STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	22773, 22782	1	1

JOB #16
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

WARD COUNTY

BRR-0051(053):
BRIDGE 51-107-12.1, 1 MILE EAST OF KENASTON
BRIDGE 51-129-27.1, 4 MILES EAST, 3 MILES SOUTH OF CARPIO
BRO-0051(054):
BRIDGE 51-106-13.1, 1 MILE EAST, 1 MILE SOUTH OF KENASTON

STRUCTURE REPLACEMENT, GRADING, AGGREGATE SURFACING, AND INCIDENTALS

GOVERNING SPECIFICATIONS:
2020 STANDARD SPECIFICATIONS ADOPTED BY THE NORTH DAKOTA DEPARTMENT OF TRANSPORTATION AND THE SUPPLEMENTAL SPECIFICATIONS EFFECTIVE ON THE DATE THE PROJECT IS ADVERTISED.

PROJECT NUMBER\DESCRIPTION	NET MILES	GROSS MILES
BRO-0051(054)	0.264	0.264
BRIDGE NO 51-106-13.1	0.264	0.264
BRR-0051(053)	0.374	0.374
BRIDGE NO 51-107-12.1	0.126	0.126
BRIDGE NO 51-129-27.1	0.248	0.248

BRR-0051(053) DESIGN DATA BRIDGE 51-107-12.1

TRAFFIC	AVERAGE DAILY			
CURRENT 2020	PASS: <50	TRUCKS: N/A	TOTAL: <50	
FORECAST 2040	PASS: <50	TRUCKS: N/A	TOTAL: <50	

CLEAR ZONE DISTANCE: 18 FT	DESIGN SPEED: 55 MPH
MINIMUM SIGHT DIST. FOR STOPPING: 495 FT	BRIDGES: HL-93
SIGHT DIST. FOR NO PASSING ZONE: 900 FT	
PAVEMENT DESIGN LIFE: N/A	
DESIGN ACCUMULATED ONE-WAY FLEXIBLE ESALS: N/A	

BRR-0051(053) DESIGN DATA BRIDGE 51-129-27.1

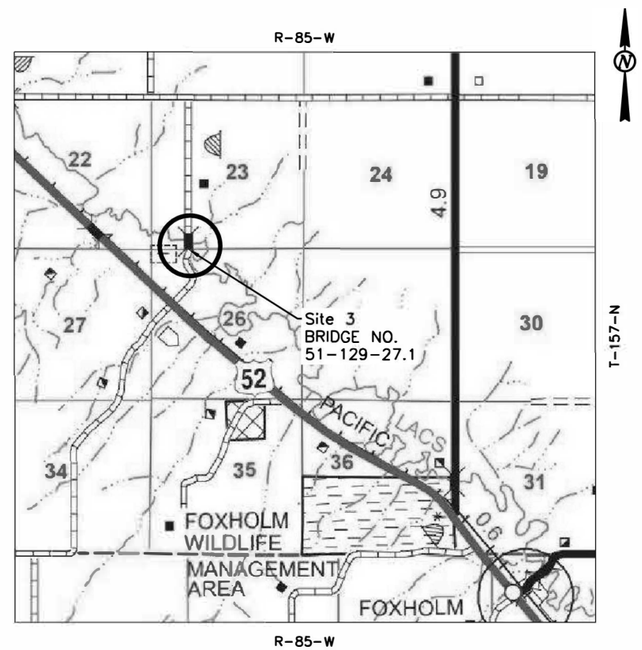
TRAFFIC	AVERAGE DAILY			
CURRENT 2020	PASS: <50	TRUCKS: N/A	TOTAL: <50	
FORECAST 2040	PASS: <50	TRUCKS: N/A	TOTAL: <50	

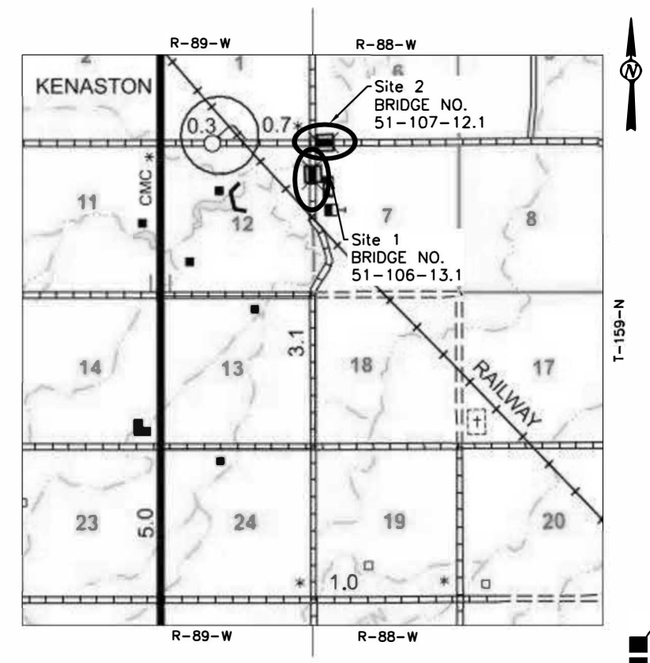
CLEAR ZONE DISTANCE: 18 FT	DESIGN SPEED: 15 MPH
MINIMUM SIGHT DIST. FOR STOPPING: 155 FT	BRIDGES: HL-93
SIGHT DIST. FOR NO PASSING ZONE: 450 FT	
PAVEMENT DESIGN LIFE: N/A	
DESIGN ACCUMULATED ONE-WAY FLEXIBLE ESALS: N/A	

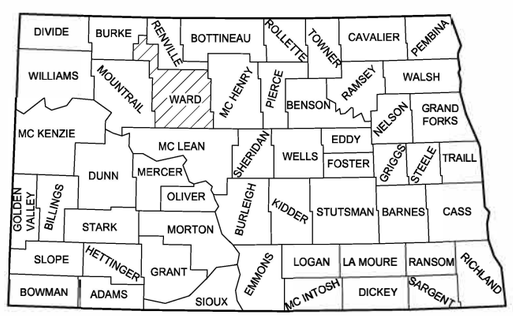
BRO-0051(054) DESIGN DATA BRIDGE 51-106-13.1

TRAFFIC	AVERAGE DAILY			
CURRENT 2020	PASS: <50	TRUCKS: N/A	TOTAL: <50	
FORECAST 2040	PASS: <50	TRUCKS: N/A	TOTAL: <50	

CLEAR ZONE DISTANCE: 18 FT	DESIGN SPEED: 55 MPH
MINIMUM SIGHT DIST. FOR STOPPING: 495 FT	BRIDGES: HL-93
SIGHT DIST. FOR NO PASSING ZONE: 900 FT	
PAVEMENT DESIGN LIFE: N/A	
DESIGN ACCUMULATED ONE-WAY FLEXIBLE ESALS: N/A	







STATE COUNTY MAP

DESIGNERS

JOSIAH ERICKSON

CARLIE BORCHERS

APPROVED DATE _____

_____
WARD COUNTY ENGINEER

Proj. No. 6790-0057
Houston Engineering Inc.
Ph: 701.237.5065

ALL ELEVATIONS ARE BASED ON THE U.S.G.S. VERTICAL DATUM OF 1988. (UNLESS NOTED OTHERWISE)

I hereby certify that the attached plans were prepared by me or under my direct supervision and that I am a duly registered professional engineer under the laws of the state of ND.

APPROVED DATE 8/21/2020

RUSTEN ROTELIUK
HOUSTON ENGINEERING INC

This document was originally issued and sealed by RUSTEN ROTELIUK, Registration Number PE-4223, on 8/21/2020 and the original document is stored at the Ward County Highway Department

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	2	1

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8	1	QUANTITIES
10	1-2	BASIS OF ESTIMATE
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30	1-3	TYPICAL SECTIONS
40	1-3	REMOVALS
50	1	HYDRAULIC DATA
51	1	PIPE LIST
60	1-3	PLAN & PROFILE
75	1-4	WETLAND IMPACTS
76	1-3	TEMPORARY EROSION CONTROL
77	1-3	PERMANENT EROSION CONTROL
80	1-2	FENCE LAYOUT
100	1-4	WORK ZONE TRAFFIC CONTROL
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200	1-21	CROSS SECTIONS

LIST OF STANDARD DRAWINGS

NUMBER	DESCRIPTION
D-101-01	NDDOT ABBREVIATIONS
D-101-02	NDDOT ABBREVIATIONS
D-101-03	NDDOT ABBREVIATIONS
D-101-10	NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS
D-101-20	LINE STYLES
D-101-21	LINE STYLES
D-101-30	SYMBOLS
D-101-32	SYMBOLS
D-203-08	STANDARD RURAL APPROACHES
D-260-01	EROSION AND SILTATION CONTROLS - SILT FENCE
D-261-01	EROSION CONTROL - FIBER ROLL PLACEMENT DETAILS
D-704-07	BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS - PERFORATED TUBE
D-704-08	BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS - U-CHANNEL POST
D-704-11	CONSTRUCTION SIGN DETAILS - WARNING SIGNS
D-704-11A	CONSTRUCTION SIGN DETAILS - WARNING SIGNS
D-704-14	CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS
D-704-19	ROAD CLOSURE AND LAND CLOSURE ON A TWO WAY ROAD LAYOUTS
D-704-21	DETOUR AND ROADWAY DIVERSION SIGN LAYOUTS
D-714-01	REINFORCED CONCRETE PIPE CULVERTS AND END SECTIONS (ROUND PIPE)
D-714-04	ROUND CORRUGATED STEEL PIPE CULVERTS AND END SECTIONS
D-714-26	TRANSVERSE MAINLINE PIPE INSTALLATION DETAIL - PIPES 4 FEET OR LESS BELOW TOP OF SUBGRADE
D-752-01	STANDARD BARBED WIRE FENCE
D-754-23	PERFORATED TUBE ASSEMBLY DETAILS
D-754-24	MOUNTING DETAILS PERFORATED TUBE
D-754-25	MOUNTING DETAILS PERFORATED TUBE
D-754-27	PERFORATED TUBE ASSEMBLY DETAILS
D-754-29	SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS REGULATORY, WARNING AND GUIDE SIGNS
D-764-01	W-BEAM GUARDRAIL GENERAL DETAILS
D-764-05	SEQUENTIAL KINKING TERMINAL
D-764-06	FLARED ENERGY ABSORBING TERMINAL
D-764-10	THRIE BEAM TRANSITION TO DOUBLE BOX BEAM RETROFIT
D-764-22	TYPICAL GRADING AT BRIDGE ENDS WITH W-BEAM GUARDRAIL

SPECIAL PROVISIONS BRR-0051(053)

NUMBER	DESCRIPTION
SP 119(20)	TEMPORARY WATER DIVERSION
SSP 1	TEMPORARY EROSION AND SEDIMENT BEST MANAGEMENT PRACTICES
SSP 2	FEDERAL MIGRATORY BIRD TREATY ACT
SSP 6	GRAVEL SURFACING
PSP 18(20)	PERMITS AND ENVIRONMENTAL CONSIDERATIONS

SPECIAL PROVISIONS BRO-0051(054)

NUMBER	DESCRIPTION
SP 120(20)	TEMPORARY WATER DIVERSION
SSP 1	TEMPORARY EROSION AND SEDIMENT BEST MANAGEMENT PRACTICES
SSP 2	FEDERAL MIGRATORY BIRD TREATY ACT
SSP 6	GRAVEL SURFACING
PSP 19(20)	PERMITS AND ENVIRONMENTAL CONSIDERATIONS

Proj. No. 6790-0057
Houston Engineering Inc.
Ph: 701.237.5065

ALL ELEVATIONS ARE BASED ON THE U.S.G.S. VERTICAL DATUM OF 1988. (UNLESS NOTED OTHERWISE)

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WARD COUNTY BRIDGE REPLACEMENTS

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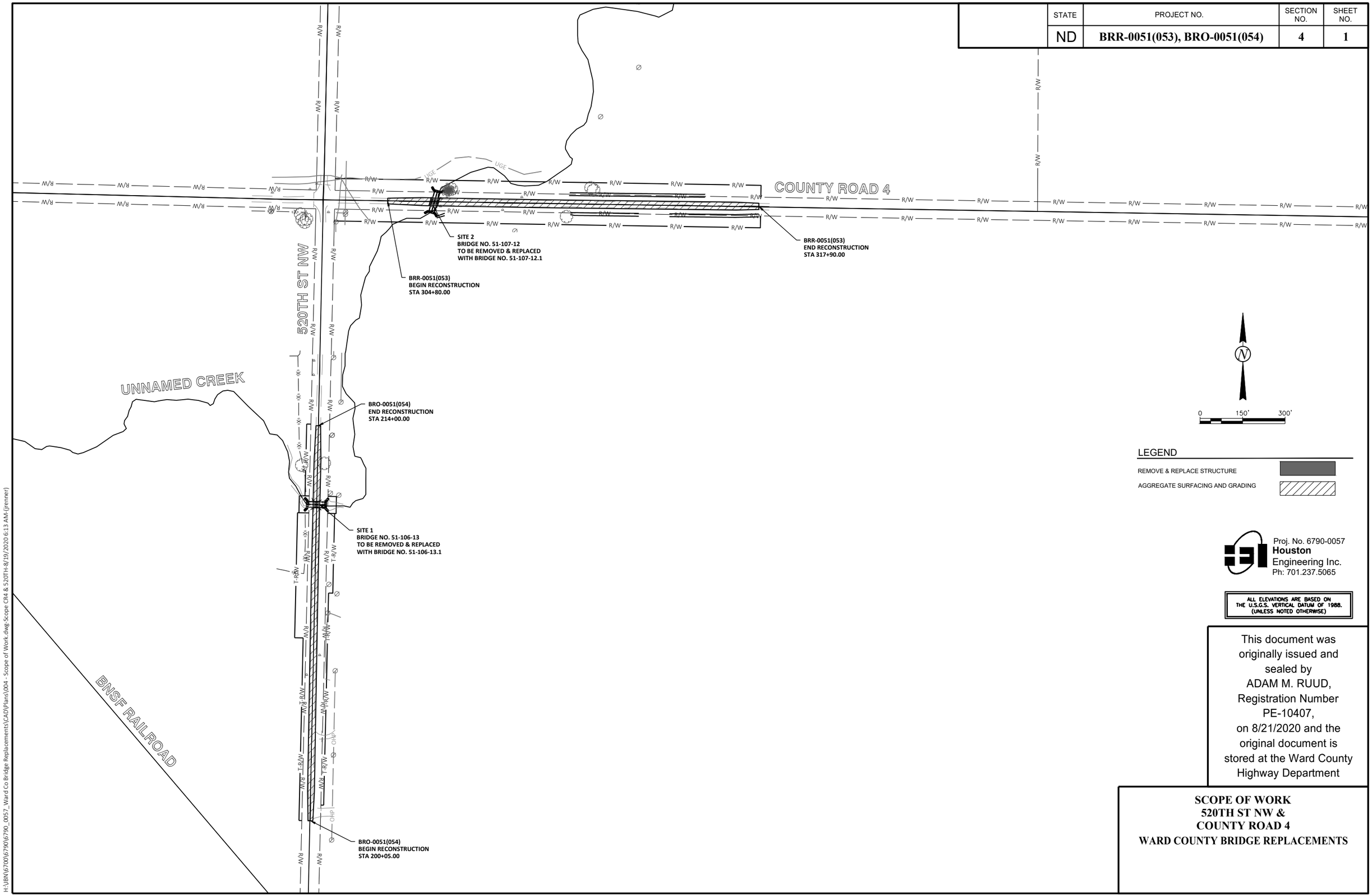
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	4	1



LEGEND

REMOVE & REPLACE STRUCTURE

AGGREGATE SURFACING AND GRADING

Proj. No. 6790-0057
Houston
Engineering Inc.
Ph: 701.237.5065

ALL ELEVATIONS ARE BASED ON THE U.S.G.S. VERTICAL DATUM OF 1988. (UNLESS NOTED OTHERWISE)

This document was originally issued and sealed by ADAM M. RUUD, Registration Number PE-10407, on 8/21/2020 and the original document is stored at the Ward County Highway Department

SCOPE OF WORK
520TH ST NW &
COUNTY ROAD 4
WARD COUNTY BRIDGE REPLACEMENTS

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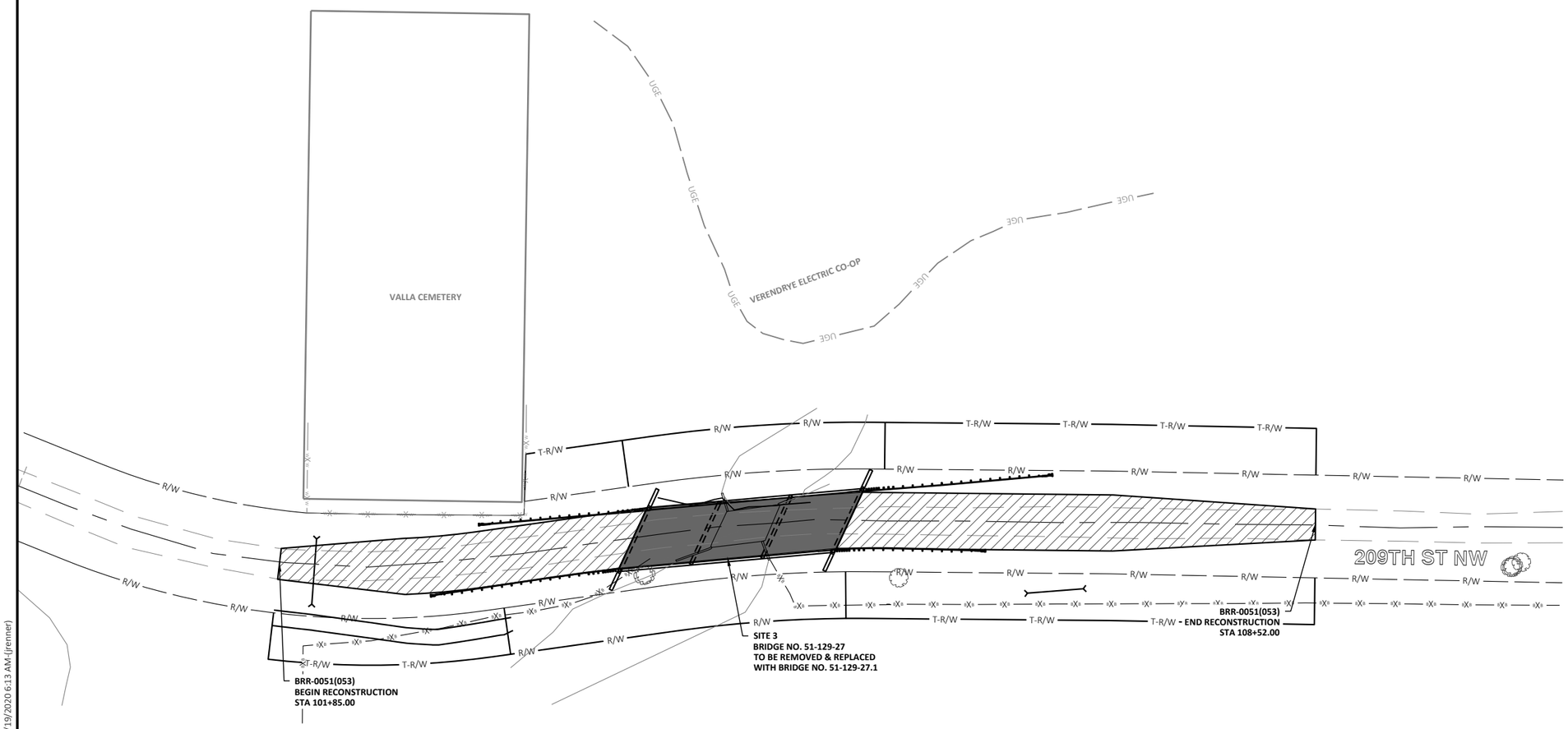
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	4	2

LEGEND

REMOVE & REPLACE STRUCTURE

AGGREGATE SURFACING AND GRADING

0 40' 80'



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SCOPE OF WORK
209TH ST NW

WARD COUNTY BRIDGE REPLACEMENTS

BRIDGE NO 51-129-27.1

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	6	1

NOTES

105-P01 UTILITY COORDINATION: Prior to beginning work, coordinate and notify utility companies.

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

202-P01 REMOVAL OF STRUCTURE: Remove, salvage, and deliver the existing individual decking and timber members on Bridge No. 51-106-13 to the Ward County Maintenance Yard at 200 72nd St SE, Minot, ND, 58701, and neatly stack the materials at a location as designated by the Ward County Engineer. Notify the Maintenance Yard 24 hours prior to delivering the materials. Include all costs to remove, salvage, deliver and neatly stack the designated materials in the price bid for "Removal of Structure Site 1.

202-P02 REMOVE EXISTING FENCE: Coordinate the timing of the removal of the existing fence at Site 3 with the adjacent landowner. Prior to removal, install a single line temporary electric fence beyond the construction limits. Make arrangements and pay for electric service to power the fence. After installation of the permanent fence, remove the temporary electric fence. Include all costs to perform this work in the price bid for "Remove Existing Fence".

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

203-P01 SHRINKAGE: 25 percent additional volume is included for shrinkage in earth embankment.

203-P02 EMBANKMENT CONSTRUCTION: Construct all embankment below the bridge to the requirements of Section 203.04.E.4, Compaction Control, Type C, of the Standard Specifications. Construct all remaining embankment to the requirements of Section 203.04.E.2, Compaction Control, Type A of the Standard Specifications. Bench all embankment at 4H:1V or flatter.

The suitability of the material from on-site excavations for use in embankments will be determined by the field engineer. If material is not suitable for the roadbed, it may be used on slope areas as determined by the Engineer.

203-P03 EXCAVATION AND FILL ELEVATIONS: All ditch grades and contours are given at the top of topsoil. A finished ground surface is available upon request.

203-P05 CONTRACTOR FURNISHED BORROW: Furnish material per Section 203.04.D.3. of the Standard Specifications.

203-P06 TOPSOIL: Remove, salvage and replace topsoil material from all disturbed areas. Quantity estimated at 4" depth. Topsoil will be paid at plan quantity and will not be measured for payment.

704-P01 TEMPORARY TRAFFIC CONTROL: Closure of roadways at each site during structure replacement will be performed as shown in the plans. No detour route will be provided. Maintain access to adjacent properties during construction.

714-P01 TRANSVERSE MAINLINE PIPE INSTALLATION: Excavate pipe trench to have a width of the outer diameter of the pipe plus an additional 2 feet on either side. Daylight trench slopes up at a 4:1 slope. Backfill with Common Excavation or Borrow Excavation material consistent with the adjacent roadway embankment compacted meeting the requirements of Section 203.04.E.1.

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	6	2

ENVIRONMENTAL NOTES

ENVIRONMENTAL NOTES (EN): The Ward County Highway Department, FHWA and North Dakota Department of Transportation 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 the Des Lacs River 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, Jessica Howell by e-mail jmhowell@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). If an inspection is not required, no follow up documentation is required.

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 TREE IMPACT: The County will measure and count trees removed to be replanted at a 2:1 ratio under a separate project.

REQUIRED PERMITS:
USACE 404 Permit
NPDES Storm Water Permit – Owner to be listed as Ward County

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	8	1

			BRO-0051(054)		BRR-051(053)			
ITEM	ITEM DESCRIPTION	UNIT	BRIDGE NO 51-106-13.1	TOTAL	BRIDGE NO 51-107-12.1	BRIDGE NO 51-129-27.1	TOTAL	TOTAL
103-0100	CONTRACT BOND	L SUM	0.33	0.33	0.33	0.34	0.67	1.00
201-0330	CLEARING & GRUBBING	L SUM	0.33	0.33	0.33	0.34	0.67	1
202-0021	REMOVE AGGREGATE BASE & SURFACING	TON	671	671	748	328	1,076	1,747
202-0108	REMOVAL OF STRUCTURE-SITE 1	L SUM	1	1	0	0	0	1
202-0109	REMOVAL OF STRUCTURE-SITE 2	L SUM	0	0	1	0	1	1
202-0110	REMOVAL OF STRUCTURE-SITE 3	L SUM	0	0	0	1	1	1
202-0312	REMOVE EXISTING FENCE	LF	240	240	0	313	313	553
203-0101	COMMON EXCAVATION-TYPE A	CY	1248	1248	4682	205	4,887	6,135
203-0109	TOPSOIL	CY	1253	1253	1613	486	2,099	3,352
203-0140	BORROW-EXCAVATION	CY	1622	1622	0	5,385	5,385	7,007
210-0050	BOX CULVERT EXCAVATION	EA	1	1	1	0	1	2
210-0099	CLASS 1 EXCAVATION	L SUM	0	0	0	1	1	1
210-0111	CLASS 2 EXCAVATION	L SUM	0	0	0	1	1	1
210-0127	CHANNEL EXCAVATION	L SUM	0	0	0	1	1	1
210-0210	FOUNDATION FILL	CY	56	56	67	0	67	123
210-0405	FOUNDATION PREPARATION-BOX CULVERT	EA	1	1	1	0	1	2
210-0411	FOUNDATION PREPARATION	L SUM	0	0	0	1	1	1
216-0100	WATER	M GAL	39	39	32	61	93	132
251-0300	SEEDING CLASS III	ACRE	2.33	2.33	3.00	0.91	3.91	6.24
251-2000	TEMPORARY COVER CROP	ACRE	2.33	2.33	3.00	0.91	3.91	6.24
253-0101	STRAW MULCH	ACRE	4.66	4.66	6.00	1.82	7.82	12.48
256-0200	RIPRAP GRADE II	CY	155	155	433	1,180	1,613	1,768
260-0200	SILT FENCE SUPPORTED	LF	22	22	20	0	20	42
260-0201	REMOVE SILT FENCE SUPPORTED	LF	22	22	20	0	20	42
261-0112	FIBER ROLLS 12IN	LF	5866	5866	3530	2620	6,150	12,016
261-0113	REMOVE FIBER ROLLS 12IN	LF	2933	2933	1765	1310	3,075	6,008
262-0100	FLOTATION SILT CURTAIN	LF	0	0	0	85	85	85
262-0101	REMOVE FLOATATION SILT CURTAIN	LF	0	0	0	85	85	85
350-0501	GRAVEL SURFACING	CY	456	456	535	321	856	1,312
602-0130	CLASS AAE-3 CONCRETE	CY	0	0	0	164.7	164.7	164.7
602-1130	CLASS AE-3 CONCRETE	CY	0	0	0	203.2	203.2	203.2
602-1250	PENETRATING WATER REPELLENT TREATMENT	SY	0	0	0	626.4	626.4	626.4
604-9600	PRESTRESSED BOX BEAM-21IN	LF	0	0	0	675	675	675
606-2908	DBL 9FT x 8FT PRECAST RCB CULVERT	LF	60	60	72	0	72	132
606-6908	DBL 9FT x 8FT PRECAST RCB END SECTION	EA	2	2	2	0	2	4
612-0115	REINFORCING STEEL-GRADE 60	LBS	0	0	0	17,171	17,171	17,171
612-0116	REINFORCING STEEL-GRADE 60-EPOXY COATED	LBS	0	0	0	32,161	32,161	32,161
616-5890	STRUCTURAL STEEL	L SUM	0	0	0	1	1	1
622-0012	STEEL H-PILE TIPS 10 X 42	EA	0	0	0	12	12	12
622-0014	STEEL H-PILING POINTS 12 X 53	EA	0	0	0	12	12	12
622-0020	STEEL PILING HP 10 X 42	LF	0	0	0	1,020	1,020	1,020
622-0040	STEEL PILING HP 12 X 53	LF	0	0	0	960	960	960
624-0129	TRAFFIC RAIL-DOUBLE BEAM GUARDRAIL	LF	0	0	0	280.0	280.0	280.0
702-0100	MOBILIZATION	L SUM	0.33	0.33	0.33	0.34	0.67	1.00
704-1000	TRAFFIC CONTROL SIGNS	UNIT	86	86	86	86	172	258
704-1052	TYPE III BARRICADE	EA	3	3	3	3	6	9
709-0100	GEOSYNTHETIC MATERIAL TYPE G	SY	304	304	356	0	356	660
709-0155	GEOSYNTHETIC MATERIAL TYPE RR	SY	232	232	649	1,578	2,227	2,459
714-4105	PIPE CONDUIT 24IN	LF	0	0	0	42	42	42
714-4099	PIPE CONDUIT 18IN-APPROACH	LF	0	0	0	36	36	36
752-0102	FENCE BARBED WIRE 3 STRAND-WOOD POST	LF	209	209	0	227	227	436
752-2100	VEHICLE GATE	EA	0	0	0	1	1	1
752-3150	CORNER ASSEMBLY BARBED WIRE-WOOD POST	EA	2	2	0	5	5	7
754-0110	FLAT SHEET FOR SIGNS-TYPE XI REFL SHEETING	SF	0	0	0	58	58	58
754-0206	STEEL GALV POSTS-TELESCOPING PERFORATED TUBE	LF	0	0	0	145	145	145
764-0131	W-BEAM GUARDRAIL	LF	0	0	0	245	245	245
764-0145	W-BEAM, GUARDRAIL END TERMINAL	EA	0	0	0	4	4	4
900-1000	TEMPORARY STREAM DIVERSION	EA	1	1	1	0	1	2
930-9537	ABUTMENT UNDERDRAIN SYSTEM	EA	0	0	0	2	2	2

Proj. No. 6790-0057
Houston Engineering Inc.
Ph: 701.237.5065

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QUANTITIES

WARD COUNTY BRIDGE REPLACEMENTS

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	10	1

BASIS OF ESTIMATE

BRO-0051(054) Bridge No 51-106-13.1 520th St NW		Stations			
		Sta 200+05.00 to Sta 214+00.00: **13.95 Sta**			
		Mainline Surface Area	Slough		
Material	Unit	Area (SF)	Length (Ft)	Area (SF)	Subtotal (CY)
Gravel Surfacing Required*	CY	34,030	2826	0.63	696

BRR-0051(053) Bridge No 15-107-12.1 County Road 4		Stations			
		Sta 304+80.00 to Sta 317+90.00: **13.1 Sta**			
		Mainline Surface Area	Slough		
Material	Unit	Area (SF)	Length (Ft)	Area (SF)	Subtotal (CY)
Gravel Surfacing Required*	CY	39,881	2678	0.63	801

BRR-0051(053) Bridge No 51-129-27.1 209th St NW		Stations					Stations					
		Sta 101+85.00 to Sta 104+26.03: **2.41 Sta**					Sta 105+41.51 to Sta 108+52.00: **3.10 Sta**					
		Mainline Surface Area	Guardrail Surface Area	Slough			Mainline Surface Area	Guardrail Surface Area	Slough			
Material	Unit	Area (SF)	Area (SF)	Length (Ft)	Area (SF)	Subtotal (CY)	Area (SF)	Area (SF)	Length (Ft)	Area (SF)	Subtotal (CY)	Total (CY)
Gravel Surfacing Required*	CY	7,571	1,368	460	0.63	176	10,890	2,433	658	0.63	262	438

BRO-0051(054) Bridge No 51-106-13.1 520th St NW		Stations				
		Sta 200+05.00 to Sta 214+00.00: **13.95 Sta**				
		Mainline Surface Area	Slough			
Material	Unit	Area (SF)	Length (Ft)	Area (SF)	Subtotal (CY)	Total (Ton)
Remove Aggregate Base & Surfacing	Ton	23,711	2796	0.63	358	**671**

BRR-0051(053) Bridge No 15-107-12.1 County Road 4		Stations				
		Sta 304+80.00 to Sta 317+90.00: **13.1 Sta**				
		Mainline Surface Area	Slough			
Material	Unit	Area (SF)	Length (Ft)	Area (SF)	Subtotal (CY)	Total (Ton)
Remove Aggregate Base & Surfacing	Ton	27,510	2556	0.63	399	**748**

BRR-0051(053) Bridge No 51-129-27.1 209th St NW		Stations				
		Sta 101+85.00 to Sta 108+52.00: **6.67 Sta**				
		Mainline Surface Area	Slough			
Material	Unit	Area (SF)	Length (Ft)	Area (SF)	Subtotal (CY)	Total (Ton)
Remove Aggregate Base & Surfacing	CY	11,675	1344	0.63	175	**328**

*Not a Pay Item

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	10	2

BASIS OF ESTIMATE

	BRO-0051(054)		BRR-0051(053)			
Salvaged Base Course	**Bridge No 51-106-13.1**	**Total**	**Bridge No 51-107-12.1**	**Bridge No 51-129-27.1**	**Total**	**Total**
A. Remove Aggregate Base & Surfacing	358 CY	358 CY	399 CY	175 CY	574 CY	932 CY
B. Salvageable Aggregate Material (A x 0.67)*	240 CY	240 CY	266 CY	117 CY	383 CY	623 CY
C. Gravel Surfacing Required*	696 CY	696 CY	801 CY	438 CY	1239 CY	1,935 CY
D. Gravel Surfacing (C - B)	456 CY	456 CY	535 CY	321 CY	856 CY	**1,312 CY**

*Not a Pay Item

	BRO-0051(054)		BRR-0051(053)			
Water	**Bridge No 51-106-13.1**	**Total**	**Bridge No 51-107-12.1**	**Bridge No 51-129-27.1**	**Total**	**Total**
10 MGal/Mile for Dust Palliative	3 MGal	3 M Gal	2 MGal	1 MGal	3 M Gal	6 MGal
10 Gal/CY for Aggregates	7 MGal	7 M Gal	8 MGal	4 MGal	12 M Gal	19 MGal
10 Gal/CY for Embankment	29 MGal	29 M Gal	22 MGal	56 MGal	78 M Gal	105 MGal
Total	39 MGal	39 M Gal	32 MGal	61 MGal	93 M Gal	132 MGal

	BRO-0051(054)		BRR-0051(053)			
Earthwork	**Bridge No 51-106-13.1**	**Total**	**Bridge No 51-107-12.1**	**Bridge No 51-129-27.1**	**Total**	**Total**
Total Embankment*	2296 CY	2296 CY	1724 CY	4472 CY	6196 CY	8,492 CY
Loose Volume Required (125% Total Emb)*	2870 CY	2870 CY	2155 CY	5590 CY	7745 CY	10,615 CY
Common Excavation Volume	1248 CY	1248 CY	4682 CY	205 CY	4887 CY	**6,135 CY**
Borrow Excavation Required	1622 CY	1622 CY	0 CY	5385 CY	5385 CY	**7,007 CY**
Topsoil	1253 CY	1253 CY	1613 CY	486 CY	2099 CY	**3,352 CY**

*Not a Pay Item

Material

Select Backfill	1.875 Ton/CY
Gravel Surfacing	1.875 Ton/CY
Seeding	All Disturbed Areas Outside of the Roadbed
Topsoil	Seeding Area @ 4" Depth

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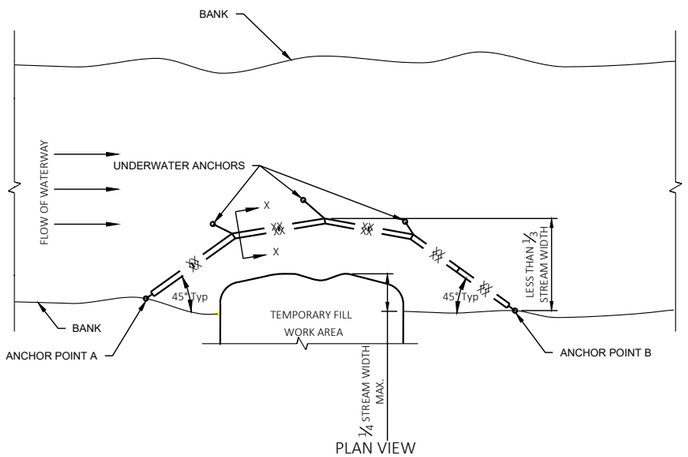
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	20	1

TYPICAL INSTALLATIONS
May vary with conditions

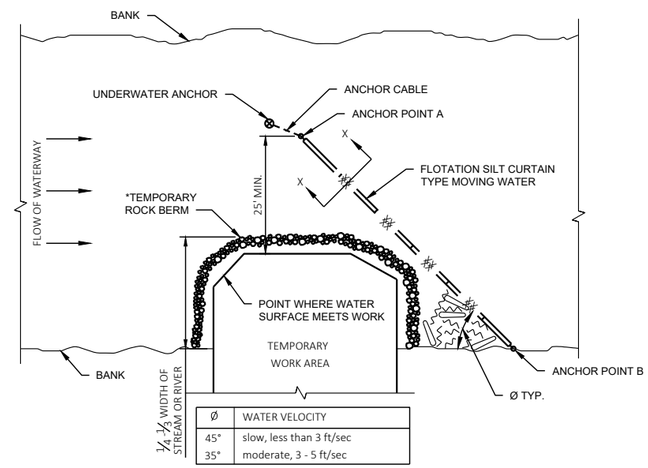


PLAN VIEW

FLOTATION SILT CURTAIN - TYPE WORK AREA

DESIGN GUIDELINES:

WHEN TEMPORARY WORK ENCROACHES LESS THAN ¼ OF THE WIDTH OF STREAM.



Ø	WATER VELOCITY
45°	slow, less than 3 ft/sec
35°	moderate, 3 - 5 ft/sec

PLAN VIEW

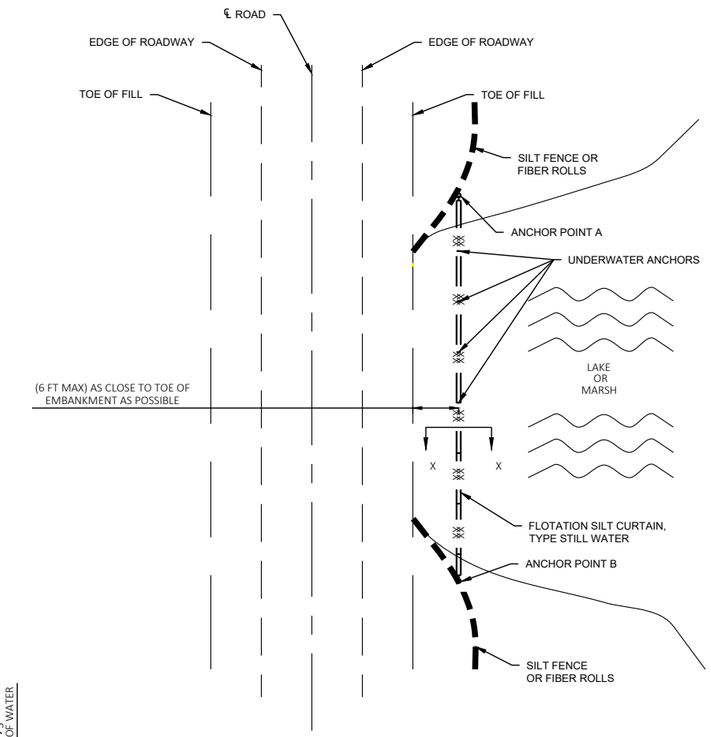
FLOTATION SILT CURTAIN - TYPE MOVING WATER

DESIGN GUIDELINES:

WHEN TEMPORARY WORK ENCROACHES MORE THAN ¼ BUT LESS THAN ⅓ WIDTH OF THE STREAM.

FOR NARROW WATERWAYS, THE CURTAIN MAY BE PLACED 1 FOOT ABOVE THE BOTTOM OF WATERWAY TO ALLOW WATER FLOW.

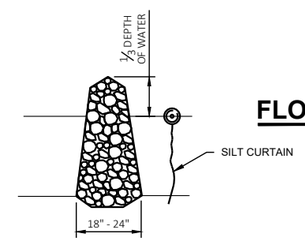
*IN AREAS WHERE THE PLANS CALL FOR RIPRAP AT THE BRIDGE, PROVIDE A TEMPORARY ROCK BERM. INCLUDE ALL COSTS FOR THE TEMPORARY ROCK BERM IN PRICE BID FOR THE "RIPRAP".



PLAN VIEW

FLOTATION SILT CURTAIN - TYPE STILL WATER

EXTEND SILT CURTAIN ONTO SHORE AND ANCHOR THERE ALSO.



TEMPORARY ROCK BERM

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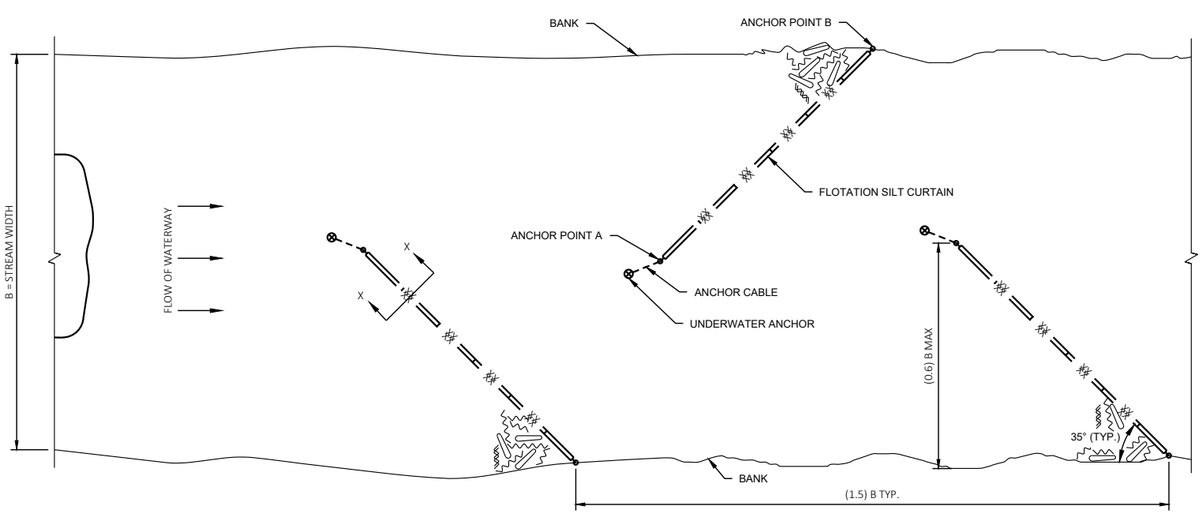
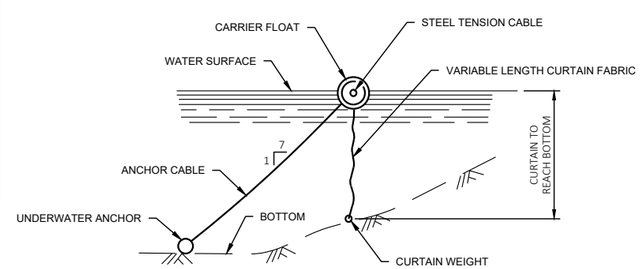


PLAN VIEW

FLOTATION SILT CURTAIN - TYPE HERRING BONE PATTERN

DESIGN GUIDELINES:
WHEN TEMPORARY WORK ENCROACHES MORE THAN ⅓ WIDTH OF THE STREAM
OR WHERE STREAM WIDTH DOESN'T ALLOW USE OF TYPE MOVING WATER.



SECTION X-X

FLOTATION SILT CURTAINS

NOTE:
MAXIMUM WATER VELOCITY FOR MOVING WATER = 5 FT/SEC

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FLOTATION SILT CURTAIN DETAILS

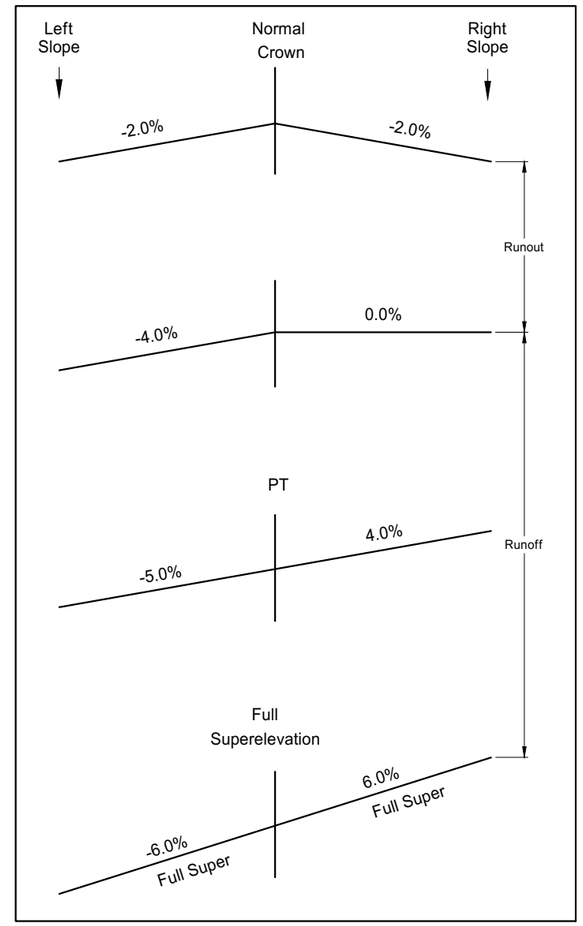
WARD COUNTY BRIDGE REPLACEMENTS

H:\JBN\6700\6790\6790_0057_Ward Co Bridge Replacements\CAD\Plans\020 - General Details dwg-General Details 1-8/19/2020 6:13 AM-(jrenner)

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	20	2

Superelevation Data

Sta	Section	Slope	
		Left Slope	Right Slope
209th St NW (Ex_209thStNW)			
101+85.00	Begin Super (Match Existing)	-8.00%	3.00%
102+79.19	End Full Super	-6.00%	6.00%
103+13.52	PT	-5.00%	4.00%
103+47.86	Reverse Crown	-4.00%	2.00%
103+82.19	Level Crown	-4.00%	0.00%
104+16.19	Normal Cross Slope	-2.00%	-2.00%



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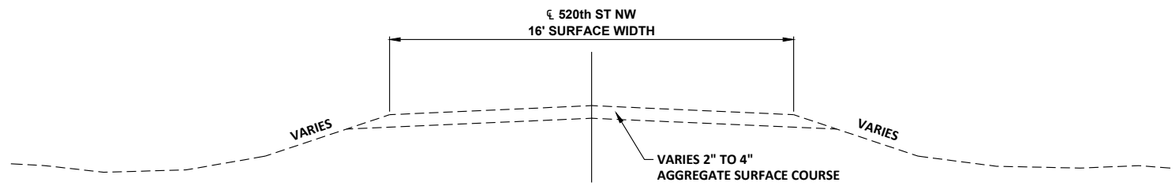
SUPERELEVATION TABLE

WARD COUNTY BRIDGE REPLACEMENTS

BRIDGE NO 51-129-27.1

H:\BN\6700\6790\6790_0057_Ward Co Bridge Replacements\CAD\Plans\020 - SuperElev.dwg:Layout1:8/19/2020 6:13 AM:(jrenner)

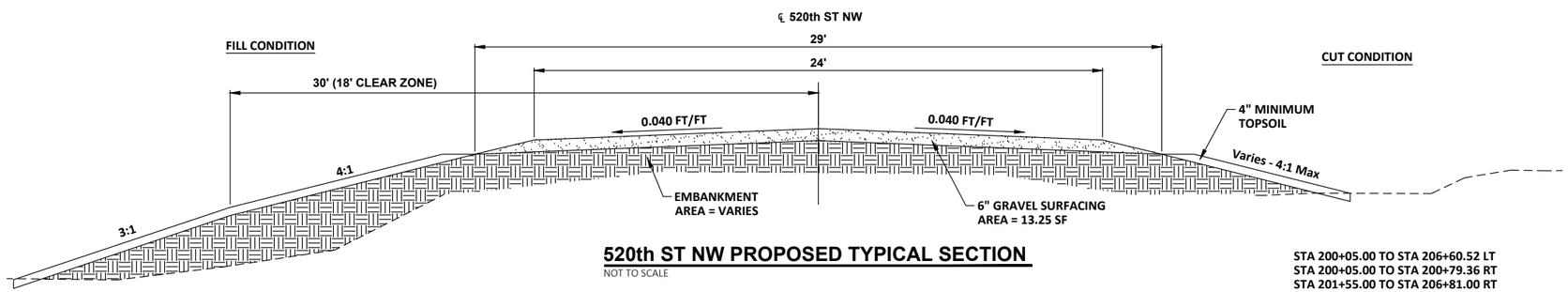
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	30	1



520th ST NW EXISTING TYPICAL SECTION

NOT TO SCALE

STA 200+05.00 TO STA 214+00.00



520th ST NW PROPOSED TYPICAL SECTION

NOT TO SCALE

STA 200+05.00 TO STA 214+00.00

STA 200+79.36 TO STA 201+55.00 RT
STA 206+60.52 TO STA 210+80.00 LT
STA 206+81.00 TO STA 210+74.86 RT

STA 200+05.00 TO STA 206+60.52 LT
STA 200+05.00 TO STA 200+79.36 RT
STA 201+55.00 TO STA 206+81.00 RT
STA 210+74.86 TO STA 214+00.00 RT
STA 210+80.00 TO STA 214+00.00 LT

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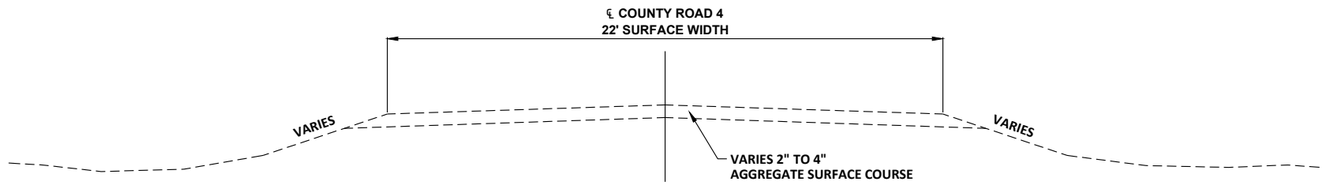
TYPICAL SECTIONS
520TH ST NW

WARD COUNTY BRIDGE REPLACEMENTS

BRIDGE NO 51-106-13.1

H:\JBN\6700\6790\6790_0057_Ward Co Bridge Replacements\CAD\Plans\030 - Typical Sections.dwg:Typical 520TH:8/19/2020 6:13 AM:(jrenner)

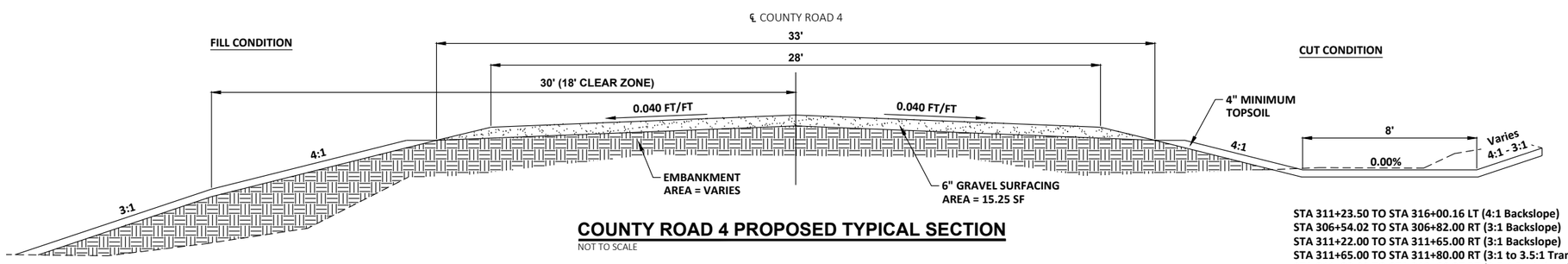
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	30	2



COUNTY ROAD 4 EXISTING TYPICAL SECTION

NOT TO SCALE

STA 304+80.00 TO STA 317+90.00



COUNTY ROAD 4 PROPOSED TYPICAL SECTION

NOT TO SCALE

STA 304+80.00 TO STA 317+90.00

STA 304+80.00 TO STA 311+23.50 LT
STA 304+80.00 TO STA 306+54.02 RT
STA 316+00.16 TO STA 317+90.00 LT
STA 306+82.00 TO STA 311+22.00 RT
STA 313+66.87 TO STA 314+74.87 RT

STA 311+23.50 TO STA 316+00.16 LT (4:1 Backslope)
STA 306+54.02 TO STA 306+82.00 RT (3:1 Backslope)
STA 311+22.00 TO STA 311+65.00 RT (3:1 Backslope)
STA 311+65.00 TO STA 311+80.00 RT (3:1 to 3.5:1 Transition)
STA 311+80.00 TO STA 313+66.87 RT (3.5:1 Backslope)
STA 314+74.87 TO STA 317+90.00 RT (4:1 Backslope)

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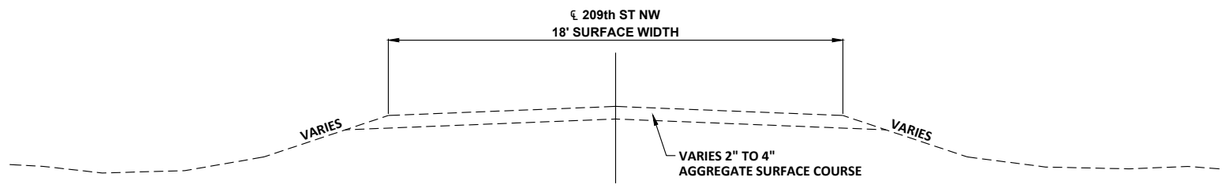
TYPICAL SECTIONS
COUNTY ROAD 4

WARD COUNTY BRIDGE REPLACEMENTS

BRIDGE NO 51-107-12.1

H:\JBN\6700\6790\6790_0057_Ward Co Bridge Replacements\CAD\Plans\030 - Typical Sections.dwg:Typical CR4:8/19/2020 6:13 AM:(jrenner)

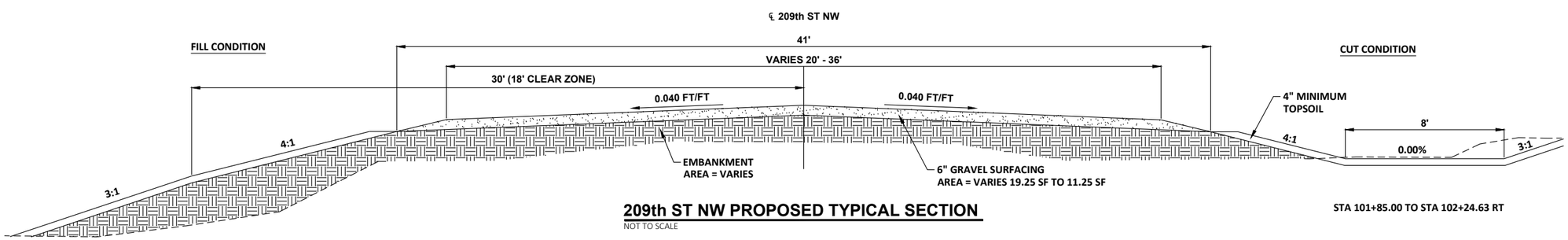
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	30	3



209th ST NW EXISTING TYPICAL SECTION

NOT TO SCALE

STA 101+85.00 TO STA 108+52.00



209th ST NW PROPOSED TYPICAL SECTION

NOT TO SCALE

STA 101+85.00 TO STA 108+52.00

STA 101+85.00 TO STA 102+24.63 RT

STA 101+85.00 TO STA 104+62.36 LT
STA 102+40.62 TO STA 104+62.36 RT
STA 105+08.87 TO STA 108+52.00 LT
STA 105+08.87 TO STA 108+52.00 RT

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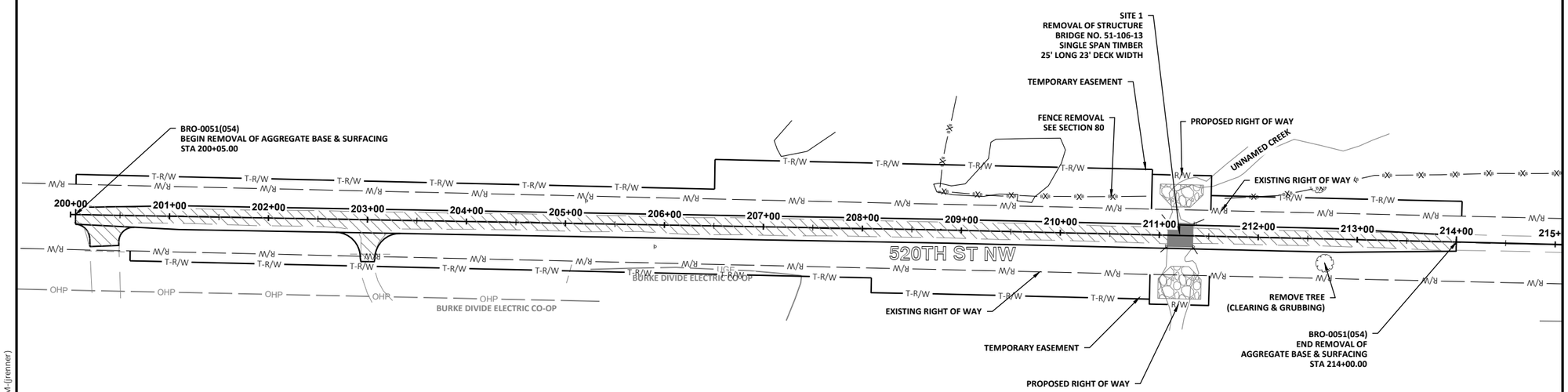
TYPICAL SECTIONS
209TH ST NW

WARD COUNTY BRIDGE REPLACEMENTS

BRIDGE NO 51-129-27.1

H:\JBN\6700\6790\6790_0057_Ward Co Bridge Replacements\CAD\Plans\030 - Typical Sections.dwg:Typical 209TH:8/19/2020 6:13 AM:(jrenner)

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	40	1



0 60' 120'

LEGEND

REMOVE AGGREGATE BASE AND SURFACING

REMOVAL OF STRUCTURE

ITEM	DESCRIPTION	QUANTITY	UNIT
202-0108	REMOVAL OF STRUCTURE-SITE 1 STA 211+08.18 TO STA 211+34.06	1	L SUM
202-0021	REMOVE AGGREGATE BASE & SURFACING STA 200+05.00 TO 214+00.00	671	TON

NOTES:

1. INCLUDE REMOVAL AND DISPOSAL OF TREES & SHRUBS REGARDLESS OF SIZE IN THE PRICE BID FOR "CLEARING AND GRUBBING."

Proj. No. 6790-0057
Houston Engineering Inc.
Ph: 701.237.5065

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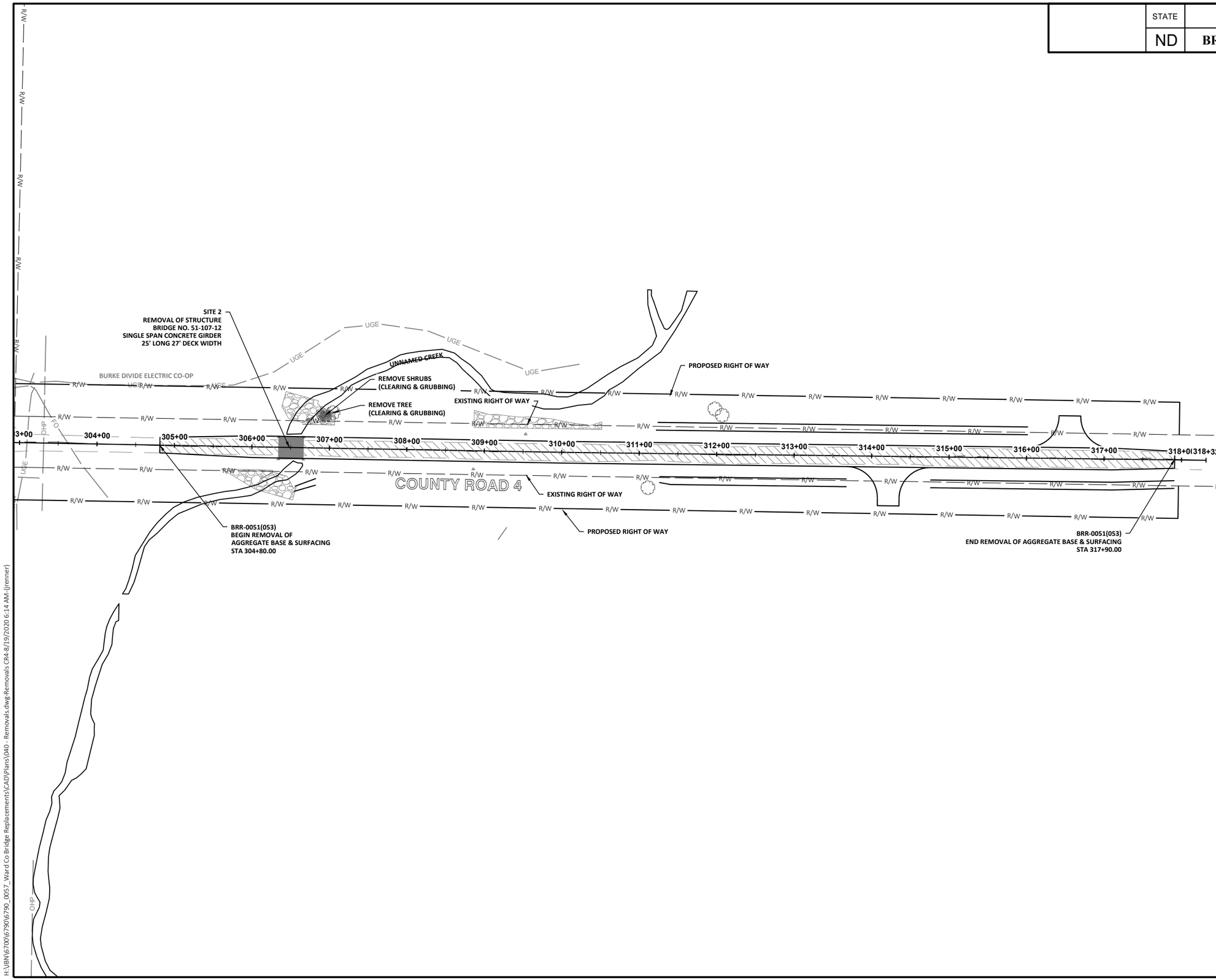
REMOVALS
520TH ST NW

WARD COUNTY BRIDGE REPLACEMENTS

BRIDGE NO 51-106-13.1

H:\BN\6700\6790\6790_0057_Ward Co Bridge Replacements\CAD\Plans\040 - Removals.dwg;Removals 520TH-8/19/2020 6:14 AM-(jrenner)

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	40	2



LEGEND

REMOVE AGGREGATE BASE AND SURFACING

REMOVAL OF STRUCTURE

ITEM	DESCRIPTION	QUANTITY	UNIT
202-0109	REMOVAL OF STRUCTURE-SITE 2		
	STA 306+34.19 TO STA 306+66.50	1	L SUM
202-0021	REMOVE AGGREGATE BASE & SURFACING		
	STA 304+80.00 TO STA 317+90.00	748	TON

NOTES:

1. INCLUDE REMOVAL AND DISPOSAL OF TREES & SHRUBS REGARDLESS OF SIZE IN THE PRICE BID FOR "CLEARING AND GRUBBING."

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REMOVALS
COUNTY ROAD 4

WARD COUNTY BRIDGE REPLACEMENTS

BRIDGE NO 51-107-12.1

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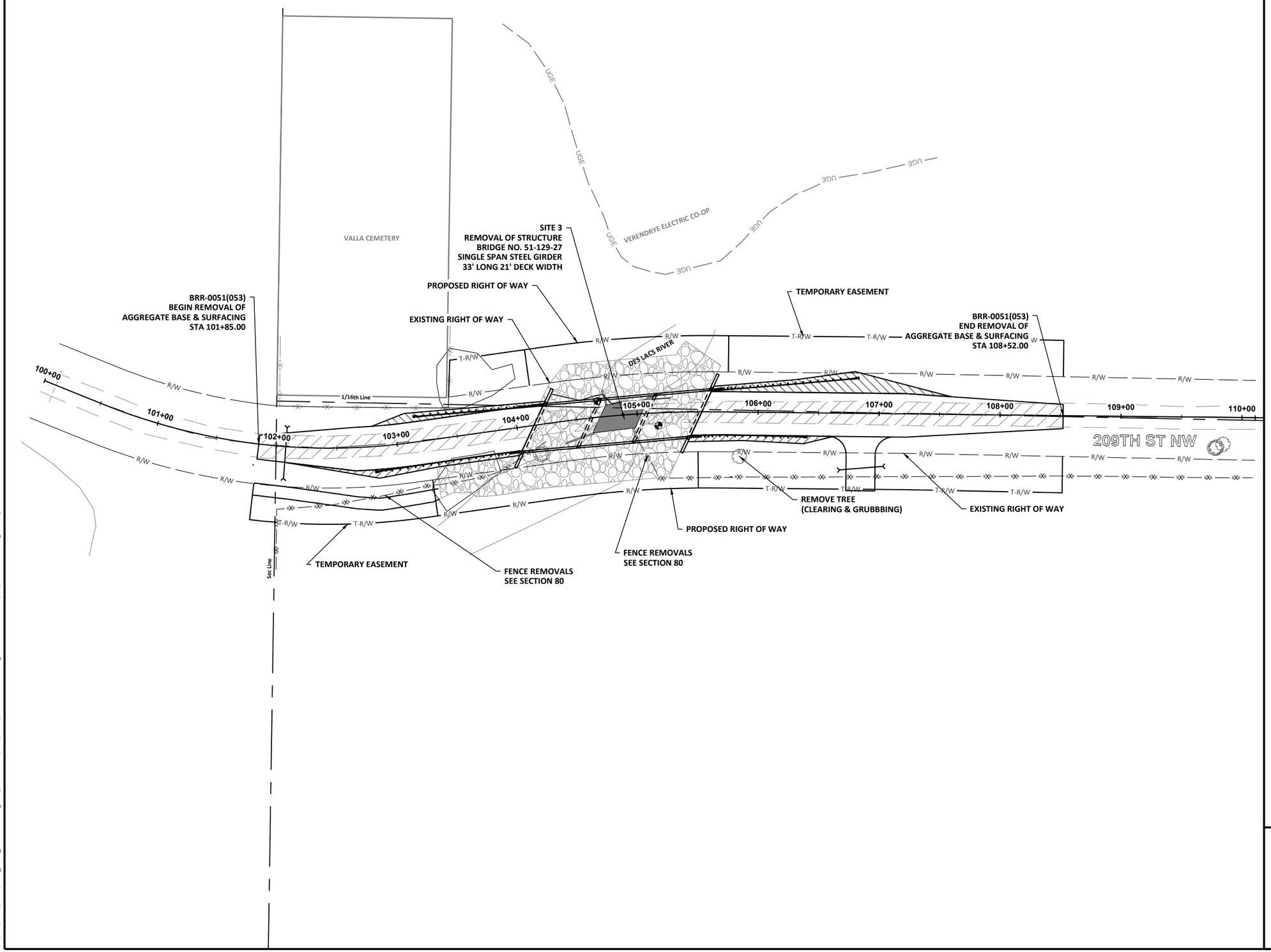
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	40	3



0 40' 80'

LEGEND

REMOVE AGGREGATE BASE AND SURFACING

REMOVAL OF STRUCTURE

ITEM	DESCRIPTION	QUANTITY	UNIT
202-0110	REMOVAL OF STRUCTURE-SITE 3 STA 104+62.36 TO STA 105+08.87	1	L SUM
202-0021	REMOVE AGGREGATE BASE & SURFACING STA 101+85.00 TO STA 108+52.00	328	TON

NOTES:

1. INCLUDE REMOVAL AND DISPOSAL OF TREES & SHRUBS REGARDLESS OF SIZE IN THE PRICE BID FOR "CLEARING AND GRUBBING."

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REMOVALS
209TH ST NW

WARD COUNTY BRIDGE REPLACEMENTS

BRIDGE NO 51-129-27.1

H:\JBN\6700\6790\6790_0057_Ward Co Bridge Replacements\CAD\Plans\040 - Removals.dwg-Removals 209TH-8/19/2020 6:14 AM-(jrenner)

HYDRAULIC DATA FOR BRR-0051(053), BR0-0051(054)

				10-YEAR DATA				100-YEAR DATA	
STATION	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)
102+08 (209thStNW)	-	24" (B)	1.28	4	1.43	4.10	1673.01	9	1673.69

(A) Hydraulic data provided is for smooth-walled type conduits
(B) Culvert diameter given at this location is the NDDOT Policy minimum diameter and exceeds hydraulic requirements.

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HYDRAULIC DATA

WARD COUNTY BRIDGE REPLACEMENTS

H:\JBN\6760\6790\6790_0057_Ward Co Bridge Replacements\CAD\Plans\050 - Hydraulic Data.dwg-Layout1-8/19/2020 6:14 AM-(jrenner)

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	Geosynthetic Material Type G	(*) End Sections		Applicable Backfill
													Begin	End	
				In	Bid Item	LF		In	Type		In	SY	EA	EA	
209th St NW															
102+08	17' Lt	102+08	25' R	24	Pipe Conduit	42	Reinforced Concrete Pipe - Class III **(barrel length = 40 LF)**	24					FES (4:1)	FES (4:1)	See Note in Section 6
106+68	46' Rt	107+03	42' Rt	18	Pipe Conduit - Approach	36	Corrugated Steel Pipe	18	A, P	2	0.064		FES	FES	See Note in Section 6

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

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

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

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

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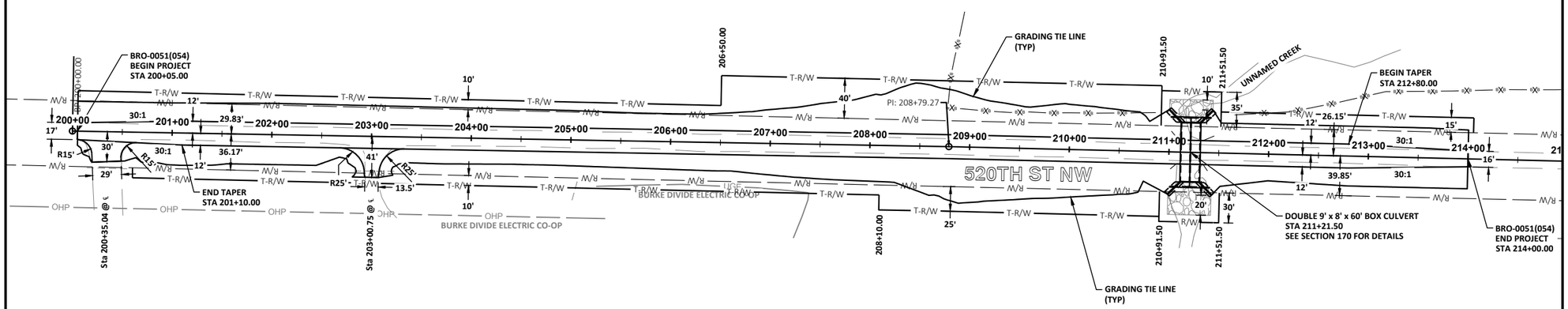
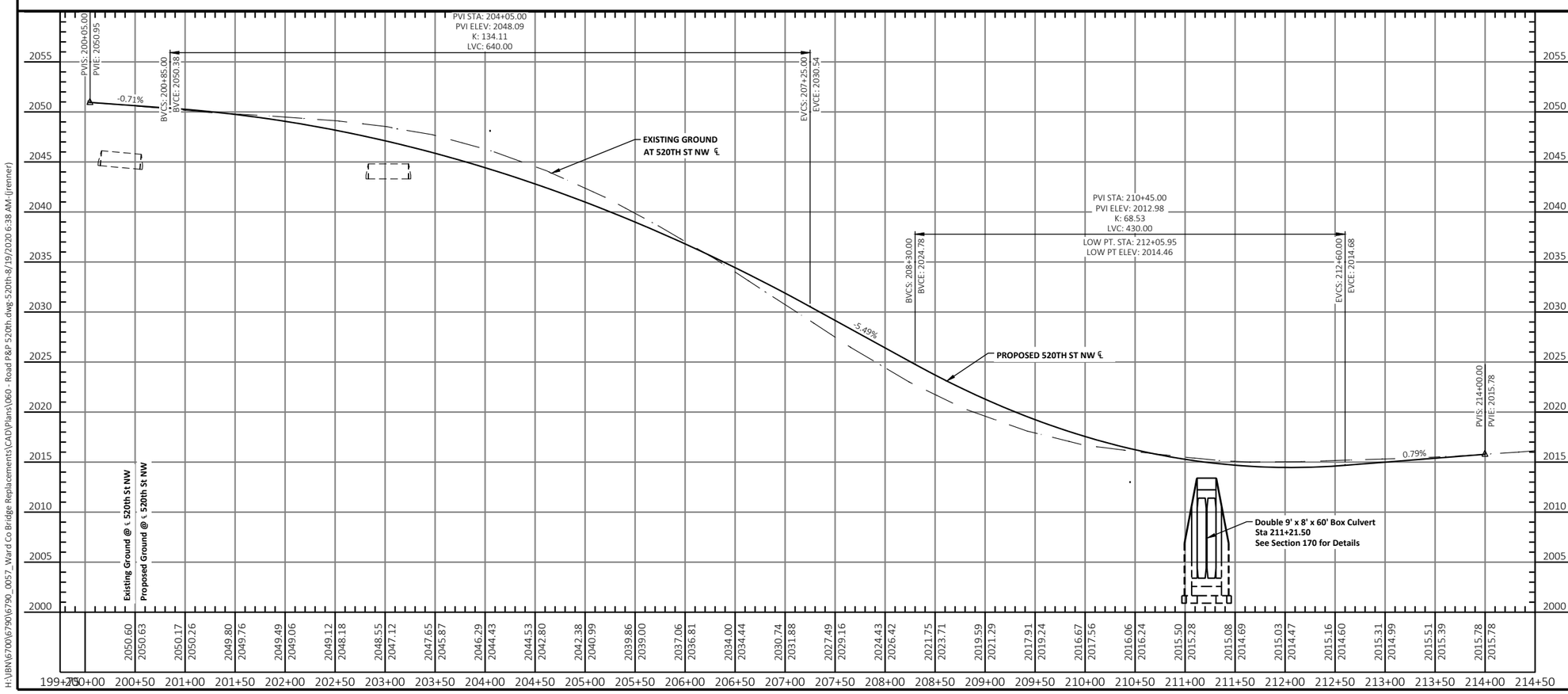
PIPE LIST

WARD COUNTY BRIDGE REPLACEMENTS

H:\JBN\6760\6790\6790_0057_Ward Co Bridge Replacements\CAD\Plans\051 - Pipelist.dwg,Layout1,8/19/2020 6:14 AM,(jrenner)

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	60	1





0 60' 120'

LEGEND

PROPOSED RIGHT OF WAY LINE	R/W
EXISTING RIGHT OF WAY LINE	R/W
TEMPORARY CONSTRUCTION EASEMENT LINE	T-R/W
RIPRAP GRADE II	

Proj. No. 6790-0057
Houston Engineering Inc.
Ph: 701.237.5065

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PLAN & PROFILE
520TH ST NW

WARD COUNTY BRIDGE REPLACEMENTS

BRIDGE NO 51-106-13.1

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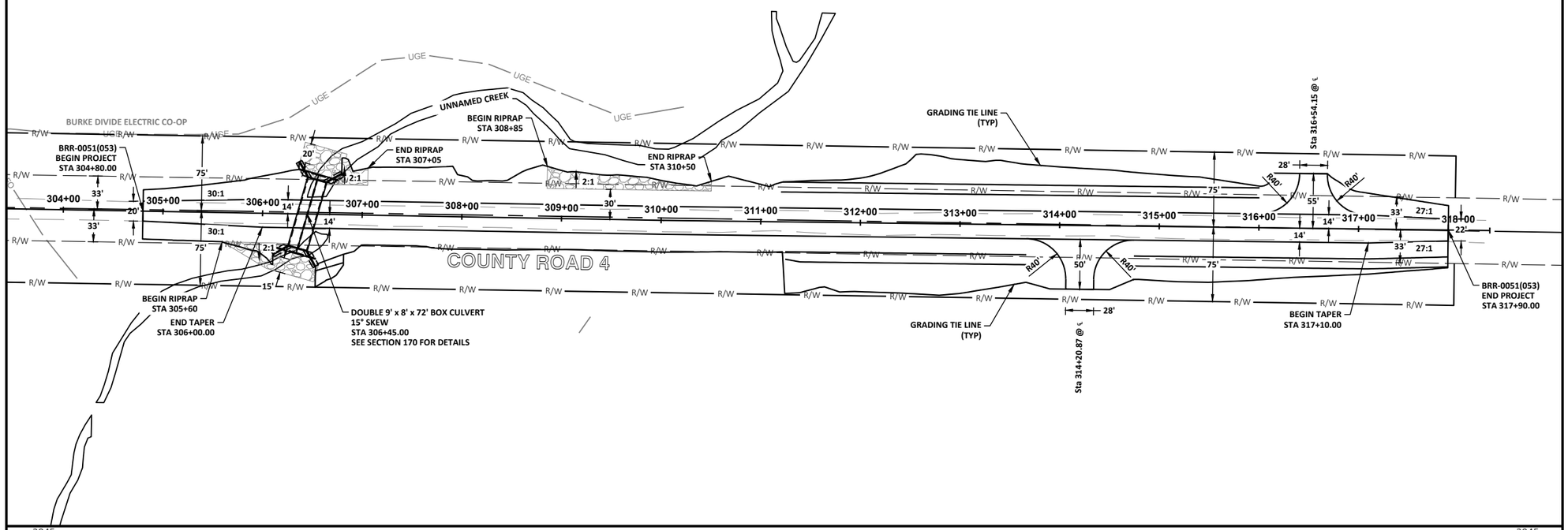
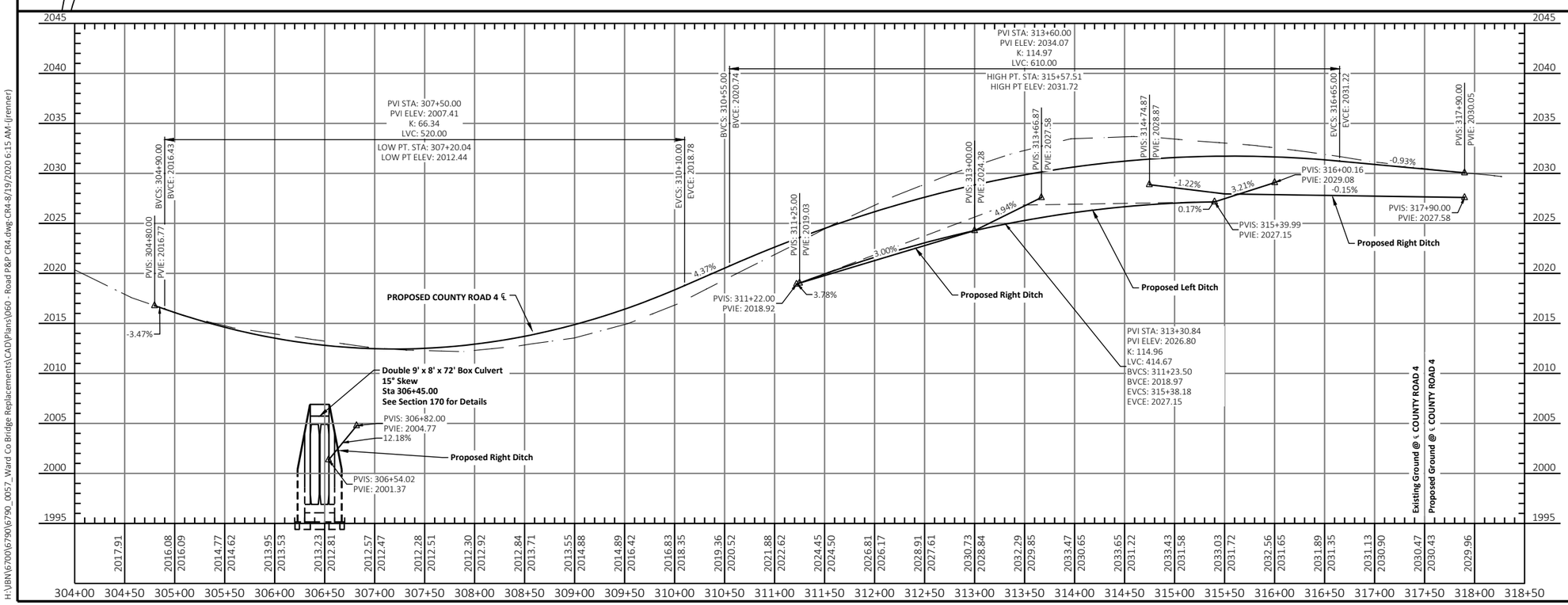
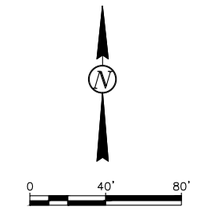
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	60	2







LEGEND

PROPOSED RIGHT OF WAY LINE	R/W
EXISTING RIGHT OF WAY LINE	R/W
TEMPORARY CONSTRUCTION EASEMENT LINE	T-R/W
RIPRAP GRADE II	

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PLAN & PROFILE
COUNTY ROAD 4

WARD COUNTY BRIDGE REPLACEMENTS

BRIDGE NO 51-107-12.1

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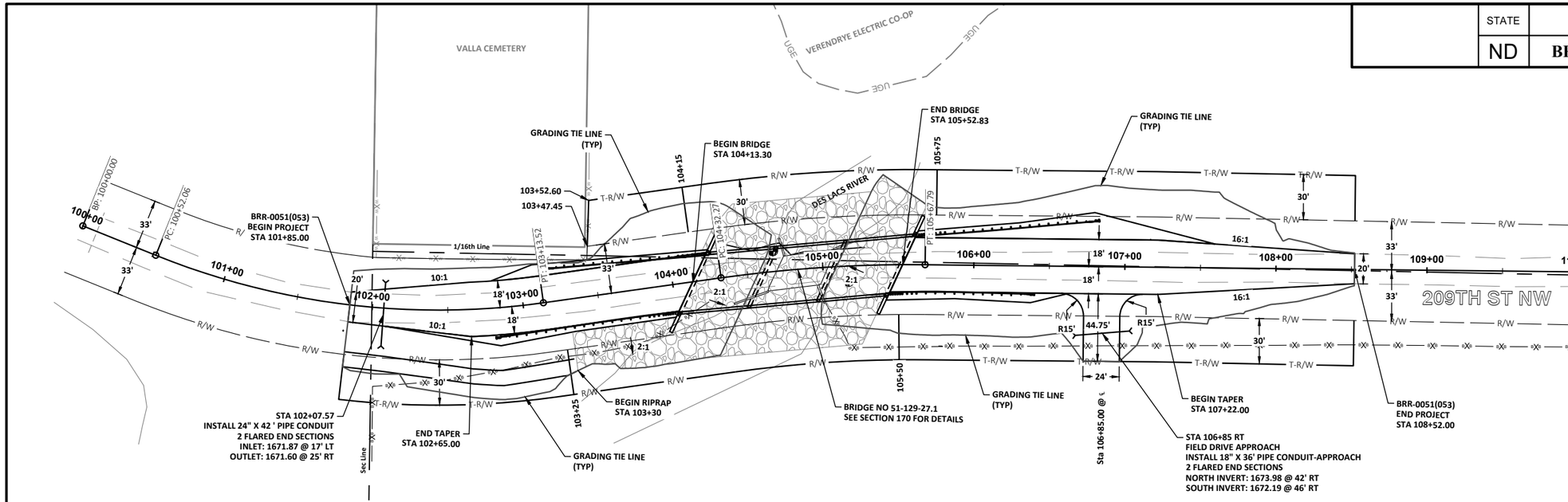
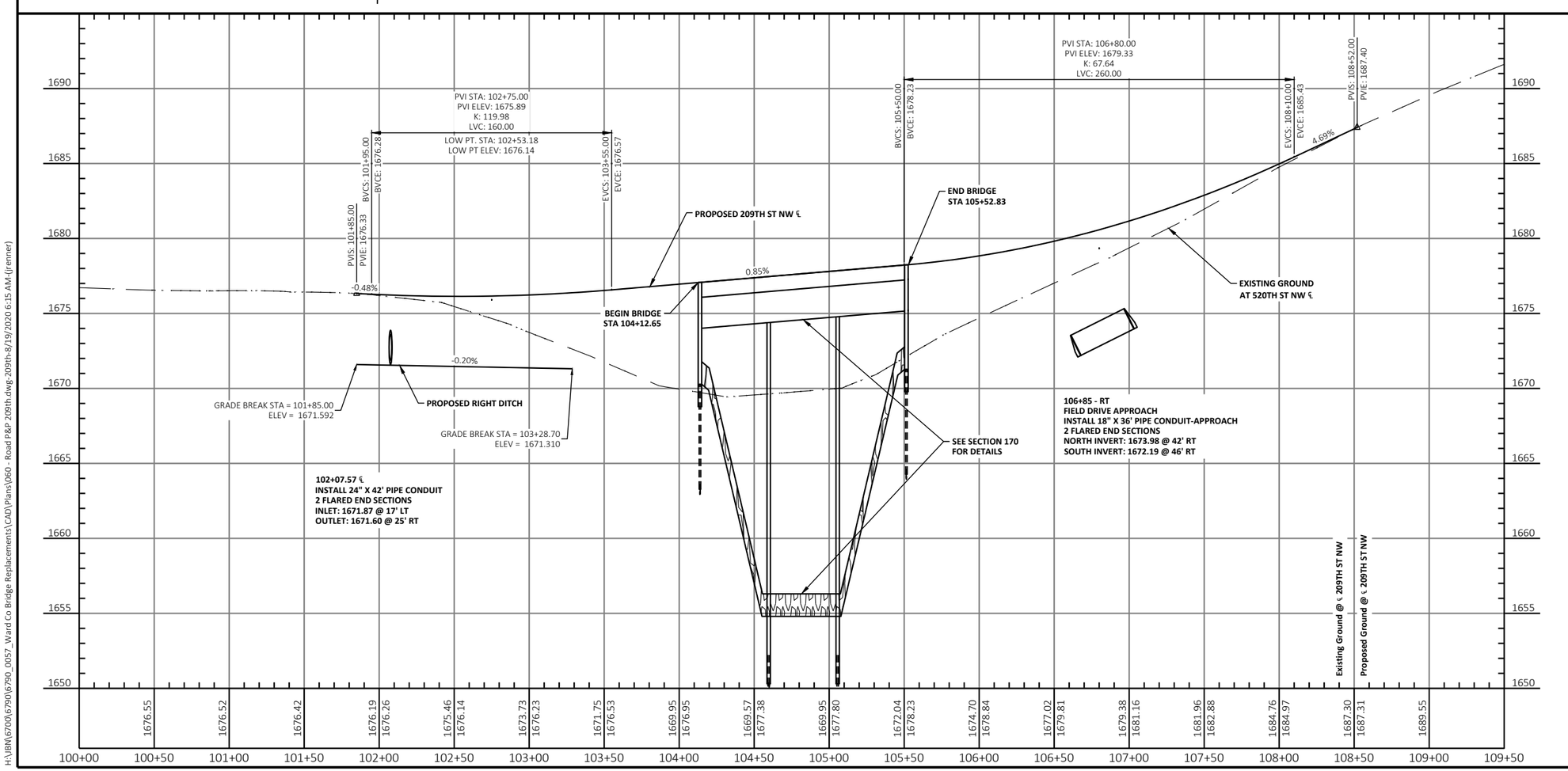
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	60	3





0 40' 80'

LEGEND

PROPOSED RIGHT OF WAY LINE	R/W
EXISTING RIGHT OF WAY LINE	R/W
TEMPORARY CONSTRUCTION EASEMENT LINE	T-R/W
RIPRAP GRADE II	

ITEM	DESCRIPTION	QUANTITY	UNIT
714-4105	PIPE CONDUIT 24IN		
	Sta 102+07.57, ℄	42	LF
714-4099	PIPE CONDUIT 18IN-APPROACH		
	Sta 106+68 46' Rt to Sta 107+03 42' Rt	36	LF

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PLAN & PROFILE
209TH ST NW

WARD COUNTY BRIDGE REPLACEMENTS

BRIDGE NO 51-129-27.1

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	75	1

Wetland Impact Table

Wetland Number	Location	Wetland Type	Wetland Feature	USACE Jurisdictional Wetlands[1]	Wetland Impacts Acre(s)			Wetland Mitigation			
								Mitigation Required		USACE/11990 Bank	
					Temp.	Perm. (Fill/Drain)	Perm. (Cut)	EO 11990	USACE	Location	Acre(s)
1a	Sec 6, T159N, R88W	Basin	Natural	Yes	-	-	-				
1b	Sec 6, T159N, R88W	Basin	Natural	Yes	< 0.010	< 0.010	-	N	N		
1c	Sec 6, T159N, R88W	Basin	Natural	Yes	-	< 0.010	-	N	N		
1d	Sec 7, T159N, R88W	Basin	Natural	Yes	-	0.020	-	N	N		
1e	Sec 7, T159N, R88W	Basin	Natural	Yes	< 0.010	< 0.010	-	N	N		
1f	Sec 7, T159N, R88W	Basin	Natural	Yes	0.010	0.100	-	Y	Y		0.100
1g	Sec 7, T159N, R88W	Basin	Natural	Yes	-	-	-				
1h	Sec 12, T159N, R89W	Basin	Natural	Yes	< 0.010	0.010	-	N	N		
1i	Sec 12, T159N, R89W	Basin	Natural	Yes	< 0.010	0.060	-	Y	Y		0.060
2a	Sec 23, T157N, R85W	Basin	Natural	Yes	-	-	-				
2b	Sec 23, T157N, R85W	Basin	Natural	Yes	-	-	-				
2c	Sec 23, T157N, R85W	Basin	Natural	Yes	-	-	-				
3	Sec 23, T157N, R85W	Basin	Natural	Yes	-	0.010	-	N	N		
				Totals	**0.010**	**0.200**					**0.160**

Impact Summary Table

Permanent Impact Summary		Temporary Impacts and additional information	
Wetland Type	Total (Acres)	Wetland Type	Total (Acres/Lf)
Natural/JD (Fill/Drain)	0.200	Temporary JD	0.010
Natural/Non-JD (Fill/Drain)	-	Non-JD Temporary	-
Artificial/JD (Fill/Drain)	-	Permanent JD > 0.10	-
Artificial /Non-JD (Fill/Drain)	-	Permanent OW	0.100 / 279.500 LF
Total	0.200	Temporary OW	0.090 / 127.300 LF
JD Natural (Cut)	-		
JD Artificial (Cut)	-		
Non-JD Natural (Cut)	-		
Non-JD Artificial (Cut)	-		
Total	0.000		

Mitigation Summary Table

	Location	Onsite Acre(s)	11990 Bank Acre(s)	USACE/11990 Bank Acre(s)	USFWS Bank Acre(s)
USACE Only	Bank	-	-	-	-
EO 11990 Only	Bank	-	-	-	-
USACE/11990	Bank	-	-	0.160	-
	Total	0.000	0.000	0.160	0.000

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Other Waters Impact Table

Other Waters													Other Water Mitigation			
			Size				Impacts to Other Waters						Mitigation Required			
							Acres			Linear Feet						
Number	Location	Type	Acre(s)	Linear Feet	Feature	USACE Jurisdictional[1]	Temp.	Perm. (Fill/Drain)	Perm. (Cut)	Temp.	Perm. (Fill/Drain)	Perm. (Cut)	EO 11990	USACE	Mitigation Location; ratio	Method
OW 1A	Sec 6 & 7, T159N, R88W	River	0.260	943	Natural	Yes	< 0.010	0.039	-	22.400	121.800	-	N	N		
OW 1B	Sec 7 & 12 T159N, R88W	River	0.500	1360	Natural	Yes	< 0.010	0.024	-	19.800	73.300	-	N	N		
OW 2	Sec 23, T157N, R85W	River	0.380	427	Natural	Yes	-	0.154	-	-	219.800	-	N	N		
						Totals	0.020	0.217	-	42.200	414.900	-				

[1] A wetland Jurisdictional Determination was issued by the USACE on July 17, 2020 (NWD-2020-01124-BIS) and July 20, 2020 (NOW-2020-01123-BIS).

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WETLAND IMPACT TABLE AND SUMMARY

WARD COUNTY BRIDGE REPLACEMENTS

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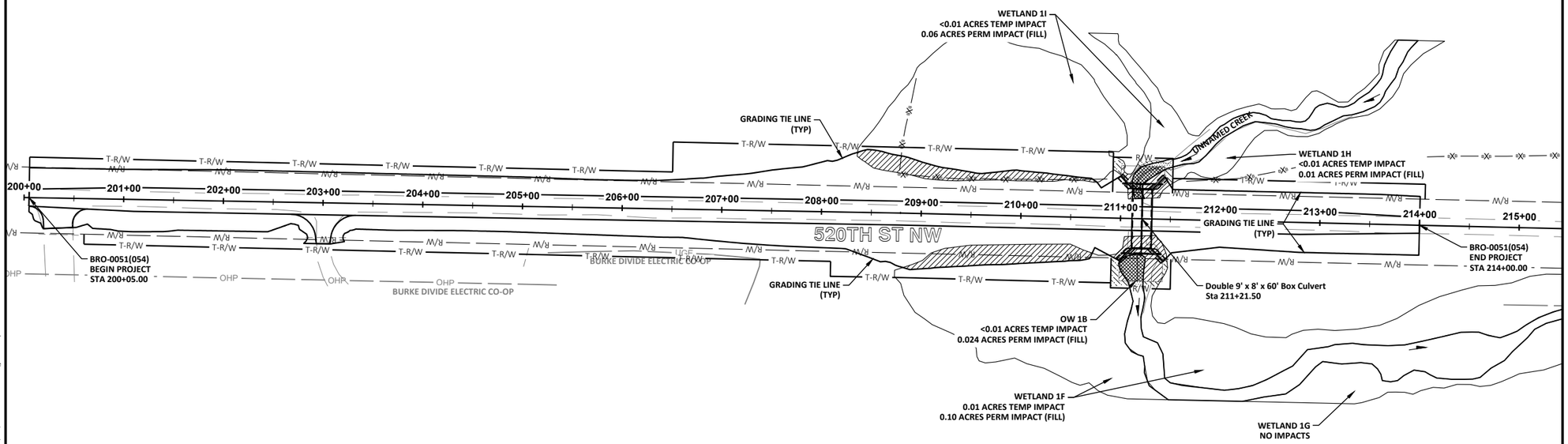
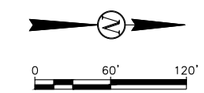
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	75	2





LEGEND

- PERMANENT WETLAND IMPACTS
- TEMPORARY WETLAND IMPACTS
- PERMANENT OTHER WATER IMPACTS
- TEMPORARY OTHER WATER IMPACTS
- FLOW ARROW

Proj. No. 6790-0057
Houston Engineering Inc.
Ph: 701.237.5065

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WETLAND IMPACTS
520TH ST NW

WARD COUNTY BRIDGE REPLACEMENTS

BRIDGE NO 51-106-13.1

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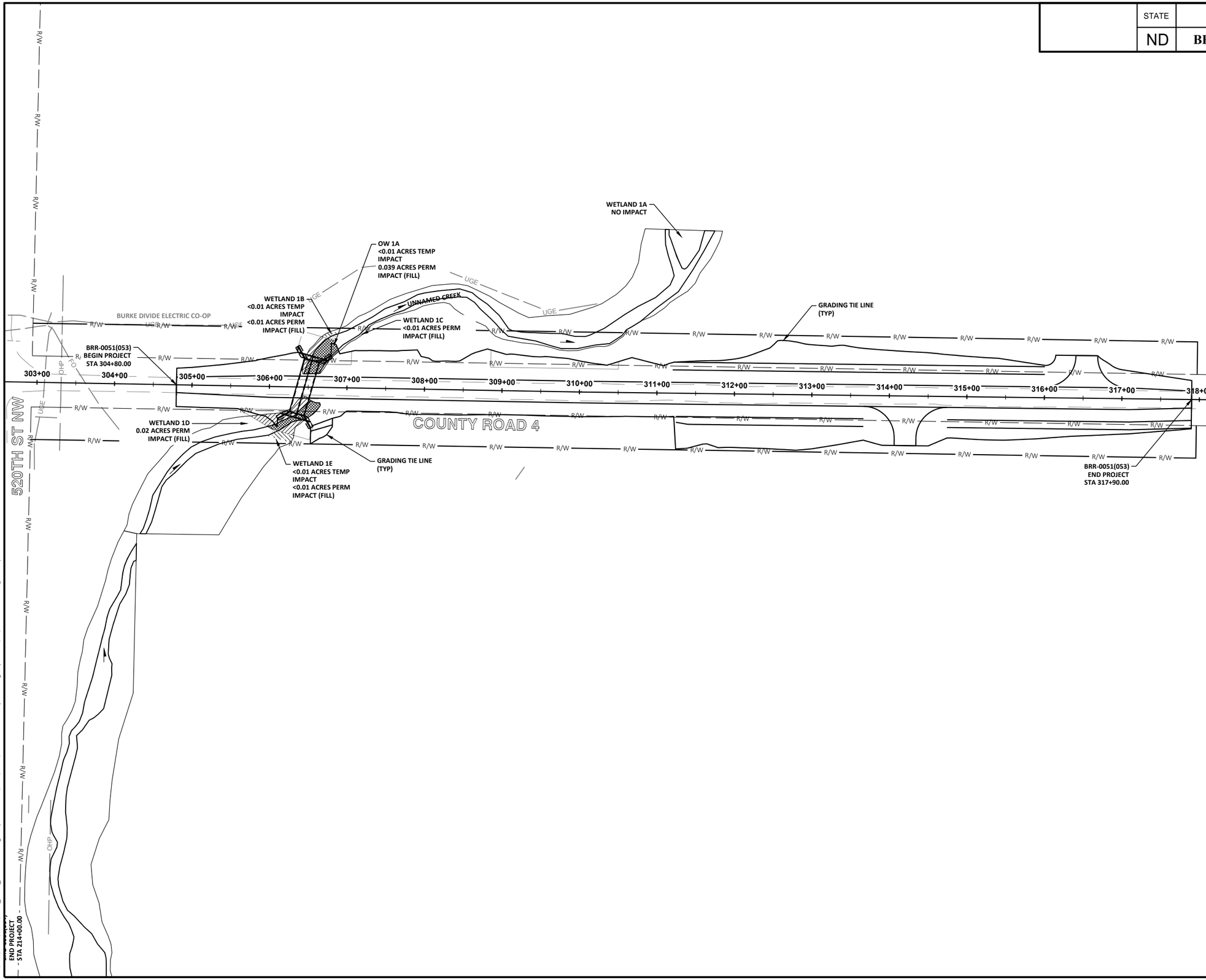
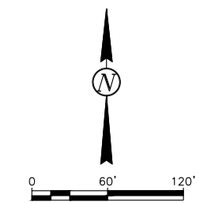
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	75	3





LEGEND

- PERMANENT WETLAND IMPACTS
- TEMPORARY WETLAND IMPACTS
- PERMANENT OTHER WATER IMPACTS
- TEMPORARY OTHER WATER IMPACTS
- FLOW ARROW

Proj. No. 6790-0057
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WETLAND IMPACTS
COUNTY ROAD 4

WARD COUNTY BRIDGE REPLACEMENTS

BRIDGE NO 51-107-12.1

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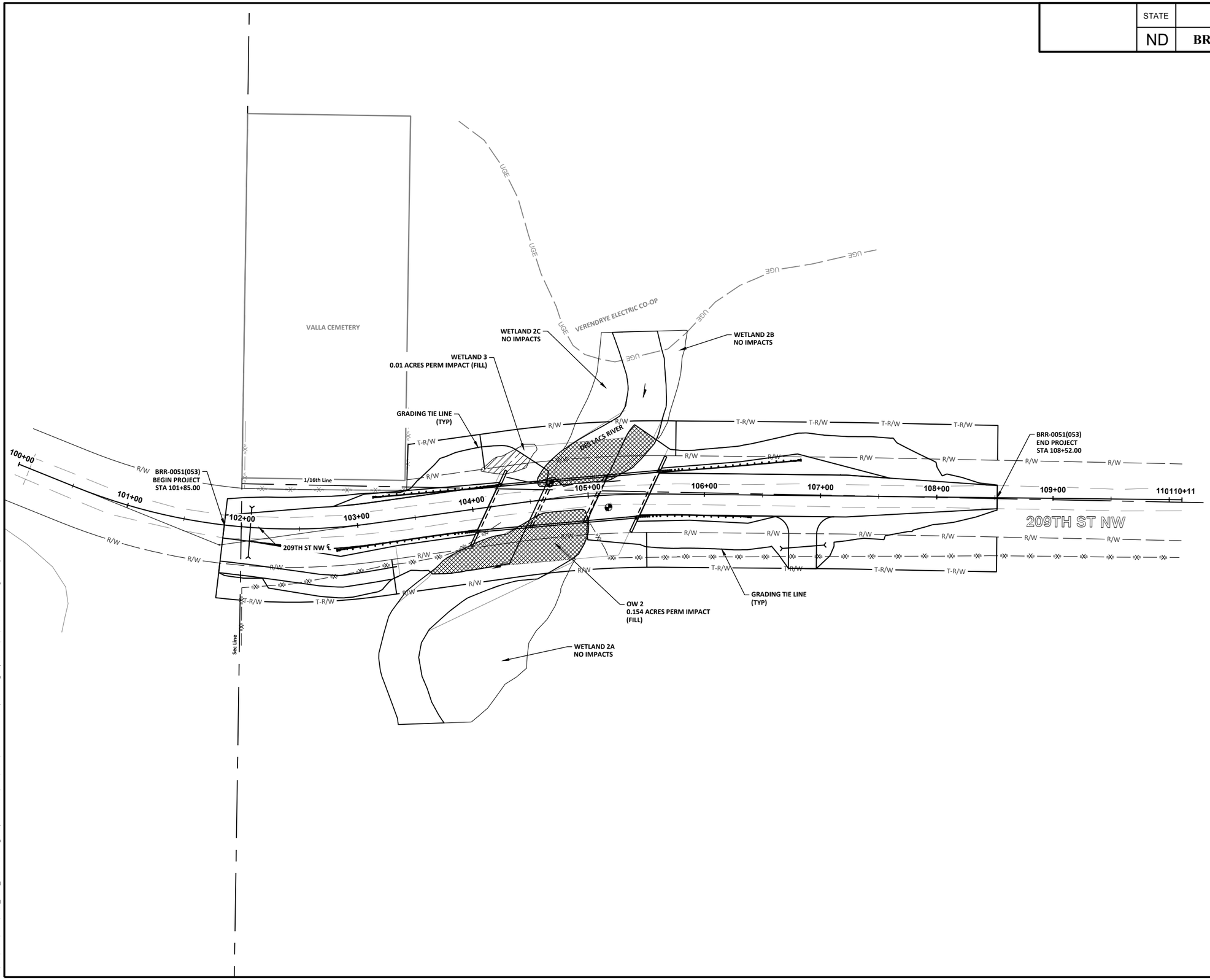
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	75	4



0 40' 80'

LEGEND

- PERMANENT WETLAND IMPACTS
- TEMPORARY WETLAND IMPACTS
- PERMANENT OTHER WATER IMPACTS
- TEMPORARY OTHER WATER IMPACTS
- FLOW ARROW

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WETLAND IMPACTS
209TH ST NW

WARD COUNTY BRIDGE REPLACEMENTS

BRIDGE NO 51-129-27.1

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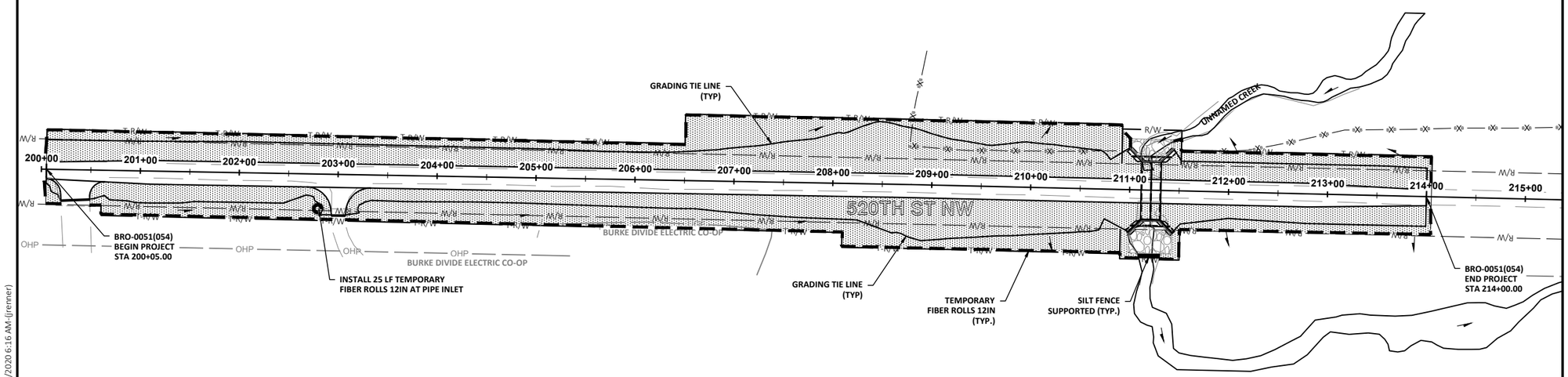
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	76	1



LEGEND

TEMPORARY FLOTATION SILT CURTAIN

TEMPORARY FIBER ROLLS

TEMPORARY COVER CROP
STRAW MULCH

FLOW ARROW

0 60' 120'

ITEM	DESCRIPTION	QUANTITY	UNIT
251-2000	TEMPORARY COVER CROP STA 200+05.00 TO STA 214+00.00	2.33	ACRE
253-0101	STRAW MULCH STA 200+05.00 TO STA 214+00.00	2.33	ACRE
260-0200	SILT FENCE SUPPORTED STA 211+10.26 TO STA 211+32.11	22	LF
260-0201	REMOVE SILT FENCE SUPPORTED STA 211+10.26 TO STA 211+32.11	22	LF
261-0112	FIBER ROLLS 12IN STA 200+05.00 TO STA 214+00.00	2,933	LF
261-0113	REMOVE FIBER ROLLS 12IN STA 200+05.00 TO STA 214+00.00	2,933	LF

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TEMPORARY EROSION CONTROL
520TH ST NW
WARD COUNTY BRIDGE REPLACEMENTS

BRIDGE NO 51-106-13.1

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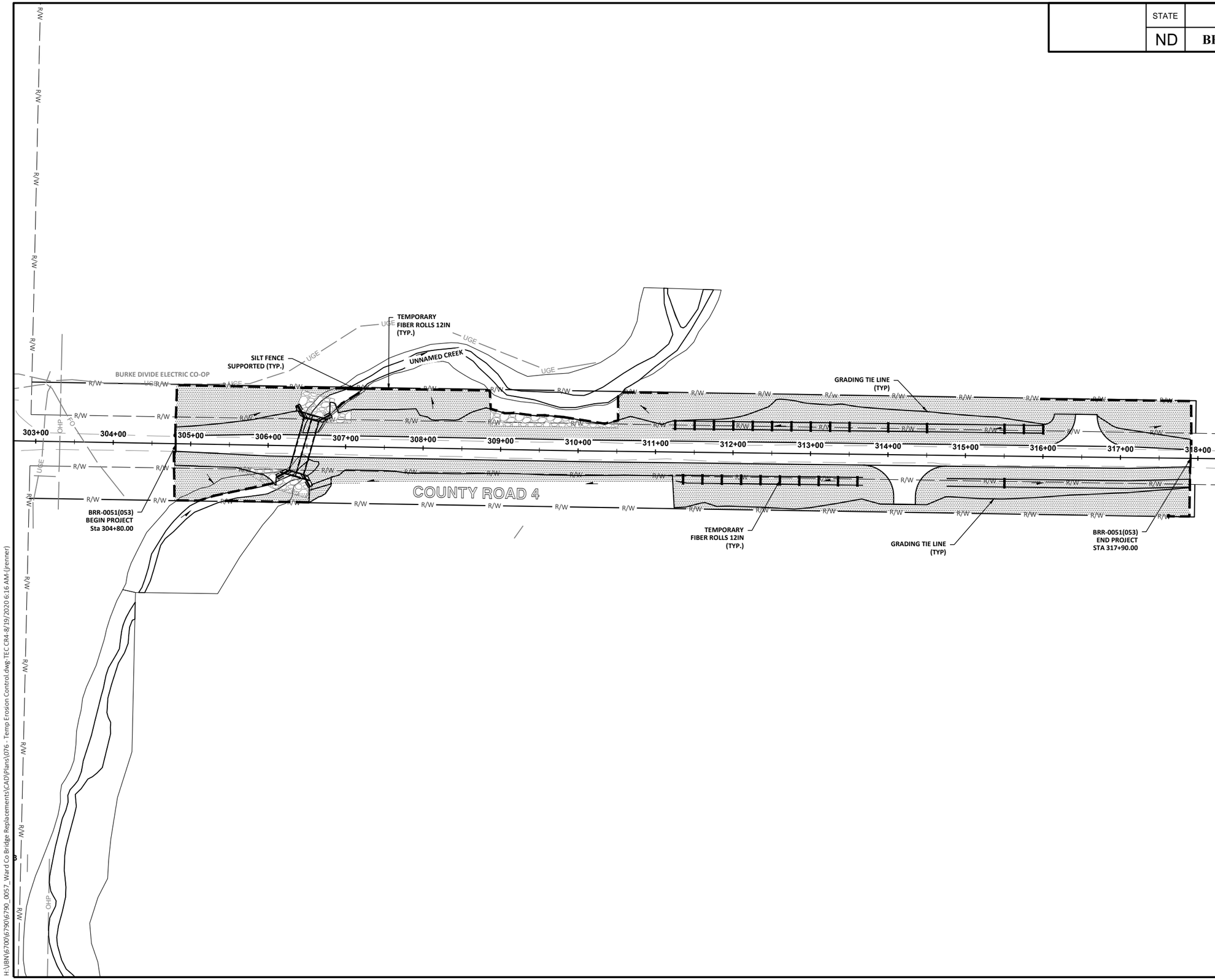
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	76	2



LEGEND

TEMPORARY FLOTATION SILT CURTAIN

TEMPORARY FIBER ROLLS

TEMPORARY COVER CROP STRAW MULCH

FLOW ARROW

N

0 60' 120'

ITEM	DESCRIPTION	QUANTITY	UNIT
251-2000	TEMPORARY COVER CROP STA 304+80.00 TO STA 317+90.00	3.00	ACRE
253-0101	STRAW MULCH STA 304+80.00 TO STA 317+90.00	3.00	ACRE
260-0200	SILT FENCE SUPPORTED STA 307+00.33 TO STA 307+20.59	20	LF
260-0201	REMOVE SILT FENCE SUPPORTED STA 307+00.33 TO STA 307+20.59	20	LF
261-0112	FIBER ROLLS 12IN STA 304+80.00 TO STA 317+90.00	1,765	LF
261-0113	REMOVE FIBER ROLLS 12IN STA 304+80.00 TO STA 317+90.00	1,765	LF

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TEMPORARY EROSION CONTROL COUNTY ROAD 4

WARD COUNTY BRIDGE REPLACEMENTS

BRIDGE NO 51-107-12.1

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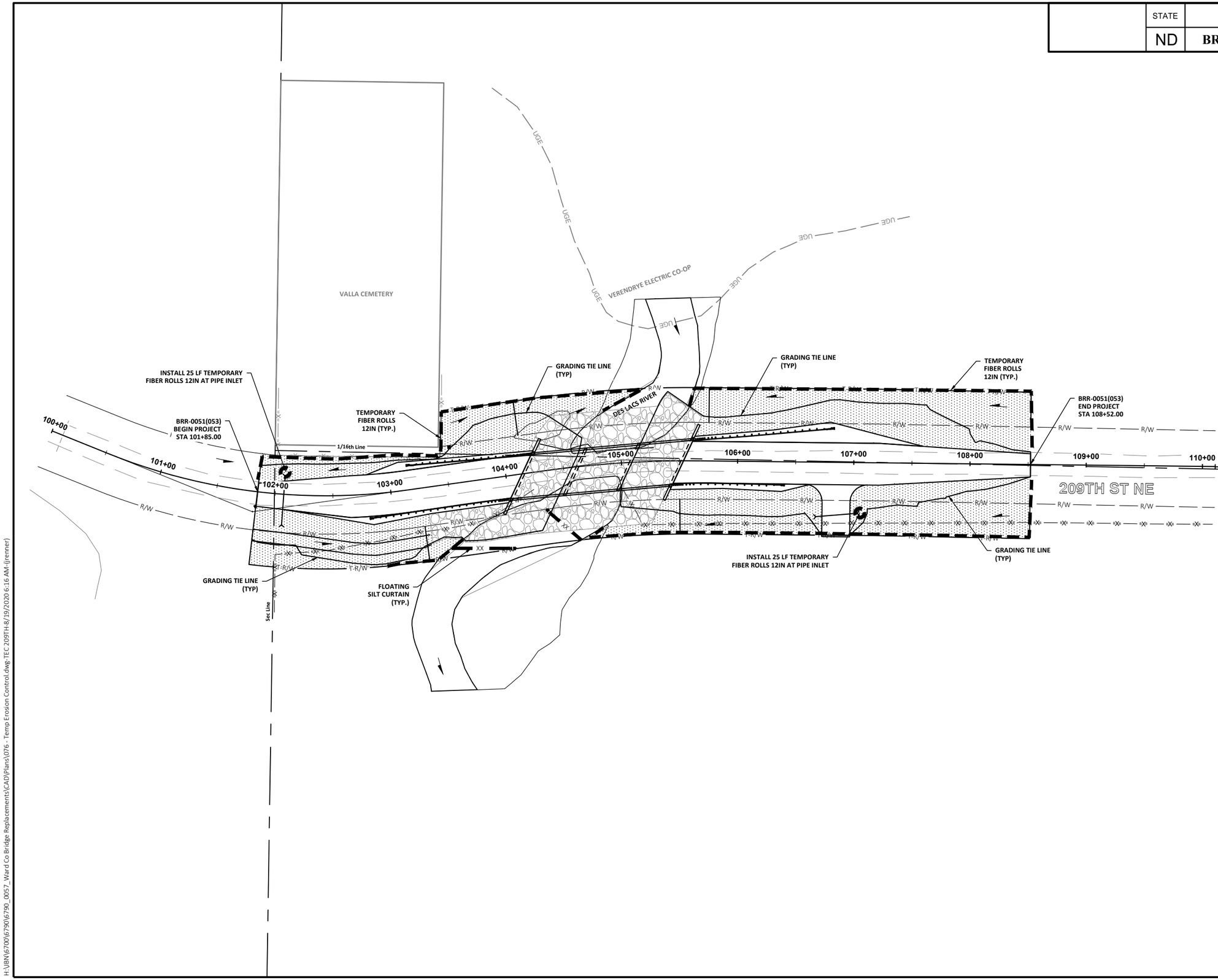
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	76	3



LEGEND

- TEMPORARY FLOTATION SILT CURTAIN
- TEMPORARY FIBER ROLLS
- TEMPORARY COVER CROP STRAW MULCH
- FLOW ARROW

0 40' 80'

ITEM	DESCRIPTION	QUANTITY	UNIT
251-2000	TEMPORARY COVER CROP 101+85.00 TO STA 108+52.00	0.90	ACRE
253-0101	STRAW MULCH 101+85.00 TO STA 108+52.00	0.90	ACRE
260-0100	FLOTATION SILT CURTAIN STA 103+45.00 TO STA 104+80.00	85	LF
260-0101	REMOVE FLOATING SILT CURTAIN STA 103+45.00 TO STA 104+80.00	85	LF
261-0112	FIBER ROLLS 12IN STA 101+85.00 TO STA 108+52.00	1,310	LF
261-0113	REMOVE FIBER ROLLS 12IN STA 101+85.00 TO STA 108+52.00	1,310	LF

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TEMPORARY EROSION CONTROL 209TH ST NW WARD COUNTY BRIDGE REPLACEMENTS

BRIDGE NO 51-129-27.1

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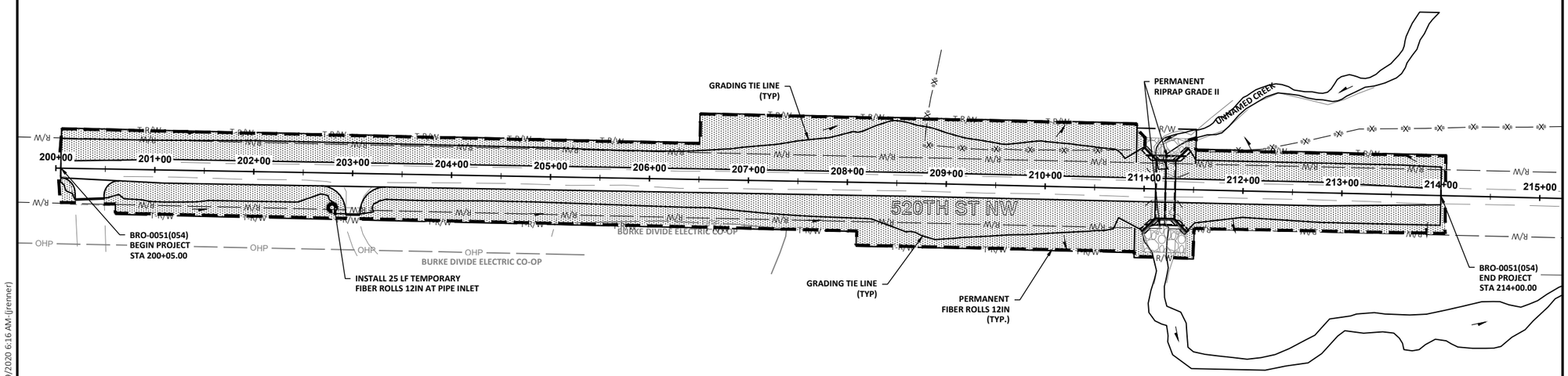
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	77	1



LEGEND

PERMANENT FIBER ROLLS

PERMANENT SEED CLASS III & STRAW MULCH

PERMANENT RIPRAP GRADE II

FLOW ARROW

0 60' 120'

ITEM	DESCRIPTION	QUANTITY	UNIT
251-0300	SEEDING CLASS III		
	STA 200+05.00 TO STA 214+00.00	2.33	ACRE
253-0101	STRAW MULCH		
	STA 200+05.00 TO STA 214+00.00	2.33	ACRE
261-0112	FIBER ROLLS 12IN		
	STA 200+05.00 TO STA 214+00.00	2,933	LF
256-0200	RIPRAP GRADE II		
	STA 211+00.02 TO STA 211+46.79	155	CY

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PERMANENT EROSION CONTROL
520TH ST NW
WARD COUNTY BRIDGE REPLACEMENTS

BRIDGE NO 51-106-13.1

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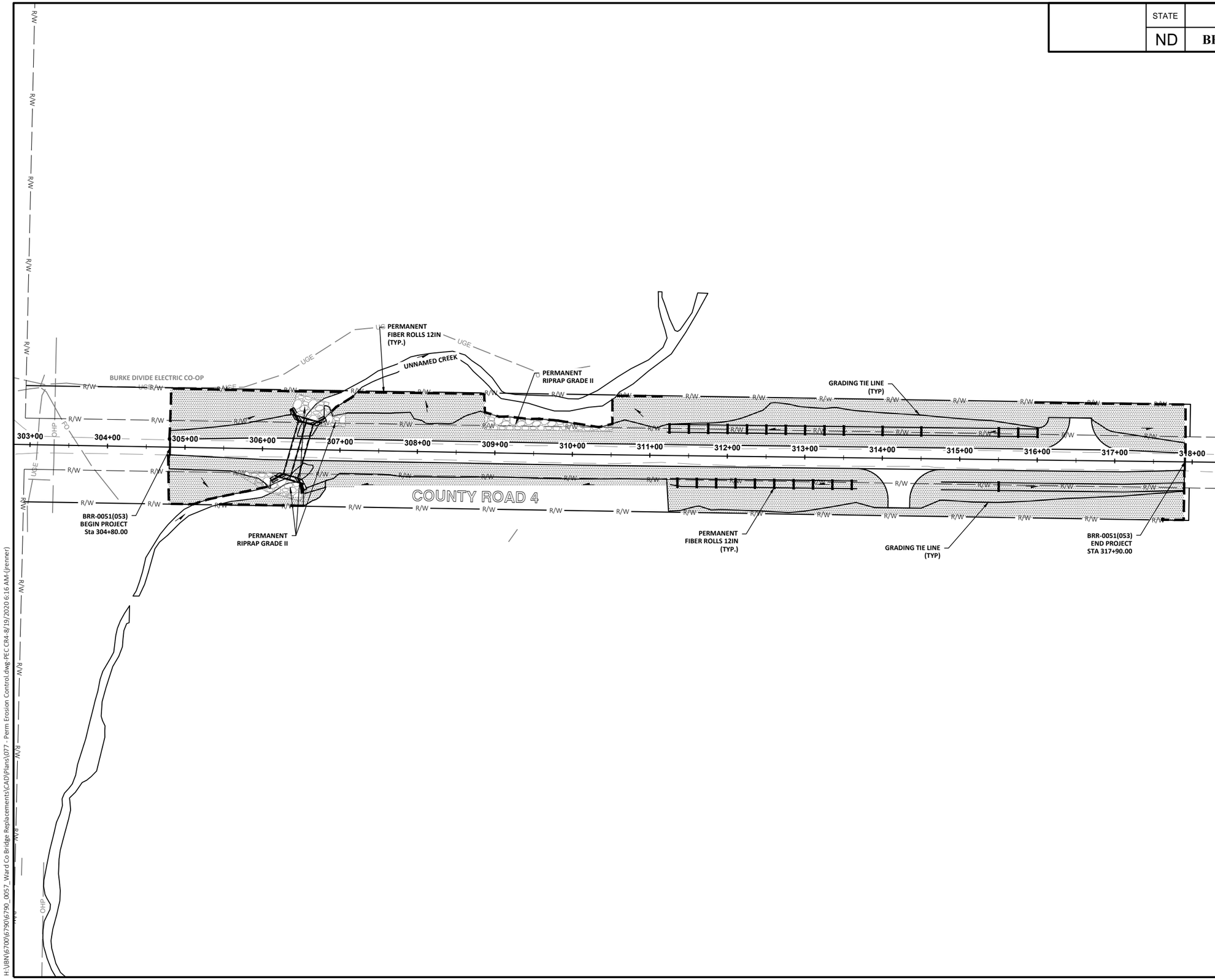
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	77	2



LEGEND

PERMANENT FIBER ROLLS

PERMANENT SEED CLASS III & STRAW MULCH

PERMANENT RIPRAP GRADE II

FLOW ARROW

N

0 60' 120'

ITEM	DESCRIPTION	QUANTITY	UNIT
251-0300	SEEDING CLASS III STA 304+80.00 TO STA 317+90.00	3.00	ACRE
253-0101	STRAW MULCH STA 304+80.00 TO STA 317+90.00	3.00	ACRE
261-0112	FIBER ROLLS 12IN STA 304+80.00 TO STA 317+90.00	1,765	LF
256-0200	RIPRAP GRADE II STA 305+88.77 TO STA 306+86.45	433	CY

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Houston Engineering Inc.
Ph: 701.237.5065

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PERMANENT EROSION CONTROL
COUNTY ROAD 4
WARD COUNTY BRIDGE REPLACEMENTS

BRIDGE NO 51-107-12.1

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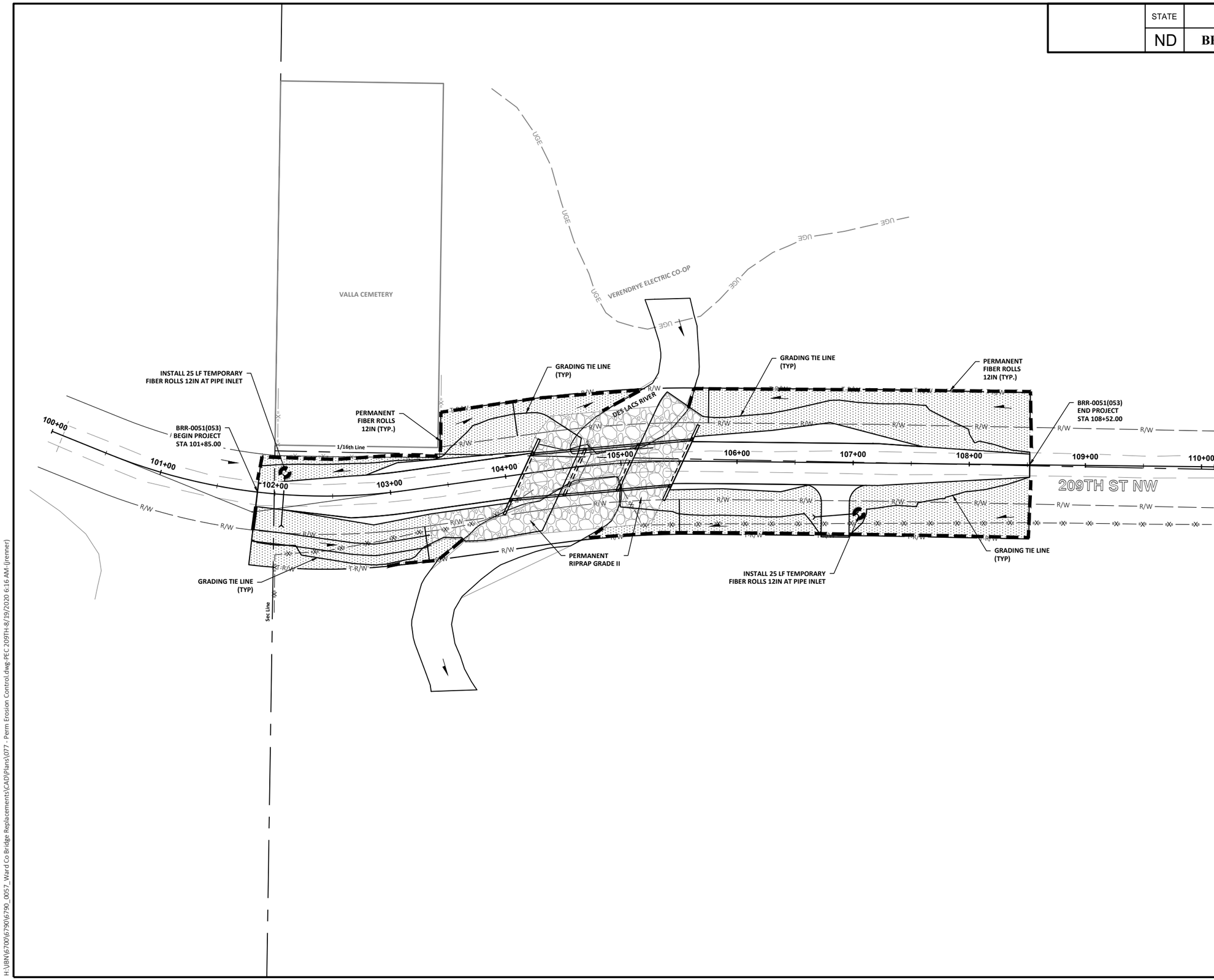
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	77	3



LEGEND

PERMANENT FIBER ROLLS

PERMANENT SEED CLASS III & STRAW MULCH

PERMANENT RIPRAP GRADE II

FLOW ARROW

0 40' 80'

ITEM	DESCRIPTION	QUANTITY	UNIT
251-0300	SEEDING CLASS III		
	STA 101+85.00 TO STA 108+52.00	0.90	ACRE
253-0101	STRAW MULCH		
	STA 101+85.00 TO STA 108+52.00	0.90	ACRE
261-0112	FIBER ROLLS 12IN		
	STA 101+85.00 TO STA 108+52.00	1,310	LF
256-0200	RIPRAP GRADE II		
	STA 103+61.74 TO STA 105+19.53	1,180	CY

Proj. No. 6810-0004
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PERMANENT EROSION CONTROL
209TH ST NW
WARD COUNTY BRIDGE REPLACEMENTS

BRIDGE NO 51-129-27.1

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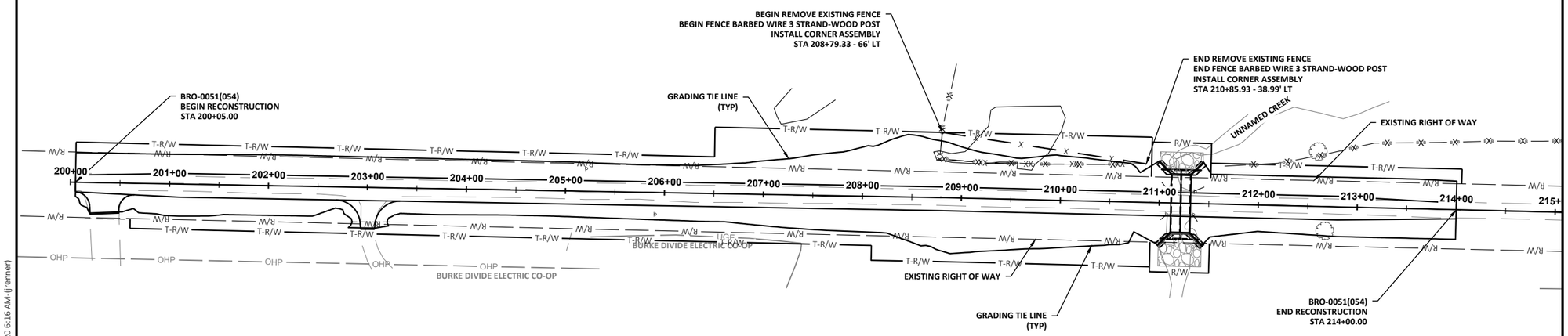
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	80	1



LEGEND

PROPOSED FENCE — X — X —

REMOVE FENCE — XX — XX —

0 60' 120'

ITEM	DESCRIPTION	QUANTITY	UNIT
202-0312	REMOVE EXISTING FENCE		
	STA 208+79.33 LT TO STA 210+85.93 LT	240	LF
752-0102	FENCE BARBED WIRE 3 STRAND-WOOD POST		
	STA 208+79.33 LT TO STA 210+85.93 LT	209	LF
752-3150	CORNER ASSEMBLY BARBED WIRE-WOOD POST		
	STA 208+79.33 - 70.76' LT	1	EA
	STA 210+85.93 - 38.99' LT	1	EA

NOTES:

1. STATIONING AND OFFSETS FOR CORNER ASSEMBLIES ARE GIVEN TO CENTER OF 8" CORNER POST.

Proj. No. 6790-0057
Houston Engineering Inc.
Ph: 701.237.5065

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FENCE LAYOUT
520TH ST NW

WARD COUNTY BRIDGE REPLACEMENTS

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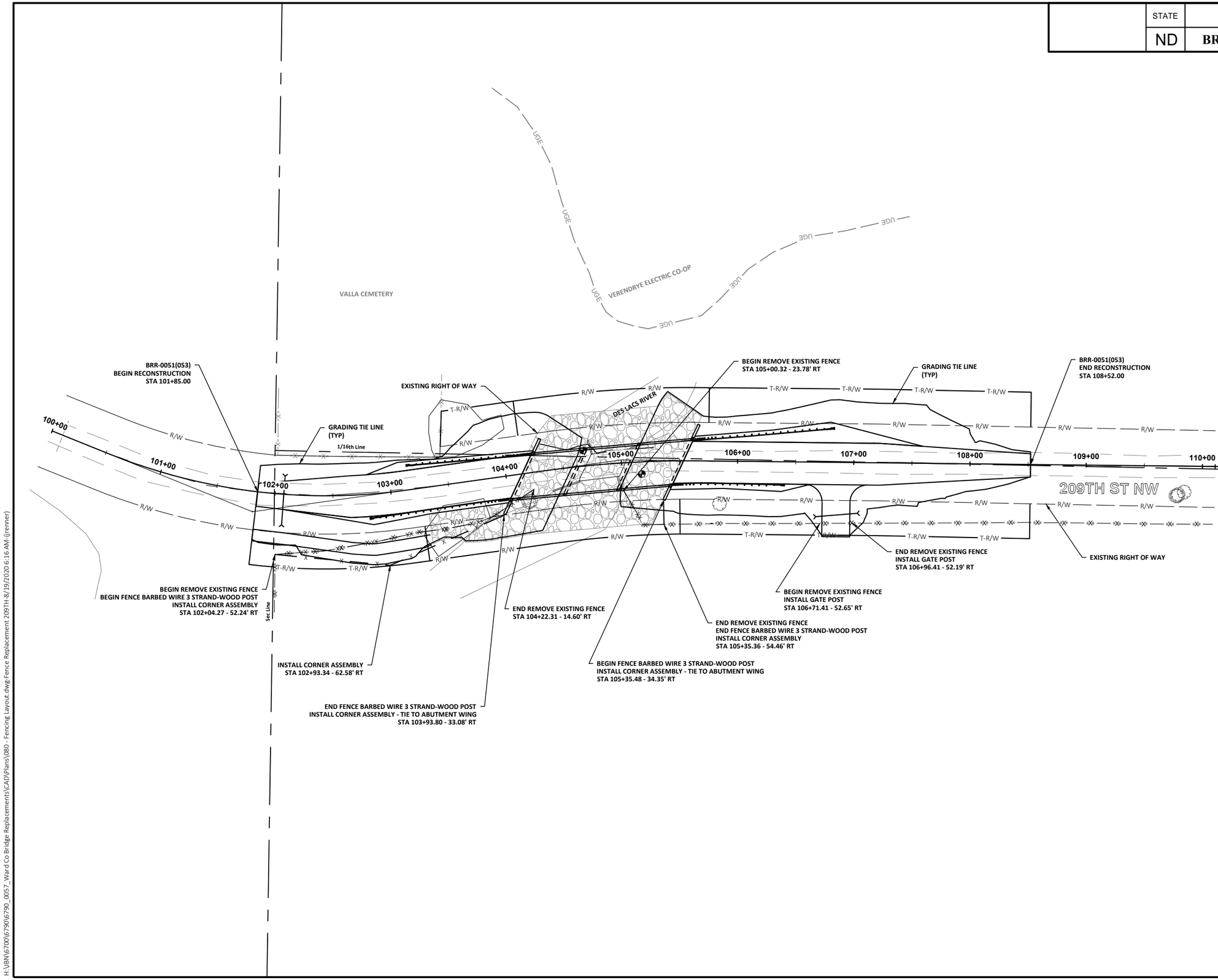
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	80	2



LEGEND

PROPOSED FENCE — X — X —

REMOVE FENCE — XX — XX —

0 40' 80'

ITEM	DESCRIPTION	QUANTITY	UNIT
202-0312	REMOVE EXISTING FENCE		
	STA 102+04.27 RT TO STA 104+22.31 RT	233	LF
	STA 105+00.32 RT TO STA 105+35.36 RT	52	LF
	STA 106+71.41 RT TO STA 106+96.41 RT	28	LF
752-0102	FENCE BARBED WIRE 3 STRAND-WOOD POST		
	STA 102+04.27 RT TO STA 103+93.80 RT	207	LF
	STA 105+35.48 RT TO STA 105+35.36 RT	20	LF
752-2100	VEHICLE GATE		
	STA 106+71.41 RT TO STA 106+96.41 RT	1	EA
752-3150	CORNER ASSEMBLY BARBED WIRE-WOOD POST		
	STA 102+04.27 - 52.24' RT	1	EA
	STA 102+93.34 - 62.58' RT	1	EA
	STA 103+93.80 - 33.08' RT	1	EA
	STA 105+35.48 - 34.35' RT	1	EA
	STA 105+35.36 - 54.46' RT	1	EA

NOTES:

1. STATIONING AND OFFSETS FOR CORNER ASSEMBLIES ARE GIVEN TO CENTER OF 8" CORNER POST.

Proj. No. 6790-0057
Houston Engineering Inc.
Ph: 701.237.5065

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FENCE LAYOUT
209TH ST NW

WARD COUNTY BRIDGE REPLACEMENTS

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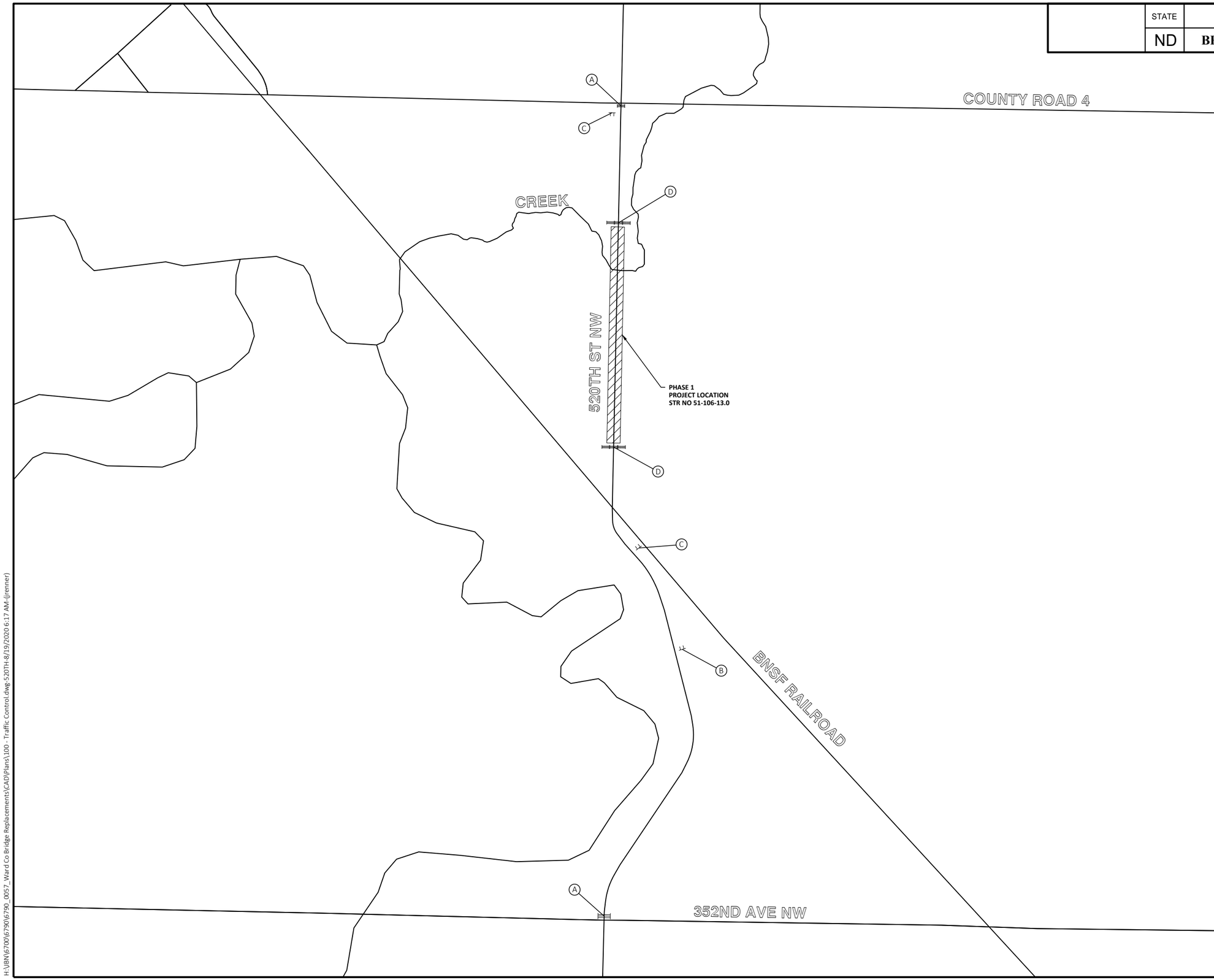
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	100	1



A — BRIDGE OUT XX MILES AHEAD LOCAL TRAFFIC ONLY — - 2
R11-3B-60
BARRICADE MOUNTED

B — ROAD CLOSED 1500 FT — - 1
W20-3-48
POST MOUNTED

C — ROAD CLOSED 750 FT — - 2
W20-3-48
POST MOUNTED

D — ROAD CLOSED — - 2
R11-2-48
BARRICADE MOUNTED

N

0 300' 600'

Proj. No. 6810-0004
Houston
Engineering Inc.
Ph: 701.237.5065

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TRAFFIC CONTROL
PHASE 1

WARD COUNTY BRIDGE REPLACEMENTS

BRIDGE NO 51-106-13.0
520TH ST NW

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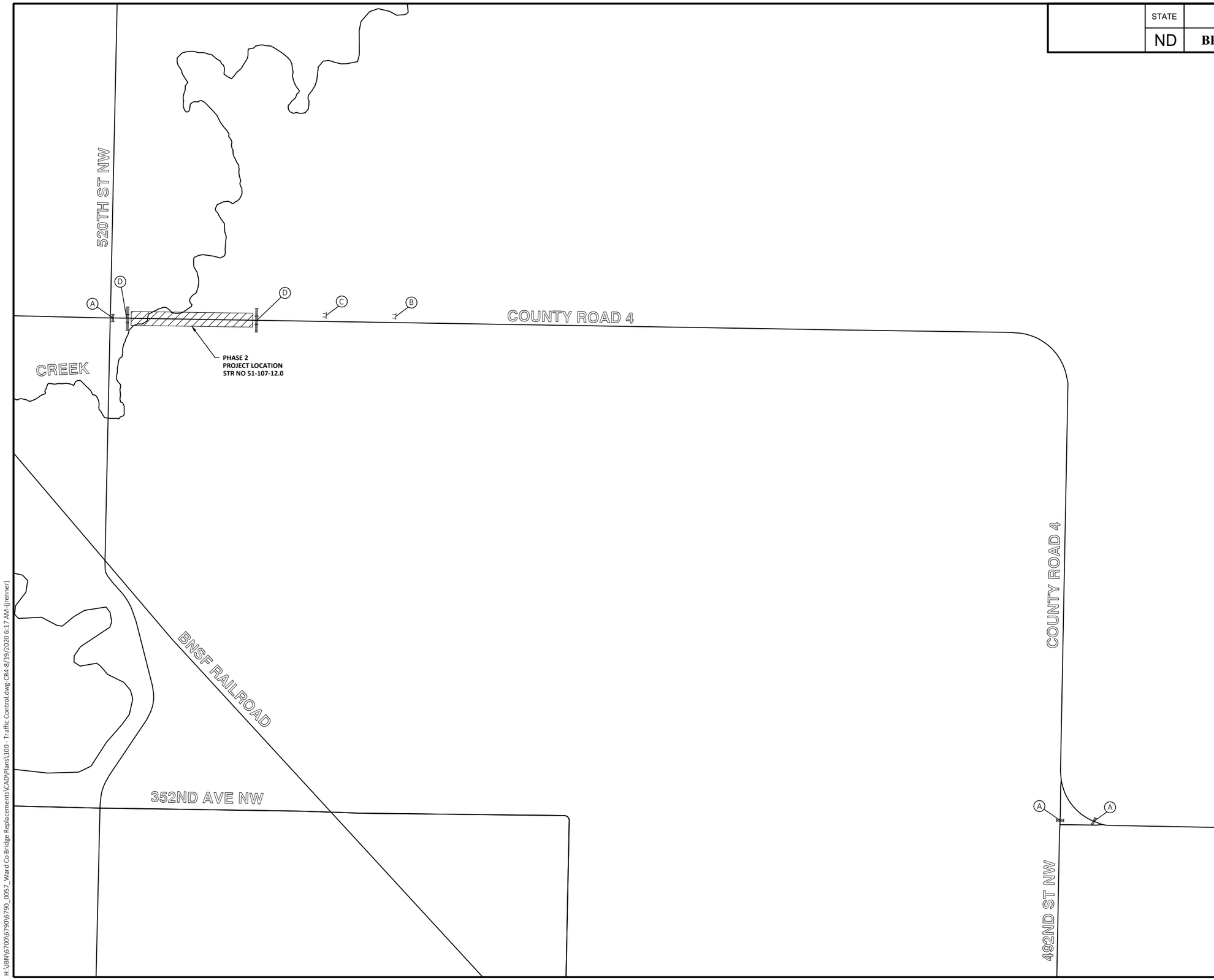
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	100	2



(A) BRIDGE OUT XX MILES AHEAD LOCAL TRAFFIC ONLY - 3
R11-3B-60
BARRICADE MOUNTED

(B) ROAD CLOSED 1500 FT - 1
W20-3-48
POST MOUNTED

(C) ROAD CLOSED 750 FT - 1
W20-3-48
POST MOUNTED

(D) ROAD CLOSED - 2
R11-2-48
BARRICADE MOUNTED

N

0 500' 1000'

Proj. No. 6810-0004
Houston
Engineering Inc.
Ph: 701.237.5065

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TRAFFIC CONTROL
PHASE 2

WARD COUNTY BRIDGE REPLACEMENTS

BRIDGE NO 51-107-12.0
COUNTY ROAD 4

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	100	3

A — BRIDGE OUT XX MILES AHEAD LOCAL TRAFFIC ONLY — - 2
R11-3B-60
BARRICADE MOUNTED

B — ROAD CLOSED 1500 FT — - 2
W20-3-48
POST MOUNTED

C — ROAD CLOSED 750 FT — - 2
W20-3-48
POST MOUNTED

D — ROAD CLOSED — - 2
R11-2-48
BARRICADE MOUNTED

N

0 500' 1000'

Proj. No. 6810-0004
Houston Engineering Inc.
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TRAFFIC CONTROL
PHASE 3

WARD COUNTY BRIDGE REPLACEMENTS

BRIDGE NO 51-129-27.0
209TH ST NW

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	100	4

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED BY SITE NO. 1	2	3		TOTAL AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
D3-36	36"x6"	STREET NAME SIGN (Sign and installation only)						6	
E5-1-48	60"x60"	EXIT GORE						43	
G20-1-60	60"x24"	ROAD WORK NEXT __ MILES						34	
G20-1b-60	60"x24"	WORK IN PROGRESS/ NO WORK IN PROGRESS (Sign and installation only)						26	
G20-2-48	48"x24"	END ROAD WORK						19	
G20-4-36	36"x18"	PILOT CAR FOLLOW ME (Mounted to back of pilot car)						18	
G20-10-108	108"x48"	CONTRACTOR SIGN						64	
G20-50a-72	72"x36"	ROAD WORK NEXT __ MILES RT & LT ARROWS						37	
G20-52a-72	72"x24"	ROAD WORK NEXT __ MILES RT or LT ARROW						30	
G20-55-96	96"x48"	SPEED LIMIT ENFORCED - MINIMUM FEE $80 WHEN WORKERS PRESENT						59	
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)						10	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)						10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)						10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)						7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)						7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)						7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)						7	
M4-5-24	24"x12"	TO SIGN						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 ARROW RIGHT or LEFT						23	
M5-1-21	21"x15"	ARROW AHD AND RT or LT(Mounted on route marker post)						7	
M5-2-21	21"x15"	ARROW AHD UP & RT or LT (Mounted on route marker post)						7	
M6-1-21	21"x15"	ARROW RT or LT (Mounted on route marker post)						7	
M6-2-21	21"x15"	ARROW UP & RT or LT (Mounted on route marker post)						7	
M6-3-21	21"x15"	ARROW AHD (Mounted on route marker post)						7	
R1-1-48	48"x48"	STOP						32	
R1-1a-18	18"x18"	STOP and SLOW PADDLE Back to Back						5	
R1-2-60	60"x60"	YIELD						29	
R2-1-48	48"x60"	SPEED LIMIT __						39	
R2-1a-24	24"x18"	MINIMUM FEE $80 (Mounted on Speed Limit post)						10	
R3-2-24	24"x24"	NO LEFT TURN						11	
R3-2-36	36"x36"	NO LEFT TURN						20	
R3-5R-24	30"x24"	RIGHT ONLY						15	
R3-7-48	48"x48"	LEFT or RIGHT LANE MUST TURN LEFT or RIGHT						35	
R4-1-48	48"x60"	DO NOT PASS						39	
R4-7-48	48"x60"	KEEP RIGHT SYMBOL						39	
R5-1-48	48"x48"	DO NOT ENTER						35	
R6-1-36	36"x12"	ONE WAY RIGHT or LEFT						13	
R7-1-12	12"x18"	NO PARKING						11	
R10-6-24	24"x36"	STOP HERE ON RED						16	
R11-2-48	**48"x30"**	**ROAD CLOSED**	**2**	**2**	**2**		**2**	**28**	**56**
R11-2a-48	48"x30"	STREET CLOSED						28	
R11-3a-60	60"x30"	ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY						31	
R11-3c-60	60"x30"	STREET CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY						31	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC						31	
W1-3-48	48"x48"	RIGHT or LEFT SHARP REVERSE CURVE ARROW						35	
W1-4-48	48"x48"	RIGHT or LEFT REVERSE CURVE ARROW						35	
W1-4b-48	48"x48"	DOUBLE RIGHT or LEFT REVERSE CURVE ARROW						35	
W1-6-48	48"x24"	LARGE ARROW						26	
W3-1-48	48"x48"	STOP AHEAD SYMBOL						35	
W3-3-48	48"x48"	SIGNAL AHEAD SYMBOL						35	
W3-4-48	48"x48"	BE PREPARED TO STOP						35	
W3-5-48	48"x48"	SPEED REDUCTION AHEAD						35	
W4-2-48	48"x48"	RIGHT or LEFT LANE TRANSITION SYMBOL						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 SYMBOL						35	
W8-1-48	48"x48"	BUMP						35	
W8-3-48	48"x48"	PAVEMENT ENDS						35	
W8-7-48	48"x48"	LOOSE GRAVEL						35	
W8-9a-48	48"x48"	SHOULDER DROP-OFF						35	
W8-11-48	48"x48"	UNEVEN LANES						35	
W8-12-48	48"x48"	NO CENTER STRIPE						35	
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY						35	
W8-54-48	48"x48"	TRUCKS ENTERING AHEAD or __ FT.						35	
W8-55-48	48"x48"	TRUCKS CROSSING AHEAD or __ FT.						35	
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY						35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL						35	
W12-1-36	36"x36"	CROSSING DOUBLE ARROW						23	
W12-2-48	48"x48"	LOW CLEARANCE SYMBOL						35	
W13-1-24	24"x24"	__ MPH ADVISORY SPEED PLATE (Mounted on warning sign post)						11	
W13-4-48	48"x60"	RAMP ARROW						39	
W14-3-48	48"x36"	NO PASSING ZONE						23	
W16-9P-24	24"x12"	AHEAD						7	
W20-1-48	48"x48"	ROAD WORK AHEAD or _FT or _ MILE						35	
W20-2-48	48"x48"	DETOUR AHEAD or __ FT						35	
W20-3-48	**48"x48"**	**ROAD or STREET CLOSED AHEAD or __ FT.**	**3**	**2**	**4**		**4**	**35**	**140**
W20-4-48	48"x48"	ONE LANE ROAD AHEAD or __ FT.						35	
W20-5-48	48"x48"	RIGHT or LEFT LANE CLOSED AHEAD or __ FT.						35	

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED BY SITE NO. 1	2	3		TOTAL AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
W20-7a-48	48"x48"	FLAGGING SYMBOL						35	
W20-7k-24	24"x18"	__ FEET (Mounted on warning sign post)						10	
W20-8-48	48"x48"	STREET CLOSED						35	
W20-51-48	48"x48"	EQUIPMENT WORKING						35	
W20-52-54	54"x12"	NEXT __ MILES (Mounted on warning sign post)						12	
W21-1a-48	48"x48"	WORKERS SYMBOL						35	
W21-2-48	48"x48"	FRESH OIL						35	
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or __ FT						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.						35	
W21-6a-48	48"x48"	SURVEY CREW AHEAD						35	
W21-50-48	48"x48"	BRIDGE PAINTING AHEAD or __ FT.						35	
W21-51-48	48"x48"	MATERIAL ON ROADWAY						35	
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK						35	
	24"x24"	TAKE TURNS (6" D letters) (Mounted on stop sign post)						11	
R11-3b-60	**60"x30"**	**BRIDGE OUT _ MILES AHEAD LOCAL TRAFFIC ONLY**	**2**	**2**	**2**		**2**	**31**	**62**

SPECIAL SIGNS

SPEC & CODE

704-1000	**TRAFFIC CONTROL SIGNS**	**TOTAL UNITS 258**

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY BY SITE NO. 1	2	3		TOTAL QUANTITY
704-0100	FLAGGING	MHR					
704-1037	ATTENUATION DEVICE-TYPEB-35	EACH					
704-1041	ATTENUATION DEVICE-TYPE B-55	EACH					
704-1043	ATTENUATION DEVICE-TYPE B-65	EACH					
704-1044	ATTENUATION DEVICE-TYPE B-70	EACH					
704-1050	TYPE I BARRICADES	EACH					
704-1051	TYPE II BARRICADES	EACH					
704-1052	**TYPE III BARRICADES**	EACH	**8**	**9**	**8**		**9**
704-1060	DELINEATOR DRUMS	EACH					
704-1065	TRAFFIC CONES	EACH					
704-1067	TUBULAR MARKERS	EACH					
704-1070	DELINEATOR	EACH					
704-1072	FLEXIBLE DELINEATORS	EACH					
704-1080	STACKABLE VERTICAL PANELS	EACH					
704-1081	VERTICAL PANELS - BACK TO BACK	EACH					
704-1085	SEQUENCING ARROW PANEL - TYPE A	EACH					
704-1086	SEQUENCING ARROW PANEL - TYPE B	EACH					
704-1087	SEQUENCING ARROW PANEL - TYPE C	EACH					
704-1088	SEQUENCING ARROW PANEL - TYPE C - CROSSOVER	EACH					
704-1095	TYPE B FLASHERS	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					
704-4011	PORTABLE CHANGEABLE MESSAGE SIGN	EACH					
762-0200	RAISED PAVEMENT MARKERS	EACH					
762-0420	SHORT TERM 4IN LINE - TYPE R	LF					
762-0424	SHORT TERM 8IN LINE-TYPE R	LF					
762-0426	SHORT TERM 24IN LINE-TYPE R	LF					
762-0430	SHORT TERM 4IN LINE - TYPE NR	LF					
772-2110	FLASHING BEACON - POST MOUNTED	EACH					

NOTES:

SITE 1 - BRIDGE NO 51-106-13.1
PROJECT BRO-0051(054)

SITE 2 - 51-107-12.1
PROJECT BRR-0051(053)

SITE 3 - 51-129-27.1
PROJECT BRR-0051(053)

Proj. No. 6810-0004
Houston Engineering Inc.
Ph: 701.237.5065

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TRAFFIC CONTROL DEVICE LIST

WARD COUNTY BRIDGE REPLACEMENTS

H:\JBN\6700\6790\6790_0057_Ward Co Bridge Replacements\CAD\Plans\100 - Traffic Control.dwg-SIGNS-8/19/2020 6:17 AM-(jrenner)

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053)	110	1

STA	SIGN NO.	ASSEMBLY NO.	FLAT SHEET FOR SIGNS IV SF	FLAT SHEET FOR SIGNS IX SF	SIGN SUPPORT LENGTH 1ST LF	SIGN SUPPORT LENGTH 2ND LF	SIGN SUPPORT LENGTH 3RD LF	SIGN SUPPORT LENGTH 4TH LF	SUPPORT SIZE	MAX POST LEN LF	SLEEVE LENGTH 1ST LF	SLEEVE LENGTH 2ND LF	SLEEVE LENGTH 3RD LF	SLEEVE LENGTH 4TH LF	SLEEVE SIZE	ANCHOR EA	ANCHOR LF	ANCHOR SIZE	RESET SIGN PANEL EA	RESET SIGN SUPPORT EA	BREAK-AWAY EA	COMMENTS
209TH ST NW																						
88+67.06 RT	W3-5-36	20		9.0	11.3				2.5 x 2.5 10 ga	12.9						1	4	3 x 3 7 ga			1	
90+92.06 LT	R2-1-24	9		5.0	10.3				2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga				
90+92.06 RT	R2-1-24	9		5.0	10.3				2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga				
95+72.06 LT	R2-1-24	9		5.0	10.3				2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga				
95+72.06 RT	R2-1-24	9		5.0	10.3				2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga				
107+93.52 LT	R2-1-24	9		5.0	10.3				2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga				
107+93.52 RT	R2-1-24	9		5.0	10.3				2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga				
112+73.52 LT	R2-1-24	9		5.0	10.3				2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga				
112+73.52 RT	R2-1-24	9		5.0	10.3				2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga				
114+98.52 LT	W3-5-36	20		9.0	11.3				2.5 x 2.5 10 ga	12.9						1	4	3 x 3 7 ga			1	
SUB TOTAL				58.0	105.0												40				2	
GRAND TOTAL				58.0	105.0												40				2	

Proj. No. 6790-0057
Houston
Engineering Inc.
Ph: 701.237.5065

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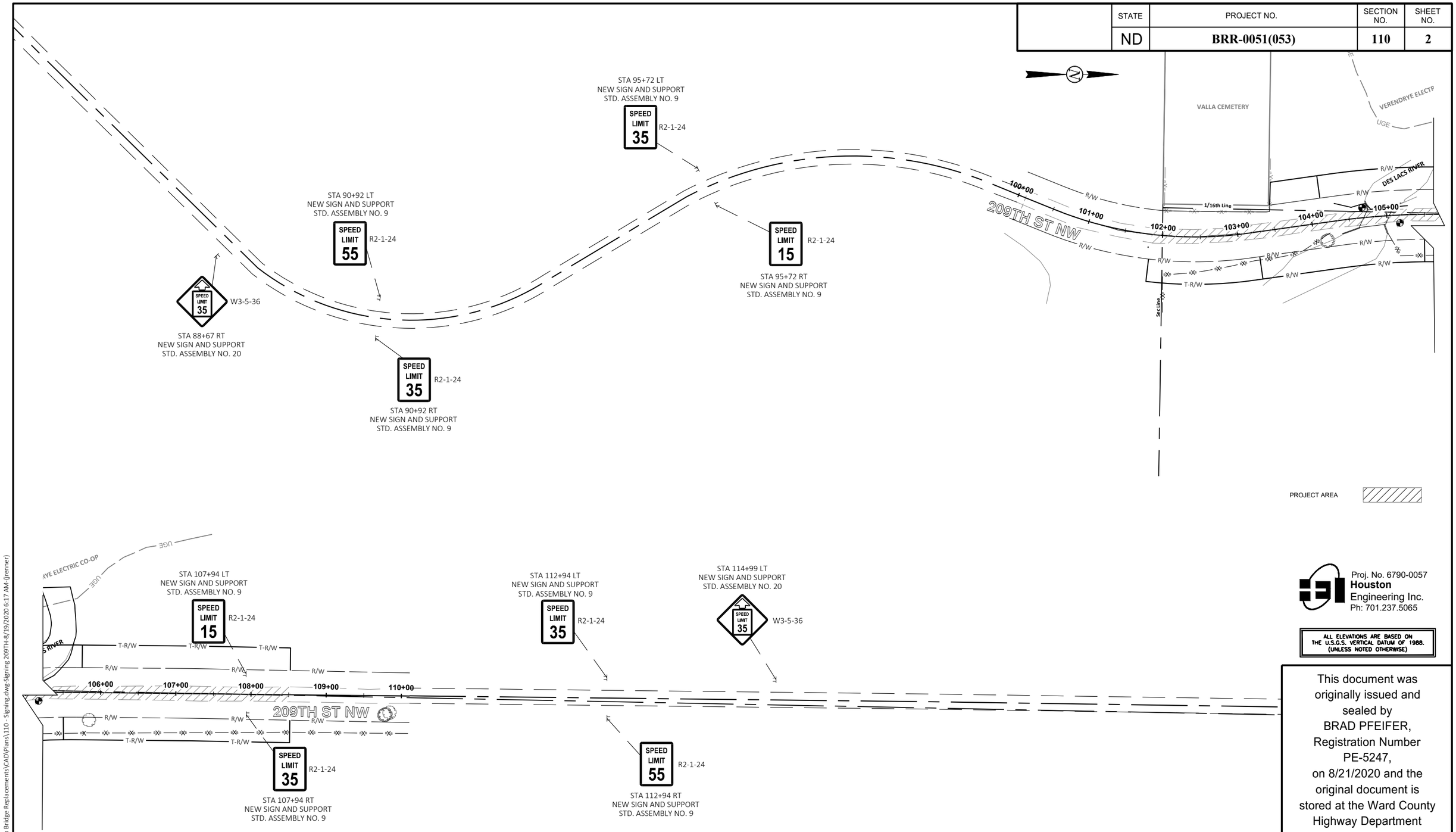
SIGN SUMMARY
PERFORATED TUBE

WARD COUNTY BRIDGE REPLACEMENTS

BRIDGE NO. 51-129-27.1

H:\JBN\6700\6790\6790_0057_Ward Co Bridge Replacements\CAD\Plans\110 - Signing.dwg-Quantity-8/19/2020 6:17 AM-(jrenner)

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053)	110	2



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SIGNING
209TH ST NW

WARD COUNTY BRIDGE REPLACEMENTS

BRIDGE NO. 51-129-27.1

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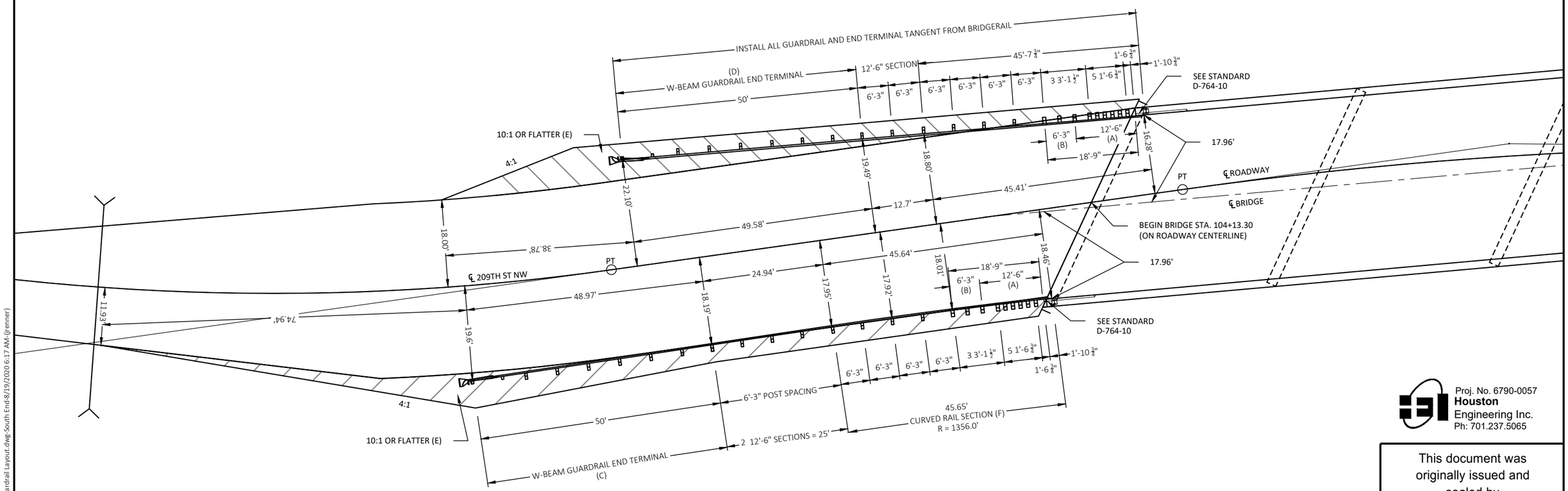
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	130	1



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(A) THRIE BEAM RAIL (DOUBLE THICKNESS).

(B) W-THRIE BEAM TRANSITION SECTION (DOUBLE THICKNESS).

(C) A FLEAT IS TO BE INSTALLED AT THIS LOCATION.

(D) AN SKT IS TO BE INSTALLED AT THIS LOCATION.

(E) EMBANKMENT FOR GUARDRAIL INSTALLATION HAS BEEN INCLUDED IN THE QUANTITIES FOR BORROW.

(F) RAIL TO BE CURVED USING STRAIGHT RAIL SECTIONS.

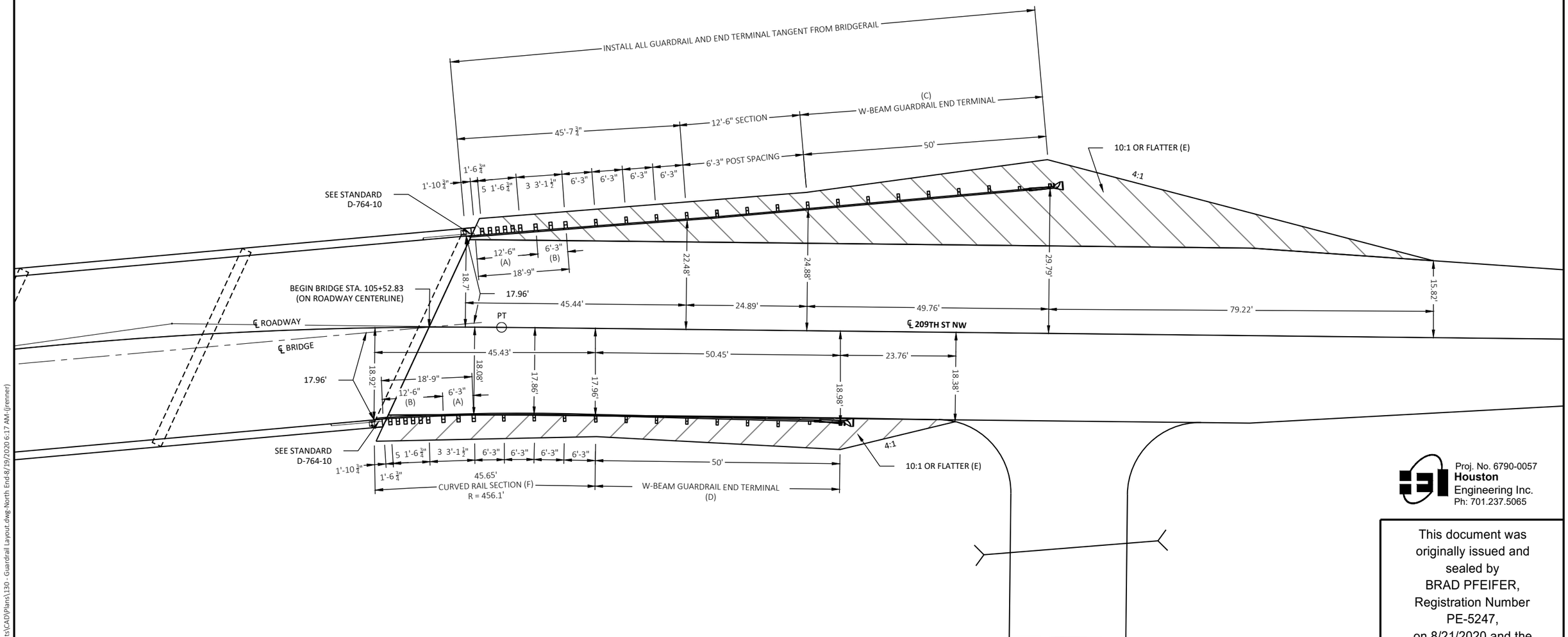
THRIE/W-BEAM GUARDRAIL LAYOUT
SOUTH END OF BRIDGE

WARD COUNTY BRIDGE REPLACEMENTS

BRIDGE NO 51-129-27.0
209TH ST NE

H:\BN\6700\6790\6790_0057_Ward Co Bridge Replacements\CAD\Plans\130 - Guardrail Layout.dwg-South End:8/19/2020 6:17 AM:(jrenner)

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	130	2



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(A) THRIE BEAM RAIL (DOUBLE THICKNESS).

(B) W-THRIE BEAM TRANSITION SECTION (DOUBLE THICKNESS).

(C) A FLEAT IS TO BE INSTALLED AT THIS LOCATION.

(D) AN SKT IS TO BE INSTALLED AT THIS LOCATION.

(E) EMBANKMENT FOR GUARDRAIL INSTALLATION HAS BEEN INCLUDED IN THE QUANTITIES FOR BORROW.

(F) RAIL TO BE CURVED USING STRAIGHT RAIL SECTIONS.

THRIE/W-BEAM GUARDRAIL LAYOUT
NORHT END OF BRIDGE

WARD COUNTY BRIDGE REPLACEMENTS

BRIDGE NO 51-129-27.0
209TH ST NE

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W-BEAM GUARDRAIL SUMMARY OF QUANTITIES

LOCATION	(A) 5/8" Ø x 18" LONG GUARD-RAIL BOLT	(A) 6" x 8" x 6'-0" TIMBER POST	(A) 6" x 8" x 14" TIMBER BLOCK	(A) 5/8" Ø x 1 1/4" LONG GUARD-RAIL BOLT	(A) 12'- 6" STRAIGHT W-BEAM RAIL SECTION	(A) REFL-ECTOR-IZED PLATES	(A) 8"x 8" x 6' WOOD POST	(A) 8"x 8" x 22" WOOD OFF-SET BLOCK	(A) 8"x 8" x 18" WOOD OFF-SET BLOCK	(A) 8"x 8" x 14" WOOD OFF-SET BLOCK	(A) 6'-3" DOUBLE W-THRIE BEAM TRANS-ITION SECTION	(A) 12'-6" DOUBLE THRIE BEAM SECTION	(A) 2'-6" THRIE BEAM TERM-INAL CON-NECTOR	(A) 7/8" Ø x VAR-IABLE LONG. BOLT	(A) 3/4" Ø x 2-1/2" LONG POST BOLT
	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH
Sta 103.32.19 to 104+03.55 Rt	25	8	8	64	4	6	9	7	1	1	1	1	1	5	2
Sta 103+67.52 to 104+28.62 Lt	23	6	6	56	3	6	9	7	1	1	1	1	1	5	2
Sta 105+38.27 to 105+87.05 Rt	21	4	4	48	2	5	9	7	1	1	1	1	1	5	2
Sta 105+58.57 to 106+30.59 Lt	25	8	8	64	4	6	9	7	1	1	1	1	1	5	2
TOTAL	94	26	26	232	13	23	36	28	4	4	4	4	4	20	8

764-0131 W-BEAM GUARDRAIL

Sta 103+31.98 to 104+02.62 Rt	70.7 LF
Sta 103+68.58 to 104+26.98 Lt	58.2 LF
Sta 105+41.67 to 105+87.05 Rt	45.7 LF
Sta 105+60.26 to 106+30.59 Lt	70.65 LF
Total	245.25 LF

764-0145 W-BEAM GUARDRAIL END TERMINAL

Sta 102+83.29 to 103+31.98 Rt	1 EA
Sta 103+19.06 to 103+68.58 Lt	1 EA
Sta 105+87.05 to 106+37.50 Rt	1 EA
Sta 106+30.59 to 106+80.35 Lt	1 EA
Total	4 EA

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

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GUARDRAIL QUANTITIES

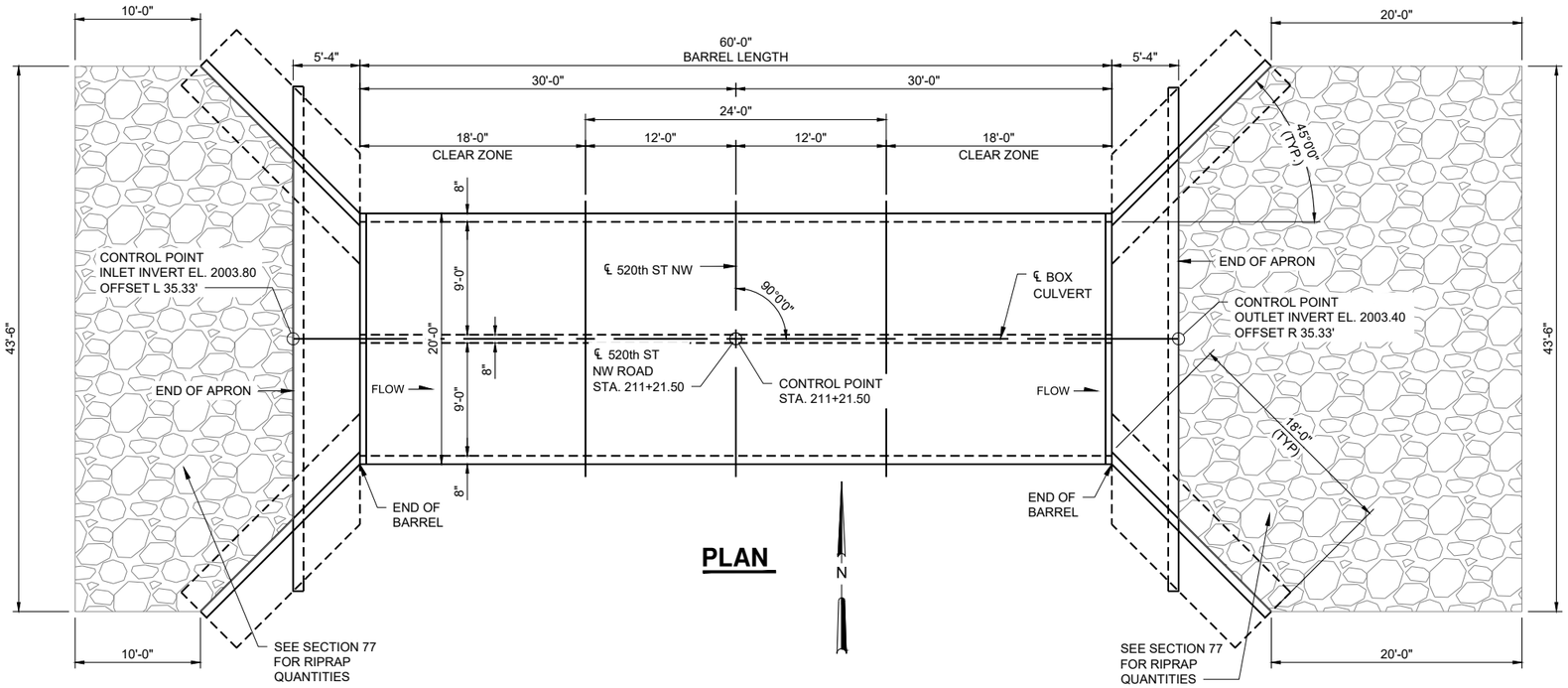
WARD COUNTY BRIDGE REPLACEMENTS

BRDIGE NO. 51-129-27.0
209TH ST NW

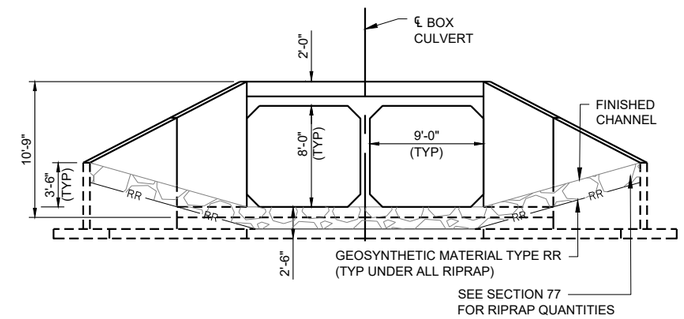
H:\JBN\6700\6790\6790_0057_Ward Co Bridge Replacements\CAD\Plans\130 - Guardrail Layout.dwg Quantities-8/19/2020 6:17 AM-(jrenner)

SITE 1

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	170	1

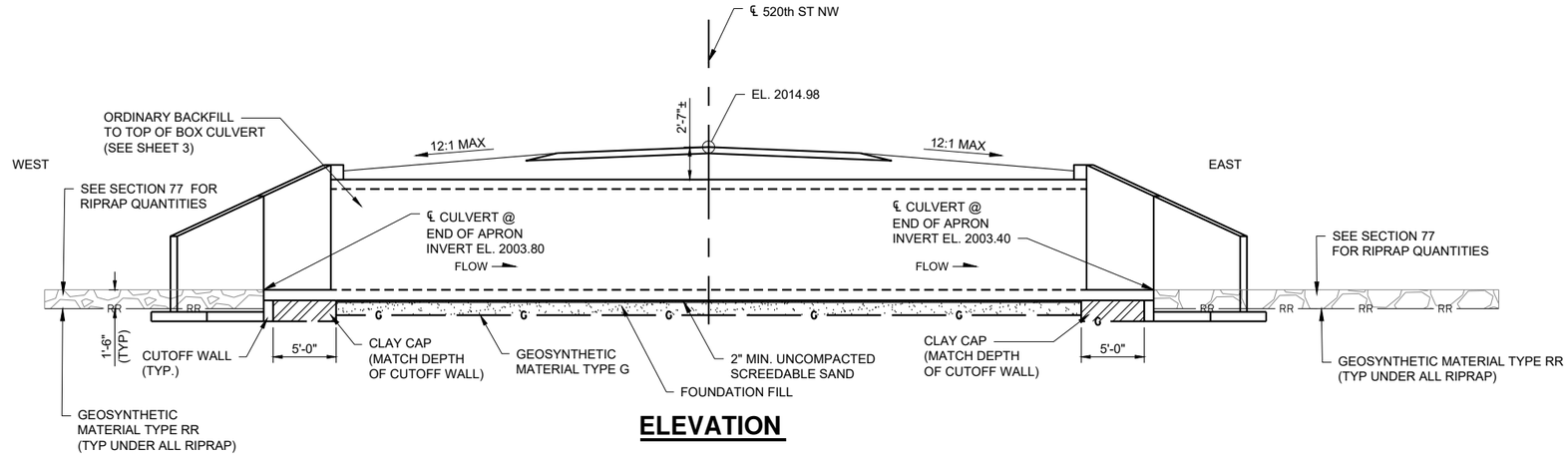


PLAN



END VIEW

(SHOWING DIMENSIONS)



ELEVATION

Proj. No. 6790-0057
Houston
Engineering Inc.
Ph: 701.237.5065

ALL ELEVATIONS ARE BASED ON THE U.S.G.S. VERTICAL DATUM OF 1988. (UNLESS NOTED OTHERWISE)

BOX CULVERT BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
210	0050	BOX CULVERT EXCAVATION	EA	1
210	0210	FOUNDATION FILL	CY	56
210	0405	FOUNDATION PREPARATION-BOX CULVERT	EA	1
606	2908	DBL 9FT x 8FT PRECAST RCB CULVERT	LF	60
606	6908	DBL 9FT x 8FT PRECAST RCB END SECTION	EA	2
709	0100	GEOSYNTHETIC MATERIAL TYPE G	SY	304

HYDRAULIC DATA:

DRAINAGE AREA (SQ. MI.)	18
STREAM GRADIENT (FT/FT)	0.04
DESIGN FREQUENCY (-YEAR)	25-YEAR
DESIGN DISCHARGE (CFS)	646
DESIGN HEADWATER STAGE (FT)	2009.13
DESIGN TAILWATER STAGE (FT)	2008.71
VELOCITY THROUGH CULVERT (FPS)	8.32
100-YEAR FREQUENCY DISCHARGE (CFS)	1087
100-YEAR FREQUENCY HEADWATER (FT)	2010.47
OVERTOPPING STAGE (FT)	2014.41
OVERTOPPING DISCHARGE (CFS)	1425
STRUCTURE SELECTION	DOUBLE 9'x8'x60' RCB

DESIGN DATA

DBL BARREL INSIDE WIDTH	=	9'-0"
DBL BARREL INSIDE HEIGHT	=	8'-0"
BARREL LENGTH	=	60'-0"
SKEW ANGLE	=	0°

DESIGN LOADING

HL-93 LIVE LOAD

MAXIMUM FILL HEIGHT	=	5'-0"
MINIMUM FILL HEIGHT	=	2'-0"

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SPECIAL PROVISIONS	
SP 4(14)	MIGRATORY BIRD TREATY ACT

HL-93 DESIGN LOADING

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

520th St. NW

REINFORCED CONCRETE
DOUBLE BOX CULVERT LAYOUT

CLEAR SPAN 2 x 9' CLEAR HEIGHT 8'
MAXIMUM FILL 5'

PROJECT: BRR-0051(053)
STATION: 211+21.50
WARD COUNTY

H:\JBN\6700\6790\6790_0057_Ward Co Bridge Replacements\CAD\Plans\170 - Box Culvert.dwg-520th St NE P & P-8/19/2020 6:14 AM-(jrenner)

NOTES - SITE 1

100 SCOPE OF WORK: Work at this site consists of removing an existing structure and building a new double barrel 9' x 8' x 60'-0" precast concrete box culvert.

202 REMOVAL OF STRUCTURE: The existing structure is a single span timber girder bridge with a timber deck, 24'-11" long with a clear roadway width of 22'-4". The abutments are timber. Include all work required to remove the bridge and old abutments from a previous structure in the contract unit price for "Removal of Structure - Site 1." See section 40 for quantity.

210 ORDINARY BACKFILL: Compact material as specified in Section 203.04 E.2.a, "ND T 180."

606 PRECAST SECTION: Tie the barrel sections together with prestressing strands or 1"ϕ tie bolts as shown on Standard Drawing D-714-22. Use a minimum of 6 - 0.5" diameter 270k strands for double box sections and 4 - 0.5" diameter 270k strands for single box sections, with one strand in each corner. Stress prestressing strands from opposite ends to a force of 20 kips. Use corrosion protected prestressing cables with their ends grouted. If tie bolts are used, place two ties per exterior wall at each joint located at third points of the wall clear height.

Payment for "Dbl 9ft x 8ft Precast RCB End Section" includes the apron, cutoff wall, parapet and wingwalls. Attach the apron to the last barrel section, the wingwalls and the cutoff wall. Attach the wingwalls to the last barrel section. Provide a welded tie type system for the connections of the apron to the box and wingwalls. Connect the wingwalls to the last barrel section by the use of tie bolts, steel-bolted plates or other approved method so the inside corner surface is smooth.

Use ASTM A36 steel for bolts, plates, angles, and studs. Use heavy hex nuts meeting the requirements of ASTM A563 and washers meeting ASTM F436, Type 1. Provide welded pipe sleeves meeting the requirements of ASTM A53, Grade B. Galvanize hardware and structural steel according to section 854.

Welders are to meet the requirements of Section 105.06 D. Galvanize field welds according to Section 854.02.

Cast holes at 3'-0" centers through the apron and into the cutoff wall to receive ¾" diameter reinforcing bars. Cast holes in the last barrel section at 1'-0" centers for ½" diameter reinforcing bars to attach the parapet. Cast parapet against the section. Install the bars according to the manufacturer's recommendations, with a high strength adhesive specifically intended for concrete anchorage, in accordance with Section 806.02.

Separate single precast units may be used as alternates to a multi cell culvert. Provide a minimum distance of 3" between separate precast units and a maximum distance of 1'-0". Fill this with a controlled density backfill. Use a controlled density backfill consisting of cement, water, pozzolanic materials, and fillers. Use a material that is fluid on placement to flow around and fill voids in the backfill area. Use a material that is able to support normal loads after 6 hours and have a compressive strength in the range of 75 psi to 125 psi at 28 days. If one of the mix designs shown is used, no further testing will be required. Each mix design yields approximately one cubic yard of flowable mortar.

MIX DESIGN #1		MIX DESIGN #2	
Cement	100 lbs	Cement	165 lbs
Fly Ash	300 lbs	Fine Aggregate	2600 lbs
Fine Aggregate	2600 lbs	Water	50 gals
Water	70 gals		

For the 12" cap, use a weatherproof and freeze/thaw resistant, non-shrink cement grout material such as SikaGrout® 212, BASF Masterflow® 928, Euclid NS Grout, or an approved equal which complies with ASTM C1107.

Include the controlled density backfill and materials used for the 12" cap in the price bid for "Dbl 9Ft x 8Ft Precast RCB Culvert".

Additional excavation, material, etc. required for single precast units will not be paid for but shall be included in cost of DBL 9Ft x 8Ft Precast RCB Culvert.

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520TH ST W

NOTES

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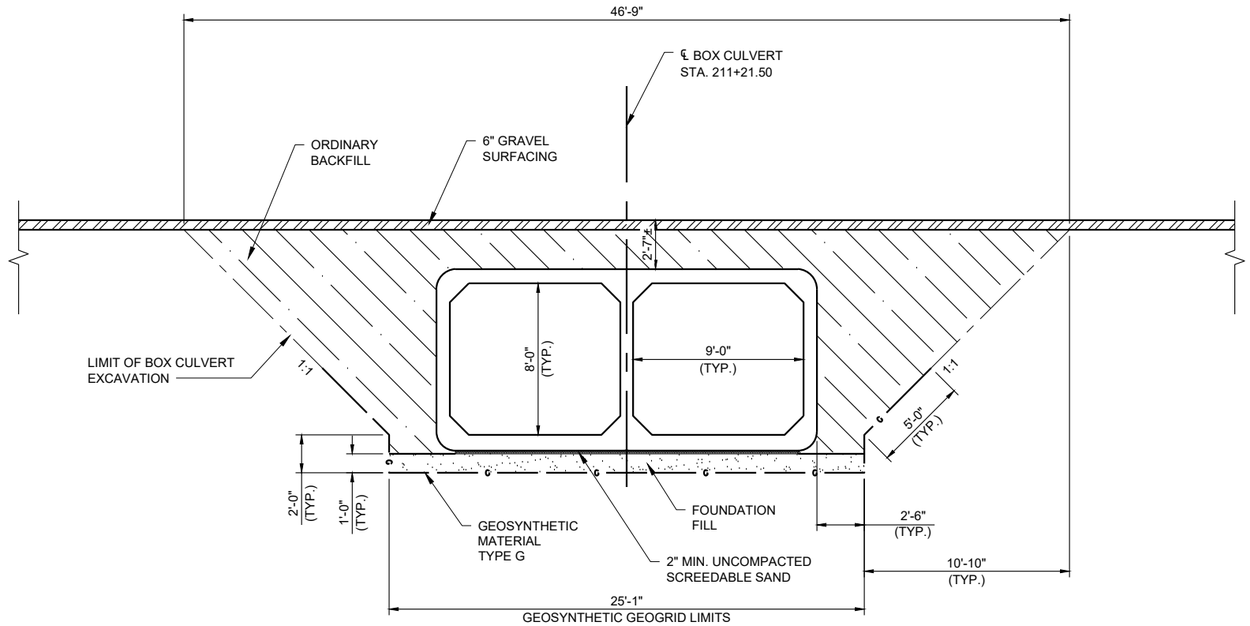
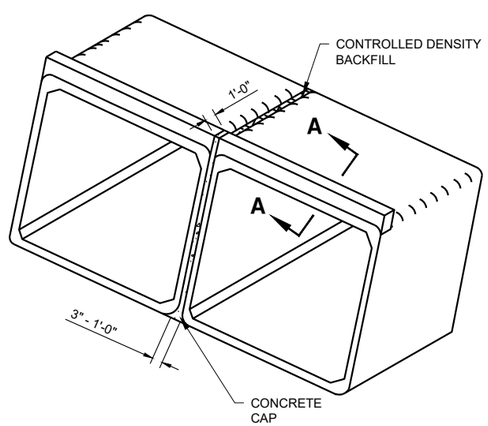
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	170	3

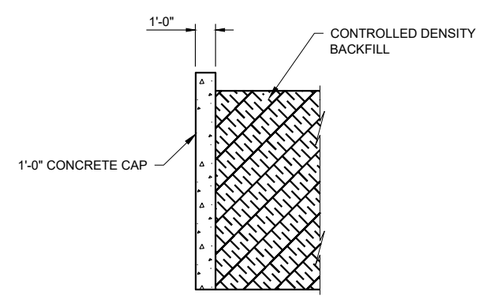


FIELD APPROACH EXCAVATION & FOUNDATION FILL DETAIL



(WINGS & APRON NOT SHOWN)

MULTIPLE CELL INSTALLATION



THE INTENT OF THIS DRAWING IS TO SHOW ONLY THE PLACEMENT OF THE CONTROLLED DENSITY BACKFILL BETWEEN ADJACENT BARRELS. THE REPRESENTATION OF THE NUMBER OF BARRELS IS ARBITRARY.

A-A

NOTES:

1. PROVIDE A 1'-0" MINIMUM DEPTH OF FOUNDATION FILL UNDER THE FLOOR. REMOVE AND REPLACE ALL UNSOUND MATERIAL UNDER THE BOX WITH FOUNDATION FILL. THE ENGINEER WILL DETERMINE THE DEPTH REQUIRED.
2. EXTEND THE GEOSYNTHETIC MATERIAL TO THE END OF APRON AND FOUNDATION FILL TO THE CLAY CAP AS SHOWN.
3. INCLUDE BOX CULVERT BACKFILL OPERATIONS AND ALL ORDINARY BACKFILL REQUIRED IN THE PRICE BID FOR "BOX CULVERT EXCAVATION."
4. BACKFILL WINGWALL WITH FOUNDATION FILL PER MANUFACTURER RECOMMENDATION. ANY NON-ORDINARY BACKFILL REQUIRED SHALL BE PER THE MANUFACTURER'S RECOMMENDATIONS AND INCLUDED IN COST OF DBL 9FTx8FT PRECAST RCB END SECTION.
5. INCLUDE ALL COSTS FOR PLACEMENT AND MATERIAL OF SCREEDABLE SAND IN THE PRICE BID FOR "BOX CULVERT EXCAVATION."

FOR A DOUBLE BARREL CULVERT WITH 9" THICK ROOF, 10" FLOOR AND 8" WALLS,THE FOLLOWING TOTAL FACTORED MOMENTS AND SHEARS WOULD RESULT FROM THE APPLICATION OF THE REQUIRED LOADS.

FACTORED DESIGN MOMENTS (DOUBLE)		FACTORED DESIGN SHEARS (DOUBLE)	
WALL MOMENT	1706 FT-LBS	WALL SHEAR	2,613 LBS
ROOF MOMENTS		ROOF SHEARS	
CORNER	-8,475 FT-LBS	CORNER	5,696 LBS
BOTTOM	18,526 FT-LBS	WALL	8,318 LBS
TOP	-20,785 FT-LBS	FLOOR SHEARS	
FLOOR MOMENTS		CORNER	7,626 LBS
CORNER	-6,822 FT-LBS	WALL	11,030 LBS
TOP	12,909 FT-LBS		
BOTTOM	-23,077 FT-LBS		

FOR A SINGLE BARREL CULVERT WITH 10" THICK ROOF, 10" FLOOR AND 8" WALLS,THE FOLLOWING TOTAL FACTORED MOMENTS AND SHEARS WOULD RESULT FROM THE APPLICATION OF THE REQUIRED LOADS

FACTORED DESIGN MOMENTS (SINGLE)		FACTORED DESIGN SHEARS (SINGLE)	
WALL MOMENT	610 FT-LBS	WALL SHEAR	2,708 LBS
ROOF MOMENTS		ROOF SHEARS	
CORNER	-8,980 FT-LBS	CORNER	7,007 LBS
BOTTOM	20,797 FT-LBS	FLOOR SHEARS	
FLOOR MOMENTS		CORNER	9,566 LBS
CORNER	-8,441 FT-LBS		
TOP	18,741 FT-LBS		

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520TH ST NW

FOUNDATION FILL

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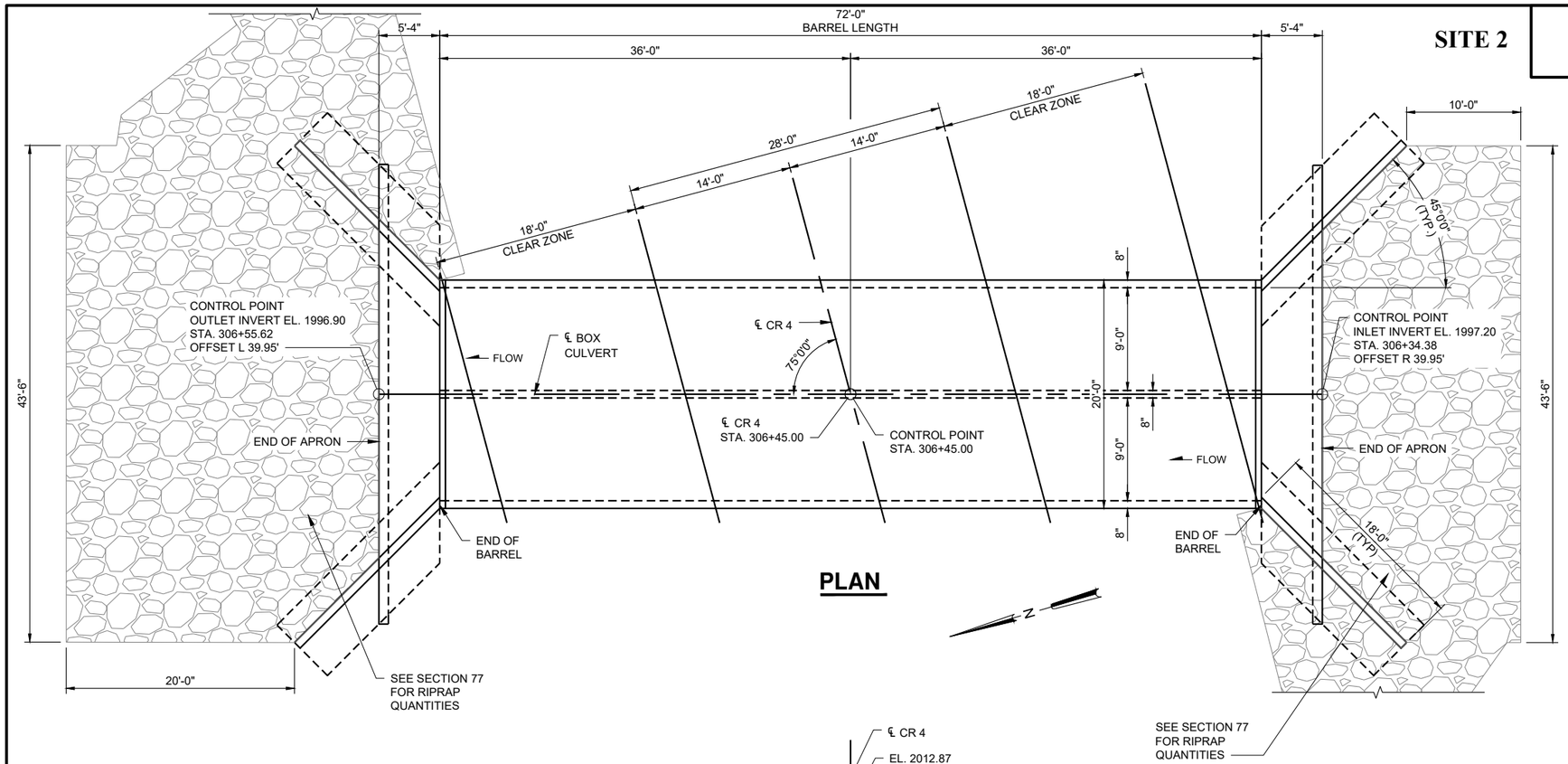
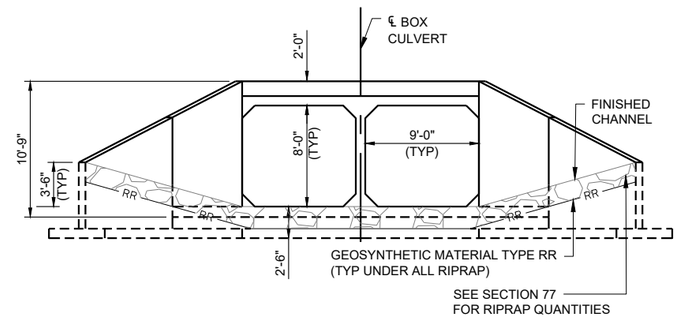
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	170	4

SITE 2

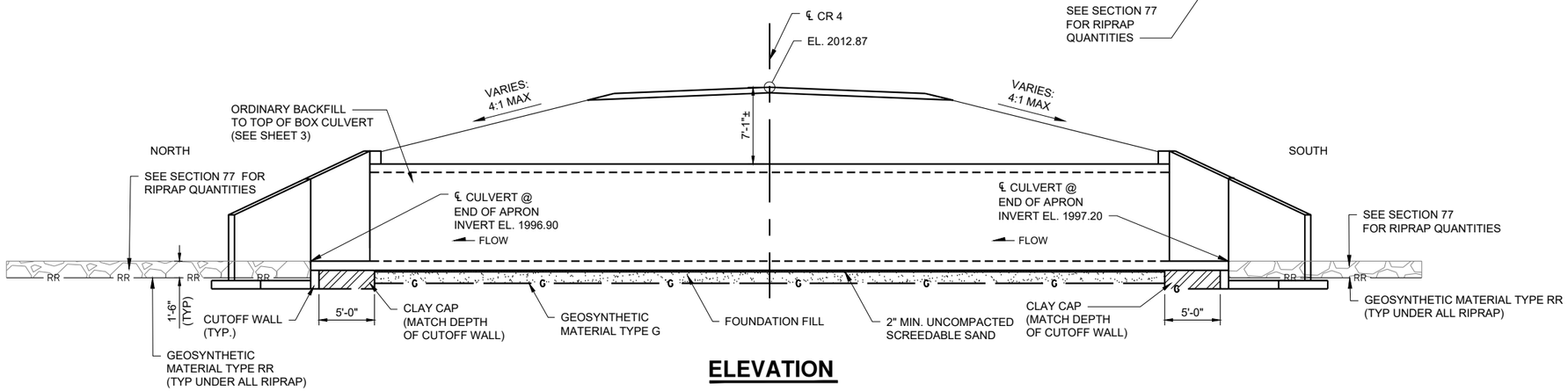


PLAN



END VIEW

(SHOWING DIMENSIONS)



ELEVATION

BOX CULVERT BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
210	0050	BOX CULVERT EXCAVATION	EA	1
210	0210	FOUNDATION FILL	CY	67
210	0405	FOUNDATION PREPARATION-BOX CULVERT	EA	1
606	2908	DBL 9FT x 8FT PRECAST RCB CULVERT	LF	72
606	6908	DBL 9FT x 8FT PRECAST RCB END SECTION	EA	2
709	0100	GEOSYNTHETIC MATERIAL TYPE G	SY	356

HYDRAULIC DATA:

DRAINAGE AREA (SQ. MI.)	18
STREAM GRADIENT (FT/FT)	0.04
DESIGN FREQUENCY (-YEAR)	25-YEAR
DESIGN DISCHARGE (CFS)	646
DESIGN HEADWATER STAGE (FT)	2003.62
DESIGN TAILWATER STAGE (FT)	2003.4
VELOCITY THROUGH CULVERT (FPS)	6.52
100-YEAR FREQUENCY DISCHARGE (CFS)	1087
100-YEAR FREQUENCY HEADWATER (FT)	2004.65
OVERTOPPING STAGE (FT)	2012.72
OVERTOPPING DISCHARGE (CFS)	2050
STRUCTURE SELECTION	DOUBLE 9'x8'x72' RCB

DESIGN DATA

DBL BARREL INSIDE WIDTH	=	9'-0"
DBL BARREL INSIDE HEIGHT	=	8'-0"
BARREL LENGTH	=	72'-0"
SKEW ANGLE	=	15°

DESIGN LOADING

HL-93 LIVE LOAD

MAXIMUM FILL HEIGHT	=	10'-0"
MINIMUM FILL HEIGHT	=	5'-0"

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SPECIAL PROVISIONS

SP 4(14)	MIGRATORY BIRD TREATY ACT

HL-93 DESIGN LOADING

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

COUNTY ROAD 4
15° SKEW
REINFORCED CONCRETE
DOUBLE BOX CULVERT LAYOUT

CLEAR SPAN 2 x 9' CLEAR HEIGHT 8'
MAXIMUM FILL 10'

PROJECT: BRO-0051(054)
STATION: 306+45.00
WARD COUNTY

H:\JBN\6700\6790\6790_0057_Ward Co Bridge Replacements\CAD\Plans\170 - Box Culvert.dwg-CR 4 P & P-8/19/2020 6:18 AM-(jrenner)

NOTES - SITE 2

100 SCOPE OF WORK: Work at this site consists of removing an existing structure and building a new double barrel 9' x 8' x 72'-0" precast concrete box culvert.

202 REMOVAL OF STRUCTURE: The existing structure is a single span concrete girder bridge, 24'-11" long with a clear roadway width of 27'-2". The abutments are timber. Include all work required to remove the bridge and old abutments from a previous structure in the contract unit price for "Removal of Structure - Site 2." See section 40 for quantity.

210 ORDINARY BACKFILL: Compact material as specified in Section 203.04 E.2.a, "ND T 180."

606 PRECAST SECTION: Tie the barrel sections together with prestressing strands or 1"ϕ tie bolts as shown on Standard Drawing D-714-22. Use a minimum of 6 - 0.5" diameter 270k strands for double box sections and 4 - 0.5" diameter 270k strands for single box sections, with one strand in each corner. Stress prestressing strands from opposite ends to a force of 20 kips. Use corrosion protected prestressing cables with their ends grouted. If tie bolts are used, place two ties per exterior wall at each joint located at third points of the wall clear height.

Payment for "Dbl 9ft x 8ft Precast RCB End Section" includes the apron, cutoff wall, parapet and wingwalls. Attach the apron to the last barrel section, the wingwalls and the cutoff wall. Attach the wingwalls to the last barrel section. Provide a welded tie type system for the connections of the apron to the box and wingwalls. Connect the wingwalls to the last barrel section by the use of tie bolts, steel-bolted plates or other approved method so the inside corner surface is smooth.

Use ASTM A36 steel for bolts, plates, angles, and studs. Use heavy hex nuts meeting the requirements of ASTM A563 and washers meeting ASTM F436, Type 1. Provide welded pipe sleeves meeting the requirements of ASTM A53, Grade B. Galvanize hardware and structural steel according to section 854.

Welders are to meet the requirements of Section 105.06 D. Galvanize field welds according to Section 854.02.

Cast holes at 3'-0" centers through the apron and into the cutoff wall to receive ¾" diameter reinforcing bars. Cast holes in the last barrel section at 1'-0" centers for ½" diameter reinforcing bars to attach the parapet. Cast parapet against the section. Install the bars according to the manufacturer's recommendations, with a high strength adhesive specifically intended for concrete anchorage, in accordance with Section 806.02.

Separate single precast units may be used as alternates to a multi cell culvert. Provide a minimum distance of 3" between separate precast units and a maximum distance of 1'-0". Fill this with a controlled density backfill. Use a controlled density backfill consisting of cement, water, pozzolanic materials, and fillers. Use a material that is fluid on placement to flow around and fill voids in the backfill area. Use a material that is able to support normal loads after 6 hours and have a compressive strength in the range of 75 psi to 125 psi at 28 days. If one of the mix designs shown is used, no further testing will be required. Each mix design yields approximately one cubic yard of flowable mortar.

MIX DESIGN #1		MIX DESIGN #2	
Cement	100 lbs	Cement	165 lbs
Fly Ash	300 lbs	Fine Aggregate	2600 lbs
Fine Aggregate	2600 lbs	Water	50 gals
Water	70 gals		

For the 12" cap, use a weatherproof and freeze/thaw resistant, non-shrink cement grout material such as SikaGrout® 212, BASF Masterflow® 928, Euclid NS Grout, or an approved equal which complies with ASTM C1107.

Include the controlled density backfill and materials used for the 12" cap in the price bid for "Dbl 9Ft x 8Ft Precast RCB Culvert".

Additional excavation, material, etc. required for single precast units will not be paid for but shall be included in cost of DBL 9Ft x 8Ft Precast RCB Culvert.

Proj. No. 6790-0057
Houston Engineering Inc.
Ph: 701.237.5065

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COUNTY ROAD 4

NOTES

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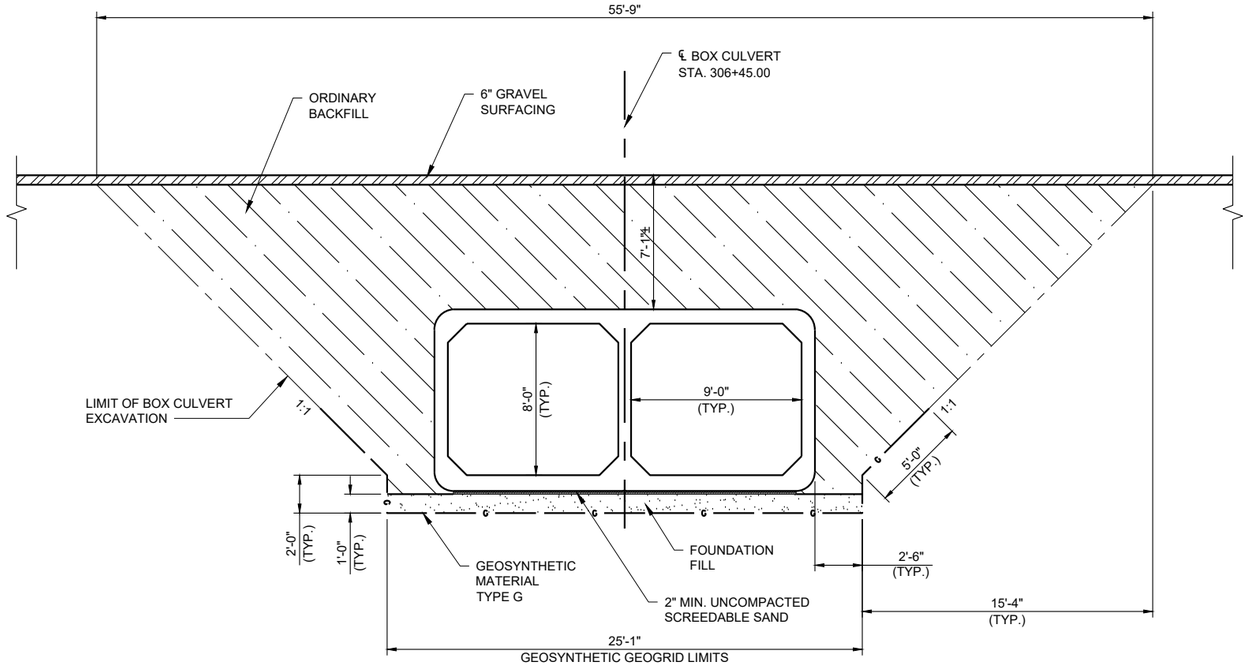
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	170	6



FIELD APPROACH EXCAVATION & FOUNDATION FILL DETAIL

NOTES:

1. PROVIDE A 1'-0" MINIMUM DEPTH OF FOUNDATION FILL UNDER THE FLOOR. REMOVE AND REPLACE ALL UNSOUND MATERIAL UNDER THE BOX WITH FOUNDATION FILL. THE ENGINEER WILL DETERMINE THE DEPTH REQUIRED.
2. EXTEND THE GEOSYNTHETIC MATERIAL TO THE END OF APRON AND FOUNDATION FILL TO THE CLAY CAP AS SHOWN.
3. INCLUDE BOX CULVERT BACKFILL OPERATIONS AND ALL ORDINARY BACKFILL REQUIRED IN THE PRICE BID FOR "BOX CULVERT EXCAVATION."
4. BACKFILL WINGWALL WITH FOUNDATION FILL PER MANUFACTURER RECOMMENDATION. ANY NON-ORDINARY BACKFILL REQUIRED SHALL BE PER THE MANUFACTURER'S RECOMMENDATIONS AND INCLUDED IN COST OF DBL 9FTx8FT PRECAST RCB END SECTION.
5. INCLUDE ALL COSTS FOR PLACEMENT AND MATERIAL OF SCREEDABLE SAND IN THE PRICE BID FOR "BOX CULVERT EXCAVATION."

FOR A DOUBLE BARREL CULVERT WITH 9" THICK ROOF, 10" FLOOR AND 8" WALLS,THE FOLLOWING TOTAL FACTORED MOMENTS AND SHEARS WOULD RESULT FROM THE APPLICATION OF THE REQUIRED LOADS.

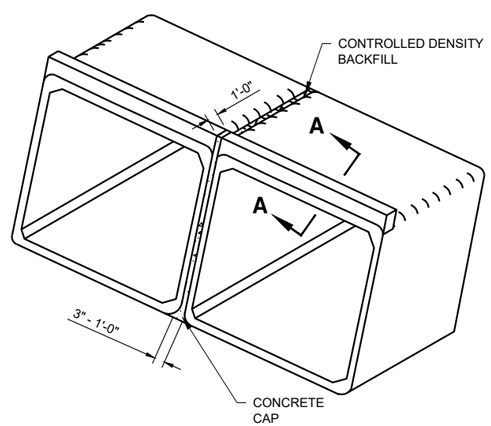
FACTORED DESIGN MOMENTS (DOUBLE)	
WALL MOMENT	1476 FT-LBS
ROOF MOMENTS	
CORNER	-9,313 FT-LBS
BOTTOM	12,539 FT-LBS
TOP	-23,849 FT-LBS
FLOOR MOMENTS	
CORNER	-9,385 FT-LBS
TOP	13,398 FT-LBS
BOTTOM	-25,849 FT-LBS

FACTORED DESIGN SHEARS (DOUBLE)	
WALL SHEAR	3,878 LBS
ROOF SHEARS	
CORNER	6,596 LBS
WALL	9,511 LBS
FLOOR SHEARS	
CORNER	8,912 LBS
WALL	12,318 LBS

FOR A SINGLE BARREL CULVERT WITH 10" THICK ROOF, 10" FLOOR AND 8" WALLS,THE FOLLOWING TOTAL FACTORED MOMENTS AND SHEARS WOULD RESULT FROM THE APPLICATION OF THE REQUIRED LOADS

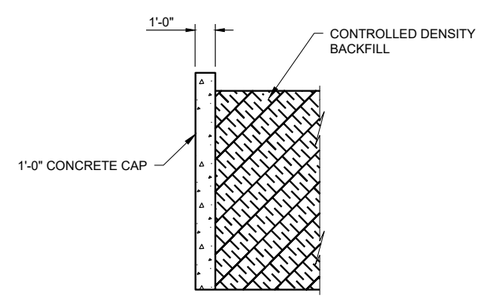
FACTORED DESIGN MOMENTS (SINGLE)	
WALL MOMENT	361 FT-LBS
ROOF MOMENTS	
CORNER	-10,235 FT-LBS
BOTTOM	16,402 FT-LBS
FLOOR MOMENTS	
CORNER	-10,698 FT-LBS
TOP	19,604 FT-LBS

FACTORED DESIGN SHEARS (SINGLE)	
WALL SHEAR	3,996 LBS
ROOF SHEARS	
CORNER	7,620 LBS
FLOOR SHEARS	
CORNER	10,319 LBS



(WINGS & APRON NOT SHOWN)

MULTIPLE CELL INSTALLATION



THE INTENT OF THIS DRAWING IS TO SHOW ONLY THE PLACEMENT OF THE CONTROLLED DENSITY BACKFILL BETWEEN ADJACENT BARRELS. THE REPRESENTATION OF THE NUMBER OF BARRELS IS ARBITRARY.

A-A

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Houston Engineering Inc.
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COUNTY ROAD 4

FOUNDATION FILL

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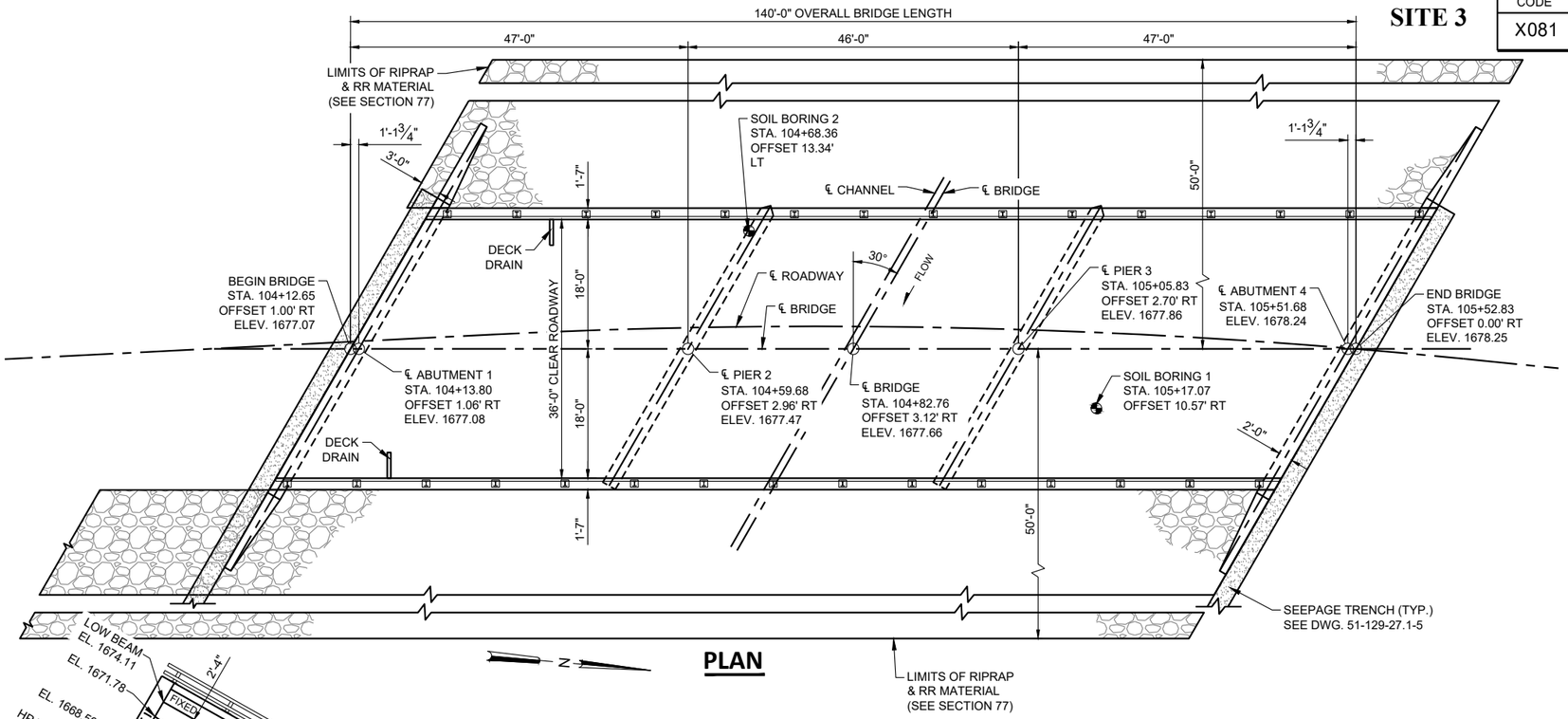
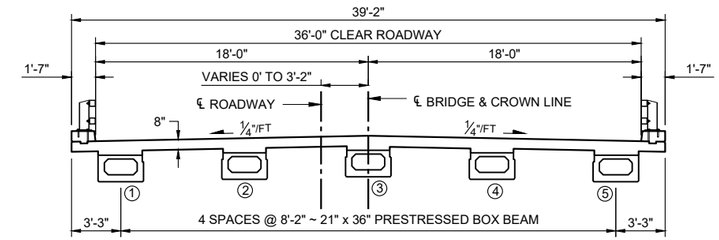
BRIDGE CODE		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
X081		ND	BRR-0051(053), BRO-0051(054)	170	7

SITE 3



PLAN

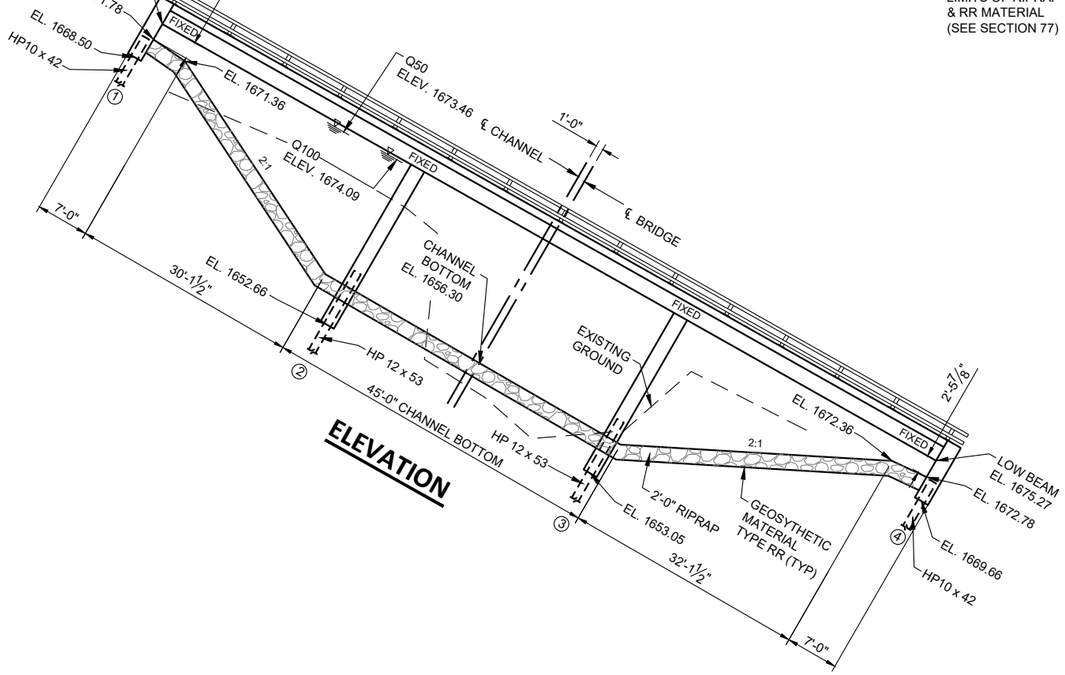


TYPICAL SECTION

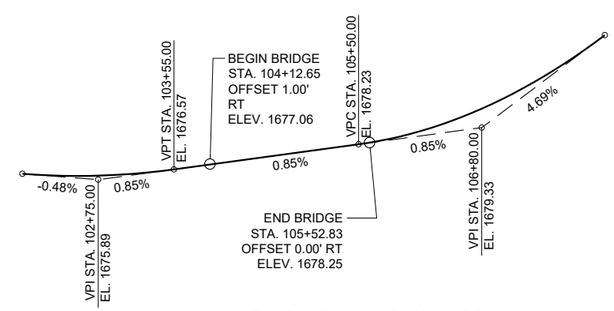
DESIGN STRENGTHS:

f'c = 3,000 psi - CLASS AE-3 CONCRETE
f'c = 4,000 psi - CLASS AAE-3 CONCRETE
f'ci = 4,000 psi - PRESTRESSED CONCRETE BEAM
f'c = 5,000 psi - PRESTRESSED CONCRETE BEAM
fy = 270,000 psi - PRESTRESSED STRANDS (LOW RELAX)
fy = 50,000 psi - STRUCTURAL STEEL
fy = 60,000 psi - REINFORCING STEEL

LOAD & RESISTANCE FACTOR DESIGN



ELEVATION



VERTICAL CURVE DATA

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Houston Engineering Inc.
Ph: 701.237.5065

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SPECIAL PROVISIONS	
SP 4(14)	MIGRATORY BIRD TREATY ACT

STANDARD DRAWINGS
D-622-1, D-714-18, D-900-1
F.W.S. 15 PSF
HL-93 DESIGN LOADING

SURVEY CONTROL POINTS

POINT	NORTHING	EASTING	ELEVATION
CP100	513704.80	1696381.13	1686.37
CP100	513208.86	1696225.16	1675.74

HYDRAULIC DESIGN DATA

DRAINAGE AREA	807 SQ. MI.
STREAM GRADIENT	0.04 %
50 YR DESIGN DISCHARGE [1]	3,966 CFS
50 YR MEAN VELOCITY AT BRIDGE [1]	3.1 FPS
50 YR DESIGN STAGE [2]	1673.46
100 YR DESIGN DISCHARGE [1]	4,899 CFS
100 YR MEAN VELOCITY AT BRIDGE [1]	3.6 FPS
100 YR DESIGN STAGE [2]	1674.09

[1] LOCAL RUNOFF
[2] REGIONAL FLOOD
SEE HYDRAULIC REPORT FOR DESRCRIPTIONS OF LOCAL RUNOFF & REGIONAL FLOOD

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NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

290TH ST NW

BRIDGE LAYOUT

PROJECT: BRR-0051(053)
STATION: 104+82.76
WARD COUNTY

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NOTES - SITE 3

100 SCOPE OF WORK: Work at this site consists of removing an existing structure and building a new 3-span prestressed concrete box beam bridge with an overal length of 140'-0" and a clear roadway width of 36'-0".

100 WORK DRAWINGS: Provide the following work drawings to the Engineer for review in accordance with Section 105.08.

- Prestressed Box Beams
- Bridge Rail
- Deck Drains
- Deck Protection Angles

100 GENERAL: Include the cost of furnishing and placing preformed expansion joint filler, concrete inserts, deck vents, and other miscellaneous items in the price bid for Class AE-3 Concrete and Class AAE-3 Concrete.

107 HAZARDOUS MATERIAL: The existing structural steel is painted with lead-based paint. Remove and dispose of any loose and peeling paint found on the existing structural steel according to the North Dakota Department of Health's management of lead-based paint debris.

202 REMOVAL OF STRUCTURE: The existing structure is a single span steel girder bridge with a cast-in-place concrete deck, 35'-1" long with a clear roadway width of 20'-0". The abutments are cast-in-place concrete and are adjacent to timber retaining walls. Include all work required to remove the bridge and retaining walls from the existing structure in the contract unit price for "Removal of Structure."

Submit SFN 17987 "Asbestes Notification of Demolition and Renovation" to the North Dakota Department of Health 10 days before beginning removals.

210 CHANNEL EXCAVATION: Extend the typical channel cross section 30 feet north and south of the bridge centerline and transition to meeting existing grading at 100 feet from centerline. Dispose of excess excavated material or waste materials off-site. Include all costs in the bid price for "Channel Excavation."

210 EXCAVATION: Include the excavation costs at the abutments, as shown in the "Detail at Abutment," in the lump sum bid item, "Class 1 Excavation." Include the excavation costs at the piers in the lump sum bid item, "Class 2 Excavation."

602 DIAPHRAGMS AND ENDWALLS: Place the pier diaphragm and endwall concrete at the same time as the deck concrete.

602 DECK PLACEMENT: Place the deck at a minimum rate of 40 CY per hour.

602 CURING CONCRETE: Wet cure all concrete surfaces not covered by forms. Cover the concrete with a double thickness of burlap. Maintain surface moisture between the final finish and placement of burlap by periodic applications of a light fog spray of water. Keep the burlap continuously moist until the end of the curing period.

Cure deck concrete as specified in Section 602.04 F.2, "Deck Slab Concrete." Do not cover the wet cure burlap with a waterproof material such as polyethylene during the curing period.

602 SURFACE FINISH "D": Apply Surface Finish "D" to the inside and top faces of the curb.

602 PENETRATING WATER REPELLANT TREATMENT: Apply penetrating water repellant treatment to the driving surface of the bridge deck and the inside and top faces of the curb. Do not apply penetrating water repellant treatment on the bridge deck until after the curb has been installed.

616 STRUCTURAL STEEL: Use ASTM A36 structural steel for ice noses on piers, deck drains, and deck protection angles. Shop drawings for ice noses will not be required unless changes to plan details are proposed.

622 PILING: Drive abutment piling with a diesel hammer with a rated energy and ram weight (minimum of 3,000 pounds) of at least 31,523 foot-pounds-tons computed by the formula:

$$W(E - 11{,}319) + 0.557*E$$

Drive pier piling with a diesel hammer with a rated energy and weight (minimum of 3,000 pounds) of at least 49,329 foot-pound-tons computed by the formula:

$$W(E - 14{,}014) + 0.704*E$$

W = Weight of ram (tons)
E = Rated hammer energy

Run the hammer at an energy that produces a penetration at bearing between ½" and 3 inches in the last 10 blows.

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Engineering Inc.
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290TH ST NW

NOTES - SITE 3

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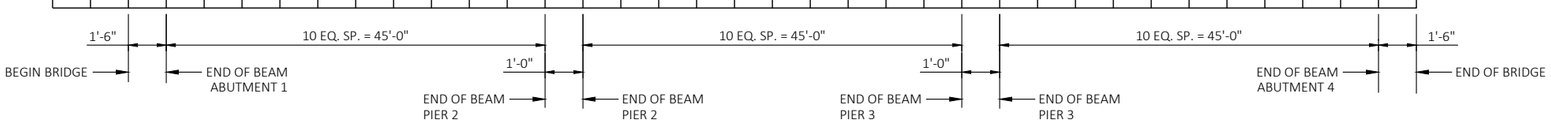
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	170	9

CL Beam 5	CL Beam 4	CL Beam 3	CL Beam 2	CL Beam 1
1676.65	1676.86	1677.07	1676.94	1676.81
1676.66	1676.87	1677.08	1676.95	1676.82
1676.72	1676.93	1677.14	1677.01	1676.88
1676.77	1676.98	1677.19	1677.06	1676.93
1676.82	1677.03	1677.24	1677.11	1676.98
1676.86	1677.08	1677.29	1677.16	1677.02
1676.91	1677.12	1677.33	1677.20	1677.07
1676.94	1677.16	1677.37	1677.24	1677.10
1676.97	1677.19	1677.40	1677.27	1677.13
1677.00	1677.21	1677.42	1677.29	1677.16
1677.02	1677.23	1677.44	1677.31	1677.18
1677.04	1677.25	1677.46	1677.33	1677.20
1677.05	1677.26	1677.47	1677.34	1677.21
1677.11	1677.32	1677.53	1677.40	1677.26
1677.16	1677.37	1677.58	1677.45	1677.32
1677.21	1677.42	1677.63	1677.50	1677.37
1677.25	1677.47	1677.68	1677.55	1677.41
1677.29	1677.51	1677.72	1677.59	1677.45
1677.33	1677.55	1677.76	1677.63	1677.49
1677.36	1677.58	1677.79	1677.66	1677.52
1677.39	1677.60	1677.81	1677.68	1677.55
1677.41	1677.62	1677.83	1677.70	1677.57
1677.43	1677.64	1677.85	1677.72	1677.59
1677.44	1677.65	1677.86	1677.73	1677.60
1677.49	1677.71	1677.92	1677.79	1677.65
1677.55	1677.76	1677.97	1677.84	1677.71
1677.60	1677.81	1678.02	1677.89	1677.76
1677.64	1677.86	1678.07	1677.94	1677.80
1677.68	1677.90	1678.11	1677.98	1677.84
1677.72	1677.93	1678.14	1678.01	1677.88
1677.75	1677.96	1678.17	1678.04	1677.91
1677.78	1677.99	1678.20	1678.07	1677.94
1677.80	1678.01	1678.22	1678.09	1677.96
1677.82	1678.03	1678.24	1678.11	1677.99
1677.83	1678.04	1678.25	1678.13	1678.00



BEAM 1 IS THE WEST BEAM

SCREED ELEVATIONS

BRIDGE BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
202	0110	REMOVAL OF STRUCTURE-SITE 3	L SUM	1
210	0099	CLASS 1 EXCAVATION	L SUM	1
210	0111	CLASS 2 EXCAVATION	L SUM	1
210	0127	CHANNEL EXCAVATION	L SUM	1
210	0411	FOUNDATION PREPARATION	L SUM	1
602	0130	CLASS AAE-3 CONCRETE	CY	164.7
602	1130	CLASS AE-3 CONCRETE	CY	203.2
602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	626.4
604	9600	PRESTRESSED BOX BEAM-21IN	LF	675.0
612	0115	REINFORCING STEEL-GRADE 60	LBS	17,171
612	0116	REINFORCING STEEL-GRADE 60-EPOXY COATED	LBS	32,161
616	5890	STRUCTURAL STEEL	L SUM	1
622	0012	STEEL H-PILE TIPS 10 X 42	EA	12
622	0014	STEEL H-PILING POINTS 12 X 53	EA	12
622	0020	STEEL PILING HP 10 X 42	LF	1,020
622	0040	STEEL PILING HP 12 X 53	LF	960
624	0129	TRAFFIC RAIL-DOUBLE BEAM GUARDRAIL	LF	280.0
930	9537	ABUTMENT UNDERDRAIN SYSTEM	EA	2

Proj. No. 6790-057
Houston Engineering Inc.
Ph: 701.237.5065

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290TH ST NW

SCREED ELEVATIONS & BID ITEM QUANTITIES

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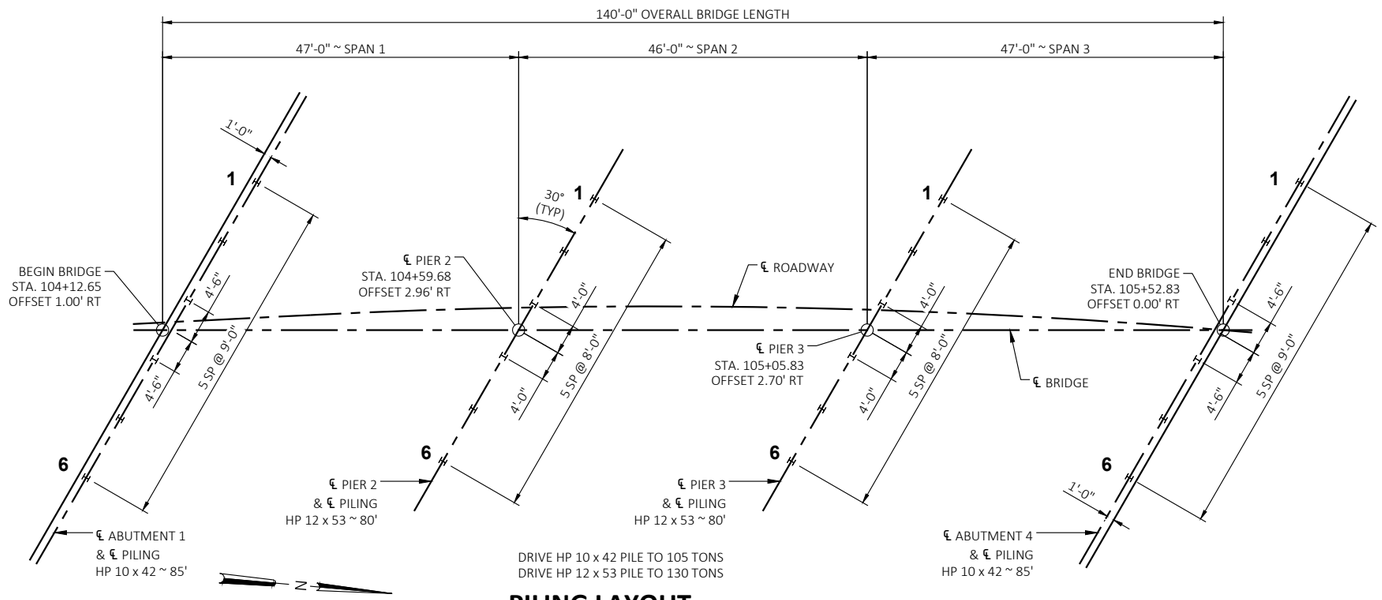
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	170	10



PILING LAYOUT

	PILE COORDINATES		
	PILE	NORTHING	EASTING
ABUT 1	1	513,284.34	1,696,383.11
	6	513,265.39	1,696,423.93
PIER 2	1	513,328.95	1,696,381.30
	6	513,312.11	1,696,417.58
PIER 3	1	513,374.77	1,696,377.21
	6	513,357.93	1,696,413.49
ABUT 4	1	513,421.48	1,696,370.86
	6	513,402.54	1,696,411.68

NOTE:

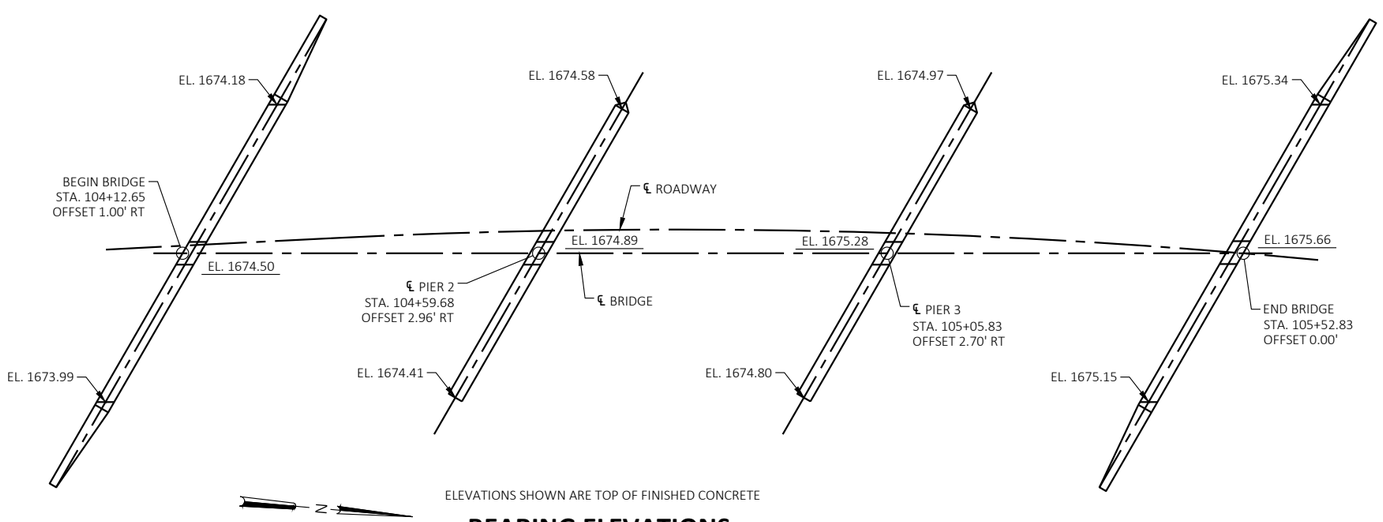
FOR DOUBLE ACTING OR SINGLE ACTING DIESEL HAMMERS, CALCULATE THE SAFE BEARING VALUE OF PILES BY THE FOLLOWING FORMULA:

$$P = \frac{4.5E}{S + 0.2} \times \frac{W + 0.2M}{W + M}$$

WHERE:

P = SAFE BEARING VALUE, IN POUNDS.
W = WEIGHT OF STRIKING PARTS (RAM), IN POUNDS.
M = WEIGHT OF PARTS BEING DRIVEN, IN POUNDS. INCLUDES PILE WEIGHT, ANVIL (IF ANY), DRIVING CAP, ETC.
E = ENERGY PER BLOW, IN FOOT-POUNDS.
S = AVERAGE PENETRATION OF PILE IN INCHES PER BLOW FOR LAST TEN BLOWS.

FOR SINGLE ACTING HAMMERS, CALCULATE E BY MULTIPLYING OBSERVED STROKE (FT) AND W (LBS).



ELEVATIONS SHOWN ARE TOP OF FINISHED CONCRETE

BEARING ELEVATIONS

Proj. No. 6790-057
Houston Engineering Inc.
Ph: 701.237.5065

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290TH ST NW

PILING LAYOUT & BEARING ELEVATIONS

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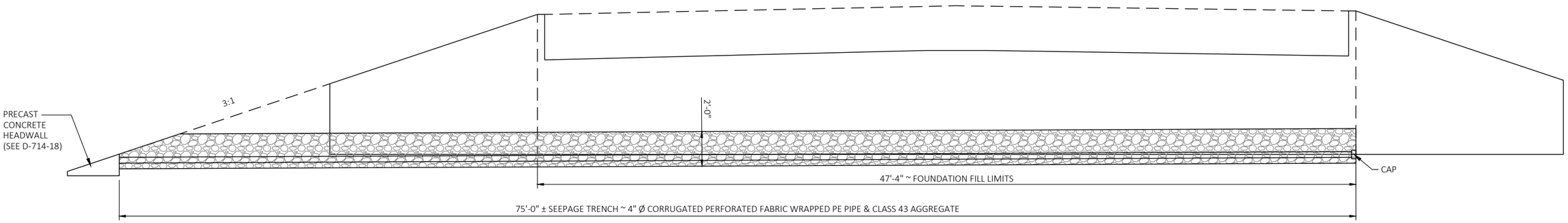
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	170	11



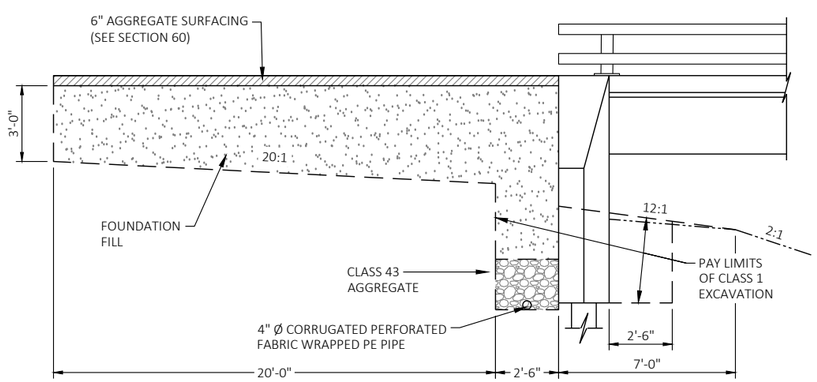
BACK FACE OF ABUTMENT

NOTES:

USE CORRUGATED PERFORATED FABRIC WRAPPED PE PIPE THAT MEETS THE REQUIREMENTS OF SECTION 830.03 A.4. PROVIDE FABRIC WRAPPING FOR THE PIPE THAT MEETS THE REQUIREMENTS OF SECTION 858.01 FOR D3 OR D4 DRAINAGE FABRIC. PROVIDE AGGREGATE THAT MEETS THE REQUIREMENTS OF SECTION 816.03, CLASS 43. PROVIDE FOUNDATION FILL THAT MEETS THE REQUIREMENTS OF SECTION 210.

INCLUDE THE COST TO FURNISH AND PLACE THE FOUNDATION FILL, AGGREGATE, CORRUGATED PERFORATED PIPE AND HEADWALLS IN THE PAY ITEM "ABUTMENT UNDERDRAIN SYSTEM."

PLACE ABUTMENT UNDERDRAIN SYSTEM TO GRADE TO DOWNSTREAM SIDE OF BRIDGE.



DETAIL AT ABUTMENT

Proj. No. 6790-057
Houston
Engineering Inc.
Ph: 701.237.5065

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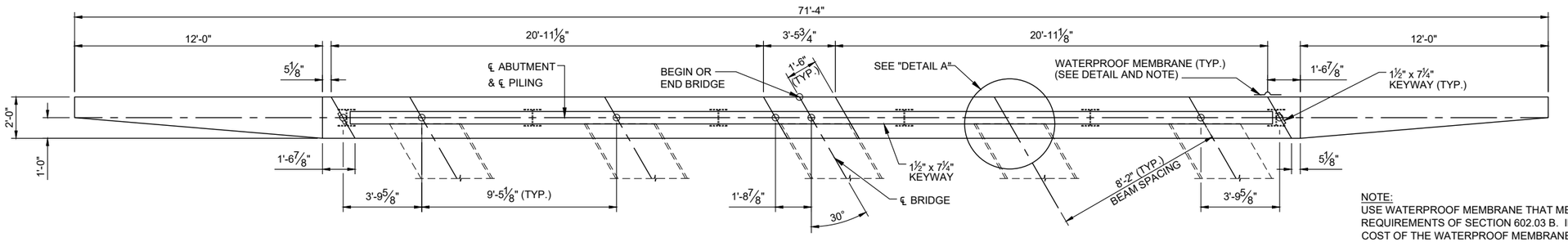
290TH ST NW

ABUTMENT UNDERDRAIN & EXCAVATION DETAILS

51-129-27.1-5

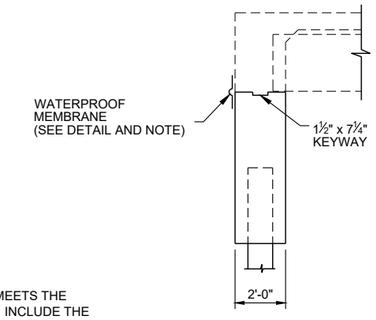
08/20/20 08:59:17AM H:\JBN\6700\6790\6790_0057_Ward Co Bridge Replacements\CAD\Plans\Bridge\Abutment Underdrain.dwg

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	170	12

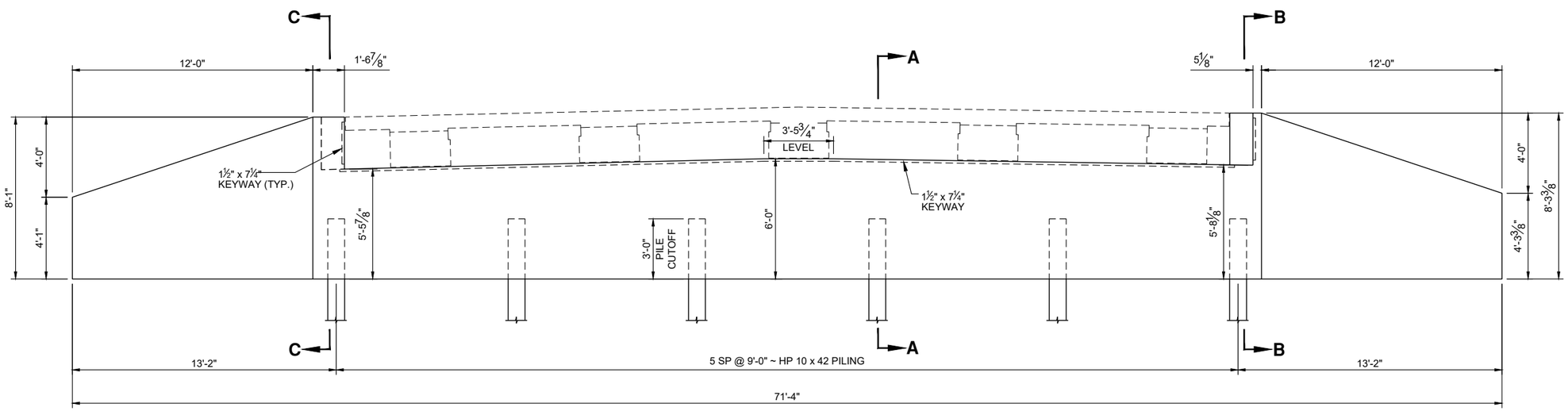


PLAN

NOTE:
USE WATERPROOF MEMBRANE THAT MEETS THE REQUIREMENTS OF SECTION 602.03 B. INCLUDE THE COST OF THE WATERPROOF MEMBRANE IN THE CONTRACT UNIT PRICE FOR "CLASS AE-3 CONCRETE."

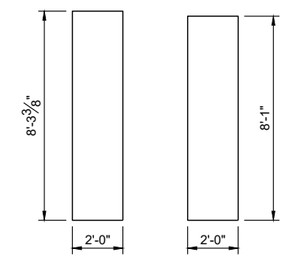


A - A



ELEVATION

NOTE: ABUTMENT 1 SHOWN IN ELEVATION VIEW, FACING SOUTH



B - B

C - C

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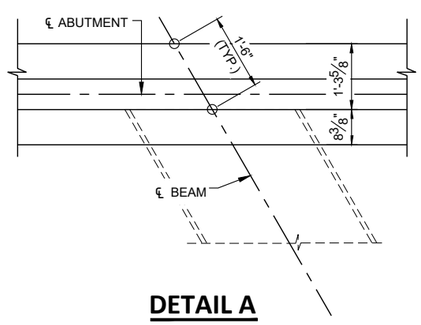
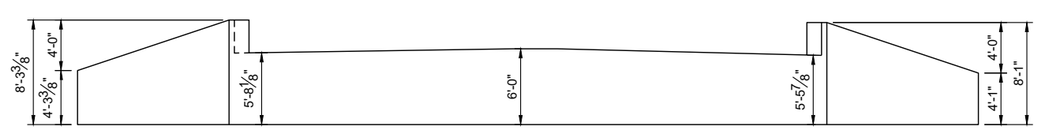


DETAIL A



(SHOWING BACKWALL HEIGHTS, FACING NORTH)

ABUTMENT 4

QUANTITIES

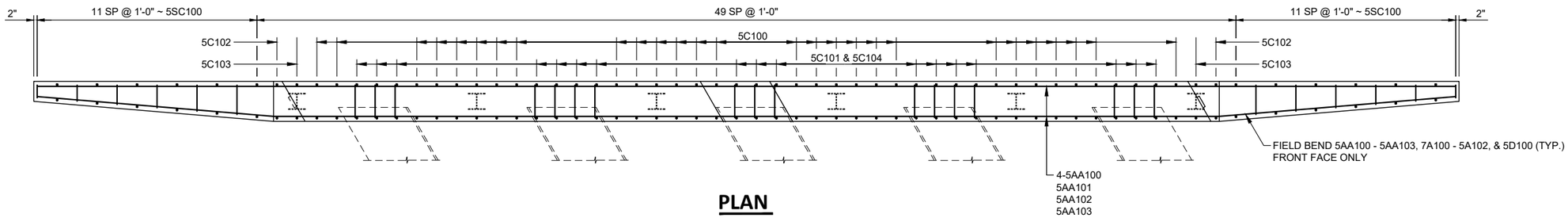
SEE DWG 51-129-27.1-7

290TH ST NW

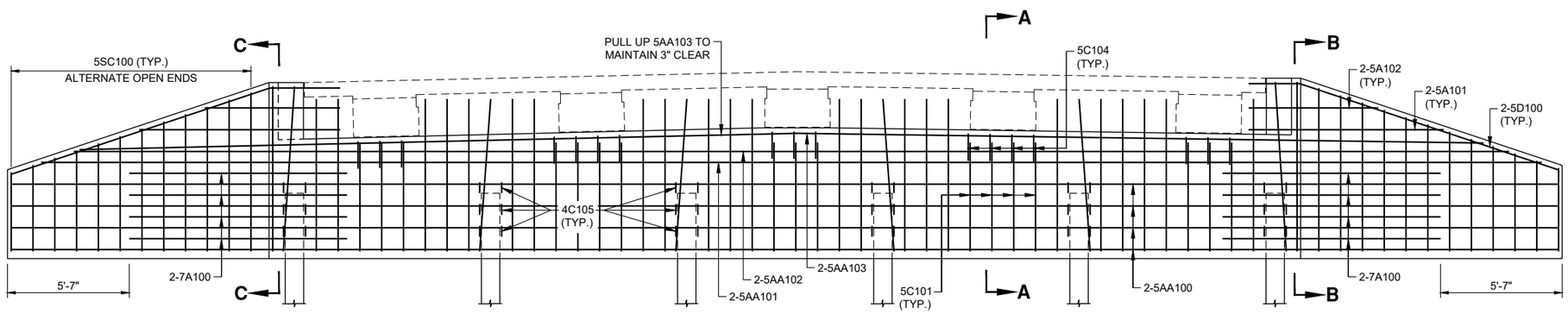
ABUTMENT GEOMETRICS

08/20/20 11:22:14AM H:\JBN\6700\6790\6790_0057_Ward Co Bridge Replacements\CAD\Plans\Bridge\Abutment Geometrics.dwg

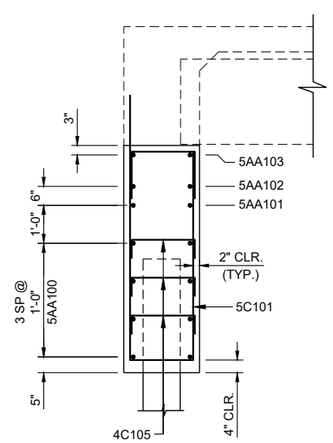
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	170	13



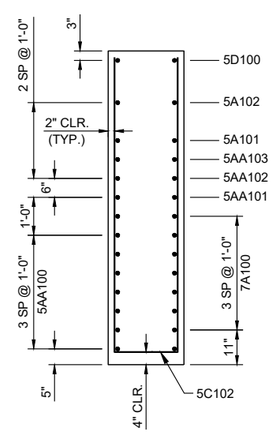
PLAN



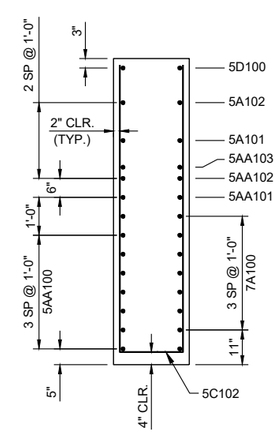
ELEVATION



A - A



B - B



C - C

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Engineering Inc.
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QUANTITIES	(ONE ABUTMENT)
CLASS AE-3 CONCRETE	29.0 CY
REINFORCING STEEL	2,676 LBS

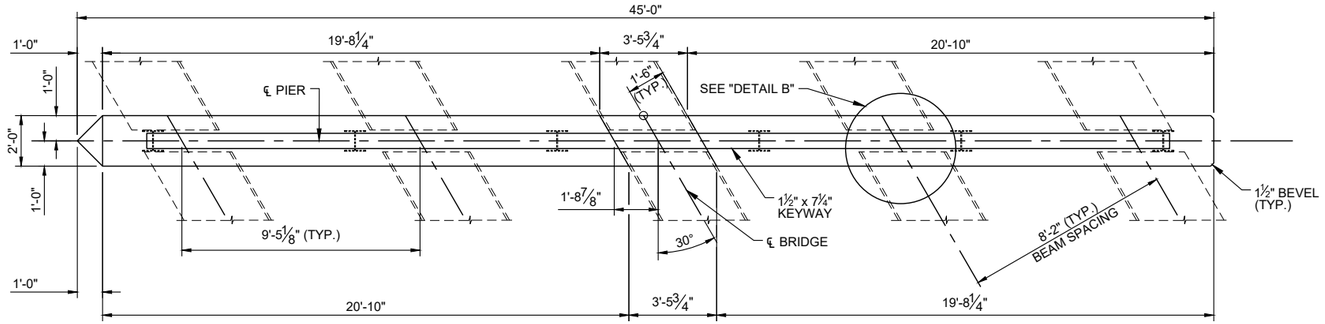
290TH ST NW

ABUTMENT REINFORCING

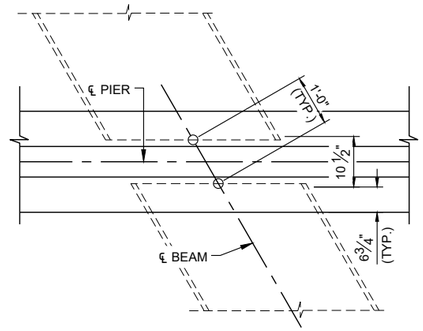
51-129-27.1-7

08/20/20 11:22:21AM H:\JBN\6700\6790\6790_0057_Ward Co Bridge Replacements\CAD\Plans\Bridge\Abutment Reinforcement.dwg

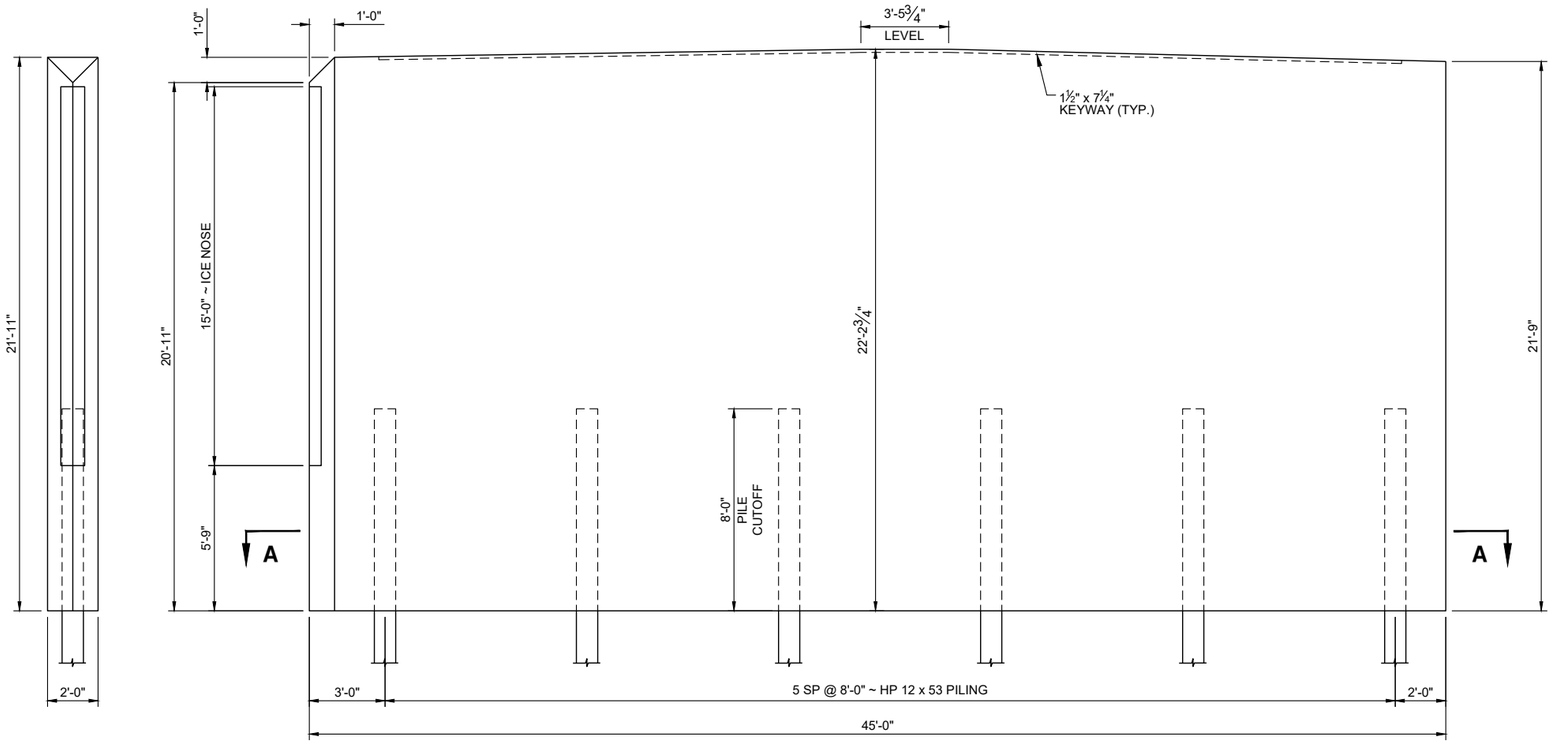
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	170	14



PLAN

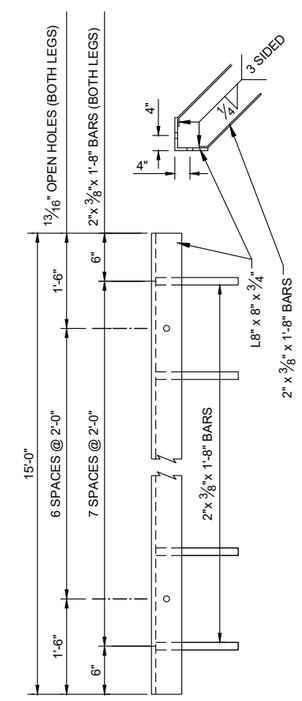


DETAIL B



END VIEW

ELEVATION



NOTE:

GALVANIZE ICE NOSE IN ACCORDANCE WITH SECTION 854 AFTER FABRICATION.

ICE NOSE DETAIL

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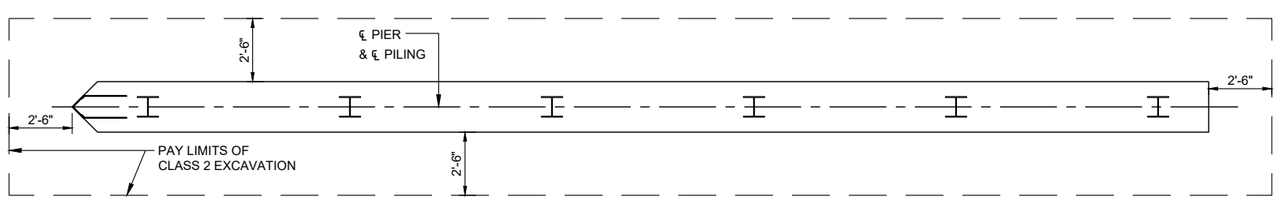


A - A

QUANTITIES

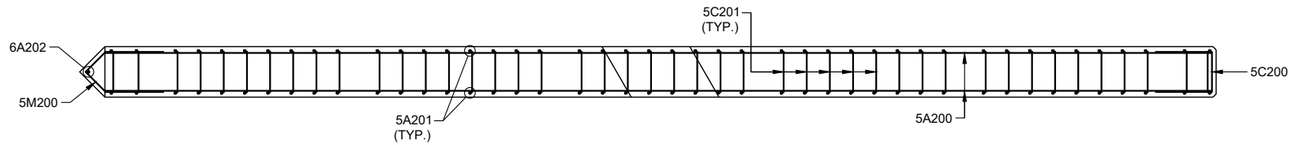
SEE DWG 51-129-27.1-9

290TH ST NW

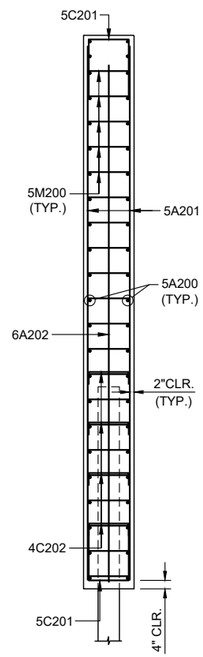
PIER GEOMETRICS

08/20/20 11:22:29AM H:\JBN\6700\6790\6790_0057_Ward Co Bridge Replacements\CAD\Plans\Bridge\Pier Geometrics.dwg

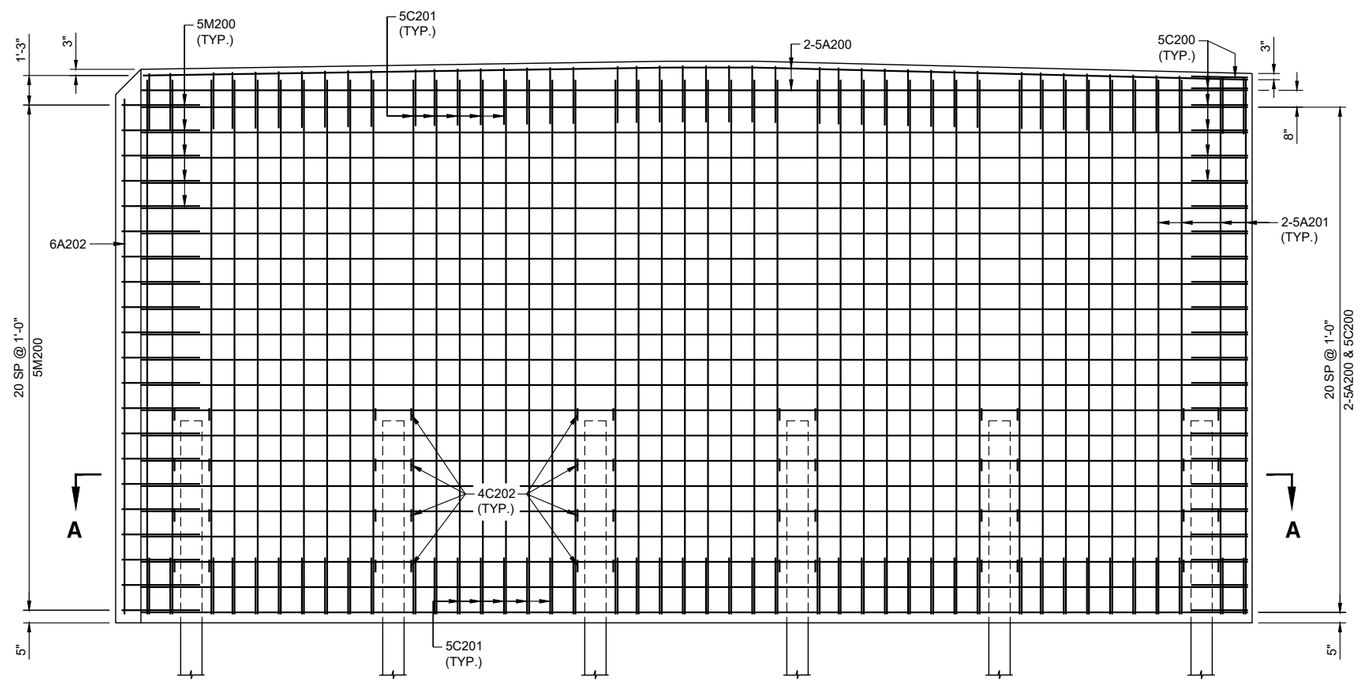
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	170	15



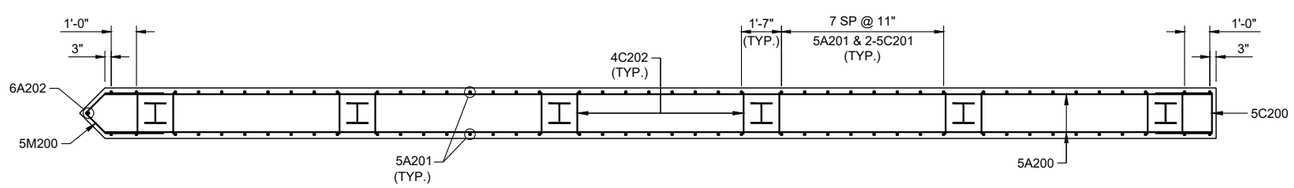
PLAN



END VIEW



ELEVATION



A-A

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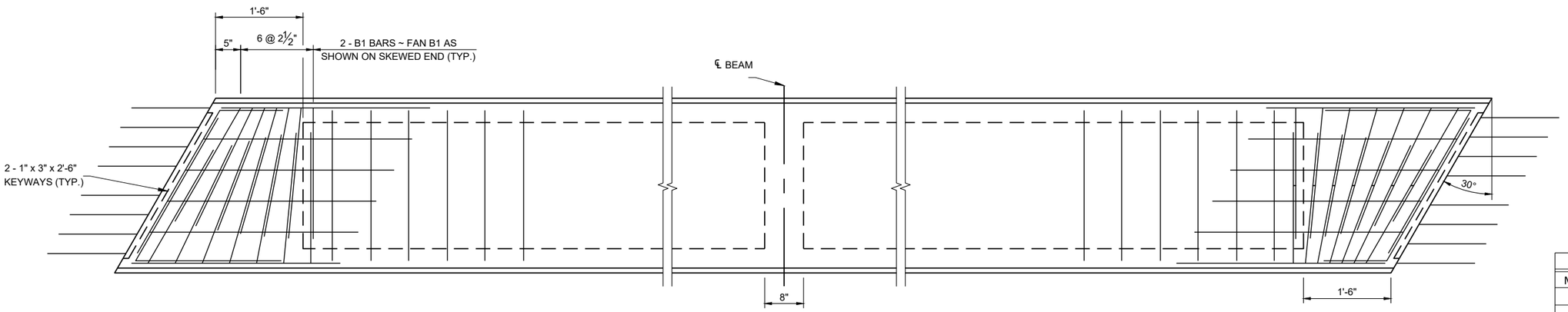
QUANTITIES	(ONE PIER)
CLASS AE-3 CONCRETE	72.6 CY
REINFORCING STEEL	5,018 LBS

290TH ST NW

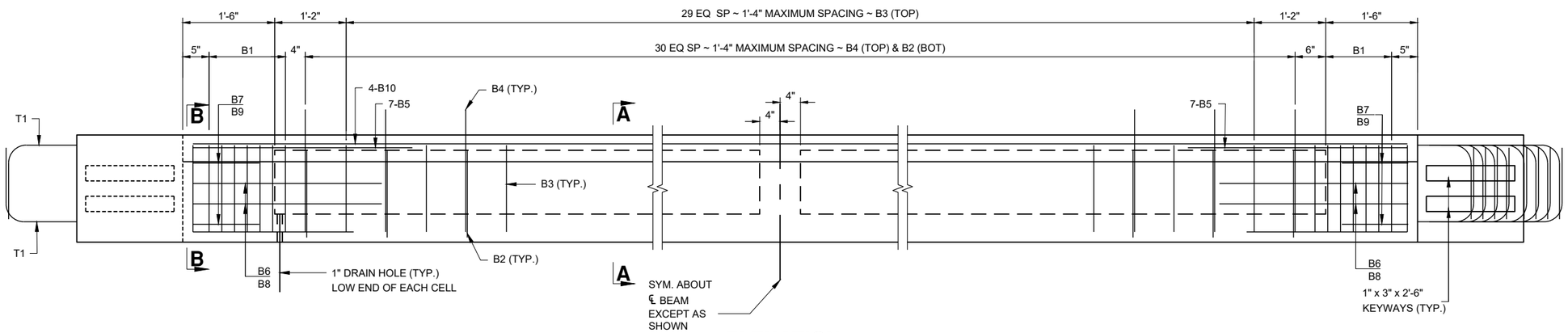
PIER REINFORCING

08/20/20 11:22:34AM H:\JBN\6700\6790\6790_0057_Ward Co Bridge Replacements\CAD\Plans\Bridge\Pier Reinforcement.dwg

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	170	16



PLAN



ELEVATION

BILL OF REINFORCEMENT (PER BEAM)				
MARK	NO.	SIZE	LENGTH	SHAPE
B1	28	4	6' - 1"	BENT
B2	31	4	5' - 5"	BENT
B3	30	4	5' - 0"	BENT
B4	31	4	6' - 9"	BENT
B5	14	5	7' - 7"	BENT
B6	4	4	5' - 11"	BENT
B7	4	4	3' - 11"	BENT
B8	4	4	7' - 4"	BENT
B9	4	4	5' - 4"	BENT
B10	4	4	44' - 8"	STRT.
T1*	32	4	3' - 9"	STRT.

* FIELD BEND AS SHOWN (GRADE 40).

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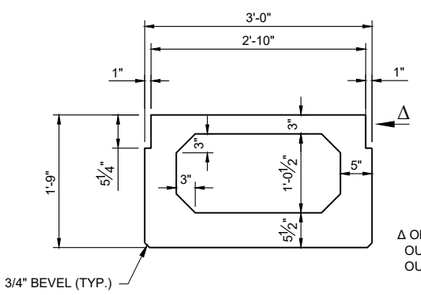
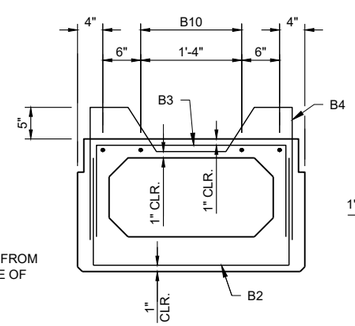


(SHOWING DIMENSIONS)

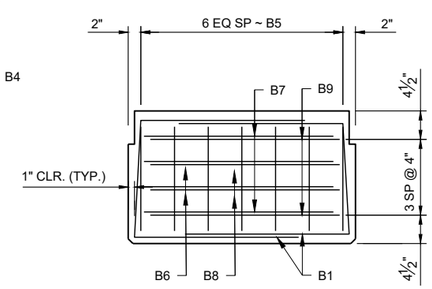
A - A

Δ OMIT NOTCH FROM OUTSIDE FACE OF OUTER BEAM.

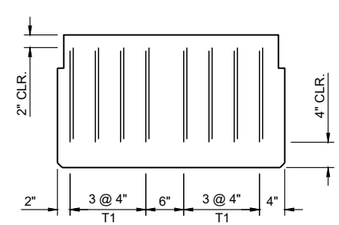


(SHOWING REINFORCING)

A - A



B - B



END VIEW

BEAM SECTION DATA
WT = 471 LBS/FT + 1580 LBS
CROSS SECTIONAL AREA = 438.0 IN^2
C.G. (FROM BOTTOM) = 9.4 IN
I = 22,358 IN^4
SB = 2,366 IN^3

QUANTITIES	(ONE BEAM)
BEAM LENGTH	45.0 LF

290TH ST NW

PRE-TENSIONED 21" x 36" PRESTRESSED SPREAD BOX BEAM

51-129-27.1-10

08/20/20 08:59:42AM H:\JBN\6700\6790\6790_0057_Ward Co Bridge Replacements\CAD\Plans\Bridge\21IN Box Beam.dwg

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	170	17

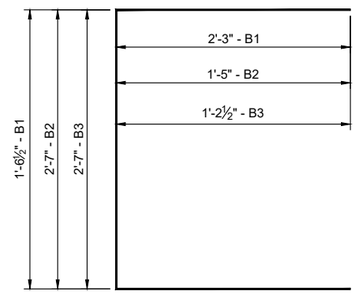
NOTES:

SELECT THE FINAL PRESTRESS FORCE (REMAINING AFTER ALL LOSSES HAVE BEEN ACCOUNTED FOR) AND ITS CORRESPONDING CENTER OF GRAVITY, FROM THOSE ON A CURVE DETERMINED BY THE THREE VALUES SHOWN IN THE "PRESTRESSING DATA" TABLE.

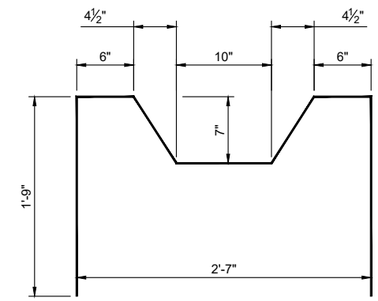
MINOR CHANGES TO THE SHAPE OF THE BEAM AND TO REINFORCING STEEL MAY BE MADE TO ACCOMMODATE THE FORMS OF VARIOUS CONTRACTORS AND THEIR CONSTRUCTION METHODS WITH THE APPROVAL OF THE ENGINEER.

PROVIDE HANDLING HOOKS OR DEVICES AS REQUIRED BY THE CONTRACTOR. INSTALL HOOKS WITHIN 4'-0" OF THE END OF BEAM.

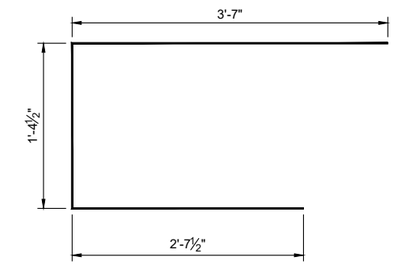
CAST THE BEAMS NO MORE THAN 6 MONTHS BEFORE BEAM PLACEMENT ON THE PROJECT.



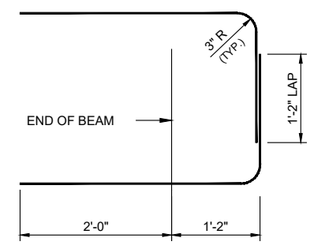
B1, B2, & B3



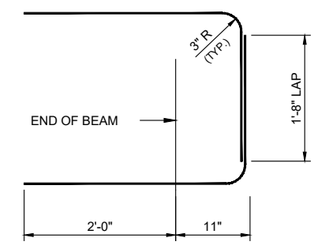
B4



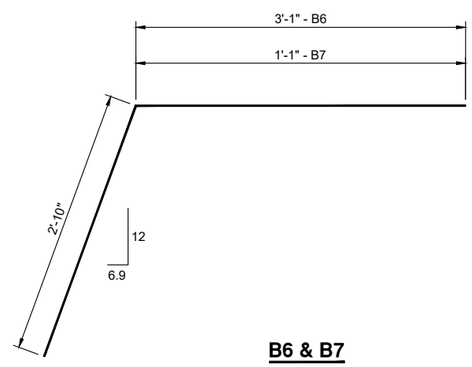
B5



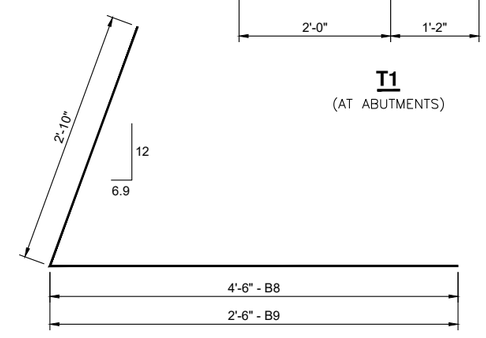
T1
(AT ABUTMENTS)



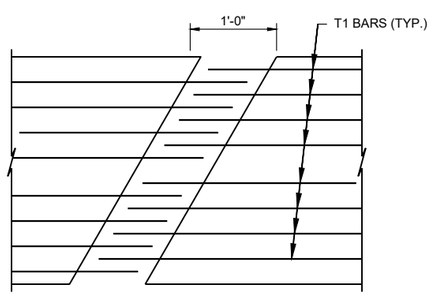
T1
(AT PIERS)



B6 & B7



B8 & B9



BEAM END PLAN AT PIER

BENT BAR DETAILS

(DIMENSIONS SHOWN ARE OUT TO OUT)

PRESTRESSING DATA					
C.G.	FINAL FORCE	DETENSION STRENGTH	ACCEPTANCE STRENGTH	WEIGHT (TONS)	BEAM LENGTH
2.00	414.6 k	4000 psi (Min)	5000 psi (Min)	11.4	45'-0"
2.25	422.8 k				
2.50	431.4 k				

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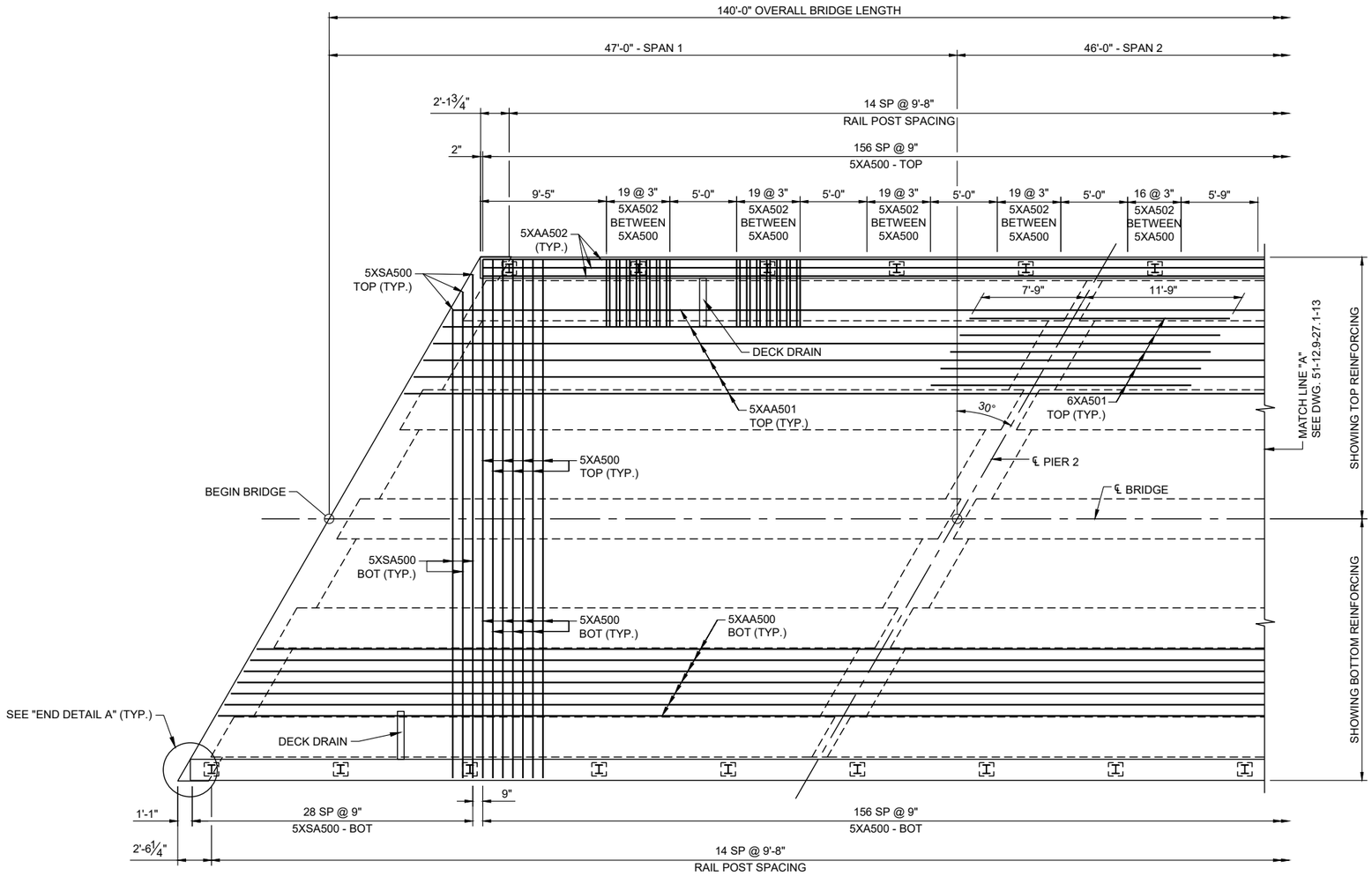
290TH ST NW

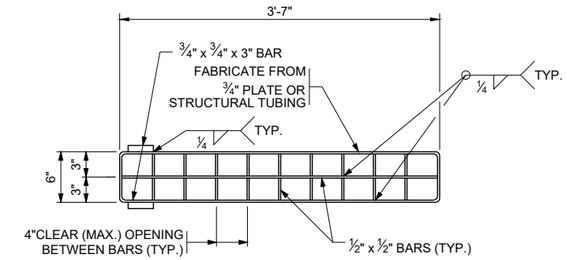
PRE-TENSIONED 21" x 36"
PRESTRESSED SPREAD BOX BEAM

08/20/20 08:59:47AM H:\JBN\6700\6790\6790_0057_Ward Co Bridge Replacements\CAD\Plans\Bridge\Box Beam Rebar.dwg

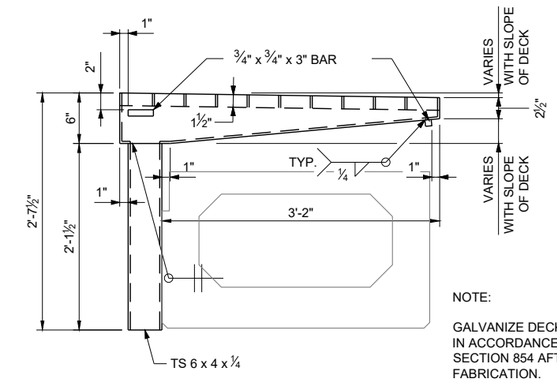
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	170	18



PLAN



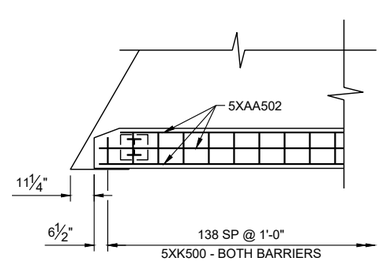
PLAN



NOTE:

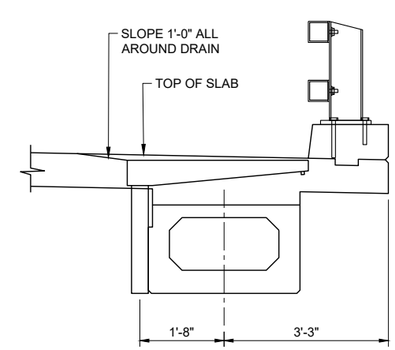
GALVANIZE DECK DRAIN IN ACCORDANCE WITH SECTION 854 AFTER FABRICATION.

ELEVATION



END DETAIL A

DECK DRAIN LOCATIONS		
STATION	OFFSET	
104+17.09	19.25'	RT
104+41.34	15.61'	LT



DECK DRAIN PLACEMENT DIAGRAM

Proj. No. 6790-057
Houston Engineering Inc.
Ph: 701.237.5065

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QUANTITIES

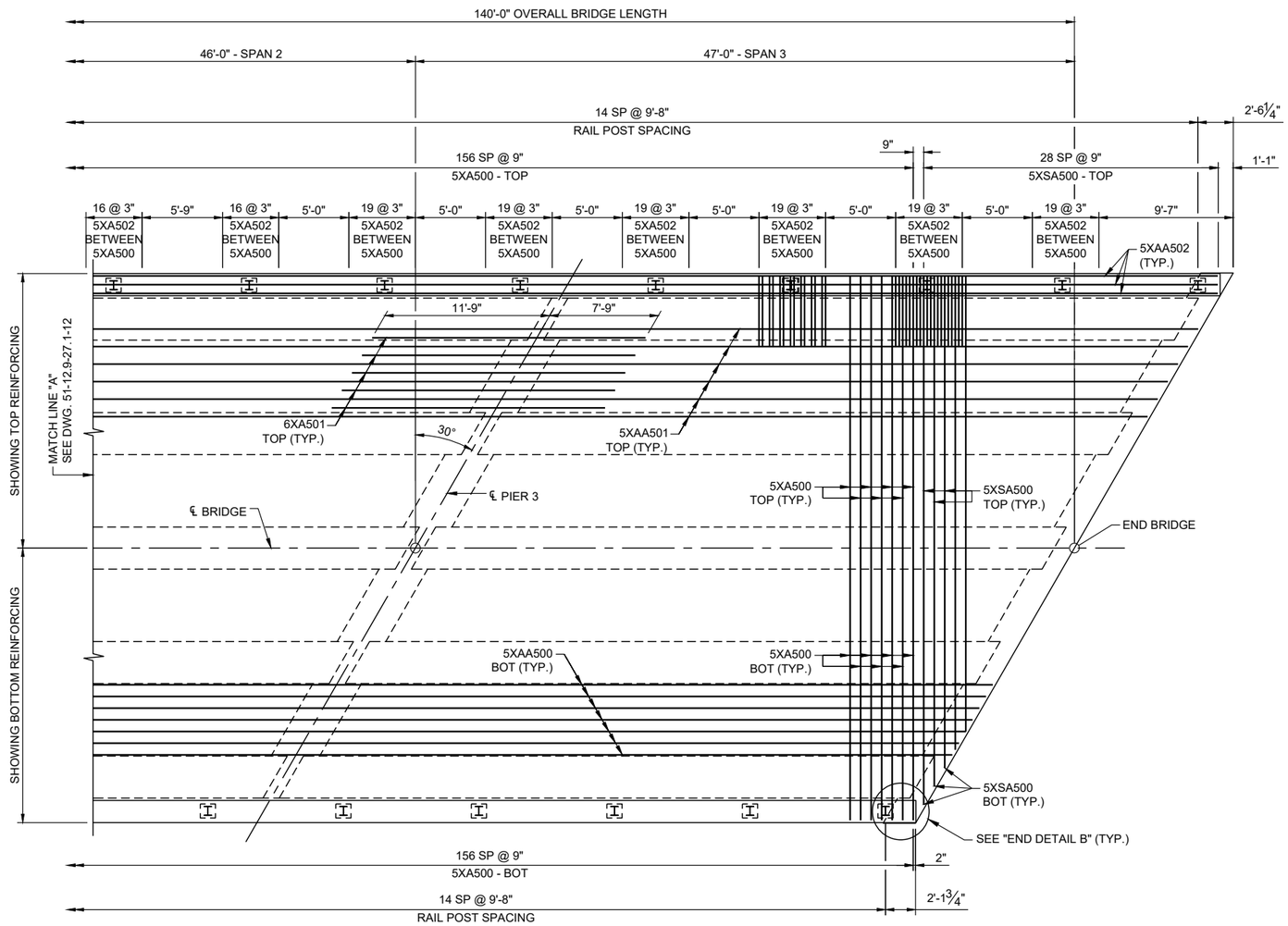
SEE DWG 51-129-27.1-16

290TH ST NW

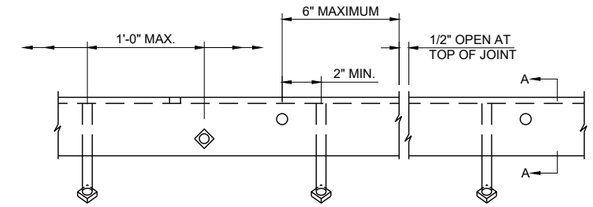
HALF SLAB LAYOUT

08/20/20 08:59:52AM H:\JBN\6700\6790\6790_0057_Ward Co Bridge Replacements\CAD\Plans\Bridge\Slab Layout.dwg

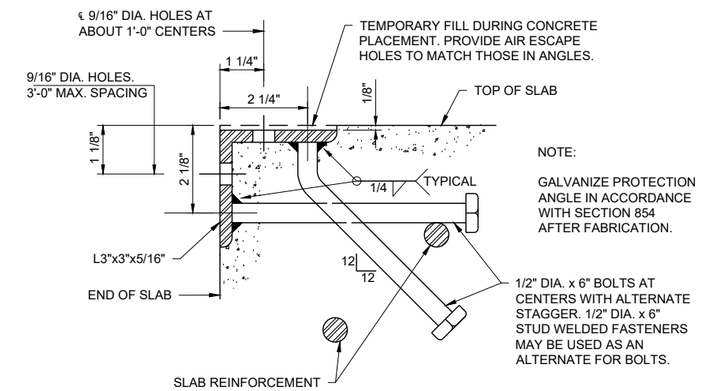
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	170	19



PLAN



ELEVATION

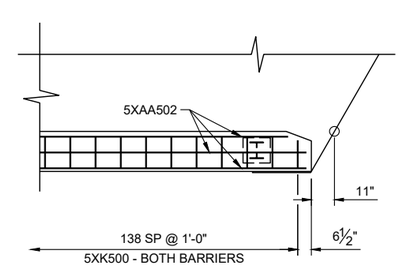


NOTE:

GALVANIZE PROTECTION ANGLE IN ACCORDANCE WITH SECTION 854 AFTER FABRICATION.

SECTION A-A

PROTECTION ANGLE DETAIL



END DETAIL B

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QUANTITIES

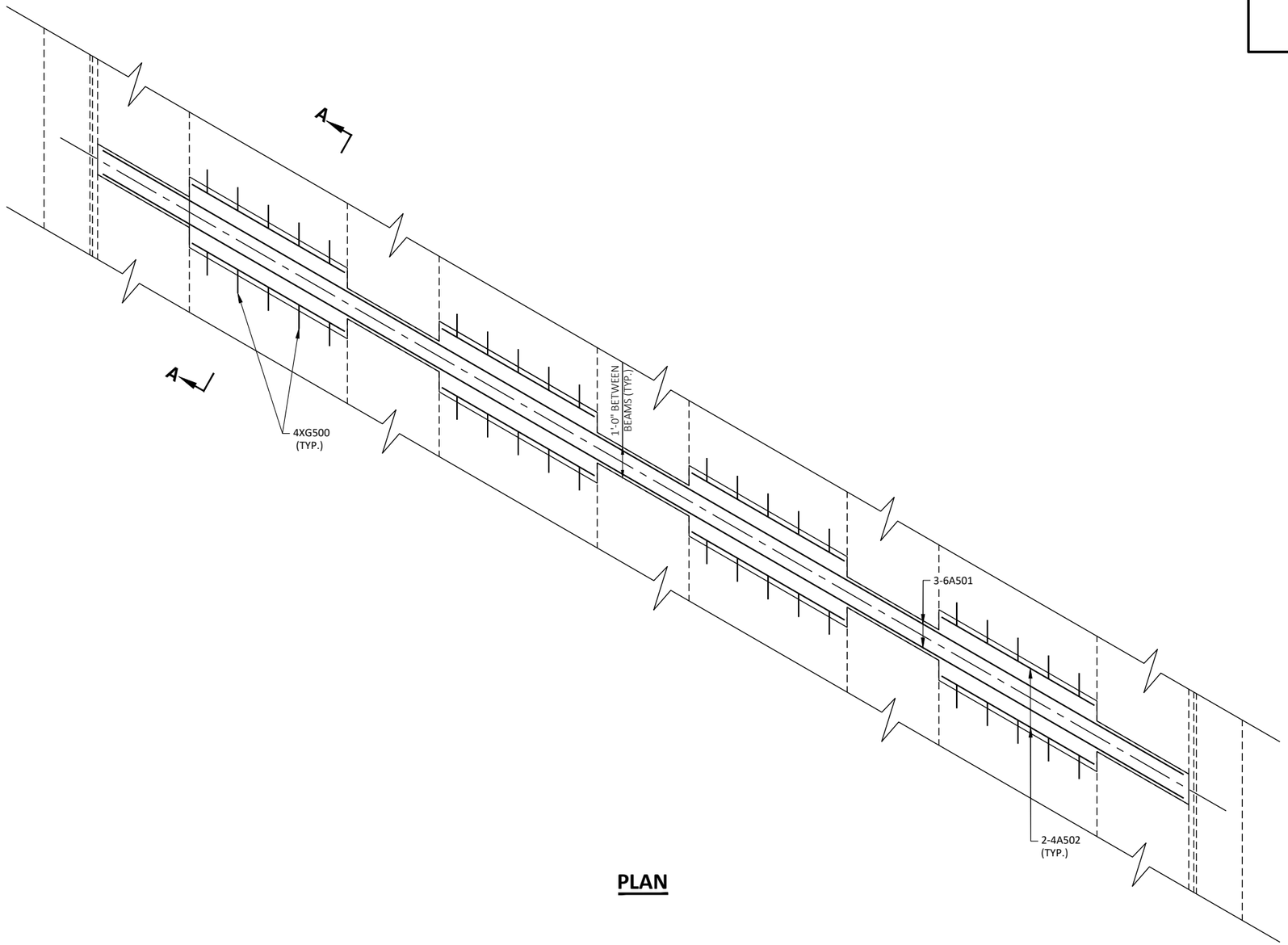
SEE DWG 51-129-27.1-16

290TH ST NW

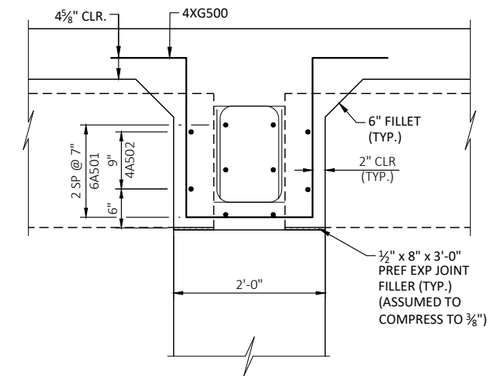
HALF SLAB LAYOUT

08/20/20 08:59:55AM H:\JBN\6700\6790\6790_0057_Ward Co Bridge Replacements\CAD\Plans\Bridge\Slab Layout.dwg

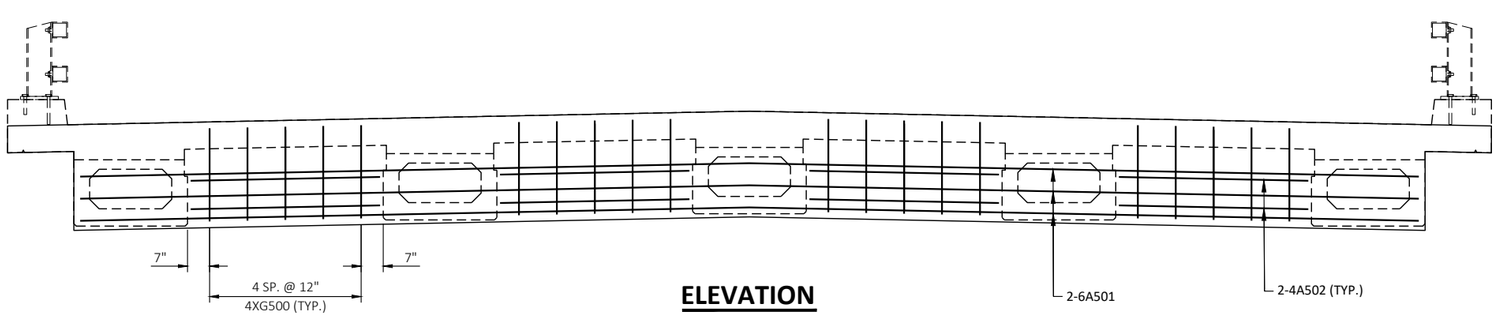
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	170	20



PLAN



A - A



ELEVATION

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QUANTITIES

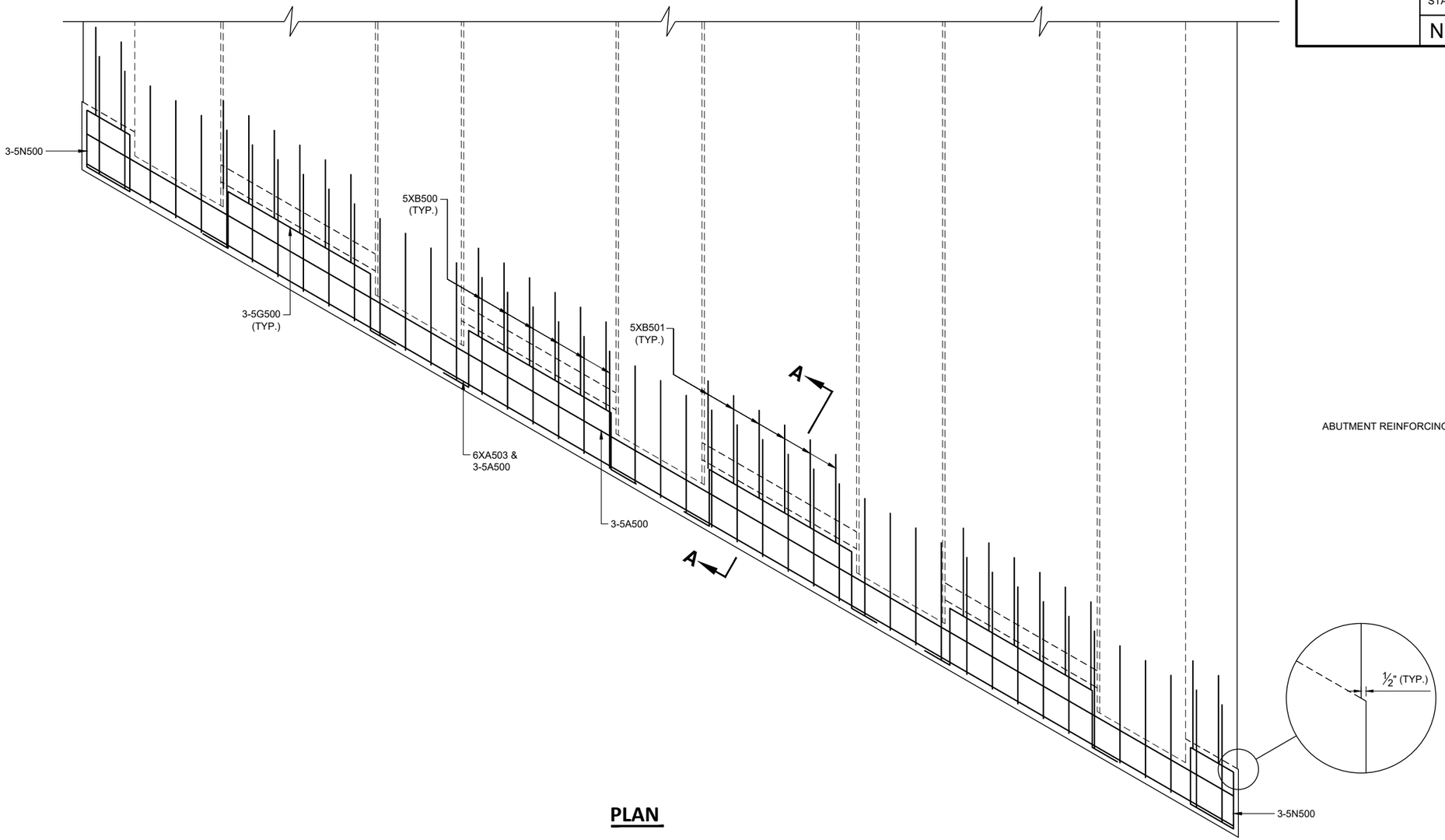
SEE DWG 51-129-27.1-16

290TH ST NW

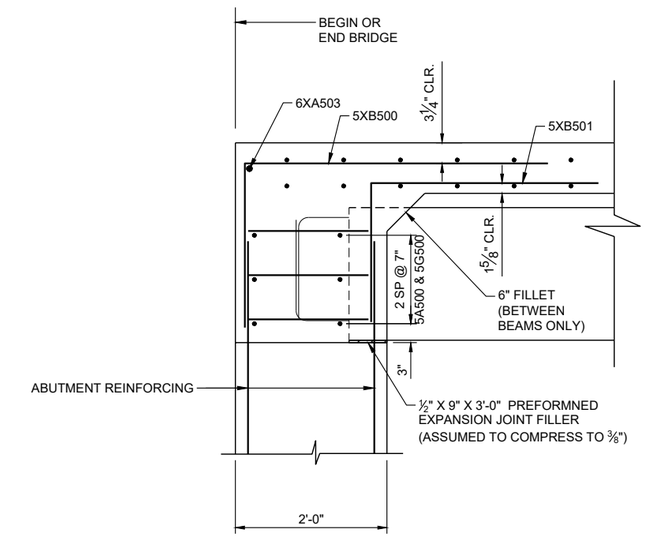
PIER DIAPHRAGM DETAILS

08/20/20 09:00:02AM H:\JBN\6700\6790\6790_0057_Ward Co Bridge Replacements\CAD\Plans\Bridge\Pier Diaphragm Details.dwg

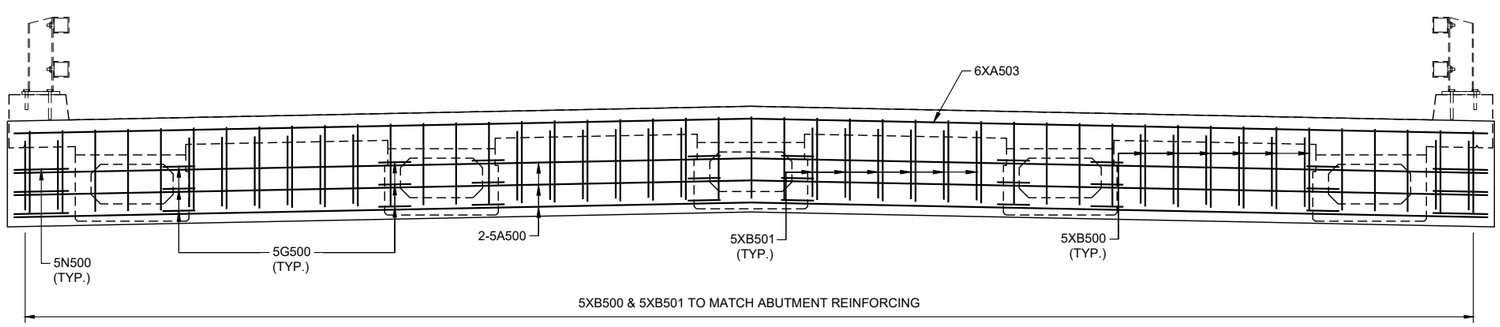
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	170	21



PLAN



A - A



ELEVATION

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QUANTITIES

SEE DWG 51-129-27.1-16

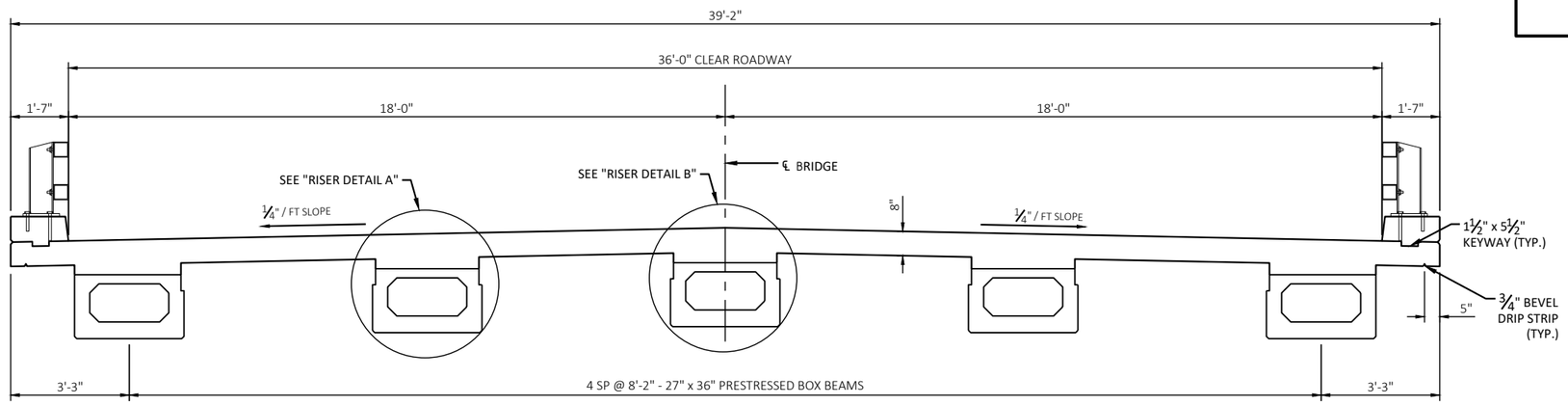
290TH ST NW

ENDWALL DETAILS

51-129-27.1-15

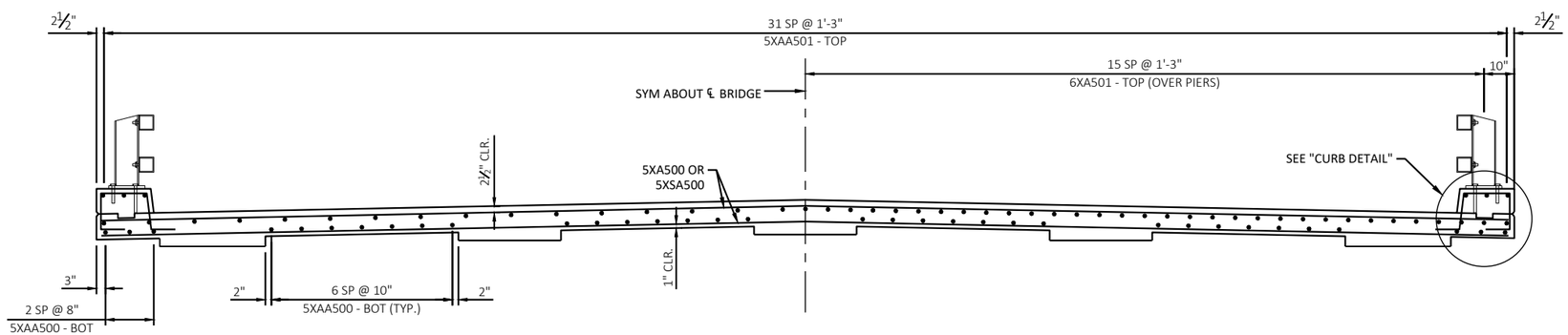
08/20/20 11:22:39AM H:\JBN\6700\6790\6790_0057_Word Co Bridge Replacements\CAD\Plans\Bridge\End Diaphragm Details.dwg

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	170	22



SLAB SECTION

SHOWING DIMENSIONS

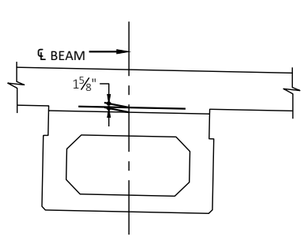


SHOWING REINFORCEMENT AT MIDSPAN

SHOWING REINFORCEMENT OVER SUPPORT

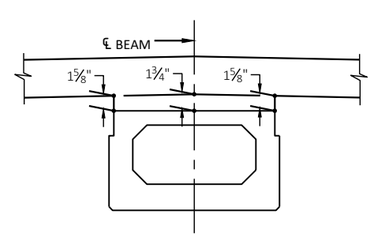
SLAB SECTION

SHOWING REINFORCING

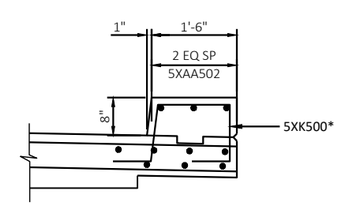


THE 1⅝" DIMENSION SHOWN IS LOCATED AT THE SUPPORTS. THE ANTICIPATED MIDSPAN RISER IS 1". THE RISER SHALL BE ADJUSTED TO MAINTAIN THE 8" SLAB THICKNESS.

RISER DETAIL A



RISER DETAIL B



* CURB REINFORCING SHALL HAVE 1½" CLR.

CURB DETAIL

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QUANTITIES	
CLASS AAE-3 CONCRETE	164.7 CY
REINFORCING STEEL	1,783 LBS
REINFORCING STEEL (EPOXY)	32,161 LBS

290TH ST NW

SLAB SECTION

08/20/20 09:00:12AM H:\JBN\6700\6790\6790_0057_Ward Co Bridge Replacements\CAD\Plans\Bridge\Superstructure Layout.dwg

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	170	23

BILL OF REINFORCING STEEL, GRADE 60

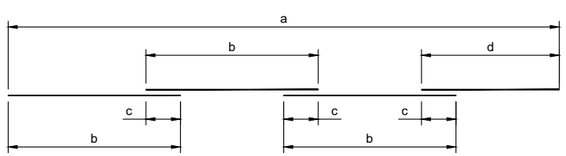
LETTER PREFIX OF BAR MARK DENOTES SHAPE - SEE BAR DETAILS

LOCATION		SIZE	MARK	NO. EACH /SET	NOMINAL LENGTH	DETAILING DIMENSIONS a	b	c	d	e	f	g	h	k
ABUTMENTS	REGULAR	7	A100	32	10'-0"		10'-0"							
		5	A101	8	8'-11"		8'-11"							
		5	A102	8	5'-11"		5'-11"							
		5	C100	54	15'-8"		7'-0"	1'-8"	7'-0"					
		5	C101	34	13'-8"		7'-0"	1'-8"	5'-0"					
		5	C102	4	16'-10"		7'-7"	1'-8"	7'-7"					
		5	C103	4	14'-3"		5'-0"	1'-8"	7'-7"					
		5	C104	34	4'-2"		1'-3"	1'-8"	1'-3"					
		4	C105	72	2'-8"		6"	1'-8"	6"					
		5	D100	8	14'-10"		2'-4"	12'-6"					12	4
		5	AA100	16	73'-0"		50'-0"	2'-0"	23'-0"	1		71'-0"		
		5	AA101	4	70'-10"		50'-0"	2'-0"	20'-10"	1		68'-10"		
		5	AA102	4	67'-10"		50'-0"	2'-0"	17'-10"	1		65'-10"		
		5	AA103	4	66'-5"		50'-0"	2'-0"	16'-5"	1		64'-5"		
		5	SC100	4	144'-6"	8"	3'-8"	7'-3"	1'-7"	11				
PIERS	REGULAR	5	A200	92	43'-10"		43'-10"							
		5	A201	176	21'-2"		21'-2"							
		6	A202	2	20'-5"		20'-5"							
		5	C200	46	6'-0"		2'-3"	1'-6"	2'-3"					
		5	C201	176	6'-2"		2'-3"	1'-8"	2'-3"					
		4	C202	96	2'-8"		6"	1'-8"	6"					
		5	M200	42	6'-8"	2'-3"	1'-1"	1'-1"	2'-3"				12	12

LOCATION		SIZE	MARK	NO. EACH /SET	NOMINAL LENGTH	DETAILING DIMENSIONS a	b	c	d	e	f	g	h	k
SUPERSTRUCTURE	REGULAR	5	A500	12	44'-11"		44'-11"							
		6	A501	12	40'-10"		40'-10"							
		4	A502	32	5'-8"		5'-8"							
		5	G500	24	10'-5"	1'-11"	5'-7"	1'-11"	6"				12	6.9
		5	N500	12	8'-2"	1'-11"	1'-8"	6"					6.9	12
	EPOXY	5	XA500	314	38'-10"		38'-10"							
		6	XA501	62	19'-6"		19'-6"							
		5	XA502	352	5'-0"		5'-0"							
		6	XA503	2	44'-11"		44'-11"							
		5	XB500	90	6'-2"		2'-2"	4'-0"						
		5	XB501	56	4'-10"		1'-10"	3'-0"						
		4	XG500	40	8'-1"	2'-1"	1'-11"	2'-1"	1'-0"				12	0
		5	XK500	278	4'-10"	6"	1'-1"	1'-3"	1'-0"	1'-0"		1'-4.5"	1.5	12
		5	XAA500	34	144'-8"		60'-0"	2'-6"	24'-8"	2		139'-8"		
		5	XAA501	32	143'-8"		60'-0"	2'-0"	23'-8"	2		139'-8"		
		5	XAA502	6	142'-9"		60'-0"	2'-0"	22'-9"	2		138'-9"		
		5	XSA500	4	565'-6"	1'-4"	37'-8"			28				

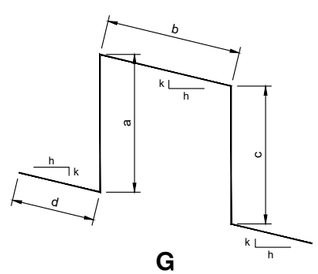
NOTES:

1. VERIFY THE QUANTITY, SIZE, AND SHAPE OF THE BAR REINFORCEMENT AGAINST THE STRUCTURE DRAWINGS AND IMMEDIATELY NOTIFY THE ENGINEER OF ANY DISCREPANCIES. DISCREPANCIES IN THE BAR LIST WILL NOT BE CAUSE FOR ADJUSTMENT OF THE CONTRACT UNIT PRICE.
2. ALL DIMENSIONS ARE OUT TO OUT OF BARS.
3. NOMINAL LENGTH OF EACH BENT BAR OR CUT BAR IS THE SUM TOTAL OF THE DETAILING DIMENSIONS FOR THAT BAR, UNLESS OTHERWISE NOTED.
4. TURN ADJACENT "AA" BARS END FOR END SO THAT THE SPLICE LOCATIONS ARE STAGGERED.
5. THE "f" DIMENSION INDICATES THE INSIDE RADIUS UNLESS OTHERWISE NOTED.
6. AN "X" PRECEEDING A BAR DESIGNATION INDICATES AN EPOXY COATED BAR.

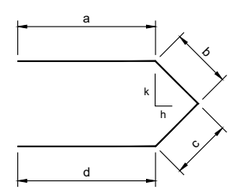


c = Lap Splice (typ)
e = # of "b" Length Pieces in a Set
Total Length per Set = e x b + d

AA



G



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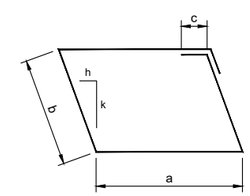
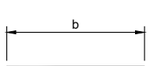
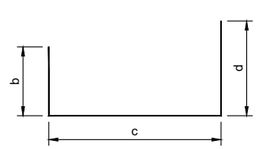


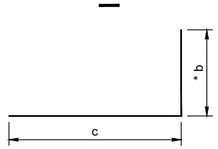
N



A

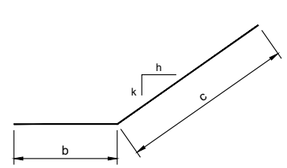


C

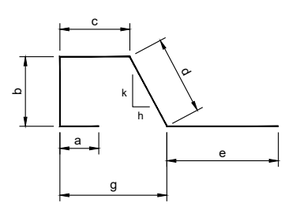


B

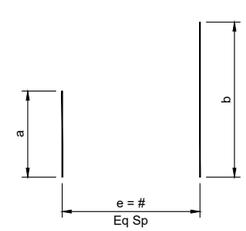
* b = Vertical Leg for XB500 and XB501



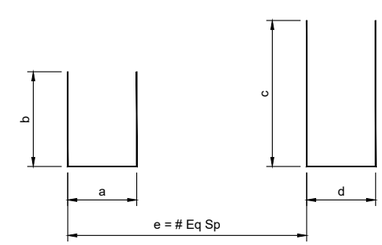
D



K



SA



SC

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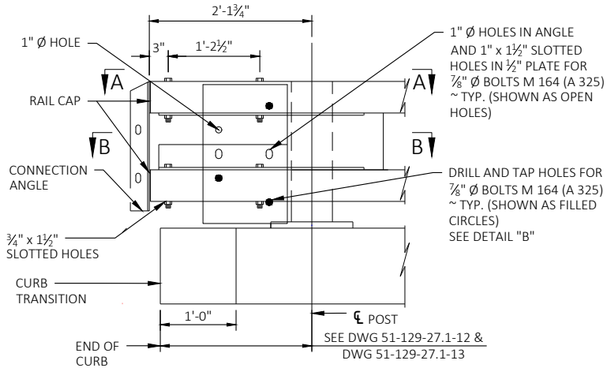
290TH ST NW

REINFORCING BAR LIST & DETAILS

51-129-27.1-17

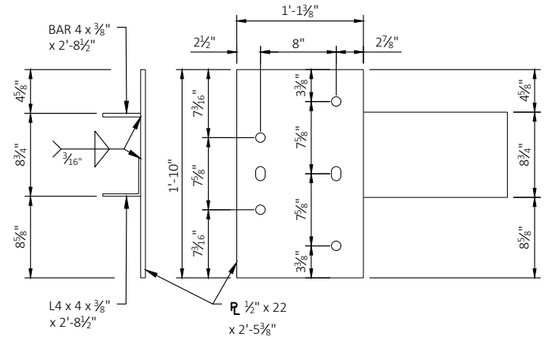
08/20/20 09:00:17AM H:\JBN\6700\6790\6790_0057_Ward Co Bridge Replacements\CAD\Plans\Bridge\Reinforcment Schedule.dwg

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	170	24



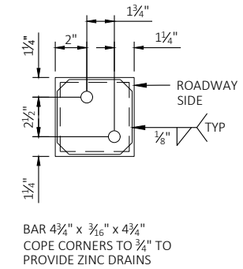
END POST CONNECTION DETAIL

(TYP. @ EACH END)

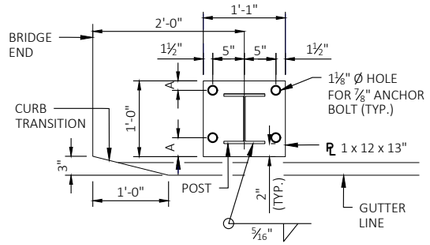


GUARDRAIL CONNECTION PLATE DETAILS

(4 REQUIRED)

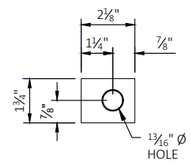


RAIL CAP END VIEW



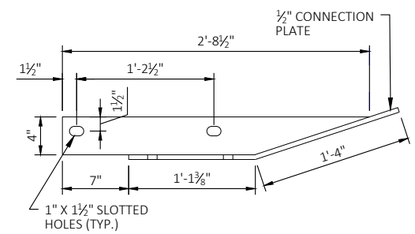
(A) VARIABLE 1½" TO 3"

BASE PLATE DETAIL



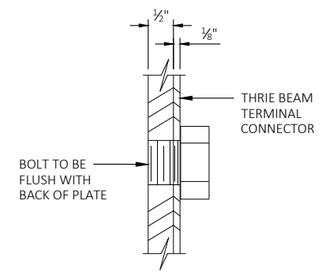
¼" BAR AASHTO M 270 GRADE 36. POSITION WASHERS TO COMPLETELY COVER SLOTTED HOLES

BAR WASHER "C"

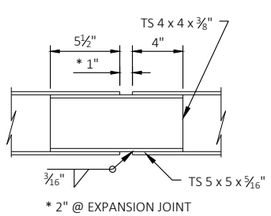


(BAR 4 X ⅜")

A-A



DETAIL "B"



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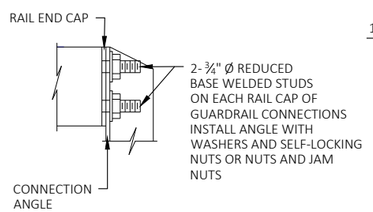
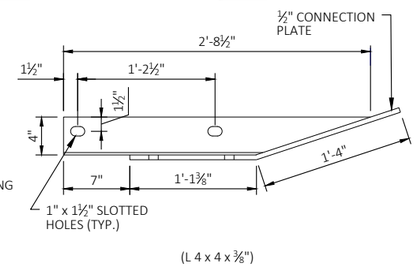
RAIL SPLICE DETAIL



RAL CAP DETAIL



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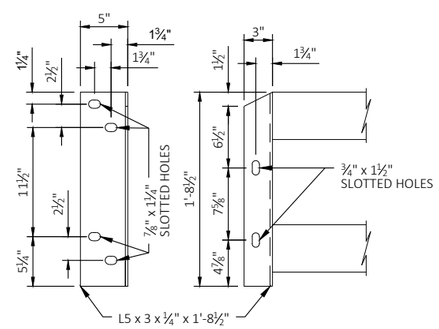
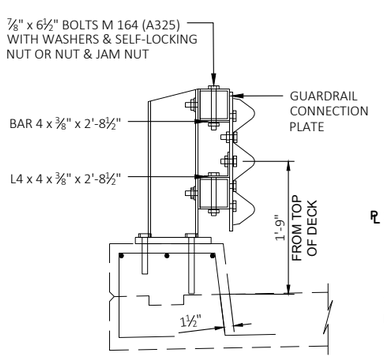
B-B



CONNECTION ANGLE DETAIL



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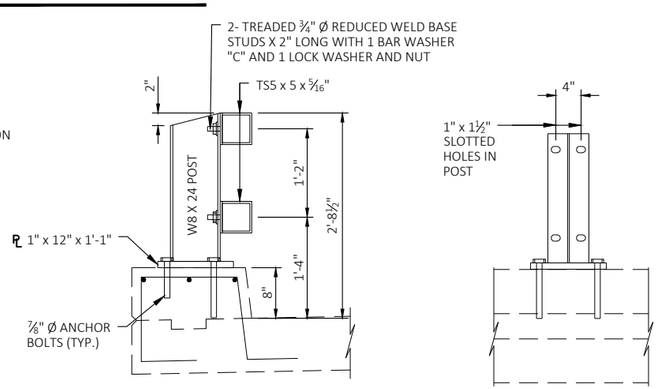

CURB MOUNT POST DETAILS

NOTES:

INCLUDE ALL MATERIALS AND LABOR NECESSARY TO CONSTRUCT THE BRIDGE RAIL AND CONNECTIONS PLATES IN THE BID ITEM "TRAFFIC RAIL-DOUBLE BEAM GUARDRAIL"

FABRICATE RAILING TO THE FINAL HORIZONTAL AND VERTICAL ALIGNMENT OF THE STRUCTURE. INSTALL POSTS NORMAL TO GRADE. FABRICATE RAILS SO THAT EACH RAIL SEGMENT BETWEEN SPLICES IS ATTACHED TO A MINIMUM OF TWO POSTS.

USE SQUARE STRUCTURAL TUBING IN ACCORDANCE WITH ASTM SPECIFICATION A 500 GRADE B FOR RAIL ELEMENTS. ENSURE STEEL POSTS, PLATES, BARS, AND ANGLES CONFORM TO AASHTO A 36, UNLESS OTHERWISE NOTED. HOT-DIP GALVANIZE ALL STRUCTURAL STEEL AFTER FABRICATION IN ACCORDANCE WITH AASHTO M111.

USE BOLTS AND ANCHORS MEETING ASTM A 325 OR A 449. USE REDUCED BASE STUDS MEETING ASTM A 307 GRADE C. USE NUTS MEETING ASTM A 563 AND WASHERS MEETING ASTM A 436. GALVANIZE ALL BOLTS, STUDS, NUTS, AND WASHERS IN ACCORDANCE WITH AASHTO M 232.

EMBED THE FRONT ANCHOR BOLT A MINIMUM OF 9 INCHES AND THE BACK ANCHOR BOLT A MINIMUM OF 6 INCHES INTO THE CONCRETE. EITHER CAST ANCHORS INTO THE CURB, OR INSTALL THEM WITH A CHEMICAL ADHESIVE SYSTEM THAN CAN DEVELOP A TENSILE STRENGTH OF AT LEAST 17,500 POUNDS. IF A CHEMICAL ADHESIVE SYSTEM IS USED, DEMONSTRATE THE SUITABILITY OF THE OF THE ANCHORAGE OF THE FIRST FOUR INSTALLED ANCHOR BOLTS, IN THE PRESENCE OF THE ENGINEER, VIA INSTALLATION AND STATIC TENSION TESTS IN ACCORDANCE WITH TEST PROCEDURES PRESCRIBED IN ASTM E 488.DURING THE TEST ENSURE THAT NO PORTION OF THE TESTING DEVICE BEARS ON THE CONCRETE SURFACE WITH A DISTANCE EQUAL TO THE ANCHOR BOLT EMBEDMENT DEPTH. CONDUCT RANDOM STATIC TENSION TESTING ON 10% (NOT INCLUDING THE INITIAL 4 INSTALLATIONS) OF ALL INSTALLATIONS ON THE PROJECT AS DIRECTED BY THE ENGINEER. EACH TESTED ANCHOR BOLT ANCHORAGE SYSTEM MUST PROVIDE A MINIMUM STATIC TENSION OF 15,000 POUNDS. IF THE BOND BETWEEN THE ANCHOR BOLT AND THE CONCRETE IS BROKEN, RESULTING IN SLIPPAGE DURING THE TEST, THE ANCHORAGE SYSTEM HAS FAILED. FAILURE OF ANY ANCHOR BOLT ANCHORAGE SYSTEM TESTED WILL REQUIRE MODIFICATION OF THE INSTALLATION PROCEDURES OR USE OF A DIFFERENT ANCHOR BOLT ANCHORAGE SYSTEM. AFTER TESTING, TAP EACH TESTED ANCHOR BOLT WITH A HAMMER TO ENSURE BOND HAS NOT BEEN BROKEN.

FIELD VERIFY ALL DIMENSIONS OF CONSTRUCTED BRIDGE AND REPORT ANY VARIANCES FROM PLAN TO THE ENGINEER PRIOR TO INSTALLATION OF THE TRAFFIC RAIL. IF NECESSARY, SUBMIT ANY REVISED WORK DRAWINGS TO THE ENGINEER FOR REVIEW SHOWING ALL REQUIRED CHANGES TO ACCOMMODATE VARIATIONS.

Proj. No. 6790-0057
Houston Engineering Inc.
Ph: 701.237.5065

This document was originally issued and sealed by COLEMAN V. WAGNER, Registration Number PE-27189, on 8/21/2020 and the original document is stored at the Ward County Highway Department

290TH ST NW

TRAFFIC RAIL DETAILS

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	175	1

BRAUN INTERTEC
The Science You Build On.

LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2002897
Geotechnical Evaluation
Bridge Replacement BRR-0051(053)
209th St. NW
Ward County, North Dakota

BORING: **ST-01**
LOCATION: See attached sketch. Elevations based on benchmark of NW bridge abutment with assumed elevation of 1670.4 feet.
LATITUDE: 48.40197 LONGITUDE: -101.62018

DRILLER: A.Horner LOGGED BY: C.Yoder START DATE: 04/13/20 END DATE: 04/14/20
SURFACE ELEVATION: 1669.0 ft RIG: 7518 METHOD: 3 1/4" HSA SURFACING: Grass WEATHER: Windy, cold

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
~~1668.7~~ 0.3		SANDY LEAN CLAY (CL), trace roots, black, frozen (moist when thawed) (TOPSOIL)		50/2" (REF) 2"			Frozen to 1 1/2 feet.
		FILL: SANDY LEAN CLAY (CL), trace Gravel, brown, moist		7-9-7 (16) 10"			
1663.0			5	3-4-3 (7) 18"			
6.0		CLAYEY SAND (SC), fine-grained Sand, brown, moist, loose (ALLUVIUM)		3-2-5 (7) 18"			
1660.5							
8.5		POORLY GRADED SAND with SILT (SP-SM), fine-grained Sand, trace Gravel, brown, moist, loose (ALLUVIUM)	10	6-4-3 (7) 18"			
1658.0							
11.0	K1	CLAYEY SAND (SC), fine-grained Sand, brown to gray, moist to wet, very loose (ALLUVIUM)		1-1-2 (3) 18"			
			15	2-1-3 (4) 10"			
1653.0							
16.0		FAT CLAY with SAND (CH), trace Gravel, trace mineralization, brown, moist, stiff to very stiff (GLACIAL TILL)					
			20	2-3-5 (8) 18"	2	20	
			25	3-9-10 (19) 18"	2.5	19	
			30	3-10-12 (22) 18"	3		

Continued on next page

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2002897
Geotechnical Evaluation
Bridge Replacement BRR-0051(053)
209th St. NW
Ward County, North Dakota

BORING: **ST-01**
LOCATION: See attached sketch. Elevations based on benchmark of NW bridge abutment with assumed elevation of 1670.4 feet.
LATITUDE: 48.40197 LONGITUDE: -101.62018

DRILLER: A.Horner LOGGED BY: C.Yoder START DATE: 04/13/20 END DATE: 04/14/20
SURFACE ELEVATION: 1669.0 ft RIG: 7518 METHOD: 3 1/4" HSA SURFACING: Grass WEATHER: Windy, cold

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
		FAT CLAY with SAND (CH), trace Gravel, trace mineralization, brown, moist, stiff to very stiff (GLACIAL TILL)					
		Sand lenses from 34 1/2 to 36 feet	35	6-10-11 (21) 18"	2		
1631.0							
38.0		BULLION CREEK FORMATION, CLAYSTONE, brown, moist, decomposed, very soft, hand deformed sample classified as "Fat Clay with Sand (CH)"	40	10-14-19 (33) 18"	4.5	20	
1628.0							
41.0		BULLION CREEK FORMATION, LIGNITE, black, moist, decomposed, very soft	45	8-26-50/4" (REF) 4"		52	
1622.0							
47.0		BULLION CREEK FORMATION, CLAYSTONE, gray, moist, decomposed, very soft, hand deformed sample classified as "Fat Clay (CH)"	50	7-14-18 (32) 14"	>4.5	26	
			55	7-17-24 (41) 18"	>4.5		
			60	47-50 (50) 10"	>4.5	52	
		Lignite seam at 61 feet					

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Proj. No. 6790-057
Houston Engineering Inc.
Ph: 701.237.5065

290TH ST NW

SOIL BORINGS

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	175	2

BRAUN INTERTEC
The Science You Build On.

LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2002897
Geotechnical Evaluation
Bridge Replacement BRR-0051(053)
209th St. NW
Ward County, North Dakota

BORING: **ST-01**

LOCATION: See attached sketch. Elevations based on benchmark of NW bridge abutment with assumed elevation of 1670.4 feet.

LATITUDE: 48.40197 LONGITUDE: -101.62018

DRILLER: A.Horner LOGGED BY: C.Yoder START DATE: 04/13/20 END DATE: 04/14/20

SURFACE ELEVATION: 1669.0 ft RIG: 7518 METHOD: 3 1/4" HSA SURFACING: Grass WEATHER: Windy, cold

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
		BULLION CREEK FORMATION, CLAYSTONE, gray, moist, decomposed, very soft, hand deformed sample classified as "Fat Clay (CH)" *interbedded with Siltstone at 65 feet*	65	8-16-21 (37) 18"	>4.5	21	LL=78, PL=20, PI=58
			70	7-14-12 (26) 18"	>4.5	21	
		Lignite seam at 74 1/2 feet	75	20-16-21 (37) 10"	>4.5		
			80	15-19-23 (42) 18"	4.5	28	LL=110, PL=25, PI=85
		Sandstone lenses at 85 feet	85	20-21-26 (47) 18"	4.5		
			90	20-24-40 (64) 18"	>4.5	20	
			95	16-30-31 (61) 18"	>4.5		
1573.0 / 96.0							

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2002897
Geotechnical Evaluation
Bridge Replacement BRR-0051(053)
209th St. NW
Ward County, North Dakota

BORING: **ST-01**

LOCATION: See attached sketch. Elevations based on benchmark of NW bridge abutment with assumed elevation of 1670.4 feet.

LATITUDE: 48.40197 LONGITUDE: -101.62018

DRILLER: A.Horner LOGGED BY: C.Yoder START DATE: 04/13/20 END DATE: 04/14/20

SURFACE ELEVATION: 1669.0 ft RIG: 7518 METHOD: 3 1/4" HSA SURFACING: Grass WEATHER: Windy, cold

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
		END OF BORING					Water observed at 13.5 feet while drilling.
		Boring then backfilled with auger cuttings					Water observed at 77.0 feet with 96.0 feet of tooling in the ground at end of drilling.
		100					
		105					
		110					
		115					
		120					
		125					

Proj. No. 6790-057
Houston Engineering Inc.
Ph: 701.237.5065

290TH ST NW

SOIL BORINGS

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	175	3

BRAUN INTERTEC
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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2002897
Geotechnical Evaluation
Bridge Replacement BRR-0051(053)
209th St. NW
Ward County, North Dakota

BORING: **ST-02**
LOCATION: See attached sketch
LATITUDE: 48.40183 LONGITUDE: -101.62026

DRILLER: A.Horner | LOGGED BY: C.Yoder | START DATE: 04/13/20 | END DATE: 04/14/20
SURFACE ELEVATION: 1671.6 ft | RIG: 7518 | METHOD: 3 1/4" HSA | SURFACING: Grass | WEATHER: Windy, cold

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
~~1671.3~~ 0.3		SANDY LEAN CLAY (CL), trace roots, brown, frozen (moist when thawed) (TOPSOIL)		50/2" (REF) 2"			Frozen to 1 1/2 feet.
		FILL: SILTY SAND (SM), fine-grained Sand, brown, moist		2-7-6 (13) 13"			
			5	2-2-2 (4) 8"			
				1-2-3 (5) 6"			
1662.6 9.0		CLAYEY SAND (SC), fine-grained Sand, brown to gray, moist to wet, loose to medium dense (ALLUVIUM)	10	2-2-3 (5) 18"			
				2-1-5 (6) 18"			
			15	2-2-4 (6) 18"			
			20	1-1-4 (5) 18"			
			25	6-4-8 (12) 18"			
1645.6 26.0		BULLION CREEK FORMATION, LIGNITE, black, moist, decomposed, very soft	30	6-25-50/5" (REF) 12"		80	
1640.6 31.0		BULLION CREEK FORMATION, CLAYSTONE,					

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2002897
Geotechnical Evaluation
Bridge Replacement BRR-0051(053)
209th St. NW
Ward County, North Dakota

BORING: **ST-02**
LOCATION: See attached sketch
LATITUDE: 48.40183 LONGITUDE: -101.62026

DRILLER: A.Horner | LOGGED BY: C.Yoder | START DATE: 04/13/20 | END DATE: 04/14/20
SURFACE ELEVATION: 1671.6 ft | RIG: 7518 | METHOD: 3 1/4" HSA | SURFACING: Grass | WEATHER: Windy, cold

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
		BULLION CREEK FORMATION, CLAYSTONE, gray, moist, decomposed, very soft, hand deformed sample classified as "Fat Clay with Sand (CH)"	35	12-14-15 (29) 18"	>4.5	26	
		Lignite seam at 40 feet	40	19-28-32 (60) 16"	>4.5		
			45	10-14-24 (38) 8"	>4.5	25	
1623.6 48.0		BULLION CREEK FORMATION, CLAYSTONE, dark gray, moist, decomposed, very soft, hand deformed sample classified as "Fat Clay (CH)"	50	17-24-31 (55) 18"	>4.5		
			55	16-21-29 (50) 18"		23	
1613.6 58.0		BULLION CREEK FORMATION, SILTSTONE, gray, moist to dry, decomposed to highly weathered, very soft to soft, sample retrieved as non-cemented "Silt (ML)"	60	20-31-38 (69) 18"			

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Proj. No. 6790-057
Houston Engineering Inc.
Ph: 701.237.5065

290TH ST NW

SOIL BORINGS

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2002897
Geotechnical Evaluation
Bridge Replacement BRR-0051(053)
209th St. NW
Ward County, North Dakota

BORING: **ST-02**
LOCATION: See attached sketch
LATITUDE: 48.40183 LONGITUDE: -101.62026

DRILLER: A.Horner | LOGGED BY: C.Yoder | START DATE: 04/13/20 | END DATE: 04/14/20
SURFACE ELEVATION: 1671.6 ft | RIG: 7518 | METHOD: 3 1/4" HSA | SURFACING: Grass | WEATHER: Windy, cold

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
		BULLION CREEK FORMATION, SILTSTONE, gray, moist to dry, decomposed to highly weathered, very soft to soft, sample retrieved as non-cemented "Silt (ML)"	65	10-25-42 (67) 10"		25	P200=98%
			70	20-21-29 (50) 18"			
1599.6 / 72.0		BULLION CREEK FORMATION, CLAYSTONE, dark gray, moist, decomposed, very soft, hand deformed sample classified as "Fat Clay (CH)"	75	18-23-27 (50) 16"		26	
1593.6 / 78.0		BULLION CREEK FORMATION, SANDSTONE, gray, moist, decomposed, very soft, fine grained, sample retrieved as non-cemented "Clayey Sand (SC)"	80	18-22-35 (57) 18"			
			85	24-36-38 (74) 18"			
1585.6 / 86.0		BULLION CREEK FORMATION, CLAYSTONE, gray, moist, decomposed, very soft, hand deformed sample classified as "Fat Clay (CH)"	90	10-24-37 (61) 18"		27	
			95	31-37-44 (81) 18"			
1575.6 / 96.0							

Continued on next page

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2002897
Geotechnical Evaluation
Bridge Replacement BRR-0051(053)
209th St. NW
Ward County, North Dakota

BORING: **ST-02**
LOCATION: See attached sketch
LATITUDE: 48.40183 LONGITUDE: -101.62026

DRILLER: A.Horner | LOGGED BY: C.Yoder | START DATE: 04/13/20 | END DATE: 04/14/20
SURFACE ELEVATION: 1671.6 ft | RIG: 7518 | METHOD: 3 1/4" HSA | SURFACING: Grass | WEATHER: Windy, cold

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	q_p tsf	MC %	Tests or Remarks
		END OF BORING					Water observed at 9.5 feet while drilling.
		Boring then backfilled with auger cuttings					Water observed at 11.0 feet with 96.0 feet of tooling in the ground at end of drilling.
							Water observed at 30.0 feet immediately after withdrawal of auger.

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Proj. No. 6790-057
Houston Engineering Inc.
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290TH ST NW

SOIL BORINGS

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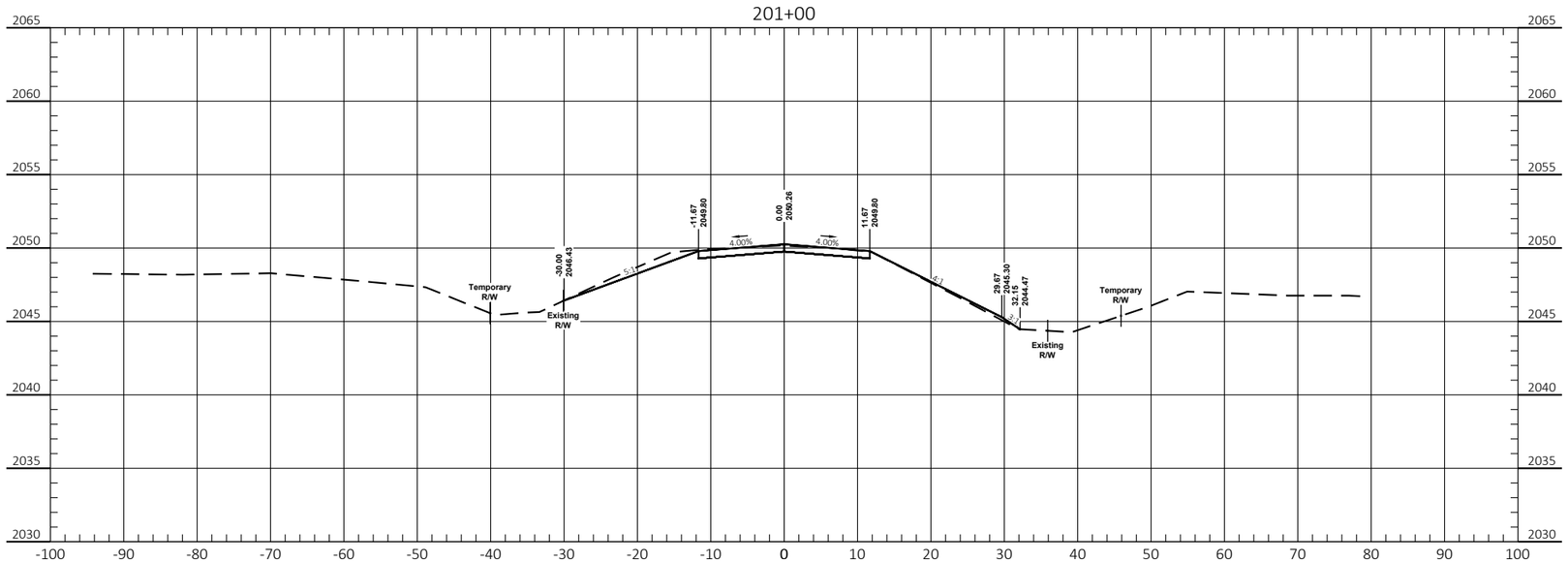
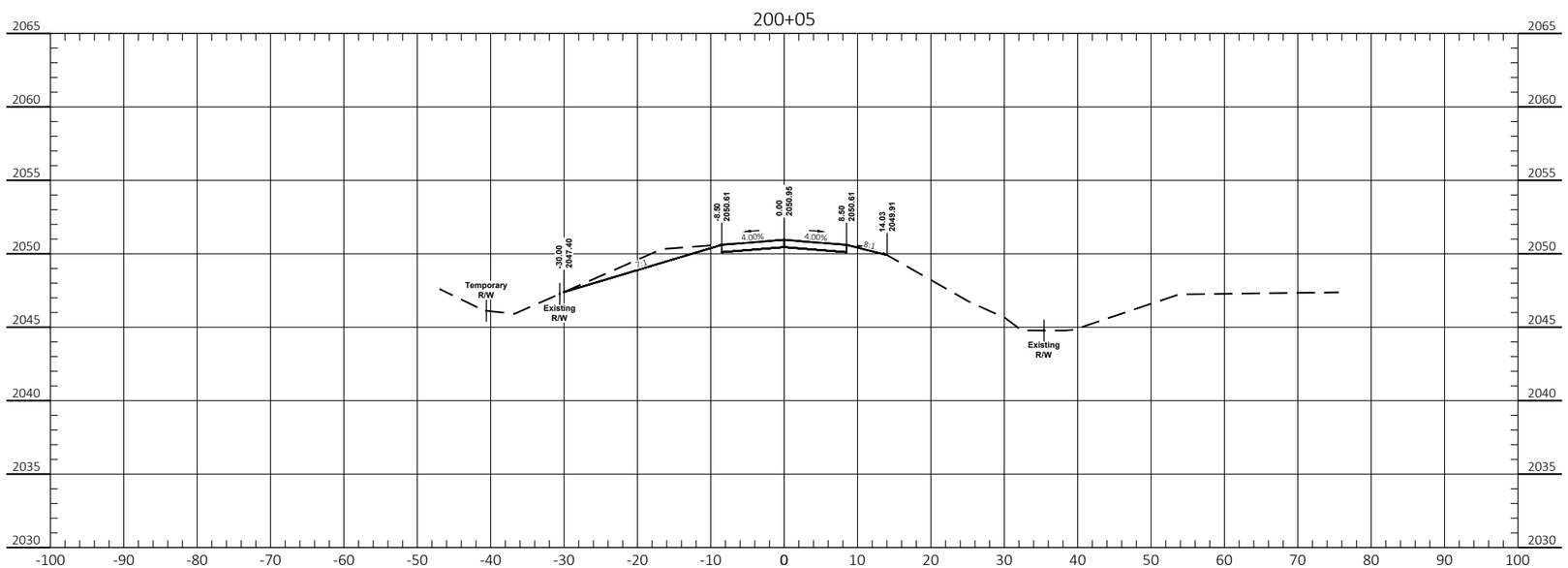
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	200	1

520TH ST NW





Proj. No. 6790-0057
Houston Engineering Inc.
Ph: 701.237.5065

ALL ELEVATIONS ARE BASED ON THE U.S.G.S. VERTICAL DATUM OF 1988. (UNLESS NOTED OTHERWISE)

CROSS SECTIONS
520TH ST NW

WARD COUNTY BRIDGE REPLACEMENTS

BRIDGE NO 51-106-13.1

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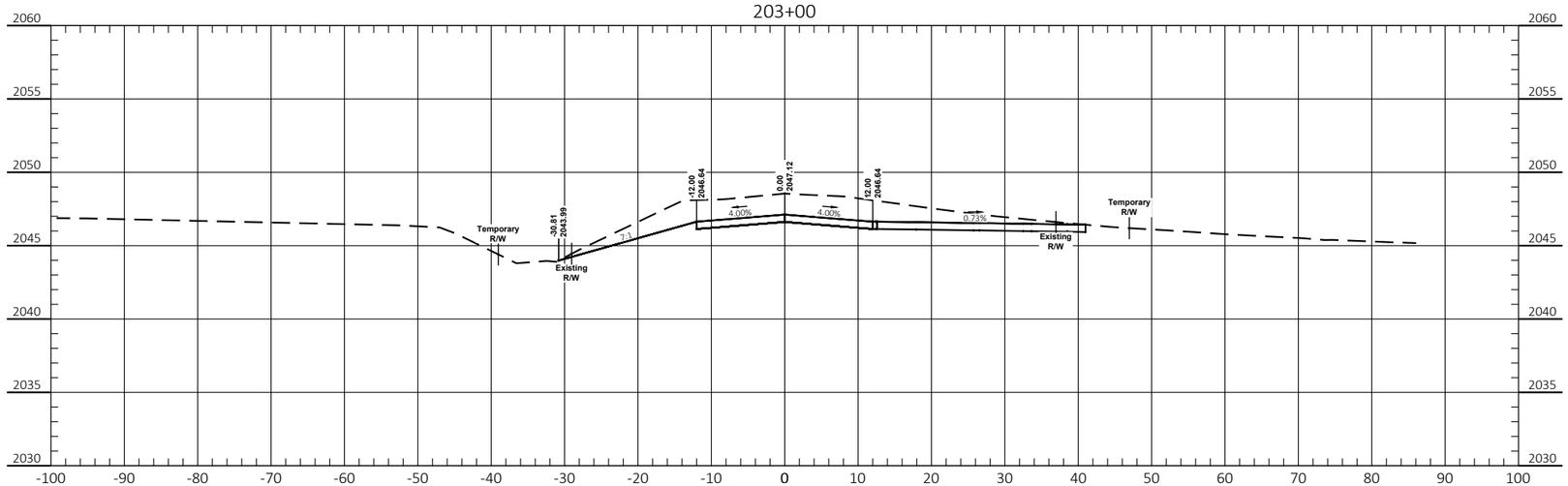
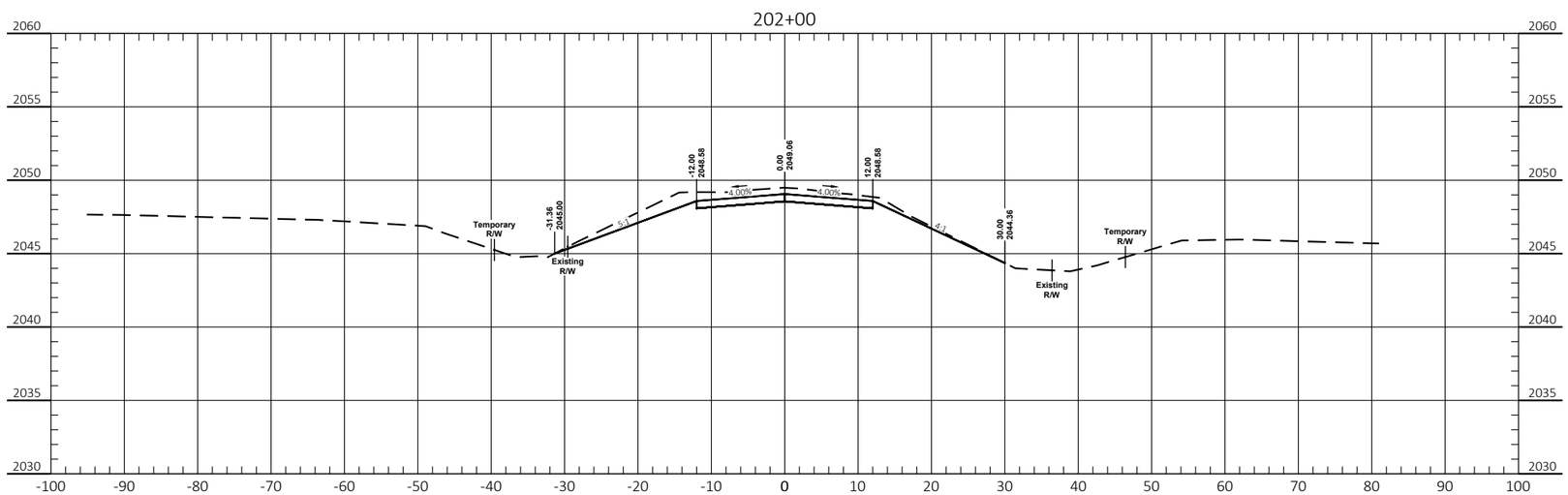
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	200	2

520TH ST NW





Proj. No. 6790-0057
Houston Engineering Inc.
Ph: 701.237.5065

ALL ELEVATIONS ARE BASED ON THE U.S.G.S. VERTICAL DATUM OF 1988. (UNLESS NOTED OTHERWISE)

CROSS SECTIONS
520TH ST NW

WARD COUNTY BRIDGE REPLACEMENTS

BRIDGE NO 51-106-13.1

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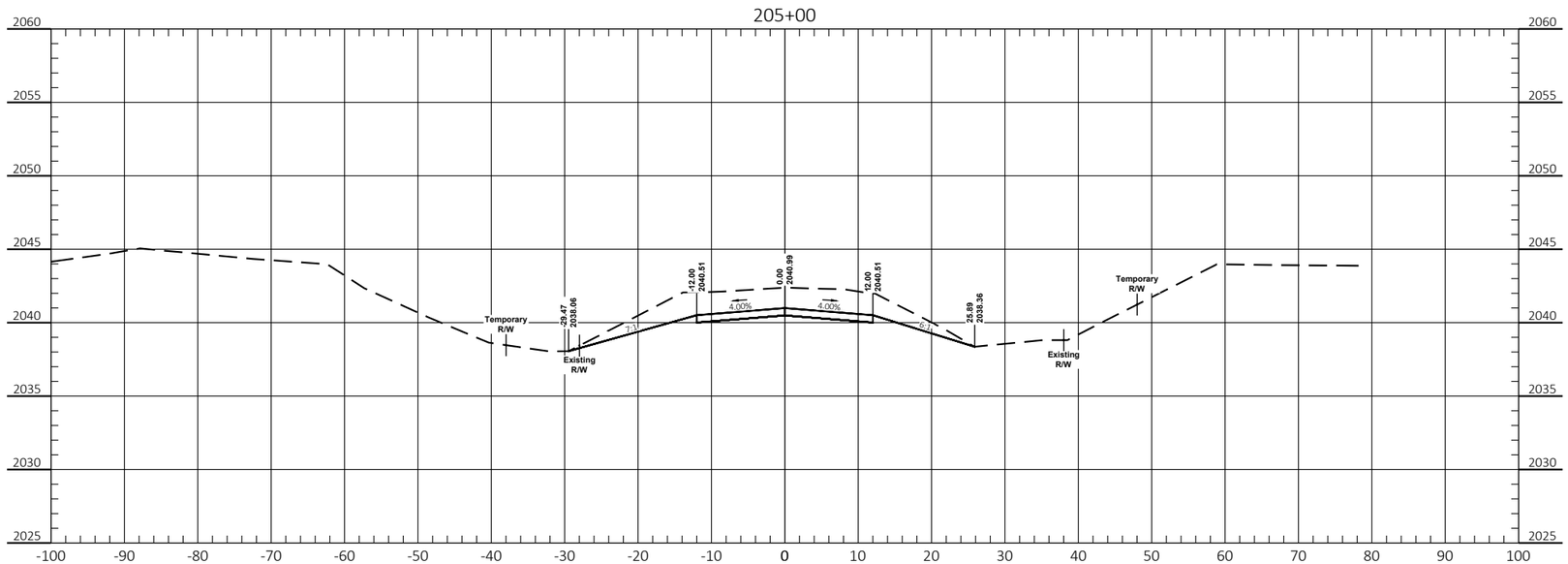
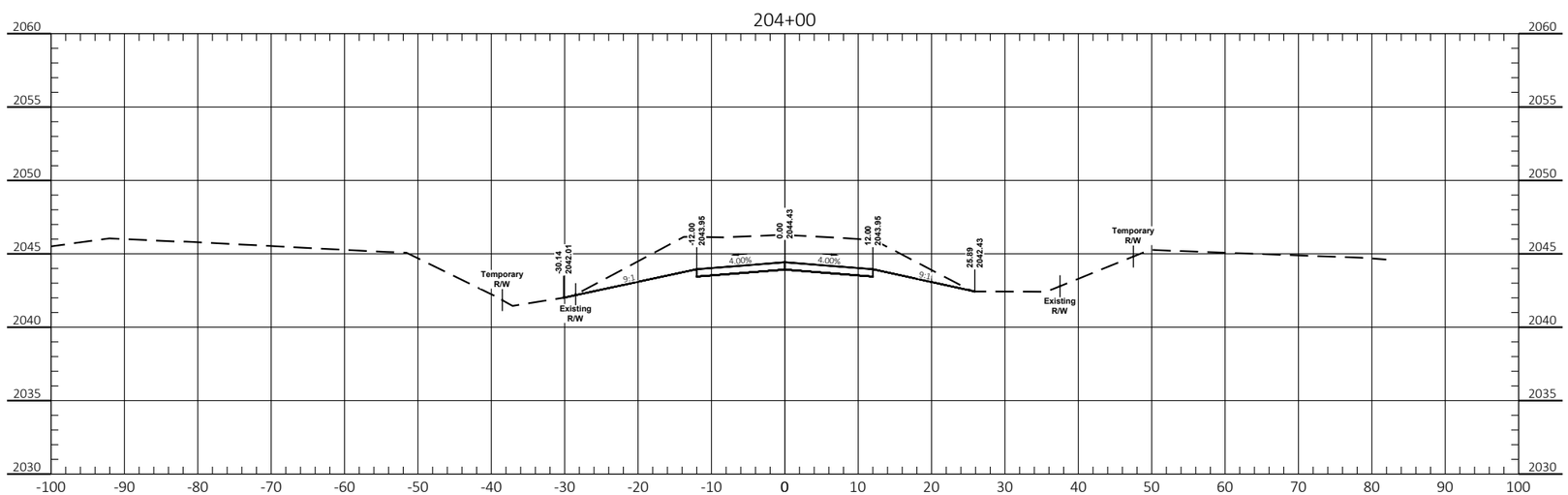
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	200	3

520TH ST NW





Proj. No. 6790-0057
Houston Engineering Inc.
Ph: 701.237.5065

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CROSS SECTIONS
520TH ST NW

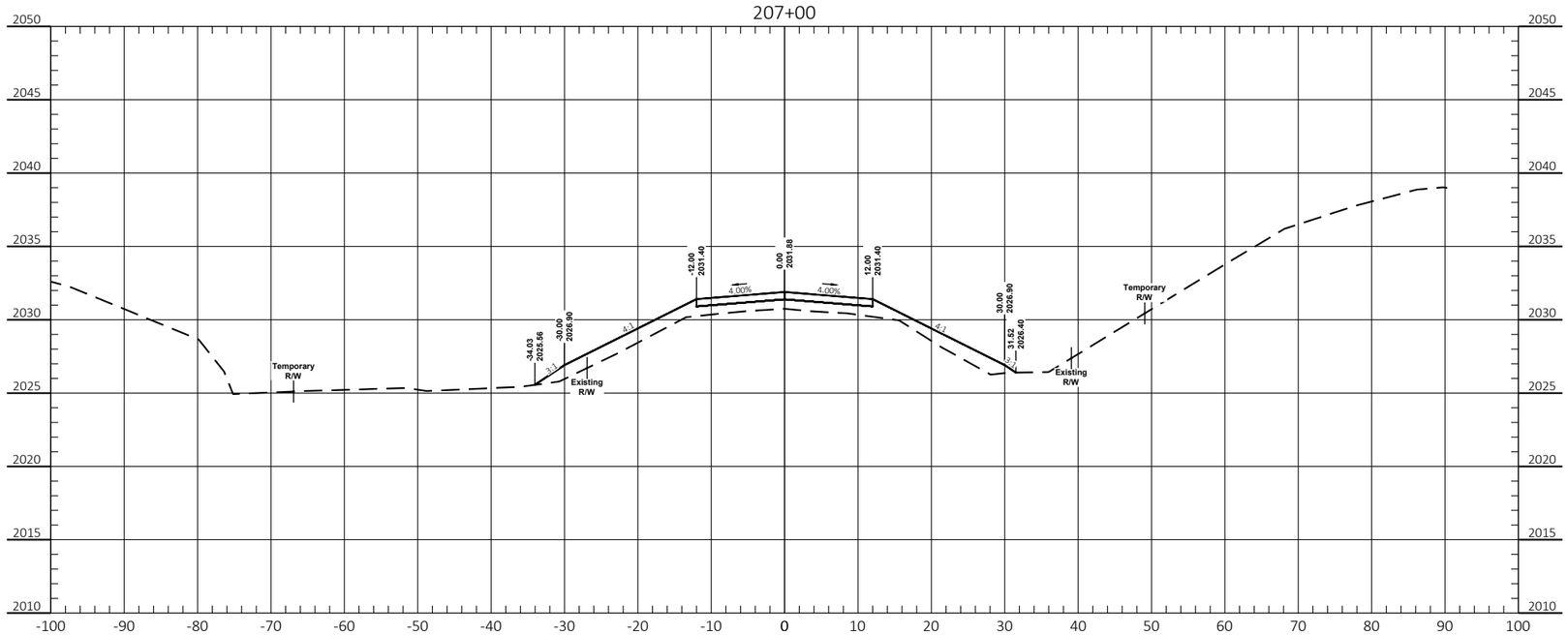
WARD COUNTY BRIDGE REPLACEMENTS

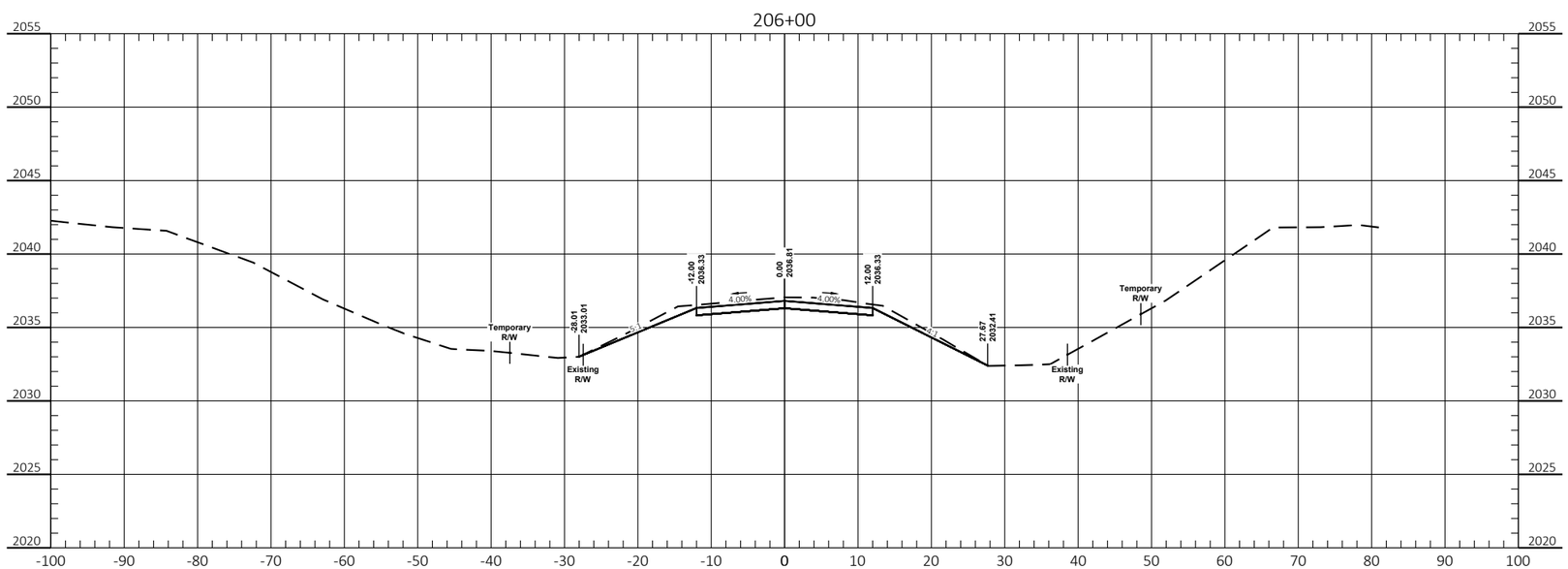
BRIDGE NO 51-106-13.1

H:\JBN\6700\6790\6790_0057_Ward Co Bridge Replacements\CAD\Plans\200 - X-SEC - 520th.dwg-520th (3)-8/19/2020 6:20 AM-(jrenner)

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	200	4

520TH ST NW





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CROSS SECTIONS
520TH ST NW

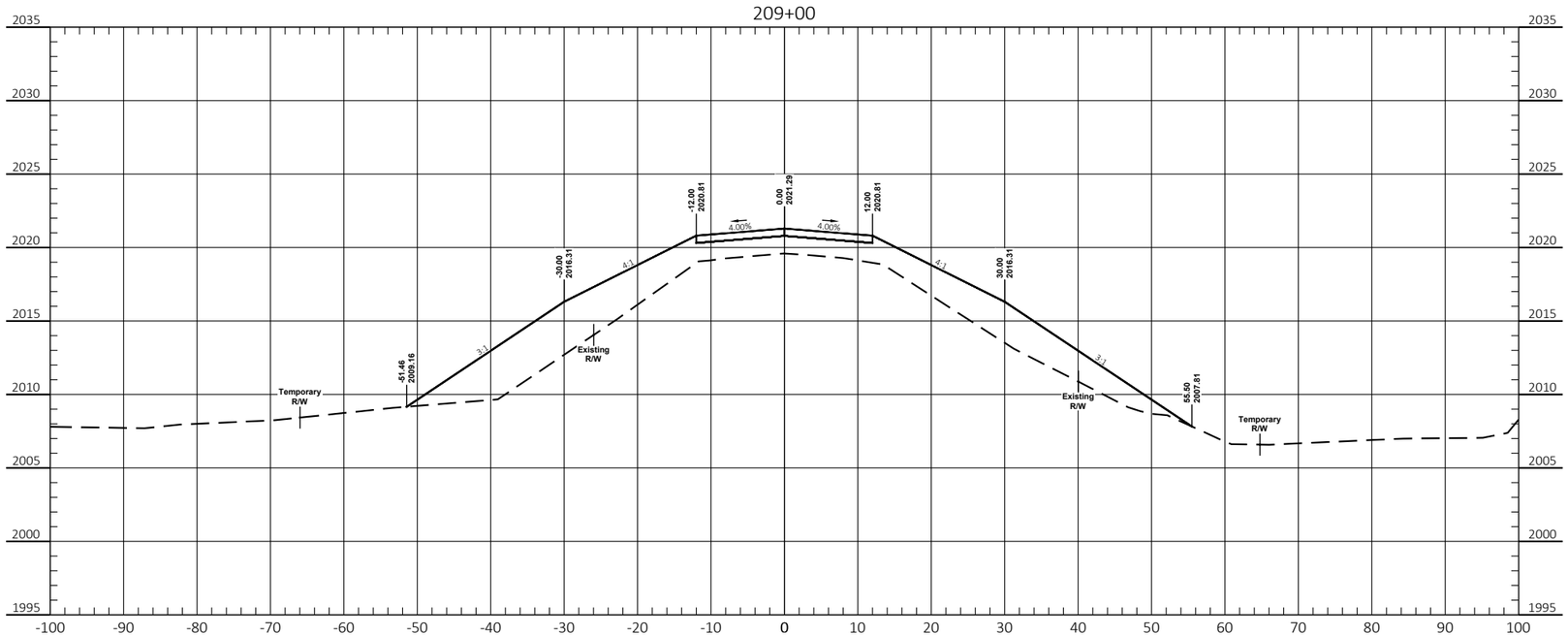
WARD COUNTY BRIDGE REPLACEMENTS

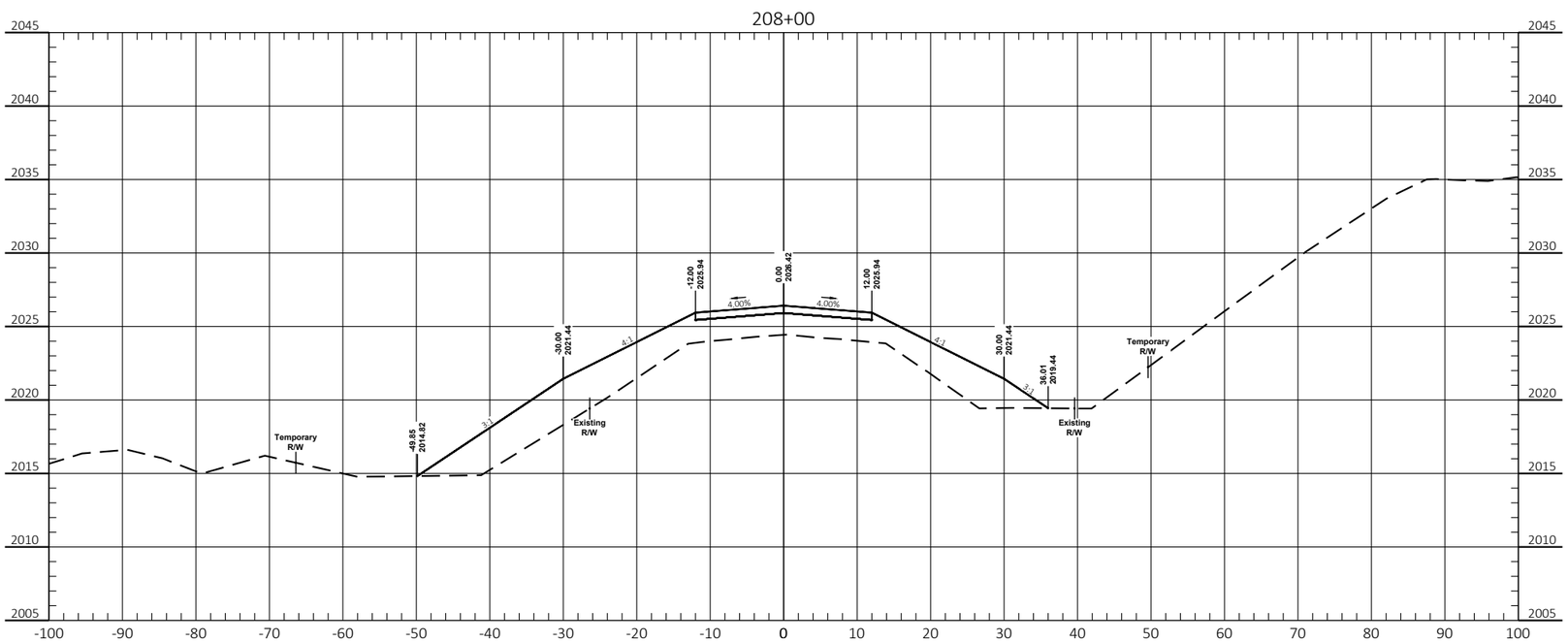
BRIDGE NO 51-106-13.1

H:\JBN\6700\6790\6790_0057_Ward Co Bridge Replacements\CAD\Plans\200 - X-SEC - 520th.dwg-520th (4)-8/19/2020 6:20 AM-(jrenner)

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	200	5

520TH ST NW





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CROSS SECTIONS
520TH ST NW

WARD COUNTY BRIDGE REPLACEMENTS

BRIDGE NO 51-106-13.1

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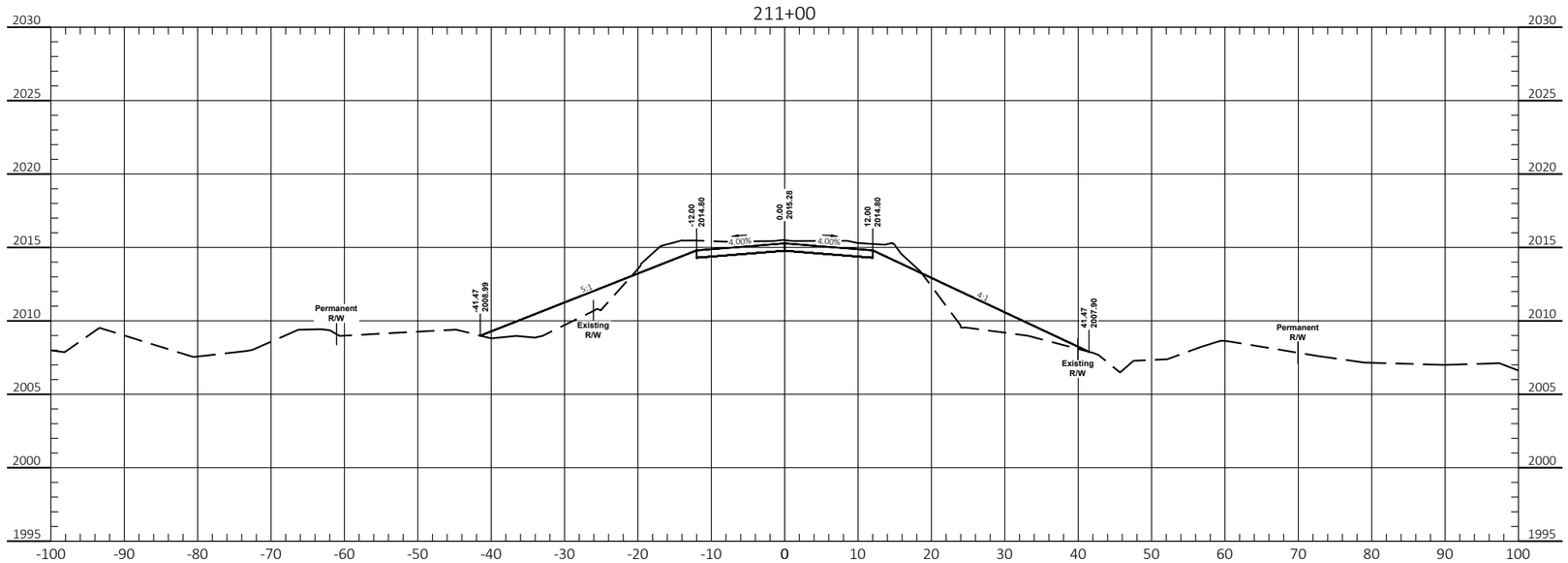
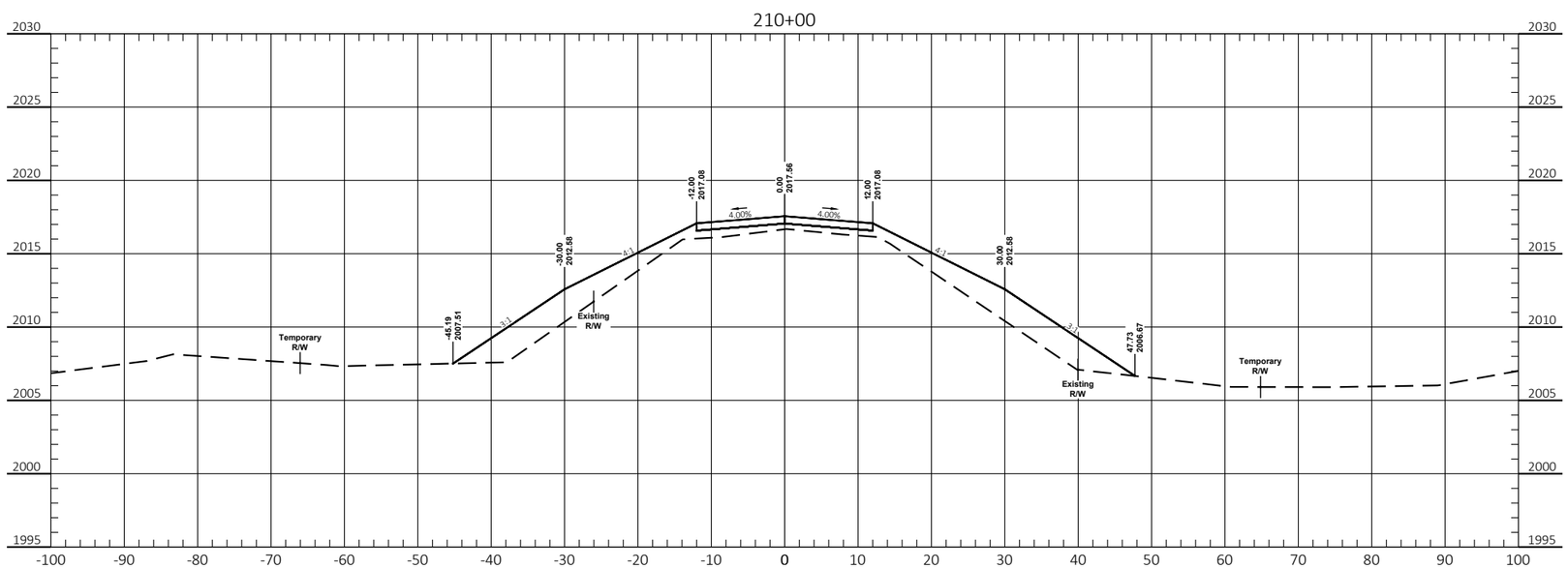
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	200	6

520TH ST NW





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CROSS SECTIONS
520TH ST NW

WARD COUNTY BRIDGE REPLACEMENTS

BRIDGE NO 51-106-13.1

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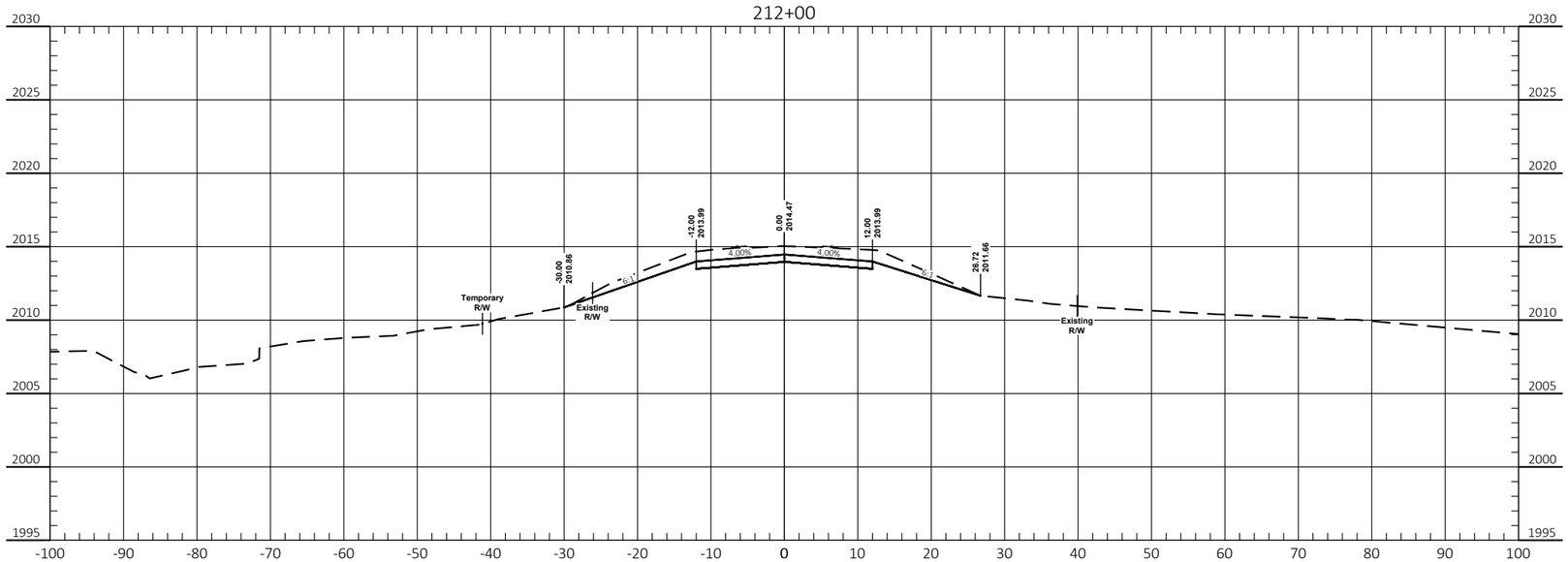
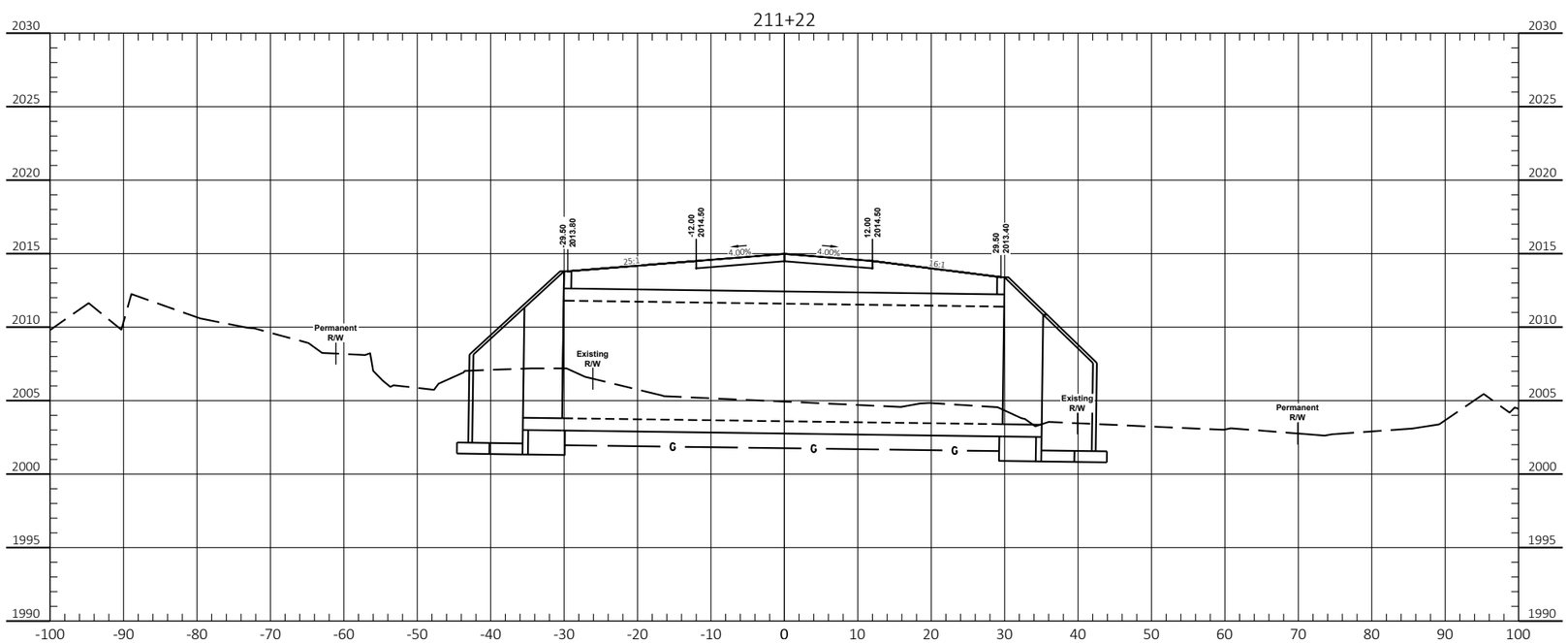
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	200	7

520TH ST NW





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CROSS SECTIONS
520TH ST NW

WARD COUNTY BRIDGE REPLACEMENTS

BRIDGE NO 51-106-13.1

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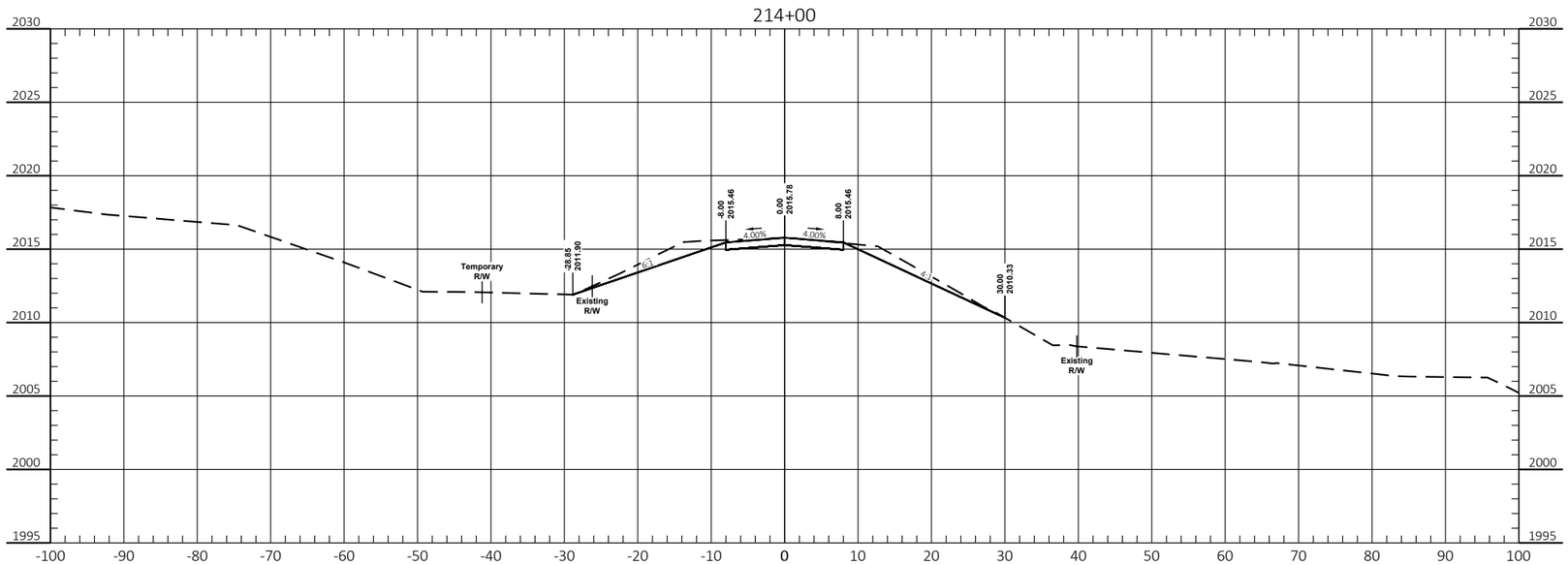
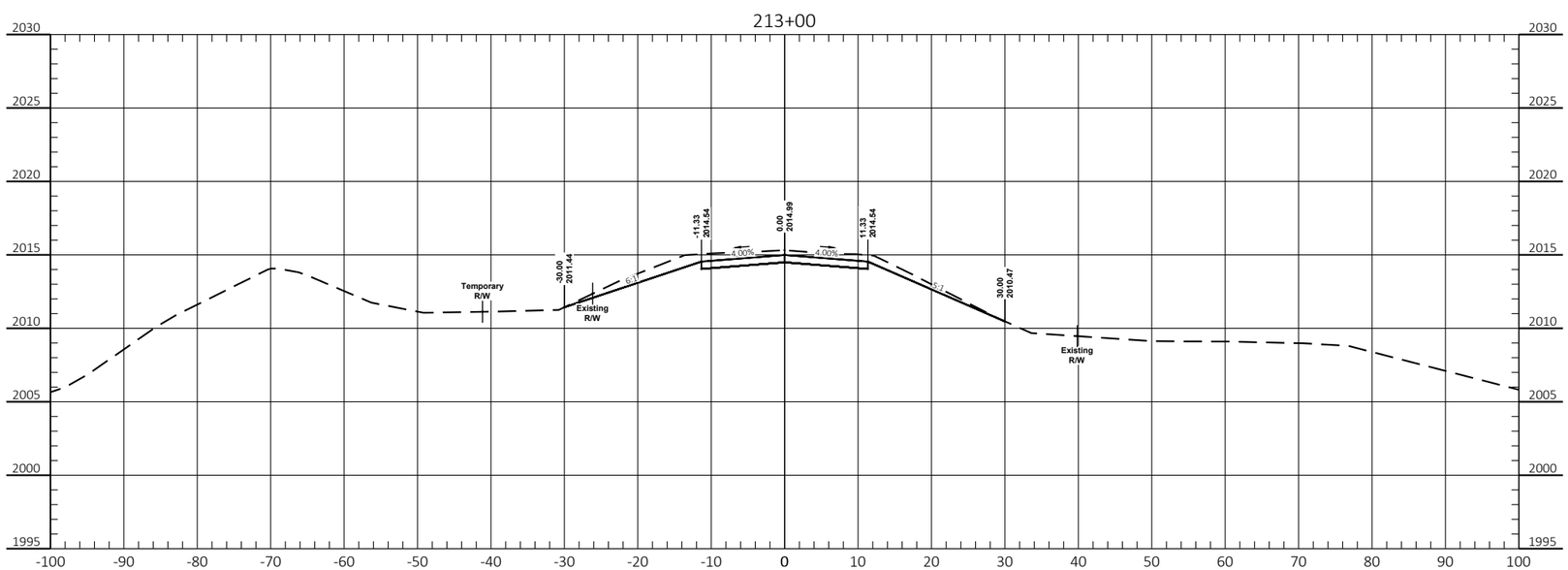
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	200	8

520TH ST NW





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CROSS SECTIONS
520TH ST NW

WARD COUNTY BRIDGE REPLACEMENTS

BRIDGE NO 51-106-13.1

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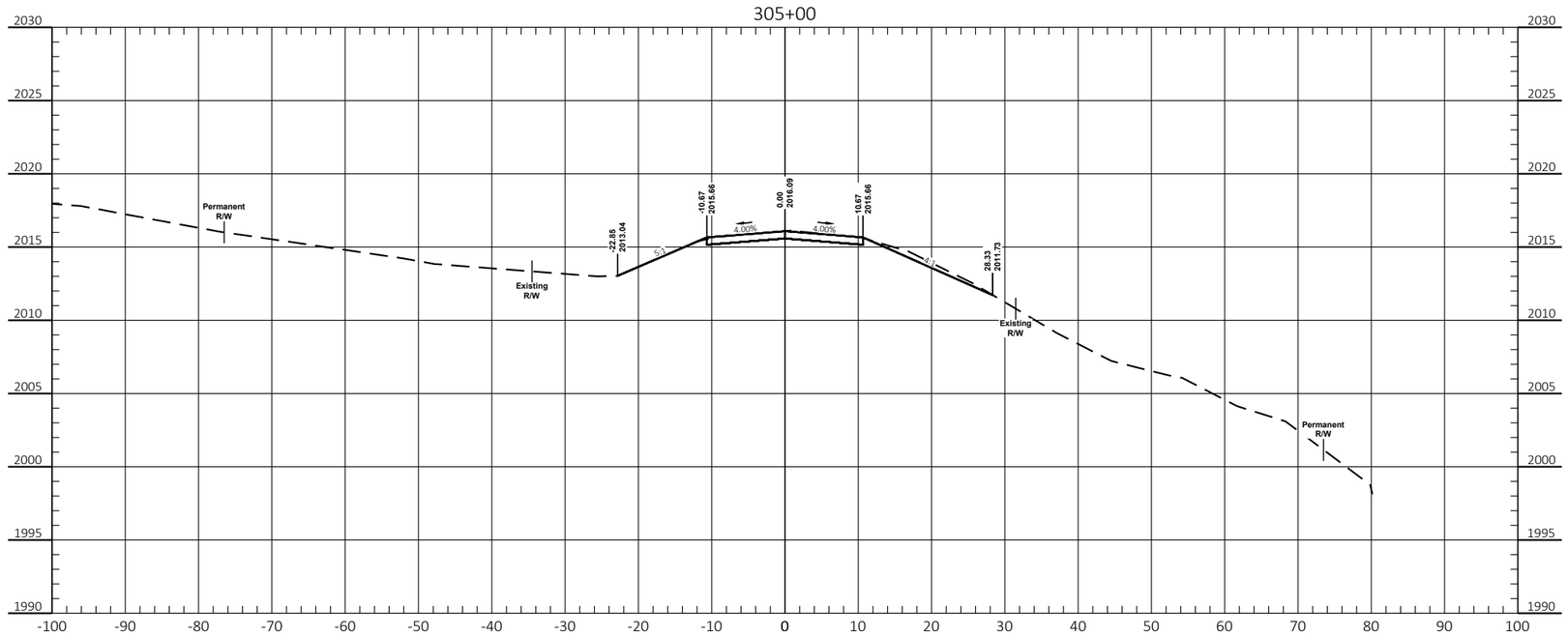
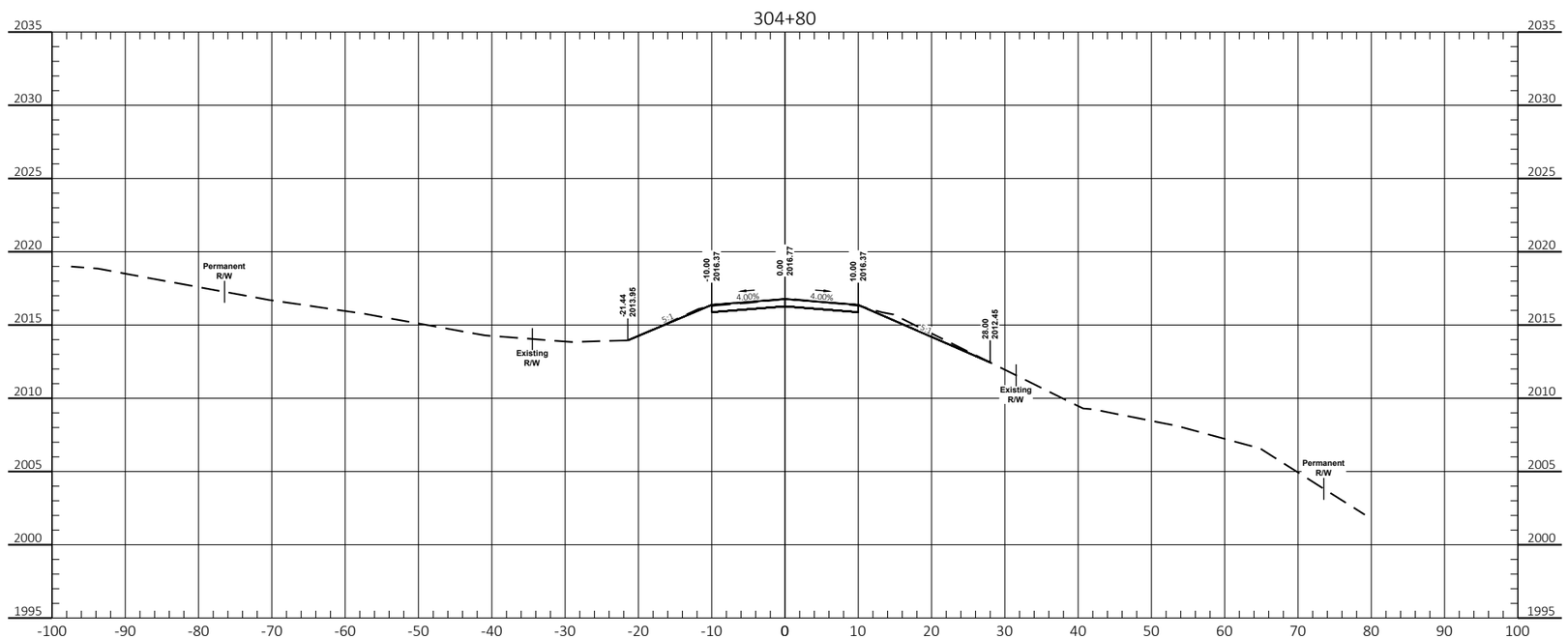
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	200	9

COUNTY ROAD 4





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CROSS SECTIONS
COUNTY ROAD 4

WARD COUNTY BRIDGE REPLACEMENTS

BRIDGE NO 51-107-12.1

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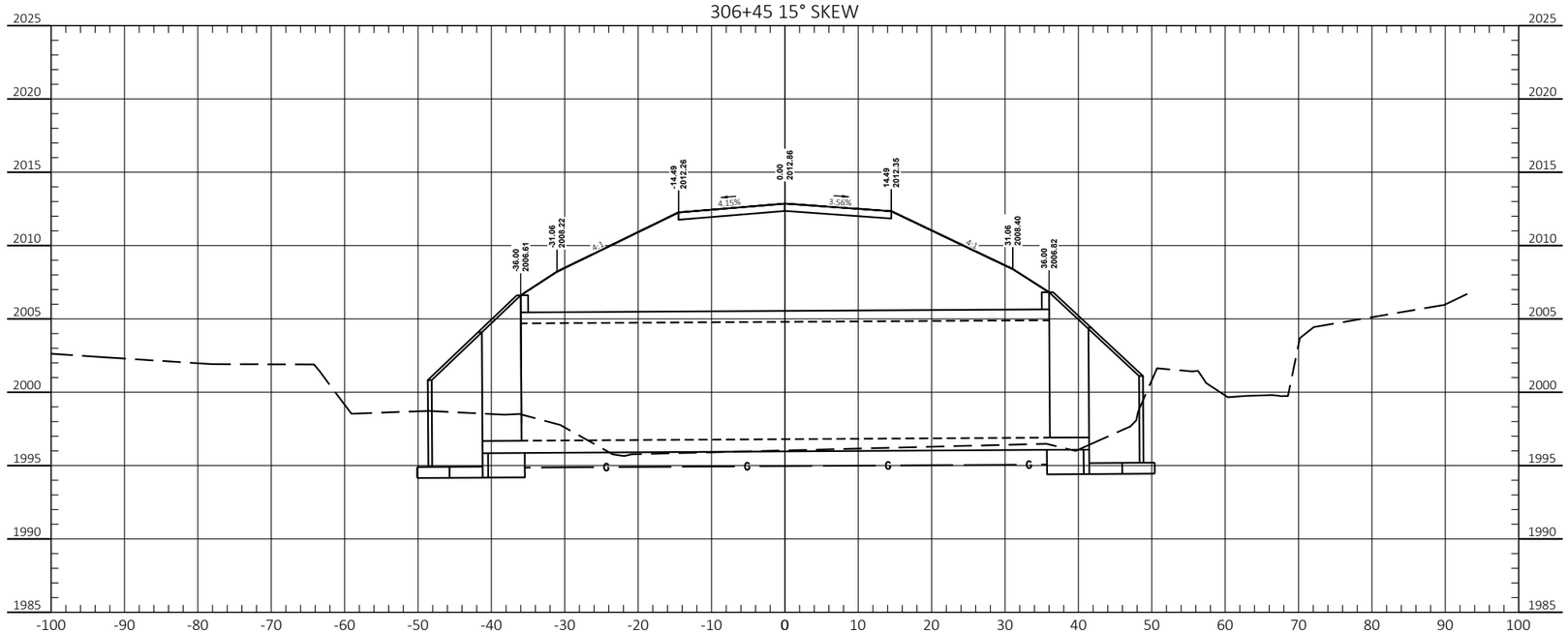
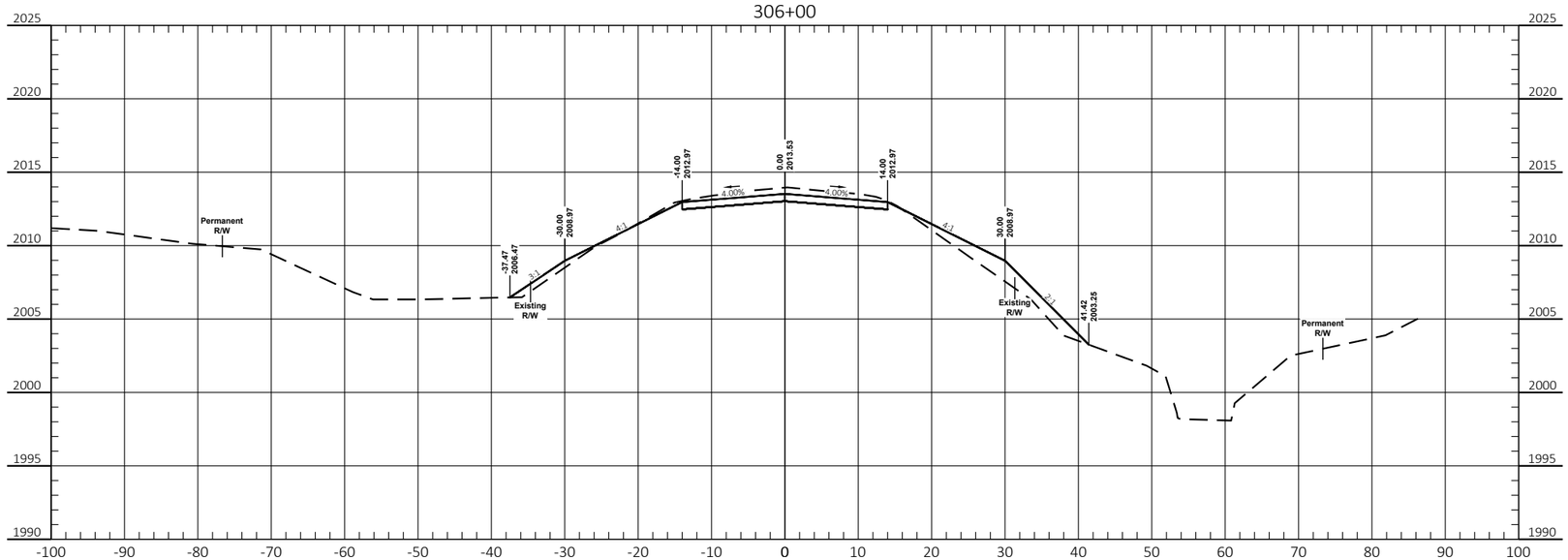
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	200	10

COUNTY ROAD 4

306+45 15° SKEW



306+00



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CROSS SECTIONS
COUNTY ROAD 4

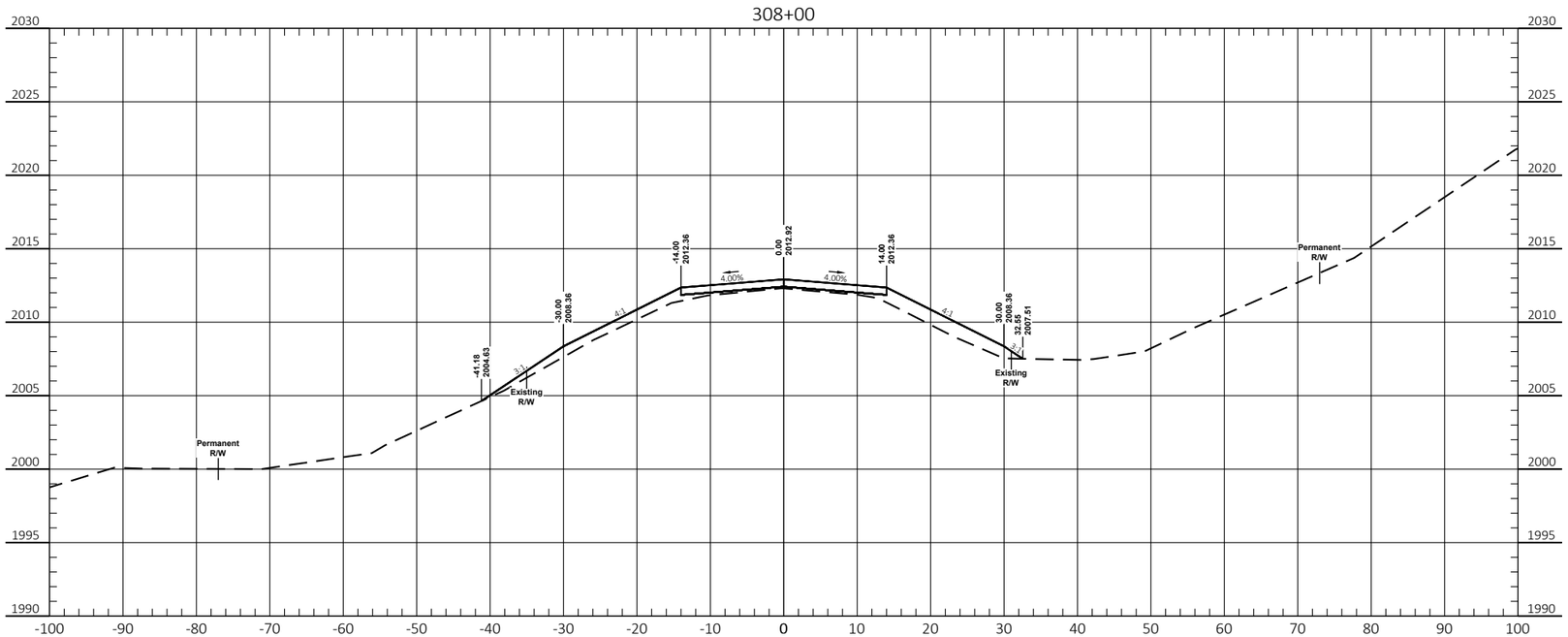
WARD COUNTY BRIDGE REPLACEMENTS

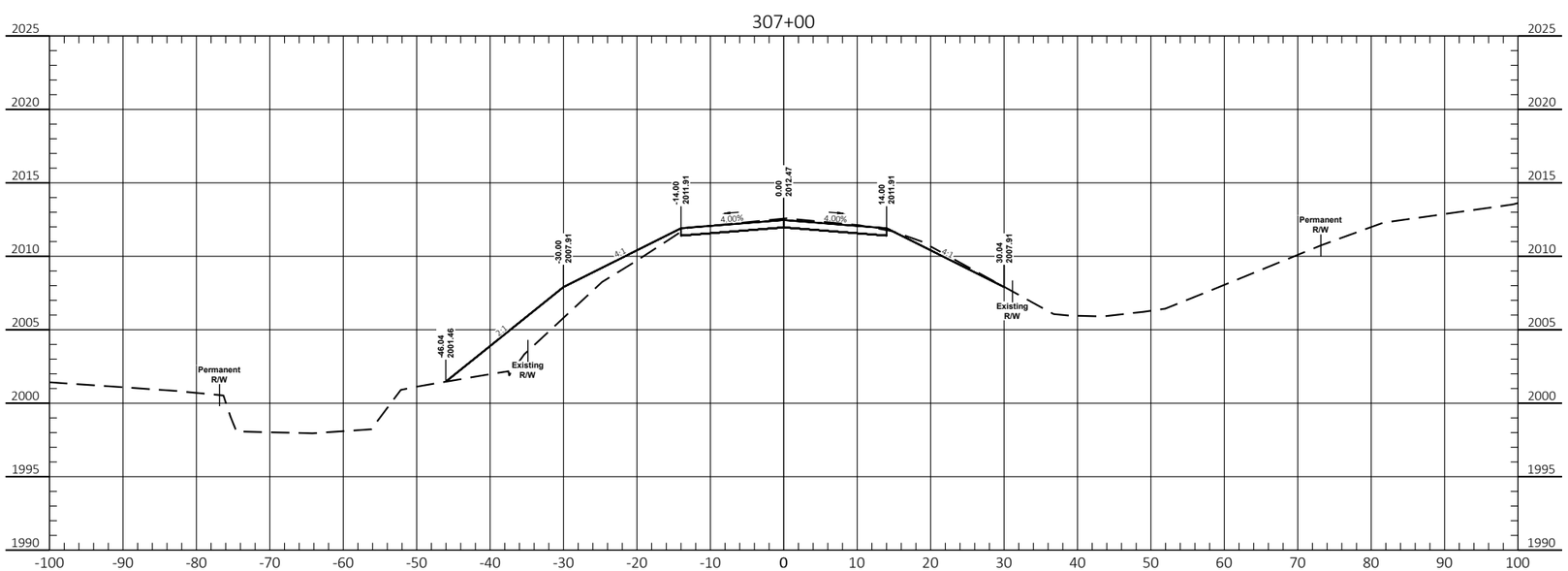
BRIDGE NO 51-107-12.1

H:\BN\6700\6790\6790_0057_Ward Co Bridge Replacements\CAD\Plans\200 - X-SEC - CR4 & 209th.dwg-CR4 (2)-8/19/2020 6:21 AM-(jrenner)

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	200	11

COUNTY ROAD 4





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CROSS SECTIONS
COUNTY ROAD 4

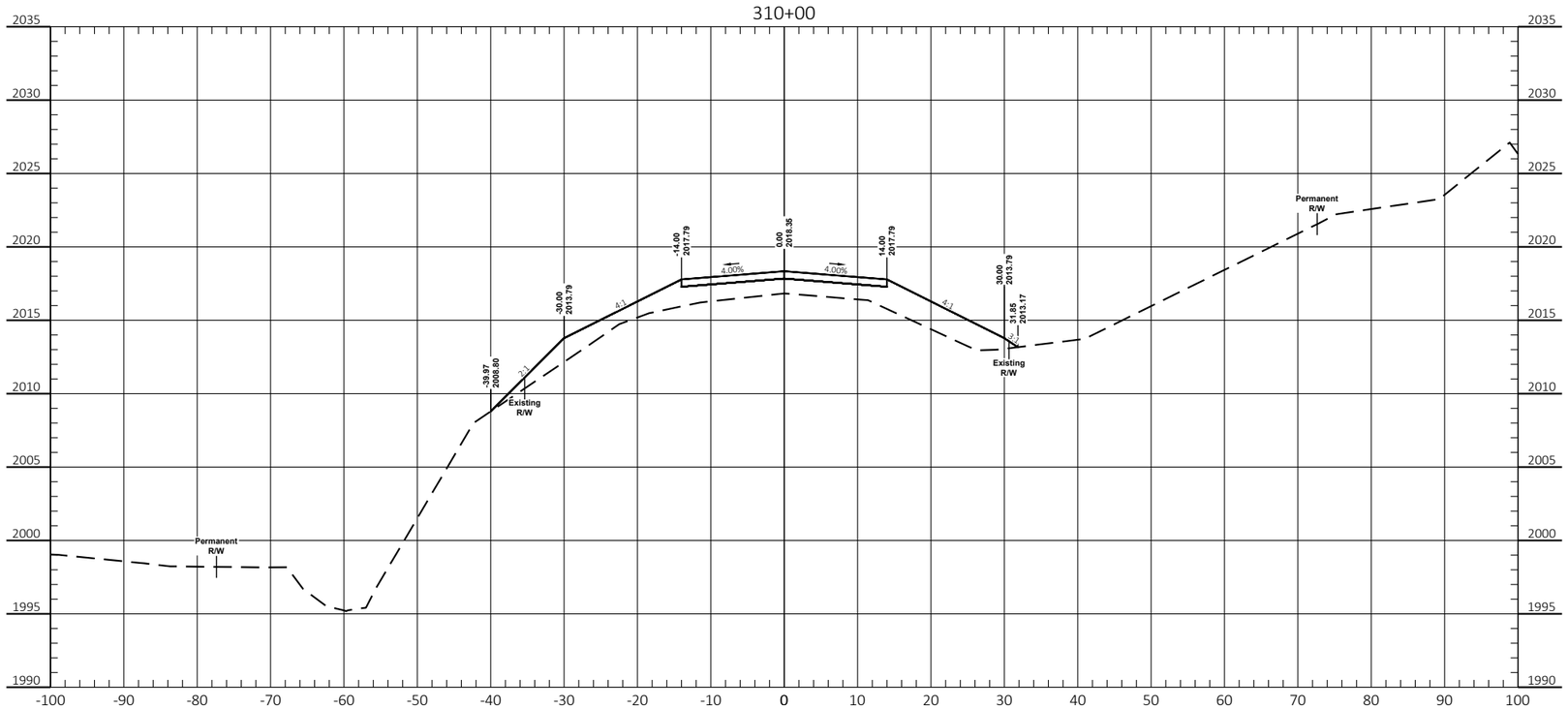
WARD COUNTY BRIDGE REPLACEMENTS

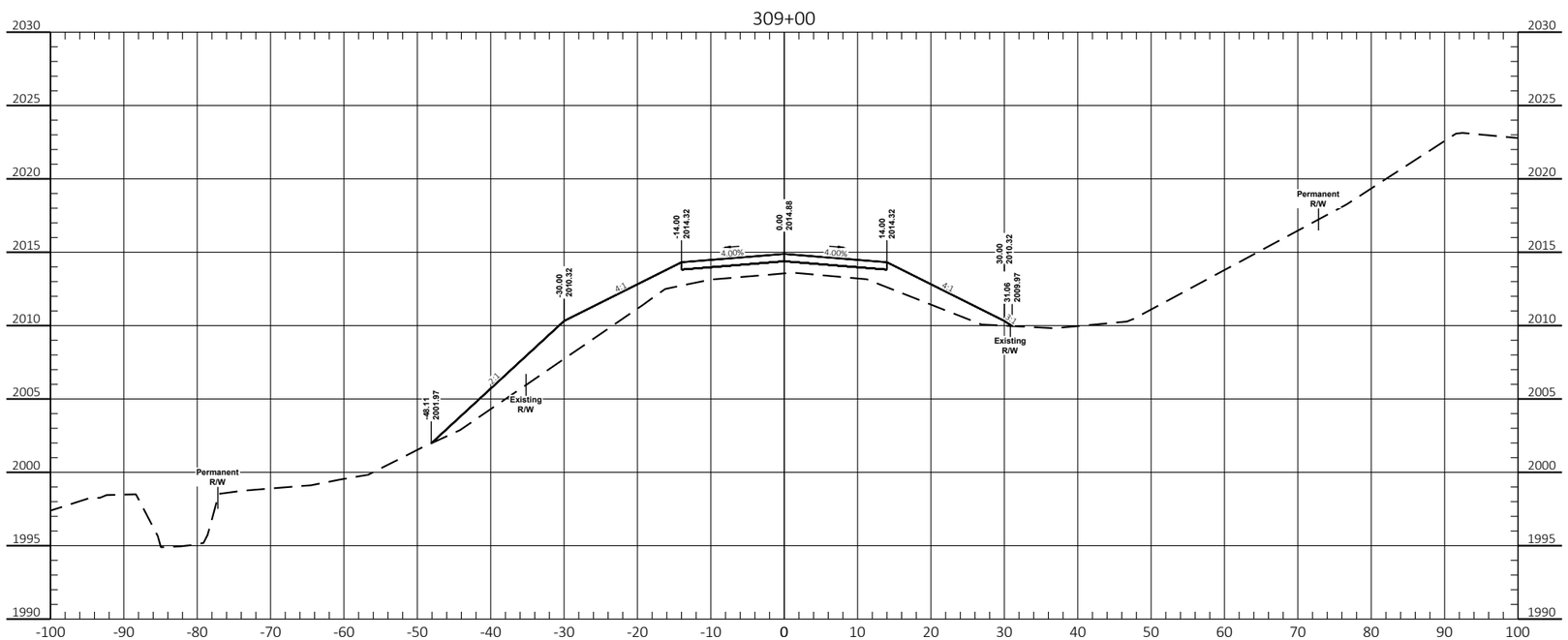
BRIDGE NO 51-107-12.1

H:\BN\6700\6790\6790_0057_Ward Co Bridge Replacements\CAD\Plans\200 - X-SEC - CR4 & 209th.dwg-CR4 (3)-8/19/2020 6:21 AM-(jrenner)

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	200	12

COUNTY ROAD 4





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CROSS SECTIONS
COUNTY ROAD 4

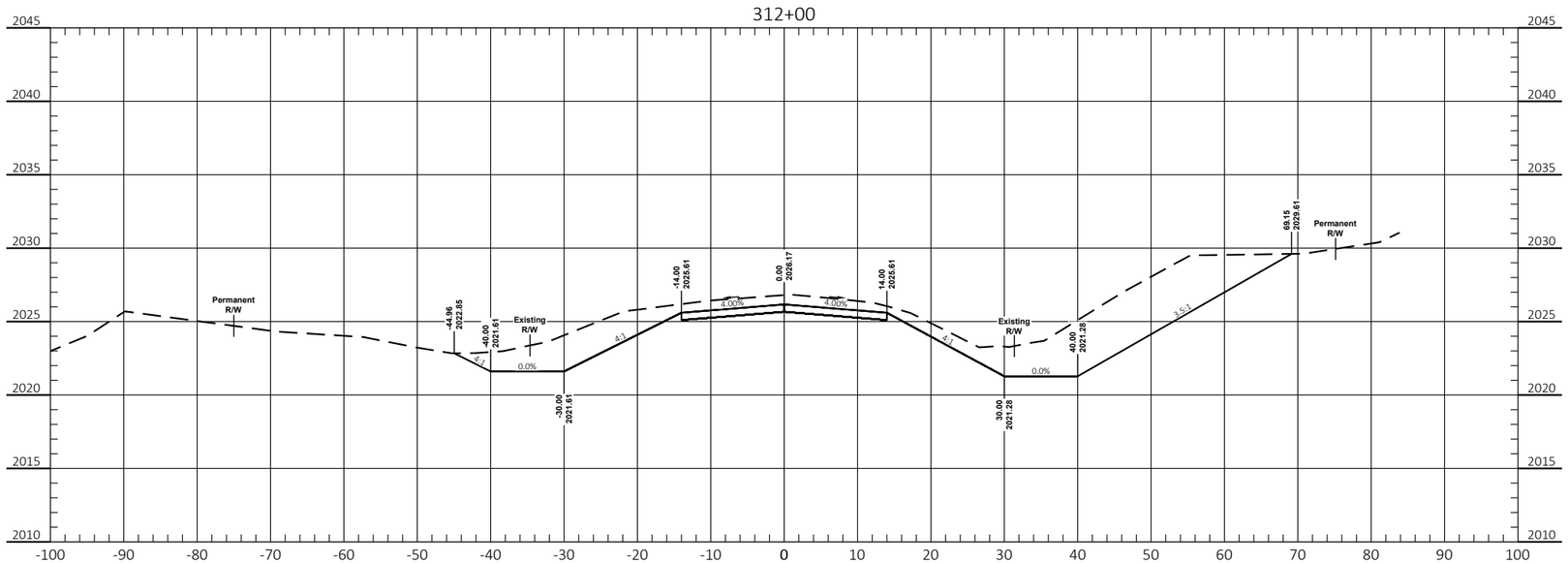
WARD COUNTY BRIDGE REPLACEMENTS

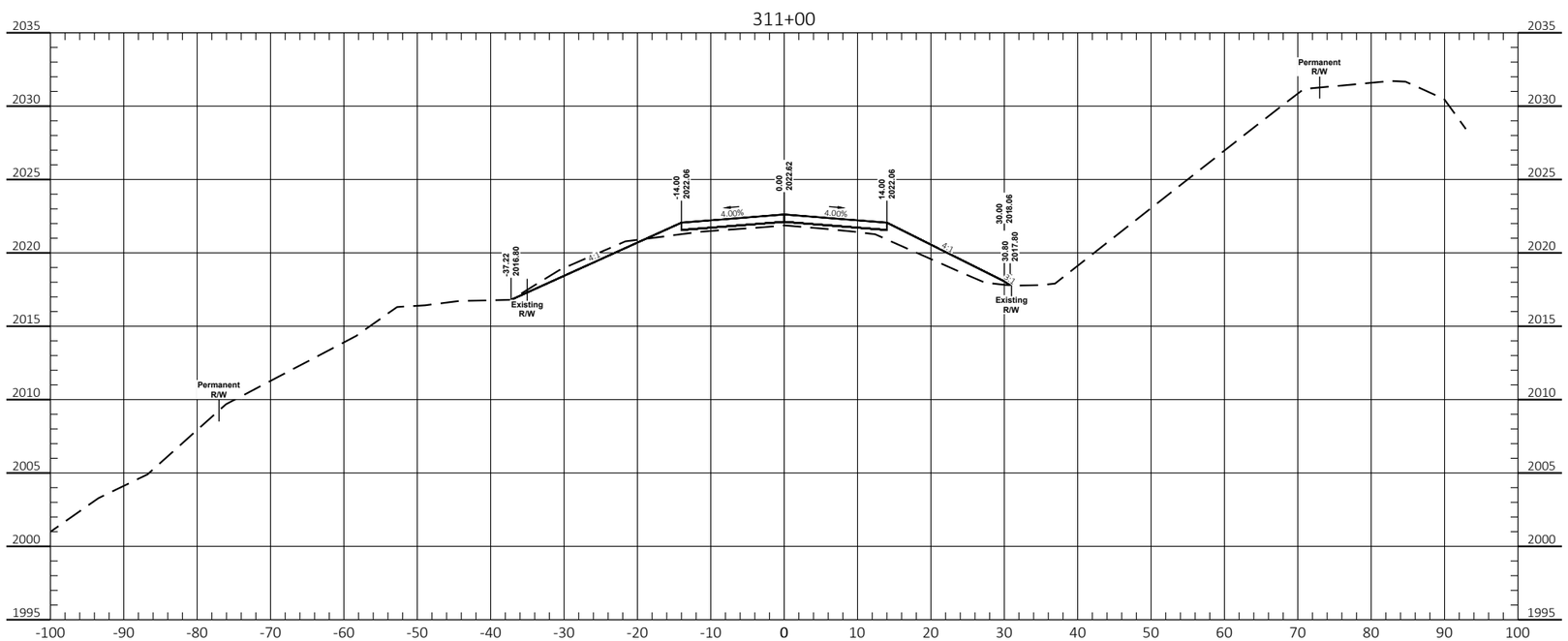
BRIDGE NO 51-107-12.1

H:\BN\6700\6790\6790_0057_Ward Co Bridge Replacements\CAD\Plans\200 - X-SEC - CR4 & 209th.dwg-CR4 (4)-8/19/2020 6:21 AM-(jrenner)

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	200	13

COUNTY ROAD 4





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CROSS SECTIONS
COUNTY ROAD 4

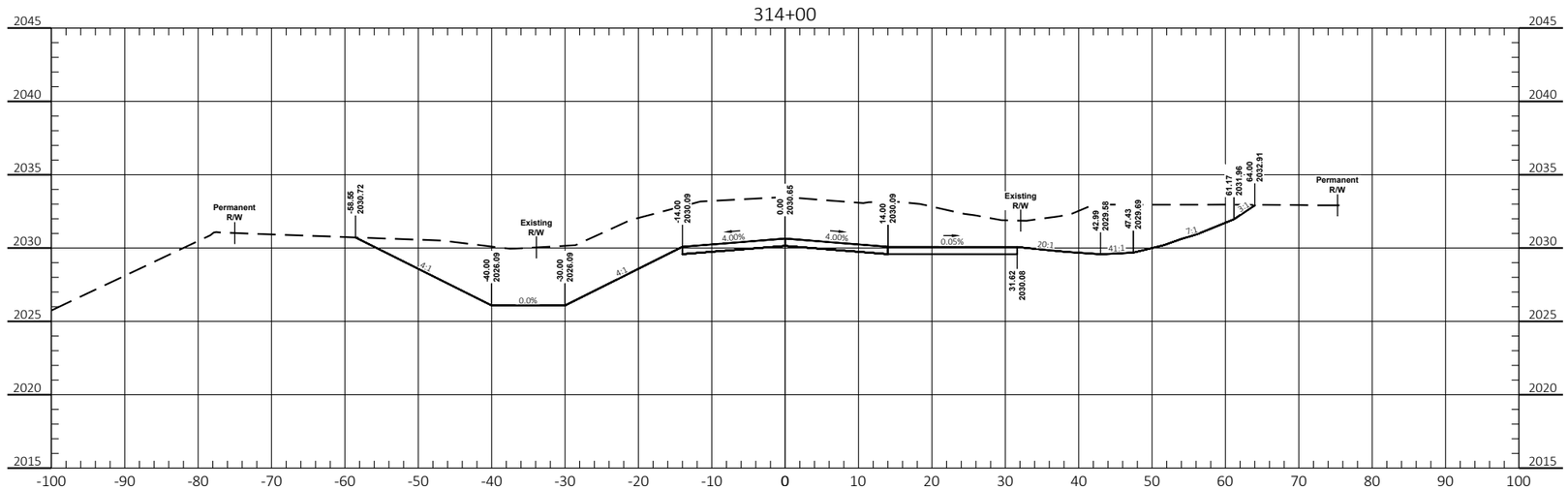
WARD COUNTY BRIDGE REPLACEMENTS

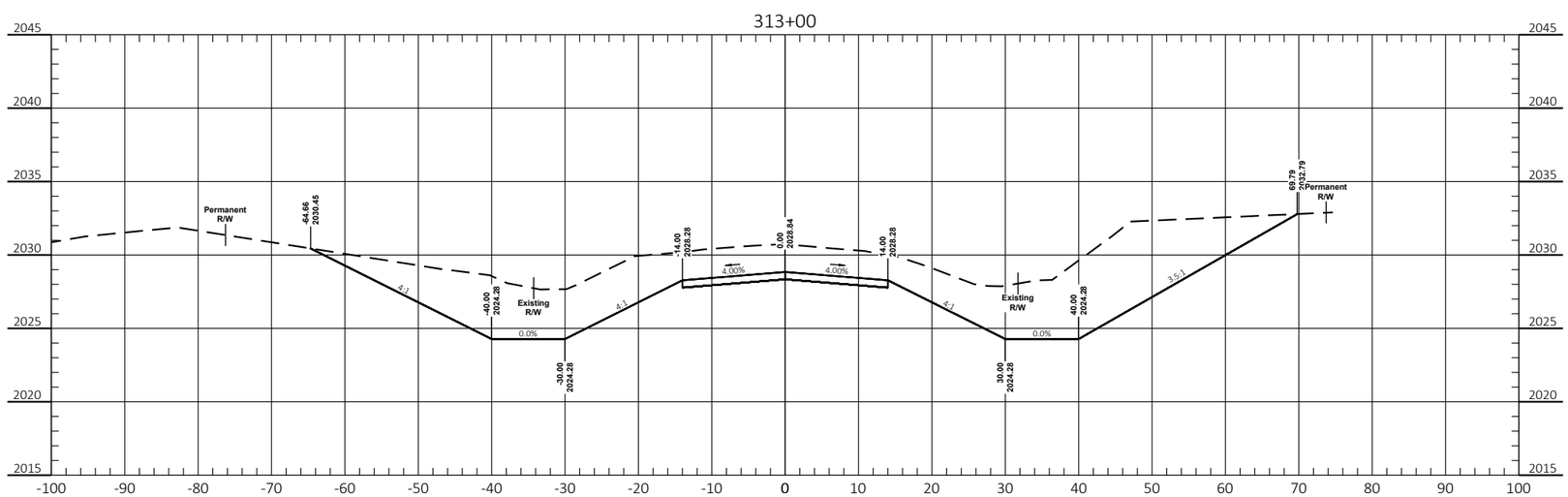
BRIDGE NO 51-107-12.1

H:\JBN\6700\6790\6790_0057_Ward Co Bridge Replacements\CAD\Plans\200 - X-SEC - CR4 & 209th.dwg-CR4 (5)-8/19/2020 6:21 AM-(jrenner)

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	200	14

COUNTY ROAD 4





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CROSS SECTIONS
COUNTY ROAD 4

WARD COUNTY BRIDGE REPLACEMENTS

BRIDGE NO 51-107-12.1

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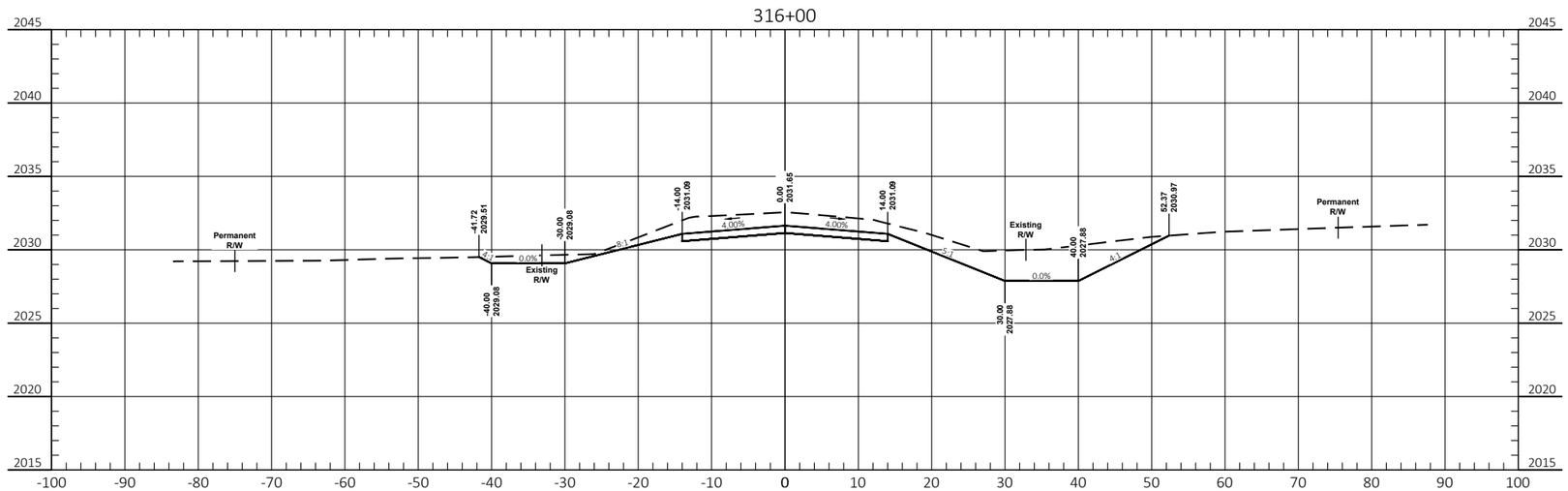
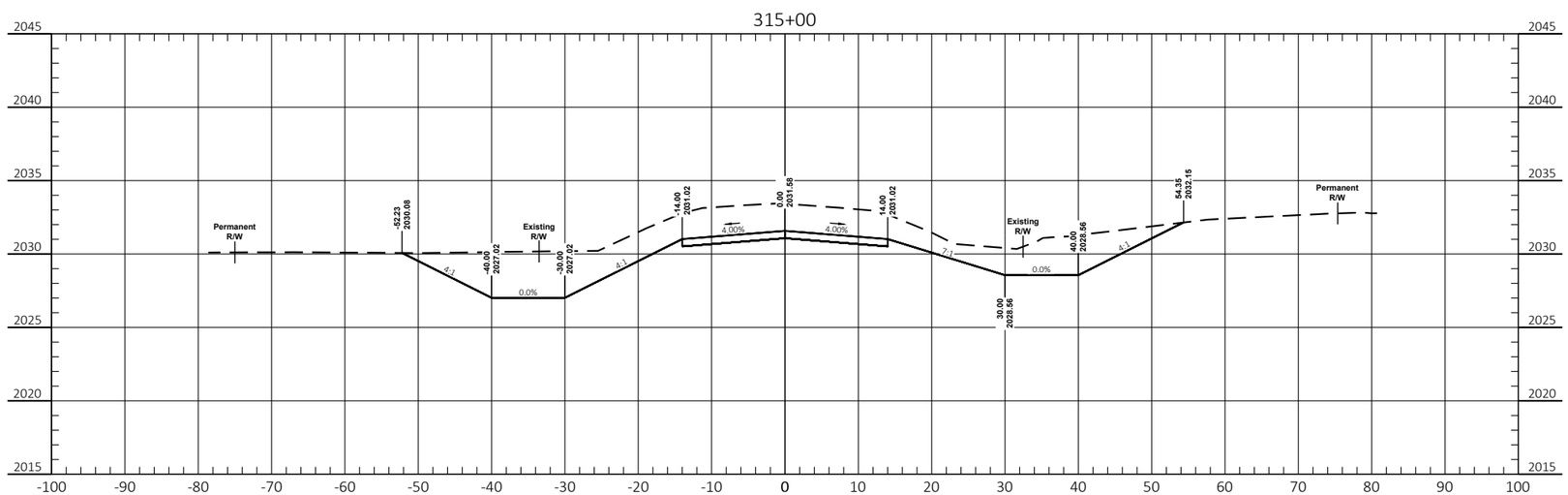
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	200	15

COUNTY ROAD 4





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CROSS SECTIONS
COUNTY ROAD 4

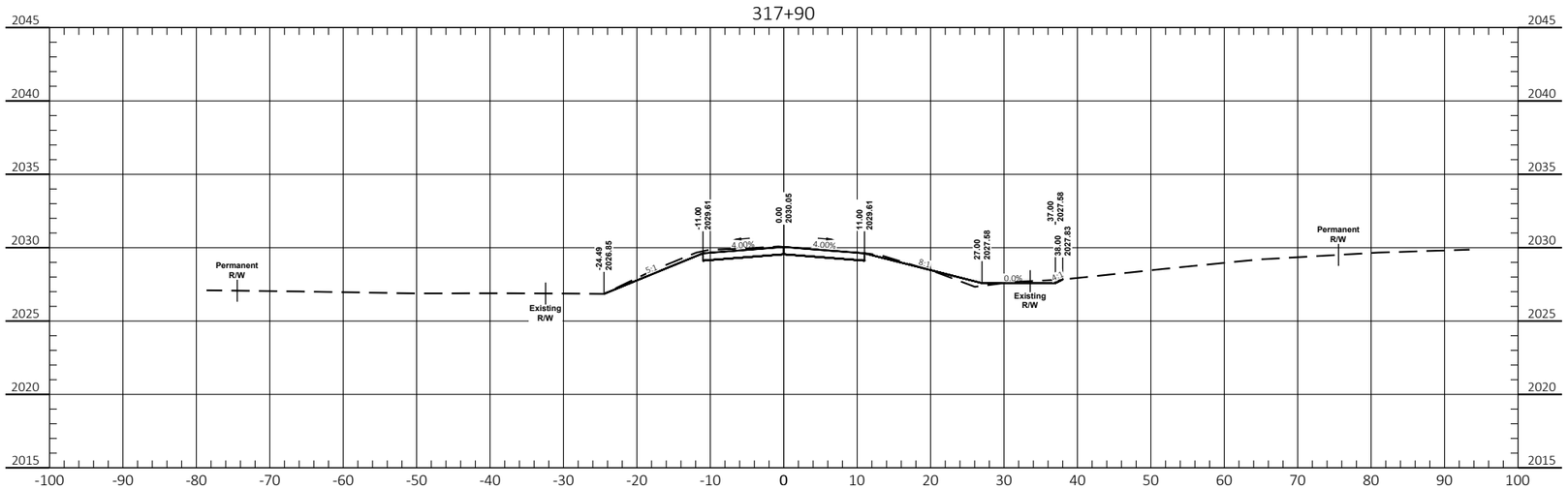
WARD COUNTY BRIDGE REPLACEMENTS

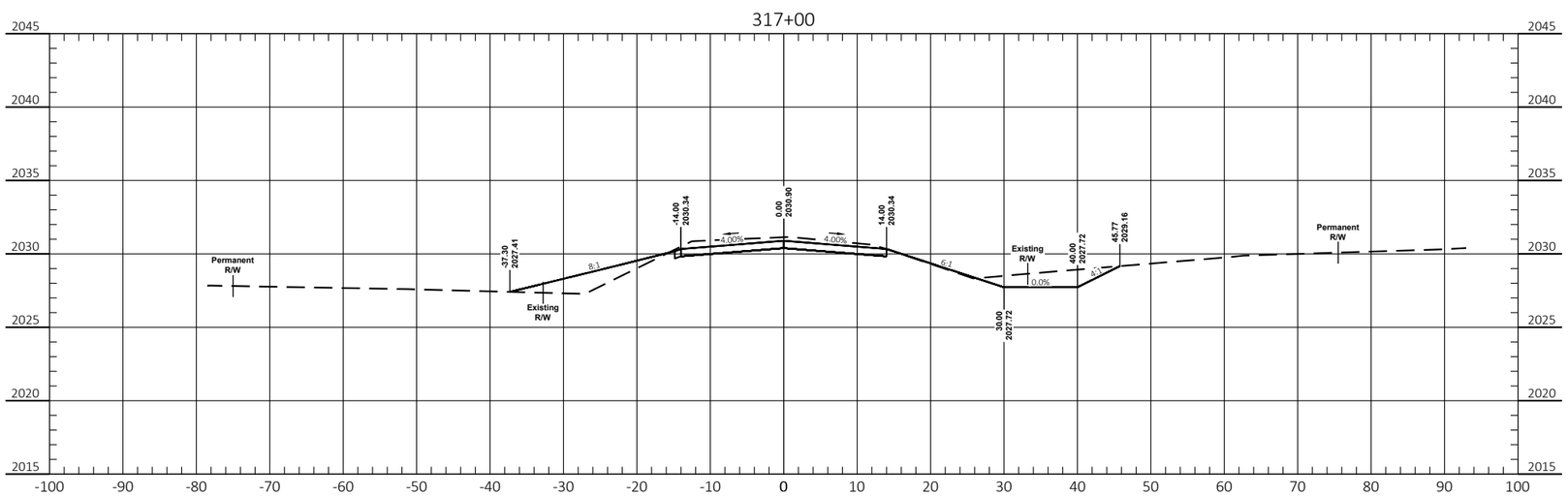
BRIDGE NO 51-107-12.1

H:\JBN\6700\6790\6790_0057_Ward Co Bridge Replacements\CAD\Plans\200 - X-SEC - CR4 & 209th.dwg-CR4 (7)-8/19/2020 6:21 AM-(jrenner)

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	200	16

COUNTY ROAD 4





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CROSS SECTIONS
COUNTY ROAD 4

WARD COUNTY BRIDGE REPLACEMENTS

BRIDGE NO 51-107-12.1

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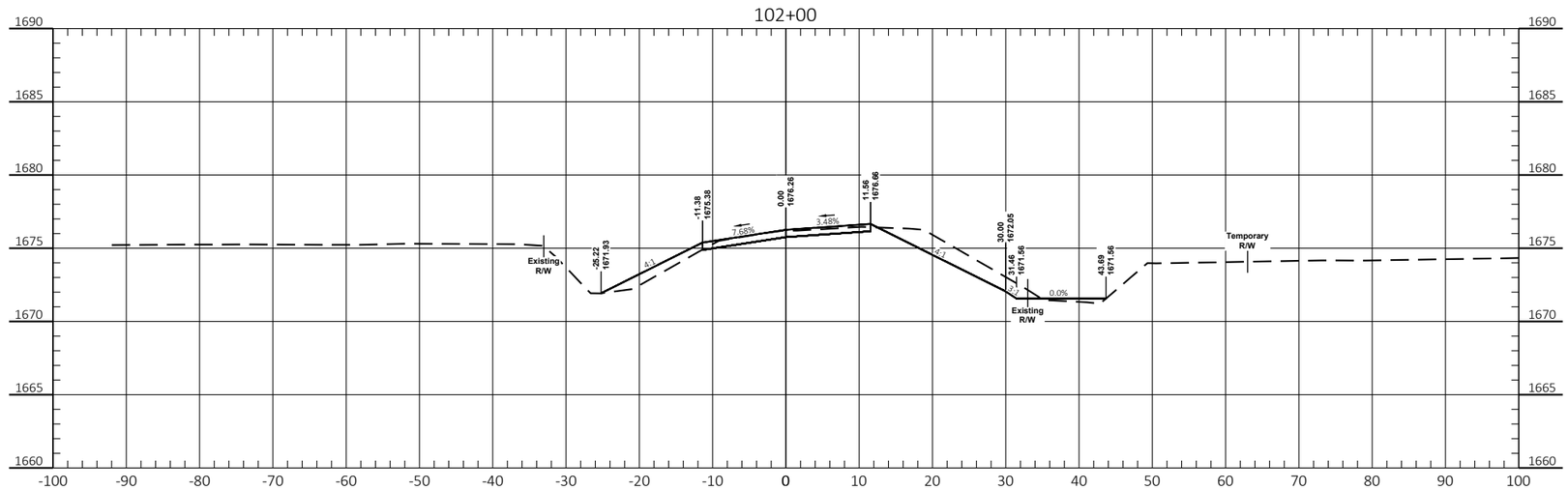
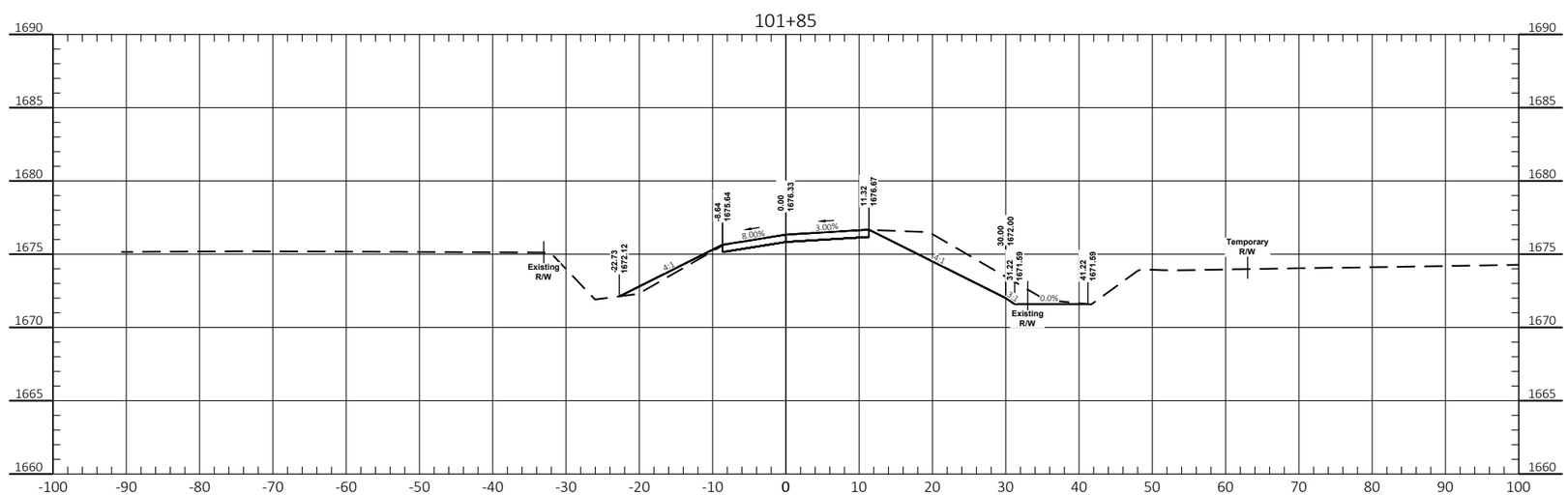
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	200	17

209TH ST NW





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CROSS SECTIONS
209TH ST NW

WARD COUNTY BRIDGE REPLACEMENTS

BRIDGE NO 51-129-27.1

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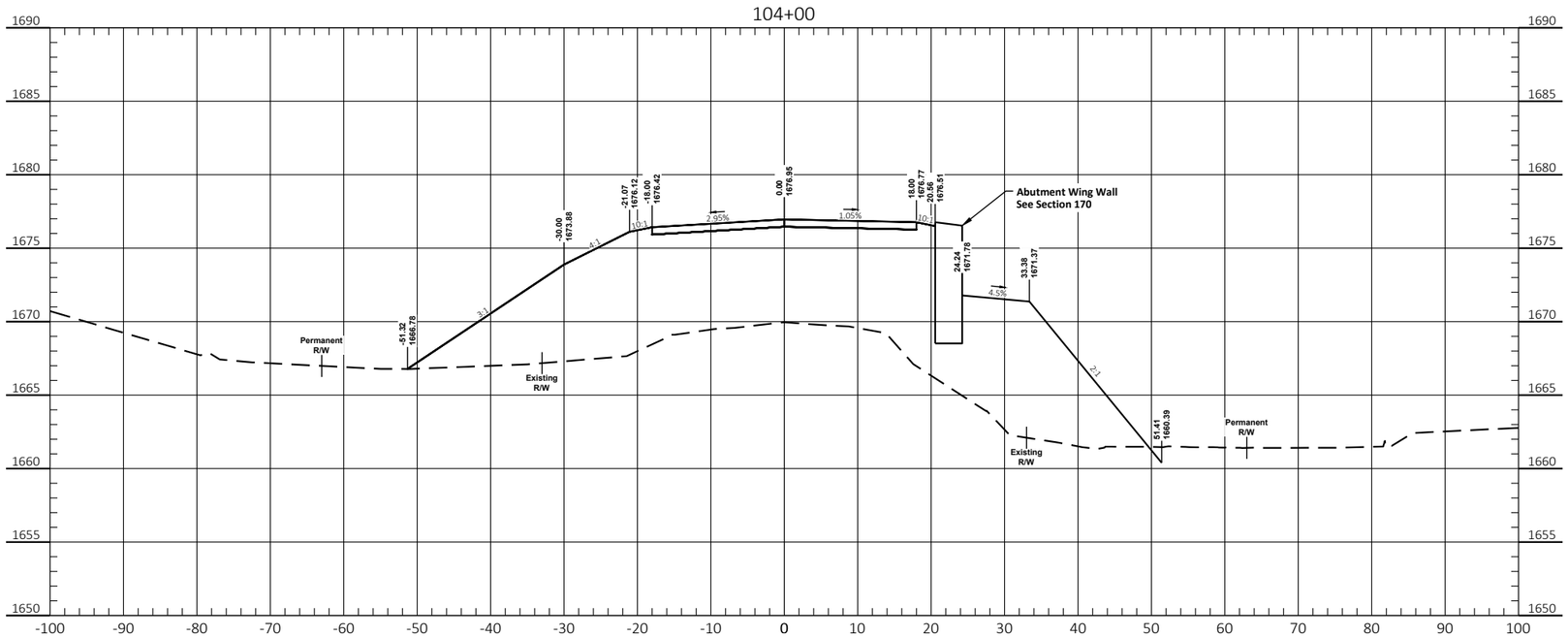
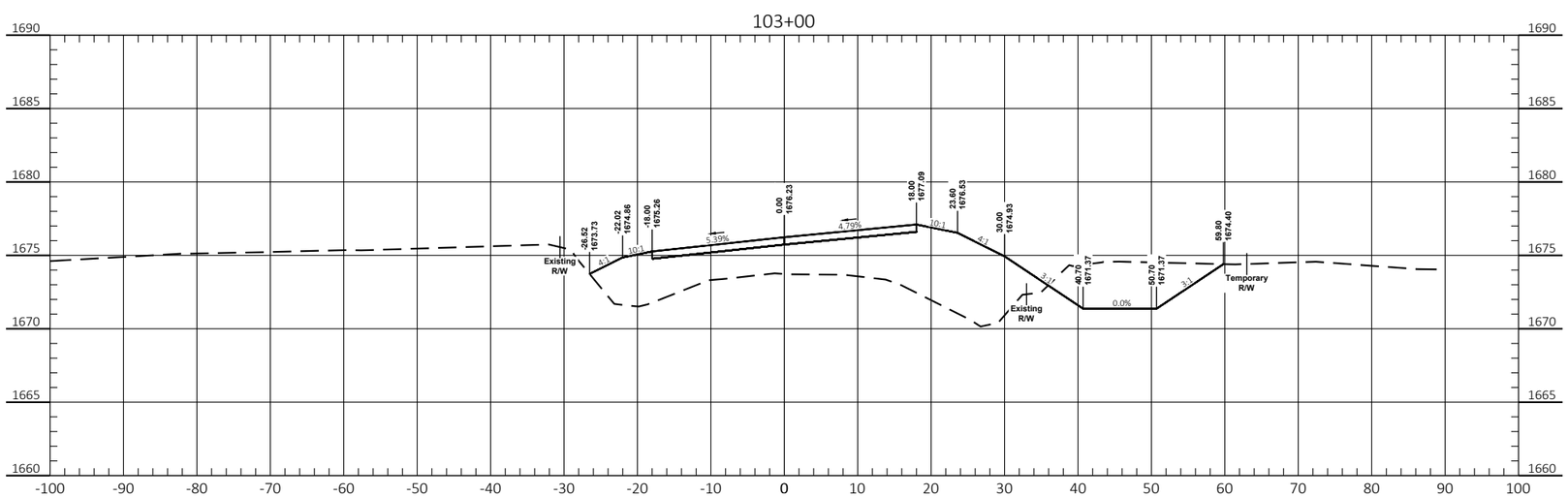
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	200	18

209TH ST NW





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CROSS SECTIONS
209TH ST NW

WARD COUNTY BRIDGE REPLACEMENTS

BRIDGE NO 51-129-27.1

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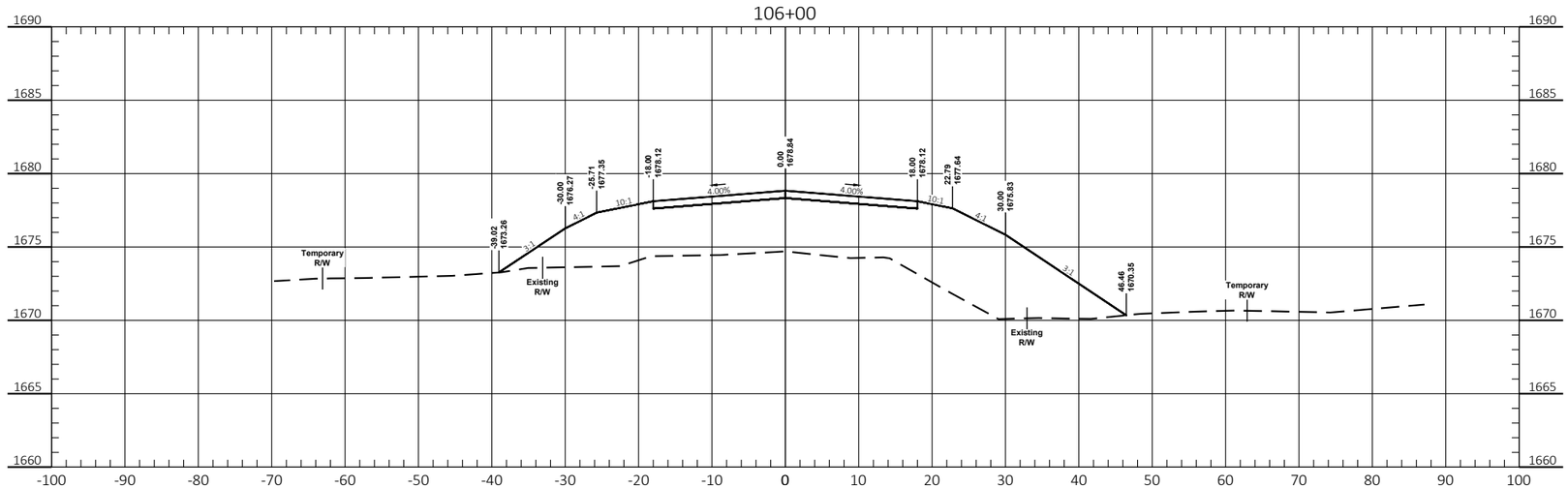
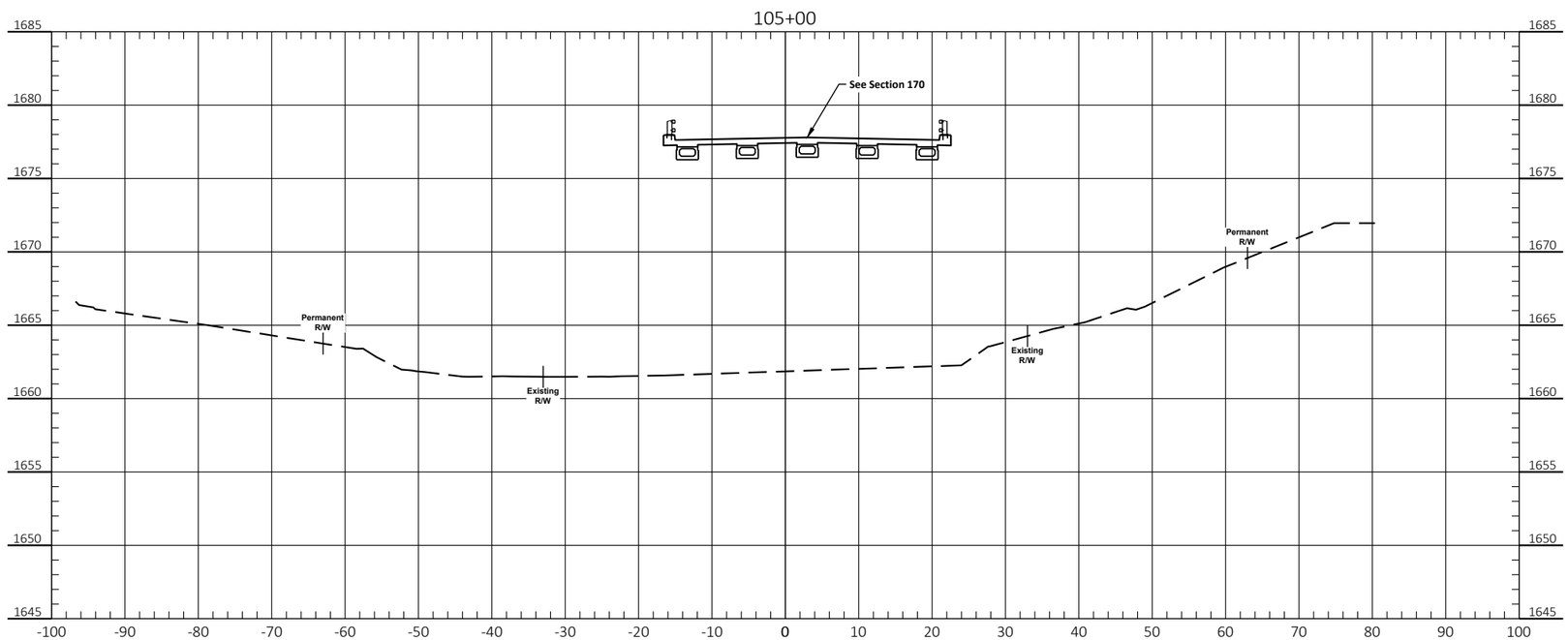
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	200	19

209TH ST NW





Proj. No. 6790-0057
Houston Engineering Inc.
Ph: 701.237.5065

ALL ELEVATIONS ARE BASED ON THE U.S.G.S. VERTICAL DATUM OF 1988. (UNLESS NOTED OTHERWISE)

CROSS SECTIONS
209TH ST NW

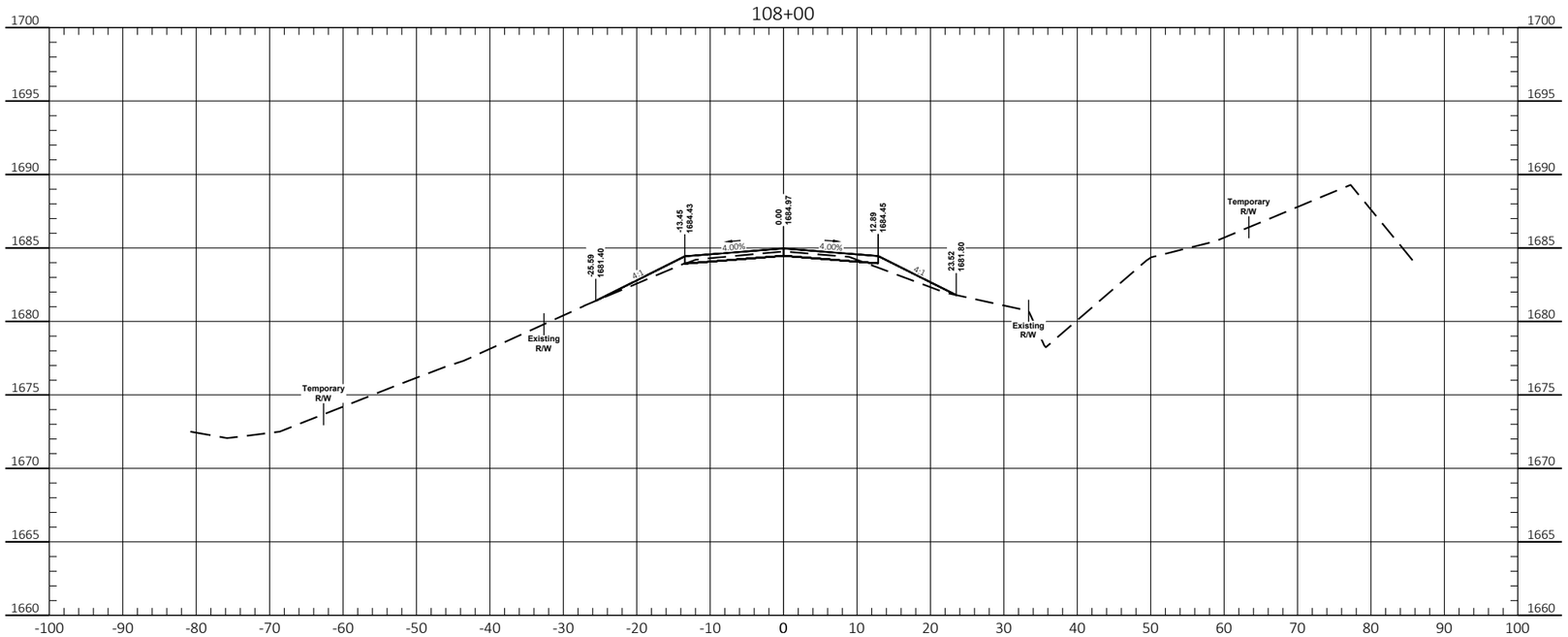
WARD COUNTY BRIDGE REPLACEMENTS

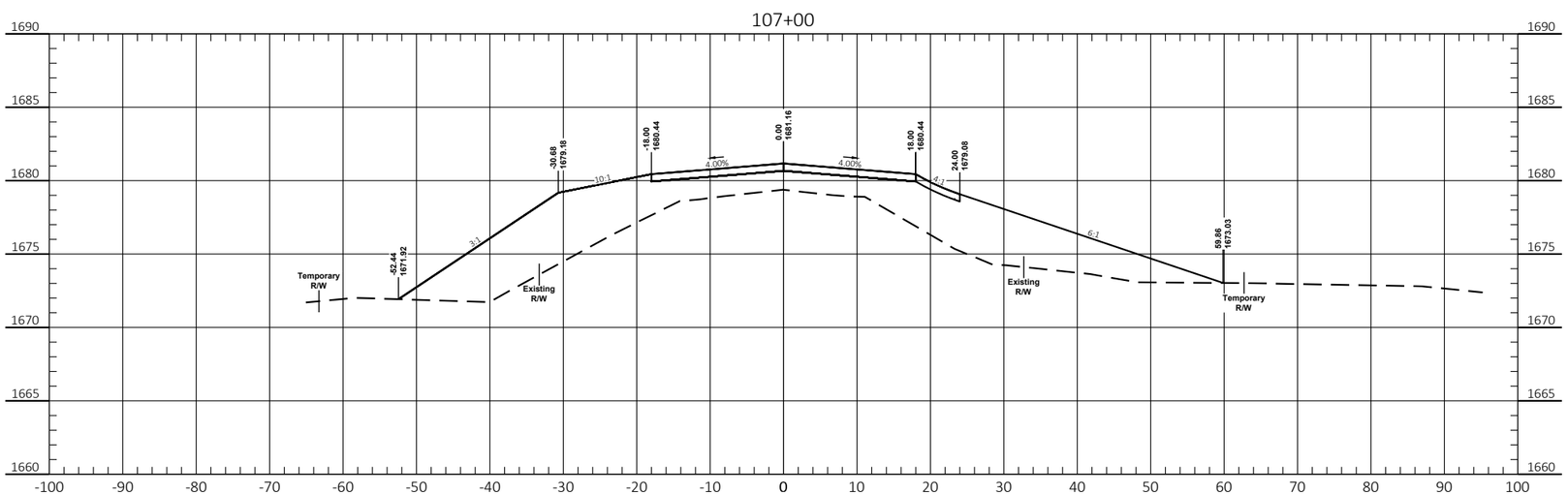
BRIDGE NO 51-129-27.1

H:\JBN\6700\6790\6790_0057_Ward Co Bridge Replacements\CAD\Plans\200 - X-SEC - CR4 & 209th.dwg:209TH(3):8/19/2020 6:21 AM:(jrenner)

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	200	20

209TH ST NW





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CROSS SECTIONS
209TH ST NW

WARD COUNTY BRIDGE REPLACEMENTS

BRIDGE NO 51-129-27.1

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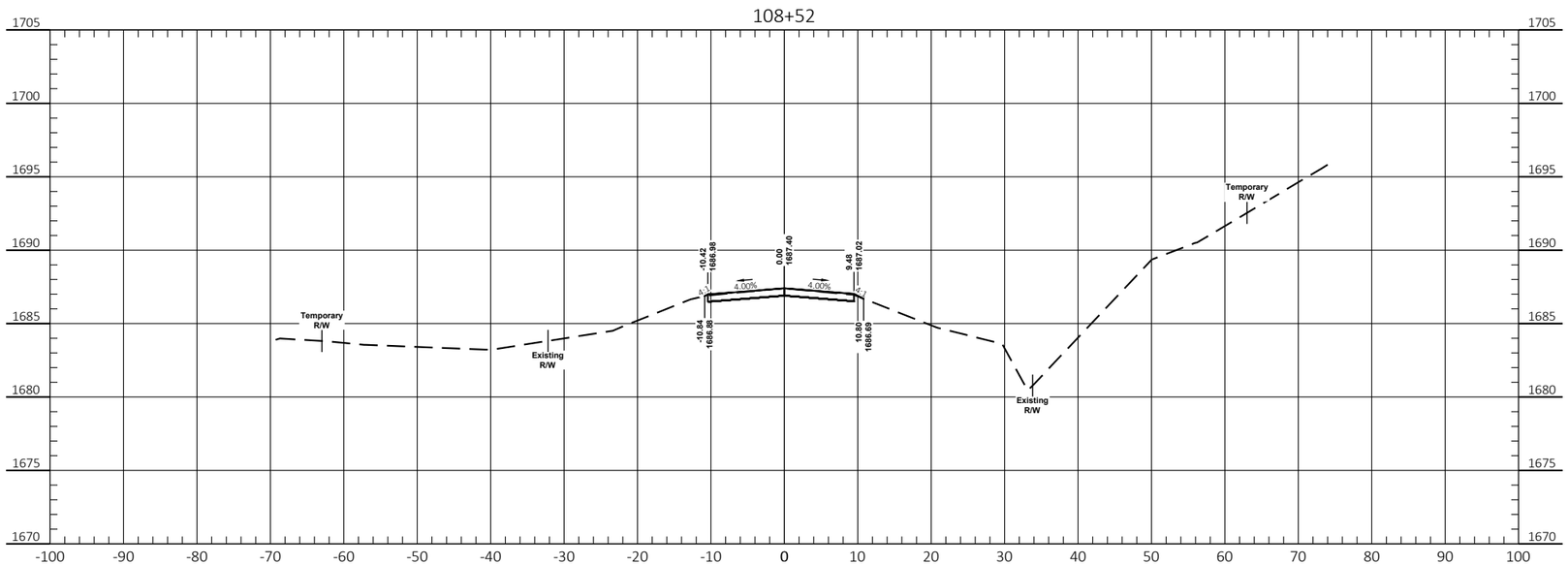
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRR-0051(053), BRO-0051(054)	200	21

209TH ST NW



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CROSS SECTIONS
209TH ST NW

WARD COUNTY BRIDGE REPLACEMENTS

BRIDGE NO 51-129-27.1

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