DESIGN DATA				
Traffic	Average Daily			
Current 2021	Pass: 240	Trucks: 135	Total: 375	
Preventive Maintenance				

	STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
	ND	SS-5-016(031)111	23485	1	1

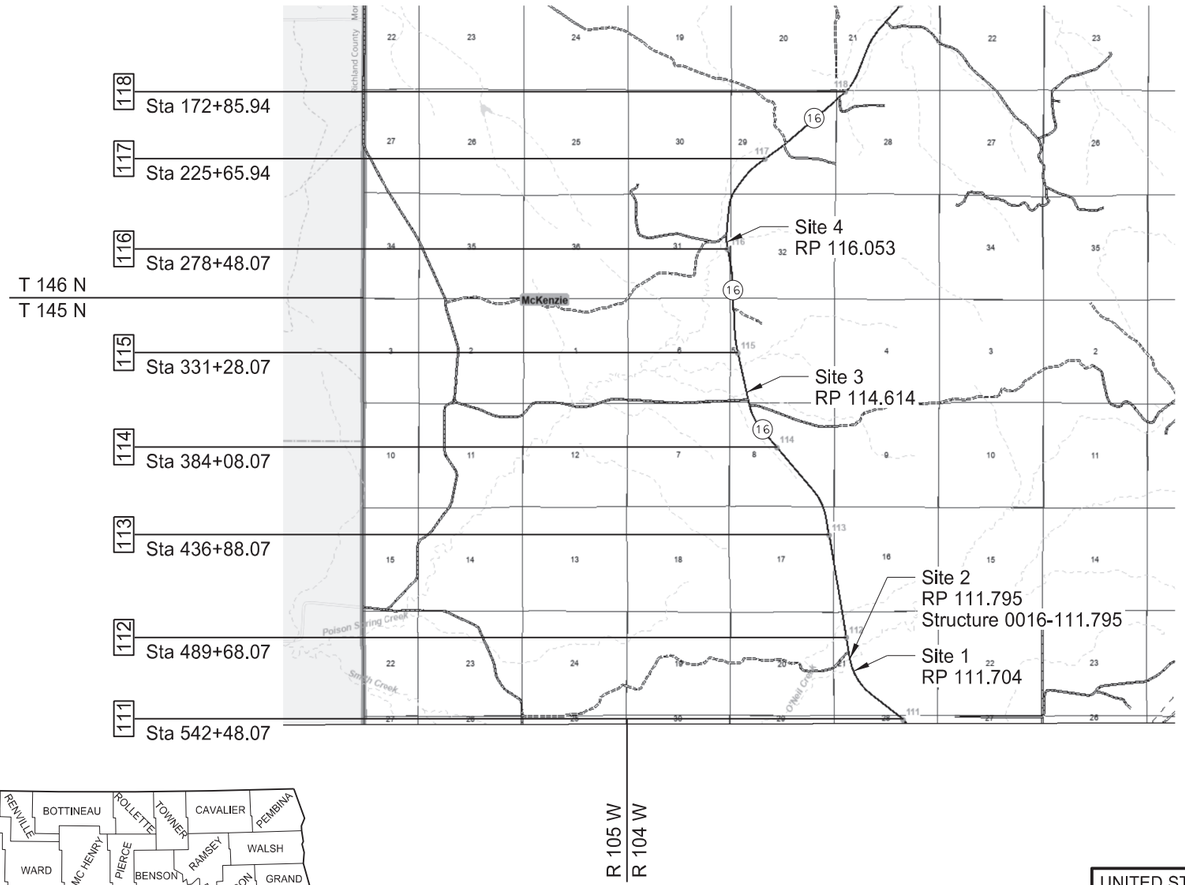
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

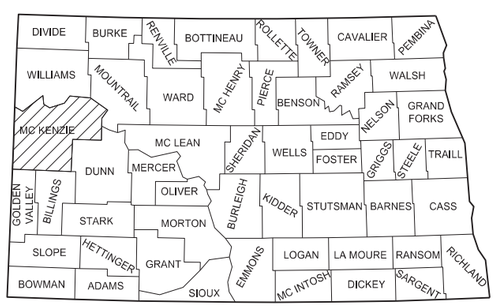
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McKenzie County
Culvert Rehab - RP 111.704, 111.795, 114.614 , and 116.053
39 Miles N. of Beach
Embankment & Erosion Control

GOVERNING SPECIFICATIONS	Date Published and Adopted by the North Dakota Department of Transportation
Standard Specifications	07/1/2025
Supplemental Specifications	NONE

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
SS-5-016(031)111	0.758	4.349





STATE COUNTY MAP

DESIGNER
Alex Spady

UNITED STATES FOREST SERVICE
CURTIS GRUDNIEWSKI
Digitally signed by CURTIS GRUDNIEWSKI
Date: 2026.03.12 07:55:14 -06'00'

ND DEPARTMENT OF TRANSPORTATION
OFFICE OF PROJECT DEVELOPMENT
Kirk Hoff
03/16/26

NDDOT DESIGN DIVISION

REGISTERED PROFESSIONAL ENGINEER
MICHAEL E. JOHNSON
PE-6389
DATE 03/12/26
NORTH DAKOTA

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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PLAN SECTIONS

Section	Page(s)	Description
1	1	Title Sheet
2	1	Table of Contents
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6	4	Environmental Notes
8	1 - 2	Quantities
10	1	Basis of Estimate
20	1 - 14	General Details
30	1	Typical Sections
51	1	Allowable Pipe List
75	1 - 4	Wetland Impacts
76	1 - 3	Temporary Erosion Control
77	1 - 3	Permanent Erosion Control
80	1 - 3	Layouts
81	1	Survey Coordinate and Curve Data
82	1	Survey Data Layouts
100	1	Work Zone Traffic Control
175	1	Soil Boring Logs
200	1 - 12	Cross Sections

LIST OF STANDARD DRAWINGS

Number	Description
D-101-1, 2, 3, 4	NDDOT Abbreviations
D-101-10	NDDOT Utility Company and Organization Abbreviations
D-101-20, 21	Line Styles
D-101-30, 31, 32, 33	Symbols
D-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, 11A	Construction Sign Details - Warning Signs
D-704-13	Barricade And Channelizing Device Details
D-704-14	Construction Sign Punching And Mounting Details
D-704-15	Road Closure Layouts
D-704-16	Lane Closure On A Two Lane Road Using Traffic Control Signals
D-704-17	Sign Layout For One Lane Closure Two Lane Roadway
D-704-22	Construction Truck And Temporary Detour Layouts
D-704-24	Shoulder Closures And Bridge Painting Layouts
D-704-33	Two-Lane Roadway Portable Rumble Strips
D-704-50	Portable Sign Support Assembly
D-714-1	Reinforced Concrete Pipe Culverts And End Sections (Round Pipe)
D-714-4	Round Corrugated Steel Pipe Culverts And End Sections
D-714-22	Concrete Pipe, Cattle Pass, or Precast Concrete Box Culvert Ties
D-714-28	Transverse Mainline Pipe Installation Detail for Pipes Installed in New Embankment Areas
D-752-1	Standard Barbed Wire Fence
D-754-83	Object Markers - Culverts
D-772-6	Span Wire Mounted Traffic Signals

SPECIAL PROVISIONS

Number	Description
SSP 2	Federal Migratory Bird Treaty Act
PSP 2	Permits and Environmental Considerations
SP 390(25)	Machine Hygene
SP 391(25)	Temporary Water Diversion
SP 392(25)	Fire Protection and Suppression
SP 393(25)	Utility Coordination

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MCKENZIE COUNTY

Sec 21
T-145-N
R-104-W

Site 1

Site 2

5905+01 - 90' Lt to W end
5905+08 - 83' Rt to E end
108" X 173' Elliptical SPP (good, skew)

5908+05 - 55' Lt
18" x 112' CSP (good)
CSFES (poor)

42" CSP Pipe Extension 56'

Fill voids at existing headwall

Riprap around existing headwall

5900+00

5905+00

5910+00

US Forest Service

Existing R/W

Rebuild Berm

24" RCP?

30" RCP

Dirt

Gr

140'

100'

120'

100'

100'

100'

O'NEIL CREEK

Legend

Work Area

Proposed Riprap

R/W

Proposed R/W

Scope of Work

ND 16
Site 1 & 2

CHAD FRISINGER
REGISTERED
PROFESSIONAL
PE-4876
07/03/24
ENGINEER
NORTH DAKOTA

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MCKENZIE COUNTY

Sec 8
T-145-N
R-104-W

Sec 5
T-145-N
R-104-W

33'

33'

Sec line

6050+00

6055+00

6060+00

6050+43 - 51' Lt
18" x 80' CSP (fair)
2 CSFES (fair)

US Forest Service

Existing R/W

OH

FO

Rebuild foreslope

Existing R/W

US Forest Service

6050+23 - 54' Rt
18" x 90' CSP (fair)
2 CSFES (fair)

6053+93 - ℄
94' Rt to E end
84" x 160' RCP (fair)
2 RCFES (fair)

Legend

Work Area

Proposed Riprap

R/W

Proposed R/W

Scope of Work

ND 16
Site 3

CHAD FRISINGER
REGISTERED
PROFESSIONAL
ENGINEER
NORTH DAKOTA
PE-4876
07/03/24

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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MCKENZIE COUNTY

Avoidance Area
Sta 6134+22
289 ft LT
RP 116.118

Avoidance Area
Sta 6132+12
180 ft LT
RP 116.078

Trees & Brush Remain

6130+00

6135+00

Replace 6' pipe segment of 72" RCP
& Extend 72" RCP 20'

Fill in washout with borrow

Remove & relay pipe

6125+00

US Forest Service

Existing R/W

100'

100'

Existing R/W

Sec Line

Legend

Work Area

Proposed Riprap

R/W

Proposed R/W

Scope of Work

ND 16
Site 4

CHAD FRISINGER
REGISTERED
PROFESSIONAL
PE-4876
07/03/24
ENGINEER
NORTH DAKOTA

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NOTES

105-P01 WORK HOURS: For Site 3 (RP 114.614), begin work 3 hours after sunrise from March 1 to June 15 as described in EN-4 SHARP-TAILED GROUSE LEK.

105-P02 UTILITIES: No utility relocations or adjustments are planned. Protect all utilities in place at their existing location.

107-P01 PAVEMENT SWEEPING: Sweep the roadway adjacent to the construction areas used by construction equipment before opening to public traffic as directed by the Engineer.

109-P01 PAY PLAN QUANTITY: The Engineer will pay plan quantity for the following items and field measurements will not be taken.

203-0103 COMMON EXCAVATION – TYPE C
203-0119 TOPSOIL-IMPORTED
251-0300 SEEDING CLASS III
251-1000 WETLAND SEED
251-2000 TEMPORARY COVER CROP
900-0700 FLEXIBLE GROWTH MEDIUM

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

203-P01 BORROW: If the Engineer and Contractor agree, plan quantity will be used as the measurement for payment for “Borrow - Excavation”.

203-P02 COMPACTION AND DENSITY CONTROL: Compact material as specified in Section 203.04 G.3, Compaction Control, Type B. Use a jumping jack compactor in areas accessible for the sheepsfoot roller.

251-P01 SEEDING CLASS III: Due to steep sloped areas, double the application rate for the Class III seed mixture. Apply the seed using a seed drill as specified in 251.02 A or with the use of a broadcast seed spreader.

251-P02 ORDER OF OPERATIONS FOR SEEDING: Due to the spring seeding restriction for Seeding Class III, perform seeding as follows:

Year 1 – After June 15, 2027:

- Seed temporary cover crop and place erosion control in disturbed areas as shown in Sec 76.

Year 2 – Prior to June 15, 2028:

- Seed Class III and place erosion control in newly disturbed areas as shown in Sec 77.

- In areas seeded in Year 1 after June 15th, seed Class III and place erosion control as shown in Sec 77.

In areas not designated for ECB or TRM, seed Class III through the established vegetation and bonded fiber.

In areas designated for ECB or TRM, prepare the seedbed in accordance with NDDOT Specification 251.04.A, “General” and 251.04.B, “Seedbed Preparation”. Cultivate or disc all areas, even if the temporary cover crop has achieved greater than 25% vegetative coverage. Seed Class III and install permanent erosion and sediment control measures as shown in Section 77.

Include all costs for additional work for seedbed preparation, as described above, in the price bid for “Seeding Class III”.

251-P03 SEEDING CLASS III: Use the following seed mix for all permanent seeding. Include the cost for seeding in the contract unit price bid for “SEEDING CLASS III.”

	Species	Variety	PLS (lb./acre)
Grasses	Canada Wildrye (c)	Mandan	2.8
	Green Needlegrass (c)	Lodorm	2.4
	Western Wheatgrass (c)	Rodan	4.9
	Blue Grama (w)	Bad River	0.3
	Prairie Sandreed (w)	Goshen	0.8
	Little Bluestem (w)	Badlands	0.8
	Sideoats Grama (aw)	Pierre	1.2
Forbs	Purple Prairieclover	Local	0.25
	or		
	White Prairieclover	Antelope	0.3
	Stiff Sunflower	Bismarck	0.7
	or		
	Stiff Goldenrod	Local	0.1
	Purple Coneflower	Bismarck	0.5
	or		
	Prairie Coneflower	Local	0.1
	Totals	Forbs	13.4
		Alternate Forbs	12.5

(c) - cool season
(w) - warm season
(aw) - alternate warm season (for one warm season species)

If any of the species or varieties are not available, contact Environmental and Transportation Services (ETS) Section (701-328-2592) for a replacement. Plant the Class III seed mix between May 1st and June 15th.

REGISTERED PROFESSIONAL ENGINEER
SARA A. CAHLIN
PE-8397
DATE 10/15/26
NORTH DAKOTA

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NOTES

251-P04 TEMPORARY COVER CROP: In the steep sloped areas, apply the temporary cover crop using a seed drill as specified in 251.02 B or with the use of a broadcast seed spreader.

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

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

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

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

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

Use in conjunction with Standard Drawings D-704-16 and 17 when the contractor has the option of selecting the method of traffic control for the lane closure.

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

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

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

Install PRS that meet the following criteria:

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

Use individual PRS constructed in one of the following manners:

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

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

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

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

704-P01 TRAFFIC CONTROL DEVICES: Provide traffic control consisting of a shoulder closure, lane closure and flagging. The traffic control device quantities are based on two shoulder closures, one lane closure and one temporary road closure. The developed list uses the Standard Drawings for traffic control:

D-704-15 Type A for delivering materials and equipment

D-704-16 & D-704-17 for Site 4 pipe repairs. At centerline, place stackable vertical panels in place of the portable precast concrete median barriers and attenuation devices. Lane closure to remain until foreslopes are at finished grade.

D-704-22 Type K and Type L for construction trucks hauling material

D-704-24, Type U for Shoulder Closure

704-P02 TRAFFIC CONTROL: The traffic control devices list has been developed using the traffic control layout sheets and the list below:

D-704-16 or 17: For Site 4 pipe repairs. At centerline, place stackable vertical panels in place of the portable precast concrete median barriers and attenuation devices.

714-P01 PIPE WORK: The joints at the Site 4 (Sta 116.053) are untied and have separated. Install adjustable concrete pipe tie bolts to prevent further joint separation. Some pipe ties will have to be installed internally where the existing pipe is in earthen embankment. These pipe ties are required to be epoxied in place since no exterior fasteners can be installed. Drill and epoxy two pipe ties per joint.

Provide dewatering for remove and reset pipe at Site 4 if necessary, according to site conditions.

The cost of all equipment, labor, filling of the void areas, dewatering, and placing internal pipe tie bolts is included in the price bid for “Remove & Relay Pipe – All Types & Sizes”.

714-P02 CULVERT TIES: Tie culvert joints on all pipe extensions, and any pipe removed and reset in accordance with D-714-22. Include all cost for labor, materials, and equipment in the

REGISTERED PROFESSIONAL ENGINEER
SARA A. CAHLIN
PE-8397
DATE 10/15/26
NORTH DAKOTA

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NOTES

contract unit price bid for “Remove & Relay Pipe - All Types & Sizes”.

752-P01 TEMPORARY FENCE: Install 4 strand barbed wire temporary fencing prior to removing existing fencing. Install temporary fencing around temporary construction easements where existing fence is removed until permanent fencing is in place. Field fit temporary fencing in areas of deep draws or wooded areas, with the approval of the Engineer. Verify the need for temporary fence with the landowner. The cost to install and remove temporary fencing is included in the price bid for “Temporary Fence”.

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

900-P01 FLEXIBLE GROWTH MEDIUM: Use one of the following Flexible Growth Medium products:

Profile Flexterra HP-FGM
Mat Inc. Flex Guard
EarthGuard FM

If requested to the Engineer, Environmental & Transportation Services will review other manufacturers’ products.

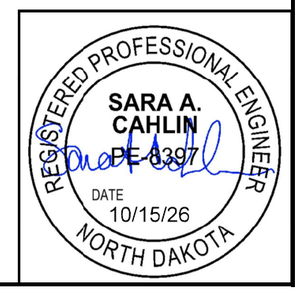
Apply Flexible growth medium (FGM) with hydraulic seeding equipment using a hose and a 50° nozzle. Apply FGM from opposing directions to assure 100% soil coverage. Apply FGM at a rate of 3000-3500 lbs/acre.

Include all costs associated with installation FGM areas in the unit price bid for “Flexible Growth Medium.”

930-P01 SHORING: Temporary shoring is required as shown on the plans for the pipe repair and extension on the west side of Site 4. The Contractor is responsible to design, construct, maintain, and remove the temporary shoring. Install the temporary shoring prior to excavation for the pipe repair and extension. Backfill the pipe to the proposed cross sections and remove the temporary shoring.

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

Include all labor, equipment, and material needed for this work in the bid item, "Shoring".



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ENVIRONMENTAL NOTES

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

EN-1 AVOIDANCE AREAS: The Project Engineer will contact Reilly Lembo of the Environmental and Transportation Services Division to coordinate any meetings needed to identify the limits of both avoidance areas. Avoidance area 1 is located at Sta. 6132+12 (RP 116.078) and is 180 ft Lt of the roadway centerline. Avoidance area 2 is located at Sta. 6134+22 (RP 116.118) and is 289 ft Lt of the roadway centerline. The avoidance areas must not be disturbed.

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

EN-3 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 SHARP-TAILED GROUSE LEK: To minimize potential impacts on sharp-tailed grouse breeding habitat identified near RP 114.614 (Site 3), all construction activity adjacent to the assumed active lek site would be suspended for the first three hours of daylight beginning at sunrise for the time period of March 1 to June 15.

REGISTERED PROFESSIONAL ENGINEER
SARA A. CAHLIN
PE-8397
DATE 10/15/26
NORTH DAKOTA

ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
103	0100	CONTRACT BOND	L SUM	0.47	0.47
202	0169	REMOVAL OF END SECTION-ALL TYPES & SIZES	EA	1	1
202	0312	REMOVE EXISTING FENCE	LF	1,641	1,641
203	0103	COMMON EXCAVATION-TYPE C	CY	220	220
203	0119	TOPSOIL-IMPORTED	CY	229	229
203	0140	BORROW-EXCAVATION	CY	2,014	2,014
216	0100	WATER	M GAL	48	48
251	0300	SEEDING CLASS III	ACRE	2.51	2.51
251	1000	WETLAND SEED	ACRE	0.06	0.06
251	2000	TEMPORARY COVER CROP	ACRE	2.57	2.57
255	0102	ECB TYPE 2	SY	347	347
255	0202	TRM TYPE 2	SY	213	213
256	0200	RIPRAP GRADE II	CY	177	177
256	0300	RIPRAP GRADE III	CY	334	334
261	0112	FIBER ROLLS 12IN	LF	7,070	7,070
261	0113	REMOVE FIBER ROLLS 12IN	LF	3,670	3,670
702	0100	MOBILIZATION	L SUM	0.47	0.47
704	0100	FLAGGING	MHR	200	200
704	1000	TRAFFIC CONTROL SIGNS	UNIT	1,820	1,820
704	1018	LANE CLOSURE-SIGNAL CONTROL/FLAGGING CONTROL	EA	1	1
704	1048	PORTABLE RUMBLE STRIPS	EA	2	2
704	1052	TYPE III BARRICADE	EA	2	2
704	1060	DELINEATOR DRUMS	EA	18	18
704	1067	TUBULAR MARKERS	EA	40	40
704	1080	STACKABLE VERTICAL PANELS	EA	11	11
709	0155	GEOSYNTHETIC MATERIAL TYPE RR	SY	511	511
714	1510	PIPE CONC REINF 72IN CL III	LF	26	26
714	5050	PIPE CORR STEEL .064IN 42IN	LF	56	56
714	5835	END SECT CORR STEEL .109IN 42IN	EA	1	1
714	9659	REMOVE & RELAY PIPE-ALL TYPES & SIZES	LF	46	46
714	9660	REMOVE & RELAY END SECTION-ALL TYPE & SIZES	EA	2	2
714	9900	INSTALL CONCRETE PIPE TIES	SET	1	1
752	0200	FENCE BARBED WIRE 4 STRAND	LF	1,567	1,567

ESTIMATE NUMBER: 24013 ESTIMATE TYPE: FINAL FINALIZED: Y RUN DATE: 07/03/2024 TIME: 13:54:01

ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-5-016(031)111	8	2

SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
752	0905	TEMPORARY FENCE	LF	2,048	2,048
752	3140	CORNER ASSEMBLY BARBED WIRE	EA	12	12
752	4100	DOUBLE BRACE ASSEMBLY BARBED WIRE	EA	4	4
762	0420	SHORT TERM 4IN LINE-TYPE R	LF	2,700	2,700
762	0426	SHORT TERM 24IN LINE-TYPE R	LF	24	24
900	0700	FLEXIBLE GROWTH MEDIUM	SY	24,323	24,323
900	1000	TEMPORARY STREAM DIVERSION	EA	1	1
902	0400	MACHINE HYGIENE	L SUM	0.47	0.47
910	0900	GROUT	CF	20	20
930	8230	SHORING	EA	1	1

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Earthwork Locations	Common Excavation - Type C (CY)	Embankment (CY)	Borrow - Excavation (CY)	Imported Topsoil (CY)
Site 1 & 2 - RP 111.704 & RP 111.795	220	1708	1488	145
Site 3 - RP 114.614	0	307	307	49
Site 4 - RP 116.053	0	219	219	35
Totals	220	2234	2014	229

Water
25 MGal/Mile for Dust Pallative
1 mile * 25 Mgal = 25 Mgal
10 Gal/CY for Embankment
(2234 CY * 10 Gal/CY)/1000 Gal/Mgal = 23 Mgal

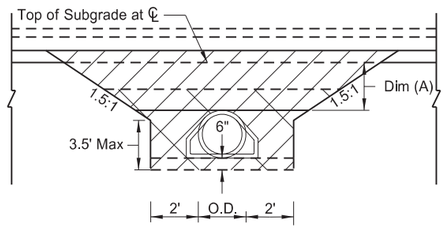
Basis of Estimate

ND 16

CHAD FRISINGER
REGISTERED
PROFESSIONAL
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ENGINEER
NORTH DAKOTA

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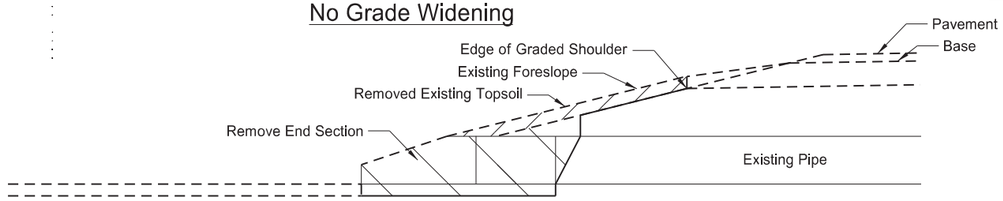
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Removal Detail

Side View

No Grade Widening

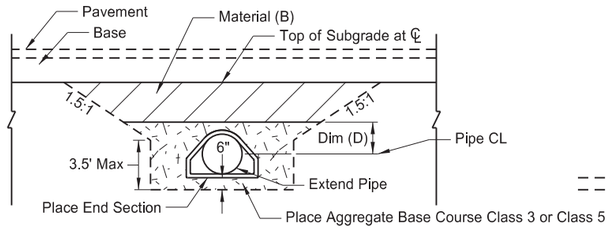


Removal Section

Cross Section View

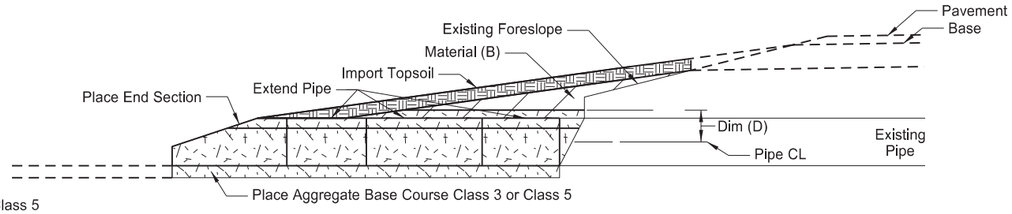
Pay Items
1) Pipe*
2) Remove & Reset End Section or
Remove End Section and Place New End Section

*Included in Pipe Pay Item
1) Pipe
2) Aggregate Base Course Class 3 or Class 5
3) Embankment
4) Topsoil
5) Seeding
6) Mulch



Backfill Detail

Side View (Topsoil not shown)



Proposed Section

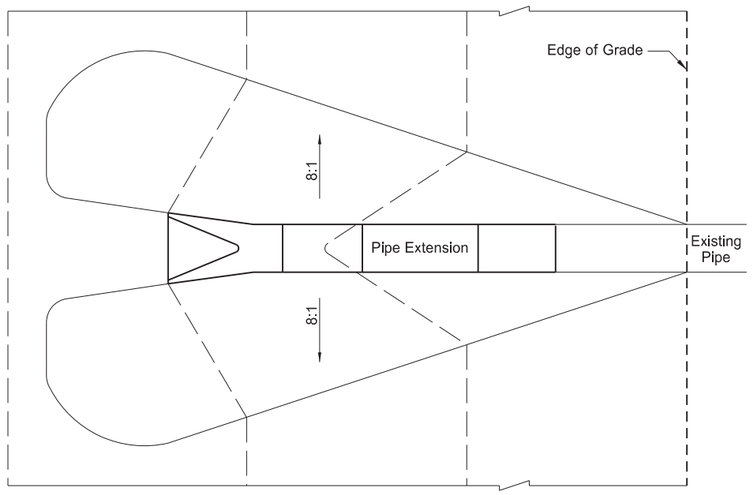
Cross Section View

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

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

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

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



Proposed Section

Plan View

Mainline Centerline Pipe Extension Detail

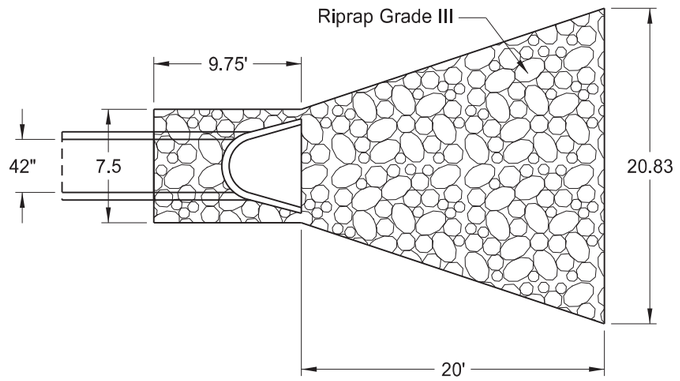
ND 16
Site 1 & 4

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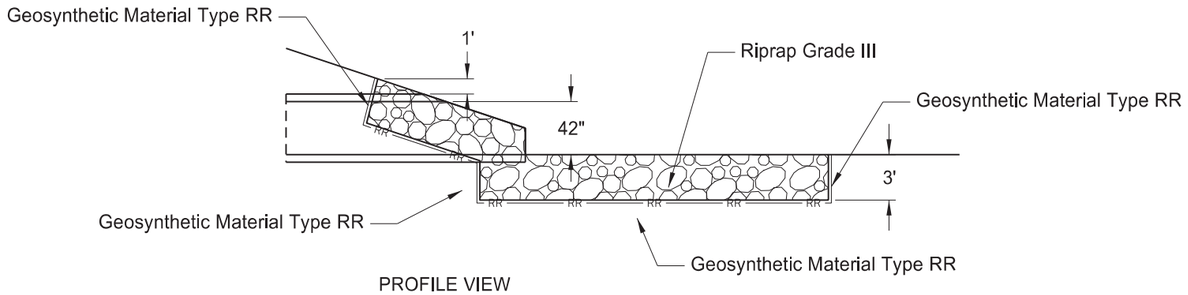
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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-016(031)111	20	2

*Quantities in Section 77



PLAN VIEW



PROFILE VIEW

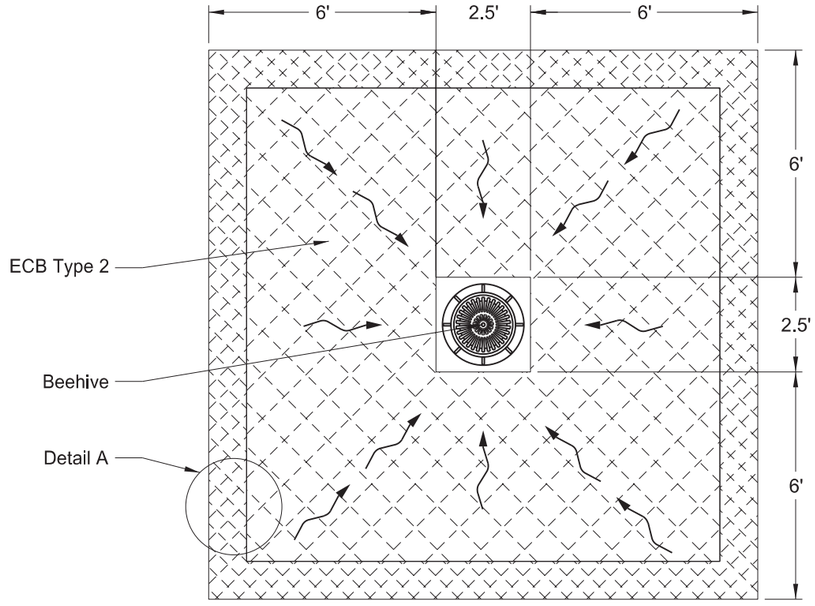
Riprap at Pipe Outlet

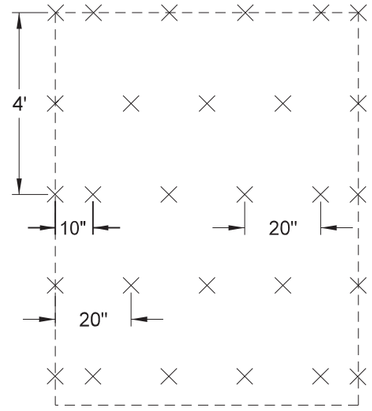
ND 16
Site 1

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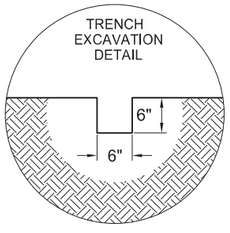
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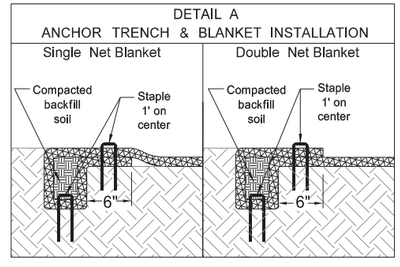
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	ND	SS-5-016(031)111	20	3

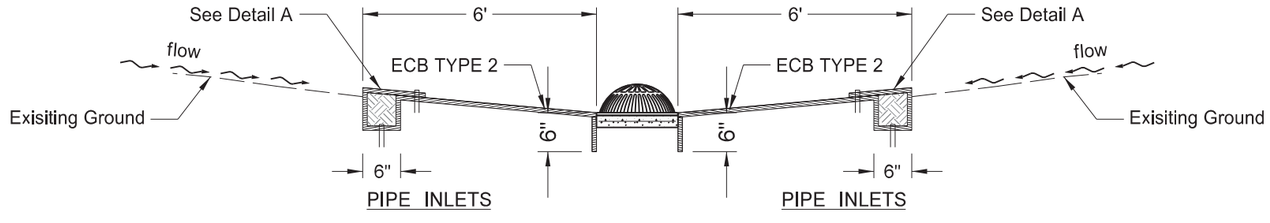




STAPLE PATTERN







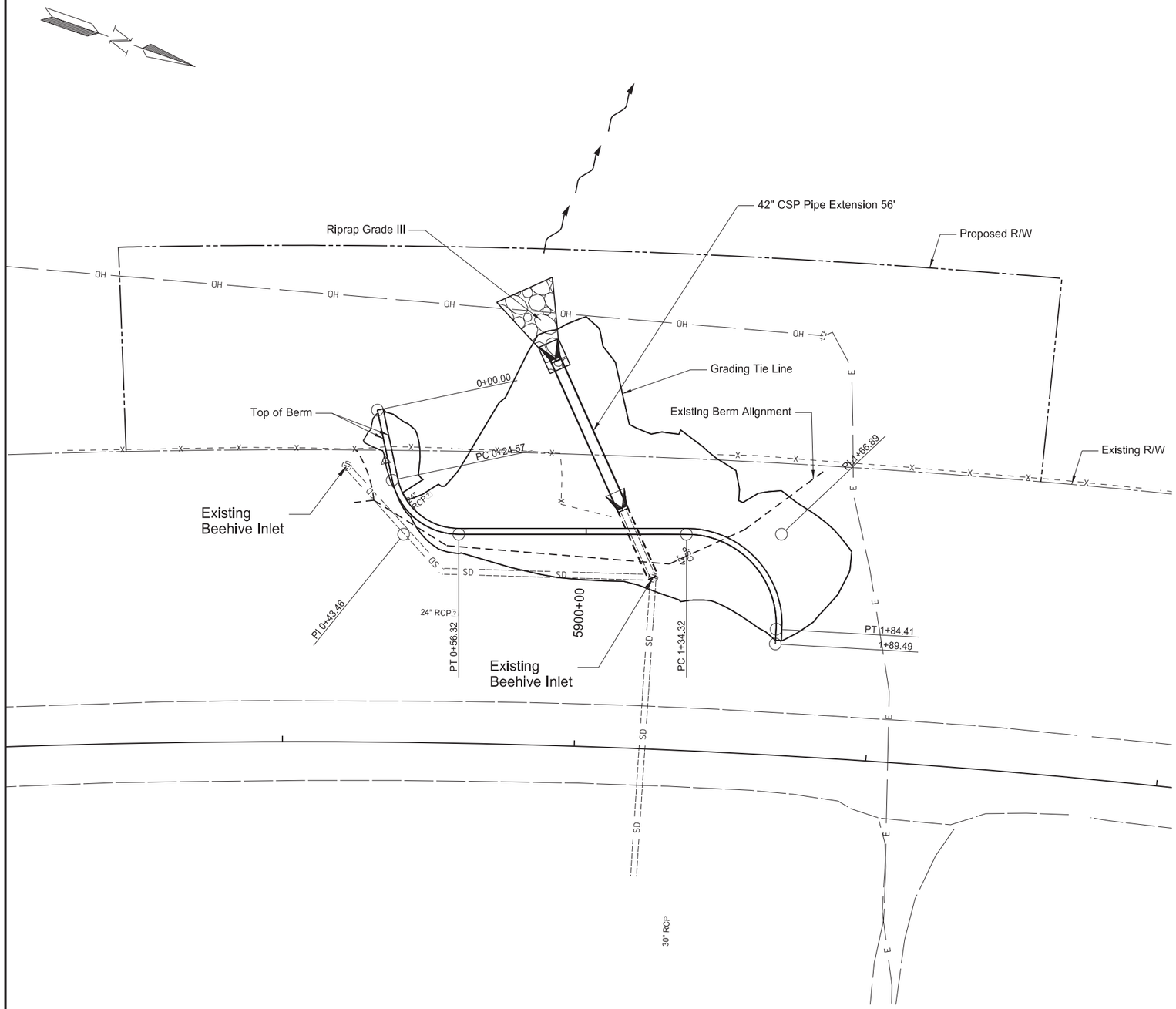
Erosion Control at Beehive

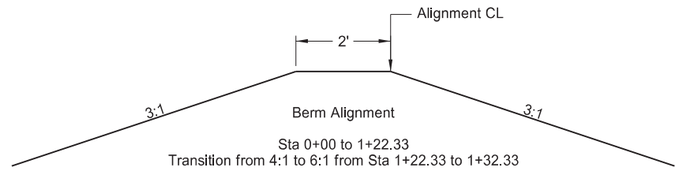
ND 16
Site 1

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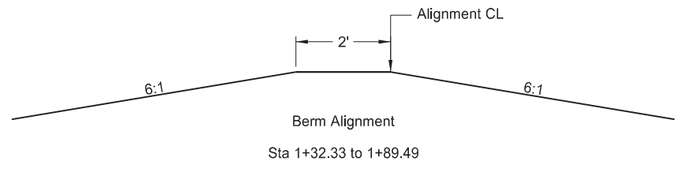
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Sta 0+00 to 1+22.33
Transition from 4:1 to 6:1 from Sta 1+22.33 to 1+32.33



Sta 1+32.33 to 1+89.49

Berm Detail

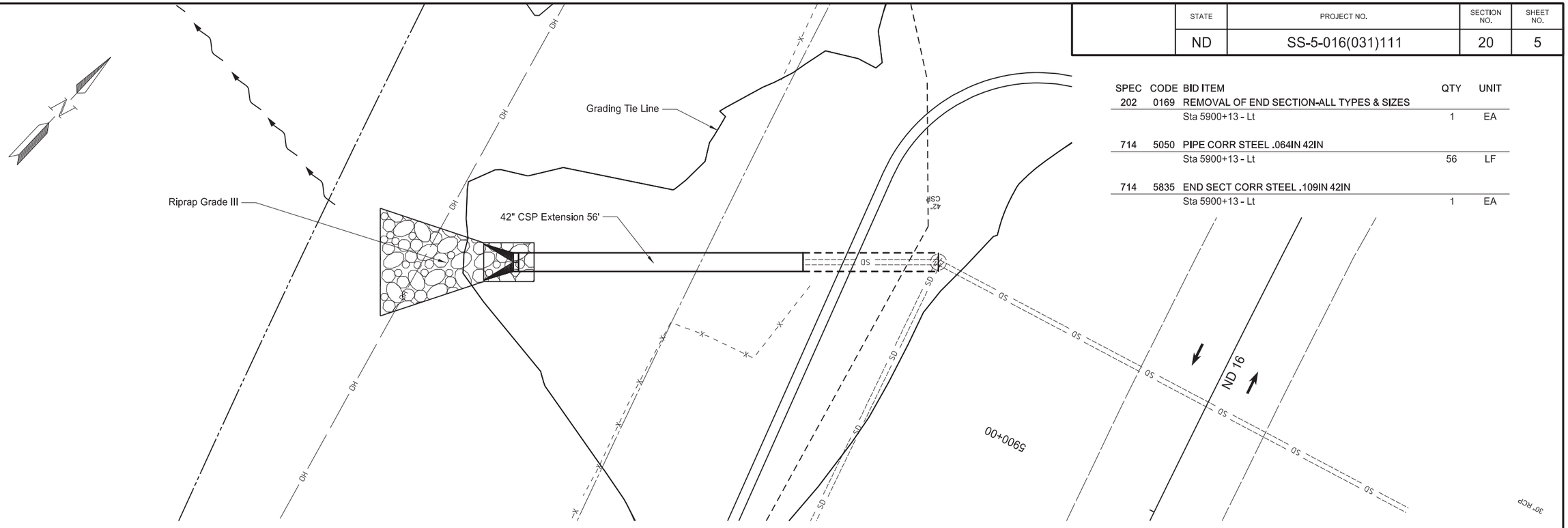
ND 16
Site 1

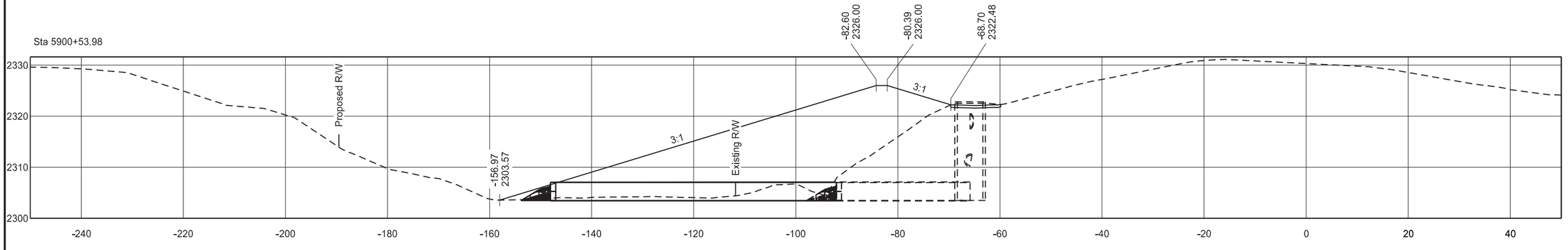
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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-016(031)111	20	5

SPEC	CODE	BID ITEM	QTY	UNIT
202	0169	REMOVAL OF END SECTION-ALL TYPES & SIZES		
		Sta 5900+13 - Lt	1	EA
714	5050	PIPE CORR STEEL .064IN 42IN		
		Sta 5900+13 - Lt	56	LF
714	5835	END SECT CORR STEEL .109IN 42IN		
		Sta 5900+13 - Lt	1	EA





Pipe Extension

ND 16
Site 1

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-016(031)111	20	6

SPEC	CODE	BID ITEM	QTY	UNIT
910	0900	GROUT		
		Sta 5905+04 - Lt	20	CF



Headwall Undermining
Site 2
Sta 5905+04



910-P01 GROUT: The west end of the Structural Plate Pipe (9' diameter) at Sta 5905+04 has a small amount of undermining between the SPP and existing concrete headwall. There is a void under the concrete headwall approximately 1' in depth, as well as some other smaller voids around the headwall. Remove loose material and vegetation from the voids. Place grout to fill the voids under the concrete headwall. Use a grout consisting of concrete, mortar or cementitious patching material approved by the Engineer. Fill the voids without causing disturbance or damage to the SPP and concrete headwall. Finish the exposed surface of the grout to provide a smooth even surface that will prevent further erosion or undermining at this location.

The actual size of void is not known. It is estimated that 20 CF of grout will be needed to fill the void. Grout will not be measured on the project and will be paid for as plan quantity. Include all costs of materials, equipment and labor to pressure grout the void in the price bid for "Grout".

Grout Detail

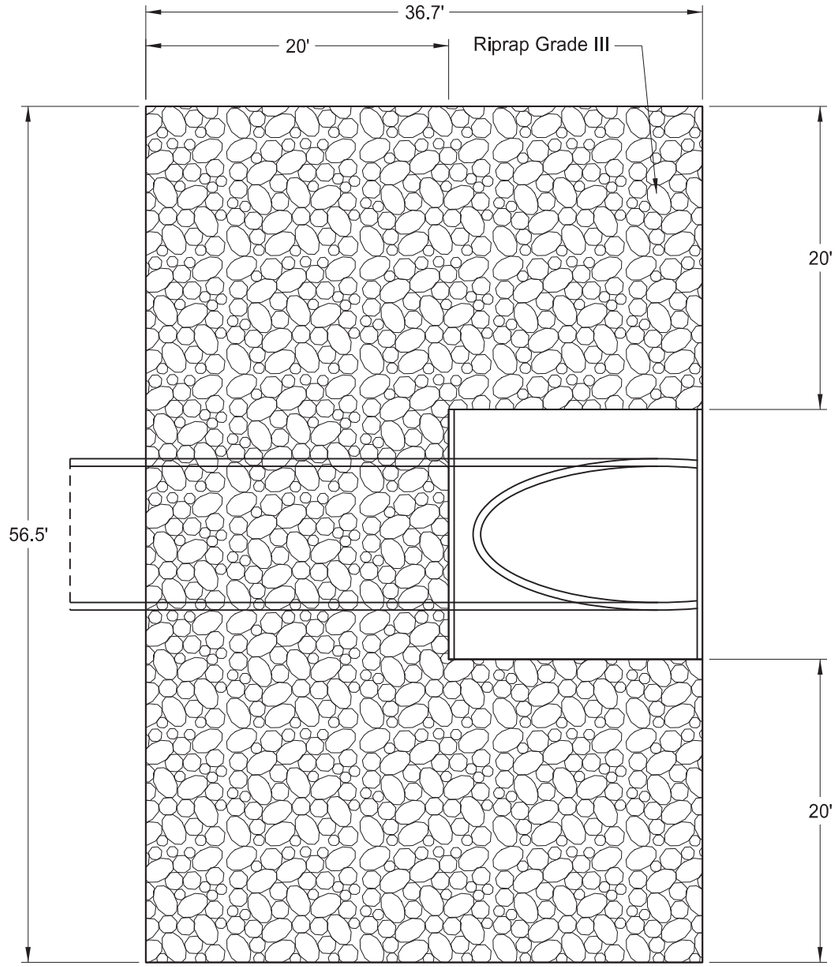
ND 16
Site 2

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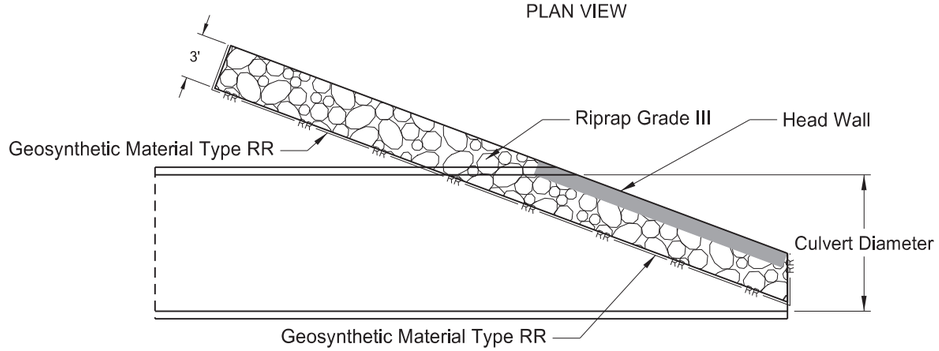
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*Quantities in Section 77



PLAN VIEW



PROFILE VIEW

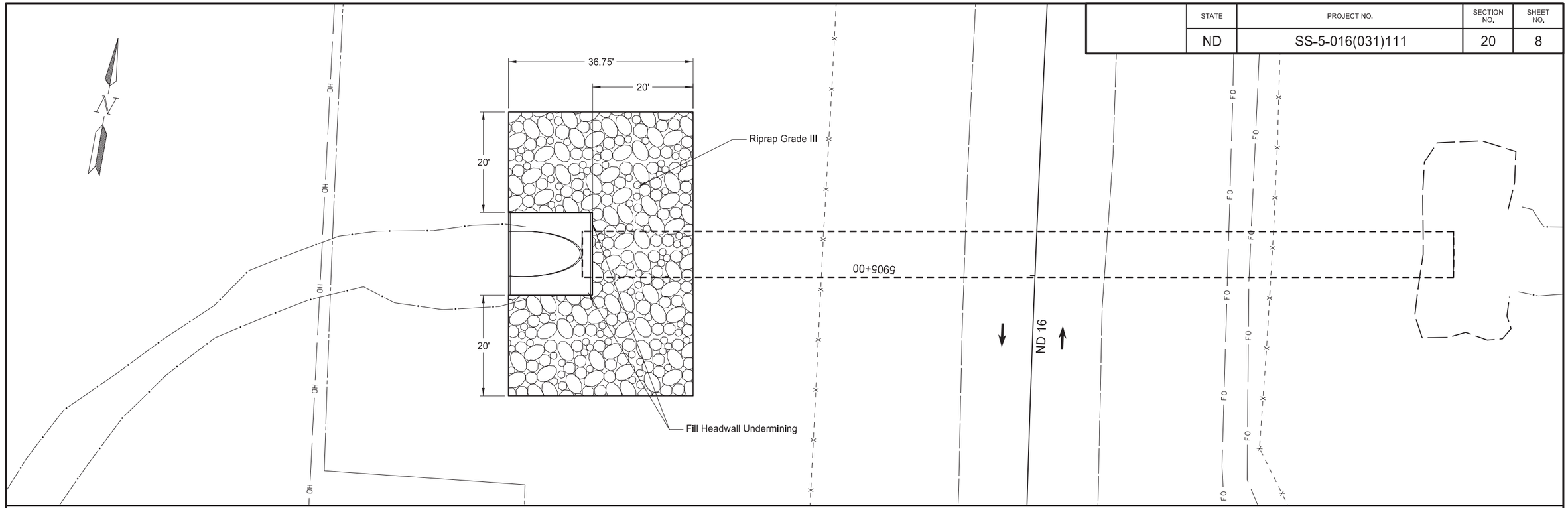
Riprap at Headwall

ND 16
Site 2

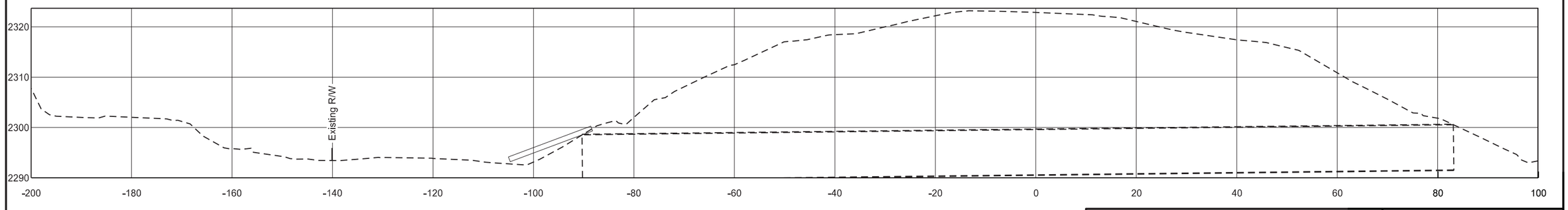
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Sta 5905+04.21



Riprap at Headwall

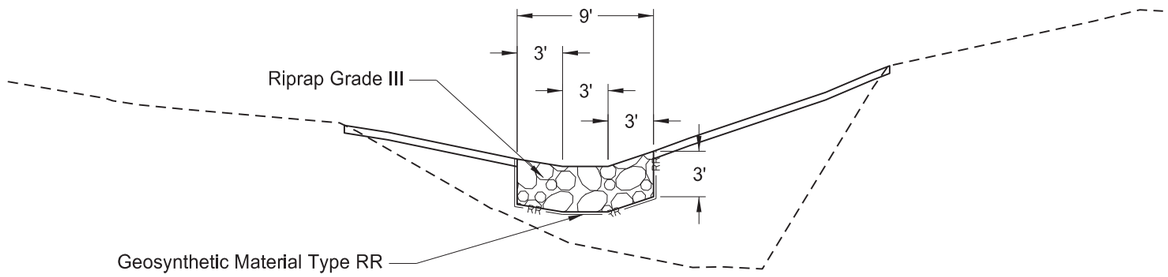
ND 16
Site 2

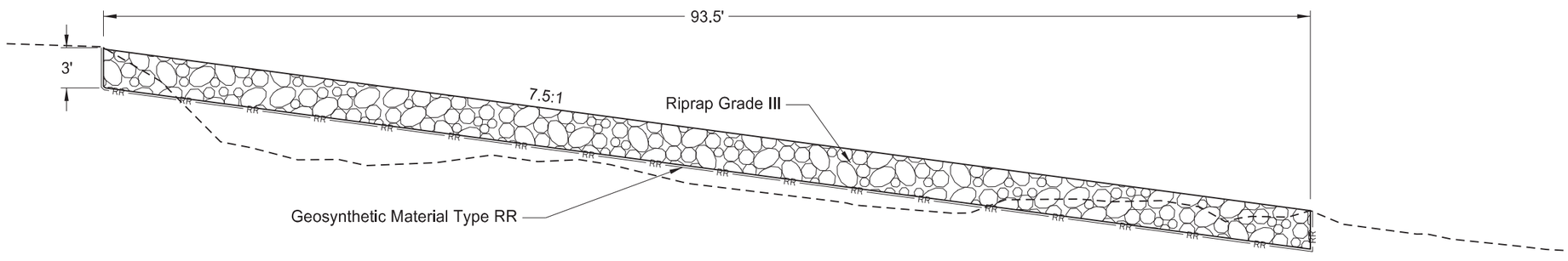
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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-016(031)111	20	9

*Quantities in Section 77





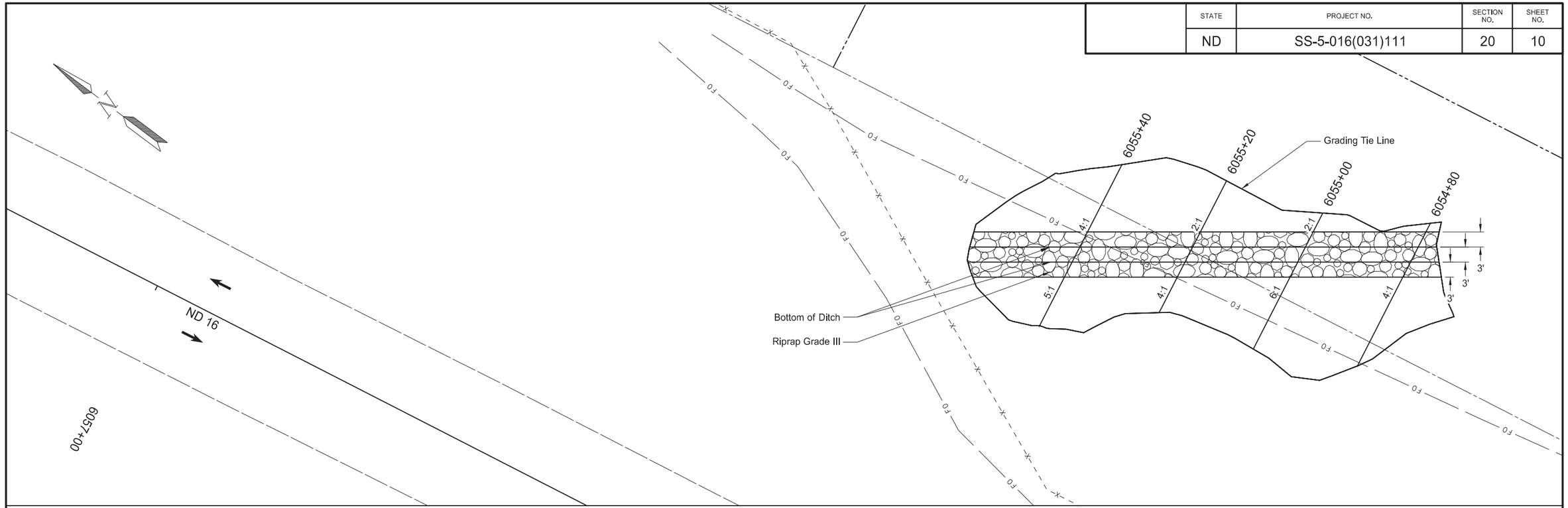
Riprap

ND 16
Site 3

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Ditch Detail

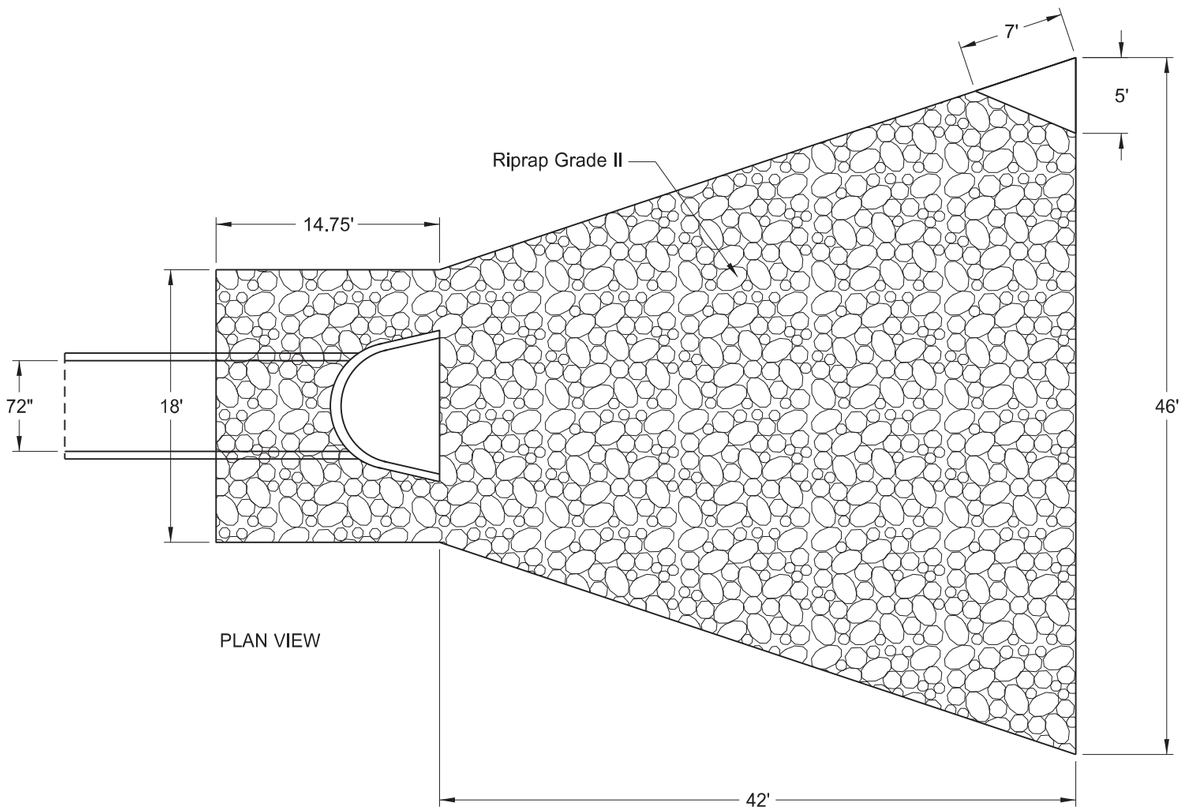
ND 16
Site 3

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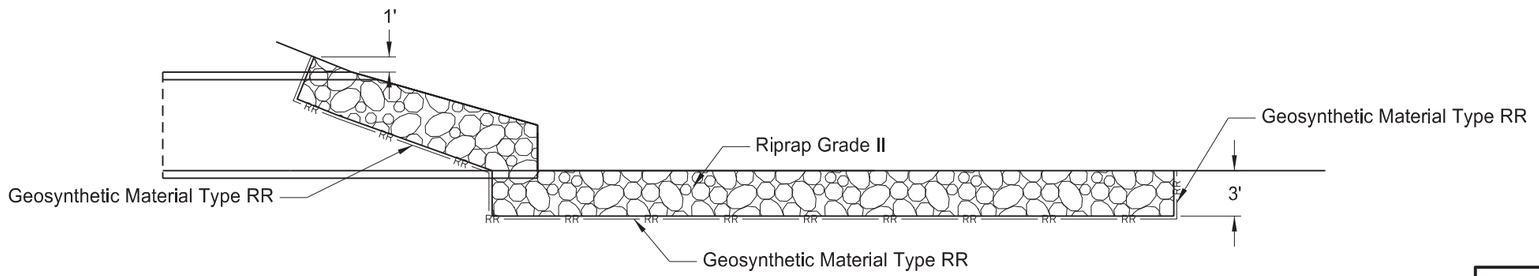
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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-016(031)111	20	11

*Quantities in Section 77



PLAN VIEW



PROFILE VIEW

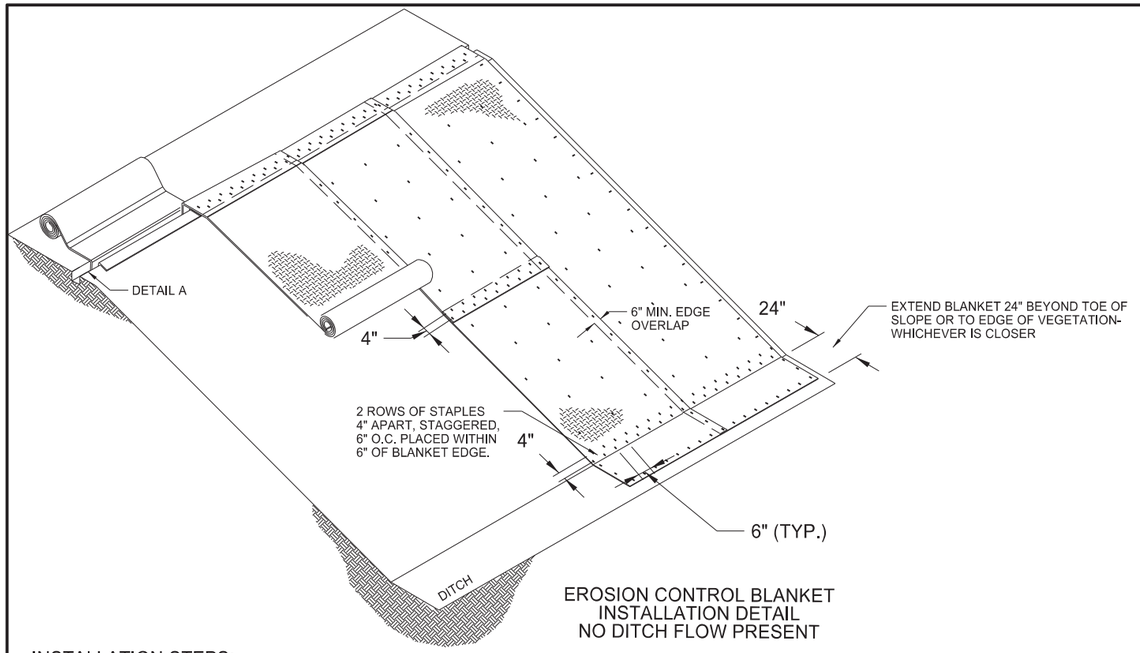
Riprap at Pipe Outlet

ND 16
Site 4

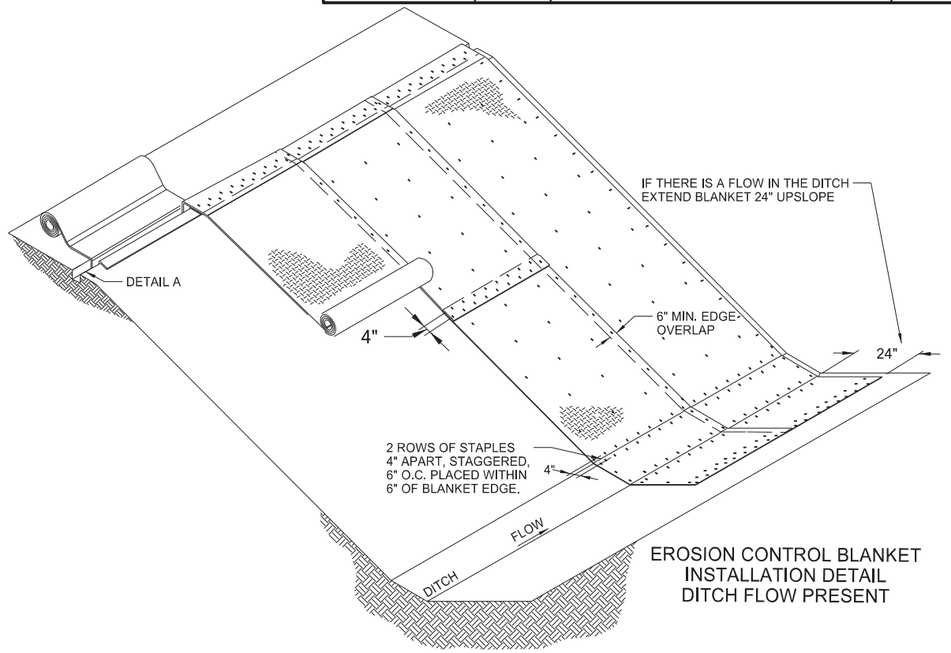
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NORTH DAKOTA

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-016(031)111	20	12



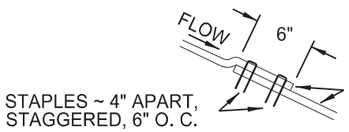
EROSION CONTROL BLANKET
INSTALLATION DETAIL
NO DITCH FLOW PRESENT



EROSION CONTROL BLANKET
INSTALLATION DETAIL
DITCH FLOW PRESENT

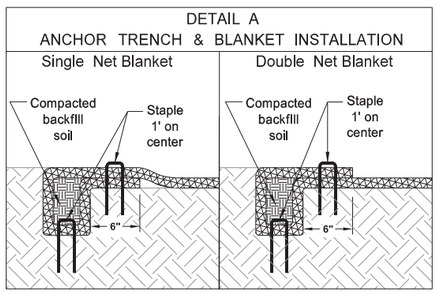
INSTALLATION STEPS:

1. Prepare smooth slope per spec. section 255
2. Amend soil and seed, as specified.
3. Dig anchor trench. Set aside native soil removed from trench.
4. Secure blanket in anchor trench, staking or stapling blanket as shown.
5. Replace native soil previously removed from trench.
6. Staple blanket as shown so there are no gaps between the blanket and the soil. Staple while unrolling blanket to minimize walking on blanket.
7. Install splices a minimum 24 inches prior to toe of slope.

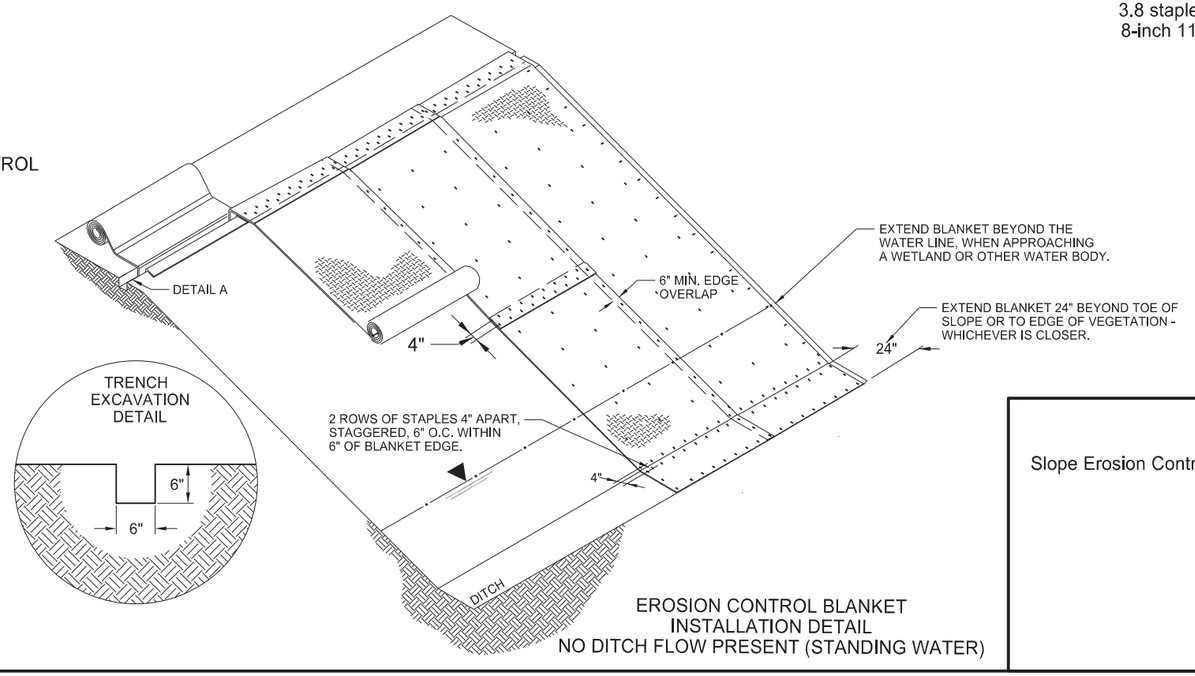


STAPLES ~ 4" APART, STAGGERED, 6" O. C.

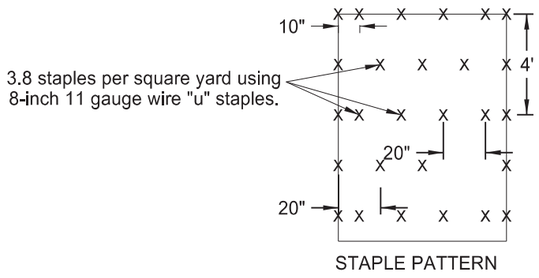
EROSION CONTROL BLANKETS



NOTE:
Install Single Net Blanket with netting on top of installed blanket.



EROSION CONTROL BLANKET
INSTALLATION DETAIL
NO DITCH FLOW PRESENT (STANDING WATER)



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

STAPLE PATTERN

Slope Erosion Control Blanket Installation Details

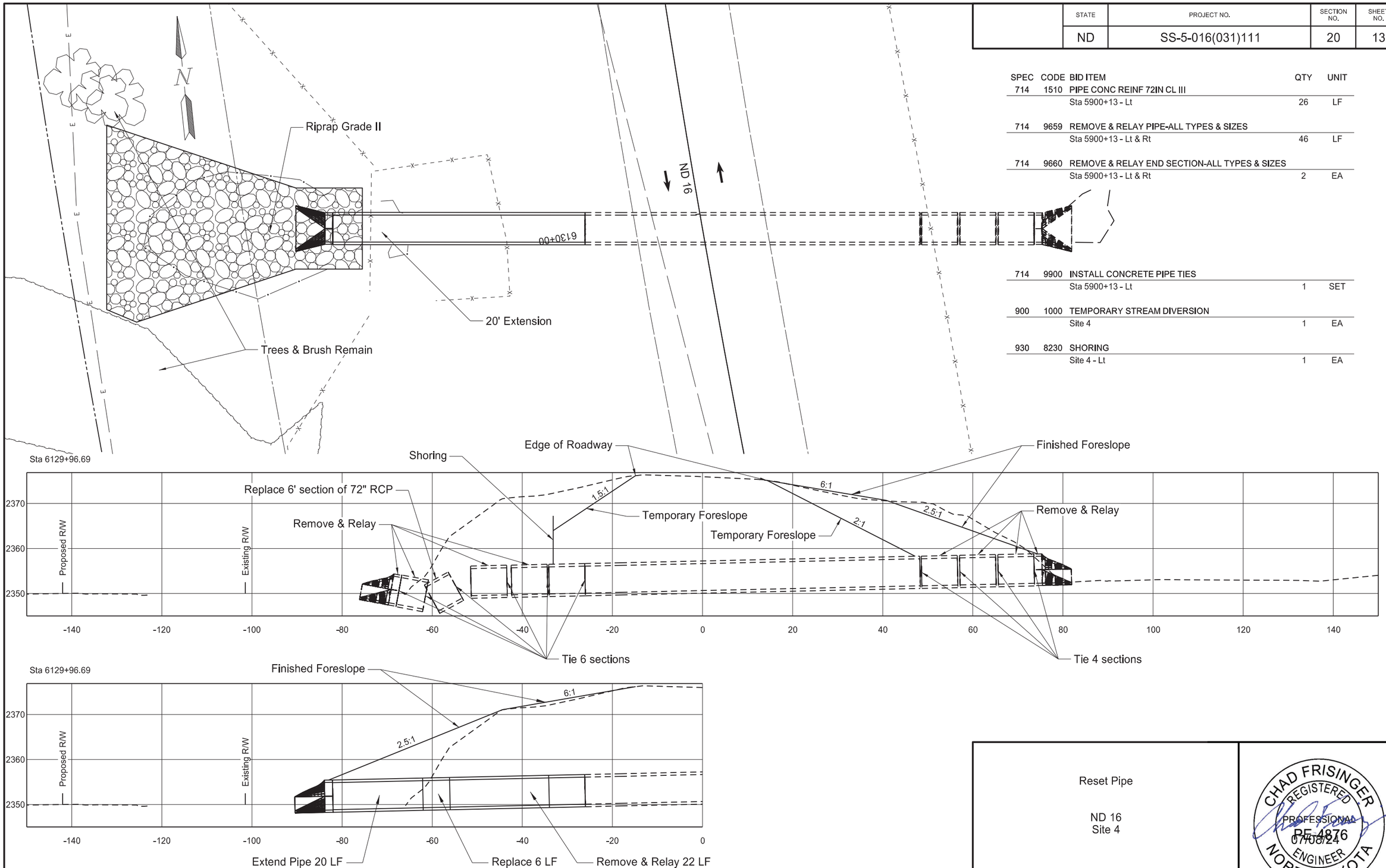
ND 16
Site 4

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	ND	SS-5-016(031)111	20	13

SPEC	CODE	BID ITEM	QTY	UNIT
714	1510	PIPE CONC REINF 72IN CL III		
		Sta 5900+13 - Lt	26	LF
714	9659	REMOVE & RELAY PIPE-ALL TYPES & SIZES		
		Sta 5900+13 - Lt & Rt	46	LF
714	9660	REMOVE & RELAY END SECTION-ALL TYPES & SIZES		
		Sta 5900+13 - Lt & Rt	2	EA
714	9900	INSTALL CONCRETE PIPE TIES		
		Sta 5900+13 - Lt	1	SET
900	1000	TEMPORARY STREAM DIVERSION		
		Site 4	1	EA
930	8230	SHORING		
		Site 4 - Lt	1	EA



Reset Pipe

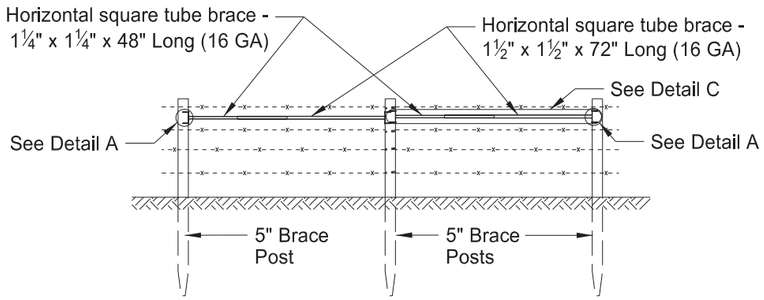
ND 16
Site 4

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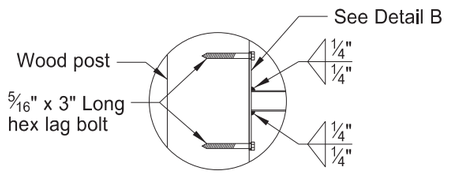
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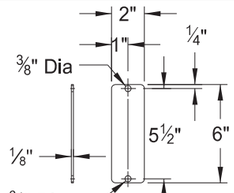
SQUARE TUBE BRACE



DOUBLE BRACE ASSEMBLY
(Square Tube Brace)

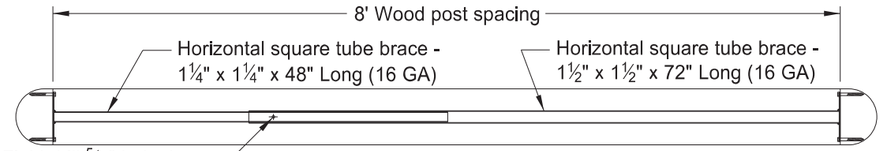


Detail A
(Square Tube Brace)

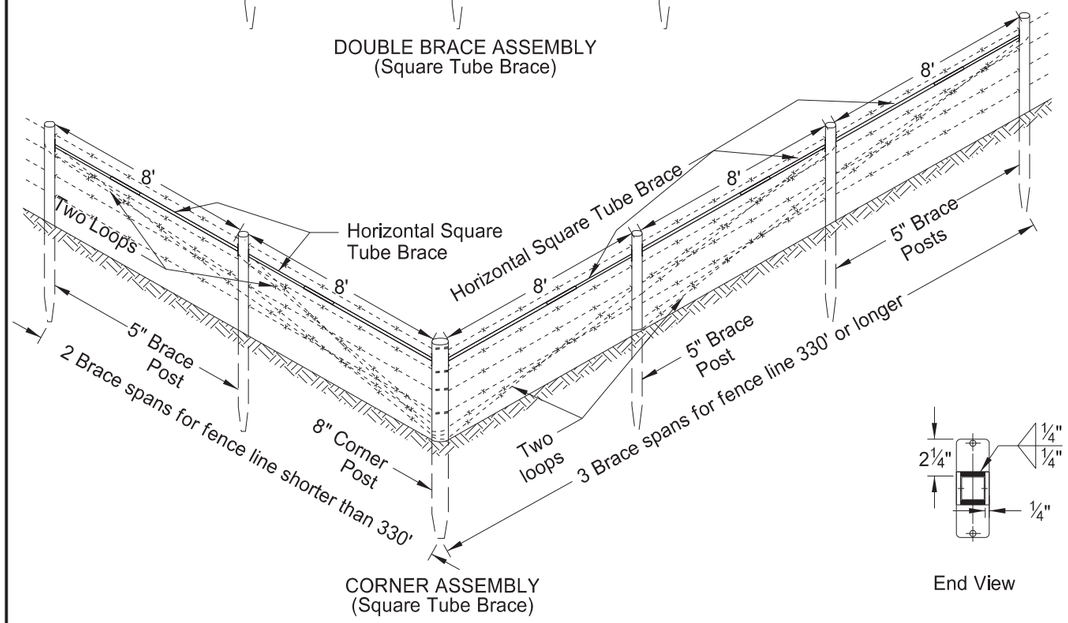


Detail B
(Square Tube Brace)

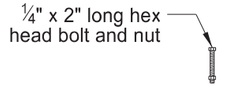
Square Tube Brace For Wood Posts	
Quantity	Description
1	¼" x 2" Long Hex Head Bolt
4	5/16" x 3" Long Hex Head Lag Bolt
2	FL⅛" x 2" x 6"
1	Square Tube - 1½" x 1½" x 72" Long (16 GA)
1	Square Tube - 1¼" x 1¼" x 48" Long (16 GA)

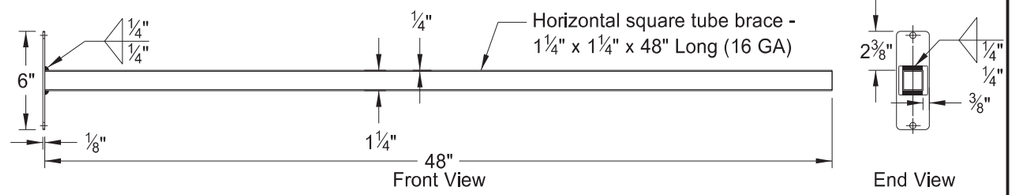


Detail C
(Square Tube Brace)



CORNER ASSEMBLY
(Square Tube Brace)

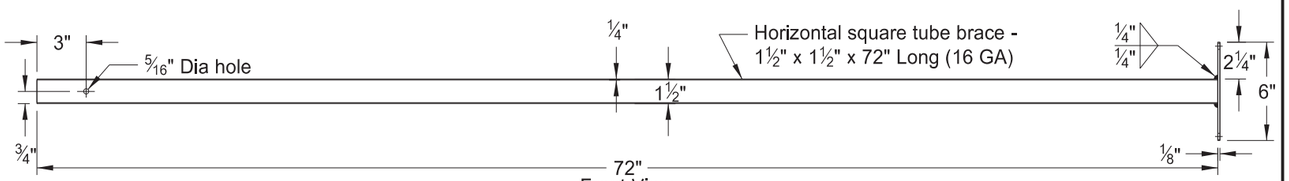




Front View

End View

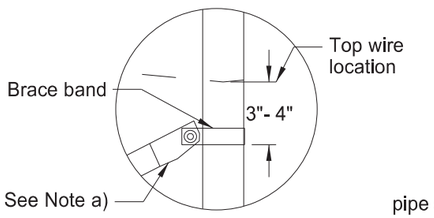
End View



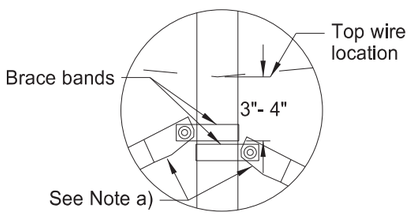
Front View

Square Tube Brace Details

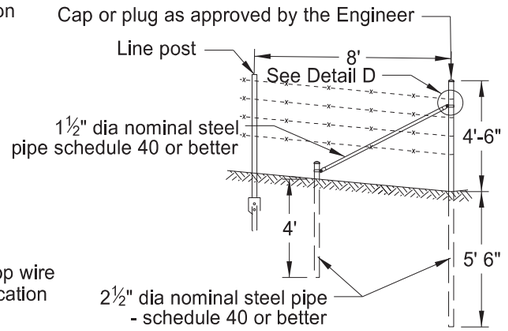
ROUND PIPE BRACE



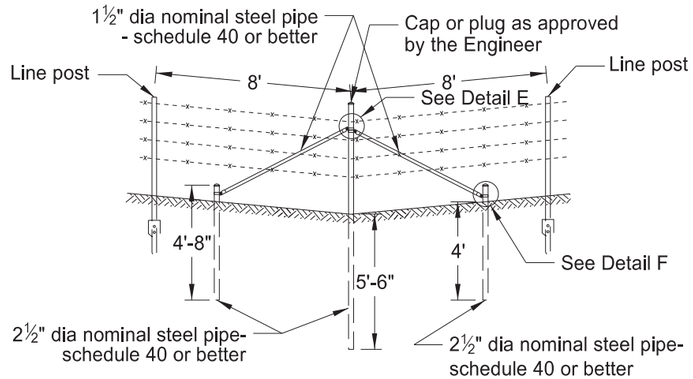
Detail D
(Steel Pipe Brace)



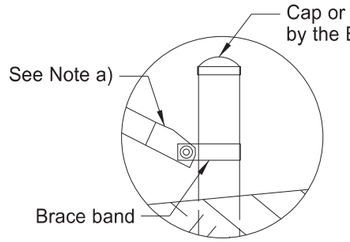
Detail E
(Steel Pipe Brace)



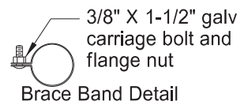
FENCE TERMINAL
(Steel Pipe Brace)



CORNER AND DOUBLE BRACE ASSEMBLY
(Steel Pipe Brace)



Detail F
(Steel Pipe Brace)



Brace Band Detail
(Steel Pipe Brace)

Note a) Flatten approximately 1 1/2 " of both ends of the brace rails and drill/punch a hole in the flattened part for the 3/8 " bolt.

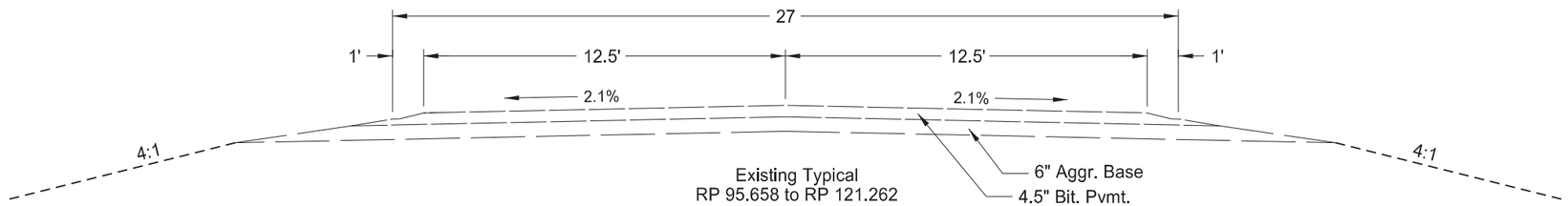
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Corner and Double Brace Assemblies
Square Tube Brace and Round Pipe Brace Alternates

ND 16

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Existing Typical
RP 95.658 to RP 121.262

*No work is to be preformed on the roadway. Typical section is shown to indicate the shoulder width to deliver equipment and materials

Existing Typical Section

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Begin Station / Location	Begin Offset	End Station / Location	End Offset	Pipe Installation (Pay Item)			Allowable Material	Required Diameter	Steel Pipe Coatings	Steel Pipe Corrugations or Spiral Ribs	Steel Pipe Minimum Thickness	Geosythetic Material - Type G (Pay Item)	(*) End Sections		Applicable Backfill
				In	Bid Item	LF		In	Type		In	SY	Begin EA	End EA	
5900+13	82' Lt	5899+90	133' Lt	42	Pipe Corr. Steel (Extension)	56'	Corrugated Steel Pipe	42	A	2	0.168			FES	Section 20 Sheet 3
							Corrugated Steel Pipe	42	P	2	0.064				
							Spiral Rib Steel Pipe	42	P	3/4, 1	0.064				
6130+05	49' Lt	6130+06	55' Lt	72	Pipe Conc. Reinf. CL III (Replacement)	26'	Reinforced Concrete Pipe - Class III (barrel length = 6 LF)	72					Remove & Relay	Remove & Relay	Section 20 Sheet 3

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

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

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

(*) End sections are measured and paid for separately for pipe extensions.
FES = Flared End Section
TES = Traversable End Section

Allowable Pipe List

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	ND	SS-5-016(031)111	75	1

Wetland Impact Table

					Wetland Impact					Wetland Mitigation													
					Wetland Impacts Acre(s)			USFWS Easement Impacts Acre(s)		Mitigation Proposed			USACE/11990 Bank		11990 Bank		USFWS Bank		Onsite Mitigation Method			Onsite Constructed Location	
Wetland Number	Location	Wetland Type	Wetland Feature	USACE Jurisdictional Wetlands[1]	Temp.	Perm. (Fill/Drain)	Perm. (Cut)	Temp.	Perm.	EO 11990	USACE	USFWS	Location	Acre(s)	Location	Acre(s)	Location	Acre(s)	Mitigation Location; Ratio	Ditch Shift Acre(s)	Onsite Acre(s)	Onsite Constructed Site #	Onsite Constructed Size Acre(s)
1C	Sec 21 T-145-N R-104-W			Y	0.021	0.002	0.000	0.000	0.000	Y	N				Anderson Bank	0.002							
				Totals	0.021	0.002	0.000	0.000	0.000							0.002				0.000	0.000		0.000

Other Waters and Streams Impact Table

					Impacts to Other Waters						Other Water Mitigation								
					Acres			Linear Feet			Mitigation Proposed			USACE Mitigation Bank		Onsite Mitigaiton Method		Onsite Constructed Location	
Number	Location	Type	Feature	USACE Jurisdictional	Temp.	Perm. (Fill/Drain)	Perm. (Cut)	Temp.	Perm. (Fill/Drain)	Perm. (Cut)	EO 11990	USACE	USFWS	Location	Acre(s)	Mitigation Location; ratio	Acre(s)	Onsite Constructed Site #	Onsite Constructed Size Acre(s)
OW2a	Sec 21 T-145-N R-104-W			Y	0.024	0.008	0.000	37	13	0	N	N							
OW2b	Sec 21 T-145-N R-104-W			Y	0.000	0.000	0.000	0	0	0									
OW3a	Sec 5 T-145-N R-104-W			Y	0.000	0.000	0.000	0	0	0									
OW3b	Sec 5 T-145-N R-104-W			Y	0.000	0.000	0.000	0	0	0									
OW4a	Sec 31 T-146-N R-104-W			Y	0.002	0.028	0.000	24	43	0	N	N							
OW4b	Sec 21 T-145-N R-104-W			Y	0.026	0.000	0.000	46	0	0	N	N							
				Totals	0.052	0.036	0.000	107	56	0					0.000		0.000		0.000

Impact Summary Table

Permanent Impact Summary		Temporary Impacts and additional information	
Wetland Type	Total Acre(s)	WaterType	Total Acre(s)
Natural/JD (Fill/Drain)	0.002	Temporary Wetland JD	0.021
Natural/Non-JD (Fill/Drain)		Non-JD Wetland Temporary	
Artificial/JD (Fill/Drain)			
Artificial /Non-JD		Permanent OW	0.036
Total	0.002	Temporary OW	0.052
JD Natural (Cut)		Permanent OW-d	0.026
JD Artificial (Cut)		Temporary OW-d	0.012
Non-JD Natural (Cut)			
Non-JD Artificial (Cut)			
Total	0.000		

Other Water - D Impact Table

					Impacts to Other Waters						Other Water Mitigation								
					Acres			Linear Feet			Mitigation Proposed			USACE Mitigation Bank		Onsite Mitigaiton Method		Onsite Constructed Location	
Number	Location	Type	Feature	USACE Jurisdictional	Temp.	Perm. (Fill/Drain)	Perm. (Cut)	Temp.	Perm. (Fill/Drain)	Perm. (Cut)	EO 11990	USACE	USFWS	Location	Acre(s)	Mitigation Location; ratio	Acre(s)	Onsite Constructed Site #	Onsite Constructed Size Acre(s)
OW1a-d	Sec 21 T-145-N R-104-W	Drainage		Y	0.012	0.026	0.000	25	53	0	N	N							
OW1b-d	Sec 21 T-145-N R-104-W	Drainage		Y	0.000	0.000	0.000	0	0	0									
				Totals	0.012	0.026	0.000	25	53	0									

[1] A wetland Jurisdictional Determination is pending. All aquatic resources are assumed juristictional for planning purposes.

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	Onsite					
EO 11990 Only	Anderson			0.002		
USACE/11990	Onsite					
USFWS						
Total		0	0	0.002	0	0

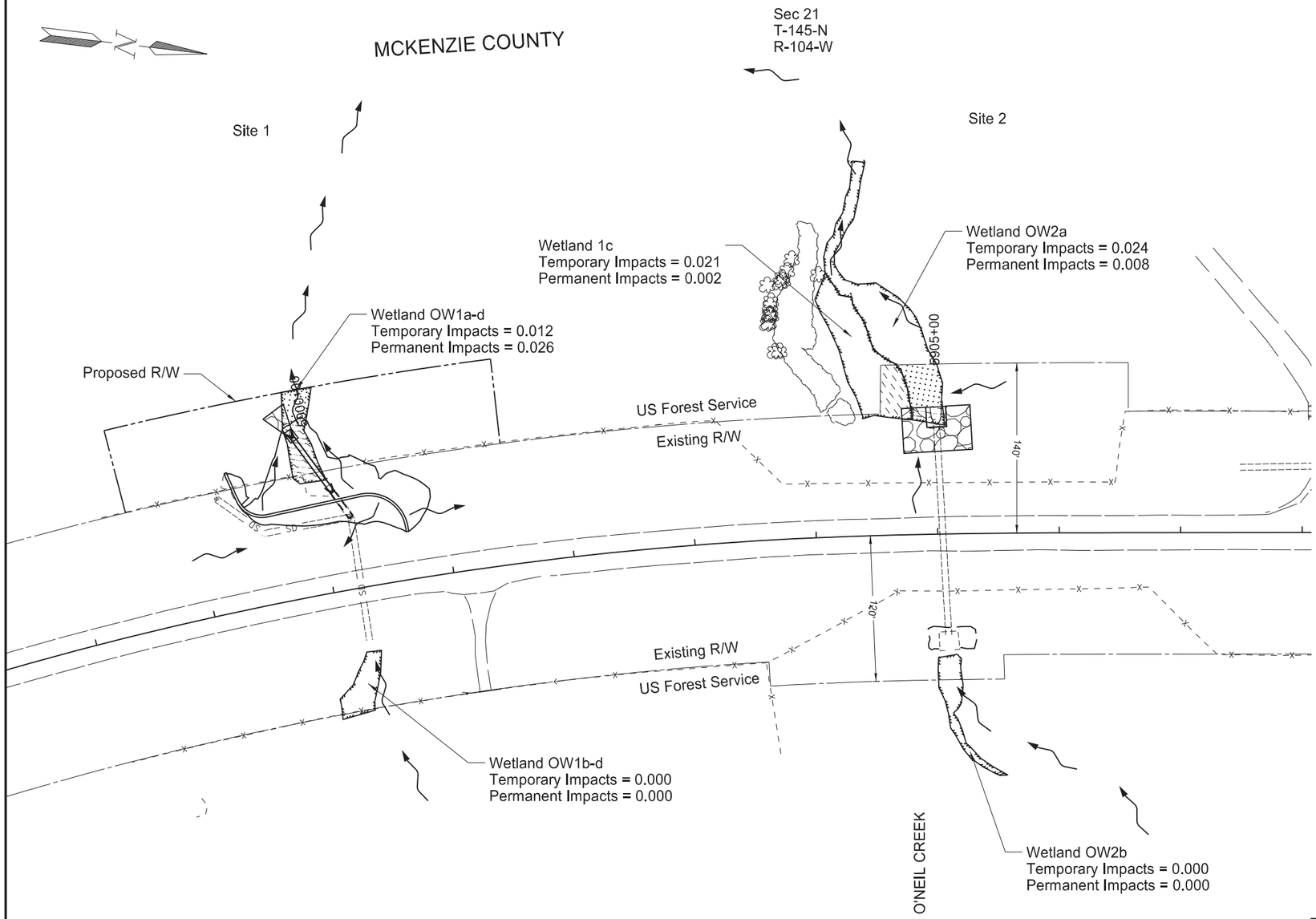
Wetland Impact Tables

ND 16

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LEGEND

- Wetland Impact Permanent
- Wetland Impact Temporary
- Other Water Impact Permanent
- Other Water Impact Temporary
- Grading Tie Line
- Limits of Disturbance

Wetland Impacts

ND 16
Site 1 & 2

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MCKENZIE COUNTY

Sec 5
T-145-N
R-104-W

Rec Sec Cor
95° 50' W to
3 1/4" BLM Alum cap

33'

33'

Sec line

N 87° 12' 19" W

6050+00

6055+00

Wetland OW3a
Temporary Impacts = 0.000
Permanent Impacts = 0.000

US Forest Service

Existing R/W

N 9° 50' 41" W

Existing R/W

US Forest Service

Wetland OW3b
Temporary Impacts = 0.000
Permanent Impacts = 0.000

Proposed R/W

LEGEND

- - - - - - - - - - Grading Tie Line

- - - - - - - - - - Limits of Disturbance

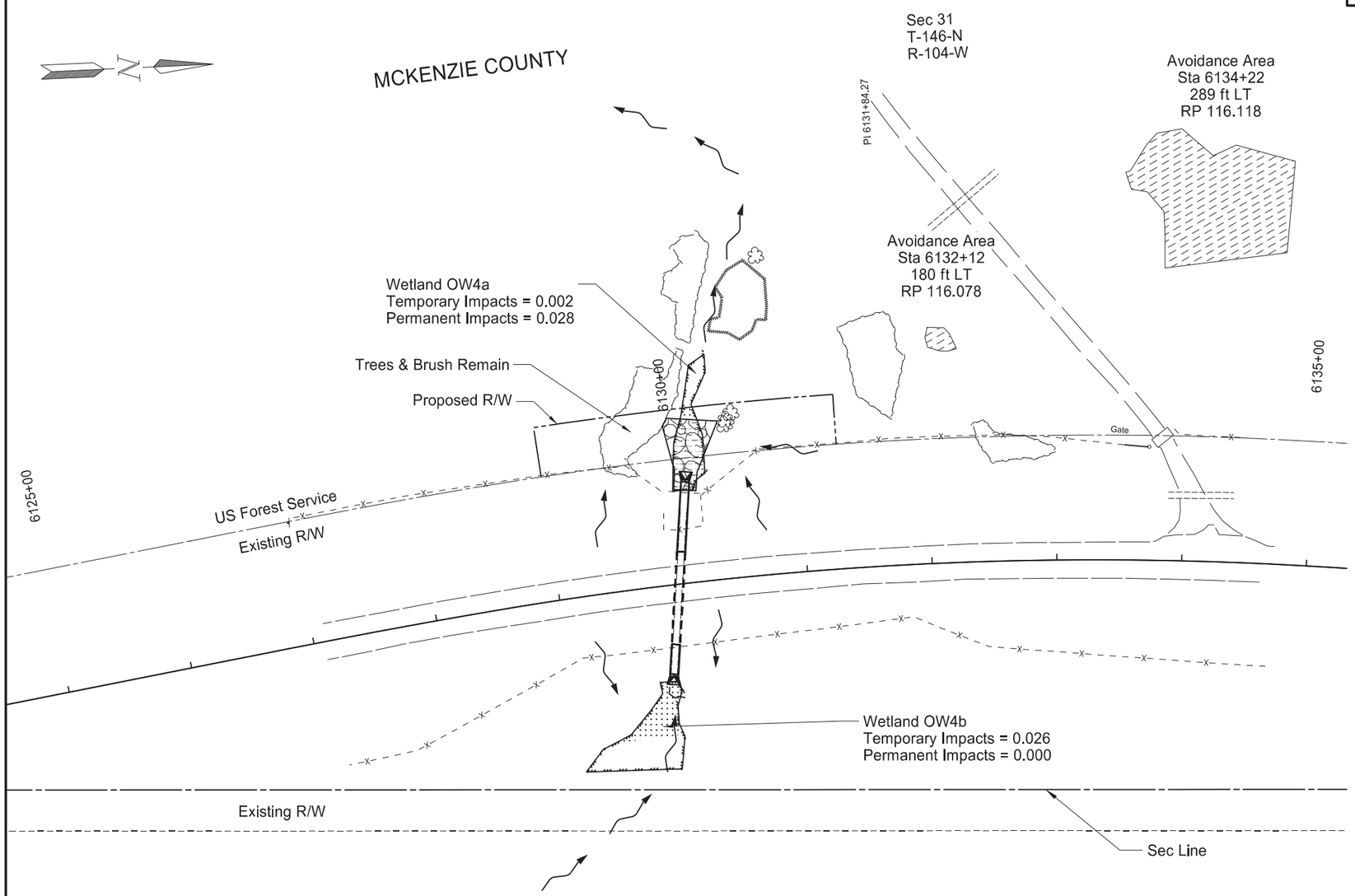
Wetland Impacts

ND 16
Site 3

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LEGEND

- Other Water Impact Permanent
- Other Water Impact Temporary
- Cultural Avoidance Area
- Grading Tie Line
- Limits of Disturbance

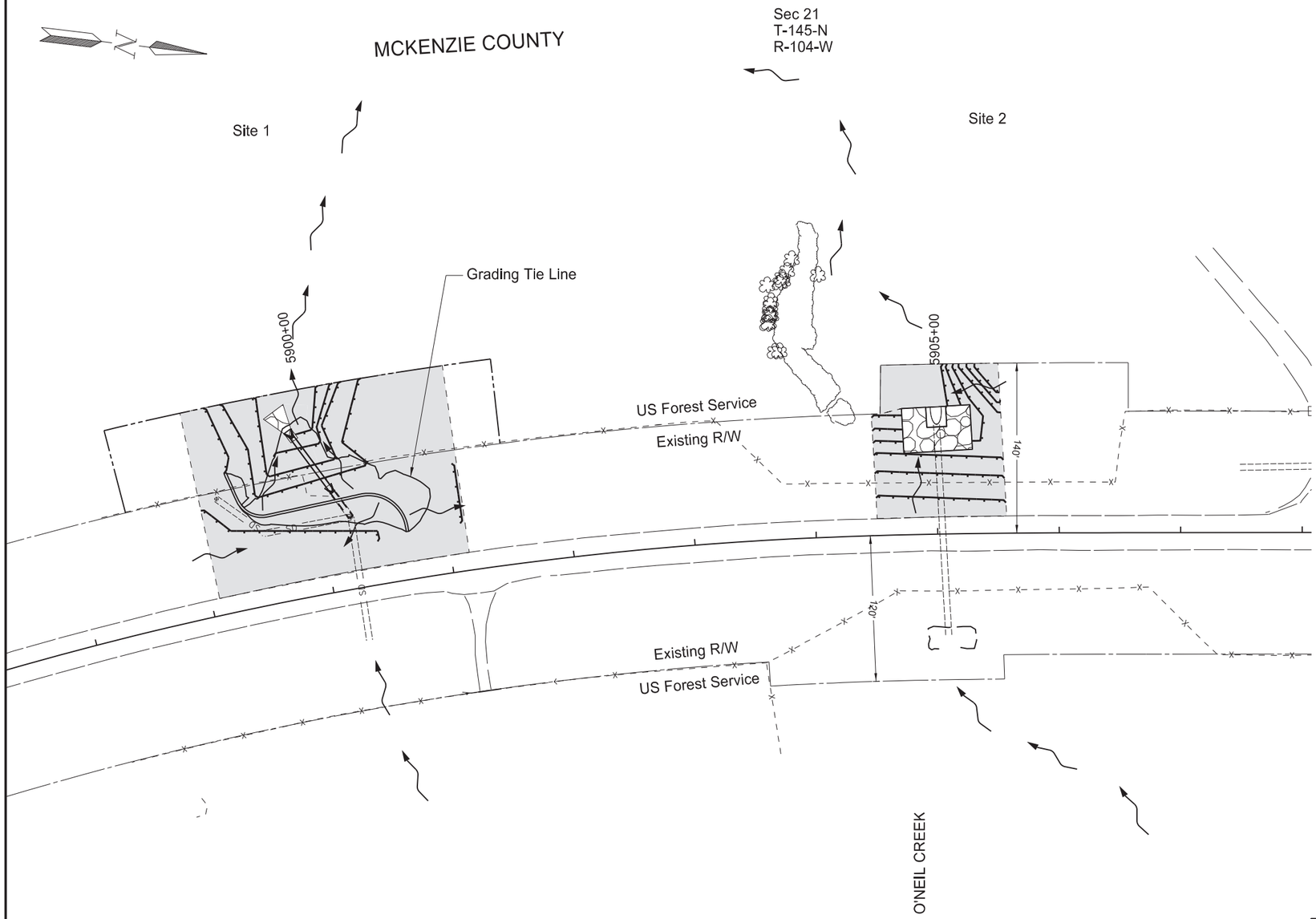
Wetland Impacts

ND 16
Site 4

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SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Site 1	0.76	ACRE
		Site 2	0.25	ACRE
261	0112	FIBER ROLLS 12IN		
		Site 1	870	LF
		Site 2	690	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Site 1	870	LF
		Site 2	690	LF
900	0700	FLEXIBLE GROWTH MEDIUM		
		Site 1	3673	SY
		Site 2	1223	SY

LEGEND

- Temporary Cover Crop & Flexible Growth Medium
- Riprap Grade III (Paid in Section 77)
- Fiber Rolls 12 IN
- Flow Direction

*Fiber rolls are set based on the contours at 5' interval

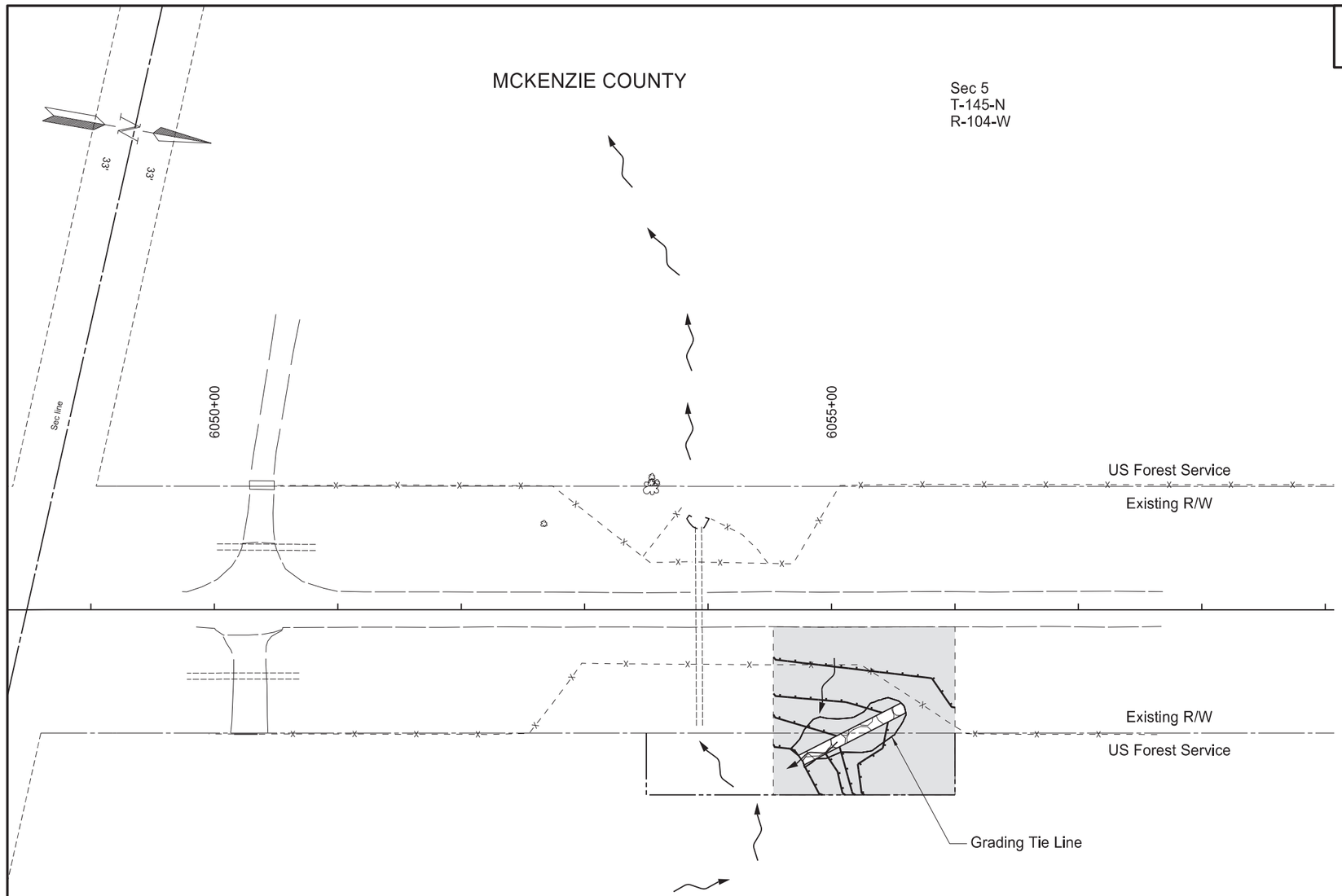
Temporary Erosion Control

ND 16
Site 1 & 2

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SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Site 3	0.44	ACRE
261	0112	FIBER ROLLS 12IN		
		Site 3	510	CY
261	0113	REMOVE FIBER ROLLS 12IN		
		Site 3	510	LF
900	0700	FLEXIBLE GROWTH MEDIUM		
		Site 3	2130	SY

LEGEND

- Temporary Cover Crop & Flexible Growth Medium
- Riprap Grade III (Paid in Section 77)
- Fiber Rolls 12 IN
- Flow Direction

*Fiber rolls are set based on the contours at 5' interval

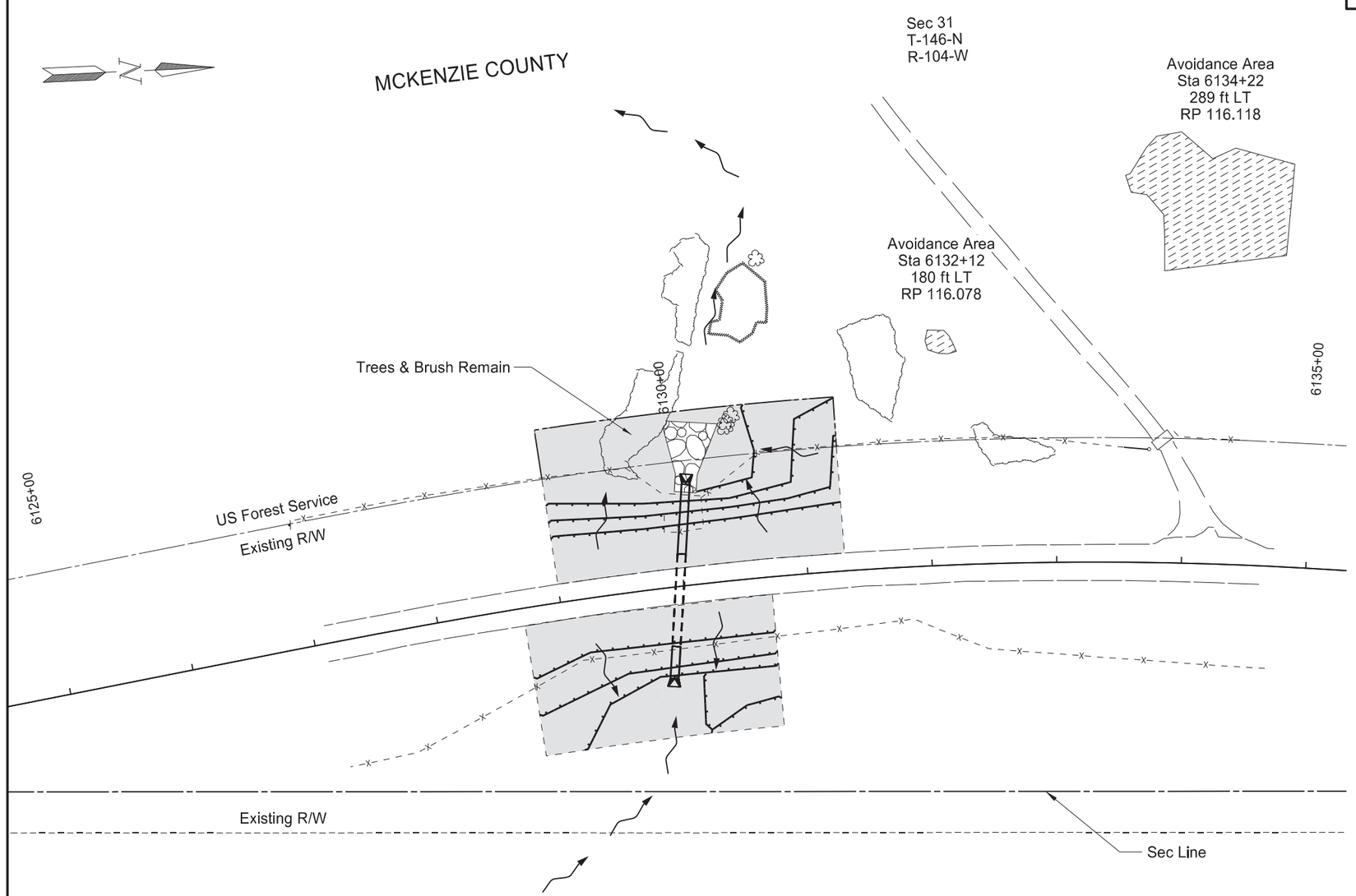
Temporary Erosion Control

ND 16
Site 3

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SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Site 3	1.12	ACRE
261	0112	FIBER ROLLS 12IN		
		Site 3	1600	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Site 3	1600	LF
900	0700	FLEXIBLE GROWTH MEDIUM		
		Site 3	5415	SY

LEGEND

- Temporary Cover Crop & Flexible Growth Medium
- Riprap Grade II (Paid in Section 77)
- Cultural Avoidance Area
- Fiber Rolls 12 IN
- Flow Direction

*Fiber rolls are set based on the contours at 5' interval

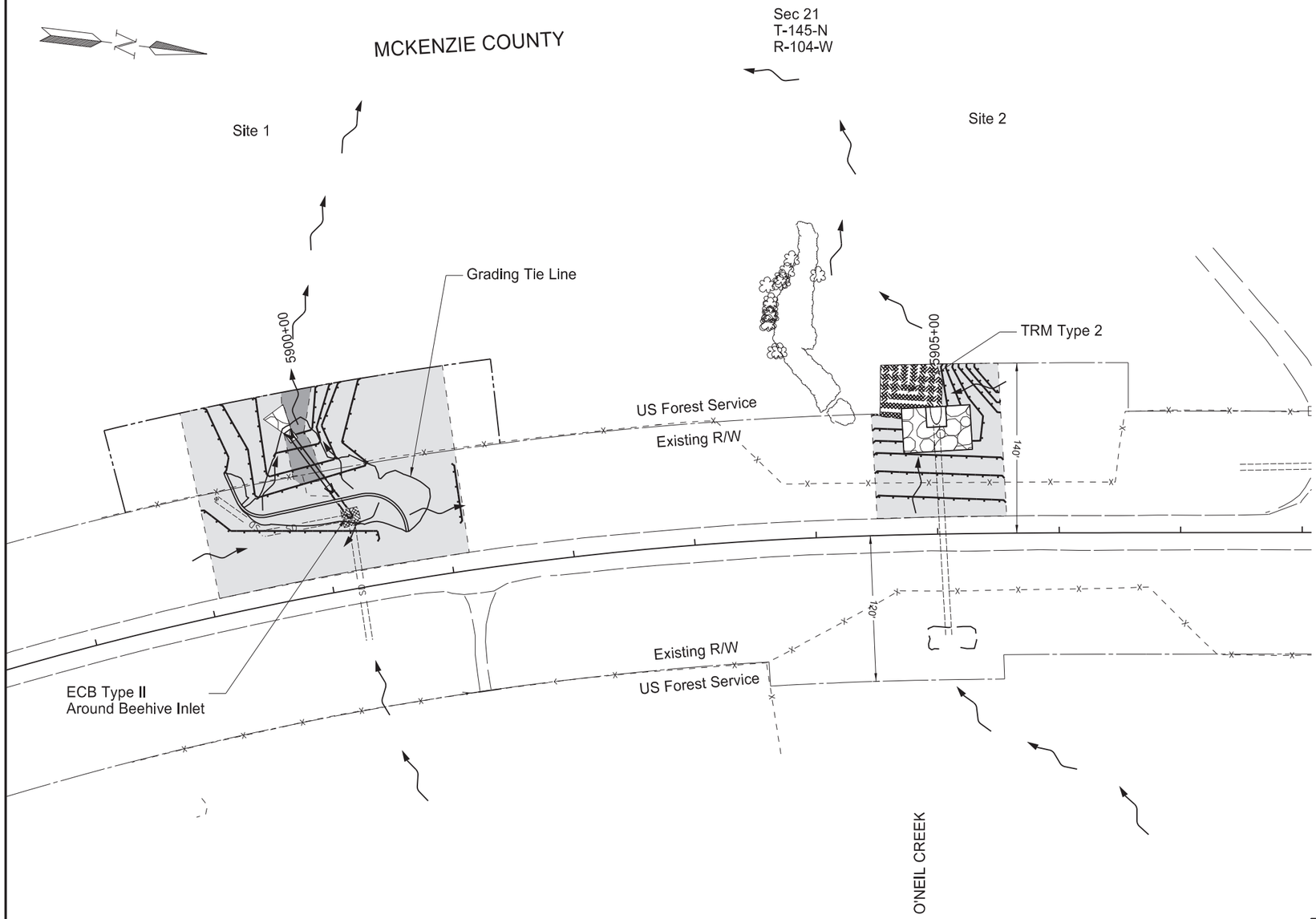
Temporary Erosion Control

ND 16
Site 4

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SPEC	CODE	BID ITEM	QTY	UNIT
251	0300	SEEDING CLASS III		
		Site 1	0.73	ACRE
		Site 2	0.25	ACRE
251	1000	WETLAND SEED		
		Site 1	0.03	ACRE
255	0102	ECB TYPE II		
		Site 1	23	SY
255	0202	TRM TYPE 2		
		Site 2	213	SY
256	0300	RIPRAP GRADE III		
		Site 1	40	CY
		Site 2	200	CY
261	0112	FIBER ROLLS 12IN		
		Site 1	870	LF
		Site 2	660	LF
709	0155	GEOSYNTHETIC MATERIAL TYPE RR		
		Site 1	40	SY
		Site 2	200	SY
900	0700	FLEXIBLE GROWTH MEDIUM		
		Site 1	3650	SY
		Site 2	1010	SY

LEGEND

- Seeding Class III & Flexible Growth Medium
- Wetland Seed & Flexible Growth Medium
- Riprap Grade III
- TRM TYPE 2
- Fiber Rolls 12 IN
- ECB TYPE II
- Flow Direction

*Fiber rolls are set based on the contours at 5' interval

Permanent Erosion Control

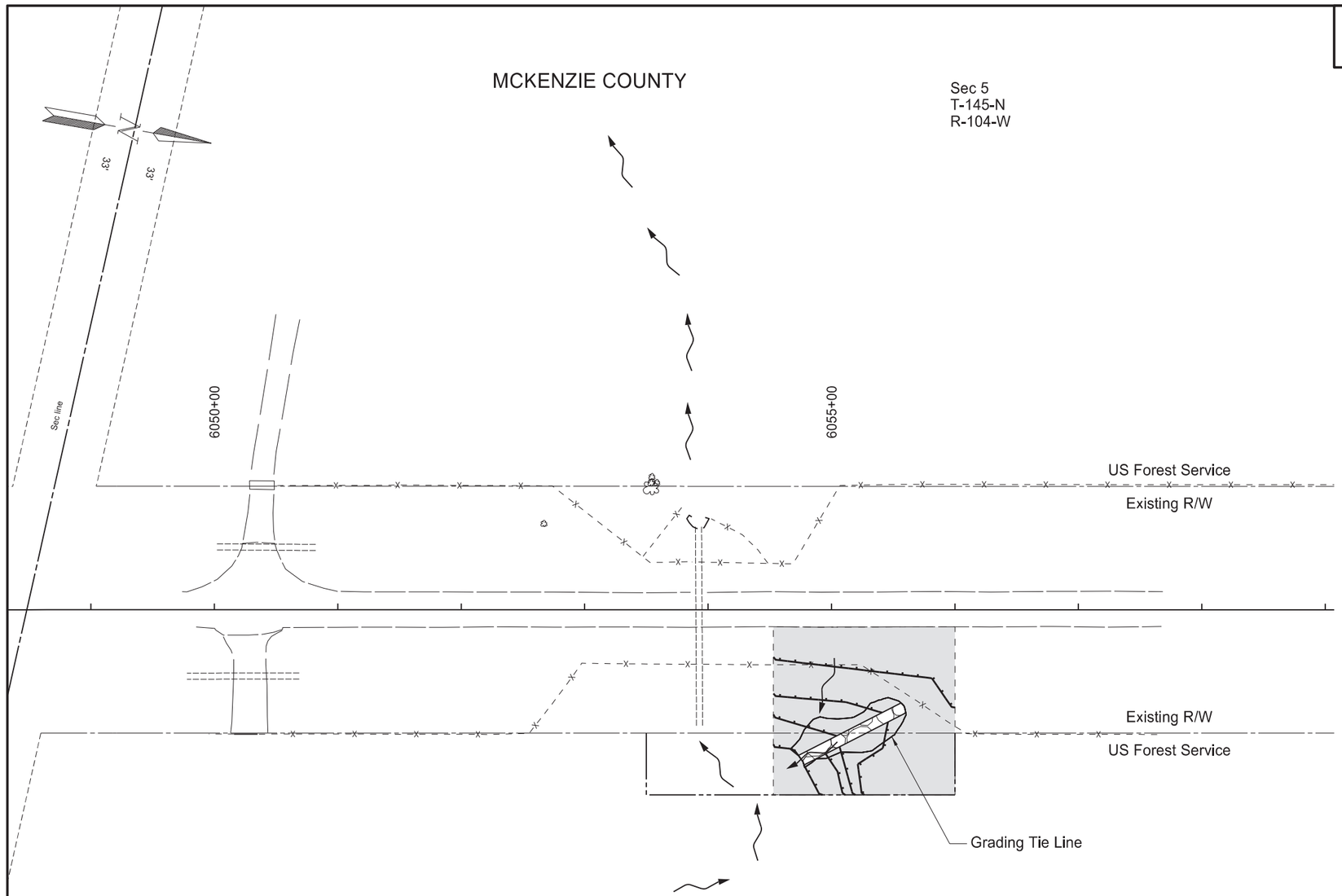
ND 16
Site 1 & 2

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SPEC	CODE	BID ITEM	QTY	UNIT
251	0300	SEEDING CLASS III		
		Site 3	0.44	ACRE
256	0300	RIPRAP GRADE III		
		Site 3	94	CY
261	0112	FIBER ROLLS 12IN		
		Site 3	510	LF
709	0155	GEOSYNTHETIC MATERIAL TYPE RR		
		Site 3	94	SY
900	0700	FLEXIBLE GROWTH MEDIUM		
		Site 3	2130	SY

LEGEND

- Seeding Class III & Flexible Growth Medium
- Riprap Grade III
- Fiber Rolls 12 IN
- Flow Direction

*Fiber rolls are set based on the contours at 5' interval

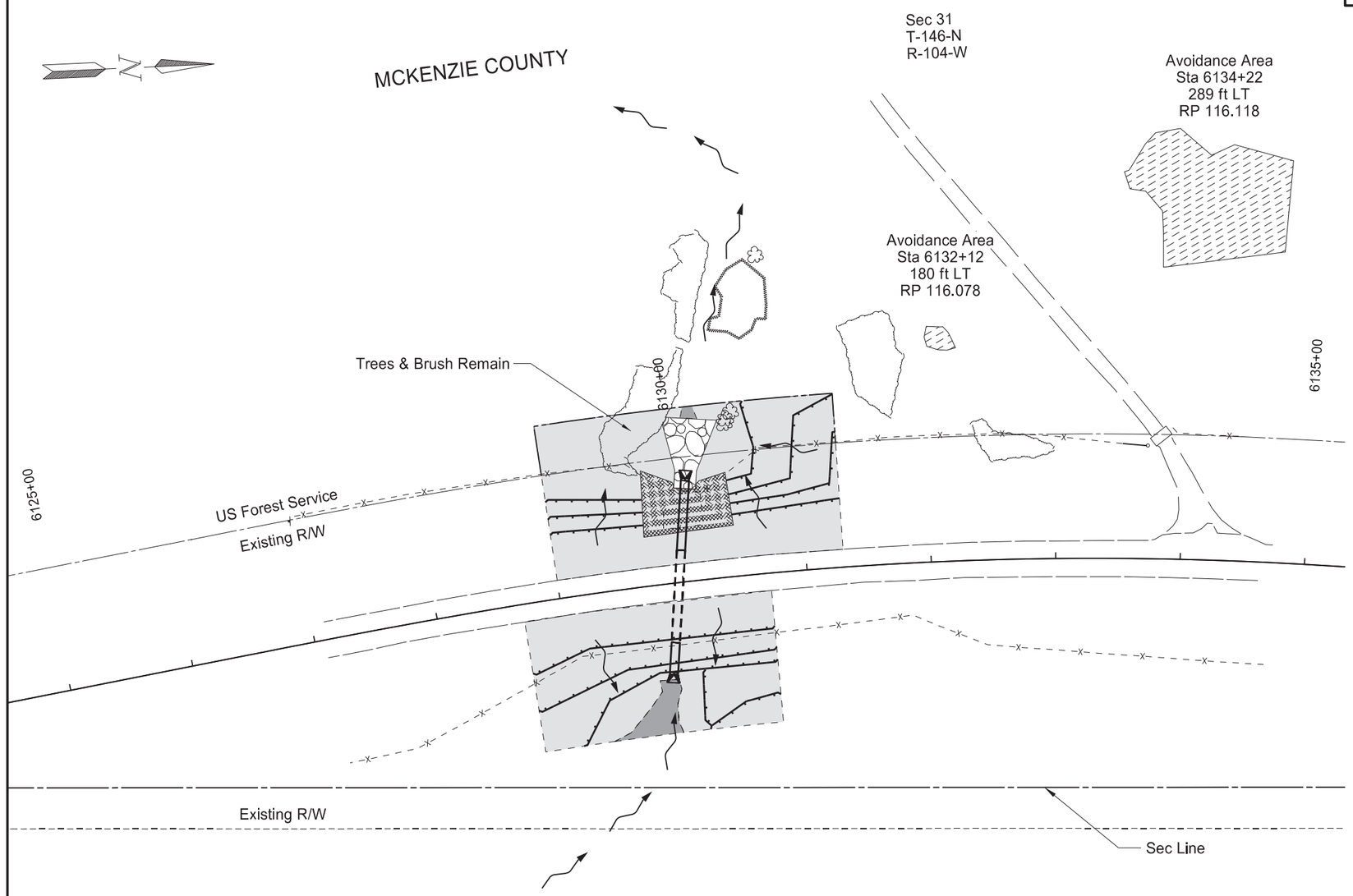
Permanent Erosion Control

ND 16
Site 3

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SPEC	CODE	BID ITEM	QTY	UNIT
251	0300	SEEDING CLASS III		
		Site 4	1.09	ACRE
251	1000	WETLAND SEED		
		Site 4	0.03	ACRE
255	0102	ECB TYPE II		
		Site 4	324	SY
256	0200	RIPRAP GRADE II		
		Site 4	177	CY
261	0112	FIBER ROLLS 12IN		
		Site 4	1360	LF
709	0155	GEOSYNTHETIC MATERIAL TYPE RR		
		Site 4	177	SY
900	0700	FLEXIBLE GROWTH MEDIUM		
		Site 4	5092	SY

LEGEND

- Seeding Class III & Flexible Growth Medium
- Wetland Seed & Flexible Growth Medium
- Riprap Grade II
- ECB Type II
- Cultural Avoidance Area
- Fiber Rolls 12 IN
- Flow Direction

*Fiber rolls are set based on the contours at 5' interval

Permanent Erosion Control

ND 16
Site 4

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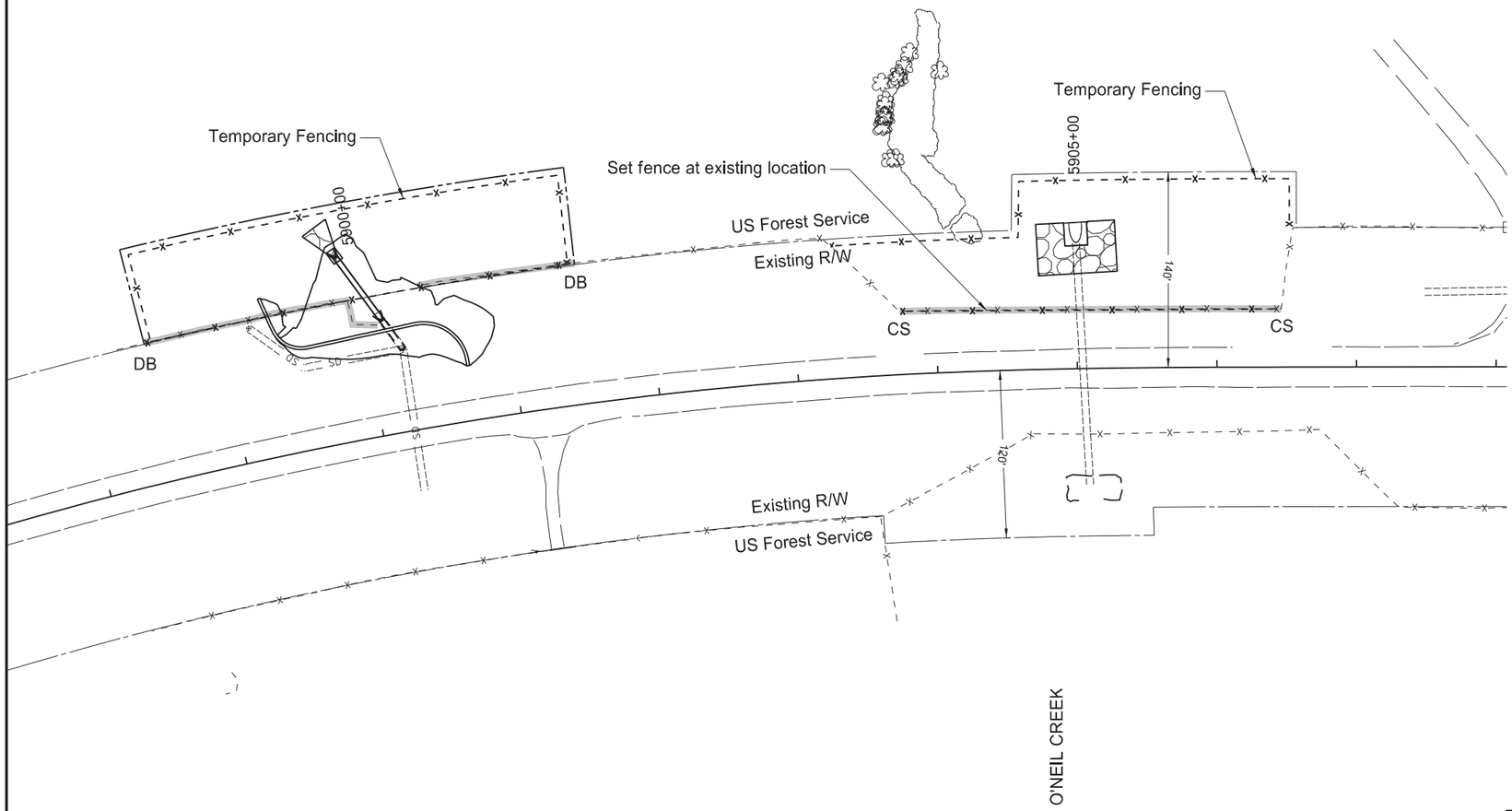
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MCKENZIE COUNTY

Sec 21
T-145-N
R-104-W

Site 1

Site 2



SPEC	CODE	BID ITEM	QTY	UNIT
202	0312	REMOVE EXISTING FENCE		
		Sta 5898+50 - 100' Lt to Sta 5901+50 - 100' Lt	300	LF
		Sta 5093+75 - 45' Lt to Sta 5096+46 42' - Lt	271	LF
752	0200	FENCE BARBED WIRE 4 STRAND		
		Sta 5898+50 - 100' Lt to Sta 5901+50 - 100' Lt	300	LF
		Sta 5093+75 - 45' Lt to Sta 5096+46 42' - Lt	271	LF
752	0905	TEMPORARY FENCE		
		Sta 5898+50 - 100' Lt to Sta 5901+50 - 100' Lt	430	LF
		Sta 5093+75 - 45' Lt to Sta 5096+46 42' - Lt	404	LF
752	3140	CORNER ASSEMBLY BARBED WIRE		
		Sta 5093+750 - 45' Lt	1	EA
		Sta 5096+46 - 42' Lt	1	EA
752	4100	DOUBLE BRACE ASSEMBLY BARBED WIRE		
		Sta 5898+50 - 100' Lt	1	EA
		Sta 5091+50 - 100' Lt	1	EA

LEGEND

CS	Corner Assembly Barbed Wire
DB	Double Brace Assembly Barbed Wire
x– – – –x– – – –	Remove Existing Fence
– – – – –x– – – –x	Fence Barbed Wire 4 Strand

*Place Temporary Fence 5' within the Right of Way

Fencing

ND 16
Site 1 & 2

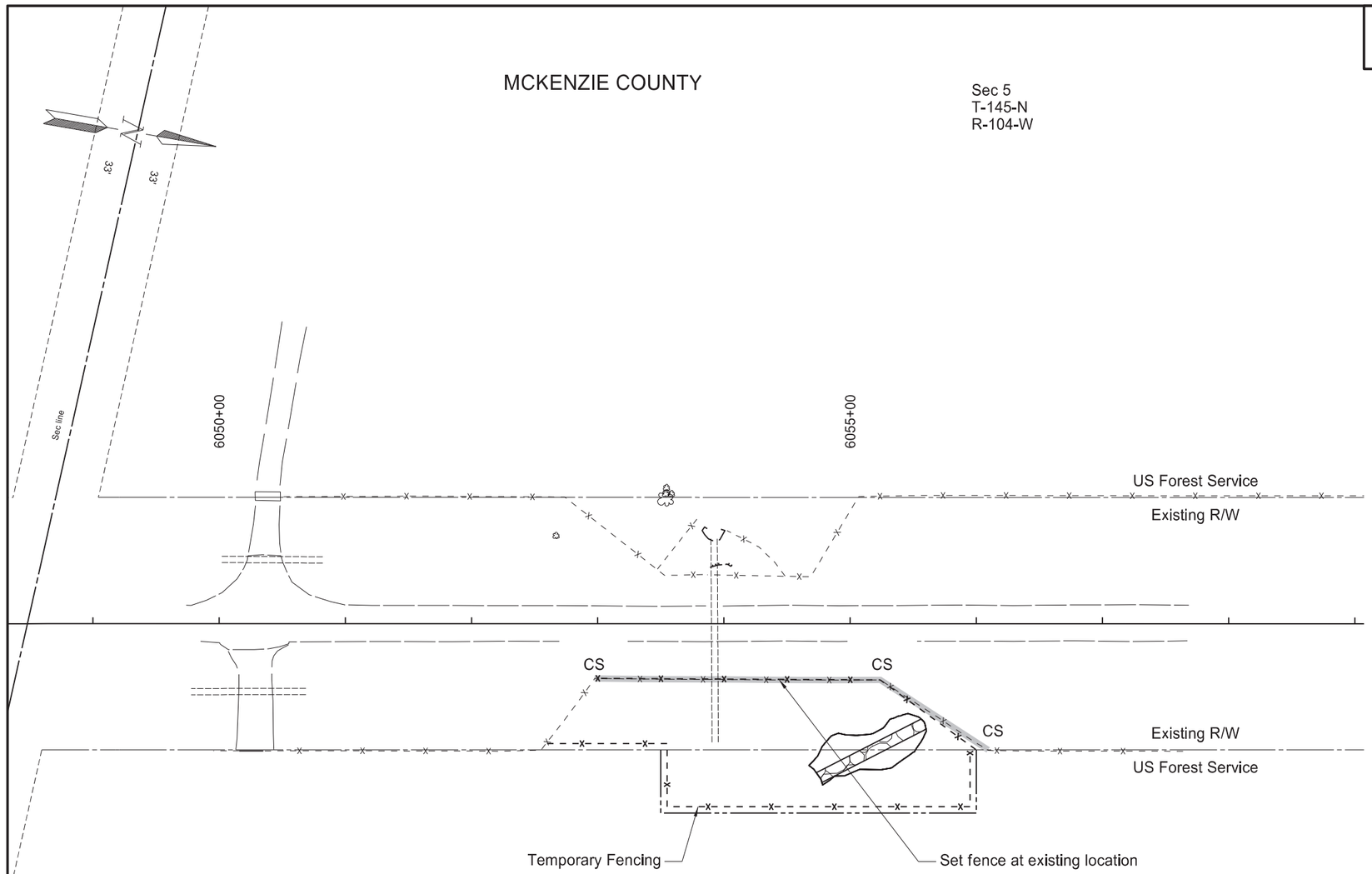
CHAD FRISINGER
REGISTERED
PROFESSIONAL
PE-4876
07/03/24
ENGINEER
NORTH DAKOTA

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-016(031)111	80	2

MCKENZIE COUNTY

Sec 5
T-145-N
R-104-W



SPEC	CODE	BID ITEM	QTY	UNIT
202	0312	REMOVE EXISTING FENCE		
		Sta 6052+98 - 43' Rt to Sta 6056+00 - 100' Rt	320	LF
752	0200	FENCE BARBED WIRE 4 STRAND		
		Sta 6052+98 - 43' Rt to Sta 6056+00 - 100' Rt	320	LF
752	0905	TEMPORARY FENCE		
		Sta 6052+98 - 43' Rt to Sta 6056+00 - 100' Rt	435	LF
752	3140	CORNER ASSEMBLY BARBED WIRE		
		Sta 6052+98 - 43' Rt	1	EA
		Sta 6055+24 - 45' Rt	1	EA
		Sta 6056+00 - 100' Rt	1	EA

LEGEND

CS	Corner Assembly Barbed Wire
x– – – – –x– – – –	Remove Existing Fence
– – – – –x– – – – –x	Fence Barbed Wire 4 Strand

*Place Temporary Fence 5' within the Right of Way

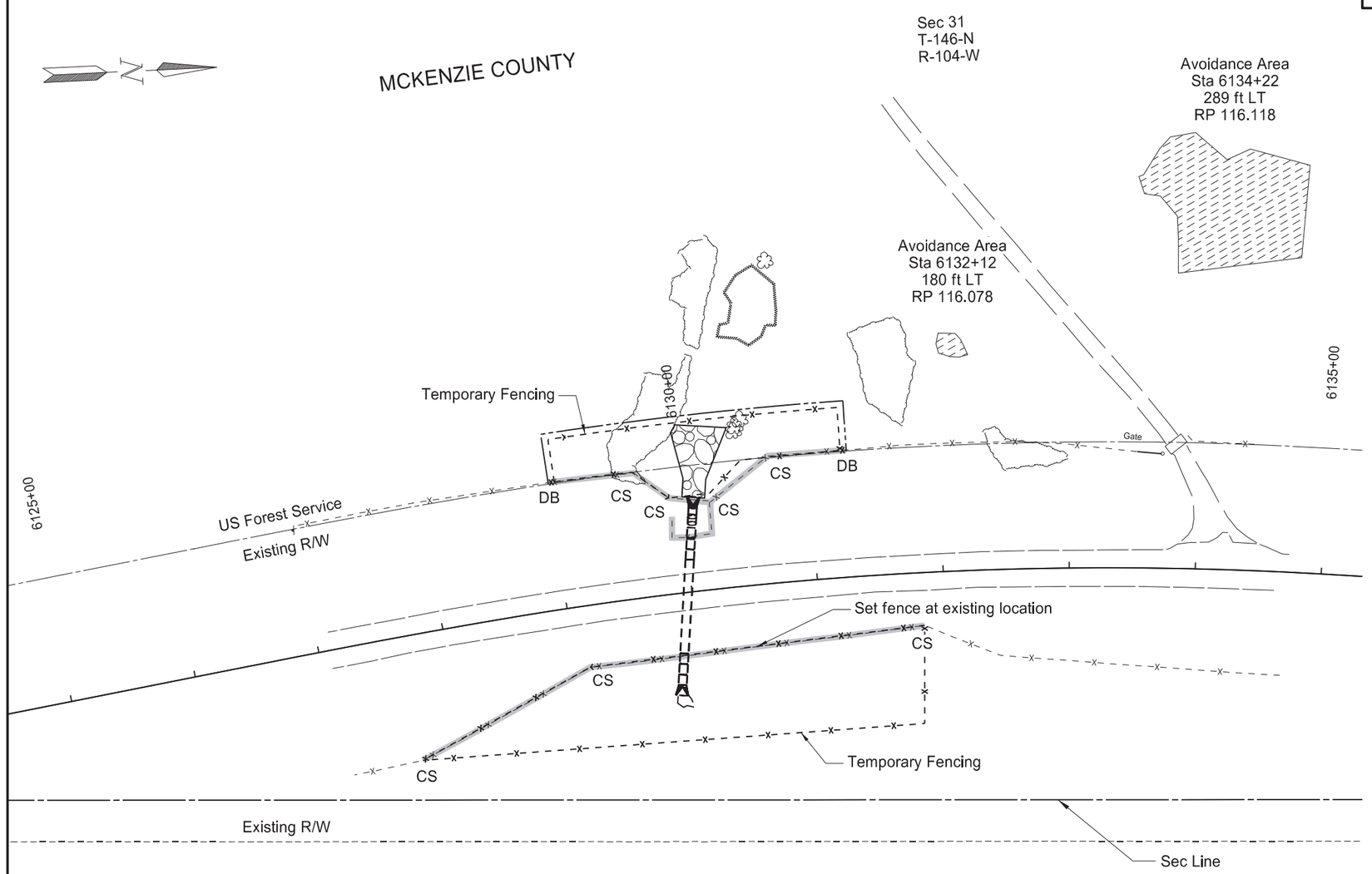
Fencing

ND 16
Site 3

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-016(031)111	80	3



SPEC	CODE	BID ITEM	QTY	UNIT
202	0312	REMOVE EXISTING FENCE		
		Sta 6129+00 - 100' Lt to Sta 6131+30 - 100' Lt	330	LF
		Sta 6127+66 - 100' Rt to Sta 6131+83 - 42' Rt	420	LF
752	0200	FENCE BARBED WIRE 4 STRAND		
		Sta 6129+00 - 100' Lt to Sta 6131+30 - 100' Lt	256	LF
		Sta 6127+66 - 100' Rt to Sta 6131+83 - 42' Rt	420	LF
752	0905	TEMPORARY FENCE		
		Sta 6129+00 - 100' Lt to Sta 6131+30 - 100' Lt	302	LF
		Sta 6127+66 - 100' Rt to Sta 6131+83 - 42' Rt	477	LF
752	3140	CORNER ASSEMBLY BARBED WIRE		
		Sta 6127+66 - 100' Rt	1	EA
		Sta 6129+12 - 49' Rt	1	EA
		Sta 6129+65 - 100' Lt	1	EA
		Sta 6129+91 - 76' Lt	1	EA
		Sta 6130+22 - 76' Lt	1	EA
		Sta 6130+48 - 100' Lt	1	EA
		Sta 6131+83 - 42' Rt	1	EA
752	4100	DOUBLE BRACE ASSEMBLY BARBED WIRE		
		Sta 6129+00 - 100' Lt	1	EA
		Sta 6131+30 - 100' Lt	1	EA

LEGEND

CS	Corner Assembly Barbed Wire
DB	Double Brace Assembly Barbed Wire
	Cultural Avoidance Area
x- - - -x- - - -x	Remove Existing Fence
- - - -x- - - -x	Fence Barbed Wire 4 Strand

*Place Temporary Fence 5' within the Right of Way

Fencing

ND 16
Site 4

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NORTH DAKOTA

PRELIMINARY SURVEY COORDINATE AND CURVE DATA - 3 MI N TROTTERS N TO 8 MI N TROTTERS

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-5-016(031)111	81	1

HORIZONTAL ALIGNMENT

PNT	STATION	NORTHING	EASTING
ND 16 (Align: SCL 16 RP)			
Begin	5867+91.61	150,065.11	1,117,365.68
TS	5882+24.85	150,990.59	1,116,271.31
SC	5885+24.85	151,188.25	1,116,045.68
PI	5895+02.01	151,815.29	1,115,296.11
CS	5903+71.73	152,786.20	1,115,184.85
ST	5906+71.73	153,083.35	1,115,143.91
Sec line Xing	5952+81.06	157,659.84	1,114,594.61
TS	5976+12.51	159,974.67	1,114,316.77
SC	5979+12.51	160,271.83	1,114,275.84
PI	5985+54.31	160,909.76	1,114,204.54
CS	5991+56.90	161,414.23	1,113,807.60
ST	5994+56.90	161,654.64	1,113,628.20
TS	6032+26.22	164,635.77	1,111,321.57
SC	6035+26.22	164,876.18	1,111,142.18
PI	6040+87.81	165,317.20	1,110,794.32
CS	6046+20.58	165,871.50	1,110,703.45
Sec line Xing	72.52' from ST	166,094.65	1,110,659.41
ST	6049+20.58	166,166.10	1,110,647.01
TS	6074+36.78	168,645.25	1,110,216.79
SC	6077+36.78	168,941.26	1,110,168.08
PI	6080+91.12	169,289.96	1,110,104.91
CS	6084+42.77	169,644.31	1,110,108.86
ST	6087+42.77	169,944.30	1,110,107.37
End	6102+83.13	171,484.66	1,110,113.15

CURVE DATA

ARC DEFINITION

Curve Combination		Curve Combination	
PI	= 5895+02.01	PI	= 6040+87.81
Delta	= 42°56'08" (RT)	Delta	= 27°53'09" (RT)
Da	= 02°00'00"	Da	= 02°00'00"
R	= 2,864.93'	R	= 2,864.93'
Ts	= 1,277.16'	Ts	= 861.59'
L	= 1,846.88'	L	= 1,094.36'
Ls	= 300.00'	Ls	= 300.00'
Sc	= 02°59'59"	Sc	= 02°59'59"
Curve Combination		Curve Combination	
PI	= 5985+54.31	PI	= 6080+91.12
Delta	= 30°53'11" (LT)	Delta	= 10°03'35" (RT)
Da	= 02°00'00"	Da	= 01°00'00"
R	= 2,864.93'	R	= 5,729.65'
Ts	= 9,41.81'	Ts	= 654.34'
L	= 1,244.40'	L	= 705.99'
Ls	= 300.00'	Ls	= 300.00'
Sc	= 02°59'59"	Sc	= 01°30'00"

US PUBLIC LAND SURVEY DATA

CORNER	IRN	NORTHING	EASTING
T-145-N R-104-W			
SW Cor Sec 6	1-C	166,372.27	1,104,490.24
NW Cor Sec 8	3-C	166,141.06	1,109,708.64
NW Cor Sec 9	5-C	165,883.04	1,114,994.20
NE Cor Sec 17	5-E	160,614.98	1,114,738.92
NE Cor Sec 20	5-G	155,344.13	1,114,481.53
NE Cor Sec 29	5-J	150,073.71	1,114,220.74
NE Cor Sec 28	7-J	149,835.11	1,119,491.09
SE Cor Sec 22	9-J	149,576.09	1,124,778.17

REFERENCE MARKERS

#	NORTHING	EASTING	STATION	OFFSET	ALIGN
114	163,803.38	1,112,007.66	6021+48	33' Rt	SCL 16 RP
115	168,639.85	1,110,251.30	6074+26	33' Rt	SCL 16 RP

SURVEY CONTROL POINTS

PNT	NORTHING	EASTING	ELEV	STATION	OFFSET	ALIGN	MONUMENT
PRIMARY CONTROL							
GPS 110	147,454.88	1,119,754.83	2,333.34				1 1/2" Alum Cap stamped NDDOT CONTROL
GPS 113	160,578.67	1,114,297.88	2,441.73	5982+03	89' Rt	SCL 16 RP	1 1/2" Alum cap stamped NDDOT CONTROL
GPS 114	167,380.87	1,110,535.12	2,372.63	6061+37	97' Rt	SCL 16 RP	1 1/2" Alum cap stamped NDDOT CONTROL
SECONDARY CONTROL							
CP 32023	152,331.86	1,115,200.82	2,325.60	5899+34	96' Lt	SCL 16 RP	#6 Rebar
RTK 31735	152,585.25	1,115,326.84	2,328.58	5901+41	97' Rt	SCL 16 RP	#6 Rebar
CP 32021	152,714.92	1,115,099.36	2,329.61	5903+18	97' Lt	SCL 16 RP	#6 Rebar
RTK 40000	153,773.58	1,115,157.89	2,331.85	5913+55	96' Rt	SCL 16 RP	#5 Rebar
RTK 50100	166,016.79	1,110,654.56	2,375.07	6047+72	19' Lt	SCL 16 RP	Mag nail
RTK 40002	166,305.15	1,110,721.15	2,369.72	6050+45	97' Rt	SCL 16 RP	#5 Rebar

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

INITIALIZING BENCH MARK
NDGPS Stations (OPUS)

- [x] NAVD-88
- [ ] _____
- [ ] GEOID12B
- [x] GEOID18
- [ ] _____

Date Survey Completed 05/31/23

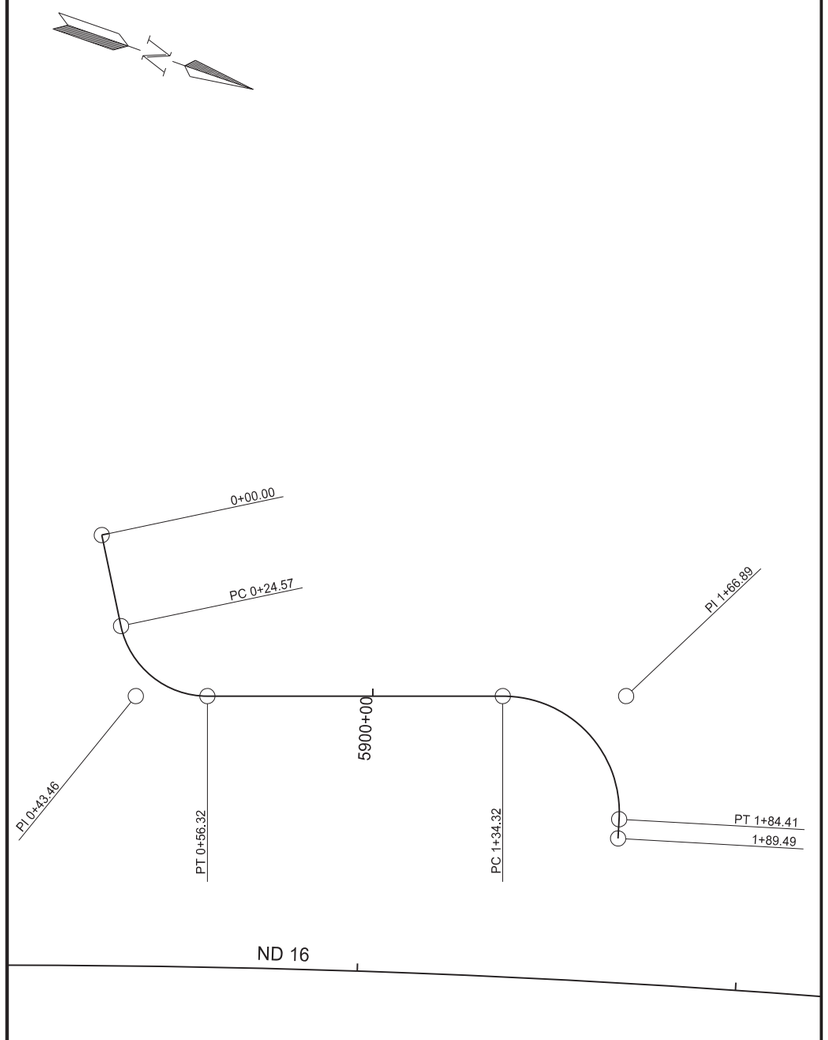
- [ ] Assumed Coordinates
- [x] All coordinates on this sheet are McKenzie County ground coordinates. They are derived from the NAD83(2011) reference frame; North Dakota North Zone Combination Factor (cf) = 0.9998485

NOTES: Alignment based on NDDOT ROW Plat # RS-5-016(07)095

REGISTERED PROFESSIONAL LAND SURVEYOR
STEFAN JOHNSON
LS-10169
DATE
NORTH DAKOTA
06/28/23

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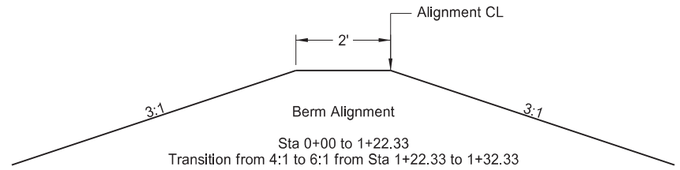
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-5-016(031)111	82	1



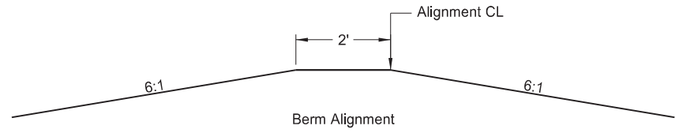
Horizontal Alignment Review Report

Berm Alignment
ND 16
Site 2

		Station	Northing	Easting
Element: Linear				
START	( )	0	152323.557	1115185.341
PC	( )	24.566	152336.247	1115206.375
	Tangential Direction:	N58.898°E		
	Tangential Length:	24.566		
Element: Circular				
PC	( )	24.566	152336.247	1115206.375
COMBINATION	( )	43.462	152346.008	1115222.555
CC	( )		152356.203	1115194.336
PT	( )	56.322	152363.856	1115216.35
	Radius:	23.307		
	Delta:	78.067° Left		
	Degree of Curvature (Arc):	245.837°		
	Length:	31.756		
	Tangent:	18.896		
	Chord:	29.356		
	Middle Ordinate:	5.203		
	External:	6.698		
	Back Tangent Direction:	N58.898°E		
	Back Radial Direction:	S31.102°E		
	Chord Direction:	N19.864°E		
	Ahead Radial Direction:	N70.830°E		
	Ahead Tangent Direction:	N19.170°W		
Element: Linear				
PT	( )	56.322	152363.856	1115216.35
PC	( )	134.323	152437.532	1115190.737
	Tangential Direction:	N19.170°W		
	Tangential Length:	78.002		
Element: Circular				
PC	( )	134.323	152437.532	1115190.737
COMBINATION	( )	166.892	152468.295	1115180.043
CC	( )		152447.641	1115219.814
PT	( )	184.413	152477.241	1115211.359
	Radius:	30.784		
	Delta:	93.227° Right		
	Degree of Curvature (Arc):	186.122°		
	Length:	50.089		
	Tangent:	32.569		
	Chord:	44.744		
	Middle Ordinate:	9.638		
	External:	14.031		
	Back Tangent Direction:	N19.170°W		
	Back Radial Direction:	N70.830°E		
	Chord Direction:	N27.444°E		
	Ahead Radial Direction:	S15.942°E		
	Ahead Tangent Direction:	N74.058°E		
Element: Linear				
PT	( )	184.413	152477.241	1115211.359
END	( )	189.488	152478.635	1115216.239
	Tangential Direction:	N74.058°E		
	Tangential Length:	5.075		



Sta 0+00 to 1+22.33
Transition from 4:1 to 6:1 from Sta 1+22.33 to 1+32.33



Sta 1+32.33 to 1+89.49

Alignment Layout

ND 16
Site 1

CHAD FRISINGER
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07/03/24
ENGINEER
NORTH DAKOTA

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-5-016(031)111	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**	**6**	**26**	**156**
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**	**2**	**59**	**118**
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)		11	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)		10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)		10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)		7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)		7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)		7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)		7	
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)		7	
M4-9-30	30"x24"	DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT		15	
M4-10-48	48"x18"	DETOUR (INSIDE ARROW) RIGHT or LEFT (Mounted on barricade)		7	
M5-1-21	21"x15"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)		7	
M5-1-30	30"x21"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)		9	
M6-1-21	21"x15"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		7	
M6-1-30	30"x21"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		9	
M6-3-21	21"x15"	DIRECTIONAL ARROW UP (Mounted on route marker post)		7	
R1-1-48	**48"x48"**	**STOP**	**4**	**32**	**128**
R1-2-60	60"x60"	YIELD		29	
R2-1-36	**36"x48"**	**SPEED LIMIT __ (Portable only)**	**6**	**30**	**180**
R2-1-48	**48"x60"**	**SPEED LIMIT __**	**4**	**39**	**156**
R2-1aP-24	**24"x18"**	**MINIMUM FEE $150 (Mounted on Speed Limit post)**	**6**	**10**	**60**
R3-2-48	48"x48"	NO LEFT TURN		35	
R4-1-48	48"x60"	DO NOT PASS		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**	**2**	**16**	**32**
R11-2-48	48"x30"	ROAD CLOSED (Mounted on barricade)		12	
R11-2a-48	48"x30"	STREET CLOSED (Mounted on barricade)		12	
R11-3a-60	60"x30"	ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-3c-60	60"x30"	STREET CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC (Mounted on barricade)		15	
W1-3-48	48"x48"	REVERSE TURN RIGHT or LEFT		35	
W1-4-48	**48"x48"**	**REVERSE CURVE RIGHT or LEFT**	**1**	**35**	**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**	**2**	**35**	**70**
W3-4-48	**48"x48"**	**BE PREPARED TO STOP**	**2**	**35**	**70**
W3-5-48	**48"x48"**	**SPEED REDUCTION AHEAD**	**5**	**35**	**175**
W4-2-48	48"x48"	LANE ENDS RIGHT or LEFT		35	
W5-1-48	**48"x48"**	**ROAD NARROWS**	**2**	**35**	**70**
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**	**2**	**35**	**70**
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY		35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL		35	
W13-1P-30	30"x30"	__ MPH ADVISORY SPEED PLAQUE (Mounted on warning sign post)		14	
W14-3-64	64"x48"	NO PASSING ZONE		28	
W16-2P-30	30"x24"	__ FEET PLAQUE (Mounted on warning sign post)		10	
W20-1-48	**48"x48"**	**ROAD WORK AHEAD or _FT or _ MILE**	**6**	**35**	**210**
W20-2-48	48"x48"	DETOUR AHEAD or __ FT or _ MILE		35	
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or __ FT or _ MILE		35	
W20-4-48	**48"x48"**	**ONE LANE ROAD AHEAD or __ FT or _ MILE**	**2**	**35**	**70**
W20-5-48	48"x48"	RIGHT or CENTER or LEFT LANE CLOSED AHEAD or __ FT or _ MILE		35	
W20-7-48	**48"x48"**	**FLAGGER**	**2**	**35**	**70**
W20-8-18	**18"x18"**	**STOP - SLOW PADDLE Back to Back**	**2**	**5**	**10**
W20-52P-54	54"x12"	NEXT __ MILES (Mounted on warning sign post)		12	
W21-1-48	48"x48"	WORKERS		35	
W21-2-48	48"x48"	FRESH OIL		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**	**2**	**35**	**70**
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**	**1820**

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
704-0100	**FLAGGING**	**MHR**	**200**
704-1018	**LANE CLOSURE-SIGNAL CONTROL/FLAGGING CONTROL**	**EACH**	**1**
704-1035	ATTENUATION DEVICE-TYPE B-25	EACH	
704-1043	ATTENUATION DEVICE-TYPE B-65	EACH	
704-1048	**PORTABLE RUMBLE STRIPS**	**EACH**	**2**
704-1050	TYPE I BARRICADES	EACH	
704-1052	**TYPE III BARRICADES**	**EACH**	**2**
704-1060	**DELINEATOR DRUMS**	**EACH**	**18**
704-1065	TRAFFIC CONES	EACH	
704-1067	**TUBULAR MARKERS**	**EACH**	**40**
704-1070	DELINEATOR	EACH	
704-1072	FLEXIBLE DELINEATORS	EACH	
704-1080	**STACKABLE VERTICAL PANELS**	**EACH**	**11**
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**	**2700**
762-0426	**SHORT TERM 24IN LINE-TYPE R**	**LF**	**24**
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/

CHAD FRISINGER
REGISTERED
PROFESSIONAL
PE-4876
03/12/26
ENGINEER
NORTH DAKOTA

Traffic Control Devices List

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-5-016(031)111	175	1

NDDOT
North Dakota Department of Transportation

NORTH DAKOTA DEPARTMENT OF TRANSPORATION
300 AIRPORT ROAD
BISMARCK, ND 58504

LOG OF BORING SB - 1

PROJECT NUMBER SS-5-016(031)111 **DATE STARTED** 8/4/22 **COMPLETED** 8/4/22
PCN 23485 **ELEVATION** 2376 ft
LOCATION Mckenzie County **Northing** 5264312.82 ft **Easting** 125173.68 ft
DRILLED BY Dallan **LOGGED BY** Jamie **DRILLING METHOD**
ENGINEER
NOTES Coordinate System: NAD_1983_UTM_Zone_14N

ELEVATION (ft)	DEPTH (ft)	MATERIAL DESCRIPTION	AASHTO	USCS	SAMPLE TYPE & NUMBER	RECOVERY (%)	SPT N VALUE (20 40 60 80)	MC / PL LL / CLAY FRACTION (%) (20 40 60 80)	TESTS & REMARKS
2375	0	Stiff Moist Brn Lean Clay w/Sand	A-7-6	CL	406	25	12	19 42	
			A-7-6	CL	407	25	7	17 47	
	5		A-6	CL	408	75		18 33	
2370		2370.0 ft 6.0 ft Medium Stiff Moist Brn Lean Clay w/Sand	A-6	CL	409	80	5	17 33	
			A-7-6	ML	410	75		28 43	γ_d = 100.0 pcf γ = 120.1 pcf CU=24.5°, c'=474psf
	10	2365.0 ft 11.0 ft							
2365		Stiff Moist Brn Lean Clay	A-4	CL	411	90	14	27	
	15		A-6	CL	412	80		18 35	
2360			A-6	CL	413	80	14	15 35	
	20	2355.0 ft 21.0 ft	A-6	CL	414	90		29	γ_d = 109.7 pcf γ = 131.7 pcf CU=32.6°, c'=205psf
2355		Soft to Medium Stiff Wet Brn Lean Clay w/Sand. Water bearing starting at 21`	A-4	CL	415	85	5	27	
	25		A-6	CL	416	75		18 34	
2350			A-4	CL	417	90	7	29	
	30		A-2-4	SM	418	100		24	
2345			A-6	CL	419	100	3	30	
	35		A-4	CL-ML	420	100		25	
2340			A-4	CL-ML	421	100	3	26	
	40				422	100			
2335		2334.0 ft 42.0 ft	A-6	CL	423	100	4	16 38	
		Bottom of borehole at 42.0 ft							

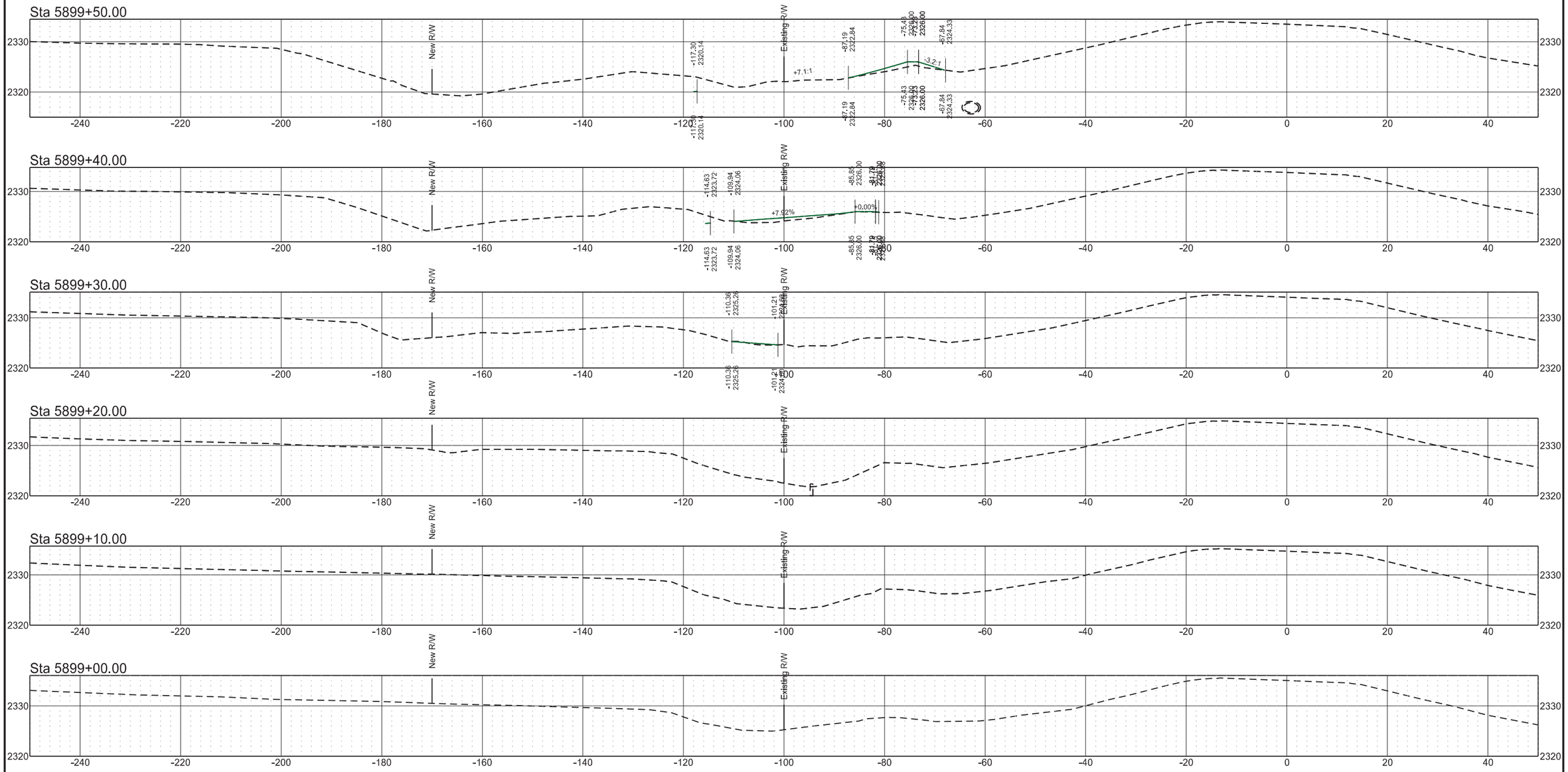
NDDOT LOG 11X17 PLAN SHEET - NDDOT_DATATEMP_20180208.GDT - 4/3/24 10:34 - F:\LAB\PROJECTS\GINT\5-016(031)111.GPJ

REGISTERED PROFESSIONAL ENGINEER
COLTER SCHWAGLER
PE-27747
DATE 04/03/24
NORTH DAKOTA

Boring Log 1

Site 1

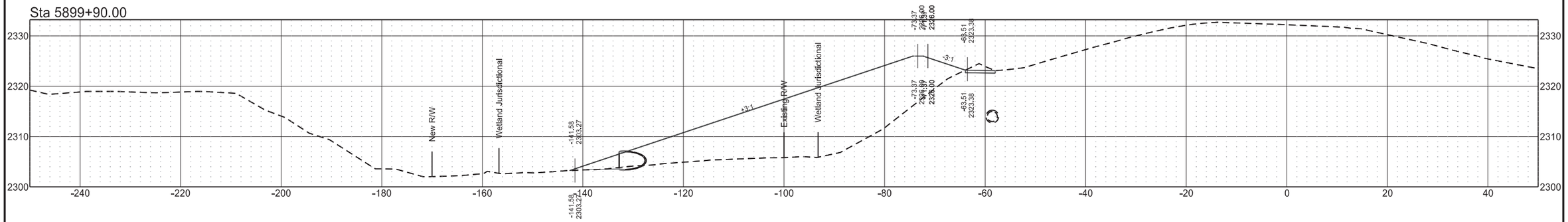
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	ND	SS-5-016(031)111	200	1



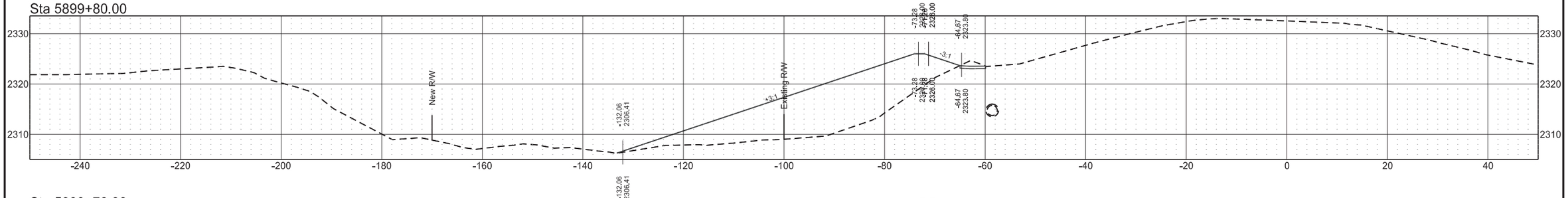
Site 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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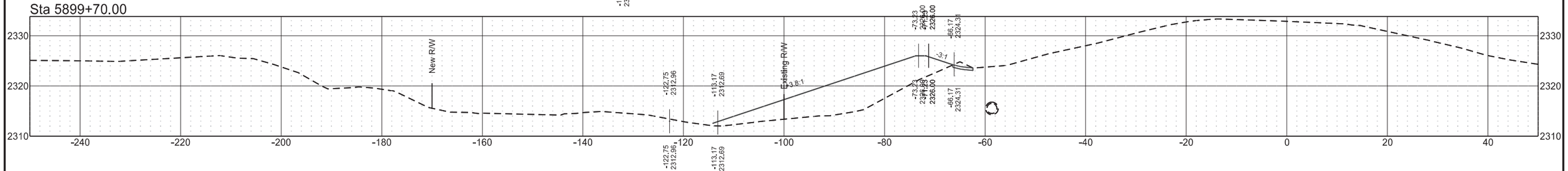
Sta 5899+90.00



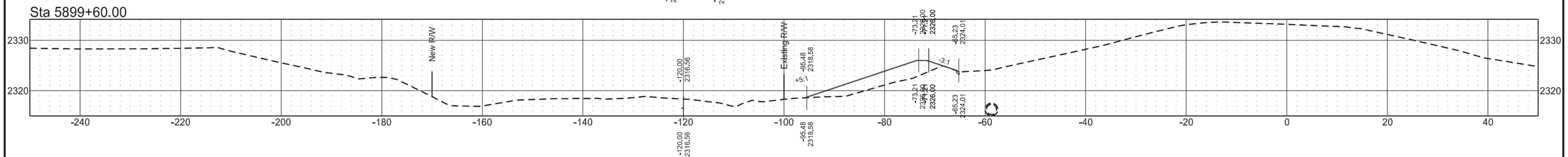
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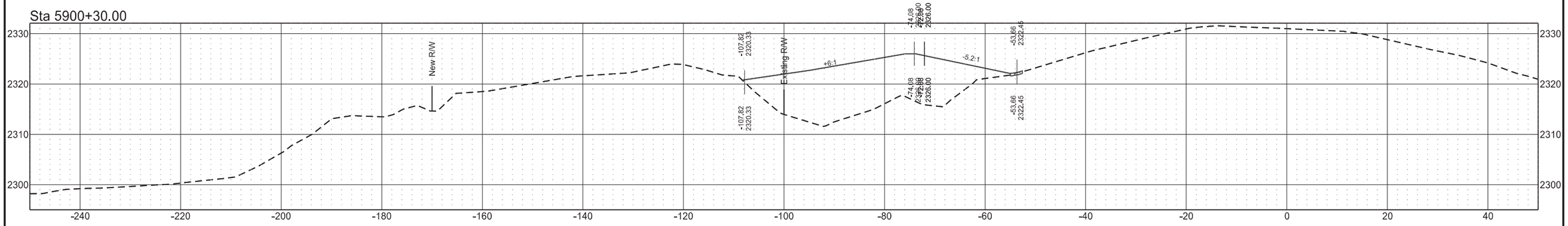
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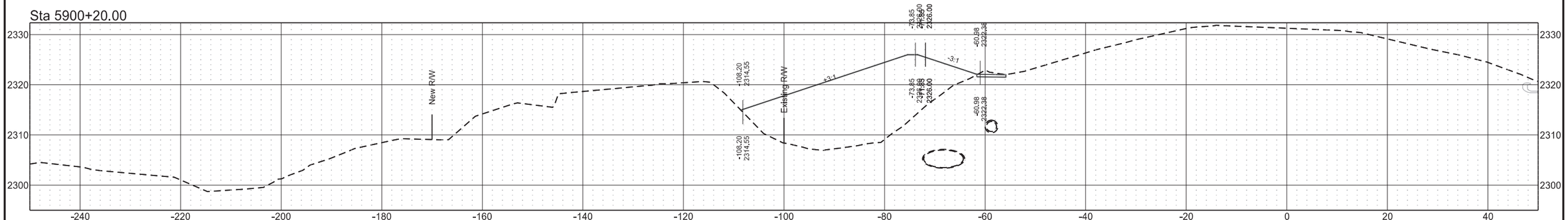
Site 1

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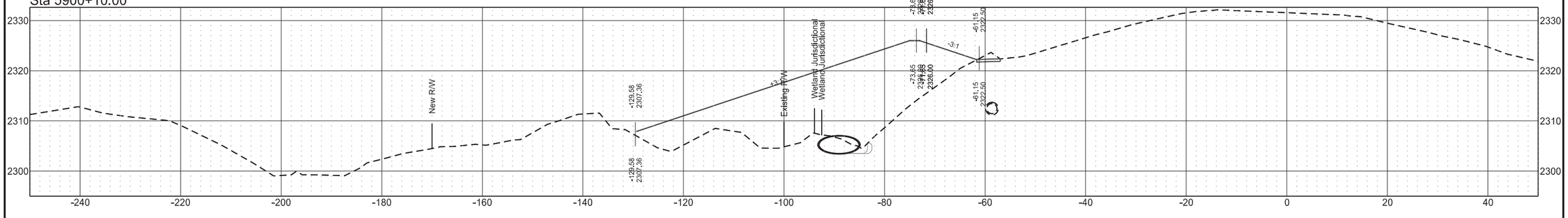
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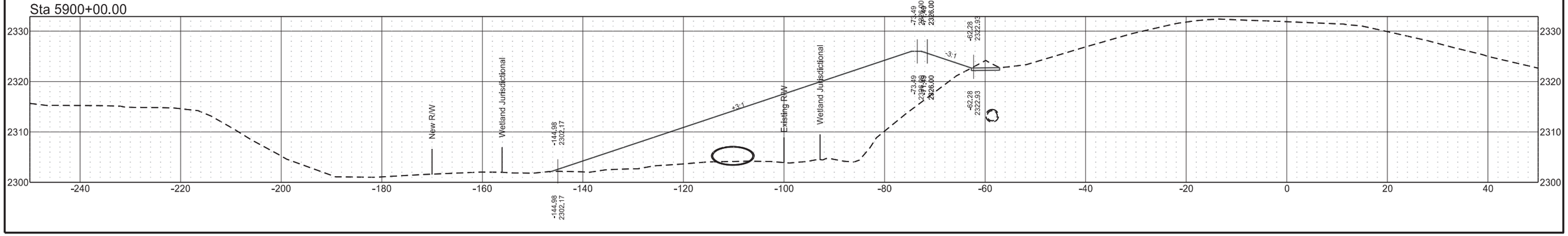
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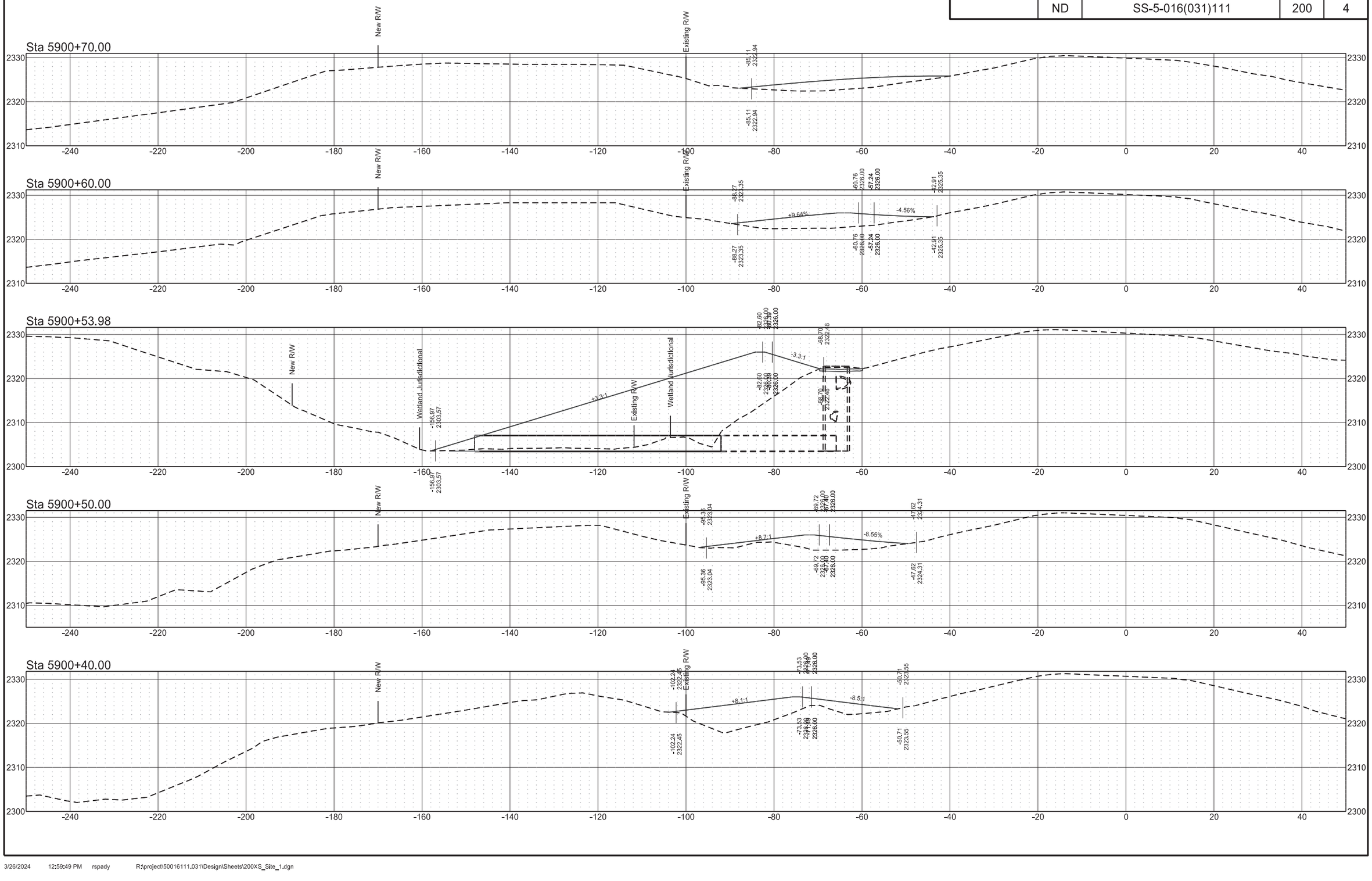


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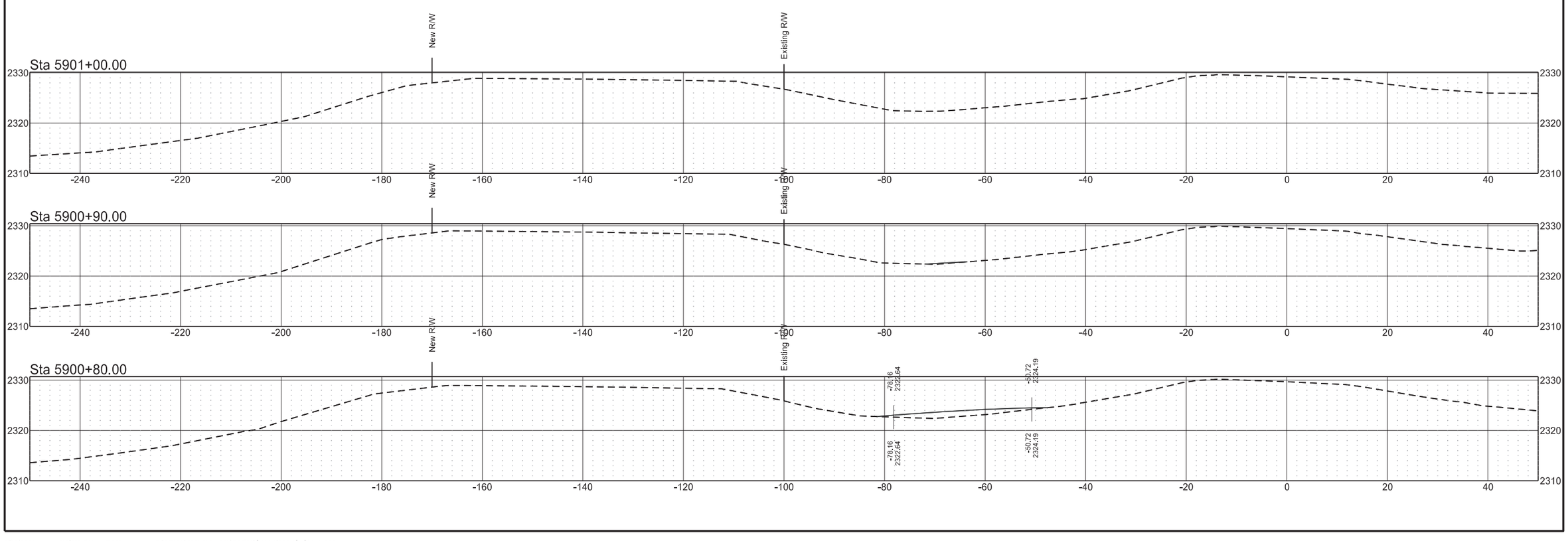
Site 1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-016(031)111	200	4



Site 1

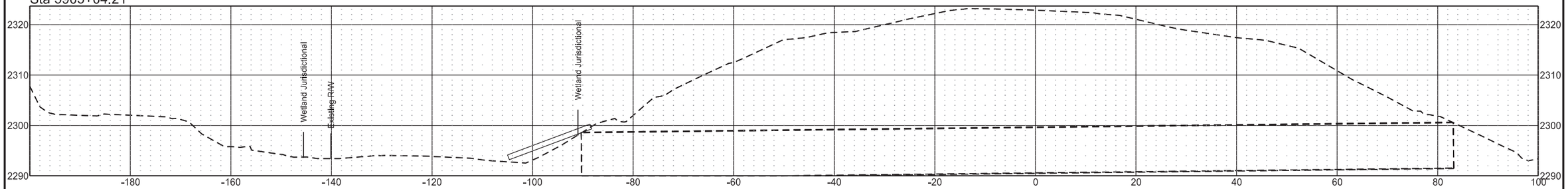
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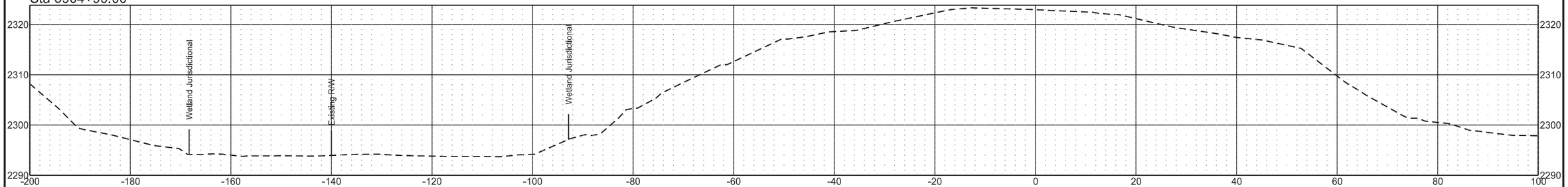
Site 2

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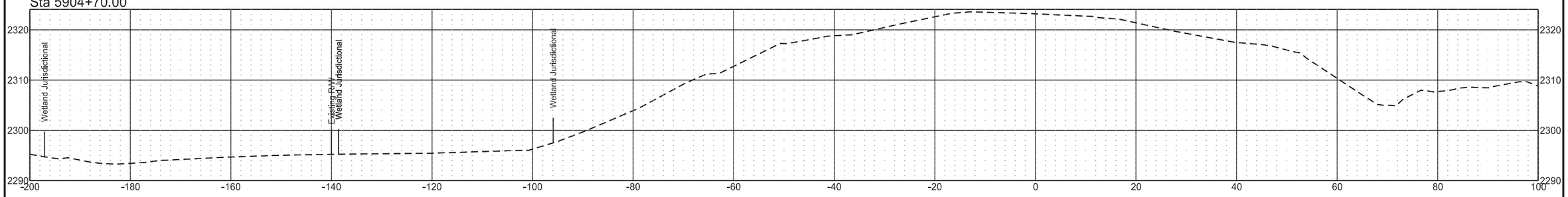
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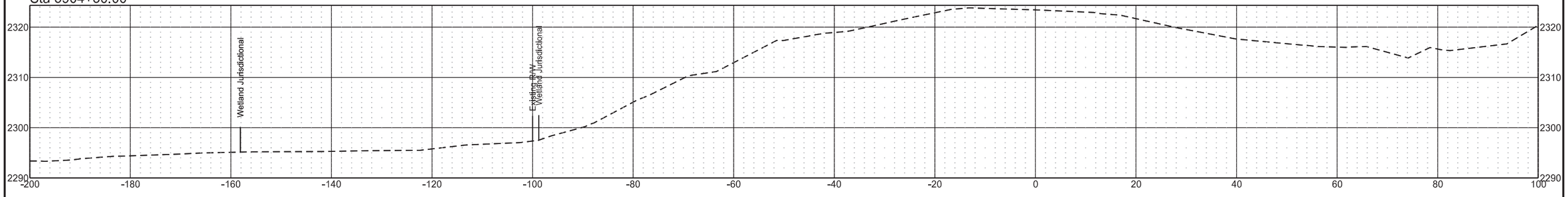
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Sta 5904+70.00



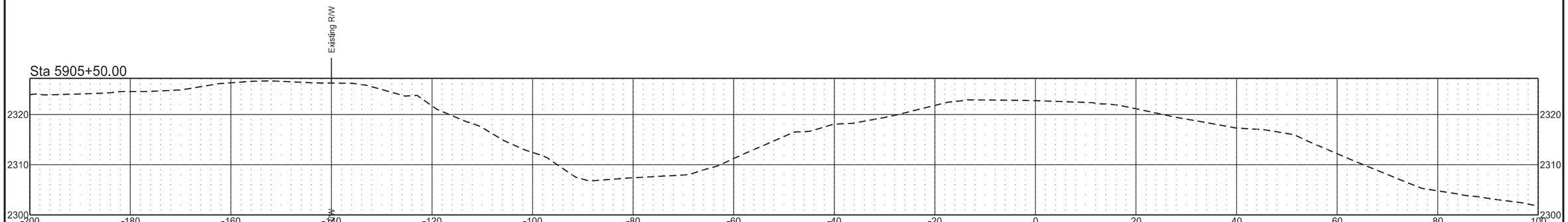
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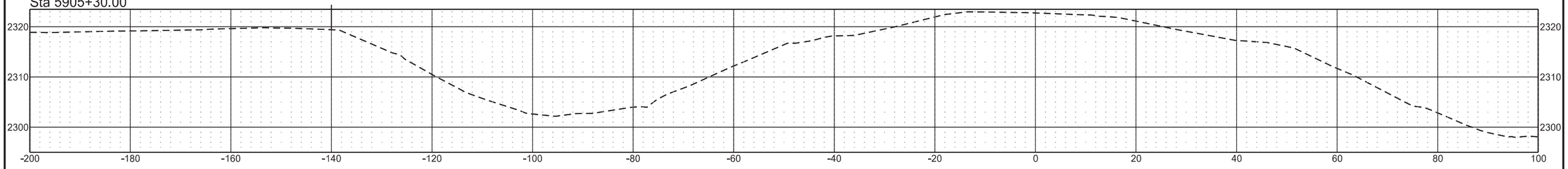
Site 2

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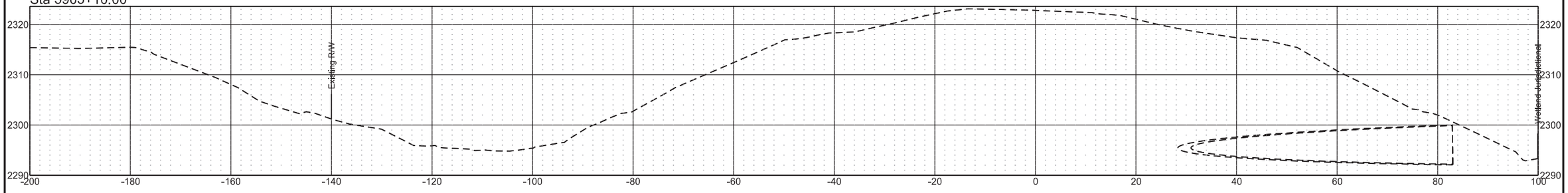
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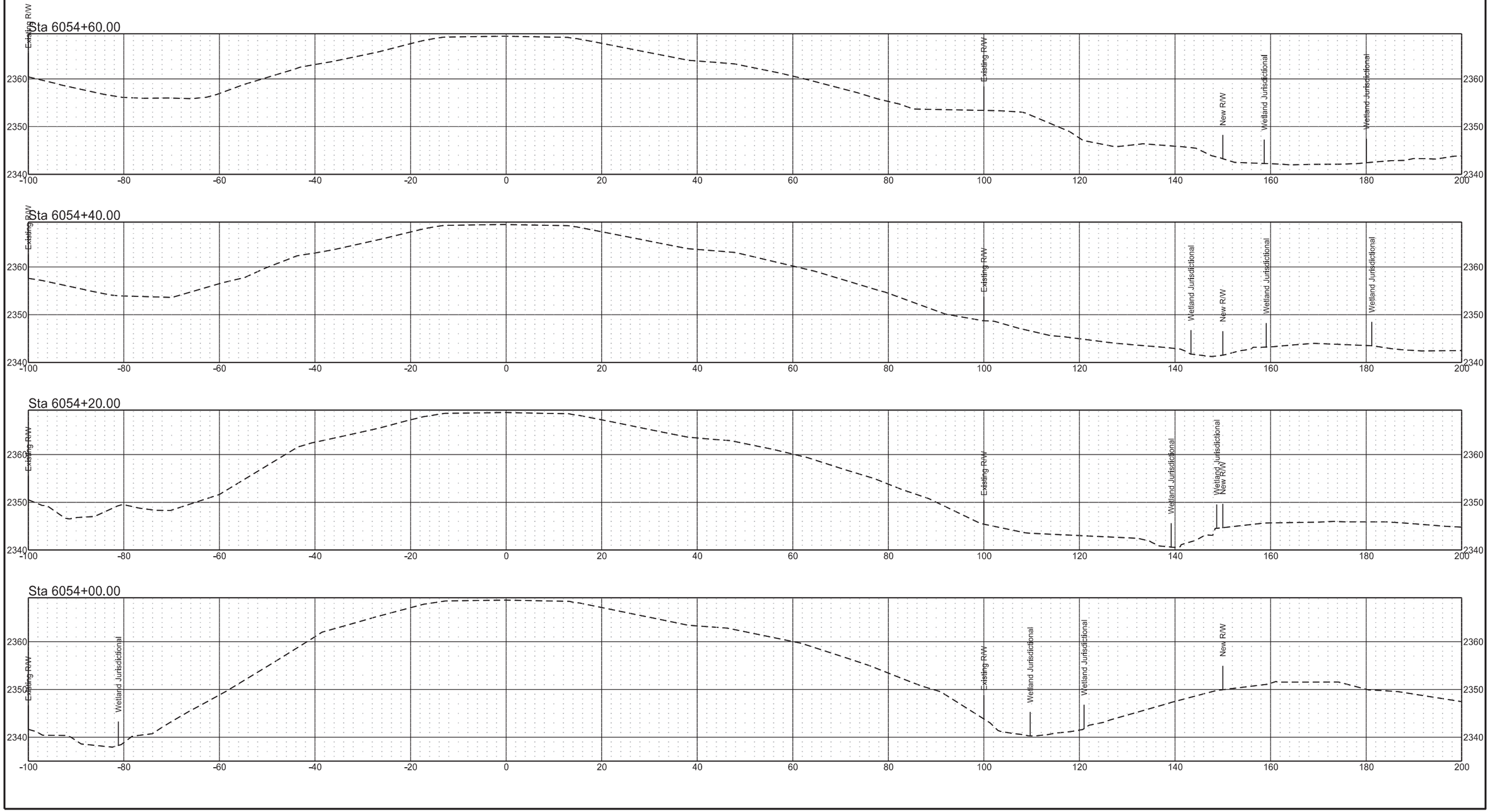


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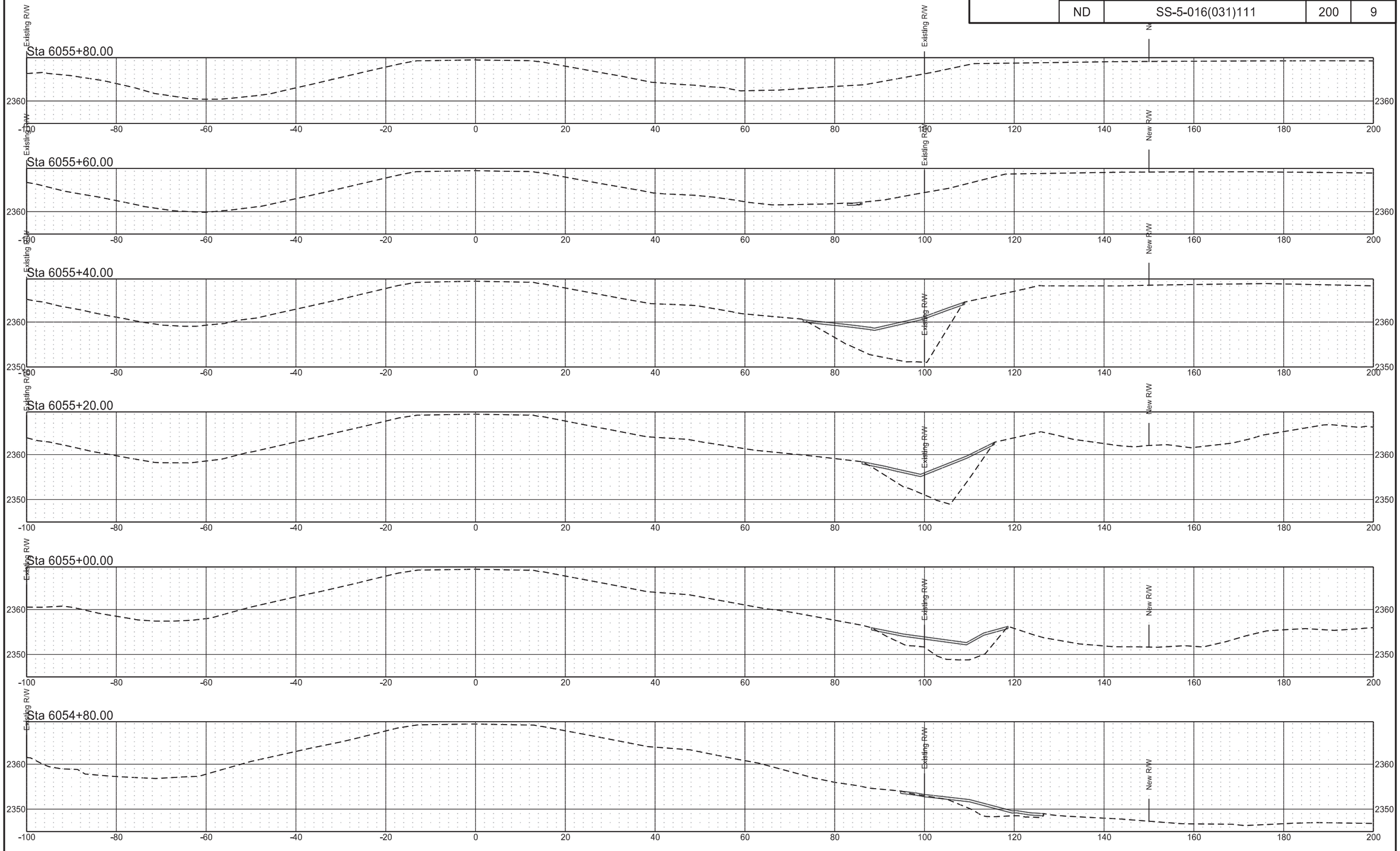
Site 3

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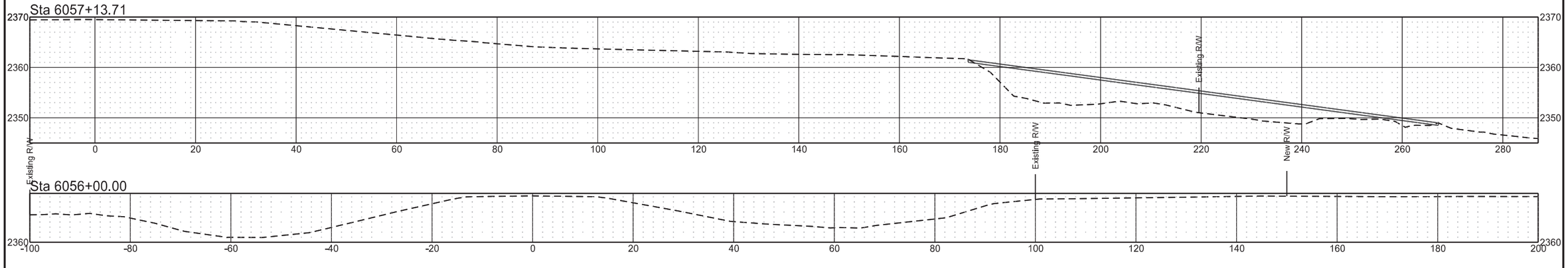
Site 3

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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Site 3

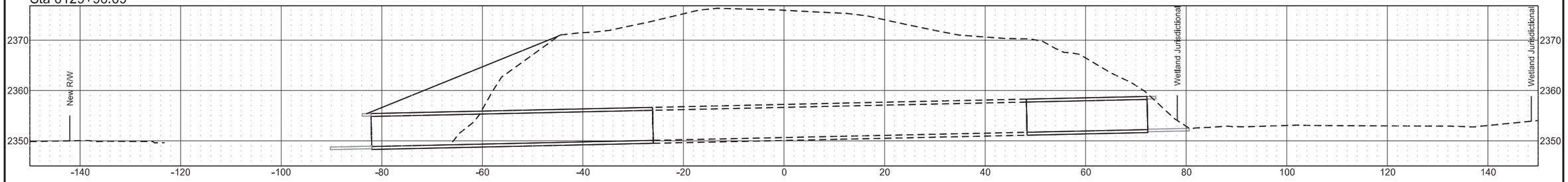
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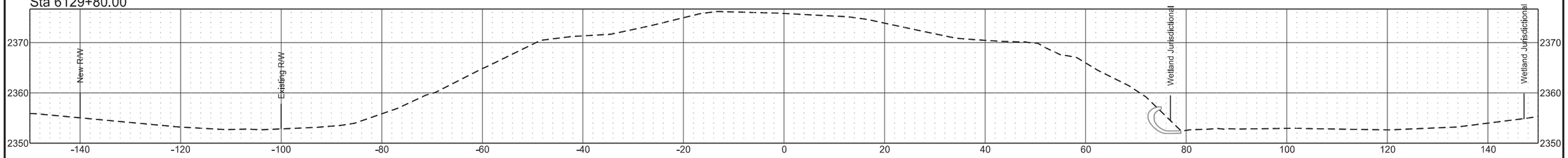
Site 4

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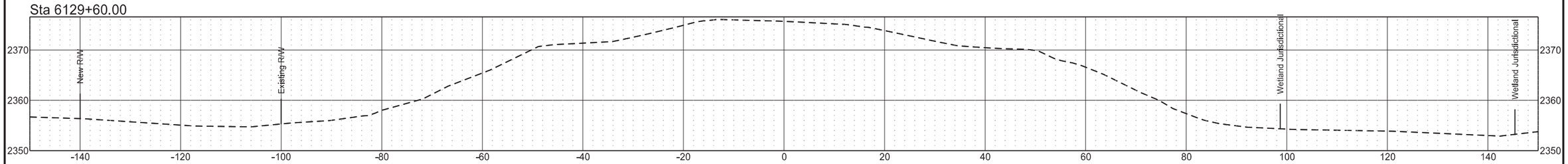
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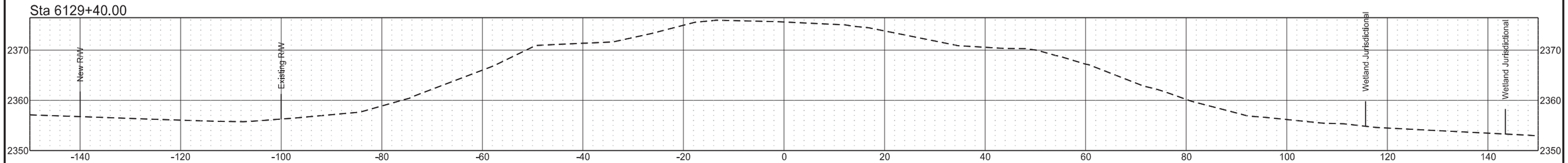
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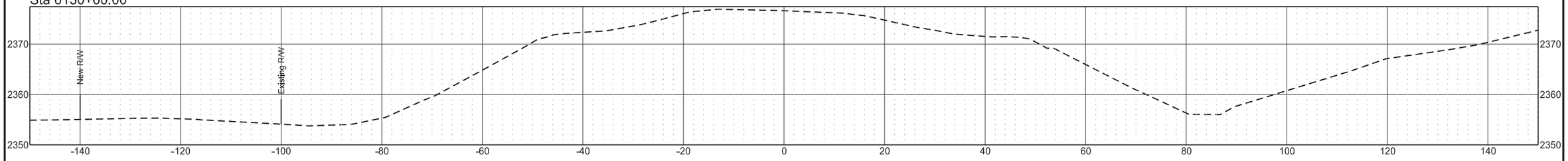
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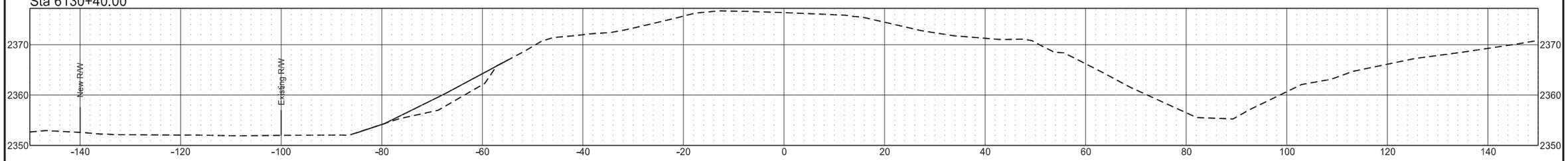
Site 4

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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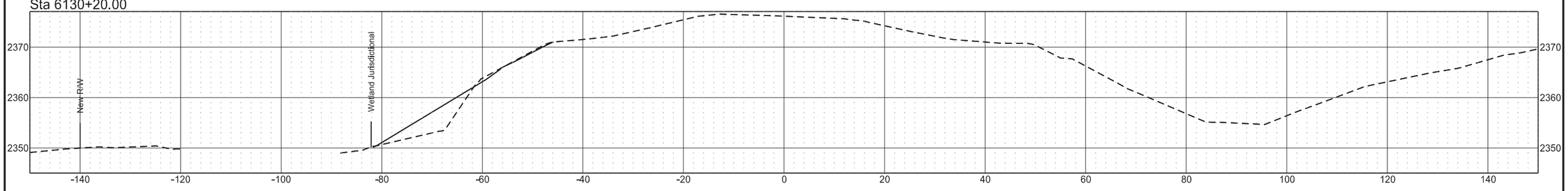
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Sta 6130+40.00



Sta 6130+20.00



Sta 6130+00.00

