

DESIGN DATA			
Traffic	Average Daily		
Current 2014	Pass: 225	Trucks: 70	Total: 295
Forecast 2034	Pass: 290	Trucks: 100	Total: 390
Clear Zone Distance: 26'		Design Speed: 65 MPH	
Minimum Sight Dist. for Stopping: 645'		Bridges: N/A	
Sight Dist. for No Passing Zone: 1100'			
Pavement Design Life (years)			
Design Accumulated One-way ESALs:			

JOB # 19
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	SS-1-014(006)021	20975	1	1

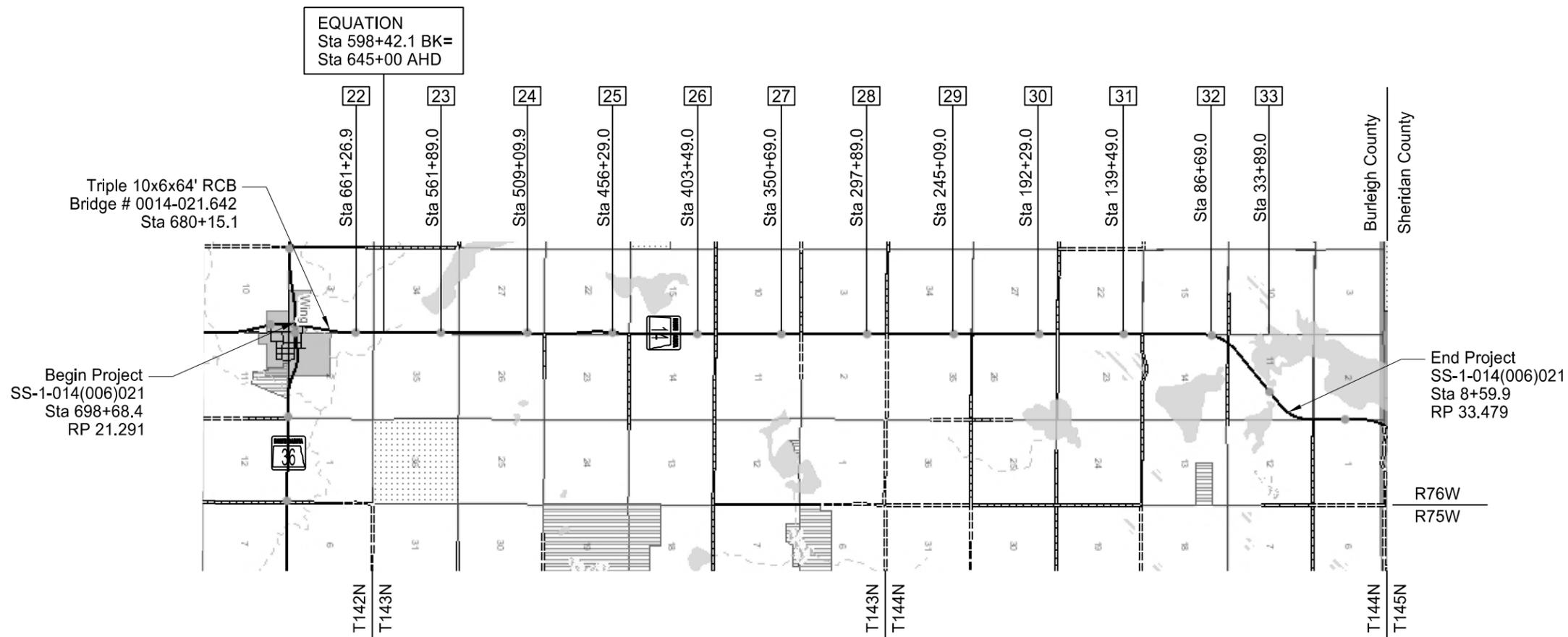
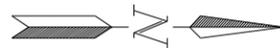
SS-1-014(006)021

GOVERNING SPECIFICATIONS:
 2014 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
SS-1-014(006)021	12.188	12.188

Burleigh County
 Wing N to 1 Mi S Co Line

3" HMA Overlay and Incidentals

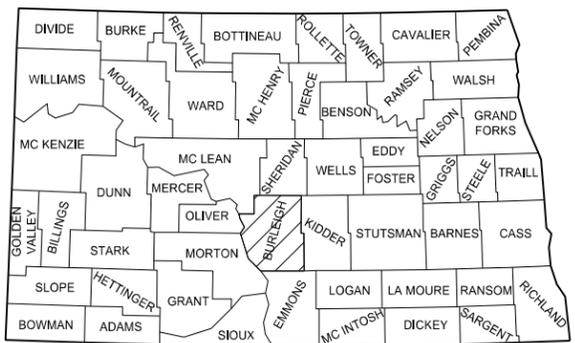


EQUATION
 Sta 598+42.1 BK=
 Sta 645+00 AHD

Triple 10x6x64' RCB
 Bridge # 0014-021.642
 Sta 680+15.1

Begin Project
 SS-1-014(006)021
 Sta 698+68.4
 RP 21.291

End Project
 SS-1-014(006)021
 Sta 8+59.9
 RP 33.479



STATE COUNTY MAP

DESIGNERS
 Aaron Derman /s/

APPROVED DATE 6-6-16
 Roger Weigel /s/
 for OFFICE OF PROJECT DEVELOPMENT
 ND DEPARTMENT OF TRANSPORTATION

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 6-6-16
 James Douglas Rath /s/
 NDDOT DESIGN

This document was originally issued and sealed by James Douglas Rath Registration Number PE- 4288, on 6/16/16 and the original document is stored at the North Dakota Department of Transportation

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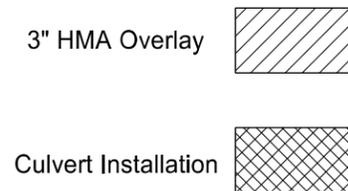
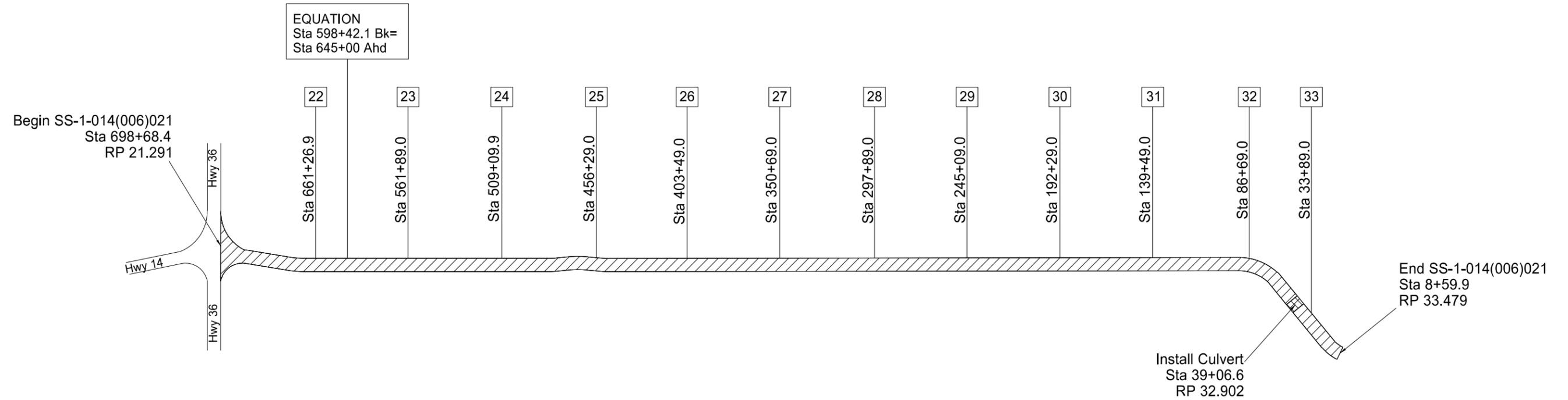
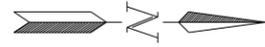
PLAN SECTIONS

Section	Page(s)	Description
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4	1	Scope of Work
6	1	Notes
6	2	Environmental Notes
8	1	Quantities
10	1 - 2	Basis of Estimate
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30	1 - 5	Typical Sections
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51	1	Allowable Pipe List
75	1 - 2	Wetland Impacts
76	1	Temporary Erosion Control
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100	1 - 4	Work Zone Traffic Control
180	1 - 12	Pit Plats

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D-101-10	NDDOT Utility Company and Organization Abbreviations
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D-101-30, 31, 32	Symbols
D-704-2	Traffic Control For Coring Of Hot Bituminous Pavement
D-704-5	Contractor Sign Detail
D-704-7	Breakaway Systems For Construction Zone Signs - Perforated Tube
D-704-8	Breakaway Systems For Construction Zone Signs - U-Channel Post
D-704-9	Construction Sign Details - Terminal And Guide Signs
D-704-10	Construction Sign Details - Regulatory Signs
D-704-11	Construction Sign Details - Warning Signs
D-704-13	Barricade And Channelizing Device Details
D-704-14	Construction Sign Punching And Mounting Details
D-704-15	Road Closure Layouts
D-704-19	Road Closure And Lane Closure On A Two Way Road Layouts
D-704-20	Terminal And Seal Coat Sign Layouts
D-704-22	Construction Truck And Temporary Detour Layouts
D-704-24	Shoulder Closures And Bridge Painting Layouts
D-704-26	Miscellaneous Sign Layouts
D-704-27	Traffic Control Plan For Moving Operations
D-704-50	Portable Sign Support Assembly
D-704-56	Mobile Operation - Grinding Shoulder Rumble Strips
D-706-1	Bituminous Laboratory
D-714-1	Reinforced Concrete Pipe Culverts And End Sections (Round Pipe)
D-714-4	Round Corrugated Steel Pipe Culverts And End Sections
D-714-22	Concrete Pipe Or Precast Concrete Box Culvert Ties
D-714-25	Transverse Mainline Pipe Installation Detail for Pipes More Than 4 Feet Below Top of the Proposed Subgrade
D-754-83	Object Markers - Culverts
D-760-4	Rumble Strips Undivided Highways (Shoulders Less Than 4')
D-762-4	Pavement Marking
D-762-11	Short-Term Pavement Marking

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Scope of Work

3" HMA Overlay

ND Highway 14
Wing N to 1 Mi S Co Line

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NOTES

104-P01 WATER LEVEL: The Contractor should be aware that the water levels at the pipe replacement location may rise. NDDOT reserves the right to change any aspect of the work that is affected by the rising water. The contractor's unit bid prices for all bid items will be considered full compensation for that item regardless of the water elevation at the time of construction.

It is the responsibility of the contractor to become informed in regards to the anticipated water level at the time of construction. The submission of a proposal will be considered conclusive evidence that the bidder is satisfied with the conditions to be encountered in performing the work and as to the requirements of the proposed work. For the purposes of preparing these plans, the water elevation was assumed to be 1940.12 (NAVD 88) on the west side of the road.

107-700 HAUL ROADS: The Engineer will not designate paved roads off the state system as haul roads.

107-710 HAUL ROADS: Before submitting a proposal, contact the appropriate State, County, Township, or City officials to determine if there are any roadways that will be designated as "no haul routes".

256-P01 RIPRAP GRADE II: Place riprap as soon as possible to minimize erosion potential. Place riprap around the culvert in such a manner that the pipe is not damaged and the flow is not obstructed.

262-P01 FLOTATION SILT CURTAIN: The flotation silt curtain must be in place before the installation of the cofferdam or any excavation for the pipe ends is done. Include all costs associated with installation, maintenance, and removal of the flotation silt curtain in the bid price for "Flotation Silt Curtain".

430-P01 HOT MIX ASPHALT - TIGHT BLADING: Use approximately 1/4" of the 3" asphalt overlay for tight blading before the asphalt overlay is applied. Place the tight blading in a single motor grader pass across the full width of the lane and shoulder. Compact the material with a pneumatic roller prior to the overlay. Include all costs associated with tight blading in the bid price for "Superpave FAA 43" and "PG 58-28 Asphalt Cement".

430-P02 HOT MIX ASPHALT: Paver lay the hot mix asphalt in two lifts with the top lift being 1 1/2".

626-P01 COFFERDAM: Cofferdam will be required to install the culvert at Sta 39+06.6. Include all costs associated with installing and removing the cofferdam and dewatering the work area in the price bid for "Cofferdam".

704-P01 TRAFFIC CONTROL FOR BITUMINOUS PAVEMENT: Provide traffic control consisting of a lane closure, flagging, and a pilot car. Provide additional devices at no additional cost to the Department.

Traffic control device quantities are based on a 6 mile limitation and the list below.

D-704-15, Layout Type A for a temporary lane closure with pilot car to perform placing of aggregate, milling, paving, and cutting in centerline rumble strips. Quantities are based on two lane closures happening simultaneously.

D-704-19, Layout Type F for a temporary roadway closure at pipe replacement location.

D-704-20, Layout Type G as the basis of the Construction Signing Sheet

D-704-22, Layouts Type K and L for trucks entering and exiting the roadway as needed.

D-704-24, Layout Type R and S for shoulder as needed.

D-704-26, Layouts Type BB, CC, EE, FF, and GG as needed.

D-704-27, for pavement marking.

D-704-56, for grinding shoulder rumble strips.

704-P02 PIPE INSTALLATION: Provide traffic control for the installation of the centerline pipe in accordance with the Traffic Control Layout for Pipe Removal and Replacement in conjunction with Standard Drawing D-704-19, Layout Type F. Install pipe, backfill trench up to grade, and return traffic to normal by end of day's work. If unable to complete the centerline pipe replacement work in one working day, make the area traversable for two lanes of traffic or flag 24 hours per day. Provide a fifteen foot wide driving surface with the use of flaggers or a twenty-eight foot wide driving surface with the use of traffic control devices (D-704-15 Type B) to maintain traffic.

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ENVIRONMENTAL NOTES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-1-014(006)021	6	2

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

EN-1 TEMPORARY WETLAND IMPACT: Temporary impact areas within wetlands and 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.

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ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-1-014(006)021	8	1

SPEC CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
-----	-----	-----	-----	-----
103	0100 CONTRACT BOND	L SUM	0.51	0.51
202	0132 REMOVAL OF BITUMINOUS SURFACING	SY	134	134
202	0174 REMOVAL OF PIPE ALL TYPES AND SIZES	LF	104	104
230	0125 SHOULDER PREPARATION	MILE	24.376	24.376
256	0200 RIPRAP GRADE II	CY	176	176
262	0100 FLOTATION SILT CURTAIN	LF	134	134
302	0120 AGGREGATE BASE COURSE CL 5	TON	833	833
401	0050 TACK COAT	GAL	23,679	23,679
411	0105 MILLING PAVEMENT SURFACE	SY	535	535
430	0043 SUPERPAVE FAA 43	TON	38,766	38,766
430	1000 CORED SAMPLE	EA	128	128
430	5828 PG 58-28 ASPHALT CEMENT	TON	2,327	2,327
626	0100 COFFERDAM	EA	1	1
702	0100 MOBILIZATION	L SUM	0.51	0.51
704	0100 FLAGGING	MHR	350	350
704	1000 TRAFFIC CONTROL SIGNS	UNIT	1,716	1,716
704	1052 TYPE III BARRICADE	EA	6	6
704	1060 DELINEATOR DRUMS	EA	8	8
704	1067 TUBULAR MARKERS	EA	244	244
704	1080 STACKABLE VERTICAL PANELS	EA	10	10
704	1185 PILOT CAR	HR	150	150
706	0550 BITUMINOUS LABORATORY	EA	0.51	0.51
706	0600 CONTRACTOR'S LABORATORY	EA	0.51	0.51
709	0151 GEOSYNTHETIC MATERIAL TYPE R1	SY	562	562
709	0155 GEOSYNTHETIC MATERIAL TYPE RR	SY	335	335
714	4120 PIPE CONDUIT 42IN	LF	118	118
754	0805 OBJECT MARKERS - CULVERTS	EA	2	2
760	0005 RUMBLE STRIPS - ASPHALT SHOULDER	MILE	24.35	24.35
760	0007 RUMBLE STRIPS - ASPHALT CENTERLINE	MILE	12.175	12.175
762	0430 SHORT TERM 4IN LINE-TYPE NR	LF	113,196	113,196
762	1104 PVMT MK PAINTED 4IN LINE	LF	166,055	166,055

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MATERIALS

AGGREGATE BASE COURSE CL 5 @ 1.5 TON/CY + 25% = 1.875 TON/CY
TACK COAT @ 0.05 GAL/SY
SUPERPAVE FAA 43 @ 2.0 TON/CY
PG 58-28 ASPHALT CEMENT @ 6.0% of SUPERPAVE FAA 43

***WATER**

Water for Compaction:
20 Gal/Ton of Aggregate Base Course Cl 5
10 Gal/CY for Embankment

*Not a Bid Item. Price to be included in Pipe Bid Item.

REMOVAL OF PAVEMENT

Bituminous Pavement @ 1.875 TON/CY
Aggregate Base @ 1.875 TON/CY

SPEC CODE	BID ITEM	UNIT	QUANTITY
760 0005	RUMBLE STRIPS - ASPHALT SHOULDER	MILE	24.350
760 0007	RUMBLE STRIPS - ASPHALT CENTERLINE	MILE	12.175

430-1000 CORED SAMPLE							
Specification Section	A Lanes	B Lifts	C Distance (Feet)	D Sublots (A x B x C) ÷ 2000	Quantity (D x 2)	Quantity (1 per mile)	Unit
430.04.1.2.b(1), "General"	2	1	64351	64	128	N/A	EA
430.04.1.2.b(2) "Pavement Thickness Determination Cores"					N/A	0	EA
				Total	128	0	EA

Short Term 4In Line-Type NR			
Location	Basis	Quantity	
Yellow Centerline Top of 1st Lift	Center Skips	1,320 LF / mile	15,557 LF
	Barrier Stripe	17,931 LF	17,931 LF
	Double Barrier	10,560 LF/mile	4,244 LF
Yellow Centerline Top of 2nd Lift	Center Skips	1,320 LF / Mile	15,557 LF
	Barrier Stripe	17,931 LF	17,931 LF
	Double Barrier	10,560 LF/mile	4,244 LF
Yellow Centerline Rumble Strip Fogging	Center Skips	1,320 LF / Mile	15,557 LF
	Barrier Stripe	17,931 LF	17,931 LF
	Double Barrier	10,560 LF/mile	4,244 LF

TOTAL Short Term 4In Line - Type NR	113,196 LF
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White Edge Lines - Pvmt Mk Painted 4In Line			
Location - ND 14	Basis	Quantity	Unit
8+59.9 to 698+68.4	10,560 LF/mile	128,701	LF
Exceptions		378	Unit
	Total	128,323	LF

Yellow Centerline Skips - Pvmt Mk Painted 4In Line			
Location - ND 14	Basis	Quantity	Unit
8+59.9 to 698+68.4	1,320 LF/mile	15,557	LF

Yellow Centerline Barrier - Pvmt Mk Painted 4In Line			
Location - ND 14	Basis	Quantity	Unit
8+59.9 to 698+68.4	17,931	17,931	LF

Yellow Double Barrier - Pvmt Mk Painted 4In Line			
Location - ND 14	Basis	Quantity	Unit
8+59.9 to 698+68.4	10,560 LF/mile	4,244	LF

TOTAL Pvmt Mk Painted 4In Line	166,055	LF
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Barrier Striping Locations			
Stations	Barrier Stripe SB(LF)	Barrier Stripe NB(LF)	Double Barrier(LF)
Sta 698+68 to Sta 691+66			702
Sta 691+66 to Sta 683+43	823		
Sta 542+67 to Sta 530+21		1246	
Sta 530+21 to Sta 526+99			322
Sta 526+99 to Sta 514+32	1267		
Sta 495+69 to Sta 488+51		718	
Sta 484+28 to Sta 475+78	850		
Sta 462+64 to Sta 450+97		1167	
Sta 450+97 to Sta 447+64			333
Sta 447+64 to Sta 436+45	1119		
Sta 427+78 to Sta 412+52		1526	
Sta 412+52 to Sta 400+59	1193		
Sta 383+74 to Sta 374+92		882	
Sta 374+92 to Sta 370+12			480
Sta 370+12 to Sta 362+25	787		
Sta 282+47 to Sta 270+48		1199	
Sta 270+48 to Sta 267+63			285
Sta 267+62 to Sta 254+27	1335		
Sta 249+26 to Sta 241+12		814	
Sta 237+54 to Sta 226+50	1104		
Sta 211+72 to Sta 207+34		438	
Sta 200+47 to Sta 194+82	565		
Sta 95+56 to Sta 91+02		454	
Sta 83+21 to Sta 78+77	444		
Total	9487	8444	2122

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Basis of Estimate
3" HMA Overlay
ND Highway 14
Wing N to 1 Mi S Co Line

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-1-014(006)021	10	2

Hwy 14 Tangent Section	Hwy 14 Curve Section
Sta 24+27.7 to Sta 64+61.5	Sta 8+59.9 to Sta 24+27.7
Sta 93+10.6 to Sta 446+47.2	Sta 64+61.5 to Sta 93+10.6
Sta 451+75.5 to Sta 458+94.8	Sta 446+47.2 to Sta 451+75.5
Sta 469+69.8 to Sta 475+53.5	Sta 458+94.8 to Sta 469+69.8
Sta 481+03.5 to Sta 598+42.1BK=	Sta 475+53.5 to Sta 481+03.5
Sta 645+00 AHD to Sta 697+93.4	
Total Stations = 577.05	Total Stations = 65.70

SPEC	CODE	BID ITEM	UNIT	Hwy 14 Tangent Section				Hwy 14 Curve Section			
				Width (ft)	Depth (in)	Quantity per Station	SubTotal	Width (ft)	Depth (in)	Quantity per Station	SubTotal
230	0125	SHOULDER PREPARATION	MILE	--	--	0.0379	21.858	--	--	0.0379	2.489
401	0050	TACK COAT @ 0.05 GAL/SY - 1st Lift	GAL	31.5	--	17.50	10,098	31.5	--	17.50	1,150
401	0050	TACK COAT @ 0.05 GAL/SY - 2nd Lift	Gal	34	--	18.89	10,900	34	--	18.89	1,241
430	0043	SUPERPAVE FAA 43 @ 2 TON/CY	TON	30	3	59.26	34,196	30	3	59.26	3,893
430	5828	PG 58-28 ASPHALT CEMENT @ 6.0% OF SUPERPAVE FAA 43	TON	30	--	3.56	2,052	30	--	3.56	234

Culvert Replacement Location
Sta 38+88.9 to Sta 39+24.4
Total Stations = 0.36

SPEC	CODE	BID ITEM	UNIT	Culvert Replacement Location			
				Width (ft)	Depth (in)	Quantity per Station	SubTotal
202	0132	REMOVAL OF BITUMINOUS SURFACING	SY	34	8.5	377.8	134
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES	LF	104	--	104.0	104
256	0200	RIPRAP GRADE II	CY	35.5	--	495.8	176
302	0120	AGGREGATE BASE COURSE CL 5 @ 1.875 TON/CY	TON	38	8.5	173.6	62
709	0151	GEOSYNTHETIC MATERIAL TYPE R1	SY	117.5	--	1582.8	562
709	0155	GEOSYNTHETIC MATERIAL TYPE RR	SY	75	--	944.4	335
714	4120	PIPE CONDUIT 42IN	LF	118	--	118	118

Milling Transition
Sta 697+93.4 to Sta 698+68.4
Total Stations = 0.75

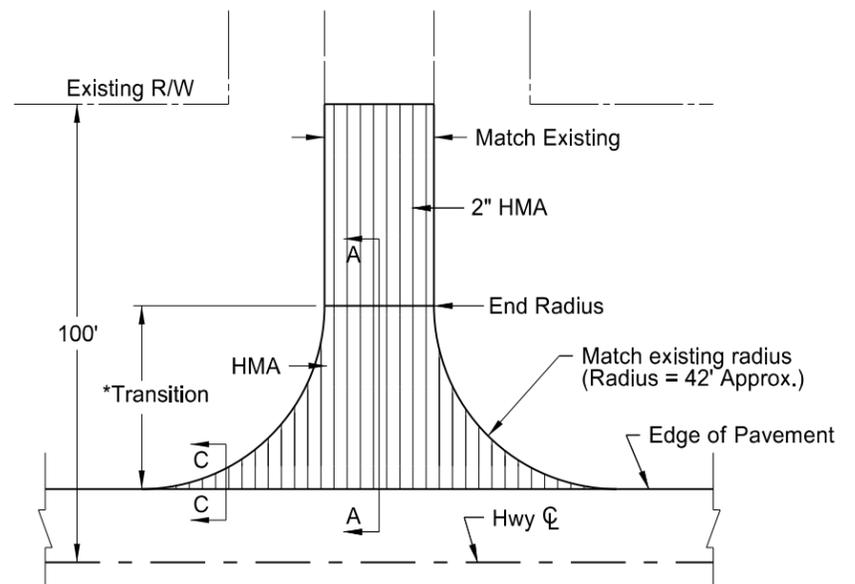
SPEC	CODE	BID ITEM	UNIT	Milling Transition			
				Width (ft)	Depth (in)	Quantity per Station	SubTotal
230	0125	SHOULDER PREPARATION	MILE	--	--	0.0379	0.028
401	0050	TACK COAT @ 0.05 GAL/SY - 1st Lift	GAL	34-44	--	35.67	27
401	0050	TACK COAT @ 0.05 GAL/SY - 2nd Lift	GAL	34-44	--	35.67	27
411	0105	MILLING PAVEMENT SURFACE	SY	30-44	--	713.33	535
430	0043	SUPERPAVE FAA 43 @ 2 TON/CY	TON	30-44	1.5-3	91.8	69
430	5828	PG 58-28 ASPHALT CEMENT @ 6.0% OF SUPERPAVE FAA 43	TON	30-44	--	5.5	4.1

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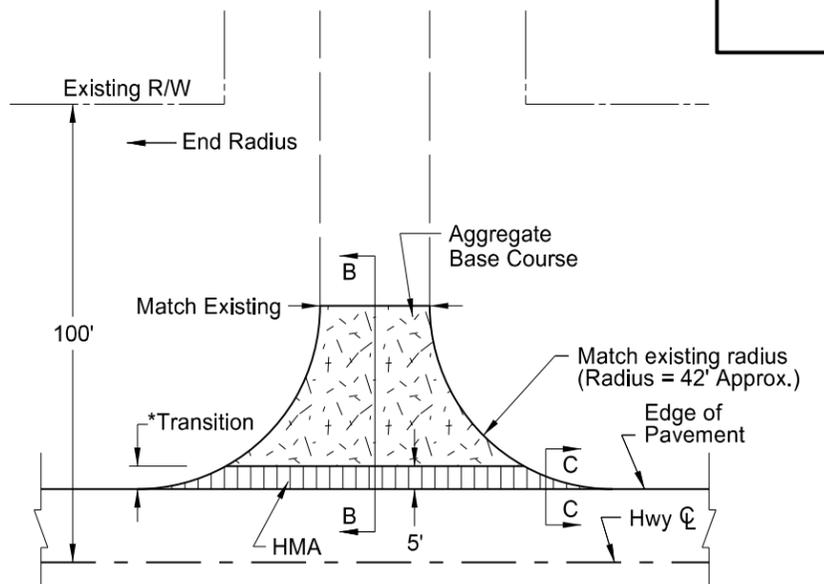
Basis of Estimate

3" HMA Overlay

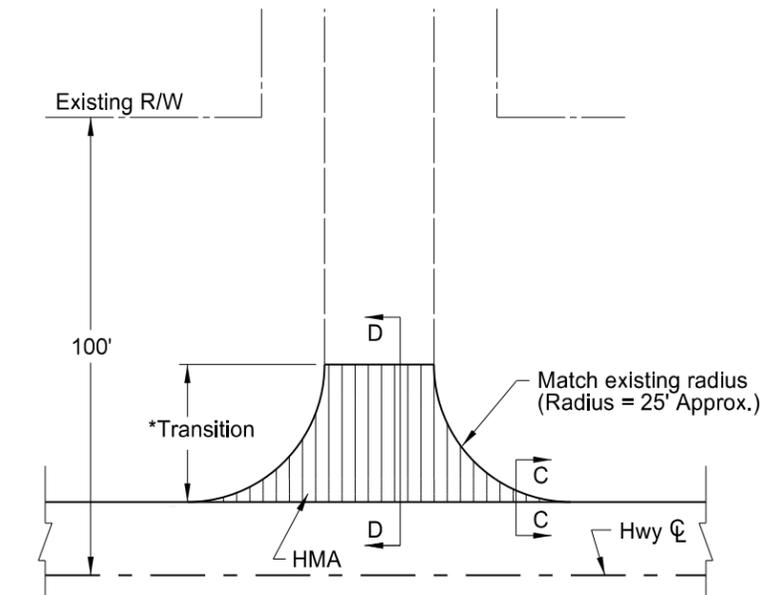
ND Highway 14
Wing N to 1 Mi S Co Line



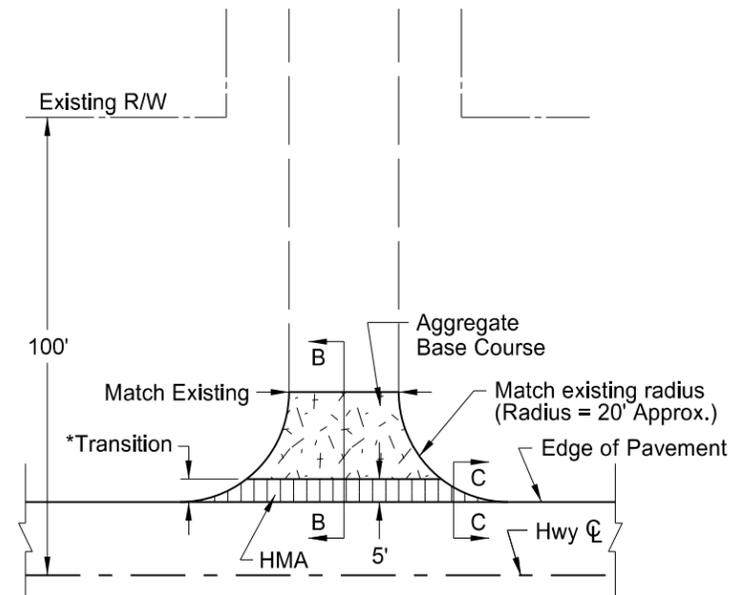
(1) Paved Section Line, County Road, or Street Approach



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



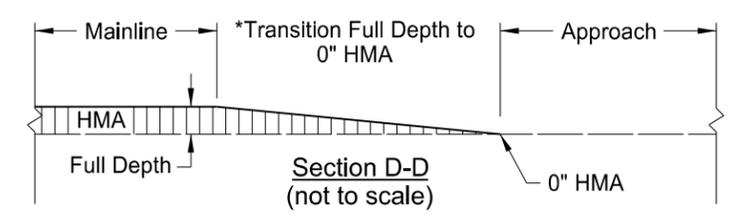
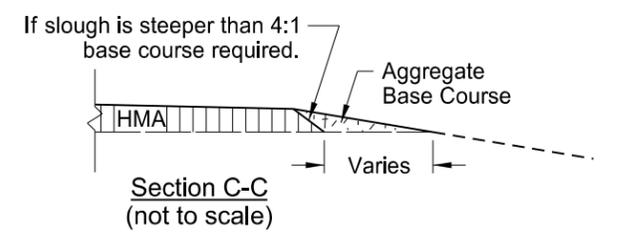
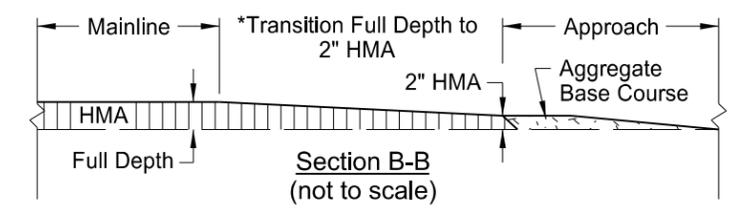
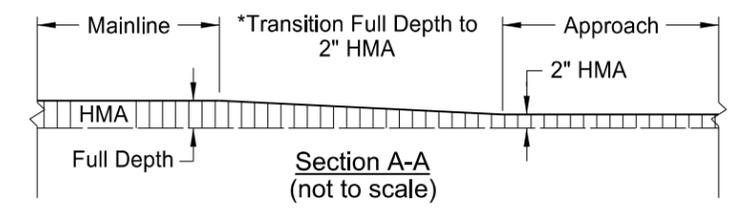
(3) Paved Private Drive Approach



(4) Gravel Private or Field Drive Approach

Notes:

- Actual HMA paving and aggregate base course locations may vary in the field, as approved by the Engineer.
- Quantity totals have been included in the bid items of the "Estimate of Quantities" of the plans.
- 400 Tons of aggregate base course has been provided in the quantities to fill in around the radii. This material will be required when sloughs are steeper than 4:1 (see section C-C)



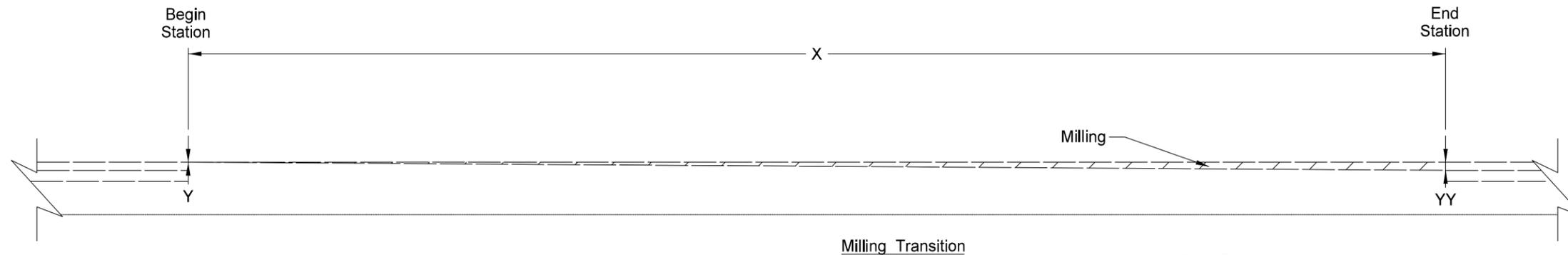
BASIS OF ESTIMATE		(1)	(2)	(3)	(4)	TOTALS
ITEM	UNIT	Paved Section Line	Gravel Section Line	Paved Private Drive	Gravel Field/Private Drive	
Number of Locations	#	10	5	3	47	65
Aggregate Base Course CL 5	TON	N/A	6	N/A	3	171
Tack Coat	GAL	15.5	2.3	4.3	1.2	236
Superpave FAA 43	TON	40	6.3	7.2	3.3	608
PG 58-28 Asphalt Cement	TON	2.4	.38	.43	.2	37

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Approach Paving Details for Preventive Maintenance or Minor Rehabilitation Projects

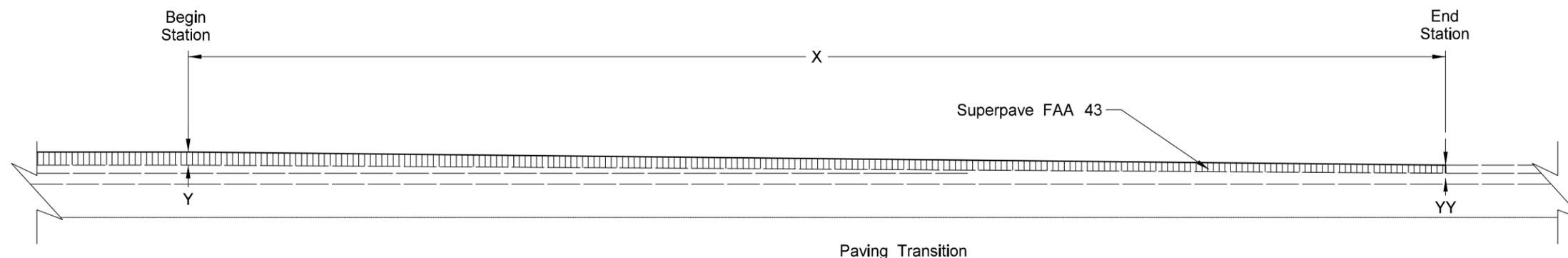
3" HMA Overlay
ND Highway 14
Wing N to 1 Mi S Co Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-1-014(006)021	20	2



Milling Transition

X	Begin Station	Y	End Station	YY
150 ft.	697+93.4	0 in.	698+68.4	1.5 in.



Paving Transition

X	Begin Station	Y	End Station	YY
150 ft.	697+93.4	3 in.	698+68.4	1.5 in.

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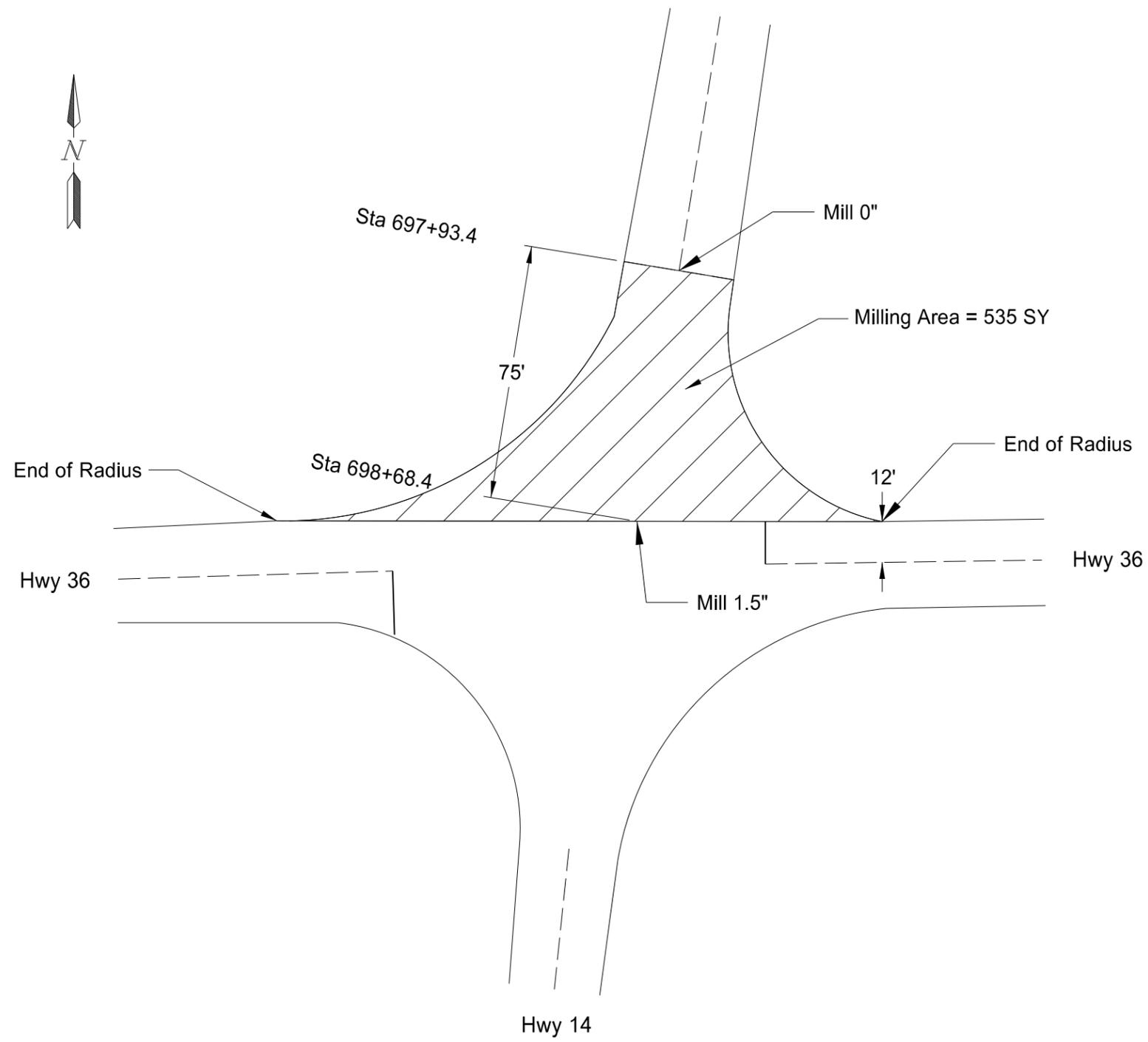
Milling and Paving Transitions
Project Ends

3" HMA Overlay

ND Highway 14
Wing N to 1 Mi S Co Line

NOTE: Drawing is not to scale.

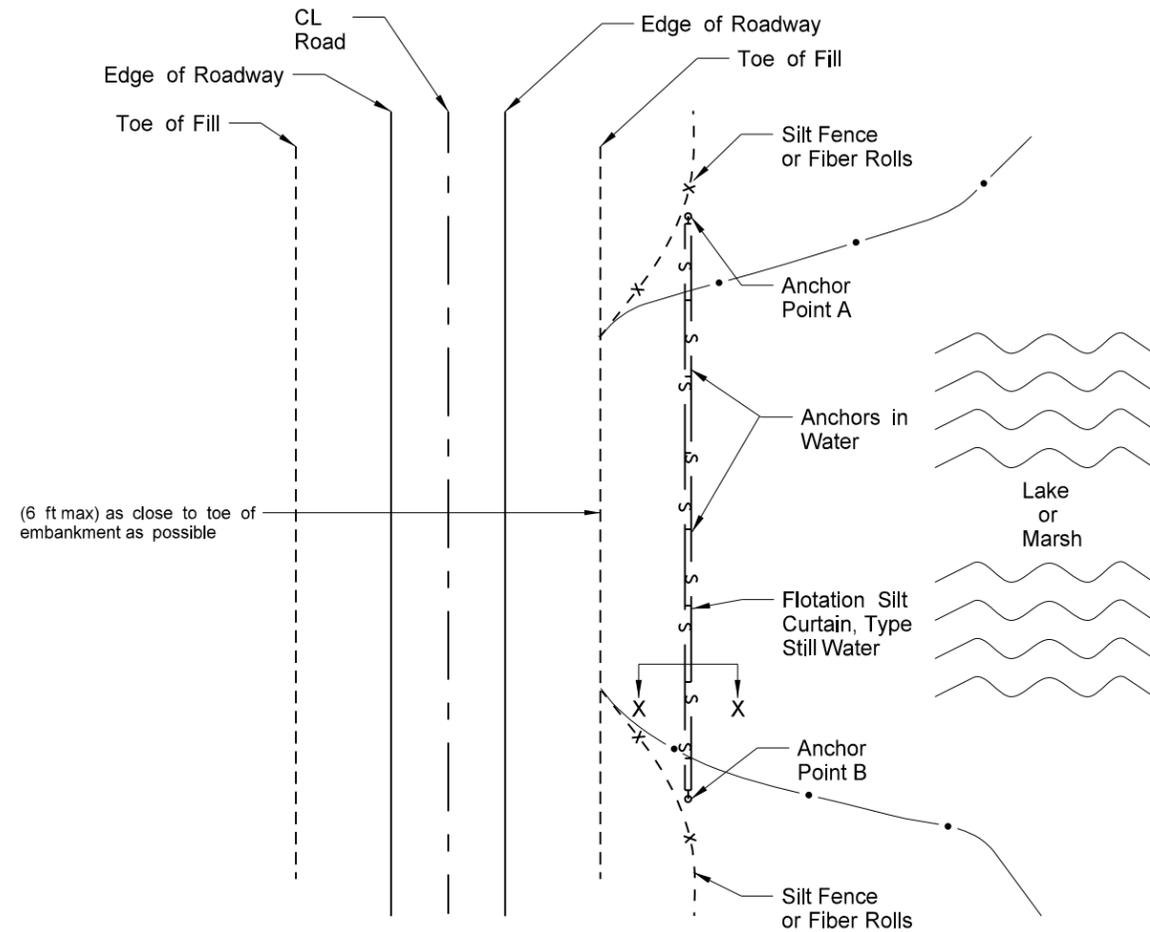
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-1-014(006)021	20	3



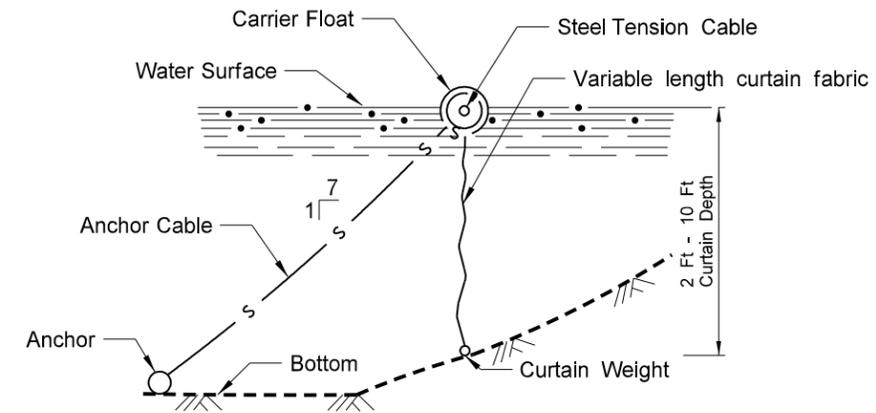
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Milling - Jct ND 36 & ND 14
 3" HMA Overlay
 ND Highway 14
 Wing N to 1 Mi S Co Line

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-1-014(006)021	20	4



PLAN VIEW
FLOTATION SILT CURTAIN - TYPE STILL WATER
 The silt curtain shall extend onto shore and shall also be anchored there.



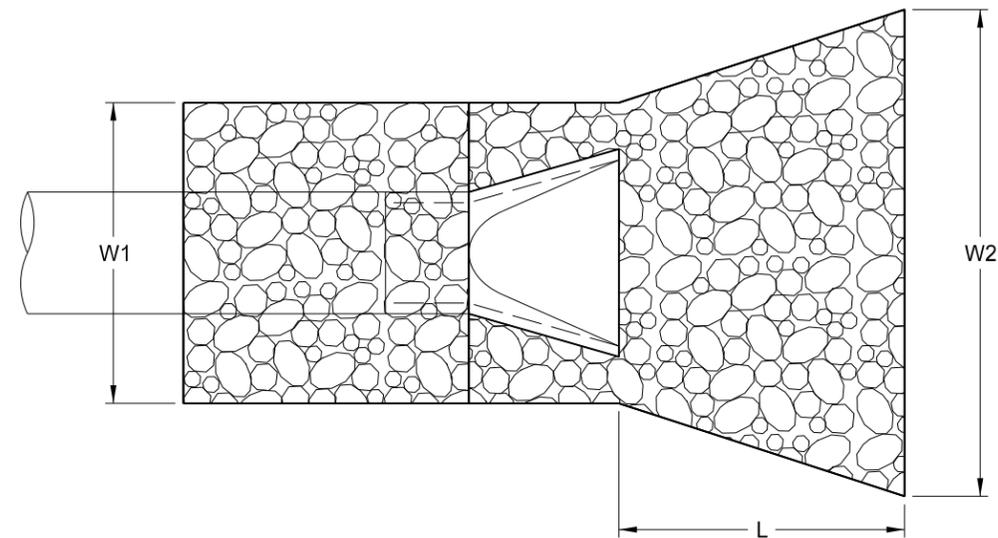
SECTION X-X
FLOTATION SILT CURTAINS

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

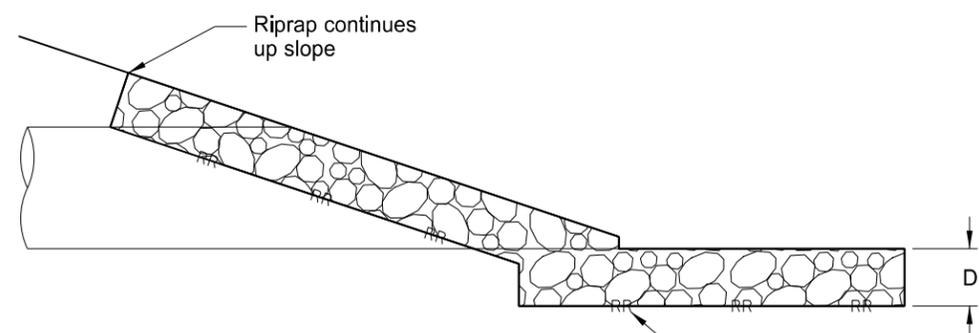
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Temporary Erosion Control - Flotation Silt Curtain
 3" HMA Overlay
 ND Highway 14
 Wing N to 1 Mi S Co Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-1-014(006)021	20	5



PLAN VIEW



PROFILE VIEW

Riprap Dimensions				
Culvert Diameter	L (feet)	W1 (feet)	W2 (feet)	Riprap Depth, D (Inches)
42	10	10.5	17	24
48	10	12	19	24

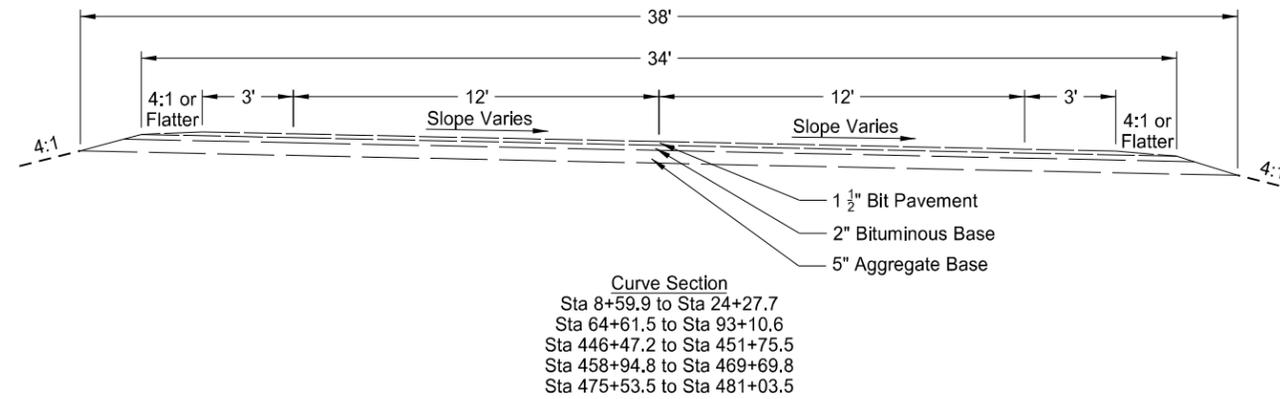
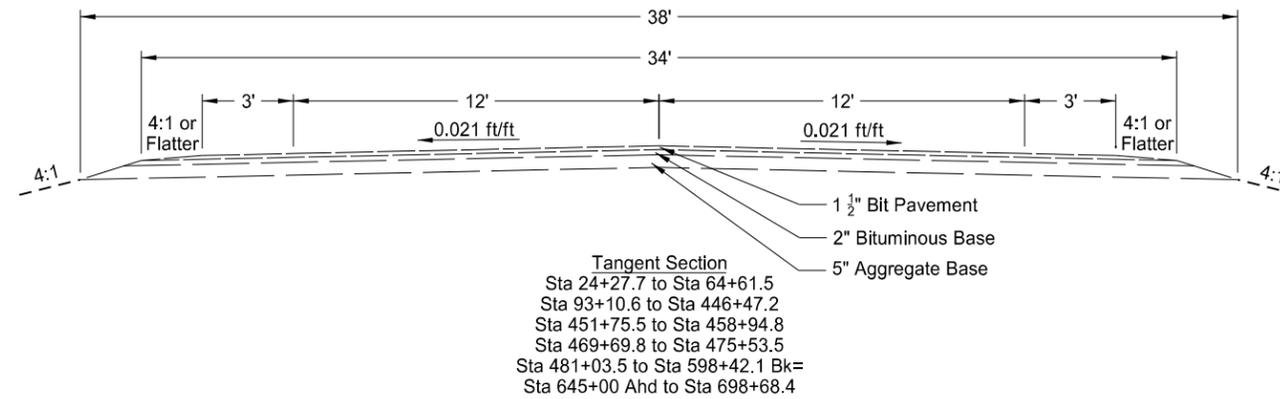
Riprap Locations and Quantities						
Location (Sta.)	Alignment	Pipe Dia. (inches)	Geosynthetic Material Type RR (SY)		Riprap Grade II (CY)	
			LT	RT	LT	RT
39+06.6	ND Hwy 14	42	15		10	

Culvert Diameter	Geosynthetic Material Type RR (SY)	Riprap Grade II (CY)
42	15	10
48	17	11

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Detail
 Riprap at Pipe Outlets
 3" HMA Overlay
 ND Highway 14
 Wing N to 1 Mi S Co Line

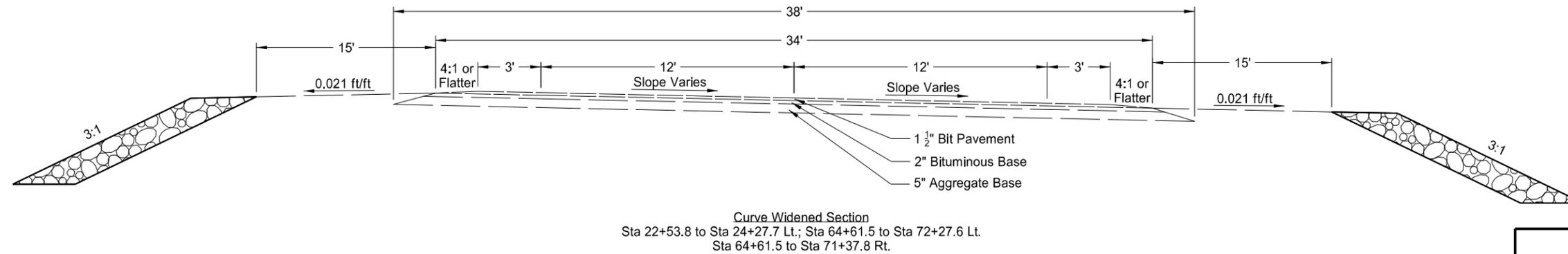
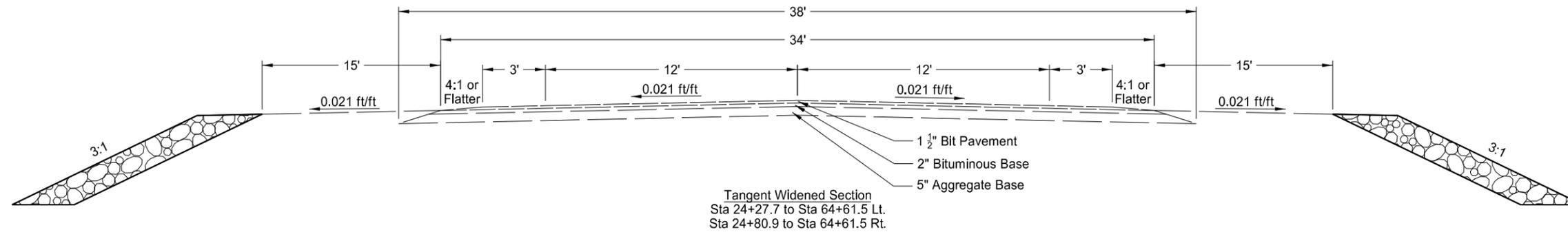
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-1-014(006)021	30	1



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Existing Typical Sections
3" HMA Overlay
ND Highway 14
Wing N to 1 Mi S Co Line

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-1-014(006)021	30	2



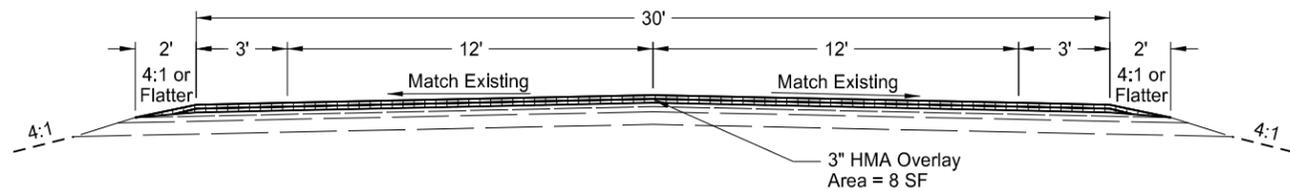
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Existing Typical Sections

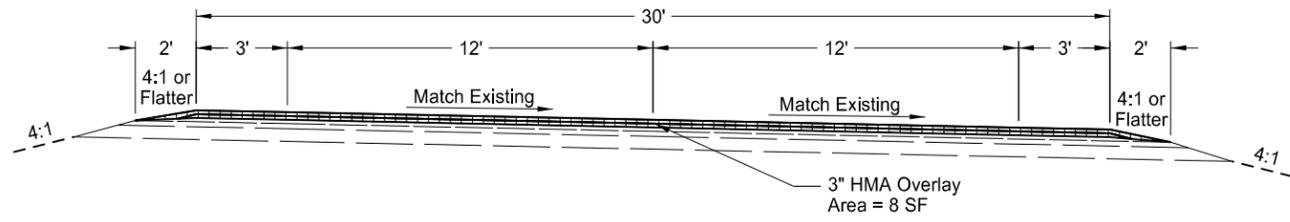
3" HMA Overlay

ND Highway 14
Wing N to 1 Mi S Co Line

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-1-014(006)021	30	3



Tangent Section
 Sta 24+27.7 to Sta 64+61.5
 Sta 93+10.6 to Sta 446+47.2
 Sta 451+75.5 to Sta 458+94.8
 Sta 469+69.8 to Sta 475+53.5
 Sta 481+03.5 to Sta 598+42.1 BK=
 Sta 645+00 AHD to Sta 698+68.4

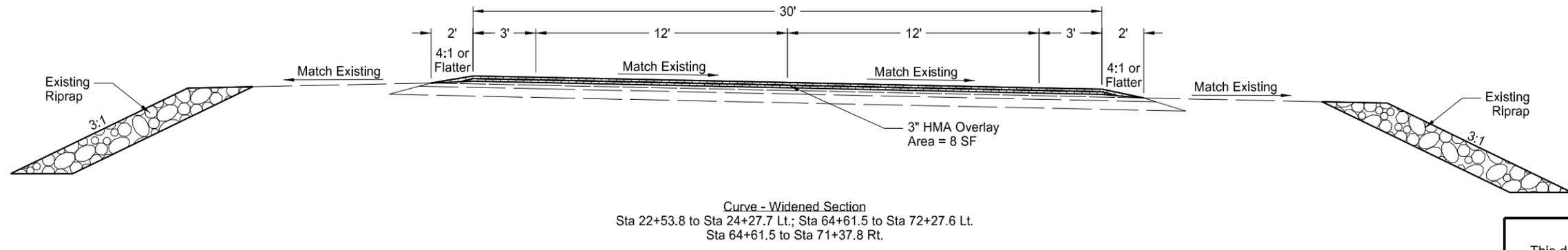
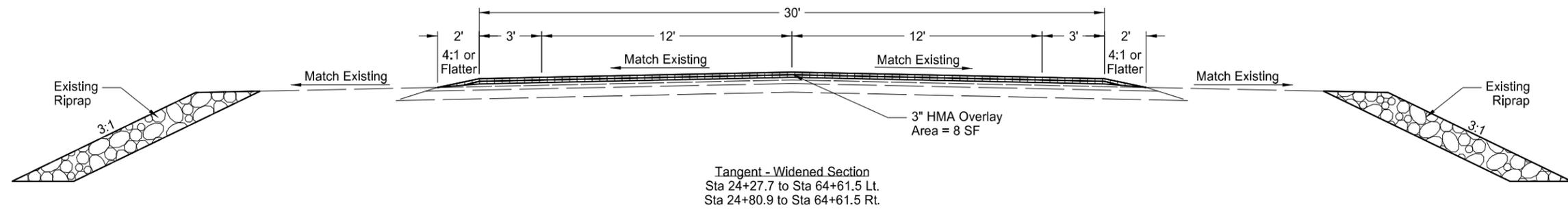


Curve Section
 Sta 8+59.9 to Sta 24+27.7
 Sta 64+61.5 to Sta 93+10.6
 Sta 446+47.2 to Sta 451+75.5
 Sta 458+94.8 to Sta 469+69.8
 Sta 475+53.5 to Sta 481+03.5

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Proposed Typical Sections
 3" HMA Overlay
 ND Highway 14
 Wing N to 1 Mi S Co Line

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-1-014(006)021	30	4



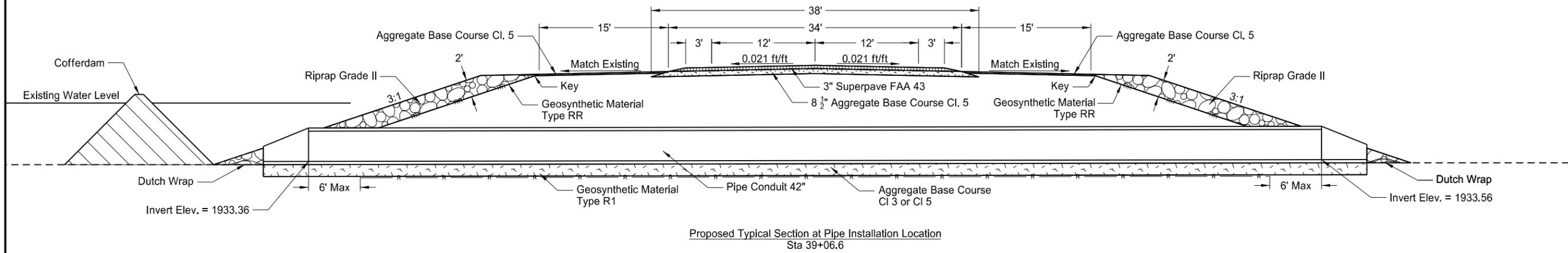
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Proposed Typical Sections

3" HMA Overlay

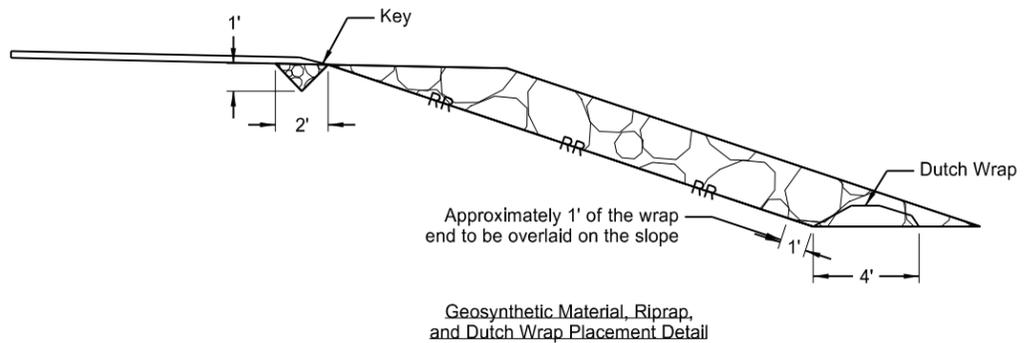
ND Highway 14
Wing N to 1 Mi S Co Line

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-1-014(006)021	30	5



Proposed Typical Section at Pipe Installation Location
Sta 39+06.6

Note: If the water elevation is higher than currently shown, the riprap will move up the 3:1 slope.



Geosynthetic Material, Riprap,
and Dutch Wrap Placement Detail

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Proposed Pipe Typical Section

3" HMA Overlay

ND Highway 14
Wing N to 1 Mi S Co Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-1-014(006)021	50	1

HYDRAULIC DATA FOR SS-1-014(006)021 (A)									
STATION	EXISTING PIPE	PROPOSED PIPE SIZE	DRAINAGE AREA (ACRES)	25-YEAR DATA				100-YEAR DATA	
				DESIGN DISCHARGE (CFS)	DESIGN HEADWATER (FT)	DESIGN VELOCITY (FPS)	DESIGN STAGE (NAVD 88)	100-YEAR DISCHARGE (CFS)	100-YEAR STAGE (NAVD 88)
1737+38 (B)	36" RCP	42"	8645.5	-	-	-	-	-	-

(A) Hydraulic data provided is for smooth-walled (Manning's n=0.012) type conduits.
(B) Centerline culvert at 1737+38 acts as an equalizer and is not evaluated as a conventional culvert.

This document was originally issued and sealed by
Randall Sandvig
Registration Number
PE- 8783,
on 6/30/16 and the original document is stored at the
North Dakota Department
of Transportation

Culvert Hydraulic Data
ND 14
Wing N to 1 Mi S Co Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-1-014(006)021	51	1

Begin Station / Location	Begin Offset	End Station / Location	End Offset	Pipe Installation (Pay Item)		Allowable Material	Required Diameter	Steel Pipe Coatings	Steel Pipe Corrugations or Spiral Ribs	Steel Pipe Minimum Thickness	R1 Fabric (Pay Item)	(*) End Sections		Applicable Backfill	
				In	Bid Item							LF	In		Type
39+06.6 (ND 14)	58.75 Lt	39+06.6 (ND 14)	58.75 Rt	42	Pipe Conduit	118	Reinforced Concrete Pipe - Class III(barrel length = 112 LF)	42				561	FES	FES	Standard D-714-25
							Corrugated Steel Pipe	48	Z, A, P	2	0.064				
							Spiral Rib Steel Pipe	42	Z, A, P	3/4, 1	0.064				

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

Corrug 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"

(*) The price bid for "Pipe Conduit" bid items includes end sections.
FES = Flared End Section
TES = Traversable End Section

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Allowable Pipe List

3" HMA Overlay

ND Highway 14
Wing N to 1 Mi S Co Line

Wetland Impact Table															
Wetland Number	Location	Cowardin Class.	Wetland Type	Wetland Size (acres)	Wetland Feature	USACE Jurisdictional Wetlands ¹	Wetland Impacts (acres)		USFWS Easement Impacts (acres)		Wetland Mitigation				
							Temp.	Perm.	Temp.	Perm.	Mitigation Required			Location; Acreage; Wetland #; Ratio	Onsite Mitigation Acres
											EO 11990	USACE	USFWS		
1a	Sec.3, T142N, R76W	PEM/C	Basin	.37	Natural	No	0.0	0.0	0.0	0.0	No	No	No	N/A	0.0
1b	Sec.3, T142N, R76W	PEMA/C	Basin	.46	Natural	No	0.0	0.0	0.0	0.0	No	No	No	N/A	0.0
2a	Sec.11, T144N, R76W	PEMA	Basin	.94	Natural	No	0.07*	0.00	0.0	0.0	No	No	No	N/A	0.0
2b	Sec.11, T144N, R76W	PEMA	Basin	.68	Natural	No	0.07*	0.00	0.0	0.0	No	No	No	N/A	0.0
Totals				2.45			0.14	0.00	0.0	0.0					0.0

¹ A wetland Jurisdictional Determination was issued by the USACE on 8/25/2015; NWO-2015-1407-BIS.

² All impacts to natural wetlands (natural/jurisdictional and natural/non-jurisdictional), regardless of size, as well as impacts greater than 0.10 acre to artificial/jurisdictional wetlands require mitigation.

³ All artificial/non-jurisdictional, deep water (impacts greater than 6.6 feet), Other Waters less than 300 linear feet (determined by the USACE on a case by case), and temporary impacts do not require mitigation.

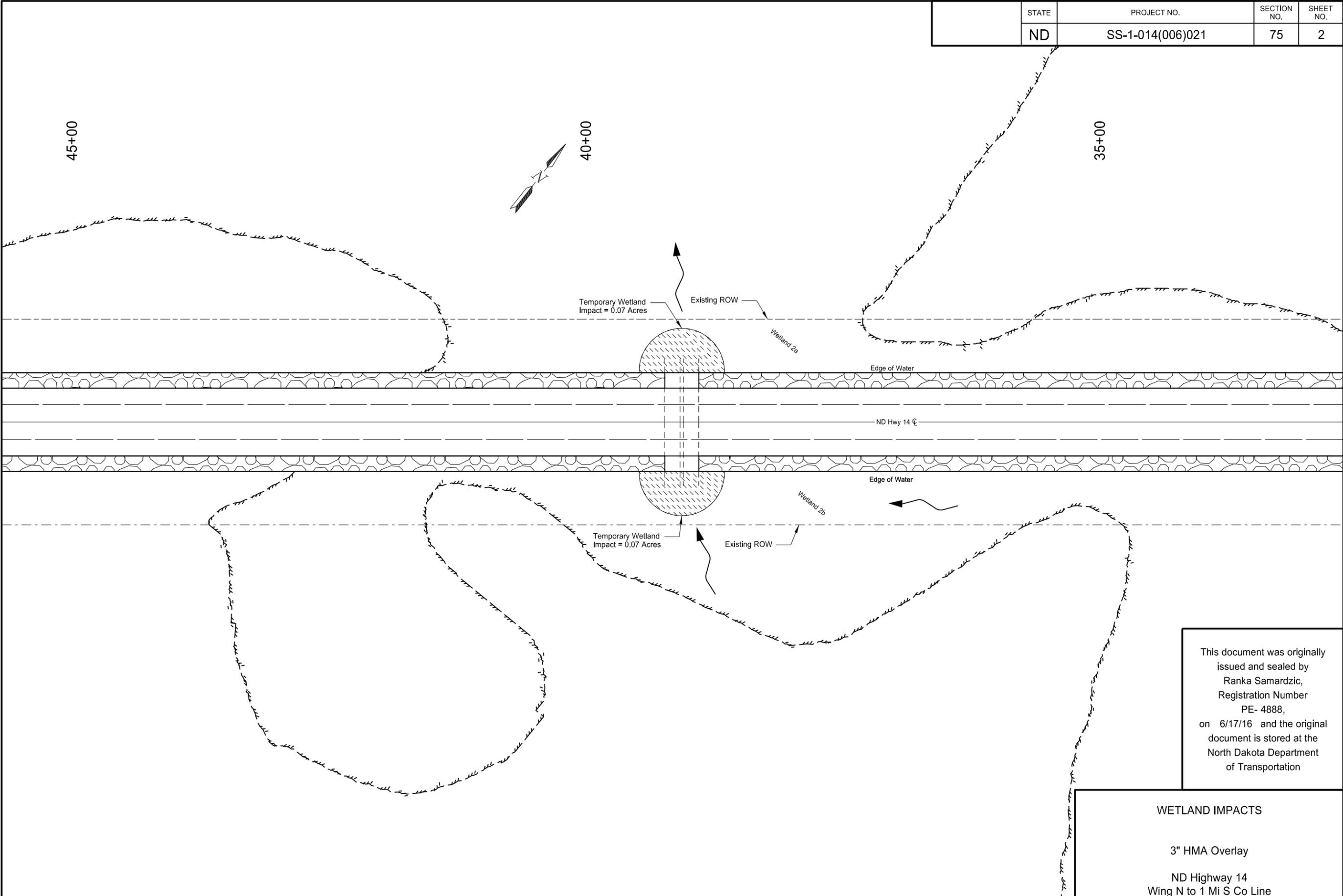
*These numbers are only an estimation. No existing cross-sections are available for these areas, so the impacts cannot be calculated at this time.

Summary Impact Table			
Total Permanent Impact Summary		Temporary Impacts and additional information	
Wetland Type	Total (Acres)	Wetland Type	Total (Acres/Lf)
Natural/JD	0.00	Temporary JD	0.00
Natural/Non-JD	0.00	Non-JD Temporary	0.14
Artificial/JD	0.00	Permanent JD > 0.10	0.00
Artificial/Non-JD	0.00	Permanent OW	0.00
Total	0.00	Temporary OW	0.00

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Wetlands Mitigation and Environmental

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-1-014(006)021	75	2



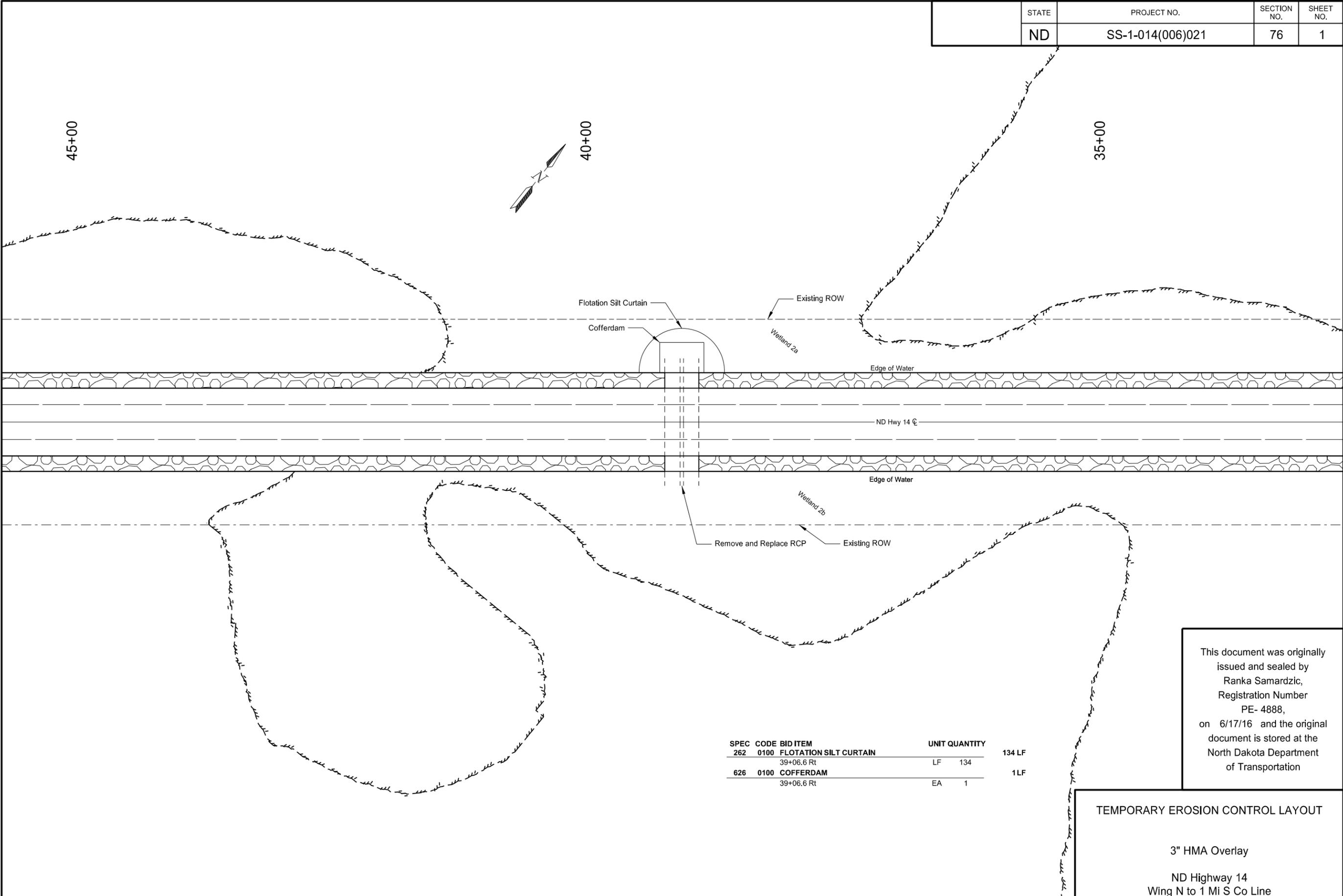
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WETLAND IMPACTS

3" HMA Overlay

ND Highway 14
Wing N to 1 Mi S Co Line

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-1-014(006)021	76	1



SPEC	CODE	BID ITEM	UNIT	QUANTITY	
262	0100	FLOTATION SILT CURTAIN			134 LF
		39+06.6 Rt	LF	134	
626	0100	COFFERDAM			1 LF
		39+06.6 Rt	EA	1	

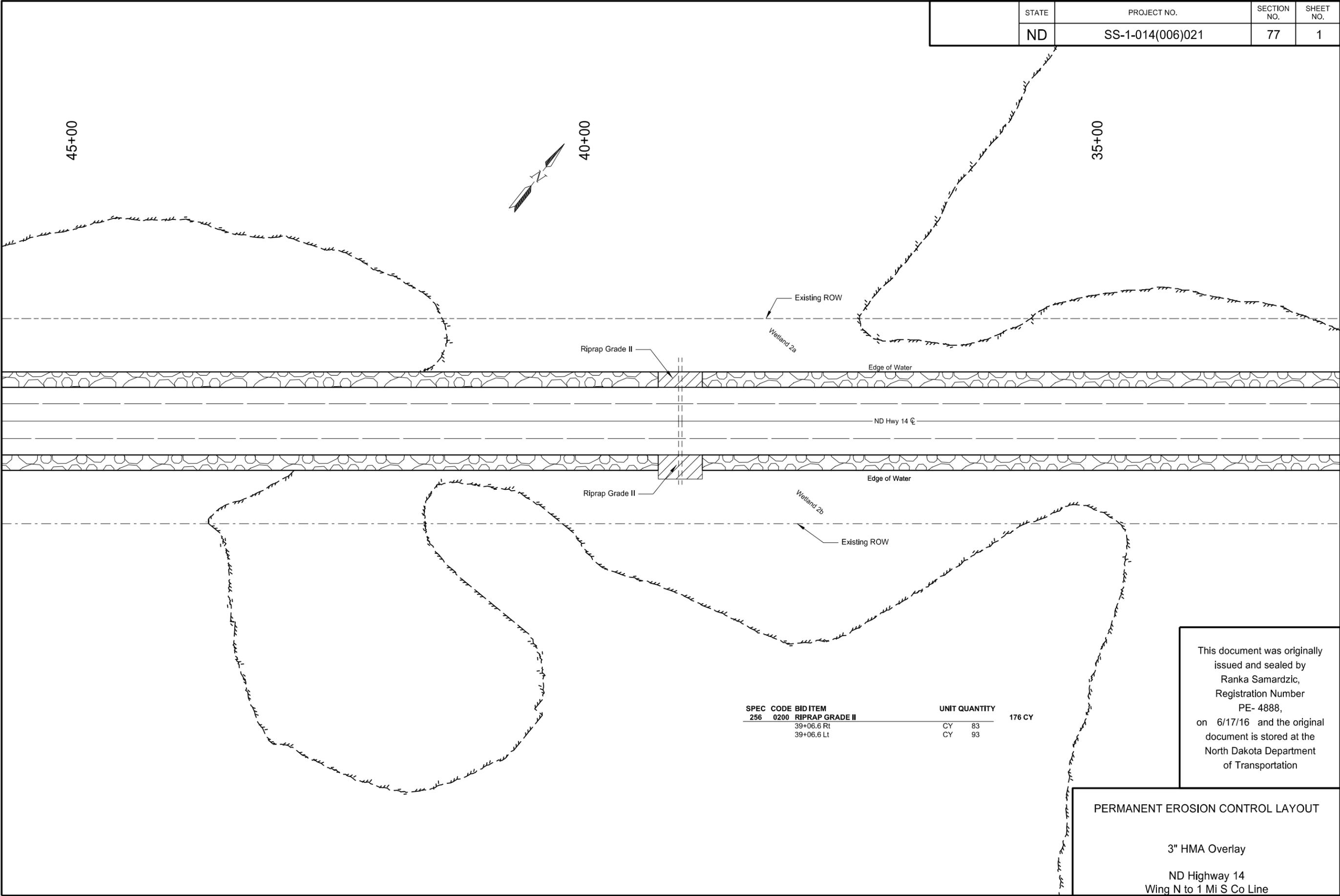
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TEMPORARY EROSION CONTROL LAYOUT

3" HMA Overlay

ND Highway 14
Wing N to 1 Mi S Co Line

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-1-014(006)021	77	1



SPEC	CODE	BID ITEM	UNIT	QUANTITY	TOTAL
256	0200	RIPRAP GRADE II			176 CY
		39+06.6 Rt	CY	83	
		39+06.6 Lt	CY	93	

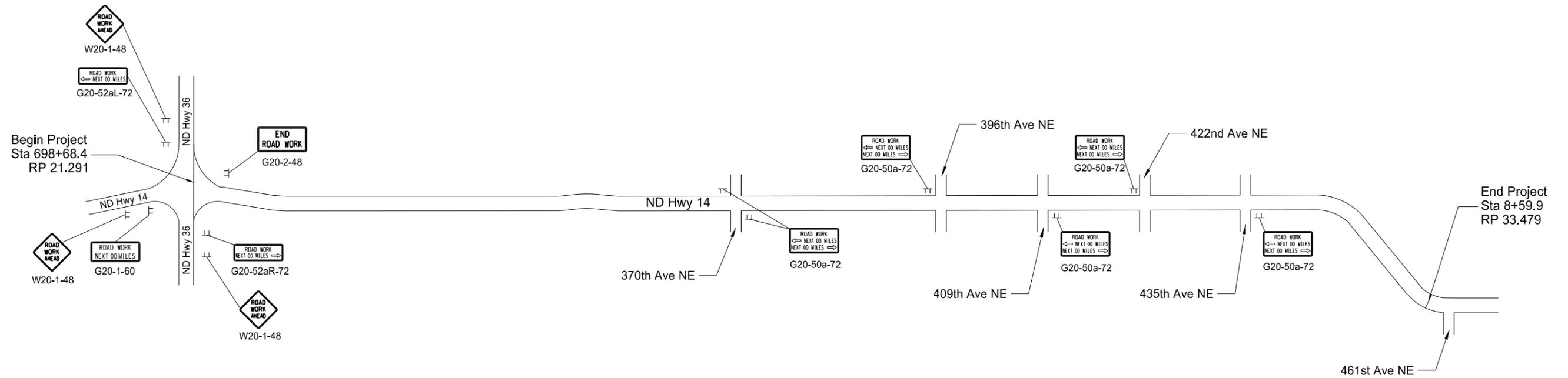
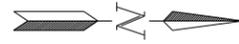
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PERMANENT EROSION CONTROL LAYOUT

3" HMA Overlay

ND Highway 14
Wing N to 1 Mi S Co Line

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-1-014(006)021	100	2



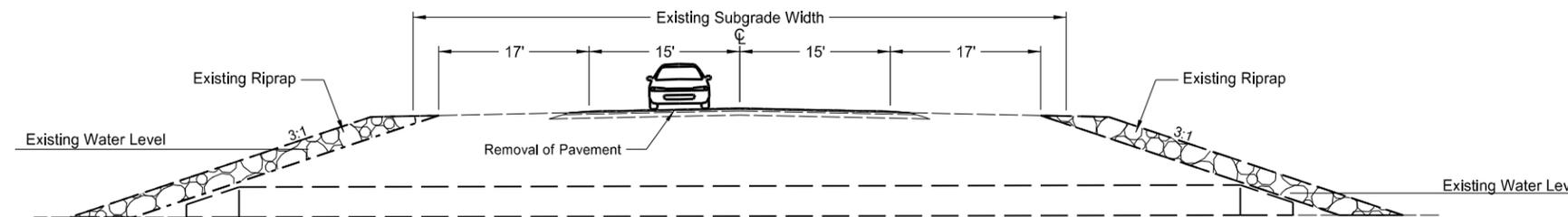
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Construction Signing

3" HMA Overlay

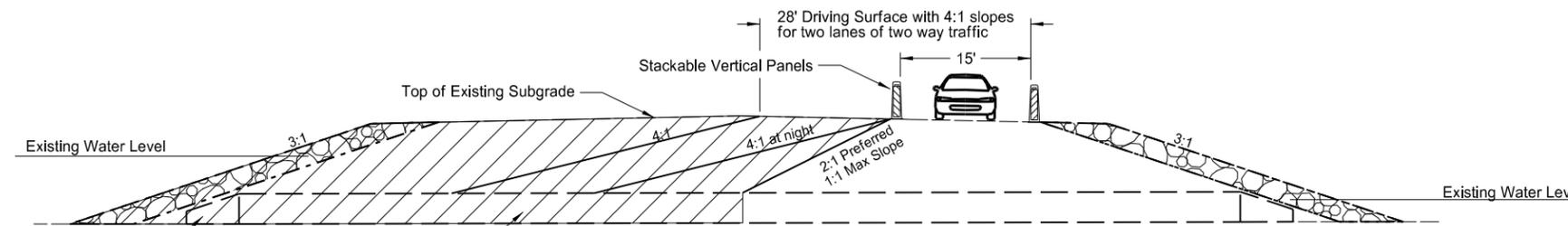
ND Highway 14
Wing N to 1 Mi S Co Line

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-1-014(006)021	100	3



Phase 1
Pavement Removal, Installing Cofferdams
One Lane Two Way Traffic With Flagging Operation

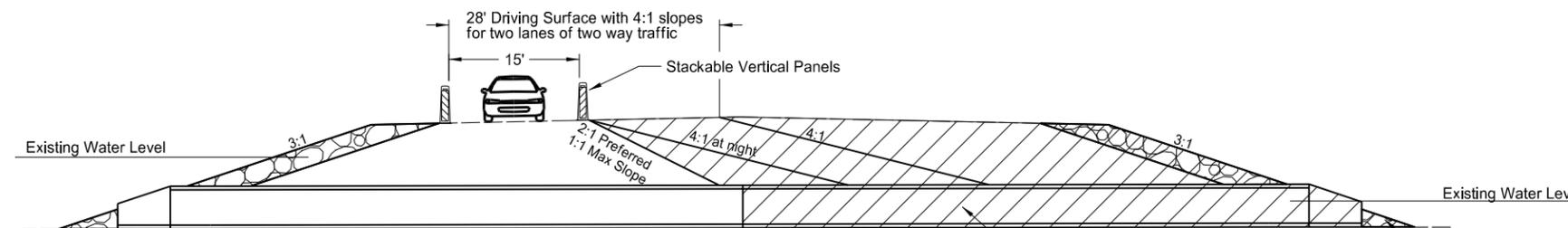
- PHASE ONE:**
- Maintain two way traffic with flagging on half of roadway while removing pavement on both lanes in accordance with Std. Dwg. D-704-19 Layout Type F.
 - Remove Pavement.
 - Install Cofferdams.



Phase 2
Removal of Existing Pipe, Installation of New Pipe
One Lane Traffic With Flagging Operation

- PHASE TWO:**
- Maintain one lane traffic with flagging using a 15' roadway width in accordance with Std. Dwg. D-704-19 Layout Type F.
 - Excavate on half of roadway according to Std. Dwg. D-714-25.
 - Install Geosynthetic Material, Aggregate Base Course, Pipe Conduit, Pipe Backfill, Suitable Excavated Material, Riprap, and additional embankment if needed on half of roadway according to Std. Dwg. D-714-25.
 - If the contractor is unable to complete the pipe replacement work in one working day, the area shall be made traversable for two lanes of two way traffic or flagged 24 hours per day for one lane of traffic. A 15' driving surface with (2:1 during day / 4:1 during night) foreslopes shall be provided to maintain one lane of traffic with the use of flaggers in accordance with Std. Dwg. D-704-19 Layout Type F or a 28' driving surface and 4:1 foreslopes for two lanes of traffic in accordance with Std. Dwg. D-704-15 Layout Type B.

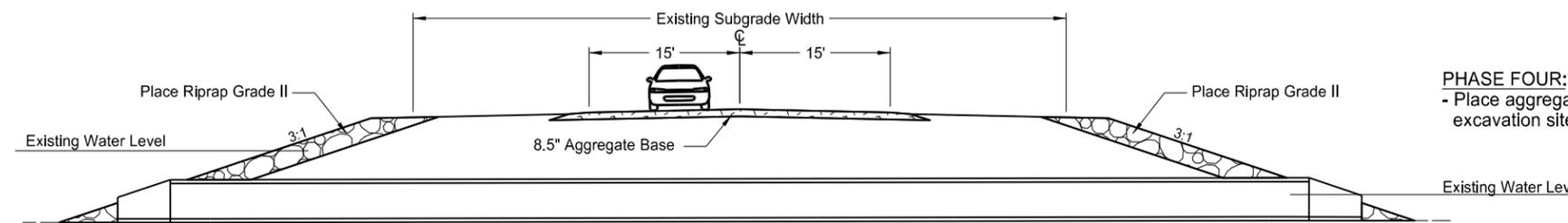
See Std. Spec. 714.04 A.2
Remove and Replace Pipe on one half of roadway. Place embankment on one half of roadway



Phase 3
Removal of Existing Pipe, Installation of New Pipe
One Lane Traffic With Flagging Operation

- PHASE THREE:**
- Maintain on lane traffic on the other half of the roadway with flagging using a 15' roadway width in accordance with Std. Dwg. D-704-19 Layout Type F.
 - Excavate on other half of roadway according to Std. Dwg. D-714-25.
 - Install Geotextile Synthetic Material, Aggregate Base Course, Pipe Conduit, Pipe Backfill, Suitable Excavated Material, Riprap, and additional embankment if needed on other half of roadway according to Std. Dwg. D-714-25.
 - If the contractor is unable to complete the pipe replacement work in one working day, the area shall be made traversable for two lanes of two way traffic or flagged 24 hours per day for one lane of traffic. A 15' driving surface with (2:1 during day / 4:1 during night) foreslopes shall be provided to maintain one lane of traffic with the use of flaggers in accordance with Std. Dwg. D-704-19 Layout Type F or a 28' driving surface and 4:1 foreslopes for two lanes of traffic in accordance with Std. Dwg. D-704-15 Layout Type B.

Remove and Replace Pipe on one half of roadway. Place embankment on one half of roadway
See Std. Spec. 714.04 A.2



Phase 4
Return to Normal Two Way
Two Lane Traffic

- PHASE FOUR:**
- Place aggregate to match existing asphalt around excavation site to return to normal two lane two way traffic.

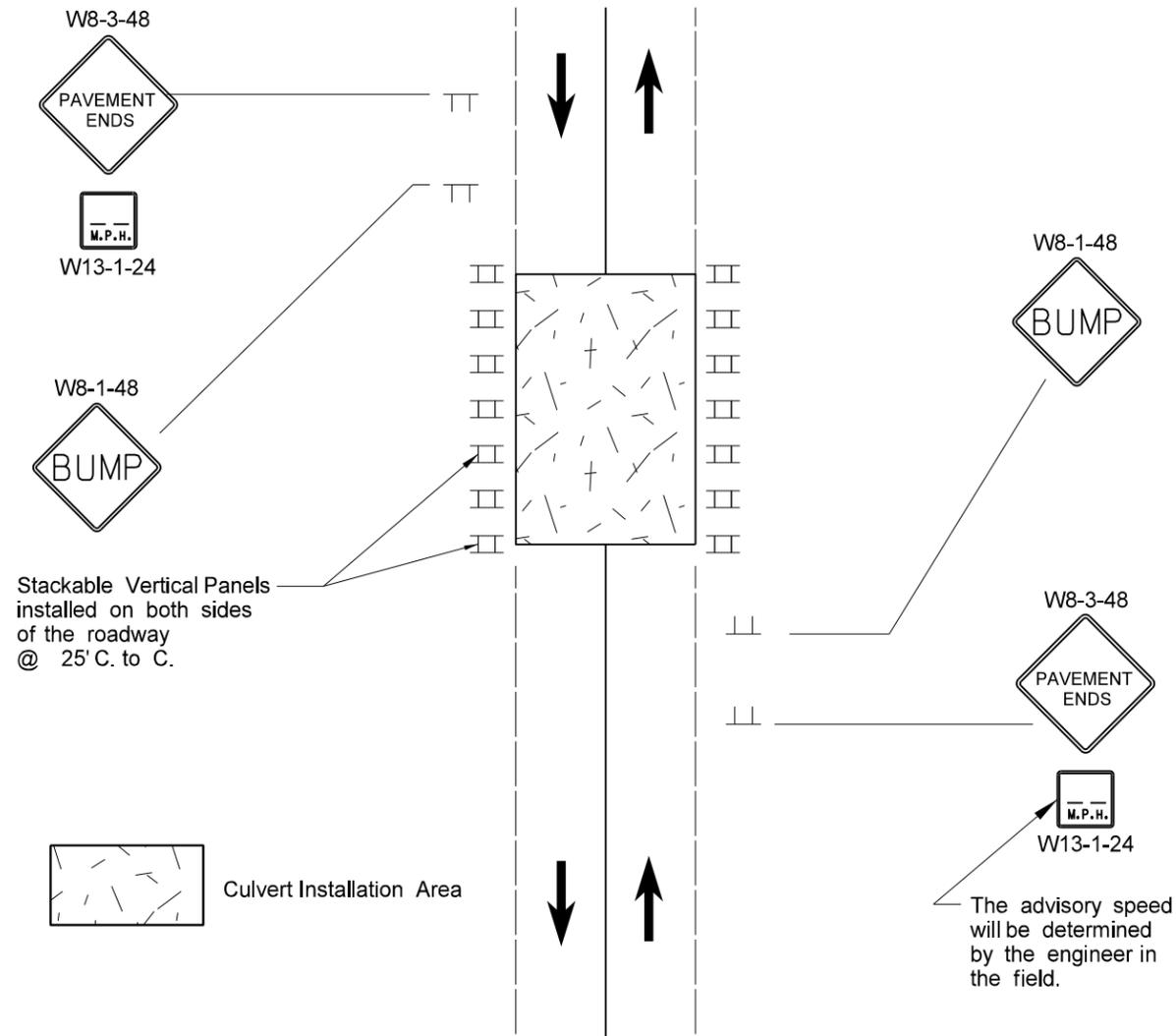
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Work Zone Traffic Control
for Pipe Removal and Installation

3" HMA Overlay

ND Highway 14
Wing N to 1 Mi S Co Line

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-1-014(006)021	100	4



Culvert Installation Area - No Work Present During Non-Working Hours

Note: See Standard D-704-19, Layout Type F for when work is present.

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Work Zone Traffic Control
Sign Layout for Culvert Installation Area

3" HMA Overlay

ND Highway 14
Wing N to 1 Mi S Co Line

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-1-014(006)021	180	1

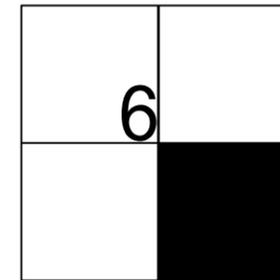
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

LOCATION OF PIT IN SECTION

TEST HOLE PLAT

Location: SE1/4 6-144-76 County: Burleigh

Ownership: Van Zee Ranch LLC (Ryan Van Zee)

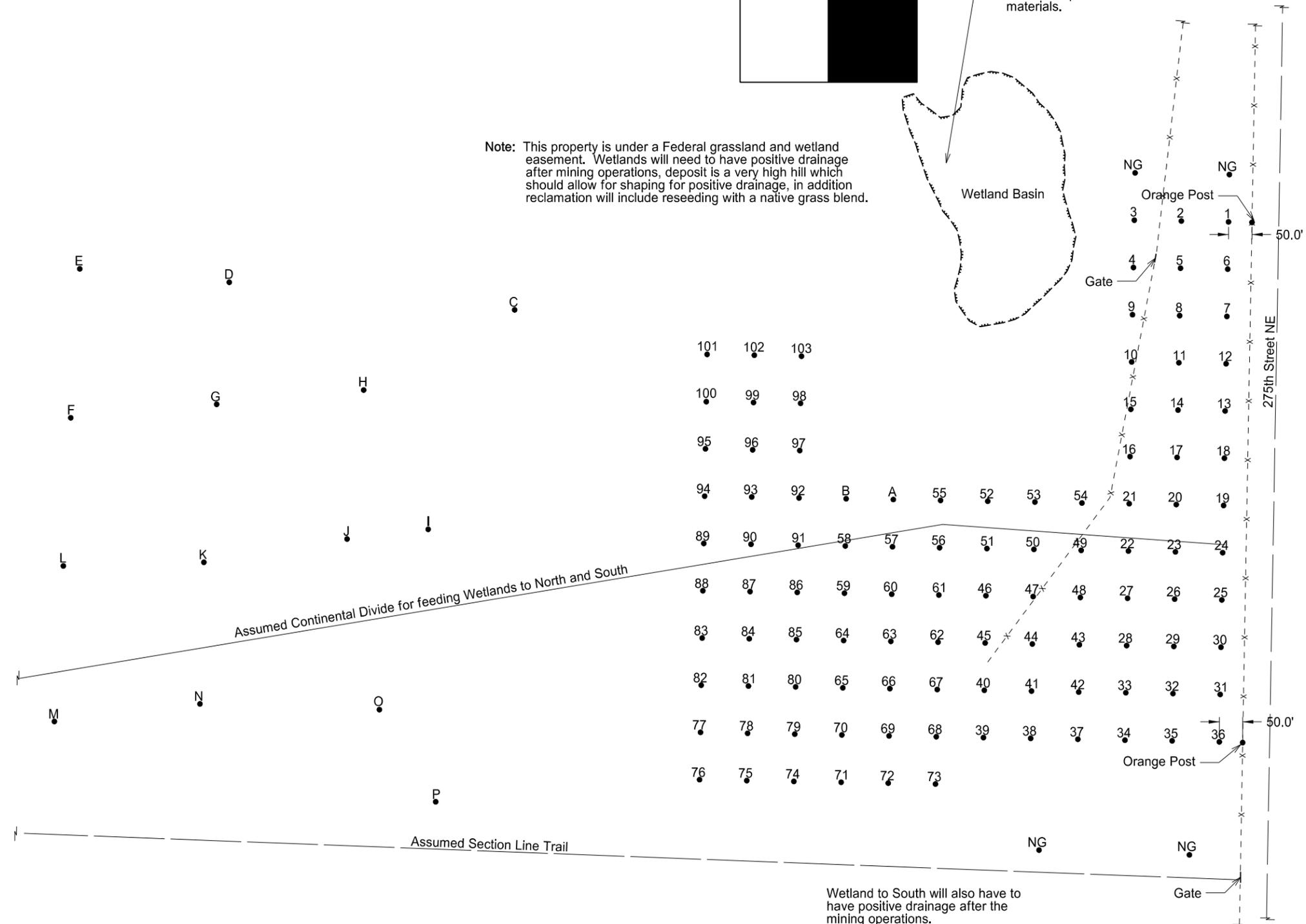


Protected wetland will need to have positive drainage back to it after mining operations. A silt fence will also need to be placed around wetland to protect from silt and mud materials.

Note: This property is under a Federal grassland and wetland easement. Wetlands will need to have positive drainage after mining operations, deposit is a very high hill which should allow for shaping for positive drainage, in addition reclamation will include reseeding with a native grass blend.

- Area "A" consists of test holes 1-9
- Area "B" consists of test holes 10-18
- Area "C" consists of test holes 19-27
- Area "D" consists of test holes 28-36
- Area "E" consists of test holes 37-45
- Area "F" consists of test holes 46-54
- Area "G" consists of test holes 55-64
- Area "H" consists of test holes 65-73
- Area "I" consists of test holes 74-82
- Area "J" consists of test holes 83-91
- Area "K" consists of test holes 92-103

- Legend
- gr = gravel
 - Fgr = fine gravel
 - CGr = coarse gravel
 - sd = sand
 - FS = fine sand
 - CS = coarse sand
 - sh = shale
 - SiCl = silt clay
 - rk = rock
 - FeO = iron oxide
 - CoS = coal slack
 - NG = no gravel
 - DM = disturbed material
 - WL = water line



Wetland to South will also have to have positive drainage after the mining operations.

Scale 1"=250'

PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES							
Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	
1	1.5	0.5 Fgr SiCl	0	6	18	27	SiCl	14	1.0	1.0 gr SiCl	2	10	19	30	SiCl	23	0.5	1.5 gr SiCl	0	3	9	20	SiCl	31	1.0	1.0 Fgr SiCl	2	13	24	34	SiCl
		2.0 gr SiCl								5.0 gr								1.0 Fgr SiCl								1.0 gr SiCl					
		1.0 Fgr SiCl								3.0 sd sh								2.0 gr SiCl								4.0 gr					
2	1.0	3.0 gr SiCl	2	15	26	40	+WL 8.0			2.0 Fgr sh								2.0 sd								1.0 Fgr					
		3.0 Fgr								1.0 gr SiCl								1.0 sd SiCl								2.0 gr					
		1.0 gr						15	1.0	2.0 gr SiCl	0	4	12	24	SiCl			1.0 sd								1.0 FS					
3	3.0	6.0 gr SiCl	0	4	17	30	SiCl			1.0 sd								3.0 sd sh								1.0 Fgr					
4	1.0	2.0 gr SiCl	1	11	20	29	SiCl			1.0 sd CoS						24	0.5	3.5 gr	2	10	23	39	SiCl			1.0 sd					
		2.0 gr								2.0 sd								3.0 Fgr								1.0 gr					
5	1.0	2.0 gr SiCl	0	7	19	32	SiCl			1.0 sd sh								3.0 gr						32	0.5	4.5 gr SiCl	1	11	21	30	rk
		2.0 gr								1.0 gr SiCl								1.0 sd sh								1.0 gr					
		1.0 Fgr SiCl						16	2.0	2.0 Fgr sh	0	3	12	25	SiCl			1.0 gr SiCl								1.0 FS sh					
		1.0 gr SiCl								1.0 sd sh								2.0 sd sh								3.0 FS					
		2.0 gr								1.0 gr						25	0.5	1.5 gr	0	4	13	23	SiCl			2.0 sd sh					
6	0.5	2.5 gr SiCl	1	5	13	20	SiCl	17	1.0	1.0 gr SiCl	0	6	16	29				1.5 Fgr								3.0 Fgr					
		1.0 gr								0.5 Fgr SiCl								0.5 sd						33	1.0	1.0 Fgr SiCl	0	1	7	15	SiCl
		1.0 sd sh								2.5 sd								2.0 gr								1.0 sd					
7	1.0	1.0 sd SiCl	0	4	12	21	SiCl			1.0 Fgr								1.0 sd								1.0 gr					
		2.5 sd								3.0 gr								1.0 SiCl								1.0 Fgr sh					
		0.5 Fgr								2.0 Fgr								1.0 sd SiCl								1.0 sd sd					
		2.0 gr						18	2.0	2.0 FS SiCl	1	8	19	30	+WL 10.0			1.0 sd sh								1.0 sd					
8	3.0	1.0 gr SiCl	2	8	18	29	SiCl			5.0 gr								1.0 Fgr sh								1.0 Fgr					
		2.0 gr								1.0 sd sh						26	1.0	1.0 gr SiCl	0	6	13	21	SiCl			1.0 Fgr SiCl					
		1.0 gr SiCl						19	1.5	0.5 sd SiCl	0	8	21	30	SiCl			3.0 FS sh						34	2.0	1.0 FS SiCl	0	4	7	11	SiCl
		3.0 sd sh								1.0 gr SiCl								2.0 sd								1.0 gr SiCl					
		1.0 Fgr								1.0 sd SiCl								1.0 sd sh								3.0 sd sh					
9	1.0	2.5 gr SiCl	0	3	13	24	SiCl			2.0 gr SiCl								3.0 Fgr sh								1.0 sd					
		0.5 gr								2.5 gr						27	0.5	0.5 gr SiCl	0	9	19	29	SiCl	35	2.5	0.5 Fgr SiCl	0	7	15	24	SiCl
		2.0 Fgr								1.5 sd								1.0 sd SiCl								1.0 Fgr sh					
		4.0 sd								1.0 Fgr								1.0 Fgr SiCl								4.0 gh sh					
		1.0 Fgr								1.0 gr								1.0 gr SiCl								4.0 sd sh					
		1.0 gr SiCl						20	1.0	1.0 gr SiCl	1	7	14	24	SiCl			3.0 gr								1.0 CS sh					
10	0.5	3.5 gr SiCl	1	8	18	29	SiCl			1.0 sd sh								2.0 sd sh								1.0 sd sh					
		3.0 sd sh								1.0 gr						28	1.5	2.5 gr SiCl	1	8	20	31	SiCl			1.0 Fgr sh					
		2.0 Fgr								2.0 gr sh								1.0 gr								1.0 CS sh					
		2.0 CS								2.0 sd sh								1.0 gr sh								1.0 Fgr sh					
11	1.0	3.0 gr SiCl	0	6	16	25	SiCl			2.0 Fgr sh								1.5 gr						36	2.0	1.0 Fgr	0	10	20	28	SiCl
		1.0 Fgr								2.0 CS sh								1.5 sd sh								3.5 gr					
		1.0 Fgr SiCl								1.0 Fgr sh								1.0 gr								2.0 FS sh					
		3.0 sd						21	1.0	1.0 gr SiCl	0	1	8	17	SiCl	29	0.5	3.5 gr SiCl	0	6	16	25	SiCl			2.5 sd sh					
		2.0 sd sh								3.0 sd								1.0 sd CoS													
12	1.0	2.0 gr SiCl	2	8	21	33	SiCl			2.0 Fgr sh								3.5 sd								RANGE	76	TWP	144	SEC	SE1/4 6
		2.0 gr sh						22	1.0	0.5 gr SiCl	0	2	9	14	SiCl			0.5 Fgr								COUNTY	Burleigh		Nov-15		
		3.5 gr								1.5 FS sh								2.0 Fgr sh								PROSPECTED BY	Volk/Nelson				
13	1.5	0.5 Fgr SiCl	0	8	19	31	SiCl			2.0 FS								1.0 gr								INSPECTED & APPROVED	Jeffrey Swank		Jan-16		
		1.0 sd								1.0 gr sh						30	1.0	1.0 gr	0	4	13	25	SiCl								
		1.0 Fgr								2.0 sd sh								1.0 gr sh													
		5.0 gr								1.0 gr								2.0 Fgr													
		1.0 gr SiCl																1.0 FS sh													
																		2.0 sd sh													

PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES							
Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
37	1.0	2.0 sd SiCl	0	6	12	18	SiCl	44	2.0	1.0 sd SiCl	0	7	16	25	SiCl	53	2.5	2.0 sd SiCl	0	4	10	16	rk	61	1.0	2.0 gr	0	7	15	26	Si Cl
		1.0 gr SiCl								1.0 Fgr SiCl								1.0 gr								1.0 Fgr					
		1.0 sd sh								1.0 sd SiCl								1.5 FS SiCl								2.0 CS					
		1.0 Fgr sh								1.0 Fgr SiCl								2.0 gr								4.0 Fgr					
		1.0 gr sh								1.0 gr					54	1.0	1.0 sd SiCl	0	4	12	20	SiCl			1.0 CS						
		4.0 sd sh								2.0 gr SiCl															0.5 Fgr						
		1.0 gr SiCl								1.0 Fgr													62	3.0	2.0 Fgr	0	6	10	17	Si Cl	
38	1.0	4.0 gr SiCl	1	11	21	29	SiCl			1.0 sd															2.0 sd						
		1.0 sd								2.0 sd sh															0.5 Fgr						
		2.0 gr								1.0 Fgr sh															0.5 Fgr Si Cl						
		3.0 sd sh						45	1.5	1.5 sd SiCl	0	10	19	27	SiCl			1.0 gr sh						63	5.0	1.0 gr	0	2	9	20	Si Cl
		1.0 Fgr								1.0 Fgr SiCl						55	0.5	1.5 Fgr	0	3	10	16	+WL 13.0			6.0 Fgr					
39	1.0	1.0 sd SiCl	0	6	16	26	SiCl			3.0 gr SiCl													64	3.0	2.0 FS	0	3	8	12	Si Cl	
		1.0 gr sh								2.0 sd sh															3.0 FS Si Cl						
		1.0 gr								2.5 gr sh															0.5 Fgr						
		2.0 sd sh						46	3.0	1.0 sd SiCl	0	10	19	27	SiCl			1.0 gr Si Cl								1.5 Fgr Si Cl					
		1.0 CS sh								1.0 gr															1.0 sd						
		1.0 sd CoS								2.0 sd															1.0 Fgr						
		3.0 sd sh								1.5 gr													65	4.0	1.5 Fgr	0	12	21	27	Si Cl	
		1.0 gr sh						47	1.0	4.0 gr SiCl	2	16	28	41	SiCl	56	6.0	4.0 Fgr	0	8	17	26	WL 14.0			1.5 FS Si Cl					
		1.0 gr SiCl								1.0 gr sh															1.0 Fgr						
40	1.0	1.0 gr SiCl	0	7	16	24	SiCl			1.0 gr															1.0 gr						
		2.0 FS SiCl								1.0 Fgr						57	5.0	2.0 Fgr Si Cl	0	4	9	17	SiCl			1.0 Fgr Si Cl					
		2.0 gr								1.0 gr SiCl													66	4.0	3.0 sd Si Cl	0	5	16	29	Si Cl	
		4.0 sd sh						48	0.5	1.0 gr SiCl	0	3	11	20	SiCl			1.0 sd								1.0 Fgr Si Cl					
		1.0 sd CoS								1.5 FS sh															1.0 Fgr						
		1.0 gr								1.0 gr															3.0 gr						
41	0.5	2.5 gr SiCl	1	11	20	31	SiCl			3.0 Fgr						58	2.0	1.0 gr	2	12	22	29	SiCl			1.0 sd					
		3.5 gr								2.0 sd sh															1.0 Fgr Si Cl						
		4.5 sd sh						49	1.5	3.5 gr SiCl	0	6	14	23	SiCl			3.0 gr						67	1.5	1.5 gr	0	4	12	23	Si Cl
		3.0 Fgr sh								3.0 sd sh															1.0 Fgr						
42	1.0	1.0 gr SiCl	0	9	18	27	SiCl			2.0 sd															1.0 CS						
		1.0 sd SiCl						50	0.5	0.5 gr SiCl	0	8	19	27	SiCl			1.0 Fgr Si Cl						68	1.0	3.0 gr	0	8	18	26	Si Cl
		1.0 sd sh								1.0 Fgr SiCl															1.0 Fgr						
		1.0 gr sh								5.0 gr															3.0 FS						
		1.0 gr								1.0 sd sh															1.0 Fgr						
		3.0 sd sh								1.0 sd CoS																					
		1.0 gr sh								2.0 sd sh						59	2.0	1.0 gr	0	6	19	28	SiCl								
43	1.0	2.0 gr SiCl	0	6	15	26	SiCl	51	2.0	2.0 FS	0	1	7	13	SiCl			2.0 Fgr													
		1.0 gr								3.0 FS SiCl															1.0 Fgr						
		3.0 sd sh								3.0 sd SiCl															1.0 Fgr Si Cl						
		1.0 Fgr								2.0 gr															1.0 CS						
		1.0 SiCl						52	2.5	0.5 sd SiCl	0	2	9	17	SiCl	60	7.0	1.0 Fgr	0	2	8	17	SiCl			2.0 Fgr					
		1.0 gr								1.0 sd sh															1.0 sd						
										1.0 Fgr SiCl															2.0 Fgr						
										1.0 gr SiCl															2.0 sd						
										1.0 Fgr															1.0 Fgr Si Cl						
										3.0 sd sh																					
										0.5 Fgr sh																					
										1.0 gr sh																					

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 PROSPECTED BY Volk/Nelson
 INSPECTED & APPROVED Jeffrey Swank Jan-16

PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES							
Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
69	6.0	2.0 sd	0	3	9	17	Si Cl	76	1.0	1.0 Fgr sh	0	1	7	17	FS Si Cl	82	0.5	1.5 Fgr sh	1	9	21	33	Si Cl	89	2.0	1.0 sd sh	0	6	15	25	rk
		1.0 FS								3.0 sd sh								1.0 sd sh								1.0 sd Co S					
		2.0 FS Si Cl								4.0 FS Si Cl								2.0 Fgr sh								1.5 sd sh					
		4.0 Fgr								1.0 gr sh								2.0 sd sh								0.5 Fgr					
		1.0 gr								3.0 sd sh								4.5 gr								1.0 CS sh					
		1.0 Fgr								1.0 Fgr sh								0.5 Si Cl								1.0 sd sh					
70	2.0	2.0 Fgr	0	13	23	32	Si Cl			3.0 sd sh								2.0 gr								1.0 sd					
		4.0 gr						77	1.0	1.0 sd Si Cl	0	8	18	28	Si Cl			3.5 gr Co S								2.0 Fgr sh					
		2.5 Fgr								1.0 sd sh						83	1.0	1.0 CS Si Cl	0	5	15	27	Si Cl			1.0 gr					
71	2.0	6.0 Fgr	0	7	20	32	Si Cl			1.0 sd								1.0 sd								2.0 gr Si Cl					
		1.0 sd								1.0 sd Co S								4.0 sd sh								1.0 gr Co S					
		1.0 sd sh								1.0 sd sh								4.0 gr								1.0 gr Si Cl					
		1.0 Fgr								2.0 gr sh								1.0 sd sh						90	1.0	1.0 gr	0	3	13	26	Si Cl
		1.0 Si Cl								1.0 Fgr sh								2.0 gr sh								4.0 Fgr					
		1.0 Fgr								1.0 gr sh								2.0 gr Si Cl								1.0 sd					
		1.0 gr								1.0 gr Si Cl						84	0.5	1.5 sd	0	2	11	22	Si Cl			2.0 Fgr					
		1.0 Fgr								1.0 gr Co S								4.0 Fgr								1.0 sd					
		3.0 gr								1.0 gr Si Cl								1.0 FS sh								1.0 gr					
		1.0 gr Si Cl						78	1.0	2.0 sd	0	7	18	30	Si Cl			2.0 Fgr sh								2.0 sd					
72	1.0	1.5 gr	0	5	10	16	Si Cl			1.0 Fgr						85	2.0	4.0 sd Si Cl	0	3	7	13	Si Cl	91	2.0	1.0 sd Si Cl	0	8	16	22	Si Cl
		1.5 Fgr								1.0 Fgr sh								2.0 gr Si Cl								1.0 sd					
		1.0 FS								1.0 FS sh						86	1.0	4.0 FS	0	3	6	11	Si Cl			1.0 sd Si Cl					
		2.0 Fgr Si Cl								1.0 sd								1.0 Fgr								3.0 gr Si Cl					
		2.0 Fgr								3.0 gr								2.0 FS Si Cl								2.0 sd					
		1.5 FS								2.0 sd sh						87	1.0	1.0 gr Si Cl	0	4	10	18	Si Cl			1.0 sd sh					
		1.5 Fgr								1.0 Fgr								1.0 Fgr								1.0 gr					
		1.0 FS								2.0 gr								1.0 CS Co S								1.0 Fgr Si Cl					
		1.0 gr						79	1.0	1.0 gr Si Cl	0	2	10	19	Si Cl			3.0 sd sh						92	2.0	4.0 sd Si Cl	0	0	3	5	Si Cl
73	3.0	3.0 Fgr	0	1	5	10	Si Cl			2.0 Fgr sh								1.0 Fgr sh								4.0 sd					
		2.5 FS								3.0 sd sh								1.0 sd sh						93	2.0	1.0 gr Si Cl	0	7	17	27	Si Cl
		0.5 sd								1.5 Fgr sh								1.0 sd Co S								1.0 sd					
		2.0 Fgr								0.5 Fgr Co S								1.0 Fgr								3.0 Fgr					
74	2.0	2.0 gr	0	9	20	31	Si Cl			1.0 gr Si Cl								1.0 gr sh								3.0 sd sh					
		2.0 sd sh						80	1.0	2.0 CS	0	0	6	16	Si Cl	88	1.0	1.0 Fgr	0	6	14	26	Si Cl			1.0 FS sh					
		1.0 Fgr								3.0 sd								1.0 gr								1.0 Fgr sh					
		2.0 sd sh								1.0 sd sh								4.0 sd								1.0 gr sh					
		3.0 gr								1.0 Fgr sh								3.0 gr								1.5 gr Si Cl					
75	2.0	1.0 sd sh	2	6	16	27	Si Cl			1.0 sd sh								1.0 Fgr													
		2.5 CS sh								1.0 sd								2.0 sd													
		0.5 Fgr sh								1.0 sd sh								2.0 gr													
		2.0 sd sh								1.0 gr Si Cl																					
		1.0 Fgr						81	1.5	1.5 Fgr	0	3	10	22	Si Cl																
		2.0 gr								2.0 sd																					
		4.0 gr sh								2.0 Fgr																					
		1.0 CS sh								1.0 sd																					
		2.0 Fgr sh								1.0 Fgr																					
										1.0 sd sh																					
										1.0 Fgr																					
										2.0 sd																					
										1.0 sd sh																					

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PROSPECTED BY Volk/Nelson

INSPECTED & APPROVED Jeffrey Swank Jan-16

PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES							
Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
94	2.0	1.0 Fgr	0	5	15	25	Si Cl	102	1.0	1.0 Fgr	0	8	18	28	Si Cl	A	1.0	5.0 sd Si Cl	0	0	6	13	Si Cl	H	1.0	1.0 sd	0	6	15	28	+
		2.0 sd								1.0 sd								2.0 Fgr sh								3.0 Fgr					
		1.0 Fgr								1.0 Fgr Co S						B	2.0	3.0 FS Si Cl	0	0	4	5	rk			2.0 Fgr sh					
		4.0 sd								7.0 Fgr								1.0 sd Si Cl								1.0 gr					
		2.0 FS						103	3.0	8.0 Fgr	0	5	13	22	Si Cl	C	0.5	0.5 gr Si Cl	1	9	21	33	Si Cl			2.0 FS					
		3.0 gr								2.0 gr								1.0 sd								1.0 gr					
		2.0 gr Si Cl																2.0 Fgr								1.0 sd sh					
95	2.0	1.0 sd Si Cl	0	2	11	22	+WL 17.0											8.0 gr								4.0 gr					
		1.0 sd														D	2.0	1.0 sd	0	5	16	26	+			2.0 Fgr sh					
		2.0 Fgr																2.0 Fgr								2.0 gr Si Cl					
		1.0 sd																1.0 sd						I	0.5	1.5 Fgr sh	1	10	22	34	+Cave
		2.0 sd sh																2.0 Fgr								1.0 sd					
		1.0 Fgr sh																2.0 sd								2.0 Fgr					
		1.5 sd sh																1.0 Fgr								1.0 sd					
		0.5 Fgr sh																1.0 sd								2.0 Fgr					
		2.0 sd sh																1.0 Fgr								10.0 gr					
		1.0 gr sh																1.0 gr						J	1.0	1.0 sd	0	9	20	31	Si Cl
		1.0 gr Si Cl																1.0 Fgr								4.0 Fgr					
		1.0 gr sh																5.0 gr								1.0 sd Co S					
96	1.0	2.0 Fgr	0	4	13	23	Si Cl									E	1.0	6.0 Fgr	0	8	18	29	Si Cl			0.5 sd					
		1.0 sd																2.0 sd								1.5 Fgr					
		1.0 Fgr sh																1.0 gr Si Cl								1.0 gr					
		1.0 sd sh																1.0 FS								1.0 gr Si Cl					
		2.0 sd																3.0 gr Si Cl								1.0 gr					
		1.0 FS																1.0 Fgr								1.0 gr Si Cl					
		1.0 sd sh														F	1.0	1.0 sd Si Cl	0	7	17	26	+			3.0 gr					
		1.0 gr																2.0 sd								1.0 gr Si Cl					
97	3.0	1.0 FS Si Cl	0	2	6	10	Si Cl											1.5 Fgr						K	2.0	3.0 sd	0	6	17	27	+
		3.0 sd Si Cl																2.5 gr								5.0 Fgr					
98	3.0	1.5 FS	0	6	10	13	Si Cl											4.0 Fgr								2.0 sd					
		2.5 Fgr																1.0 gr								1.0 Fgr					
99	1.0	3.0 Fgr	0	5	14	25	Si Cl											1.0 sd								7.0 gr					
		1.0 CS																1.0 Fgr						L	1.0	5.0 Fgr	0	8	19	31	Si Cl
		4.0 Fgr																5.0 gr								2.0 sd sh					
		1.0 FS														G	1.0	2.0 Fgr	0	6	16	28	Si Cl			1.0 Fgr sh					
		1.0 gr																3.0 sd								7.0 gr					
		1.0 Fgr																2.0 Fgr													
		1.0 gr																2.0 sd sh													
100	2.0	6.0 Fgr	0	3	12	25	Si Cl											1.0 gr													
		1.5 sd																2.0 Fgr													
		3.5 Fgr																4.0 Fgr sh													
101	2.0	3.0 Fgr	1	11	21	32	+WL 15.0											2.0 gr sh													
		1.0 sd																													
		1.0 Fgr																													
		1.0 FS																													
		1.0 Fgr																													
		5.0 gr																													
		1.0 Fgr																													

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PROSPECTED BY Volk/Nelson

INSPECTED & APPROVED Jeffrey Swank Jan-16

PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES											
Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole				
M	1.0	1.0 sd	0	10	20	29	Si Cl																												
		2.0 Fgr																																	
		1.0 sd																																	
		1.5 Fgr																																	
		1.5 sd																																	
		2.0 gr																																	
		1.0 Fgr																																	
		3.0 gr																																	
N	1.0	2.0 Fgr	1	7	16	27	Si Cl																												
		5.0 sd sh																																	
		2.0 gr sh																																	
		1.0 sd sh																																	
		3.0 gr																																	
		2.0 gr Si Cl																																	
O	0.5	4.5 sd	1	9	20	33	+																												
		1.0 sd sh																																	
		1.0 sd																																	
		1.0 Fgr																																	
		1.0 sd sh																																	
		11.0 gr																																	
P	2.0	2.0 Fgr	1	8	18	28	Si Cl																												
		2.0 sd sh																																	
		2.0 gr																																	
		2.0 sd																																	
		2.0 gr Si Cl																																	

RANGE 76 TWP 144 SEC SE1/4 6

COUNTY Burleigh Nov-15

PROSPECTED BY Volk/Nelson

INSPECTED & APPROVED Jeffrey Swank Jan-16

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-1-014(006)021	180	7

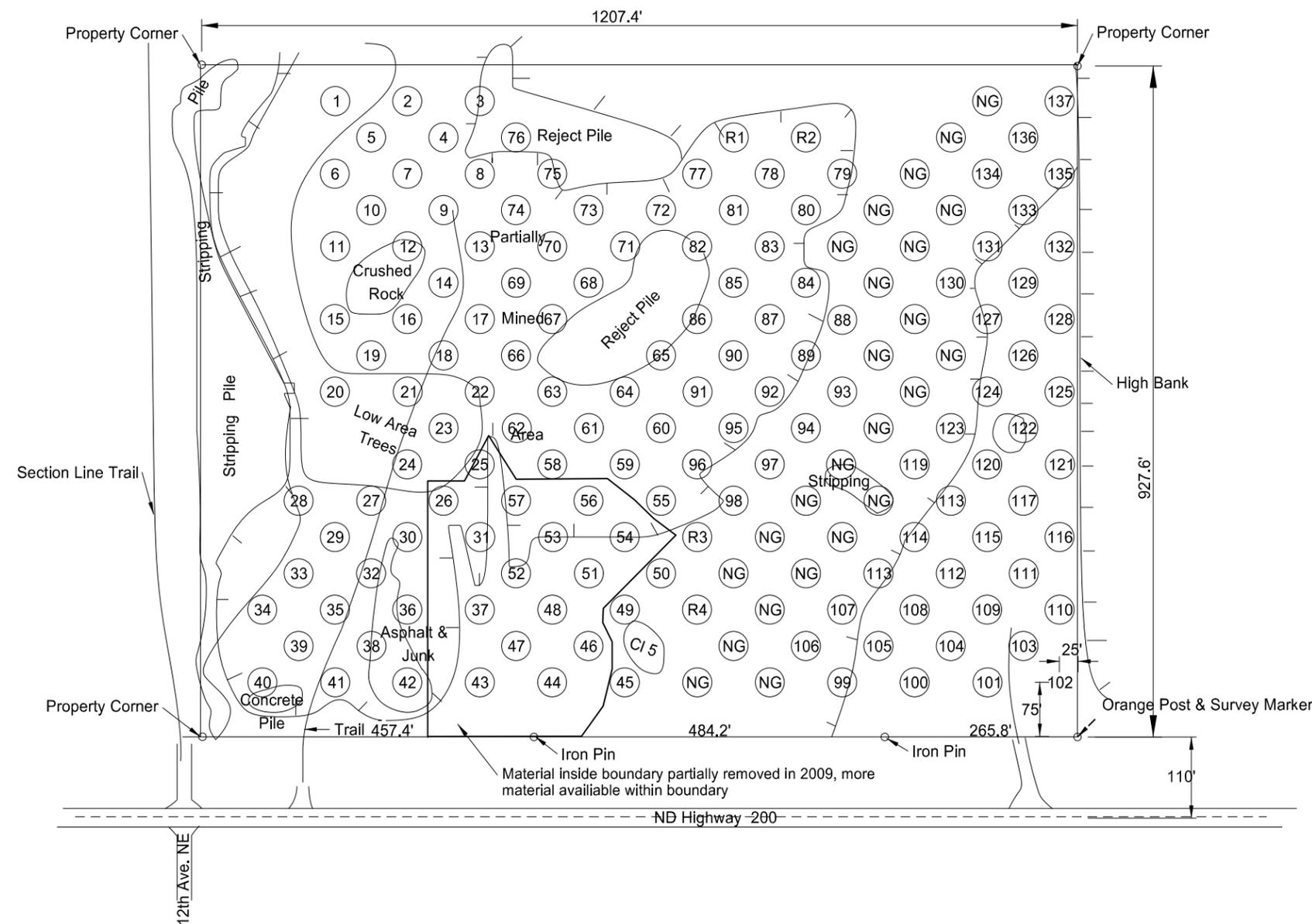
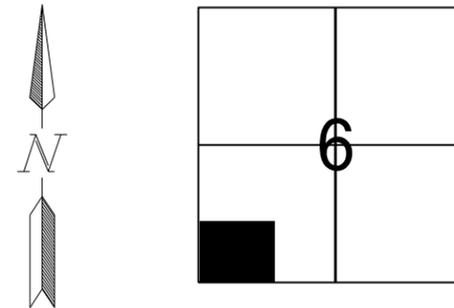
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

TEST HOLE PLAT

Location: SW1/4SW1/4 6-146-75 County: Sheridan

Ownership: State Owned

LOCATION OF PIT IN SECTION



- Area " A " consists of Test Holes 1 - 14
- Area " B " consists of Test Holes 15 - 28
- Area " C " consists of Test Holes 29 - 43
- Area " D " consists of Test Holes 44 - 54
- Area " E " consists of Test Holes 55 - 66
- Area " F " consists of Test Holes 67 - 76
- Area " G " consists of Test Holes 77 - 88
- Area " H " consists of Test Holes 89 - 98
- Area " I " consists of Test Holes 99 - 113
- Area " J " consists of Test Holes 114 - 125
- Area " K " consists of Test Holes 126 - 137

- Legend:
- gr = gravel
 - sd = sand
 - FS = fine sand
 - Fgr = fine gravel
 - CS = coarse sand
 - sh = shale
 - SiCl = silt clay
 - rk = rock
 - FeO = Iron oxide
 - CoS = Coal Slack
 - WL = water line
 - NG = no gravel
 - DM = disturbed material

Scale 1" = 200'

																						STATE	PROJECT NO.	SECTION NO.	SHEET NO.
																						ND	SS-1-014(006)021	180	8

PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES							
Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
1	2.0	3.0 gr SiCl	2	26	40	49	+WL 5.0	15	1.0	1.0 gr SiCl	1	15	28	42	+WL 5.5	29	0.5	1.5 sd CoS	0	8	21	34	+WL10.0	36	0.5	2.5 FgrSiCl	1	11	25	42	+WL14.0
2	5.0 DM	1.0 FgrSiCl	1	19	33	50	+WL 8.0			1.0 Fgr sh								1.0 gr								3.0 gr					
		1.0 Fgr								2.0 gr								1.0 Fgr								1.0 Fgr					
		1.0 gr								0.5 sd								1.0 sd								1.0 gr					
3	8.0 DM	3.0 gr	1	15	37	55	+WL14.0	16	2.0	1.0 Fgr	0	11	25	42	+WL 6.0			2.0 sd CoS								2.0 Fgr sh					
		3.0 gr SiCl								1.0 Fgr CoS								1.0 Fgr								2.0 sd sh					
4	2.0 DM	1.0 FgrSiCl	1	10	22	36	+WL10.0			1.0 Fgr								1.5 gr								1.0 CS CoS					
		3.0 Fgr								1.0 gr CoS								0.5 gr CoS								1.0 Fgr CoS					
		1.0 gr						17	0.5	4.5 gr SiCl	1	18	33	48	+WL 5.0	30	0.5	1.5 gr SiCl	0	9	22	41	+WL 8.0	37	0.5	0.5 FgrSiCl	4	17	30	42	+
		1.0 sd CoS						18	1.0	1.0 FgrSiCl	0	10	24	43	+WL 5.0			2.0 Fgr								4.0 gr					
		1.0 Fgr CoS								3.0 Fgr								3.0 Fgr sh								1.0 sd					
		1.0 sd CoS						19	1.0 DM	1.0 gr SiCl	0	4	15	36	+WL 4.5			1.0 gr								1.0 sd CoS					
5	1.5 DM	1.0 Fgr	0	3	12	24	+WL 8.0			2.5 Fgr						31	0.5	0.5 Fgr	0	9	22	34	+WL10.0			2.0 Fgr					
		2.5 FS						20	0.5	1.0 sd sh	0	10	22	41	+WL 3.0			1.0 Fgr CoS								2.0 Fgr CoS					
		2.0 Fgr sh								1.5 sd sh								2.0 Fgr								1.0 Fgr sh					
		1.0 gr						21	0.5	0.5 Fgr CoS	0	6	16	29	+WL 4.0			1.0 sd sh								1.0 FS CoS					
6	1.0 DM	2.5 FgrSiCl	0	11	26	42	+WL 6.0			1.0 Fgr								1.0 FS								1.0 Fgr sh					
		2.5 Fgr								1.0 sd								2.0 sd								1.0 sd sh					
7	1.0	2.0 gr sh	0	9	18	28	+WL 9.0			1.0 Fgr								1.0 Fgr CoS								1.0 Fgr sh					
		1.0 FS						22	0.5	3.5 gr SiCl	0	4	13	22	+WL 5.0			1.0 gr CoS								4.0 gr					
		2.0 SiCl								1.0 sd						32	0.5	3.5 gr sh	0	11	26	43	+WL12.0	38	0.5	0.5 Fgr SiCl	0	1	12	25	+WL15.0
		3.0 gr sh						23	0.5	1.5 Fgr SiCl	1	13	26	44	+WL 4.0			1.5 sd sh								3.0 gr					
8	2.0	2.0 Fgr	0	13	28	40	+WL 9.0			1.0 gr SiCl								1.5 Fgr sh								2.0 Fgr sh					
		1.0 gr								1.0 Fgr CoS								1.0 FgrSiCl								2.0 Fgr CoS					
		2.0 Fgr						24	0.5	1.0 gr SiCl	0	4	13	27	+WL 3.5			2.0 Fgr								1.0 sd					
		1.0 gr								2.0 Fgr sh								1.0 FS CoS								2.0 Fgr					
		1.0 Fgr						25	0.5	3.5 Fgr	0	5	10	33	+WL10.5			1.0 gr								1.0 sd					
9	0.5	2.5 gr sh	0	14	27	38	+WL 9.0			2.0 sd						33	0.5	1.0 sd sh	0	7	20	37	+WL10.5			3.0 Fgr sh					
		1.0 SiCl								2.0 FS SiCl								4.5 Fgr sh						39	1.0	3.0 gr SiCl	1	10	21	36	+WL17.0
		1.0 sd								2.5 Fgr CoS								1.0 sd								1.0 sd					
		4.0 gr						26	0.5	4.5 gr	1	14	28	45	+WL11.0			3.5 gr sh								1.0 sd CoS					
10	0.5	1.5 Fgr SiCl	0	8	23	37	+WL 7.5			4.0 sd CoS						34	0.5	0.5 Fgr	2	10	25	39	+WL17.0			2.0 gr					
		2.0 gr SiCl								2.0 Fgr CoS								1.0 gr								5.0 Fgr sh					
		1.0 Fgr SiCl						27	0.5	1.5 gr SiCl	0	8	21	39	+WL 7.5			1.0 Fgr CoS								2.0 sd sh					
		1.0 Fgr								2.0 Fgr								1.0 Fgr								2.0 Fgr sh					
		1.5 Fgr sh								1.0 sd								1.0 Fgr sh													
11	0.5	2.5 gr SiCl	0	13	27	42	+WL 6.0			2.5 gr								2.0 Fgr													
		3.0 gr sh						28	0.5	2.5 gr	0	2	10	24	+WL13.0			1.0 Fgr sh													
12	3.5 DM	0.5 FgrSiCl	1	15	30	42	+WL 9.0			1.5 sd								1.0 sd sh													
		1.0 Fgr								0.5 Fgr CoS								1.0 Fgr													
		3.0 FgrSiCl								1.0 sd CoS								1.0 sd CoS													
		1.0 gr								1.0 sd sh								3.0 Fgr													
13	0.5	2.5 gr sh	1	13	31	47	+WL 7.0			1.0 SiCl								1.0 Fgr CoS													
		1.0 Fgr sh								1.0 sd								2.0 gr													
		3.0 gr								2.0 Fgr						35	0.5	4.5 gr SiCl	1	10	23	38	+WL15.0								
14	4.0	1.0 FgrSiCl	1	14	31	41	+WL 6.0			2.0 gr CoS								2.0 sd sh													
		1.0 gr sh																3.0 gr													
																		2.0 sd sh													
																		2.0 Fgr sh													
																		1.0 gr													

RANGE 75 TWP 146 SEC SW1/4SW1/4 6
COUNTY Sheridan Jun-08
PROSPECTED BY Volk/KNelson
INSPECTED & APPROVED Carter Jun-08

																						STATE	PROJECT NO.	SECTION NO.	SHEET NO.
																						ND	SS-1-014(006)021	180	9

PIT LOGGING BY TEST HOLES							PIT LOGGING BY TEST HOLES							PIT LOGGING BY TEST HOLES							PIT LOGGING BY TEST HOLES										
Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
40	7.0 DM	1.0 Fgr CoS	0	8	20	35	+WL16.0	46	1.0	5.0 gr	1	16	30	42	+	51	0.5	0.5 FgrSiCl	2	15	28	41	+	55	0.5	0.5 Fgr CoS	0	10	21	39	+WL18.0
		2.0 Fgr								1.0 sd sh								2.0 gr								1.0 Fgr					
		1.0 sd sh								2.0 Fgr sh								1.0 Fgr sh								2.0 gr					
		1.0 Fgr								2.0 sd sh								5.0 Fgr								1.0 sd sh					
		1.0 sd CoS								4.5 gr								1.0 Fgr sh								1.0 Fgr sh					
		1.0 Fgr CoS								1.5 sd sh								1.0 gr								2.0 Fgr					
		1.0 Fgr sh								2.0 Fgr								1.0 sd CoS								1.0 Fgr sh					
		1.0 Fgr								1.0 gr								1.0 Fgr CoS								1.0 sd sh					
41	0.5	2.5 gr	1	13	26	38	+WL18.5	47	1.0	2.0 Fgr SiCl	0	10	25	39	+			1.0 gr								2.0 Fgr					
		2.0 Fgr sh								2.0 Fgr sh								1.0 FgrSiCl								3.0 sd sh					
		2.0 gr								1.0 Fgr								1.0 gr								1.0 Fgr sh					
		1.0 sd sh								1.0 Fgr sh								1.0 gr sh								1.0 Fgr					
		1.0 SiCl								1.0 Fgr								2.0 Fgr CoS								1.0 Fgr sh					
		1.0 sd CoS								1.0 sd sh								1.0 sd sh						56	2.0	2.0 Fgr	0	9	21	35	+WL16.5
		3.0 gr								1.0 Fgr						52	0.5	1.5 gr	1	13	28	41	+			2.5 gr					
		3.0 sd sh								1.0 sd sh								2.0 gr sh								1.5 sd CoS					
		2.5 Fgr sh								2.0 Fgr sh								1.0 sd sh								2.0 Fgr					
42	10.0 DM	2.0 gr SiCl	2	11	25	41	+WL18.0			1.0 gr								2.0 gr								1.0 sd					
		1.0 Fgr								2.0 Fgr								5.0 sd sh								2.0 gr					
		1.0 Fgr CoS								1.0 sd sh								5.0 gr								1.0 sd sh					
		2.0 Fgr								2.0 Fgr sh								1.0 FS								1.0 gr					
		1.0 sd CoS						48	0.5	2.5 gr SiCl	2	18	32	44	+			2.0 gr								1.0 FS					
		1.0 gr CoS								2.0 sd sh						53	0.5	0.5 Fgr	3	18	31	46	+			0.5 Fgr CoS					
43	0.5	1.5 Fgr SiCl	2	18	31	44	+			4.0 gr								2.0 gr						57	0.5	1.5 Fgr	0	9	21	39	+WL12.0
		3.0 gr sh								1.0 sd sh								1.0 Fgr								1.0 gr					
		2.0 Fgr sh								3.5 gr								1.0 Fgr sh								2.0 Fgr sh					
		1.0 gr								1.5 sd sh								1.0 Fgr								1.0 sd					
		1.0 sd sh								2.0 gr								2.0 Fgr sh								1.0 Fgr					
		4.0 gr								1.0 sd CoS								3.0 Fgr								1.0 sd CoS					
		3.0 sd sh								2.0 gr								3.0 gr								2.0 Fgr					
		4.0 gr						49	5.0 DM	3.0 gr	0	1	13	25	+			1.0 sd CoS								2.0 Fgr sh					
44	0.5	1.5 Fgr SiCl	1	14	29	43	+			1.0 sd CoS								1.0 Fgr CoS						58	0.5	2.0 Fgr sh	0	11	25	41	+WL 7.5
		2.0 Fgr sh								2.0 Fgr								1.0 Fgr sh								1.5 FS sh					
		4.5 gr								1.0 gr								3.0 Fgr								1.0 Fgr sh					
		3.5 sd sh								1.0 Fgr CoS						54	3.5	1.5 gr sh	1	13	27	41	+			1.0 sd					
		2.0 gr sh								1.0 Fgr								2.0 gr								1.5 gr					
		1.0 sd								1.0 gr								2.0 Fgr													
		3.0 Fgr sh								1.0 Fgr sh								2.0 gr													
		2.0 gr								1.0 Fgr								2.0 sd sh													
45	4.0	2.0 gr SiCl	1	13	25	38	+			1.0 Fgr CoS								2.0 gr													
		1.0 gr								2.0 gr								3.0 sd CoS													
		2.0 Fgr						50	1.0	6.0 gr	0	13	26	39	+			2.0 Fgr CoS													
		1.0 Fgr sh								1.0 sd																					
		1.0 Fgr								2.0 Fgr sh																					
		2.0 Fgr sh								1.0 gr																					
		3.0 Fgr								3.0 Fgr sh																					
		2.0 gr								1.0 sd sh																					
		1.0 Fgr								3.0 Fgr sh																					
		1.0 Fgr sh								1.0 gr																					
										1.0 sd sh																					

RANGE 75 TWP 146 SEC SW1/4SW1/4 6

COUNTY Sheridan Jun-08

PROSPECTED BY Volk/KNelson

INSPECTED & APPROVED Carter Jun-08

																					STATE	PROJECT NO.	SECTION NO.	SHEET NO.
																					ND	SS-1-014(006)021	180	10

PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES							
Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
59	0.5	0.5 Fgr	0	5	14	34	+WL 9.0	72	0.5	0.5 gr SiCl	2	12	25	39	+WL 5.5	85	0.5	1.0 Fgr sh	0	10	21	35	+WL 4.5	96	0.5	1.5 gr sh	0	8	23	38	+WL14.0
		1.0 gr								1.0 Fgr SiCl								2.5 sd								1.0 sd CoS					
		2.0 Fgr								1.0 Fgr CoS								0.5 gr								4.0 Fgr sh					
		1.0 FS sh								1.0 Fgr					86	0.5	1.5 Fgr	0	10	26	45	+WL 6.5			1.0 sd						
		1.0 Fgr								1.0 Fgr sh															2.0 gr sh						
		2.0 Fgr CoS								0.5 gr CoS															2.0 sd sh						
		1.0 Fgr sh						73	0.5	1.5 gr SiCl	0	12	27	44	+WL 5.0	87	1.5	0.5 Fgr sh	0	6	19	35	+WL 6.5			1.0 gr					
60	0.5	1.5 sd sh	0	5	18	33	+WL 7.5			3.0 gr sh															1.0 sd sh						
		2.0 Fgr CoS						74	0.5	0.5 Fgr SiCl	0	11	25	42	+WL 5.5			3.5 Fgr sh						97	11.0	4.0 Fgr sh	0	10	26	42	+
		1.0 FS sh								1.0 gr						88	4.0	3.0 gr SiCl	1	13	26	40	SiCl			2.0 gr sh					
		1.0 Fgr								1.0 Fgr CoS															3.0 Fgr sh						
		1.0 sd CoS								1.0 sd CoS															2.0 Fgr SiCl						
		0.5 gr								0.5 Fgr						89	5.0	3.0 gr	1	10	25	42	+			3.0 Fgr sh					
61	0.5	1.5 Fgr sh	0	3	16	37	+WL 5.0			1.0 gr															1.0 FS						
		1.0 Fgr						75	4.0 DM	1.0 FgrSiCl	0	10	25	40	+WL 9.0			2.0 sd sh								2.0 Fgr					
		2.0 Fgr sh								2.0 Fgr sh													99	0.5	3.5 Fgr sh	0	9	21	34	+	
62	0.5	1.5 sd SiCl	1	14	26	38	+WL 8.0			2.0 Fgr															5.0 gr sh						
		2.0 gr						76	0.5	2.5 gr SiCl	1	14	27	41	+WL10.0	90	0.5	0.5 sd CoS	0	1	9	25	+WL 5.0			3.0 gr					
		2.0 sd sh								1.0 Fgr sh															3.0 sd sh						
		2.0 gr								1.0 sd															2.0 FS sh						
63	1.0	1.0 Fgr SiCl	0	6	18	35	+WL 5.0			2.0 gr															3.0 sd sh						
		2.0 Fgr								3.0 Fgr sh						91	0.5	3.5 Fgr	0	6	20	38	+WL 6.0	100	2.0	1.0 Fgr SiCl	0	8	25	40	+
		1.0 gr						77	0.5	1.5 FgrSiCl	0	3	24	42	+WL 4.0			2.0 sd sh								2.0 gr					
64	0.5	1.5 Fgr sh	0	1	10	27	+WL 4.5			2.0 Fgr sh						92	5.0	1.0 Fgr sh	0	8	18	34	+WL16.5			1.0 Fgr sh					
		1.5 sd sh						78	0.5	1.5 Fgr sh	0	2	16	29	+WL 3.0			1.0 sd CoS								2.0 gr sh					
		1.0 Fgr sh								1.0 FS sh															1.0 Fgr sh						
65	4.0 DM	3.0 Fgr sh	0	4	16	31	+WL11.0	79	4.0	4.0 Fgr	0	10	23	36	+WL17.0			3.0 sd CoS								2.0 gr sh					
		1.0 sd sh								1.0 Fgr sh															1.0 sd sh						
		1.0 Fgr sh								1.0 sd sh															8.0 Fgr sh						
		1.0 sd								1.0 sd SiCl															1.0 Fgr sh						
		1.0 Fgr								3.0 Fgr sh															1.5 gr						
66	0.5	0.5 Fgr	0	6	19	37	+WL 5.0			1.0 Fgr						93	8.0	2.0 Fgr	0	10	23	37	+			3.0 Fgr					
		1.0 Fgr CoS								1.0 gr															5.0 gr						
		2.0 Fgr								1.0 Fgr sh															2.0 Fgr sh						
		1.0 gr						80	4.0	3.0 Fgr sh	1	13	27	38	+WL 9.5			2.0 Fgr sh								2.0 gr					
67	4.0 DM	1.0 sd sh	0	2	5	9	+WL 5.0			1.0 gr															2.0 sd sh						
68	0.5	2.5 Fgr sh	0	4	17	31	+WL 4.0			1.5 Fgr															2.0 sd sh						
		1.0 Fgr						81	0.5	4.5 Fgr sh	0	12	27	43	+WL 5.0	94	7.0	3.0 gr	0	10	25	40	+								
69	0.5	1.5 FgrSiCl	1	15	29	42	+WL 5.0	82	0.5	3.0 Fgr	0	4	16	33	+WL 6.5			5.0 Fgr sh								2.0 gr sh					
		1.0 Fgr								1.0 sd sh															3.0 Fgr sh						
		2.0 gr								1.5 Fgr																					
70	0.5	0.5 Fgr sh	0	10	23	37	+WL 4.5	83	0.5	0.5 sd sh	0	5	17	35	+WL 5.5	95	3.0	1.0 Fgr sh	0	4	15	30	+WL11.5	RANGE 75 TWP 146 SEC SW1/4SW1/4 6							
		3.5 Fgr								1.0 Fgr CoS													COUNTY Sheridan Jun-08								
71	0.5	0.5 gr SiCl	0	9	24	39	+WL 5.0			3.5 Fgr sh													PROSPECTED BY Volk/KNelson								
		1.0 sd sh						84	5.0	1.0 sd	0	4	15	29	+WL13.5			1.0 FS CoS						INSPECTED & APPROVED Carter Jun-08							
		3.0 Fgr sh								3.0 Fgr sh																					
										2.0 sd sh																					
										1.0 Fgr sh																					
										1.5 Fgr																					

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PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES									
Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole		
102	1.0	2.0 gr SiCl	1	11	27	41	+	107	2.0	1.0 Fgr	0	12	27	42	+	113	0.5	2.5 gr	0	11	25	38	+	119	9.0	1.0 gr SiCl	0	5	16	29	+		
		2.0 Fgr sh								1.0 gr								8.0 Fgr sh								2.0 Fgr sh							
		3.0 gr								1.0 Fgr sh								1.0 sd CoS								1.0 CS sh							
		3.0 Fgr								1.0 Fgr								5.0 Fgr sh								3.5 Fgr sh							
		4.0 gr								1.0 gr sh								1.0 FS								0.5 sd CoS							
		2.0 sd sh								2.0 sd sh								1.0 Fgr sh								1.0 Fgr sh							
		3.0 Fgr								1.0 Fgr sh								1.0 sd								1.0 sd sh							
103	1.0	4.0 gr SiCl	0	13	28	42	+			1.0 gr					114	0.5	1.5 gr	2	17	30	40	+			1.0 Fgr sh								
		5.0 Fgr sh								1.0 Fgr CoS													120	0.5	6.5 Fgr sh	0	11	26	41	+			
		2.5 FS								4.0 Fgr sh															5.0 gr								
		3.5 Fgr sh								4.0 gr sh															1.0 sd CoS								
		2.0 gr sh						108	0.5	1.5 gr SiCl	1	17	31	44	+			5.0 gr									1.0 gr						
		2.0 Fgr sh								3.0 gr															1.0 sd sh								
104	0.5	0.5 FgrSiCl	1	12	27	41	+			11.0 Fgr sh																1.5 gr							
		1.0 gr SiCl								2.0 gr															3.5 sd sh								
		1.0 gr								1.0 FS						115	2.0	1.0 gr SiCl	0	8	22	35	+	121	1.0	1.0 gr SiCl	2	14	25	38	+		
		1.0 gr CoS								1.0 gr															2.0 gr								
		1.5 gr sh						109	1.0	2.0 gr SiCl	1	13	25	38	+			1.5 gr sh									5.0 Fgr						
		1.5 Fgr sh								2.0 gr															1.0 Fgr CoS								
		3.5 gr sh								7.0 Fgr sh															4.0 Fgr								
		0.5 sd sh								2.0 gr sh															1.0 CS								
		4.0 gr								1.0 FS sh															1.0 Fgr								
		2.0 gr sh								1.0 gr sh															2.0 Fgr sh								
		3.0 Fgr sh								1.0 Fgr CoS															2.0 Fgr								
105	0.5	4.5 gr	1	16	30	43	+			2.0 Fgr sh																2.0 Fgr							
		6.0 Fgr sh								1.0 sd sh						116	0.5	2.5 gr	2	16	31	43	+	122	1.5	0.5 Fgr SiCl	0	10	26	41	+		
		3.0 gr sh						110	1.0	1.0 FgrSiCl	0	14	27	39	+			2.0 gr sh									4.0 gr sh						
		1.0 sd sh								2.0 gr															2.5 Fgr sh								
		2.0 gr sh								1.0 sd															0.5 sd CoS								
		1.0 sd sh								4.0 Fgr															2.0 Fgr sh								
		1.0 FS								1.0 Fgr CoS															1.0 gr sh								
		1.0 FS CoS								1.0 FS															1.0 CS sh								
106	1.0	1.0 Fgr SiCl	0	2	13	27	+			4.0 Fgr															7.0 Fgr sh								
		2.0 gr sh								2.0 gr						117	1.0	4.5 gr SiCl	2	16	30	46	+										
		2.0 Fgr CoS								2.0 Fgr																							
		4.0 Fgr sh								1.0 sd																							
		1.0 sd sh						111	2.0	6.0 gr SiCl	2	18	34	48	+			1.0 Fgr sh															
		1.0 sd CoS								2.0 Fgr sh																							
		1.0 Fgr sh								5.0 gr																							
		1.0 sd sh								2.0 Fgr sh																							
		1.0 Fgr sh								3.0 gr																							
		2.0 sd sh						112	1.0	2.0 gr SiCl	0	0	15	42	+	118	1.0	1.0 gr SiCl	1	16	28	41	+										
		3.0 Fgr sh								1.5 Fgr sh																							
										2.0 gr SiCl																							
										1.5 Fgr sh																							
										2.0 Fgr CoS																							
										5.0 gr sh																							
										2.0 gr																							
										2.0 gr sh																							
										1.0 Fgr sh																							

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																				ND	SS-1-014(006)021	180	12

PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES							
Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1/2" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
123	4.0	2.0 gr SiCl	0	7	19	31	+	129	1.0	1.0 gr SiCl	0	11	24	38	+	134	4.0	1.0 FgrSiCl	0	0	8	18	SiCl	R1	1.0	1.0 gr	0	1	7	19	+WL 2.0
		2.0 Fgr								1.0 Fgr sh								1.0 sd sh						R2	0.5	2.0 Fgr sh					
		2.0 gr								1.0 gr								1.0 sd SiCl						R3	5.0	2.0 gr sh	1	16	28	41	+
		2.0 gr sh								6.0 gr sh								1.0 FS SiCl								6.0 Fgr sh					
		1.0 sd								2.0 Fgr sh								1.0 sd sh								1.0 Fgr					
		1.0 gr								1.0 sd sh								3.0 Fgr sh								3.0 Fgr sh					
		1.0 sd sh								2.0 Fgr sh						135	2.0	1.0 gr SiCl	0	10	19	33	+			1.0 gr					
		2.0 Fgr sh								1.5 FS sh								3.0 Fgr								2.0 gr CoS					
		1.0 sd CoS								0.5 Fgr sh								3.0 gr						R4	11.0	7.0 Fgr sh	0	11	27	42	+
		2.0 sd sh								2.0 gr sh								1.0 Fgr								2.0 gr					
124	2.0	2.0 gr SiCl	0	9	21	34	+			1.0 Fgr sh								1.0 sd													
		5.0 sd sh						130	1.0	9.0 Fgr sh	0	8	18	30	SiCl			1.0 Fgr													
		11.0 Fgr sh								3.0 sd sh								1.0 Fgr sh													
125	1.0	1.0 gr SiCl	0	6	16	29	+			2.0 Fgr sh								1.5 sd													
		2.0 gr						131	1.0	2.0 Fgr sh	0	10	25	39	+			0.5 sd CoS													
		2.0 Fgr sh								2.0 gr								5.0 gr													
		1.0 sd								1.0 Fgr sh						136	0.5	2.5 gr	0	7	17	28	SiCl								
		6.5 Fgr sh								1.5 gr sh								2.0 Fgr sh													
		2.5 sd sh								0.5 FgrSiCl								3.0 sd sh													
		3.0 sd								2.0 Fgr sh								4.0 gr													
		1.0 Fgr sh								1.0 Fgr CoS								1.0 gr SiCl													
126	0.5	0.5 gr SiCl	0	6	18	33	+			1.5 Fgr sh								2.0 sd sh													
		1.0 FgrSiCl								1.5 gr sh								1.0 sd SiCl													
		2.0 Fgr sh								2.0 Fgr sh						137	2.0	3.0 gr SiCl	1	12	24	38	+WL18.5								
		2.0 gr sh								4.0 gr sh								2.0 gr sh													
		1.0 sd sh						132	1.0	1.0 FS	1	9	21	34	+			1.0 sd sh													
		1.0 Fgr sh								1.0 gr SiCl								7.0 Fgr sh													
		1.0 gr sh								2.0 gr								3.0 sd sh													
		11.0 Fgr sh								1.0 sd sh								0.5 gr													
127	1.0	2.0 sd sh	0	8	20	33	+			1.0 gr sh																					
		4.0 Fgr sh								2.0 sd sh																					
		3.0 gr								1.0 gr sh																					
		1.0 sd CoS								2.0 Fgr sh																					
		1.0 sd sh								3.0 gr sh																					
		2.0 Fgr sh								3.0 sd sh																					
		1.0 sd sh								1.0 gr																					
		2.0 gr								1.0 FS sh																					
		3.0 Fgr sh						133	1.0	2.0 Fgr sh	1	12	26	38	+																
128	0.5	1.5 gr SiCl	0	9	20	35	SiCl			2.0 gr sh																					
		1.0 FgrSiCl								2.0 Fgr sh																					
		1.0 Fgr								2.0 gr																					
		1.0 gr								4.0 sd sh																					
		3.0 Fgr								1.0 SiCl																					
		1.0 Fgr sh								2.0 FS CoS																					
		1.0 gr SiCl								3.0 gr																					
		5.0 Fgr								1.0 Fgr sh																					
		1.0 Fgr sh																													
		1.0 SiCl																													
		2.5 sd CoS																													

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