STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	HEC-0004(202)	23759	1	1

BILLINGS COUNTY
NORTH DAKOTA
PLANS FOR FEDERAL AID PROJECT

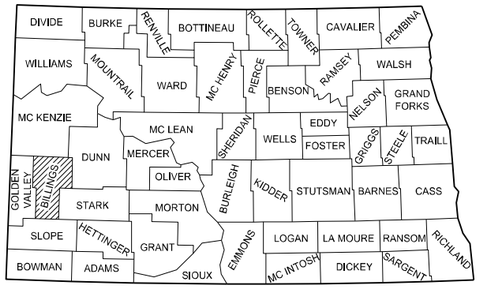
HEC-0004(202)
MULTIPLE LOCATIONS

Guardrail Embankment, W-Beam Guardrail, Bridge Rail Retrofit, & Incidentals

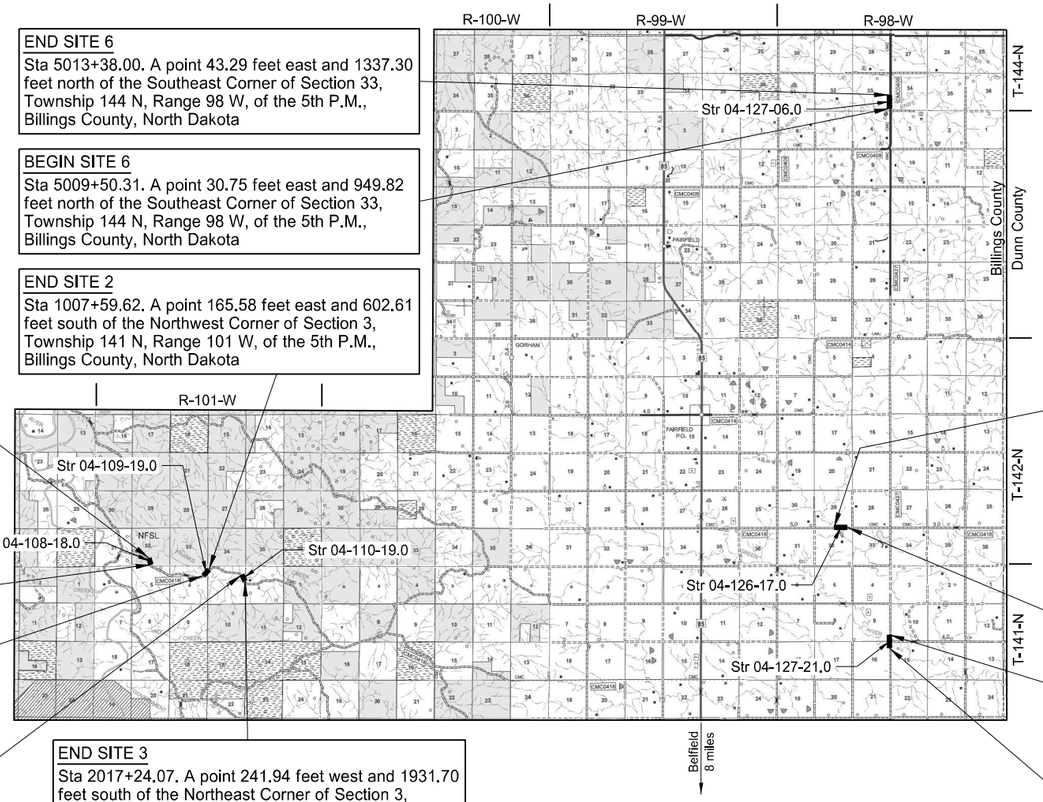
DESIGN DATA

Traffic ~ HEC-0004(202)		Average Daily (All Locations)			Est. 30th Max. Hr.
		Passenger	Trucks	Total	
Current Traffic	2025	<100	-	<100	-
Forecast Traffic	2045	<100	-	<100	-

Clear Zone Distance: 14 Feet
Design Speed: 45 MPH
Minimum Sight Dist. for Stopping: 360 Feet



STATE COUNTY MAP



END SITE 6
Sta 5013+38.00. A point 43.29 feet east and 1337.30 feet north of the Southeast Corner of Section 33, Township 144 N, Range 98 W, of the 5th P.M., Billings County, North Dakota

BEGIN SITE 6
Sta 5009+50.31. A point 30.75 feet east and 949.82 feet north of the Southeast Corner of Section 33, Township 144 N, Range 98 W, of the 5th P.M., Billings County, North Dakota

END SITE 2
Sta 1007+59.62. A point 165.58 feet east and 602.61 feet south of the Northwest Corner of Section 3, Township 141 N, Range 101 W, of the 5th P.M., Billings County, North Dakota

BEGIN SITE 1
Sta 10+90.79. A point 97.09 feet west and 757.09 feet north of the South Quarter Corner of Section 32, Township 142 N, Range 101 W, of the 5th P.M., Billings County, North Dakota

END SITE 1
Sta 15+05.39. A point 53.09 feet west and 344.85 feet north of the South Quarter Corner of Section 32, Township 142 N, Range 101 W, of the 5th P.M., Billings County, North Dakota

BEGIN SITE 2
Sta 1003+35.95. A point 128.25 feet west and 907.81 feet south of the Northwest Corner of Section 3, Township 141 N, Range 101 W, of the 5th P.M., Billings County, North Dakota

BEGIN SITE 3
Sta 2013+37.88. A point 376.07 feet west and 1569.56 feet south of the Northeast Corner of Section 3, Township 141 N, Range 101 W, of the 5th P.M., Billings County, North Dakota

END SITE 3
Sta 2017+24.07. A point 241.94 feet west and 1931.70 feet south of the Northeast Corner of Section 3, Township 141 N, Range 101 W, of the 5th P.M., Billings County, North Dakota

BEGIN SITE 5
Sta 4036+12.87. A point 1672.26 feet west and 59.85 feet north of the Northeast Corner of Section 32, Township 142 N, Range 98 W, of the 5th P.M., Billings County, North Dakota

END SITE 5
Sta 4039+89.33. A point 1296.03 feet west and 46.39 feet north of the Northeast Corner of Section 32, Township 142 N, Range 98 W, of the 5th P.M., Billings County, North Dakota

END SITE 4
Sta 3027+52.03. A point 3.72 feet west and 117.48 feet north of the Northwest Corner of Section 15, Township 141 N, Range 98 W, of the 5th P.M., Billings County, North Dakota

BEGIN SITE 4
Sta 3023+79.84. A point 8.03 feet west and 254.52 feet south of the Northwest Corner of Section 15, Township 141 N, Range 98 W, of the 5th P.M., Billings County, North Dakota

END SITE 7
Sta 6012+70.22. A point approximately 3541 feet east and 1250 feet north of the Southwest Corner of Section 32, Township 137 N, Range 101 W, of the 5th P.M., Billings County, North Dakota

BEGIN SITE 7
Sta 6008+35.12. A point approximately 3413 feet east and 876 feet north of the Southwest Corner of Section 32, Township 137 N, Range 101 W, of the 5th P.M., Billings County, North Dakota

GOVERNING SPECIFICATIONS	Date Published and Adopted by the North Dakota Department of Transportation
Standard Specifications	7/1/2025
Supplemental Specifications	NONE

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
Site 1 (04-108-18.0)	0.079	0.079
Site 2 (04-109-19.0)	0.080	0.080
Site 3 (04-110-19.0)	0.073	0.073
Site 4 (04-127-21.0)	0.070	0.070
Site 5 (04-126-17.0)	0.071	0.071
Site 6 (04-127-06.0)	0.073	0.073
Site 7 (04-110-48.0)	0.082	0.082
Totals	0.528	0.528

This project consists of approximately 0.527 miles of guardrail embankment and guardrail installation at existing bridges in multiple locations located in Billings County, North Dakota.

DESIGNERS

Andrew Krebs, PE

Shawn Mayfield, PE

U.S.D.A. FOREST SERVICE DAKOTA PRAIRIE GRASSLANDS

Approved By CURTIS GRUDNIEWSKI Digitally signed by CURTIS GRUDNIEWSKI Date: 2025.10.29 11:24:43 -06'00'
Grasslands Engineer — Date

REGISTERED PROFESSIONAL ENGINEER
ANDREW KREBS
PE-7876
DATE 10/29/25
NORTH DAKOTA

KLJ
677 27TH AVENUE EAST
DICKINSON, ND 58601
(701) 483-1284, FAX (855) 288-8055

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	2	1

TABLE OF CONTENTS

SECTION NO.	SHEET NO.	DESCRIPTION
1	1	Title Sheet
2	1	Table of Contents, List of Special Provisions, & List of Standard Drawings
6	1-2	Plan Notes
6	3	Environmental Notes
8	1	Estimate of Quantities
10	1	Basis of Estimate
20	1-3	Details
30	1	Typical Sections
40	1-5	Removals
75	1-2	Wetland, Mitigation and Environmental
76	1-7	Temporary Sediment and Erosion Control
77	1-7	Permanent Sediment and Erosion Control
80	1-3	Fencing Layouts
81	1-2	Survey Coordinate and Curve Data
100	1-5	Work Zone Traffic Control
130	1-8	Guardrail
170	1-3	Bridges
200	1-3	Cross Sections – Site 1
200	4-6	Cross Sections – Site 3
200	7-11	Cross Sections – Site 6

LIST OF STANDARD DRAWINGS

STANDARD NO.	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-261-1	Erosion Control – Fiber Roll Placement Details
D-704-7	Breakaway Systems for Construction Zone Signs – Perforated Tube
D-704-8	Breakaway Systems for Construction Zone Signs – U-Channel Post
D-704-9	Construction Sign Details – Terminal and Guide Signs
D-704-10	Construction Sign Details – Regulatory Signs
D-704-11	Construction Sign Details – Warning Signs
D-704-13	Barricade and Channelizing Device Details
D-704-14	Construction Sign Punching and Mounting Details
D-704-19	Road Closure and Lane Closure on a Two Way Road Layouts
D-704-22	Construction Truck and Temporary Detour Layouts
D-704-50	Portable Sign Support Assembly
D-714-4	Round Corrugated Steel Pipe Culverts and End Sections
D-764-1	W-Beam Guardrail General Details
D-764-5	Sequential Kinking Terminal
D-764-6	Flared Energy Absorbing Terminal
D-764-10	Thrie Beam Transition to Double Box Beam Retrofit
D-764-13	W-Beam Guardrail with Approaches near Bridge for Low Volume Low Speed Roadways
D-764-14	Special W-Beam Guardrail Anchor
D-764-22	Typical Grading at Bridge Ends with W-Beam Guardrail
D-764-38	MGS Flared Energy Absorbing Terminal – Wood Post
D-764-40	MGS W-Beam Guardrail General Details
D-764-48	Typical Grading at Bridge Ends with MGS W-Beam Guardrail
D-764-51	MASH Sequential Kinking Terminal – Wood Post

LIST OF SPECIAL PROVISIONS

SP #	DESCRIPTION
PSP 48(25)	Permits and Environmental Considerations
SSP 1	Temporary Erosion and Sediment Best Management Practices
SSP 3	Local Agency Contracts

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	6	1

PLAN NOTES

100-P01 **EXISTING SIGNS:** Billings County will remove the existing signs as needed after the Contractor has installed the work zone traffic control. Billings County will reset the existing signs after the Contractor has constructed the project. The contact for Billings County is Pat Redmond at (701) 690-6827.

105-P01 **UTILITIES:** The vertical and horizontal utility locations shown in the plans are approximate. Plan locations should not be interpreted as exact for bidding or construction purposes.

105-P02 **UTILITIES:** No utility relocations or adjustments are planned. All utilities on the project need to be protected and remain in existing location.

202-P01 **CLEARING & GRUBBING / REMOVAL OF TREES:** Cut down trees that are 3 inches or larger in diameter measured at a point 4.5 feet above the ground after October 31st and before April 1st. Cut trees may be laid on the ground and removed at a later date. Trees to be cut down during this time period are shown in Section 40.

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

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

203-P01 **GUARDRAIL EMBANKMENT:** The cost of labor, equipment, and materials to perform the following work will be included in the price bid for "GUARDRAIL EMBANKMENT"

1. Construct inslopes for Guardrail Embankment according to Standard Drawing D-764-22 or D-764-48 and Section 203.04 G of the Standard Specifications utilizing Compaction Control, Type B. The total embankment material needed to construct the guardrail embankments as shown in the plans is shown on the summary table located in Section 10 Sheet 1.

2. Borrow material for the project will be obtained from borrow sites located by the Contractor and approved by the Engineer. Include all royalties, utility and fencing adjustments, environmental and cultural clearances, site restoration, and any other costs associated with obtaining, transporting, and placing borrow material in the unit price bid for "GUARDRAIL EMBANKMENT". The total borrow material needed to construct the guardrail embankments as shown in the plans is shown on the summary table located in Section 10 Sheet 1.

3. Include all costs associated with stripping, stockpiling, stabilizing, transporting, and placing topsoil material in the unit price bid for "GUARDRAIL EMBANKMENT". The total topsoil quantity to construct the guardrail embankments as shown in the plans is shown on the summary table located in Section 10 Sheet 1.

4. Include all grading costs associated with constructing approaches in the unit price bid for "GUARDRAIL EMBANKMENT".

5. Include all costs associated with placing seed and straw mulch in all disturbed areas in the unit price bid for "GUARDRAIL EMBANKMENT".

210-P01 **FOUNDATION FILL:** Delete Section 210.04 B.3 and insert the following:

3. Foundation Fill.
Place foundation fill in layers not exceeding 6 inches to the required elevation. Thoroughly compact each layer with mechanical tamping equipment. Use water as required to achieve satisfactory compaction and stability.

210-P02 **PIPE EXCAVATION:** The amount of excavation under the centerline pipe may vary due to the depth of poor foundation soil and will be determined by the Engineer. The actual excavation, regardless of depth, will not be measured for payment but will be included in the unit price bid for "FOUNDATION FILL". Excavate according to the limits for width and length as shown on Section 20 Sheet 2. Use Foundation Fill material to backfill the excavation areas. Payment for Foundation Fill will be according to the limits for width and length as shown on Section 20 Sheet 2 and depth measured in the field.

216-P01 **WATER:** Include all costs associated with the application of water for compaction of subgrade and foundation fill, and for use as a dust palliative, as required, in the cost for other bid items.

251-P01 **SEEDING WEST OF HWY 85:** Seeding Class III shall consist of the following #37-28A seed mixture Scenario #13 for Sites 1,2,3 & 7:

Species	Preferred Cultivar, Ecotype, or Germplasm	Common Name	Drilled PLS lb/acre
Cool Season Grasses:			
Elymus canadensis	Mandan	Canada wildrye	2.8
Nassella viridula	Lodorm	Green needlegrass	2.4
Pascopyrum smithii	Rodan	Western wheatgrass	4.9
Warm Season Grasses:			
Bouteloua gracilis	Bad River	Blue grama	0.3
Calamovilfa longifolia	Goshen	Prairie sandreed	0.8
Schizachyrium scoparium	Badlands	Little bluestem	0.8
Alternate Warm Season (for one of the above species) *Bouteloua curtipendula*	Pierre	Sideoats grama	1.2
Forbs *Dalea purpurea*	Local	Purple prairieclover	0.25
OR *Dalea candida*	Antelope	White prairieclover	0.3
Helianthus pauciflorus	Bismarck	Stiff sunflower	0.7
OR *Solidago rigida*	Local	Stiff goldenrod	0.1
Echinacea angustifolia	Bismarck	Purple coneflower	0.5
OR *Ratibida columnifera*	Local	Praire coneflower	0.1
Companion		Oats	10
Totals		**Forbs** **Alternate Forbs**	**23.4** **(22.5)**

Cultivars listed in the second column are preferred, but local seed collections grown for harvest are acceptable if performance and origin are certified or documented. All seed sources should be derived from local collections and grown in a general area extending 300 miles north and 200 miles south of the area to be reclaimed, within similar elevation and precipitation zones as western North Dakota, i.e., from Jamestown on the east to Billings, MT on the west.

For broadcast seeding, multiply pounds of each species seeded by 1.5. The seed bed should be thoroughly worked and firm.

The seed mix may need to be adjusted due to site characteristics and/or lack of available seed for some species. In the latter case, adjust the species seeding rates by the formulas below table to obtain approximately 50 seed per square foot and/or 12-16 lbs. of PLS per acre for drilled seed and 18-24 lbs. per acre for broadcast seeding.

REGISTERED PROFESSIONAL ENGINEER
ANDREW J KREBS
PE-7876
DATE 10/29/25
NORTH DAKOTA

HEC-0004(202)
Multiple Locations

KLJ

Plan Notes

Billings County, ND

DRWN. BY	CHKD. BY	PROJECT NO.
AK	SPK	2103-01811

PLAN NOTES

Seeding depth should be 1/4 inch or less for drilled seed.

Note: The following steps/documents are required as per Conditions of Approval #28 B, Certification & Reporting:
1. Report of Seeding (#37-28B)
2. Certification of Seed Mixture from Seed Company, and seed tags from bags or copy of seed tags for all planted material on forest service property must be submitted to the Medora Ranger District. (The Engineer will submit these upon receiving them from the Contractor.)

Call the Medora Ranger District (701) 227-7800 if there are any questions.

251-P02 **SEEDING EAST OF HWY 85:** Seeding Class III shall consist of the following mixture for Sites 4, 5, & 6:

Species	Lbs. of PLS/Acre
Alfalfa	9
Western Wheatgrass	4
Fairway Crested Wheatgrass	5
Slender Wheatgrass	2
Oats	10
Total	**30**

261-P01 **FIBER ROLLS:** Fiber rolls have been provided for temporary and permanent erosion control. The perimeter temporary erosion control has been provided for placement prior to disturbing the topsoil or as indicated by the Engineer.

Preserve the temporary erosion control throughout the duration of the project. If the erosion is damaged due to negligence, repair at the Contractor's expense.

Place permanent fiber rolls after seeding Class III. Locations are shown in Section 77.

An additional 400 LF of Fiber Rolls 12IN have been provided for locations to be determined by the Engineer. Include all costs for labor, equipment, and materials necessary to complete this work and all costs to relocate fiber rolls as needed for construction related activities in the unit price bid for "FIBER ROLLS 12IN".

302-P01 **COUNTY INSTALLED SURFACING:** County forces will haul, lay, & compact the 6 inches of aggregate or scoria surfacing, as noted on the Typical Sections. They will also reshape the existing surfacing as needed. Coordinate grading operation with Billings County so that the surfacing can be placed within 48 hours after the finished grading is complete at each site. The County is available to haul, lay, and compact the surfacing from Monday through Thursday only.

The Contractor is responsible for all roadway maintenance from the project start through final acceptance. The only exception is if the County does not begin delivery of the surfacing within the 48 hours notice period, not including Friday through Sunday. The contact is Pat Redmond at (701) 690-6827.

Allow the County to complete surfacing installation prior to beginning guardrail installation.

704-P01 **TRAFFIC CONTROL DEVICES LIST:** The traffic control devices list has been developed using traffic control signing layouts (shown in Section 100 of the plans) and Standard Drawings listed below:

- Standard D-704-19, Type E: For road closure to all but local traffic. Detour is not provided.
- Standard D-704-22, Type K: For trucks hauling material.

704-P02 **TRAFFIC CONTROL GENERAL:** Leave roadway open to local traffic during construction.

714-P01 **FLARED END SECTIONS:** Level and compact the material under the flared end sections to grade prior to setting all flared end sections to ensure no voids exist beneath.

714-P02 **DEFLECTION TESTING:** Delete Section 714.04 A.8 in its entirely and insert the following:

8. Deflection Testing.
The Engineer will visually inspect all metal pipe used on the project for deflection a minimum of 30 days after the pipe is installed. If the Engineer sees any deflection, the Engineer will require the Contractor to pass a nine point mandrel or approved object through the pipe to check for deflection. Use a mandrel with a diameter not less than 95 percent of the inside diameter of the pipe. If the mandrel cannot be passed through the pipe, replace the pipe.

Perform the deflection test under the observation of the Engineer.

714-P03 **COMPACTION CONTROL FOR AGGREGATE:** Delete Section 714.04 A.10 in its entirely and insert the following:

10. Compaction Control for Aggregate.
Place foundation fill in layers not exceeding 6 inches to the required elevation. Thoroughly compact each layer with mechanical tamping equipment. Use water as required to achieve satisfactory compaction and stability.

714-P04 **COMPACTION CONTROL FOR NON-AGGREGATE MATERIAL:** Delete Section 714.04 A.11 in its entirely and insert the following:

11. Compaction Control for Non-Aggregate Material.
Compact non-aggregate material to the compaction requirements in Section 203.04 G.3, "Compaction Control, Type B." Use a maximum lift thickness of 6 inches.

Compact material for approach pipes according to the manufacture's recommendations.

REGISTERED PROFESSIONAL ENGINEER
ANDREW J. KREBS
PE-7876
DATE 10/29/25
NORTH DAKOTA

HEC-0004(202)
Multiple Locations

KLJ

Plan Notes

Billings County, ND

DRWN. BY	CHKD. BY	PROJECT NO.
AK	SPK	2103-01811

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	6	3

ENVIRONMENTAL NOTES

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

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

EN-2 THREATENED AND ENDANGERED SPECIES: The project is located near/within suitable habitat for the species listed in the following table:

SPECIES	HABITAT	PRESENCE
Whooping Crane	Cropland/Wetland Associations	Spring: March 15 - May 15* Fall: September 10 – November 15
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).

Conduct tree removal activities outside of the active season for the northern long-eared bat (November 1 – April 14).

Ensure Tree removal is limited to that specified in the project plans. Install bright colored flagging/fencing prior to any tree clearing to ensure contractors stay within clearing limits.

EN-3 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-4 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.

PERMITS REQUIRED:

United States Army Corp of Engineers – Section 404 Permit
Status: Has been obtained for the project.

North Dakota Department of Environmental Quality – NDPDES Construction Stormwater Permit
Status: To be obtained by the Contractor prior to construction. Owner is to be listed as Billings County on the permit.

EN-5 NOXIOUS WEED CONTROL ON FOREST SERVICE LANDS: To prevent the potential spread of noxious weeds, the Contractor is required to furnish weed-free equipment. The Contractor's equipment shall be cleaned to remove all dirt and plant parts and material that may carry noxious weed seeds into the construction area on FS Lands. All subsequent move-ins shall be treated the same as the initial move-in. Prior to move-in the Contractor shall make equipment available to Forest Service inspection at an agreed location.

EN-6 FIRE CONTROL ON FOREST SERVICE LANDS:

a) Contractor's Responsibility for Contractor-Caused Fires – The Contractor, whether or not directed by the Forest Service, shall immediately extinguish, without expense to the Government, all fires on or in the vicinity of the project which are caused by Contractor's employees, whether set directly or indirectly as a result of Contractor operations. The Contractor may be held liable for all damages and costs of additional labor, subsistence, equipment, supplies, and transportation resulting from fires set or caused by the Contractor's employees or resulting from contract operations.

b) Fire Plan – At all times during fire season period, as specified by State law, the Contractor shall comply with each of the following provisions to the extent applicable to his operation under the contract.

i. Fire Tools – The Contractor will provide for each employee in the contract area at least one approved hand tool of a type appropriate in the contract area, such as shovel, pulaski, or ax.

ii. Fire Extinguishers – Each unit of powered equipment used in connection with this contract, including automobiles, trucks, tractors, etc., shall be equipped with a fire extinguisher as follows: One - fire extinguisher, dry chemical type of not less than 2-1/2-pound capacity with 4 BC or higher rating.

iii. Smoking – Smoking shall not be permitted within the contract area except on surfaced or dirt roads, at landings, within closed vehicles, in camps, or at other posted places, and shall never be allowed while working or traveling on foot.

iv. Storage of Petroleum and Other Highly Flammable Products – Gasoline, oil, grease, or other highly flammable material will be stored either in a separate building used exclusively for such storage, or at a site where all combustible debris and vegetation is cleared away within a radius of 25 feet. Fire extinguishers and/or sand barrels may be required at such locations specified by the Forest Service when unusually hazardous conditions exist.

v. Welding – Welding or use of cutting torches will be permitted only in areas that have been cleared or are free of all material capable of carrying fire. Flammable debris and vegetation must be removed from within a minimum of 10 feet radius of all welding and cutting torch operations. A shovel and a 5-gallon standard backpack water container (filled), with hand pump attached, shall be immediately available for use in the event of a fire start.

REGISTERED PROFESSIONAL ENGINEER
ANDREW J. KREBS
PE-7876
DATE 10/29/25
NORTH DAKOTA

HEC-0004(202)
Multiple Locations

KLJ

Environmental Notes
Billings County, ND

DRWN. BY	CHKD. BY	PROJECT NO.
AK	SPK	2103-01811

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEC-0004(202)	8	1

ESTIMATE OF QUANTITIES

Spec	Code	Description	Unit	Total Quantities
103	0100	CONTRACT BOND	LSUM	1
201	0330	CLEARING & GRUBBING	LSUM	1
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES	LF	28
202	0312	REMOVE EXISTING FENCE	LF	1,183
203	0218	GUARDRAIL EMBANKMENT	EA	28
210	0210	FOUNDATION FILL	CY	6
261	0112	FIBER ROLLS 12IN	LF	2,780
261	0113	REMOVE FIBER ROLLS 12IN	LF	1,390
624	3002	DOUBLE BOX BEAM RAIL RETROFIT - E-RAIL	LF	284.9
702	0100	MOBILIZATION	LSUM	1
704	1000	TRAFFIC CONTROL SIGNS	UNIT	701
704	1052	TYPE III BARRICADE	EA	26
714	5015	PIPE CORR STEEL .064IN 18IN	LF	62
714	5201	PIPE CORR STEEL .079IN 24IN POLYMERIC COATED	LF	4
714	5810	END SECT CORR STEEL .064IN 18IN	EA	2
714	9660	REMOVE & RELAY END SECTION-ALL TYPE & SIZES	EA	1
752	0200	FENCE BARBED WIRE 4 STRAND	LF	1,172
752	2100	VEHICLE GATE	EA	2
752	2995	CORNER ASSEMBLY-WOOD POST	EA	5
752	3995	DOUBLE BRACE ASSEMBLY-WOOD POST	EA	13
764	0131	W-BEAM GUARDRAIL	LF	1,359
764	0145	W-BEAM GUARDRAIL END TERMINAL	EA	27
764	2081	REMOVE END TREATMENT & TRANSITION	EA	4

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEC-0004(202)	10	1

BASIS OF ESTIMATE

Foundation Fill – (Volume +25%)
Pipe Culverts: Depth & Limits as shown in Section 20 Sheet 2

Water
Included with other items if needed

Guardrail Embankment Quantity Summary (For Informational Purposes)								
Location	Embankment (CY)	Excavation (CY)	Borrow (CY)	Topsoil (CY)	Temporary Cover Crop (ACRE)	Seeding Class III East of Hwy 85 (ACRE)	Seeding Class III Scenario 13 (ACRE)	Straw Mulch (ACRE)
Site 1	373	69	304	165	0.26	-	0.26	0.52
Site 2	486	0	486	187	0.30	-	0.30	0.60
Site 3	428	4	424	163	0.24	-	0.24	0.48
Site 4	356	0	356	210	0.26	0.26	-	0.52
Site 5	256	0	256	184	0.24	0.24	-	0.48
Site 6	659	142	525	245	0.40	0.40	-	0.80
Site 7	570	0	570	248	0.34	-	0.34	0.68
Total	**3,128**	**215**	**2,921**	**1,402**	**2.04**	**0.90**	**1.14**	**4.08**

Notes:
1. Quantity shown for embankment has been increased by 25% to account for shrinkage.
2. Topsoil depth is estimated at 4 inches.
3. One application of temporay seeding and straw mulch is included for use if needed.
4. Seeding and mulching areas shown are based on the calculated area between the edge of roadway and limits of construction. Additional seeding and mulching for disturbed areas used to facilitate construction or accommodate the Contractor's method and means will be the responsibility of the Contractor with no additional cost to the project.

REGISTERED PROFESSIONAL ENGINEER
ANDREW KREBS
PE-7876
DATE 10/10/25
NORTH DAKOTA

HEC-0004(202)
Multiple Locations

KLJ

Basis of Estimate

Billings County, ND

DRWN. BY	CHKD. BY	PROJECT NO.
AK	SPK	2103-01811

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEC-0004(202)	20	1

Curve 10818_3 (Site 1)

P.C. Station	=	3+00.00
P.I. Station	=	7+83.44
P.T. Station	=	11+27.16
Delta	=	74° 22' 06" (RT)
Degree	=	8° 59' 27"
Tangent	=	483.44
Length	=	827.16
Radius	=	637.27
External	=	162.62
Back	=	S 80° 17' 40.59" E
Ahead	=	S 05° 55' 34.68" E
Chord Bearing	=	S 43° 06' 37.64" E
Proposed Full Super	=	5.2%

Station			Left Slope	RIght Slope
3+50.33	PC	+ 50.33	5.20	-5.20
10+76.83	PT	- 50.33	5.20	-5.20
11+08.39	PT	- 18.77	3.57	-3.57
	PT			
11+77.49	PT	+ 50.33	0.00	-3.57
12+46.59	PT	+ 119.43	-3.57	-3.57

Curve 11048_3 (Site 7)

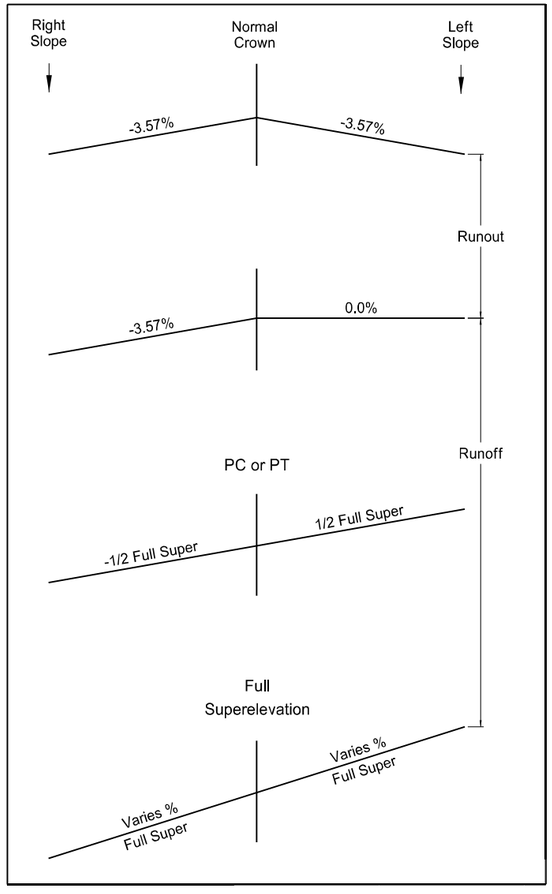
P.C. Station	=	6003+50.00
P.I. Station	=	6006+42.49
P.T. Station	=	6009+11.82
Delta	=	39° 19' 40" (LT)
Degree	=	7° 00' 00"
Tangent	=	292.49
Length	=	561.82
Radius	=	818.51
External	=	50.69
Back	=	N 57° 56' 49.33" E
Ahead	=	N 18° 37' 09.33" E
Chord Bearing	=	N 38° 16' 59.33" E
Proposed Full Super	=	5.8%

Station			Left Slope	RIght Slope
6004+14.45	PC	+ 64.45	-5.80	5.80
6008+47.37	PT	- 64.45	-5.80	5.80
6008+96.94	PT	- 14.88	-3.57	3.57
	PT			
6009+76.27	PT	+ 64.45	-3.57	0.00
6010+55.60	PT	+ 143.78	-3.57	-3.57

Curve 10818_6 (Site 1)

P.C. Station	=	14+91.40
P.I. Station	=	18+30.82
P.T. Station	=	21+09.18
Delta	=	58° 59' 38" (LT)
Degree	=	9° 32' 57"
Tangent	=	339.42
Length	=	617.78
Radius	=	600.00
External	=	89.35
Back	=	S 05° 55' 34.68" E
Ahead	=	S 64° 55' 12.68" E
Chord Bearing	=	S 35° 25' 23.68" E
Proposed Full Super	=	5.2%

Station			Left Slope	RIght Slope
13+71.97	PC	- 119.43	-3.57	-3.57
14+41.07	PC	- 50.33	-3.57	0.00
	PC			
15+10.17	PC	+ 18.77	-3.57	3.57
15+41.73	PC	+ 50.33	-5.20	5.20
20+58.85	PT	- 50.33	-5.20	5.20



REGISTERED PROFESSIONAL ENGINEER
ANDREW J. KREBS
PE-7876
DATE 10/10/25
NORTH DAKOTA

Note: Calculation based on AASHTO Method Five. A design speed of 35 MPH for Site 1, a design speed of 45 MPH for Site 7, and maximum superelevation of 6% were used.

HEC-0004(202)

Multiple Locations

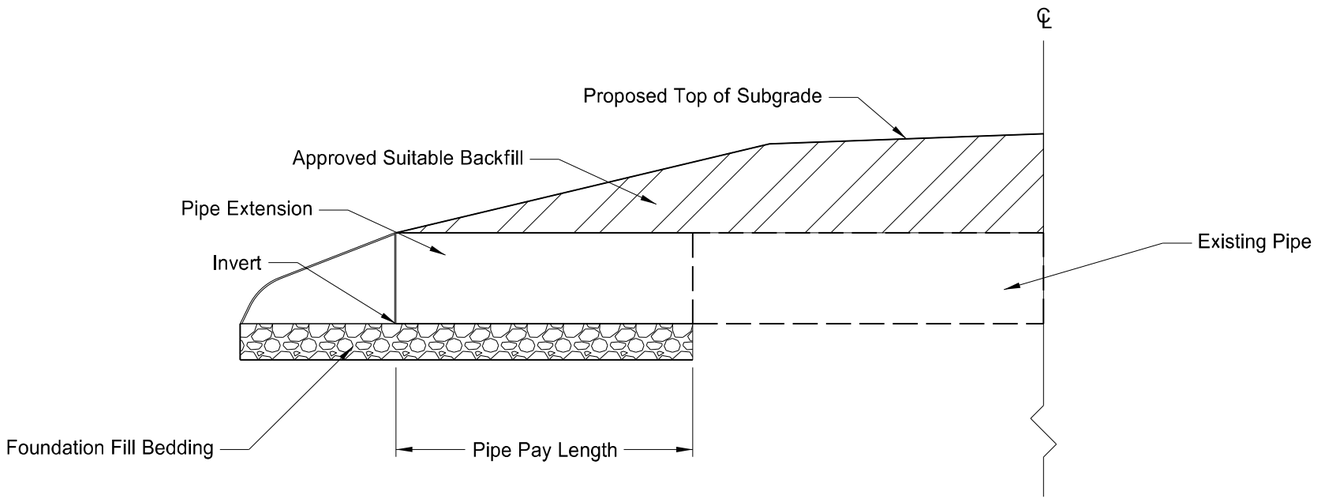
KLJ

Superelevation Tables

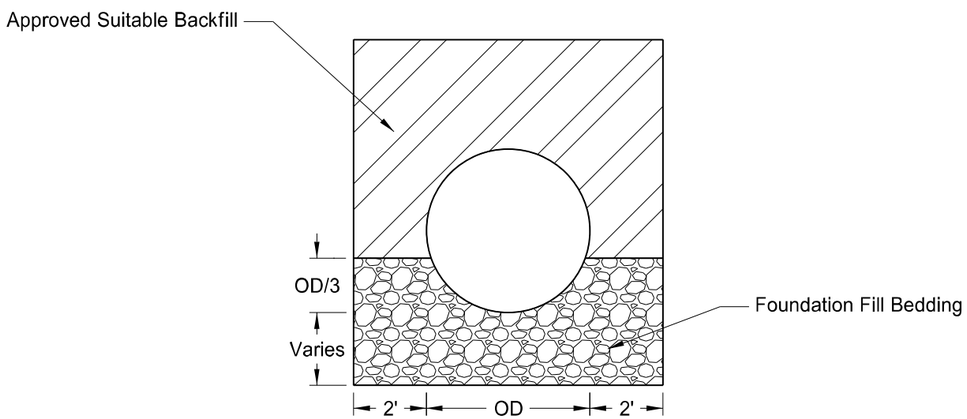
Billings County, ND

DRAWN BY	CHK'D BY	PROJECT NO.
AK	SPK	2103-01811

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	20	2



One-half Pipe Extension



Bedding
CY Per Foot
(for centerline CSP)

Size	CSP
24"	0.70

*2' has been provided for use if needed as determined by the Engineer in the field.

Pay Items
1) Pipe*
2) Foundation Fill
3) Removal of Pipe (If Required)

*Included in Pipe Pay Item
1) Pipe
2) Trench Excavation
3) Pipe Embankment

REGISTERED PROFESSIONAL ENGINEER
ANDREW KREBS
PE-7876
DATE 10/10/25
NORTH DAKOTA

HEC-0004(202)
Multiple Locations

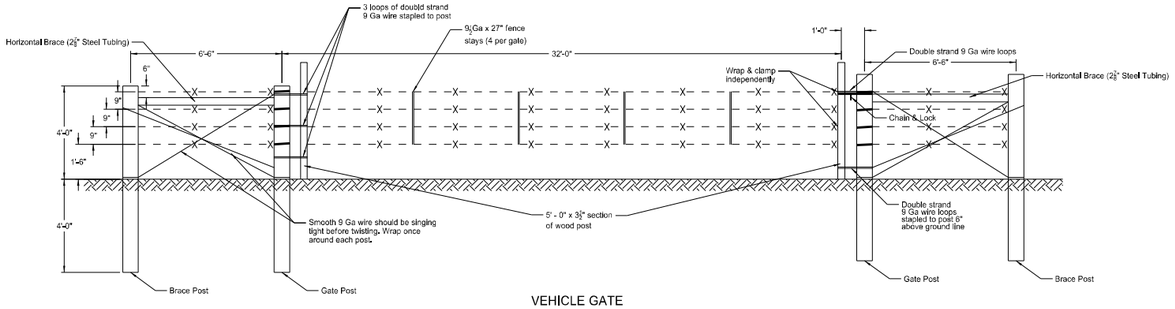
KLJ

Pipe Extension Bedding & Backfill Details

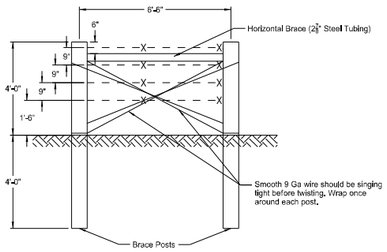
Billings County, ND

DRWN. BY	CHK'D. BY	PROJECT NO.
AK	SPK	2103-01811

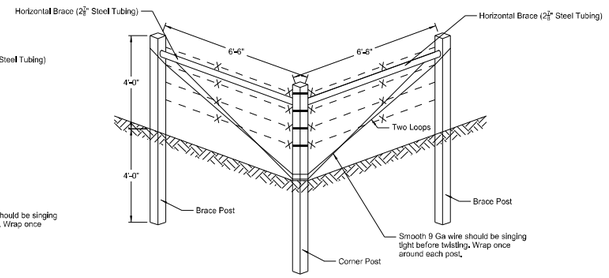
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	20	3



VEHICLE GATE



DOUBLE BRACE ASSEMBLY



CORNER ASSEMBLY

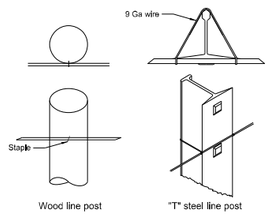
NOTES

1. No deduction in measured pay length of cable fence will be made for gates, corner assemblies, double brace assemblies, fence terminals, or depression fencing. Include all costs for abutment fencing in the price bid for fencing bid items.

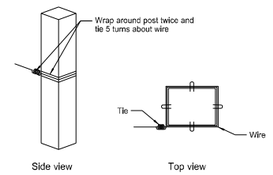
2. Install double brace assemblies shall be installed at locations shown on the plans or established by the Engineer. Place adjacent fence terminals, corner assemblies, or double brace assemblies at a maximum of 1,320 feet.

3. Place line posts in a repeating pattern of 5 steel posts and then 1 wood post. Locations of double brace assemblies and vehicle gates as shown on the plans may be adjusted by the Engineer.

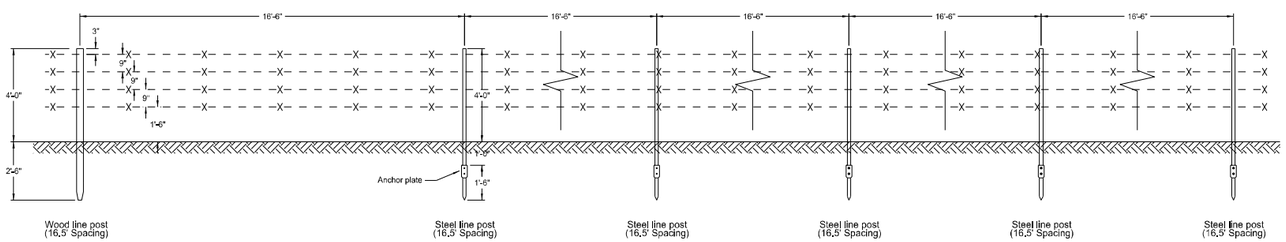
	POST SIZES							
	TREATED WOOD		TREATED RAILROAD TIE		STEEL			
USE OF POST	Post dia.	Post length	Post dimensions	Post length	Post dia.	Post length	Post wt. Lbs/Ft	Anchor wt. Lbs.
Line Post	4"	6'-6"				6'-6"	1.33	0.67
Corner Post			7"x9"	8'				
Brace Post			7"x9"	8'				
Gate Post			7"x9"	8'				
Horizontal Brace					2⅞"	6'-6"	As approved by Engineer	



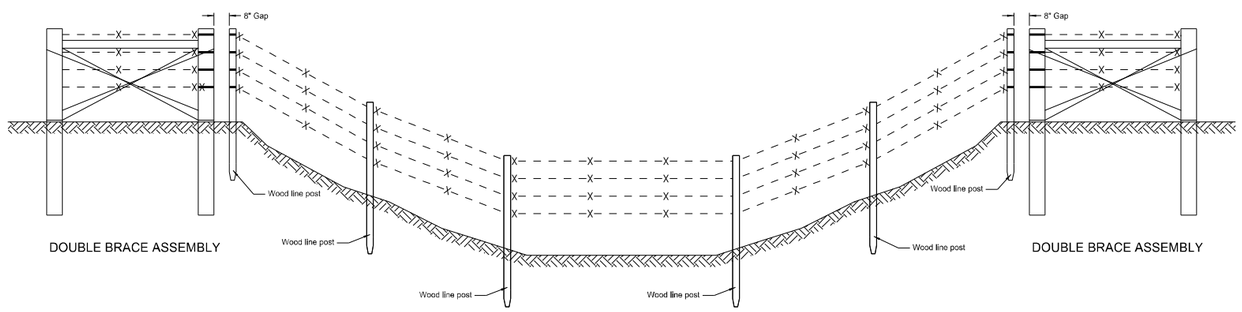
FASTENING TO POSTS



WRAP-AROUND DETAIL



LINE POST DETAIL



BREAK-AWAY FENCE FOR WIDE
DEPRESSIONS SUBJECT TO FLOODING

REGISTERED PROFESSIONAL ENGINEER
ANDREW KREBS
PE-7876
DATE 10/10/25
NORTH DAKOTA

HEC-0004(202)

Multiple Locations

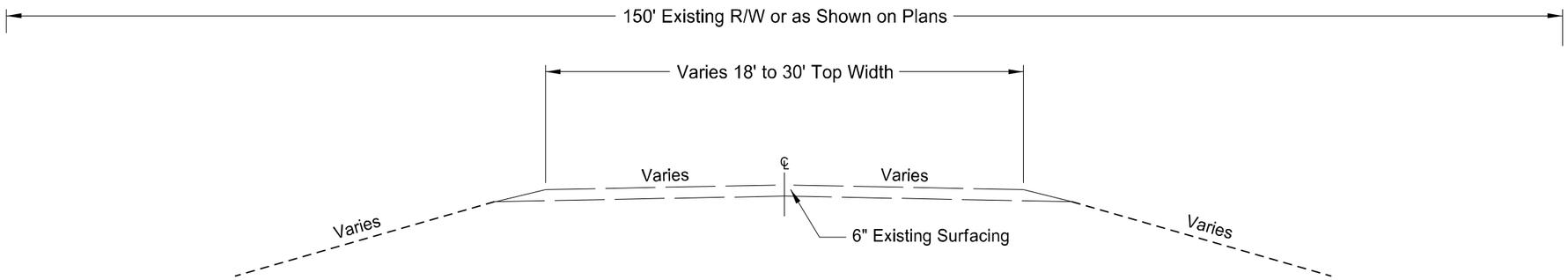
KLJ

Permanent Fencing Details

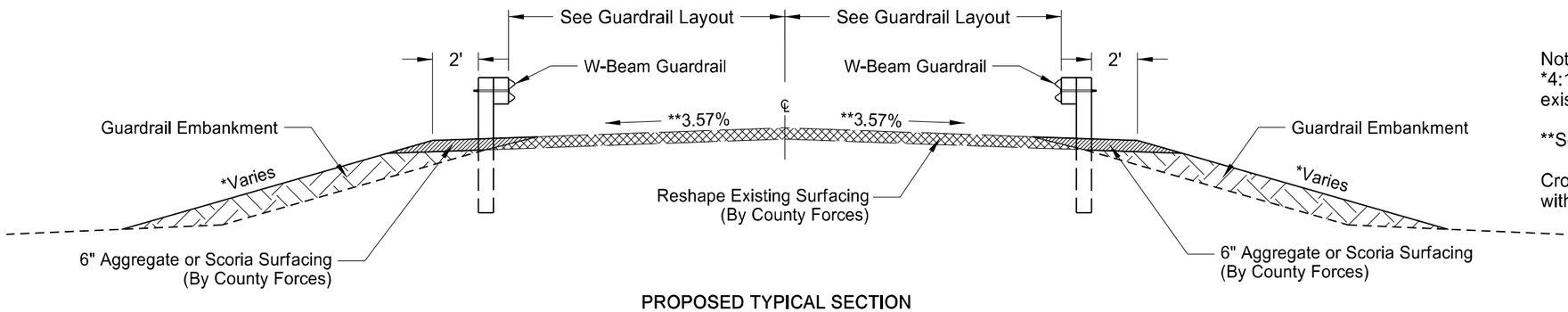
Billings County, ND

DRWN. BY	CHKD. BY	PROJECT NO.
AK	SPK	2103-01811

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	30	1



EXISTING TYPICAL SECTION

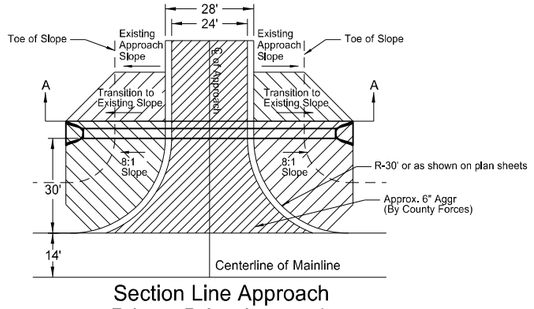


PROPOSED TYPICAL SECTION

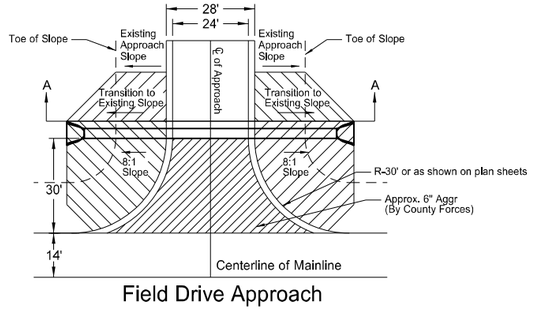
Notes:
*4:1 Max Slope thru End Terminal then transition to existing to match at Bridge Abutment

**See Section 20 Sheet 1 for Superelevations

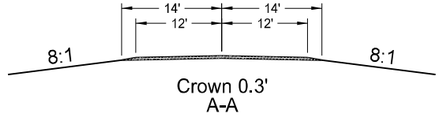
Cross sections have been provided for locations with a ditch section



Section Line Approach
Private Drive Approach



Field Drive Approach



Crown 0.3'
A-A

REGISTERED PROFESSIONAL ENGINEER
ANDREW J KREBS
PE-7876
DATE 10/10/25
NORTH DAKOTA

HEC-0004(202)
Multiple Locations

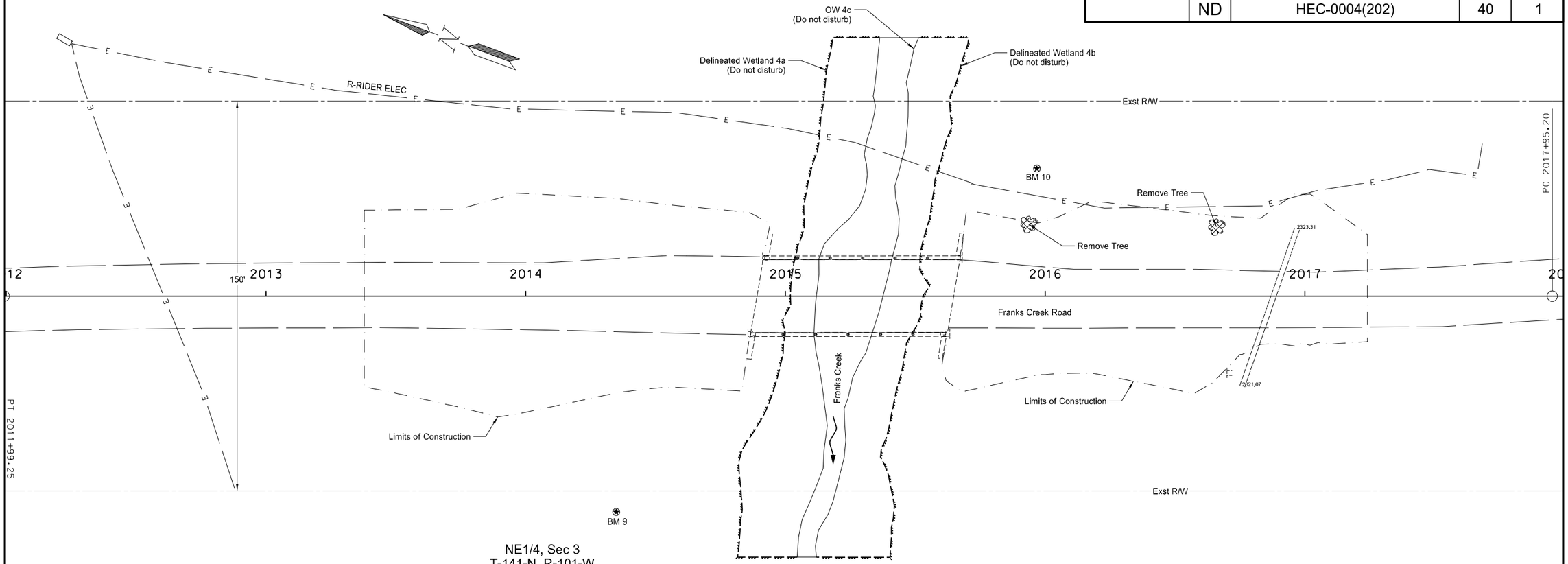
KLJ

Existing & Proposed Typical Sections

Billings County, ND

DRWN. BY	CHK'D. BY	PROJECT NO.
AK	SPK	2103-01811

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	40	1



REGISTERED PROFESSIONAL ENGINEER
ANDREW J KREBS
PE-7876
DATE 10/10/25
NORTH DAKOTA

LEGEND

- Remove Existing Fence
- Remove Existing Guardrail
- Tree Removal

HEC-0004(202)

Structure # 04-110-19.0

KLJ

Removals

Site 3
Billings County, ND

DRWN. BY	CHK'D. BY	PROJECT NO.
AK	SPK	2103-01811

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEC-0004(202)	40	2

NE1/4NE1/4, Sec 16
T-141-N, R-98-W
Mary Kaye Knudsen ET AL

SE1/4, Sec 9
T-141-N, R-98-W
Arvid C & Mary E Hecker

NW1/4, Sec 15
T-141-N, R-98-W
Jayden Krivoruchka

SW1/4SW1/4, Sec 10
T-141-N, R-98-W
AMGC Farms LLC

66'

CONS TEL

OW 6d
(Do not disturb)

Delineated Wetland 6b
(Do not disturb)

Delineated Wetland 6c
(Do not disturb)

B Wire

R-RIDER ELEC

PP

Exst R/W

Gate

Limits of Construction

FO Ped

Remove Existing Fence
70 LF

Remove Existing Fence
57 LF

PC 3026+34.49

3024

3025

3026

3027

3028

3029

150'

Sec Line

123rd Ave SW

7000

POT 7000+00.00

Remove Existing Fence
180 LF

Remove Existing Fence
94 LF

PC 7000+51.86

26th St SW

7001

BM 1

WBI ENERGY

PI 7001+95.42

CONS TEL

202	0312	REMOVE EXISTING FENCE	
		Sta 3023+80 to 3025+53 Rt	180 LF
		Sta 3025+05 to 3025+52 Lt	70 LF
		Sta 3026+20 to 3026+27 Rt	94 LF
		Sta 3026+28 to 3026+42 Lt	57 LF
		Total =	401 LF

LEGEND

- Remove Existing Fence
- Remove Existing Guardrail
- Tree Removal

REGISTERED PROFESSIONAL ENGINEER
ANDREW J KREBS
PE-7876
DATE 10/10/25
NORTH DAKOTA

HEC-0004(202)
Structure # 04-127-21.0

KLJ

Removals

Site 4
Billings County, ND

DRWN. BY	CHK'D. BY	PROJECT NO.
AK	SPK	2103-01811

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEC-0004(202)	40	3

SW1/4SE1/4, Sec 29
T-142-N, R-98-W
Andrew J Klym

SE1/4SE1/4, Sec 29
T-142-N, R-98-W
Kevin & Collette Kirsch

NE1/4, Sec 32
T-142-N, R-98-W
Geoff & Debra Obrigewitsch

OW 5c
(Do not disturb)

Delineated Wetland 5a
(Do not disturb)

Delineated Wetland 5b
(Do not disturb)

Sixteenth Line 4039+64.64

CONS TEL

R-RIDER ELEC

Exst R/W

B Wire

PP

BM 4

BM 3

Remove Existing Fence
59 LF

Remove Existing Fence
51 LF

Remove Existing Fence
51 LF

Remove Existing Fence
64 LF

Limits of Construction

4035 4036 4037 4038 4039 4040

150'

Sec Line

23rd St SW

OH

PL

ONEOK

202	0312	REMOVE EXISTING FENCE	
		Sta 4037+31 to 4037+62 Lt	59 LF
		Sta 4037+79 to 4037+88 Rt	51 LF
		Sta 4038+26 to 4038+36 Lt	51 LF
		Sta 4038+44 to 4038+83 Rt	64 LF
		Total =	225 LF

REGISTERED PROFESSIONAL ENGINEER
ANDREW J KREBS
PE-7876
DATE 10/10/25
NORTH DAKOTA

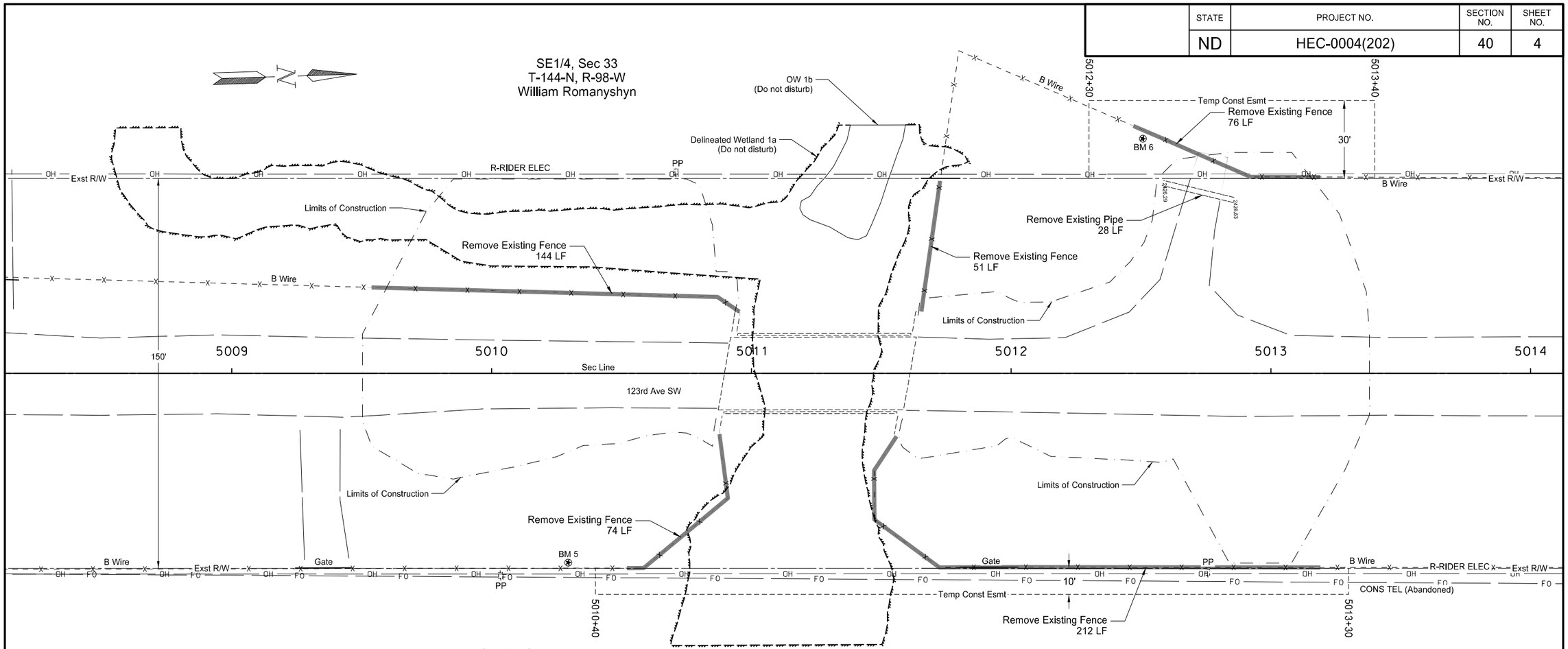
LEGEND
- Remove Existing Fence
- Remove Existing Guardrail
- Tree Removal

HEC-0004(202)
Structure # 04-126-17.0

Removals
Site 5
Billings County, ND

DRWN. BY	CHK'D. BY	PROJECT NO.
AK	SPK	2103-01811

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	40	4



202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES		
		Sta 5012+72 Lt	28	LF
202	0312	REMOVE EXISTING FENCE		
		Sta 5009+54 to 5010+95 Lt	144	LF
		Sta 5010+52 to 5010+91 Rt	74	LF
		Sta 5011+47 to 5013+19 Rt	212	LF
		Sta 5011+65 to 5011+73 Lt	51	LF
		Sta 5012+47 to 5013+19 Lt	76	LF
		Total =	557	LF

REGISTERED PROFESSIONAL ENGINEER
ANDREW KREBS
PE-7876
DATE 10/10/25
NORTH DAKOTA

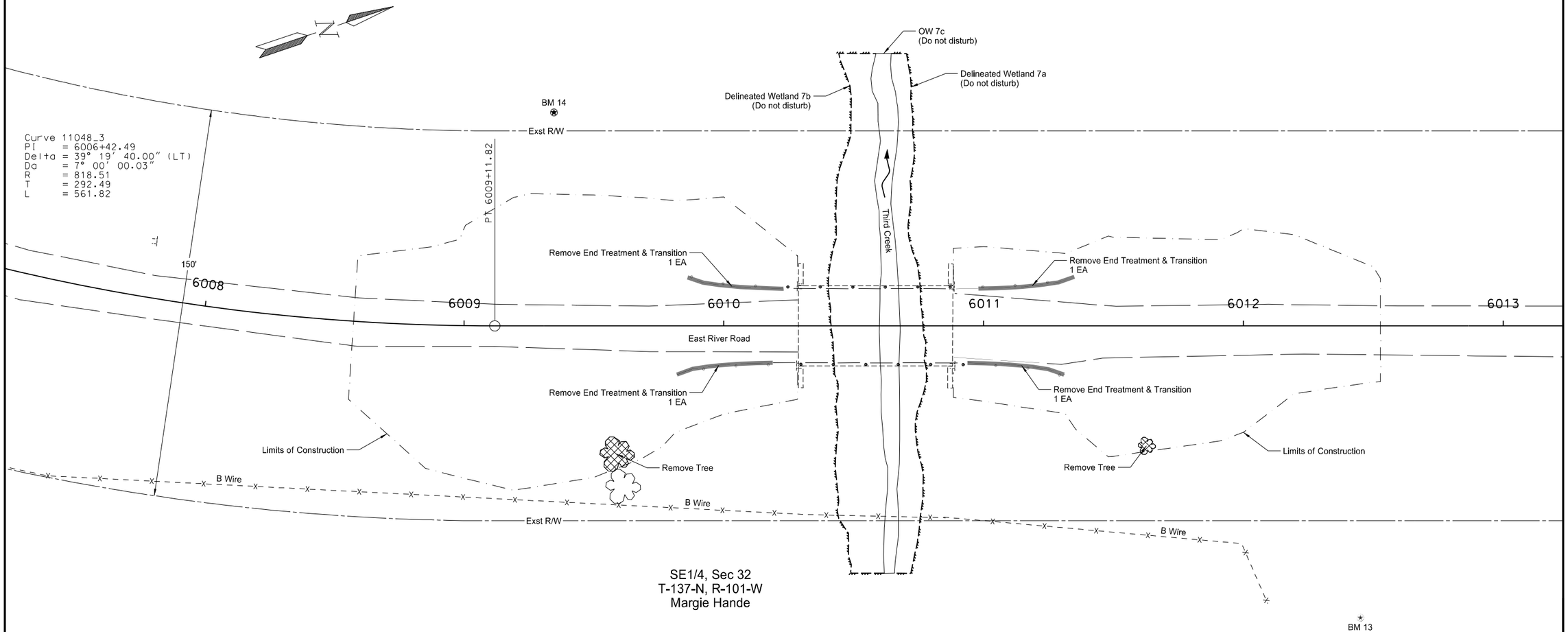
LEGEND
- Remove Existing Fence
- Remove Existing Guardrail
- Tree Removal

HEC-0004(202)
Structure # 04-127-06.0

Removals
Site 6
Billings County, ND

DRWN. BY	CHK'D. BY	PROJECT NO.
AK	SPK	2103-01811

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	40	5



764	2081	REMOVE END TREATMENT & TRANSITION	
		Sta 6009+82 to 6010+19 Rt	1 EA
		Sta 6009+86 to 6010+23 Lt	1 EA
		Sta 6010+94 to 6011+31 Rt	1 EA
		Sta 6010+98 to 6011+35 Lt	1 EA
		Total =	4 EA

REGISTERED PROFESSIONAL ENGINEER
ANDREW J KREBS
PE-7876
DATE 10/10/25
NORTH DAKOTA

LEGEND

- Remove Existing Fence
- Remove Existing Guardrail
- Tree Removal

HEC-0004(202)

Structure # 04-110-48.0

KLJ

Removals

Site 7
Billings County, ND

DRAWN BY	CHK'D BY	PROJECT NO.
AK	SPK	2103-01811

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	75	1

Wetland Impact Table

Wetland Number	Location	Wetland Type	Wetland Feature	USACE Jurisdictional Wetlands	Wetland Impact					Wetland Mitigation					
					Wetland Impacts Acre(s)			USFWS Easement Impacts Acre(s)		Mitigation Proposed			Onsite Mitigation Method		
					Temp.	Perm. (Fill/Drain)	Perm. (Cut)	Temp.	Perm.	EO 11990	USACE	USFWS	Mitigation Location; Ratio	Ditch Shift Acre(s)	Onsite Acre(s)
1a	Sec 34, T-144-N, R-98-W	Riverine	Natural	Y	0.045	0.012				Y	N		Ditch Shift 1; 1:1	0.012	
2a	Sec 32, T-142-N, R-101-W	Riverine	Natural	Y											
2b	Sec 32, T-142-N, R-101-W	Riverine	Natural	Y											
3a	Sec 3, T-141-N, R-101-W	Riverine	Natural	Y											
3b	Sec 3, T-141-N, R-101-W	Riverine	Natural	Y											
4a	Sec 2, T-141-N, R-101-W	Riverine	Natural	Y											
4b	Sec 2, T-141-N, R-101-W	Riverine	Natural	Y											
5a	Sec 32, T-142-N, R-98-W	Riverine	Natural	Y											
5b	Sec 32, T-142-N, R-98-W	Riverine	Natural	Y											
6a	Sec 9, T-141-N, R-98-W	Ditch	Created	Y											
6b	Sec 15, T-141-N, R-98-W	Riverine	Natural	Y											
6c	Sec 15, T-141-N, R-98-W	Riverine	Natural	Y											
7a	Sec 32, T-137-N, R-101-W	Riverine	Natural	Y											
7b	Sec 32, T-137-N, R-101-W	Riverine	Natural	Y											
				Totals	0.045	0.012	-	-	-					0.012	-

Other Waters Impact Table

Number	Location	Type	Feature	USACE Jurisdictional[1]	Impacts to Other Waters						Other Water Mitigation		
					Acres			Linear Feet			Mitigation Proposed		
					Temp.	Perm. (Fill/Drain)	Perm. (Cut)	Temp.	Perm. (Fill/Drain)	Perm. (Cut)	EO 11990	USACE	USFWS
OW 1b	Sec 33, T-144-N, R-98-W	River	Natural	Y									
OW 2c	Sec 32, T-142-N, R-101-W	Creek	Natural	Y									
OW 3c	Sec 3, T-141-N, R-101-W	Creek	Natural	Y									
OW 4c	Sec 2, T-141-N, R-101-W	Creek	Natural	Y									
OW 5c	Sec 32, T-142-N, R-98-W	Creek	Natural	Y									
OW 6d	Sec 9, T-141-N, R-98-W	River	Natural	Y									
OW 7c	Sec 32, T-137-N, R-101-W	Creek	Natural	Y									
				Totals	-	-	-	-	-	-			

[1] A wetland Jurisdictional Determination was issued by the USACE on 05/24/2023; NWO-1980-02417-BIS for Wetland 1a and OW 1b.
A wetland Jurisdictional Determination was issued by the USACE on 05/09/2023; NWO-2023-00548-BIS for Wetlands 2a and 2b, and OW 2c.
A wetland Jurisdictional Determination was issued by the USACE on 05/09/2023; NWO-2023-00549-BIS for Wetlands 3a and 3b, and OW 3c.
A wetland Jurisdictional Determination was issued by the USACE on 05/09/2023; NWO-2023-00551-BIS for Wetlands 4a and 4b, and OW 4c.
A wetland Jurisdictional Determination was issued by the USACE on 05/09/2023; NWO-2023-00552-BIS for Wetlands 5a and 5b, and OW 5c.
A wetland Jurisdictional Determination was issued by the USACE on 06/09/2023; NWO-2015-02357-BIS for Wetlands 6a, 6b, 6c and OW 6d.
A wetland Jurisdictional Determination was issued by the USACE on 05/10/2023; NWO-1997-61421-BIS for Wetlands 7a and 7b, and OW 7c.

Mitigation Summary Table

	Location	Ditch Shift Acre(s)	Onsite Acre(s)	11990 Bank Acre(s)	USACE/11990 Bank Acre(s)	USFWS Bank Acre(s)
USACE Only						
EO 11990 Only	Onsite	0.012				
USACE/11990						
USFWS						
Total		0.012	-	-	-	-

Impact Summary Table

Permanent Impact Summary		Temporary Impacts and additional information	
Wetland Type	Total Acre(s)	Water Type	Total Acre(s)
Natural/JD (Fill/Drain)	0.012	Temporary Wetland JD	0.045
Natural/Non-JD (Fill/Drain)	0.000	Non-JD Wetland Temporary	0.000
Artificial/JD (Fill/Drain)	0.000		
Artificial/Non-JD (Fill/Drain)	0.000	Permanent OW	0.000
Total	0.012	Temporary OW	0.000
JD Natural (Cut)	-	Permanent OW-d	-
JD Artificial (Cut)	-	Temporary OW-d	-
Non-JD Natural (Cut)	-		
Non-JD Artificial (Cut)	-		
Total	-		

REGISTERED PROFESSIONAL ENGINEER
ANDREW KREBS
PE-7876
DATE 10/10/25
NORTH DAKOTA

HEC-0004(202)
Multiple Locations

KLJ

Wetlands, Mitigation and Environmental
Wetland Impact Table
Billings County, ND

DRWN. BY	CHK'D. BY	PROJECT NO.
AK	DB	2103-01811

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	75	2

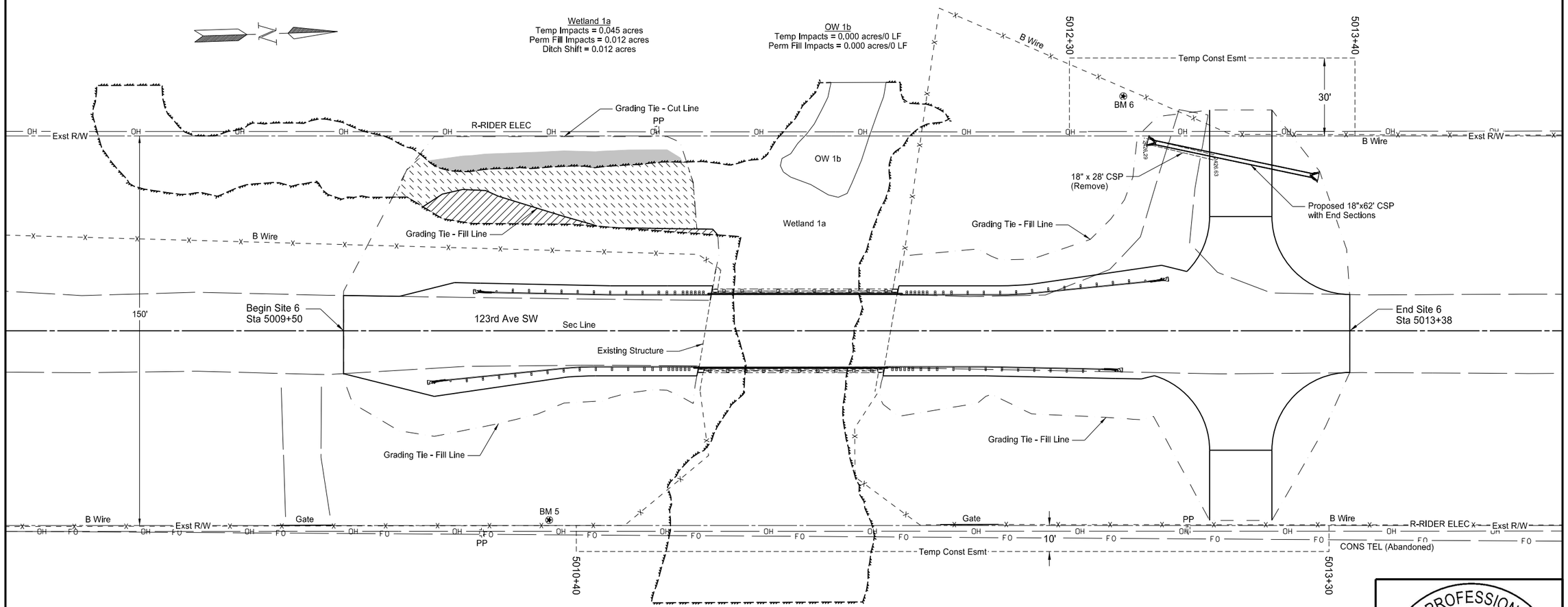
Wetland Delineated Existing

Wetland Impact Permanent

Wetland Impact Temporary

Ditch Shift

SE1/4, Sec 33
T-144-N, R-98-W
William Romanyshyn



SW1/4, Sec 34
T-144-N, R-98-W
William Romanyshyn

REGISTERED PROFESSIONAL ENGINEER
ANDREW J. KREBS
PE-7876
DATE 10/10/25
NORTH DAKOTA

HEC-0004(202)

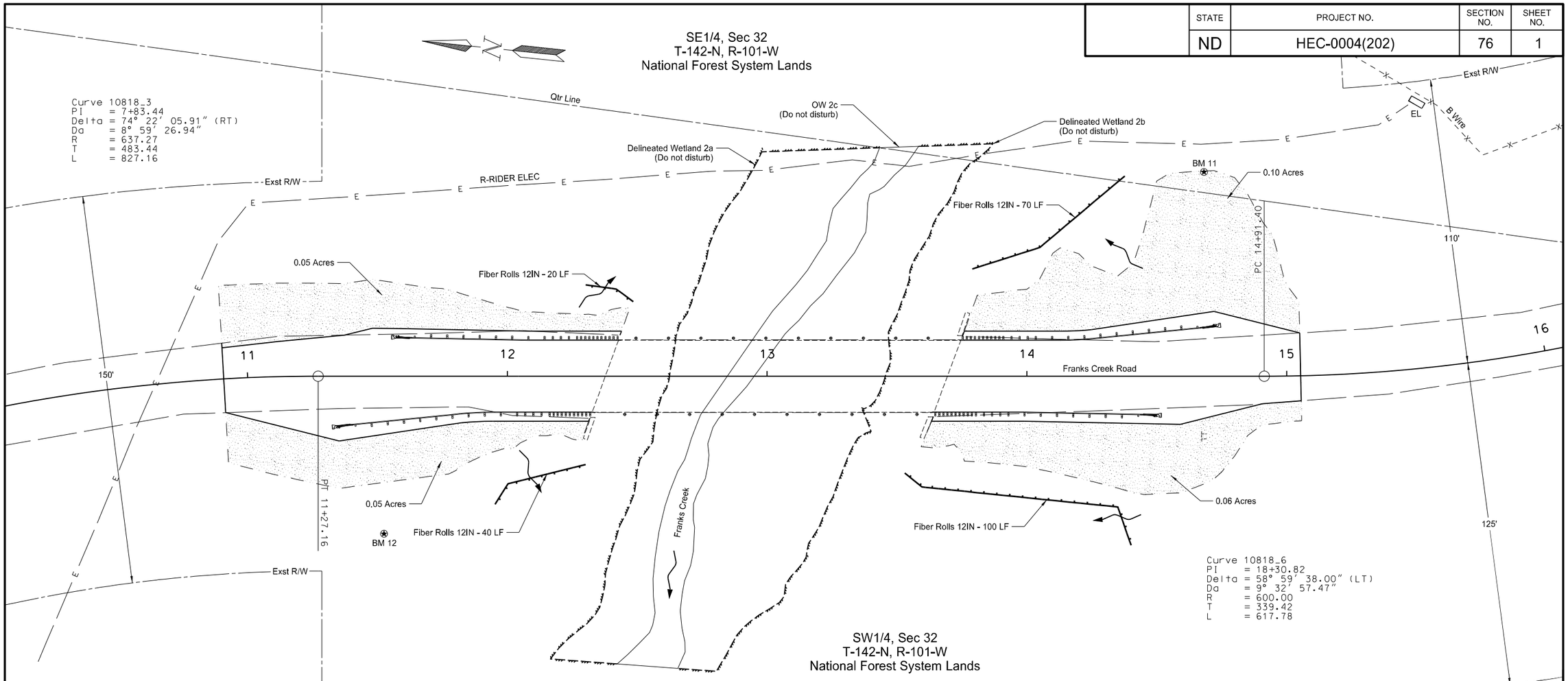
Structure # 04-127-06.0

KLJ

Wetlands, Mitigation and Environmental
Site 6
Billings County, ND

DRWN. BY	CHK'D. BY	PROJECT NO.
AK	DB	2103-01811

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	76	1



261	0112	FIBER ROLLS 12IN		
		Sta 11+95 to 12+30 Rt	40	LF
		Sta 12+30 to 12+48 Lt	20	LF
		Sta 13+53 to 14+40 Rt	100	LF
		Sta 13+79 to 14+38 Lt	70	LF
		Total =	230	LF

261	0113	REMOVE FIBER ROLLS 12IN		
		Sta 11+95 to 12+30 Rt	40	LF
		Sta 12+30 to 12+48 Lt	20	LF
		Sta 13+53 to 14+40 Rt	100	LF
		Sta 13+79 to 14+38 Lt	70	LF
		Total =	230	LF

REGISTERED PROFESSIONAL ENGINEER
ANDREW J. KREBS
PE-7876
DATE 10/10/25
NORTH DAKOTA

HEC-0004(202)

Structure # 04-108-18.0

LEGEND

Fiber Rolls 12IN

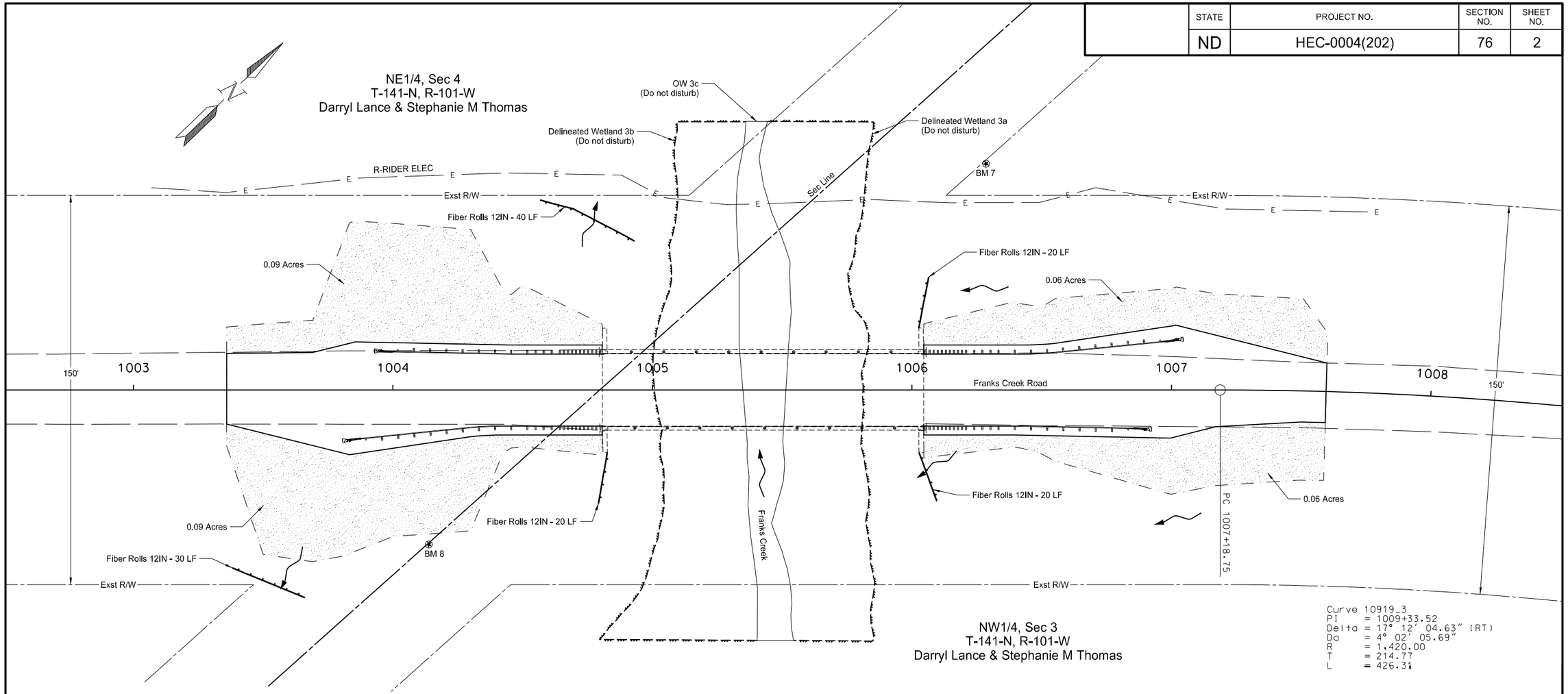
Temporary Cover Crop & Straw Mulch

KLJ

Temporary Sediment and Erosion Control
Site 1
Billings County, ND

DRAWN BY	CHK'D. BY	PROJECT NO.
AK	SPK	2103-01811

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	76	2



261	0112	FIBER ROLLS 12IN		
		Sta 1003+38 to 1003+66 Rt	30	LF
		Sta 1004+57 to 1004+93 Lt	40	LF
		Sta 1004+79 to 1004+83 Rt	20	LF
		Sta 1006+03 to 1006+10 Rt	20	LF
		Sta 1006+03 to 1006+06 Lt	20	LF
		Total =	130	LF

261	0113	REMOVE FIBER ROLLS 12IN		
		Sta 1003+38 to 1003+66 Rt	30	LF
		Sta 1004+57 to 1004+93 Lt	40	LF
		Sta 1004+79 to 1004+83 Rt	20	LF
		Sta 1006+03 to 1006+10 Rt	20	LF
		Sta 1006+03 to 1006+06 Lt	20	LF
		Total =	130	LF

REGISTERED PROFESSIONAL ENGINEER
ANDREW J KREBS
PE-7876
DATE 10/10/25
NORTH DAKOTA

LEGEND
- Fiber Rolls 12IN
- Temporary Cover Crop & Straw Mulch

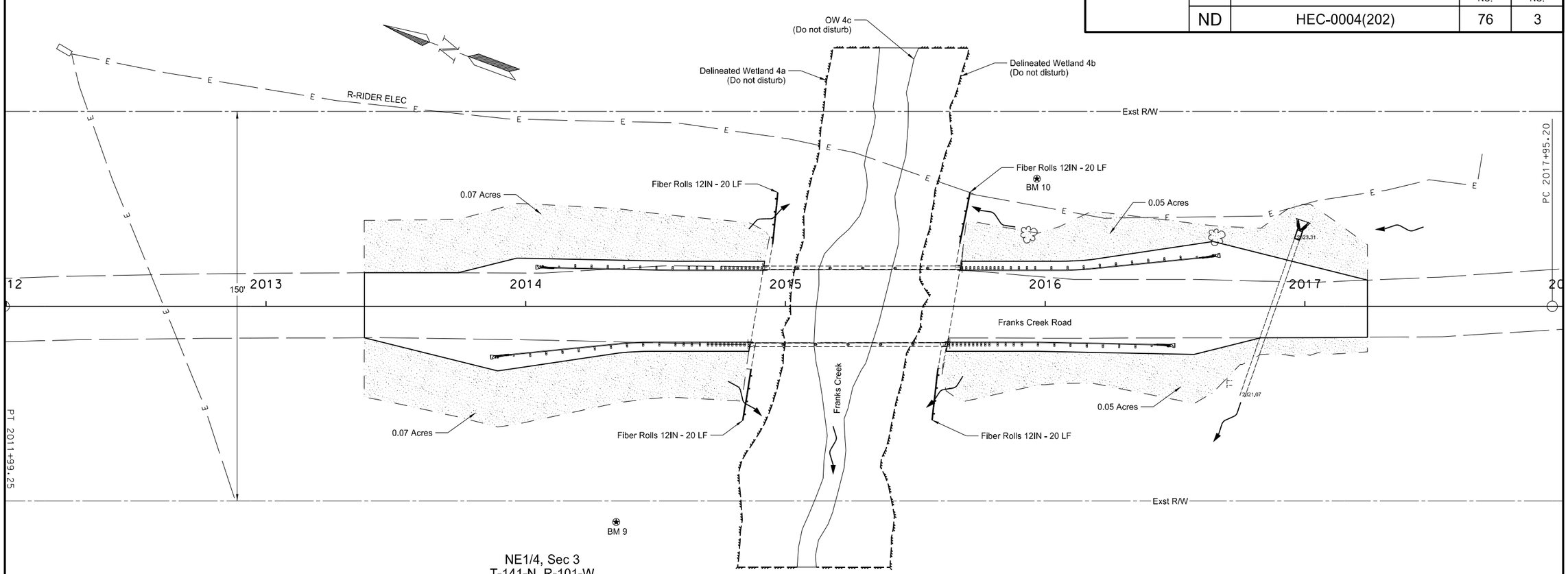
HEC-0004(202)
Structure # 04-109-19.0

KLJ

Temporary Sediment and Erosion Control
Site 2
Billings County, ND

DRAWN BY	CHK'D BY	PROJECT NO.
AK	SPK	2103-01811

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	76	3



261	0112	FIBER ROLLS 12IN		
		Sta 2014+84 to 2014+87 Rt	20	LF
		Sta 2014+95 to 2014+97 Lt	20	LF
		Sta 2015+56 to 2015+59 Rt	20	LF
		Sta 2015+67 to 2015+71 Lt	20	LF
		Total =	80	LF

261	0113	REMOVE FIBER ROLLS 12IN		
		Sta 2014+84 to 2014+87 Rt	20	LF
		Sta 2014+95 to 2014+97 Lt	20	LF
		Sta 2015+56 to 2015+59 Rt	20	LF
		Sta 2015+67 to 2015+71 Lt	20	LF
		Total =	80	LF

REGISTERED PROFESSIONAL ENGINEER
ANDREW J KREBS
PE-7876
DATE 10/10/25
NORTH DAKOTA

HEC-0004(202)
Structure # 04-110-19.0

LEGEND
Fiber Rolls 12IN
Temporary Cover Crop & Straw Mulch

KLJ

Temporary Sediment and Erosion Control
Site 3
Billings County, ND

DRWN. BY	CHKD. BY	PROJECT NO.
AK	SPK	2103-01811

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEC-0004(202)	76	4

NE1/4NE1/4, Sec 16
T-141-N, R-98-W
Mary Kaye Knudsen ET AL

SE1/4, Sec 9
T-141-N, R-98-W
Arvid C & Mary E Hecker

NW1/4, Sec 15
T-141-N, R-98-W
Jayden Krivoruchka

SW1/4SW1/4, Sec 10
T-141-N, R-98-W
AMGC Farms LLC

CONS TEL
R-RIDER ELEC
PP
Exst R/W
B Wire
OW 6d
(Do not disturb)
Delineated Wetland 6c
(Do not disturb)
Delineated Wetland 6b
(Do not disturb)
Fiber Rolls 12IN - 50 LF
Gate
FO Ped
Green River
Fiber Rolls 12IN - 20 LF
0.06 Acres
0.02 Acres
0.12 Acres
Fiber Rolls 12IN - 90 LF
Fiber Rolls 12IN - 20 LF
0.06 Acres
66'
150'
Sec Line
123rd Ave SW
3024
3025
3026
3027
3028
3029
7000
7001
POT 7000+00.00
PC 7000+51.86
PI 7001+95.42
26th St SW
WBI ENERGY
BM 1
Curve 26STSW1
PI = 7001+95.42
Delta = 11° 26' 46.17" (RT)
Da = 4° 00' 00.07"
R = 1,432.39
T = 143.55
L = 286.15

261	0112	FIBER ROLLS 12IN		
		Sta 3024+02 to 3034+92 Rt	90	LF
		Sta 3025+51 to 3025+55 Rt	20	LF
		Sta 3025+52 to 3025+55 Lt	20	LF
		Sta 3026+25 to 3026+30 Rt	20	LF
		Sta 3026+25 to 3026+40 Lt	50	LF
		Total =	200	LF

261	0113	REMOVE FIBER ROLLS 12IN		
		Sta 3024+02 to 3034+92 Rt	90	LF
		Sta 3025+51 to 3025+55 Rt	20	LF
		Sta 3025+52 to 3025+55 Lt	20	LF
		Sta 3026+25 to 3026+30 Rt	20	LF
		Sta 3026+25 to 3026+40 Lt	50	LF
		Total =	200	LF

REGISTERED PROFESSIONAL ENGINEER
ANDREW KREBS
PE-7876
DATE 10/10/25
NORTH DAKOTA

HEC-0004(202)
Structure # 04-127-21.0

LEGEND
Fiber Rolls 12IN
Temporary Cover Crop & Straw Mulch

KLJ

Temporary Sediment and Erosion Control
Site 4
Billings County, ND

DRAWN BY	CHK'D BY	PROJECT NO.
AK	SPK	2103-01811

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEC-0004(202)	76	5

SW1/4SE1/4, Sec 29
T-142-N, R-98-W
Andrew J Klym

SE1/4SE1/4, Sec 29
T-142-N, R-98-W
Kevin & Collette Kirsch

NE1/4, Sec 32
T-142-N, R-98-W
Geoff & Debra Obrigewitsch

OW 5c
(Do not disturb)

Delineated Wetland 5a
(Do not disturb)

Delineated Wetland 5b
(Do not disturb)

Spring Creek

Sixteenth Line 4039+64.64

CONS TEL

R-RIDER ELEC

Exst R/W

B Wire

PP

BM 4

BM 3

Fiber Rolls 12IN - 40 LF

Fiber Rolls 12IN - 20 LF

0.05 Acres

0.07 Acres

4035

4036

4037

4038

4039

4040

150'

Sec Line

23rd St SW

ONEOK

PL

OH

261	0112	FIBER ROLLS 12IN	
		Sta 4036+13 Rt	20 LF
		Sta 4037+53 to 4037+63 Lt	20 LF
		Sta 4037+80 to 4037+84 Rt	20 LF
		Sta 4038+20 to 4038+25 Lt	40 LF
		Sta 4038+42 to 4038+53 Rt	20 LF
		Total =	120 LF

261	0113	REMOVE FIBER ROLLS 12IN	
		Sta 4036+13 Rt	20 LF
		Sta 4037+53 to 4037+63 Lt	20 LF
		Sta 4037+80 to 4037+84 Rt	20 LF
		Sta 4038+20 to 4038+25 Lt	40 LF
		Sta 4038+42 to 4038+53 Rt	20 LF
		Total =	120 LF

REGISTERED PROFESSIONAL ENGINEER
ANDREW J KREBS
PE-7876
DATE 10/10/25
NORTH DAKOTA

HEC-0004(202)
Structure # 04-126-17.0

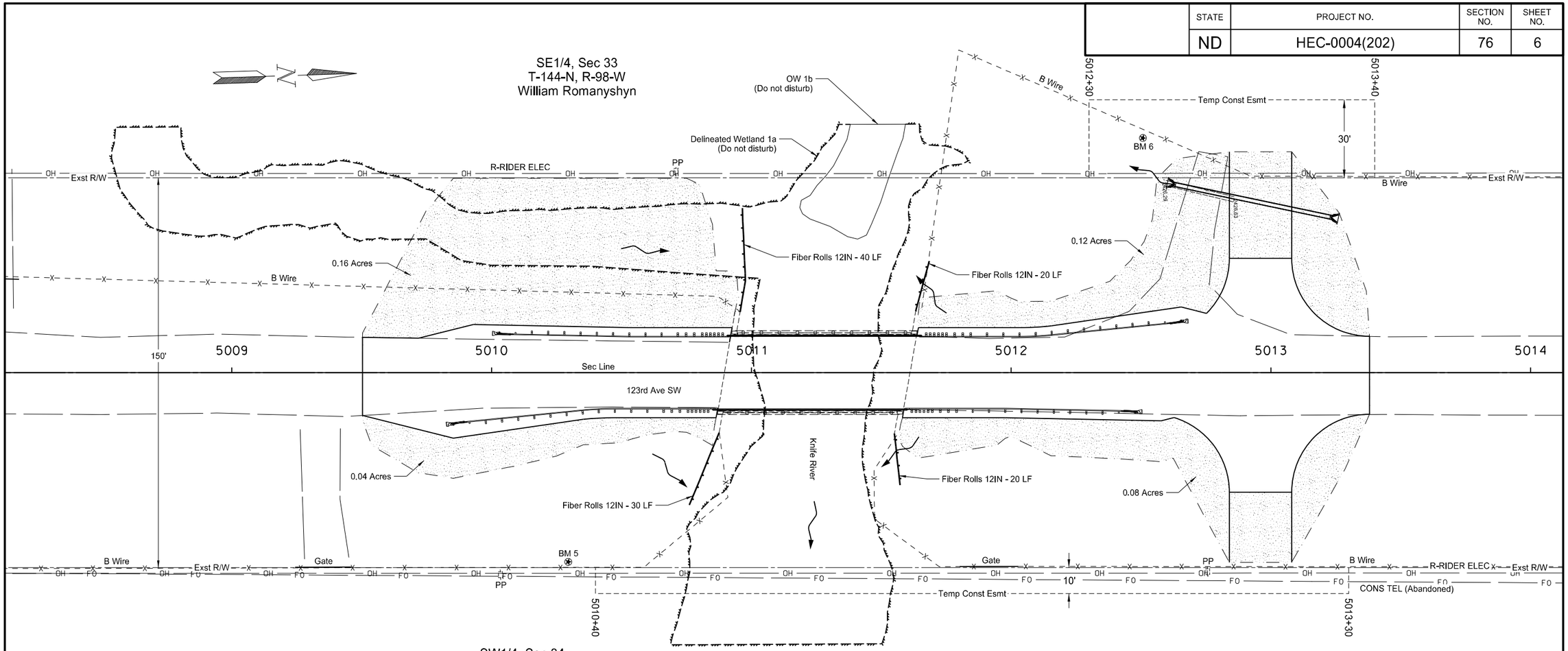
LEGEND
- Fiber Rolls 12IN
- Temporary Cover Crop & Straw Mulch

KLJ

Temporary Sediment and Erosion Control
Site 5
Billings County, ND

DRWN. BY	CHK'D. BY	PROJECT NO.
AK	SPK	2103-01811

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	76	6



261	0112	FIBER ROLLS 12IN		
		Sta 5010+76 to 5010+88 Rt	30	LF
		Sta 5010+96 to 5010+97 Lt	40	LF
		Sta 5011+55 to 5011+57 Rt	20	LF
		Sta 5011+63 to 5011+68 Lt	20	LF
		Total =	110	LF

261	0113	REMOVE FIBER ROLLS 12IN		
		Sta 5010+76 to 5010+88 Rt	30	LF
		Sta 5010+96 to 5010+97 Lt	40	LF
		Sta 5011+55 to 5011+57 Rt	20	LF
		Sta 5011+63 to 5011+68 Lt	20	LF
		Total =	110	LF

REGISTERED PROFESSIONAL ENGINEER
ANDREW KREBS
PE-7876
DATE 10/10/25
NORTH DAKOTA

HEC-0004(202)

Structure # 04-127-06.0

LEGEND

Fiber Rolls 12IN

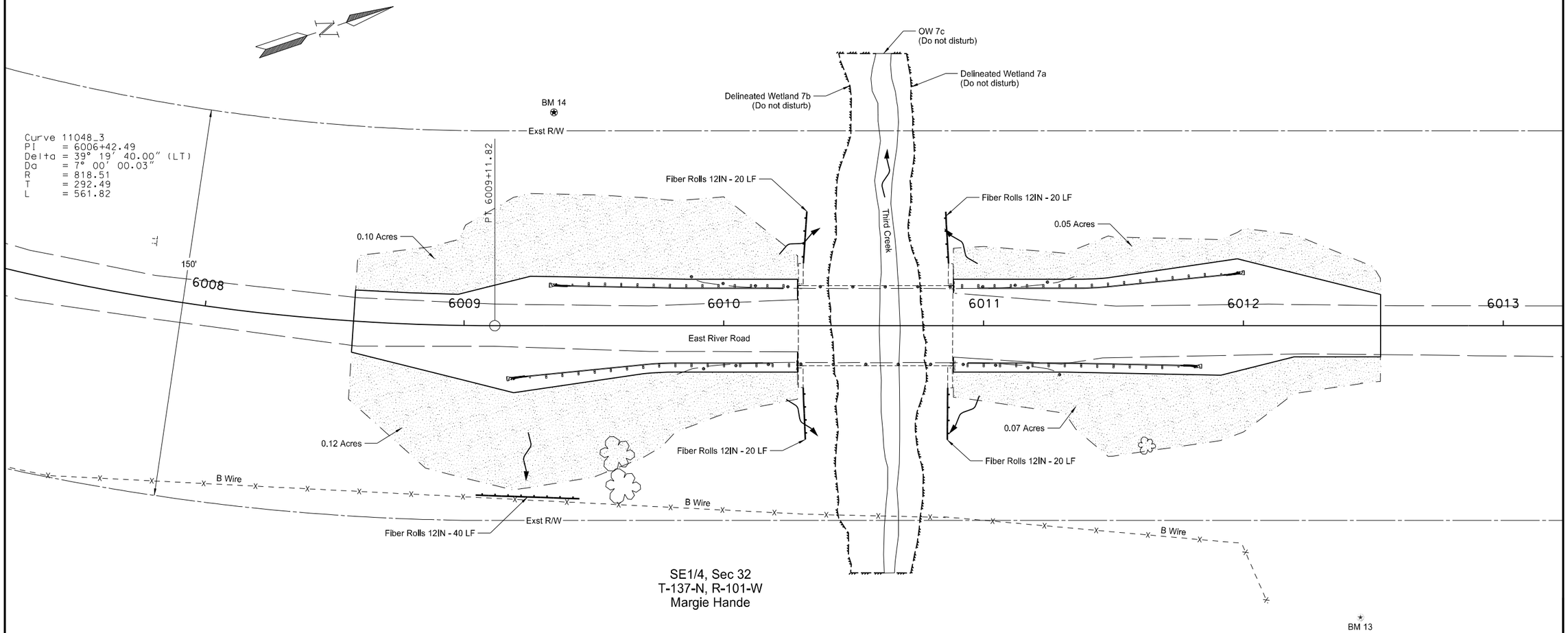
Temporary Cover Crop & Straw Mulch

KLJ

Temporary Sediment and Erosion Control
Site 6
Billings County, ND

DRAWN BY	CHK'D BY	PROJECT NO.
AK	SPK	2103-01811

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	76	7



261	0112	FIBER ROLLS 12IN		
		Sta 6009+05 to 6009+45 Rt	40	LF
		Sta 6010+31 to 6010+32 Rt	20	LF
		Sta 6010+31 to 6010+32 Lt	20	LF
		Sta 6010+85 to 6010+86 Lt	20	LF
		Sta 6010+86 Rt	20	LF
		Total =	120	LF

261	0113	REMOVE FIBER ROLLS 12IN		
		Sta 6009+05 to 6009+45 Rt	40	LF
		Sta 6010+31 to 6010+32 Rt	20	LF
		Sta 6010+31 to 6010+32 Lt	20	LF
		Sta 6010+85 to 6010+86 Lt	20	LF
		Sta 6010+86 Rt	20	LF
		Total =	120	LF

REGISTERED PROFESSIONAL ENGINEER
ANDREW KREBS
PE-7876
DATE 10/10/25
NORTH DAKOTA

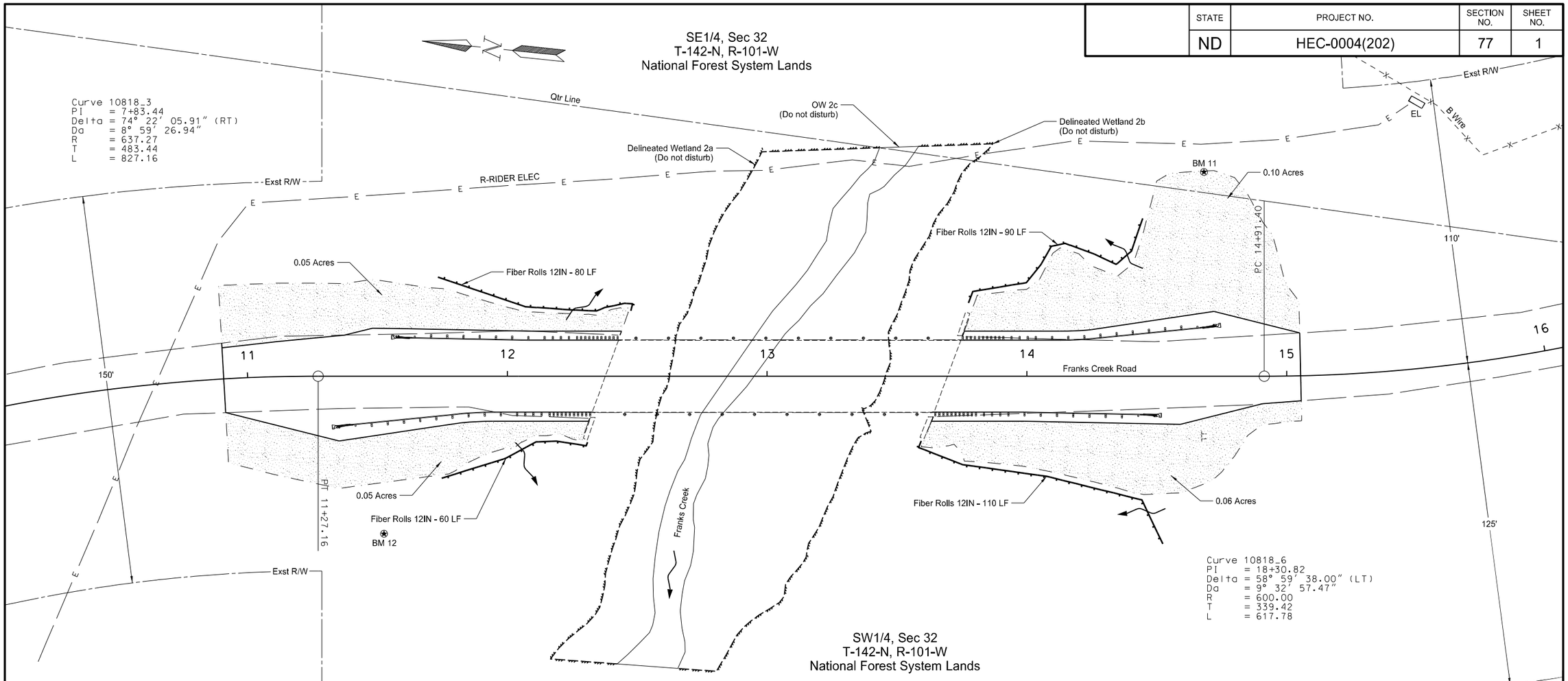
LEGEND
- Fiber Rolls 12IN
- Temporary Cover Crop & Straw Mulch

HEC-0004(202)
Structure # 04-110-48.0

Temporary Sediment and Erosion Control
Site 7
Billings County, ND

DRAWN BY	CHK'D BY	PROJECT NO.
AK	SPK	2103-01811

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	77	1



261	0112	FIBER ROLLS 12IN	
		Sta 11+73 to 12+47 Lt	80 LF
		Sta 11+75 to 12+31 Rt	60 LF
		Sta 13+58 to 14+52 Rt	110 LF
		Sta 13+78 to 14+45 Lt	90 LF
		Total =	340 LF

REGISTERED PROFESSIONAL ENGINEER
ANDREW J. KREBS
PE-7876
DATE 10/10/25
NORTH DAKOTA

HEC-0004(202)

Structure # 04-108-18.0

LEGEND

Fiber Rolls 12IN

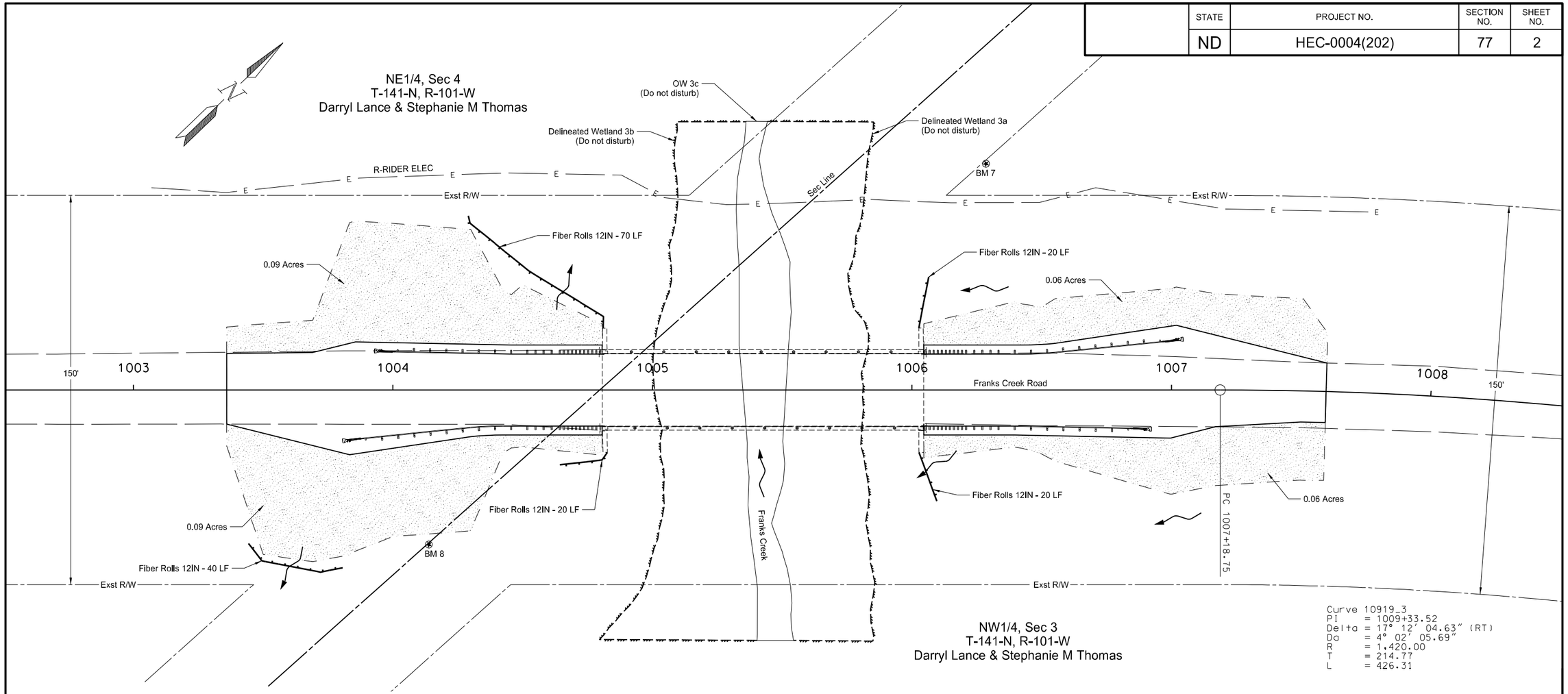
Seeding Class III & Straw Mulch

KLJ

Permanent Sediment and Erosion Control
Site 1
Billings County, ND

DRWN. BY	CHK'D. BY	PROJECT NO.
AK	SPK	2103-01811

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	77	2



261	0112	FIBER ROLLS 12IN	
		Sta 1003+44 to 1003+80 Rt	40 LF
		Sta 1004+29 to 1004+81 Lt	70 LF
		Sta 1004+64 to 1004+83 Rt	20 LF
		Sta 1006+03 to 1006+10 Rt	20 LF
		Sta 1006+03 to 1006+06 Lt	20 LF
		Total =	170 LF

REGISTERED PROFESSIONAL ENGINEER
ANDREW KREBS
PE-7876
DATE 10/10/25
NORTH DAKOTA

LEGEND

Fiber Rolls 12IN

Seeding Class II & Straw Mulch

HEC-0004(202)

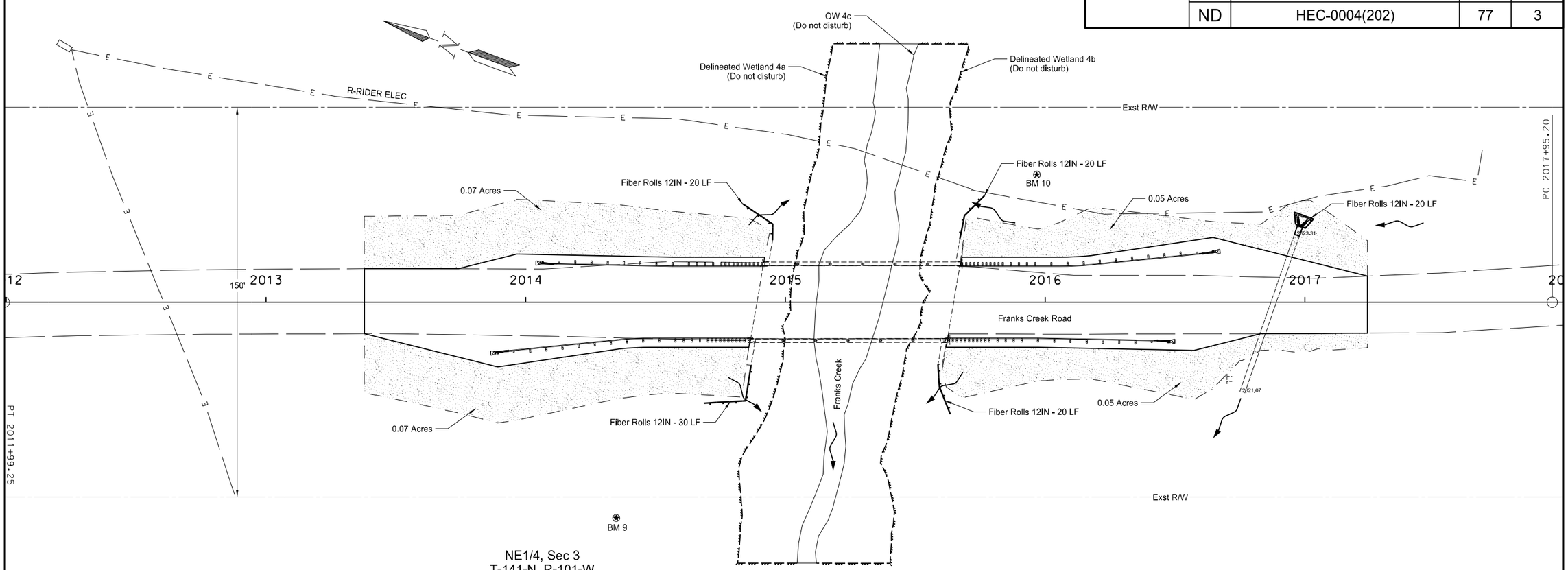
Structure # 04-109-19.0

KLJ

Permanent Sediment and Erosion Control
Site 2
Billings County, ND

DRAWN BY	CHKD. BY	PROJECT NO.
AK	SPK	2103-01811

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	77	3



261	0112	FIBER ROLLS 12IN		
		Sta 2014+69 to 2014+87 Rt	30	LF
		Sta 2014+84 to 2014+95 Lt	20	LF
		Sta 2015+59 to 2015+64 Rt	20	LF
		Sta 2015+67 to 2015+77 Lt	20	LF
		Sta 2016+96 to 2017+03 Lt	20	LF
		Total =	110	LF

REGISTERED PROFESSIONAL ENGINEER
ANDREW J KREBS
PE-7876
DATE 10/10/25
NORTH DAKOTA

HEC-0004(202)
Structure # 04-110-19.0

LEGEND
Fiber Rolls 12IN
Seeding Class II & Straw Mulch

KLJ

Permanent Sediment and Erosion Control
Site 3
Billings County, ND

DRWN. BY	CHKD. BY	PROJECT NO.
AK	SPK	2103-01811

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEC-0004(202)	77	4

NE1/4NE1/4, Sec 16
T-141-N, R-98-W
Mary Kaye Knudsen ET AL

SE1/4, Sec 9
T-141-N, R-98-W
Arvid C & Mary E Hecker

NW1/4, Sec 15
T-141-N, R-98-W
Jayden Krivoruchka

SW1/4SW1/4, Sec 10
T-141-N, R-98-W
AMGC Farms LLC

CONS TEL
OW 6d (Do not disturb)
Delineated Wetland 6b (Do not disturb)
Delineated Wetland 6c (Do not disturb)
Fiber Rolls 12IN - 70 LF
R-RIDER ELEC
PP
Exst R/W
B Wire
Green River
Gate
FO Ped
Fiber Rolls 12IN - 20 LF
0.06 Acres
0.02 Acres
0.12 Acres
Fiber Rolls 12IN - 100 LF
66'
150'
Sec Line
123rd Ave SW
3024
3025
3026
3027
3028
3029
7000
7001
POT 7000+00.00
PC 7000+51.86
PI 7001+95.42
26th St SW
BM 1
WBI ENERGY
Curve 26STSW1
PI = 7001+95.42
Delta = 11° 26' 46.17" (RT)
Da = 4° 00' 00.07"
R = 1,432.39
T = 143.55
L = 286.15

261	0112	FIBER ROLLS 12IN		
		Sta 3024+02 to 3025+00 Rt	100	LF
		Sta 3025+40 to 3025+55 Lt	20	LF
		Sta 3025+40 to 3025+55 Rt	20	LF
		Sta 3026+25 to 3026+44 Lt	70	LF
		Sta 3026+25 to 3026+41 Rt	20	LF
		Total =	230	LF

REGISTERED PROFESSIONAL ENGINEER
ANDREW J KREBS
PE-7876
DATE 10/10/25
NORTH DAKOTA

HEC-0004(202)
Structure # 04-127-21.0

LEGEND
Fiber Rolls 12IN
Seeding Class II & Straw Mulch

KLJ

Permanent Sediment and Erosion Control
Site 4
Billings County, ND

DRWN. BY	CHK'D. BY	PROJECT NO.
AK	SPK	2103-01811

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEC-0004(202)	77	5

SW1/4SE1/4, Sec 29
T-142-N, R-98-W
Andrew J Klym

SE1/4SE1/4, Sec 29
T-142-N, R-98-W
Kevin & Collette Kirsch

NE1/4, Sec 32
T-142-N, R-98-W
Geoff & Debra Obrigewitsch

OW 5c
(Do not disturb)

Delineated Wetland 5a
(Do not disturb)

Delineated Wetland 5b
(Do not disturb)

Spring Creek

Sixteenth Line 4039+64.64

CONS TEL

R-RIDER ELEC

Exst R/W

B Wire

PP

BM 4

BM 3

0.05 Acres

0.07 Acres

Fiber Rolls 12IN - 20 LF

4035

4036

4037

4038

4039

4040

150'

Sec Line

23rd St SW

OH

PL

ONEOK

R-RIDER ELEC

261	0112	FIBER ROLLS 12IN	
		Sta 4036+41 Rt	20 LF
		Sta 4037+45 to 4037+63 Lt	20 LF
		Sta 4037+64 to 4037+81 Rt	20 LF
		Sta 4038+24 to 4038+42 Lt	20 LF
		Sta 4038+42 to 4038+59 Rt	20 LF
		Total =	100 LF

REGISTERED PROFESSIONAL ENGINEER
ANDREW J KREBS
PE-7876
DATE 10/10/25
NORTH DAKOTA

HEC-0004(202)

Structure # 04-126-17.0

LEGEND

Fiber Rolls 12IN

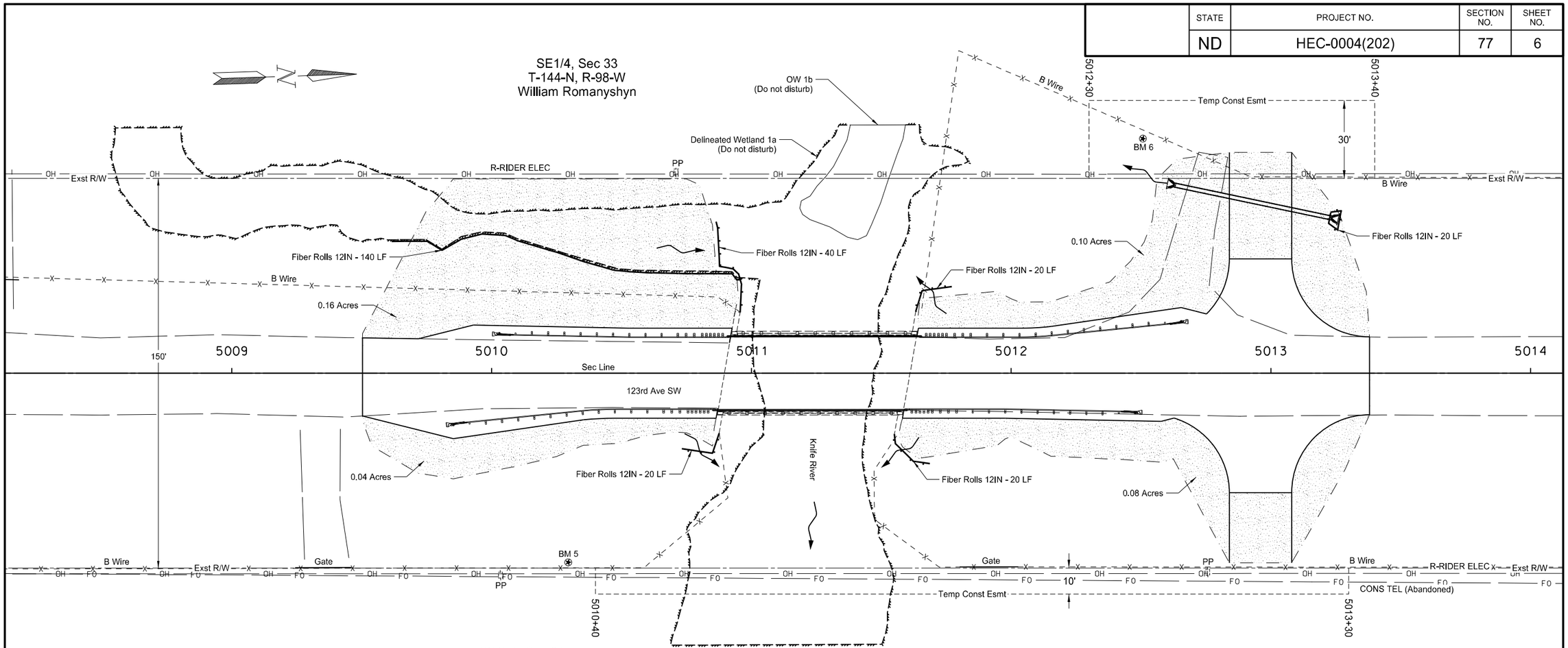
Seeding Class II & Straw Mulch

KLJ

Permanent Sediment and Erosion Control
Site 5
Billings County, ND

DRWN. BY	CHK'D. BY	PROJECT NO.
AK	SPK	2103-01811

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	77	6



261	0112	FIBER ROLLS 12IN		
		Sta 5009+62 to 5010+96 Lt	140	LF
		Sta 5010+73 to 5010+88 Rt	20	LF
		Sta 5010+86 to 5010+96 Lt	40	LF
		Sta 5011+55 to 5011+69 Rt	20	LF
		Sta 5011+63 to 5011+77 Lt	20	LF
		Sta 5013+22 to 5013+27 Lt	20	LF
		Total =	260	LF

REGISTERED PROFESSIONAL ENGINEER
ANDREW J. KREBS
PE-7876
DATE 10/10/25
NORTH DAKOTA

HEC-0004(202)

Structure # 04-127-06.0

LEGEND

Fiber Rolls 12IN

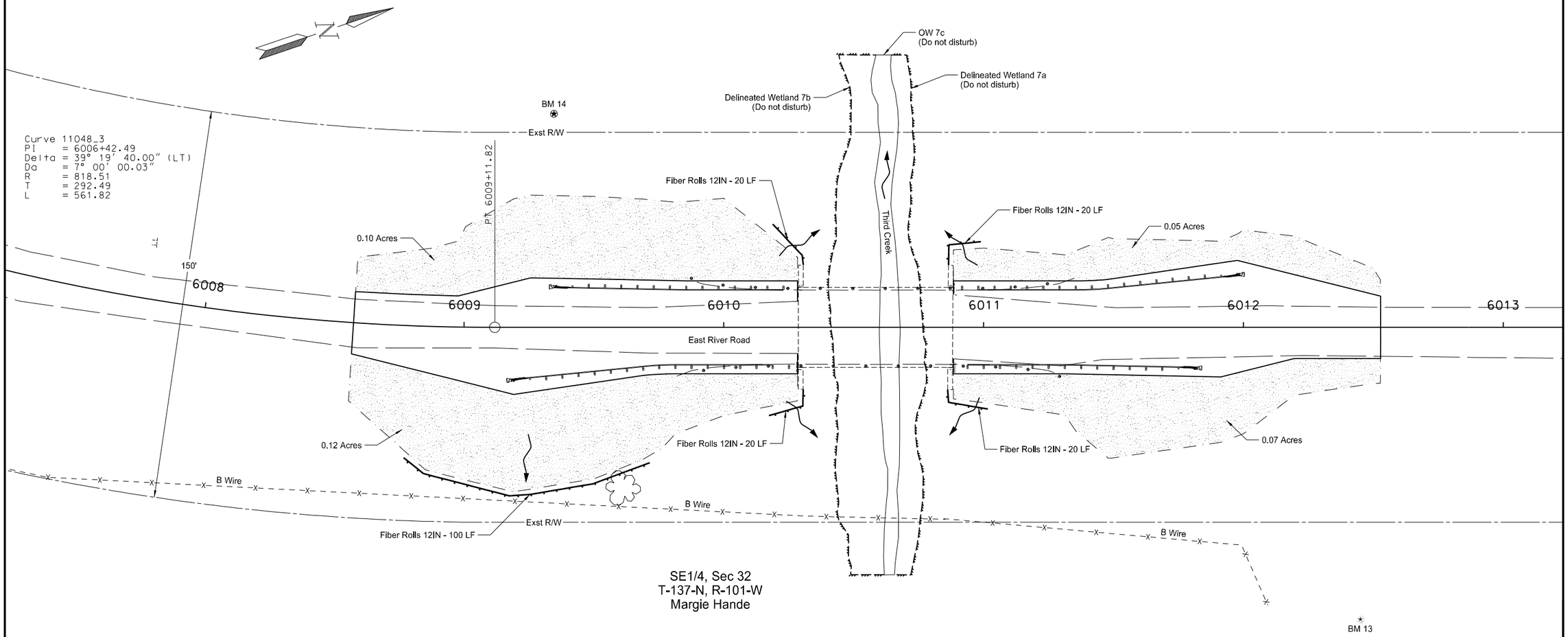
Seeding Class II & Straw Mulch

KLJ

Permanent Sediment and Erosion Control
Site 6
Billings County, ND

DRAWN BY	CHK'D BY	PROJECT NO.
AK	SPK	2103-01811

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	77	7



261	0112	FIBER ROLLS 12IN		
		Sta 6008+79 to 6009+71 Rt	100	LF
		Sta 6010+17 to 6010+31 Rt	20	LF
		Sta 6010+19 to 6010+31 Lt	20	LF
		Sta 6010+86 to 6010+99 Lt	20	LF
		Sta 6010+86 to 6011+02 Rt	20	LF
		Total =	180	LF

REGISTERED PROFESSIONAL ENGINEER
ANDREW J. KREBS
PE-7876
DATE 10/10/25
NORTH DAKOTA

LEGEND

Fiber Rolls 12IN

Seeding Class II & Straw Mulch

HEC-0004(202)

Structure # 04-110-48.0

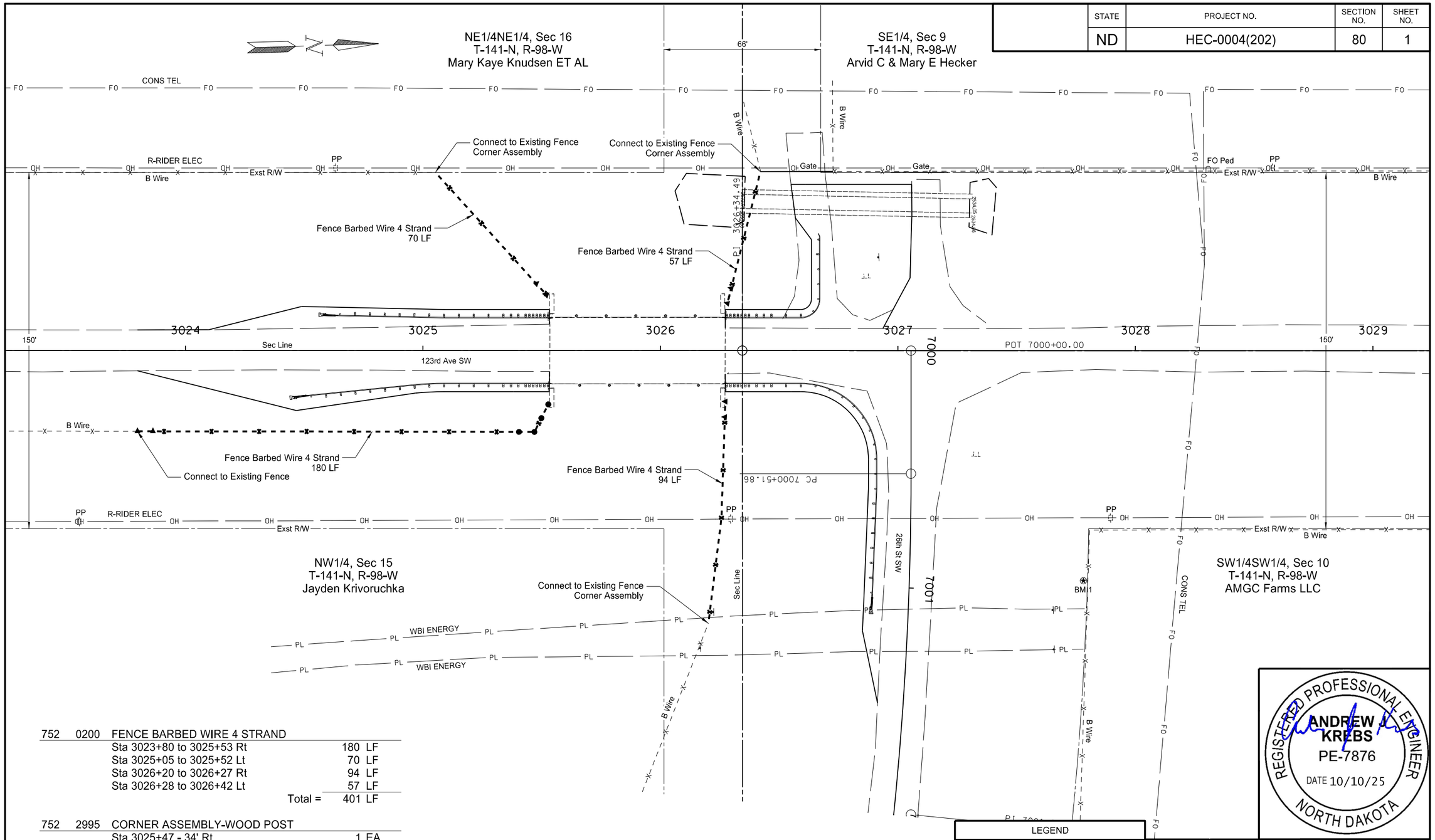
KLJ

Permanent Sediment and Erosion Control
Site 7
Billings County, ND

DRWN. BY	CHK'D. BY	PROJECT NO.
AK	SPK	2103-01811

10/10/2025 9:19:22 AM AndrewKrebs K:\Projects\County\ND\Billings\2103-01811_HEC-0004(202)PCN23759\CAD\Design\Plans\Sections\077PE_007.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEC-0004(202)	80	1



752	0200	FENCE BARBED WIRE 4 STRAND		
		Sta 3023+80 to 3025+53 Rt	180	LF
		Sta 3025+05 to 3025+52 Lt	70	LF
		Sta 3026+20 to 3026+27 Rt	94	LF
		Sta 3026+28 to 3026+42 Lt	57	LF
		Total =	401	LF
752	2995	CORNER ASSEMBLY-WOOD POST		
		Sta 3025+47 - 34' Rt	1	EA
752	3995	DOUBLE BRACE ASSEMBLY-WOOD POST		
		Sta 3023+83 - 34' Rt	1	EA
		Sta 3025+50 - 26' Lt	1	EA
		Sta 3026+27 - 25' Rt	1	EA
		Sta 3026+29 - 23' Lt	1	EA
		Total =	4	EA

Note:

Install temporary fencing until permanent fencing is in place. The cost of temporary fence is incidental to other items.

LEGEND

- Fence Barbed Wire 4 Strand
- Corner Assembly Wood Post
- Double Brace Assembly Wood Post
- Vehicle Gate Assembly

REGISTERED PROFESSIONAL ENGINEER
ANDREW J. KREBS
PE-7876
DATE 10/10/25
NORTH DAKOTA

HEC-0004(202)

Structure # 04-127-21.0

KLJ

Fencing Layout

Site 4
Billings County, ND

DRAWN BY	CHK'D. BY	PROJECT NO.
AK	SPK	2103-01811

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEC-0004(202)	80	2

SW1/4SE1/4, Sec 29
T-142-N, R-98-W
Andrew J Klym

SE1/4SE1/4, Sec 29
T-142-N, R-98-W
Kevin & Collette Kirsch

NE1/4, Sec 32
T-142-N, R-98-W
Geoff & Debra Obrigewitsch

FO CONS TEL

Sixteenth Line 4039+64.64

R-RIDER ELEC

B Wire

Exst R/W

PP

BM 3

BM 4

Connect to Existing Fence Corner Assembly

Fence Barbed Wire 4 Strand 59 LF

Fence Barbed Wire 4 Strand 51 LF

Fence Barbed Wire 4 Strand 51 LF

Fence Barbed Wire 4 Strand 64 LF

4035 4036 4037 4038 4039 4040

150'

Sec Line

23rd St SW

OH

PL ONEOK PL

752	0200	FENCE BARBED WIRE 4 STRAND		
		Sta 4037+31 to 4037+62 Lt	59	LF
		Sta 4037+79 to 4037+88 Rt	51	LF
		Sta 4038+26 to 4038+36 Lt	51	LF
		Sta 4038+44 to 4038+83 Rt	64	LF
		Total =	225	LF

752	3995	DOUBLE BRACE ASSEMBLY-WOOD POST		
		Sta 4037+60 - 27' Lt	1	EA
		Sta 4037+79 - 28' Rt	1	EA
		Sta 4038+27 - 28' Lt	1	EA
		Sta 4038+46 - 27' Rt	1	EA
		Total =	4	EA

Note:

Install temporary fencing until permanent fencing is in place. The cost of temporary fence is incidental to other items.

LEGEND

- Fence Barbed Wire 4 Strand
- Corner Assembly Wood Post
- Double Brace Assembly Wood Post
- Vehicle Gate Assembly

REGISTERED PROFESSIONAL ENGINEER
ANDREW KREBS
PE-7876
DATE 10/10/25
NORTH DAKOTA

HEC-0004(202)

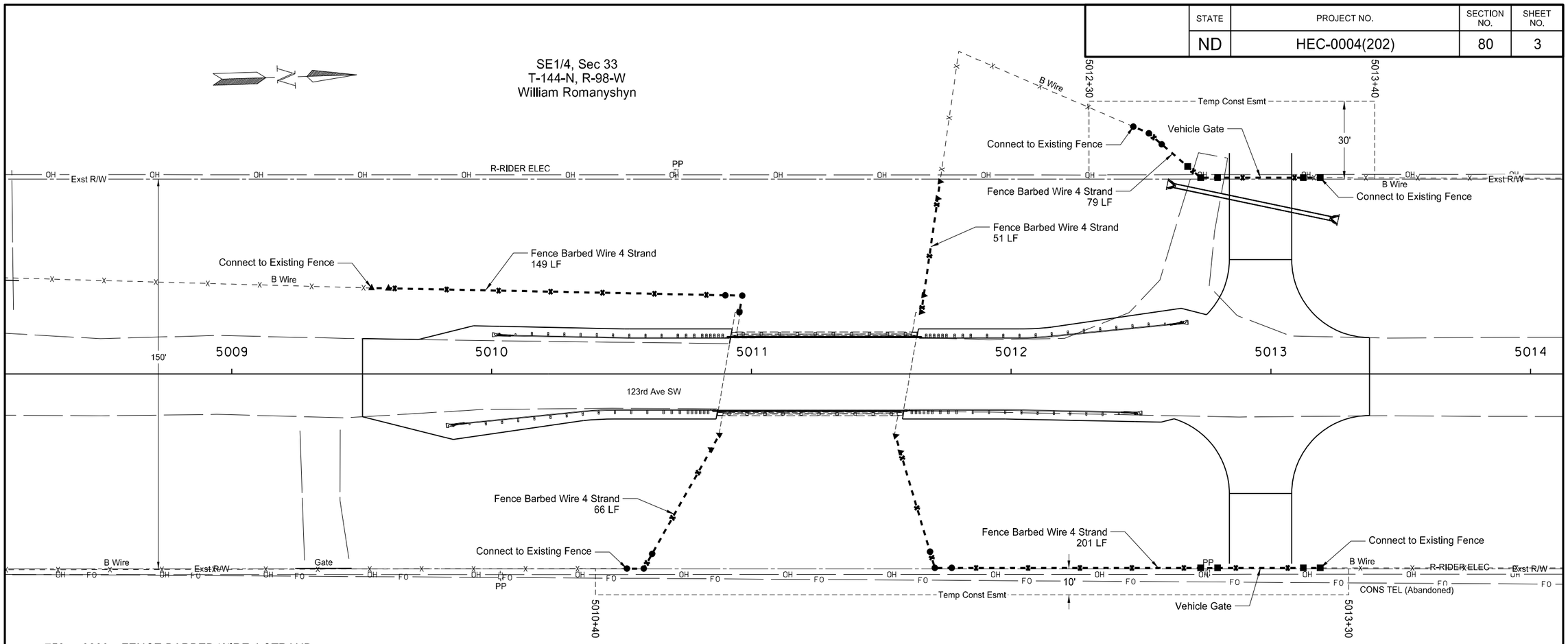
Structure # 04-126-17.0

Fencing Layout

Site 5
Billings County, ND

DRWN. BY	CHK'D. BY	PROJECT NO.
AK	SPK	2103-01811

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEC-0004(202)	80	3



752	0200	FENCE BARBED WIRE 4 STRAND		
		Sta 5009+54 to 5010+96 Lt	149	LF
		Sta 5010+52 to 5010+88 Rt	66	LF
		Sta 5011+56 to 5013+19 Rt	201	LF
		Sta 5011+65 to 5011+73 Lt	51	LF
		Sta 5012+47 to 5013+19 Lt	79	LF
		Total =	546	LF
752	2100	VEHICLE GATE		
		Sta 5012+96 Rt & Lt	2	EA
752	2995	CORNER ASSEMBLY-WOOD POST		
		Sta 5010+59 - 75' Rt	1	EA
		Sta 5010+97 - 30' Lt	1	EA
		Sta 5011+71 - 74' Rt	1	EA
		Sta 5012+53 - 93' Lt	1	EA
		Total =	4	EA
752	3995	DOUBLE BRACE ASSEMBLY-WOOD POST		
		Sta 5009+57 - 33' Lt	1	EA
		Sta 5010+86 - 26' Rt	1	EA
		Sta 5011+56 - 27' Rt	1	EA
		Sta 5011+66 - 27' Lt	1	EA
		Sta 5011+72 - 71' Lt	1	EA
		Total =	5	EA

SW1/4, Sec 34
T-144-N, R-98-W
William Romanyshyn

Note:

Install temporary fencing until permanent fencing is in place. The cost of temporary fence is incidental to other items.

LEGEND

- Fence Barbed Wire 4 Strand
- Corner Assembly Wood Post
- Double Brace Assembly Wood Post
- Vehicle Gate Assembly

REGISTERED PROFESSIONAL ENGINEER
ANDREW KREBS
PE-7876
DATE 10/10/25
NORTH DAKOTA

HEC-0004(202)

Structure # 04-127-06.0

KLJ

Fencing Layout

Site 6
Billings County, ND

DRWN. BY	CHK'D. BY	PROJECT NO.
AK	SPK	2103-01811

ALIGNMENT SURVEY COORDINATE DATA - MULTIPLE LOCATIONS

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEC-0004(202)	81	1

HORIZONTAL ALIGNMENT

POINT	STATION	NORTHING	EASTING	LATITUDE	LONGITUDE	DESCRIPTION
Site 1 - Franks Creek Road (Chain 10818)						
BEGIN	0+00.00	526,192.84	1,217,907.12	47°04'12.146" N	103°30'46.465" W	
PC	3+00.00	526,142.26	1,218,202.83	47°04'11.759" N	103°30'42.168" W	
PI	7+83.44	526,060.76	1,218,679.34	47°04'11.136" N	103°30'35.244" W	
PT	11+27.16	525,579.91	1,218,729.26	47°04'06.412" N	103°30'34.257" W	
PC	14+91.40	525,217.62	1,218,766.87	47°04'02.853" N	103°30'33.514" W	
PI	18+30.82	524,880.01	1,218,801.91	47°03'59.536" N	103°30'32.821" W	
PT	21+09.18	524,736.13	1,219,109.33	47°03'58.233" N	103°30'28.304" W	
END	24+09.18	524,608.97	1,219,381.05	47°03'57.081" N	103°30'24.311" W	
Site 2 - Franks Creek Road (Chain 10919)						
BEGIN	1000+00.00	523,440.97	1,226,369.26	47°03'48.188" N	103°28'42.794" W	
PC	1007+18.75	523,959.45	1,226,867.04	47°03'53.488" N	103°28'35.892" W	
PI	1009+33.52	524,114.37	1,227,015.78	47°03'55.072" N	103°28'33.830" W	
PT	1011+45.06	524,218.38	1,227,203.69	47°03'56.168" N	103°28'31.174" W	
END	1014+30.43	524,356.58	1,227,453.35	47°03'57.625" N	103°28'27.646" W	
Site 3 - Franks Creek Road (Chain 11019)						
BEGIN	2000+00.00	523,539.56	1,230,605.05	47°03'50.741" N	103°27'41.704" W	
PC	2003+00.00	523,504.20	1,230,902.96	47°03'50.503" N	103°27'37.384" W	
PI	2008+00.99	523,445.16	1,231,400.46	47°03'50.105" N	103°27'30.171" W	
PT	2011+99.25	522,975.35	1,231,574.47	47°03'45.536" N	103°27'27.403" W	
PC	2017+95.20	522,416.50	1,231,781.46	47°03'40.101" N	103°27'24.112" W	
PI	2022+53.91	521,986.35	1,231,940.78	47°03'35.917" N	103°27'21.578" W	
PT	2026+11.30	521,950.83	1,232,398.11	47°03'35.736" N	103°27'14.958" W	
END	2027+24.23	521,942.08	1,232,510.70	47°03'35.692" N	103°27'13.328" W	
Site 4 - 123rd Ave SW (Chain 12721)						
BEGIN	3000+00.00	508,330.90	1,321,181.22	47°01'52.336" N	103°05'46.746" W	Qtr Cor
PI	3026+34.49	510,964.08	1,321,264.31	47°02'18.340" N	103°05'46.803" W	Sec Cor
END	3079+07.48	516,234.43	1,321,431.28	47°03'10.388" N	103°05'46.909" W	Sec Cor

HORIZONTAL ALIGNMENT

POINT	STATION	NORTHING	EASTING	LATITUDE	LONGITUDE	DESCRIPTION
Site 4 - 26th St SW (Chain 26STSW)						
BEGIN	7000+00.00	511,035.04	1,321,266.56	47°02'19.041" N	103°05'46.805" W	
PC	7000+51.86	511,033.40	1,321,318.40	47°02'19.042" N	103°05'46.056" W	
PI	7001+95.42	511,028.85	1,321,461.88	47°02'19.044" N	103°05'43.983" W	
PT	7003+38.02	510,995.92	1,321,601.60	47°02'18.764" N	103°05'41.951" W	
END	7004+07.60	510,979.96	1,321,669.34	47°02'18.629" N	103°05'40.966" W	
Site 5 - 23rd St SW (Chain 12617)						
BEGIN	4000+00.00	527,128.19	1,311,227.88	47°04'54.502" N	103°08'19.471" W	Sec Cor
END	4052+86.19	526,939.11	1,316,510.69	47°04'54.381" N	103°07'03.085" W	Sec Cor
Site 6 - 123rd Ave SW (Chain 12706)						
BEGIN	5000+00.00	584,799.88	1,323,723.73	47°14'27.539" N	103°05'46.541" W	Sec Cor
END	5026+36.73	587,435.22	1,323,809.04	47°14'53.564" N	103°05'46.567" W	Qtr Cor
Site 7 - East River Road (Chain 11048)						
BEGIN	6000+00.00	365,547.00	1,227,212.30	46°37'51.024" N	103°27'04.951" W	
PC	6003+50.00	365,732.75	1,227,508.94	46°37'52.966" N	103°27'00.803" W	
PI	6006+42.49	365,887.97	1,227,756.84	46°37'54.589" N	103°26'57.337" W	
PT	6009+11.82	366,165.15	1,227,850.23	46°37'57.358" N	103°26'56.149" W	
END	6016+07.16	366,824.10	1,228,072.24	46°38'03.940" N	103°26'53.324" W	

NOTES: Survey is based upon North Dakota State Plane System, NAD83(2011), South Zone, US Survey Feet
Coordinates are grid coordinates. Combined scale factor to go from Grid Distance to Ground Distance = 1.0001915367
Vertical Control Datum: North American Vertical Datum 1988 (NAVD 88), Geoid 18

REGISTERED PROFESSIONAL LAND SURVEYOR
JAMES A. COOPER
LS-5501
DATE 10/10/2025
NORTH DAKOTA

☐ Assumed Coordinates

☒ All coordinates on this sheet are GRID coordinates.
They are dereived from the "North Dakota State Plane Coordinate System of 1983", NAD83(2011), South Zone. Units are in U.S. Survey Feet.

HEC-0004(202)

Multiple Locations

KLJ

Survey Coordinate and Curve Data

Billings County, ND

DRWN. BY	CHK'D. BY	PROJECT NO.
AK	JAC	2103-01811

ALIGNMENT SURVEY COORDINATE DATA - MULTIPLE LOCATIONS

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEC-0004(202)	81	2

SURVEY CONTROL POINTS

POINT	STATION	NORTHING	EASTING	LATITUDE	LONGITUDE	DESCRIPTION
Site 1 - Franks Creek Road						
GPS2	524,575.44	1,220,067.23	2293.5	47°03'57.010" N	103°30'14.388" W	1" KLJ Alum Cap
GPS6	529,811.39	1,214,514.84	2435.3	47°04'46.550" N	103°31'37.451" W	1" KLJ Alum Cap
BM11	525,248.85	1,218,842.68	2257.2	47°04'03.189" N	103°30'32.437" W	#4 Rebar
BM12	525,548.44	1,218,671.54	2248.9	47°04'06.080" N	103°30'35.073" W	#4 Rebar
Site 2 - Franks Creek Road						
BM7	523,954.76	1,226,741.65	2293.5	47°03'53.395" N	103°28'37.699" W	#4 Rebar
BM8	523,698.27	1,226,698.85	2285.4	47°03'50.849" N	103°28'38.177" W	#4 Rebar
Site 3 - Franks Creek Road						
BM9	522,725.60	1,231,578.38	2314.1	47°03'43.074" N	103°27'27.211" W	#4 Rebar
BM10	522,619.60	1,231,758.57	2318.3	47°03'42.095" N	103°27'24.553" W	#4 Rebar
Site 4 - 123rd Ave SW						
BM1	511,104.56	1,321,365.75	2536.4	47°02'19.759" N	103°05'45.407" W	1" KLJ Alum Cap
BM2	510,723.50	1,321,183.92	2542.8	47°02'15.941" N	103°05'47.849" W	#5 Rebar
Site 5 - 23rd St SW						
CP3	527,186.78	1,307,079.45	2670.3	47°04'53.700" N	103°09'19.411" W	1" KLJ Alum Cap
BM3	526,926.94	1,314,848.41	2577.9	47°04'53.714" N	103°07'27.086" W	1" KLJ Alum Cap
BM4	527,057.00	1,315,221.33	2574.4	47°04'55.120" N	103°07'21.762" W	1" KLJ Alum Cap
Site 6 - 123rd Ave SW						
CP1	584,225.50	1,327,072.67	2508.3	47°14'22.962" N	103°04'57.757" W	1" KLJ Alum Cap
RP4	590,016.84	1,326,528.42	2454.2	47°15'19.916" N	103°05'08.402" W	#4 Rebar
BM5	585,826.50	1,323,829.85	2429.9	47°14'37.701" N	103°05'45.495" W	#4 Rebar
BM6	586,052.87	1,323,673.96	2429.3	47°14'39.883" N	103°05'47.862" W	#4 Rebar
Site 7 - East River Road						
BM13	366,445.08	1,228,063.05	2422.9	46°38'00.198" N	103°26'53.252" W	#4 Rebar
BM14	366,212.96	1,227,779.64	2407.6	46°37'57.803" N	103°26'57.185" W	1" KLJ Alum Cap

SURVEY CONTROL POINTS

POINT	STATION	NORTHING	EASTING	LATITUDE	LONGITUDE	DESCRIPTION

NOTES: Survey is based upon North Dakota State Plane System, NAD83(2011), South Zone, US Survey Feet
Coordinates are grid coordinates. Combined scale factor to go from Grid Distance to Ground Distance = 1.0001915367
Vertical Control Datum: North American Vertical Datum 1988 (NAVD 88), Geoid 18

REGISTERED PROFESSIONAL LAND SURVEYOR
JAMES A. COOPER
LS-5501
DATE 10/10/2025
NORTH DAKOTA

☐ Assumed Coordinates

☒ All coordinates on this sheet are GRID coordinates.
They are dereived from the "North Dakota State Plane Coordinate System of 1983", NAD83(2011), South Zone. Units are in U.S. Survey Feet.

HEC-0004(202)
Multiple Locations

KLJ

Survey Coordinate and Curve Data

Billings County, ND

DRWN. BY	CHK'D. BY	PROJECT NO.
AK	JAC	2103-01811

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEC-0004(202)	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		28	
G20-1b-60	60"x24"	NO WORK IN PROGRESS (Sign and installation only)		18	
G20-2-48	**48"x24"**	**END ROAD WORK**	**11**	**26**	**286**
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		36	
G20-55-96	96"x48"	SPEED LIMIT ENFORCED - MINIMUM FEE $150 WHEN WORKERS PRESENT		59	
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)		11	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)		10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)		10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)		7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)		7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)		7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)		7	
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)		7	
M4-9-30	30"x24"	DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT		15	
M4-10-48	48"x18"	DETOUR (INSIDE ARROW) RIGHT or LEFT (Mounted on barricade)		7	
M5-1-21	21"x15"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)		7	
M5-1-30	30"x21"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)		9	
M6-1-21	21"x15"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		7	
M6-1-30	30"x21"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		9	
M6-3-21	21"x15"	DIRECTIONAL ARROW UP (Mounted on route marker post)		7	
R1-1-48	48"x48"	STOP		32	
R1-2-60	60"x60"	YIELD		29	
R2-1-36	36"x48"	SPEED LIMIT __ (Portable only)		30	
R2-1-48	48"x60"	SPEED LIMIT __		39	
R2-1aP-24	24"x18"	MINIMUM FEE $150 (Mounted on Speed Limit post)		10	
R3-2-48	48"x48"	NO LEFT TURN		35	
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)**	**15**	**12**	**180**
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)**	**11**	**15**	**165**
R11-3c-60	60"x30"	STREET CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC (Mounted on barricade)		15	
W1-3-48	48"x48"	REVERSE TURN RIGHT or LEFT		35	
W1-4-48	48"x48"	REVERSE CURVE RIGHT or LEFT		35	
W1-4b-48	48"x48"	TWO LANE REVERSE CURVE RIGHT or LEFT		35	
W1-6-48	48"x24"	ONE DIRECTION LARGE ARROW		26	
W3-1-48	48"x48"	STOP AHEAD		35	
W3-3-48	48"x48"	SIGNAL AHEAD		35	
W3-4-48	48"x48"	BE PREPARED TO STOP		35	
W3-5-48	48"x48"	SPEED REDUCTION AHEAD		35	
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		35	
W8-3-48	48"x48"	PAVEMENT ENDS		35	
W8-7-48	48"x48"	LOOSE GRAVEL		35	
W8-11-48	48"x48"	UNEVEN LANES		35	
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		35	
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY		35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL		35	
W13-1P-30	30"x30"	__ MPH ADVISORY SPEED PLAQUE (Mounted on warning sign post)		14	
W14-3-64	64"x48"	NO PASSING ZONE		28	
W16-2P-30	30"x24"	__ FEET PLAQUE (Mounted on warning sign post)		10	
W20-1-48	48"x48"	ROAD WORK AHEAD or _FT or _ MILE		35	
W20-2-48	48"x48"	DETOUR AHEAD or __ FT or _ MILE		35	
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or __ FT or _ MILE		35	
W20-4-48	48"x48"	ONE LANE ROAD AHEAD or __ FT or _ MILE		35	
W20-5-48	48"x48"	RIGHT or CENTER or LEFT LANE CLOSED AHEAD or __ FT or _ MILE		35	
W20-7-48	48"x48"	FLAGGER		35	
W20-8-18	18"x18"	STOP - SLOW PADDLE Back to Back		5	
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		35	
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or __ FT or _ MILE		35	
W21-5-48	48"x48"	SHOULDER WORK		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	

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
W21-6-48	48"x48"	SURVEY CREW		35	
W21-50-48	48"x48"	BRIDGE PAINTING AHEAD or __ FT		35	
W21-51-48	48"x48"	MATERIAL ON ROADWAY		35	
W21-52-48	48"x48"	PAVEMENT BREAKS		35	
W21-53-48	48"x48"	RUMBLE STRIPS AHEAD		35	
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK		35	
W24-1-48	48"x48"	DOUBLE REVERSE CURVE		35	

SPECIAL SIGNS

SPEC & CODE

704-1000	**TRAFFIC CONTROL SIGNS**	**TOTAL UNITS**	**701**

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
704-0100	FLAGGING	MHR	
704-1048	PORTABLE RUMBLE STRIPS	EACH	
704-1050	TYPE I BARRICADES	EACH	
704-1052	**TYPE III BARRICADES**	**EACH**	**26**
704-1060	DELINEATOR DRUMS	EACH	
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	
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	
704-1500	OBLITERATION OF PVMT MK	SF	
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF	
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH	
762-0200	RAISED PAVEMENT MARKERS	EACH	
762-0420	SHORT TERM 4IN LINE - TYPE R	LF	
762-0430	SHORT TERM 4IN LINE - TYPE NR	LF	

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

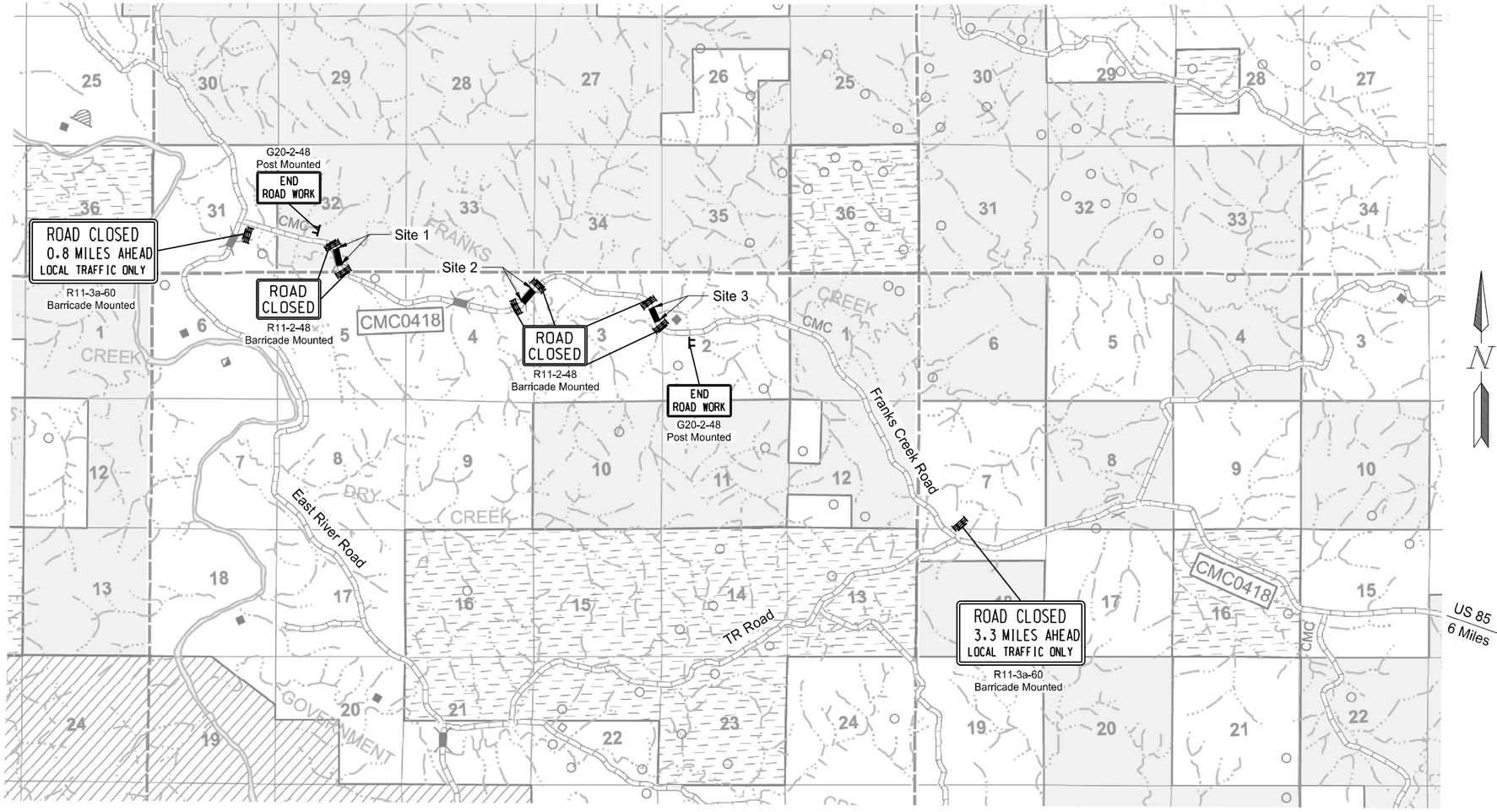
REGISTERED PROFESSIONAL ENGINEER
ANDREW KREBS
PE-7876
DATE 10/10/25
NORTH DAKOTA

Traffic Control Devices List
Work Zone Traffic Control

Billings County, ND

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	100	2

CONSTRUCTION SIGN LAYOUT



The sign layout as shown is for general information purposes only. The Contractor will be required to conform to MUTCD and the Standard Drawings when installing the traffic control signing.

REGISTERED PROFESSIONAL ENGINEER
ANDREW J. KREBS
PE-7876
DATE 10/10/25
NORTH DAKOTA

HEC-0004(202)
Multiple Locations

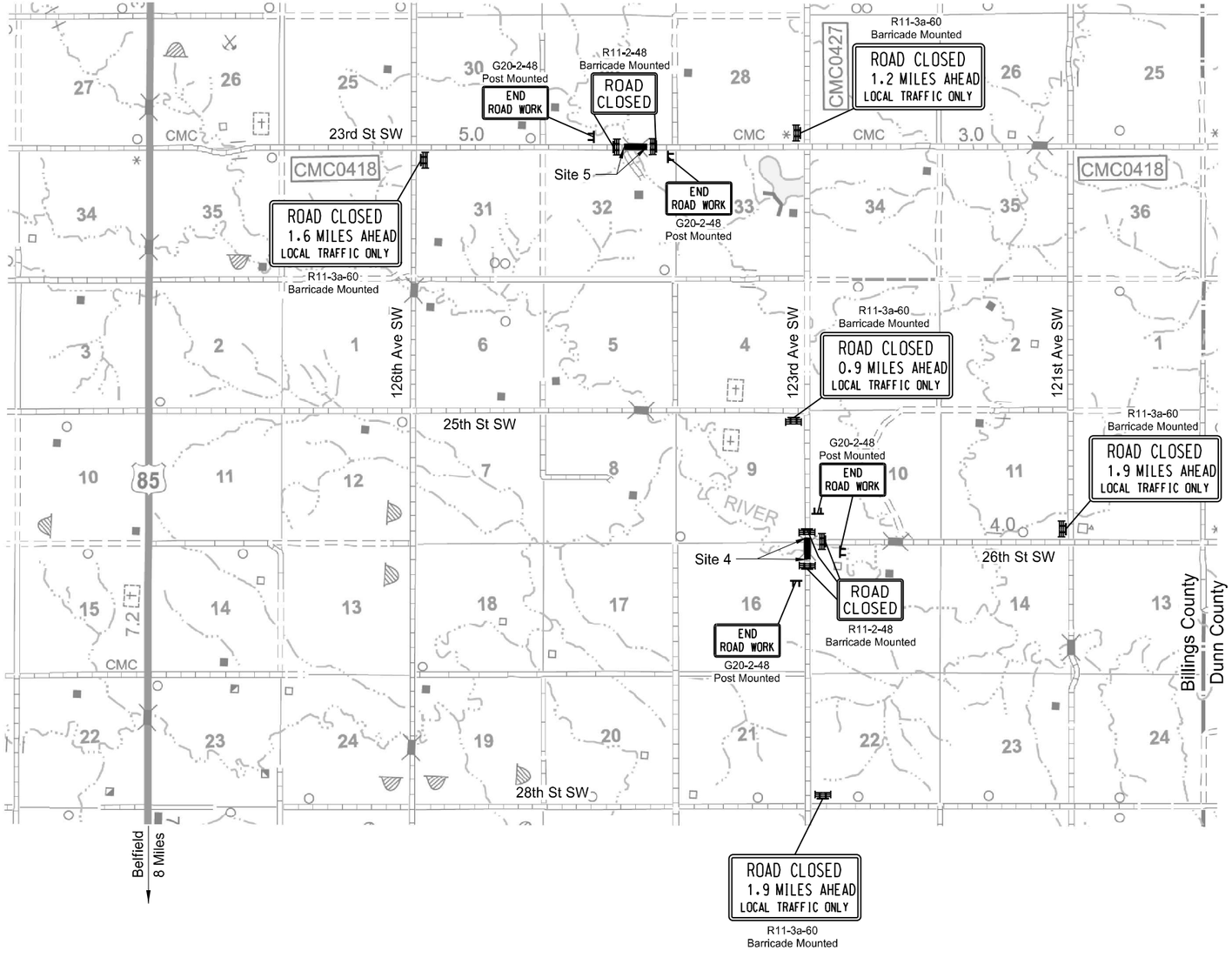
KLJ

Work Zone
Traffic Control
Sites 1, 2, & 3
Billings County, ND

DRWN. BY	CHKD. BY	PROJECT NO.
AK	SPK	2103-01811

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	100	3

CONSTRUCTION SIGN LAYOUT



The sign layout as shown is for general information purposes only. The Contractor will be required to conform to MUTCD and the Standard Drawings when installing the traffic control signing.

REGISTERED PROFESSIONAL ENGINEER
ANDREW KREBS
PE-7876
DATE 10/10/25
NORTH DAKOTA

HEC-0004(202)
Multiple Locations

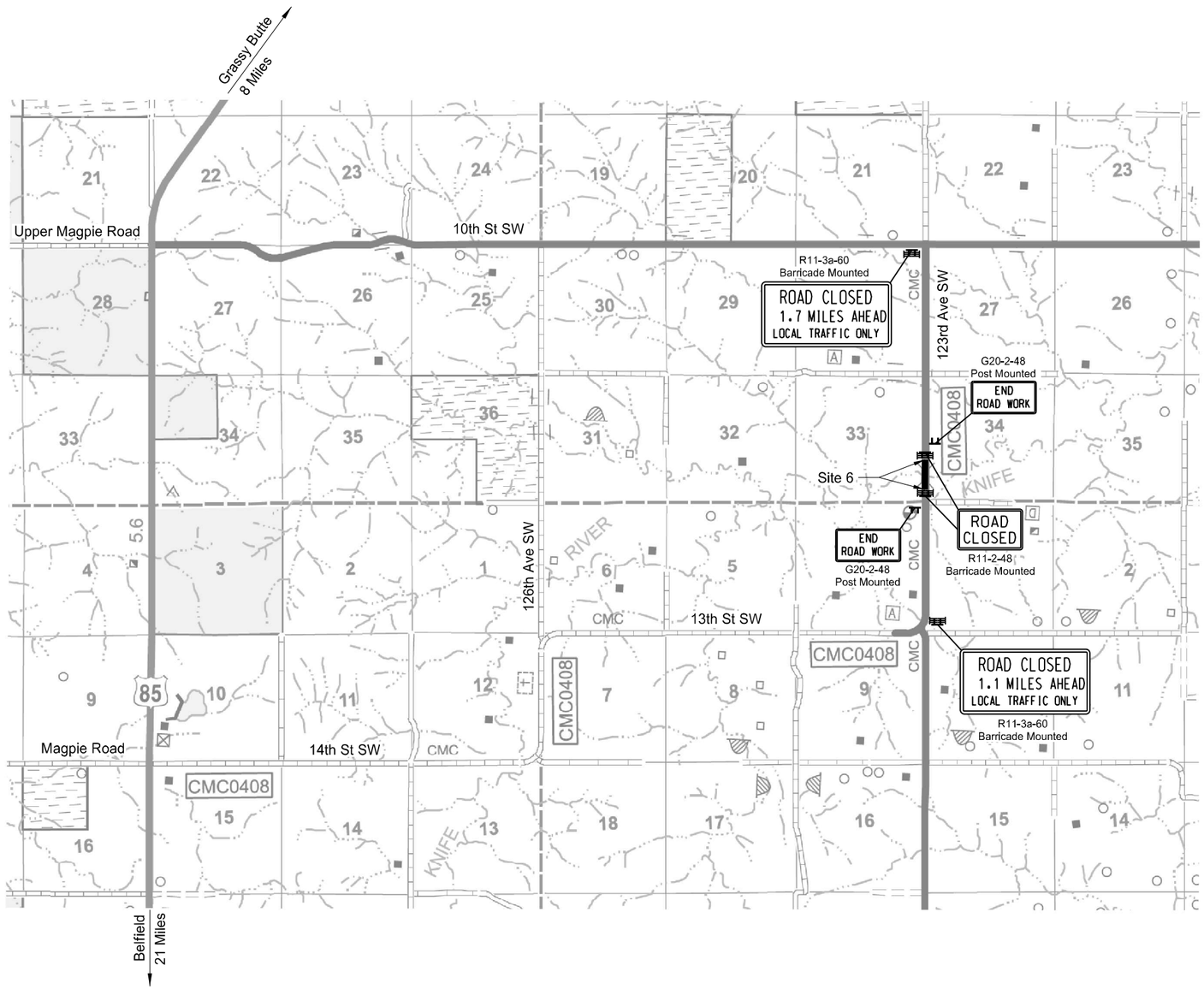
KLJ

Work Zone
Traffic Control
Sites 4 & 5
Billings County, ND

DRWN. BY	CHK'D. BY	PROJECT NO.
AK	SPK	2103-01811

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	100	4

CONSTRUCTION SIGN LAYOUT



The sign layout as shown is for general information purposes only. The Contractor will be required to conform to MUTCD and the Standard Drawings when installing the traffic control signing.

REGISTERED PROFESSIONAL ENGINEER
ANDREW KREBS
PE-7876
DATE 10/10/25
NORTH DAKOTA

HEC-0004(202)
Multiple Locations

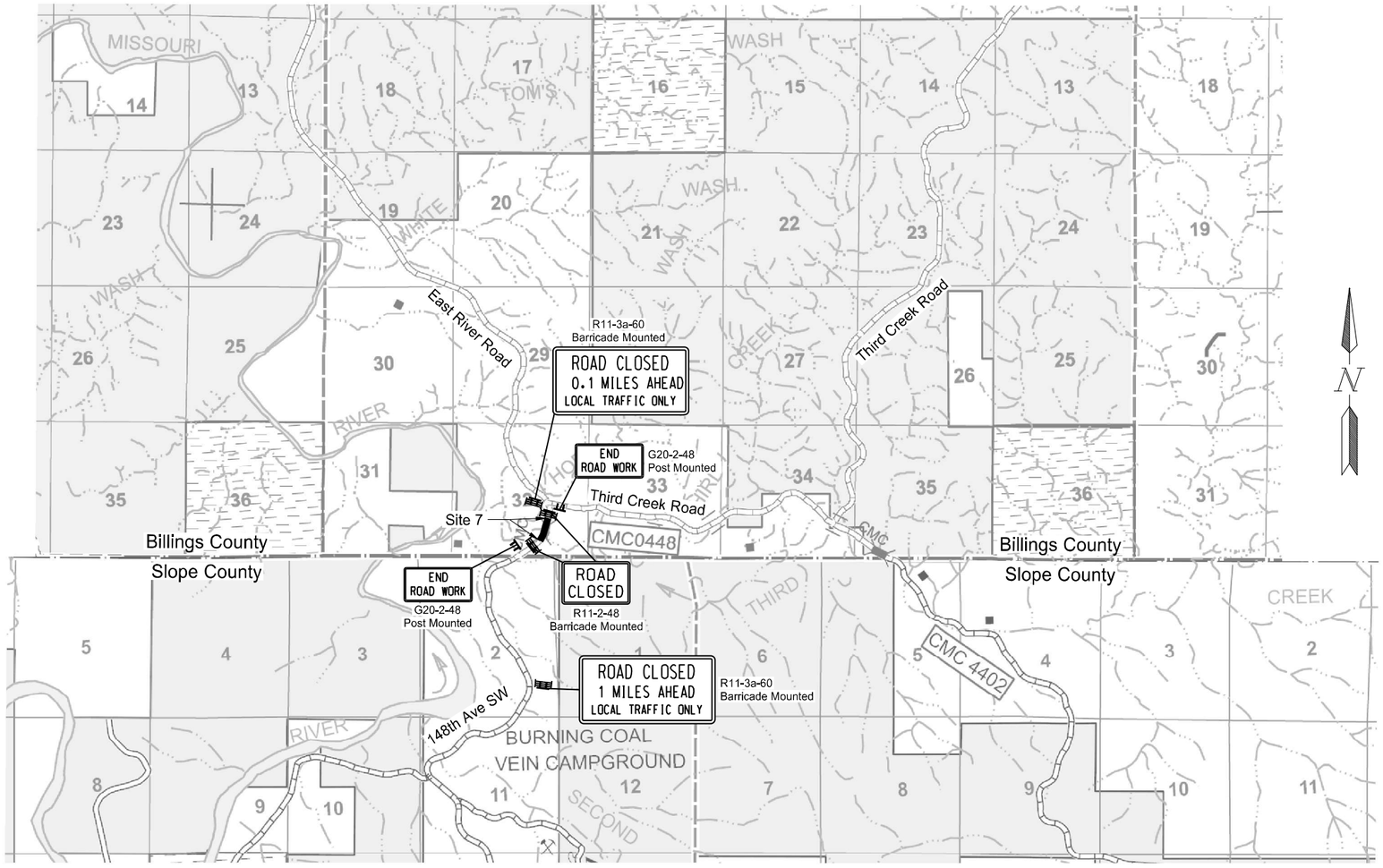
KLJ

Work Zone
Traffic Control
Site 6
Billings County, ND

DRWN. BY	CHKD. BY	PROJECT NO.
AK	SPK	2103-01811

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	100	5

CONSTRUCTION SIGN LAYOUT



The sign layout as shown is for general information purposes only. The Contractor will be required to conform to MUTCD and the Standard Drawings when installing the traffic control signing.

REGISTERED PROFESSIONAL ENGINEER
ANDREW KREBS
PE-7876
DATE 10/10/25
NORTH DAKOTA

HEC-0004(202)
Multiple Locations

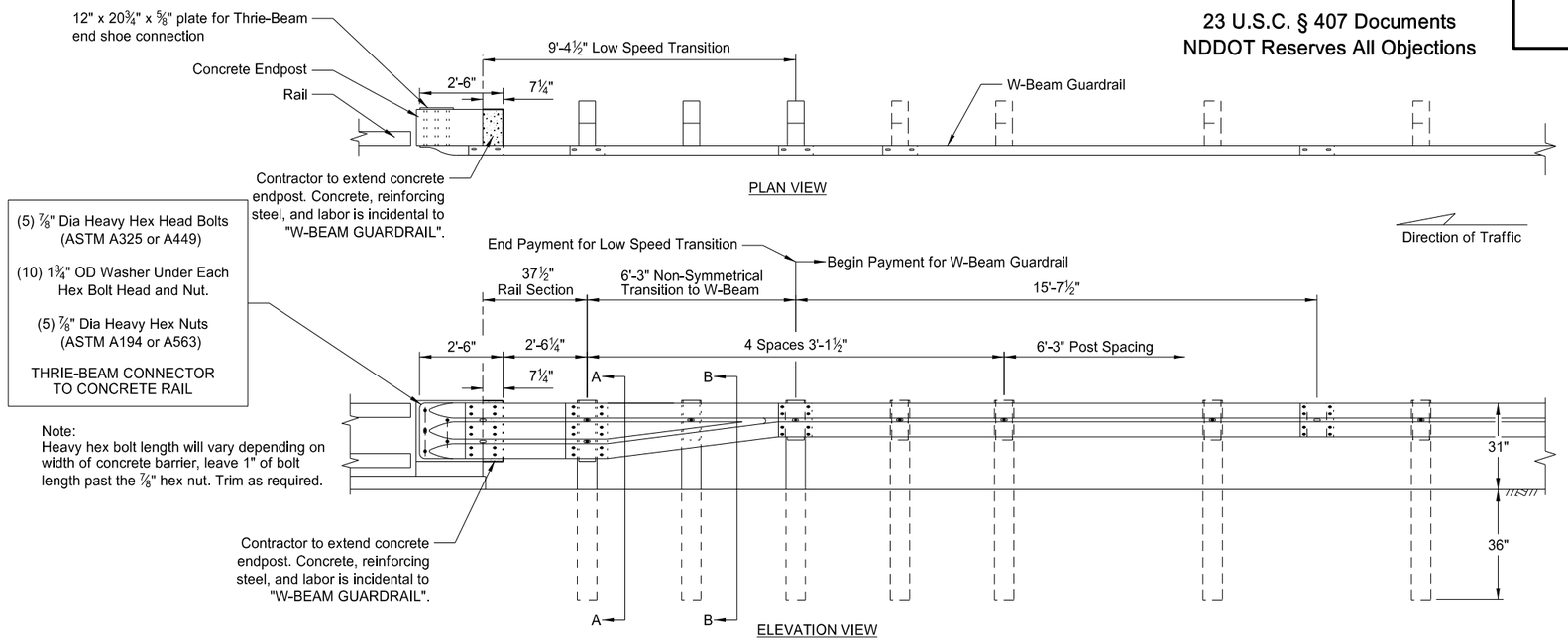
KLJ

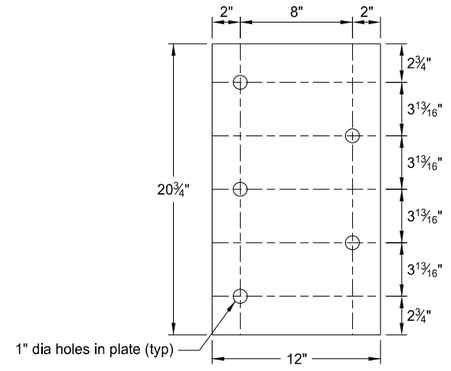
Work Zone
Traffic Control
Site 7
Billings County, ND

DRWN. BY	CHK'D. BY	PROJECT NO.
AK	SPK	2103-01811

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEC-0004(202)	130	1

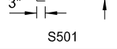
23 U.S.C. § 407 Documents
NDDOT Reserves All Objections





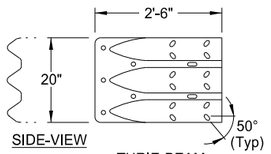
THRIE-BEAM TERMINAL CONNECTOR PLATE (12" x 20¾" x ⅝")

BAR LIST - ONE ENDPOST					
SIZE	MARK	NO.	LENGTH	SHAPE	LOCATION
4	S500	4	0'-8"	——	Endpost Anchor
4	S501	1	4'-10"	▭	Endpost Hoop



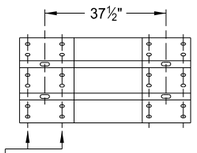
S501

Note: Drill and epoxy S500 into existing concrete endpost with 4" minimum embedment.

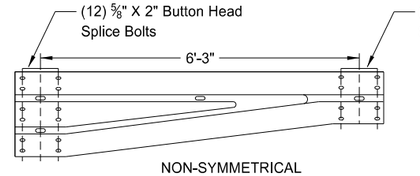


SIDE-VIEW

THRIE-BEAM TERMINAL CONNECTOR 10GA



THRIE-BEAM RAIL SHORT SECTION 10GA



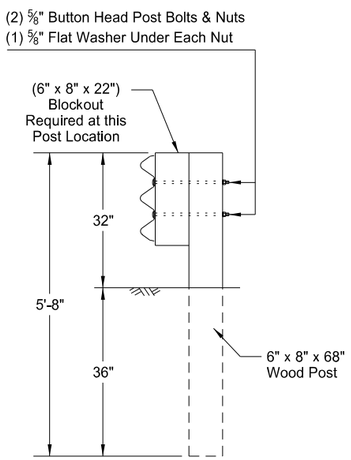
NON-SYMMETRICAL W-BEAM TO THRIE-BEAM TRANSISTION 10GA

(12) ⅝" X 2" Button Head Splice Bolts with Recessed Nuts
(12) Rectangular Guardrail Plate Washers

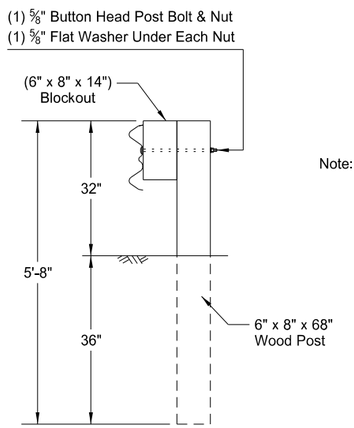
Plate Washer Instructions

Bridge Approach - Upstream: The short rail laps over the terminal connector. Plate washers are installed under the splice nuts against inside of connector.

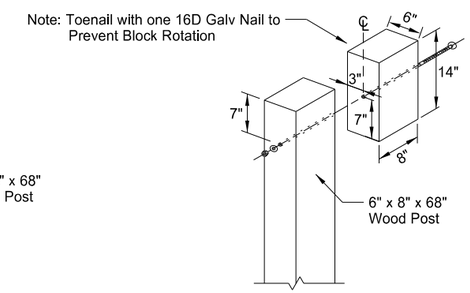
Bridge Approach - Downstream: The terminal connector laps over the nested rail. Plate washers are installed under the bolt head against outside of connector.



SECTION A-A



SECTION B-B



WOOD BLOCK TO RECTANGULAR WOOD POST

REGISTERED PROFESSIONAL ENGINEER
SHAWN M. MAYFIELD
PE-4979
DATE 12-9-25
NORTH DAKOTA

HEC-0004(202)

Structure #s 04-108-18.0, 04-109-19.0, & 04-110-19.0

KLJ

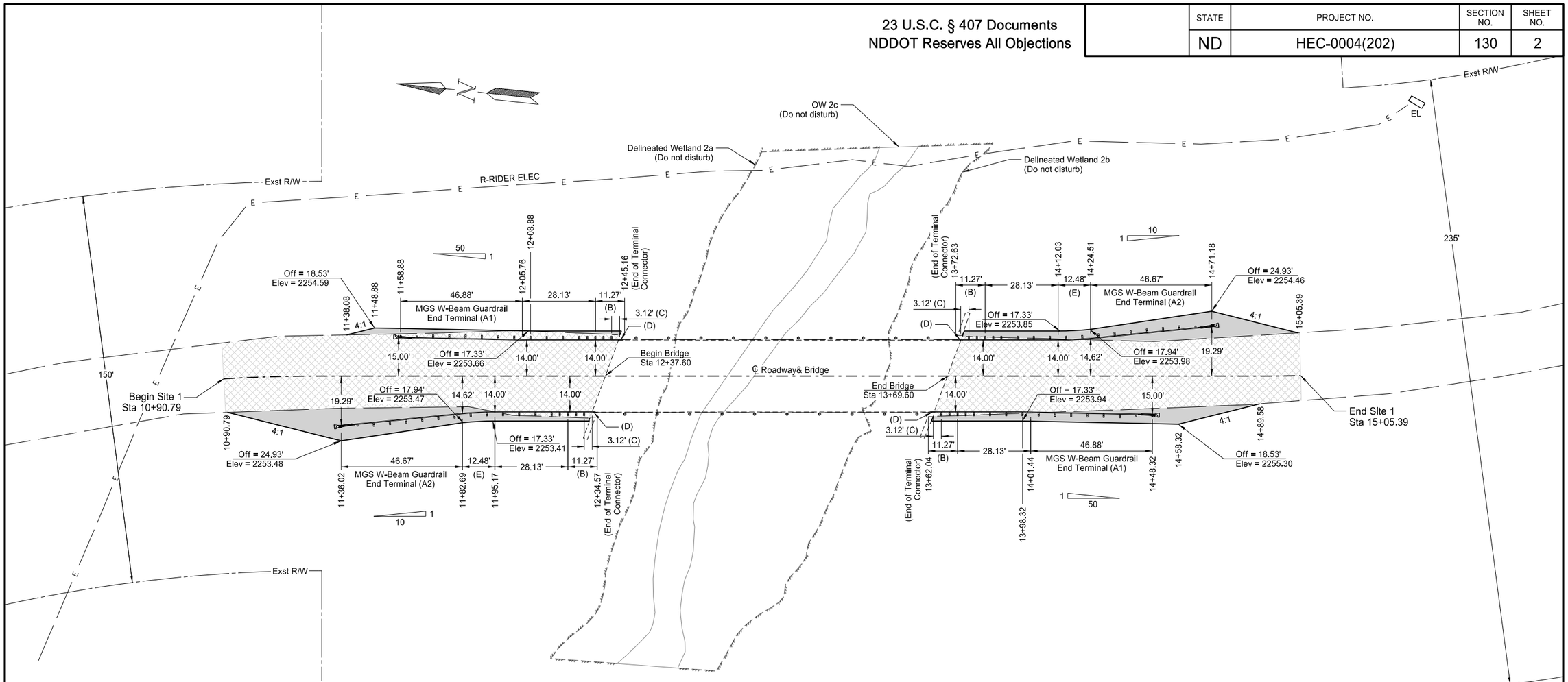
Thrie-Beam Transition Detail

Billings County, ND

DRWN. BY	CHK'D. BY	PROJECT NO.
AK	SMM	2103-01811

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

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	130	2



Guardrail Embankment (F)

Reshaping Roadway (By County Forces)

GUARDRAIL STAKING DIAGRAM

NOTES:

(A1) Install a MASH Sequential Kinking end terminal at this location. See Standard Drawing D-764-51.

(A2) Install a FLEAT end terminal at this location. See Standard Drawing D-764-38.

(B) Thrie-Beam Transition. See Sheet 130-1. Include all material and work involved to install the Thrie-Beam Transition in the unit price bid for "W-BEAM GUARDRAIL".

(C) End of concrete endpost to center of timber post.

(D) Remove, salvage, and stockpile all existing object markers at the bridge ends for County pickup. Extend each existing concrete endpost as shown on Sheet 130-1. Connect rail to concrete endpost by drilling holes through it. The thickness of the concrete endpost is approximately 13-inches. Provide hex bolts of sufficient length to extend through the full thickness of the concrete endpost, rail, connector plate, washers, and nut. Include all costs in the unit price bid for "W-BEAM GUARDRAIL".

(E) Curved Rail Section R = 125.42'.

(F) See Standard Drawing D-764-48. Include all material and work involved to widen for guardrail installation in the unit price bid for "GUARDRAIL EMBANKMENT".

Refer to Standard Drawing D-764-40 for additional details.

All offsets to back face of W-Beam.

QUANTITIES	
GUARDRAIL EMBANKMENT	4 EA
W-BEAM GUARDRAIL	182.6 LF
W-BEAM GUARDRAIL END TERMINAL	4 EA

REGISTERED PROFESSIONAL ENGINEER
SHAWN M MAYFIELD
PE-4979
DATE 12-9-25
NORTH DAKOTA

HEC-0004(202)

Structure # 04-108-18.0

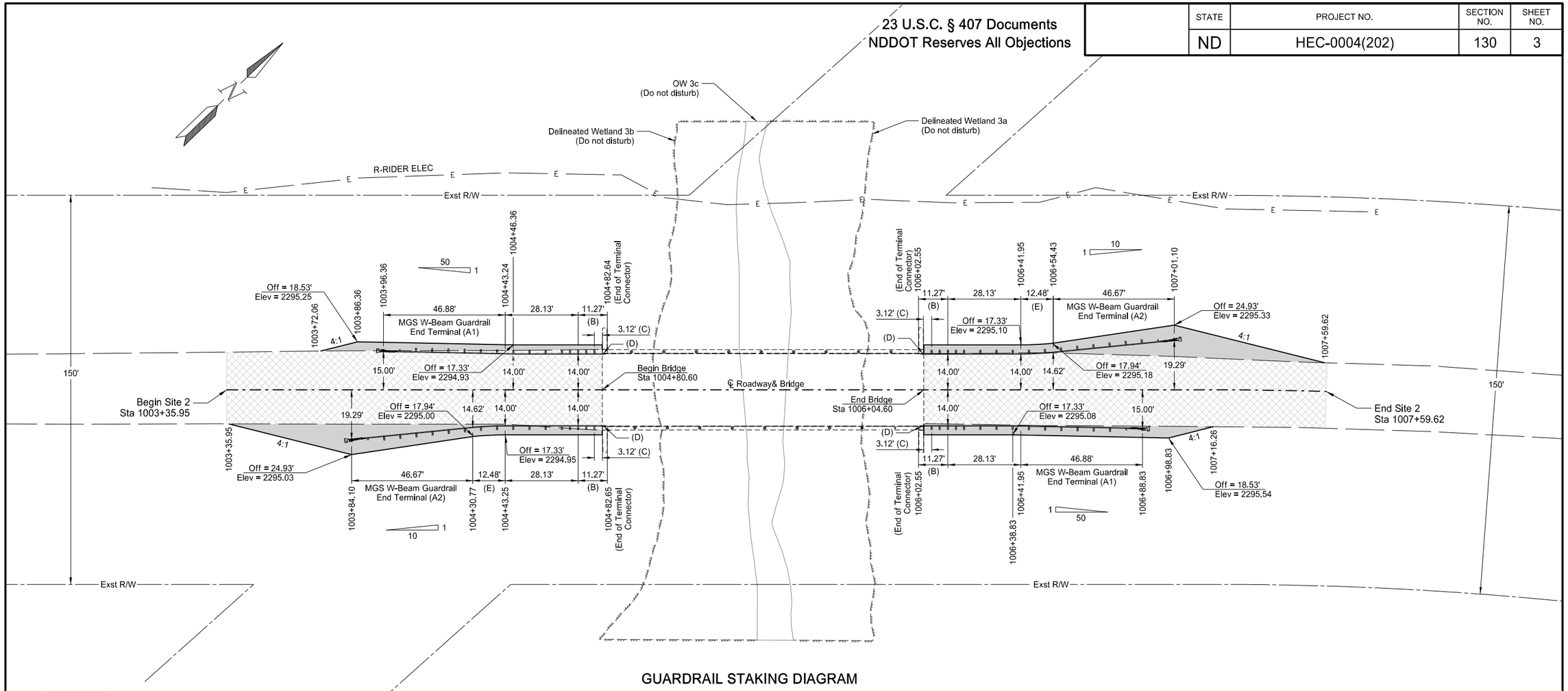
KLJ

MGS W-Beam
Guardrail Layout
Site 1
Billings County, ND

DRAWN BY	CHK'D. BY	PROJECT NO.
AK	SMM	2103-01811

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

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	130	3



GUARDRAIL STAKING DIAGRAM

Guardrail Embankment (F)

Reshaping Roadway (By County Forces)

NOTES:

(A1) Install a MASH Sequential Kinking end terminal at this location. See Standard Drawing D-764-51.

(A2) Install a FLEAT end terminal at this location. See Standard Drawing D-764-38.

(B) Thrie-Beam Transition. See Sheet 130-1. Include all material and work involved to install the Thrie-Beam Transition in the unit price bid for "W-BEAM GUARDRAIL".

(C) End of concrete endpost to center of timber post.

(D) Remove, salvage, and stockpile all existing object markers at the bridge ends for County pickup. Extend each existing concrete endpost as shown on Sheet 130-1. Connect rail to concrete endpost by drilling holes through it. The thickness of the concrete endpost is approximately 13-inches. Provide hex bolts of sufficient length to extend through the full thickness of the concrete endpost, rail, connector plate, washers, and nut. Include all costs in the unit price bid for "W-BEAM GUARDRAIL".

(E) Curved Rail Section R = 125.42'.

(F) See Standard Drawing D-764-48. Include all material and work involved to widen for guardrail installation in the unit price bid for "GUARDRAIL EMBANKMENT".

Refer to Standard Drawing D-764-40 for additional details.

All offsets to back face of W-Beam.

QUANTITIES	
GUARDRAIL EMBANKMENT	4 EA
W-BEAM GUARDRAIL	182.6 LF
W-BEAM GUARDRAIL END TERMINAL	4 EA

REGISTERED PROFESSIONAL ENGINEER
SHAWN M. MAYFIELD
PE-4979
DATE 12-9-25
NORTH DAKOTA

HEC-0004(202)

Structure # 04-109-19.0

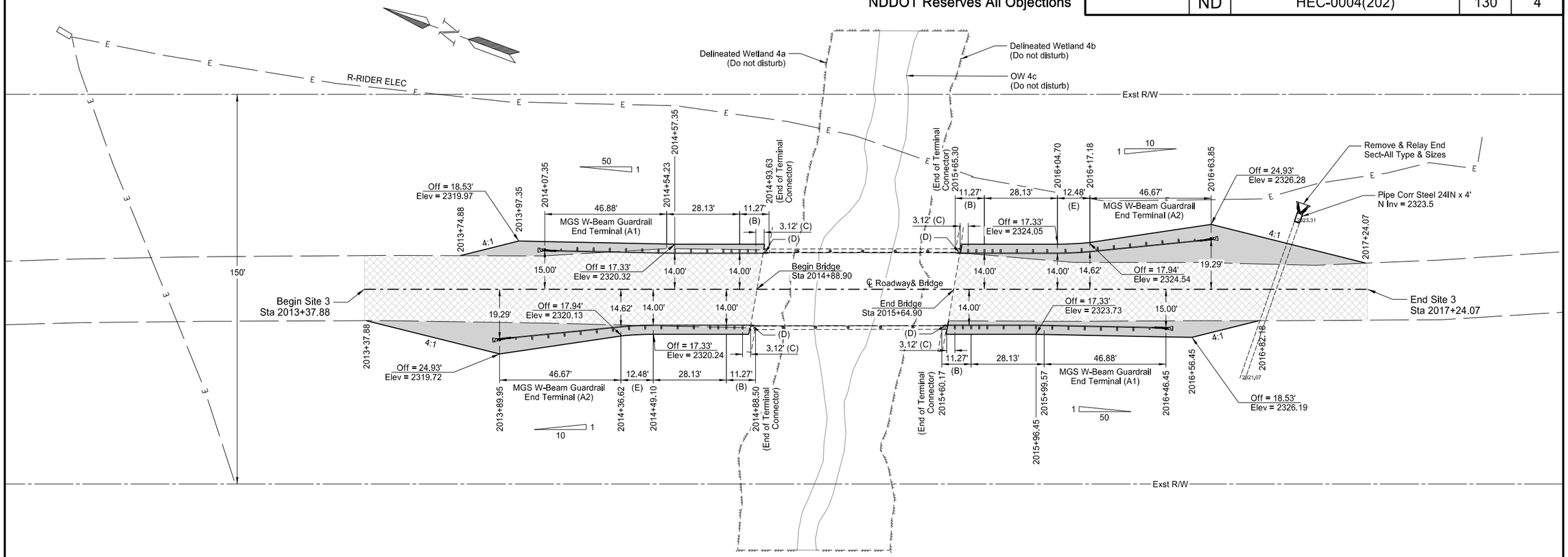
KLJ

MGS W-Beam Guardrail Layout
Site 2
Billings County, ND

DRWN. BY	CHK'D. BY	PROJECT NO.
AK	SMM	2103-01811

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

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	130	4



GUARDRAIL STAKING DIAGRAM

Guardrail Embankment (F)

Reshaping Roadway (By County Forces)

NOTES:

(A1) Install a MASH Sequential Kinking end terminal at this location. See Standard Drawing D-764-51.

(A2) Install a FLEAT end terminal at this location. See Standard Drawing D-764-38.

(B) Thrie-Beam Transition. See Sheet 130-1. Include all material and work involved to install the Thrie-Beam Transition in the unit price bid for "W-BEAM GUARDRAIL".

(C) End of concrete endpost to center of timber post.

(D) Remove, salvage, and stockpile all existing object markers at the bridge ends for County pickup. Extend each existing concrete endpost as shown on Sheet 130-1. Connect rail to concrete endpost by drilling holes through it. The thickness of the concrete endpost is approximately 13-inches. Provide hex bolts of sufficient length to extend through the full thickness of the concrete endpost, rail, connector plate, washers, and nut. Include all costs in the unit price bid for "W-BEAM GUARDRAIL".

(E) Curved Rail Section R = 125.42'.

(F) See Standard Drawing D-764-48. Include all material and work involved to widen for guardrail installation in the unit price bid for "GUARDRAIL EMBANKMENT".

Refer to Standard Drawing D-764-40 for additional details.

All offsets to back face of W-Beam.

QUANTITIES	
GUARDRAIL EMBANKMENT	4 EA
PIPE CORR STEEL .079IN 24IN POLYMERIC COATED	4 LF
REMOVE & RELAY END SECTION-ALL TYPE & SIZES	1 EA
W-BEAM GUARDRAIL	182.6 LF
W-BEAM GUARDRAIL END TERMINAL	4 EA

REGISTERED PROFESSIONAL ENGINEER
SHAWN M. MAYFIELD
PE-4979
DATE 12-9-25
NORTH DAKOTA

HEC-0004(202)
Structure # 04-110-19.0

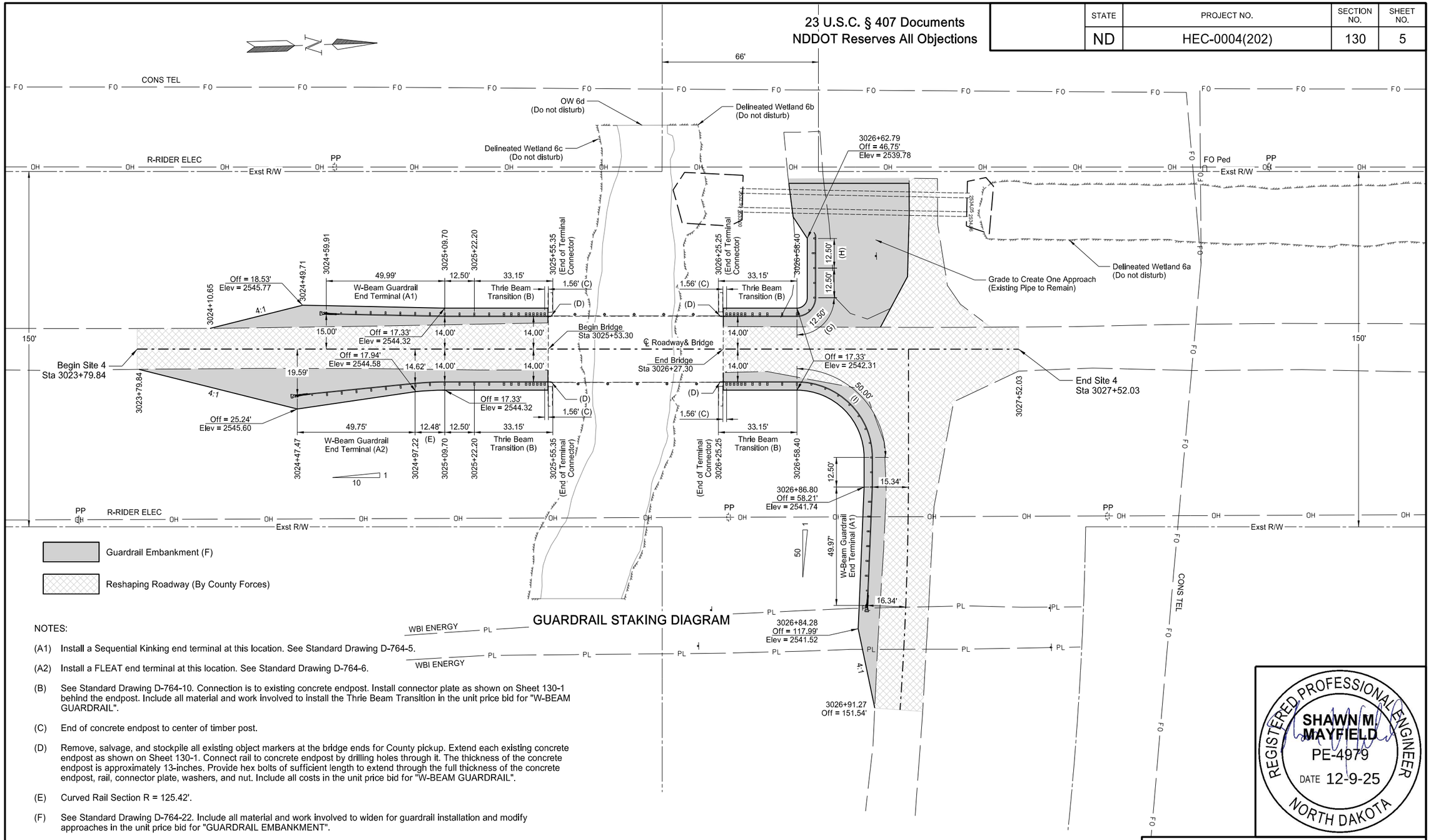
KLJ

MGS W-Beam
Guardrail Layout
Site 3
Billings County, ND

DRAWN BY	CHK'D. BY	PROJECT NO.
AK	SMM	2103-01811

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEC-0004(202)	130	5



GUARDRAIL STAKING DIAGRAM

NOTES:

(A1) Install a Sequential Kinking end terminal at this location. See Standard Drawing D-764-5.

(A2) Install a FLEAT end terminal at this location. See Standard Drawing D-764-6.

(B) See Standard Drawing D-764-10. Connection is to existing concrete endpost. Install connector plate as shown on Sheet 130-1 behind the endpost. Include all material and work involved to install the Thrie Beam Transition in the unit price bid for "W-BEAM GUARDRAIL".

(C) End of concrete endpost to center of timber post.

(D) Remove, salvage, and stockpile all existing object markers at the bridge ends for County pickup. Extend each existing concrete endpost as shown on Sheet 130-1. Connect rail to concrete endpost by drilling holes through it. The thickness of the concrete endpost is approximately 13-inches. Provide hex bolts of sufficient length to extend through the full thickness of the concrete endpost, rail, connector plate, washers, and nut. Include all costs in the unit price bid for "W-BEAM GUARDRAIL".

(E) Curved Rail Section R = 125.42'.

(F) See Standard Drawing D-764-22. Include all material and work involved to widen for guardrail installation and modify approaches in the unit price bid for "GUARDRAIL EMBANKMENT".

(G) Radius = 8'

(H) Install Special W-Beam Guardrail Anchor at this location. See Standard Drawing D-764-14. Include all costs in the unit price bid for "W-BEAM GUARDRAIL".

(I) Radius = 32'

Refer to Standard Drawings D-764-1 and D-764-13 for additional details.

All offsets to back face of W-Beam.

QUANTITIES	
GUARDRAIL EMBANKMENT	4 EA
W-BEAM GUARDRAIL	270.3 LF
W-BEAM GUARDRAIL END TERMINAL	3 EA

REGISTERED PROFESSIONAL ENGINEER
SHAWN M. MAYFIELD
PE-4979
DATE 12-9-25
NORTH DAKOTA

HEC-0004(202)
Structure # 04-127-21.0

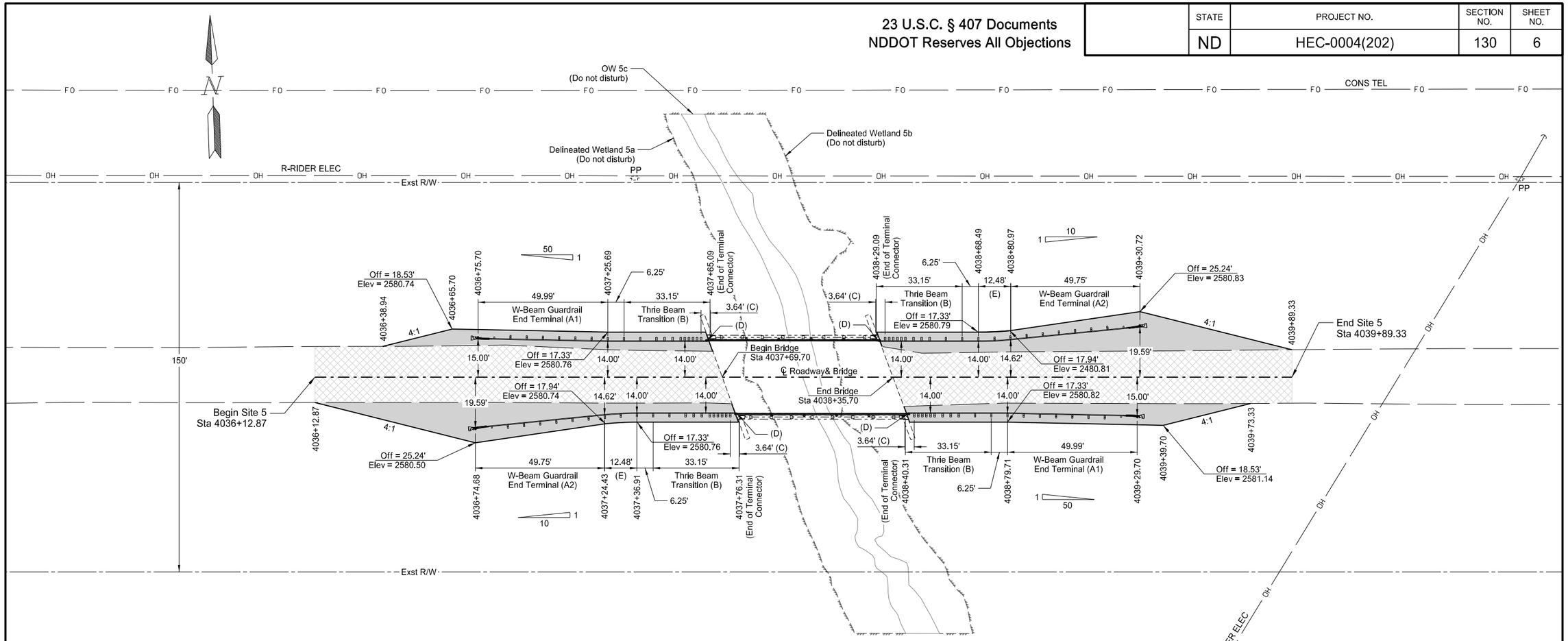
KLJ

W-Beam
Guardrail Layout
Site 4
Billings County, ND

DRAWN BY	CHK'D. BY	PROJECT NO.
AK	SMM	2103-01811

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEC-0004(202)	130	6



GUARDRAIL STAKING DIAGRAM

Guardrail Embankment (F)

Reshaping Roadway (By County Forces)

NOTES:

(A1) Install a Sequential Kinking end terminal at this location. See Standard Drawing D-764-5.

(A2) Install a FLEAT end terminal at this location. See Standard Drawing D-764-6.

(B) See Standard Drawing D-764-10. Include all material and work involved to install the Thrie Beam Transition in the unit price bid for "W-BEAM GUARDRAIL".

(C) End of concrete endpost to center of timber post.

(D) Remove, salvage, and stockpile all existing object markers at the bridge ends for County pickup. Connect to Double Box Beam E-Rail Retrofit. Include all costs in the unit price bid for "W-BEAM GUARDRAIL".

(E) Curved Rail Section R = 125.42'.

(F) See Standard Drawing D-764-22. Include all material and work involved to widen for guardrail installation and modify approaches in the unit price bid for "GUARDRAIL EMBANKMENT".

Refer to Standard Drawing D-764-1 for additional details.

All offsets to back face of W-Beam.

QUANTITIES	
GUARDRAIL EMBANKMENT	4 EA
W-BEAM GUARDRAIL	182.6 LF
W-BEAM GUARDRAIL END TERMINAL	4 EA

REGISTERED PROFESSIONAL ENGINEER
SHAWN M MAYFIELD
PE-4979
DATE 12-9-25
NORTH DAKOTA

HEC-0004(202)

Structure # 04-126-17.0

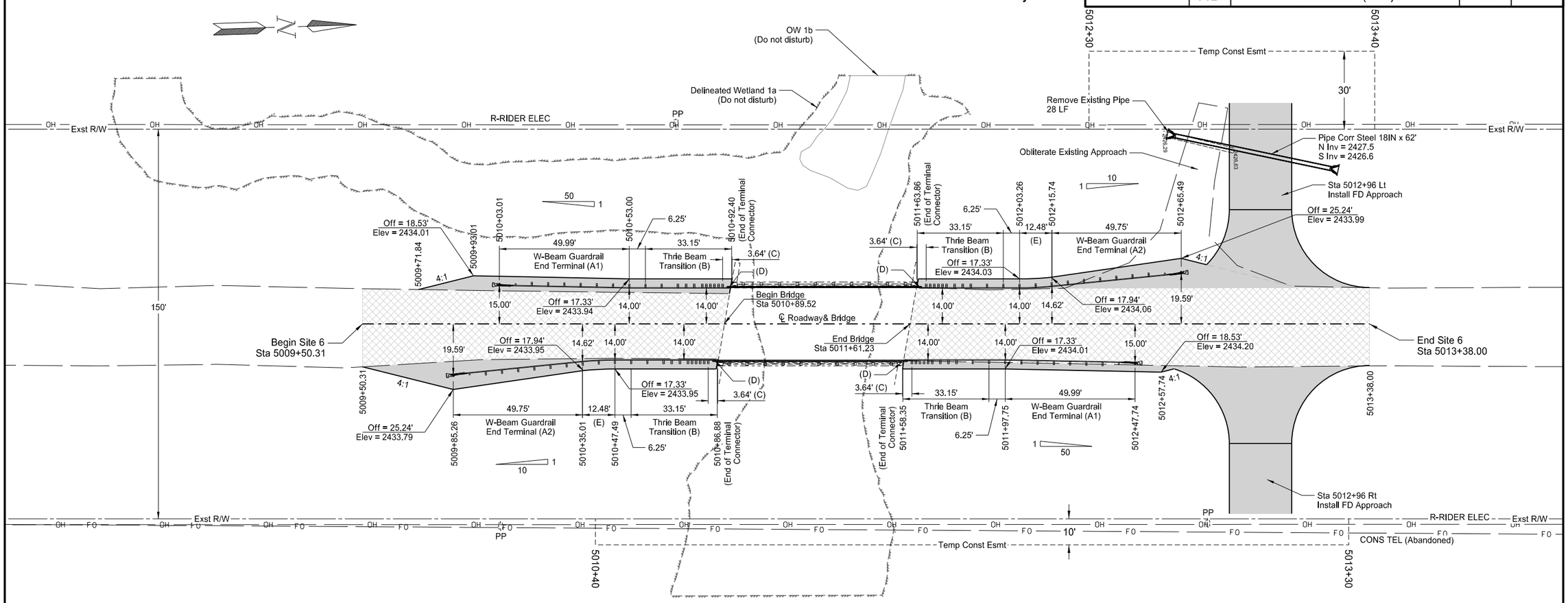
KLJ

W-Beam
Guardrail Layout
Site 5
Billings County, ND

DRWN. BY	CHK'D. BY	PROJECT NO.
AK	SMM	2103-01811

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

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	130	7



Guardrail Embankment (F)

Reshaping Roadway (By County Forces)

GUARDRAIL STAKING DIAGRAM

NOTES:

(A1) Install a Sequential Kinking end terminal at this location. See Standard Drawing D-764-5.

(A2) Install a FLEAT end terminal at this location. See Standard Drawing D-764-6.

(B) See Standard Drawing D-764-10. Include all material and work involved to install the Thrie Beam Transition in the unit price bid for "W-BEAM GUARDRAIL".

(C) End of concrete endpost to center of timber post.

(D) Remove, salvage, and stockpile all existing object markers at the bridge ends for County pickup. Connect to Double Box Beam E-Rail Retrofit. Include all costs in the unit price bid for "W-BEAM GUARDRAIL".

(E) Curved Rail Section R = 125.42'.

(F) See Standard Drawing D-764-22. Include all material and work involved to widen for guardrail installation and modify approaches in the unit price bid for "GUARDRAIL EMBANKMENT".

Refer to Standard Drawing D-764-1 for additional details.

All offsets to back face of W-Beam.

REGISTERED PROFESSIONAL ENGINEER
SHAWN M. MAYFIELD
PE-4979
DATE 12-9-25
NORTH DAKOTA

QUANTITIES	
GUARDRAIL EMBANKMENT	4 EA
PIPE CORR STEEL .064IN 18IN	62 LF
END SECT CORR STEEL .064IN 18IN	2 EA
W-BEAM GUARDRAIL	182.6 LF
W-BEAM GUARDRAIL END TERMINAL	4 EA

HEC-0004(202)

Structure # 04-127-06.0

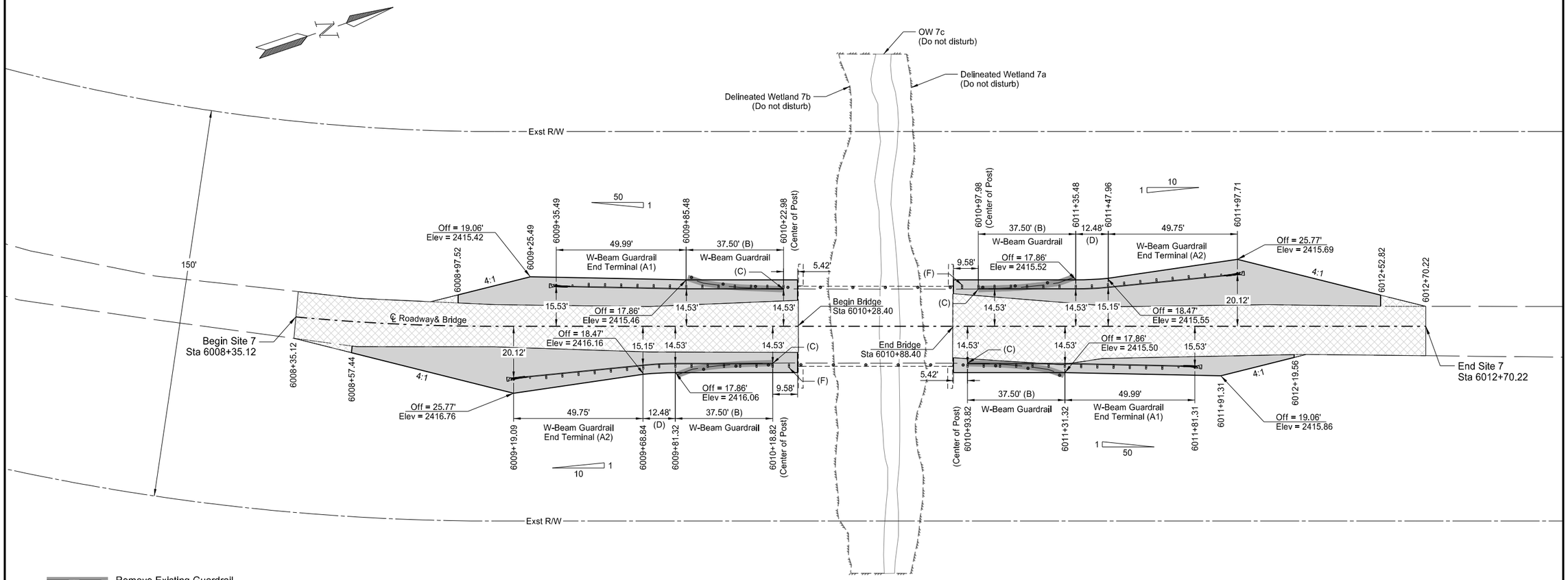
KLJ

W-Beam
Guardrail Layout
Site 6
Billings County, ND

DRAWN BY	CHK'D BY	PROJECT NO.
AK	SMM	2103-01811

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

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	130	8



Remove Existing Guardrail

Guardrail Embankment (E)

Reshaping Roadway (By County Forces)

GUARDRAIL STAKING DIAGRAM

NOTES:

(A1) Install a Sequential Kinking end terminal at this location. See Standard Drawing D-764-5.

(A2) Install a FLEAT end terminal at this location. See Standard Drawing D-764-6.

(B) Post space for guardrail is 6'-3" unless dimensioned otherwise.

(C) Remove, salvage, and stockpile all existing object markers at the bridge ends for County pickup. Connect to Existing Bridge Railing. Include all costs in the unit price bid for "W-BEAM GUARDRAIL".

(D) Curved Rail Section R = 125.42'.

(E) See Standard Drawing D-764-22. Include all material and work involved to widen for guardrail installation in the unit price bid for "GUARDRAIL EMBANKMENT".

(F) Replace existing timber post with new timber post. Include all material and work involved in the unit price bid for "W-BEAM GUARDRAIL".

Refer to Standard Drawing D-764-1 for additional details.

All offsets to back face of W-Beam.

REGISTERED PROFESSIONAL ENGINEER
SHAWN M. MAYFIELD
PE-4979
DATE 12-9-25
NORTH DAKOTA

QUANTITIES	
GUARDRAIL EMBANKMENT	4 EA
W-BEAM GUARDRAIL	175.0 LF
W-BEAM GUARDRAIL END TERMINAL	4 EA

HEC-0004(202)
Structure # 04-110-48.0

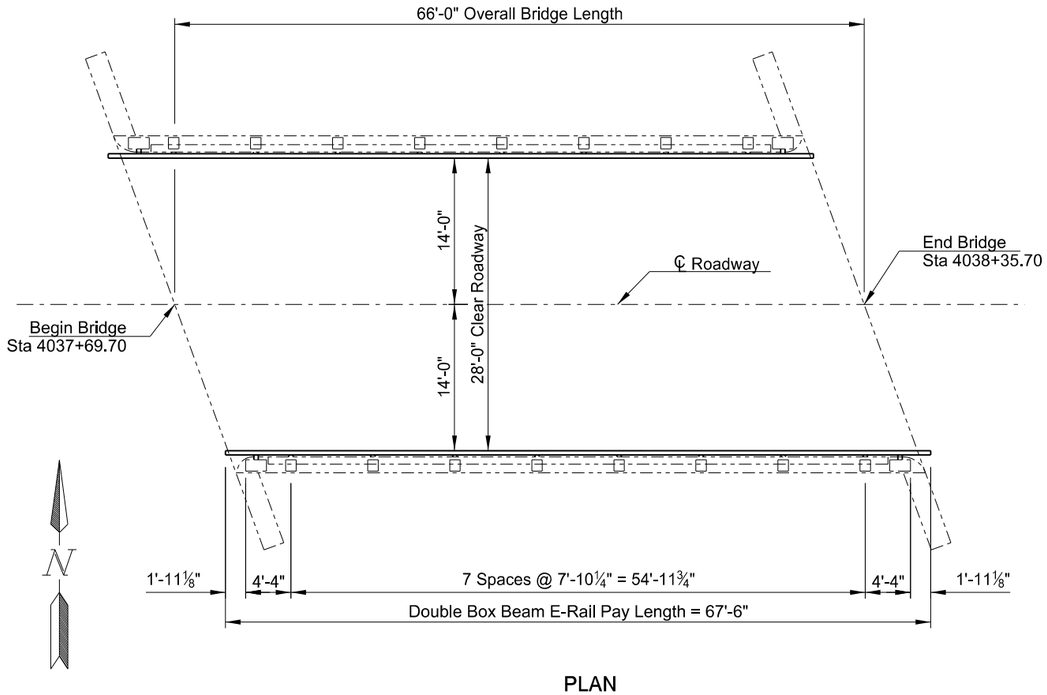
KLJ

W-Beam
Guardrail Layout
Site 7
Billings County, ND

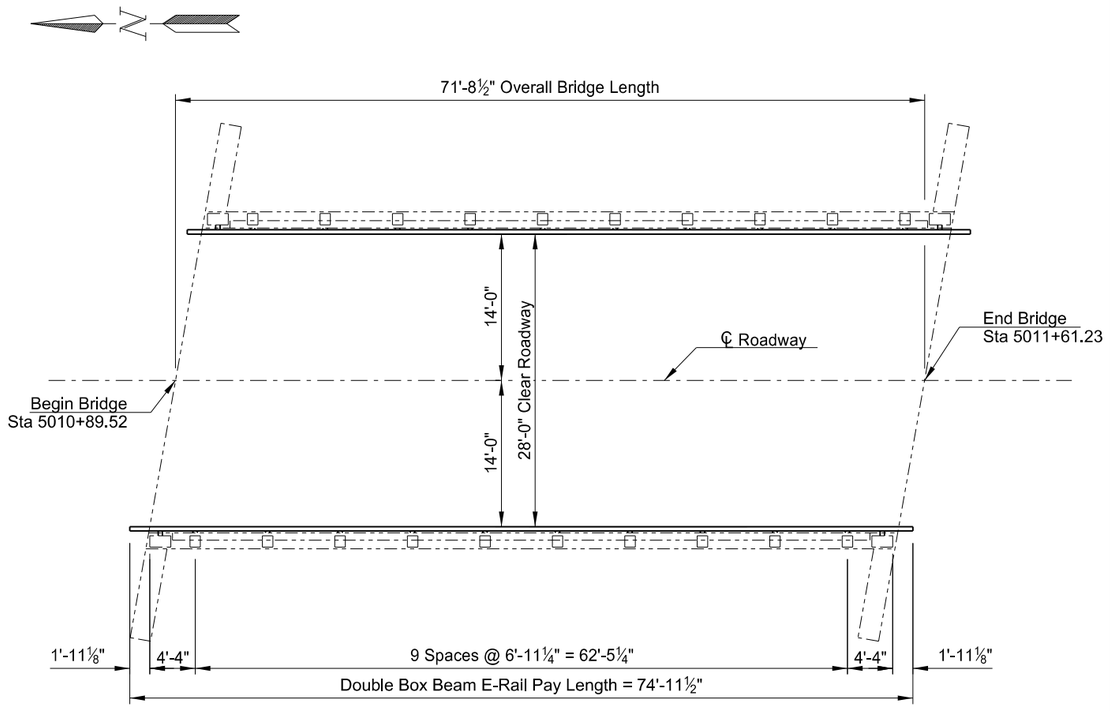
DRWN. BY	CHK'D. BY	PROJECT NO.
AK	SMM	2103-01811

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

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	170	1



PLAN
(04-126-17.0)



PLAN
(04-127-06.0)

DOUBLE BOX BEAM BID ITEMS (04-126-17.0)

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
624	3002	DOUBLE BOX BEAM RAIL RETROFIT - E-RAIL	LF	135.0

DOUBLE BOX BEAM BID ITEMS (04-127-06.0)

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
624	3002	DOUBLE BOX BEAM RAIL RETROFIT - E-RAIL	LF	149.9

REGISTERED PROFESSIONAL ENGINEER
SHAWN M. MAYFIELD
PE-4979
DATE 12-2-25
NORTH DAKOTA

HEC-0004(202)
Structure # 04-126-17.0 & Structure # 04-127-06.0

KLJ

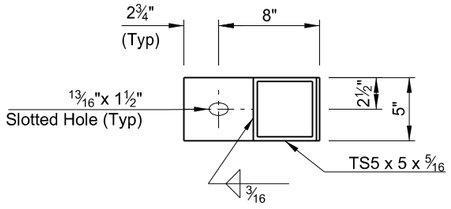
Double Box Beam
E-Rail Layout

Billings County, ND

DRWN. BY	CHK'D. BY	PROJECT NO.
SMM	CDB	2103-01811

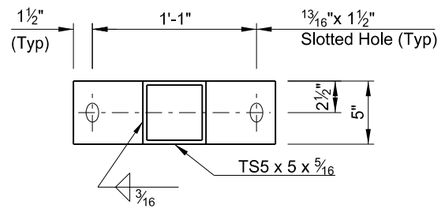
23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	170	2



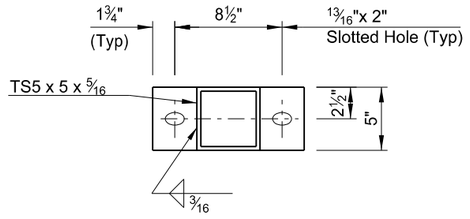
(Concrete Rail Connection)

BAR 5 X ½ X 10¾" DETAIL



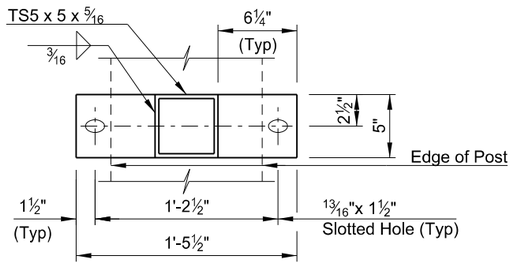
(Concrete Rail Connection)

BAR 5 X ½ X 1'-4" DETAIL



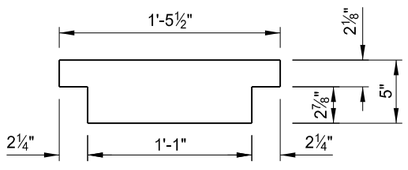
(Rail Connection)

BAR 5 X ½ X 1'-0" DETAIL



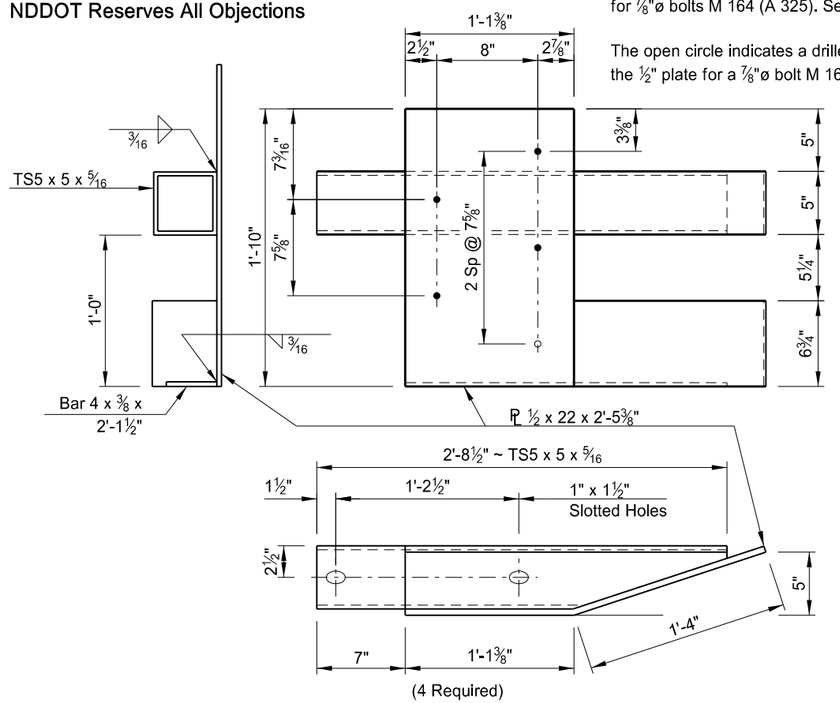
(Concrete Post Connection)

BAR 5 X ½ X 1'-5½" DETAIL



¼" & ⅛" Thickness
Quantities Determined in Field

SHIM PLATE DETAIL



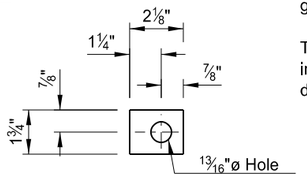
(4 Required)

GUARDRAIL CONNECTION PLATE DETAILS

The filled circles indicate drilled and tapped holes for ⅞"ø bolts M 164 (A 325). See Detail "B".

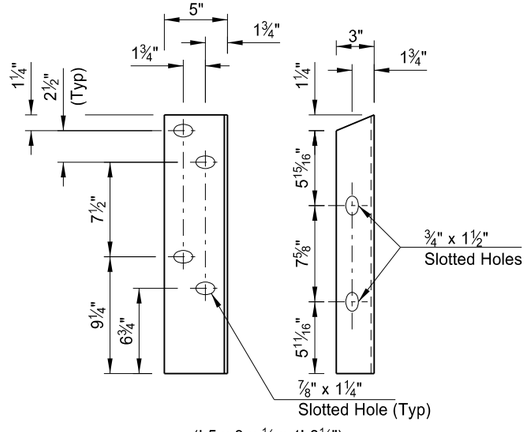
The open circle indicates a drilled hole through the ½" plate for a ⅞"ø bolt M 164 (A 325).

Position washers to completely cover slotted holes.



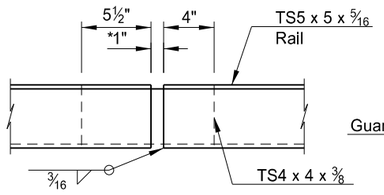
(¼" PL AASHTO M 270 Grade 36)

PL WASHER "C"



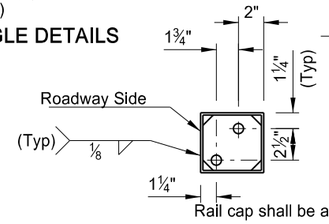
(L5 x 3 x ¼ x 1'-8½")
(4 Required)

CONNECTION ANGLE DETAILS



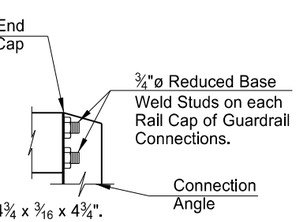
* 2" at expansion splices.

RAIL SPLICE DETAIL

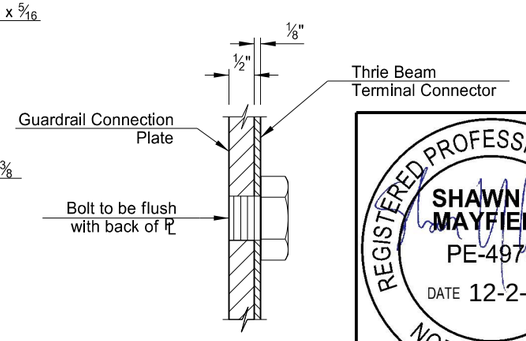


Rail cap shall be a Bar 4¾ x ¾16 x 4¾".
Cope corners 1" to provide Zinc drains.

RAIL CAP DETAILS



Install angle with washers and self-locking nuts or nuts and jam unit.



DETAIL "B"

Fabricate rail elements from square structural tubing in accordance with ASTM Specification A 500 Grade B.

Supply steel plates and angles conforming to AASHTO Specification M 270 Grade 36, unless otherwise noted.

Fabricate railing to the horizontal and vertical alignment of the structure.

Include costs for furnishing and installing the guardrail connection plates in "DOUBLE BOX BEAM RAIL RETROFIT - E-RAIL".

Hot-dip galvanize structural steel after fabrication according to AASHTO M 111.

Fabricate rails so that each rail segment between splices is attached to a minimum of two posts.

Supply threaded rods meeting M 270 Grade 36 Steel and galvanize according to M 232. Tighten the threaded rods to provide a minimum tensile force of 2,500 lbs. and a maximum tensile force of 2,700 lbs.

Embed the anchor bolts into the concrete with a chemical adhesive system that can develop a tensile strength of at least 17,500 lbs.

Supply all anchor and splice bolts meeting AASHTO M 164 (A 325) and be galvanized according to M 232.

The contractor must field verify all dimensions and incorporate them into the shop drawings. Submit the double box beam rail retrofit work drawings to the Engineer for approval before fabrication.

REGISTERED PROFESSIONAL ENGINEER
SHAWN M. MAYFIELD
PE-4979
DATE 12-2-25
NORTH DAKOTA

HEC-0004(202)
Structure # 04-126-17.0 & Structure # 04-127-06.0

KLJ

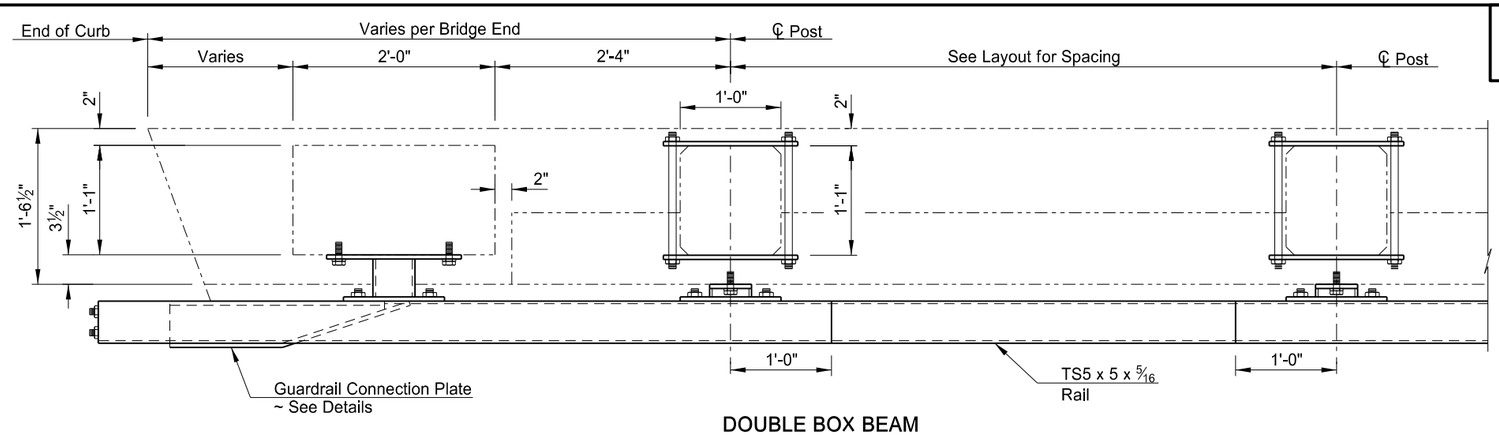
Double Box Beam E-Rail Retrofit Details

Billings County, ND

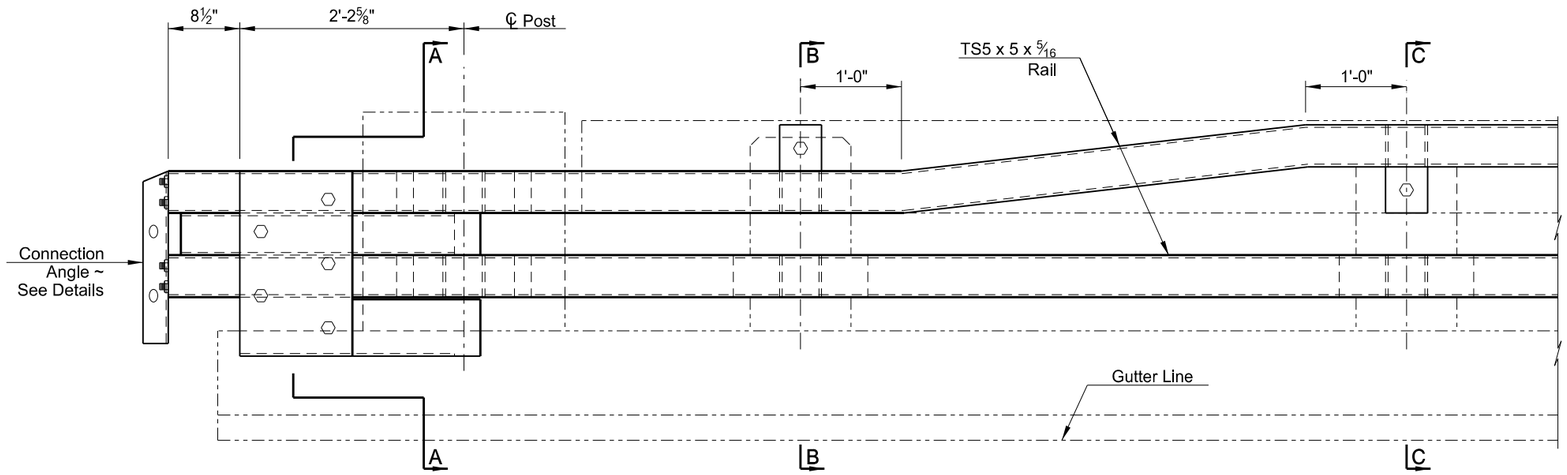
DRWN. BY	CHK'D. BY	PROJECT NO.
SMM	WDT	2103-01811

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEC-0004(202)	170	3

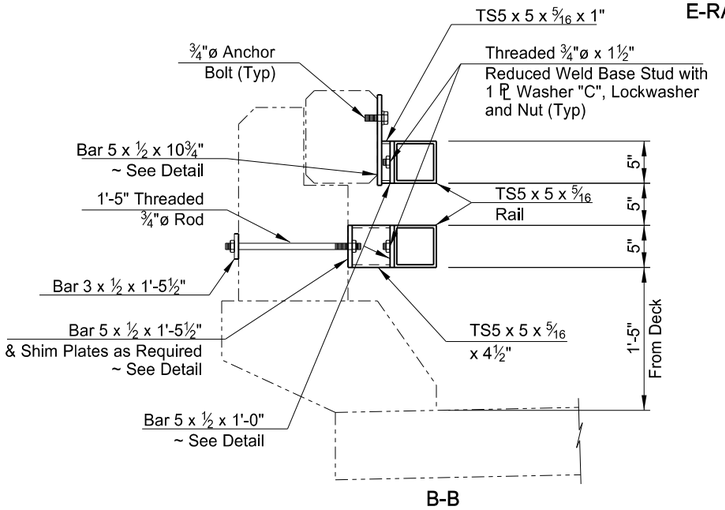
23 U.S.C. § 407 Documents
NDDOT Reserves All Objections



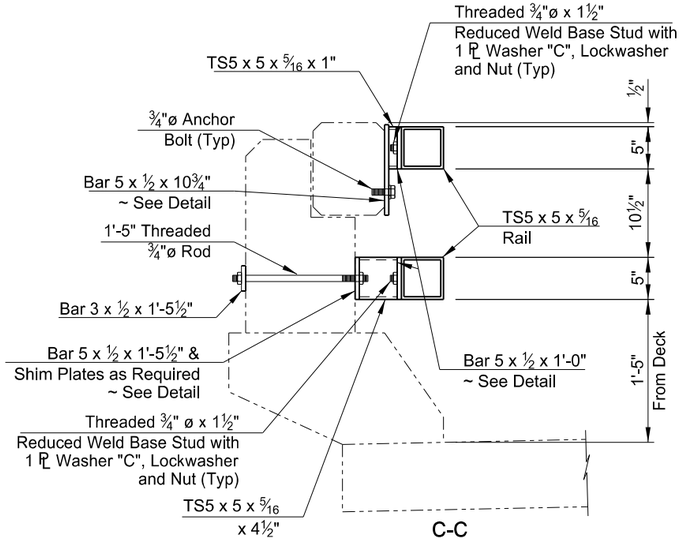
DOUBLE BOX BEAM
E-RAIL RETROFIT PART PLAN



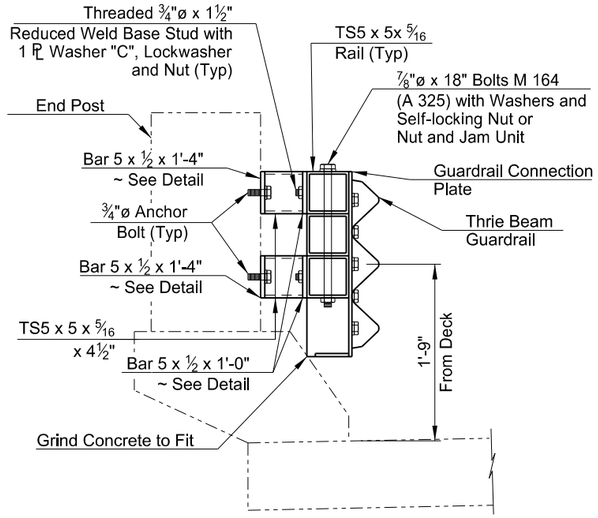
DOUBLE BOX BEAM
E-RAIL RETROFIT PART ELEVATION



B-B



C-C



A-A

REGISTERED PROFESSIONAL ENGINEER
SHAWN M. MAYFIELD
PE-4979
DATE 12-2-25
NORTH DAKOTA

HEC-0004(202)

Structure # 04-126-17.0 & Structure # 04-127-06.0

KLJ

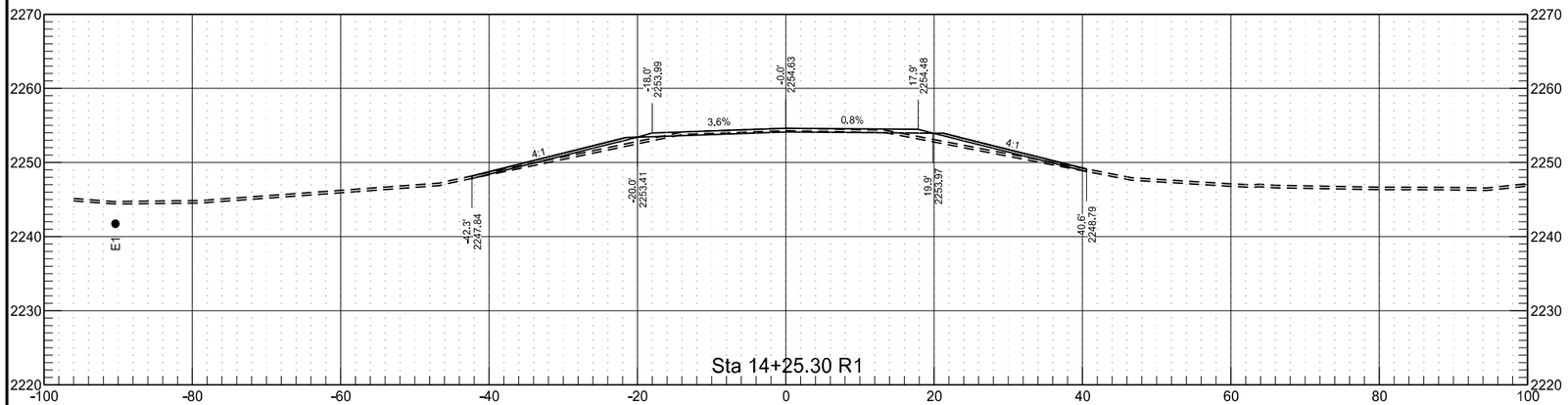
Double Box Beam
E-Rail Retrofit Details

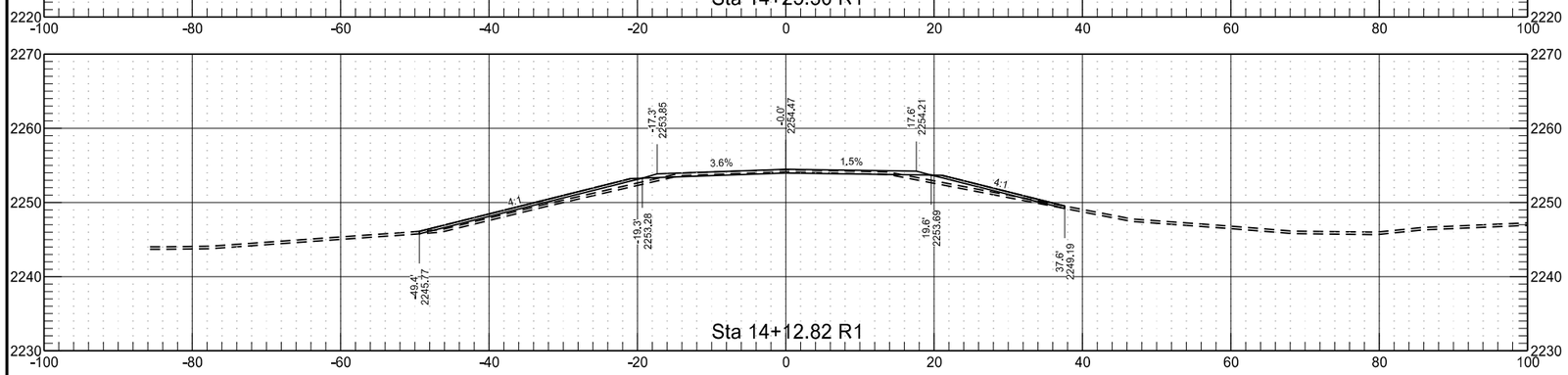
Billings County, ND

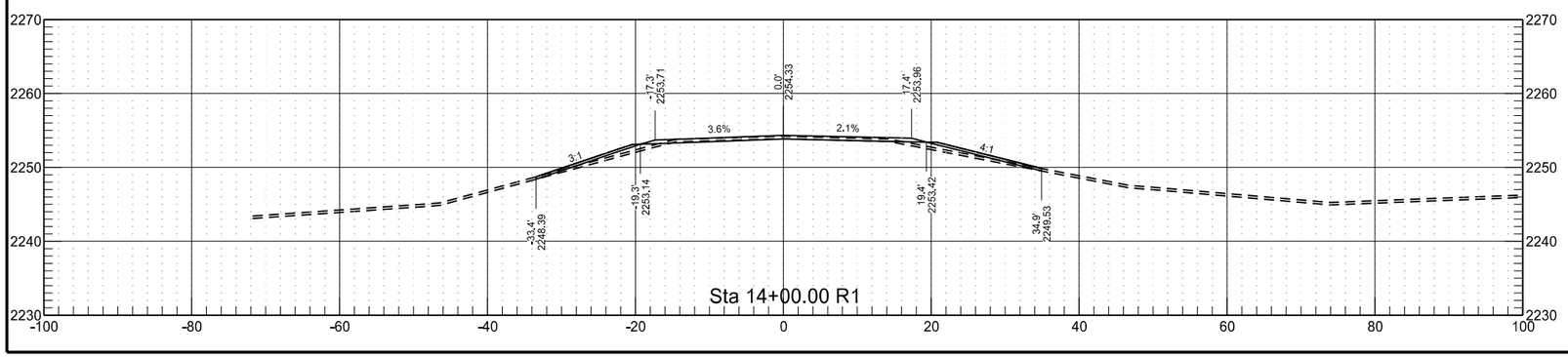
DRAWN BY	CHK'D. BY	PROJECT NO.
SMM	CDB	2103-01811

Site 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	200	1

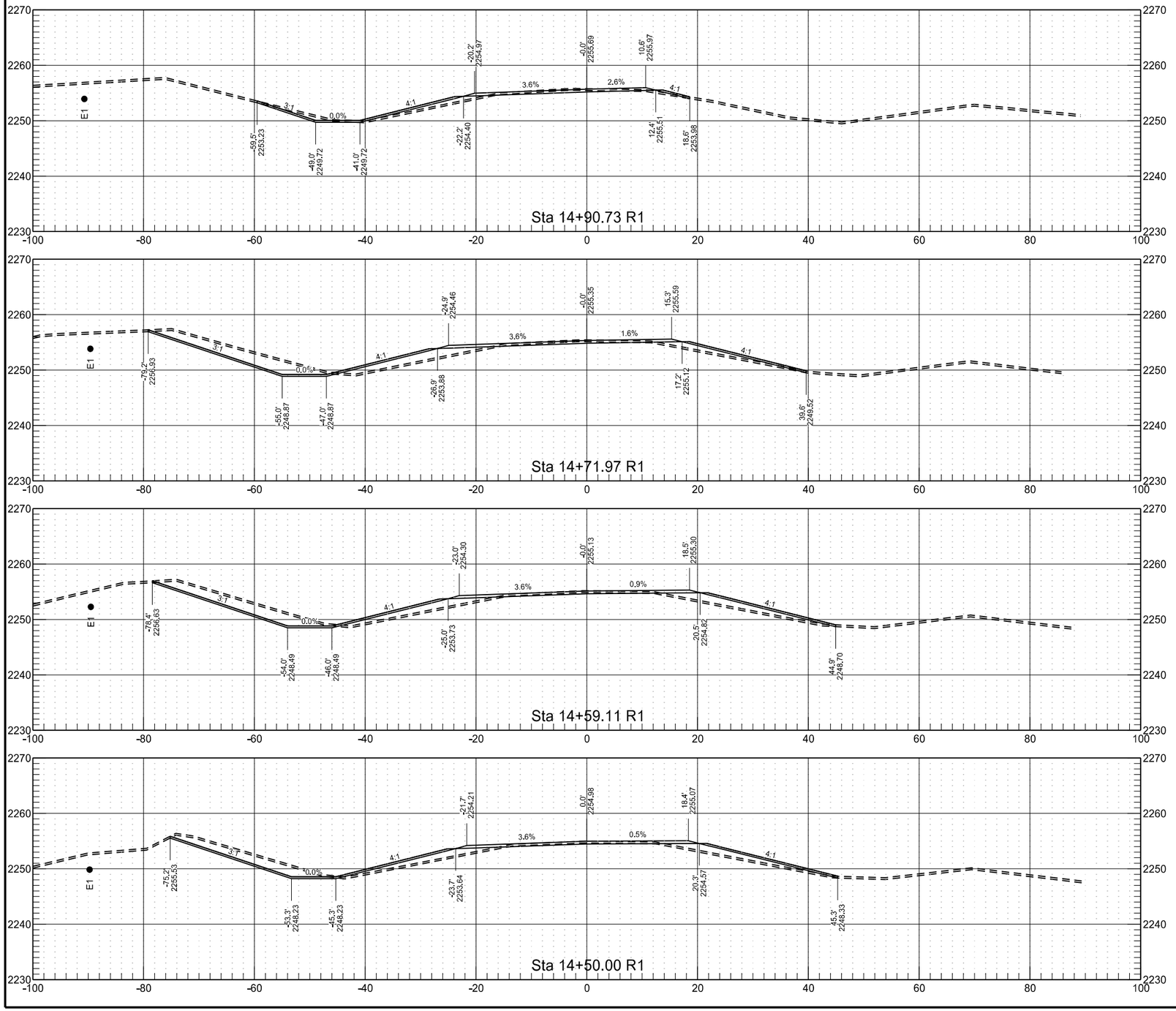






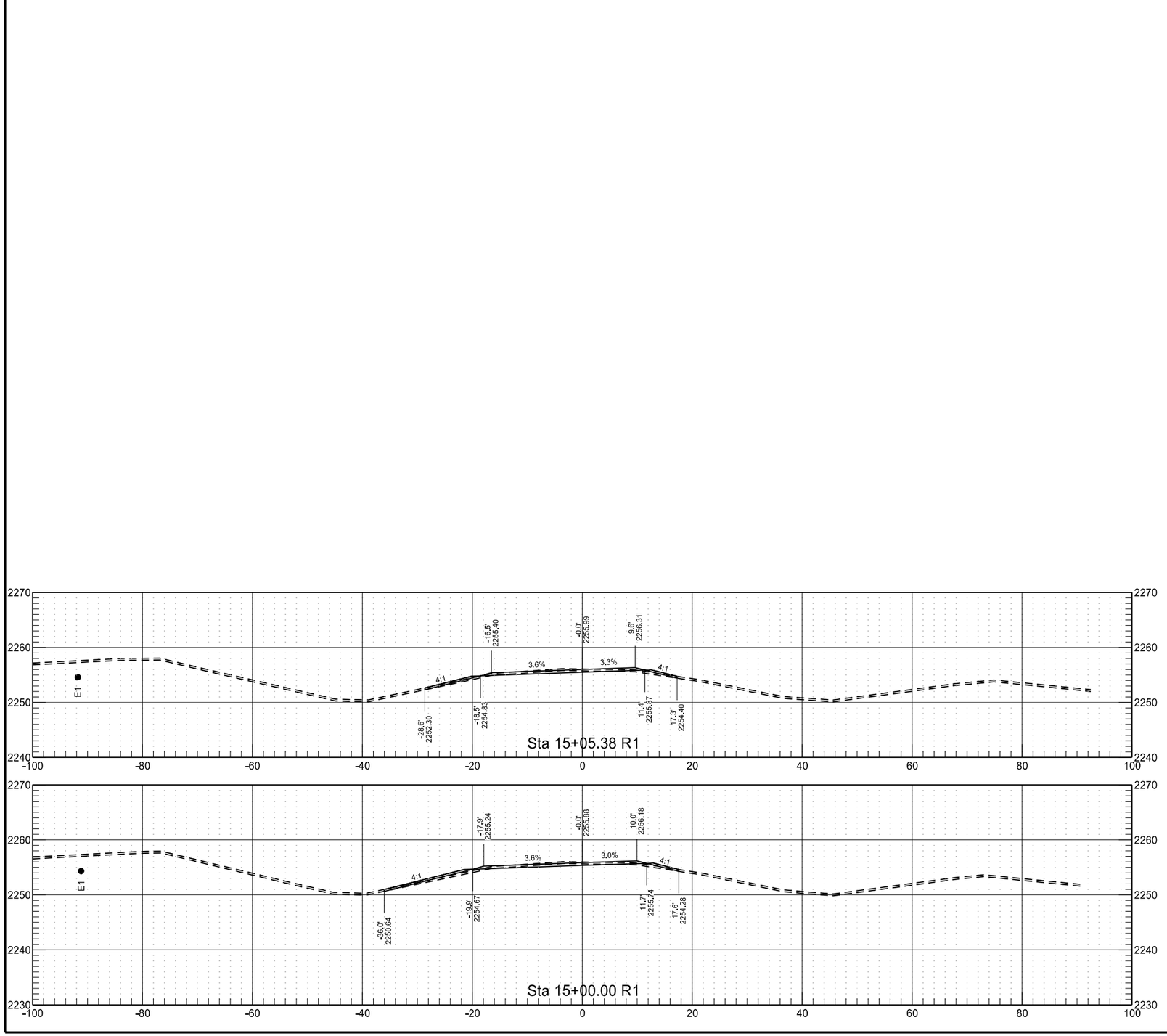
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	200	2

Site 1



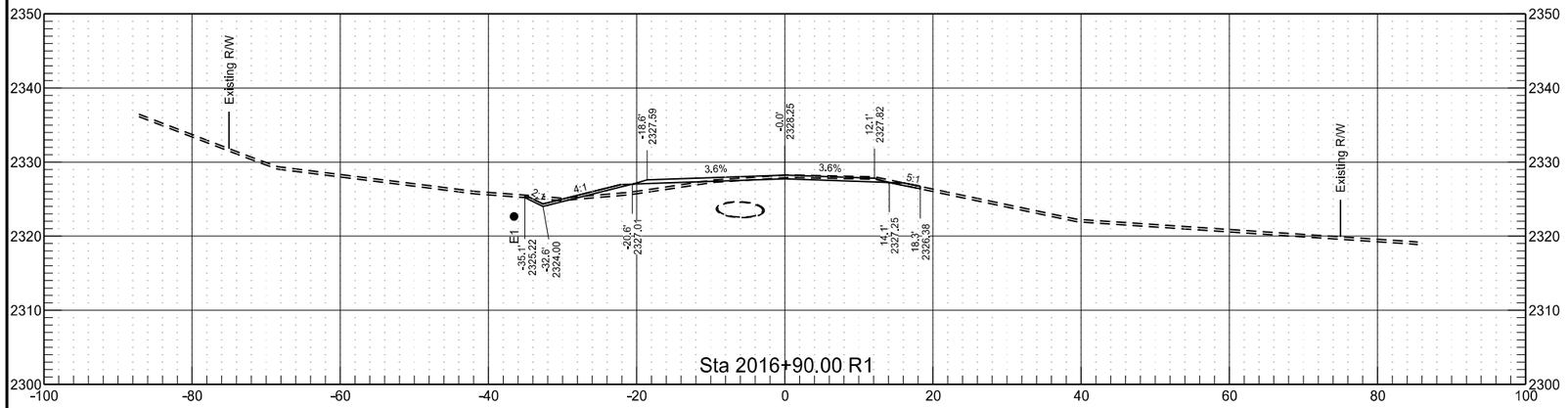
Site 1

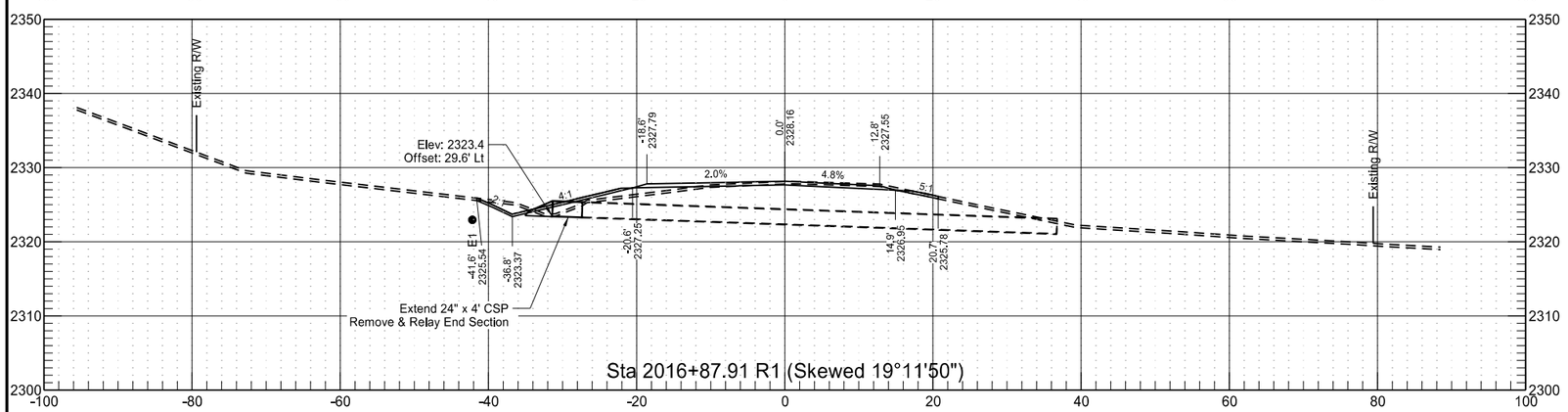
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	200	3

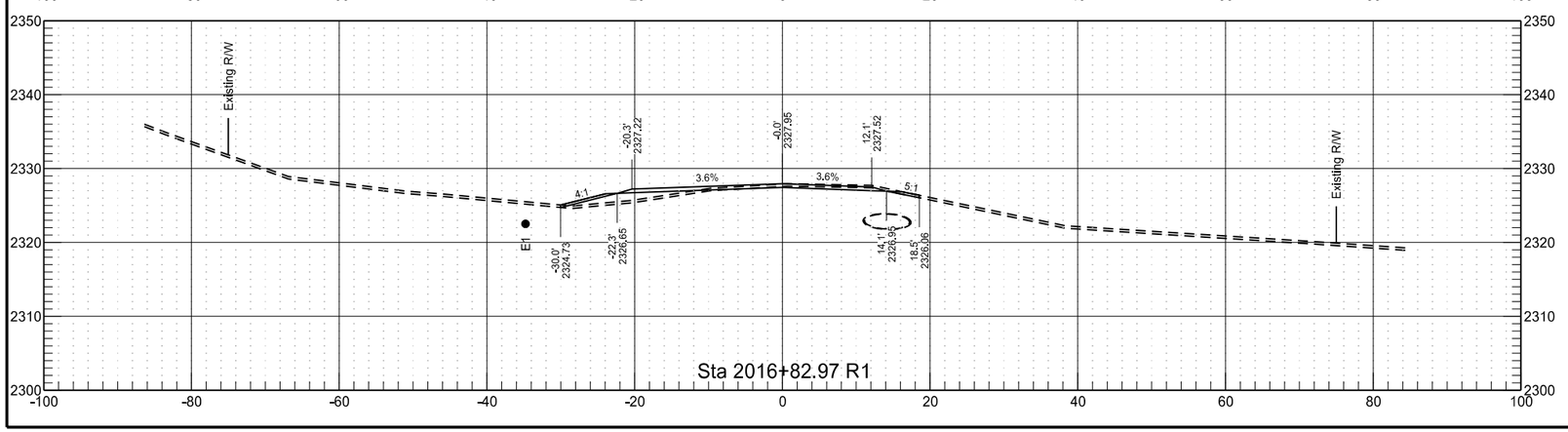


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	200	4

Site 3

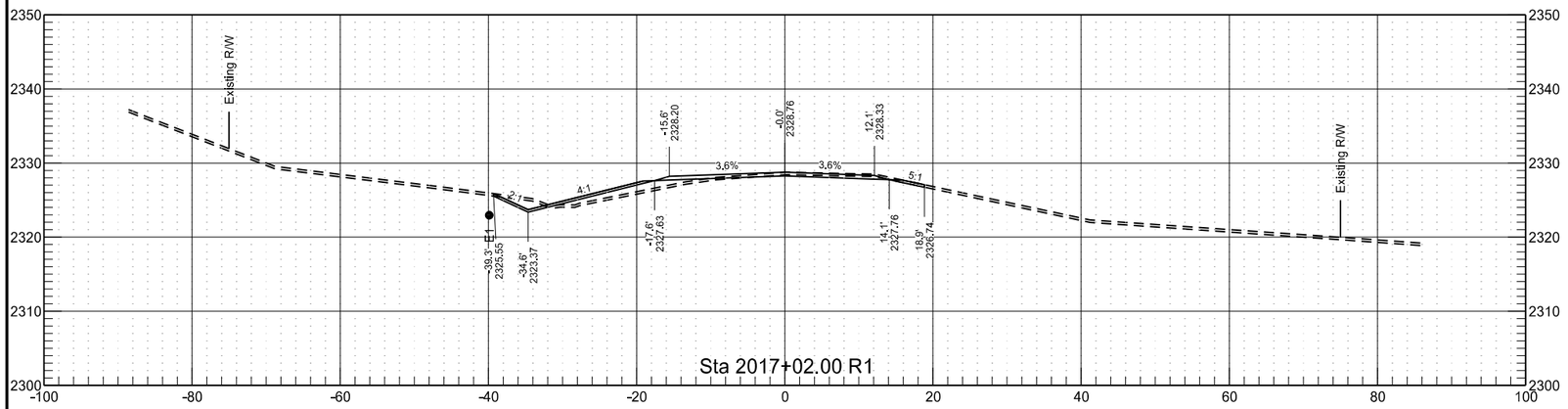


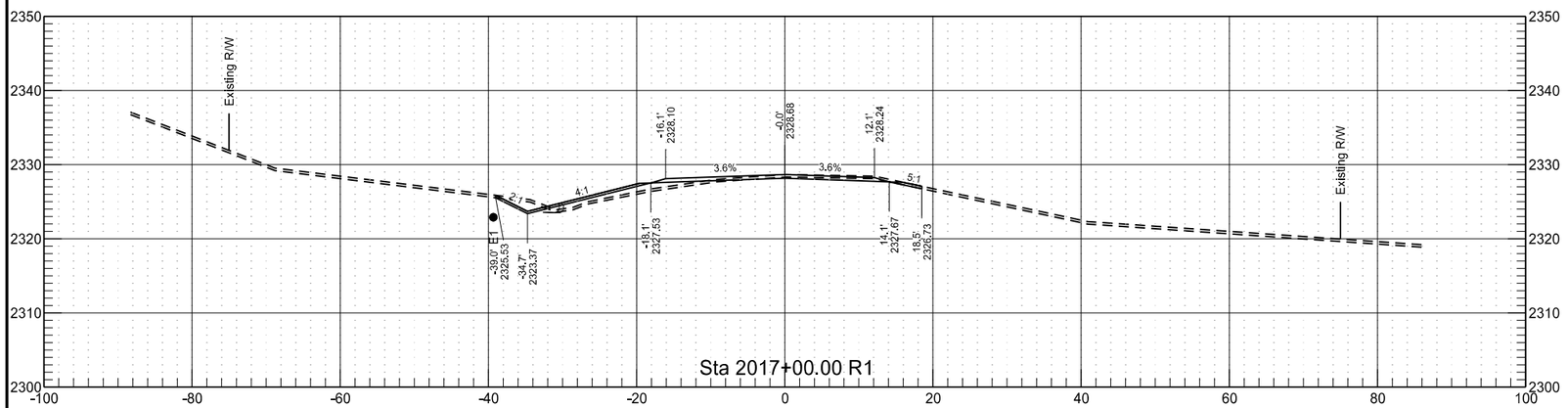


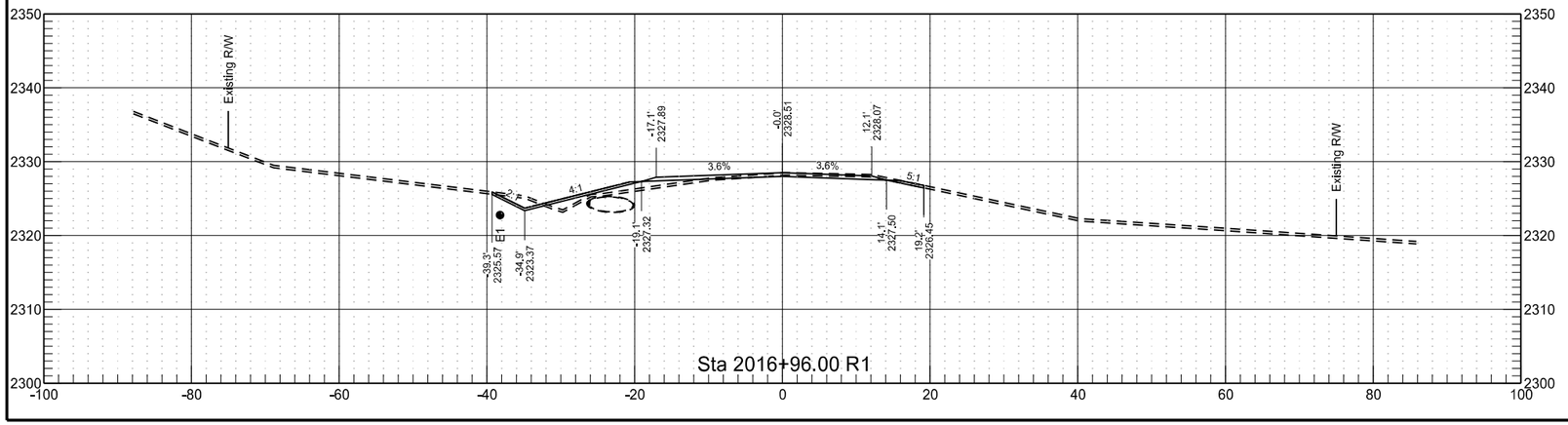


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	200	5

Site 3

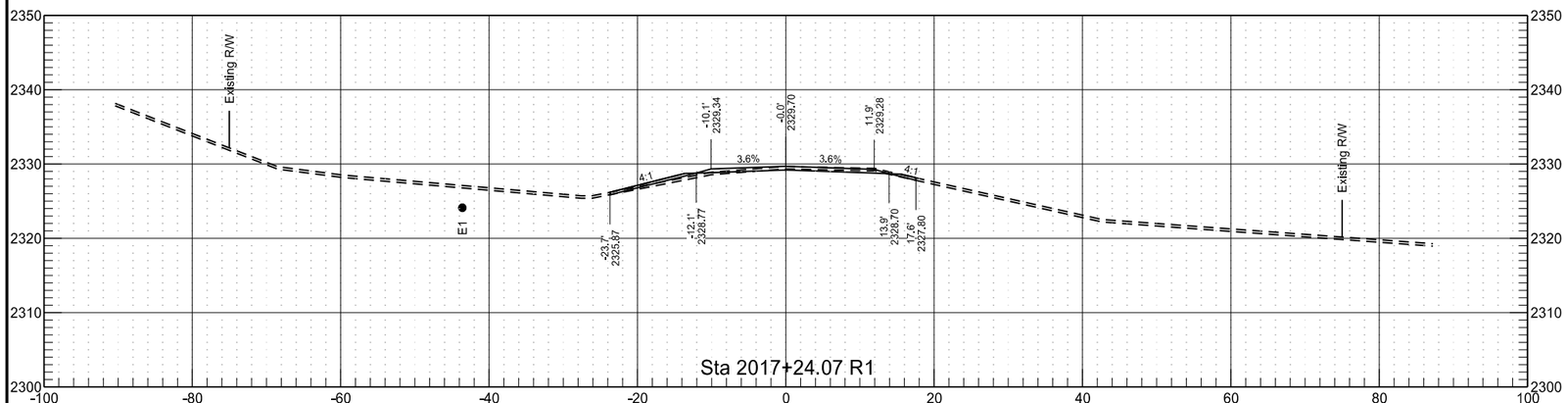


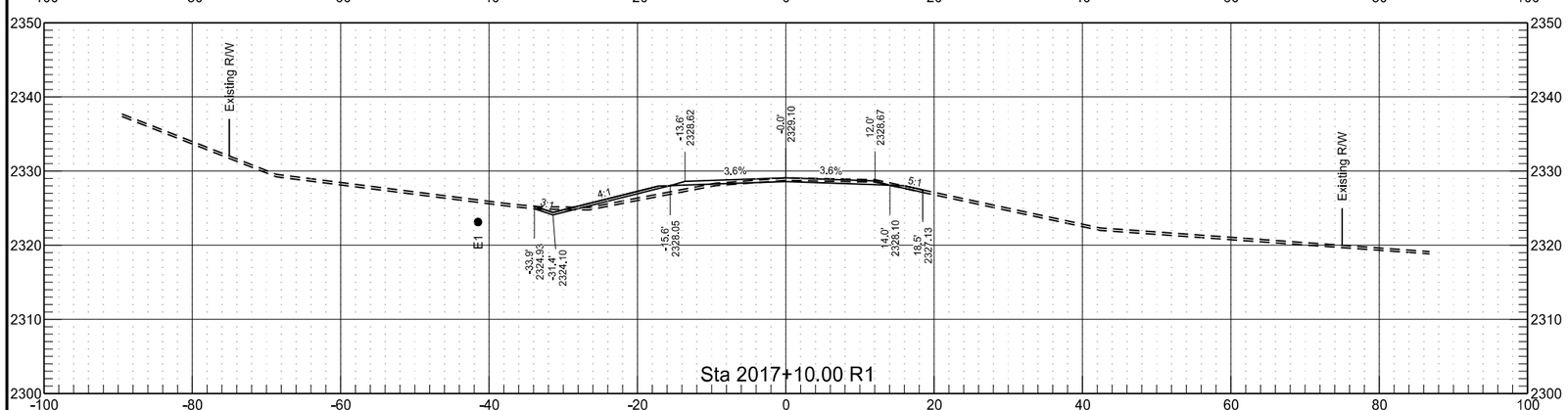




Site 3

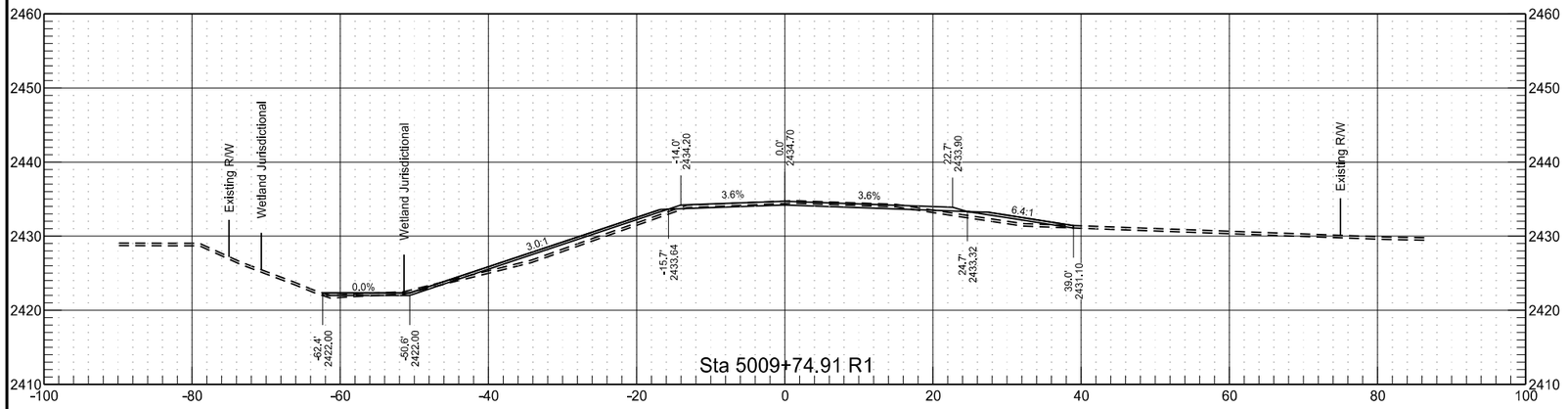
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	200	6

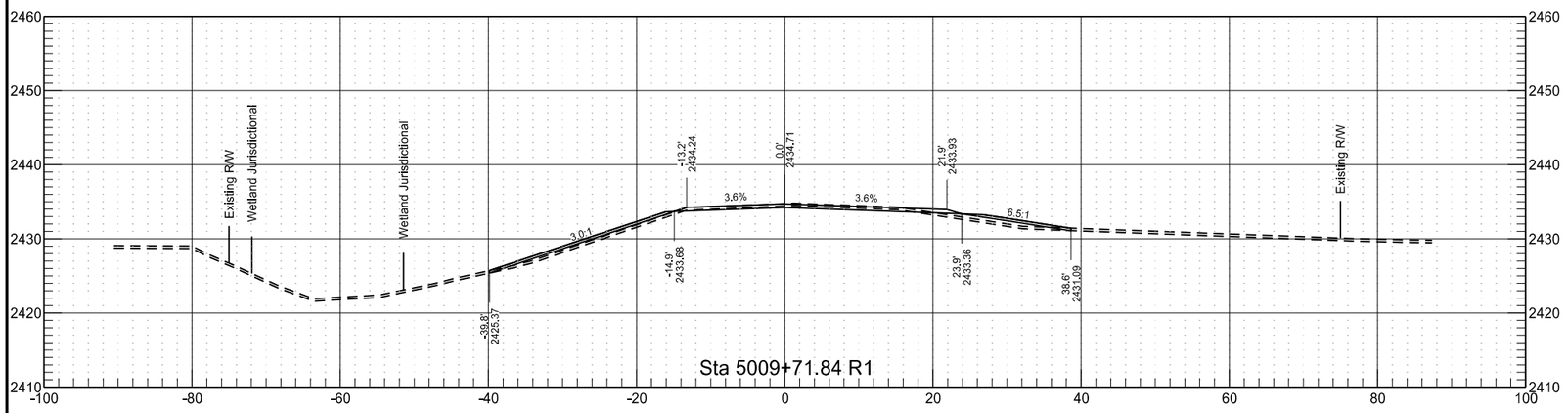


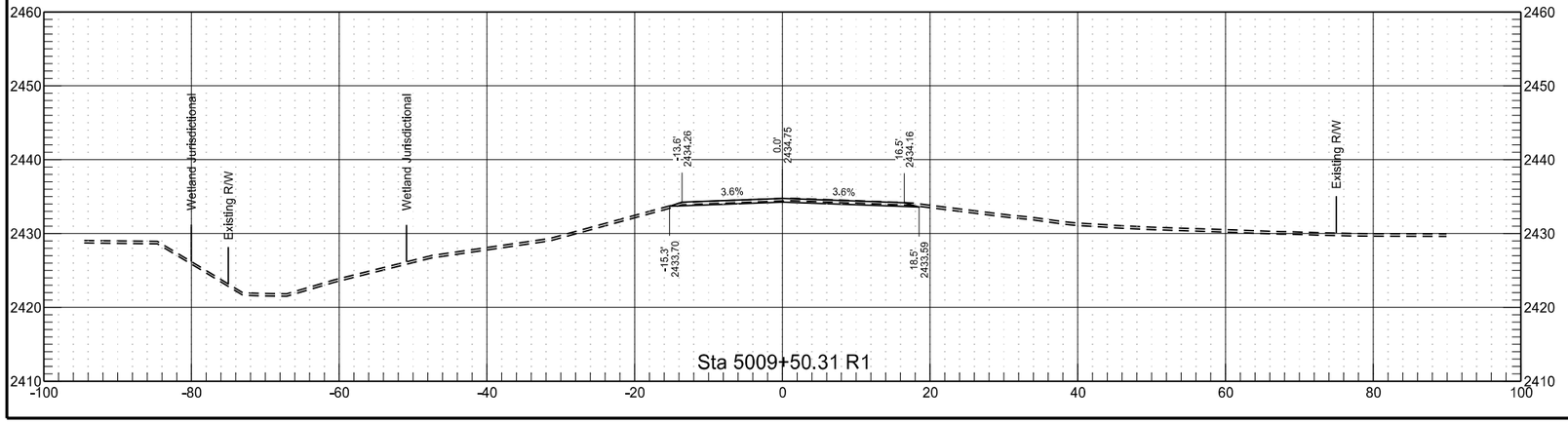


Site 6

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	200	7

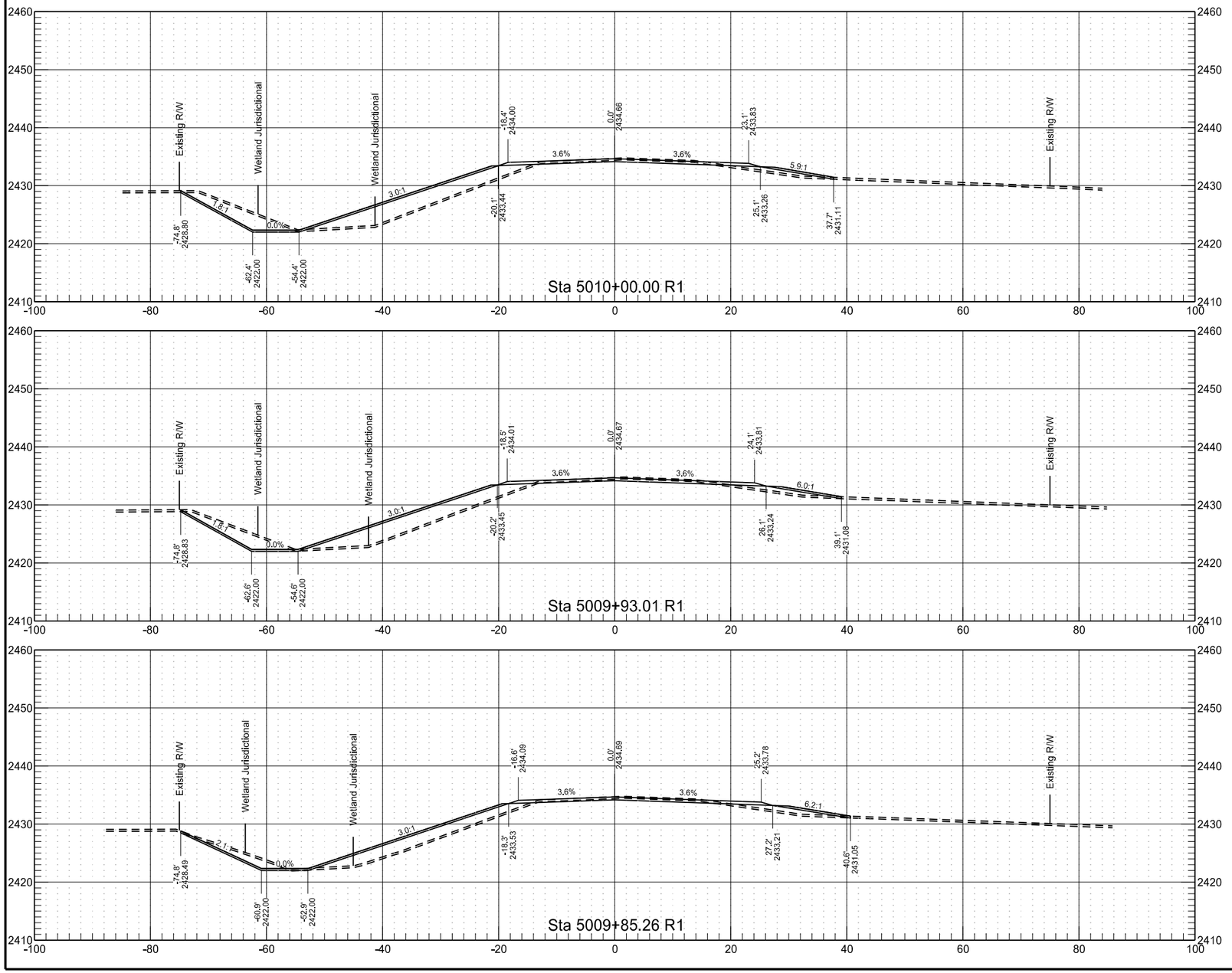






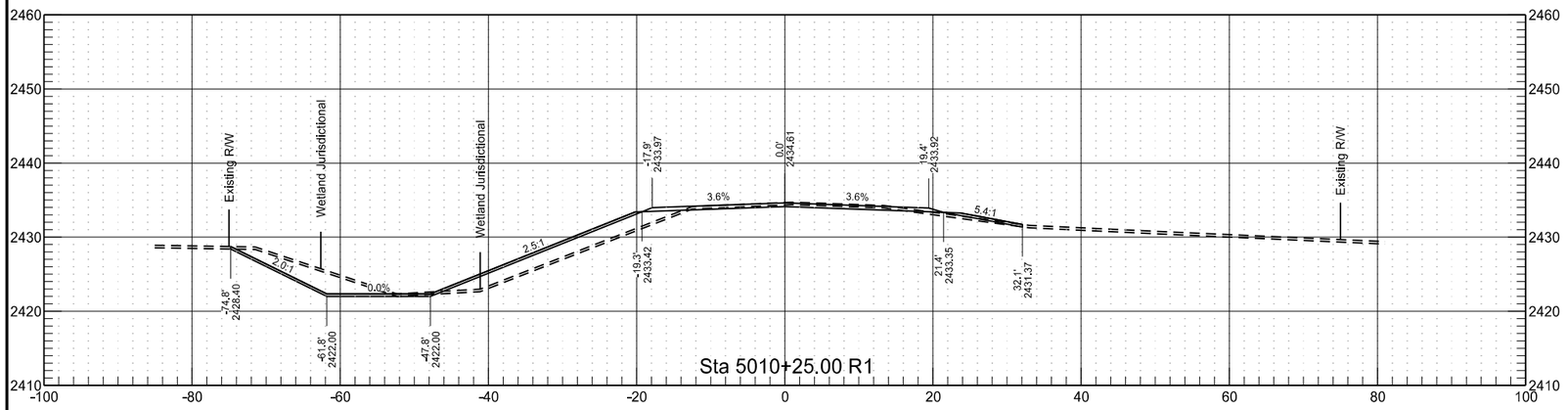
Site 6

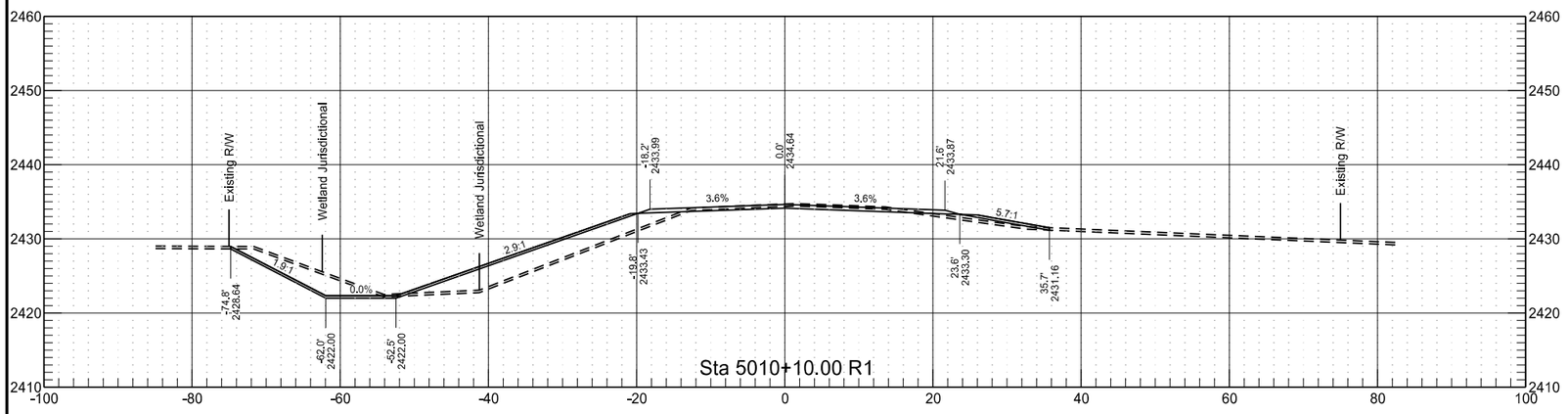
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	200	8

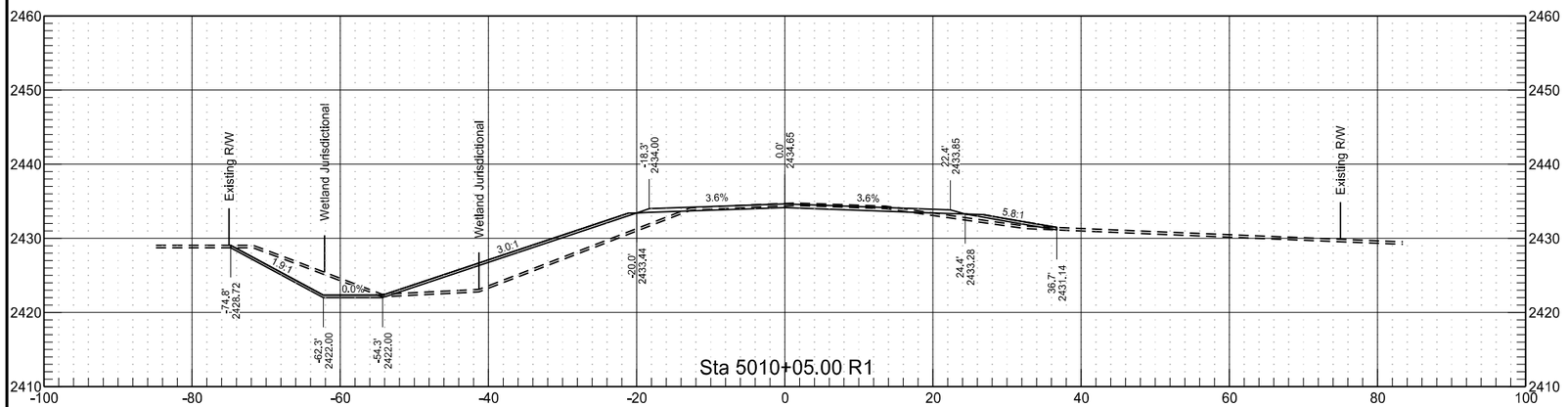


Site 6

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	200	9

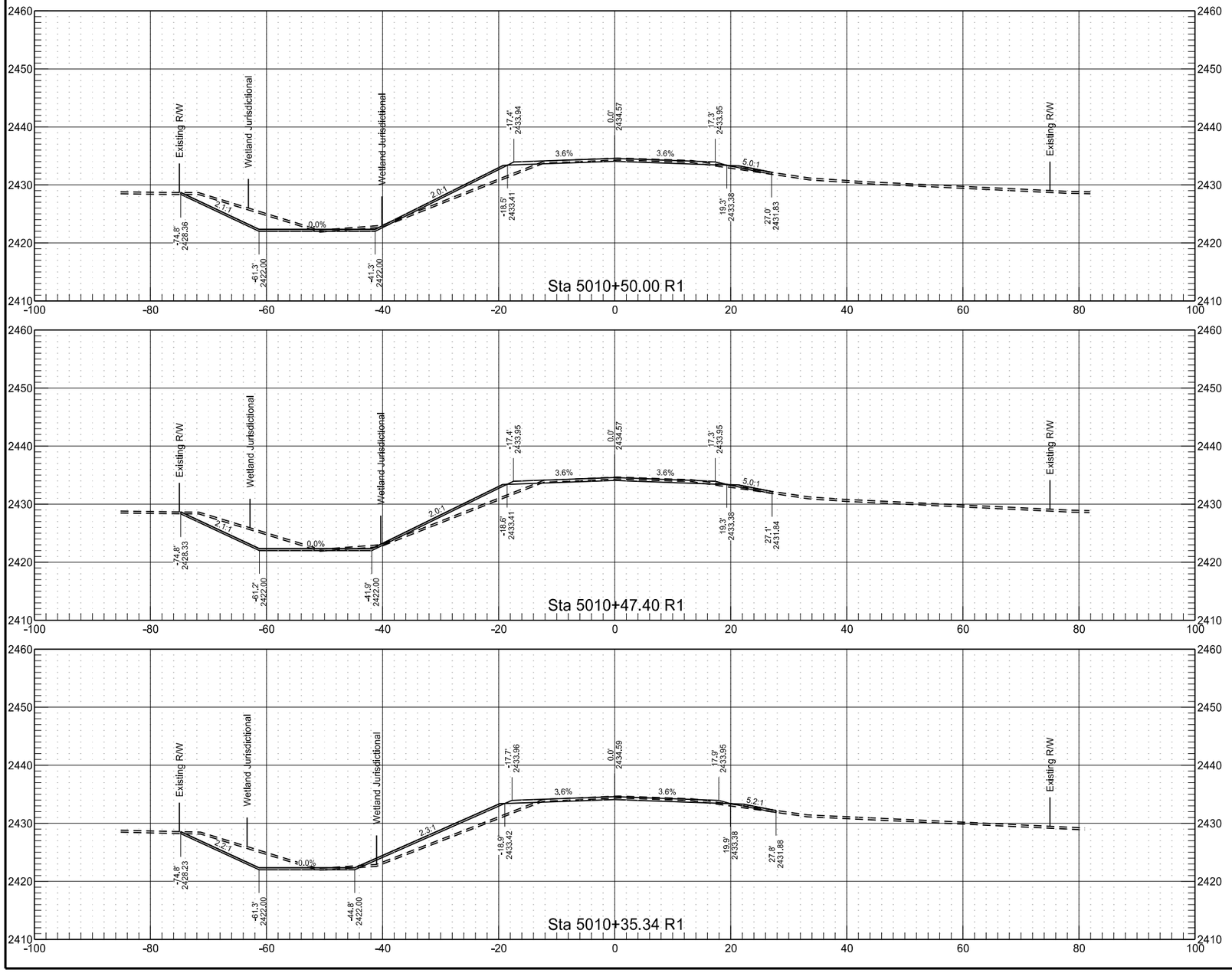






Site 6

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	200	10



Site 6

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEC-0004(202)	200	11