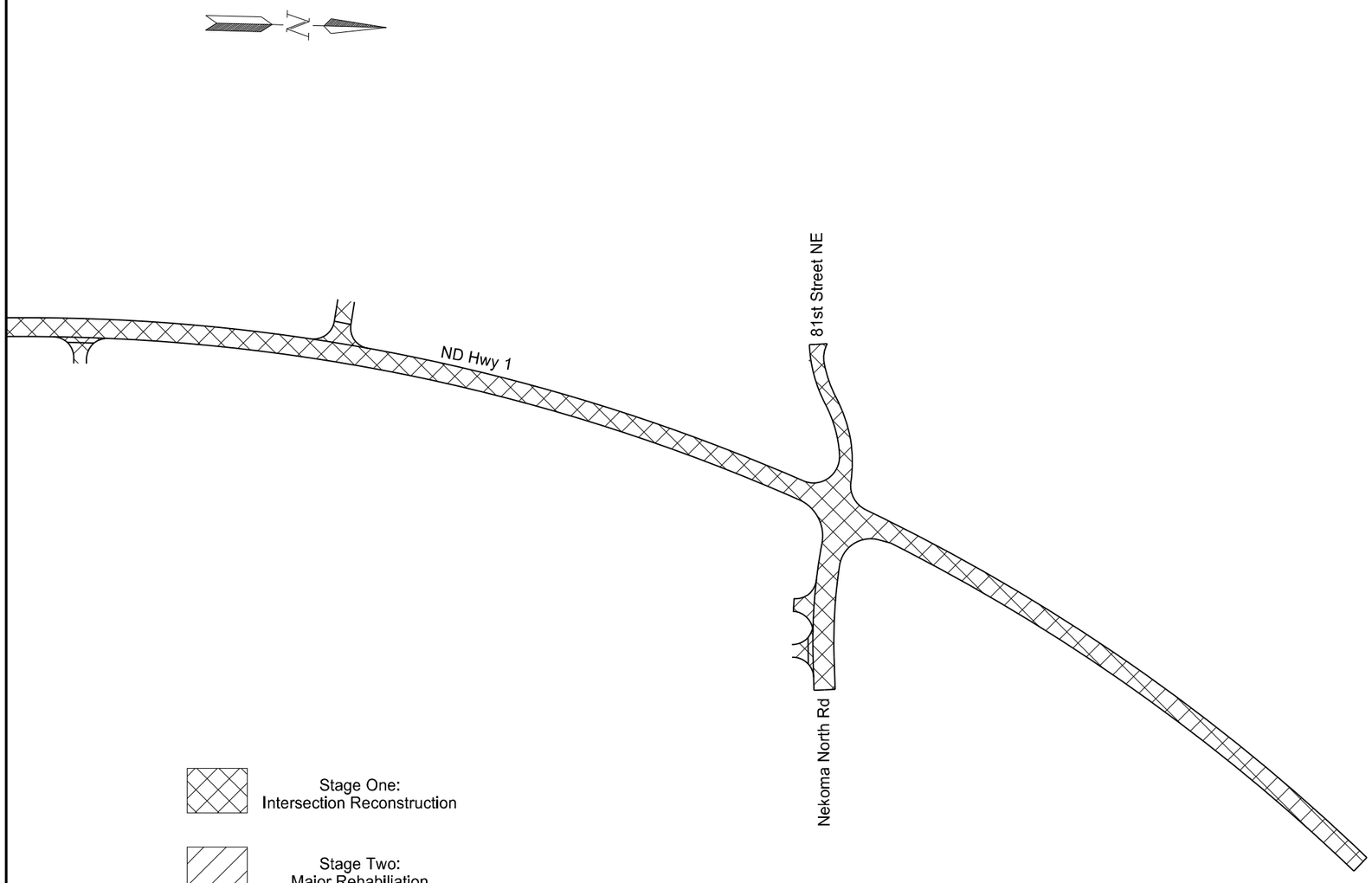
Project Sequencing
Stage Layout

Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

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	ND	NH-3-001(033)200	100	4



Stage One:
Intersection Reconstruction

Stage Two:
Major Rehabiliation
Widening

Project Sequencing
Stage Layout

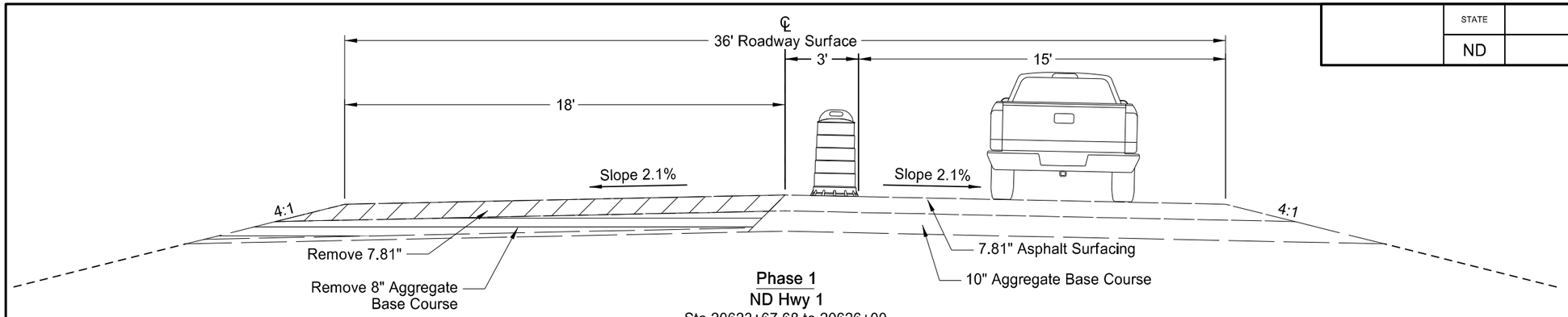
Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

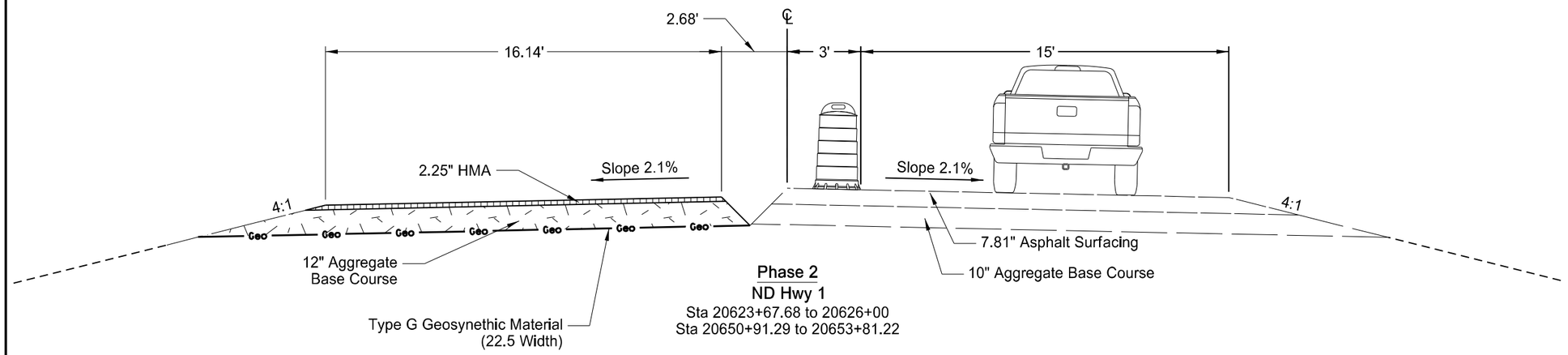
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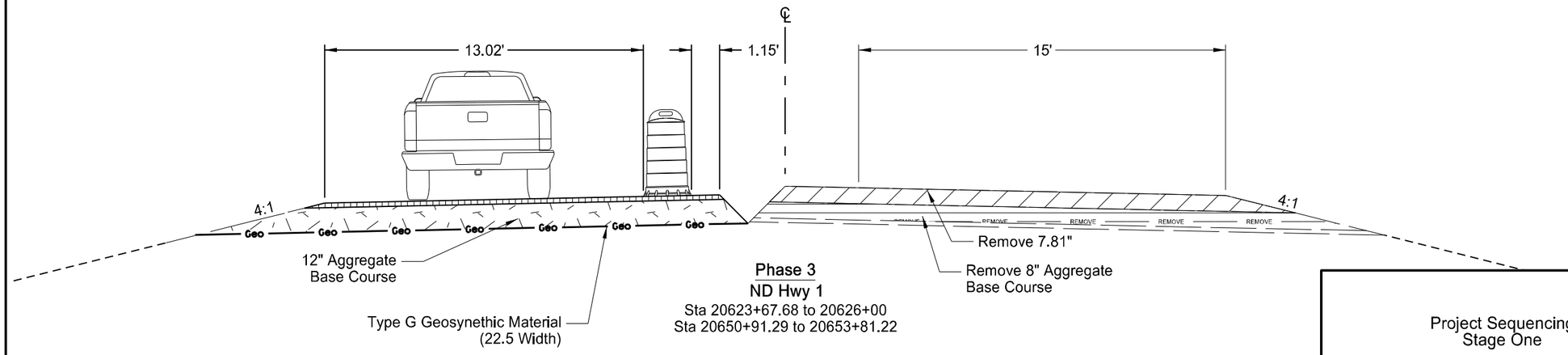
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-001(033)200	100	5



Phase 1
ND Hwy 1
Sta 20623+67.68 to 20626+00
Sta 20650+91.29 to 20653+81.22



Phase 2
ND Hwy 1
Sta 20623+67.68 to 20626+00
Sta 20650+91.29 to 20653+81.22



Phase 3
ND Hwy 1
Sta 20623+67.68 to 20626+00
Sta 20650+91.29 to 20653+81.22

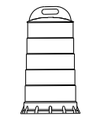
Notes:

Contractor needs to maintain 2 lanes of traffic through the reconstruction area at night or a plan on night time flagging will be required.

Phase 1
Move traffic to Northbound lane using flaggers and pilot car.
Mill Pavement surface of Southbound lane.
Remove Aggregate base course.

Phase 2
Place Type G Geosynethic material for Southbound lane.
Place Aggregate Base course for Southbound lane.
Place 2.25" HMA (lift 1 of 2) on Southbound lane.

Phase 3
Move traffic to Southbound lane using flaggers and pilot car.
Remove Asphalt surfacing from Northbound lane.
Remove Aggregate base course from Northbound lane.



Delinator Drums
(spaced @ 2 x speed limit)

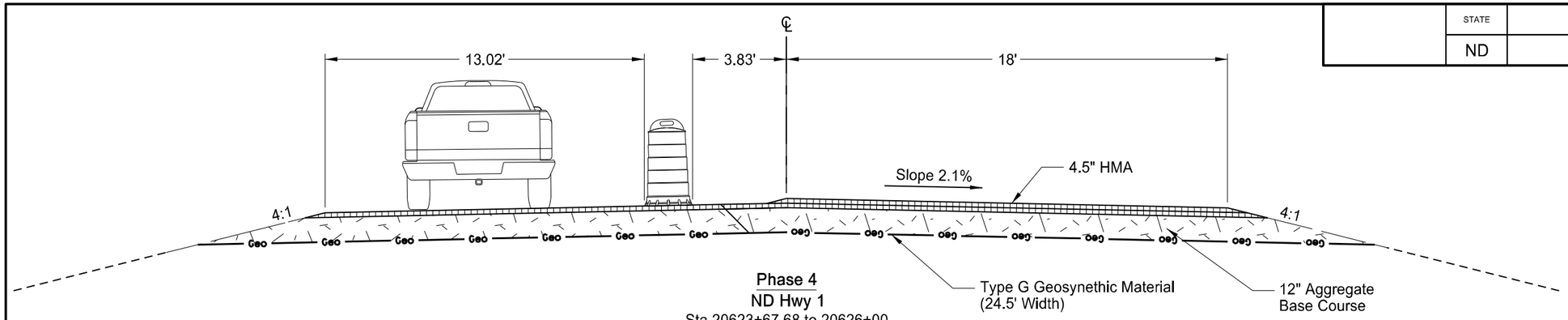
Project Sequencing
Stage One

Reconstruction
Major Rehabilitation
ND Hwy 1

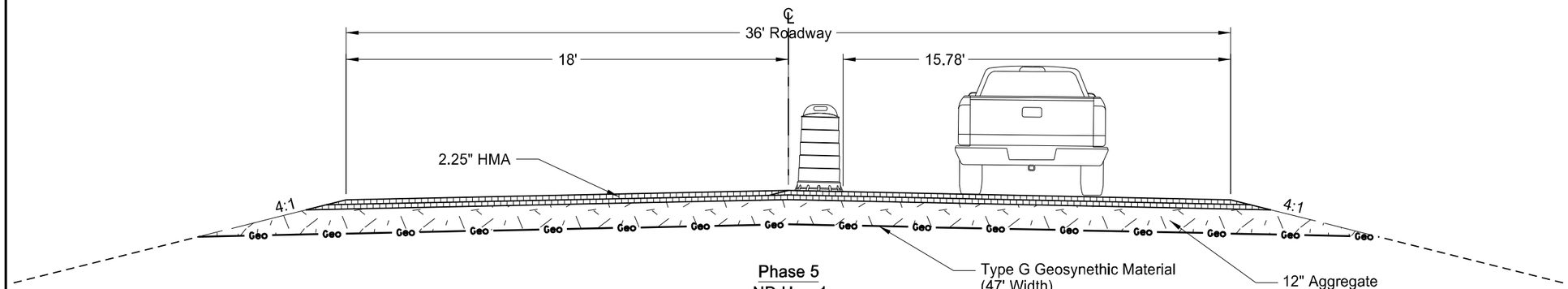
Nekoma to Nekoma Spur

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	100	6



Phase 4
ND Hwy 1
Sta 20623+67.68 to 20626+00
Sta 20650+91.29 to 20653+81.22



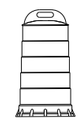
Phase 5
ND Hwy 1
Sta 20623+67.68 to 20626+00
Sta 20650+91.29 to 20653+81.22

Notes:

Contractor needs to maintain 2 lanes of traffic through the reconstruction area at night or a plan on night time flagging will be required.

Phase 4
Continue with traffic on Southbound lane using flaggers and pilot car.
Place Type G Geosynthetic material for Northbound lane.
Place Aggregate Base course for Northbound lane.
Place 4.5" HMA (2 lifts) on Northbound lane along with 2.5' past centerline.

Phase 5
Move traffic to Northbound lane using flaggers and pilot car.
Place 2.25" HMA (2nd of 2 lifts) on Southbound lane.



Delinator Drums
(spaced @ 2 x speed limit)

Project Sequencing
Stage One

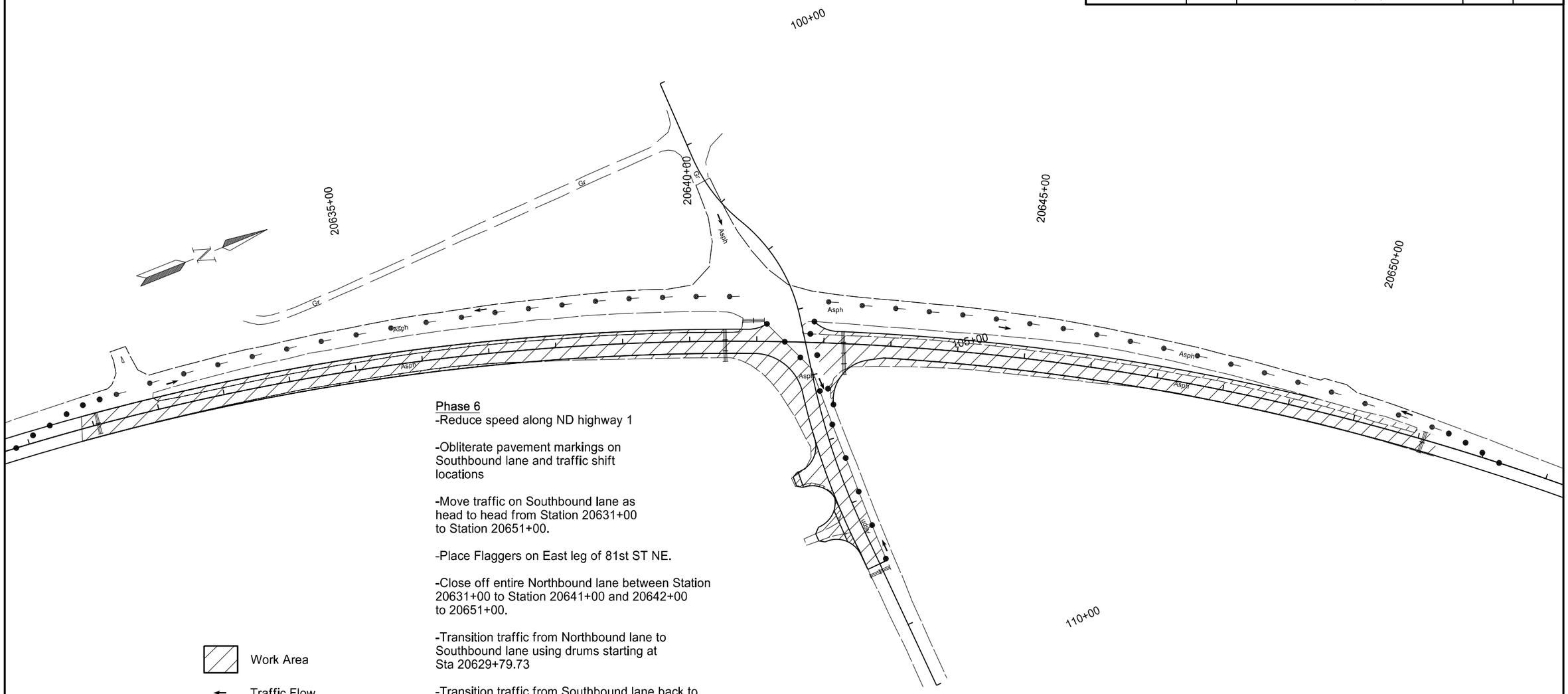
Reconstruction
Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

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DATE: 8/20/2025
NORTH DAKOTA

10/20/2023 10:10:07 AM rschuehle H:\Projects\14000\14451\3001200.033\Design\Plan\100WZ_006_Phasing_stage_one.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	100	7



Phase 6

-Reduce speed along ND highway 1

-Obliterate pavement markings on Southbound lane and traffic shift locations

-Move traffic on Southbound lane as head to head from Station 20631+00 to Station 20651+00.

-Place Flaggers on East leg of 81st ST NE.

-Close off entire Northbound lane between Station 20631+00 to Station 20641+00 and 20642+00 to 20651+00.

-Transition traffic from Northbound lane to Southbound lane using drums starting at Sta 20629+79.73

-Transition traffic from Southbound lane back to Northbound lane using drums at Sta 20651+42

-Keep north potion of median open to allow through traffic.

-Begin removing asphalt/topsoil from closed sections (Northbound lane and East leg of 81st ST NE).

-Construct new corridor in Northbound closed section.

-Construct new East leg of 81st ST NE in a manner that at end of day, the closed lane can be built up and open for use of traffic. Use Section 704.04 O, "Traffic Control for Uneven Pavement."

-Construct new approaches on East leg of 81st ST NE.

Work Area

Traffic Flow

Delinator Drums

Tubular Markers

Barricade Type III

Project Sequencing
Stage One
ND Hwy 1 & 81st ST NE

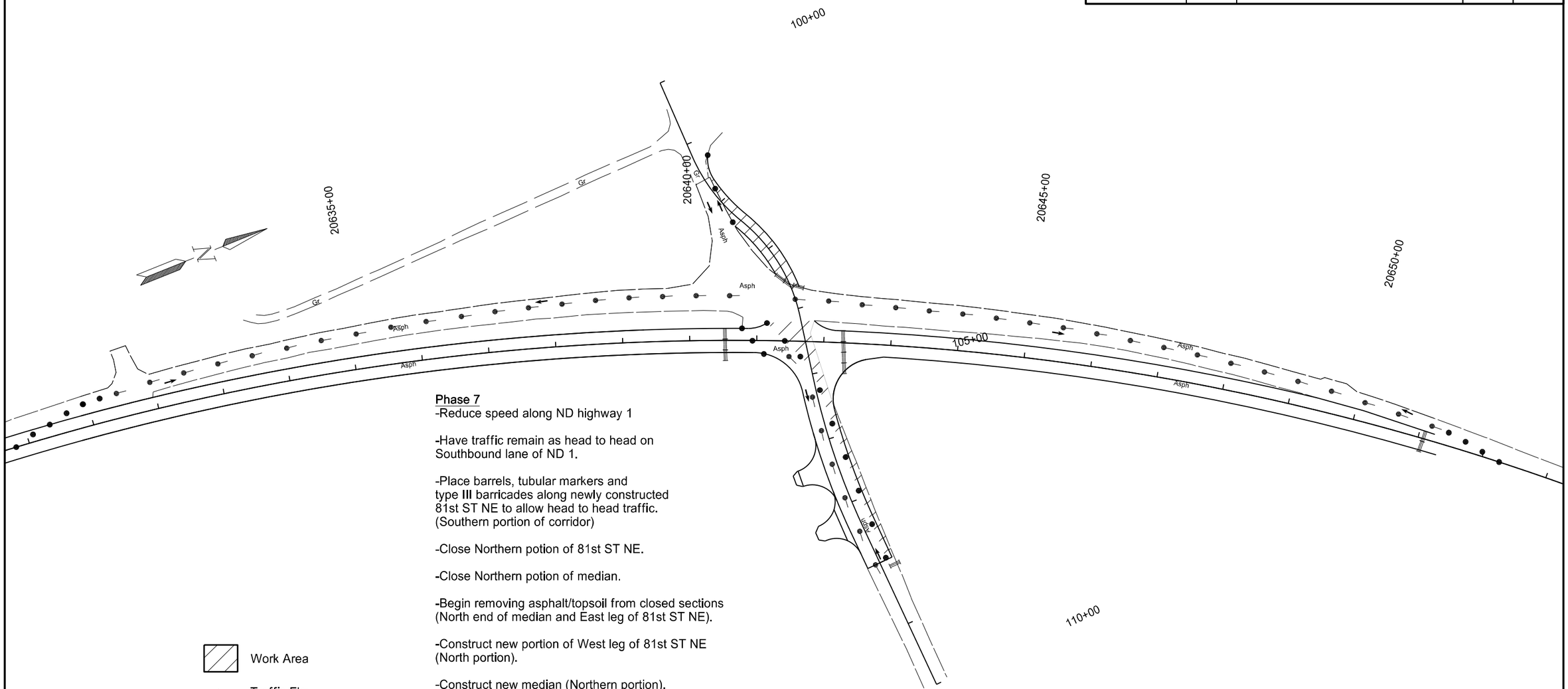
Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 8/20/2025
NORTH DAKOTA

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	100	8



Phase 7

-Reduce speed along ND highway 1

-Have traffic remain as head to head on Southbound lane of ND 1.

-Place barrels, tubular markers and type III barricades along newly constructed 81st ST NE to allow head to head traffic. (Southern portion of corridor)

-Close Northern potion of 81st ST NE.

-Close Northern potion of median.

-Begin removing asphalt/topsoil from closed sections (North end of median and East leg of 81st ST NE).

-Construct new portion of West leg of 81st ST NE (North portion).

-Construct new median (Northern portion).

Work Area

Traffic Flow

Delinator Drums

Tubular Markers

Barricade Type III

Project Sequencing
Stage One
ND Hwy 1 & 81st ST NE

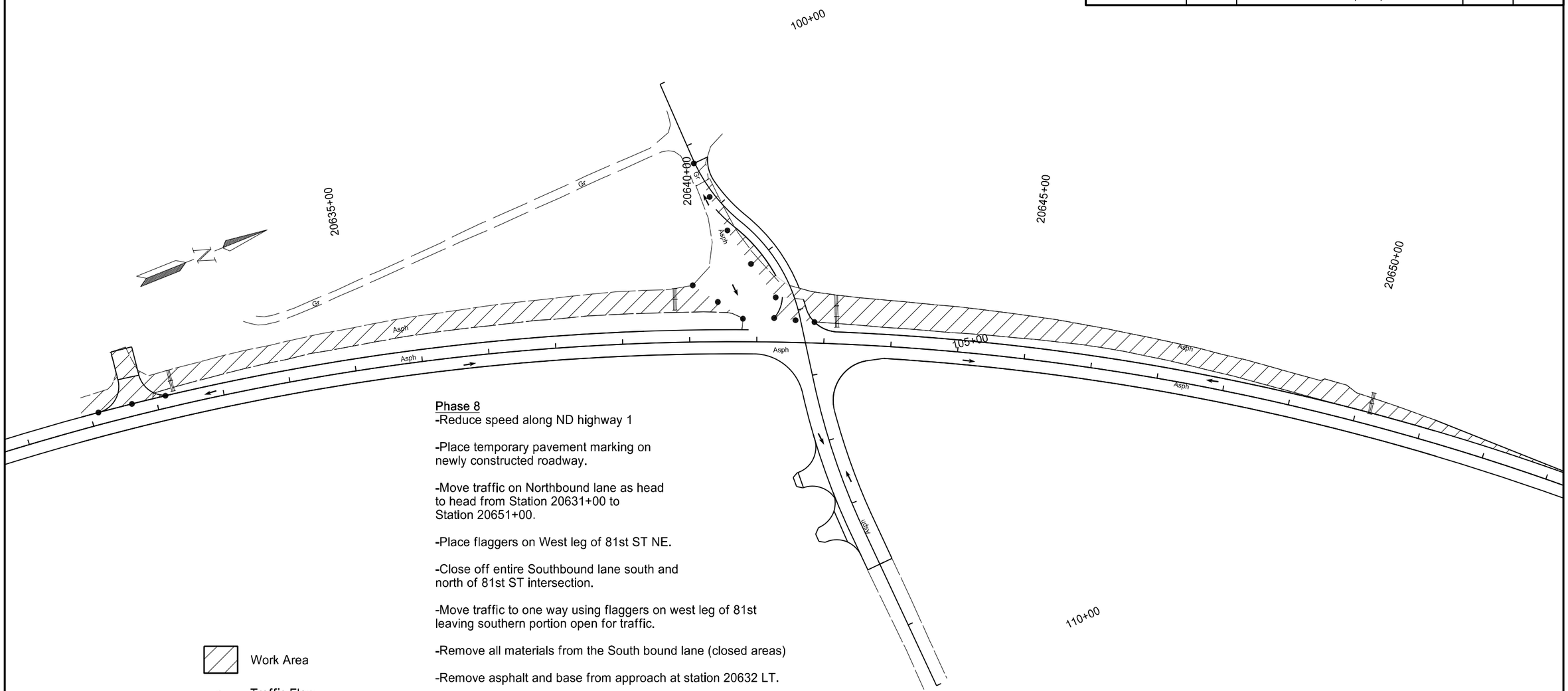
Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

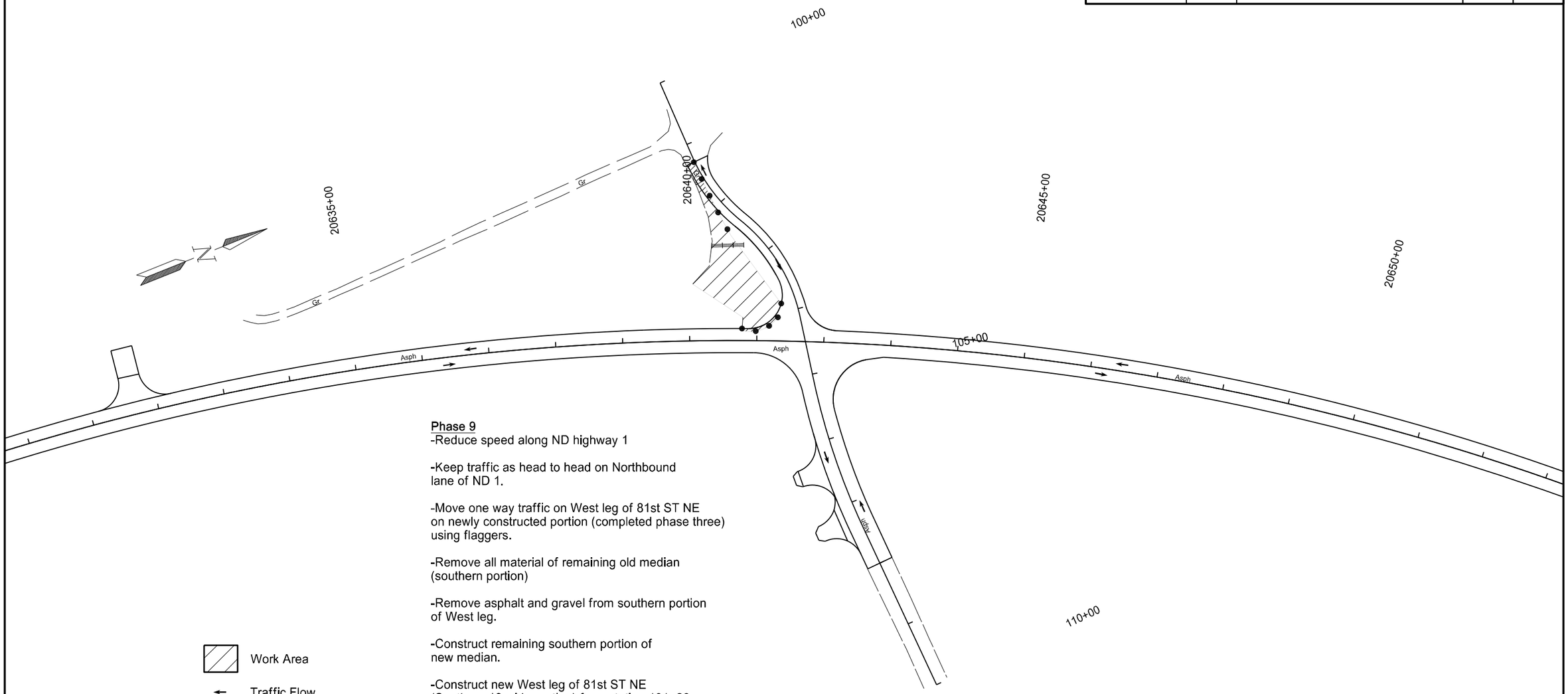
REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 8/20/2025
NORTH DAKOTA

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	100	9


100+00
20635+00
20640+00
20645+00
20650+00
105+00
110+00
Gr
Asph
Asph
Asph

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	100	10



Phase 9

-Reduce speed along ND highway 1

-Keep traffic as head to head on Northbound lane of ND 1.

-Move one way traffic on West leg of 81st ST NE on newly constructed portion (completed phase three) using flaggers.

-Remove all material of remaining old median (southern portion)

-Remove asphalt and gravel from southern portion of West leg.

-Construct remaining southern portion of new median.

-Construct new West leg of 81st ST NE (Southern 12 wide portion) from station 101+28 to station 102+02 in a manner that at end of day the closed lane can be built up and open for use of traffic. Use Section 704.04 O, "Traffic Control for Uneven Pavement."

Work Area

Traffic Flow

Delinator Drums

Tubular Markers

Barricade Type III

Project Sequencing
Stage One
ND Hwy 1 & 81st ST NE

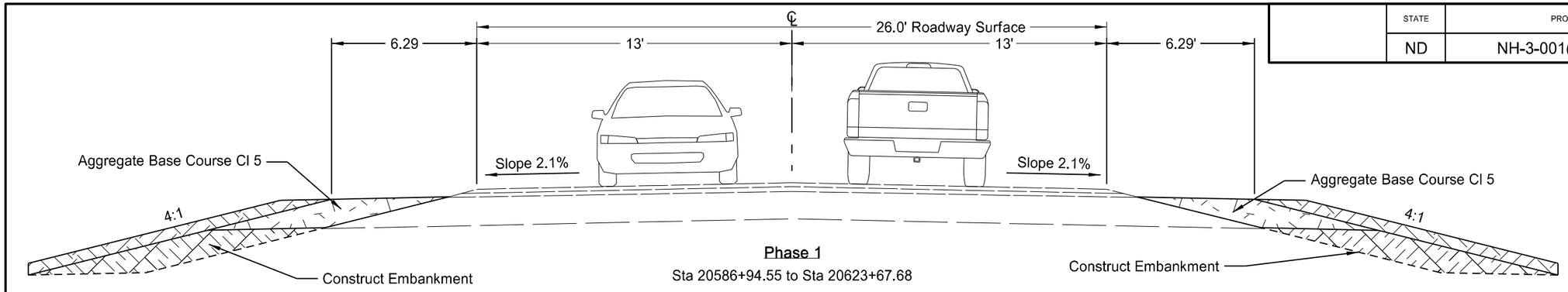
Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 8/20/2025
NORTH DAKOTA

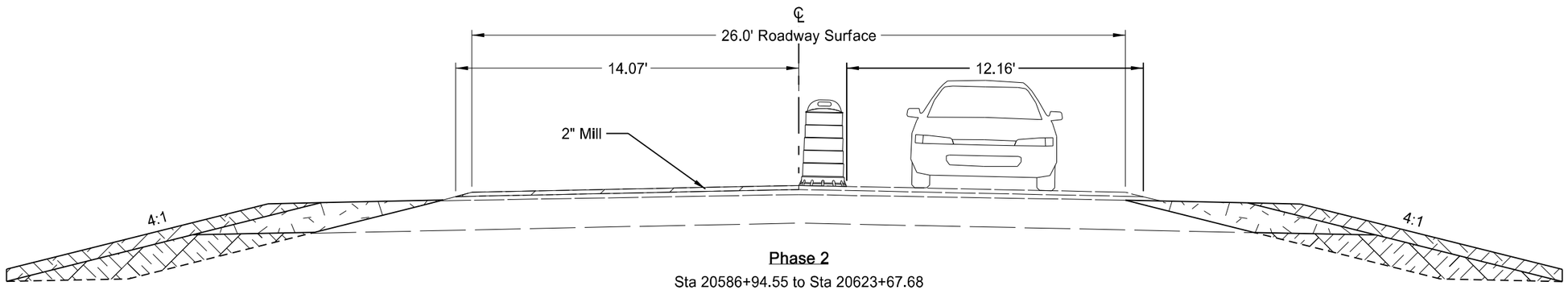
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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	100	11



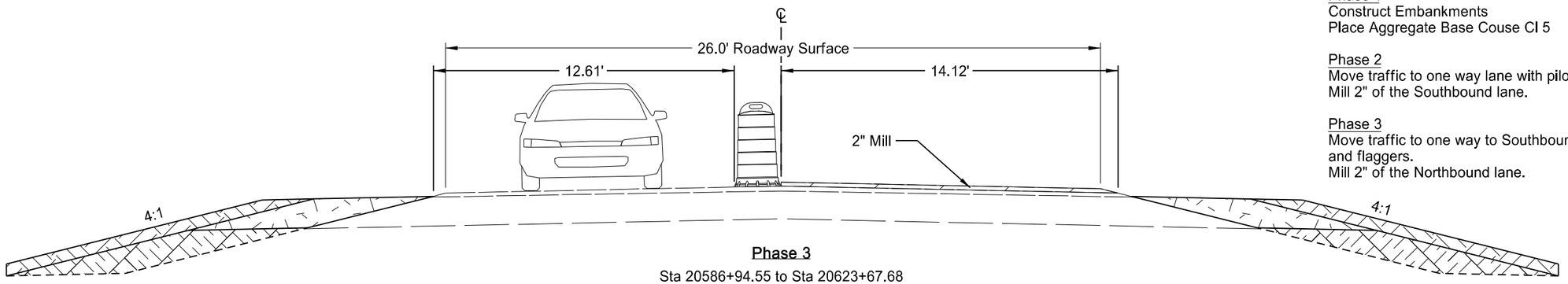
Phase 1

Sta 20586+94.55 to Sta 20623+67.68



Phase 2

Sta 20586+94.55 to Sta 20623+67.68



Phase 3

Sta 20586+94.55 to Sta 20623+67.68

Notes

Phase 1
Construct Embankments
Place Aggregate Base Couse Cl 5

Phase 2
Move traffic to one way lane with pilot car and flaggers.
Mill 2" of the Southbound lane.

Phase 3
Move traffic to one way to Southbound lane with pilot car and flaggers.
Mill 2" of the Northbound lane.



Delinator Drums
(spaced @ 2 x speed limit)

Drawing not to scale

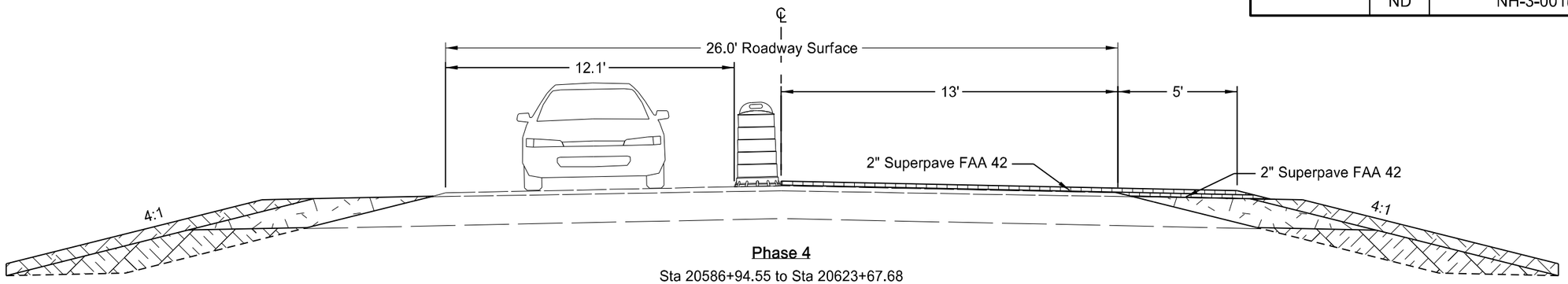
Project Sequencing
Stage Two

Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

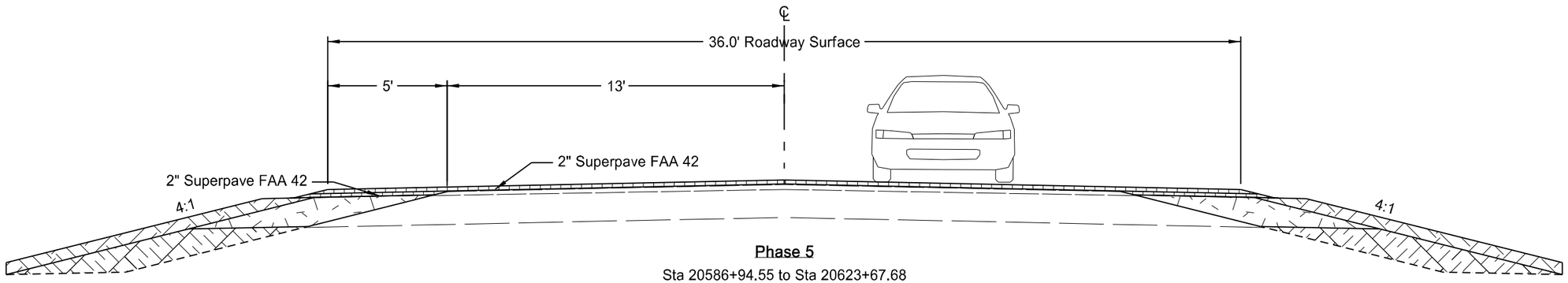
REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 8/20/2025
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	100	12



Phase 4

Sta 20586+94.55 to Sta 20623+67.68



Phase 5

Sta 20586+94.55 to Sta 20623+67.68

Notes

Phase 4
Continue with traffic as a one way on Southbound lane with pilot car and flaggers.
Place 2" Superpave FAA 42 along the 5' widening portion of Northbound lane.
Place 2" Superpave FAA 42 along full width of new driving surface.

Phase 5
Move traffic as a one way to Northbound lane with pilot car and flaggers.
Place 2" Superpave FAA 42 along the 5' widening portion of Southbound lane.
Place 2" Superpave FAA 42 along full width of new driving surface.



Delinator Drums
(spaced @ 2 x speed limit)

Project Sequencing
Stage Two

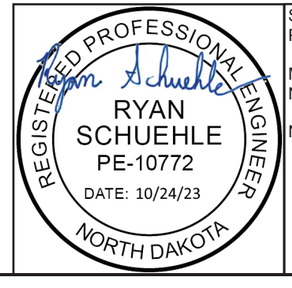
Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 8/20/2025
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
N.D.	NH-3-001(033)200	110	1

Station / RP	Sign No.	Assembly No.	Flat Sheet For Signs IV SF	Flat Sheet For Signs XI SF	Sign Support Length 1st LF	2nd LF	3rd LF	4th LF	Vert Clear-ance FT	Support Size	Max Post Len LF	Sleeve Length 1st LF	2nd LF	3rd LF	4th LF	Sleeve Size	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments
ND 1																							
20588+22 Lt		1		5.2	11.4				5.0	2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga				
20590+72 Lt	SN-1		7.5		11.0				5.0	2.5 x 2.5 10 ga	13.6						1	4	3 x 3 7 ga			1	
20600+10 Rt	SN-2	40		12.0	11.9				5.0	2.25 x 2.25 12 ga	13.5	3.7				2.5 x 2.5 12 ga	1	4	3 x 3 7 ga			1	
20605+11 Rt		63		7.1	12.3				5.0	2.5 x 2.5 10 ga	15.3						1	4	3 x 3 7 ga			1	
20611+90 Rt		1			11.4				5.0	2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga	1			
20617+30 Rt		19		6.3	13.4				5.0	2.5 x 2.5 12 ga	14.5						1	4	3 x 3 7 ga				
20619+65 Lt		63		7.1	12.3				5.0	2.5 x 2.5 10 ga	15.3						1	4	3 x 3 7 ga			1	
20624+38 Lt	SN-2			12.0	11.6				5.0	2.25 x 2.25 12 ga	13.3	3.7				2.5 x 2.5 12 ga	1	4	3 x 3 7 ga			1	
20637+93 Rt		437			14.3				5.0	2.5 x 2.5 10 ga	15.2						1	4	3 x 3 7 ga	1		1	
20644+17 Lt		437			12.9				5.0	2.5 x 2.5 10 ga	15.2						1	4	3 x 3 7 ga	1		1	
Sub Total			7.5	49.7		**Total**	122.5										**Total**	40.0		3	0	7	
81st st																							
103+89 Rt	SA2B			5.2	11.7				5.0	2.25 x 2.25 12 ga	14.7						1	4	2.5 x 2.5 12 ga	1			
105+33 Lt	SA2B			5.2	11.7				5.0	2.25 x 2.25 12 ga	14.7						1	4	2.5 x 2.5 12 ga	1			
107+75 Lt		371		6.0	11.5				5.0	2.25 x 2.25 12 ga	12.9						1	4	2.5 x 2.5 12 ga				
Sub Total			0.0	16.4		**Total**	34.9										**Total**	12.0		2	0	0	
Grand Total			**7.5**	**66.1**		**Total**	**157.4**										**Total**	**52**	**0**	**5**	**0**	**7**	

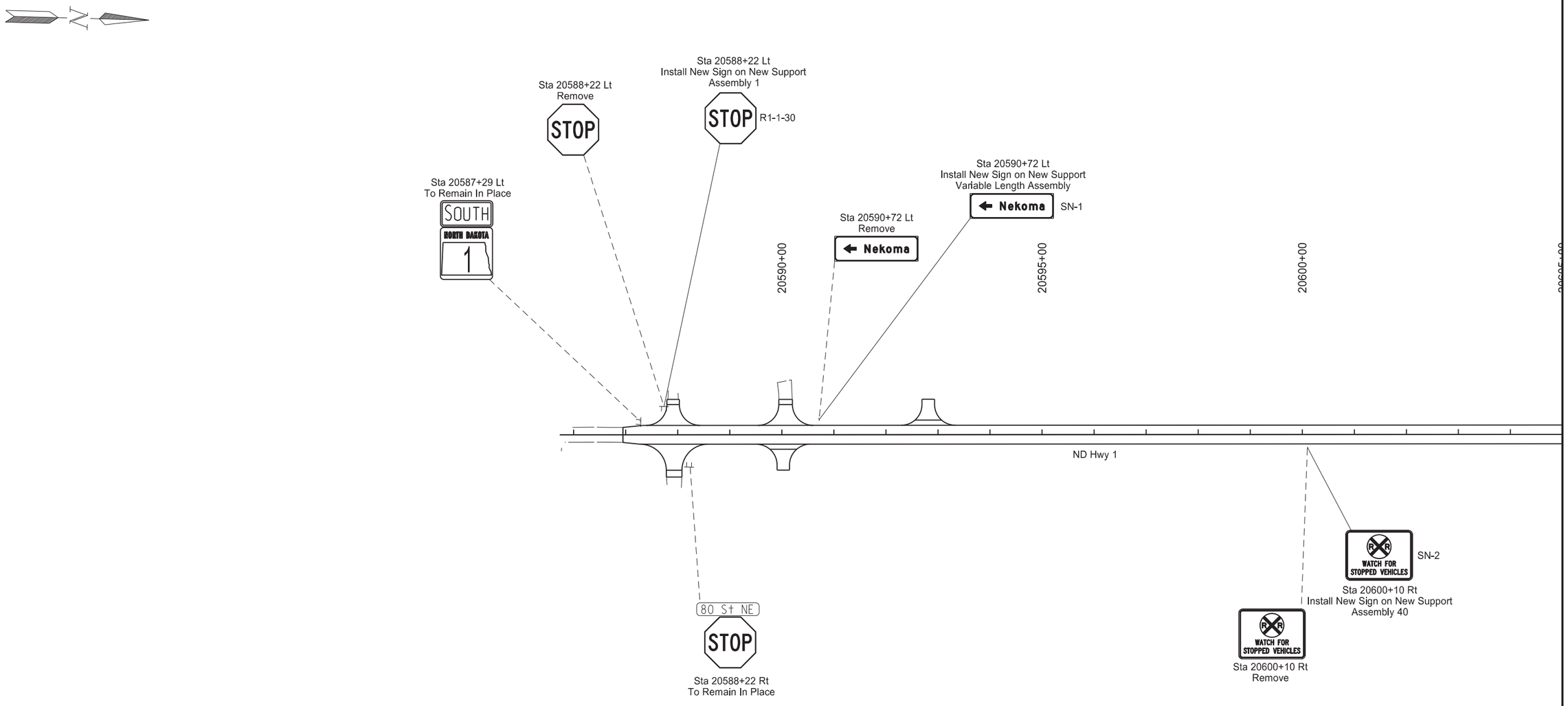


Sign Summary
Perforated Tube

Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	110	2



Signing

Major Rehabilitation
ND Hwy 1

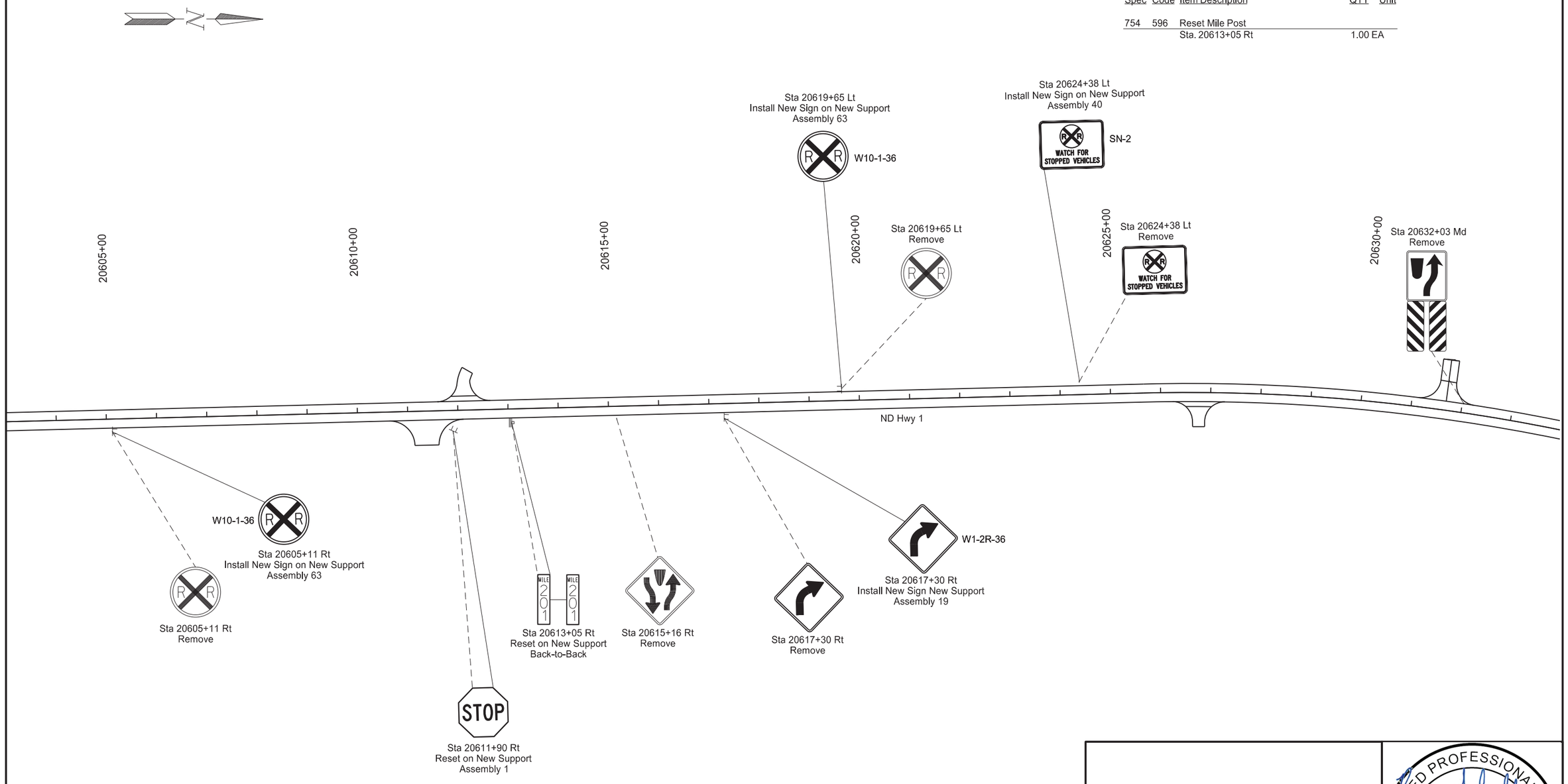
Nekoma to Nekoma Spur

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 10/24/23
NORTH DAKOTA

10/20/2023 10:10:57 AM rschuehle H:\Projects\14000\14451\3001200.033\Design\Plan\110SN_002.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	110	3

Spec	Code	Item Description	QTY	Unit
754	596	Reset Mile Post Sta. 20613+05 Rt	1.00	EA



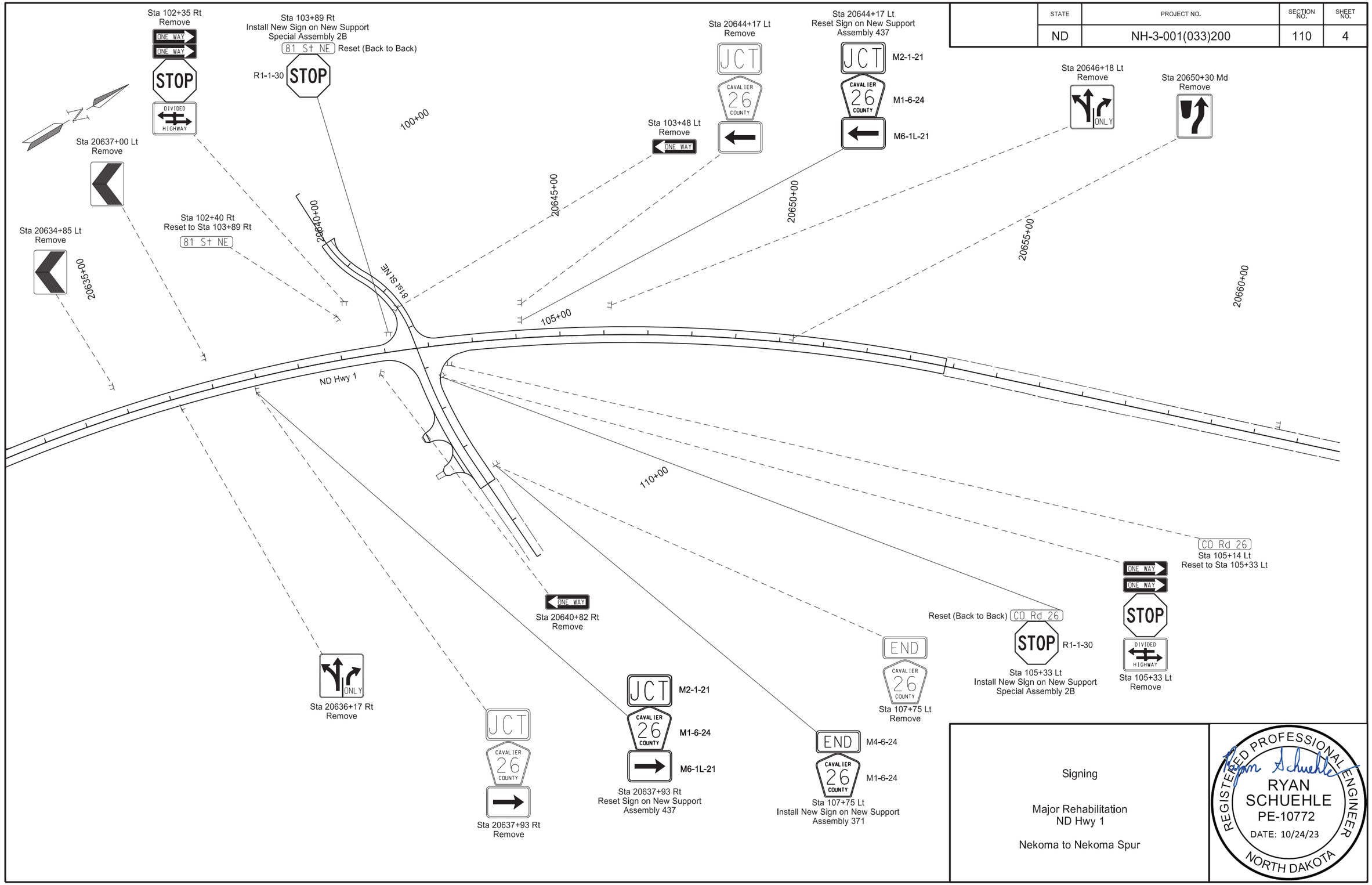
Signing

Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 10/24/23
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	110	4



Signing

Major Rehabilitation
ND Hwy 1

Nekoma to Nekoma Spur

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 10/24/23
NORTH DAKOTA

10/20/2023 10:11:10 AM rschuehle H:\Projects\14000\14451\3001200.033\Design\Plan\110SN_004.dgn

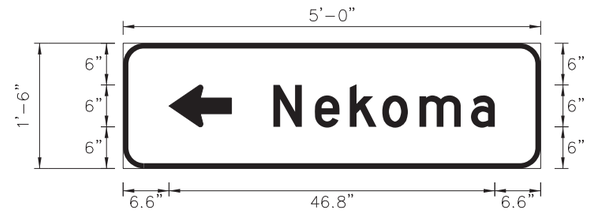
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	ND	NH-3-001(033)200	110	5

SIGN NUMBER	SN-1
WIDTH X HEIGHT	5'-0" x 1'-6"
BORDER WIDTH	0.75" (inset 0")
CORNER RADIUS	3"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE
ND_6IN_TYPE D	6.6	6	6	9	90

STATION(S):
20590+72 Lt

AREA: 7.5 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Conv_Destination.ssl

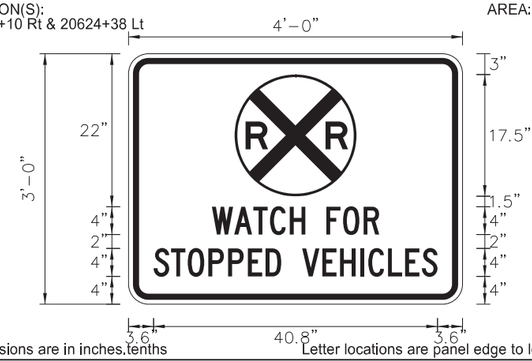
LETTER POSITION (X)																				LENGTH	SIZE	SERIES
N	e	k	o	m	a															31.8	6/4.5	D 2000
21.6	27.6	32.6	37.2	42.6	50																	

SIGN NUMBER	SN-2
WIDTH X HEIGHT	4'-0" x 3'-0"
BORDER WIDTH	0.88" (inset 0.63")
CORNER RADIUS	2.25"
MOUNTING	Ground
BACKGROUND	TYPE: XI Reflective
	COLOR: Yellow
LEGEND/BORDER	TYPE: XI Non-reflective
	COLOR: Black

SYMBOL	X	Y	WID	HT	ANGLE
ND_ADV_RR	15.3	15.5	17.5	17.5	0

STATION(S):
20600+10 Rt & 20624+38 Lt

AREA: 12.0 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Warn_36_Med.ssl

LETTER POSITION (X)																				LENGTH	SIZE	SERIES
W	A	T	C	H	F	O	R													24	4	C 2000
12	15.2	17.9	20.3	23.2	28.4	30.8	33.8															
S	T	O	P	P	E	D	V	E	H	I	C	L	E	S						40.8	4	C 2000
3.6	6.1	8.5	11.5	14.3	17.2	19.7	24.9	27.8	30.4	33.3	34.5	37.3	39.8	42.2								

Signing Details

Major Rehabilitation
ND Hwy 1

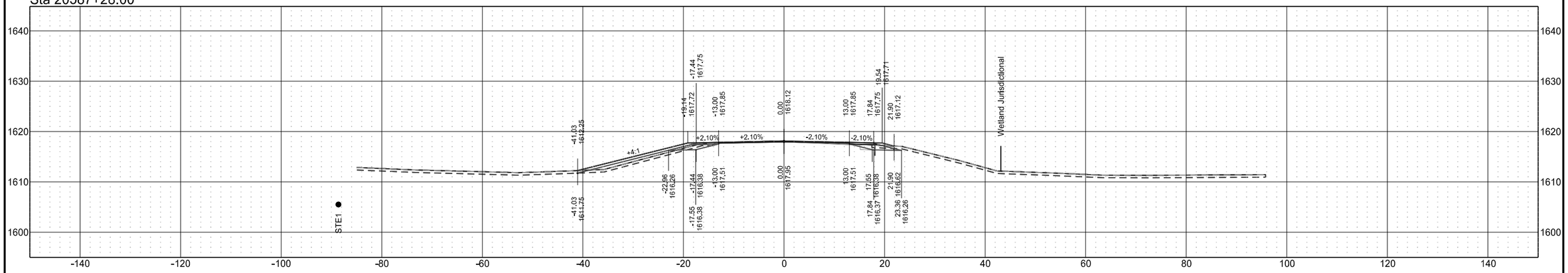
Nekoma to Nekoma Spur

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 10/24/23
NORTH DAKOTA

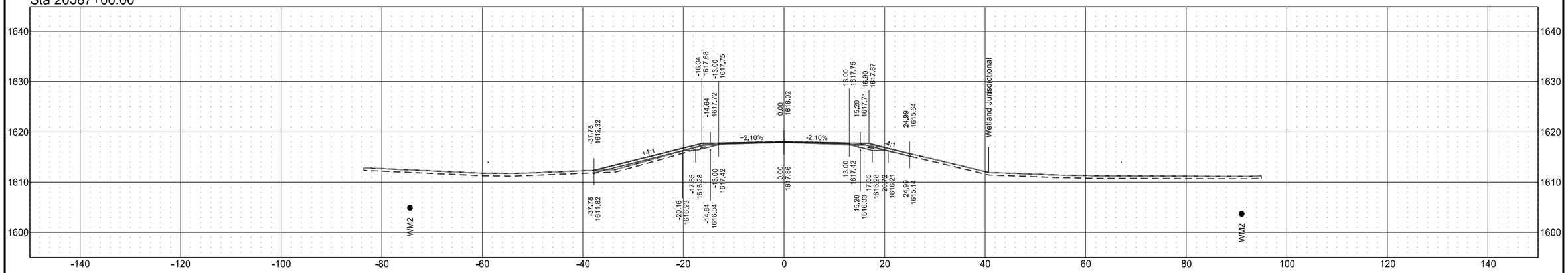
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	1

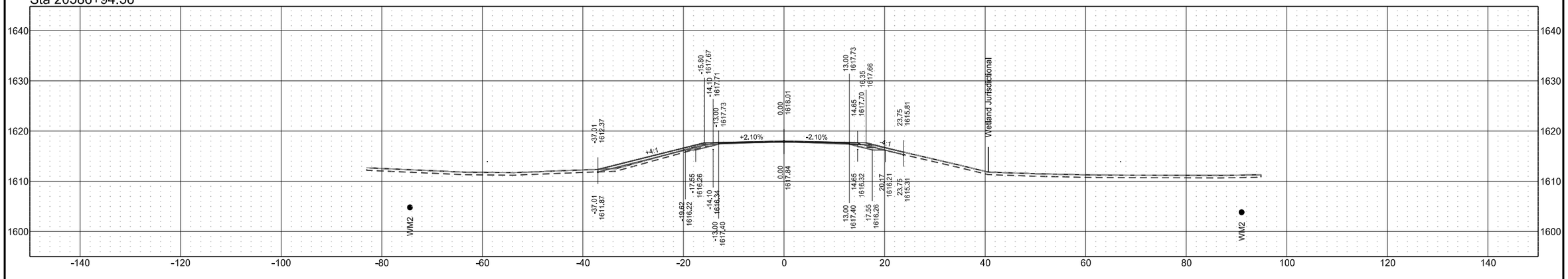
Sta 20587+28.00



Sta 20587+00.00



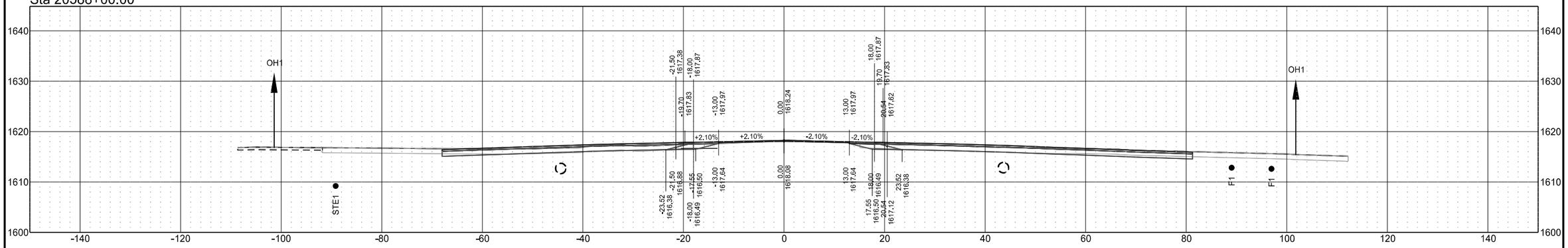
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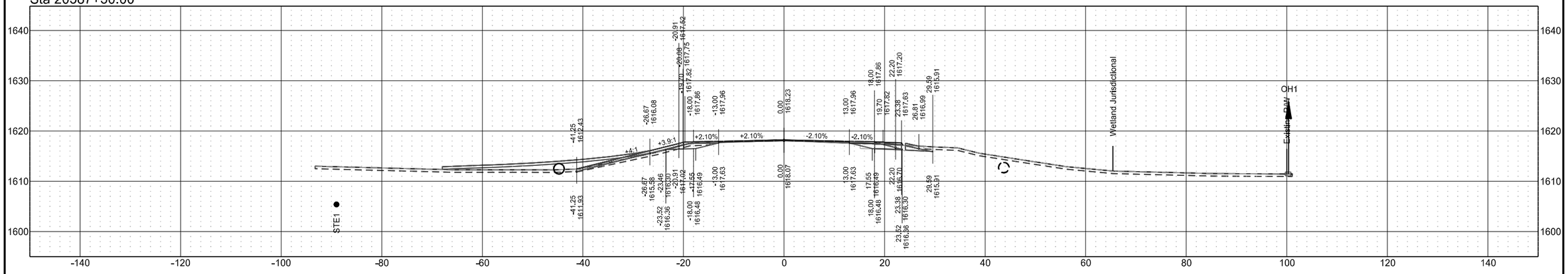
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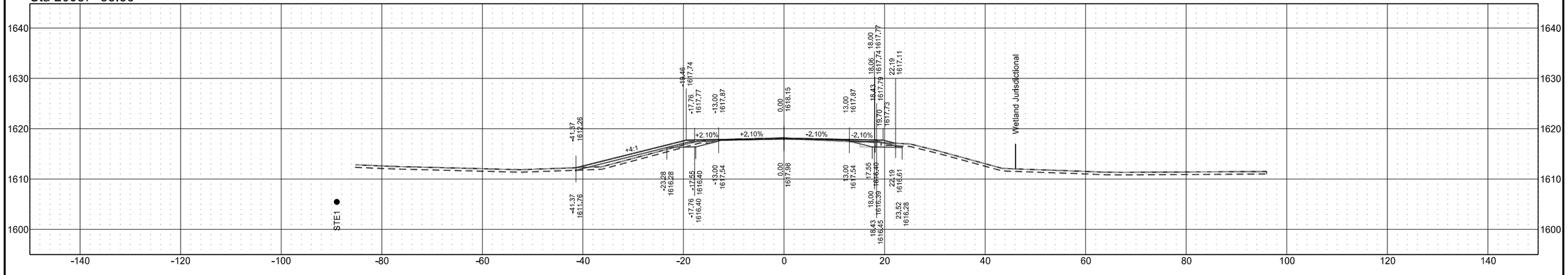
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Sta 20587+50.00



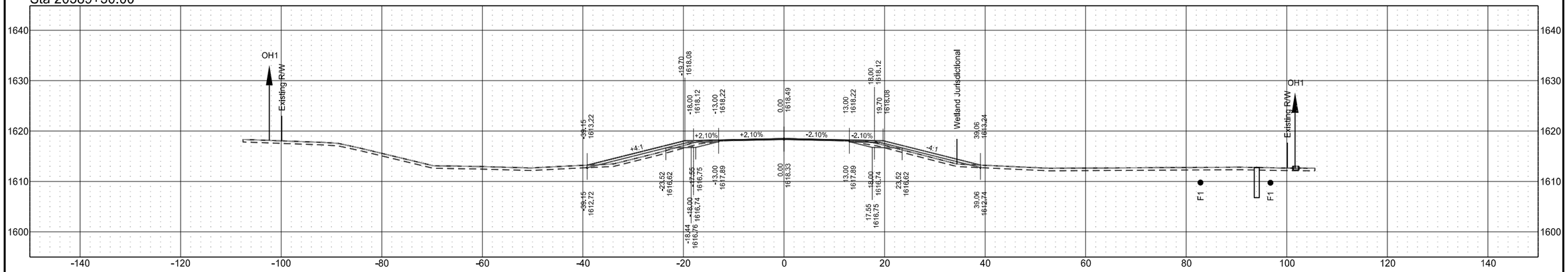
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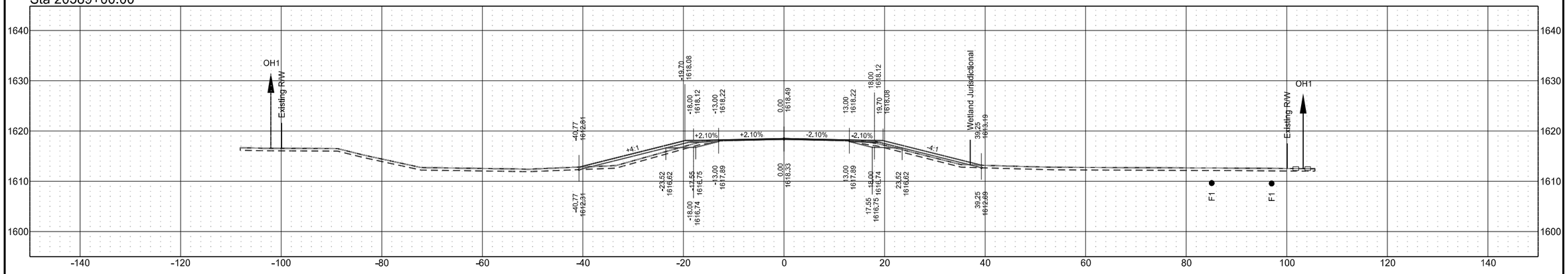
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	3

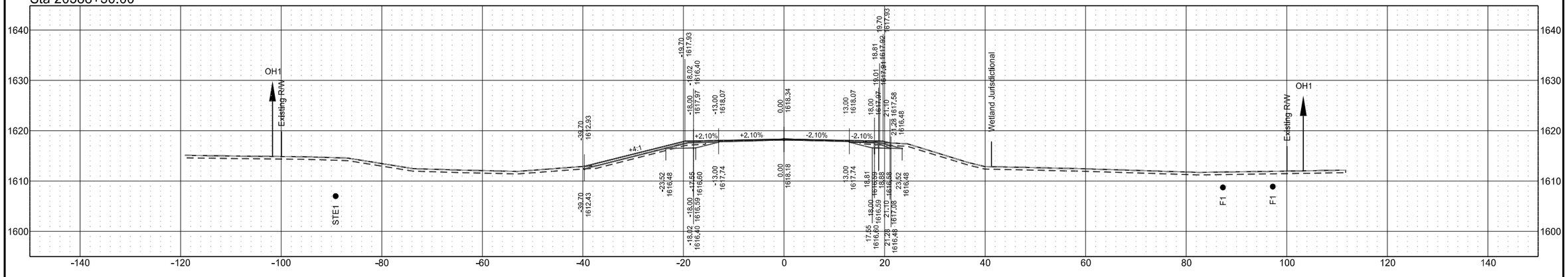
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Sta 20589+00.00



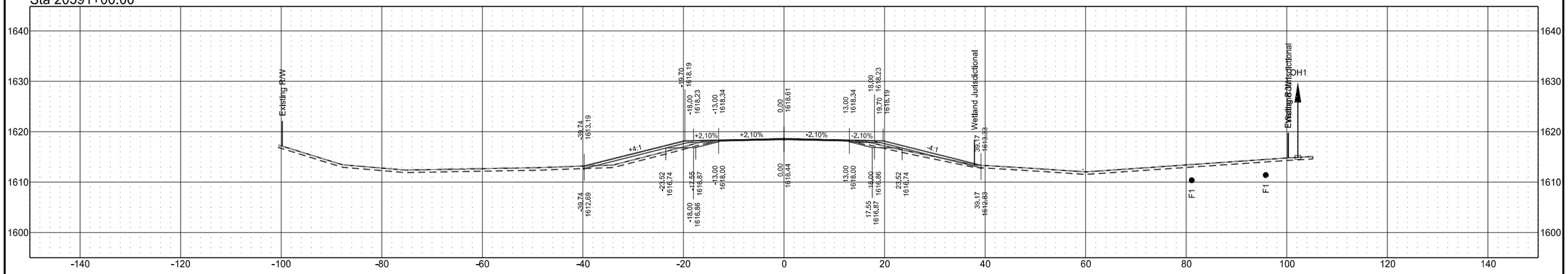
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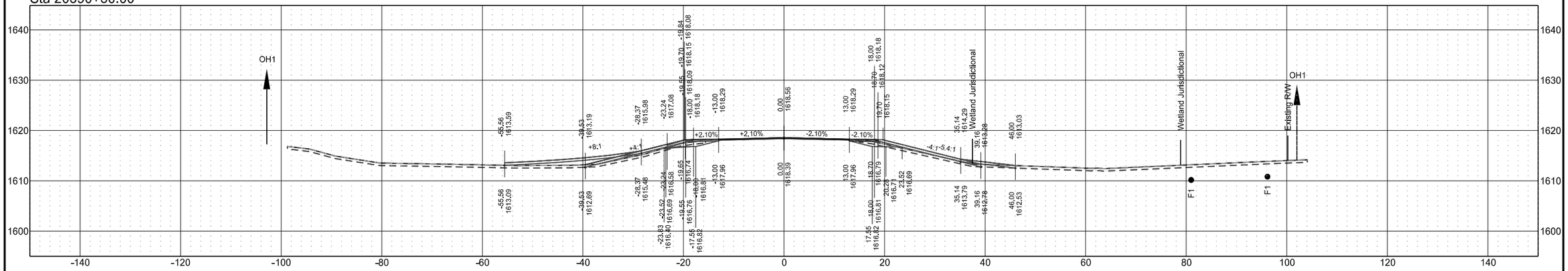
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	4

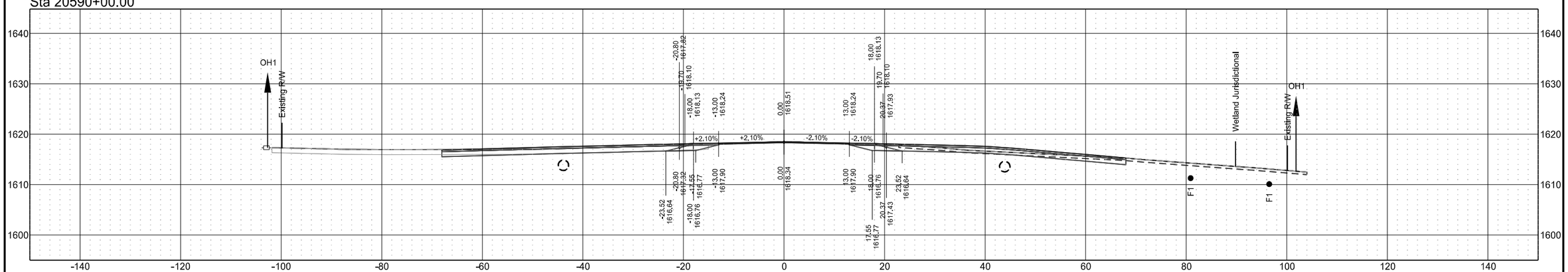
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Sta 20590+50.00



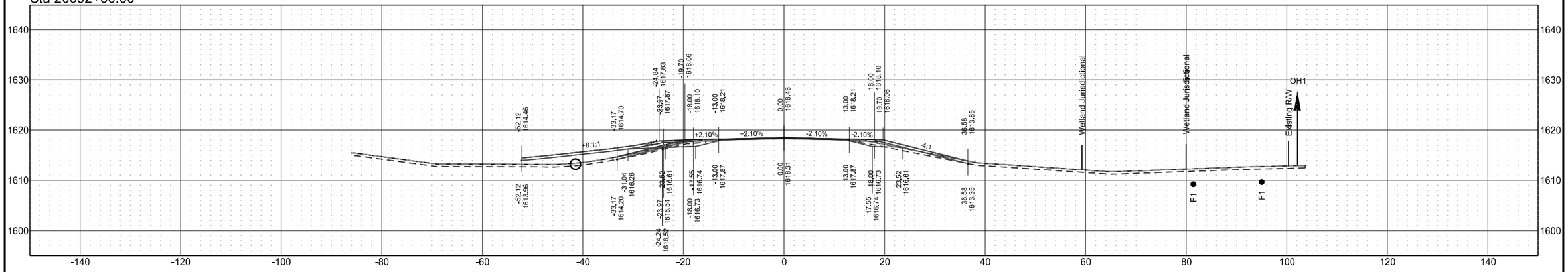
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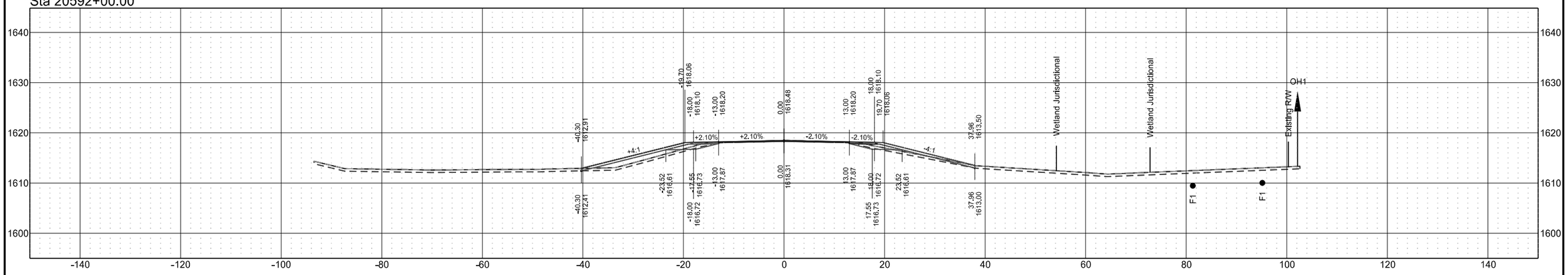
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	5

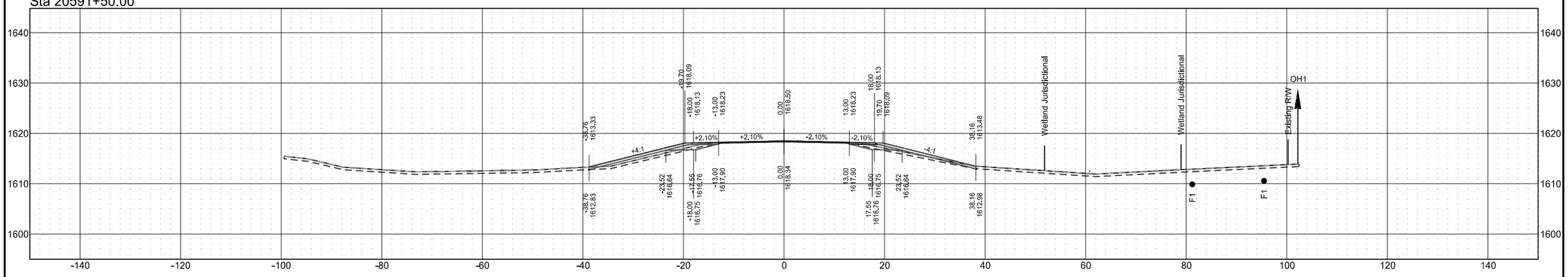
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Sta 20592+00.00



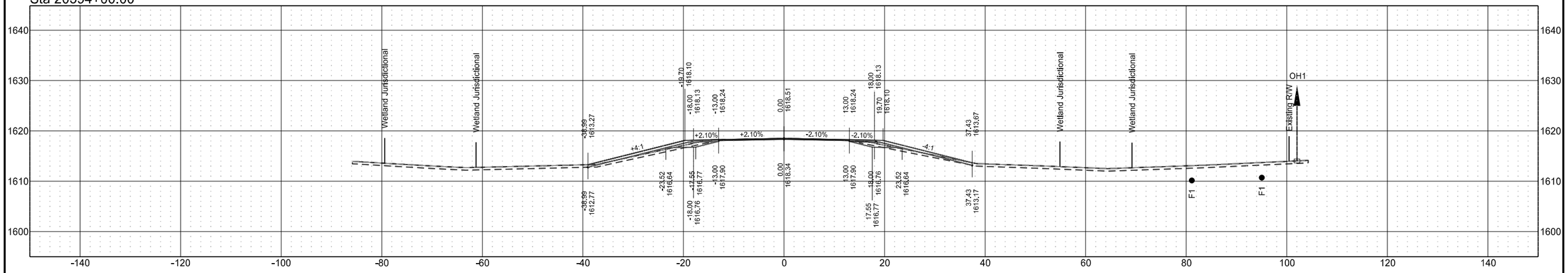
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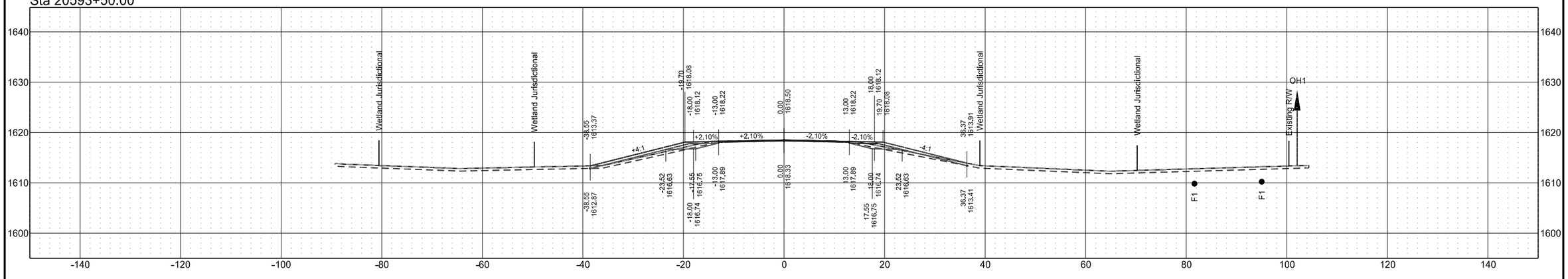
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	6

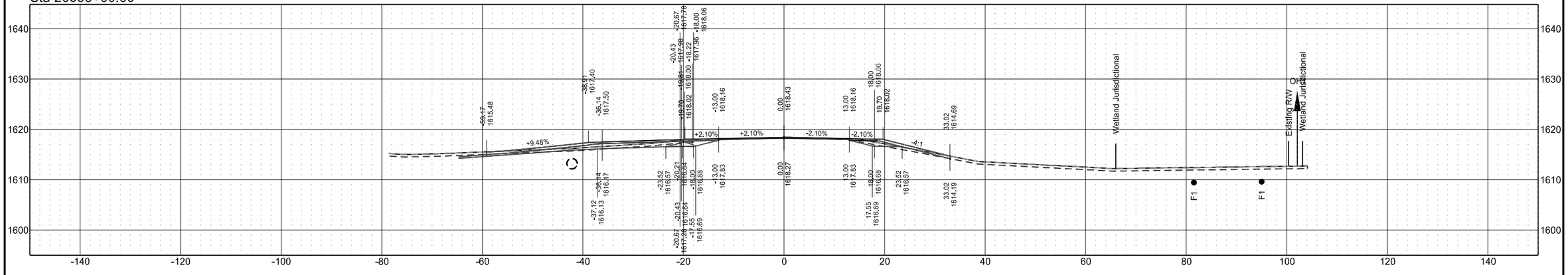
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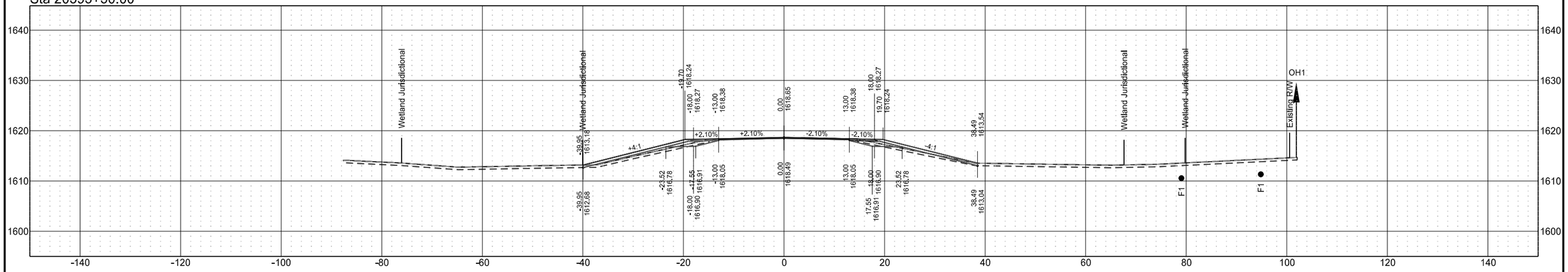
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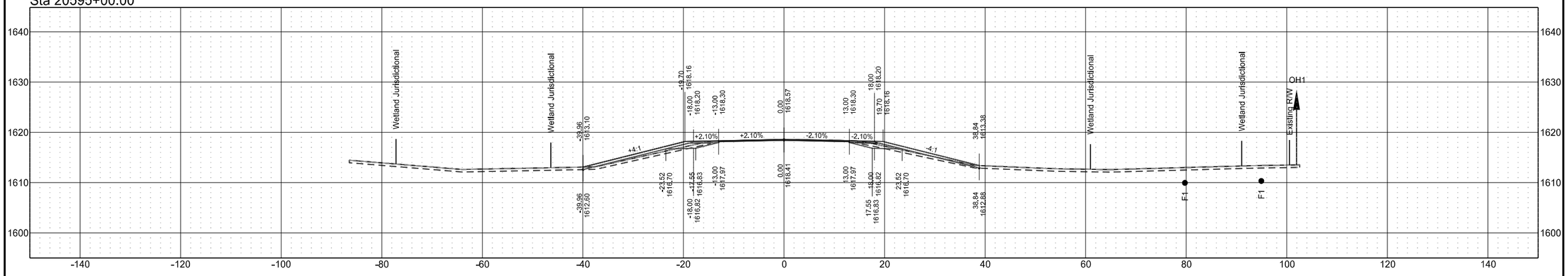
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	7

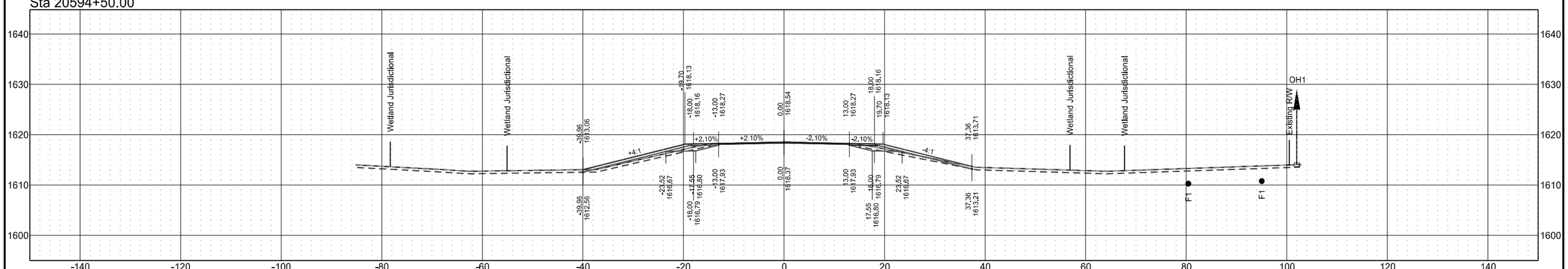
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Sta 20595+00.00



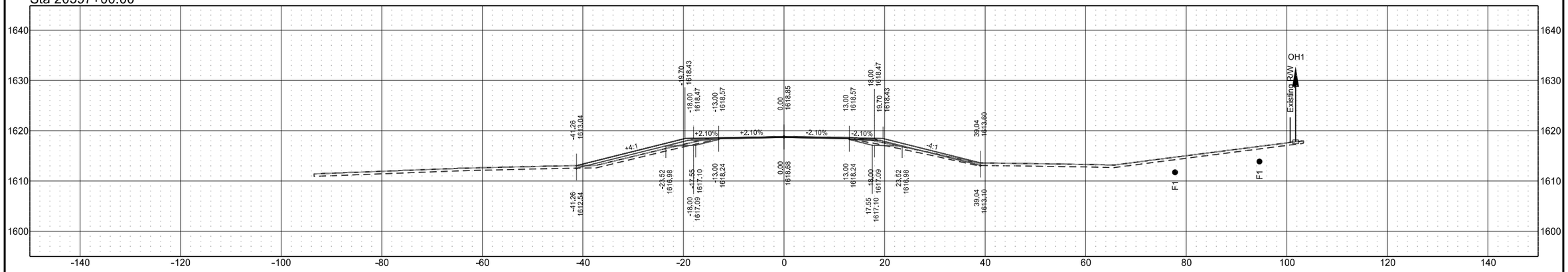
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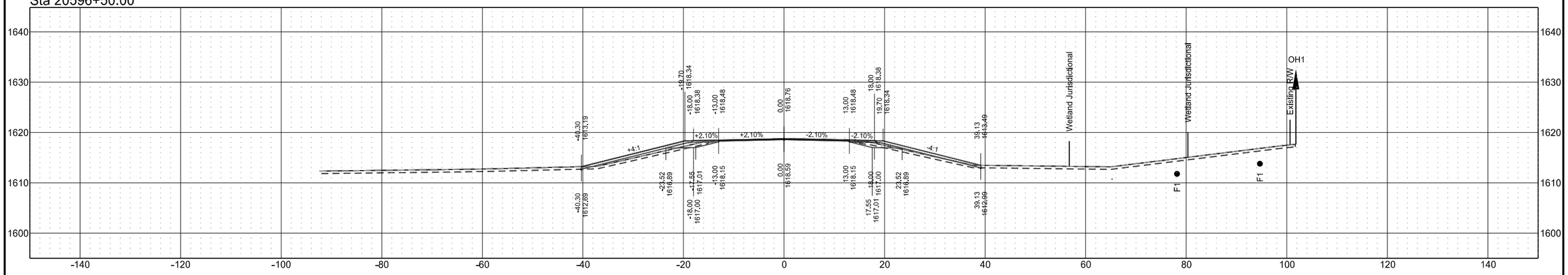
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	8

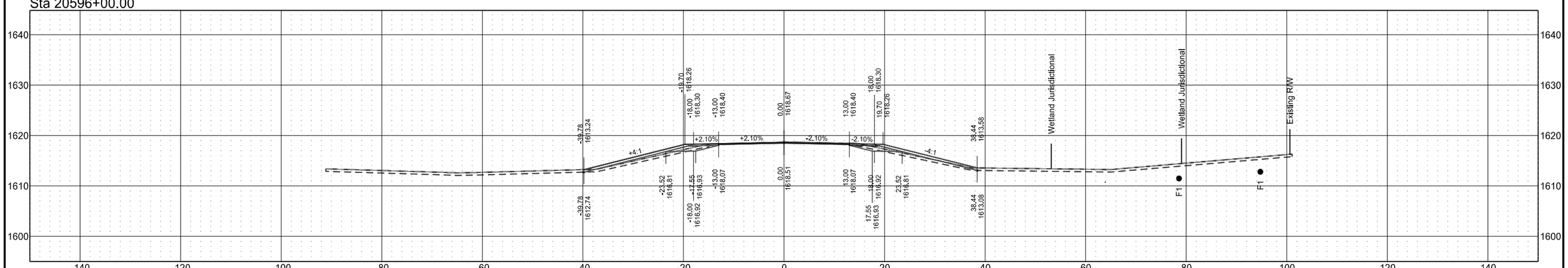
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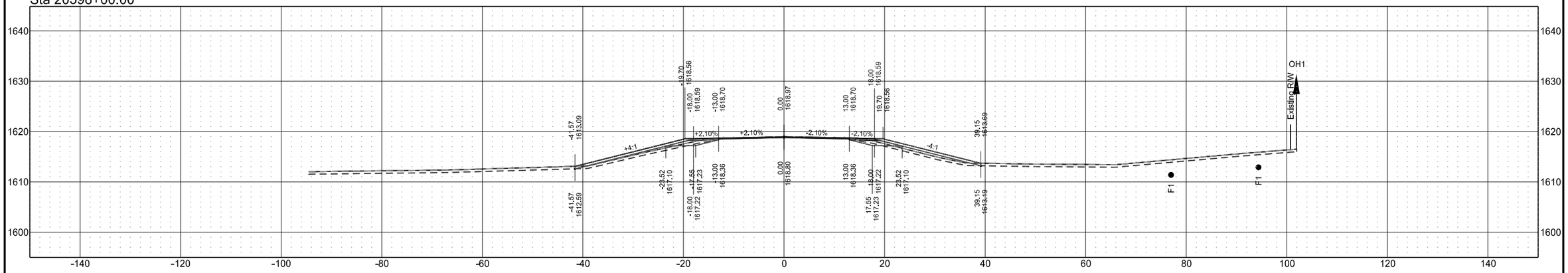
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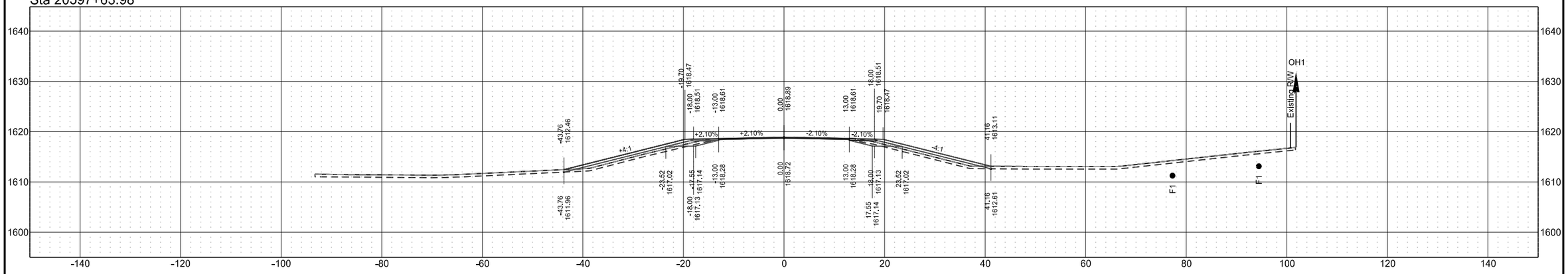
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	9

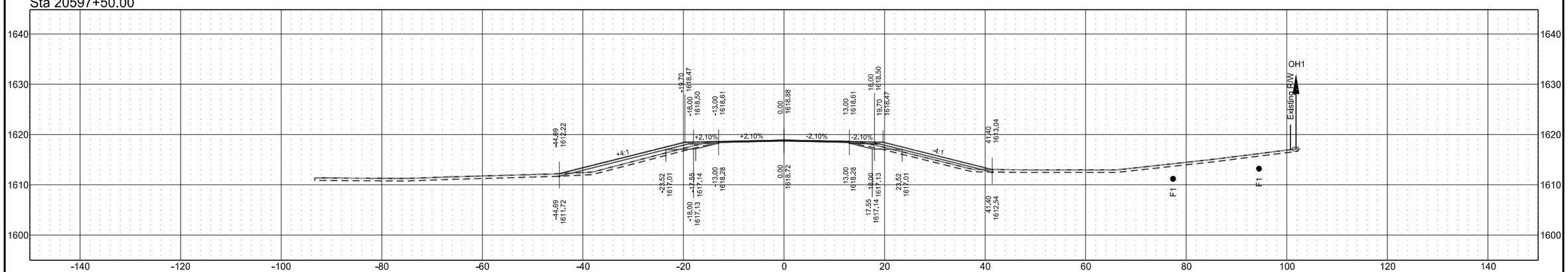
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Sta 20597+63.98



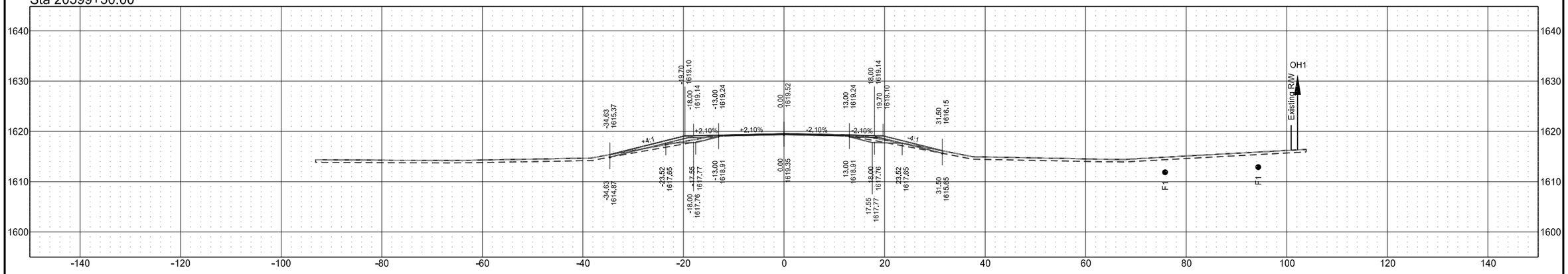
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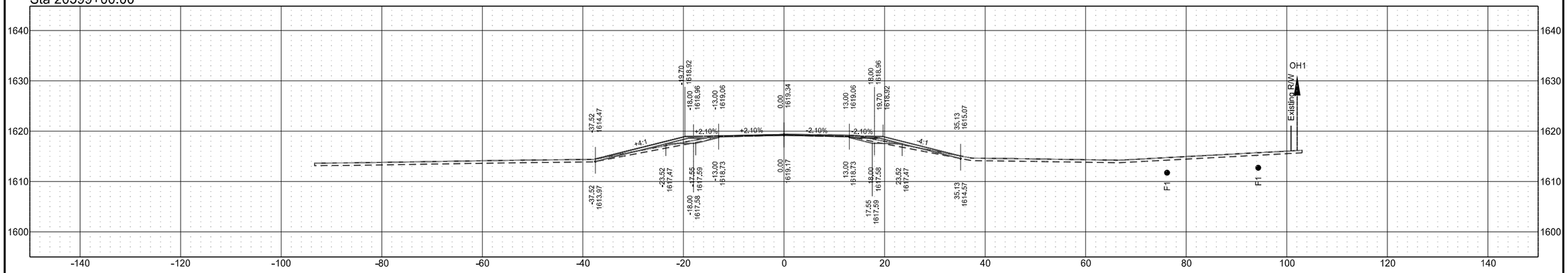
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	10

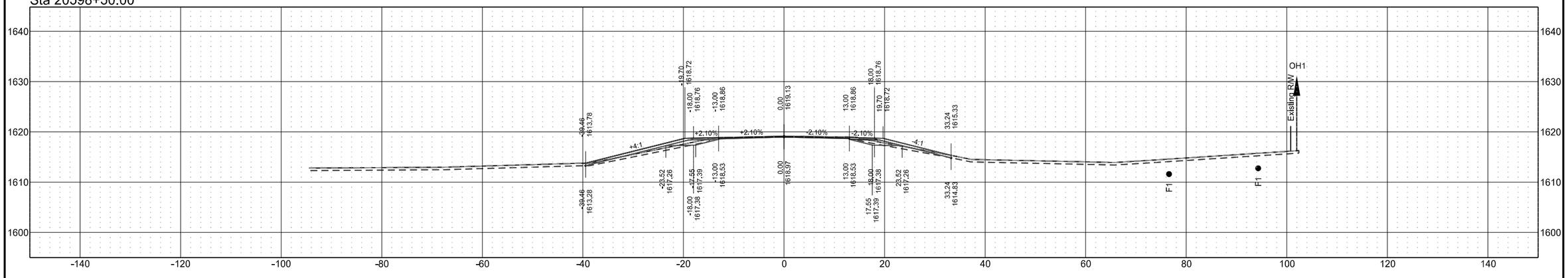
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Sta 20599+00.00



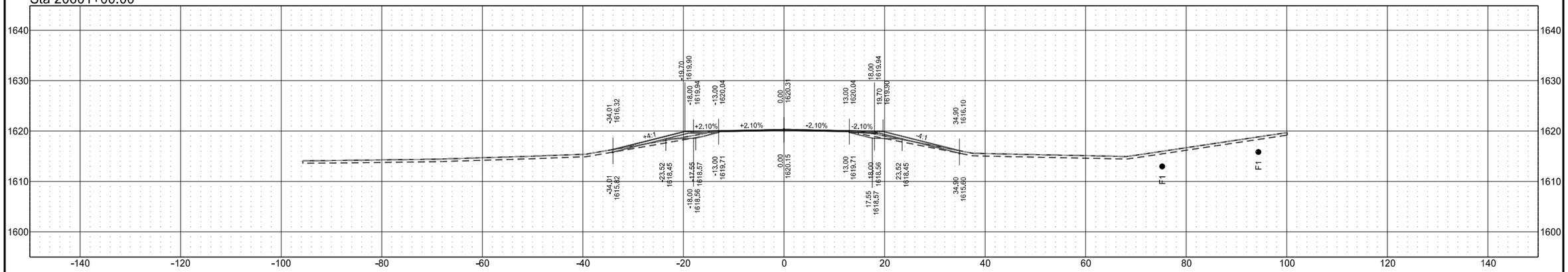
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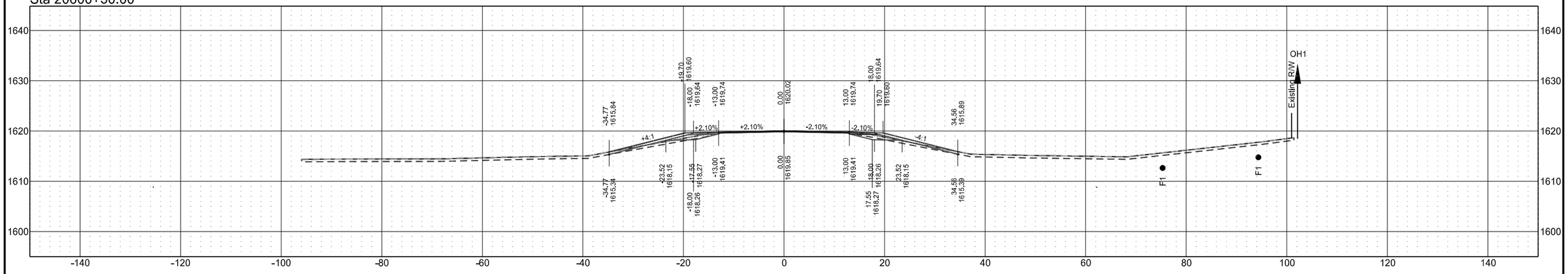
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	11

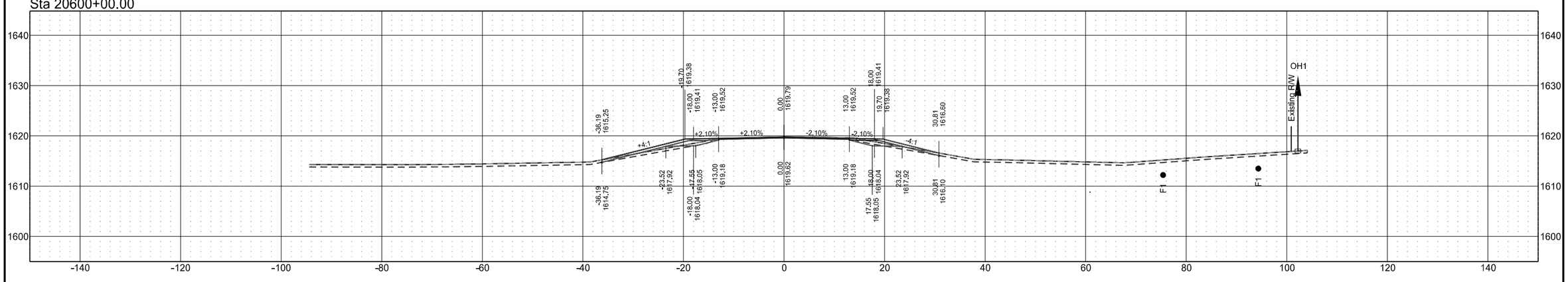
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Sta 20600+50.00



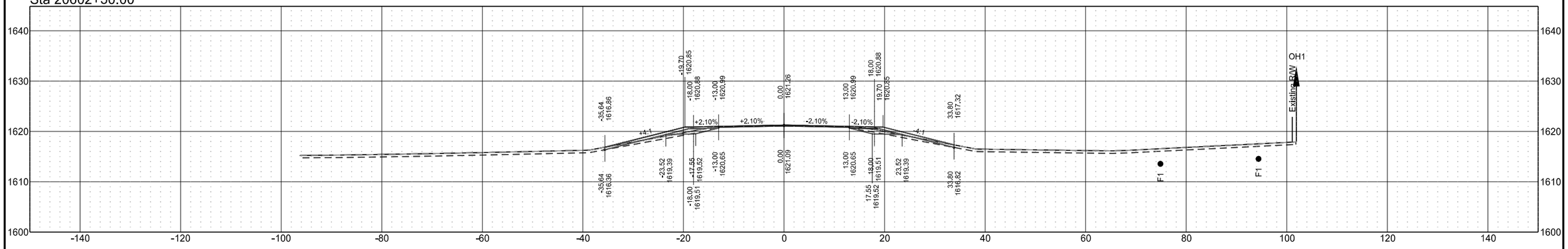
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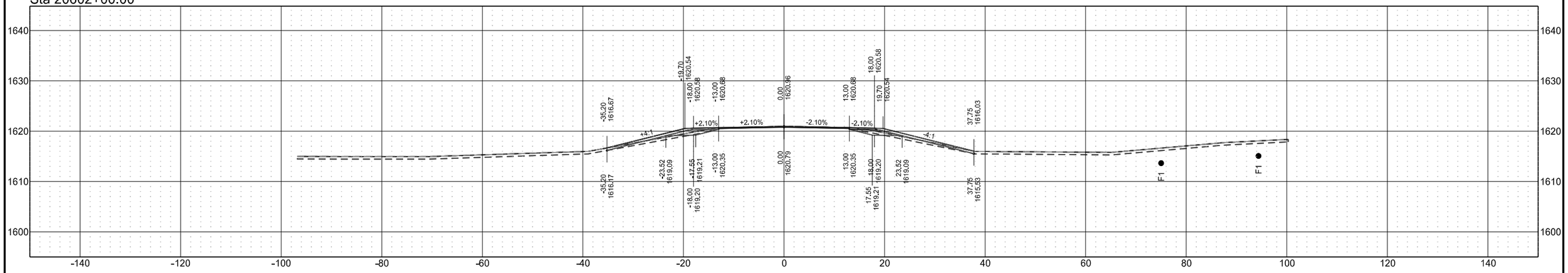
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	12

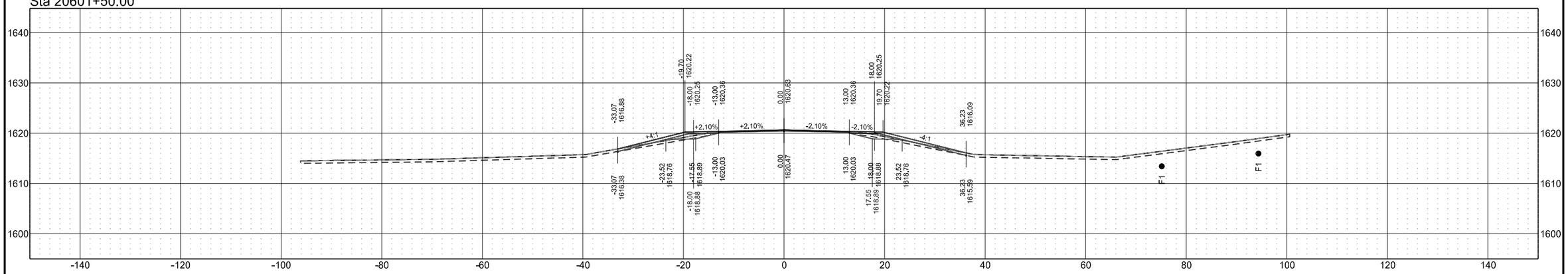
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Sta 20602+00.00



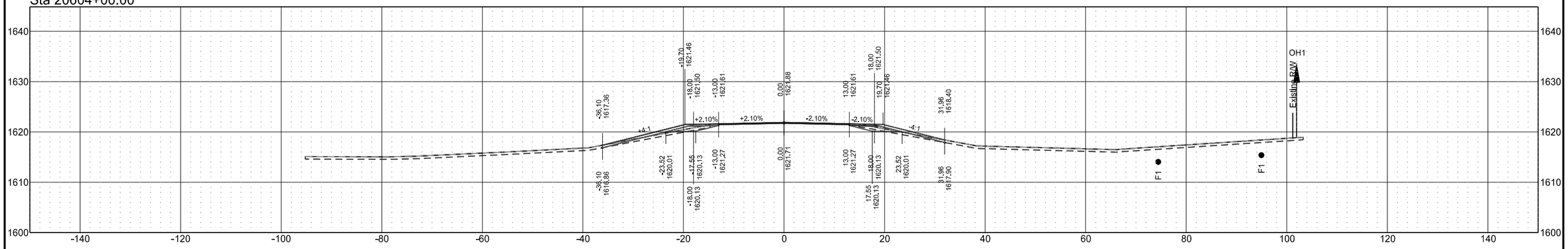
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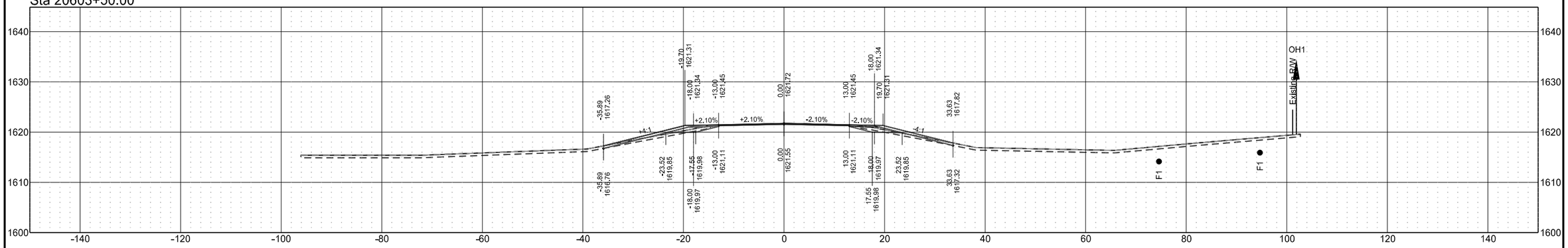
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	13

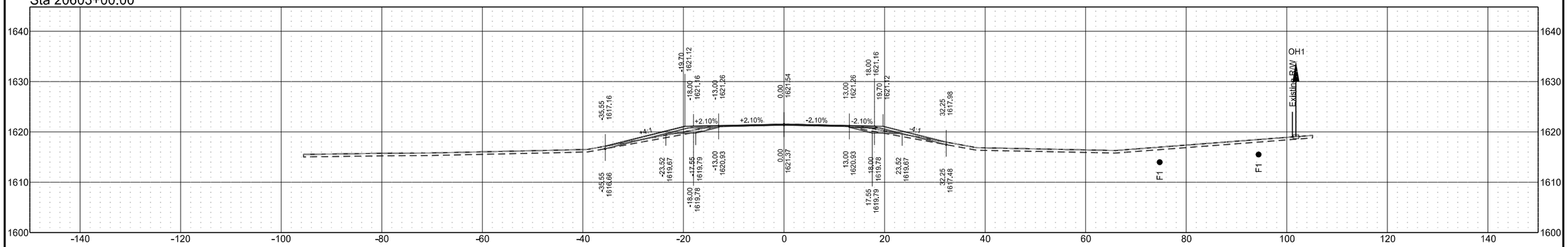
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Sta 20603+50.00



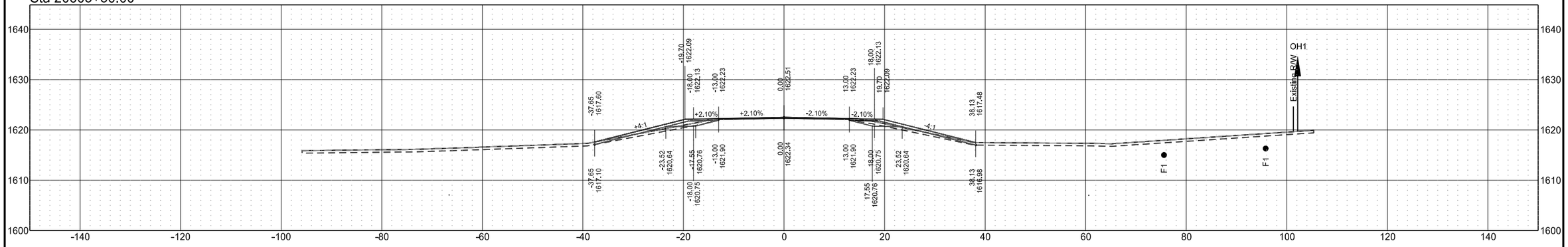
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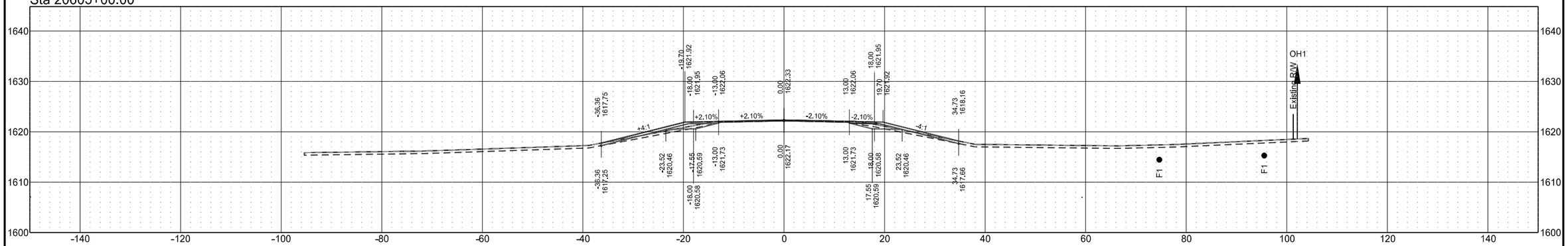
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	14

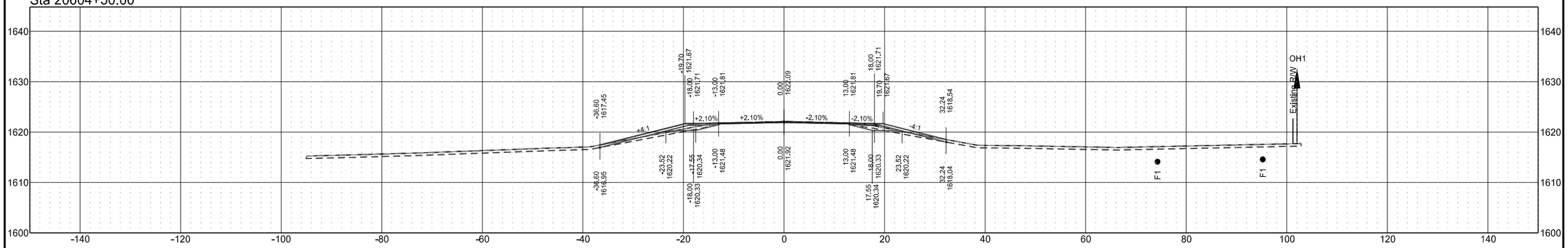
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Sta 20605+00.00



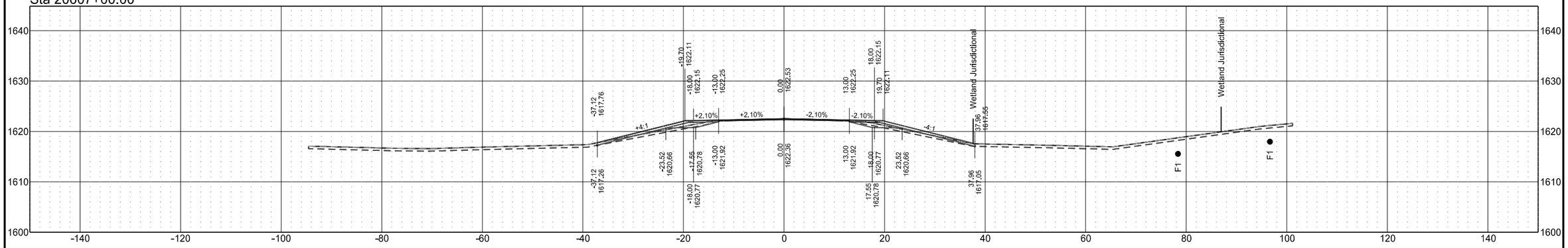
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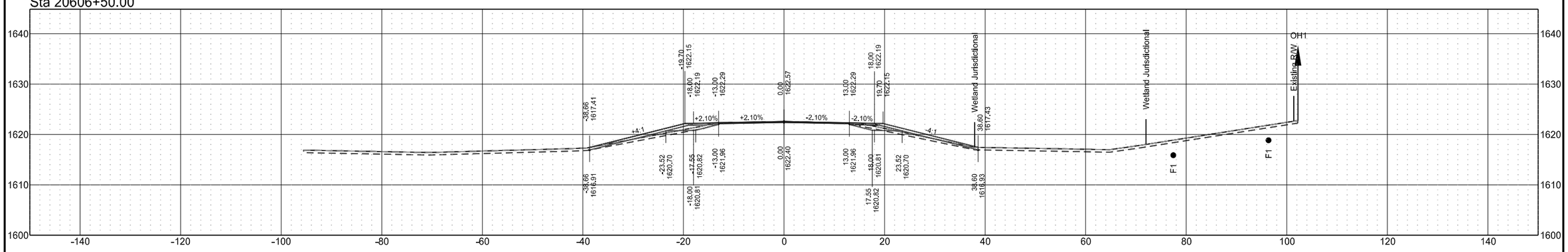
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	15

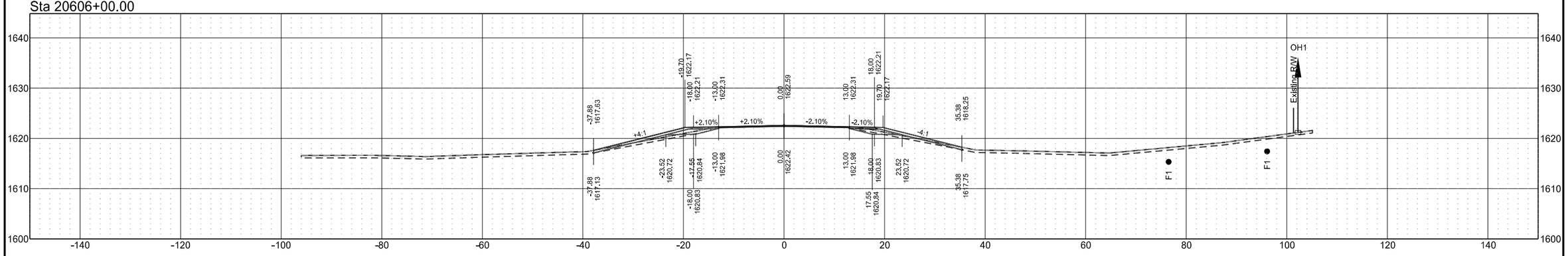
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Sta 20606+50.00



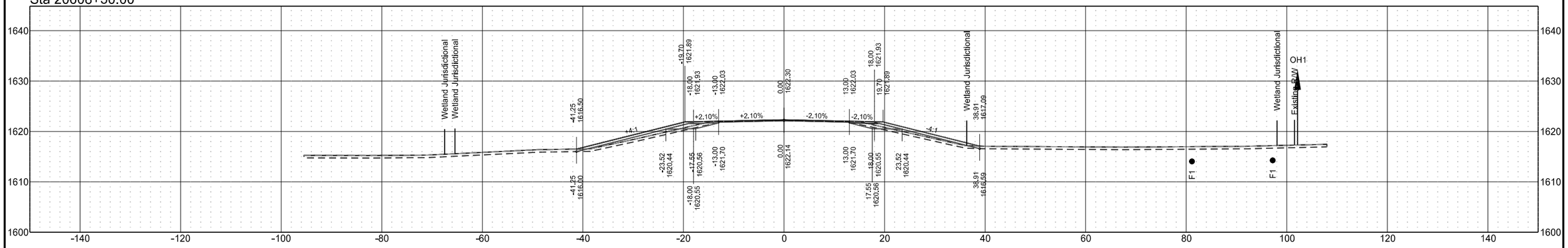
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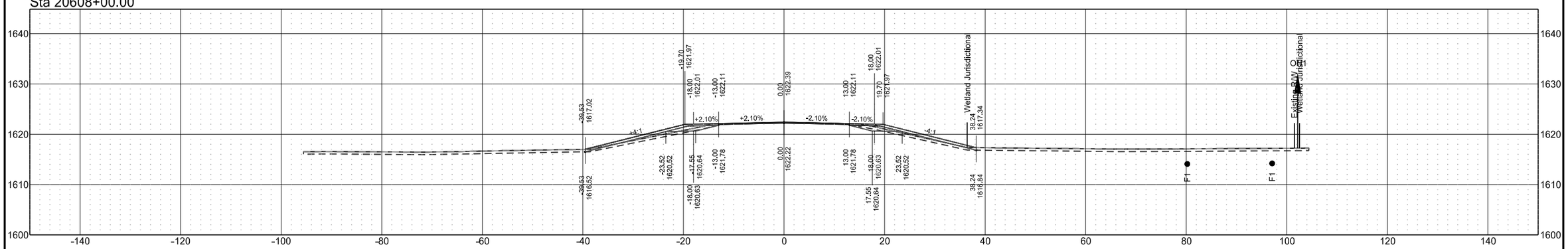
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	16

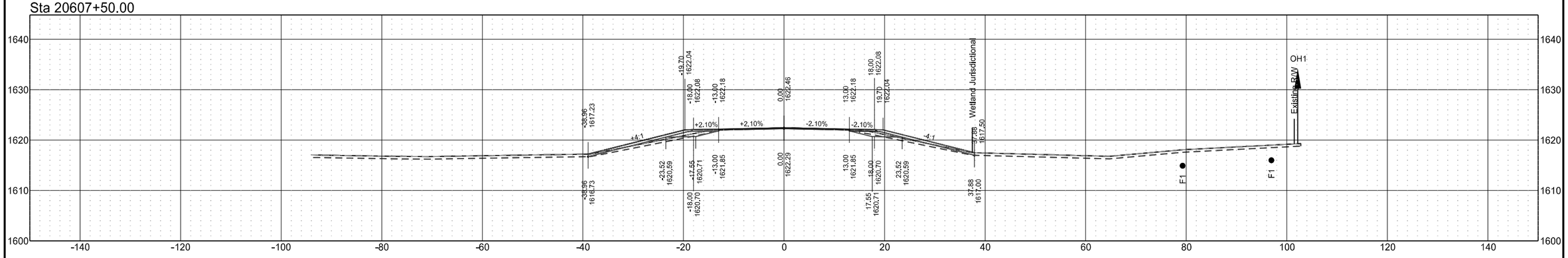
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Sta 20608+00.00



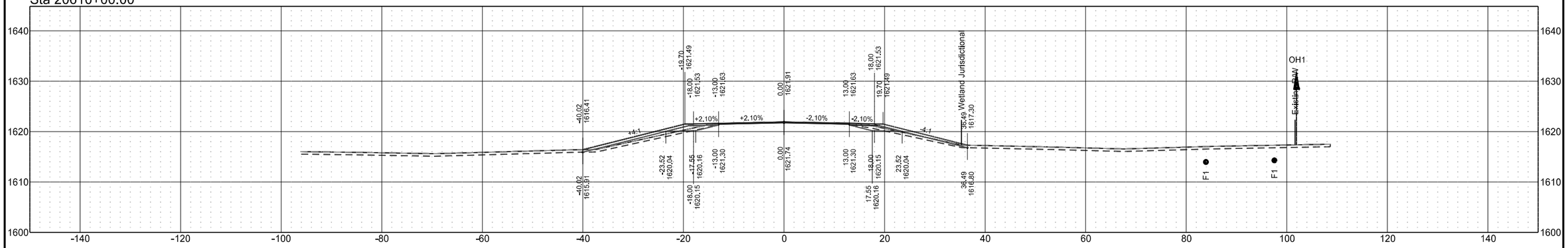
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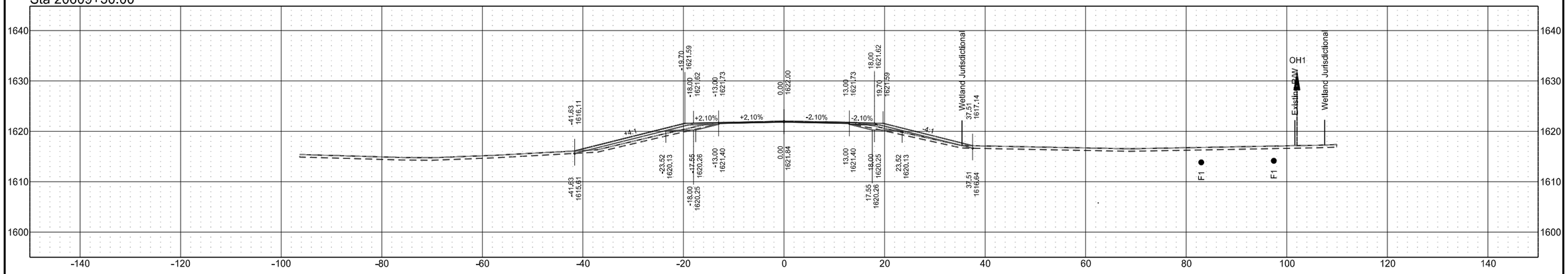
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	17

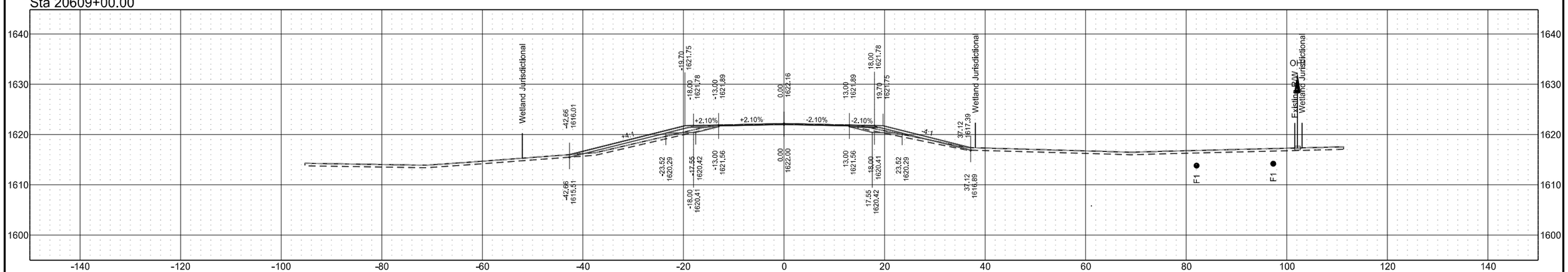
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Sta 20609+50.00



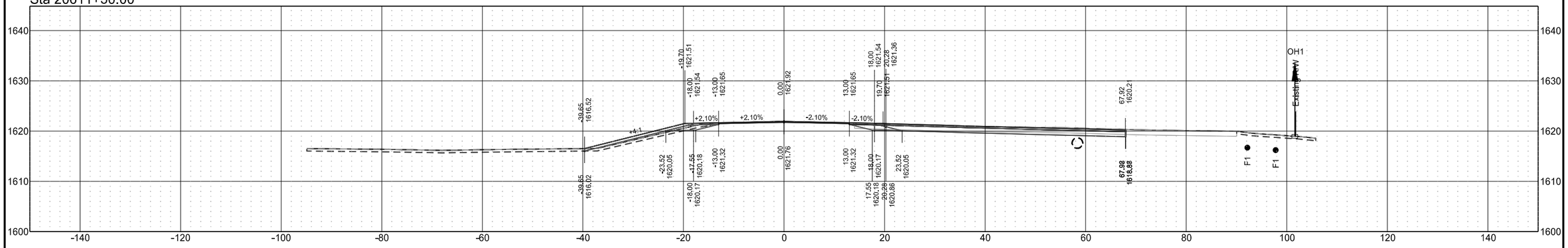
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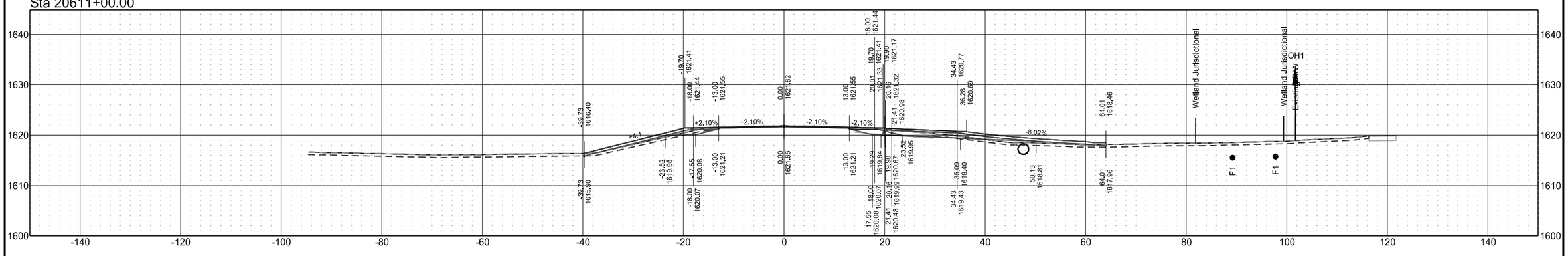
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	18

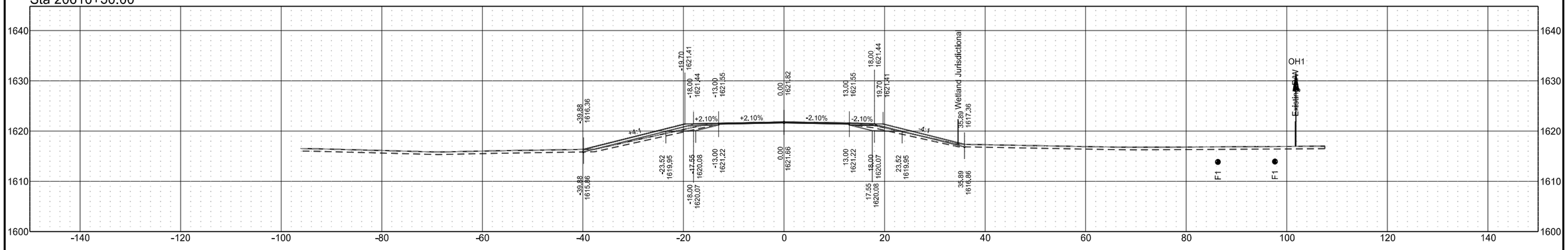
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Sta 20611+00.00



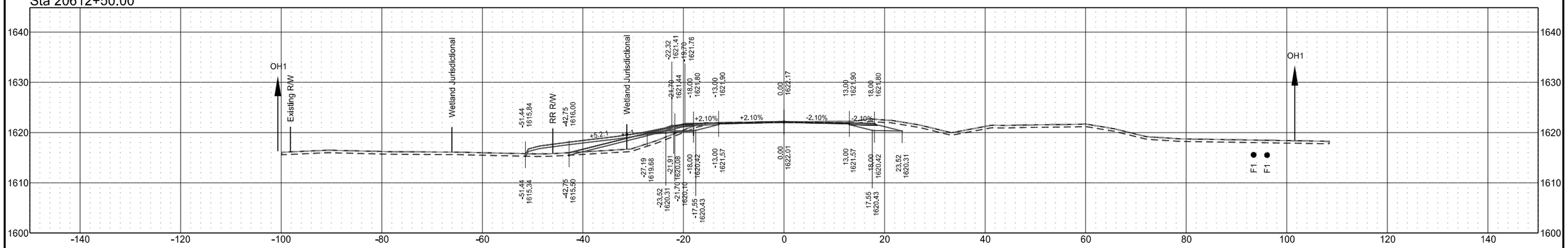
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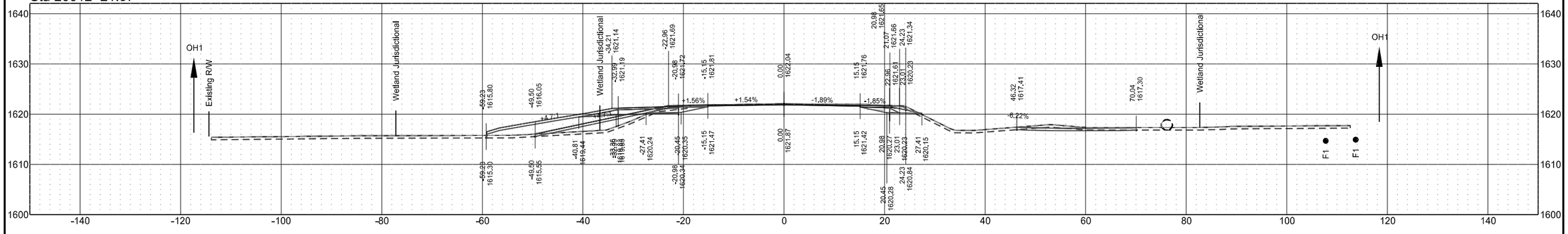
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	19

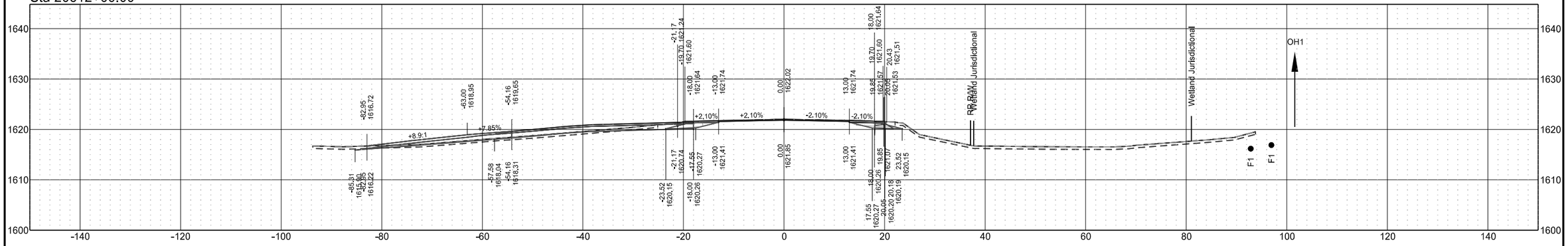
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Sta 20612+21.57



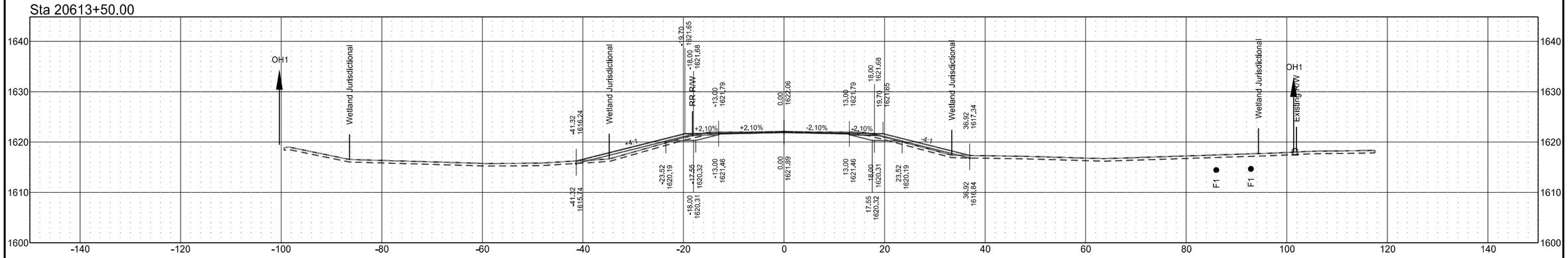
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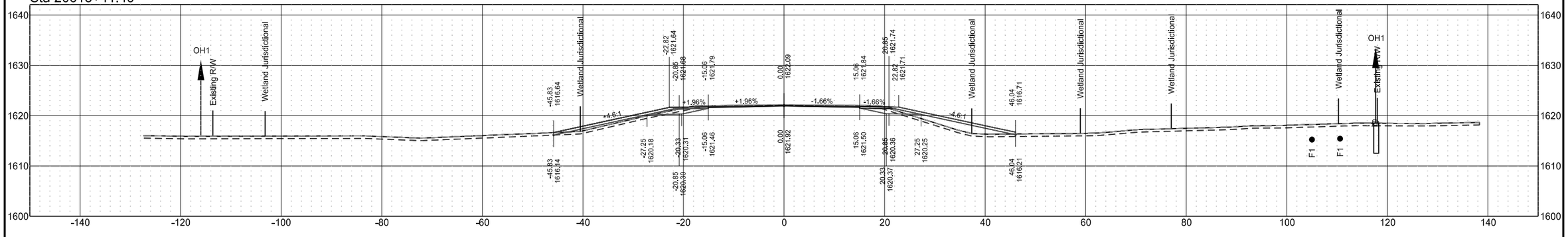
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	20

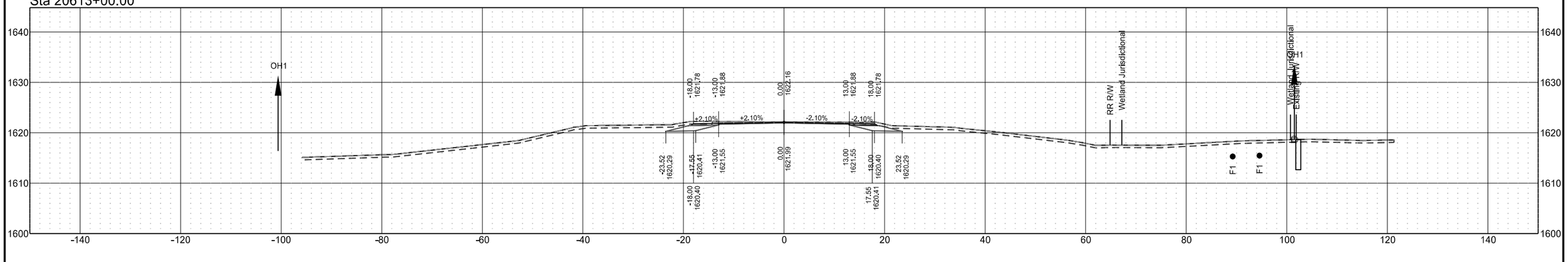
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Sta 20613+41.49



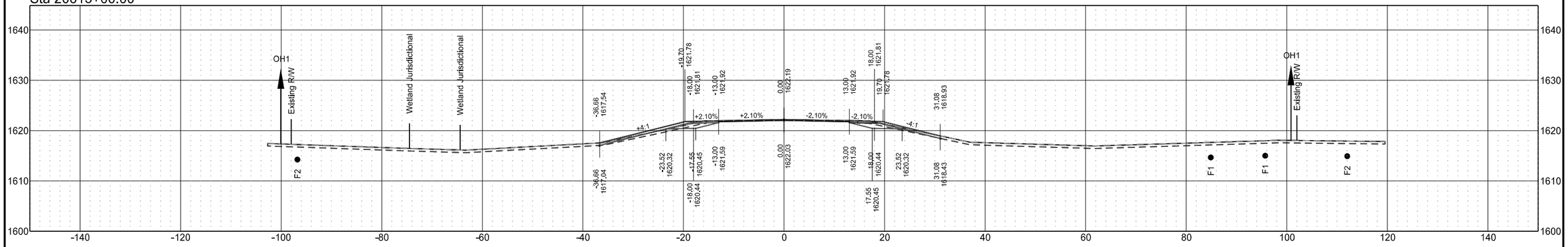
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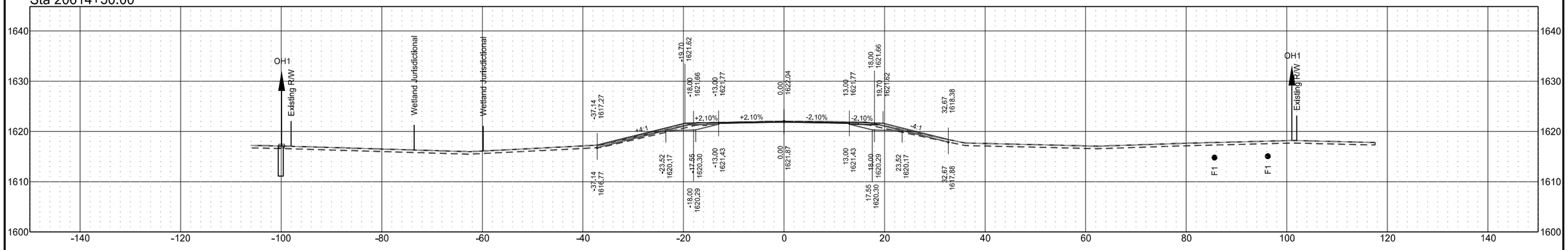
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	21

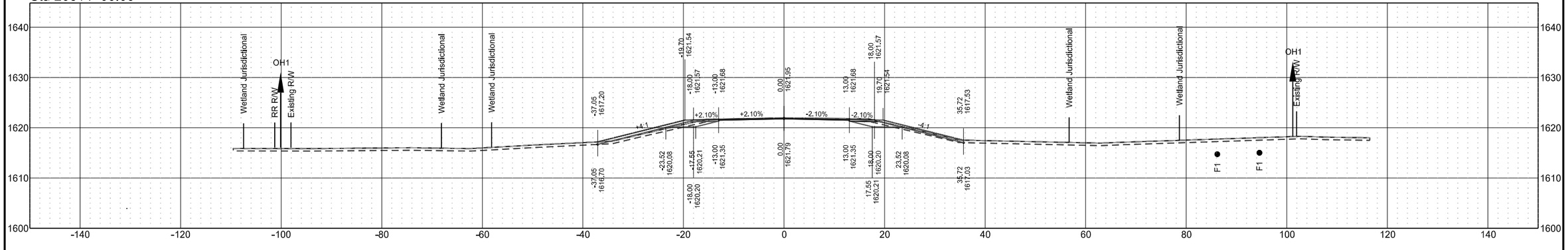
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Sta 20614+50.00



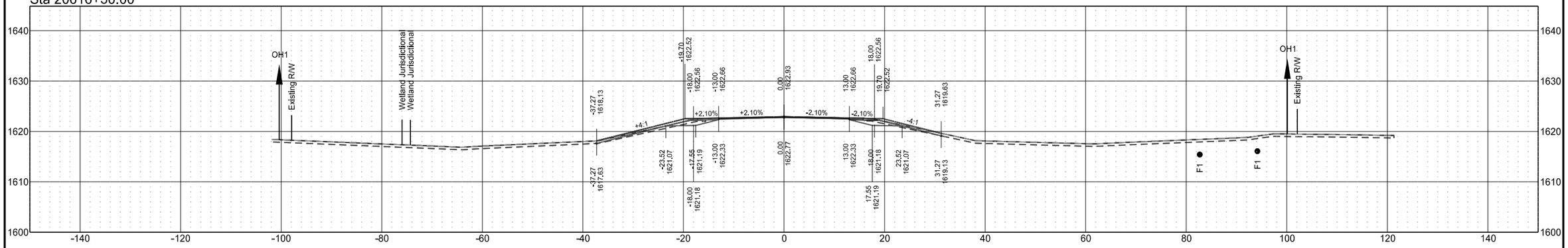
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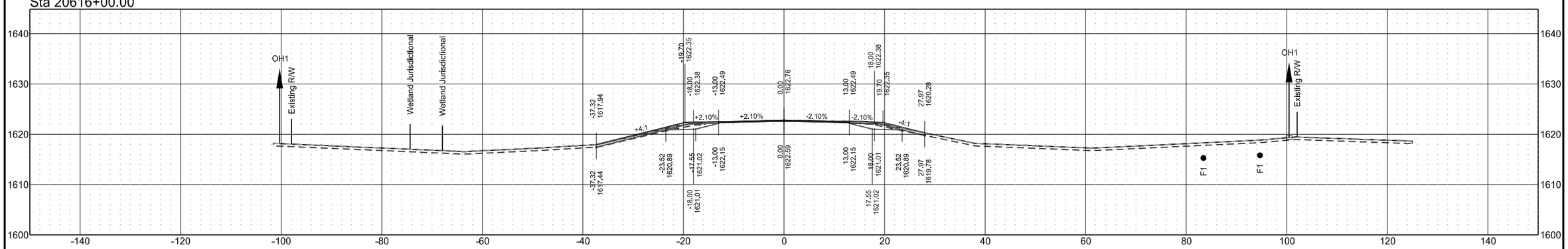
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	22

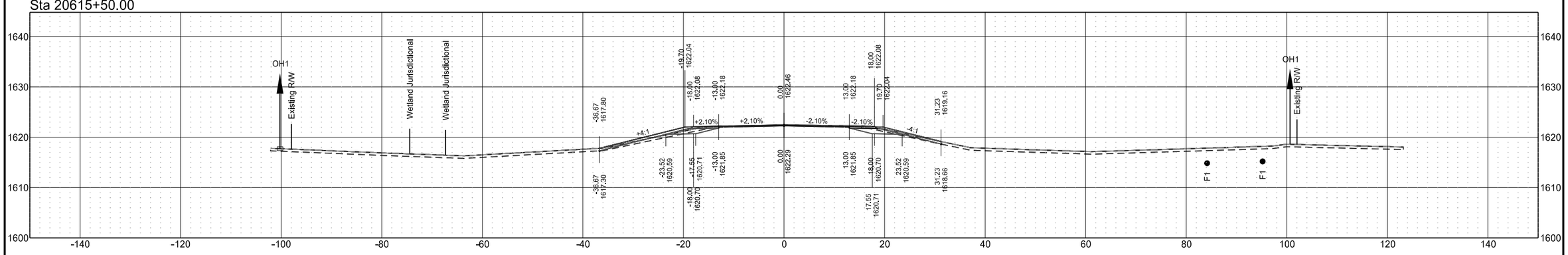
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Sta 20616+00.00



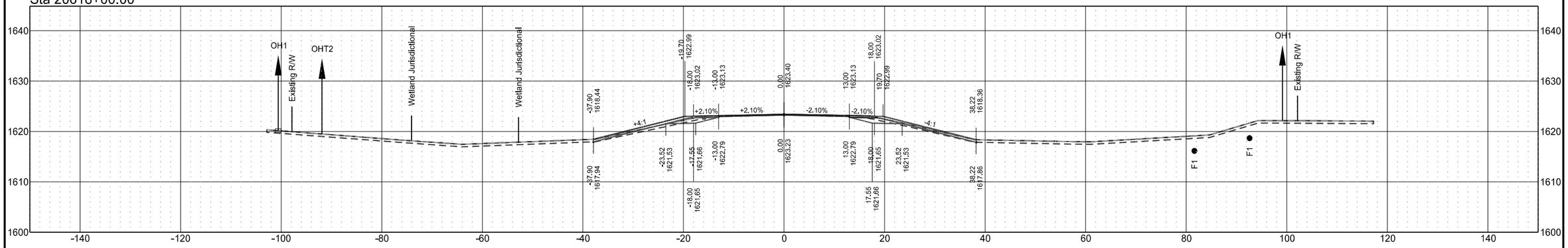
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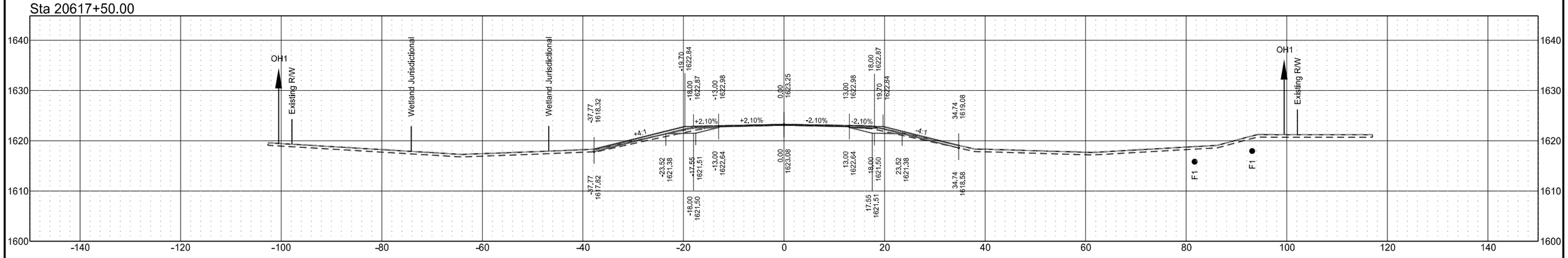
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	23

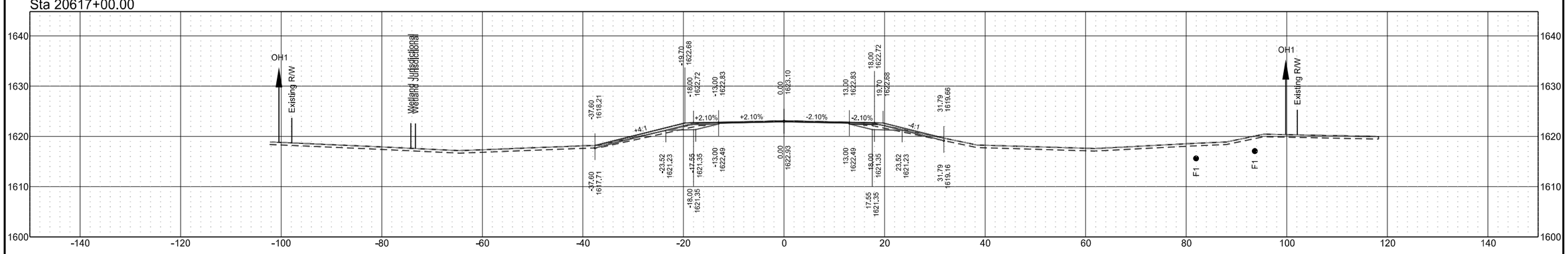
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Sta 20617+50.00



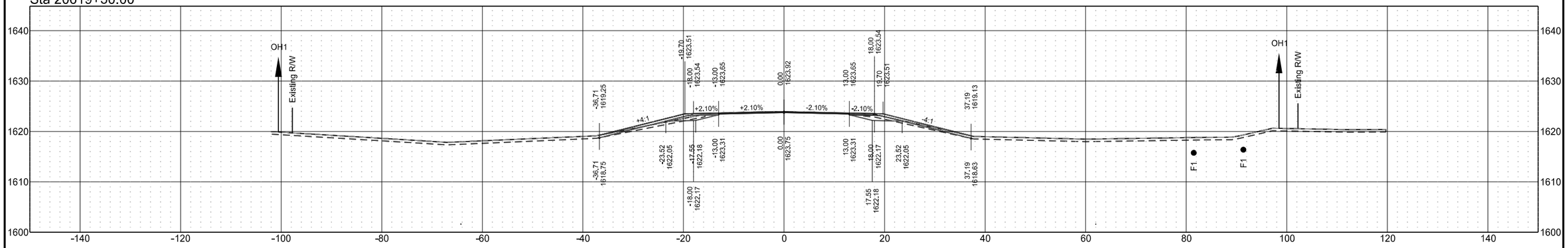
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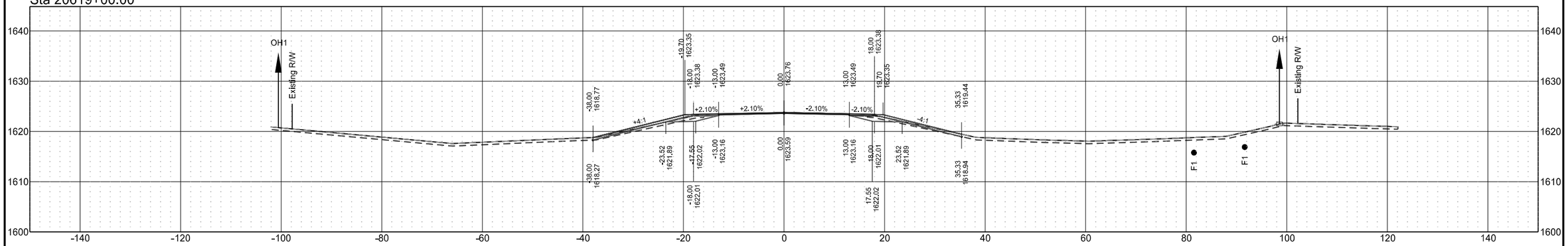
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	24

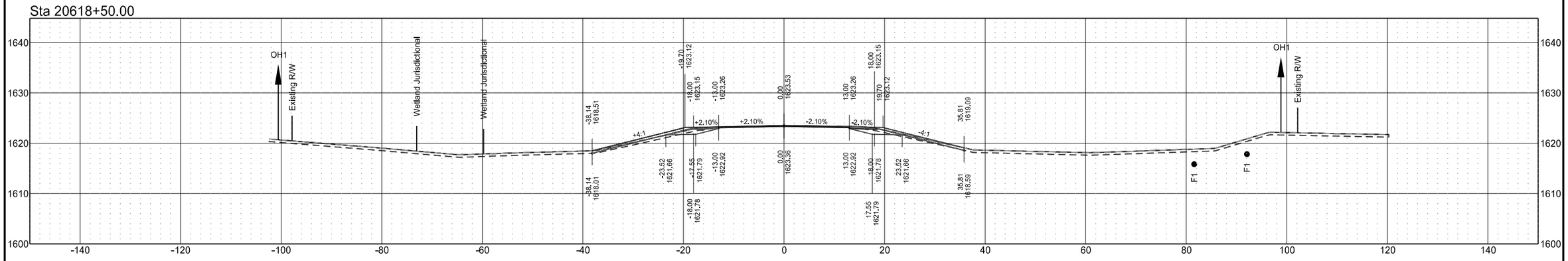
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Sta 20619+00.00



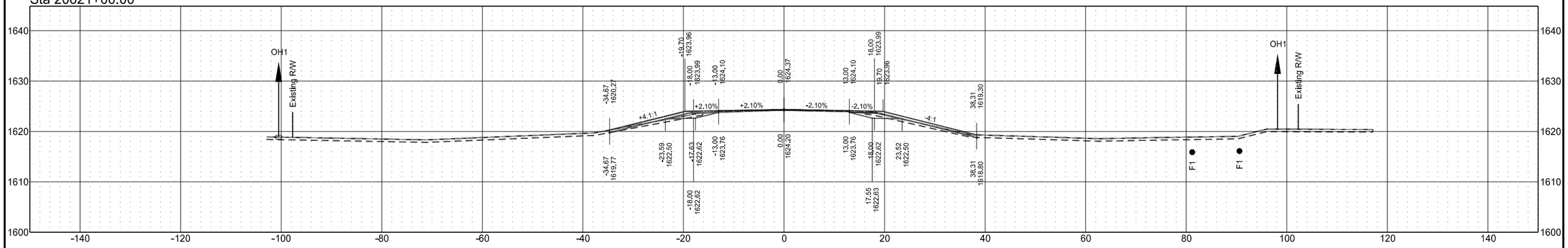
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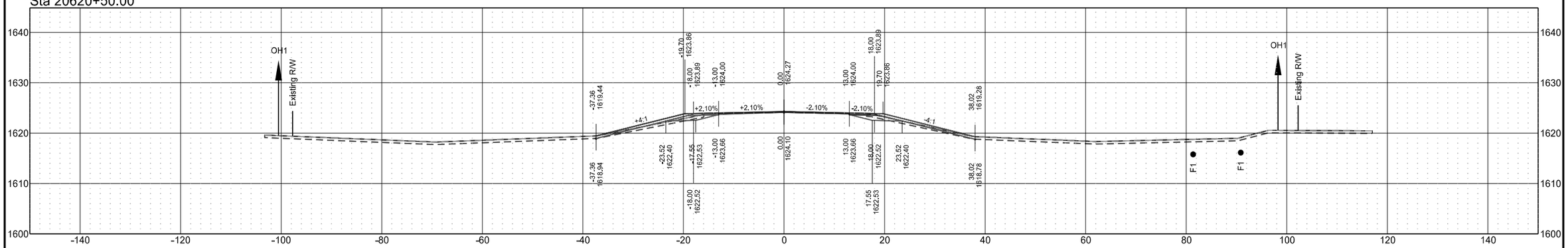
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	25

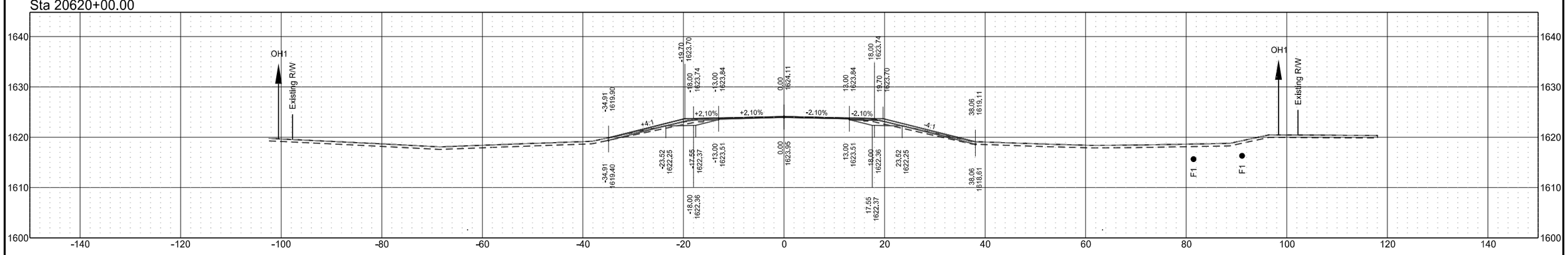
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Sta 20620+50.00



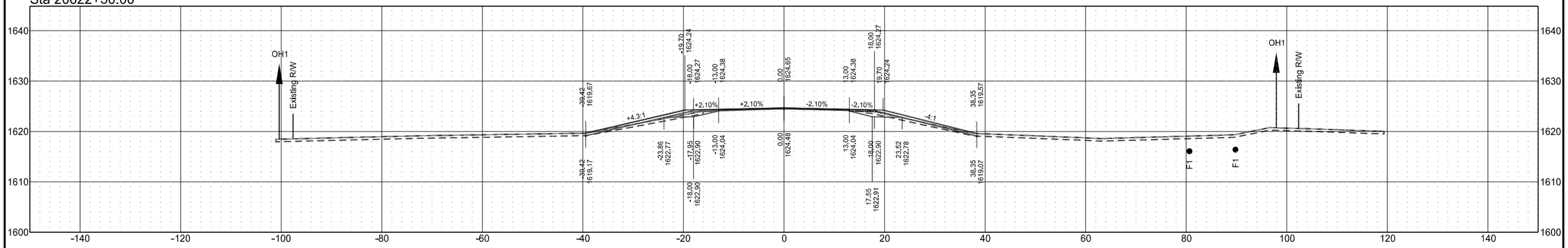
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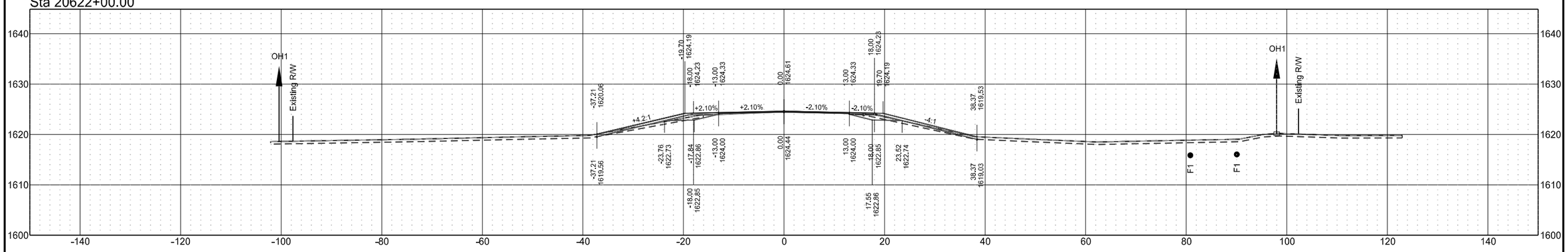
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	26

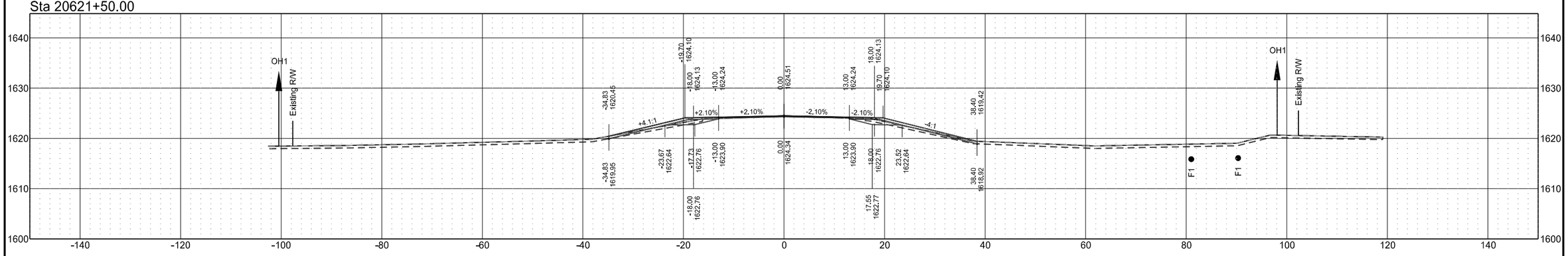
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Sta 20622+00.00



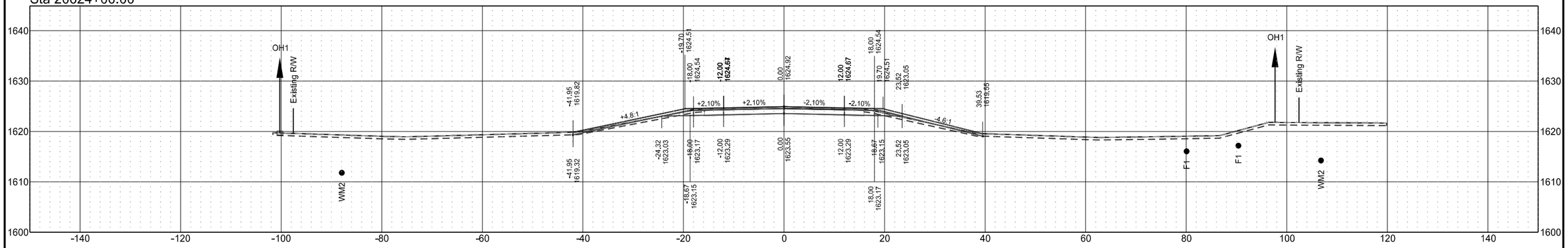
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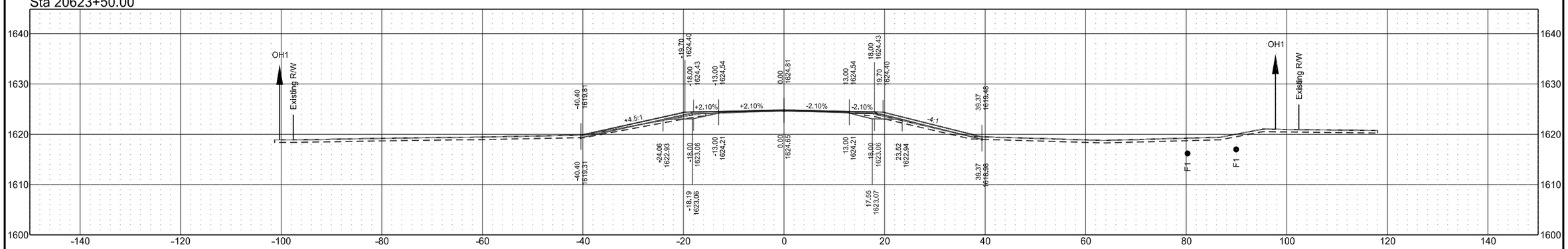
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	27

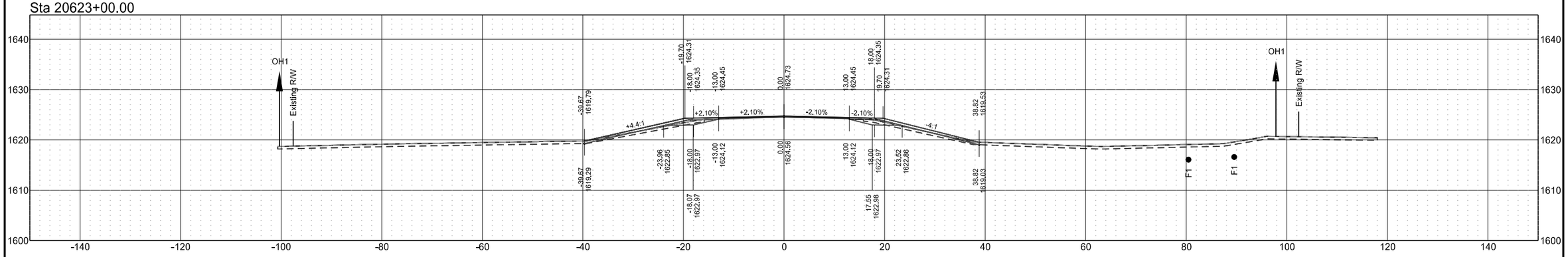
Sta 20624+00.00



Sta 20623+50.00



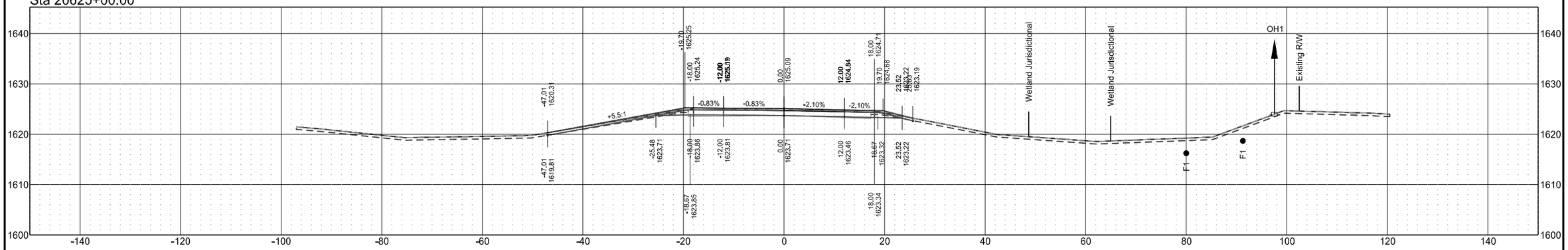
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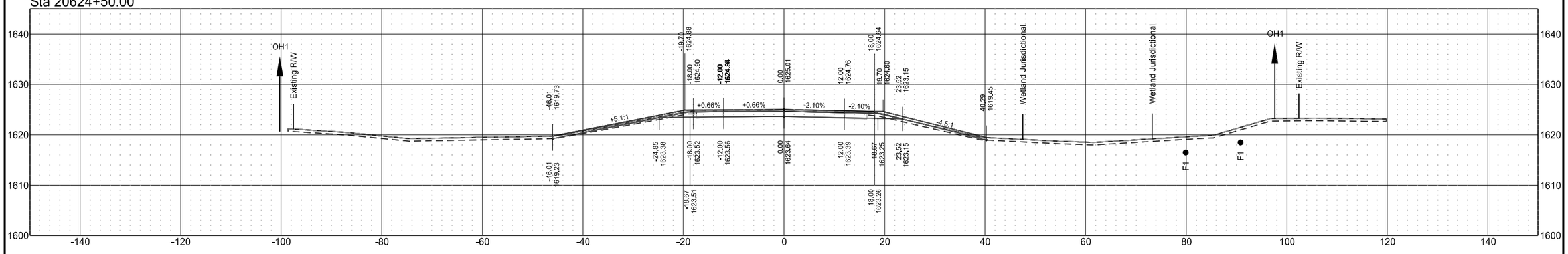
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	28

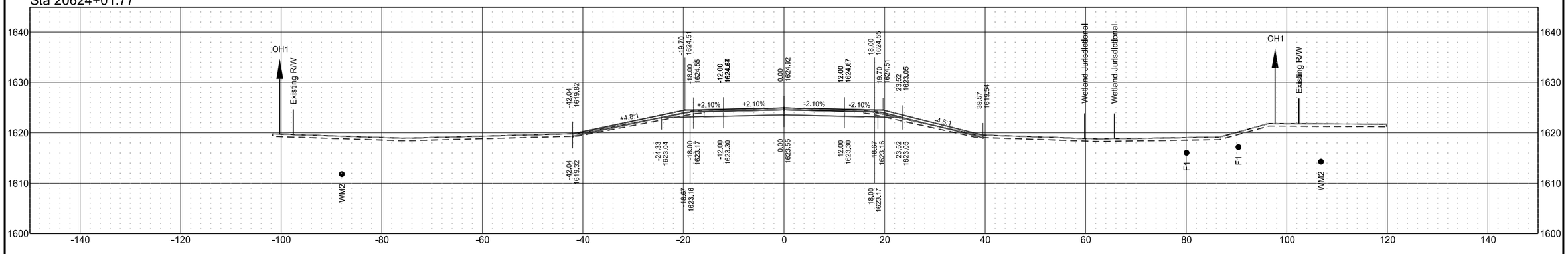
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Sta 20624+50.00



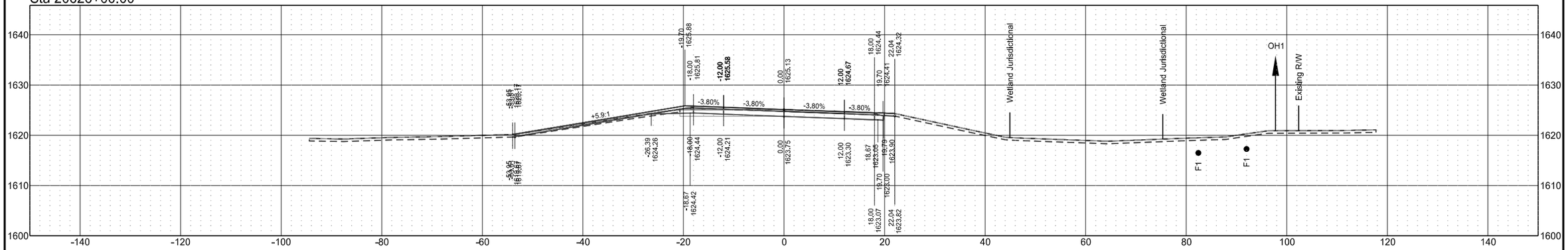
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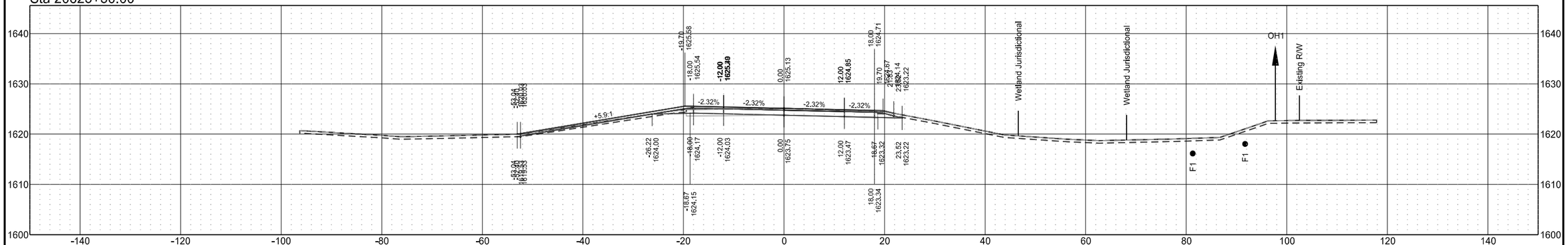
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	29

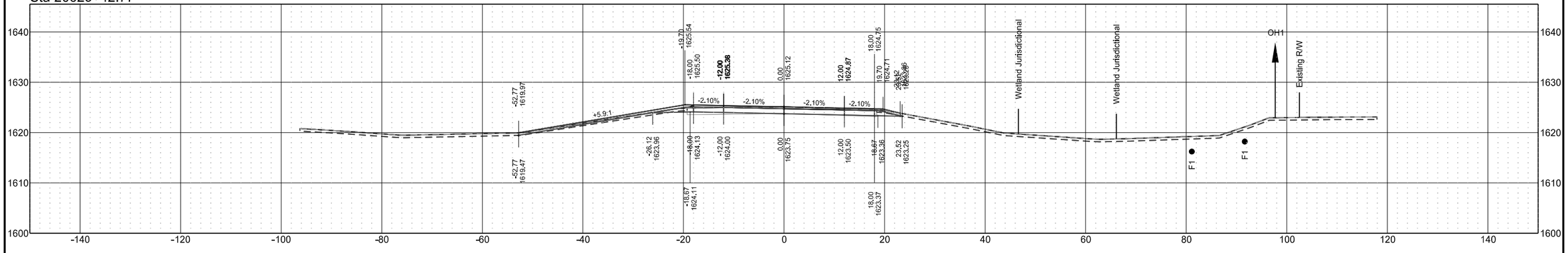
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Sta 20625+50.00



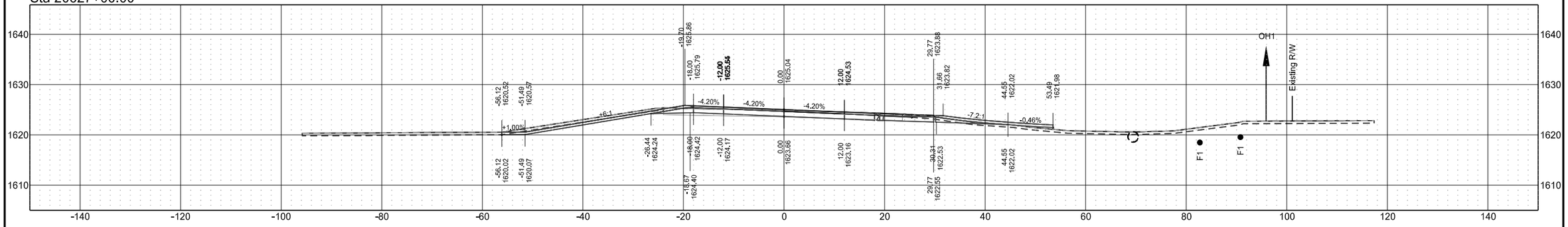
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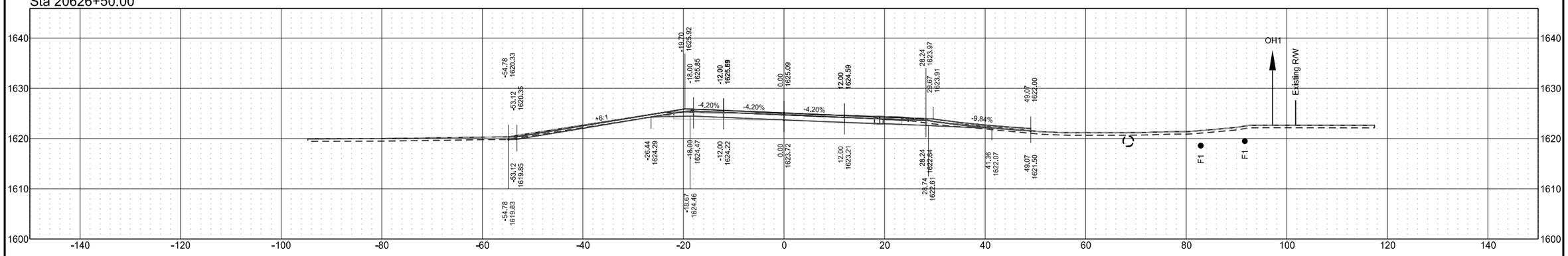
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	30

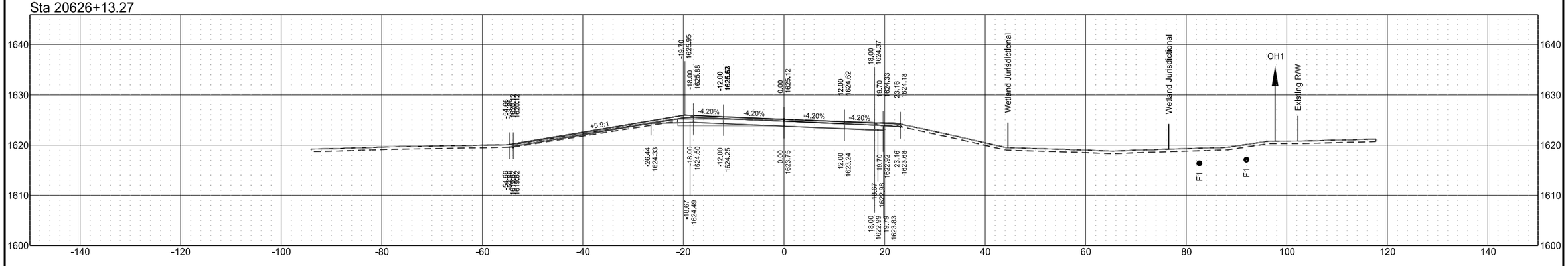
Sta 20627+00.00



Sta 20626+50.00



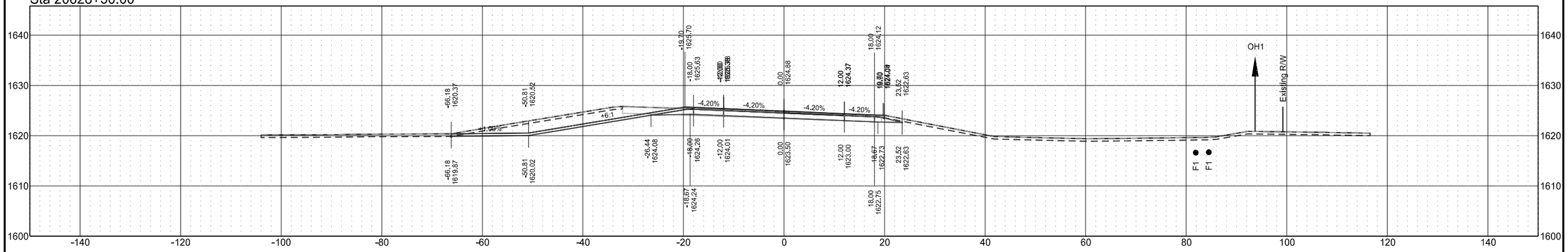
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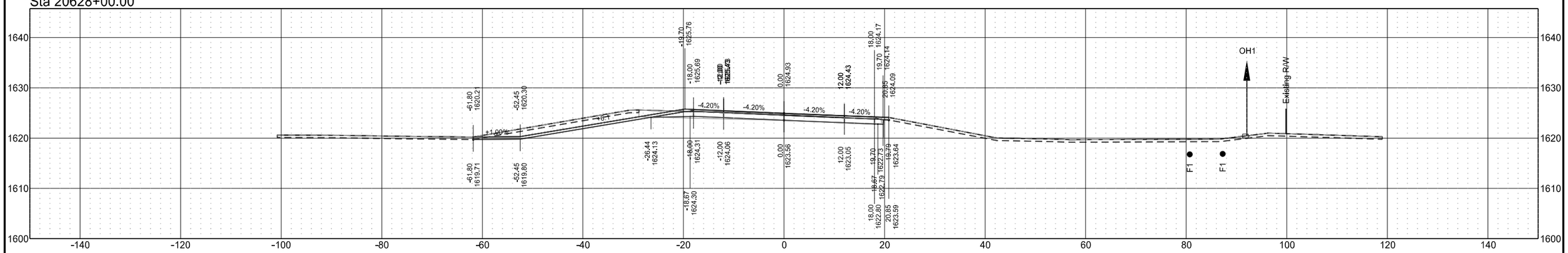
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	31

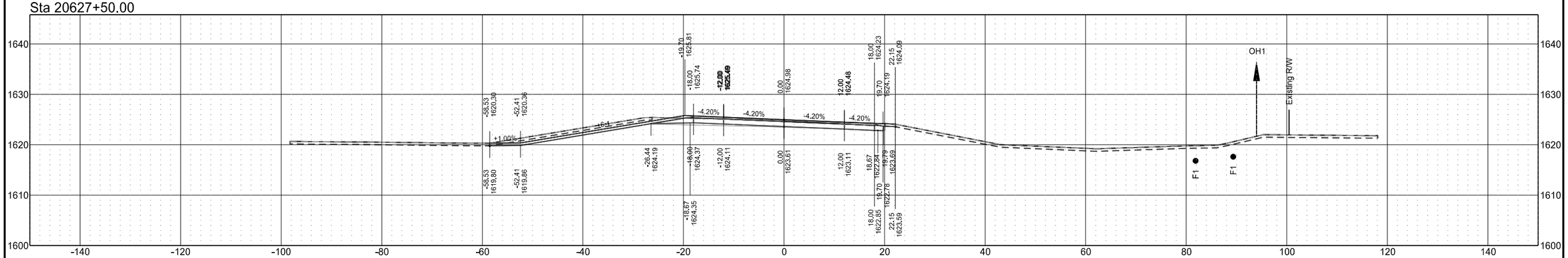
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Sta 20628+00.00



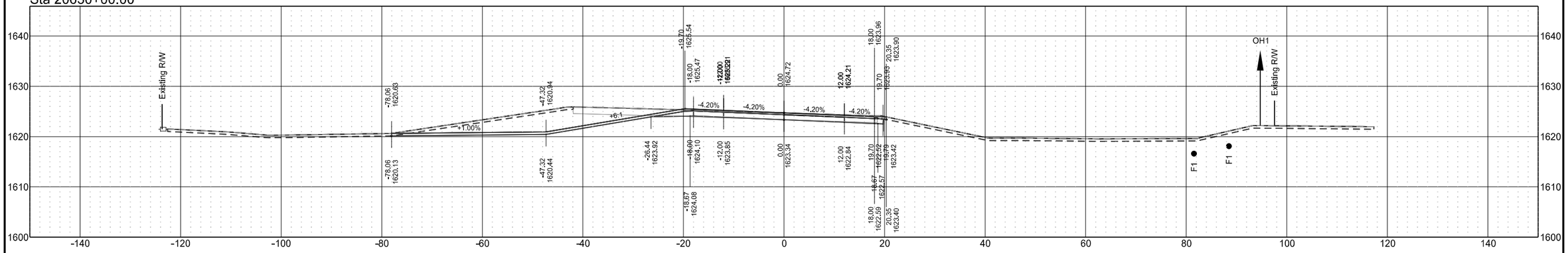
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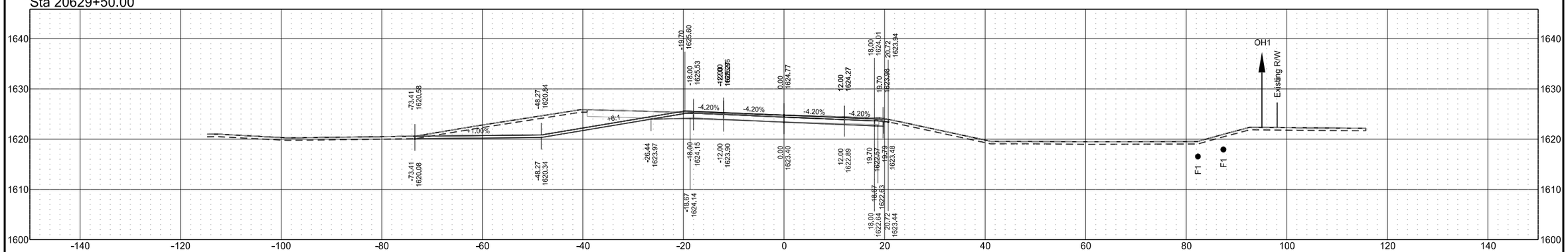
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	32

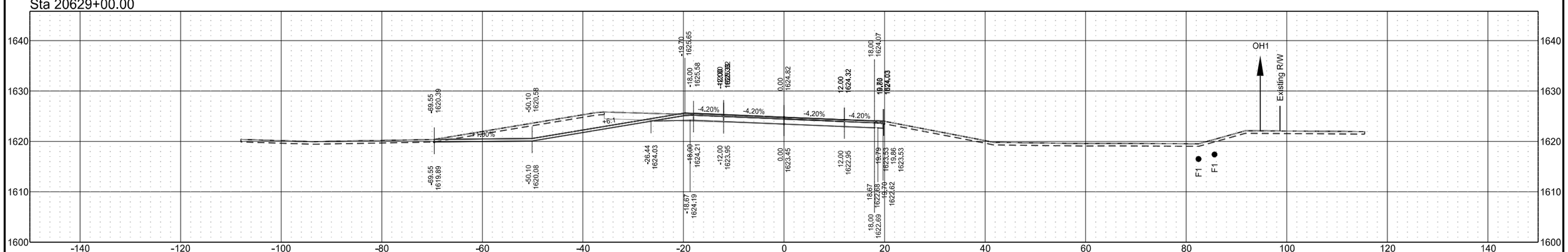
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Sta 20629+50.00



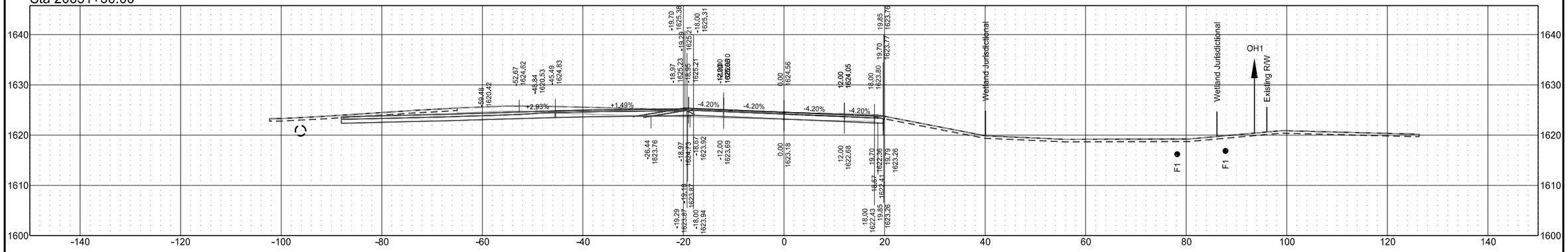
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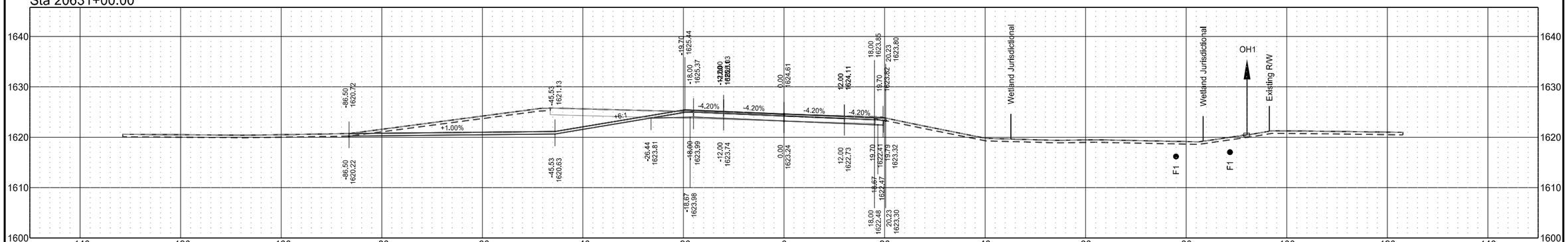
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	33

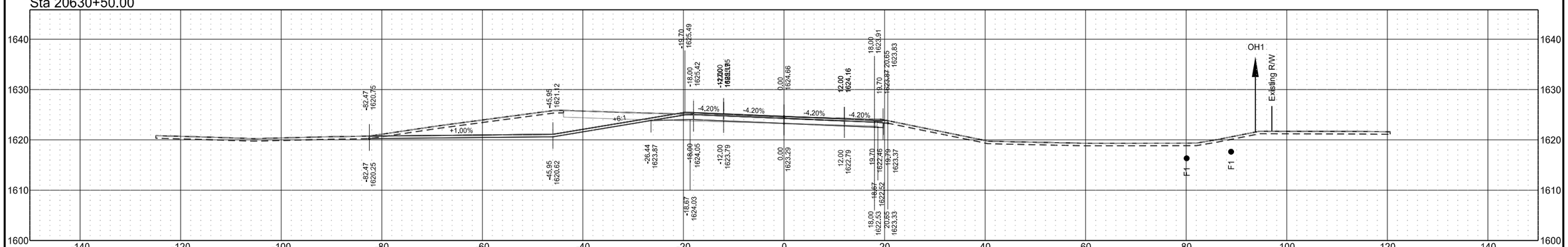
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Sta 20631+00.00



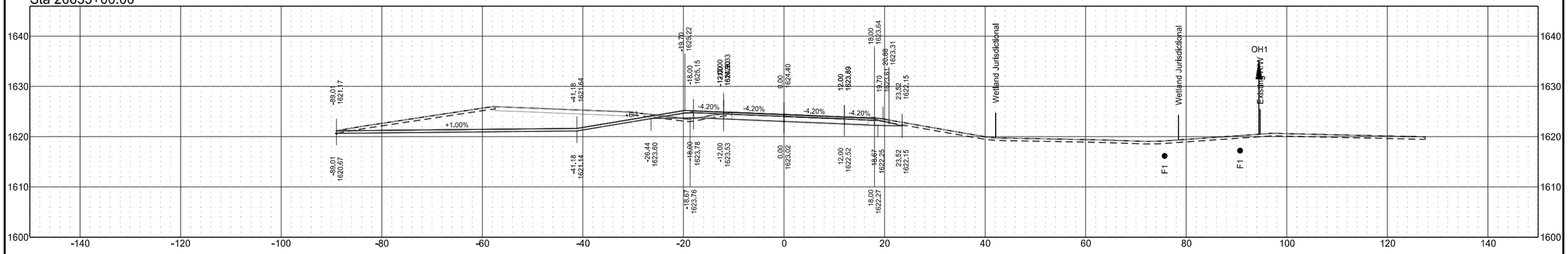
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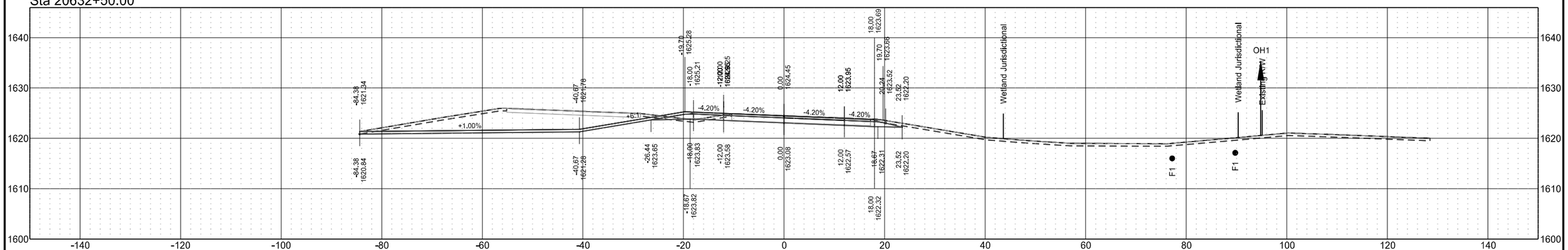
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	34

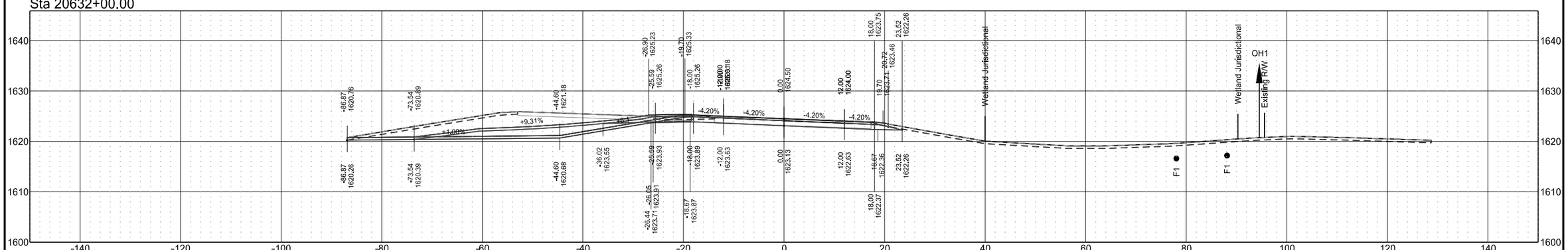
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Sta 20632+50.00



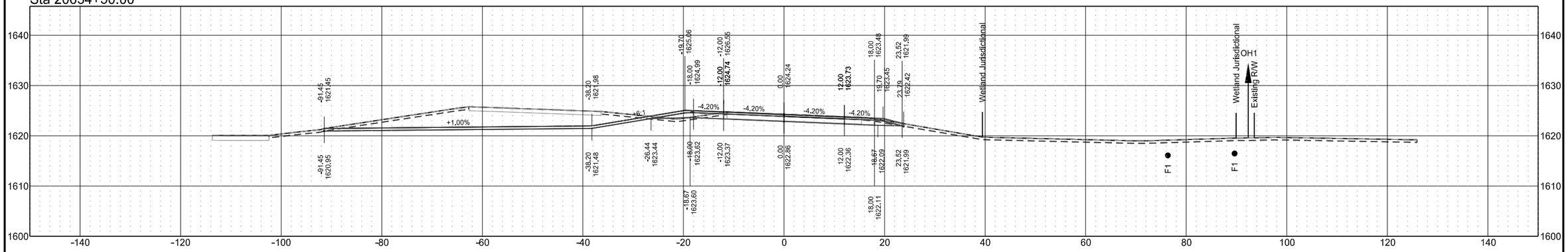
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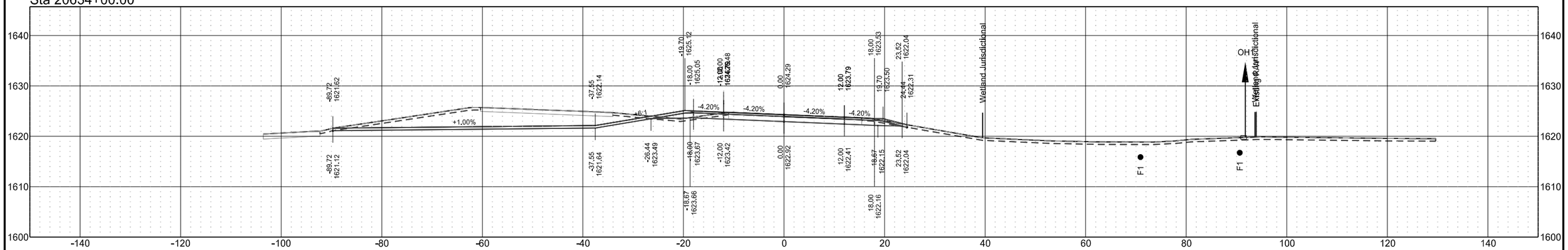
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	35

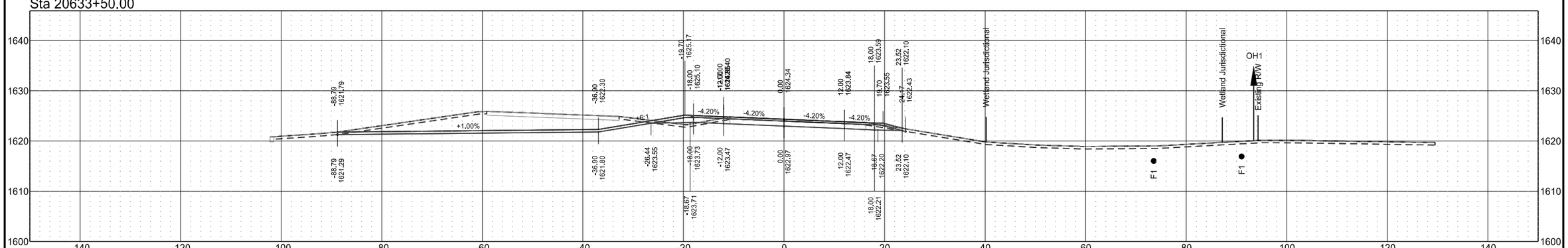
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Sta 20634+00.00



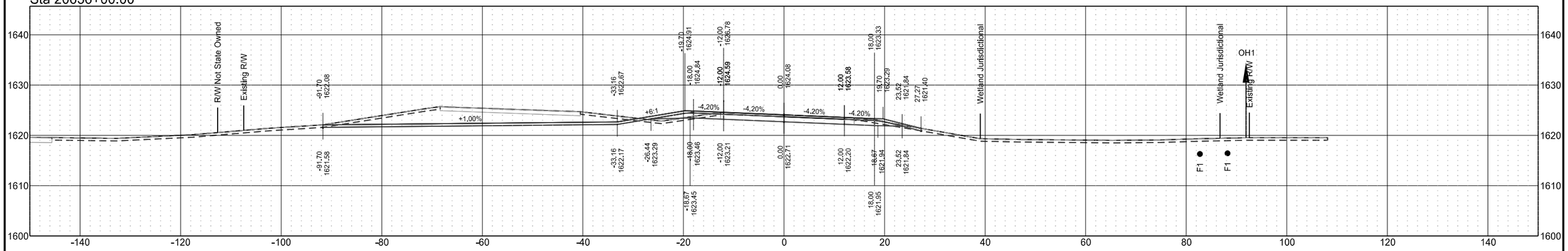
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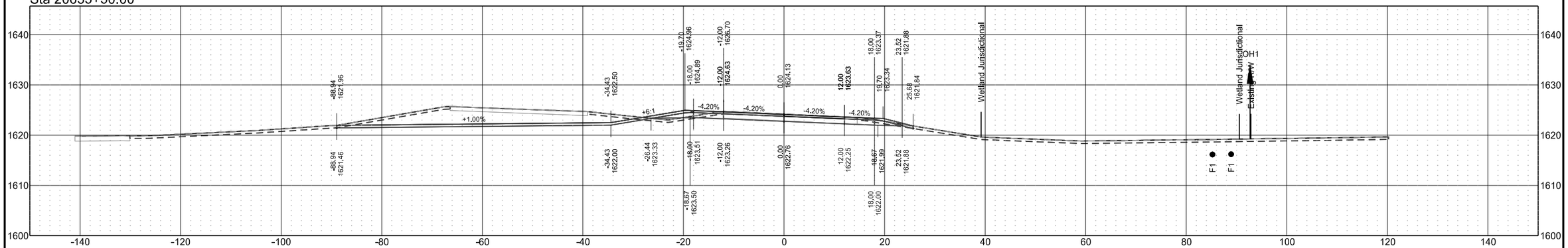
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	36

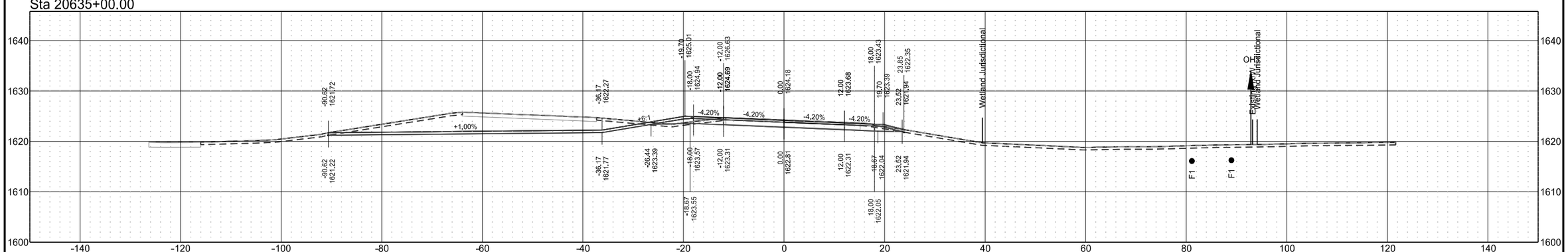
Sta 20636+00.00



Sta 20635+50.00



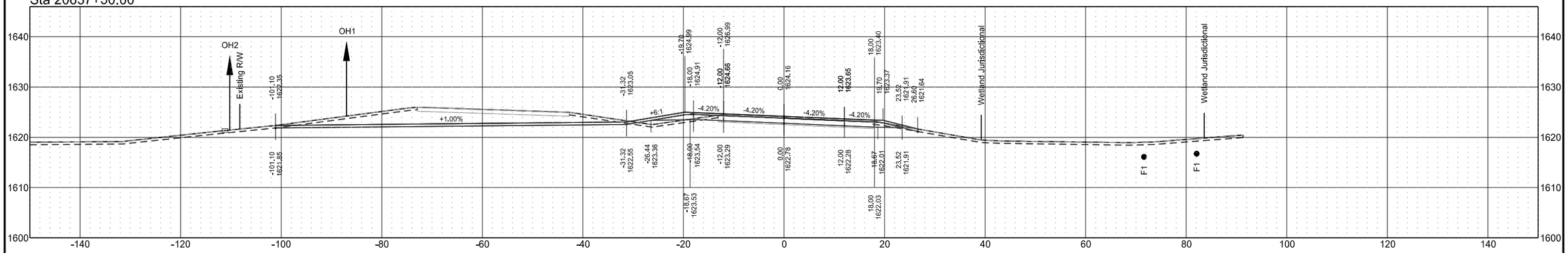
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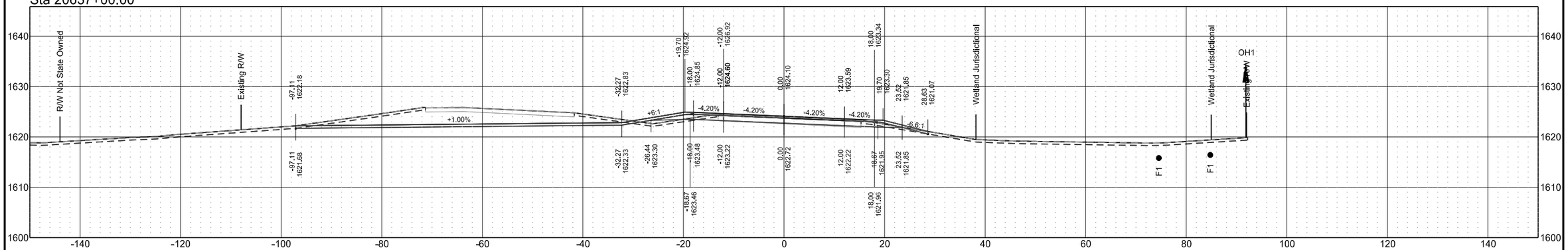
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	37

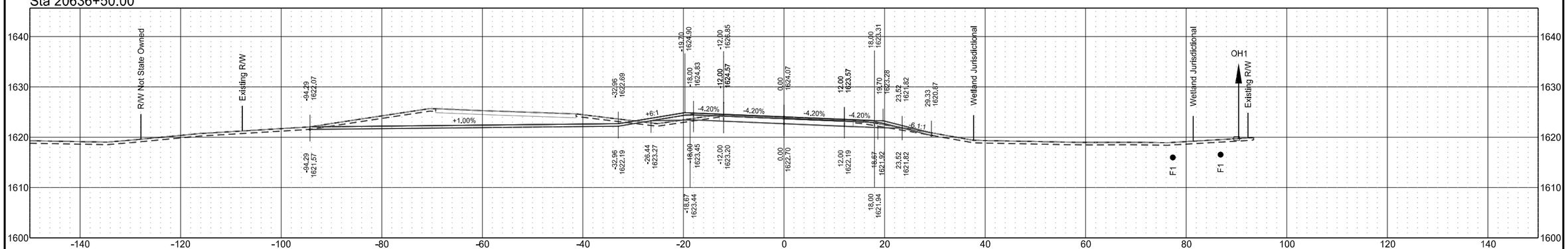
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Sta 20637+00.00



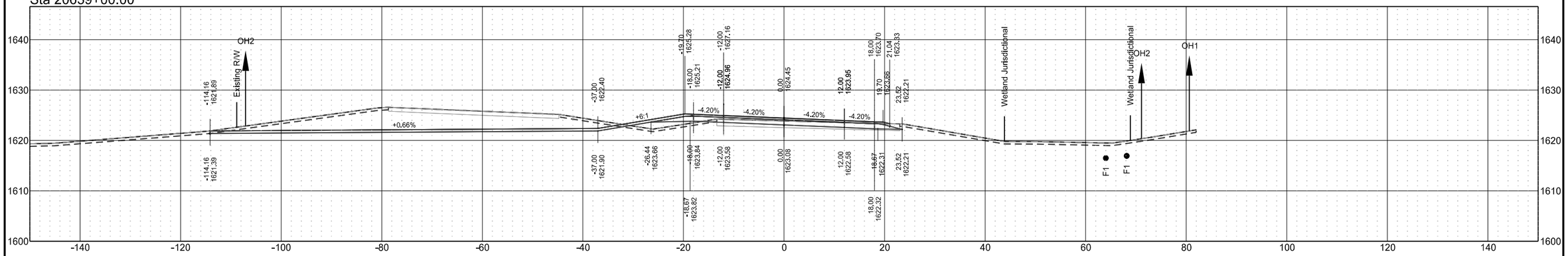
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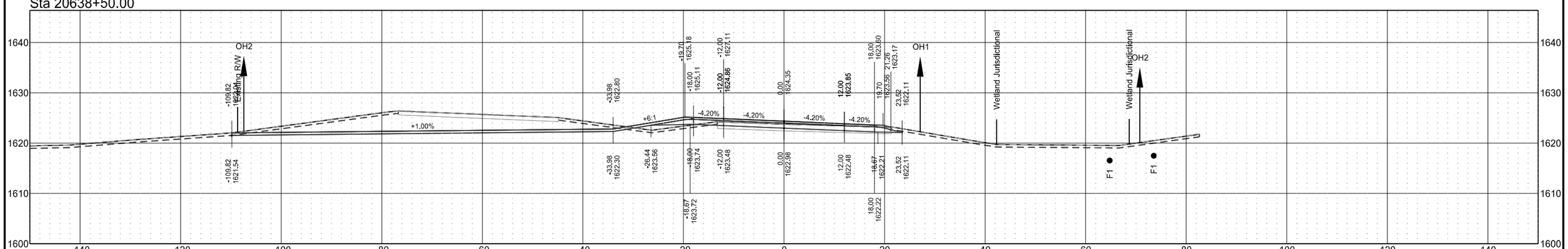
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	38

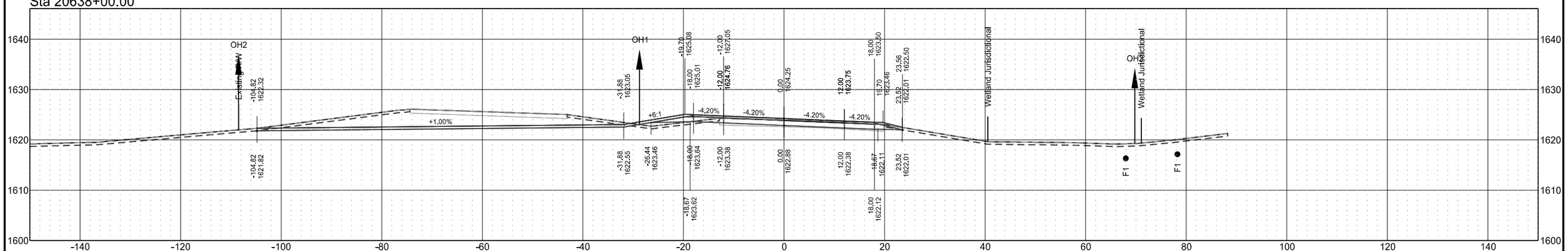
Sta 20639+00.00



Sta 20638+50.00



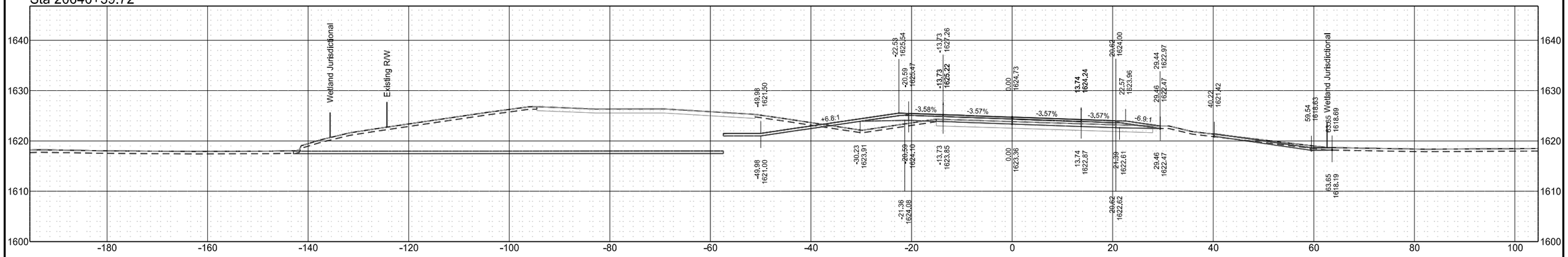
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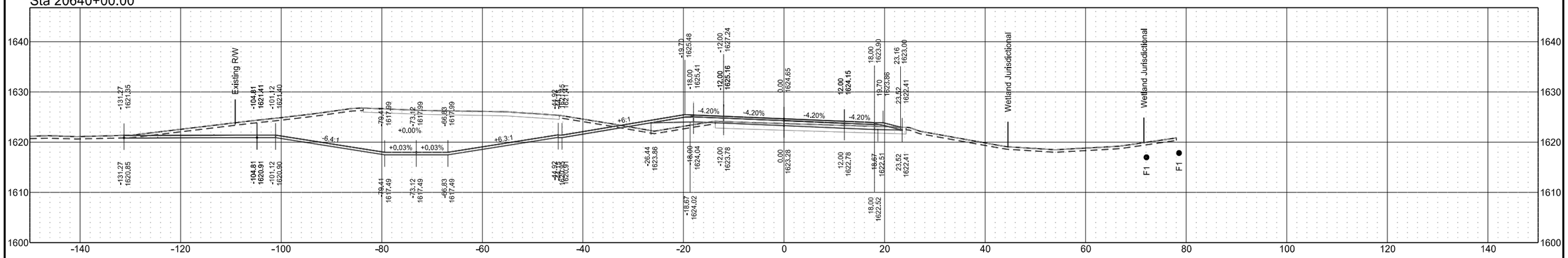
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	39

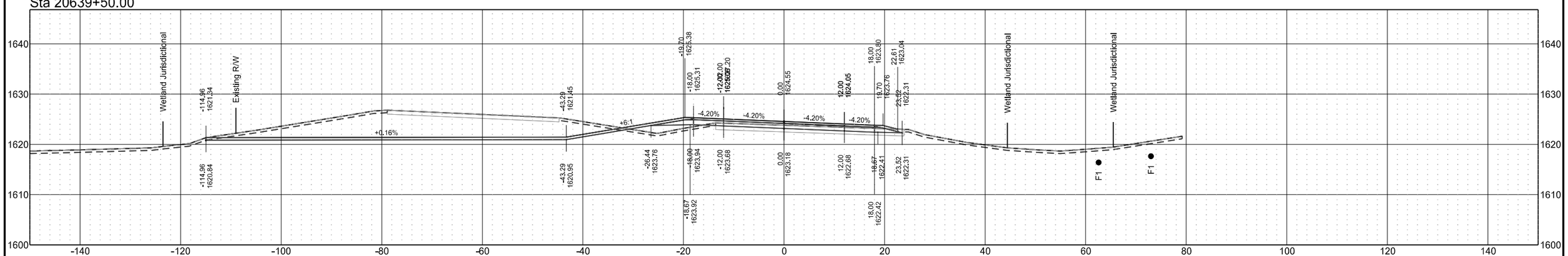
Sta 20640+39.72



Sta 20640+00.00



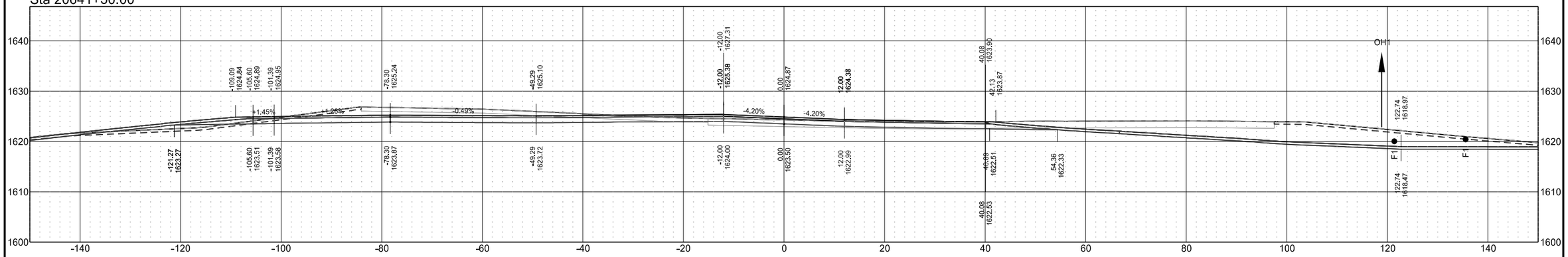
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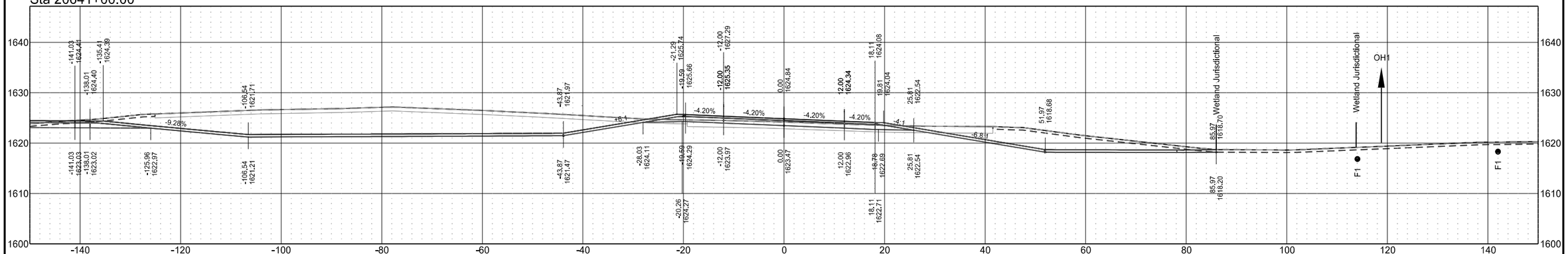
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	40

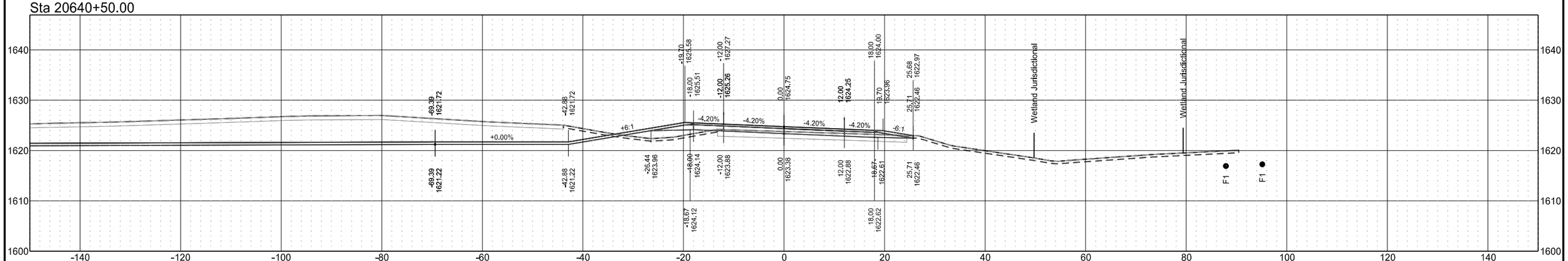
Sta 20641+50.00



Sta 20641+00.00



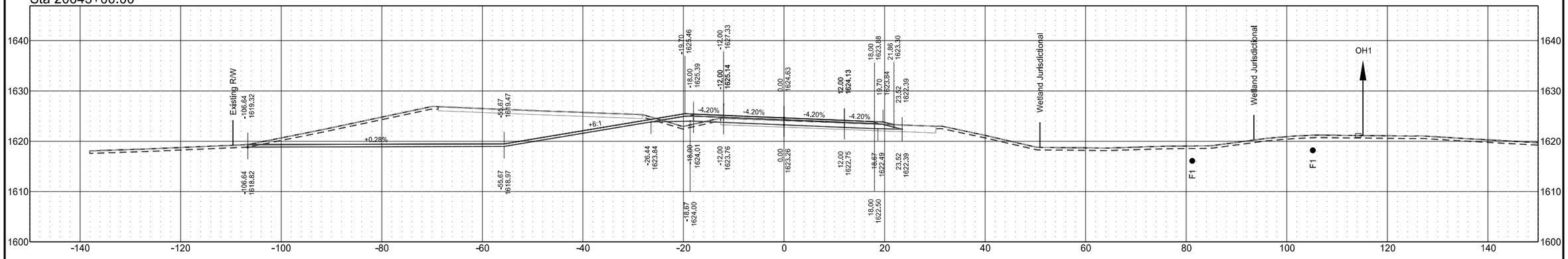
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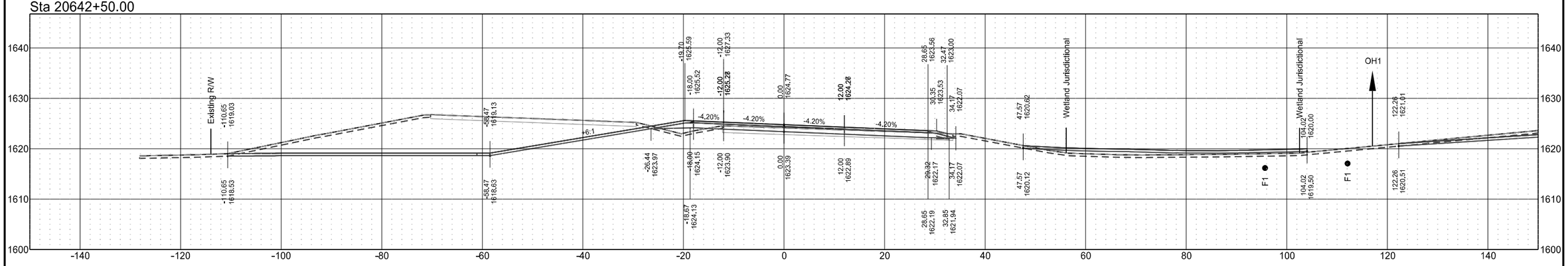
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	41

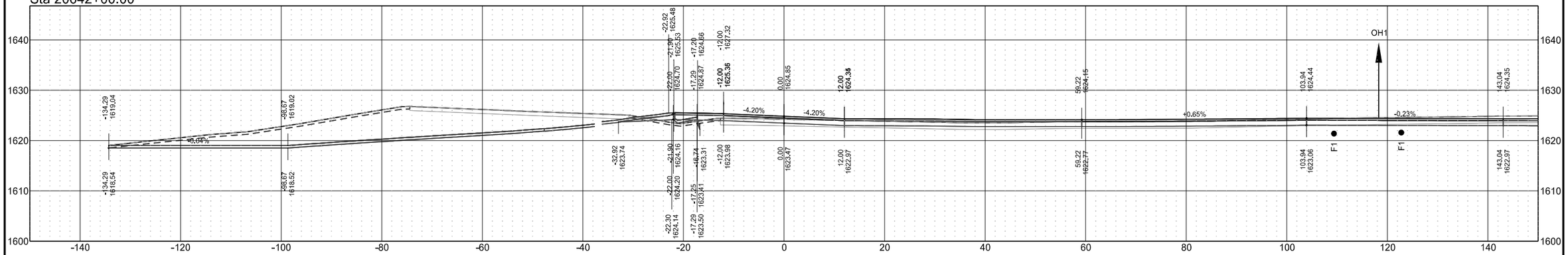
Sta 20643+00.00



Sta 20642+50.00



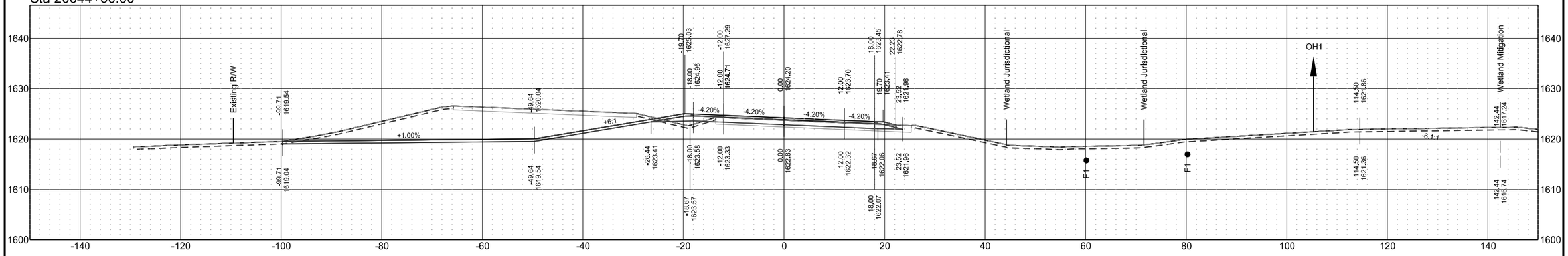
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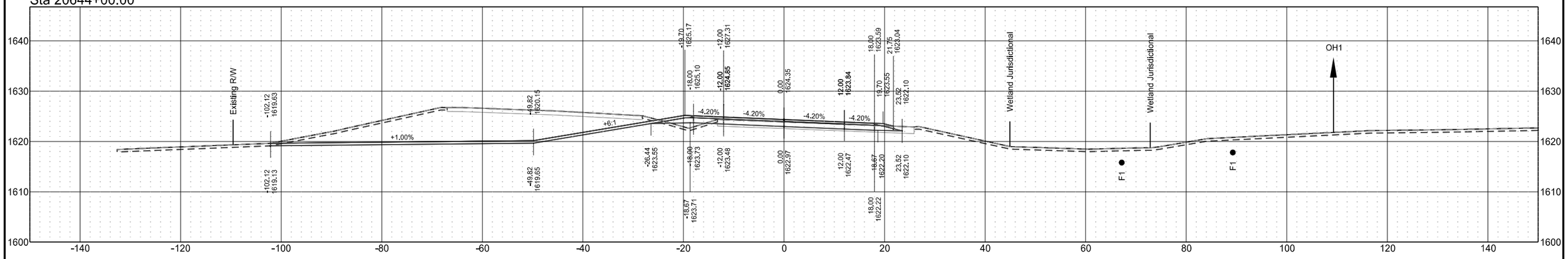
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	42

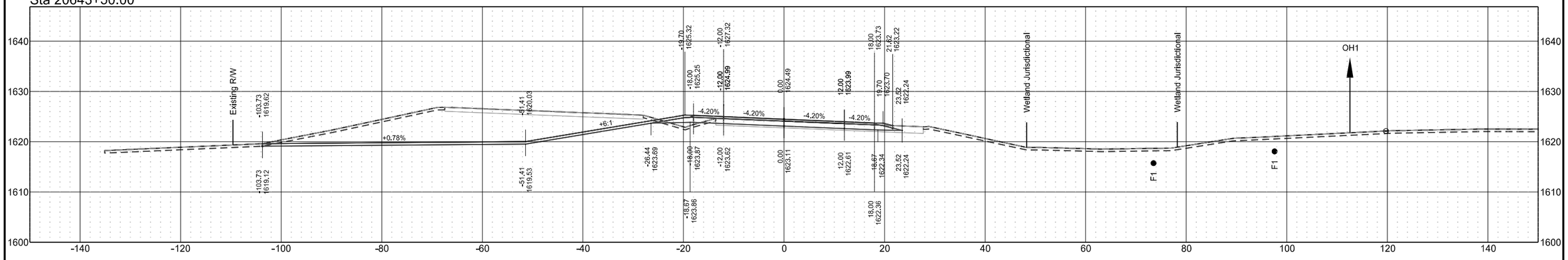
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Sta 20644+00.00



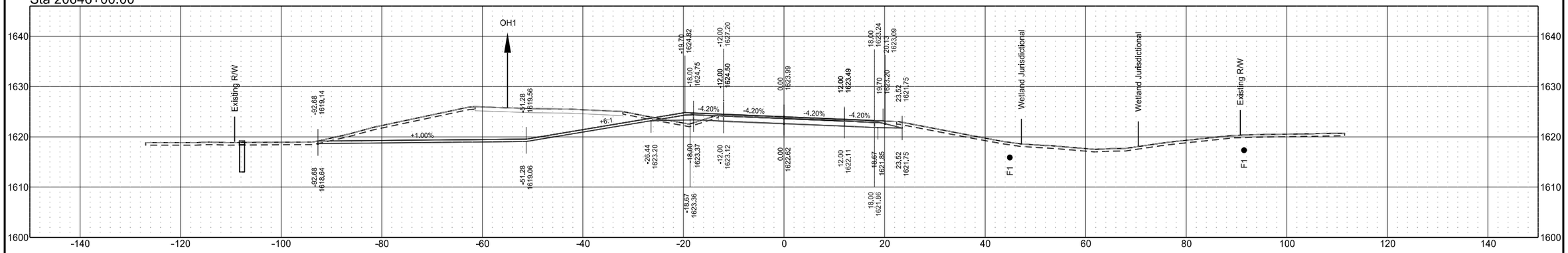
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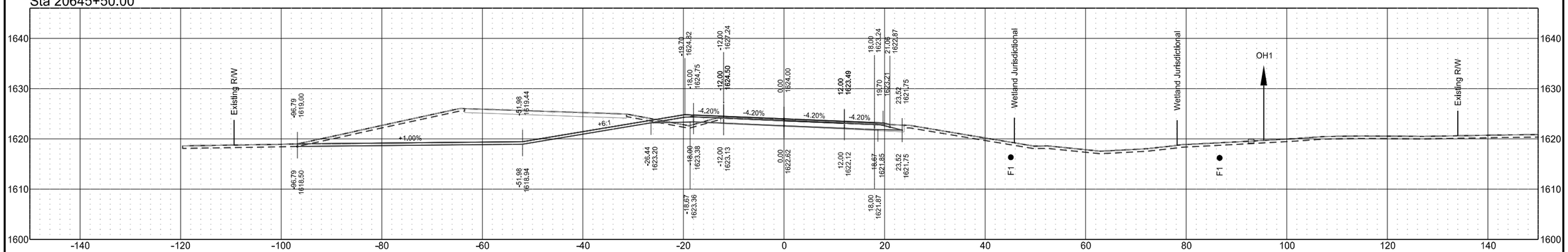
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	43

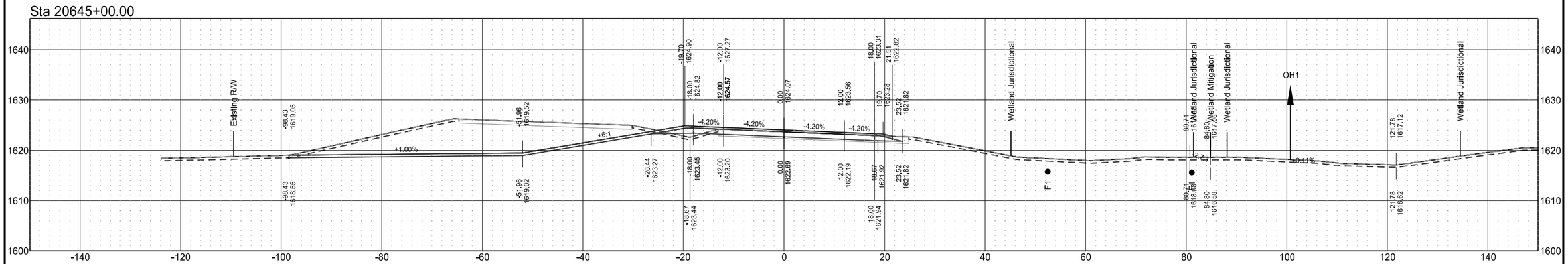
Sta 20646+00.00



Sta 20645+50.00



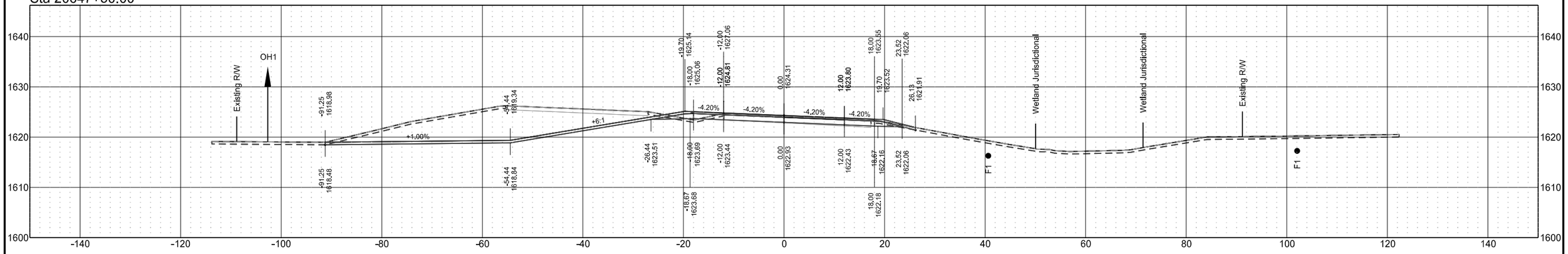
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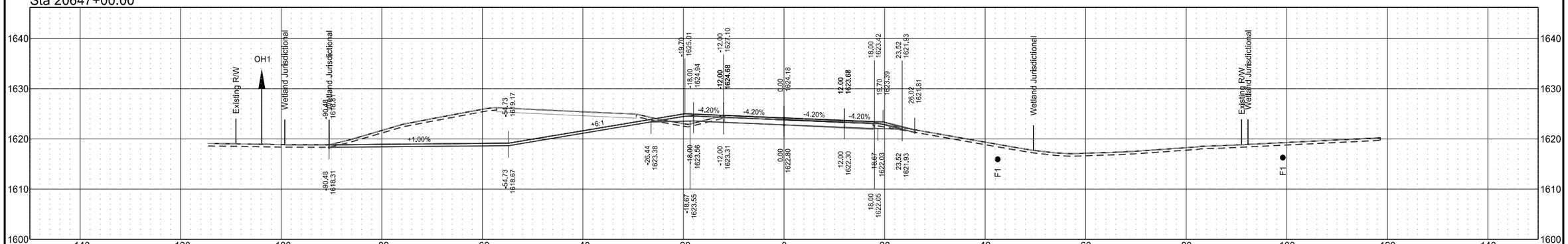
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	44

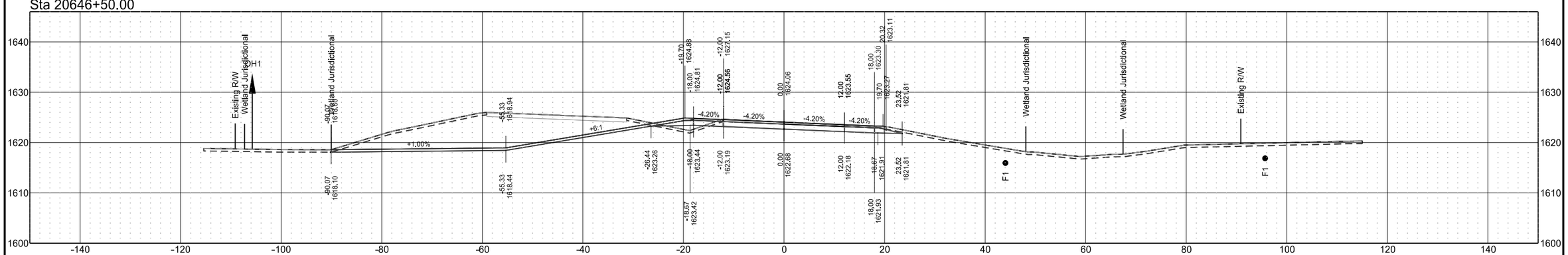
Sta 20647+50.00



Sta 20647+00.00



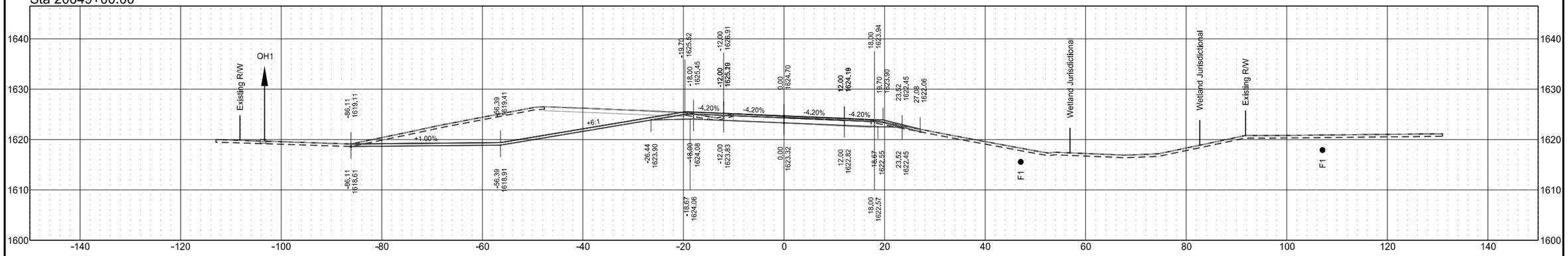
Sta 20646+50.00



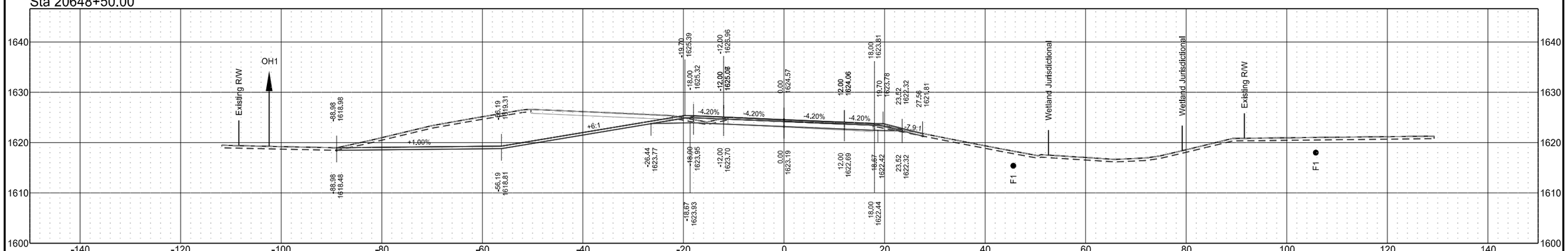
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	45

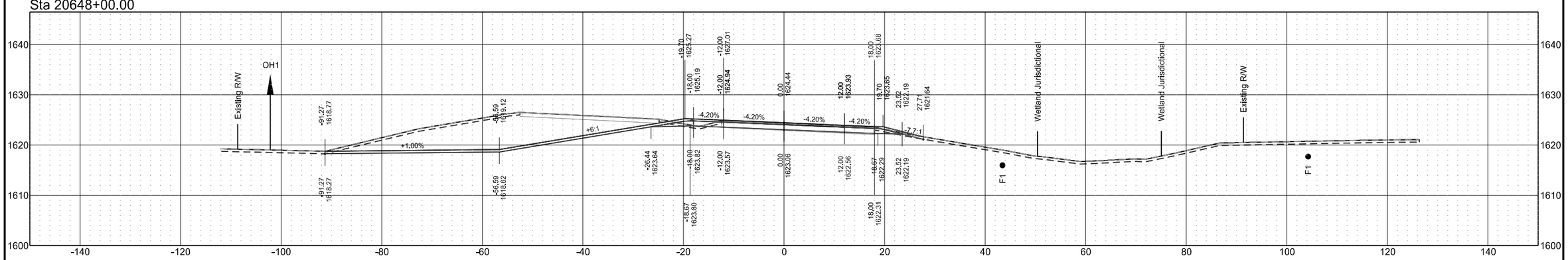
Sta 20649+00.00



Sta 20648+50.00



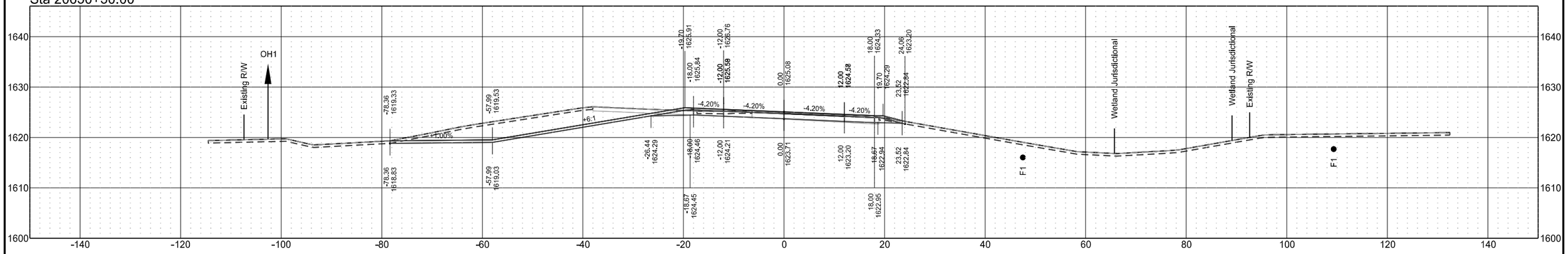
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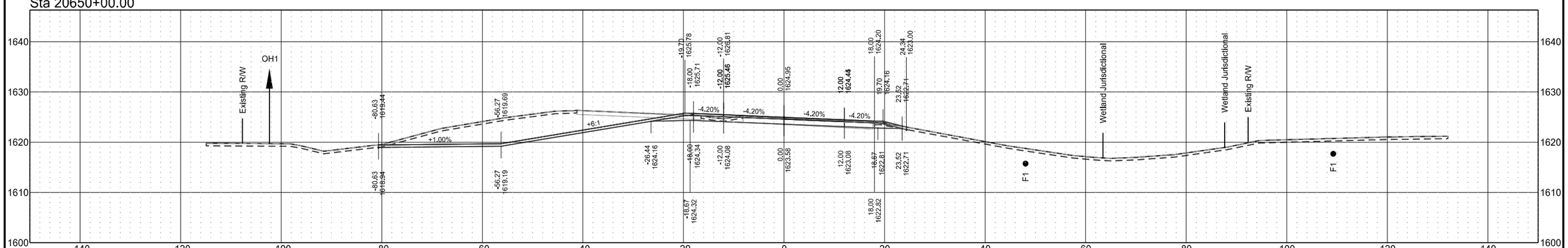
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	46

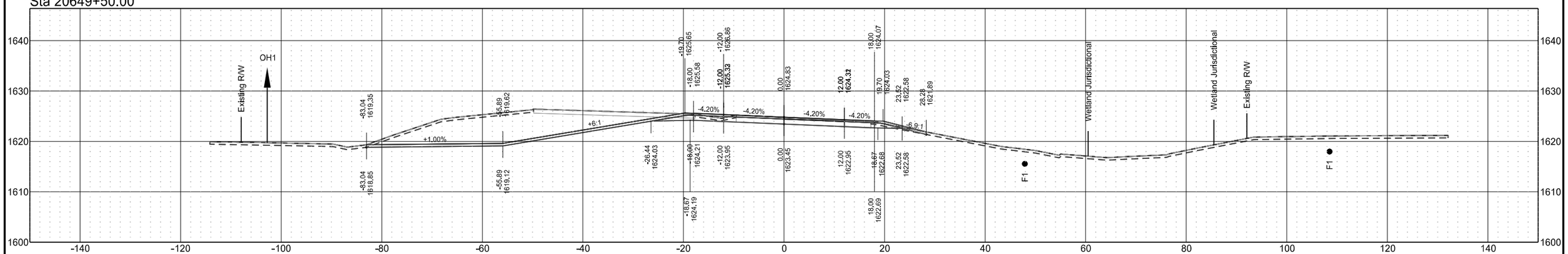
Sta 20650+50.00



Sta 20650+00.00



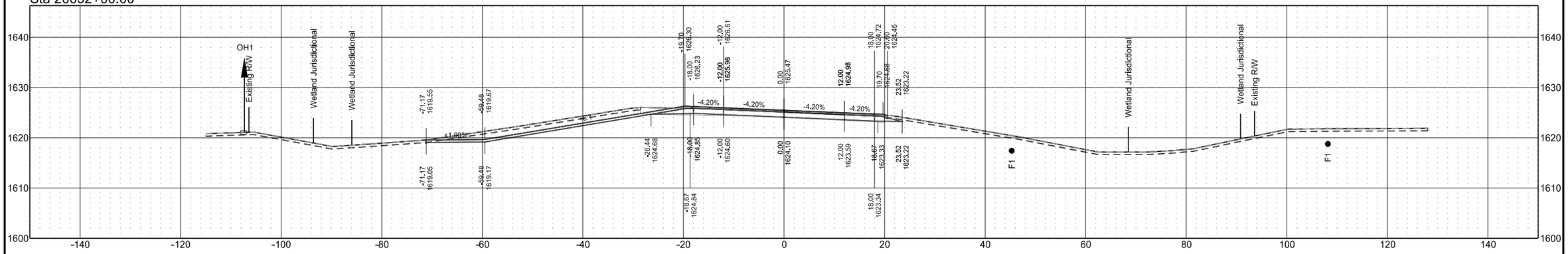
Sta 20649+50.00



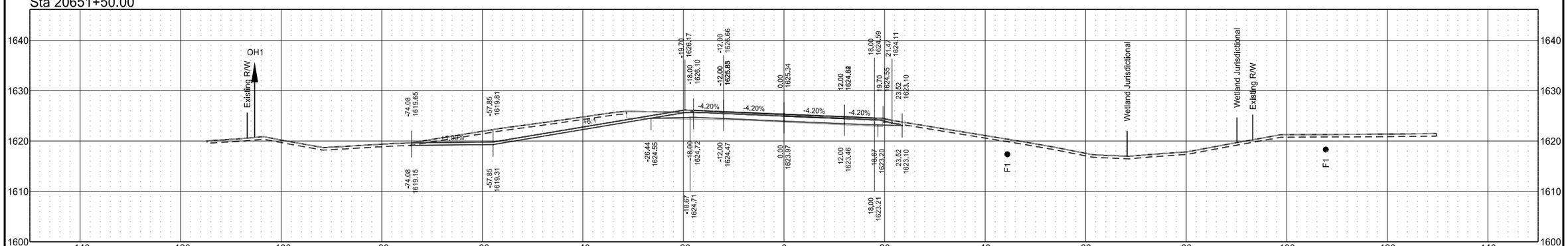
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	47

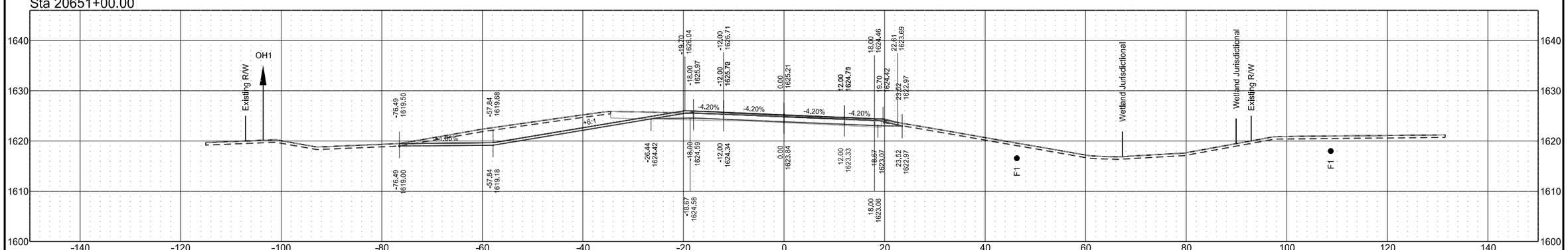
Sta 20652+00.00



Sta 20651+50.00



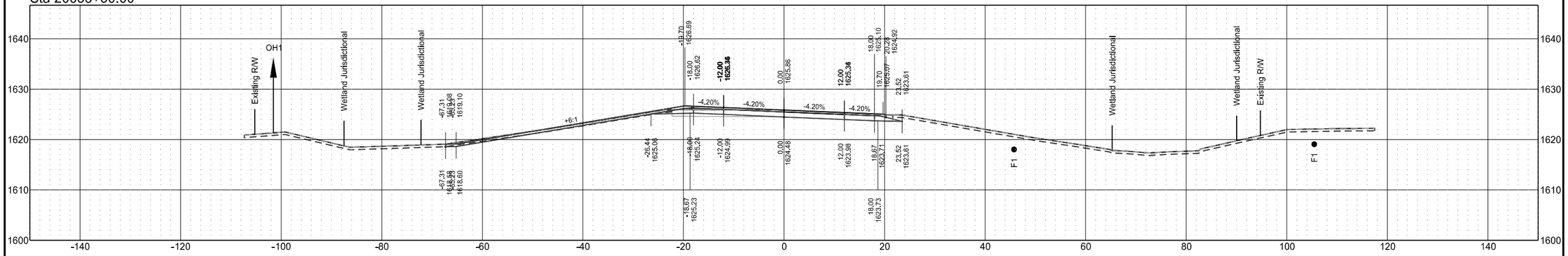
Sta 20651+00.00



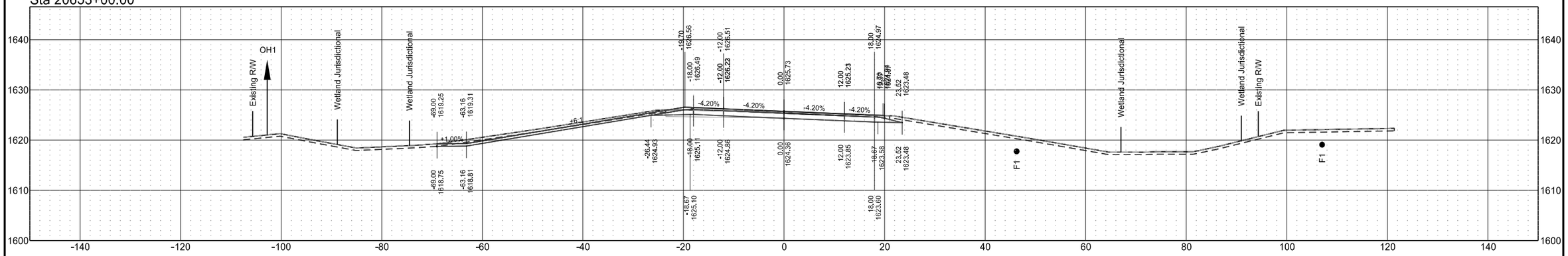
ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	48

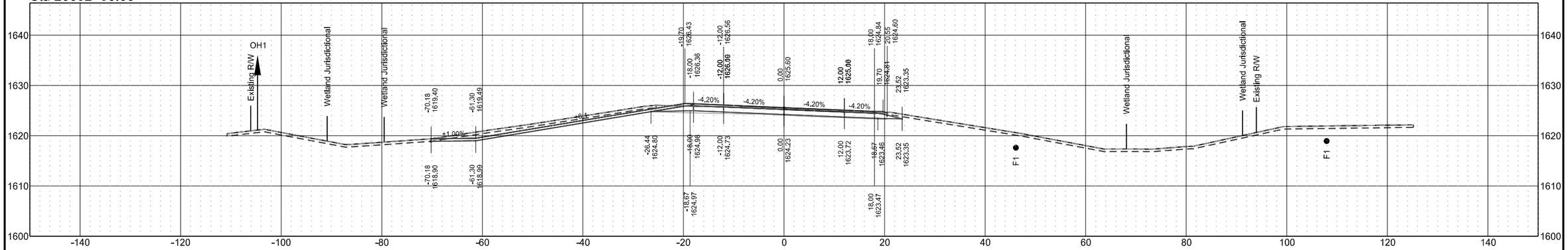
Sta 20653+50.00



Sta 20653+00.00



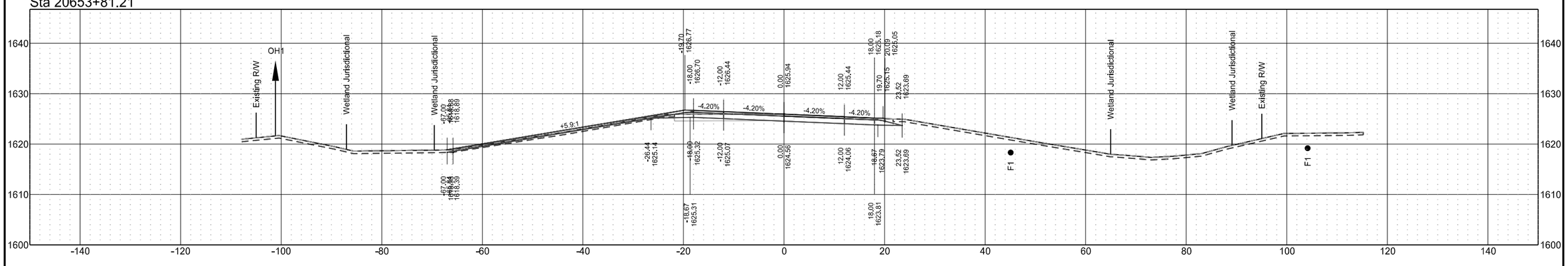
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ND Hwy 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	49

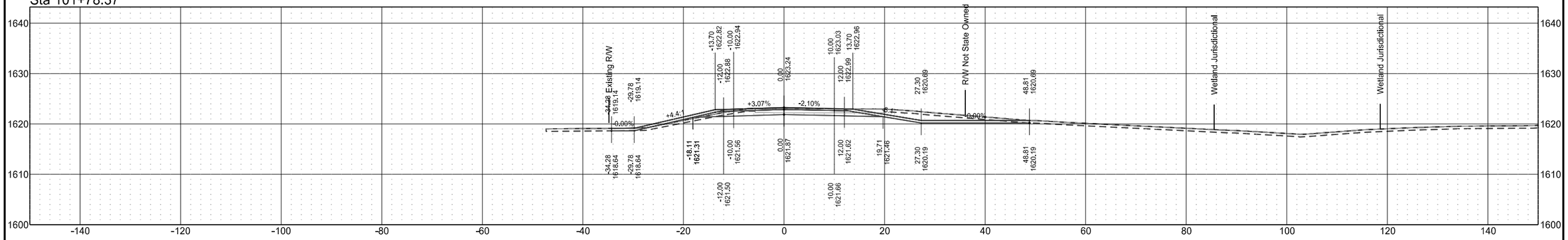
Sta 20653+81.21



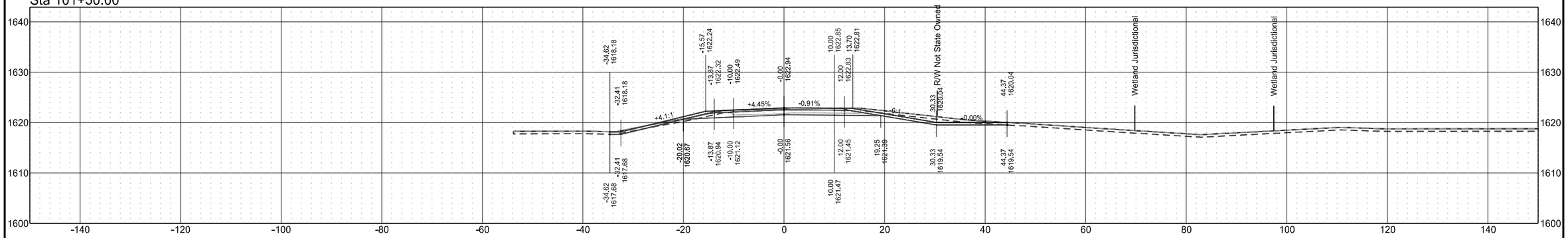
81 ST NE

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	50

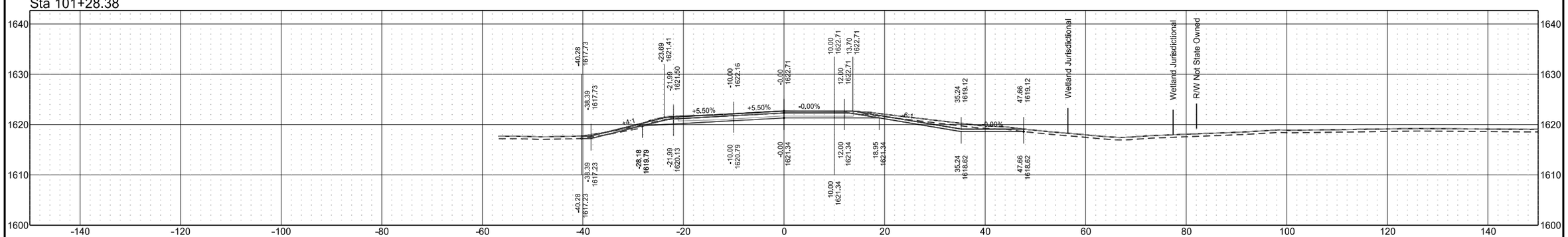
Sta 101+78.37



Sta 101+50.00



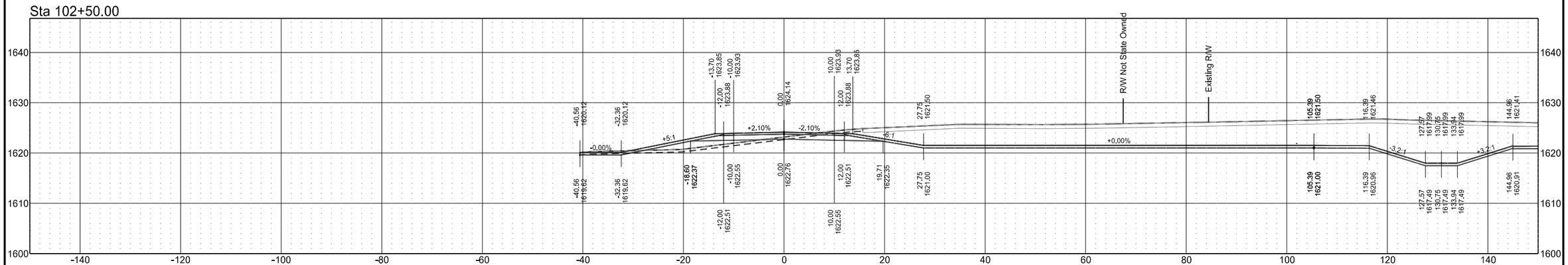
Sta 101+28.38



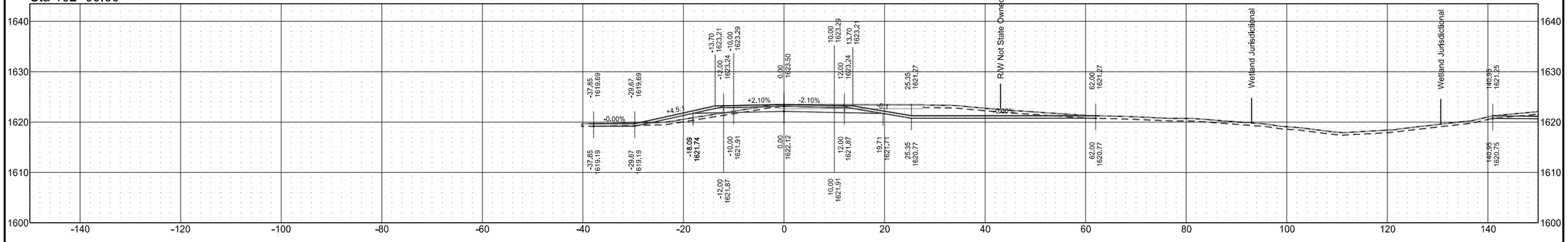
81 ST NE

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	51

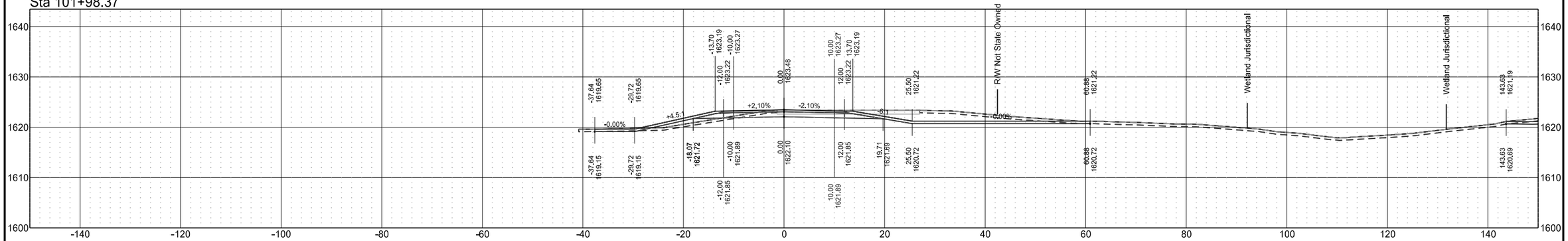
Sta 102+50.00



Sta 102+00.00



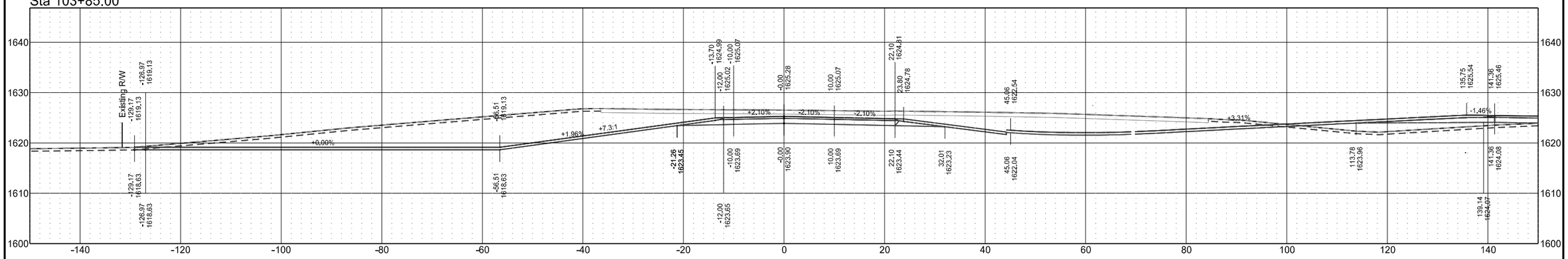
Sta 101+98.37



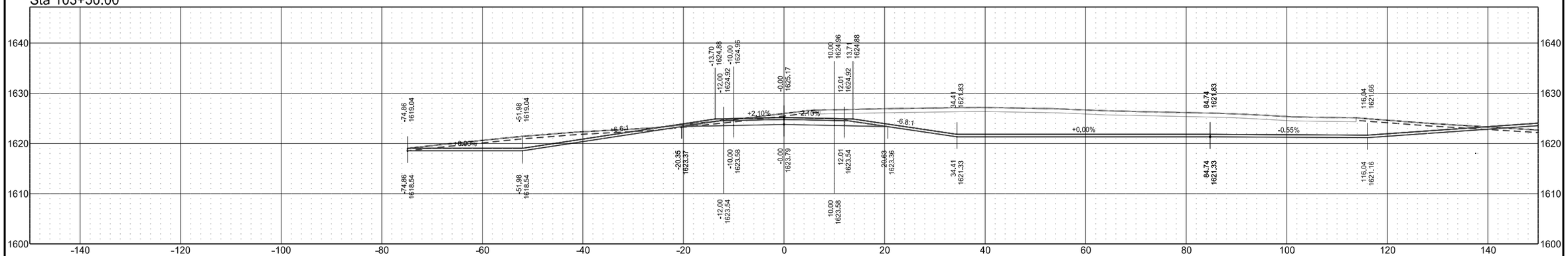
81 ST NE

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	52

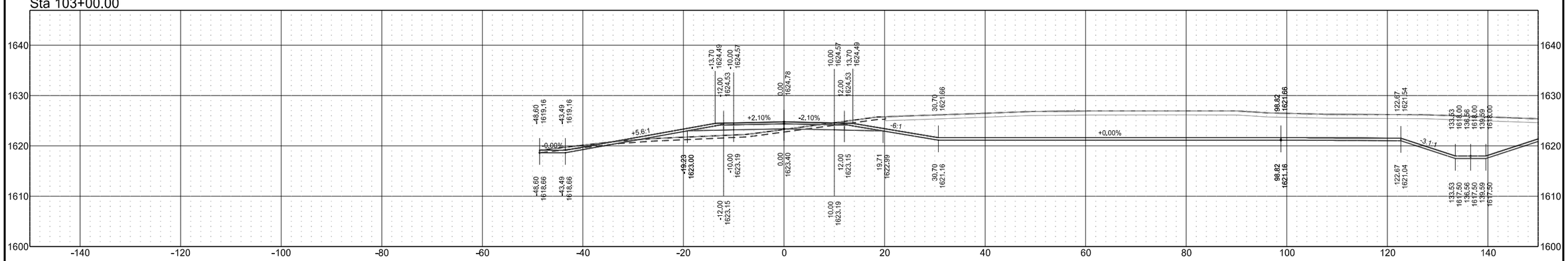
Sta 103+85.00



Sta 103+50.00



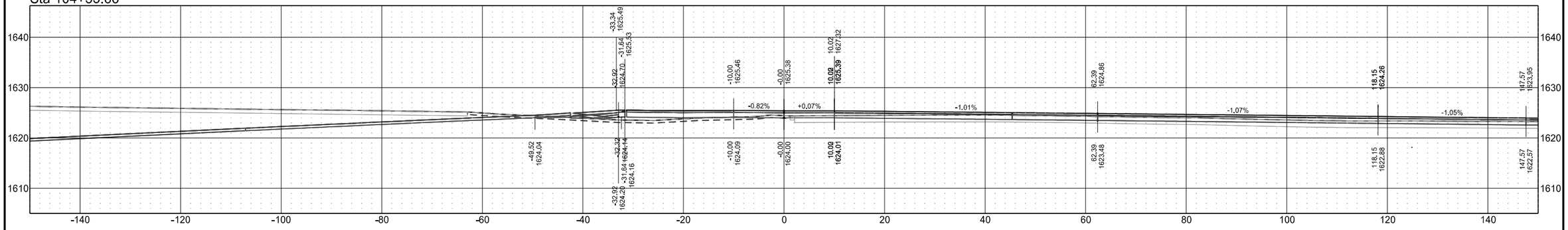
Sta 103+00.00



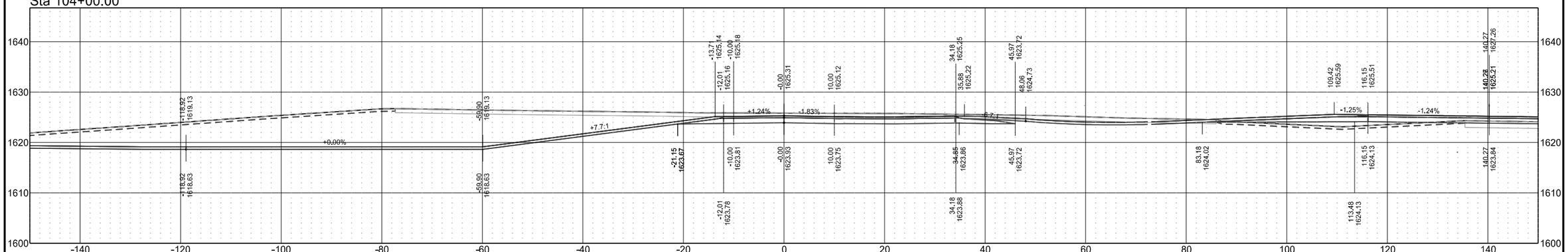
81 ST NE

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	53

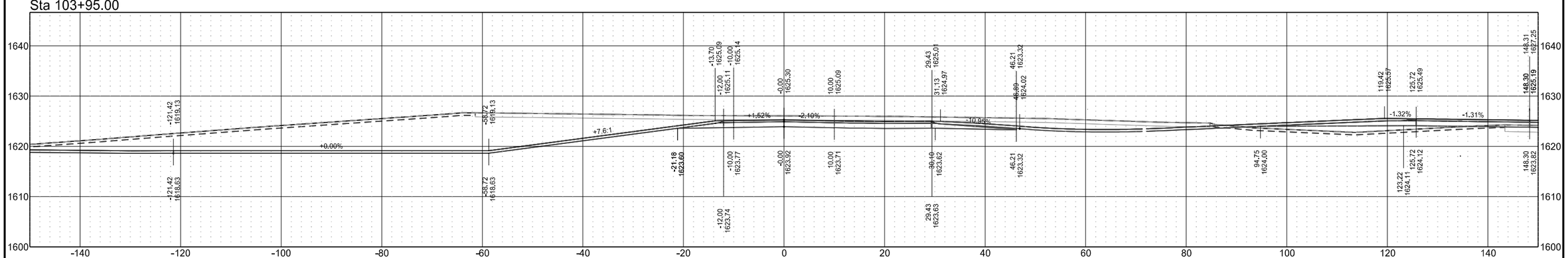
Sta 104+35.66



Sta 104+00.00



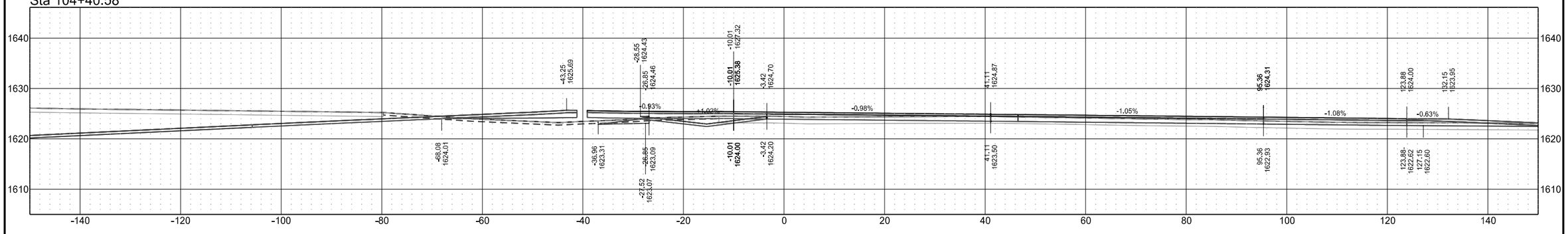
Sta 103+95.00



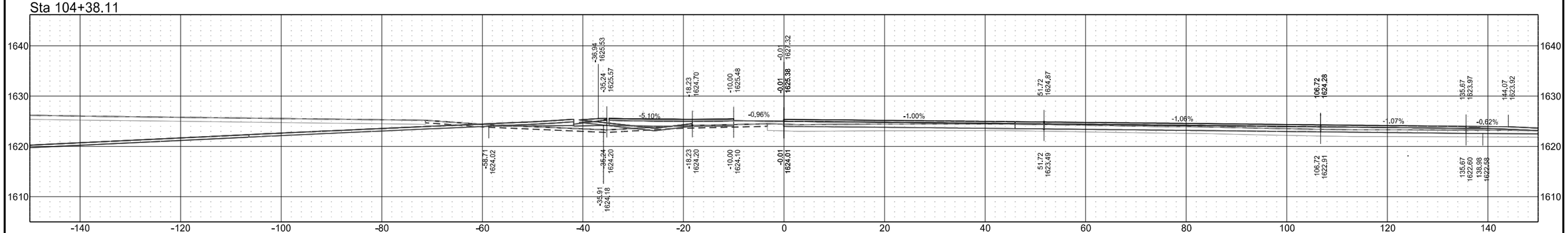
81 ST NE

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	54

Sta 104+40.58



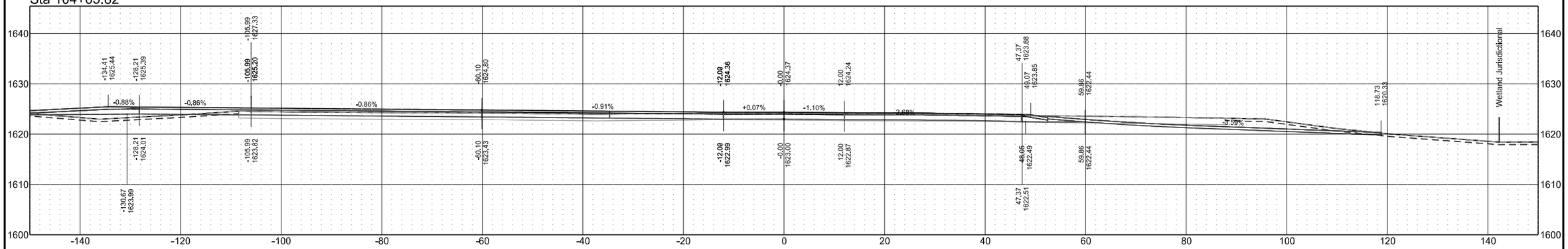
Sta 104+38.11



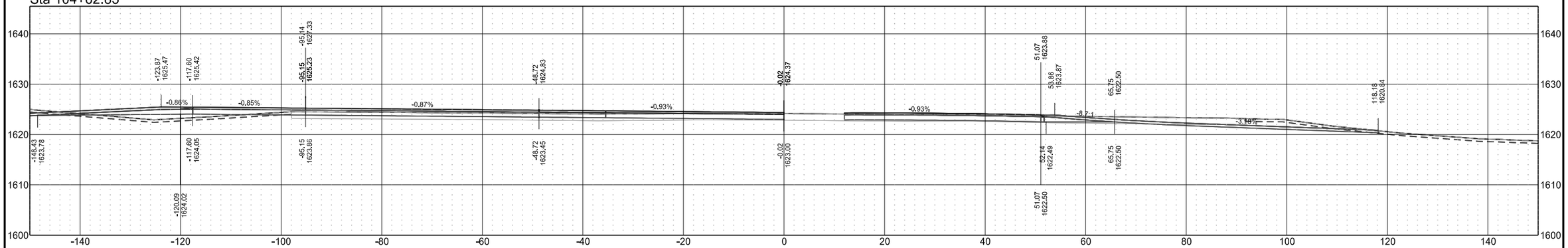
CO Rd 26

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	55

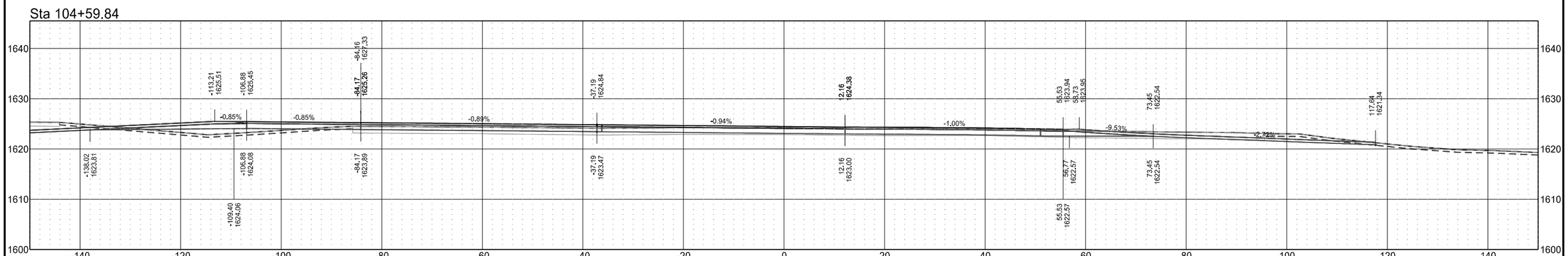
Sta 104+65.82



Sta 104+62.83



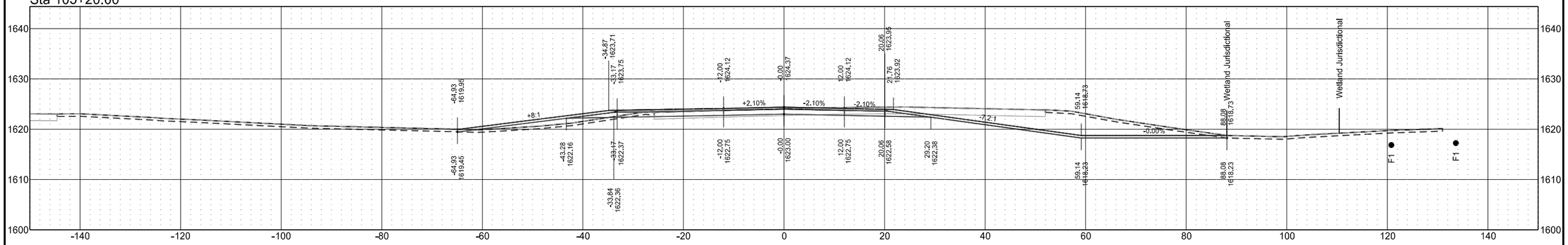
Sta 104+59.84



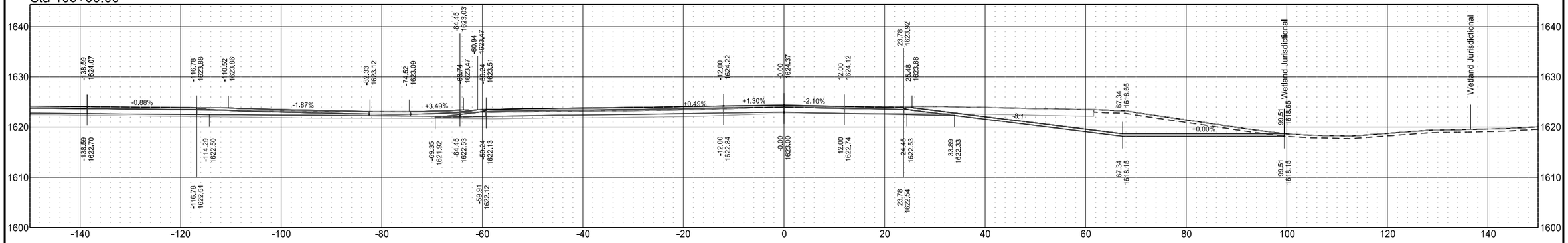
CO Rd 26

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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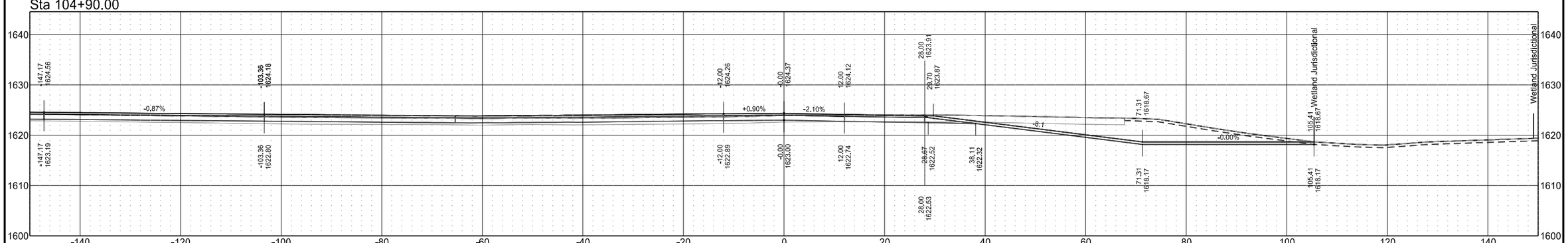
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Sta 105+00.00



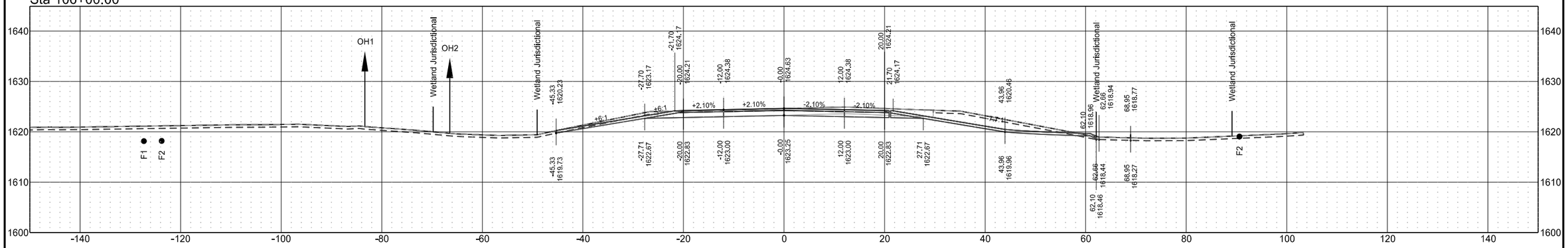
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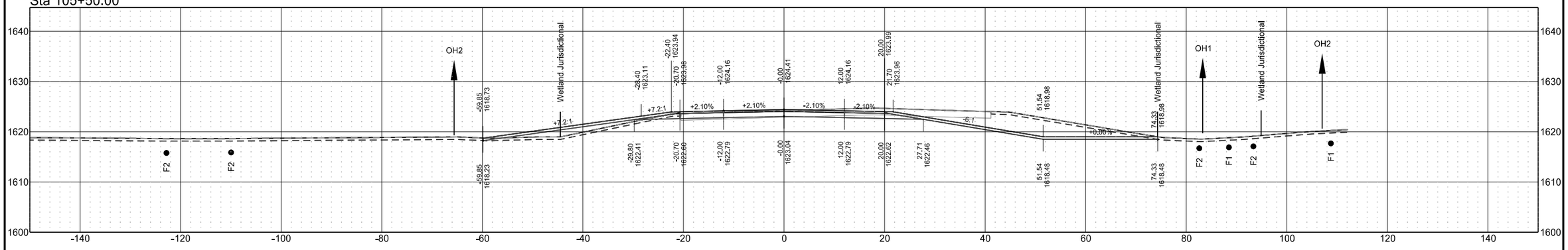
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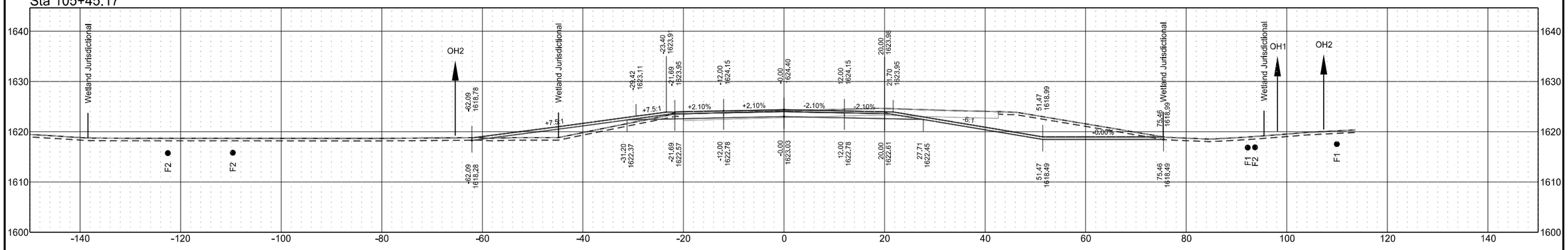
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Sta 105+50.00



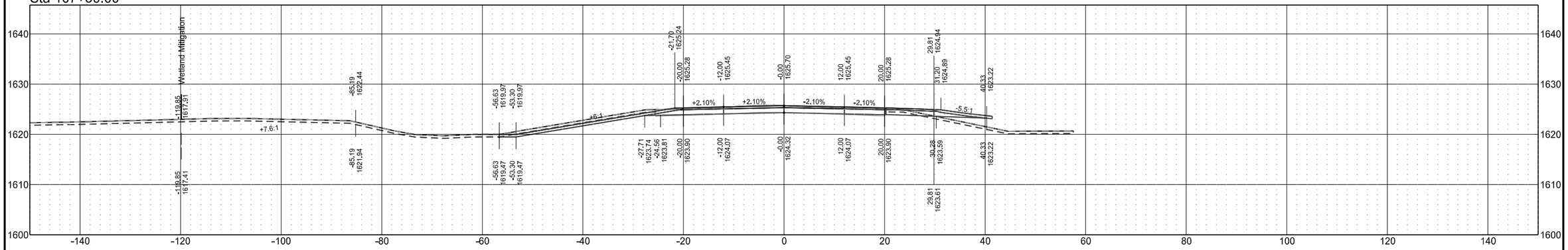
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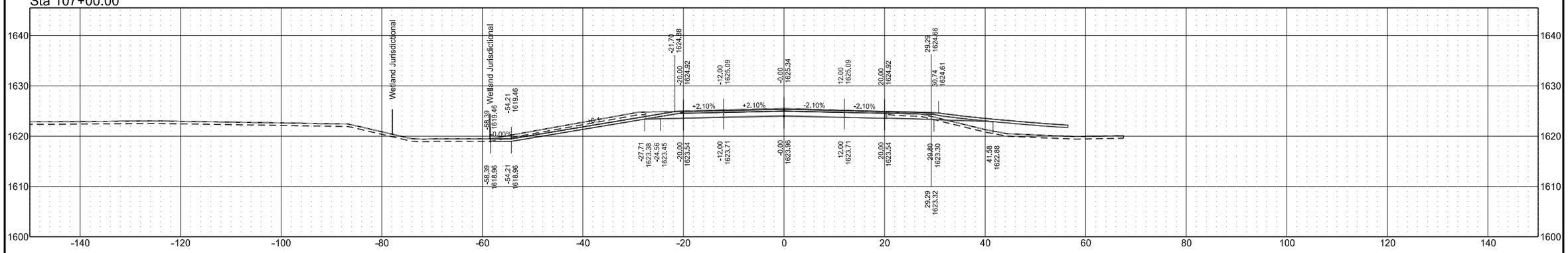
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	ND	NH-3-001(033)200	200	58

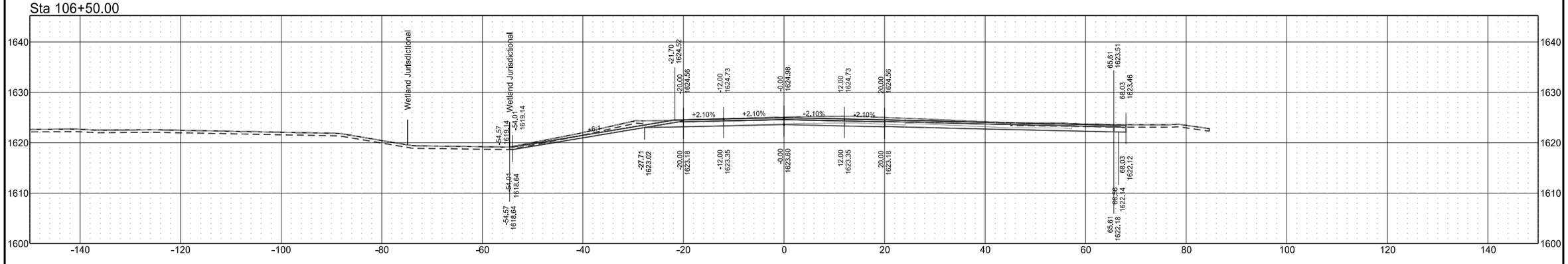
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Sta 107+00.00



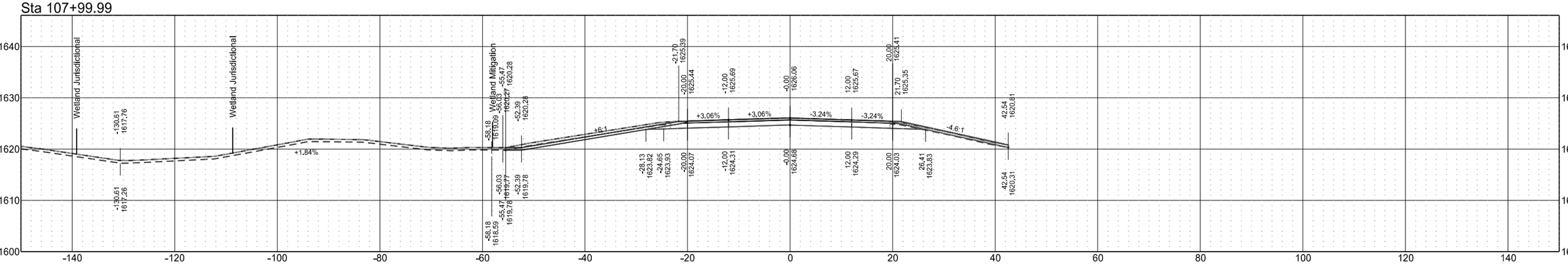
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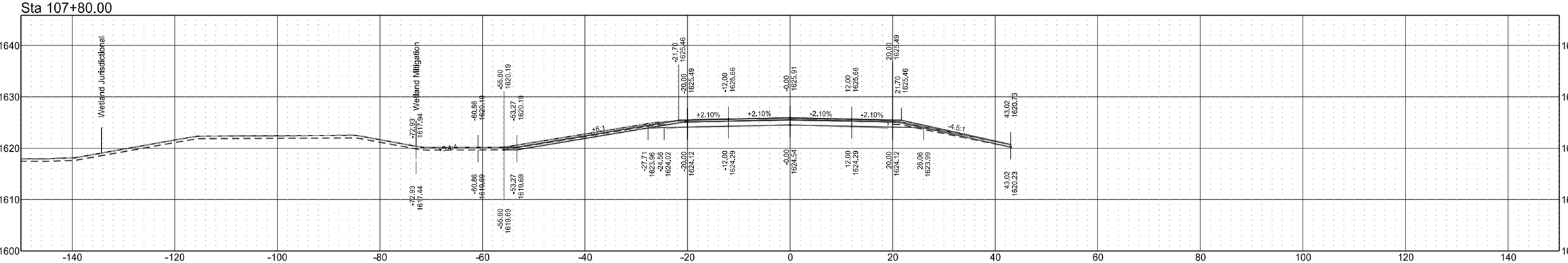
CO Rd 26

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-001(033)200	200	59

Sta 107+99.99



Sta 107+80.00



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NDDOT ABBREVIATIONS

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
04-23-18	General Revisions
09-20-18	General Revisions
12-18-20	General Revisions
08-16-22	General Revisions
04-14-25	General Revisions

KIRK J. HOFF
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PROFESSIONAL
PE-4683
04/14/25
ENGINEER
NORTH DAKOTA

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NDDOT ABBREVIATIONS

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

07-01-14

REVISIONS

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NDDOT ABBREVIATIONS

D-101-3

Salv	salvage(d)
San	sanitary sewer line
Sec	section
SL	section line
Sep	separation
Seq	sequence
Serv	service
Sht	sheet
Shtng	sheeting
Shldr	shoulder
Sw or Sdwk	sidewalk
SD	sight distance
SN	sign number
Sig	signal
Sgl	single
SRCP	slotted reinforced concrete pipe
SC	slow curing
SS	slow setting
Sm	small
S	South
SE	Southeast
SW	Southwest
SB	Southbound
Sp	spaces
Spcl	special
SA	special assembly
SP	special provisions
G	specific gravity
Spk	spike
SB	split barrel sample
SH	sprinkler head
SV	sprinkler valve
Sq	square
Stk	stake
Std	standard
N	standard penetration test
Std Specs	standard specifications
Stm L	steam line
SEC	steel encased concrete
SMA	stone matrix asphalt
SSD	stopping sight distance
SD	storm drain
St	street
SPP	structural plate pipe
SPPA	structural plate pipe arch
Str	structure
Subd	subdivision
Sub	subgrade
Sub Prep	subgrade preperation
Ss	subsoil
SS	supplement specification
Supp	supplemental
Surf	surfacing
Surv	survey
Sym	symmetrical

Tel	telephone
Tel B	Telephone Booth
Tel P	telephone pole
Tv	television
Temp	temperature
Temp	temporary
TBM	temporary bench mark
T	thinwall tube sample
Ts	topsoil
Traf	traffic
TSCB	traffic signal control box
Tr	trail
Transf	transformer
Trans	transition
TT	transmission tower
TES	traversable end section
Trans	transverse
Trtd	treated
Trmt	treatment
Qc	triaxial compression
TERO	tribal employment rights ordinance
Tpl	triple
Typ	typical
Qu	unconfined compressive strength
Ugrnd	underground
Util	utility
VG	valley gutter
Vap	vapor
Vert	vertical
VCP	vitrified clay pipe
Vol	volume
VSFS	vehicle speed feedback sign
Wkwy	walkway
W	water content
WGV	water gate valve
WL	water line
WM	water main
WMV	water main valve
W Mtr	water meter
WSV	water service valve
WW	water well
Wrng	wearing
WIM	weigh in motion
W	west
WB	westbound
Wrng	wiring
W/	with
W/o	without

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
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NDDOT ABBREVIATIONS

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

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12-18-20	Sheet Added - Continued from D-101-3
4-14-25	General Revisions

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NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

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

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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 12-18-20	Added and Revised Items, Organized by Functional Groups General Revisions

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LINE STYLES

D-101-21

Right Of Way

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

Boundary Control

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

Cross Sections and Typicals

- Existing Ground
- Existing Topsoil (Cross Section View)
- Existing Ground Void (Not Surveyed) (void — void — void — v)
- 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 (D — D)
- Geogrid (Geo — Geo)
- Geotextile Fabric Type R (R — R)
- Geotextile Fabric Type R1 (R — R)
- Geotextile Fabric Type RR (RR — RR)
- Geotextile Fabric Type S (S — S)
- Subgrade Reinforcement
- Failure Line

Countours

- Depression Contours
- Supplemental Contour

Profile

- Subgrade, Subcut or Ditch Grade
- Topsoil Profile

Striping

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

Pavement Joints

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

Bridge Details

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

Erosion Control

- Limits of Const Transition Line
- Bale Check
- Rock Check
- Floating Silt Curtain (S — S)
- Silt Fence (SF — SF)
- Excavation Limits
- Fiber Rolls

Environmental

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

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

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SYMBOLS

D-101-30

North Arrow (Half Scale)

Alignment Data Point

Alignment Monument

Spot Elevation

Existing Miscellaneous Spot

Existing Access Control Arrow

Existing Benchmark

Reset USGS Marker

Iron Monument Found

Iron Pin R/W Monument

Property Corner

Iron Pin Reference Monument

Right of Way Marker (Exst, Ppsd, Reset)

Existing Federal Reference Corner

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

Existing Witness Corner

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

Existing Traverse PI Aerial Panel

Existing Reference Marker Point NGS

Existing EFB Misc

Existing Bush or Shrub

Existing Large Evergreen Tree

Existing Small Evergreen Tree

Existing Large Tree

Existing Small Tree

Existing Tree Trunk

Cairn or Stone Circle

Existing Artifact

Existing Satellite Dish

Existing Weather Station

Existing Windmill or Tower

Reinforced Pavement

CSB Continuous Split Barrel Sample

FA Flight Auger Sample

SB Split Barrel Sample

T Thinwall Tube Sample

N Standard Penetration Test

Incl Inclinometer Tube

Excavation Unit

Existing Ground Water Well Bore Hole

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

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SYMBOLS

D-101-31

- Flexible Delineator
- Flexible Delineator Type A (Exst, Ppsd)
- Flexible Delineator Type B (Exst, Ppsd)
- Flexible Delineator Type C (Exst, Ppsd)
- Flexible Delineator Type D (Exst, Ppsd)
- Flexible Delineator Type E (Exst, Ppsd)
- Delineator Type A (Exst, Ppsd, Diamond Grade-Reset)
- Delineator Type B (Exst, Ppsd, Diamond Grade-Reset)
- Delineator Type C (Exst, Ppsd, Diamond Grade)
- Delineator Type D (Exst, Ppsd, Diamond Grade)
- Delineator Type E (Exst, Ppsd, Diamond Grade)
- Barricade (Type I, Type II, Type III}
- Arrow Panel (Caution Mode, Double Direction, Left Directional, Right Directional, Sequencing, Truck Mounted)
- Attenuation Device
- Truck Mounted Attenuator
- Delineator Drums
- Flagger
- Tubular Marker
- Traffic Cone
- Back to Back Vertical Panel Sign

- Highway Sign (Exst, Ppsd)
- Mile Post Type A (Exst-Ppsd-Reset)
- Mile Post Type B (Exst, Ppsd)
- Mile Post Type C (Exst, Ppsd)
- Object Marker Type I (Exst, Ppsd)
- Object Marker Type II (Exst, Ppsd)
- Object Marker Type III (Exst, Ppsd)
- Existing Reference Marker
- Road Closure Gate 18 Ft (Exst, Ppsd)
- Road Closure Gate 28 Ft (Exst, Ppsd)
- Road Closure Gate 40 Ft (Exst, Ppsd)
- Existing Railroad Battery Box
- Existing RR Profile Spot
- Existing Railroad Crossbuck
- Existing Railroad Frog
- Existing Mailbox (Private, Federal)

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

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SYMBOLS

D-101-32

- Existing Luminaire
- Luminaire LED
- Existing Light Standard Luminaire
- Relocate Light Standard
- Light Standard Light LED Luminaire
- Light Standard 35 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 50 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 70 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 100 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 150 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 200 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 250 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 310 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 400 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 700 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 1000 Watt High Pressure Sodium Vapor Luminaire
- Emergency Vehicle Detector
- Video Detection Camera

- High Mast Light Standard 3 Luminaire (Exst, Ppsd)
- High Mast Light Standard 4 Luminaire (Exst, Ppsd)
- High Mast Light Standard 5 Luminaire (Exst, Ppsd)
- High Mast Light Standard 6 Luminaire (Exst, Ppsd)
- High Mast Light Standard 7 Luminaire (Exst, Ppsd)
- High Mast Light Standard 8 Luminaire (Exst, Ppsd)
- High Mast Light Standard 9 Luminaire (Exst, Ppsd)
- High Mast Light Standard 10 Luminaire (Exst, Ppsd)
- Overhead Sign Structure Load Center (Exst, Ppsd)
- Traffic Signal Controller (Exst, Ppsd)
- Pad Mounted Traffic Signal Controller (Exst, Ppsd)
- Flashing Beacon (Exst, Ppsd)
- Concrete Foundation (Exst, Ppsd)
- Pipe Mounted Flasher (Exst, Ppsd)
- Pad Mounted Feed Point (Exst, Ppsd)
- Pipe Mounted Feed Point with Pad (Exst, Ppsd)
- Pole Mounted Feed Point (Exst, Ppsd)
- Junction Box (Exst, Ppsd)
- Existing Pedestrian Head with Number
- Existing Signal Head
- Pole Mounted Head
- Existing Lighting Standard Pole

- Existing Traffic Signal Standard
- Pull Box (Exst-Ppsd-Undefined)
- Intelligent Transportation Pull Box (Exst, Ppsd)
- Transformer (Exst, Ppsd)
- Power Pole (Exst-Ppsd-with Transformer)
- Wood Pole (Exst, Ppsd)
- Pedestrian Push Button Post (Exst, Ppsd)
- Existing Pole
- Existing Telephone Pole
- Existing Post
- Connection Conductor (Ground, Neutral, Phase 1, Phase 2)

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

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SYMBOLS

D-101-33

Existing Manhole (Electrical, Gas, Telephone)

Water Manhole (Exst, Exst with Valve)

Sanitary Sewer Manhole (Exst, Ppsd, Exst with Valve)

Sanitary Force Main Manhole (Exst, Ppsd, Exst with Valve)

Storm Drain Manhole (Exst, Ppsd, Exst with Inlet, Ppsd with Inlet)

Force Main Storm Drain Manhole (Exst, Exst with Valve)

Manhole (Ppsd, Ppsd 48 Inch, Exst Undefined)

Existing Water Appurtenance

Sprinkler Head (Exst, Ppsd)

Fire Hydrant (Exst, Ppsd)

Cleanout (Exst Sanitary, Underdrain)

Existing Catch Basin Inlet (Round, Square)

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 Vegitation Barrier, Ppsd Double with Vegitation Barrier)

Cap or Stub
Exst Gas, Exst Sanitary, Exst Storm Drain, Ppsd Storm Drain, Exst Water

Existing Pedestal
Electrical, Telephone, Fiber Optic Telephone, TV, Fiber Optic TV, Undefined

Existing Pipe Vent
Gas, Fuel, Sanitary, Storm Drain, Water, Undefined

Valve
Exst Gas, Exst Water, Ppsd Water, Exst Undefined

Pump
Sanitary, Storm Drain, Exst Water

Corrugated Metal End Section (18, 24, 30, 36, 42, 48, 54, 60 Inch)

Reinforced Concrete End Section (18, 24, 30, 36, 42, 48, 54, 60 Inch)

Existing Utility Marker

Existing Meter

Existing Fuel Dispensers

Existing Fuel Filler Pipes

Existing Fuel Leak Sensors

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

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12 18 2020

Cross Section Legend

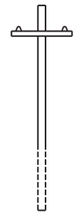
D-101-40

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

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



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



Anchor

High Tension Cable Guardrail

* Usually the transverse utilities are shown on a cross section with 2 or more symbols. The utility runs from one symbol to the other, but the connection may not be shown.



Connection to infer that probably will not be displayed

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	
9-20-18	
REVISIONS	
DATE	CHANGE
6/14/2023	CADD Standards Update

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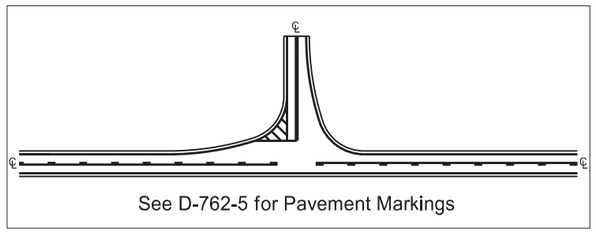
06/14/23

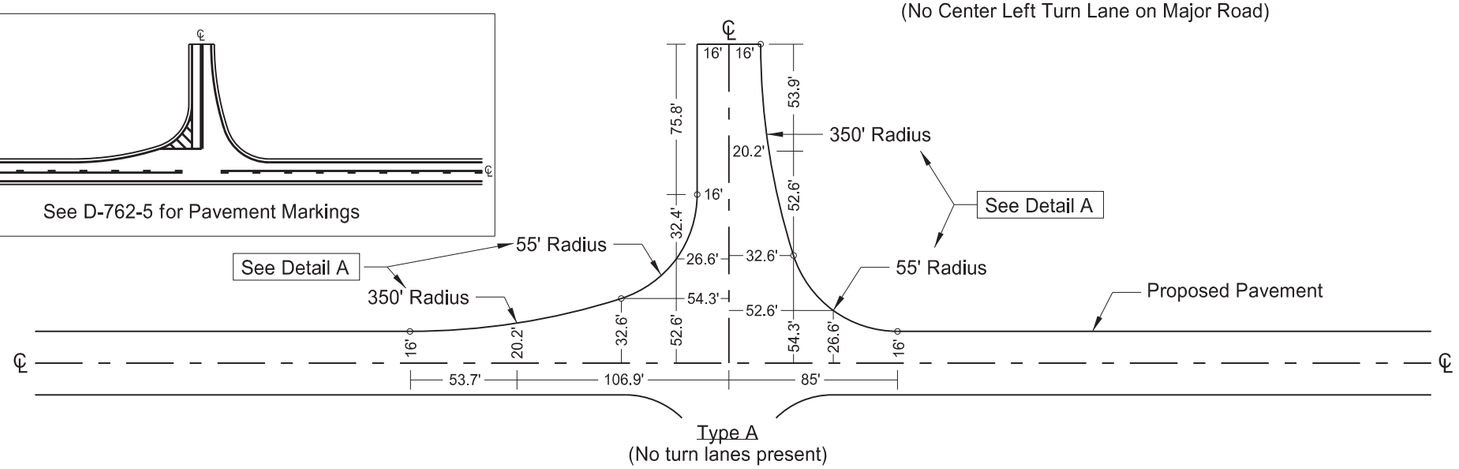
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STANDARD 90 DEGREE FLARED INTERSECTION

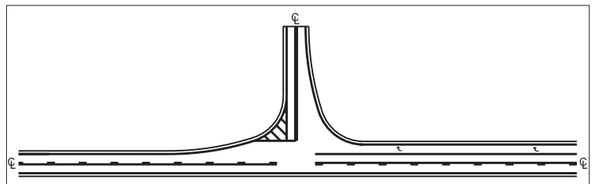
(No Center Left Turn Lane on Major Road)

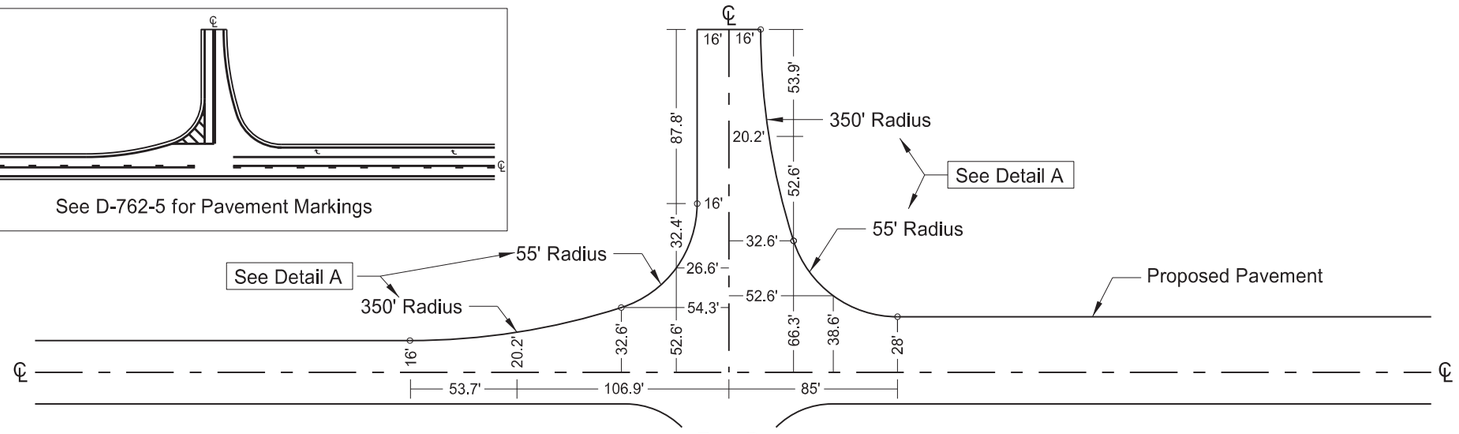
D-203-5



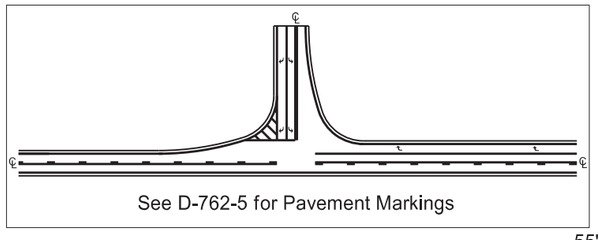


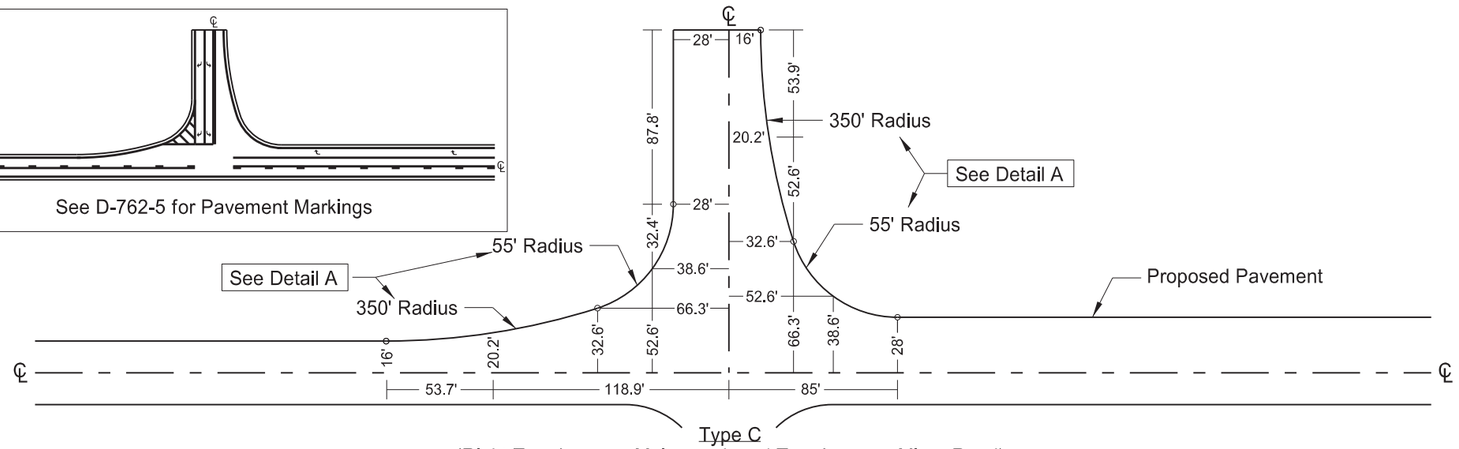
Type A
(No turn lanes present)





Type B
(Right Turn Lane on Major Road)

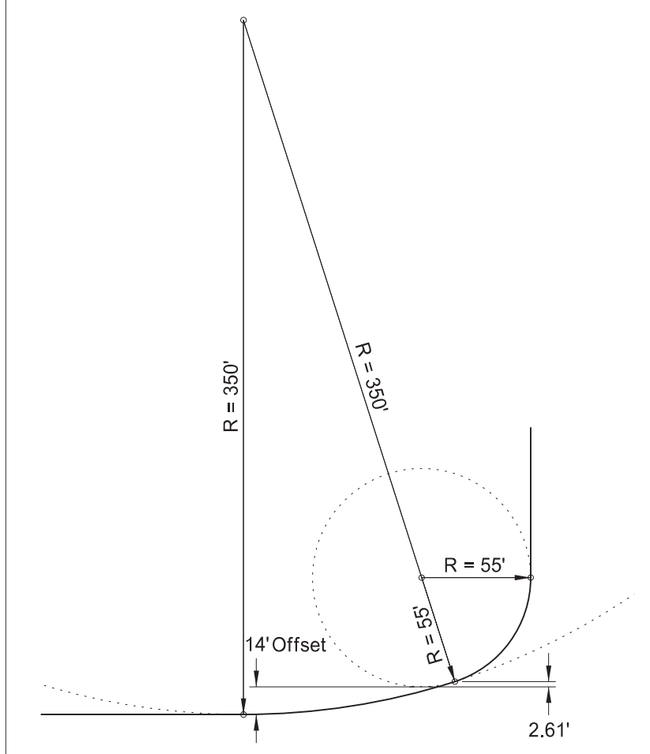




Type C
(Right Turn Lane on Major road, and Turn Lane on Minor Road)

Detail A

Compound Curve (350' Radius, 55' Radius, 14' Offset)



- ◦ Radius Tangent Point
- ⊢ xx.x' ⊣ Pavement widths
- ——— Proposed Pavement

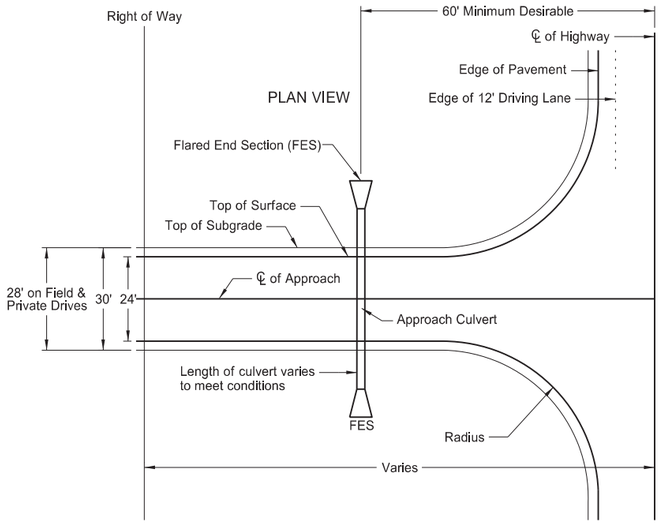
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
3-29-16	
REVISIONS	
DATE	CHANGE
8-17-17	Corrected Pvmt Mkg Std reference.
8-30-18	Corrected pvmt mkg layouts.
10-25-19	Added Detail A ref to appr left side
8-09-24	Electronic Stamp/Signature.

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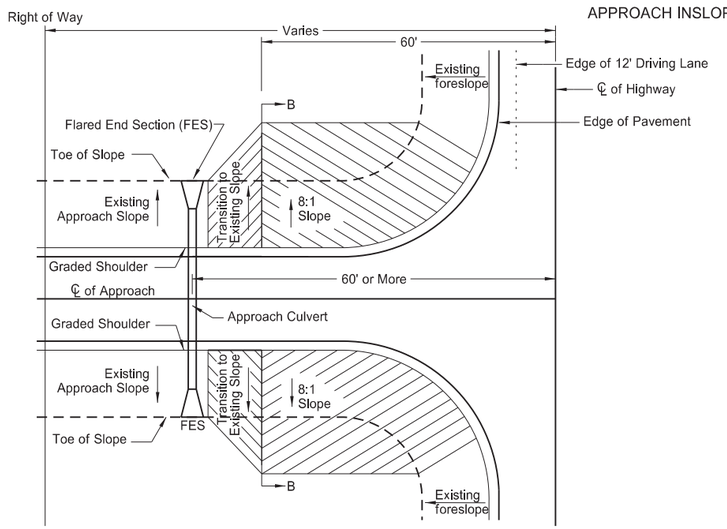
08/09/24

STANDARD RURAL APPROACHES

D-203-8

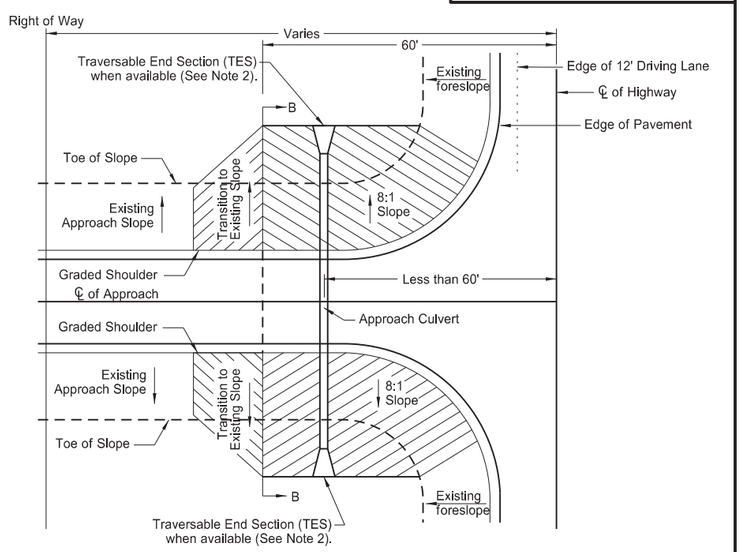


APPROACH INSLOPES



CASE 1

APPROACH PIPE LOCATED
60' OR MORE FROM ℄



CASE 2

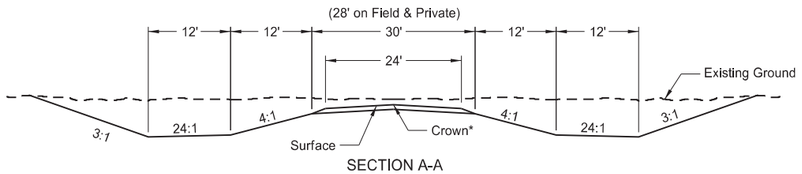
APPROACH PIPE LOCATED
LESS THAN 60' FROM ℄

Approach Pipe Traversable End Sections (TES)

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

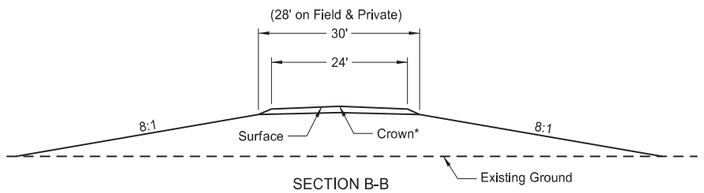
CRITERIA FOR RURAL APPROACH TYPES

	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)

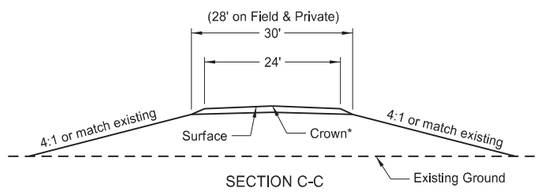


SECTION A-A

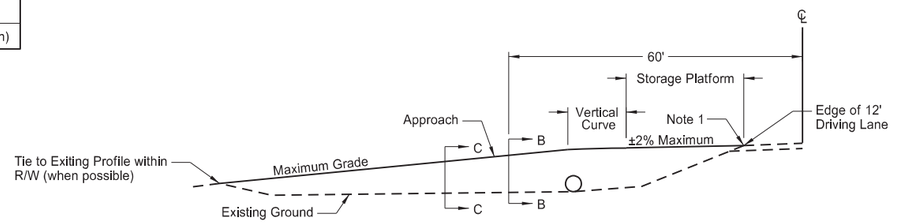
*2.1% crown for paved surface
*3.0% crown for gravel surface



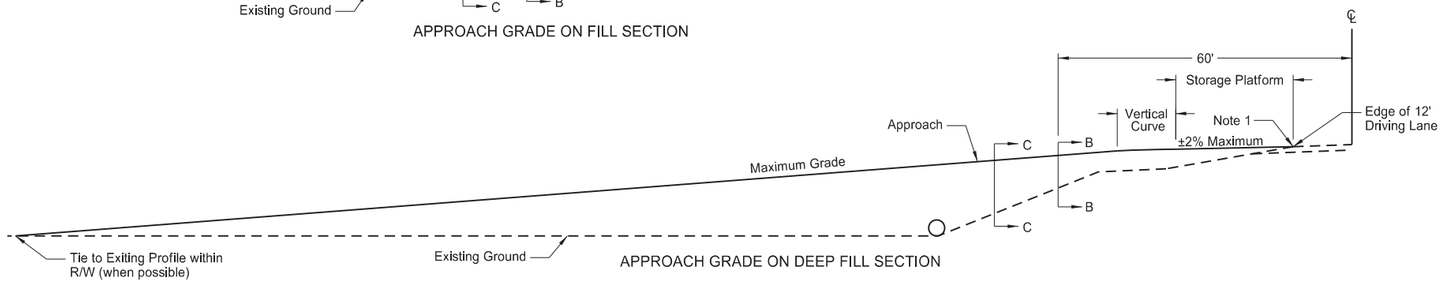
SECTION B-B



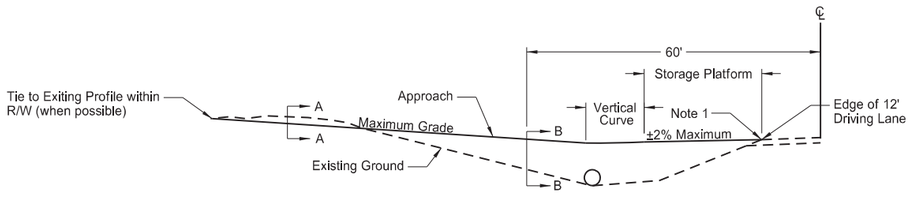
SECTION C-C



APPROACH GRADE ON FILL SECTION



APPROACH GRADE ON DEEP FILL SECTION



APPROACH GRADE ON CUT SECTION

NOTES:

1. 5% Max Rollover between approach storage platform and highway.
2. 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.

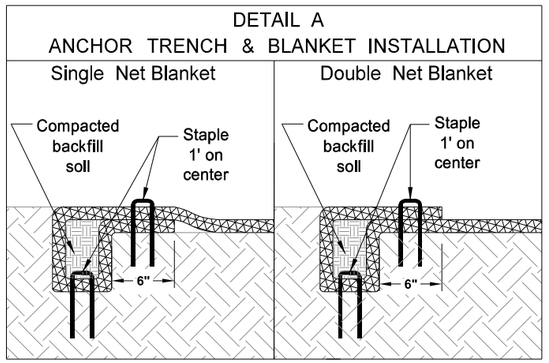
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-25-14	
REVISIONS	
DATE	CHANGE
06-30-17	Revised Radius, Storage Platform, Inslope dimensions, and Note 1
10-25-19	Changed "Inslope" to "Foreslope"
06-29-22	Added "TES", Table, and Note 2

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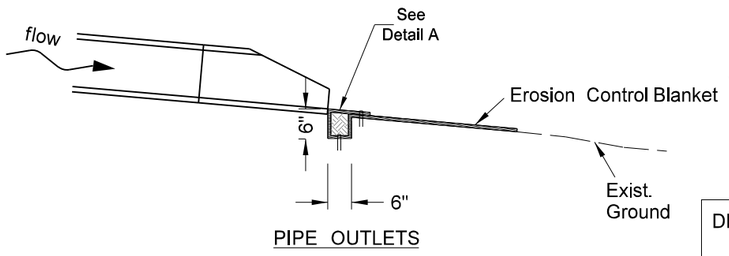
06/29/22

D-255-2

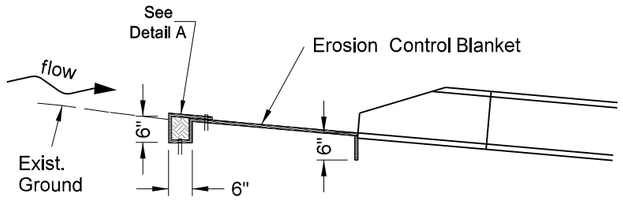
EROSION AND SILTATION CONTROL
EROSION CONTROL BLANKET INSTALLATION



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

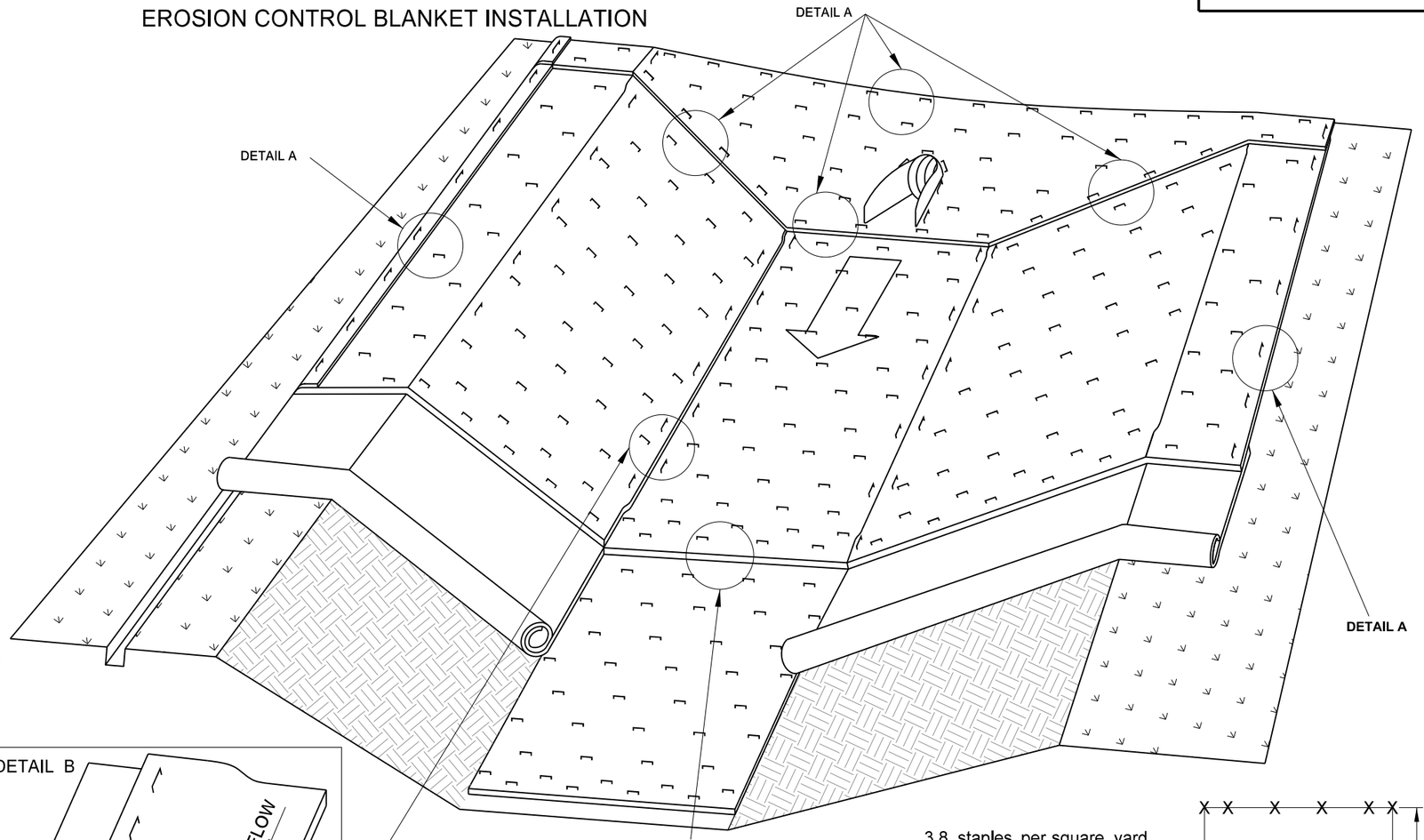


PIPE OUTLETS

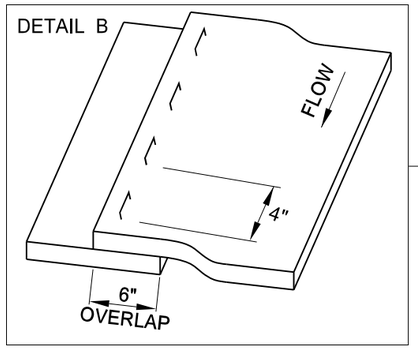


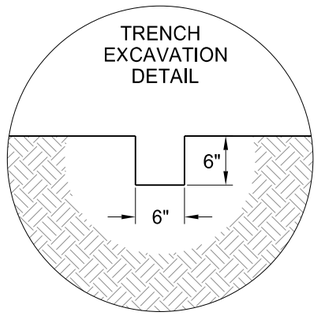
PIPE INLETS

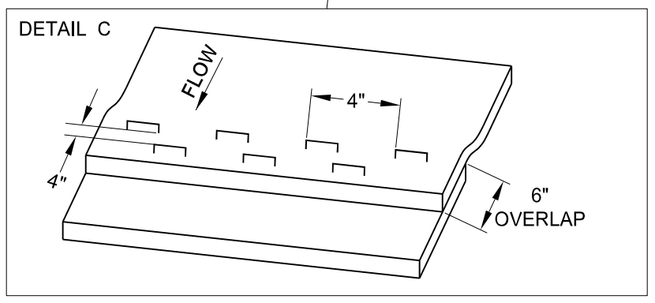
INSTALLATION AT PIPE ENDS



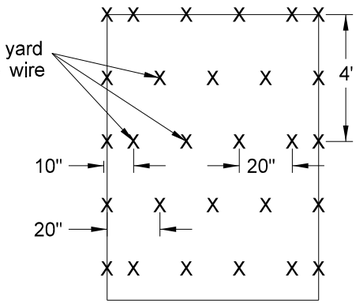
BLANKET LAYOUT
CHANNEL OR SLOPE INSTALLATION







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



STAPLE PATTERN

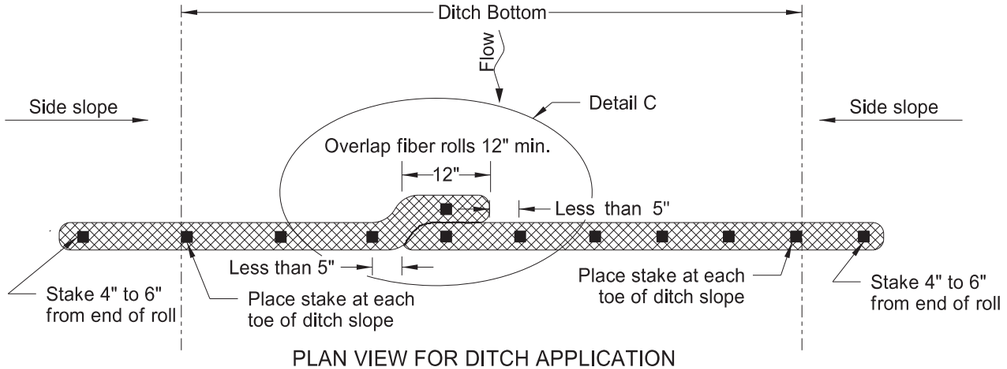
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
06-26-14	Changed standard drawing number from D-708-5 to D-255-2.
07-27-15	Changed Installation details such as trench depth and overlap dimensions.
08-27-19	New Design Engineer PE Stamp.

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

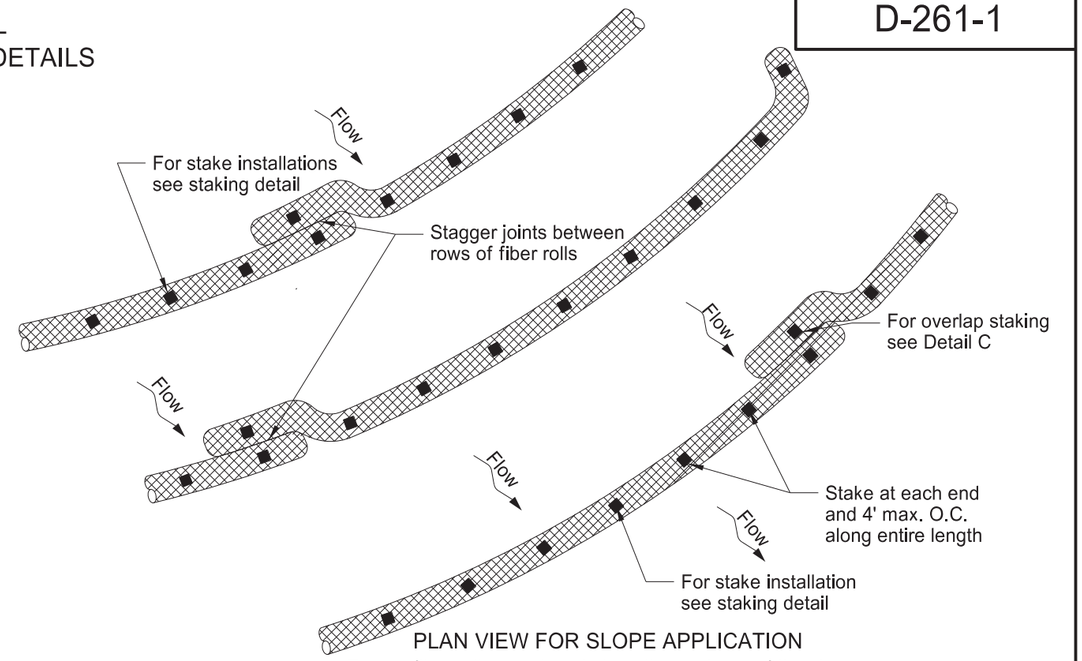
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D-261-1

EROSION CONTROL
FIBER ROLL PLACEMENT DETAILS

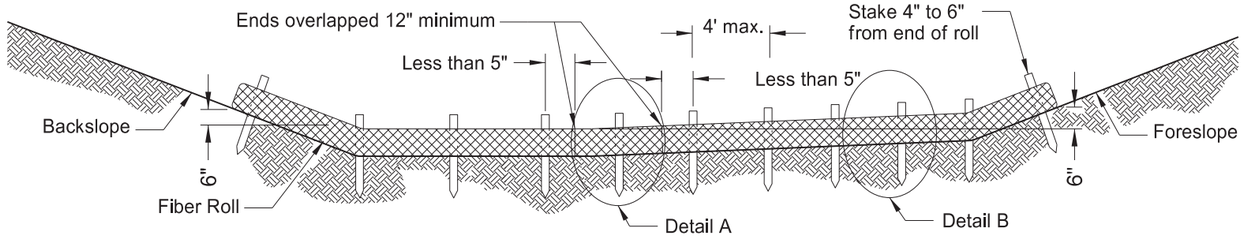


PLAN VIEW FOR DITCH APPLICATION

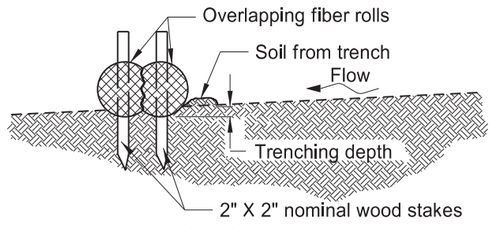


PLAN VIEW FOR SLOPE APPLICATION

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

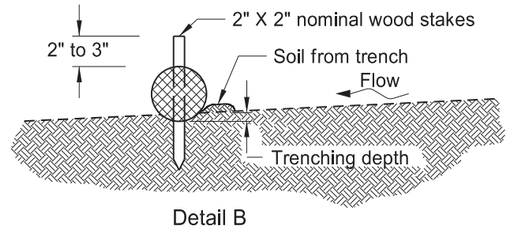


12 OR 20 INCH FIBER ROLL - DITCH BOTTOM



Detail A

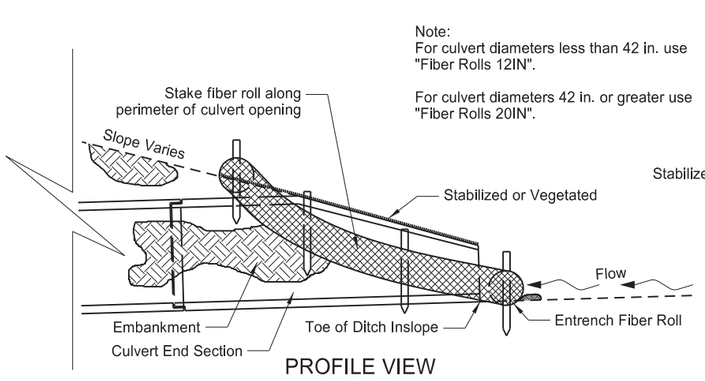
Fiber Roll Overlapping Staking Detail



Detail B

Fiber Roll Staking Detail

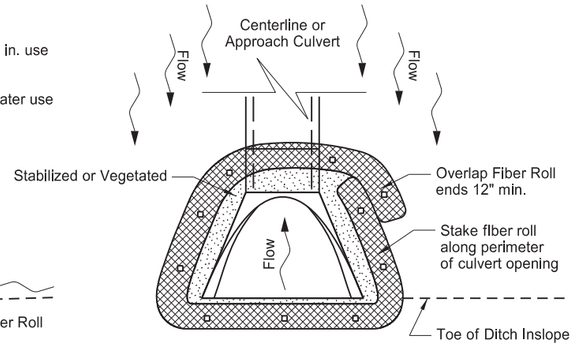
NOTE: Do not allow runoff to run under or around roll.



PROFILE VIEW

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 PROTECTION (INLET OF CULVERT)

FIBER ROLL DIAMETER	NOMINAL STAKE SIZE	MINIMUM STAKE LENGTH	TRENCH DEPTH	
			MINIMUM	MAXIMUM
6"	2" x 2"	18"	2"	2"
9" or 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

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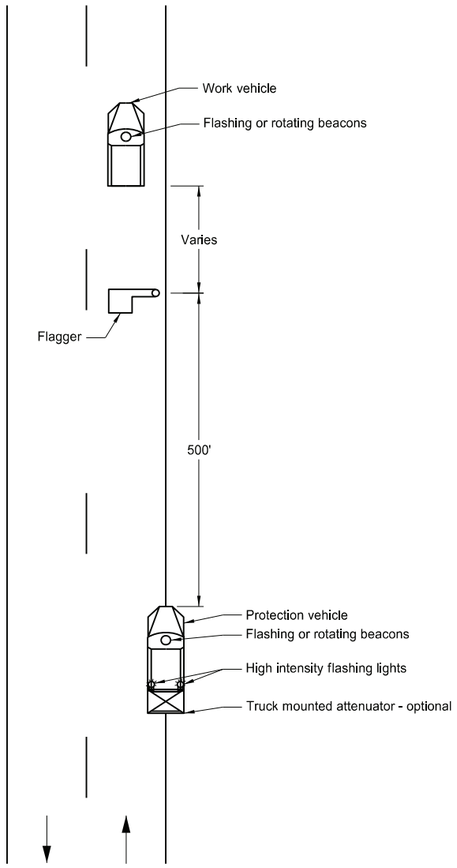
03/13/25

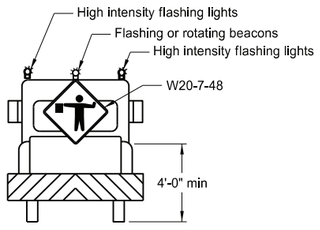
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TRAFFIC CONTROL FOR CORING OF HOT BITUMINOUS PAVEMENT

D-704-2

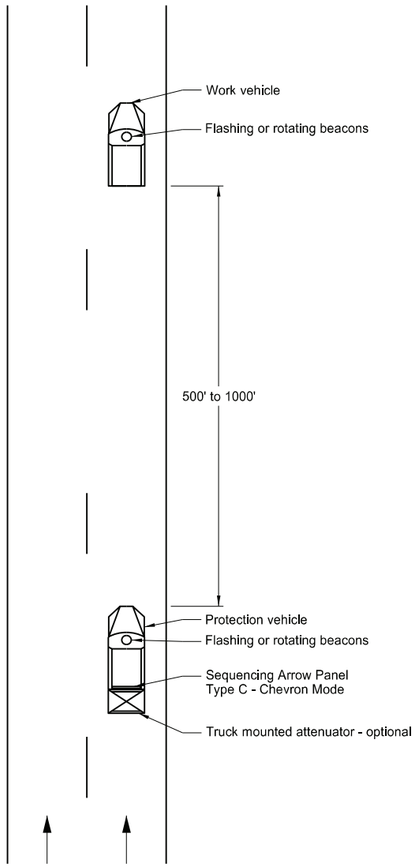
Two Lane, Two Way Roadways

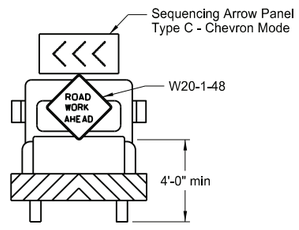




Typical Protection Vehicle

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

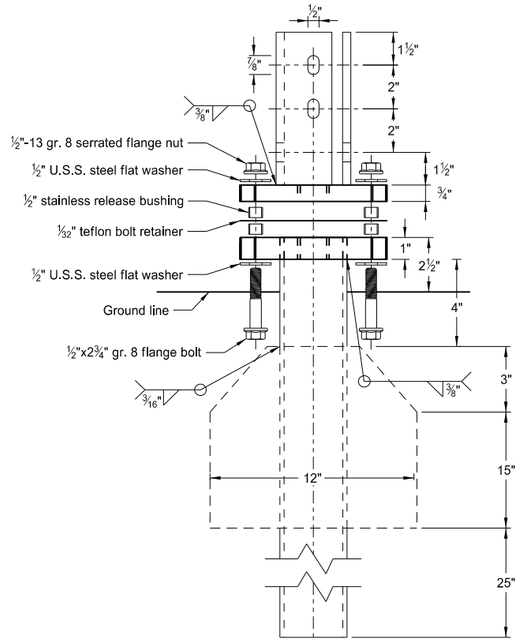
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08/01/24

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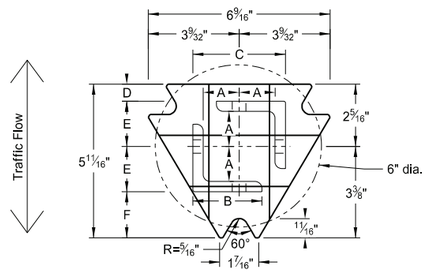
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-7

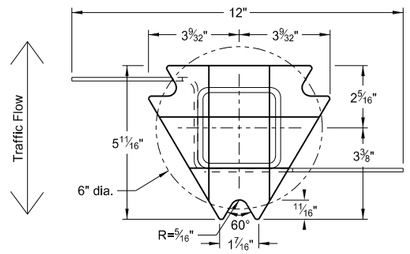


Multi-Directional
Slip Base Assembly

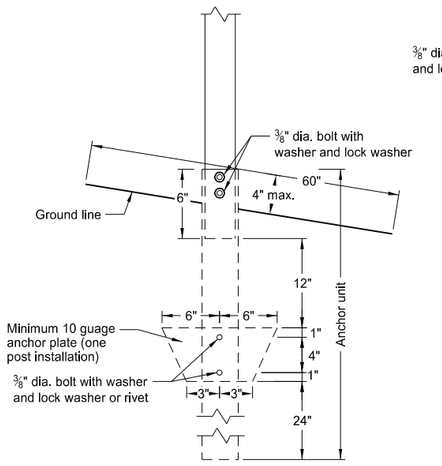
Perforated Tube



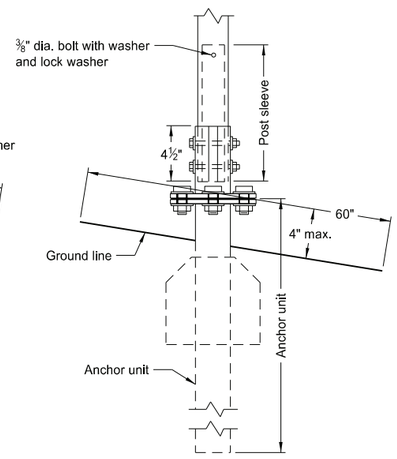
Top Post Receiver
Plate - ASTM A572 grade 50
Angle Receiver - 2½"x2½"x⅜" ASTM A36 structural angle



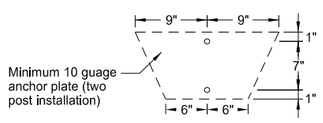
Bottom Soil Stub
Tube - 3"x3"x7 gauge ASTM A500 grade B tube
Stabilizing Wing - 7 gauge H.R.P.O. ASTM A1011
Plate - ASTM A572 grade 50

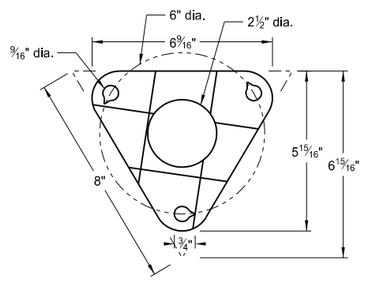


Anchor Unit and Post Assembly



Multi-Directional
Slip Base Anchor Unit
and Post Sleeve Assembly





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

Notes:

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

Telescoping Perforated Tube						
Number of Posts	Post Size in.	Wall Thick-ness Gauge	Sleeve Size in.	Wall Thick-ness Gauge	Slip Base	Anchor Size without Slip Base in.
1	2	12			No	2¼
1	2¼	12			No	2½
1	2½	12			(A)	3
1	2½	10			Yes	
1	2¼	12	2	12	Yes	
1	2½	12	2¼	12	Yes	
2	2	12			No	2¼
2	2¼	12			No	2½
2	2½	12			Yes	
2	2½	12			Yes	
2	2¼	10	2	12	Yes	
2	2½	12	2¼	12	Yes	
3 & 4	2½	12			Yes	
3 & 4	2½	10			Yes	
3 & 4	2½	12	2¼	12	Yes	
3 & 4	2¼	12	2	12	Yes	
3 & 4	2½	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
1½ x 1½	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2¼ x 2¼	0.105	12	2.773	0.561	0.695	0.499
2 3/16 x 2 3/16	0.135	10	3.432	0.605	0.841	0.590
2½ x 2½	0.105	12	3.141	0.804	0.803	0.643
2½ x 2½	0.135	10	4.006	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 9/64"	2½"	3 1/32"	25/32"	1 33/64"	1 7/8"
2½"x10 ga.	1 9/32"	2½"	3 5/16"	⅝"	1 21/32"	1¾"

(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 2½"x10 ga.

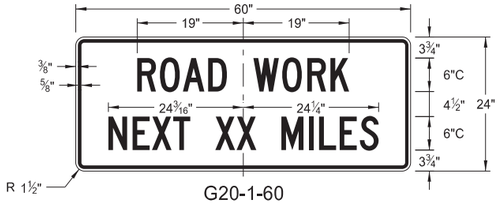
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
10-03-19	New Design Engr PE Stamp
8-01-24	Electronic Stamp/Signature

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ENGINEER
NORTH DAKOTA
08/01/24

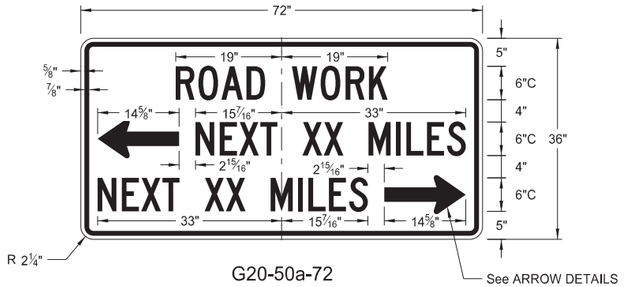
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CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS

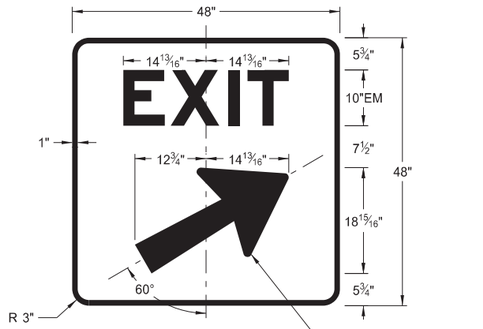
D-704-9



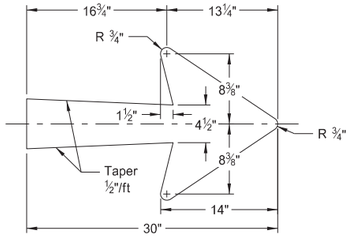
G20-1-60
Legend: black (non-refl)
Background: orange



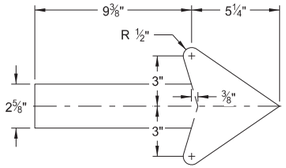
G20-50a-72
Legend: black (non-refl)
Background: orange



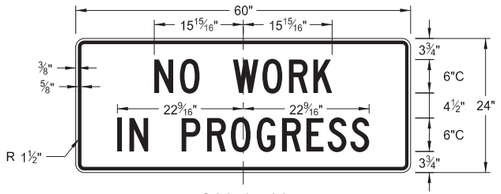
E5-1(L or R)-48
Legend: white
Background: green (orange optional)



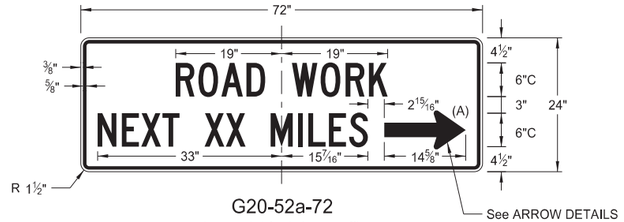
E5-1-48



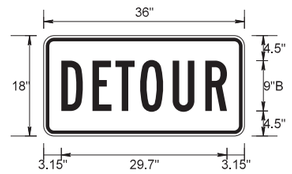
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G20-52a-72



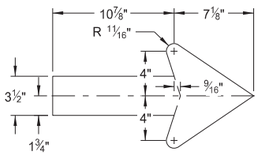
G20-1b-60
Legend: black (non-refl)
Background: orange



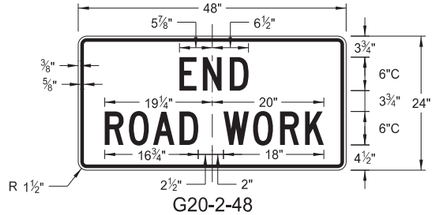
G20-52a-72
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Background: orange



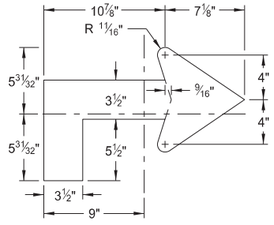
M4-8-36
Legend: black (non-refl)
Background: orange



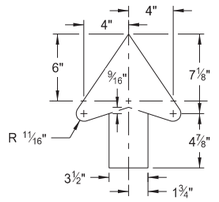
M4-9(L or R)-30
Right or Left



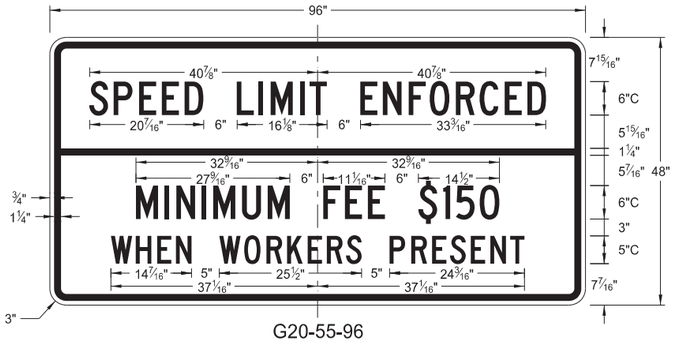
G20-2-48
Legend: black (non-refl)
Background: orange



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



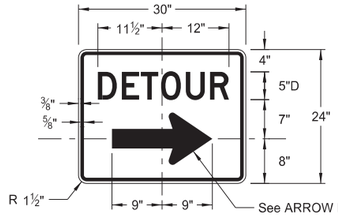
M4-9-30
Straight



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



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



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

ARROW DETAILS

NOTES:

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

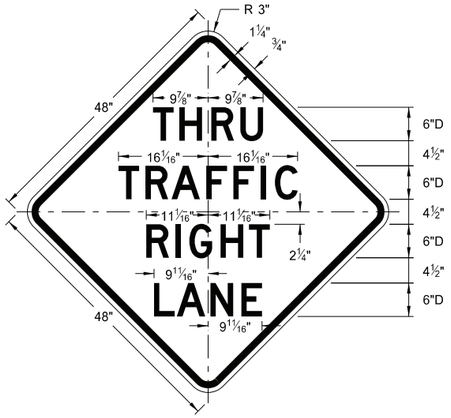
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
08-17-17	Added sign & background color
10-03-19	New Design Engineer PE Stamp
08-01-24	Electronic Stamp/Signature
06-30-25	Legislative Changes

KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
06/30/25
ENGINEER
NORTH DAKOTA

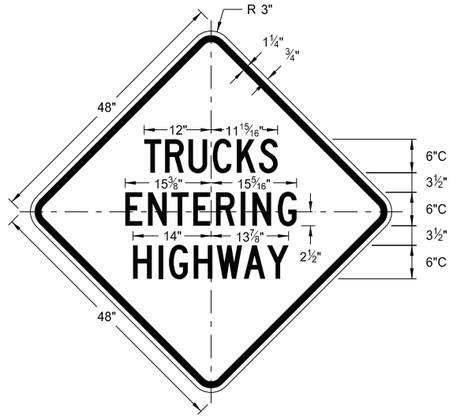
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CONSTRUCTION SIGN DETAILS
WARNING SIGNS

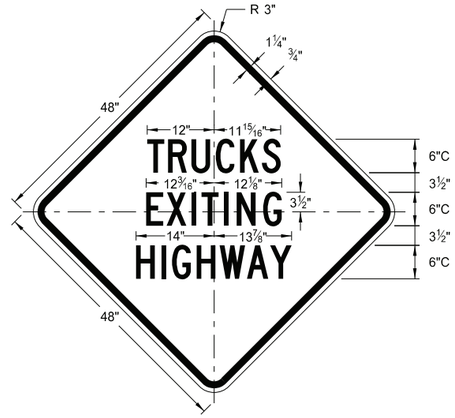
D-704-11



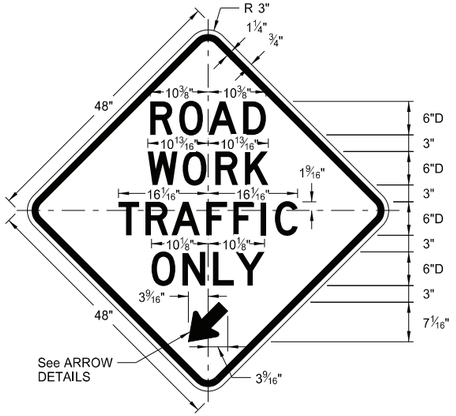
W5-8-48
Legend: black (non-refl)
Background: orange



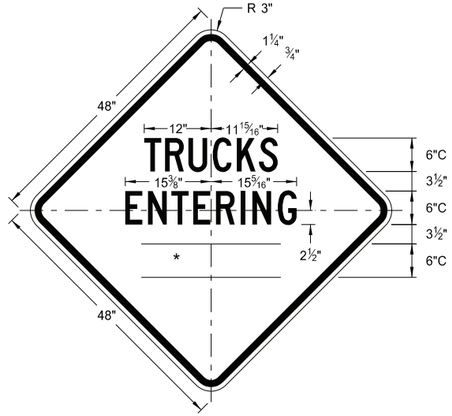
W8-53-48
Legend: black (non-refl)
Background: orange



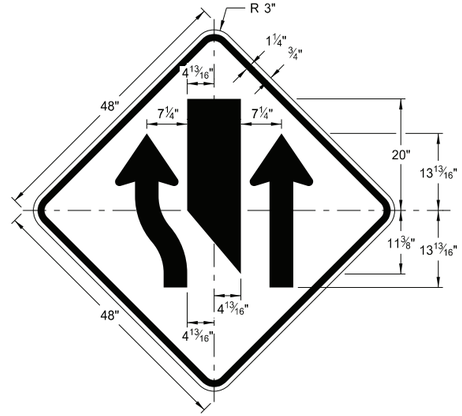
W8-56-48
Legend: black (non-refl)
Background: orange



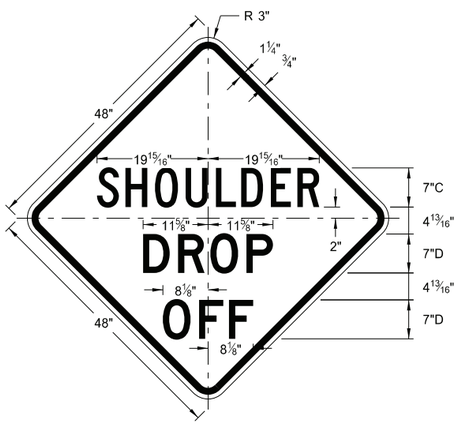
W5-9-48
Legend; black (non-refl)
Background: orange



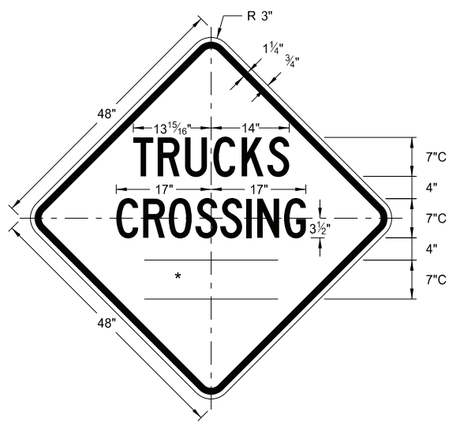
W8-54-48
Legend; black (non-refl)
Background: orange



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



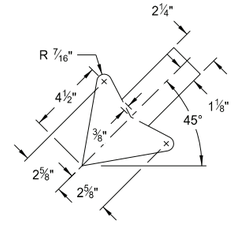
W8-9a-48
Legend: black (non-refl)
Background: orange



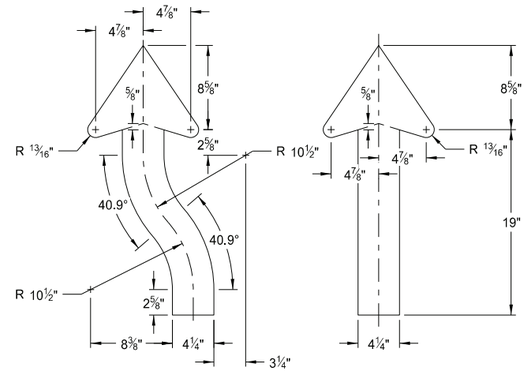
W8-55-48
Legend: black (non-refl)
Background: orange

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

* DISTANCE MESSAGES



W5-9-48



W9-3a-48

ARROW DETAILS

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17	Updated sign number
5-31-18	Revised sign and arrow details
10-03-19	New Design Engineer PE Stamp
8-01-24	Electronic Stamp/Signature

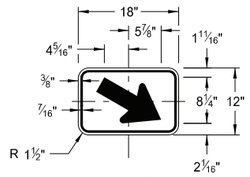
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/01/24

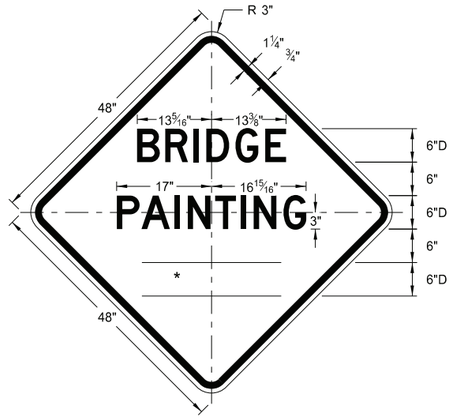
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CONSTRUCTION SIGN DETAILS
WARNING SIGNS

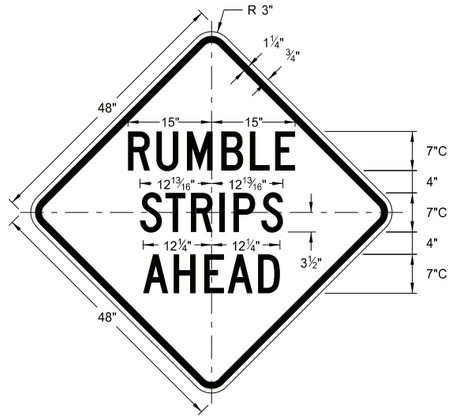
D-704-11A



W16-7aP-18
Legend: black (non-refl)
Background: orange



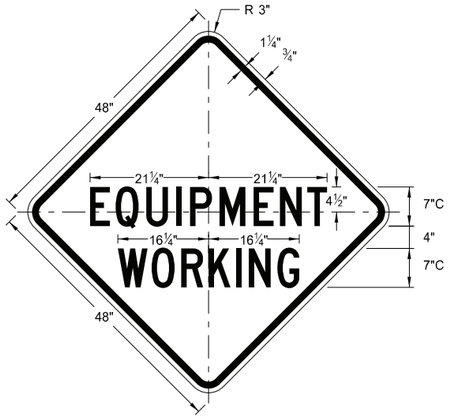
W21-50-48
Legend: black (non-refl)
Background: orange



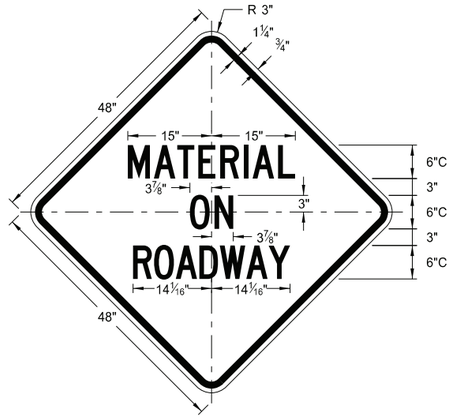
W21-53-48
Legend: black (non-refl)
Background: orange

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

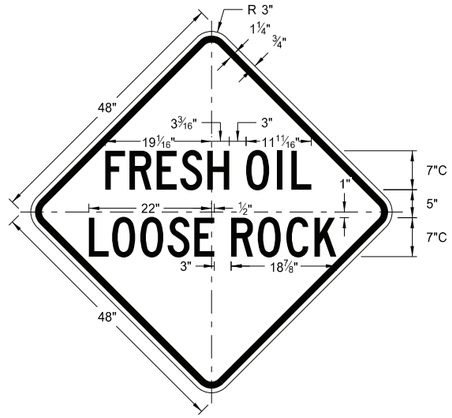
* DISTANCE MESSAGES



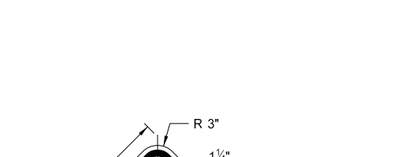
W20-51-48
Legend: black (non-refl)
Background: orange



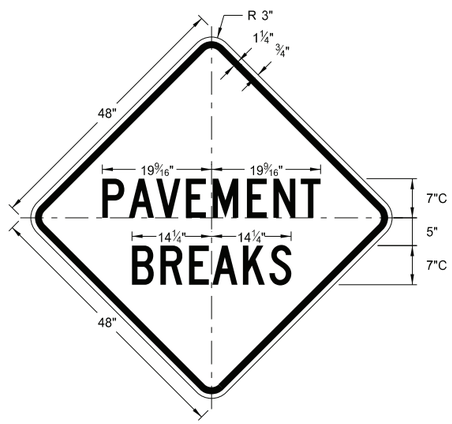
W21-51-48
Legend: black (non-refl)
Background: orange



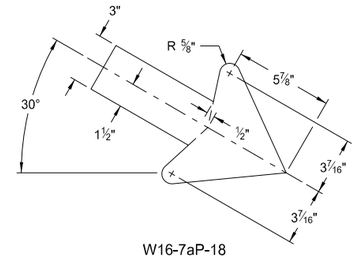
W22-8-48
Legend: black (non-refl)
Background: orange



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



W21-52-48
Legend: black (non-refl)
Background: orange



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.

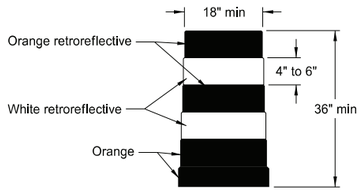
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/01/24

DocuSign Envelope ID: B6D1C72A-6E5E-4E5C-A02F-4D3D1C582775

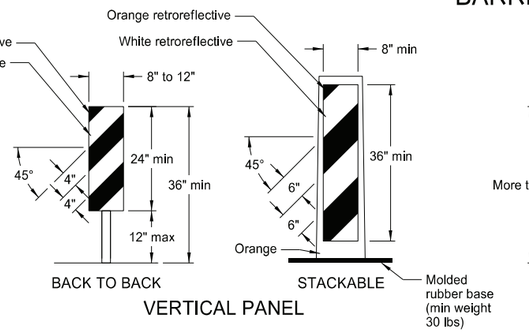
BARRICADE AND CHANNELIZING DEVICE DETAILS

D-704-13



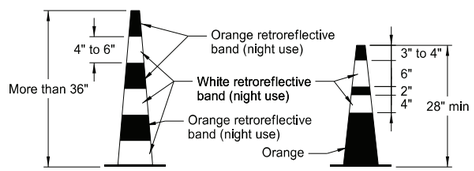
DELINEATOR DRUM

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



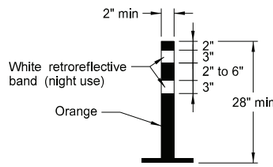
VERTICAL PANEL

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.



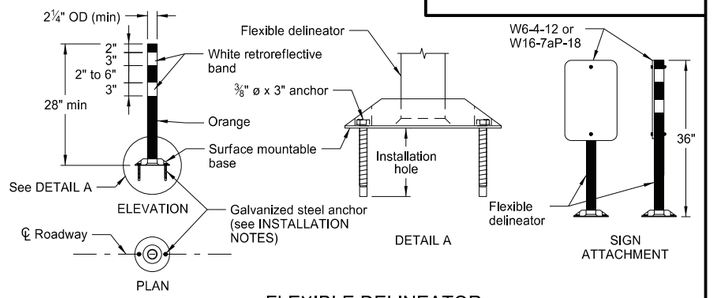
TRAFFIC CONE

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



TUBULAR MARKER

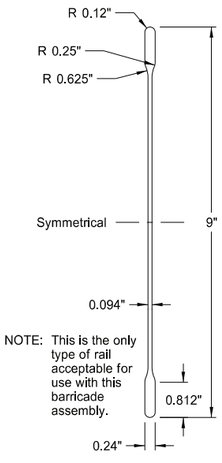
Provide retroreflectorization of tubular markers more than 42" in height by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.



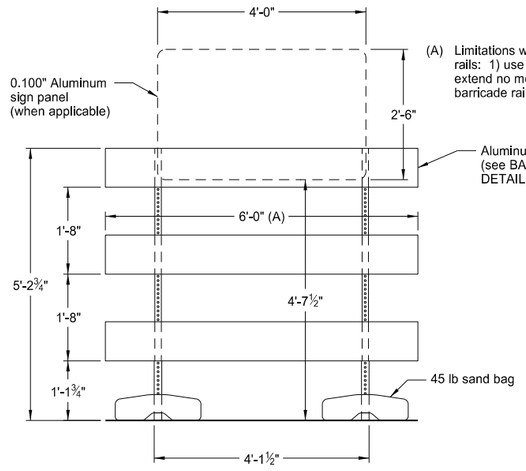
FLEXIBLE DELINEATOR

INSTALLATION NOTES:

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

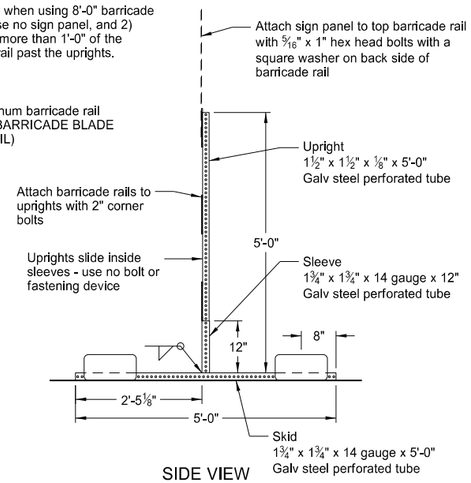


BARRICADE BLADE DETAIL



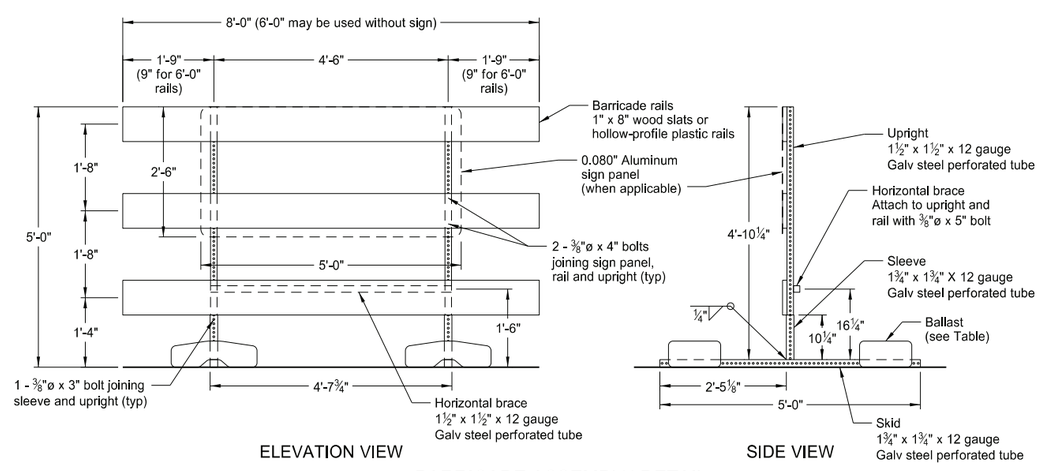
ELEVATION VIEW

(A) Limitations when using 8'-0" barricade rails: 1) use no sign panel, and 2) extend no more than 1'-0" of the barricade rail past the uprights.



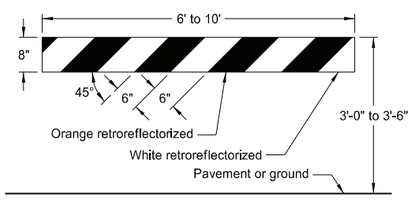
SIDE VIEW

BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)

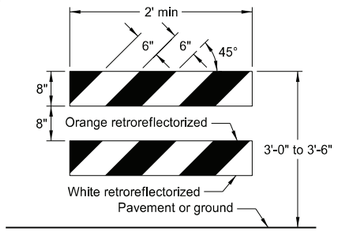


BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)

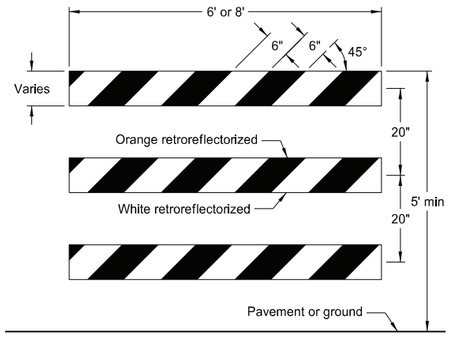
NOTE: For barricade markings use alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Place retroreflective sheeting on both sides of the rails with a minimum of 270 square inches of visible retroreflective area facing vehicular traffic. When the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



TYPE I BARRICADE

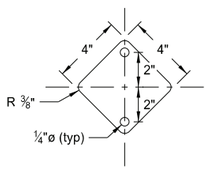


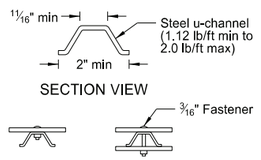
TYPE II BARRICADE

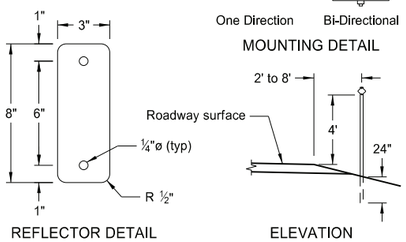


TYPE III BARRICADE

BARRICADE RAIL DETAILS







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

KIRK J. HOFF
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PE-4683
ENGINEER
NORTH DAKOTA

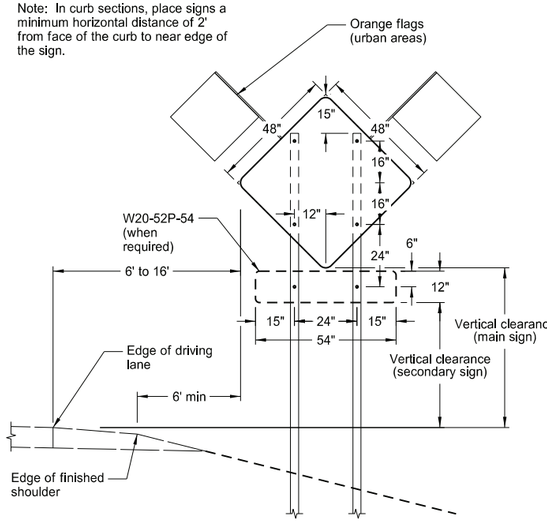
08/01/24

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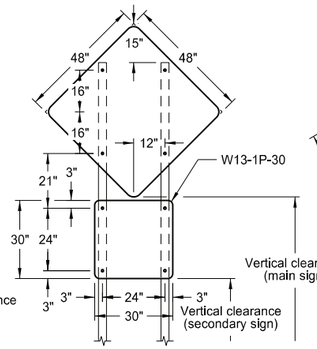
CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

D-704-14

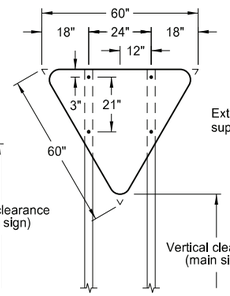
Note: In curb sections, place signs a minimum horizontal distance of 2' from face of the curb to near edge of the sign.



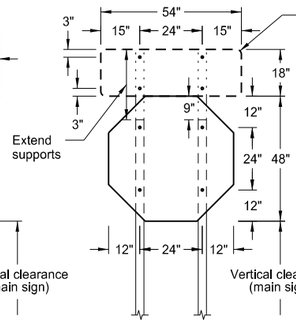
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



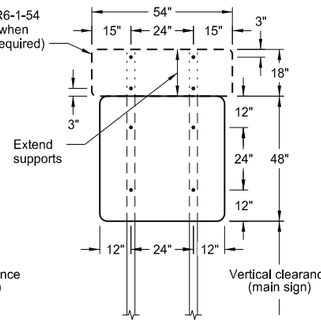
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



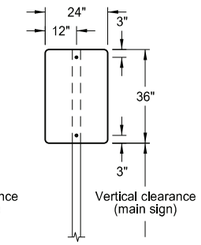
R1-2-60 - YIELD SIGN



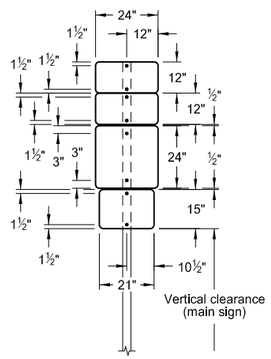
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



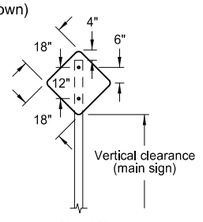
48" x 48" SIGN
(with R6-1-54 sign as required)



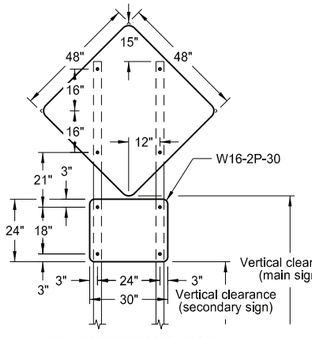
24" x 36" SIGN



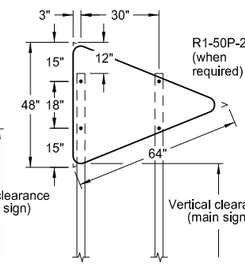
24" x 24"
ROUTE MARKER
ASSEMBLY



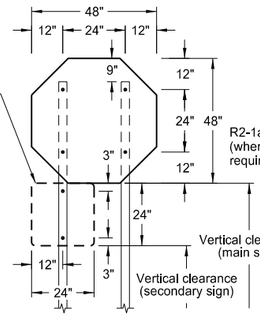
18" x 18"
DIAMOND SIGN



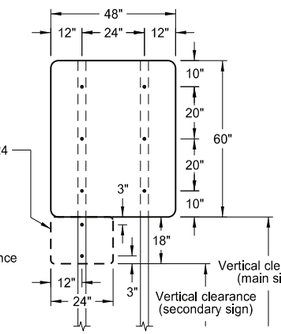
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



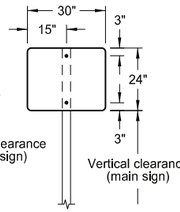
W14-3-64 - PENNANT SIGN



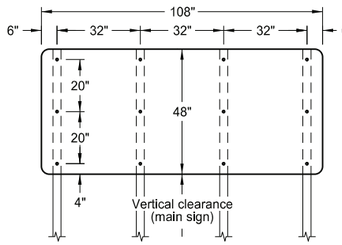
R1-1-48 - STOP SIGN
(with R1-50P-24 sign as required)



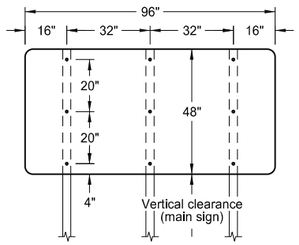
48" x 48" SIGN
(with R2-1aP-24 sign as required)



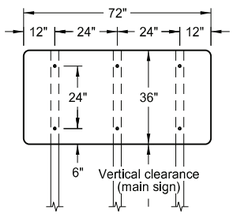
30" x 24" SIGN



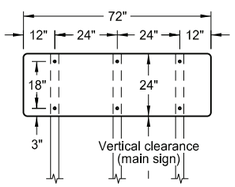
108" x 48" SIGN



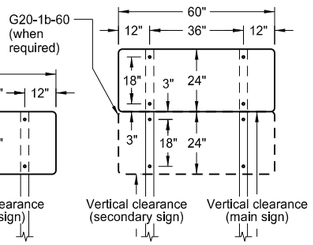
96" x 48" SIGN



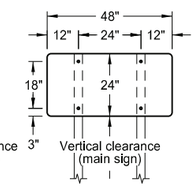
72" x 36" SIGN



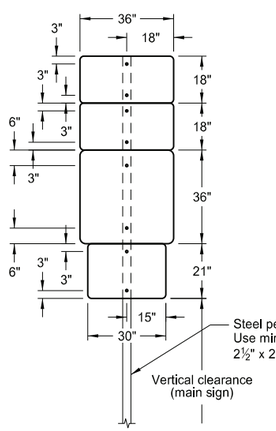
72" x 24" SIGN



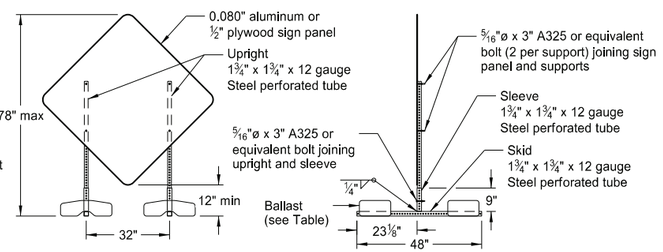
60" x 24" SIGN



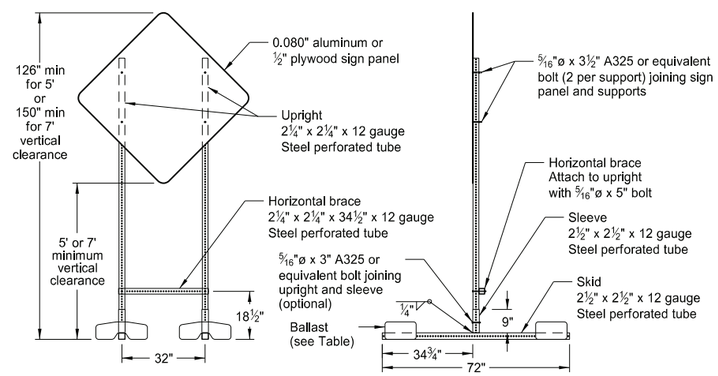
48" x 24" SIGN



36" x 36"
ROUTE MARKER
ASSEMBLY



PORTABLE SIGN SUPPORT
LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT
HIGH-MOUNTING HEIGHT

NOTES:

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

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

   Do not attach guy wires to sign supports. Attach wind beams behind sign panels when used with u-posts.

2. Sign Panels: Provide sign panels made of 0.100" aluminum, ½" plywood, or other approved material, except where noted. Punch all holes round for 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 unforseen 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

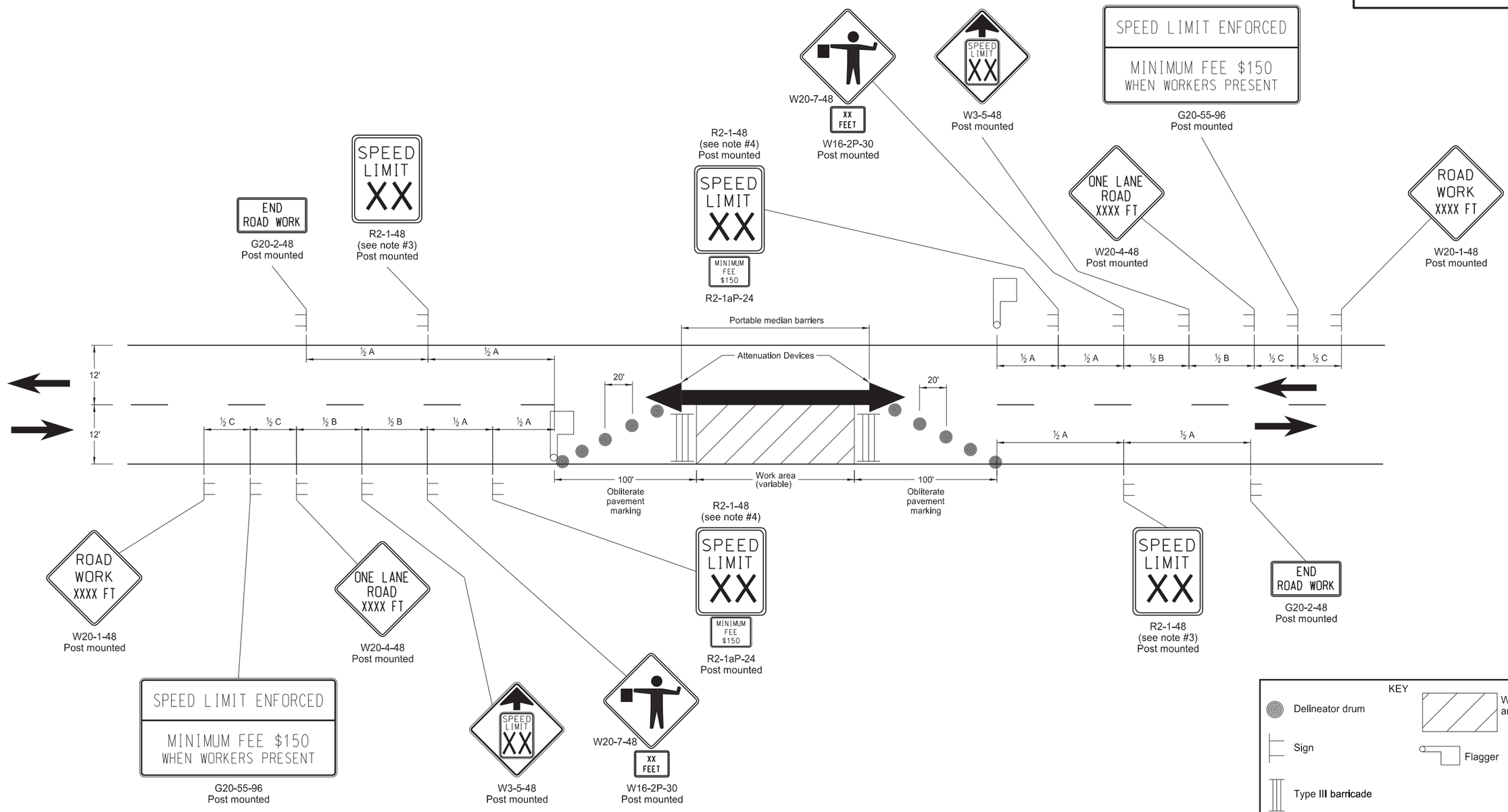
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/01/24

Docusign Envelope ID: 2F5C9714-A0E1-42BB-B36B-42204844BFCB

SIGN LAYOUT FOR ONE LANE CLOSURE TWO LANE ROADWAY

D-704-17



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

Notes:
1. Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
2. Remove existing striping as required. Use back to back delineators when inslope is 4:1 or flatter and roadway alignment is visible to approaching vehicles. Place back to back vertical panels when roadways have steep slopes and alignment is not visible to approaching traffic.
3. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
4. 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 ½B.
5. 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.
6. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
7. Cover existing speed limit signs within a reduced speed zone.
8. Sign G20-55-96 is not required if this layout is part of other traffic control that contains this sign, or if work is less than 15 days.
9. Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

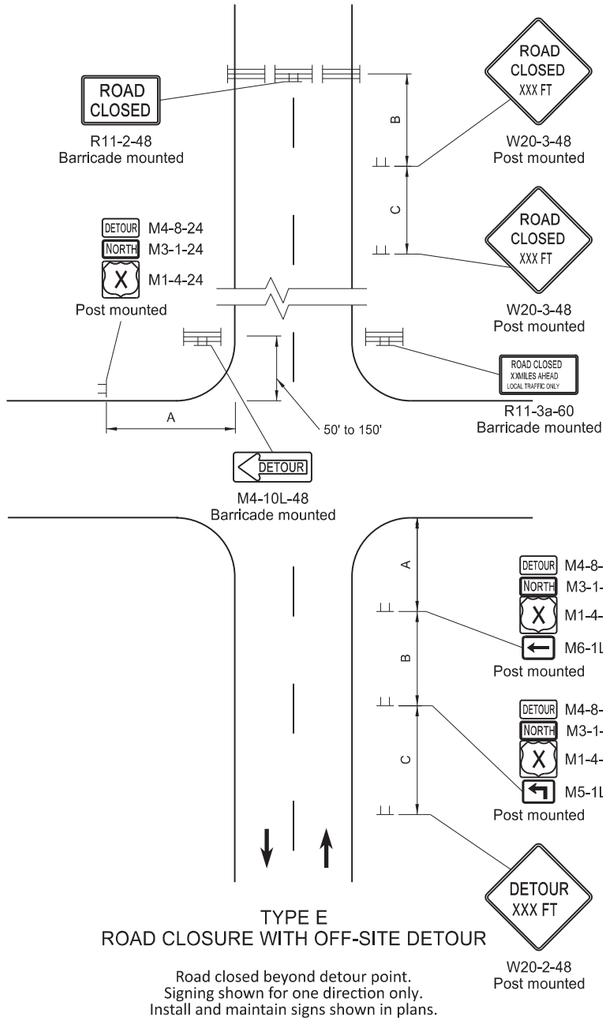
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
08-17-17	Note update & sign numbers
11-01-19	Removed signs & revised note
12-08-21	Switched order of Road Work XXXX and Spd Limit Enforced & added Dollars At Work
11-29-22	Removed Dollars At Work
08-21-24	Pvmt Mkg Width & Med Barrier
06-30-25	Legislative Changes

KIRK J. HOFF REGISTERED PROFESSIONAL PE-4683 06/30/25 ENGINEER NORTH DAKOTA

Docusign Envelope ID: 2F5C9714-A0E1-42BB-B36B-42204844BFCB

ROAD CLOSURE AND LANE CLOSURE ON A TWO WAY ROAD LAYOUTS

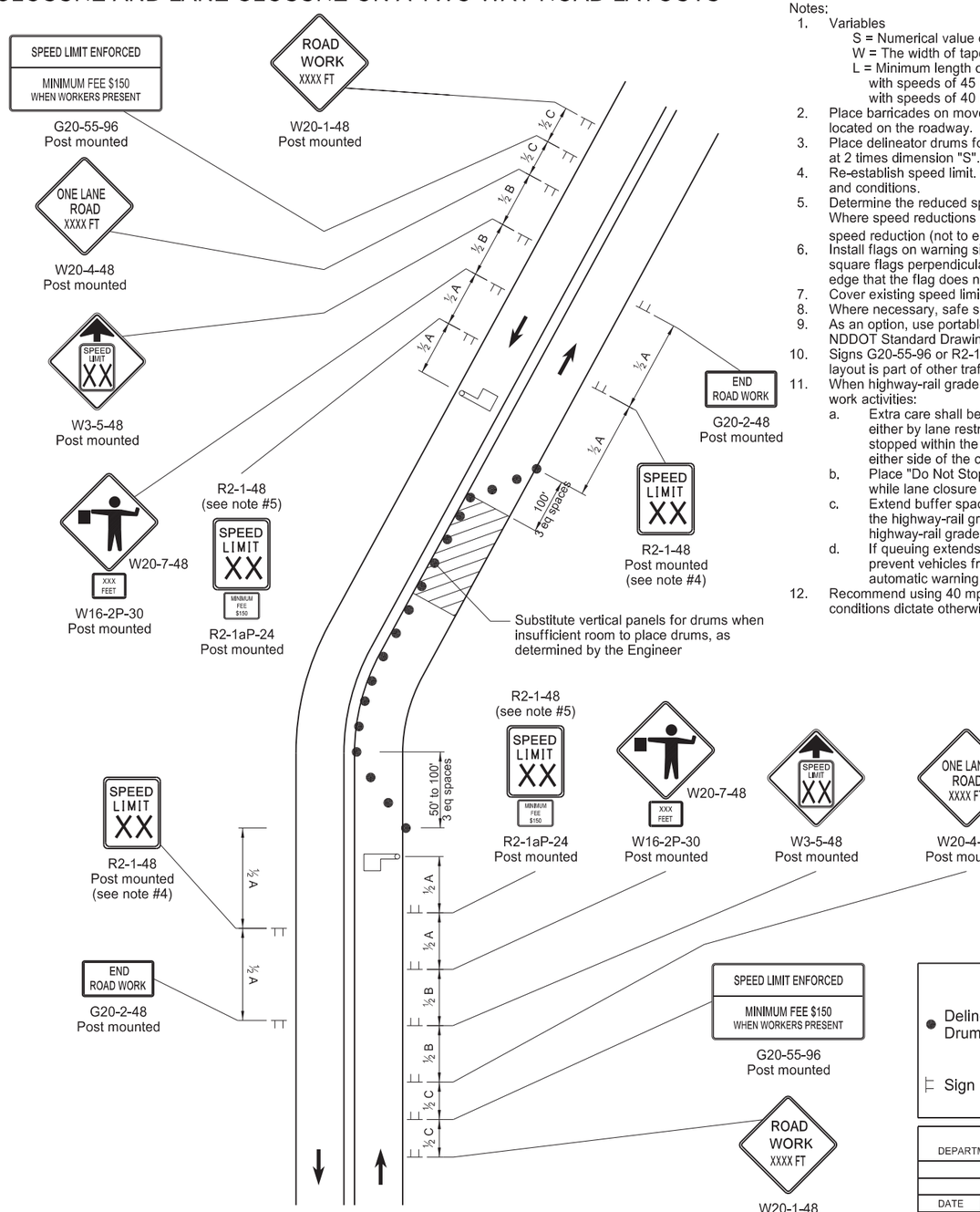
D-704-19



TYPE E
ROAD CLOSURE WITH OFF-SITE DETOUR

Road closed beyond detour point.
Signing shown for one direction only.
Install and maintain signs shown in plans.

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



TYPE F
LANE CLOSURE ON A TWO LANE ROAD USING FLAGGERS

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

Notes:

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

KEY

- Delineator Drum
- Type III Barricade
- Flagger
- Sign
- Work/Hazard Area

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

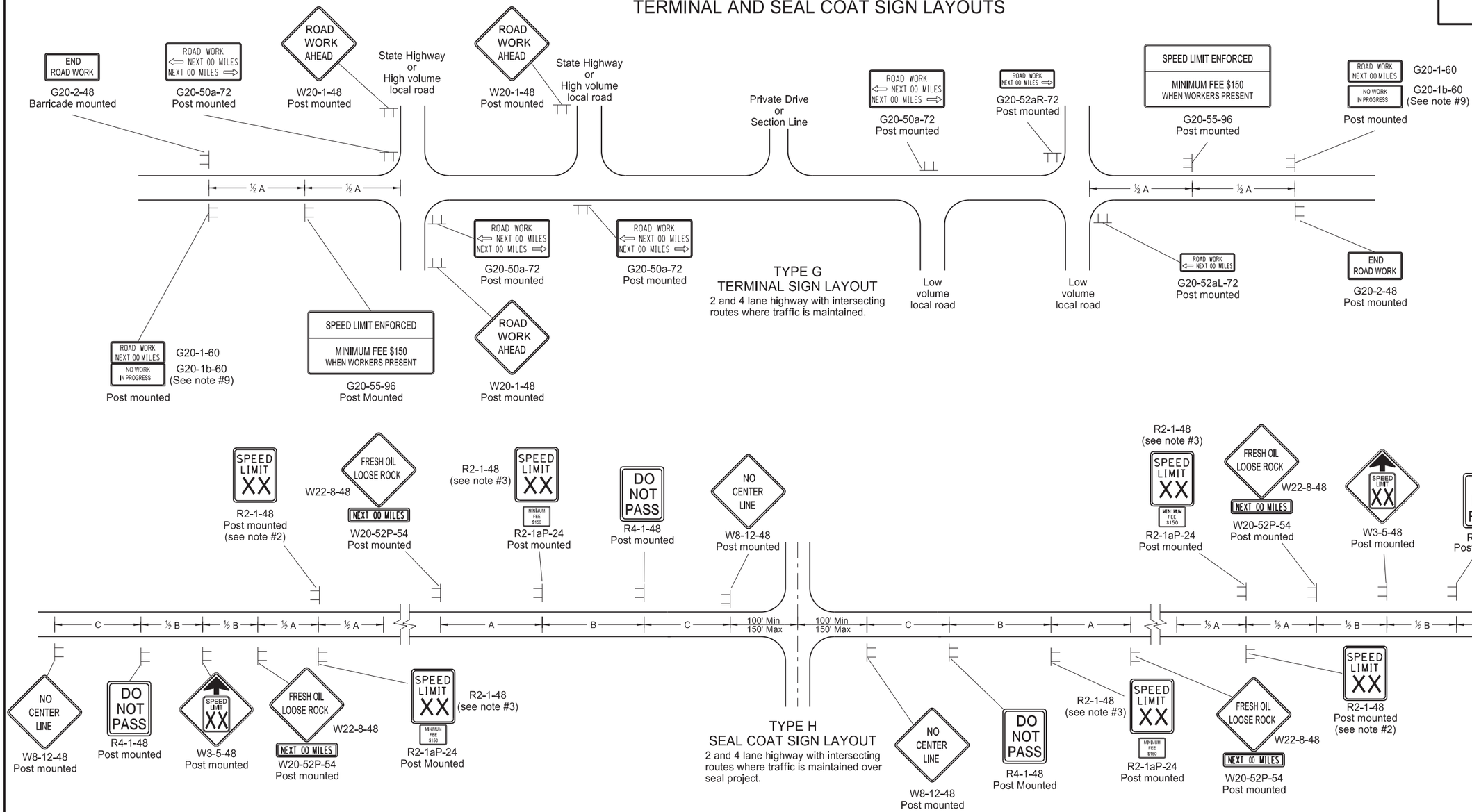
DATE	CHANGE
03-13-14	Revised Sign Cell "ROAD WORK XXX FT"
08-17-17	Update notes & sign numbers
11-01-19	Revised signs, sign #s, & notes
12-08-21	Switched order of Road Work XXX and Spd Limit Enforced & added Dollars At Work
11-29-22	Removed Dollars At Work
06-30-25	Legislative Changes

KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
06/30/25
ENGINEER
NORTH DAKOTA

Docusign Envelope ID: 2F5C9714-A0E1-42BB-B36B-42204844BFCB

TERMINAL AND SEAL COAT SIGN LAYOUTS

D-704-20



Notes:

1. Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
2. Determine the exact speed limit in the field, based on location and conditions.
3. 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 ½ B.
4. 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.
5. Cover existing speed limit signs within a reduced speed zone.
6. 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.
7. As an option, use portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Drawing D-704-14.
8. Cover or remove speed limit signs from layout Type H when loose aggregate is removed.
9. Install sign G20-1b-60 when work is suspended for winter.
10. Use other traffic control layouts in immediate work areas. Place sign R2-1aP-24 below speed limit signs in reduced speed limit work areas.
11. 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.
12. Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

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

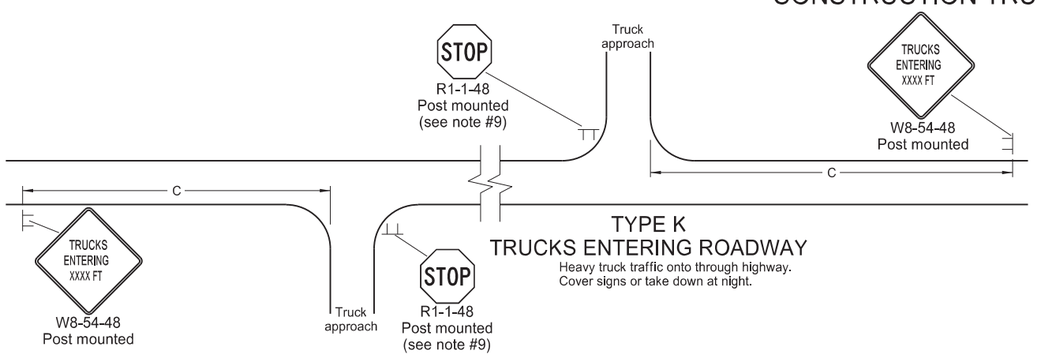
KIRK J. HOFF REGISTERED PROFESSIONAL PE-4683 06/30/25 ENGINEER NORTH DAKOTA

Docusign Envelope ID: 2F5C9714-A0E1-42BB-B36B-42204844BFCB

CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

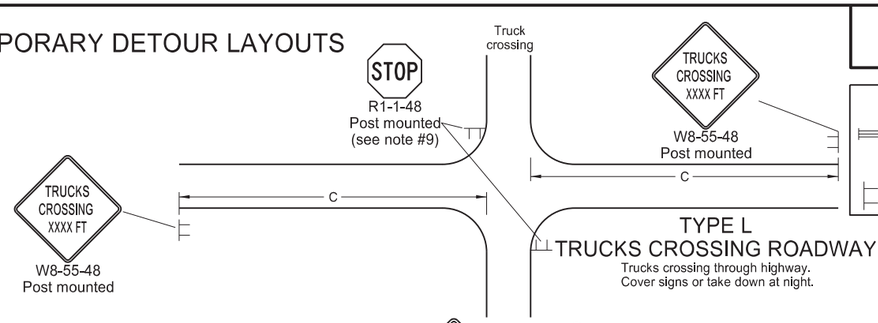
D-704-22

KEY: Type III barricade; Work area; Sign; Flagger



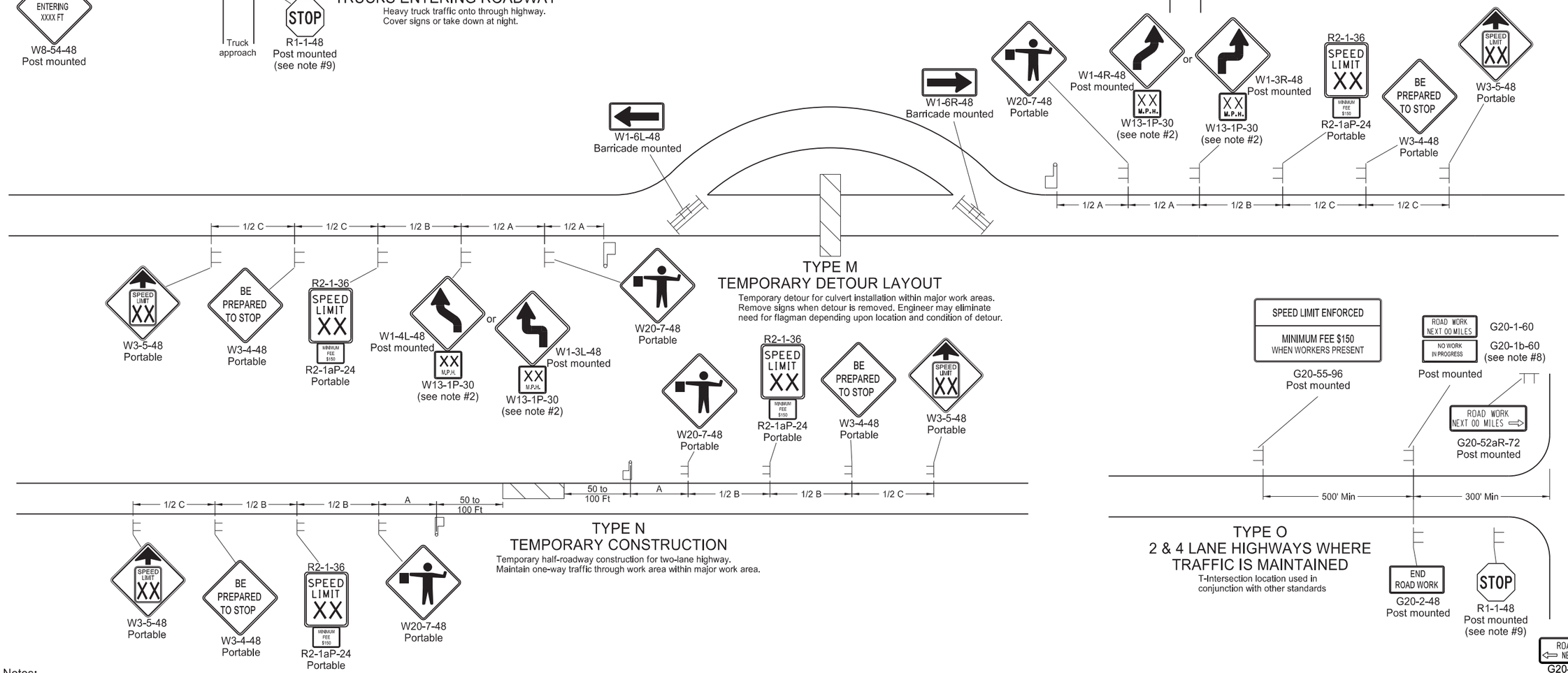
TYPE K
TRUCKS ENTERING ROADWAY

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



TYPE L
TRUCKS CROSSING ROADWAY

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



TYPE M
TEMPORARY DETOUR LAYOUT

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

TYPE N
TEMPORARY CONSTRUCTION

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

TYPE O
2 & 4 LANE HIGHWAYS WHERE TRAFFIC IS MAINTAINED

T-Intersection location used in conjunction with other standards

Notes:

1. Place barricades on a moveable assemblies and signs on portable assemblies when located on roadway.
2. Where necessary, safe speed to be determined by the Engineer.
3. 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 ½ B.
4. 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.
5. Cover existing speed limit signs within a reduced speed zone.
6. Covered (when approved by engineer) or obliterated pavement marking measured as Obliteration of Pavement Marking.
7. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
8. Install sign G20-1b-60 when work is suspended for winter.
9. If existing stop sign is in place, a 48" stop sign is not required.
10. 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.
11. 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

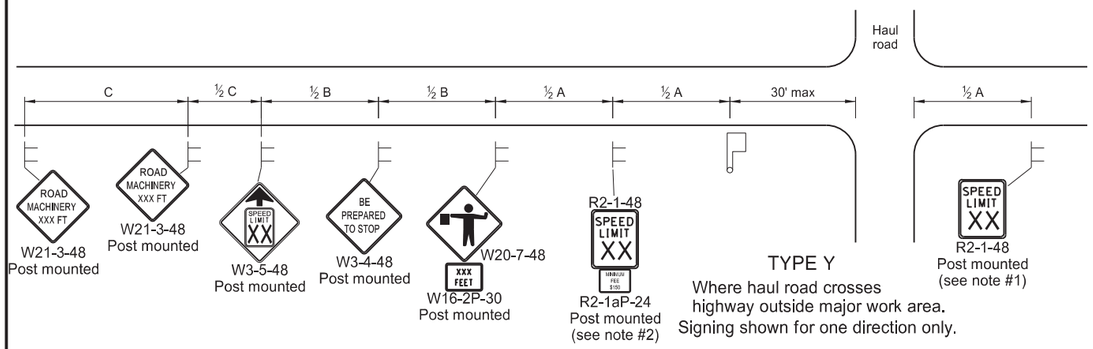
DATE	CHANGE
08-17-17	Update notes & sign numbers
11-01-19	Revised sign numbers & note 7
12-09-21	Added Speed Limit Enforced and Dollars At Work signs
11-29-22	Removed Dollars At Work
06-30-25	Legislative Changes

KIRK J. HOFFMANN
REGISTERED
PROFESSIONAL
PE-4683
06/30/25
ENGINEER
NORTH DAKOTA

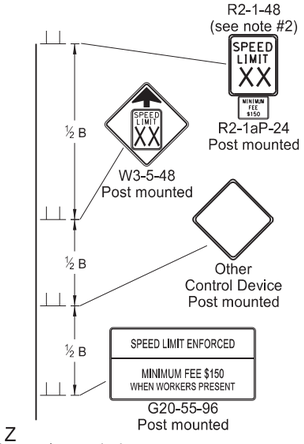
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MISCELLANEOUS SIGN LAYOUTS

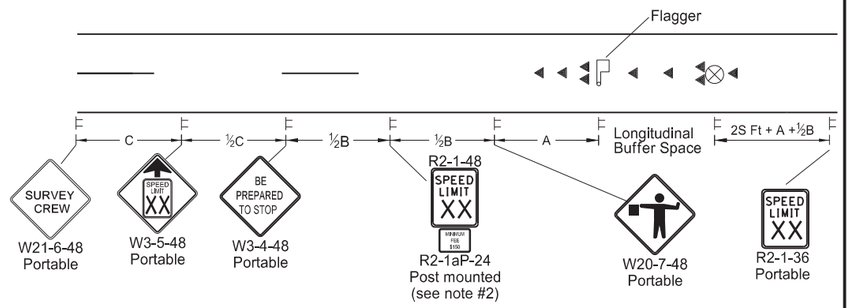
D-704-26



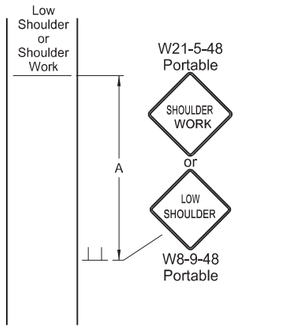
TYPE Y
Where haul road crosses highway outside major work area.
Signing shown for one direction only.



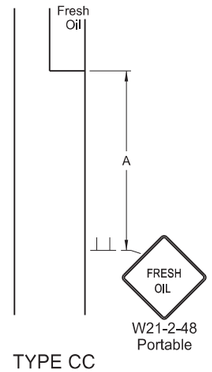
TYPE Z
Where speed zone is needed
Signing shown for one direction only.



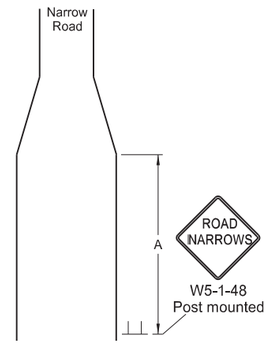
TYPE AA
Where survey crew is used
Signing shown for one direction only.



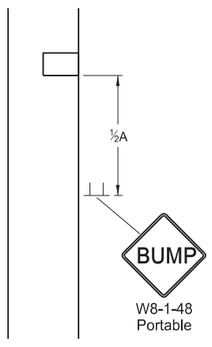
TYPE BB
Within major work area where sign conditions exist



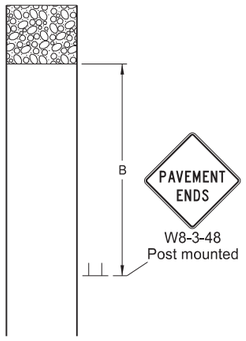
TYPE CC
Where sign conditions exist



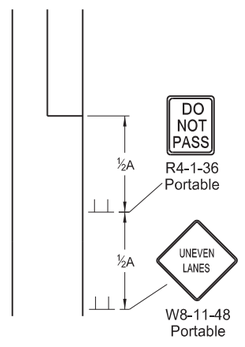
TYPE DD
Where sign conditions exist



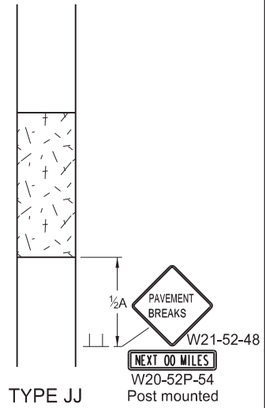
TYPE EE
Where sign conditions exist



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

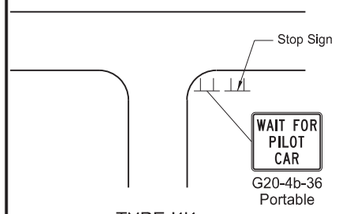


TYPE GG
Where elevation difference exists between lanes



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

KEY
Flagger
Sign
Cones
Survey Equipment
S = Numerical value of speed limit or 85th percentile.



TYPE KK
At major intersections within pilot car control area

Notes
1. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
2. Determine reduced speed limit based on in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at ½B.
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.

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

KIRK J. HOFF
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06/30/25
ENGINEER
NORTH DAKOTA

Docusign Envelope ID: E17899F0-B912-4482-BF85-7148763D5F5D

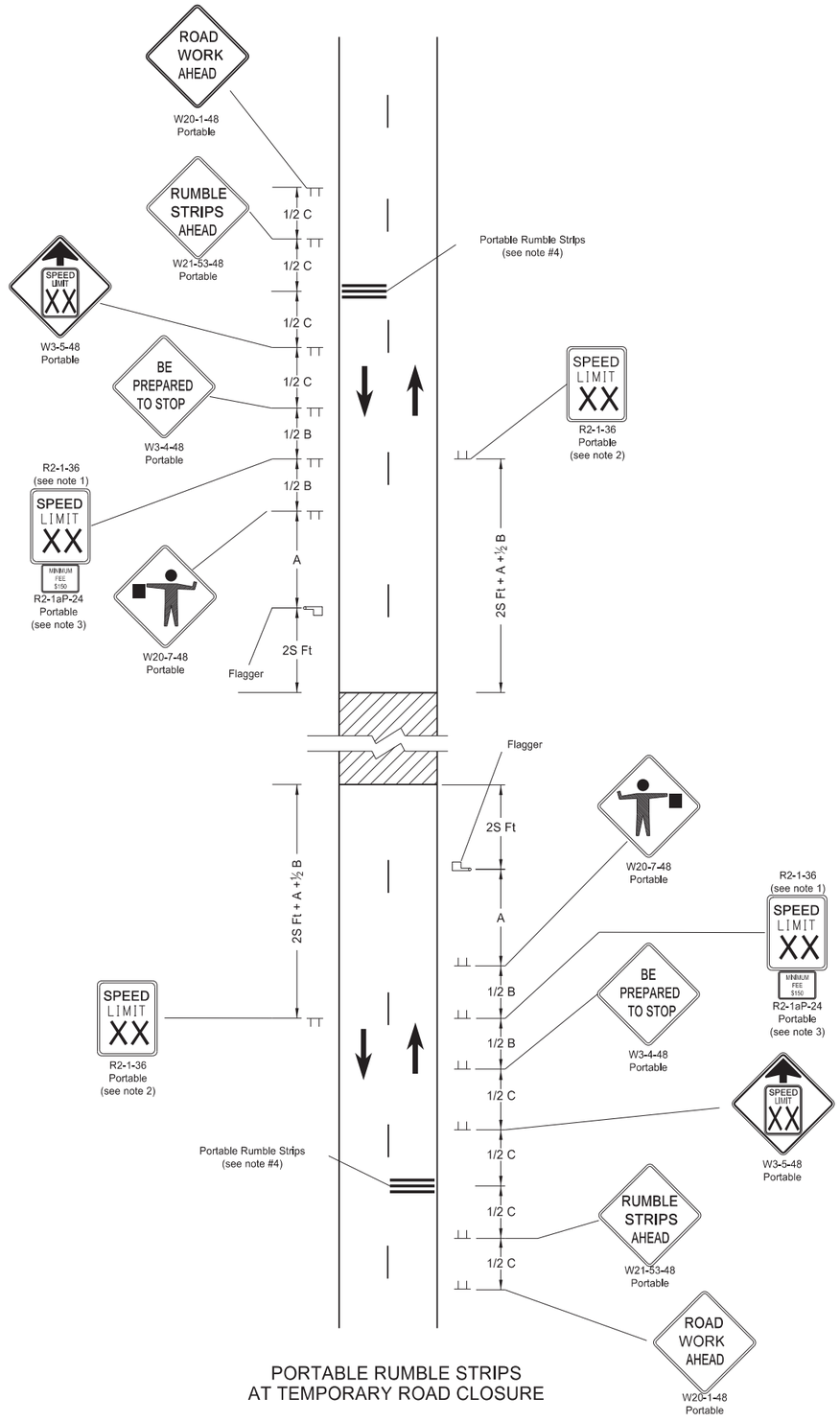
Two-Lane Roadway Portable Rumble Strips

KEY

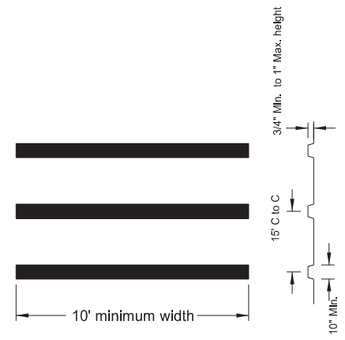
- Work area
- Flagger
- Sign

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

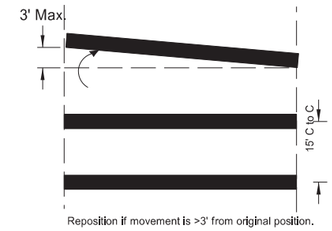
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - High Speed (over 45 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720



PORTABLE RUMBLE STRIPS
AT TEMPORARY ROAD CLOSURE

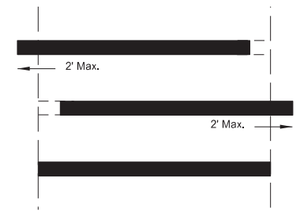


PORTABLE RUMBLE STRIPS ARRAY DETAIL



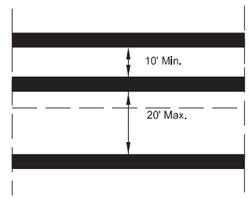
Reposition if movement is >3' from original position.

Skewing



Reposition if movement is >2' from original position.

Lateral



Reposition if distance between strips is <10' or >20'.

Perpendicular to Travel with or against traffic

PORTABLE RUMBLE STRIPS ARRAY TYPES OF MOVEMENT AND MAXIMUM ALLOWANCES

Notes:

1. Determine speed in the field based on location and conditions.
2. Re-establish the speed limit. Determine the exact speed limit in the field, dependent on location and conditions.
3. Sign R2-1aP-24 is not required when pilot car operation is used.
4. Do not use rumble strips on a non paved surface or in a pre-construction speed zone of 45 mph or less.

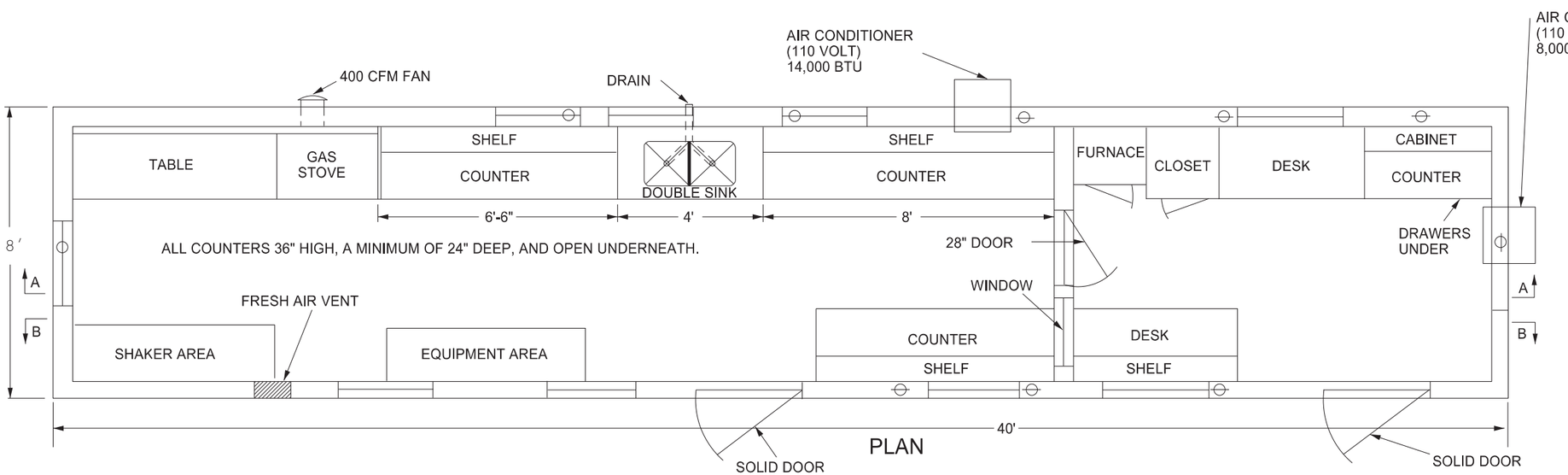
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
02-22-22	
REVISIONS	
DATE	CHANGE
03-07-23	Use changed to min 45 mph
06-30-25	Legislative Changes

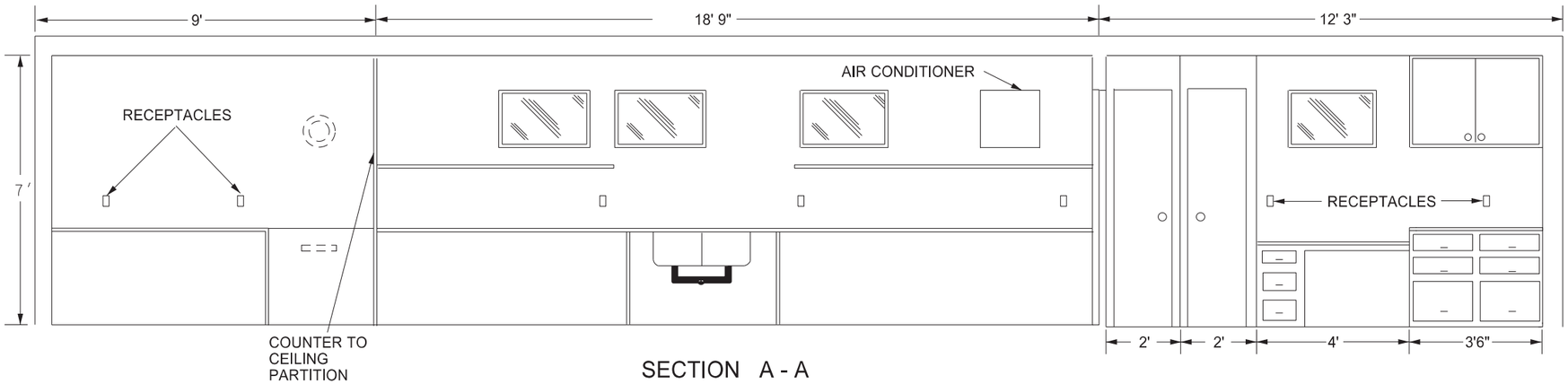
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
06/30/25
ENGINEER
NORTH DAKOTA

DocuSign Envelope ID: F79C127B-7DC6-4C12-8D5B-0260B182956E

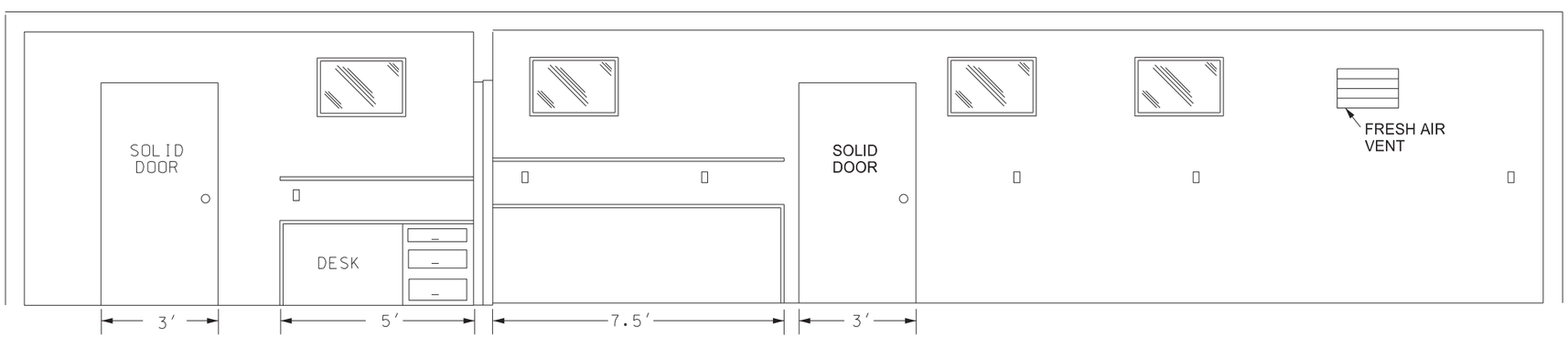
BITUMINOUS LABORATORY

D-706-1





SECTION A - A



SECTION B - B

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

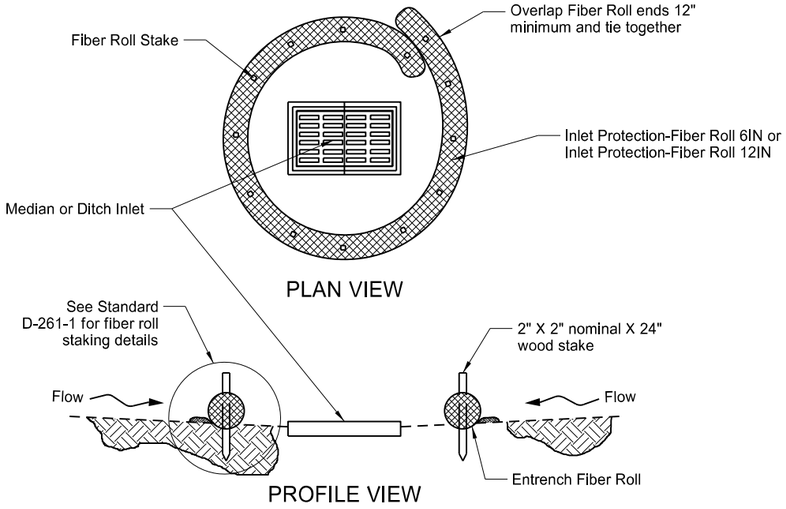
REVISIONS

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.

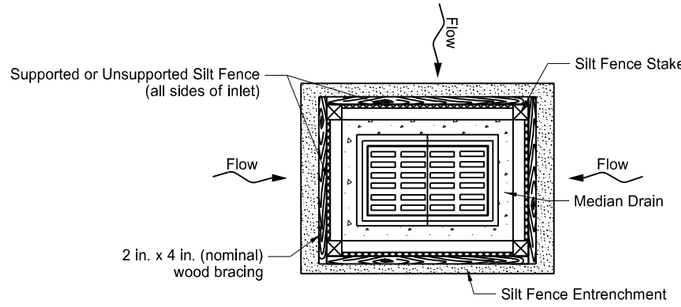
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PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

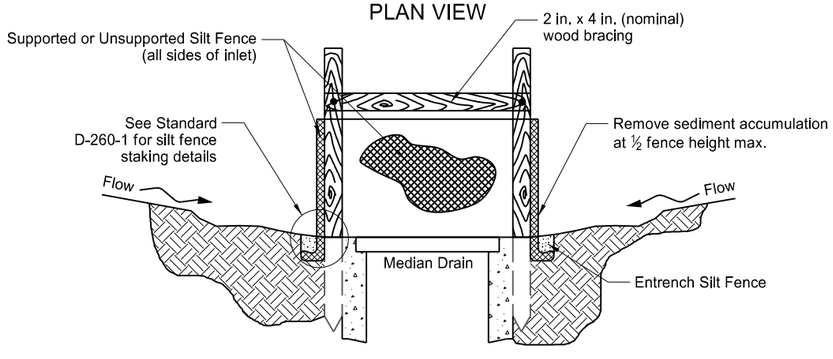
08/09/24

EROSION AND SILTATION CONTROLS
MEDIAN OR DITCH INLET PROTECTION

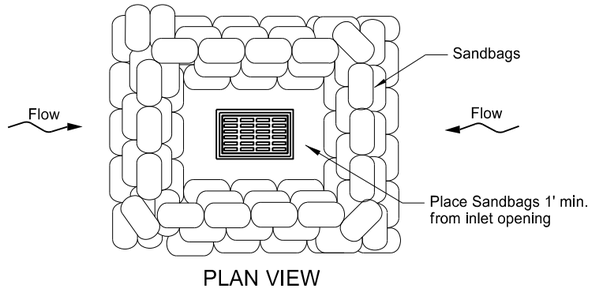


FIBER ROLL PROTECTION (MEDIAN OR DITCH INLET)

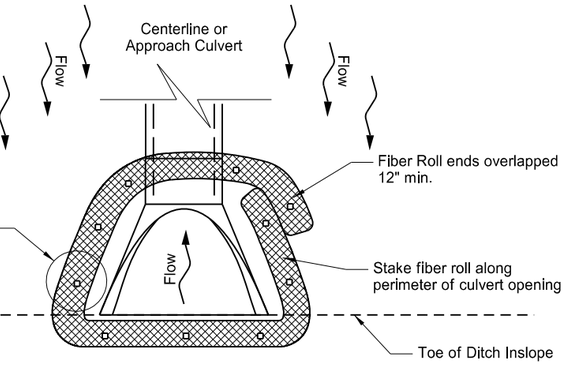




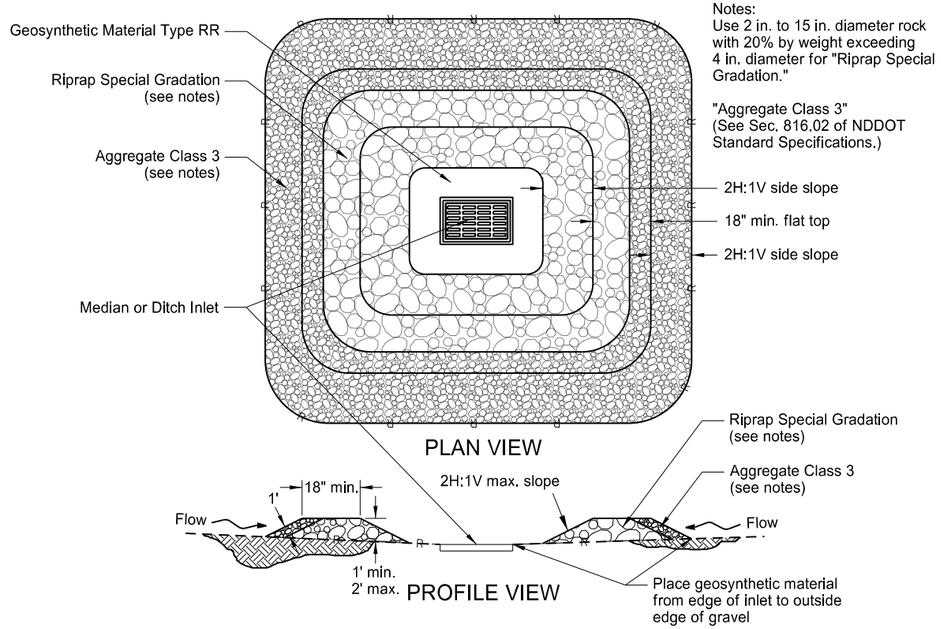
SILT FENCE PROTECTION (MEDIAN OR DITCH INLET)



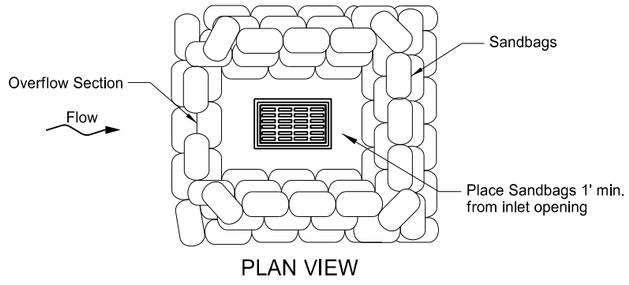
SANDBAG PROTECTION (LOW POINT)



FIBER ROLL PROTECTION (INLET OF CULVERT)



GRAVEL INLET PROTECTION (MEDIAN OR DITCH INLET)



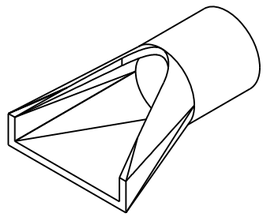
SANDBAG PROTECTION (ON SLOPE)

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
06-26-14	Updated reference to standard drawing number for fiber roll staking details.
10-01-14	Updated reference to standard drawing number for silt fence.
10-17-17	Updated to active voice.
08-27-19	New Design Engineer PE Stamp.

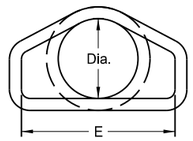
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 8-27-19 and the original document is stored at the North Dakota Department of Transportation

REINFORCED CONCRETE PIPE CULVERTS AND END SECTIONS
(Round Pipe)

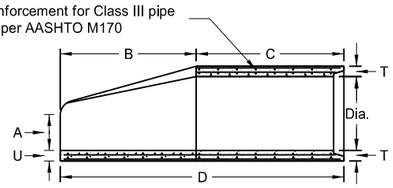
FLARED END SECTION						
TERMINAL DIMENSIONS						
DIA	A	B	C	D	E	U
12	0'-4"	2'-0"	4'-0⅞"	6'-0⅞"	2'-0"	2"
15	0'-6"	2'-3"	3'-10"	6'-1"	2'-6"	2¼"
18	0'-9"	2'-3"	3'-10"	6'-1"	3'-0"	2½"
21	0'-9"	3'-0"	3'-1"	6'-1"	3'-6"	2¾"
24	0'-9½"	3'-7½"	2'-6"	6'-1½"	4'-0"	3"
27	0'-10½"	4'-0"	2'-1½"	6'-1½"	4'-6"	3¼"
30	1'-0"	4'-6"	1'-7¾"	6'-1¾"	5'-0"	3½"
36	1'-3"	5'-3"	2'-9"	8'-0"	6'-0"	4"
42	1'-9"	5'-3"	2'-9"	8'-0"	6'-6"	4½"
48	2'-0"	6'-0"	2'-0"	8'-0"	7'-0"	5"
54	2'-3"	5'-5"	2'-9¼"	8'-2¼"	7'-6"	5½"
60	2'-11"	5'-0"	3'-3"	8'-3"	8'-0"	5"
66	2'-6"	6'-0"	2'-3"	8'-3"	8'-6"	5½"
72	3'-0"	6'-6"	1'-9"	8'-3"	9'-0"	6"
78	3'-0"	7'-6"	1'-9"	9'-3"	9'-6"	6½"
84	3'-0"	7'-6½"	1'-9"	9'-3½"	10'-0"	6½"
90	3'-5"	7'-3½"	2'-0"	9'-3½"	11'-0"	6½"



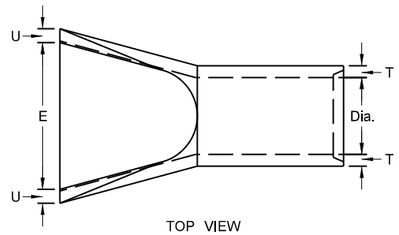
PERSPECTIVE



END VIEW



SIDE VIEW



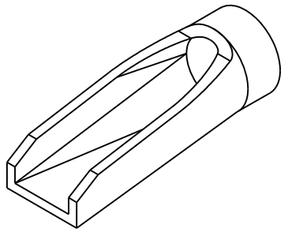
TOP VIEW

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

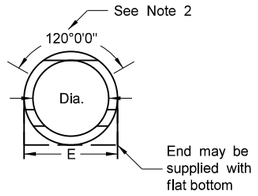
NOTES:

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

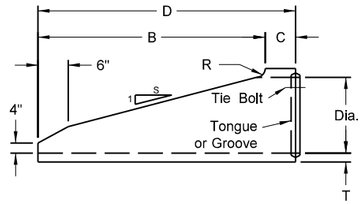
TRAVERSABLE END SECTION						
DIA	B	C	D	E	R	S
15"	4'	9"	4'-9"	1'-7½"	3"	6
18"	5'-9"	9"	6'-6"	1'-11"	3"	6
24"	6'	1'	7'	2'-6"	3"	4
30"	7'-6"	1'	8'-6"	3'-1"	3½"	4
36"	7'-3"	15"	8'-6"	3'-8"	3"	4



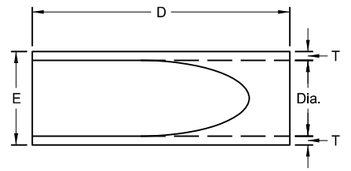
PERSPECTIVE



END VIEW



SIDE VIEW



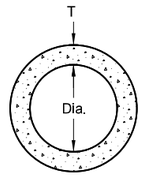
TOP VIEW

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

NOTES (Traversable End Section):

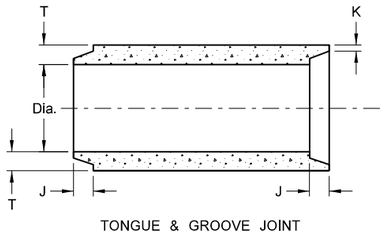
1. Manufactured in accordance with applicable portions of ASTM C76/AASHTO M170.
2. Reinforcement per Class III RCP with double reinforcement in the upper 120° of the full barrel portion.

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 End Min.	Minimum Wall Thickness (T)
Dia	Sq. ft.	Lbs.	In.	In.	In.
12	0.79	92	1⅛-2⅛	¾	2
15	1.23	127	1⅛-2¼	⅞	2¼
18	1.77	168	1⅛-2⅛	1	2½
21	2.40	214	1⅛-3⅛	1⅛	2¾
24	3.14	265	2¾-3¾	1⅛	3
27	3.98	322	2¾-4	1¼	3¼
30	4.91	384	3¼-4¼	1¼	3½
33	5.94	452	3¼-4¼	1½	3¾
36	7.07	524	3¼-4¼	1½	4
42	9.62	685	3¾-4¾	1¾	4½
48	12.57	685	3⅞-4¾	1⅞	5
54	15.90	1070	4⅛-5¼	2	5½
60	19.63	1296	4½-5½	2¼	6
66	23.76	1542	5-6	2⅝	6½
72	28.27	1810	5⅛-6¾	2⅞	7
78	33.18	2098	6¼-7¼	2⅞	7½
84	38.48	2410	5⅛-7¾	3⅜	8
90	44.18	2793	6¾-8½	3⅛	8½
96	50.27	3092	7-8¼	3½	9
102	56.75	3466	7-8¼	3½	9½
108	63.62	3864	7¼-8½	3¾	10

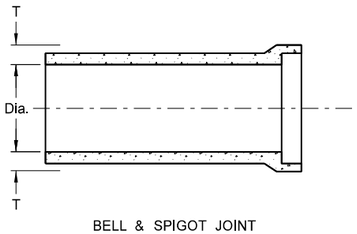


END VIEW

CIRCULAR PIPE

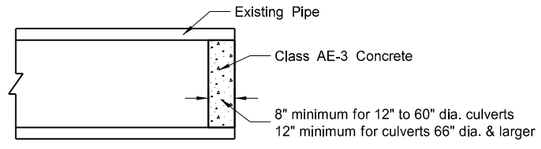


TONGUE & GROOVE JOINT



BELL & SPIGOT JOINT

JOINTS FOR REINFORCED CONCRETE PIPE



CONCRETE PIPE PLUG

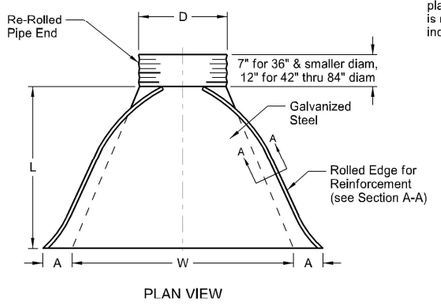
SEE STANDARD DRAWING D-714-22 FOR DETAILS OF CONCRETE PIPE TIES (TIE BOLTS).

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

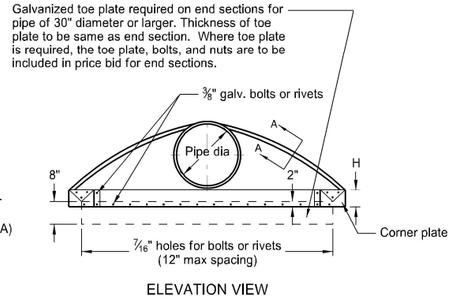
This document was originally issued and sealed by Jon Ketterling Registration Number PE-4684, on 9/18/19 and the original document is stored at the North Dakota Department of Transportation

ROUND CORRUGATED STEEL PIPE CULVERTS AND END SECTIONS

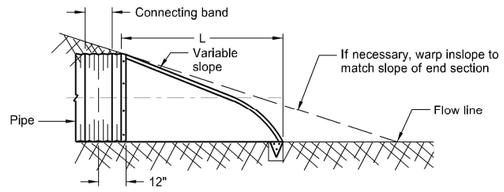
D-714-4



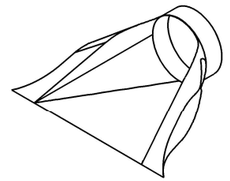
PLAN VIEW



ELEVATION VIEW



TYPICAL CROSS SECTION
(showing connector section)



PERSPECTIVE VIEW

** PIPE DIA.	GALVANIZED THICKNESS	END SECTION DIMENSIONS A	B	H	L	W	APPROX. SLOPE	BODY
IN	IN	IN	IN	IN	IN	IN	RATE	PIECE
15	0.064 - 0.079	7	8	6	26	30	2½:1	1
18	0.064 - 0.109	8	10	6	31	36	2½:1	1
24	0.064 - 0.109	10	13	6	41	48	2½:1	1
30	0.064 - 0.109	12	16	8	51	60	2½:1	1 or 2
36	0.064 - 0.109	14	19	9	60	72	2½:1	2
42	0.064 - 0.138	16	22	11	69	84	2½:1	2
48	0.064 - 0.168	18	27	12	78	90	2¼:1	2
54	0.064 - 0.168	18	30	12	84	102	2:1	2
*60	0.064 - 0.168	18	33	12	87	114	1¾:1	3
*66	0.064 - 0.168	18	36	12	87	120	1½:1	3
*72	0.064 - 0.168	18	39	12	87	126	1½:1	3
*78	0.064 - 0.168	18	42	12	87	132	1¼:1	3
*84	0.064 - 0.168	18	45	12	87	138	1⅛:1	3

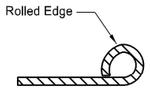
* These sizes have 0.109" sides and 0.138" center panels.

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

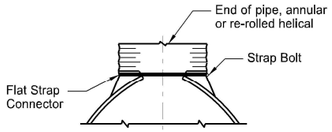
Manufacturers tolerances of above dimensions will be allowed.

Splices to be the lap riveted type.

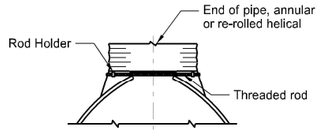
Multiple panel bodies shall have lap seams which are to be tightly joined with ⅜" dia. galv. bolts or rivets. Nuts to be torqued to 25 foot-lbs ±.



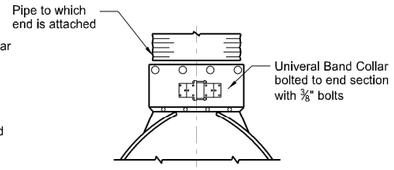
SECTION A-A



TYPE #1
For circular pipes with diameter 24" & smaller



TYPE #2
For circular pipes with diameter 30" through 36"

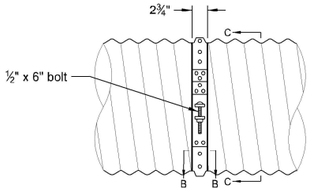


TYPE #3
For all pipe sizes

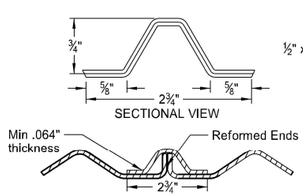
COUPLING BAND DIMENSIONS				
COUPLING TYPE	CORRUGATION PITCH x DEPTH	PIPE SIZE	COUPLING BAND LENGTH	MIN. BAND THICKNESS
Hat Band	2⅔" x ½"	12" - 48"	2¾"	.064"
Annular Band	2⅔" x ½"	12" - 72"	12"	.052"
		78" - 84"	12"	.079"
	3" x 1"	48" - 120"	14"	.052"
Hugger Band	2⅔" x ½" Rerolled End	12" - 72"	10½"	.052"
		78" - 84"	10½"	.079"
	3" x 1" Rerolled End	48" - 120"	10½"	.052"
	5" x 1" Rerolled End	48" - 120"	12"	.064"

NOTES:

1. Pipes and connecting bands shall conform to applicable sections of NDDOT Standard Specifications and to AASHTO M-36.
2. 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 ¼" galv. angle for 60" through 72" dia. and 2½" x 2½" x ¼" galv. angle for 78" and 84" dia.. Angles to be attached by galv. ⅜" dia. bolts and nuts. Angles are to extend from pipe to the corner wing bend.
3. 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.
4. 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.
5. ½" x 8" bolts may be used as a substitute for the ½" x 6" bolts shown in the details.
6. Coupling bands wider than 14" may be used if a minimum of four ½" bolts with maximum spacing of 5½" are used for the connection.
7. Length of spot welds shall be minimum ½".



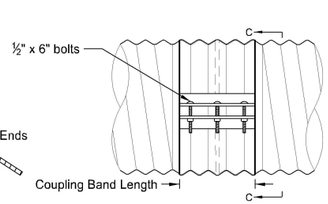
SIDE VIEW



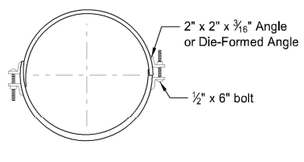
SECTIONAL VIEW

SECTION B-B

HAT BAND FOR FLANGED END PIPE

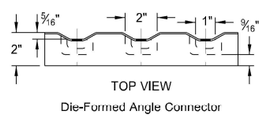


SIDE VIEW

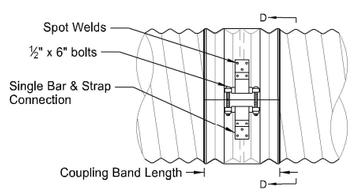


SECTION C-C
Angle Connection

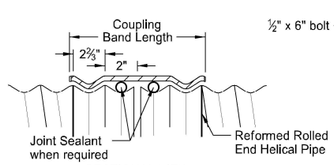
ANNULAR BAND



TOP VIEW
Die-Formed Angle Connector

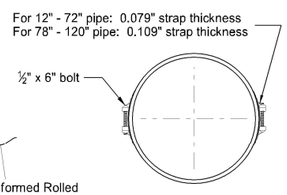


SIDE VIEW

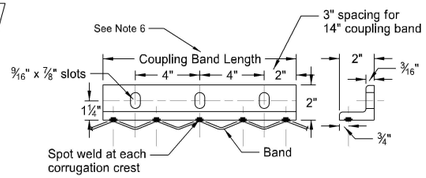


SECTIONAL VIEW

HUGGER COUPLING BAND



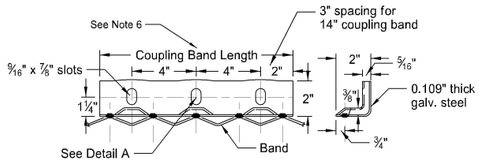
SECTION D-D
Bar & Strap Connection



SIDE VIEW

END VIEW

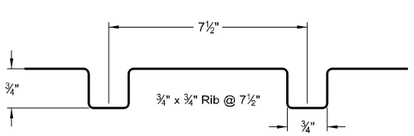
2" x 2" x 3/16" Angle Connector

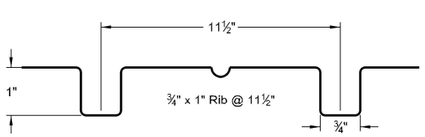


SIDE VIEW

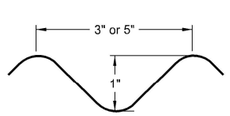
END VIEW

Die-Formed Angle Connector

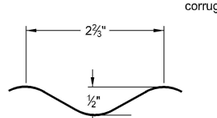




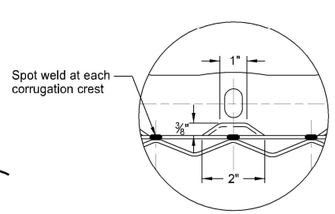
SPIRAL RIB CORRUGATIONS



3" x 1" CORRUGATIONS or
5" x 1" CORRUGATIONS



2⅔" x ½" CORRUGATIONS



Detail A

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

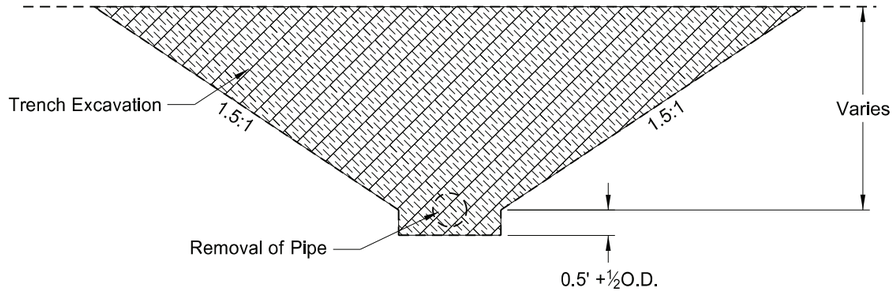
JONATHAN D KETTERLING
REGISTERED
PROFESSIONAL
PE-4684
ENGINEER
NORTH DAKOTA

09/23/22

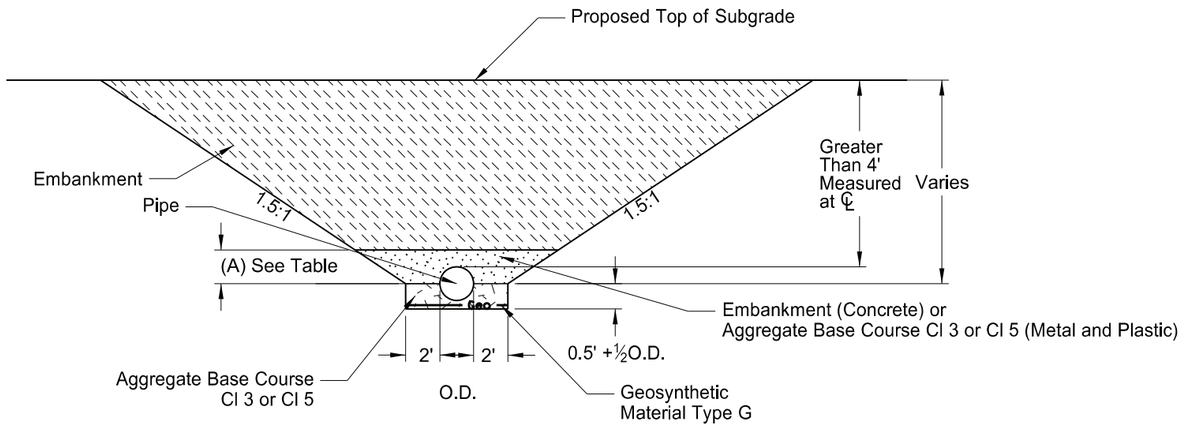
DocuSign

TRANSVERSE MAINLINE PIPE INSTALLATION DETAIL
PIPES MORE THAN 4 FEET BELOW TOP OF SUBGRADE

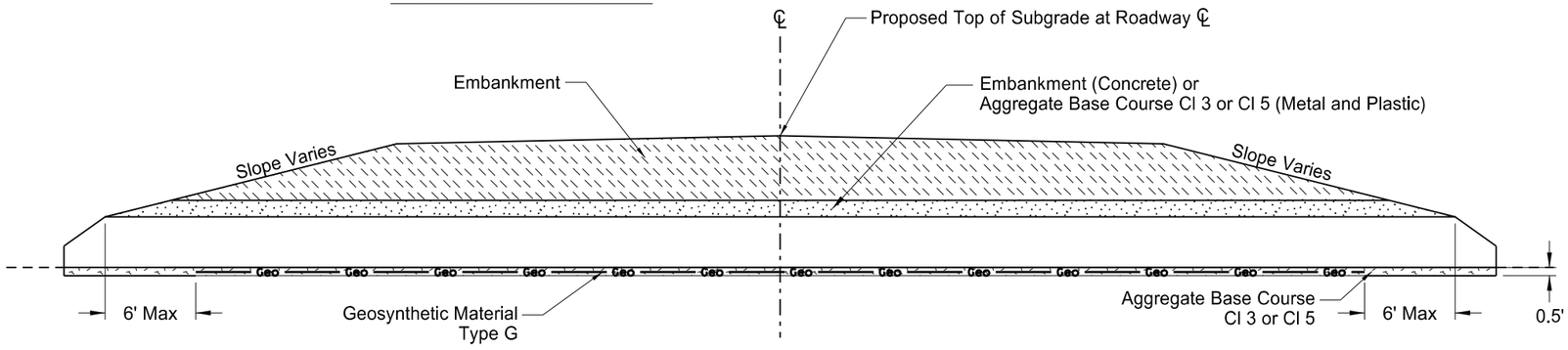
D-714-25



EXCAVATION DETAIL



INSTALLATION DETAIL



CROSS SECTION

Pay Items
1) Pipe*
2) Geosynthetic Material Type G
3) Removal of Pipe (if required)

*Included in Pipe Pay Item
1) Pipe
2) Trench excavation
3) Aggregate Base Course Cl 3 or Cl 5
4) Embankment

NOTES:

1) This drawing applies to new/replaced mainline and paved intersection roadways (including ramps). It does not include pipes in approaches.

2) Embankment may be either Borrow Excavation or Common Excavation - Type A.

Backfill Dimensions	
Pipe Materials	Dimension (A)
Concrete	0.5 O.D.
Metal and Plastic	0.5 O.D. + 1 Foot

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

7-26-13

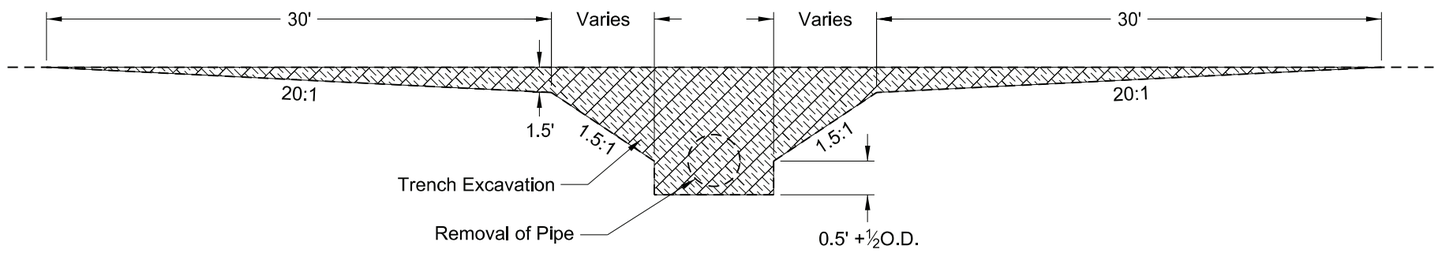
REVISIONS

DATE	CHANGE
10-15-13	Label Formatting
1-21-14	Nomenclature
9-18-15	Title Rewording
12-10-15	Added Plastic Pipe
5-27-20	Replaced R1 Fabric with Geogrid Changed bedding depth

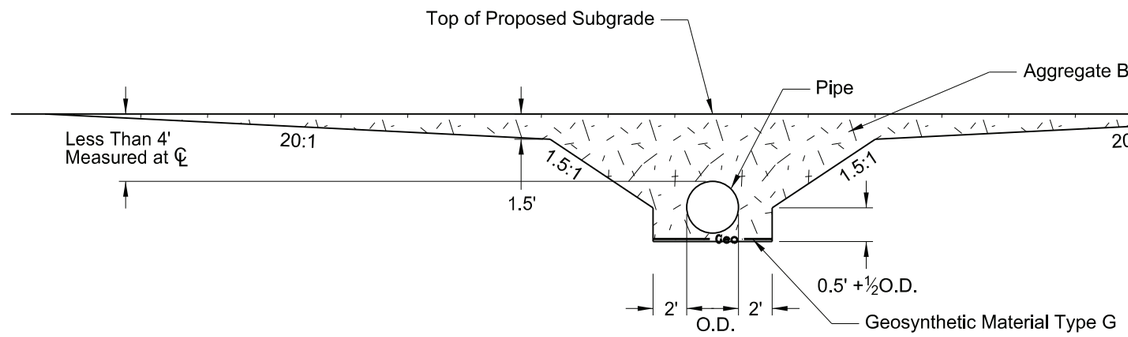
REGISTERED PROFESSIONAL ENGINEER
MATTHEW C KURLE
PE-8777
DATE
05/27/20
NORTH DAKOTA
DocuSign

TRANSVERSE MAINLINE PIPE INSTALLATION DETAIL
PIPES 4 FEET OR LESS BELOW TOP OF SUBGRADE

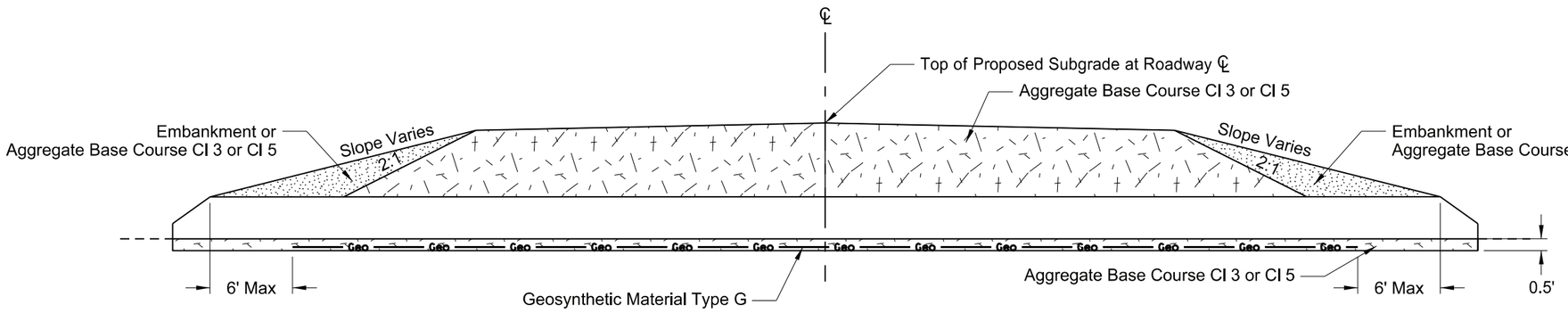
D-714-26



EXCAVATION DETAIL



INSTALLATION DETAIL



CROSS SECTION

Pay Items
1) Pipe*
2) Geosynthetic Material Type G
3) Removal of Pipe (if required)

*Included in Pipe Pay Item
1) Pipe
2) Trench Excavation
3) Aggregate Base Course Cl 3 or Cl 5
4) Embankment

NOTES:

1) This drawing applies to new/replaced mainline and paved intersection roadway pipes only (including ramps). It does not include pipes in approaches.

2) Embankment may be either borrow Excavation or Common Excavation - Type A

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

7-26-13

REVISIONS

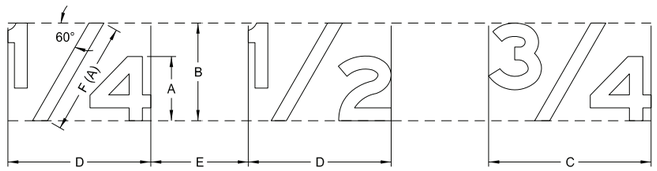
DATE	CHANGE
10-15-13	Label Formatting
1-21-15	Nomenclature
9-18-15	Title Rewording
5-27-20	Replaced R1 Fabric with Geogrid Changed bedding depth

REGISTERED PROFESSIONAL ENGINEER
MATTHEW C KURLE
PE-8777
DATE
05/27/20
NORTH DAKOTA
DocuSign

DocuSign Envelope ID: 3BB6949C-35F3-4834-B8EF-90A4185B6E25

LETTER AND ARROW DETAILS

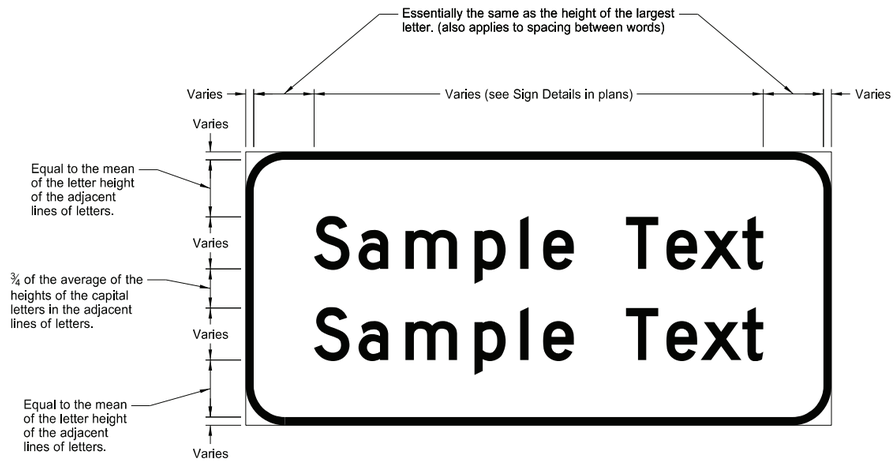
D-754-9



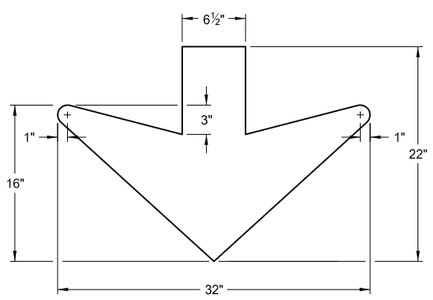
DETERMINE SIZE OF THE FRACTION AS FOLLOWS:

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

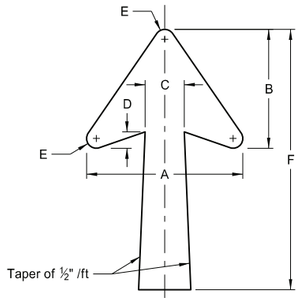
(A) Center diagonal stroke of fraction optically.



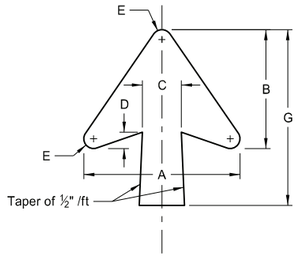
TYPICAL SPACING



DOWN ARROW



TYPE A

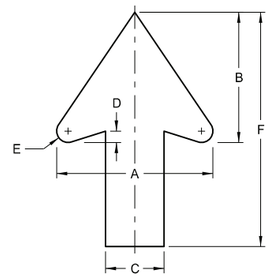


TYPE B

DESIGNATION	LETTER SIZE (Upper Case)	A	B	C	D	E	F	G
ND_6IN	6"	12"	9.125"	3"	1"	0.625"	20"	13.5"
ND_8IN	8"	15.125"	11.563"	3.75"	1.313"	0.813"	25"	17"
ND_10IN	10"	18.25"	14"	4.5"	1.5"	0.75"	30"	20"
ND_12IN	12"							
ND_13IN	13.3"							
ND_16IN	16"	22.25"	17"	5.375"	1.75"	1"	35"	25"
ND_20IN	20"							

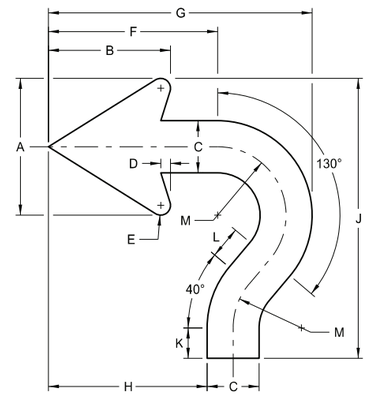
NOTE: Arrow size on gore signs is based on the letter size of "EXIT".

NOTE: Measure rotation angle of arrows counterclockwise from positions shown in details.



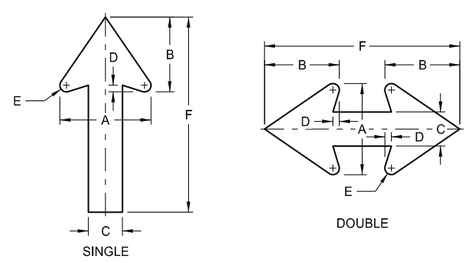
TYPE D

DESIGNATION	LETTER SIZE (Upper Case)	A	B	C	D	E	F
ND_2IN	2"	2"	1.625"	0.75"	0.125"	0.125"	3"
ND_4IN	4"	4"	3.313"	1.5"	0.25"	0.25"	6"
ND_6IN	6"	6"	4.875"	2.25"	0.375"	0.375"	9"
ND_8IN	8"	8"	6.625"	3"	0.5"	0.5"	12"
ND_10IN	10"	10"	8.375"	3.75"	0.75"	0.75"	15"
ND_12IN	12"	12"	10"	4.5"	0.875"	0.875"	18"



ROUNDABOUT

DESIGNATION	LETTER SIZE (Upper Case)	A	B	C	D	E	F	G	H	J	K	L	M
ND_6IN	6"	5.25"	4.688"	2"	0.375"	0.375"	6.5"	10.125"	6.094"	10.75"	1.168"	1.25"	2.625"
ND_8IN	8"	7"	5.75"	2.625"	0.5"	0.5"	8.688"	13.5"	8.166"	14.333"	1.557"	1.667"	3.5"



SPECIAL

DESIGNATION	A	B	C	D	E	F	USES
ND_0.75IN	2"	1.625"	0.75"	0.125"	0.125"	7.75"	Parking Signs (Regulatory)
ND_2.625IN	7"	5.75"	2.625"	0.5"	0.5"	15"	Frontage Road Signs

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

8-3-11

REVISIONS

DATE	CHANGE
7-8-14	Revised gore sign and added 4" D & D arrow
5-4-16	Revised Distance & Destination and Typical Spacing details
4-23-18	Revised arrow details
8-30-18	Updated notes to active voice.
8-29-19	New Design Engr PE Stamp.
8-05-24	Electronic Stamp/Signature.

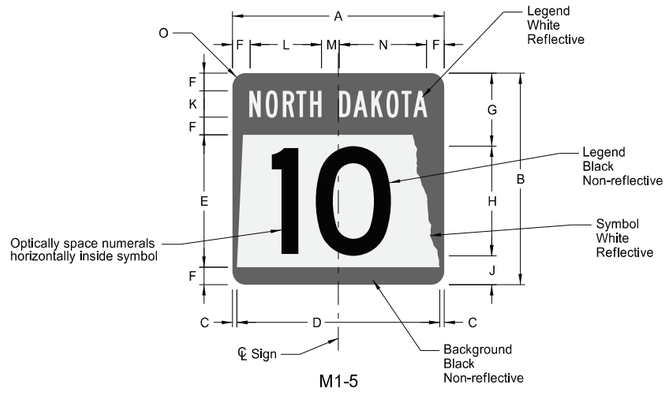
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PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/05/24

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STATE HIGHWAY ROUTE SHIELD DETAIL

D-754-11

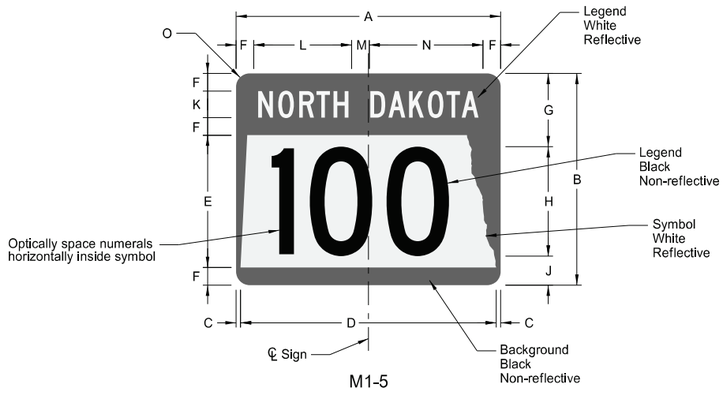


M1-5

STATE ROUTE MARKER

SIGN	DIMENSION (INCHES)													
	A	B	C	D	E	F	G	H	J	K	L	M	N	O
1, 2 digits	18*	18*	0.38	17.25	11.25	1.5	6.38	9 D**	2.63	2.25 B	6.1	1.5	7.4	1.5
1, 2 digits	24	24	0.5	23	15	2	8.5	12 D**	3.5	3 B	8.1	2	9.9	1.5
1, 2 digits	36	36	0.75	34.5	22.5	3	12.75	18 D**	5.25	4.5 B	12.1	3	14.9	2.25
1, 2 digits	48*	48*	1	46	30	4	17	24 D**	7	6 B	16.2	4	19.8	3

* Size not for independent use (only for use within a guide sign)
** Reduce numeral spacing by 25%

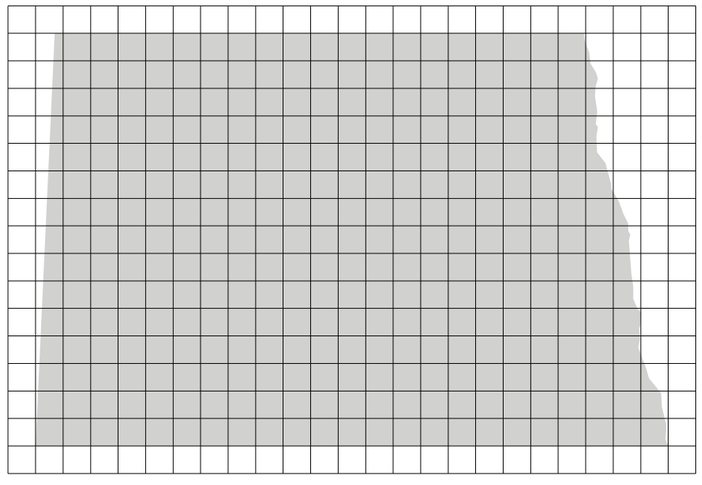


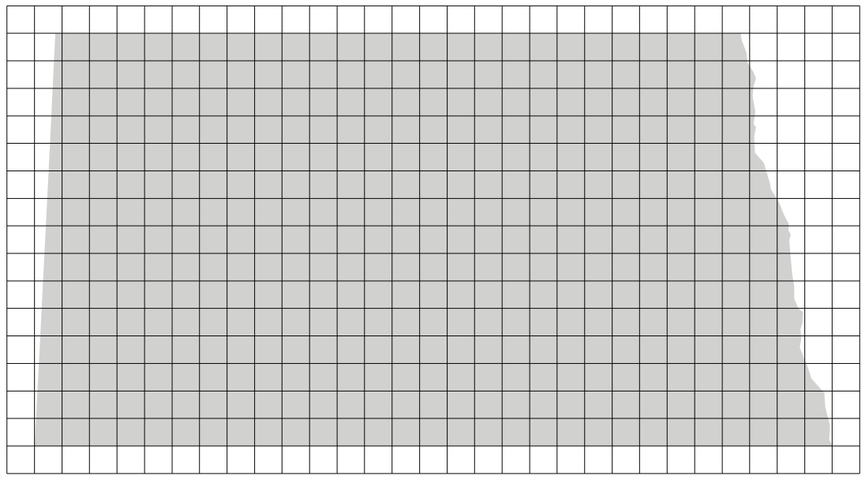
M1-5

STATE ROUTE MARKER

SIGN	DIMENSION (INCHES)													
	A	B	C	D	E	F	G	H	J	K	L	M	N	O
3 digits	24*	18*	1,13	21,75	11,25	1,5	6,38	9 C**	2,63	2,25 C	8,8	2	10,2	1,5
3 digits	30	24	0.5	29	15	2	8.5	12 C**	3.5	3 C	10.7	2.5	12.8	1.5
3 digits	45	36	0.75	43.5	22.5	3	12.75	18 C**	5.25	4.5 C	16.1	3.8	19.1	2.25
3 digits	60*	48*	1	58	30	4	17	24 C**	7	6 C	21.5	5	25.5	3
4 digits	24*	18*	1.13	21.75	11.25	1.5	6.38	9 B***	2.63	2.25 C	8.8	2	10.2	1.5
4 digits	30	24	0.5	29	15	2	8.5	12 B***	3.5	3 C	10.7	2.5	12.8	1.5
4 digits	45	36	0.75	43.5	22.5	3	12.75	18 B***	5.25	4.5 C	16.1	3.8	19.1	2.25
4 digits	60*	48*	1	58	30	4	17	24 B***	7	6 C	21.5	5	25.5	3

* Size not for independent use (only for use within a guide sign)
** Reduce numeral spacing by 25%
*** Reduce numeral spacing by 50%





Note: North Dakota symbol graphics file may be obtained from the Design Division of North Dakota Department of Transportation.

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

4-23-18

REVISIONS

DATE	CHANGE
8-29-19	New Design Engineer PE Stamp.
8-05-24	Electronic Stamp/Signature.

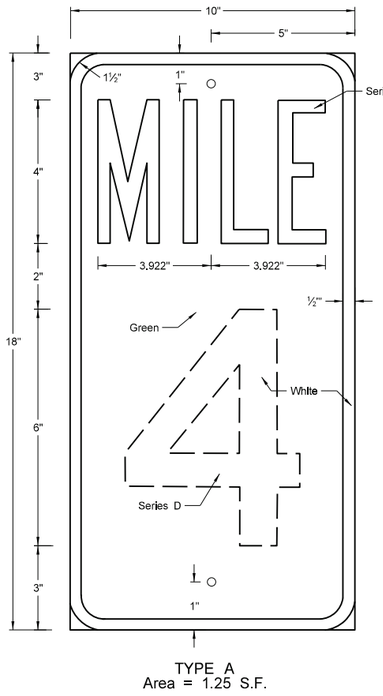
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PE-4683
ENGINEER
NORTH DAKOTA

08/05/24

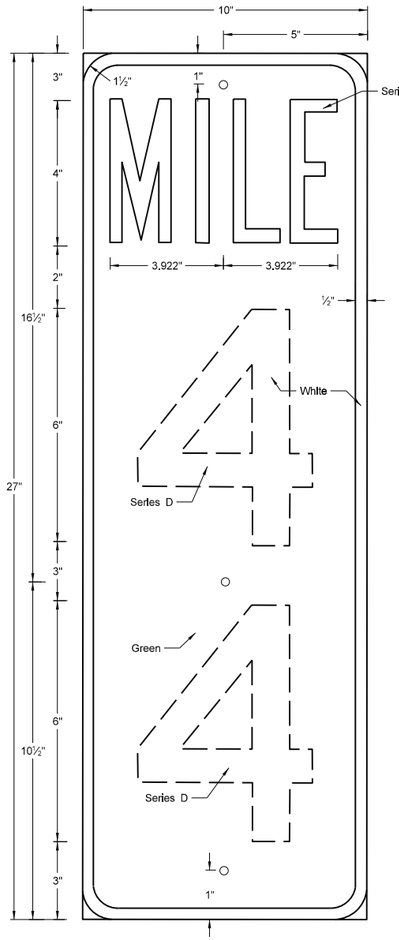
DocuSign Envelope ID: 3BB6949C-35F3-4834-B8EF-90A4185B6E25

(CONVENTIONAL USE) REFERENCE MARKERS

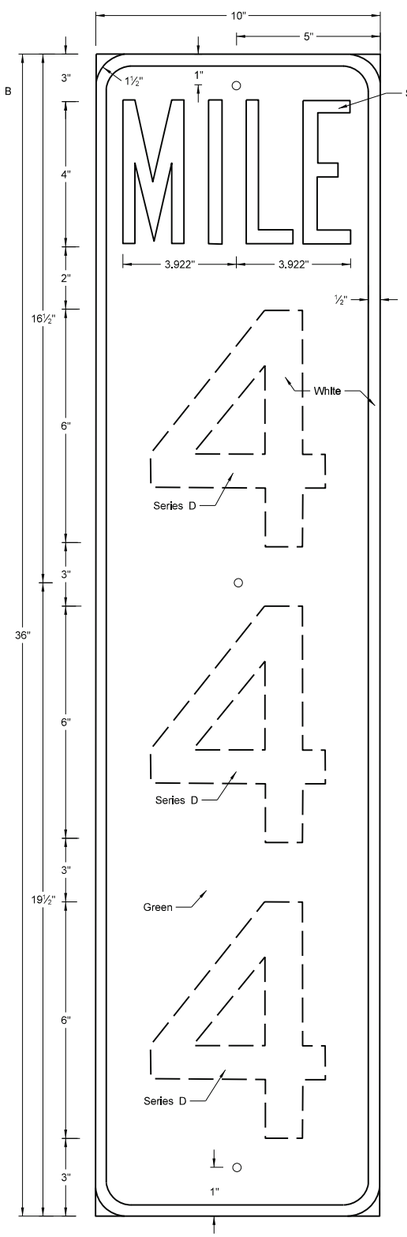
D-754-19



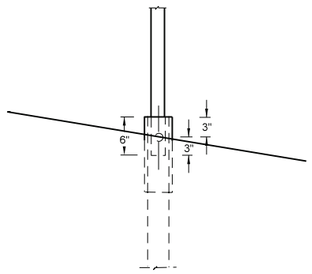
TYPE A
Area = 1.25 S.F.



TYPE B
Area = 1.88 S.F.

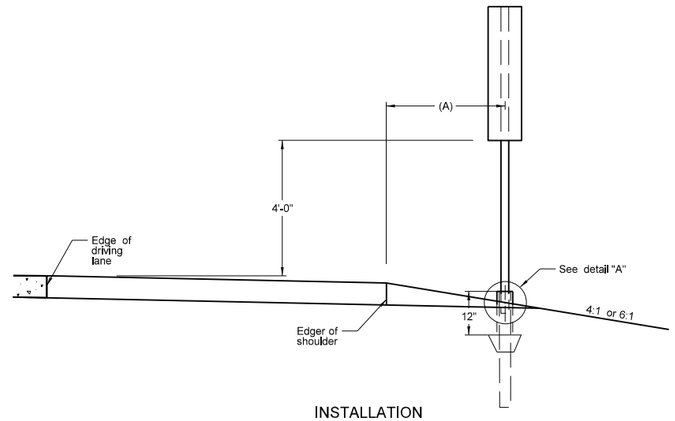


TYPE C
Area = 2.50 S.F.

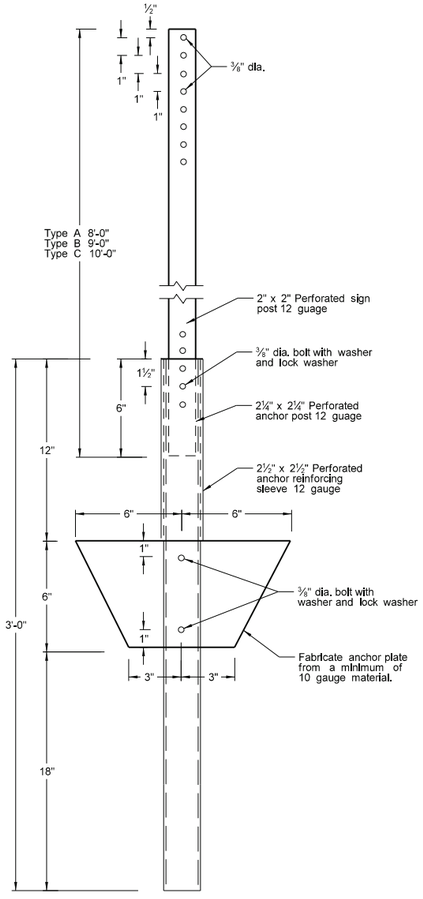


DETAIL "A"

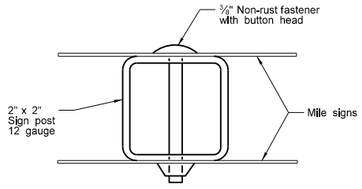
(A) 8' Clearance to finished shoulder or in line with existing delineator posts.



INSTALLATION



POST AND ANCHOR PLATE DETAIL



ASSEMBLY DETAIL
(back to back)

NOTES:
Installation: Install posts along right shoulder.

Sign: Fabricate backing of 0.080 aluminum.

Fasteners: Attach signs to post with tension pin type fastener or other suitable vandal resistant non-rust fastener.

Reflective Sheeting: Use Type IV sheeting.

Numbers: Use screened or applied copy numbers of the series shown.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
7-8-14	Revised post and reflective sheeting notes
8-30-18	Updated to active voice.
8-29-19	New Design Engineer PE Stamp.
8-05-24	Electronic Stamp/Signature.

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ENGINEER
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08/05/24

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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.

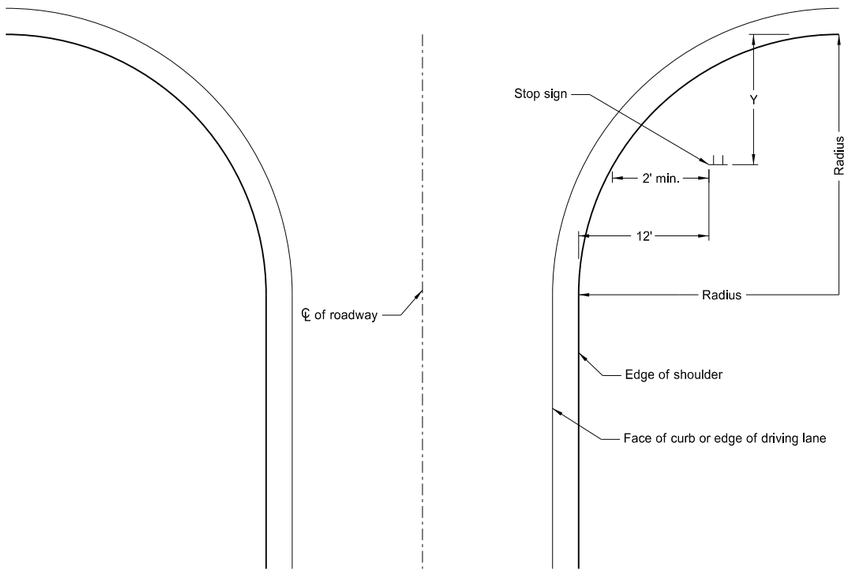
   Install signs on expressways a minimum height of 7'.

   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.

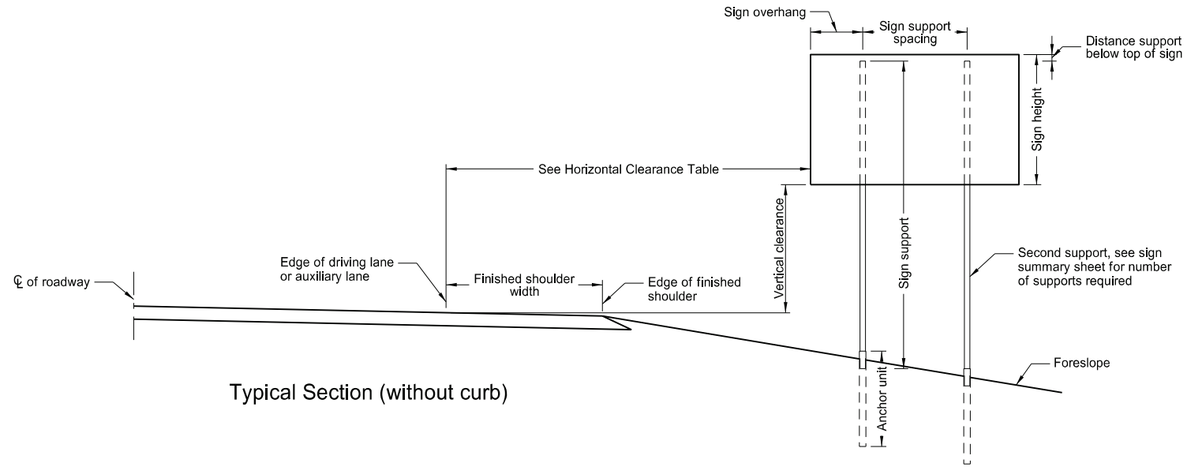
4. Provide a horizontal clearance from edge of shared use path to edge of sign of 3', except where width is limited. Provide a minimum clearance of 2'.



Stop Sign Location
Wide Throat Intersection

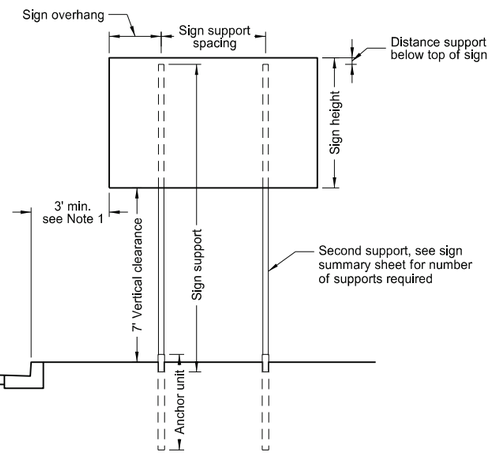
Use layout for the placement of "Stop" signs.

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



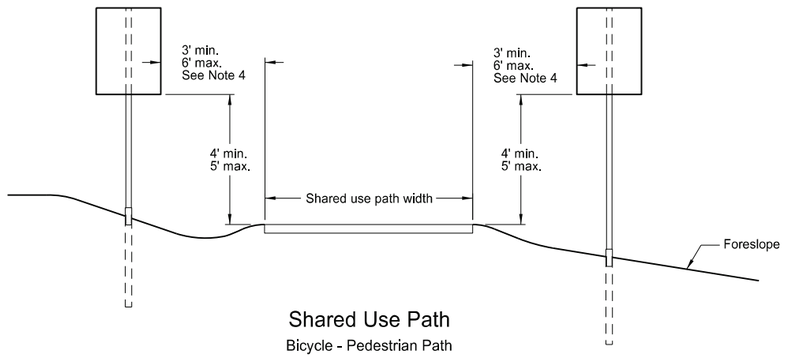
Typical Section (without curb)

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



Shared Use Path

Bicycle - Pedestrian Path

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
7-8-14	Revised note 2, added note 4.
8-30-18	Updated notes to active voice.
8-29-19	New Design Engineer PE Stamp.
8-05-24	Electronic Stamp/Signature.

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PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

Kirk J. Hoff

08/05/24

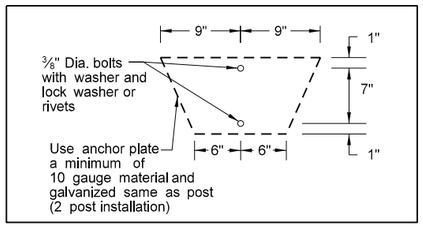
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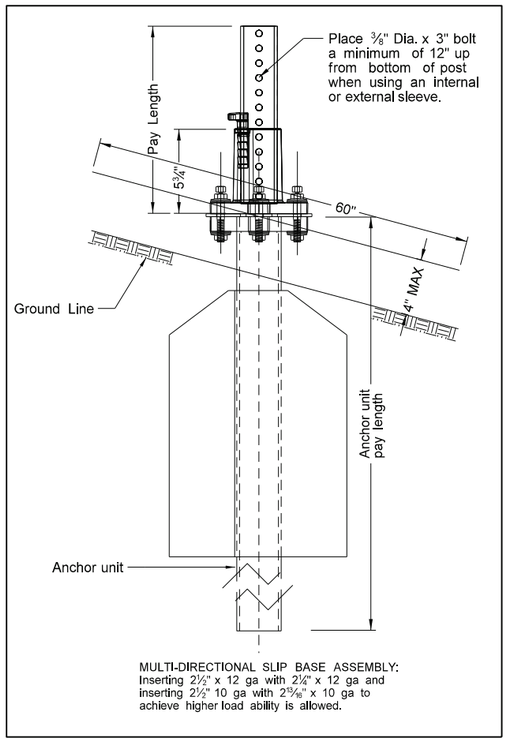
Mounting Details Perforated Tube

D-754-24

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	2¼	12
1	2¼	12			No	2½	12
1	2½	12			(B)	3(C)	7
1	2½	10			Yes		7
1	2¼	12	2½(D)	12	Yes		7
1	2½	12	2¼	12	Yes		7
2	2½	10			Yes		7
2	2¼	12	2½(D)	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	2½(D)	12	Yes		7
3 & 4	2½	10	2 3/16	10	Yes		7

(B) - Provide a shim as specified by the manufacturer when placing 2½", 12 gauge posts in standard soils without breakaway bases. Provide breakaway base when placing the support in weak soils. The Engineer will determine if the soils are weak. Weak soils are classified as boggy, wet, or loose soil areas.
(C) - 3" anchor unit
(D) - 2½" x 12 ga. x 18" minimum length external sleeve required.

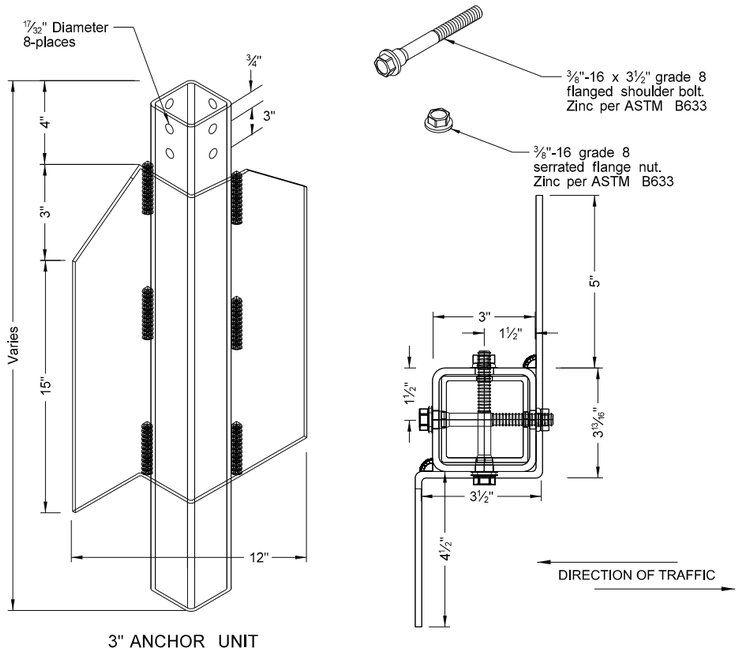




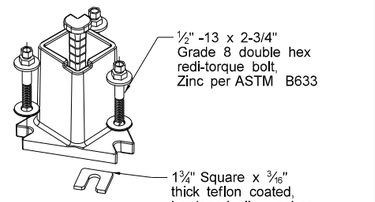
MULTI-DIRECTIONAL SLIP BASE ASSEMBLY:
Inserting 2½" x 12 ga with 2¼" x 12 ga and inserting 2½" 10 ga with 2 15/16" x 10 ga to achieve higher load ability is allowed.

SHOULDER BOLT

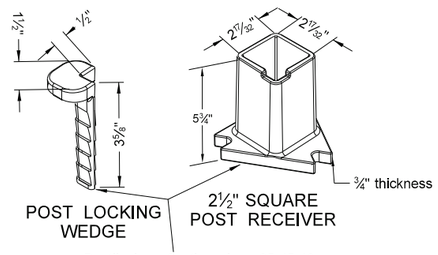
Shimming agent to reduce tolerance between 3" anchor unit and 2½" post.
(use standard ⅜" diameter grade 8 bolt with proper shim)

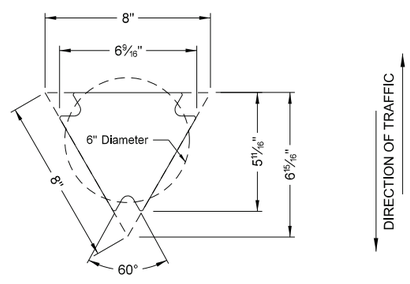


3" ANCHOR UNIT



SLIP BASE FOR 2½" POST





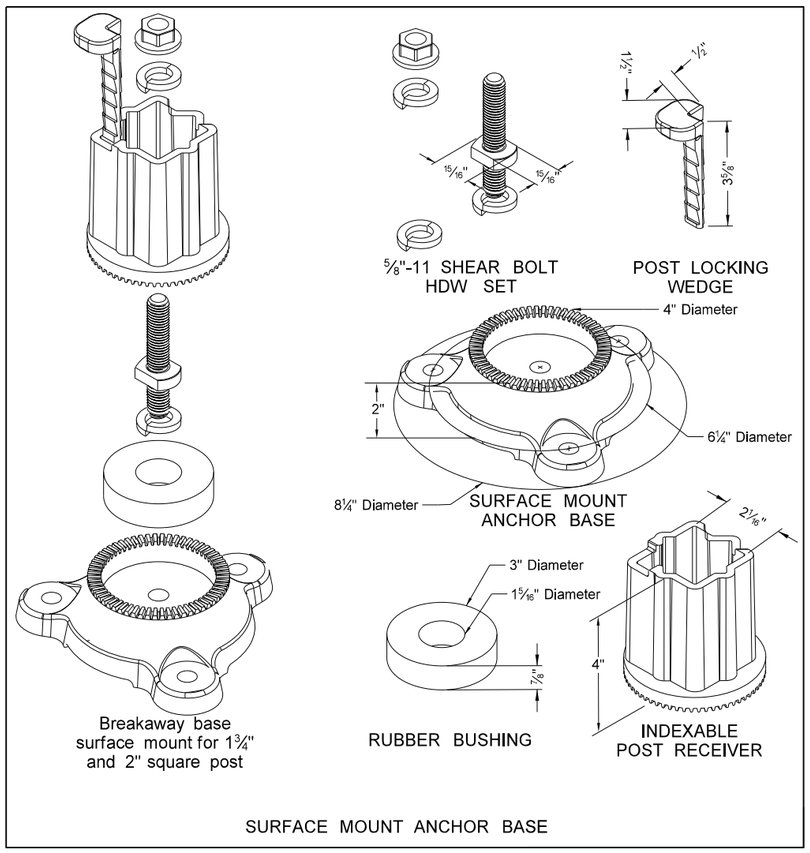
SLIP BASE DETAIL

Properties of Telescoping Perforated Tubes: Tube Size In.	Wall Thickness in.	U.S. Standard Gauge	Weight Per Foot Lbs.	Moment of Inertia In.⁴	Cross Sect. Area In.²	Section Modulud In.³
1½ x 1½	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2¼ x 2¼	0.105	12	2.773	0.561	0.695	0.499
2 3/16 x 2 3/16	0.135	10	3.432	0.605	0.841	0.590
2½ x 2½	0.105	12	3.141	0.804	0.803	0.643
2½ x 2½	0.135	10	4.006	0.979	1.010	0.783

The 2 3/16" size 10 gauge is shown as 2.19" size on the plans; The 2½" size is shown as 2.51" size on the plans.

NOTE:

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. Provide 7 guage HRPO commmercial quality ASTM A569 and 3" x 3" x 7" guage ASTM A500 grade B anchor material with 43.9 KSI yield strength and 59.3 KSI tensile strength. Hot dip galvanize anchor per ASTM A123/153. Tolerances on anchor unit and slip base bottom assembly are +/- 0.005" unless otherwise noted.
3. Eliminate wings when anchor is used in concrete sidewalk.
4. Provide a minimum 8' distance between the first and fourth post on four post signs.
5. Install in accordance with manufacturers recommendation.
6. Use a minimum ½" diameter x 4" grade 8 concrete fastener for surface mount breakaway base.



SURFACE MOUNT ANCHOR BASE

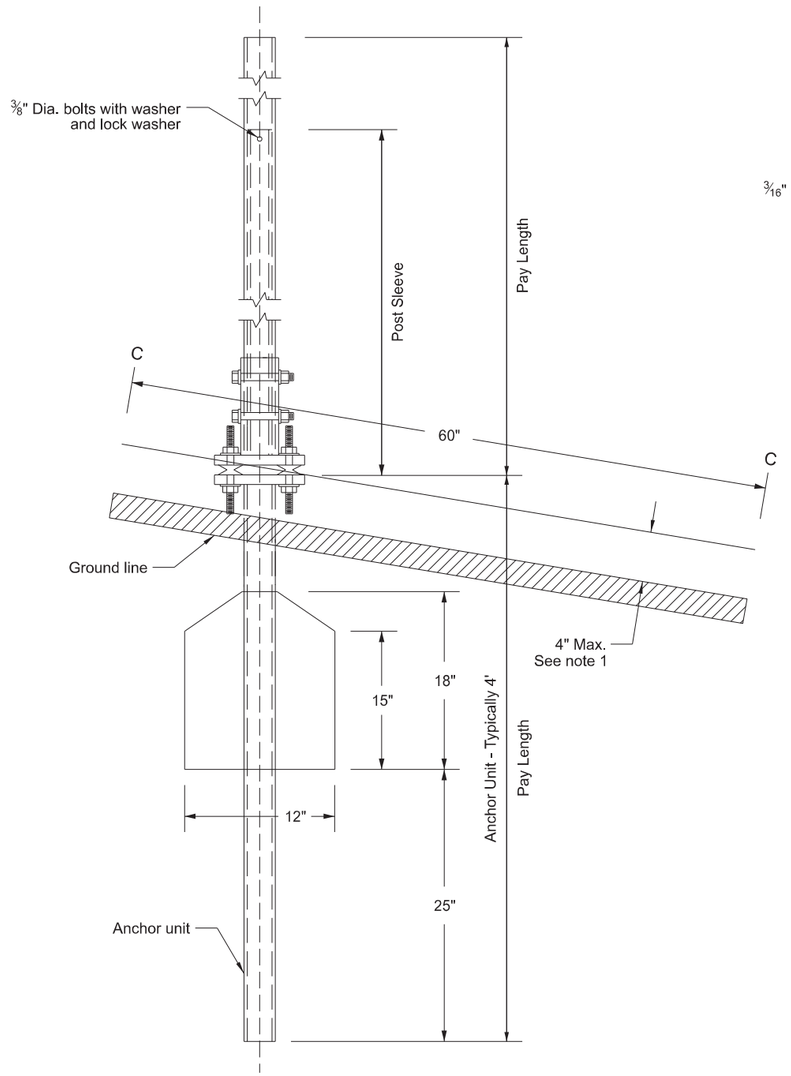
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-6-09	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice & corrected max height of base.
8-29-19	New Design Engineer PE Stamp.
8-05-24	Electronic Stamp/Signature.

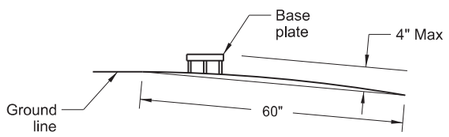
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/05/24

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D-754-24A

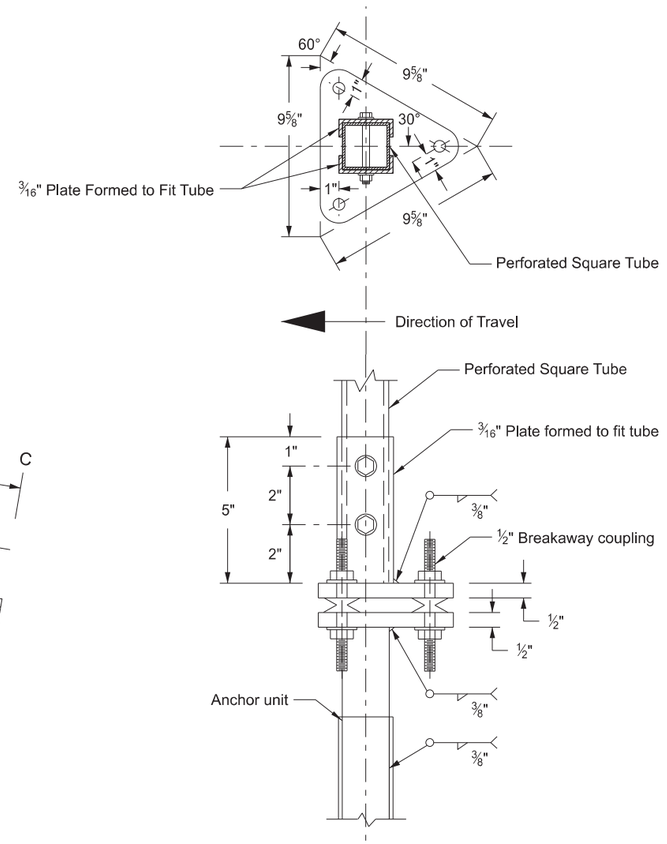




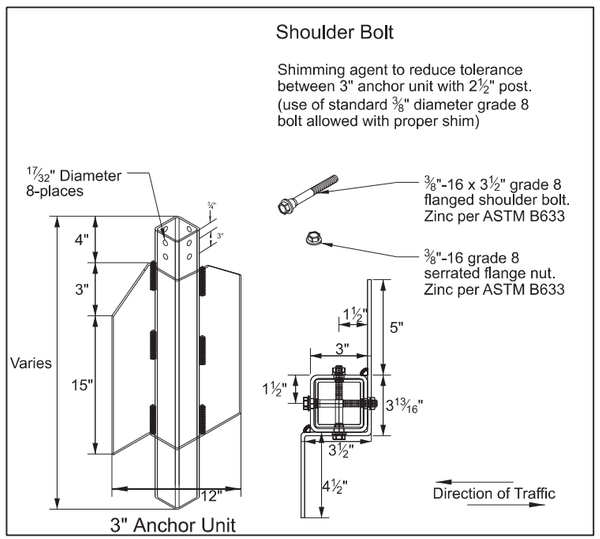
Section C-C

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.

Breakaway Coupler System for Perforated Tubes



Base Plate with Breakaway Coupler



3" Anchor Unit

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 Guage
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	2 3/16	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

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.

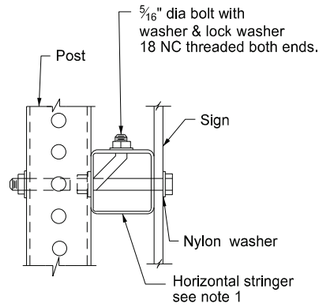
KIRK J. HOFFT REGISTERED PROFESSIONAL PE-4683 ENGINEER NORTH DAKOTA

07/22/25

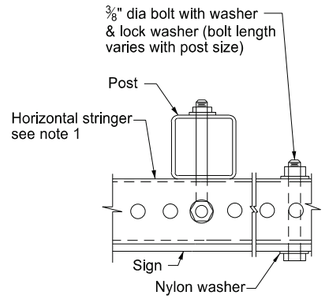
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Mounting Details Perforated Tube

D-754-25

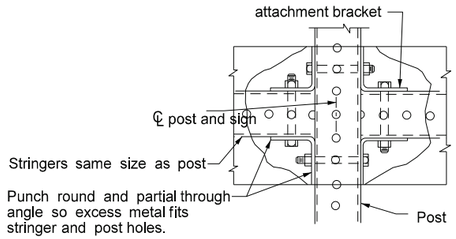


Side View



Top View

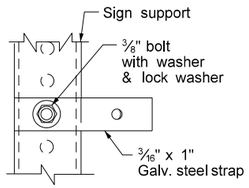
STRINGER MOUNTING
(WITH STRINGER IN FRONT OF POST)



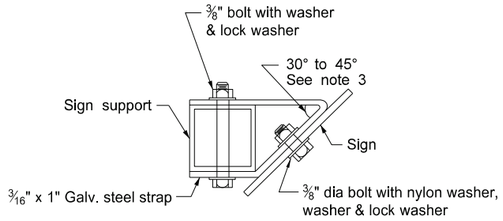
STREET NAME SIGNS AND ONE WAY SIGNS
SINGLE POST ASSEMBLY
ONE STRINGER OR BACK TO BACK MOUNTING

Note:

1. Horizontal stringers - Use perforated tubes or 1¾" x 3/16" thick, 1.08 lbs./ft aluminum or 3.16 lbs./ft steel z bar stringers.
2. Use minimum outside diameter 15/16" ±1/16" and 10 gauge thick metal washers on sign face.
3. Place No Parking signs with directional arrows at a 30 to 45 degree angle with the line of traffic flow. Turning the support to the correct angle for No Parking signs requiring the above angles is allowed. If the No Parking sign is placed with another sign that requires placement at a 90 degree angle with the line of traffic flow, use the detailed angle strap to mount the No Parking sign. Use flat washers and lock washers with all nylon washers.
4. Punching the sign backing and placing the bolt through the sign, the stringer and the post is allowed in lieu of using the bent bolt to attach the post to the stringer.
5. 4" vertical clearance of anchor or breakaway base. The 4" x 60" measurement is above and below post location and also back and ahead of post.

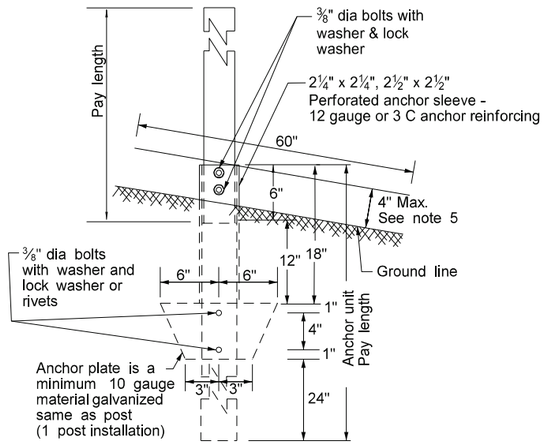


Side View



Top View

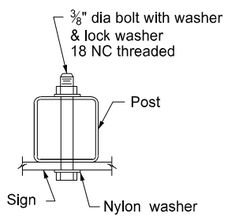
STRAP DETAIL



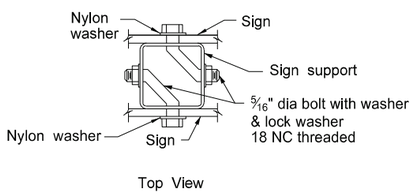
ANCHOR UNIT AND POST ASSEMBLY

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	2¼	12
1	2¼	12			No	2½	12
1	2½	12			(B)	3(C)	7
1	2½	10			Yes		7
1	2¼	12	2½(D)	12	Yes		7
1	2½	12	2¼	12	Yes		7
2	2½	10			Yes		7
2	2¼	12	2½(D)	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	2½(D)	12	Yes		7
3 & 4	2½	10	2 3/16	10	Yes		7

(B) - When placing 2½", 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) - 2½" x 12 ga. x 18" minimum length external sleeve required.

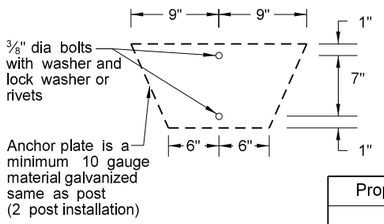


BOLT MOUNTING



Top View

BACK TO BACK MOUNTING



Properties of Telescoping Perforated Tubes							
Tube Size In.	Wall Thickness In.	U.S. Standard Gauge	Weight Per Foot Lbs.	Moment of Inertia $In.^4$	Cross Sect. area $In.^2$	Section Modulus $In.^3$
1½ x 1½	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2¼ x 2¼	0.105	12	2.773	0.561	0.695	0.499
2 3/16 x 2 3/16	0.135	10	3.432	0.605	0.841	0.590
2½ x 2½	0.105	12	3.141	0.804	0.803	0.643
2½ x 2½	0.135	10	4.006	0.979	1.010	0.783

The 2 3/16" size 10 gauge is shown as 2.19" size on the plans.
The 2½" size is shown as 2.51" size on the plans.

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

8-6-09

REVISIONS

DATE	CHANGE
7-8-14	Revised Note 3.
8-30-18	Updated notes to active voice.
8-30-19	New Design Engr PE Stamp.
8-05-24	Electronic Stamp/Signature.

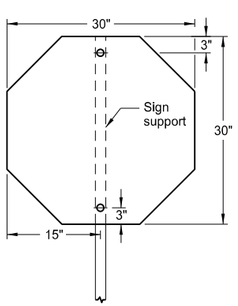
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/05/24

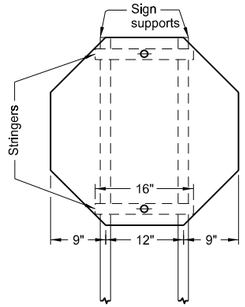
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SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS REGULATORY, WARNING AND GUIDE SIGNS

D-754-26

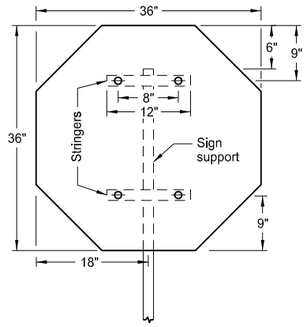


1 Post

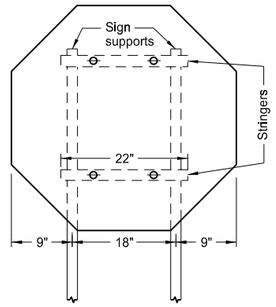


2 Posts

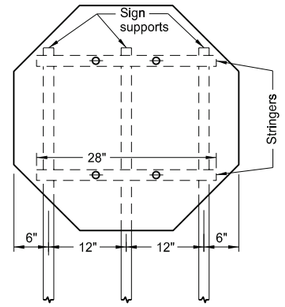
Assembly No. 1



1 Post



2 Posts

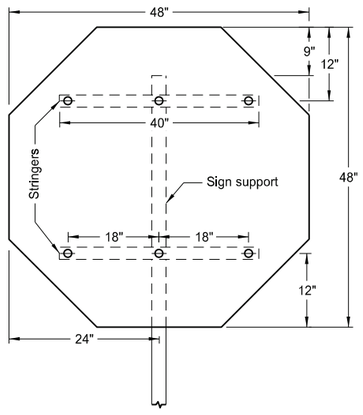


3 Posts

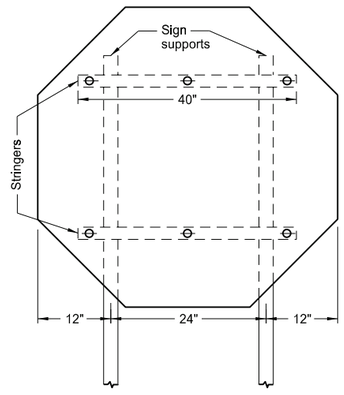
Assembly No. 2

Notes:

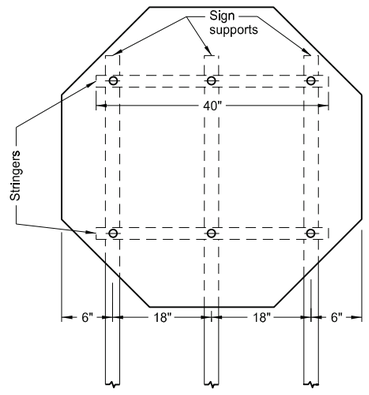
1. Use 0.100 inch minimum thickness sign backing material.
2. Use 1½" x 1½" perforated square tube stringers.
3. Punch holes round for ⅜" bolt.



1 Post

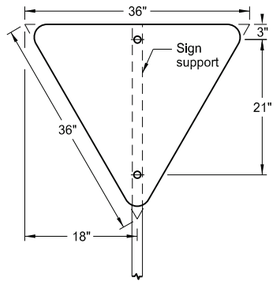


2 Posts

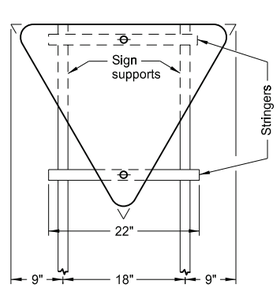


3 Posts

Assembly No. 3

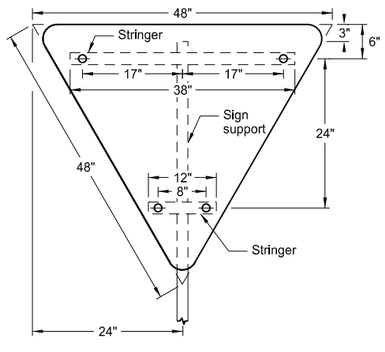


1 Post

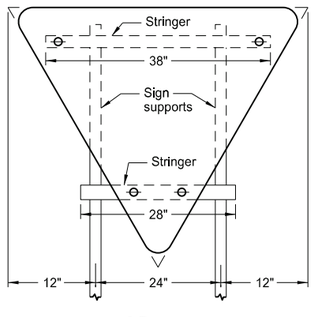


2 Posts

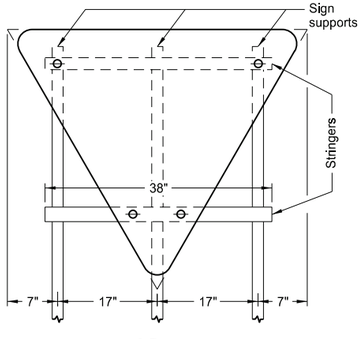
Assembly No. 4



1 Post



2 Posts



3 Posts

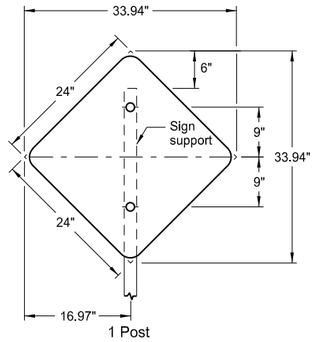
Assembly No. 5

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
8-30-18 8-30-19 8-05-24	Updated notes to active voice. New Design Engineer PE Stamp. Electronic Stamp/Signature.

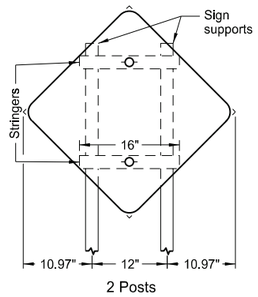
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
08/05/24

DocuSign Envelope ID: 245AF61F-5CB3-4068-9ABB-3DD8A55F5268

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

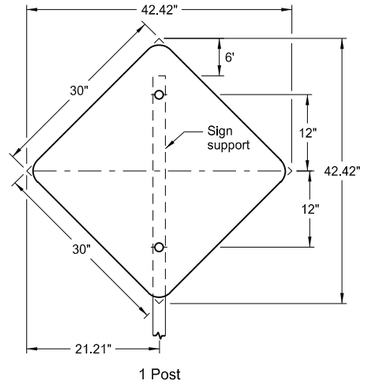


1 Post

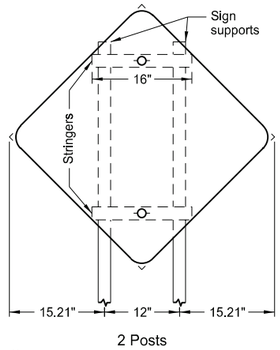


2 Posts

Assembly No. 18

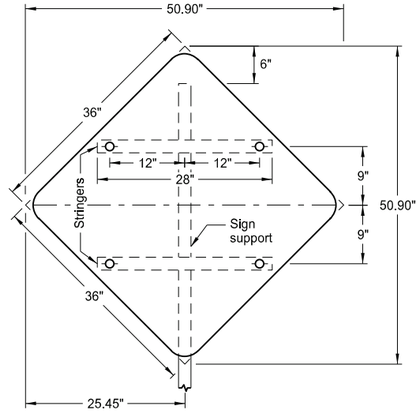


1 Post

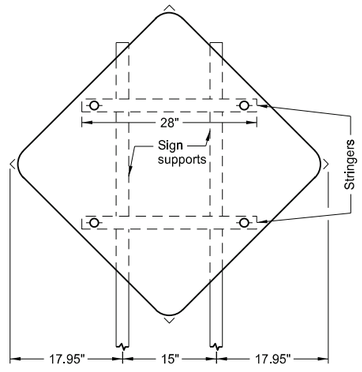


2 Posts

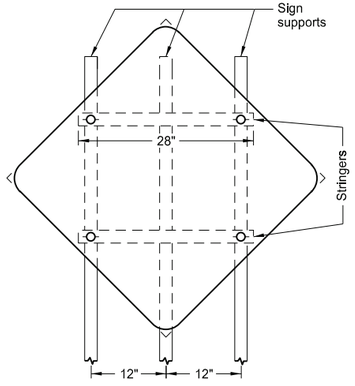
Assembly No. 19



1 Post

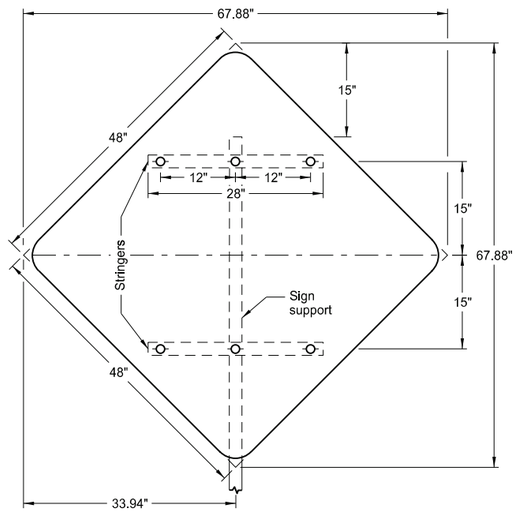


2 Posts

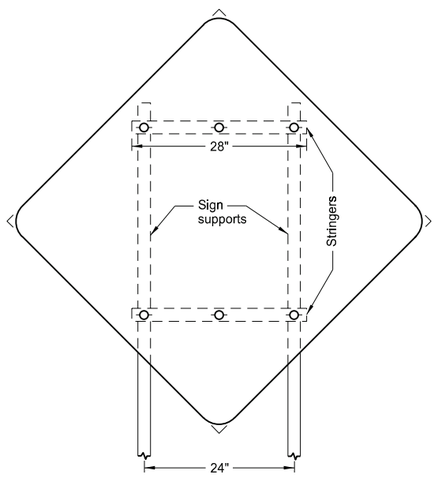


3 Posts

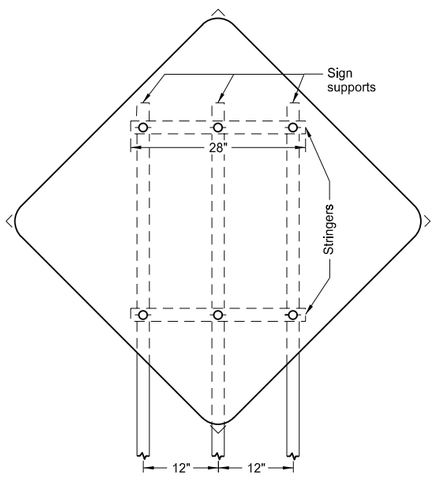
Assembly No. 20



1 Post



2 Posts



3 Posts

Assembly No. 21

Notes:

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice.
8-30-19	New Design Engineer PE Stamp.
8-06-24	Electronic Stamp/Signature.

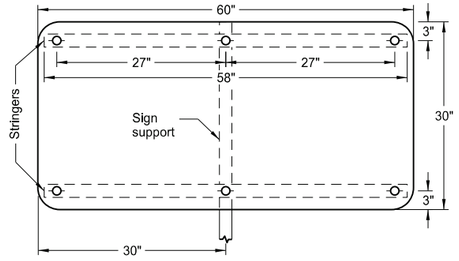
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/06/24

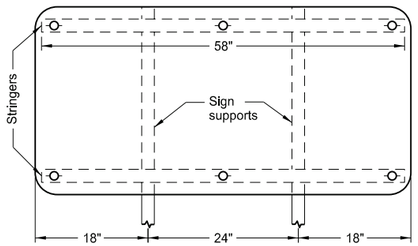
DocuSign Envelope ID: 245AF61F-5CB3-4068-9ABB-3DD8A55F5268

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

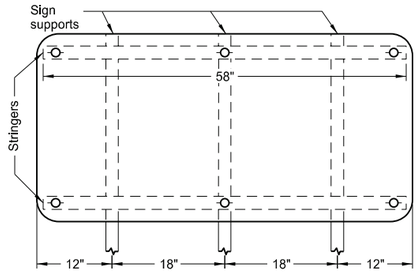
D-754-33



1 Post



2 Posts

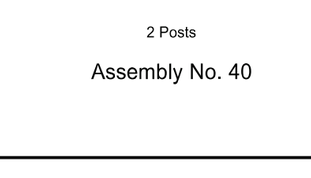


3 Posts

Assembly No. 38



1 Post

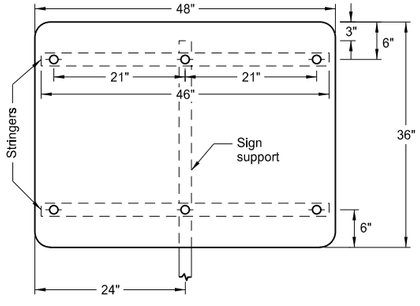


2 Posts

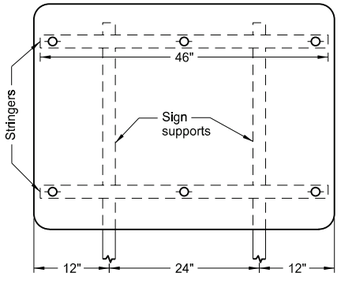


3 Posts

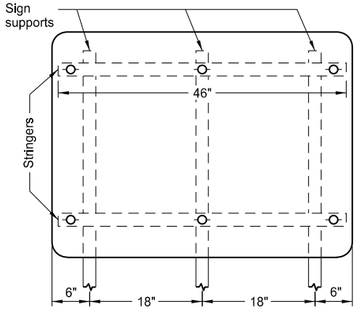
Assembly No. 39



1 Post



2 Posts



3 Posts

Assembly No. 40

Notes:

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice.
8-30-19	New Design Engineer PE Stamp.
8-06-24	Electronic Stamp/Signature.

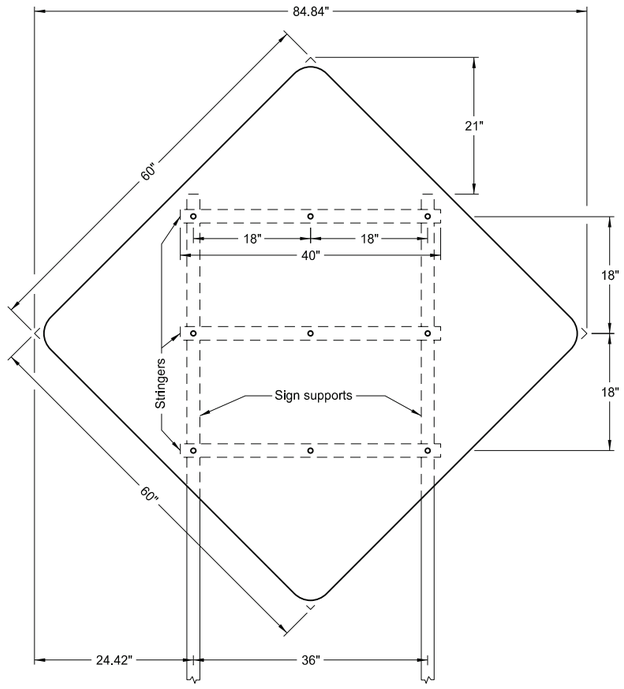
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/06/24

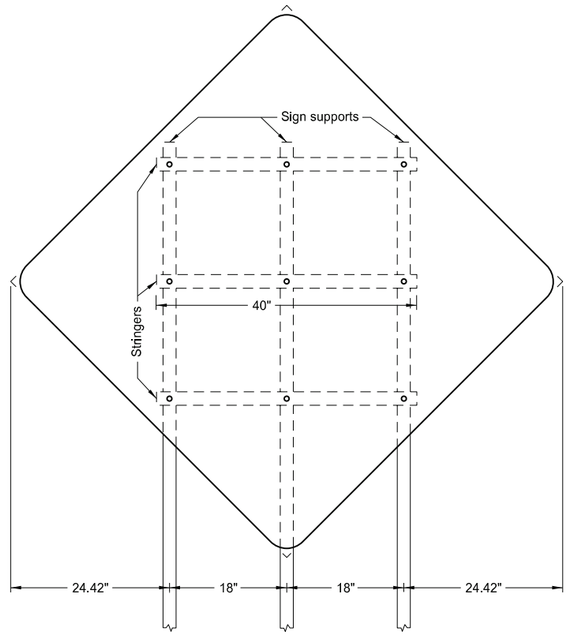
DocuSign Envelope ID: 245AF61F-5CB3-4068-9ABB-3DD8A55F5268

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

D-754-40



2 Posts

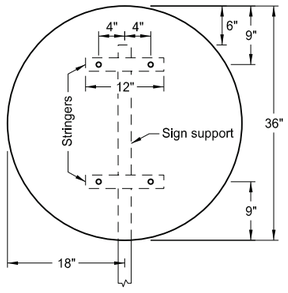


3 Posts

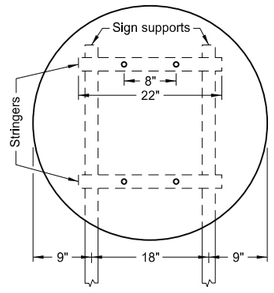
ASSEMBLY NO. 62

Notes:

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



1 Post



2 Posts

ASSEMBLY NO. 63

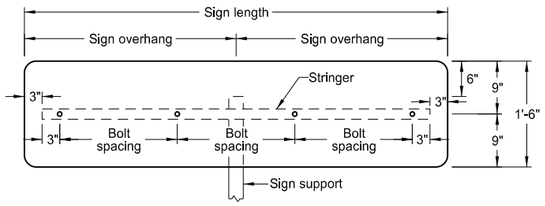
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-22-12	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice.
8-30-19	New Design Engineer PE Stamp.
8-06-24	Electronic Stamp/Signature.

KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
08/06/24

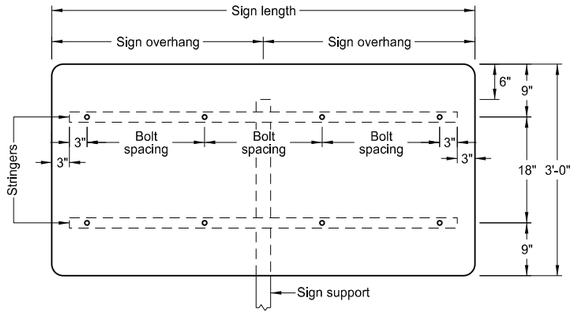
DocuSign Envelope ID: BCB8FF2A-083E-48A1-8BCC-2D048B980E67

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

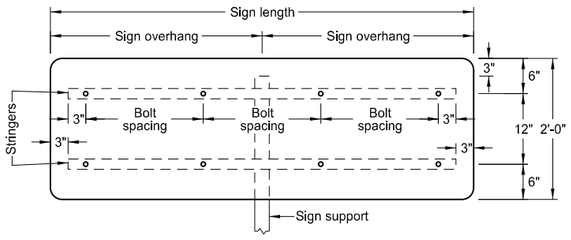
D-754-47



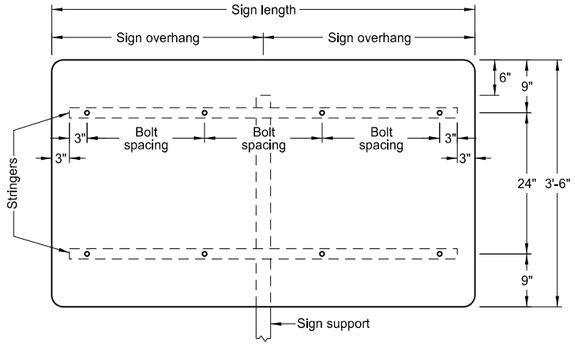
VARIES X 1'-6"



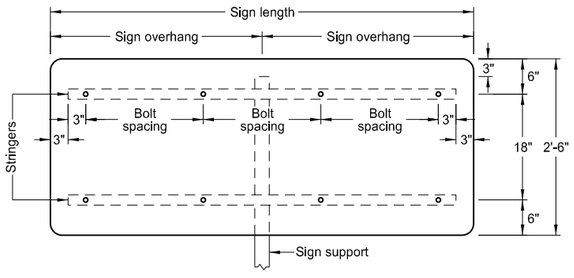
VARIES X 3'-0"



VARIES X 2'-0"



VARIES X 3'-6"



VARIES X 2'-6"

1 POST		
Sign Length	Sign Overhang	Bolt Spacing
4'-0"	2'-0"	18"
4'-6"	2'-3"	21"
5'-0"	2'-6"	24"
5'-6"	2'-9"	18"
6'-0"	3'-0"	20"
6'-6"	3'-3"	22"
7'-0"	3'-6"	24"
7'-6"	3'-9"	2-20" & 2-19"
8'-0"	4'-0"	21"
8'-6"	4'-3"	2-22" & 2-23"
9'-0"	4'-6"	24"
9'-6"	4'-9"	4-20" & 1-22"
10'-0"	5'-0"	2-21" & 3-22"
10'-6"	5'-3"	4-23" & 1-22"
11'-0"	5'-6"	24"
11'-6"	5'-9"	21"
12'-0'	6'-0"	22"

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.
4. Attach single stringer to single post signs with special stringer angle, shown on "Mounting Details Perforated Tube" standard drawing.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-25-12	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice.
9-04-19	New Design Engr PE Stamp.
8-07-24	Electronic Stamp/Signature.

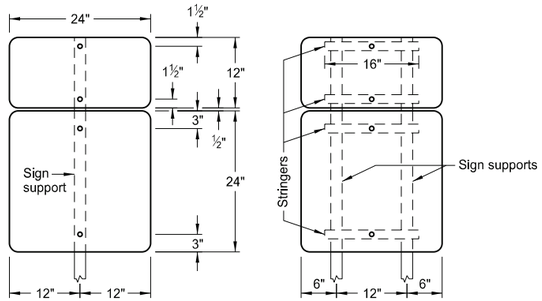
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/07/24

DocuSign Envelope ID: BCB8FF2A-083E-48A1-8BCC-2D048B980E67

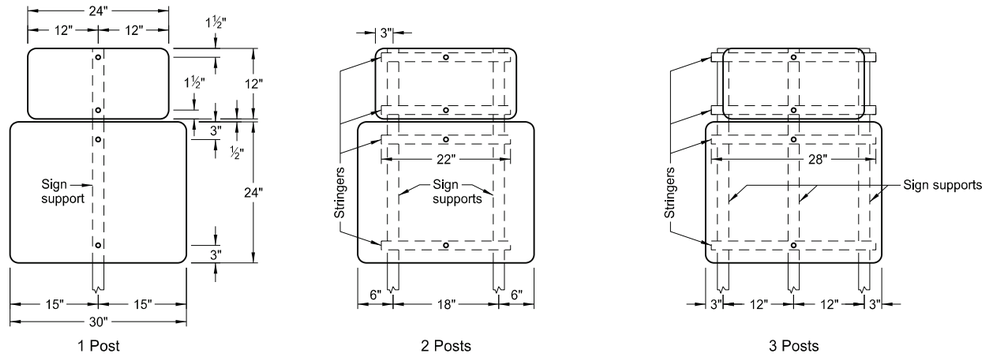
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS - ROUTE MARKER SIGNS

D-754-51



1 Post 2 Posts

ASSEMBLY NO. 371

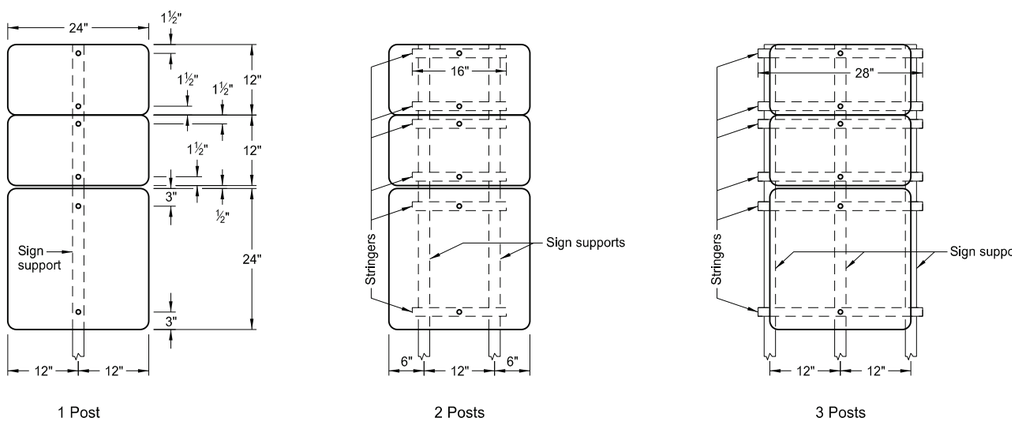


1 Post 2 Posts 3 Posts

ASSEMBLY NO. 372

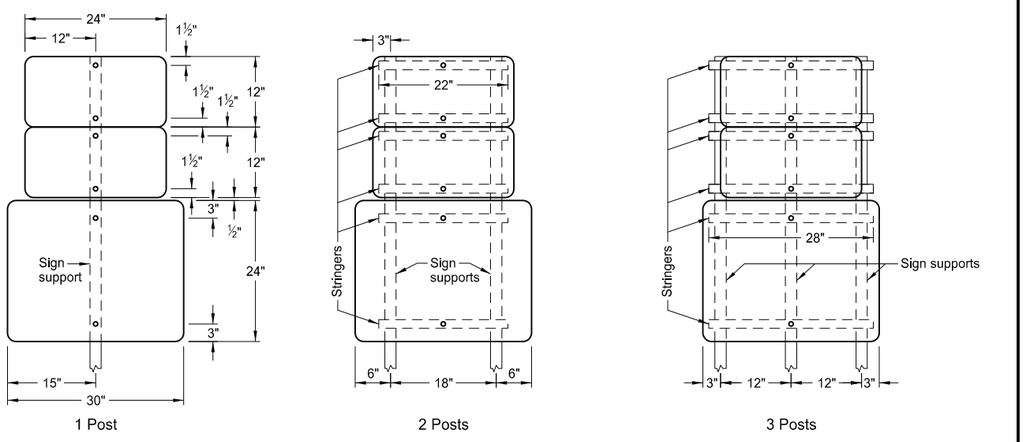
Notes:

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



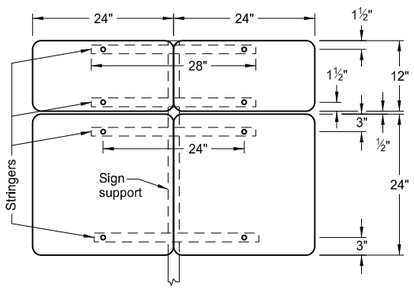
1 Post 2 Posts 3 Posts

ASSEMBLY NO. 373

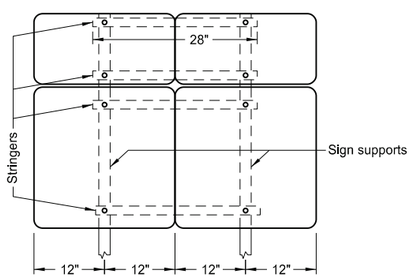


1 Post 2 Posts 3 Posts

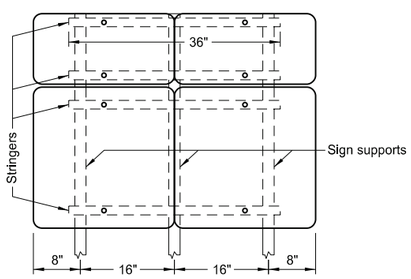
ASSEMBLY NO. 374



1 Post



2 Posts



3 Posts

ASSEMBLY NO. 375

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.

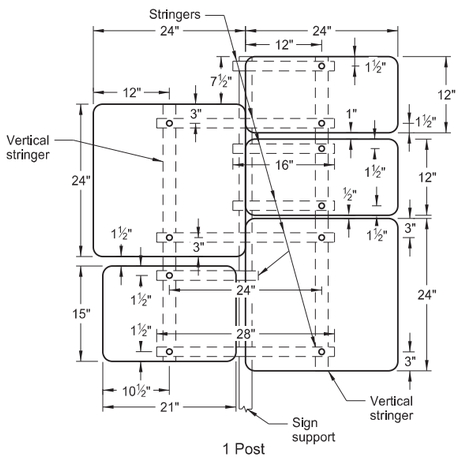
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/07/24

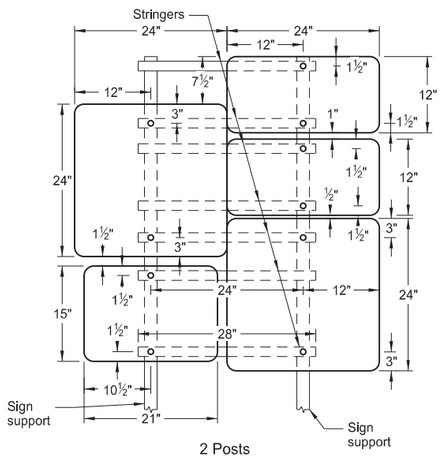
DocuSign Envelope ID: C3490446-F65D-4226-AC76-79FBB84E9BA5

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

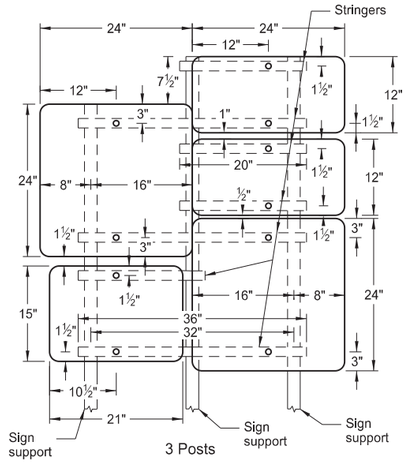
D-754-74



1 Post



2 Posts

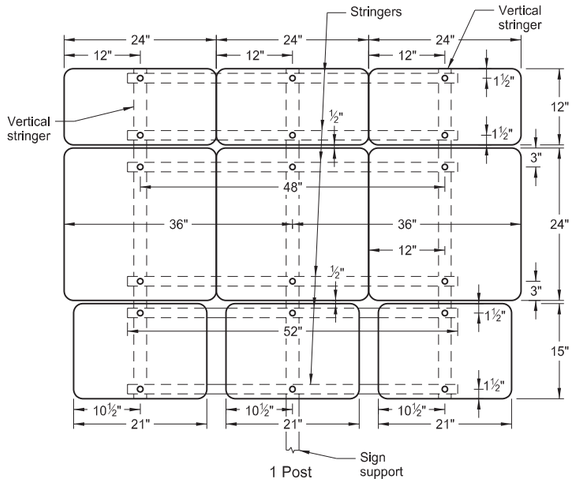


3 Posts

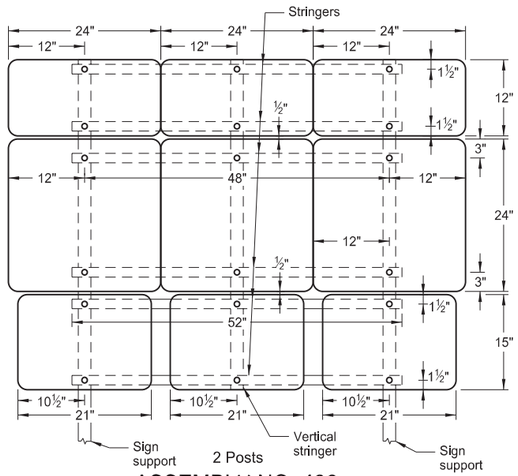
ASSEMBLY NO. 435

Notes:

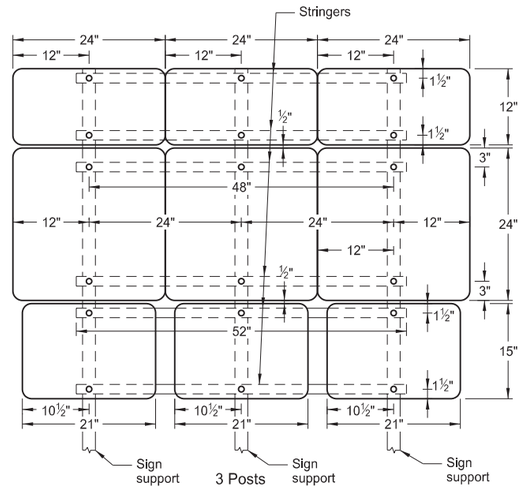
1. Use 0.100 inch minimum thickness sign backing material.
2. Use 1½"x1½" perforated square tube stringers.
3. Punch holes round for ⅜" bolt.



1 Post

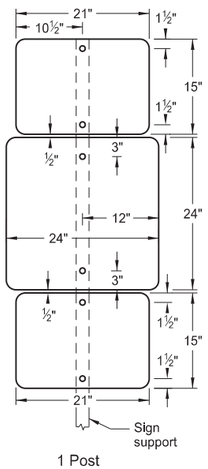


2 Posts

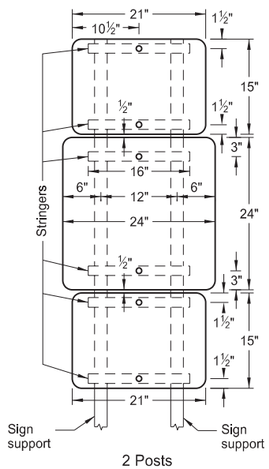


3 Posts

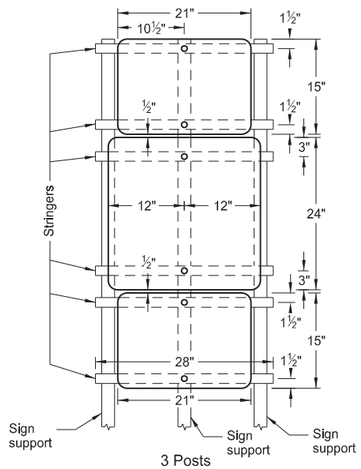
ASSEMBLY NO. 436



1 Post



2 Posts



3 Posts

ASSEMBLY NO. 437

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-25-12	
REVISIONS	
DATE	CHANGE
~~8-30-18~~	~~Updated notes to active voice.~~
~~9-05-19~~	~~New Design Engineer PE Stamp.~~
8-08-24	Electronic Stamp/Signature.

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

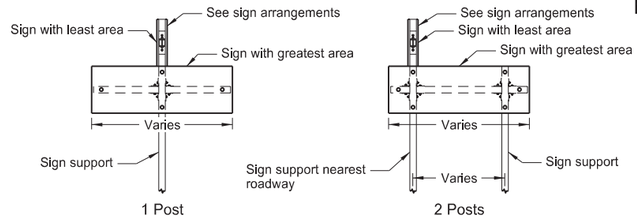
08/08/24

DocuSign Envelope ID: C3490446-F65D-4226-AC76-79FBB84E9BA5

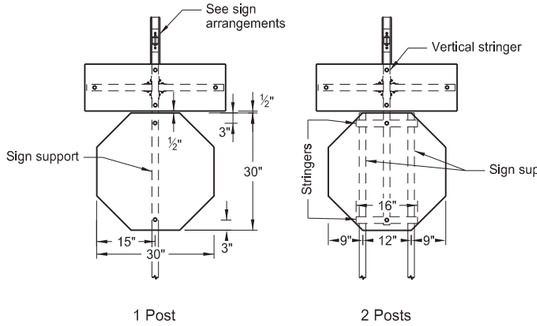
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS FOR STREET NAME SIGNS AND 911 SIGNS

D-754-87

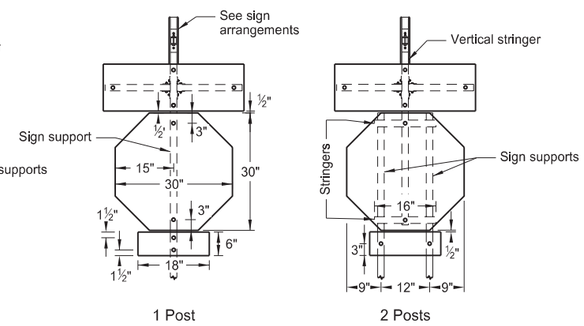
A - Single sign
B - Single sign back to back
C - Single sign each direction
D - Single sign one direction, back to back other direction
E - Back to back both directions



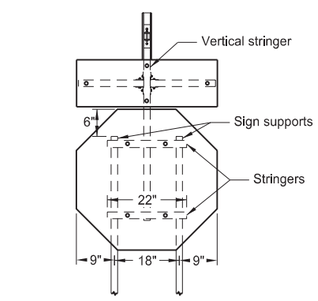
Special Assembly 1 (A, B, C, D or E)

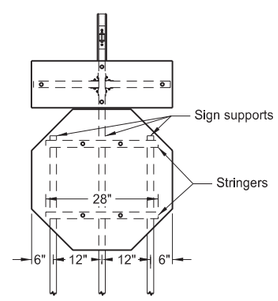


Special Assembly 2 (A, B, C, D or E)

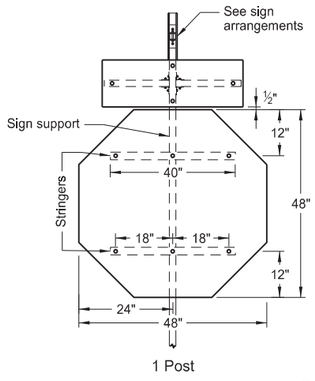


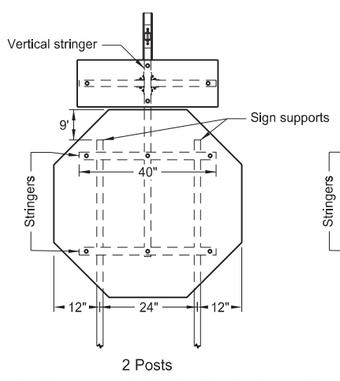
Special Assembly 3 (A, B, C, D or E)

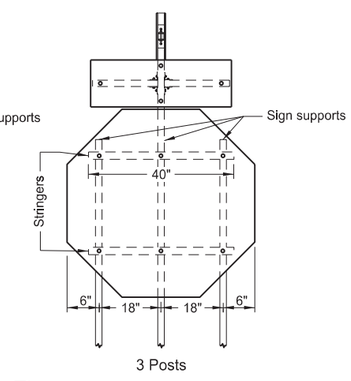




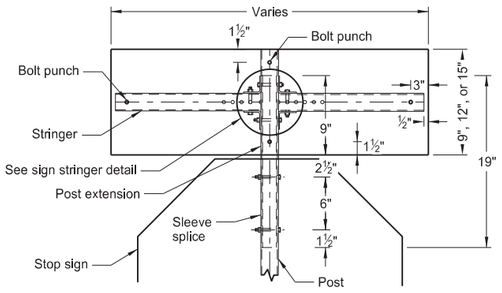
Special Assembly 4 (A, B, C, D or E)





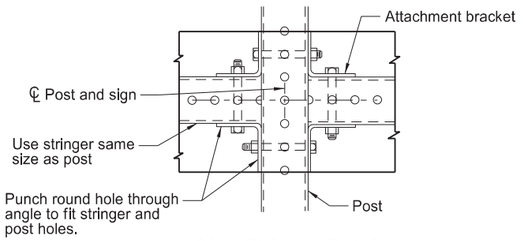


Special Assembly 5 (A, B, C, D or E)



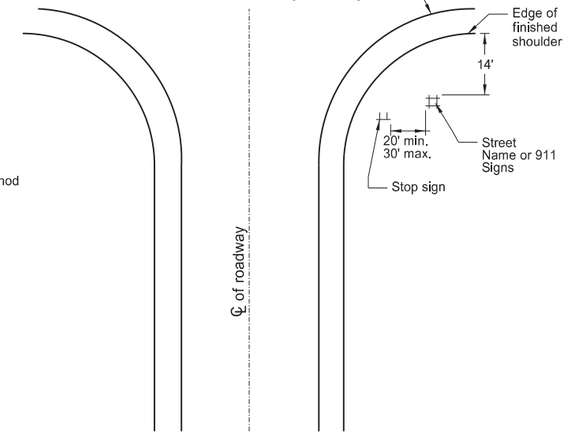
Sleeve Splice Detail

Note: Only use splice method with approval of engineer.



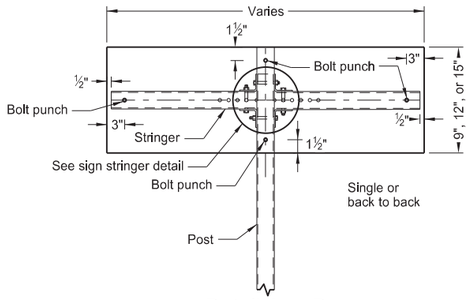
Sign Stringer Detail

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

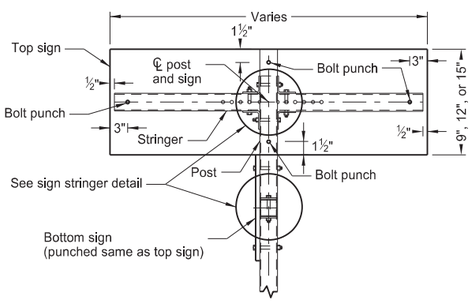


Intersection Layout

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

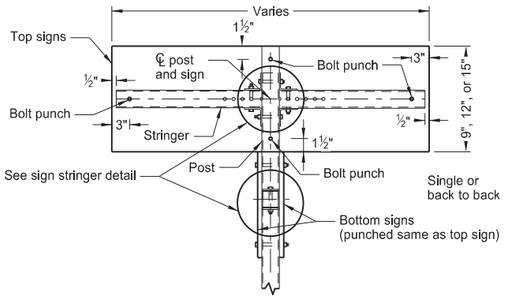


Detail A or B



Detail C

Sign Arrangements



Detail D or E

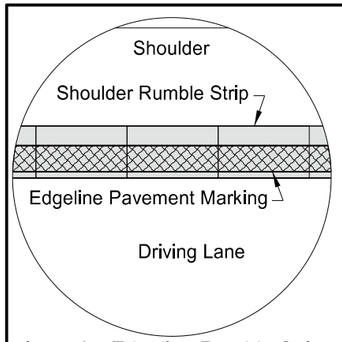
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
8-30-18	Added 2 post layout for SA1 and Updated notes to active voice.
9-05-19	New Design Engineer PE Stamp.
8-08-24	Electronic Stamp/Signature.

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

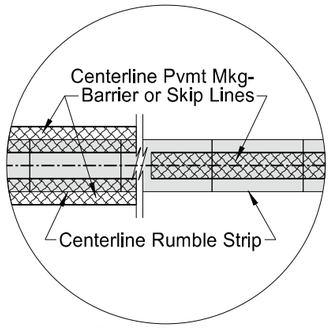
08/08/24

RUMBLE STRIPS
UNDIVIDED HIGHWAYS (SHOULDERS LESS THAN 4')

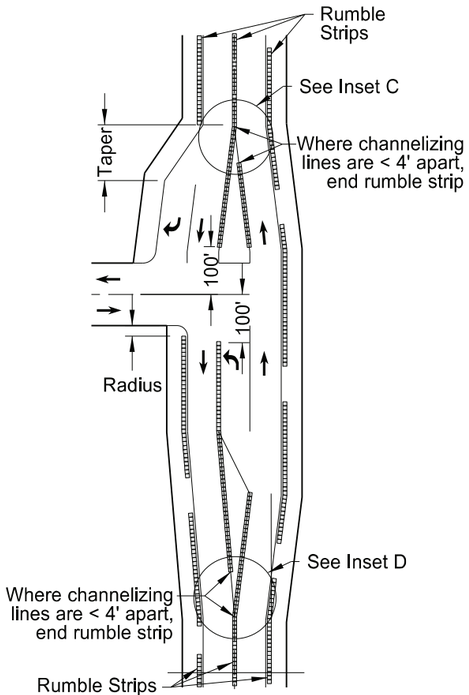
D-760-4



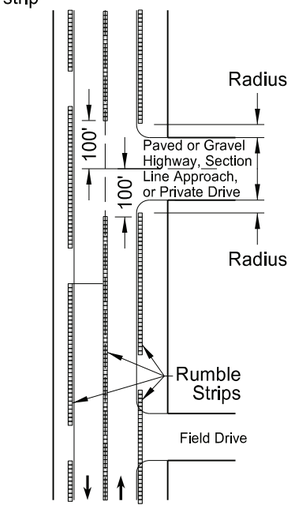
Inset A - Edgeline Rumble Strip
(Layout for opposite shoulder reversed)



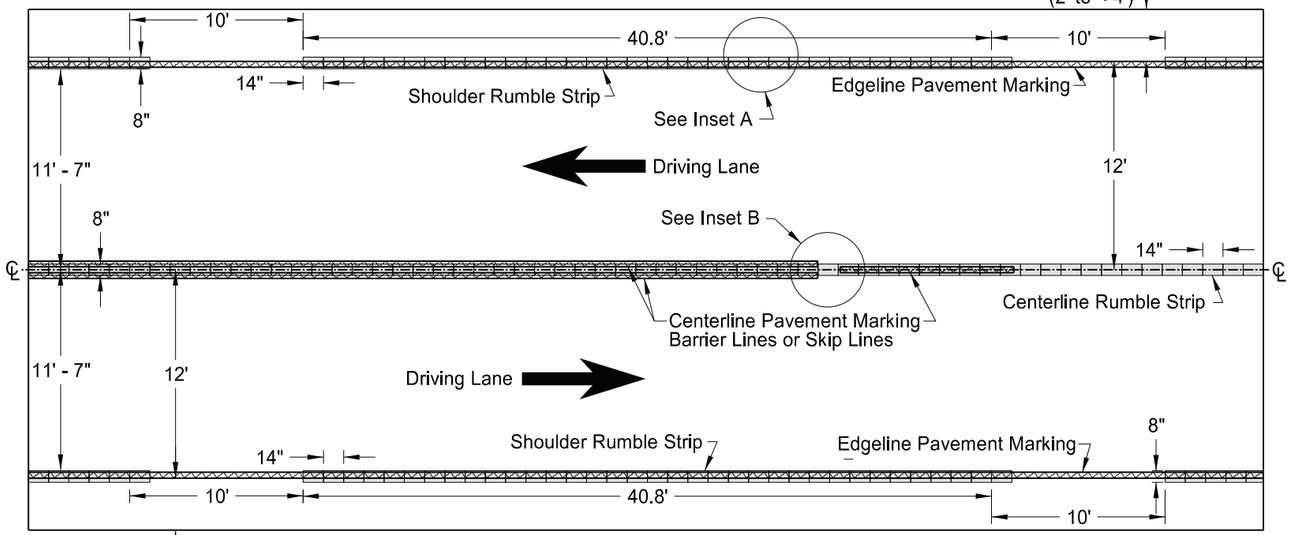
Inset B - Centerline Rumble Strip



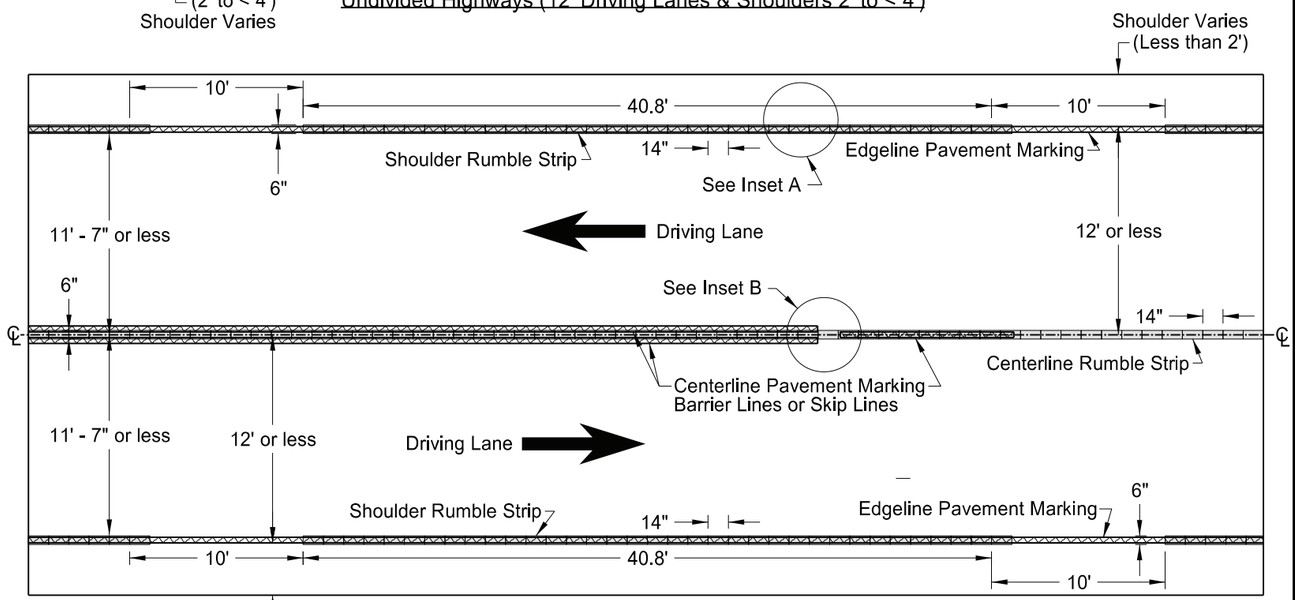
Turn Lane
(Right & Left)



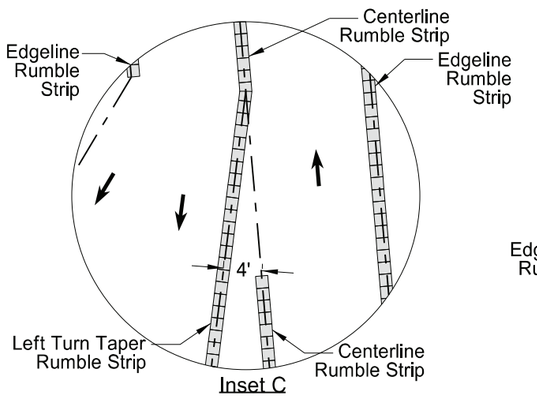
Entrance Roadways



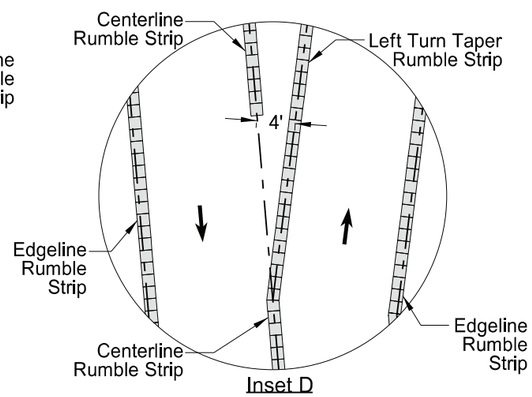
Undivided Highways (12' Driving Lanes & Shoulders 2' to < 4')



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



Inset C



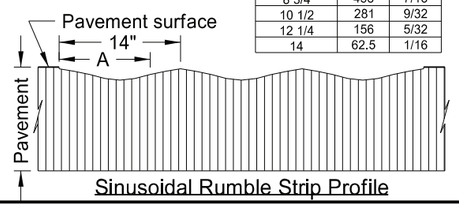
Inset D

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

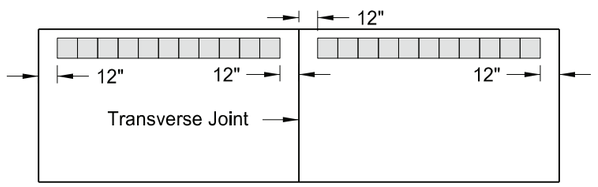
2) Discontinue centerline rumble strips 100' before and after paved or gravel highways, section line approaches, or private drives. Place rumble strips at left turn lanes as shown below.

3) No additional quantity provided for centerline rumble strips on left turn tapers. Include all costs for centerline rumble strips on left turn tapers in the price bid for "Sinusoidal Rumble Strip - Asphalt Centerline" or "Sinusoidal Rumble Strip - Concrete Centerline".

Milling Depths		
Location A (in)	Depth	
	MIL	in
0	62.5	1/16
1 3/4	156	5/32
3 1/2	281	9/32
5 1/4	438	7/16
7	500	1/2
8 3/4	438	7/16
10 1/2	281	9/32
12 1/4	156	5/32
14	62.5	1/16



Sinusoidal Rumble Strip Profile



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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-29-09	
REVISIONS	
DATE	CHANGE
2-25-10	Note 4 was added.
4-19-10	Revised Note 5, Note 6, and Turn Lane (Right & Left).
9-08-11	Revised Notes and D-760-4.
1-26-12	Revised details for rumble strip widths and dimensions.
10-25-19	Added missing dimensions.
11-16-21	Revised turn lane rumble layout.
3-07-23	Added Note 3.
5-26-23	Rumble Strips made Sinusoidal.

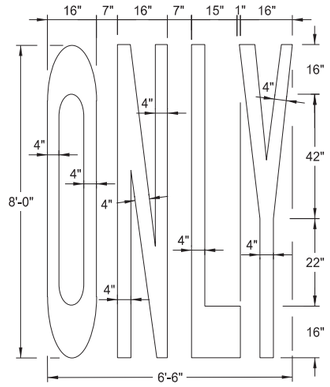
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

05/26/23

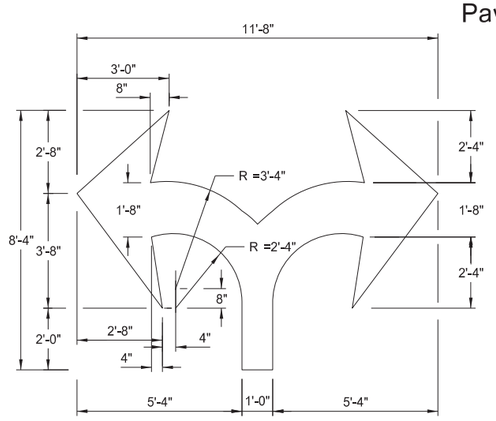
DocuSign Envelope ID: F823D7A4-83CC-4936-ABE1-378FF7682B3C

Pavement Marking Message Details

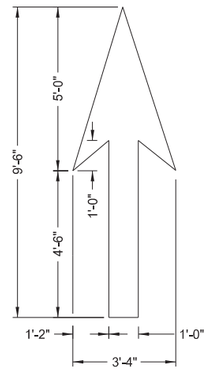
D-762-1



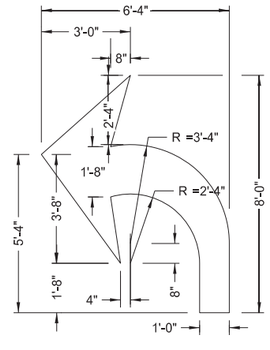
22 S. F.



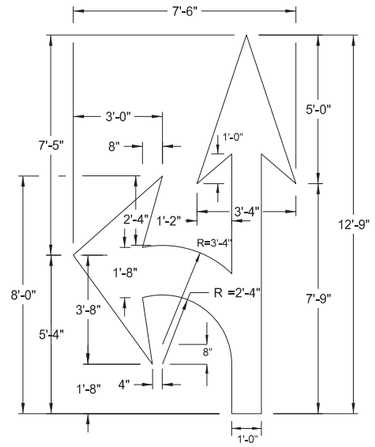
29 S. F.



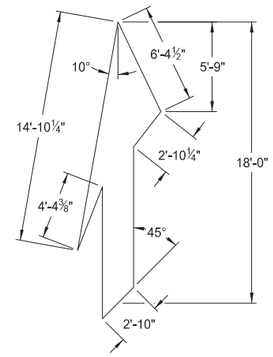
12 S. F.



16 S. F.

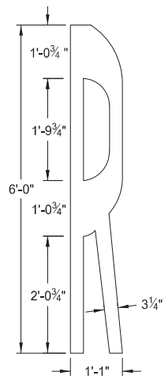


27 S. F.

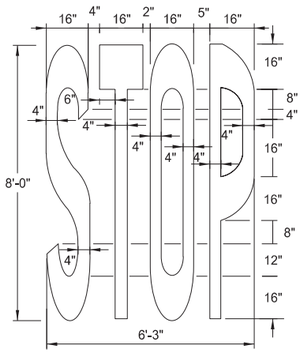


41 S. F.

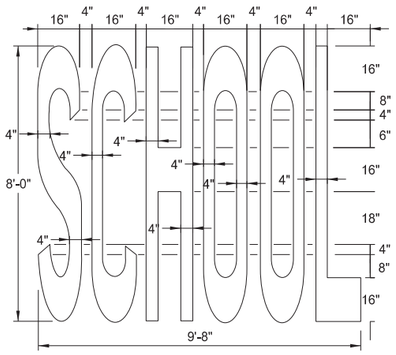
Note: Rotate merge arrow 20° from edge of roadway.



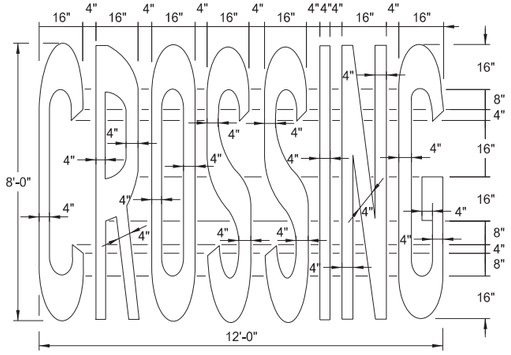
4 S. F.



22 S. F.



34.5 S. F.

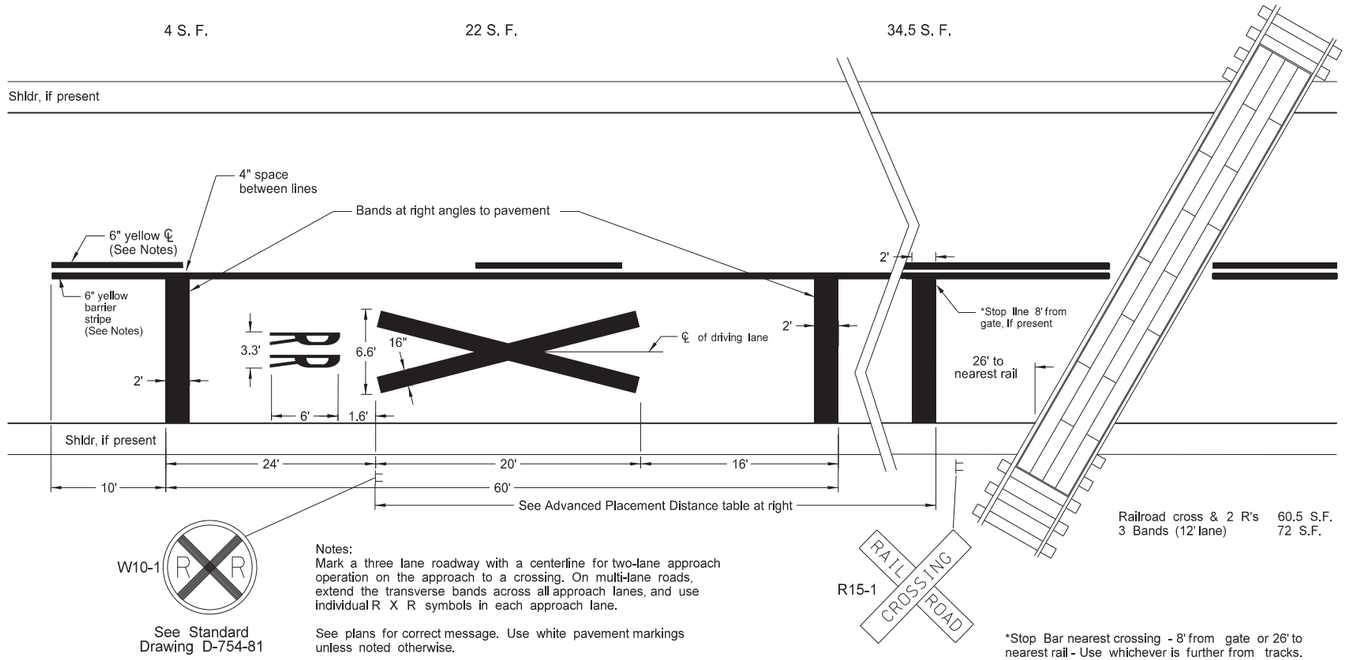


46 S. F.

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

Chevron Crosshatching Table

Centerline Pavement Marking Skip Spacing Detail



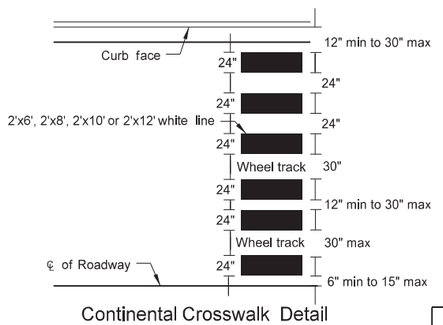
Notes:
Mark a three lane roadway with a centerline for two-lane approach operation on the approach to a crossing. On multi-lane roads, extend the transverse bands across all approach lanes, and use individual R X R symbols in each approach lane.

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

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 nearest rail - Use whichever is further from tracks.

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



Continental Crosswalk Detail

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.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

12-6-11

REVISIONS

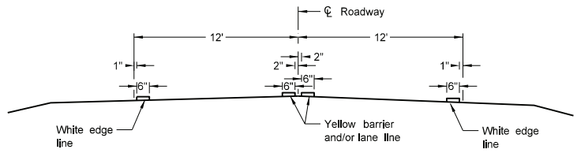
DATE	CHANGE
10-17-17	Updated to active voice.
08-27-19	New Design Engineer PE Stamp.
01-28-2020	Revised min Stop Bar distance to rail.
11-22-2023	Revised pavement marking widths.

KIRK J. HOFF REGISTERED PROFESSIONAL PE-4683 11/22/23 ENGINEER NORTH DAKOTA

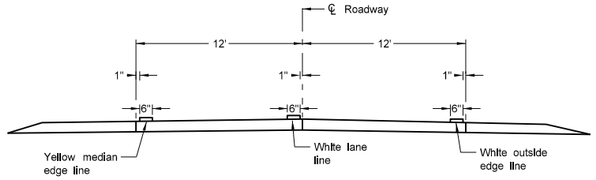
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PAVEMENT MARKING

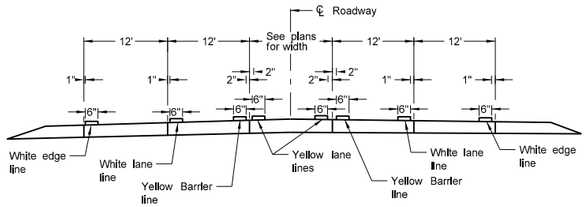
D-762-4



Two Lane Two Way
RURAL ROADWAY



Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



RURAL FIVE LANE ROADWAY
Concrete Section

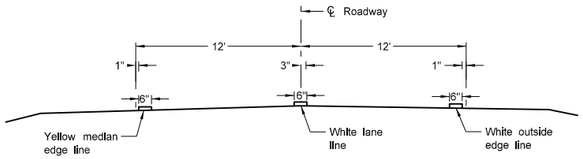
NOTES:

1. Continue edge lines through private drives and field drives. Break edge lines for intersections.

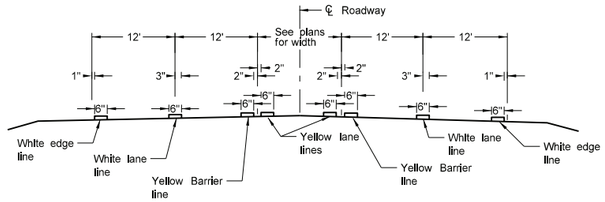
   For section lines, county roads, and street approaches, stripe the radii and edge lines of the paved surface within the right of way except where curb and gutter is present.

2. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph,

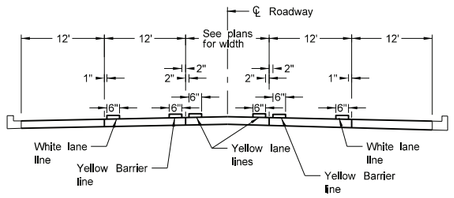
3. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits < 40 mph.



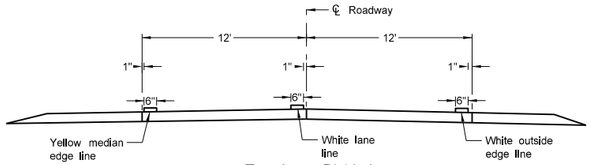
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



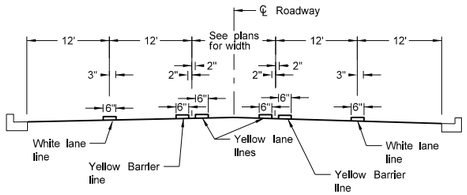
RURAL FIVE LANE ROADWAY
Asphalt Section



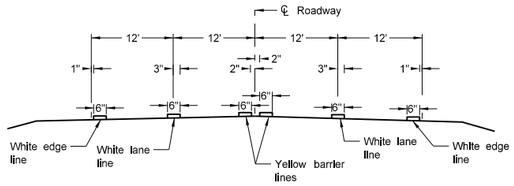
URBAN FIVE LANE SECTION
Concrete Section



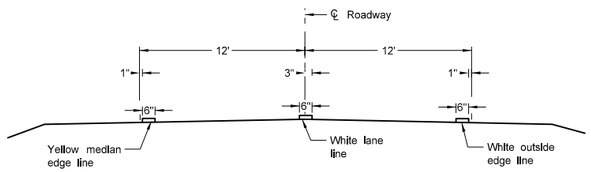
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Concrete Section



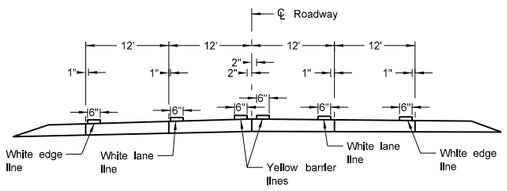
URBAN FIVE LANE SECTION
Asphalt Section



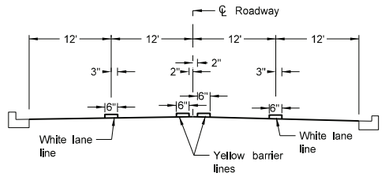
RURAL FOUR LANE ROADWAY
Asphalt Section



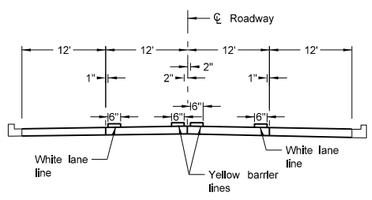
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



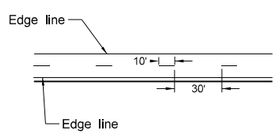
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

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

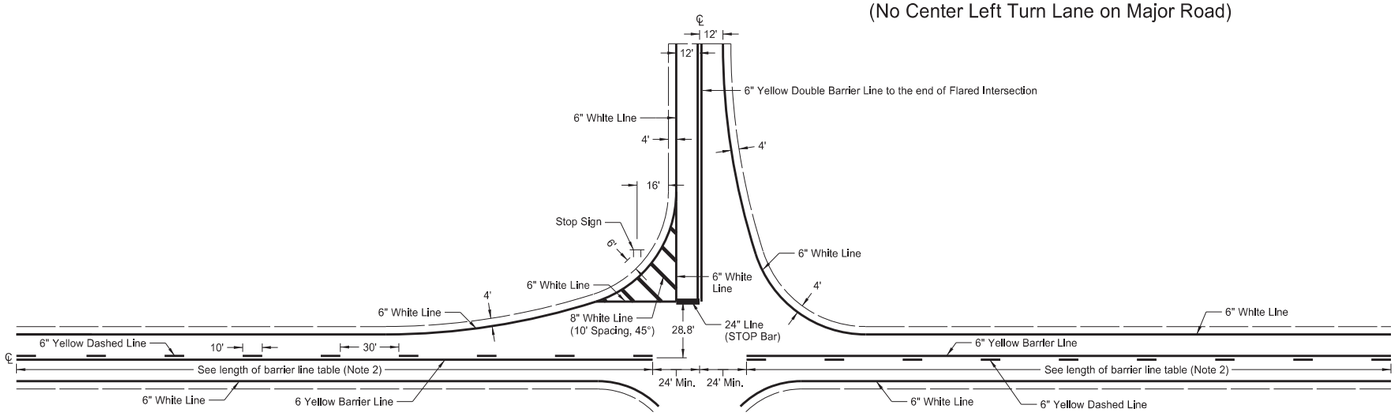
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
07/09/24
ENGINEER
NORTH DAKOTA

DocuSign Envelope ID: 09EA856C-BD61-42B6-B726-BC2420A5CEC1

PAVEMENT MARKING FOR STANDARD 90 DEGREE FLARED INTERSECTION

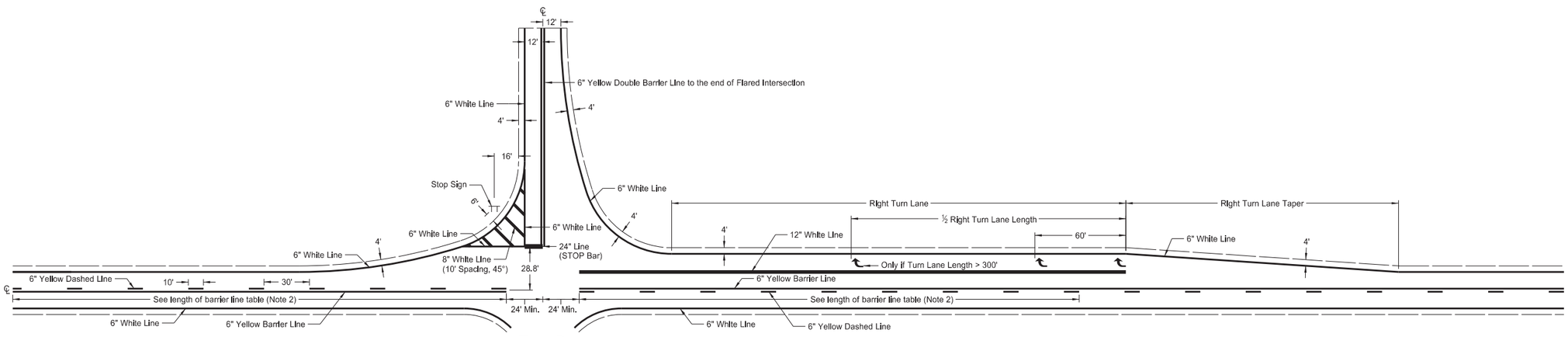
D-762-5

(No Center Left Turn Lane on Major Road)



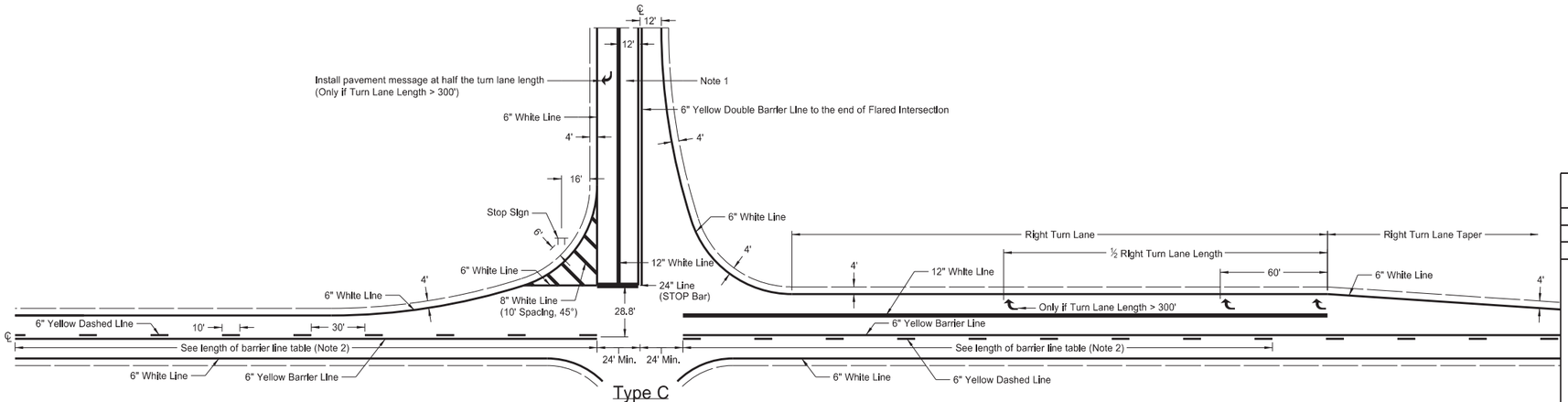
Type A

(No turn lanes present)



Type B

(Right Turn Lane on Major Road)



Type C

(Right Turn Lane on Major Road, and Turn Lane on Minor Road)

Notes

1. At "T" intersections (3-leg), additionally install left turn pavement marking message arrow.
2. The barrier lines have variable distances dependent on speed limit. Obtain barrier line length from table below (stopping sight distance.)
3. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph.
4. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits ≤ 40.
5. Wide line - 8 inches wide if 4 inch normal width lines are used and 12 inches wide if 6 inch normal width lines are used.

Table for Length of Barrier Line									
Speed Limit (mph)	30	35	40	45	50	55	60	65	70
Minimum Length	200'	250'	305'	360'	425'	495'	570'	645'	730'

6" Marking

8" Marking

12" Marking

24" Marking

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

3-29-16

REVISIONS

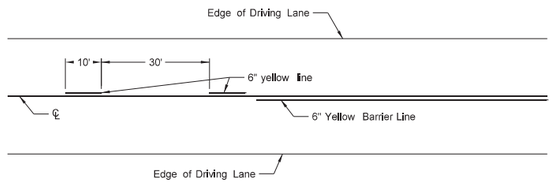
DATE	CHANGE
8-17-17	Updated note & dimensioning.
8-30-18	Corrected pvmt mkg placement.
8-27-19	New Design Engineer PE Stamp.
11-22-23	Revised pavement marking widths.
1-17-24	Revised wide pvmt mkg width.

KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
01/17/24
ENGINEER
NORTH DAKOTA

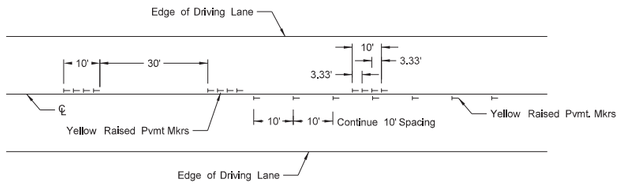
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SHORT-TERM PAVEMENT MARKING

D-762-11

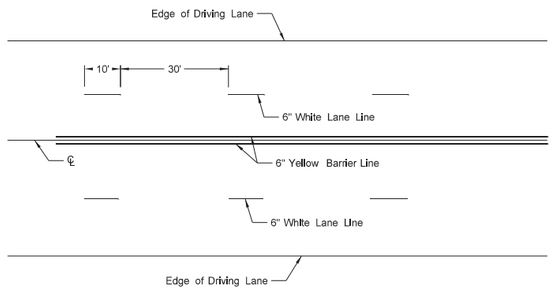


Painted or Tape Lines

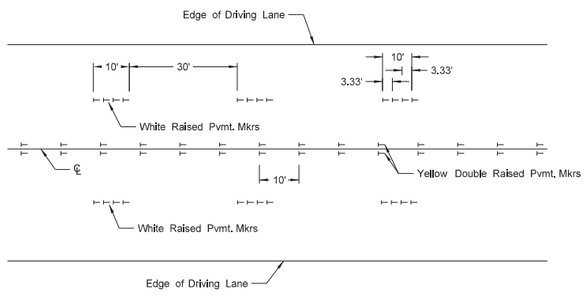


Raised Pavement Markers

TWO-LANE TWO-WAY ROADWAY

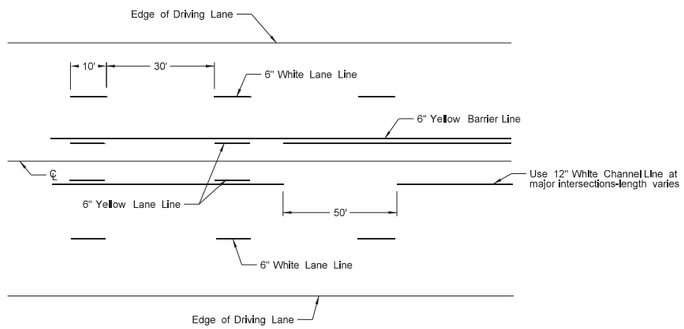


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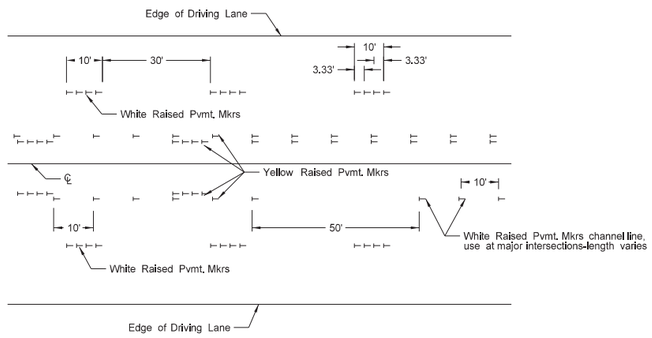


Raised Pavement Markers

FOUR LANE ROADWAY

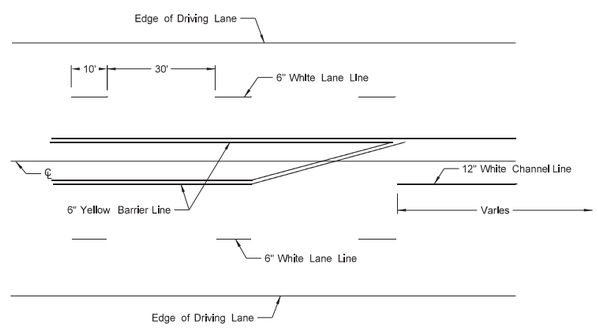


Painted or Tape Lines

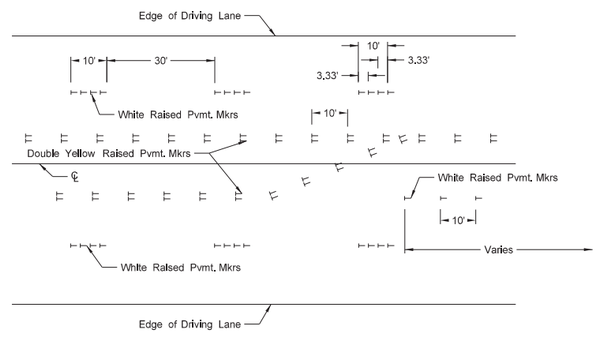


Raised Pavement Markers

FIVE LANE ROADWAY TWO WAY LEFT TURN



Painted or Tape Lines



Raised Pavement Markers

FIVE LANE ROADWAY WITH MARKED ISLANDS

NOTES:

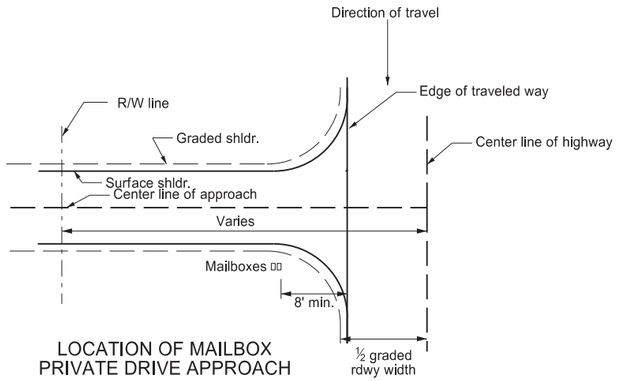
1. Place no passing zones on two-lane two-way roadways as shown. In lieu of short term no passing zone pavement markings, place no passing zone signs. Replace no passing zone signs with short term no passing zone pavement marking within three days.
2. Place short term center line stripe (paint) on top lift to match exact placement of permanent stripe.
3. Remove raised markers and tape markings after permanent pavement marking is installed.
4. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph.
5. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits ≤ 40 mph.
6. Wide lines - 8 inches wide if 4 inch normal width lines are used and 12 inches wide if 6 inch normal width lines are used.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
3-29-16	Re-numbered to be D-762-11 (previously was D-762-6)
10-17-17	Updated to active voice.
8-27-19	New Design Engineer PE Stamp.
11-22-23	Revised pavement marking widths.
1-17-24	Revised wide pvmt marking width.

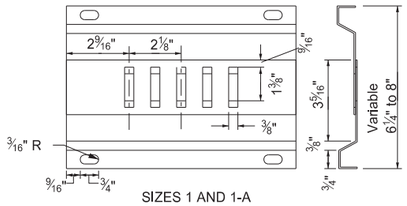
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
01/17/24
ENGINEER
NORTH DAKOTA

MAILBOX LOCATION DETAILS

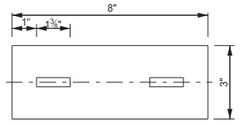
D-766-1



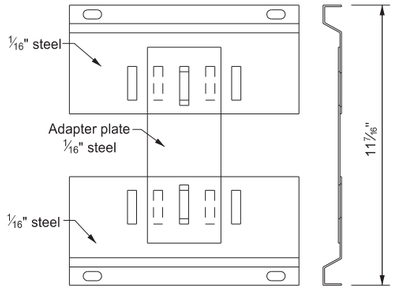
LOCATION OF MAILBOX
PRIVATE DRIVE APPROACH
ALTERNATE "A" LOCATION



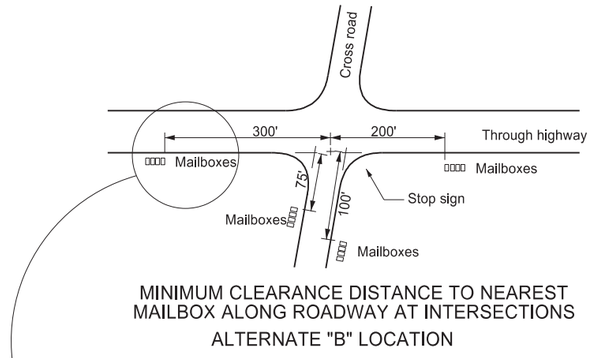
SIZES 1 AND 1-A
MOUNTING BRACKET



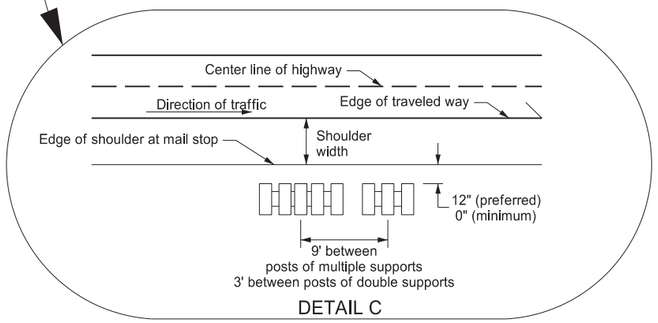
ADAPTOR PLATE



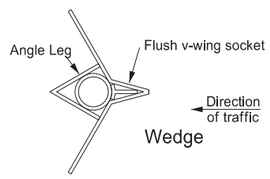
SIZE 2 WITH ADAPTOR PLATE
MOUNTING BRACKET



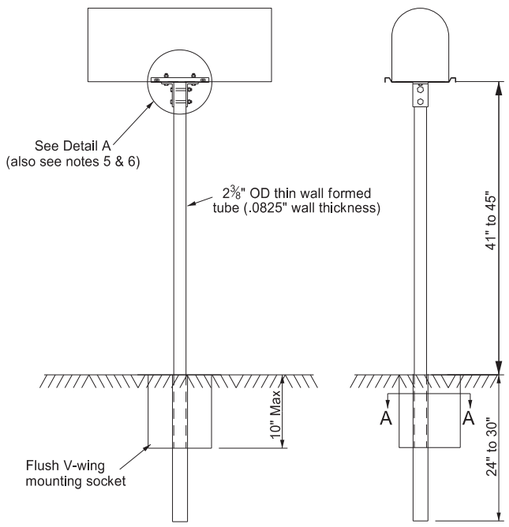
MINIMUM CLEARANCE DISTANCE TO NEAREST
MAILBOX ALONG ROADWAY AT INTERSECTIONS
ALTERNATE "B" LOCATION



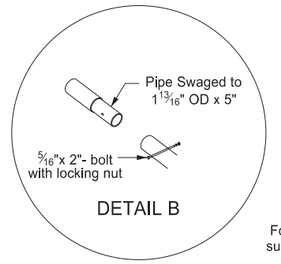
DETAIL C



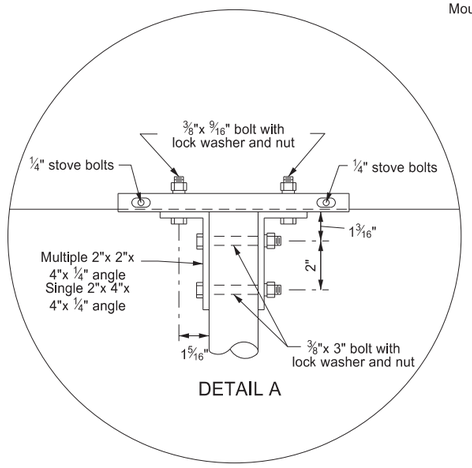
FLUSH V-WING
POST MOUNTING SOCKET
SECTION A-A



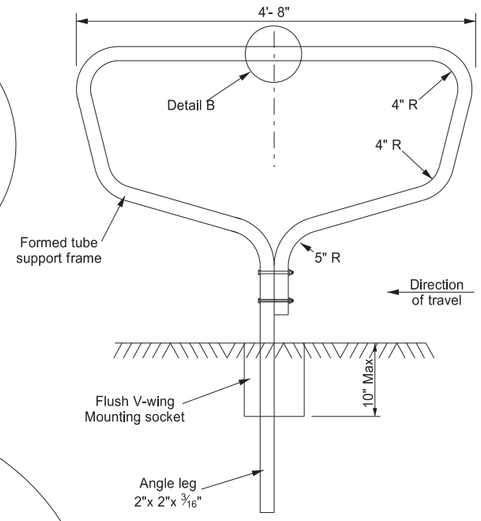
SIDE FRONT
SINGLE SUPPORT



DETAIL B



DETAIL A



FRONT

Notes:

1. The mailbox support and hardware details consist of the "V-Loc Mailbox Support System" manufactured by:

   Tapco Traffic & Parking Control Co. Inc.

   Use any equal crash tested and Federal Highway Administration approved support system meeting the requirements of NCHRP Report 350 or MASH. Install approved alternate mailbox assemblies in the manner and arrangement crash tested.

2. Install mailboxes in Alternate "A" locations when possible. Install mailboxes in Alternate "B" locations when warranted by existing field conditions.

3. Locate mailboxes on the right-hand side of the road in the direction traveled by the carrier. The Engineer will verify the correct direction with the postmaster before installion.

4. Install mailboxes on private drive approaches on the downstream side of the approach.

5. Install angle connection parallel to traffic flow for size 2 mailbox mounted on single posts.

6. For Size 2 mailbox mounted on multiple supports, attach the adapter plate to mounting bracket with 2 each, 3/8" by 9/16" bolts with lock washers and nuts. Then attach the unit to the formed tube support frame using 4 angle connections as shown in Detail A.

7. Space multiple support frames a minimum of 4 feet apart. Space single support frames a minimum of 3 ft apart. Do not place more than five No. 1 mailboxes, three No. 2 mailboxes, or any combination of four No. 1-A and No. 2 mailboxes on multiple support frames.

TABLE A

TYPICAL MAILBOX DIMENSIONS			
Size	Width	Height	Length
1	6½"	8½"	19"
1-A	8"	10½"	21"
2	11½"	13½"	23½"

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-15-2010	
REVISIONS	
DATE	CHANGE
08-25-2023	Dsn Engr stamp/signature update

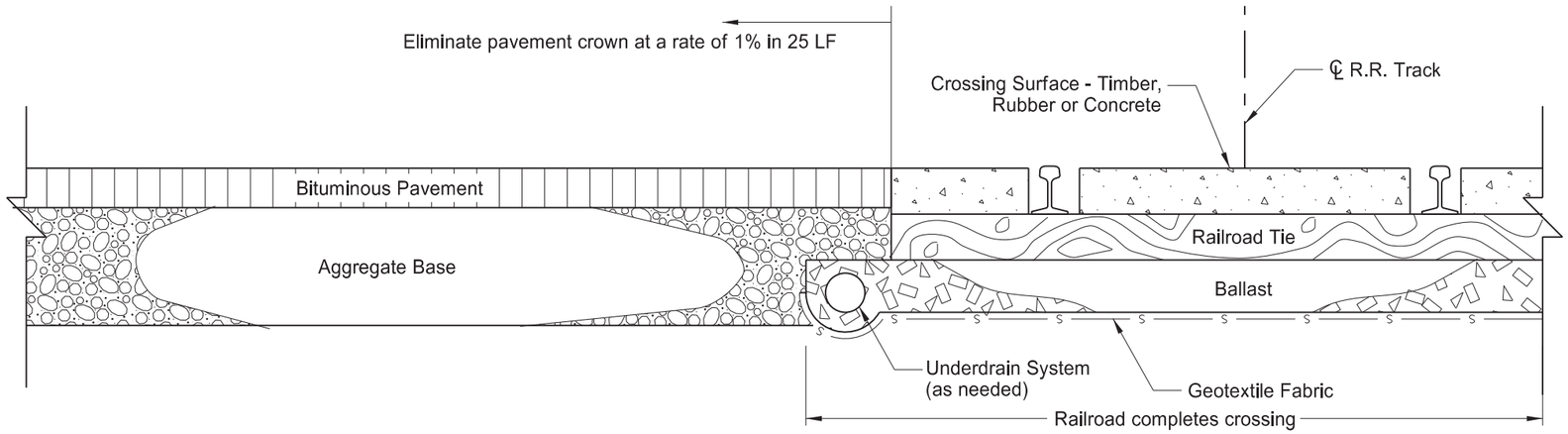
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/25/23

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Pavement Details at Railroad Crossing

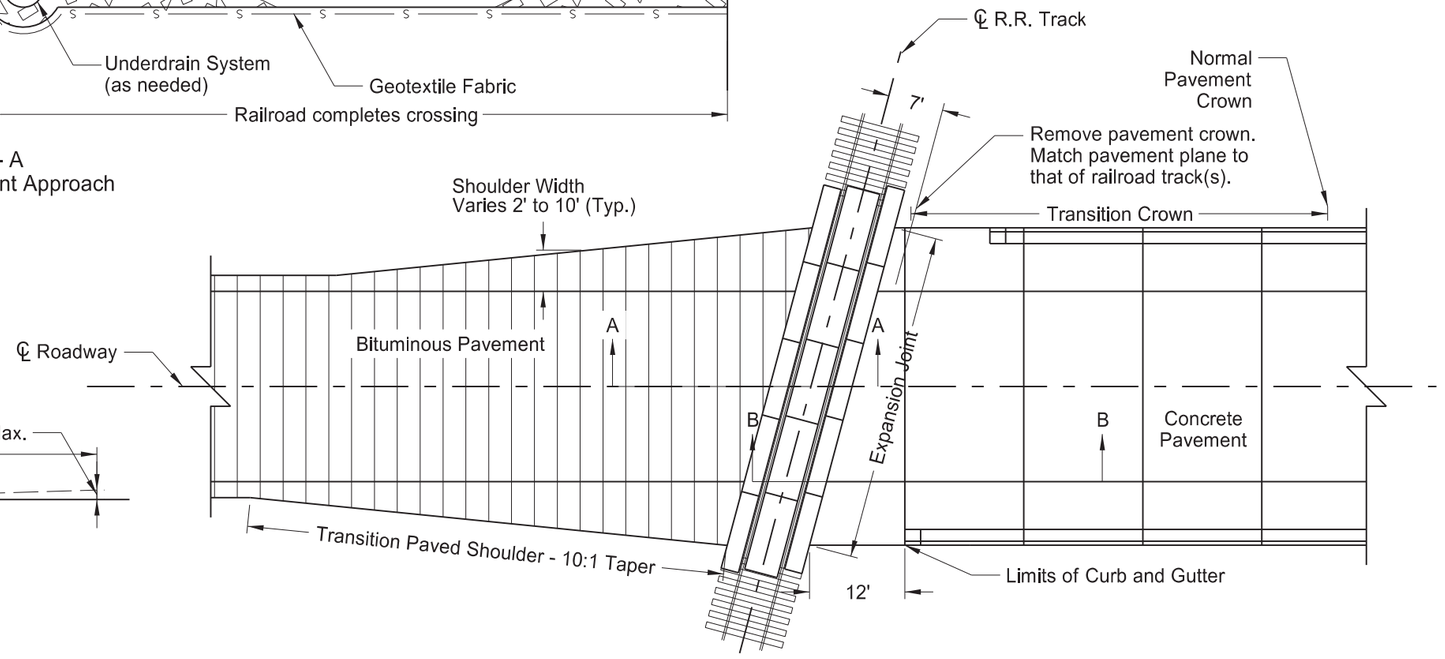
D-900-2



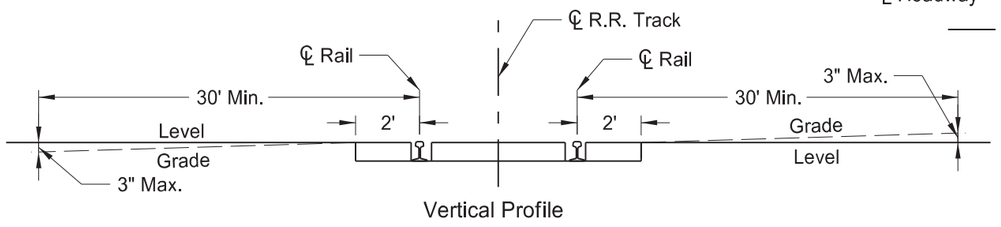
Section A - A
Bituminous Pavement Approach

Notes:

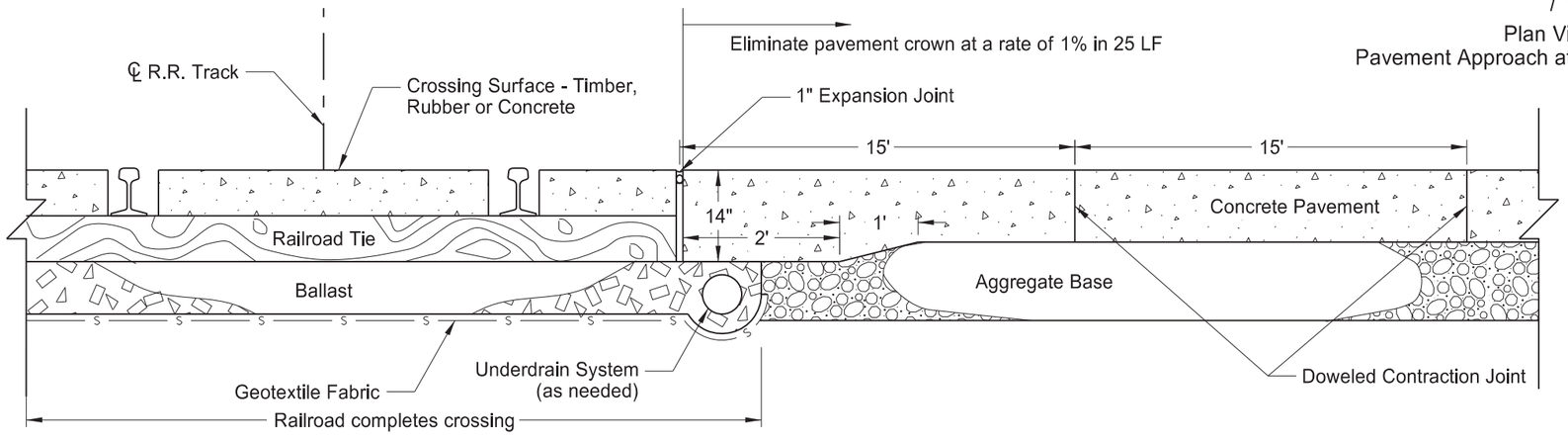
1. See typical section on plans for thickness of aggregate base, pavements and finished shoulder widths.
2. Basis of Estimate: Include all costs for the preformed expansion joint and additional concrete slab thickness in the price bid for concrete pavement pay items.



Plan View
Pavement Approach at Railroad Crossing



Vertical Profile



Section B - B
Concrete Pavement Approach and Joint Treatment

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-1-13	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
8-28-19	New Design Engineer PE Stamp.
8-09-24	Electronic Stamp/Signature.

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ENGINEER
NORTH DAKOTA

08/09/24