DESIGN DATA				
Traffic	Average Daily			
Current 2020	Pass: 2,160	Trucks: 635	Total: 2,795	
Preventive Maintenance				

STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	IM-5-094(158)027	23518	1	1

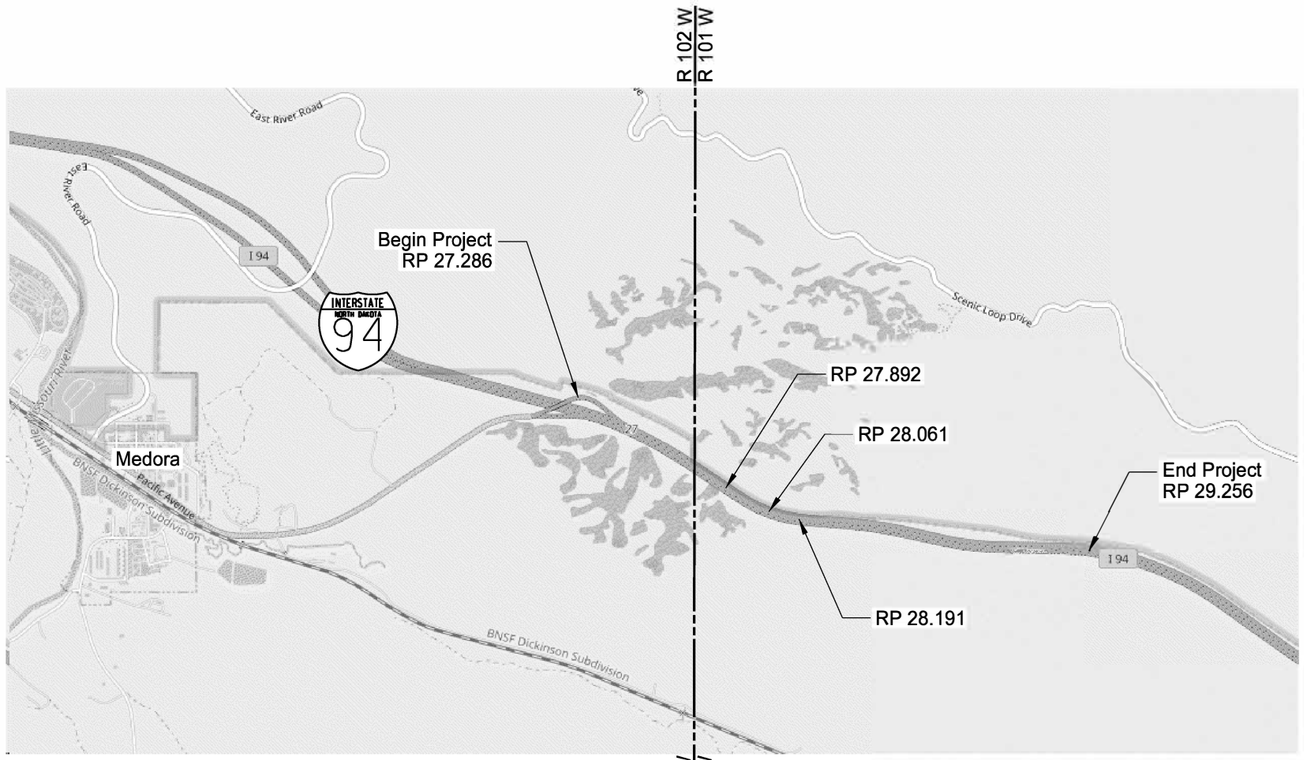
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

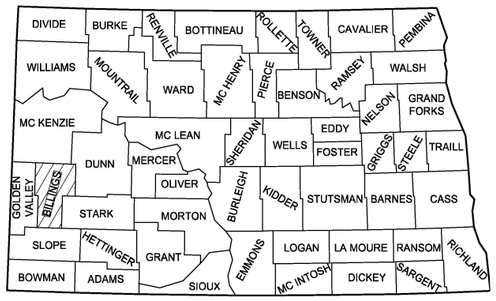
IM-5-094(158)027

Billings County
Interstate 94, W of E Medora Int to 2 Mi E
Culvert Rehabilitation
Grading
Erosion Control

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
IM-5-094(158)027	0.00	1.97





STATE COUNTY MAP

DESIGNER
Kyle Wieler, PE
DESIGNER
Julian Yap, PE
DESIGNER
Stuart Withers

UNITED STATES FOREST SERVICE
Approved by: Grasslands Engineer
CURTIS GRUDNIEWSKI
Digitally signed by CURTIS GRUDNIEWSKI
Date: 2025.12.09 12:49:56 -07'00'

ND DEPARTMENT OF TRANSPORTATION
OFFICE OF PROJECT DEVELOPMENT

kirk Hoff 03/03/26

CIVIL SCIENCE

REGISTERED PROFESSIONAL ENGINEER
CHRISTOPHER H. MAPLES
PE - 10272
DATE 03/03/26
03/03/26
NORTH DAKOTA

12/9/2025 10:13:44 AM cmaples L:\ND\Projects\Active 2022\Tx22216.00 - I -94_W of E Medora Int to 2MI E\700 - CAD\5-094.158.027\Consultant\dgn\Design\Sheets\001TS.dgn

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
4	1	Scope of Work
6	1 - 3	Notes
6	4	Environmental Notes
8	1	Quantities
11	1	Data Tables
20	1 - 2	General Details
50	1	Hydraulic Data
50	2	Inlet and Manhole Summary
51	1	Allowable Pipe List
60	1 - 5	Plan & Profile
75	1 - 7	Wetland Impacts
76	1 - 5	Temporary Erosion Control
77	1 - 5	Permanent Erosion Control
81	1	Survey Coordinate and Curve Data
82	1	Survey Data Layouts
100	1	Work Zone Traffic Control

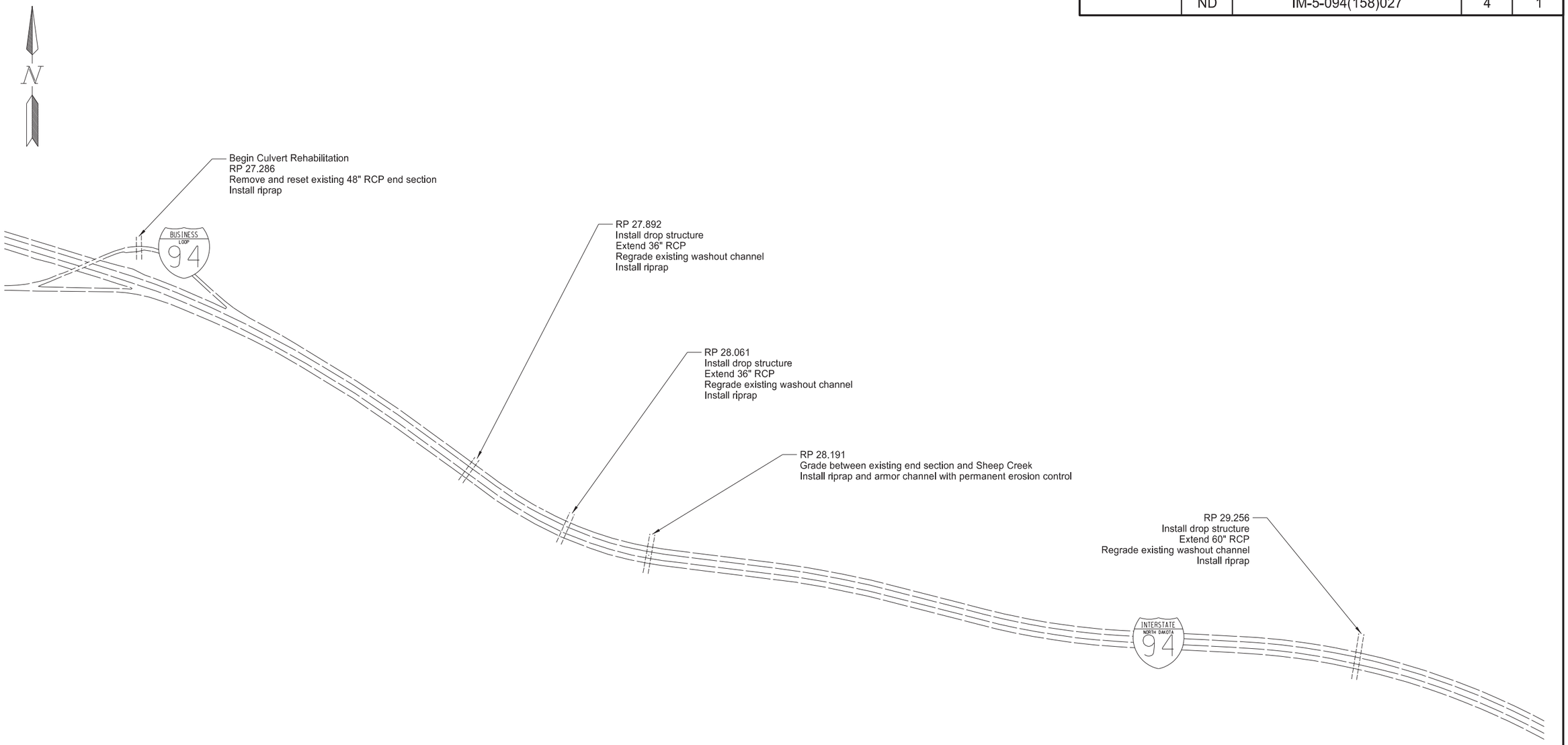
LIST OF STANDARD DRAWINGS

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-704-12	Shoulder Closure Tapers
D-704-13	Barricade And Channelizing Device Details
D-704-14	Construction Sign Punching And Mounting Details
D-704-24	Shoulder Closures And Bridge Painting Layouts
D-704-35	Sign Layout For One Lane Closure - Interstate System
D-704-50	Portable Sign Support Assembly
D-714-1	Reinforced Concrete Pipe Culverts And End Sections (Round Pipe)
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-722-5	Manhole Details
D-752-2	Chain Link Fence

SPECIAL PROVISIONS

Number	Description
SSP 1	Temporary Erosion and Sediment Best Management Practices
SSP 2	Federal Migratory Bird Treaty Act
PSP 32(25)	Permits and Environmental Considerations
SP 212(25)	US Forest Service Considerations

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Scope of Work
Project Area

W of Medora Int to 2 Mi E
Billings County

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PE - 10272
DATE 12/01/23
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NOTES

GENERAL NOTES

100-P01 TIMING RESTRICTIONS: Timing of construction activities are limited in proximity to the Theodore Roosevelt National Park (TRNP). Timing restrictions are for the work areas located at:

- RP 27.892
- RP 28.061
- RP 28.191
- RP 29.256

In these areas, construction activities are limited to 6 am to 8 pm mountain time. Regular construction activities include any activity that adds additional noise to the environment such as movement of heavy equipment.

Certain construction activities may require work outside of these times. Submit a written request to the Engineer at least 30 calendar days prior to working outside of the restricted time frame. The Engineer will notify the National Park Service (NPS) of the request. Requests that do not add substantial ambient noise will be considered.

The Department bears no liability for costs or delays resulting from the Engineer's approval or rejection of a request to perform outside the restricted time frame.

100-P02 WORKING DAYS: Construction activities are to be limited to weekdays. Submit requests to perform work on weekends to the Engineer at least 7 days prior to the requested weekend work.

The Engineer will notify the National Park Service (NPS) of the request.

The Department bears no liability for costs or delays resulting from the Engineer's approval or rejection of a request to perform outside the restricted time frame.

100-P03 SCHEDULING: No construction activities will be allowed prior to March 1.

107-300 CONSTRUCTION TRAFFIC ACCESS: Access areas within the right of way only at interchanges.

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

203-0119 TOPSOIL-IMPORTED
251-0300 SEEDING CLASS III
251-1000 WETLAND SEED
251-2000 TEMPORARY COVER CROP
900-0700 FLEXIBLE GROWTH MEDIUM

201-P01 CLEARING & GRUBBING: Remove old CSP pipes, tires and garbage in the existing drainage channels. Include all cost for labor, materials, and equipment in the contract unit price bid for "CLEARING & GRUBBING".

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

203-P01 COMMON EXCAVATION-TYPE A: Common excavation quantities are provided for volume total amounts. Include all materials, labor, and equipment necessary for Common Excavation-Type A in the contract unit price bid for "RIPRAP GRADE _".

203-P02 COMMON EXCAVATION-TYPE B: Common excavation quantities are provided for volume total amounts. Include all materials, labor, and equipment necessary for Common Excavation-Type B in the contract unit price bid for "RIPRAP GRADE _".

203-P03 BORROW EXCAVATION: Earthwork quantities are provided for information purposes only. The borrow source material will be acquired by the Contractor. Include all materials, labor, and equipment necessary for Borrow Excavation in the contract unit price bid for "RIPRAP GRADE _".

203 P04 COMMON EXCAVATION-WASTE: Waste material will become the property of the Contractor.

251-P01 ORDER OF OPERATIONS FOR TEMPORARY STABILIZATION:

1) Seed Temporary Cover Crop
2) Install Flexible Growth Medium

251-P02 ORDER OF OPERATIONS FOR SEEDING: Due to the spring seeding restriction for Seeding Class III, perform seeding as follows: Plant Seeding Class III in accordance with NDDOT Specifications 251.04 C.

Year 1

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

Year 2: Prior to June 15th

- Seed Class III and place erosion control as shown in Section 77.
  - Seed Class III through the established vegetation.

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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 (lbs/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.

256-P01 RIPRAP: Existing riprap 12 inches or larger in diameter at project sites must be salvaged for use on the project if clean and free of debris and blended with imported riprap materials. Engineer has final authority to approve or deny use of existing riprap.

Place riprap within 7 days of pipe installation/channel construction to minimize erosion potential. All costs to complete the above-described work are included in the contract unit price bid for “RIPRAP GRADE _.”

261-P01 FIBER ROLLS 12IN: Place fiber rolls as needed to stabilize slopes used for access to the project site locations. An additional 200 LF of FIBER ROLLS 12IN has been included for discretionary purposes.

704-P01 TRAFFIC CONTROL DEVICES: The traffic control devices list is based on Contractor performing work at one culvert location at a time. The developed list uses the Standard Drawings for traffic control:

D-704-24, Layout HH for Shoulder Closed on Freeway

D-704-35, Sign Layout for One Lane Closure Interstate System.

Limit the project to one lane closure at a time with a maximum length of 1 mile.

704-P02 SEQUENCING ARROW PANEL - TYPE C: Provide solar powered arrow panels that meet the requirements of the MUTCD and ITE and that are capable of operating for 20 days without a solar charge.

Include all costs for materials, equipment, labor, and incidentals in the contract unit price bid for “SEQUENCING ARROW PANEL - TYPE C”.

714-P01 TRENCH SHORING: Utilize shoring between the proposed improvements and the edge of pavement in accordance with current OSHA standards. Protect existing pipe in place. Include all cost for labor, materials, and equipment in the contract unit price bid for “PIPE CONC REINF 36IN CL III” and “PIPE CONC REINF 60IN CL III”.

714-P02 CULVERT TIES: Tie all culvert joints in accordance with Std Dwg D-7-14-22. Include all cost for labor, materials, and equipment in the contract unit price bid for “PIPE CONC REINF 36IN CL III” and “PIPE CONC REINF 60IN CL III”.

722-100 MANHOLES: Riser heights for manholes are noted in the plans. Fill the bottom of each manhole structure with concrete, up to the lowest invert elevation. See NDDOT standard detail D-722-5.

752-P01 FENCE REMOVE & RESET: At each culvert locations access Theodore Roosevelt National Park (TRNP) directly adjacent to the existing culvert. To access TRNP cut the existing park fence at the centerline of the culvert. Roll fence back no further than the nearest post with diagonal braces. Install brace assemblies at the limits of fence removal. Carefully remove existing fence posts to reuse when restoring fence. Protect existing braced posts in place. Construct temporary fence around the work area inside the NDDOT ROW utilizing 6’ x 24’ TRNP fence panels. Contact TRNP to arrange collection of 14 fence panels.

Philip McCall
Chief of Facility Management
701-690-8745

Provide 42’ of separation between motorists and the fence panels. Arrange fence panels such that there are no gaps between panels as well as the existing fence. During working hours when the Contractor is active at a culvert location one fence panel may be moved to provide access to the site.

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During this time the Contractor will ensure that no wildlife enter the ROW through the gap. Whenever workers are not currently working at a culvert location fence panels must be positioned such that there are no gaps between panels as well as the existing fence. Allow TRNP and NDDOT to inspect the fence panels prior to picking them up and when they are returned. The Contractor is liable for any damage to fence panels and will repair or replace damaged panels.

After construction reset the existing fence. When resetting fence leave brace assemblies added for fence removal in place. Reset existing fence posts matching existing post spacing. Stretch the fence back to original position and reconnect using appropriate crimpers. Include all costs for labor, materials, and equipment in the contract unit price bid for “FENCE REMOVE & RESET”.

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.”

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ENVIRONMENTAL NOTES

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

EN-1 SPAWNING RESTRICTION: Do not work within Sheep Creek from April 15 to June 1.

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 WOODY VEGETATION MITIGATION: Complete a tree/shrub count prior to tree/shrub removals. The count will be added to NDDOT's Tree Impact and Mitigation Ledger.

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Estimated Quantities

SPEC	CODE	ITEM DESCRIPTION	UNIT	IM-5-094(158)027				TOTAL
103	0100	CONTRACT BOND	L SUM	0.34				0.34
201	0330	CLEARING & GRUBBING	L SUM	0.64				0.64
202	0169	REMOVAL OF END SECTION-ALL TYPES & SIZES	EA	3				3
202	0170	REMOVAL OF CULVERTS-ALL TYPES & SIZES	LF	72				72
203	0119	TOPSOIL-IMPORTED	CY	447				447
251	0300	SEEDING CLASS III	ACRE	0.41				0.41
251	1000	WETLAND SEED	ACRE	0.07				0.07
251	2000	TEMPORARY COVER CROP	ACRE	0.48				0.48
256	0100	RIPRAP GRADE I	CY	96				96
256	0200	RIPRAP GRADE II	CY	199				199
256	0300	RIPRAP GRADE III	CY	580				580
261	0112	FIBER ROLLS 12IN	LF	1552				1552
261	0113	REMOVE FIBER ROLLS 12IN	LF	676				676
702	0100	MOBILIZATION	L SUM	0.34				0.34
704	1000	TRAFFIC CONTROL SIGNS	UNIT	508				508
704	1052	TYPE III BARRICADE	EA	1				1
704	1060	DELINEATOR DRUMS	EA	25				25
704	1067	TUBULAR MARKERS	EA	60				60
704	1087	SEQUENCING ARROW PANEL-TYPE C	EA	1				1
709	0155	GEOSYNTHETIC MATERIAL TYPE RR	SY	666				666
714	0905	PIPE CONC REINF 36IN CL III	LF	180				180
714	1310	PIPE CONC REINF 60IN CL III	LF	76				76
714	3035	END SECT-CONC REINF 36IN	EA	2				2
714	3055	END SECT-CONC REINF 60IN	EA	1				1
714	9660	REMOVE & RELAY END SECTION-ALL TYPE & SIZES	EA	1				1
722	0107	MANHOLE 54IN	EA	2				2
722	0130	MANHOLE 84IN	EA	1				1
722	1106	MANHOLE RISER 54IN	LF	48.44				48.44
722	1130	MANHOLE RISER 84IN	LF	34.72				34.72
752	0920	FENCE REMOVE & RESET	L SUM	1				1
900	0700	FLEXIBLE GROWTH MEDIUM	SY	4670				4670
902	0400	MACHINE HYGIENE	L SUM	0.34				0.34

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Culvert Rehabilitation Locations	Common Excavation – Type A* (CY)	Common Excavation – Type B* (CY)	Embankment* (CY)	Borrow – Excavation* (CY)		Common Excavation - Waste* (CY)	Topsoil - Imported** (CY) Pay Item
				Type A	Type B		
	A	A	B	C = B - A		D = A - B	F
RP 27.286	--	0	142	--	142	--	27
RP 27.892	31	--	1,314	1,283	--	--	106
RP 28.061	29	--	92	63	--	--	45
RP 28.191	--	1,032	5	--	--	1,027	146
RP 29.256	63	--	1,110	1,047	--	--	123
Subtotals				2,393	142		
Totals	123	1,032	2,663	**2,535**		**1,027**	**447**

* Earthwork quantities are for informational purposes only.

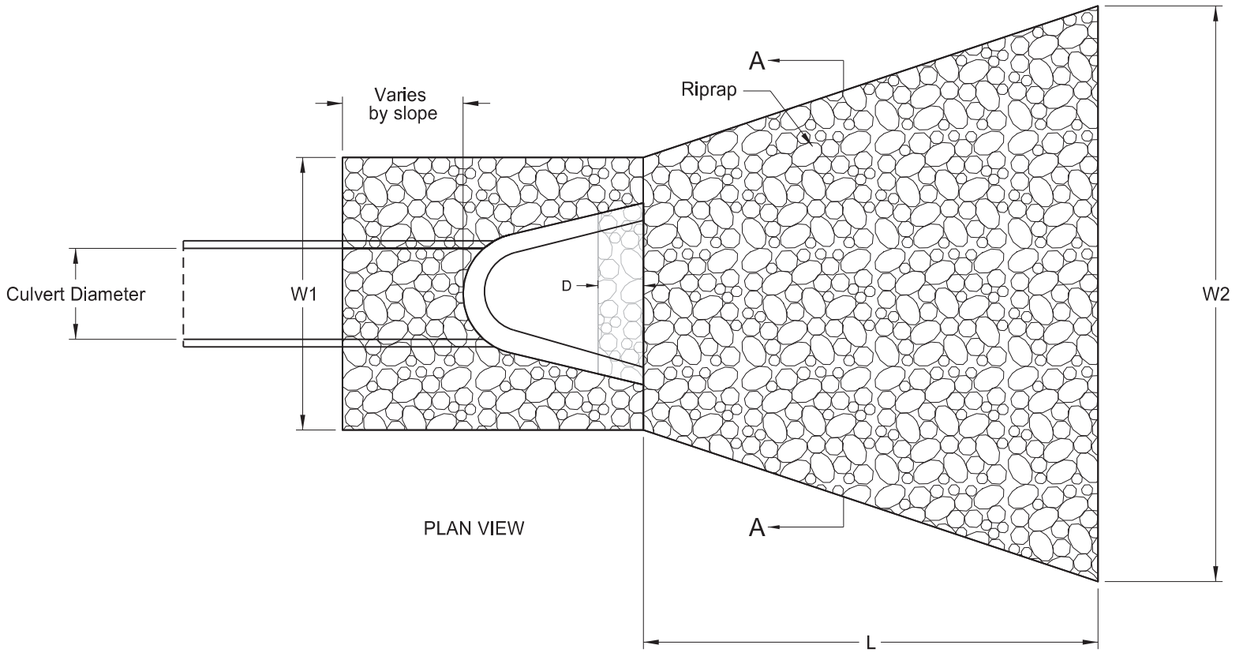
**Topsoil to be spread evenly within disturbed area.

Earthwork Summary

All Locations

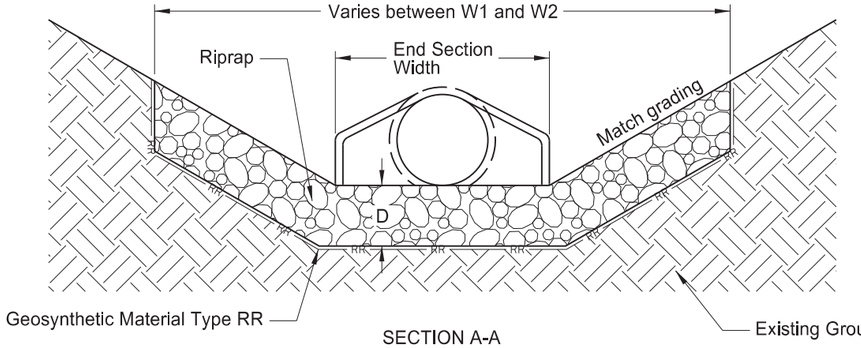
REGISTERED PROFESSIONAL ENGINEER
CHRISTOPHER H. MAPLES
PE - 10272
DATE 03/28/24
NORTH DAKOTA

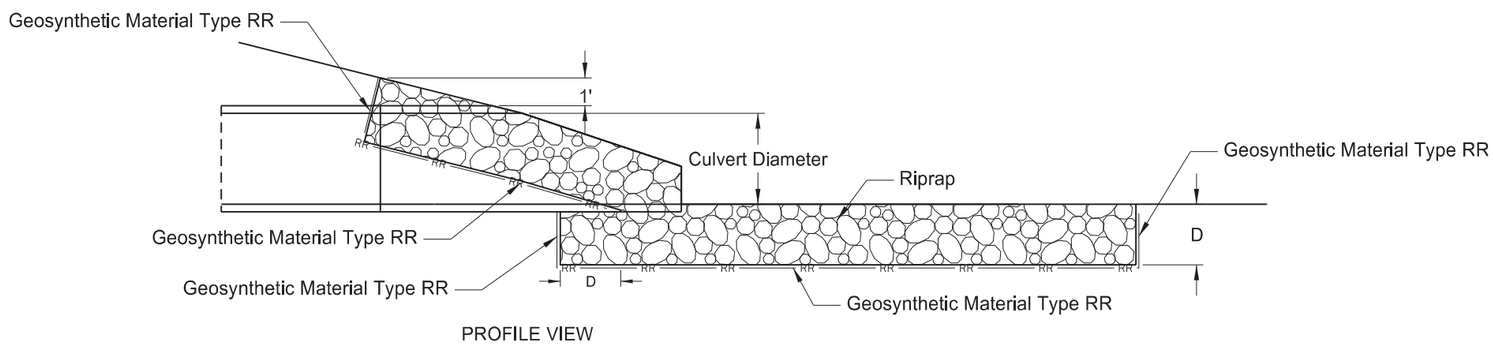
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Location	Dimensions: Culvert Diameter (inches)	L (feet)	W1 (feet)	W2 (feet)	Riprap Depth, D (inches)	Riprap Grade	Quantities: Geosynthetic Material Type RR (SY)	Riprap Grade I (CY)	Riprap Grade II (CY)	Riprap Grade III (CY)
RP 27.286*	48	35	30	33	44	II	163		199	
RP 27.892	36	12	10	14	30	I	29	25		
RP 28.061	36	11	10	14	30	I	28	24		
RP 29.256	60	20	12	23	30	I	59	50		
TOTAL							279	99	199	

Note: These quantities are included in the total quantities in Section 77.
*See additional layout details on Section 77 Sheet 1.



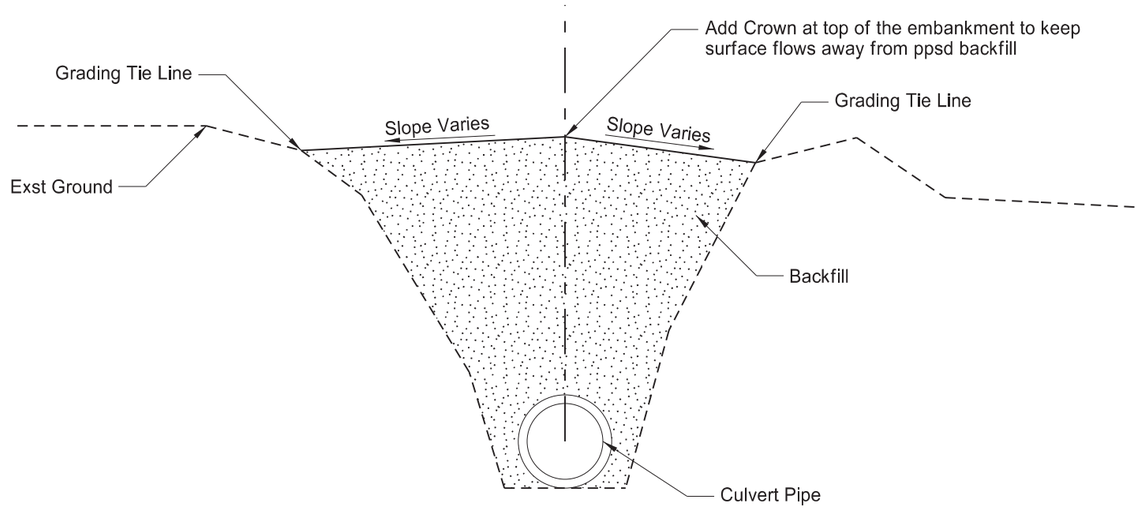


Riprap at Pipe Outlets

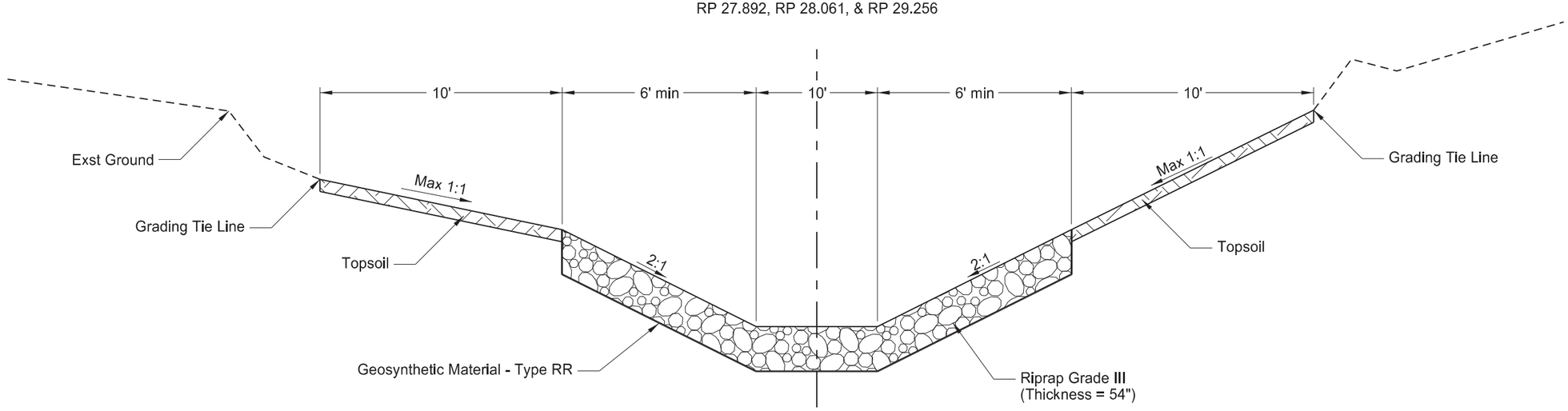
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Backfill Cross Section Details
RP 27.892, RP 28.061, & RP 29.256



Ditch Cross Section
RP 28.191

Detail for Pipe Backfills & Ditch

W of Medora Int to 2 Mi E
Billings County, ND

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HYDRAULIC DATA FOR IM-5-094(158)027 (A)									
				50 - YEAR DATA				100 - YEAR DATA	
RP	EXISTING PIPE	PROPOSED PIPE SIZE	DRAINAGE AREA (ACRES)	DESIGN DISCHARGE (CFS)	DESIGN HEADWATER (FT)	DESIGN VELOCITY (FPS)	DESIGN STAGE (NAVD 88)	100-YEAR DISCHARGE (CFS)	100-YEAR STAGE (NAVD 88)
27.892	36"x216' RCP	36" (B)	19.7	55	4.36	8.2	2425.34	125	2428.10
28.061	36"x252' RCP	36" (B)	17.5	50	3.94	7.6	2429.83	114	2438.38
29.256	60"x360' RCP	60" (B)	61.5	133	5.13	8.0	2483.85	153	2484.44
(A) Hydraulic Data provided is for smooth-walled (Manning's n=0.012) type conduits.									
(B) Includes drop manhole structure.									

Culvert Hydraulic Data

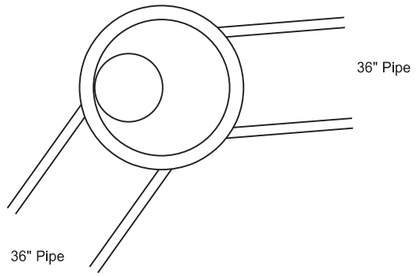
All Locations

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CHRISTOPHER H. MAPLES
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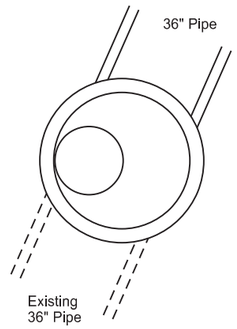
Manhole No. RP 27.892
Type Manhole 54IN
Sta. 233+00, 126' Lt
Rim Elev. 2420.12'
Base Elev. 2395.57'
Invert Elev. 2396.57'
H' Dist 22.21'

Inv SW 2414.45 Pipe Conduit 36IN-Storm Drain
Inv E 2396.57 Pipe Conduit 36IN-Storm Drain



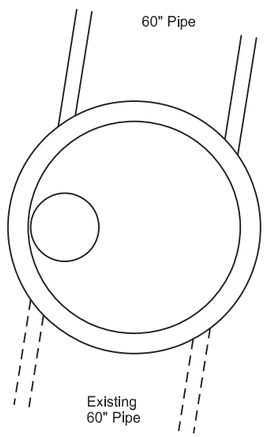
Manhole No. RP 28.061
Type Manhole 54IN
Sta. 241+91, 100' Lt
Rim Elev. 2429.30'
Base Elev. 2400.90'
Invert Elev. 2401.90'
H' Dist 26.23'

Inv SW 2416.81 Existing Pipe Conduit 36IN-Storm Drain
Inv NE 2401.74 Pipe Conduit 36IN-Storm Drain



Manhole No. RP 29.256
Type 84IN
Sta. 305+12, 181' Lt
Rim Elev. 2492.06'
Base Elev. 2455.01'
Invert Elev. 2456.18'
H' Dist 34.72'

Inv S 2468.77 Existing Pipe Conduit 60IN-Storm Drain
Inv N 2456.18 Pipe Conduit 60IN-Storm Drain



Manhole Summary

All Locations

REGISTERED PROFESSIONAL ENGINEER
CHRISTOPHER H. MAPLES
PE - 10272
DATE 12/01/23
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(158)027	51	1

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	(*) End Sections		Applicable Backfill
													Begin	End	
				In	Bid Item	LF		In	Type		In	SY	EA	EA	
233+00 / RP 27.892	112' Lt	233+00 / RP 27.892	126' Lt	36	714 0905	14	Reinforced Concrete Pipe - Class III **(barrel length = 14 LF)**	36							Standard D-714-27
233+00 / RP 27.892	126' Lt	233+77 / RP 27.892	204' Lt	36	714 0905	112	Reinforced Concrete Pipe - Class III **(barrel length = 112 LF)** With 15° Horiz. Bend (**)	36						FES	Standard D-714-27
241+91 / RP 28.061	100' Lt	241+91 / RP 28.061	154' Lt	36	714 0905	54	Reinforced Concrete Pipe - Class III **(barrel length = 54 LF)**	36						FES	Standard D-714-27
305+12 / RP 29.256	181' Lt	305+08 / RP 29.256	257' Lt	60	714 1310	76	Reinforced Concrete Pipe - Class III **(barrel length = 76 LF)**	60						FES	Standard D-714-27

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
(**) 15° Horizontal Bend is incidental to 714-0905 PIPE CONC REINF 36IN CL III

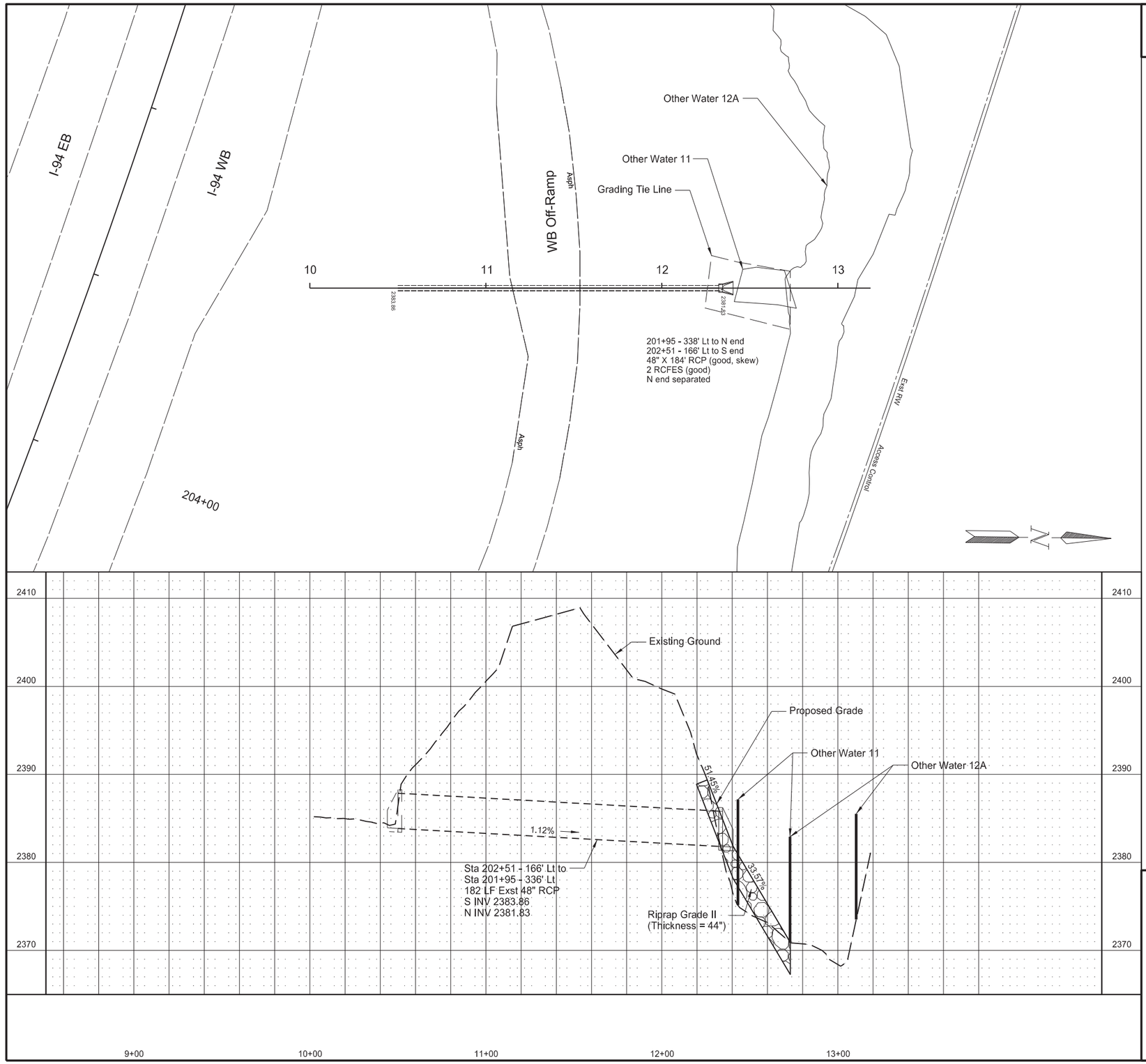
Allowable Pipe List

All Locations

REGISTERED PROFESSIONAL ENGINEER
CHRISTOPHER H. MAPLES
PE - 10272
DATE 12/01/23
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(158)027	60	1

SPEC	CODE	BID ITEM	QTY	UNIT
714	9660	REMOVE & RELAY END SECTION-ALL TYPE & SIZES		
		Sta 201+95 - 338' Lt	1	EA

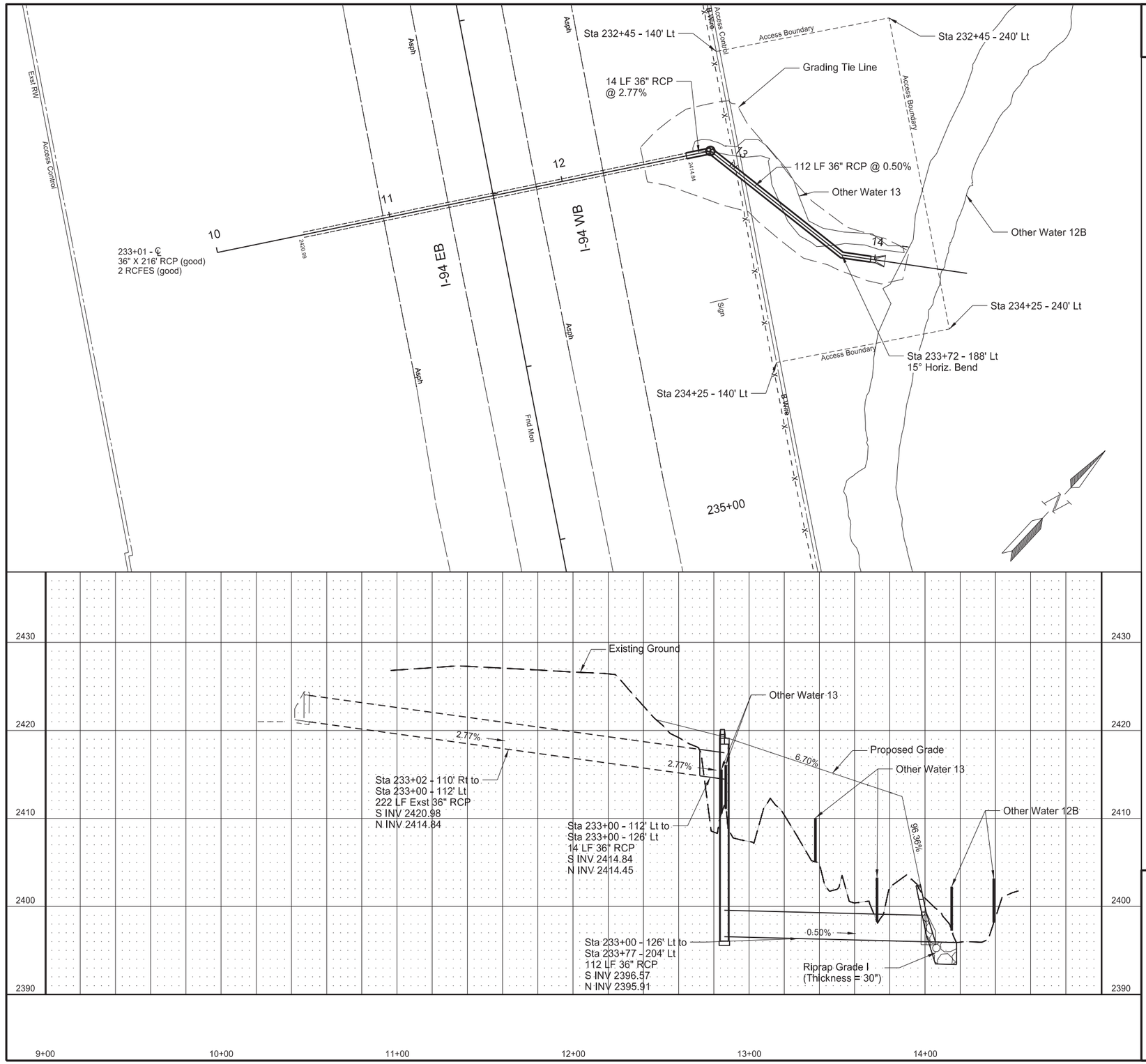


Plan & Profile

RP 27.286

REGISTERED PROFESSIONAL ENGINEER
CHRISTOPHER H. MAPLES
PE - 10272
DATE 12/01/23
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(158)027	60	2



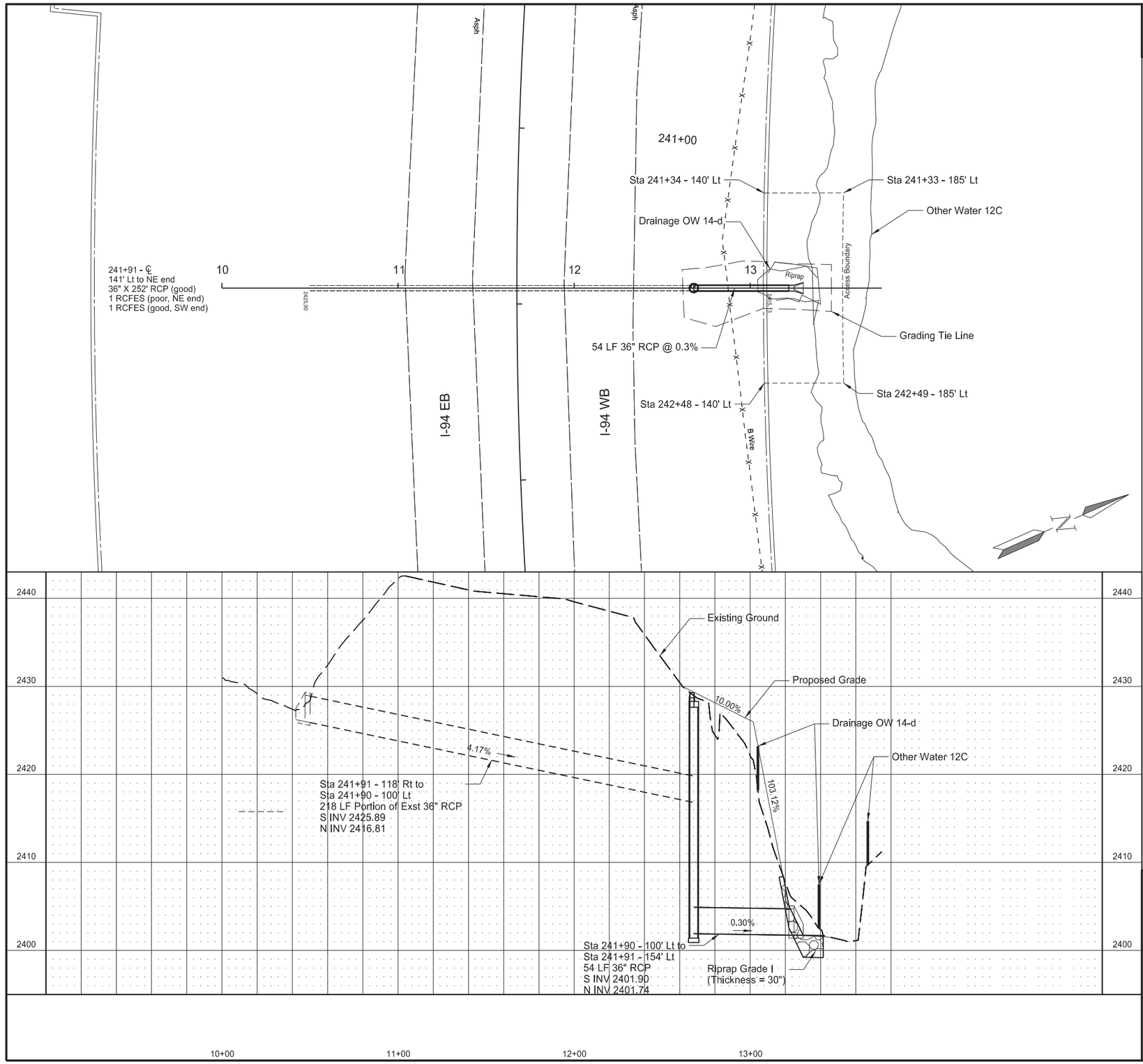
SPEC	CODE	BID ITEM	QTY	UNIT
202	0169	REMOVAL OF END SECTION-ALL TYPES & SIZES		
		Sta 233+00 - 112' Lt	1	EA
714	0905	PIPE CONC REINF 36IN CL III		
		Sta 233+00 - 112' Lt to Sta 233+00 - 126' Lt	14	LF
		Sta 233+00 - 126' Lt to Sta 233+77 - 204' Lt	112	LF
		TOTAL	126	LF
714	3035	END SECT-CONC REINF 36IN		
		Sta 233+77 - 204' Lt	1	EA
722	0107	MANHOLE 54IN		
		Sta 233+00 - 126' Lt	1	EA
722	1106	MANHOLE RISER 54IN		
		Sta 233+00 - 126' Lt	22.21	LF

Plan & Profile

RP 27.892

REGISTERED PROFESSIONAL ENGINEER
CHRISTOPHER H. MAPLES
PE - 10272
DATE 12/01/23
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(158)027	60	3



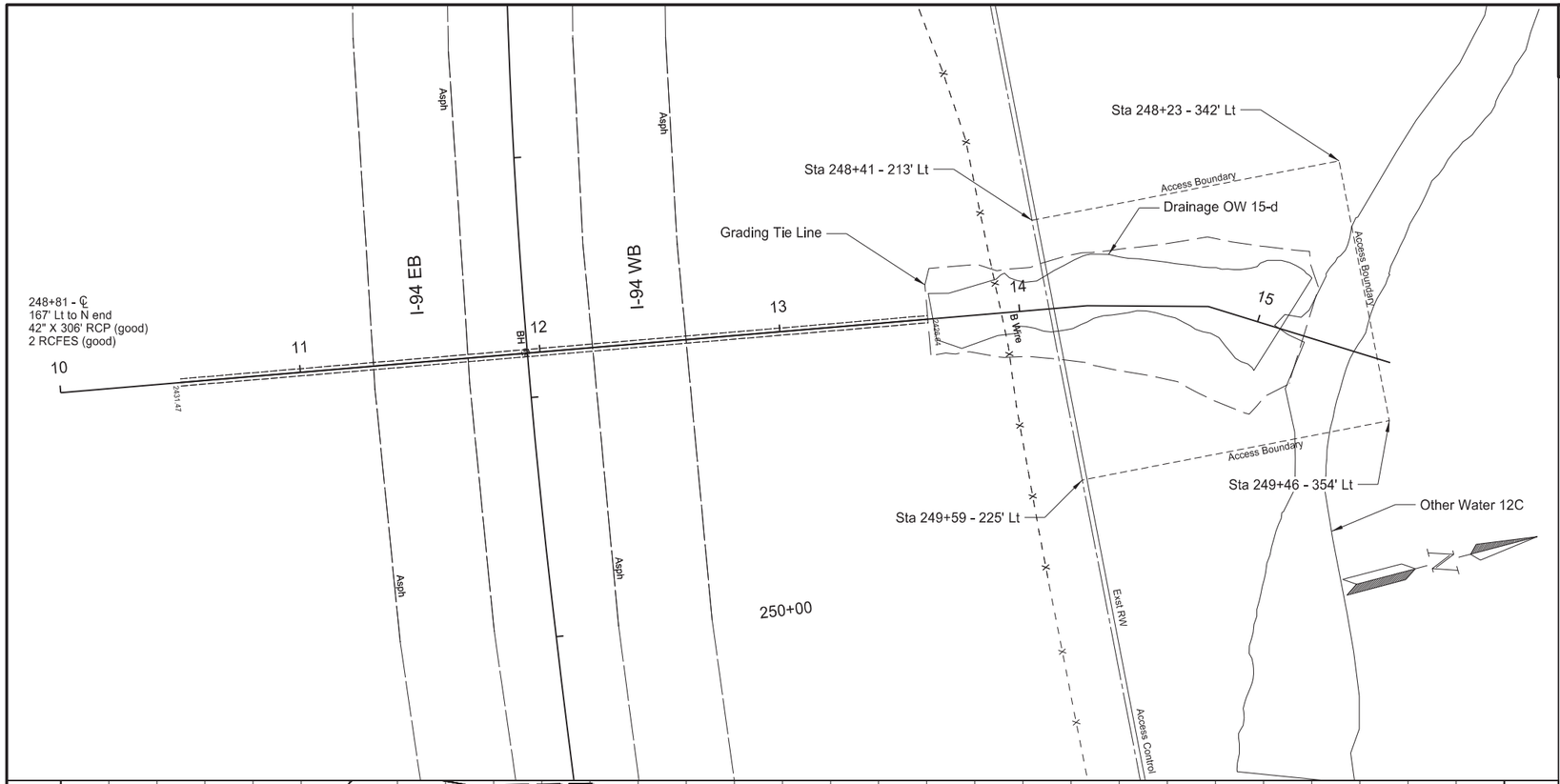
SPEC	CODE	BID ITEM	QTY	UNIT
202	0169	REMOVAL OF END SECTION-ALL TYPES & SIZES		
		Sta 241+91 - 140' Lt	1	EA
202	0170	REMOVAL OF CULVERTS-ALL TYPES & SIZES		
		Sta 241+91 - 100' Lt to Sta 241+91 - 140' Lt	38	LF
714	0905	PIPE CONC REINF 36IN CL III		
		Sta 241+91 - 100' Lt to Sta 241+91 - 154' Lt	54	LF
714	3035	END SECT-CONC REINF 36IN		
		Sta 241+91 - 154' Lt	1	EA
722	0107	MANHOLE 54IN		
		Sta 241+91 - 100' Lt	1	EA
722	1106	MANHOLE RISER 54IN		
		Sta 241+91 - 100' Lt	26.23	LF

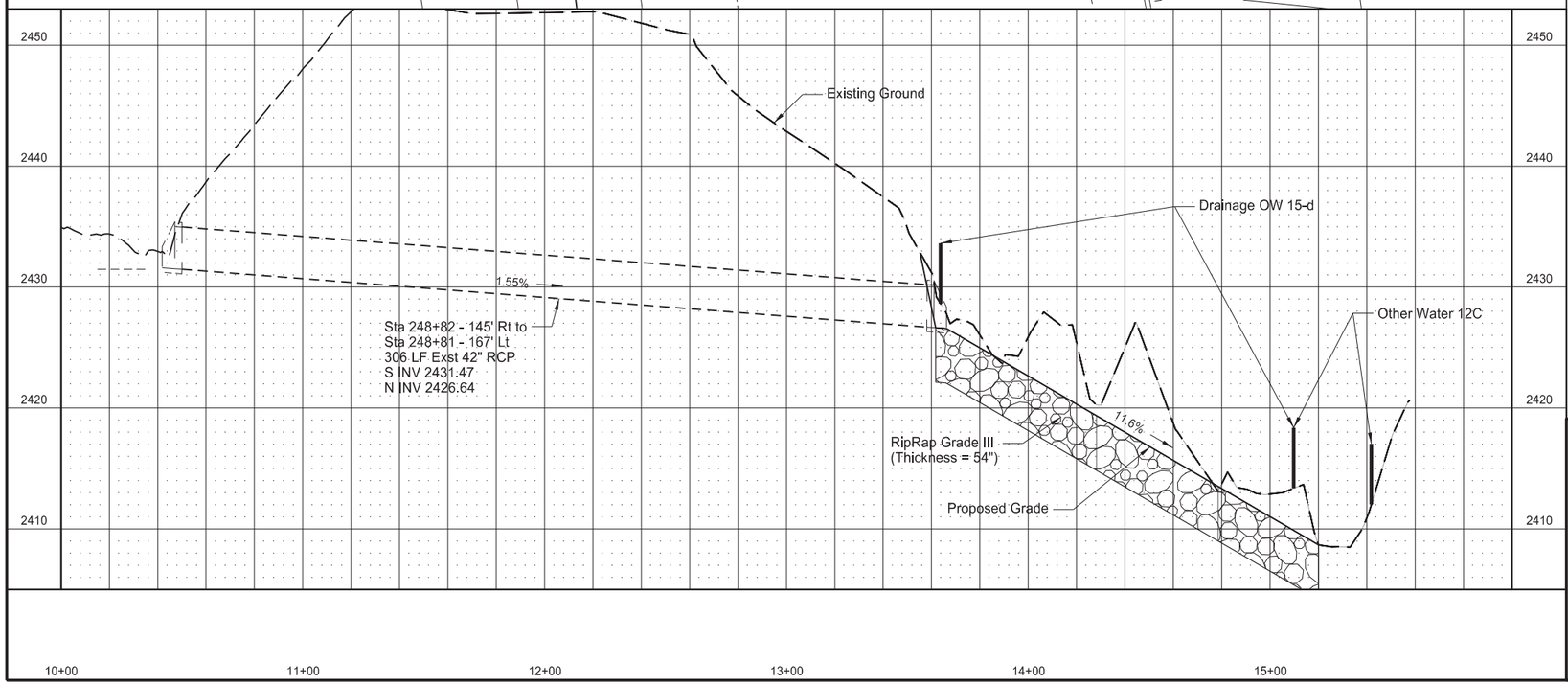
Plan & Profile

RP 28.061

REGISTERED PROFESSIONAL ENGINEER
CHRISTOPHER H. MAPLES
PE - 10272
DATE 12/01/23
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(158)027	60	4





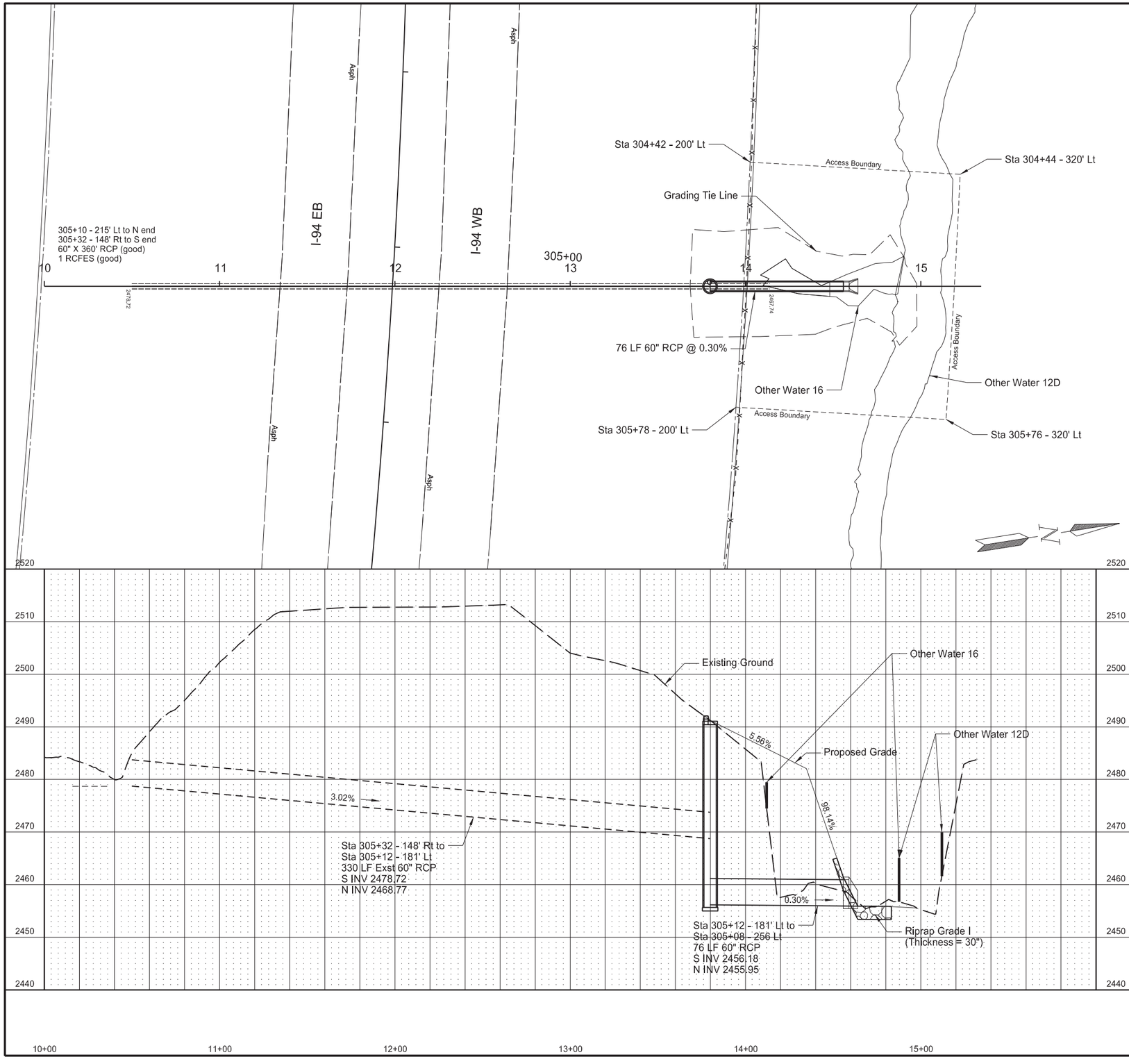
Plan & Profile

RP 28.191

REGISTERED PROFESSIONAL ENGINEER
CHRISTOPHER H. MAPLES
PE - 10272
DATE 12/01/23
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(158)027	60	5

SPEC	CODE	BID ITEM	QTY	UNIT
202	0169	REMOVAL OF END SECTION-ALL TYPES & SIZES		
		Sta 305+10 - 212' Lt	1	EA
202	0170	REMOVAL OF CULVERTS-ALL TYPES & SIZES		
		Sta 305+12 - 181' Lt to Sta 305+10 - 212' Lt	34	LF
714	1310	PIPE CONC REINF 60IN CL III		
		Sta 305+12 - 181' Lt to Sta 305+08 - 257' Lt	76	LF
714	3055	END SECT-CONC REINF 60IN		
		Sta 305+08 - 257' Lt	1	EA
722	0130	MANHOLE 84IN		
		Sta 305+12 - 181' Lt	1	EA
722	1130	MANHOLE RISER 84IN		
		Sta 305+12 - 181' Lt	34.72	LF



Plan & Profile

RP 29.256

REGISTERED PROFESSIONAL ENGINEER
CHRISTOPHER H. MAPLES
PE - 10272
DATE 12/01/23
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(158)027	75	1

Other Waters Impact Table

Other Waters											Other Water Mitigation				
			Size				Impacts to Other Waters				Mitigation Required				
							Acre(s)		Linear Feet						
Number	Location	Type	Acre(s)	Linear Feet	Feature	USACE Jurisdictional[1]	Temp	Perm	Temp	Perm	EO 11990	USACE	USFWS	Mitigation Location; ratio	Method
OW 11	Sec.25, T140N, R102W	Stream	0.01	35	Natural	Yes	0.000	0.013	3	32	N	N	N		
OW 12A	Sec.25, T140N, R102W	Stream	0.40	462	Natural	Yes	0.011	0.001	54	33	N	N	N		
OW 12B	Sec.30, T140N, R101W	Stream	0.54	758	Natural	Yes	0.010	0.001	43	20	N	N	N		
OW 12C	Sec.30, T140N, R101W	Stream	0.89	1337	Natural	Yes	0.024	0.009	111	53	N	N	N		
OW 12D	Sec.29, T140N, R101W	Stream	0.34	578	Natural	Yes	0.030	0.000	88	22	N	N	N		
OW 13	Sec.30, T140N, R101W	Stream	0.03	138	Natural	Yes	0.000	0.027	4	134	N	N	N		
OW 16	Sec. 29, T140N R101W	Stream	0.02	69	Natural	Yes		0.025		69	N	N	N		
		Totals	**2.23**	**3377**			**0.075**	**0.076**	**303**	**363**					

REGISTERED PROFESSIONAL ENGINEER
CHRISTOPHER H. MAPLES
PE - 10272
DATE 12/21/23
NORTH DAKOTA

Wetlands, Mitigation and Environmental

W of Medora Int to 2 Mi E
Billings County, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(158)027	75	2

Other Waters-d Impact Table

Other Waters											Other Water Mitigation				
			Size				Impacts to Other Waters				Mitigation Required				
Number	Location	Type	Acre(s)	Linear Feet	Feature	USACE Jurisdictional[1]	Acre(s) Temp	Acre(s) Perm	Linear Feet Temp	Linear Feet Perm	EO 11990	USACE	USFWS	Mitigation Location; ratio	Method
OW 14-d	Sec.30, T140N, R101W	Ephemeral Swale	0.01	22	Natural	No		0.013		22	N	N	N		
OW 15-d	Sec.30, T140N, R101W	Ephemeral Swale	0.09	137	Natural	No		0.091		137	N	N	N		
		Totals	**0.10**	**159**				**0.104**		**159**					

[1] A wetland Jurisdictional Determination was issued by the USACE on 01/06/2023; NWO-2014-00225-BIS.

Impact Summary Table

Permanent Impact Summary		Temporary Impacts and additional information	
Wetland Type	Total (Acres)	Wetland Type	Total Acre(s)
Natural/JD		Temporary JD	
Natural/Non-JD		Non-JD Temporary	
Artificial/JD		Permanent JD > 0.10	
Artificial /Non-JD		Permanent OW	0.076
Total		Temporary OW	0.075
		Permanent OW-d	0.104
		Temporary OW-d	

Mitigation Summary Table

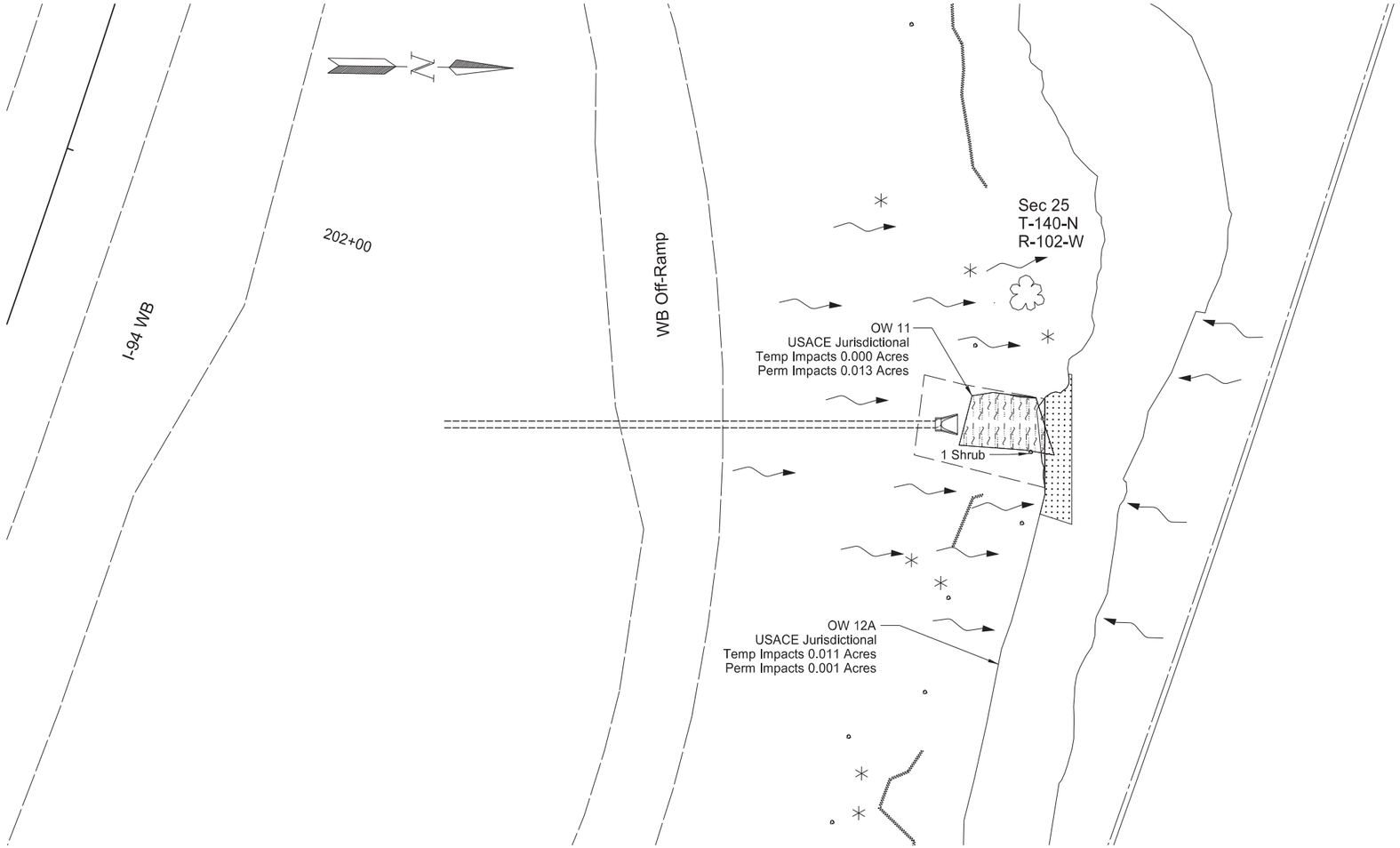
	Location	Onsite Acre(s)	11990 Bank Acre(s)	USACE/11990 Bank Acre(s)	USFWS Bank Acre(s)
USACE Only					
EO 11990 Only					
USACE/11990					
USFWS					
	Total				

REGISTERED PROFESSIONAL ENGINEER
CHRISTOPHER H. MAPLES
PE - 10272
DATE 12/21/23
NORTH DAKOTA

Wetlands, Mitigation and Environmental

W of Medora Int to 2 Mi E
Billings County, ND

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(158)027	75	3



LEGEND

- OW Temp Impacts
- OW Perm Impacts
- Grading Tie Line
- Flow Direction
- Other Waters (OW)

Wetlands, Mitigation and Environmental

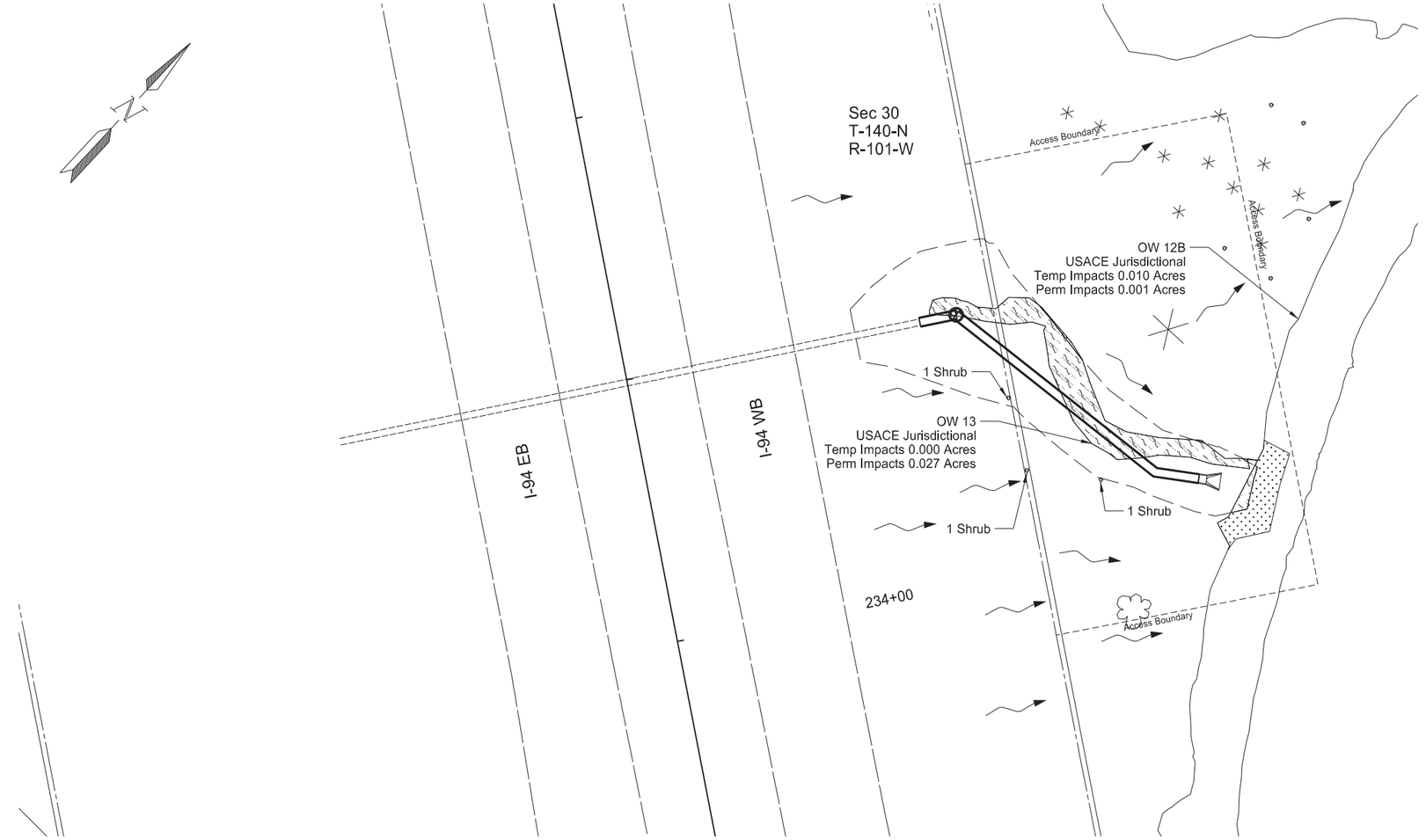
RP 27.286

W of Medora Int to 2 Mi E
Billings County, ND

REGISTERED PROFESSIONAL ENGINEER
CHRISTOPHER H. MAPLES
PE - 10272
DATE 12/21/23
NORTH DAKOTA

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(158)027	75	4



LEGEND

- OW Temp Impacts
- OW Perm Impacts
- Grading Tie Line
- Flow Direction
- Other Waters (OW)

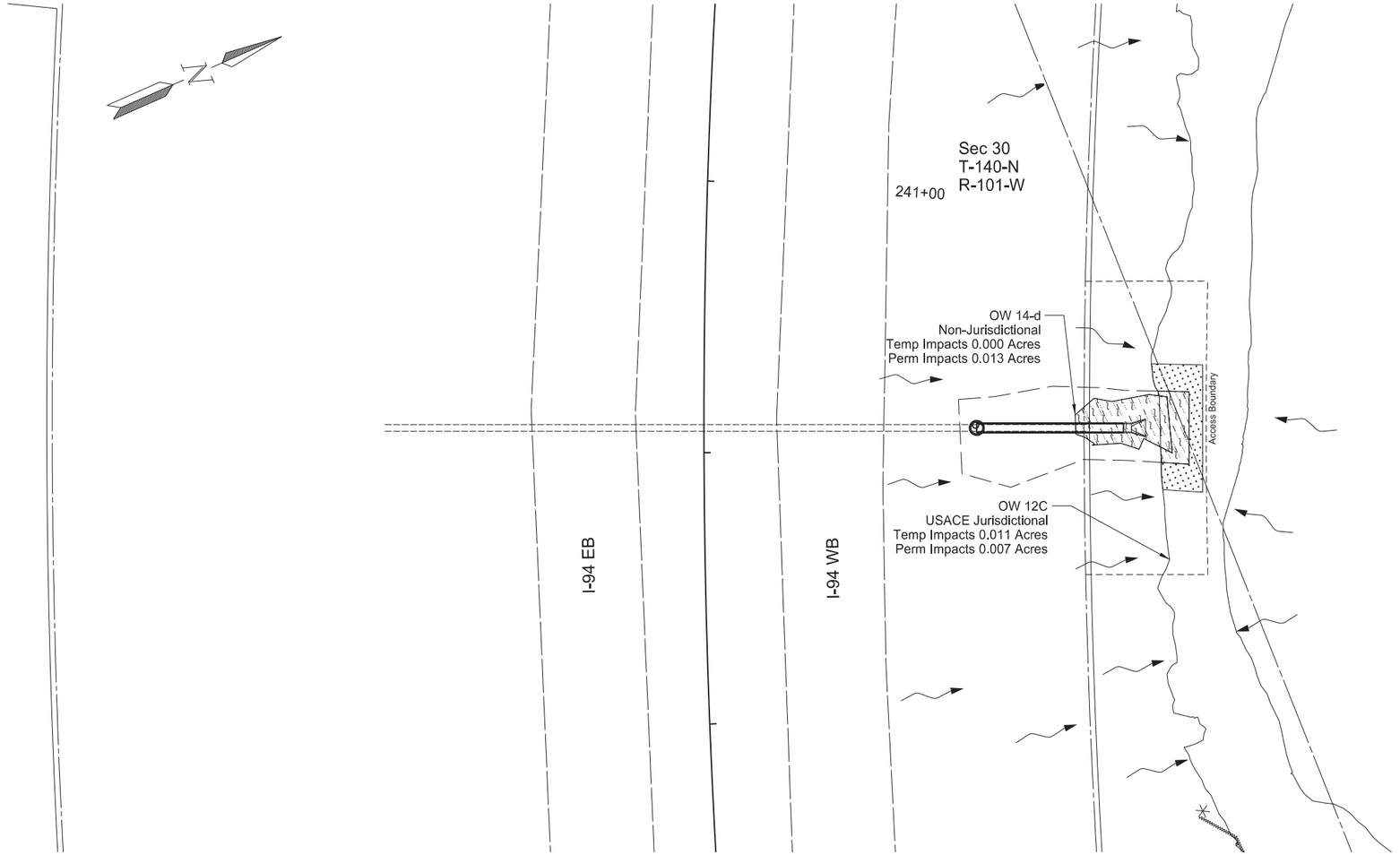
Wetlands, Mitigation and Environmental

RP 27.892

W of Medora Int to 2 Mi E
Billings County, ND

REGISTERED PROFESSIONAL ENGINEER
CHRISTOPHER H. MAPLES
PE - 10272
DATE 12/21/23
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(158)027	75	5



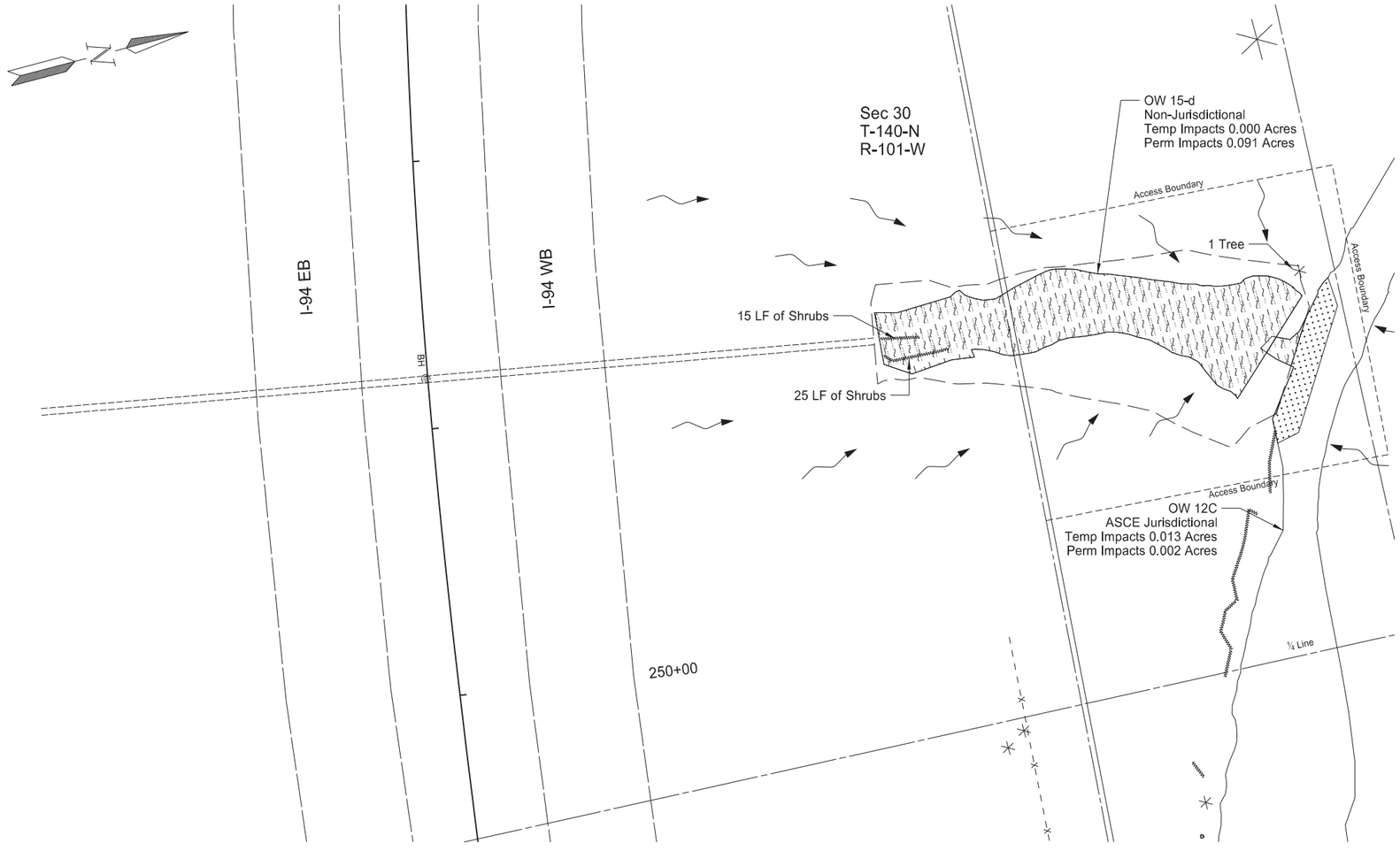
Wetlands, Mitigation and Environmental

RP 28.061

W of Medora Int to 2 Mi E
Billings County, ND

REGISTERED PROFESSIONAL ENGINEER
CHRISTOPHER H. MAPLES
PE - 10272
DATE 12/21/23
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(158)027	75	6



LEGEND

- OW Temp Impacts
- OW Perm Impacts
- Grading Tie Line
- Flow Direction
- Other Waters (OW)

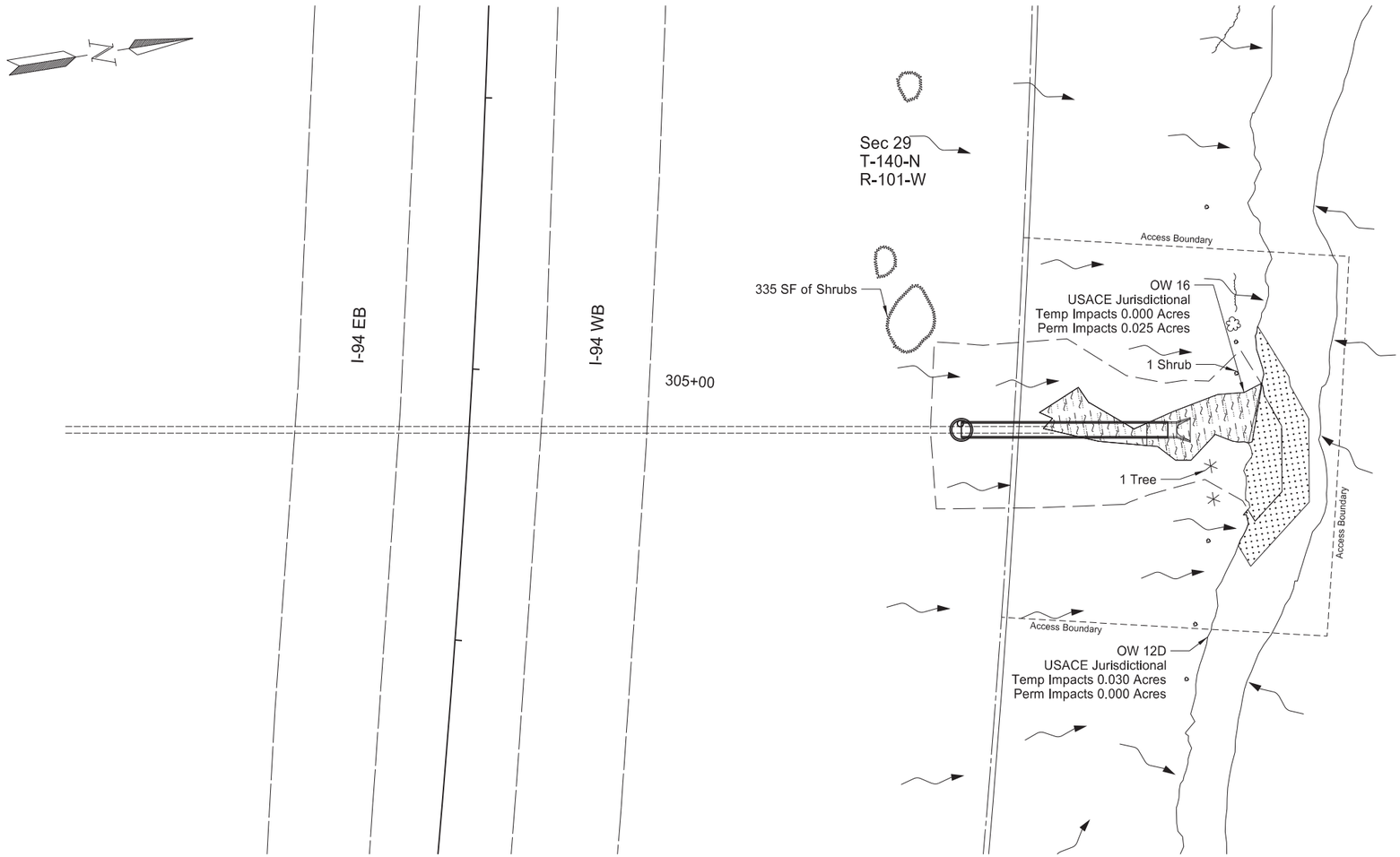
Wetlands, Mitigation and Environmental

RP 28.191

W of Medora Int to 2 Mi E
Billings County, ND

REGISTERED PROFESSIONAL ENGINEER
CHRISTOPHER H. MAPLES
PE - 10272
DATE 12/21/23
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(158)027	75	7



LEGEND

- OW Temp Impacts
- OW Perm Impacts
- Grading Tie Line
- Flow Direction
- Other Waters (OW)

Wetlands, Mitigation and Environmental

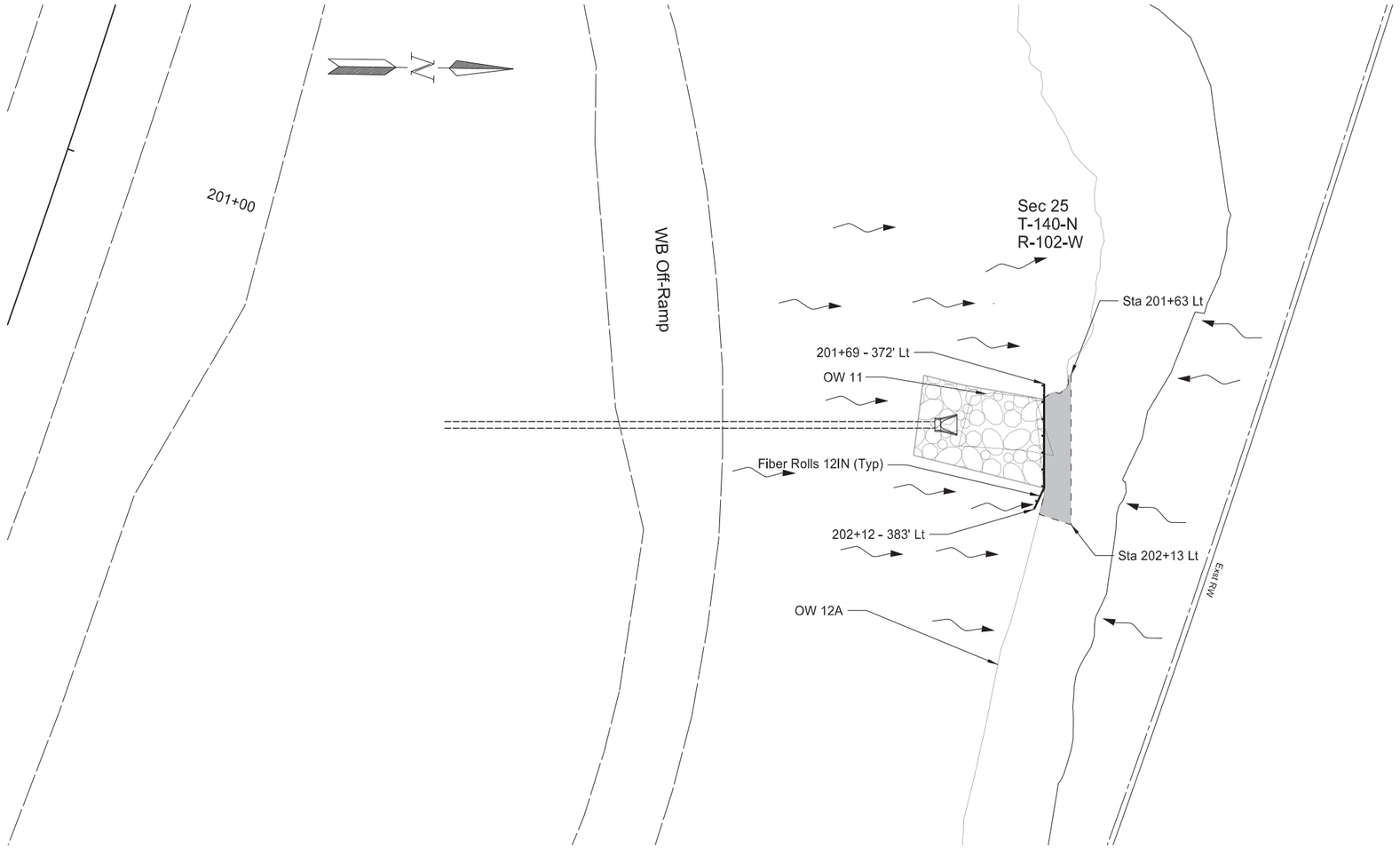
RP 29.256

W of Medora Int to 2 Mi E
Billings County, ND

REGISTERED PROFESSIONAL ENGINEER
CHRISTOPHER H. MAPLES
PE - 10272
DATE 12/21/23
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(158)027	76	1

SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sta 201+63 Lt to Sta 202+13 Lt	0.01	ACRE
261	0112	FIBER ROLLS 12IN		
		Sta 201+69 - 372' Lt to Sta 202+12 - 383' Lt	47	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Sta 201+69 - 372' Lt to Sta 202+12 - 383' Lt	47	LF
900	0700	FLEXIBLE GROWTH MEDIUM		
		Sta 201+63 Lt to Sta 202+13 Lt	54	SY



LEGEND

- Temporary Cover Crop & Flexible Growth Medium
- Riprap (Paid in Section 77)
- Fiber Rolls 12 IN
- Existing Other Waters
- Flow Direction
- Grading Tie Line

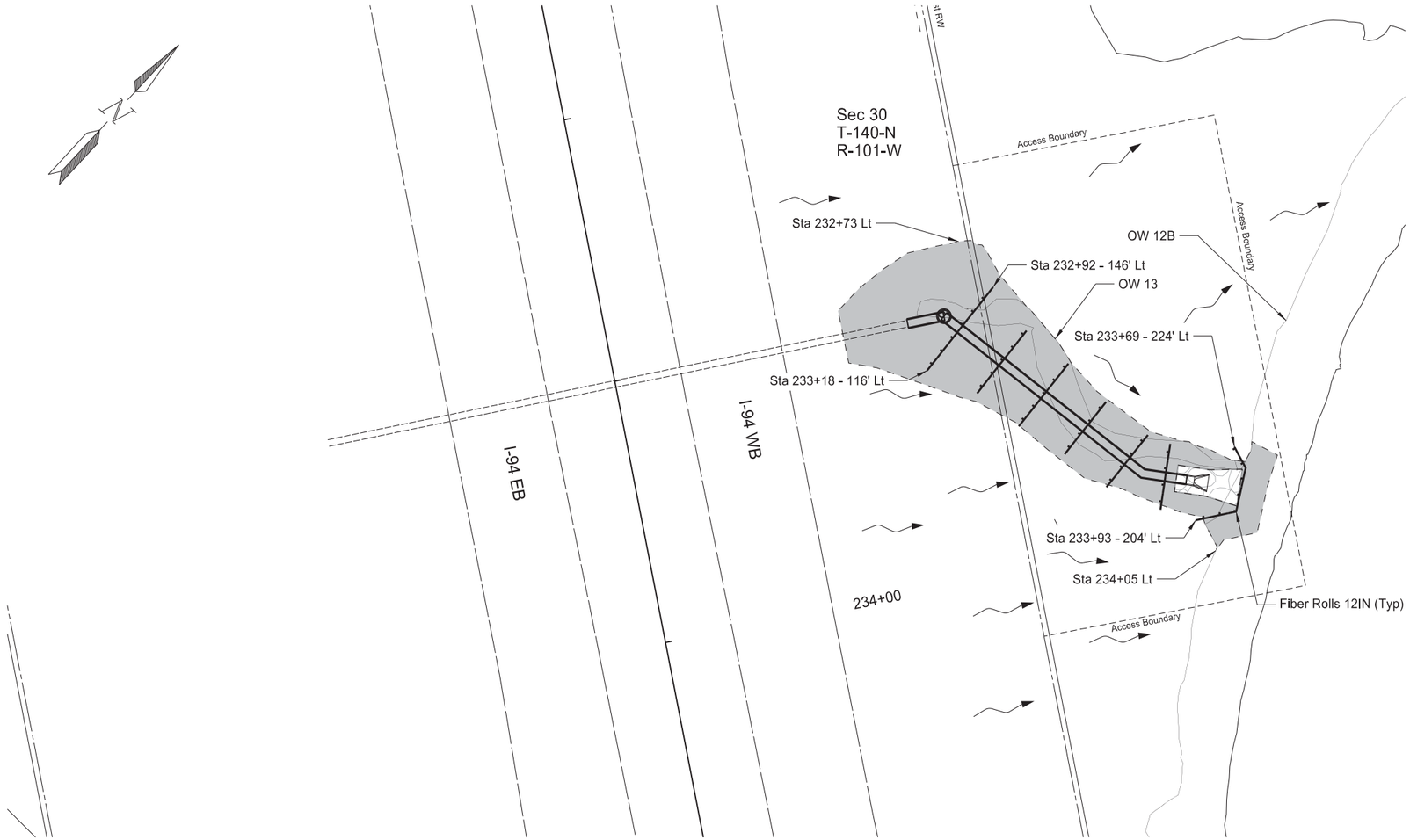
Temporary Erosion Control

RP 27.286

W of Medora Int to 2 Mi E
Billings County, ND

REGISTERED PROFESSIONAL ENGINEER
CHRISTOPHER H. MAPLES
PE - 10272
DATE 03/28/24
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(158)027	76	2



SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sta 232+73 Lt to Sta 234+05 Lt	0.14	ACRE
261	0112	FIBER ROLLS 12IN		
		Sta 232+92 - 146' Lt to Sta 233+18 - 116' Lt	40	LF
		Sta 233+11 - 155' Lt to Sta 233+30 - 133' Lt	30	LF
		Sta 233+26 - 168' Lt to Sta 233+46 - 146' Lt	30	LF
		Sta 233+43 - 180' Lt to Sta 233+59 - 161' Lt	25	LF
		Sta 233+58 - 193' Lt to Sta 233+74 - 174' Lt	25	LF
		Sta 233+63 - 200' Lt to Sta 233+86 - 192' Lt	25	LF
		Sta 233+69 - 224' Lt to Sta 233+93 - 204' Lt	41	LF
		TOTAL	216	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Sta 232+92 - 146' Lt to Sta 233+18 - 116' Lt	40	LF
		Sta 233+11 - 155' Lt to Sta 233+30 - 133' Lt	30	LF
		Sta 233+26 - 168' Lt to Sta 233+46 - 146' Lt	30	LF
		Sta 233+43 - 180' Lt to Sta 233+59 - 161' Lt	25	LF
		Sta 233+58 - 193' Lt to Sta 233+74 - 174' Lt	25	LF
		Sta 233+63 - 200' Lt to Sta 233+86 - 192' Lt	25	LF
		Sta 233+69 - 224' Lt to Sta 233+93 - 204' Lt	41	LF
		TOTAL	216	LF
900	0700	FLEXIBLE GROWTH MEDIUM		
		Sta 232+73 Lt to Sta 234+05 Lt	661	SY

LEGEND

- Temporary Cover Crop & Flexible Growth Medium
- Riprap (Paid in Section 77)
- Fiber Rolls 12 IN
- Existing Other Waters
- Flow Direction
- Grading Tie Line

Temporary Erosion Control

RP 27.892

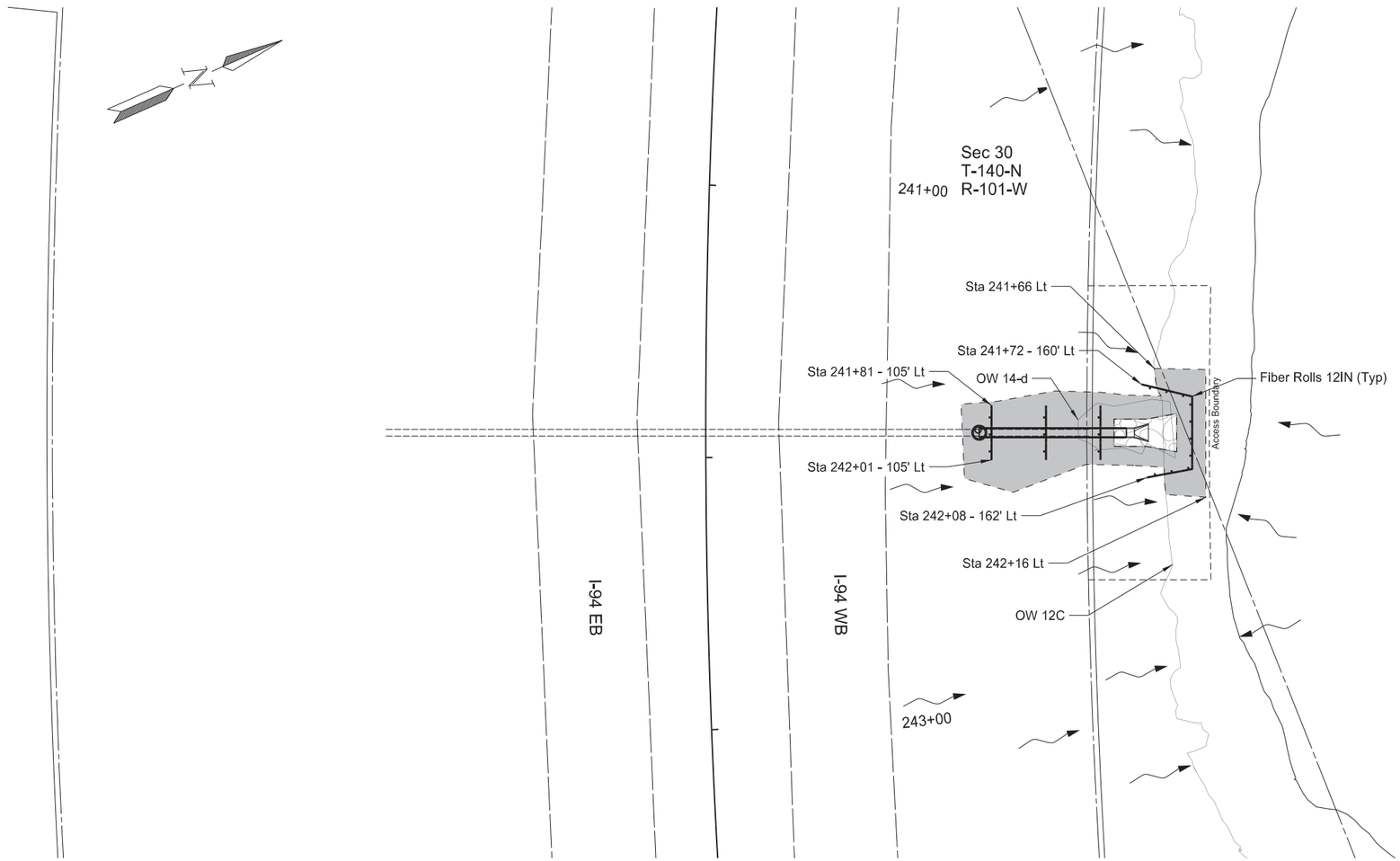
W of Medora Int to 2 Mi E
Billings County, ND

REGISTERED PROFESSIONAL ENGINEER
CHRISTOPHER H. MAPLES
PE - 10272
DATE 03/28/24
NORTH DAKOTA

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(158)027	76	3

SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sta 241+66 Lt to Sta 242+16 Lt	0.06	ACRE
261	0112	FIBER ROLLS 12IN		
		Sta 241+72 - 160' Lt to Sta 242+08 - 162' Lt	63	LF
		Sta 241+81 - 105' Lt to Sta 242+01 - 105' Lt	20	LF
		Sta 241+81 - 125' Lt to Sta 242+01 - 125' Lt	20	LF
		Sta 241+81 - 145' Lt to Sta 242+02 - 145' Lt	20	LF
		TOTAL	123	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Sta 241+72 - 160' Lt to Sta 242+08 - 162' Lt	63	LF
		Sta 241+81 - 105' Lt to Sta 242+01 - 105' Lt	20	LF
		Sta 241+81 - 125' Lt to Sta 242+01 - 125' Lt	20	LF
		Sta 241+81 - 145' Lt to Sta 242+02 - 145' Lt	20	LF
		TOTAL	123	LF
900	0700	FLEXIBLE GROWTH MEDIUM		
		Sta 241+66 Lt to Sta 242+16 Lt	293	SY



LEGEND

- Temporary Cover Crop & Flexible Growth Medium
- Riprap (Paid in Section 77)
- Fiber Rolls 12 IN
- Existing Other Waters
- Flow Direction
- Grading Tie Line

Temporary Erosion Control

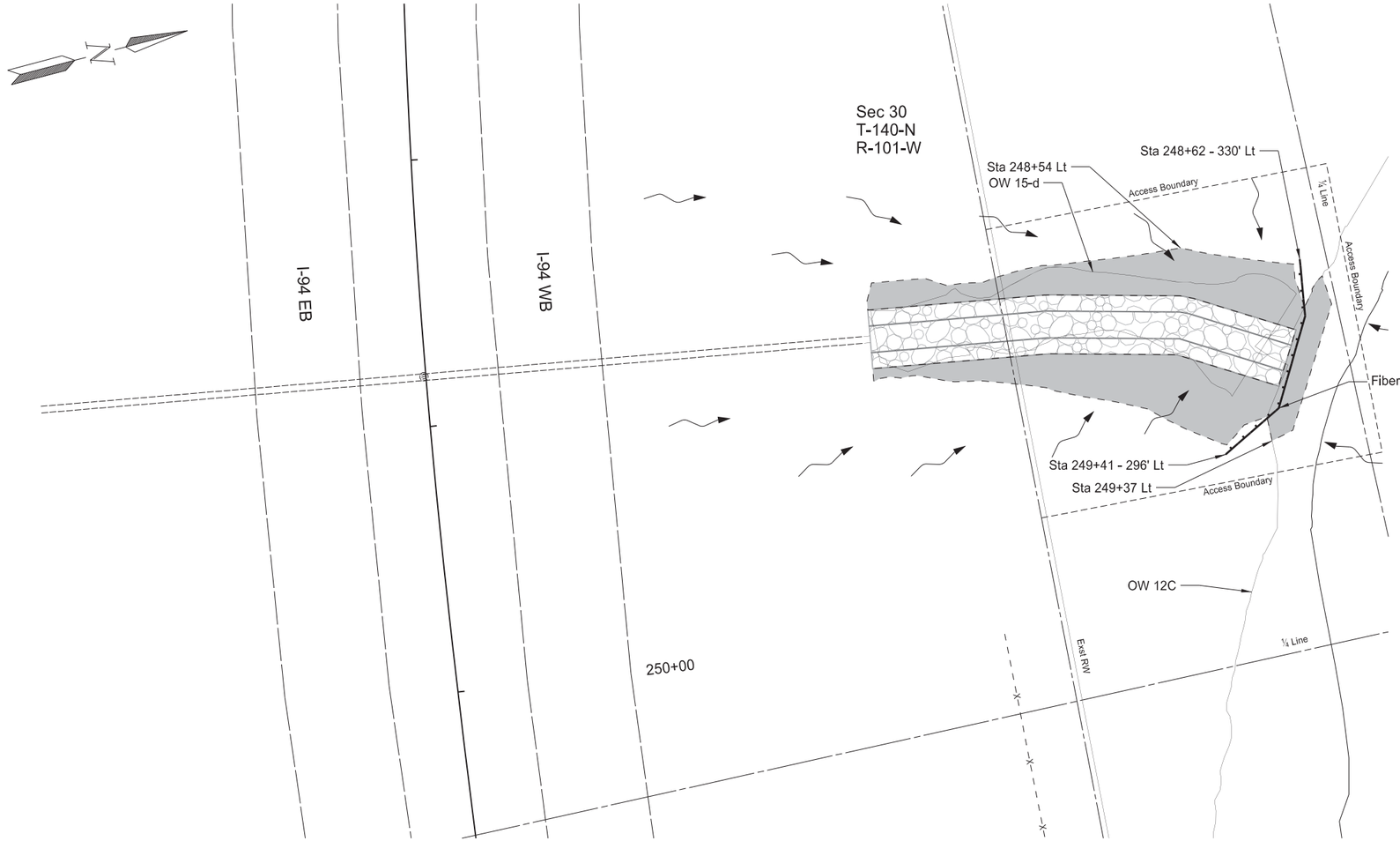
RP 28.061

W of Medora Int to 2 Mi E
Billings County, ND

REGISTERED PROFESSIONAL ENGINEER
CHRISTOPHER H. MAPLES
PE - 10272
DATE 03/28/24
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(158)027	76	4

SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sta 248+54 Lt to Sta 249+37 Lt	0.11	ACRE
261	0112	FIBER ROLLS 12IN		
		Sta 248+62 - 330' Lt to Sta 249+41 - 296' Lt	84	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Sta 248+62 - 330' Lt to Sta 249+41 - 296' Lt	84	LF
900	0700	FLEXIBLE GROWTH MEDIUM		
		Sta 248+54 Lt to Sta 249+37 Lt	553	SY



LEGEND

- Temporary Cover Crop & Flexible Growth Medium
- Riprap (Paid in Section 77)
- Fiber Rolls 12 IN
- Existing Other Waters
- Flow Direction
- Grading Tie Line

Temporary Erosion Control

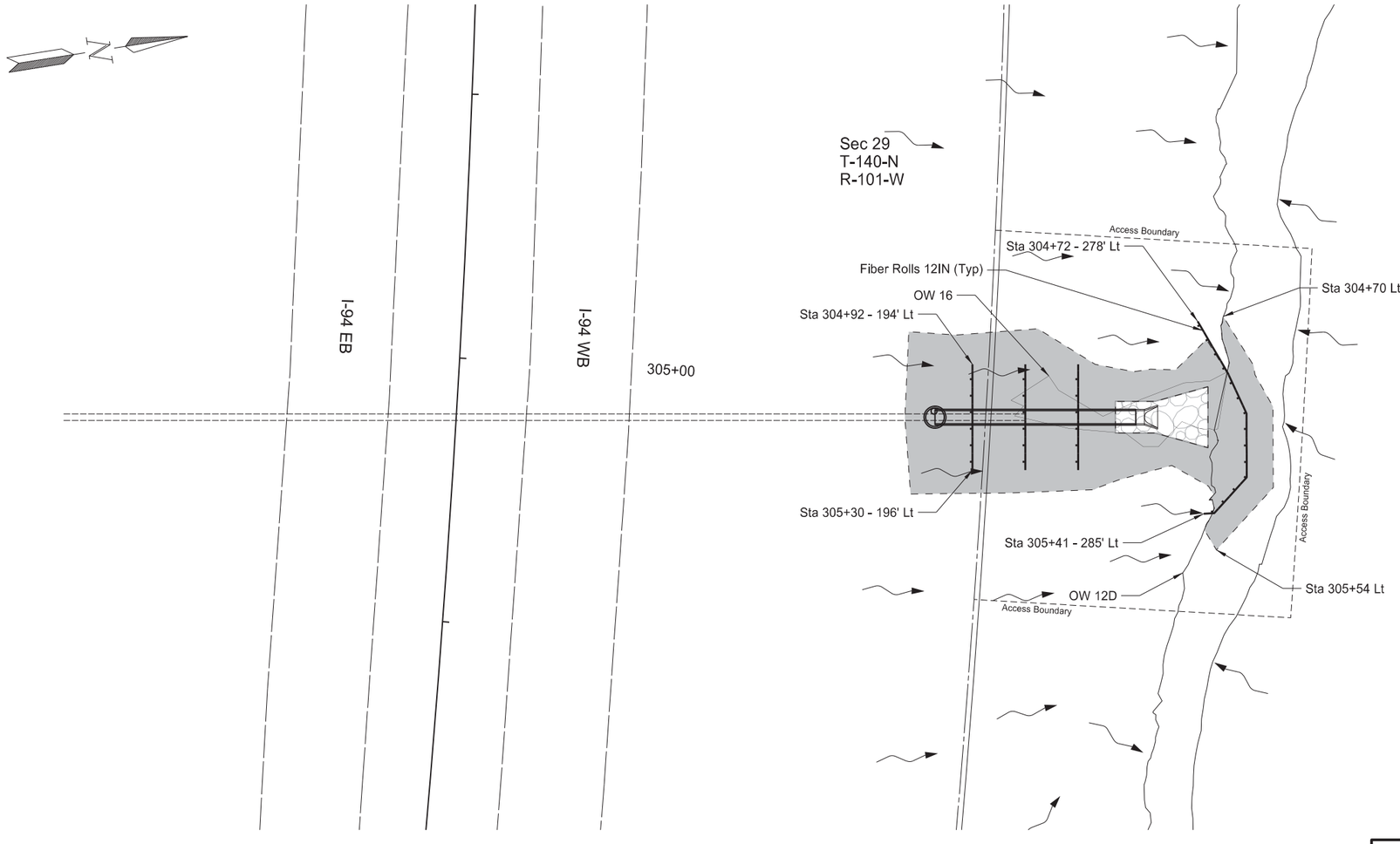
RP 28.191

W of Medora Int to 2 Mi E
Billings County, ND

REGISTERED PROFESSIONAL ENGINEER
CHRISTOPHER H. MAPLES
PE - 10272
DATE 03/28/24
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(158)027	76	5

SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sta 304+70 Lt to Sta 305+54 Lt	0.16	ACRE
261	0112	FIBER ROLLS 12IN		
		Sta 304+72 - 278' Lt to Sta 305+41 - 285' Lt	86	LF
		Sta 304+90 - 234' Lt to Sta 305+28 - 236' Lt	40	LF
		Sta 304+91 - 214' Lt to Sta 305+29 - 216' Lt	40	LF
		Sta 304+92 - 194' Lt to Sta 305+30 - 196' Lt	40	LF
		TOTAL	206	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Sta 304+72 - 278' Lt to Sta 305+41 - 285' Lt	86	LF
		Sta 304+90 - 234' Lt to Sta 305+28 - 236' Lt	40	LF
		Sta 304+91 - 214' Lt to Sta 305+29 - 216' Lt	40	LF
		Sta 304+92 - 194' Lt to Sta 305+30 - 196' Lt	40	LF
		TOTAL	206	LF
900	0700	FLEXIBLE GROWTH MEDIUM		
		Sta 304+70 Lt to Sta 305+54 Lt	774	SY



LEGEND

- Temporary Cover Crop & Flexible Growth Medium
- Riprap (Paid in Section 77)
- Fiber Rolls 12 IN
- Existing Other Waters
- Flow Direction
- Grading Tie Line

Temporary Erosion Control

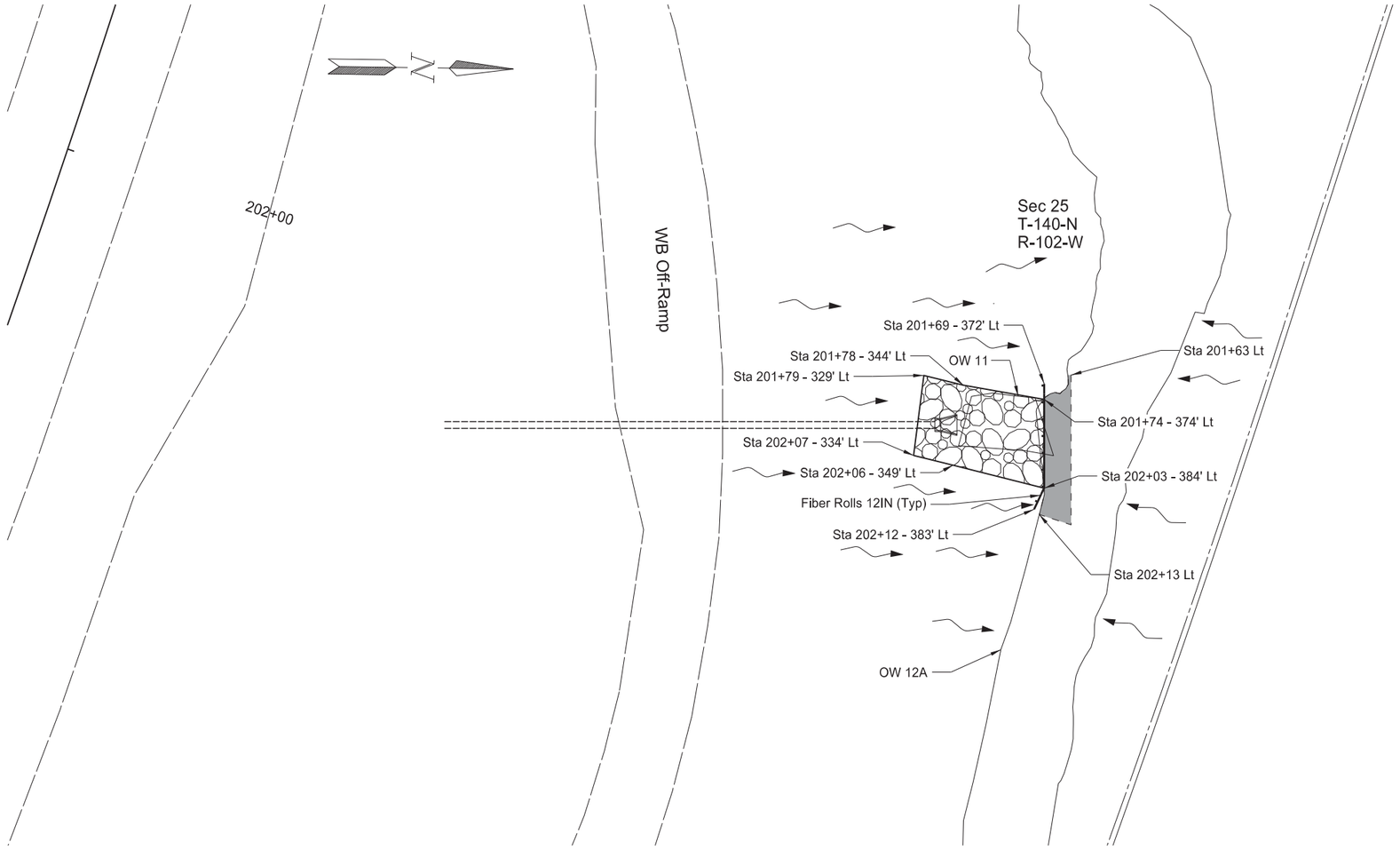
RP 29.256

W of Medora Int to 2 Mi E
Billings County, ND

REGISTERED PROFESSIONAL ENGINEER
CHRISTOPHER H. MAPLES
PE - 10272
DATE 03/28/24
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(158)027	77	1

SPEC	CODE	BID ITEM	QTY	UNIT
251	1000	WETLAND SEED		
		Sta 201+63 Lt to Sta 202+13 Lt	0.01	ACRE
256	0200	RIPRAP GRADE II		
		Sta 201+74 Lt to Sta 202+07 Lt	199	CY
261	0112	FIBER ROLLS 12IN		
		Sta 201+69 - 372' Lt to Sta 202+12 - 383' Lt	47	LF
709	0155	GEOSYNTHETIC MATERIAL TYPE RR		
		Sta 201+74 Lt to Sta 202+07 Lt	163	SY
900	0700	FLEXIBLE GRCWTH MEDIUM		
		Sta 201+63 Lt to Sta 202+13 Lt	54	SY



LEGEND

- Wetland Seed & Flexible Growth Medium
- Riprap Grade II
- Fiber Rolls 12 IN
- Existing Other Waters
- Flow Direction

Permanent Erosion Control

RP 27.286

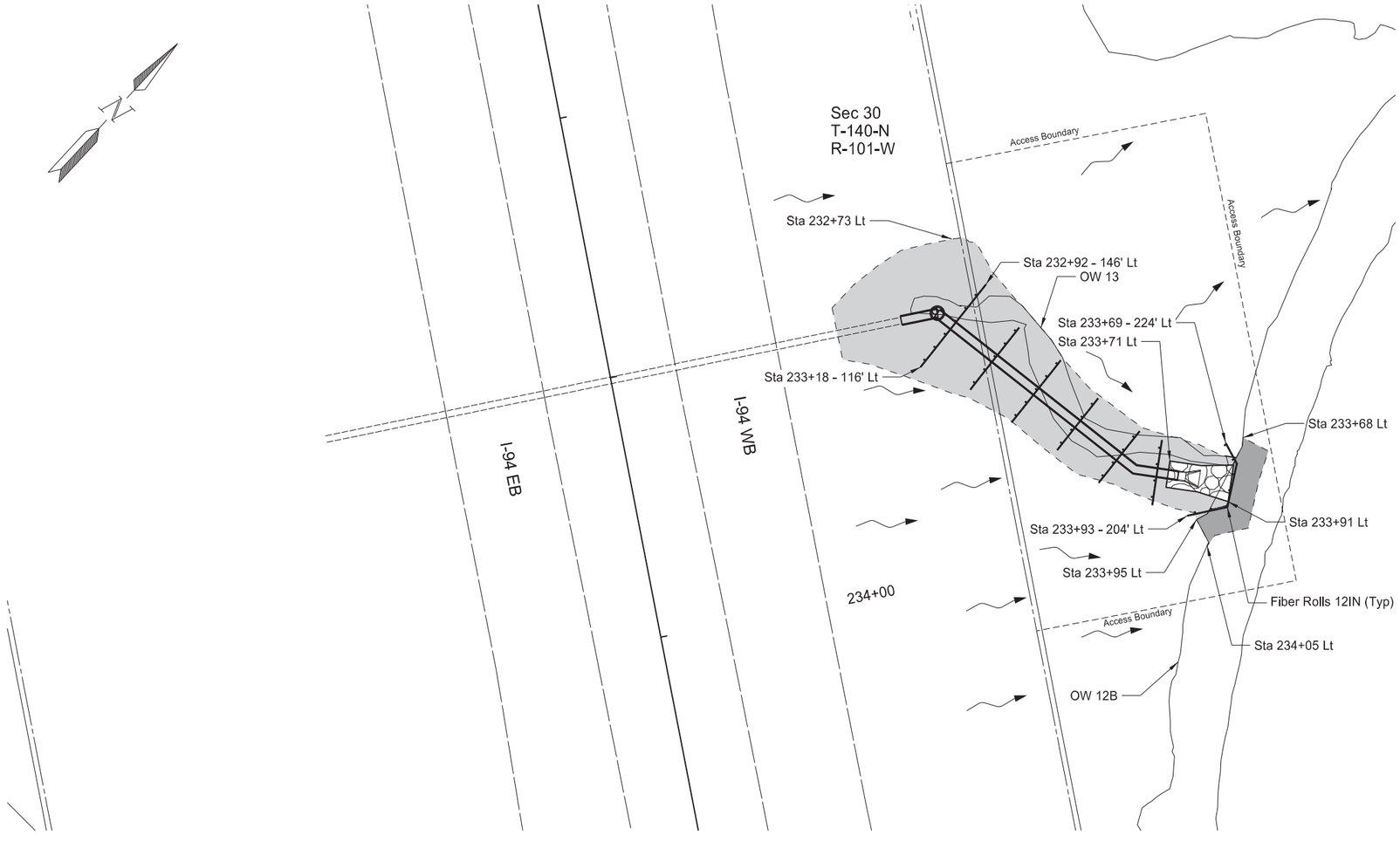
W of Medora Int to 2 Mi E
Billings County, ND

REGISTERED PROFESSIONAL ENGINEER
CHRISTOPHER H. MAPLES
PE - 10272
DATE 03/28/24
NORTH DAKOTA

3/27/2024 5:21:22 PM swithers L:\ND\Projects\Active 2022\Tx22216.00 - I-94_ W of E Medora Int to 2MI E\700 - CAD\5-094.158.027\Consultant\dgn\Design\Sheets\077PE_001.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(158)027	77	2

SPEC	CODE	BID ITEM	QTY	UNIT
251	0300	SEEDING CLASS III		
		Sta 232+73 Lt to Sta 233+95 Lt	0.13	ACRE
251	1000	WETLAND SEED		
		Sta 233+68 Lt to Sta 234+05 Lt	0.01	ACRE
256	0100	RIPRAP GRADE I		
		Sta 233+71 Lt to Sta 233+91 Lt	24	CY
261	0112	FIBER ROLLS 12IN		
		Sta 232+92 - 146' Lt to Sta 233+18 - 116' Lt	40	LF
		Sta 233+11 - 155' Lt to Sta 233+30 - 133' Lt	30	LF
		Sta 233+26 - 168' Lt to Sta 233+46 - 146' Lt	30	LF
		Sta 233+43 - 180' Lt to Sta 233+59 - 161' Lt	25	LF
		Sta 233+58 - 193' Lt to Sta 233+74 - 174' Lt	25	LF
		Sta 233+63 - 200' Lt to Sta 233+86 - 192' Lt	25	LF
		Sta 233+69 - 224' Lt to Sta 233+93 - 204' Lt	41	LF
		TOTAL	216	LF
709	0155	GEOSYNTHETIC MATERIAL TYPE RR		
		Sta 233+71 Lt to Sta 233+91 Lt	29	SY
900	0700	FLEXIBLE GROWTH MEDIUM		
		Sta 232+73 Lt to Sta 234+05 Lt	661	SY



LEGEND

- Seeding Class III & Flexible Growth Medium
- Wetland Seed & Flexible Growth Medium
- Riprap Grade I
- Fiber Rolls 12 IN
- Existing Other Waters
- Flow Direction

Permanent Erosion Control

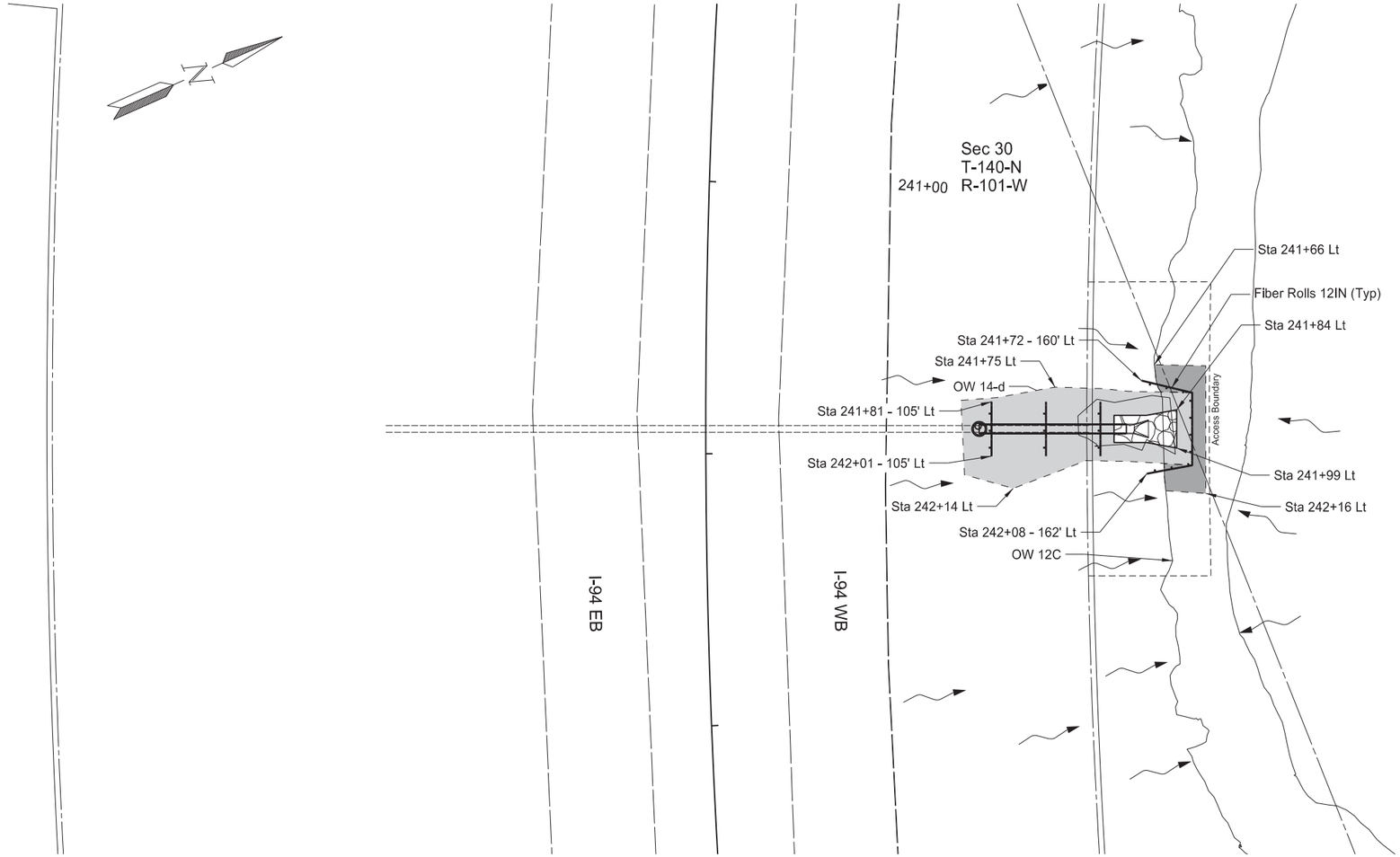
RP 27.892

W of Medora Int to 2 Mi E
Billings County, ND

REGISTERED PROFESSIONAL ENGINEER
CHRISTOPHER H. MAPLES
PE - 10272
DATE 03/28/24
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(158)027	77	3

SPEC	CODE	BID ITEM	QTY	UNIT
251	0300	SEEDING CLASS III		
		Sta 241+75 Lt to Sta 242+14 Lt	0.05	ACRE
251	1000	WETLAND SEED		
		Sta 241+66 Lt to Sta 242+16 Lt	0.01	ACRE
256	0100	RIPRAP GRADE I		
		Sta 241+84 Lt to Sta 241+99 Lt	23	CY
261	0112	FIBER ROLLS 12IN		
		Sta 241+72 - 160' Lt to Sta 242+08 - 162' Lt	63	LF
		Sta 241+81 - 105' Lt to Sta 242+01 - 105' Lt	20	LF
		Sta 241+81 - 125' Lt to Sta 242+01 - 125' Lt	20	LF
		Sta 241+81 - 145' Lt to Sta 242+02 - 145' Lt	20	LF
		TOTAL	123	LF
709	0155	GEOSYNTHETIC MATERIAL TYPE RR		
		Sta 241+84 Lt to Sta 241+99 Lt	28	SY
900	0700	FLEXIBLE GROWTH MEDIUM		
		Sta 241+66 Lt to Sta 242+16 Lt	293	SY



LEGEND

- Seeding Class III & Flexible Growth Medium
- Wetland Seed & Flexible Growth Medium
- Riprap Grade I
- Fiber Rolls 12 IN
- Existing Other Waters
- Flow Direction

Permanent Erosion Control

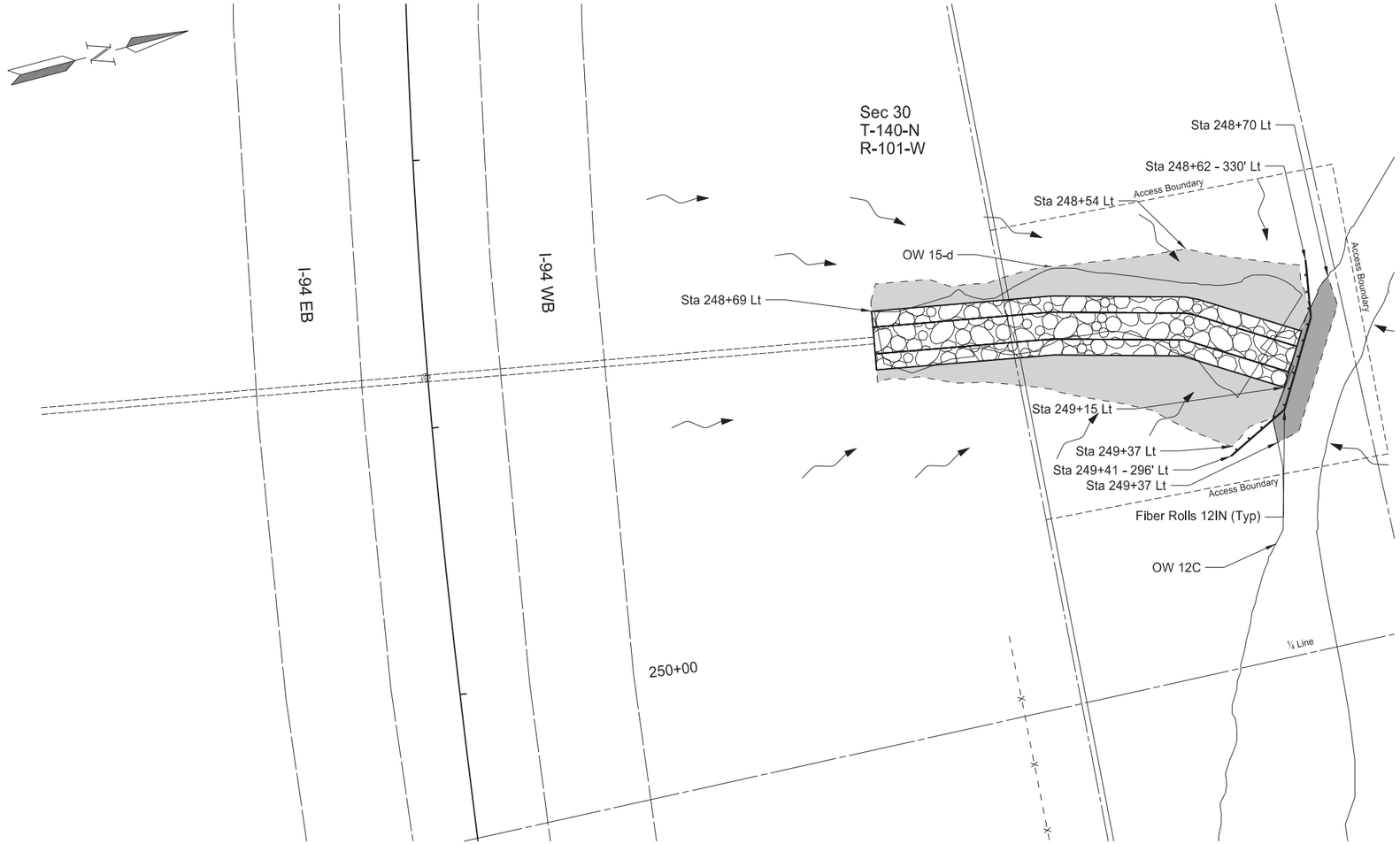
RP 28.061

W of Medora Int to 2 Mi E
Billings County, ND

REGISTERED PROFESSIONAL ENGINEER
CHRISTOPHER H. MAPLES
PE - 10272
DATE 03/28/24
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(158)027	77	4

SPEC	CODE	BID ITEM	QTY	UNIT
251	0300	SEEDING CLASS III		
		Sta 248+54 Lt to Sta 249+37 Lt	0.10	ACRE
251	1000	WETLAND SEED		
		Sta 248+70 Lt to Sta 249+37 Lt	0.01	ACRE
256	0300	RIPRAP GRADE III		
		Sta 248+69 Lt to Sta 249+15 Lt	580	CY
261	0112	FIBER ROLLS 12IN		
		Sta 248+62 - 330' Lt to Sta 249+41 - 296' Lt	84	LF
709	0155	GEOSYNTHETIC MATERIAL TYPE RR		
		Sta 248+69 Lt to Sta 249+15 Lt	387	SY
900	0700	FLEXIBLE GROWTH MEDIUM		
		Sta 248+54 Lt to Sta 249+37 Lt	553	SY



LEGEND

- Seeding Class III & Flexible Growth Medium
- Wetland Seed & Flexible Growth Medium
- Riprap Grade III
- Fiber Rolls 12 IN
- Existing Other Waters
- Flow Direction

Permanent Erosion Control

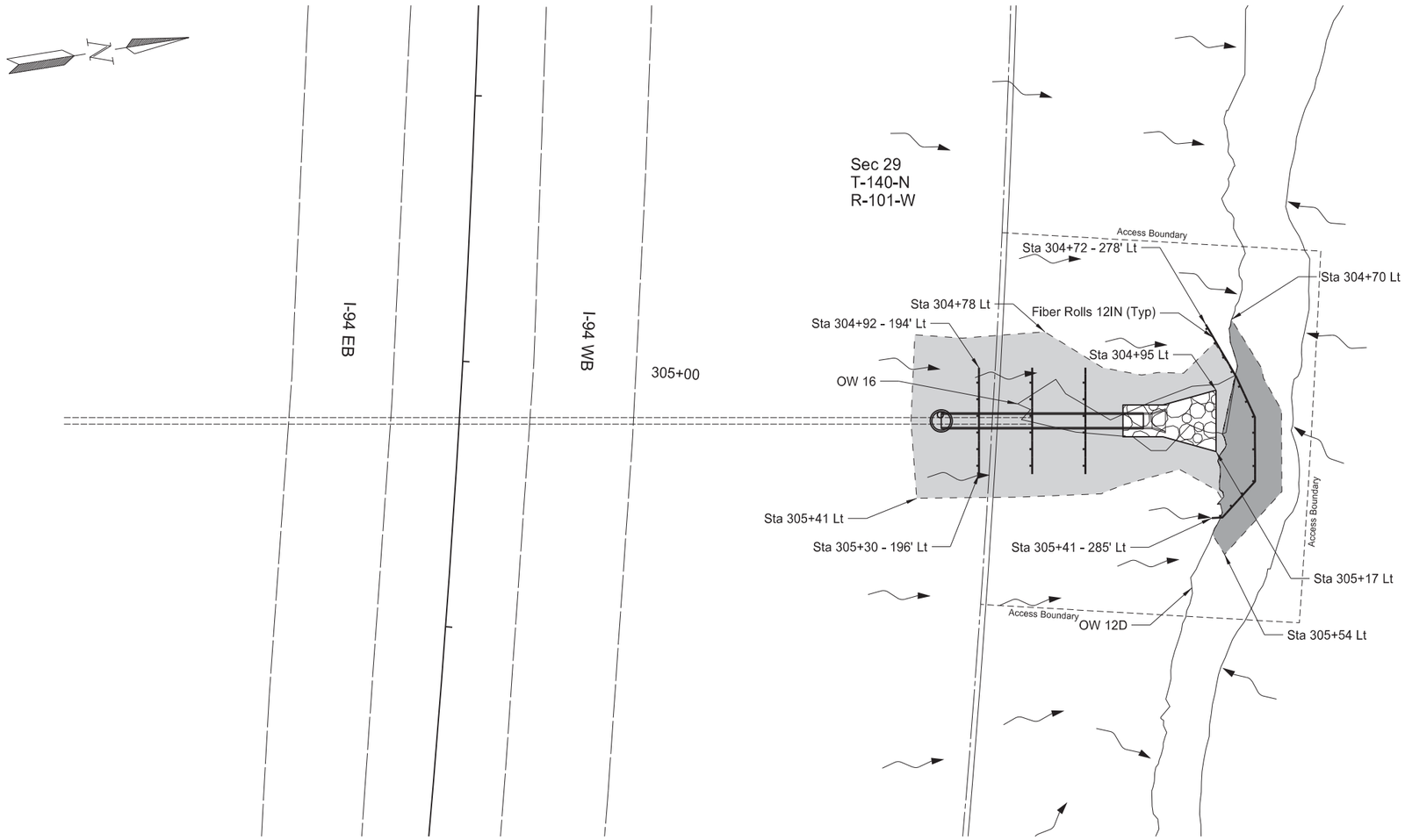
RP 28.191

W of Medora Int to 2 Mi E
Billings County, ND

REGISTERED PROFESSIONAL ENGINEER
CHRISTOPHER H. MAPLES
PE - 10272
DATE 03/28/24
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(158)027	77	5

SPEC	CODE	BID ITEM	QTY	UNIT
251	0300	SEEDING CLASS III		
		Sta 304+78 Lt to Sta 305+41 Lt	0.13	ACRE
251	1000	WETLAND SEED		
		Sta 304+70 Lt to Sta 305+54 Lt	0.03	ACRE
256	0100	RIPRAP GRADE I		
		Sta 304+95 Lt to Sta 305+17 Lt	49	CY
261	0112	FIBER ROLLS 12IN		
		Sta 304+72 - 278' Lt to Sta 305+41 - 285' Lt	86	LF
		Sta 304+90 - 234' Lt to Sta 305+28 - 236' Lt	40	LF
		Sta 304+91 - 214' Lt to Sta 305+29 - 216' Lt	40	LF
		Sta 304+92 - 194' Lt to Sta 305+30 - 196' Lt	40	LF
		TOTAL	206	LF
709	0155	GEOSYNTHETIC MATERIAL TYPE RR		
		Sta 304+95 Lt to Sta 305+17 Lt	59	SY
900	0700	FLEXIBLE GROWTH MEDIUM		
		Sta 304+70 Lt to Sta 305+54 Lt	774	SY



LEGEND

- Seeding Class III & Flexible Growth Medium
- Wetland Seed & Flexible Growth Medium
- Riprap Grade I
- Fiber Rolls 12 IN
- Existing Other Waters
- Flow Direction

Permanent Erosion Control

RP 29.256

W of Medora Int to 2 Mi E
Billings County, ND

REGISTERED PROFESSIONAL ENGINEER
CHRISTOPHER H. MAPLES
PE - 10272
DATE 03/28/24
NORTH DAKOTA

PRELIMINARY SURVEY COORDINATE AND CURVE DATA - W of E Medora Int to 2 Mi E

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(158)027	81	1

HORIZONTAL ALIGNMENT

PNT	STATION	NORTHING	EASTING
EX 94			
Begin PT	173+37.62	470933.94	1218515.32
PC	201+25.60	470116.14	1221180.65
PI C1	205+13.69	470002.30	1221551.67
PCC	209+00.60	469839.46	1221903.95
PI C2	218+49.56	469441.31	1222765.34
PT	227+92.30	468881.42	1223531.53
TS	234+21.60	468510.12	1224039.62
SC	237+21.60	468337.40	1224284.86
PI SCS3	243+21.73	467979.04	1224766.38
CS	248+88.30	467912.91	1225362.96
ST	251+88.30	467872.07	1225660.13
PC	258+02.90	467799.03	1226270.37
PI C4	263+19.23	467737.67	1226783.05
PT	268+34.00	467607.88	1227282.80
PC	275+40.30	467430.35	1227966.43
PI C5	281+30.73	467281.93	1228537.90
PT	287+17.00	467253.18	1229127.62
PC	295+57.60	467212.24	1229967.23
PI C6	313+65.94	467124.18	1231773.42
End PT	330+60.90	466015.23	1233201.83

CURVE DATA

ARC DEFINITION

	C1		C5
PI STA	= 205+13.69	PI STA	= 281+30.73
Delta	= 7° 45' 00" RT	Delta	= 11° 46' 01" LT
Da	= 1° 00' 00"	Da	= 1° 00' 00"
R	= 5729.65	R	= 5729.65
T	= 388.09	T	= 590.43'
L	= 775.00	L	= 1176.70
	C2		C6
PI STA	= 218+49.56	PI STA	= 313+65.94
Delta	= 11° 21' 00" RT	Delta	= 35° 01' 58" RT
Da	= 0° 36' 00"	Da	= 1° 00' 00"
R	= 9549.34	R	= 5729.63
T	= 948.96	T	= 1808.34
L	= 1891.70	L	= 3503.30
	SCS3		
PI STA	= 243+21.73		
Delta	= 29° 19' 57" LT		
Da	= 2° 00' 00"		
R	= 2864.93		
Ls	= 300.00		
Sc	= 2° 59' 59"		
Ts	= 900.13		
L	= 1,166.70		
	C4		
PI STA	= 263+19.23		
Delta	= 7° 44' 00" RT		
Da	= 0° 45' 00"		
R	= 7639.49		
T	= 516.33		
L	= 1031.10		

US PUBLIC LAND SURVEY DATA

CORNER	IRN	NORTHING	EASTING

SURVEY CONTROL POINTS

PNT	NORTHING	EASTING	ELEV	STATION	OFFSET	MONUMENT DESCRIPTION
Primary Control						
GPS 1	468847.83	1217799.03	2410.08	N/A	N/A	#5 Rebar
GPS 2	471007.40	1210770.66	2271.78	N/A	N/A	#5 Rebar

NOTES: Sheet 1 of 1

Date Survey Completed 09/28/2022

☐ Assumed Coordinates

☒ All coordinates on this sheet are Billings County ground coordinates. They are derived from the NAD83(2011) reference frame; North Dakota South Zone Combination Factor (cf) = 0.9998085

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

INITIALIZING BENCH MARK
NDGPS Stations (OPUS)

☒ NAVD-88

☐ _____

☐ GEOID12B ☐ _____

☒ GEOID18

REGISTERED PROFESSIONAL LAND SURVEYOR
DAVID T MORTENSEN
LS – 27699
DATE 12-01-23
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-5-094(158)027	82	1

Billings County			
PNT	STATION	NORTHING	EASTING
RP 27.286			
Begin	10+00.00	470185.31	1221352.90
End	13+18.57	470503.85	1221348.50
RP 27.892			
Begin	10+00.00	468450.98	1223849.39
PI	12+85.98	468683.83	1224015.42
PI	13+81.20	468691.34	1224110.34
End	14+53.06	468732.06	1224169.54
RP 28.061			
Begin	10+00.00	467960.71	1224629.33
End	13+74.74	468303.53	1224780.66
RP 28.191			
Begin	10+00.00	467722.29	1225322.81
PI	14+28.22	468144.16	1225396.24
PI	14+78.54	468192.75	1225409.37
End	15+57.68	468259.96	1225451.13
RP 29.256			
Begin	10+00.00	466888.36	1230891.29
End	15+34.45	467416.21	1230975.06

Culvert and Channel Alignments

Culvert Rehab - Various Locations
Billings/Golden Valley County, ND

REGISTERED PROFESSIONAL LAND SURVEYOR
DAVID MORTENSEN
LS – 27699
DATE 12-01-23
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-5-094(158)027	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**	**1**	**26**	**26**
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**	**1**	**59**	**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)**	**2**	**30**	**60**
R2-1-48	**48"x60"**	**SPEED LIMIT __**	**2**	**39**	**78**
R2-1aP-24	**24"x18"**	**MINIMUM FEE $150 (Mounted on Speed Limit post)**	**4**	**10**	**40**
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)		12	
R11-2a-48	48"x30"	STREET CLOSED (Mounted on barricade)		12	
R11-3a-60	60"x30"	ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-3c-60	60"x30"	STREET CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC (Mounted on barricade)		15	
W1-3-48	48"x48"	REVERSE TURN RIGHT or LEFT		35	
W1-4-48	48"x48"	REVERSE CURVE RIGHT or LEFT		35	
W1-4b-48	48"x48"	TWO LANE REVERSE CURVE RIGHT or LEFT		35	
W1-6-48	48"x24"	ONE DIRECTION LARGE ARROW		26	
W3-1-48	48"x48"	STOP AHEAD		35	
W3-3-48	48"x48"	SIGNAL AHEAD		35	
W3-4-48	48"x48"	BE PREPARED TO STOP		35	
W3-5-48	**48"x48"**	**SPEED REDUCTION AHEAD**	**1**	**35**	**35**
W4-2-48	**48"x48"**	**LANE ENDS RIGHT or LEFT**	**1**	**35**	**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		35	
W8-55-48	48"x48"	TRUCKS CROSSING AHEAD or __ FT or _ MILE		35	
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY		35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL		35	
W13-1P-30	30"x30"	__ MPH ADVISORY SPEED PLAQUE (Mounted on warning sign post)		14	
W14-3-64	64"x48"	NO PASSING ZONE		28	
W16-2P-30	30"x24"	__ FEET PLAQUE (Mounted on warning sign post)		10	
W20-1-48	**48"x48"**	**ROAD WORK AHEAD or _FT or _ MILE**	**1**	**35**	**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**	**1**	**35**	**35**
W20-7-48	**48"x48"**	**FLAGGER**	**1**	**35**	**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**	**2**	**35**	**70**
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED		35	
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or __ FT or _ MILE		35	

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**	**508**

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**	**1**
704-1060	**DELINEATOR DRUMS**	**EACH**	**25**
704-1065	TRAFFIC CONES	EACH	
704-1067	**TUBULAR MARKERS**	**EACH**	**60**
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**	**1**
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
CHRISTOPHER H. MAPLES
PE - 10272
DATE 12/09/25
NORTH DAKOTA

Traffic Control Devices List

W of Medora Int to 2 Mi E
Billings County, ND