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DESIGN DATA				
Traffic	Average Daily			
Current 2016	Pass: 470	Trucks: 160	Total: 630	
Forecast 2036	Pass: 520	Trucks: 180	Total: 700	
Clear Zone Distance: Existing		Design Speed: 45/65		
Minimum Sight Dist. for Stopping: Existing		Bridges: N/A		
Sight Dist. for No Passing Zone: Existing				
Pavement Design Life (years)				
Design Accumulated One-way ESALs: N/A				

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ND	SS-6-018(081)239	23653	1	1
	SS-6-018(087)240	24024		

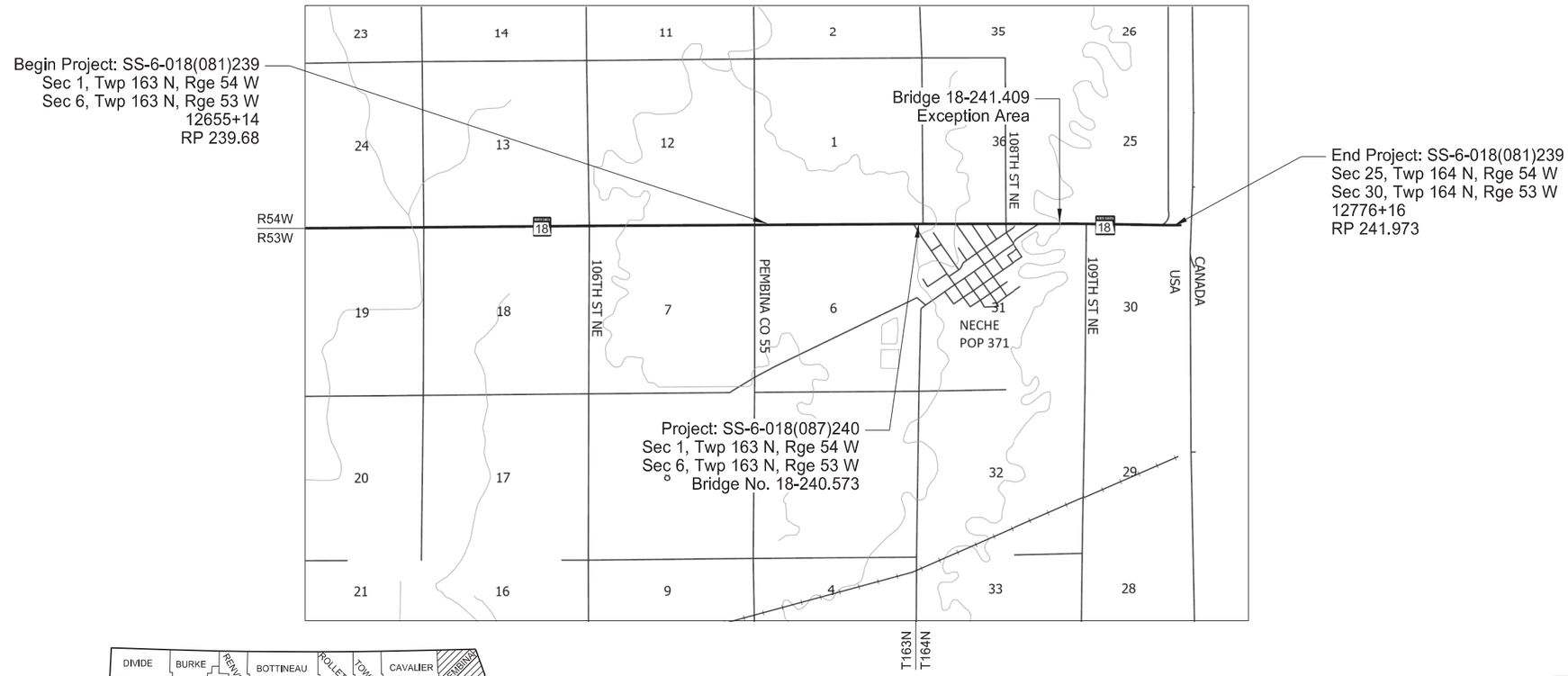
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

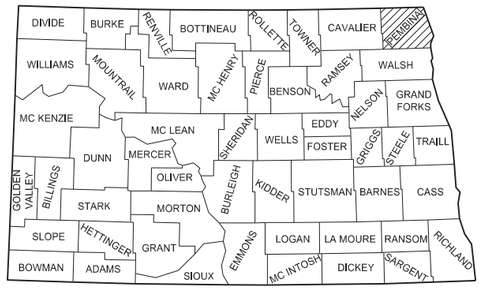
SS-6-018(081)239
SS-6-018(087)240
Pembina County
ND 18
Pembina County 55 N to State Line

Widening, Milling, HMA Overlay, Approach Slab Removal,
Box Culvert, 7th Street Realignment, End Barrier Modification, & Pipe Extensions

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

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
SS-6-018(081)239 \ ND Hwy 18	2.259	2.293
SS-6-018(087)240 \ Box Culvert	N/A	N/A





STATE COUNTY MAP

DESIGNER
James Butler
Ryan Rykowsky
Zachary Thelen
Matthew Robinson

ND DEPARTMENT OF TRANSPORTATION
OFFICE OF PROJECT DEVELOPMENT

Kirk Hoff
09/05/24

SRF CONSULTING GROUP, INC.

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 09/05/24
NORTH DAKOTA

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SRF Consulting Group, Inc.

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PLAN SECTIONS

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30	1 - 7	Typical Sections
40	1 - 4	Removals
51	1 - 4	Allowable Pipe List
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77	1 - 4	Permanent Erosion Control
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90	1	Paving Layouts
100	1 - 7	Work Zone Traffic Control
110	1 - 11	Signing
120	1	Pavement Marking
130	1 - 3	Guardrail
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200	1 - 146	Cross Sections

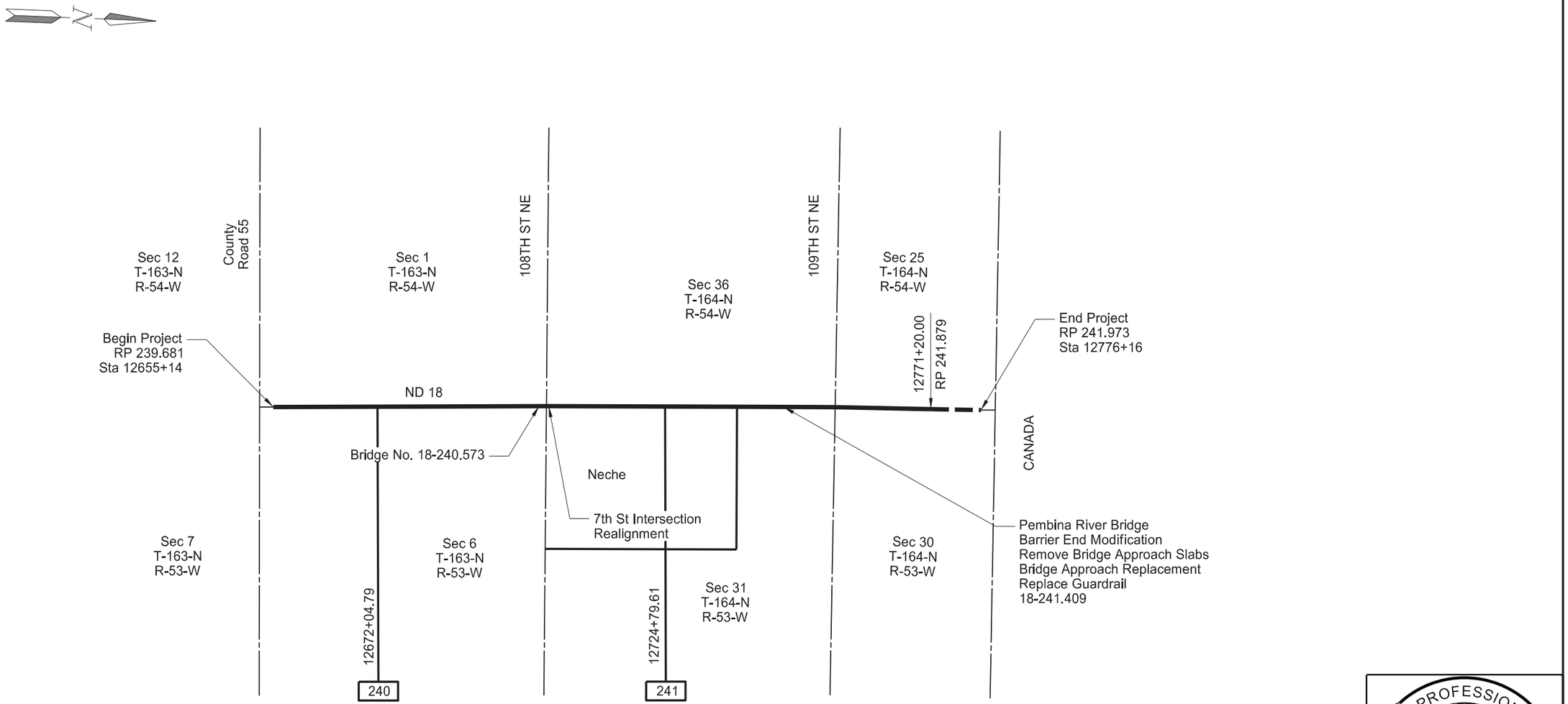
SPECIAL PROVISIONS

Number	Description
PSP 16(24)	Permits and Environmental Considerations
SSP 1	Temporary Erosion and Sediment Best Management Practices
SSP 2	Federal Migratory Bird Treaty Act
SSP 4	Longitudinal Joint Density
SSP 10	E-Ticketing
SP 160(24)	Structural and Channel Excavation Foundation Fill and Preparation
SP 175(24)	Utility Coordination

LIST OF STANDARD DRAWINGS

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-203-8	Standard Rural Approaches
D-260-1	Erosion And Siltation Controls - Silt Fence
D-704-16	Lane Closure On A Two Lane Road Using Traffic Control Signals
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
D-704-24	Shoulder Closures And Bridge Painting Layouts
D-704-26	Miscellaneous Sign Layouts
D-704-33	Two-Lane Roadway Portable Rumble Strips
D-706-1	Bituminous Laboratory
D-714-4	Round Corrugated Steel Pipe Culverts And End Sections
D-714-27M	Pipe Installation Detail for Multiple Longitudinal Mainline Pipe or Pipe Not Under the Roadway
D-748-1	Curb & Gutter And Valley Gutter
D-754-1	Pipe Or W-Shape Assembly Details
D-754-9	Letter and Arrow Details
D-754-10	Arrow Details for Lane Control and Arrow-Per-Lane Signs
D-754-11	State Highway Route Shield Detail
D-754-12	Breakaway Coupler System - Structural Details For W-Shape Supports
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D-754-14	Wind Beams And Anchor Plates For W-Shape Supports
D-754-19	(Conventional Use) Reference Markers
D-754-23	Perforated Tube Assembly Details
D-754-24	Mounting Details Perforated Tube
D-754-24A	Breakaway Coupler System For Perforated Tubes
D-754-25	Mounting Details Perforated Tube
D-754-26, 27,28,29,32	Sign Punching, Stringer and Support Location Details Regulatory, Warning and Guide Signs
D-754-47, 48	Sign Punching, Stringer and Support Location Details For Variable Length Signs
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D-754-87	Sign Punching, Stringer And Support Location Details For Street Name Signs And 911 Signs
D-762-4	Pavement Marking
D-762-11	Short-Term Pavement Marking
D-764-40	MGS W-Beam Guardrail General Details
D-764-48	Typical Grading at Bridge Ends with MGS W-Beam Guardrail
D-764-50	MASH SoftStop End Terminal - Steel Post
D-764-51	MASH Sequential Kinking Terminal - Wood Post
D-764-64	MGS W-Beam Transition with Approach Curb to In Place Concrete Jersey Barrier

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Widening, 2" Mill & 2" HMA Overlay

2" Mill & 2" HMA Overlay

Bridge Exception Area
Sta 12745+50.29 to Sta 12747+30.29 - Pembina River

REGISTERED PROFESSIONAL ENGINEER
RYAN
SCHUEHLE
PE-10772
DATE: 9/4/2024
NORTH DAKOTA

Scope of Work

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

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NOTES

GENERAL NOTES

100-P01 CONTACTS: Coordinate and provide a detailed work activity schedule of this project to the US Border Officials: 10949 HWY #18 Neche, ND 58265 Phone: 701-886-7744.

107-P01 MAINTAINING TRAFFIC - DROP-OFFS: If, at the end of the work day, drop-offs greater than 2 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 material with a 4:1 or flatter slope along the entire length of the area. Compact materials using Type C compaction, as specified in 203.04 G.4, “Compaction Control Type C”.

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

The Engineer will measure stackable vertical panels as specified in Section 704. 05, “Method of Measurement” and will pay for panels as specified in Section 704.06, “Basis of Payment”.

The Engineer will not measure material used to construct the wedge. Include the cost of materials, equipment, labor, and incidentals required for this operation in the contract unit price for “Salvaged Base Course”.

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.

202-P01 REMOVAL OF CULVERTS-ALL TYPES & SIZES: Corrugated steel culverts with damage at the end of the pipe have been allotted a 4 FT removal of pipe quantity per damaged end. Cut the pipe perpendicular to the cross section a distance 4 FT back from the pipe opening to allow for a clean connection to the pipe extension using an appropriate pipe band as detailed in Standard Drawing 714-04.

Include all cost associated with saw cutting the pipe in the contract unit price for “Removal of Culverts-All Types And Sizes.”

202-P02 REMOVAL OF BITUMINOUS SURFACING: Removal of Bituminous Surfacing includes the removal of the bituminous pavement and the underlying aggregate base.

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

203-P01 COMPACTION AND DENSITY CONTROL: Compact material for widening as specified in Section 203.04 G.4, Compaction Control Type C. Benching and horizontal lifts will not be required. All other requirements of Section 203.04 G.4 of the Standard Specifications will apply. In addition to Section 203.04 G.4, make 2 passes with a sheepsfoot roller over the entire area of the embankment before replacing the topsoil. Compact the material at a moisture content that is acceptable to the Engineer. Provide a sheepsfoot roller that meet the requirements of Section 151 of the Standard Specifications.

203-P02 CONTRACTOR FURNISHED BORROW: The Contractor will obtain the proper clearance for contractor furnished borrow. A number of potential material sources are identified as borrow clues, these sites are:

- Clue A: Section 24, T162N, R54W, Quarter Section E ½ N ¼ - 5 Acre site north of the Tongue River. Contact landowner Jim Hodgson at 218-556-6277.
- Clue B: Section 35, T162N, R53W, Quarter Section SE ¼ - the Pembina County Fair Association is interested in removing the dirt stock car race track in Hamilton, ND – estimates of material volume are 1/10 of a mile of track at 8 to 10 feet in height. Contact Norm Becker at 701-520-3002.

Provide borrow material that is composed of a Group and Subgroup Classification of A-6 or A-7-6 as defined by AASHTO M 145-91. Provide the Engineer with a certified lab report listing the results of the material tests required in AASHTO M 145-91. Provide the Engineer with splits of all soil samples. Earth moving equipment (scraper hauled dirt) will not be allowed on the highway pavement.

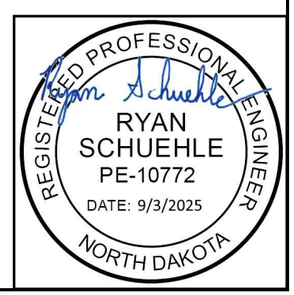
203-P03 COMMON EXCAVATION-WASTE: For approaches designated in section 40 removals, remove asphalt from the edge of shoulder to the edge of sluff or extent of surfacing. Remove aggregate and embankment to a 6” depth. All costs for time, material, and labor required to remove and dispose of the material are included in the contract unit price for “Common Excavation-Waste”.

256-P01 REMOVE AND REPLACE RIPRAP: Salvage existing riprap before extending culverts. After extension, place salvaged riprap according to Section 256.04, “Construction Requirements” on Geosynthetic Material Type RR.

Include all costs to remove and replace riprap as well as installing geosynthetic material in the contract unit price for “Remove and Replace Riprap.”

302-P01 SALVAGED BASE COURSE: If operations do not allow adequate time to produce Salvaged Base Course from available material, the Engineer will accept Aggregate Base Course CL 5 in accordance with 817.01 A of the Standard Specifications. A written request for material substitution is not required.

411-P01 MILLED MATERIAL: Approximately 3,686 tons of millings will be created. If operations do not allow for milled material to be utilized in the production of Salvaged Base Course, then all milled material will become property of the contractor.



NOTES

430-100 FOG SEAL: Apply a fog seal of 0.05 Gal/SY to final surface of the hot mix asphalt if the ND T 113 “Lightweight Pieces in Virgin Aggregate” test results exceeds 3.0% during mix design or production of the hot mix asphalt. Apply the fog seal behind the finish roller before the mat temperature drops below 130 degrees Fahrenheit. Use the same emulsion material as the Tack Coat. Apply the fog seal at no additional cost to the Department.

704-200 STATE FURNISHED MEDIAN BARRIER: Obtain (10) 18” x 19’ steel barriers. They can be picked up from the Sterling yard and returned to the New Salem yard. Contact the Bismarck District office at 701-328-6950 to facilitate the exchanges.

Section 704.04 J “Precast Concrete Median Barrier (State Furnished)” applies to the contract item “State Furnished Median Barrier”.

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

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

Section 704.04 J “Precast Concrete Median Barrier (State Furnished)” applies to the contract item “State Furnished Median Barrier”.

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

Payment for the State Furnished Median Barrier will follow Section 704.06 D ”Precast Concrete Median Barrier (State Furnished)”. Include all costs associated with median barriers in the contract unit price for “State Furnished Median Barrier”.

704-450 LANE CLOSURE - SIGNAL CONTROL/FLAGGING CONTROL: Install either the signal controlled lane closure on Standard D-704-16 or the flagging controlled lane closure on Standard D-704-17.

Obtain an electrical source for traffic signals. Solar powered signals may be used. Place generators a minimum of 60 feet from the roadway centerline, unless the generator and signal are part of a trailer mounted unit.

Place utility poles and equipment a minimum of 60 feet from the roadway centerline and place power conductors a minimum of 6 inches below the ground surface. Remove poles after they are no longer necessary.

The Engineer will measure individual traffic control devices, other than the signal system and flaggers, shown on the standards. Payment will be made at the respective contract unit price.

Include the cost of either a traffic signal system or flaggers in the contract unit price for "Lane Closure – Signal Control/Flagging 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".

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DATE: 9/3/2025
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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NOTES

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 based on length of project and the list below. The Department will pay for all necessary deployed devices, regardless of the length of the lane closure.

1. Standard D-704-16 or D-704-17 for Reinforced Concrete Box Culvert placement.
2. Standard D-704-19, type F;
3. Standard D-704-20, layout G – signing will be required at County Road 55.
4. Standard D-704-22, layouts K and L
5. Standard D-704-24, layout R;
6. Standard D-704-26, layouts BB, CC, EE, and GG.
7. Standard D-704-33.

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

1. The field office shall be a minimum of 450 square feet and have a minimum ceiling height of 7 feet. The facility must be completely insulated and weather tight.
2. Indoor bathroom facilities.
3. A heating and cooling system that is capable of maintaining the temperature between 65°F and 78°F year round.
4. Lighting (lumens required 110 foot-candles).
5. A minimum of 6 electrical outlets spaced evenly throughout the building, and a minimum of 3 phone jacks.
6. Have 3 desks and 3 desk chairs, and 3 extra chairs.
7. Cabinet space with a minimum of 32 cubic feet.
8. File cabinet with at least 2 drawers.
9. Counter space with a minimum of 40 square feet.
10. The floor will be free of protrusions so it will accommodate office equipment.
11. Fax machine.
12. Photocopy/scanner machine capable of making 11”x17” photocopies/scans, and toner to last the duration of the project. Paper to be supplied by the Engineer. A separate table or cabinet to support the copier.
13. Have a microwave, and a 15 cubic foot refrigerator or larger.
14. The location of the field office shall be on, or as close to the project and aggregate laboratory as possible, and be approved by the Engineer.
15. The field office shall be available for occupancy one week prior to the start of construction and remain available through project completion.
16. Shall be wired for DSL Broadband internet capabilities. The internet shall have a wireless Wi-Fi router and also the capabilities of hard wiring to a computer.

All requirements of the Field Office are subject to approval by the Engineer. Include all installation and set-up fees for the utilities; rent costs; and costs for phone, internet, water, sewer, heating fuels, and electricity in the contract unit price for “Field Office”.

714-P01 PIPE CLEANOUT: Clean out all centerline and approach culverts designated in the plans before extending them. When necessary, remove material beyond the end of the pipe adequately to complete the work and to the satisfaction of the Engineer. Dispose of unsuitable material according to section 107.17 of the Standard Specifications. Include the cost of cleaning the pipes and disposal of material in the contract unit price for “Pipe Metal Arch XXIN x XXIN” and “Pipe Conc Reinf XXIN CL III”.

714-P02 PLUG PIPE: At locations designated on the plans for plug pipe, fill the conduit with controlled density backfill (CDB).

Before plugging the pipes, cap the ends with a weatherproof and freeze/thaw resistant, non-shrink cement grout material such as SikaGrout 212, BASF Masterflow 928, Euclid NS Grout, or and approved equal which complies with ASTM C1107.

The CDB consists of cement, water, fly ash, and aggregate at the ratio specified below. Mix the material continuously during pumping or placement to keep the solution from separating.

MIX DESIGN

Cement	75 lbs
Fly Ash	125 lbs
Fine aggregate	2600 lbs
Water	416.5 gals

Include all materials, equipment, labor, and incidentals needed to perform this work in the price bid for “Plug Pipe – All Types & Sizes”. Approximately 248 feet of 36-inch RCP and 89 feet of 24-inch RCP will be filled with CDB.

Complete installation of reinforced concrete box culvert at station 12702+37.23, the outlet channel, and culverts at stations 12703+43 – 65’ Lt, 12703+44 – 73’ LT, 12703+46 – 81’ LT and along 7th St alignment stations 12+87, 12+95 and 13+03 before plugging pipes.

748-P01 CURB & GUTTER-TYPE 1 SPECIAL: Install curb and gutter in accordance with Standard Drawing D-748-1, except for height transitions provided for a distance of 3 feet at each end, as shown on Standard Drawing D-764-64.
The curb and gutter will be measured and paid for by the linear foot as "Curb & Gutter - Type I Special".

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NORTH DAKOTA

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 SPAWNING RESTRICTION: Work not to take place within the Pembina River, classified fishery, between April 15 and June 1 to protect the resources during the spawning period.

EN-2 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-3 AVOIDANCE AREAS: The Engineer will contact Reilly Lembo of the Environmental and Transportation Services Division to coordinate any meetings needed to identify the limits of the avoidance area. The site is at approximately Sta 12710+48 to 12712+98 as shown in the section 60 plans. This avoidance area within the right-of-way must not be disturbed and will be fenced prior to commencement of any construction. Install the fence in the location designated in the plans, maintain the fence, and remove the fence upon completion of the project. Include all costs to provide, place, maintain, and remove the fence in the price bid for “Temporary Safety Fence”.

EN-4 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.

EN-5 WETLAND MITIGATION: Wetland mitigation is required for unavoidable permanent wetland impacts. The wetland mitigation plan is incorporated into the plans for this project. After completion of the mitigation area, the Engineer will complete the Onsite Mitigation Certification Form SFN 61042. Any sedimentation occurring within the mitigation area will be removed.

EN-6 THREATENED AND ENDANGERED SPECIES: The project is located near/within suitable habitat for the species listed in the following table

SPECIES	HABITAT	PRESENCE
Northern Long-Eared Bat	Forested/Wooded Areas/Bridges/Box Culverts/Caves/Mines	Active Season: April 15 - October 31* Inactive Season: Nov 1 – April 14*

*Time frames can differ slightly, depending on the year

If any of the above threatened and endangered species are identified within 1 mile of the project, the Contractor will notify the Engineer immediately and cease construction activities in the vicinity until an avoidance area is established. The Engineer will establish an avoidance area that is at least a 0.5 mile and immediately coordinate with the USFWS (701-355-8513), FHWA (701-221-9464), and NDDOT Environmental and Transportation Services (701-328-2592). The Contractor will not resume work within the avoidance area until the Engineer has confirmed with the agencies that work may proceed (either the species have left the area, or approved avoidance/minimization measures have been implemented).

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NORTH DAKOTA

Estimated Quantities

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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SPEC	CODE	ITEM DESCRIPTION	UNIT	PCN 23653 ND 18	PCN 24024 18-240.573			TOTAL
103	0100	CONTRACT BOND	L SUM	0.8	0.2			1
202	0111	REMOVAL OF CONCRETE	L SUM	1				1
202	0132	REMOVAL OF BITUMINOUS SURFACING	SY	833				833
202	0169	REMOVAL OF END SECTION-ALL TYPES & SIZES	EA	26				26
202	0170	REMOVAL OF CULVERTS-ALL TYPES & SIZES	LF	20				20
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES	LF	130				130
202	0400	REMOVAL OF RIPRAP - LOOSE ROCK	CY	35				35
203	0103	COMMON EXCAVATION-TYPE C	CY	5938				5938
203	0109	TOPSOIL	CY	11893				11893
203	0113	COMMON EXCAVATION-WASTE	CY	942				942
203	0140	BORROW-EXCAVATION	CY	18221				18221
210	0050	BOX CULVERT EXCAVATION	EA		1			1
210	0210	FOUNDATION FILL	CY		1247			1247
210	0250	BOX CULVERT FOUNDATION AGGREGATE	CY		197			197
210	0405	FOUNDATION PREPARATION-BOX CULVERT	EA		1			1
216	0100	WATER	M GAL	480				480
251	0200	SEEDING CLASS II	ACRE	19.3				19.3
251	2000	TEMPORARY COVER CROP	ACRE	19.2				19.2
253	0101	STRAW MULCH	ACRE	38.6				38.6
255	0102	ECB TYPE 2	SY	1238				1238
256	0701	REMOVE AND REPLACE RIPRAP	CY	48				48
260	0100	SILT FENCE UNSUPPORTED	LF	6204				6204
260	0101	REMOVE SILT FENCE UNSUPPORTED	LF	6204				6204
261	0112	FIBER ROLLS 12IN	LF	11877				11877
261	0113	REMOVE FIBER ROLLS 12IN	LF	2970				2970
262	0100	FLOTATION SILT CURTAIN	LF	96				96
262	0101	REMOVE FLOTATION SILT CURTAIN	LF	96				96
302	0100	SALVAGED BASE COURSE	TON	9346				9346
401	0050	TACK COAT	GAL	2441				2441
401	0060	PRIME COAT	GAL	499				499
401	0160	BLOTTER MATERIAL CL 44	TON	12				12
411	0114	MILLING PAVEMENT SURFACE - 2 INCH	SY	36856				36856
430	0043	SUPERPAVE FAA 43	TON	6751				6751
430	1000	CORED SAMPLE	EA	47				47
430	5815	PG 58S-34 ASPHALT CEMENT	TON	425				425
602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	936				936
606	1204	12FT X 4FT PRECAST RCB CULVERT	LF		66			66
606	3204	DBL 12FT X 4FT PRECAST RCB CULVERT	LF		66			66
606	5204	12FT X 4FT PRECAST RCB END SECTION	EA		2			2
606	7204	DBL 12FT X 4FT PRECAST RCB END SECTION	EA		2			2
702	0100	MOBILIZATION	L SUM	0.8	0.2			1
704	0100	FLAGGING	MHR	900				900
704	1000	TRAFFIC CONTROL SIGNS	UNIT	2793				2793
704	1018	LANE CLOSURE-SIGNAL CONTROL/FLAGGING CONTROL	EA	1				1
704	1039	ATTENUATION DEVICE-TYPE B-45	EA	2				2
704	1048	PORTABLE RUMBLE STRIPS	EA	2				2
704	1052	TYPE III BARRICADE	EA	29				29

Estimated Quantities

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	8	2
	SS-6-018(087)240		

SPEC	CODE	ITEM DESCRIPTION	UNIT	PCN 23653 ND 18	PCN 24024 18-240.573			TOTAL
704	1060	DELINEATOR DRUMS	EA	175				175
704	1080	STACKABLE VERTICAL PANELS	EA	18				18
704	1185	PILOT CAR	HR	200				200
704	3511	STATE FURNISHED MEDIAN BARRIER	LF	190				190
706	0400	FIELD OFFICE	EA	0.8	0.2			1
706	0500	AGGREGATE LABORATORY	EA	0.8	0.2			1
706	0550	BITUMINOUS LABORATORY	EA	0.8	0.2			1
706	0600	CONTRACTOR'S LABORATORY	EA	0.8	0.2			1
709	0100	GEOSYNTHETIC MATERIAL TYPE G	SY	395	393			788
714	0615	PIPE CONC REINF 24IN CL III	LF	12				12
714	0820	PIPE CONC REINF 30IN CL III	LF	92				92
714	3023	END SECT-TRAVERSABLE REINF. CONC.24IN	EA	22				22
714	3033	END SECT-TRAVERSABLE REINF. CONC.30IN	EA	2				2
714	4099	PIPE CONDUIT 18IN-APPROACH	LF	28				28
714	4106	PIPE CONDUIT 24IN-APPROACH	LF	236				236
714	4113	PIPE CONDUIT 30IN-APPROACH	LF	22				22
714	4116	PIPE CONDUIT 36IN-APPROACH	LF	375				375
714	6065	PIPE METAL ARCH 49IN X 33IN	LF	44				44
714	6080	PIPE METAL ARCH 64IN X 43IN	LF	20				20
714	6501	END SECT-TRAVERSABLE METAL 18IN	EA	2				2
714	6506	END SECT-TRAVERSABLE METAL 24IN	EA	2				2
714	6511	END SECT-TRAVERSABLE METAL 30IN	EA	2				2
714	6560	END SECT METAL ARCH 64IN X 43IN	EA	1				1
714	9660	REMOVE & RELAY END SECTION-ALL TYPE & SIZES	EA	5				5
714	9680	PLUG PIPE-ALL TYPES & SIZES	EA	10				10
724	0270	REMOVE GATE VALVE & BOX	EA	2				2
724	0430	REMOVE HYDRANT	EA	1				1
748	0141	CURB & GUTTER-TYPE 1 SPECIAL	LF	80				80
752	0911	TEMPORARY SAFETY FENCE	LF	267				267
754	0110	FLAT SHEET FOR SIGNS-TYPE XI REFL SHEETING	SF	122				122
754	0112	FLAT SHEET FOR SIGNS-TYPE IV REFL SHEETING	SF	81				81
754	0206	STEEL GALV POSTS-TELESCOPING PERFORATED TUBE	LF	580				580
754	0214	GALV STEEL POSTS-W-SHAPE POSTS(TWO OR MORE)	LF	60				60
754	0563	REFERENCE MARKER-TYPE C	EA	3				3
754	0592	RESET SIGN PANEL	EA	9				9
754	0805	OBJECT MARKERS - CULVERTS	EA	48				48
754	1104	REMOVE SIGN FOUNDATION	EA	2				2
760	0025	SINUSOIDAL RUMBLE STRIP - ASPHALT SHOULDER	MILE	0.74				0.74
760	0027	SINUSOIDAL RUMBLE STRIP - ASPHALT CENTERLINE	MILE	0.37				0.37
762	0103	PVMT MK PAINTED-MESSAGE	SF	24				24
762	0432	SHORT TERM 6IN LINE-TYPE NR	LF	6060				6060
762	1106	PVMT MK PAINTED 6IN LINE	LF	30520				30520
762	1112	PVMT MK PAINTED 12IN LINE	LF	622				622
762	1124	PVMT MK PAINTED 24IN LINE	LF	882				882
764	0131	W-BEAM GUARDRAIL	LF	158				158
764	0145	W-BEAM GUARDRAIL END TERMINAL	EA	4				4
764	2080	REMOVE BOX BEAM GUARDRAIL	LF	266				266

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	8	3
	SS-6-018(087)240		

Estimated Quantities

SPEC	CODE	ITEM DESCRIPTION	UNIT	PCN 23653 ND 18	PCN 24024 18-240.573			TOTAL
764	2081	REMOVE END TREATMENT & TRANSITION	EA	4				4
766	0100	MAILBOX-ALL TYPES	EA	3				3
930	9223	CRACK SEALING	LF	120				120
930	9612	SPALL REPAIR	SF	1				1
930	9647	BARRIER END MODIFICATION	EA	4				4

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	10	1

BASIS OF ESTIMATE

	Stations	Stations	Stations	Stations	Stations	Stations
	Bridge Appr. Replacement	Mainline 2' Widening	Reinforced Concrete Box	7th Street Realignment	Mainline 2" Overlay	Pembina River Bridge
	12745+30.28 to 12745+50.18 12747+30.41 to 12747+50.29	12655+13.97 to 12701+13.26 12703+92.17 to 12744+13.88 12748+47.59 to 12771+19.99	12701+13.23 to 12703+92.24	10+00 to 16+49.90	12771+20 to 12776+16.16	12744+14.09 to 12745+30.28 12747+50.29 to 12748+47.72
	0.4 Sta	109 Sta	2.8 Sta	6.5 Sta	5.0 Sta	2.2 Sta

Material	Unit	Width (Ft)	Quantity/Sta	Width (Ft)	Quantity/Sta	Width (Ft)	Quantity/Sta	Width (Ft)	Quantity/Sta	Width (Ft)	Quantity/Sta	Width (Ft)	Quantity/Sta
Milling Pavement Surface - 2 Inch	SY	-	0	26.3	304.54	-	0	24-28.36	7.44	26.3-50.8	562.76	26.2-37.8	354.52
Removal of Bituminous Surfacing	SY	-	0	-	0	24.9-26.2	297.50	-	0.00	-	0	-	0
Salvaged Base Course @ 1.875 Ton/CY	TON	46.4-51.8	495	2.0_2.0	40.77	38.37	321.07	32.37-36.73	121.85	-	0	Varies	265
Tack Coat @ 0.05 Gal/SY (1st Lift)	Gal	43.7-49.1	20	31.46	17.2	31.46	16.25	28-32.37	14.31	31.46	29.6	29.2-52.2	16.36
Tack Coat @ 0.05 Gal/SY (2nd Lift)	Gal	43.1-48.5	20	-	0	31.46	16.25	-	0	-	0	-	0
Prime Coat @ 0.35 Gal/SY	Gal	46.4-51.8	145	-	0	32.18	130	-	0	-	0	-	0
Blotter Material CL 44 @ 12 Lb/SY	TON	46.4-51.8	2.5	-	0	32.18	2	-	0	-	0	-	0
Superpave FAA 43 @ 2 Ton/CY	TON	42.6-48.0	162.5	30	40.69	30	108.93	28-32.37	104.62	25-120	65.8	28.7-51.7	57.27
PG 58S-34 Asphalt Cement @ 6.3%	TON	-	10.24	-	2.56	-	6.86	-	6.59	-	4.15	-	3.61

Permanent Pavement Marking			
Location - Type	Basis	Quantity	
Yellow Centerline - Pvmt MK Painted 6 IN Line	Centerline Skips 1,320 LF/mile	3,030	LF
White Edge Lines - Pvmt MK Painted 6 IN Line	10,560 LF/mile	24,210	LF
Yellow Intersection Barrier Line - Pvmt MK Painted 6 IN Line	645 LF/ Each Side of Intersection	2,580	LF

Short Term 6 IN Line-Type NR			
Location	Applications	Basis	Quantity
Centerline Sta 12655+13.97 to Sta 12675+00.00	1 Application: Top of Fogged Centerline Rumble Strips	Centerline Skips 1,320 LF/mile (Yellow)	500 LF
Centerline Sta 12655+13.97 to Sta 12776+16.17	1 Application: Top of Milled Surface	Centerline Skips 1,320 LF/mile (Yellow)	3,030 LF
Centerline Sta 12675+00.00 to Sta 12776+16.17	1 Application: Top of Fogged Centerline Rumble Strips	Centerline Skips 1,320 LF/mile (Yellow)	2,530 LF

Spec	Code	Item Description	QTY	Unit
762	1106	PVMT MK PAINTED 6IN LINE		
		Total	29,820	LF
762	432	SHORT TERM 6IN LINE-TYPE NR		
		Total	6060	LF

REGISTERED PROFESSIONAL ENGINEER
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DATE: 9/4/2024
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	10	2

BASIS OF ESTIMATE

HMA Cored Samples							
	A	B		C			
Specification Section	Distance (Ft) /1000	Lanes	Joints	Lifts	Quantity (A x B x C)	Quantity (1 per mile)	Unit
430.04 I.2.b(2), "Pavement Density Cores" - Mainline Overlay	12	2	N/A	1	24		EA
430.04 I.2.b(2), "Pavement Density Cores" - Mainline Reconstruct	1	2	N/A	2	4		EA
430.04 I.2.b(2), "Pavement Density Cores" - 7th Street Reconstruct	1	2	N/A	2	4		EA
SSP 4 Longitudinal Joint Density in HMA Pavements (Centerline)	12	N/A	1	1	12		EA
430.04 I.2.b(3),"Pavement Thickness Determination Cores"	N/A	N/A	N/A	1	N/A	3	EA
				Total	44	3	EA

Basis of Estimate
HMA @ 2 Ton/CY
Aggregate @ 1.875 Ton/CY

Water

FOR	BASIS	ITEM QTY	WATER QTY
Dust Palliative	25 Mgal/Mile	2.56	60
Aggregates	20 Gal/Ton	8933	180
Embankment	10 Gal/CY	23582.9	240
		TOTAL	480

Mailboxes

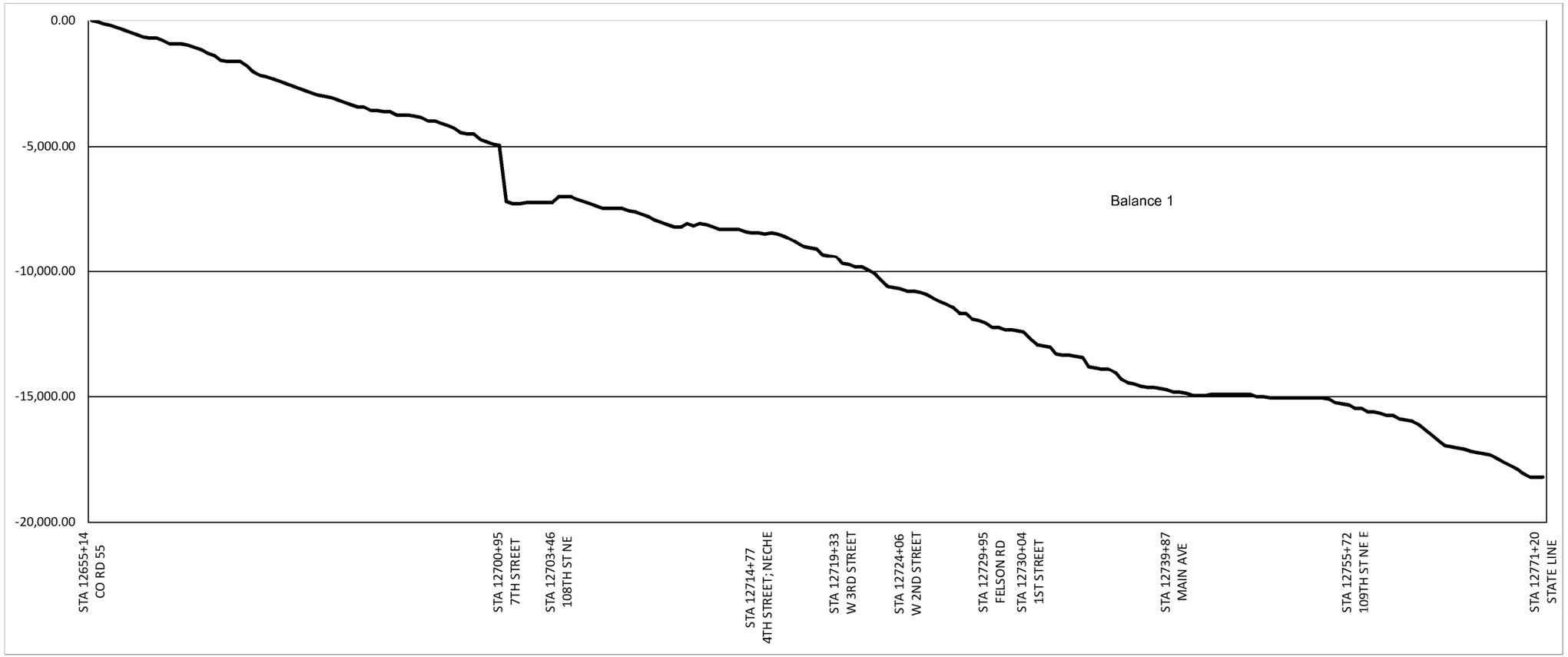
Station	Type	Work
12718+67 – LT	Single	Replace
12718+71 – LT	Single	Replace
12750+14 – LT	Single	Replace

Milling Summary						
Milling Pavement Surface (SY)	Millings (CY)	Total Millings (Ton)	10% loss (Ton)	Salvaged Base Course Required (Ton)	Virgin Aggregate Required (Ton)	Ratio of Salvaged Material (%)
A	B	C	D = C x 0.10	F	G = F -C	H = C/F x 100
36856	2048	4096	410	8933	4837	46

Spec	Code	Item Description	QTY	Unit
760	0025	Sinusoidal Rumble Strips – Asphalt Shoulder		
Left Shoulder		Sta 12655+44 to Sta 12675+00	0.37	Miles
Right Shoulder		Sta 12655+44 to Sta 12675+00	0.37	Miles
760	0027	Sinusoidal Rumble Strips – Asphalt Centerline		
Sta 12655+44 to Sta 12675+00			0.37	Miles

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NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	11	1



Station / Location

Total For the Project (Balance 1)

Haul = 2,125,647 CY Sta
Excavation Hauled = 18,854 CY
Average Haul Distance for the Project= 113 Sta

REGISTERED PROFESSIONAL ENGINEER
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DATE: 9/3/2025
NORTH DAKOTA

Mass Diagram

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	11	2

Spec	Code	Item Description	QTY	Unit
203	0103	Common Excavation - Type C	5937.4	CY
203	0140	Borrow - Excavation	18220.5	CY
203	109	Topsoil	11893.0	CY

Earthwork Summary			
Roadway	Common Excavation - Type C	Embankment	Balance
	CY	CY	CY
	A	B	C = A - B
Mainline - ND 18	2406.8	15745.0	-13338.2
Sideroads & Approaches	2955.6	7837.9	-4882.3
Temporary Widening at Box Culvert	575	575	0.0
Totals	5937.4	24157.9	-18220.5

Roadway	Excavation (CY)	Embankment (CY)	Balance (CY)
ND 18	2406.8	15745.0	-13338.2
FD 12663+73 WEST	15.4	143.2	-127.8
FD 12663+73 EAST	19.1	130.1	-111.0
FD 12690+07	15.9	134.8	-118.9
7TH ST	1989.0	4248.0	-2259.0
108TH ST NE	362.0	115.0	247.0
FD 12711+73	17.2	125.1	-107.9
4TH ST	0.0	10.3	-10.3
PD 12718+20	25.9	277.9	-252.0
W 3RD ST	32.1	281.8	-249.7
W 2ND ST	55.7	173.1	-117.4
FELSON RD	41.7	238.6	-196.9
1ST ST	18.1	111.1	-93.0
FD 12733+91	20.0	283.5	-263.5
PD 12734+79	19.7	384.0	-364.3
PD 12738+39	40.1	130.5	-90.4
MAIN AVE	56.6	163.1	-106.5
PD 12750+33	32.6	133.0	-100.4
PD 12750+44	53.2	98.7	-45.5
FD 12752+65	20.9	39.0	-18.1
109TH ST NE EAST	67.5	175.7	-108.2
FD 12756+05	17.2	167.4	-150.2
FD 12757+56	16.2	146.3	-130.1
FD 12763+99	19.5	127.7	-108.2
Roadway Total	**5362.4**	**23582.9**	**-18220.5**

FD = Field Drive
PD = Private Drive

Topsoil Summary			
Location	Topsoil from Stripping (CY)	Topsoil Required (CY)	Topsoil (CY) (Pay Item)
Project Area	A	B	A
Totals:	11,893	10,830	11,893

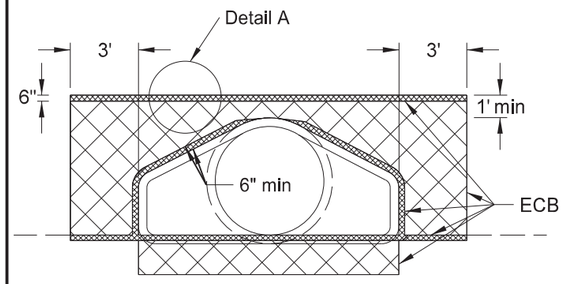
REGISTERED PROFESSIONAL ENGINEER
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PE-10772
DATE: 9/3/2025
NORTH DAKOTA

Earthwork Summary

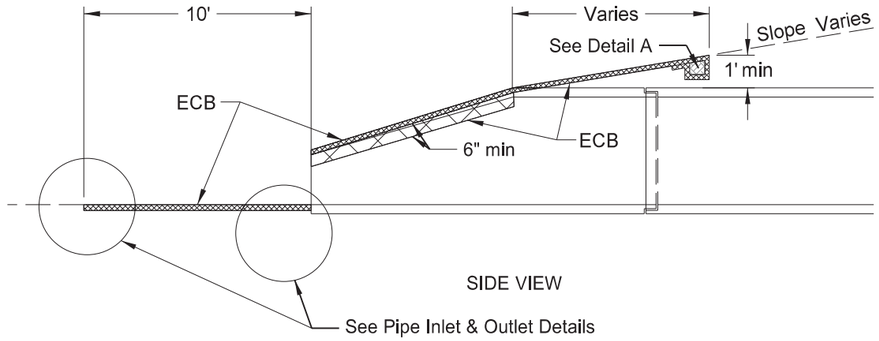
ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	20	1

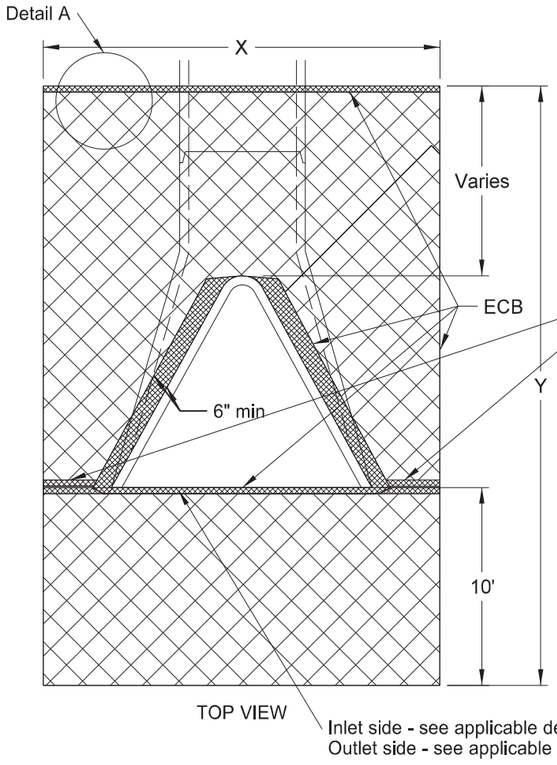


FRONT VIEW



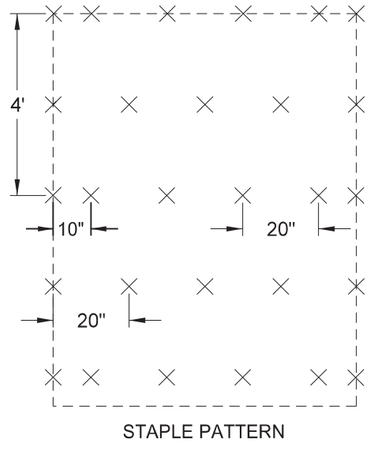
SIDE VIEW

Note: Quantity tables shown in Section 20 sheet 2.



TOP VIEW

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

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

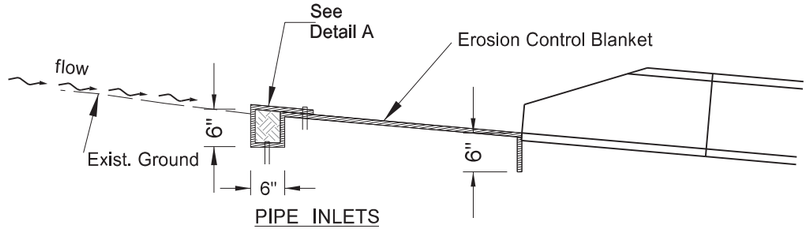
Note: Quantities based on 8:1 slope.

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

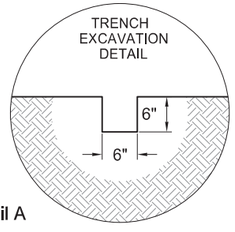
Note: Quantities based on 6:1 slope.

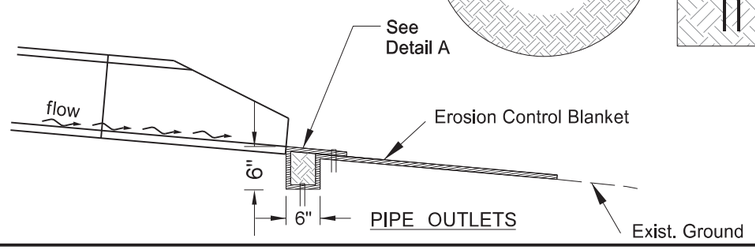
CENTERLINE CULVERTS				
DIA	X	Y	Surface area to be protected	ECB
In	Ft	Ft	SF	SY
24	10.5	17.6	172.1	20
27	11.0	18.0	182.3	21
30	11.6	18.5	195.1	22
36	12.7	19.2	216.7	24
42	13.3	19.2	225.2	25
48	13.8	20.0	238.0	27
54	14.5	19.5	244.7	28
60	15.0	19.0	248.3	28
66	15.6	20.0	264.5	30
72	16.2	20.5	276.8	31

Note: Quantities based on 4:1 slope.

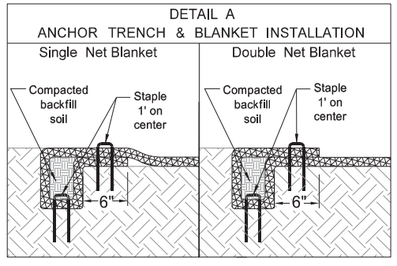


PIPE INLETS





PIPE OUTLETS



REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
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DATE: 9/5/2024
NORTH DAKOTA

Erosion Control at Culvert Flared End Sections

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	20	2

Erosion Control Blanket (ECB)					
Location to be Protected	Culvert Type Appr/CL	Pipe Diam (Inch)	No.	Unit Quantity	Total Quantity Type 2
Station				(SY)	(SY)
12670+68	CL	49x33	2	27	54
12670+78	CL	49x33	2	27	54
12688+06	CL	24	2	20	40
12693+08	CL	30	2	22	44
12697+79	CL	64x43	2	30	60
Total					252

Note: Based on 4:1 slope.

Erosion Control Blanket (ECB)					
Location to be Protected	Culvert Type Appr/CL	Pipe Diam (Inch)	No.	Unit Quantity	Total Quantity Type 2
Station				(SY)	(SY)
12663+70 - 42' RT	Appr	24	2	24	48
12663+71 - 60' LT	Appr	18	2	22	44
12690+12 - 48' LT	Appr	24	2	24	48
12690+11 - 43' LT	Appr	24	2	24	48
12703+46 - 65' LT	Appr	36	2	30	60
12703+46 - 73' LT	Appr	36	2	30	60
12703+46 - 81' LT	Appr	36	2	30	60
12718+30 - 41' LT	Appr	24	2	24	48
12719+33 - 41' RT	Appr	24	2	24	48
12724+02 - 41' RT	Appr	24	2	24	48
12729+96 - 41' LT	Appr	24	2	24	48
12730+08 - 42' RT	Appr	24	2	24	48
12733+82 - 40' LT	Appr	24	2	24	48
12734+76 - 41' RT	Appr	24	2	24	48
12757+54 - 40' RT	Appr	24	2	24	48
12763+93 - 42' LT	Appr	30	2	27	54
12703+00 - 280.0' RT	Appr	36	2	30	60
12703+01 - 288.0' RT	Appr	36	2	30	60
12703+02 - 295.9' RT	Appr	36	2	30	60
Total					986

REGISTERED PROFESSIONAL ENGINEER
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PE-10772
DATE: 9/5/2024
NORTH DAKOTA

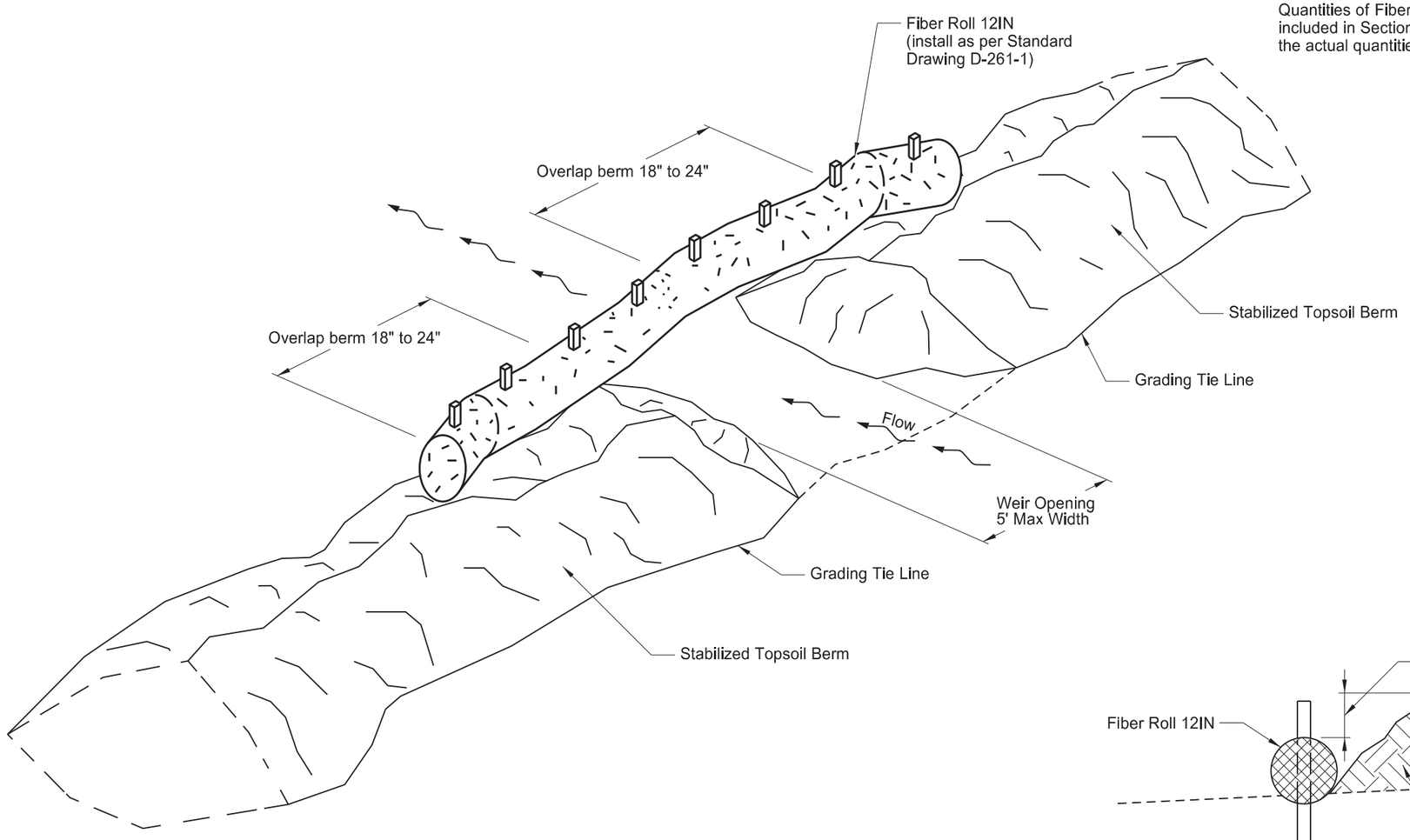
Erosion Control at Culvert Flared End Sections

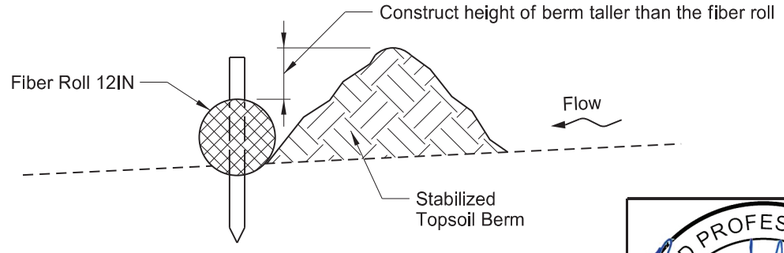
ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	20	3

Quantities of Fiber Roll 12IN and Remove Fiber Roll 12IN have been included in Section 76 for use at weirs. The Engineer will measure the actual quantities required in the field.





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. The Engineer will measure and pay for fiber rolls separately.
7. The Engineer will measure and pay for removal of fiber rolls separately when required by the specifications.
8. The Engineer will measure and pay for soil stabilization and temporary cover crop separately.
9. Include the costs to create, maintain, and dismantle the berm in the unit price bid for "Topsoil".

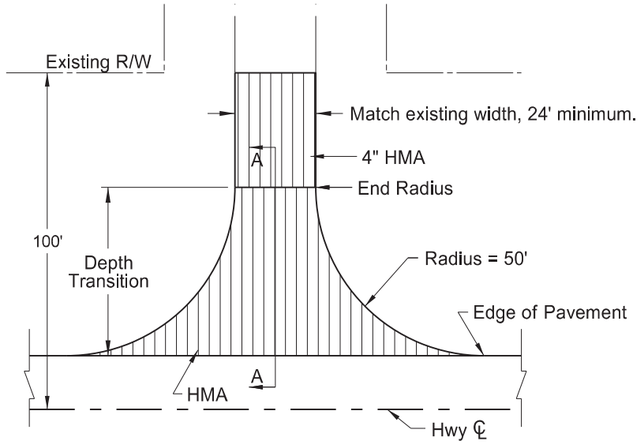
REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 9/5/2024
NORTH DAKOTA

Temporary Topsoil Berm and Weir Detail

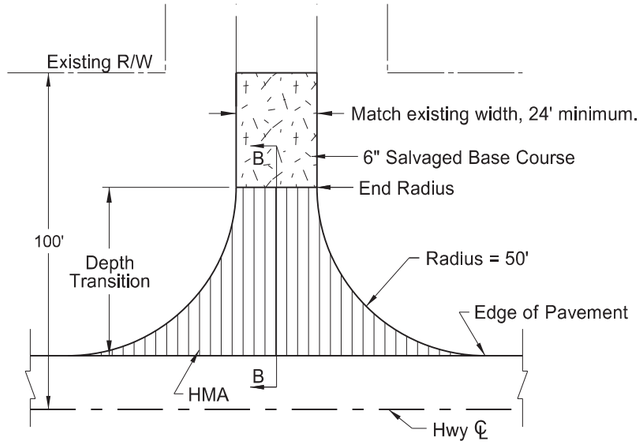
ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	20	4



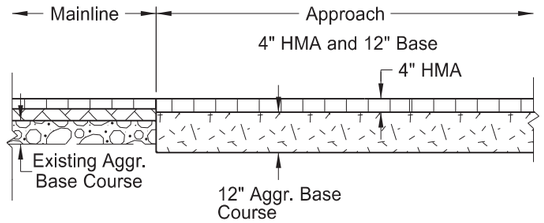
(1) Paved Section Line, County Road, or Street Approach



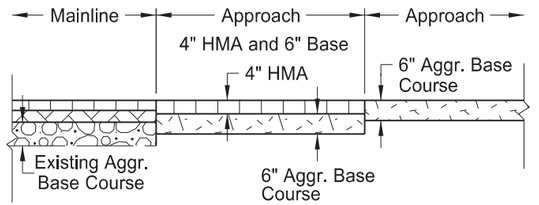
(2) Gravel Section Line, County Road, or Street Approach

Notes:

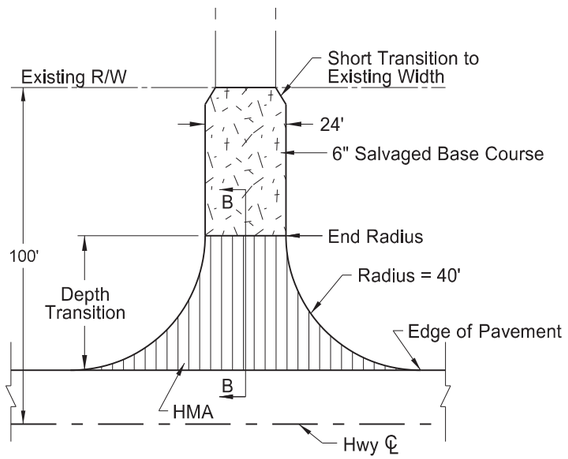
1. Actual HMA paving and Salvaged Base Course locations may vary in the field, as approved by the Engineer.
2. Quantity totals have been included in the bid items of the "Estimate of Quantities" of the plans.



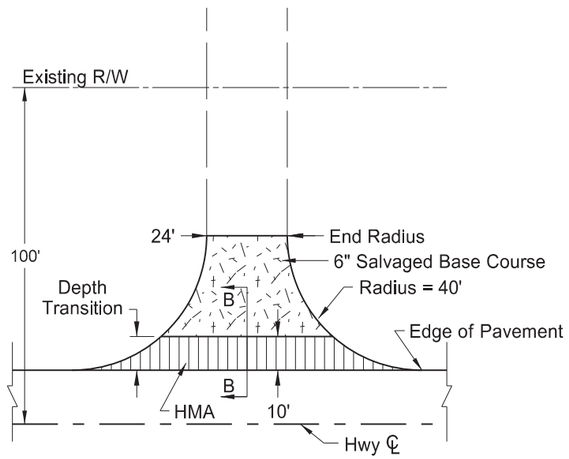
Section A-A
(not to scale)



Section B-B
(not to scale)



(3) Gravel Private Drive Approach



(4) Field Drive Approach

Basis of Estimate				(1) Paved Road		(2) Gravel Road		(3) Gravel Private Drive		(4) Field Drive		Total
Number of Locations				3		5		5		8		
Spec	Code		Unit	Total	Average	Total	Average	Total	Average	Total	Average	
302	0100	Salvaged Base Course @ 1.875 Ton/CY	Ton	238	59.6	676	135.2	620	123.9	632	70.2	2166
401	0050	Tack Coat @ 0.05 Gal/SY	Gal	9	2.1	60	12.0	53	10.6	39	4.3	161
401	0060	Prime Coat @ 0.35 Gal/SY	Gal	60	15.0	0	0.0	0	0.0	0	0.0	60
401	0160	Blotter Material CL 44 @ 12 lbs/SY	Ton	1	0.3	0	0.0	0	0.0	0	0.0	1
430	0043	Superpave FAA 43 @ 2 Ton/CY	Ton	44	10.9	271	54.2	241	48.1	176	19.5	732
430	5815	PG 58S-34 Asphalt Cement @ 6.3% (both lifts)	Ton	3	0.7	17	3.4	15	3.0	11	1.2	46

REGISTERED PROFESSIONAL ENGINEER
RYAN
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PE-10772
DATE: 9/5/2024
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Approach Paving Details for
New or Regrading Rural Approaches

(Approach Grading)

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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Approaches					
Station	Lt/Rt	Paved Section Line (1)	Gravel Section Line (2)	Gravel Private Drive (3)	Field Drive (4)
12663+73	Rt				1
12663+73	Lt				1
12690+07	Lt				1
12700+49**	Rt	1			
12703+46	Lt		1		
12703+46*	Rt	1			
12711+73**	Lt				1
12714+30	Rt	1			
12718+20	Lt			1	
12719+18	Rt		1		
12723+95	Rt		1		
12729+95	Lt		1		
12730+05	Rt	1			
12733+91	Lt				1
12734+79	Rt			1	
12738+39	Lt			1	
12740+51	Rt	1			
12750+33	Rt			1	
12750+44	Lt			1	
12752+65	Lt				1
12756+01	Rt		1		
12756+05	Lt				1
12757+56	Rt				1
12763+99	Lt				1
Totals		5	5	5	9

* Indicates new approach

** Indicates approach to be abandoned

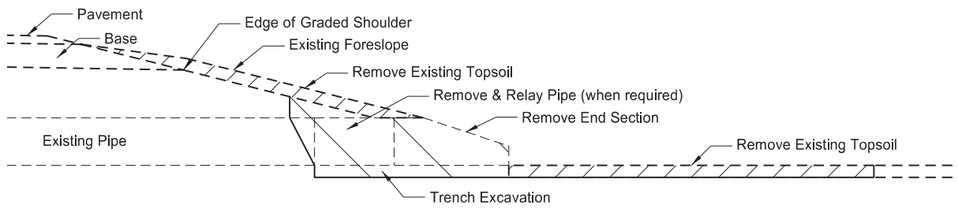
REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 9/5/2024
NORTH DAKOTA

Approach Types

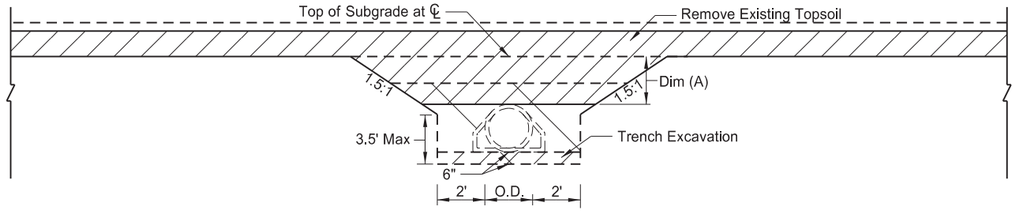
ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

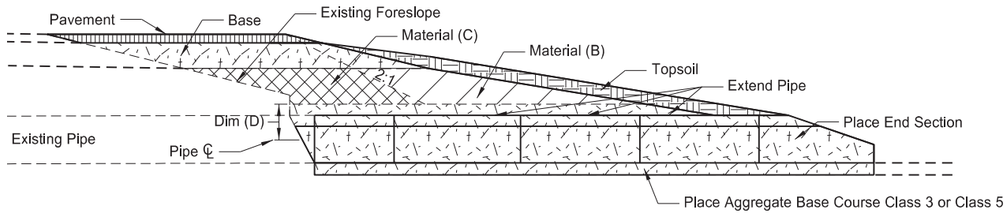
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	20	6



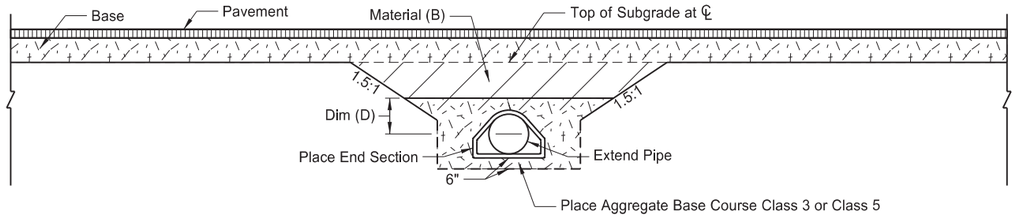
Removal Section
Cross Section View



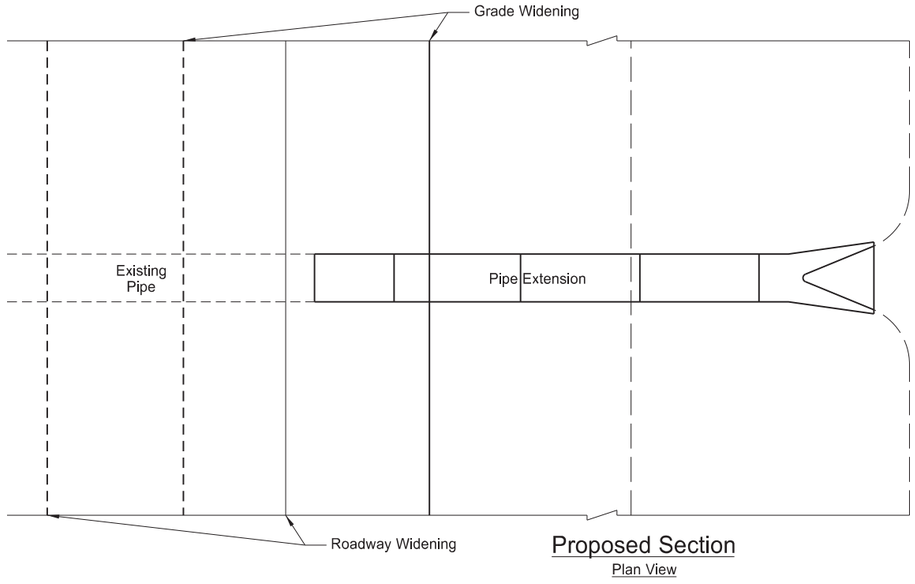
Removal Detail
Side View



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.

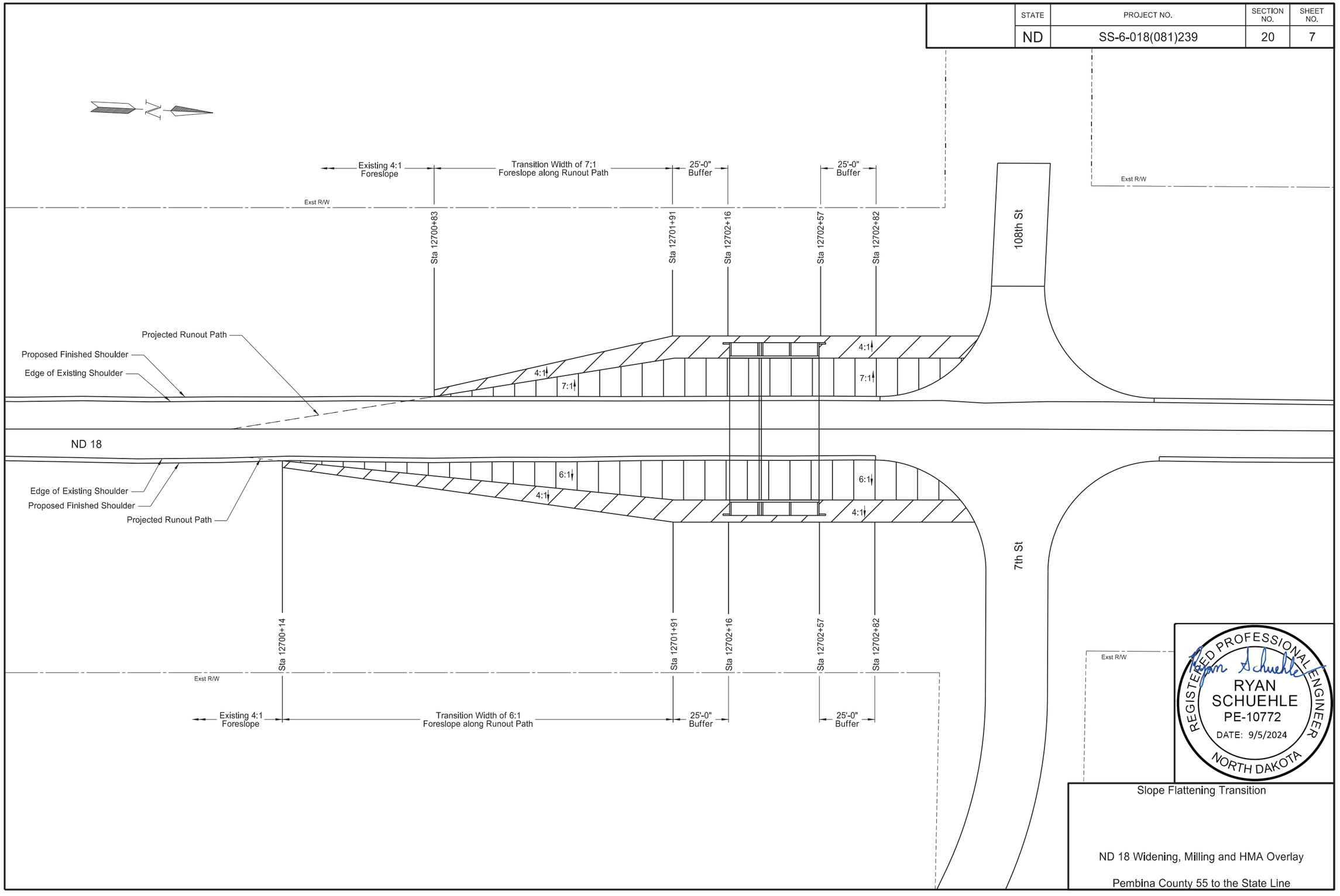
REGISTERED PROFESSIONAL ENGINEER
ZACHARY THELEN
PE-40305
DATE: 9/9/24
NORTH DAKOTA

Mainline Widening CL Pipe Extension Detail

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	20	7



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RYAN SCHUEHLE
PE-10772
DATE: 9/5/2024
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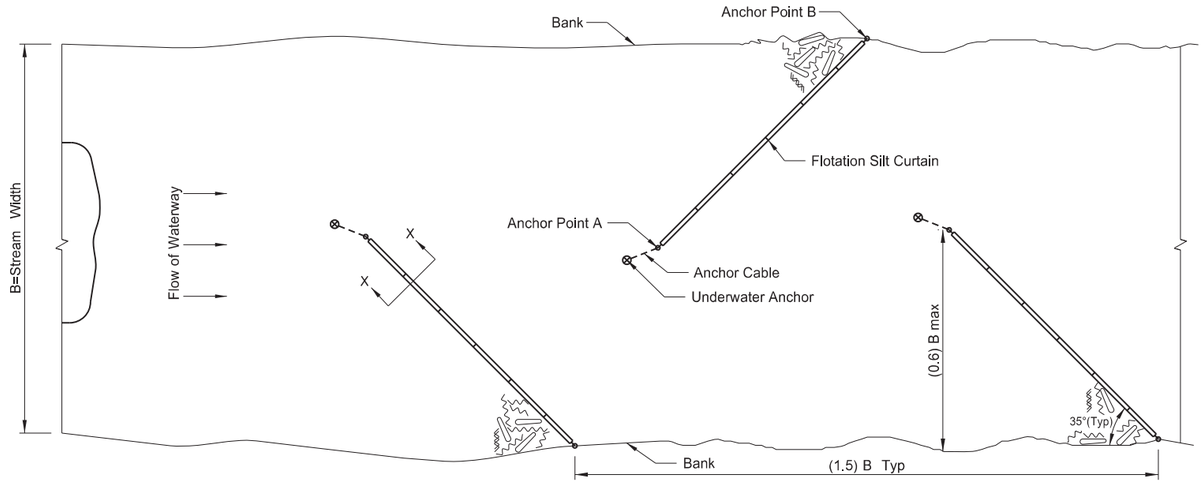
Slope Flattening Transition

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

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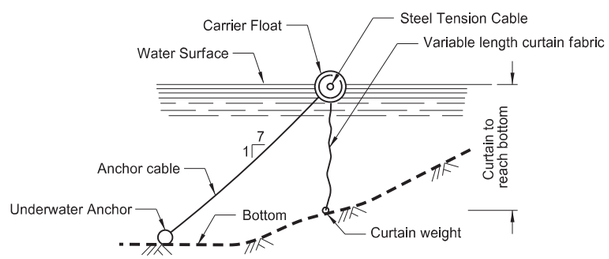
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	20	8



PLAN VIEW

FLOTATION SILT CURTAIN - TYPE HERRING BONE PATTERN

DESIGN GUIDELINES:
When temporary work encroaches more than ⅓ width of the stream
Or where stream width doesn't allow use of Type Moving Water



SECTION X-X
FLOTATION SILT CURTAINS

Note:
Maximum water velocity for moving water = 5 ft/sec

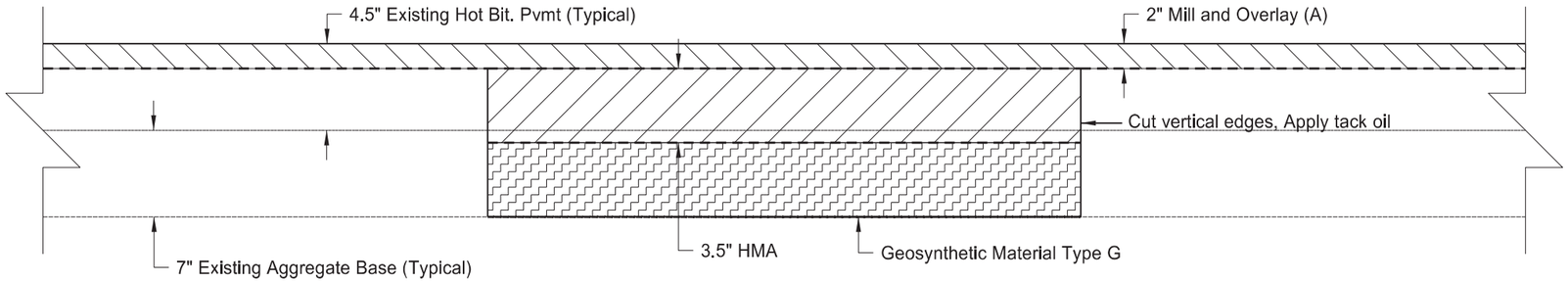
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PE-10772
DATE: 9/5/2024
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Temporary Erosion Control - Flotation Silt Curtain

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

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	ND	SS-6-018(081)239	20	9



Notes:

1. The exact locations, lengths and widths to be patched will be determined by the Engineer in the field.
2. Broken or unstable bituminous surfacing will be removed and replaced according to Section 430.04 G.
3. Remove existing base and subgrade material to the depth required to obtain a stable subgrade. Replace removed base and subgrade material with salvaged base course and compact.
4. Include all costs to remove & dispose of unstable material and cut vertical edges in the contract price for SUPERPAVE FAA 43.
5. Include all costs to haul, place and compact salvaged base course in the contract price for SALVAGED BASE COURSE.
6. (A) Paving quantities included in section 60.

Basis of Estimate										
Location				Salvaged Base Course (Ton) 7" Typical	Tack Coat @ 0.05 Gal/SY	Prime Coat @ 0.35 Gal/SY	Blotter Material CL 44 @ 12 lbs/SY (Ton)	Superpave FAA 43 @ 2 Ton/CY	PG 58S-34 Asphalt Cement @ 6.3%	Geosynthetic Material Type G (SY)
Begin Station	End Station	Length (LF)	Width (Ft)							
12706+99	12707+35	36	30	38	6	5	1	24	2	120
12713+59	12713+97	38	30	40	7	5	1	25	2	127
12728+57	12728+79	22	30	23	4	3	1	15	1	74
12735+45	12735+67	22	30	23	4	3	1	15	1	74
Total				124	21	16	4	79	6	395

Salvaged Base Course

Typical Milling Pavement Surface & HMA

HMA

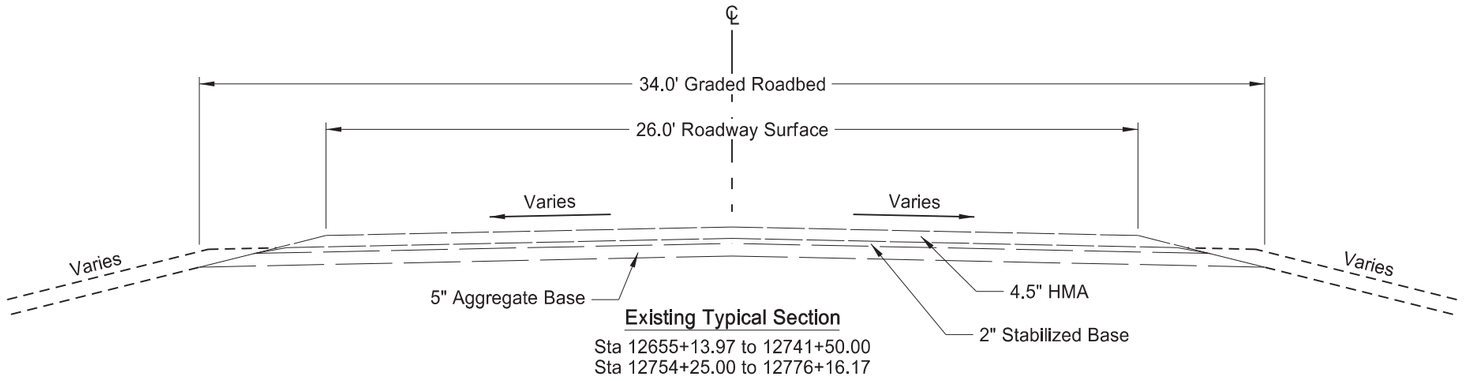
REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 9/5/2024
NORTH DAKOTA

Culvert Patching Detail

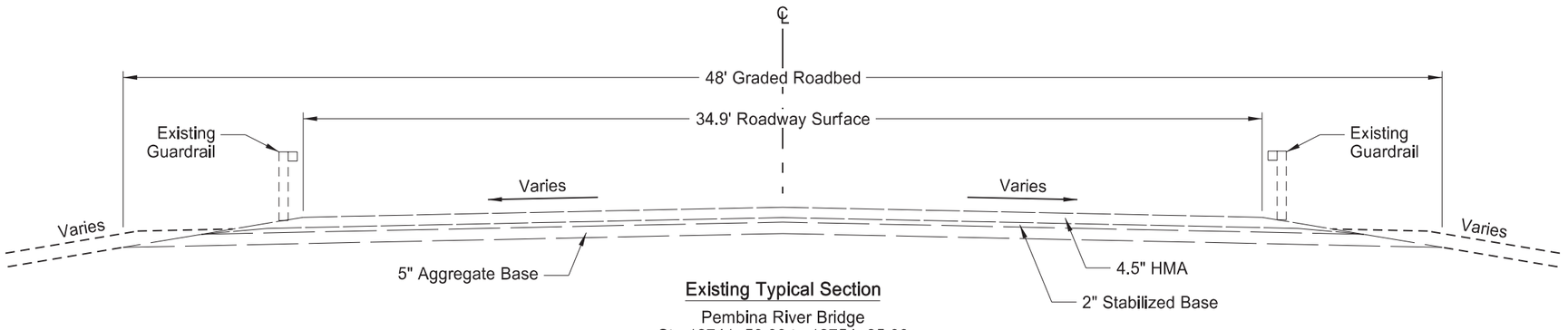
ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

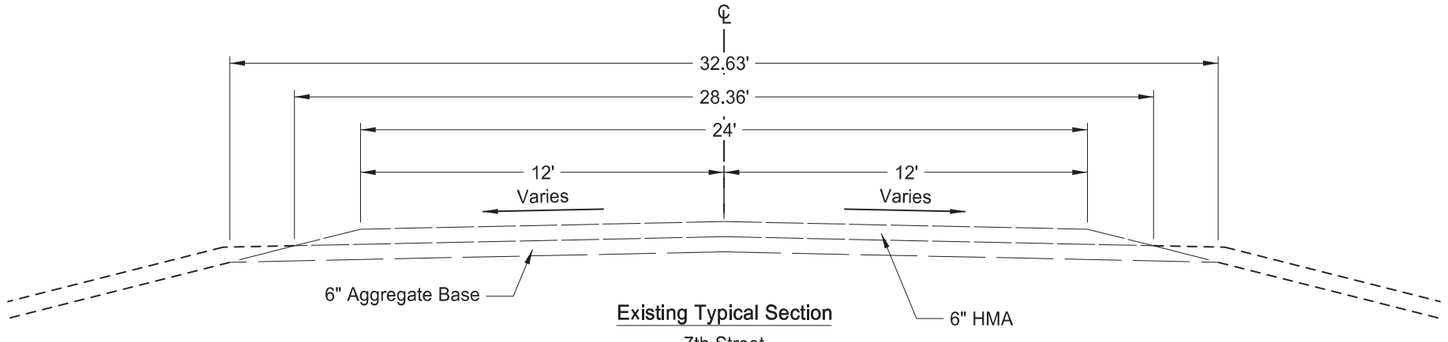
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	30	1



Existing Typical Section
Sta 12655+13.97 to 12741+50.00
Sta 12754+25.00 to 12776+16.17



Existing Typical Section
Pembina River Bridge
Sta 12741+50.00 to 12754+25.00



Existing Typical Section
7th Street
Sta 14+00.00 - 16+00.00

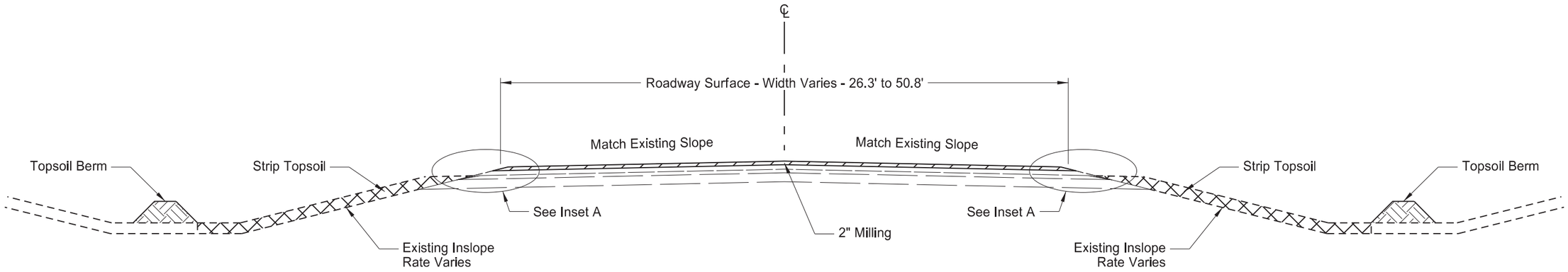
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RYAN SCHUEHLE
PE-10772
DATE: 9/4/2024
NORTH DAKOTA

Existing Typical Sections

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

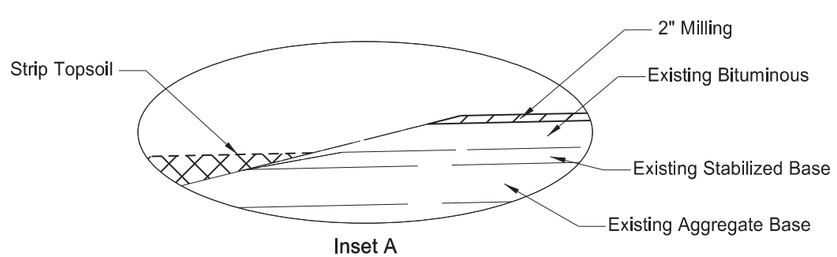
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	30	2



Milling Typical Section

Sta 12655+13.97 to 12745+50.34
Sta 12747+30.07 to 12776+16.17

Note:
See Sheet 20-3 For Earthen Topsoil Berm



Inset A

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RYAN SCHUEHLE
PE-10772
DATE: 9/4/2024
NORTH DAKOTA

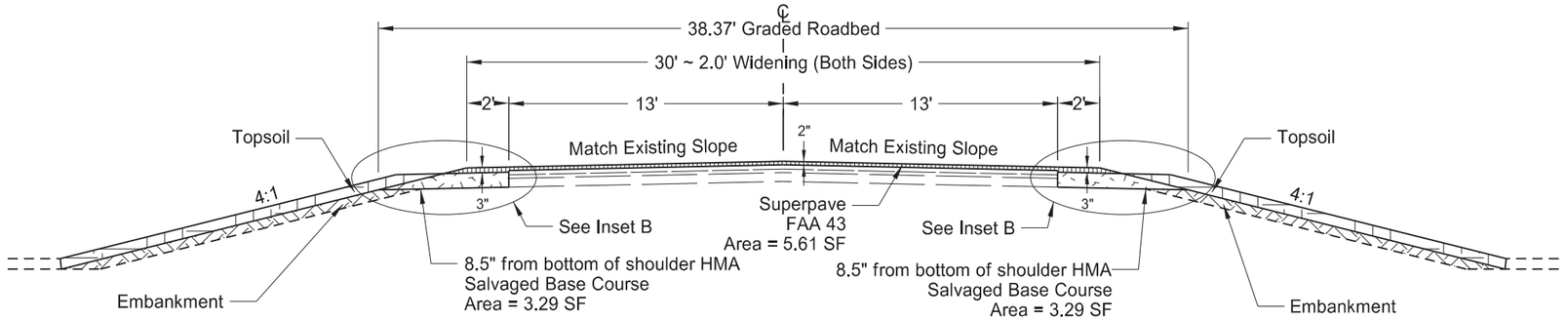
Milling Typical Section

ND 18 Widening, Milling and HMA Overlay

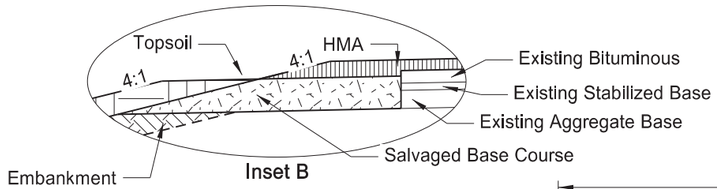
Pembina County 55 to the State Line

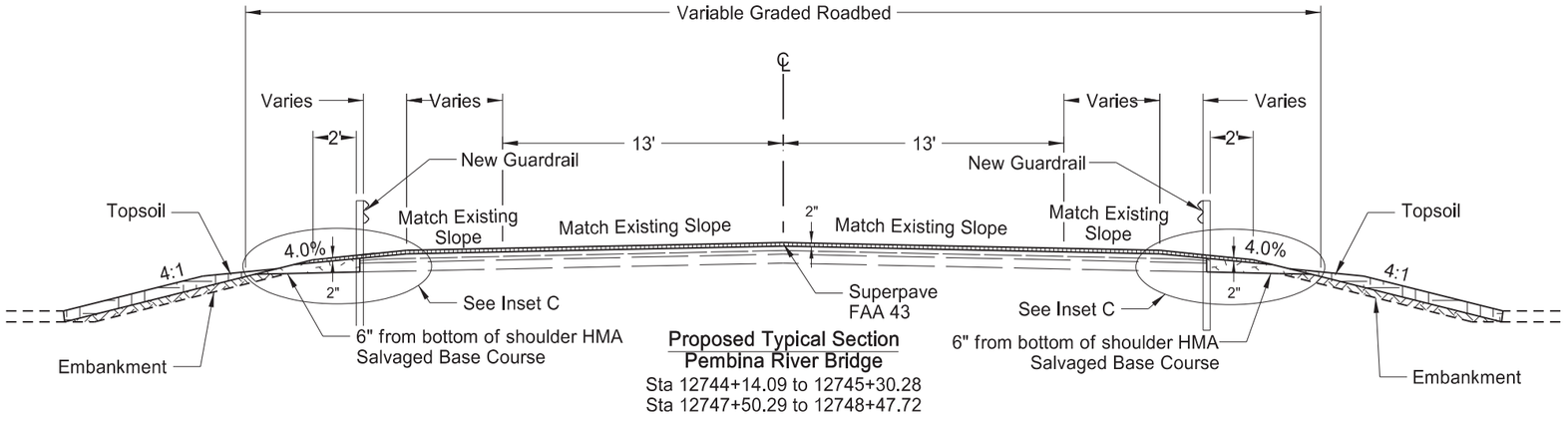
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	30	3

Note:
2' widening is measured from existing sluff PI, before 2" mill.

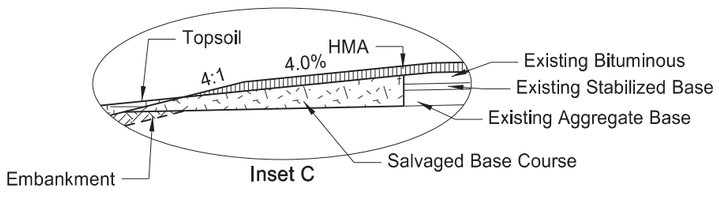


Proposed Typical Section
2" Overlay, 2' Widening
Sta 12655+13.97 to 12701+13.26
Sta 12703+92.17 to 12744+13.88
Sta 12748+47.59 to 12771+19.99





Proposed Typical Section
Pembina River Bridge
Sta 12744+14.09 to 12745+30.28
Sta 12747+50.29 to 12748+47.72



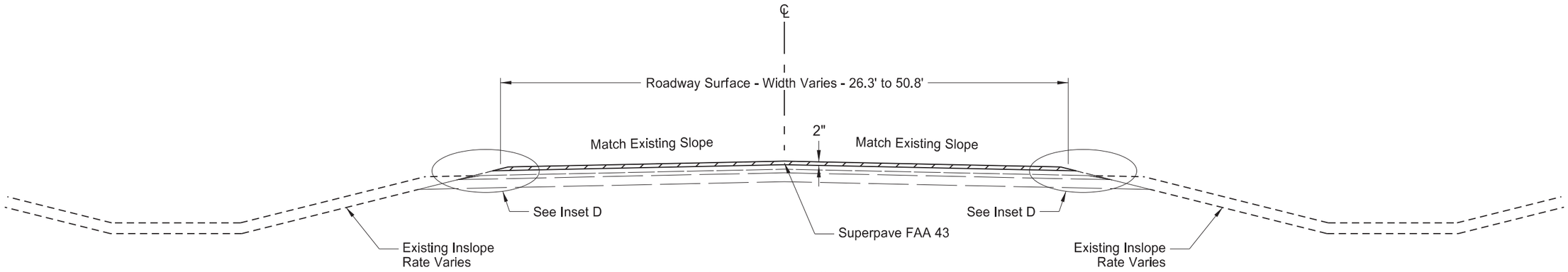
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RYAN SCHUEHLE
PE-10772
DATE: 9/4/2024
NORTH DAKOTA

Proposed Typical Sections
2" Overlay, 2' Widening

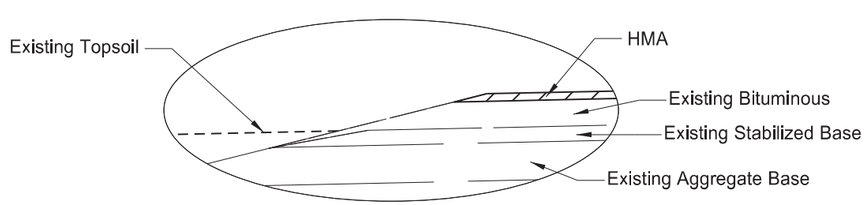
ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	30	4



Proposed Typical Section
2" Overlay
Sta 12771+20.00 to 12776+16.17



Inset D

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PE-10772
DATE: 9/4/2024
NORTH DAKOTA

Proposed Typical Sections
2" Overlay

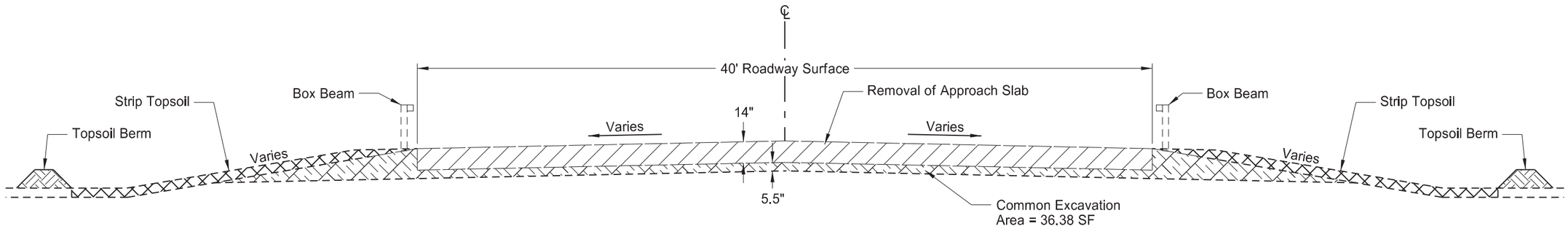
ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

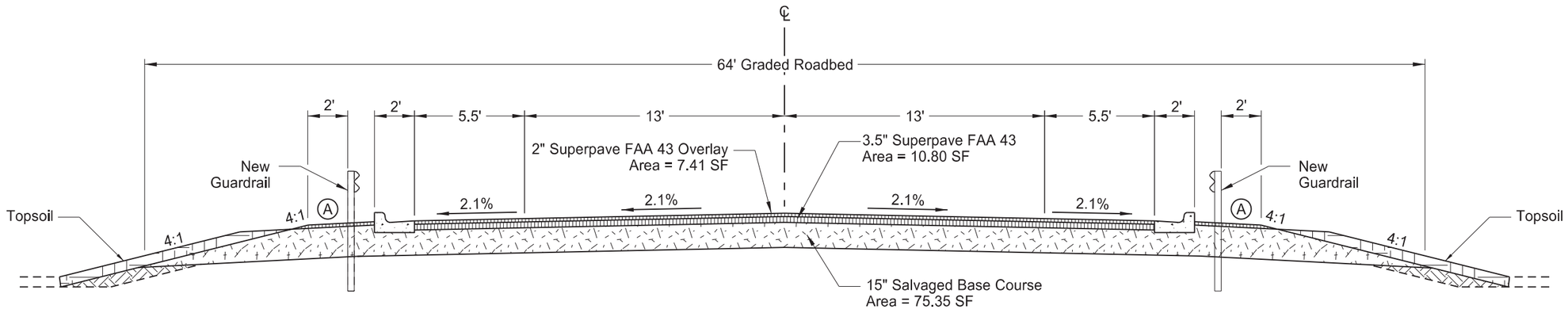
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	30	5

Note:

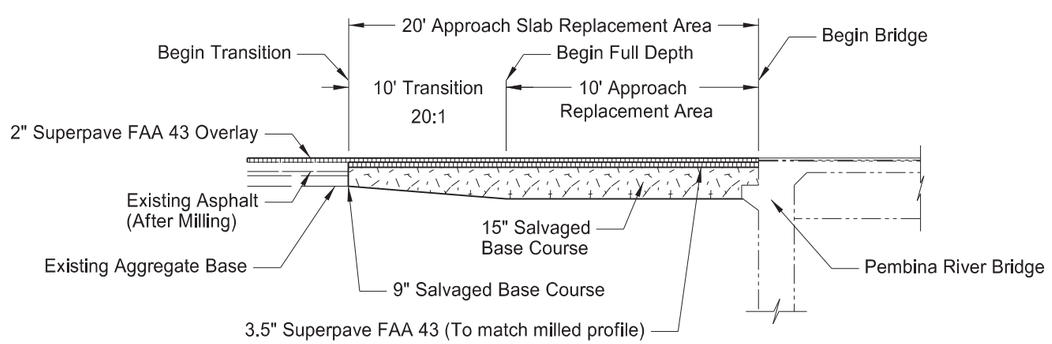
Ⓐ 4.0% cross slope from Sta 12745+30.28 to 12745+50.18
4.0% cross slope from Sta 12747+30.41 to 12747+50.29



Bridge Approach Replacement Removal Typical Section
Sta 12745+30.28 to 12745+50.18
Sta 12747+30.41 to 12747+50.29



Bridge Approach Replacement Proposed Typical Section
Sta 12745+30.28 to 12745+50.18
Sta 12747+30.41 to 12747+50.29



Bridge Approach Replacement Profile View (Both Sides of Bridge)

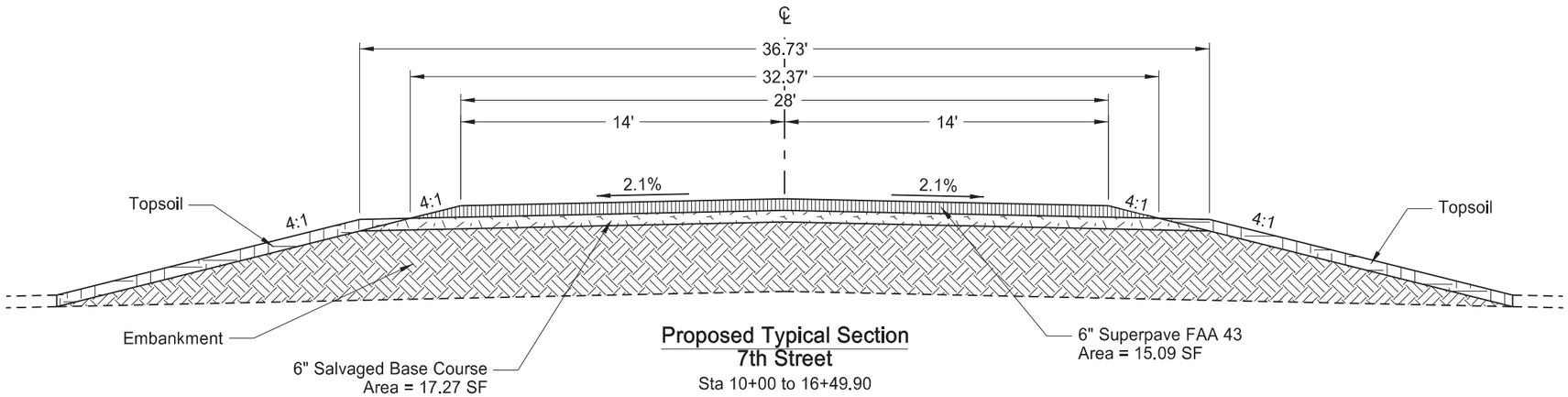
REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 9/4/2024
NORTH DAKOTA

Proposed Typical Sections
Pembina River Bridge Approach Replacement

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	30	6



Proposed Typical Section
7th Street
Sta 10+00 to 16+49.90

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PE-10772
DATE: 9/4/2024
NORTH DAKOTA

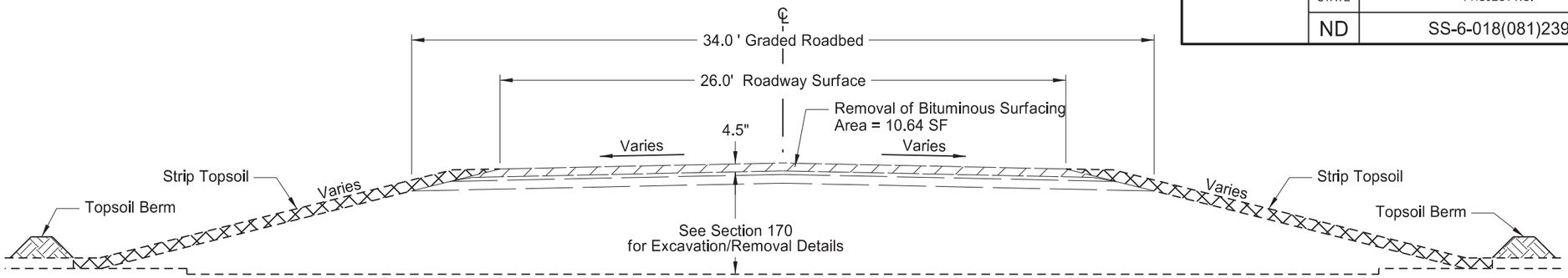
Proposed Typical Sections
7th Street Approach

ND 18 Widening, Milling and HMA Overlay

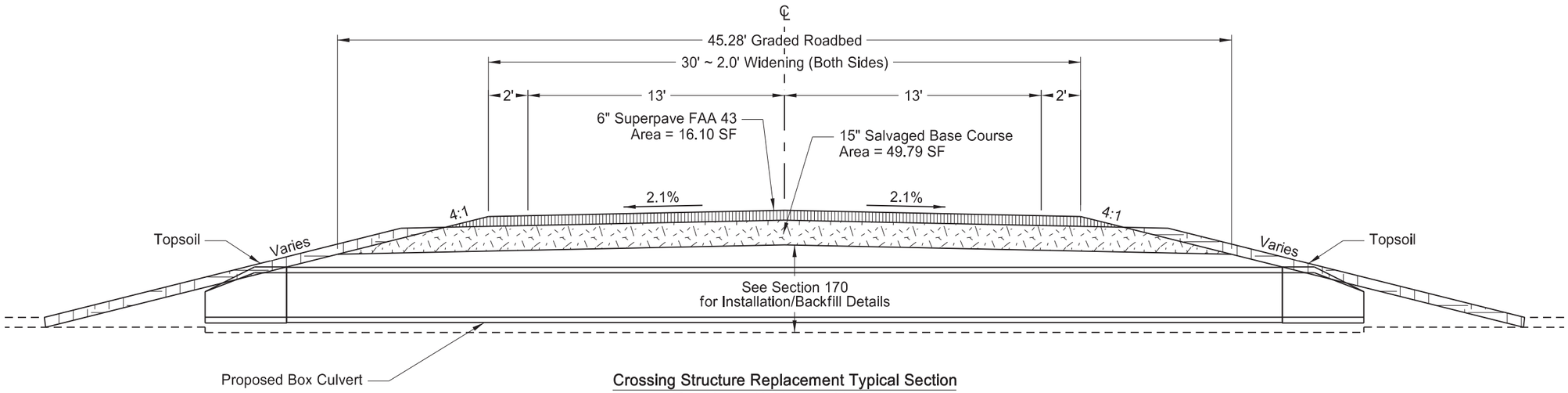
Pembina County 55 to the State Line

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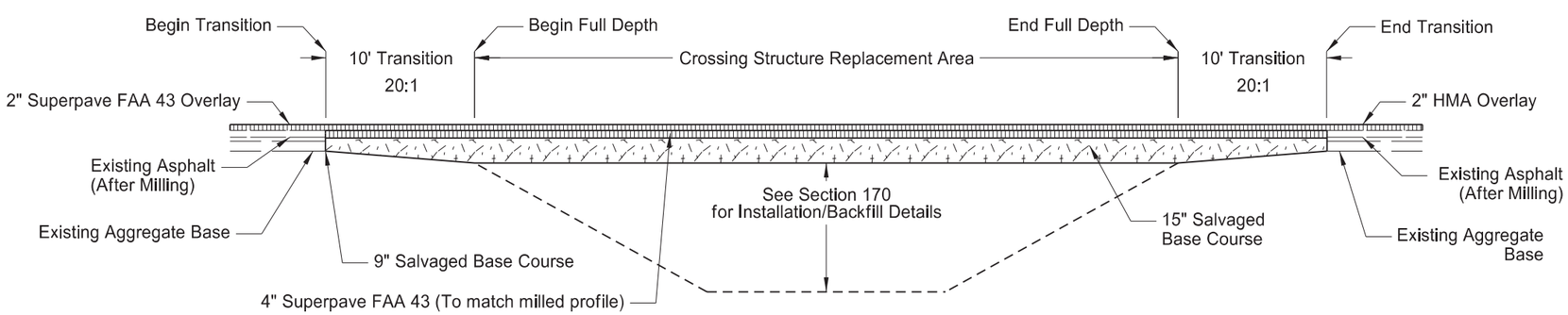
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	30	7



Crossing Structure Replacement Typical Section
Sta 12701+13.23 to 12703+92.24



Crossing Structure Replacement Typical Section
Sta 12701+13.23 to 12703+92.24



Crossing Structure Replacement Profile View

REGISTERED PROFESSIONAL ENGINEER
RYAN
SCHUEHLE
PE-10772
DATE: 9/4/2024
NORTH DAKOTA

Proposed Typical Sections
Reinforced Concrete Box Culvert

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	40	1

Spec	Code	Item Description	QTY	Unit
203	0113	Common Excavation-Waste		
		Sta 12645+00 to Sta 12665+00	19	CY
411	0114	Milling Pavement Surface - 2 Inch		
		Sta 12645+00 to Sta 12665+00	2860	SY
		Sta 12665+00 to Sta 12685+00	5756	SY

LEGEND

- Milling Pavement Surface - 2 Inch
- Common Excavation-Waste (Approach locations)
- Removal of Bituminous Surfacing (See Sheets 30-7)
- Remove Bridge Approach Slab (See Section 170 & Sheet 30-5)

Note:
Common Excavation-Waste includes removal of pavement, aggregate base, and unsuitable grading.

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
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DATE: 9/4/2024
NORTH DAKOTA

Removals

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	40	2

Spec	Code	Item Description	QTY	Unit
202	0132	Removal of Bituminous Surfacing		
		Sta 12685+00 to Sta 12705+00	833	SY
203	0113	Common Excavation-Waste		
		Sta 12685+00 to Sta 12705+00	73	CY
		Sta 12705+00 to Sta 12725+00	131	CY
411	0114	Milling Pavement Surface - 2 Inch		
		Sta 12685+00 to Sta 12705+00	4990	SY
		Sta 12705+00 to Sta 12725+00	6200	SY
724	0270	Remove Gate Valve & Box		
		Sta 12703+11.54	1	EA
		Sta 12703+13.84	1	EA
724	0430	Remove Hydrant		
		Sta 12703+13.31	1	EA

LEGEND

- Milling Pavement Surface - 2 Inch
- Common Excavation-Waste (Approach locations)
- Removal of Bituminous Surfacing (See Sheets 30-7)
- Remove Bridge Approach Slab (See Section 170 & Sheet 30-5)

Note:
Common Excavation-Waste includes removal of pavement, aggregate base, and unsuitable grading.

Refer to SP 175(24) for Remove Hydrant and Remove Gate Valve & Box.

REGISTERED PROFESSIONAL ENGINEER
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DATE: 9/4/2024
NORTH DAKOTA

Removals

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	40	3

Spec	Code	Item Description	QTY	Unit
203	0113	Common Excavation-Waste		
		Sta 12725+00 to Sta 12745+00	136	CY
		Sta 12745+00 to Sta 12765+00	144	CY
411	0114	Milling Pavement Surface - 2 Inch		
		Sta 12725+00 to Sta 12745+00	6602	SY
		Sta 12745+00 to Sta 12765+00	5900	SY

LEGEND

- Milling Pavement Surface - 2 Inch
- Common Excavation-Waste (Approach locations)
- Removal of Bituminous Surfacing (See Sheets 30-7)
- Remove Bridge Approach Slab (See Section 170 & Sheet 30-5)

Note:
Common Excavation-Waste includes removal of pavement, aggregate base, and unsuitable grading.

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 9/4/2024
NORTH DAKOTA

Removals

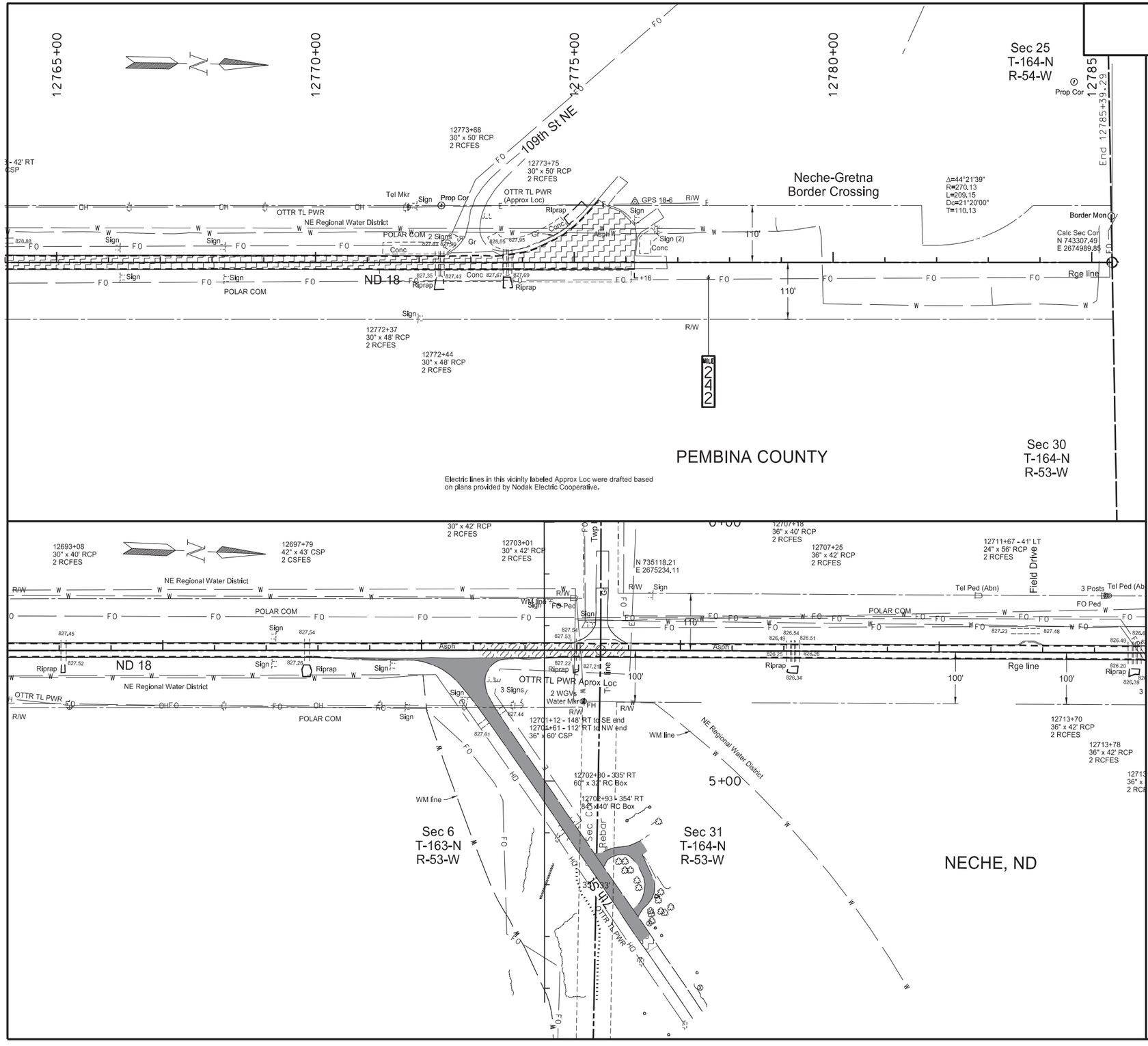
ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	40	4

Spec	Code	Item Description	QTY	Unit
203	0113	Common Excavation-Waste		
		Sta 12700+96 to Sta 12704+36	366	CY
		Sta 12703+43 to Sta 12704+19	73	CY
411	0114	Milling Pavement Surface - 2 Inch		
		Sta 12765+00 to Sta 12776+16	4481	SY
		Sta 12704+36 to Sta 12704+50	67	SY



LEGEND

- Milling Pavement Surface - 2 Inch
- Common Excavation-Waste (Approach locations)
- Removal of Bituminous Surfacing (See Sheets 30-7)
- Remove Bridge Approach Slab (See Section 170 & Sheet 30-5)

Note:
Common Excavation-Waste includes removal of pavement, aggregate base, and unsuitable grading.

REGISTERED PROFESSIONAL ENGINEER
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DATE: 9/4/2024
NORTH DAKOTA

Removals

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	51	1

Centerline / Approach	Begin Station/ Location	Begin Offset	End Station/ Location	End Offset	Pipe Installation (Pay Item)			Allowable Material	Required Diameter	Steel Pipe Coatings	Steel Pipe Corrugations or Spiral Ribs	Steel Pipe Minimum Thickness	(*) End Treatments		Geosynthetic Material Type G (Pay Item)	Applicable Backfill	Pipe Cleanout (B)	Notes
					IN	Bid Item	LF		IN	Type	IN	IN	Begin EA	End EA	SY		EA	
Approach	12663+38	41.5' RT	12663+50	41.5' RT	24	Pipe Conduit - Approach (Extension)	12	Corrugated Steel Pipe	24	Z, A, P	2	0.064	TES			Spec. 714.04.A		
Approach	12663+45	60.9' LT	12663+57	60.5' LT	18	Pipe Conduit - Approach (Extension)	12	Corrugated Steel Pipe	18	Z, A, P	2	0.064	TES			Spec. 714.04.A		
Approach	12663+84	59.6' LT	12664+00	59.1' LT	18	Pipe Conduit - Approach (Extension)	16	Corrugated Steel Pipe	18	Z, A, P	2	0.064		TES		Spec. 714.04.A		
Approach	12663+91	41.7' RT	12664+11	41.8' RT	24	Pipe Conduit - Approach (Extension)	20	Corrugated Steel Pipe	24	Z, A, P	2	0.064		TES		Spec. 714.04.A		
Centerline	12670+68	32.7' LT	12670+68	22.7' LT	49 x 33	Pipe Corr. Steel (Extension)	10	Corrugated Steel Pipe	49 x 33	P	2	0.079	Remove & Relay			Section 20 Sheet 5	1	
Centerline	12670+68	21.9' RT	12670+68	33.9' RT	49 x 33	Pipe Corr. Steel (Extension)	12	Corrugated Steel Pipe	49 x 33	P	2	0.079		Remove & Relay		Section 20 Sheet 5		
Centerline	12670+78	32.6' LT	12670+78	22.6' LT	49 x 33	Pipe Corr. Steel (Extension)	10	Corrugated Steel Pipe	49 x 33	P	2	0.079	Remove & Relay			Section 20 Sheet 5	1	
Centerline	12670+78	22.1' RT	12670+78	34.1' RT	49 x 33	Pipe Corr. Steel (Extension)	12	Corrugated Steel Pipe	49 x 33	P	2	0.079		Remove & Relay		Section 20 Sheet 5		
Centerline	12688+05	20.4' RT	12688+05	26.4' RT	24	Pipe Conc. Reinf. CL III (Extension)	6	Reinforced Concrete Pipe - Class III (Barrel Length = 6 LF)	24					TES		Section 20 Sheet 5		
Centerline	12688+06	28.7' LT	12688+06	22.7' LT	24	Pipe Conc. Reinf. CL III (Extension)	6	Reinforced Concrete Pipe - Class III (Barrel Length = 6 LF)	24				TES			Section 20 Sheet 5	1	
Approach	12689+71	42.8' LT	12689+89	43.0' LT	24	Pipe Conduit - Approach (Extension)	18	Reinforced Concrete Pipe - Class III (Barrel Length = 18 LF)	24				TES			Spec. 714.04.A		
Approach	12689+76	47.3' LT	12689+90	47.4' LT	24	Pipe Conduit - Approach (Extension)	14	Reinforced Concrete Pipe - Class III (Barrel Length = 14 LF)	24				TES			Spec. 714.04.A		
Approach	12690+33	43.3' LT	12690+37	43.3' LT	24	Pipe Conduit - Approach (Extension)	4	Reinforced Concrete Pipe - Class III (Barrel Length = 4 LF)	24					TES		Spec. 714.04.A		

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

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
TES = Traversable End Section

Notes: (A) New apron only.
(B) Quantity listed on one end of pipe. Clean out the entire pipe to the satisfaction of the Engineer.
(C) Stationing and offsets read from 7th St.

REGISTERED PROFESSIONAL ENGINEER
ZACHARY THELEN
PE-40305
DATE: 9/9/24
NORTH DAKOTA

Allowable Pipe List

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	51	2

Centerline / Approach	Begin Station/ Location	Begin Offset	End Station/ Location	End Offset	Pipe Installation (Pay Item)			Allowable Material	Required Diameter	Steel Pipe Coatings	Steel Pipe Corrugations or Spiral Ribs	Steel Pipe Minimum Thickness	(*) End Treatments		Geosynthetic Material Type G (Pay Item)	Applicable Backfill	Pipe Cleanout (B)	Notes
													Begin	End				
					IN	Bid Item	LF		IN	Type	IN	IN	EA	EA	SY		EA	
Approach	12690+34	47.7' LT	12690+38	47.7' LT	24	Pipe Conduit - Approach (Extension)	4	Reinforced Concrete Pipe - Class III (Barrel Length = 4 LF)	24					TES		Spec. 714.04.A		
Centerline	12693+08	24.6' LT	12693+08	18.6' LT	30	Pipe Conc. Reinf. CL III (Extension)	6	Reinforced Concrete Pipe - Class III (Barrel Length = 6 LF)	30				TES			Section 20 Sheet 5	1	
Centerline	12693+08	18.4' RT	12693+08	24.4' RT	30	Pipe Conc. Reinf. CL III (Extension)	6	Reinforced Concrete Pipe - Class III (Barrel Length = 6 LF)	30					TES		Section 20 Sheet 5		
Centerline	12697+79	31.4' LT	12697+79	22.4' LT	64 x 43	Pipe Corr. Steel (Extension)	9	Corrugated Steel Pipe	64 x 43	P	2	0.109	FES			Section 20 Sheet 5	1	
Centerline	12697+79	20.9' RT	12697+79	31.9' RT	64 x 43	Pipe Corr. Steel (Extension)	11	Corrugated Steel Pipe	64 x 43	P	2	0.109		Remove & Relay		Section 20 Sheet 5		
Approach	12703+71	81.0' LT	12703+20	81.1' LT	36	Pipe Conduit - Approach	52	Reinforced Concrete Pipe - Class III (Barrel Length = 46 LF)	36				FES	FES		Spec. 714.26		
								Corrugated Steel Pipe	36	Z, A, P	2	0.064						
Approach	12703+72	73.0' LT	12703+15	73.1' LT	36	Pipe Conduit - Approach	58	Reinforced Concrete Pipe - Class III (Barrel Length = 52 LF)	36				FES	FES		Spec. 714.26		
								Corrugated Steel Pipe	36	Z, A, P	2	0.064						
Approach	12703+74	65.0' LT	12703+11	65.1' LT	36	Pipe Conduit - Approach	64	Reinforced Concrete Pipe - Class III (Barrel Length = 58 LF)	36				FES	FES		Spec. 714.26		
								Corrugated Steel Pipe	36	Z, A, P	2	0.064						
Approach	12717+82	40.5' LT	12718+04	40.6' LT	24	Pipe Conduit - Approach (Extension)	22	Reinforced Concrete Pipe - Class III (Barrel Length = 22 LF)	24				TES			Spec. 714.04.A		
Approach	12718+55	40.6' LT	12718+59	40.7' LT	24	Pipe Conduit - Approach (Extension)	4	Reinforced Concrete Pipe - Class III (Barrel Length = 4 LF)	24					TES		Spec. 714.04.A		

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

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
TES = Traversable End Section

Notes: (A) New apron only.
(B) Quantity listed on one end of pipe. Clean out the entire pipe to the satisfaction of the Engineer.
(C) Stationing and offsets read from 7th St.

REGISTERED PROFESSIONAL ENGINEER
ZACHARY THELEN
PE-40305
DATE: 9/9/24
NORTH DAKOTA

Allowable Pipe List

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	51	3

Centerline / Approach	Begin Station/ Location	Begin Offset	End Station/ Location	End Offset	Pipe Installation (Pay Item)			Allowable Material	Required Diameter	Steel Pipe Coatings	Steel Pipe Corrugations or Spiral Ribs	Steel Pipe Minimum Thickness	(*) End Treatments		Geosynthetic Material Type G (Pay Item)	Applicable Backfill	Pipe Cleanout (B)	Notes
													Begin	End				
					IN	Bid Item	LF		IN	Type	IN	IN	EA	EA	SY		EA	
Approach	12718+95	41.9' RT	12719+03	41.7' RT	24	Pipe Conduit - Approach (Extension)	8	Reinforced Concrete Pipe - Class III (Barrel Length = 8 LF)	24				TES			Spec. 714.04.A		
Approach	12719+63	40.0' RT	12719+69	39.8' RT	24	Pipe Conduit - Approach (Extension)	6	Reinforced Concrete Pipe - Class III (Barrel Length = 6 LF)	24					TES		Spec. 714.04.A		
Approach	12723+69	41.1' RT	12723+69	41.1' RT					24				TES			Spec. 714.04.A	1	
Approach	12724+35	41.1' RT	12724+43	41.1' RT	24	Pipe Conduit - Approach (Extension)	8	Reinforced Concrete Pipe - Class III (Barrel Length = 8 LF)	24					TES		Spec. 714.04.A		
Approach	12729+57	41.0' LT	12729+65	40.9' LT	24	Pipe Conduit - Approach (Extension)	8	Reinforced Concrete Pipe - Class III (Barrel Length = 8 LF)	24				TES			Spec. 714.04.A		
Approach	12729+74	41.7' RT	12729+78	41.7' RT	24	Pipe Conduit - Approach (Extension)	4	Reinforced Concrete Pipe - Class III (Barrel Length = 4 LF)	24				TES			Spec. 714.04.A		
Approach	12730+27	40.6' LT	12730+35	40.6' LT	24	Pipe Conduit - Approach (Extension)	8	Reinforced Concrete Pipe - Class III (Barrel Length = 8 LF)	24					TES		Spec. 714.04.A		
Approach	12730+39	41.9' RT	12730+43	41.9' RT	24	Pipe Conduit - Approach (Extension)	4	Reinforced Concrete Pipe - Class III (Barrel Length = 4 LF)	24					TES		Spec. 714.04.A		
Approach	12733+52	41.0' LT	12733+62	40.8' LT	24	Pipe Conduit - Approach (Extension)	10	Reinforced Concrete Pipe - Class III (Barrel Length = 10 LF)	24				TES			Spec. 714.04.A		
Approach	12734+02	39.9' LT	12734+30	39.3' LT	24	Pipe Conduit - Approach (Extension)	28	Reinforced Concrete Pipe - Class III (Barrel Length = 28 LF)	24					TES		Spec. 714.04.A		
Approach	12734+44	40.7' RT	12734+56	40.7' RT	24	Pipe Conduit - Approach (Extension)	12	Reinforced Concrete Pipe - Class III (Barrel Length = 12 LF)	24				TES			Spec. 714.04.A		
Approach	12734+96	40.6' RT	12735+12	40.6' RT	24	Pipe Conduit - Approach (Extension)	16	Reinforced Concrete Pipe - Class III (Barrel Length = 16 LF)	24					TES		Spec. 714.04.A		
Approach	12757+19	40.1' RT	12757+31	40.2' RT	24	Pipe Conduit - Approach (Extension)	12	Reinforced Concrete Pipe - Class III (Barrel Length = 12 LF)	24				TES			Spec. 714.04.A		

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

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
TES = Traversable End Section

Notes: (A) New apron only.
(B) Quantity listed on one end of pipe. Clean out the entire pipe to the satisfaction of the Engineer.
(C) Stationing and offsets read from 7th St.

REGISTERED PROFESSIONAL ENGINEER
ZACHARY THELEN
PE-40305
DATE: 9/9/24
NORTH DAKOTA

Allowable Pipe List

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	51	4

Centerline / Approach	Begin Station/ Location	Begin Offset	End Station/ Location	End Offset	Pipe Installation (Pay Item)			Allowable Material	Required Diameter	Steel Pipe Coatings	Steel Pipe Corrugations or Spiral Ribs	Steel Pipe Minimum Thickness	(*) End Treatments		Geosynthetic Material Type G (Pay Item)	Applicable Backfill	Pipe Cleanout (B)	Notes
					IN	Bid Item	LF		IN	Type	IN	IN	Begin	End	SY		EA	
Approach	12757+77	40.5' RT	12757+91	40.6' RT	24	Pipe Conduit - Approach (Extension)	14	Reinforced Concrete Pipe - Class III (Barrel Length = 14 LF)	24					TES		Spec. 714.04.A		
Approach	12763+63	41.3' LT	12763+73	41.5' LT	30	Pipe Conduit - Approach (Extension)	10	Corrugated Steel Pipe	30	Z, A, P	2	0.064	TES			Spec. 714.04.A		
Approach	12764+17	42.2' LT	12764+29	42.4' LT	30	Pipe Conduit - Approach (Extension)	12	Corrugated Steel Pipe	30	Z, A, P	2	0.064		TES		Spec. 714.04.A		
Approach	12+86	32.1' LT	12+88	34.1' RT	36	Pipe Conduit - Approach	69	Reinforced Concrete Pipe - Class (Barrel Length = 64 LF)	36				FES	FES		Spec. 714.26		(C)
								Corrugated Steel Pipe	36	Z, A, P	2	0.064						
Approach	12+95	32.7' LT	12+95	35.5' RT	36	Pipe Conduit - Approach	67	Reinforced Concrete Pipe - Class (Barrel Length = 62 LF)	36				FES	FES		Spec. 714.26		(C)
								Corrugated Steel Pipe	36	Z, A, P	2	0.064						
Approach	13+05	33.4' LT	13+02	36.7' RT	36	Pipe Conduit - Approach	65	Reinforced Concrete Pipe - Class (Barrel Length = 60 LF)	36				FES	FES		Spec. 714.26		(C)
								Corrugated Steel Pipe	36	Z, A, P	2	0.064						

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

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
TES = Traversable End Section

Notes: (A) New apron only.
(B) Quantity listed on one end of pipe. Clean out the entire pipe to the satisfaction of the Engineer.
(C) Stationing and offsets read from 7th St.

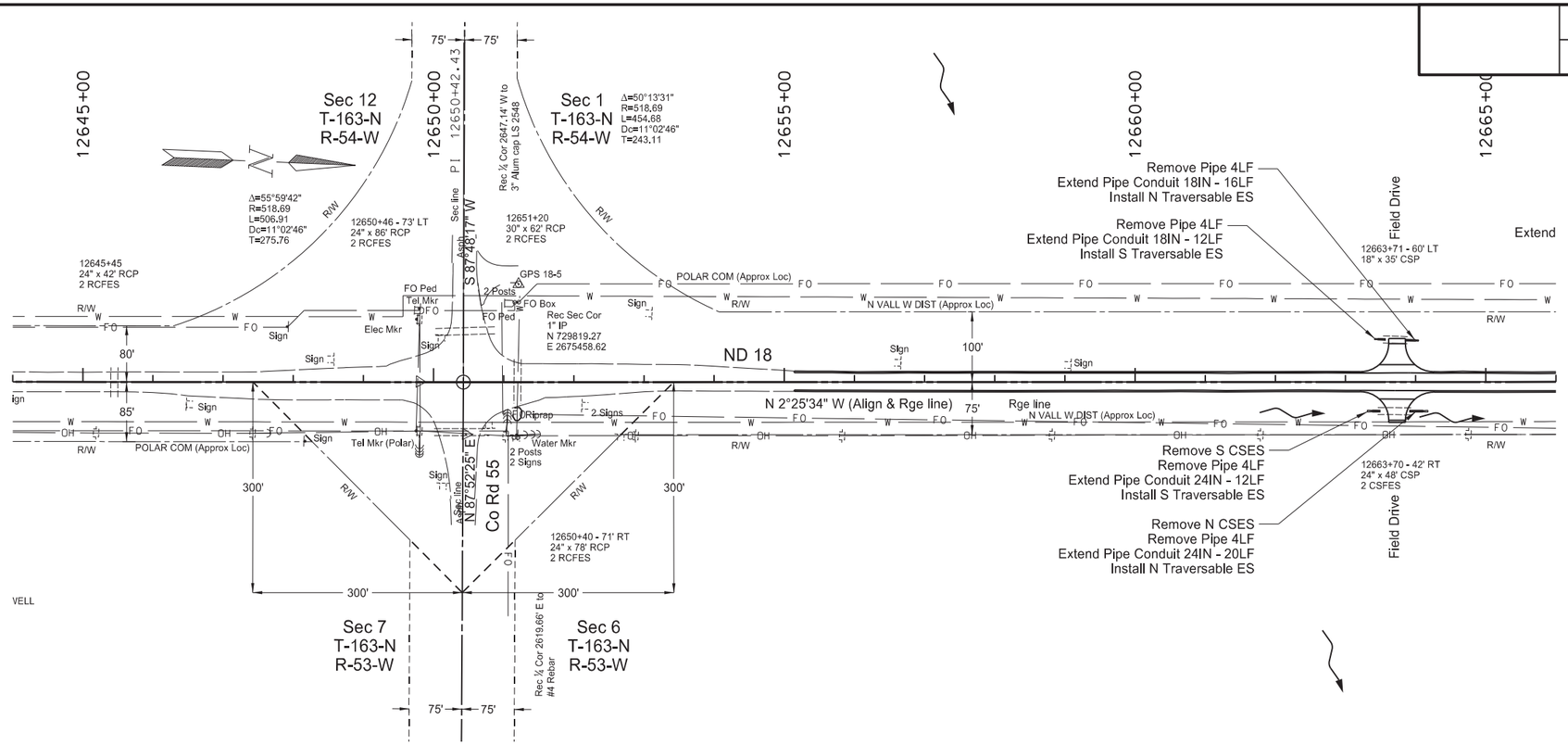
REGISTERED PROFESSIONAL ENGINEER
ZACHARY THELEN
PE-40305
DATE: 9/9/24
NORTH DAKOTA

Allowable Pipe List

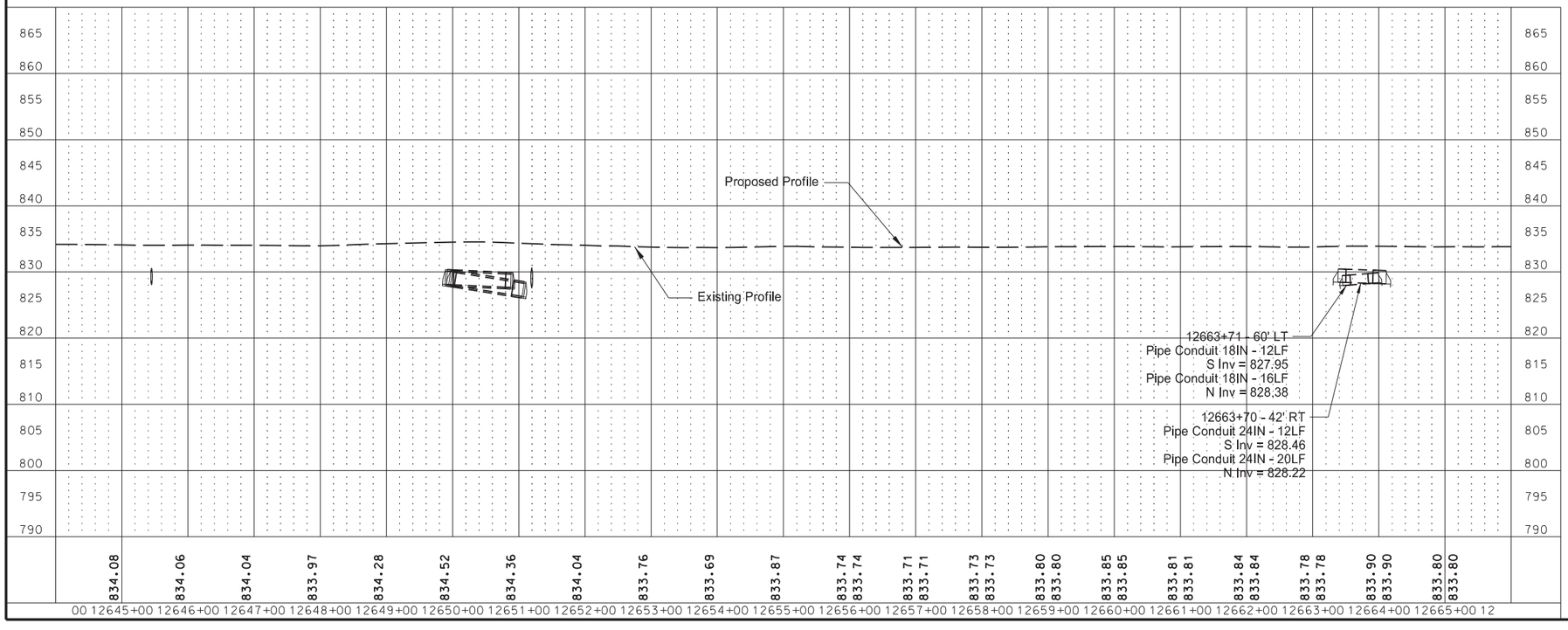
ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	55	1



Spec	Code	Item Description	QTY	Unit
202	0170	Removal of Culverts-All Types & Sizes		
		12663+70 - 42' RT - S	4	LF
		12663+70 - 42' RT - N	4	LF
		12663+71 - 60' LT - S	4	LF
		12663+71 - 60' LT - N	4	LF
714	4099	Pipe Conduit 18IN-Approach (Extension)		
		12663+45 - 60.9' LT to 12663+57 - 60.5' LT	12	LF
		12663+84 - 59.6' LT to 12664+00 - 59.1' LT	16	LF
714	4106	Pipe Conduit 24IN-Approach (Extension)		
		12663+38 - 41.5' RT to 12663+50 - 41.5' RT	12	LF
		12663+91 - 41.7' RT to 12664+11 - 41.8' RT	20	LF
714	6501	End Sect-Traversable Metal 18IN		
		12663+71 - 60' LT - N & S	2	EA
714	6506	End Sect-Traversable Metal 24IN		
		12663+70 - 42' RT - N & S	2	EA
754	0805	Object Markers - Culverts		
		12663+70 - 42' RT - N & S	2	EA
		12663+71 - 60' LT - N & S	2	EA



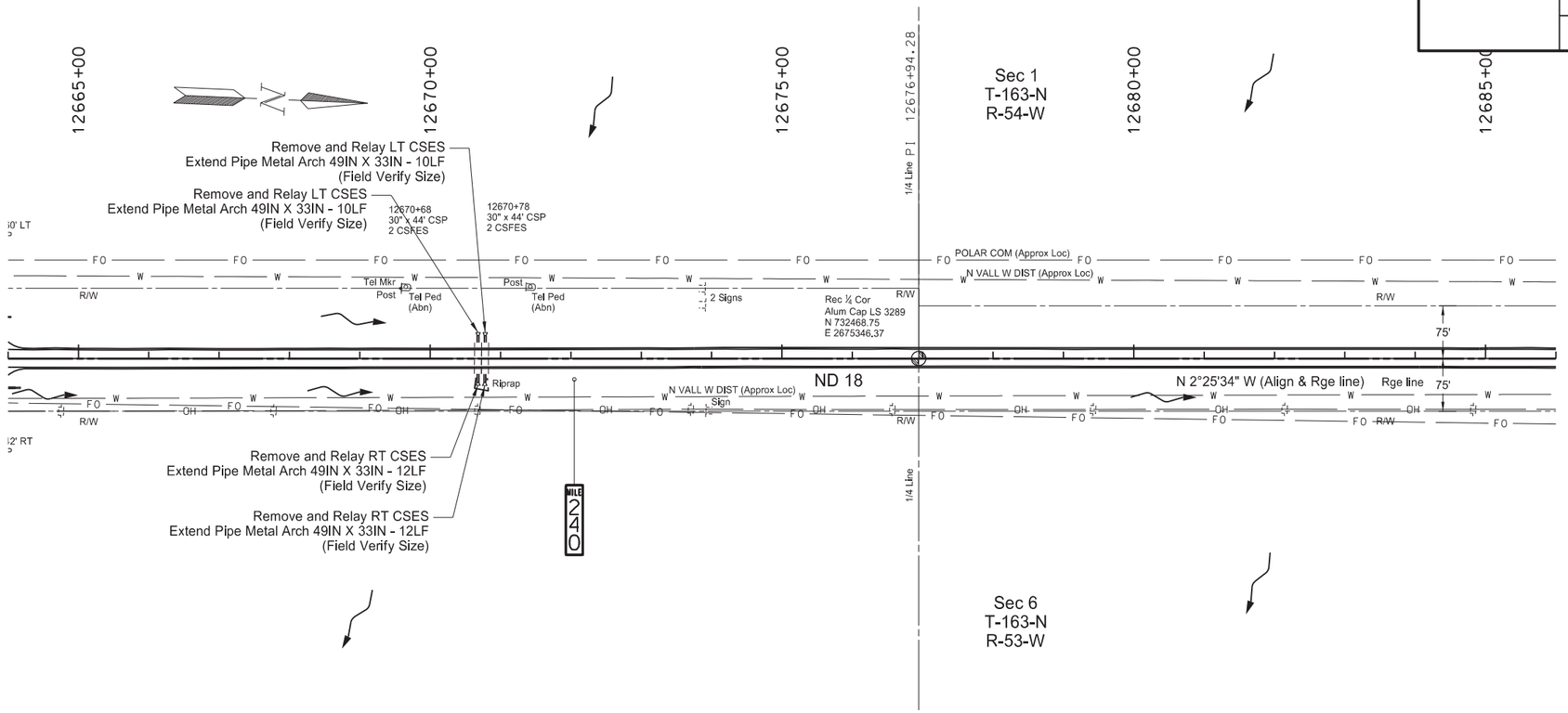
REGISTERED PROFESSIONAL ENGINEER
ZACHARY THELEN
PE-40305
DATE: 9/9/24
NORTH DAKOTA

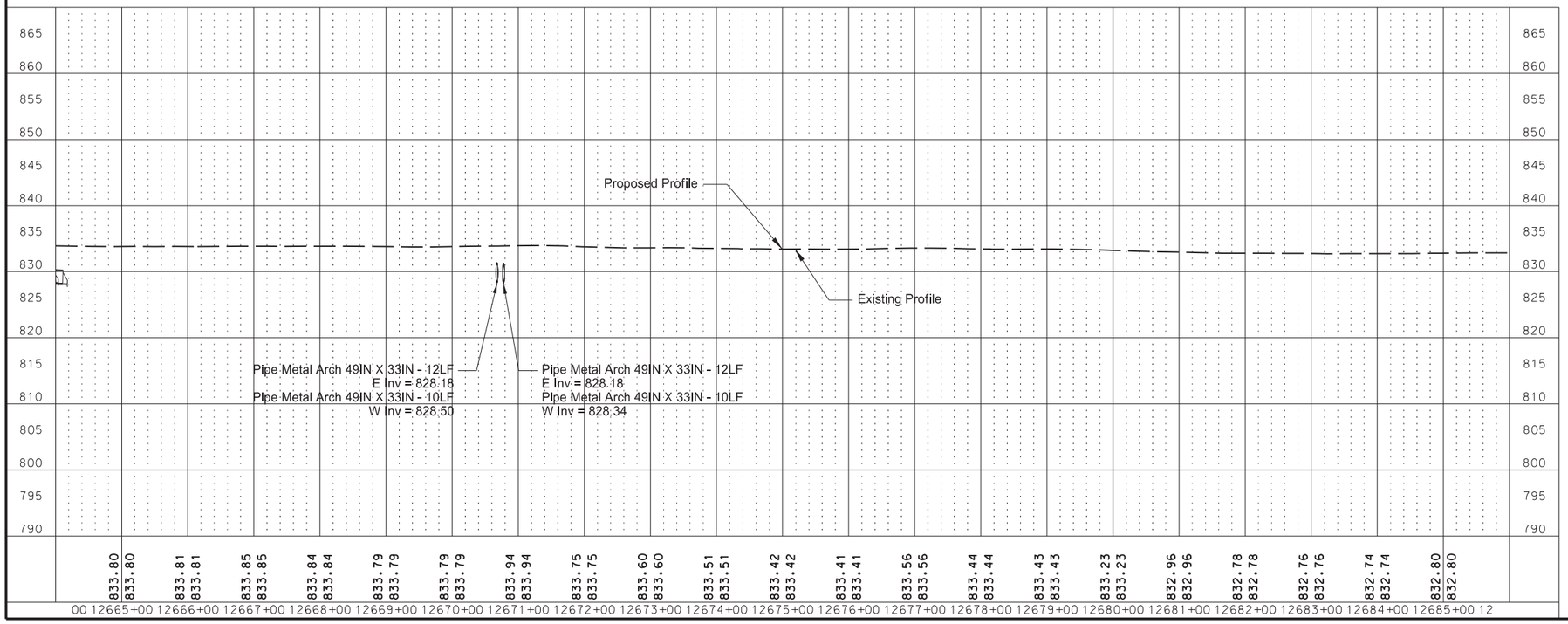
Drainage Layout

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	55	2





Spec	Code	Item Description	QTY	Unit
256	0701	Remove and Replace Riprap		
		12670+75 - 39' RT	17	CY
714	6065	Pipe Metal Arch 49IN x 33IN		
		12670+68 - 32.5' LT to 12670+68 - 22.7' LT	10	LF
		12670+68 - 21.9' RT to 12670+68 - 33.8' RT	12	LF
		12670+78 - 32.6' LT to 12670+78 - 22.6' LT	10	LF
		12670+78 - 22.1' RT to 12670+78 - 34' RT	12	LF
714	9660	Remove & Relay End Section-All Types & Sizes		
		12670+68 - LT & RT	2	EA
		12670+78 - LT & RT	2	EA
754	0805	Object Markers - Culverts		
		12670+68 - LT & RT	2	EA
		12670+78 - LT & RT	2	EA

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PE-40305
DATE: 9/9/24
NORTH DAKOTA

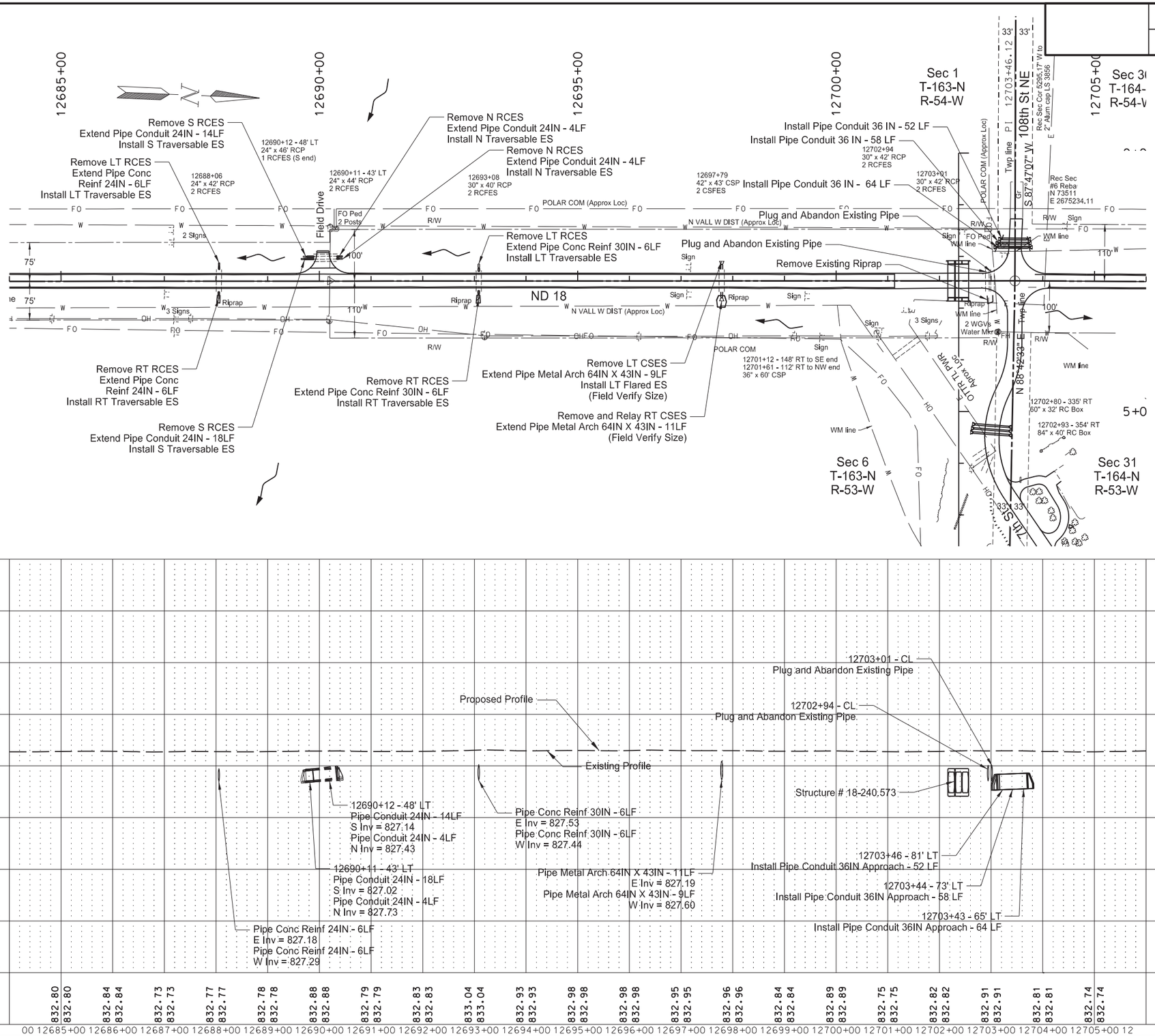
Drainage Layout

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	55	3



Spec	Code	Item Description	QTY	Unit
202	0169	Removal of End Section-All Types &Sizes		
		12688+06 - LT & RT	2	EA
		12690+12 - 48' LT - N & S	2	EA
		12690+11 - 43' LT - N & S	2	EA
		12693+08 - LT & RT	2	EA
		12697+79 - LT	1	EA
202	0400	Removal of Riprap - Loose Rock		
		12702+97 - 36' RT	8	CY
256	0701	Remove and Replace Riprap		
		12688+05 - 36' RT	5	CY
		12693+08 - 36' RT	6	CY
		12697+79 - 40' RT	20	CY
714	0615	Pipe Conc Reinf 24IN CL III		
		12688+06 - 28.7' LT to 12688+06 - 22.7' LT	6	LF
		12688+05 - 20.4' RT to 12688+05 - 26.4' RT	6	LF
714	0820	Pipe Conc Reinf 30IN CL III		
		12693+08 - 24.6' LT to 12693+08 - 18.6' LT	6	LF
		12693+08 - 18.4' RT to 12693+08 - 24.4' RT	6	LF
714	3023	End Sect-Traversable Reinf. Conc.24IN		
		12688+06 - LT & RT	2	EA
		12690+12 - 48' LT - N & S	2	EA
		12690+11 - 43' LT - N & S	2	EA
714	3033	End Sect-Traversable Reinf. Conc.30IN		
		12693+08 - LT & RT	2	EA
714	4106	Pipe Conduit 24IN-Approach (Extension)		
		12689+76 - 47.3' LT to 12689+90 - 47.4' LT	14	LF
		12690+34 - 47.7' LT to 12690+38 - 47.7' LT	4	LF
		12689+71 - 42.8' LT to 12689+89 - 43' LT	18	LF
		12690+33 - 43.3' LT to 12690+37 - 43.3' LT	4	LF
714	4116	Pipe Conduit 36IN-Approach		
		12703+46 - 81.0' LT	52	LF
		12703+44 - 73.0' LT	58	LF
		12703+43 - 65.0' LT	64	LF
714	6080	Pipe Metal Arch 64IN x 43IN		
		12697+79 - 31.4' LT to 12697+79 - 22.4' LT	9	LF
		12697+79 - 20.9' RT to 12697+79 - 31.9' RT	11	LF
714	6560	End Sect Metal Arch 64IN x 43IN		
		12697+79 - LT	1	EA
714	9660	Remove & Relay End Section-All Types & Sizes		
		12697+79 - RT	1	EA
714	9680	Plug Pipe-All Types & Sizes		
		12702+94 - CL	1	EA
		12703+01 - CL	1	EA
754	0805	Object Markers - Culverts		
		12688+06 - LT & RT	2	EA
		12690+12 - 48' LT - N & S	2	EA
		12690+11 - 43' LT - N & S	2	EA
		12693+08 - LT & RT	2	EA
		12697+79 - LT & RT	2	EA
		12703+46 - 81.0' LT - N & S	2	EA
		12703+44 - 73.0' LT - N & S	2	EA
		12703+43 - 65.0' LT - N & S	2	EA

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PE-40305
DATE: 9/9/24
NORTH DAKOTA

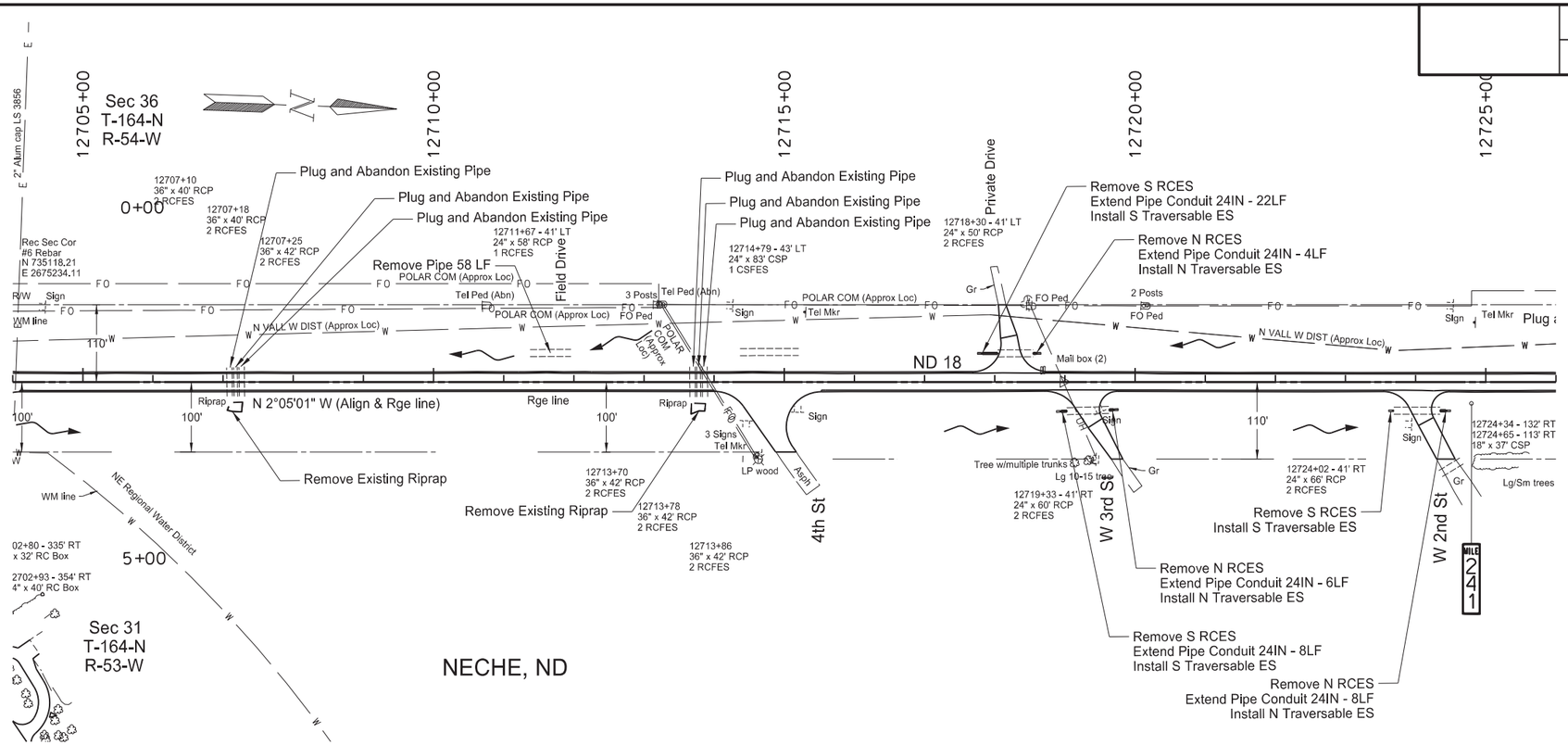
Drainage Layout

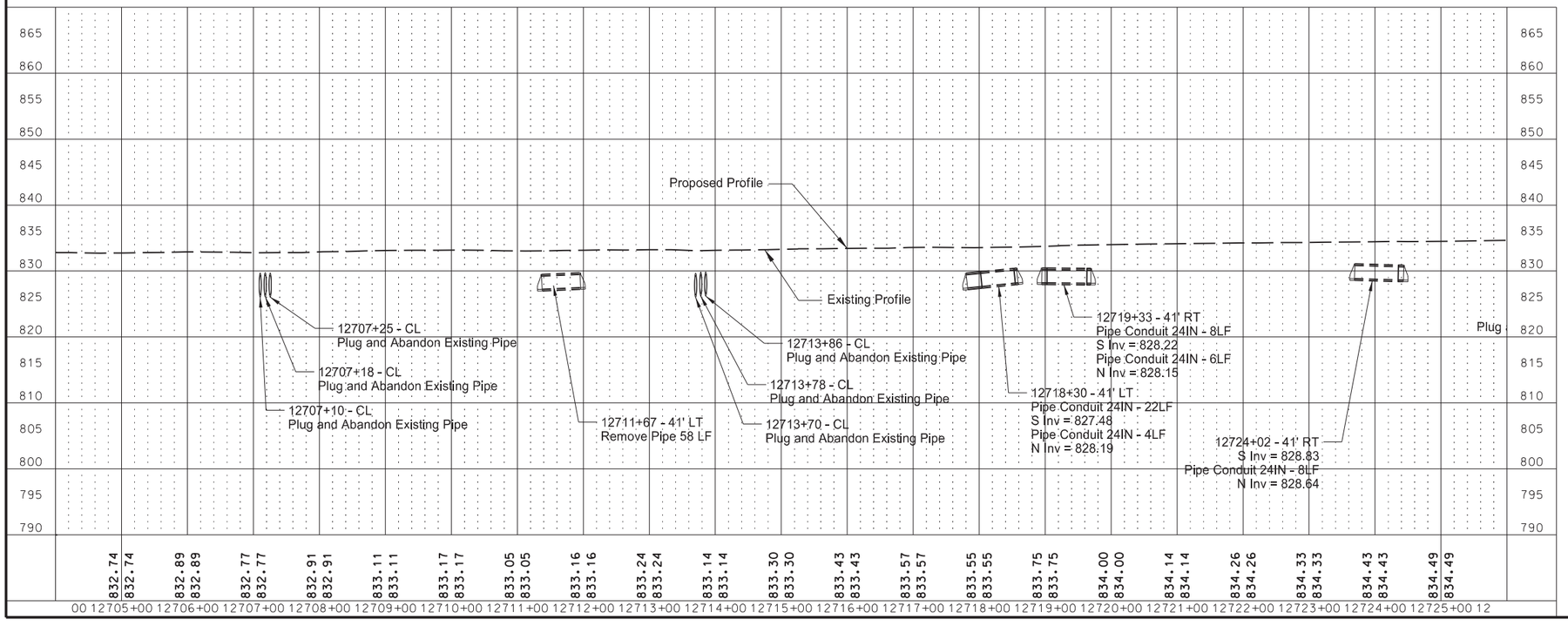
ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	55	4





Spec	Code	Item Description	QTY	Unit
202	0169	Removal of End Section-All Types &Sizes		
		12718+30 - 41' LT - N & S	2	EA
		12719+33 - 41' RT - N & S	2	EA
		12724+02 - 41' RT - N & S	2	EA
202	0174	Removal of Pipe All Types & Sizes		
		12711+67 - 41' LT	58	LF
202	0400	Removal of Riprap - Loose Rock		
		12707+17 - 36' RT	14	CY
		12713+78 - 36' RT	13	CY
714	3023	End Sect-Traversable Reinf. Conc.24IN		
		12718+30 - 41' LT - N & S	2	EA
		12719+33 - 41' RT - N & S	2	EA
		12724+02 - 41' RT - N & S	2	EA
714	4106	Pipe Conduit 24IN-Approach (Extension)		
		12717+82 - 40.5' LT to 12718+04 - 40.6' LT	22	LF
		12718+55 - 40.6' LT to 12718+59 - 40.7' LT	4	LF
		12718+95 - 41.9' RT to 12719+03 - 41.7' RT	8	LF
		12719+63 - 40' RT to 12719+69 - 39.8' RT	6	LF
		12724+35 - 41.1' RT to 12724+43 - 41.1' RT	8	LF
714	9680	Plug Pipe-All Types & Sizes		
		12707+10 - CL	1	EA
		12707+18 - CL	1	EA
		12707+25 - CL	1	EA
		12713+70 - CL	1	EA
		12713+78 - CL	1	EA
		12713+86 - CL	1	EA
754	0805	Object Markers - Culverts		
		12718+30 - 41' LT - N & S	2	EA
		12719+33 - 41' RT - N & S	2	EA
		12724+02 - 41' RT - N & S	2	EA

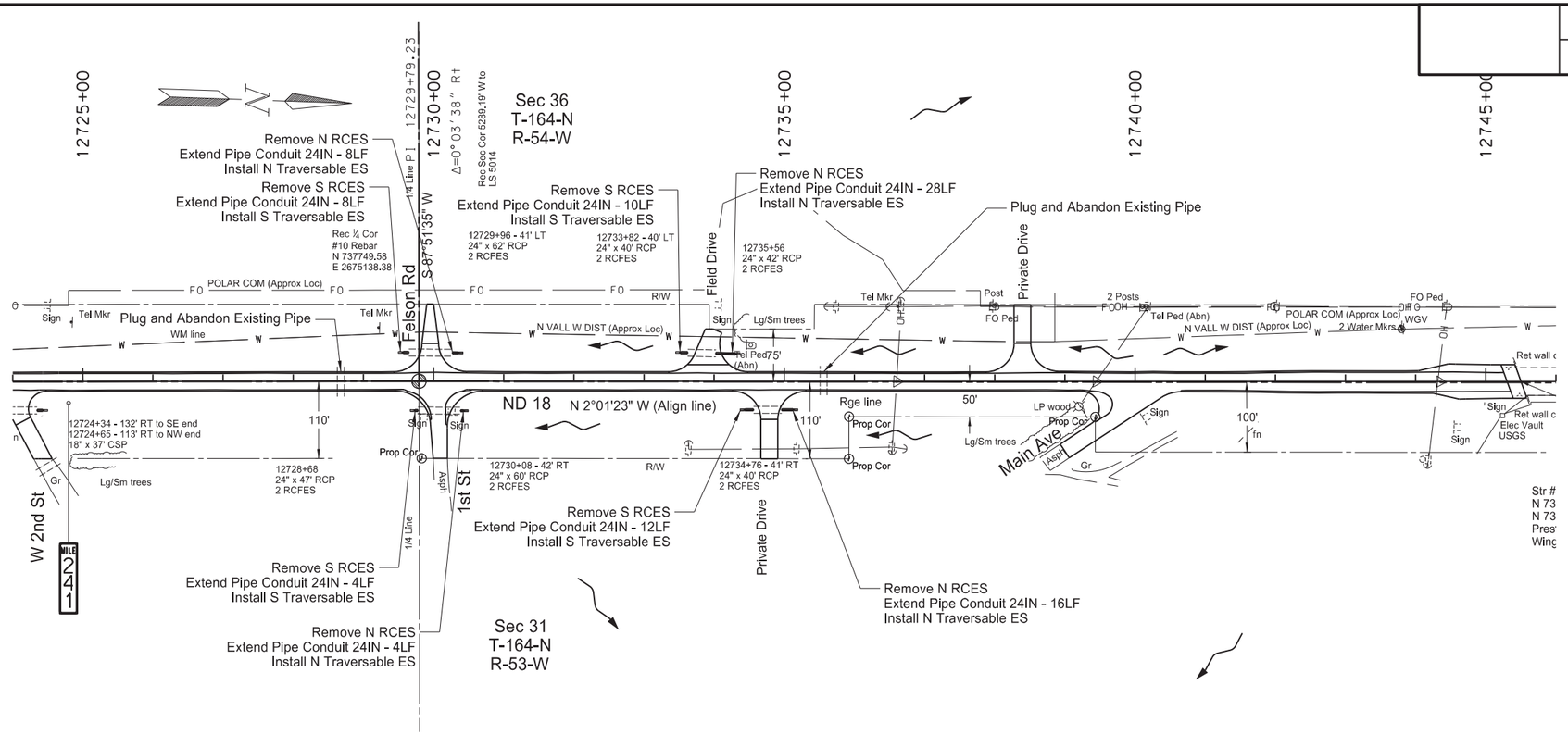
REGISTERED PROFESSIONAL ENGINEER
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PE-40305
DATE: 9/9/24
NORTH DAKOTA

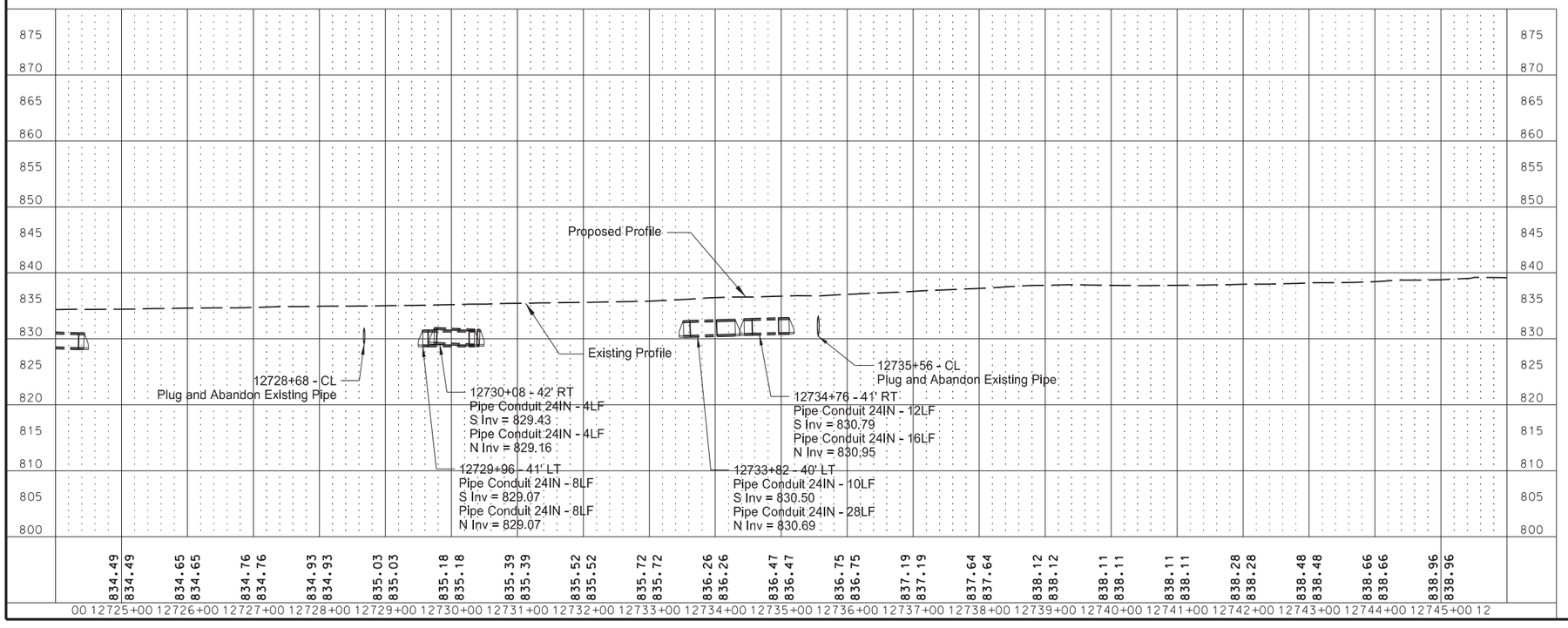
Drainage Layout

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	55	5





Spec	Code	Item Description	QTY	Unit
202	0169	Removal of End Section-All Types &Sizes		
		12729+96 - 41' LT - N & S	2	EA
		12730+08 - 42' RT - N & S	2	EA
		12733+82 - 40' LT - N & S	2	EA
		12734+76 - 41' RT - N & S	2	EA
714	3023	End Sect-Traversable Reinf. Conc.24IN		
		12729+96 - 41' LT - N & S	2	EA
		12730+08 - 42' RT - N & S	2	EA
		12733+82 - 40' LT - N & S	2	EA
		12734+76 - 41' RT - N & S	2	EA
714	4106	Pipe Conduit 24IN-Approach (Extension)		
		12729+57 - 41' LT to 12729+65 - 40.9' LT	8	LF
		12730+27 - 40.6' LT to 12730+35 - 40.6' LT	8	LF
		12729+74 - 41.7' RT to 12729+78 - 41.7' RT	4	LF
		12730+39 - 41.9' RT to 12730+43 - 41.9' RT	4	LF
		12733+52 - 41' LT to 12733+62 - 40.8' LT	10	LF
		12734+02 - 39.9' LT to 12734+30 - 39.3' LT	28	LF
		12734+44 - 40.7' RT to 12734+56 - 40.7' RT	12	LF
		12734+96 - 40.6' RT to 12735+12 - 40.6' RT	16	LF
714	9680	Plug Pipe-All Types & Sizes		
		12728+68 - CL	1	EA
		12735+56 - CL	1	EA
754	0805	Object Markers - Culverts		
		12729+96 - 41' LT - N & S	2	EA
		12730+08 - 42' RT - N & S	2	EA
		12733+82 - 40' LT - N & S	2	EA
		12734+76 - 41' RT - N & S	2	EA

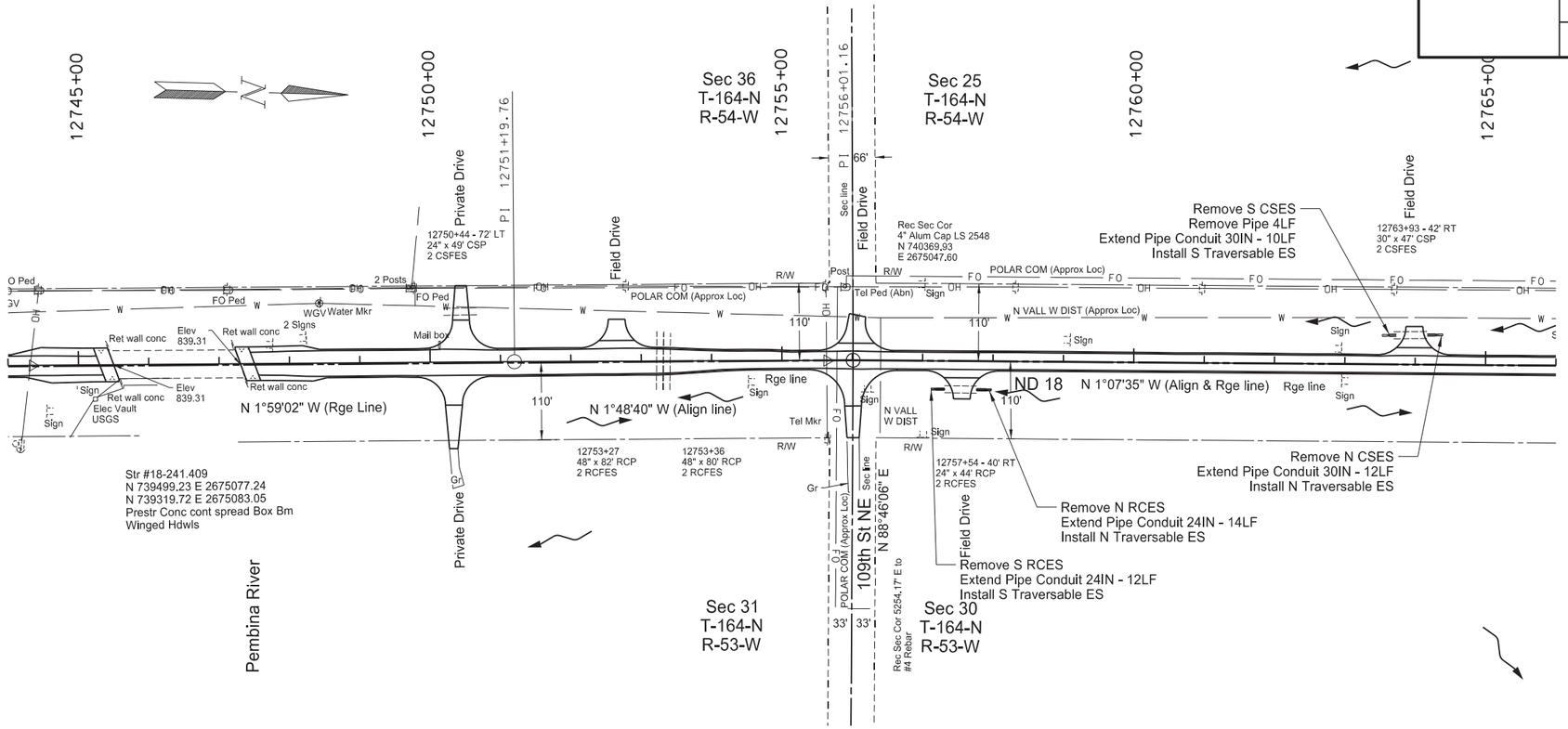
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ZACHARY THELEN
PE-40305
DATE: 9/9/24
NORTH DAKOTA

Drainage Layout

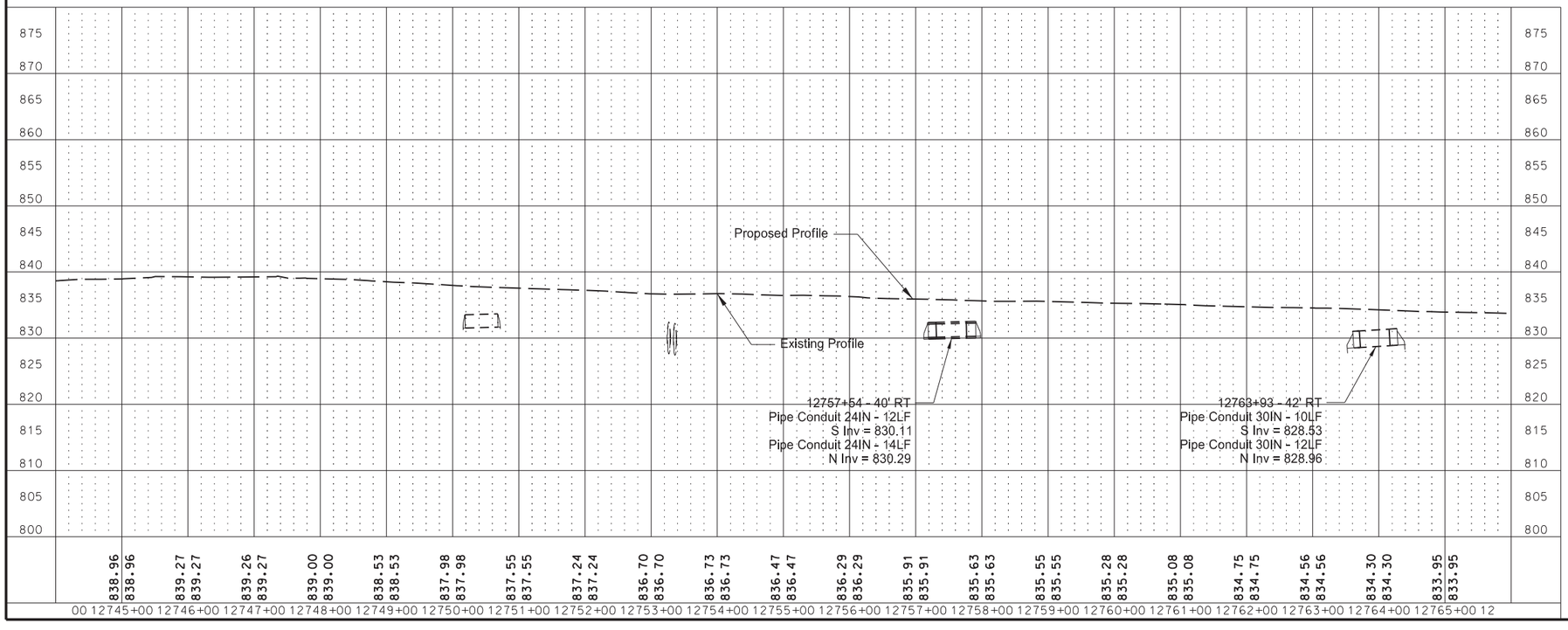
ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	55	6



Spec	Code	Item Description	QTY	Unit
202	0169	Removal of End Section-All Types &Sizes		
		12757+54 - 40' RT - N & S	2	EA
		12763+93 - 42' RT - N	1	EA
202	0170	Removal of Culverts-All Types & Sizes		
		12763+93 - 42' RT - S	4	LF
714	3023	End Sect-Traversable Reinf. Conc.24IN		
		12757+54 - 40' RT - N & S	2	EA
714	4106	Pipe Conduit 24IN-Approach (Extension)		
		12757+19 - 40.1' RT to 12757+31 - 40.2' RT	12	LF
		12757+77 - 40.5' RT to 12757+91 - 40.6' RT	14	LF
714	4113	Pipe Conduit 30IN-Approach (Extension)		
		12763+63 - 41.3' RT to 12763+73 - 41.5' RT	10	LF
		12764+17 - 42.2' RT to 12764+29 - 42.5' RT	12	LF
714	6511	End Sect-Traversable Metal 30IN		
		12763+93 - 42' RT - N & S	2	EA
754	0805	Object Markers - Culverts		
		12757+54 - 40' RT - N & S	2	EA
		12763+93 - 42' RT - N & S	2	EA



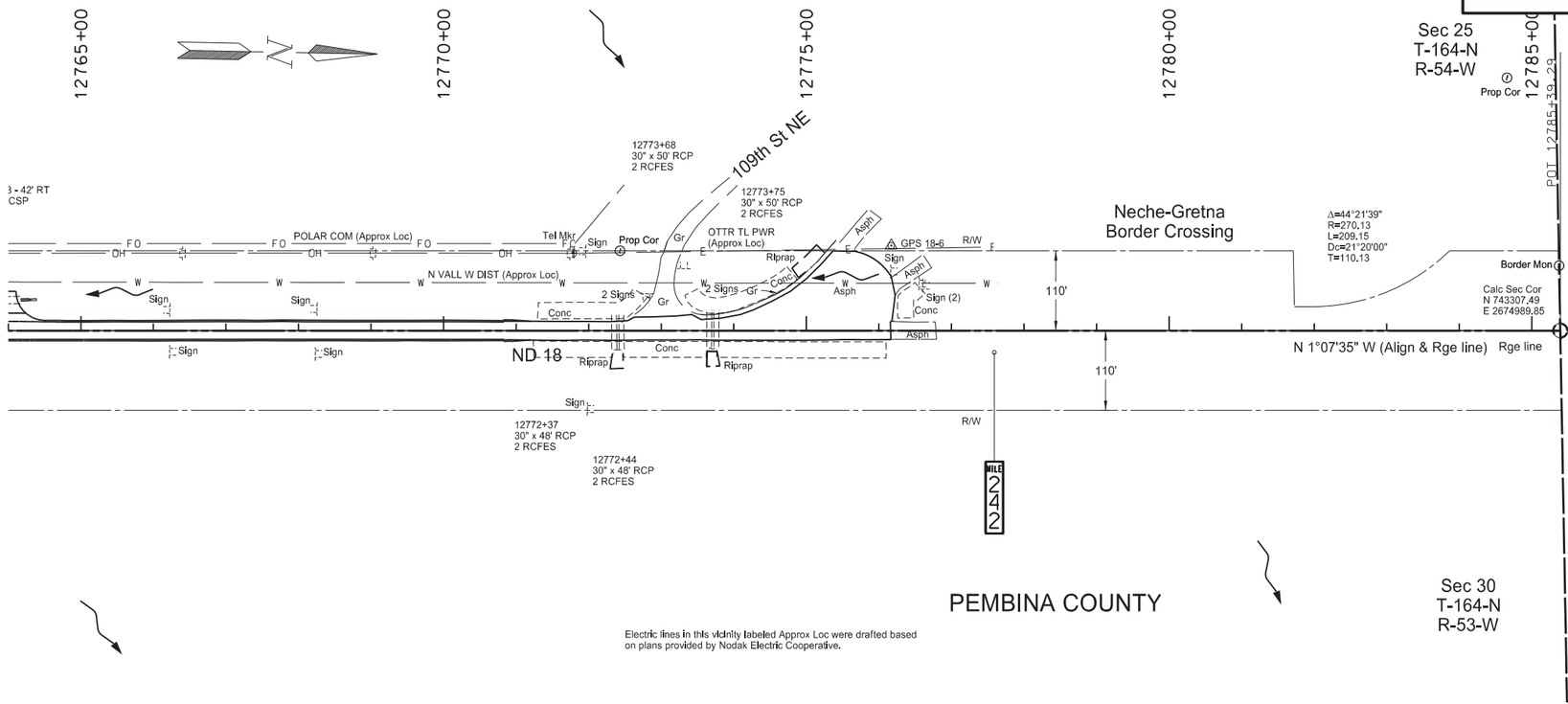
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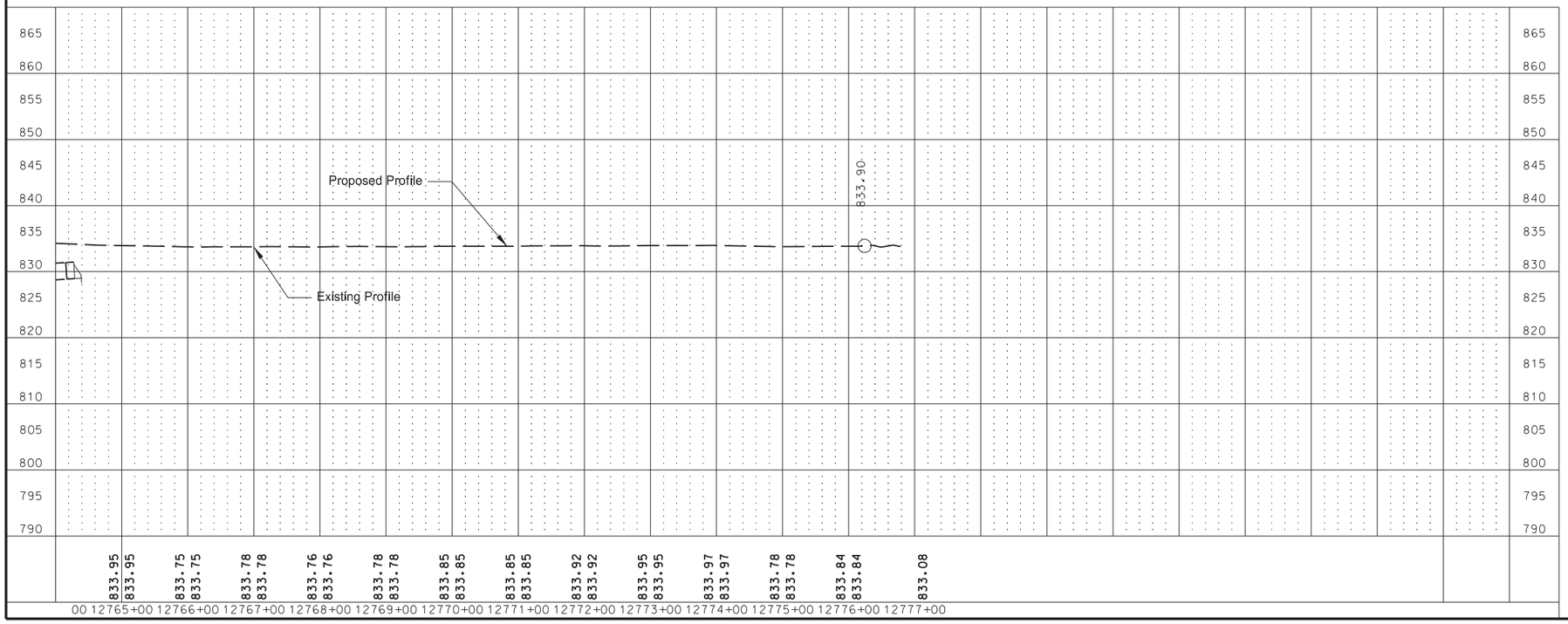
Drainage Layout

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	55	7





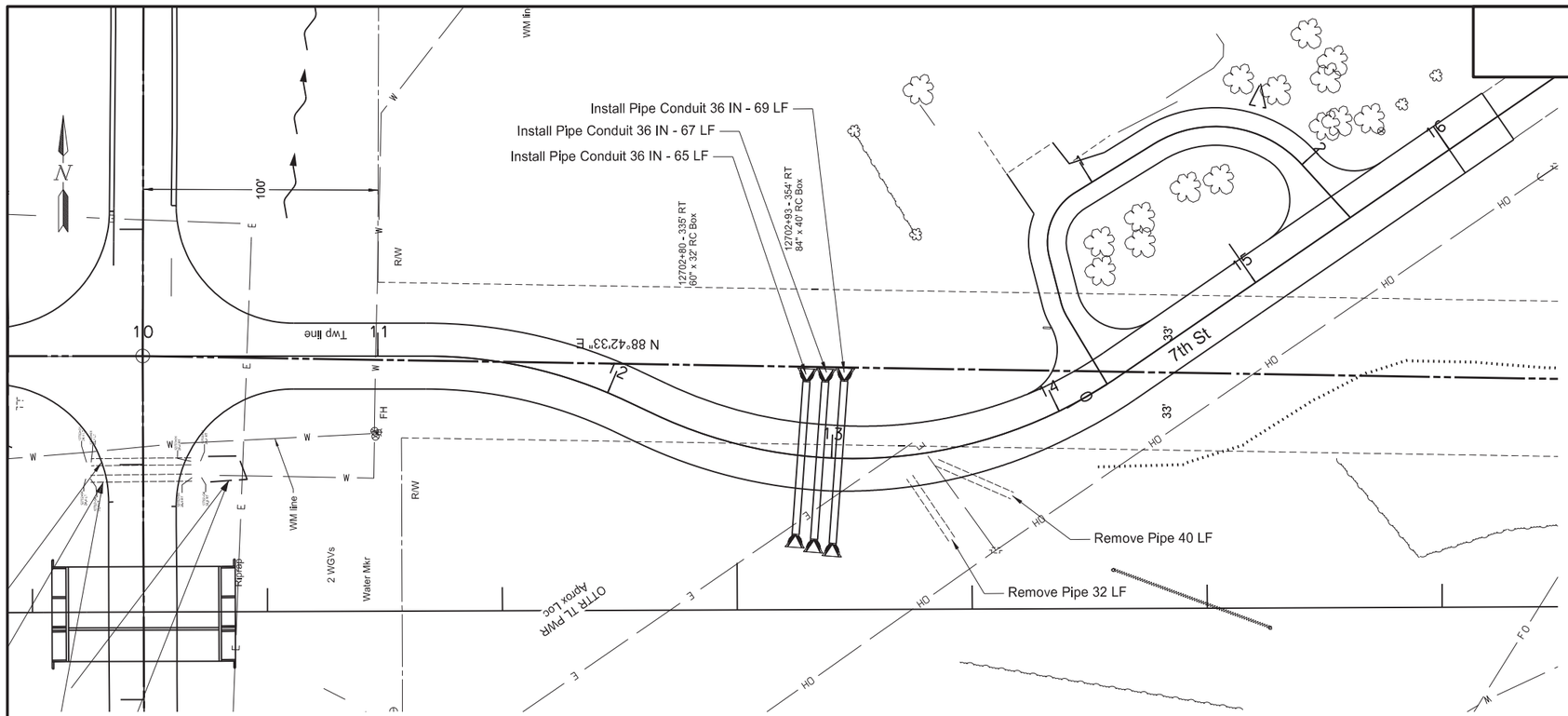
REGISTERED PROFESSIONAL ENGINEER
ZACHARY THELEN
PE-40305
DATE: 9/9/24
NORTH DAKOTA

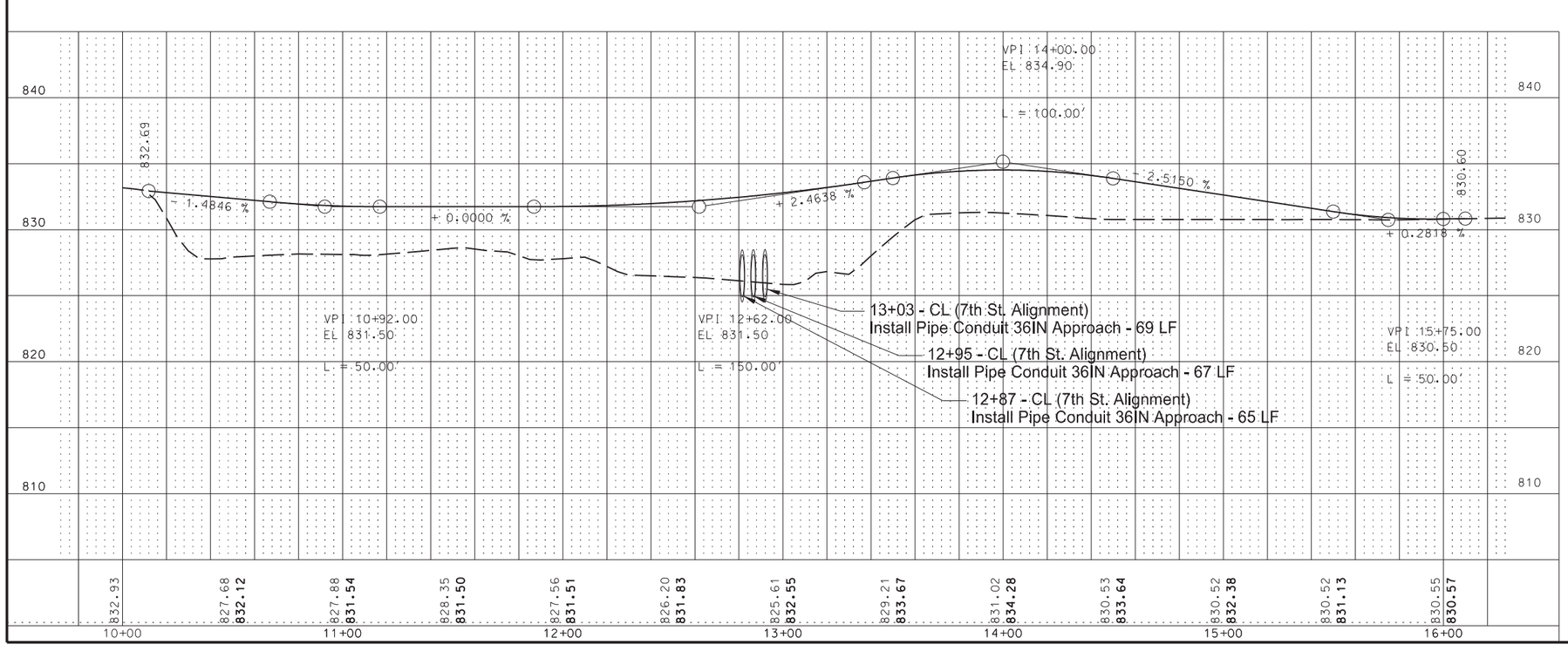
Drainage Layout

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	55	8





202	0174	Removal of Pipe All Types & Sizes		
		12702+80 - 335' RT	32	LF
		12702+93 - 354' RT	40	EA
714	4116	Pipe Conduit 36IN-Approach		
		13+03 - CL (7th St. Alignment)	69	LF
		12+95 - CL (7th St. Alignment)	67	LF
		12+87 - CL (7th St. Alignment)	65	LF
754	0805	Object Markers - Culverts		
		13+03 - CL - N & S (7th St. Alignment)	2	EA
		12+95 - CL - N & S (7th St. Alignment)	2	EA
		12+87 - CL - N & S (7th St. Alignment)	2	EA

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ZACHARY THELEN
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DATE: 9/9/24
NORTH DAKOTA

Drainage Layout

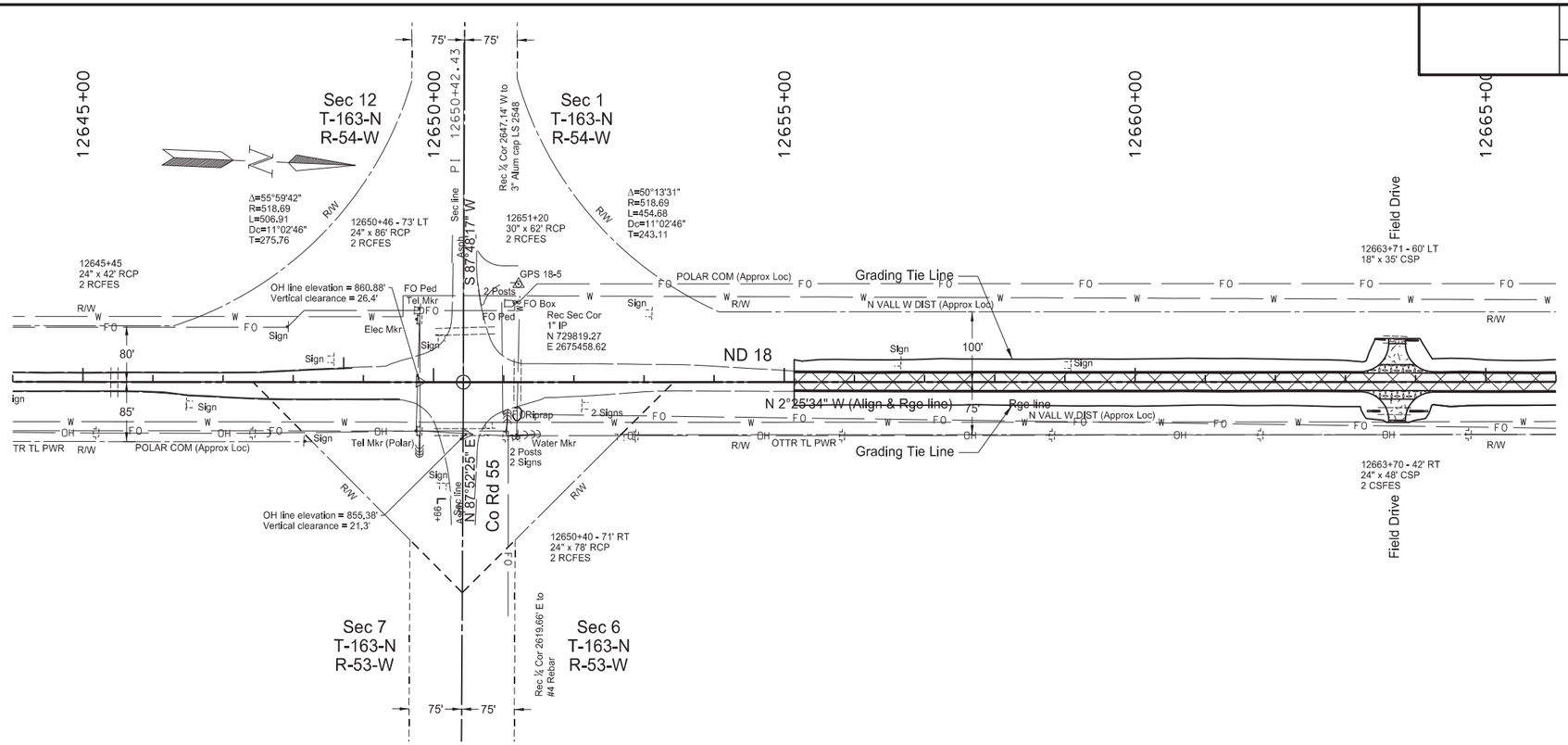
7th St

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	60	1



Spec	Code	Item Description	QTY	Unit
302	0100	Salvaged Base Course		
		Sta 12655+14 to Sta 12665+00	403	TON
401	0050	Tack Coat		
		Sta 12655+14 to Sta 12665+00	162	GAL
430	0043	Superpave FAA 43		
		Sta 12655+14 to Sta 12665+00	385	TON
430	5815	PG 58S-34 Asphalt Cement		
		Sta 12655+14 to Sta 12665+00	24	TON

LEGEND

- Bituminous Pavement - 2 Inch
- 2' Widening
- Approach Pavement (See Sheet 20-4)
- Aggregate Surfacing (See Sheet 20-4)
- Bridge Approach Reconstruction And Reinforced Concrete Box Culvert Placement (See Sheets 30-5 & 30-7)
- Approach Topsoil Tie Down Limits

See Section 55 Plans For Removal and Replacement of Riprap

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 9/4/2024
NORTH DAKOTA

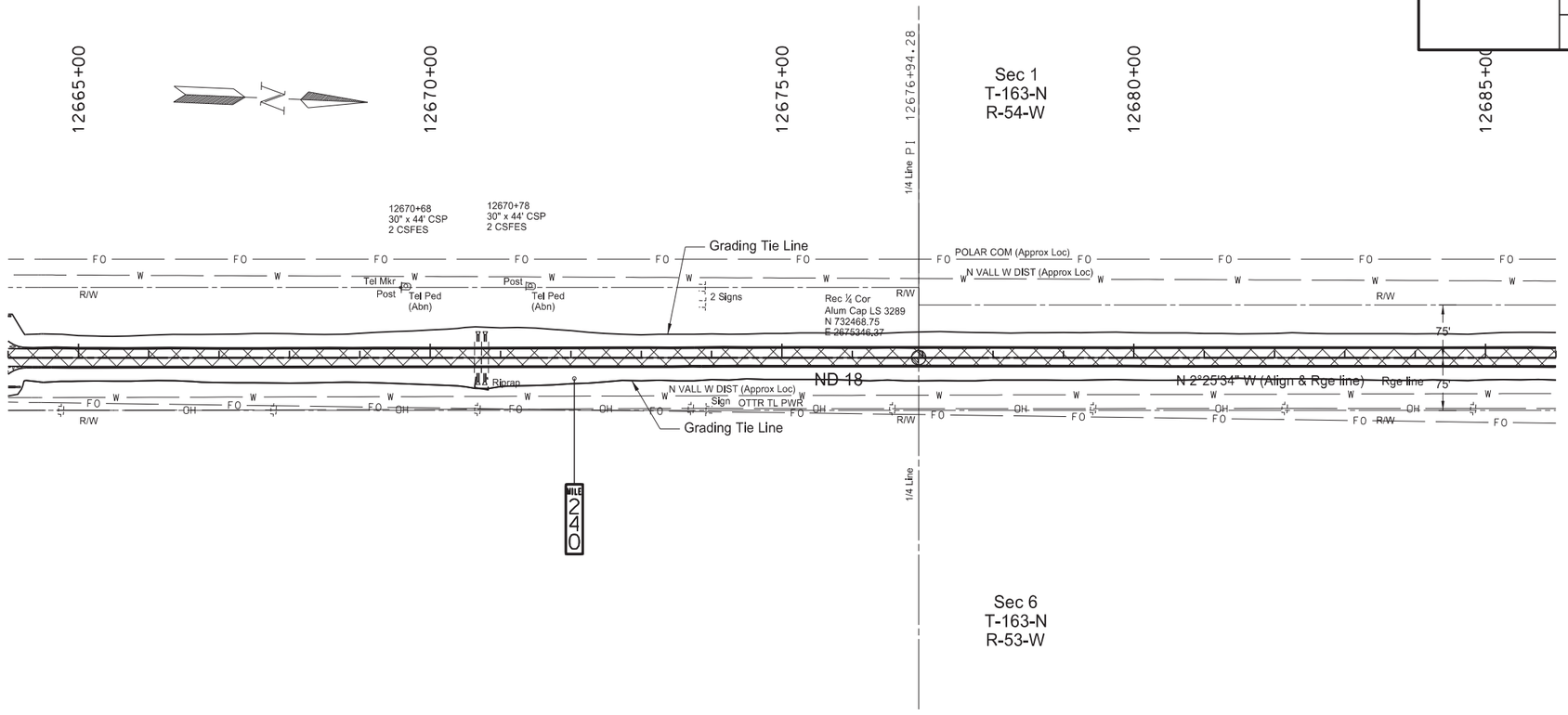
Plan & Profile

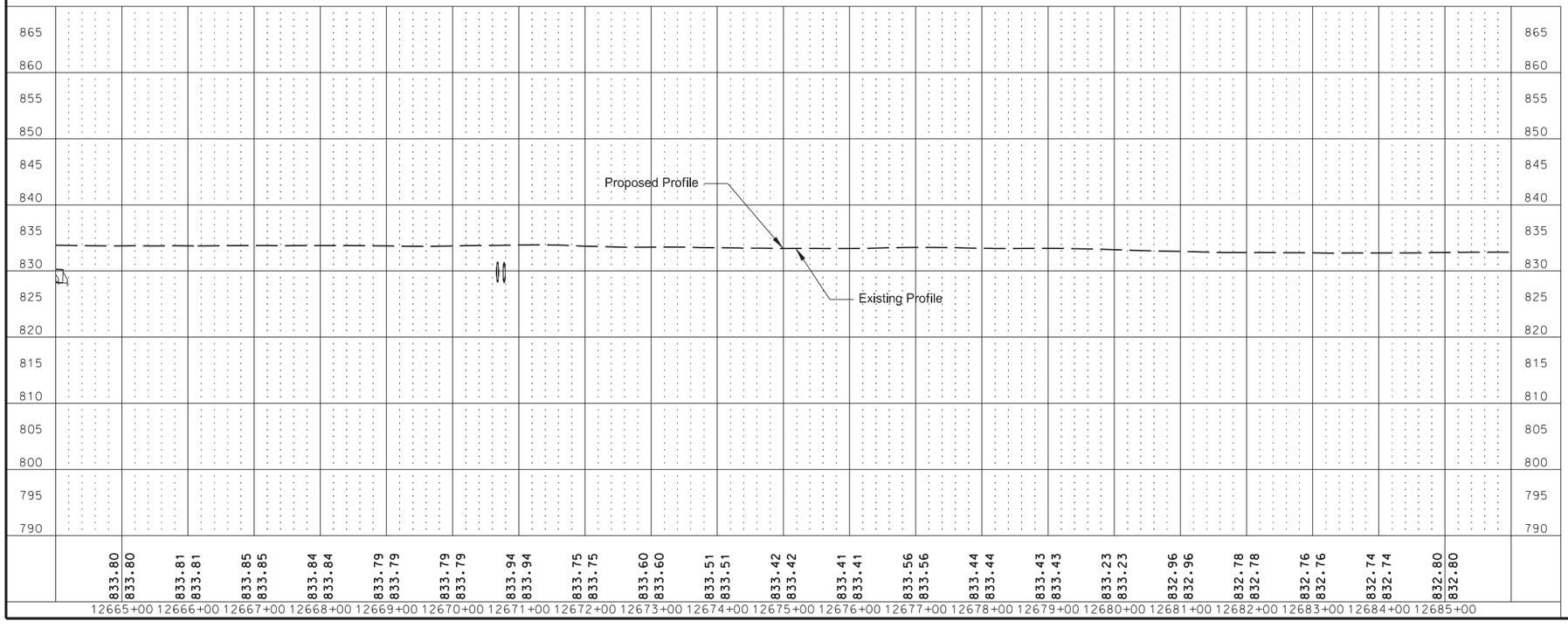
ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	60	2





Spec	Code	Item Description	QTY	Unit
302	0100	Salvaged Base Course		
		Sta 12665+00 to Sta 12685+00	914	TON
401	0050	Tack Coat		
		Sta 12665+00 to Sta 12685+00	333	GAL
430	0043	Superpave FAA 43		
		Sta 12665+00 to Sta 12685+00	795	TON
430	5815	PG 58S-34 Asphalt Cement		
		Sta 12665+00 to Sta 12685+00	50	TON

LEGEND

- Bituminous Pavement - 2 Inch
- 2' Widening
- Approach Pavement (See Sheet 20-4)
- Aggregate Surfacing (See Sheet 20-4)
- Bridge Approach Reconstruction And Reinforced Concrete Box Culvert Placement (See Sheets 30-5 & 30-7)
- Approach Topsoil Tie Down Limits

See Section 55 Plans For Removal and Replacement of Riprap

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 9/4/2024
NORTH DAKOTA

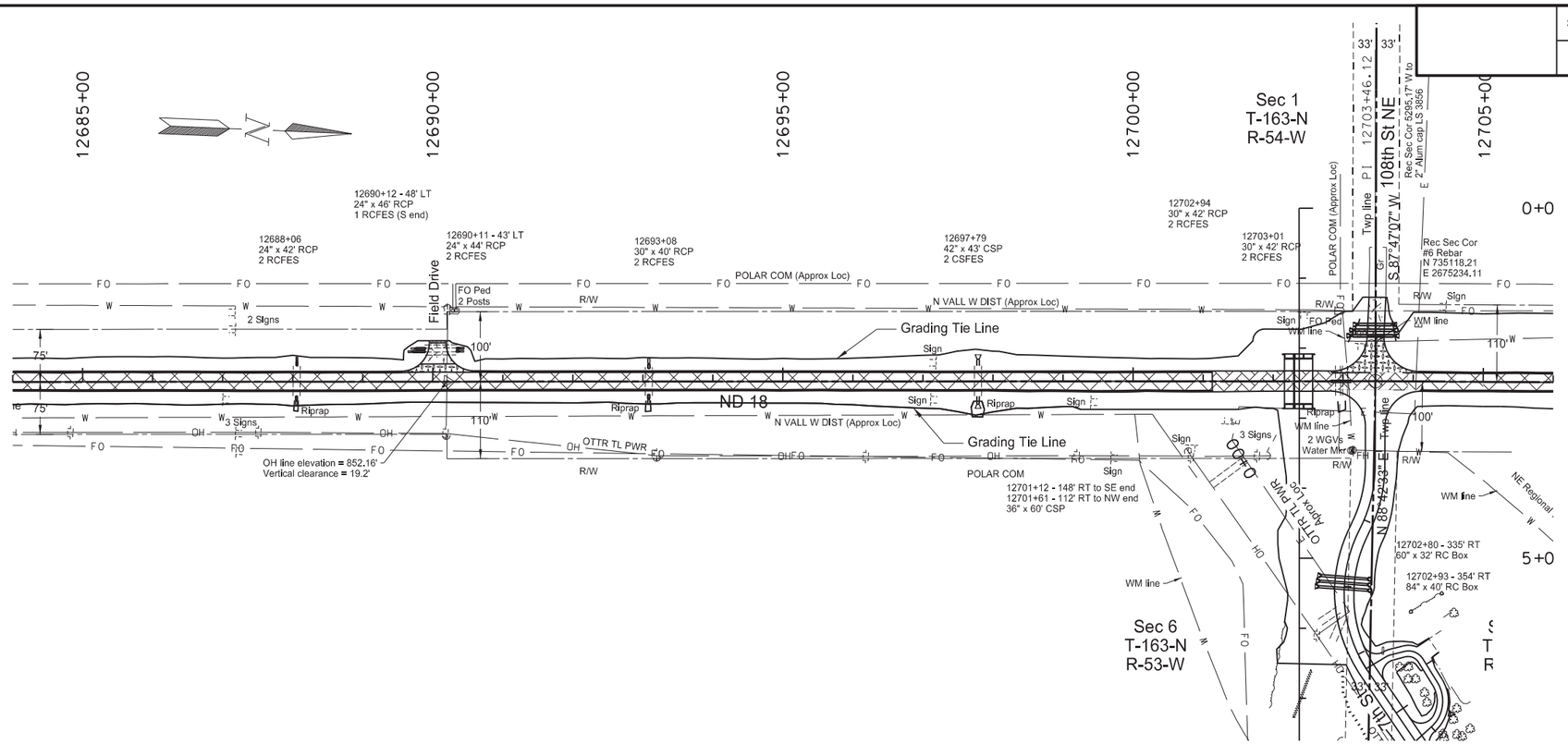
Plan & Profile

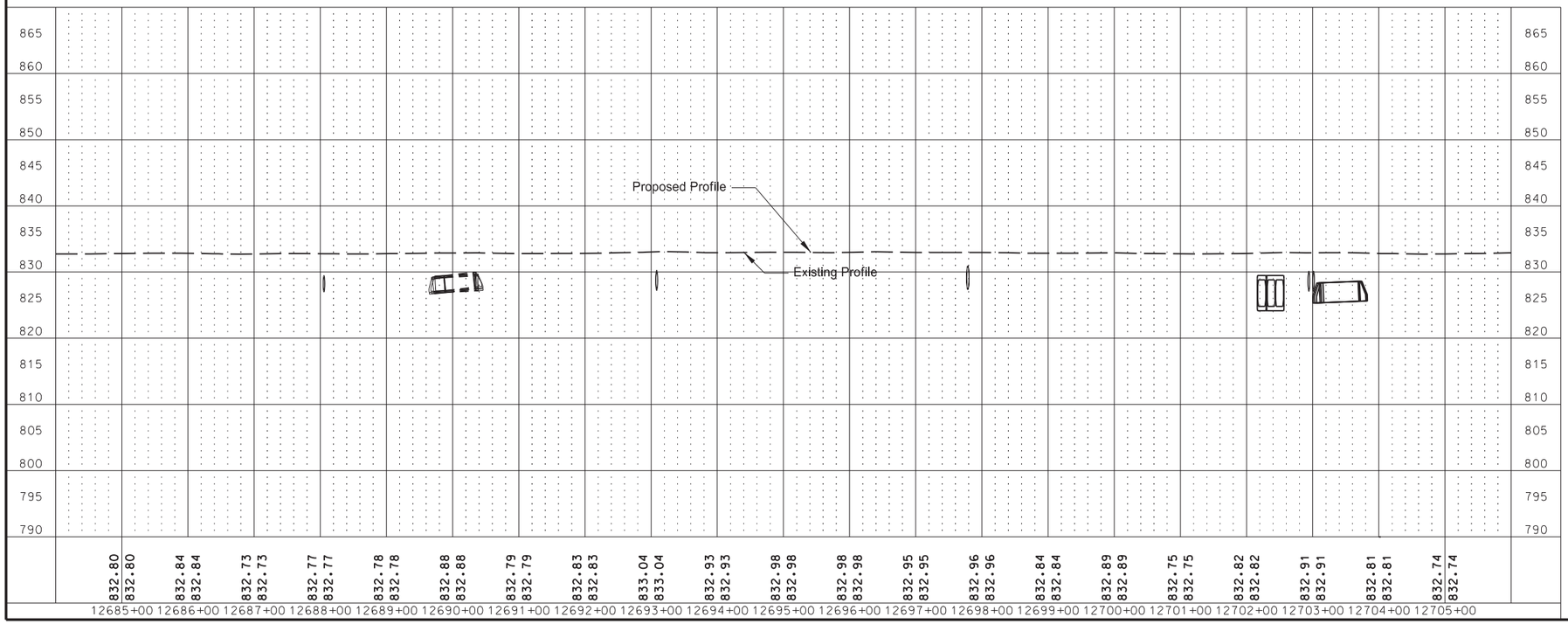
ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	60	3





Spec	Code	Item Description	QTY	Unit
302	0100	Salvaged Base Course		
		Sta 12685+00 to Sta 12705+00	1654	TON
401	0050	Tack Coat		
		Sta 12685+00 to Sta 12705+00	380	GAL
401	0060	Prime Coat		
		Sta 12685+00 to Sta 12705+00	365	GAL
401	0160	Blotter Material CL 44		
		Sta 12685+00 to Sta 12705+00	6	TON
430	0043	Superpave FAA 43		
		Sta 12685+00 to Sta 12705+00	992	TON
430	5815	PG 58S-34 Asphalt Cement		
		Sta 12685+00 to Sta 12705+00	62	TON

LEGEND

- Bituminous Pavement - 2 Inch
- 2' Widening
- Approach Pavement (See Sheet 20-4)
- Aggregate Surfacing (See Sheet 20-4)
- Bridge Approach Reconstruction And Reinforced Concrete Box Culvert Placement (See Sheets 30-5 & 30-7)
- Approach Topsoil Tie Down Limits

See Section 55 Plans For Removal and Replacement of Riprap

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 9/4/2024
NORTH DAKOTA

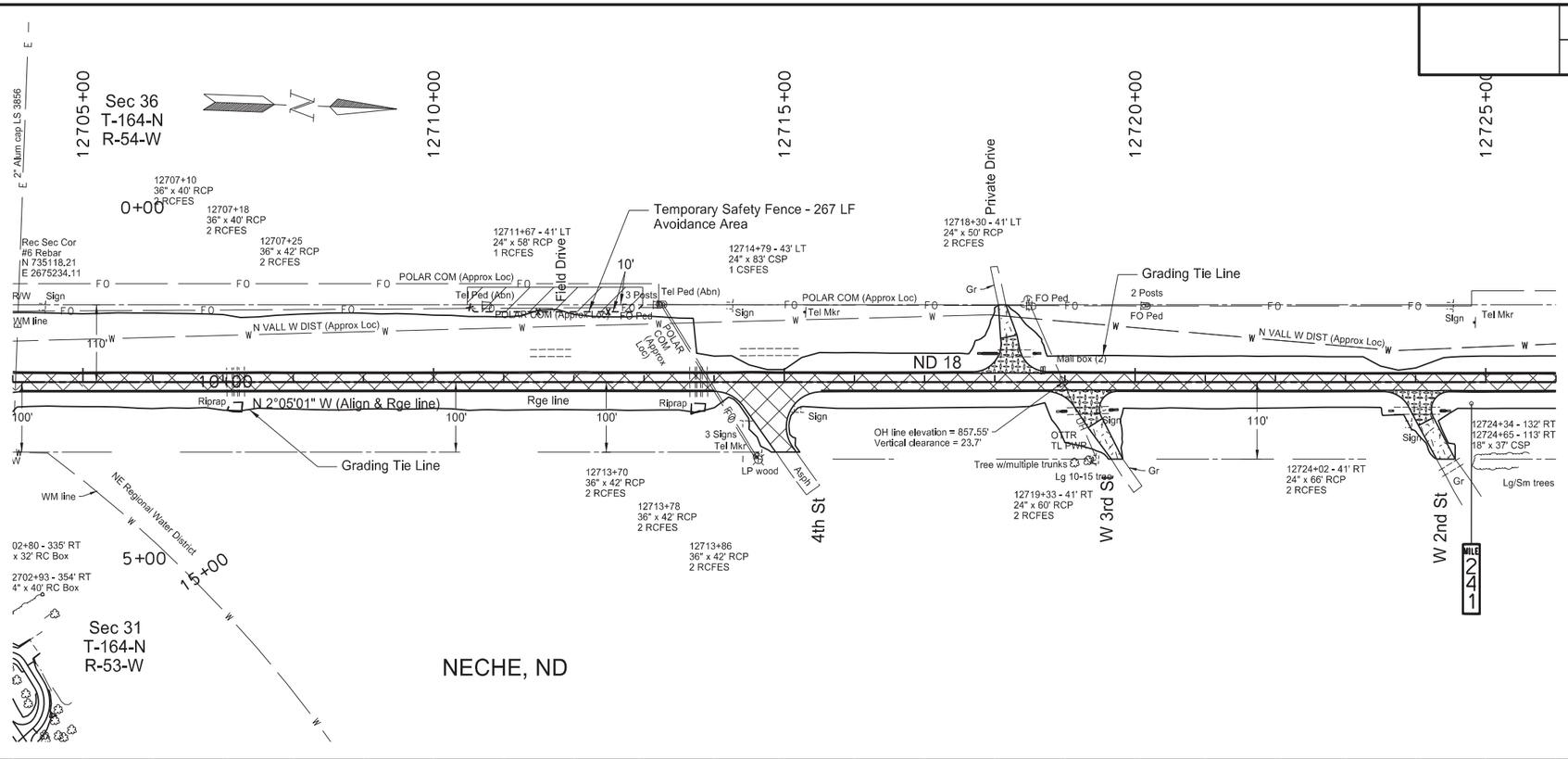
Plan & Profile

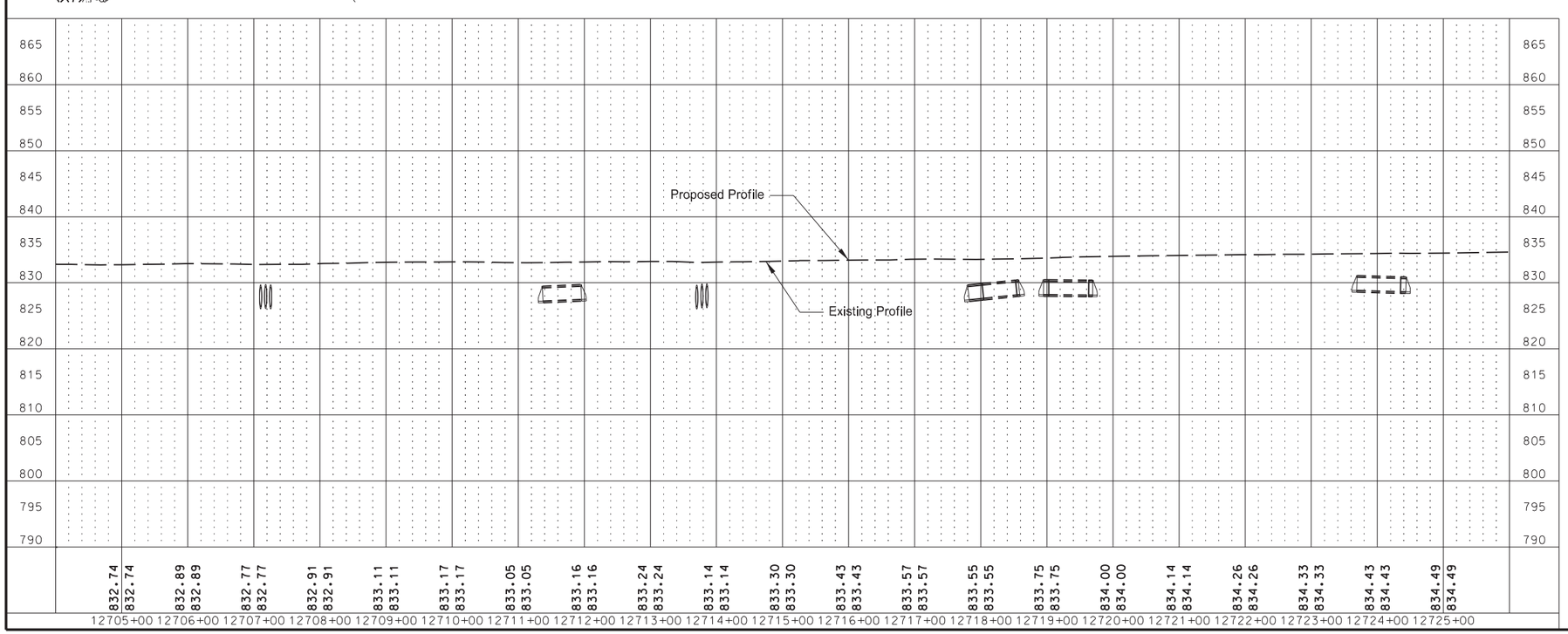
ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	60	4





Spec	Code	Item Description	QTY	Unit
302	0100	Salvaged Base Course		
		Sta 12705+00 to Sta 12725+00	787	TON
401	0050	Tack Coat		
		Sta 12705+00 to Sta 12725+00	346	GAL
430	0043	Superpave FAA 43		
		Sta 12705+00 to Sta 12725+00	815	TON
430	5815	PG 58S-34 Asphalt Cement		
		Sta 12705+00 to Sta 12725+00	51	TON
752	0911	Temporary Safety Fence		
		Sta 12710+48 to Sta 12712+98 LT	267	LF

LEGEND

- Bituminous Pavement - 2 Inch
- 2' Widening
- Approach Pavement (See Sheet 20-4)
- Aggregate Surfacing (See Sheet 20-4)
- Bridge Approach Reconstruction And Reinforced Concrete Box Culvert Placement (See Sheets 30-5 & 30-7)
- Approach Topsoil Tie Down Limits

See Section 55 Plans For Removal and Replacement of Riprap

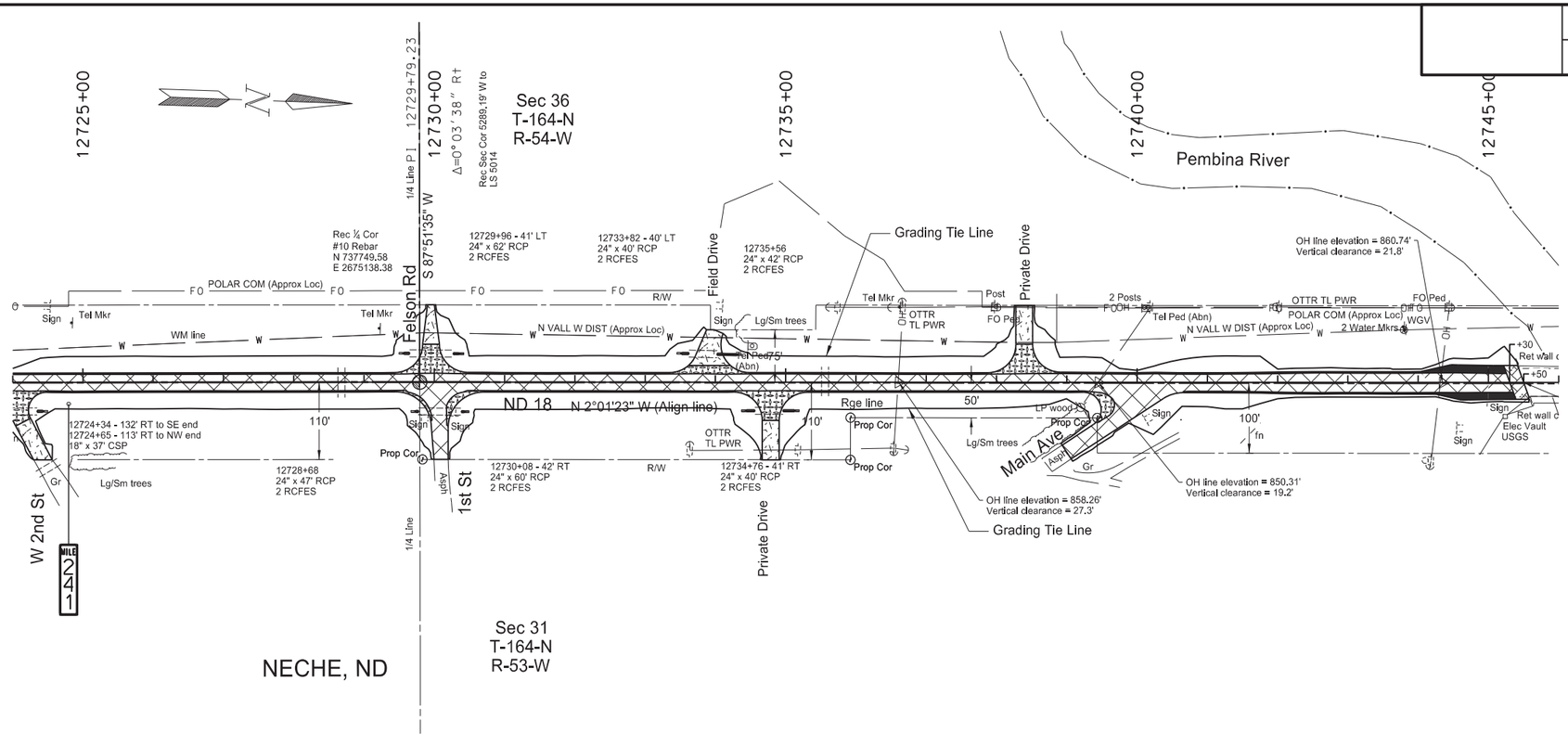
REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 9/4/2024
NORTH DAKOTA

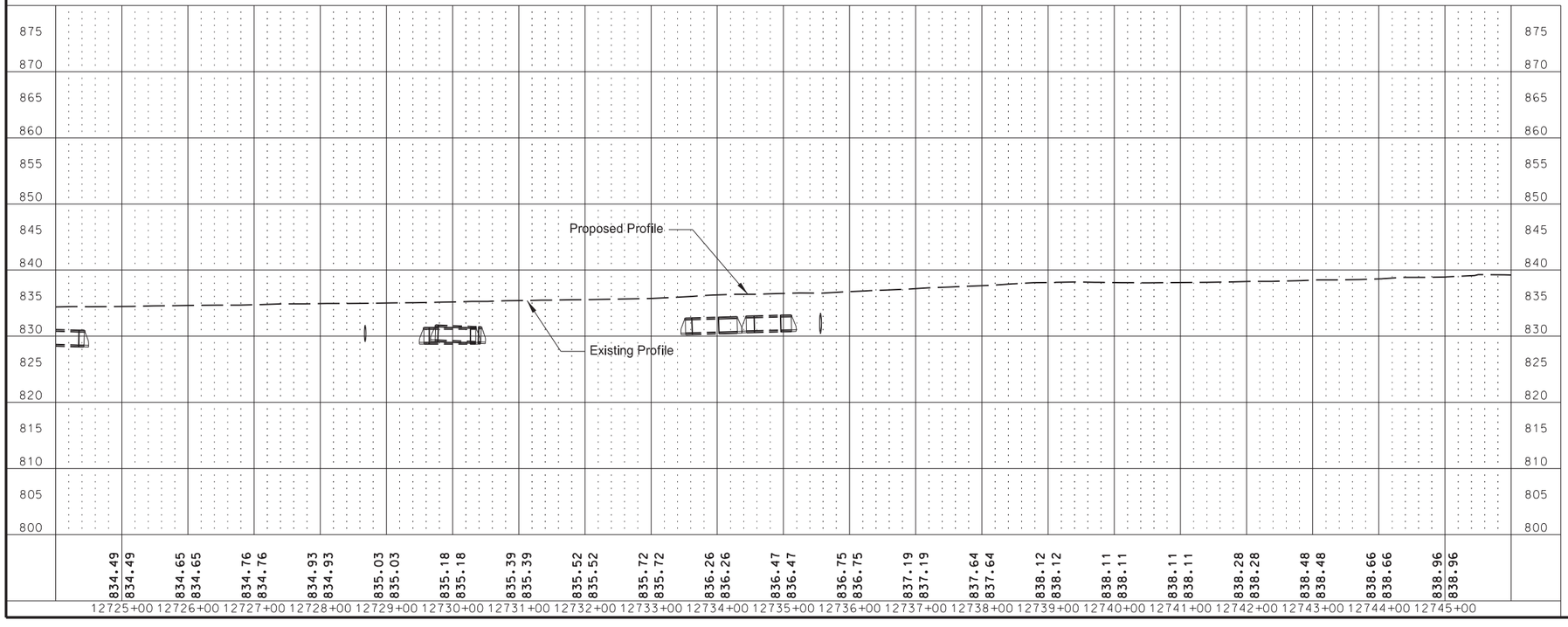
Plan & Profile

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	60	5





Spec	Code	Item Description	QTY	Unit
302	0100	Salvaged Base Course		
		Sta 12725+00 to Sta 12745+00	965	TON
401	0050	Tack Coat		
		Sta 12725+00 to Sta 12745+00	360	GAL
430	0043	Superpave FAA 43		
		Sta 12725+00 to Sta 12745+00	863	TON
430	5815	PG 58S-34 Asphalt Cement		
		Sta 12725+00 to Sta 12745+00	54	TON

LEGEND

- Bituminous Pavement - 2 Inch
- 2' Widening And Guardrail Pavement
- Approach Pavement (See Sheet 20-4)
- Aggregate Surfacing (See Sheet 20-4)
- Bridge Approach Reconstruction (See Sheet 30-5)
- Approach Topsoil Tie Down Limits

See Section 55 Plans For Removal and Replacement of Riprap

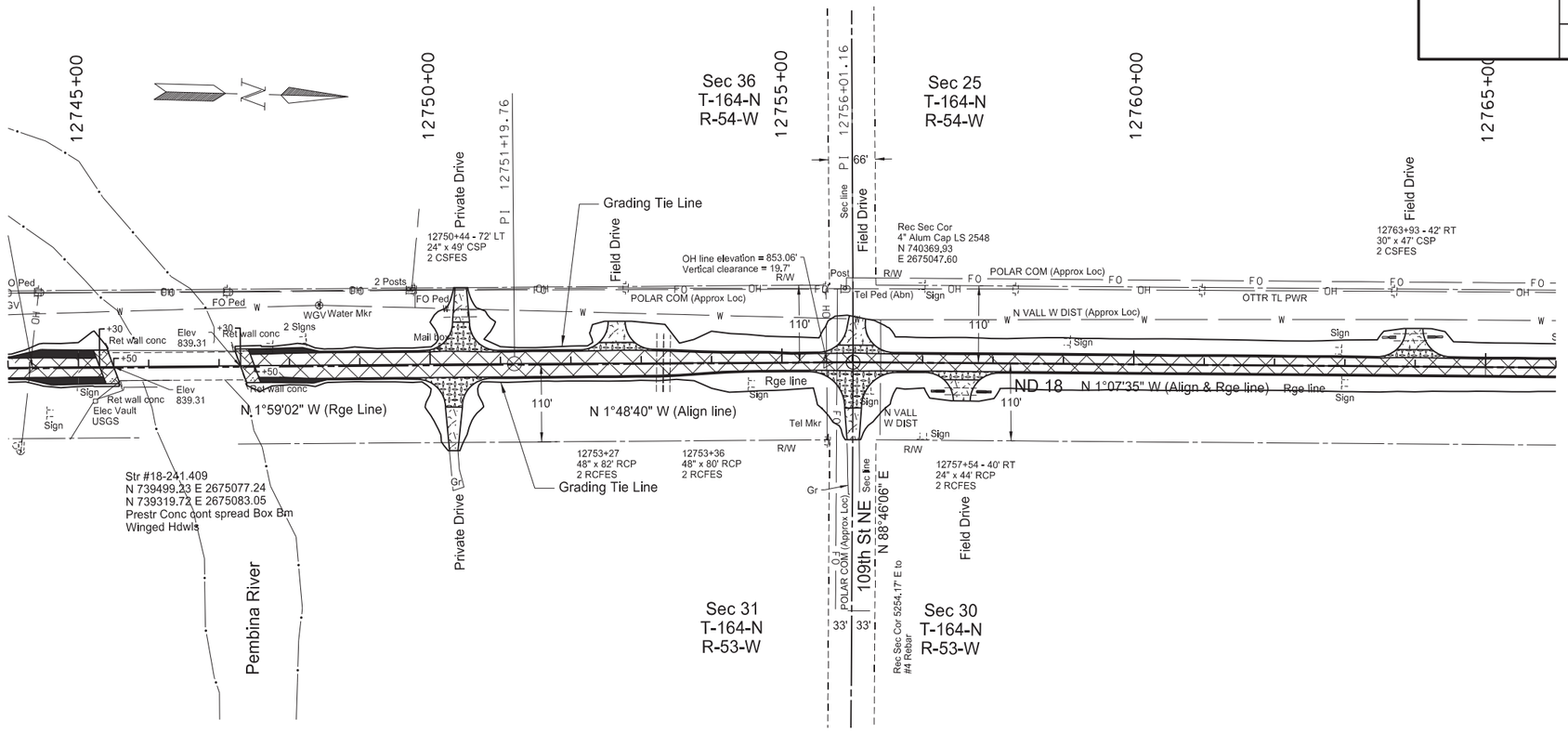
REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 9/4/2024
NORTH DAKOTA

Plan & Profile

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	60	6



Spec	Code	Item Description	QTY	Unit
302	0100	Salvaged Base Course		
		Sta 12745+00 to Sta 12765+00	1117	TON
401	0050	Tack Coat		
		Sta 12745+00 to Sta 12765+00	335	GAL
401	0060	Prime Coat		
		Sta 12745+00 to Sta 12765+00	58	GAL
401	0160	Blotter Material CL 44		
		Sta 12745+00 to Sta 12765+00	1	TON
430	0043	Superpave FAA 43		
		Sta 12745+00 to Sta 12765+00	836	TON
430	5815	PG 58S-34 Asphalt Cement		
		Sta 12745+00 to Sta 12765+00	53	TON

LEGEND

- Bituminous Pavement - 2 Inch
- 2' Widening And Guardrail Pavement
- Approach Pavement (See Sheet 20-4)
- Aggregate Surfacing (See Sheet 20-4)
- Bridge Approach Reconstruction (See Sheet 30-5)
- Approach Topsoil Tie Down Limits

See Section 55 Plans For Removal and Replacement of Riprap

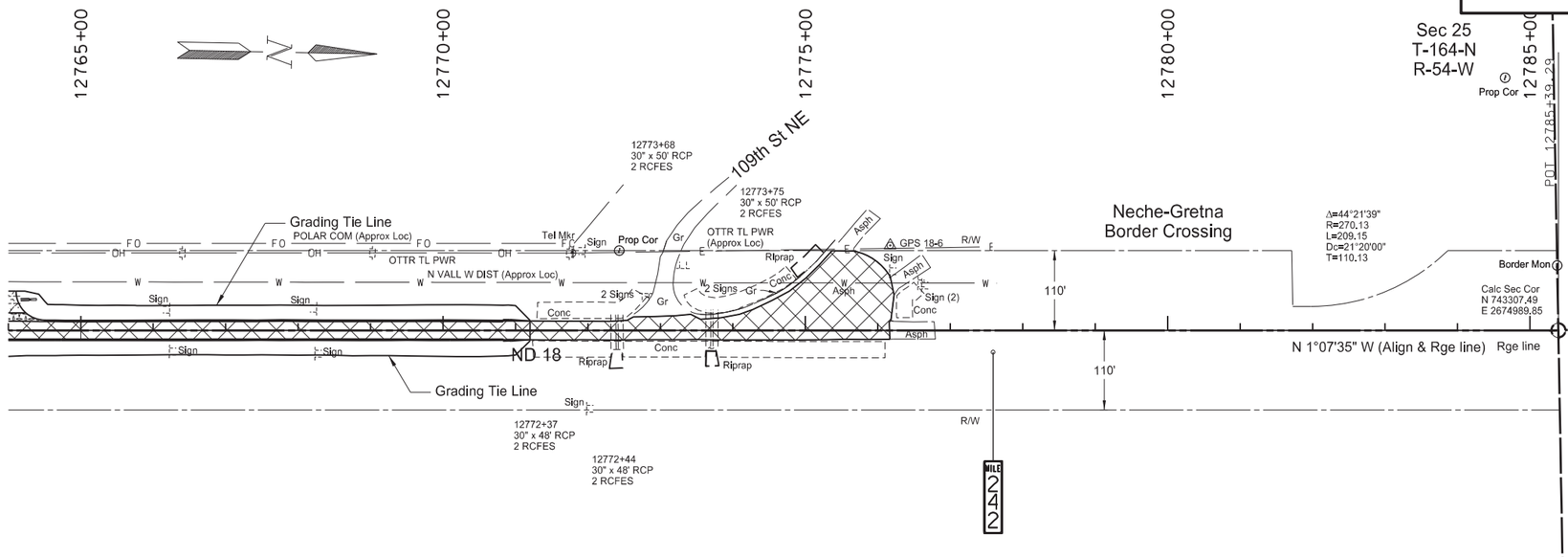
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Plan & Profile

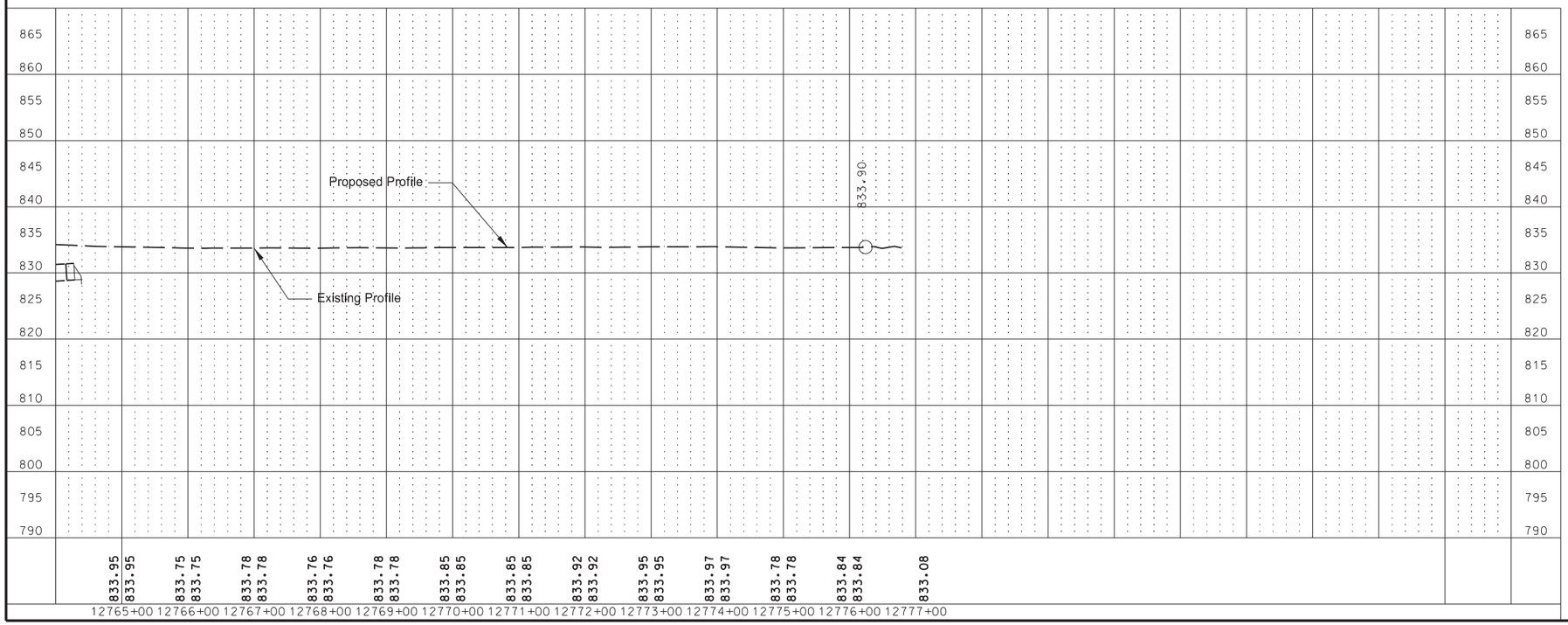
ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	60	7



Electric lines in this vicinity labeled Approx Loc were drafted based on plans provided by Nodak Electric Cooperative.



Spec	Code	Item Description	QTY	Unit
302	0100	Salvaged Base Course		
		Sta 12765+00 to Sta 12776+16.17	284	TON
401	0050	Tack Coat		
		Sta 12765+00 to Sta 12776+16.17	250	GAL
430	0043	Superpave FAA 43		
		Sta 12765+00 to Sta 12776+16.17	574	TON
430	5815	PG 58S-34 Asphalt Cement		
		Sta 12765+00 to Sta 12776+16.17	36	TON

LEGEND

- Bituminous Pavement - 2 Inch
- 2' Widening
- Approach Pavement (See Sheet 20-4)
- Aggregate Surfacing (See Sheet 20-4)
- Bridge Approach Reconstruction And Reinforced Concrete Box Culvert Placement (See Sheets 30-5 & 30-7)
- Approach Topsoil Tie Down Limits

See Section 55 Plans For Removal and Replacement of Riprap

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DATE: 9/4/2024
NORTH DAKOTA

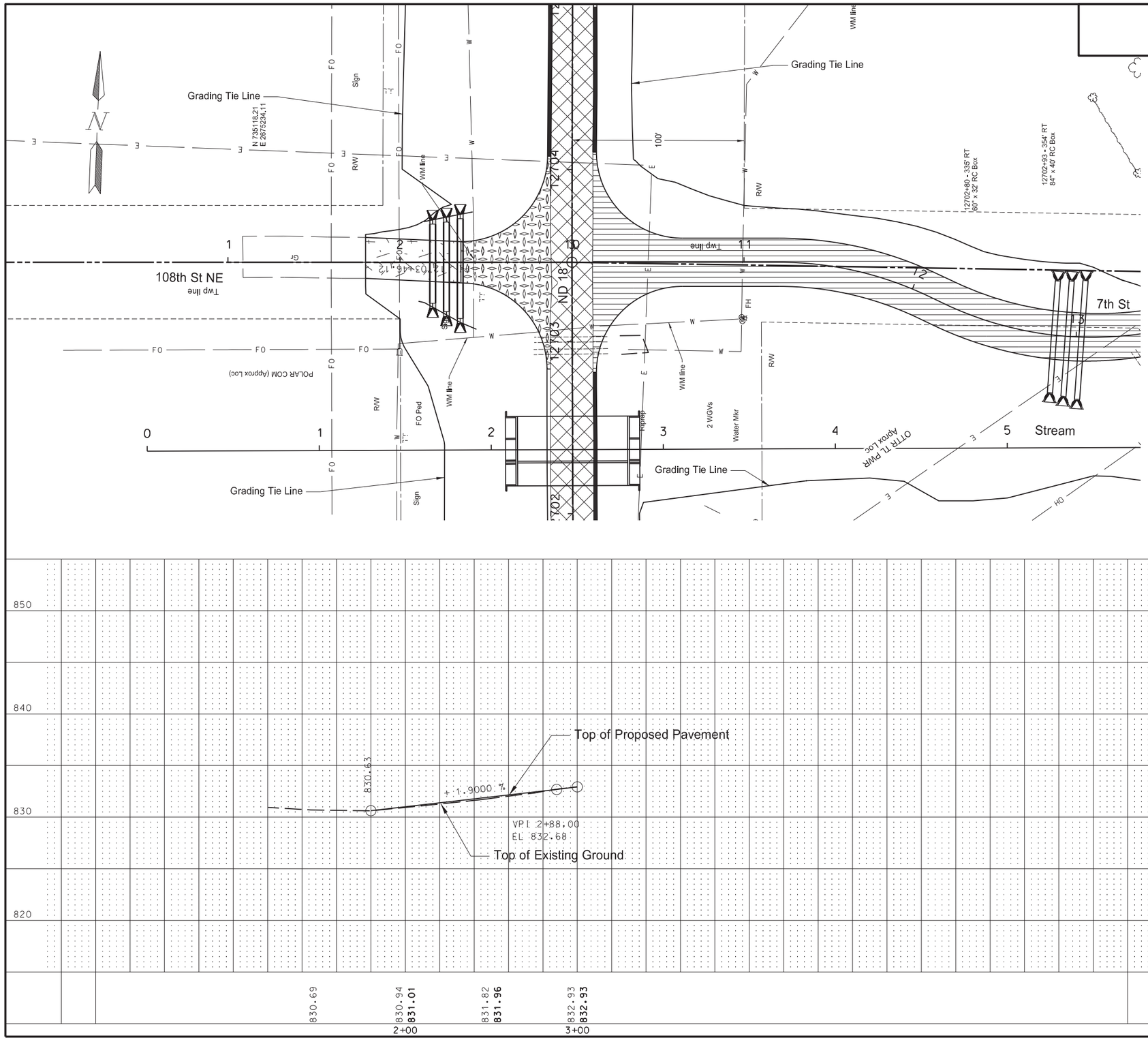
Plan & Profile

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

9/4/2024 11:42:54 AM JButler H:\Projects\16000\16455\6018239.081\TechData\Design\Plan\060PP_007.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	60	8



LEGEND

- Bituminous Pavement - 2 Inch
- Bituminous Pavement - 6 Inch
- Bridge ApproachReplacements (See Sheets 30-3 to 30-5)
- 2' Widening
- 6" Salvaged Base Course
- Approach Pavement (See Sheet 20-4)
- Aggregate Surfacing (See Sheet 20-4)
- Approach Topsoil Tie Down Limits

NOTE:
Side Street Quantities
Calculated in Section 20-4
Approach Paving Details

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Plan & Profile

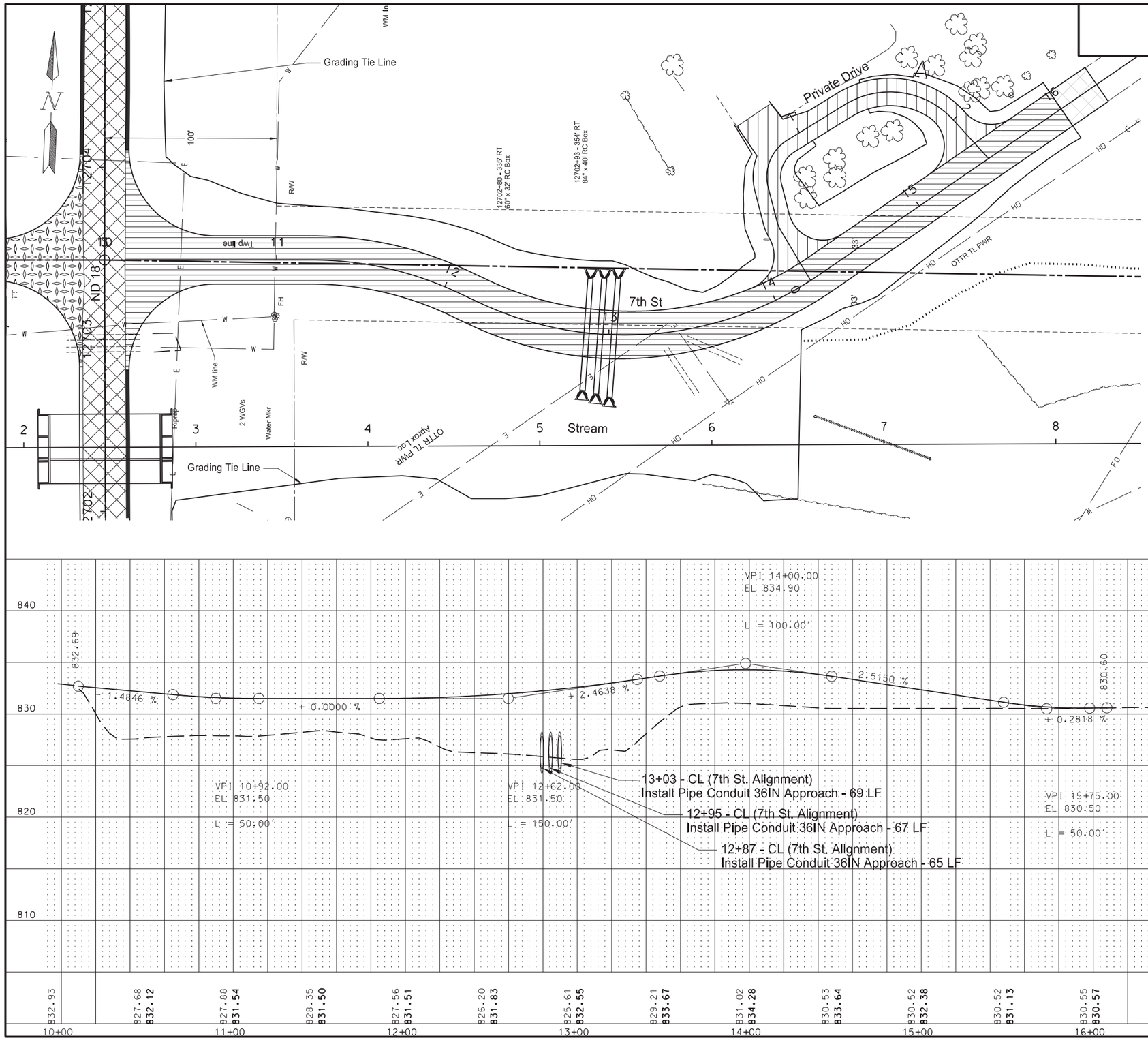
108th St NE

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	60	9

Spec	Code	Item Description	QTY	Unit
302	0100	Salvaged Base Course		
		Sta 10+00 to Sta 16+00	630	TON
		Sta 00+12 to Sta 02+17	162	TON
401	0050	Tack Coat		
		Sta 10+00 to Sta 16+00	93	GAL
430	0043	Superpave FAA 43		
		Sta 10+00 to Sta 16+00	672	TON
		Sta 16+00 to Sta 16+25	8	TON
430	5815	PG 58S-34 Asphalt Cement		
		Sta 10+00 to Sta 16+00	43	TON



LEGEND

- Bituminous Pavement - 2 Inch
- Bituminous Pavement - 6 Inch
- Bridge ApproachReplacements (See Sheets 30-3 to 30-5)
- 2' Widening
- 6" Salvaged Base Course
- Approach Pavement (See Sheet 20-4)
- Aggregate Surfacing (See Sheet 20-4)
- Approach Topsoil Tie Down Limits

NOTE:
Side Street Quantities
Calculated in Section 20-4
Approach Paving Details

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DATE: 9/4/2024
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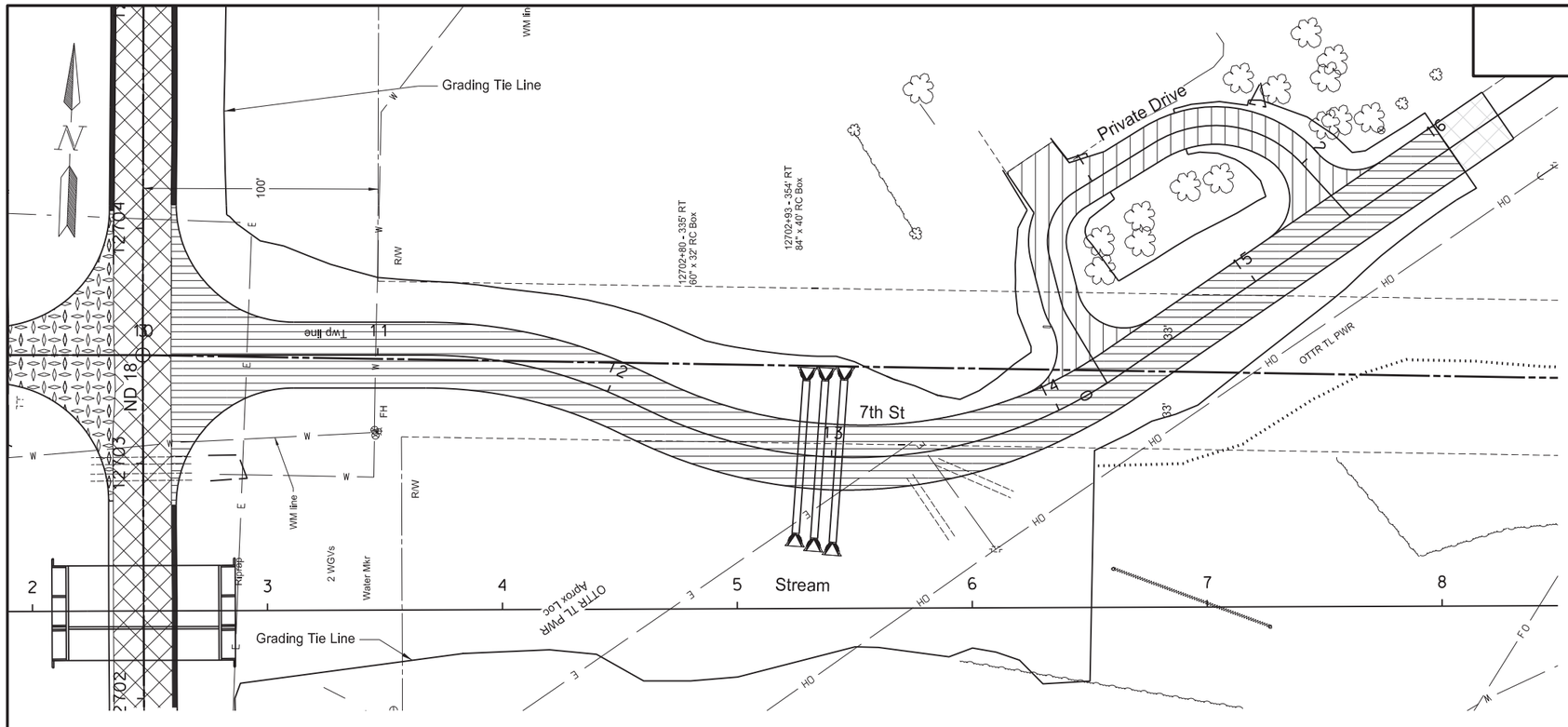
Plan & Profile

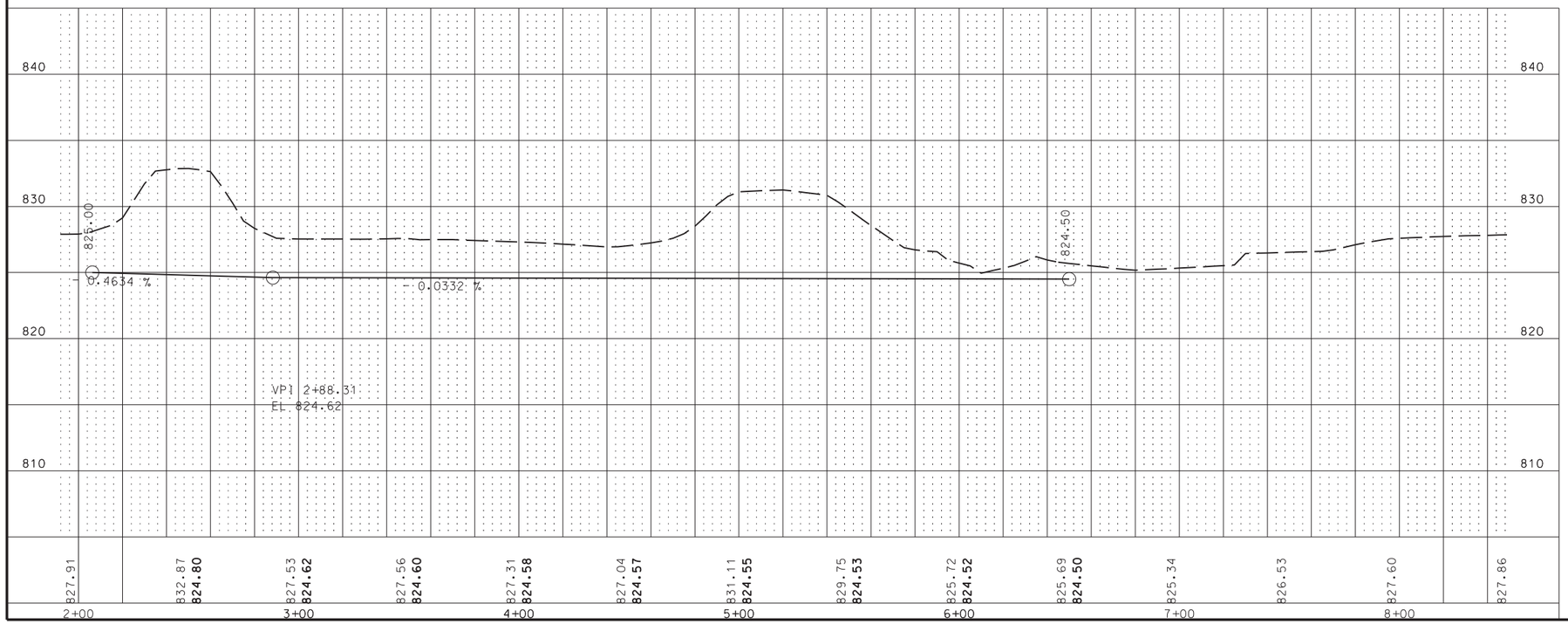
7th St

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	60	10





LEGEND

- Bituminous Pavement - 2 Inch
- Bituminous Pavement - 6 Inch
- Bridge ApproachReplacements (See Sheets 30-3 to 30-5)
- 2' Widening
- 6" Salvaged Base Course
- Approach Pavement (See Sheet 20-4)
- Aggregate Surfacing (See Sheet 20-4)
- Approach Topsoil Tie Down Limits

NOTE:
Side Street Quantities
Calculated in Section 20-4
Approach Paving Details

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DATE: 9/4/2024
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Plan & Profile

Stream Profile

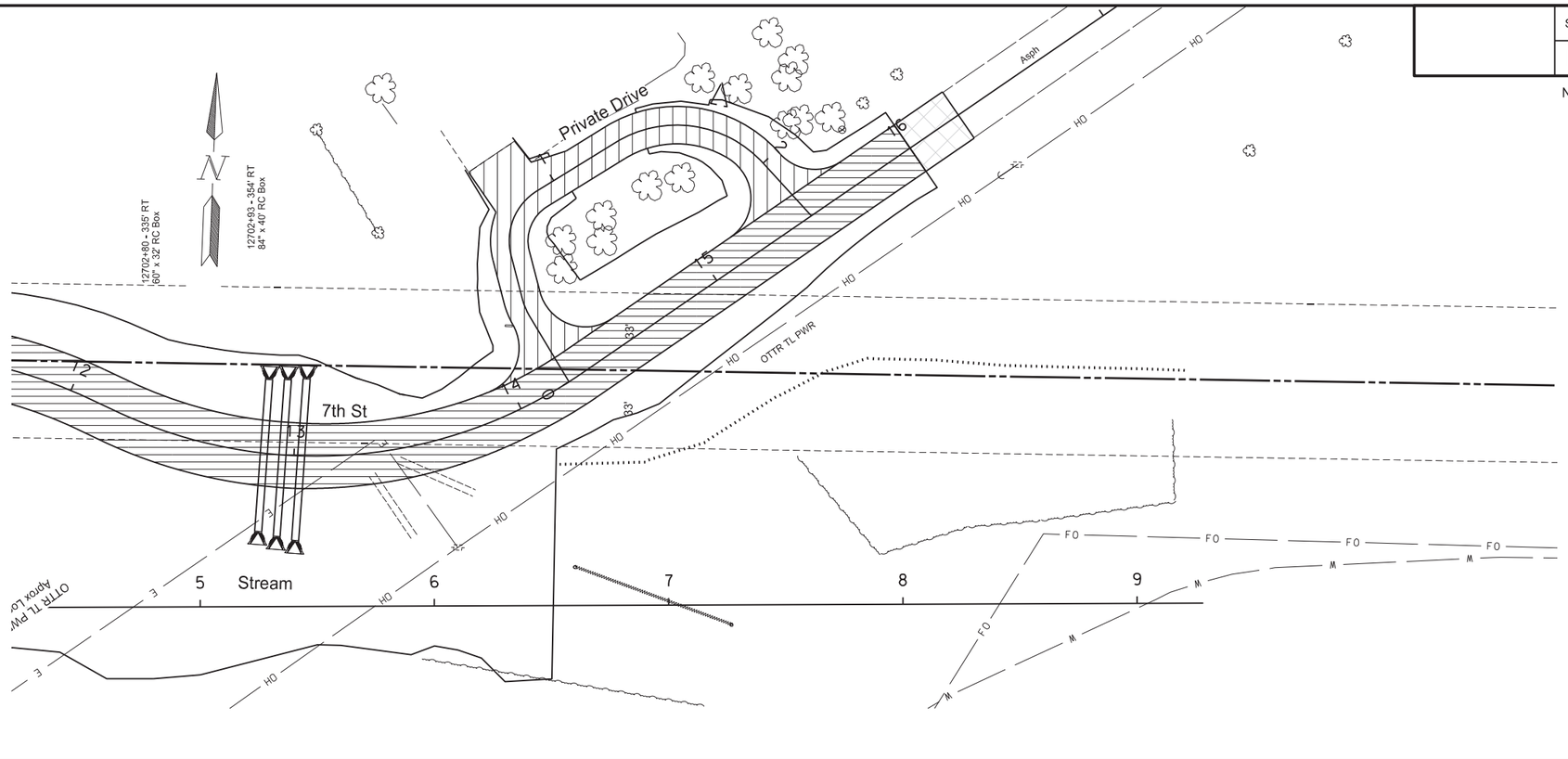
ND 18 Widening, Milling and HMA Overlay

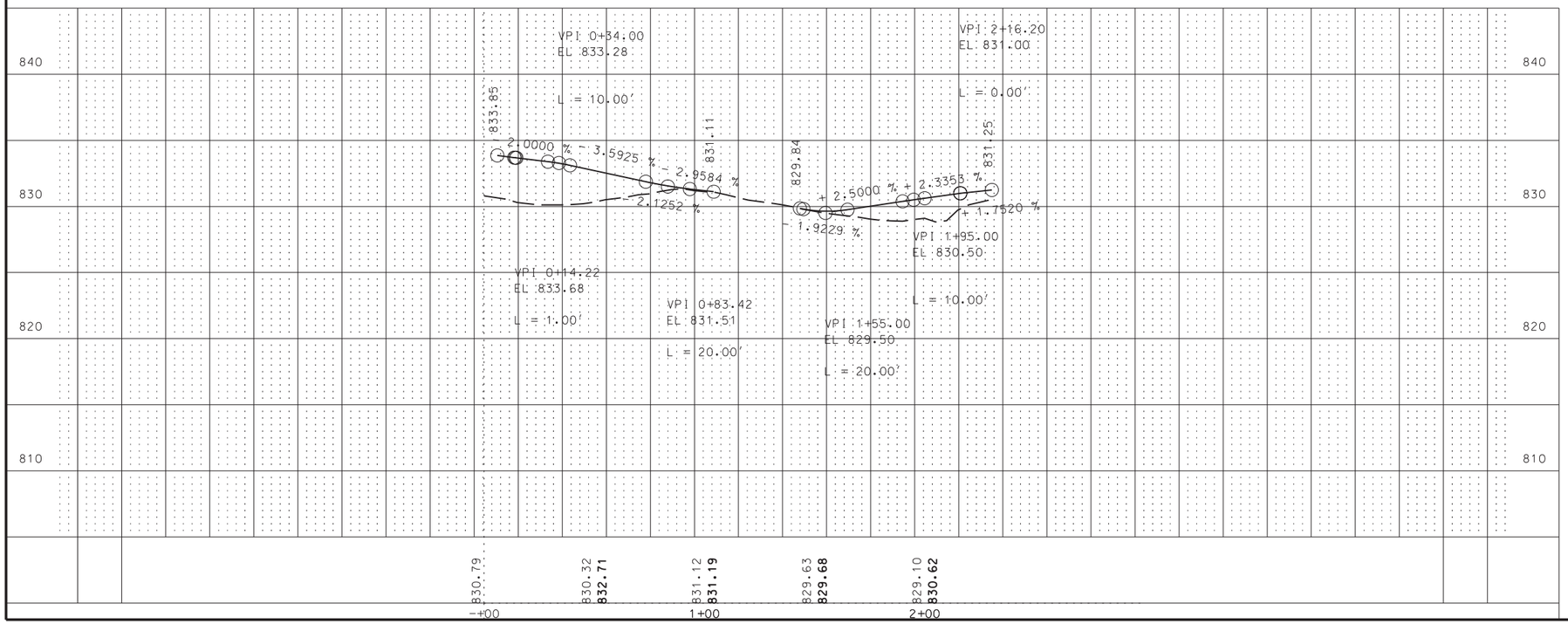
Pembina County 55 to the State Line

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	60	11

Note: Quantities for Private Drive are shown on Section 60 sheet 9.





LEGEND

- Bituminous Pavement - 2 Inch
- Bituminous Pavement - 6 Inch
- Bridge ApproachReplacements (See Sheets 30-3 to 30-5)
- 2' Widening
- 6" Salvaged Base Course
- Approach Pavement (See Sheet 20-4)
- Aggregate Surfacing (See Sheet 20-4)
- Approach Topsoil Tie Down Limits

NOTE:
Side Street Quantities Calculated in Section 20-4 Approach Paving Details

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DATE: 9/4/2024
NORTH DAKOTA

Plan & Profile

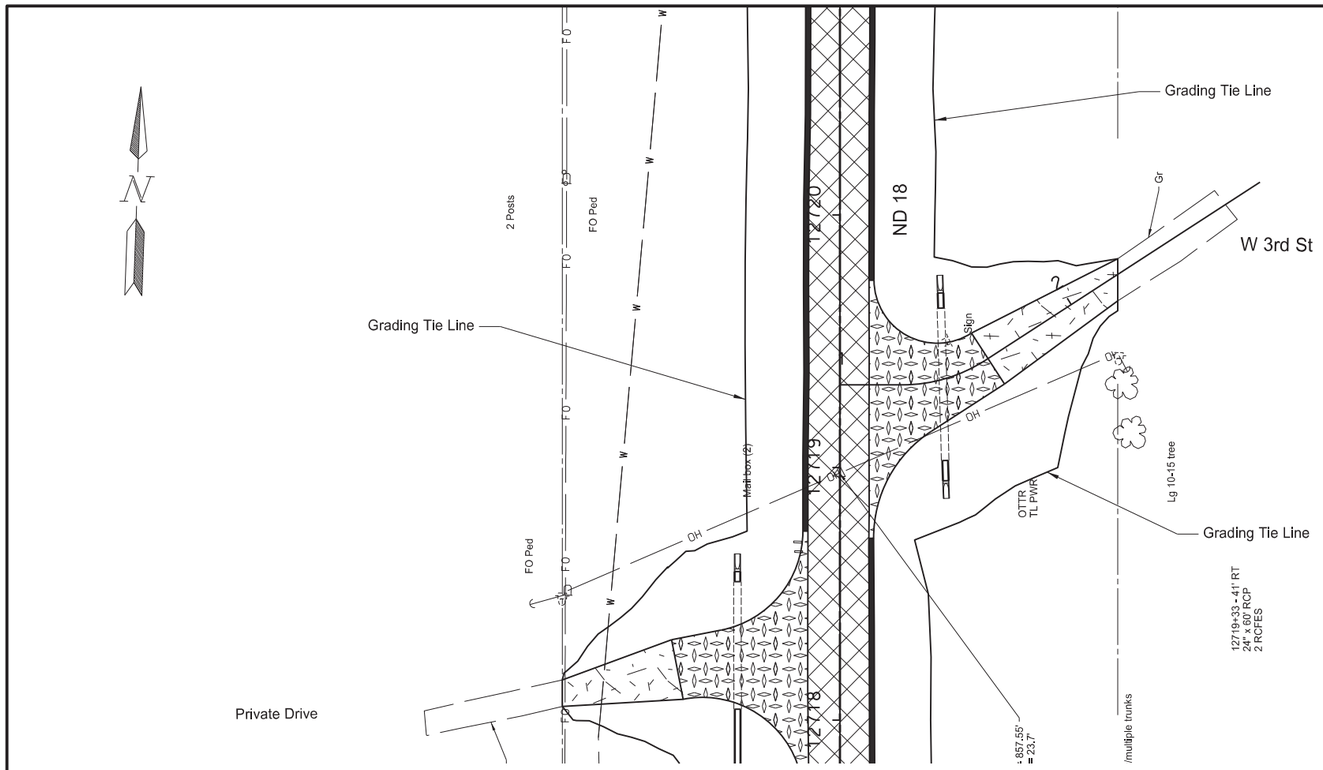
Private Drive

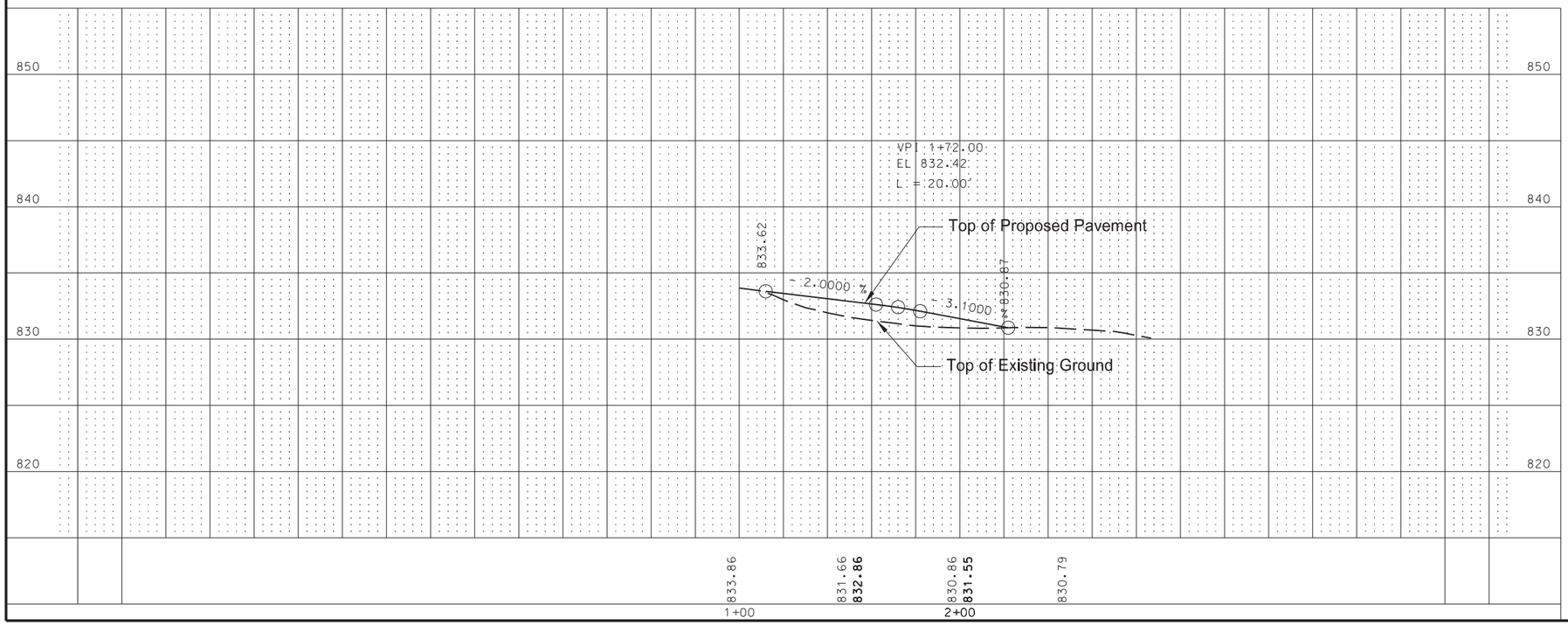
ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

9/4/2024 11:43:03 AM JButler H:\Projects\16000\16455\6018239.081\TechData\Design\Plan\060PP_011.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	60	12





LEGEND

- Bituminous Pavement - 2 Inch
- Bituminous Pavement - 6 Inch
- Bridge ApproachReplacements (See Sheets 30-3 to 30-5)
- 2' Widening
- 6" Salvaged Base Course
- Approach Pavement (See Sheet 20-4)
- Aggregate Surfacing (See Sheet 20-4)
- Approach Topsoil Tie Down Limits

NOTE:
Side Street Quantities
Calculated in Section 20-4
Approach Paving Details

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 9/4/2024
NORTH DAKOTA

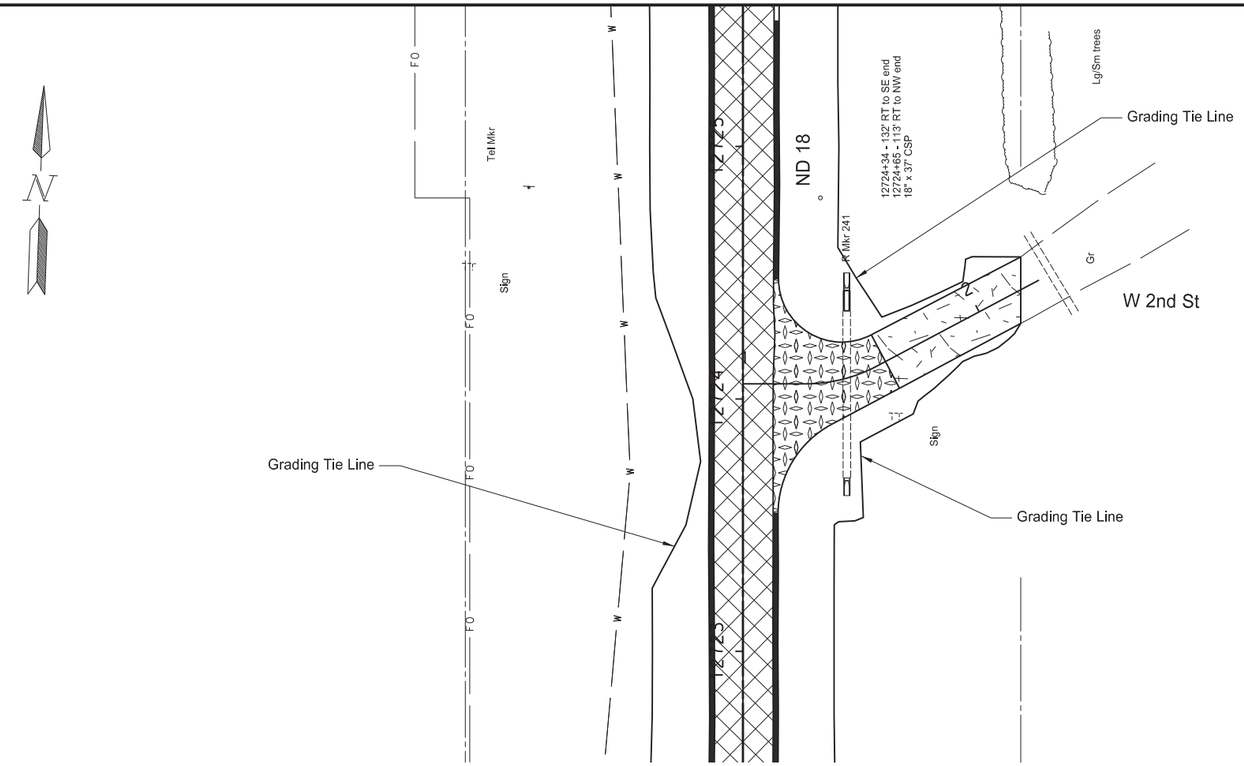
Plan & Profile

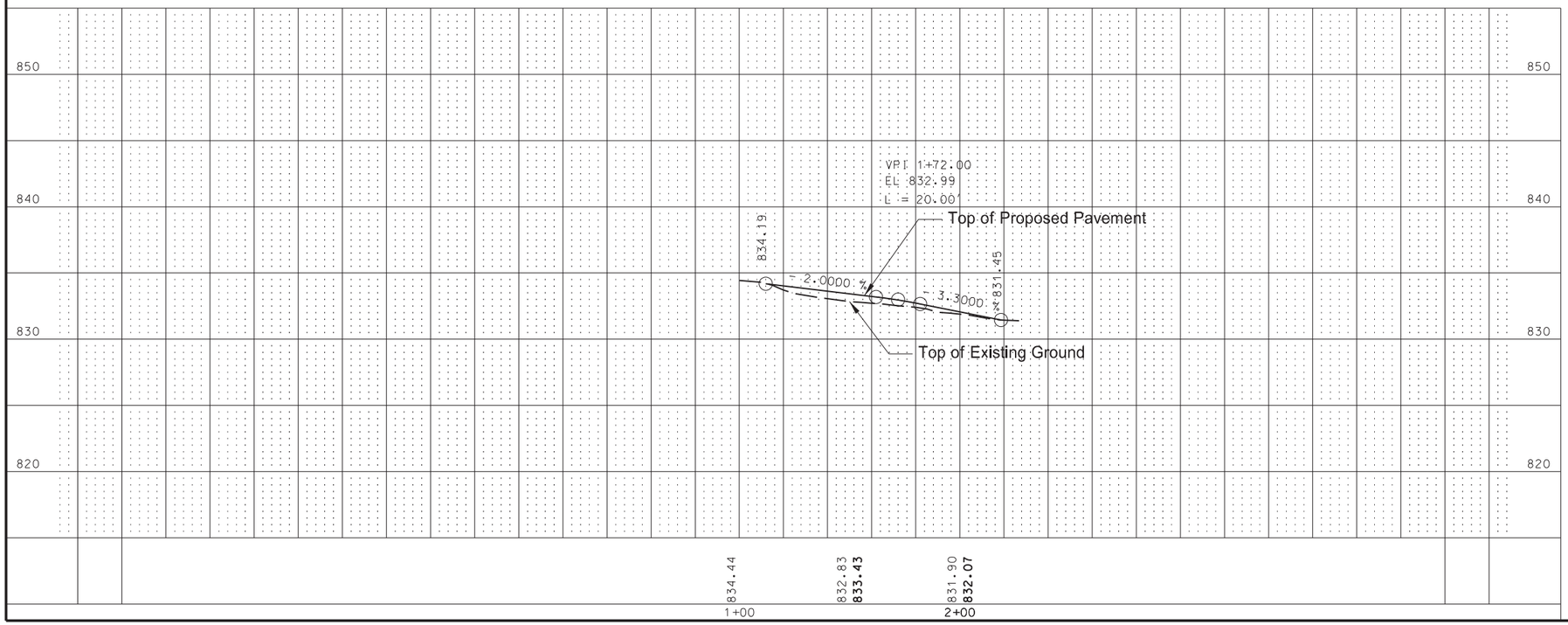
W 3rd St

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	60	13





LEGEND

- Bituminous Pavement - 2 Inch
- Bituminous Pavement - 6 Inch
- Bridge ApproachReplacements (See Sheets 30-3 to 30-5)
- 2' Widening
- 6" Salvaged Base Course
- Approach Pavement (See Sheet 20-4)
- Aggregate Surfacing (See Sheet 20-4)
- Approach Topsoil Tie Down Limits

NOTE:
Side Street Quantities
Calculated in Section 20-4
Approach Paving Details

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PE-10772
DATE: 9/4/2024
NORTH DAKOTA

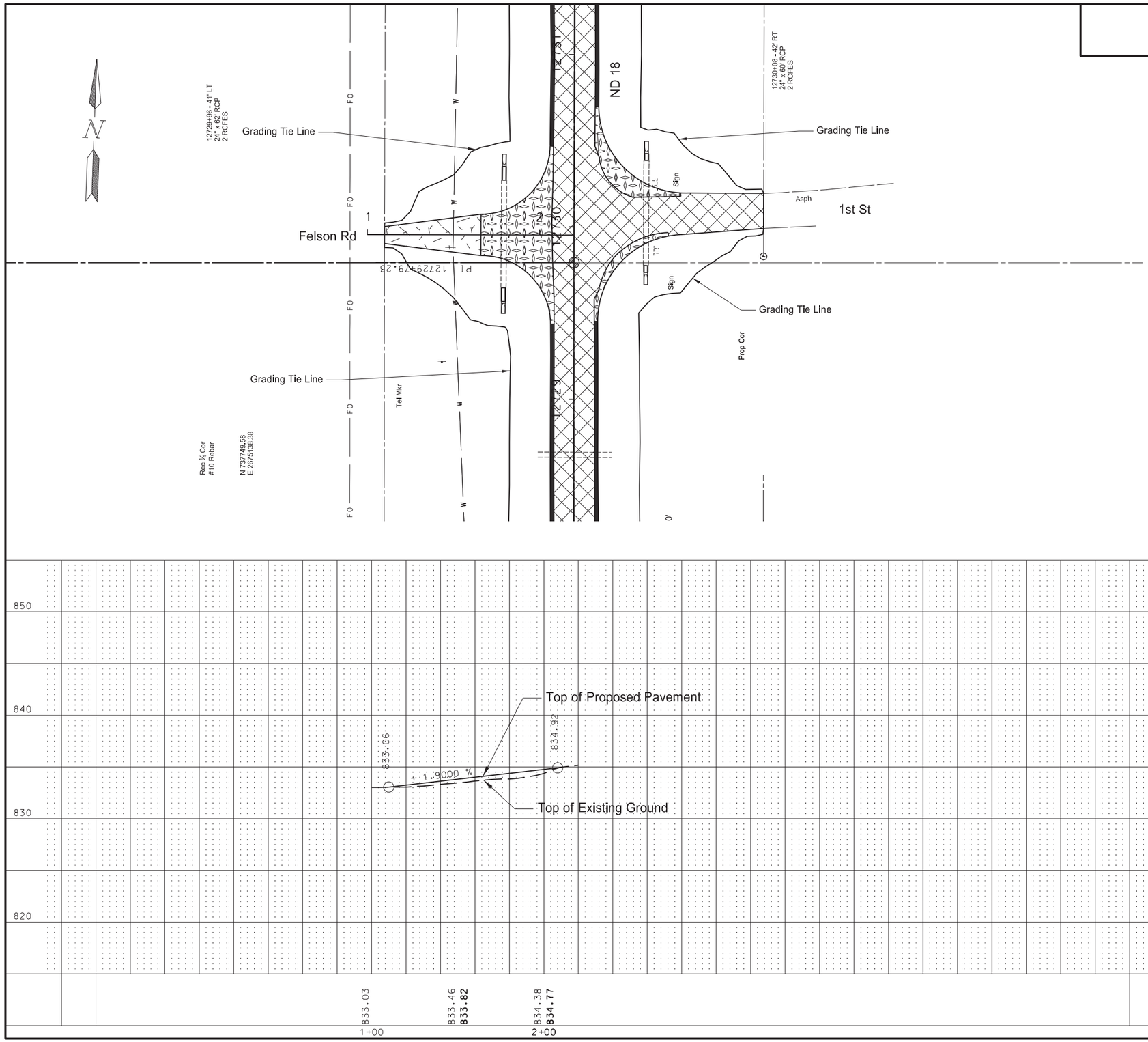
Plan & Profile

W 2nd St

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	60	14



LEGEND

- Bituminous Pavement - 2 Inch
- Bituminous Pavement - 6 Inch
- Bridge ApproachReplacements (See Sheets 30-3 to 30-5)
- 2' Widening
- 6" Salvaged Base Course
- Approach Pavement (See Sheet 20-4)
- Aggregate Surfacing (See Sheet 20-4)
- Approach Topsoil Tie Down Limits

NOTE:
Side Street Quantities
Calculated in Section 20-4
Approach Paving Details

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DATE: 9/4/2024
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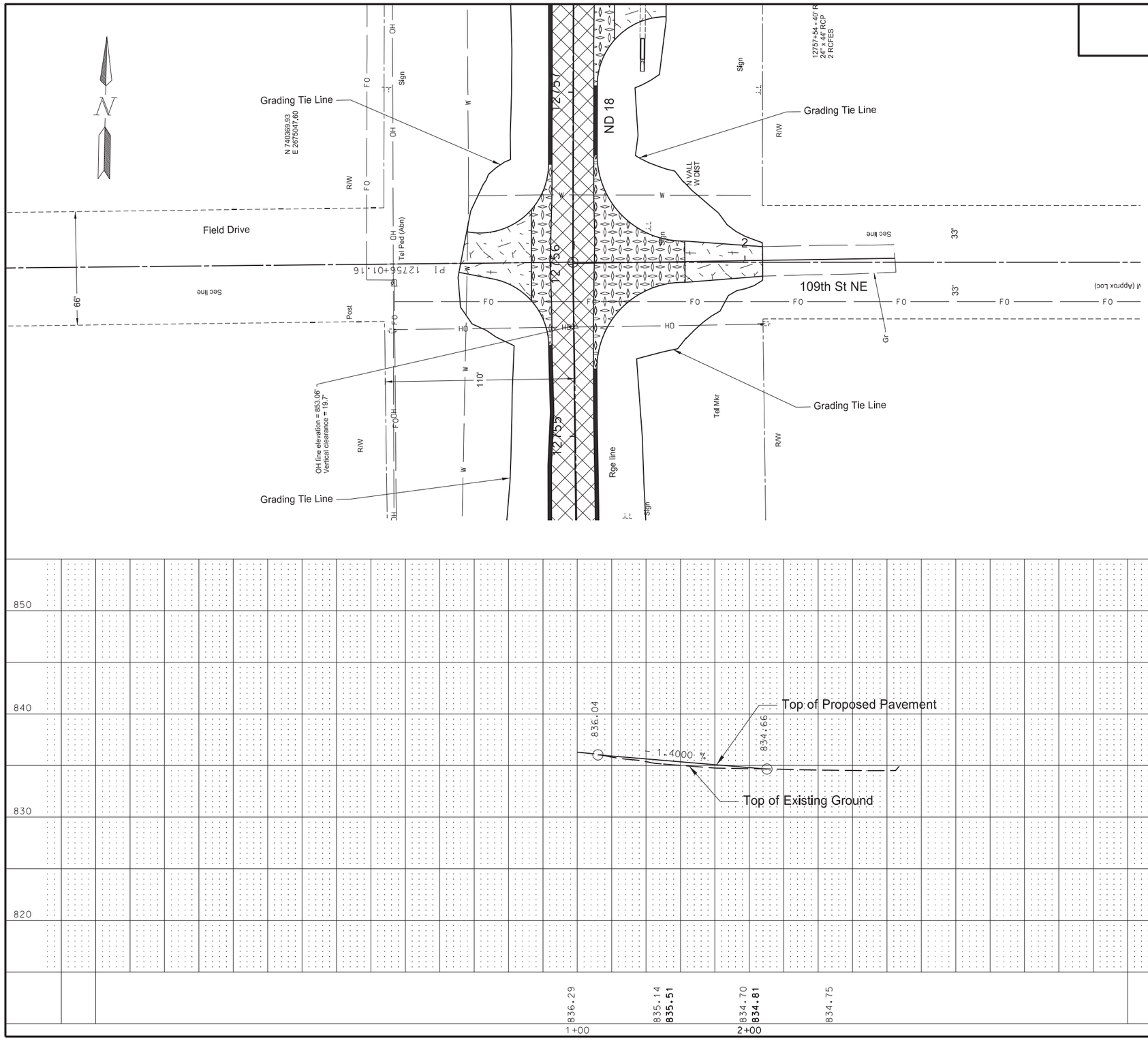
Plan & Profile

Felson Road

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	60	15



LEGEND

- Bituminous Pavement - 2 Inch
- Bituminous Pavement - 6 Inch
- Bridge ApproachReplacements (See Sheets 30-3 to 30-5)
- 2' Widening
- 6" Salvaged Base Course
- Approach Pavement (See Sheet 20-4)
- Aggregate Surfacing (See Sheet 20-4)
- Approach Topsoil Tie Down Limits

NOTE:
Side Street Quantities
Calculated in Section 20-4
Approach Paving Details

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DATE: 9/4/2024
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Plan & Profile

East 109th St NE

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	75	1

Wetland Impact Table

Wetland Number	Location	Wetland Type	Wetland Feature	USACE Jurisdictional Wetlands[1]	Wetland Impact			Wetland Mitigation				
					Wetland Impacts Acre(s)			Mitigation Proposed			USACE/11990 Bank	
					Temp.	Perm. (Fill/Drain)	Perm. (Cut)	EO 11990	USACE	USFWS	Location	Acre(s)
44	Sec. 6, T163N, R53W	Ditch	Artificial	N	0.009	0.000		N	N	N		
45	Sec. 1, T163N, R54W	Ditch	Artificial	N	-	-						
46	Sec. 6, T163N, R53W	Ditch	Artificial	N	0.000	-						
47	Sec. 6, T163N, R53W	Ditch	Artificial	Y	0.110	0.008		N	N	N		
48	Sec. 1, T163N, R54W	Ditch	Artificial	N	0.001	-						
49	Sec. 6, T163N, R53W	Ditch	Artificial	Y	0.042	-						
50a	Sec. 36, T164N, R54W	Ditch	Artificial	Y	0.207	-						
50b	Sec. 36, T164N, R54W	Ditch	Natural	Y	0.027	-						
50c	Sec. 36, T164N, R54W	Ditch	Artificial	Y	0.305	-						
50d	Sec. 31, T164N, R53W	Ditch	Artificial	Y	0.028	0.022		N	Y	N	Kirkeby/Schuster	0.022
50e	Sec. 31, T164N, R53W	Intermittent Stream	Natural	Y	0.013	0.008		Y	Y	N	Kirkeby/Schuster	0.008
50f	Sec. 31, T164N, R53W	Ditch	Artificial	Y	0.139	0.130		N	Y	N	Kirkeby/Schuster	0.130
50g	Sec. 31, T164N, R53W	Ditch	Artificial	Y	0.002	0.001		N	Y	N	Kirkeby/Schuster	0.001
50h	Sec. 31, T164N, R53W	Ditch	Artificial	Y	-	-						
50i	Sec. 36, T164N, R54W	Ditch	Artificial	Y	0.007	-						
50j	Sec. 36, T164N, R54W	Ditch	Natural	Y	-	-						
50k	Sec. 36, T164N, R54W	Ditch	Artificial	Y	-	-						
50l	Sec. 36, T164N, R54W	Ditch	Artificial	Y	0.023	-						
50m	Sec. 31, T164N, R53W	Ditch	Artificial	Y	0.057	0.055		N	Y	N	Kirkeby/Schuster	0.055
50n	Sec. 31, T164N, R53W	Ditch	Artificial	Y	0.089	0.037		N	Y	N	Kirkeby/Schuster	0.037
50o	Sec. 31, T164N, R53W	Ditch	Artificial	Y	0.085	0.059		N	Y	N	Kirkeby/Schuster	0.059
51a	Sec. 25, T164N, R54W	Ditch	Artificial	N	0.038	-						
51b	Sec. 25, T164N, R54W	Ditch	Artificial	N	0.005	-						
52a	Sec. 25, T164N, R54W	Ditch	Artificial	Y	-	-						
52b	Sec. 25, T164N, R54W	Ditch	Artificial	Y	-	-						
52c	Sec. 25, T164N, R54W	Ditch	Artificial	Y	-	-						
				Totals	**1.187**	**0.320**						**0.312**

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Wetlands Mitigation and Environmental

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	75	2

					Impacts to Other Waters						Other Water Mitigation				
					Acres			Linear Feet			Mitigation Proposed			USACE Mitigation Bank	
Number	Location	Type	Feature	USACE Jurisdictional[1]	Temp.	Perm. (Fill/Drain)	Perm. (Cut)	Temp.	Perm. (Fill/Drain)	Perm. (Cut)	EO 11990	USACE	USFWS	Location	Acre(s)
50	Sec.31, T164N, R53W		Natural River	Y	0.000	0.000									
				Totals	**0.000**	**0.000**									**0.000**

[1] A wetland Jurisdictional Determination was re-issued by the USACE on 03/07/2023; NWO-2009-01042-BIS.

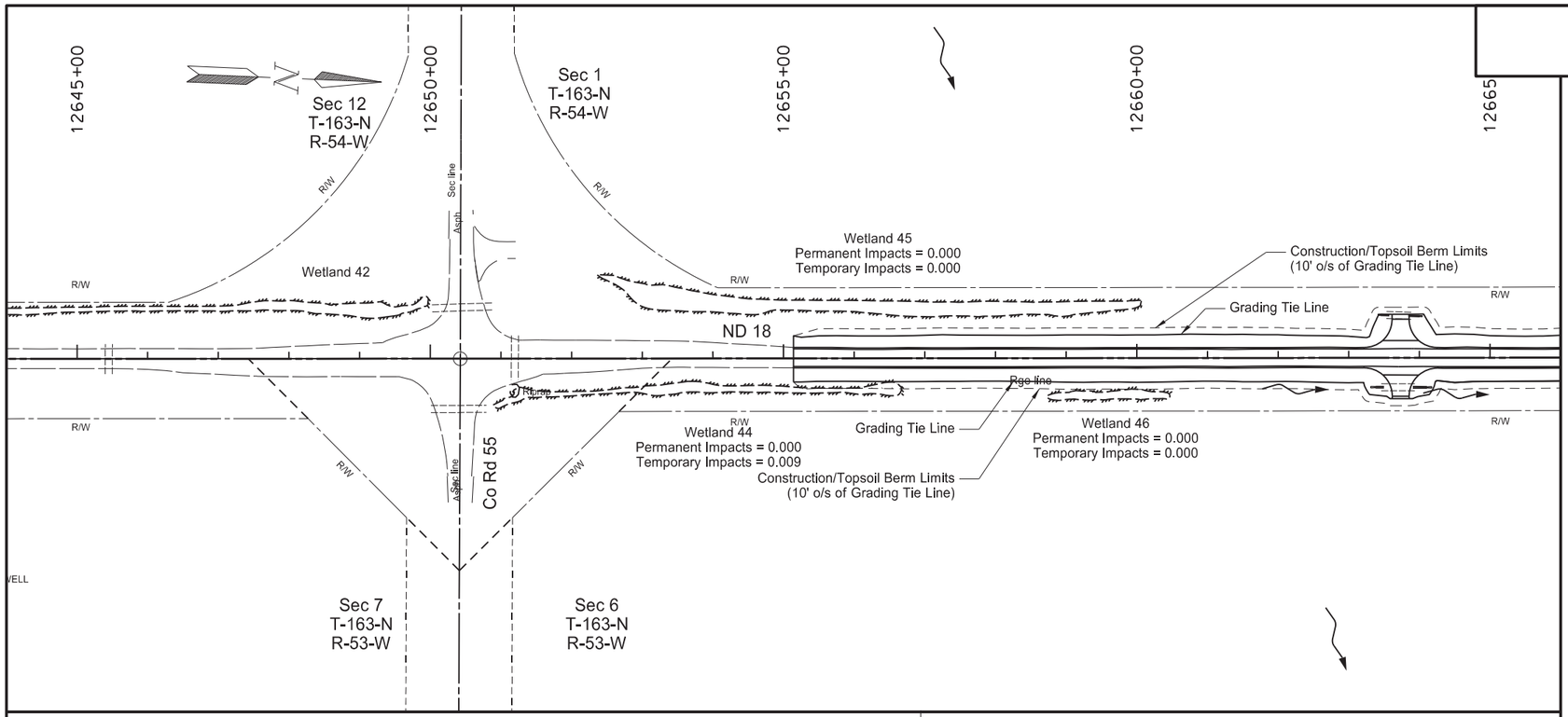
Impact Summary Table			
Permanent Impact Summary		Temporary Impacts and additional information	
Wetland Type	Total Acre(s)	WaterType	Total Acre(s)
Natural/JD (Fill/Drain)	0.008	Temporary Wetland JD	1.134
Natural/Non-JD (Fill/Drain)	-	Non-JD Wetland Temporary	0.053
Artificial/JD (Fill/Drain)	0.312		
Artificial /Non-JD (Fill/Drain))	-	Permanent OW	-
Total	**0.320**	Temporary OW	-
JD Natural (Cut)	-	Permanent OW-d	-
JD Artificial (Cut)	-	Temporary OW-d	-
Non-JD Natural (Cut)	-		
Non-JD Artificial (Cut)	-		
Total	**0.000**		

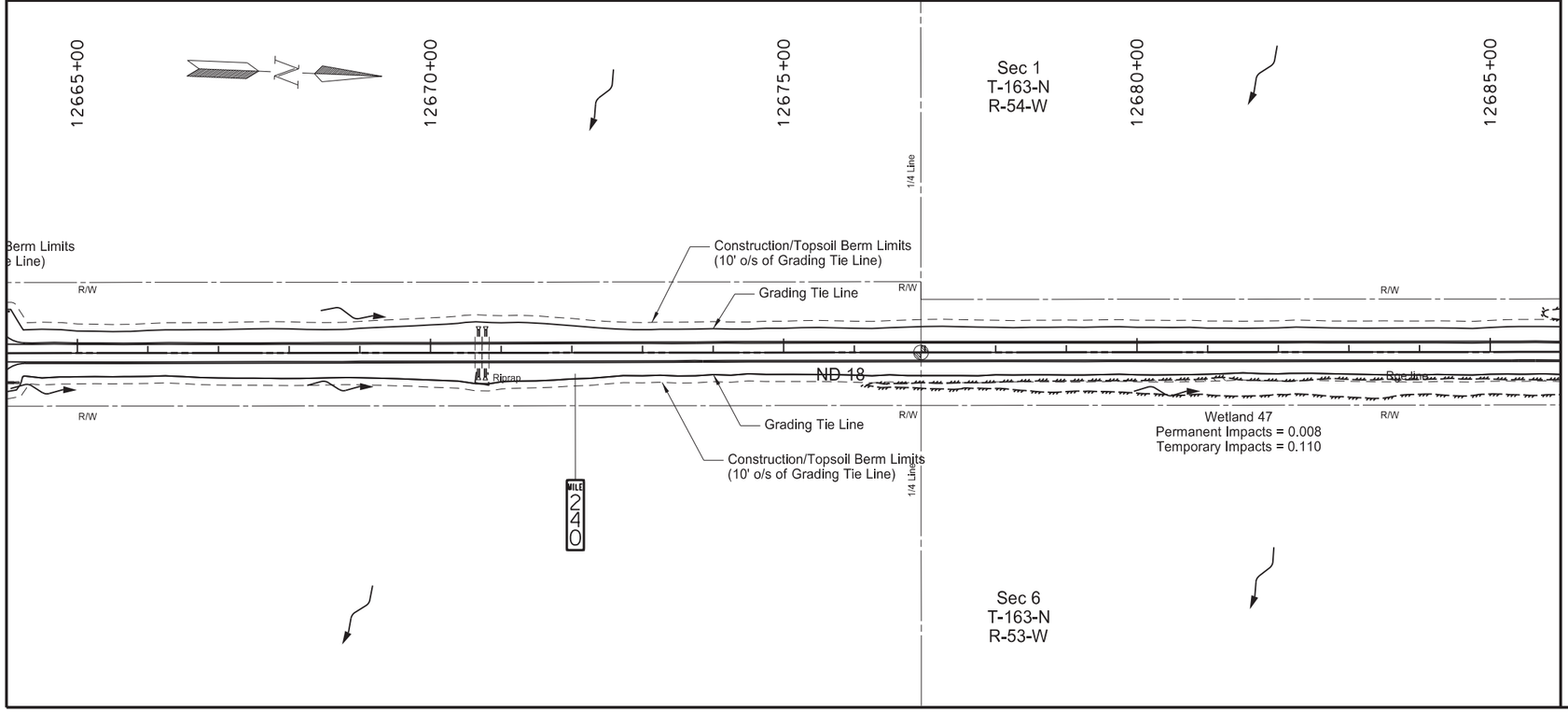
Mitigation Summary Table		
	Location	USACE/11990 Bank Acre(s)
USACE/11990	Kirkeby/Schuster	0.312
	Total	**0.312**

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Wetlands Mitigation and Environmental

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	75	3





LEGEND

Temporary Wetland Impacts (Ac)

Permanent Wetland Impacts (Ac)

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 9/4/2024
NORTH DAKOTA

Wetland Impacts

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

9/4/2024 11:43:15 AM JButler H:\Projects\16000\16455\6018239.081\TechData\Design\Plan\075WL_003.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	75	4

12685+00 12690+00 12695+00 12700+00 12705

Sec 1
T-163-N
R-54-W

108th St NE

Twp line

Gr

0+0

Wetland 48
Permanent Impacts = 0.000
Temporary Impacts = 0.001

R/W

Construction/Topsoil Berm Limits
(10' o/s of Grading Tie Line)

Grading Tie Line

Riprap

ND 18

Wetland 47
Permanent Impacts = 0.008
Temporary Impacts = 0.110

Wetland 49
Permanent Impacts = 0.000
Temporary Impacts = 0.042

5+0

Sec 6
T-163-N
R-53-W

Sec 31
T-164-N
R-53-W

12705+00 12710+00 12715+00 12720+00 12725+00

Sec 36
T-164-N
R-54-W

0+00

5+00

15+00

Wetland 50a
Permanent Impacts = 0.000
Temporary Impacts = 0.207

Wetland 50b
Permanent Impacts = 0.000
Temporary Impacts = 0.027

Wetland 50c
Permanent Impacts = 0.000
Temporary Impacts = 0.305

Wetland 50d
Permanent Impacts = 0.022
Temporary Impacts = 0.028

Wetland 50e
Permanent Impacts = 0.008
Temporary Impacts = 0.013

Wetland 50f
Permanent Impacts = 0.130
Temporary Impacts = 0.139

Wetland 50g
Permanent Impacts = 0.001
Temporary Impacts = 0.002

Wetland 50h
Permanent Impacts = 0.000
Temporary Impacts = 0.000

Wetland 50i
Permanent Impacts = 0.000
Temporary Impacts = 0.007

Wetland 50j
Permanent Impacts = 0.000
Temporary Impacts = 0.000

Wetland 50k
Permanent Impacts = 0.000
Temporary Impacts = 0.000

Wetland 50l
Permanent Impacts = 0.000
Temporary Impacts = 0.023

Wetland 50o
Permanent Impacts = 0.059
Temporary Impacts = 0.085

Wetland 50n
Permanent Impacts = 0.037
Temporary Impacts = 0.089

Snow Fence
Avoidance Area

Asphalt

Rge line

Tree w/multiple trunks

Lg 10-15 tree

Lg/Sm trees

4th St

W 3rd St

W 2nd St

MILE 127

Sec 31
T-164-N
R-53-W

NECHE, ND

LEGEND

Temporary Wetland Impacts (Ac)

Permanent Wetland Impacts (Ac)

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PE-10772
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NORTH DAKOTA

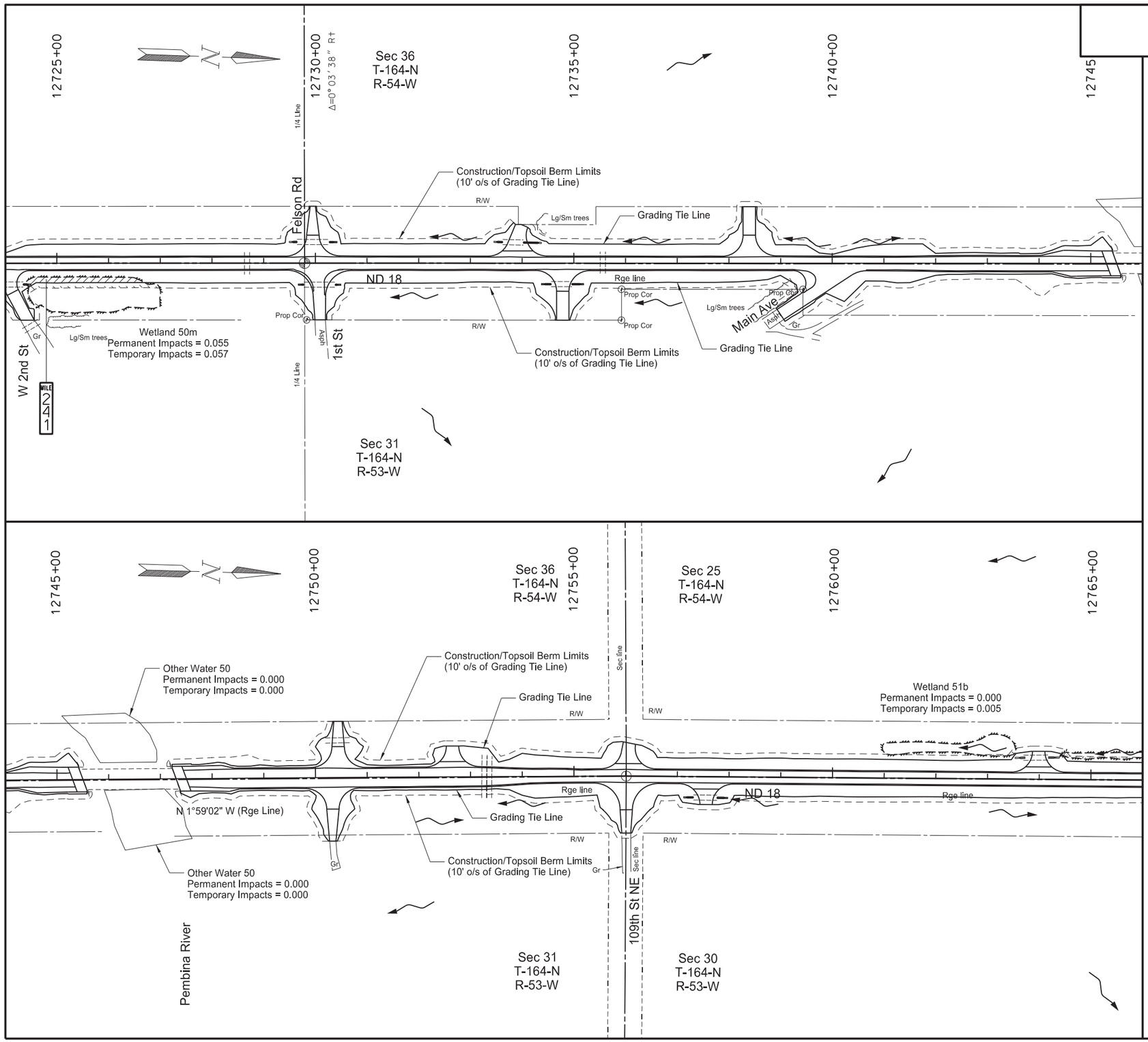
Wetland Impacts

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

9/4/2024 11:43:17 AM JButler H:\Projects\16000\16455\6018239.081\TechData\Design\Plan\075WL_004.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	75	5



LEGEND

Temporary Wetland Impacts (Ac)

Permanent Wetland Impacts (Ac)

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 9/4/2024
NORTH DAKOTA

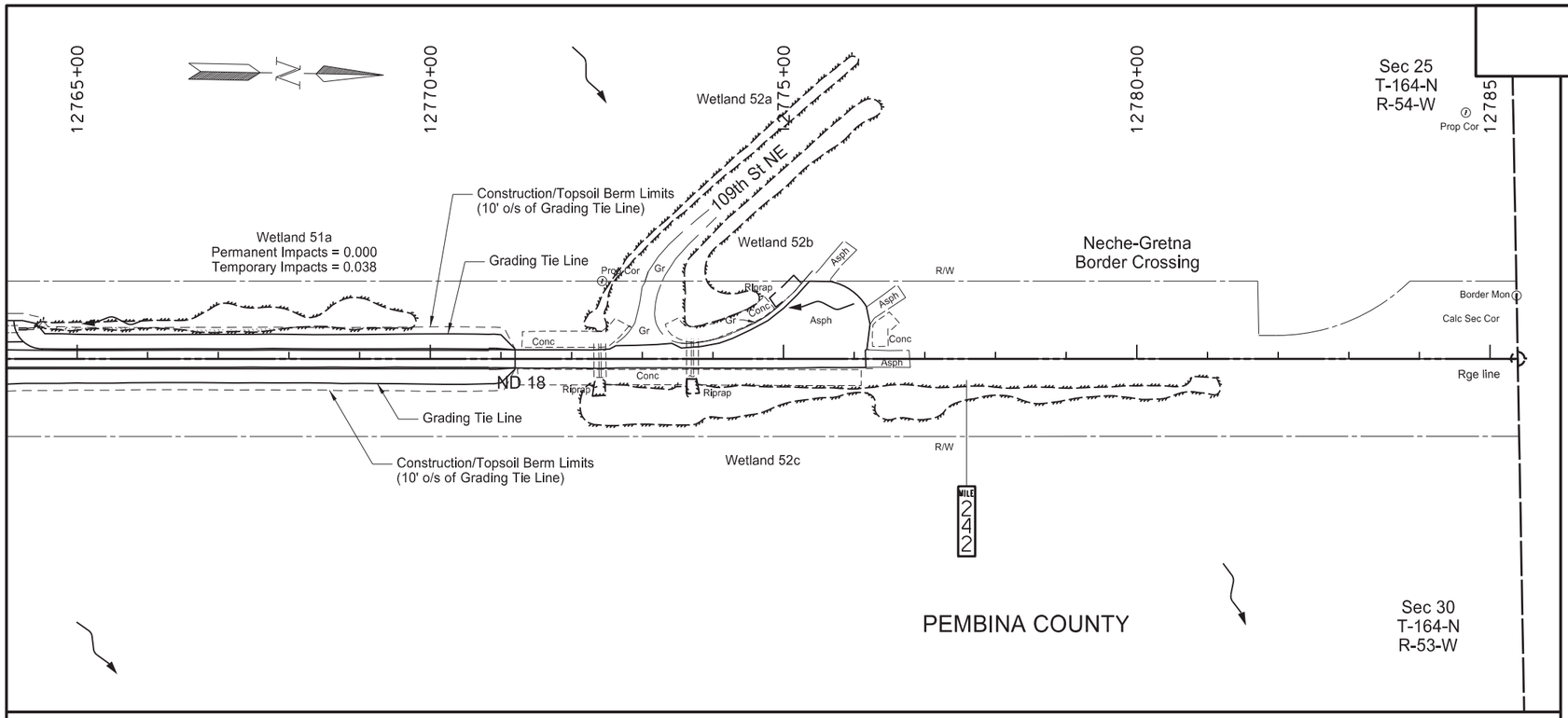
Wetland Impacts

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	75	6



LEGEND

Temporary Wetland Impacts (Ac)

Permanent Wetland Impacts (Ac)

REGISTERED PROFESSIONAL ENGINEER
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DATE: 9/4/2024
NORTH DAKOTA

Wetland Impacts

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(087)240	75	7

Wetland Impact Table

Wetland #	Location	Temporary Impact	Permanent Cut	Total Perm Fill	Acres of Perm Fill in NDDOT ROW	Acres of Perm Fill outside NDDOT ROW
2	T164N R54W Sec 36	0.04	0.04	0.24	0.03	0.21
3	T164N R53W Sec 31	0.03	0.04	0.08	0	0.08
10	T164N R54W Sec 36	0.03	0.02	0	0	0
12	T164N R54W Sec 36	0.02	0.03	0.001	0.001	0
Total		**0.12**	**0.13**	**0.321**	**0.031**	**0.29**

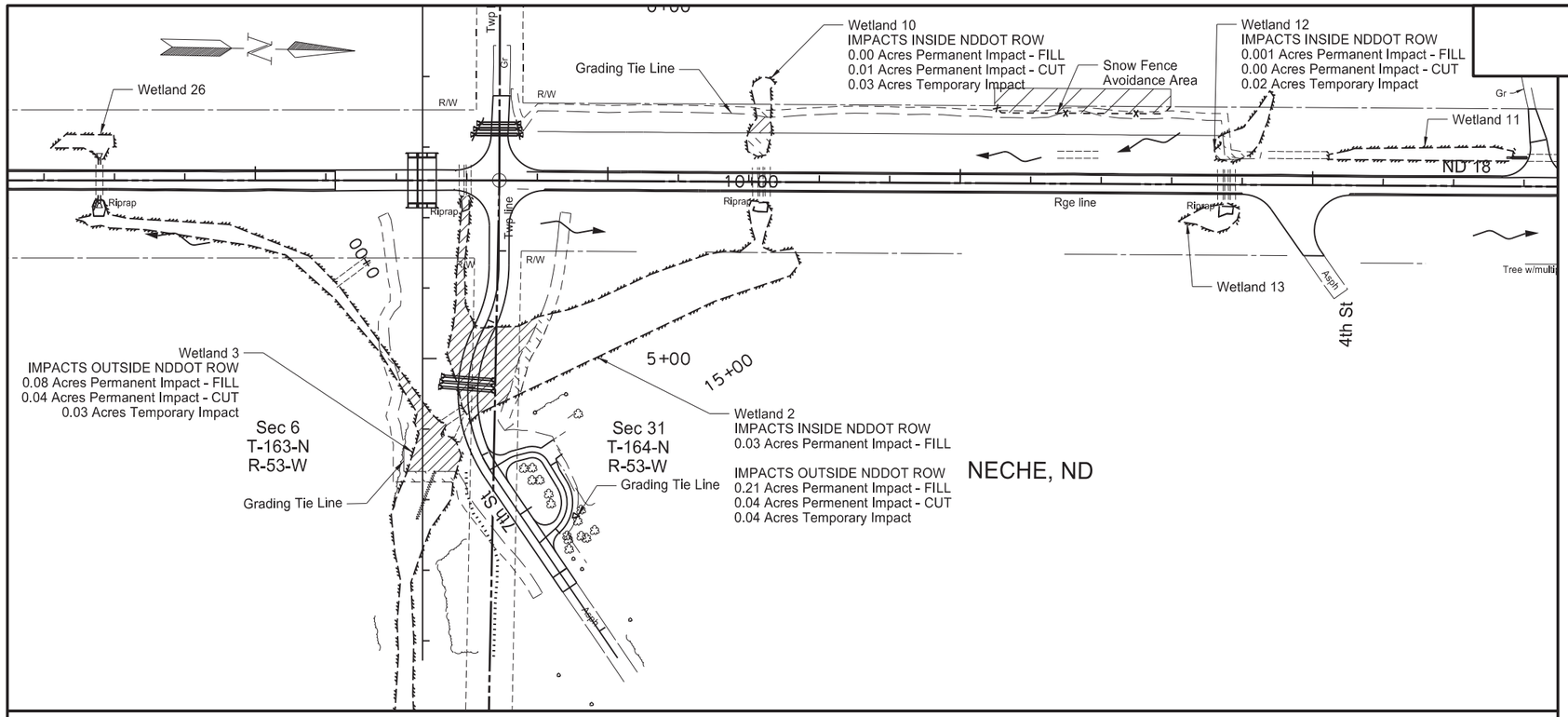
Wetlands assumed jurisdictional for permitting purposes. Permitted under USACE number NWO-2024-00271-BIS

Mitigation Summary	
Ducks Unlimited	0.29
NDDOT Wetland Bank	0.031
Total	**0.321**

REGISTERED PROFESSIONAL ENGINEER
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DATE: 9/4/2024
NORTH DAKOTA

Wetlands Mitigation and Environmental

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(087)240	75	8



LEGEND

Temporary Wetland Impacts (Ac)

Permanent Wetland Impacts (Ac)

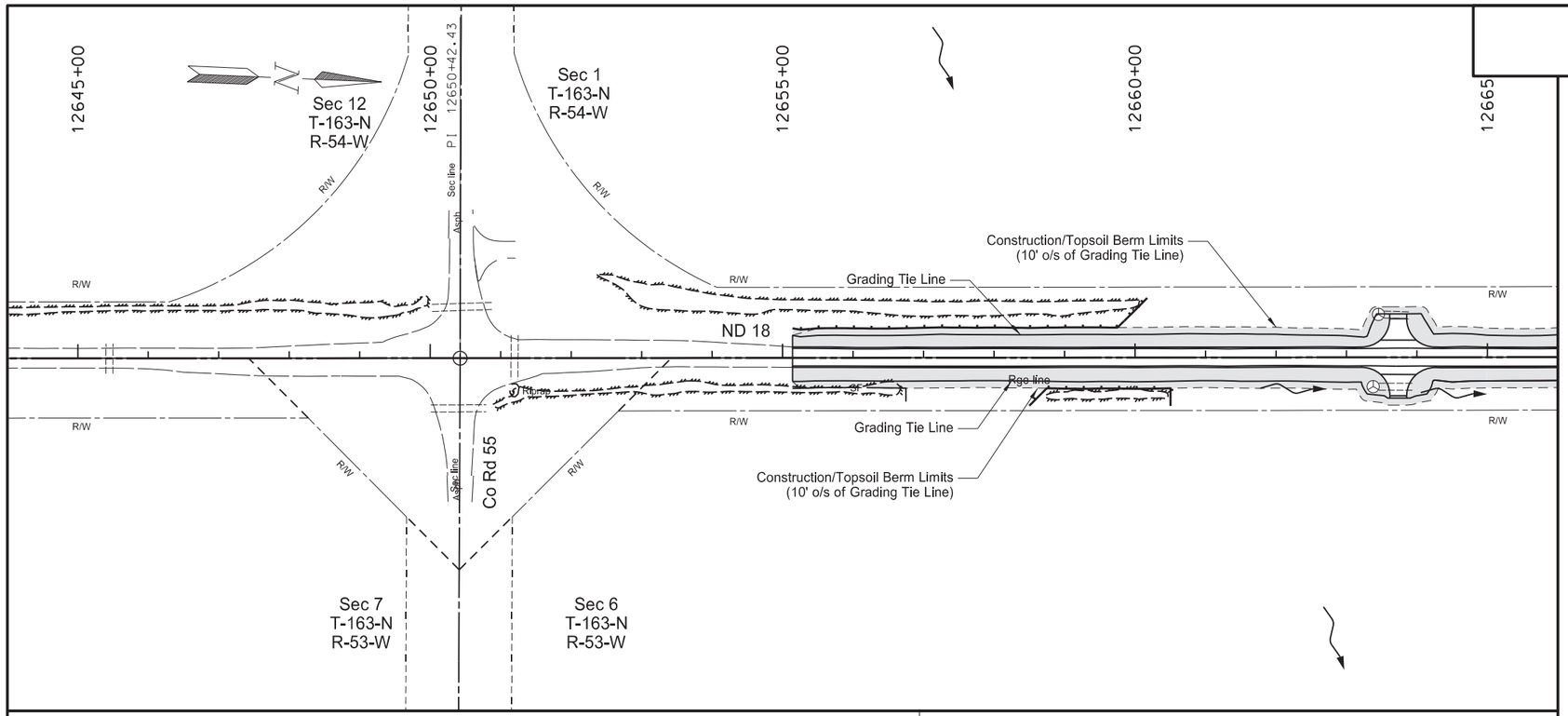
REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
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DATE: 9/4/2024
NORTH DAKOTA

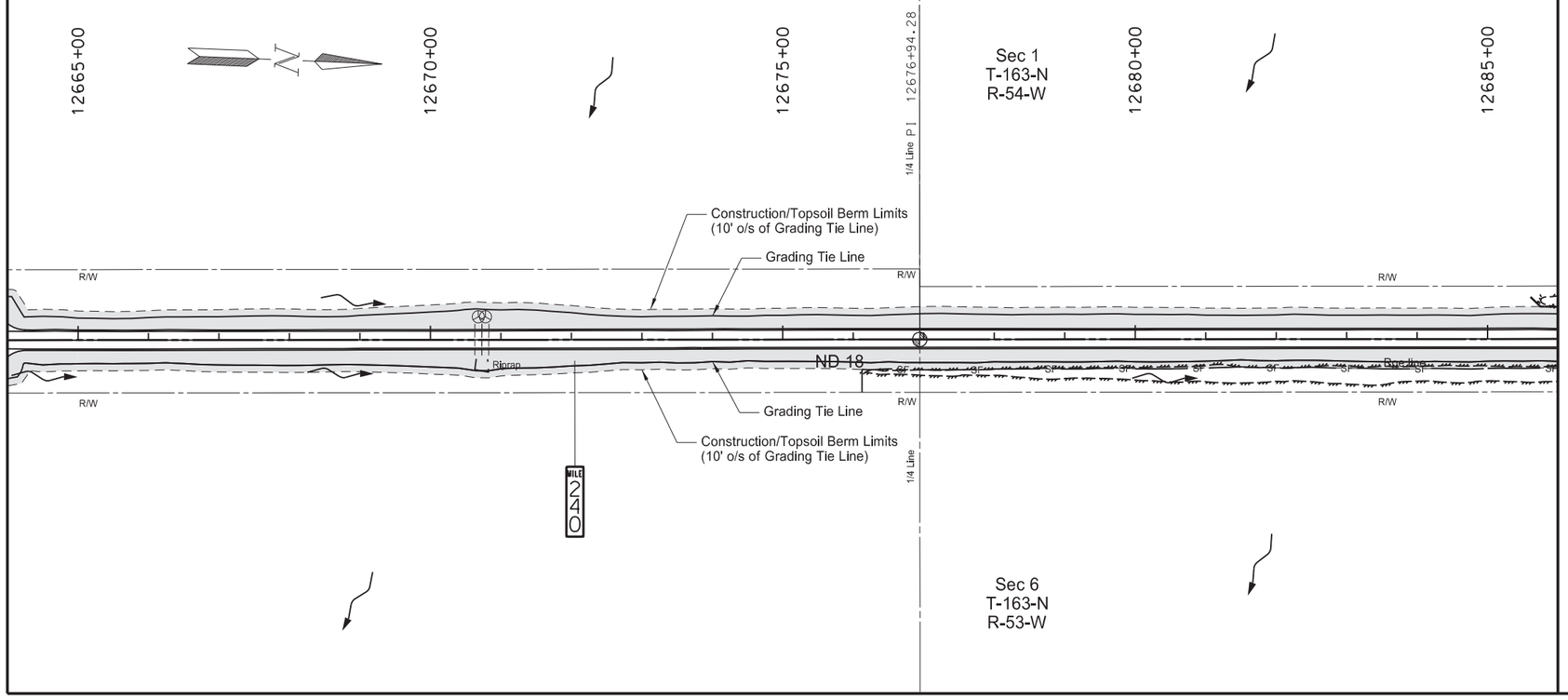
Wetland Impacts

ND 18 Precast Box Culvert

Pembina County 55 to the State Line

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	76	1





Spec	Code	Item Description	QTY	Unit
251	2000	Temporary Cover Crop		
		Sta 12645+00 to Sta 12665+00	1.32	Acre
		Sta 12665+00 to Sta 12685+00	2.76	Acre
253	0101	Straw Mulch		
		Sta 12645+00 to Sta 12665+00	1.32	Acre
		Sta 12665+00 to Sta 12685+00	2.76	Acre
260	0100	Silt Fence Unsupported		
		Sta 12655+14 to Sta 12656+75 RT	186	LF
		Sta 12676+12 to Sta 12685+00 RT	920	LF
260	0101	Remove Silt Fence Unsupported		
		Sta 12655+14 to Sta 12656+75 RT	186	LF
		Sta 12676+12 to Sta 12685+00 RT	920	LF
261	0112	Fiber Rolls 12IN		
		Sta 12655+14 to Sta 12660+17 LT	521	LF
		Sta 12658+50 to Sta 12660+50 RT	235	LF
		4 Culvert Inlets @ 20 LF/EA	80	LF
		Earthen Berm Openings @ 1%	60	LF
261	0113	Remove Fiber Rolls 12IN		
		Sta 12655+14 to Sta 12660+17 LT	521	LF
		Sta 12658+50 to Sta 12660+50 RT	235	LF
		4 Culvert Inlets @ 20 LF/EA	80	LF
		Earthen Berm Openings @ 1%	60	LF

LEGEND

- Temporary Cover Crop & Straw Mulch
- SF — Silt Fence Unsupported
- Fiber Roll
- Culvert Inlet Protection

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 9/4/2024
NORTH DAKOTA

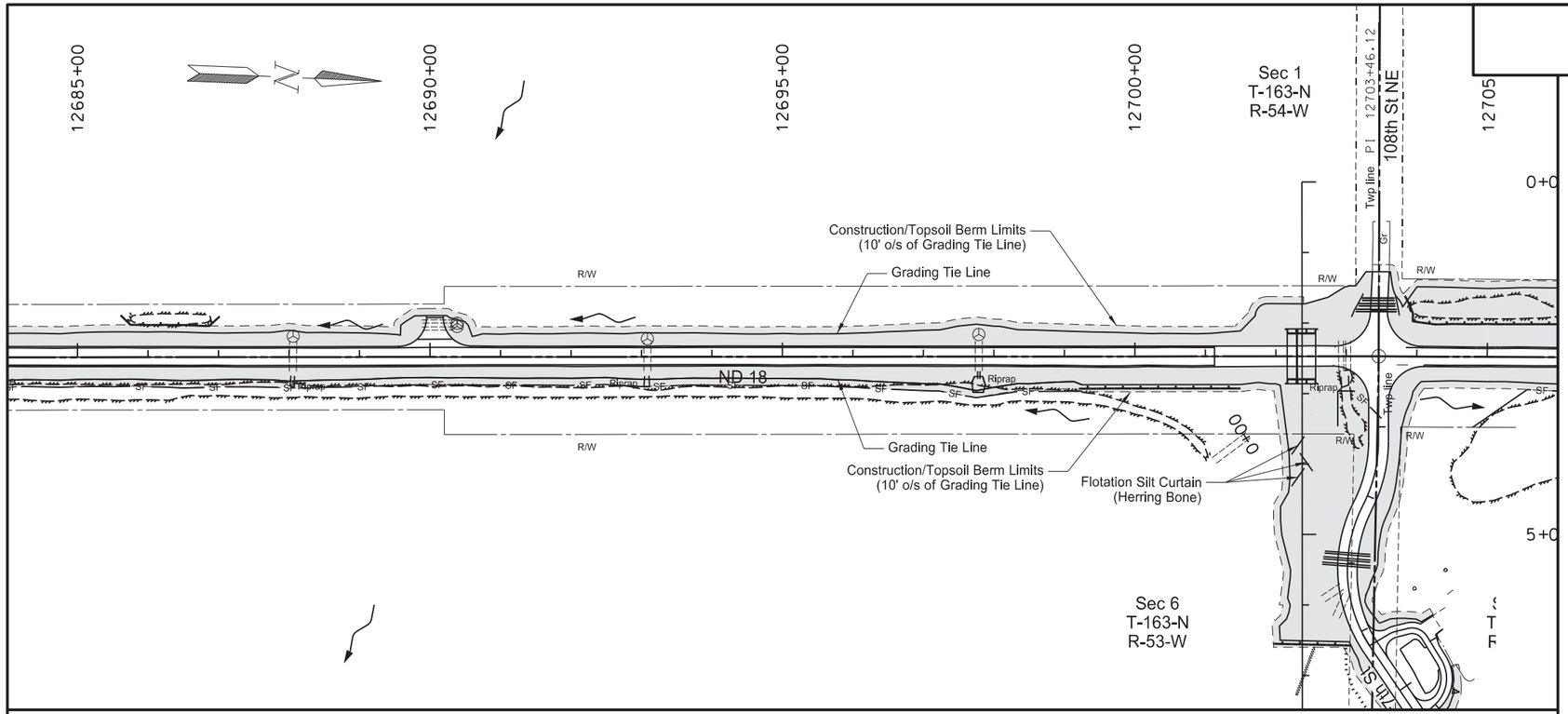
Temporary Erosion Control

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	76	2



251	2000	Temporary Cover Crop		
		Sta 12685+00 to Sta 12705+00	4.40	Acre
		Sta 12705+00 to Sta 12725+00	4.36	Acre
253	0101	Straw Mulch		
		Sta 12685+00 to Sta 12705+00	4.40	Acre
		Sta 12705+00 to Sta 12725+00	4.36	Acre
260	0100	Silt Fence Unsupported		
		Sta 12685+00 to Sta 12699+25 RT	1427	LF
		Sta 12702+88 to Sta 12703+50 RT	128	LF
		Sta 12704+80 to Sta 12705+00 RT	24	LF
		Sta 12705+00 to Sta 12714+58 RT	1004	LF
		Sta 12713+61 to Sta 12714+51 LT	95	LF
		Sta 12715+03 to Sta 12717+07 LT	210	LF
		Sta 12715+24 to Sta 12719+25 RT	479	LF
		Sta 12719+93 to Sta 12723+81 RT	486	LF
		Sta 12724+66 to Sta 12725+00 RT	119	LF
260	0101	Remove Silt Fence Unsupported		
		Sta 12685+00 to Sta 12699+25 RT	1427	LF
		Sta 12702+88 to Sta 12703+50 RT	128	LF
		Sta 12704+80 to Sta 12705+00 RT	24	LF
		Sta 12705+00 to Sta 12714+58 RT	1004	LF
		Sta 12713+61 to Sta 12714+51 LT	95	LF
		Sta 12715+03 to Sta 12717+07 LT	210	LF
		Sta 12715+24 to Sta 12719+25 RT	479	LF
		Sta 12719+93 to Sta 12723+81 RT	486	LF
		Sta 12724+66 to Sta 12725+00 RT	119	LF
261	0112	Fiber Rolls 12IN		
		Sta 12685+61 to Sta 12687+02 LT	152	LF
		Sta 12699+20 to Sta 12701+50 RT	230	LF
		Sta 12701+97 to Sta 12703+07 RT	110	LF
		Sta 12703+83 to Sta 12705+00 LT	145	LF
		Sta 12705+00 to Sta 12711+54 LT	663	LF
		15 Culvert Inlets @ 20 LF/EA	300	LF
		Earthen Berm Openings @ 1%	80	LF
261	0113	Remove Fiber Rolls 12IN		
		Sta 12685+61 to Sta 12687+02 LT	152	LF
		Sta 12699+20 to Sta 12701+50 RT	230	LF
		Sta 12703+83 to Sta 12705+00 LT	145	LF
		Sta 12705+00 to Sta 12711+54 LT	663	LF
		15 Culvert Inlets @ 20 LF/EA	300	LF
		Earthen Berm Openings @ 1%	80	LF
262	0100	Flotation Silt Curtain (Herring Bone)		
		Sta 3+61 to Sta 3+87 LT	32	LF
		Sta 3+85 to Sta 4+11 RT	32	LF
		Sta 4+06 to Sta 4+32 LT	32	LF
262	0101	Remove Flotation Silt Curtain(Herring Bone)		
		Sta 3+61 to Sta 3+87 LT	32	LF
		Sta 3+85 to Sta 4+11 RT	32	LF
		Sta 4+06 to Sta 4+32 LT	32	LF

LEGEND

- Temporary Cover Crop & Straw Mulch
- SF — Silt Fence Unsupported
- Fiber Roll
- Culvert Inlet Protection

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 9/4/2024
NORTH DAKOTA

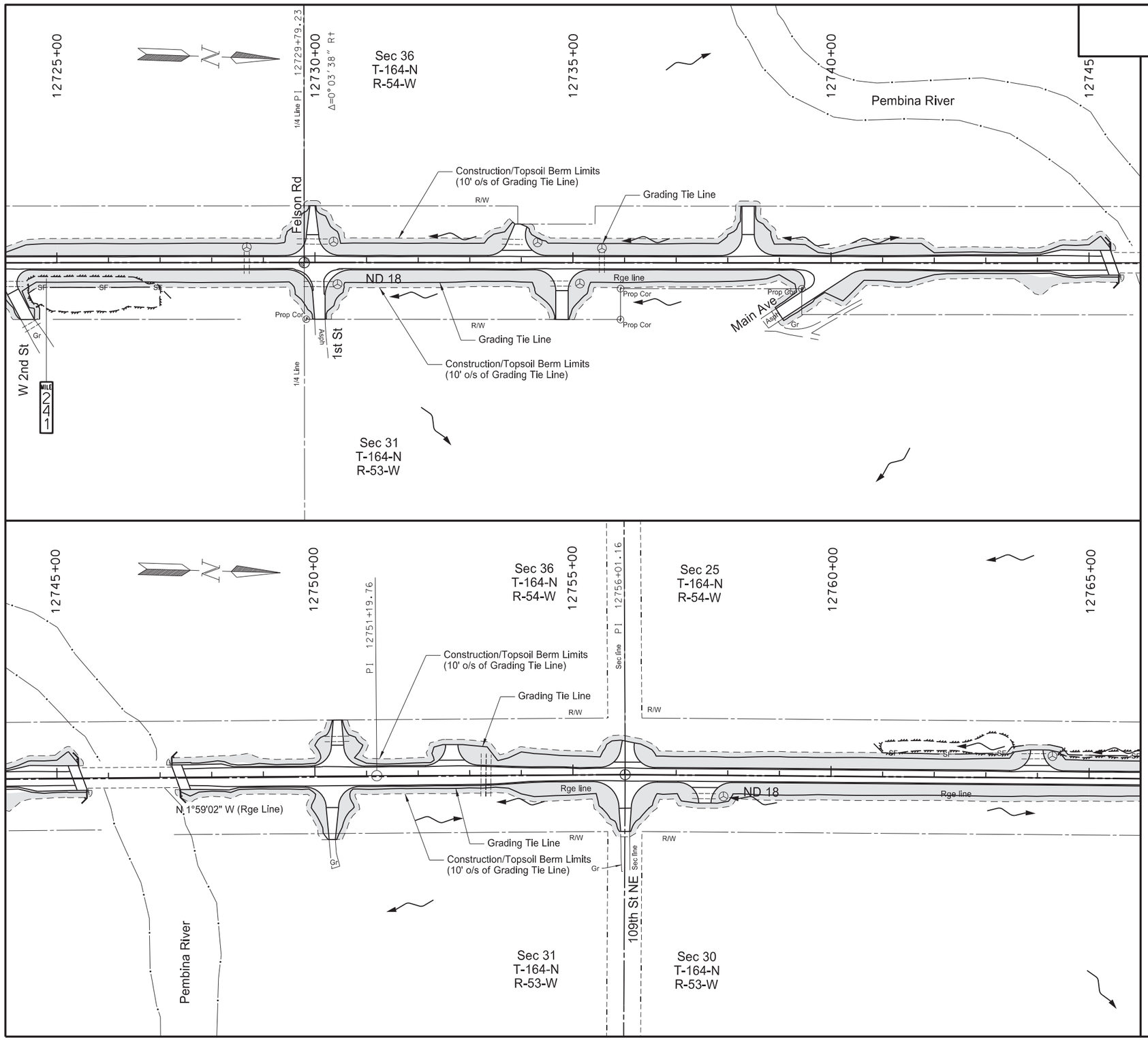
Temporary Erosion Control

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	76	3

Spec	Code	Item Description	QTY	Unit
251	2000	Temporary Cover Crop		
		Sta 12725+00 to Sta 12745+00	3.04	Acre
		Sta 12745+00 to Sta 12765+00	2.50	Acre
253	0101	Straw Mulch		
		Sta 12725+00 to Sta 12745+00	3.04	Acre
		Sta 12745+00 to Sta 12765+00	2.50	Acre
260	0100	Silt Fence Unsupported		
		Sta 12725+00 to Sta 12727+21 RT	230	LF
		Sta 12760+82 to Sta 12763+73 LT	304	LF
		Sta 12764+19 to Sta 12765+00 LT	88	LF
260	0101	Remove Silt Fence Unsupported		
		Sta 12725+00 to Sta 12727+21 RT	230	LF
		Sta 12760+82 to Sta 12763+73 LT	304	LF
		Sta 12764+19 to Sta 12765+00 LT	88	LF
261	0112	Fiber Rolls 12IN		
		Sta 12745+31 to Sta 12745+42 LT	30	LF
		Sta 12745+47 to Sta 12745+58 RT	30	LF
		Sta 12747+23 to Sta 12747+33 LT	30	LF
		Sta 12747+39 to Sta 12747+50 RT	30	LF
		8 Culvert Inlets @ 20 LF/EA	160	LF
		Earthen Berm Openings @ 1%	80	LF
261	0113	Remove Fiber Rolls 12IN		
		Sta 12745+31 to Sta 12745+42 LT	30	LF
		Sta 12745+47 to Sta 12745+58 RT	30	LF
		Sta 12747+23 to Sta 12747+33 LT	30	LF
		Sta 12747+39 to Sta 12747+50 RT	30	LF
		8 Culvert Inlets @ 20 LF/EA	160	LF
		Earthen Berm Openings @ 1%	80	LF



LEGEND

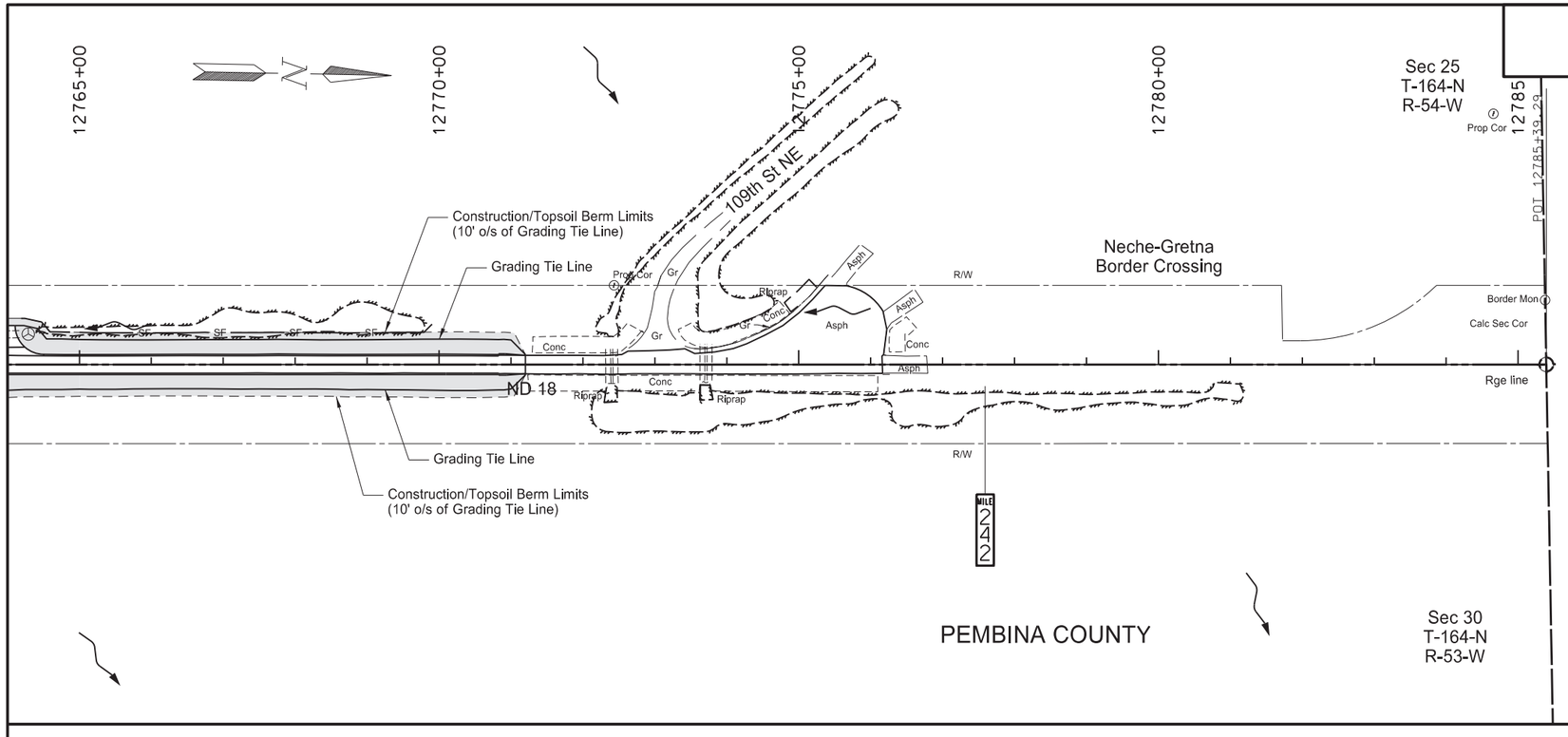
- Temporary Cover Crop & Straw Mulch
- SF — Silt Fence Unsupported
- Fiber Roll
- Culvert Inlet Protection

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 9/4/2024
NORTH DAKOTA

Temporary Erosion Control

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	76	4

Spec	Code	Item Description	QTY	Unit
251	2000	Temporary Cover Crop		
		Sta 12765+00 to Sta 12776+16	0.86	Acre
253	0101	Straw Mulch		
		Sta 12765+00 to Sta 12776+16	0.86	Acre
260	0100	Silt Fence Unsupported		
		Sta 12765+00 to Sta 12769+90 LT	504	LF
260	0101	Remove Silt Fence Unsupported		
		Sta 12765+00 to Sta 12769+90 LT	504	LF
261	0112	Fiber Rolls 12IN		
		Earthen Berm Openings @ 1%	34	LF
261	0113	Remove Fiber Rolls 12IN		
		Earthen Berm Openings @ 1%	34	LF

LEGEND

- Temporary Cover Crop & Straw Mulch
- SF — Silt Fence Unsupported
- Fiber Roll
- Culvert Inlet Protection

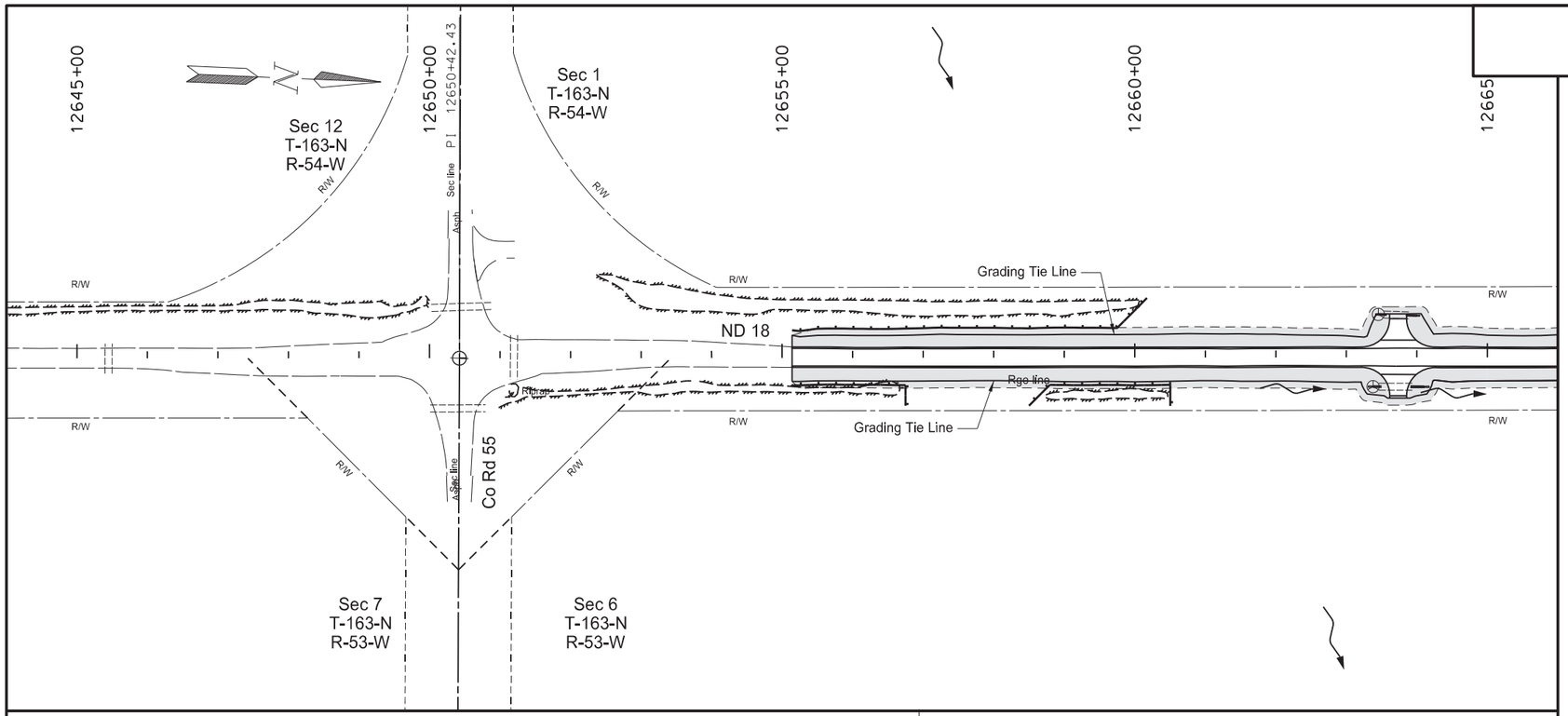
REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 9/4/2024
NORTH DAKOTA

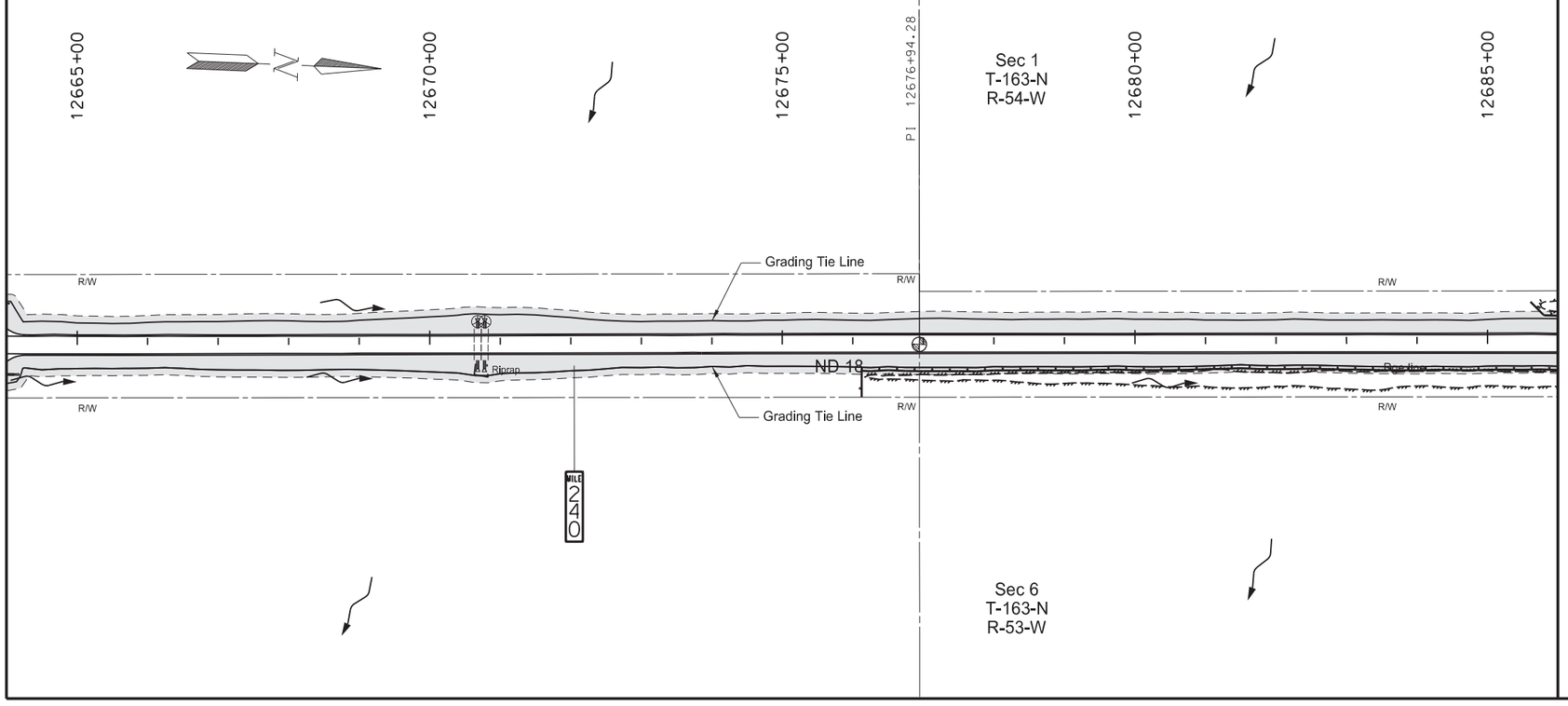
Temporary Erosion Control

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	77	1





Spec	Code	Item Description	QTY	Unit
251	0200	Seeding Class II		
		Sta 12645+00 to Sta 12665+00	1.33	Acre
		Sta 12665+00 to Sta 12685+00	2.76	Acre
253	0101	Straw Mulch		
		Sta 12645+00 to Sta 12665+00	1.33	Acre
		Sta 12665+00 to Sta 12685+00	2.76	Acre
261	0112	Fiber Rolls 12IN		
		Sta 12655+14 to Sta 12656+75 RT	190	LF
		Sta 12655+14 to Sta 12660+17 LT	521	LF
		Sta 12658+50 to Sta 12660+50 RT	243	LF
		Sta 12676+12 to Sta 12685+00 RT	925	LF
		4 Culvert Inlets @ 20 LF/EA	80	LF

LEGEND

- Seeding Class II & Straw Mulch
- Fiber Roll
- Culvert Inlet Protection

REGISTERED PROFESSIONAL ENGINEER
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PE-10772
DATE: 9/4/2024
NORTH DAKOTA

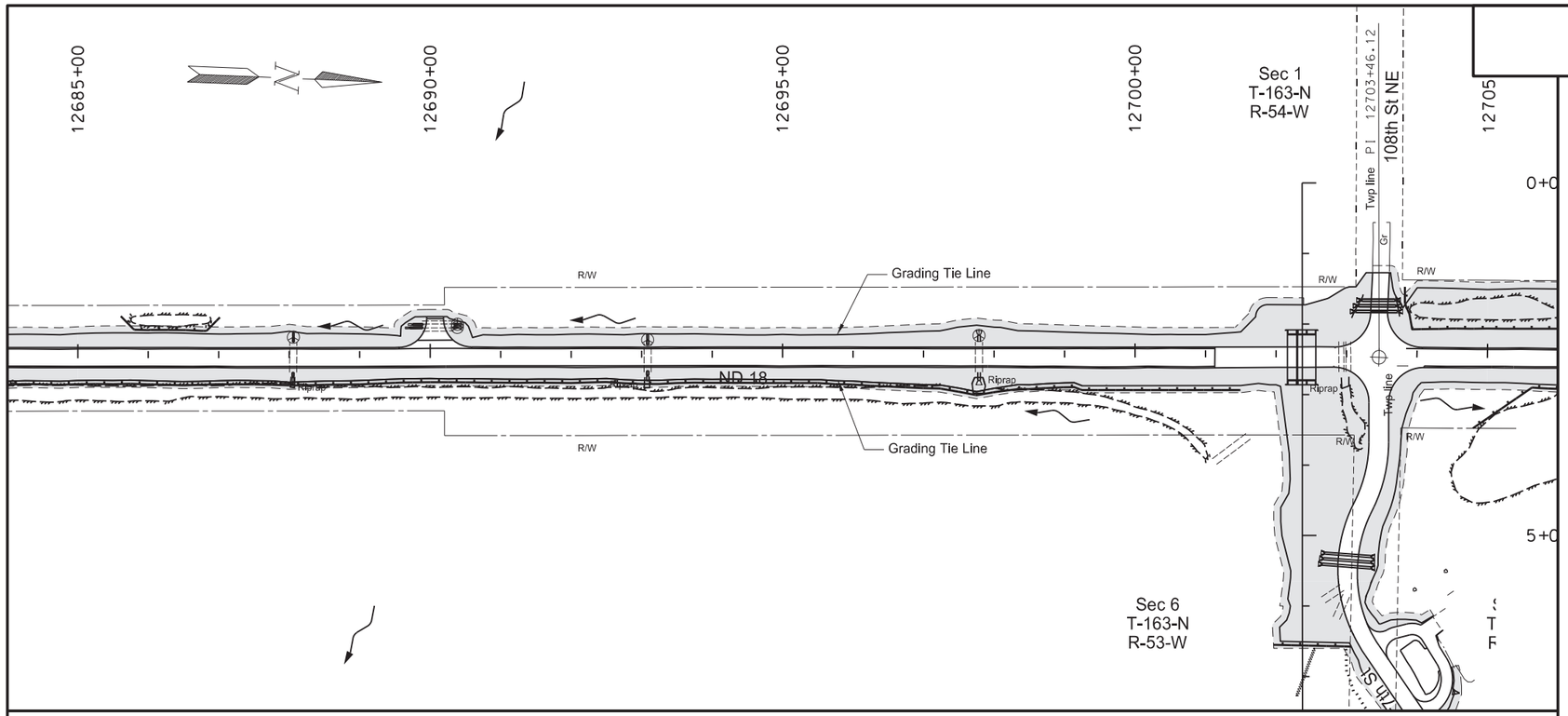
Permanent Erosion Control

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	77	2



Spec	Code	Item Description	QTY	Unit
251	0200	Seeding Class II		
		Sta 12685+00 to Sta 12705+00	4.30	Acre
		Sta 12705+00 to Sta 12725+00	4.36	Acre
253	0101	Straw Mulch		
		Sta 12685+00 to Sta 12705+00	4.30	Acre
		Sta 12705+00 to Sta 12725+00	4.36	Acre
261	0112	Fiber Rolls 12IN		
		Sta 12685+00 to Sta 12700+89 RT	1665	LF
		Sta 12685+61 to Sta 12687+02 LT	157	LF
		Sta 12701+97 to Sta 12703+07 RT	110	LF
		Sta 12703+82 to Sta 12705+00 LT	169	LF
		Sta 12704+80 to Sta 12705+00 RT	24	LF
		Sta 12705+00 to Sta 12714+58 RT	1008	LF
		Sta 12705+00 to Sta 12711+57 LT	666	LF
		Sta 12713+51 to Sta 12714+51 LT	107	LF
		Sta 12715+03 to Sta 12717+12 LT	216	LF
		Sta 12715+19 to Sta 12719+26 RT	495	LF
		Sta 12719+88 to Sta 12723+81 RT	506	LF
		Sta 12724+61 to Sta 12725+00 RT	104	LF
		15 Culvert Inlets @ 20 LF/EA	300	LF

LEGEND

- Seeding Class II & Straw Mulch
- Fiber Roll
- Culvert Inlet Protection

REGISTERED PROFESSIONAL ENGINEER
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PE-10772
DATE: 9/4/2024
NORTH DAKOTA

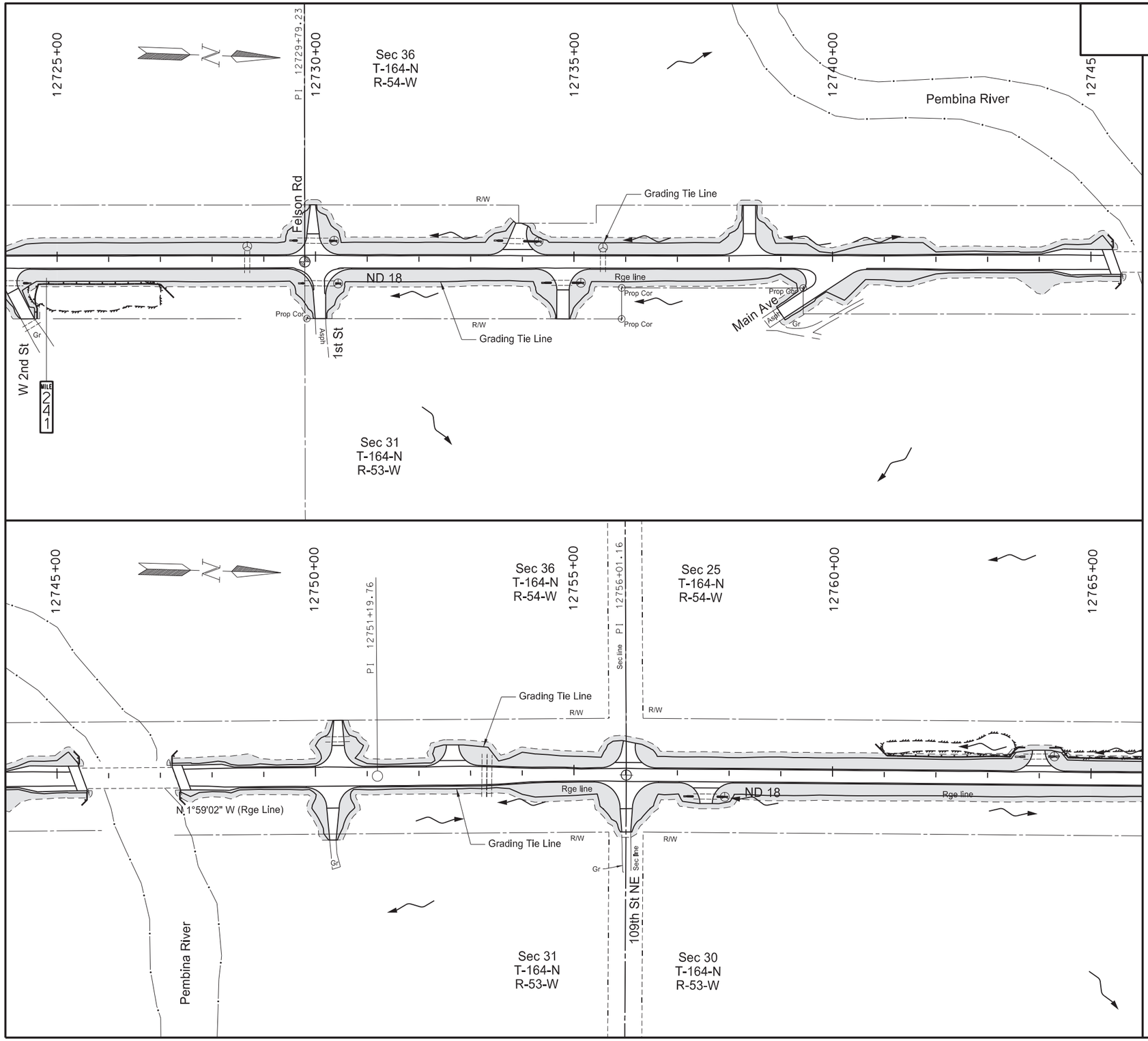
Permanent Erosion Control

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	77	3



Spec	Code	Item Description	QTY	Unit
251	0200	Seeding Class II		
		Sta 12725+00 to Sta 12745+00	3.05	Acre
		Sta 12745+00 to Sta 12765+00	2.50	Acre
253	0101	Straw Mulch		
		Sta 12725+00 to Sta 12745+00	3.05	Acre
		Sta 12745+00 to Sta 12765+00	2.50	Acre
261	0112	Fiber Rolls 12IN		
		Sta 12725+00 to Sta 12727+26 RT	237	LF
		Sta 12745+32 to Sta 12745+43 LT	30	LF
		Sta 12745+47 to Sta 12745+58 RT	30	LF
		Sta 12747+23 to Sta 12747+33 LT	30	LF
		Sta 12747+37 to Sta 12747+48 RT	30	LF
		Sta 12760+82 to Sta 12763+73 LT	308	LF
		Sta 12764+19 to Sta 12765+00 LT	90	LF
		8 Culvert Inlets @ 20 LF/EA	160	LF

LEGEND

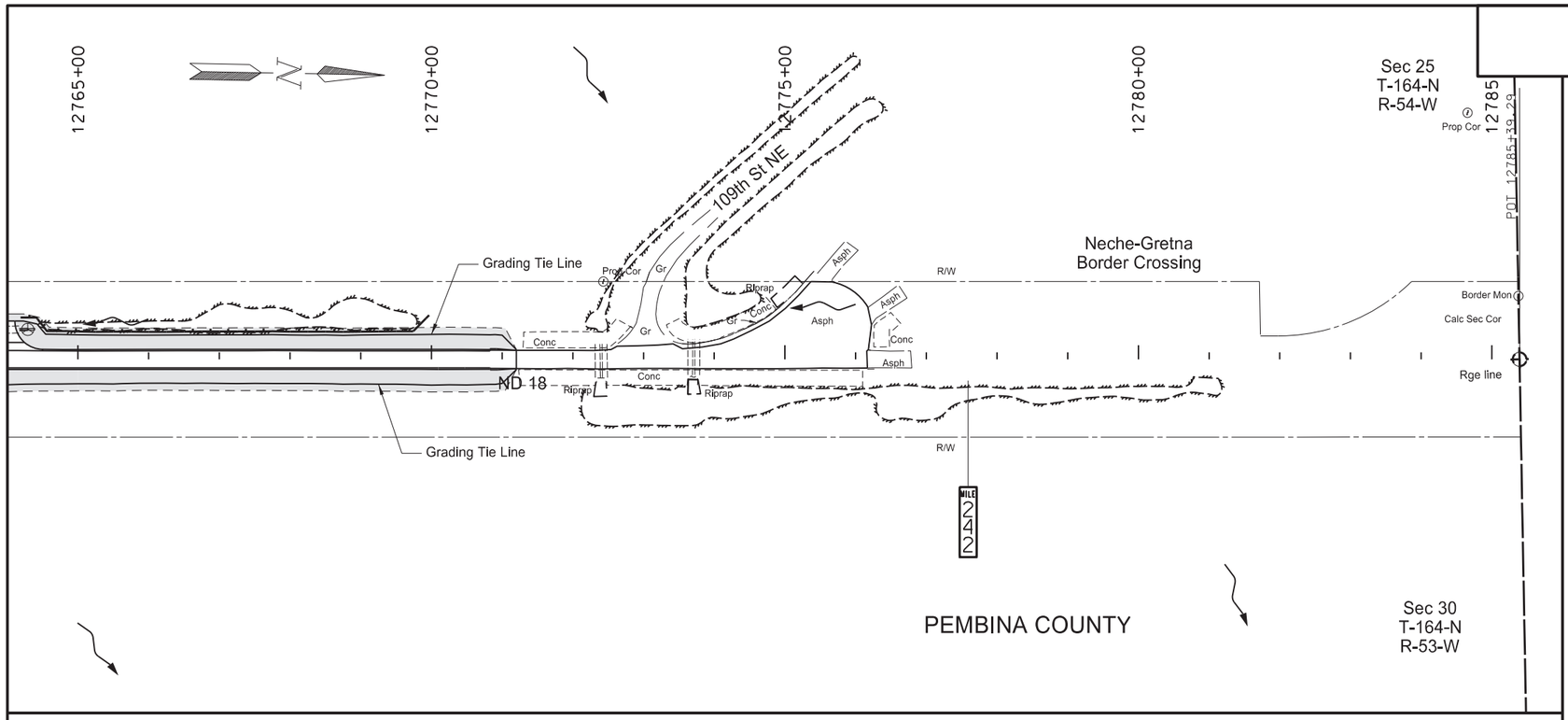
- Seeding Class II & Straw Mulch
- Fiber Roll
- Culvert Inlet Protection

REGISTERED PROFESSIONAL ENGINEER
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DATE: 9/4/2024
NORTH DAKOTA

Permanent Erosion Control

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	77	4

Spec	Code	Item Description	QTY	Unit
251	0200	Seeding Class II		
		Sta 12765+00 to Sta 12776+16	0.86	Acre
253	0101	Straw Mulch		
		Sta 12765+00 to Sta 12776+16	0.86	Acre
261	0112	Fiber Rolls 12IN		
		Sta 12765+00 to Sta 12769+97 LT	506	LF

LEGEND

Seeding Class II & Straw Mulch

Fiber Roll

Culvert Inlet Protection

REGISTERED PROFESSIONAL ENGINEER
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DATE: 9/4/2024
NORTH DAKOTA

Permanent Erosion Control

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

PRELIMINARY SURVEY COORDINATE AND CURVE DATA - ND 18, E JCT 5 N TO STATE LINE

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	81	1

HORIZONTAL ALIGNMENT

PNT	STATION	NORTHING	EASTING
Station Equation ND 18(SCL 18) at ND 5(SCL 5)			
ND 5 Rec Sec Cor	16747+36.80	671880.30	2677800.50
ND 18 Rec Sec Cor	12070+55.52	671880.30	2677800.50
ND 18 (Chain: SCL18)			
BEG (Rec Sec Cor)	12070+55.52	671880.30	2677800.50
PI (Rec Sec Cor)	12123+27.28	677148.93	2677618.88
PI (Rec 1/4 Cor)	12149+60.53	679780.72	2677531.13
PI (Rec Sec Cor)	12175+93.79	682412.51	2677443.38
PI (Rec 1/4 Cor)	12202+31.69	685049.00	2677357.11
PI (Rec Sec Cor)	12228+69.58	687685.49	2677270.83
PI (Rec 1/4 Cor)	12255+00.31	690314.19	2677167.90
PI (Rec Sec Cor)	12281+31.03	692942.90	2677064.96
PI (Rec 1/4 Cor)	12307+78.49	695587.49	2676941.72
PI (Rec Sec Cor)	12334+25.75	698231.87	2676818.17
PI (Rec 1/4 Cor)	12360+30.96	700834.89	2676711.42
PI (Rec Sec Cor)	12386+36.10	703437.84	2676604.69
PI (Rec 1/4 Cor)	12412+68.99	706068.10	2676486.95
PI (Rec Sec Cor)	12439+01.97	708698.47	2676369.72
PI (Rec Sec Cor)	12491+91.74	713983.13	2676137.46
PI (Rec 1/4 Cor)	12518+37.86	716626.79	2676023.30
PI (Rec Sec Cor)	12544+83.99	719270.46	2675909.14
PI (Rec 1/4 Cor)	12571+29.56	721913.48	2675793.24
PI (Rec Sec Cor)	12597+75.12	724556.50	2675677.34
PI (Rec 1/4 Cor)	12624+08.79	727187.90	2675567.82
PI (Rec Sec Cor)	12650+42.43	729819.27	2675458.62
PI (Rec 1/4 Cor)	12676+94.28	732468.75	2675346.37
PI (Rec Sec Cor)	12703+46.12	735118.21	2675234.11
PI (Rec 1/4 Cor)	12729+79.23	737749.58	2675138.38
PI	12751+19.76	739888.77	2675062.82
PI (Rec Sec Cor)	12756+01.16	740369.93	2675047.60
END (Calc Sec Cor)	12785+39.29	743307.49	2674989.85

CURVE DATA

ARC DEFINITION

US PUBLIC LAND SURVEY DATA

DESC.	SEC-TWP-RGE	NORTHING	EASTING
S 1/4 Cor	Sec 36 T-162-N R-54-W	671787.84	2675165.66
SE Cor	Sec 36 T-162-N R-54-W	671880.30	2677800.50
S 1/4 Cor	Sec 31 T-162-N R-53-W	671972.73	2680424.62
E 1/4 Cor	Sec 36 T-162-N R-54-W	674514.68	2677709.71
S 1/4 Cor	Sec 25 T-162-N R-54-W	677059.39	2674972.04
SE Cor	Sec 25 T-162-N R-54-W	677148.93	2677618.88
S 1/4 Cor	Sec 30 T-162-N R-53-W	677260.37	2680186.48
W 1/4 Cor	Sec 30 T-162-N R-53-W	679780.72	2677531.13
SW Cor	Sec 24 T-162-N R-54-W	682247.75	2672197.14
SE Cor	Sec 24 T-162-N R-54-W	682412.51	2677443.38
SE Cor	Sec 19 T-162-N R-53-W	682658.28	2682658.06
W 1/4 Cor	Sec 19 T-162-N R-53-W	685049.00	2677357.11
SW Cor	Sec 13 T-162-N R-54-W	687491.02	2671952.99
SE Cor	Sec 13 T-162-N R-54-W	687685.49	2677270.83
SE Cor	Sec 18 T-162-N R-53-W	687939.67	2682533.76
W 1/4 Cor	Sec 18 T-162-N R-53-W	690314.19	2677167.90
SW Cor	Sec 12 T-162-N R-54-W	692739.51	2671879.16
SE Cor	Sec 12 T-162-N R-54-W	692942.90	2677064.96
SE Cor	Sec 7 T-162-N R-53-W	693236.65	2682482.96
E 1/4 Cor	Sec 12 T-162-N R-54-W	695587.49	2676941.72
SW Cor	Sec 1 T-162-N R-54-W	698036.19	2671686.68
SE Cor	Sec 1 T-162-N R-54-W	698231.87	2676818.17
SE Cor	Sec 6 T-162-N R-53-W	698454.17	2682211.95
W 1/4 Cor	Sec 6 T-162-N R-53-W	700834.89	2676711.42
SW Cor	Sec 36 T-163-N R-54-W	703253.28	2671329.73
SE Cor	Sec 36 T-163-N R-54-W	703437.84	2676604.69
SE Cor	Sec 31 T-163-N R-53-W	703613.43	2681918.34
E 1/4 Cor	Sec 36 T-163-N R-54-W	706068.10	2676486.95
SW Cor	Sec 25 T-163-N R-54-W	708472.45	2671105.50
SE Cor	Sec 25 T-163-N R-54-W	708698.47	2676369.72
SE Cor	Sec 30 T-163-N R-53-W	708896.12	2681666.96
E 1/4 Cor	Sec 25 T-163-N R-54-W	711340.85	2676253.56

SURVEY CONTROL POINTS

PNT	NORTHING	EASTING	ELEV	STATION	OFFSET	ALIGN	CONTROL POINT DESCRIPTION
PRIMARY CONTROL							
GPS 18-1	666587.56	2677961.40	858.23	16747+12	5295' RT	SCL 5	#6 REBAR / 2" ALUMINUM CAP STAMPED GPS 18-1
GPS 18-2	682399.96	2677692.02	848.74	12175+73	248' RT	SCL 18	#6 REBAR / 2" ALUMINUM CAP STAMPED GPS 18-2
GPS 18-3	698277.54	2676652.70	833.56	12334+78	164' LT	SCL 18	#6 REBAR / 2" ALUMINUM CAP STAMPED GPS 18-3
GPS 18-4	713682.08	2676020.56	829.35	12488+97	125' LT	SCL 18	#6 REBAR / 2" ALUMINUM CAP STAMPED GPS 18-4
GPS 18-5	729892.10	2675315.89	831.39	12651+21	139' LT	SCL 18	#6 REBAR / ALUMINUM CAP STAMPED GPS 18-5
GPS 18-6	742383.15	2674890.87	833.71	12776+17	117' LT	SCL 18	#6 REBAR / 2" ALUMINUM CAP STAMPED GPS 18-6
SECONDARY CONTROL							
RTK 264	671274.58	2677809.33	859.84	16747+24	606' RT	SCL 5	
RTK 263	677930.48	2677616.88	855.03	12131+08	24' RT	SCL 18	
RTK 262	718834.92	2675954.27	829.07	12540+47	26' RT	SCL 18	
RTK 261	721957.87	2675850.96	829.42	12571+71	60' RT	SCL 18	
RTK 260	723251.78	2675794.86	830.14	12651+21	60' RT	SCL 18	

NOTES: Sheet 1 of 2

Date Survey Completed 08/08/17

☐ Assumed Coordinates

☒ All coordinates on this sheet are Pembina County ground coordinates. They are derived from the NAD83(2011) reference frame; North Dakota North Zone Combination Factor (cf) = 0.9999640

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

INITIALIZING BENCH MARK NDGPS Stations (OPUS)

☒ NAVD-88
☐ NGVD-29

☐ GEOID 09 ☒ GEOID 12B
☐ GEOID 12A

REGISTERED LAND SURVEYOR
DEAN DUSHECK
LS-5901
DATE: 9/5/24
NORTH DAKOTA

PRELIMINARY SURVEY COORDINATE AND CURVE DATA - ND 18, E JCT 5 N TO STATE LINE

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	81	2

HORIZONTAL ALIGNMENT

PNT	STATION	NORTHING	EASTING
ND 5 (Chain: SCL5)			
BEG (Rec Sec Cor)	16721+00.34	671787.84	2675165.66
PI (Rec Sec Cor)	16747+36.80	671880.30	2677800.50
END (Rec Sec Cor)	16773+62.55	671972.73	2680424.62

CURVE DATA

ARC DEFINITION

US PUBLIC LAND SURVEY DATA

DESC.	SEC-TWP-RGE	NORTHING	EASTING
SW Cor	Sec 24 T-163-N R-54-W	713790.40	2670872.34
SE Cor	Sec 24 T-163-N R-54-W	713983.13	2676137.46
S 1/4 Cor	Sec 19 T-163-N R-53-W	714086.41	2678773.27
W 1/4 Cor	Sec 19 T-163-N R-53-W	716626.79	2676023.30
SW Cor	Sec 13 T-163-N R-54-W	719077.87	2670633.38
SE Cor	Sec 13 T-163-N R-54-W	719270.46	2675909.14
SE Cor	Sec 18 T-163-N R-53-W	719493.50	2681177.25
W 1/4 Cor	Sec 18 T-163-N R-53-W	721913.48	2675793.24
S 1/4 Cor	Sec 12 T-163-N R-54-W	724449.16	2673037.74
SE Cor	Sec 12 T-163-N R-54-W	724556.50	2675677.34
S 1/4 Cor	Sec 7 T-163-N R-53-W	724658.92	2678291.94
E 1/4 Cor	Sec 12 T-163-N R-54-W	727187.90	2675567.82
S 1/4 Cor	Sec 1 T-163-N R-54-W	729717.87	2672813.43
SE Cor	Sec 1 T-163-N R-54-W	729819.27	2675458.62
S 1/4 Cor	Sec 6 T-163-N R-53-W	729916.48	2678076.49
W 1/4 Cor	Sec 6 T-163-N R-53-W	732468.75	2675346.37
SW Cor	Sec 36 T-164-N R-54-W	734913.58	2669942.90
SW Cor	Sec 31 T-164-N R-53-W	735118.21	2675234.11
SE Cor	Sec 31 T-164-N R-53-W	735237.31	2680519.18
W 1/4 Cor	Sec 36 T-164-N R-54-W	737552.05	2669852.89
E 1/4 Cor	Sec 36 T-164-N R-54-W	737749.58	2675138.38
Calc Cor	Sec 36 T-164-N R-54-W	739888.77	2675062.82
SW Cor	Sec 30 T-164-N R-53-W	740369.93	2675047.60
SE Cor	Sec 30 T-164-N R-53-W	740482.88	2680301.25
Calc Cor	Sec 30 T-164-N R-53-W	743307.49	2674989.85

SURVEY CONTROL POINTS

PNT	NORTHING	EASTING	ELEV	STATION	OFFSET	ALIGN
CONTROL POINT DESCRIPTION						

REFERENCE MARKERS

R Mkr#	NORTHING	EASTING	STATION	O\S	Alignment
229	673938.97	2677760.21	12091+14	31' RT	SCL 18
230	679219.26	2677579.44	12143+98	30' RT	SCL 18
231	684512.25	2677406.21	12196+94	32' RT	SCL 18
232	689782.17	2677219.77	12249+67	31' RT	SCL 18
233	695050.92	2676997.89	12302+40	31' RT	SCL 18
235	705619.54	2676537.66	12408+19	31' RT	SCL 18
236	710885.92	2676300.27	12460+90	27' RT	SCL 18
237	716203.84	2676073.46	12514+13	32' RT	SCL 18
238	721481.17	2675840.86	12566+96	29' RT	SCL 18
239	726848.36	2675607.13	12620+68	25' RT	SCL 18
240	731980.95	2675396.74	12672+05	30' RT	SCL 18
241	737251.40	2675187.18	12724+80	31' RT	SCL 18
242	742527.98	2675035.24	12777+59	30' RT	SCL 18
317	671819.43	2677013.00	16739+48	33' RT	SCL 5
318	671998.38	2682115.84	N/A	N/A	N/A

NOTES: Sheet 2 of 2

Date Survey Completed 08/08/17

☐ Assumed Coordinates

☒ All coordinates on this sheet are Pembina County ground coordinates.
They are derived from the NAD83(2011) reference frame; North Dakota North Zone Combination Factor (cf) = 0.9999640

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

INITIALIZING BENCH MARK
NDGPS Stations (OPUS)

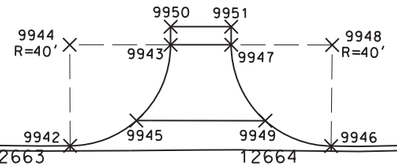
☒ NAVD-88
☐ NGVD-29

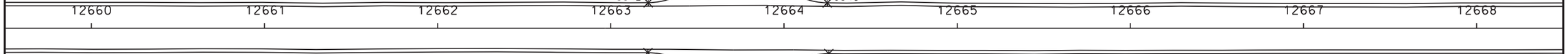
☐ GEOID 09 ☒ GEOID 12B
☐ GEOID 12A

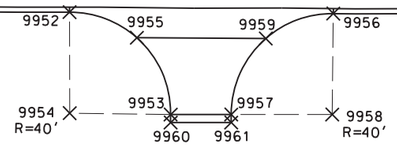
REGISTERED LAND SURVEYOR
DEAN
DUSHECK
LS-5901
DATE: 9/5/24
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	82	1

ND 18				
Point	North	East	Station	Offset
9942	731,096.71	2,675,389.84	12663+21.63	-14.64
9943	731,134.79	2,675,348.20	12663+61.44	-54.64
9944	731,094.83	2,675,349.89	12663+21.44	-54.64
9945	731,122.51	2,675,378.77	12663+47.87	-24.62
9946	731,199.98	2,675,385.57	12664+24.99	-14.55
9947	731,158.77	2,675,347.18	12663+85.44	-54.64
9948	731,198.74	2,675,345.58	12664+25.44	-54.54
9949	731,173.54	2,675,376.65	12663+98.96	-24.57
9950	731,134.49	2,675,341.03	12663+61.44	-61.81
9951	731,158.47	2,675,340.02	12663+85.44	-61.81

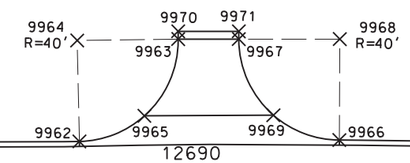


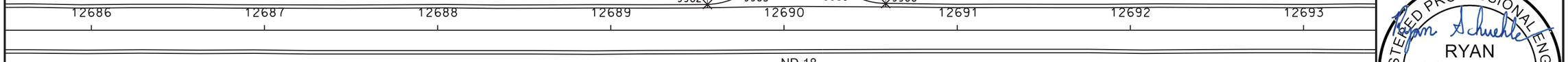




ND 18				
Point	North	East	Station	Offset
9952	731,097.70	2,675,418.47	12663+21.41	14
9953	731,139.42	2,675,457.31	12663+61.44	54.57
9954	731,099.43	2,675,458.44	12663+21.44	54
9955	731,124.76	2,675,427.48	12663+48.07	24.15
9956	731,202.09	2,675,414.62	12664+25.87	14.58
9957	731,163.39	2,675,456.30	12663+85.44	54.57
9958	731,203.36	2,675,454.60	12664+25.44	54.57
9959	731,175.81	2,675,425.60	12663+99.15	24.43
9960	731,139.55	2,675,460.46	12663+61.44	57.72
9961	731,163.53	2,675,459.44	12663+85.44	57.72

ND 18				
Point	North	East	Station	Offset
9962	733,728.50	2,675,278.00	12689+55.80	-14.98
9963	733,765.89	2,675,235.84	12689+94.94	-55.52
9964	733,725.95	2,675,238.08	12689+54.94	-54.97
9965	733,753.81	2,675,266.78	12689+81.56	-25.12
9966	733,831.33	2,675,273.11	12690+58.75	-15.52
9967	733,789.87	2,675,234.83	12690+18.94	-55.52
9968	733,829.83	2,675,233.13	12690+58.94	-55.52
9969	733,804.83	2,675,264.35	12690+32.63	-25.38
9970	733,765.76	2,675,232.79	12689+94.94	-58.57
9971	733,789.74	2,675,231.78	12690+18.94	-58.57





ND 18

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 9/4/2024
NORTH DAKOTA

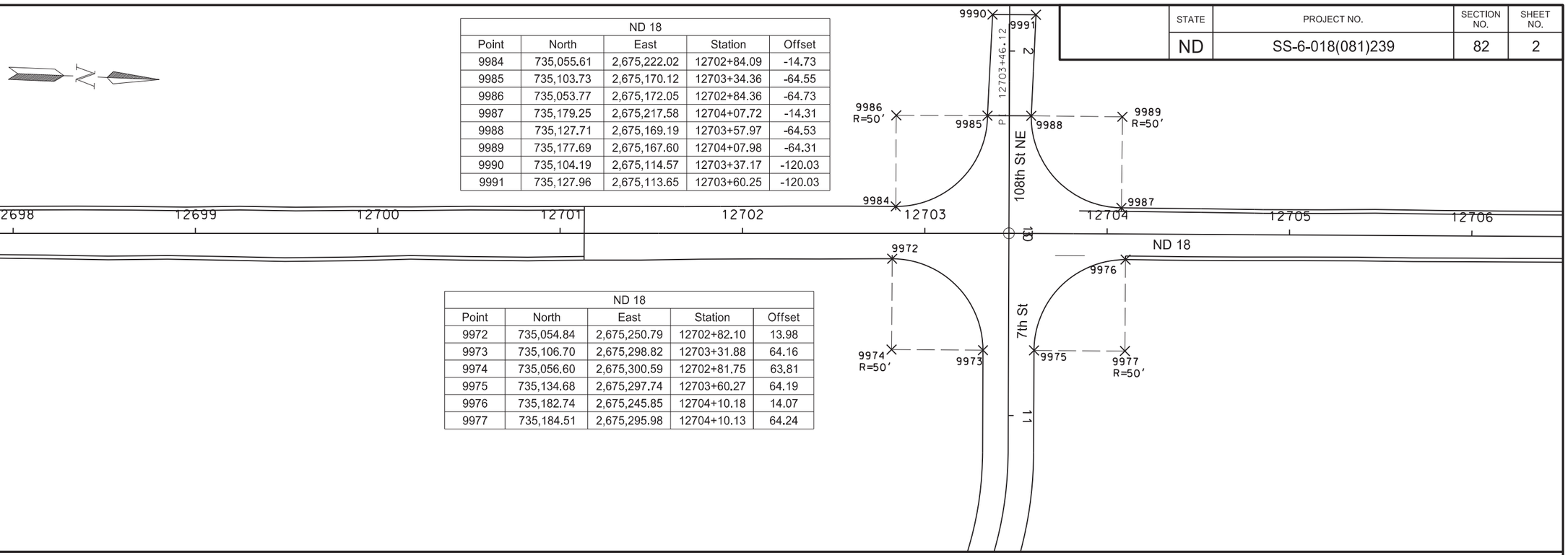
Survey Data Points

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

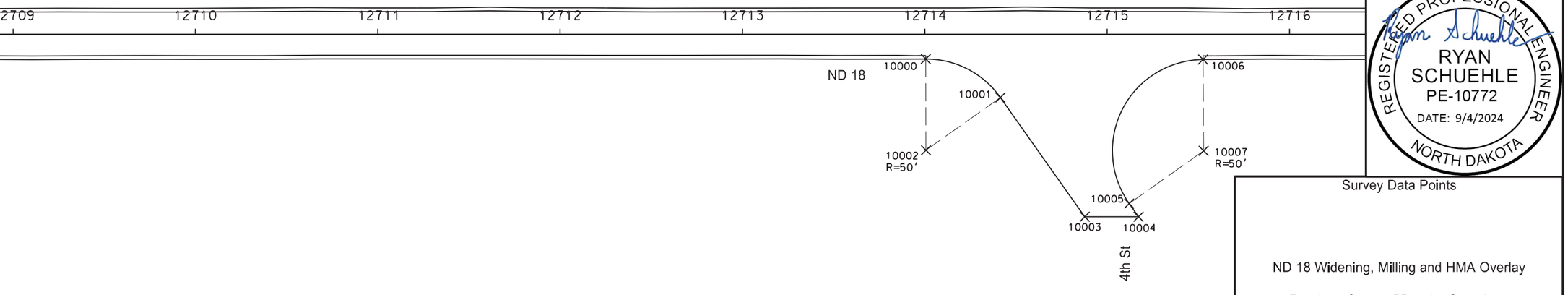
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	82	2

ND 18				
Point	North	East	Station	Offset
9984	735,055.61	2,675,222.02	12702+84.09	-14.73
9985	735,103.73	2,675,170.12	12703+34.36	-64.55
9986	735,053.77	2,675,172.05	12702+84.36	-64.73
9987	735,179.25	2,675,217.58	12704+07.72	-14.31
9988	735,127.71	2,675,169.19	12703+57.97	-64.53
9989	735,177.69	2,675,167.60	12704+07.98	-64.31
9990	735,104.19	2,675,114.57	12703+37.17	-120.03
9991	735,127.96	2,675,113.65	12703+60.25	-120.03



ND 18				
Point	North	East	Station	Offset
9972	735,054.84	2,675,250.79	12702+82.10	13.98
9973	735,106.70	2,675,298.82	12703+31.88	64.16
9974	735,056.60	2,675,300.59	12702+81.75	63.81
9975	735,134.68	2,675,297.74	12703+60.27	64.19
9976	735,182.74	2,675,245.85	12704+10.18	14.07
9977	735,184.51	2,675,295.98	12704+10.13	64.24

ND 18				
Point	North	East	Station	Offset
10000	736,172.44	2,675,209.36	12714+00.55	13.59
10001	736,214.06	2,675,228.95	12714+41.43	34.69
10002	736,174.34	2,675,259.33	12714+00.64	63.59
10003	736,262.69	2,675,292.54	12714+87.71	100
10004	736,292.16	2,675,291.47	12715+17.21	100
10005	736,286.80	2,675,284.46	12715+12.10	92.79
10006	736,324.40	2,675,204.13	12715+52.60	13.89
10007	736,326.52	2,675,254.08	12715+52.90	63.89



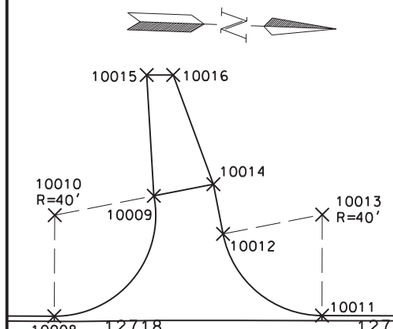
REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 9/4/2024
NORTH DAKOTA

Survey Data Points

ND 18 Widening, Milling and HMA Overlay

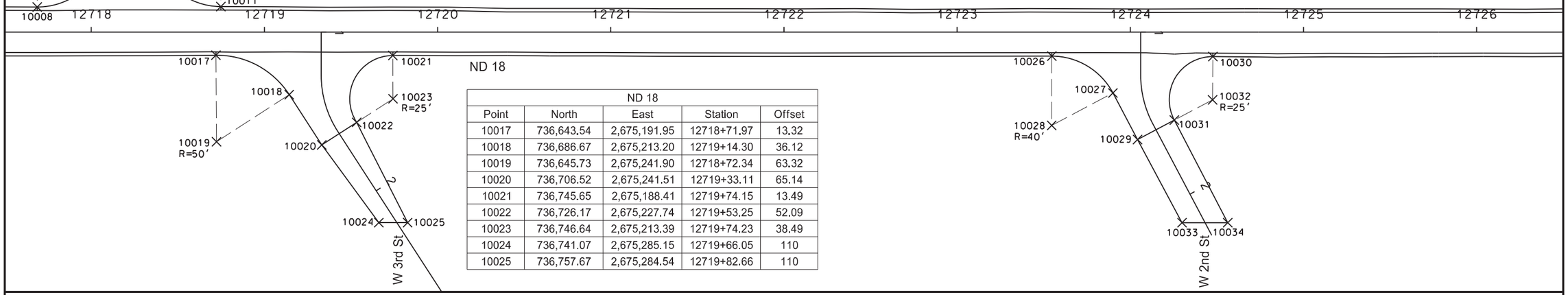
Pembina County 55 to the State Line

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	82	3

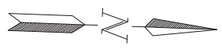


ND 18				
Point	North	East	Station	Offset
10008	736,539.41	2,675,167.92	12717+68.79	-14.48
10009	736,577.11	2,675,118.86	12718+08.24	-62.13
10010	736,538.15	2,675,127.94	12717+68.98	-54.48
10011	736,645.37	2,675,163.82	12718+74.83	-14.72
10012	736,605.03	2,675,132.92	12718+35.63	-47.07
10013	736,643.98	2,675,123.84	12718+74.89	-54.72
10014	736,600.48	2,675,113.41	12718+31.80	-66.73
10015	736,572.51	2,675,071.13	12718+05.38	-110
10016	736,583.00	2,675,070.75	12718+15.88	-110

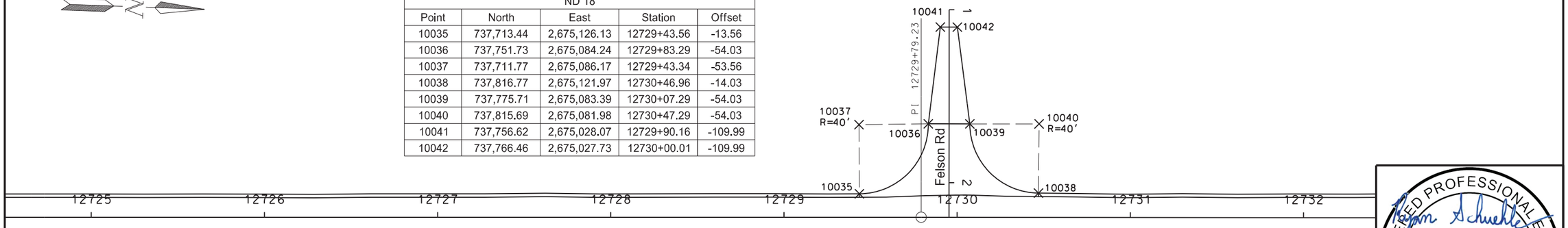
ND 18				
Point	North	East	Station	Offset
10026	737,125.95	2,675,174.94	12723+54.68	13.86
10027	737,161.97	2,675,194.92	12723+89.96	35.14
10028	737,127.33	2,675,214.91	12723+54.61	53.86
10029	737,177.18	2,675,221.27	12724+04.19	62.02
10030	737,218.88	2,675,171.78	12724+47.66	14.09
10031	737,197.96	2,675,209.27	12724+25.40	50.79
10032	737,219.62	2,675,196.77	12724+47.49	39.09
10033	737,204.59	2,675,268.28	12724+29.88	110
10034	737,230.95	2,675,267.32	12724+56.26	110



ND 18				
Point	North	East	Station	Offset
10017	736,643.54	2,675,191.95	12718+71.97	13.32
10018	736,686.67	2,675,213.20	12719+14.30	36.12
10019	736,645.73	2,675,241.90	12718+72.34	63.32
10020	736,706.52	2,675,241.51	12719+33.11	65.14
10021	736,745.65	2,675,188.41	12719+74.15	13.49
10022	736,726.17	2,675,227.74	12719+53.25	52.09
10023	736,746.64	2,675,213.39	12719+74.23	38.49
10024	736,741.07	2,675,285.15	12719+66.05	110
10025	736,757.67	2,675,284.54	12719+82.66	110



ND 18				
Point	North	East	Station	Offset
10035	737,713.44	2,675,126.13	12729+43.56	-13.56
10036	737,751.73	2,675,084.24	12729+83.29	-54.03
10037	737,711.77	2,675,086.17	12729+43.34	-53.56
10038	737,816.77	2,675,121.97	12730+46.96	-14.03
10039	737,775.71	2,675,083.39	12730+07.29	-54.03
10040	737,815.69	2,675,081.98	12730+47.29	-54.03
10041	737,756.62	2,675,028.07	12729+90.16	-109.99
10042	737,766.46	2,675,027.73	12730+00.01	-109.99



ND 18				
Point	North	East	Station	Offset
10043	737,716.07	2,675,153.38	12729+45.19	13.77
10044	737,768.14	2,675,199.41	12729+95.62	61.65
10045	737,718.29	2,675,203.34	12729+45.60	63.77
10046	737,773.59	2,675,247.57	12729+99.37	109.96
10047	737,793.88	2,675,246.86	12730+19.68	109.98
10048	737,792.52	2,675,203.30	12730+19.85	66.4
10049	737,840.58	2,675,149.42	12730+69.78	14.24
10050	737,842.36	2,675,199.38	12730+69.80	64.24

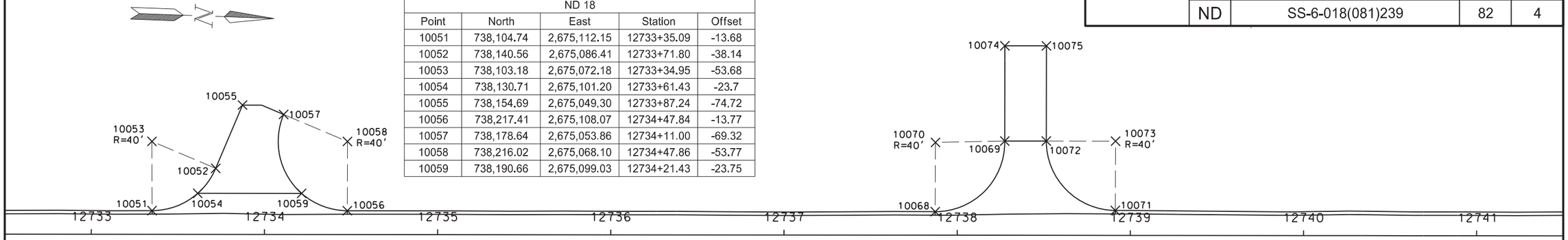
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PE-10772
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NORTH DAKOTA

Survey Data Points

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

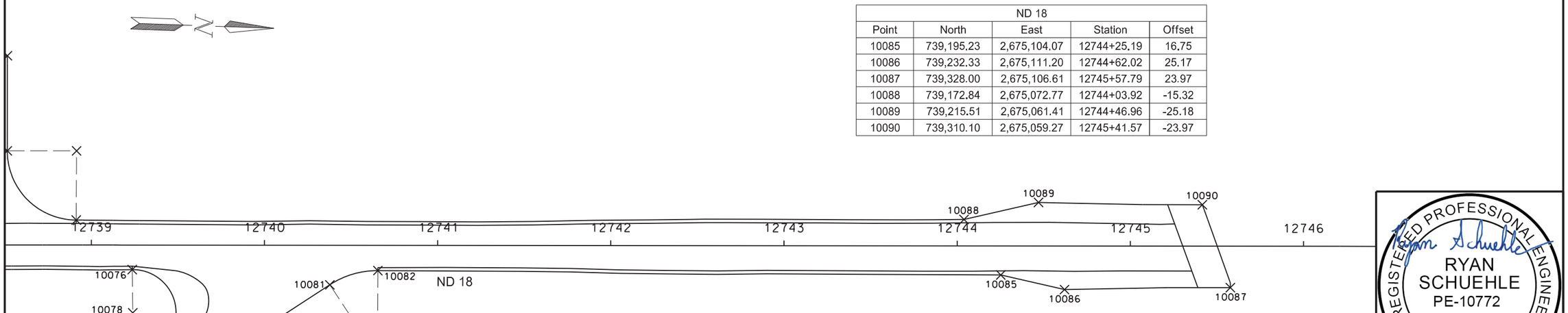
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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ND 18				
Point	North	East	Station	Offset
10051	738,104.74	2,675,112.15	12733+35.09	-13.68
10052	738,140.56	2,675,086.41	12733+71.80	-38.14
10053	738,103.18	2,675,072.18	12733+34.95	-53.68
10054	738,130.71	2,675,101.20	12733+61.43	-23.7
10055	738,154.69	2,675,049.30	12733+87.24	-74.72
10056	738,217.41	2,675,108.07	12734+47.84	-13.77
10057	738,178.64	2,675,053.86	12734+11.00	-69.32
10058	738,216.02	2,675,068.10	12734+47.86	-53.77
10059	738,190.66	2,675,099.03	12734+21.43	-23.75

ND 18				
Point	North	East	Station	Offset
10060	738,196.96	2,675,136.68	12734+26.39	14.1
10061	738,238.66	2,675,175.44	12734+66.69	54.3
10062	738,198.67	2,675,176.65	12734+26.69	54.1
10063	738,301.22	2,675,133.20	12735+30.71	14.3
10064	738,262.64	2,675,174.59	12734+90.69	54.3
10065	738,302.62	2,675,173.18	12735+30.69	54.3
10066	738,240.63	2,675,231.40	12734+66.69	110.29
10067	738,264.62	2,675,230.57	12734+90.69	110.31

ND 18				
Point	North	East	Station	Offset
10068	738,556.66	2,675,096.28	12737+87.30	-13.58
10069	738,595.33	2,675,054.05	12738+27.43	-54.42
10070	738,555.38	2,675,056.31	12737+87.43	-53.58
10071	738,660.55	2,675,091.77	12738+91.28	-14.43
10072	738,619.31	2,675,053.20	12738+51.43	-54.42
10073	738,659.29	2,675,051.79	12738+91.43	-54.42
10074	738,593.39	2,674,999.08	12738+27.43	-109.42
10075	738,617.37	2,674,998.25	12738+51.43	-109.41



ND 18				
Point	North	East	Station	Offset
10085	739,195.23	2,675,104.07	12744+25.19	16.75
10086	739,232.33	2,675,111.20	12744+62.02	25.17
10087	739,328.00	2,675,106.61	12745+57.79	23.97
10088	739,172.84	2,675,072.77	12744+03.92	-15.32
10089	739,215.51	2,675,061.41	12744+46.96	-25.18
10090	739,310.10	2,675,059.27	12745+41.57	-23.97

ND 18				
Point	North	East	Station	Offset
10076	738,693.92	2,675,119.22	12739+23.66	14.19
10077	738,709.64	2,675,164.55	12739+37.77	60.04
10078	738,695.13	2,675,144.19	12739+23.98	39.19
10079	738,666.25	2,675,195.44	12738+93.32	89.39
10080	738,679.78	2,675,214.48	12739+06.17	108.88
10081	738,808.27	2,675,123.87	12740+37.77	22.87
10082	738,835.68	2,675,114.64	12740+65.49	14.62
10083	738,837.24	2,675,164.62	12740+65.29	64.62

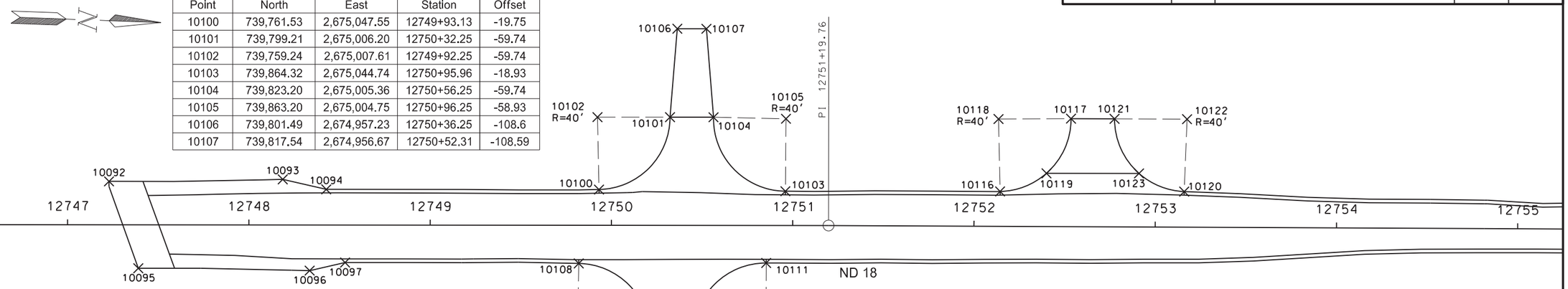
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PE-10772
DATE: 9/4/2024
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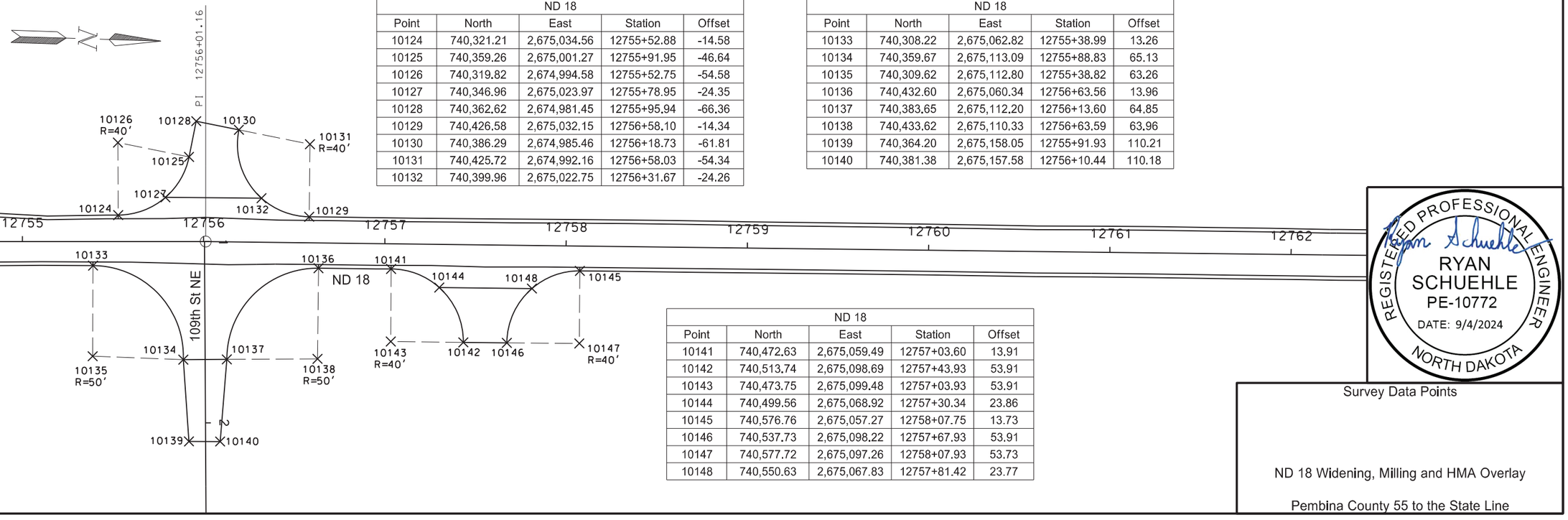


ND 18				
Point	North	East	Station	Offset
10100	739,761.53	2,675,047.55	12749+93.13	-19.75
10101	739,799.21	2,675,006.20	12750+32.25	-59.74
10102	739,759.24	2,675,007.61	12749+92.25	-59.74
10103	739,864.32	2,675,044.74	12750+95.96	-18.93
10104	739,823.20	2,675,005.36	12750+56.25	-59.74
10105	739,863.20	2,675,004.75	12750+96.25	-58.93
10106	739,801.49	2,674,957.23	12750+36.25	-108.6
10107	739,817.54	2,674,956.67	12750+52.31	-108.59

ND 18				
Point	North	East	Station	Offset
10092	739,491.23	2,675,052.87	12747+22.81	-23.97
10093	739,586.96	2,675,048.29	12748+18.65	-25.18
10094	739,611.12	2,675,052.93	12748+42.63	-19.69
10095	739,509.12	2,675,100.23	12747+39.02	23.99
10096	739,603.64	2,675,098.09	12748+33.55	25.19
10097	739,622.99	2,675,092.94	12748+53.07	20.72

ND 18				
Point	North	East	Station	Offset
10108	739,751.83	2,675,088.73	12749+81.99	21.06
10109	739,792.52	2,675,127.31	12750+21.29	61.05
10110	739,752.55	2,675,128.72	12749+81.29	61.05
10111	739,855.18	2,675,084.73	12750+85.41	20.71
10112	739,816.51	2,675,126.46	12750+45.29	61.05
10113	739,856.47	2,675,124.71	12750+85.29	60.71
10114	739,799.88	2,675,189.04	12750+26.46	123.01
10115	739,812.05	2,675,188.61	12750+38.64	123.01

ND 18				
Point	North	East	Station	Offset
10116	739,982.70	2,675,040.57	12752+14.34	-19.27
10117	740,020.34	2,674,998.96	12752+53.28	-59.67
10118	739,980.37	2,675,000.63	12752+13.28	-59.26
10119	740,007.90	2,675,029.66	12752+39.87	-29.38
10120	740,084.20	2,675,036.94	12753+15.91	-19.69
10121	740,044.33	2,674,998.20	12752+77.28	-59.67
10122	740,084.31	2,674,996.94	12753+17.28	-59.67
10123	740,058.91	2,675,027.84	12752+90.91	-29.59



ND 18				
Point	North	East	Station	Offset
10124	740,321.21	2,675,034.56	12755+52.88	-14.58
10125	740,359.26	2,675,001.27	12755+91.95	-46.64
10126	740,319.82	2,674,994.58	12755+52.75	-54.58
10127	740,346.96	2,675,023.97	12755+78.95	-24.35
10128	740,362.62	2,674,981.45	12755+95.94	-66.36
10129	740,426.58	2,675,032.15	12756+58.10	-14.34
10130	740,386.29	2,674,985.46	12756+18.73	-61.81
10131	740,425.72	2,674,992.16	12756+58.03	-54.34
10132	740,399.96	2,675,022.75	12756+31.67	-24.26

ND 18				
Point	North	East	Station	Offset
10133	740,308.22	2,675,062.82	12755+38.99	13.26
10134	740,359.67	2,675,113.09	12755+88.83	65.13
10135	740,309.62	2,675,112.80	12755+38.82	63.26
10136	740,432.60	2,675,060.34	12756+63.56	13.96
10137	740,383.65	2,675,112.20	12756+13.60	64.85
10138	740,433.62	2,675,110.33	12756+63.59	63.96
10139	740,364.20	2,675,158.05	12755+91.93	110.21
10140	740,381.38	2,675,157.58	12756+10.44	110.18

ND 18				
Point	North	East	Station	Offset
10141	740,472.63	2,675,059.49	12757+03.60	13.91
10142	740,513.74	2,675,098.69	12757+43.93	53.91
10143	740,473.75	2,675,099.48	12757+03.93	53.91
10144	740,499.56	2,675,068.92	12757+30.34	23.86
10145	740,576.76	2,675,057.27	12758+07.75	13.73
10146	740,537.73	2,675,098.22	12757+67.93	53.91
10147	740,577.72	2,675,097.26	12758+07.93	53.73
10148	740,550.63	2,675,067.83	12757+81.42	23.77

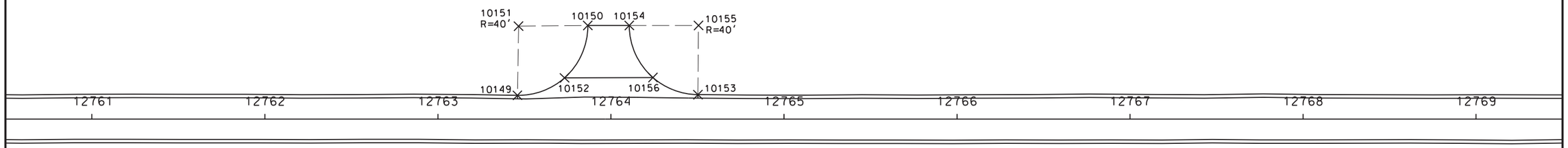
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Survey Data Points

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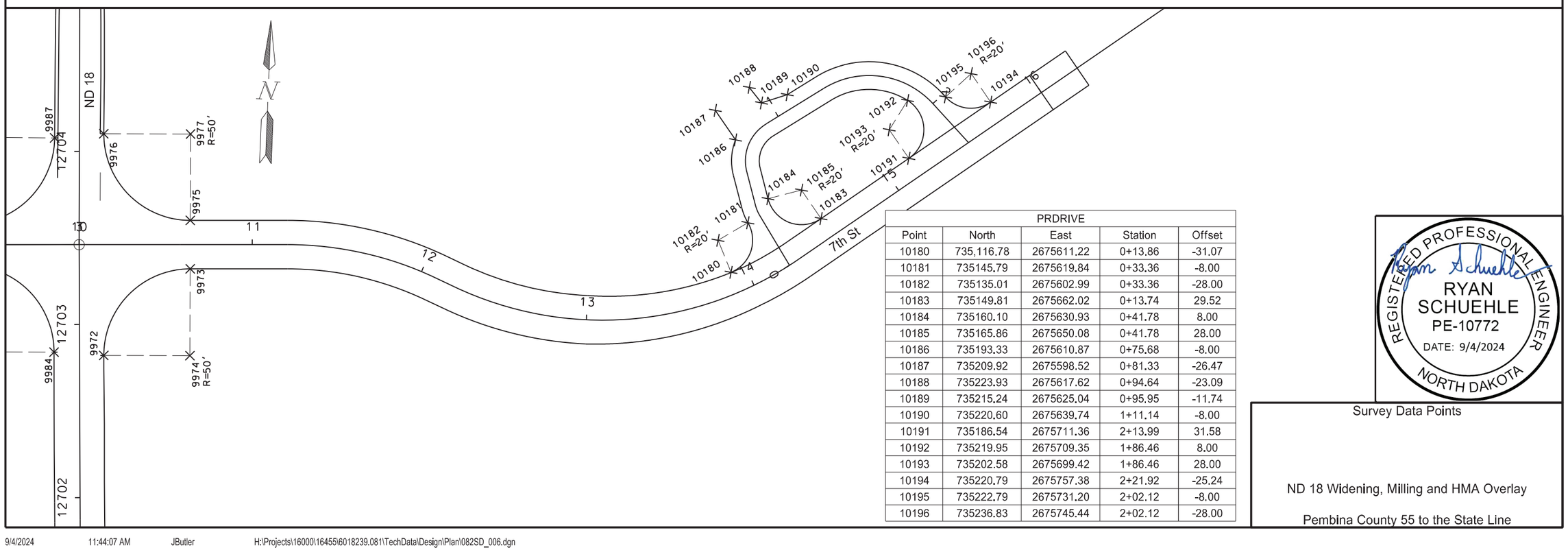
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ND 18

ND 18				
Point	North	East	Station	Offset
10149	741,114.31	2,675,019.24	12763+45.95	-13.73
10150	741,154.15	2,674,978.05	12763+86.59	-54.13
10151	741,114.17	2,674,979.24	12763+46.59	-53.72
10152	741,141.33	2,675,008.60	12763+73.17	-23.83
10153	741,218.60	2,675,016.79	12764+50.27	-14.13
10154	741,178.15	2,674,977.58	12764+10.59	-54.13
10155	741,218.14	2,674,976.79	12764+50.59	-54.13
10156	741,192.39	2,675,007.40	12764+24.25	-24.03



PRDRIVE				
Point	North	East	Station	Offset
10180	735,116.78	2675611.22	0+13.86	-31.07
10181	735145.79	2675619.84	0+33.36	-8.00
10182	735135.01	2675602.99	0+33.36	-28.00
10183	735149.81	2675662.02	0+13.74	29.52
10184	735160.10	2675630.93	0+41.78	8.00
10185	735165.86	2675650.08	0+41.78	28.00
10186	735193.33	2675610.87	0+75.68	-8.00
10187	735209.92	2675598.52	0+81.33	-26.47
10188	735223.93	2675617.62	0+94.64	-23.09
10189	735215.24	2675625.04	0+95.95	-11.74
10190	735220.60	2675639.74	1+11.14	-8.00
10191	735186.54	2675711.36	2+13.99	31.58
10192	735219.95	2675709.35	1+86.46	8.00
10193	735202.58	2675699.42	1+86.46	28.00
10194	735220.79	2675757.38	2+21.92	-25.24
10195	735222.79	2675731.20	2+02.12	-8.00
10196	735236.83	2675745.44	2+02.12	-28.00

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Chain PR7THST N contains:
8410 CUR PR7THST N1 CUR PR7THST N2 8411

Beginning chain PR7THST N description

==========

Point 8410 X 2,675,234.11 Y 735,118.21 Sta 10+00.00

Course from 8410 to PC PR7THST N1 N 87° 47' 06.98" E Dist 120.52

Curve Data
-_____

Curve PR7THST N1

P.I. Station 11+65.47 X 2,675,399.46 Y 735,124.60
Delta = 25° 20' 01.27" (RT)
Degree = 28° 38' 52.40"
Tangent = 44.95
Length = 88.43
Radius = 200.00
External = 4.99
Long Chord = 87.71
Mid. Ord. = 4.87
P.C. Station 11+20.52 X 2,675,354.54 Y 735,122.87
P.T. Station 12+08.95 X 2,675,440.80 Y 735,106.96
C.C. X 2,675,362.27 Y 734,923.02
Back = N 87° 47' 06.98" E
Ahead = S 66° 52' 51.76" E
Chord Bear = S 79° 32' 52.39" E

Course from PT PR7THST N1 to PC PR7THST N2 S 66° 52' 51.76" E Dist 12.00

Curve Data
-_____

Curve PR7THST N2

P.I. Station 13+35.90 X 2,675,557.55 Y 735,057.11
Delta = 59° 46' 35.89" (LT)
Degree = 28° 38' 52.40"
Tangent = 114.95
Length = 208.66
Radius = 200.00
External = 30.68
Long Chord = 199.32
Mid. Ord. = 26.60
P.C. Station 12+20.95 X 2,675,451.83 Y 735,102.24
P.T. Station 14+29.61 X 2,675,649.77 Y 735,125.74
C.C. X 2,675,530.36 Y 735,286.18
Back = S 66° 52' 51.76" E
Ahead = N 53° 20' 32.35" E
Chord Bear = N 83° 13' 50.30" E

Course from PT PR7THST N2 to 8411 N 53° 20' 32.35" E Dist 316.43

Point 8411 X 2,675,903.61 Y 735,314.66 Sta 17+46.04

==========
Ending chain PR7THST N description

Chain PR108THSTNE contains:
8299 8300

Beginning chain PR108THSTNE description
==========

Point 8299 X 2,675,034.26 Y 735,110.48 Sta 1+00.00

Course from 8299 to 8300 N 87° 47' 06.71" E Dist 200.00

Point 8300 X 2,675,234.11 Y 735,118.21 Sta 3+00.00

==========
Ending chain PR108THSTNE description

Chain PRW3RDST contains:
8307 CUR W3RDST 8308

Beginning chain PRW3RDST description
==========

Point 8307 X 2,675,176.43 Y 736,703.83 Sta 1+00.00

Course from 8307 to PC W3RDST N 87° 54' 59.25" E Dist 24.84

Curve Data
-_____

Curve W3RDST
P.I. Station 1+42.59 X 2,675,218.99 Y 736,705.38
Delta = 32° 56' 57.35" (LT)
Degree = 95° 29' 34.68"
Tangent = 17.74
Length = 34.50
Radius = 60.00
External = 2.57
Long Chord = 34.03
Mid. Ord. = 2.46
P.C. Station 1+24.84 X 2,675,201.25 Y 736,704.73
P.T. Station 1+59.35 X 2,675,233.51 Y 736,715.56
C.C. X 2,675,199.07 Y 736,764.69
Back = N 87° 54' 59.25" E
Ahead = N 54° 58' 01.90" E
Chord Bear = N 71° 26' 30.57" E

Course from PT W3RDST to 8308 N 54° 58' 01.90" E Dist 129.79

Point 8308 X 2,675,339.79 Y 736,790.07 Sta 2+89.13

==========
Ending chain PRW3RDST description

Chain PRW2NDST contains:
8309 CUR W2NDST 8310

Beginning chain PRW2NDST description
==========

Point 8309 X 2,675,159.22 Y 737,176.73 Sta 1+00.00

Course from 8309 to PC W2NDST N 87° 54' 59.25" E Dist 24.89

Curve Data
-_____

Curve W2NDST
P.I. Station 1+39.79 X 2,675,198.99 Y 737,178.18
Delta = 27° 54' 19.47" (LT)
Degree = 95° 29' 34.68"
Tangent = 14.91
Length = 29.22
Radius = 60.00
External = 1.82
Long Chord = 28.93
Mid. Ord. = 1.77
P.C. Station 1+24.89 X 2,675,184.09 Y 737,177.63
P.T. Station 1+54.11 X 2,675,211.90 Y 737,185.63
C.C. X 2,675,181.91 Y 737,237.60
Back = N 87° 54' 59.25" E
Ahead = N 60° 00' 39.78" E
Chord Bear = N 73° 57' 49.51" E

Course from PT W2NDST to 8310 N 60° 00' 39.77" E Dist 72.74

Point 8310 X 2,675,274.90 Y 737,221.99 Sta 2+26.85

==========
Ending chain PRW2NDST description

Chain PRFELSONRD contains:
8311 8312

Beginning chain PRFELSONRD description
==========

Point 8311 X 2,675,017.89 Y 737,761.39 Sta 1+00.00

Course from 8311 to 8312 N 87° 58' 36.98" E Dist 120.00

Point 8312 X 2,675,137.82 Y 737,765.63 Sta 2+20.00

==========
Ending chain PRFELSONRD description

Chain PR109THSTNE E contains:
8329 8330

Beginning chain PR109THSTNE E description
==========

Point 8329 X 2,675,047.62 Y 740,369.23 Sta 1+00.00

Course from 8329 to 8330 N 87° 51' 25.58" E Dist 187.20

Point 8330 X 2,675,234.68 Y 740,376.22 Sta 2+87.20

==========
Ending chain PR109THSTNE E description

Chain PR109THSTNE W contains:
8337 8338 8339

Beginning chain PR109THSTNE W description
==========

Point 8337 X 2,674,881.45 Y 742,087.11 Sta 1+00.00

Course from 8337 to 8338 S 80° 56' 13.96" E Dist 84.46

Point 8338 X 2,674,964.86 Y 742,073.80 Sta 1+84.46

Course from 8338 to 8339 N 88° 52' 25.21" E Dist 49.24

Point 8339 X 2,675,014.09 Y 742,074.77 Sta 2+33.70

==========
Ending chain PR109THSTNE W description

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Sideroad Alignment Descriptions

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Beginning chain PRDRIVE description
==========

Point 8412 X 2,675,644.82 Y 735,122.17 Sta 0+00.00

Course from 8412 to PC PRDRIVE1 N 33° 09' 06.44" W Dist 33.13

Curve Data

Curve PRDRIVE1

P.I. Station 0+36.74 X 2,675,624.73 Y 735,152.93
Delta = 16° 25' 29.41" (RT)
Degree = 229° 10' 59.22"
Tangent = 3.61
Length = 7.17
Radius = 25.00
External = 0.26
Long Chord = 7.14
Mid. Ord. = 0.26
P.C. Station 0+33.13 X 2,675,626.70 Y 735,149.91
P.T. Station 0+40.30 X 2,675,623.69 Y 735,156.38
C.C. X 2,675,647.63 Y 735,163.58
Back = N 33° 09' 06.44" W
Ahead = N 16° 43' 37.03" W
Chord Bear = N 24° 56' 21.73" W

Course from PT PRDRIVE1 to PC PRDRIVE2 N 16° 43' 37.03" W Dist 19.61

Curve Data

Curve PRDRIVE2

P.I. Station 0+78.35 X 2,675,612.74 Y 735,192.83
Delta = 72° 50' 53.06" (RT)
Degree = 229° 10' 59.22"
Tangent = 18.45
Length = 31.79
Radius = 25.00
External = 6.07
Long Chord = 29.69
Mid. Ord. = 4.88
P.C. Station 0+59.91 X 2,675,618.05 Y 735,175.16
P.T. Station 0+91.69 X 2,675,628.05 Y 735,203.11
C.C. X 2,675,641.99 Y 735,182.36
Back = N 16° 43' 37.03" W
Ahead = N 56° 07' 16.04" E
Chord Bear = N 19° 41' 49.50" E

Course from PT PRDRIVE2 to PC PRDRIVE3 N 56° 07' 16.04" E Dist 39.25

Curve Data

Curve PRDRIVE3

P.I. Station 1+72.36 X 2,675,695.02 Y 735,248.08
Delta = 79° 16' 35.82" (RT)
Degree = 114° 35' 29.61"
Tangent = 41.42
Length = 69.18
Radius = 50.00
External = 14.93
Long Chord = 63.79
Mid. Ord. = 11.50
P.C. Station 1+30.94 X 2,675,660.64 Y 735,224.99
P.T. Station 2+00.12 X 2,675,724.11 Y 735,218.59
C.C. X 2,675,688.51 Y 735,183.48
Back = N 56° 07' 16.04" E
Ahead = S 44° 36' 08.14" E
Chord Bear = S 84° 14' 26.05" E

Course from PT PRDRIVE3 to 8413 S 44° 36' 08.14" E Dist 30.40

Point 8413 X 2,675,745.45 Y 735,196.95 Sta 2+30.52

==========
Ending chain PRDRIVE description

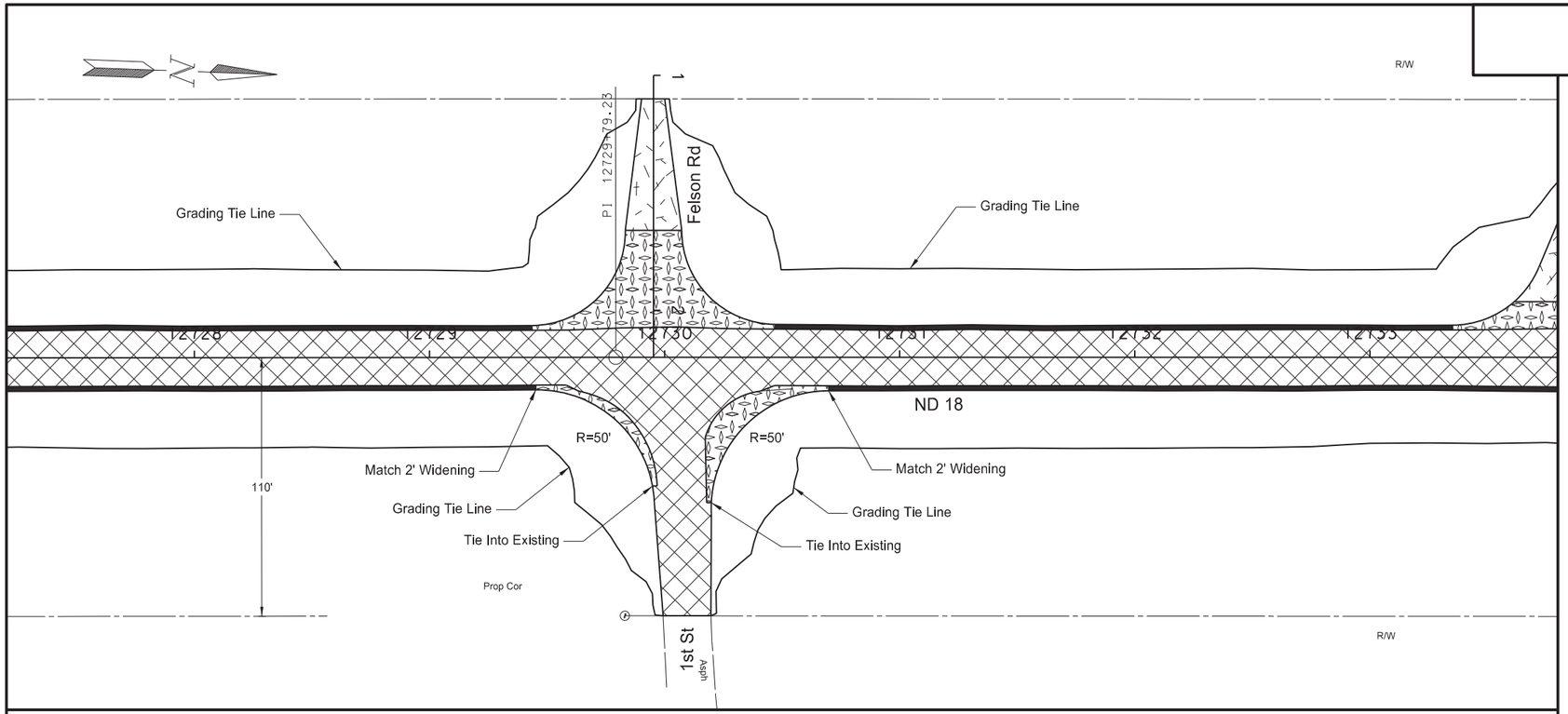
REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 9/4/2024
NORTH DAKOTA

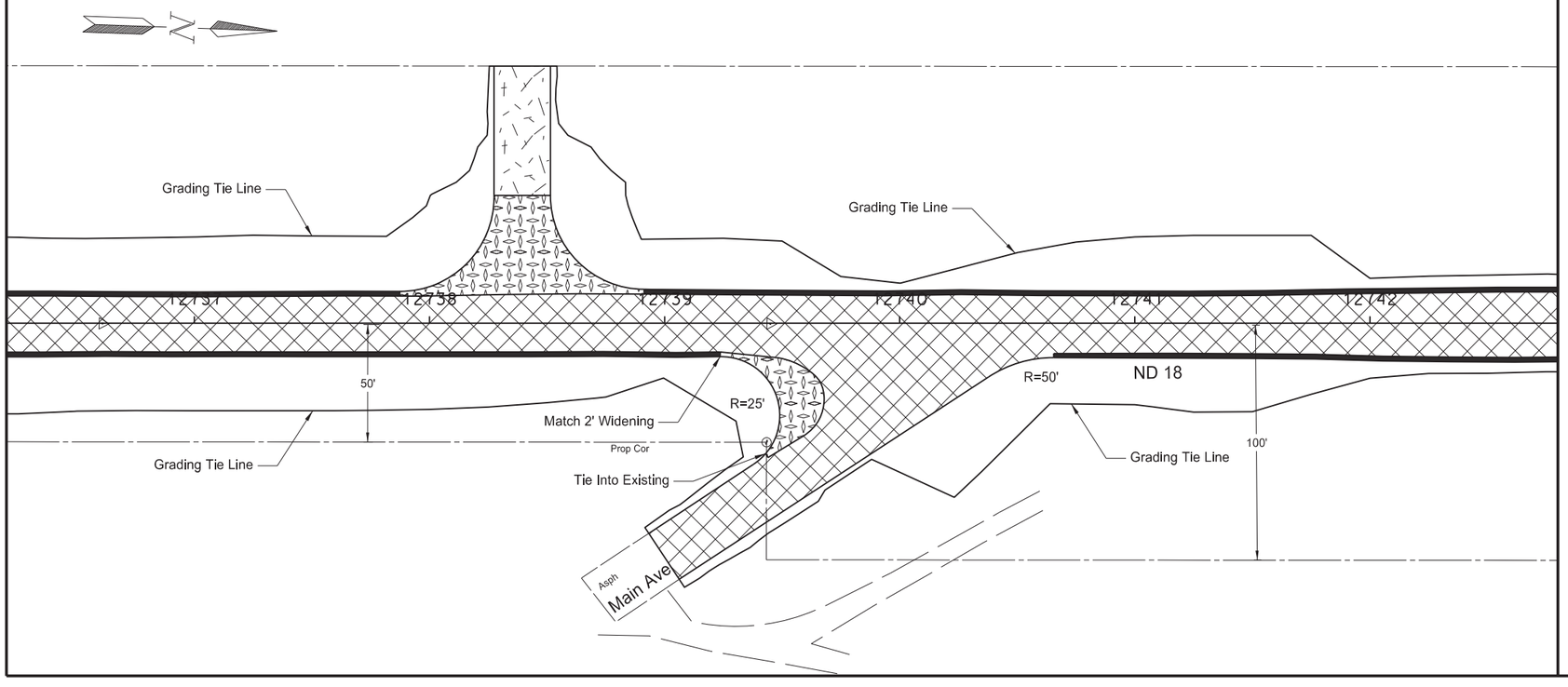
Sideroad Alignment Descriptions

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	90	1





LEGEND

- 4" HMA with 12" Salvaged Base
- 2" HMA Overlay
- 6" Salvaged Base Surfacing
- 2" HMA with Variable Salvaged Base (2' Shoulder Widening)

REGISTERED PROFESSIONAL ENGINEER
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PE-10772
DATE: 9/4/2024
NORTH DAKOTA

Paving Layout

Intersection of 1st St / Felson Rd
Intersection of Main Ave

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	100	1

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
E5-1-48	48"x48"	EXIT GORE		35	
G20-1-60	**60"x24"**	**ROAD WORK NEXT __ MILES**	**2**	**28**	**56**
G20-1b-60	**60"x24"**	**NO WORK IN PROGRESS (Sign and installation only)**	**2**	**18**	**36**
G20-2-48	**48"x24"**	**END ROAD WORK**	**4**	**26**	**104**
G20-4-36	36"x18"	PILOT CAR FOLLOW ME (Mounted to back of pilot car)		18	
G20-4b-36	36"x30"	WAIT FOR PILOT CAR		18	
G20-50a-72	72"x36"	ROAD WORK NEXT __ MILES RT & LT ARROWS		43	
G20-52a-72	**72"x24"**	**ROAD WORK NEXT __ MILES RT or LT ARROW**	**2**	**36**	**72**
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**	**5**	**59**	**295**
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)		11	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)		10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)		10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)		7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)		7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)		7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)		7	
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)		7	
M4-8a-24	24"x12"	END DETOUR		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)**	**2**	**7**	**14**
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**	**2**	**32**	**64**
R1-2-60	60"x60"	YIELD		29	
R2-1-36	**36"x48"**	**SPEED LIMIT __ (Portable only)**	**2**	**30**	**60**
R2-1-48	**48"x60"**	**SPEED LIMIT __**	**9**	**39**	**351**
R2-1aP-24	24"x18"	MINIMUM FEE $80 (Mounted on Speed Limit post)		10	
R2-1aP-24	**24"x18"**	**MINIMUM FEE $150 (Mounted on Speed Limit post)**	**5**	**10**	**50**
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)**	**8**	**12**	**96**
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)**	**1**	**15**	**15**
W1-3-48	48"x48"	REVERSE TURN RIGHT or LEFT		35	
W1-4-48	**48"x48"**	**REVERSE CURVE RIGHT or LEFT**	**4**	**35**	**140**
W1-4b-48	48"x48"	TWO LANE REVERSE CURVE RIGHT or LEFT		35	
W1-6-48	**48"x24"**	**ONE DIRECTION LARGE ARROW**	**2**	**26**	**52**
W3-1-48	48"x48"	STOP AHEAD		35	
W3-3-48	48"x48"	SIGNAL AHEAD		35	
W3-4-48	**48"x48"**	**BE PREPARED TO STOP**	**2**	**35**	**70**
W3-5-48	**48"x48"**	**SPEED REDUCTION AHEAD**	**4**	**35**	**140**
W4-2-48	48"x48"	LANE ENDS RIGHT or LEFT		35	
W5-1-48	48"x48"	ROAD NARROWS		35	
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE		35	
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW		35	
W6-3-48	48"x48"	TWO WAY TRAFFIC		35	
W8-1-48	**48"x48"**	**BUMP**	**1**	**35**	**35**
W8-3-48	48"x48"	PAVEMENT ENDS		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**	**2**	**35**	**70**
W8-55-48	**48"x48"**	**TRUCKS CROSSING AHEAD or __ FT or _ MILE**	**2**	**35**	**70**
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY		35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL		35	
W13-1P-30	**30"x30"**	**__ MPH ADVISORY SPEED PLAQUE (Mounted on warning sign post)**	**2**	**14**	**28**
W14-3-64	64"x48"	NO PASSING ZONE		28	
W16-2P-30	**30"x24"**	**__ FEET PLAQUE (Mounted on warning sign post)**	**5**	**10**	**50**
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**	**5**	**35**	**175**
W20-5-48	48"x48"	RIGHT or CENTER or LEFT LANE CLOSED AHEAD or __ FT or _ MILE		35	
W20-7-48	**48"x48"**	**FLAGGER**	**5**	**35**	**175**
W20-8-18	**18"x18"**	**STOP - SLOW PADDLE Back to Back**	**5**	**5**	**25**
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**	**2**	**35**	**70**
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK		35	
W24-1-48	48"x48"	DOUBLE REVERSE CURVE		35	

SPECIAL SIGNS

Consign 1	**48" X 48"**	**XX FT Lane AHEAD**	**2**	**35**	**70**

SPEC & CODE

704-1000	**TRAFFIC CONTROL SIGNS**	**TOTAL UNITS**	**2793**

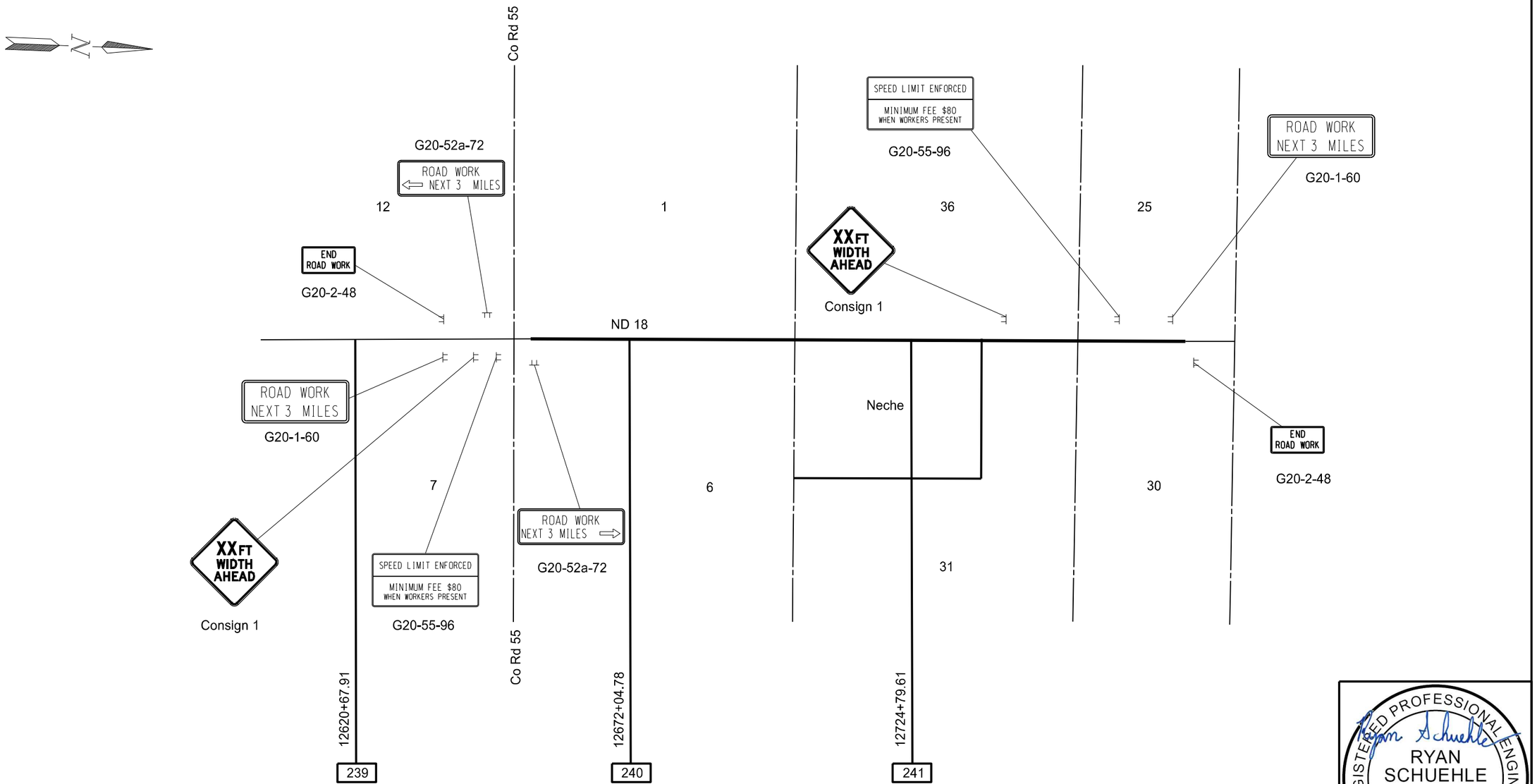
SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
302-0100	**SALVAGED BASE COURSE**	**TON**	**140**
704-0100	**FLAGGING**	**MHR**	**900**
704-1018	**LANE CLOSURE-SIGNAL CONTROL/FLAGGING CONTROL**	**EACH**	**1**
704-1039	**ATTENUATION DEVICE-TYPE B-45**	**EACH**	**2**
704-1048	**PORTABLE RUMBLE STRIPS**	**EACH**	**2**
704-1050	TYPE I BARRICADES	EACH	
704-1052	**TYPE III BARRICADES**	**EACH**	**29**
704-1060	**DELINEATOR DRUMS**	**EACH**	**175**
704-1065	TRAFFIC CONES	EACH	
704-1067	TUBULAR MARKERS	EACH	
704-1070	DELINEATOR	EACH	
704-1072	FLEXIBLE DELINEATORS	EACH	
704-1080	**STACKABLE VERTICAL PANELS**	**EACH**	**18**
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**	**200**
704-1500	OBLITERATION OF PVMT MK	SF	
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF	
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH	
704-3511	**STATE FURNISHED MEDIAN BARRIER**	**LF**	**190**
714-0820	**PIPE CONC REINF 30IN CL III**	**LF**	**80**
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: 9/3/2025
NORTH DAKOTA

Traffic Control Devices List

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	100	2



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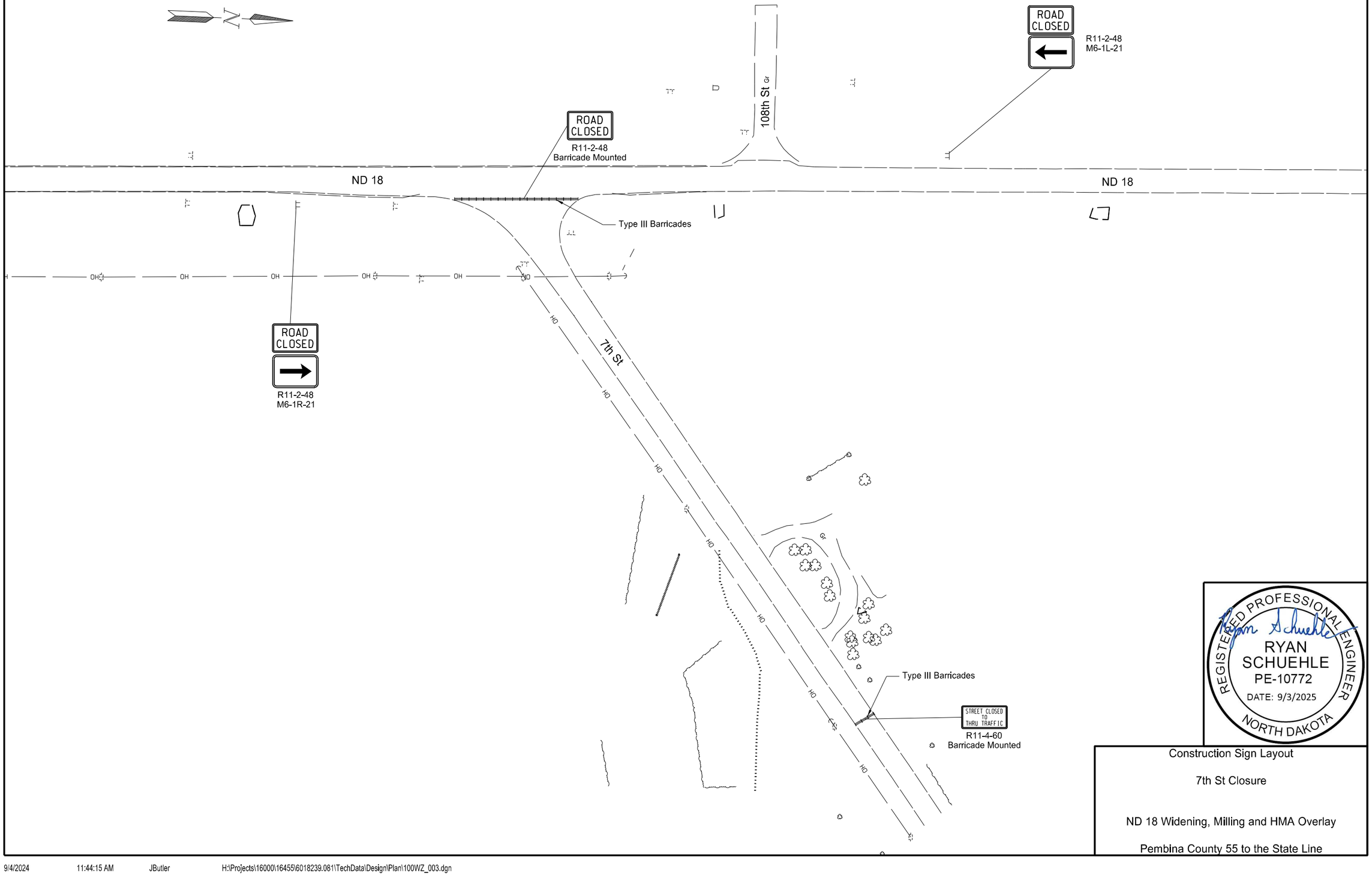
Note: Placement of Consign 1 only when work for Reinforced Concrete Box Culvert is occuring.

Construction Sign Layout

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	100	3



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DATE: 9/3/2025
NORTH DAKOTA

Construction Sign Layout

7th St Closure

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	100	4

Notes:

1. Refer to Section 30 Sheet 7 of the plans for reinforced concrete box culvert placement area construction details. Traffic control devices are provided in the WZTC Device List.
2. Refer to Section 100 Sheet 6 for reinforced concrete box culvert placement phasing. Traffic control shown will be used for phase 1 (Left lane pavement and subgrade removal, temporary embankment, temporary culverts, and temporary salvaged base) and phase 3 (Left temporary embankment removal, temporary culvert removal reinforced concrete box culvert placement backfill and salvaged base placement). Provide additional stakable vertical panels at edge of road in the culvert replacement locations.
3. Maintain single lane traffic with flagging operations on both ends of the Box Culvert construction area.
4. Recomended speed limit is 35 mph through the construction zone. The engineer will determine the appropriate speed limit based on actual field conditions.
5. Reinforced concrete box culvert placement widening lengths are not drawn to scale.
6. Layout is shown using standard drawing 704-17. Standard drawing 704-16 will be used if temporary traffic signals are used instead of flagging. Flagging control will be used for traffic entering from 108th St.
7. If the lane closure is still active at night a plan for night time flagging will be required.
8. Installation and removal of temporary culvert extensions to be included in price bid for "Pipe Conc Reinf 30IN CL III."

Refer to Standard Drawing D-704-17 for sign spacing and layout requirements

R2-1-48 SPEED TIMIL XX MINIMUM FEE $80 — R2-1a-24

W20-7-48 XX FEET — W16-2-30

W3-5-48 SPEED LIMIT XX

W20-4-48 ONE LANE ROAD XXXX FT

W20-1-48 ROAD WORK XXXX FT

Construction Phasing will vary. Resume to appropriate speed limit.

R2-1-48 SPEED TIMIL XX

R11-2-48 ROAD CLOSED — Type III Barricade

W-1-6L-48 — Barricade Mounted

Reinforced concrete box culvert placement

Attenuation Device Type B-45

Delineator Drums Spaced @ 20'

190' Median Barrier

Edge of Existing Pavement

Flagger

108th St

Hwy ℄

ND 18

Asph

Refer to Note 2 for Work Zone Operations

Temporary Culvert Extensions 30" RCP at approximately 40' EA (2 culverts)

Attenuation Device Type B-45

7th St

W1-4R-48

W13-1P-30 XX M.P.H.

R11-2-48 ROAD CLOSED — Type III Barricade

W-1-6R-48 — Barricade Mounted

W1-4L-48

W13-1P-30 XX M.P.H.

R2-1-48 SPEED TIMIL XX

Construction Phasing will vary. Resume to appropriate speed limit.

Work Area

REGISTERED PROFESSIONAL ENGINEER
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DATE: 9/3/2025
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Workzone Traffic Control

Reinforced concrete box culvert placement (Phases 1 & 3)

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	100	5

Notes:

1. Refer to Section 30 Sheet 7 of the plans for reinforced concrete box culvert placement area construction details. Traffic control devices are provided in the WZTC Device List.
2. Refer to Section 100 Sheet 6 for reinforced concrete box culvert placement phasing. Traffic control shown will be used for phase 2 (Right lane pavement and subgrade removal, reinforced concrete box culvert placement, and placement of new embankment and Salvaged Base) and phase 4 (Placement of remaining Right lane Salvaged Base). Traffic will be traveling along the temporary widening area for phase 2, traffic will be traveling along ND 18 for phase 4.
3. Maintain single lane traffic with flagging operations on both ends of the Box Culvert construction area.
4. Recomended speed limit is 25 mph through the construction zone. The engineer will determine the appropriate speed limit based on actual field conditions.
5. Reinforced concrete box culvert placement widening lengths are not drawn to scale.
6. Layout is shown using standard drawing 704-17. Standard drawing 704-16 will be used if temporary traffic signals are used instead of flagging. Flagging control will be used for traffic entering from 108th St.
7. If the lane closure is still active at night a plan for night time flagging will be required.
8. Installation and removal of temporary culvert extensions to be included in price bid for "Pipe Conc Reinf 30IN CL III."

Refer to Standard Drawing D-704-17 for sign spacing and layout requirements

R2-1-48 SPEED TIMIL XX MINIMUM FEE $80 — R2-1a-24

W20-7-48 XX FEET — W16-2-30

W3-5-48 SPEED LIMIT XX

W20-4-48 ONE LANE ROAD XXXX FT

W20-1-48 ROAD WORK XXXX FT

Construction Phasing will vary. Resume to appropriate speed limit.

R2-1-48 SPEED TIMIL XX

ND 18

Reinforced Concrete Box Culvert Placement

Phase 2 Only

W1-4R-48

W13-1P-30 XX M.P.H.

Delineator Drums Spaced @ 20'

Edge of Existing Pavement

Stackable Vertical Panels Spaced @ 25'

Temporary Widening Area

Temporary Culvert Extensions

Flagger

108th St

Flagger

ND 18

Hwy ℄

Asph

Flagger

Refer to Note 2 for Work Zone Operations

190' Median Barrier

Attenuation Device Type B-45

Attenuation Device Type B-45

W1-4L-48

W13-1P-30 XX M.P.H.

W1-4L-48

W13-1P-30 XX M.P.H.

Phase 2 Only

R11-2-48 ROAD CLOSED

W-1-6L-48

2 - Type III Barricades

Barricade Mounted

R11-2-48 ROAD CLOSED

W-1-6R-48

Type III Barricade

Barricade Mounted

W1-4R-48

W13-1P-30 XX M.P.H.

R2-1-48 SPEED TIMIL XX

Construction Phasing will vary. Resume to appropriate speed limit.

7th St

Refer to Standard Drawing D-704-17 for sign spacing and layout requirements

W20-7-48 XX FEET — W16-2-30

R2-1-48 SPEED LIMIT XX MINIMUM FEE $80 — R2-1a-24

W20-1-48 ROAD WORK XXXX FT

W20-4-48 ONE LANE ROAD XXXX FT

W3-5-48 SPEED LIMIT XX

Work Area

Widening and Temporary Surfacing Aggregate (Salvaged Base Course) for Reinforced Concrete Box Culvert placement

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 9/3/2025
NORTH DAKOTA

Workzone Traffic Control

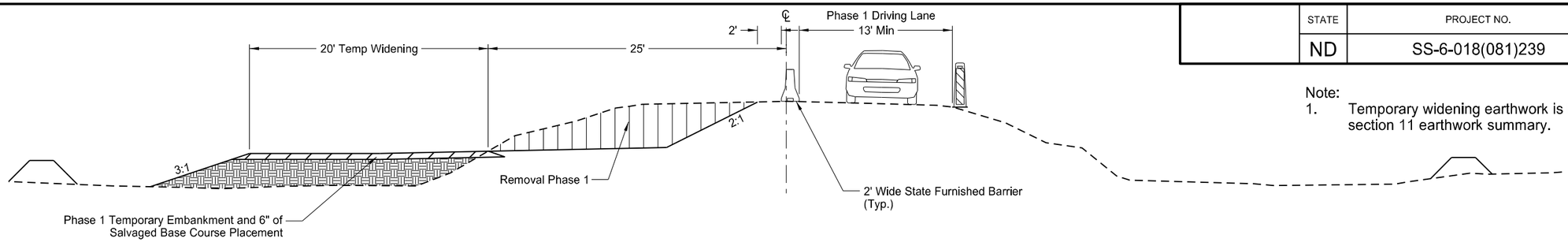
Reinforced concrete box culvert placement (Phases 2 & 4)

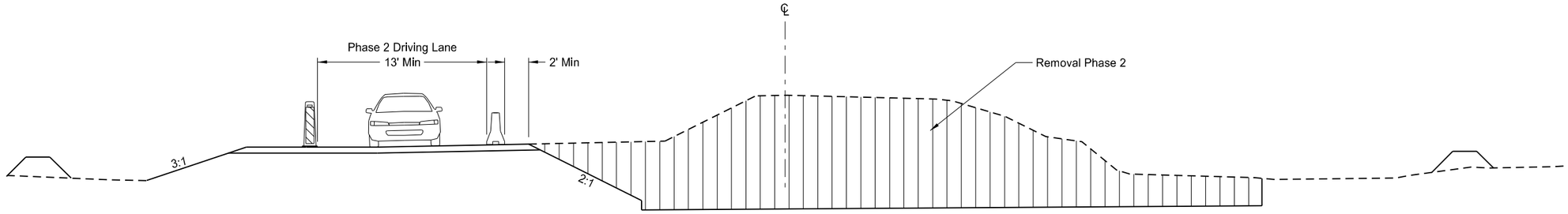
ND 18 Widening, Milling and HMA Overlay

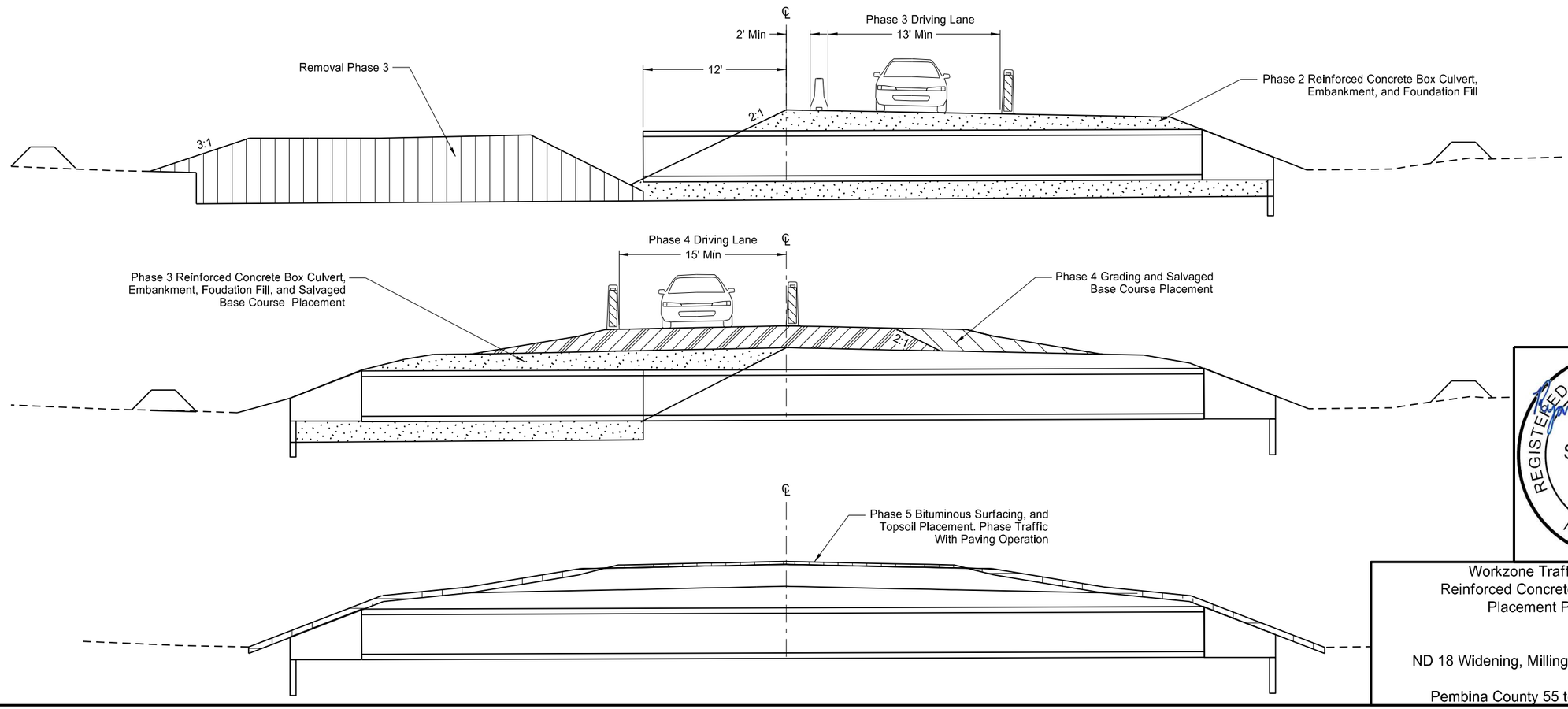
Pembina County 55 to the State Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	100	6

Note:
1. Temporary widening earthwork is included in the section 11 earthwork summary.







REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 9/3/2025
NORTH DAKOTA

Workzone Traffic Control
Reinforced Concrete Box Culvert
Placement Phasing

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

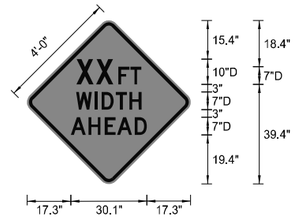
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	100	7

SIGN NUMBER	Consign 1
WIDTH X HEIGHT	4'-0" x 4'-0"
BORDER WIDTH	1.25" (inset 0.75")
CORNER RADIUS	3"
MOUNTING	Ground
BACKGROUND	TYPE: XI Reflective
	COLOR: Fluorescent Orange
LEGEND/BORDER	TYPE: Non-reflective
	COLOR: Black

SYMBOL	X	Y	WID	HT	ANGLE

STATION(S):
N/A

AREA: 16.0 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Const_48_Large_Diam.sid

LETTER POSITION (X)																		LENGTH	SIZE	SERIES
X	X	F	T															25.7	10,7	D 2000
19.5	27.3	36.1	40.9																	
W	I	D	T	H														25.9	7	D 2000
19.4	26.7	29.5	35.2	40.6																
A	H	E	A	D														30.1	7	D 2000
17.3	24.3	30.8	35.7	42.7																

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 9/3/2025
NORTH DAKOTA

Work Zone Traffic Control
Construction Sign Details

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
N.D.	SS-6-018(081)239	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
Sub Total			0.0	0.0		**Total**	0.0										**Total**	0.0		0	0	0	
ND 18																							
12656+66 Lt	SN 1		17.5		12.0	12.4			5.0	2.25 x 2.25 12 ga	14.4	3.5	3.8			2.5 x 2.5 12 ga	2	4	3 x 3 7 ga			2	
12659+09 Lt		437	8.4		14.3				5.0	2.5 x 2.5 10 ga	15.2						1	4	3 x 3 7 ga			1	
12660+59 Lt					12.3	12.7	12.8		5.0	2.25 x 2.25 12 ga	13.2	4.4	4.8	4.9		2.5 x 2.5 12 ga	3	4	3 x 3 7 ga	1		3	
12687+00 Rt		20		9.0	13.7				5.0	2.25 x 2.25 12 ga	14.7	4.7				2.5 x 2.5 12 ga	1	4	3 x 3 7 ga			1	
12697+11 Rt		9		5.0	11.0				5.0	2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga				
12697+19 Lt		9		5.0	11.0				5.0	2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga				
12699+40 Rt	SN 2 & S.A.A		5.3		11.3				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga	1			
12703+04 Rt		14		4.0	12.1				5.0	2 x 2 12 ga	13.0						1	4	2.25 x 2.25 12 ga				
12703+22 Lt	SN 3 & S.A.2B		8.0	5.2	11.6				5.0	2.25 x 2.25 12 ga	14.7						1	4	2.5 x 2.5 12 ga				
12703+88 Rt		1		5.2	12.5				5.0	2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga				
12714+46 Rt	S.A.B			10.4	12.2				5.0	2.25 x 2.25 12 ga	14.6						1	4	2.5 x 2.5 12 ga				
12715+19 Rt	SN 4 & S.A.2B		6.0	5.2	13.4				5.0	2.25 x 2.25 12 ga	14.7						1	4	2.5 x 2.5 12 ga				
12719+54 Rt		1		5.2	12.7				5.0	2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga				
12723+94 Rt	S.A.C				14.8				5.0	2.5 x 2.5 12 ga	15.0						1	4	3 x 3 7 ga	1			
12729+86 Rt		14		4.0	9.9				5.0	2 x 2 12 ga	13.0						1	4	2.25 x 2.25 12 ga				
12730+32 Rt		1		5.2	12.8				5.0	2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga				
12740+12 Rt		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				
12744+98 Rt	SN 5		10.0		12.0				5.0	2.25 x 2.25 12 ga	15.7	2.7				2.5 x 2.5 12 ga	1	4	3 x 3 7 ga			1	
12747+77 Lt	SN 2 & S.A.A		5.3		10.7				5.0	2.25 x 2.25 12 ga	12.6						1	4	2.5 x 2.5 12 ga				
12748+24 Lt	SN 5		10.0		11.0				5.0	2.25 x 2.25 12 ga	15.7	1.7				2.5 x 2.5 12 ga	1	4	3 x 3 7 ga			1	
12754+52 Rt		20		9.0	13.7				5.0	2.25 x 2.25 12 ga	14.7	4.7				2.5 x 2.5 12 ga	1	4	3 x 3 7 ga			1	
12756+26 Rt	S.A.2B			5.2	11.2				5.0	2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga	1			
12759+10 Lt					12.6	13.2	13.7		5.0	2.25 x 2.25 12 ga	15.0	3.6	4.2	4.8		2.5 x 2.5 12 ga	3	4	3 x 3 7 ga	1		3	
12762+95 Lt		9		5.0	12.2				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga				
12762+96 Rt		9		5.0	12.9				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga				
12766+22 Rt		15		6.3	12.2				5.0	2.5 x 2.5 12 ga	14.5						1	4	3 x 3 7 ga	1			
12766+23 Lt		371		6.0	12.7				5.0	2.25 x 2.25 12 ga	12.9						1	4	2.5 x 2.5 12 ga	1			
12768+26 Lt		37	10.0		11.9				5.0	2.25 x 2.25 12 ga	16.0	2.4				2.5 x 2.5 12 ga	1	4	3 x 3 7 ga	1		1	
12772+83 Lt		1		5.2	9.2				5.0	2 x 2 12 ga	10.5						1	4	2.25 x 2.25 12 ga				

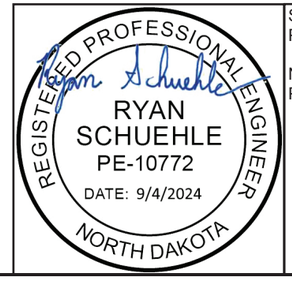
REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 9/4/2024
NORTH DAKOTA

Sign Summary
Perforated Tube

ND 18
Pembina County 55 to the State Line

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
N.D.	SS-6-018(081)239	110	2

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
12773+31 Lt		19		6.3	11.1				5.0	2.25 x 2.25 12 ga	11.6						1	4	2.5 x 2.5 12 ga				
12776+16 Lt		9		5.0	8.7				5.0	2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga				
Sub Total			80.5	121.6		**Total**	435.9										**Total**	144.0		8	0	14	
Grand Total			**80.5**	**121.6**		**Total**	**435.9**										**Total**	**144**	**0**	**8**	**0**	**14**	

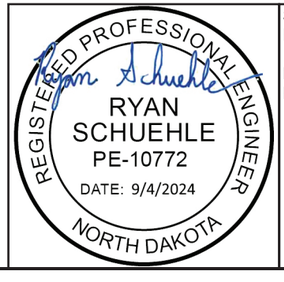


Sign Summary
Perforated Tube

ND 18
Pembina County 55 to the State Line

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
N.D.	SS-6-018(081)239	110	3

Station / RP	Sign / Assembly No.	Flat Sheet For Signs IV SF	Flat Sheet For Signs XI SF	Panel For Signs IV SF	Panel For Signs XI SF	Overlay Panel IV SF	Overlay Panel XI SF	Vert Clear-ance FT	Galv Steel Sheet Standard Pipe 1st LF	Galv Steel Sheet Standard Pipe 2nd LF	Size	Galv Steel Post W-Shape Posts 1st LF	Galv Steel Post W-Shape Posts 2nd LF	Galv Steel Post W-Shape Posts 3rd LF	Max Post Len LF	Post Space FT	Revise Fuse Joint EA	Std Pipe Fdn Dia FT	Std Pipe Fdn Dep FT	Std Pipe Fdn Vol CY	W-Shape Pile LF	Remove Sign Fdns Conc Fdn EA	Remove Sign Fdns W-Shape Pile EA	Reset Sign Panel EA	Reset Sign Support EA	Stub Post EA	Multi Dir Base EA	Comments
ND18																												
12768+23 Rt								5.0			W4x13	15.8	16.2		16.9	4.0					28		2	1				
Sub Total								**Total**	0.0			**Total**	32.0							0.0	28	0	2	1	0	0	0	
Grand Total								**Total**	**0.0**			**Total**	**32.0**							**0.0**	**28**	**0**	**2**	**1**	**0**	**0**	**0**	

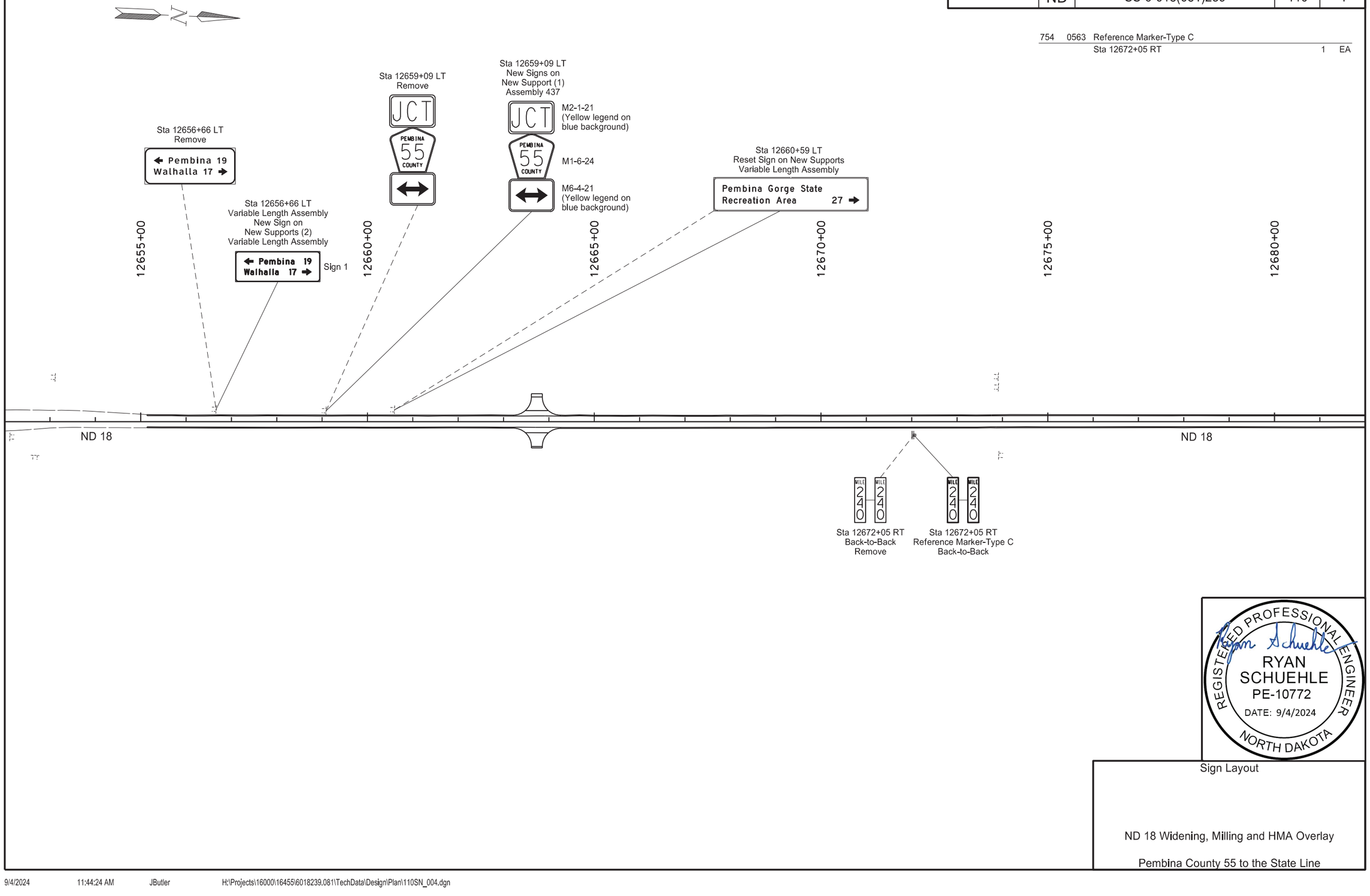


Sign Summary
Round Steel Pipe & W-Shape

ND 18
Pembina County 55 to the State Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	110	4

754 0563 Reference Marker-Type C
Sta 12672+05 RT 1 EA



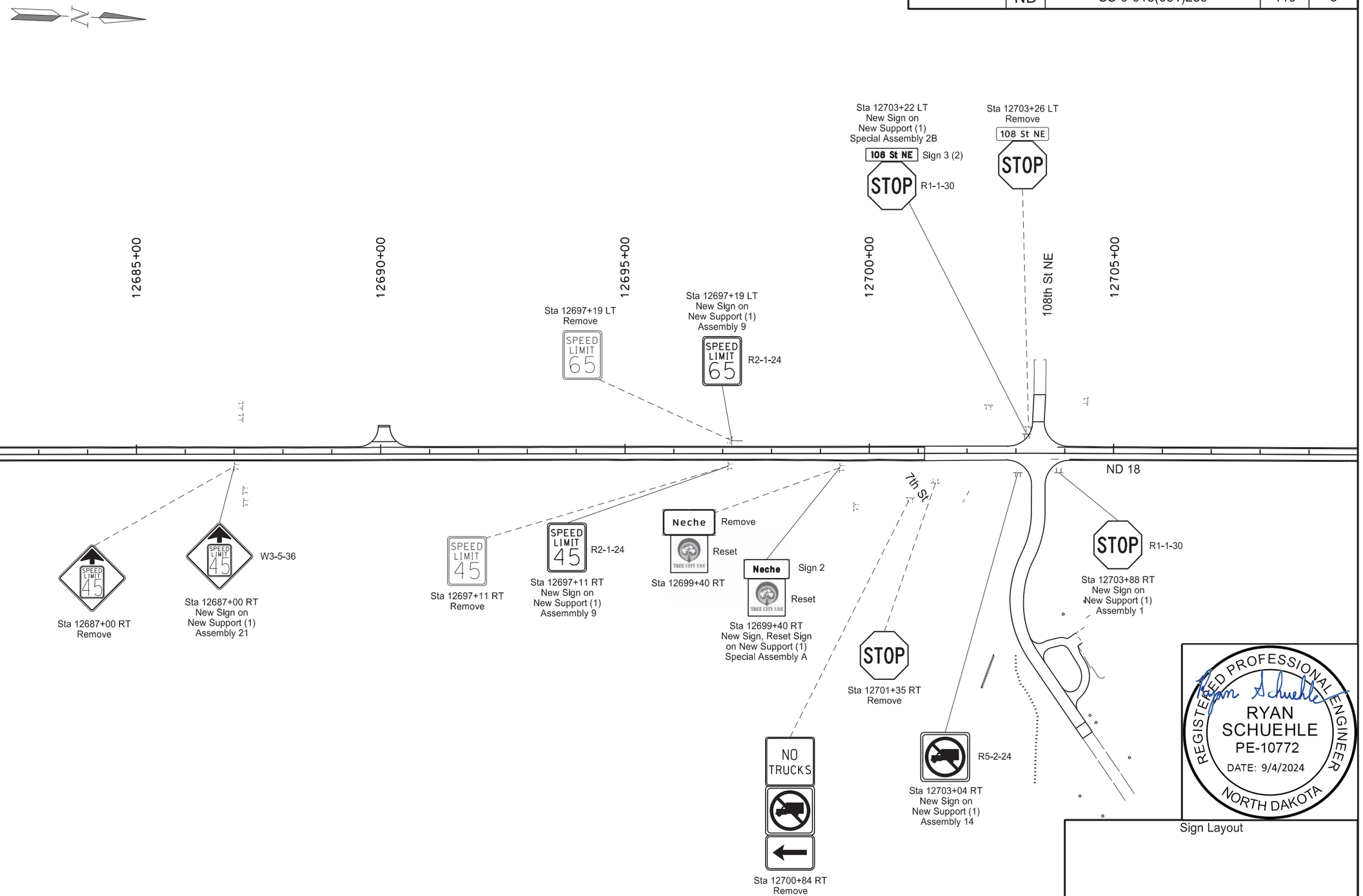
REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 9/4/2024
NORTH DAKOTA

Sign Layout

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	110	5



REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 9/4/2024
NORTH DAKOTA

Sign Layout

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	110	6

754 0563 Reference Marker-Type C
Sta 12724+79 RT 1 EA

12710+00 12715+00 12720+00 12725+00 12730+00 12735+00

Felson Rd

NECHE, ND

4th St

3rd St E

2nd St E

ND 18

TRUCK ROUTE
THRU TRUCK ROUTE
Sta 12714+46 RT
Remove

4th St
Sta 12714+68 RT
Remove

4th St Sign 4 (2)
STOP R1-1-30
Sta 12715+19 RT
New Signs on
New Support (1)
Special Assembly 2B

STOP
Sta 12715+19 RT
Remove

STOP R1-1-30
Sta 12719+50 RT
Remove

STOP R1-1-30
Sta 12719+54 RT
New Sign on
New Support (1)
Assembly 1

R14-1-24 TRUCK ROUTE TRUCK ROUTE R14-1-24
M6-1-21 M6-1-21
Sta 12714+46 RT
Back-to-Back
New Signs on
New Support (1)
Special Assembly B

CAUTION
SLOW Watch for Equipment & Trucks Loading
Sta 12723+94 RT
Reset Signs on
New Support (1)
Special Assembly C

MILE 241 MILE
Sta 12724+79 RT
Back-to-Back
Remove

MILE 241 MILE
Sta 12724+79 RT
Reference Marker-Type C
Back-to-Back

TRUCK ROUTE
THRU TRUCK ROUTE
Sta 12729+86 RT
Remove

R5-2-24
Sta 12729+86 RT
New Sign on
New Support (1)
Assembly 14

STOP
Sta 12730+25 RT
Remove

STOP R1-1-30
Sta 12730+32 RT
New Sign on
New Support (1)
Assembly 1

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 9/4/2024
NORTH DAKOTA

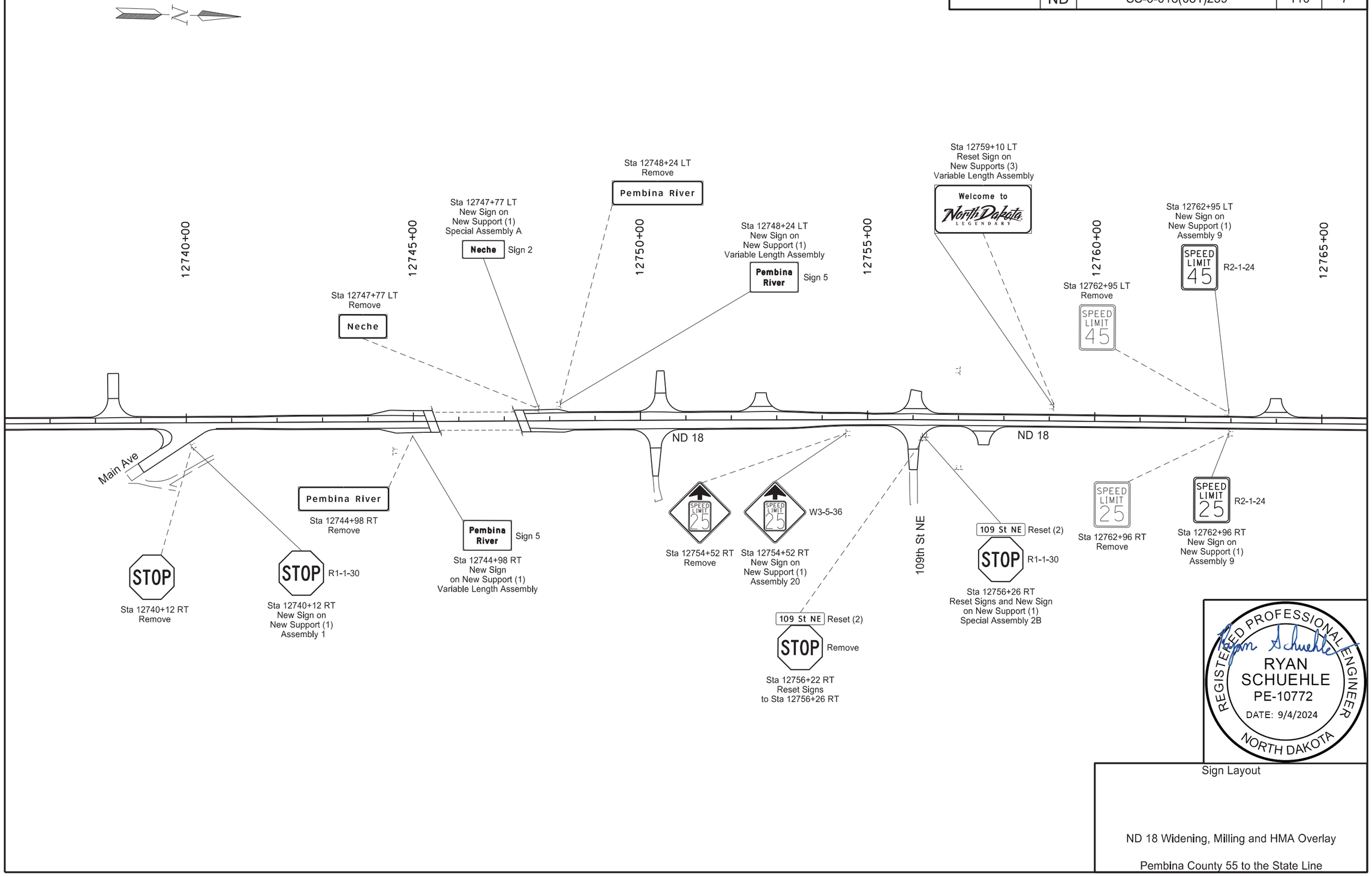
Sign Layout

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

9/4/2024 11:44:26 AM JButler H:\Projects\16000\16455\6018239.081\TechData\Design\Plan\110SN_006.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	110	7



REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 9/4/2024
NORTH DAKOTA

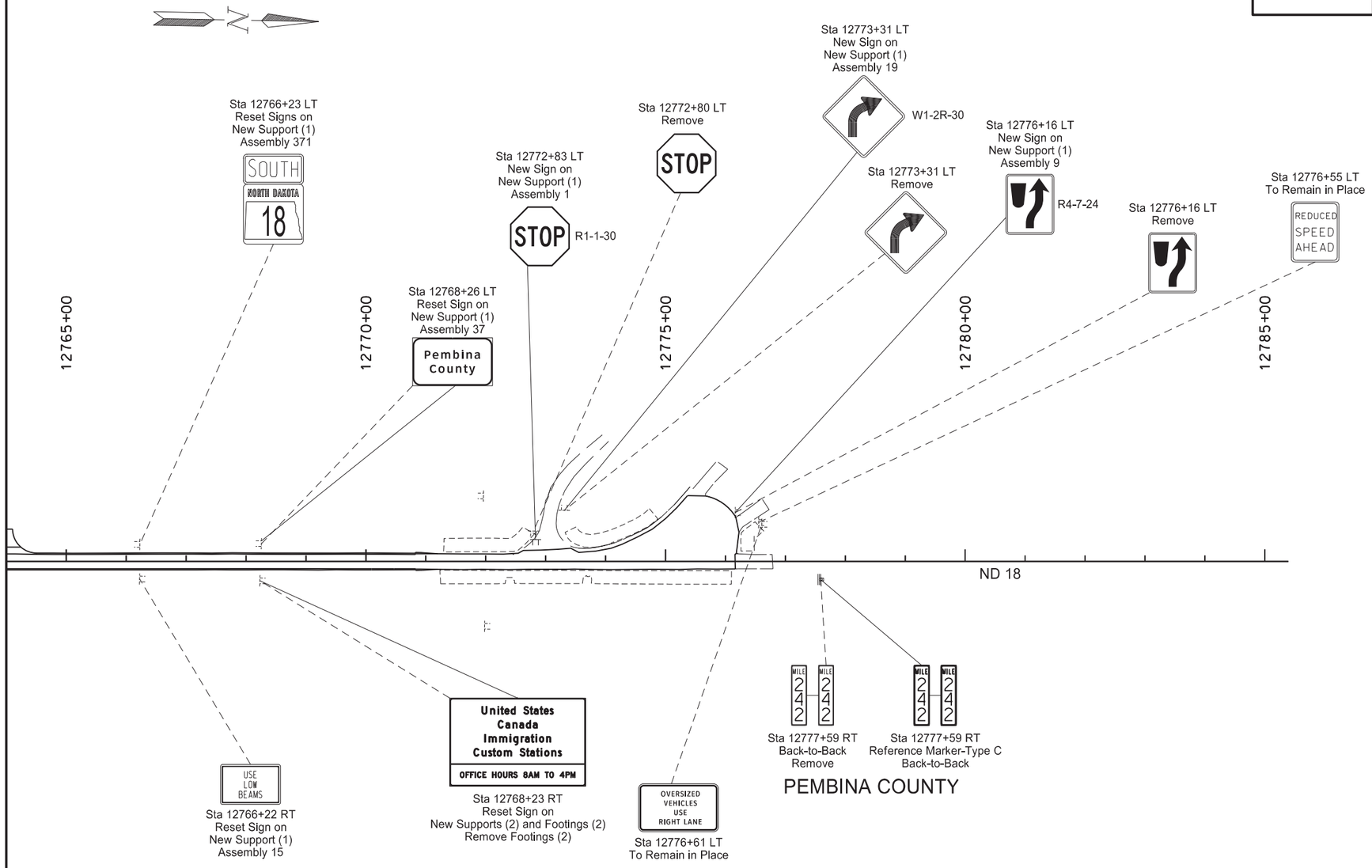
Sign Layout

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	110	8

754 0563 Reference Marker-Type C
Sta 12777+59 RT 1 EA



REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 9/4/2024
NORTH DAKOTA

Sign Layout

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

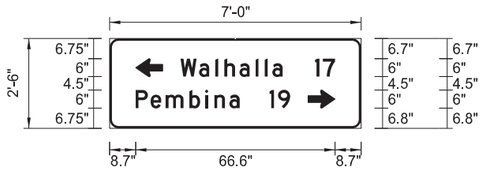
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	110	9

SIGN NUMBER	Sign 1
WIDTH X HEIGHT	7'-0" x 2'-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	8.7	17.3	6	9	90
ND_6IN_TYPE D	66.3	6.8	6	9	270

STATION(S):
12656+66 LT

AREA: 17.5 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Conv_DestInation.ssl

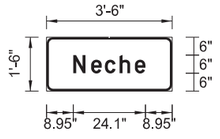
LETTER POSITION (X)																				LENGTH	SIZE	SERIES
W	a	l	h	a	l	l	a													34.1	6/4.5	D 2000
23.7	29.9	35.3	38.3	43.3	48.8	51.8	54.4															
1	7																			6.7	6	D 2000
68.6	71.2																					
P	e	m	b	i	n	a														34.7	6/4.5	D 2000
8.7	13.7	18.7	26.6	31.9	35	40																
1	9																			6.9	6	D 2000
53.4	56.2																					

SIGN NUMBER	Sign 2
WIDTH X HEIGHT	3'-6" x 1'-6"
BORDER WIDTH	0.75" (inset 0")
CORNER RADIUS	2.25"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE

STATION(S):
12699+40 RT
12747+77 LT

AREA: 5.3 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Conv_Boundary.ssl

LETTER POSITION (X)																				LENGTH	SIZE	SERIES
N	e	c	h	e																24.1	6/4.5	D 2000
8.9	14.9	19.5	24.4	29.5																		

SIGN NUMBER	Sign 3
WIDTH X HEIGHT	4'-0" x 1'-0"
BORDER WIDTH	0.5" (inset 0")
CORNER RADIUS	1.5"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE

STATION(S):
12703+22 LT

AREA: 4.0 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Conv_Street Name.ssl

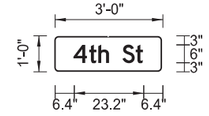
LETTER POSITION (X)																				LENGTH	SIZE	SERIES
1	0	8		S	t		N	E												37.4	6/4.5	D 2000
5.3	8.1	13.6	17.6	22.1	26.6	29	33.5	39														

SIGN NUMBER	Sign 4
WIDTH X HEIGHT	3'-0" x 1'-0"
BORDER WIDTH	0.5" (inset 0")
CORNER RADIUS	1.5"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE

STATION(S):
12715+19 RT

AREA: 3.0 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Conv_Street Name.ssl

LETTER POSITION (X)																				LENGTH	SIZE	SERIES
4	t	h		S	t															23.2	6/4.5	D 2000
6.4	11.7	14.7	18.3	22.8	27.2																	

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 9/4/2024
NORTH DAKOTA

Sign Details

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

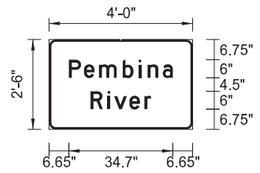
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	110	10

SIGN NUMBER	Sign 5
WIDTH X HEIGHT	4'-0" x 2'-6"
BORDER WIDTH	0.75" (inset 0")
CORNER RADIUS	2.25"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE

STATION(S):
12744+98 RT
12748+24 LT

AREA: 10.0 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Conv_Geographic Feature.ssl

LETTER POSITION (X)																		LENGTH	SIZE	SERIES
P	e	m	b	i	n	a												34.7	6/4.5	D 2000
6.6	11.7	16.7	24.6	29.9	32.9	38														
R	i	v	e	r														20.3	6/4.5	D 2000
13.9	19.5	21.7	26.8	31.9																

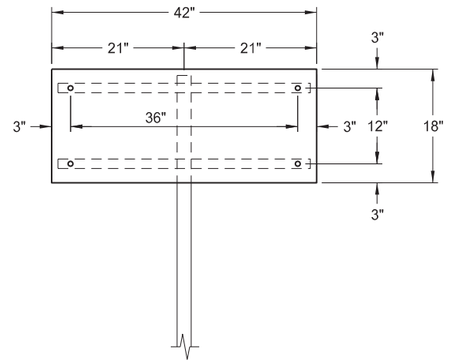
REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 9/4/2024
NORTH DAKOTA

Sign Details

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

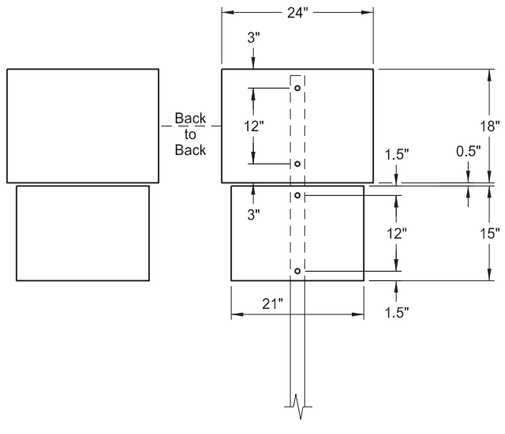
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	110	11



Special Assembly A

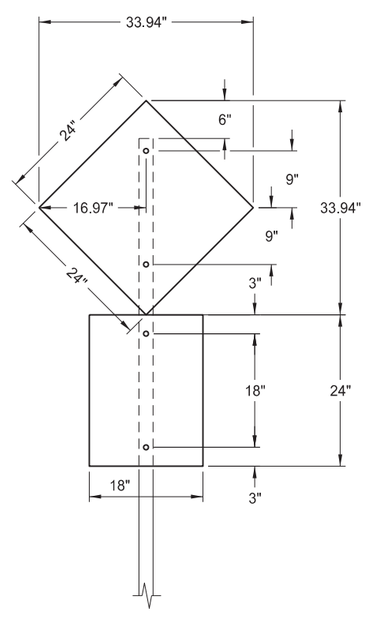
Sta 12699+40 RT
Sta 12747+77 LT

Pay Area: 5.3 SF



Special Assembly B

Sta 12714+46 RT
Pay Area: 10.4 SF



Special Assembly C

Sta 12723+94 RT

Pay Area: 0.0 SF (Reset Signs)

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RYAN SCHUEHLE
PE-10772
DATE: 9/4/2024
NORTH DAKOTA

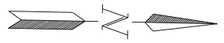
Special Assemblies

ND 18 Widening, Milling and HMA Overlay

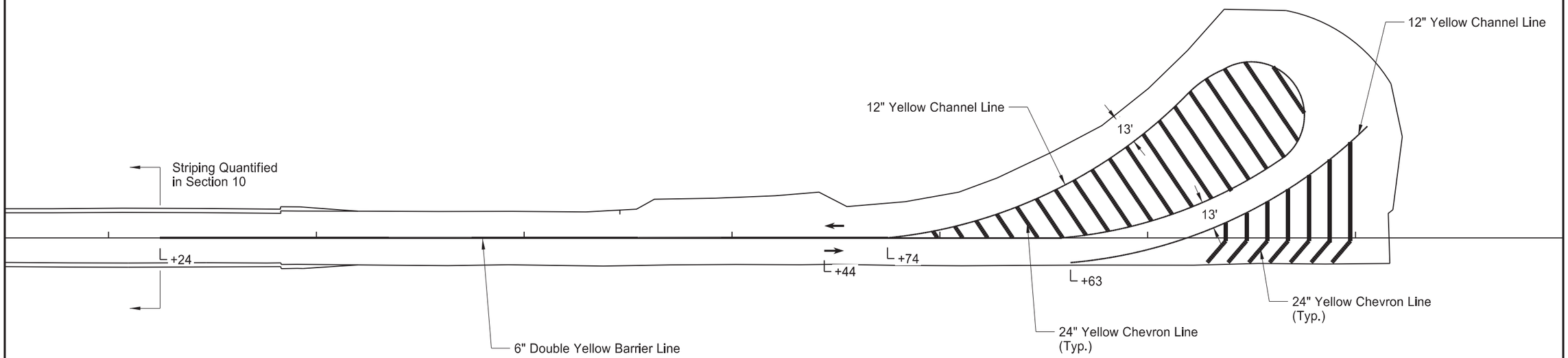
Pembina County 55 to the State Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	120	1

762	0103	PVMT MK PAINTED-MESSSAGE			
		Arrow (THRU)	12 SF x 2 EA =	24	SF
762	1106	PVMT MK PAINTED 6 IN LINE			
		Double Yellow Barrier	Length x 2 =	700	LF
762	1112	PVMT MK PAINTED 12 IN LINE			
		Yellow Channel Line		622	LF
762	1124	PVMT MK PAINTED 24 IN LINE			
		Yellow Chevron/Crosshatch		882	LF



12770 12771 12772 12773 12774 12775 12776



REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 9/4/2024
NORTH DAKOTA

Pavement Marking Layout
International Border Crossing

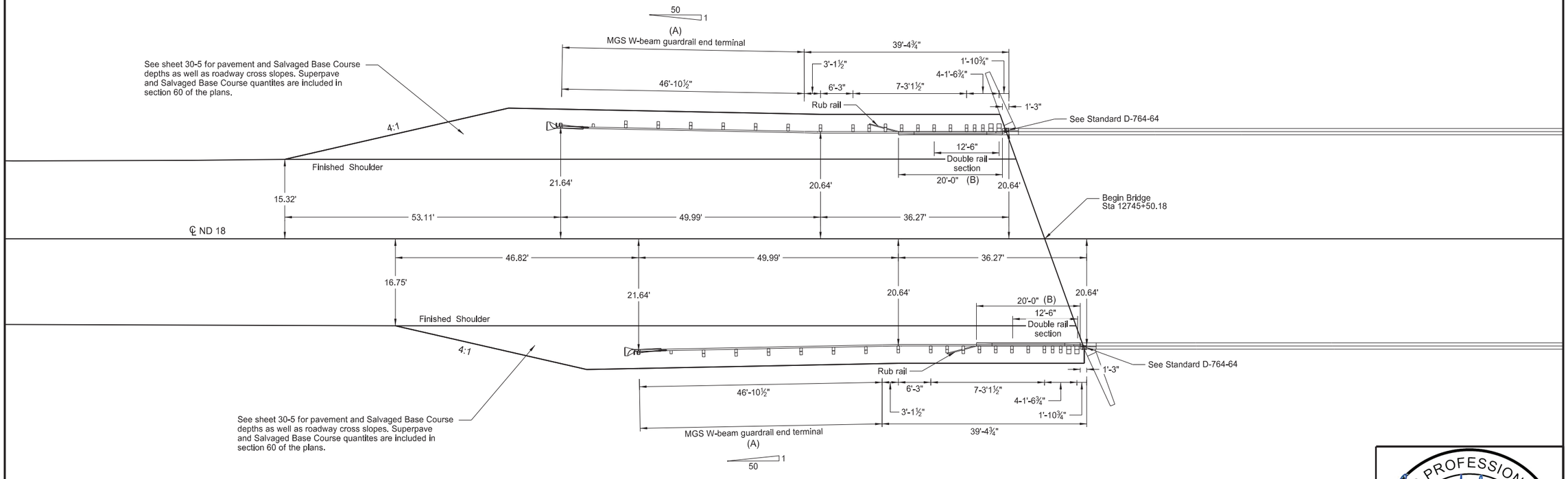
ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	130	1

23 USC § 407 Documents
NDDOT Reserves All Objections



(A) Install a MASH SoftStop or SKT End Terminal at this location. See Standard D-764-50 or D-764-51. Dimensions shown are for a MASH SKT End Terminal. If a MASH SoftStop End Terminal is used, install per Standard D-764-50 at a 50:1 taper over its length.

(B) Install curb and gutter in accordance with Standard Drawing D-748-1, except for height transitions provided for a distance of 3 feet at each end, as shown on Standard Drawing D-764-64. The curb and gutter will be measured and paid for by the linear foot as "Curb & gutter - type 1 special".

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 9/4/2024
NORTH DAKOTA

MGS W-Beam Guardrail Layout

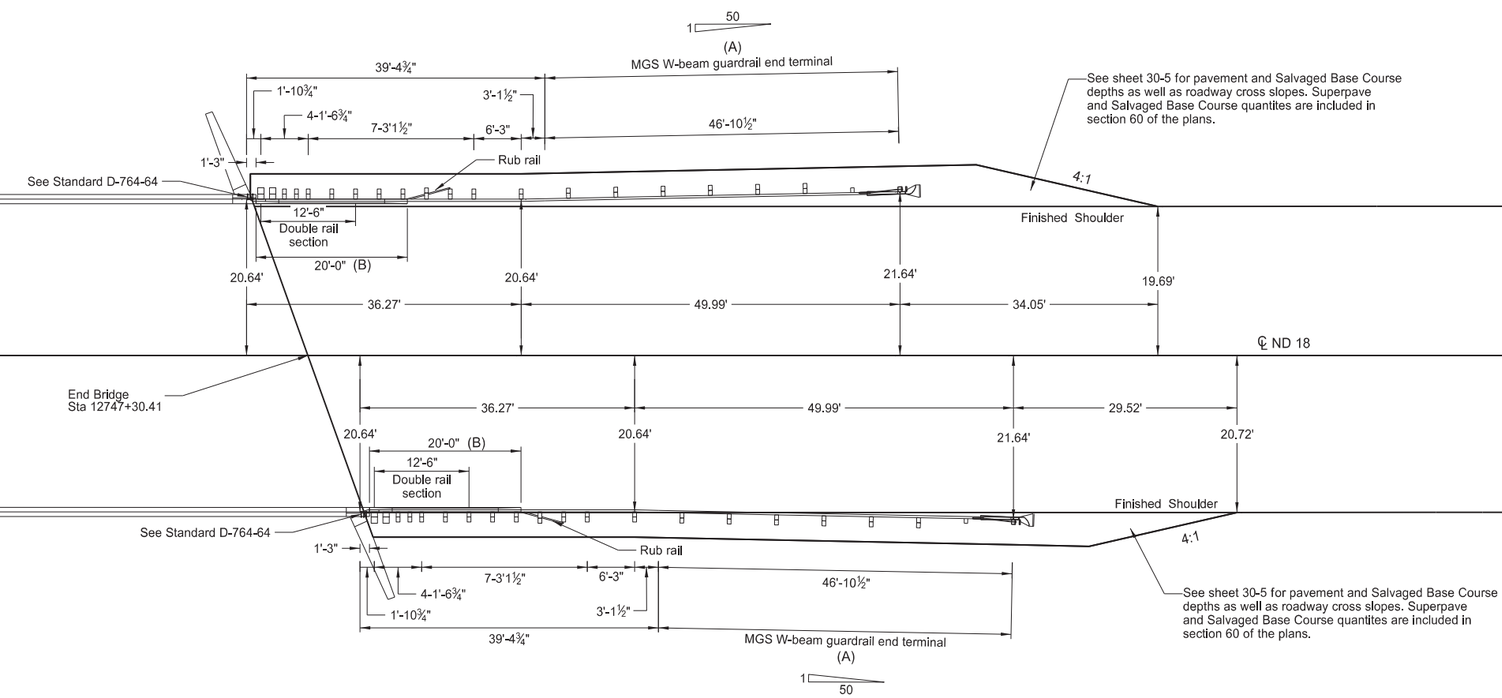
Pembina River Bridge
RP 241.409

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	130	2

23 USC § 407 Documents
NDDOT Reserves All Objections



(A) Install a MASH SoftStop or SKT End Terminal at this location. See Standard D-764-50 or D-764-51. Dimensions shown are for a MASH SKT End Terminal. If a MASH SoftStop End Terminal is used, install per Standard D-764-50 at a 50:1 taper over its length.

(B) Install curb and gutter in accordance with Standard Drawing D-748-1, except for height transitions provided for a distance of 3 feet at each end, as shown on Standard Drawing D-764-64. The curb and gutter will be measured and paid for by the linear foot as "Curb & gutter - type 1 special".

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 9/4/2024
NORTH DAKOTA

MGS W-Beam Guardrail Layout

Pembina River Bridge
RP 241.409

ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	130	3

23 USC § 407 Documents
NDDOT Reserves All Objections

MGS W-BEAM GUARDRAIL SUMMARY OF QUANTITIES

MGS W-BEAM GUARDRAIL AT BRIDGE ENDS

LOCATION	(A) TERM-INAL CON-NECTOR	(A) 5/8" ø x 22" LONG GUARD-RAIL BOLT	(A) 5/8" ø x 20" LONG GUARD-RAIL BOLT	(A) 7/8" ø x 9" LONG H.S. HEX HEAD BOLT	(A) 5/8" ø x 18" LONG GUARD-RAIL BOLT	(A) 6"x 8" x 14" WOOD OFF-SET BLOCK	(A) 6"x 8" x 6' - 0" TIMBER POST	(A) 5/8" ø x 1 1/4" LONG GUARD-RAIL BOLT	(A) 12'-6" DOUBLE RAIL SECTION	(A) 12'-6" STRAIGHT RAIL SECTION	(A) 5/8" ø x 11" LONG HEX HEAD BOLT	(A) 1/2" ø x 4" LONG LAG SCREW	(A) 6" x 8" x 7'-0" TIMBER POST	(A) RUB RAIL END SHOE	(A) C 6 x 8.2 x 14'-6 1/4" RUB RAIL SECTION	(A) C 6 x 8.2 x 12'-7" BENT RUB RAIL SECTION	(A) 5/8" ø x 1 1/2" LONG GUARD-RAIL BOLT	(A) 7 3/4" x 4 1/2" x 3/8" RUB RAIL SPLICE PLATE	(A) 10" x 10" x 8'-0" TIMBER POST	(A) 10" x 8" x 21" TAPERED TIMBER BLOCK	(A) 6" x 8" x 21" TIMBER BLOCK	(A) 6" x 9 3/4" x 14" TIMBER BLOCK	(A) REFL-ECTOR-IZED PLATES
	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH
Sta 12744+72.01 to Sta 12745+58.28 Rt	1	2	10	4	10	3	8	32	1	2	2	1	3	1	1	1	4	1	2	2	7	1	5
Sta 12744+57.03 to Sta 12745+43.30 Lt	1	2	10	4	10	3	8	32	1	2	2	1	3	1	1	1	4	1	2	2	7	1	5
Sta 12747+37.29 to Sta 12748+23.56 Rt	1	2	10	4	10	3	8	32	1	2	2	1	3	1	1	1	4	1	2	2	7	1	5
Sta 12747+22.30 to Sta 12748+08.58 Lt	1	2	10	4	10	3	8	32	1	2	2	1	3	1	1	1	4	1	2	2	7	1	5
TOTAL	4	8	40	16	40	12	32	128	4	8	8	4	12	4	4	4	16	4	8	8	28	4	20

(A) These items are not to be bid separately but shall be included in the price bid for the item "W-Beam Guardrail".

Spec	Code	Item Description		QTY	Unit
748	0141	Curb & Gutter-Type 1 Special			
		Sta 12745+37.03 to Sta 12745+57.03 Rt		20	LF
		Sta 12745+22.05 to Sta 12745+42.05 Lt		20	LF
		Sta 12747+38.54 to Sta 12747+58.54 Rt		20	LF
		Sta 12747+23.55 to Sta 12747+43.55 Lt		20	LF
			Total	80	LF
764	0131	W-Beam Guardrail			
		Sta 12745+18.89 to Sta 12745+58.28 Rt		39.4	LF
		Sta 12745+03.89 to Sta 12745+43.30 Lt		39.4	LF
		Sta 12747+37.29 to Sta 12747+76.68 Rt		39.4	LF
		Sta 12747+22.30 to Sta 12747+61.70 Lt		39.4	LF
			Total	157.6	LF
764	0145	W-Beam Guardrail End Terminal			
		Sta 12744+72.01 to Sta 12745+18.89 Rt		1	EA
		Sta 12744+57.03 to Sta 12745+03.89 Lt		1	EA
		Sta 12747+76.68 to Sta 12748+23.56 Rt		1	EA
		Sta 12747+61.70 to Sta 12748+08.58 Lt		1	EA
			Total	4	EA

Spec	Code	Item Description		QTY	Unit
764	2080	Remove Box Beam Guardrail			
		Sta 12744+66.49 to Sta 12745+59.31 Rt		93	LF
		Sta 12745+05.49 to Sta 12745+45.13 Lt		40	LF
		Sta 12747+35.38 to Sta 12747+74.63 Rt		40	LF
		Sta 12747+20.90 to Sta 12748+14.05 Lt		93	LF
			Total	266	LF
764	2081	Remove End Teatment & Transition			
		Sta 12744+26.60 to Sta 12744+66.49 Rt		1	EA
		Sta 12744+65.44 to Sta 12745+05.49 Lt		1	EA
		Sta 12747+74.63 to Sta 12748+14.70 Rt		1	EA
		Sta 12748+14.05 to Sta 12748+53.83 Lt		1	EA
			Total	4	EA

REGISTERED PROFESSIONAL ENGINEER
RYAN SCHUEHLE
PE-10772
DATE: 9/4/2024
NORTH DAKOTA

MGS W-Beam Guardrail Quantities

Pembina River Bridge
RP 241.409

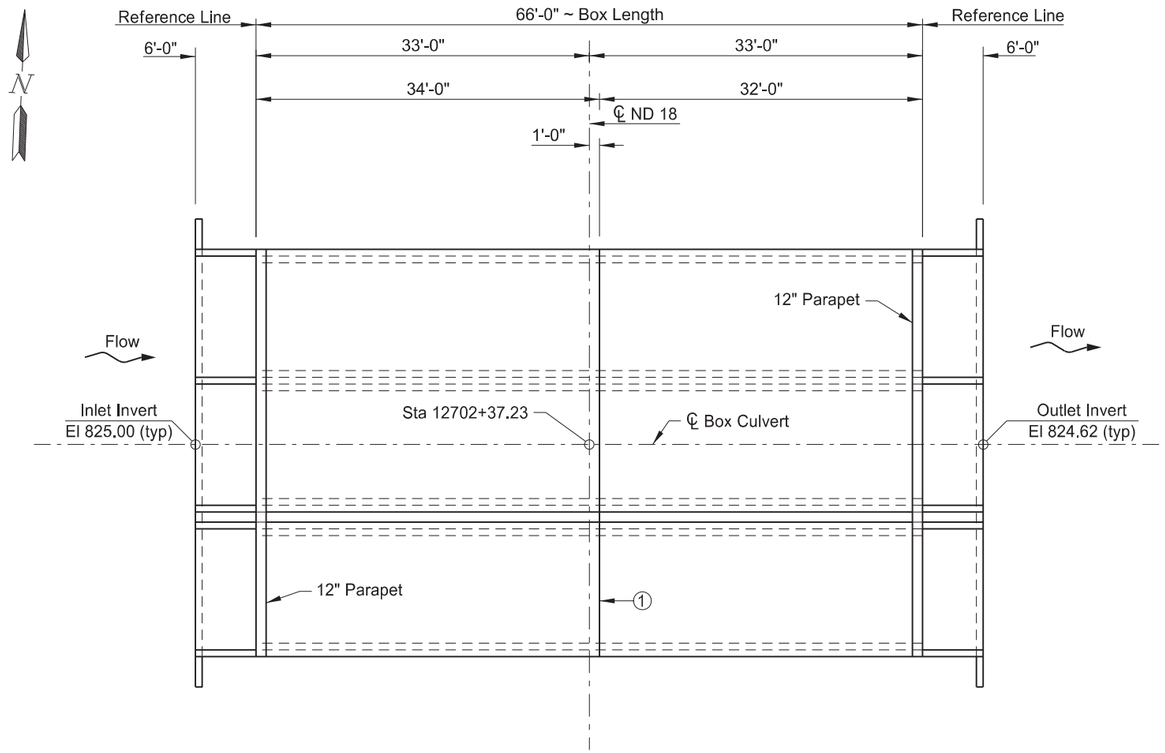
ND 18 Widening, Milling and HMA Overlay

Pembina County 55 to the State Line

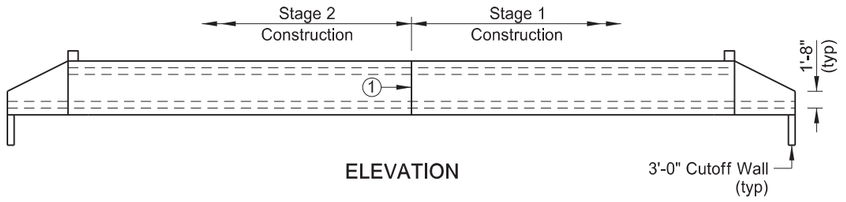
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23 U.S.C. § 407
NDDOT Reserves All Objections

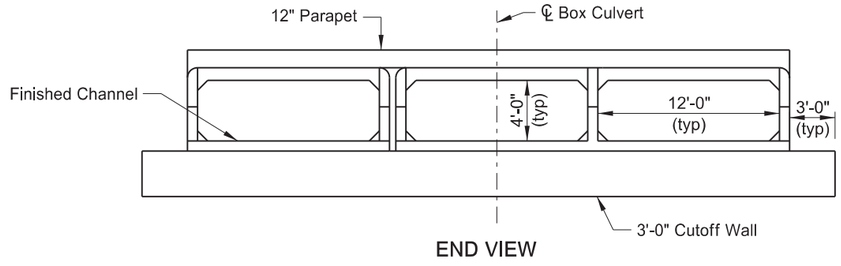
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(087)240 SS-6-018(081)239	170	1



PLAN



ELEVATION



END VIEW

NOTE:

① Denotes division between Stage 1 and Stage 2 construction

See Section 100 of Plans for traffic phasing during Staged construction.

HYDRAULIC DATA:

Drainage Area	3.75	sq mi
Stream Gradient	0.0003	ft/ft
Design Frequency	50	yr
Design Discharge	213.15	cfs
Design Headwater Stage	828.64	ft
Design Tailwater Stage	828.57	ft
Velocity Through Culvert	1.53	fps
100-Year Frequency Discharge	252.28	cfs
100-Year Frequency Headwater	829.01	ft
Overtopping Stage	832.52	ft
Overtopping Discharge	718.92	cfs

BOX CULVERT BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
210	0050	BOX CULVERT EXCAVATION	EA	1
210	0210	FOUNDATION FILL	CY	1247
210	0250	BOX CULVERT FOUNDATION AGGREGATE	CY	197
210	0405	FOUNDATION PREPARATION-BOX CULVERT	EA	1
606	1204	12FT X 4FT PRECAST RCB CULVERT	LF	66
606	3204	DBL 12FT X 4FT PRECAST RCB CULVERT	LF	66
606	5204	12 FT x 4FT PRECAST RCB END SECTION	EA	2
606	7204	DBL 12FT X 4FT PRECAST RCB END SECTION	EA	2
709	0100	GEOSYNTHETIC MATERIAL TYPE G	SY	393

REGISTERED PROFESSIONAL ENGINEER
MATTHEW G. ROBINSON
PE-28604
Date 06/21/24
NORTH DAKOTA

STANDARD DRAWINGS

D-714-22

HL-93 DESIGN LOADING

ND Highway 18

CLEAR SPAN 3X12' CLEAR HEIGHT 4'
MAXIMUM FILL 7' STATION 12702+37.23

PRECAST CONCRETE
TRIPLE BOX CULVERT LAYOUT

ND DEPARTMENT OF TRANSPORTATION
BRIDGE DIVISION

Jason Thorenson
06/21/24

DRAWING NO. 18-240.573-1

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-6-018(087)240 SS-6-018(081)239	170	2

NOTES

100 SCOPE OF WORK: Work at this site consists of installing a new triple-barrel, 12' x 4' x 66'-0" precast concrete box culvert.

606 JOINTS: Provide joints in accordance with Section 606.E.3, with the exception that a 12” minimum width waterproof membrane is allowable around the exterior surfaces of the box culvert walls and roof.

606 PRECAST BOX CULVERT DESIGN: Design the box culvert and box culvert end sections in accordance with the AASHTO LRFD Bridge Design Specifications, 9th Edition. Design for HL-93 live load and a fill height range from 2 ft to 7 ft over the box culvert.

Load rate the box culvert in accordance with both the NDDOT Load Rating Manual and the AASHTO Manual for Bridge Evaluation, 2018 Edition, incorporating the latest Interim Revisions. Provide a box culvert design to achieve a rating factor greater than or equal to 1.0 for all load rating vehicles.

Include with the work drawing submittals a Load Rating Report sealed by a ND registered PE, and an AASHTOWare BrR Model of the structure in XML format.

606 PRECAST SECTION: The culvert will be constructed in two stages. Place the precast sections for each stage to the limits shown in the plans.

Tie the precast barrel and precast end sections together with 1"ϕ tie bolts as shown on Standard Drawing D-714-22. A lock nut or lock washer may be provided in lieu of tack welding as shown in the standard drawings. Place ties in the exterior walls of each precast segment. Use two ties per exterior wall joint, located at the one-third points of the wall’s clear height.

As an alternative to the double-cell precast segment, two single-cell precast segments may be provided. This provision also applies to the end sections. This substitution will be made at no additional cost to the project.

Payment for the sloped end sections includes the cutoff walls and parapets. Cast holes at 3’-0” centers through the last end section and into the cutoff wall to receive 3/4” diameter reinforcing bars. Additionally, cast holes at 2’-0 centers in the first end section to accommodate 3/4” diameter reinforcing bars for attaching the parapet. Install the bars according to the manufacturer’s recommendations, utilizing a high-strength adhesive specifically intended for concrete anchorage, in accordance with Section 806.02.

Provide a distance of 1'-0" between separate precast units. Fill the void between the barrel sections with a controlled density backfill. Before filling the void, cap the ends as shown with a weatherproof and freeze/thaw resistant, non-shrink cement grout material such as SikaGrout 212, BASF Masterflow 928, Euclid NS Grout, or an approved equal which complies with ASTM C1107.

Fill the gap between the end sections with controlled density backfill or Class 41 aggregate capped as shown with AE-3 concrete.

The controlled density backfill consists of cement, water, fly ash, and aggregate at the ratio specified below. Place controlled density backfill as shown in the plans. Mix the material continuously during pumping or placement to keep the solution from separating.

MIX DESIGN

Cement	75 lbs
Fly Ash	125 lbs
Fine Aggregate	2600 lbs
Water	416.5 gals

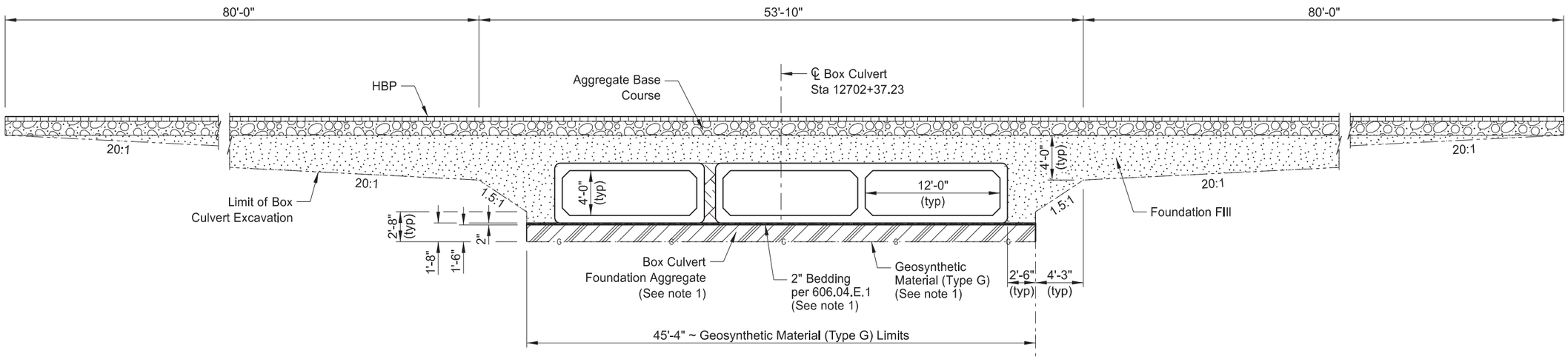
Include all labor, equipment, and material costs for the non-shrink grout, reinforcement, controlled density backfill, AE-3 concrete, and Class 41 aggregate in the price bid for the precast culvert and precast end section bid items.

REGISTERED PROFESSIONAL ENGINEER
MATTHEW G. ROBINSON
PE-28604
Date 06/21/24
NORTH DAKOTA

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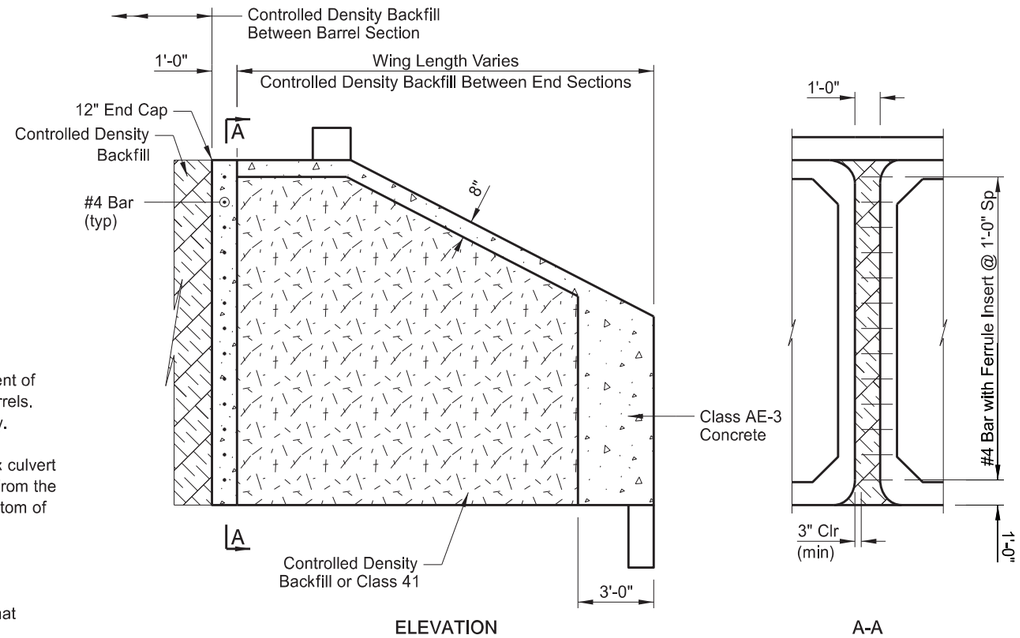
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NDDOT Reserves All Objections

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ND	SS-6-018(087)240 SS-6-018(081)239	170	3



(SHOWING SECTION ALONG ℄ ROADWAY)

GEOSYNTHETIC GEOGRID PLACEMENT AND BACKFILL TRHOUGH EXISTING EMBANKMENT



ELEVATION A-A

CONTROLLED DENSITY BACKFILL DETAIL

NOTES:

The intent of this detail is to show only the placement of the controlled density backfill between adjacent barrels. The representation of the size of barrels is arbitrary.

Embed the #4 bar 6" into the side of one of the box culvert end sections maintaining a 3" minimum clearance from the other box culvert. Spacing measured 1'-0" from bottom of box and spaced at 1'-0" up the front face.

Install the #4 bars according to the manufacturer's recommendations, with a high strength adhesive specifically intended for concrete anchorage and that meets the requirements of Section 806.02.

NOTES:

1. Extend the geosynthetic, bedding material, and box culvert foundation aggregate material below the box culvert to the end of the apron.
2. Place bedding required for the east half or west half prior to box culvert section placement for the corresponding half.

REGISTERED PROFESSIONAL ENGINEER
MATTHEW G. ROBINSON
PE-28604
Date 06/21/24
NORTH DAKOTA

ND Highway 18

ELEVATION & FOUNDATION FILL DETAIL

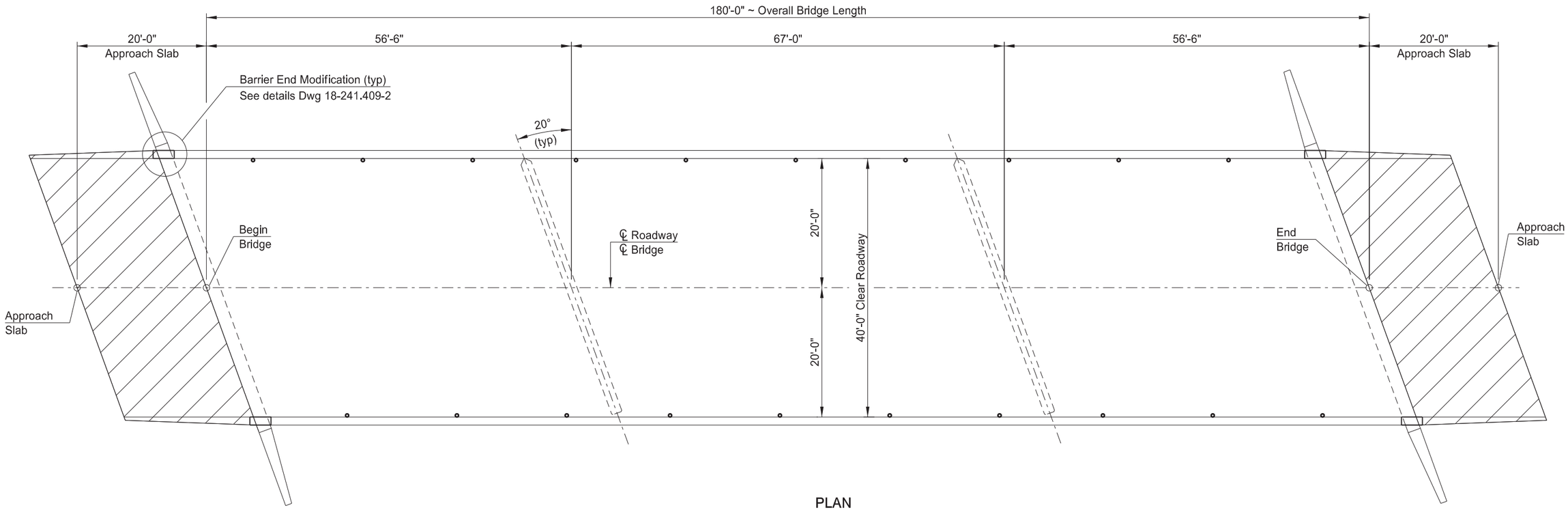
ND DEPARTMENT OF TRANSPORTATION
BRIDGE DIVISION

DRAWING NO. 18-240.573-3

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

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	SS-6-018(081)239	170	4



PLAN

Concrete to be removed

BRIDGE BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
202	0111	REMOVAL OF CONCRETE	L SUM	1
602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	936
930	9223	CRACK SEALING	LF	120
930	9612	SPALL REPAIR	SF	1
930	9647	BARRIER END MODIFICATION	EA	4

REGISTERED PROFESSIONAL ENGINEER
RYAN A. RYKOWSKY
PE-6691
DATE: 09/05/24
NORTH DAKOTA

PEMBINA RIVER

BRIDGE LAYOUT

ND DEPARTMENT OF TRANSPORTATION
BRIDGE DIVISION

Jason Thorenson
09/06/24

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18-241.409-1

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NOTES

100 SCOPE OF WORK: Work at this site consists of removing concrete approach slabs; repairing a spall on the bridge barrier; and applying penetrating water repellent treatment and crack sealing and top the bridge deck and barriers.

202 REMOVAL OF CONCRETE: Remove the concrete approach slabs in a manner that prevents any damage to parts of the structure to remain. Include all labor and equipment required to remove the concrete approach slabs in the price bid for “Removal of Concrete.”

602 WATER WASHING EQUIPMENT: In addition to the water-washing equipment listed in Section 602.02 D, a cold water pressure washer that provides a minimum nozzle pressure of 3,000 psi may be used.

602 PENETRATING WATER REPELLENT TREATMENT: Apply penetrating water repellent solution to the top of the bridge deck and the front face and tops of barriers. Do not apply crack sealant, pavement marking, or allow traffic until the solution has completely penetrated and the entire driving surface is dry.

930 CRACK SEALING: After the penetrating water repellent has been applied and is dry, the Engineer will perform a visual inspection of the bridge deck and barriers to determine the need for crack sealing. Mark and repair all visible cracks appearing on the top surface 0.02" or greater in width at its widest segment or as directed by the Engineer.

Immediately before applying the sealer, clean the cracks by removing all dust and debris with compressed air. Seal the cracks with a two-part epoxy in accordance with the manufacturer's recommendations. Chase crack with the sealant application to limits of crack, including those portions that are narrower than 0.02" wide. Use Paulco TE-2501 (Viking Paints, Inc.), Dural 50 LM (Euclid Chemical Co.), TK-9000 or TK-2110 (TK Products), or an approved equal epoxy sealer.

930 SPALL REPAIR: The structure has areas of spalling and concrete deterioration as indicated in the "Spall Repair" table.

Remove all unsound concrete and replace it with new concrete to the original constructed section. Use a 15 pound maximum size chipping hammer on any unsound concrete. Remove concrete around the periphery of any exposed reinforcing steel to provide a minimum clearance behind the bar of ¼" plus the dimension of the maximum size aggregate of the repair material. Provide sharp, neat lines at least 1 inch deep at the edges of the repair areas. Produce these sharp, neat lines by saw cutting or other means approved by the Engineer.

Sandblast clean the existing concrete and exposed reinforcing steel. Repair any damaged epoxy coating on the reinforcing steel with a patching material that meets ASTM A775 and ASTM D3963. Clean the existing concrete surface by high pressure water blasting. After the surface has dried and just before the patching material is placed, coat the surface with an epoxy bonding agent.

Replace removed concrete with a two component, polymer-modified, cementitious repair mortar material that is specifically intended for patching concrete and contains a corrosion inhibitor. This patching material may be SikaTop 123 Plus (Sika Corporation), Duraltop Gel (Euclid Chemical Company), MasterEmaco N 400 (BASF Corporation), or an approved equal repair mortar. Cure the material as recommended by the manufacturer.

The extents of repairs as shown in the "Spall Repair" table are approximations. The actual limits and number of repair locations are to be determined by the Engineer in the field. See supplemental bid information for photos.

Include all labor, equipment and materials needed to repair the spall areas in the bid item "Spall Repair."

SPALL REPAIR (SF)		
PICTURE	LOCATION	TOTAL (SF)
#1	BARRIER BACKFACE SW CORNER	1

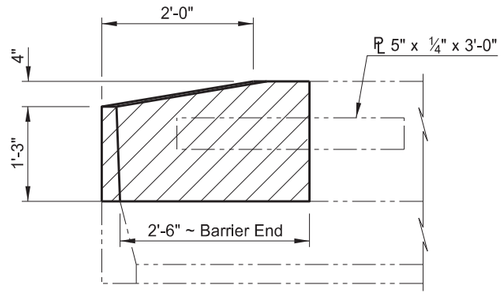
REGISTERED PROFESSIONAL ENGINEER
RYAN A. RYKOWSKY
PE-6691
DATE: 09/05/24
NORTH DAKOTA

DocuSign Envelope ID: 5DF666CD-9CDE-40D0-ACB9-6AB1F26ED42C

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

	STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	170	6

The hatched areas indicate barrier concrete to be removed and modified. Saw cut concrete to provide for a neat line prior to being removed. Carefully remove concrete to ensure no damage is done to the existing reinforcing steel that is to remain in place.



SHOWING REMOVAL LIMITS
BARRIER END MODIFICATION DETAIL

NOTES:

The dimensions shown in the "Bent Bar Details" are out to out. The bar marks beginning with an "X" indicate an epoxy coated bar.

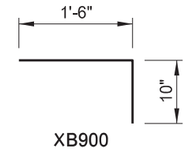
Use a special surface finish on all surfaces that matches the existing barrier in texture and color.

Tie the approach curb and gutter section to the modified barrier end with a #4 rebar. Embed the bars 6" into the barrier end using a high strength adhesive specifically intended for concrete anchorage that meets the requirements of Section 806.02. Embed the bar 1'-6" into the curb and gutter section. Place 1" polystyrene between the barrier end and the curb and gutter section.

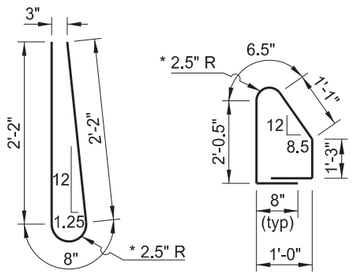
The estimated material quantities shown are for informational purposes only. Include the concrete, reinforcing bars, polystyrene, connection plates, pipe, and labor required to modify the barrier ends in the pay item "Barrier End Modification." Use Class AAE-3 concrete and Grade 60 reinforcing steel. Provide reinforcing steel that meets the requirements of Section 612.

BARRIER END MODIFICATIONS			
BAR LIST - FOUR CORNERS			
4	XA900	20	2'-11"
5	XB900	8	2'-4"
5	XL900	4	5'-0"
5	XMK900	4	6'-3"

ESTIMATED MATERIAL QUANTITIES	
REINFORCING STEEL (LBS)	CONCRETE (CY)
105	0.7

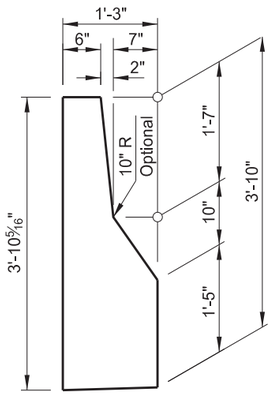


XB900

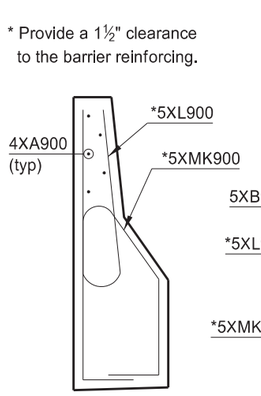


XL900 XMK900

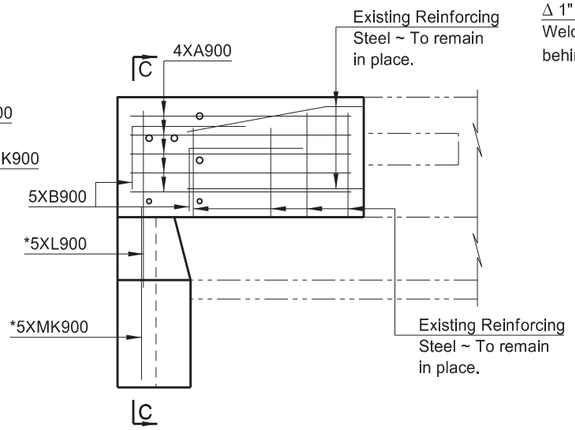
* Inside Radius
BENT BAR DETAILS



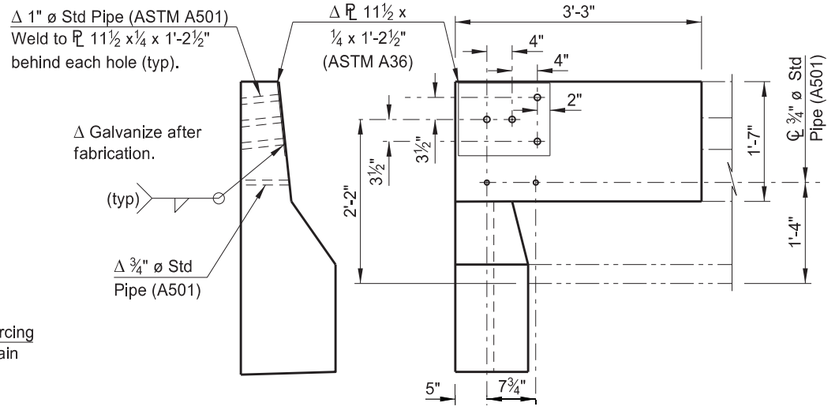
SHOWING DIMENSIONS
BARRIER DETAIL



C-C



SHOWING REINFORCING



SHOWING DIMENSIONS

(SHOWING FRONT FACE OF MODIFIED BARRIER END)
BARRIER END MODIFICATION & CONNECTION PLATE DETAILS

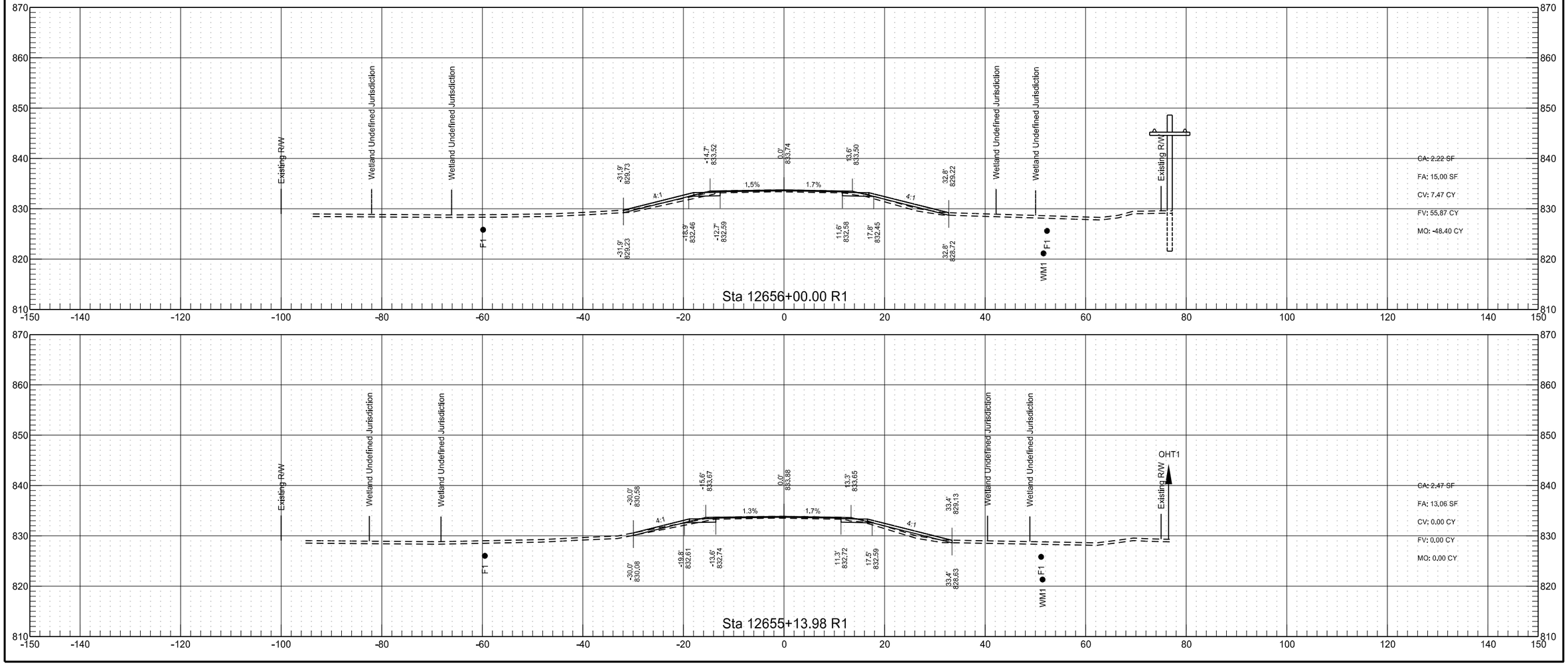
REGISTERED PROFESSIONAL ENGINEER
RYAN A. RYKOWSKY
PE-6691
DATE 09/05/24
NORTH DAKOTA

PEMBINA RIVER

BARRIER END MODIFICATION

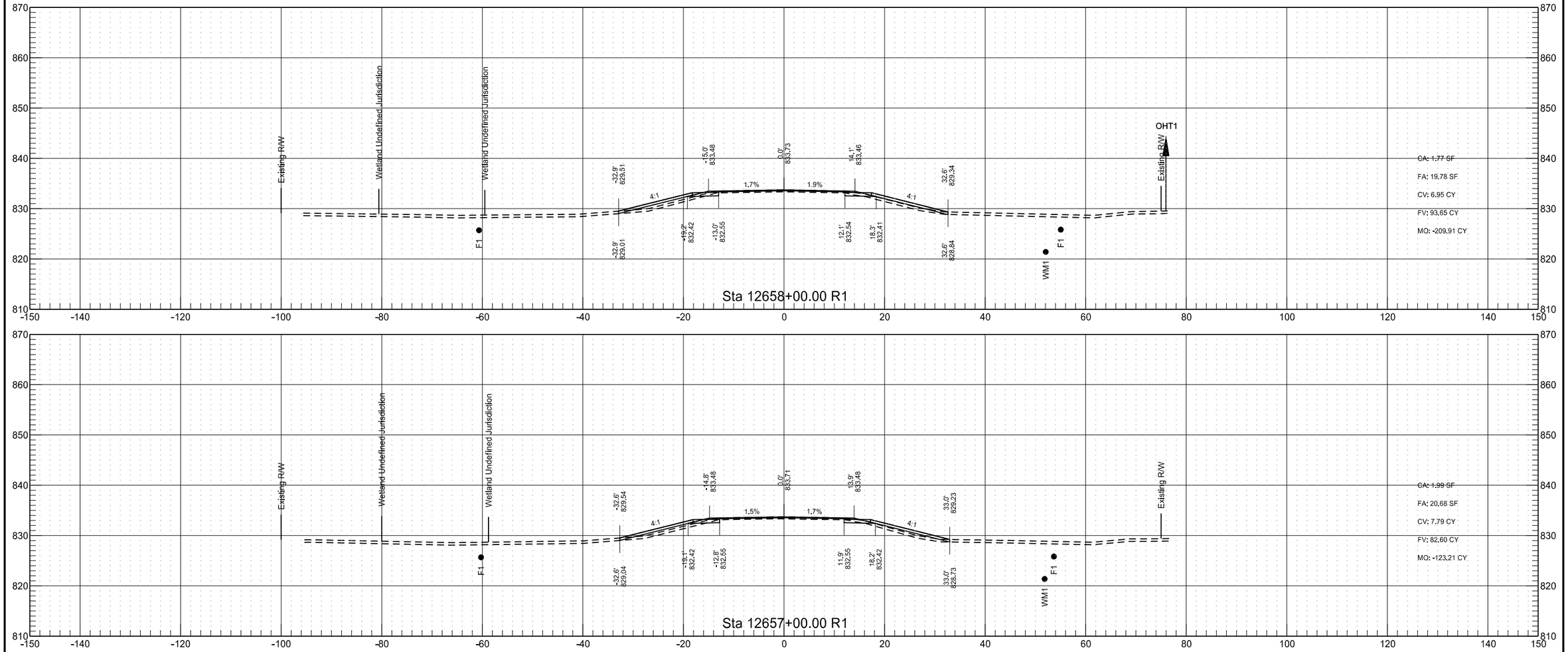
ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	1



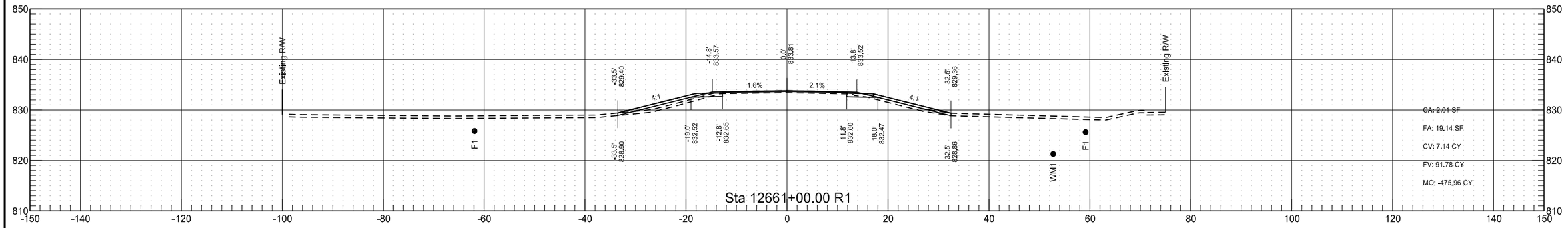
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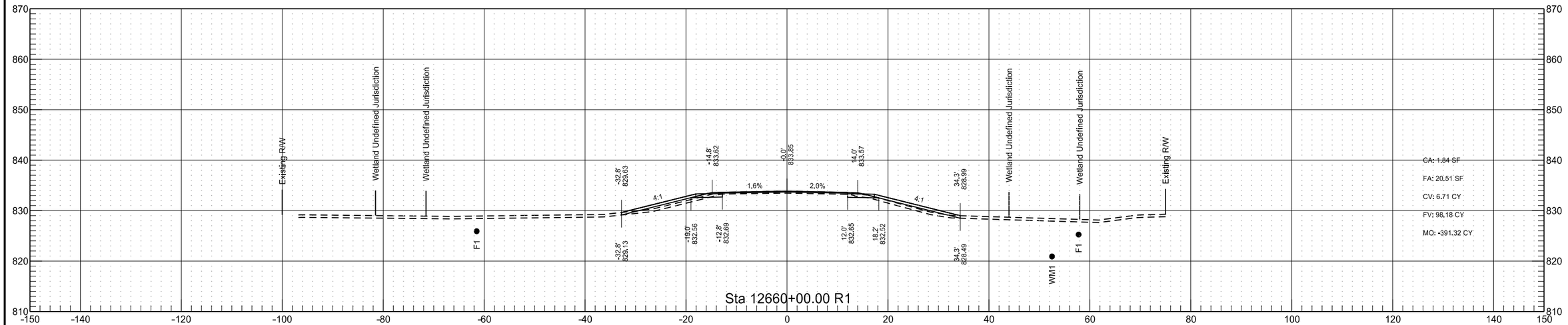
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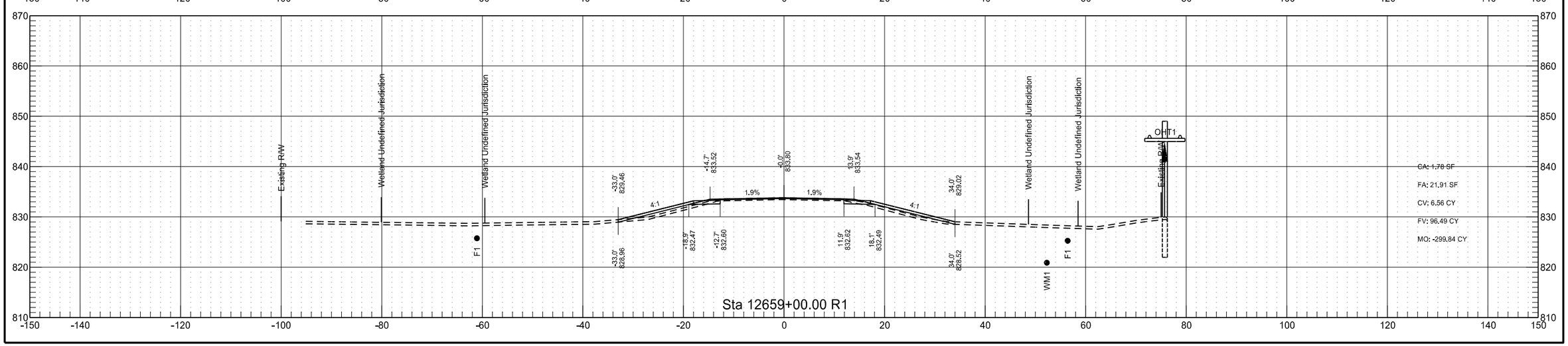


ND 18

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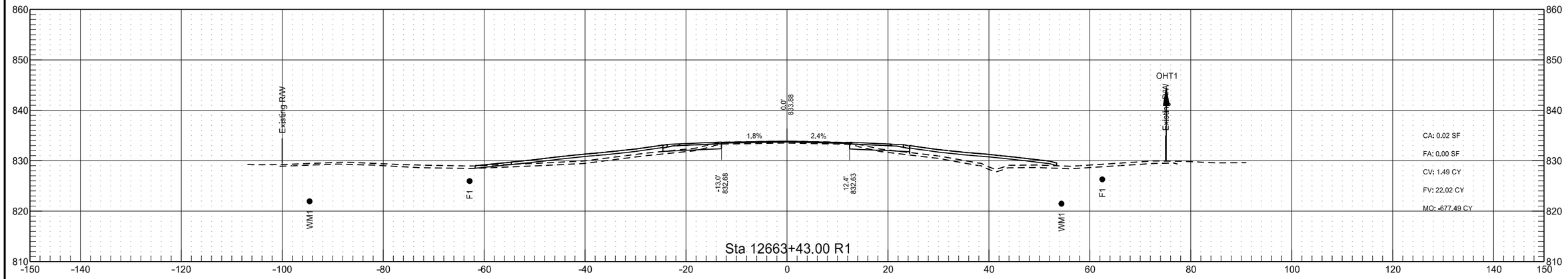


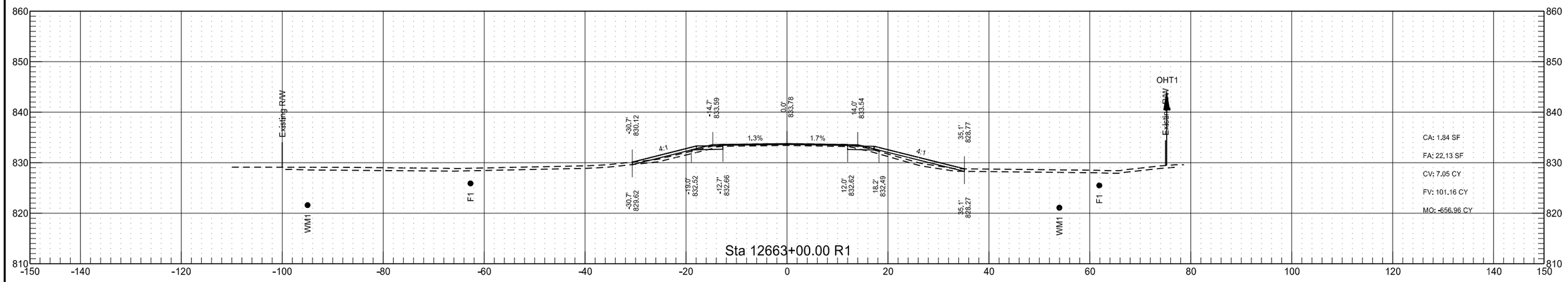


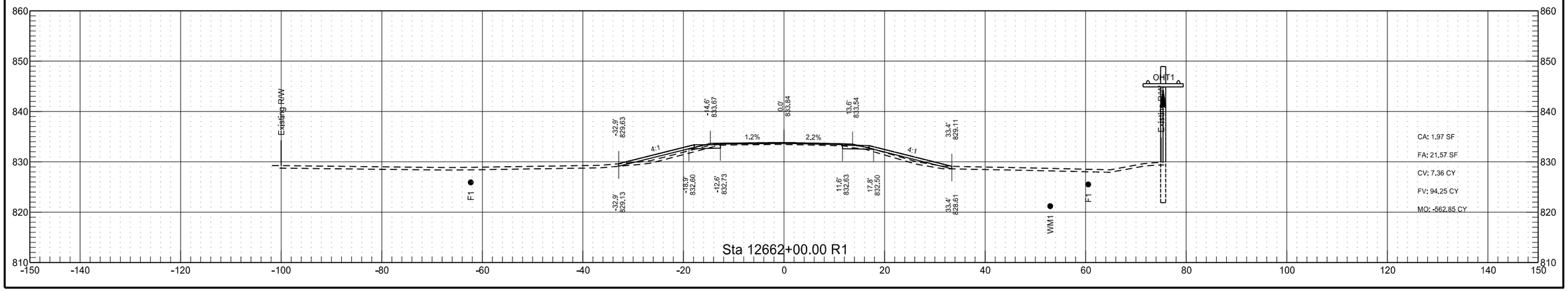


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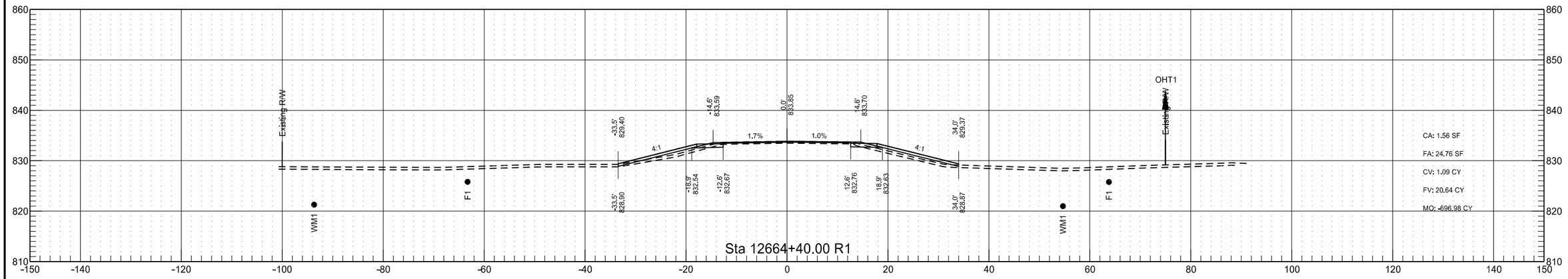


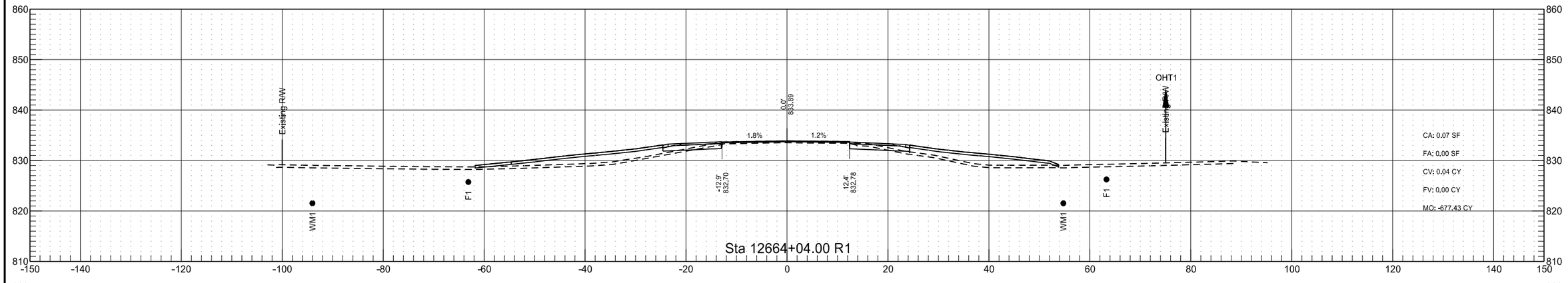


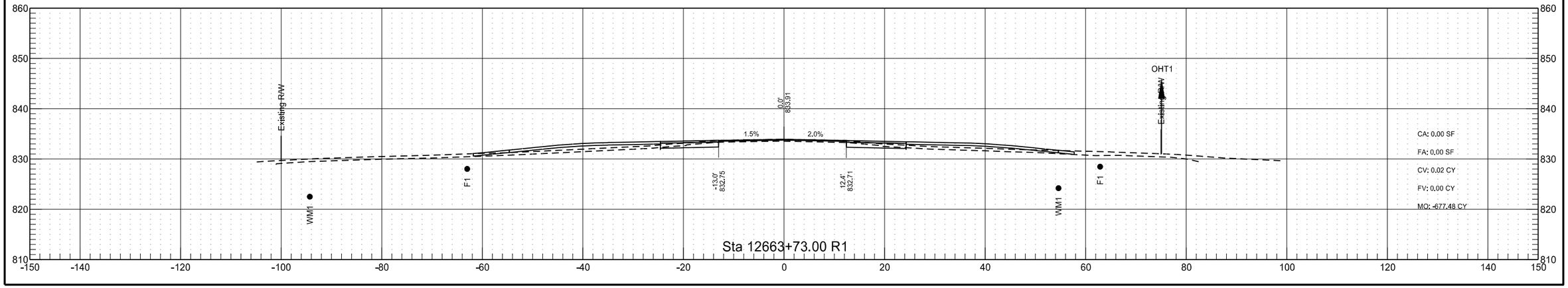


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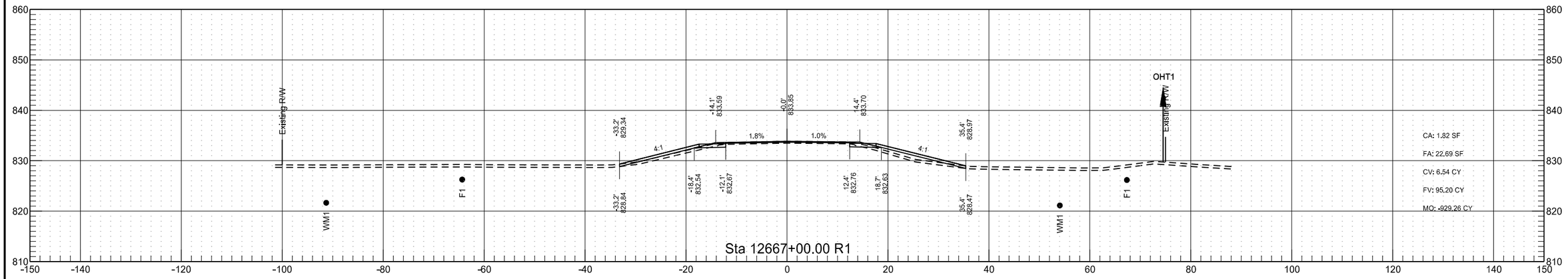


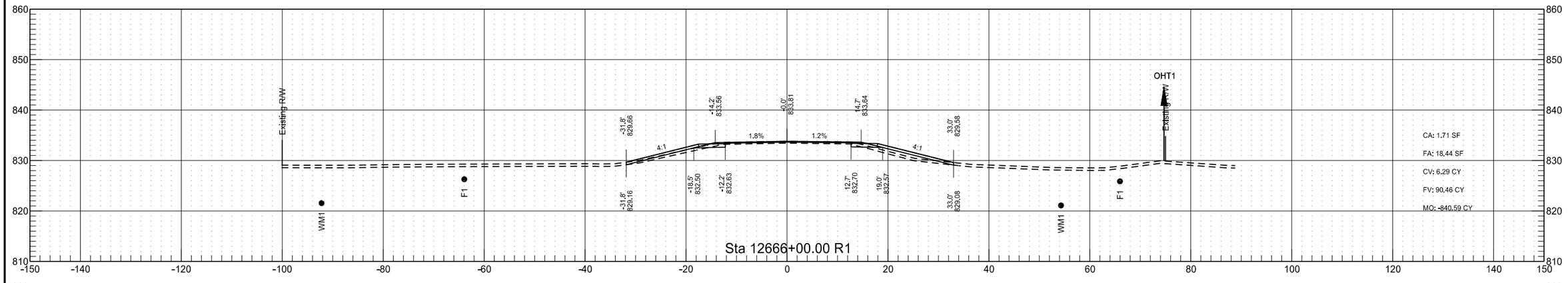


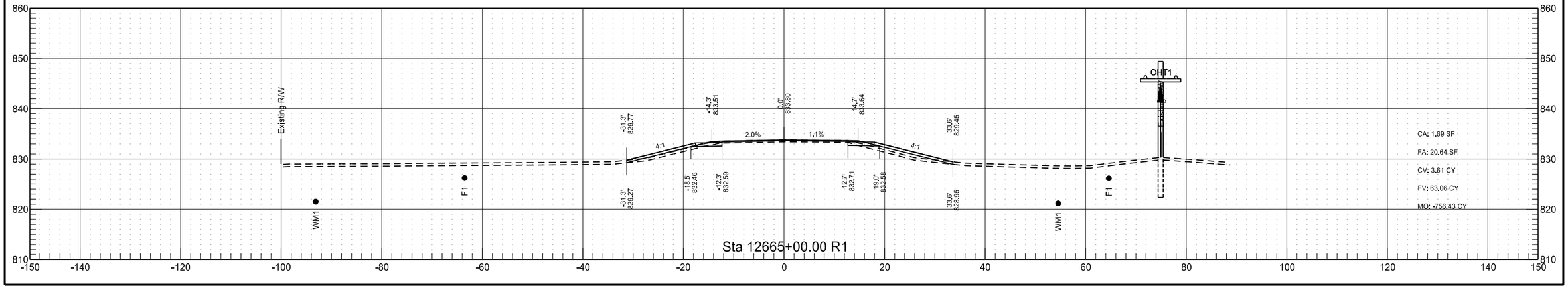


ND 18

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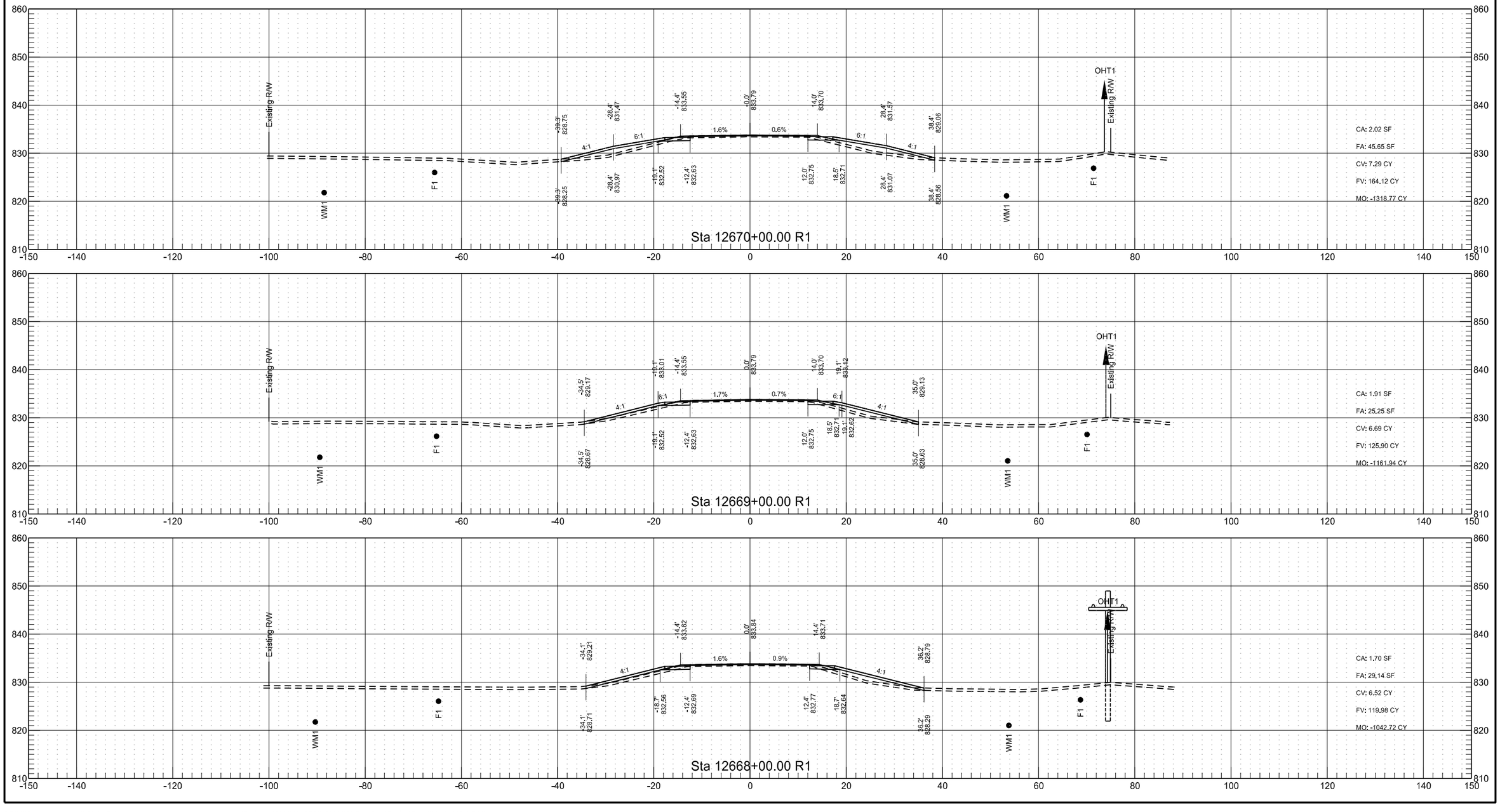






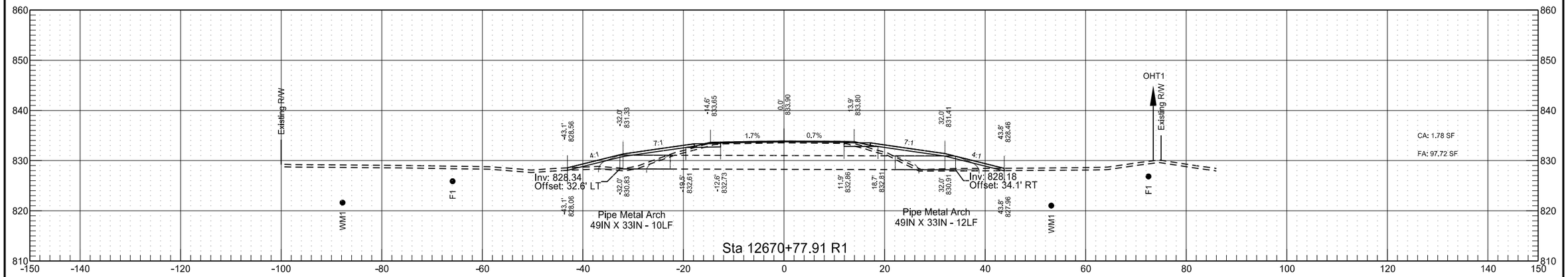
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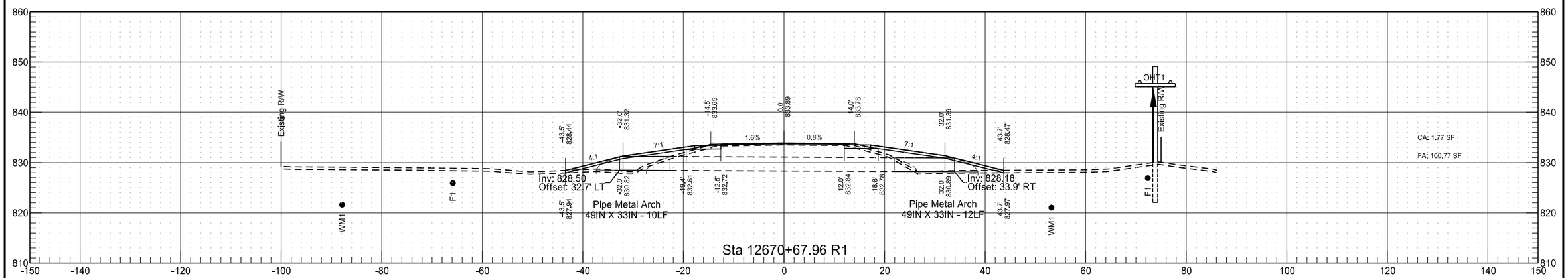
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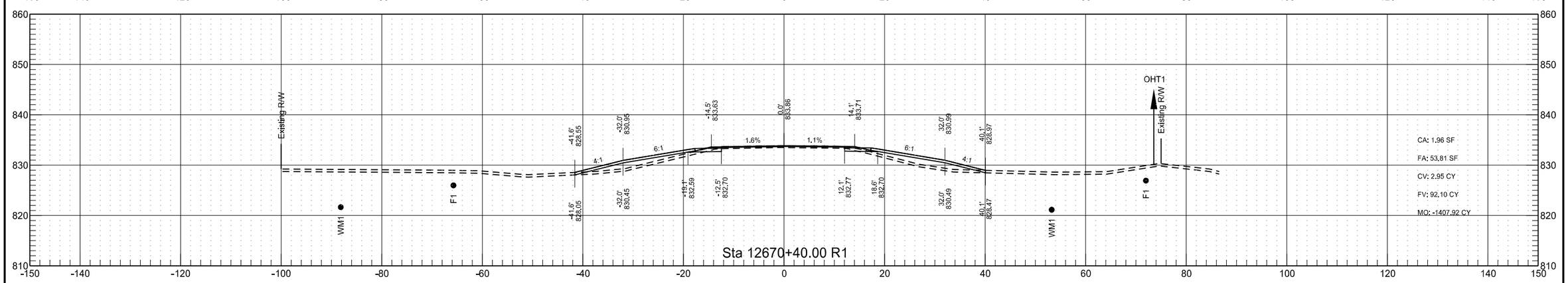


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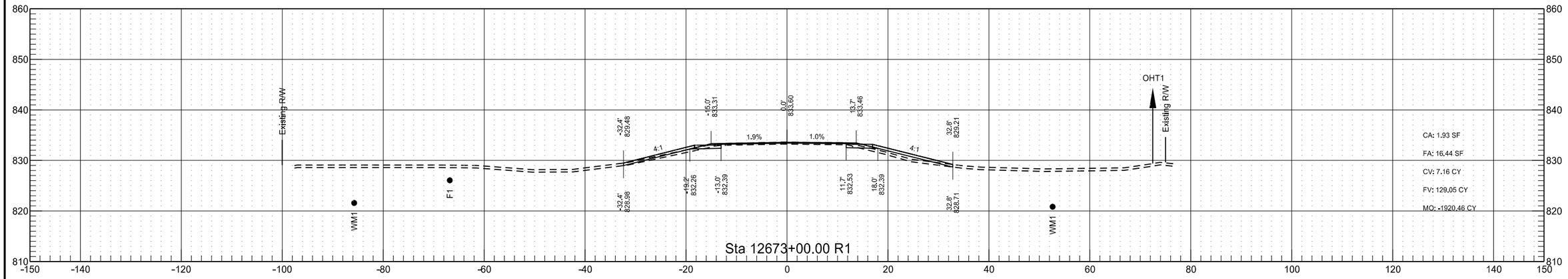


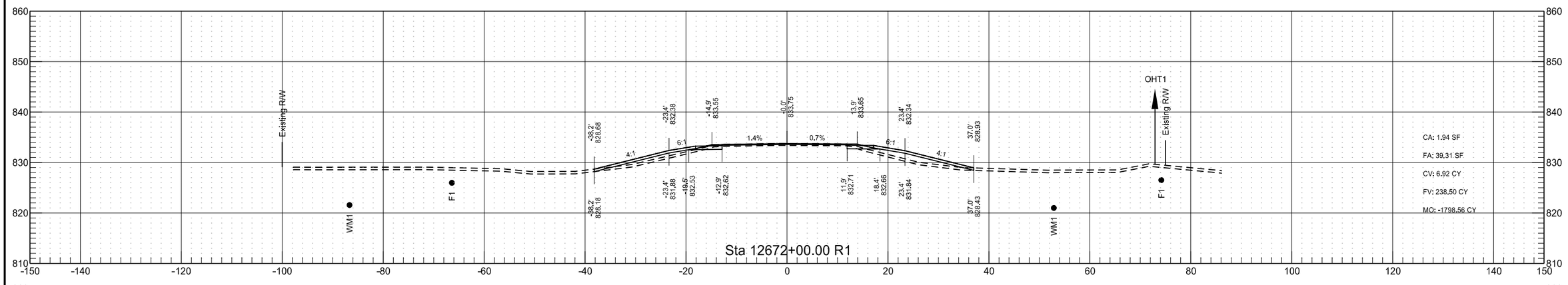


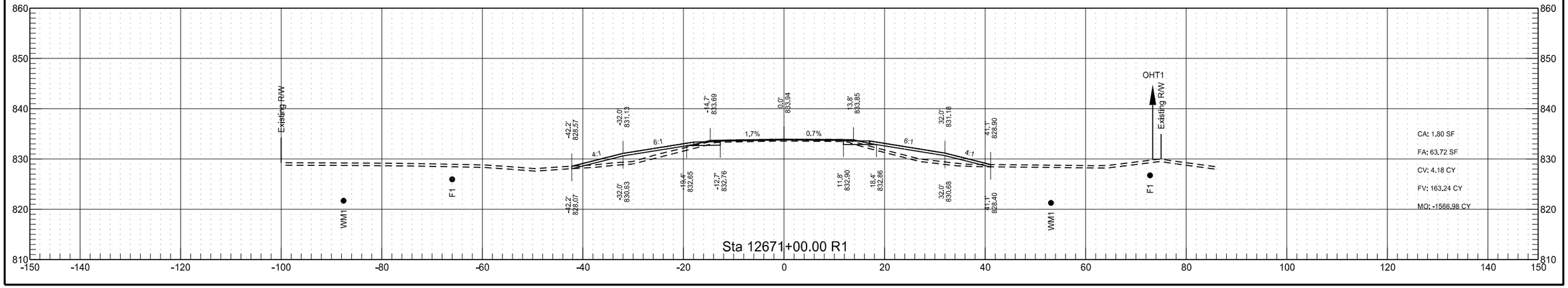


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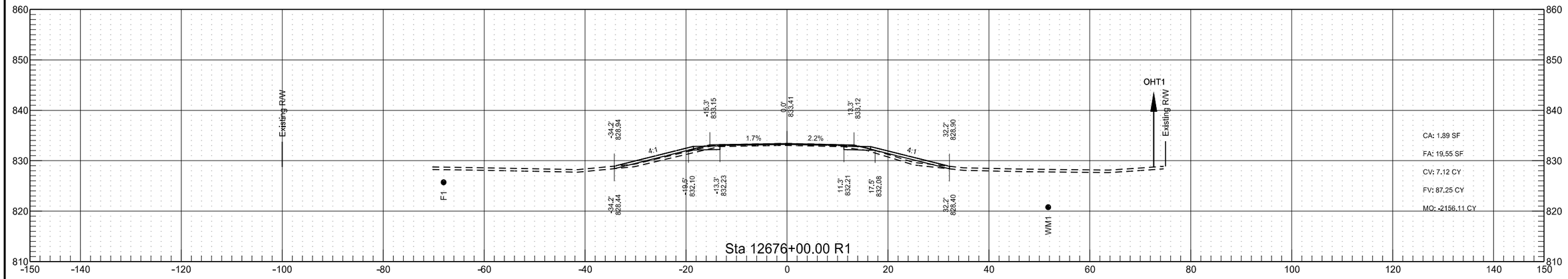


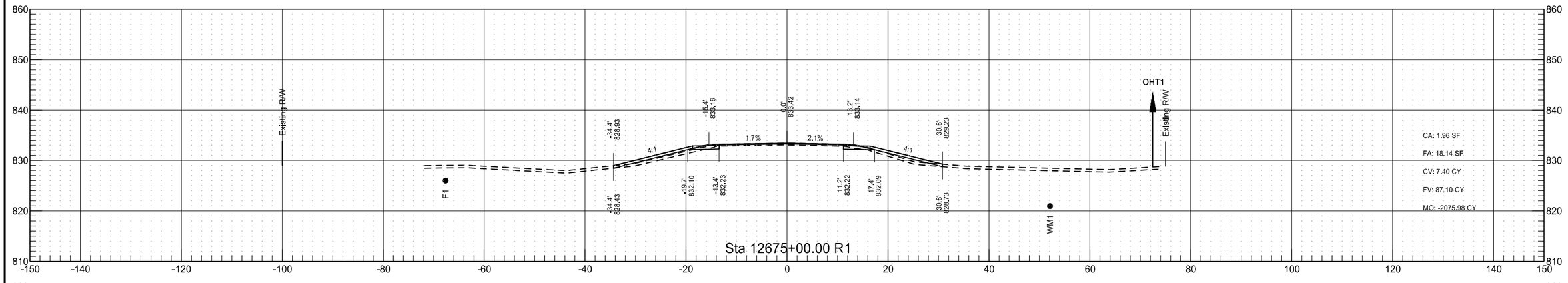


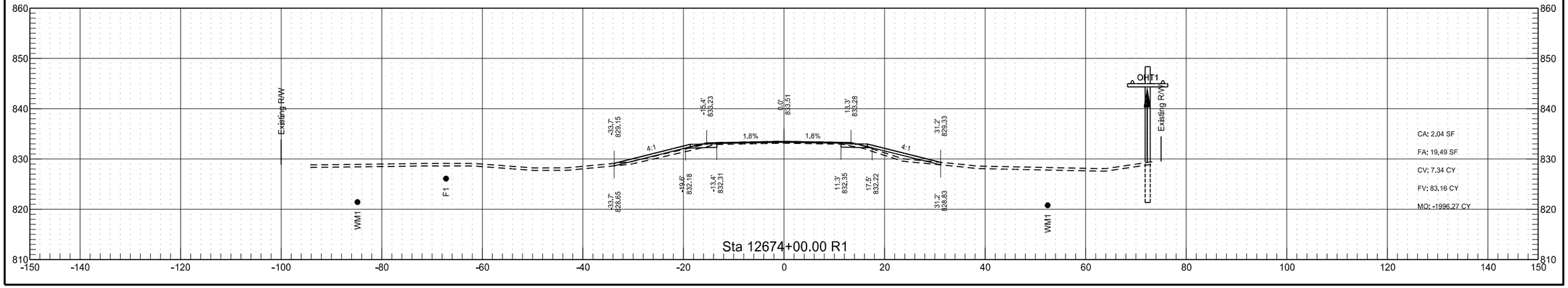


ND 18

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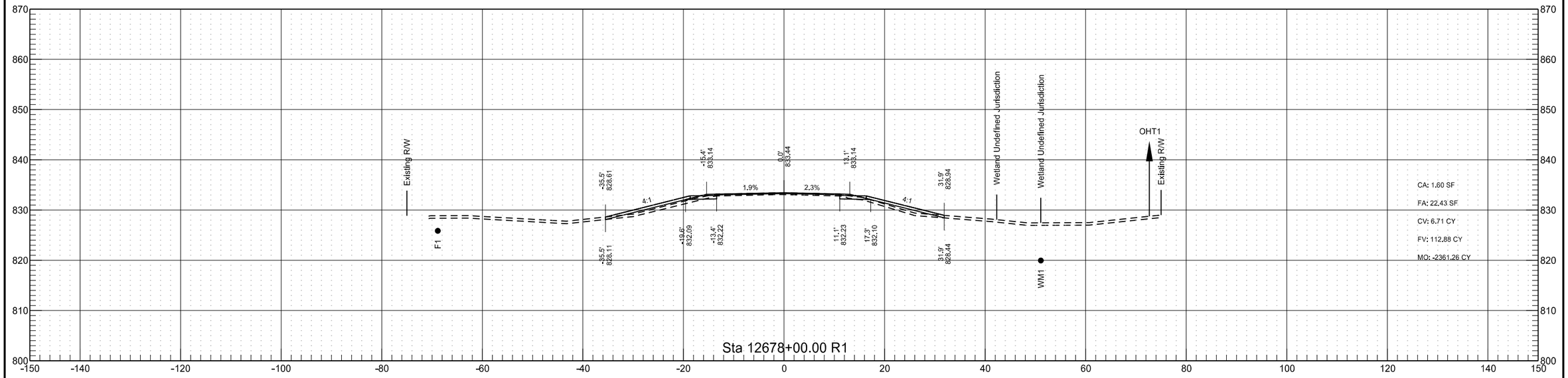


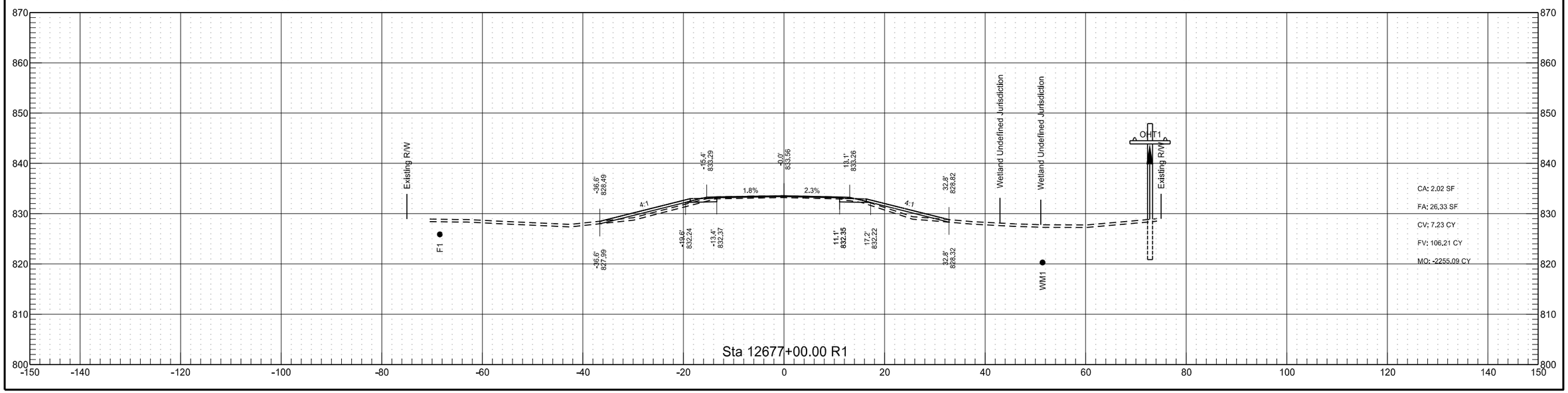




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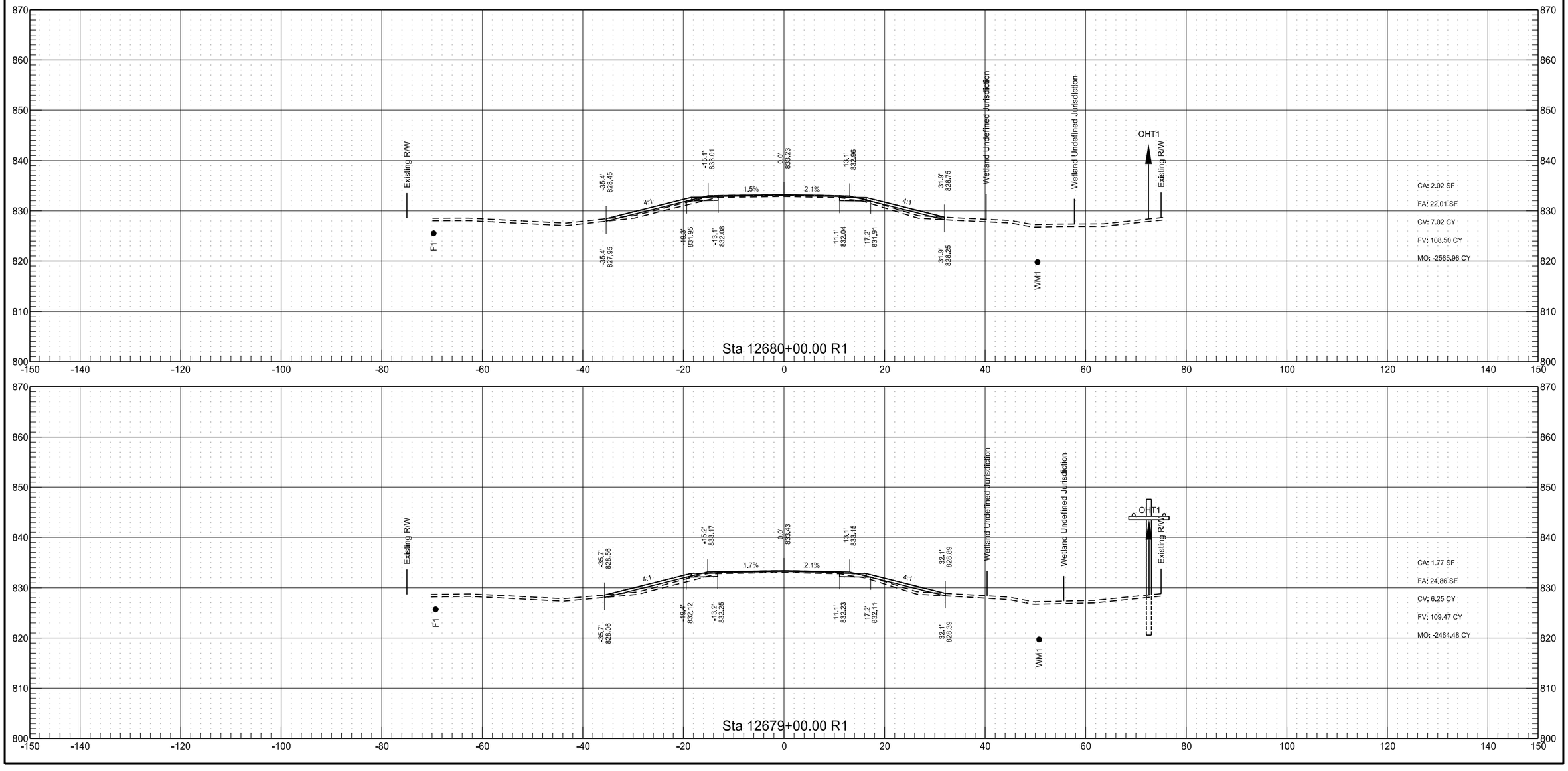
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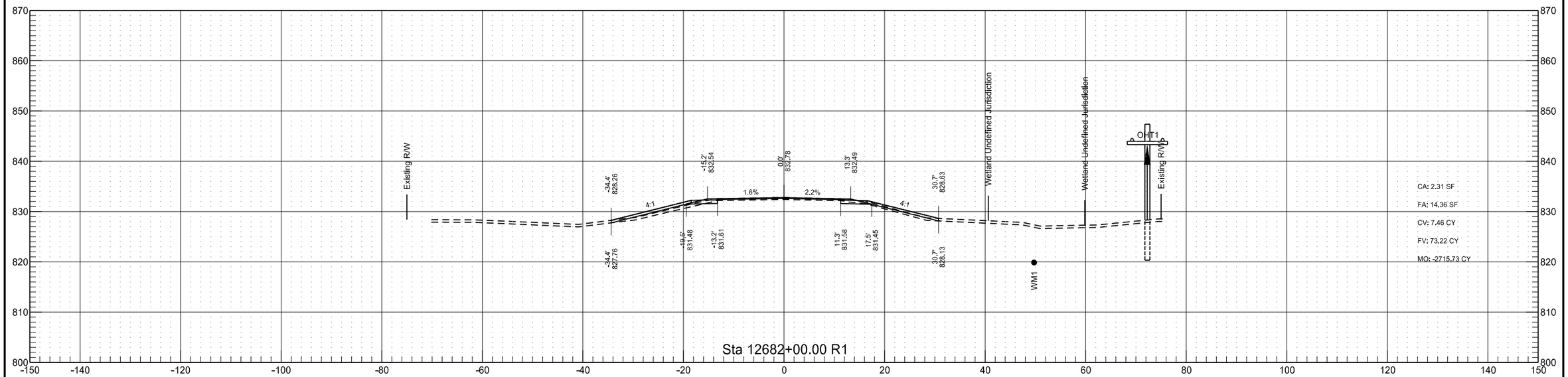
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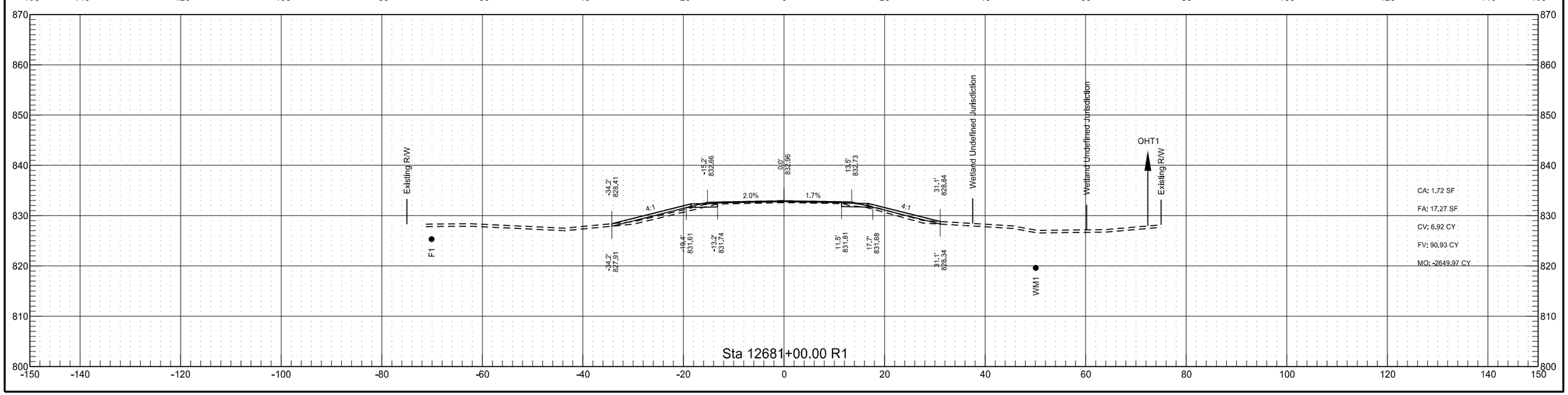
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ND 18

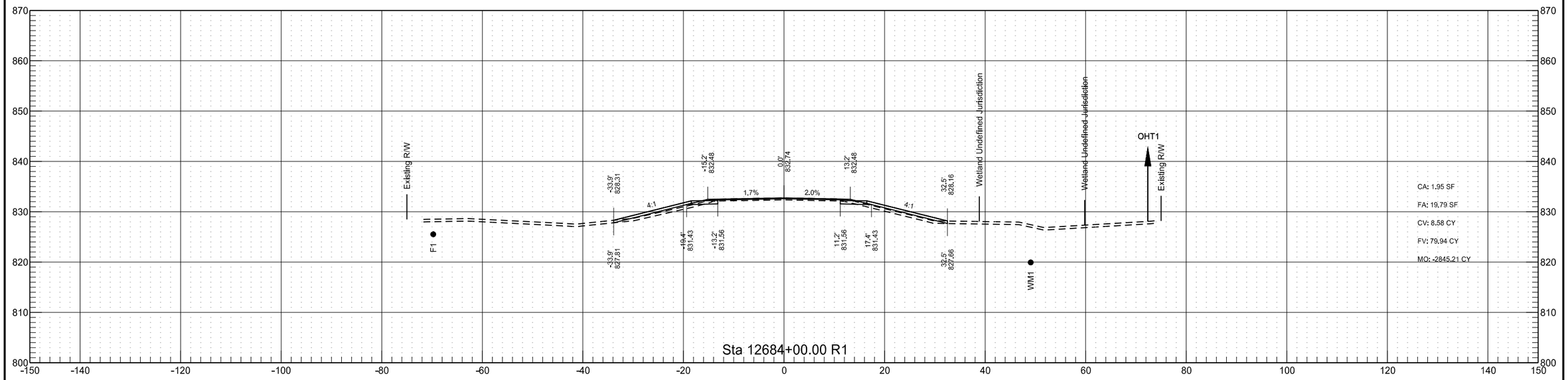
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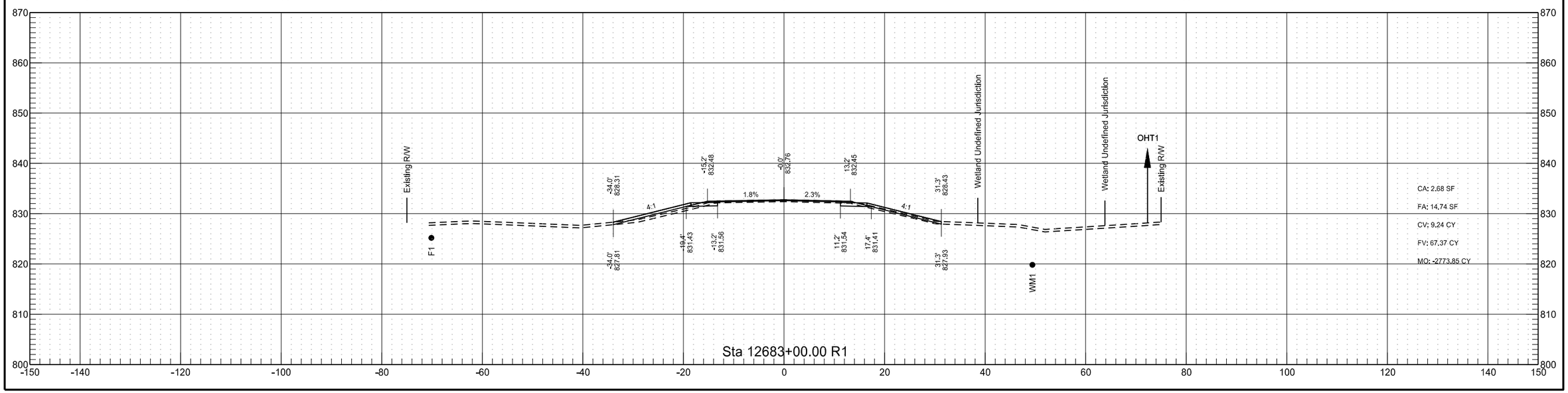




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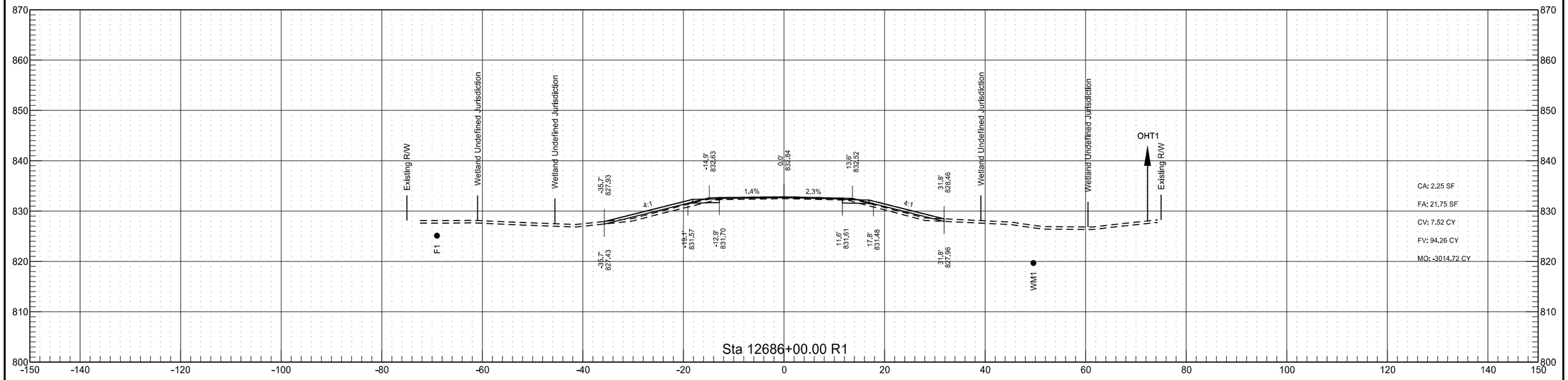
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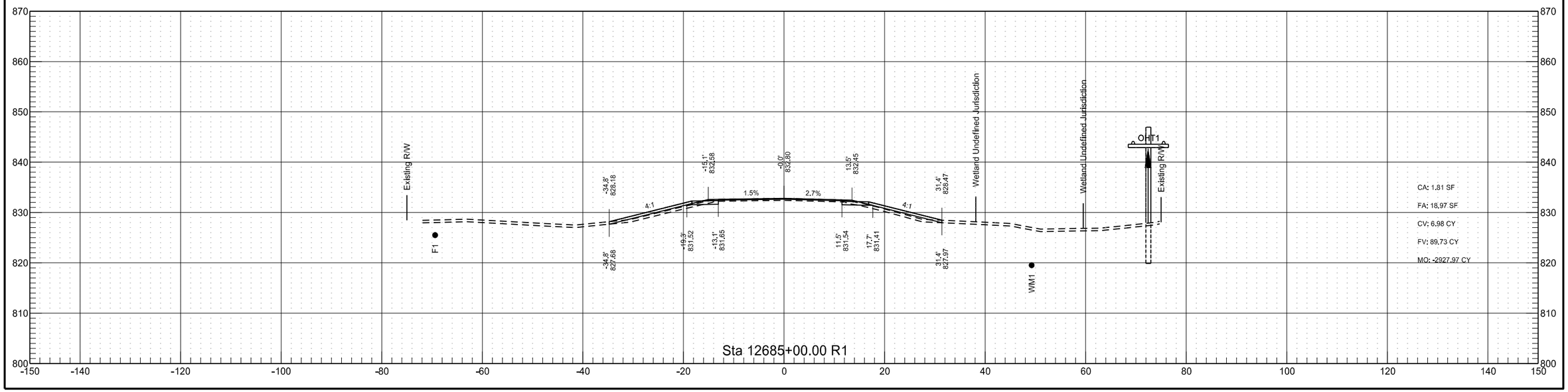




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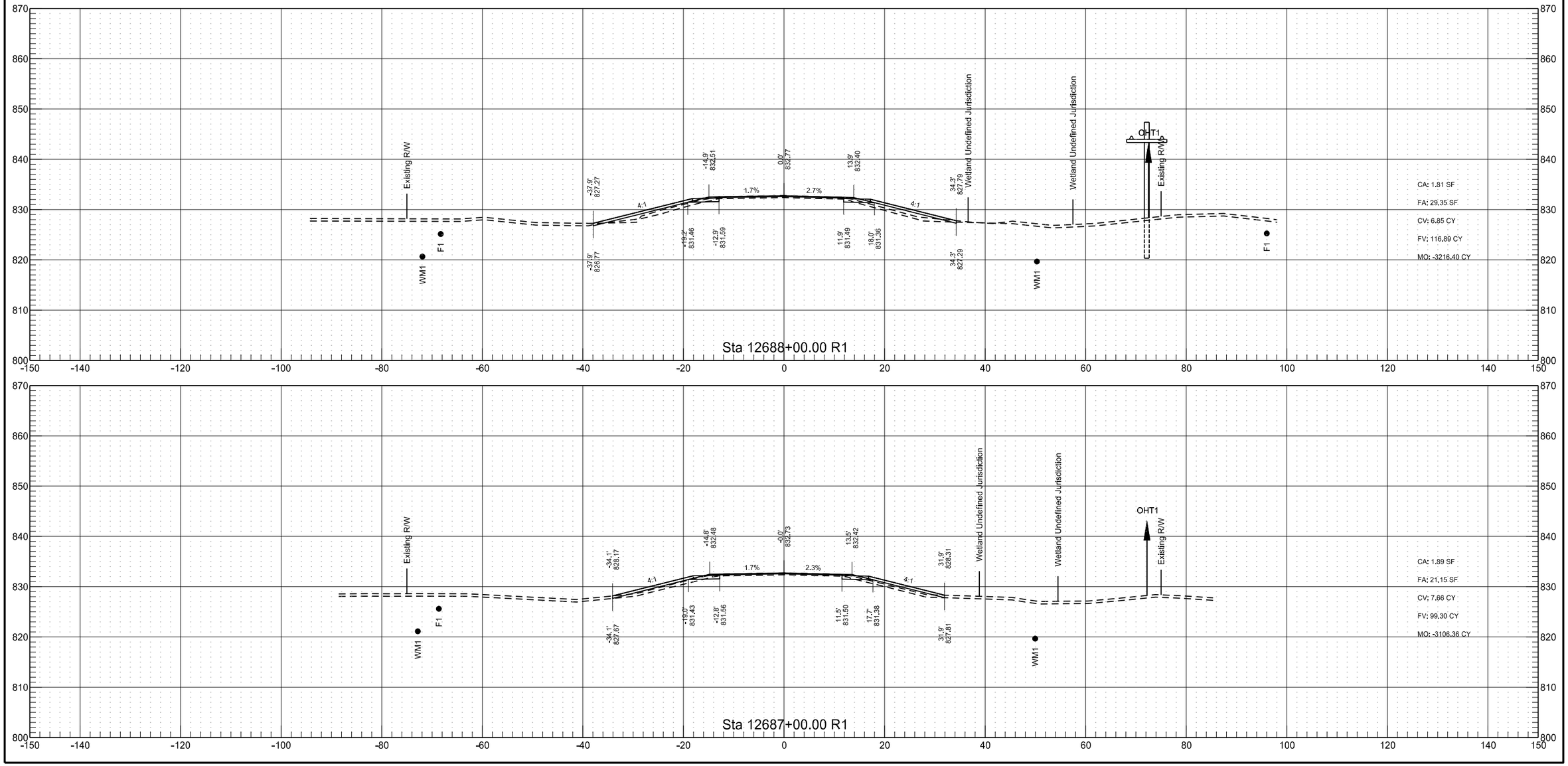
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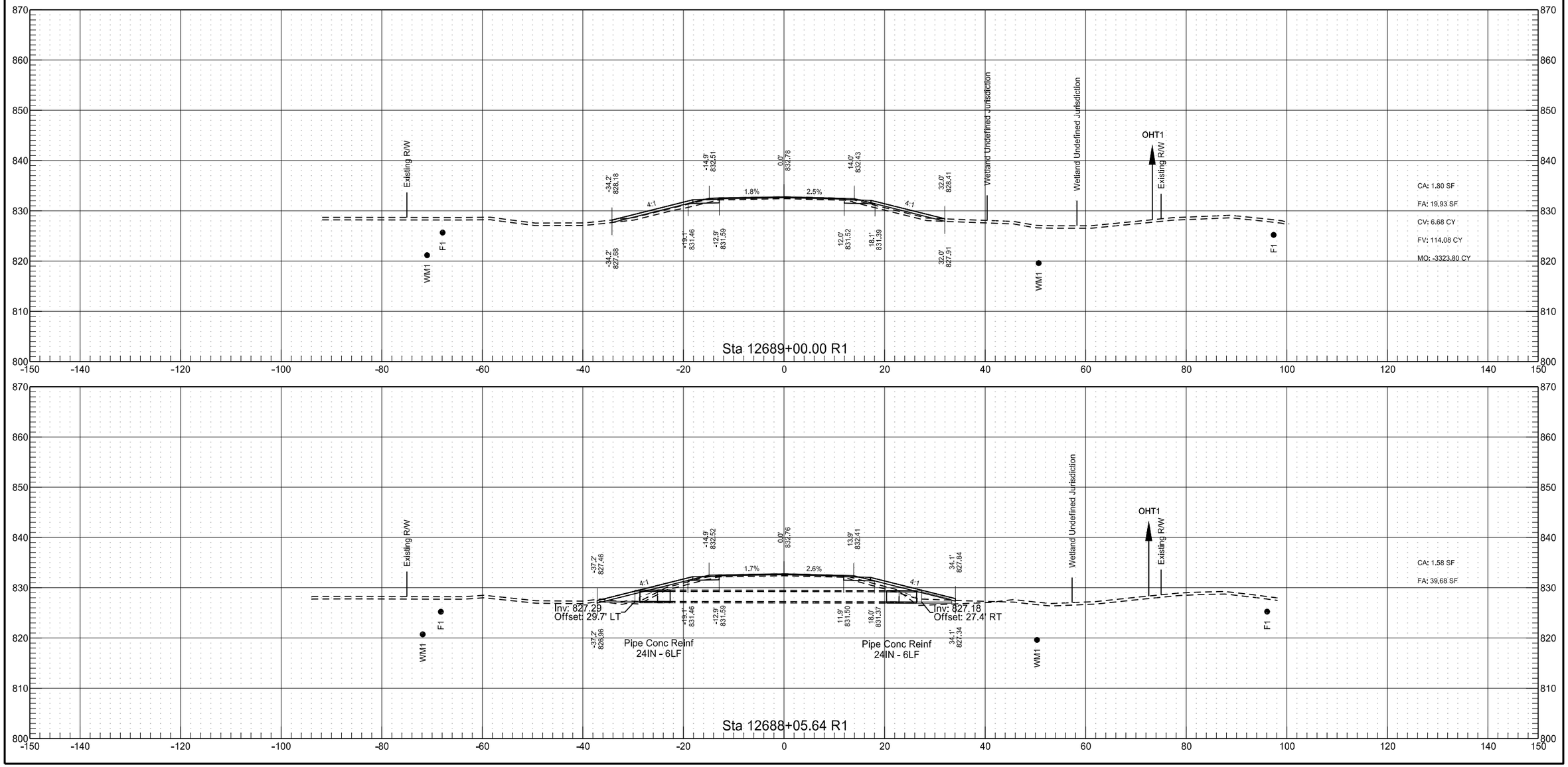
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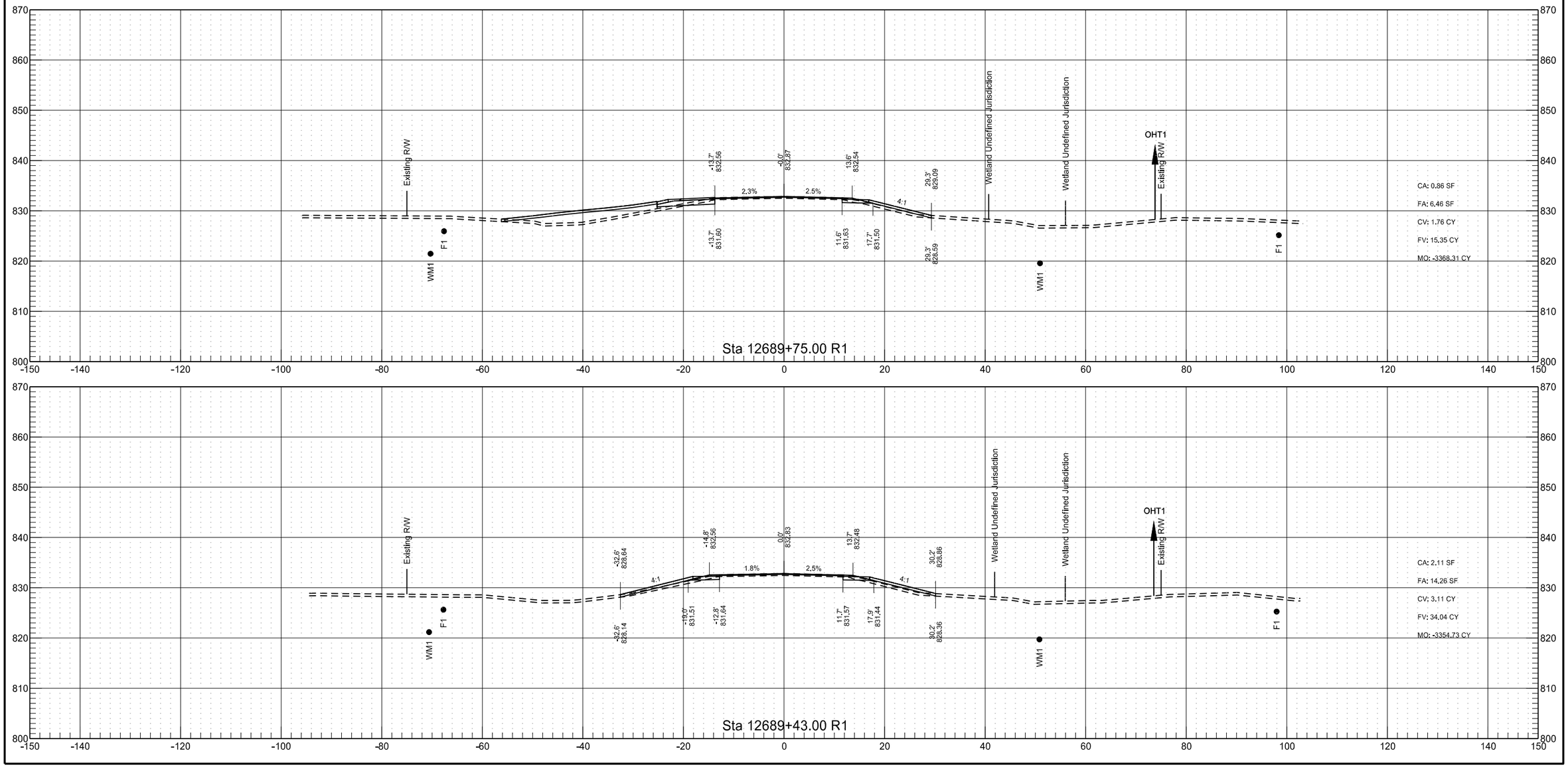
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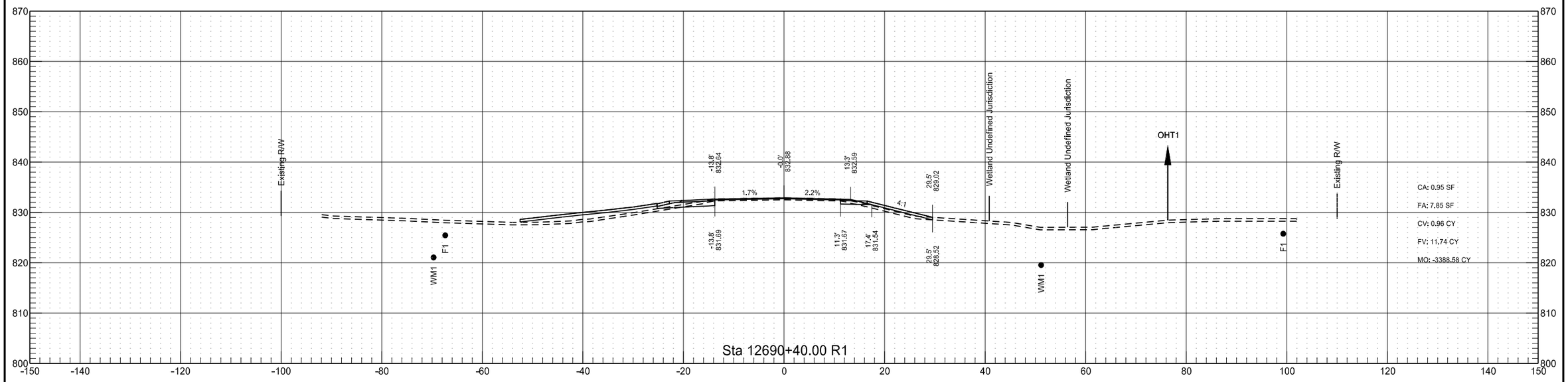
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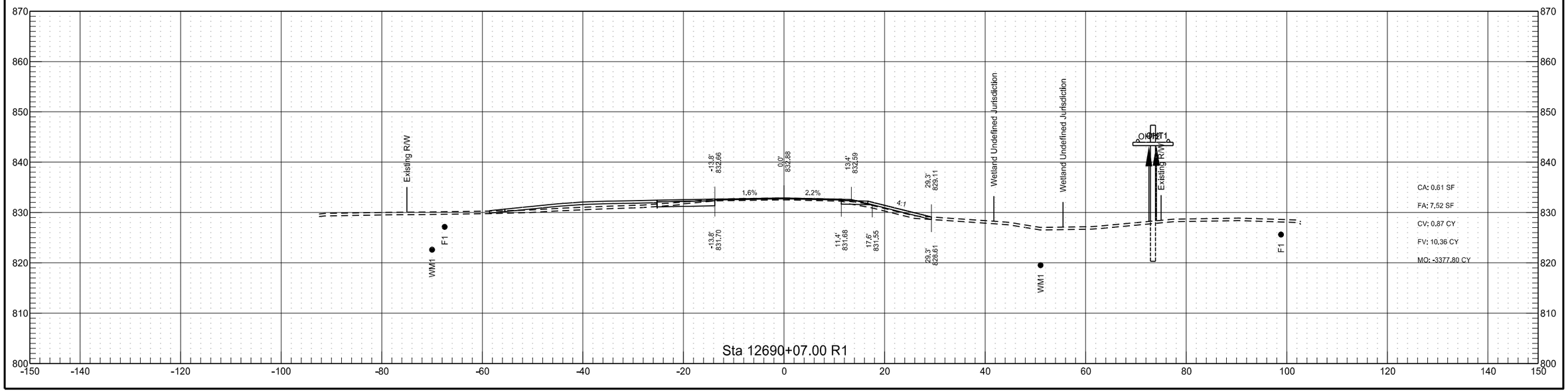
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ND 18

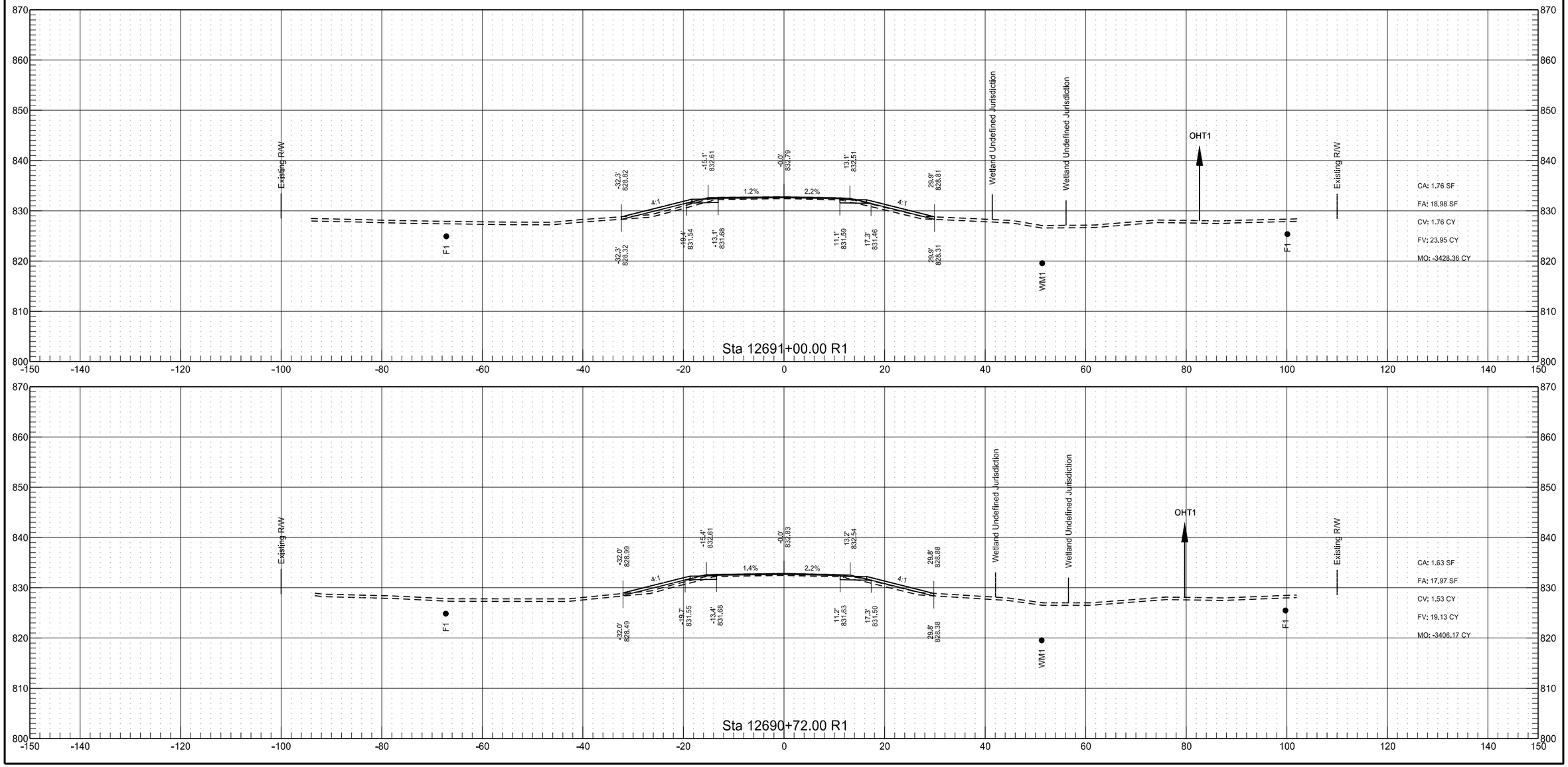
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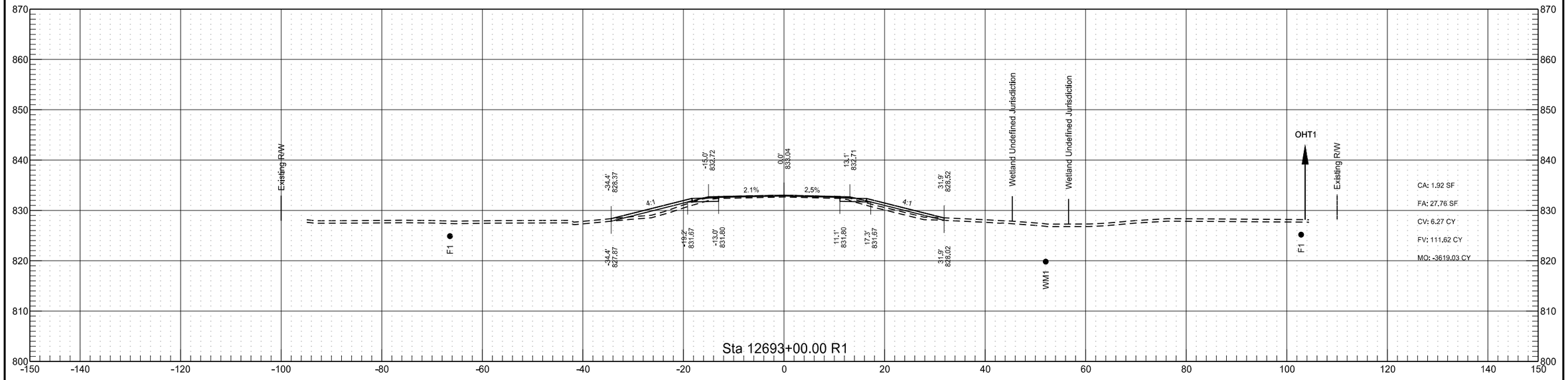
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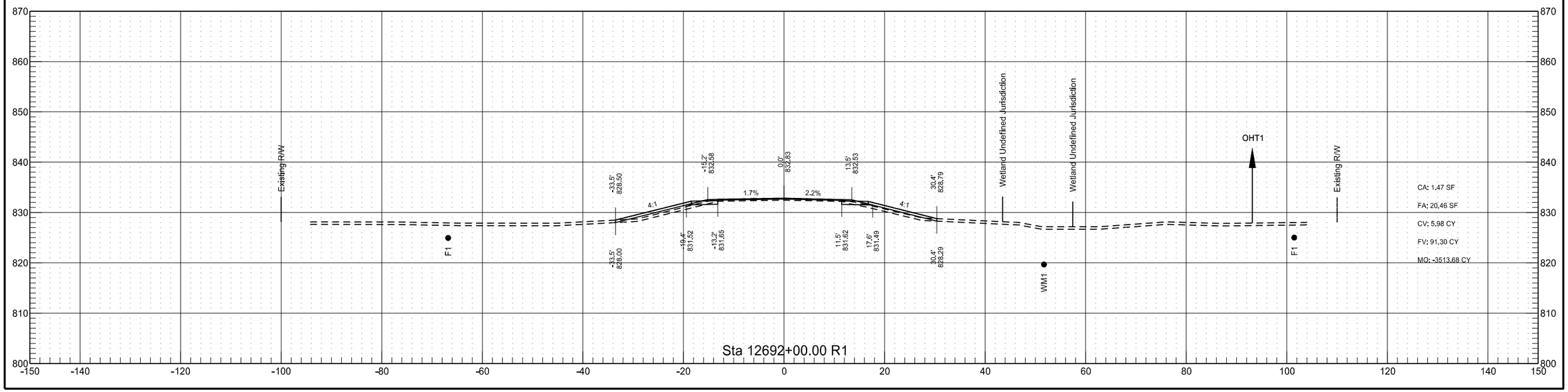
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	ND	SS-6-018(081)239	200	20



ND 18

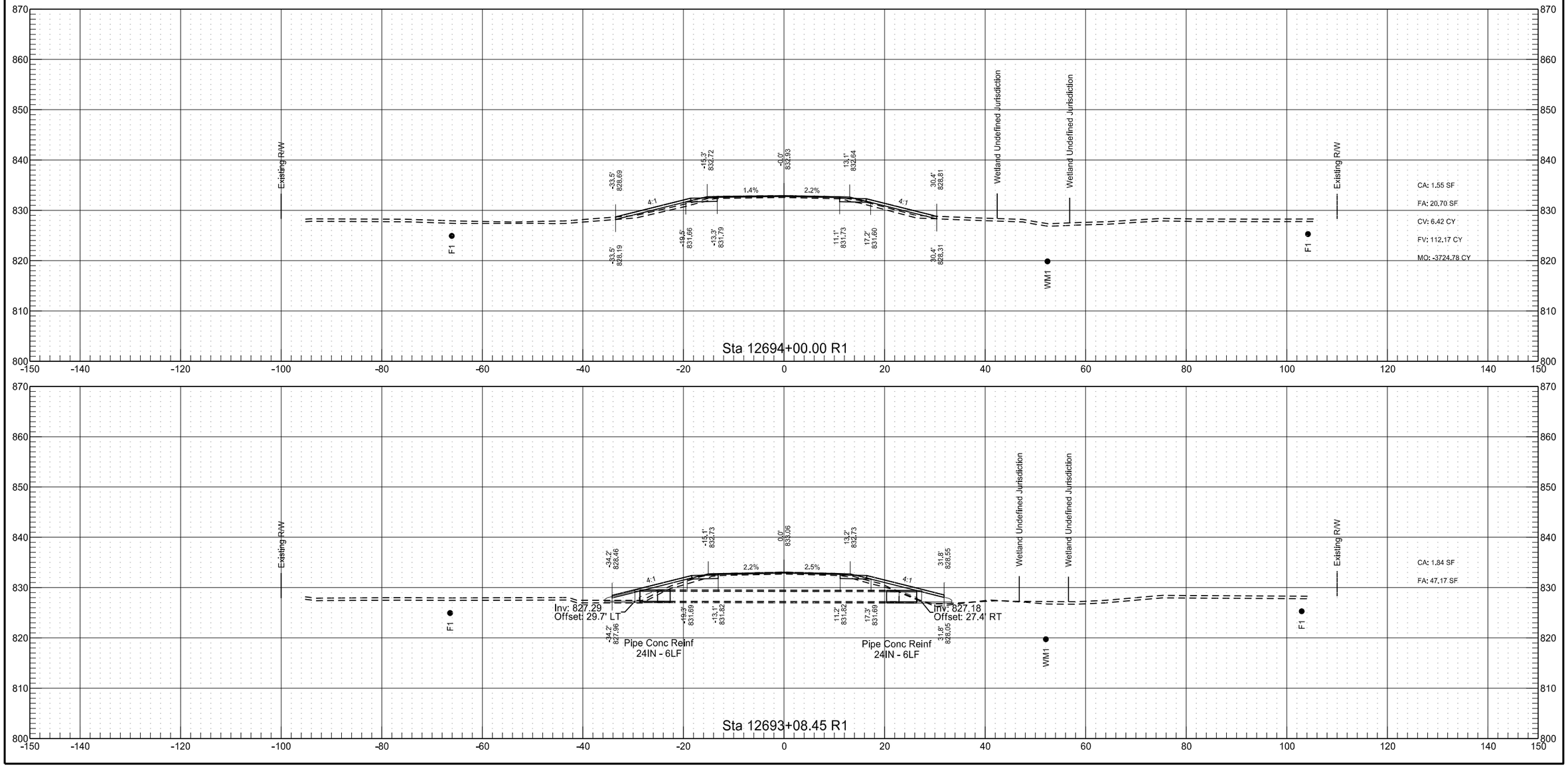
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	21





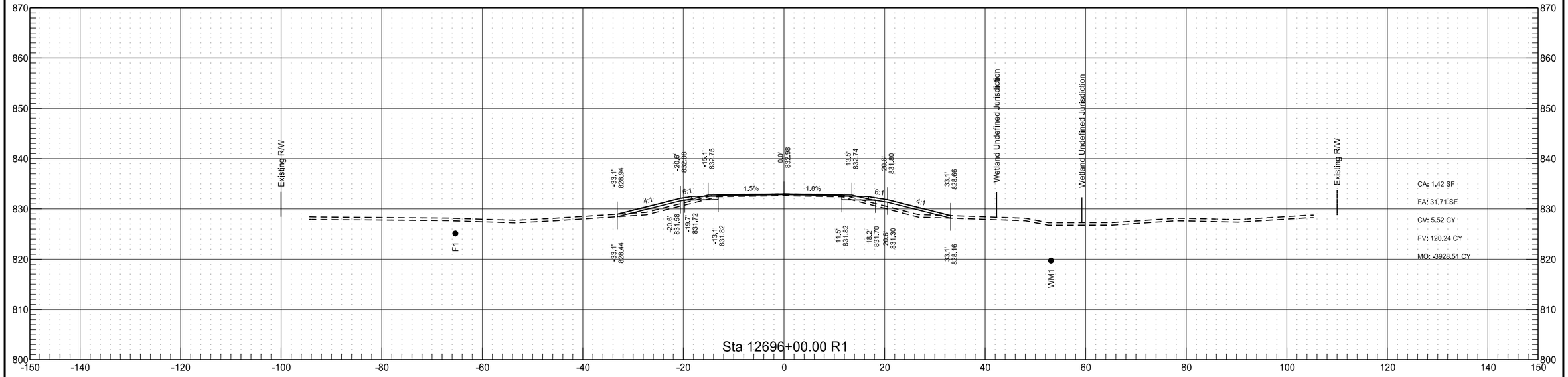
ND 18

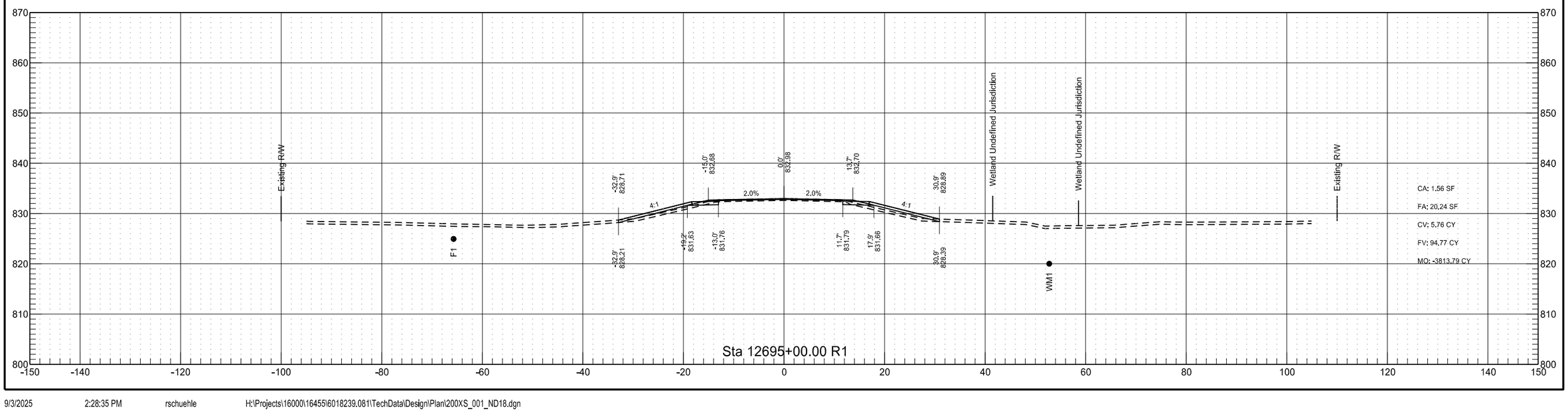
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	22



ND 18

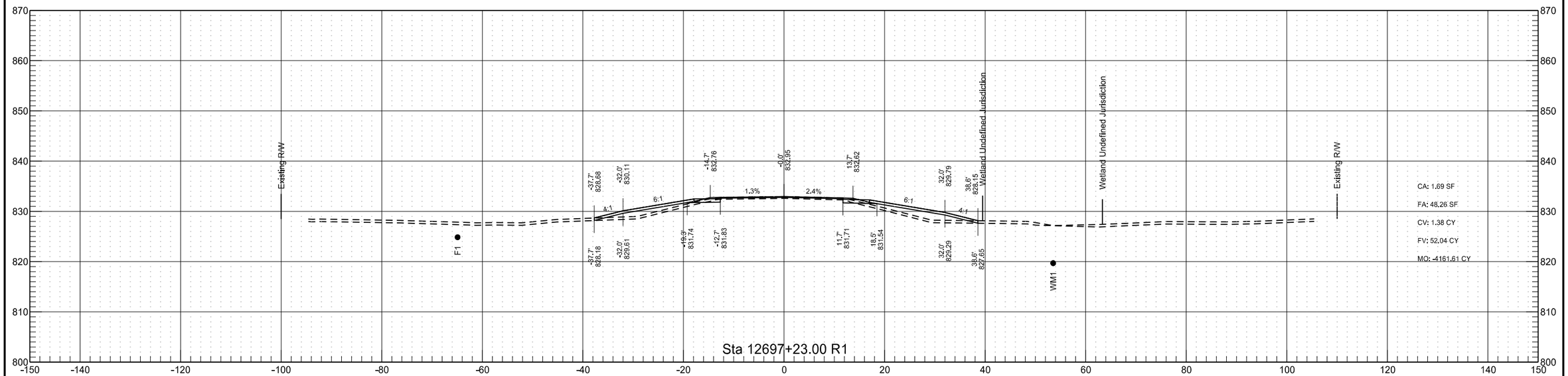
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	23





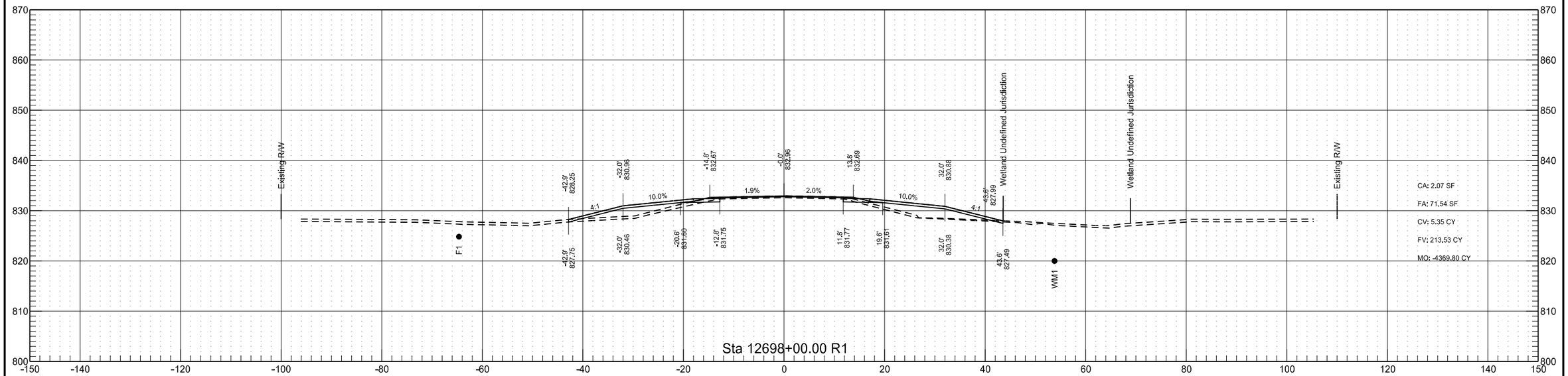
ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	24



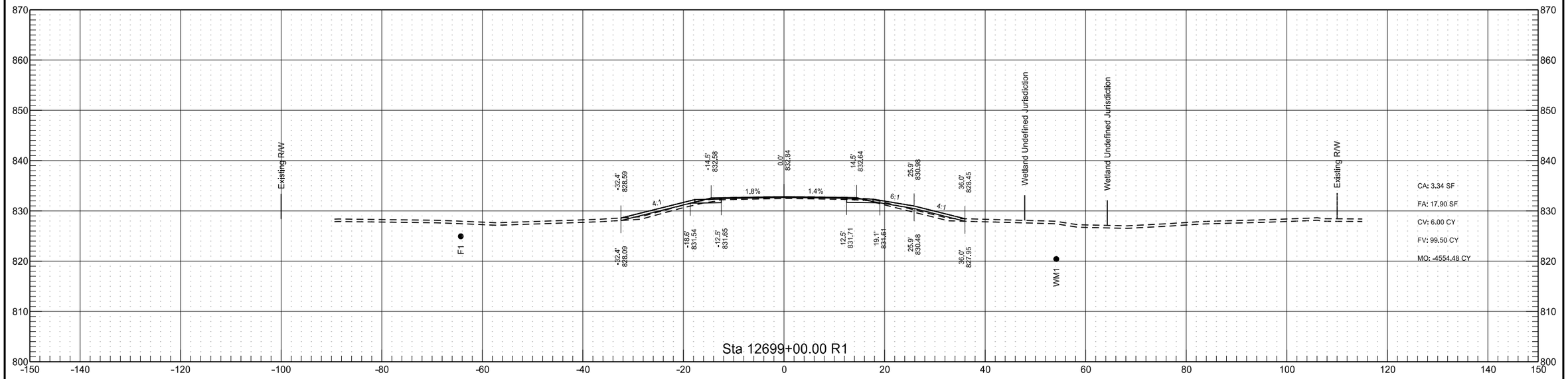
ND 18

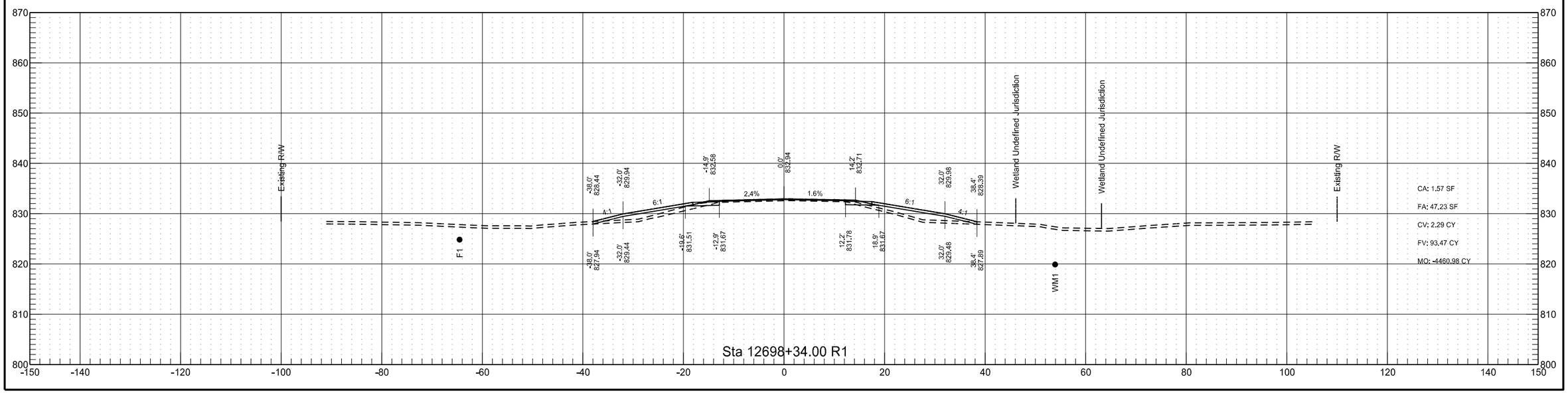
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	25



ND 18

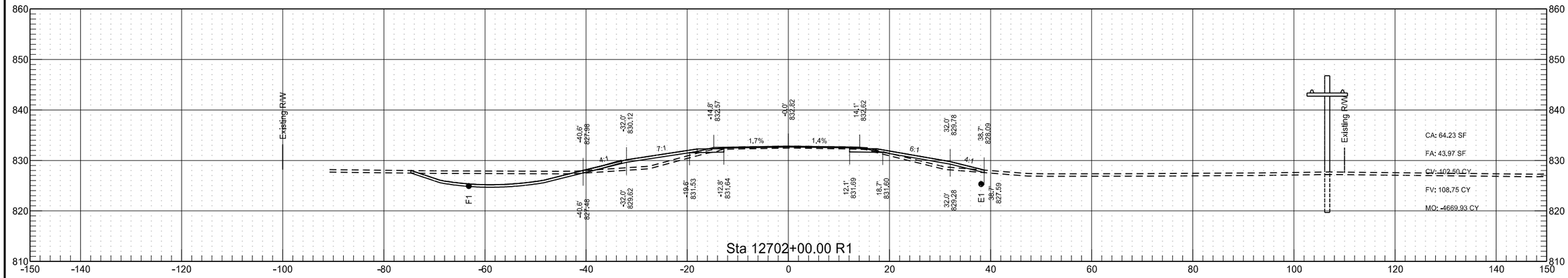
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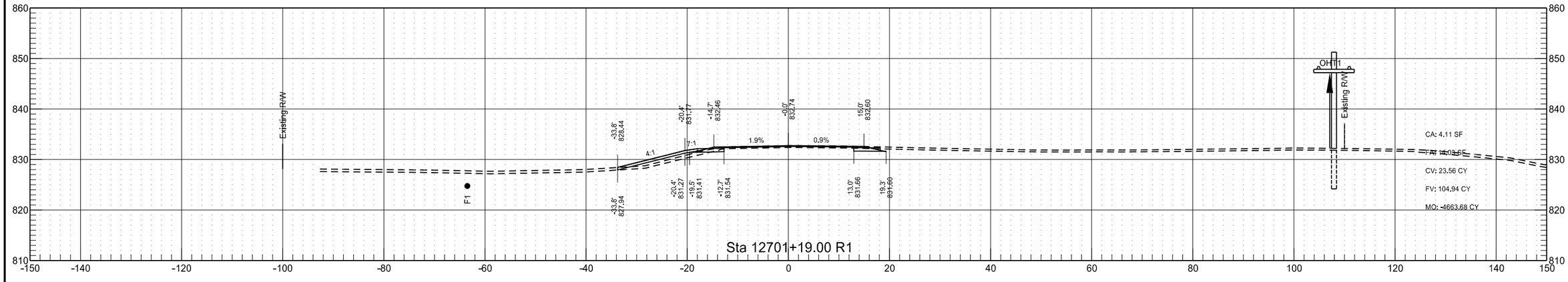


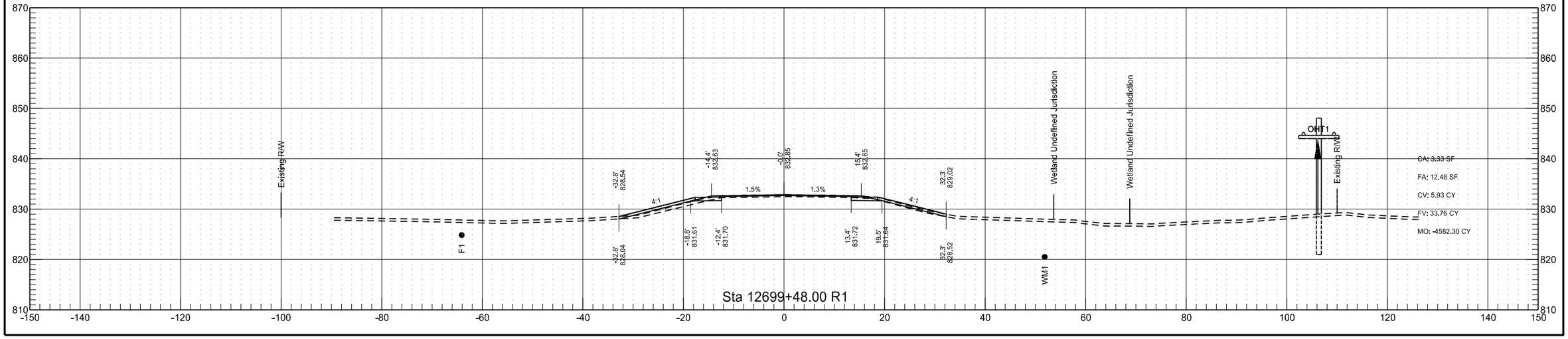


ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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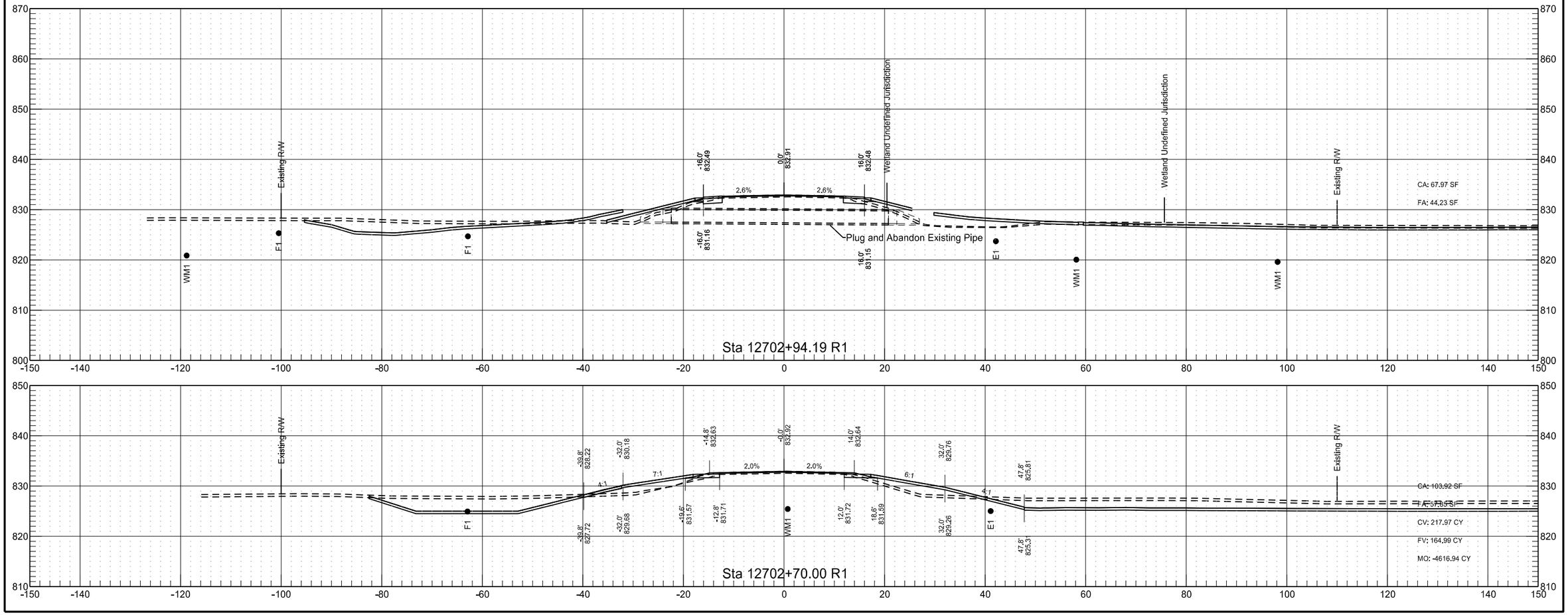






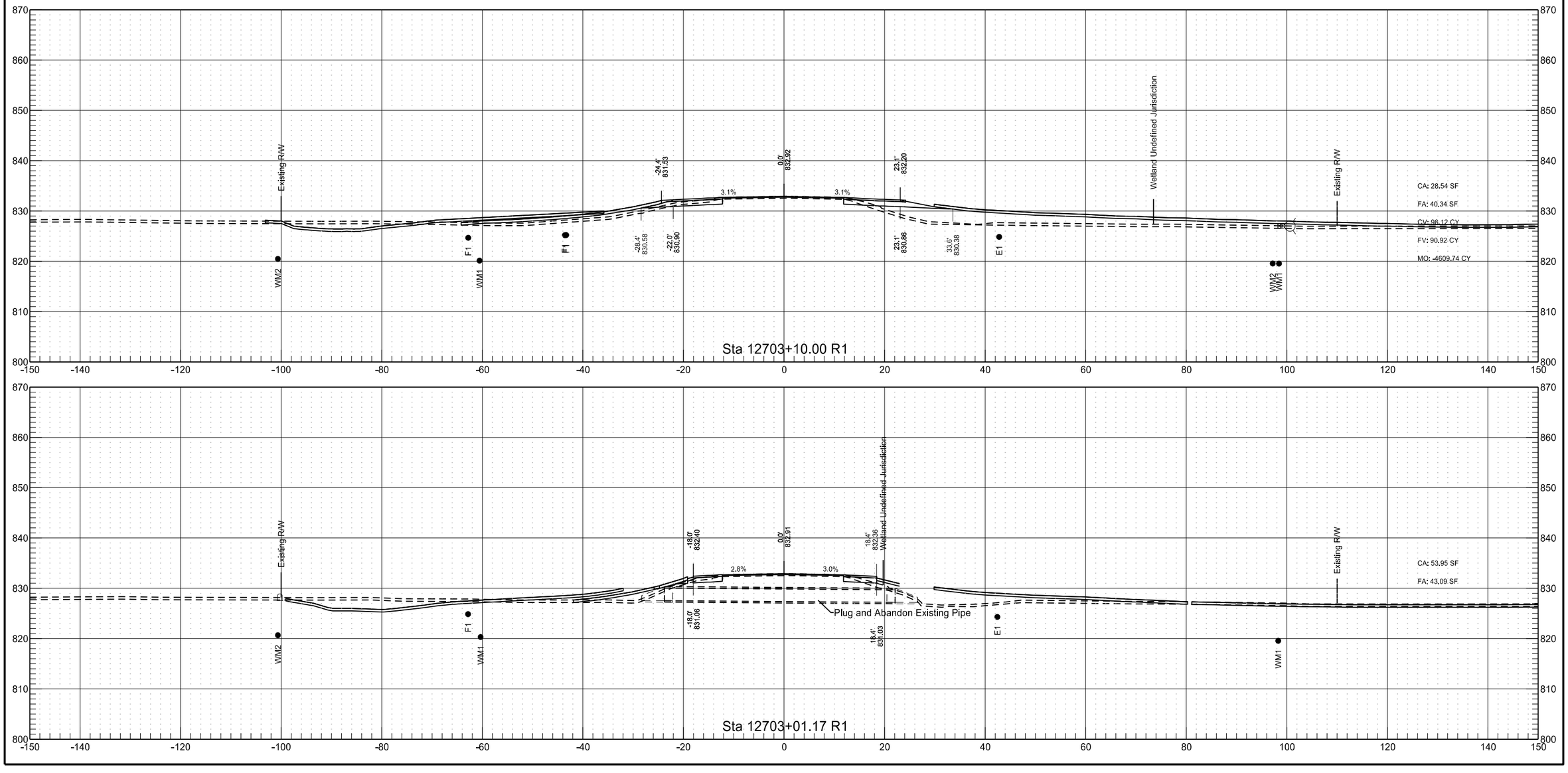
ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	28



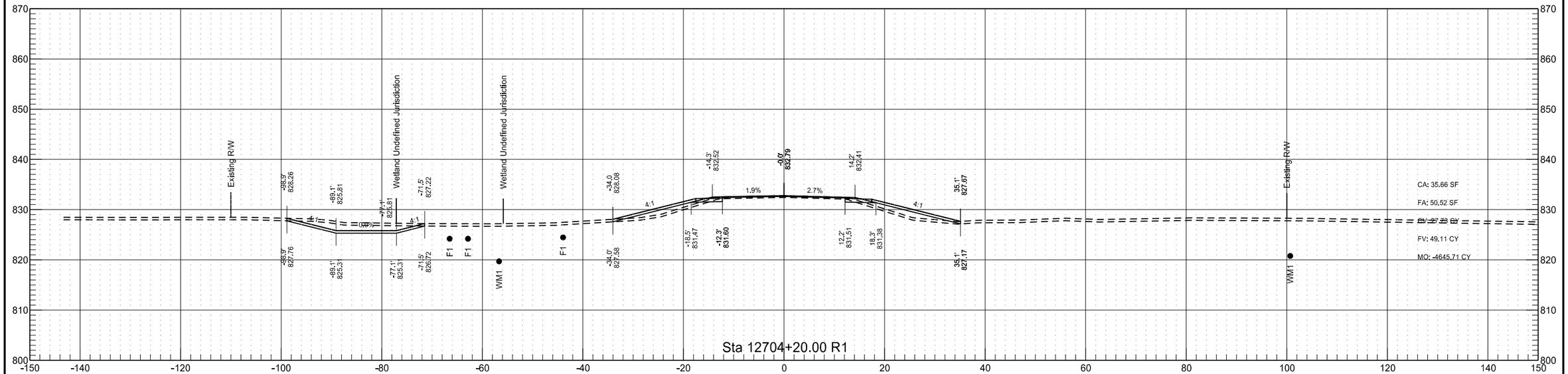
ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	29



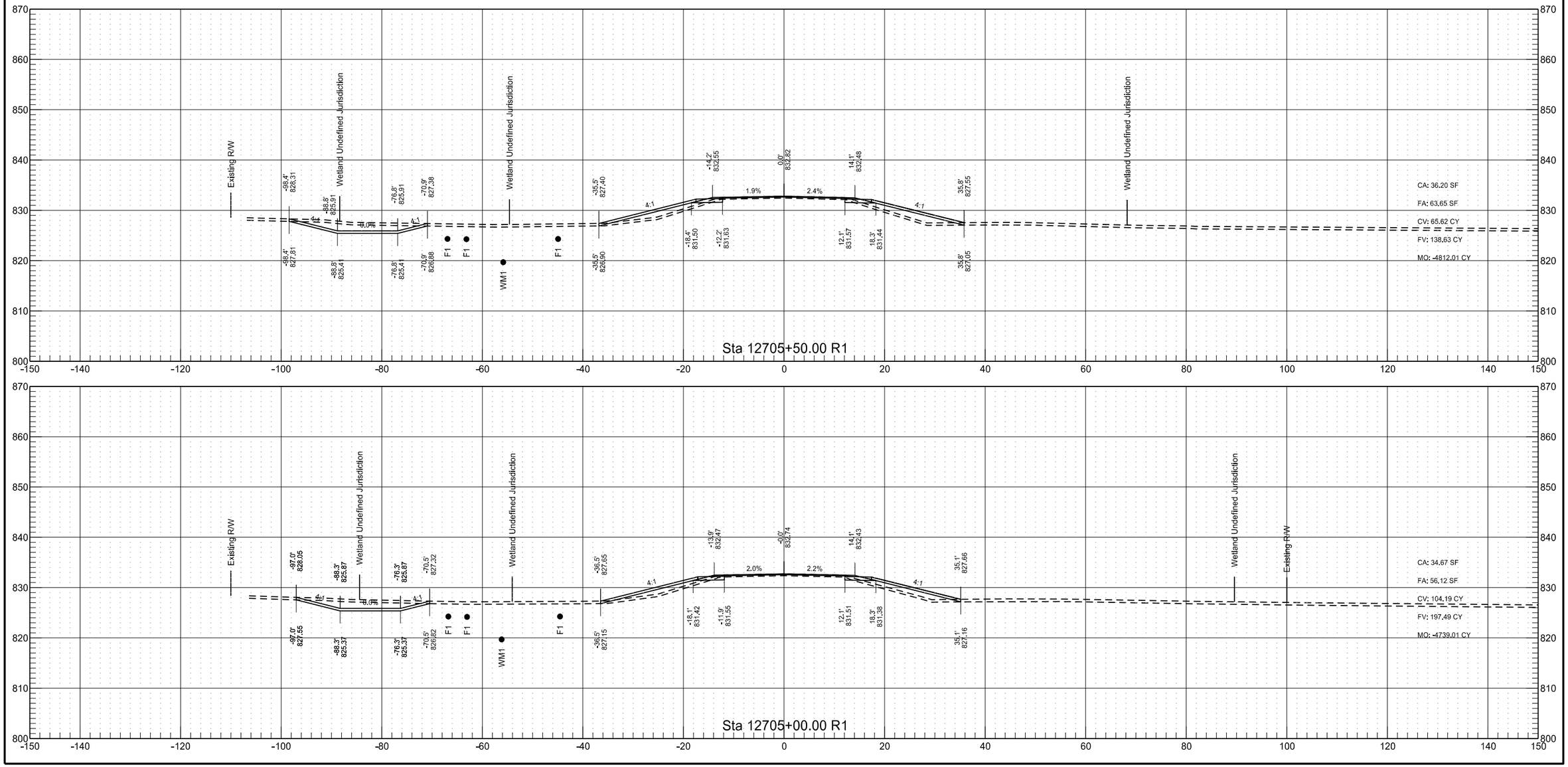
ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	30



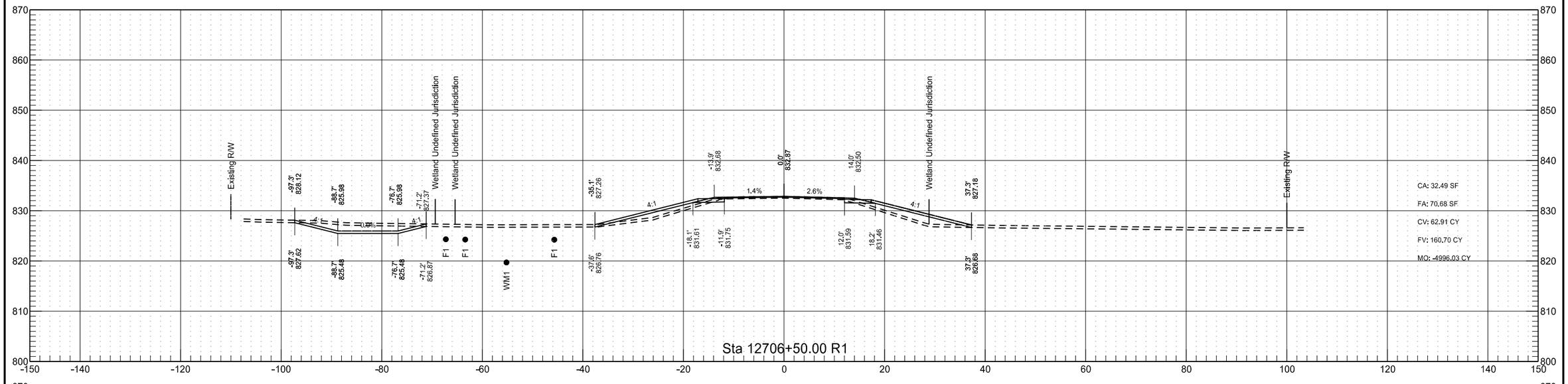
ND 18

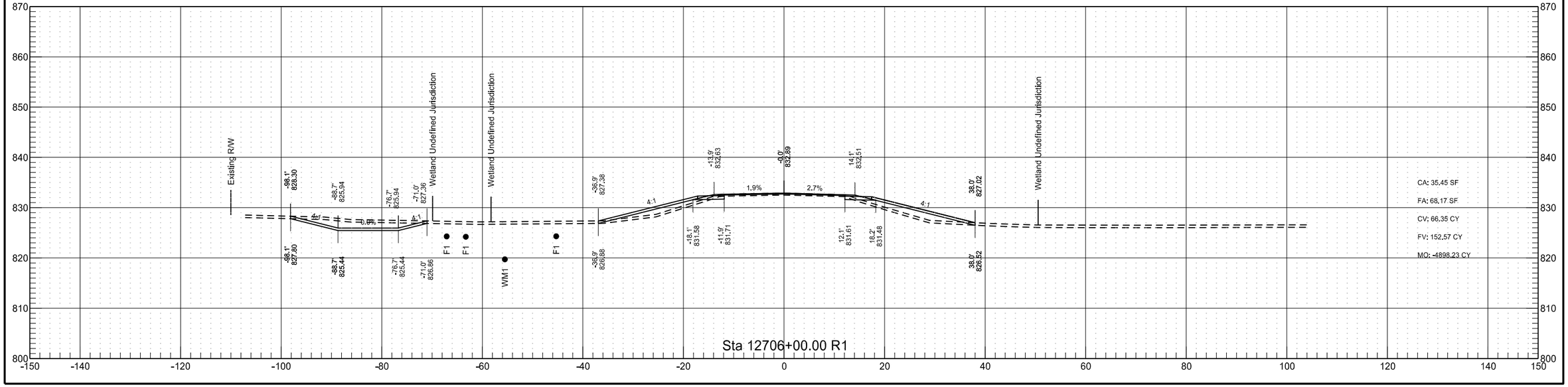
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	31



ND 18

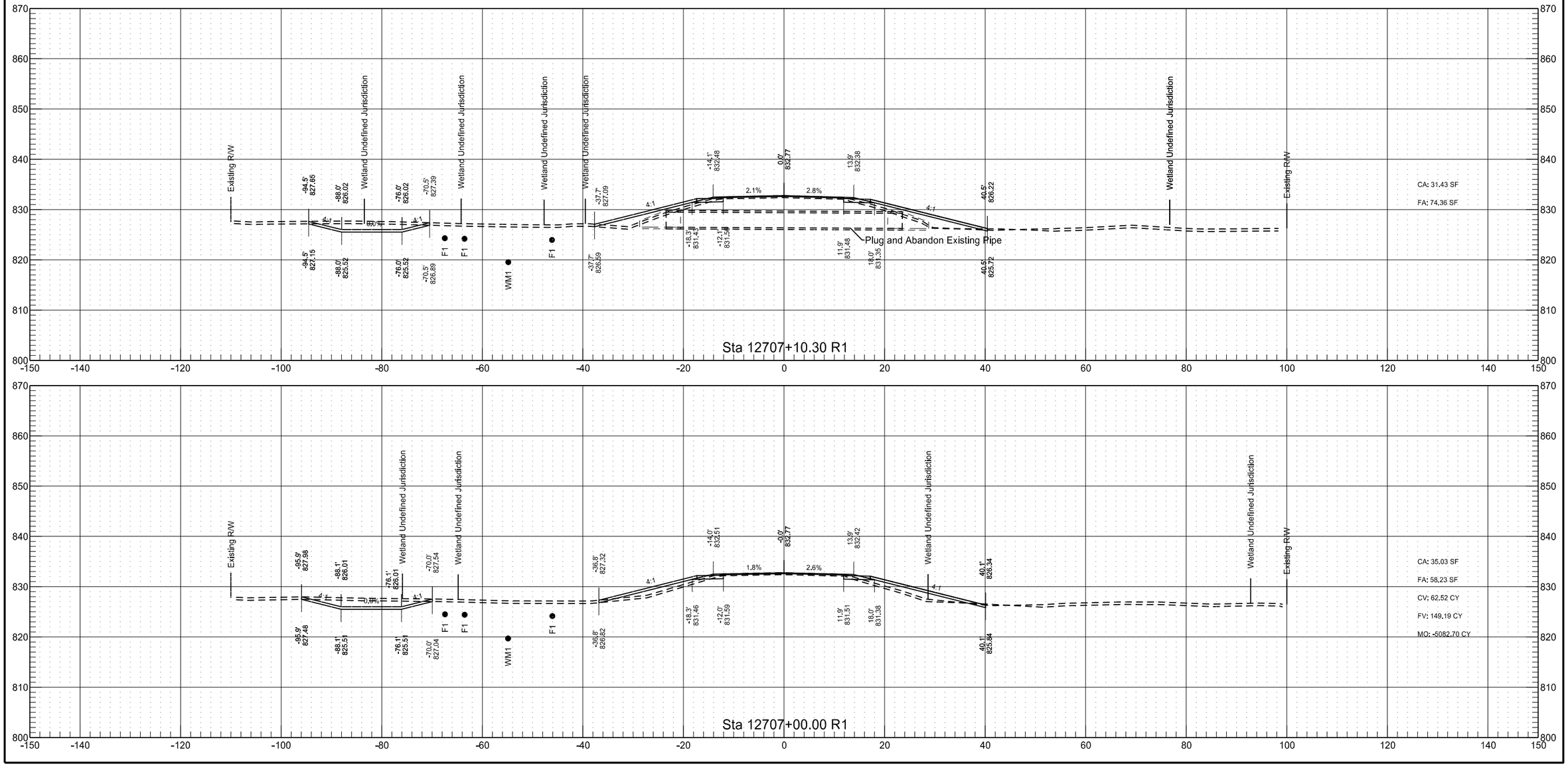
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	32





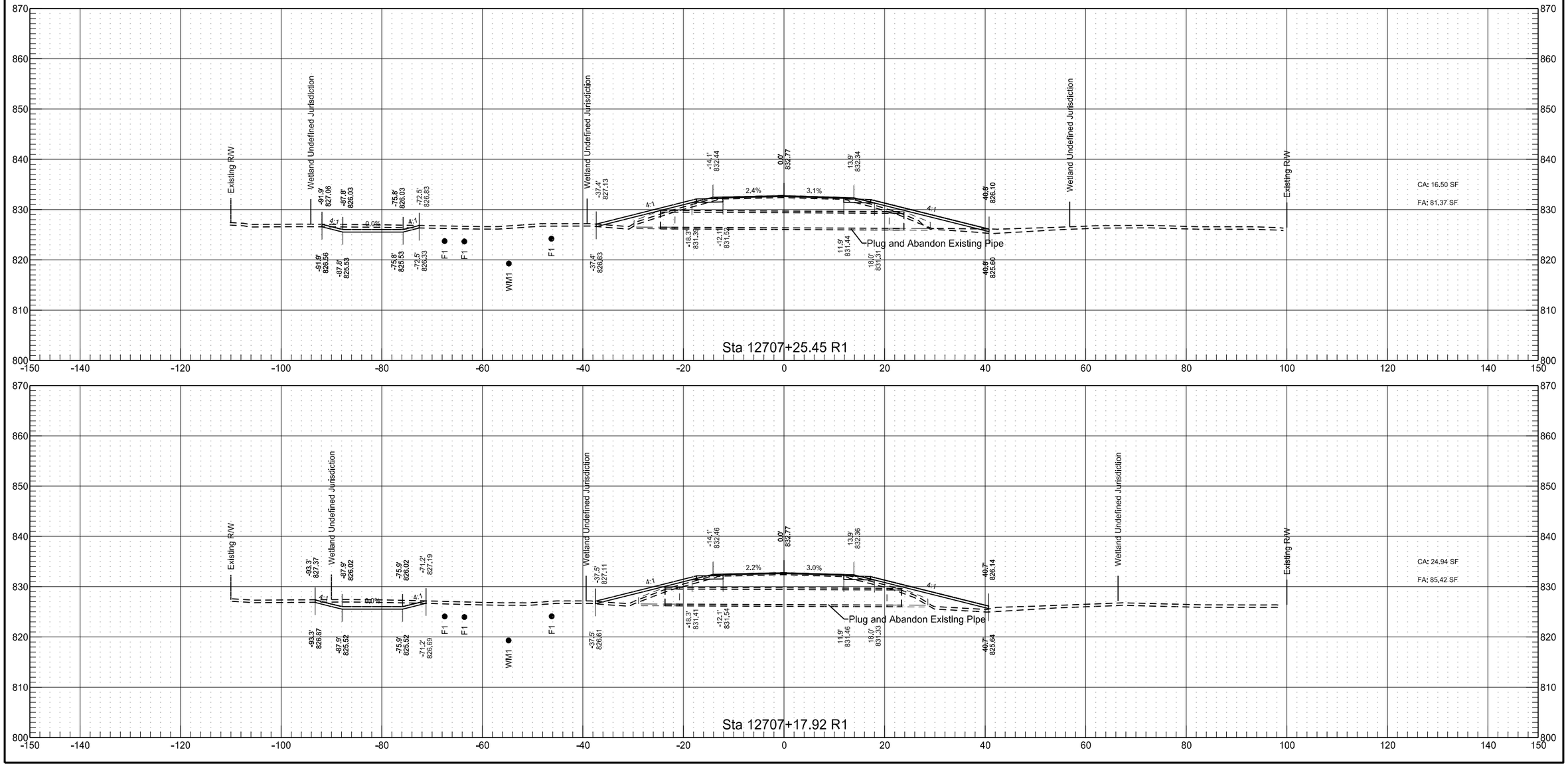
ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	33



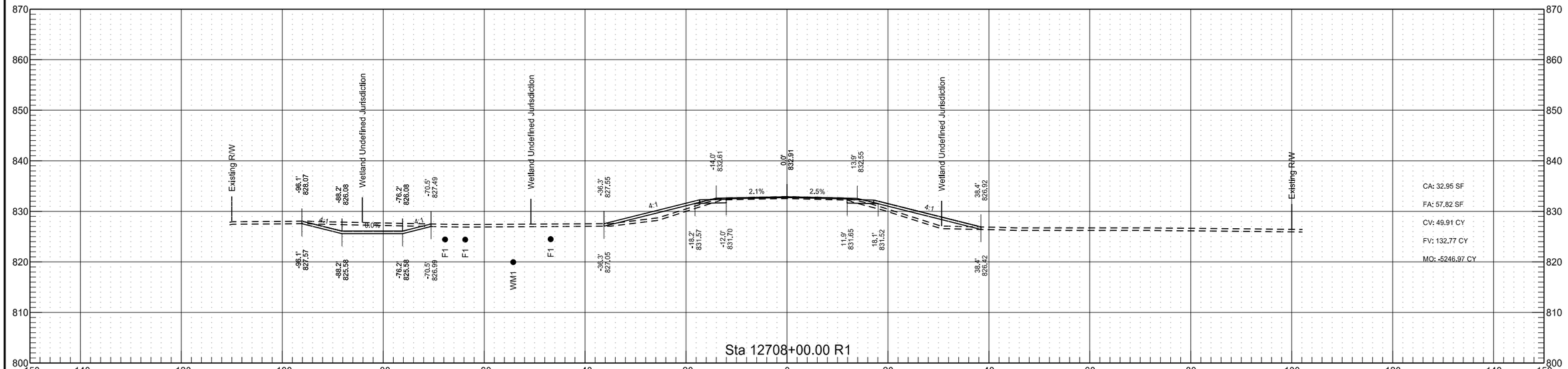
ND 18

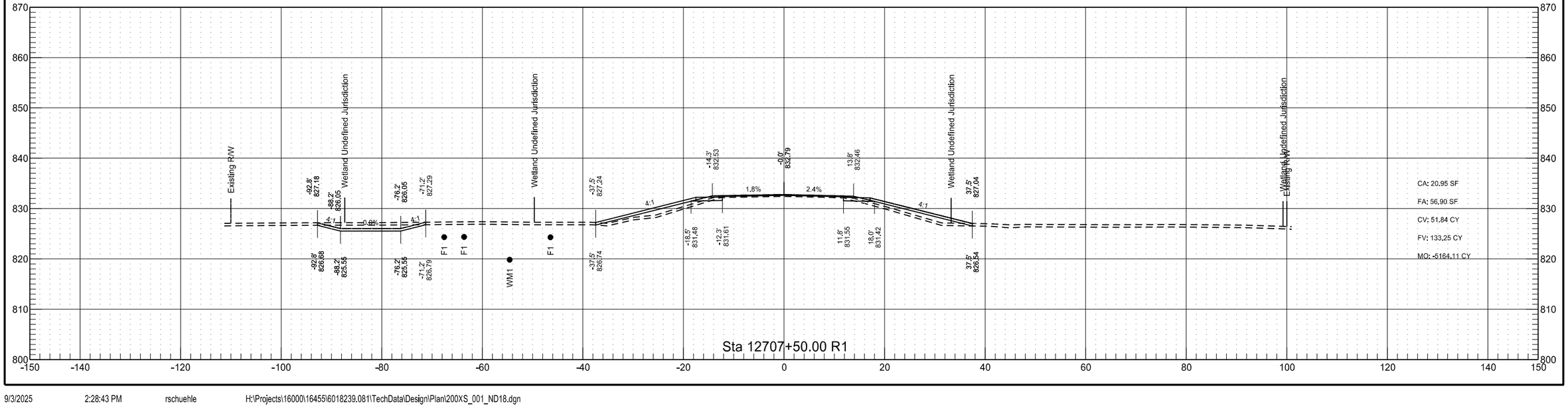
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	34



ND 18

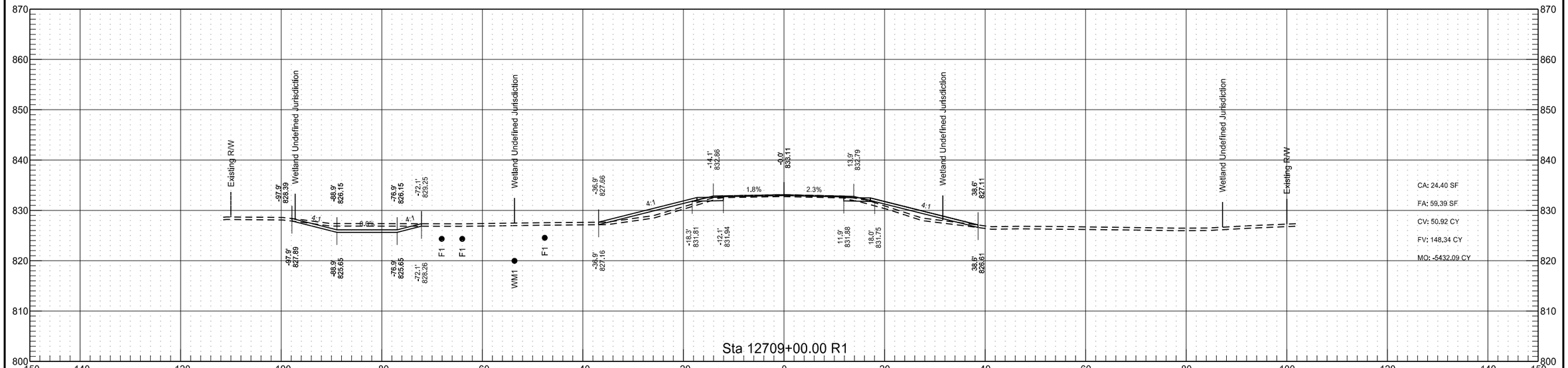
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	35





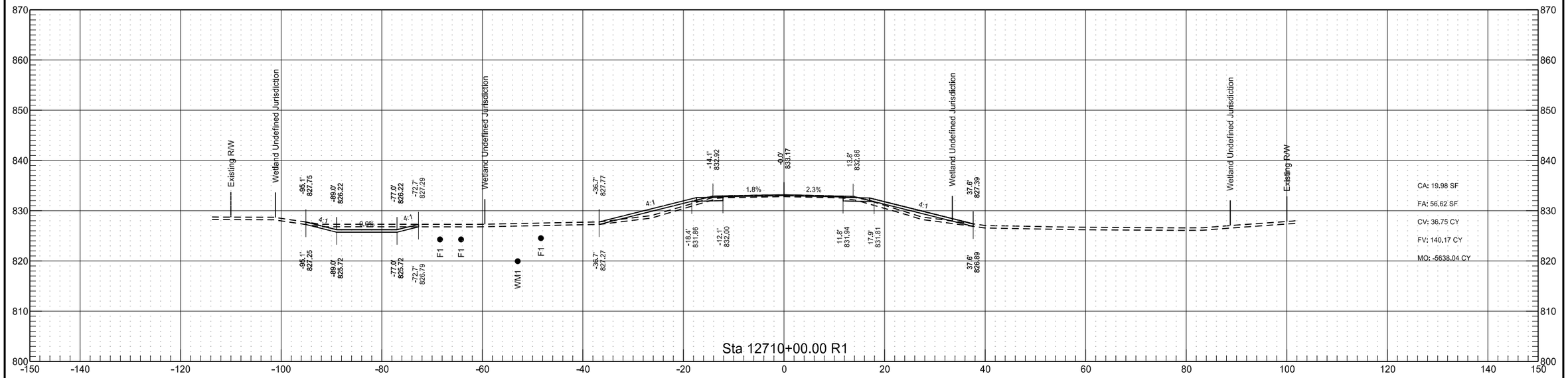
ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	36



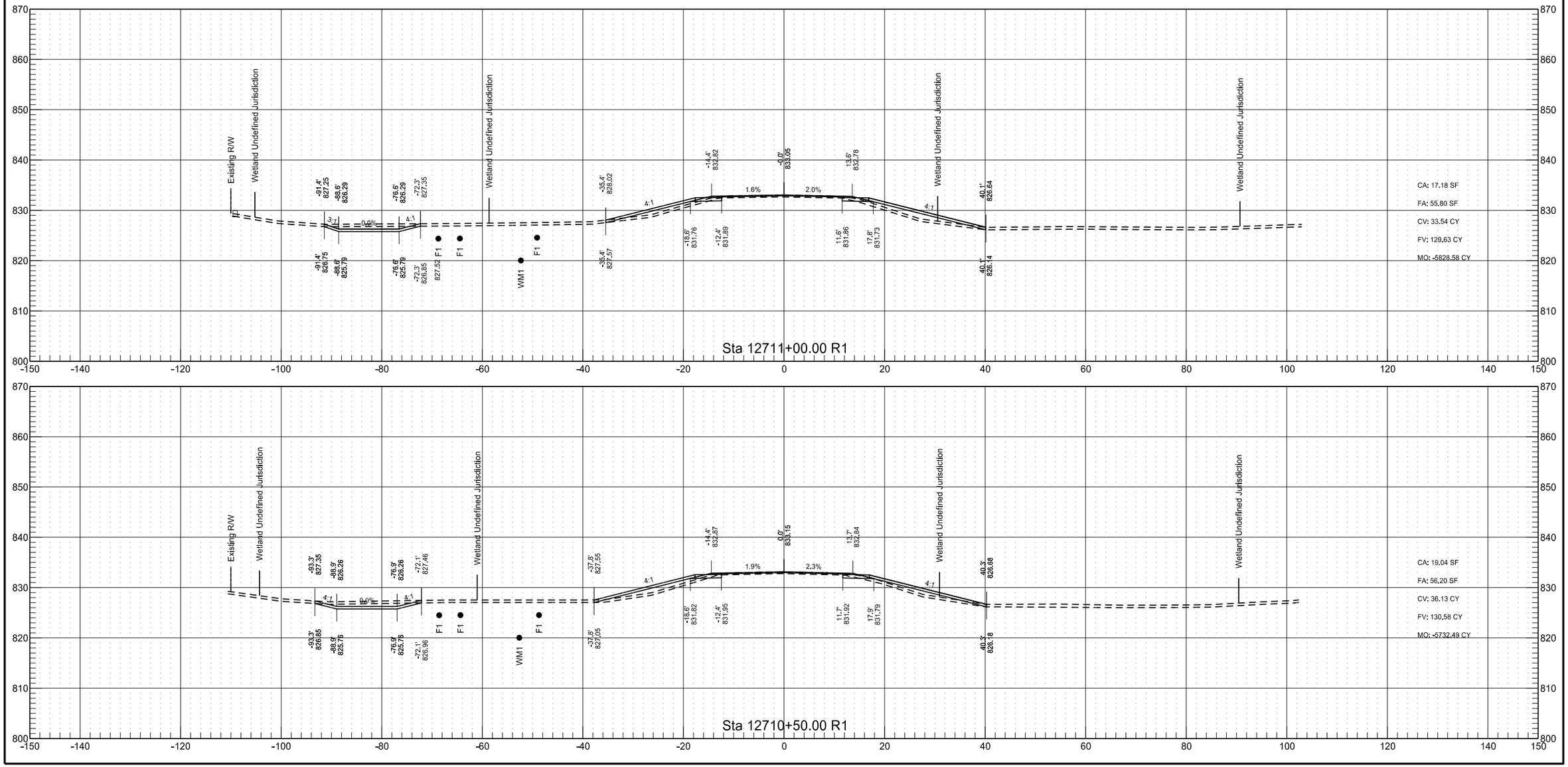
ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	37



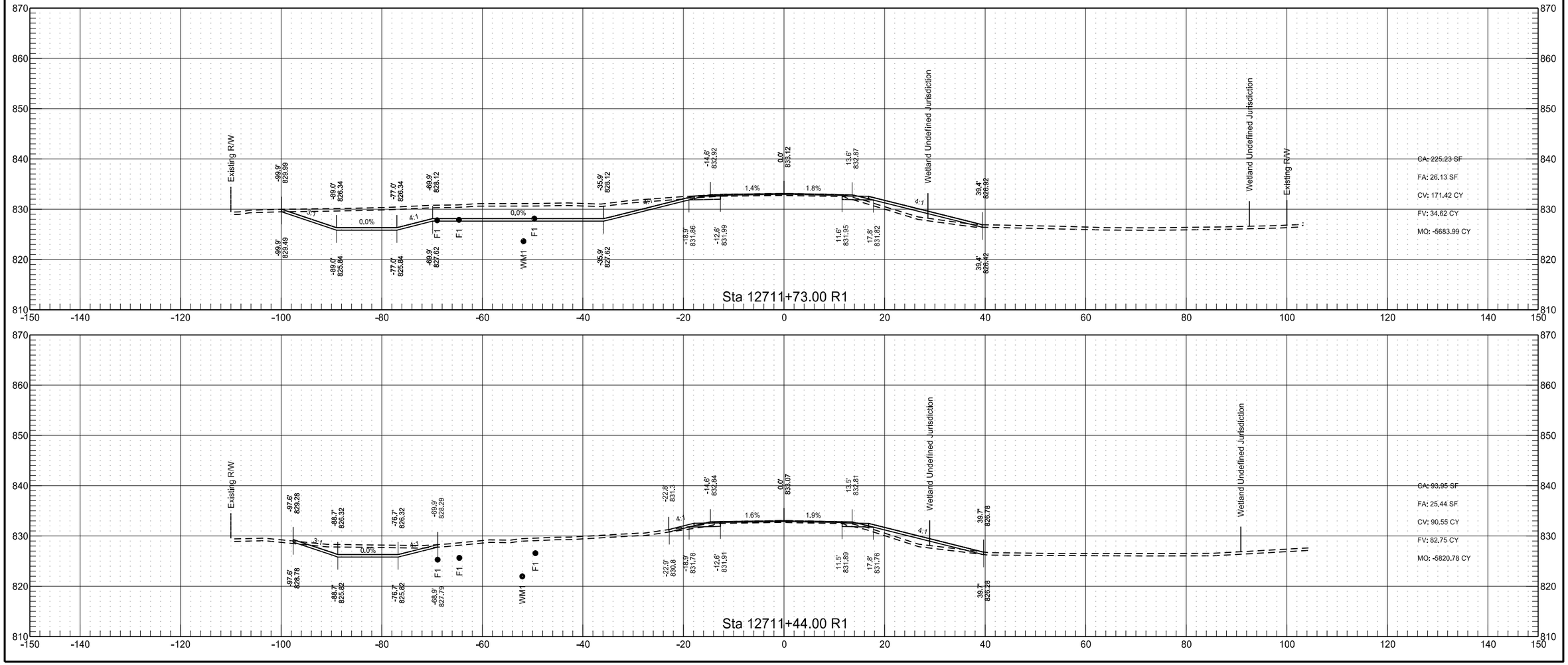
ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	38



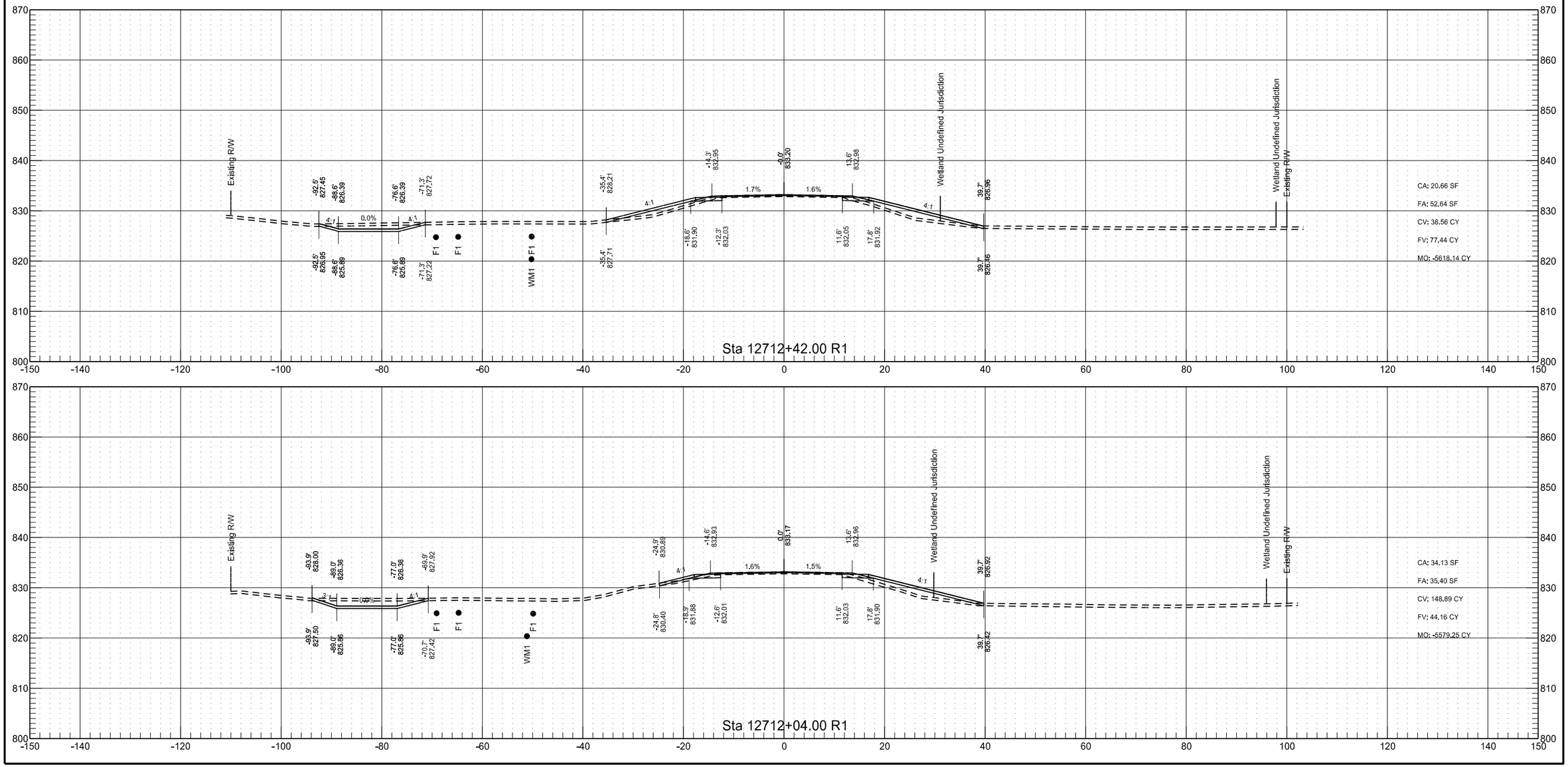
ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	39



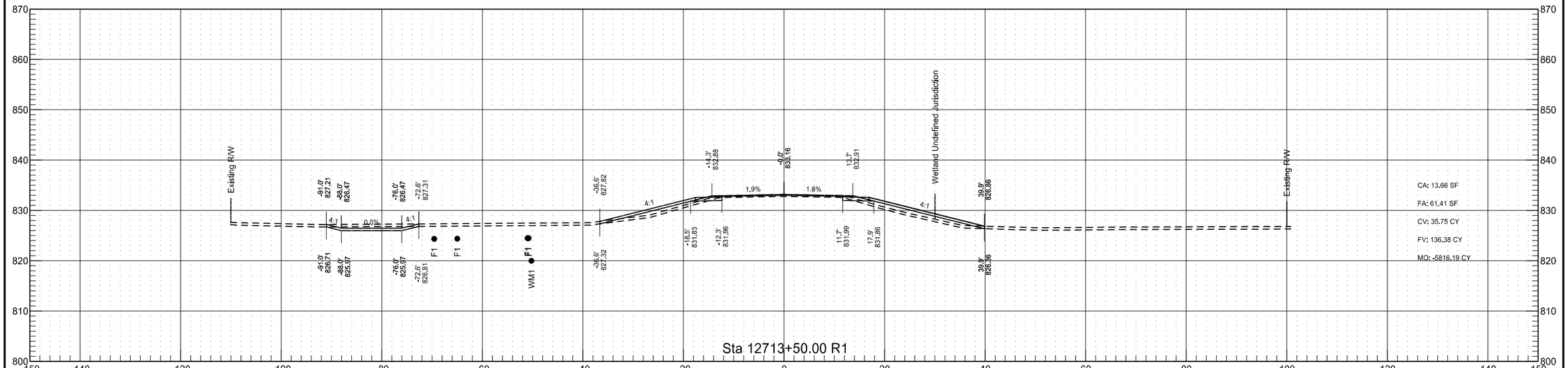
ND 18

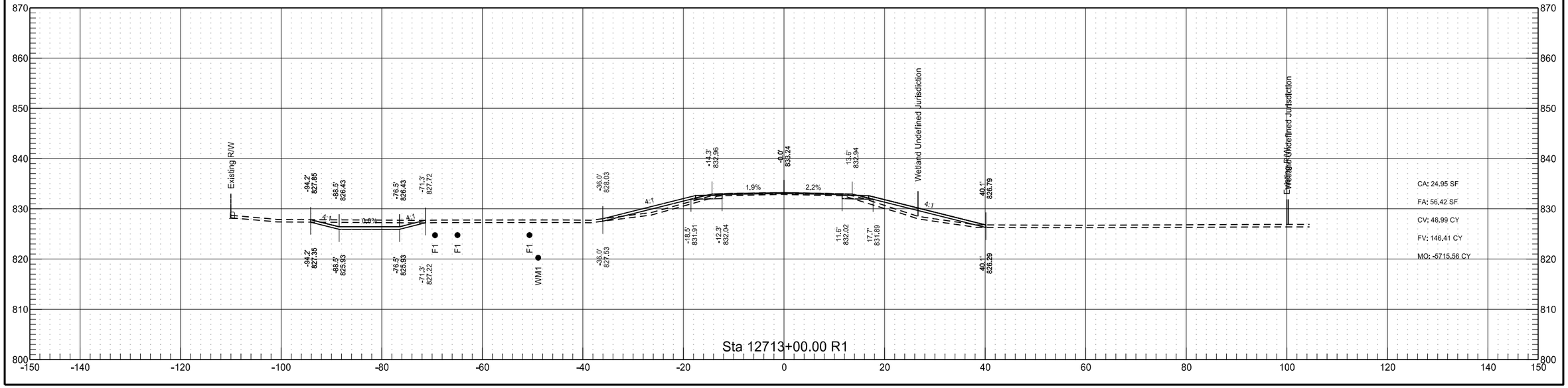
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	40



ND 18

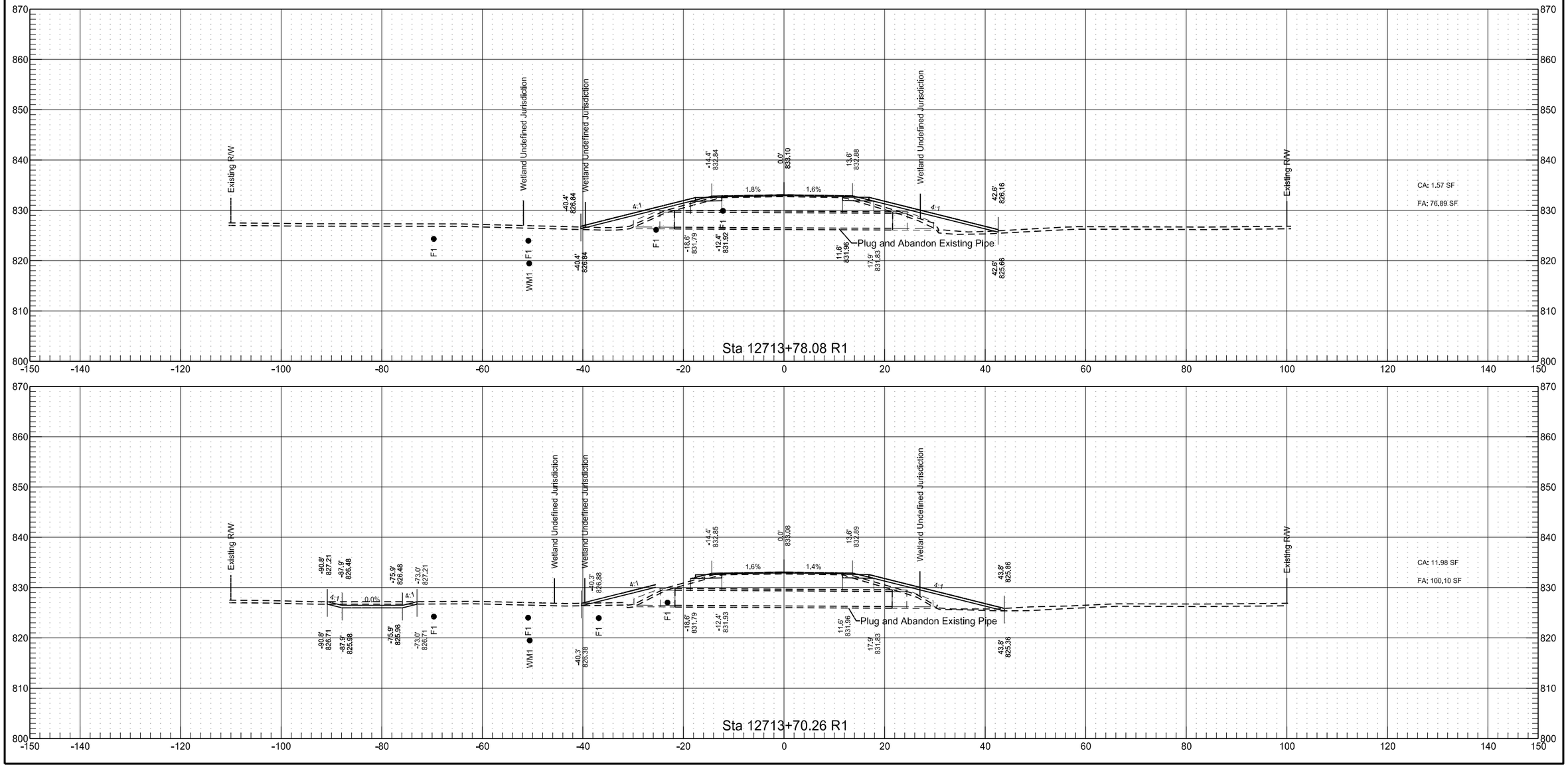
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	41





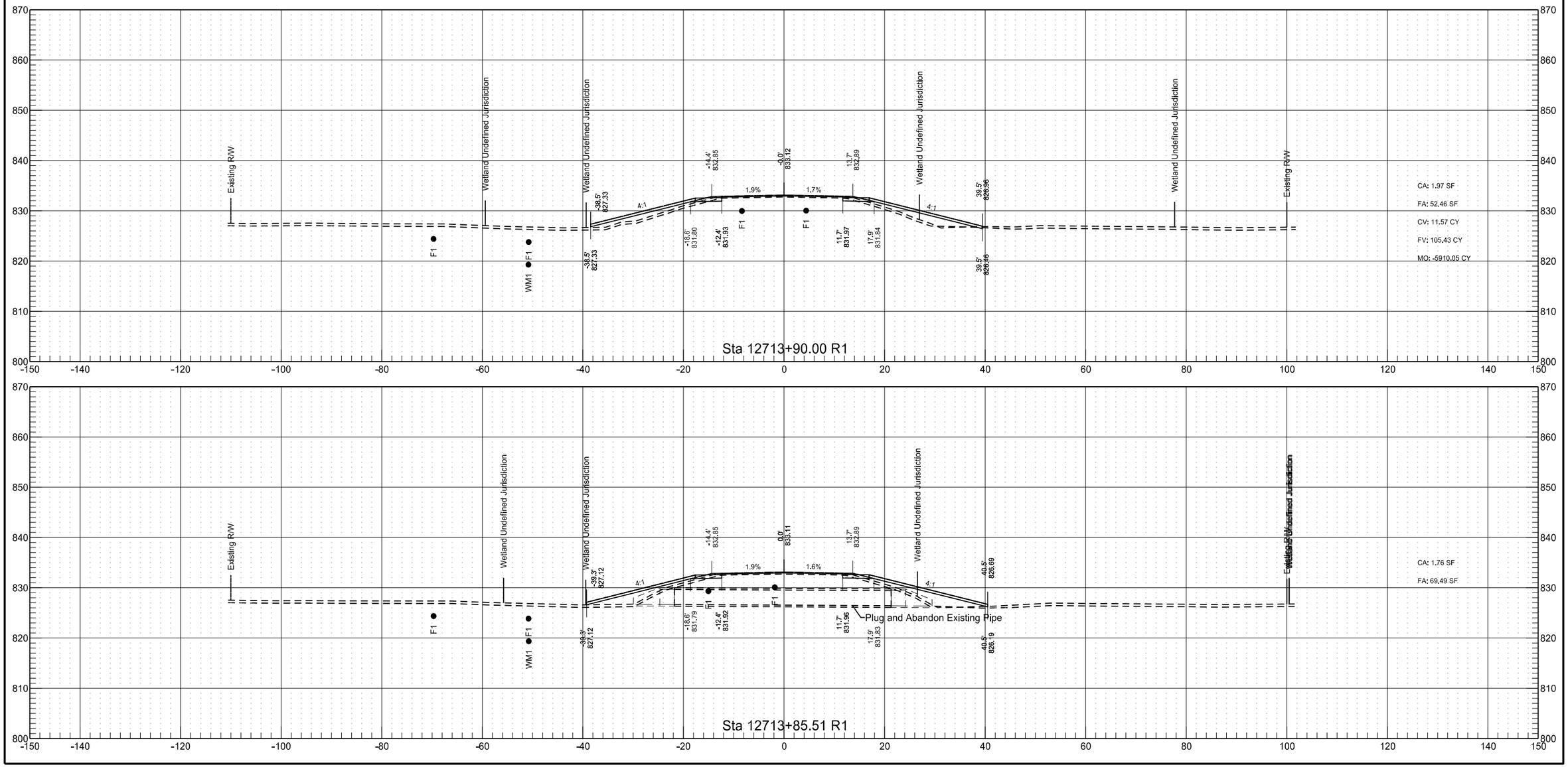
ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	42



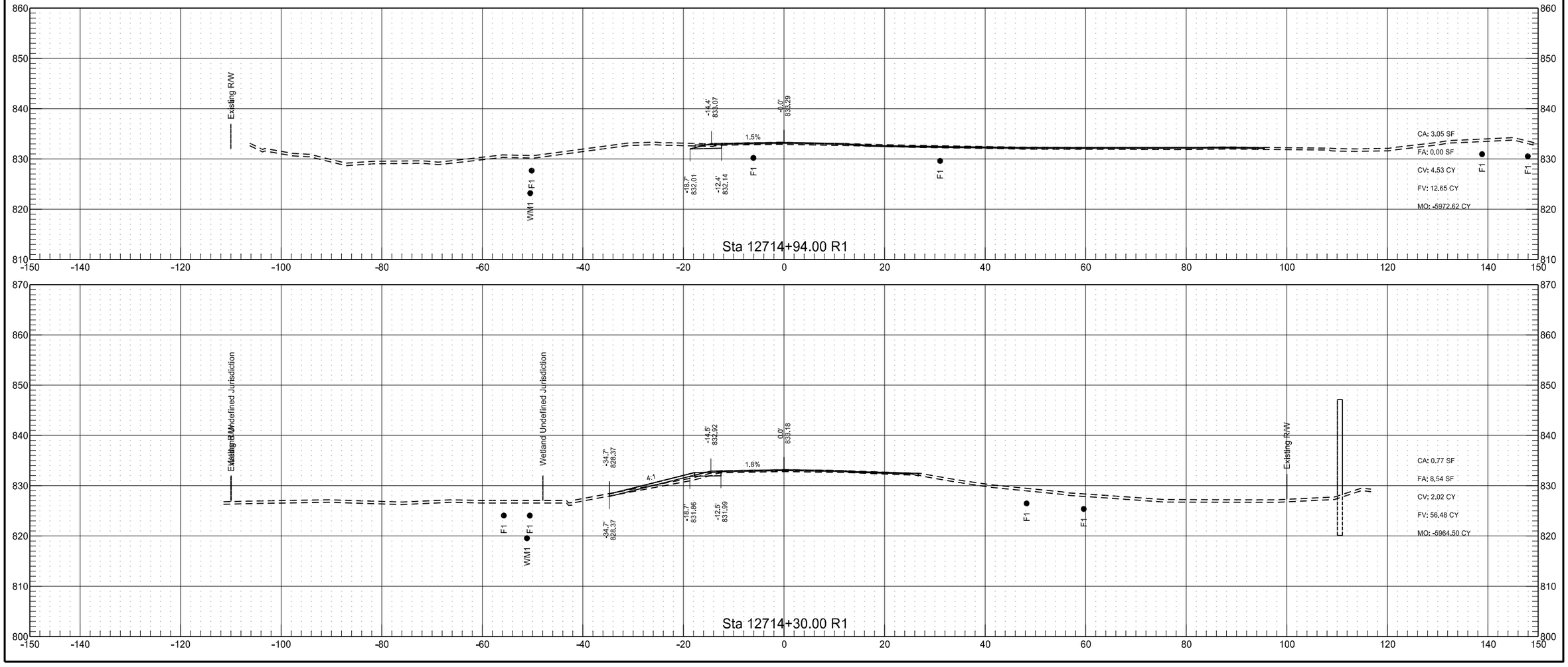
ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	43



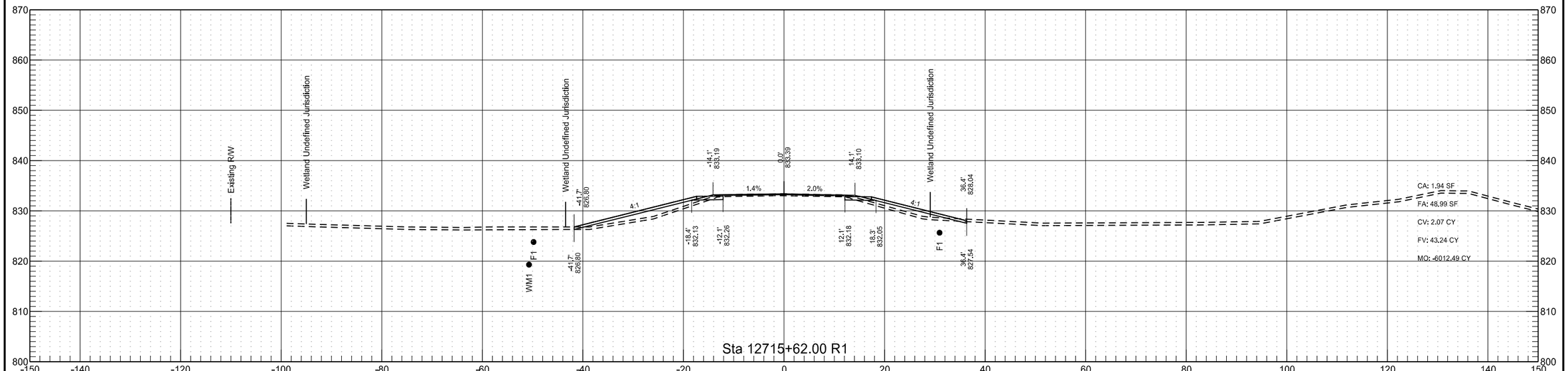
ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	44



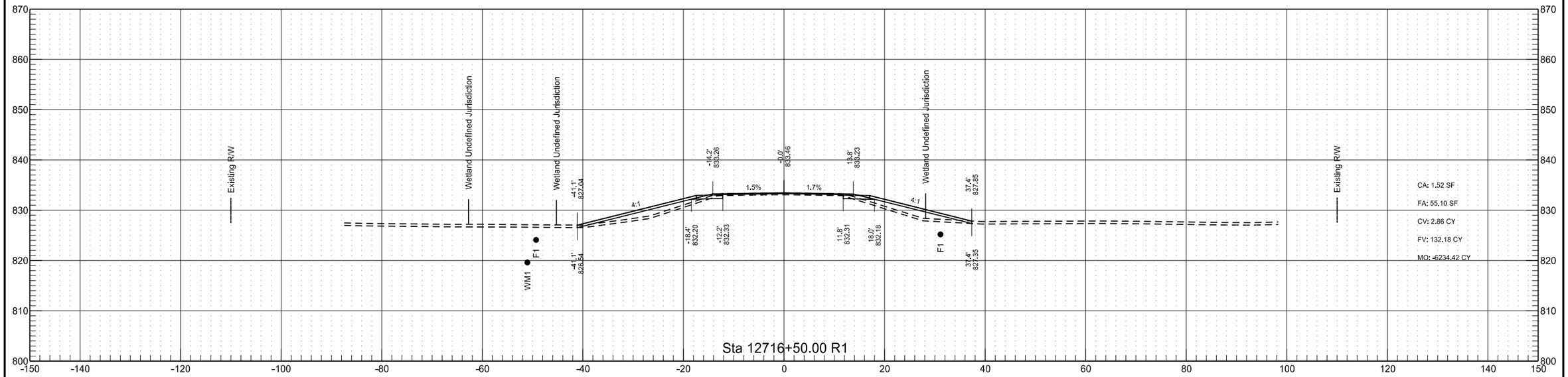
ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	45



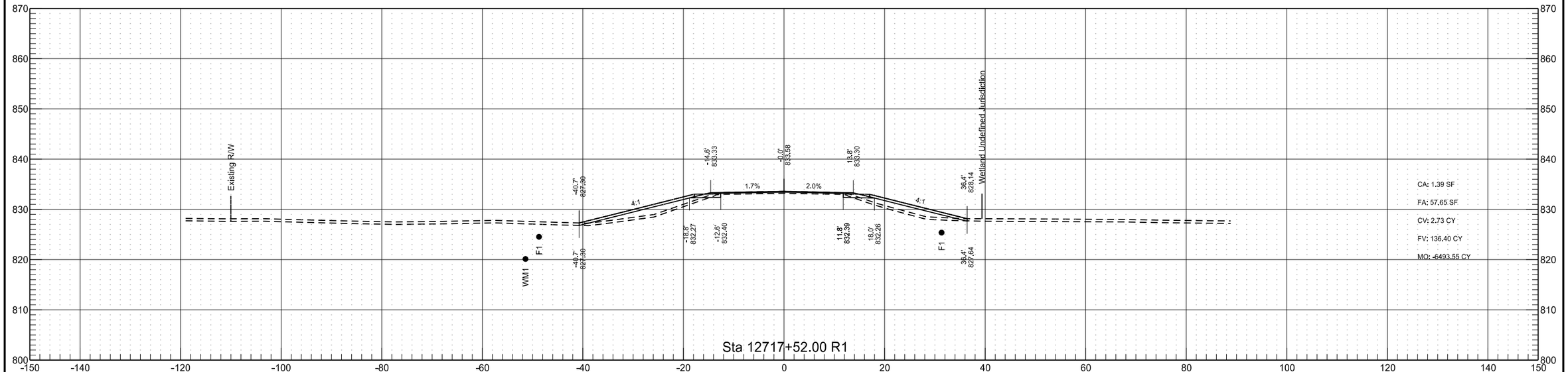
ND 18

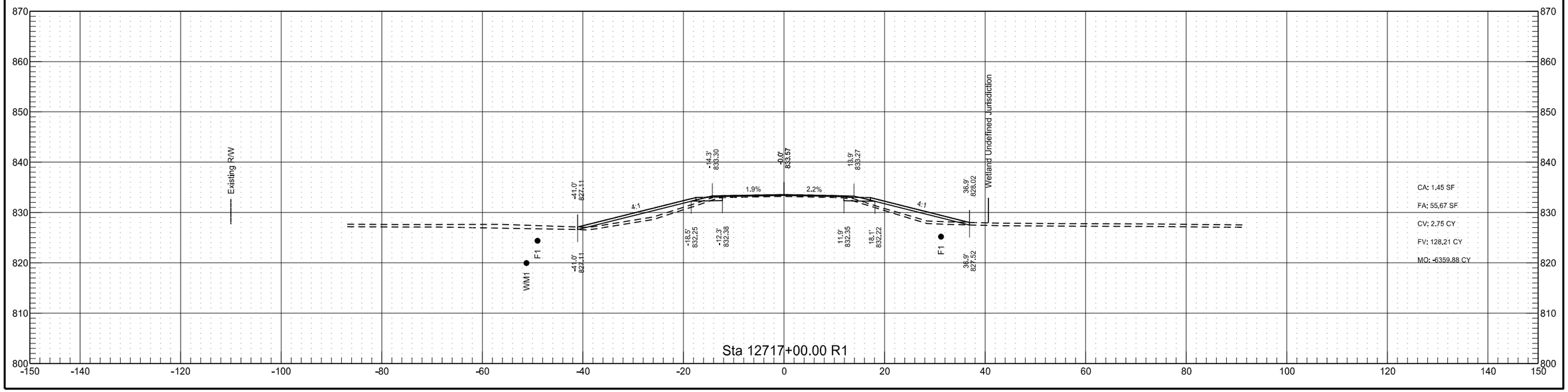
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	46



ND 18

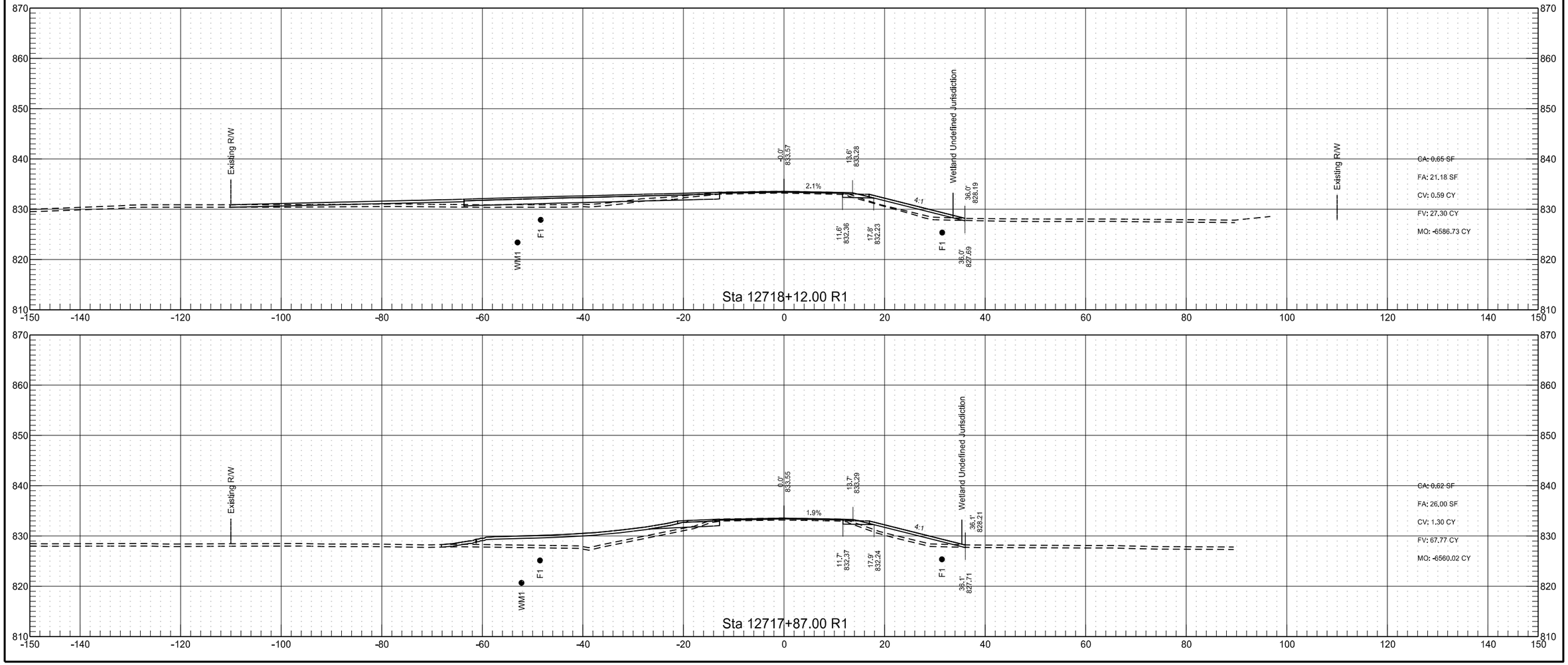
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	47





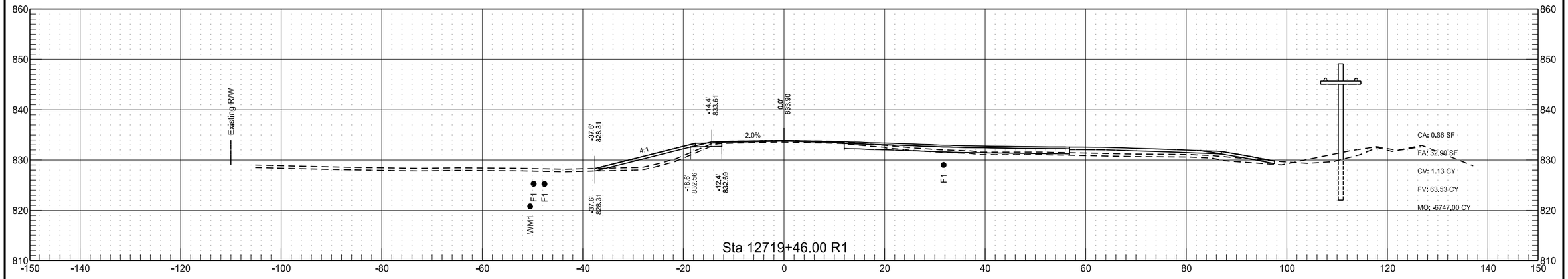
ND 18

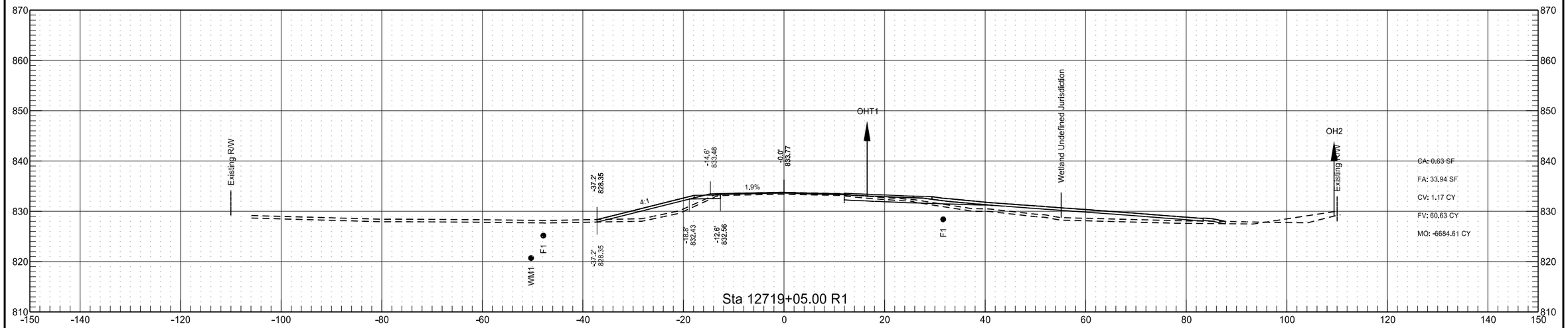
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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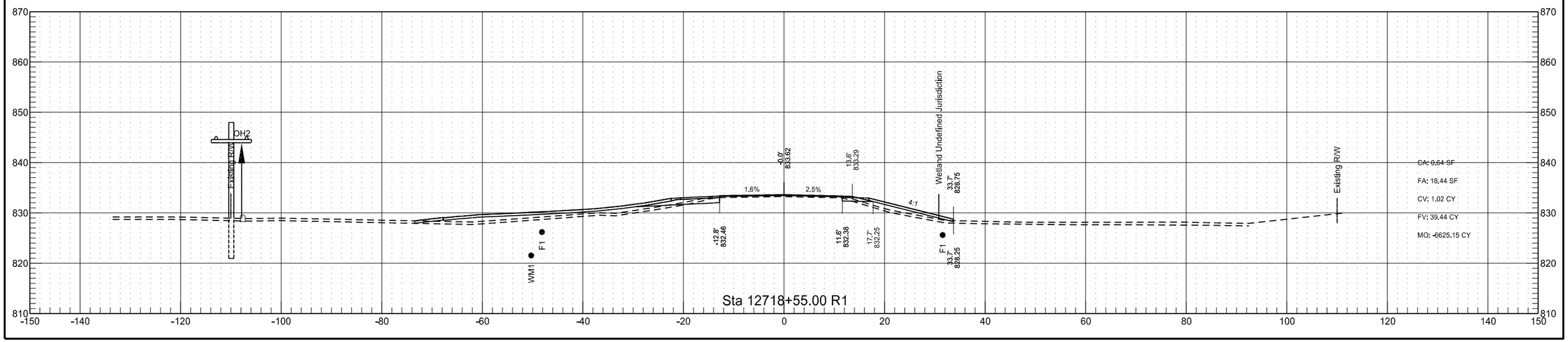


ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	49

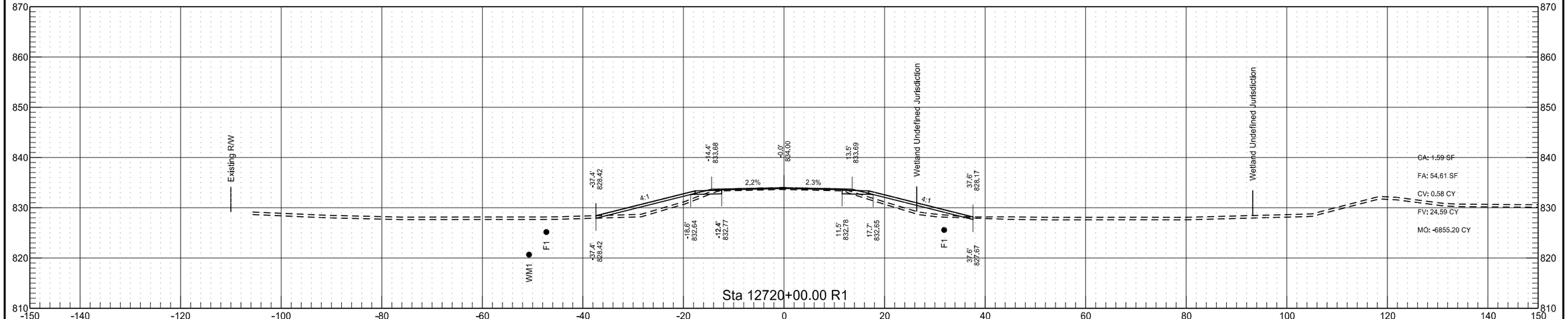






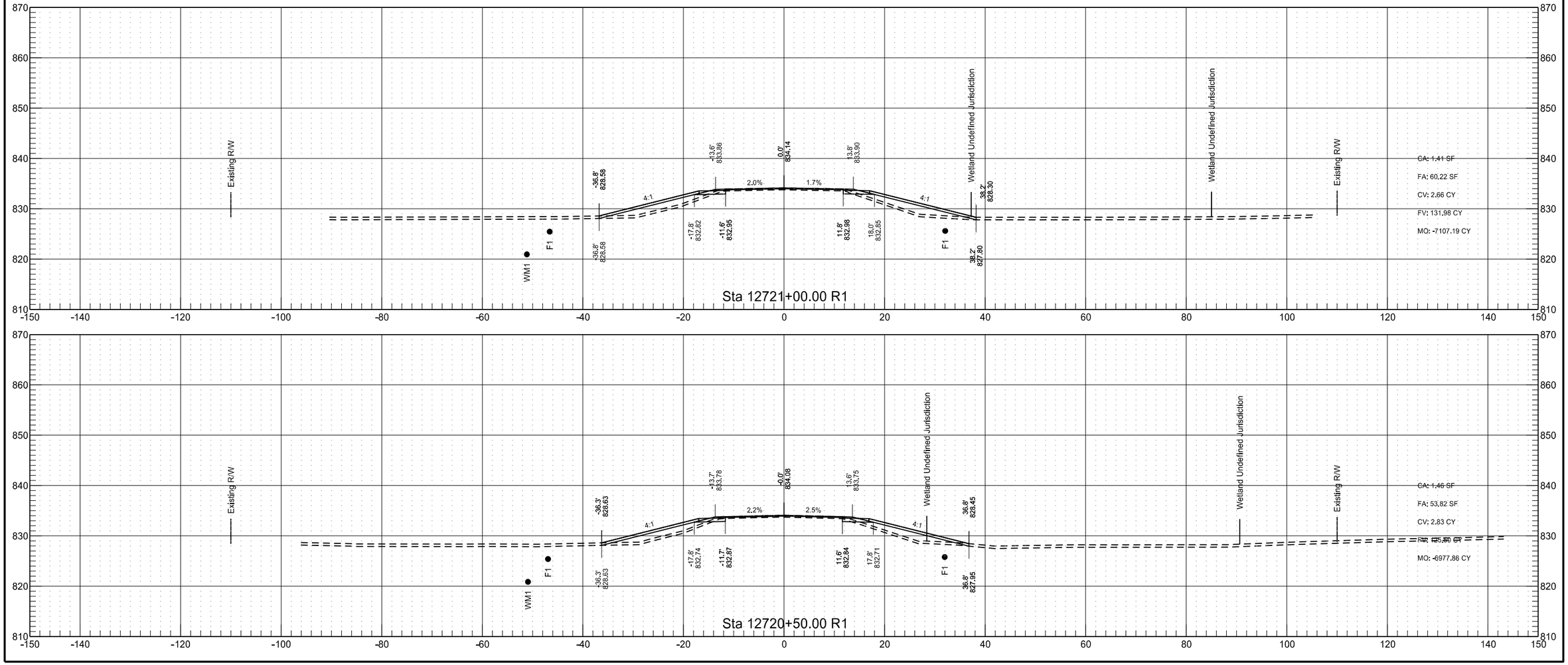
ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	50



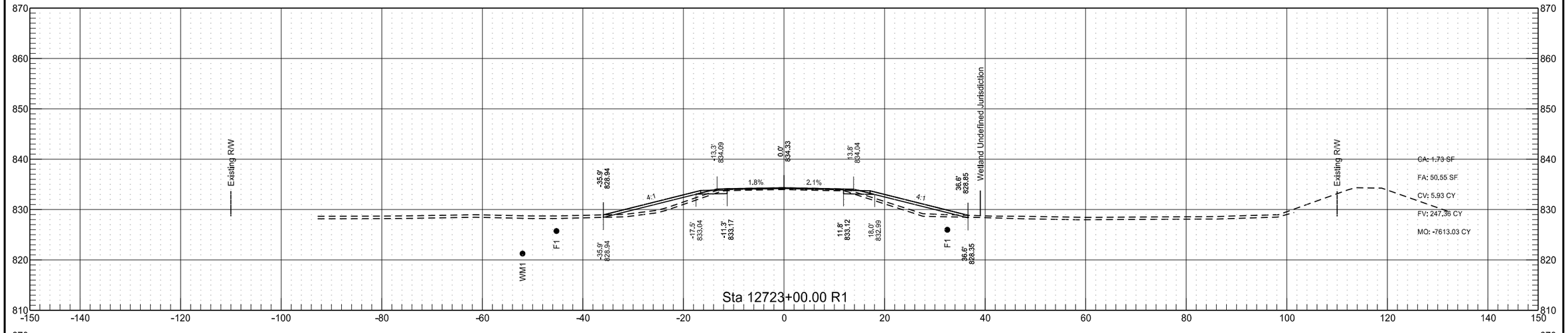
ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	51



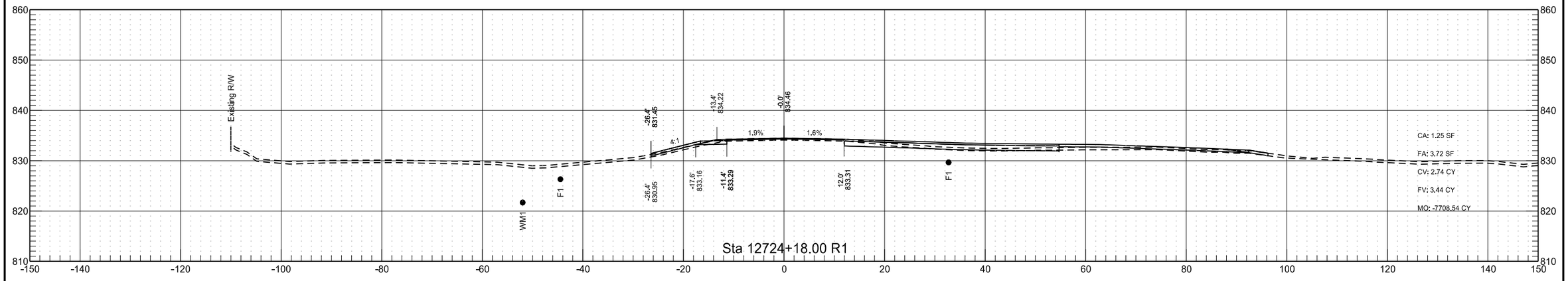
ND 18

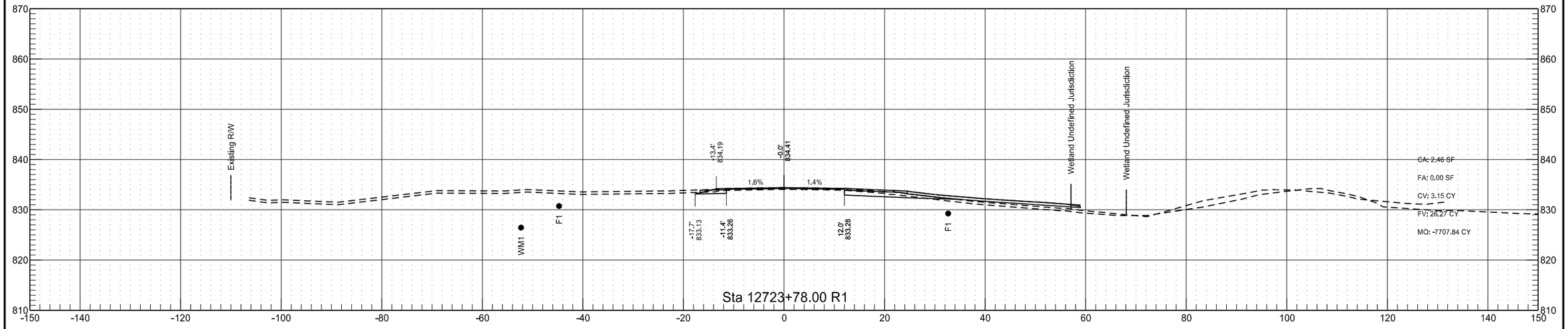
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	52

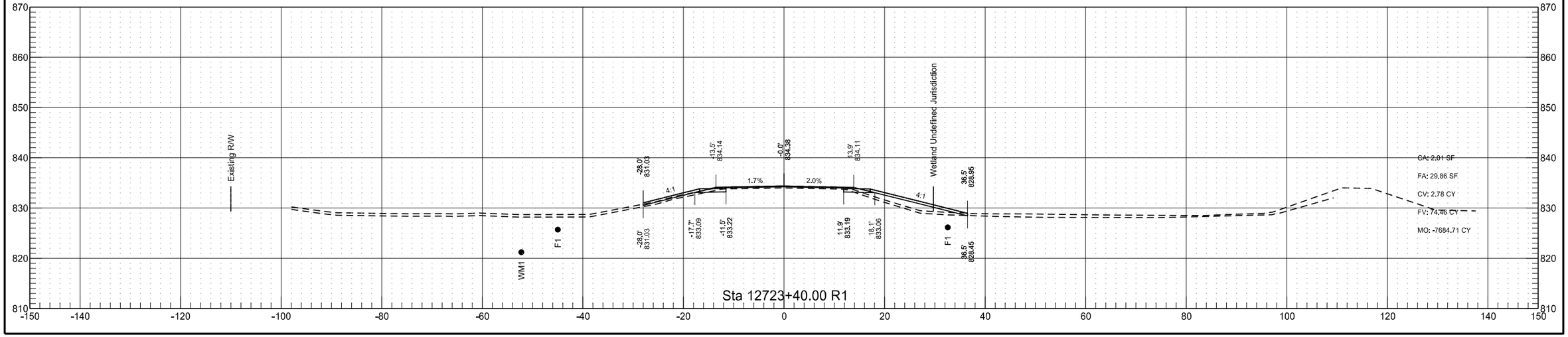


ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	53

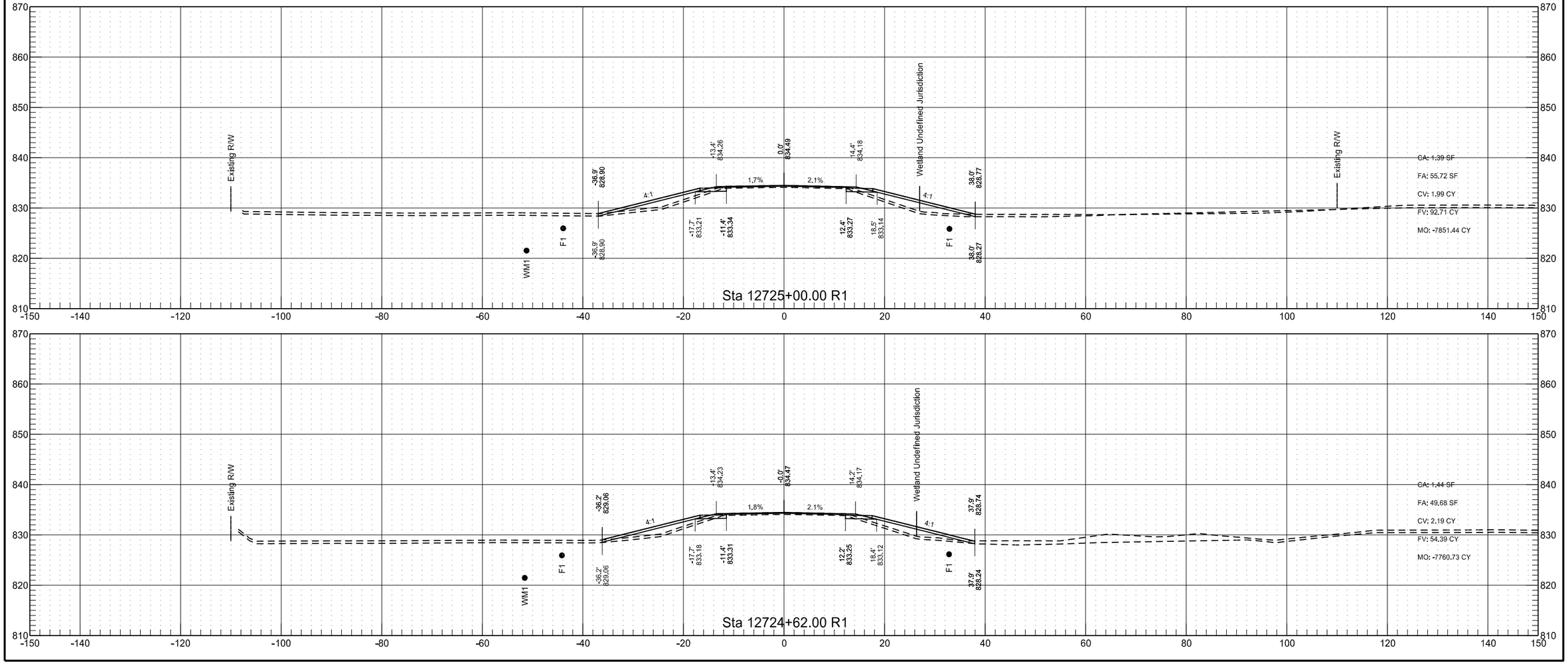






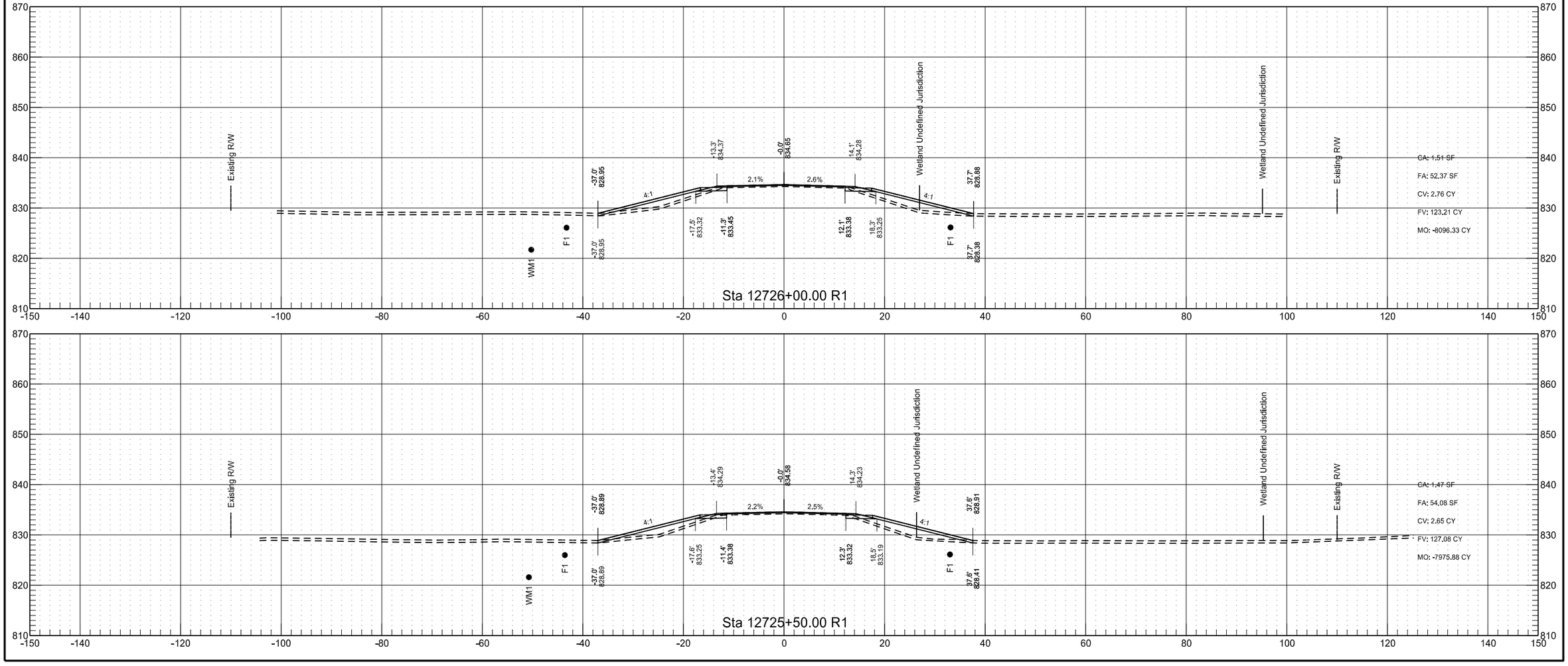
ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	54



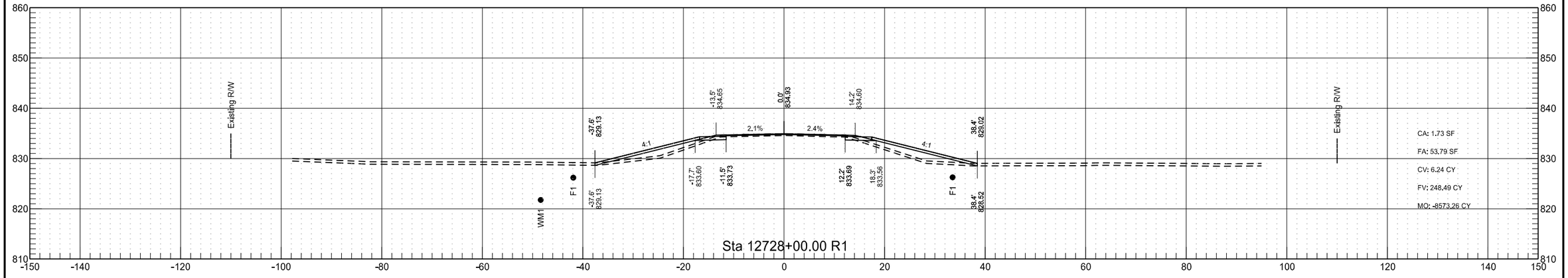
ND 18

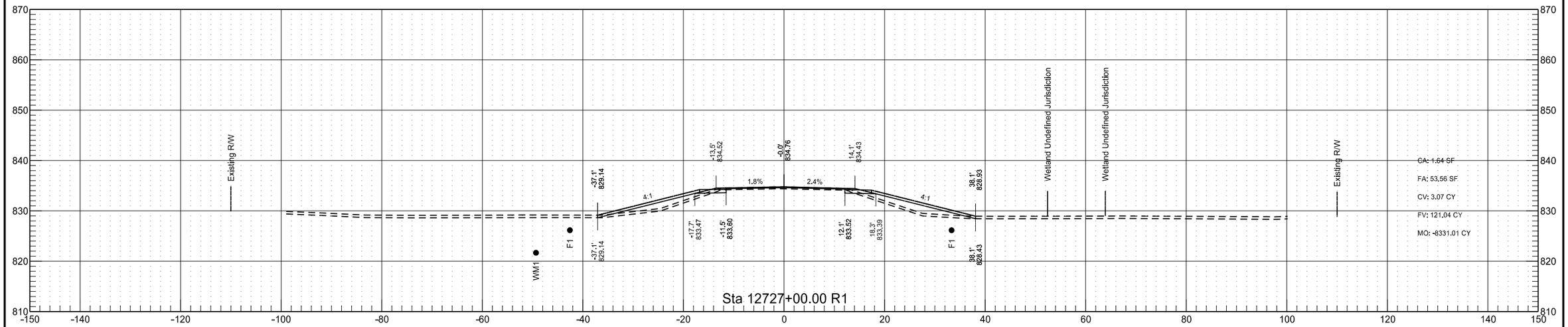
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	55

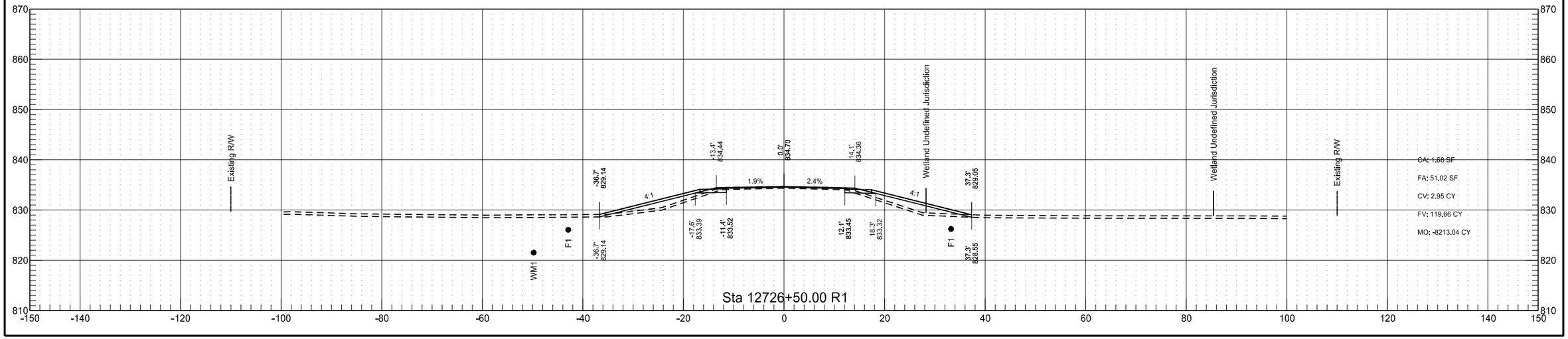


ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	56

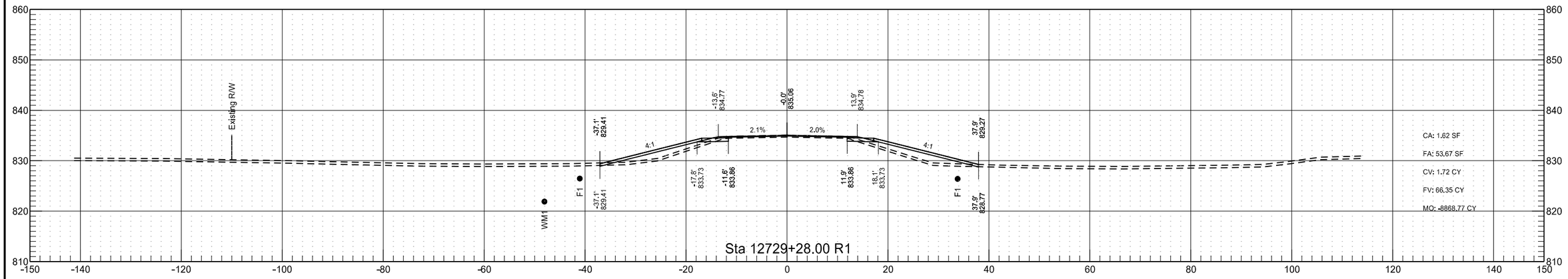


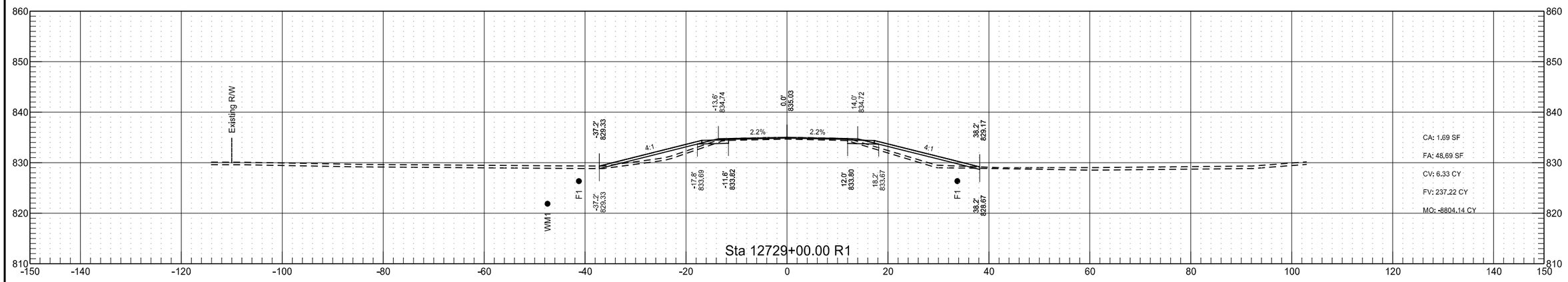


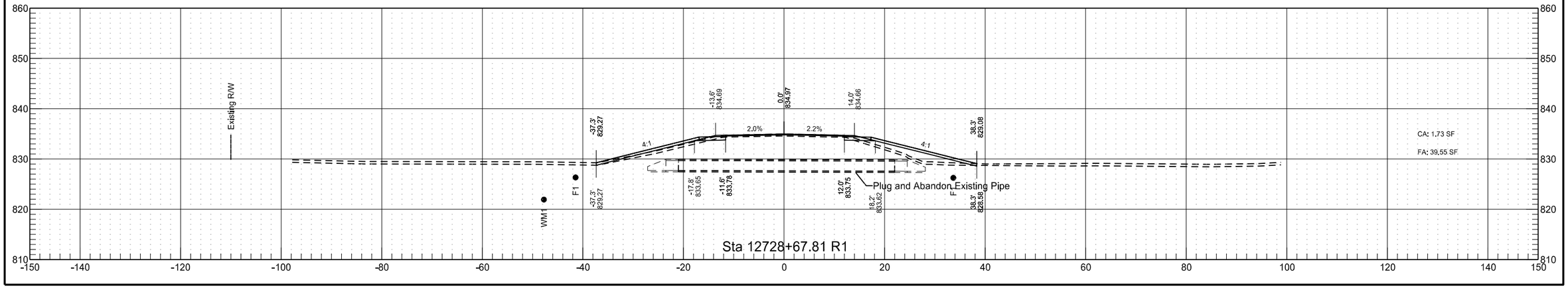


ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	57

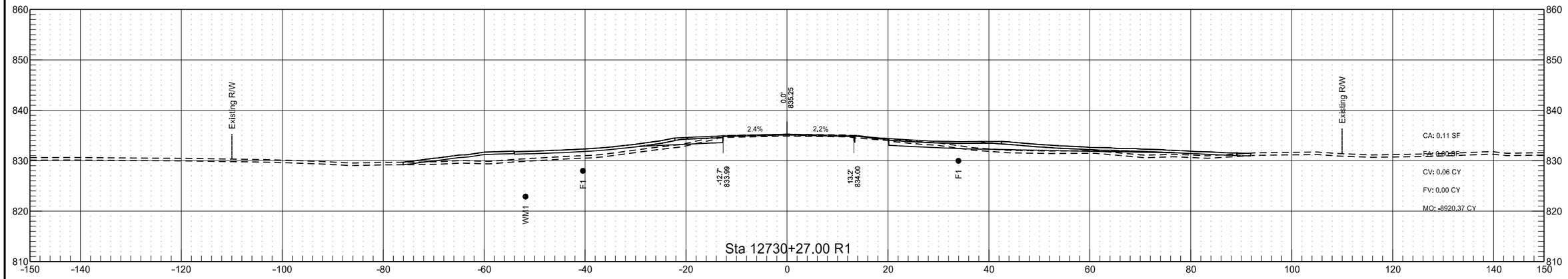


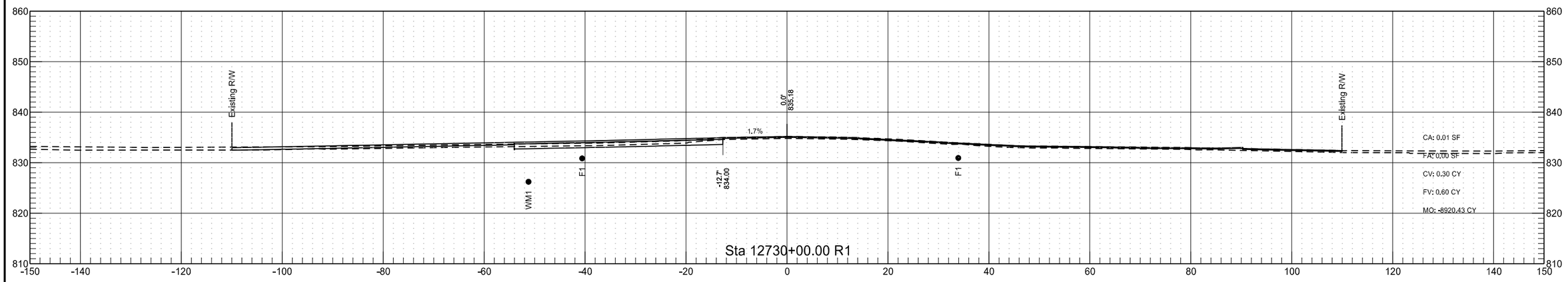


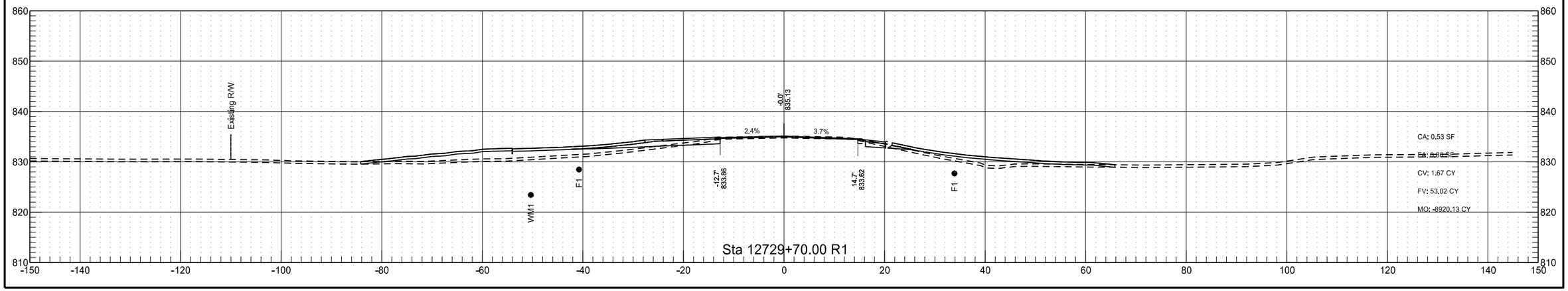


ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	58

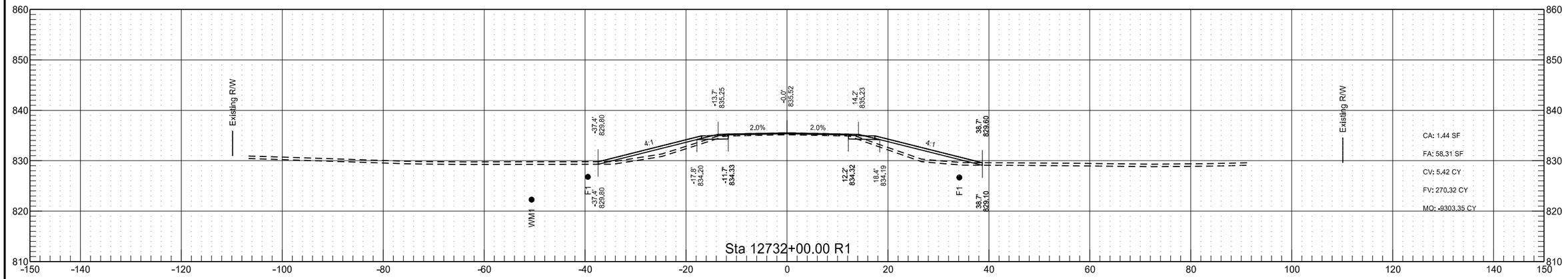


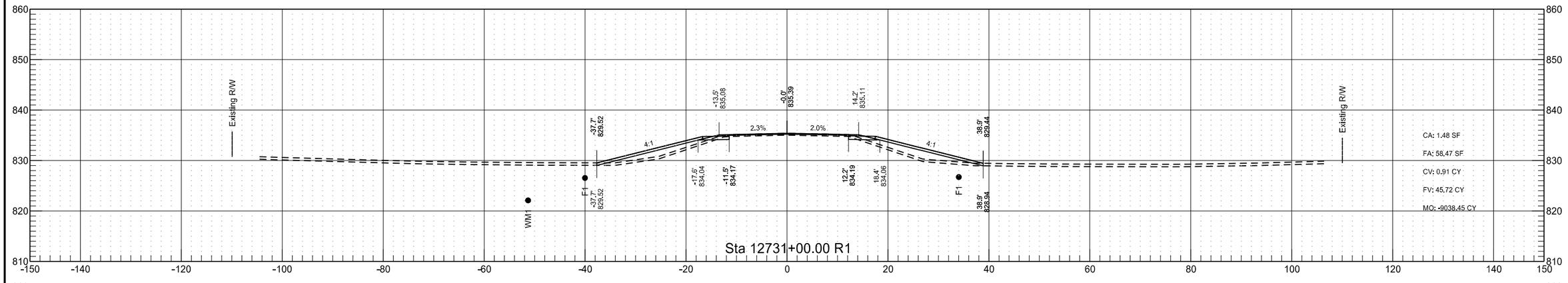


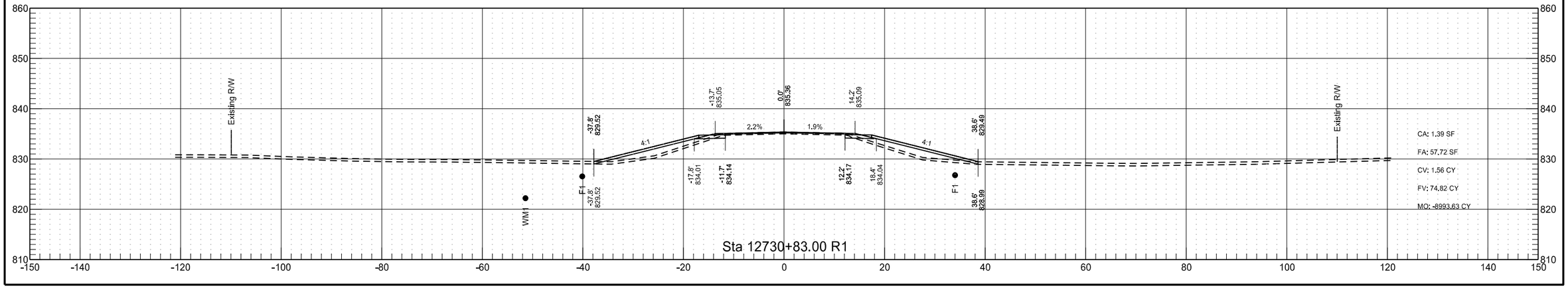


ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	59

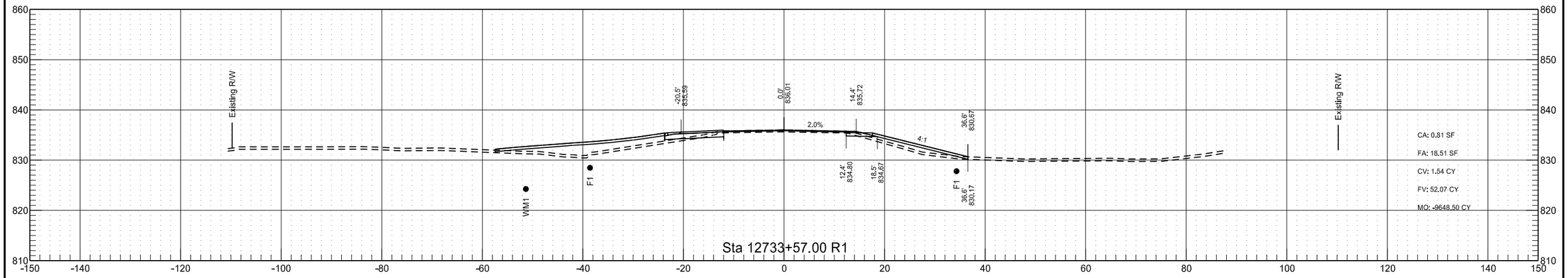


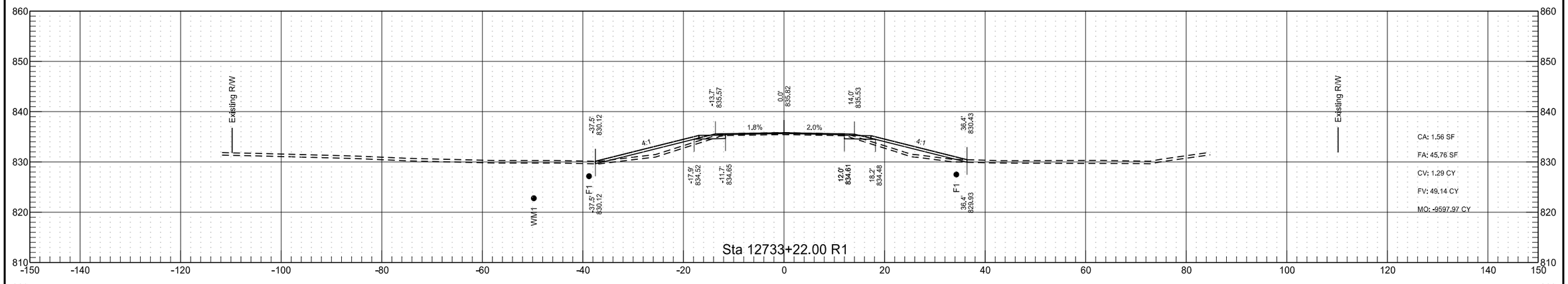


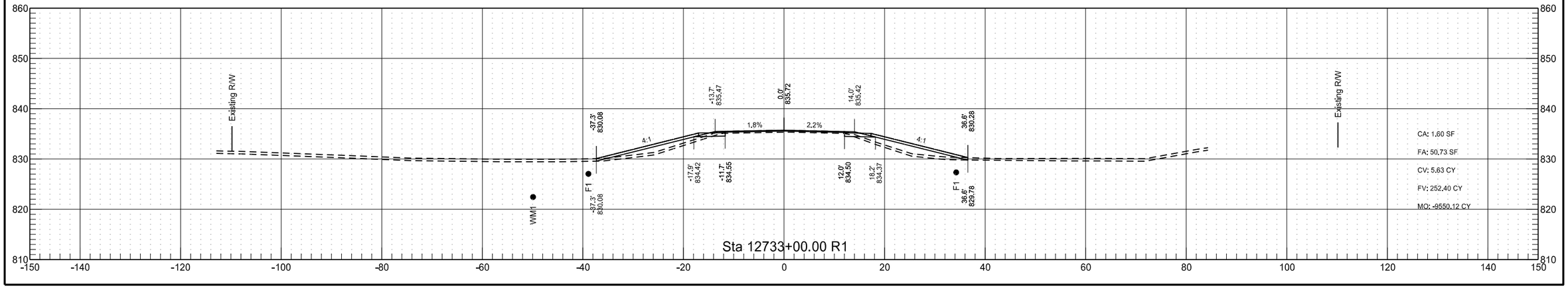


ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	60

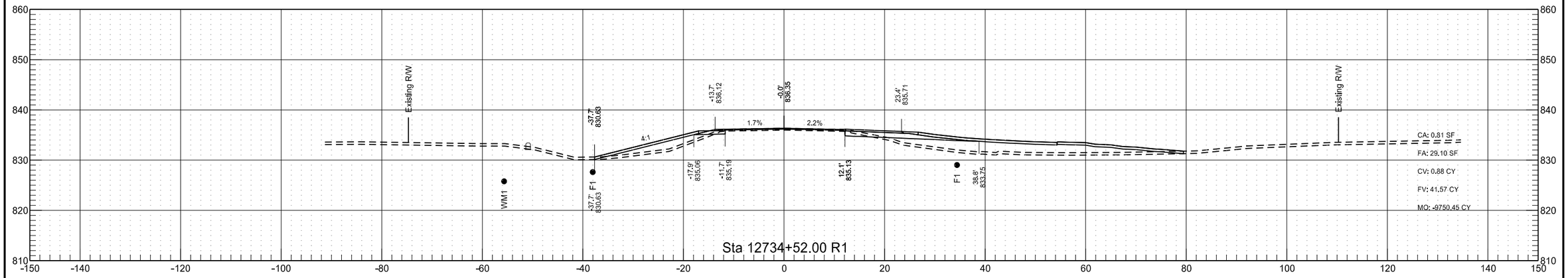


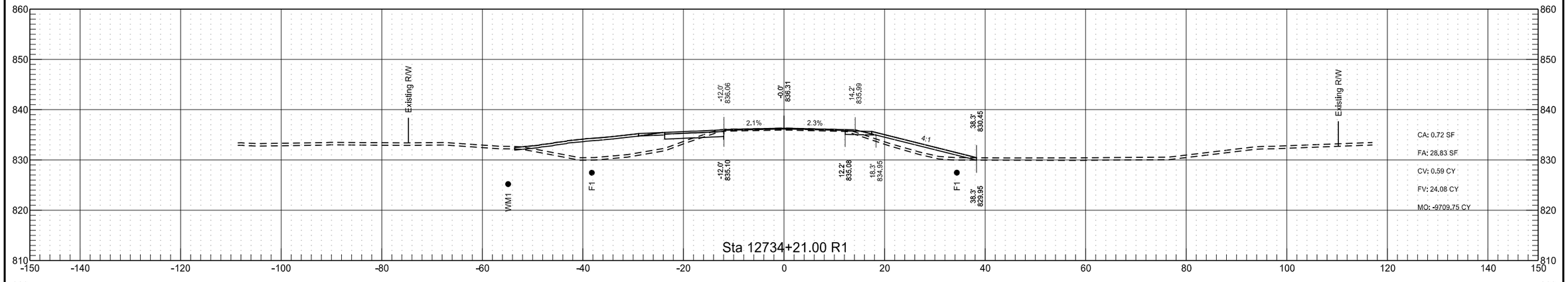


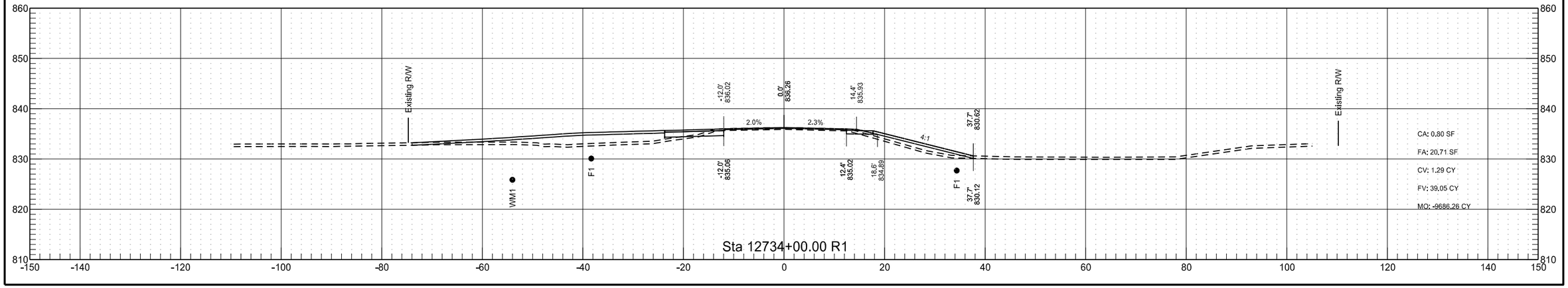


ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	61

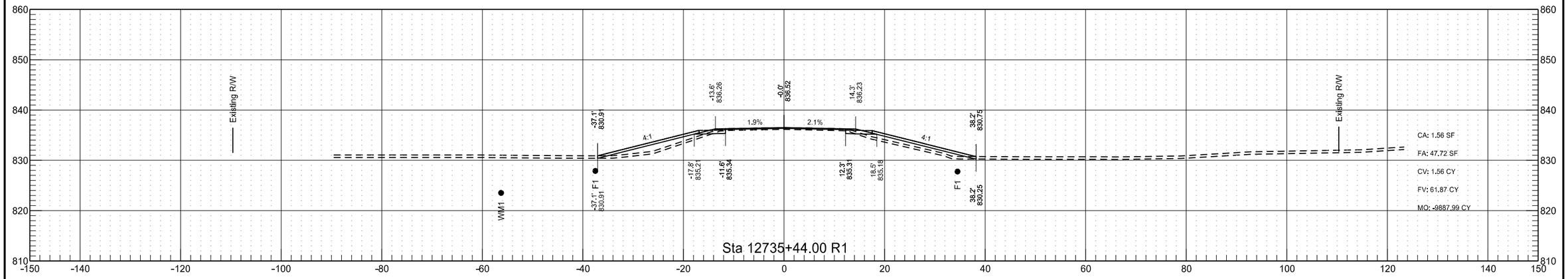


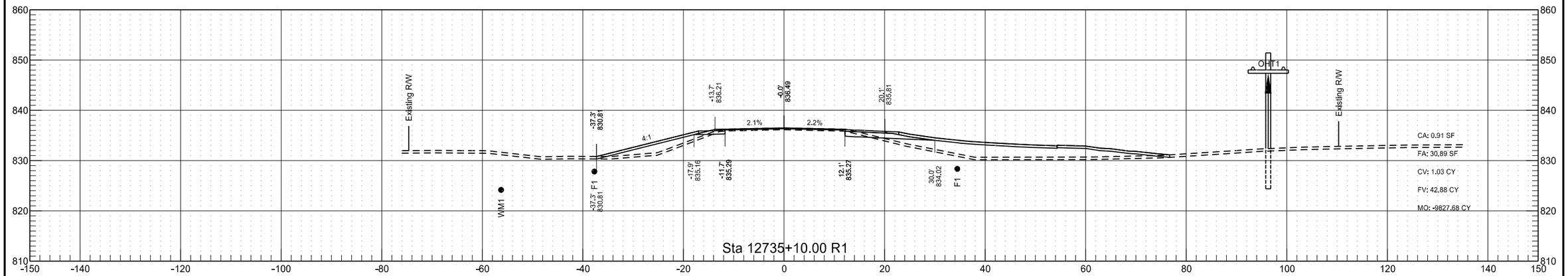


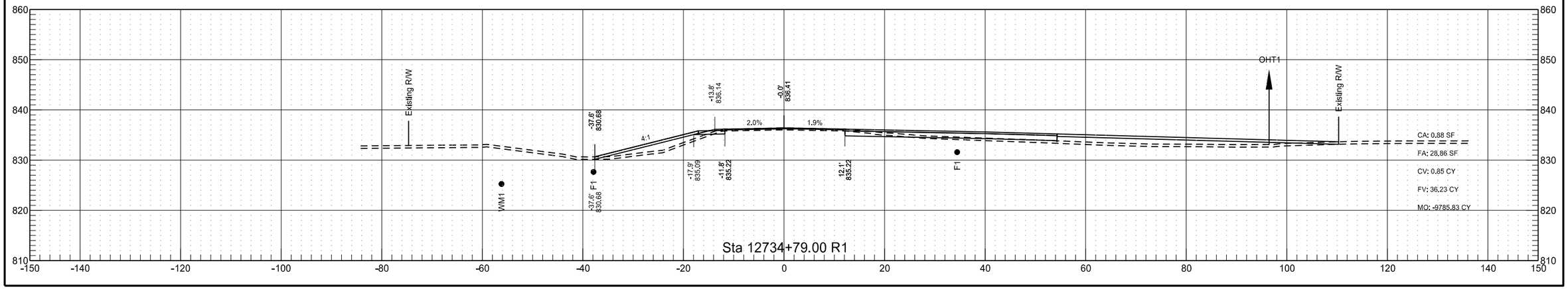


ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	62

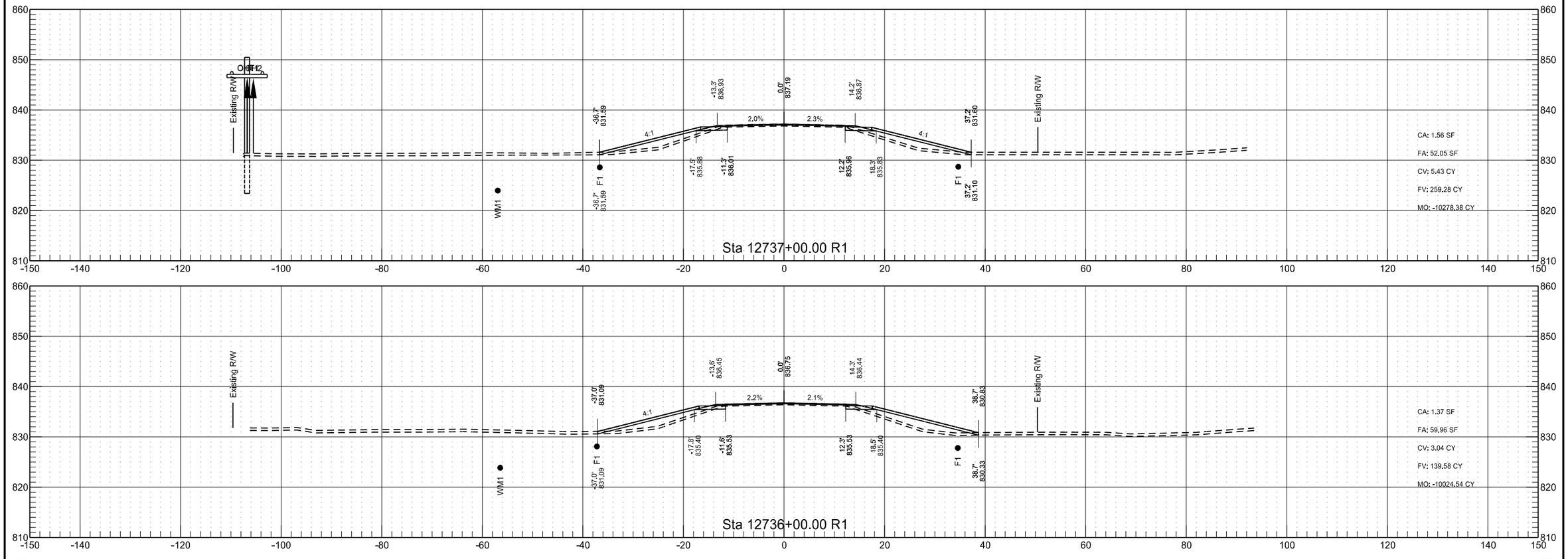






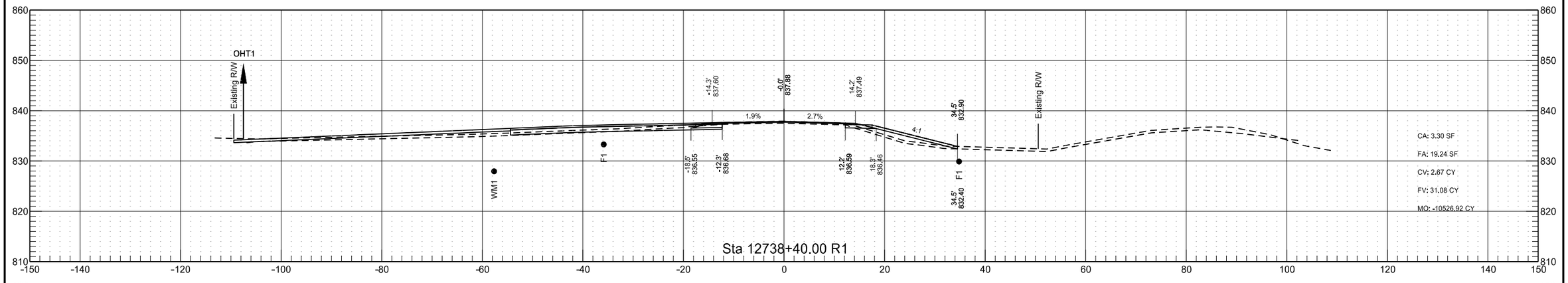
ND 18

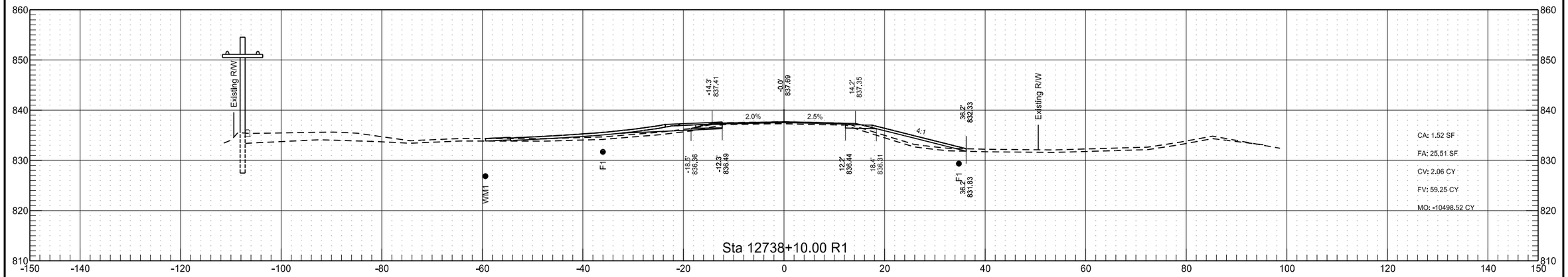
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	63

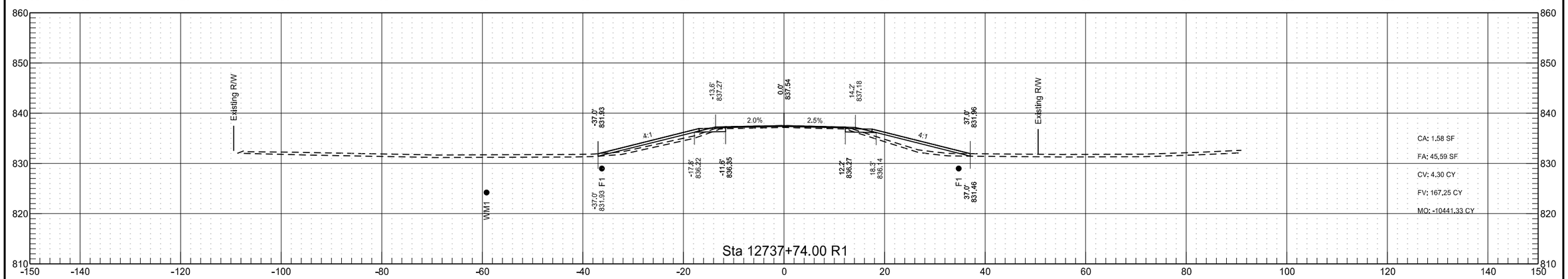


ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	64

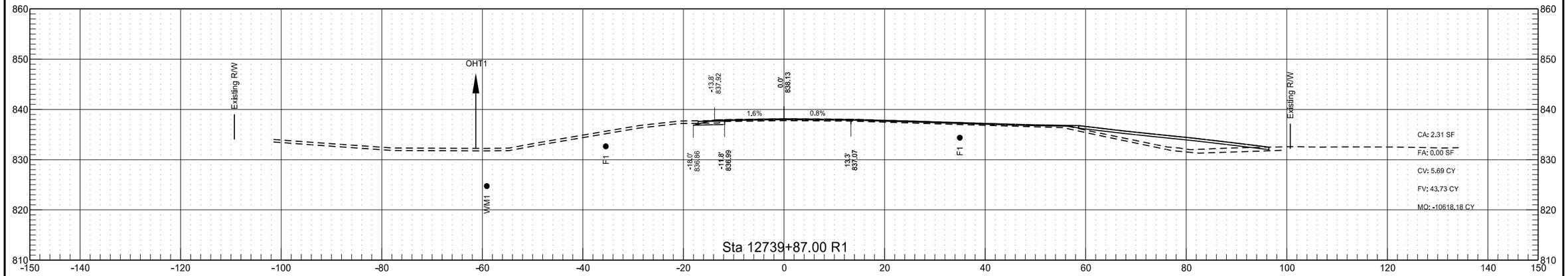


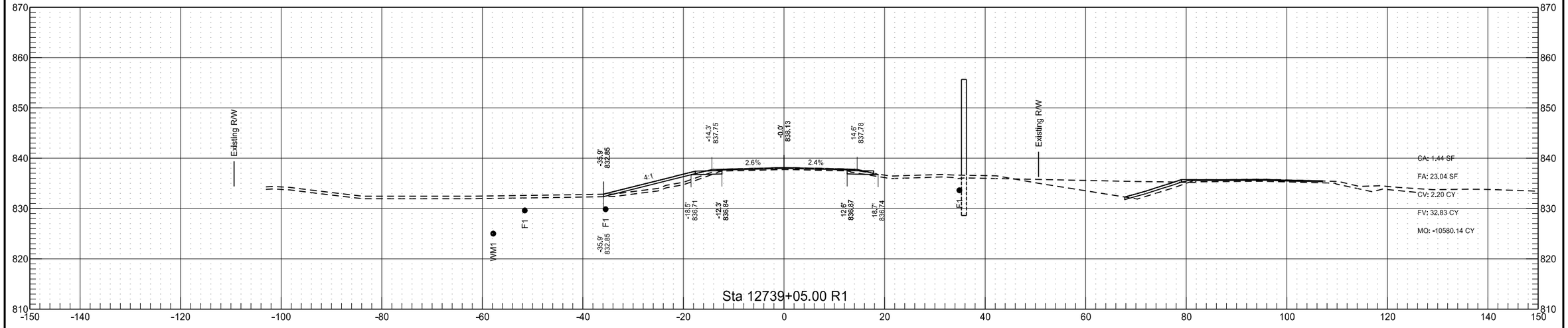


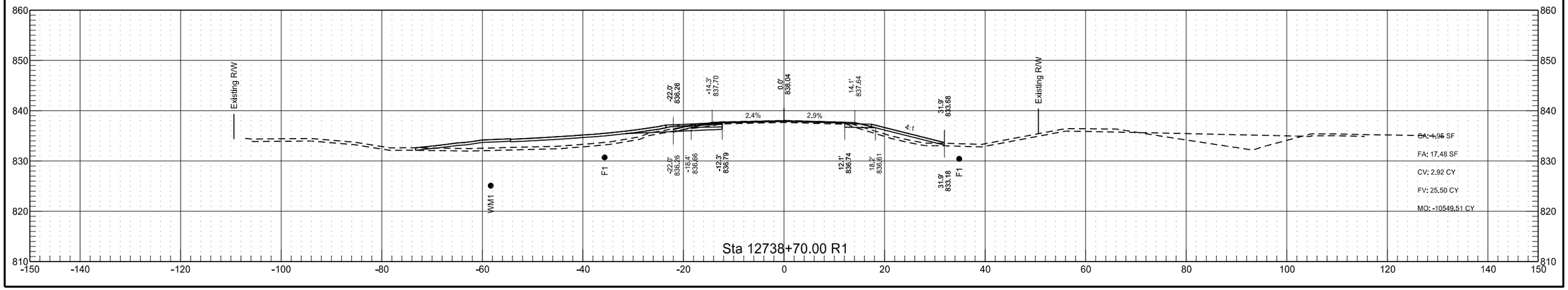


ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	65

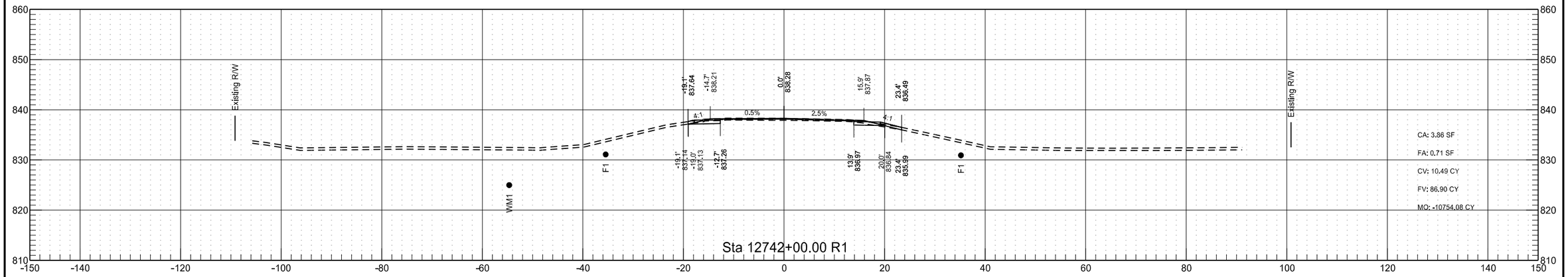


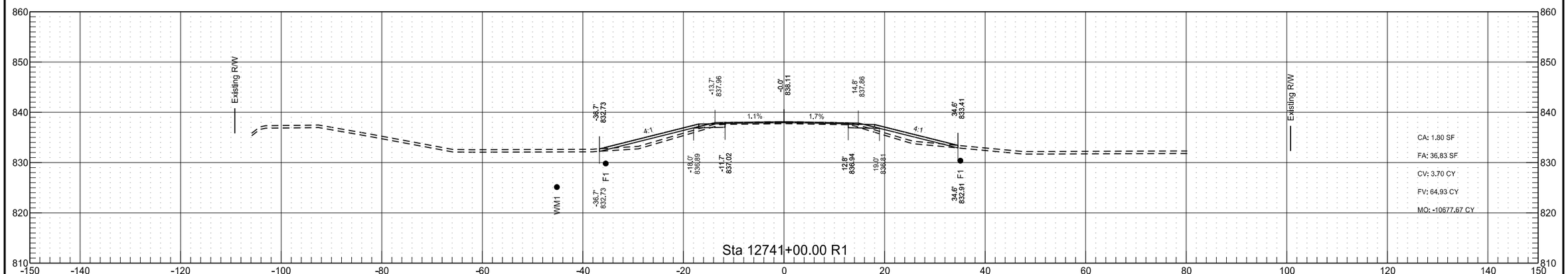


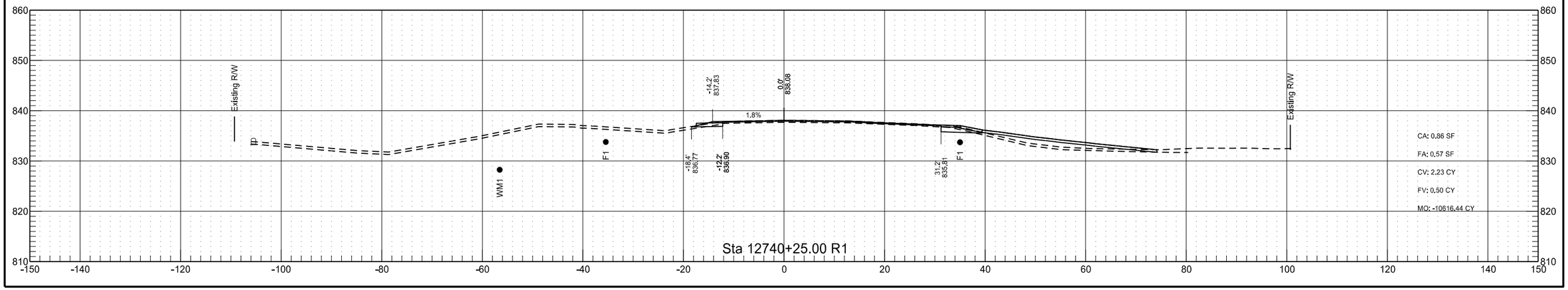


ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	66

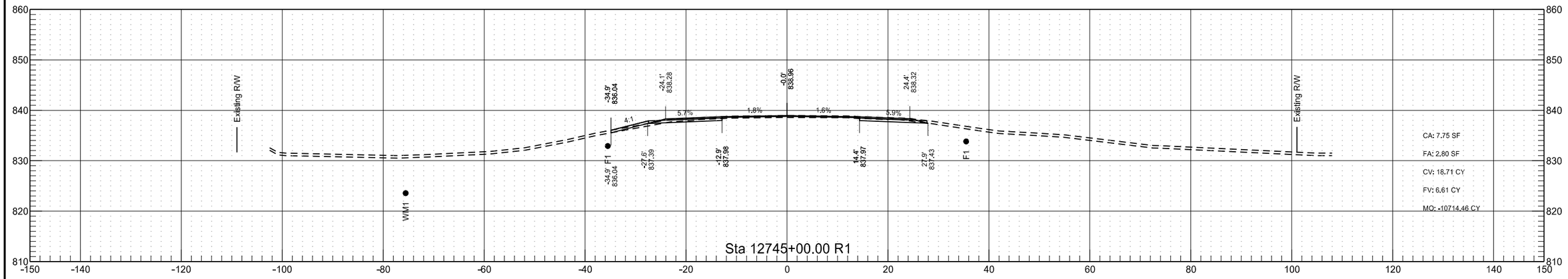


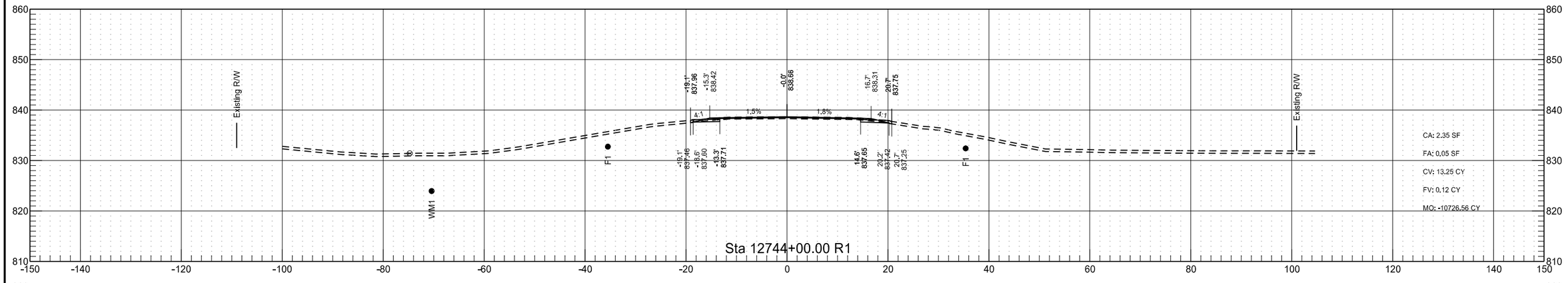


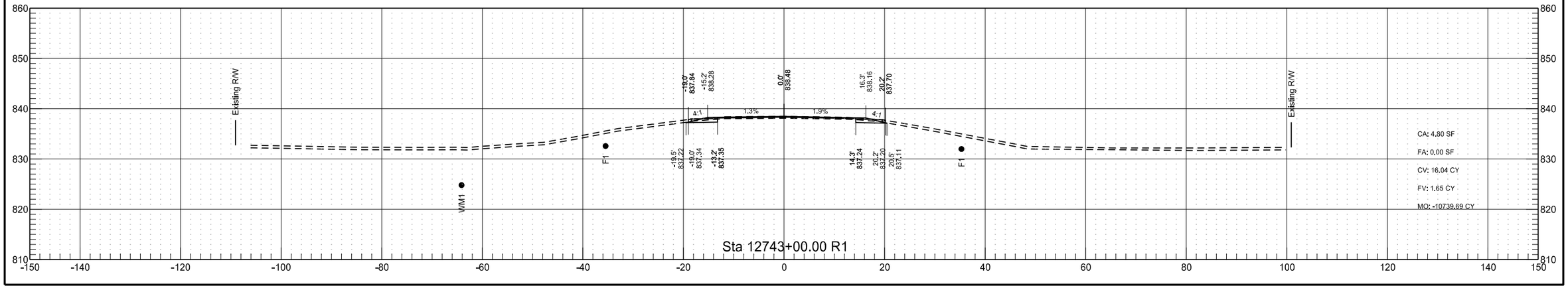


ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	67

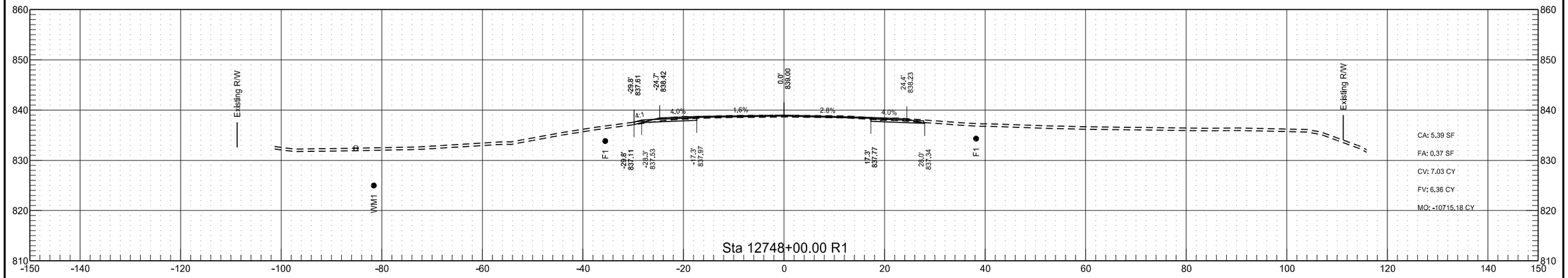


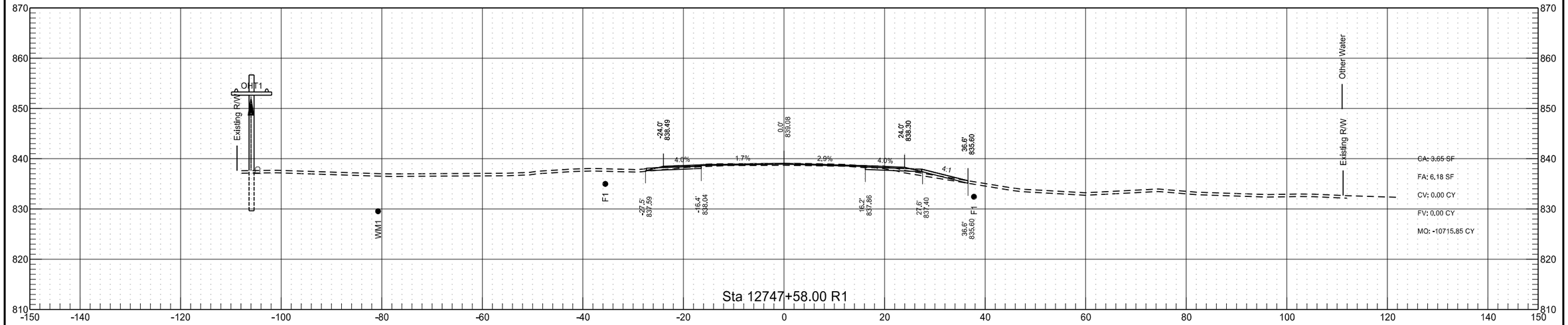


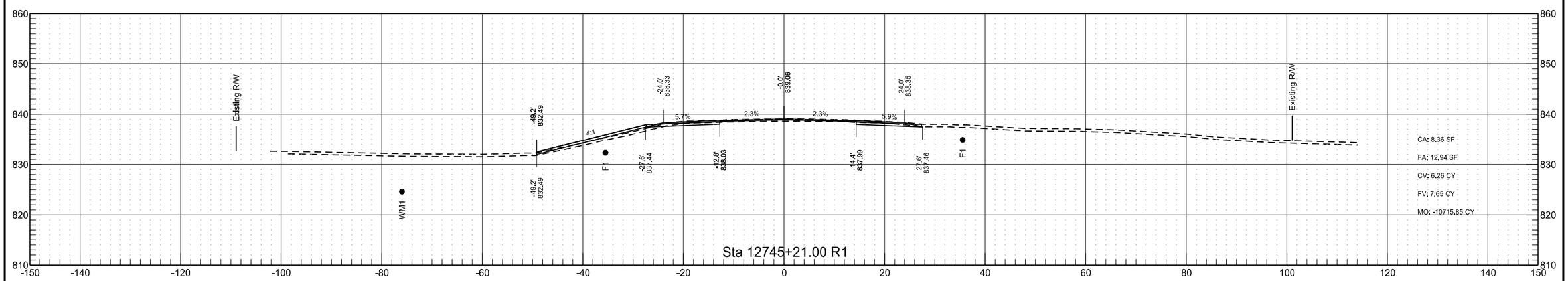


ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	68

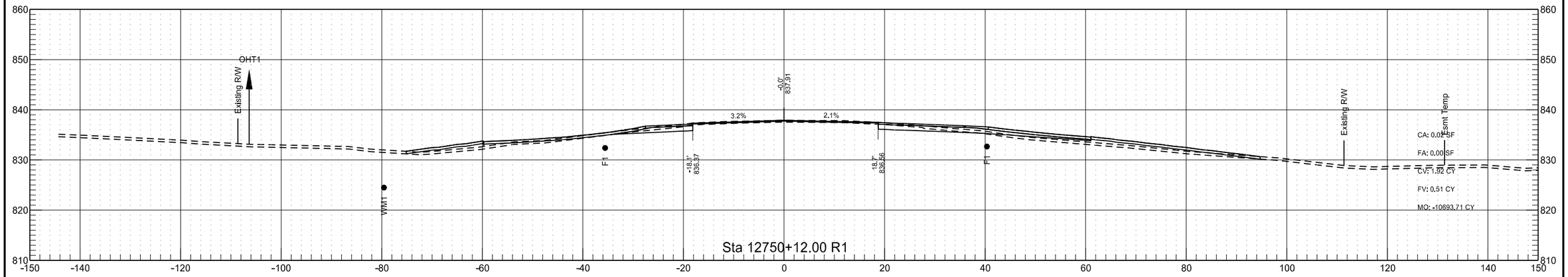


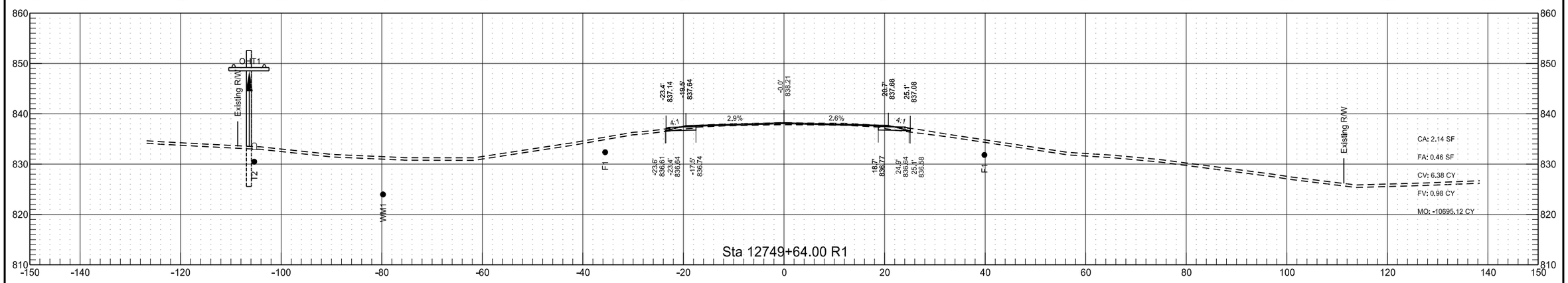


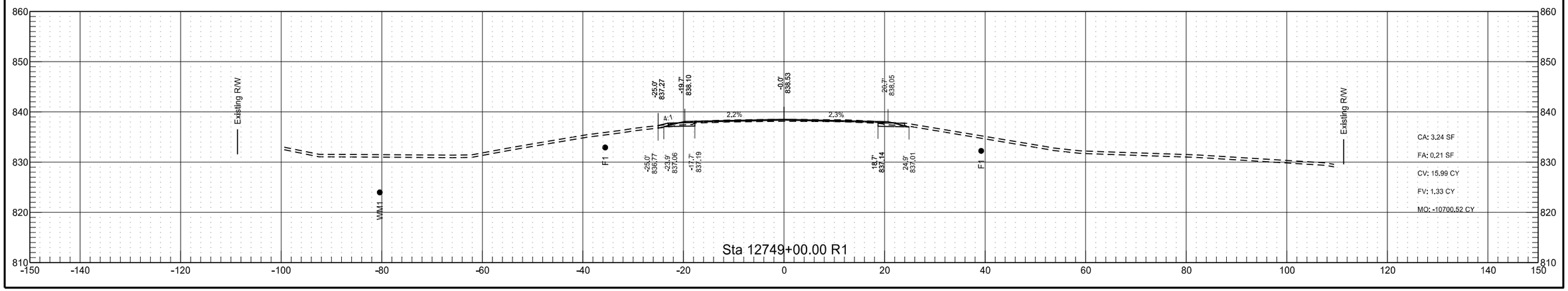


ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	69

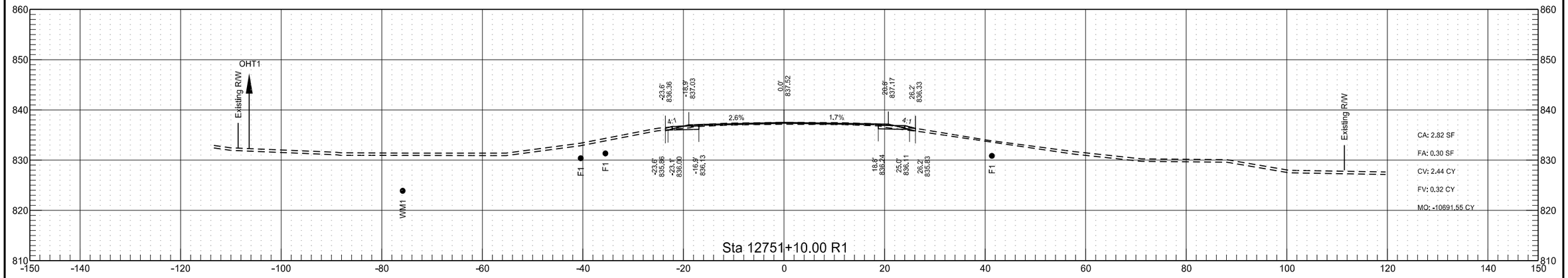


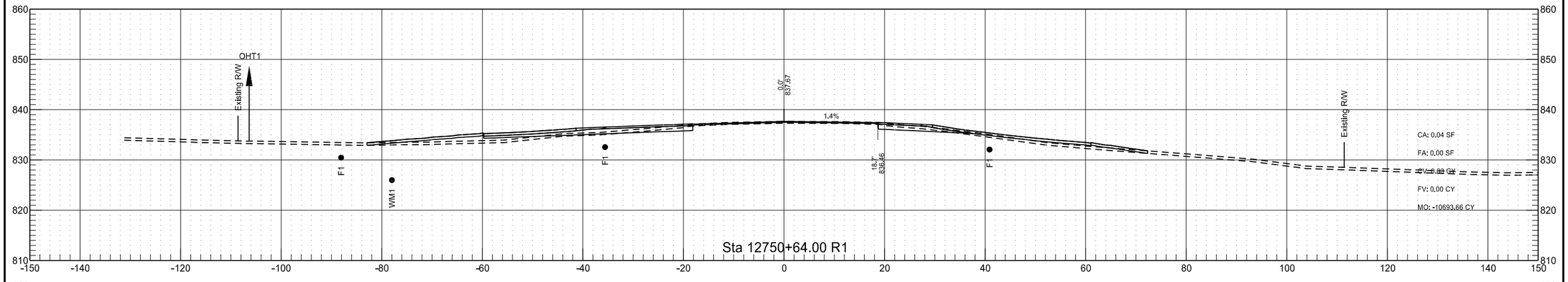


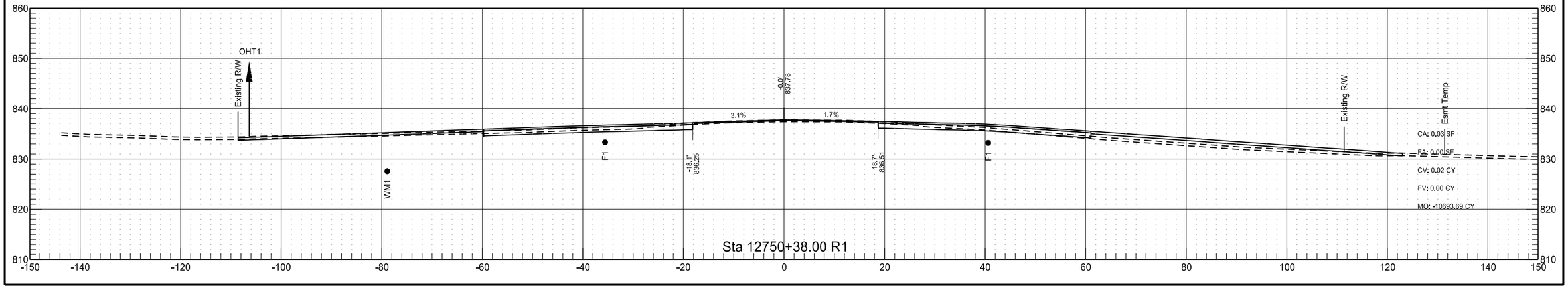


ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	70

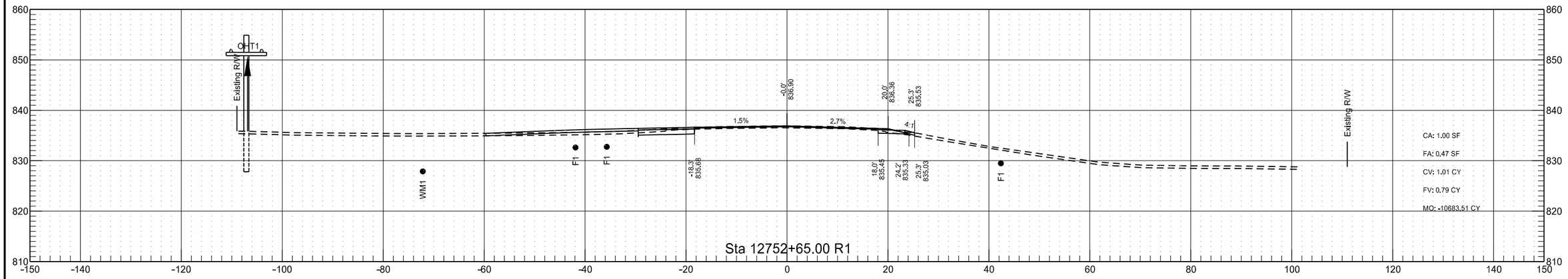


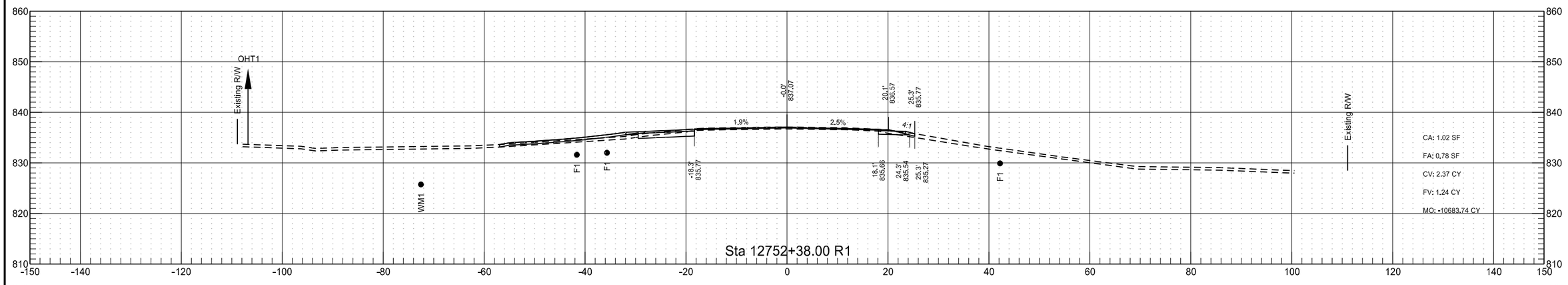


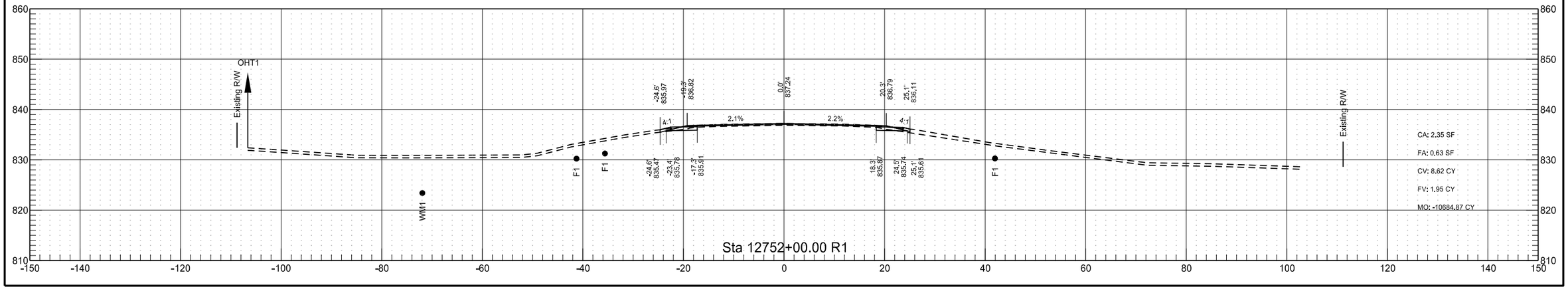


ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	71

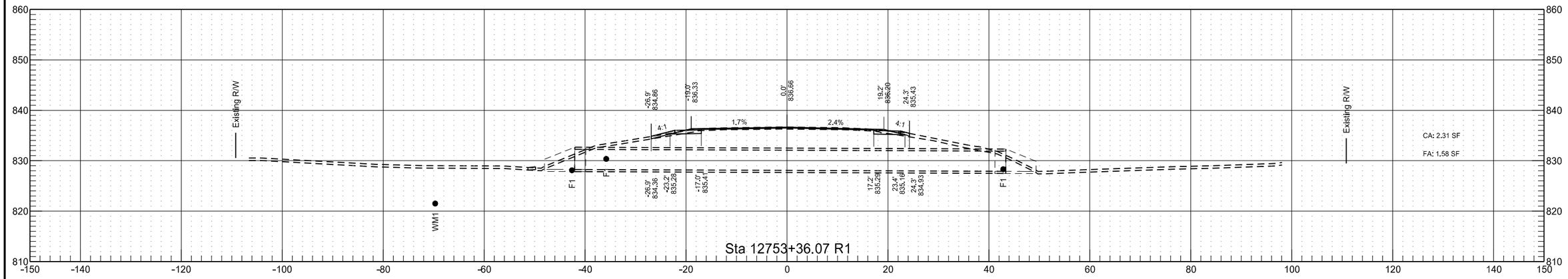


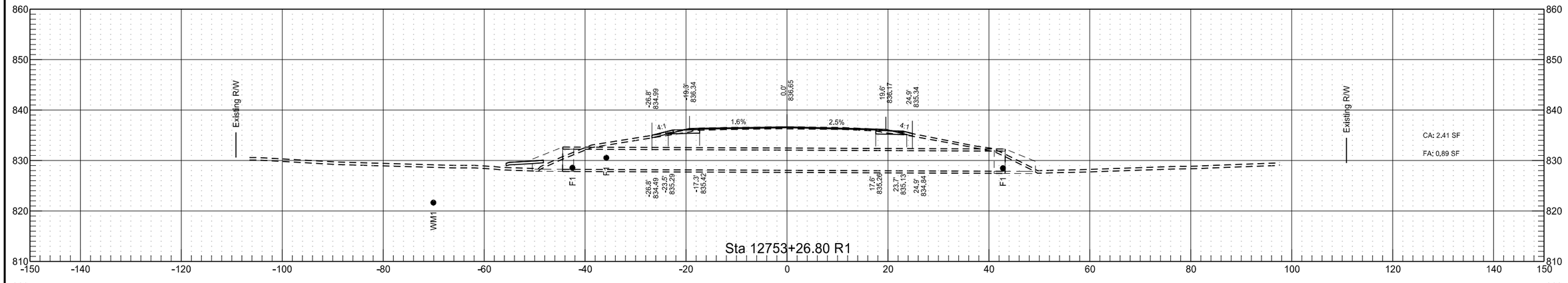


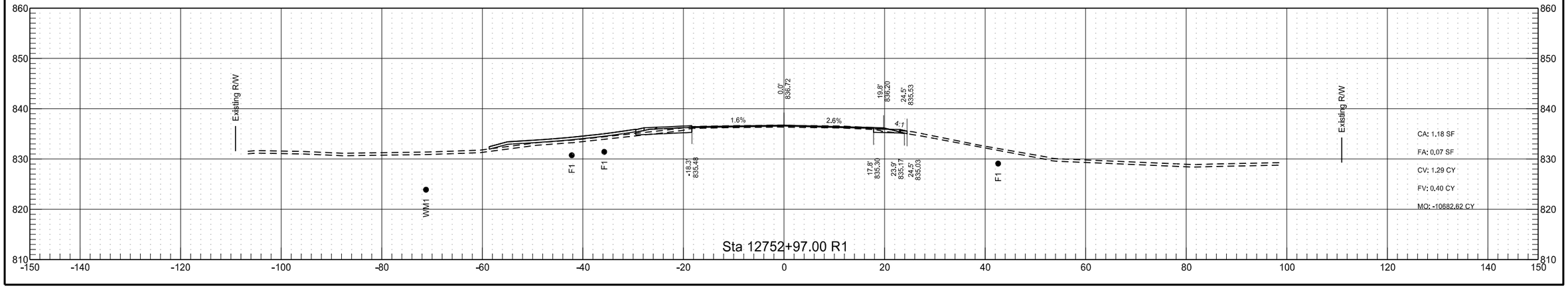


ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	72

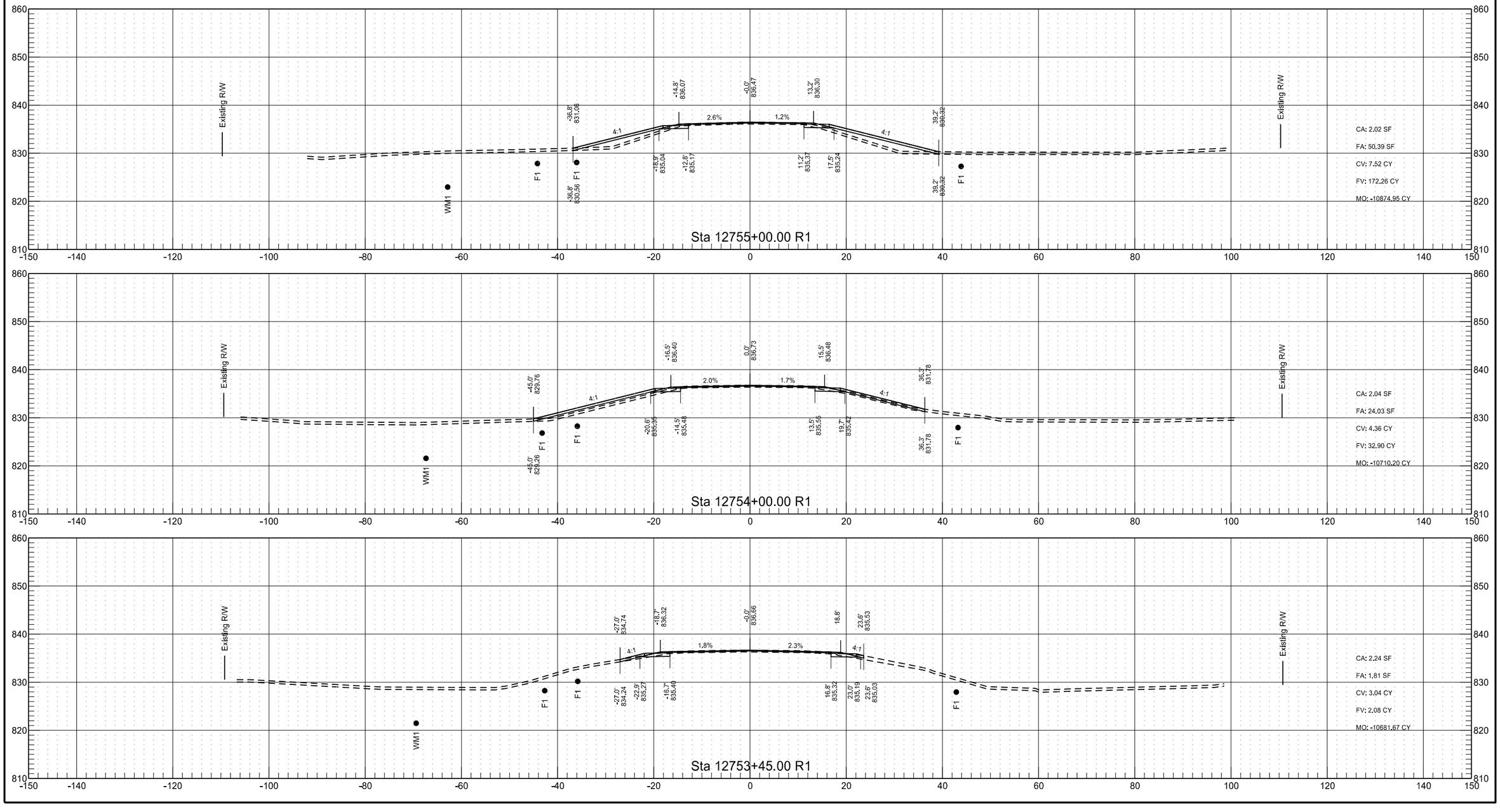






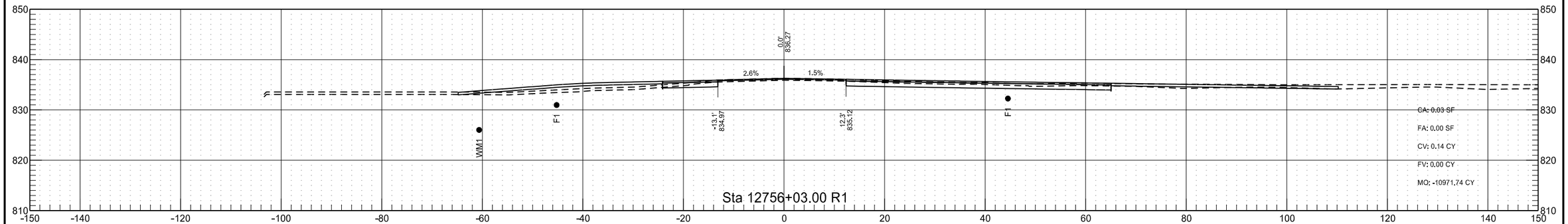
ND 18

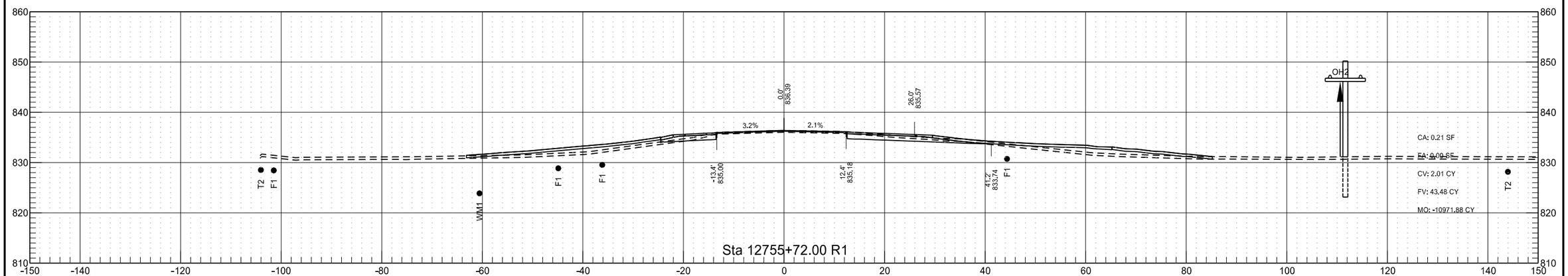
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	73

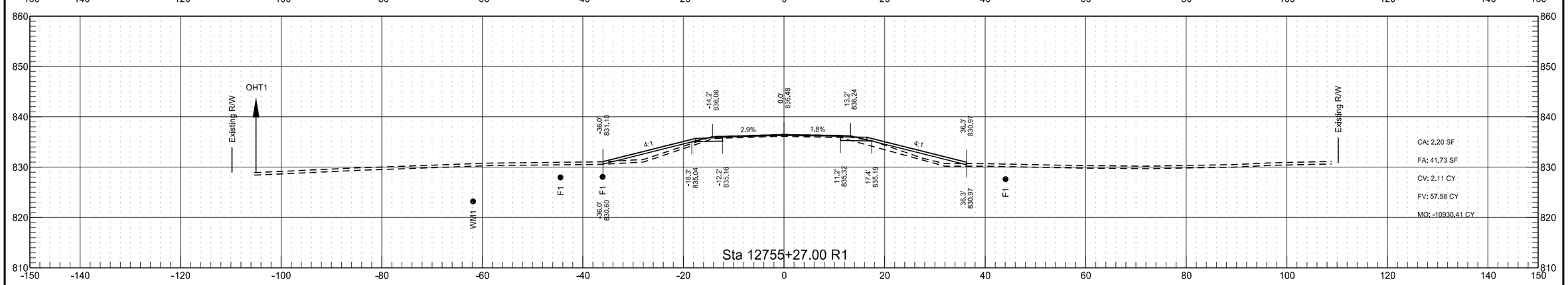


ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	74

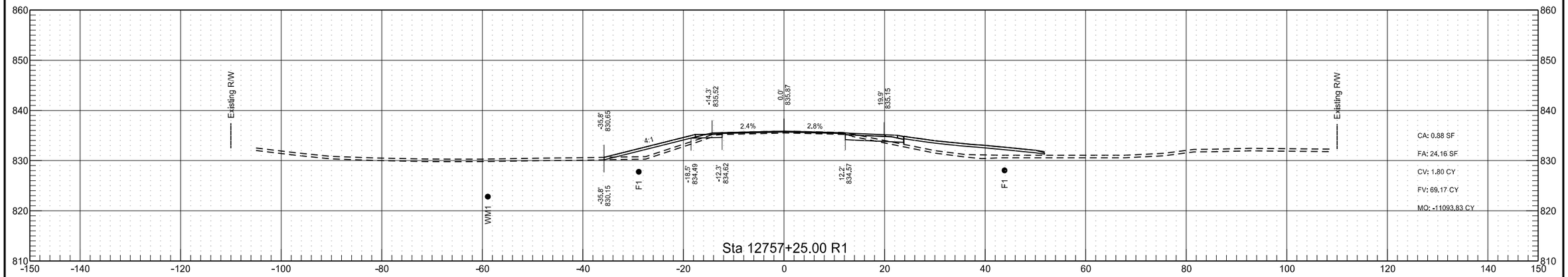


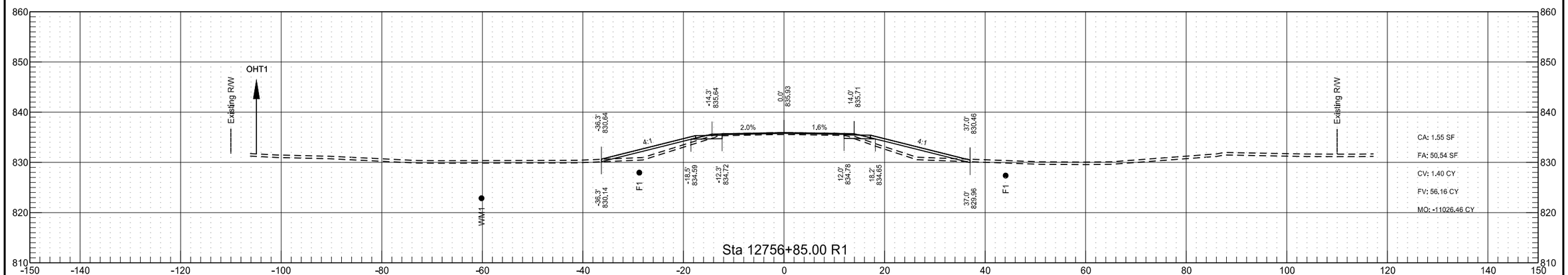


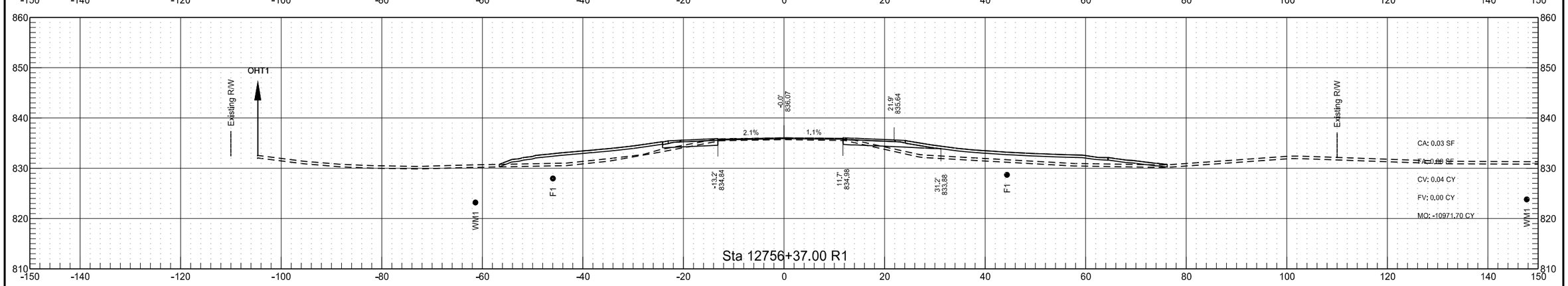


ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	75

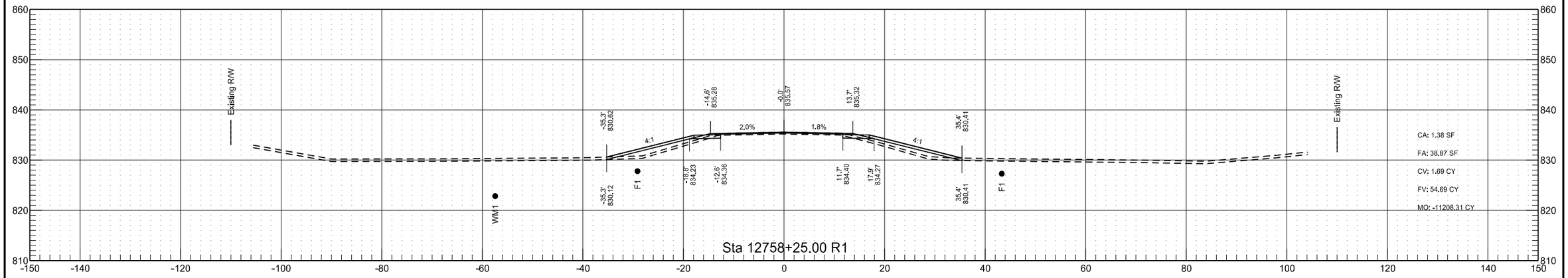


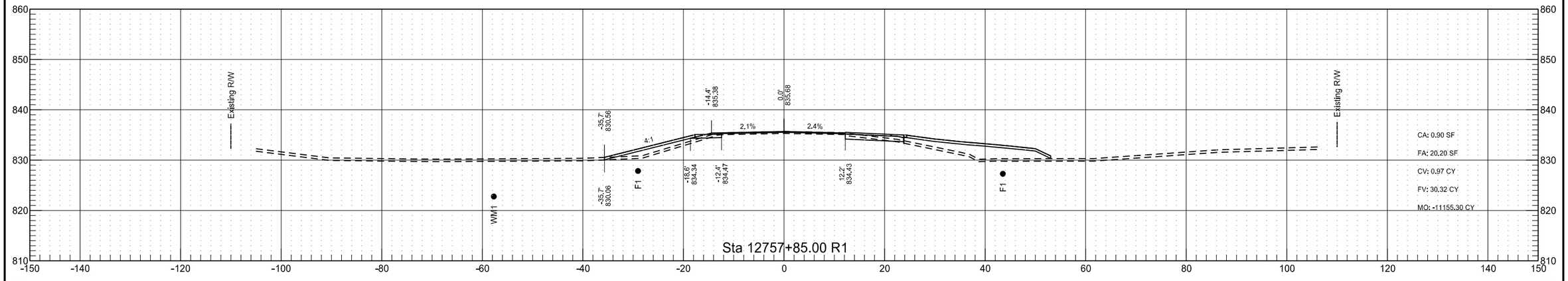


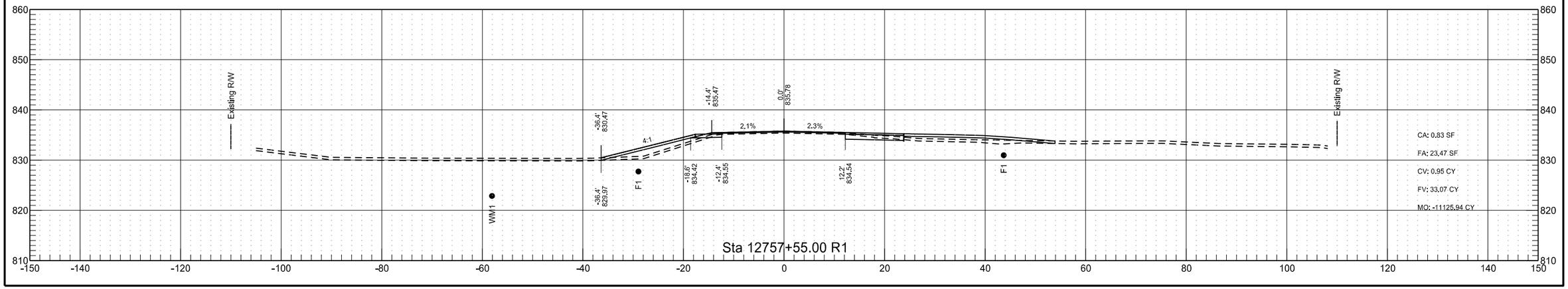


ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	76

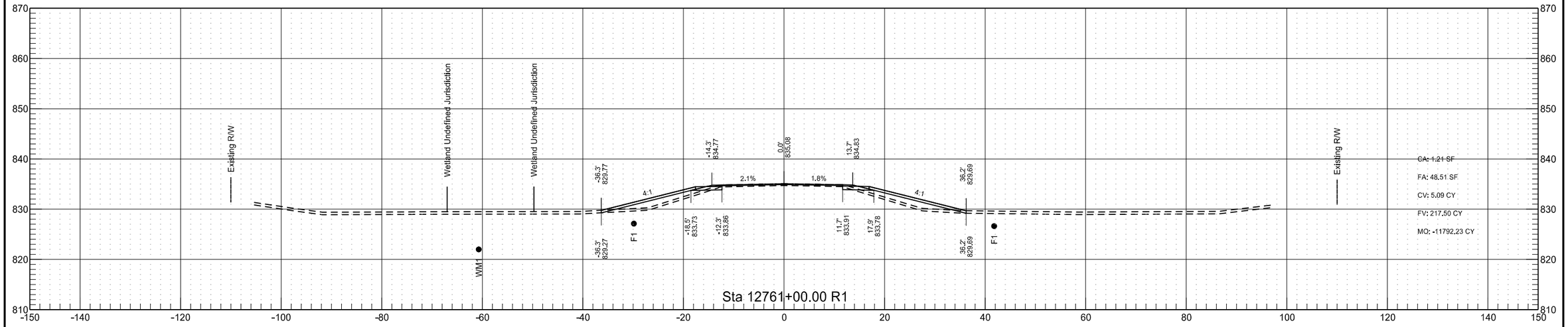


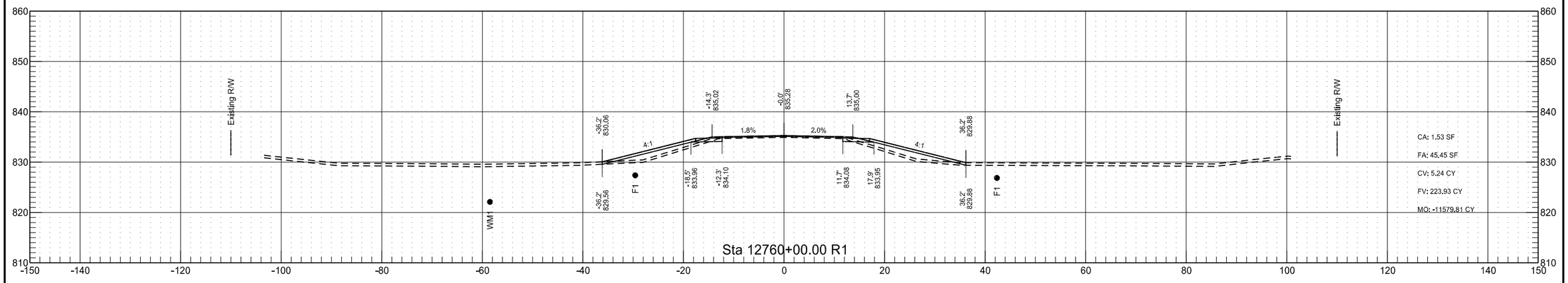


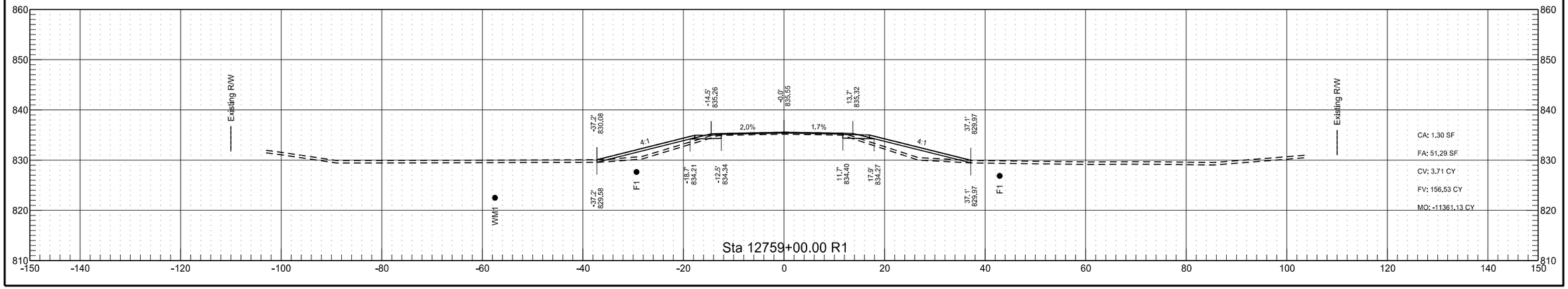


ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	77

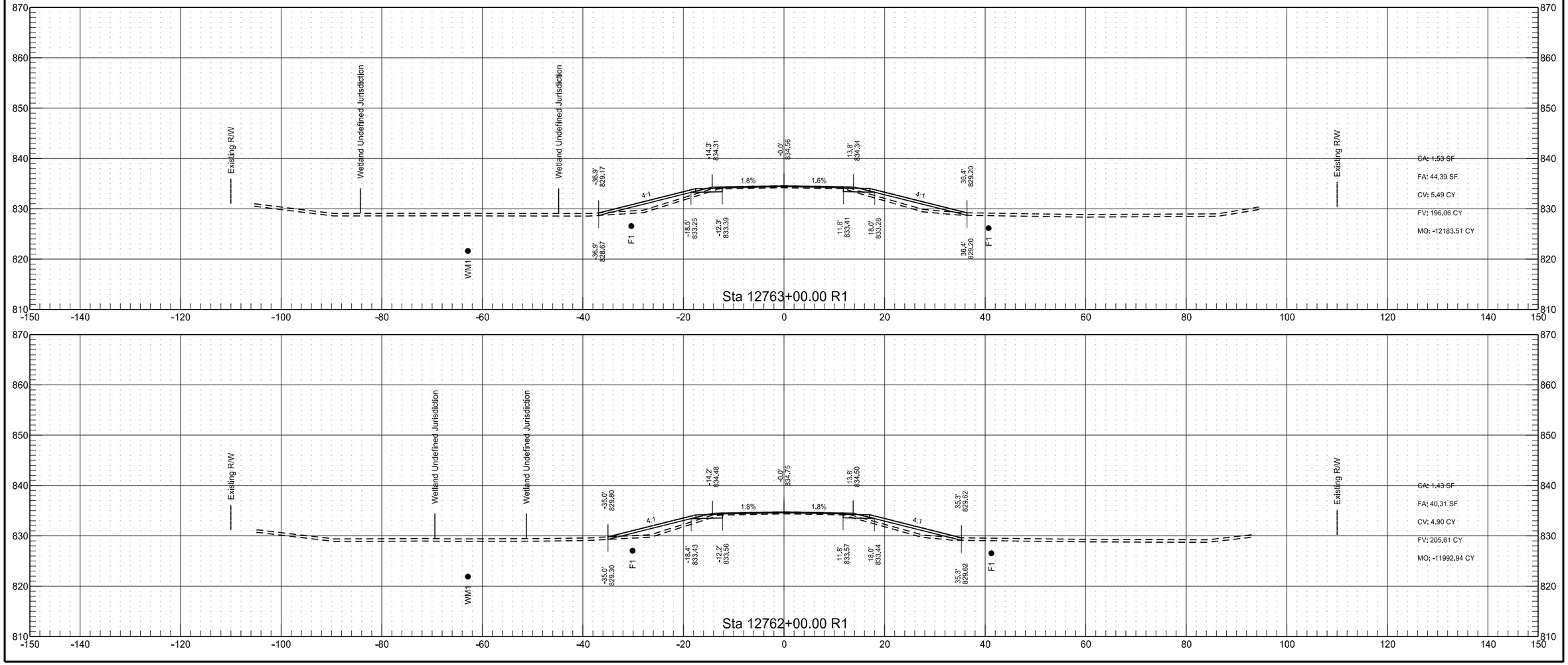






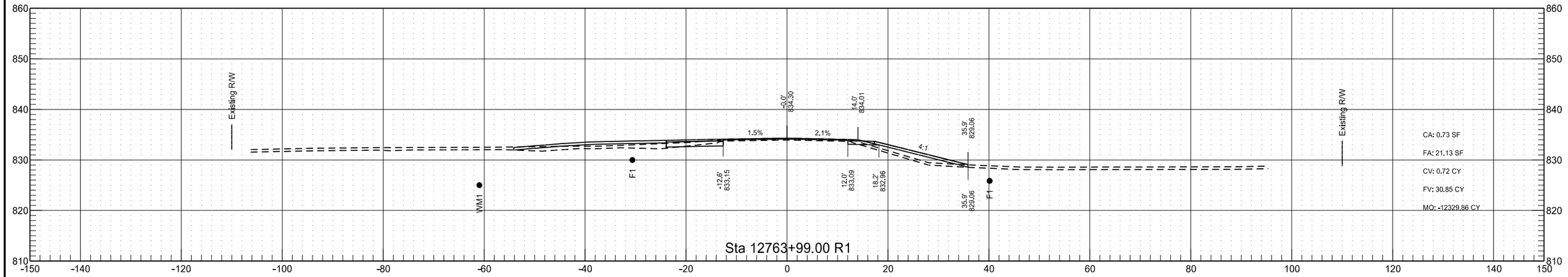
ND 18

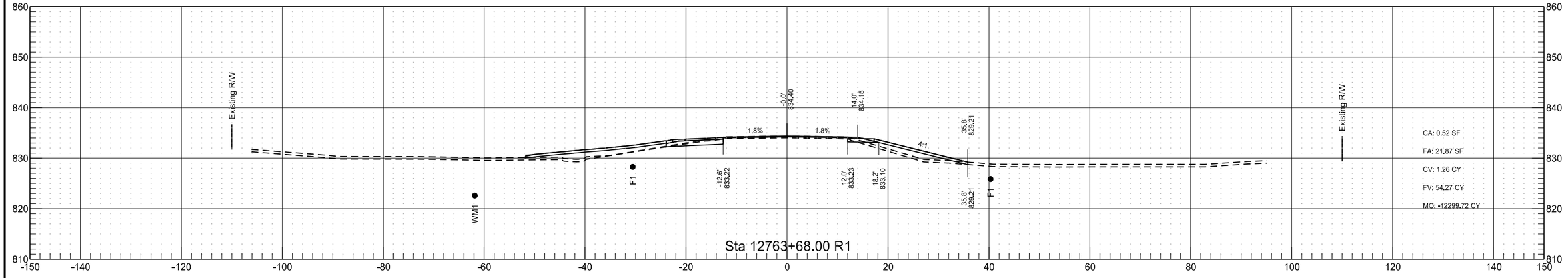
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	78

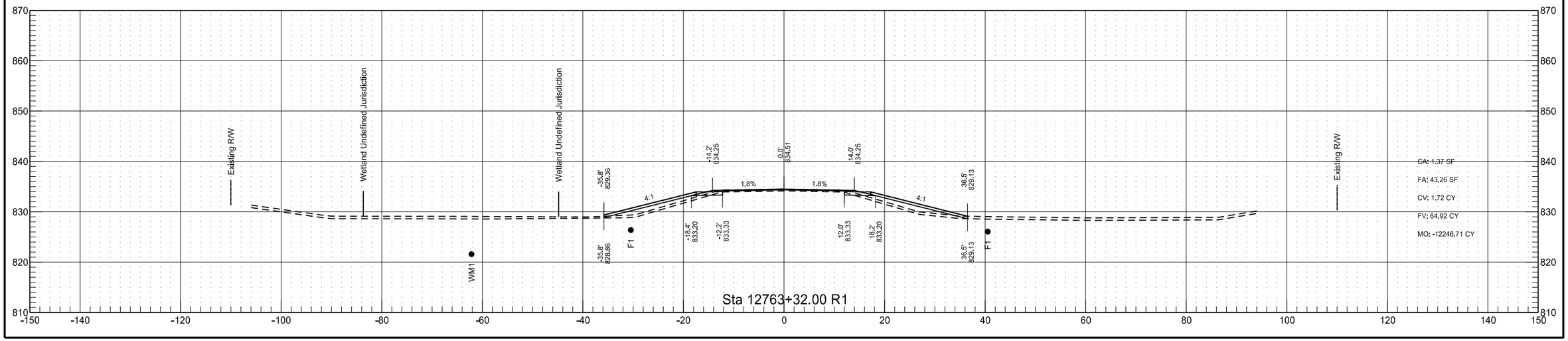


ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	79

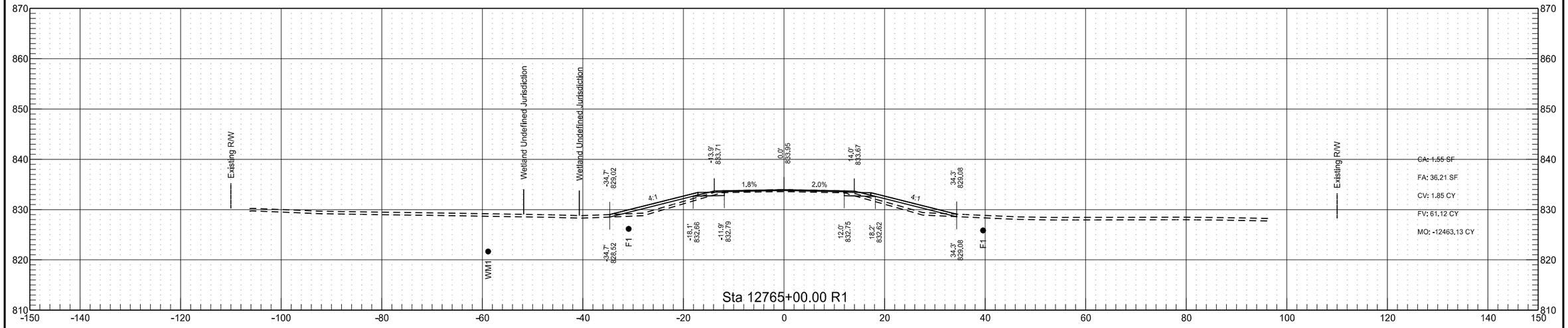


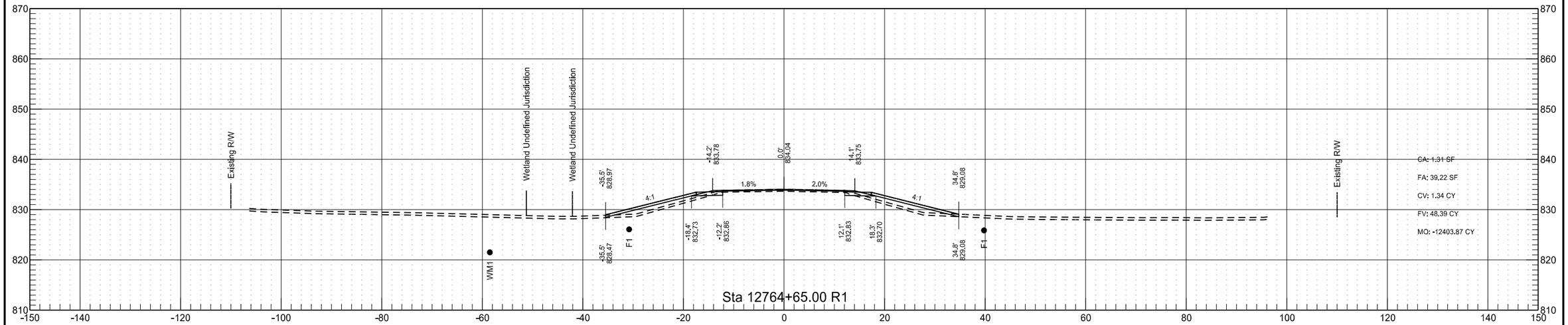


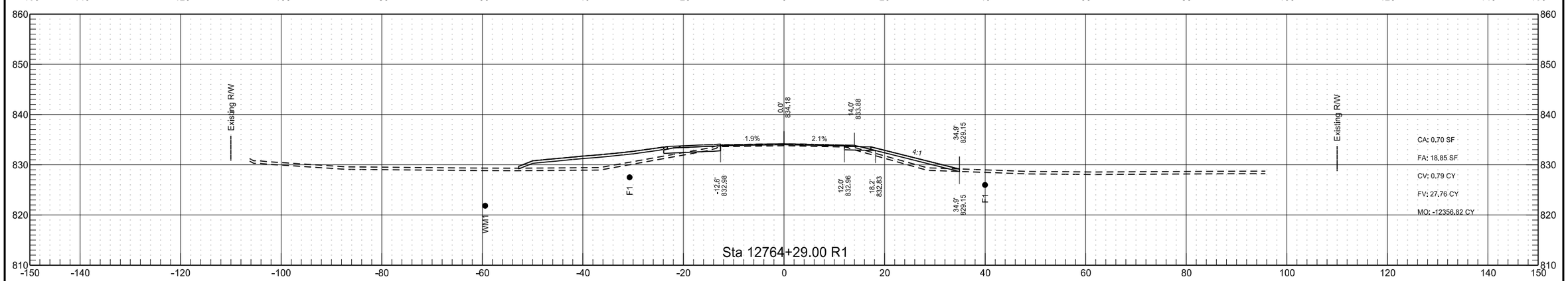


ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	80

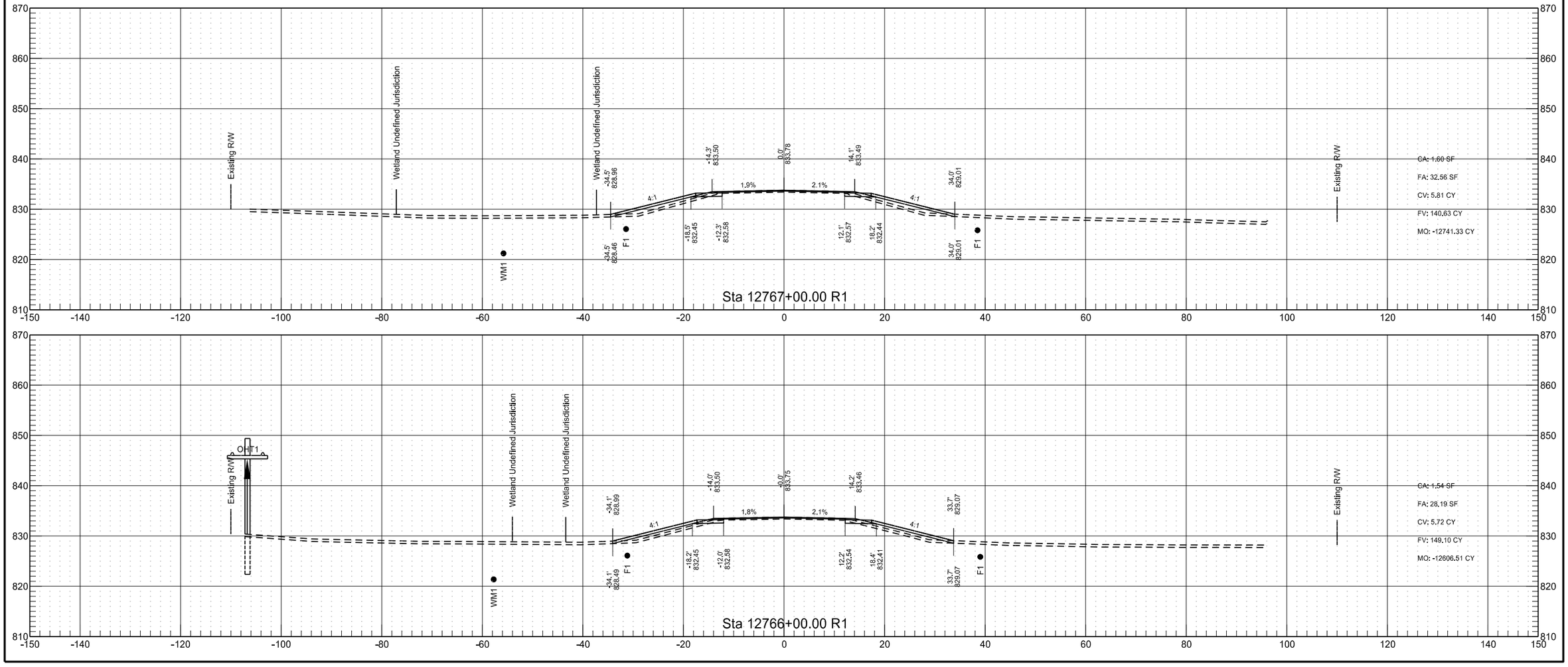






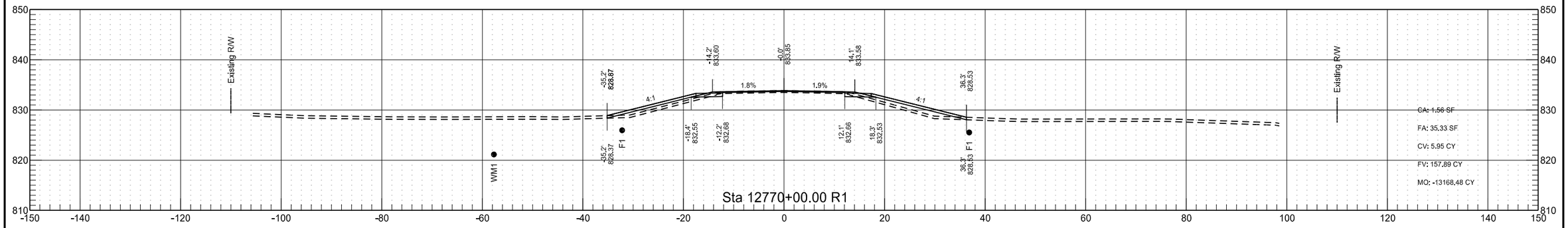
ND 18

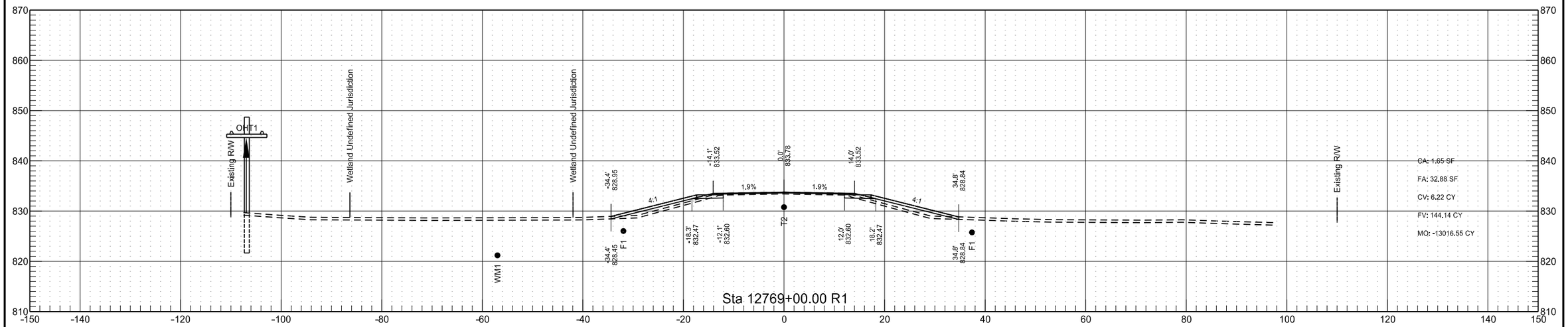
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	81

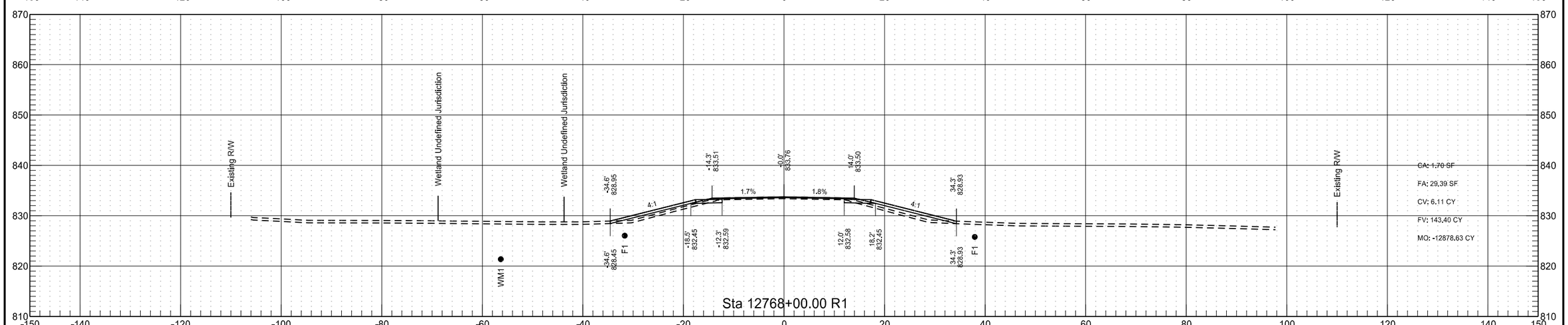


ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	82

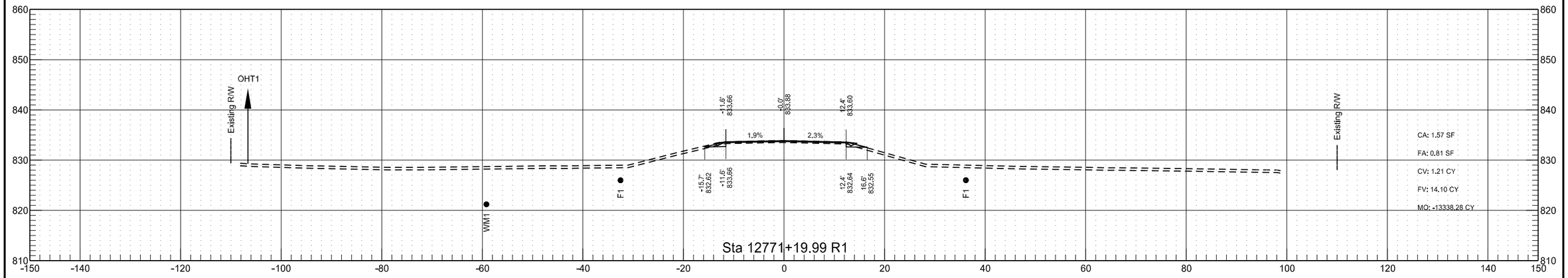


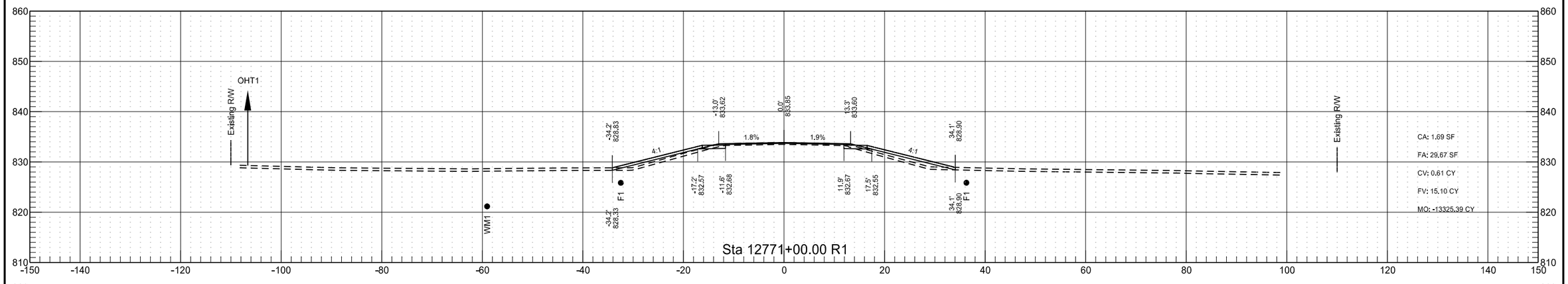


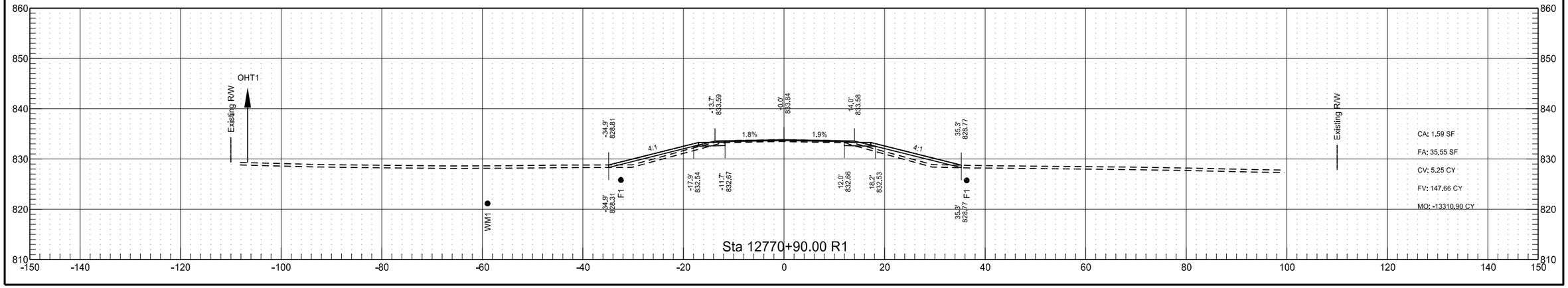


ND 18

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	83

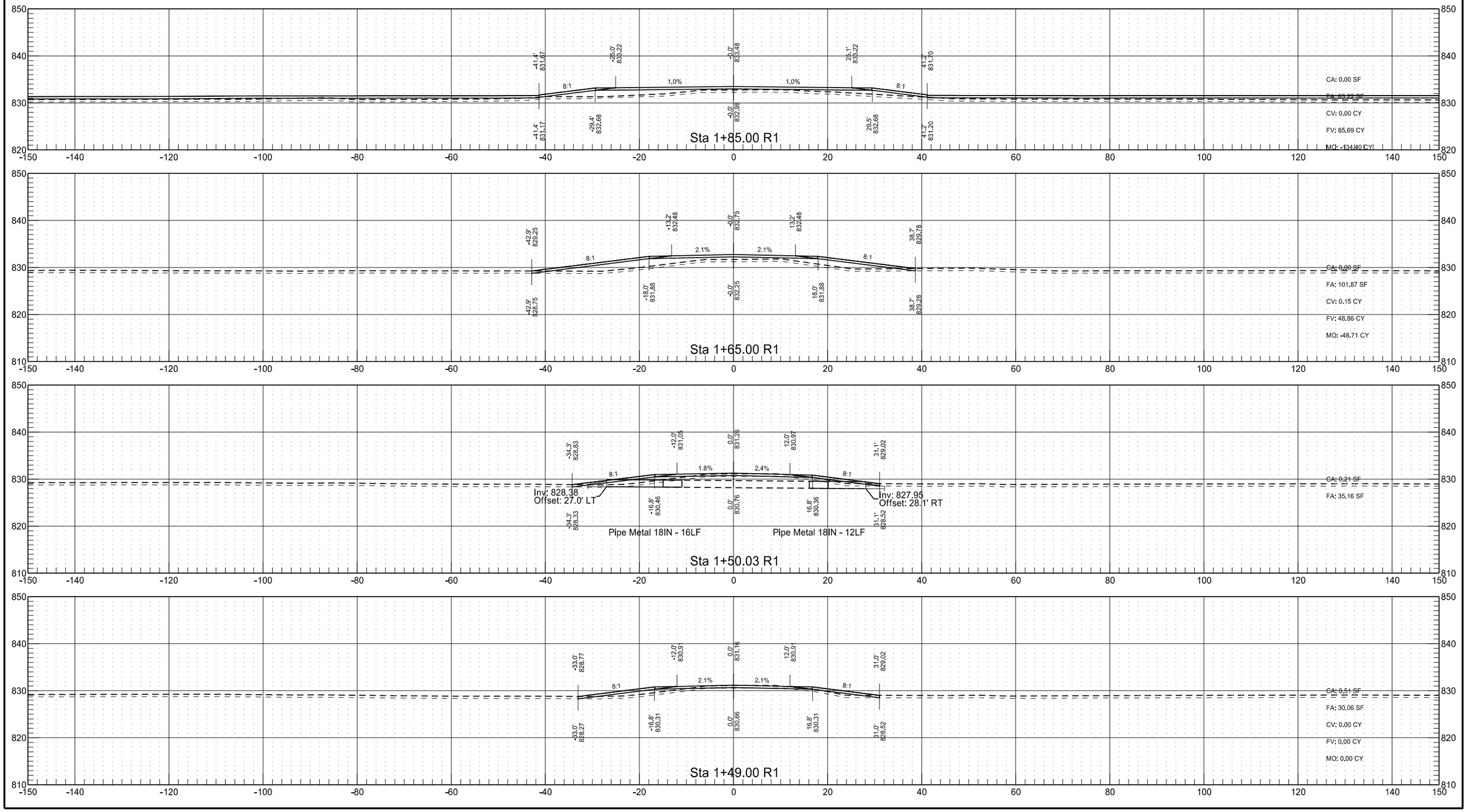






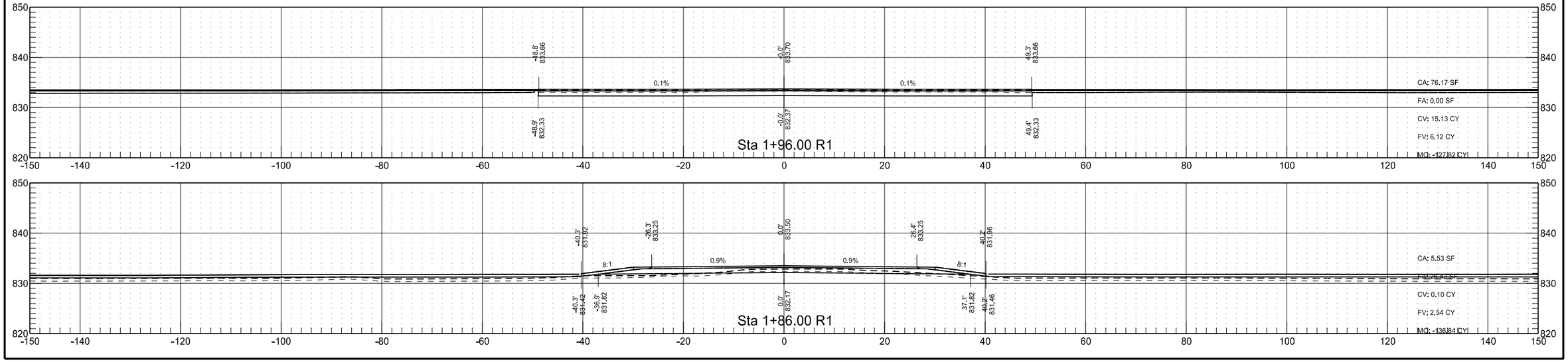
FD 12663+73 WEST

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	84



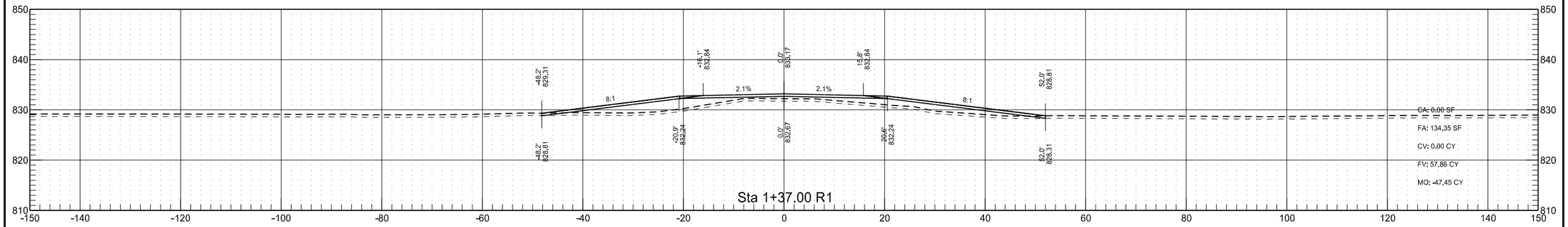
FD 12663+73 WEST

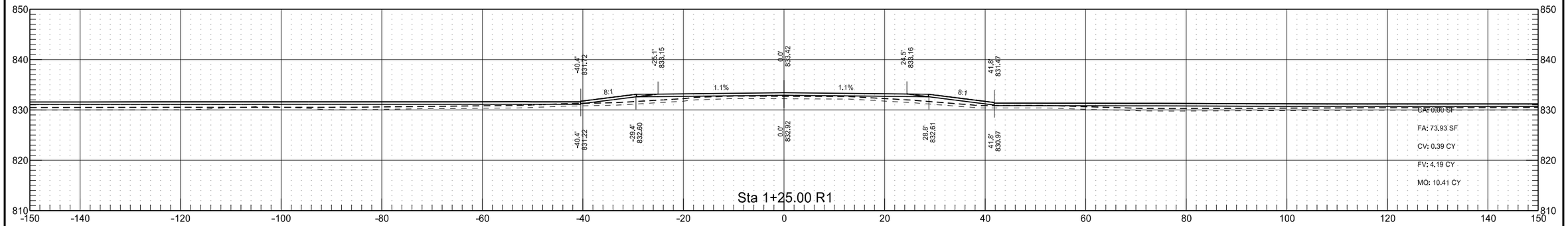
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	85

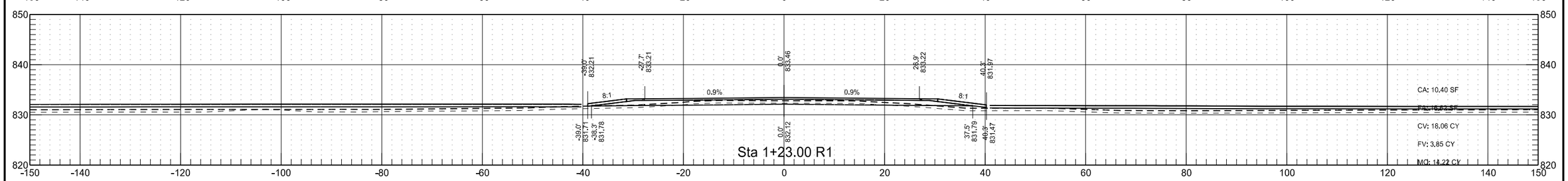


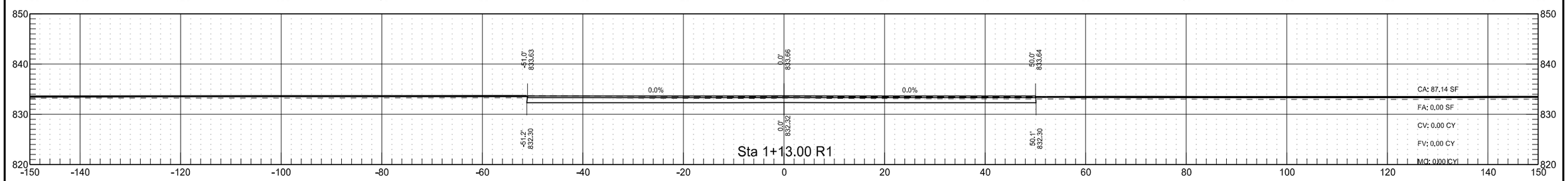
FD 12663+73 EAST

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	86



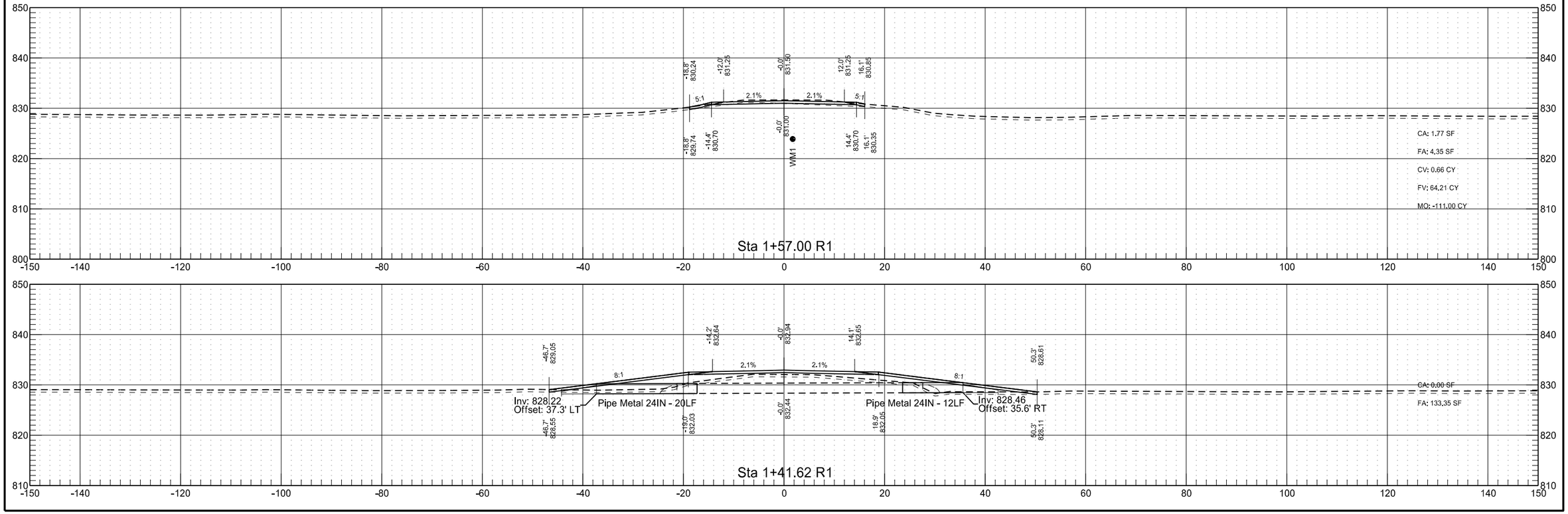






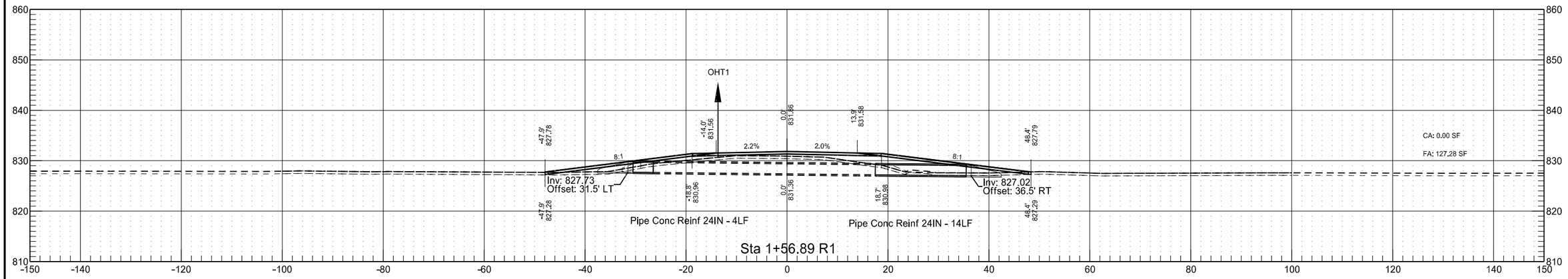
FD 12663+73 EAST

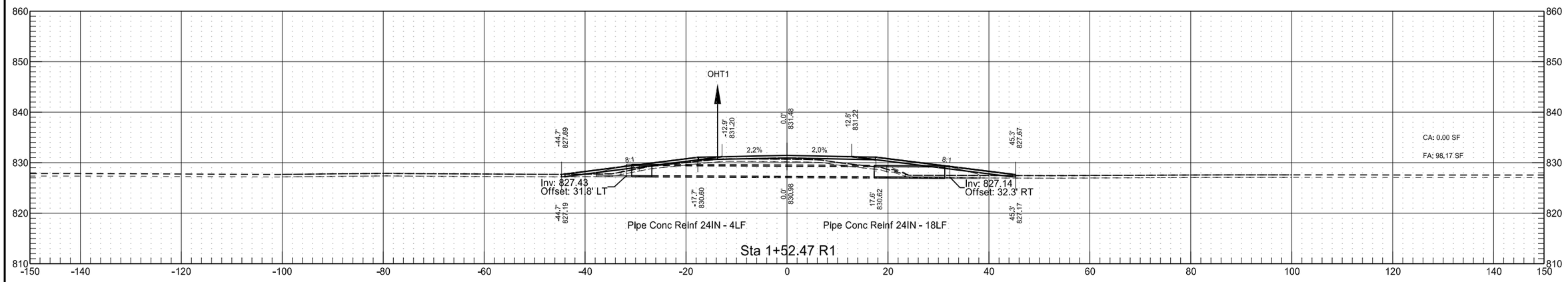
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	87

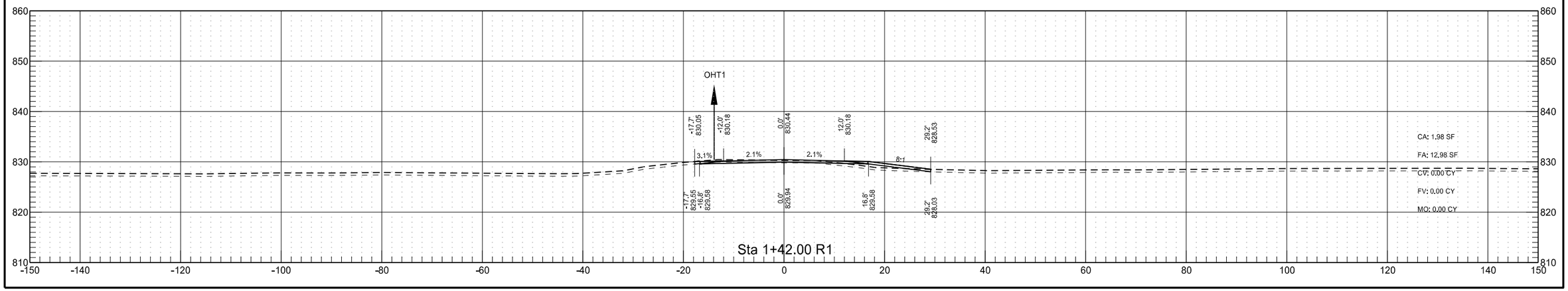


FD 12690+07

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	88

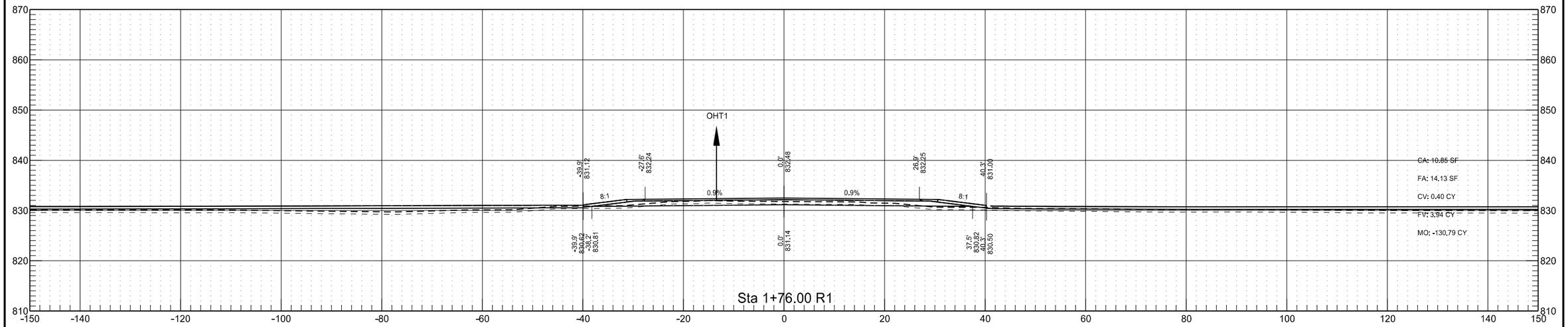


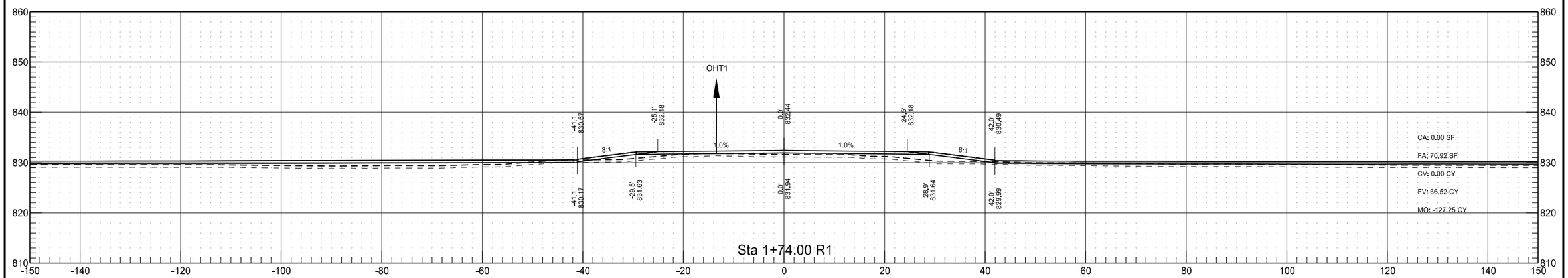


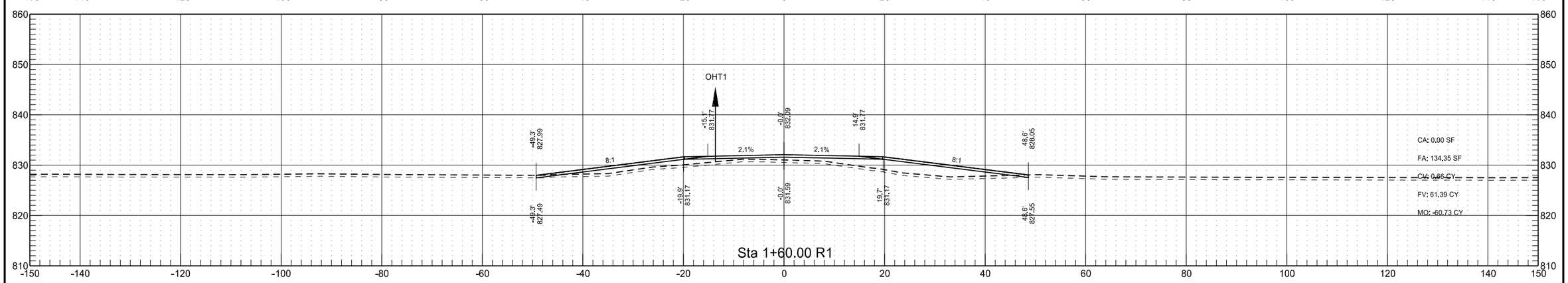


FD 12690+07

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	89

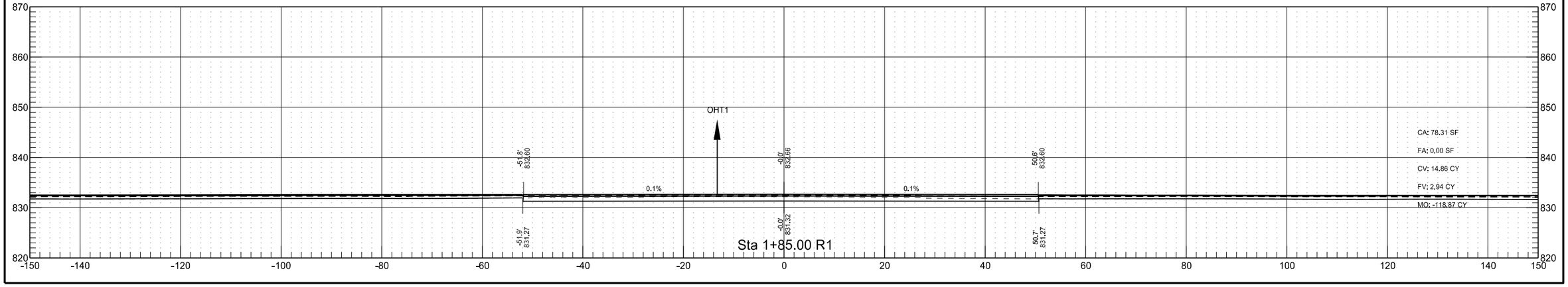






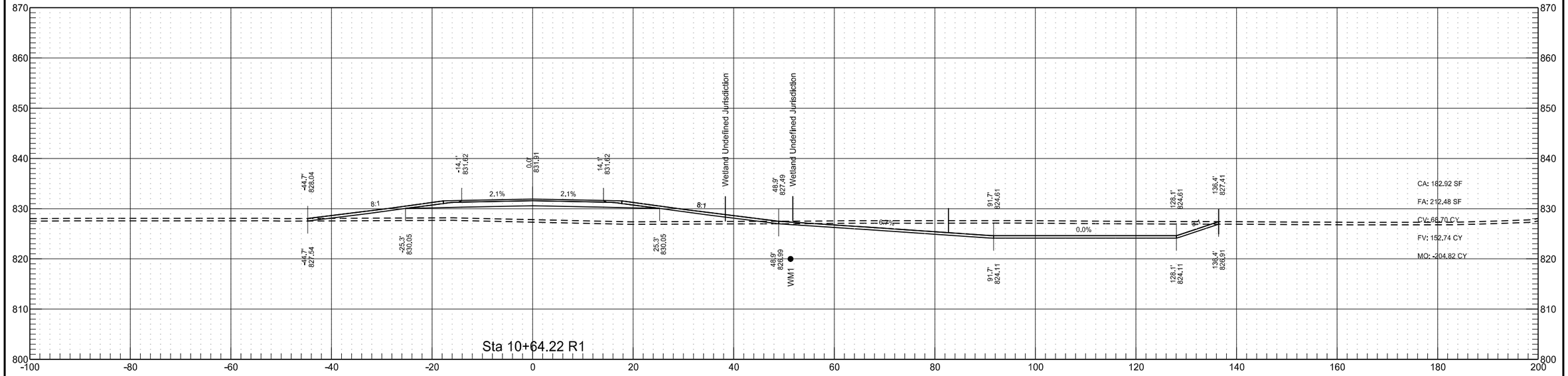
FD 12690+07

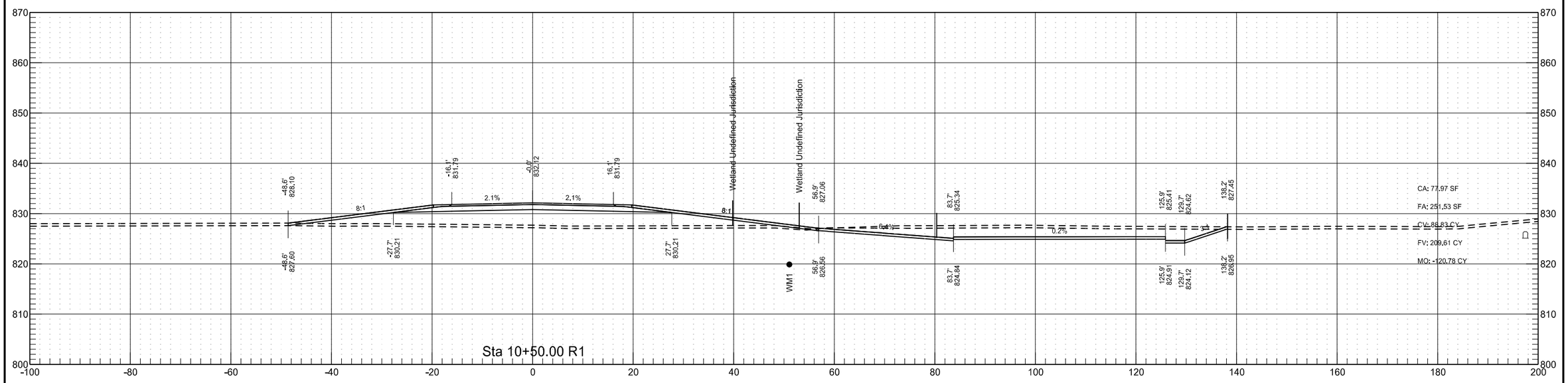
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	90

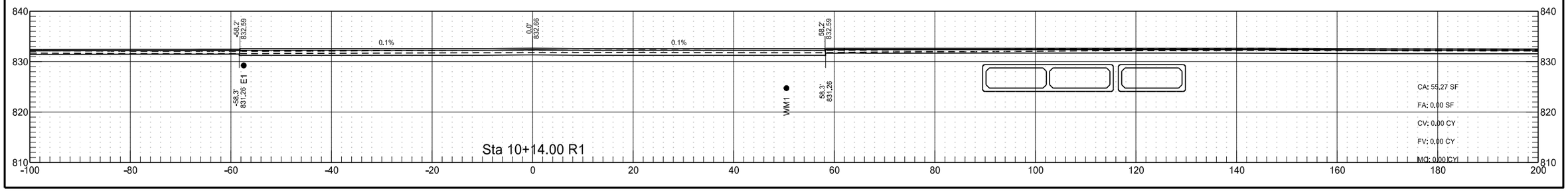


7TH ST

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	91

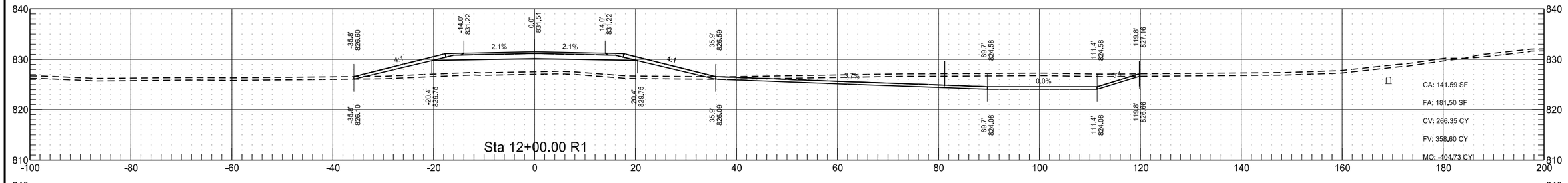


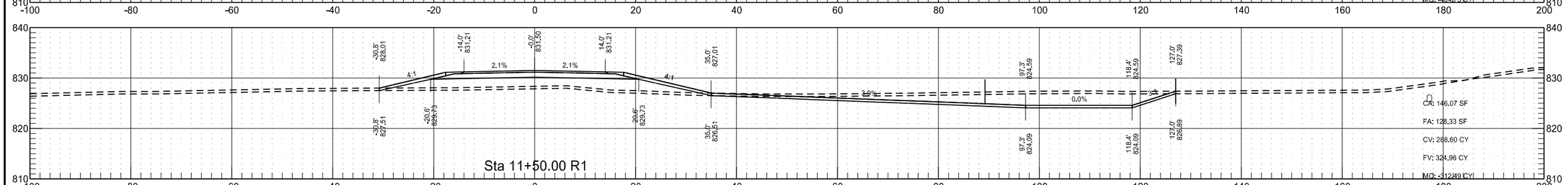


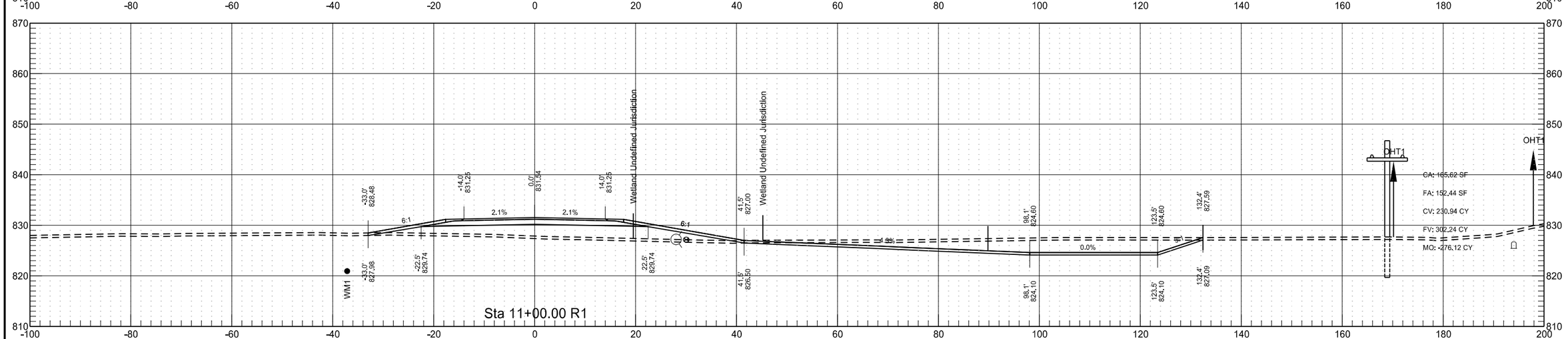


7TH ST

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	92

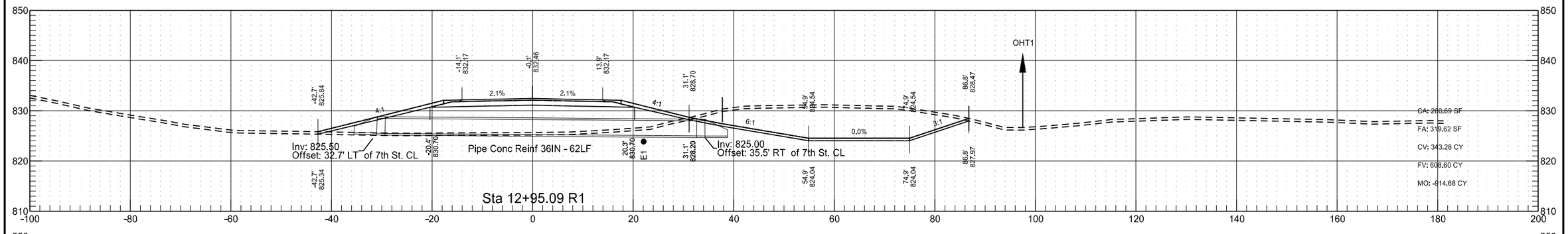


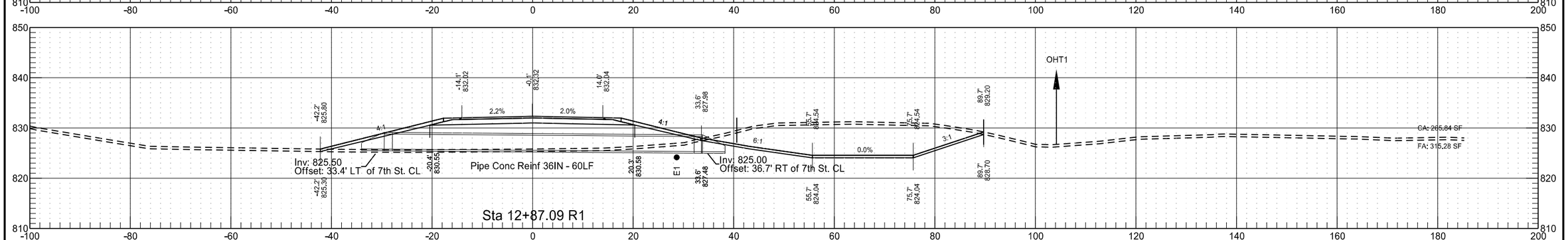


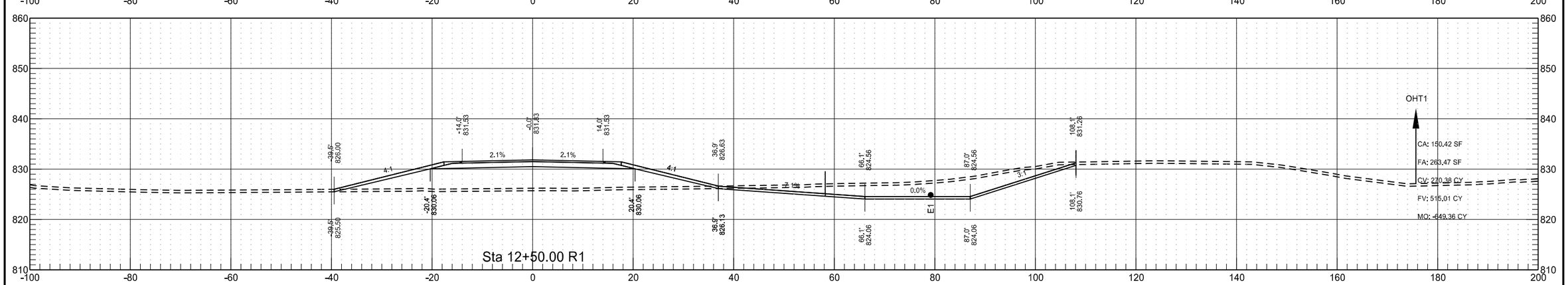


7TH ST

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	93

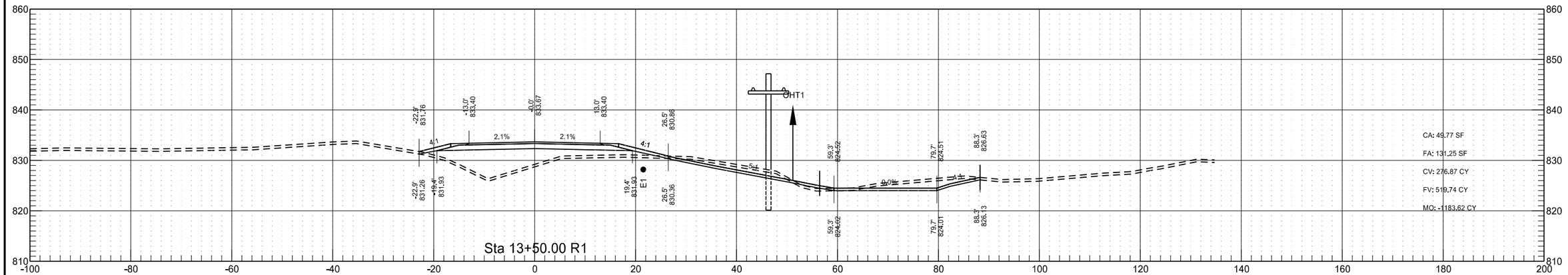


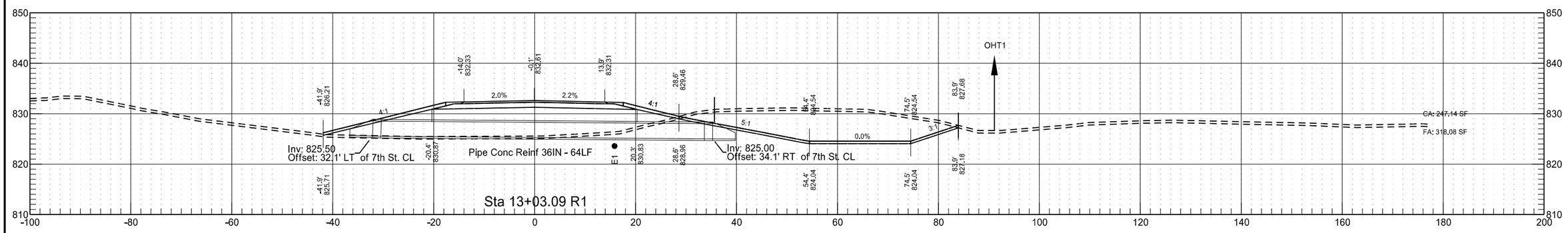


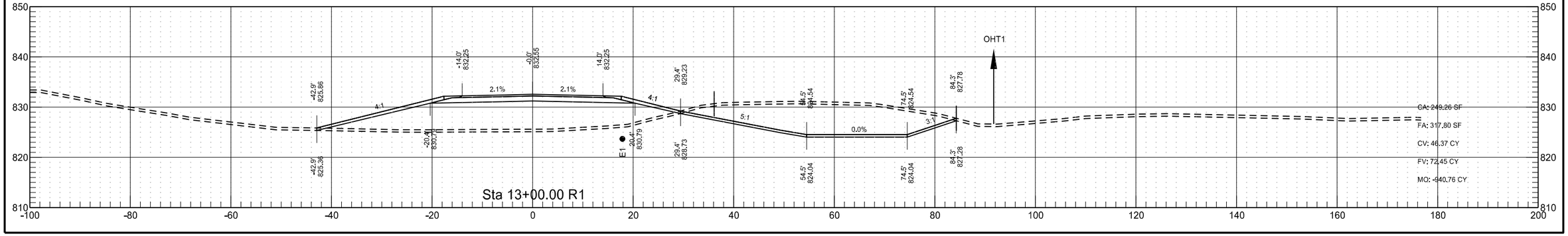


7TH ST

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	94

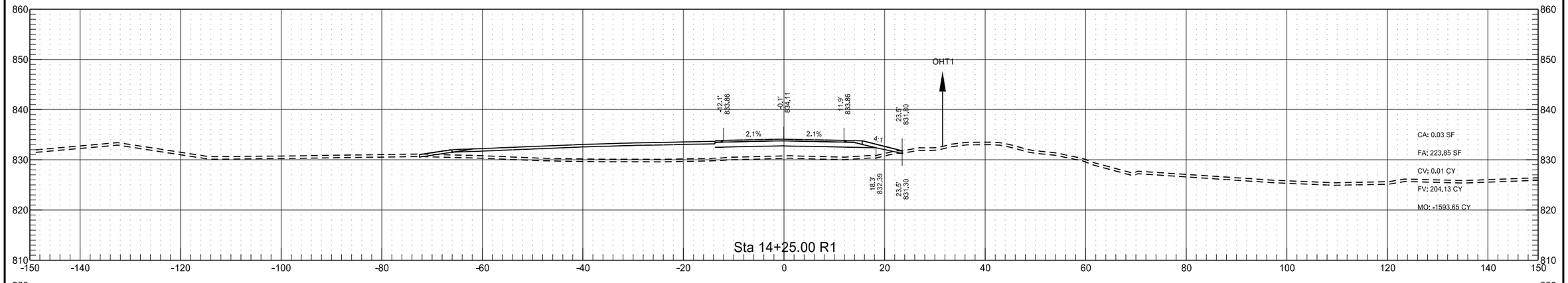


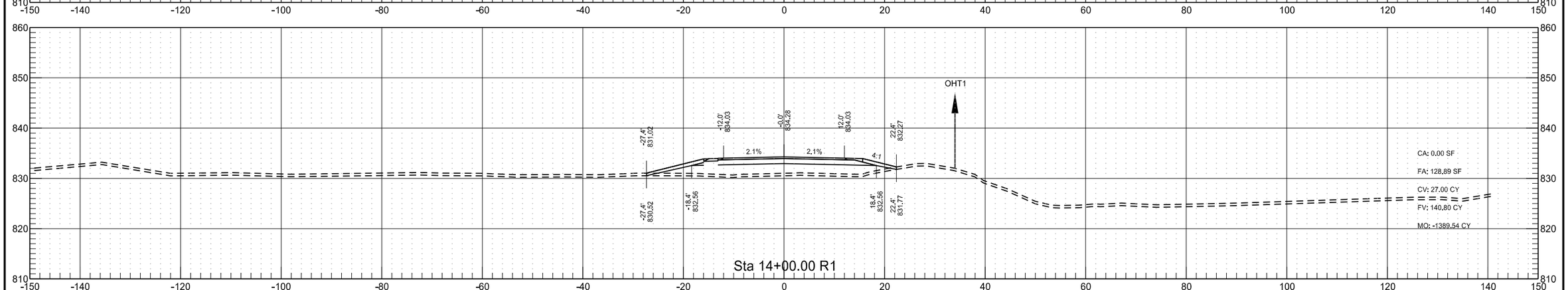


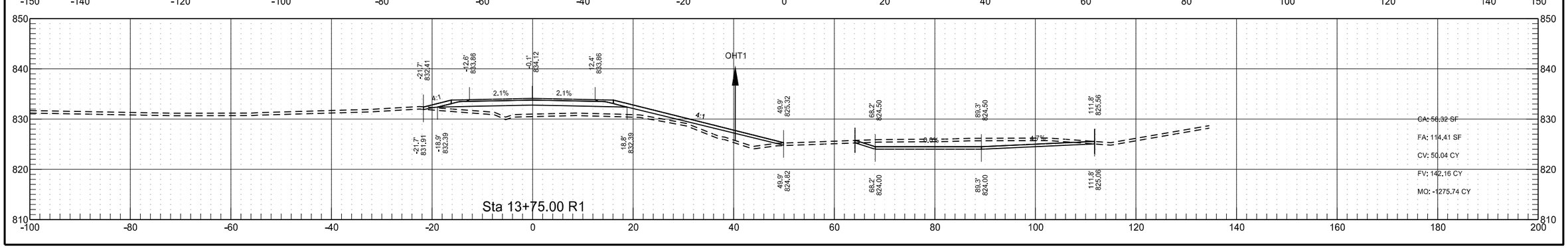


7TH ST

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	95

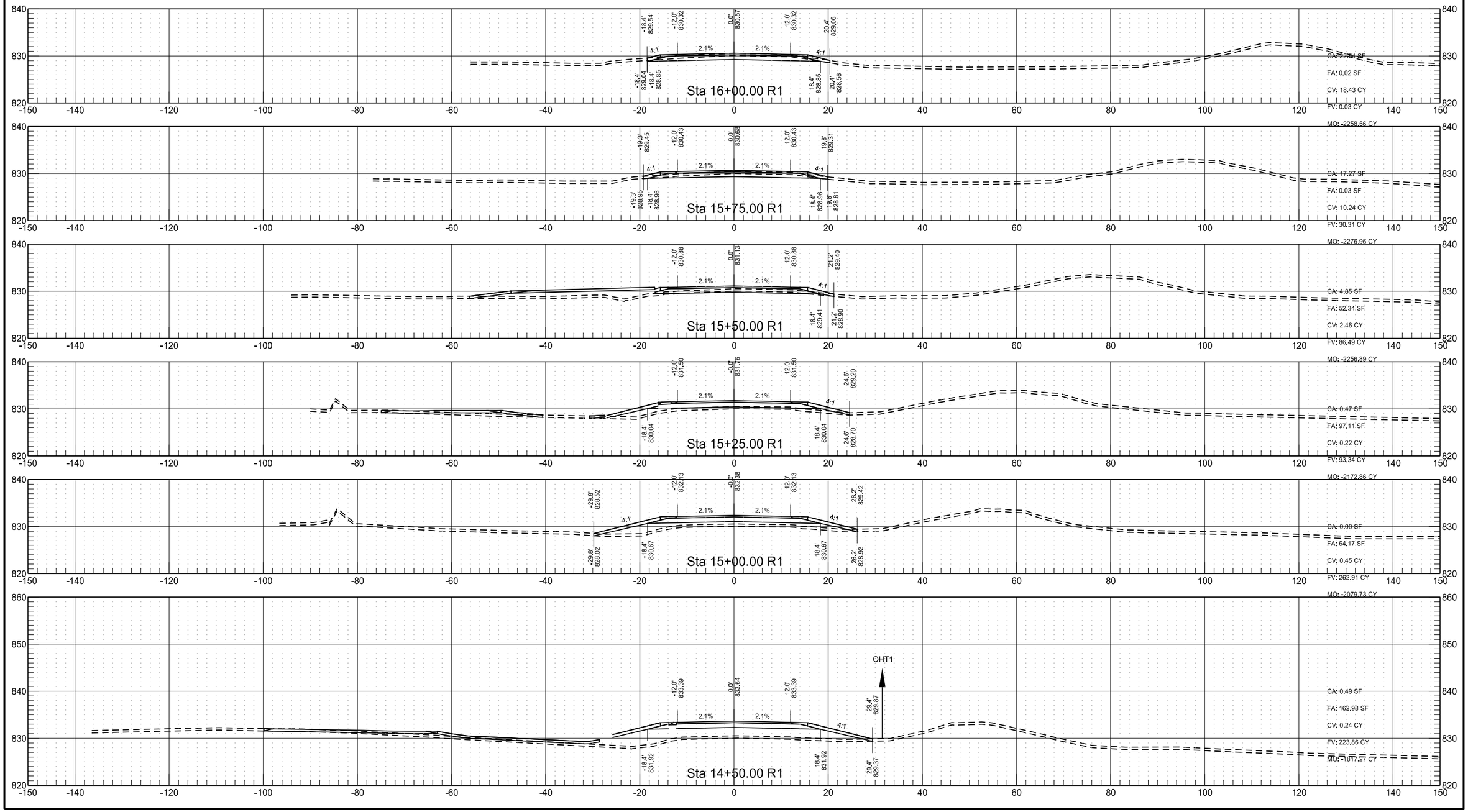






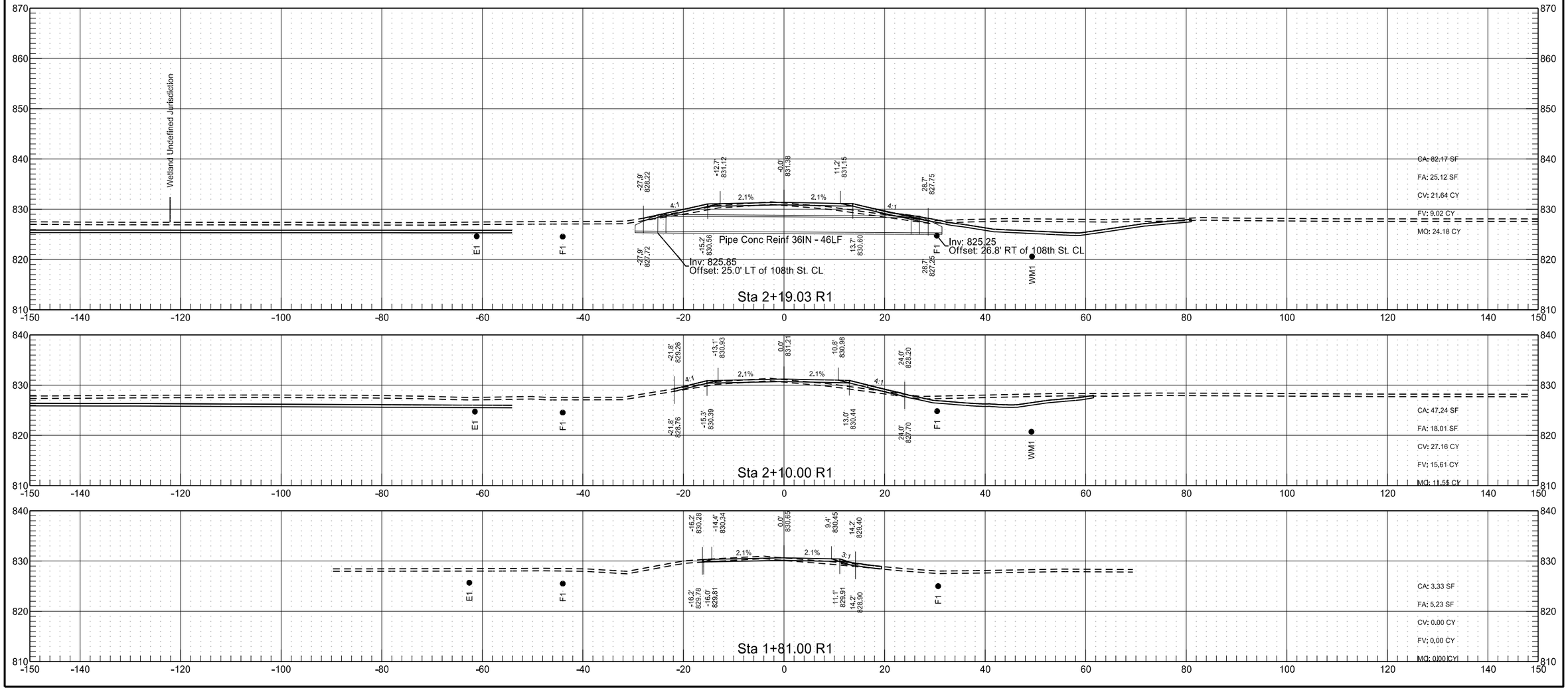
7TH ST

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	96



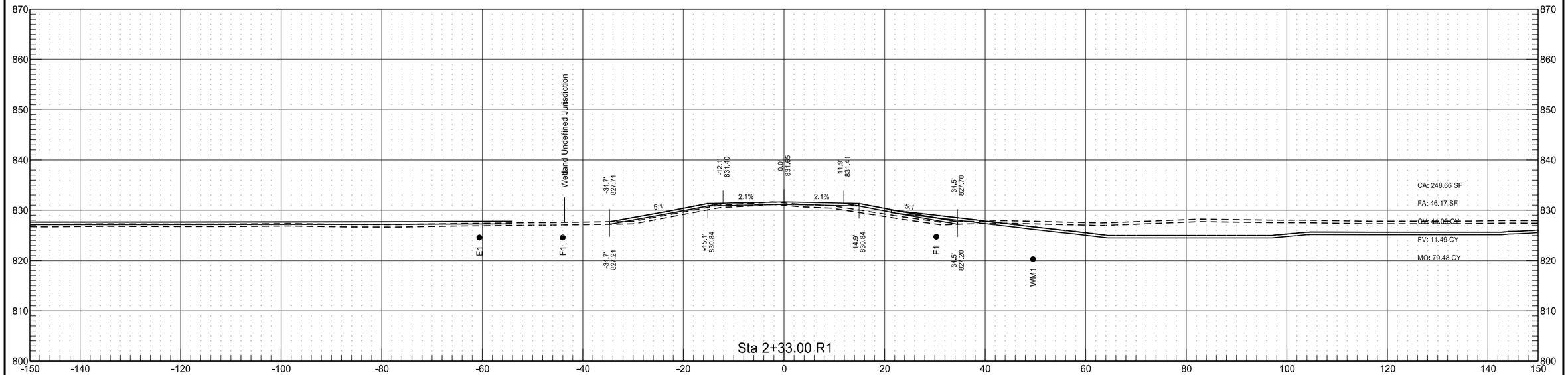
108TH ST NE

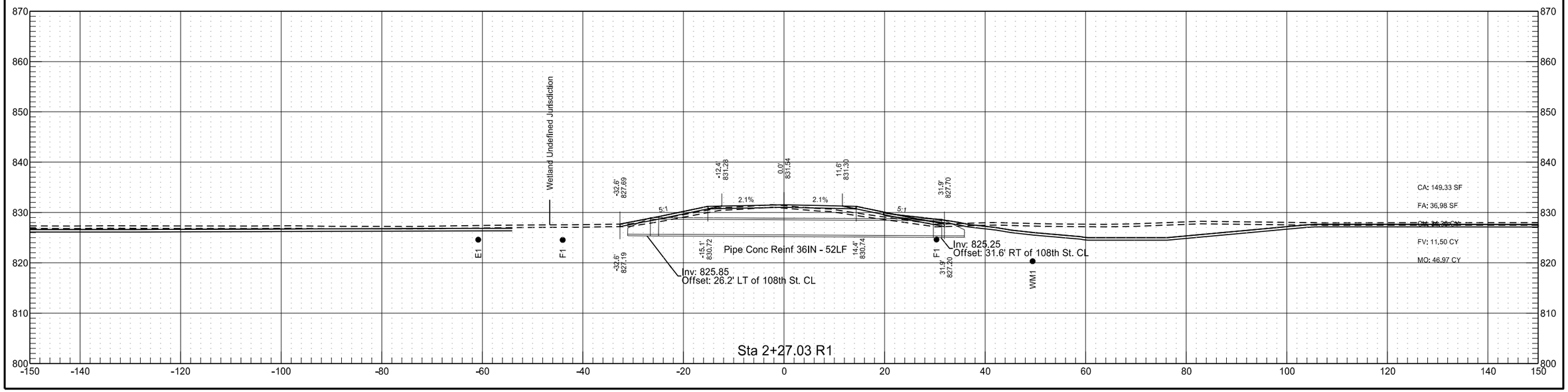
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	97



108TH ST NE

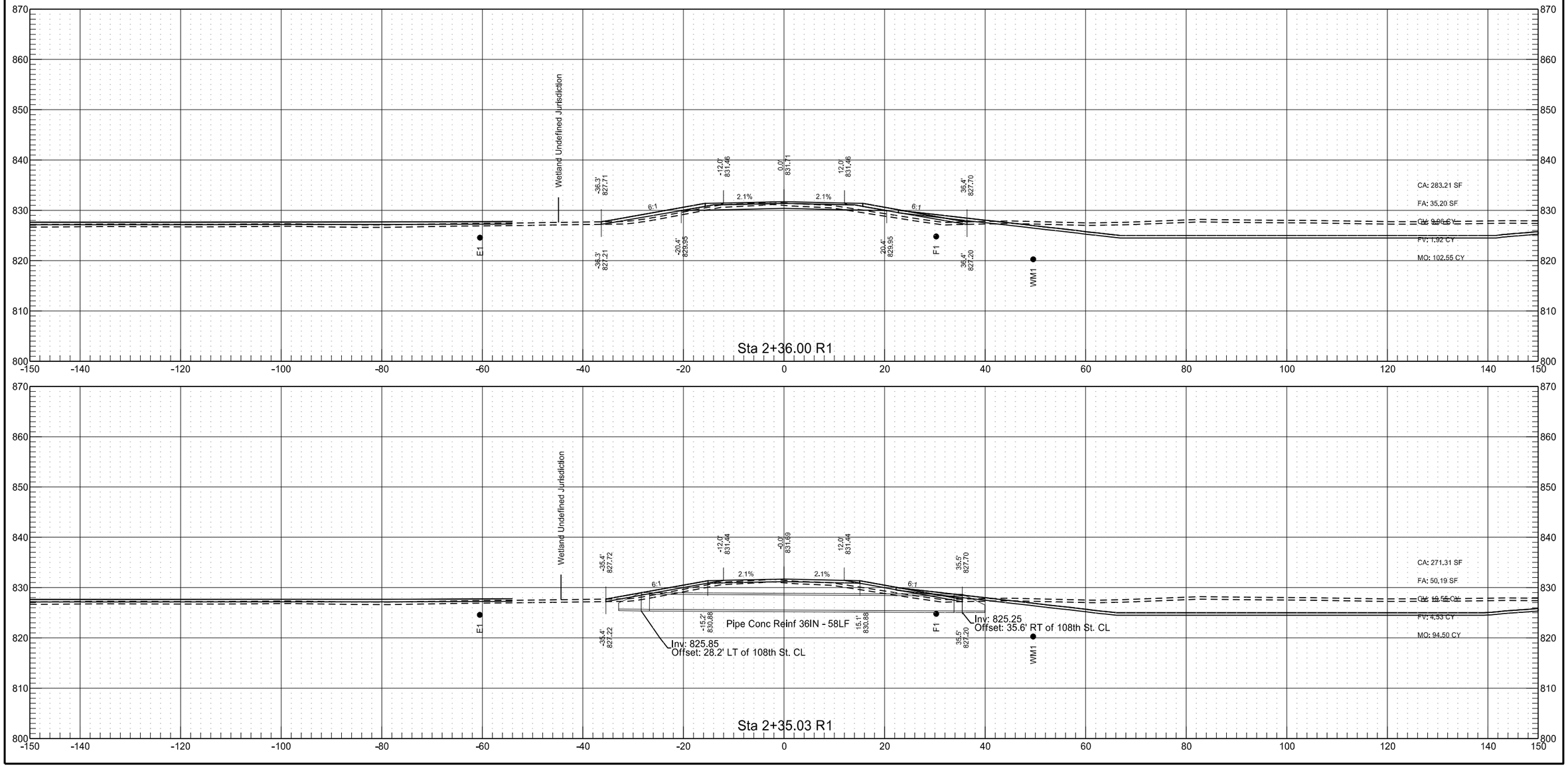
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	98





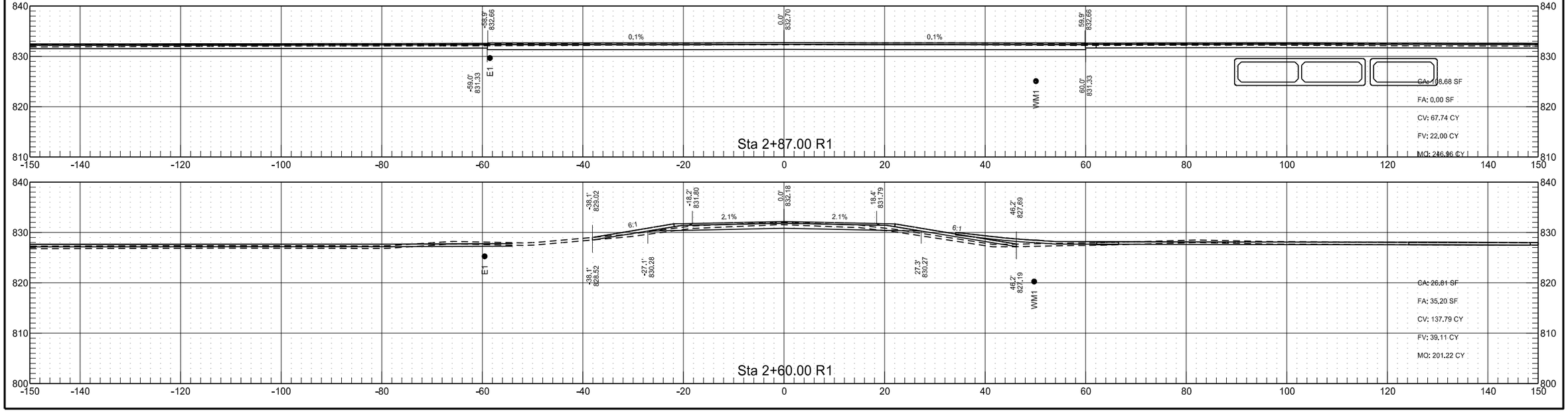
108TH ST NE

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	99



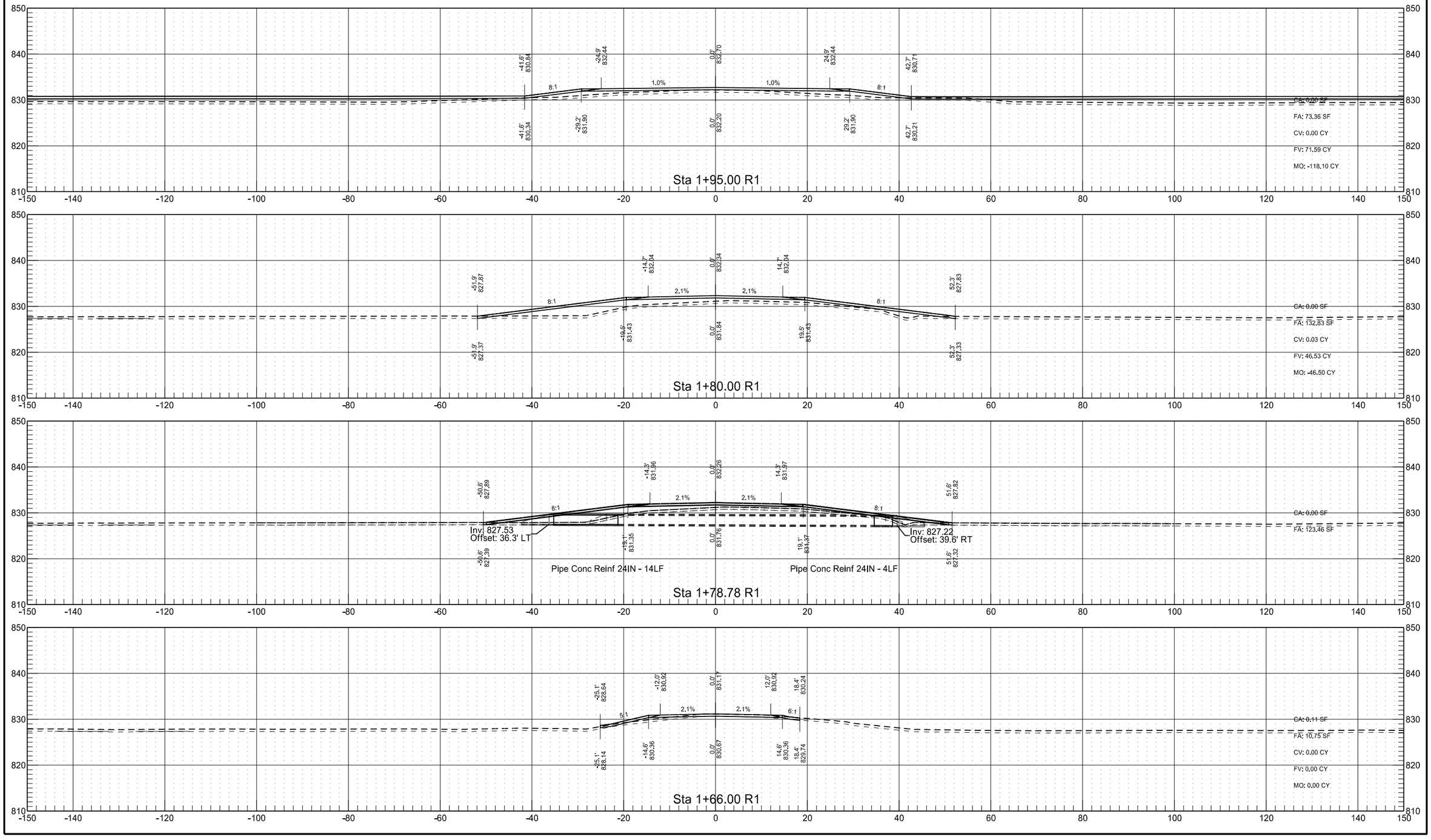
108TH ST NE

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	100



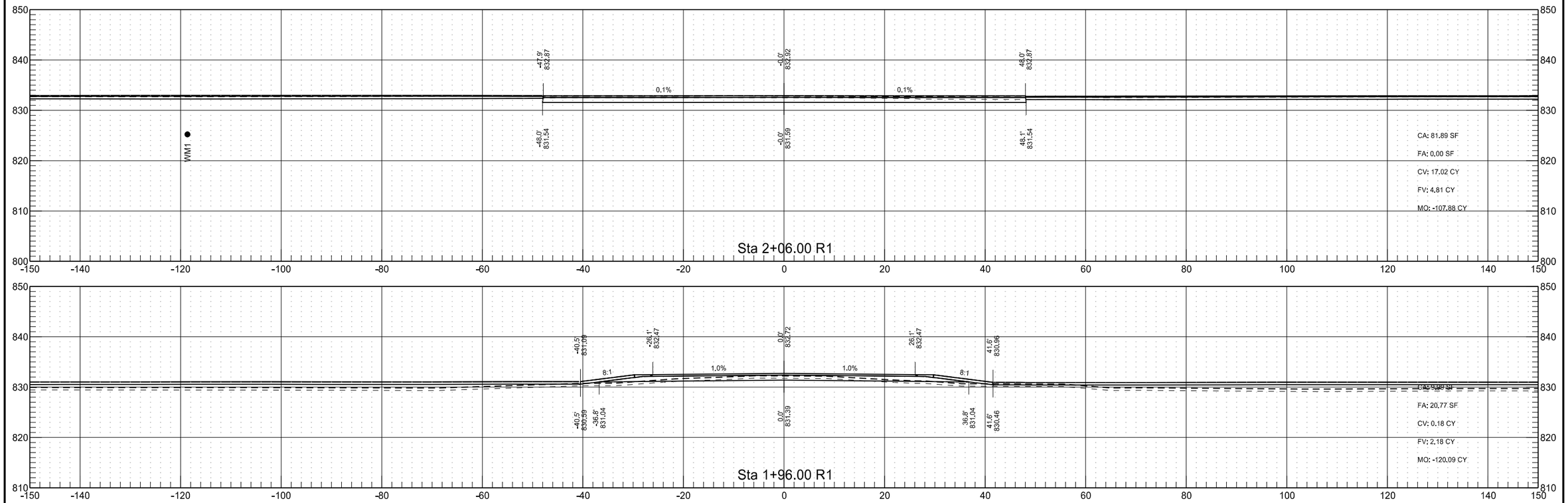
FD 12711+73

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	101



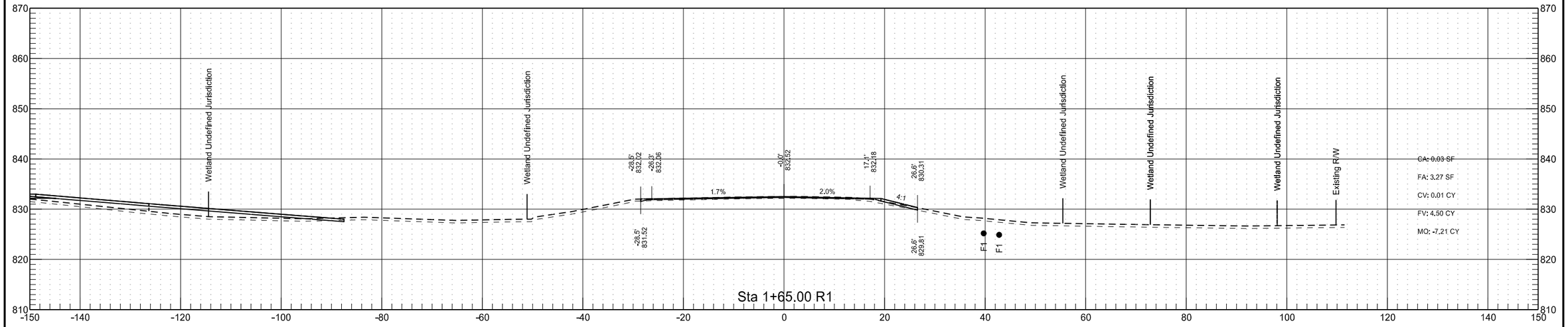
FD 12711+73

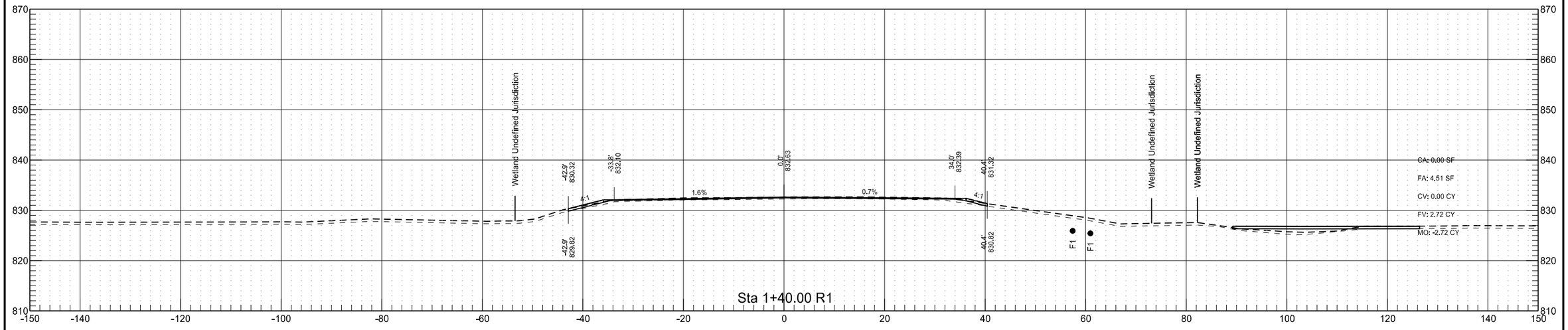
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	ND	SS-6-018(081)239	200	102

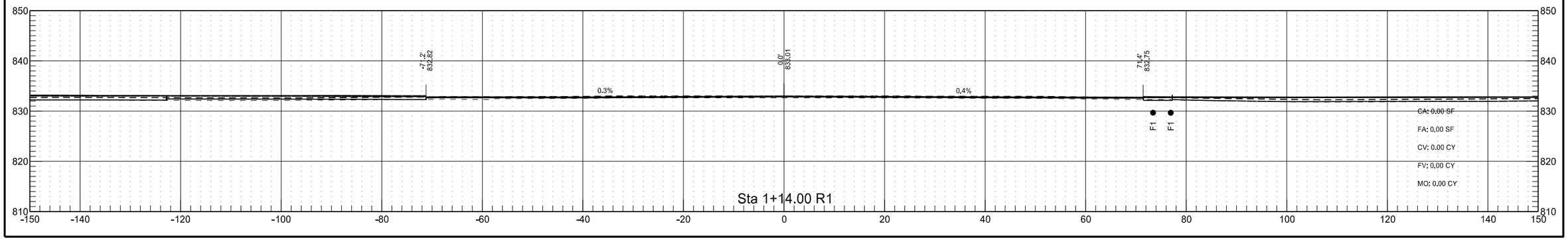


4TH ST

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	103

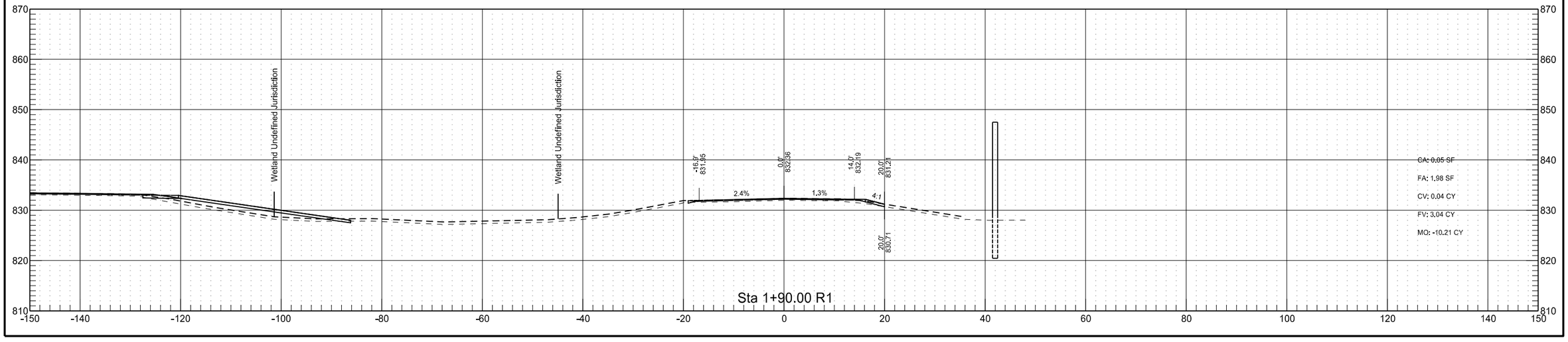






4TH ST

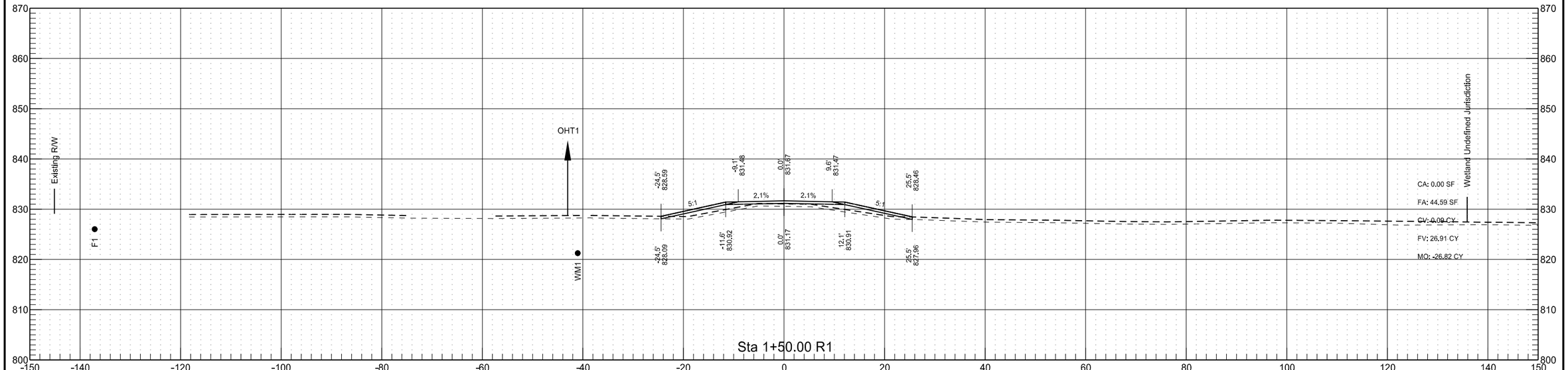
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	104

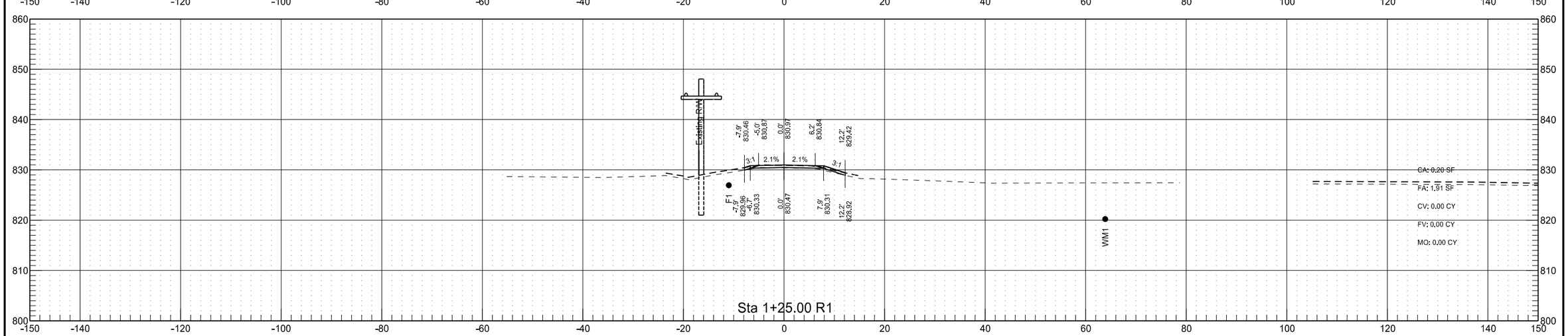


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PD 12718+20

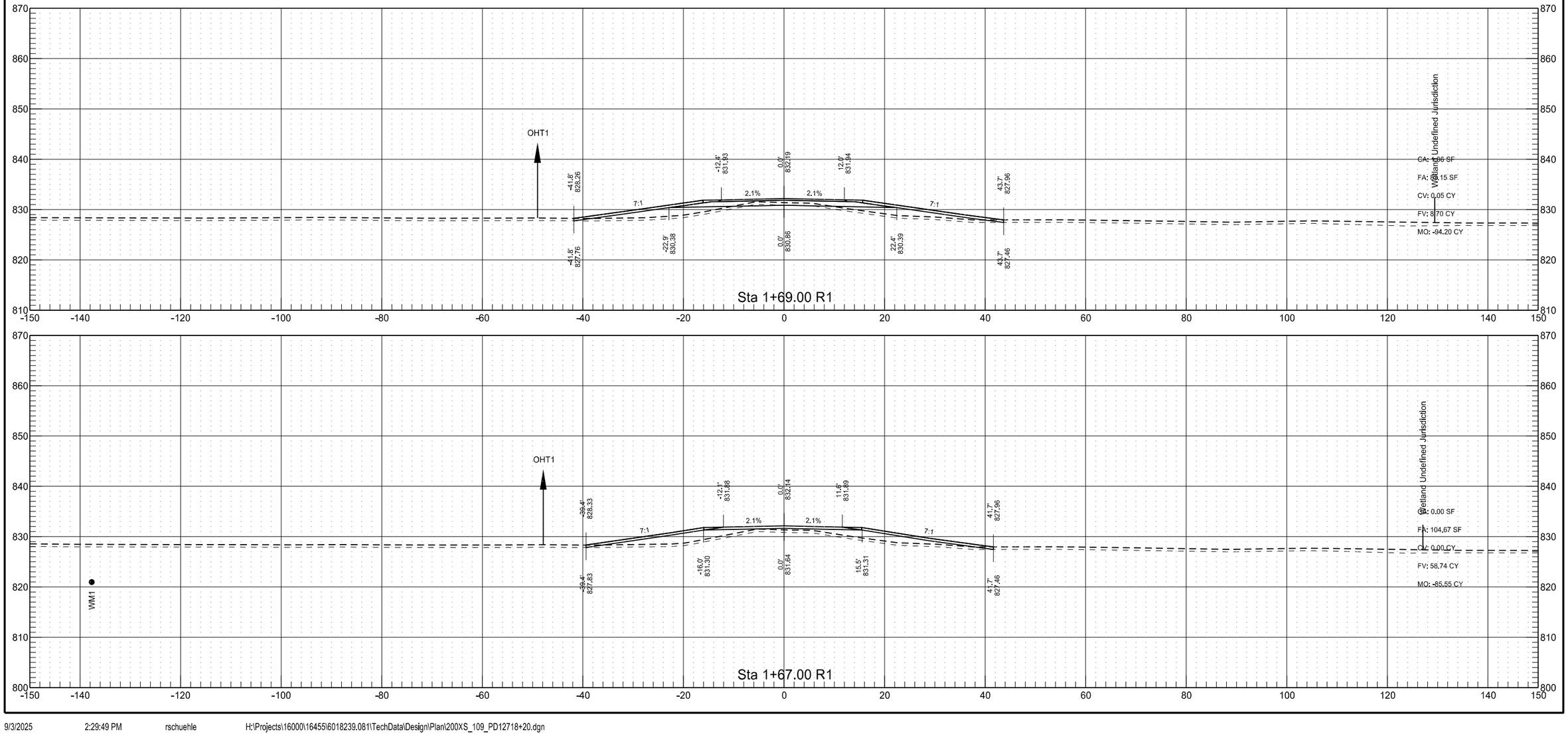
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	105





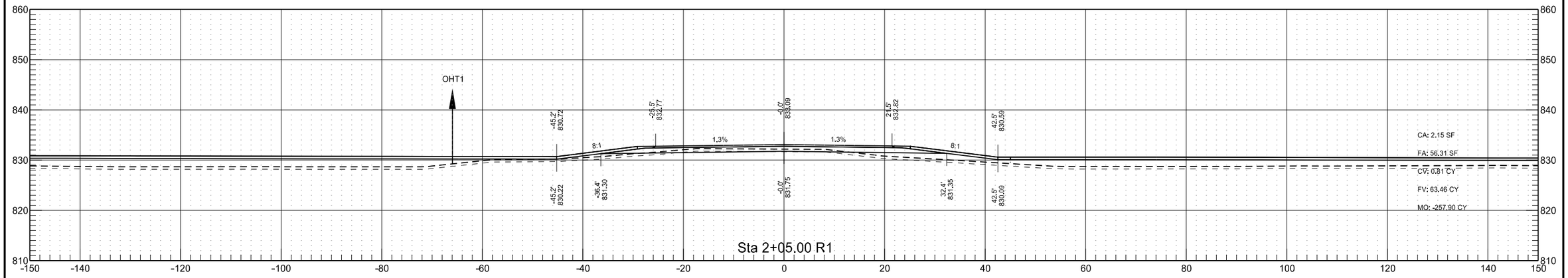
PD 12718+20

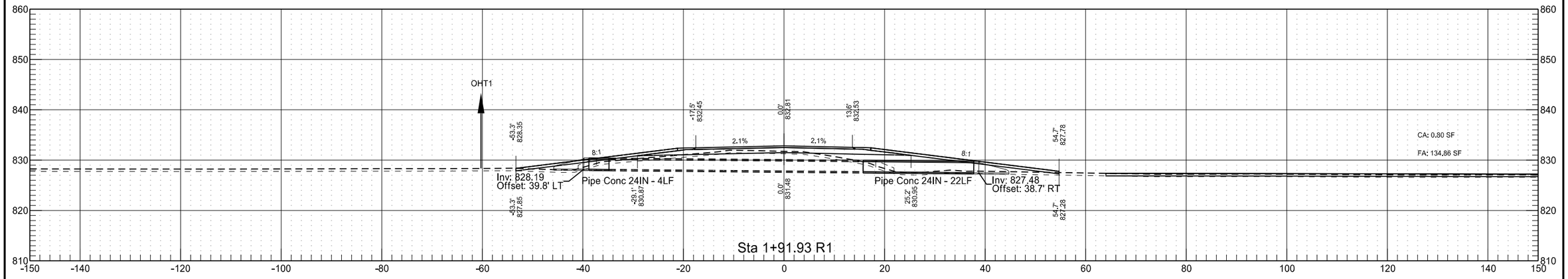
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	106

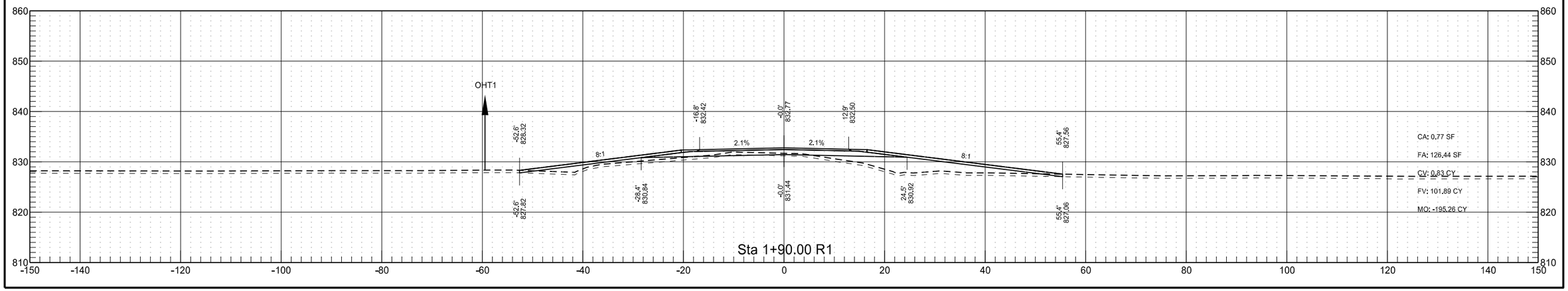


PD 12718+20

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	107

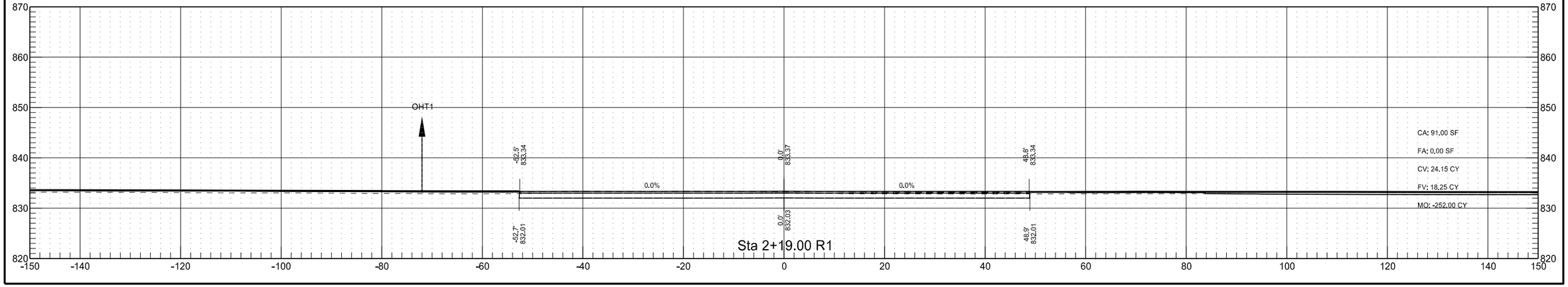






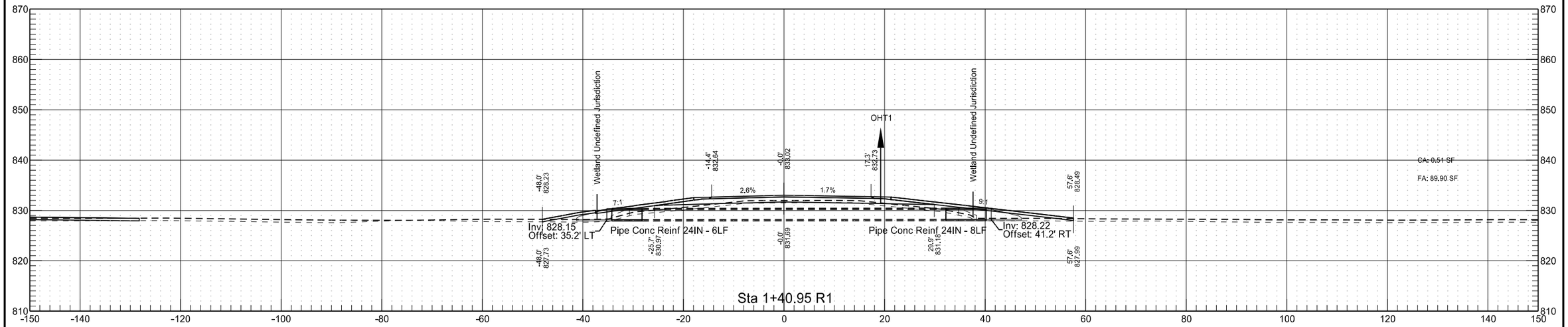
PD 12718+20

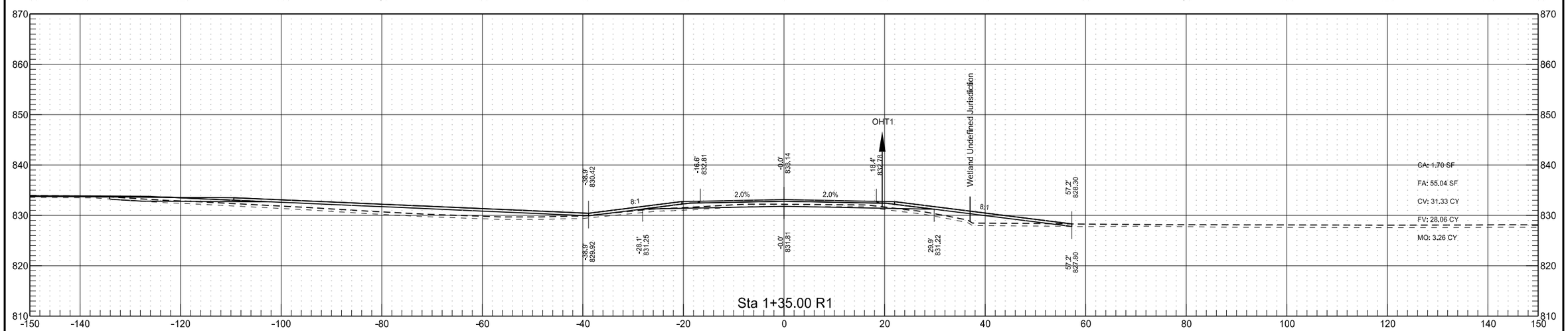
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	108

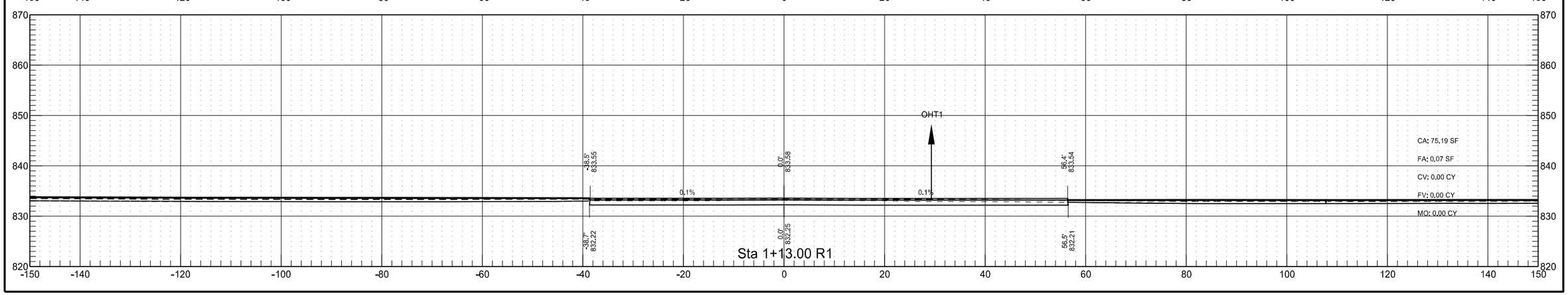


W 3RD ST

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	109

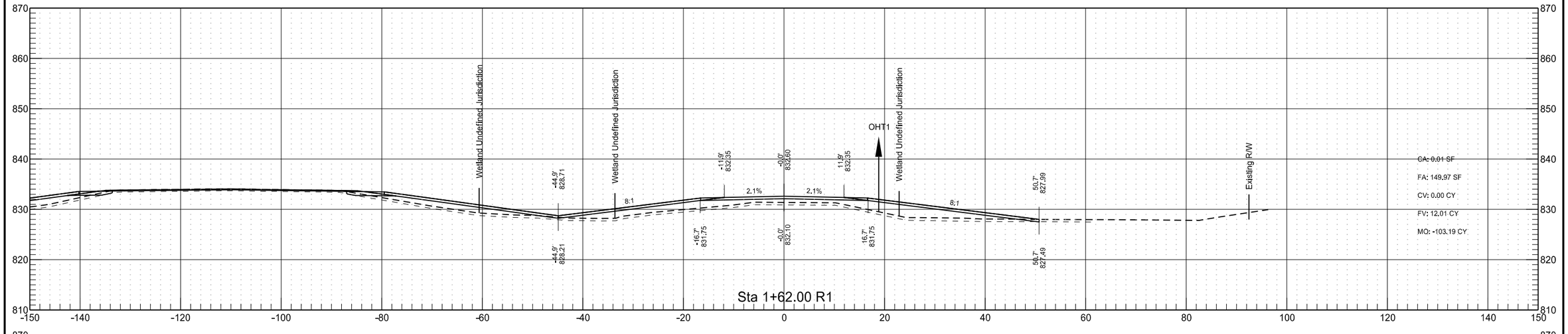






W 3RD ST

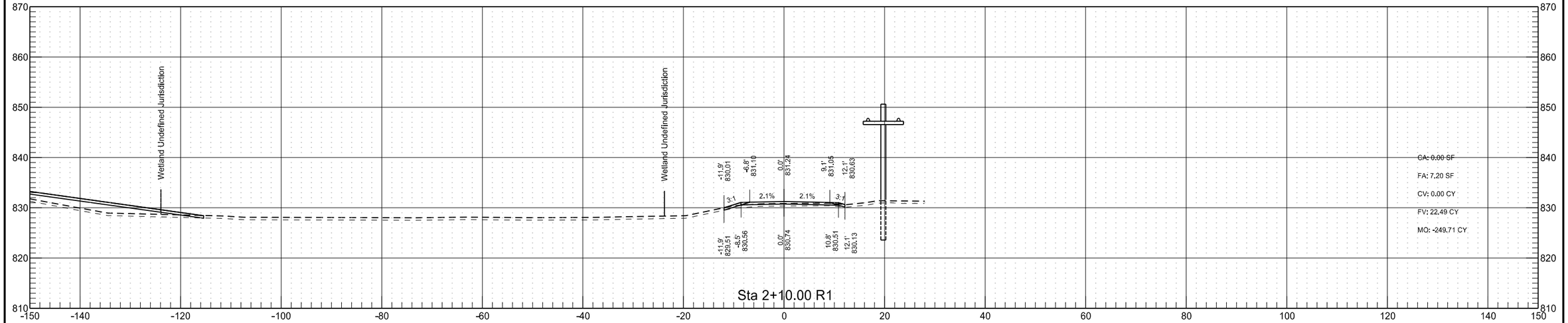
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	110

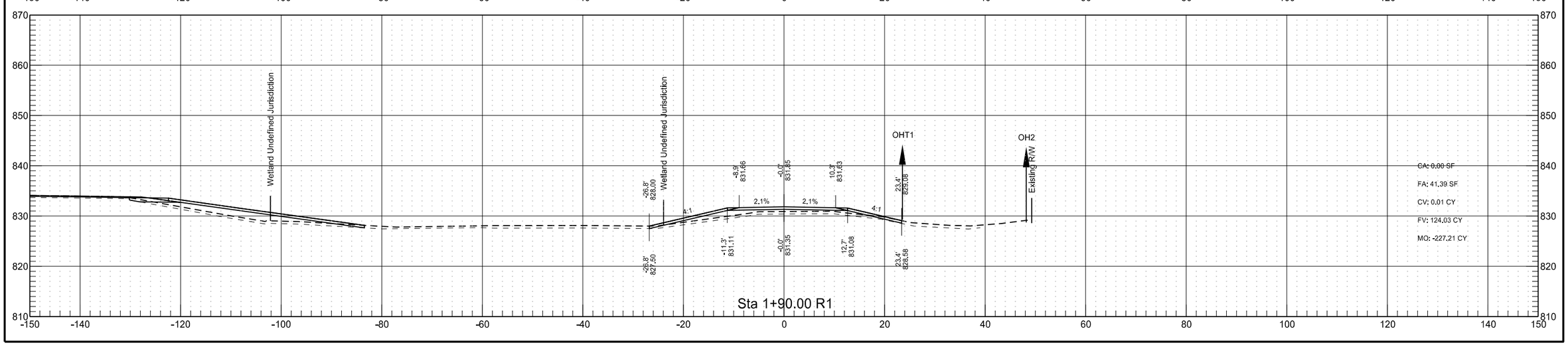


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W 3RD ST

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	111

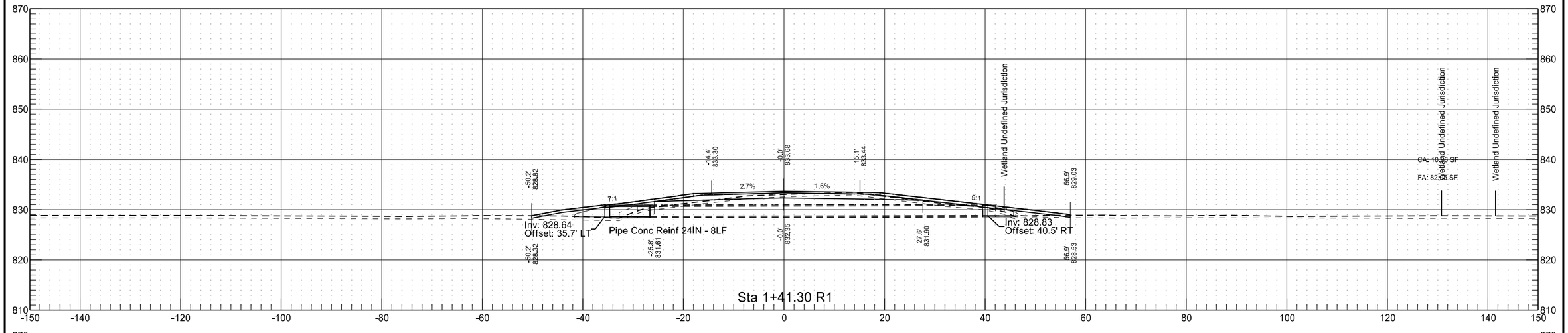


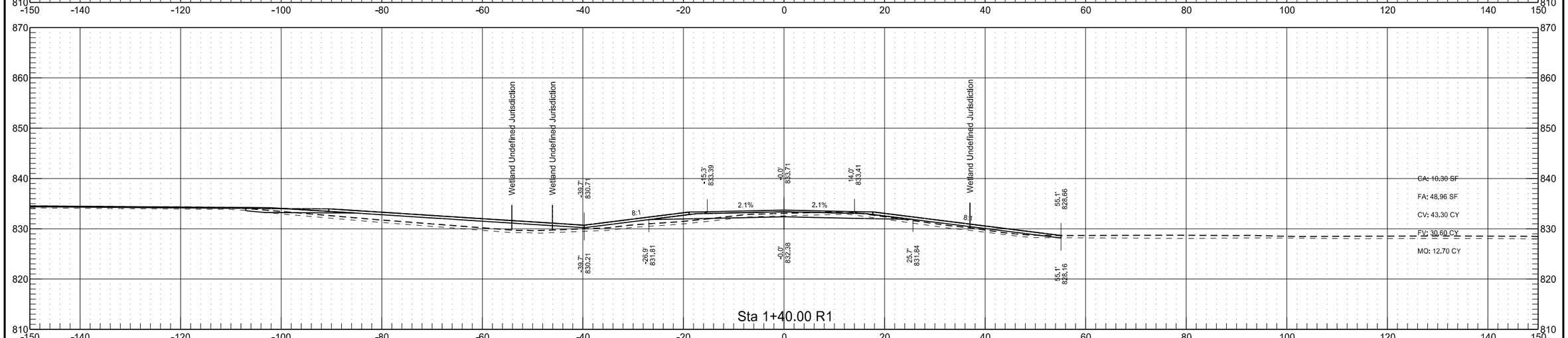


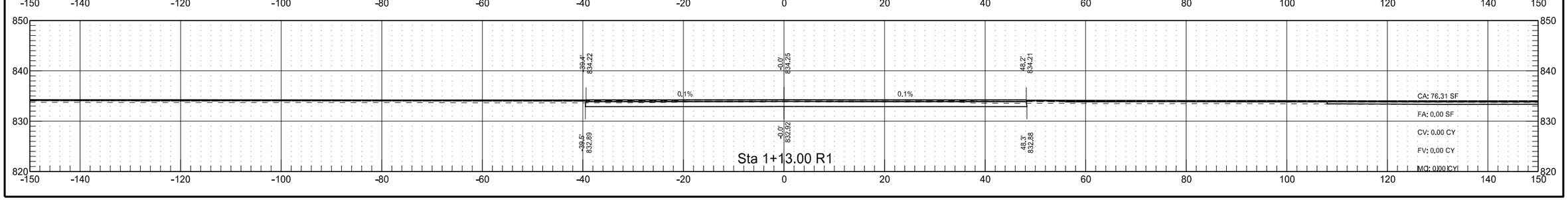
9/3/2025 2:29:53 PM rschuehle H:\Projects\16000\16455\6018239.081\TechData\Design\Plan\200XS_110_W3RDST.dgn

W 2ND ST

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	112

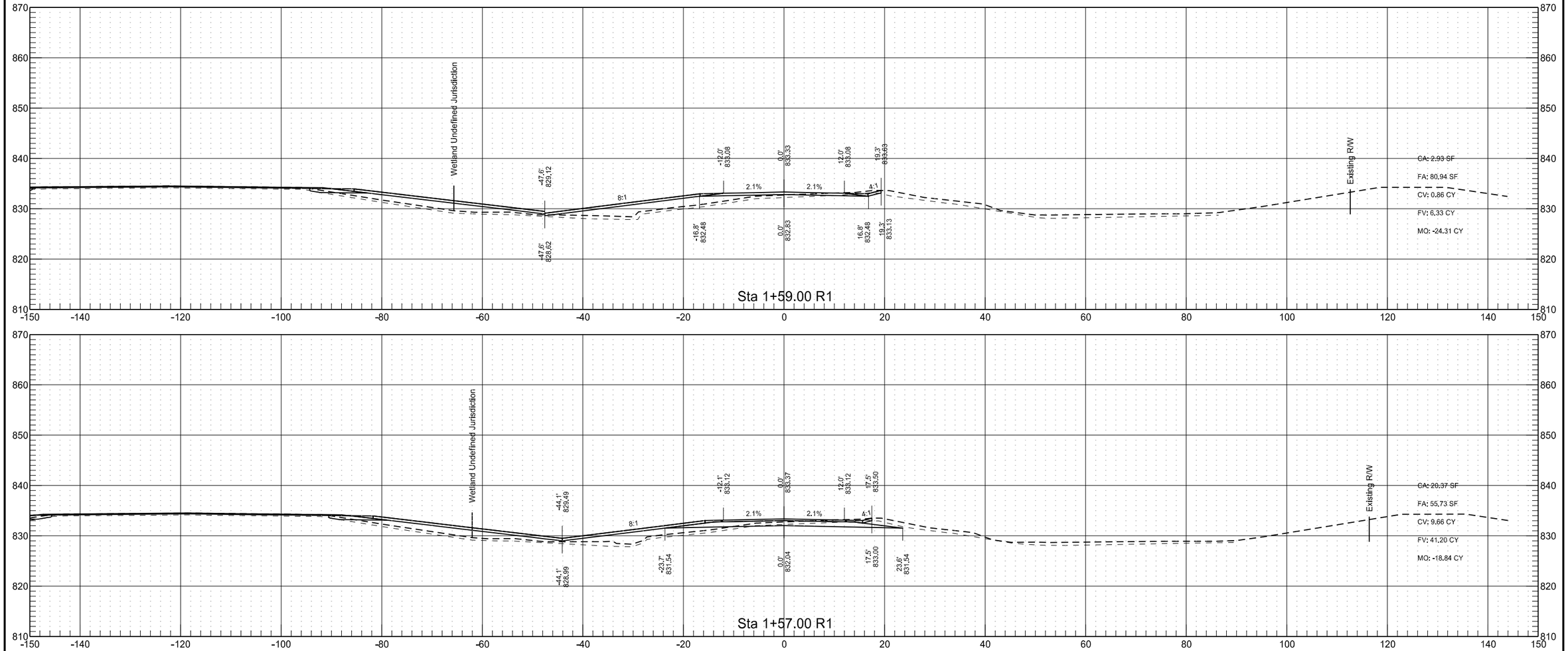






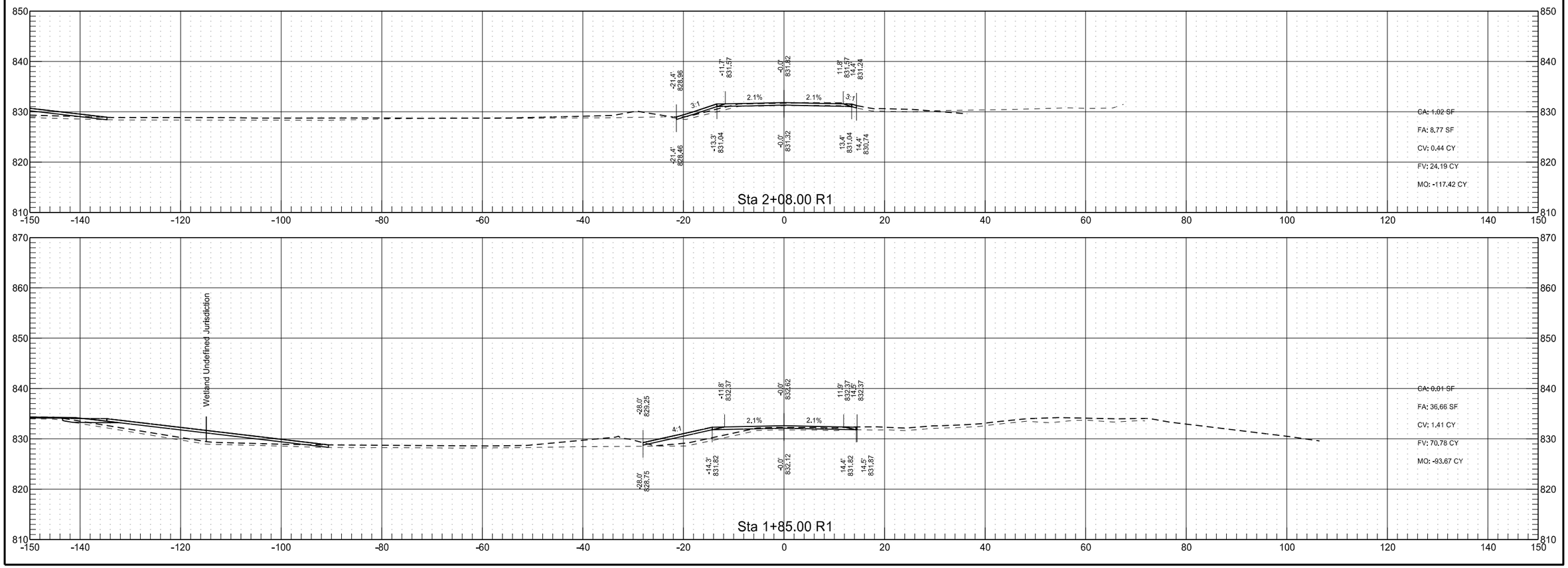
W 2ND ST

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	113



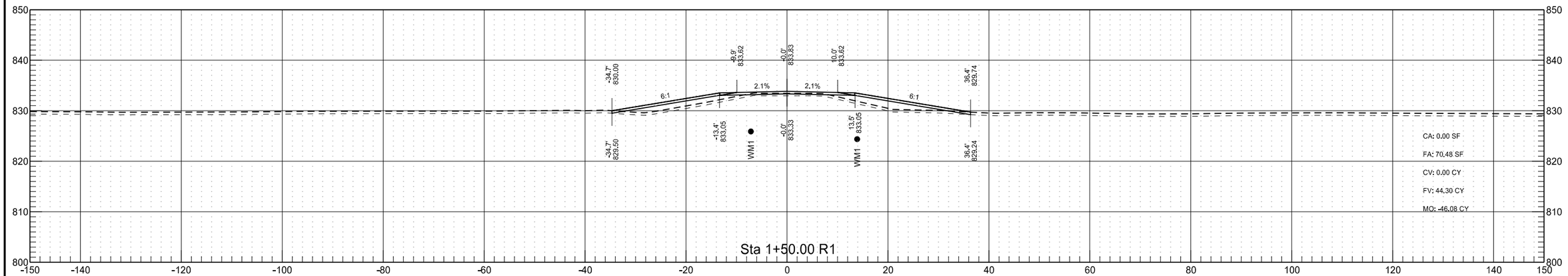
W 2ND ST

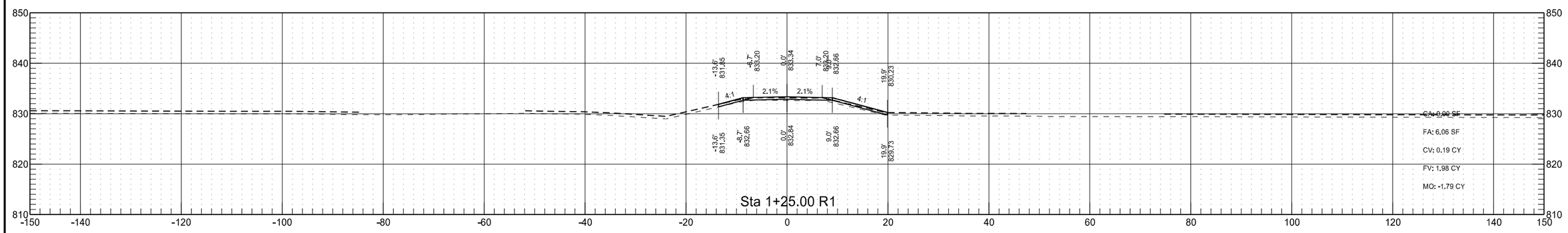
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	114

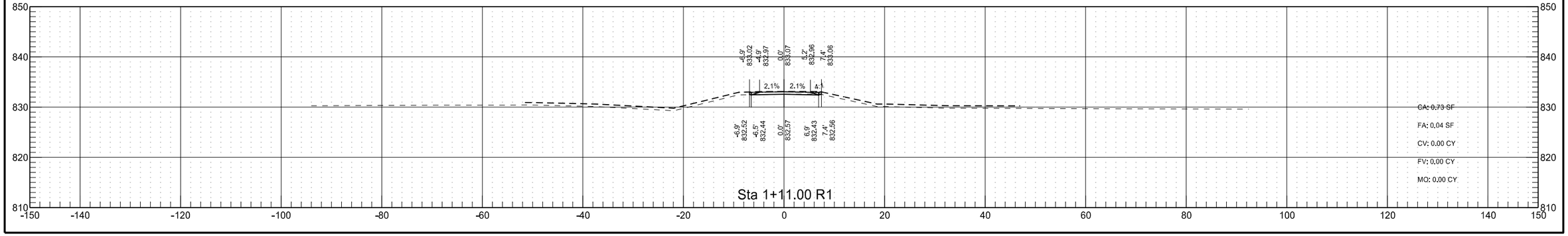


FELSON RD

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	115

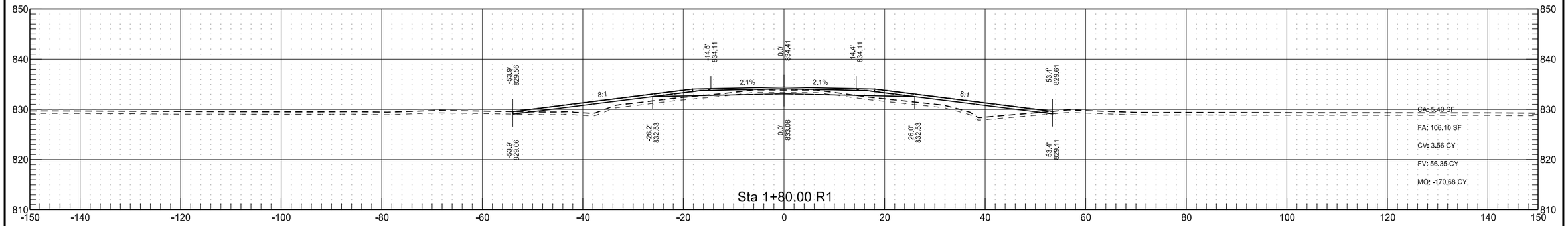


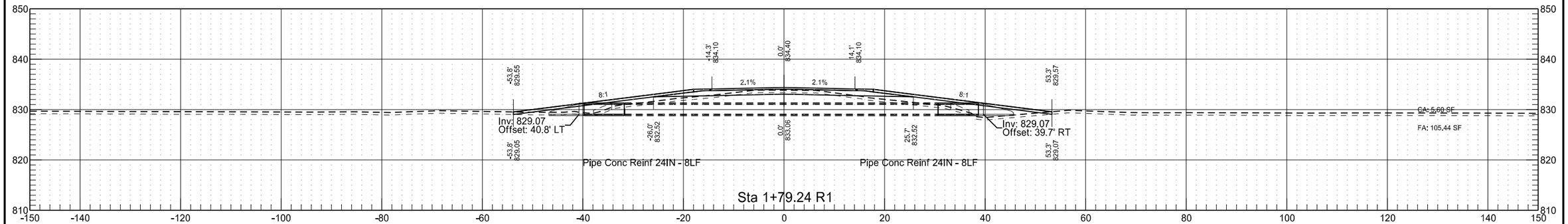


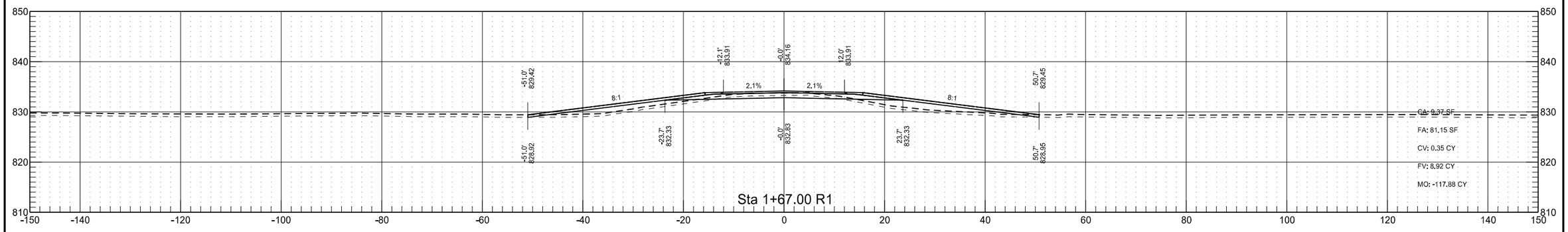


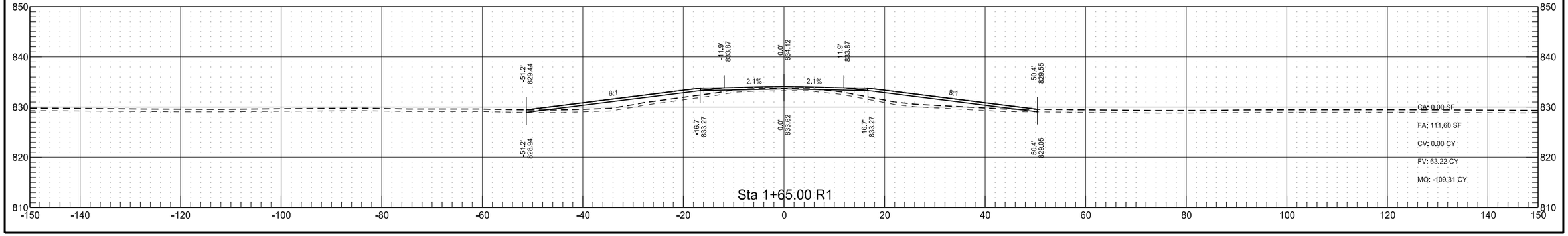
FELSON RD

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	116



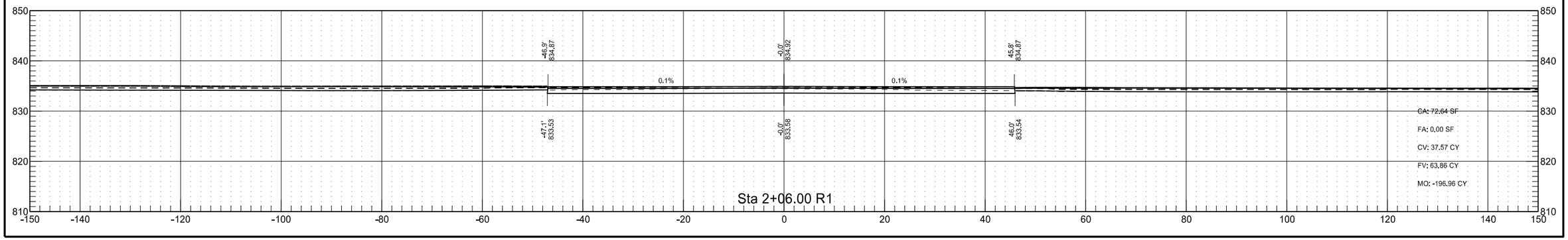






FELSON RD

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	117

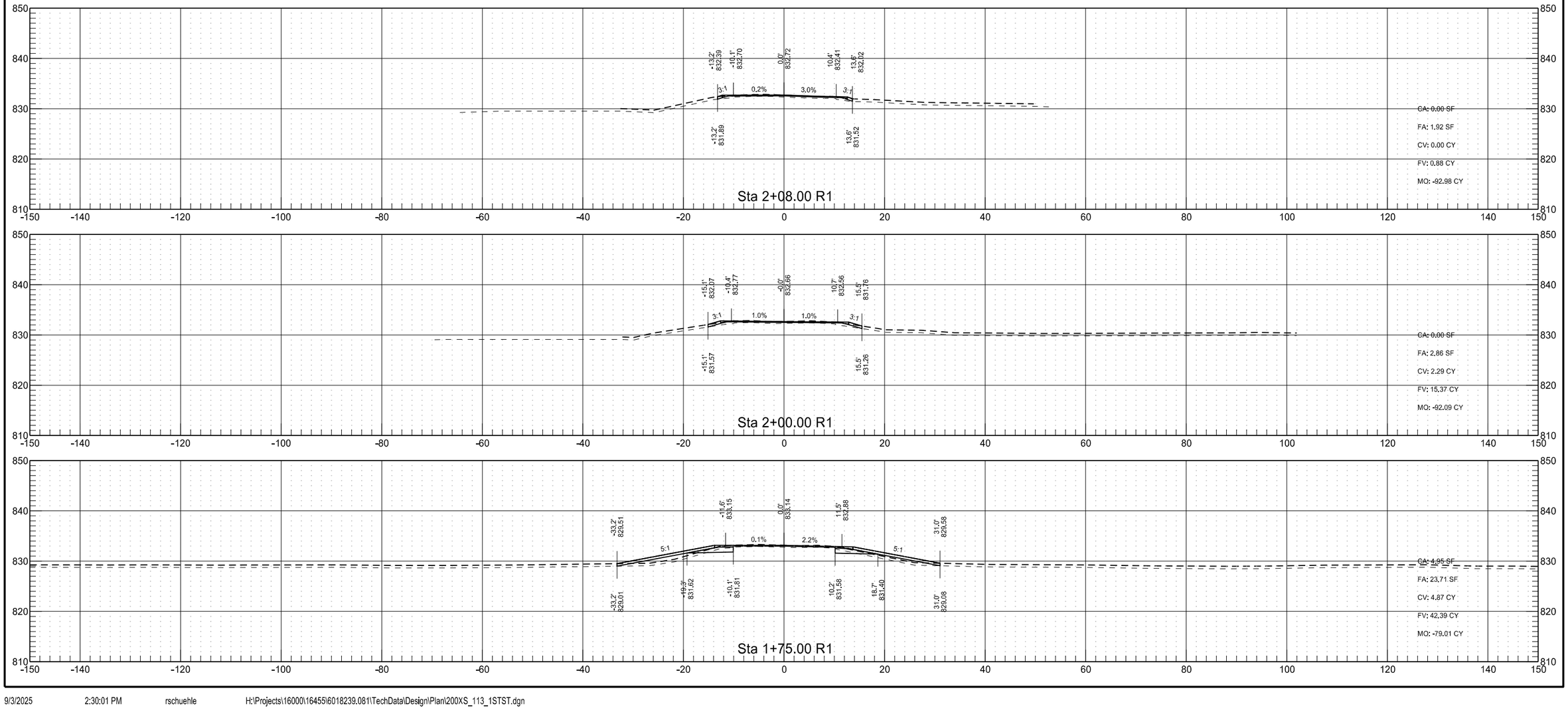


1ST ST

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	118

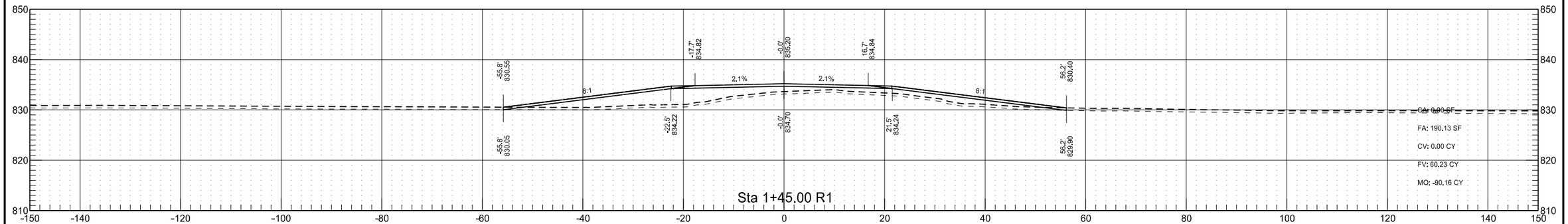
1ST ST

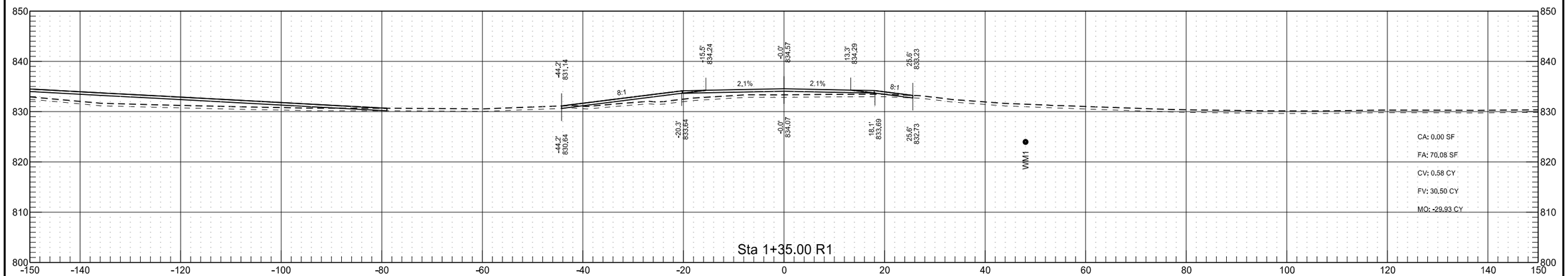
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	119

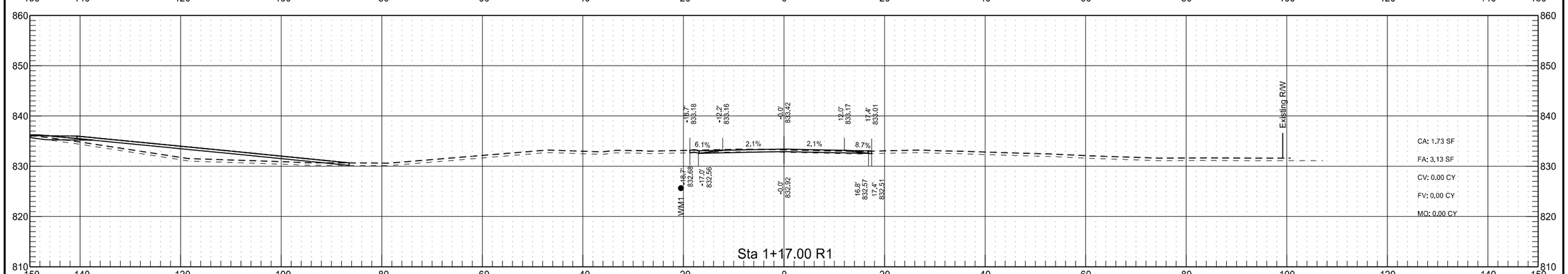


FD 12733+91

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	120

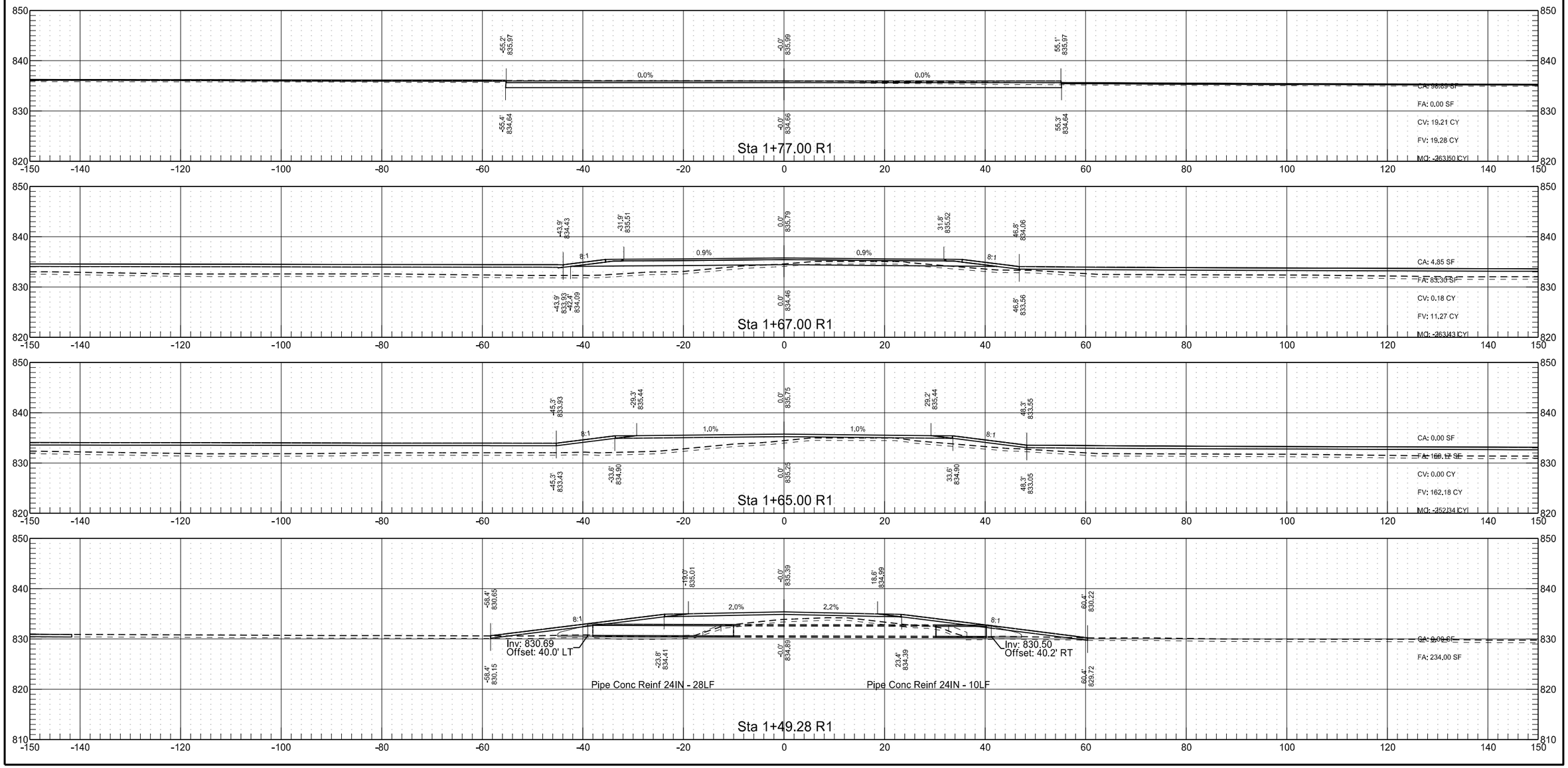






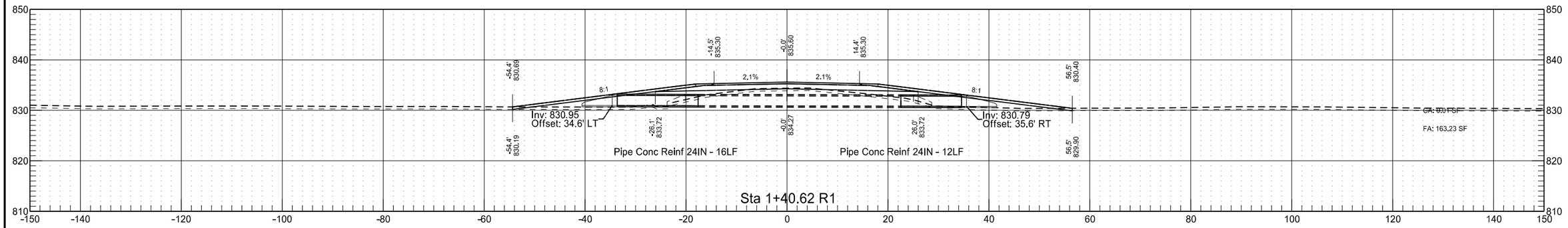
FD 12733+91

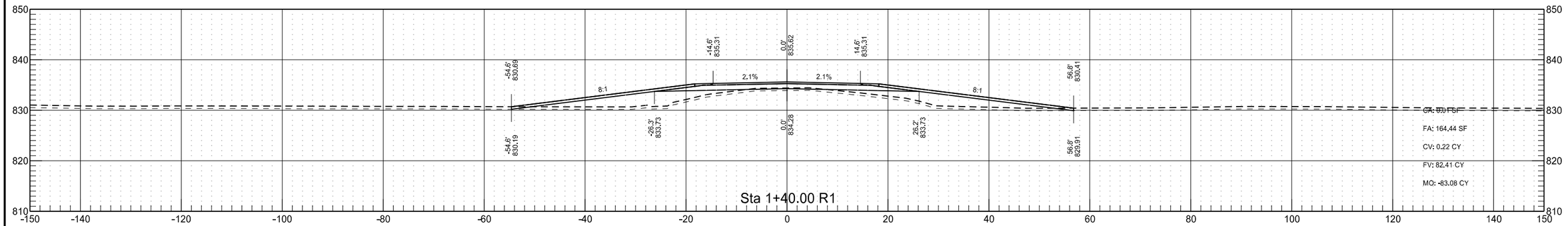
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	121

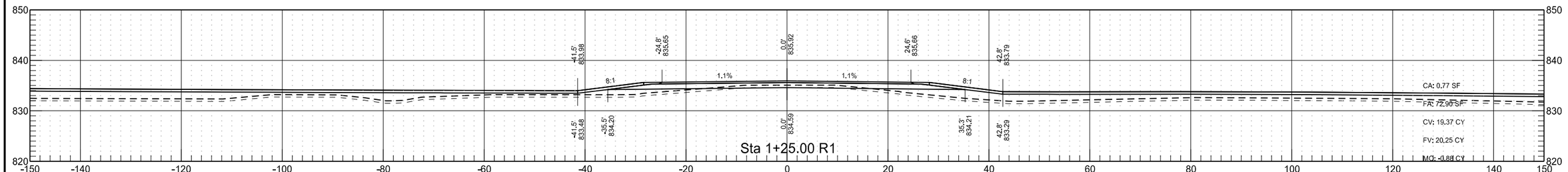


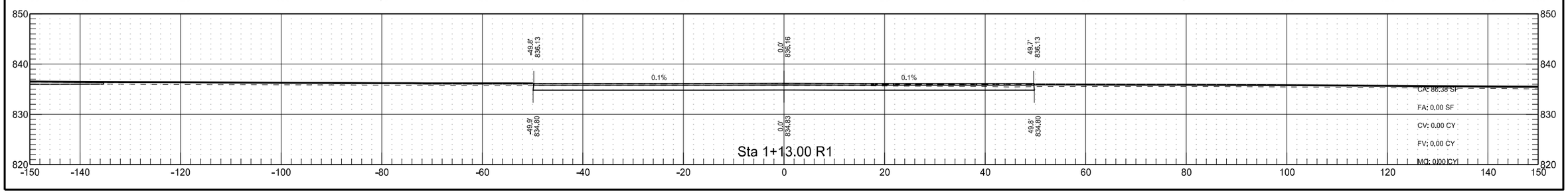
PD 12734+79

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	122



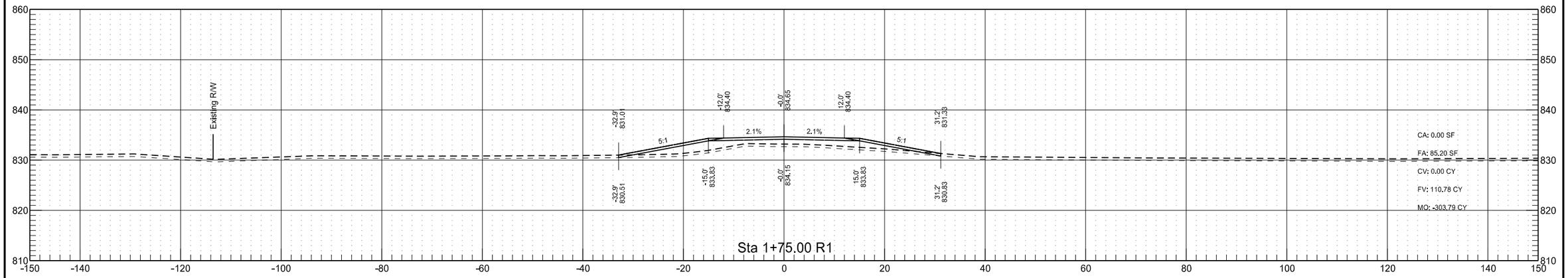


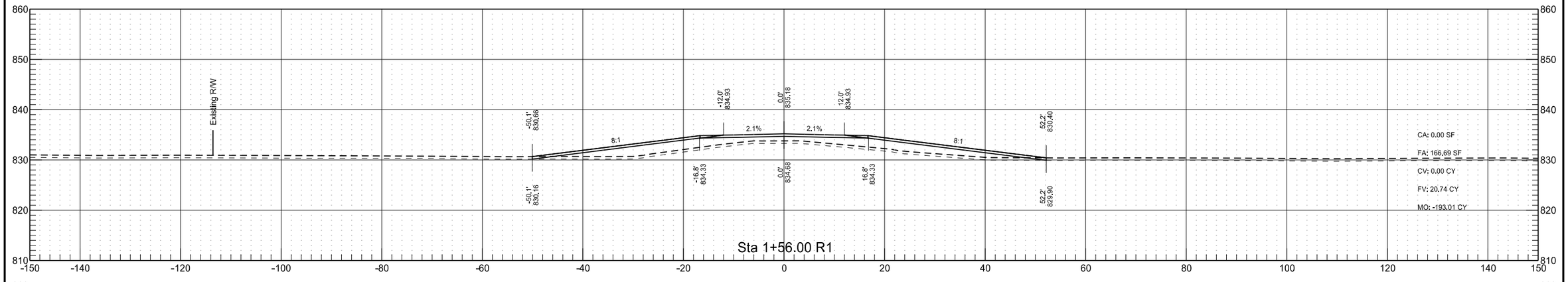


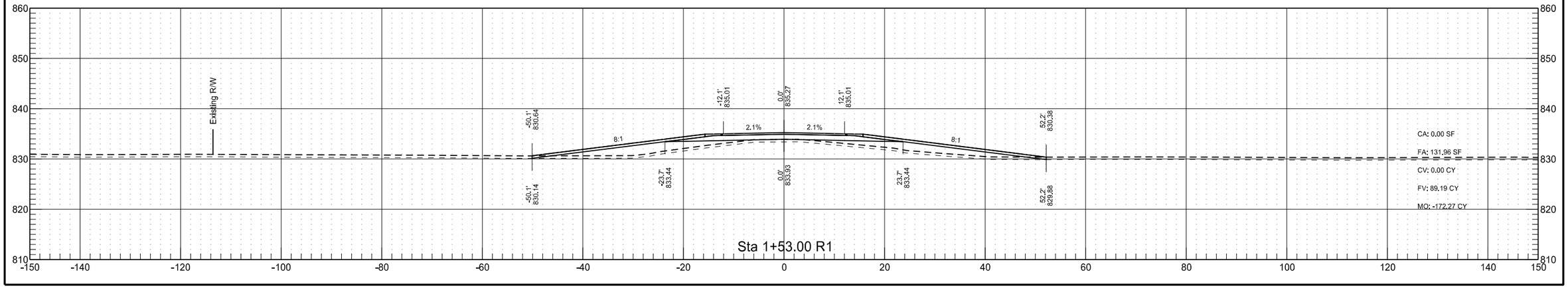


PD 12734+79

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	123

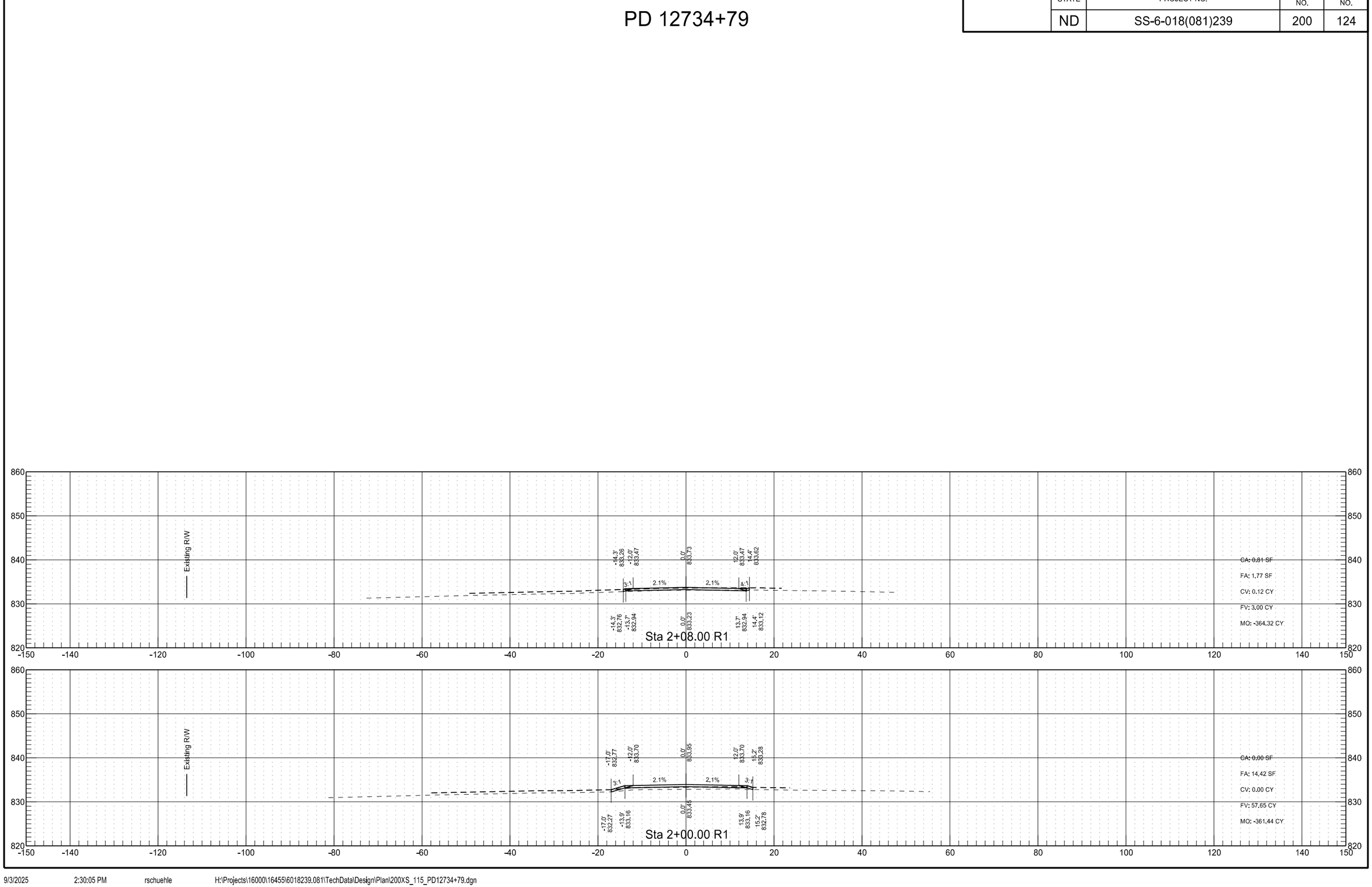






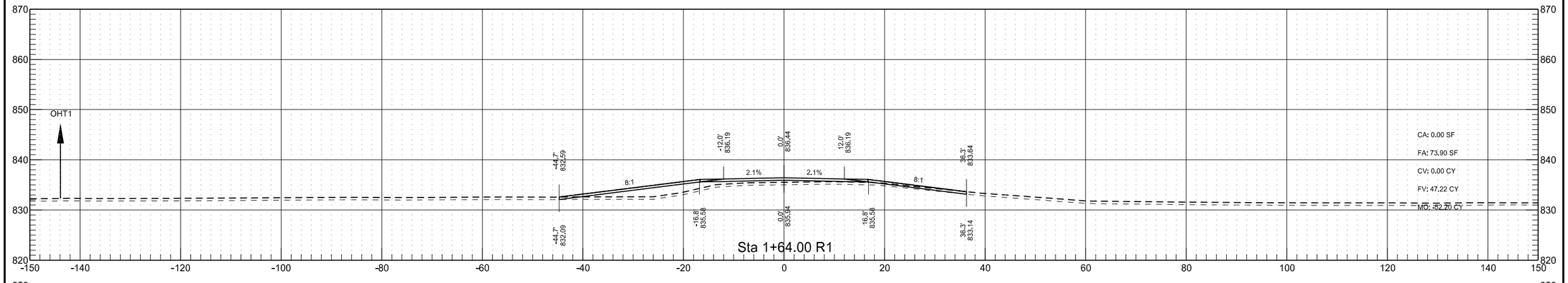
PD 12734+79

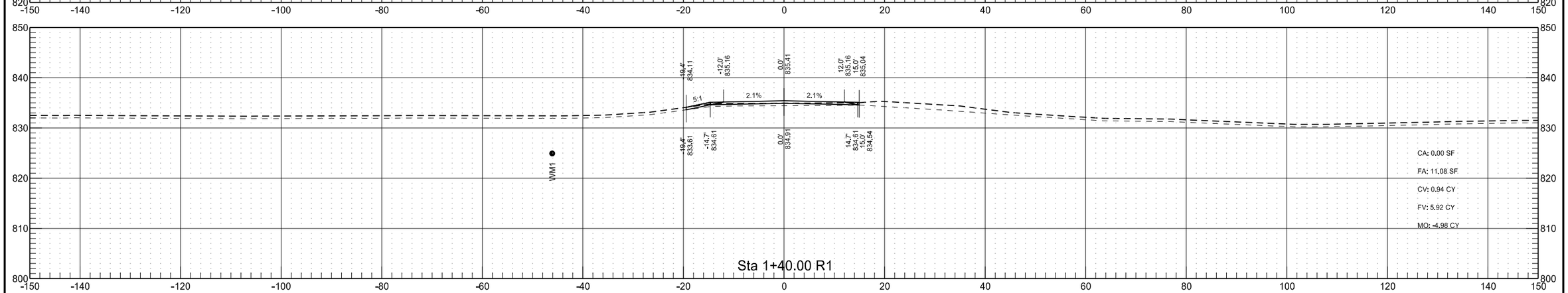
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	ND	SS-6-018(081)239	200	124

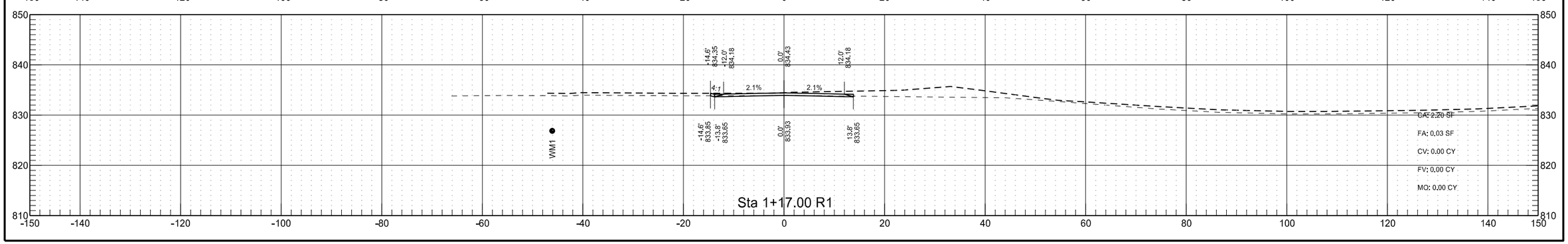


PD 12738+39

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	125

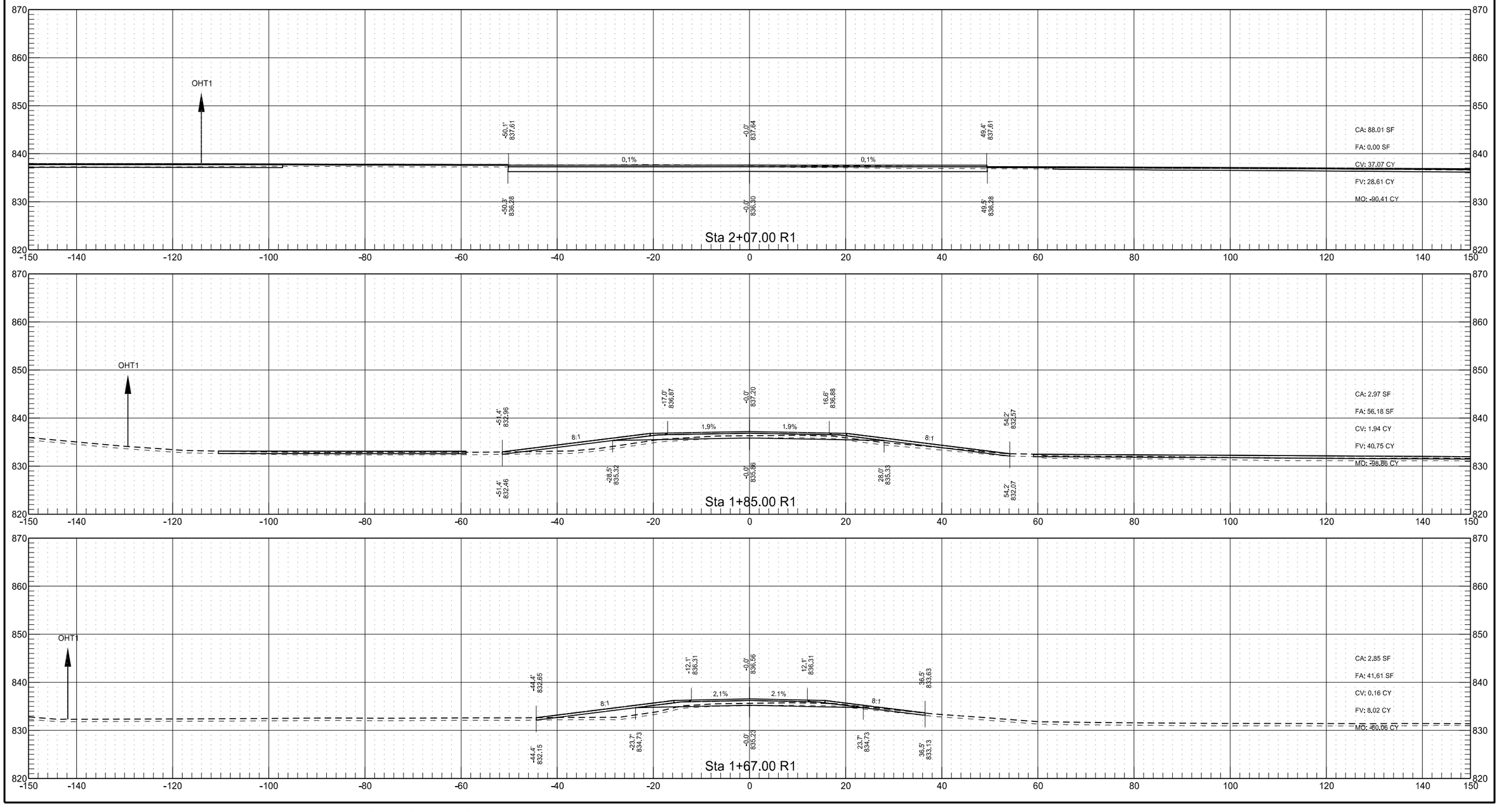






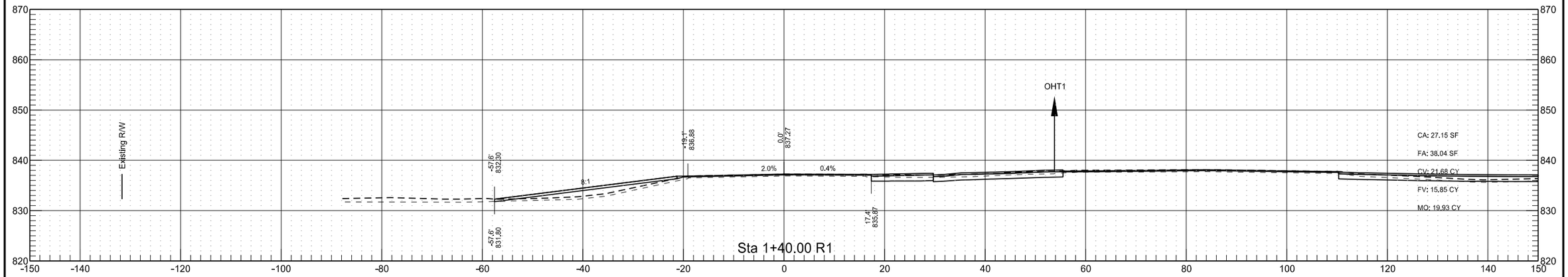
PD 12738+39

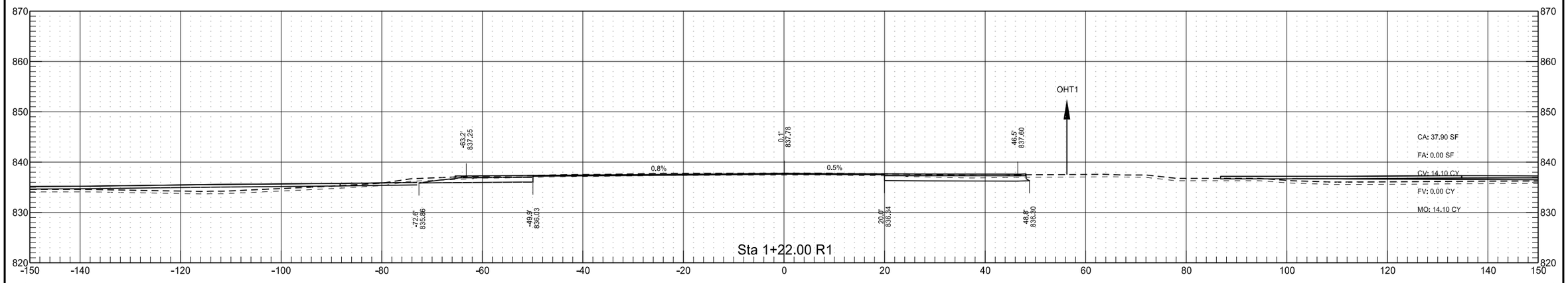
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	ND	SS-6-018(081)239	200	126

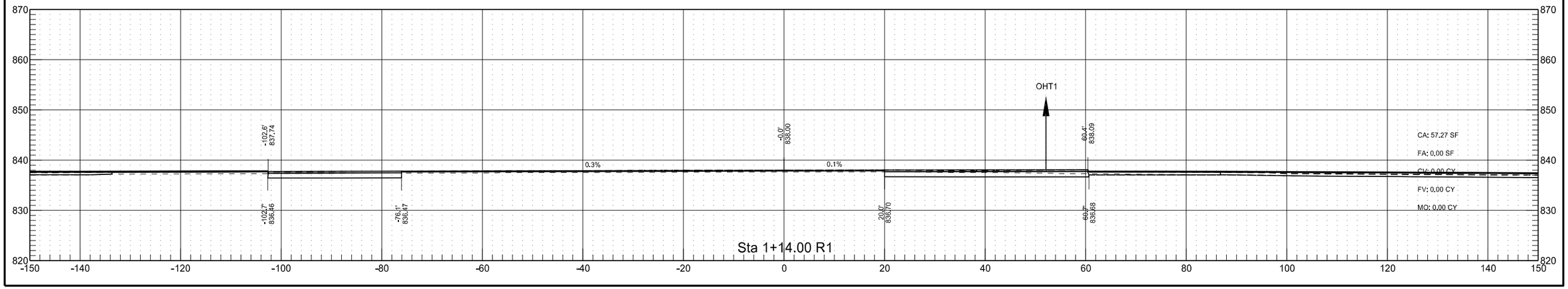


MAIN AVE

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	127

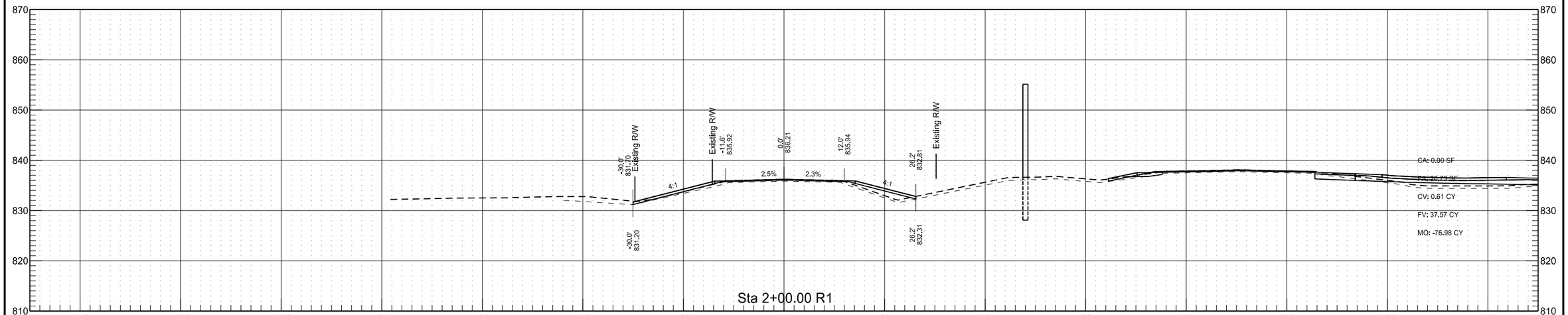


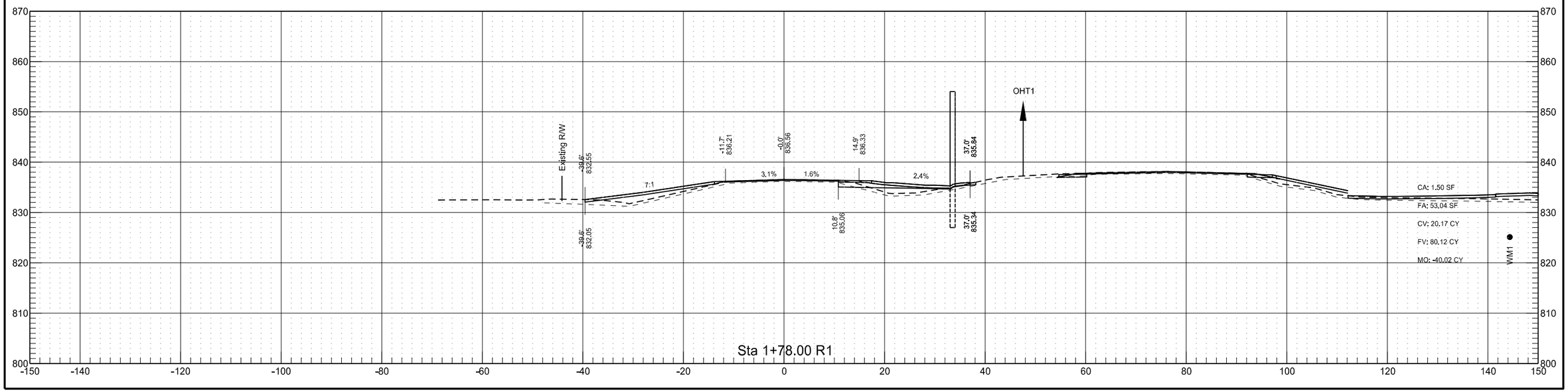




MAIN AVE

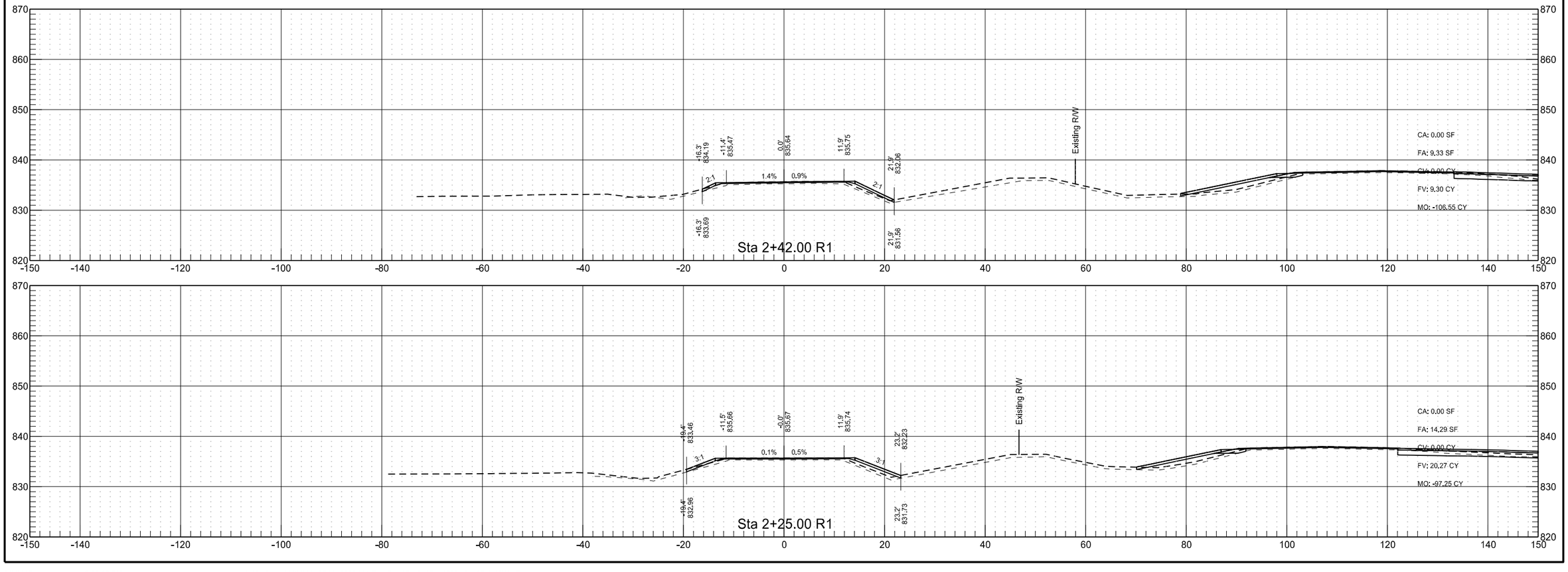
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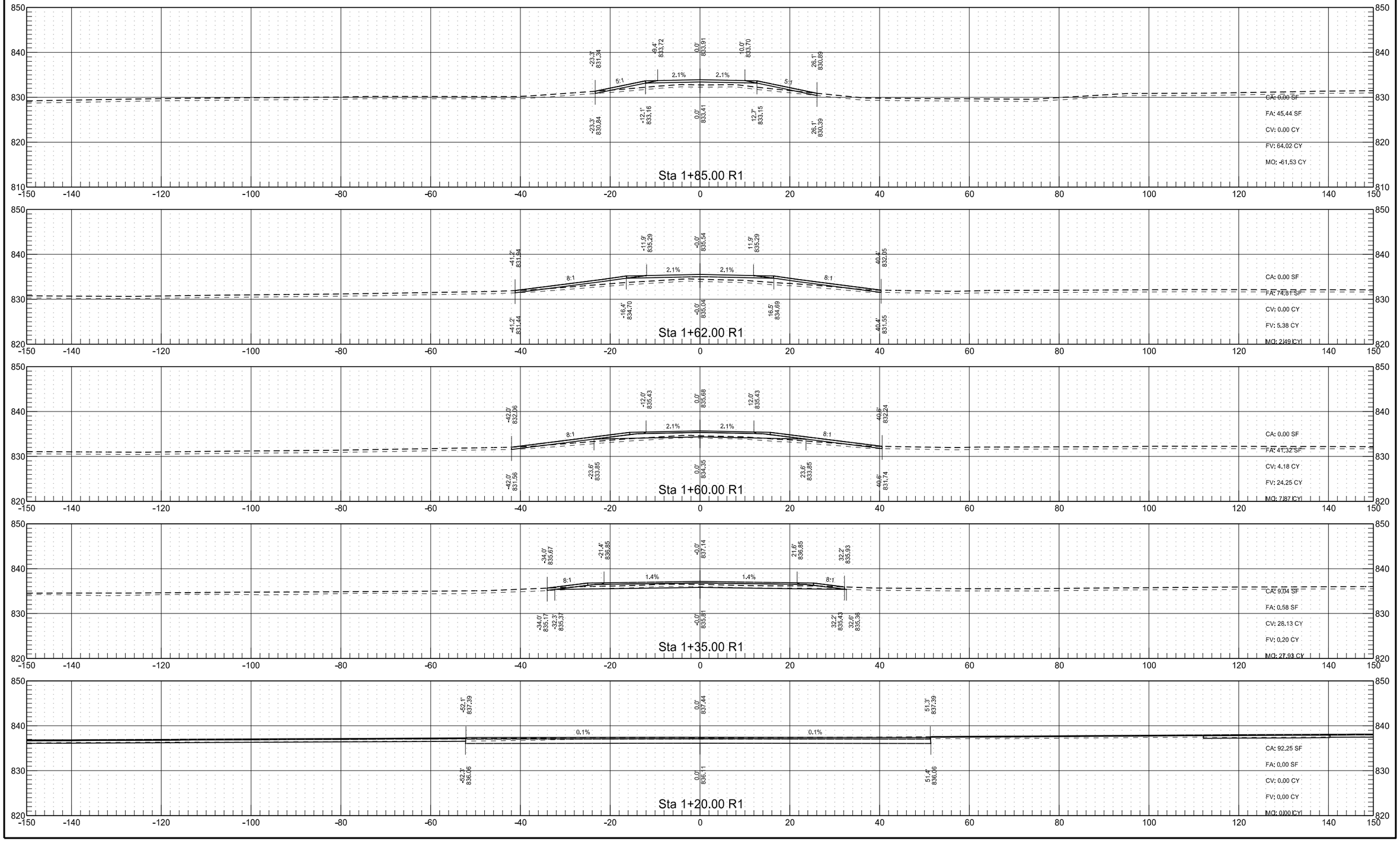
MAIN AVE

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	129



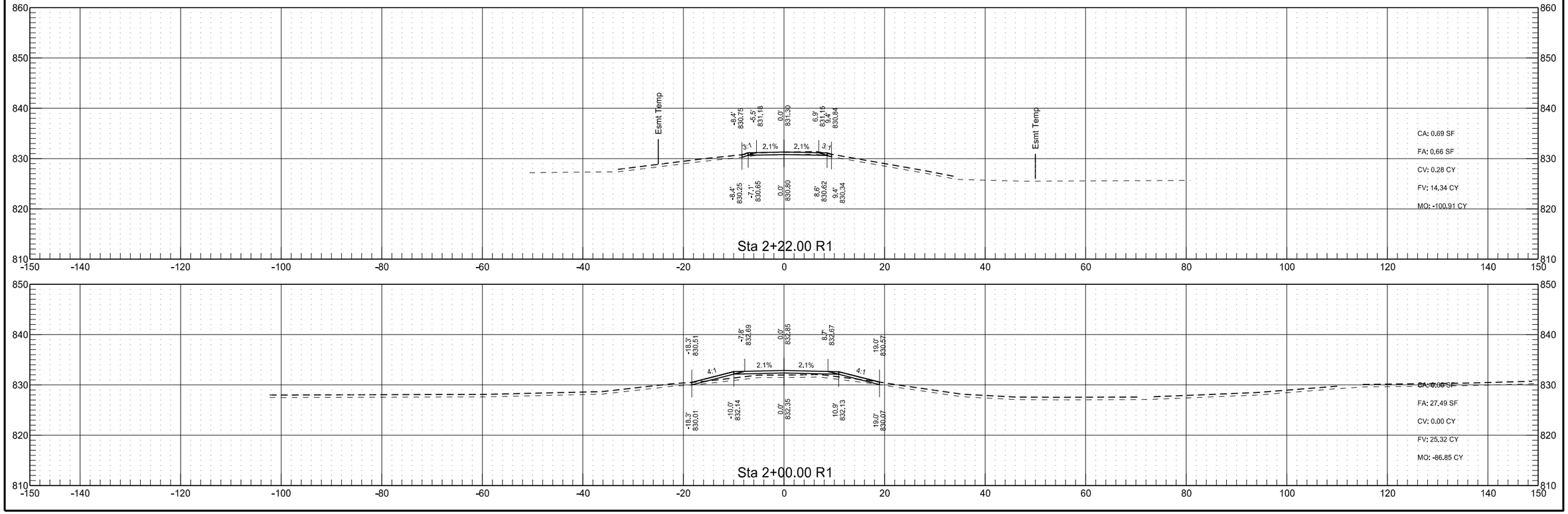
PD 12750+33

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	130



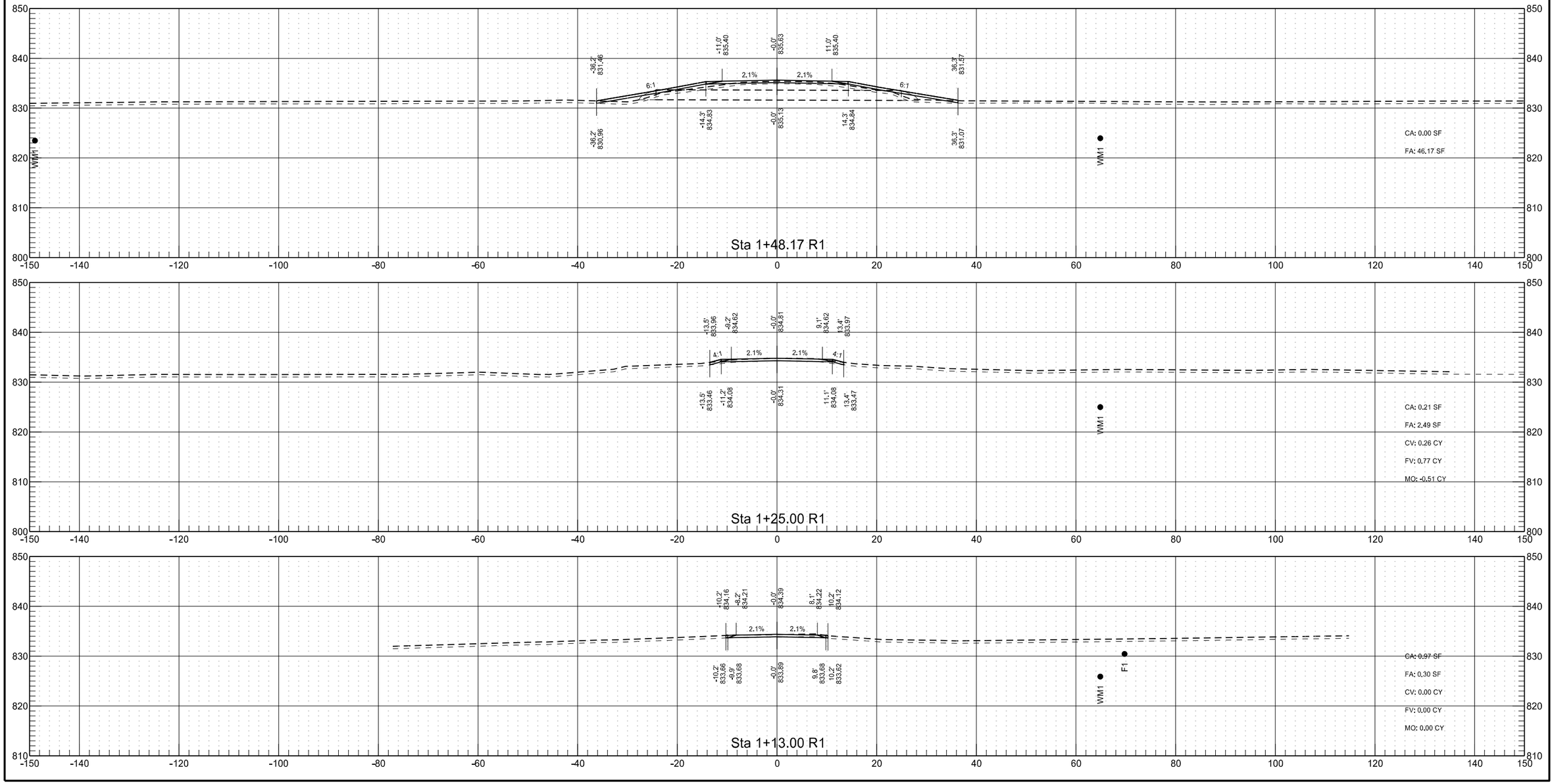
PD 12750+33

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	131



PD 12750+44

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	132

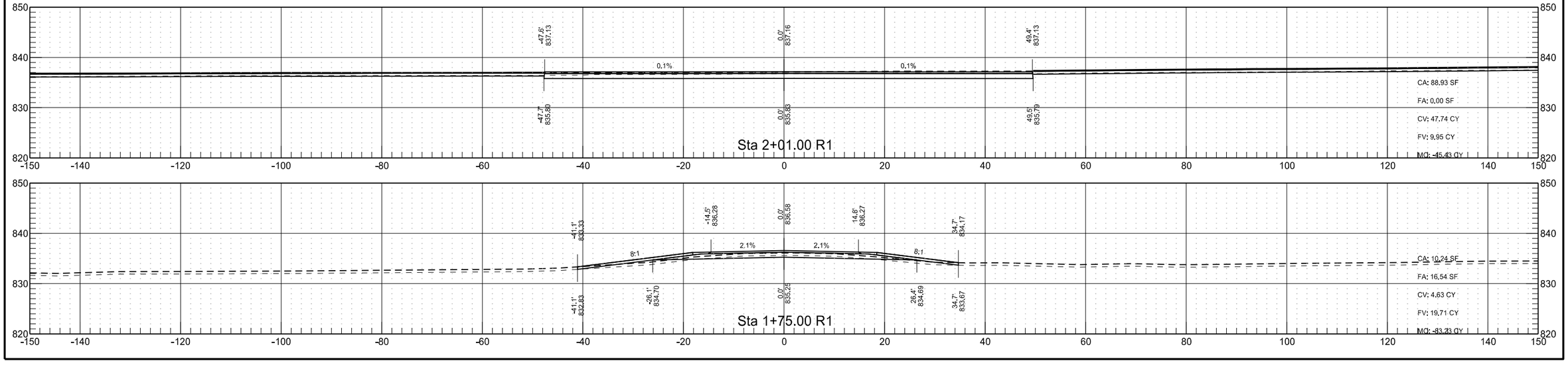


PD 12750+44

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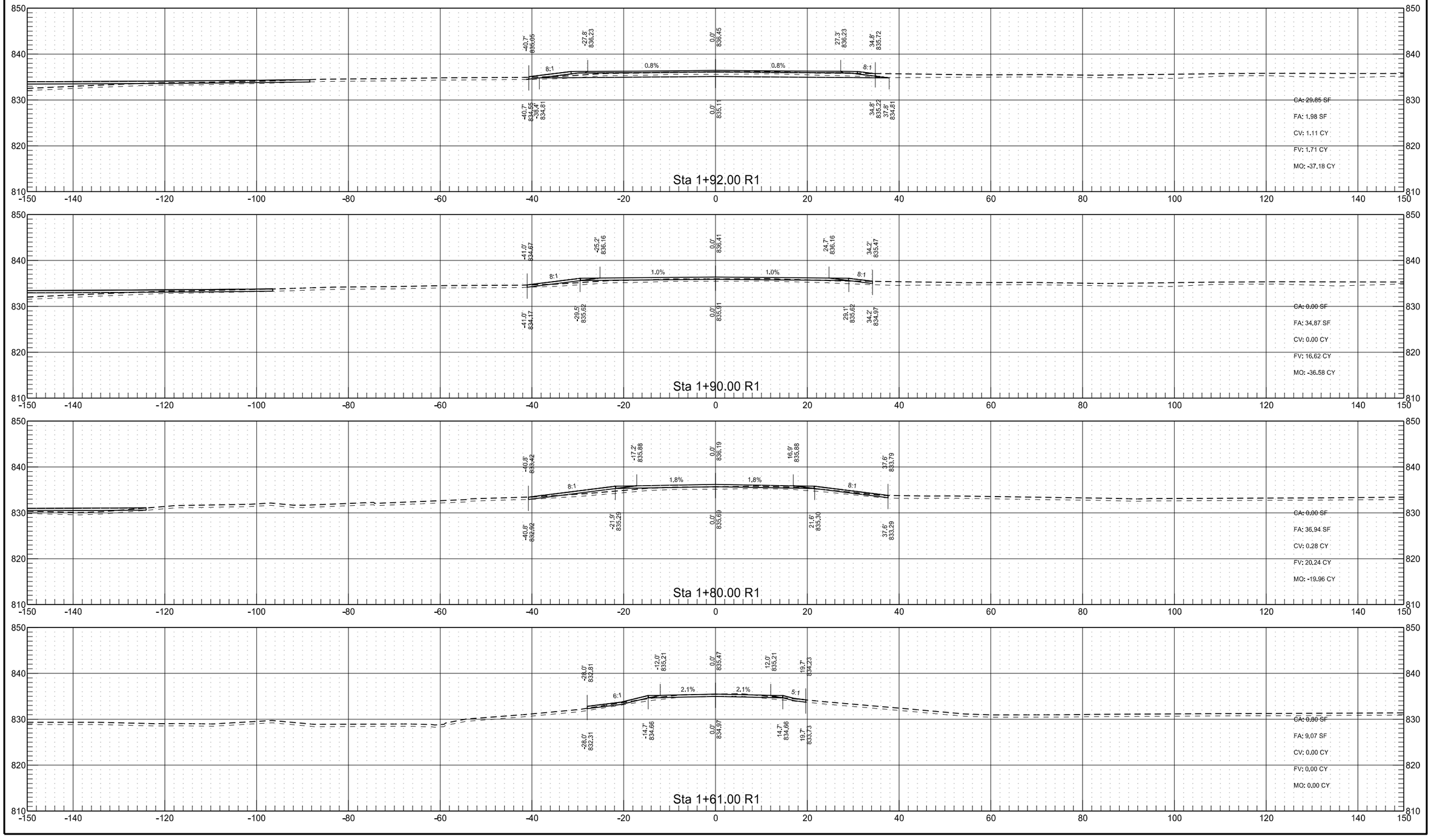
PD 12750+44

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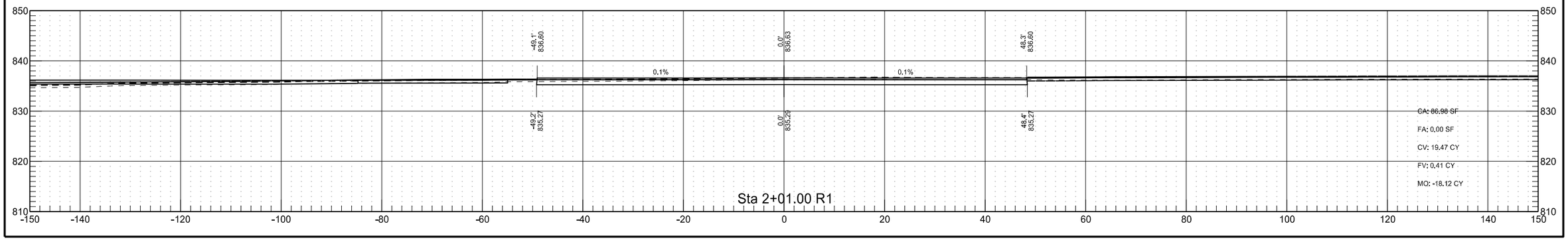
FD 12752+65

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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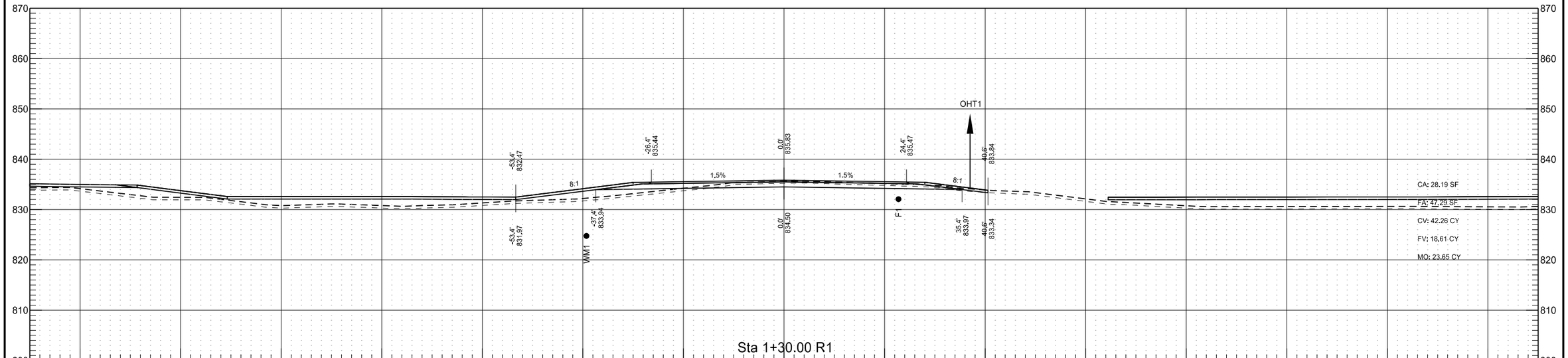
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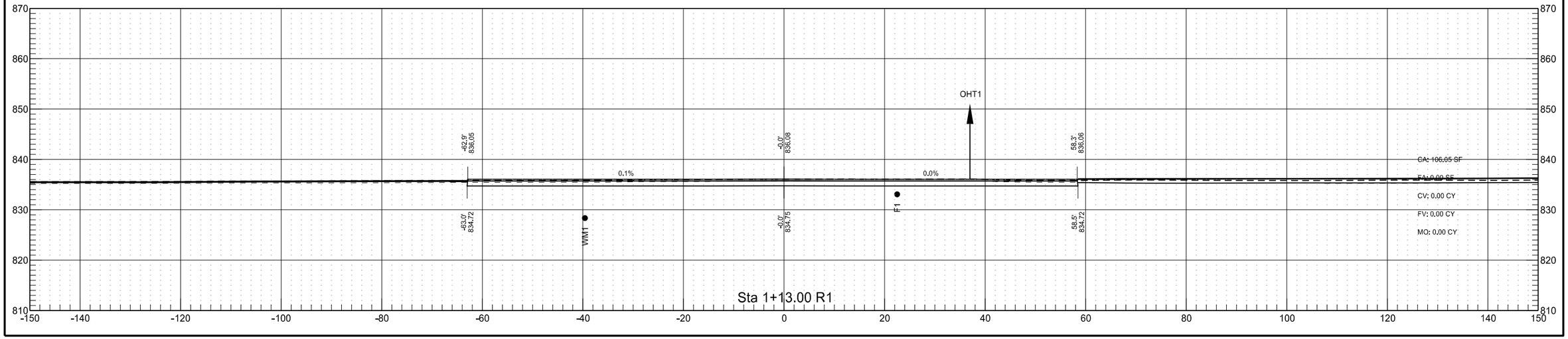
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	ND	SS-6-018(081)239	200	136



109TH ST NE EAST

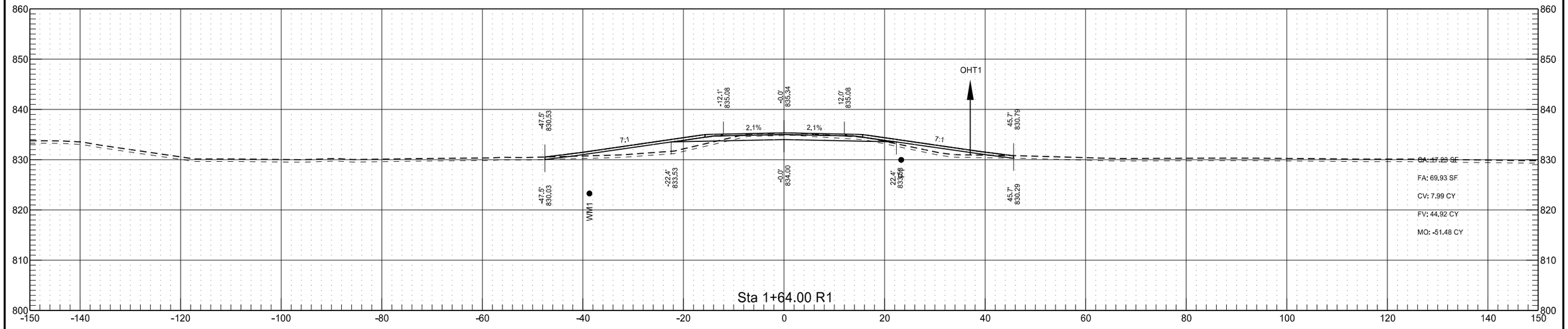
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	ND	SS-6-018(081)239	200	137

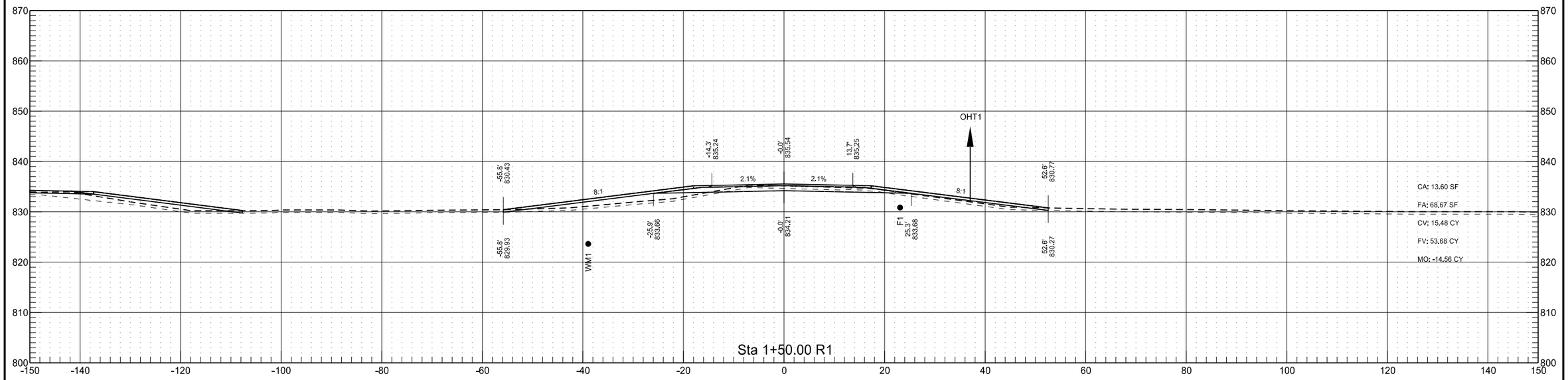




109TH ST NE EAST

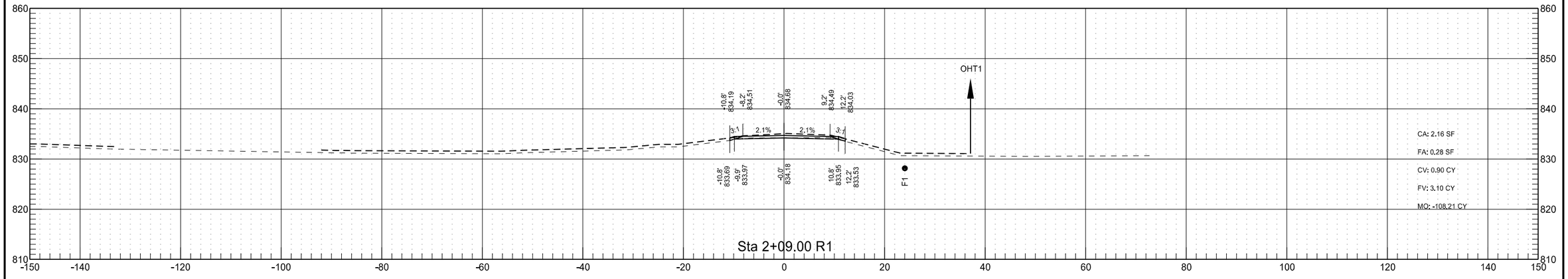
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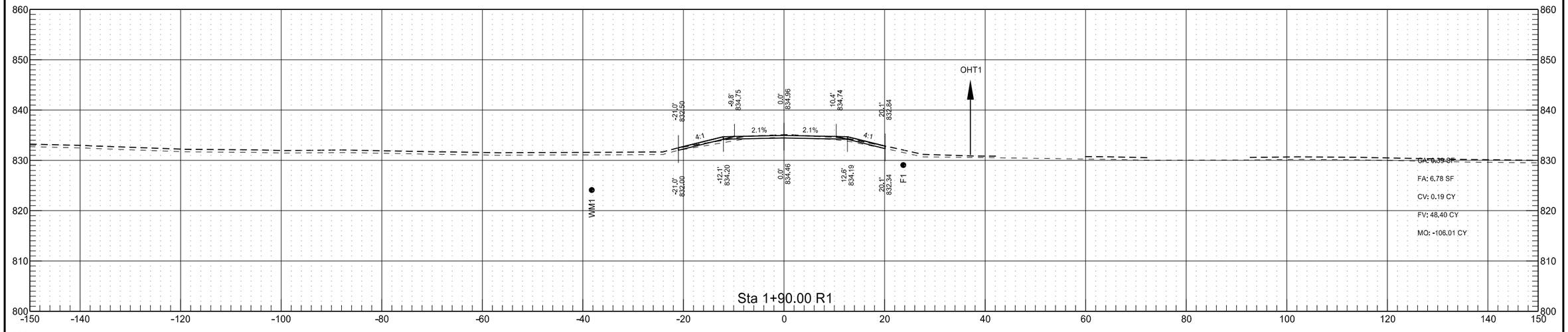


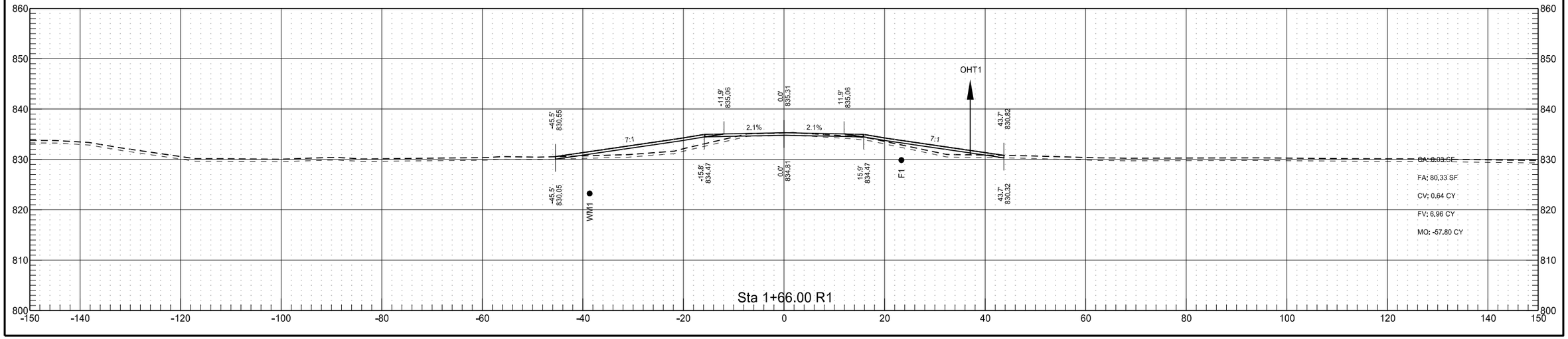


109TH ST NE EAST

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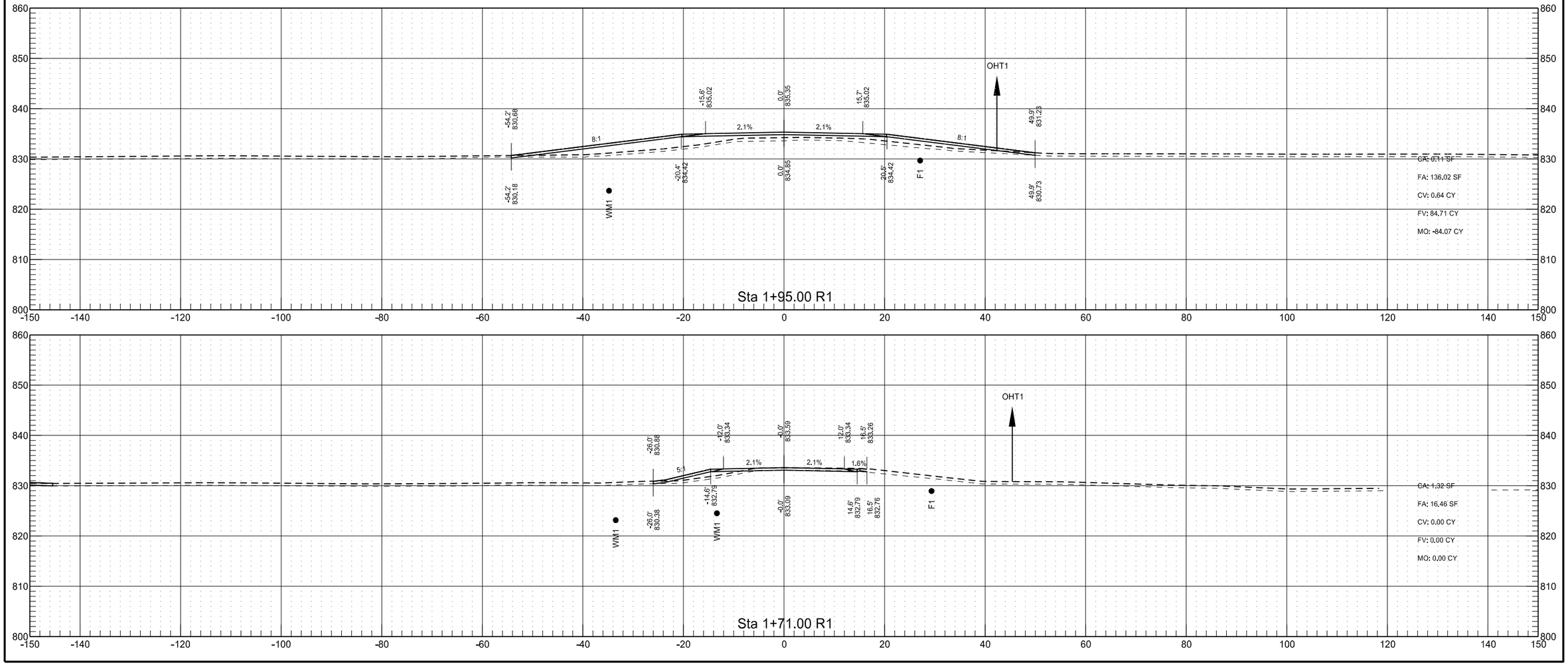






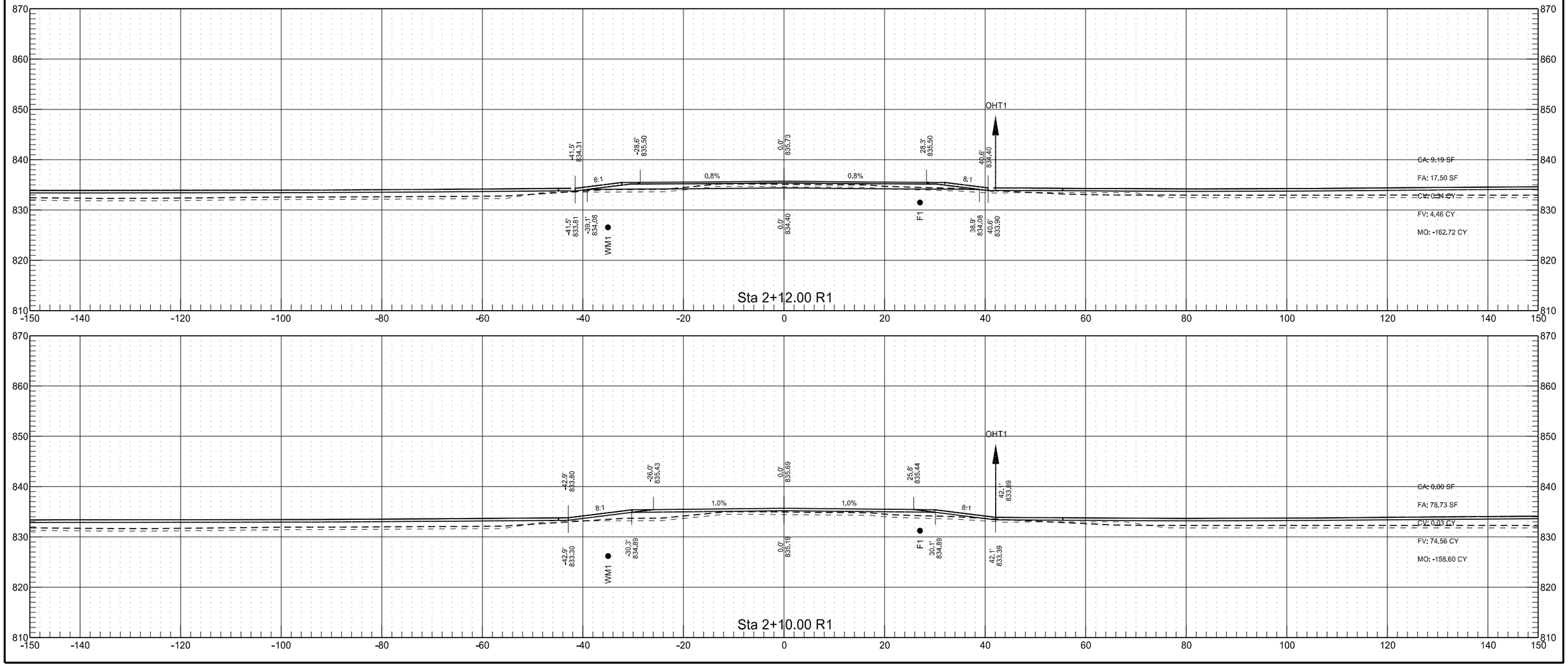
FD 12756+05

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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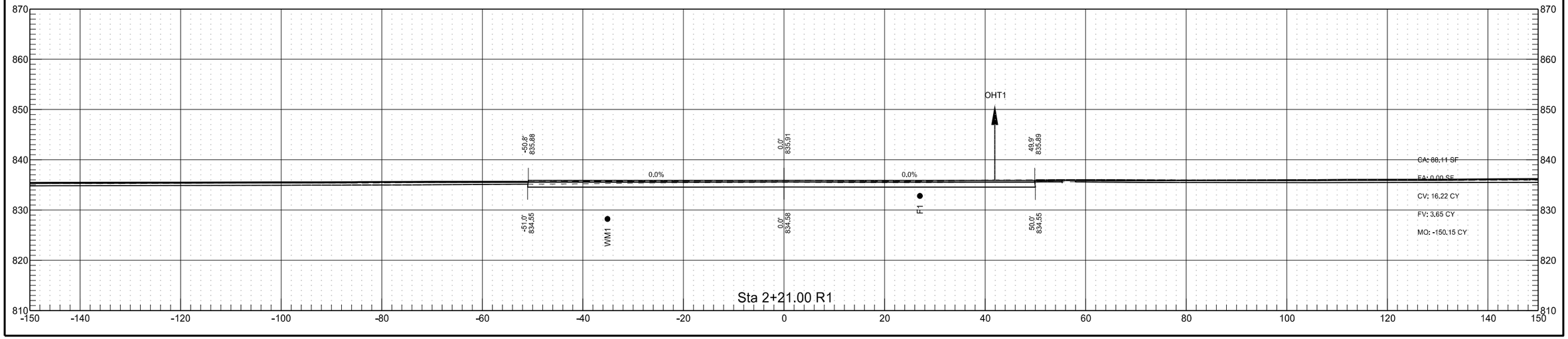
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FD 12756+05



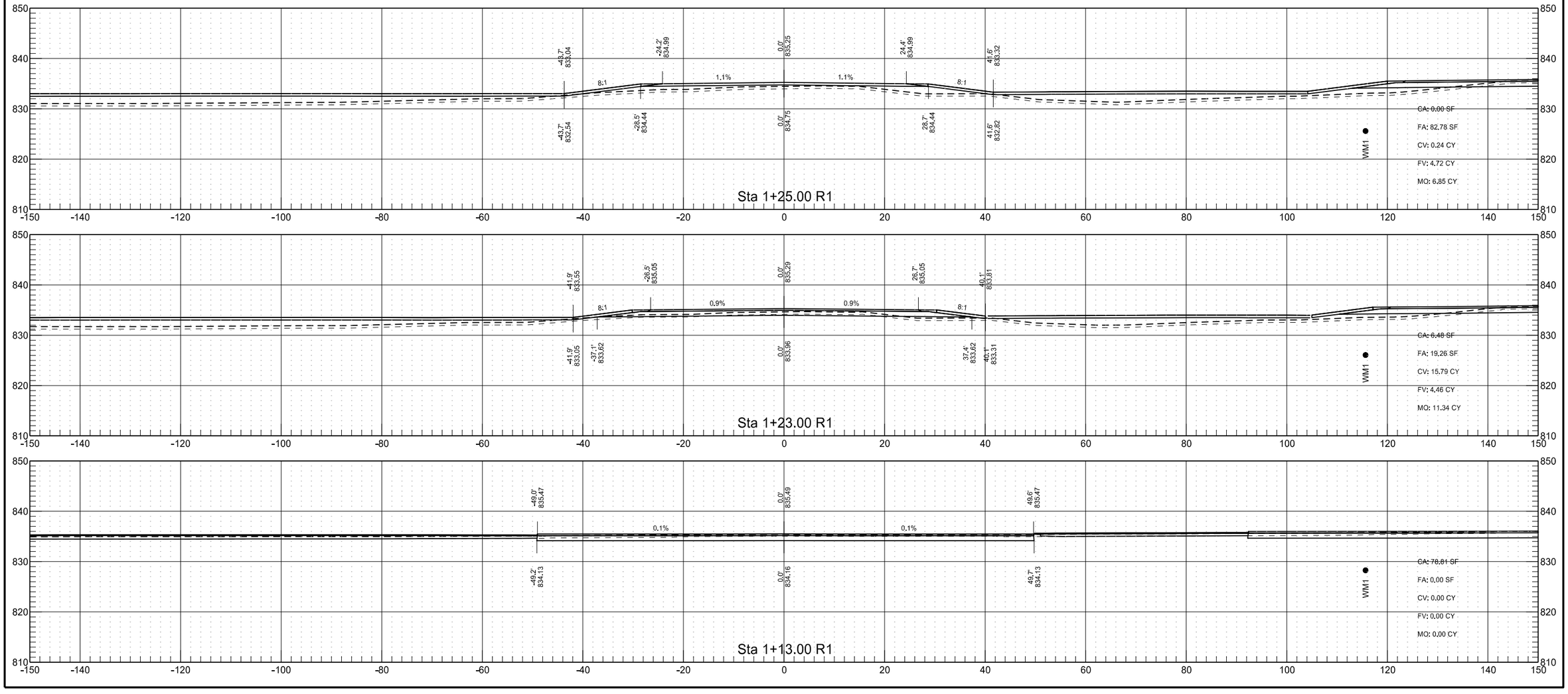
FD 12756+05

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	142



FD 12757+56

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	143

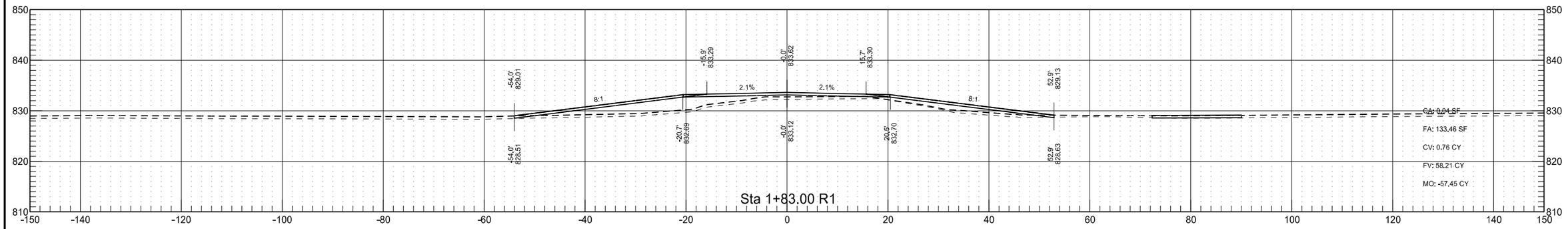


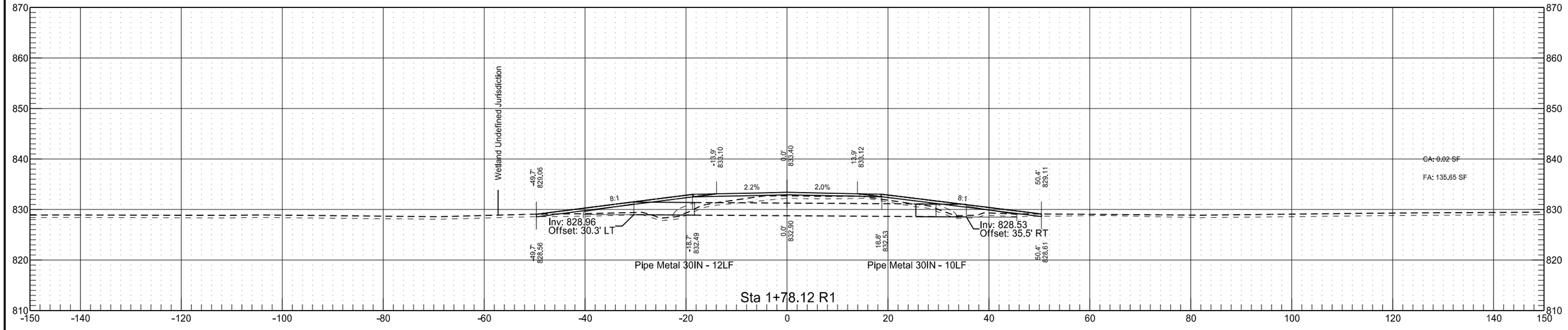
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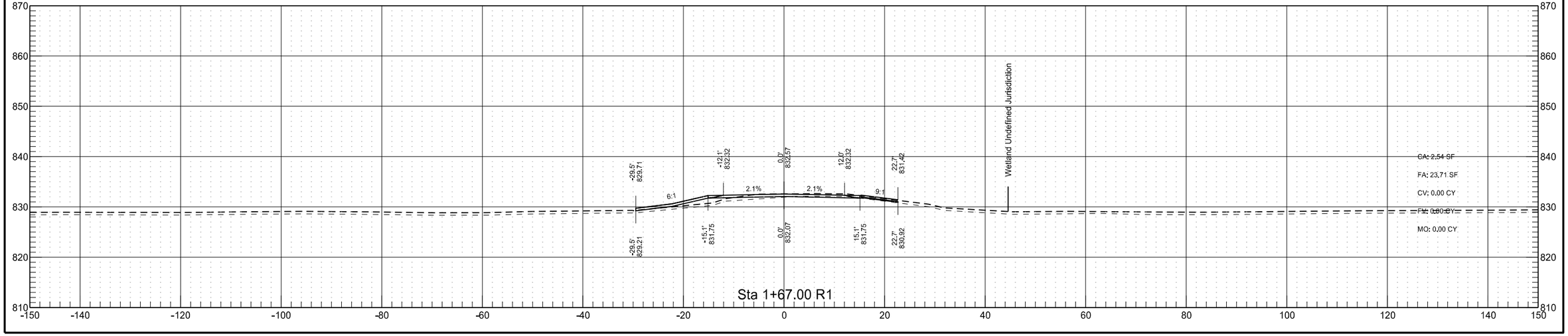
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FD 12763+99

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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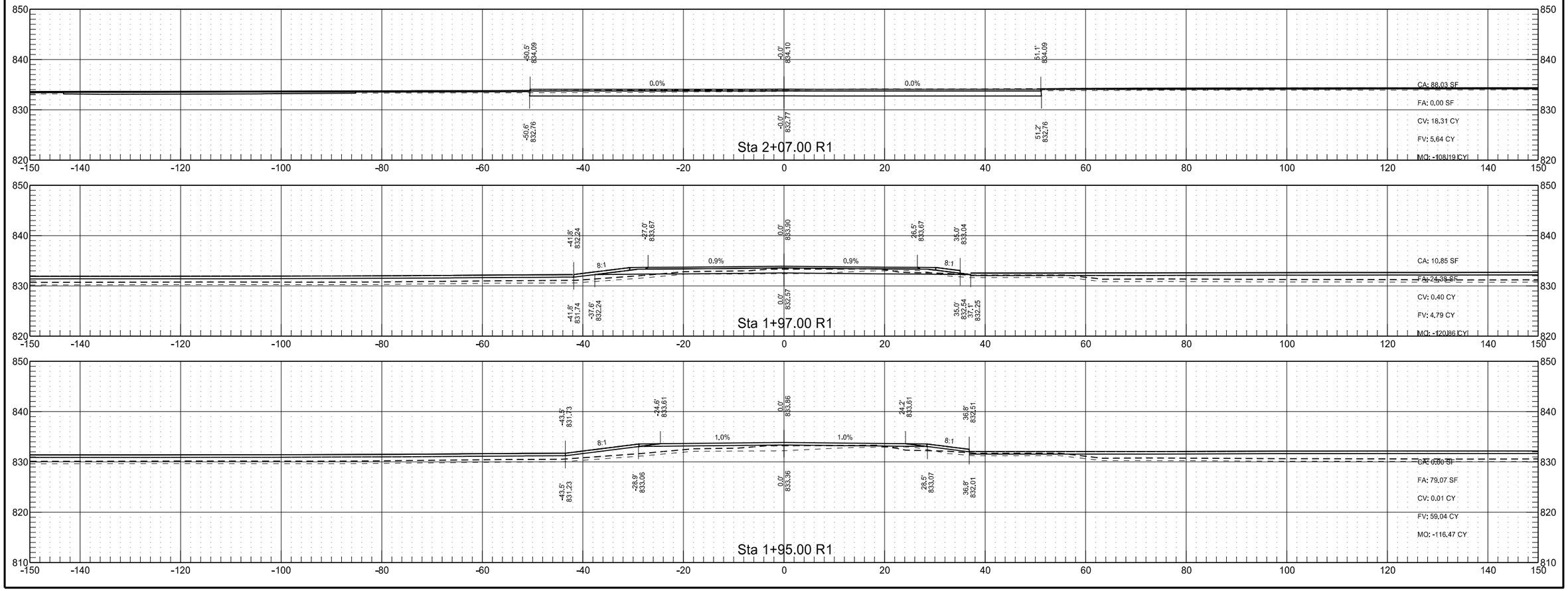






FD 12763+99

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-6-018(081)239	200	146



Docusign Envelope ID: 60E6D5C0-46BC-49CB-8E0F-CBA6AC9DB3C4

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
REGISTERED
PROFESSIONAL
PE-4683
04/14/25
ENGINEER
NORTH DAKOTA

Docusign Envelope ID: 60E6D5C0-46BC-49CB-8E0F-CBA6AC9DB3C4

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

DATE	CHANGE
08-03-15	General Revisions
04-23-18	General Revisions
12-18-20	General Revisions
08-16-22	General Revisions
04-14-25	General Revisions

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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
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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

07-01-14

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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

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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

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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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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

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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)

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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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12 18 2020

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

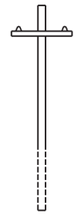
D-101-40

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.



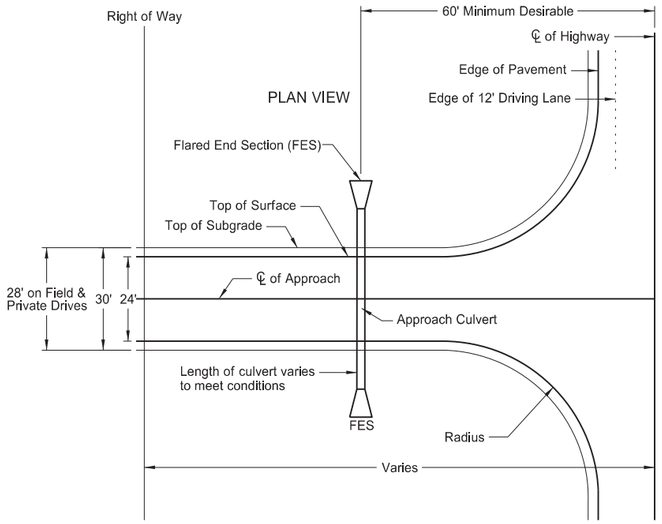
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-20-18	
REVISIONS	
DATE	CHANGE
6/14/2023	CADD Standards Update

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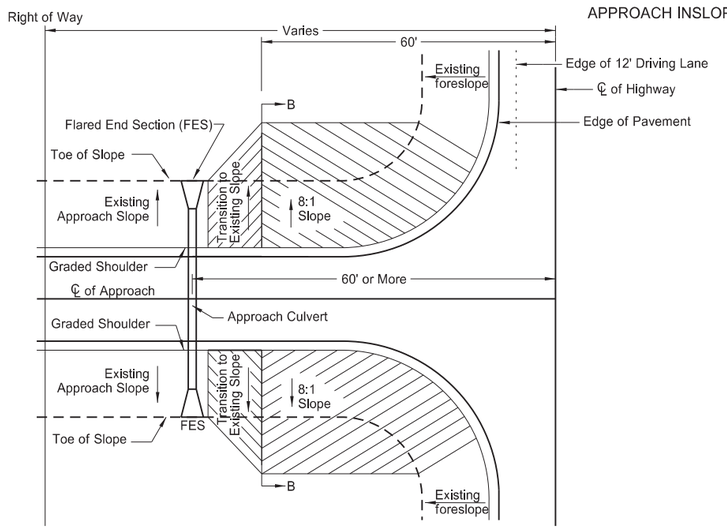
06/14/23

STANDARD RURAL APPROACHES

D-203-8

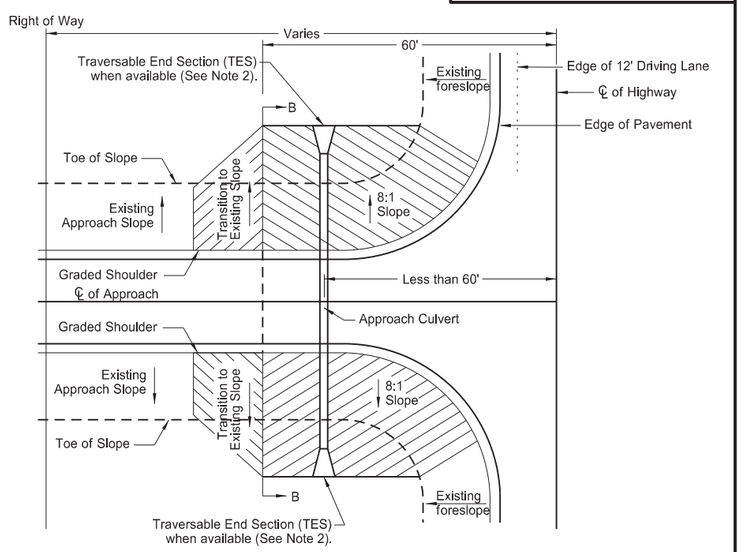


APPROACH INSLOPES



CASE 1

APPROACH PIPE LOCATED
60' OR MORE FROM ℄



CASE 2

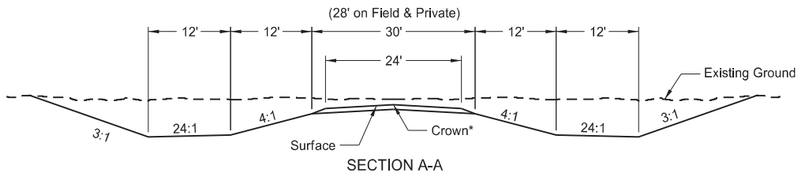
APPROACH PIPE LOCATED
LESS THAN 60' FROM ℄

Approach Pipe Traversable End Sections (TES)

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

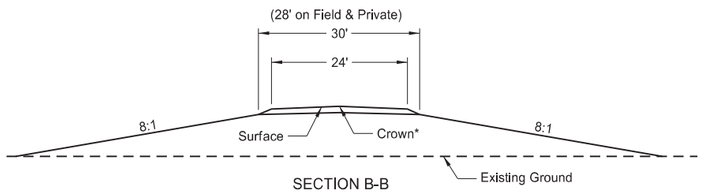
CRITERIA FOR RURAL APPROACH TYPES

	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)

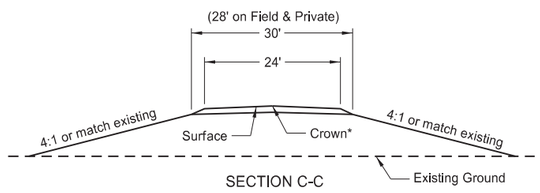


SECTION A-A

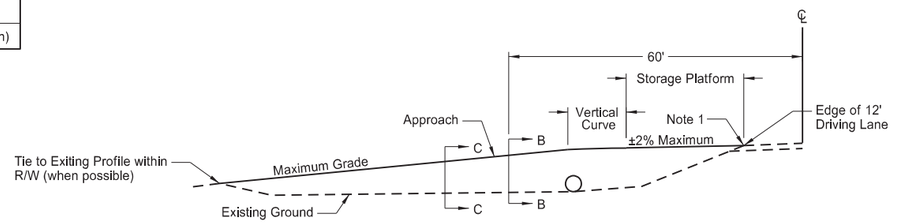
*2.1% crown for paved surface
*3.0% crown for gravel surface



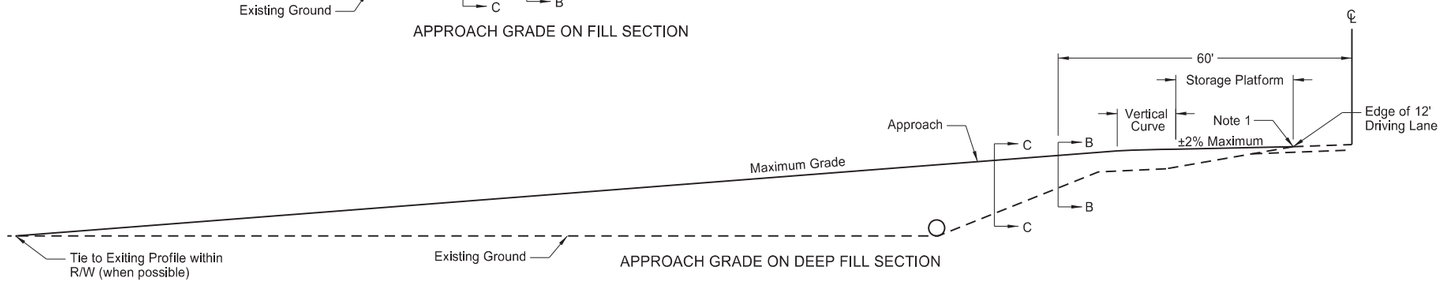
SECTION B-B



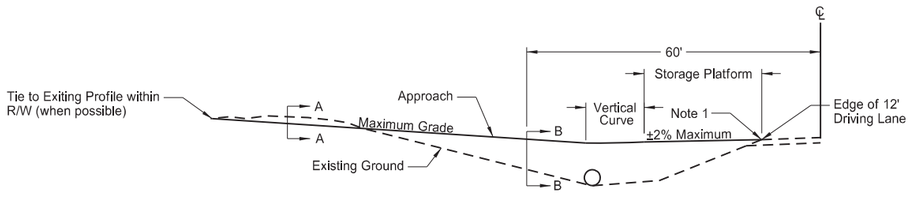
SECTION C-C



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

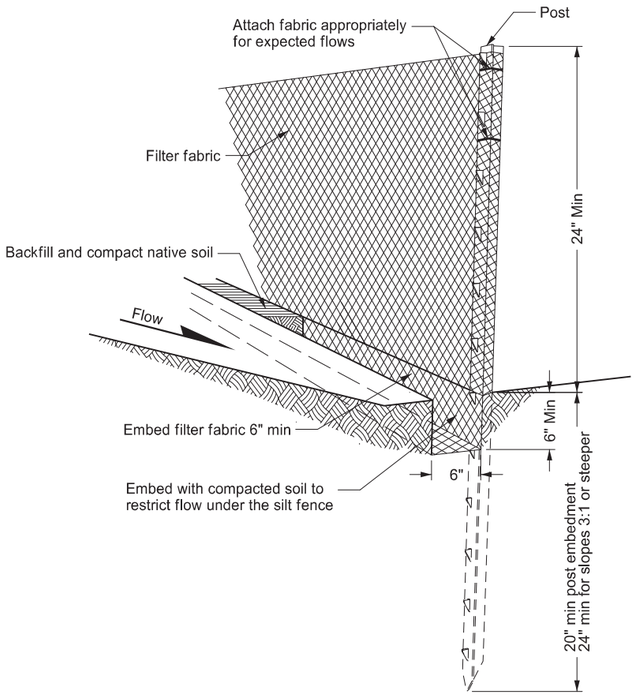
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06/29/22

Docusign Envelope ID: B2017174-2071-4D82-BD09-F2B4B86DFDCB

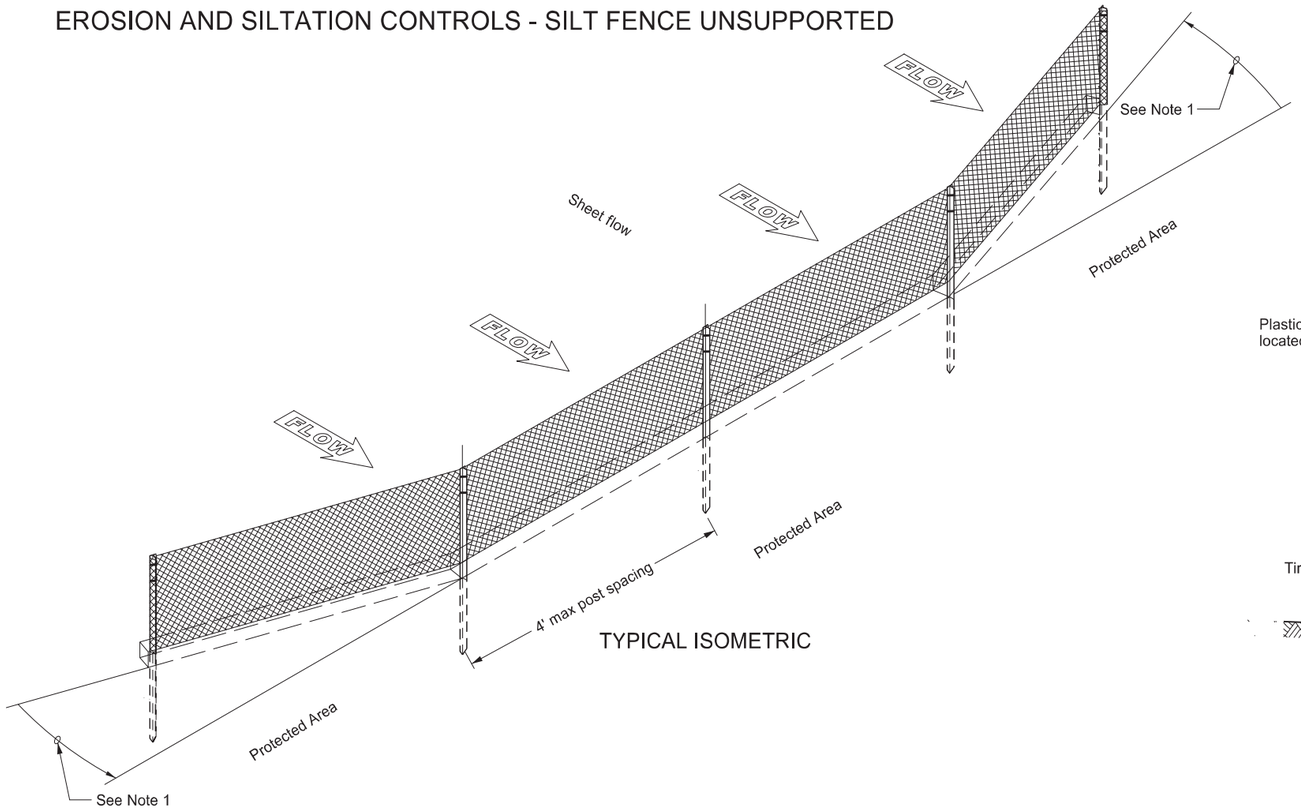
EROSION AND SILTATION CONTROLS - SILT FENCE UNSUPPORTED

D-260-1

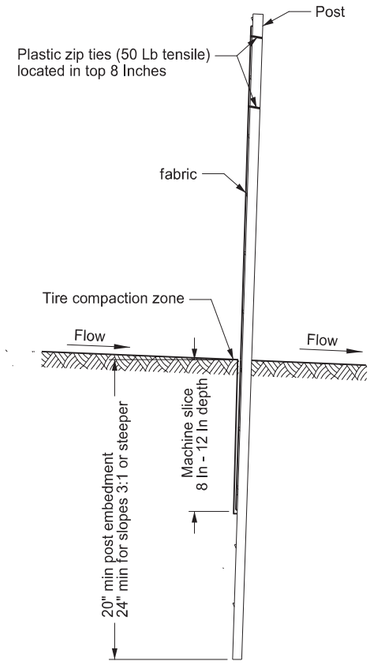


HAND PLACED INSTALLATION DETAIL

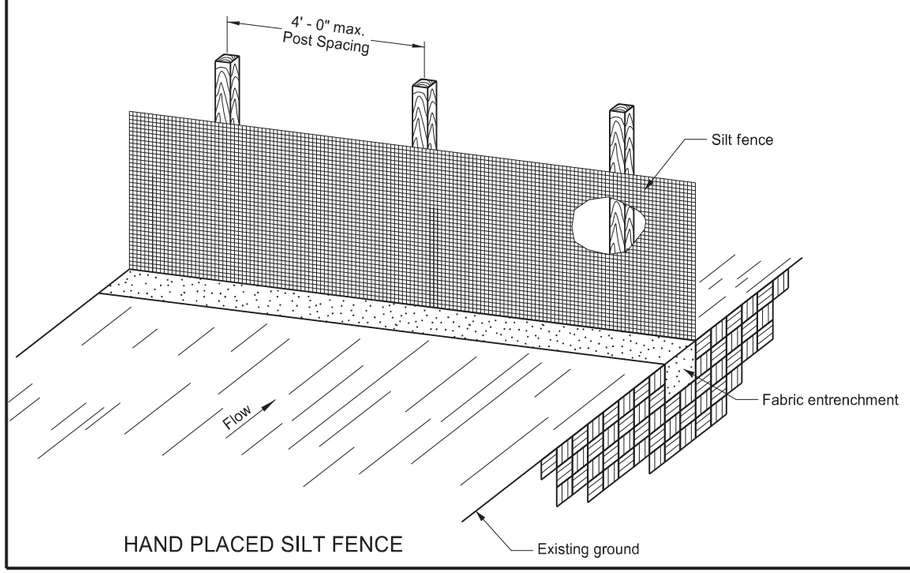
Minimize disturbance of ground around trench and smooth surface after excavation to avoid concentrating flows. Compact to prevent undercutting flows.



TYPICAL ISOMETRIC



MACHINE SLICED INSTALLATION DETAIL



HAND PLACED SILT FENCE

NOTES:
1. Install the ends of the silt fence to point slightly upslope to prevent sediment from flowing around the ends of the fence.
2. Place splices outside low spots.
3. Do not embed silt fence placed in standing water.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
06-26-14	Standard drawing resulted from splitting standard D-708-2.
06-27-16	Revised details & added new ones.
08-27-19	New Design Engineer PE Stamp.
07-22-25	Matched Revised Silt Fence Specs.

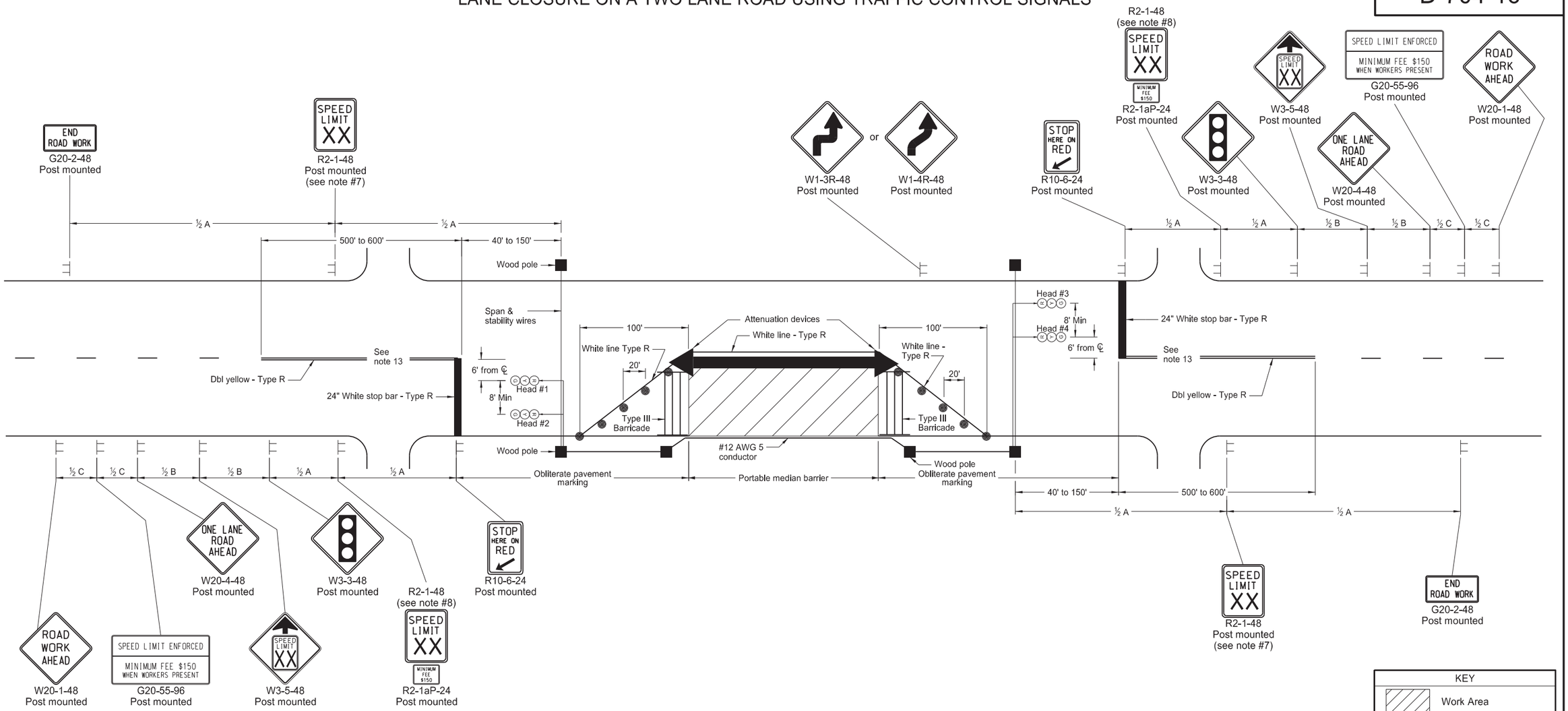
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ENGINEER
NORTH DAKOTA

07/22/25

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

LANE CLOSURE ON A TWO LANE ROAD USING TRAFFIC CONTROL SIGNALS

D-704-16



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

SUGGESTED TIMING AND SIGNAL SEQUENCE						
Heads 1 & 2	Green	Yellow	Red			
Heads 3 & 4			Red	Green	Yellow	Red
Time Cycle = 90 seconds	18.0	4.5	22.5	18.0	4.5	22.5
Percent of Cycle	20	5	25	20	5	25

KEY

- Work Area
- Type III Barricade
- Sign
- Delineator Drum
- Wood Pole

Notes:

1. Span conductor overhead between poles except on bridges, where it may alternately be attached and supported by the bridge structure. When conductor is supported by the bridge structure, attach conductor to avoid interference with bridge construction. Attach conductor on either side of bridge as determined by field personnel.
2. Locate controller on a wood pole in the cable run between signal heads for through traffic movements.
3. The timing schedule is suggested trial setting. Check signals in operation frequently to obtain the most efficient timing schedule.
4. Place wood poles a minimum of 16 feet from edge of driving lane. Provide a minimum 16 to 19 feet clearance from the center line of the roadway to the bottom of traffic signal heads suspended over the roadway.
5. Place traffic signal heads with 12 inch red, yellow and green lenses and 5 inch louvered backplates.
6. See standard drawing "Span Wire Mounted Traffic Signals" for interim traffic construction details.
7. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
8. 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.
9. 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.
10. Cover existing speed limit signs within a reduced speed zone.
11. Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
12. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
13. Continue double yellow centerline thru private drives.
14. 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.
15. Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.
16. As an option, use solar powered signals instead of wood pole signal system.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

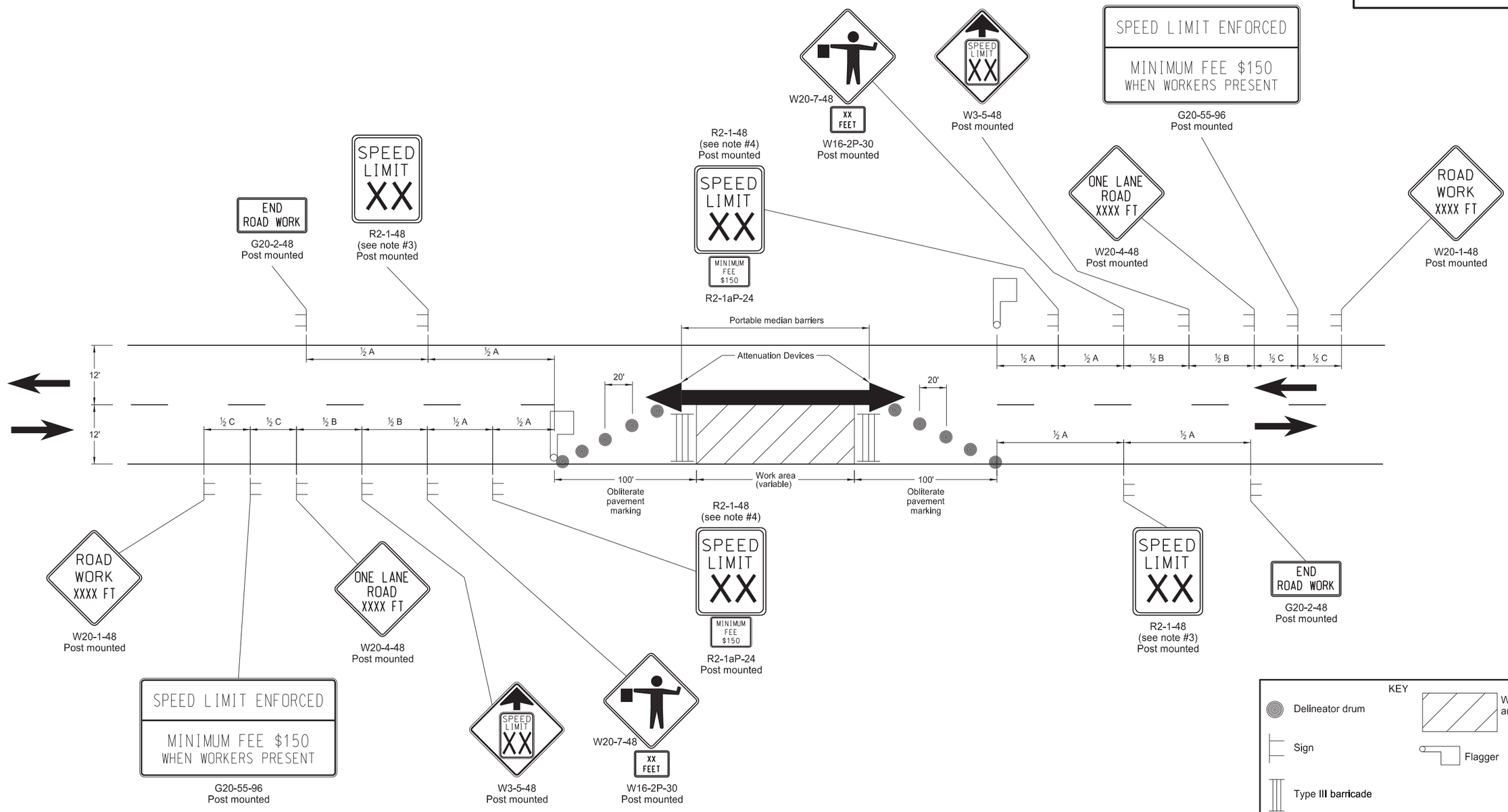
DATE	CHANGE
11-20-15	Revised Note 6 & Renumbered
	Minimum Fee plaque
08-17-17	Revised notes & added note
11-01-19	Revise sign #s & pvmt mk type
12-08-21	Switched order of Road Work Ahead and Spd Limit Enforced & added Dollars At Work
11-29-22	Removed Dollars At Work
08-31-23	Corrected Note 14 grammar
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

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.

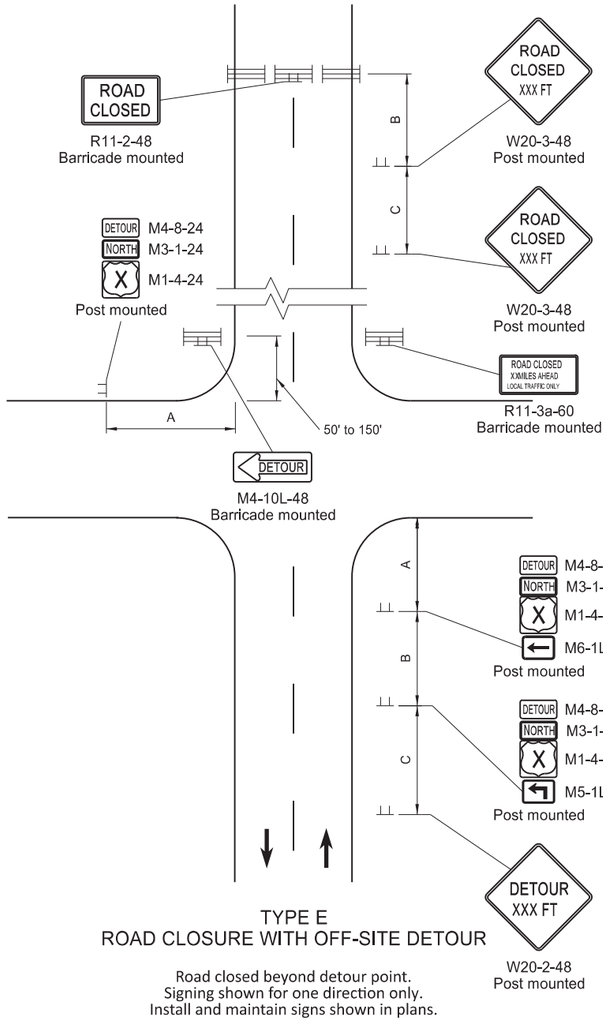
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
08-17-17	Note update & sign numbers
11-01-19	Removed signs & revised note
12-08-21	Switched order of Road Work XXXX and Spd Limit Enforced & added Dollars At Work
11-29-22	Removed Dollars At Work
08-21-24	Pvmt Mkg Width & Med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

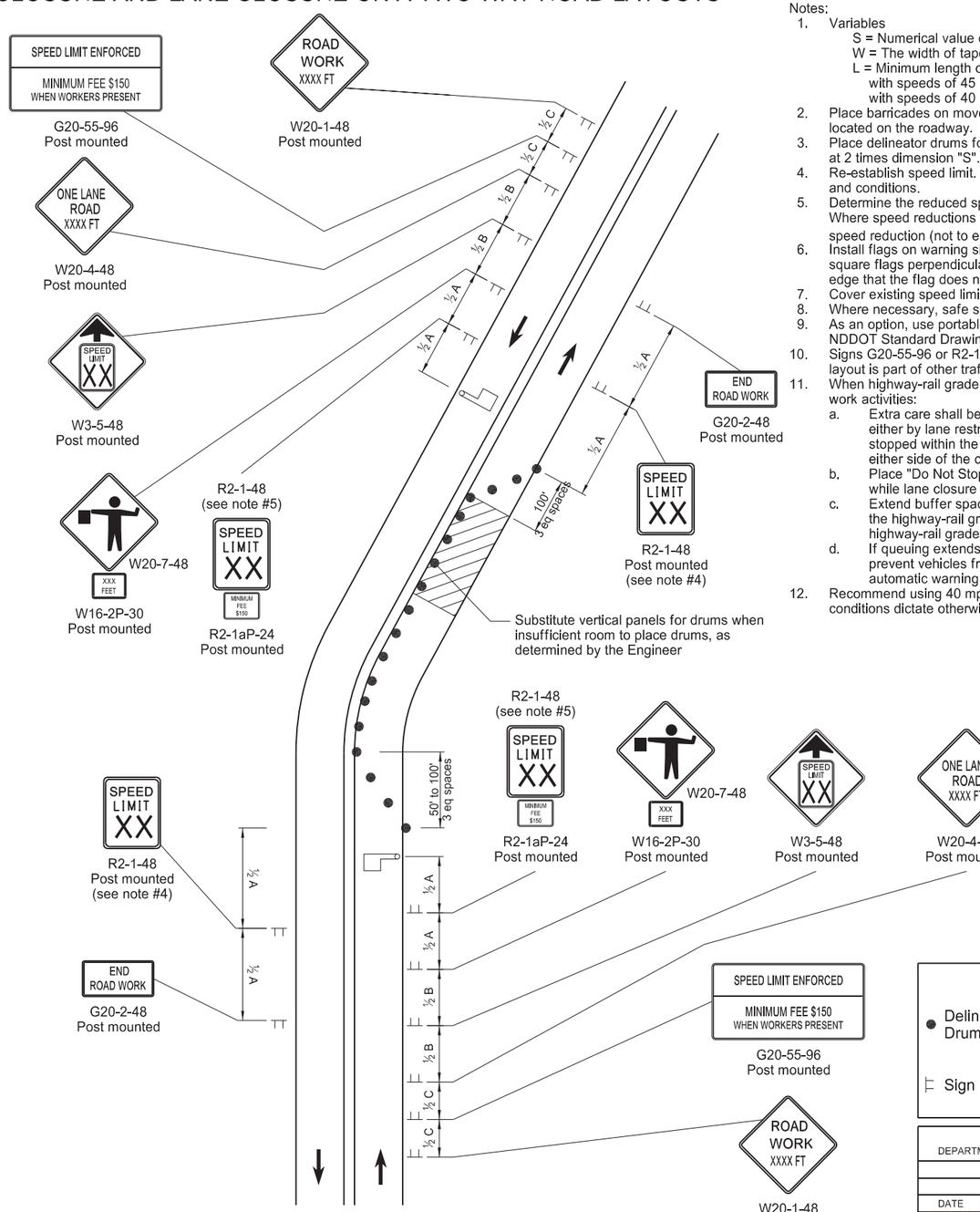
D-704-19



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

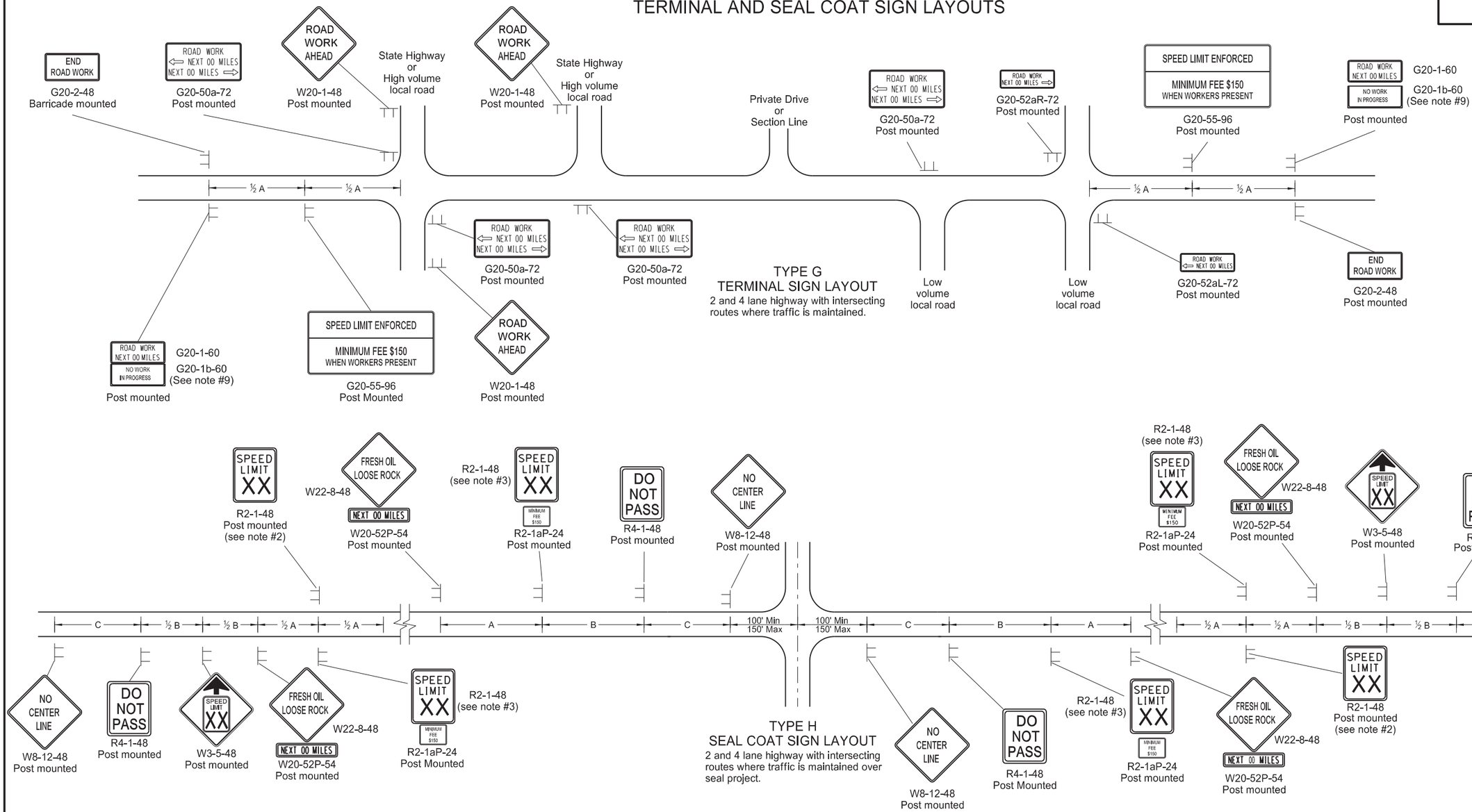
DATE	CHANGE
03-13-14	Revised Sign Cell "ROAD WORK XXX FT"
08-17-17	Update notes & sign numbers
11-01-19	Revised signs, sign #s, & notes
12-08-21	Switched order of Road Work XXX and Spd Limit Enforced & added Dollars At Work
11-29-22	Removed Dollars At Work
06-30-25	Legislative Changes

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

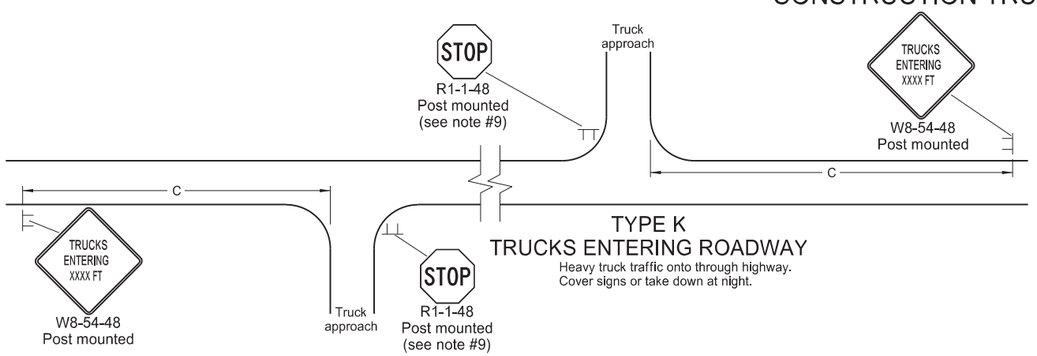
KIRK J. HOFF REGISTERED PROFESSIONAL PE-4683 06/30/25 ENGINEER NORTH DAKOTA

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

CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

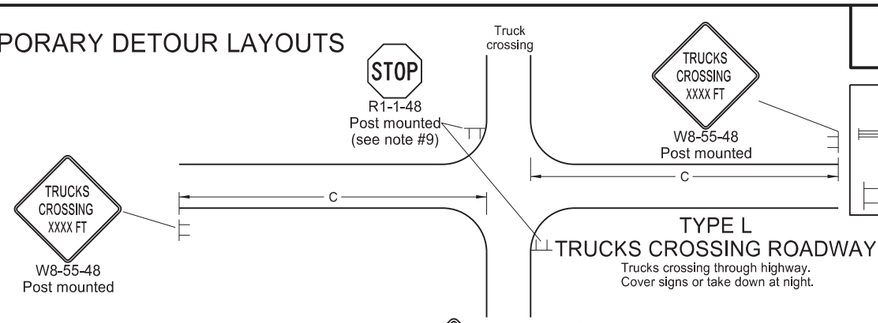
D-704-22

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



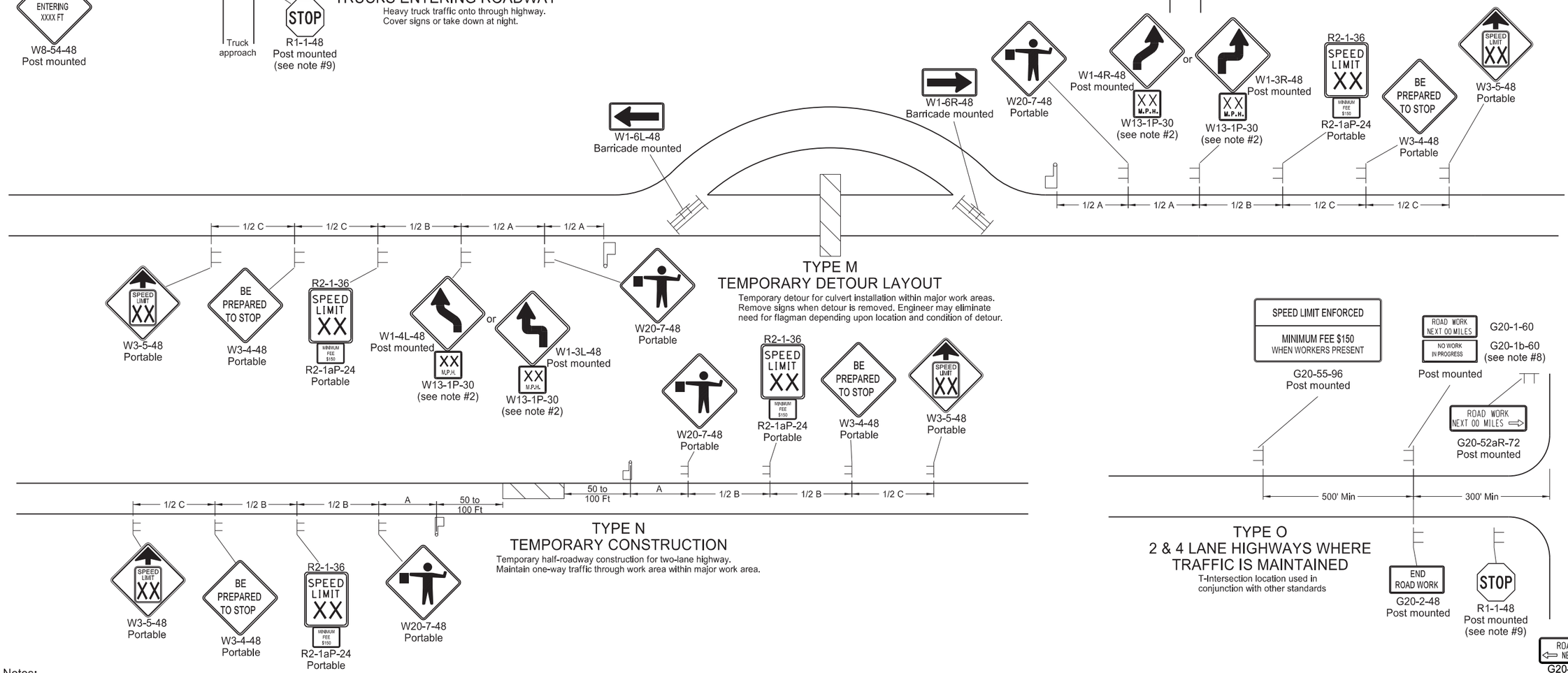
TYPE K
TRUCKS ENTERING ROADWAY

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

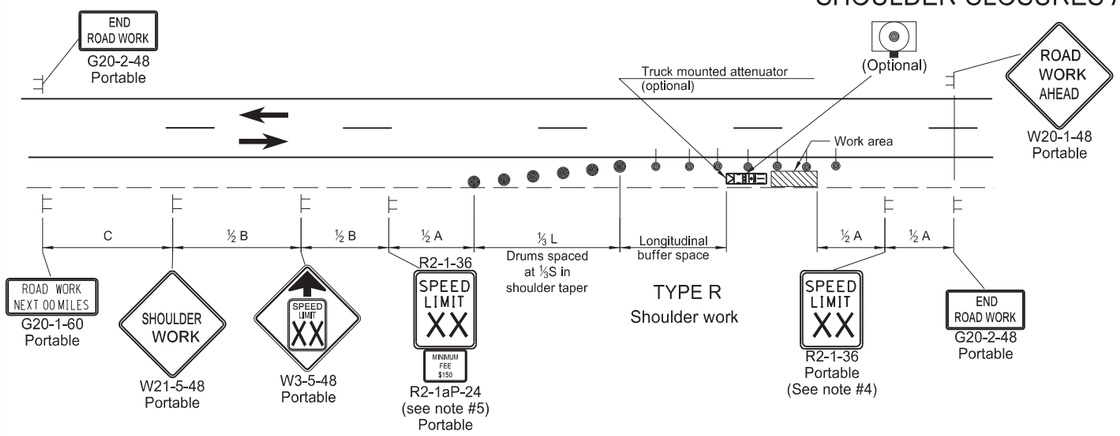
DATE	CHANGE
08-17-17	Update notes & sign numbers
11-01-19	Revised sign numbers & note 7
12-09-21	Added Speed Limit Enforced and Dollars At Work signs
11-29-22	Removed Dollars At Work
06-30-25	Legislative Changes

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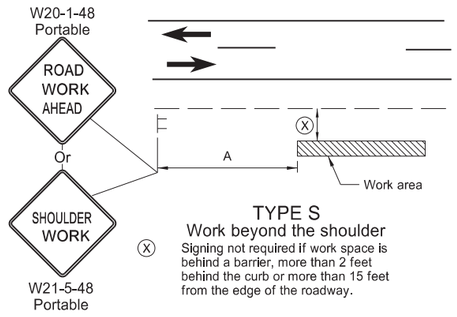
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SHOULDER CLOSURES AND BRIDGE PAINTING LAYOUTS

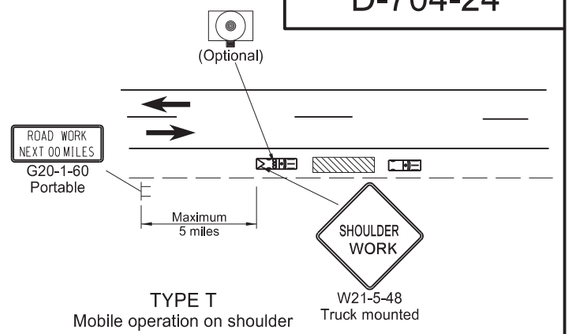
D-704-24



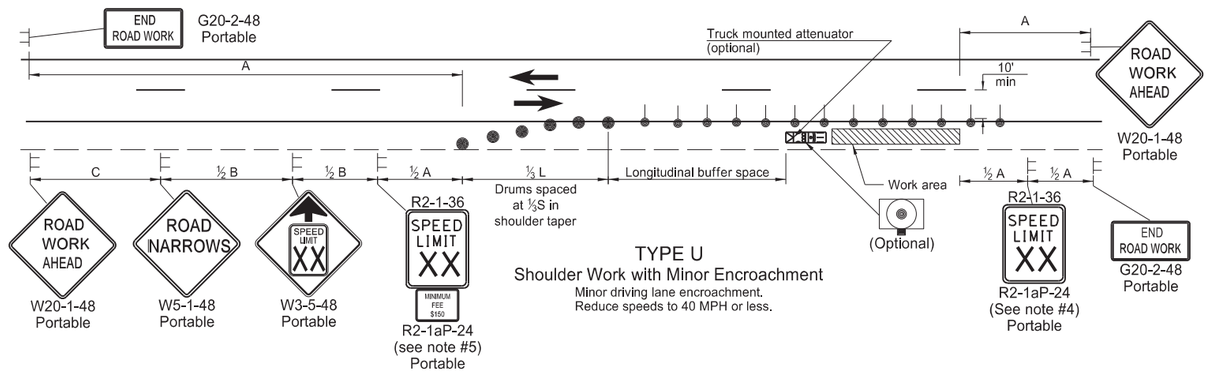
TYPE R
Shoulder work



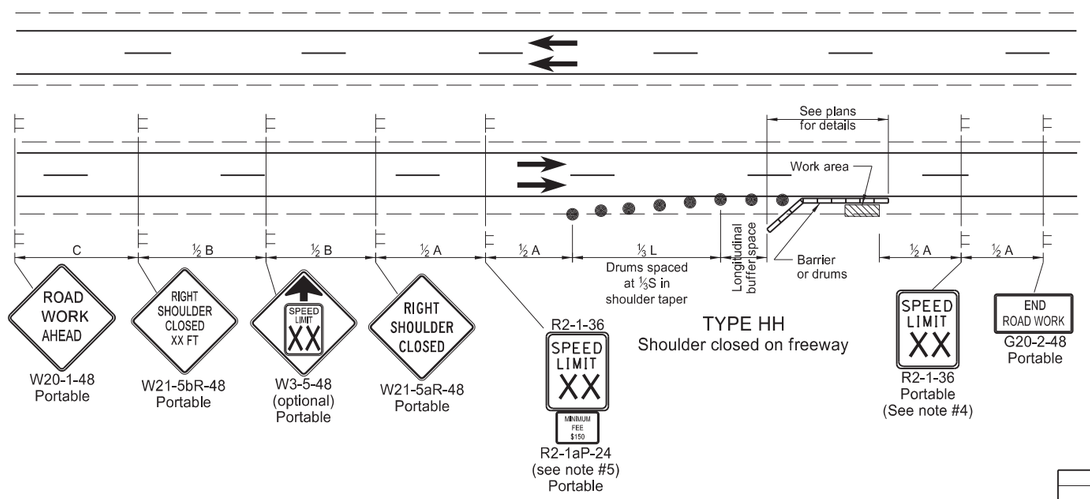
TYPE S
Work beyond the shoulder
Signing not required if work space is behind a barrier, more than 2 feet behind the curb or more than 15 feet from the edge of the roadway.



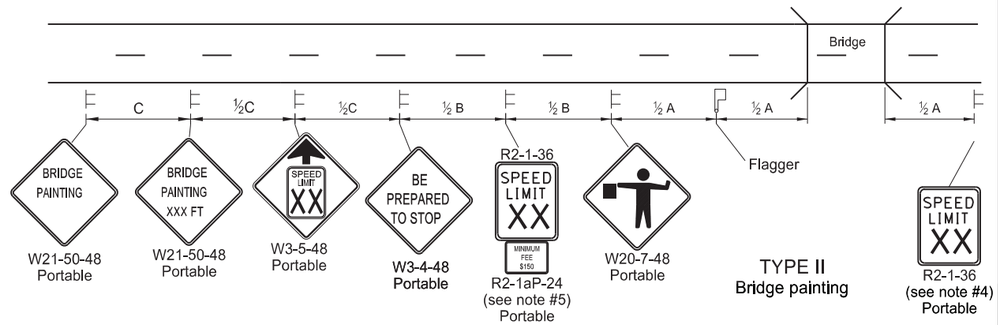
TYPE T
Mobile operation on shoulder



TYPE U
Shoulder Work with Minor Encroachment
Minor driving lane encroachment.
Reduce speeds to 40 MPH or less.



TYPE HH
Shoulder closed on freeway



TYPE II
Bridge painting

Notes
1. Variables
   S = Numerical value of speed limit or 85th percentile.
   W = The width of the taper in feet.
   L = Minimum length of taper, S x W for freeways, expressways, and all other roads with speeds of 45 mph or greater, or W x S^2 /60 for urban, residential, and other streets with speeds of 40 mph or less.
2. Space delineator drums for tapering traffic at dimension "S". Space delineator drums or tubular markers for tangents at 2 times "S".
3. Sequencing Arrow Panels
   Use Type A on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
   UseType B on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).
   Use Type C on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
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 the 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. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
9. Recommend 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

KEY

Sign	Work area
Delineator Drum	Tubular Marker
Sequencing Arrow Panel (Caution Mode)	

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

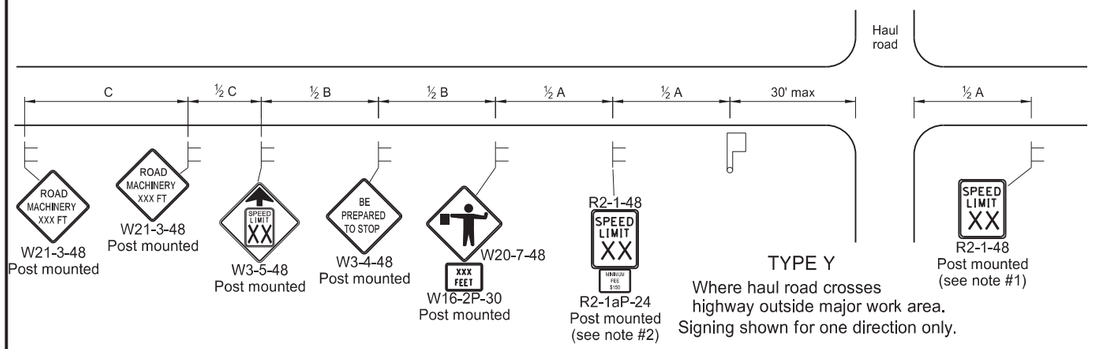
DATE	CHANGE
08-17-17	Updated notes & revised signs
11-01-19	Revised drum spacing & signs nos
08-01-24	Electronic Stamp/Signature
06-30-25	Legislative Changes

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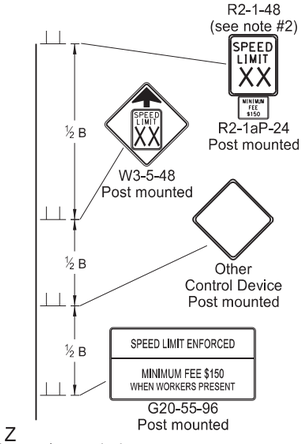
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MISCELLANEOUS SIGN LAYOUTS

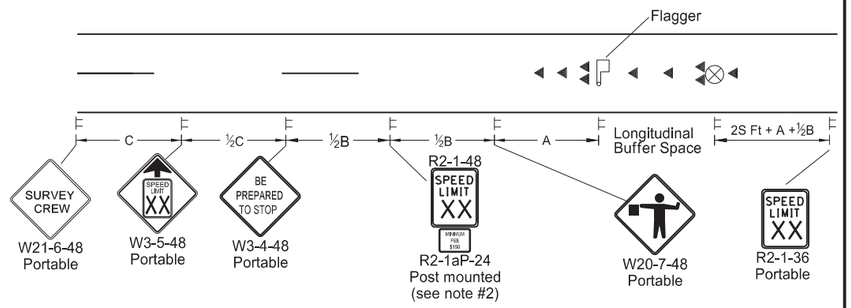
D-704-26



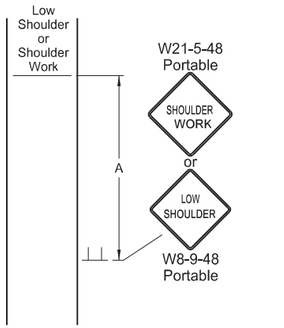
TYPE Y
Where haul road crosses highway outside major work area.
Signing shown for one direction only.



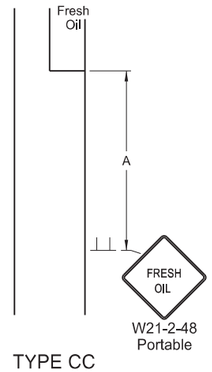
TYPE Z
Where speed zone is needed
Signing shown for one direction only.



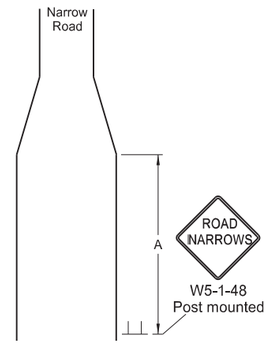
TYPE AA
Where survey crew is used
Signing shown for one direction only.



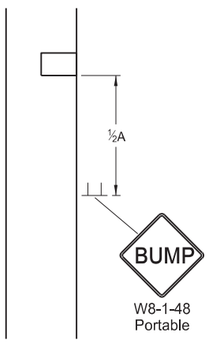
TYPE BB
Within major work area where sign conditions exist



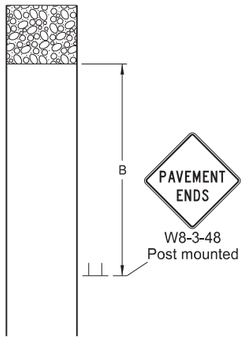
TYPE CC
Where sign conditions exist



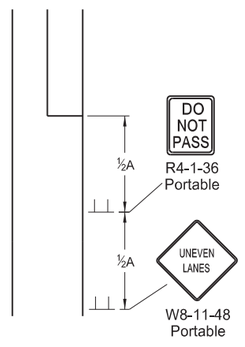
TYPE DD
Where sign conditions exist



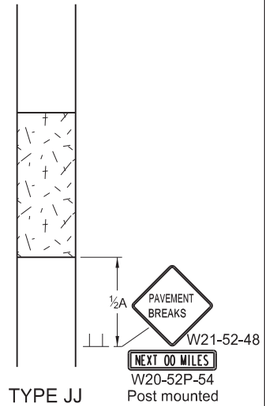
TYPE EE
Where sign conditions exist



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

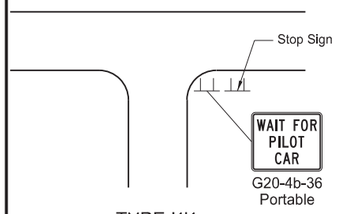


TYPE GG
Where elevation difference exists between lanes



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

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NORTH DAKOTA

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

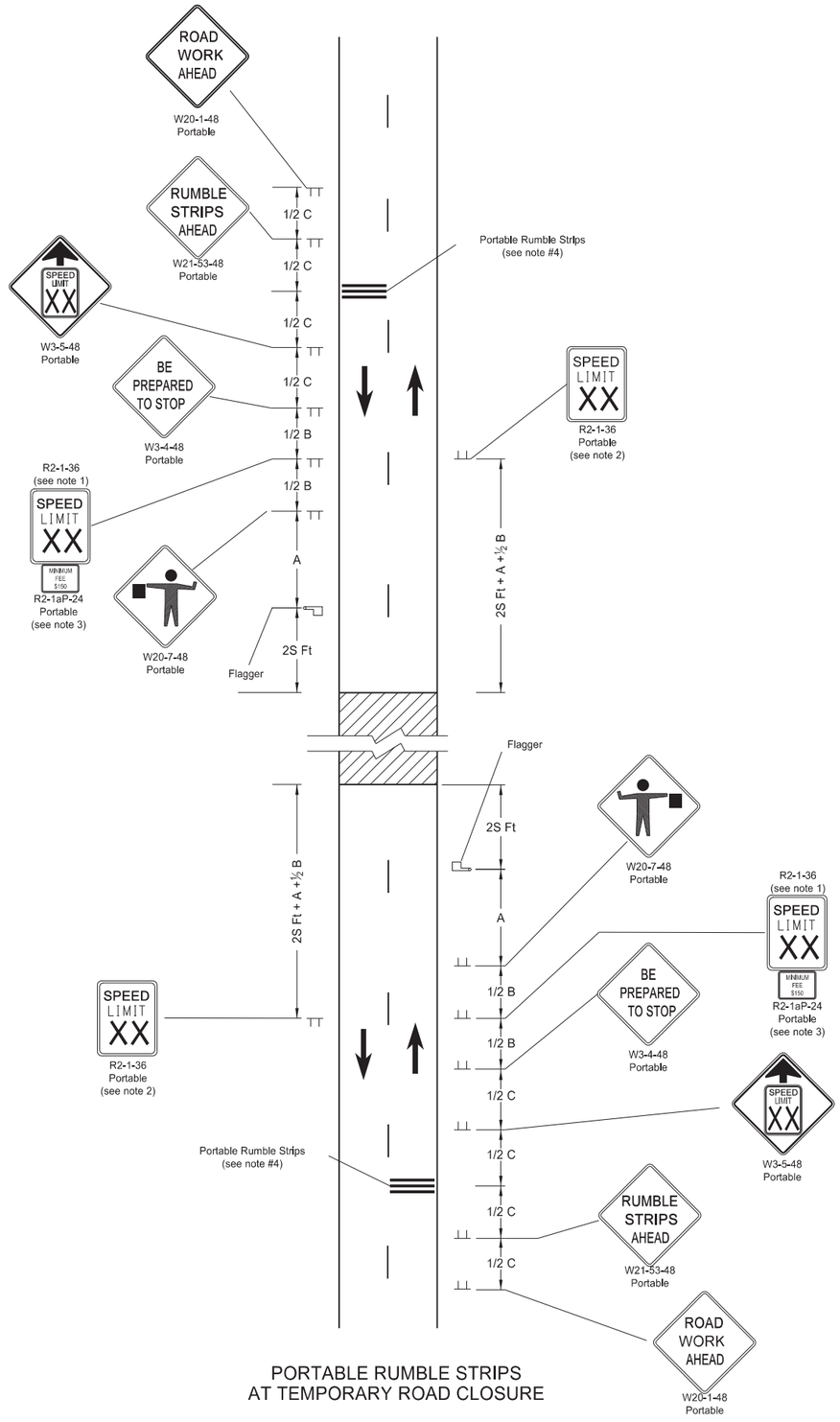
Two-Lane Roadway Portable Rumble Strips

KEY

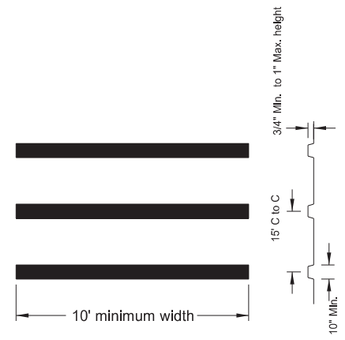
- Work area
- Flagger
- Sign

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

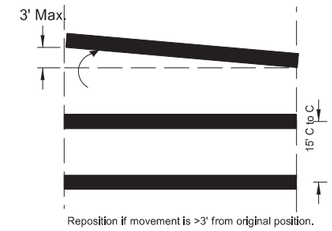
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - High Speed (over 45 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720



PORTABLE RUMBLE STRIPS
AT TEMPORARY ROAD CLOSURE

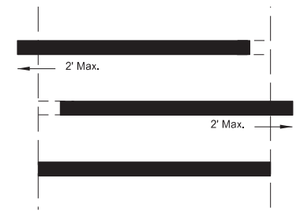


PORTABLE RUMBLE STRIPS ARRAY DETAIL



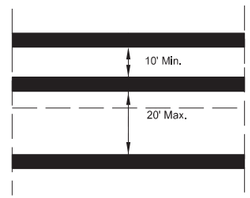
Reposition if movement is >3' from original position.

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.

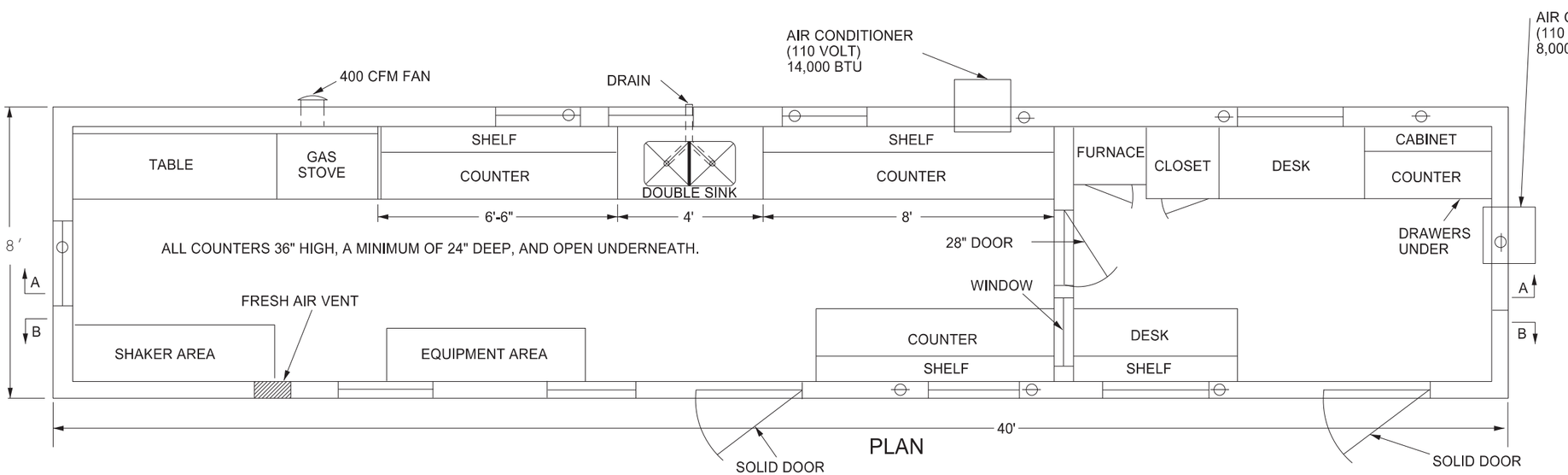
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
02-22-22	
REVISIONS	
DATE	CHANGE
03-07-23	Use changed to min 45 mph
06-30-25	Legislative Changes

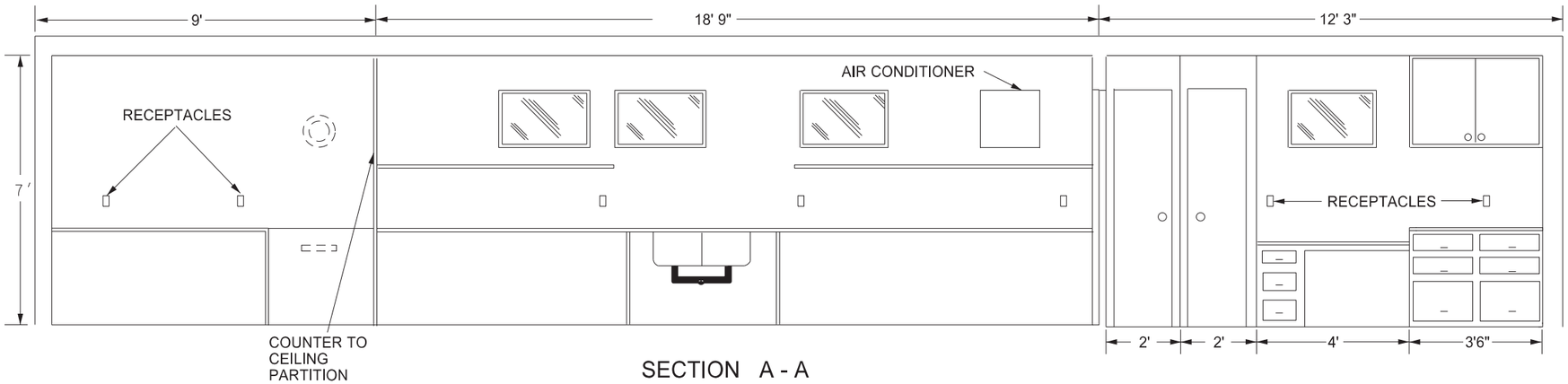
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REGISTERED
PROFESSIONAL
PE-4683
06/30/25
ENGINEER
NORTH DAKOTA

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

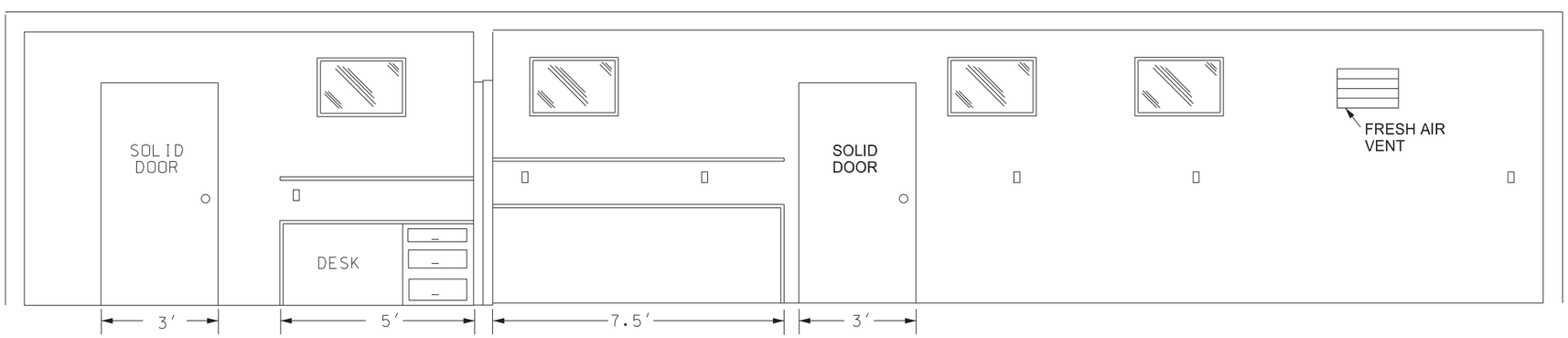
BITUMINOUS LABORATORY

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

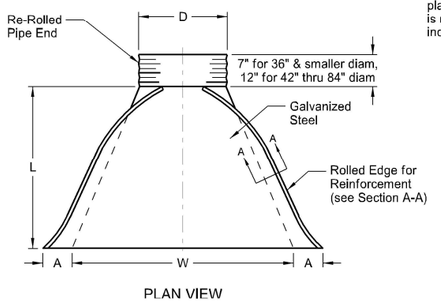
DATE	CHANGE
07-30-14	Changed standard's title and revised notes.
01-11-16	Revised notes.
08-27-19	New Design Engineer PE Stamp
08-09-24	Electronic Stamp/Signature.

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

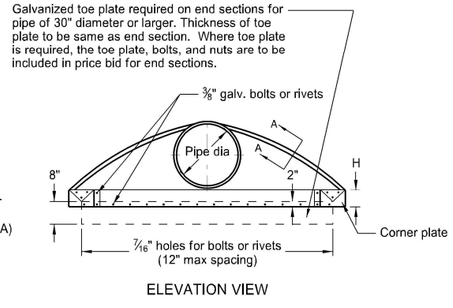
08/09/24

ROUND CORRUGATED STEEL PIPE CULVERTS AND END SECTIONS

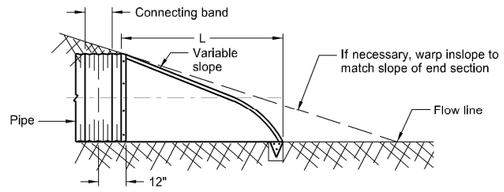
D-714-4



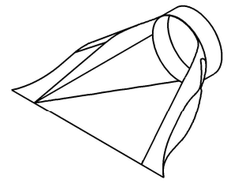
PLAN VIEW



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

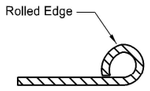
* These sizes have 0.109" sides and 0.138" center panels.

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

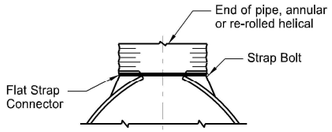
Manufacturers tolerances of above dimensions will be allowed.

Splices to be the lap riveted type.

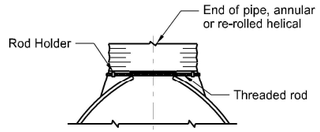
Multiple panel bodies shall have lap seams which are to be tightly joined with ⅜" dia. galv. bolts or rivets. Nuts to be torqued to 25 foot-lbs ±.



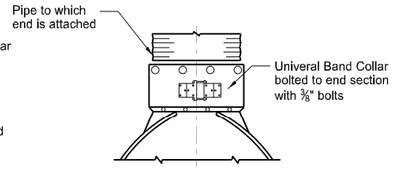
SECTION A-A



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



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

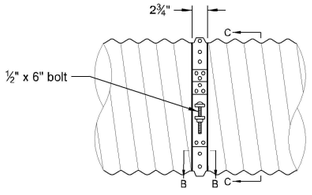


TYPE #3
For all pipe sizes

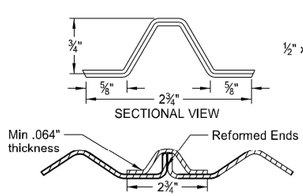
COUPLING BAND DIMENSIONS				
COUPLING TYPE	CORRUGATION PITCH x DEPTH	PIPE SIZE	COUPLING BAND LENGTH	MIN. BAND THICKNESS
Hat Band	2⅔" x ½"	12" - 48"	2¾"	.064"
Annular Band	2⅔" x ½"	12" - 72"	12"	.052"
		78" - 84"	12"	.079"
	3" x 1"	48" - 120"	14"	.052"
Hugger Band	2⅔" x ½" Rerolled End	12" - 72"	10½"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



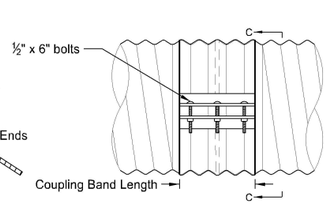
SIDE VIEW



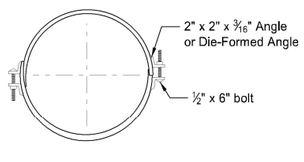
SECTIONAL VIEW

SECTION B-B

HAT BAND FOR FLANGED END PIPE

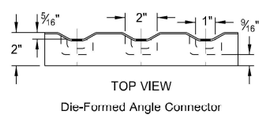


SIDE VIEW

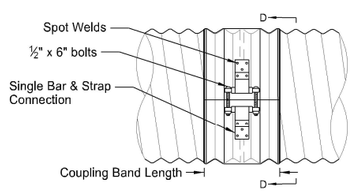


SECTION C-C
Angle Connection

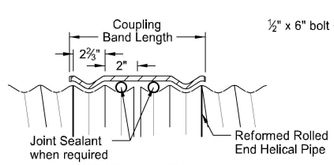
ANNULAR BAND



TOP VIEW
Die-Formed Angle Connector

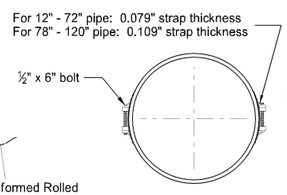


SIDE VIEW

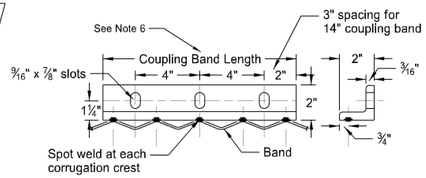


SECTIONAL VIEW

HUGGER COUPLING BAND



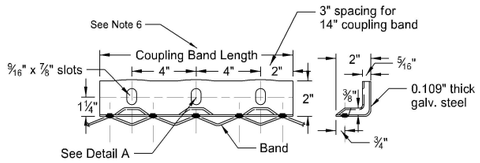
SECTION D-D
Bar & Strap Connection



SIDE VIEW

END VIEW

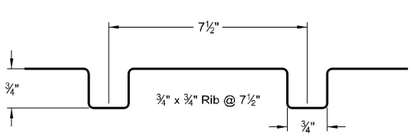
2" x 2" x 3/16" Angle Connector

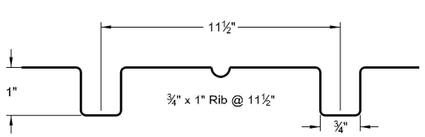


SIDE VIEW

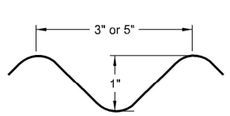
END VIEW

Die-Formed Angle Connector

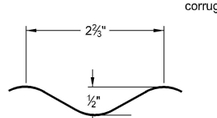




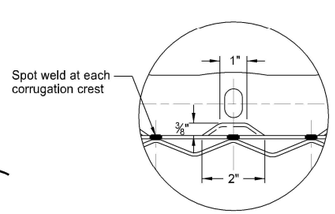
SPIRAL RIB CORRUGATIONS



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

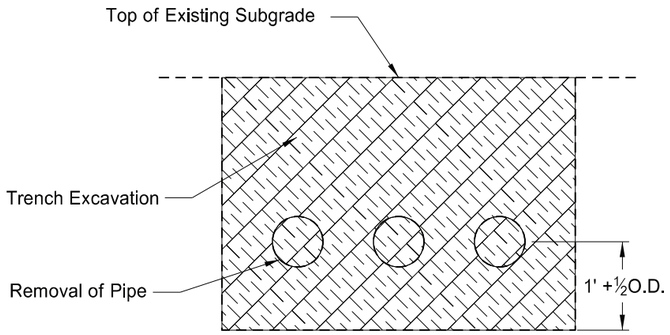
JONATHAN D KETTERLING
REGISTERED
PROFESSIONAL
PE-4684
ENGINEER
NORTH DAKOTA

09/23/22

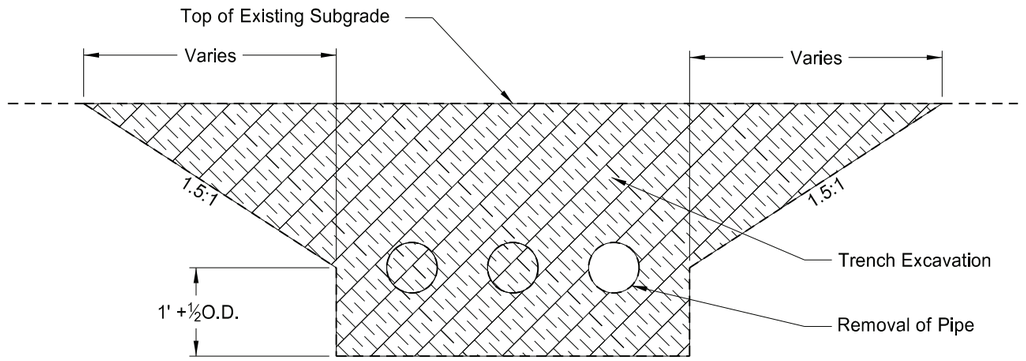
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PIPE INSTALLATION DETAIL FOR MULTIPLE LONGITUDINAL MAINLINE PIPE OR PIPE NOT UNDER THE ROADWAY

D-714-27M



EXCAVATION DETAIL A



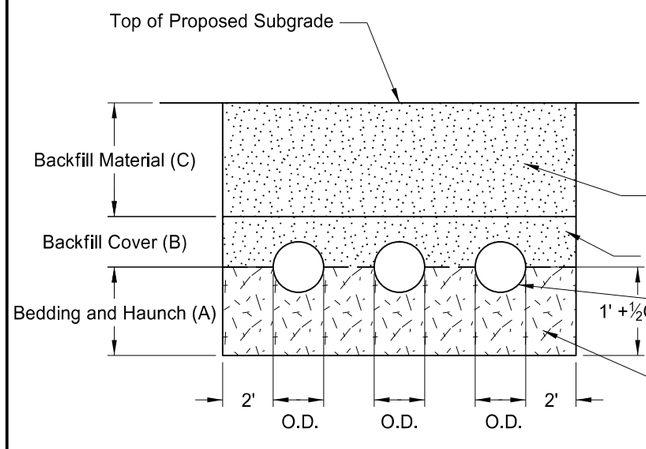
EXCAVATION DETAIL B

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

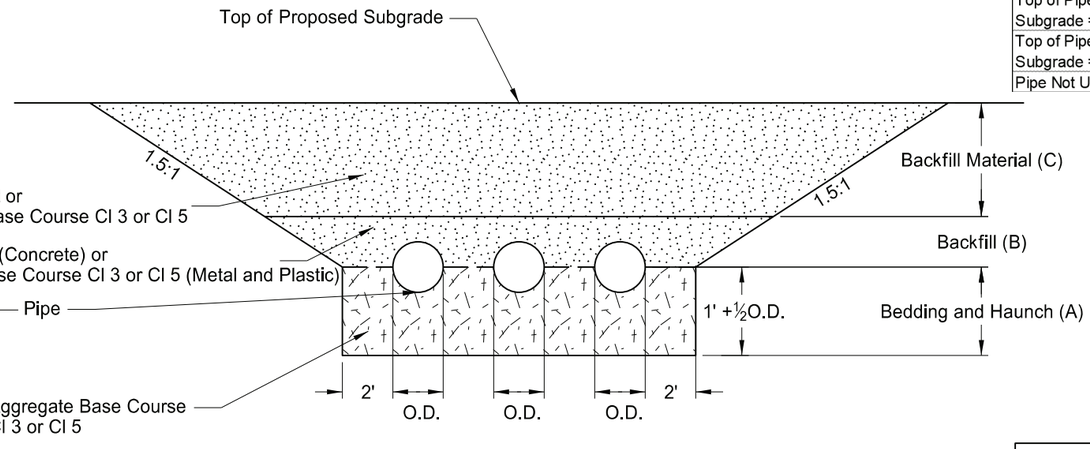
*Included in Pipe Pay Item
1) Pipe
2) Trench excavation
3) Aggregate base course Cl 3 or Cl 5
4) Embankment

NOTES:
1) This drawing applies to new/extended mainline and paved intersection roadway pipes only (including ramps). It does not include pipes in approaches.
2) It is the contactor's option to select Detail A or B.
3) The exact location of the pipes will be shown in the plans.
4) Embankment may be either Borrow Excavation or Common Excavation - Type A

Bedding and Haunch (A)
Pipes Not Under Roadway = 0.5 O.D. + 1 Feet
Pipes Under the Roadway = 0.5 O.D. + 1 Feet
Backfill Cover (B)
Concrete Pipe = 0.5 O.D.
Metal and Plastic = 0.5 O.D. + 1 Foot
Backfill Material (C)
Top of Pipe 4 Feet or Less Below the Top of Proposed Subgrade = Aggregate Base Course Cl3 or Cl 5
Top of Pipe Greater than 4 Feet Below the Top of Proposed Subgrade = Common Excavation - Type A
Pipe Not Under Roadway = Common Excavation - Type B



BACKFILL DETAIL A



BACKFILL DETAIL B

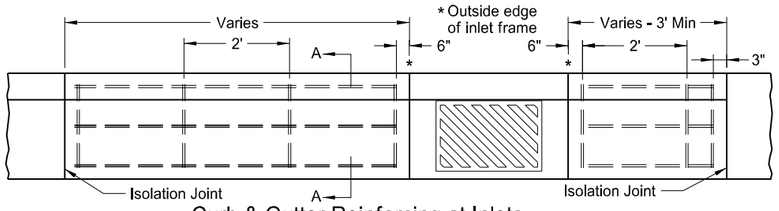
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-4-14	
REVISIONS	
DATE	CHANGE
1-21-15 12-10-15 5-27-20	Nomenclature Added Plastic Pipe Changed bedding depth and updated table

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

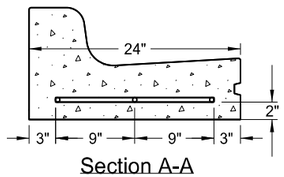
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Curb & Gutter and Valley Gutter

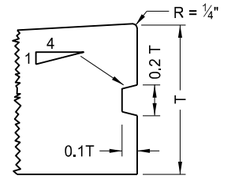
D-748-1



Curb & Gutter Reinforcing at Inlets



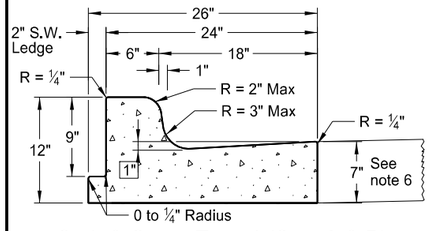
Section A-A



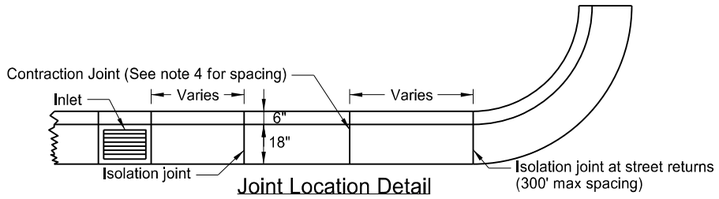
Keyway Detail for Curb & Gutter

(To be used with PCC Pavement and Drives)

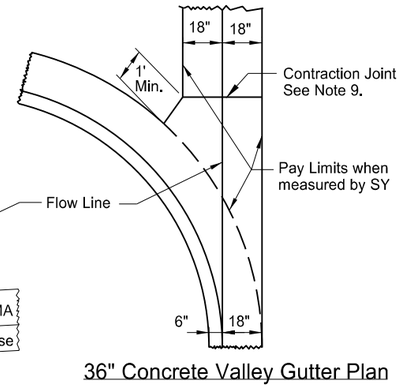
T= Thickness of pavement unless otherwise noted on plans.



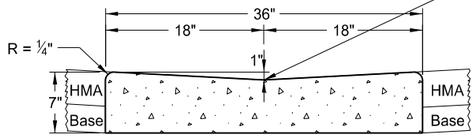
Curb & Gutter Type 1 (Sec. A & B)
Adjacent to Concrete Sidewalk, Median, or Parking Lot. (Sec. A shown. See Sec B for additional details.)



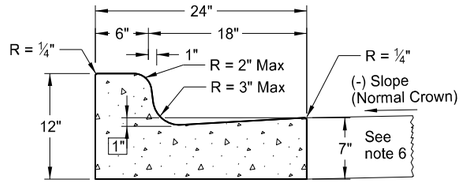
Joint Location Detail



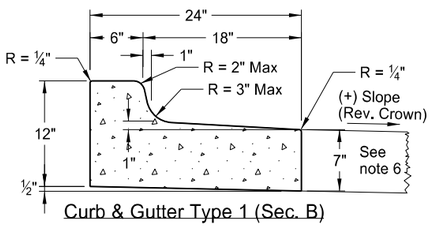
36" Concrete Valley Gutter Plan



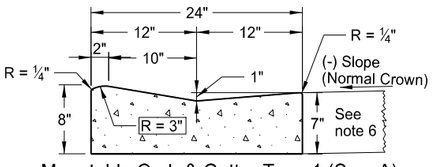
36" Concrete Valley Gutter Detail



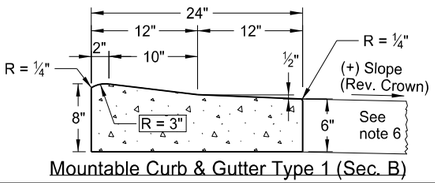
Curb & Gutter Type 1 (Sec. A)



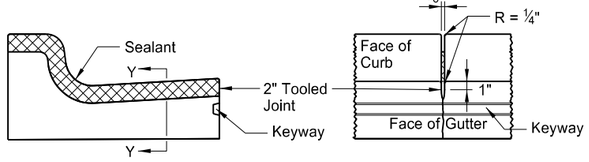
Curb & Gutter Type 1 (Sec. B)



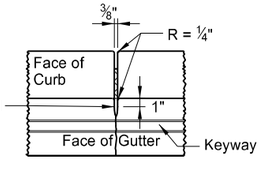
Mountable Curb & Gutter Type 1 (Sec. A)



Mountable Curb & Gutter Type 1 (Sec. B)

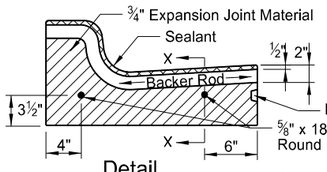


Detail
(10' Max Spacing)

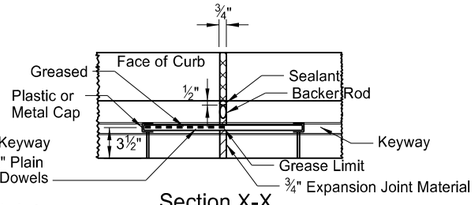


Section Y-Y

Contraction Joint

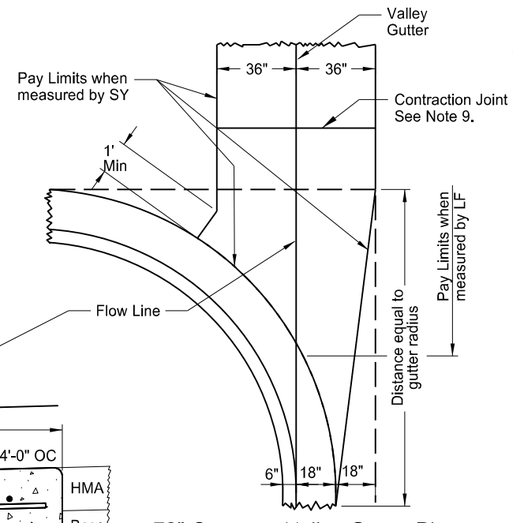


Detail

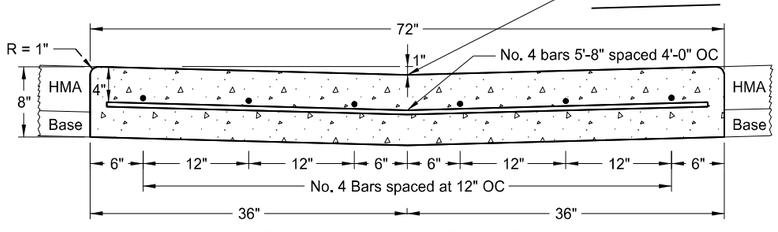


Section X-X

Isolation Joint



72" Concrete Valley Gutter Plan



72" Concrete Valley Gutter Detail

NOTES:

1. Use Curb and Gutter Type 1 (Sec. A & B). Use section "A" with (-) pavement slopes and section "B" with (+) pavement slopes.
2. Contraction Joints: Tool the Curb & Gutter 2" as shown on the contraction joint details.
3. Isolation Joints: Use ¾" expansion joint material for isolation joints. Form the backer rod and joint sealant opening with a pre-cut piece of wood or other material approved by the engineer. Dowel supports are not required on the second pour at a cold joint. Install plastic or metal caps and greased dowels in the cold joint for the second pour.
4. Joint Spacing: For hot mix asphalt pavements use a 10' max joint spacing for the curb and gutter with panels on each side of the inlets. For concrete pavements match the joint spacing for the curb and gutter to the pavement joint on PCC Pavements (approximately 15' spacing.)
5. Joint sealing: For contraction joint, use joint sealant that conforms to section 826.02B. Use sealant for expansion joints specified in note 3 above. Tool and install sealant in accordance with the manufacturer's recommendations.
6. Curb & Gutter-Pavement Interface: For hot mix asphalt pavement use gutter depth shown. For PCC pavements, either match gutter depth to adjacent pavement depth or construct gutter depth shown.
7. Tie curb and gutter to abutting PCC pavement with No. 4 bars, 2'-0" in length, spaced at 3'-9" centers for 15' joint spacing (maximum spacing of 4' centers).
8. On street returns and other locations where new curb and gutter ends and does not abut existing curb and gutter, taper the last two (2) feet of the curb from 6" in height to 0". Install a 1/2" premolded full depth isolation joint (the same shape as the curb and gutter just ahead of the taper) with an 18" plain round bar across the joint.
9. Valley Gutter Joints: Form, saw, or score ⅛" min. to ⅜" max. width contraction joints (a minimum 2" depth) at approx 10' intervals. Seal the joints with hot poured elastic type joint sealer (Section 826.02A.2 of the Standard Specifications.) Include all costs for the joint and sealant in the price bid for Valley Gutter.
10. Reinforcing at Inlets: Use #4 deformed reinforcing bars without splices. Include all costs for reinforcing bars at inlets (even inlets located on radii) in the price bid for "Curb & Gutter - Type 1" or "Curb & Gutter Mountable - Type 1." Extend reinforcement to the second joint (with rebar placed through the first joint) in cases where the 3' minimum panel length can't be obtained.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-7-2013	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
08-27-19	New Design Engr PE Stamp.
10-30-24	Revised bar size & notes.

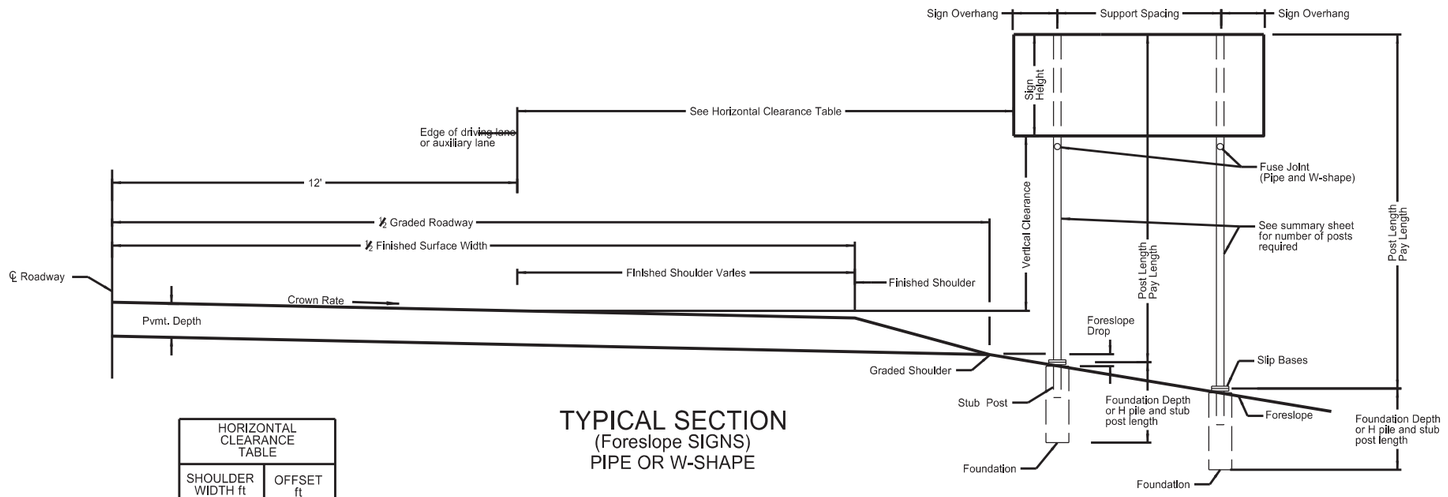
KIRK J. HOFF REGISTERED PROFESSIONAL PE-4683 ENGINEER NORTH DAKOTA

Kirk J Hoff

10/30/24

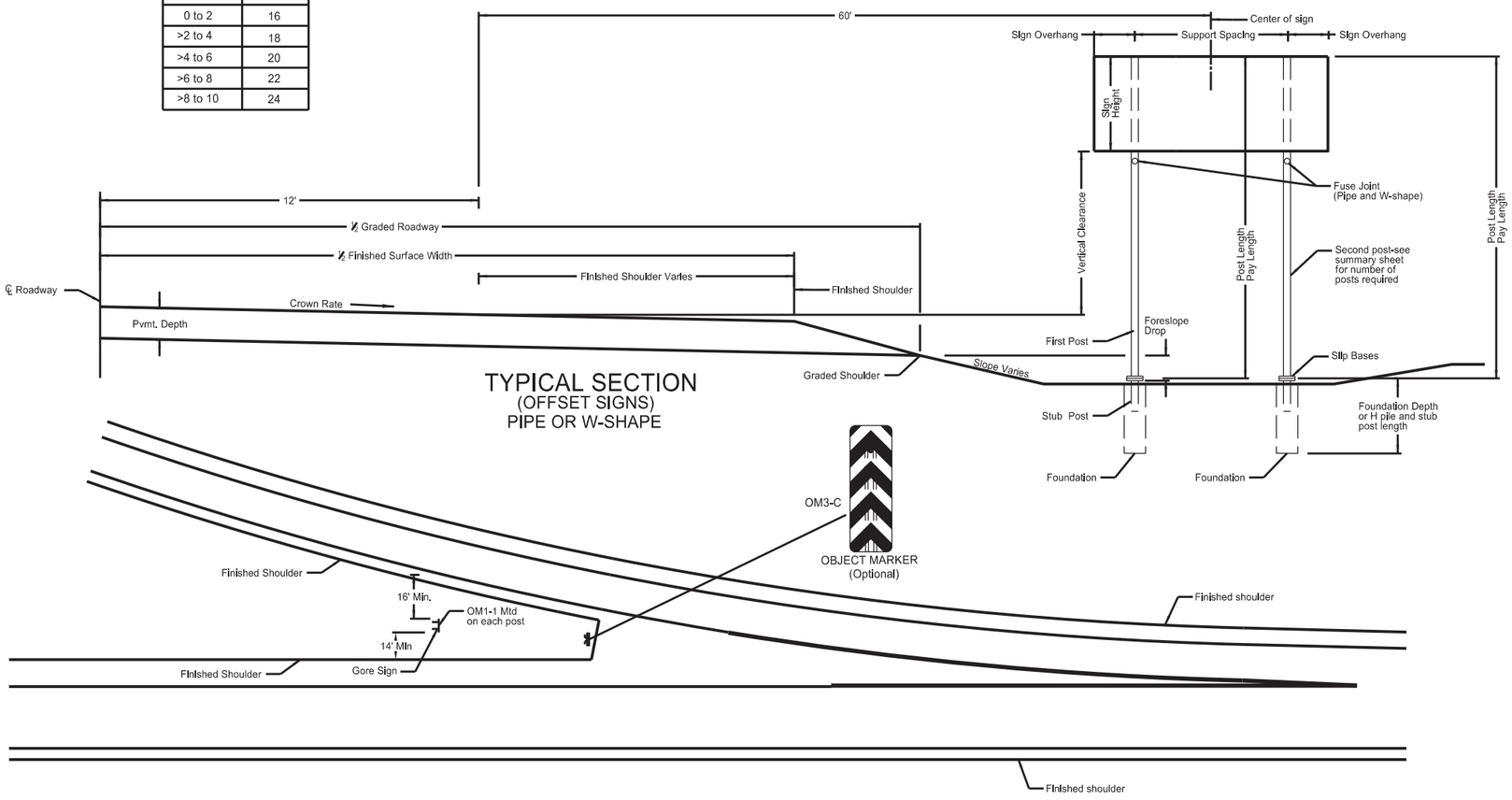
PIPE OR W-SHAPE ASSEMBLY DETAILS

D-754-1



TYPICAL SECTION
(Foreslope SIGNS)
PIPE OR W-SHAPE

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
(OFFSET SIGNS)
PIPE OR W-SHAPE

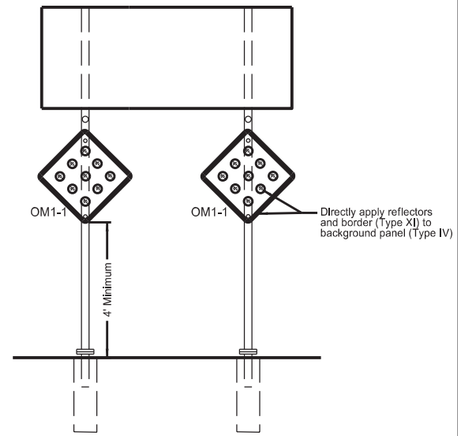
EXIT RAMP
GORE SIGN PLACEMENT

NOTES:

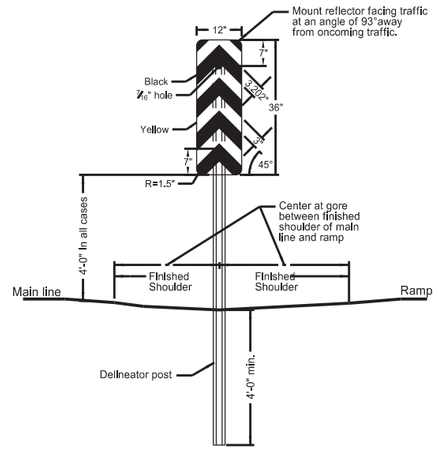
MINIMUM VERTICAL CLEARANCE:
Install signs with a minimum 5 foot vertical clearance from bottom of sign to top edge of the driving lane or auxiliary lane in rural locations. Provide a minimum 7 foot vertical clearance where parking or pedestrian movements occur. Install signs with a minimum 7 foot vertical clearance on freeways, expressways, and multi-lane conventional roadways.

A vertical clearance of 5 feet is acceptable where signs are placed a minimum of 30 feet from the edge of the traveled way.

Place signs a maximum of 6" above the vertical clearance specified above.



GORE SIGN OBJECT MARKER INSTALLATION



OBJECT MARKER INSTALLATION

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
7-18-14	Modify notes and update reflective sheeting for object marker. Add correct section number for object marker post.
8-30-18	Updated notes to active voice.
11-26-21	Revised Object Marker signs.

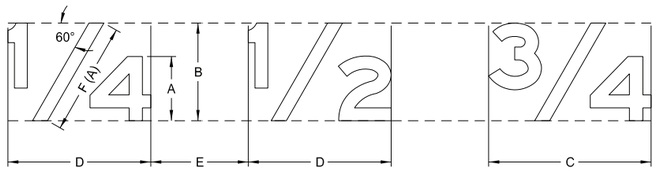
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

11/26/21

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

LETTER AND ARROW DETAILS

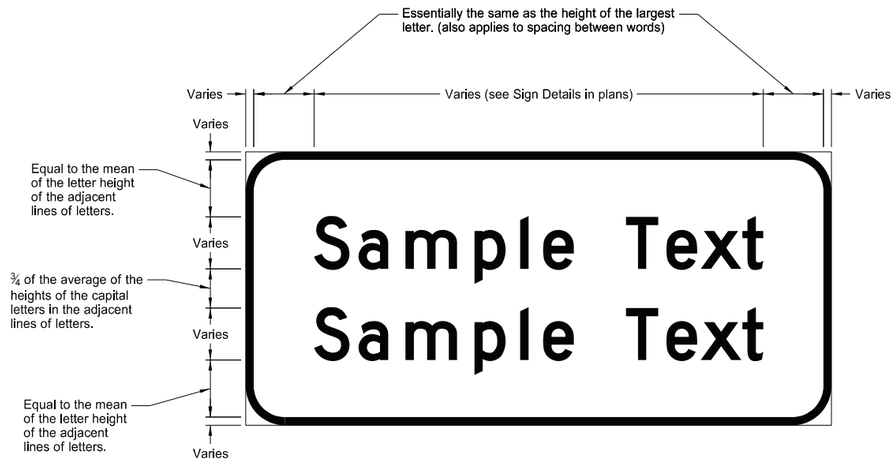
D-754-9



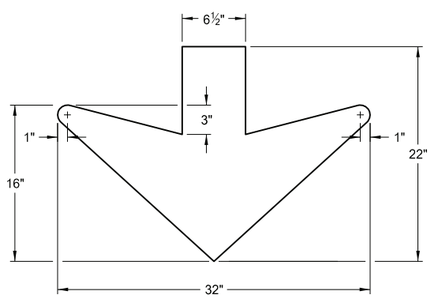
DETERMINE SIZE OF THE FRACTION AS FOLLOWS:

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

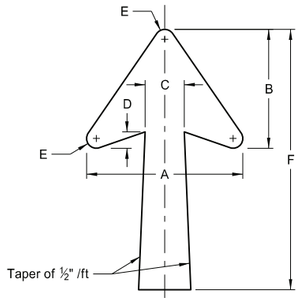
(A) Center diagonal stroke of fraction optically.



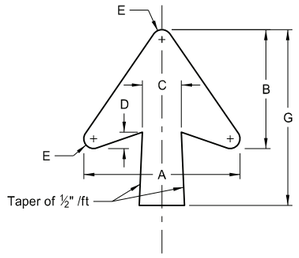
TYPICAL SPACING



DOWN ARROW



TYPE A

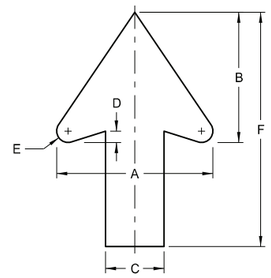


TYPE B

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"							

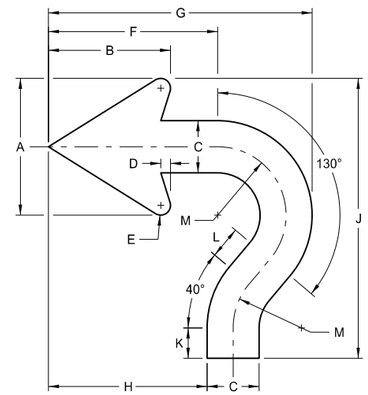
NOTE: Arrow size on gore signs is based on the letter size of "EXIT".

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



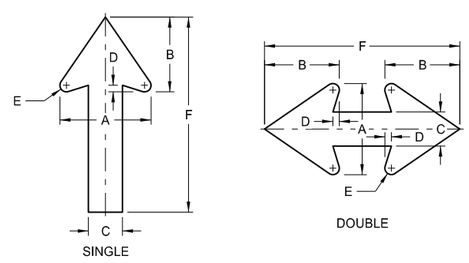
TYPE D

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.

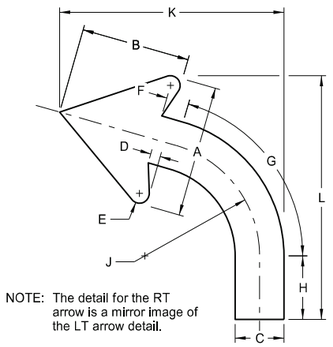
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/05/24

DocuSign Envelope ID: 028FA5AB-97D0-4516-BC9A-38F76BB98B10

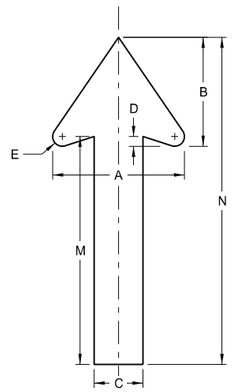
ARROW DETAILS FOR LANE CONTROL AND ARROW-PER-LANE SIGNS

D-754-10

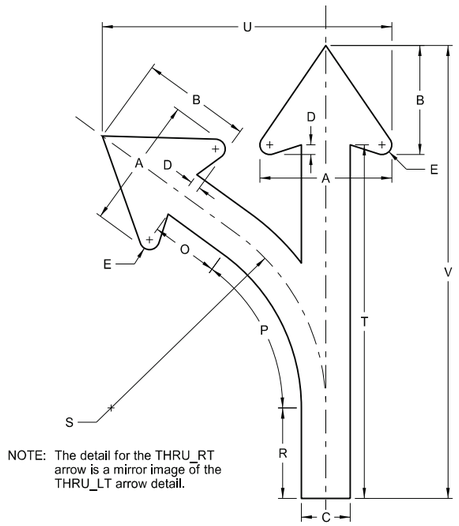


NOTE: The detail for the RT arrow is a mirror image of the LT arrow detail.

LT

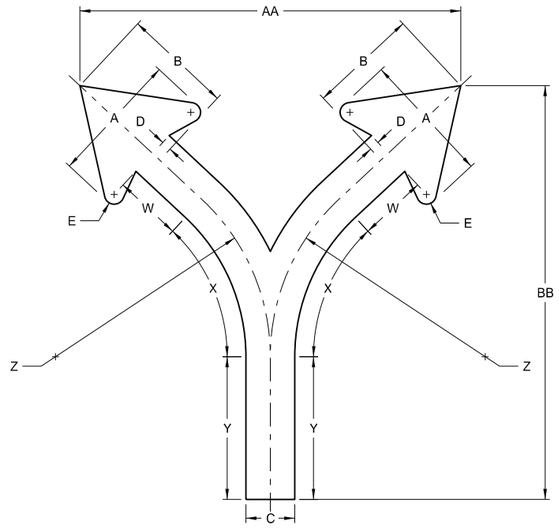


THRU



NOTE: The detail for the THRU_RT arrow is a mirror image of the THRU_LT arrow detail.

THRU_LT



SPLIT

ADVANCE INTERSECTION CONTROL

DESIGNATION	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	R	S	T	U	V	W	X	Y	Z	AA	BB
ND_2.5IN	6.75"	5.563"	2.5"	0.5"	0.5"	1.140"	74°	3.279"	5.875"	11.468"	12.478"	13.687"	18.75"	3.480"	54°	4.642"	11"	18.125"	14.813"	23.188"	3.485"	47°	9.313"	11"	19.5"	23.188"
ND_3IN	8.126"	6.688"	3"	0.563"	0.563"	1.444"	74°	3.752"	7.731"	14.376"	15.487"	16.927"	23.052"	3.448"	54°	6.811"	13.2"	22.367"	17.232"	28.492"	3.508"	46°	12.305"	13.2"	21.92"	28.492"
ND_3.75IN	10.126"	8.375"	3.75"	0.75"	0.75"	1.679"	74°	4.889"	8.813"	17.202"	18.717"	20.5"	28.125"	5.195"	54°	6.960"	16.5"	27.157"	22.220"	34.782"	5.198"	47°	13.969"	16.5"	29.25"	34.782"

LANE-USE CONTROL

DESIGNATION	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	R	S	T	U	V	W	X	Y	Z	AA	BB
ND_4.5IN	12.126"	10"	4.5"	0.875"	0.875"	1.519"	72°	6.326"	11.4"	20.25"	23.418"	14.293"	23.418"	3.188"	68°	4"	17"	30.375"	29.5"	39.5"	-	-	-	-	-	-

ARROW-PER-LANE

DESIGNATION	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	R	S	T	U	V	W	X	Y	Z	AA	BB
ND_7.75IN	21"	17.25"	7.75"	1.5"	1.5"	6.701"	66°	14.303"	20"	36.25"	45"	50.25"	66"	11.831"	68°	4.125"	31.875"	50.25"	56"	66"	0.127"	60°	8.190"	43.25"	70.75"	55"

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
4-23-18	
REVISIONS	
DATE	CHANGE
8-29-19	New Design Engineer PE Stamp.
8-21-24	Thru Lt/Rt Lane Use Control Arrow

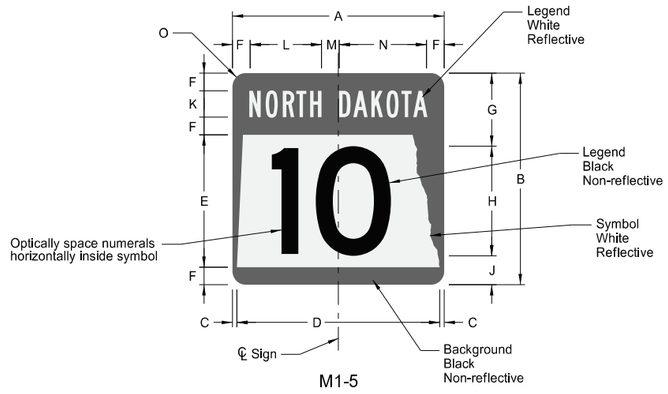
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/21/24

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

STATE HIGHWAY ROUTE SHIELD DETAIL

D-754-11

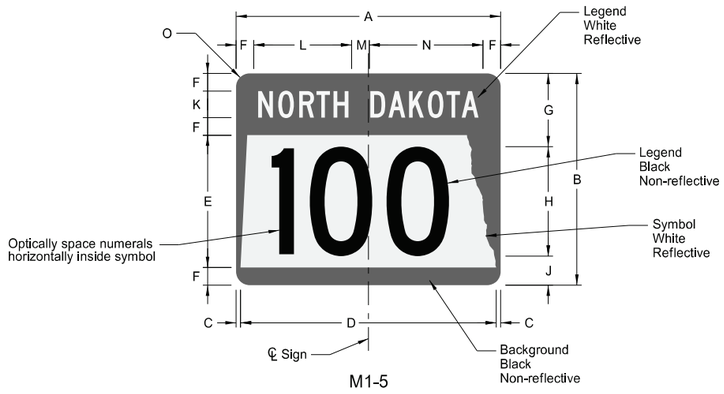


M1-5

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%

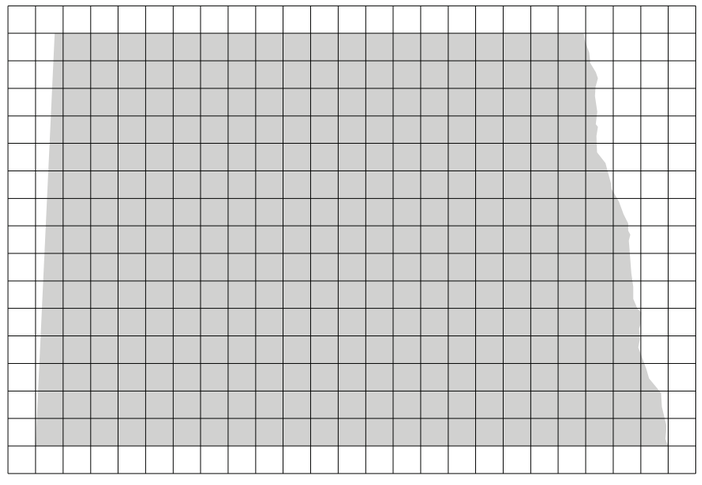


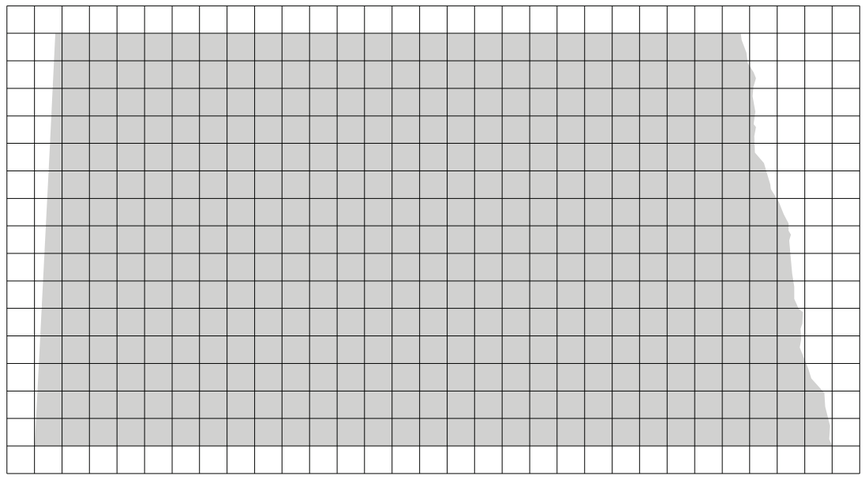
M1-5

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.

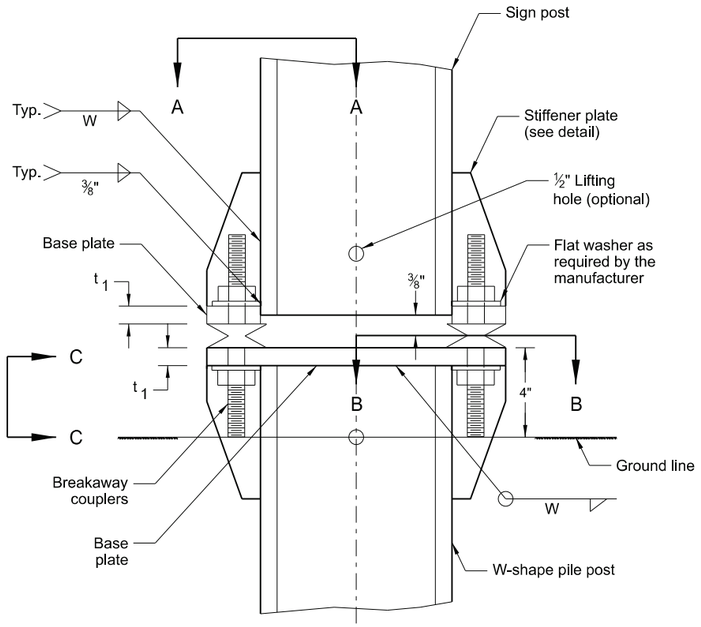
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/05/24

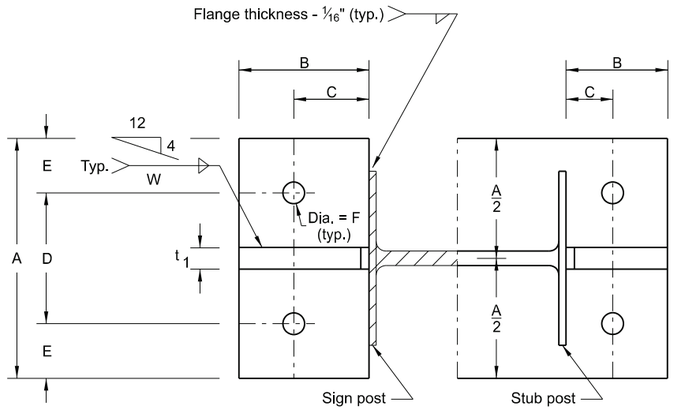
DocuSign Envelope ID: 3BB6949C-35F3-4834-B8EF-90A4185B6E25

Breakaway Coupler System
Structural Details
for W-Shape Supports

D-754-12



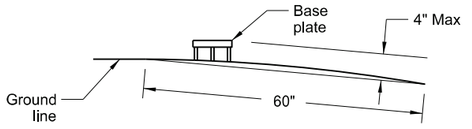
Sign Post and Stub Post
Elevation



Section A - A
Section B - B
(See Table for Dimensions)

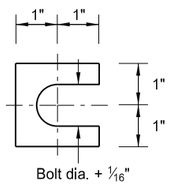
Notes:

1. Use either the breakaway base system shown on standard D-754-13 or a breakaway coupling system manufactured from material meeting the requirements of ASTM A325 fasteners with the special requirements as specified by DENT BREAKAWAY IND., INC. which meets the requirements of NCHRP Report 350.
2. Use structural steel conforming to Sec. 894.03 B.6 and high strength bolts conforming to ASTM - A325. Refer to "Sign Summary" sheet for specific data on each individual sign installation.
3. Use manufacturer's recommendations for assembly procedures.

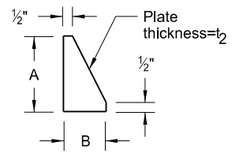


Section C - C

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



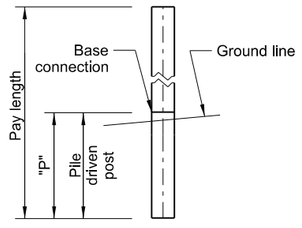
Shim Detail



Stiffener Plate Detail
(See Table for Dimensions)

Furnish 2 - .012"± thick and 2 - .032"± thick shims per post. Fabricate shims from brass shim stock or strip conforming to ASTM B36.

Sections shown are for installations on right shoulder and in gore. Plate slot bevels are opposite hand from that shown for installations on left shoulder.



W-Shape - Pile Footing

W-Shape Post & Pile Size	Base Connection Data										Footing Data
	Bolt Size	A	B	C	D	E	t_1	t_2	W	F	W-Shape Pile Post "P"
W4X13	3/4" x 5 1/4"	6"	2 1/2"	1 1/2"	3 1/2"	1 1/4"	1"	1/2"	1/4"	13/16"	14'
W5X16											14'
W6X20	7/8" x 5 1/4"	8"	3"	1 3/4"	4"	2"	1 1/4"	1/2"	1/4"	15/16"	14'
W8X24											14'
W8X28	1" x 5 1/4"	8"	3"	2"	4"	2"	1 1/2"	3/4"	5/16"	1 1/16"	14'

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-4-2013	
REVISIONS	
DATE	CHANGE
7-8-14	Revised notes 2 and 3.
8-30-18	Updated notes to active voice.
8-29-19	New Design Engineer PE Stamp.
8-05-24	Electronic Stamp/Signature.

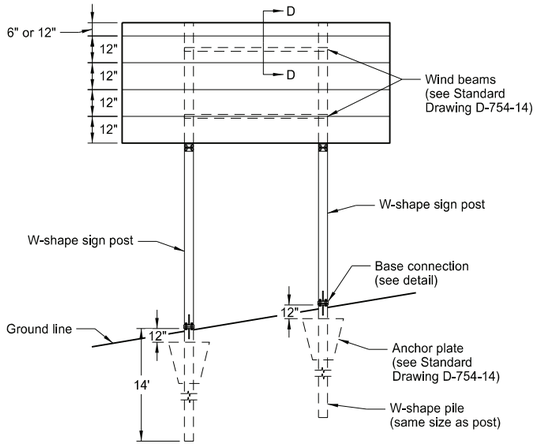
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/05/24

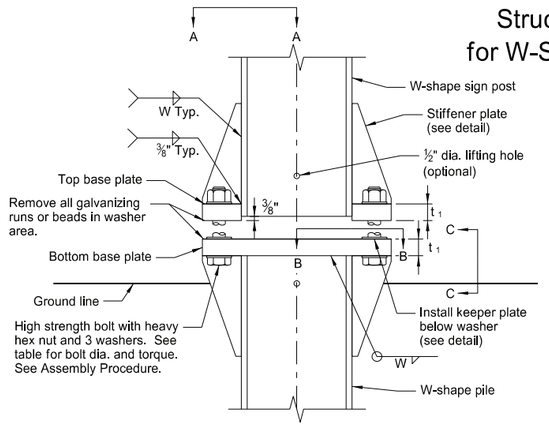
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Breakaway System Structural Details for W-Shape Supports

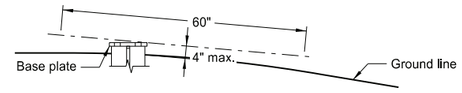
D-754-13



Typical Panel Mounting on W-shape Sign Posts



Base Connection Detail



Section C-C Stub Height Requirements

Maximum projection of base plate limits are defined as a line 4" parallel to any chord, which is perpendicular to, or aligned radially to, the center line of the highway and has the chord's end points on the ground surface on opposite sides of the stub post.

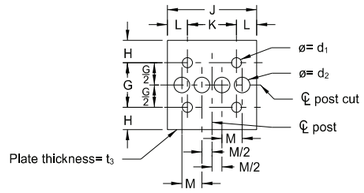
Notes:

Use structural steel conforming to Section 894.03 B.6 of the Standard Specifications and high strength bolts conforming to ASTM A325.

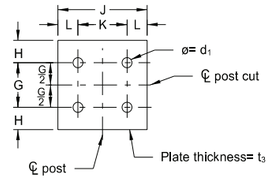
Refer to Sign Summary sheet for specific data on individual sign installation.

Install perforated fuse plate on side of post facing traffic.

Saw cut posts. Shear or flame cut plates using a mechanically guided cutting torch in accordance with Section 754.04 D.4.b of the Standard Specifications. Prepare edge in accordance with Section 754.04 D.4.c of the Standard Specifications.



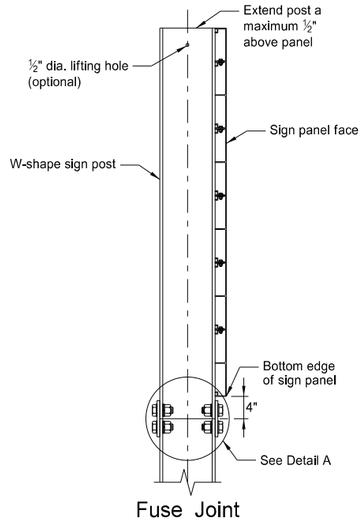
Perforated Fuse Plate



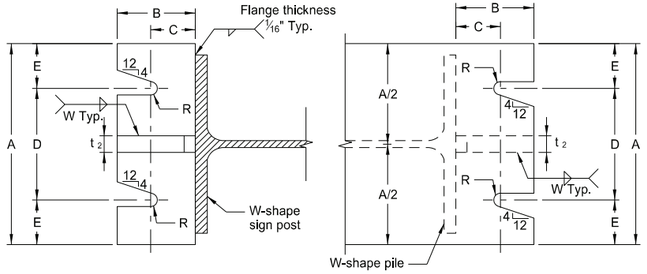
Hinge Plate

Assembly Procedure:

1. Assemble base plates with bolts and one flat washer between top base plate and keeper plate.
2. Shim as required to plumb post.
3. Tighten all base connection bolts the maximum possible with 12" to 15" wrench to bed washers and shims and clean bolt threads.
4. Loosen each bolt in turn and retighten in systematic order to the prescribed torque (see table).
5. Assemble perforated fuse and hinge plates to post with bolts and one flat washer and lock washer under nut.

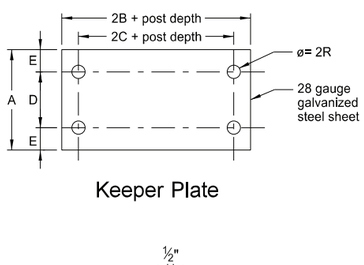


Fuse Joint (Side View)

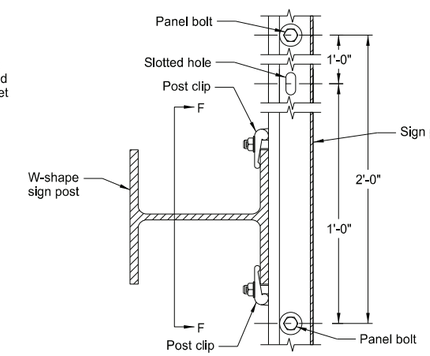


Section A-A Section B-B

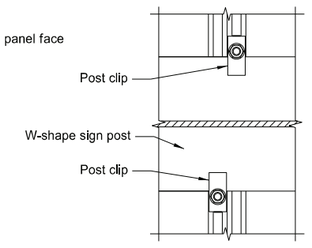
Sections shown for installations on right shoulder. Reverse plate slot bevels for installations on left shoulder.



Keeper Plate

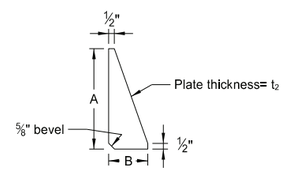


Section E-E

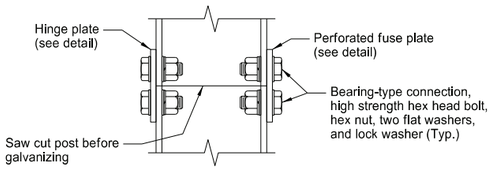


Section F-F

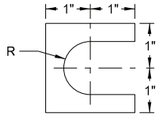
Install post clips on both sides of each post at each panel joint indicated.



Stiffener Plate

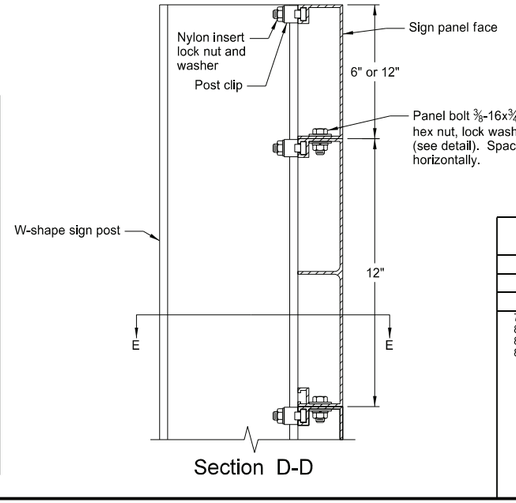


Detail A

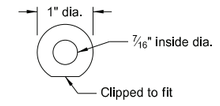


Shim Detail

Furnish 2 each .012"± thick and 2 each .032"± thick shims per post. Shims shall be fabricated from brass shim stock or strip conforming to ASTM B36.



Section D-D



Flat Washer Detail

Thickness = 5/64"

W-Shape Post and Pile Size	Base Connection Dimensions										Fuse and Hinge Plate Dimensions									
	Bolt Size and Torque	A	B	C	D	E	t_1	t_2	W	R	G	H	J	K	L	M	d_1	d_2	t_3	Bolt dia.
W4x13	¾" ø x 3½" Torque = 600 in-lb	6"	2½"	1½"	3½"	1¼"	1"	½"	¼"	13/32"	2"	1¼"	4"	2¼"	⅞"	1"	11/16"	¾"	⅜"	⅝"
W5x16	¾" ø x 3½" Torque = 600 in-lb	6"	2½"	1½"	3½"	1¼"	1"	½"	¼"	13/32"	2½"	1¼"	5"	2¾"	1⅛"	1⅛"	13/16"	⅞"	⅜"	¾"
W6x20	⅞" ø x 4¼" Torque = 800 in-lb	8"	3"	1¾"	4"	2"	1¼"	½"	¼"	15/32"	2½"	1¼"	6"	3½"	1¼"	1⅜"	13/16"	1⅛"	⅜"	¾"
W8x24	⅞" ø x 4¼" Torque = 800 in-lb	8"	3"	1¾"	4"	2"	1¼"	½"	¼"	15/32"	2½"	1½"	6½"	3½"	1½"	1½"	15/16"	1¼"	½"	⅞"
W8x28	1" ø x 5" Torque = 1000 in-lb	8"	3"	2"	4"	2"	1½"	¾"	5/16"	17/32"	2½"	1½"	6½"	3½"	1½"	1⅝"	1⅛"	1⅛"	½"	1"
W8x31	1⅛" ø x 5" Torque = 1200 in-lb	9"	3½"	2"	5"	2"	1½"	¾"	5/16"	19/32"	3"	1¾"	8"	5½"	1¼"	2"	1⅛"	1½"	½"	1"
W10x39	1⅛" ø x 5" Torque = 1200 in-lb	9"	3½"	2"	5"	2"	1½"	¾"	5/16"	19/32"	3"	1¾"	8"	5½"	1¼"	1⅞"	1⅜"	1⅜"	½"	1⅛"

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE
7-18-14	Revised first note.
8-30-18	Updated notes to active voice.
8-29-19	New Design Engineer PE Stamp.
8-05-24	Electronic Stamp/Signature.

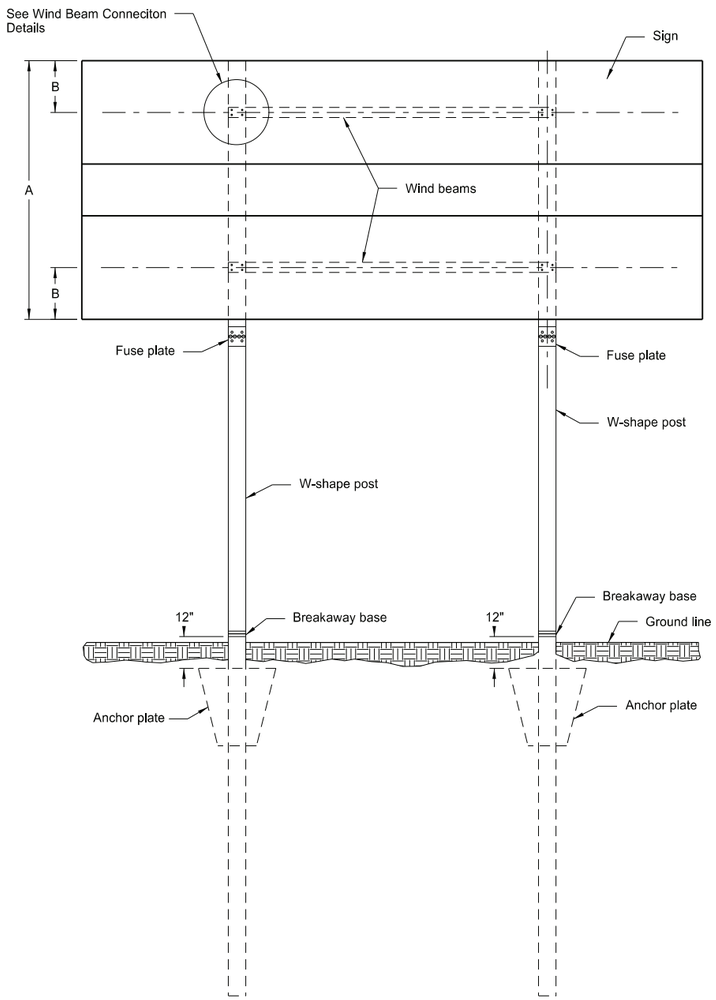
KIRK J. HOFFA
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/05/24

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

WIND BEAMS AND ANCHOR PLATES FOR W-SHAPE SUPPORTS

D-754-14



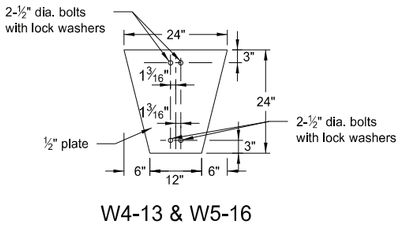
ASSEMBLY DETAIL FOR WIND BEAMS AND ANCHOR PLATES

Notes:

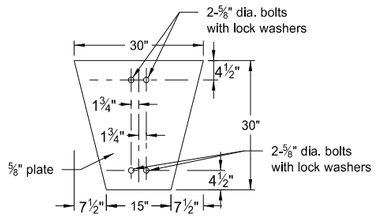
Calculate the B distance using the formula, B=A/4.

Use wind beam conforming to Section 894.03 B.6 of the Standard Specifications.

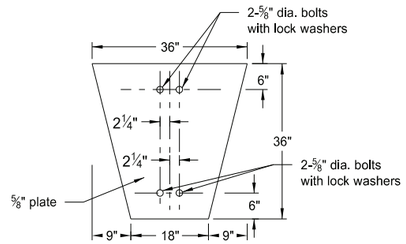
Use bolts conforming to ASTM A307 and galvanized according to ASTM A153.



W4-13 & W5-16

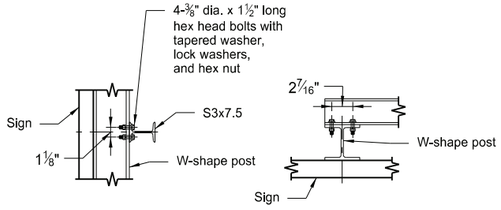


W6-20, W8-24 & W8-28



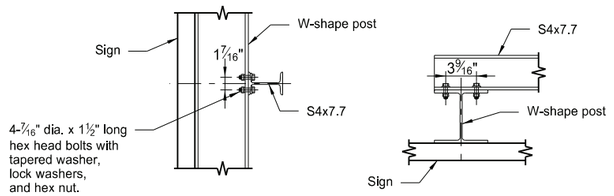
W8-31 & W10-39

ANCHOR PLATE DETAILS



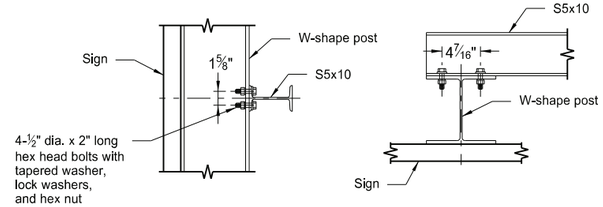
End View Top View

W4-13 & W5-16



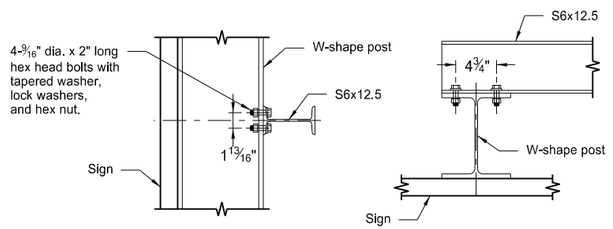
End View Top View

W6-20, W8-24 and W8-28



End View Top View

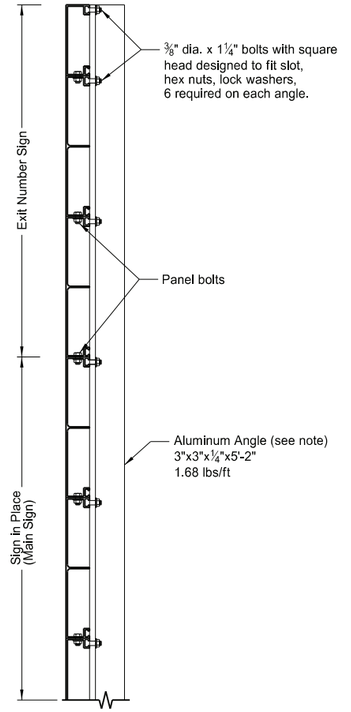
W8-31



End View Top View

W10-39

WIND BEAM CONNECTION DETAILS



ASSEMBLY DETAIL FOR EXIT NUMBER SIGNS

Note: Use two aluminum angles on each sign. Vary distance between angles dependent on post spacing of sign in place. Place angles as near as possible to posts. The Engineer will determine exact location.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

10-3-13

REVISIONS

DATE	CHANGE
7-8-14	Revised second note.
8-30-18	Updated notes to active voice.
8-29-19	New Design Engineer PE Stamp.
8-05-24	Electronic Stamp/Signature.

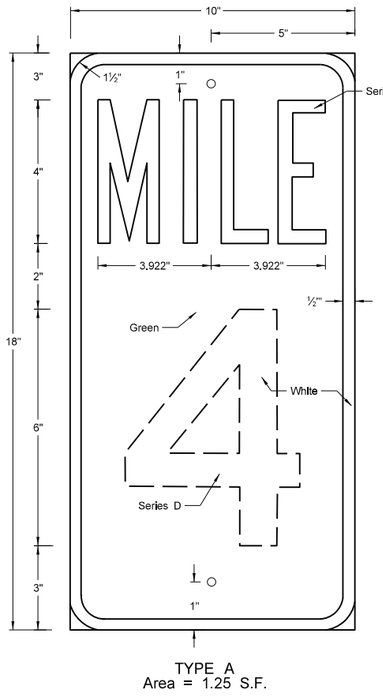
KIRK J. HOFF REGISTERED PROFESSIONAL PE-4683 ENGINEER NORTH DAKOTA

08/05/24

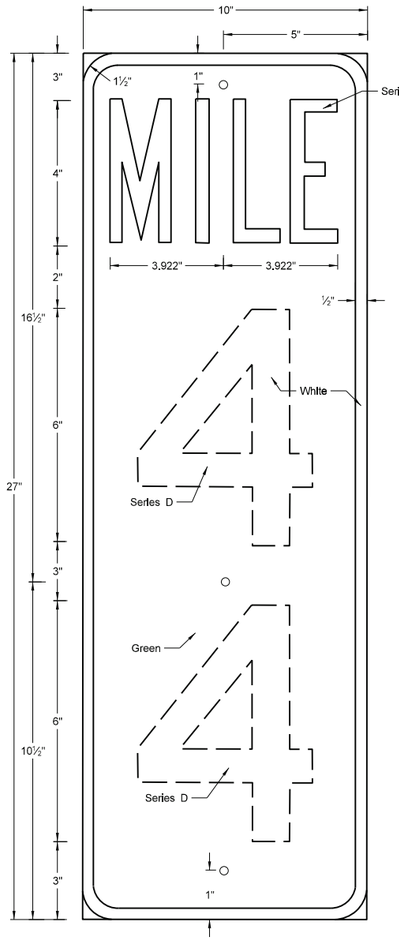
DocuSign Envelope ID: 3BB6949C-35F3-4834-B8EF-90A4185B6E25

(CONVENTIONAL USE) REFERENCE MARKERS

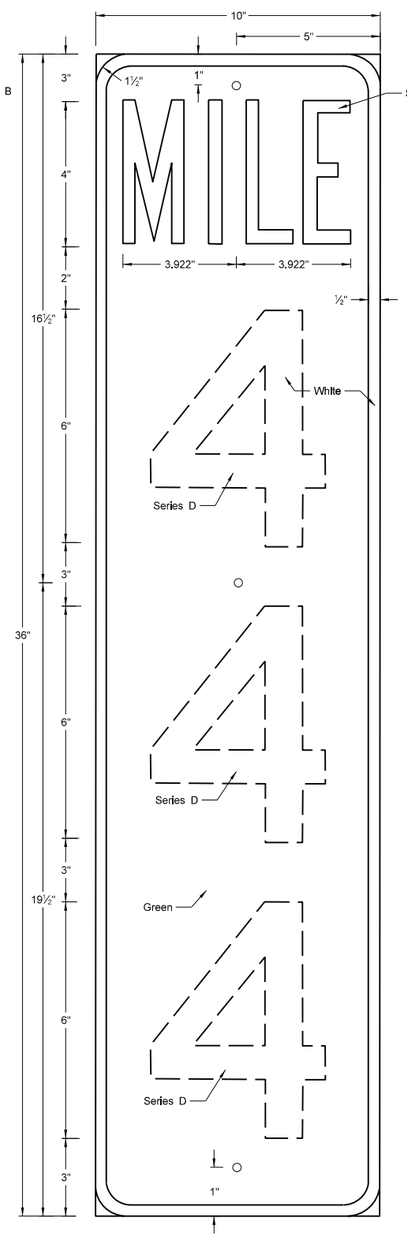
D-754-19



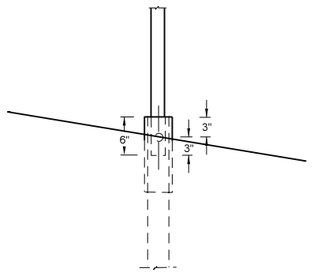
TYPE A
Area = 1.25 S.F.



TYPE B
Area = 1.88 S.F.

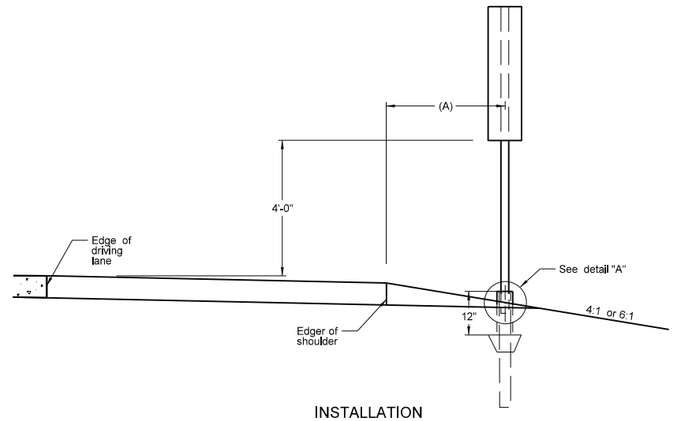


TYPE C
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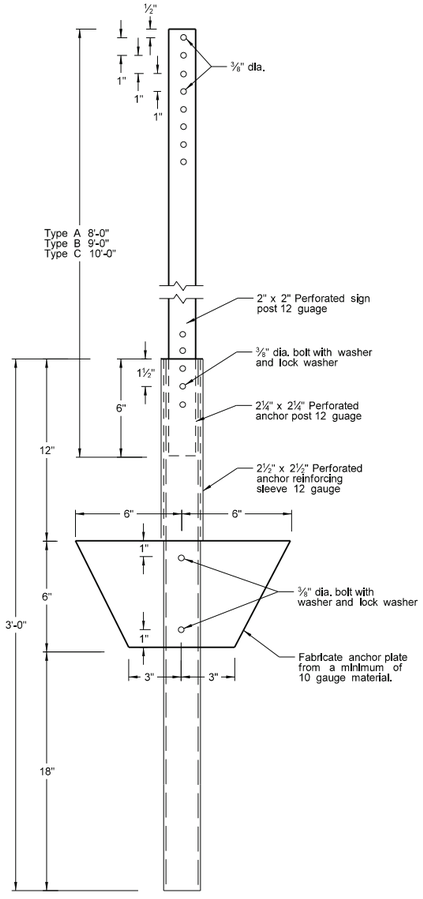


DETAIL "A"

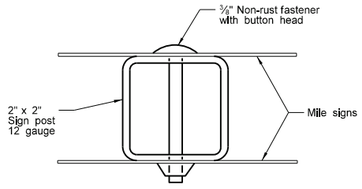
(A) 8' Clearance to finished shoulder or in line with existing delineator posts.



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.

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

08/05/24

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

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.

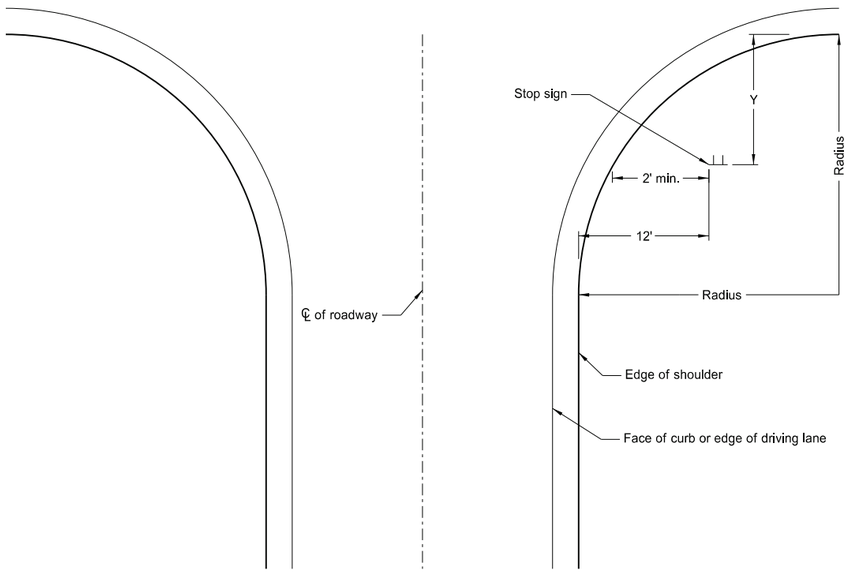
   Install signs on expressways a minimum height of 7'.

   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.

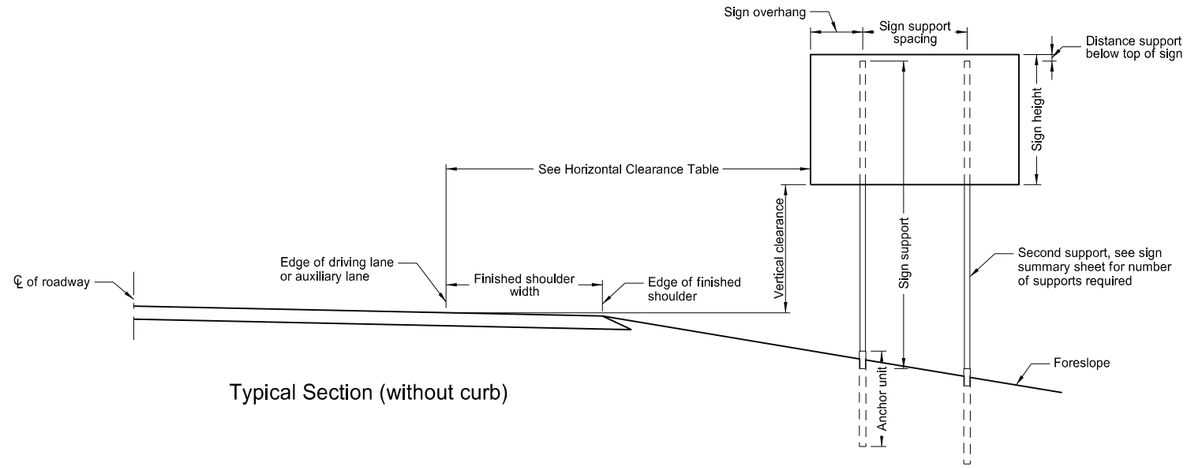
4. Provide a horizontal clearance from edge of shared use path to edge of sign of 3', except where width is limited. Provide a minimum clearance of 2'.



Stop Sign Location
Wide Throat Intersection

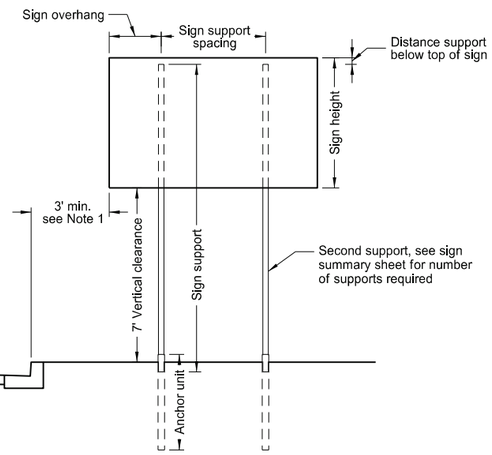
Use layout for the placement of "Stop" signs.

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



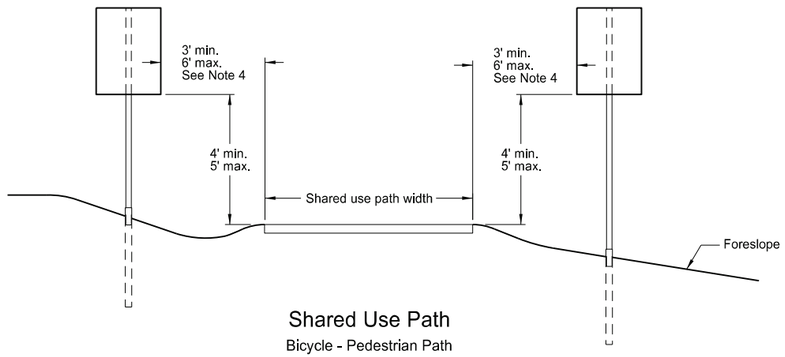
Typical Section (without curb)

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.

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

Kirk J. Hoff

08/05/24

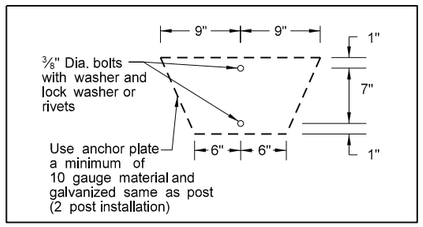
DocuSign Envelope ID: 3BB6949C-35F3-4834-B8EF-90A4185B6E25

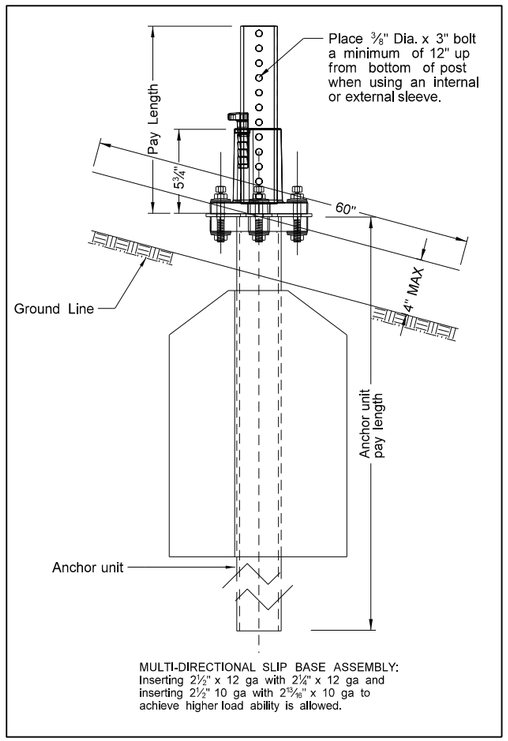
Mounting Details Perforated Tube

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.

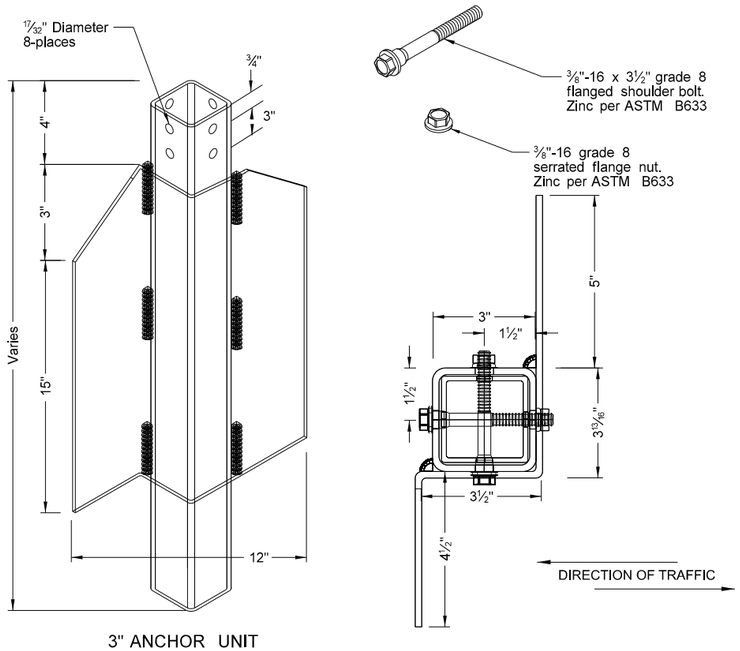




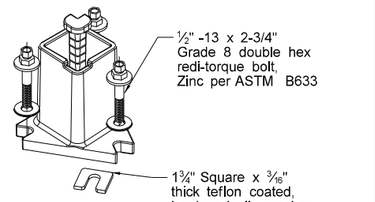
MULTI-DIRECTIONAL SLIP BASE ASSEMBLY:
Inserting 2½" x 12 ga with 2¼" x 12 ga and inserting 2½" 10 ga with 2 15/16" x 10 ga to achieve higher load ability is allowed.

SHOULDER BOLT

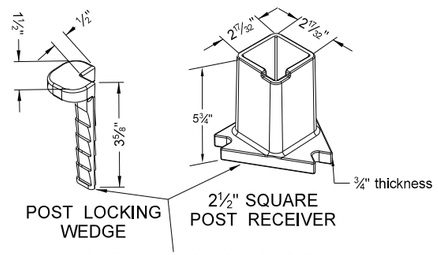
Shimming agent to reduce tolerance between 3" anchor unit and 2½" post.
(use standard ⅜" diameter grade 8 bolt with proper shim)

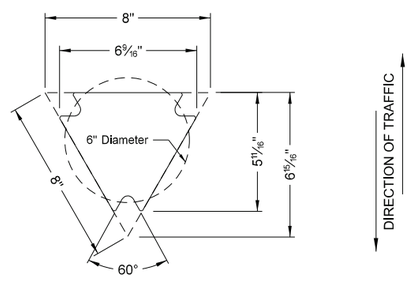


3" ANCHOR UNIT



SLIP BASE FOR 2½" POST





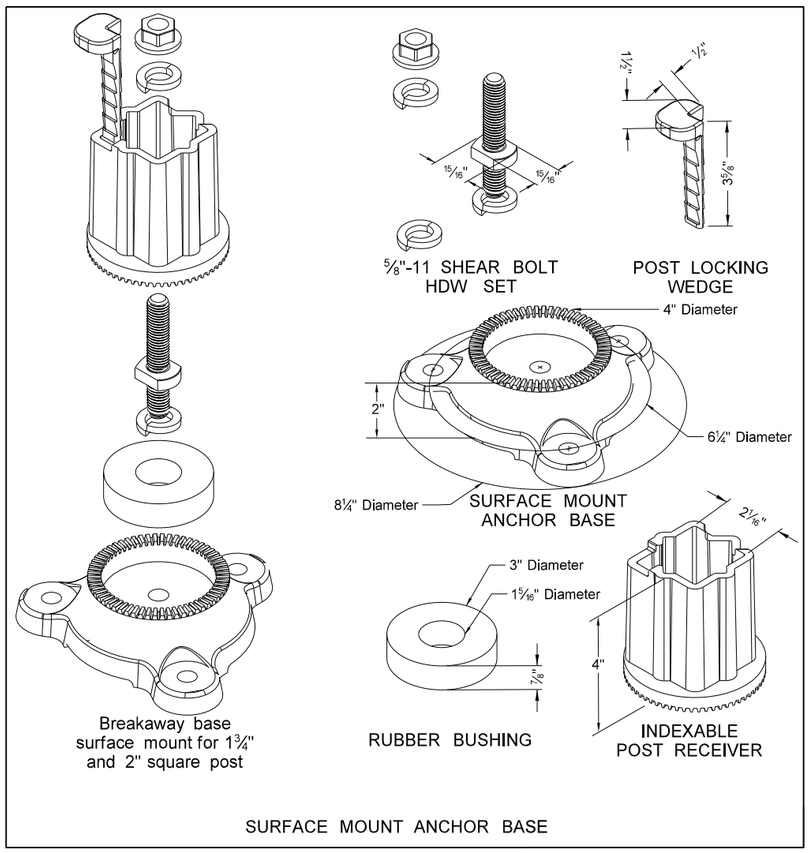
SLIP BASE DETAIL

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

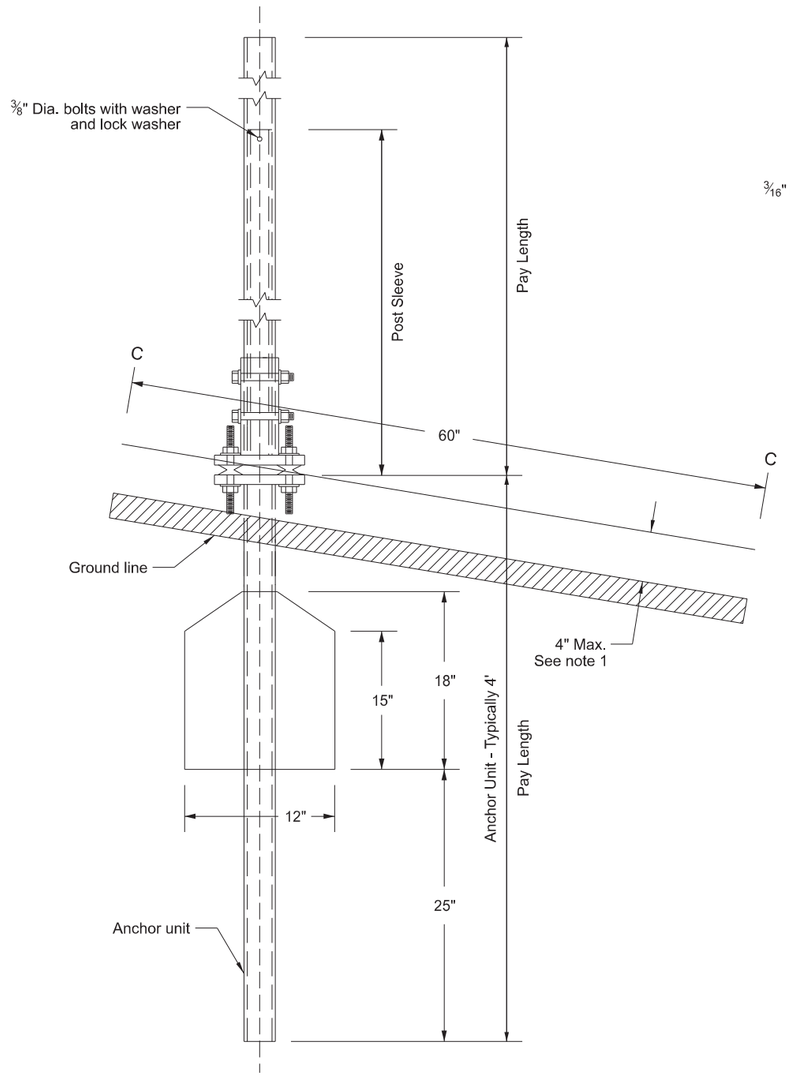
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-6-09	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice & corrected max height of base.
8-29-19	New Design Engineer PE Stamp.
8-05-24	Electronic Stamp/Signature.

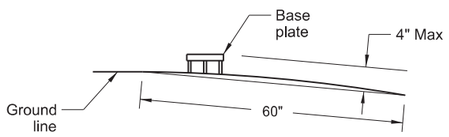
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/05/24

Docusign Envelope ID: B2017174-2071-4D82-BD09-F2B4B86DFDCB

D-754-24A

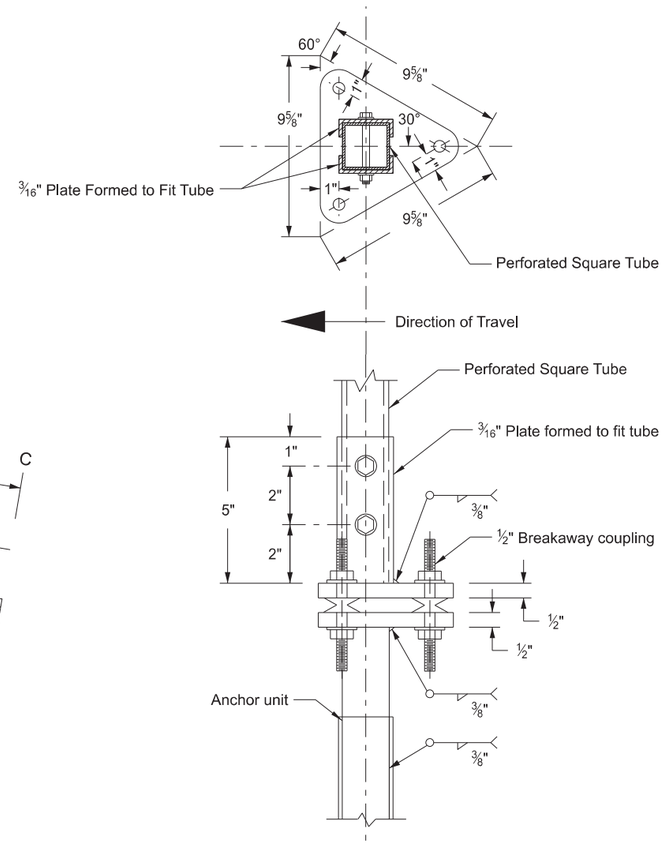




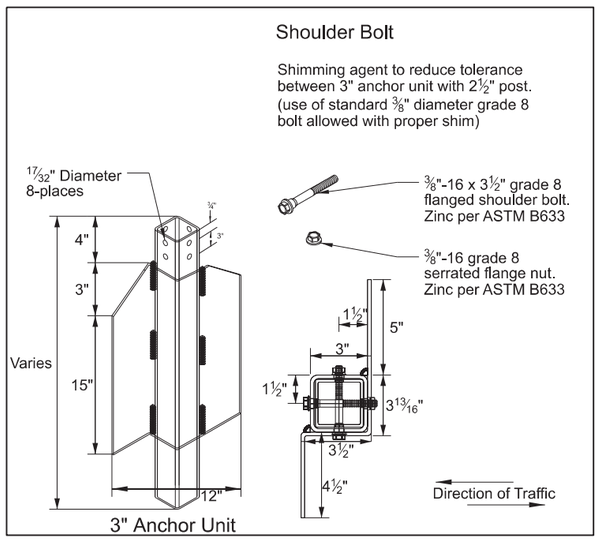
Section C-C

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.

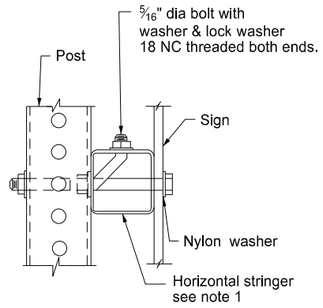
KIRK J. HOFFT REGISTERED PROFESSIONAL PE-4683 ENGINEER NORTH DAKOTA

07/22/25

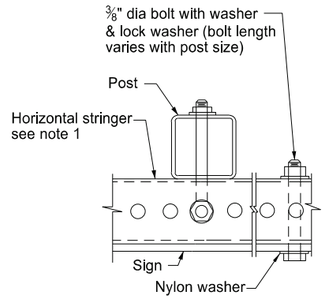
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Mounting Details Perforated Tube

D-754-25

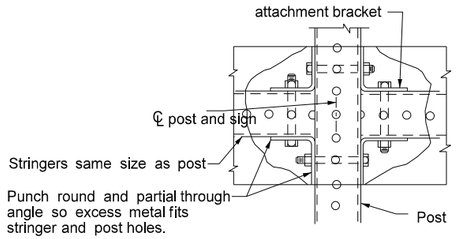


Side View



Top View

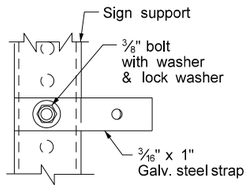
STRINGER MOUNTING
(WITH STRINGER IN FRONT OF POST)



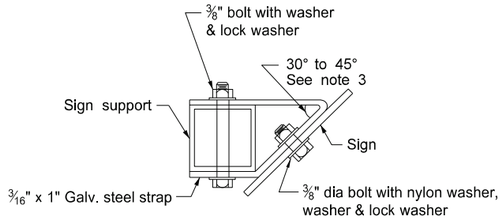
STREET NAME SIGNS AND ONE WAY SIGNS
SINGLE POST ASSEMBLY
ONE STRINGER OR BACK TO BACK MOUNTING

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.

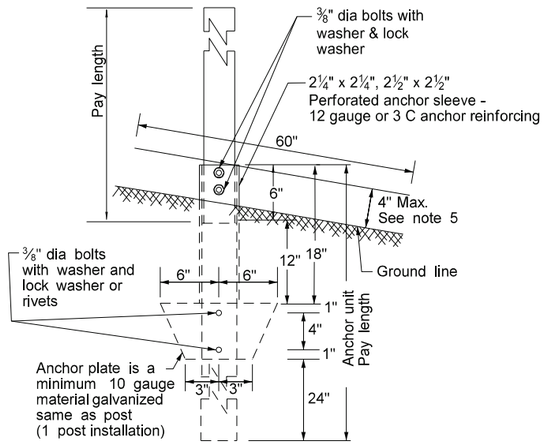


Side View



Top View

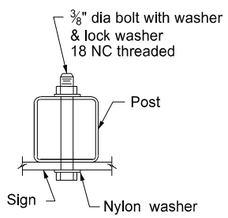
STRAP DETAIL



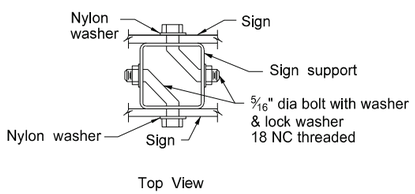
ANCHOR UNIT AND POST ASSEMBLY

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.

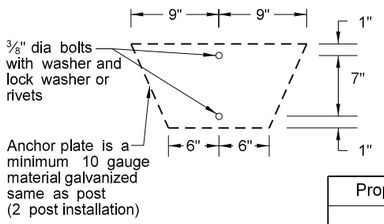


BOLT MOUNTING



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.

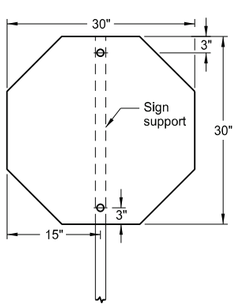
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/05/24

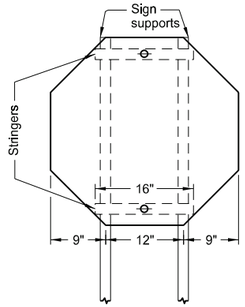
DocuSign Envelope ID: 3BB6949C-35F3-4834-B8EF-90A4185B6E25

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

D-754-26

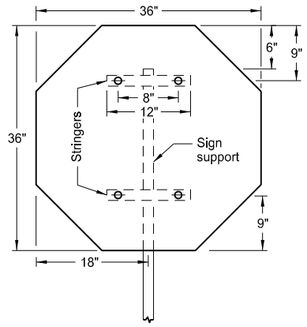


1 Post

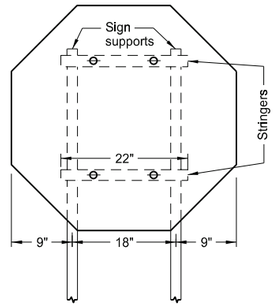


2 Posts

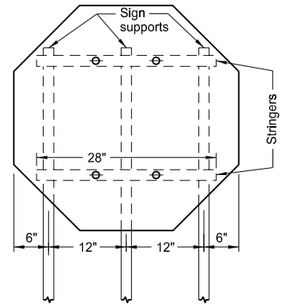
Assembly No. 1



1 Post



2 Posts

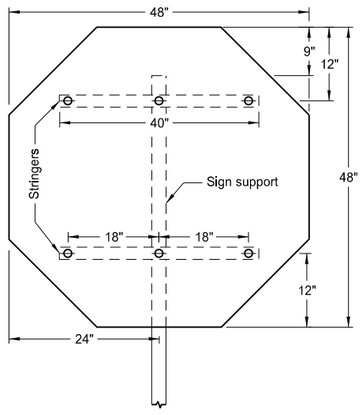


3 Posts

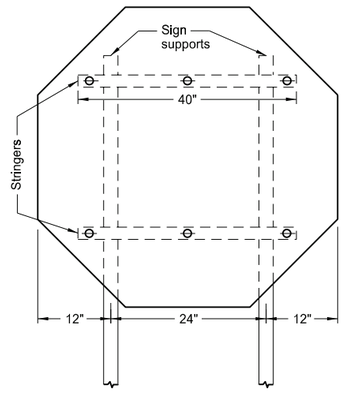
Assembly No. 2

Notes:

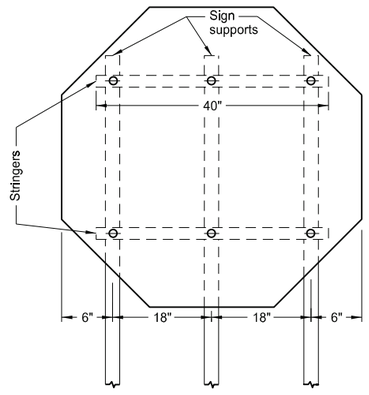
1. Use 0.100 inch minimum thickness sign backing material.
2. Use 1½" x 1½" perforated square tube stringers.
3. Punch holes round for ⅜" bolt.



1 Post

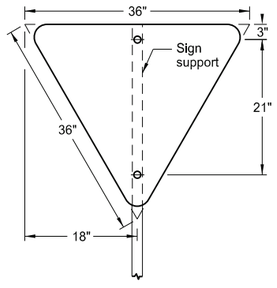


2 Posts

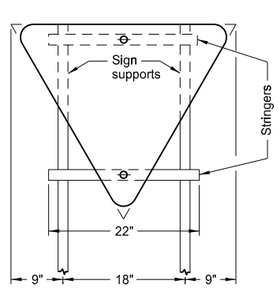


3 Posts

Assembly No. 3

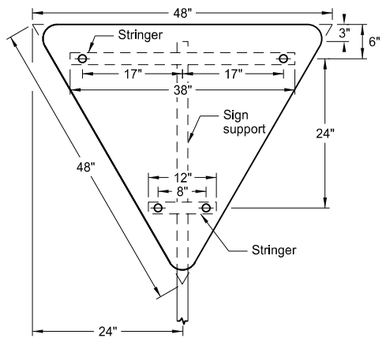


1 Post

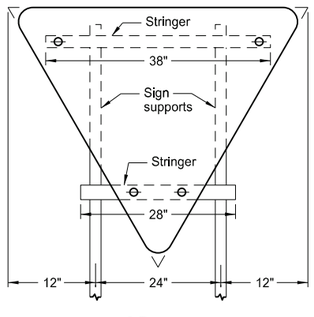


2 Posts

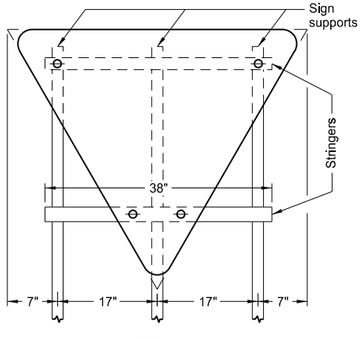
Assembly No. 4



1 Post



2 Posts



3 Posts

Assembly No. 5

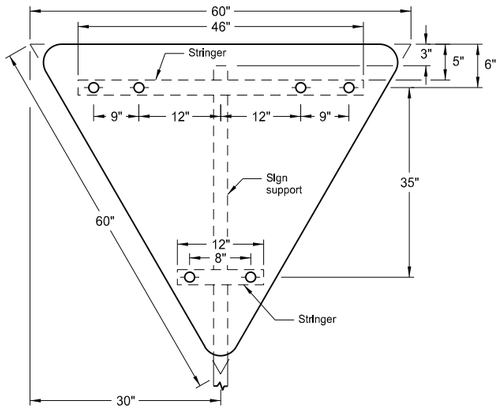
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
8-30-18 8-30-19 8-05-24	Updated notes to active voice. New Design Engineer PE Stamp. Electronic Stamp/Signature.

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

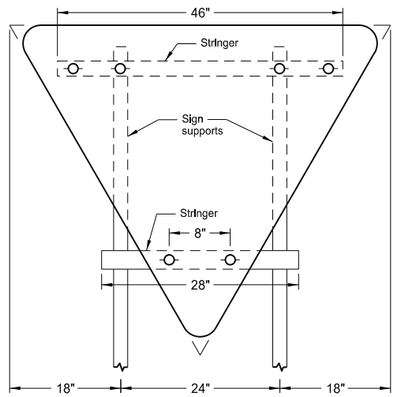
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SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS REGULATORY, WARNING AND GUIDE SIGNS

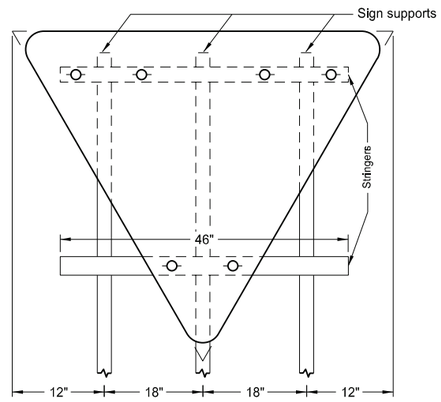
D-754-27



1 Post



2 Posts

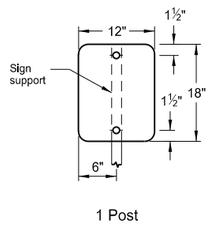


3 Posts

Assembly No. 6

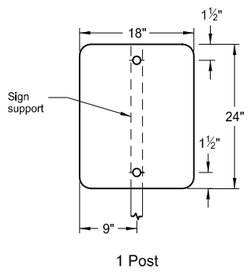
Notes:

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.



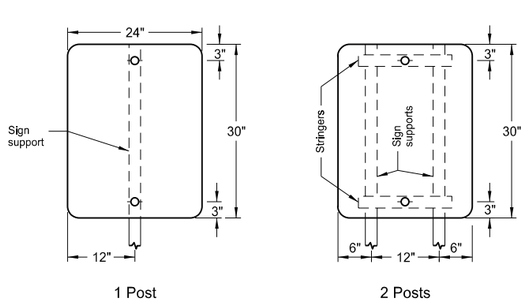
1 Post

Assembly No. 7



1 Post

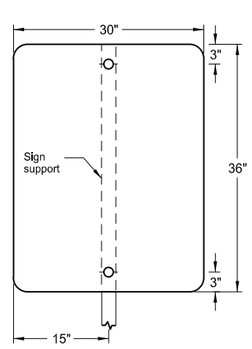
Assembly No. 8



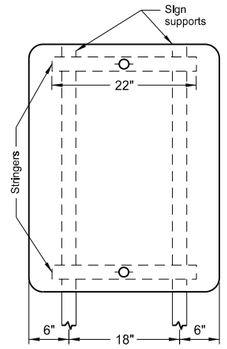
1 Post

2 Posts

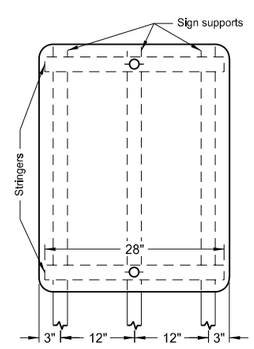
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1 Post

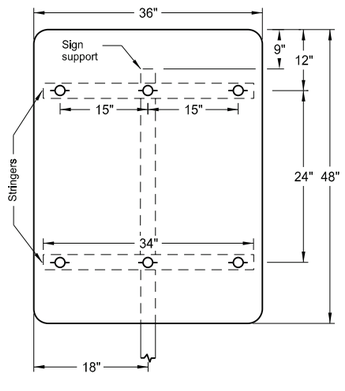


2 Posts

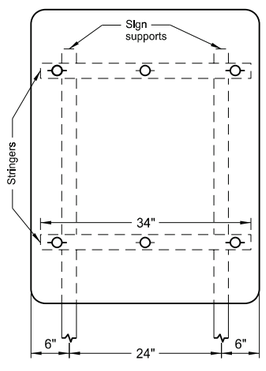


3 Posts

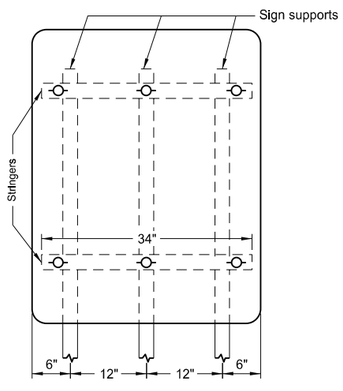
Assembly No. 10



1 Post



2 Posts



3 Posts

Assembly No. 11

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.

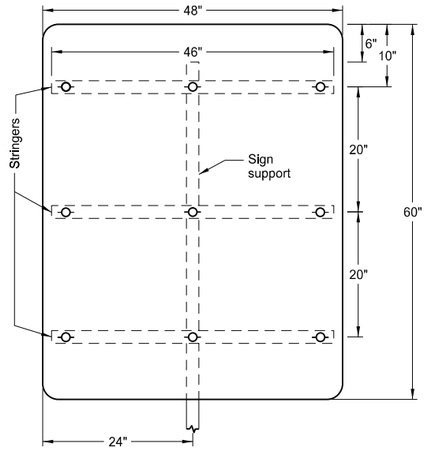
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/06/24

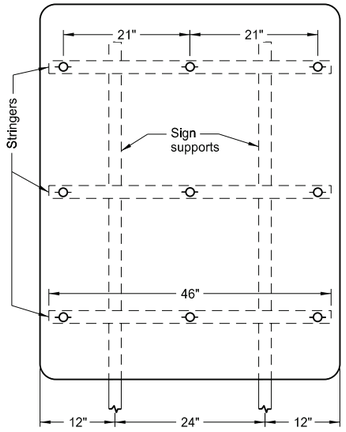
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SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS REGULATORY, WARNING AND GUIDE SIGNS

D-754-28

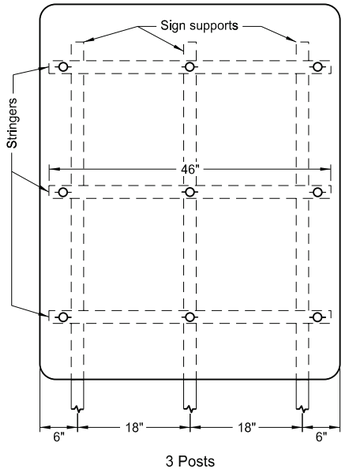


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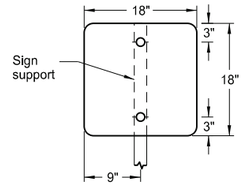


2 Posts

Assembly No. 12

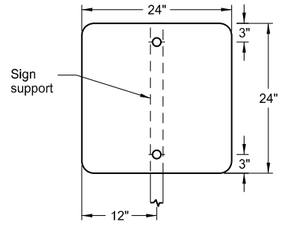


3 Posts

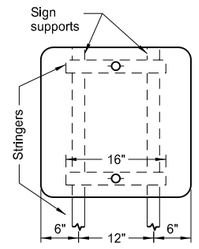


1 Post

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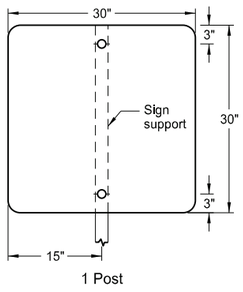


1 Post

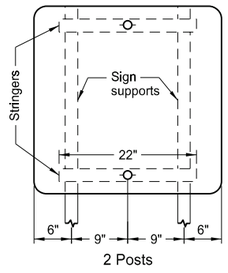


2 Posts

Assembly No. 14

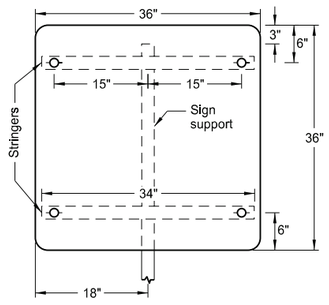


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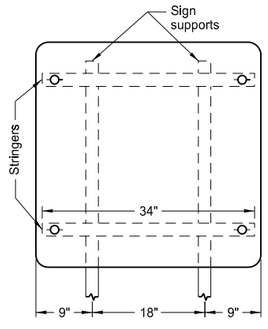


2 Posts

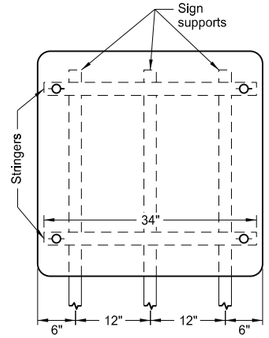
Assembly No. 15



1 Post

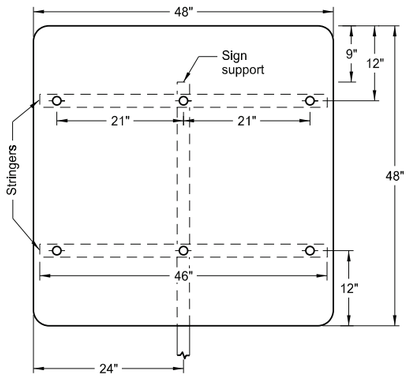


2 Posts

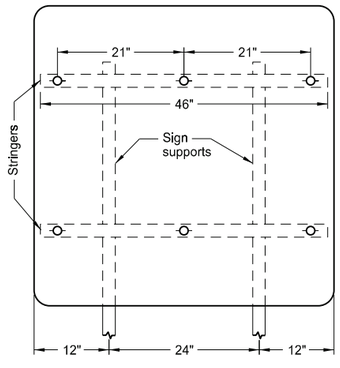


3 Posts

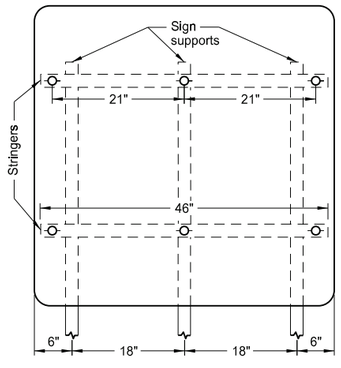
Assembly No. 16



1 Post



2 Posts



3 Posts

Assembly No. 17

Notes:

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

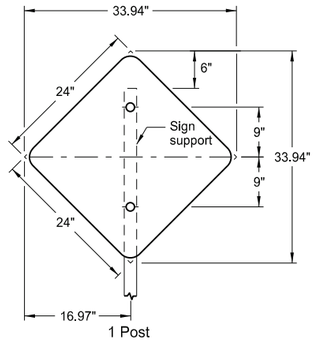
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
8-30-18	Updated to active voice & changed Assembly 16 post spacing.
8-30-19	New Design Engineer PE Stamp.
8-06-24	Electronic Stamp/Signature.

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

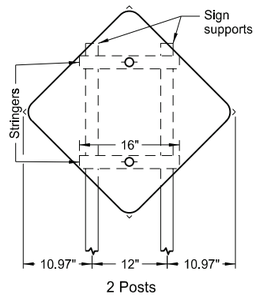
08/06/24

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

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

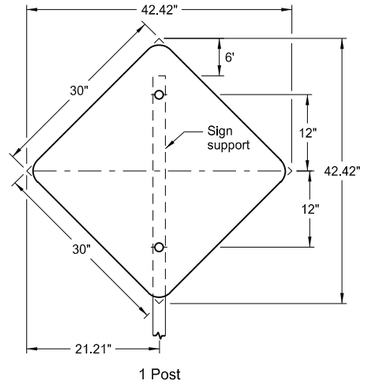


1 Post

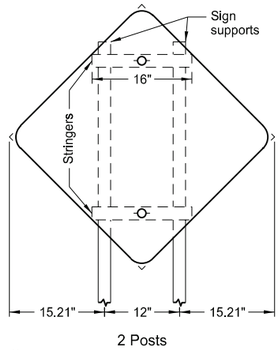


2 Posts

Assembly No. 18

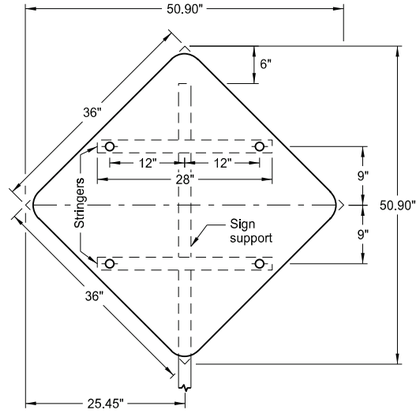


1 Post

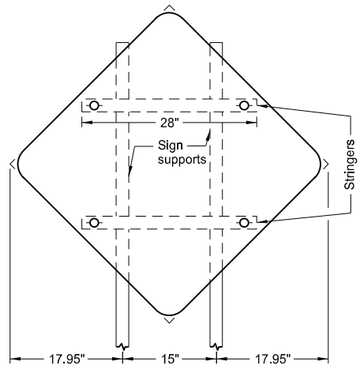


2 Posts

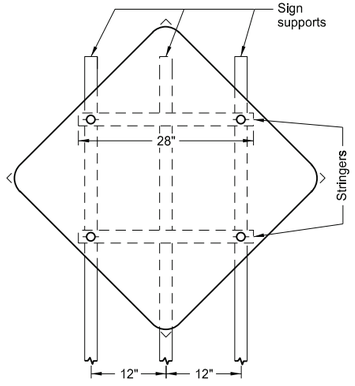
Assembly No. 19



1 Post

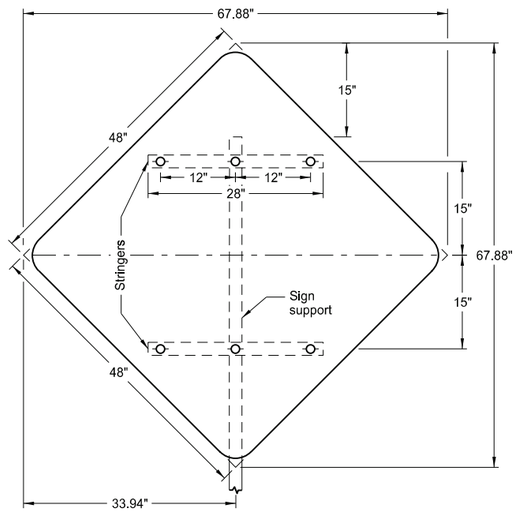


2 Posts

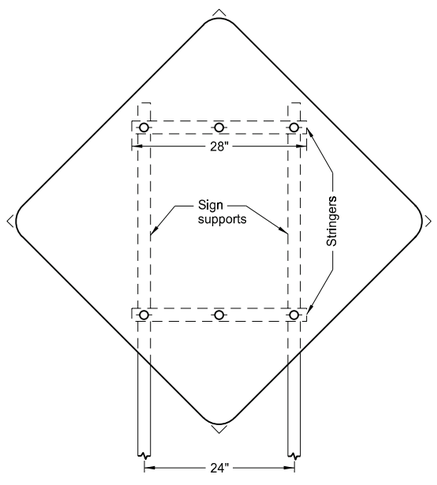


3 Posts

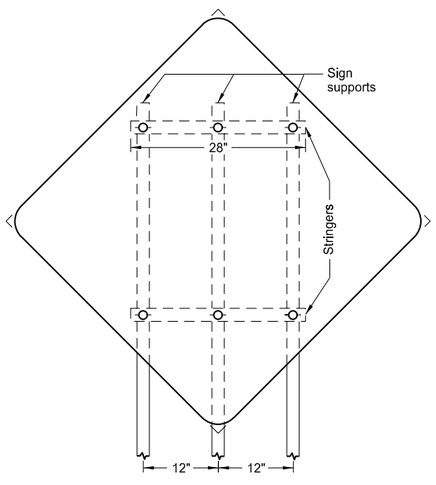
Assembly No. 20



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.

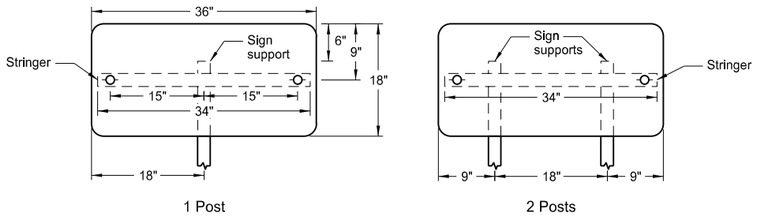
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/06/24

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

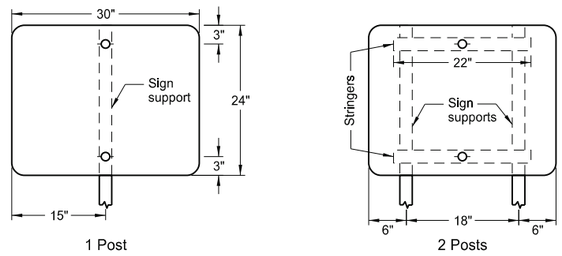
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS REGULATORY, WARNING AND GUIDE SIGNS

D-754-32



1 Post 2 Posts

Assembly No. 31

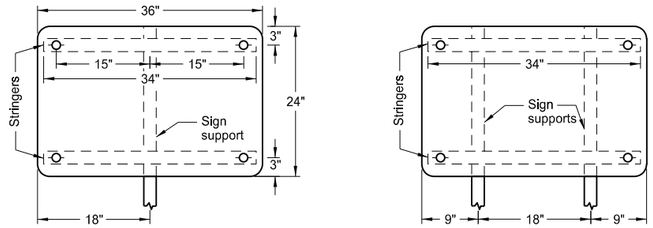


1 Post 2 Posts

Assembly No. 32

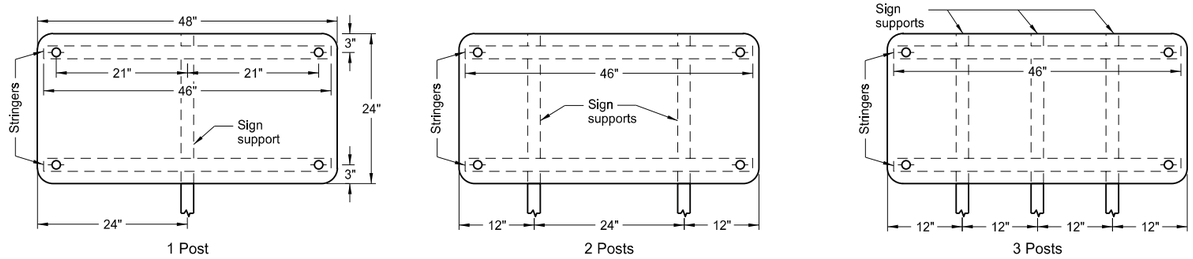
Notes:

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.



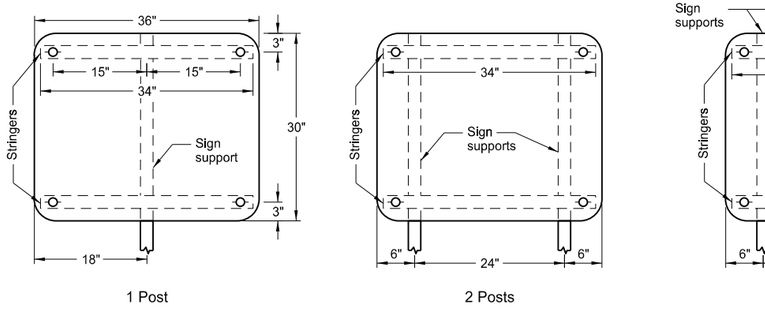
1 Post 2 Posts

Assembly No. 33



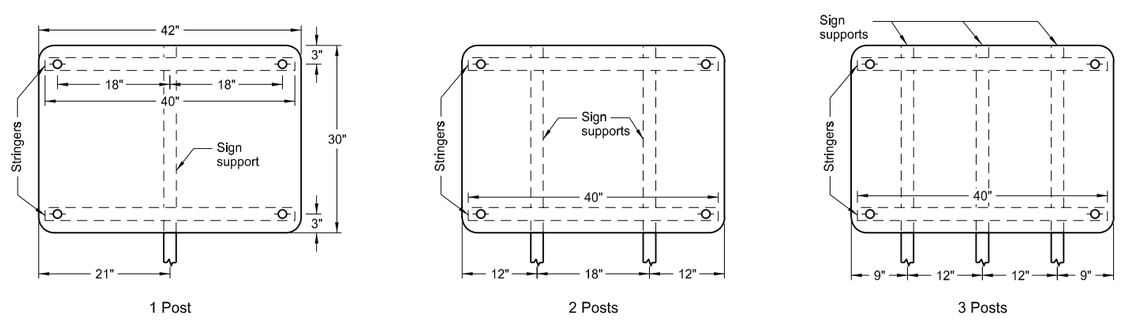
1 Post 2 Posts 3 Posts

Assembly No. 34



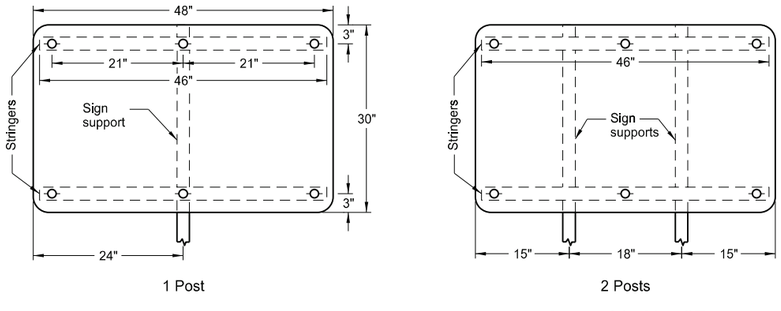
1 Post 2 Posts 3 Posts

Assembly No. 35



1 Post 2 Posts 3 Posts

Assembly No. 36



1 Post 2 Posts 3 Posts

Assembly No. 37

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.

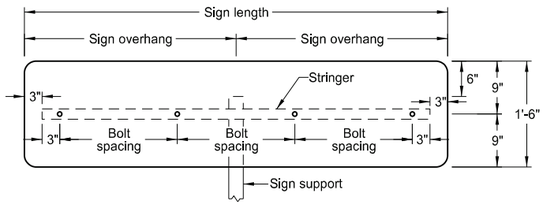
KIRK J. HOFF REGISTERED PROFESSIONAL PE-4683 ENGINEER NORTH DAKOTA

08/06/24

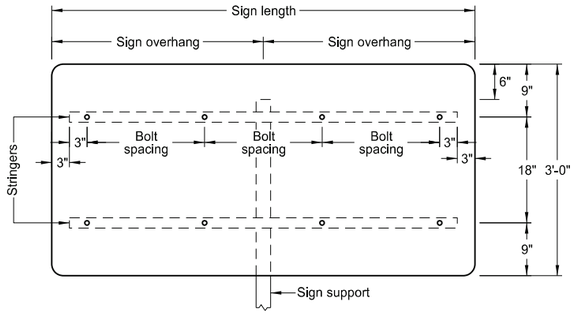
DocuSign Envelope ID: BCB8FF2A-083E-48A1-8BCC-2D048B980E67

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

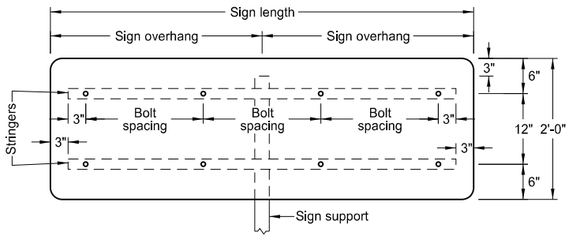
D-754-47



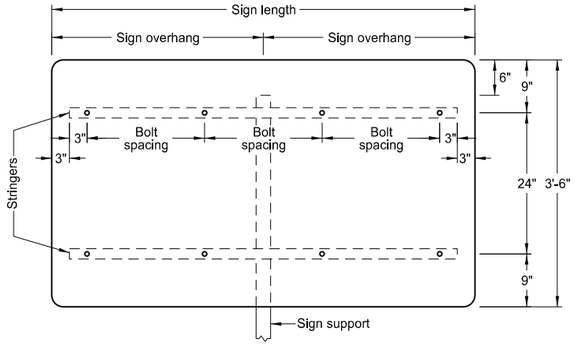
VARIES X 1'-6"



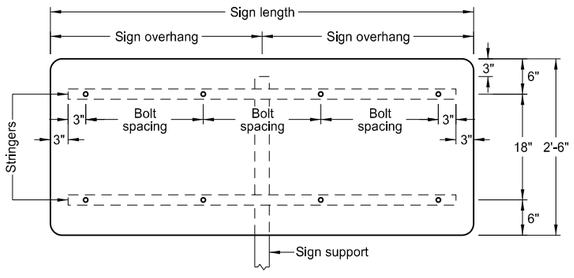
VARIES X 3'-0"



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.

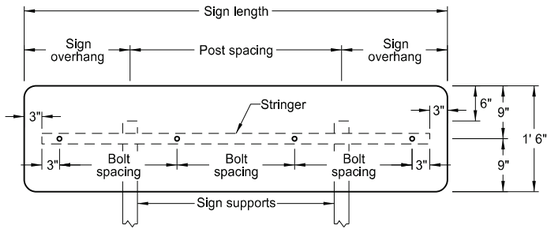
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/07/24

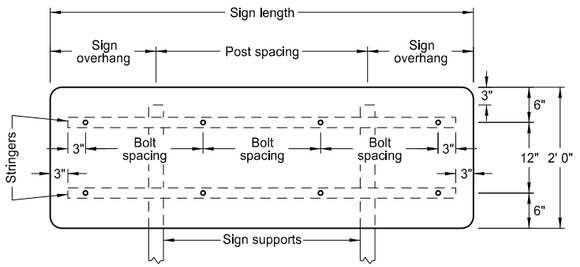
DocuSign Envelope ID: BCB8FF2A-083E-48A1-8BCC-2D048B980E67

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

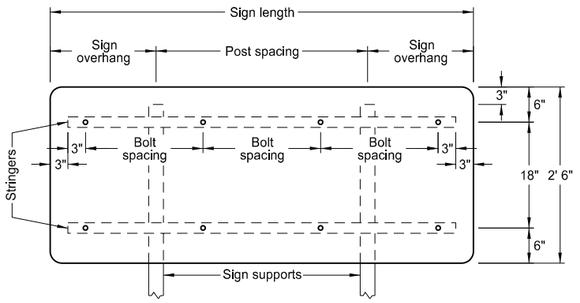
D-754-48



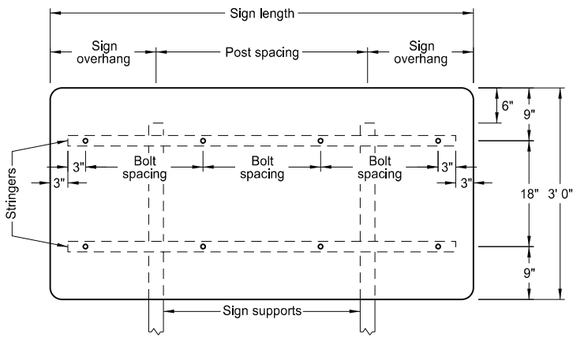
VARIES X 1'-6"



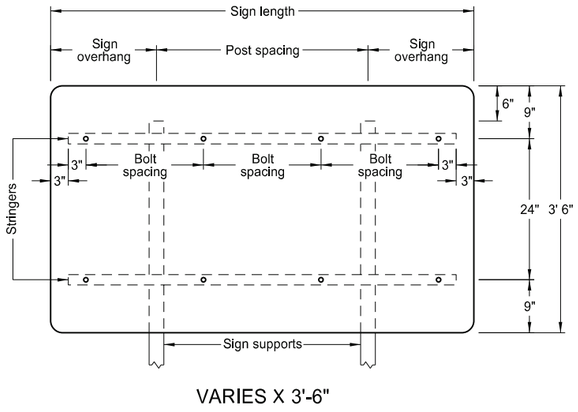
VARIES X 2'-0"



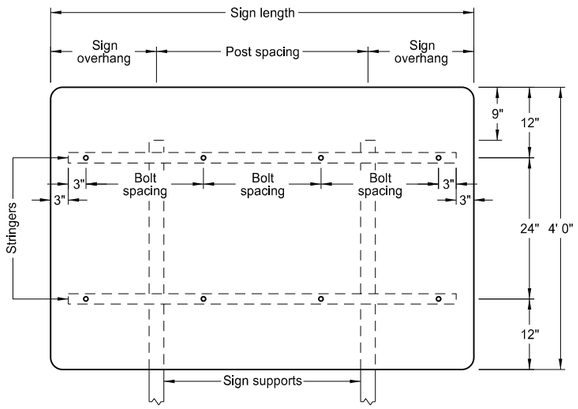
VARIES X 2'-6"



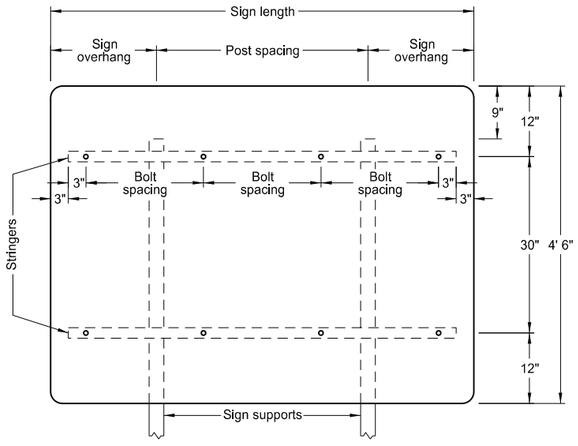
VARIES X 3'-0"



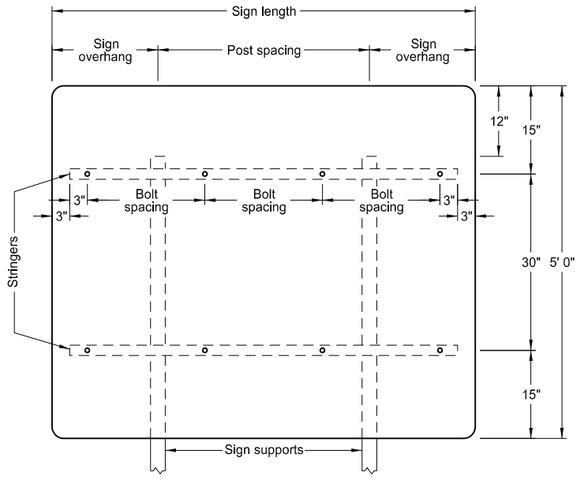
VARIES X 3'-6"



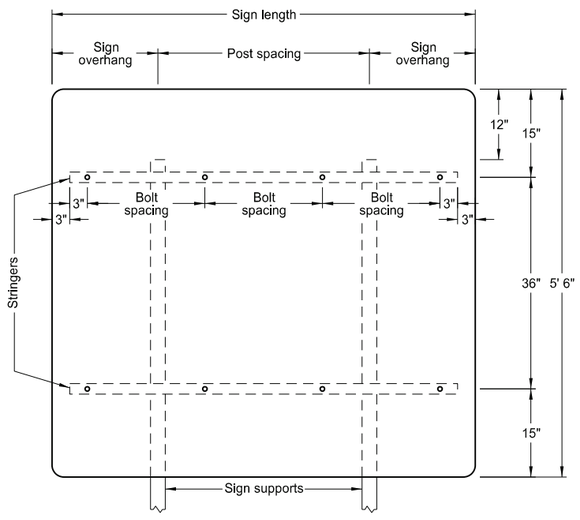
VARIES X 4'-0"



VARIES X 4'-6"



VARIES X 5'-0"



VARIES X 5'-6"

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

Notes:

1. 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.

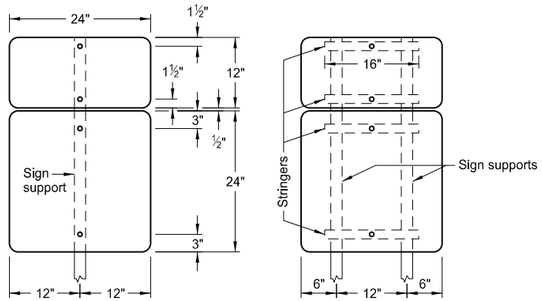
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-25-12	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice.
9-04-19	New Design Engineer PE Stamp.
8-07-24	Electronic Stamp/Signature.

KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
08/07/24

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

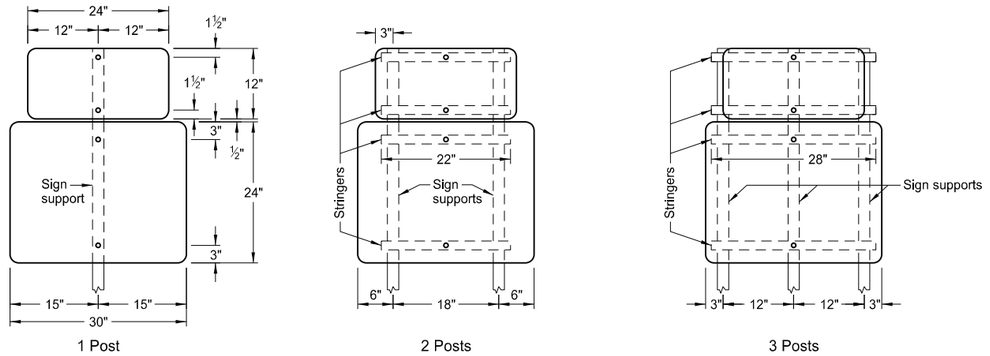
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS - ROUTE MARKER SIGNS

D-754-51



1 Post 2 Posts

ASSEMBLY NO. 371

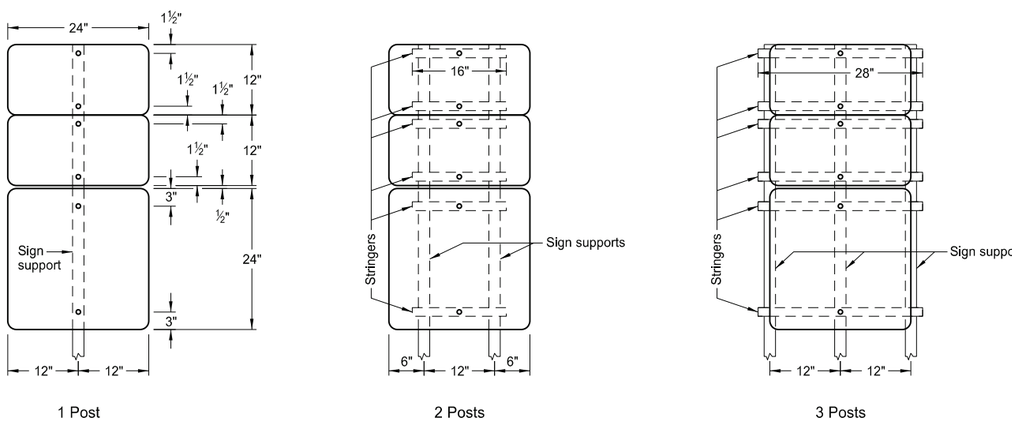


1 Post 2 Posts 3 Posts

ASSEMBLY NO. 372

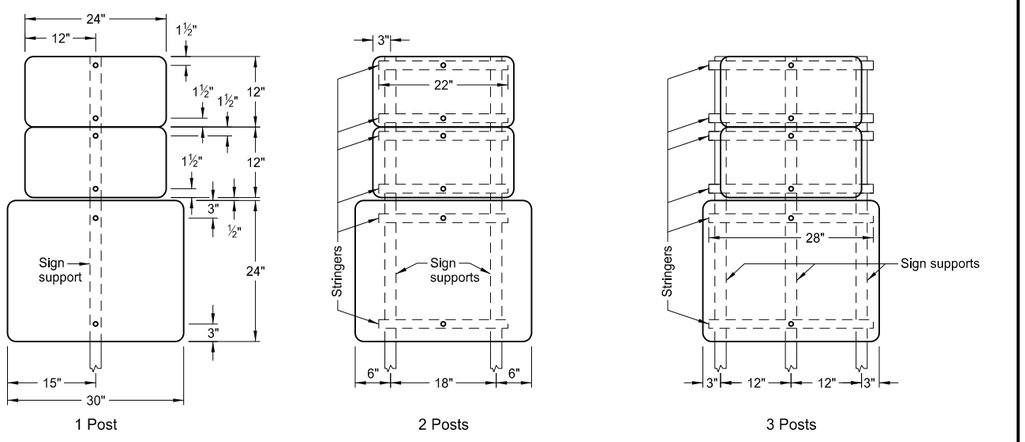
Notes:

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.



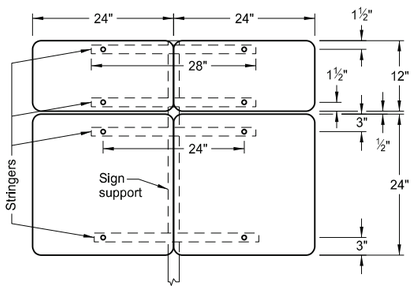
1 Post 2 Posts 3 Posts

ASSEMBLY NO. 373

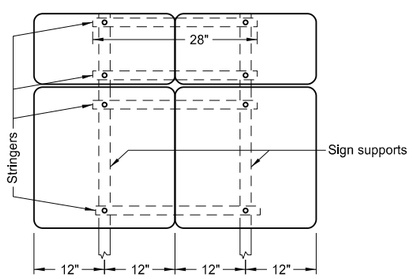


1 Post 2 Posts 3 Posts

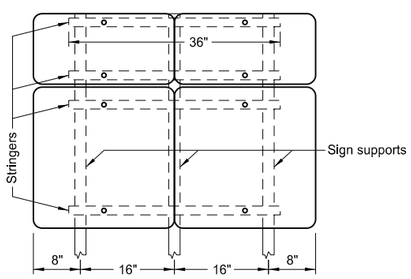
ASSEMBLY NO. 374



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.

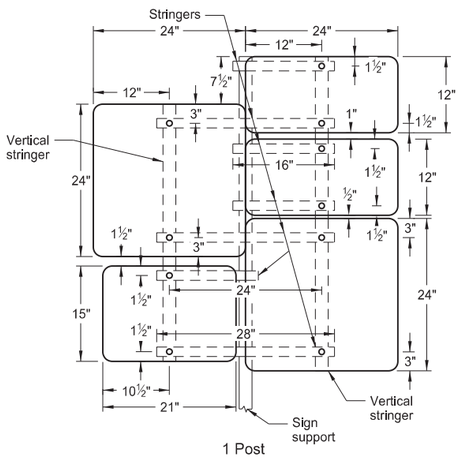
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/07/24

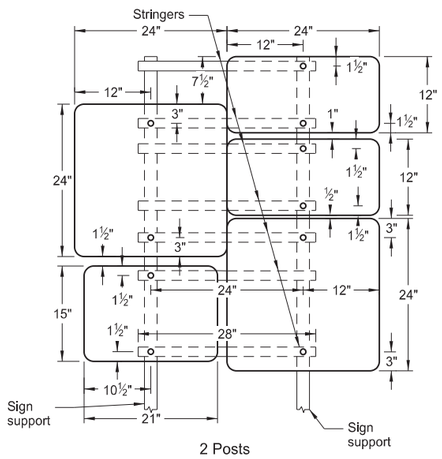
DocuSign Envelope ID: C3490446-F65D-4226-AC76-79FBB84E9BA5

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

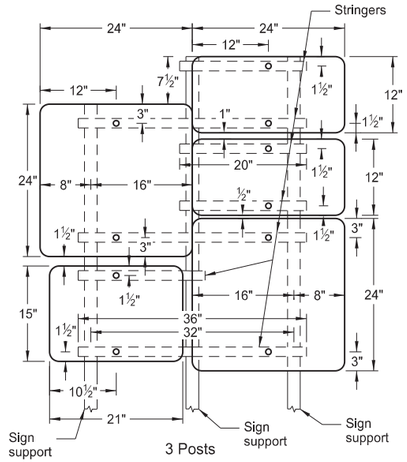
D-754-74



1 Post



2 Posts

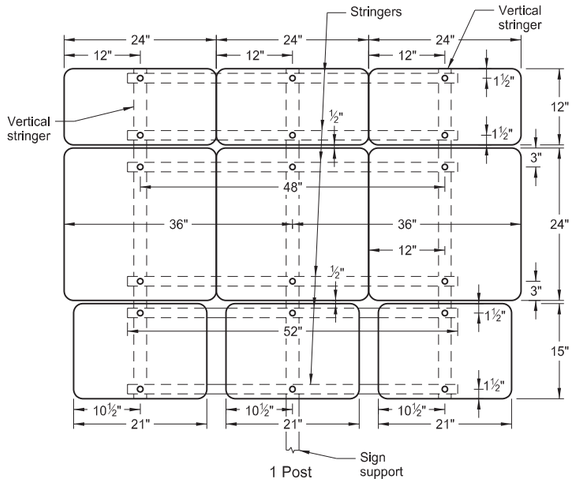


3 Posts

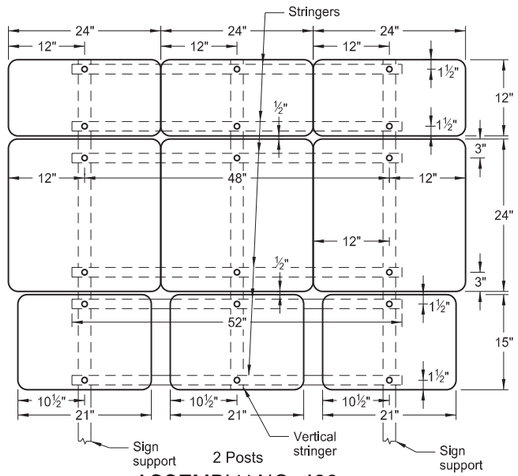
ASSEMBLY NO. 435

Notes:

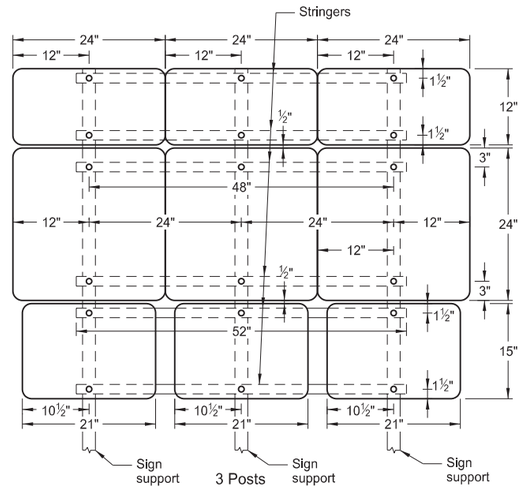
1. Use 0.100 inch minimum thickness sign backing material.
2. Use 1½"x1½" perforated square tube stringers.
3. Punch holes round for ⅜" bolt.



1 Post

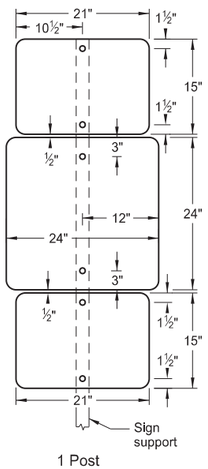


2 Posts

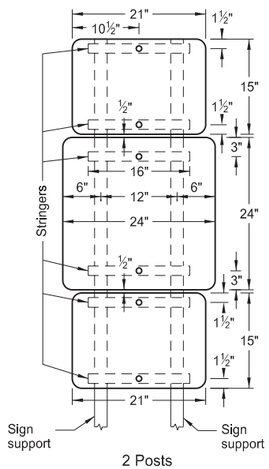


3 Posts

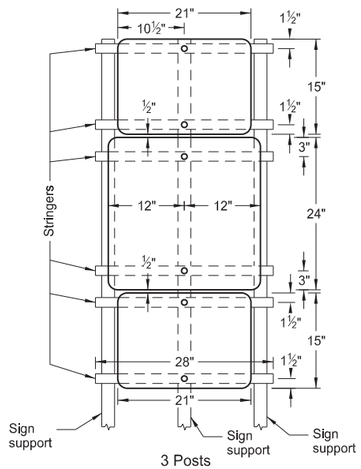
ASSEMBLY NO. 436



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.

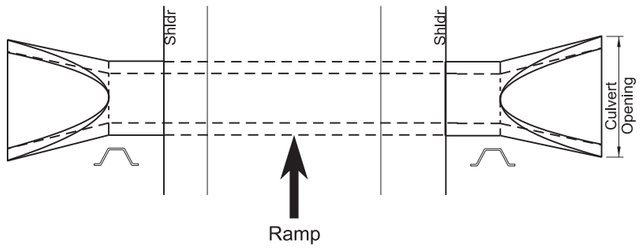
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

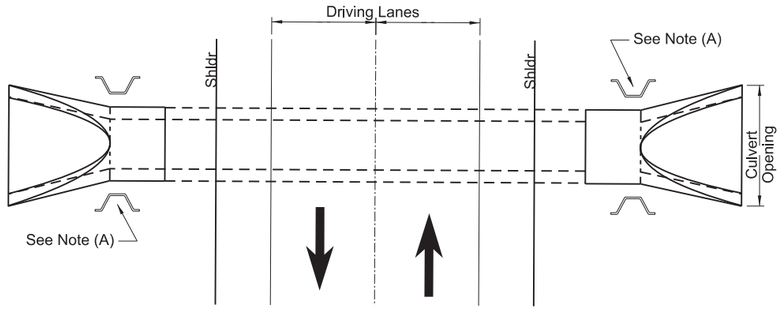
08/08/24

Docusign Envelope ID: 16F7A80B-8DD6-45CC-B8F9-AA9BED01BCFF

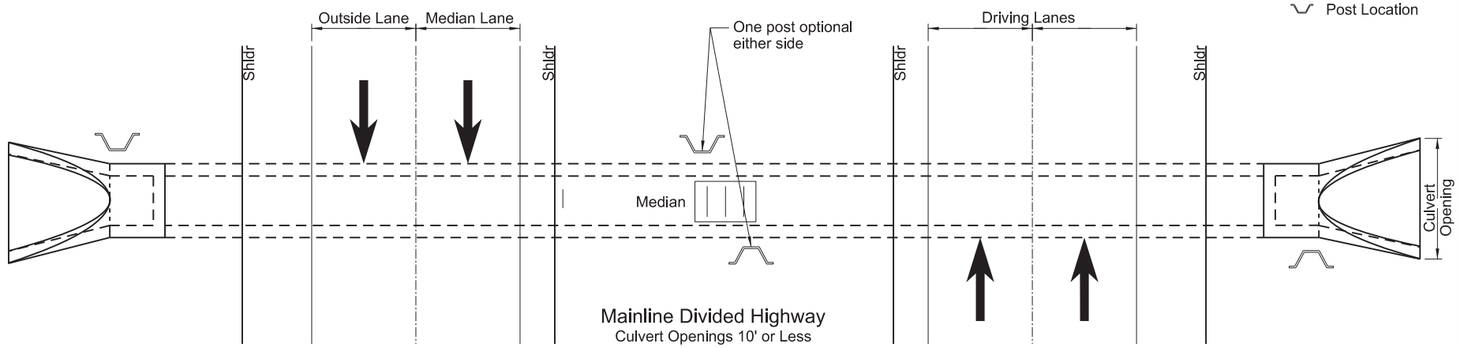
OBJECT MARKERS - CULVERTS

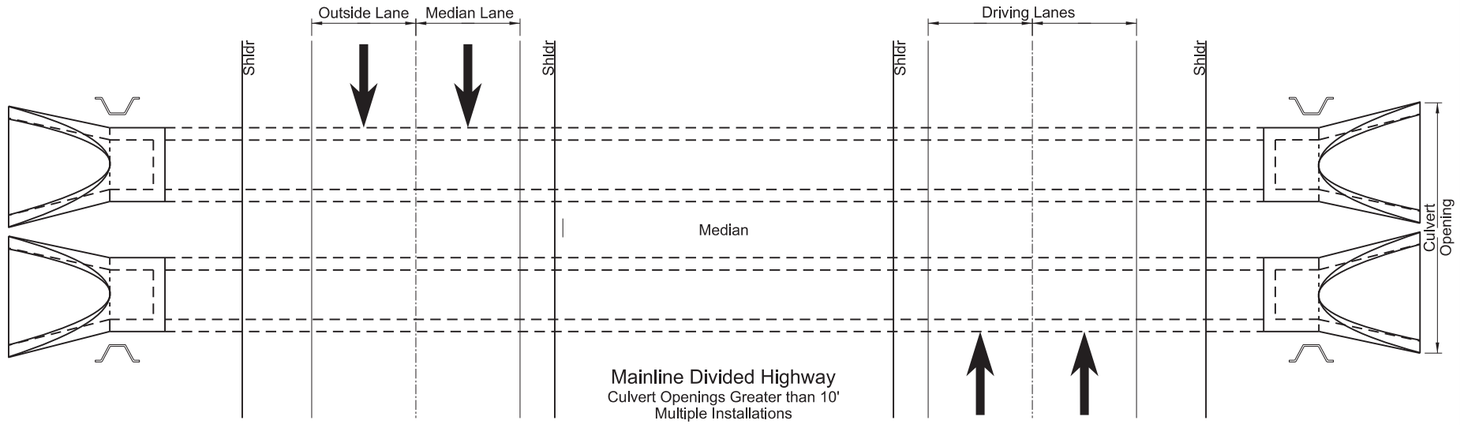
D-754-83

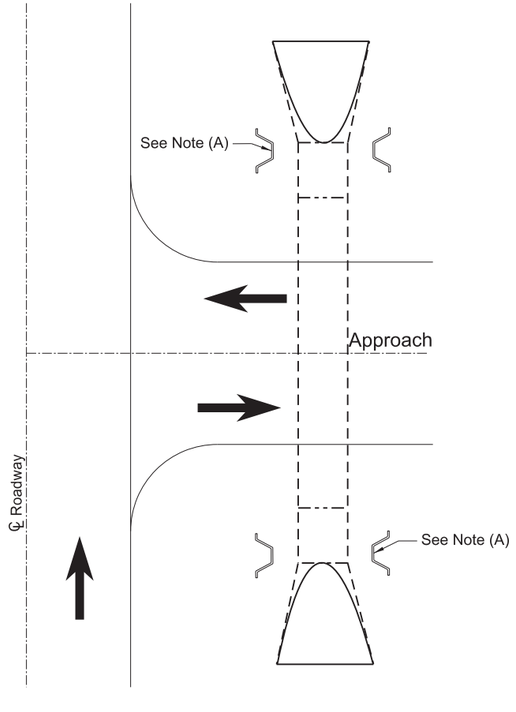


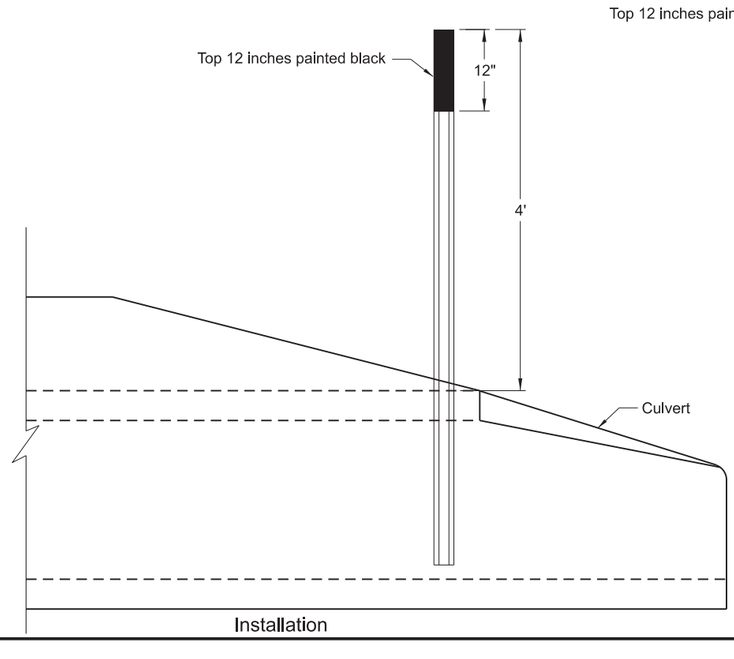


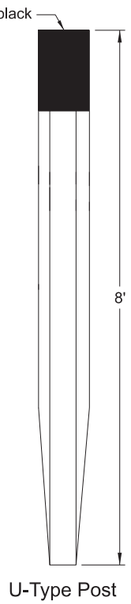
(A) Install additional marker where multiple pipe installations have a width greater than 10'.





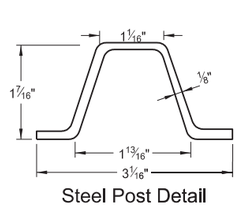




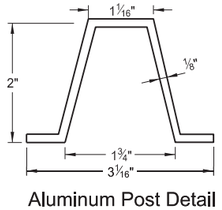


Note:

Mark each end of culverts within the right-of-way with a post. Install posts in front of culvert in direction of travel along the side of culvert and one foot from culvert opening unless shown otherwise in plans.



Steel Post Detail
Approx. 2.0 lbs/ft



Aluminum Post Detail
Approx. 0.88 lbs/ft

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-05-13	
REVISIONS	
DATE	CHANGE
7-7-14	Revised Notes
8-30-18	Updated notes to active voice.
9-05-19	New Design Engineer PE Stamp.
3-13-25	Added Approach Pipe Detail.

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

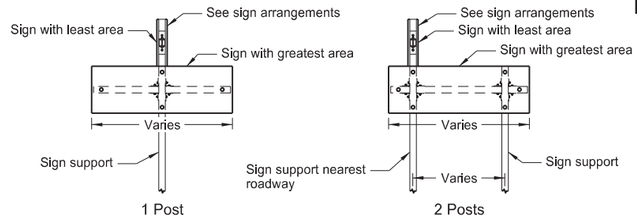
03/13/25

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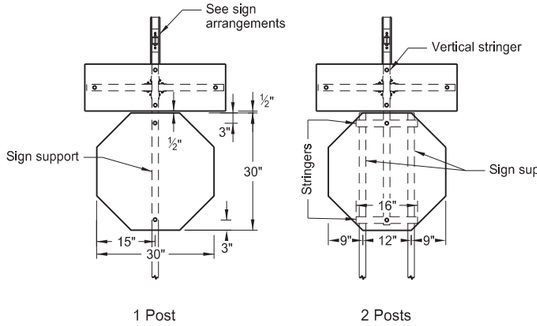
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS FOR STREET NAME SIGNS AND 911 SIGNS

D-754-87

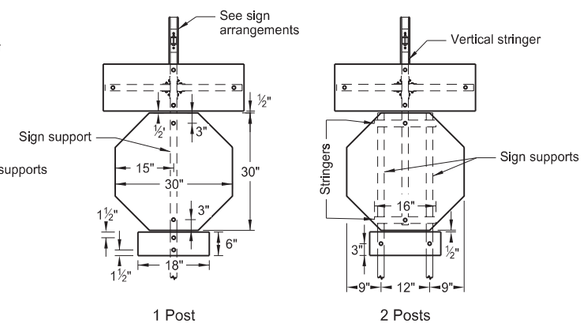
A - Single sign
B - Single sign back to back
C - Single sign each direction
D - Single sign one direction, back to back other direction
E - Back to back both directions



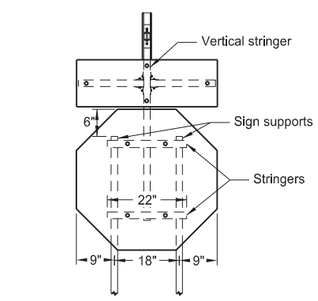
Special Assembly 1 (A, B, C, D or E)

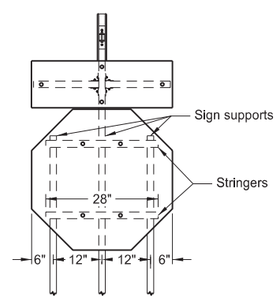


Special Assembly 2 (A, B, C, D or E)

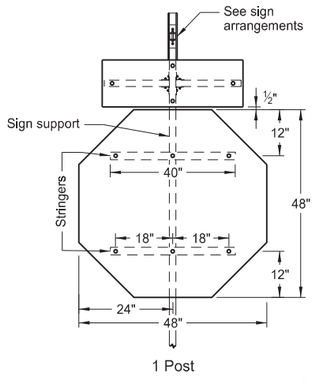


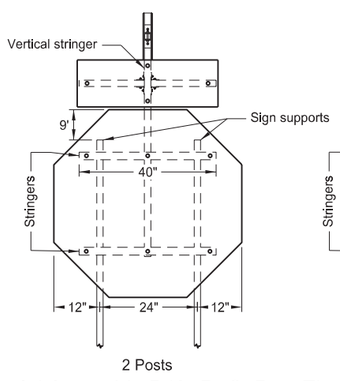
Special Assembly 3 (A, B, C, D or E)

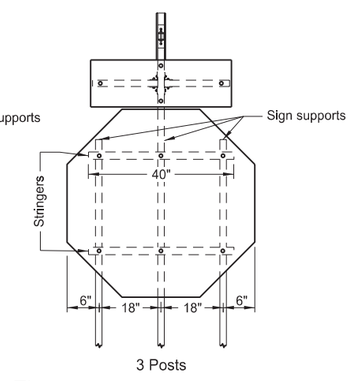




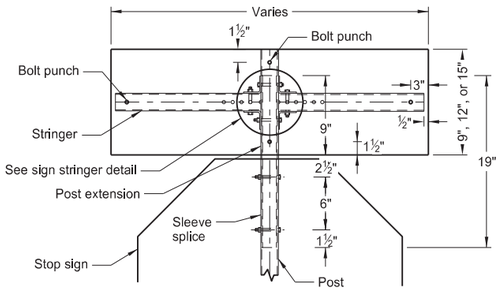
Special Assembly 4 (A, B, C, D or E)





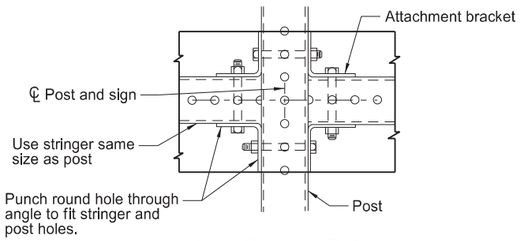


Special Assembly 5 (A, B, C, D or E)



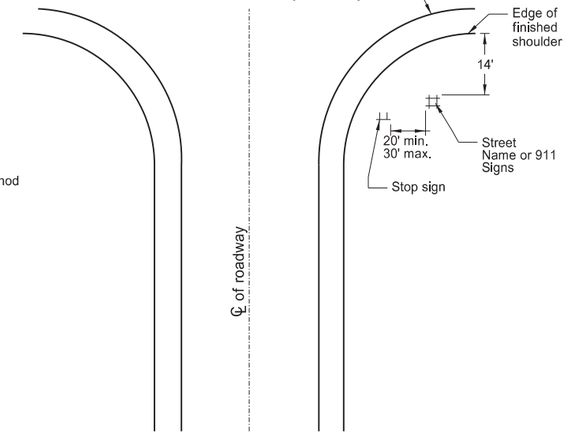
Sleeve Splice Detail

Note: Only use splice method with approval of engineer.



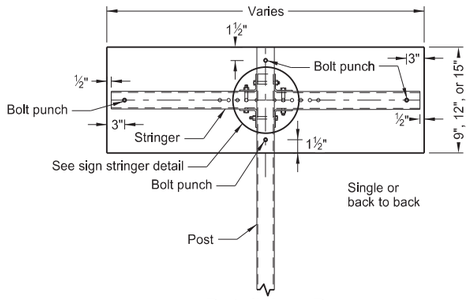
Sign Stringer Detail

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

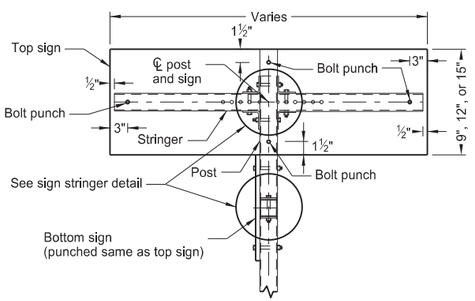


Intersection Layout

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

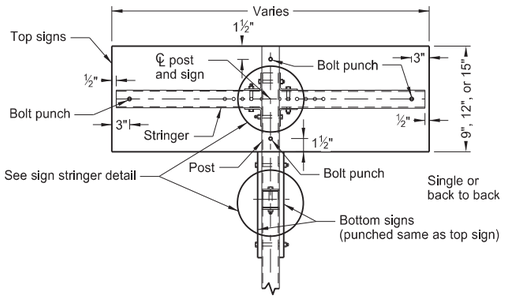


Detail A or B



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.

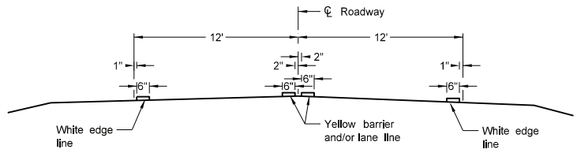
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/08/24

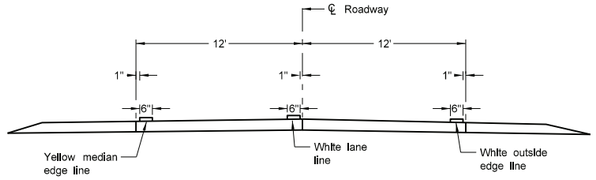
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PAVEMENT MARKING

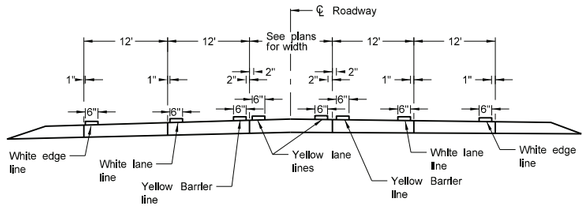
D-762-4



Two Lane Two Way
RURAL ROADWAY



Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



RURAL FIVE LANE ROADWAY
Concrete Section

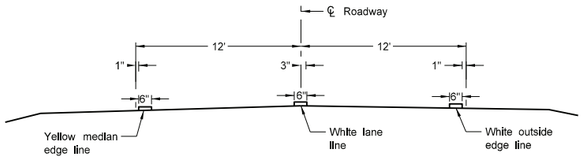
NOTES:

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

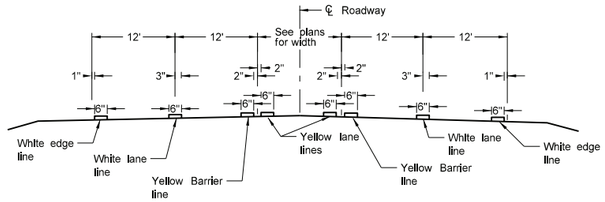
   For section lines, county roads, and street approaches, stripe the radii and edge lines of the paved surface within the right of way except where curb and gutter is present.

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

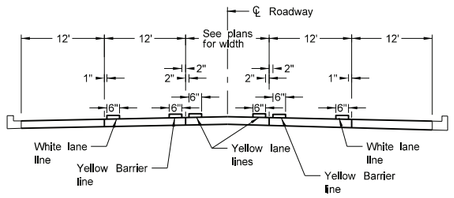
3. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits < 40 mph.



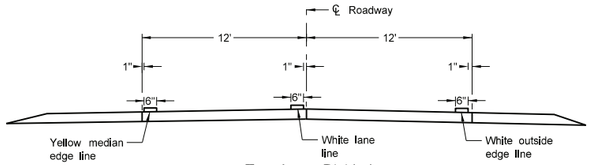
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



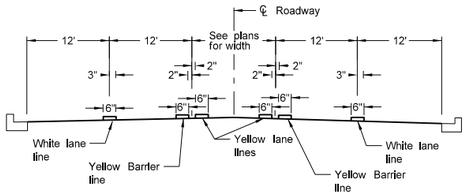
RURAL FIVE LANE ROADWAY
Asphalt Section



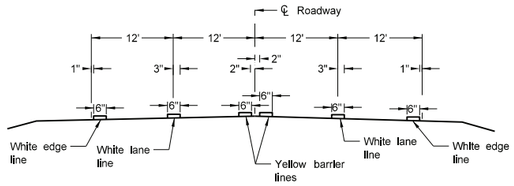
URBAN FIVE LANE SECTION
Concrete Section



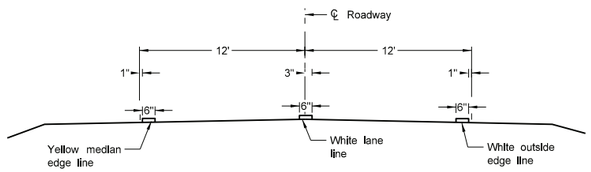
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Concrete Section



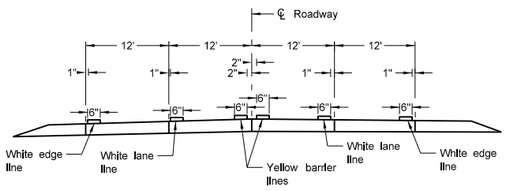
URBAN FIVE LANE SECTION
Asphalt Section



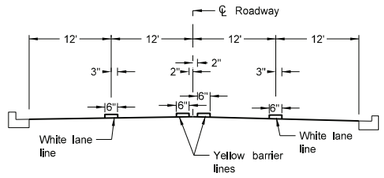
RURAL FOUR LANE ROADWAY
Asphalt Section



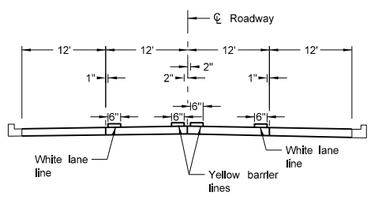
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



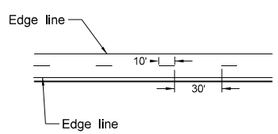
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

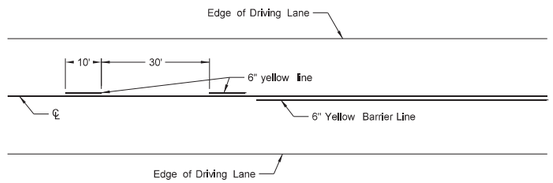
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
08-27-19	New Design Engineer PE Stamp.
11-22-23	Revised pavement marking widths.
07-09-24	Modified Note 1.

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

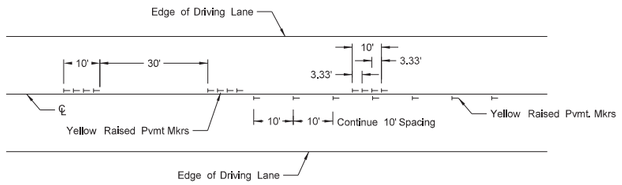
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SHORT-TERM PAVEMENT MARKING

D-762-11

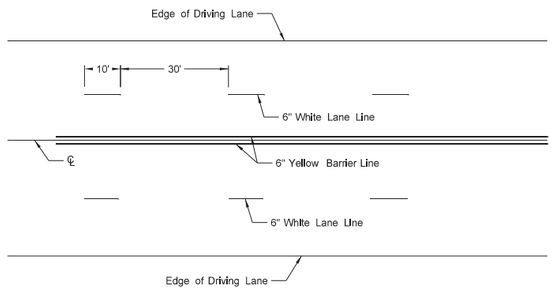


Painted or Tape Lines

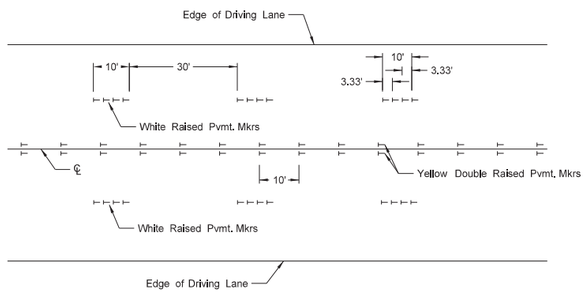


Raised Pavement Markers

TWO-LANE TWO-WAY ROADWAY

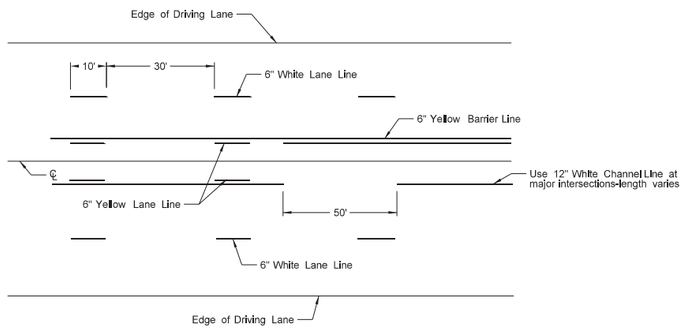


Painted or Tape Lines

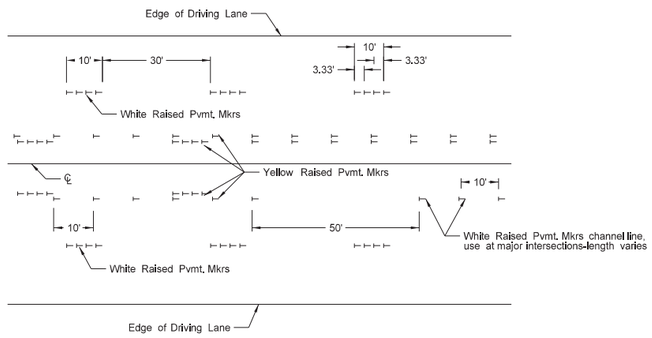


Raised Pavement Markers

FOUR LANE ROADWAY

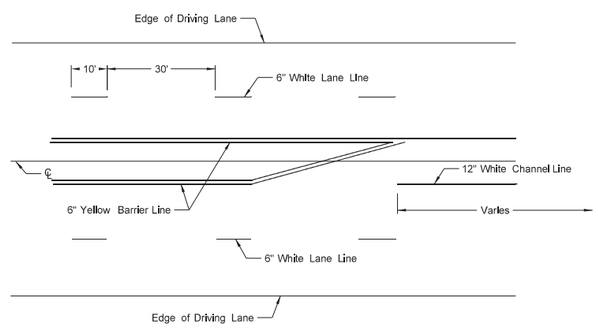


Painted or Tape Lines

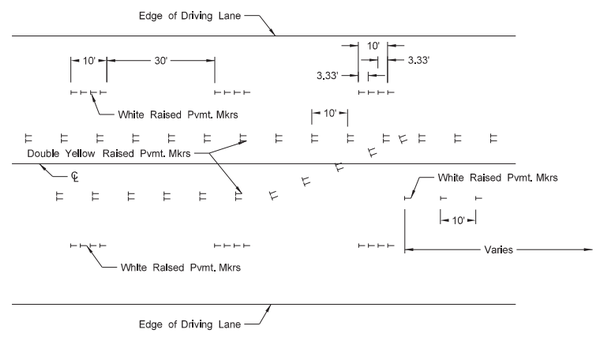


Raised Pavement Markers

FIVE LANE ROADWAY TWO WAY LEFT TURN



Painted or Tape Lines



Raised Pavement Markers

FIVE LANE ROADWAY WITH MARKED ISLANDS

NOTES:

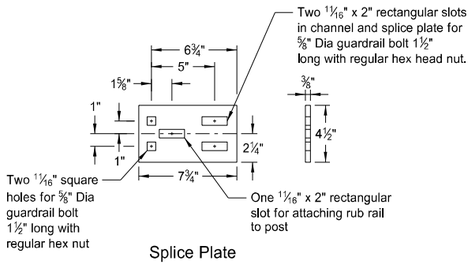
1. Place no passing zones on two-lane two-way roadways as shown. In lieu of short term no passing zone pavement markings, place no passing zone signs. Replace no passing zone signs with short term no passing zone pavement marking within three days.
2. Place short term center line stripe (paint) on top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

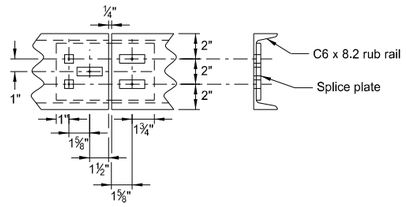
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
01/17/24
ENGINEER
NORTH DAKOTA

MGS W-BEAM GUARDRAIL GENERAL DETAILS

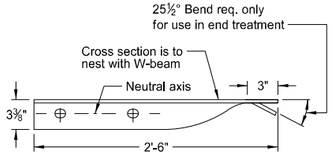
D-764-40

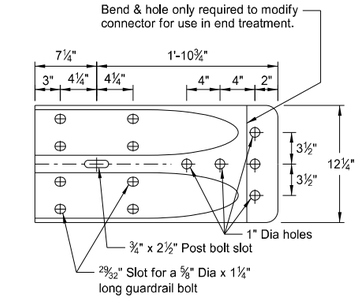


Splice Plate

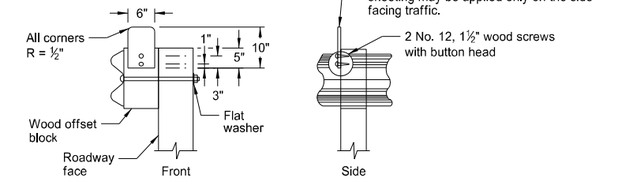


Splice Detail



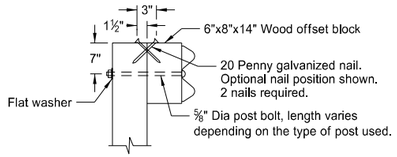


W BEAM TERMINAL CONNECTOR



REFLECTORIZED PLATE DETAIL

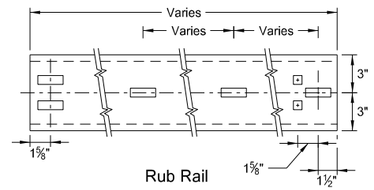
NOTE: Additional reflectors are added to the W-beam guardrail quantities for placement on end treatment.



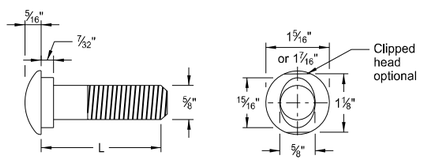
TYPICAL WOOD POST ATTACHMENT DETAIL

NOTES:

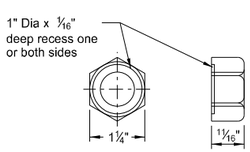
1. Begin reflector plates at the first post and space at 25' centers on guardrail less than 250' length and at 50' centers for guardrail over 250' length. Provide the reflector the same color as the pavement marking adjacent to it unless noted otherwise on the plans.
2. Replacing bituminous material at guardrail post: Dispose all excess earth from excavations for guard posts as directed by the engineer. Replace bituminous material wherever guardrail is installed after mat has been laid. Cost of excavation and replacing of bituminous material to be included in the price bid for other items.
3. Fit the Object Marker within the vertical edges of the Impact Plate. Provide type XI retroreflective sheeting meeting the requirements of Section 894.02.E of the standard specifications. Apply the sheeting to 0.100 Aluminum sheeting meeting the requirements of Section 894.01.A. Attach the Object Marker to the Impact Head Plate with rivets or other attachment device. Ensure the rivets or attachment device are non-rust. Slope the stripes downward toward the roadway side.
4. Guardrail installation height tolerance = ±1".



C6x8.2 RUB RAIL AND SPLICE PLATE

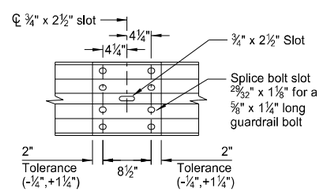


5/8" Diameter Guardrail Bolt	
L	Thread Length
1 1/4"	Full length thread
2"	1 3/4" Min thread length
9 1/2"	4" Min thread length
18"	4" Min thread length
20"	4" Min thread length
22"	4" Min thread length
25"	4" Min thread length



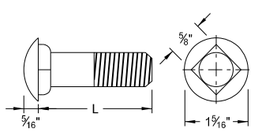
5/8" Dia recess nut

5/8" GUARDRAIL BOLT & RECESS NUT



SPLICE DETAIL

NOTE: Do not install center bolt in the 3/4" x 2 1/2" slot at mid span splices.

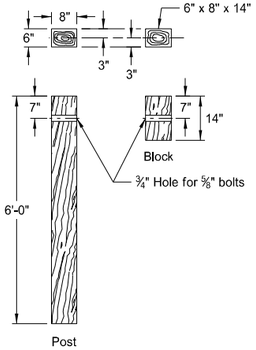


5/8" Diameter Carriage Bolt	
L	Thread Length
1 1/2"	Full length thread
3"	1 1/2" Min thread length
11"	1 3/4" Min thread length
13"	1 3/4" Min thread length



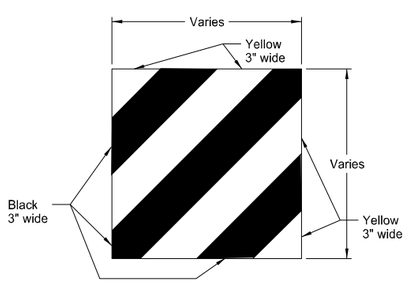
5/8" Dia hex nut

5/8" CARRIAGE BOLT & NUT

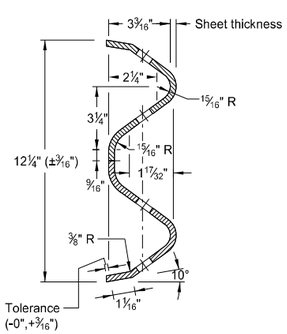


6" x 8" WOOD POST & BLOCK

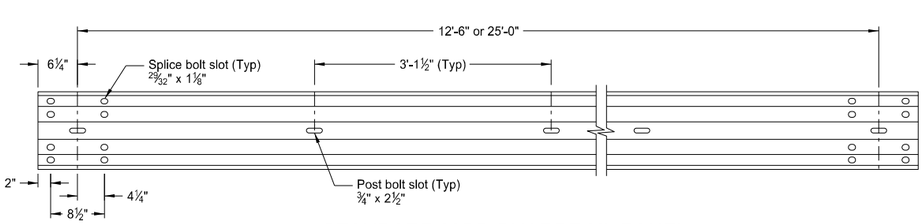
NOTE: Where soil conditions require, alternate lengths may be specified, in 6" increments.



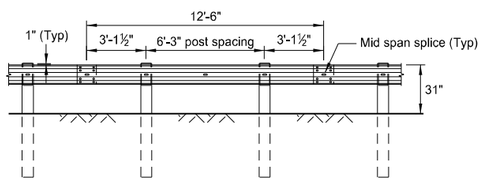
IMPACT HEAD OBJECT MARKER



W-BEAM CROSS SECTION



STANDARD MGS GUARDRAIL PANEL



STANDARD MGS GUARDRAIL SYSTEM

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
7-14-17	
REVISIONS	
DATE	CHANGE
12-02-20	Updated clipped head to optional

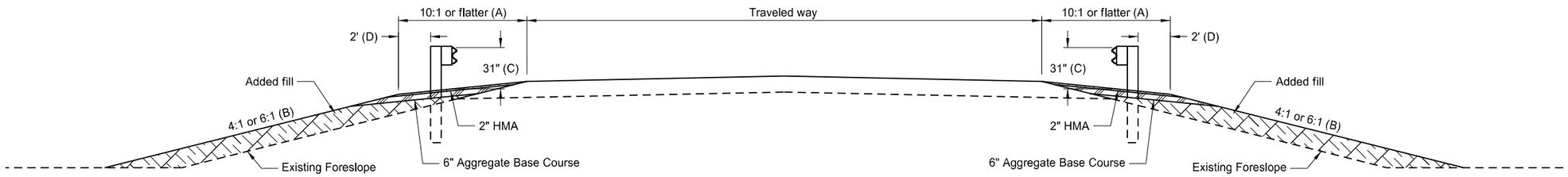
KIRK J. HOFF REGISTERED PROFESSIONAL PE-4683 ENGINEER NORTH DAKOTA

Kirk J Hoff

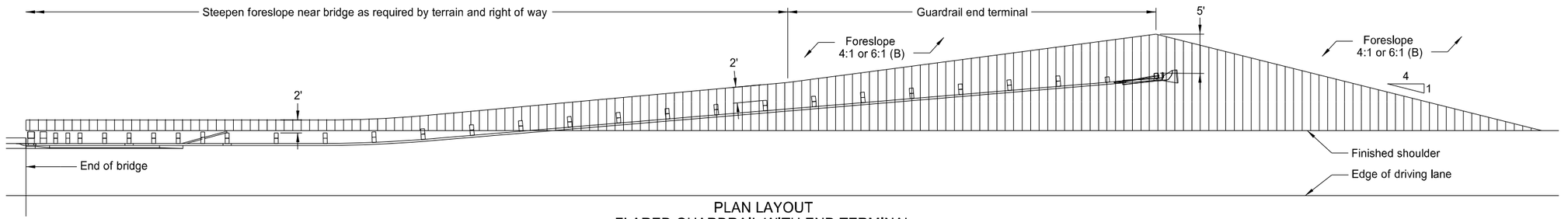
12 02 2020

D-764-48

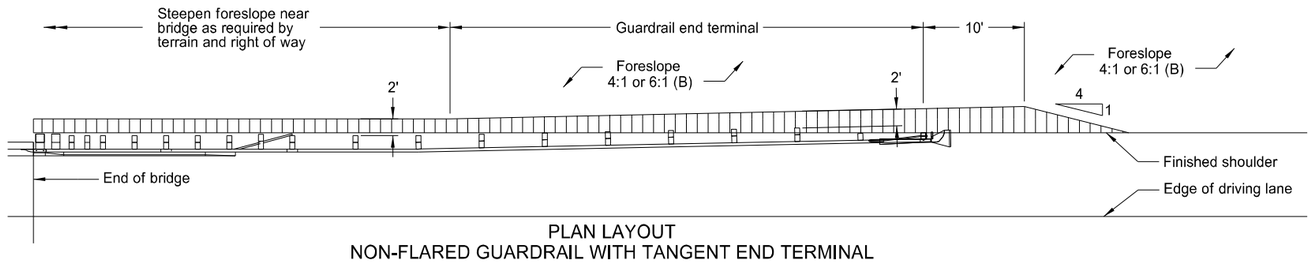
TYPICAL GRADING AT BRIDGE ENDS WITH MGS W-BEAM GUARDRAIL



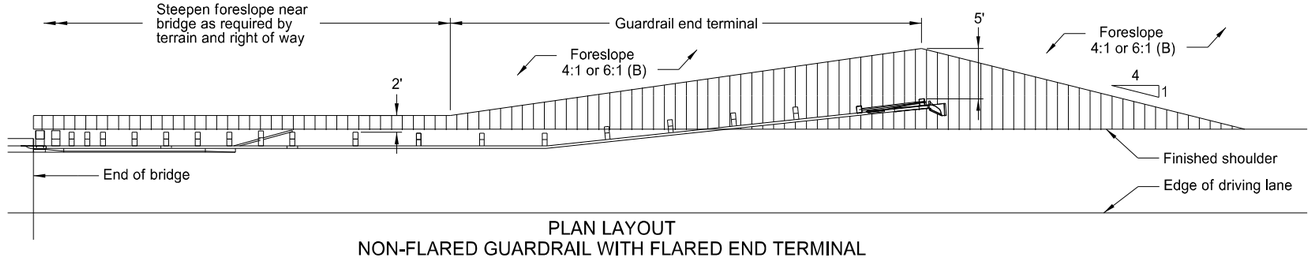
TYPICAL SECTION



PLAN LAYOUT
FLARED GUARDRAIL WITH END TERMINAL



PLAN LAYOUT
NON-FLARED GUARDRAIL WITH TANGENT END TERMINAL



PLAN LAYOUT
NON-FLARED GUARDRAIL WITH FLARED END TERMINAL

NOTES:

(A) Use slope flatter than 10:1 when required to provide proper guardrail height.

(B) When normal foreslope is 4:1, use added fill slope of 4:1. When normal foreslope is 6:1, use added fill slope of 6:1.

(C) Measure from top of guardrail to top of surfacing at front face of guardrail.

(D) Vary dimension at end terminals per Plan Layouts shown on this sheet.

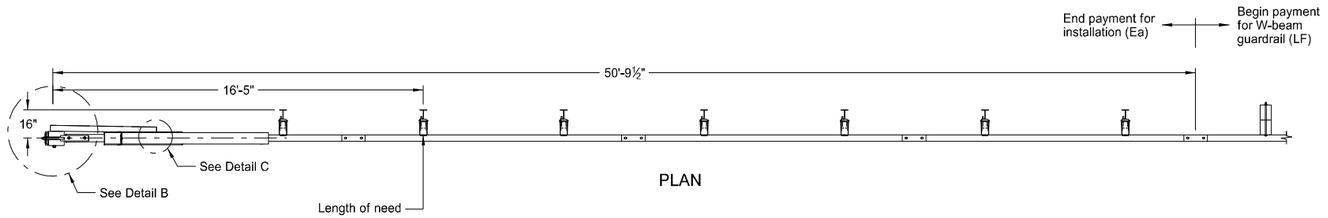
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
7-14-17	
REVISIONS	
DATE	CHANGE
12/02/20	Updated notes to active voice.

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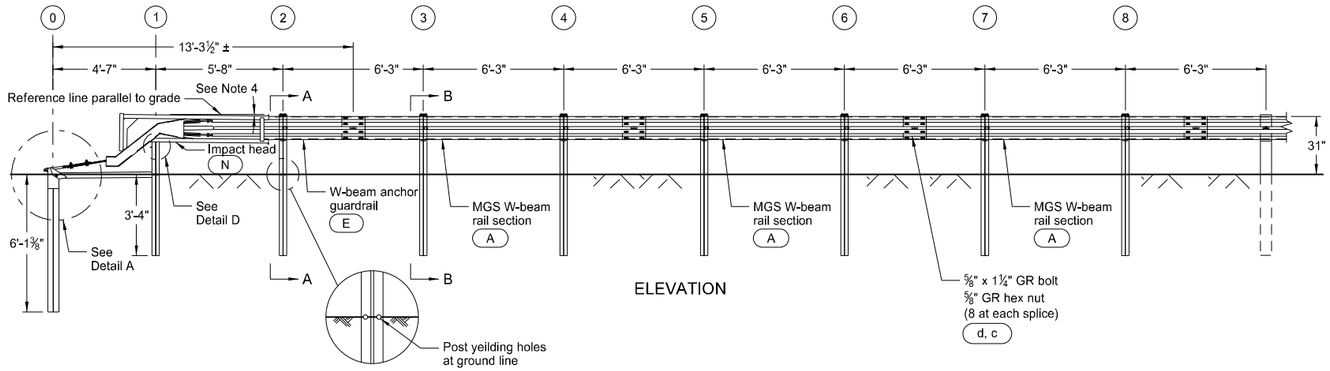
12 02 2020

MASH SOFTSTOP END TERMINAL - STEEL POST

D-764-50



PLAN

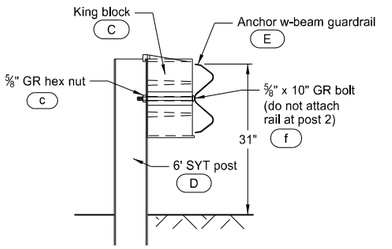


ELEVATION

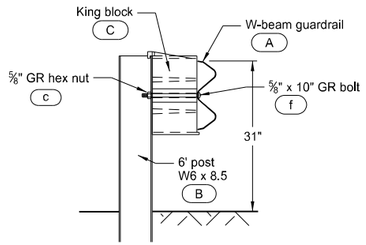
DETAIL E
Posts 1 & 2

GENERAL NOTES:

1. Galvanize all bolts, nuts, cable assemblies, cable anchors, and bearing plates.
2. Flare the SoftStop at a rate of 25:1 or flatter.
3. Do not curve the guardrail within the SoftStop under any circumstances.
4 If necessary, install the SoftStop impact head parallel to the grade line or with an upward tilt. See softstop assembly manual for specific details.

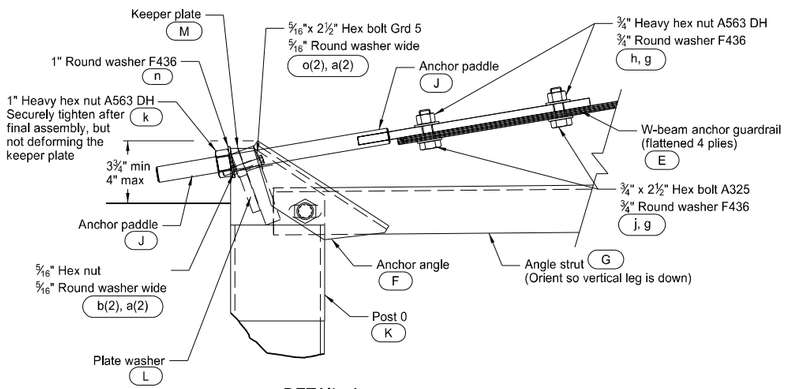


SECTION A-A
Post 2

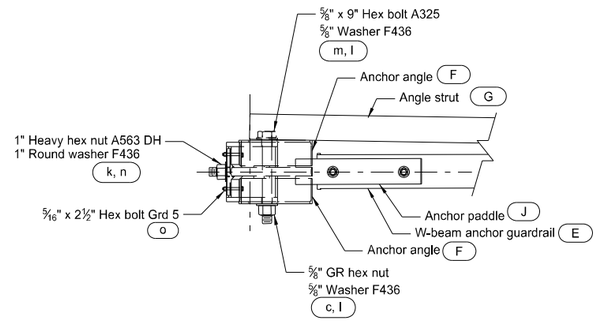


SECTION B-B
Posts 3 through 8

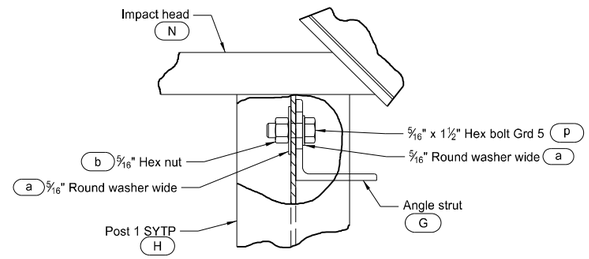
ITEM	ITEM NO.	BILL OF MATERIALS	QTY
A	000011	12 / 12'-6" / 3'-1½" / S MGS W-BEAM RAIL SECTION	3
B	000533	6'-0" STEEL POST W6 x 8.5	6
C	006777	KING BLOCK 4" X 7½" X 1'-2"	7
D	015000	6'-0" SYT POST / 8.5 / 31" GR HT	1
E	015200	SFST - ANCHOR GUARDRAIL 12'-6"	1
F	015201	SFST - ANCHOR ANGLE	2
G	015202	SFST - ANGLE STRUT	1
H	015203	SFST - POST #1 SYTP	1
J	015204	SFST - ANCHOR PADDLE	1
K	015205	SFST - POST #0	1
L	015206	SFST - PLATE WASHER	1
M	015207	SFST - KEEPER PLATE	1
N	015208	SFST - IMPACT HEAD	1
		HARDWARE	
a	003240	5/16" ROUND WASHER WIDE	6
b	003245	5/16" HEX NUT	3
c	003340	⅝" GR HEX NUT	41
d	003360	⅝" x 1¼" GR BOLT	32
e	003391	⅝" x 1¾" HEX BOLT A325	1
f	003500	⅝" x 10" GR BOLT A307	7
g	003701	¾" ROUND WASHER F436	4
h	003704	¾" HVY HEX NUT A563 DH	2
j	003717	¾" x 2½" HEX BOLT A325	2
k	003908	1" HVY HEX NUT A563 DH	1
l	004372	⅝" WASHER F436	4
m	004489	⅝" x 9" HEX BOLT A325	1
n	004902	1" ROUND WASHER F436	1
o	105285	5/16" x 2½" HEX BOLT GRD 5	2
p	105286	5/16" x 1½" HEX BOLT GRD 5	1



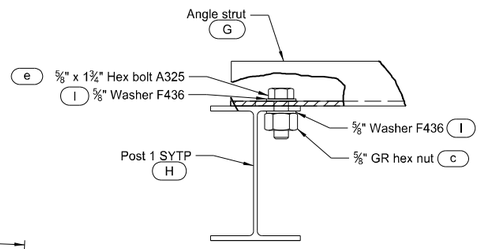
DETAIL A
Post 0



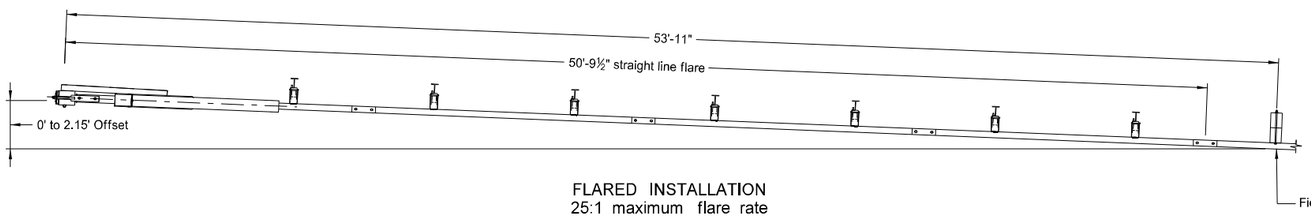
DETAIL B
Post 0



DETAIL D
Post 1



DETAIL C
Post 1
(shown near ground)



FLARED INSTALLATION
25:1 maximum flare rate

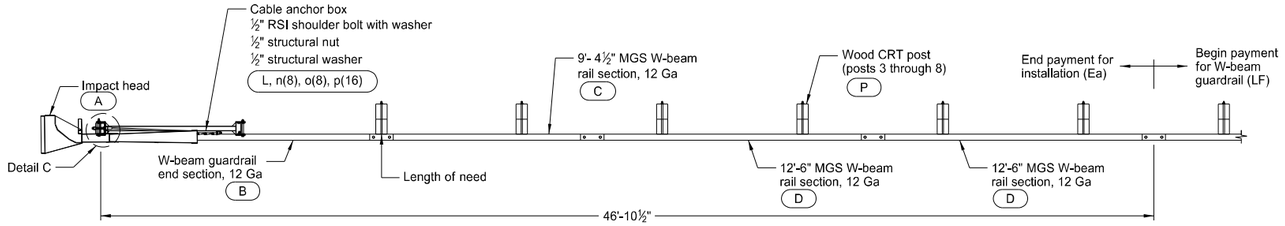
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
7-14-17	
REVISIONS	
DATE	CHANGE
12-02-20	Updated notes to active voice.

KIRK J. HOFF
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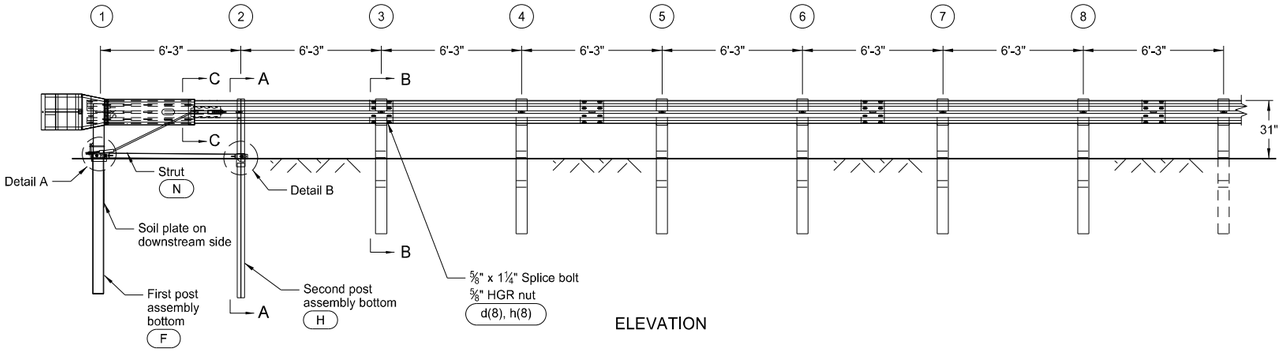
12 02 2020

MASH SEQUENTIAL KINKING TERMINAL - WOOD POST

D-764-51



PLAN

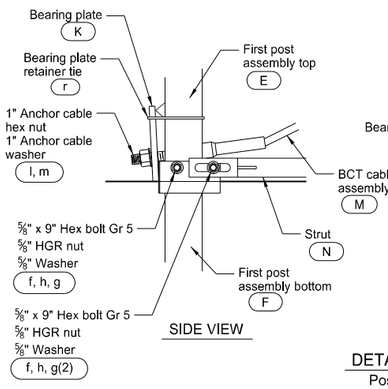


ELEVATION

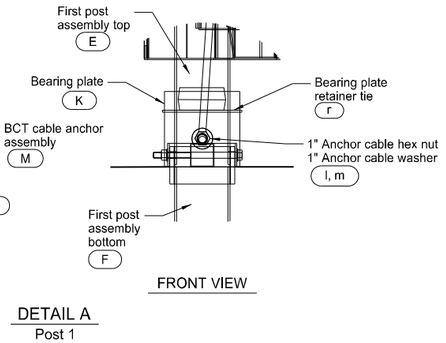
GENERAL NOTES:

1. Galvanize all bolts, nuts, cable assemblies, cable anchors, and bearing plates.
2. Flare the MSKT at a rate of up to 25:1, as needed to prevent the impact head from encroaching on the shoulder.
3. Site grade as necessary to ensure the lower sections of posts do not protrude more than 4" above the ground (measured along a 5' cord).
4. Install the lower section of the hinged posts without the upper post attached. If the post is placed in a drilled hole, compact the backfill material to prevent settlement.
5. Install breakaway cable assembly taut. Use a locking device (vice grips or channel lock pliers) to prevent the cable from twisting when tightening nuts.
6. "Toe nail" the wood blockouts to the rectangular wood posts at post 3 through post 8 with two 20 penny galvanized nails to prevent them from turning when the wood warps.

ITEM	ITEM NO.	BILL OF MATERIALS	QTY
A	MS3000	IMPACT HEAD	1
B	SF1303	W-BEAM GUARDRAIL END SECTION, 12 Ga	1
C	G12025	9'-4½" MGS W-BEAM RAIL SECTION, 12 Ga	1
D	G1203A	12'-6" MGS W-BEAM RAIL SECTION, 12 Ga	2
E	MTPHP1A	FIRST POST ASSEMBLY TOP (6" X 6" X⅛" Tube)	1
F	MTPHP1B	FIRST POST ASSEMBLY BOTTOM (6' W6X15)	1
G	UHP2A	SECOND POST ASSEMBLY TOP	1
H	HP2B	SECOND POST ASSEMBLY BOTTOM	1
K	E750	BEARING PLATE	1
L	S760	CABLE ANCHOR BOX	1
M	E770	BCT CABLE ANCHOR ASSEMBLY	1
N	MS785	STRUT	1
P	UP671	6' WOOD CRT POST	6
R	P675	WOOD BLOCKOUT OR RECYCLED EQUIVALENT	6
		HARDWARE	
a	B5160104A	5/16" x 1" HEX BOLT GR 5	2
b	W0516	5/16" WASHER	4
c	N0516	5/16" HEX NUT	2
d	B580122	⅝" Dia x 1¼" SPLICE BOLT	33
e	B581802	⅝" Dia x 18" HGR BOLT (POSTS 3 THRU 8)	6
f	B580904A	⅝" x 9" HEX BOLT GR 5	2
g	W050	⅝" WASHER	9
h	N050	⅝" Dia HGR NUT	35
j	B340854A	¾" Dia x 8½" HEX BOLT GRD A449	1
k	N030	¾" Dia HEX NUT	1
l	N100	1" ANCHOR CABLE HEX NUT	2
m	W100	1" ANCHOR CABLE WASHER	2
n	SB12A	½" RSI SHOULDER BOLT WITH WASHER	8
o	N012A	½" STRUCTURAL NUT	8
p	W012A	½" STRUCTURAL WASHER	8
r	CT-100ST	BEARING PLATE RETAINER TIE	1

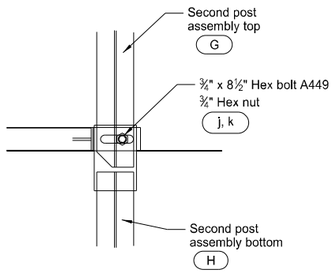


SIDE VIEW



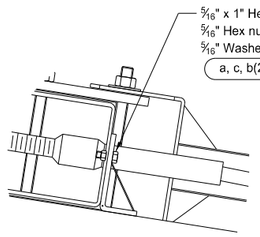
FRONT VIEW

DETAIL A
Post 1

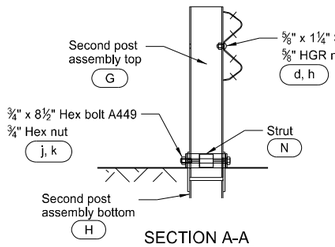


SIDE VIEW

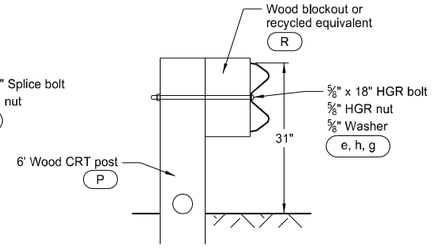
DETAIL B
Post 2



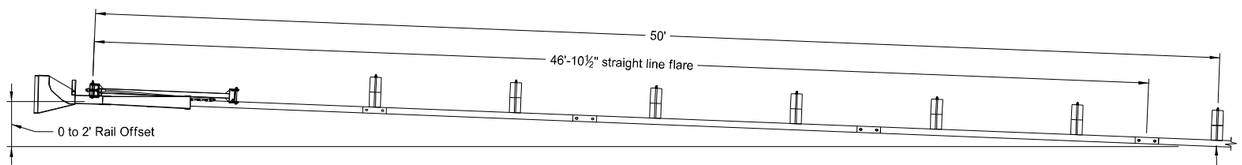
DETAIL C
Post 1 (Impact Head connection)



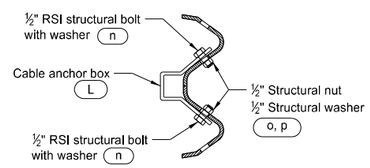
SECTION A-A
Post 2



SECTION B-B
Posts 3 through 8



FLARED INSTALLATION
25:1 maximum flare rate



SECTION C-C

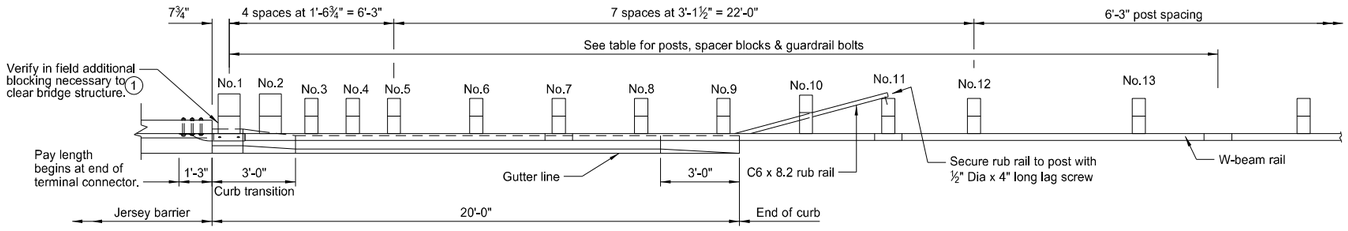
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
7-14-17	
REVISIONS	
DATE	CHANGE
12-02-20	Updated notes to active voice.

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

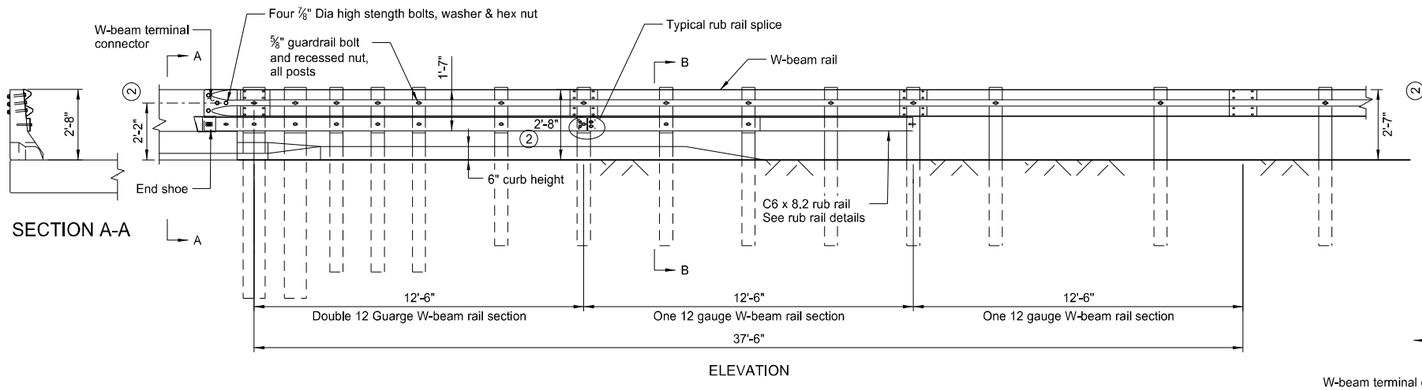
12 02 2020

MGS W-BEAM TRANSITION WITH APPROACH CURB TO IN PLACE CONCRETE JERSEY BARRIER

D-764-64



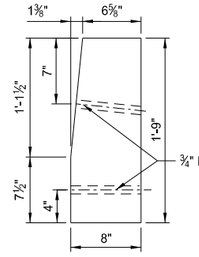
PLAN



SECTION A-A

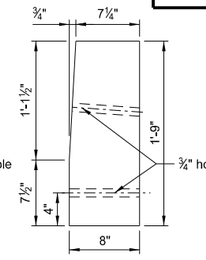
ELEVATION

GENERAL ASSEMBLY DETAILS



END VIEW

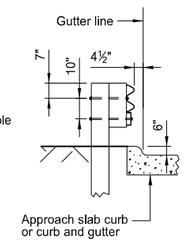
Block No. 1
(width = 10")



END VIEW

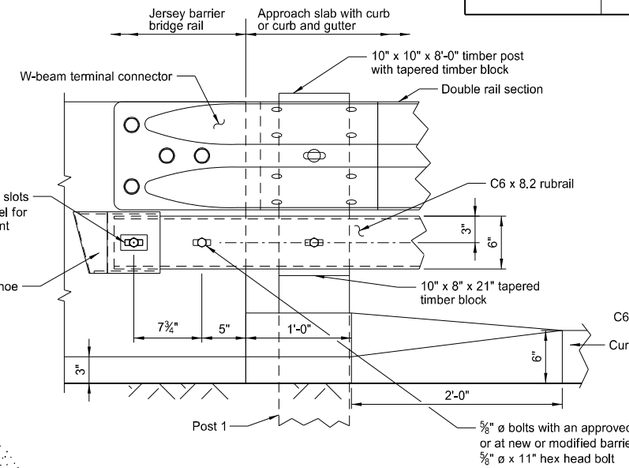
Block No. 2
(Width = 10")

TAPERED TIMBER BLOCK DETAILS

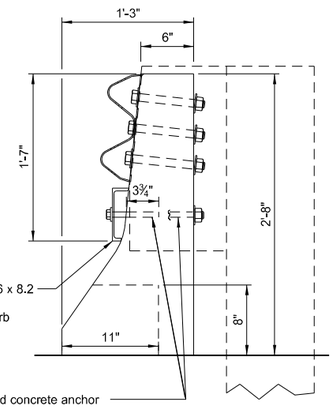


SECTION B-B

POST, TIMBER BLOCK & BOLT TABLE		
DESCRIPTION	POST NO.	SIZE
Post	1 & 2	10" X 10" X 8'-0" min long
	3-5	6" X 8"X 7'-0" min long
	6-13	6" X 8"X 6'-0" min long
Spacer block	1-2	10" X 8" X 21" tapered block
	3-9	6" X 8" X 21"
	10	6" X 9 3/4" X 14"
	11-13	6" X 8" X 14"
Guardrail bolt & recessed nut	1 & 2 & 10	5/8" Dia X 20" - guardrail
	3-9,11-13	5/8" Dia X 18" - guardrail
	1-2	5/8" Dia X 22"- rub rail
	3-9	5/8" Dia X 20"- rub rail

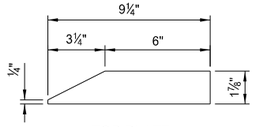


TRAFFIC SIDE ELEVATION

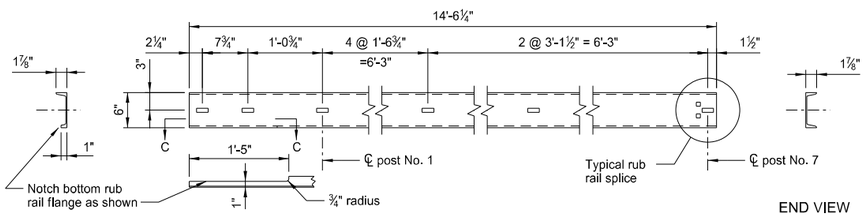


END VIEW

RAIL ATTACHMENT AND CURB DETAIL

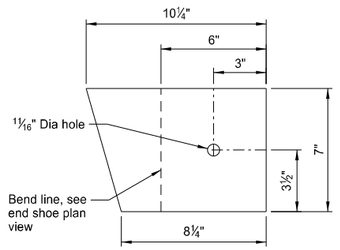


TOP PLATE

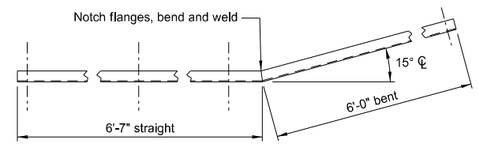


END VIEW SECTION C-C ELEVATION

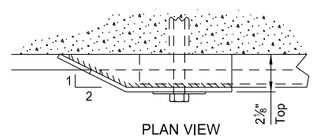
RUB RAIL STRAIGHT SECTION



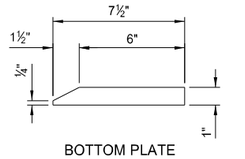
FRONT PLATE



PLAN VIEW



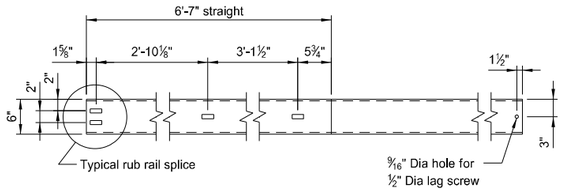
PLAN VIEW



BOTTOM PLATE

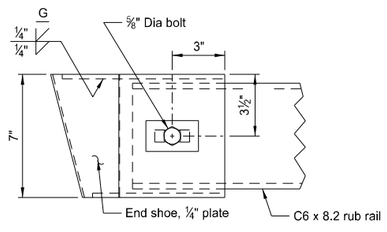
END SHOE PLATE DETAILS

(¼" plate)



ELEVATION

RUB RAIL BENT SECTION



ELEVATION

RUB RAIL END SHOE ASSEMBLY

NOTES:

Galvanize AASHTO 270M Grade 250 C6 x 8.2 rub rail and structural steel after fabrication

All rub rail slotted holes are 1¹⁄₁₆"x 2".

All rub rail square holes are 1¹⁄₁₆".

Use timber posts and blocks for W-beam guardrail.

(1) Verify need for additional blocking at post No.1 in the field.

(2) Height is 2'-8" from 0' to 12'-6" from bridge. Height tapers from 2'-8" to 2'-7" between 12'-6" to 37'-6" from bridge.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
7-14-17	
REVISIONS	
DATE	CHANGE
12-02-20	Updated notes to active voice.

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

12 02 2020