DESIGN DATA				
Traffic	Average Daily			
Current	Pass: 2470	Trucks: 190	Total: 2660	
Forecast	Pass: 3680	Trucks: 275	Total: 3955	
Clear Zone Distance:		Design Speed: 65 mph		
Minimum Sight Dist. for Stopping: 645 ft		Bridges: HS 20		
Sight Dist. for No Passing Zone: 2285 ft				
Pavement Design Life 20 (years)				
Design Accumulated One-way Flexible ESALs: 842,511				

STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	18991	1	1
	H-8-046(031)089	20652		

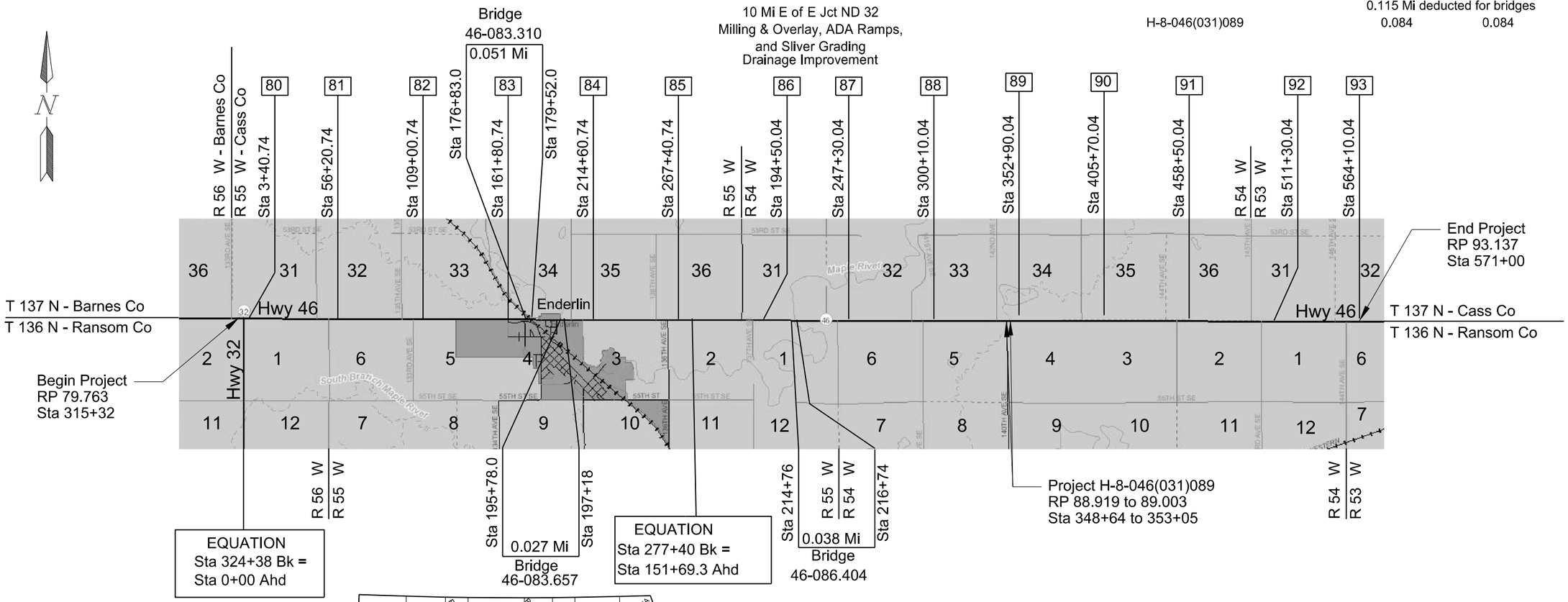
JOB # 28
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

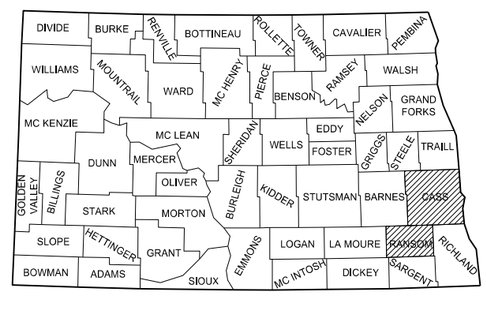
SS-8-046(025)079
H-8-046(031)089

FHWA Limited Involvement
Ransom & Cass Counties
E Jct ND 32 E to 9 Mi E of Enderlin
10 Mi E of E Jct ND 32
Milling & Overlay, ADA Ramps,
and Sliver Grading
Drainage Improvement

GOVERNING SPECIFICATIONS:
Standard Specifications adopted by the North Dakota Department of Transportation October 2008; Standard Drawings currently in effect; and other Contract Provisions submitted herein.

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
SS-8-046(025)079	13.252	13.367
	0.115 Mi deducted for bridges	
H-8-046(031)089	0.084	0.084





STATE COUNTY MAP

DESIGNERS

Sarah BaeHurst

Brian Rosin

Designer Line 3

Designer Line 4

Designer Line 5

APPROVED DATE 12/18/13

Roger Weigel
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 12/18/13

James Douglas Rath
NDDOT DIV-DIST OR CONSULTANT FIRM

This document was originally issued and sealed by James Douglas Rath, Registration Number PE- 4283, on 12/18/13 and the original document is stored at the North Dakota Department of Transportation

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SP 1010(08)	Temporary Erosion and Sediment Best Management Practices
SP 1101(08)	Split Sampling and Testing Requirements for Aggregate Base
SP 1275(08)	Weather Limitations for Hot Bituminous Mix
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LIST OF STANDARD DRAWINGS

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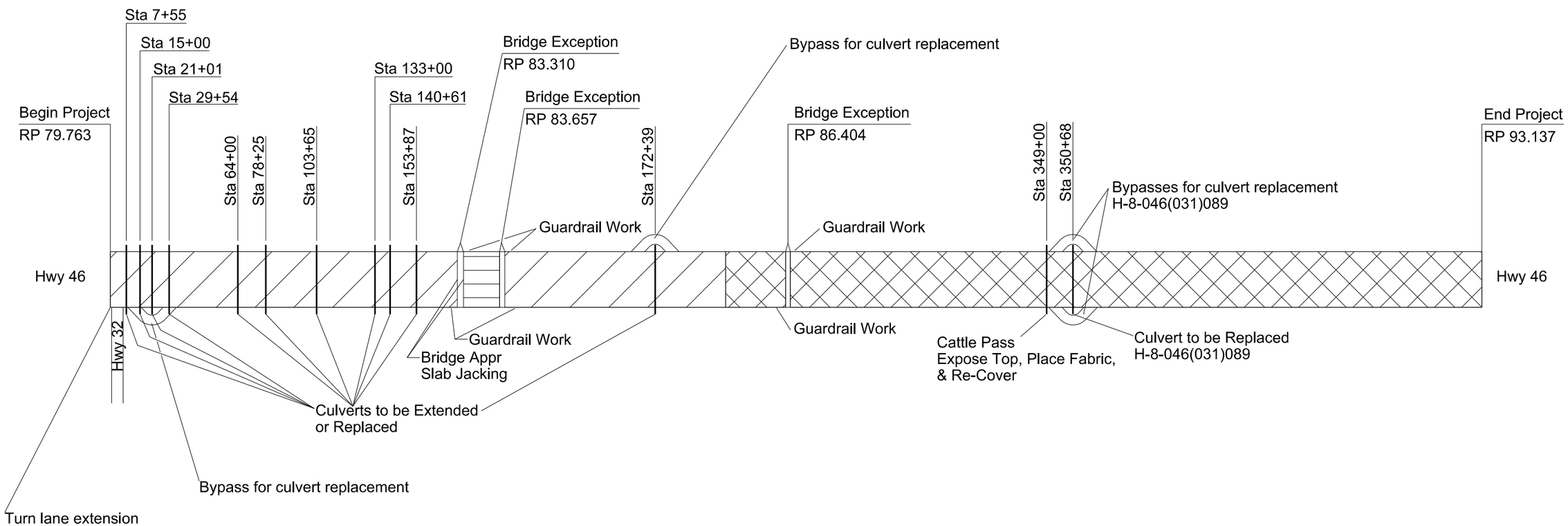
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	4	1

H-8-046(031)089



Mill and Overlay, Sliver Grading	- RP 79.763 to 83.336 and RP 83.670 to 85.790	Sta 315+32 to Sta 179+52 and Sta 195+78 to Sta 183+39
Mill and Overlay, ADA Ramps	- RP 83.336 to 83.670	Sta 179+52 to Sta 195+78
Mill and Overlay	- RP 85.790 to 93.137	Sta 183+39 to Sta 571+00

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Scope of Work

Mill and Overlay, ADA Ramps, ans Sliver Grading

E Junction of ND 32 E to 9 Miles E of Enderlin

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079 H-8-046(031)089	6	1

NOTES

GENERAL NOTES

100-P01 WEEKLY PLANNING SCHEDULE: The Contractor will be required to provide a written schedule of the next week's work and a tentative schedule of the following week's work to the Engineer. All costs for the weekly schedule shall be included in the price bid for other items.

107-P01 HAUL ROADS: No roads off the state system will be used as haul roads unless the contractor obtains written approval from the local government agency or agencies and the Engineer. The Engineer will determine what government agency or agencies approvals are Appropriate.

200-010 SHRINKAGE: 25 percent additional volume is included for shrinkage in earth embankment.

202-P01 VERTICAL CUTS: The full depth vertical cuts along the mainline sliver grading and at the turn lane extension area, as well as at pipe work areas shall be the full depth of the existing bituminous material and base. The method to make the vertical cut shall be chosen by the contractor and shall be measured and paid as "Saw Bituminous Surfacing-Full Depth." All cost for the removal of the bituminous and aggregate material shall be included in the unit price bid for "Remove and Salvage Bituminous Surfacing."

202-P02 SAWCUTS: At cattle pass and pipe installation locations a full depth transverse sawcut shall be used at the beginning and end of each pavement removal area. Any intermediate saw cuts performed to aid in the removal of pavements shall not be paid for separately. Removal and salvage of the existing pavement and base in these areas shall be measured as "Remove and Salvage Bituminous Surfacing."

203-P01 COMPACTION CONTROL: Embankment should be placed with Type A compaction control for turn lane extensions and Type B compaction control for sliver grading and bypasses.

203-P02 HAUL: No average haul has been computed for this project.

203-P03 BENCHING: Existing foreslopes will be benched in preparation for widening even when less steep than 4:1.

203-P04 MATERIAL TESTING: The contractor shall be responsible for the testing of materials proposed to be used for embankment, aggregate backfill, foundation fill, and salvaged base prior to placement of said material. A minimum of one 5 point proctor for each type of soil encountered, aggregate backfill, foundation fill, and salvaged base, shall be performed. Soil and aggregate samples shall be provided in a separate sealed glass jar to the Engineer. The Engineer will complete "check" proctors to verify the contractor's results. The cost of testing shall be included in the price bid for items "Borrow, aggregate backfill, foundation fill, and Salvaged Base".

203-P05 TOPSOIL - WETLAND: The Contractor shall strip a minimum of 6 inches of topsoil from wetland areas. The Contractor shall construct a separate stockpile site for the wetland topsoil that is no greater than 3 feet high.

The Contractor shall place and spread a minimum of 6 inches of wetland topsoil at the mitigation site. If the wetland topsoil has been stockpiled for more than 30 days, the Contractor shall place, spread, and seed the wetland topsoil with the following seed mixtures:

Grass			Full Seeding Rate Pure Live Seed/Acre	% Species in Mix	Pure Live Seed lbs./Ac
Common Name	Scientific Name	Variety			
Prairie Cord Grass	Spartina pectinata	Red River	7.0	15	1.1
American Slough Grass	Beckmannia syzigachne	Common	0.9	20	0.2
Virginia Wild-rye	Elymus virginicus	Omaha	10.0	20	2.0
Fowl Blue Grass	Poa palustris	Common	1.0	20	0.2
Fox Sedge	Carex vulpinoidea	Common	1.0	15	0.2
American Manna Grass*	Glyceria grandis	Common	1.5	10	0.2
Fowl Manna Grass*	Glyceria striata	Common	1.0	10	0.1
Bluejoint Grass**	Calamagrostis canadensis	Common	1.0	10	0.1
			Total	120	3.9

** American, fowl, or both may be used. If only one is used the seeding rate of other species does not need to be increased.*
*** Seed may not be available and can be removed without increasing the seeding rate of other species*

The Contractor shall include all costs for removal, stockpiling, seeding, and placement of wetland topsoil in the price bid for "Topsoil - Wetland."

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NOTES

203-P06 COMMON EXCAVATION: All work to remove material for wetland mitigation, shape the ditch, and dispose of the material will be included in the price bid for "Common Excavation-Waste". It shall be measured per plan quantity, unless the limits change. Transverse foreslope and backslope leading in and out of the mitigation site shall be 4:1; longitudinal slopes shall be 8:1 or flatter.

203-P07 BORROW: Borrow excavation required for this project is not available within the right of way and it will be the contractor's responsibility to obtain borrow areas. Earthwork calculations were based on the cross sections shown on the plans. No TIN is available for this project.

302-P01 SALVAGED BASE COURSE: Any virgin material used will meet Class 5 specifications.

400-P01 RECYCLED HOT BITUMINOUS PATCHES OVER CULVERT: The surface of the roadway shall be brought up to match the surface of the existing adjacent pavement as soon as the culvert has been installed. The contractor may elect to place 3" of RHBP immediately after each culvert installation. The pavement patch shall provide a satisfactory surface profile. This patch will be milled 1 ½" along with the adjacent roadway, this milling would be paid for as indicated in the mainline quantities.

If the contractor decides to wait and pave the patch areas on a different day, the contractor shall bring the grade up to the adjacent surfacing elevation with salvaged base material. Prime and blotter material shall be applied to the aggregate surface. Then prior to surfacing with the final 3" RHBP overlay the contractor shall either:

1) If the adjacent pavement has not been milled, remove 3" of aggregate with prime and blotter material. The removed material can be placed on the widened shoulder and spread evenly. The material may need to be processed. The maximum size of removed material shall be 2''. The contractor shall then place a 3" RHBP patch. This patch will be milled along with the adjacent roadway. Milling of the top 1 ½" of the patch prior to placement of the final 3" RHBP overlay will not be measured for payment.

2) If the adjacent pavement has been milled, remove 2" of aggregate with prime and blotter material. The removed material can be placed on the widened shoulder and spread evenly. The material may need to be processed. The maximum size of removed material shall be 2''. The contractor shall then place a 2" RHBP patch.

All costs for placing prime and blotter, removing 2" or 3'' of aggregate with prime and blotter material, processing the material if necessary, and leveling the material shall be included in the price bid for "Recycled Asphalt Pavement-Superpave FAA 42".

410-P01 RECYCLED HOT BITUMINOUS PAVEMENT: Paver lay the 3" overlay in 2 approximately equal lifts. Paver lay the 2" bituminous surface prior to milling, for turn lane extensions and widened shoulders in the sliver grading areas, 1 ½" below the top of the existing surface (contractor may blade lay sliver grading pavement). Paver lay the 3" bituminous patch, if used, over the culvert installations in 2 approximately equal lifts. Paver lay the 2" bituminous patch over culvert installations, if used. Paver lay the 1.5" overlay within Enderlin.

410-P02 CONTRACTOR DEVELOPED MIX DESIGN FAA 42: Submit Final Superpave Volumetric Mix Designs utilizing the millings from this project. Show the aggregate source and bitumen target percentage on the mix design. Submit the mix designs for approval 7 days before using the material.

410-P03 RECYCLED SUPERPAVE PROPERTIES: The following aggregate and mix design properties are required for Superpave Volumetric Design.

Test	Criteria	Reference
Coarse Aggregate Angularity	75% min	NDDOT Field Sampling/Testing Manual
Fine Aggregate Angularity	42% min	AASHTO T 304
Gyratory Effort, # Gyrations	N_{ini}=7, N_{des}=75, N_{max}=115	AASHTO R 35
Voids Filled with Asphalt	65-78%	AASHTO M 323, T 166
$\%G_{mm}$ @ N_{ini}	89% max	AASHTO M 323, T 166
Lightweight Pieces for Virgin Aggregate % Shale	5.0% max	AASHTO M 113, NDDOT Modified

410-P04 RECYCLED ASPHALT PAVEMENT: Add 20 percent recycled asphalt pavement (RAP) and 5.1% PG 58-28 asphalt cement in the Superpave FAA 42 mixture. The contractor shall use 100% virgin material until enough RAP material is available to achieve the 20%.

Keep job mix formula tolerances for RAP within 5 percent of the target value. During mix production, the virgin aggregate shall meet the physical property requirements as determined from the mix design, except the Initial Control Points for Superpave Aggregate may be waived.

Obtain recycled asphalt pavement from the material produced by cold milling on the project.

Process the recycled asphalt pavement so the maximum particle size does not exceed 1-1/2 inches (37.5 mm) in the cold feed.

Introduce the recycled asphalt pavement into the drum and combine with the virgin aggregate to prevent the recycled asphalt pavement from direct contact with the burner flame. Add the asphalt binder to the mixture in the drum after the virgin aggregate and RAP have been combined.

Supply a 165 pound sample of material milled from the project in addition to the virgin aggregate and liquid asphalt required in Section 410 for mix design purposes. Submit the samples to the Fargo District Materials Coordinator.

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NOTES

411-P01 MILLED MATERIAL: Use the milled bituminous material as recycle for “Recycled Asphalt Pavement-Superpave FAA 42” and for “Salvaged Base Course.”

411-P02 MILLED TAPERS: At milling transitions, remove the existing bituminous material to form a straight vertical edge to allow placement of the full depth of surfacing.

411-P03 MILLING: Milling will be approximately 1.5” at centerline with a 2.1% cross-slope on the roadway.

411-P04 TEMPORARY ASPHALT WEDGES: Place temporary asphalt wedges (prior to allowing traffic onto the milled surface) at the beginning or end of the milled transitions to allow smooth passage of vehicles. Do not use salvaged milled material for the wedges.

411-P05 MILLED MATERIAL DISPOSAL: Milled material not incorporated back into the project, meeting a maximum size of 1 ½“, with 90% passing the 1” sieve, may be disposed of by stockpiling at the NDDOT Lisbon and Leonard District Storage Yards. Upon stockpiling at the storage yard, the material becomes the property of the state.

704-252 TRAFFIC CONTROL FOR UNEVEN PAVEMENT: The contractor has the option of making the paving lanes even at the end of each day's paving operation or signing for the uneven pavement and providing the following devices: Install "Uneven Lanes" signs (Sign No. W8-11-48) and a supplemental plate (Sign No. W20-52-54), identifying the distance, on the right shoulder (both directions) in advance of the beginning of the uneven pavement and at major intersections. A major intersection shall be defined as a CMC, state, U.S. highway, or Interstate ramp. Install "Do Not Pass" signs (Sign No. R4-1-48) on the right shoulder (both directions) between the uneven lanes sign and the beginning of the uneven pavement and at major intersections. Install tubular markers spaced at two times the posted speed limit on the centerline where uneven pavement exists.

These traffic control devices shall be left in place until the lanes are even. These signs and tubular markers are included in the "Traffic Control Devices List" and will be measured and paid for at the contract unit price for each device. No extra compensation will be allowed for relocation due to work progression.

704-P01 TRAFFIC CONTROL: The contractor shall have at least one lane of traffic open to public travel during work hours. If the contractor is unable to complete the culvert replacement or cattle pass work at each location in one working day, the area shall be made safely traversable for two lanes of traffic or be flagged 24 hours per day. To maintain traffic a fifteen foot wide driving surface shall be provided with the use of flaggers or a thirty foot wide driving surface with the use of traffic control devices (D-704-15 Type B). A safe and traversable slope is defined as having a cross slope of 4:1 or flatter.

704-P02 TRAFFIC CONTROL: Traffic control shall consist of a lane closure, flagging, pilot car, and shoulder closures. Traffic Control Devices shall comply with the following Standard Drawings:

1. D-704-2, Coring bituminous pavement.
2. D-704-5, Contractor sign is applicable.
3. D-704-7, 8, 9, 10, 11, 13, and 14 as applicable.
4. D-704-15, Layout A: For saw cuts, pavement removals, widening, placement of aggregate base, milling, and paving when a one lane closure is needed to carry out these operations. Two Closures have been provided.
5. D-704-15, Layout B: for temporary bypasses at culvert replacements
6. D-704-20, Layout G: For construction signing. Signs W3-5-48 and R2-1-48 are to be moved as the work area moves through the construction zone and should be placed a minimum of 500 ft in advance of flagging signs.
7. D-704-22, Type K and L: For construction trucks entering or crossing from an aggregate source or a contractor jobsite.
8. D-704-24, Type R: For installation of the pipe extensions and widening as necessary. Delineator drums shall be used in-place of the cones as shown on the Standard Drawing. Two shoulder closures have been provided. A quantity of 13 delineator drums have been provided for each work area – total of 26 drums.
9. D-704-26, Type CC, EE, FF, and GG for paving operations, and Type BB For shoulder work.
10. D-704-27: For pavement marking operations.
11. D-704-30, Windrow marking.
12. D-704-56, Rumble Strips

Traffic control quantities for widening have been developed based on a 5 mile limitation for operations. The required traffic control signs and devices are included in the “Traffic Control Devices List” and will be measured and paid at the Contract Unit Price for each device. Additional devices required to accommodate the Contractor’s operation shall be the Contractor’s responsibility. The contractor shall relocate the flaggers and portable signs with the movement of the paving operation to minimize the delay time for the traveling public.

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NOTES

706-P01 FIELD LABORATORY TYPE-B: Prior to any work being performed on the project, the contractor shall supply one field Laboratory type-B. The field lab shall include a printer/copy machine that is compatible with NDDOT software, telephone with service and voicemail. The contractor shall supply an additional microwave with generator on site for the field personnel to complete the specified density compaction tests in a timely manner. The generator shall be of sufficient size to power the microwave oven.

708-P01 MULCHING: All excavation and embankment areas shall be stabilized with mulch after the completion of the Type B-Class II permanent seeding operation.

The contractor is allowed to use mulch as temporary erosion control to meet the requirement of the NDPDES Construction General Permit.

708-P02 TEMPORARY EROSION CONTROL: Within the project area, it is assumed that the contractor will use the existing topsoil to create an earthen berm at the bottom of the foreslope in widened areas. The earthen berm, along with the grass remaining in the ditch and fiber rolls will serve as the temporary erosion control. The earthen berm is not a separate pay item, all costs associated with creating, maintaining, and dismantling the berm are included in the unit cost for “Topsoil”. A quantity of silt fence has been provided for erosion control at the borrow site.

The berm will have a minimum height of 12 inches and be uniformly shaped in such a way that it will not fail when pressure from stormwater is applied. When the foreslope has reached final grade, the earthen berm shall be removed and the soil spread on the foreslope before the permanent seeding and mulching work is commenced. To allow stormwater to drain through the berm, weirs may be placed intermittently as needed throughout the length of the berm. These weirs shall be no more than 5 feet wide and have fiber rolls installed across the weir on the downslope side of the berm. If a weir must be made during conditions that would allow stormwater to flow through immediately, the fiber roll must be installed before the weir is made in the earthen berm.

708-P03 FIBER ROLLS: A quantity of 240’ of 12” fiber roll has been provided for temporary use at culvert inlets within the widening area. A quantity of 500’ of 12” fiber roll has also been provided for permanent erosion control to be placed at the Engineer’s discretion.

A quantity of 6,525’ of 12” fiber roll has been provided for permanent placement at the back-side of the earthen berm at the perimeter of the work area at wetlands. If there is no standing water within the adjacent wetland, immediate seeding and mulching of the earthen berm may replace the fiber roll. If seed/mulch is not immediately applied, fiber rolls are required immediately. Fiber rolls will still be required at the weirs within the berm. Class IV seed mix and mulch for this use will be paid for as “Seeding-Type B-CL IV” and “Mulching”.

708-P04 PERMANENT EROSION CONTROL: Permanent Erosion Control will consist of mulching, seeding, riprap, and fiber rolls.

708-P05 SEEDING: For the disturbed areas around the ADA ramps within Enderlin, install Class I seed mixture. All costs for labor, equipment, and materials necessary to complete the work will be included in the price bid for “Sidewalk Concrete”.

714-P01 PIPE CONDUIT: Remove sediment, fill scour holes, and restore drainage up to 40 feet beyond the ends of the pipe. Include all costs of silt removal, scour hole repair, or drainage restoration in the unit price bid for "Pipe Conduit" or “Pipe Conc Reinf” as applicable.

714-P02 PIPE REMOVAL: All costs associated with removal or disposal of existing pipes will be included in the price for the applicable size of “Pipe Conduit” or “Pipe Conc Reinf” being installed.

714-P03 CATTLE PASS: All trenching, excavation, and aggregate subgrade work associated with exposing and re-covering the cattle pass at Sta 349+00 is included in the price bid for “Borrow Excavation”.

750-P01 SIDEWALK CONCRETE: Sidewalk concrete is for the installation of ADA ramps at the locations shown on the plans. All sidewalk replacement areas shall have a No. 3 deformed reinforced bar placed 24” on center both longitudinally and transversely. The bar shall be six (6) inches shorter than the width of the slab and placed accurately at one-half the depth of the slab. Plastic chairs will be used.

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NOTES

GENERAL NOTES

760-P01 RUMBLE STRIPE EXEMPTION: The rumble stripes shall be discontinued 100 feet before and 100 feet after the ATR site. This includes centerline and edge line rumble stripes.

SECTION 110

894-100 RETROREFLECTIVE SHEETING: Provide Type IV retroreflective sheeting that meets ASTM D 4956, Type IV. Provide Type XI retroreflective sheeting that meets ASTM D 4956, Type XI.

SECTION 130

202-P03 REMOVAL OF CURB & GUTTER: Portions of the existing curb and gutter, with a curb height of 6”, shall be removed at the east end of the Soo Line RR Separation, RP 83.310, as shown in the plans. At the end of the removal length there shall be a saw-cut to a depth of 1” in the top and face of the curb and gutter to provide a neat line for the installation of the new curb and gutter.

All costs of removing the curb and gutter, including saw-cutting, as described above shall be included in the price bid for the item “Removal of Curb & Gutter.”

748-P01 CURB & GUTTER – TYPE 1 SPECIAL: Curb and gutter is required at the east end of the Soo Line RR Separation, RP 83.310, as shown in the plans.

The curb and gutter shall be Type 1 as shown on Standard Drawing D-748-1, except that the height of the curb shall be 3”. There are 3 inlets within the length of the curb that shall be adjusted as shown in the plans.

All costs for constructing the curb and gutter and adjusting the inlets, as described above shall be included in the price bid for the item “Curb & Gutter – Type 1 Special.”

764-P01 REMOVE END TREATMENT & TRANSITION: The removed end treatment and transition shall become the property of the contractor and shall be disposed of outside the highway right of way.

The item "Remove End Treatment & Transition" shall be measured by the number removed.

The cost of removing the end treatment and transition, and disposing of the material shall be included in the price bid for the item "Remove End Treatment and Transition."

764-P02 REMOVE 3-CABLE GUARDRAIL & POSTS: The removed 3-cable guardrail materials which are not to be reset shall become the property of the contractor and shall be disposed of outside the highway right of way.

The item "Remove 3-Cable Guardrail & Posts" shall be measured by the linear foot of guardrail removed.

The cost of removing the guardrail and posts and disposing of materials not to be reset shall be included in the price bid for the item "Remove 3-Cable Guardrail & Posts."

764-P03 REMOVE W-BEAM GUARDRAIL & POSTS: The removed W-beam guardrail materials which are not reset shall be delivered by the contractor to the NDDOT Maintenance Storage Yard in Leonard, and neatly stacked at a location designated by the engineer.

The cost for delivery and stacking of the removed W-beam guardrail materials which are not to be reset shall not be paid for separately, but shall be included in the price bid for the item "Remove W-Beam Guardrail & Posts.”

SECTION 150

772-P01 AUTOMATIC TRAFFIC RECORDER SYSTEM: The Contractor shall furnish and install the Automatic Traffic Recorder (ATR) site as shown in the plans. Complete the work on this site after the roadway work is completed.

Representative
The Contractor shall ensure that a qualified PEEK Traffic Corp. representative will be on site to assist and supervise the system installation and all work. The Contractor shall ensure that a PEEK Traffic Corp. representative is certified for the ATR equipment installation, operation, calibration and vehicle verification processes.

Loops
All detector loops must follow minimum curing specifications for the sealant according to the detector loop manufacturer.

The detector loops shall be installed as shown in the plans. The loop wire shall extend to the recorder cabinet and shall only have one splice per loop.

Loop wire shall meet the requirements of Spec. 896.03.B. Loops shall be installed according to the plans. Loop saw slots shall be 2 inches deep, or as recommended by the manufacturer. The loop slot shall be sealed as per Spec. 772.03 F.8.

Loop lead-in conductor shall meet the requirements of Spec. 896.03.B and shall not be spliced from the pull box to the recorder cabinet. All loop splices will be made in the pull box. All loop splices will be soldered along with a 3M splice kit, or CK 137 Shake-N-Seal from Uraseal.

Sawing & Sealing Joints

This document was originally issued and sealed by Douglas A Schumaker, Registration Number PE-5047, on 12/18/13 and the original document is stored at the North Dakota Department of Transportation.

NOTES

The Contractor shall follow the provisions of Spec. 772.03 F when sealing any joints. Hot Poured Joint Seal shall not be used for sealing any saw slots.

Cabinet
The Contractor is responsible for all wire termination. All lug terminals for wire termination shall be crimped and soldered. The conductors shall meet the requirements of section 896 of the Std. Specs.

The 2" rigid conduit shall be at a minimum depth of 24" below finished grade. Conduit trenches will require final grading and seeding. This conduit shall meet the requirements of Spec. 896.02.B and shall not be spliced from the pull box to recorder cabinet, and shall be a continuous run.

All holes made or existing in the pull box for conduit access shall be plugged/sealed and made watertight. All conduit containing electrical wire (both in the pull box and the cabinet) shall be sealed and made watertight after the wire has been pulled through and terminated.

The ADR-6000 traffic recorder shall be manufactured by PEEK Traffic Corp.

All AC power feeds, data lines, and loops shall be protected with approved surge/line protectors. A 6 outlet AC line protector unit must be provided for the 120 volt 60 Hz power source. The protector unit will include a thermal circuit breaker, and EMI/RFI noise suppression for diverting and clamping high voltage surges so as to limit the maximum voltage reaching the sensitive electronic equipment during a transient pulse. The unit will be approved by Underwriter Laboratories (UL).

The Contractor shall install a 4G Cellular Modem in the ATR cabinet. The Contractor shall contact the Information Technology Division within the NDDOT:

Robert Steckler
216 Airport Road
Bismarck, ND 58504
Telephone: (701) 328-6935

The Contractor must contact Robert Steckler a minimum of 3 weeks in advance of the installation.

Ground rods must be placed at all four (4) corners, located outside of the foundation pad. Each ground rod must be 5/8 inch diameter by 10 feet long. Connection of ground rods must be with a No. 2/0 AWG copper wire bonded to the cabinet. All buried connections will be made with a Cadweld type connection. The earth ground resistance will test to 25 ohm or less, and be tested with an earth/ground resistance tester capable of measuring earth ground resistance less than 25 ohm. The Contractor will install any additional ground rods to achieve the 25 ohm or less earth ground resistance. All test results will be documented by the Contractor and furnished to NDDOT in a clean, organized format.

Foundations
The ATR cabinet foundation and working slab shall be constructed using the ATR Detail Sheet and standard drawing D-770-1.

The cabinet foundation shall be of sufficient size so there is a minimum of 2" of clearance from the outside edge of cabinet to the outside edge of the foundation on any side. The Contractor shall ensure a water-tight seal between the cabinet and the foundation by caulking, except for V groove. Rodent protection shall be placed in the V groove between the concrete foundation and the cabinet, which shall allow water to drain properly from the cabinet. The materials and preparation of the Working Slab shall be as approved by the Engineer.

Testing
All new loops shall be tested after installation and must test to manufacturers specifications or be replaced. If the loops meet manufacturer's specifications after installation, but do not perform traffic count or classification correctly, the Contractor will be responsible for any corrections up to and including replacing the defective part or parts. This includes loops and electronics.

The Contractor shall verify vehicle classification by comparing ATR results with base line traffic counts and classification obtained by videotaping and manually counting and classifying vehicles for a period of 2 hours.

Acceptance
Acceptance of the Automatic Traffic Recorder site will be determined after the site is in operation for 30 days and is working correctly. Any damage caused as a result of construction practices or techniques shall be paid at the Contractor's expense. This includes new items installed by this contract such as new detector loops.

The Contractor shall provide the operation and maintenance manuals and detailed wiring schematics for this ATR site.

Completion of work requires the following items to be completed: the Automatic Traffic Recorder site in working order as approved by the PEEK Traffic Corp. representative, site passed inspection by the Engineer, and successful completion of testing.

All costs for labor, equipment, materials, PEEK representative, and all testing necessary to install the ATR equipment, shall be included in the price bid for "Automatic Traffic Recorder System".

This document was originally issued and sealed by Douglas A Schumaker, Registration Number PE-5047, on 12/18/13 and the original document is stored at the North Dakota Department of Transportation.

ENVIRONMENTAL COMMITMENTS

ENVIRONMENTAL COMMITMENTS: The North Dakota Department of Transportation and the Federal Highway Administration have made several environmental commitments to various agencies and the public to secure approval of this project. The environmental commitments are as follows:

COMMITMENT NO. 1: Unavoidable impacts to wetlands will be mitigated onsite. Approximately 0.66 *natural/jurisdictional*, 0.05 *natural/non-jurisdictional*, 0.0 *artificial/jurisdictional*, and 0.04 *artificial/non-jurisdictional* acres of wetlands will be impacted permanently, and 2.61 acres will be impacted temporarily.

ACTION TAKEN/REQUIRED: 0.71 acres of permanent impacts to wetlands will require mitigation. The NDDOT proposes to mitigate these impacts within the project boundaries.

Wetland Number	Location	Cowardin Class.	Wetland Type	Wetland Size Ac.	Wetland Feature	USACE Jurisdictional Wetlands*	Wetland Impacts (acres)		USFWS Easement Impacts		WETLAND MITIGATION			
											Mitigation Required			
							Temp. Ac.	Perm. Ac.	Temp.	Perm.	11990	USACE	Location	Onsite Mitigation Acres
1	Sec. 1, T136N, R56W	PEMA	Ditch	0.04	Artificial	Preamble	0	0	0	0	-	-		
2	Sec. 31, T137N, R55W	PEMA	Basin	0.12	Natural	No	0	0	0	0	-	-		
3	Sec. 31, T137N, R55W	PEMA	Ditch	0.66	Artificial	No	0.26	0.04	0	0	-	-		
4	Sec. 31, T137N, R55W	PEMC	Basin	0.06	Natural	No	0.02	0	0	0	-	-		
5	Sec. 32, T137N, R55W	PEMA	Basin	3.32	Natural	Yes	1.10	0.15	0	0	0.15	0.15	on-site	0.53
6	Sec. 6, T136N, R55W	PEMA	Basin	0.5	Natural	No	0.15	0.05	0	0	0.05	-	on-site	0.05
7	Sec. 33, T137N, R55W	PEMC	Basin	0.1	Natural	No	0	0	0	0	-	-		
8	Sec. 5, T136N, R55W	PEMC	Basin	0.12	Natural	No	0	0	0	0	-	-		
9	Sec. 4, T136N, R55W	PEMC	Ditch	0.03	Artificial	Yes	0	0	0	0	-	-		
10	Sec. 35, T137N, R55W	PEMA	Basin	<0.01	Natural	No	0	0	0	0	-	-		
11	Sec. 3, T136N, R55W	PEMA	Basin	0.62	Natural	No	0.22	0	0	0	-	-		
12	Sec. 2, T136N, R55W	PEMC	Basin	0.03	Natural	No	0.01	0	0	0	-	-		
13	Sec. 2, T136N, R55W	PEMC	Basin	3.64	Natural	Yes	1.21	0.51	0	0	0.51	0.51	0.33 ac 1:1 on-site & 0.18 ac 2:1 @ #5	0.33
14	Sec. 34, T137N, R55W	PEMC	Basin	0.11	Natural	Yes	0	0	0	0	-	-		
			Totals	**9.35**			**2.97**	**0.75**	**0.00**	**0.00**	N			**0.91**

* A wetland Jurisdictional Determination was issued by the USACE on 10/21/2013; NWO-2013-1636-BIS.

Total Permanent Impact Summary		Additional Impact Info for 404 Permit	
Wetland Type	**Total (Acres)**	**Wetland Type**	**Total (Acres/Lf)**
Natural/Non-JD	0.05	Permanent JD > 0.10	**0.66**
Artificial /Non-JD	0.04	Temporary JD	**2.31**
Natural /JD	0.66	POW	**0**
Artificial /JD	0.00		
Totals	**0.75**		

POTENTIAL OTHER WATERS										POW MITIGATION			
Number	Location	Type	Size		Feature	USACE Jurisdictional*	Impacts to Potential Other Waters			Mitigation Required		Location	Method
			Acres	Linear Feet			Acres Temp	Acres Perm	Linear Feet	11990	USACE		
POW - 1	Sec.4, T136N, R55W	Tributary	0.55	200	Natural	Yes	0	0	0	0	0	-	-
		Totals	**0.55**	**200**			**0**	**0**	**0**				

* A wetland Jurisdictional Determination was issued by the USACE on 10/21/2013; NWO-2013-1636-BIS.

PERMITS REQUIRED:

- Section 404 Permit (US Army Corps of Engineers)

ENVIRONMENTAL COMMITMENTS

ENVIRONMENTAL COMMITMENTS: The North Dakota Department of Transportation and the Federal Highway Administration have made several environmental commitments to various agencies and the public to secure approval of this project. The environmental commitments are as follows:

COMMITMENT NO. 1: Unavoidable impacts to wetlands will be mitigated onsite. Approximately 0.02 acres of Natural/Jurisdictional wetlands will be impacted permanently, and 0.45 acres will be impacted temporarily.

ACTION TAKEN/REQUIRED: NDDOT will mitigate the 0.02 acres of permanent wetland impacts at Vollrath Mitigation Site.

Wetland Number	Location	Cowardin Classification	Wetland Type	Wetland Size (acres)	Wetland Feature	USACE Jurisdictional Wetlands*	Wetland Impacts (acres)		USFWS Easement Impacts		WETLAND MITIGATION			
											Mitigation Required			Onsite Mitigation Acres
							Temp. Ac.	Perm. Ac.	Temp.	Perm.	11990	USACE	Location	
1a	Sec.34, T137N, R54W	PEM/ABF	Depressional	0.45	Natural	Yes	0.27	0.02	0	0	-	-	-	-
1b	Sec.4, T136N, R54W	PEM/ABF	Depressional	0.29	Natural	Yes	0.18	0	0	0	-	-	-	-
1c	Sec. 5, T136N, R54W	PEM/ABF	Depressional	0.04	Natural	Yes	0	0	0	0	-	-	-	-
			Totals	**0.78**			**0.45**	**0.02**	**0.00**	**0.00**	-	-		**0.00**

* A wetland Jurisdictional Determination is pending by the USACE.

PERMITS REQUIRED:

- Section 404 Permit (US Army Corps of Engineers)

ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	8	1

SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE	H-8-046(031) 089	ENDERLIN	TOTAL
103	0100	CONTRACT BOND	L SUM	1			1
202	0121	REMOVE & SALVAGE BITUMINOUS SURFACING	TON	7,439	513		7,952
202	0130	REMOVAL OF CURB & GUTTER	LF	383			383
202	0153	SAW BITUMINOUS SURFACING-FULL DEPTH	LF	49,280			49,280
203	0109	TOPSOIL	CY	17,831	686		18,517
203	0113	COMMON EXCAVATION-WASTE	CY	1,951			1,951
203	0121	TOPSOIL-WETLAND	CY	3,001			3,001
203	0140	BORROW-EXCAVATION	CY	17,960			17,960
216	0100	WATER	M GAL	826	13		839
302	0100	SALVAGED BASE COURSE	TON	15,565	672		16,237
401	0100	MC70 OR 250 LIQUID ASPHALT	GAL	69,716		1,676	71,392
401	0150	SS1H OR CSS1H OR MS1 EMULSIFIED ASPHALT	GAL	26,814	40	336	27,190
410	0247	RECYCLED ASPHALT PAVEMENT-SUPERPAVE FAA 42	TON	43,937	203	559	44,699
410	0445	PG 58-28 ASPHALT CEMENT	TON	2,254	10.3	27.7	2,292
410	0910	CORED SAMPLE	EA	289			289
411	0105	MILLING PAVEMENT SURFACE	SY	243,263		6,699	249,962
702	0100	MOBILIZATION	L SUM	1			1
704	0100	FLAGGING	MHR	1,968	20	32	2,020
704	1000	TRAFFIC CONTROL SIGNS	UNIT	2,970	1,122	48	4,140
704	1052	TYPE III BARRICADE	EA	8	12		20
704	1060	DELINEATOR DRUMS	EA	168	10		178
704	1067	TUBULAR MARKERS	EA	22	6		28
704	1081	VERTICAL PANELS-BACK TO BACK	EA	81	18		99
704	1185	PILOT CAR	HR	300			300
706	0200	FIELD LABORATORY-TYPE B	EA	1			1
706	0300	FIELD LABORATORY-TYPE C	EA	2			2
706	0400	FIELD OFFICE	EA	1			1
708	1020	RIPRAP-LOOSE ROCK	CY	173			173
708	1430	FIBER ROLLS 12IN	LF	6,792	473		7,265
708	1431	REMOVAL FIBER ROLLS 12IN	LF	220	20		240
708	2240	SEEDING-TYPE B-CL II	ACRE	46.4	0.87		47.27
708	2260	SEEDING-TYPE B-CL IV	ACRE	46.4	0.87		47.27

ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	8	2

SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE	H-8-046(031) 089	ENDERLIN	TOTAL
708	5500	MULCHING	ACRE	92.8	1.74		94.54
709	0600	GEOTEXTILE FABRIC-TYPE RR	SY	184			184
709	0701	GEOTEXTILE FABRIC-TYPE R1	SY	1,647	324		1,971
710	0100	TEMPORARY BYPASS	EA	2	1		3
710	0400	REMOVAL OF BYPASS	EA	2	1		3
714	0310	PIPE CONC REINF 18IN CL III	LF	20			20
714	0615	PIPE CONC REINF 24IN CL III	LF	4			4
714	4105	PIPE CONDUIT 24IN	LF	276			276
714	4110	PIPE CONDUIT 30IN	LF	78			78
714	4135	PIPE CONDUIT 60IN	LF		89		89
714	9656	INSTALL END SECTION-ALL TYPES & SIZES	EA	22	2		24
748	0141	CURB & GUTTER-TYPE 1 SPECIAL	LF	383			383
750	0100	SIDEWALK CONCRETE	SY			32	32
750	2115	DETECTABLE WARNING PANELS	SF			24	24
750	2120	DETECTABLE WARNING PANELS-RETROFIT	SF			8	8
754	0110	FLAT SHEET FOR SIGNS-TYPE XI REFL SHEETING	SF	166.6		38.4	205
754	0112	FLAT SHEET FOR SIGNS-TYPE IV REFL SHEETING	SF	249			249
754	0206	STEEL GALV POSTS-TELESCOPING PERFORATED TUBE	LF	986.1		64.9	1,051
754	0562	REFERENCE MARKER-TYPE B	EA	6			6
754	0592	RESET SIGN PANEL	EA	11			11
754	0805	OBJECT MARKERS - CULVERTS	EA	30	2		32
754	1104	REMOVE SIGN FOUNDATION	EA	2			2
760	0005	RUMBLE STRIPS - ASPHALT SHOULDER	MILE	26.1			26.1
760	0007	RUMBLE STRIPS - ASPHALT CENTERLINE	MILE	13			13
760	0009	RUMBLE STRIPS - INTERSECTION	EA	2			2
762	0112	EPOXY PVMT MK MESSAGE	SF	225			225
762	0113	EPOXY PVMT MK 4IN LINE	LF	228,570		3,564	232,134
762	0115	EPOXY PVMT MK 8IN LINE	LF	1,780			1,780
762	0117	EPOXY PVMT MK 24IN LINE	LF	12		54	66
762	0430	SHORT TERM 4IN LINE-TYPE NR	LF	53,057	34	396	53,487
762	1500	OBLITERATION OF PVMT MK	SF	140	203		343
764	0131	W-BEAM GUARDRAIL	LF	1,885			1,885

ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	8	3

SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE	H-8-046(031) 089	ENDERLIN	TOTAL
764	0145	W-BEAM GUARDRAIL END TERMINAL	EA	12			12
764	0151	REMOVE W-BEAM GUARDRAIL & POSTS	LF	960			960
764	1050	RESET W-BEAM GUARDRAIL	LF	550			550
764	2020	REMOVE 3-CABLE GUARDRAIL & POSTS	LF	1,228			1,228
764	2081	REMOVE END TREATMENT & TRANSITION	EA	12			12
766	0100	MAILBOX-ALL TYPES	EA	9			9
772	9010	AUTOMATIC TRAFFIC RECORDER SYSTEM	EA	1			1
930	3631	POLYURETHANE FOAM	LBS	2,500			2,500

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079 H-8-046(031)089	10	1

BASIS OF ESTIMATE

		Typical 3&4		Typical 5		Typical 6		Typical 7		Typical 7		Typical 7	
		Sta 172+35 to Sta 176+08						Sta 251+58.47 to Sta 256+68		Sta 256+68 to Sta 259+08		Sta 259+08 to Sta 263+17	
		Length = 3.7 Sta		Length = 16.8 Sta		Length = 16.3 Sta		Length = 5.1 Sta		Length = 2.4 Sta		Length = 4.1 Sta	
Material	**Unit**	Width (ft)	Quantity per Station	Width (ft)	Quantity per Station	Width (ft)	Quantity per Station	Width (ft)	Quantity per Station	Width (ft)	Quantity per Station	Width (ft)	Quantity per Station
Milling	SY	36	400	36	400	37	411	36	400	48	533	56	622
SS-1h or CSS-1h Emuls Asphalt @ 0.05 Gal/SY (1st Lift)	Gal	38.3	21.3	36.7	20.4	37.0	20.6	38.3	21.3	50.3	27.9	58.3	32.4
SS-1h or CSS-1h Emuls Asphalt @ 0.05 Gal/SY (2nd Lift)	Gal	37.1	20.6	35.6	19.8	-	-	37.1	20.6	49.1	27.3	57.1	31.7
Hot Bituminous Pavement Superpave @ 2 Ton/CY (1st Lift)	Ton	37.1	35.4	35.6	33.5	37.0	34.3	37.1	35.4	49.1	46.5	57.1	53.9
Hot Bituminous Pavement Superpave @ 2 Ton/CY (2nd Lift)	Ton	36	34.4	34.5	32.4	-	-	36	34.4	48	45.5	56	52.9
PG 58-28 Asphalt Cement @ 5.1% (1st Lift)	Ton	-	1.8	-	1.7	-	1.7	-	1.8	-	2.4	-	2.8
PG 58-28 Asphalt Cement @ 5.1% (2nd Lift)	Ton	-	1.8	-	1.7	-	-	-	1.8	-	2.3	-	2.7
MC70 or 250 Liquid Asphalt @ 0.25/SY	Gal	38.3	106.3	36.7	101.9	37.0	102.8	38.3	106.3	50.3	139.6	58.3	161.8

		Typical 1 & 2	
		Length = 246.4 Sta	
Material	**Unit**	Width (ft)	Quantity per Station
Milling	SY	30	333
SS-1h or CSS-1h Emuls Asphalt @ 0.05 Gal/SY (1st Lift) - shoulders	Gal	5.6	3.1
SS-1h or CSS-1h Emuls Asphalt @ 0.05 Gal/SY (2nd Lift) - shoulders	Gal	34.2	19.0
SS-1h or CSS-1h Emuls Asphalt @ 0.05 Gal/SY (3rd Lift) - shoulders	Gal	33.1	18.4
Hot Bituminous Pavement Superpave @ 2 Ton/CY (1st Lift)	Ton	7.1	6.1
Hot Bituminous Pavement Superpave @ 2 Ton/CY (2nd Lift)	Ton	5.6	31.1
Hot Bituminous Pavement Superpave @ 2 Ton/CY (3rd Lift)	Ton	4.2	30.1
PG 58-28 Asphalt Cement @ 5.1% (1st Lift)	Ton	-	0.3
PG 58-28 Asphalt Cement @ 5.1% (2nd Lift)	Ton	-	1.6
PG 58-28 Asphalt Cement @ 5.1% (3rd Lift)	Ton	-	1.5
Salvaged Base @1.875 Ton/CY	Ton	8.6	46.1
MC70 or 250 Liquid Asphalt @ 0.25/SY	Gal	5.6 & 34.2	110.6

Permanent Pavement Marking & Rumble Strips		
Mainline		
Location - Type	Basis	Quantity
Centerline – Epoxy Pvmt MK 4 IN Line	Centerline Skips 1,320 LF/mile Barrier Stripe 5280 LF/mile	46,420 LF 43,233 LF
Edge Lines – Epoxy Pvmt MK 4 IN Line	10,560 LF/mile	139,941 LF
Centerline Rumble Strips	Mile	12.9
Shoulder Rumble Strips	Mile	25.9
ND 32 Intersection		
Centerline – Epoxy Pvmt MK 4 IN Line	Centerline Skips 1,320 LF/mile Barrier Stripe 5280 LF/mile	138 LF 550 LF
Edge Lines – Epoxy Pvmt MK 4 IN Line	10,560 LF/mile	1100 LF
Epoxy Pvmt MK 8 IN Line	LF	24 LF
Centerline Rumble Strips	Mile	0.1
Shoulder Rumble Strips	Mile	0.2
24" White Crosswalk Bar at Ballpark in Enderlin		
Epoxy Crosswalk Bar 24 IN Line	LF	54 LF

Water

25 MGal/Mile for Dust Palliative
15 Gal/SY for Blended Base
20 Gal/Ton for Aggregates
10 Gal/CY for Embankment

Mailboxes

RP	Type	Work
83.7292 – RT	Double	Replace
84.0007 – RT	Single	Replace
86.2828 – RT	2 Singles	Replace
86.9038 – RT	Single	Replace
88.3754 – LT	Single	Replace
88.8222 - LT	Single	Replace
88.9309 – RT	Single	Replace
89.0755 – RT	Single	Replace

Coring:

Density Cores
69671 LF/2,000 LF *2 Lifts *2 lanes = 140 sublots
140 Sublots * 2 Cores/ Sublot = 280 cores

Coring:

District Materials Coordinator Cores
One full depth core per mile
13.3 miles * 1 core/mile = 13 cores

Culvert Markers	
7+55	Rt & Lt
15+00	Rt & Lt
21+01	Rt & Lt
29+54	Rt & Lt
64+00	Rt & Lt
78+25	Rt & Lt
103+65	Rt & Lt
133+00	Rt & Lt
140+61	Rt & Lt
153+87	Rt & Lt
218+99	Rt & Lt
240+69	Rt & Lt
259+46	Rt & Lt
273+90	Rt & Lt
172+39	Rt & Lt
360+59	Rt & Lt

This document was originally issued and sealed by Sarah BaeHurst, Registration Number PE-6239, on 12/18/13 and the original document is stored at the North Dakota Department of Transportation.

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079 H-8-046(031)089	10	2

BASIS OF ESTIMATE

Material	Unit	Typical 3&4		Typical 3&4		Typical 3&4		Typical 3&4		Typical 3&4		Typical 3&4	
		Sta 157+37.7 to 159+77		Sta 159+77 to Sta 162+47		Sta 162+47 to Sta 163+62		Sta 163+62 to Sta 167+35		Sta 167+35 to Sta 171+45		Sta 171+45 to Sta 172+35	
		Length = 2.4 Sta		Length = 2.7 Sta		Length = 1.2 Sta		Length = 3.7 Sta		Length = 4.1 Sta		Length = 0.9 Sta	
		Width (ft)	Quantity per Station	Width (ft)	Quantity per Station	Width (ft)	Quantity per Station	Width (ft)	Quantity per Station	Width (ft)	Quantity per Station	Width (ft)	Quantity per Station
Milling	SY	38	422	50	556	56	622	44	489	39	433	37	411
SS-1h or CSS-1h Emuls Asphalt @ 0.05 Gal/SY (1st Lift)	Gal	40.3	22.4	52.3	29.0	58.3	32.4	46.3	25.7	41.3	22.9	39.3	21.8
SS-1h or CSS-1h Emuls Asphalt @ 0.05 Gal/SY (2nd Lift)	Gal	39.1	21.7	51.1	28.4	57.1	31.7	45.1	25.1	40.1	22.3	38.1	21.2
Hot Bituminous Pavement Superpave @ 2 Ton/CY (1st Lift)	Ton	39.1	31.2	51.1	42.3	57.1	53.5	45.1	42.8	40.1	38.2	38.1	36.4
Hot Bituminous Pavement Superpave @ 2 Ton/CY (2nd Lift)	Ton	38	30.1	50	41.3	56	52.4	44	41.8	39	37.2	37	35.3
PG 58-28 Asphalt Cement @ 5.1% (1st Lift)	Ton	-	1.6	-	2.2	-	2.7	-	2.2	-	1.9	-	1.9
PG 58-28 Asphalt Cement @ 5.1% (2nd Lift)	Ton	-	1.5	-	2.1	-	2.7	-	2.1	-	1.9	-	1.8
MC70 or 250 Liquid Asphalt @ 0.25/SY	Gal	40.3	111.9	52.3	145.2	58.3	161.8	46.3	128.5	41.3	114.6	39.3	109.1

Material	Unit	Typical 7		Typical 7		Typical 8		Typical 9	
		Sta 263+17 to Sta 269+60		Sta 269+60 to Sta 277+40					
		Length = 6.4 Sta		Length = 7.8 Sta		Length = 367.6 Sta		Length = 20 Sta	
		Width (ft)	Quantity per Station	Width (ft)	Quantity per Station	Width (ft)	Quantity per Station	Width (ft)	Quantity per Station
Milling	SY	44	489	32	356	30	333	43	478
SS-1h or CSS-1h Emuls Asphalt @ 0.05 Gal/SY (1st Lift)	Gal	46.3	25.7	34.3	19.0	30.5	16.9	43.0	23.9
SS-1h or CSS-1h Emuls Asphalt @ 0.05 Gal/SY (2nd Lift)	Gal	45.1	25.1	33.1	18.4	29.4	16.3	41.6	23.1
Hot Bituminous Pavement Superpave @ 2 Ton/CY (1st Lift)	Ton	45.1	42.8	33.1	31.7	29.4	27.7	41.6	39.3
Hot Bituminous Pavement Superpave @ 2 Ton/CY (2nd Lift)	Ton	44	41.8	32	30.7	28.3	26.7	40.5	38.1
PG 58-28 Asphalt Cement @ 5.1% (1st Lift)	Ton	-	2.2	-	1.6	-	1.4	-	2.0
PG 58-28 Asphalt Cement @ 5.1% (2nd Lift)	Ton	-	2.1	-	1.6	-	1.4	-	1.9
MC70 or 250 Liquid Asphalt @ 0.25/SY	Gal	46.3	128.5	34.3	95.2	30.5	84.7	43.0	119.4

Material	Unit	Turn Lane Extension		Turn Lane shoulder widening	
		Width (ft)	Quantity Total	Width (ft)	Quantity Total
SS-1h or CSS-1h Emuls Asphalt @ 0.05 Gal/SY (1st Lift)	Gal	17.5	40.2	5.5	13.8
SS-1h or CSS-1h Emuls Asphalt @ 0.05 Gal/SY (2nd Lift)	Gal	16.7	38.3	4.7	11.8
Hot Bituminous Pavement Superpave @ 2 Ton/CY (1st Lift)	Ton	16.7	90.2	4.7	29.2
Hot Bituminous Pavement Superpave @ 2 Ton/CY (2nd Lift)	Ton	16	81.1	4	24.5
PG 58-28 Asphalt Cement @ 5.1% (1st Lift)	Ton	-	4.6	-	1.5
PG 58-28 Asphalt Cement @ 5.1% (2nd Lift)	Ton	-	4.1	-	1.2
Salvaged Base @1.875 Ton/CY	Ton	17.5	866.3	5.5	302.0
MC70 or 250 Liquid Asphalt @ 0.25/SY	Gal	17.5	48.6	5.5	15.3

Short Term 4 IN Line – Type NR		
Location	Basis	Quantity
Centerline – Top of Primed Surface of traffic lanes	Centerline Skips 1,320 LF/mile	17,493 LF
Centerline – Top of 1st Lift of traffic lanes	Centerline Skips 1,320 LF/mile	17,493 LF
Centerline – Top of 2nd Lift of traffic lanes	Centerline Skips 1,320 LF/mile	17,493 LF
Centerline – Top of Primed Surface of ND 32	Centerline Skips 1,320 LF/mile	138 LF
Centerline – Top of 1st Lift of ND 32	Centerline Skips 1,320 LF/mile	138 LF
Centerline – Top of 2nd Lift of ND 32	Centerline Skips 1,320 LF/mile	138 LF

H-8-046(031)089 Short Term 4 IN Line – Type NR		
Location	Basis	Quantity
Centerline – Top of Primed Surface of traffic lanes	Centerline Skips 1,320 LF/mile	124 LF
Centerline – Top of 1st Lift of traffic lanes	Centerline Skips 1,320 LF/mile	124 LF
Centerline – Top of 2nd Lift of traffic lanes	Centerline Skips 1,320 LF/mile	124 LF

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079 H-8-046(031)089	10	3

BASIS OF ESTIMATE

		Culverts - Quantities are in Addition to Mainline sliver grading and surfacing									
		Sta 21+01		Sta 29+54		Sta 78+25		Sta 133+00		Sta 172+39	
		Length = 24.4 Ft		Length = 116.2 Ft		Length = 113.3 Ft		Length = 133.3 Ft		Length = 21.1 Ft	
Material	**Unit**	Width (ft)	Quantity Total	Width (ft)	Quantity Total	Width (ft)	Quantity Total	Width (ft)	Quantity Total	Width (ft)	Quantity Total
SS-1h or CSS-1h Emuls Asphalt @ 0.05 Gal/SY (1st Lift)	Gal	35.6	4.8	35.6	23.0	35.6	22.4	35.6	26.4	35.6	4.2
Recycled Hot Bituminous Pavement Superpave @ 2 Ton/CY (1st Lift)	Ton	34.2	10.5	34.2	50.1	34.2	48.9	34.2	57.5	34.2	9.1
PG 58-28 Asphalt Cement @ 5.1% (1st Lift)	Ton	-	0.5	-	2.6	-	2.5	-	2.9	-	0.5
Salvaged Base @1.875 Ton/CY	Ton	35.6	79.8	35.6	380.0	35.6	370.7	35.6	436.1	35.6	69.0

		Cattle Pass	
		Sta 349+00	
		Length = 136.2 Ft	
Material	**Unit**	Width (ft)	Quantity Total
SS-1h or CSS-1h Emuls Asphalt @ 0.05 Gal/SY (1st Lift)	Gal	35.6	26.9
Hot Bituminous Pavement Superpave @ 2 Ton/CY (1st Lift)	Ton	34.2	58.7
PG 58-28 Asphalt Cement @ 5.1% (1st Lift)	Ton	-	3.0
Salvaged Base @1.875 Ton/CY	Ton	35.6	445.5
Trench Excavation	CY	-	289*
Common Excavation - Type A	CY	-	289*
Fabric - Type R1	S Y	-	129
MC70 or 250 Liquid Asphalt @ 0.25/SY	Gal	35.6	98.9

*Included in Borrow-Excavation

		Guardrail Surfacing					
		Soo Line RR Separation RP 83.310		Maple River RP 83.657		Maple River RP 86.404	
Material	**Unit**	W End	E End	W End	E End	W End	E End
SS-1h or CSS-1h Emuls Asphalt @ 0.05 Gal/SY	GAL	36	31	10	21	16	16
Recycled Hot Bituminous Pavement Superpave @ 2 Ton/CY	TON	81	70	22	46	35	35
PG 58-28 Asphalt Cement @ 5.1%	TON	4.1	3.6	1.1	2.3	1.8	1.8
Salvaged Base @1.875 Ton/CY	TON	228.0	158.7	61.1	129.0	99.5	99.5
MC70 or 250 Liquid Asphalt @ 0.25 Gal/SY	GAL	182	157	49	103	80	80

		Culvert - Quantities are in Addition to 3" mainline overlay		140th Ave Patch - Additional to approach surfacing
		Sta 350+69		Sta 350+07 Rt
		Length = 124 Ft		Area = 760 SF
Material	**Unit**	Width (ft)	Quantity Total	Quantity Total
SS-1h or CSS-1h Emuls Asphalt @ 0.05 Gal/SY (1st Lift)	Gal	51.4	35.4	4.2
Hot Bituminous Pavement Superpave @ 2 Ton/CY (1st Lift)	Ton	47.5	189.2	14.1
PG 58-28 Asphalt Cement @ 5.1% (1st Lift)	Ton	-	9.6	0.7
Salvaged Base @1.875 Ton/CY	Ton	51.4	606.2	66.0
Remove & Salvage Bit Surfacing	Ton	47.5	454	59
Topsoil	CY		686	-

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079 H-8-046(031)089	10	4

BASIS OF ESTIMATE

	Embank		Topsoil		Embank Volume*		Topsoil Vol	
	Lt	Rt	Lt	Rt	Lt	Rt	Lt	Rt
	SF	SF	SF	SF	CY	CY	CY	CY
315+32.	0	0	0	0				
317+84.	2.03	35.97	5.73	12.8	11.84	209.83	26.74	59.73
319+43.	4.65	36.48	9.42	14.43	24.59	266.66	44.61	80.18
320+98.	3.64	19.8	10.78	14.67	29.74	201.93	57.98	83.53
323+15.	0	0	2.05	4.55	18.28	99.46	51.56	77.24
4+60.	0.36	0	4.05	2.01	3.83	0.00	65.86	70.82
7+55.	11.58	4.2	11.18	9.39	81.53	28.68	83.20	62.28
9+48.	7.07	7.01	8	42.53833	83.32	50.08	68.55	185.60
15+00.	8.71	4.5	8.05	6.05	201.63	147.07	164.07	496.68
21+01.	11.53	8.58	13.29	13.09	281.58	181.97	237.51	213.02
25+46.	1.06	2.32	4.7	7.18	129.69	112.28	148.25	167.04
29+54.	0	0	7.74	5.71	0.00	0.00	93.99	97.39
34+71.	1.41	6.27	5.34	8.69	52.89	183.93	125.23	137.87
39+50.	1.19	0.44	4.74	3.44	28.83	74.40	89.41	107.60
44+47.	3.4	9.38	8.33	10.25	52.81	112.98	120.29	126.00
49+66.	18.07	15.26	12.1	11.61	257.94	296.02	196.36	210.10
54+63.	6.55	3.06	8.64	7.63	283.24	210.76	190.88	177.08
59+38.	21.08	0.57	11.88	4.1	303.80	39.91	180.50	103.18
64+00.	9.52	10.35	9.33	10.61	327.25	116.78	181.46	125.85
68+87.	2.32	8.08	5.41	10.9	133.47	207.76	132.93	193.99
74+11.	14.14	6.23	10.22	9.89	199.65	173.58	151.67	201.74
78+25.	0	0	6.21	6.44	0.00	0.00	125.96	125.20
83+35.	10.34	1.36	12.29	5.35	523.60	162.34	174.72	111.35
88+45.	5.82	0.29	9.4	3.12	190.78	19.48	204.85	79.99
93+15.	3.02	0	8.42	2.42	96.18	3.16	155.10	48.22
97+24.	1.6	0.45	5.59	3.93	43.74	4.26	106.11	48.10
103+65.	0	0	17.92	13.69	0.00	0.00	279.07	209.16
108+54.	0.37	2	3.3	6.72	51.53	64.09	192.16	184.82
113+64.	1.36	60	5.63	4.69	20.42	731.94	84.34	107.76
118+67.	2.34	2.56	7.65	8.08	43.08	728.42	123.70	118.95
123+58.	0.62	14.94	4.48	14.7	33.64	198.90	110.29	207.13
128+66.	6.81	3.5	10.03	9.17	87.37	216.84	136.50	224.55
133+00.	0	0	9.38	6.2	0.00	0.00	156.00	123.53
137+46.	9.02	6.76	10.88	10.3	322.46	209.00	167.33	136.28
140+61.	16.15	13.57	20.57	20.12	183.53	148.24	183.46	177.45
145+75.	8.01	6.93	7.57	8.1	287.46	243.91	267.85	268.61
151+25.	10.15	17.19	11.69	12.84	231.20	307.08	196.17	213.28
153+87.	7.53	16.63	16.45	16.5	107.23	205.11	136.53	142.35
158+94.	0	5.4	3.58	9.14	88.37	258.55	188.06	240.73
164+57.	0	1.49	5.24	4.18	0.00	89.79	91.96	138.87
168+77.	0	1.14	7.2	3.75	0.00	25.57	96.76	61.68
174+17.	0	0	2.96	3	0.00	14.25	101.60	67.50
203+88.	0	0	6.38	4.58	0.00	0.00	513.87	417.04
209+00.	0	0	3.06	3.1	0.00	0.00	89.51	72.82
214+66.	0	0	2.85	3.7	0.00	0.00	61.95	71.27
218+99.	0.15	0.87	2.4	4.08	1.50	8.72	42.10	62.38
219+45.	0	0.4	1.99	2.9	0.16	1.35	3.74	5.95
224+47.	0.71	1.36	3.17	3.66	8.25	20.45	47.97	60.98
229+49.	3.41	13.78	9.18	9.6	47.88	175.93	114.81	123.27
234+55.	7.71	8.16	9.57	9.4	130.25	256.98	175.69	178.04
240+69.	8.46	14.3	12.76	16.51	229.82	319.22	253.90	294.61
245+56.	7.93	7.17	10.8	8.28	184.77	242.03	212.48	223.57
252+19.	0.06	0.02	2.02	2.01	122.62	110.35	157.40	126.34
256+90.	0.02	0	2.49	2.83	0.87	0.22	39.34	42.22
258+76.	0	0	2.1	2.45	0.09	0.00	15.81	18.19
259+46.	0	0	2.93	2.52	0.00	0.00	6.52	6.44
262+44.	0	0	2.08	2.77	0.00	0.00	27.65	29.19
264+12.	0	0	2.36	3.39	0.00	0.00	13.81	19.16
267+39.	0	0	3.31	2.05	0.00	0.00	34.34	32.94
272+26.	0	0	2.4	2.82	0.00	0.00	51.50	43.92
273+90.	2.9	1.55	7.1	4.65	11.01	5.88	28.85	22.69
277+25.	0.03	0	2.41	2.45	22.72	12.02	59.00	44.05
156+91.	15.04	16.05	8.97	7.43	186.96	199.51	89.20	73.89
163+48.	16.38	35.53	14.58	13.84	477.85	784.45	286.53	258.79
168+95.	17.43	25.38	11.43	11.01	428.10	771.24	263.47	251.72
172+39.	0	0	10.13	11.87	138.79	202.10	137.35	145.75
174+56.	8.95	22.91	16.95	15.29	44.96	115.08	108.82	109.14
180+41.	0.01	9.59	2.46	7.98	121.33	440.10	210.28	252.09
183+39.	0	0	0	0	0.12	111.88	22.96	74.48
				subtotals	6974.578	10122.55	8758.395	9073.345
					17097 CY		**17831 CY**	

*Embankment Volume includes 25% increase for shrinkage.
Additional Volume is needed for guardrail, see Section 130

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079 H-8-046(031)089	10	5

BASIS OF ESTIMATE

	Vertical Cut for Slough Removal - Typical 1		Vertical Cut for Slough Removal - Typical 2		Culvert Patches - Typical 1 Totals		Culvert Patches - Typical 2 Totals		Cattle Pass Patch - Typical 8		Turn Lane Extension - Typical 1		Millings	
	Base = 1.04 SF HBP = 0.37 SF		Base = 1.81 SF HBP = 0.19 SF		AG B = 7 SF HBP = 12.83 SF		AG B = 7 SF HBP = 12.83 SF		AG B = 20 SF HBP = 13.8 SF		Base = 1.04 SF HBP = 0.37 SF			
MATERIAL	CY	TON	CY	TON	CY	TON	CY	TON	CY	TON	CY	TON	CY	TON
Granular Base @ 1.875 Ton/CY	507	951	769	1442	202	379	129	243	101	189	21	40		
Bituminous Surfacing @ 2 Ton/CY	180	361	81	161	149	297	43	87	1880	3759	21	42	10536	21072
Sub Total		1312		1603		676		329		3948		82		21072

MATERIAL	Quantity TONS
Existing Aggregate Base	3,244
Existing Bituminous Surfacing	4,708
Total Millings	21,072
Total Existing Material	29,023
Total Project Salvaged Base	15,461

*See Typical Sections for locations of existing Blended Base.

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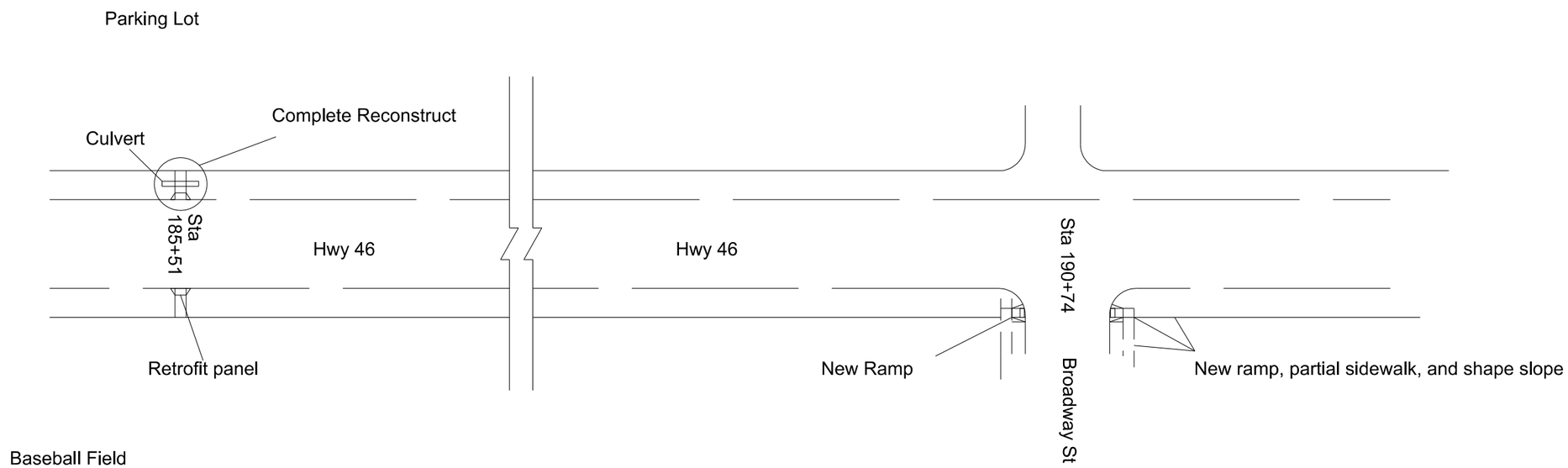
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	20	1

Note: Drawing not to scale



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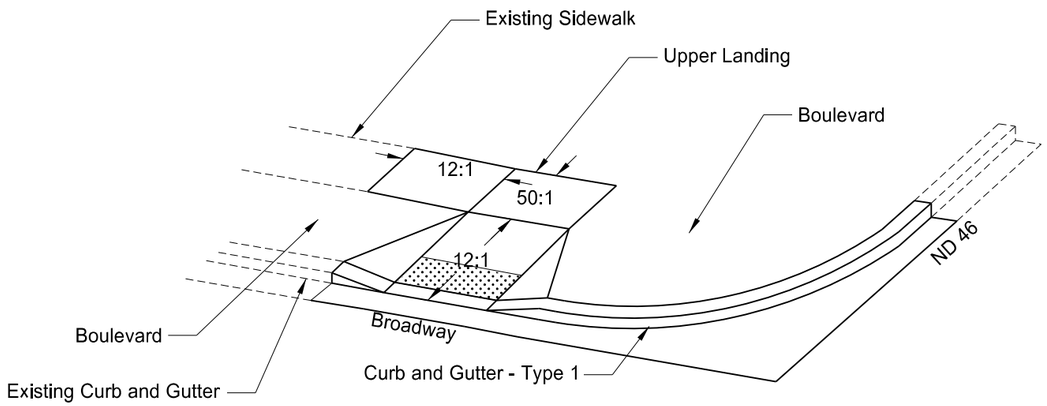
ADA Ramps in Enderlin

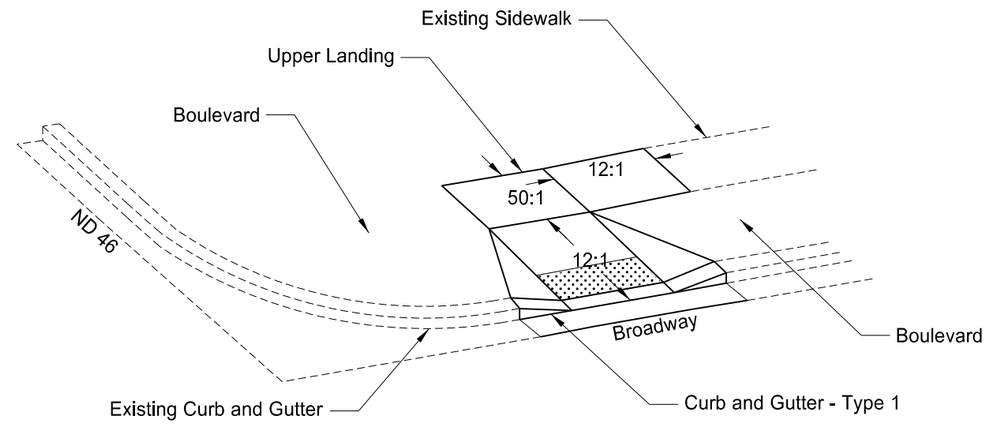
Milling & Overlay, ADA Ramps, and Sliver Grading

E Jct of ND 32 E to 9 Miles E of Enderlin

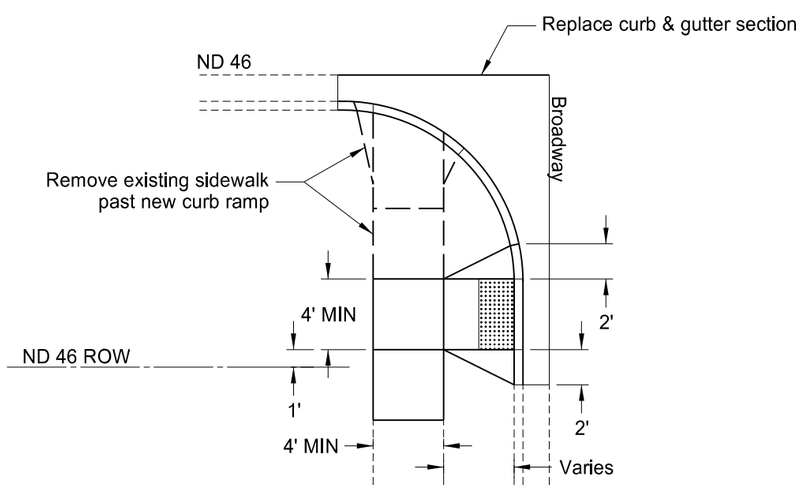
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	20	2

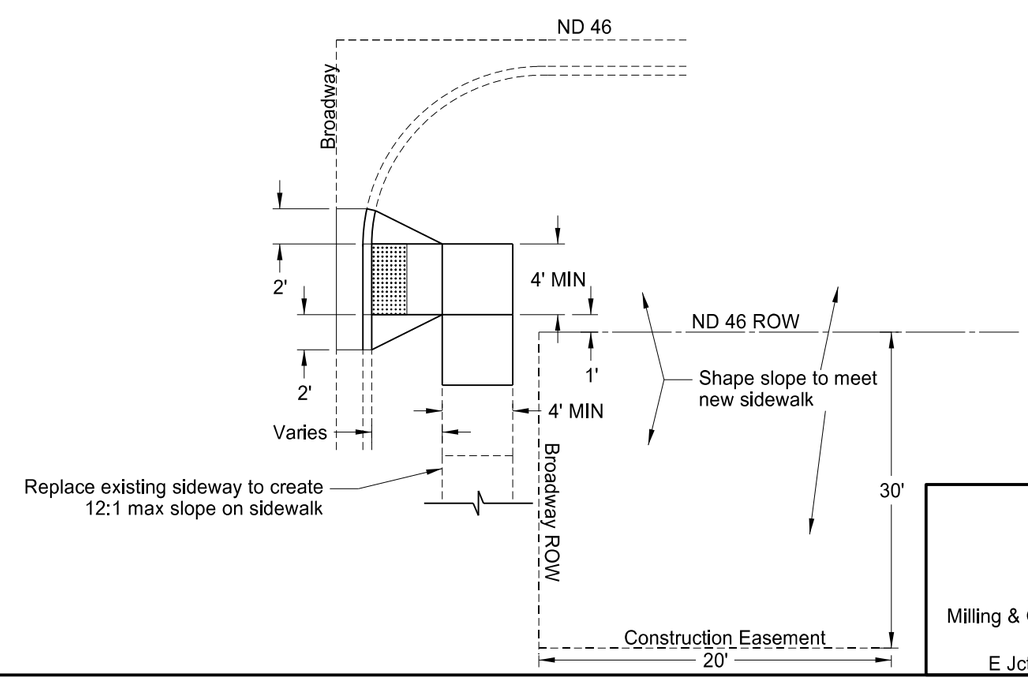


Perpendicular Curb Ramp
SW corner



Perpendicular Curb Ramp
SE corner





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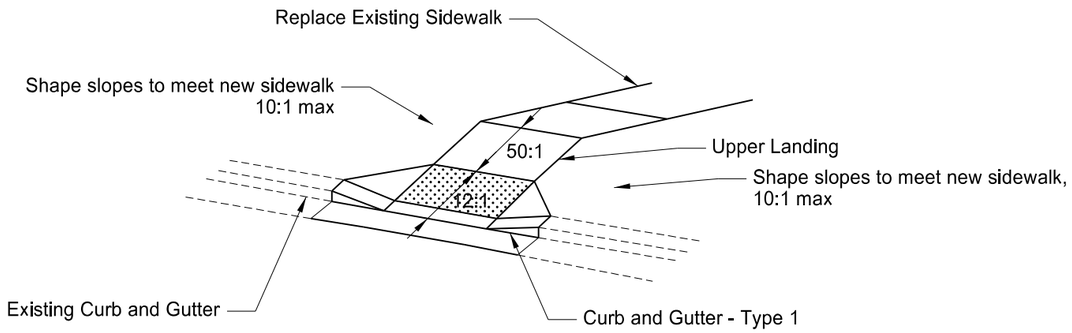
ADA Ramp Details - Broadway

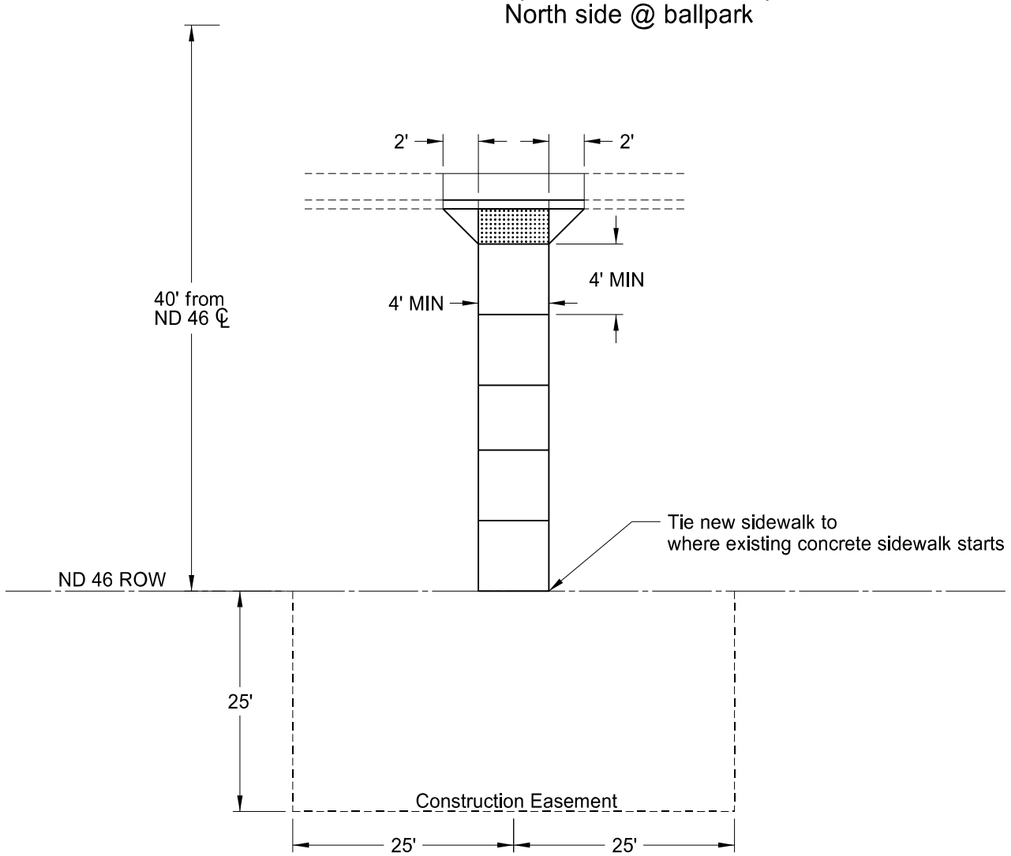
Milling & Overlay, ADA Ramps, and Sliver Grading

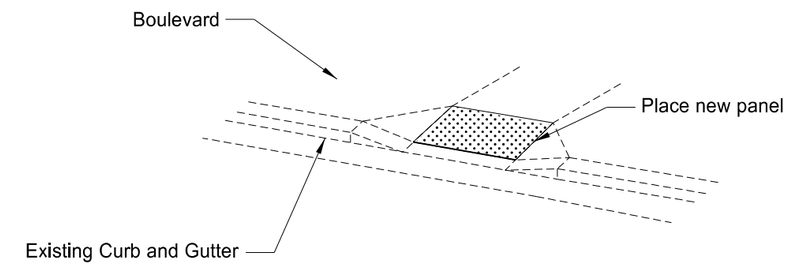
E Jct of ND 32 E to 9 Miles E of Enderlin

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	20	3



Perpendicular Curb Ramp
North side @ ballpark





Perpendicular Curb Ramp
South side @ ballpark

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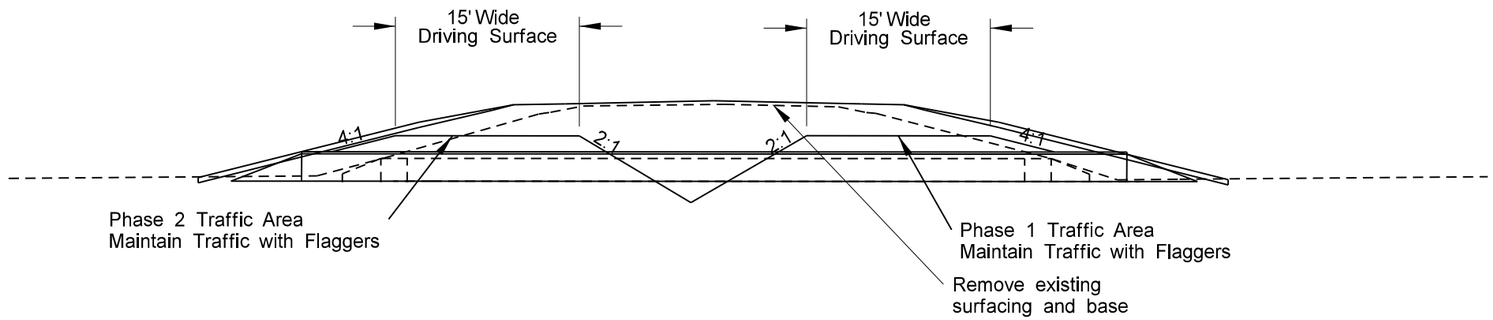
ADA Ramp Details - Ballpark

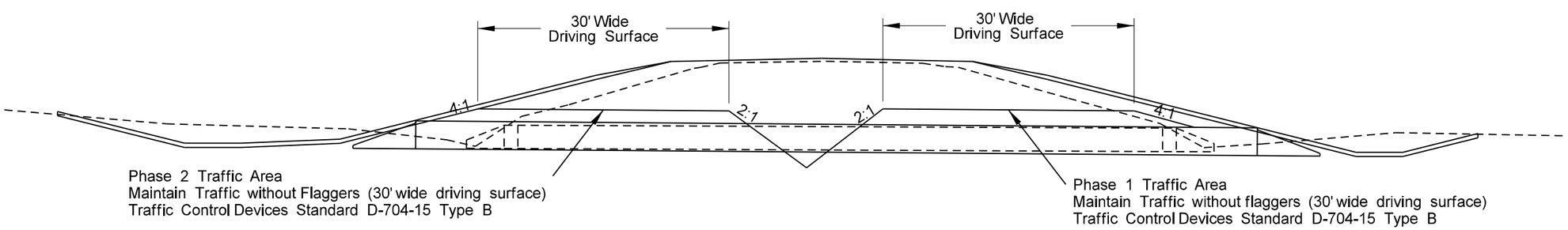
Milling & Overlay, ADA Ramps, and Sliver Grading

E Jct of ND 32 E to 9 Miles E of Enderlin

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	20	4



Phasing for a single lane of traffic with flaggers



Phasing for two lanes of traffic without flaggers

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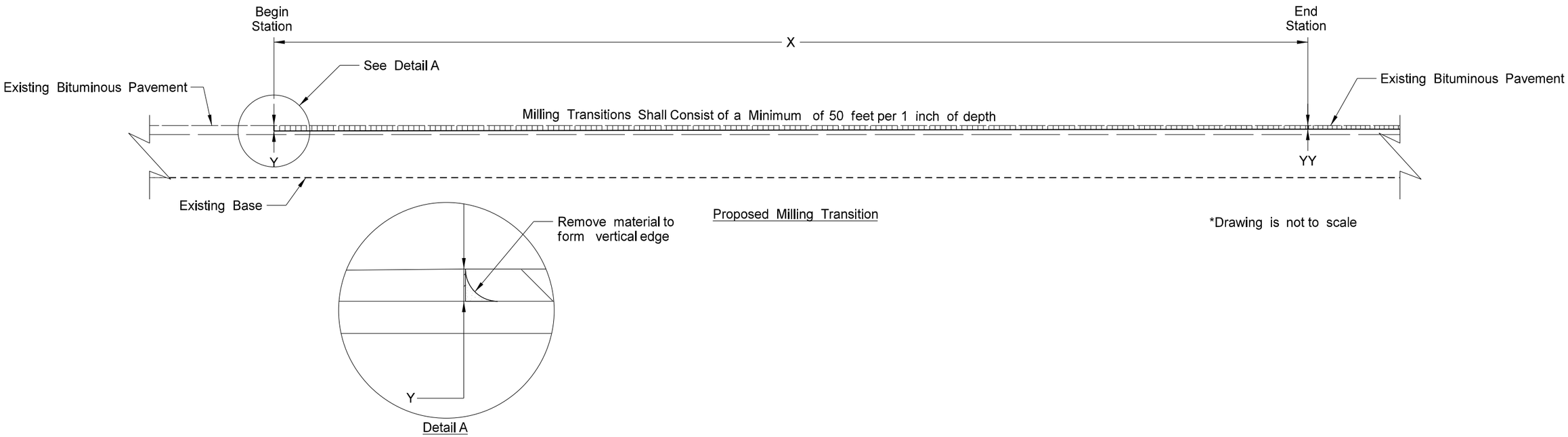
Pipe Installation Phasing Details

Milling & Overlay, ADA Ramps, and Sliver Grading

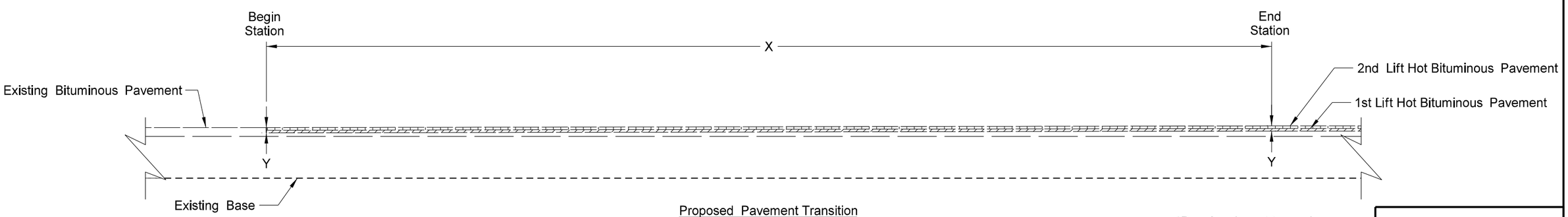
E Jct of ND 32 East to 9 Miles E of Enderlin

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	20	5



Proposed Milling Transition

*Drawing is not to scale



Proposed Pavement Transition

*Drawing is not to scale

Milling and Paving Transitions

Location	X	Begin Station	Y	YY	End Station	Mill (SY)	Tack (Gal)	RHBP (Ton)	AC (Ton)
Beginning of Project	75 ft	315+32	3.0 in	1.5 in	316+07	250	25	41.7	1.27
End of Project	75 ft	564+35	3.0 in	1.5 in	563+60	250	25	41.7	1.27
Bridge 46-083.310	75 ft	176+83	3.0 in	1.5 in	176+08	300	30	50.0	2.55
Bridge 46-083.657	75 ft	197+18	3.0 in	1.5 in	197+93	300	30	50.0	2.55
Bridge 46-086.404	75 ft	214+76	3.0 in	1.5 in	214+01	250	25	41.7	1.27
Bridge 46-086.404	75 ft	216+74	3.0 in	1.5 in	217+49	250	25	41.7	1.27

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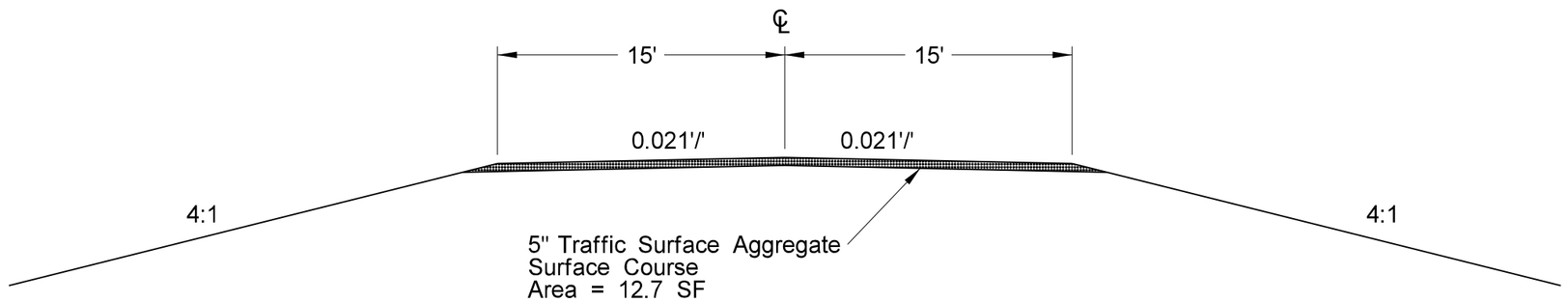
Milling and Paving Transition Details

Milling & Overlay, ADA Ramps, and Sliver Grading

E Jct of ND 32 E to 9 Miles E of Enderlin

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	20	6



TEMPORARY BYPASS ESTIMATED QUANTITIES*		
DESCRIPTION	UNIT	Total of All Locations
Traffic Surface Aggregate Surface Course at 1.875 Ton/ CY	TON	1,023
Embankment at 25% Additional Volume	CY	6,629
Water for Embankment & Traffic Surface Gravel	MGAL	87

* Quantities were calculated using 6% grade
@ Sta 21+01, it is intended that the elevation of the Bypass will meet the ditch elevation and traffic will be run on 5" of Surface Aggregate only.
@ Sta 172.39, the minimum thickness, including Surface Aggregate, of the Bypass will be 2 ft or as directed by the Engineer.
These quantities are estimates only and are included in the pay item "Temporary Bypass".
Maintenance and removal are included in the pay item "Temporary Bypass."

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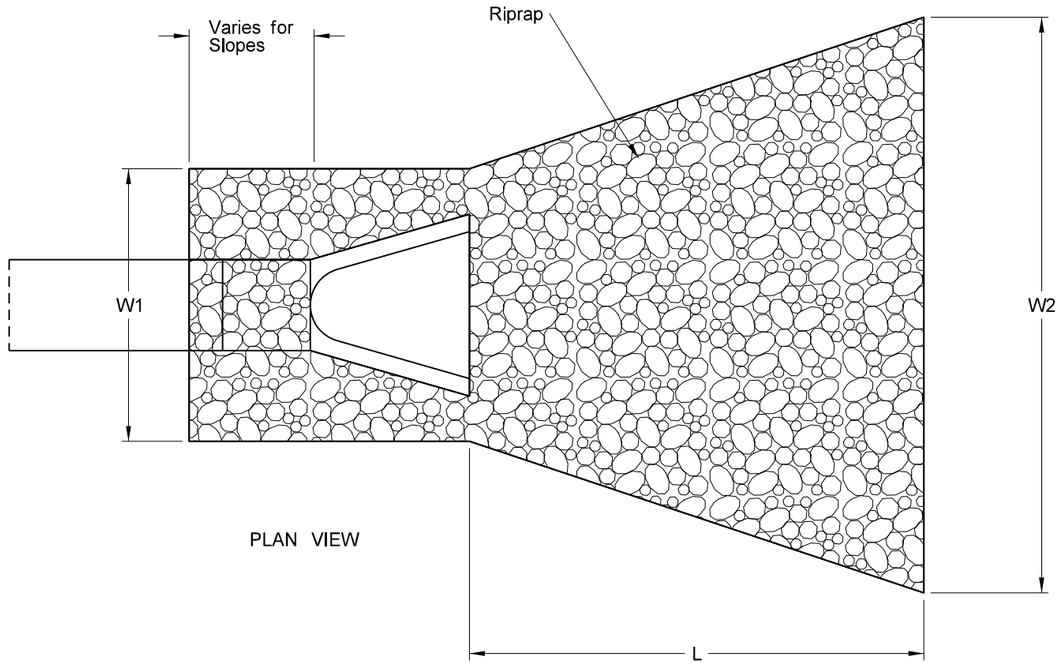
Temporary Bypass Detail

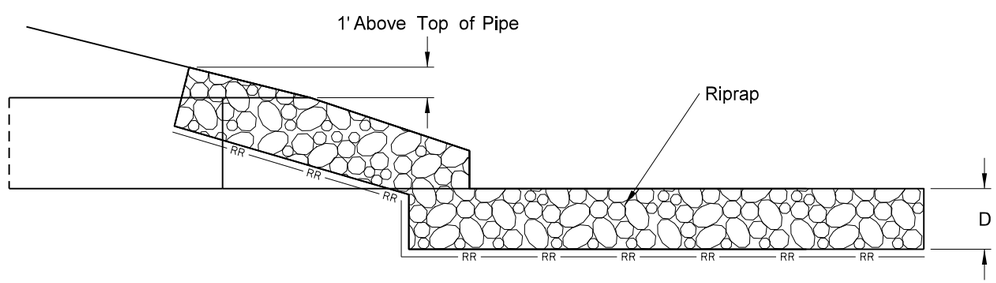
Milling & Overlay, ADA Ramps, and Sliver Grading

E Jct ND 32 E to 9 Miles E of Enderlin

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	20	7



PLAN VIEW



PROFILE VIEW

Riprap Dimensions

Culvert Station	Culvert RP	Culvert Diameter (inches)	L (feet)	W_1 (feet)	W_2 (feet)	Riprap Depth, D (feet)	RR Fabric (SY)	Riprap (CY)
133+00	82.454	24	6	6	10	2	14	9
172+39	85.581	30	11	7.5	15	2.5	25	21
350+69	88.962	60	35	15	38	3	145	143

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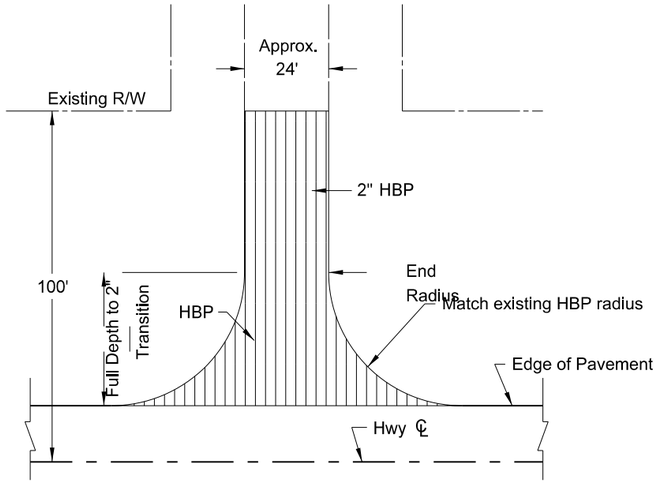
Riprap at Pipe Outlets

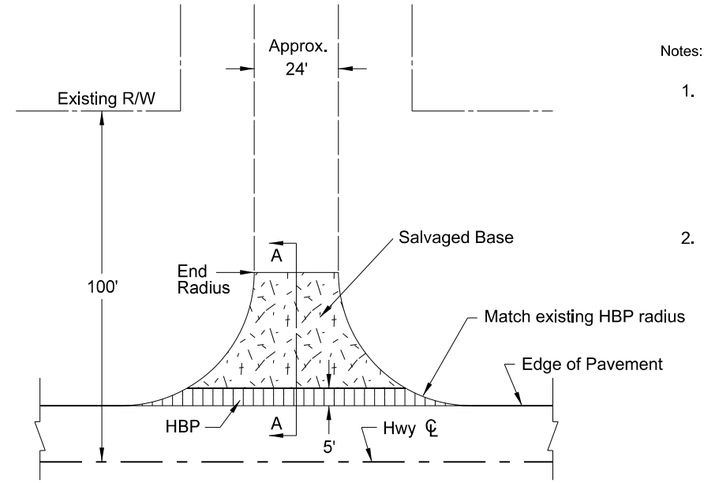
Milling & Overlay, ADA Ramps, and Sliver Grading

E Jct ND 32 E to 9 Miles E of Enderlin

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	20	8



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

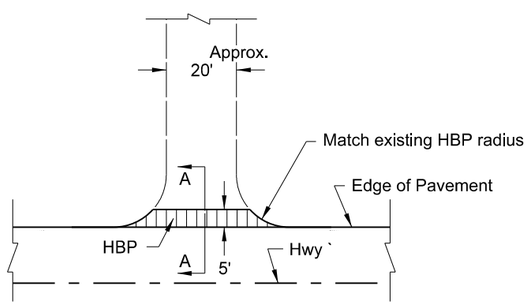


(2) Gravel Section Line, County Road, or Street Approach

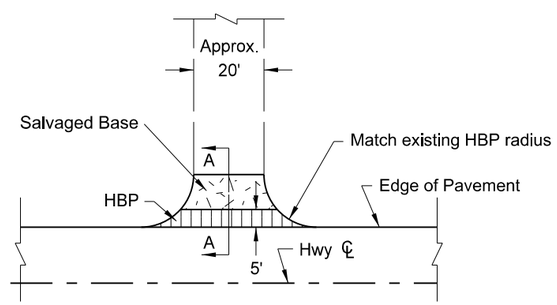
Notes:

1. A longer HBP wedge may be needed if an existing elevation difference between the mainline and the approach exists. Actual HBP paving and salvaged base locations may vary in the field for situations, as approved by the Engineer.

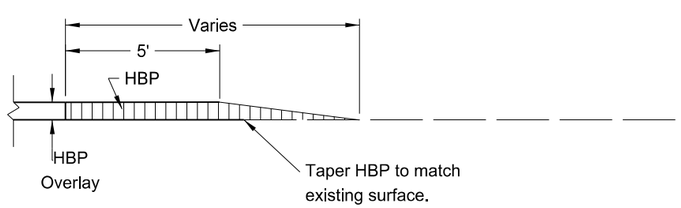
2. Quantity totals have been included in the bid items of the "Estimate of Quantities" of the plans.



(3) Paved Private Drive Approach



(4) Gravel Private Drive or Field Drive Approach



Section A-A

BASIS OF ESTIMATE		(1)	(2)	(3)	(4)	
ITEM	UNIT	Paved Section Line	Gravel Section Line	Private Drive	Field Drive	TOTALS
Number of Locations	EACH	2	16	18	60	96
Salvaged Base	TON	14	80	90	300	484
SS1h, CSS1h, or MS-1	GAL	30	160	36	120	346
RAP Superpave FAA 42	TON	65	303	38	128	534
Asphalt Cement 5.1%	TON	3.3	15.5	1.9	6.5	27.2
MC 70 or 250	GAL	73	3.3	3	3	433

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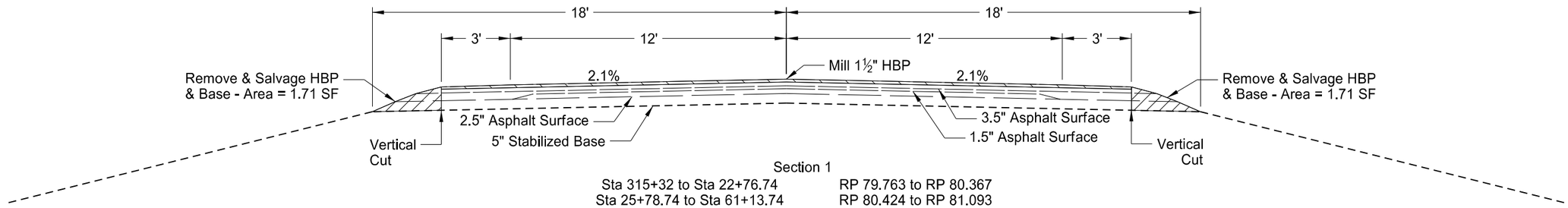
Approach Paving Details

Milling & Overlay, ADA Ramps, and Sliver Grading

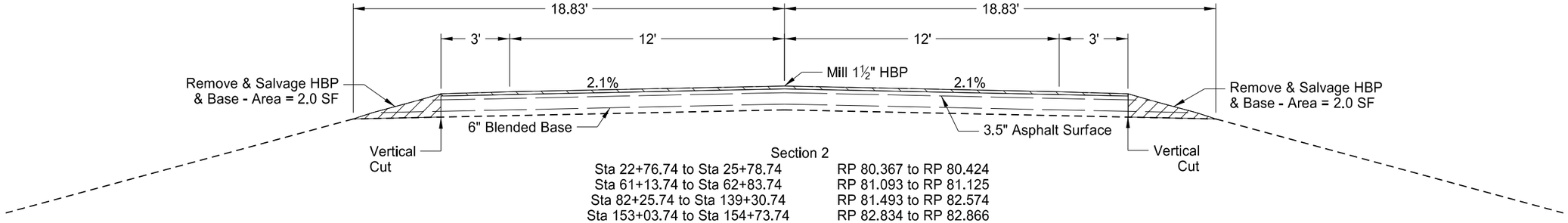
E Jct of ND 32 E to 9 Miles E of Enderlin

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	30	1



Section 1

Sta 315+32 to Sta 22+76.74	RP 79.763 to RP 80.367
Sta 25+78.74 to Sta 61+13.74	RP 80.424 to RP 81.093
Sta 62+83.74 to Sta 82+25.74	RP 81.125 to RP 81.493
Sta 139+30.74 to Sta 153+03.74	RP 82.574 to RP 82.834
Sta 154+73.74 to Sta 157+37.70	RP 82.866 to RP 82.914
Sta 151+69.3 to Sta 163+95.04	RP 85.188 to RP 85.421
Sta 166+97.04 to Sta 183+39	RP 85.478 to RP 85.790



Section 2

Sta 22+76.74 to Sta 25+78.74	RP 80.367 to RP 80.424
Sta 61+13.74 to Sta 62+83.74	RP 81.093 to RP 81.125
Sta 82+25.74 to Sta 139+30.74	RP 81.493 to RP 82.574
Sta 153+03.74 to Sta 154+73.74	RP 82.834 to RP 82.866
Sta 219+48.74 to Sta 267+75.74	RP 84.092 to RP 85.007
Sta 163+95.04 to Sta 166+97.04	RP 85.421 to RP 85.478

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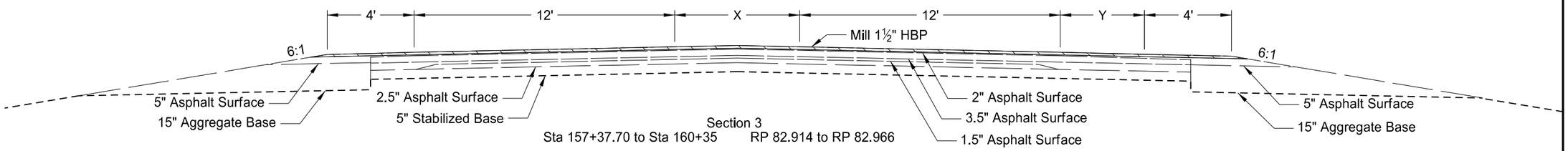
Existing, Milling, and Removal Typical Sections

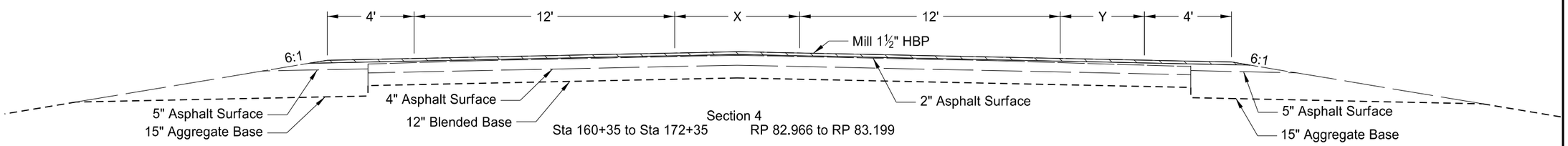
Milling & Overlay, ADA Ramps, and Sliver Grading

E Jct ND 32 E to 9 Miles E of Enderlin

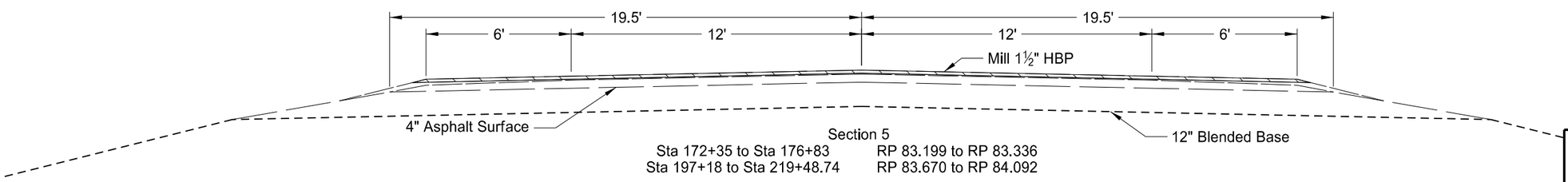
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	30	2



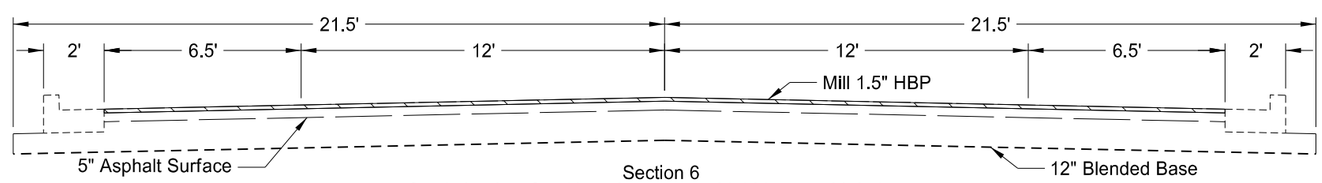
Section 3
Sta 157+37.70 to Sta 160+35 RP 82.914 to RP 82.966



Section 4
Sta 160+35 to Sta 172+35 RP 82.966 to RP 83.199



Section 5
Sta 172+35 to Sta 176+83 RP 83.199 to RP 83.336
Sta 197+18 to Sta 219+48.74 RP 83.670 to RP 84.092



Section 6
Sta 179+52 to Sta 195+78 RP 83.336 to RP 83.670

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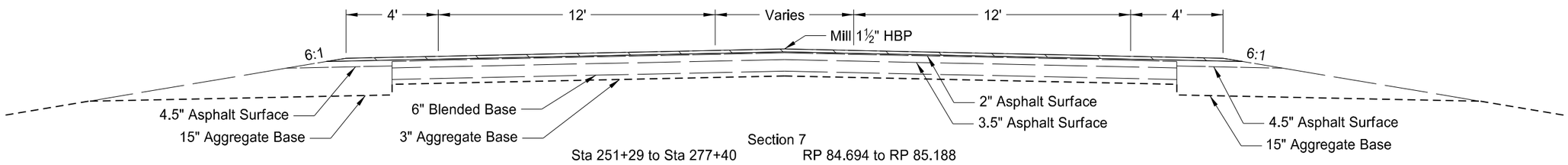
Existing and Milling Typical Sections

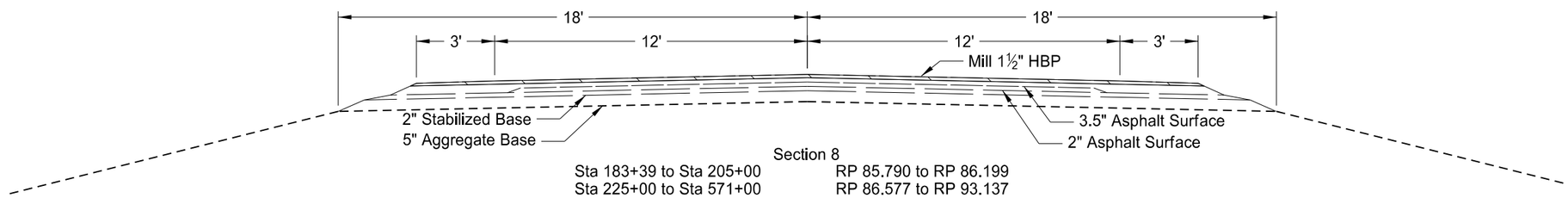
Milling & Overlay, ADA Ramps, and Sliver Grading

E Jct ND 32 E to 9 Miles E of Enderlin

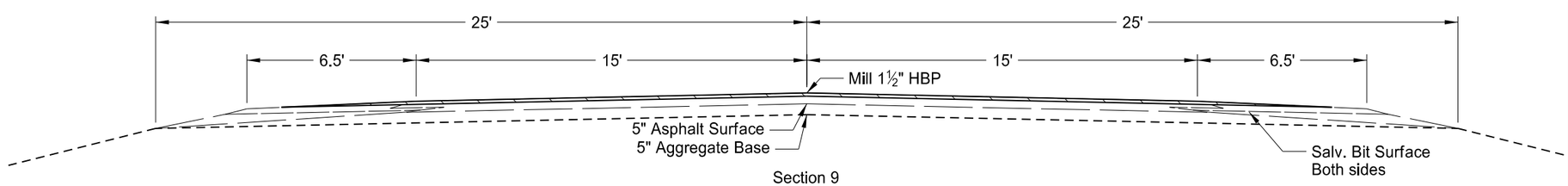
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	30	3



Section 7
Sta 251+29 to Sta 277+40 RP 84.694 to RP 85.188



Section 8
Sta 183+39 to Sta 205+00 RP 85.790 to RP 86.199
Sta 225+00 to Sta 571+00 RP 86.577 to RP 93.137



Section 9
Sta 205+00 to Sta 225+00 RP 86.199 to RP 86.577

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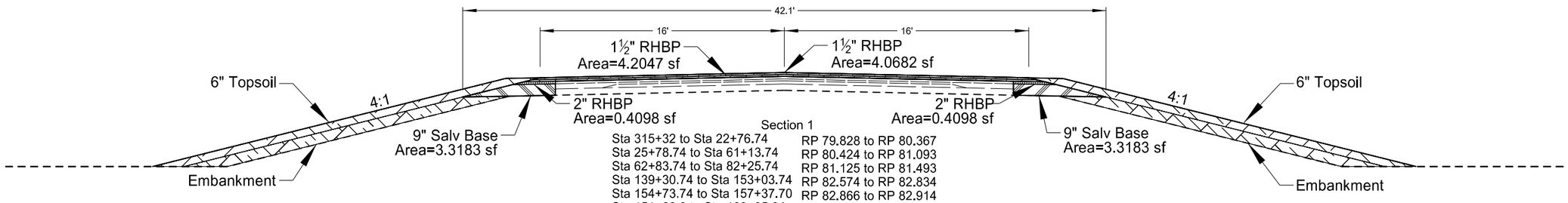
Existing and Milling Typical Sections

Milling & Overlay, ADA Ramps, and Sliver Grading

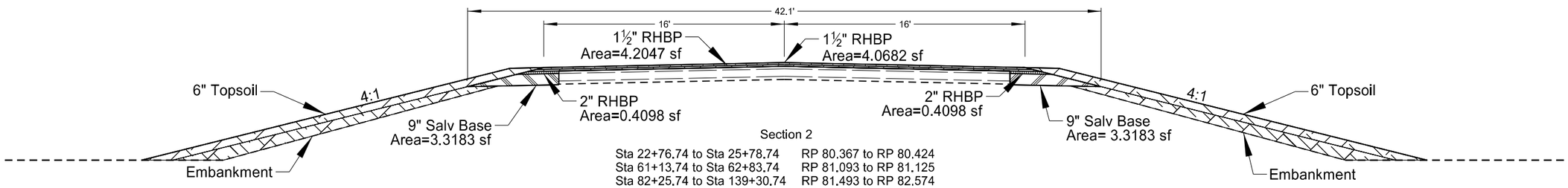
E Jct ND 32 E to 9 Miles E of Enderlin

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	30	4



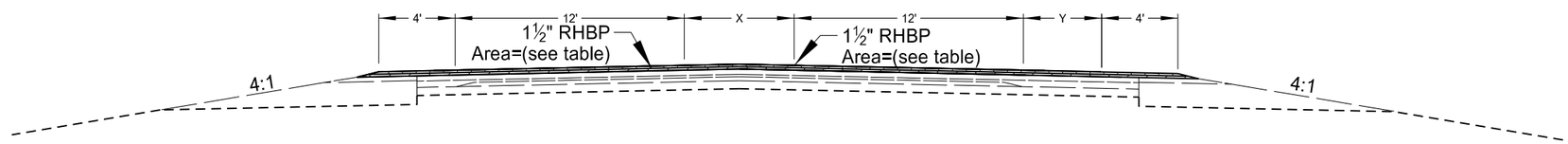
Section 1

Sta 315+32 to Sta 22+76.74	RP 79.828 to RP 80.367
Sta 25+78.74 to Sta 61+13.74	RP 80.424 to RP 81.093
Sta 62+83.74 to Sta 82+25.74	RP 81.125 to RP 81.493
Sta 139+30.74 to Sta 153+03.74	RP 82.574 to RP 82.834
Sta 154+73.74 to Sta 157+37.70	RP 82.866 to RP 82.914
Sta 151+69.3 to Sta 163+95.04	RP 85.188 to RP 85.421
Sta 166+97.04 to Sta 183+39	RP 85.478 to RP 85.790



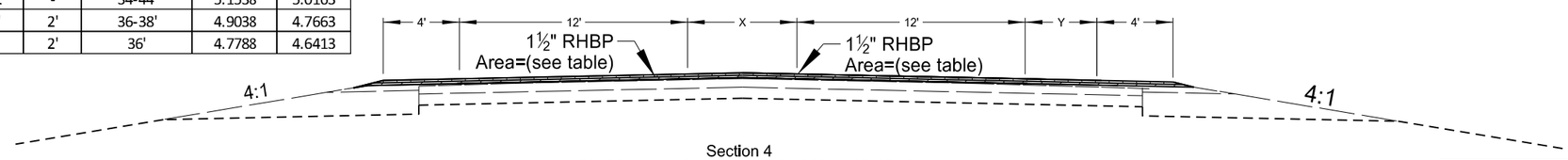
Section 2

Sta 22+76.74 to Sta 25+78.74	RP 80.367 to RP 80.424
Sta 61+13.74 to Sta 62+83.74	RP 81.093 to RP 81.125
Sta 82+25.74 to Sta 139+30.74	RP 81.493 to RP 82.574
Sta 153+03.74 to Sta 154+73.74	RP 82.834 to RP 82.866
Sta 219+48.74 to Sta 267+75.74	RP 84.092 to RP 85.007
Sta 163+95.04 to Sta 166+97.04	RP 85.421 to RP 85.478



Section 3
Sta 157+37.70 to Sta 160+35 RP 82.914 to RP 82.966

Location	X	Y	Total Surface Width	Bottom Lift Area (SF)	Top Lift Area (SF)
Sta 157+37.7 to Sta 159+77	-	0-12'	32-44'	4.2067	4.0689
Sta 159+77 to Sta 162+47	0-12'	12'	44-56'	5.7067	5.5689
Sta 162+47 to Sta 163+62	12'	12'	56'	7.2196	7.0682
Sta 163+62 to Sta 167+35	12'	-	44'	5.7788	5.6413
Sta 167+35 to Sta 171+45	2-12'	-	34-44'	5.1538	5.0163
Sta 171+45 to Sta 172+35	2-4'	2'	36-38'	4.9038	4.7663
Sta 172+35 to bridge trans.	2'	2'	36'	4.7788	4.6413



Section 4
Sta 160+35 to Sta 172+35 RP 82.966 to RP 83.199

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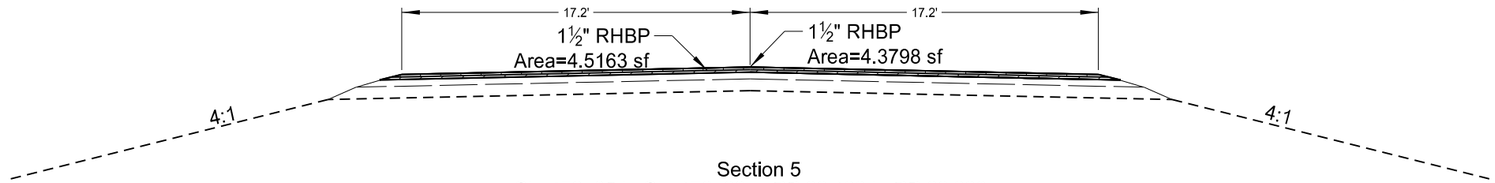
Proposed Typical Sections

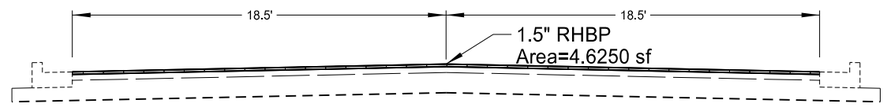
Milling & Overlay, ADA Ramps, and Sliver Grading

E Jct of ND 32 E to 9 Miles E of Enderlin

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	30	5
	H-8-046(031)089		

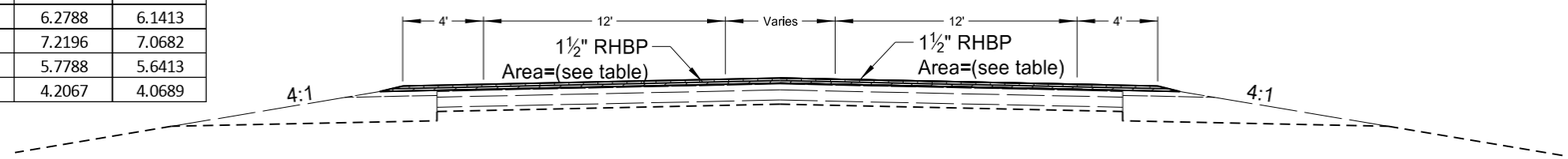


Section 5
Sta 172+35 to Sta 176+83 RP 83.199 to RP 83.336
Sta 197+18 to Sta 219+48.74 RP 83.670 to RP 84.197

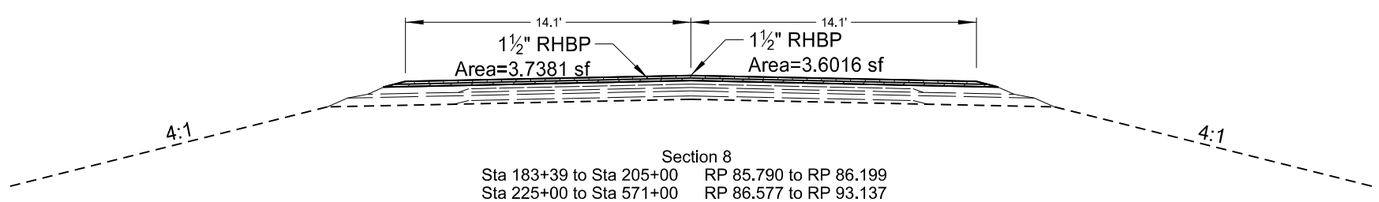


Section 6
Sta 179+52 to Sta 195+78 RP 83.336 to RP 83.670

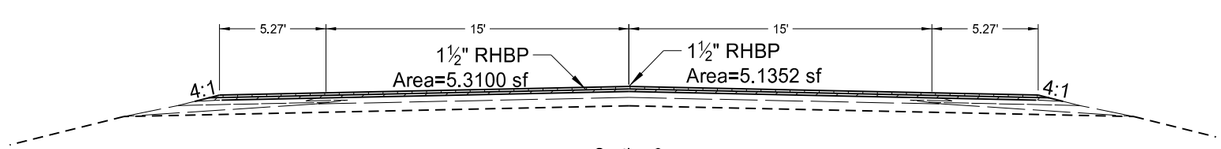
Location	Total Surface Width	Bottom Lift Area (SF)	Top Lift Area (SF)
Sta 251+28.47 to Sta 256+68	32-40'	4.7788	4.6413
Sta 256+68 to Sta 259+08	40-56'	6.2788	6.1413
Sta 259+08 to Sta 263+17	56'	7.2196	7.0682
Sta 263+17 to Sta 269+60	44'	5.7788	5.6413
Sta 269+60 to Sta 277+40	32-44'	4.2067	4.0689



Section 7
Sta 251+29 to Sta 277+40 RP 84.694 to RP 85.188



Section 8
Sta 183+39 to Sta 205+00 RP 85.790 to RP 86.199
Sta 225+00 to Sta 571+00 RP 86.577 to RP 93.137



Section 9
Sta 205+00 to Sta 225+00 RP 86.199 to RP 86.577

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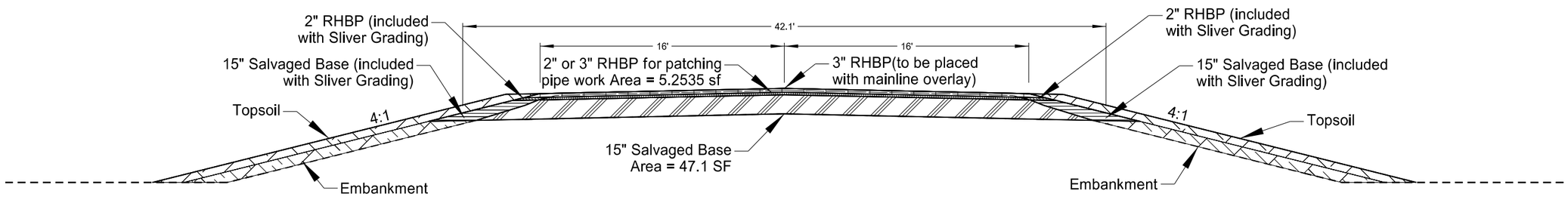
Proposed Typical Sections

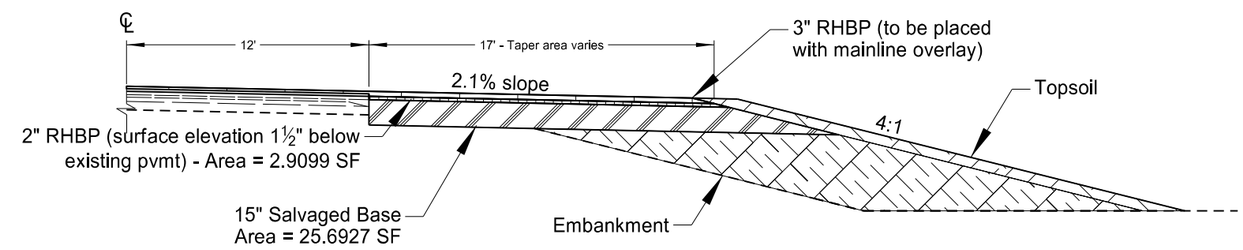
Milling & Overlay, ADA Ramps, and Sliver Grading

E Jct of ND 32 E to 9 Miles E of Enderlin

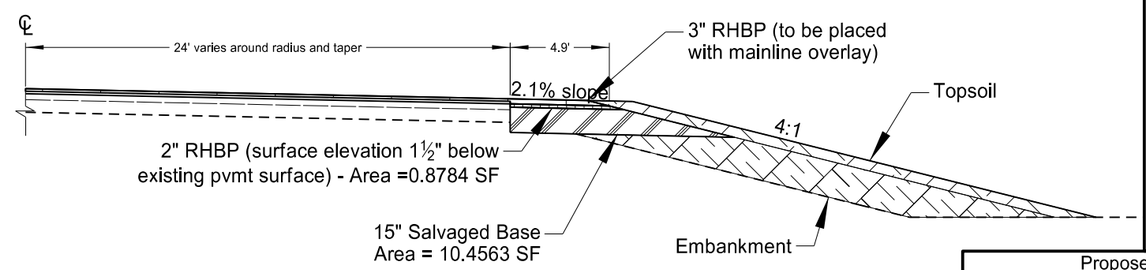
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	30	6



Culvert Patches



Turn Lane Extension
Sta 316+30 to Sta 321+33



Turn Lane Extension - shoulder widening
Sta 321+33 to Jct ND 32

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Proposed Typical Sections
at Turn Lane Extension and Culvert Patches

Milling & Overlay, ADA Ramps, and Sliver Grading

E Jct of ND 32 E to 9 Miles E of Enderlin

HYDRAULIC DATA FOR PROJECTS SS-8-046(025)079 & H-8-046(031)089 (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)
7+55	18" RCP	18"	1.3	1.8	0.82	3.48	1187.45	3.0	1187.70
15+00	18" RCP	18"	8.9	6.7	1.64	5.37	1179.30	11.1	1180.29
21+01	18" RCP	24"	41.7	15.5	2.59	6.51	1164.59	26.3	1166.55
29+54	18" RCP	24"	48.7	13.5	2.07	9.10	1168.17	23.7	1169.67
64+00	18" RCP	18"	19.3	9.9	2.24	8.49	1158.60	16.7	1160.91
78+25	21" RCP	24"	90.7	25.3	3.98	8.66	1145.30	43.3	1147.16
103+65	18" RCP	18"	2.9	3.0	0.94	7.06	1156.76	5.0	1157.12
133+00	18" RCP	24"	53.9	17.0	2.49	10.88	1142.64	29.3	1144.91
172+39	18" RCP	30"	72.1	30.7	3.22	10.94	1068.29	50.3	1070.88
349+00	4'x6' Cattle Pass	4'x6' Cattle Pass	13624.2	389.4	7.42	9.94	1061.07	725.3	1064.76
350+69	18" RCP	60"			6.43	14.08			

(A) Hydraulic data provided is for smooth-walled (Manning's n=0.012) type conduits.

This document was originally issued and sealed by Randall Sandvig, Registration Number PE- 8783, on 12/06/13 and the original document is stored at the North Dakota Department of Transportation

Culvert Hydraulic Data

ND 46
E Jct ND 32 to E of Enderlin

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	51	1

Begin Station / RP	Begin Offset	End Station / RP	End Offset	Length	Pipe Conduit Pay Size	Allowable Material	Required Diameter	Minimum Thickness	R1 Fabric (Pay Item)	(A) End Sections Begin	(A) End Sections End	Applicable Backfill Detail
				LF			In	In	SY	EA	EA	
7+55 / 80.087	37' Lt	7+55 / 80.087	33' Lt	4	18	Reinforced Concrete Pipe - Class III **(barrel length = 4 LF)**	18		-	Y - traversable		D-714-26
7+55 / 80.087			35' Rt	-	-		18		-		Y - traversable	
15+00 / 80.218	32' Lt	15+00 / 80.218	28' Rt	4	24	Reinforced Concrete Pipe - Class III **(barrel length = 4 LF)**	24		-	Y - traversable		D-714-26
15+00 / 80.218			30' Rt	-	-		24		-		Y - traversable	
21+01 / 80.333	44' Rt	21+01 / 80.333	44' Lt	88	24	Reinforced Concrete Pipe - Class III **(barrel length = 88 LF)**	24		302	Y - traversable	Y - traversable	D-714-25
						Zinc Coated Steel (2-2/3" x 1/2" Ribs)	30	0.168				
						Zinc Coated Steel (3/4" x 3/4" @ 7-1/2" Ribs)	24	0.168				
						Aluminum Coated Steel (Type 2)	30	0.138				
						Polymeric Coated Steel (over zinc or aluminum coated steel)	24	0.064				
29+54 / 80.494	33' Lt	29+54 / 80.494	29' Rt	62	24	Reinforced Concrete Pipe - Class III **(barrell length = 62 LF)**	24		310	Y - traversable	Y - traversable	D-714-26
						Zinc Coated Steel (2-2/3" x 1/2" Ribs)	30	0.168				
						Zinc Coated Steel (3/4" x 3/4" @ 7-1/2" Ribs)	24	0.168				
						Aluminum Coated Steel (Type 2)	30	0.138				
						Polymeric Coated Steel (over zinc or aluminum coated steel)	24	0.064				
64+00 / 81.149	34' Lt	64+00 / 81.149	30' Lt	4	18	Reinforced Concrete Pipe - Class III **(barrel length = 4 LF)**	18		-	Y - traversable		D-714-26
64+00 / 81.149	33' Rt	64+00 / 81.149	37' Rt	4	18	Reinforced Concrete Pipe - Class III **(barrel length = 4 LF)**	18		-		Y - traversable	D-714-26
78+25 / 81.416	31' Lt	78+25 / 81.416	29' Rt	60	24	Reinforced Concrete Pipe - Class III **(barrel length = 60 LF)**	24		306	Y - traversable	Y - traversable	D-714-26
						Zinc Coated Steel (2-2/3" x 1/2" Ribs)	30	0.168				
						Zinc Coated Steel (3/4" x 3/4" @ 7-1/2" Ribs)	24	0.168				
						Aluminum Coated Steel (Type 2)	30	0.138				

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Pipe List

Milling & Overlay, ADA Ramps, and Sliver Grading

E Jct of ND 32 E to 9 Miles E of Enderlin

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	51	2

Begin Station / RP	Begin Offset	End Station / RP	End Offset	Length	Pipe Conduit Pay Size	Allowable Material	Required Diameter	Minimum Thickness	R1 Fabric (Pay Item)	(A) End Sections Begin	(A) End Sections End	Applicable Backfill Detail
				LF			In	In	SY	EA	EA	
						Polymeric Coated Steel (over zinc or aluminum coated steel)	24	0.064				
103+65 / 81.899	44' Rt	103+65 / 81.899	40' Rt	4	18	Reinforced Concrete Pipe - Class III **(barrel length = 4 LF)**	18		-	Y - traversable		D-714-25
103+65 / 81.899	49' Lt	103+65 / 81.899	53' Lt	4	18	Reinforced Concrete Pipe - Class III **(barrel length = 4 LF)**	18		-		Y - traversable	D-714-25
133+00 / 82.454	36' Lt	133+00 / 82.454	30' Rt	66	24	Reinforced Concrete Pipe - Class III **(barrel length = 66 LF)**	24		352	Y - traversable	Y - traversable	D-714-26
						Zinc Coated Steel (2-2/3" x 1/2" Ribs)	30	0.168				
						Zinc Coated Steel (3/4" x 3/4" @ 7-1/2" Ribs)	24	0.168				
						Aluminum Coated Steel (Type 2)	30	0.138				
						Polymeric Coated Steel (over zinc or aluminum coated steel)	24	0.064				
140+61 / 82.600	73' Rt			-	-		24		-	Y		
140+61 / 82.600			87' Lt	-	-		24		-		Y	
153+87 / 82.850	51' Rt			-	-		24		-	Y - traversable		
153+87 / 82.850			83' Lt	-	-		24		-		Y	
172+39 / 85.581	37' Lt	172+39 / 85.581	41' Rt	78	30	Reinforced Concrete Pipe - Class III **(barrel length = 78 LF)**	30		248	Y	Y	D-714-25
						Zinc Coated Steel (2-2/3" x 1/2" Ribs)	36	0.168				
						Zinc Coated Steel (3/4" x 3/4" @ 7-1/2" Ribs)	30	0.168				
						Aluminum Coated Steel (Type 2)	36	0.138				
						Polymeric Coated Steel (over zinc or aluminum coated steel)	30	0.064				

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Pipe List

Milling & Overlay, ADA Ramps, and Sliver Grading

E Jct of ND 32 E to 9 Miles E of Enderlin

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	H-8-046(031)089	51	3

Begin Station / RP	Begin Offset	End Station / RP	End Offset	Length	Pipe Conduit Pay Size	Allowable Material	Required Diameter	Minimum Thickness	R1 Fabric (Pay Item)	(A) End Sections Begin	(A) End Sections End	Applicable Backfill Detail
				LF			In	In	SY	EA	EA	
350+69 / 88.958	46' Lt	350+69 / 80.333	44' Rt	90	60	Reinforced Concrete Pipe - Class III **(barrel length = 84 LF)**	60		324	Y	Y	D-714-25
						Zinc Coated Steel (2-2/3" x 1/2" Ribs)	66	0.168				
						Zinc Coated Steel (3/4" x 3/4" @ 7-1/2" Ribs)	60	0.168				
						Aluminum Coated Steel (Type 2)	66	0.138				
						Aluminum Alloy	66	0.060				
						Polymeric Coated Steel (over zinc or aluminum coated steel)	60	0.064				

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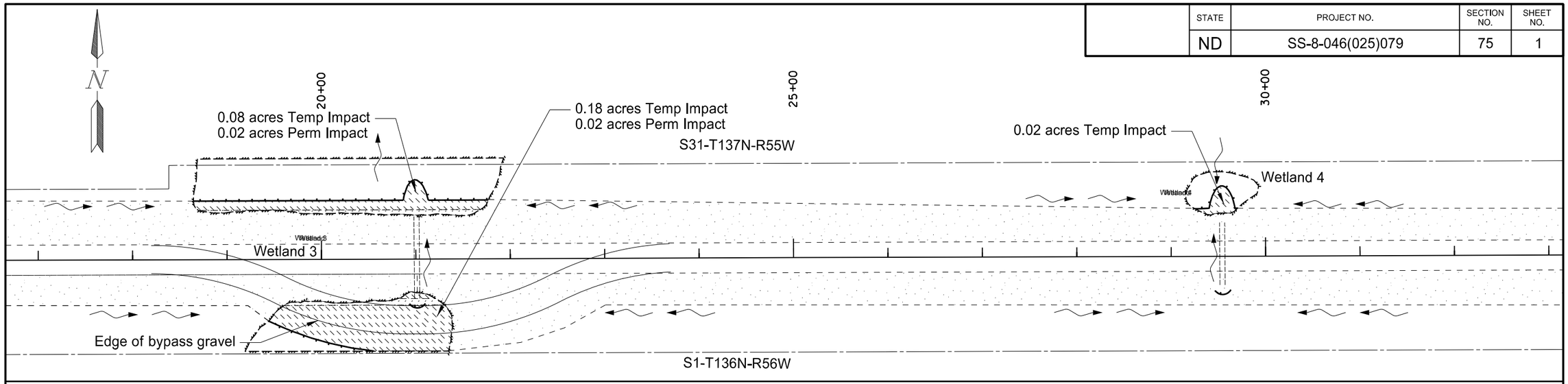
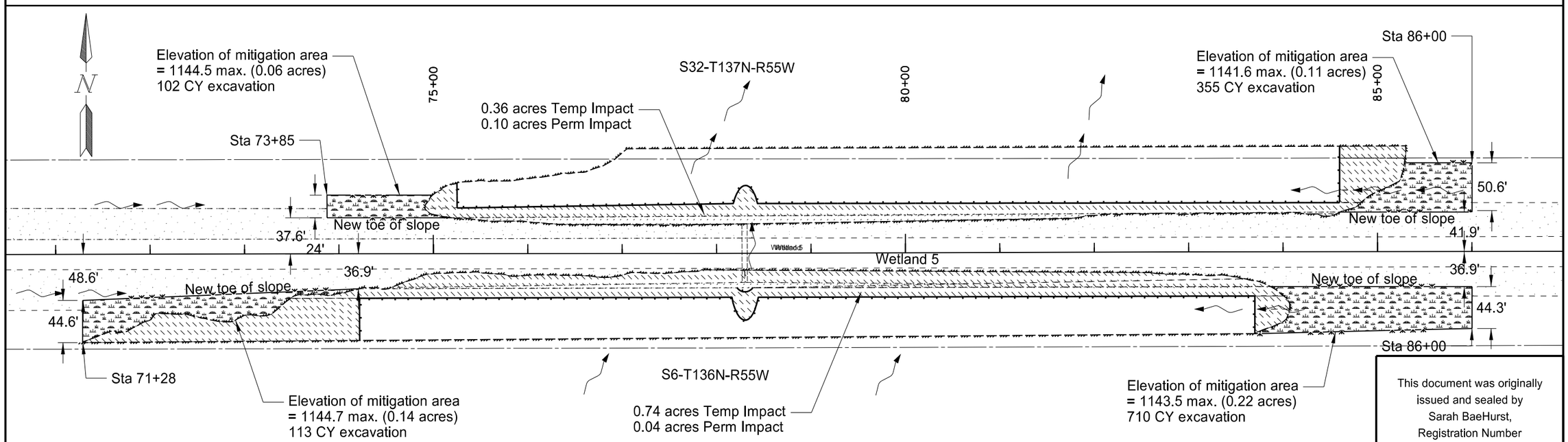
Pipe List

Milling & Overlay, ADA Ramps, & Sliver Grading

E Jct ND 32 E to 9 Miles E of Enderlin

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	75	1





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Permanent Impact

Temporary Impact

Seeding/Mulching

Wetland Mitigation

Permanent Erosion Control

12" Fiber Roll - 2639 LF

Temporary Erosion Control

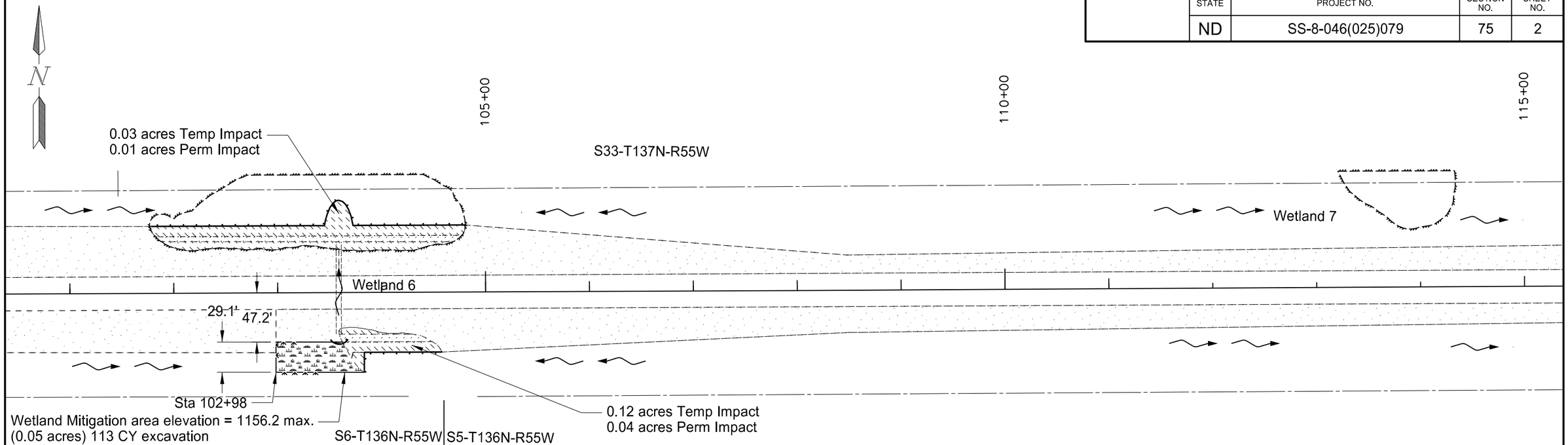
12" Fiber Roll - 60 LF (at culvert inlets)

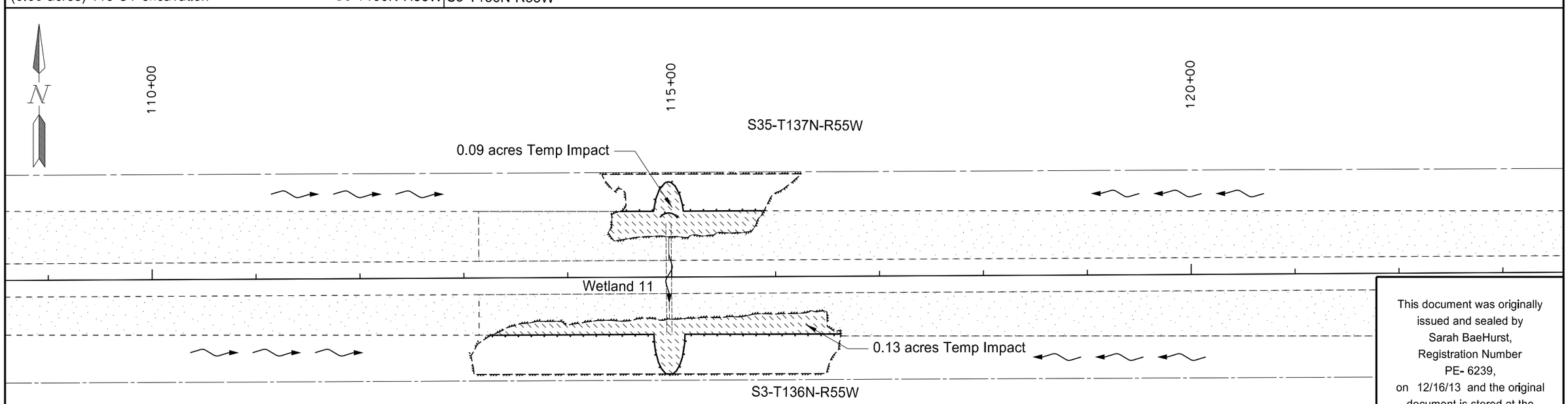
Wetlands, Seeding, and Erosion Control

Milling & Overlay, ADA Ramps, and Sliver Grading

E Jct of ND 32 E to 9 Miles E of Enderlin

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	75	2





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Permanent Impact

Seeding/Mulch

Temporary Impact

Wetland Mitigation

Permanent Erosion Control

12" Fiber Roll - 999 LF

Temporary Erosion Control

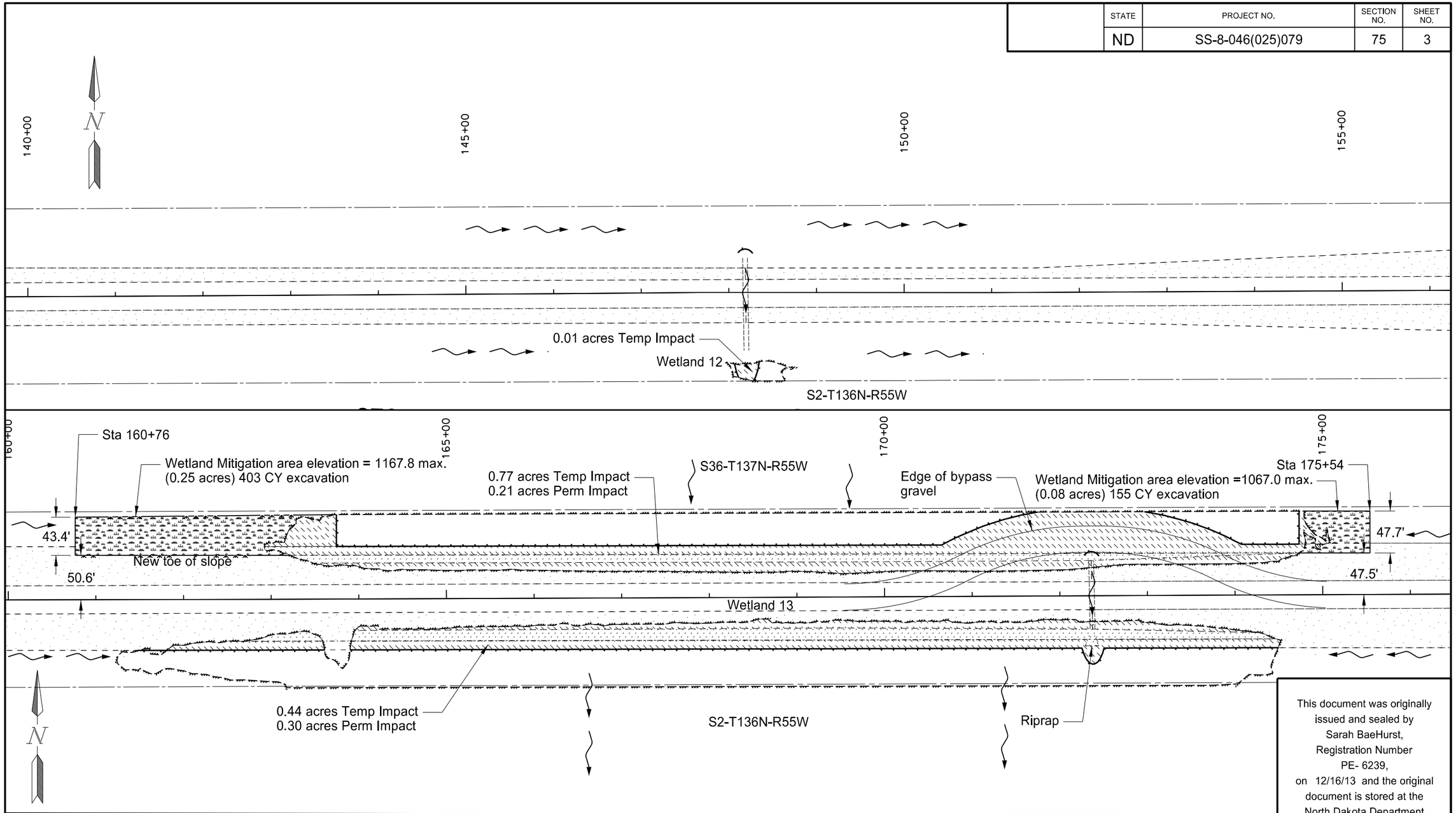
12" Fiber Roll - 40 LF (at culvert inlets)

Wetlands, Seeding, and Erosion Control

Milling & Overlay, ADA Ramps, and Sliver Grading

E Jct of ND 32 E to 9 Miles E of Enderlin

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	75	3



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Permanent Impact

Temporary Impact

Seeding/Mulch

Wetland Mitigation

Permanent Erosion Control

12" Fiber Roll - 2434 LF

Temporary Erosion Control

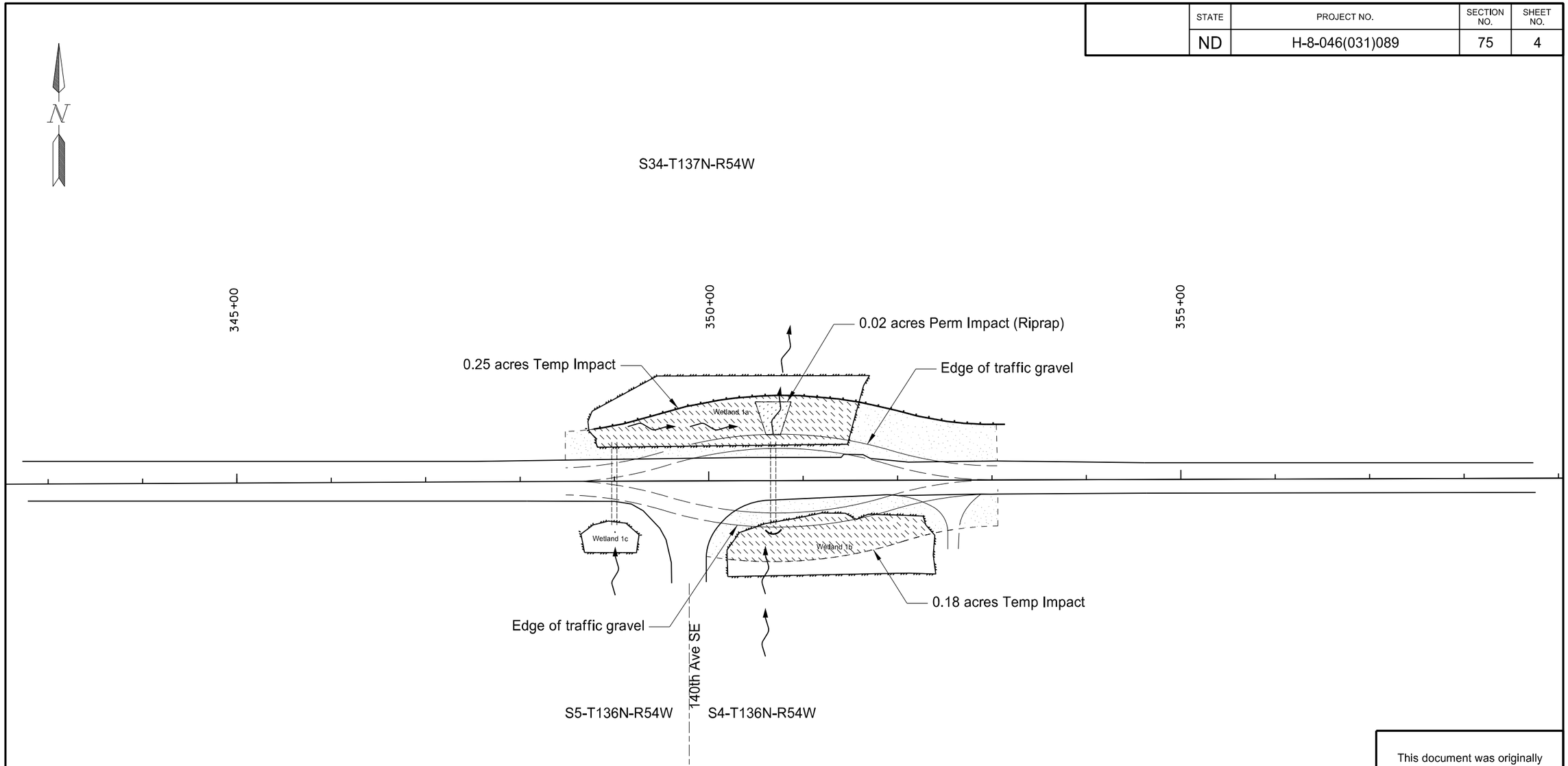
12" Fiber Roll - 40 LF (at culvert inlets)

Wetlands, Seeding, and Erosion Control

Milling & Overlay, ADA Ramps, and Sliver Grading

E Jct of ND 32 E to 9 Miles E of Enderlin

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	H-8-046(031)089	75	4



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Permanent Impact

Temporary Impact

Seeding/Mulch

Wetland Mitigation

Permanent Erosion Control

12" Fiber Roll - 453 LF

Temporary Erosion Control

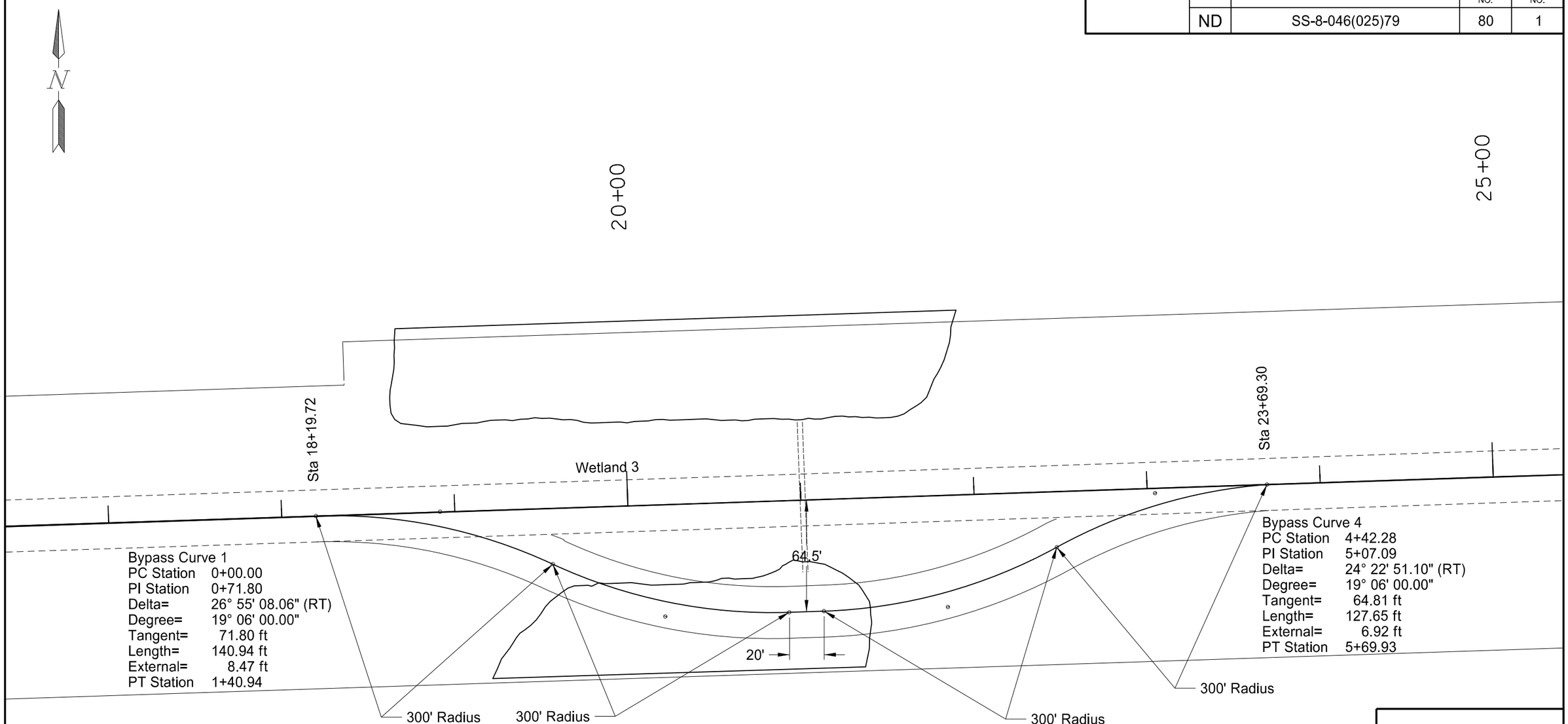
12" Fiber Roll - 20 LF (at culvert inlets)

Wetlands, Seeding, and Erosion Control

Milling & Overlay, ADA Ramps, and Sliver Grading

E Jct of ND 32 E to 9 Miles E of Enderlin

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)79	80	1



Bypass Curve 1
PC Station 0+00.00
PI Station 0+71.80
Delta= 26° 55' 08.06" (RT)
Degree= 19° 06' 00.00"
Tangent= 71.80 ft
Length= 140.94 ft
External= 8.47 ft
PT Station 1+40.94

Bypass Curve 2
PC Station 1+40.94
PI Station 2+12.56
Delta= 26° 51' 18.26" (LT)
Degree= 19° 06' 00.00"
Tangent= 71.62 ft
Length= 140.60 ft
External= 8.43 ft
PT Station 2+81.54

Bypass Curve 3
PC Station 3+01.54
PI Station 3+73.23
Delta= 26° 52' 52.34" (LT)
Degree= 19° 06' 00.00"
Tangent= 71.69 ft
Length= 140.74 ft
External= 8.45 ft
PT Station 4+42.28

Bypass Curve 4
PC Station 4+42.28
PI Station 5+07.09
Delta= 24° 22' 51.10" (RT)
Degree= 19° 06' 00.00"
Tangent= 64.81 ft
Length= 127.65 ft
External= 6.92 ft
PT Station 5+69.93

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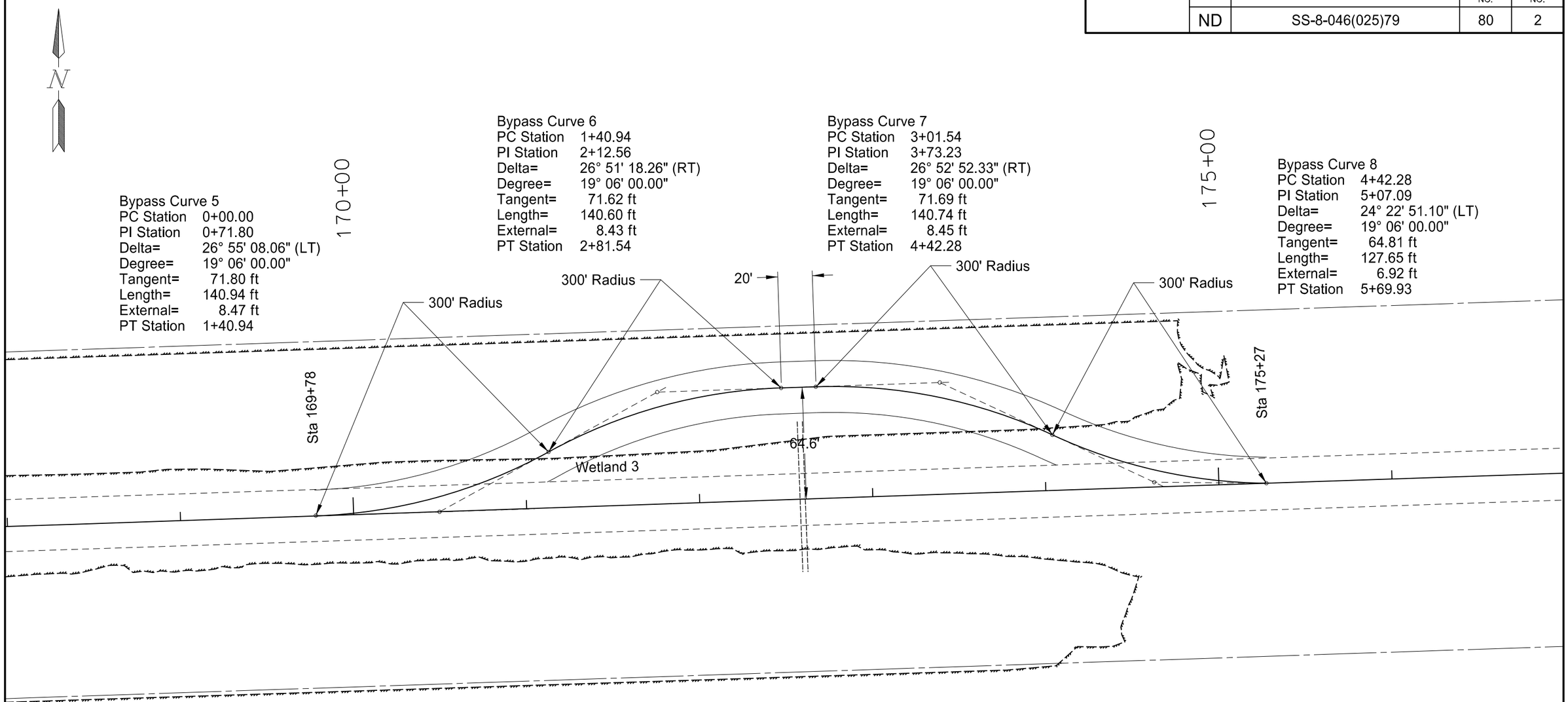
Bypass for Culvert Installation-Sta 21+01, RP 80.333

Milling and Overlay, ADA Ramps, and Sliver Grading

E Jct ND 32 E to 9 Miles E of Enderlin

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)79	80	2



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Bypass for Culvert Installation-Sta 172+39, RP 85.581

Milling and Overlay, ADA Ramps, and Sliver Grading

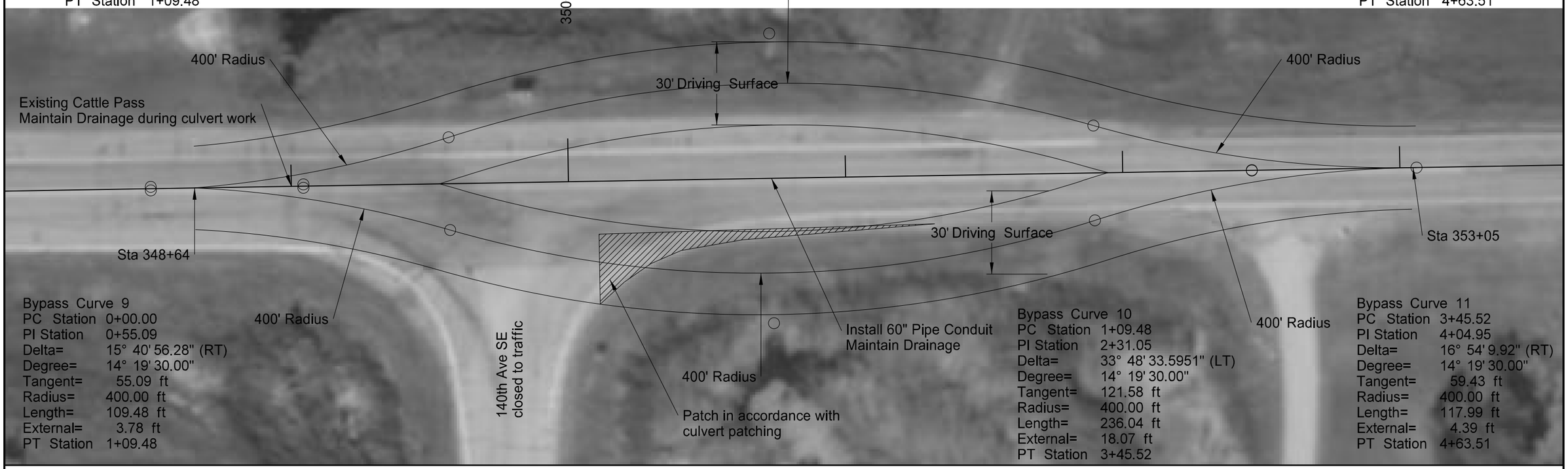
E Jct ND 32 E to 9 Miles E of Enderlin

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	H-8-046(031)089	80	3

Bypass Curve
PC Station 0+00.00
PI Station 0+55.09
Delta= 15° 40' 56.28" (LT)
Degree= 14° 19' 30.00"
Tangent= 55.09 ft
Radius= 400.00 ft
Length= 109.48 ft
External= 3.78 ft
PT Station 1+09.48

Bypass Curve 13
PC Station 1+09.48
PI Station 2+31.05
Delta= 33° 48' 33.5951" (RT)
Degree= 14° 19' 30.00"
Tangent= 121.58 ft
Radius= 400.00 ft
Length= 236.04 ft
External= 18.07 ft
PT Station 3+45.52

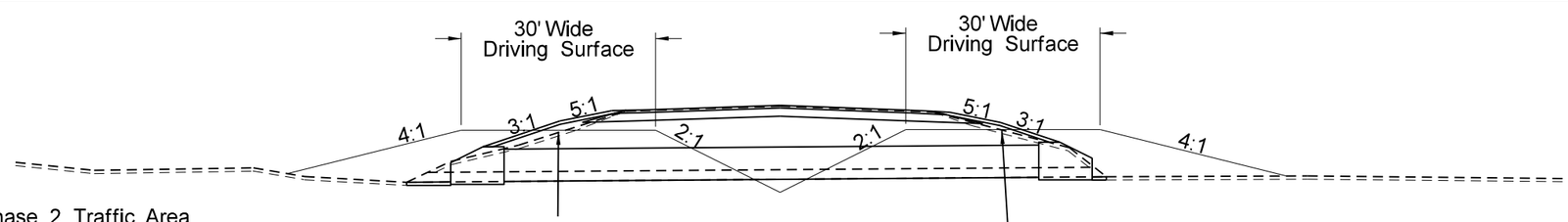
Bypass Curve 14
PC Station 3+45.52
PI Station 4+04.95
Delta= 16° 54' 9.92" (LT)
Degree= 14° 19' 30.00"
Tangent= 59.43 ft
Radius= 400.00 ft
Length= 117.99 ft
External= 4.39 ft
PT Station 4+63.51



Bypass Curve 9
PC Station 0+00.00
PI Station 0+55.09
Delta= 15° 40' 56.28" (RT)
Degree= 14° 19' 30.00"
Tangent= 55.09 ft
Radius= 400.00 ft
Length= 109.48 ft
External= 3.78 ft
PT Station 1+09.48

Bypass Curve 10
PC Station 1+09.48
PI Station 2+31.05
Delta= 33° 48' 33.5951" (LT)
Degree= 14° 19' 30.00"
Tangent= 121.58 ft
Radius= 400.00 ft
Length= 236.04 ft
External= 18.07 ft
PT Station 3+45.52

Bypass Curve 11
PC Station 3+45.52
PI Station 4+04.95
Delta= 16° 54' 9.92" (RT)
Degree= 14° 19' 30.00"
Tangent= 59.43 ft
Radius= 400.00 ft
Length= 117.99 ft
External= 4.39 ft
PT Station 4+63.51



Phase 2 Traffic Area
Maintain Traffic without Flaggers (30' wide driving surface)
Traffic Control Devices Standard D-704-15 Type B

Phase 1 Traffic Area
Maintain Traffic without flaggers (30' wide driving surface)
Traffic Control Devices Standard D-704-15 Type B

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TEMPORARY BYPASS ESTIMATED QUANTITIES		
DESCRIPTION	UNIT	Total
Embankment at 25% Additional Volume	CY	1,718*
Water	MGAL	17*

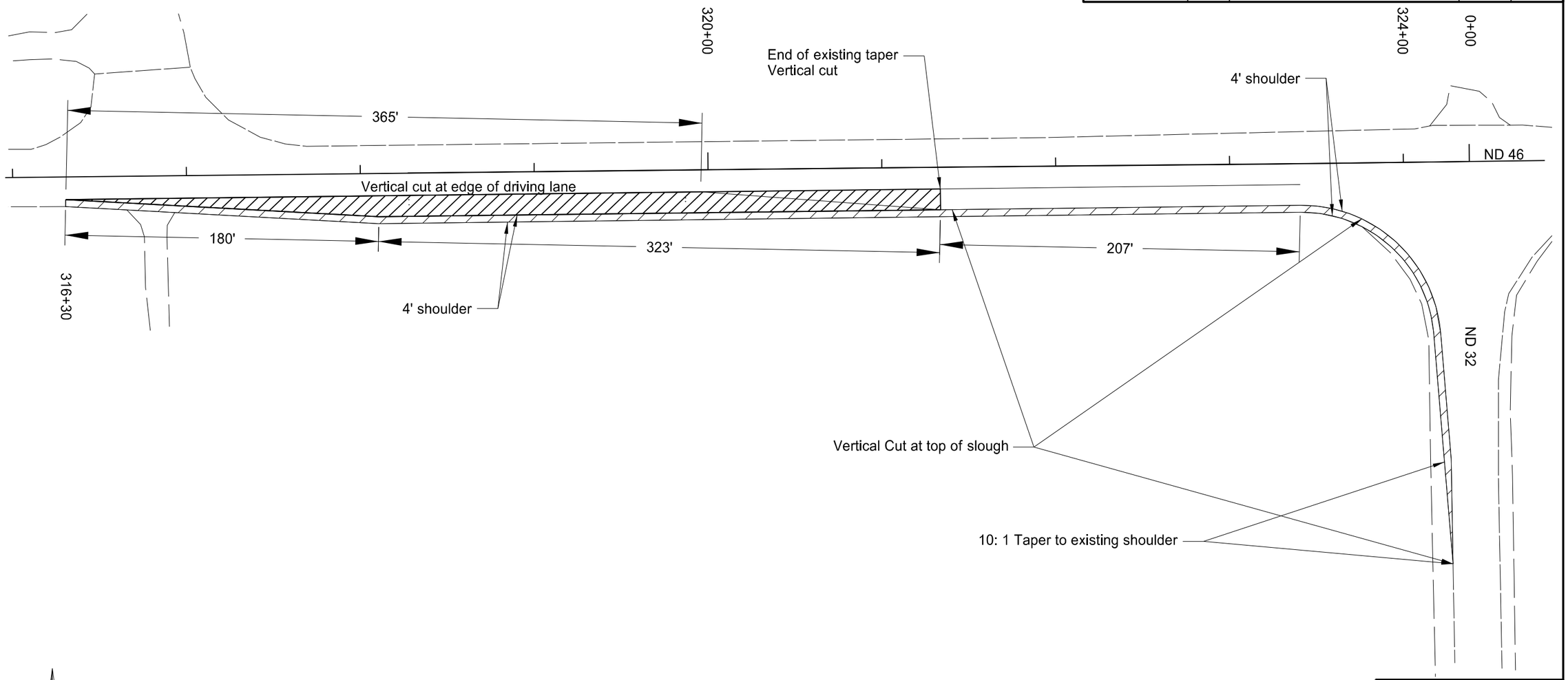
* Quantities were calculated using 6% grade
These quantities are estimates only and are included in the pay item "Temporary Bypass".
Maintenance and removal are included in the pay item "Temporary Bypass."

Temporary Bypass Layout-Sta 350+68

Drainage Improvement

10 Mi E of E Jct ND 32

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)79	90	1



Note: Paving shown is in addition to mainline paving

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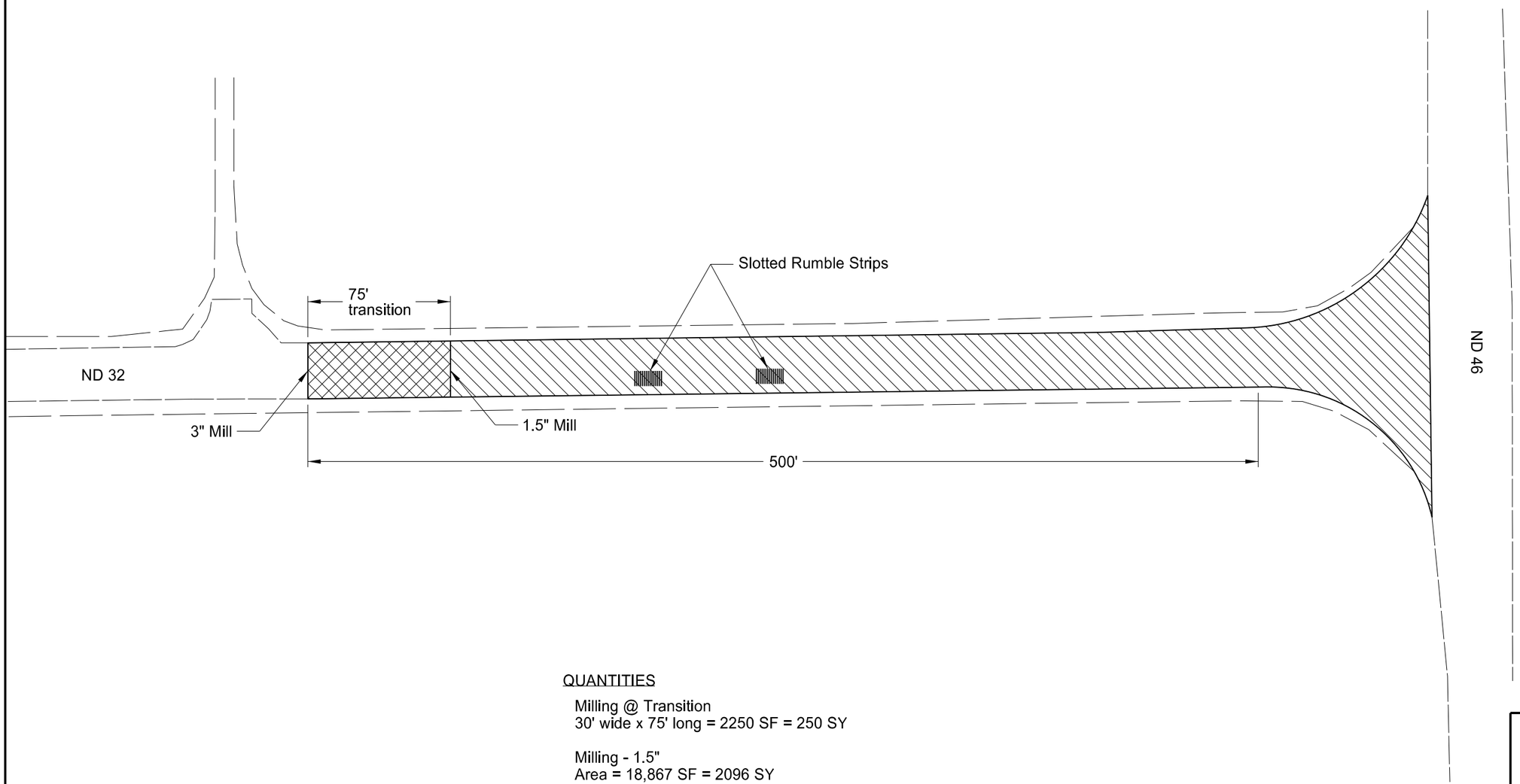
EB Turn Lane Extension and Widening at ND 32

Milling & Overlay, ADA Ramps, and Sliver Grading

E Jct of ND 32 E to 9 Miles E of Enderlin

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)79	90	2



QUANTITIES

Milling @ Transition
30' wide x 75' long = 2250 SF = 250 SY

Milling - 1.5"
Area = 18,867 SF = 2096 SY

RHBP
Area = 21,117 SF
Thickness = 3"
Quantity = 391 Ton

Prime @0.25 Gal/SY = 587 Gal
Tack @ 0.05 Gal/SY* 2 lifts = 235 Gal
AC @ 5.1% = 20 Ton

Rumble Strips - Intersection = 2 ea

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Milling & Overlay on ND 32

Milling & Overlay, ADA Ramps, and Sliver Grading

E Jct ND 32 E to 96 Miles E of Enderlin

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	100	1

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
D3-36	36"x6"	STREET NAME SIGN (Sign and installation only)		6	
G20-1-60	**60"x24"**	**ROAD WORK NEXT __ MILES**	**2**	**34**	**68**
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**	**2**	**19**	**38**
G20-4-36	**36"x18"**	**PILOT CAR FOLLOW ME (Mounted to back of pilot car)**	**2**	**18**	**36**
G20-10-108	**108"x48"**	**CONTRACTOR SIGN**	**2**	**64**	**128**
G20-50a-72	**72"x36"**	**ROAD WORK NEXT __ MILES RT & LT ARROWS**	**6**	**37**	**222**
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**	**2**	**59**	**118**
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	
M4-8-24	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**	**2**	**32**	**64**
R1-1a-18	**18"x18"**	**STOP and SLOW PADDLE Back to Back**	**4**	**5**	**20**
R1-2-60	60"x60"	YIELD		29	
R2-1-48	**48"x60"**	**SPEED LIMIT __**	**12**	**39**	**468**
R2-1a-24	**24"x18"**	**MINIMUM FEE $80 (Mounted on Speed Limit post)**	**2**	**10**	**20**
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**	**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**	**4**	**35**	**140**
W1-4b-48	48"x48"	DOUBLE RIGHT or LEFT REVERSE CURVE ARROW		35	
W1-6-48	**48"x24"**	**LARGE ARROW**	**2**	**26**	**52**
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**	**4**	**35**	**140**
W3-5-48	**48"x48"**	**SPEED REDUCTION AHEAD**	**6**	**35**	**210**
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**	**4**	**35**	**140**
W8-3-48	**48"x48"**	**PAVEMENT ENDS**	**2**	**35**	**70**
W8-7-48	48"x48"	LOOSE GRAVEL		35	
W8-9a-48	48"x48"	SHOULDER DROP-OFF		35	
W8-11-48	**48"x48"**	**UNEVEN LANES**	**2**	**35**	**70**
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.**	**2**	**35**	**70**
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	
W12-2-48	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	
W20-1-48	**48"x48"**	**ROAD WORK AHEAD or _FT or _ MILE**	**14**	**35**	**490**
W20-2-48	48"x48"	DETOUR AHEAD or __ FT		35	
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or __ FT.		35	
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	
W20-7a-48	**48"x48"**	**FLAGGING SYMBOL**	**4**	**35**	**140**
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)**	**4**	**12**	**48**
W21-1a-48	48"x48"	WORKERS SYMBOL		35	
W21-2-48	**48"x48"**	**FRESH OIL**	**2**	**35**	**70**
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or __ FT		35	

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
W21-5-48	**48"x48"**	**SHOULDER WORK**	**2**	**35**	**70**
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED		35	
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or __ FT.		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**	**2**	**35**	**70**
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK		35	
	24"x24"	TAKE TURNS (6" D letters) (Mounted on stop sign post)		11	

SPECIAL SIGNS

SPEC & CODE

704-1000	**TRAFFIC CONTROL SIGNS**	**TOTAL UNITS**	**3018**

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
704-0100	**FLAGGING**	**MHR**	**2000**
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**
704-1060	**DELINEATOR DRUMS**	**EACH**	**168**
704-1065	TRAFFIC CONES	EACH	
704-1067	**TUBULAR MARKERS**	**EACH**	**22**
704-1070	DELINEATOR	EACH	
704-1072	FLEXIBLE DELINEATORS	EACH	
704-1081	**VERTICAL PANELS - BACK TO BACK**	**EACH**	**81**
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	
704-1185	**PILOT CAR**	**HR**	**300**
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF	
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH	
762-0200	RAISED PAVEMENT MARKERS	EACH	
762-0420	SHORT TERM 4IN LINE - TYPE R	LF	
762-0430	**SHORT TERM 4IN LINE - TYPE NR**	**LF**	**560**
762-1500	**OBLITERATION OF PVMT MK**	**SF**	**240**
772-2110	FLASHING BEACON - POST MOUNTED	EACH	

NOTE:
If additional signs are required, units will be calculated using the formula from Section III-19.06 of the Design Manual.
http://www.dot.nd.gov/

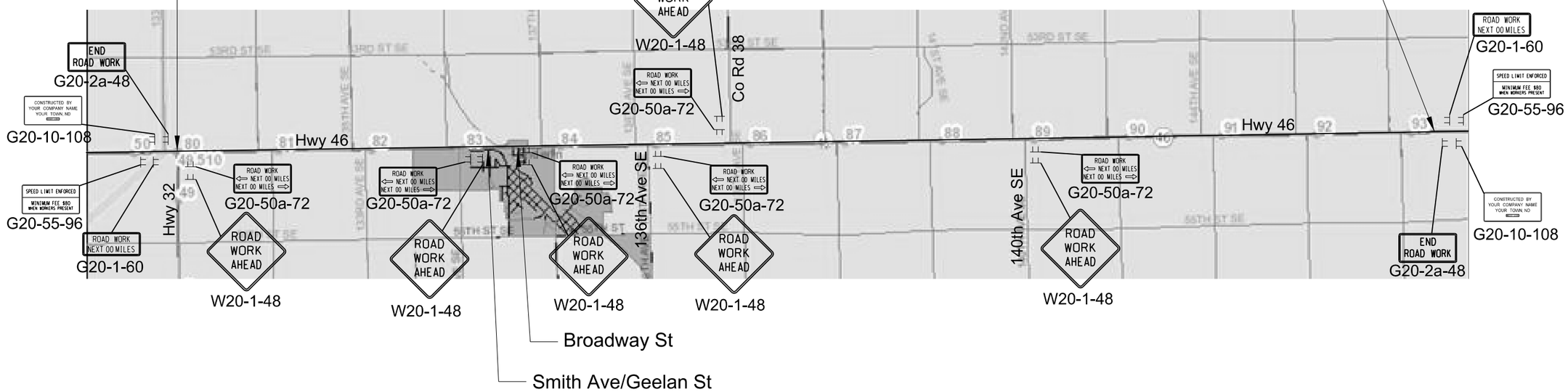
This document was originally issued and sealed by Sarah BaeHurst, Registration Number PE-6239, on 12/16/13 and the original document is stored at the North Dakota Department of Transportation.

Traffic Control Devices List

Milll/Overlay, ADA Ramps, Sliver Grade

E Jct ND 32 E to 9 MIles E of Enderlin

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	100	2



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Construction Sign Layout

Milling & Overlay, ADA Ramps, and Sliver Grading

E Jct of ND 32 E to 9 Miles E of Enderlin

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	H-8-046(031)089	100	3

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
D3-36	36"x6"	STREET NAME SIGN (Sign and installation only)		6	
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**	**2**	**19**	**38**
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	
m1-6-24	**24"X24"**	**COUNTY ROUTE MARKER (post and installation only)**	**10**	**14**	**140**
M3-1-24	**24"x12"**	**NORTH (Mounted on route marker post)**	**3**	**7**	**21**
M3-2-24	24"x12"	EAST (Mounted on route marker post)		7	
M3-3-24	**24"x12"**	**SOUTH (Mounted on route marker post)**	**7**	**7**	**49**
M3-4-24	24"x12"	WEST (Mounted on route marker post)		7	
M4-8-24	**24"x12"**	**DETOUR (Mounted on route marker post)**	**10**	**7**	**70**
M4-8a-24	**24"x18"**	**END DETOUR**	**1**	**13**	**13**
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)**	**2**	**7**	**14**
M6-1-21	**21"x15"**	**ARROW RT or LT (Mounted on route marker post)**	**7**	**7**	**49**
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)**	**1**	**7**	**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 __**	**4**	**39**	**156**
R2-1a-24	**24"x18"**	**MINIMUM FEE $80 (Mounted on Speed Limit post)**	**2**	**10**	**20**
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**	**4**	**28**	**112**
R11-2a-48	48"x30"	STREET CLOSED		28	
R11-3a-60	**60"x30"**	**ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY**	**1**	**31**	**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**	**4**	**35**	**140**
W1-4b-48	48"x48"	DOUBLE RIGHT or LEFT REVERSE CURVE ARROW		35	
W1-6-48	**48"x24"**	**LARGE ARROW**	**2**	**26**	**52**
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**	**2**	**35**	**70**
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	
W12-2-48	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	
W20-1-48	**48"x48"**	**ROAD WORK AHEAD or _FT or _ MILE**	**2**	**35**	**70**
W20-2-48	**48"x48"**	**DETOUR AHEAD or __ FT**	**1**	**35**	**35**
W20-3-48	**48"x48"**	**ROAD or STREET CLOSED AHEAD or __ FT.**	**1**	**35**	**35**
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	
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	

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
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	

SPECIAL SIGNS

SPEC & CODE

704-1000	**TRAFFIC CONTROL SIGNS**	**TOTAL UNITS**	**1122**

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
704-0100	**FLAGGING**	**MHR**	**20**
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**	**12**
704-1060	**DELINEATOR DRUMS**	**EACH**	**10**
704-1065	TRAFFIC CONES	EACH	
704-1067	**TUBULAR MARKERS**	**EACH**	**6**
704-1070	DELINEATOR	EACH	
704-1072	FLEXIBLE DELINEATORS	EACH	
704-1081	**VERTICAL PANELS - BACK TO BACK**	**EACH**	**18**
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	
704-1185	PILOT CAR	HR	
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF	
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH	
762-0200	RAISED PAVEMENT MARKERS	EACH	
762-0420	SHORT TERM 4IN LINE - TYPE R	LF	
762-0430	**SHORT TERM 4IN LINE - TYPE NR**	**LF**	**34**
762-1500	**OBLITERATION OF PVMT MK**	**SF**	**203**
772-2110	FLASHING BEACON - POST MOUNTED	EACH	

NOTE:
If additional signs are required, units will be calculated using the formula from Section III-19.06 of the Design Manual.
http://www.dot.nd.gov/

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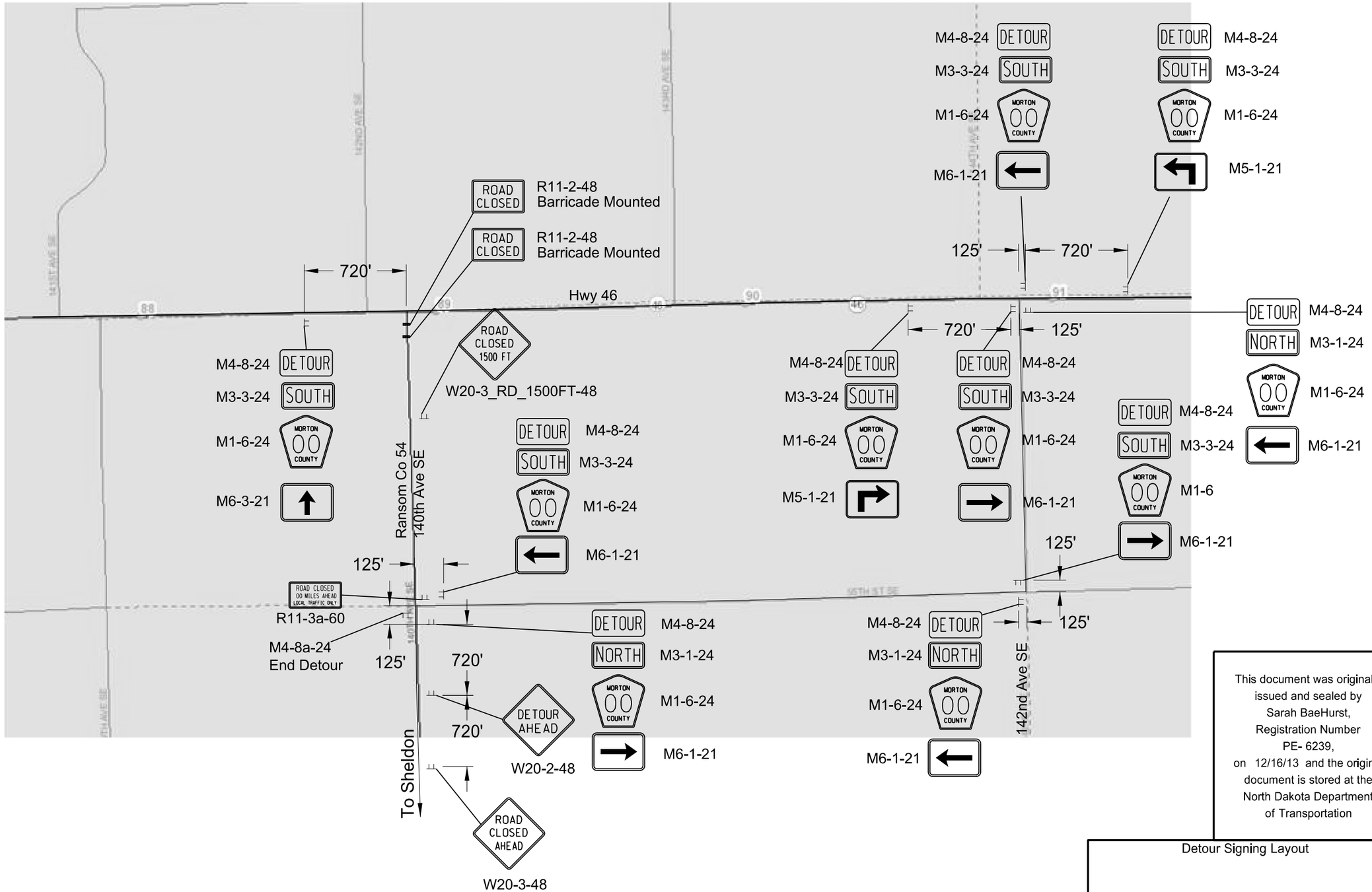
Traffic Control Devices List

Drainage Improvement Detour

10 Mi E of E Jct ND 32

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	H-8-046(031)089	100	4



Note: Total of 6 Type-3 Barricades to close Co Rd 54/140th Ave SE

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Detour Signing Layout

Drainage Improvement

10 Mi E of E Jct ND 32

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
N.D.	SS-8-046(025)079	110	1

Sta/RP	Sign No.	Assembly No.	Flat Sheet For Signs IV SF	Flat Sheet For Signs XI 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
West of Jct 32																						
316+43 Rt	SN 1		28.0		12.4	12.6	12.6		2.25 x 2.25 12 ga	13.3	4.2	4.4	4.5		2 x 2 12 ga	3	4	3 x 3 7 ga			3	
316+51 Lt	SA 2E			5.2	13.7				2.5 x 2.5 10 ga	14.6						1	4	3 x 3 7 ga	1		1	
317+30 Lt		1		5.2	12.1				2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga				
319+68 Rt		405	12.4		12.5				2.5 x 2.5 12 ga	13.5	4.2				2.25 x 2.25 12 ga	1	4	3 x 3 7 ga			1	
320+79 Lt	SN 2		17.0		10.9	11.2			2.5 x 2.5 10 ga	12.6						2	4	3 x 3 7 ga			2	
321+84 Lt		375	12.0		12.3				2.5 x 2.5 12 ga	13.8	3.9				2.25 x 2.25 12 ga	1	4	3 x 3 7 ga			1	
Sub Total			69.4	10.4		**Total**	110.3									**Total**	36		1	0	8	

Basis of Estimate
Sign Support Lengths

The sign support lengths have been calculated
using the following vertical clearances:

Areas where parking and/or pedestrian movement will occur - 84"
Rural Roadway - 60"

This document was originally issued and sealed by Douglas A. Schumaker, Registration Number PE-5047, on 12/18/2013 and the original document is stored at the North Dakota Department of Transportation

Sign Summary
Perforated Tube

E Jct of ND 32 East to 9 Miles E of Enderlin
Ransom and Cass Counties

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
N.D.	SS-8-046(025)079	110	2

Sta/RP	Sign No.	Assembly No.	Flat Sheet For Signs IV SF	Flat Sheet For Signs XI 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
Jct 32 to RP 85.000																						
0+00 Lt		34		8.0	11.3				2.5 x 2.5 10 ga	13.6						1	4	3 x 3 7 ga			1	
0+12 Lt		405	12.4		12.5				2.5 x 2.5 12 ga	13.5	4.2				2.25 x 2.25 12 ga	1	4	3 x 3 7 ga			1	
0+28 Rt	SA 2E			5.2	13.7				2.5 x 2.5 10 ga	14.6						1	4	3 x 3 7 ga	1		1	
1+58 Lt		405	12.4		12.5				2.5 x 2.5 12 ga	13.5	4.2				2.25 x 2.25 12 ga	1	4	3 x 3 7 ga			1	
1+58 Rt		371	6.0		12.5				2.25 x 2.25 12 ga	12.9						1	4	2.5 x 2.5 12 ga				
3+06 Lt	SN 3		37.5		14.1	14.3	14.4		2.5 x 2.5 10 ga	16.7	3.4	3.7	3.8		2.19 x 2.19 10 ga	3	4	3 x 3 7 ga			3	
3+06 Rt		9		5.0	12.0				2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga				
8+57 Lt		391	6.2		12.8				2.5 x 2.5 12 ga	15.9						1	4	3 x 3 7 ga				
44+58 Lt		1		5.2	12.1				2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga				
52+76 Rt	SA 2B			5.2	13.3				2.25 x 2.25 12 ga	14.2						1	4	2.5 x 2.5 12 ga	1			
97+59 Lt		1		5.2	12.1				2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga				
104+93 Rt	SA 2B			5.2	12.3				2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga	1			
109+84 Rt	BIRD				13.1				2.25 x 2.25 12 ga	14.0	4.2				2 x 2 12 ga	1	4	3 x 3 7 ga	1		1	
152+40 Rt		20		9.0	13.0				2.25 x 2.25 12 ga	14.1	4.2				2 x 2 12 ga	1	4	3 x 3 7 ga			1	
154+09 Rt	SN 4	9		5.0	12.0				2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga				
158+95 Rt		1		5.2	12.1				2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga				
159+32 Rt	SN 6		30.0		11.8	12.0			2.5 x 2.5 10 ga	12.8	4.0	4.3			2.19 x 2.19 10 ga	2	4	3 x 3 7 ga			2	
159+80 Lt		371	6.0		12.5				2.25 x 2.25 12 ga	12.9						1	4	2.5 x 2.5 12 ga				
163+12 Lt		9		5.0	12.0				2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga				
163+12 Rt		9		5.0	12.0				2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga				
163+18 Rt		4		3.9	12.2				2 x 2 12 ga	13.6						1	4	2.25 x 2.25 12 ga				
164+18 Rt		1		5.2	12.1				2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga				
166+19 Lt	SA B			5.2	12.3				2.25 x 2.25 12 ga	13.8						1	4	2.5 x 2.5 12 ga				
174+64 Lt		9		5.0	12.0				2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga				
174+64 Rt		9		5.0	12.0				2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga				
184+90 Rt	SA A			8.3	13.2				2.5 x 2.5 10 ga	14.8						1	4	3 x 3 7 ga			1	
186+15 Rt	SA A			8.3	13.2				2.5 x 2.5 10 ga	14.8						1	4	3 x 3 7 ga			1	
186+25 Lt	SA A			8.3	13.2				2.5 x 2.5 10 ga	14.8						1	4	3 x 3 7 ga			1	
187+50 Lt	SA A			8.3	13.2				2.5 x 2.5 10 ga	14.8						1	4	3 x 3 7 ga			1	
191+27 Rt		1		5.2	12.1				2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga				
200+30 Lt	SN 5		10.0		10.8				2.25 x 2.25 12 ga	11.9	3.6				2 x 2 12 ga	1	4	3 x 3 7 ga			1	
202+04 Lt		9		5.0	12.0				2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga				
202+04 Rt		9		5.0	12.0				2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga				
202+99 Lt	SA 2E			5.2	13.7				2.5 x 2.5 10 ga	14.6						1	4	3 x 3 7 ga	1		1	

Basis of Estimate
Sign Support Lengths

The sign support lengths have been calculated
using the following vertical clearances:

Areas where parking and/or pedestrian movement will occur - 84"
Rural Roadway - 60"

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Sign Summary
Perforated Tube

E Jct of ND 32 East to 9 Miles E of Enderlin
Ransom and Cass Counties

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
N.D.	SS-8-046(025)079	110	3

Sta/RP	Sign No.	Assembly No.	Flat Sheet For Signs IV SF	Flat Sheet For Signs XI 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
211+34 Rt	SA 2B			5.2	12.8				2.25 x 2.25 12 ga	14.0	4.0				2 x 2 12 ga	1	4	3 x 3 7 ga	1		1	
212+34 Lt		9		5.0	12.0				2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga				
212+34 Rt		9		5.0	12.0				2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga				
217+77 Lt	SN 4	9		5.0	12.0				2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga				
220+41 Lt		20		9.0	11.7				2.5 x 2.5 10 ga	12.9						1	4	3 x 3 7 ga			1	
220+41 Rt		371	6.0		12.5				2.25 x 2.25 12 ga	12.9						1	4	2.5 x 2.5 12 ga				
255+79 Lt		1		5.2	12.1				2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga				
258+01 Rt	SN 7		19.5		11.6	11.9			2.25 x 2.25 12 ga	12.5	4.0	4.3			2 x 2 12 ga	2	4	3 x 3 7 ga			2	
262+13 Rt		4		3.9	12.2				2 x 2 12 ga	13.6						1	4	2.25 x 2.25 12 ga				
263+60 Rt	SA 2B			5.2	12.8				2.25 x 2.25 12 ga	14.0	4.0				2 x 2 12 ga	1	4	3 x 3 7 ga	1		1	
266+56 Lt	SN 8		19.5		11.6	11.9			2.25 x 2.25 12 ga	12.5	4.0	4.3			2 x 2 12 ga	2	4	3 x 3 7 ga			2	
267+41 Lt	BIRD																		1			
Sub Total			165.5	189.6		**Total**	621.2									**Total**	200		8	0	24	
RP 35.000 East																						
175+23 Rt		437			13.6				2.5 x 2.5 10 ga	15.2						1	4	3 x 3 7 ga	1		1	
180+19 Rt	ALICE				11.0				2.5 x 2.5 12 ga	14.0	2.8				2.25 x 2.25 12 ga	1	4	3 x 3 7 ga	1		1	
181+41 Lt		371	6.0		12.5				2.25 x 2.25 12 ga	12.9						1	4	2.5 x 2.5 12 ga				
183+10 Lt		1		5.2	12.1				2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga				
191+44 Lt		437	8.4		13.8				2.5 x 2.5 10 ga	15.2						1	4	3 x 3 7 ga			1	
Sub Total			14.4	5.2		**Total**	63.1									**Total**	20		2	0	3	
Grand Total			249.3	205.2		**Total**	794.6									**Total**	256		11	0	35	

Basis of Estimate
Sign Support Lengths

The sign support lengths have been calculated
using the following vertical clearances:

Areas where parking and/or pedestrian movement will occur - 84"
Rural Roadway - 60"

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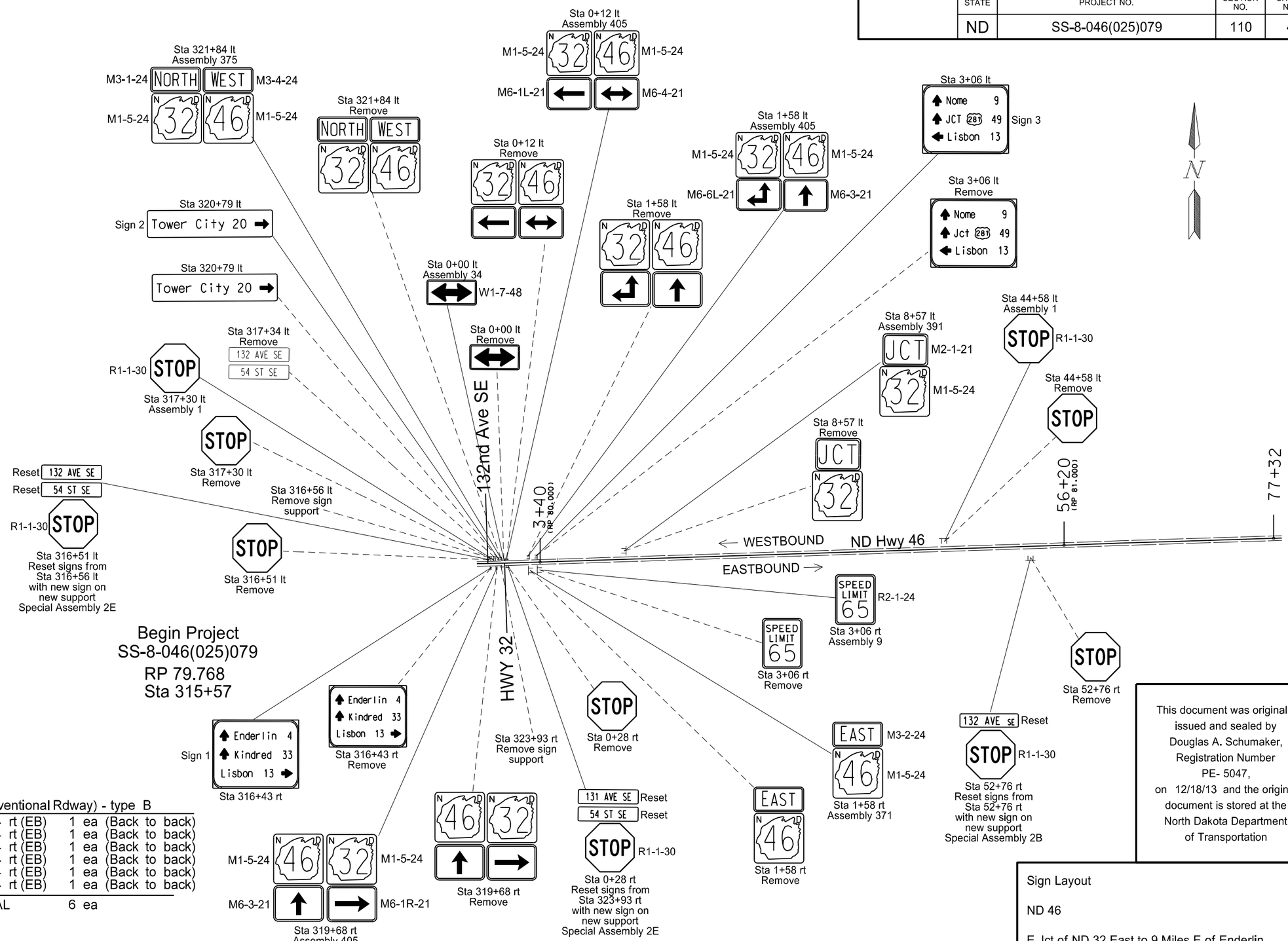
Sign Summary
Perforated Tube

E Jct of ND 32 East to 9 Miles E of Enderlin
Ransom and Cass Counties

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	110	4



Reference Marker-(Conventional Rdway) - type B

RP 80	Sta 3+40.74	rt (EB)	1	ea	(Back to back)
RP 81	Sta 56+20.74	rt (EB)	1	ea	(Back to back)
RP 82	Sta 109+00.74	rt (EB)	1	ea	(Back to back)
RP 83	Sta 161+80.74	rt (EB)	1	ea	(Back to back)
RP 84	Sta 214+60.74	rt (EB)	1	ea	(Back to back)
RP 85	Sta 267+40.74	rt (EB)	1	ea	(Back to back)
	TOTAL		6	ea	

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Sign Layout

ND 46

E Jct of ND 32 East to 9 Miles E of Enderlin

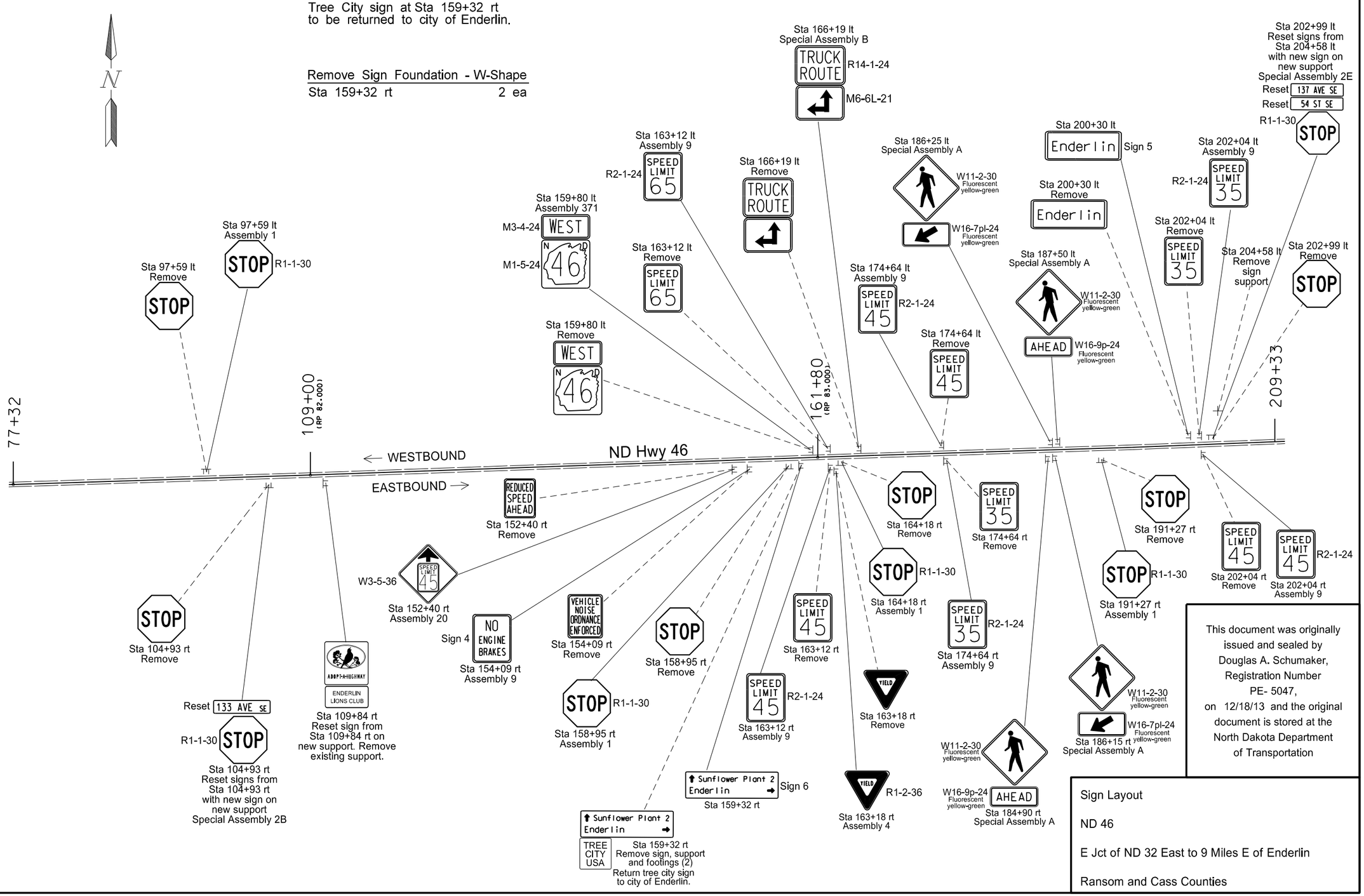
Ransom and Cass Counties

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	110	5

NOTE:
Tree City sign at Sta 159+32 rt
to be returned to city of Enderlin.

Remove Sign Foundation - W-Shape

Sta 159+32 rt	2 ea



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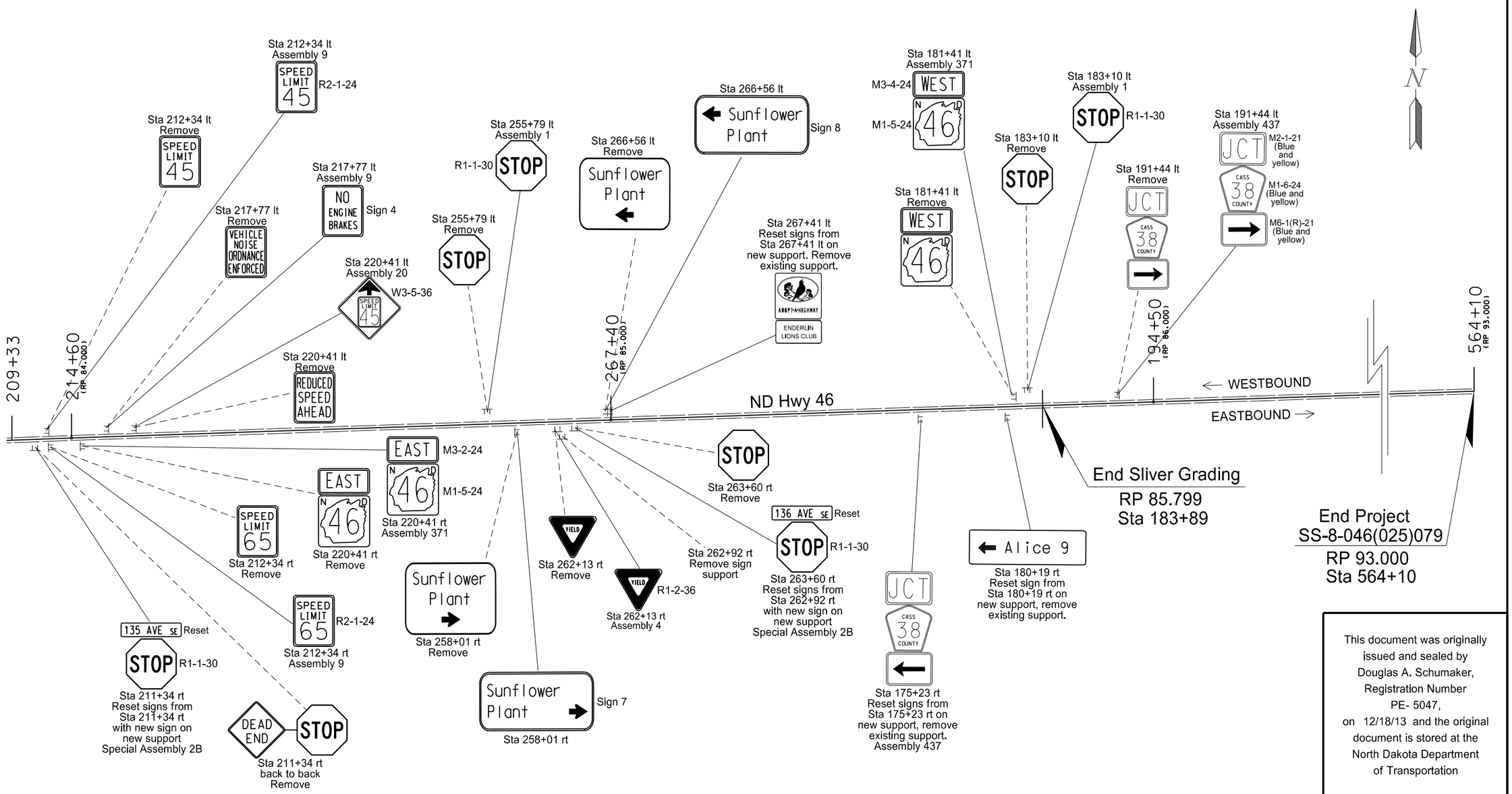
Sign Layout

ND 46

E Jct of ND 32 East to 9 Miles E of Enderlin

Ransom and Cass Counties

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	110	6



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Sign Layout

ND 46

E Jct of ND 32 East to 9 Miles E of Enderlin

Ransom and Cass Counties

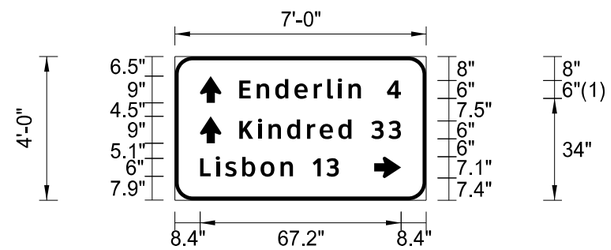
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	110	7

SIGN NUMBER	Sign 1
WIDTH x HEIGHT	7'-0" x 4'-0"
BORDER WIDTH	1.25" (inset 0")
CORNER RADIUS	6"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE
ARDD	8.4	32.5	7.1	9	90
ARDD	8.4	19	7.1	9	90
ARDD	66.6	7.4	7.1	9	0

STATION(S): 316+43 rt

AREA: 28.0 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Conv_Destination.ssl

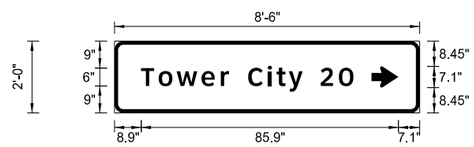
LETTER POSITION (X)									LENGTH	SIZE	SERIES
E	n	d	e	r	l	i	n		41.8	6/4.9	ClearviewHwy-5-W
21.5	27.3	33.6	39.9	46.4	50.9	54.5	58	62.2			
4									4.7	6	ClearviewHwy-5-W
70.8											
K	i	n	d	r	e	d		3	3	54	6/4.9	ClearviewHwy-5-W
21.5	27.8	31.3	37.5	44.2	48.4	54.6	59	65.6	71.4		
L	i	s	b	o	n		1	3	46.4	6/4.9	ClearviewHwy-5-W
8.4	13.7	16.8	22.5	28.7	35.3	39.5	46	50.6			

SIGN NUMBER	Sign 2
WIDTH x HEIGHT	8'-6" x 2'-0"
BORDER WIDTH	1.25" (inset 0")
CORNER RADIUS	3"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE
ARDD	85.9	8.4	7.1	9	0

STATION(S): 320+79 lt

AREA: 17.0 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Conv_Destination.ssl

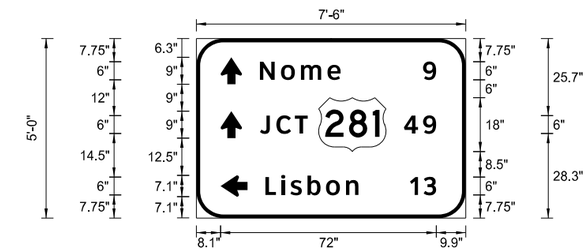
LETTER POSITION (X)													LENGTH	SIZE	SERIES
T	o	w	e	r		C	i	t	y		2	0	71	6/4.9	ClearviewHwy-5-W
8.9	14.8	20.8	29.1	35.6	38.3	44.7	51.3	54.2	58.3	62.9	68.9	75			

SIGN NUMBER	Sign 3
WIDTH x HEIGHT	7'-6" x 5'-0"
BORDER WIDTH	1.25" (inset 0")
CORNER RADIUS	9"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE
ARDD	8.1	44.8	7.1	9	90
ARDD	8.1	26.8	7.1	9	90
M1_4	40.8	22.3	22.5	18	0
ARDD	8.1	7.2	7.1	9	180

STATION(S): 3+06 lt

AREA: 37.5 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Conv_Destination.ssl

LETTER POSITION (X)													LENGTH	SIZE	SERIES
N	o	m	e										27	6/4.9	ClearviewHwy-5-W
21.2	28.3	34.9	43.8												
9													4.4	6	ClearviewHwy-5-W
75.8															
J	C	T											16	6	ClearviewHwy-5-W
21.2	26.7	32.9													
4	9												10.8	6	ClearviewHwy-5-W
69.3	75.8														
L	i	s	b	o	n								31.1	6/4.9	ClearviewHwy-5-W
23.1	28.3	31.4	37.2	43.3	50										
1	3												8.8	6	ClearviewHwy-5-W
71.4	75.9														

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Sign Details

ND 46

E Jct of ND 32 East to 9 Miles E of Enderlin

Ransom and Cass Counties

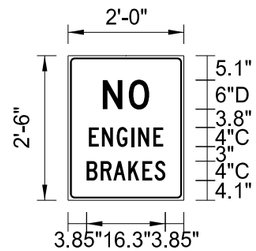
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	110	8

SIGN NUMBER	Sign 4
WIDTH x HEIGHT	2'-0" x 2'-6"
BORDER WIDTH	0.38" (inset 0.38")
CORNER RADIUS	1"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: White
LEGEND/BORDER	TYPE: Non-Reflective
	COLOR: Black

SYMBOL	X	Y	WID	HT	ANGLE

STATION(S):
154+09 rt
217+77 lt

AREA: 5.0 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Misc_Regulatory.ssl

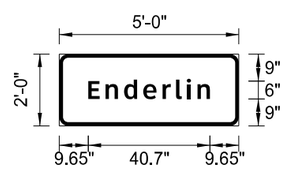
LETTER POSITION (X)																				LENGTH	SIZE	SERIES
N	O																			9.7	6	D 2000
7.2	12.6																					
E	N	G	I	N	E															15.4	4	C 2000
4.3	7	10.1	13.1	14.5	17.7																	
B	R	A	K	E	S															16.3	4	C 2000
3.8	6.8	9.4	12.5	15.4	17.9																	

SIGN NUMBER	Sign 5
WIDTH x HEIGHT	5'-0" x 2'-0"
BORDER WIDTH	1.25" (inset 0")
CORNER RADIUS	3"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE

STATION(S):
200+30 lt

AREA: 10.0 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Conv_Destination.ssl

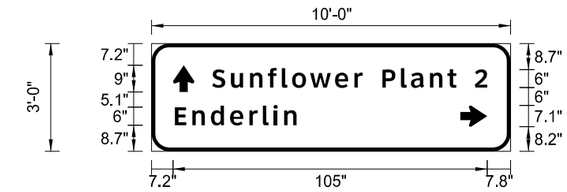
LETTER POSITION (X)																				LENGTH	SIZE	SERIES
E	n	d	e	r	l	i	n													40.7	6/4.9	ClearviewHwy-5-W
9.7	15.5	21.7	28.1	34.5	39	42.6	46.2															

SIGN NUMBER	Sign 6
WIDTH x HEIGHT	10'-0" x 3'-0"
BORDER WIDTH	1.25" (inset 0")
CORNER RADIUS	6"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE
ARDD	7.2	19.8	7.1	9	90
ARDD	103.2	8.2	7.1	9	0

STATION(S):
159+32 rt

AREA: 30.0 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Conv_Destination.ssl

LETTER POSITION (X)																				LENGTH	SIZE	SERIES
S	u	n	f	l	o	w	e	r		P	l	a	n	t		2				91.9	6/4.9	ClearviewHwy-5-W
20.3	26.6	32.9	38.9	43.5	47	53	61.3	67.8	70.5	77.1	83.4	86.7	93.1	98.9	101.9	108						
E	n	d	e	r	l	i	n													40.7	6/4.9	ClearviewHwy-5-W
7.8	13.6	19.8	26.2	32.7	37.2	40.8	44.3															

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Sign Details

ND 46

E Jct of ND 32 East to 9 Miles E of Enderlin

Ransom and Cass Counties

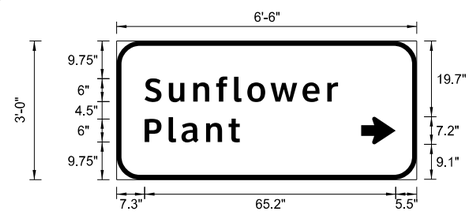
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	110	9

SIGN NUMBER	Sign 7
WIDTH x HEIGHT	6'-6" x 3'-0"
BORDER WIDTH	1.25" (inset 0")
CORNER RADIUS	6"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE
ARDD	63.5	9.2	7.2	9	0

AREA: 19.5 Sq.Ft.

STATION(S):
258+01 rt



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Conv_Destination.ssl

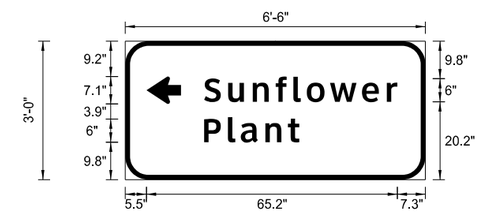
LETTER POSITION (X)																				LENGTH	SIZE	SERIES
S	u	n	f	l	o	w	e	r												50.2	6/4.9	ClearviewHwy-5-W
7.3	13.5	19.9	25.9	30.5	34	40	48.3	54.8														
P	l	a	n	t																24.7	6/4.9	ClearviewHwy-5-W
7.3	13.5	16.8	23.2	29.1																		

SIGN NUMBER	Sign 8
WIDTH x HEIGHT	6'-6" x 3'-0"
BORDER WIDTH	1.25" (inset 0")
CORNER RADIUS	6"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE
ARDD	5.5	19.7	7.1	9	180

AREA: 19.5 Sq.Ft.

STATION(S):
266+56 lt



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Conv_Destination.ssl

LETTER POSITION (X)																				LENGTH	SIZE	SERIES
S	u	n	f	l	o	w	e	r												50.2	6/4.9	ClearviewHwy-5-W
20.5	26.7	33.1	39.1	43.7	47.2	53.2	61.5	68														
P	l	a	n	t																24.7	6/4.9	ClearviewHwy-5-W
20.5	26.7	30	36.4	42.3																		

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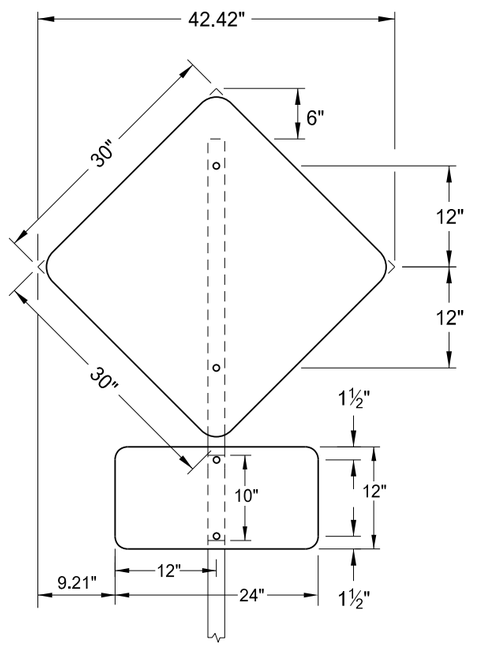
Sign Details

ND 46

E Jct of ND 32 East to 9 Miles E of Enderlin

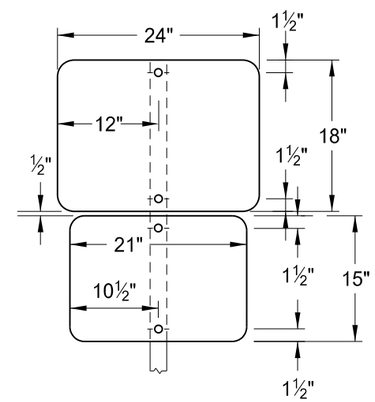
Ransom and Cass Counties

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	110	10



Special Assembly A
(Perforated Tube)
Sta 184+90 rt
Sta 186+15 rt
Sta 186+25 lt
Sta 187+50 lt

Design Area: 8.25 Sq Ft



Special Assembly B
(Perforated Tube)
Sta 166+19 lt

Design Area: 5.18 Sq Ft

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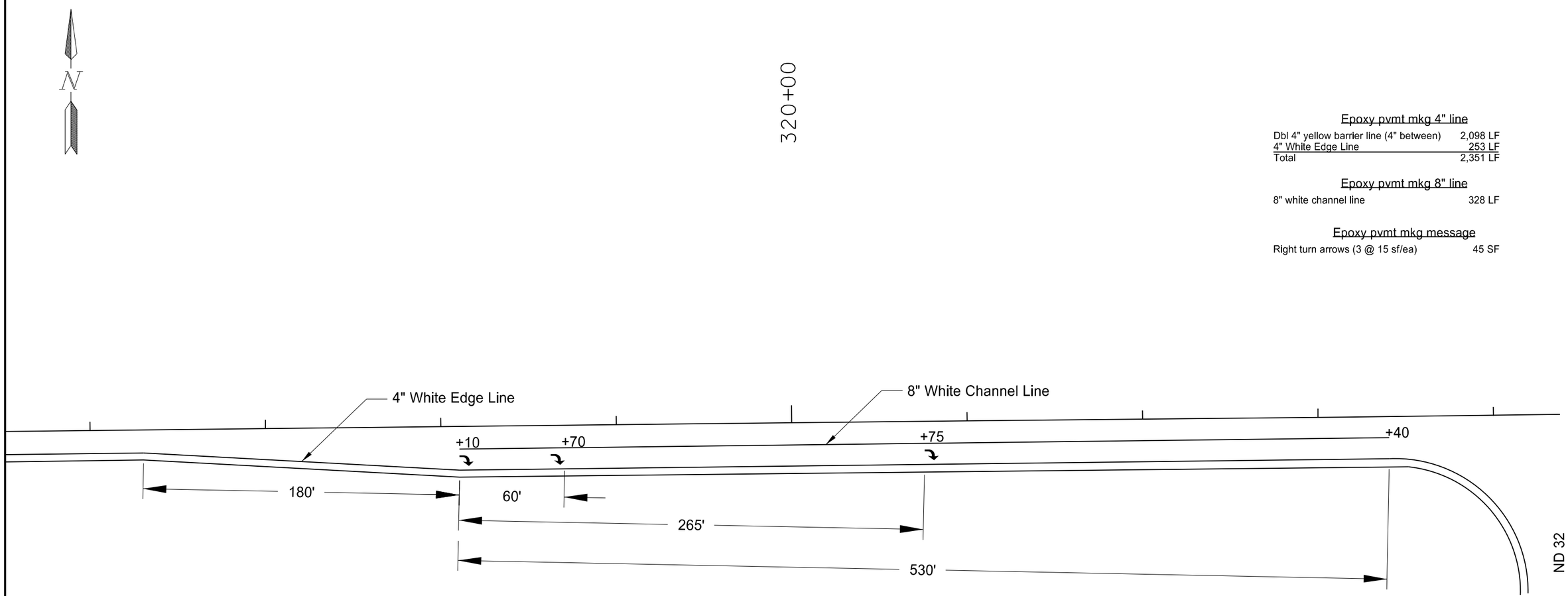
Special Assembly Details

ND 46

E Jct of ND 32 East to 9 Miles E of Enderlin

Ransom and Cass Counties

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)79	120	1



Epoxy pvmt mkg 4" line

Dbl 4" yellow barrier line (4" between)	2,098 LF
4" White Edge Line	253 LF
Total	2,351 LF

Epoxy pvmt mkg 8" line

8" white channel line	328 LF

Epoxy pvmt mkg message

Right turn arrows (3 @ 15 sf/ea)	45 SF

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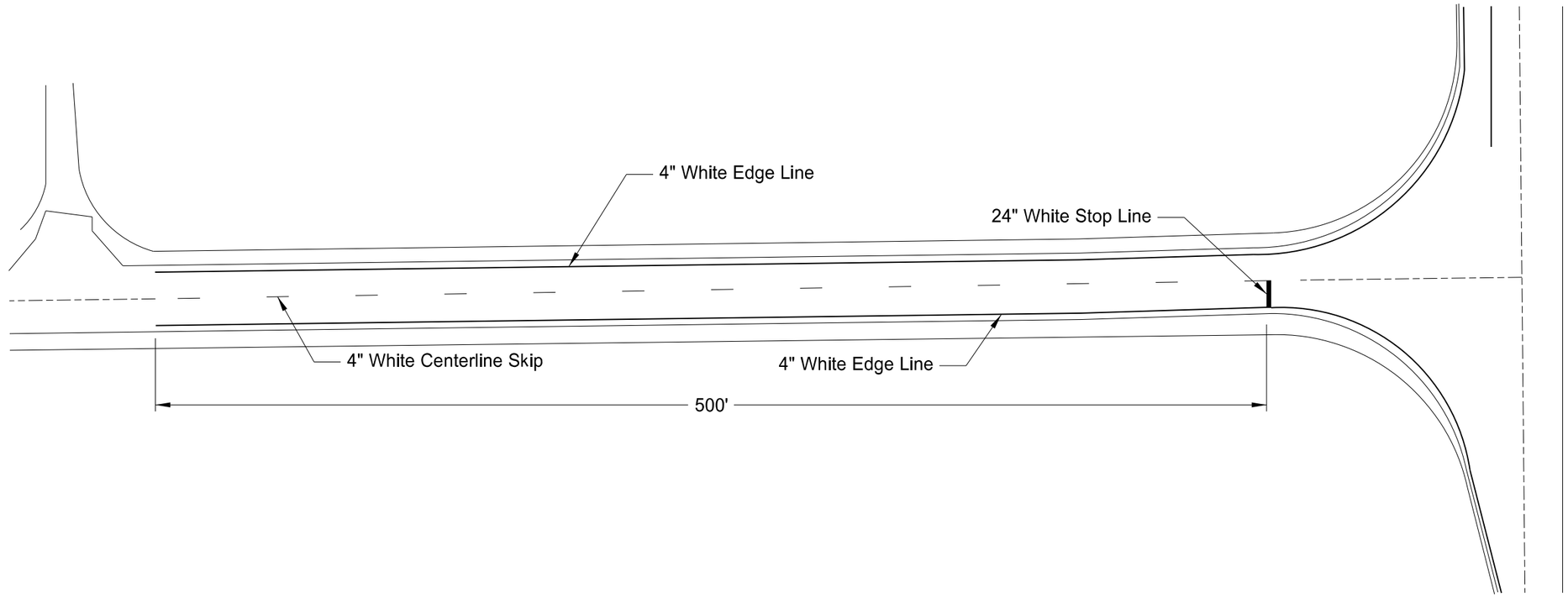
EB Right Turn Lane Pavement Marking at ND 32

Milling and Overlay, ADA Ramps, and Sliver Grading

E Jct ND 32 E to 9 MIles E of Enderlin

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)79	120	2



Epoxy pvmt mkg 4" line

4" White Skip Line (10' line, 30' skip)	130 LF
4" White Edge Line	1,000 LF
Total	1,130 LF

Epoxy pvmt mkg 24" line

24" white stop line	12 LF

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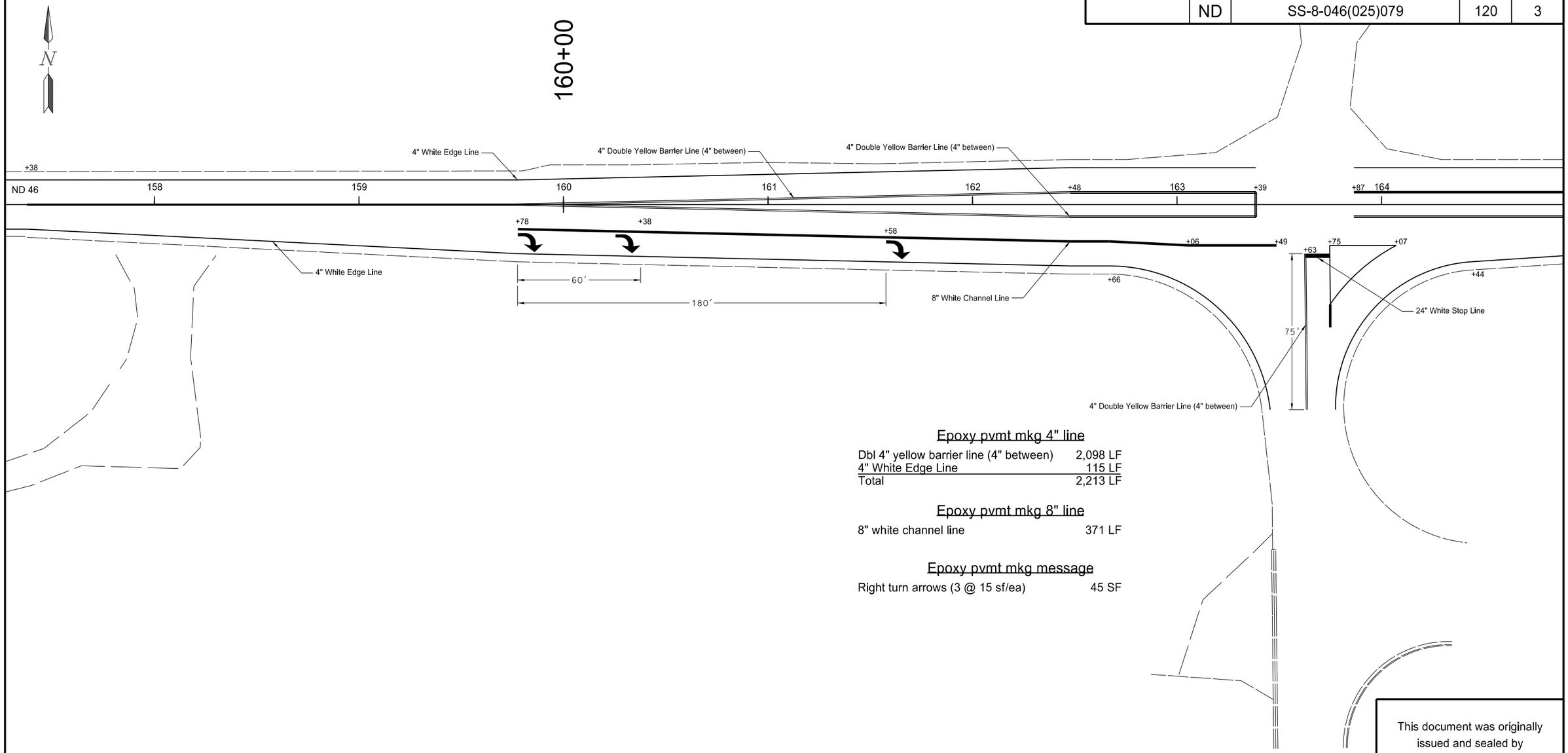
ND 32 Approach to ND 46 Pavement Marking

Milling & Overlay, ADA Ramps, and Sliver Grading

E Jct ND 32 E to 96 Miles E of Enderlin

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	120	3



Epoxy pvmt mkg 4" line

Dbl 4" yellow barrier line (4" between)	2,098 LF
4" White Edge Line	115 LF
Total	2,213 LF

Epoxy pvmt mkg 8" line

8" white channel line	371 LF

Epoxy pvmt mkg message

Right turn arrows (3 @ 15 sf/ea)	45 SF

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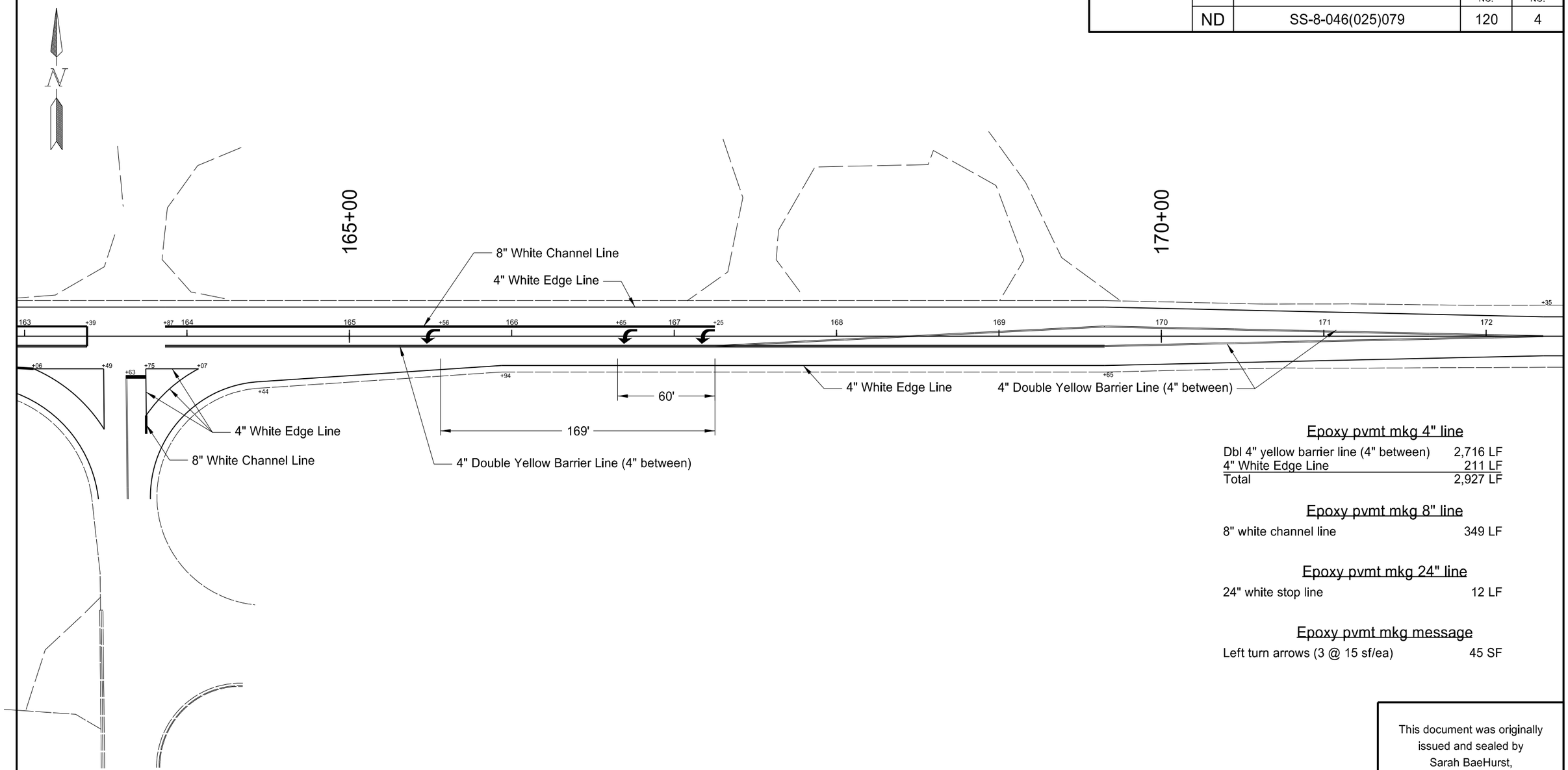
EB Right Turn Lane Pavement Marking-Railway Street

Milling and Overlay, ADA Ramps, and Sliver Grading

E Jct ND 32 E to 9 Miles E of Enderlin

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	120	4



Epoxy pvmt mkg 4" line

Dbl 4" yellow barrier line (4" between)	2,716 LF
4" White Edge Line	211 LF
Total	2,927 LF

Epoxy pvmt mkg 8" line

8" white channel line	349 LF

Epoxy pvmt mkg 24" line

24" white stop line	12 LF

Epoxy pvmt mkg message

Left turn arrows (3 @ 15 sf/ea)	45 SF

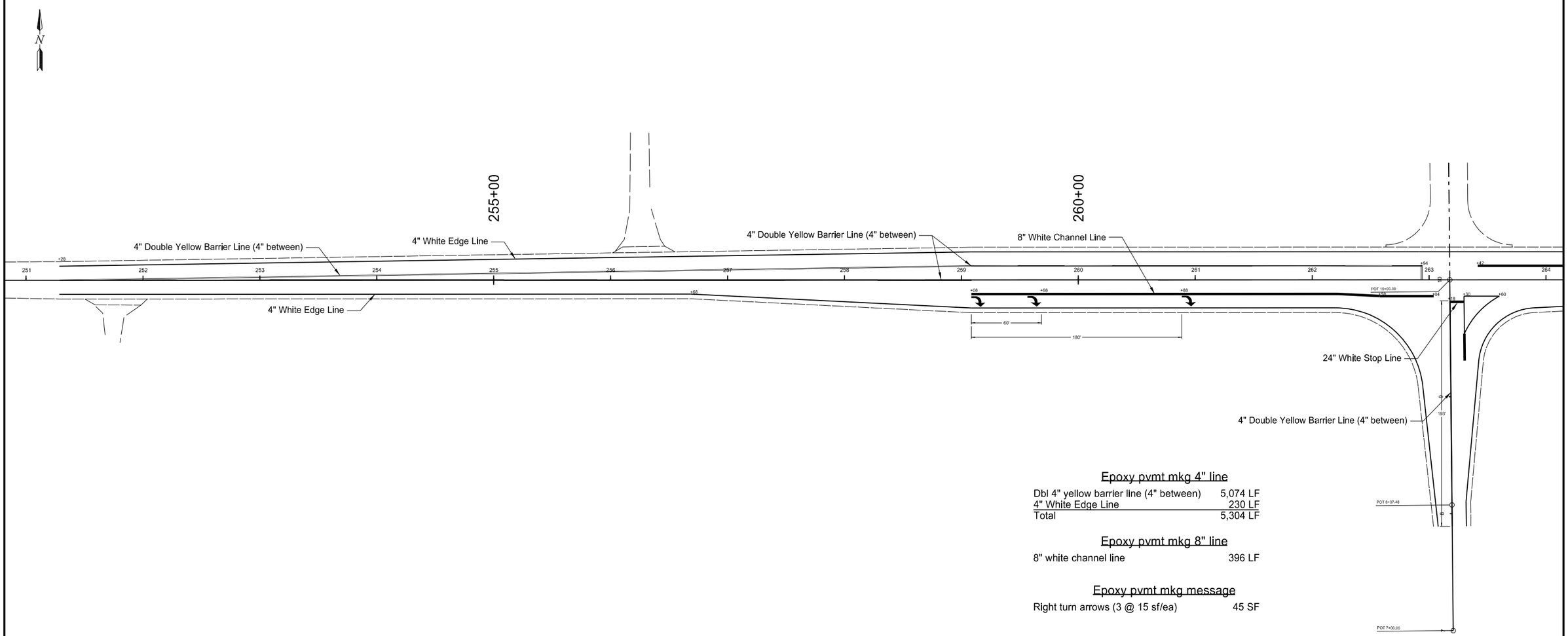
This document was originally issued and sealed by Sarah BaeHurst, Registration Number PE- 6239, on 12/16/13 and the original document is stored at the North Dakota Department of Transportation

WB Left Turn Lane Pavement Marking-Railway Street

Milling and Overaly, ADA Ramps, and Sliver Grading

E Jct ND 32 E to 9 Miles E of Enderlin

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	120	5



Epoxy pvmt mkg 4" line

Dbl 4" yellow barrier line (4" between)	5,074 LF
4" White Edge Line	230 LF
Total	5,304 LF

Epoxy pvmt mkg 8" line

8" white channel line	396 LF

Epoxy pvmt mkg message

Right turn arrows (3 @ 15 sf/ea)	45 SF

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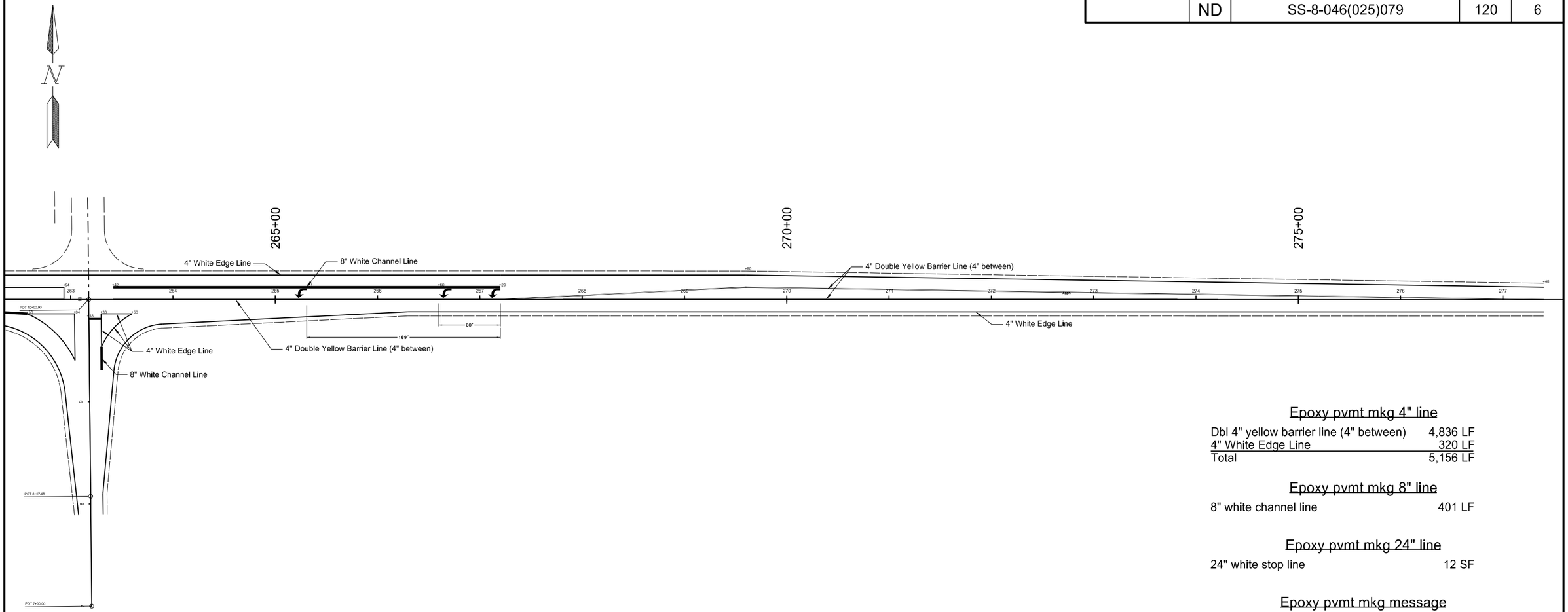
EB Right Turn Lane Pavement Marking-Sunflower Plant

Milling and Overlay, ADA Ramps, and Sliver Grading

E Jct ND 32 E to 9 Miles E of Enderlin

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	120	6



Epoxy pvmt mkg 4" line

Dbl 4" yellow barrier line (4" between)	4,836 LF
4" White Edge Line	320 LF
Total	5,156 LF

Epoxy pvmt mkg 8" line

8" white channel line	401 LF

Epoxy pvmt mkg 24" line

24" white stop line	12 SF

Epoxy pvmt mkg message

Left turn arrows (3 @ 15 sf/ea)	45 SF

This document was originally issued and sealed by Sarah BaeHurst, Registration Number PE- 6239, on 12/16/13 and the original document is stored at the North Dakota Department of Transportation

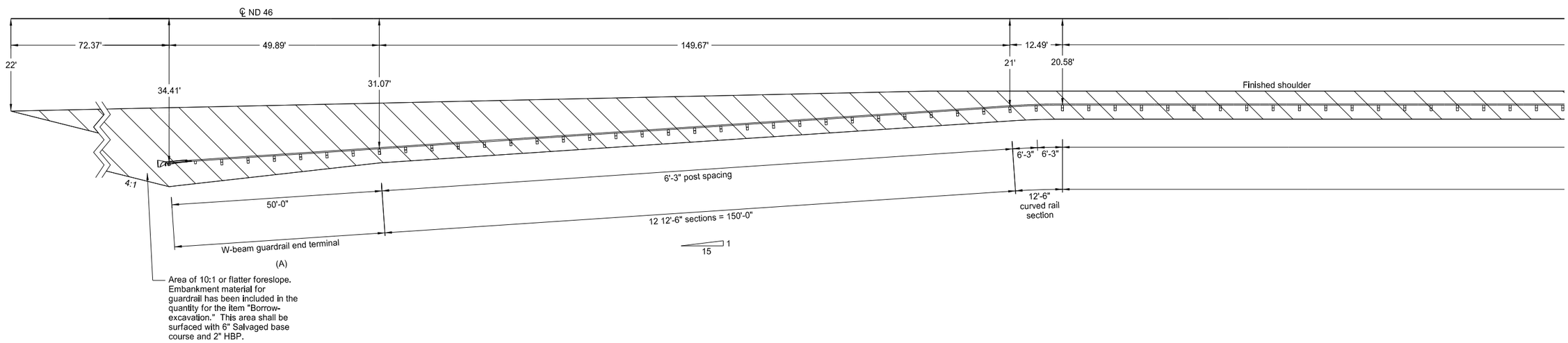
WB Left Turn Lane Pavement Marking-Sunflower Plant

Milling and Overlay, ADA Ramps, and Sliver Grading

E Jct ND 32 E to 9 Miles E of Enderlin

23 USC § 409 Documents
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	130	1



This document was originally issued and sealed by Douglas A. Schumaker, Registration Number PE- 5047, on 12/18/13 and the original document is stored at the North Dakota Department of Transportation

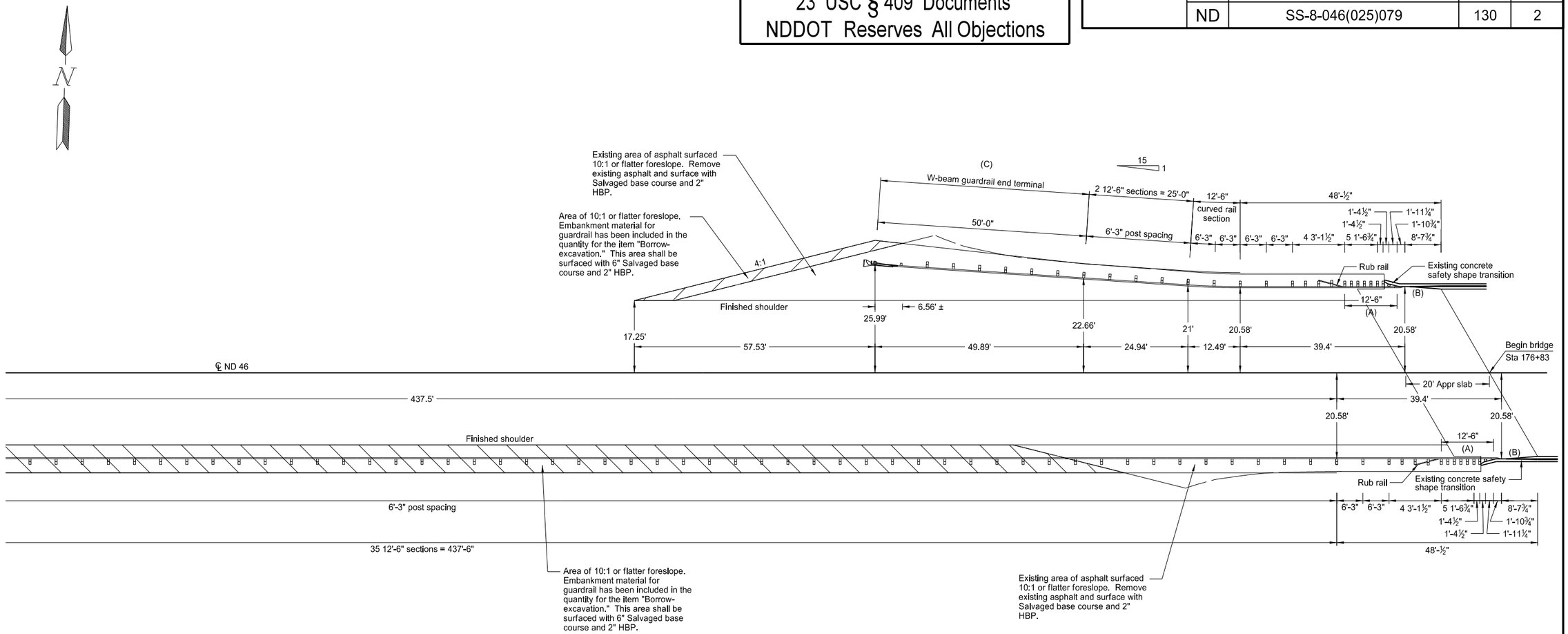
(A) The W-beam guardrail end terminal to be installed at this location shall be either a FLEAT or a Slotted Rail Terminal.

W-Beam Guardrail Layout
At Beginning of Bridge

Soo Line RR Separation
RP 83.310
ND 46
Enderlin, ND

23 USC § 409 Documents
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	130	2



This document was originally issued and sealed by Douglas A. Schumaker, Registration Number PE- 5047, on 12/18/13 and the original document is stored at the North Dakota Department of Transportation

(A) 12'-6" double rail section.

(B) Installation of the guardrail onto the existing safety shape transition requires drilling new bolt holes through the concrete. See Standard D-764-11.

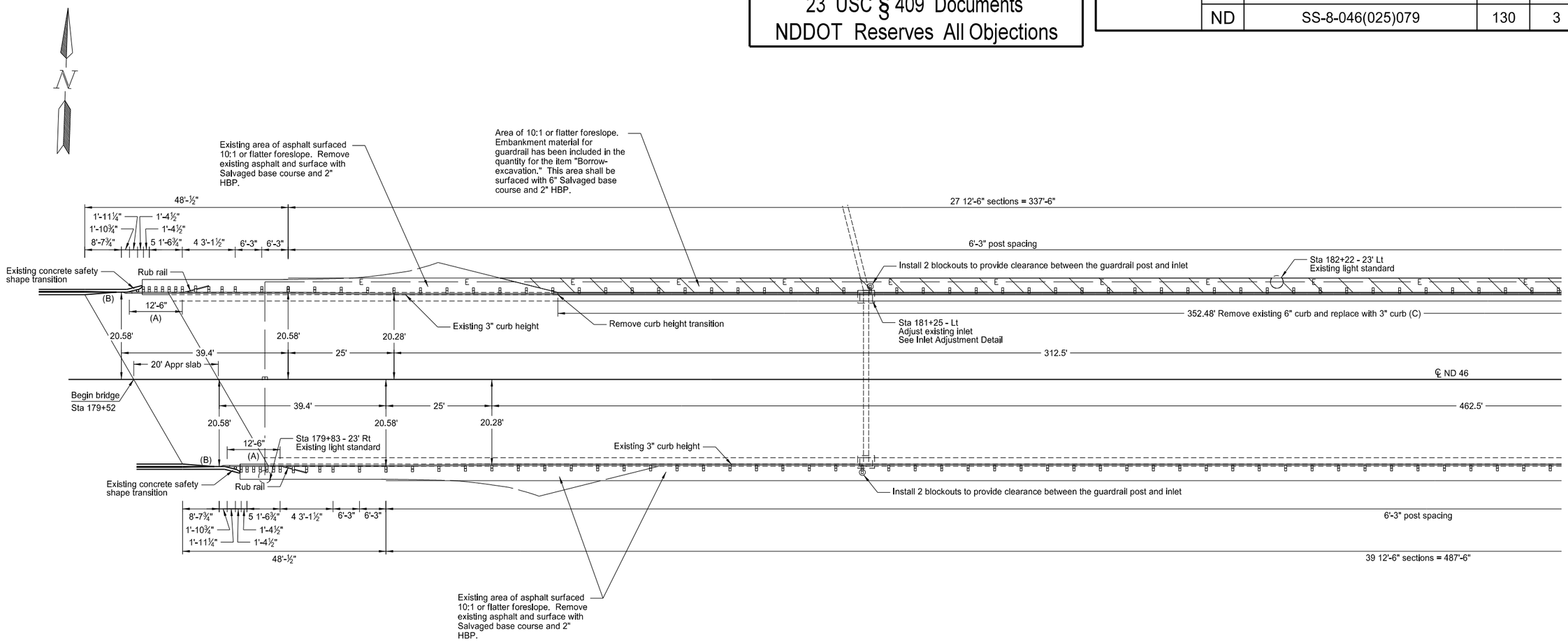
(C) The W-beam guardrail end terminal to be installed at this location shall be a FLEAT.

W-Beam Guardrail Layout
At Beginning of Bridge

Soo Line RR Separation
RP 83.310
ND 46
Enderlin, ND

23 USC § 409 Documents
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	130	3



This document was originally issued and sealed by Douglas A. Schumaker, Registration Number PE- 5047, on 12/18/13 and the original document is stored at the North Dakota Department of Transportation

(A) 12'-6" double rail section.

(B) Installation of the guardrail onto the existing safety shape transition requires drilling new bolt holes through the concrete. See Standard D-764-11.

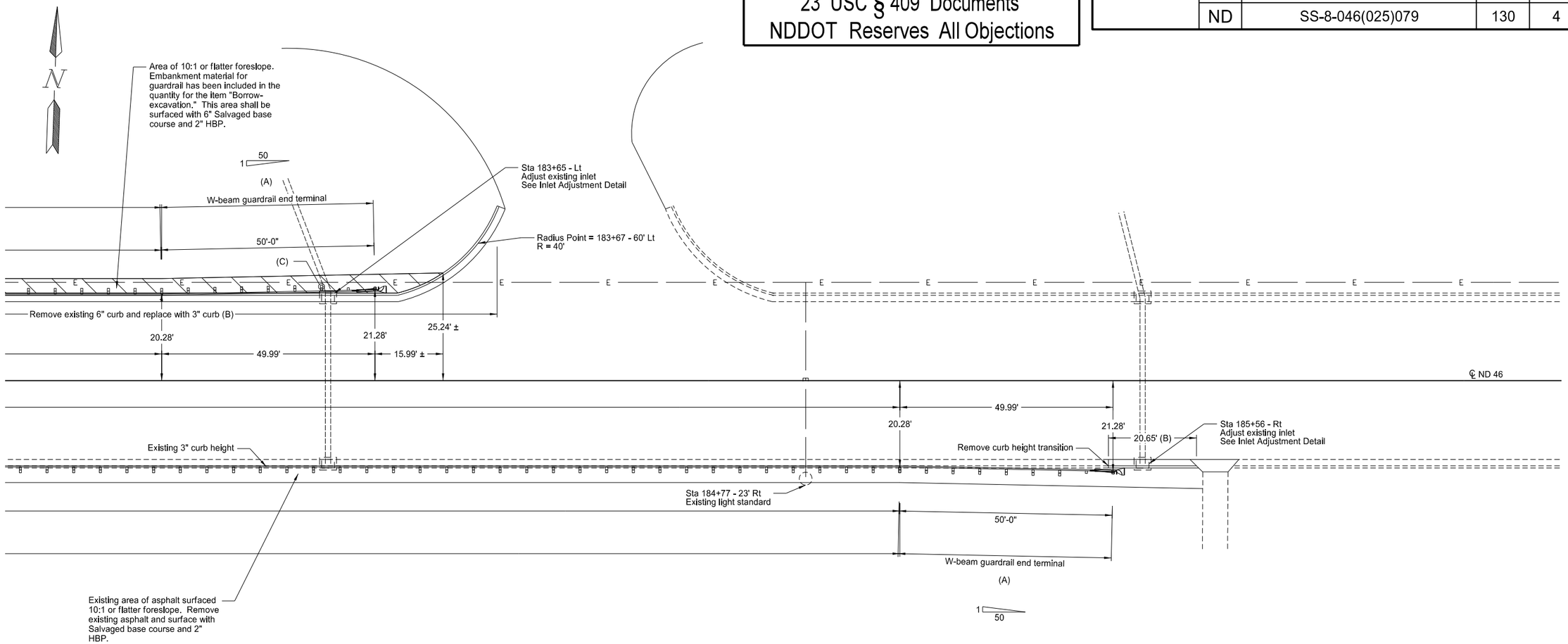
(C) Curb and gutter shall be Type 1 as shown on standard drawing D-748-1 except that the curb shall have a maximum height of 3 inches.

W-Beam Guardrail Layout
At End of Bridge

Soo Line RR Separation
RP 83.310
ND 46
Enderlin, ND

23 USC § 409 Documents
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	130	4



(A) The W-beam guardrail end terminal to be installed at this location shall be either an SKT or a ET-Plus.

(B) Curb and gutter shall be Type 1 as shown on standard drawing D-748-1 except that the curb shall have a maximum height of 3 inches.

(C) This post may need to be moved to install it without interfering with the existing culvert. To move this post the slotted holes at the splice locations, in the 337.5' straight section with 6'-3" post spacing, may be used to shift the location of the preceding posts so that this post moves away from the existing culvert. The distance for clearance shall be distributed evenly over the entire 337.5' length and should not be more than 5".

The estimated clearance without moving the post is 1".

Field verify pipe location.

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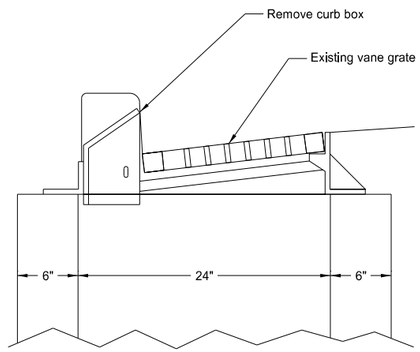
W-Beam Guardrail Layout
At End of Bridge

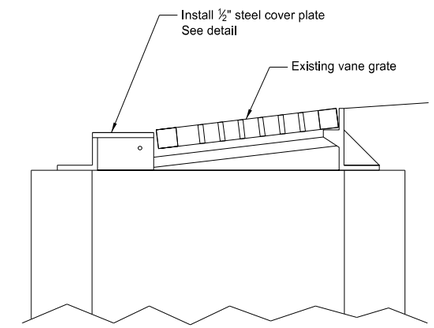
Soo Line RR Separation
RP 83.310
ND 46
Enderlin, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	130	5

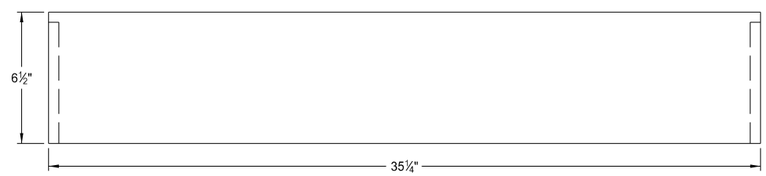
23 USC § 409 Documents
NDDOT Reserves All Objections



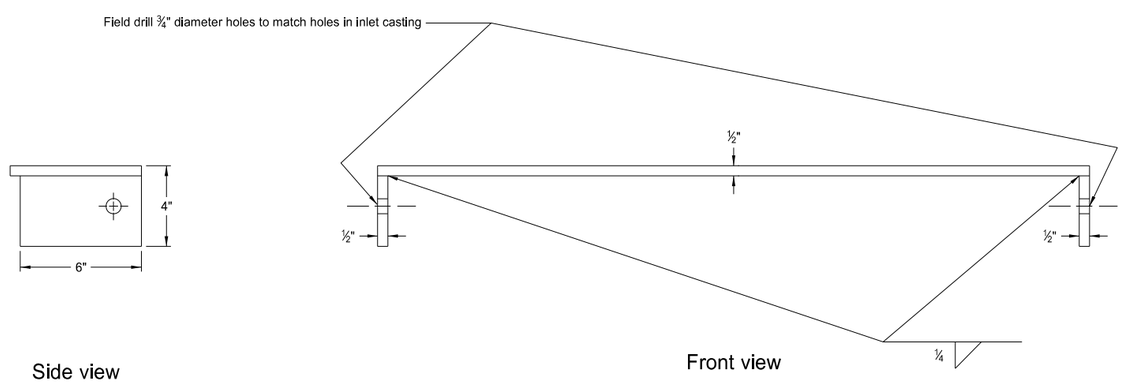
Section showing existing inlet



Section showing modified inlet



Top view



Side view

Front view

Cover Plate Details

Install cover plate using two $1\frac{1}{16}$" dia. X 2½" bolts with lockwashers, washers, and nuts.

Steel used for the cover plates shall conform to AASHTO M 183.

The cover plates shall be galvanized after fabrication in accordance with AASHTO M 111.

Fabrication and installation of the cover plates shall be included in the price bid for the item "Curb & gutter - Type 1 special."

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Inlet Adjustment Detail
At End of Bridge

Soo Line RR Separation
RP 83.310
ND 46
Enderlin, ND

23 USC § 409 Documents
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	130	6

W-BEAM GUARDRAIL SUMMARY OF QUANTITIES

W-BEAM GUARDRAIL AT BRIDGE ENDS WITH EXISTING SAFETY SHAPE TRANSITION

LOCATION	(A) TERM-INAL CONNEC-TOR EACH	(A) 6" ID STD PIPE 12" LONG EACH	(A) 5/8" Ø x 2" LONG GUARD-RAIL BOLT EACH	(A) 7/8"Ø x 10" LONG HEX HEAD BOLT EACH	(A) 5/8" Ø x 18" LONG GUARD-RAIL BOLT EACH	(A) 6"x 8" x 14" WOOD OFF-SET BLOCK EACH	(A) 6"x 8" x 6' TIMBER POST EACH	(A) 5/8" Ø x 1 1/4" LONG GUARD-RAIL BOLT EACH	(A) 12'-6" DOUBLE RAIL SECTION EACH	(A) 12'-6" STRAIGHT RAIL SECTION EACH	(A) 12'-6" CURVED RAIL SECTION EACH	(A) 1/2" Ø x 4" LONG LAG SCREW EACH	(A) 6" x 8" x 7'-0" TIMBER POSTS EACH	(A) 6" x 8" x 23" WOOD OFFSET BLOCK EACH	(A) 5'-3" RUBRAIL SECTION EACH	(A) 15'-7 1/4" RUBRAIL SECTION EACH	(A) 5/8" Ø x 1 ½" LONG HEX HEAD BOLT EACH	(A) 5/8" Ø x 20" LONG GUARD-RAIL BOLT EACH	(A) REFL-ECTOR-IZED PLATES EACH	(A) 5/8" Ø x 26" LONG GUARD-RAIL BOLT EACH	(A) 7" x 7" x ½" RUBRAIL ANCHOR PLATE EACH	(A) 7 3/4" x 4 1/2" x x 3/8" RUBRAIL SPLICE PLATE EACH	(A) 12" x 12 1/2" x 5/8" PLATE EACH	(A) 6"x 9 3/4" x 14" WOOD OFF-SET BLOCK EACH	(A) 5/8" Ø x 20" LONG GUARD-RAIL BOLT EACH
Sta 170+96.51 to 176+85.90 Rt	1	1	1	7	100	93	97	384	1	45	1	1	4	7	1	1	4	7	15		1	1	1	1	1
Sta 175+85.22 to 176+62.05 Lt	1	1	1	7	18	11	15	56	1	4	1	1	4	7	1	1	4	7	7		1	1	1	1	1
Sta 179+72.95 to 184+99.85 Rt	1	1	1	7	89	87	87	344	1	41		1	4	7	1	1	4	7	13	1	1	1	1	1	1
Sta 179+49.10 to 183+26.00 Lt	1	1	1	7	65	60	63	248	1	29		1	4	7	1	1	4	7	10	1	1	1	1	1	1
TOTAL	4	4	4	28	272	251	262	1032	4	119	2	4	16	28	4	4	16	28	45	2	4	4	4	4	4

W-beam guardrail

Sta 170+96.51 to 176+85.90 Rt	589.4	LF
Sta 175+85.22 to 176+62.05 Lt	76.9	LF
Sta 179+72.95 to 184+99.85 Rt	526.9	LF
Sta 179+49.10 to 183+26.00 Lt	376.9	LF
Total	1570.1	LF

Remove W-beam guardrail & posts

Sta 176+35.48 to 176+87.30 Rt	51.9	LF
Sta 175+86.81 to 176+63.62 Lt	76.9	LF
Sta 179+71.38 to 180+35.75 Rt	64.4	LF
Sta 179+47.62 to 179+57.02 Lt	39.4	LF
Total	232.6	LF

Reset W-beam guardrail

Sta 170+46.84 to 170+96.51 Rt	50	LF

Remove end treatment & transtition

Sta 175+98.26 to 176+35.48 Rt	1	ea
Sta 175+50.01 to 175+86.84 Lt	1	ea
Sta 180+35.75 to 180+72.30 Rt	1	ea
Sta 179+87.02 to 180+24.24 Lt	1	ea
Total	4	ea

Borrow - Excavation

Sta 169+24.58 to 175+95.77 Rt	420	CY
Sta 174+77.80 to 175+41.89 Lt	15	CY
Sta 179+88.52 to 183+41.99 Lt	165	CY
Total	600	CY

W-beam guardrail end terminal

Sta 169+96.95 to 170+46.84 Rt	1	ea
Sta 175+35.33 to 175+85.22 Lt	1	ea
Sta 184+99..85 to 185+49.84 Rt	1	ea
Sta 183+26.00 to 183+75.99 Lt	1	ea
Total	4	ea

Remove 3-cable guardrail & posts

Sta 169+52.98 to 176+35.48 Rt	682.5	LF
Sta 180+10.03 to 185+55.78 Rt	545.75	LF
Total	1228.3	LF

Removal of curb & gutter

Sta 180+52.17 to 184+04.65 Lt	362	LF
Sta 185+48.00 to 185+68.65 Rt	21	LF
Total	383	LF

Curb & gutter - type 1 special

Sta 180+52.17 to 184+04.65 Lt	362	LF
Sta 185+48.00 to 185+68.65 Rt	21	LF
Total	383	LF

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

This document was originally issued and sealed by Douglas A. Schumaker, Registration Number PE-5047, on 12/18/13 and the original document is stored at the North Dakota Department of Transportation

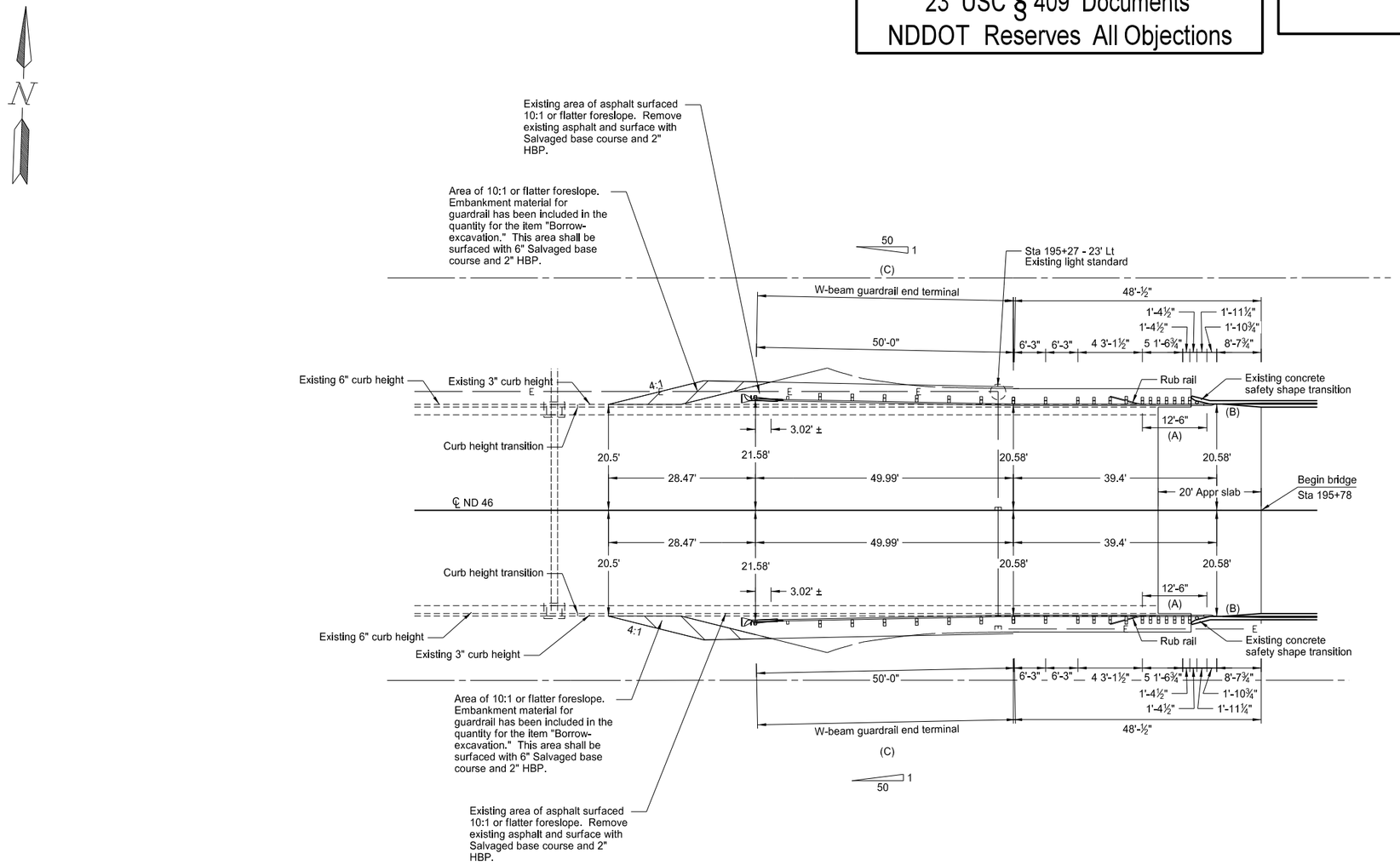
W-Beam Guardrail Quantities

Soo Line RR Separation
RP 83.310
ND 46

Enderlin, ND

23 USC § 409 Documents
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	130	7



This document was originally issued and sealed by Douglas A. Schumaker, Registration Number PE- 5047, on 12/18/13 and the original document is stored at the North Dakota Department of Transportation

(A) 12'-6" double rail section.

(B) Installation of the guardrail onto the existing safety shape transition requires drilling new bolt holes through the concrete. See Standard D-764-11.

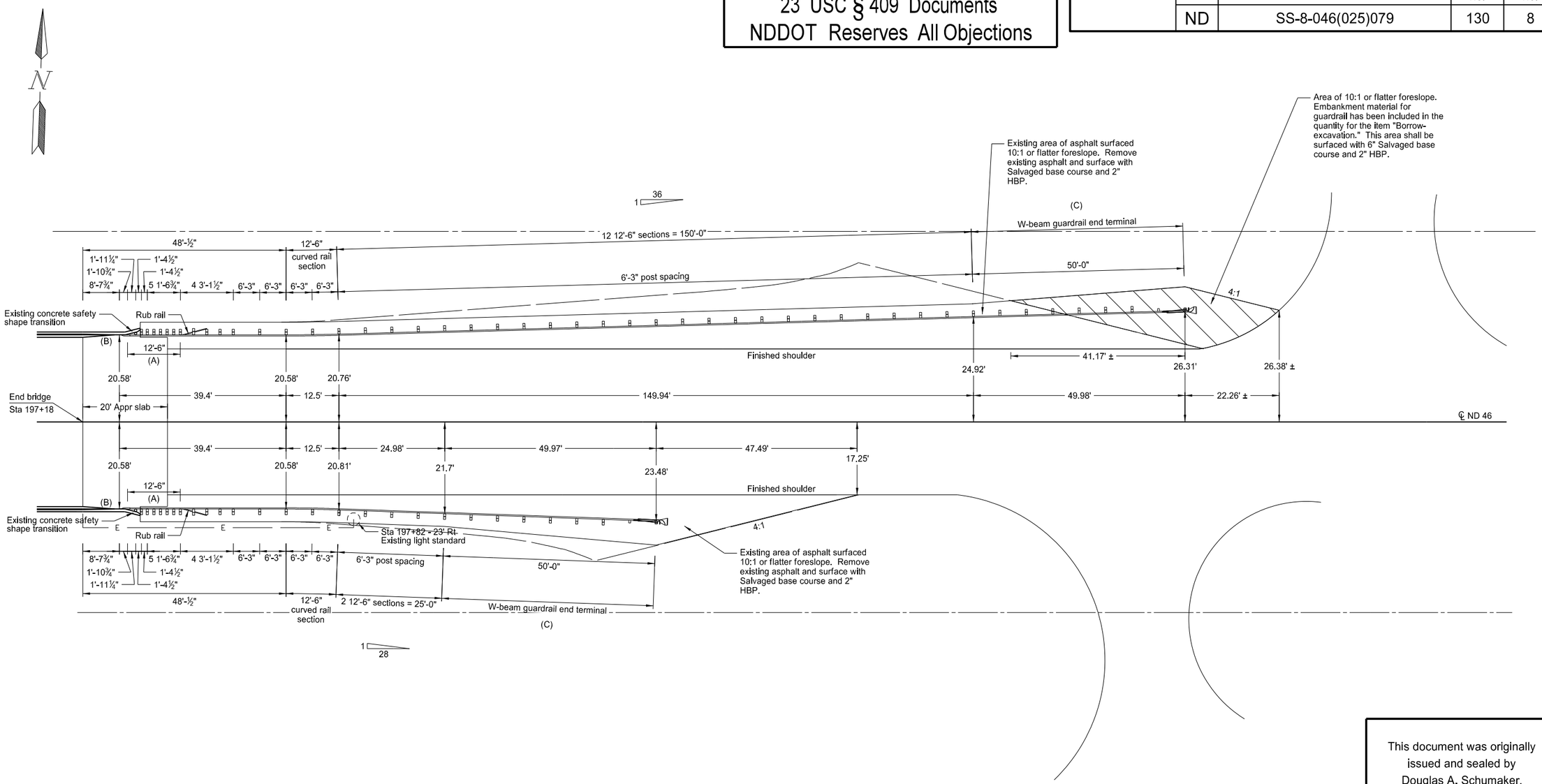
(C) The W-beam guardrail end terminal to be installed at this location shall be either an SKT or a ET-Plus.

W-Beam Guardrail Layout
At Beginning of Bridge

Maple River Bridge
RP 83.657
ND 46
Enderlin, ND

23 USC § 409 Documents
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	130	8



This document was originally issued and sealed by Douglas A. Schumaker, Registration Number PE- 5047, on 12/18/13 and the original document is stored at the North Dakota Department of Transportation

(A) 12'-6" double rail section.

(B) Installation of the guardrail onto the existing safety shape transition requires drilling new bolt holes through the concrete. See Standard D-764-11.

(C) The W-beam guardrail end terminal to be installed at this location shall be either an SKT or a ET-Plus.

W-Beam Guardrail Layout
At End of Bridge

Maple River Bridge
RP 83.657
ND 46
Enderlin, ND

23 USC § 409 Documents
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	130	9

W-BEAM GUARDRAIL SUMMARY OF QUANTITIES

W-BEAM GUARDRAIL AT BRIDGE ENDS WITH EXISTING SAFETY SHAPE TRANSITION

LOCATION	(A) TERM-INAL CONNEC-TOR	(A) 6" ID STD PIPE 12" LONG	(A) 5/8" Ø x 2" LONG GUARD-RAIL BOLT	(A) 7/8"Ø x 10" LONG HEX HEAD BOLT	(A) 5/8" Ø x 18" LONG GUARD-RAIL BOLT	(A) 6"x 8" x 14" WOOD OFF-SET BLOCK	(A) 6"x 8" x 6' TIMBER POST	(A) 5/8" Ø x 1 1/4" LONG GUARD-RAIL BOLT	(A) 12'-6" DOUBLE RAIL SECTION	(A) 12'-6" STRAIGHT RAIL SECTION	(A) 12'-6" CURVED RAIL SECTION	(A) 1/2" Ø x 4" LONG LAG SCREW	(A) 6" x 8" x 7'-0" TIMBER POSTS	(A) 6" x 8" x 23" WOOD OFFSET BLOCK	(A) 5'-3" RUBRAIL SECTION	(A) 15'-7 1/4" RUBRAIL SECTION	(A) 5/8" Ø x 1 ½" LONG HEX HEAD BOLT	(A) 5/8" Ø x 20" LONG GUARD-RAIL BOLT	(A) REFL-ECTOR-IZED PLATES		(A) 7" x 7" x ½" RUBRAIL ANCHOR PLATE	(A) 7 3/4" x 4 1/2" x x 3/8" RUBRAIL SPLICE PLATE	(A) 12" x 12 1/2" x 5/8" PLATE	(A) 6"x 9 3/4" x 14" WOOD OFF-SET BLOCK	(A) 5/8" Ø x 20" LONG GUARD-RAIL BOLT
	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH		EACH	EACH	EACH	EACH	EACH
Sta 195+42.45 to 195+69.35 Rt	1	1	1	7	10	3	7	24	1	1		1	4	7	1	1	4	7	5		1	1	1	1	1
Sta 195+42.45 to 195+69.35 Lt	1	1	1	7	10	3	7	24	1	1		1	4	7	1	1	4	7	5		1	1	1	1	1
Sta 197+26.65 to 197+78.33 Rt	1	1	1	7	14	7	11	40	1	2	1	1	4	7	1	1	4	7	7		1	1	1	1	1
Sta 197+26.65 to 197+78.33 Lt	1	1	1	7	14	7	11	40	1	2	1	1	4	7	1	1	4	7	7		1	1	1	1	1
TOTAL	4	4	4	28	48	20	36	128	4	6	2	4	16	28	4	4	16	28	24		4	4	4	4	4

W-beam guardrail

Sta 195+42.45 to 195+69.35 Rt	26.9	LF
Sta 195+42.45 to 195+69.35 Lt	26.9	LF
Sta 197+26.65 to 197+78.33 Rt	51.9	LF
Sta 197+26.65 to 197+78.33 Lt	51.9	LF
Total	157.6	LF

Remove W-beam guardrail & posts

Sta 195+31.10 to 195+70.50 Rt	39.4	LF
Sta 195+31.10 to 195+70.50 Lt	39.4	LF
Sta 197+25.50 to 198+02.31 Rt	76.9	LF
Sta 197+25.50 to 198+64.64 Lt	139.4	LF
Total	295.1	LF

Reset W-beam guardrail

Sta 195+29.95 to 195+42.45 Rt	12.5	LF
Sta 195+29.95 to 195+42.45 Lt	12.5	LF
Sta 197+78.55 to 198+03.53 Rt	25	LF
Sta 197+78.55 to 199+28.49 Lt	150	LF
Total	200	LF

Remove end treatment & transtition

Sta 194+93.88 to 195+31.10 Rt	1	ea
Sta 194+93.88 to 195+31.10 Lt	1	ea
Sta 198+02.31 to 198+39.11 Rt	1	ea
Sta 198+64.63 to 199+01.43 Lt	1	ea
Total	4	ea

W-beam guardrail end terminal

Sta 194+79.96 to 195+29.95 Rt	1	ea
Sta 194+79.96 to 195+29.95 Lt	1	ea
Sta 198+03.53 to 198+53.50 Rt	1	ea
Sta 199+28.49 to 199+78.47 Lt	1	ea
Total	4	ea

Borrow - Excavation

Sta 194+51.49 to 194+82.98 Rt	11	CY
Sta 194+51.49 to 194+82.98 Lt	5	CY
Sta 199+37.30 to 200+00.73 Lt	41	CY
Total	57	CY

(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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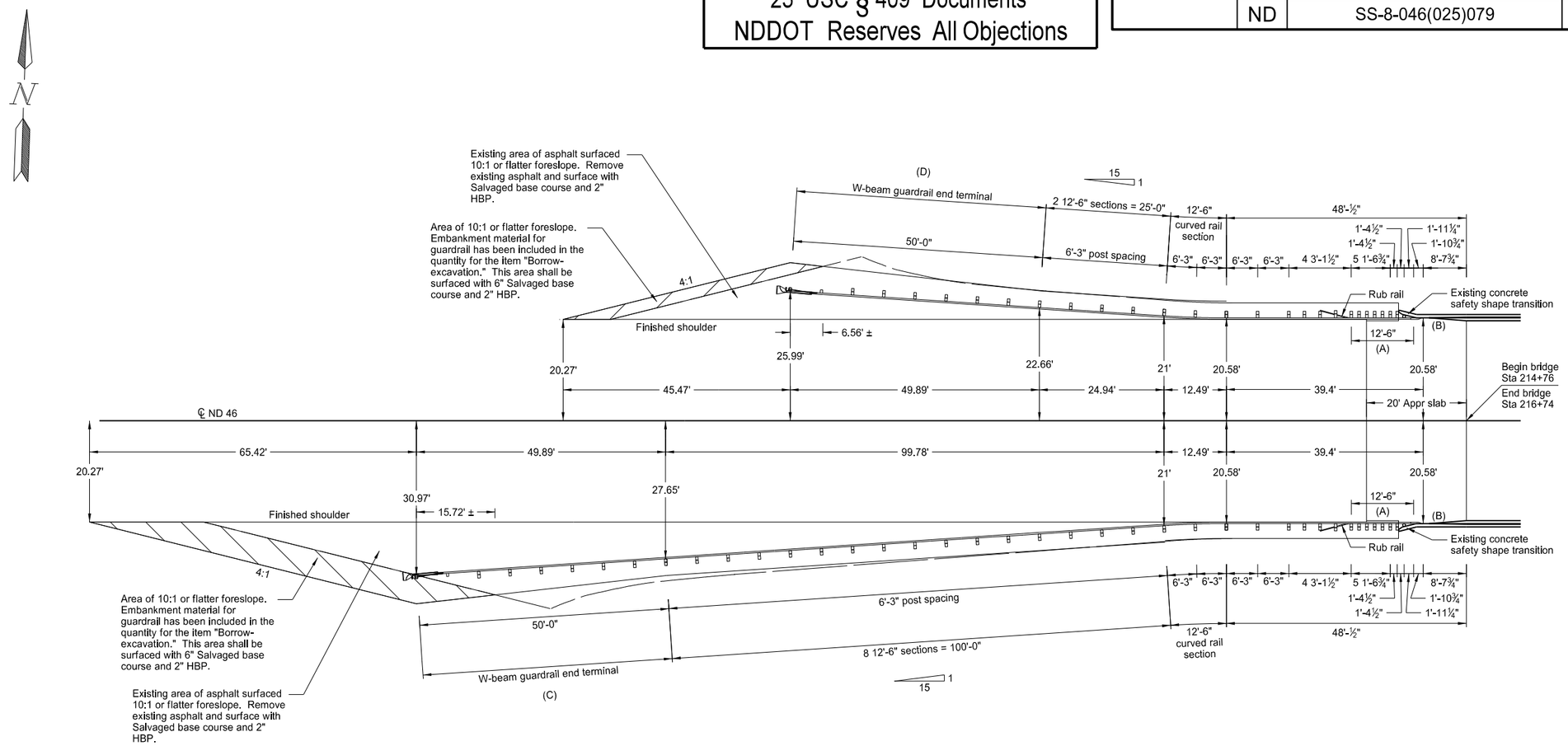
W-Beam Guardrail Quantities

Maple River Bridge
RP 83.657
ND 46

Enderlin, ND

23 USC § 409 Documents
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	130	10



(A) 12'-6" double rail section.

(B) Installation of the guardrail onto the existing safety shape transition requires drilling new bolt holes through the concrete. See Standard D-764-11.

(C) The W-beam guardrail end terminal to be installed at this location shall be either a FLEAT or a Slotted Rail Terminal.

(D) The W-beam guardrail end terminal to be installed at this location shall be a FLEAT.

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W-Beam Guardrail Layout
At Both Ends of Bridge

Maple River Bridge
RP 86.404

ND 46

23 USC § 409 Documents
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	130	11

W-BEAM GUARDRAIL SUMMARY OF QUANTITIES

W-BEAM GUARDRAIL AT BRIDGE ENDS WITH EXISTING SAFETY SHAPE TRANSITION

LOCATION	(A) TERM-INAL CONNEC-TOR	(A) 6" ID STD PIPE 12" LONG	(A) 5/8" Ø x 2" LONG GUARD-RAIL BOLT	(A) 7/8"Ø x 10" LONG HEX HEAD BOLT	(A) 5/8" Ø x 18" LONG GUARD-RAIL BOLT	(A) 6"x 8" x 14" WOOD OFF-SET BLOCK	(A) 6"x 8" x 6' TIMBER POST	(A) 5/8" Ø x 1 1/4" LONG GUARD-RAIL BOLT	(A) 12'-6" DOUBLE RAIL SECTION	(A) 12'-6" STRAIGHT RAIL SECTION	(A) 12'-6" CURVED RAIL SECTION	(A) 1/2" Ø x 4" LONG LAG SCREW	(A) 6" x 8" x 7'-0" TIMBER POSTS	(A) 6" x 8" x 23" WOOD OFFSET BLOCK	(A) 5'-3" RUBRAIL SECTION	(A) 15'-7 1/4" RUBRAIL SECTION	(A) 5/8" Ø x 1 ½" LONG HEX HEAD BOLT	(A) 5/8" Ø x 20" LONG GUARD-RAIL BOLT	(A) REFL-ECTOR-IZED PLATES		(A) 7" x 7" x ½" RUBRAIL ANCHOR PLATE	(A) 7 3/4" x 4 1/2" x x 3/8" RUBRAIL SPLICE PLATE	(A) 12" x 12 1/2" x 5/8" PLATE	(A) 6"x 9 3/4" x 14" WOOD OFF-SET BLOCK	(A) 5/8" Ø x 20" LONG GUARD-RAIL BOLT
	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH		EACH	EACH	EACH	EACH	EACH
Sta 214+15.46 to 214+27.95 Rt					3	3	3	16			1								9						
Sta 214+40.45 to 214+67.36 Rt	1	1	1	7	10	3	7	24	1	1		1	4	7	1	1	4	7	1		1	1	1	1	1
Sta 214+15.46 to 214+27.95 Lt					3	3	3	16			1								6						
Sta 214+40.45 to 214+67.36 Lt	1	1	1	7	10	3	7	24	1	1		1	4	7	1	1	4	7	1		1	1	1	1	1
Sta 217+22.05 to 217+34.54 Rt	1	1	1	7	10	3	7	24	1	1		1	4	7	1	1	4	7	1		1	1	1	1	1
Sta 216+82.65 to 217+09.55 Rt					3	3	3	16			1								6						
Sta 217+22.05 to 217+34.54 Lt	1	1	1	7	10	3	7	24	1	1		1	4	7	1	1	4	7	1		1	1	1	1	1
Sta 216+82.65 to 217+09.55 Lt					3	3	3	16			1								9						
TOTAL	4	4	4	28	52	24	40	160	4	4	4	4	16	28	4	4	16	28	34		4	4	4	4	4

W-beam guardrail

Sta 214+15.46 to 214+27.95 Rt	12.5	LF
Sta 214+40.45 to 214+67.36 Rt	26.9	LF
Sta 214+15.46 to 214+27.95 Lt	12.5	LF
Sta 214+40.45 to 214+67.36 Lt	26.9	LF
Sta 217+22.05 to 217+34.54 Rt	26.9	LF
Sta 216+82.65 to 217+09.55 Rt	12.5	LF
Sta 217+22.05 to 217+34.54 Lt	26.9	LF
Sta 216+82.65 to 217+09.55 Lt	12.5	LF
Total	157.6	LF

Remove W-beam guardrail & posts

Sta 213+29.37 to 214+68.50 Rt	139.4	LF
Sta 213+91.69 to 214+68.50 Lt	76.9	LF
Sta 216+81.50 to 217+58.31 Rt	76.9	LF
Sta 216+81.50 to 218+20.63 Lt	139.4	LF
Total	432.6	LF

Remove end treatment & transtition

Sta 212+92.57 to 213+29.37 Rt	1	ea
Sta 213+54.89 to 213+91.69 Lt	1	ea
Sta 217+58.31 to 217+95.11 Rt	1	ea
Sta 218+20.63 to 218+57.43 Lt	1	ea
Total	4	ea

Borrow - Excavation

Sta 212+04.94 to 212+81.51 Rt	56	CY
Sta 212+79.78 to 213+47.19 Lt	17	CY
Sta 218+02.81 to 218+70.22 Rt	35	CY
Sta 218+68.49 to 219+45.06 Lt	98	CY
Total	206	CY

W-beam guardrail end terminal

Sta 212+65.79 to 213+15.68 Rt	1	ea
Sta 213+40.63 to 213+90.52 Lt	1	ea
Sta 217+59.48 to 218+09.37 Rt	1	ea
Sta 218+34.32 to 218+84.21 Lt	1	ea
Total	4	ea

Reset W-beam guardrail

Sta 213+15.68 to 214+15.46 Rt	100	LF
Sta 214+27.95 to 214+40.45 Rt	12.5	LF
Sta 213+90.52 to 214+15.46 Lt	25	LF
Sta 214+27.95 to 214+40.45 Lt	12.5	LF
Sta 217+09.55 to 217+22.05 Rt	12.5	LF
Sta 217+34.54 to 217+59.48 Rt	25	LF
Sta 217+09.55 to 217+22.05 Lt	12.5	LF
Sta 217+34.54 to 218+34.32 Lt	100	LF
Total	300	LF

(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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W-Beam Guardrail Quantities

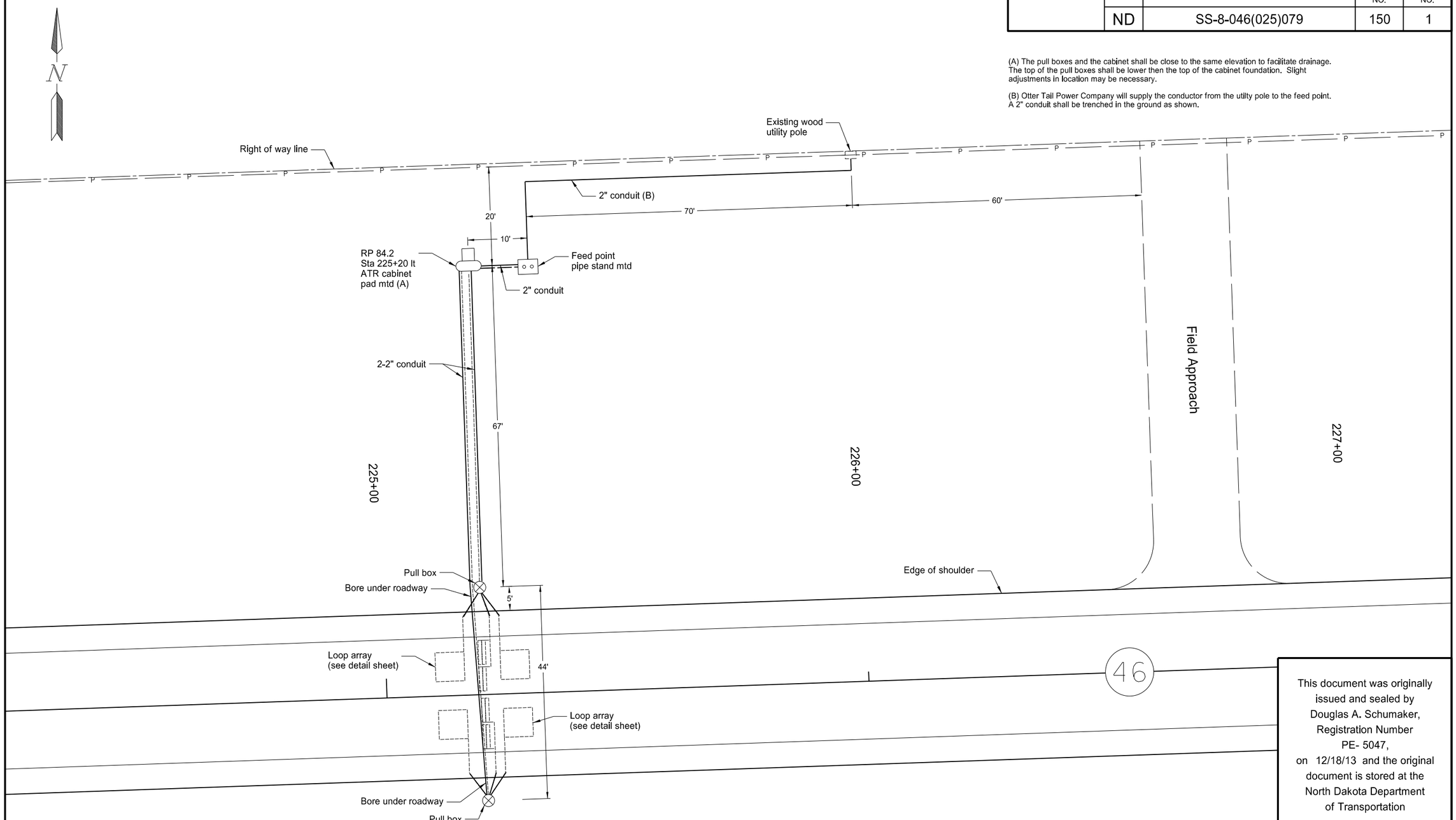
Maple River Bridge
RP 86.404

ND 46

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	150	1

(A) The pull boxes and the cabinet shall be close to the same elevation to facilitate drainage. The top of the pull boxes shall be lower then the top of the cabinet foundation. Slight adjustments in location may be necessary.

(B) Otter Tail Power Company will supply the conductor from the utilty pole to the feed point. A 2" conduit shall be trenched in the ground as shown.



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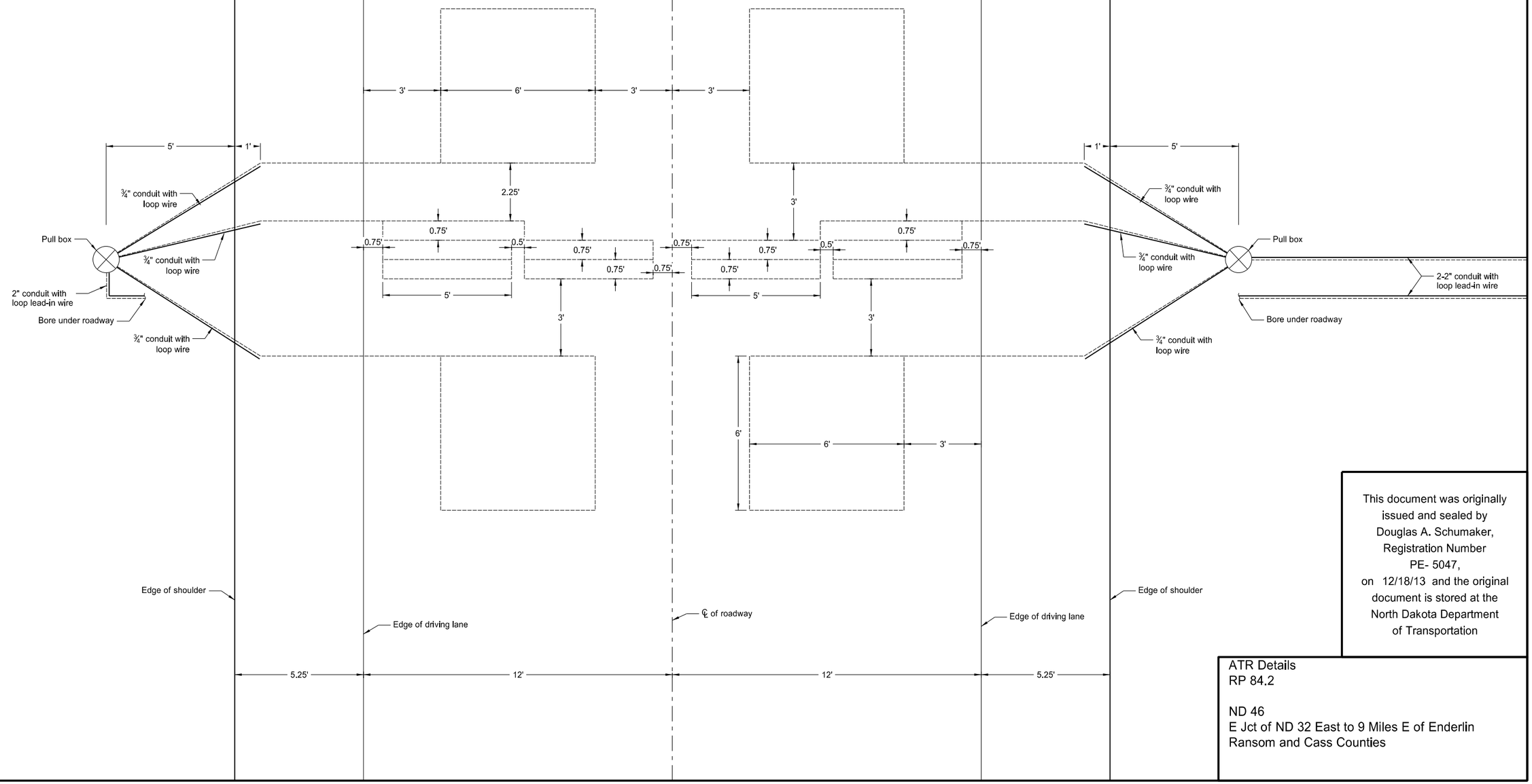
ATR Layout
RP 84.2

ND 46
E Jct of ND 32 East to 9 Miles E of Enderlin
Ransom and Cass Counties

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	150	2



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ATR Details
RP 84.2

ND 46
E Jct of ND 32 East to 9 Miles E of Enderlin
Ransom and Cass Counties

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	150	3

Quantities (A)		
Pull Box (Polymer Concrete)	EA	2
Underground Conductor No 4 Type RHW (B)	LF	60
Underground Conductor No 6 Type THW (B)	LF	30
Shielded Twisted Pair Loop Lead-In Wire 14 AWG XHHW	LF	832
Conductor Loop Wire 14 AWG XHHW (C)	LF	981
Saw Slot and Sealant for Loops	LF	227
3/4 Inch Diameter Rigid HDPE conduit	LF	42
2 Inch Diameter Rigid HDPE conduit (D)	LF	384
NEMA Type 3R Cabinet	EA	1
Concrete ATR Cabinet Foundation with working slab	EA	1
4G Cellular Modem with all necessary cabling including ethernet and power cables	EA	1
PEEK Traffic Recorder ADR 6000 with all necessary cabling	EA	1
6 Unit Power Strip	EA	1
Surge Protector	EA	1
Feed Point-pipe stand mounted including switch box, meter trim, 2" perf. tube, and concrete slab	EA	1
Vehicle Classification and Testing	EA	1
PEEK Representative	EA	1

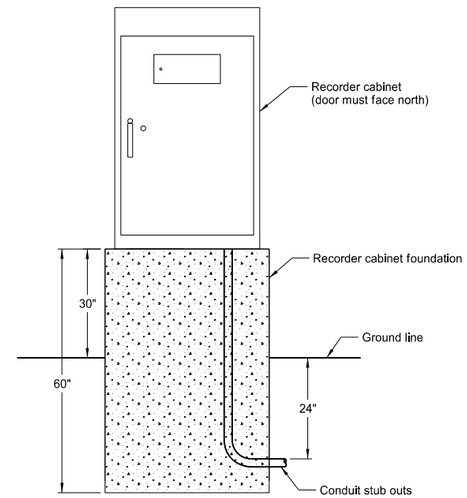
Automatic Traffic Recorder System	EA	1

(A) These quantities shall be included in the price bid for the item "Automatic Traffic Recorder System".

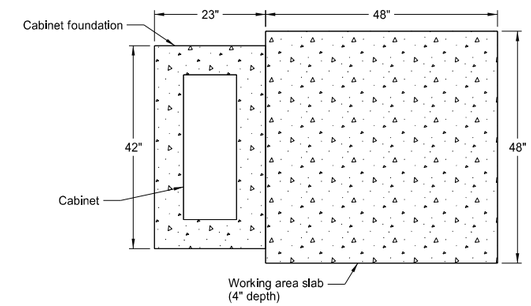
(B) 2 No 4 and 1 No 6 conductors are provided to extend from the ATR cabinet to the feed point.
Otter Tail Power Company shall supply the conductor from the feed point to the utility pole.

(C) The Entrance and Exit loops shall be 6'x6' with 4 turns of conductor per loop.
The Inner Axle loops shall be 1.5'x5' Quadrapol with 3 turns of conductor.

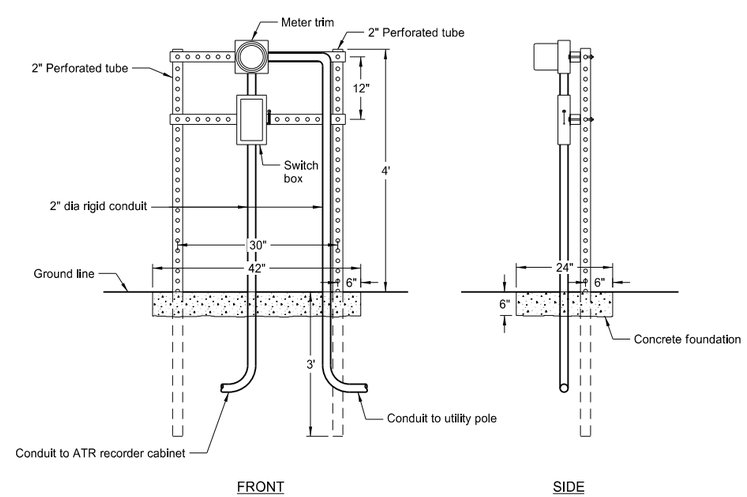
(D) An extra 20 ft of conduit stub out is provided for future use. Both ends shall be capped.



ATR Recorder Cabinet
with Concrete Foundation



Cabinet Foundation
and Working Slab



Feed Point Detail
with Concrete Foundation

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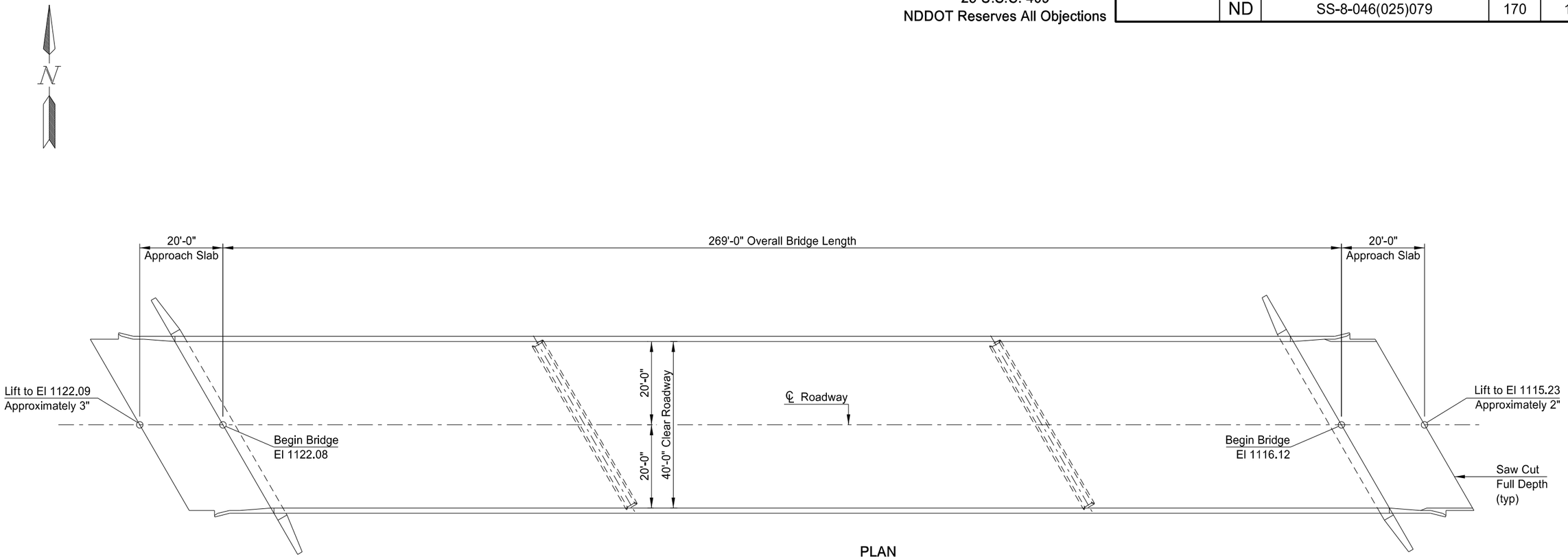
ATR Details
RP 84.2

ND 46
E Jct of ND 32 East to 9 Miles E of Enderlin
Ransom and Cass Counties

23 U.S.C. 409
NDDOT Reserves All Objections

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	170	1



PLAN

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
930	3631	POLYURETHANE FOAM	LBS	2,500

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NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
SOO LINE RAILROAD SEPERATION
ENDERLIN

BRIDGE LAYOUT

PROJECT: SS-8-046(025)079

RANSOM COUNTY

12/16/2013 — Terrence R. Udland
DATE — BRIDGE ENGINEER

NOTES

100 SCOPE OF WORK: Work at this site consists of lifting and leveling bridge approach slabs.

930 POLYURETHANE FOAM: This work shall consist of lifting and leveling the existing concrete bridge approach panels by a polyurethane foam system. Lifting and leveling of the concrete panels shall be performed by drilling injection holes, injecting polymer, verifying elevations to control lift of panel and cleanup as approved by the Project Engineer.

The medium used to lift and level the approach slabs shall be a water blown high-density polyurethane. The material shall be hydrophobic. The high density, closed cell, polyurethane system shall exhibit the following physical characteristics and properties:

Density, Lb/Cu Ft (ASTM 1622)	Compressive Strength (ASTM 1621)
3.0	40 psi
3.5	50 psi
4.0	60 psi
6.0	110 psi

The polyurethane foam system will have a free-rise density of 3.0 – 3.2 lb/ft^3, with a minimum compressive strength of 40 psi. The expansion of the polyurethane foam under pressure increases the foam density above the original free rise density value.

The high density formulation shall reach 90% of full compressive strength within 15 minutes of injection, at which time the Contractor may allow traffic on the treated areas, as approved by the Project Engineer.

The Contractor shall submit, to the Project Engineer, manufacturer's certification stating that all materials and methods meet requirements. The Contractor shall also submit all warranties and guarantees, which shall be transferred to the Department upon acceptance by the Project Engineer.

A list of the lifting and undersealing equipment shall be submitted to the Project Engineer for review. The minimum list of equipment required shall be as listed below. This list shall not preclude the use of additional equipment.

a. A pneumatic drill and an electric drill capable of drilling 5/8-inch diameter holes to the required depths.

b. A truck-mounted pumping unit capable of injecting the high-density polyurethane formulation between the concrete pavement and the underlying surface. The pumping unit shall be equipped with a dial gauge in increments of 45 grams (1/10 pound), and shall be capable of controlling the rate of flow of the material as well as of the rise of the pavement.

c. A laser leveling unit it ensure that the concrete is raised to an even plane and to the required elevations.

All equipment provided by the Contractor shall be in excellent condition and kept clean at all times. All stored materials shall be sealed and protected from contamination of dust or any foreign material.

The Contractor shall have prior experience using high-density polyurethane to raise and underseal concrete slabs.

A series of 5/8 inch holes shall be drilled at the locations required for the proper raising of the surface. The exact locations and spacing shall be determined by the Contractor. The pumping unit shall be calibrated daily, or at the Project Engineer's request, to ensure consistent accuracy of injected material.

The high density polyurethane formulation is injected under the slab. The amount of rise shall be controlled, using the pumping unit, by regulating the rate of injection of the raising/undersealing polymer. When the nozzle is removed from the hole, any excessive polyurethane material shall be removed from the area and the hole sealed with a nonexpansive cementitious grout. All removed material shall be disposed of in an environmentally acceptable manner conforming to Federal, State and local regulations. Final elevations shall be within ¼" of the elevations proposed by profile. A tight string line may be used to monitor and verify elevations for slab lengths of 50 foot or less. For longer sections, a laser level will be used to monitor and verify elevations. The Contractor shall be responsible for any pavement blowouts or excessive pavement lifting which may result from the process and shall repair the damaged area to the satisfaction of the Project Engineer without additional cost.

The slab shall not be raised more than ¼ inch while pumping in any one hole at any one time. Pavement raised above specified tolerances shall be brought to grade by grinding. If over jacking is greater than 0.10 foot, full-depth removal and replacement of the affected area shall be required, at no cost to the Owner.

The price bid for the item "Polyurethane Foam" shall include full compensation for furnishing all labor, supervision, materials tools, equipment, and incidentals for all work called for in this note. Daily material usage shall be verified by the Inspector and the Contractor and reported on a field production report.

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	180	1

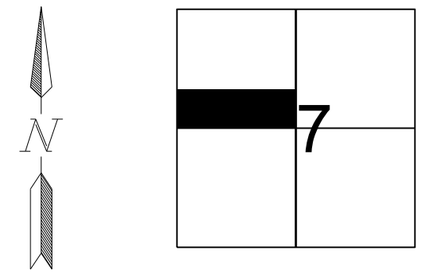
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

TEST HOLE PLAT

Location: NW1/4 7-133-54 County: Ransom

Ownership: Dean & Susan Heitkamp

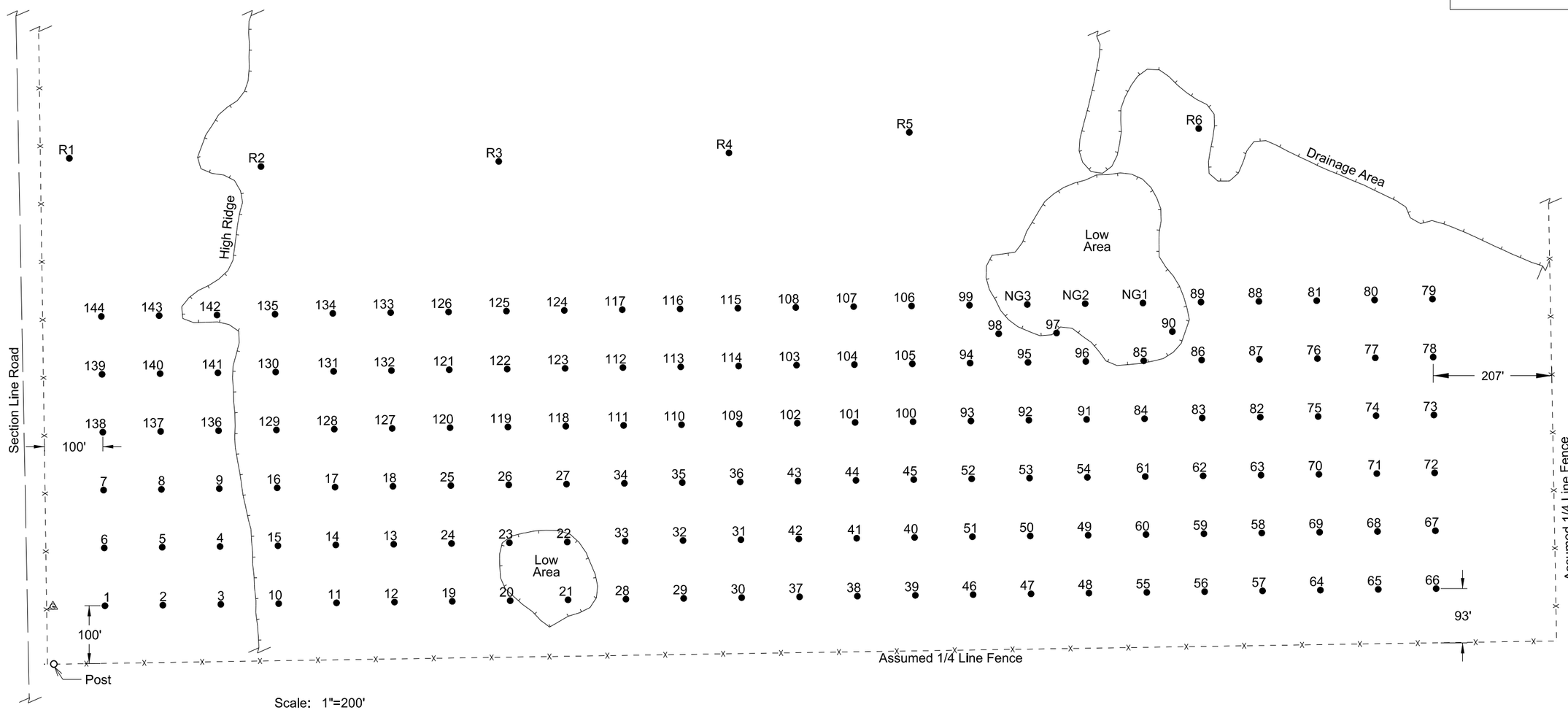
LOCATION OF PIT IN SECTION



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 55-63
Area "H" consists of Test Holes 64-72
Area "I" consists of Test Holes 73-81
Area "J" consists of Test Holes 82-90
Area "K" consists of Test Holes 91-99
Area "L" consists of Test Holes 100-108
Area "M" consists of Test Holes 109-117
Area "N" consists of Test Holes 118-126
Area "O" consists of Test Holes 127-135
Area "P" consists of Test Holes 136-144

*NOTE: Gates must remain closed at all times, or a gate guard must be present when gate is open, or a cattle guard must be in place.

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



Scale: 1"=200'

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	**SS-8-046(025)079**	**180**	**2**

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
1	1.0	1.0 sd sh	0	0	5	15	Si Cl
		2.0 FS sh					
		1.0 Fgr sh					
		2.0 gr sh					
		1.0 gr Si Cl					
		2.0 gr sh Si Cl					
		5.0 sd sh					
		1.0 sd Si Cl					
2	0.5	1.5 gr sh Si Cl	0	0	8	26	+
		5.0 sd sh					
		10.0 Fgr sh					
		1.0 sd sh					
		1.0 gr					
		1.0 gr sh					
3	1.0	1.0 Fgr Si Cl	0	0	9	22	+
		4.0 sd sh					
		1.0 CS sh					
		2.0 sd sh					
		1.0 Fgr sh					
		1.0 gr sh					
		4.0 Fgr sh					
		2.0 sd sh					
		3.0 gr sh					
4	1.0	1.0 gr sh Si Cl	0	2	9	24	+
		1.0 sd					
		4.0 sd sh					
		2.0 Fgr sh					
		1.0 gr sh					
		4.0 Fgr sh					
		3.5 gr sh					
		2.5 FS sh					
5	1.0	4.0 sd sh	0	3	10	22	+
		1.0 CS sh					
		1.0 sd sh					
		4.0 gr					
		2.0 gr sh					
		1.0 Fgr sh					
		2.0 gr					
		4.0 sd sh					
6	1.0	1.0 sd sh Si Cl	0	3	10	25	FS Si Cl
		1.0 sd sh					
		2.0 sd					
		2.0 CS sh					
		2.0 Fgr sh					
		1.0 CS sh					
		5.0 sd sh					
		2.0 gr sh					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
7	2.0	1.0 sd sh	0	3	12	27	Si Cl
		2.0 Fgr sh					
		6.0 gr sh					
		3.0 Fgr sh					
		2.0 sd sh					
8	1.0	2.0 Fgr sh Si Cl	0	0	5	13	+
		4.0 sd sh					
		5.0 FS sh					
		2.0 Fgr sh					
		6.0 FS sh					
9	1.0	1.0 gr Si Cl	0	0	6	21	+
		1.0 Fgr Si Cl					
		1.0 gr					
		1.0 Fgr					
		2.0 sd sh					
		1.0 CS sh					
		3.0 sd sh					
		2.0 Fgr sh					
		1.0 sd					
		2.0 CS					
		4.0 Fgr					
10	4.0	4.0 FS Si Cl	0	4	12	24	+WL 19.0
		2.0 Fgr sh Si Cl					
		3.0 Fgr sh					
		1.0 sd sh					
		1.0 Fgr sh					
		4.0 gr sh					
11	2.0	1.0 FS Si Cl	0	3	9	20	+WL 14.0
		3.0 sd sh					
		2.0 FS sh					
		2.0 sd sh					
		4.0 gr sh					
12	1.0	3.0 sd sh	0	5	16	32	+WL 18.0
		2.0 Fgr					
		2.0 FS sh					
		1.0 sd sh					
		1.0 FS sh					
		4.0 gr sh					
		1.0 Fgr sh					
13	1.0	1.0 sd sh	0	5	13	26	+WL 18.0
		1.0 Fgr sh					
		3.0 gr sh					
		2.0 sd sh					
		1.0 FS sh					
		1.0 sd sh					
		1.0 gr					
		2.0 Fgr sh					
		5.0 gr sh					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
14	2.0	3.0 sd Si Cl	0	2	9	24	+WL 15.5
		3.0 sd sh					
		1.0 sd					
		4.0 Fgr sh					
		1.0 gr sh					
		1.5 Fgr sh					
15	3.0	3.0 FS Si Cl	0	4	11	25	+WL 16.5
		3.0 sd sh					
		5.0 gr sh					
		2.5 Fgr sh					
16	3.0	5.0 FS Si Cl	0	2	11	25	+WL 16.0
		1.0 Fgr					
		2.0 sd sh					
		3.0 Fgr sh					
		2.0 gr sh Si Cl					
17	2.0	1.0 sd Si Cl	0	2	13	25	Si Cl
		1.0 sd sh					
		3.0 sd sh Si Cl					
		3.0 sd sh					
		1.0 Fgr sh					
		1.0 gr sh					
		3.0 gr Si Cl					
18	1.0	2.0 Fgr sh Si Cl	0	6	19	35	Si Cl
		1.0 sd sh					
		1.0 gr sh Si Cl					
		3.0 sd sh					
		1.0 gr sh					
		3.0 Fgr sh					
		1.0 gr sh					
		2.0 Fgr sh					
19	1.5	0.5 sd sh	0	6	24	50	+Cave
		1.0 Fgr sh					
		6.0 gr Si Cl					
		3.0 gr sh					
		4.0 gr					
		1.0 gr Si Cl					
		2.0 gr sh					
20	2.0	2.0 gr sh Si Cl	0	9	27	49	+Cave
		1.0 Fgr					
		2.0 gr sh Si Cl					
		3.0 Fgr sh Si Cl					
		3.0 Fgr					
		2.0 gr sh					
		2.0 sd sh					
21	3.0	3.0 gr Si Cl	0	10	27	45	+WL 11.0
		4.0 gr sh					
		1.0 gr Si Cl					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	
22	1.5	1.5 gr sh Si Cl	1	12	24	36	+WL 18.0
		3.0 gr Si Cl					
		2.0 gr sh					
		1.0 gr sh Si Cl					
		1.0 sd sh					
		3.0 sd sh					
		2.0 Fgr sh					
		3.0 sd sh					
23	2.0	7.0 gr sh Si Cl	0	5	16	27	+WL 19.0
		1.0 gr sh					
		1.0 Fgr sh					
		1.0 sd sh					
		7.0 FS sh					
24	2.0	2.0 gr Si Cl	0	7	23	45	+
		5.0 Fgr sh Si Cl					
		1.0 CS					
		3.0 gr sh					
		1.0 Fgr					
		1.0 Fgr sh					
		1.0 sd sh					
		4.0 gr sh					
25	2.0	5.0 gr sh Si Cl	0	2	10	24	Si Cl
		1.0 sd sh					
		2.0 FS sh					
		1.0 sh					
		2.0 sd sh					
		2.0 gr sh					
		2.0 sd sh					
		2.0 Fgr sh					
26	1.0	1.0 sd Si Cl	0	6	18	30	+
		4.0 gr Si Cl					
		1.0 Fgr sh Si Cl					
		3.0 gr sh Si Cl					
		4.0 sd sh					
		2.0 sh					
		2.0 sd sh					
		2.0 sd sh					

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PROSPECTED BY Volk / Nelson

INSPECTED & APPROVED B. Hoesel Sep-13

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	**SS-8-046(025)079**	**180**	**3**

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
27	1.0	3.0 gr Si Cl	0	4	13	22	+
		4.0 gr sh					
		1.0 Fgr sh Si Cl					
		2.0 Fgr sh					
		4.0 sd sh					
		1.0 FS sh					
		4.0 sd sh					
28	1.5	2.5 gr sh Si Cl	1	6	17	27	+
		2.0 gr sh					
		6.0 Fgr sh					
		1.0 sd sh					
		6.0 sd sh					
		1.0 gr sh					
29	1.5	1.5 sd sh	0	2	13	28	+
		2.0 gr sh					
		3.0 gr sh Si Cl					
		2.0 gr sh					
		1.0 gr sh Si Cl					
		1.0 gr sh					
		1.0 sd sh					
		3.0 FS sh					
		1.0 sd sh					
		3.0 Fgr sh					
30	2.0	2.0 sd sh	0	1	7	15	Si Cl
		4.0 gr sh					
		6.0 sd sh					
		4.5 sd					
31	1.5	1.5 sd sh	0	8	15	22	+
		1.0 gr sh					
		2.0 gr Si Cl					
		2.0 gr sh					
		2.0 sd sh					
		1.0 gr sh					
		1.0 Fgr sh					
		5.0 FS sh					
		1.0 Fgr sh					
		1.0 sh					
		1.0 Fgr sh					
32	1.5	1.0 sd sh	0	7	16	30	+
		1.5 gr Si Cl					
		4.0 gr sh					
		5.0 Fgr sh					
		1.0 CS sh					
		2.0 sd sh					
		3.0 sd					
		1.0 Fgr sh					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
33	1.0	1.0 Fgr sh	0	5	17	29	+
		1.0 gr Si Cl					
		3.0 gr sh					
		2.0 gr					
		3.0 gr sh					
		2.0 Fgr sh					
		2.0 FS					
		2.0 sd sh					
		3.0 gr sh					
34	1.5	4.5 gr Si Cl	0	6	18	30	+
		2.0 Fgr sh					
		3.0 Fgr sh Si Cl					
		3.0 sd sh					
		3.0 sd					
		2.0 Fgr sh					
		1.0 sd sh					
35	2.0	1.0 gr Si Cl	0	3	13	24	+
		3.0 gr sh					
		1.0 Fgr sh					
		2.0 gr sh					
		2.0 gr					
		1.0 sd					
		4.0 FS sh					
		3.0 sd sh					
		1.0 Fgr sh					
36	1.5	2.0 sd sh	0	3	10	19	+WL 19.0
		1.5 FS					
		1.0 gr Si Cl					
		4.0 sd sh					
		1.0 gr					
		6.0 sd					
		2.0 gr					
37	1.5	1.5 gr Si Cl	0	2	8	15	+WL 19.0
		1.0 gr sh Si Cl					
		3.0 gr sh					
		2.0 sd sh					
		2.0 gr					
		2.0 sd sh					
		1.0 FS sh					
		2.0 CS sh					
		3.0 sd sh					
38	1.5	1.5 gr sh Si Cl	0	2	8	15	+WL 17.0
		4.0 sd sh					
		2.0 Fgr sh					
		6.0 sd sh					
39	1.0	1.0 gr Si Cl	0	3	10	26	+WL 15.0
		7.0 gr sh					
		1.0 Fgr sh					
		5.0 sd sh					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
40	1.0	2.0 gr sh Si Cl	0	5	18	37	+WL 16.0
		5.0 Fgr sh					
		2.0 Fgr sh Si Cl					
		1.0 sd sh Si Cl					
		5.0 sd sh					
41	1.0	2.0 sd Si Cl	0	1	7	17	+WL 15.5
		1.0 Fgr Si Cl					
		2.0 gr sh					
		2.0 gr					
		2.0 sd					
		1.0 CS sh					
		1.0 sh					
		1.0 sd sh					
		2.5 FS sh					
42	2.0	3.0 gr sh Si Cl	0	4	10	16	+WL 19.0
		5.0 sd sh					
		1.0 gr					
		8.0 sd sh					
43	0.5	2.5 gr Si Cl	0	2	9	19	+WL 17.0
		1.0 Fgr sh					
		1.0 gr sh					
		1.0 Fgr sh					
		1.0 sd sh					
		2.0 gr					
		2.0 CS sh					
		5.0 sd sh					
44	1.0	1.0 gr sh Si Cl	0	7	18	30	+WL 15.0
		6.0 gr sh					
		5.0 sd sh					
		1.0 sh					
		1.0 sd sh					
45	0.5	1.5 gr Si Cl	0	8	25	48	+WL 15.0
		3.0 gr sh					
		3.0 gr					
		3.0 gr sh Si Cl					
		3.0 gr sh					
		1.0 sd sh					
46	1.0	3.0 gr	0	8	21	41	sh
		2.0 Fgr sh					
		2.0 Fgr					
		3.0 Fgr Si Cl					
		2.0 sd sh					
47	0.5	1.5 gr Si Cl	0	5	23	47	+WL 14.0
		1.0 Fgr sh					
		2.0 gr sh					
		3.0 gr					
		6.0 gr sh Si Cl					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
48	1.0	1.0 gr Si Cl	0	6	19	40	+WL 14.0
		2.0 gr					
		4.0 Fgr sh					
		1.0 sd Si Cl					
		2.0 gr Si Cl					
		1.0 Fgr sh					
		2.0 Fgr					
49	0.5	0.5 sd sh Si Cl	0	4	16	34	+WL 13.0
		1.0 Fgr sh					
		5.0 gr					
		2.0 gr sh Si Cl					
		3.0 gr sh					
		1.0 Fgr					
50	1.0	2.0 gr sh Si Cl	0	7	27	49	+WL 14.5
		1.0 gr sh					
		4.0 Fgr					
		5.0 gr Si Cl					
		1.5 gr					
51	1.0	2.0 gr sh Si Cl	0	6	23	47	+WL 15.0
		2.0 gr sh					
		4.0 gr					
		6.0 gr sh Si Cl					
52	1.0	2.0 gr Si Cl	1	12	30	50	+WL 15.0
		1.0 gr					
		1.0 gr sh					
		4.0 Fgr					
		2.0 gr Si Cl					
		2.0 Fgr Si Cl					
		1.0 gr Si Cl					
		1.0 gr					
53	0.5	1.5 gr Si Cl	0	8	22	45	+WL 13.5
		5.0 gr					
		3.0 gr sh Si Cl					
		3.5 gr sh					
54	1.0	1.0 gr Si Cl	0	5	16	32	+WL 11.0
		3.0 Fgr					
		2.0 sd Si Cl					
		2.0 sd					
		2.0 sd sh					

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	**SS-8-046(025)079**	**180**	**4**

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
55	1.0	2.0 gr Si Cl	0	2	14	34	+WL 13.0
		3.0 gr					
		2.0 gr sh Si Cl					
		1.0 gr sh					
		1.0 CS sh					
		2.0 Fgr sh					
		1.0 gr sh					
56	1.0	3.0 gr Si Cl	0	8	20	39	+WL15.0
		5.0 Fgr sh					
		2.0 sd sh Si Cl					
		4.0 sd sh					
57	1.0	1.0 gr Si Cl	0	6	18	36	+WL 15.0
		5.0 gr					
		2.0 gr sh					
		1.0 Fgr sh					
		2.0 gr sh					
		2.0 sd sh					
		1.0 Fgr sh					
58	1.0	2.0 gr Si Cl	0	7	21	34	+WL 13.0
		5.0 Fgr					
		4.0 sd					
		1.0 sd sh					
59	1.0	1.0 gr Si Cl	0	5	18	37	+WL 14.0
		4.0 gr					
		3.0 gr sh					
		1.0 Fgr sh					
		4.0 sd sh					
60	2.0	1.0 Fgr Si Cl	0	4	15	31	+WL 12.0
		2.0 Fgr sh					
		1.0 gr Si Cl					
		1.0 CS sh Si Cl					
		5.0 sd sh					
61	2.0	2.0 gr Si Cl	0	3	16	33	+WL 12.0
		2.0 gr					
		2.0 Fgr sh Si Cl					
		1.0 sd sh					
		3.0 Fgr sh					
62	1.0	1.0 gr Si Cl	0	9	22	37	+WL 12.0
		5.0 gr sh					
		5.0 sd sh					
63	0.5	1.5 gr Si Cl	0	5	19	31	+WL 12.0
		1.0 gr					
		4.0 gr sh					
		1.0 sd					
		4.0 gr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
64	1.0	1.0 gr Si Cl	0	7	19	37	+WL 13.0
		1.0 gr sh					
		3.0 Fgr sh					
		2.0 sd sh					
		1.0 sd					
		2.0 sd sh					
		2.0 Fgr sh					
65	0.5	1.5 gr Si Cl	0	12	23	35	+WL 13.0
		1.0 gr					
		1.0 gr sh					
		1.0 Fgr sh					
		2.0 gr sh					
		1.0 Fgr sh					
		1.0 gr sh					
		1.0 CS sh					
		3.0 gr sh					
66	1.0	2.0 gr sh Si Cl	1	10	24	40	+WL 14.0
		1.0 gr sh					
		2.0 gr Si Cl					
		1.0 sd					
		3.0 sd sh					
		2.0 Fgr sh					
		2.0 gr					
67	0.5	1.5 gr sh Si Cl	0	9	23	35	+WL 14.0
		4.0 gr sh					
		1.0 Fgr sh					
		1.0 CS sh					
		3.0 gr					
		3.0 gr sh					
68	1.0	2.0 gr Si Cl	0	7	21	34	+WL 14.0
		1.0 gr sh					
		1.0 Fgr sh					
		2.0 gr					
		1.0 Fgr sh					
		4.0 gr					
69	1.0	2.0 gr Si Cl	1	10	22	37	+WL 13.0
		1.0 gr					
		4.0 CS sh					
		5.0 Fgr sh					
70	0.5	0.5 gr Si Cl	1	12	24	36	+WL 13.0
		3.0 gr sh					
		2.0 Fgr sh					
		2.0 gr sh					
		2.0 gr					
		2.0 gr Si Cl					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
71	1.0	1.5 gr Si Cl	0	10	25	37	+WL 13.5
		6.5 sd sh					
		1.0 Fgr sh					
		3.5 gr sh					
72	1.0	1.5 gr Si Cl	0	9	21	36	+WL 13.0
		0.5 gr sh					
		3.0 Fgr sh					
		2.0 gr sh					
		3.0 gr					
		2.0 gr Si Cl					
73	1.0	2.0 gr Si Cl	0	10	23	37	+WL 13.0
		5.0 CS sh					
		1.0 sd sh					
		4.0 gr sh					
74	0.5	0.5 gr Si Cl	0	4	15	28	+WL 13.0
		1.0 gr					
		1.0 Fgr sh					
		2.0 sd sh					
		2.0 Fgr					
		1.0 CS					
		1.0 Fgr					
		2.0 gr sh					
		2.0 gr sh Si Cl					
75	1.0	2.0 gr Si Cl	1	10	25	38	+WL 12.5
		3.0 sd sh					
		4.0 Fgr sh					
		2.5 gr sh					
76	1.0	2.0 gr Si Cl	0	6	17	30	+WL 12.0
		1.0 gr sh					
		2.0 sd sh					
		1.0 Fgr sh					
		4.0 gr					
		1.0 gr Si Cl					
77	1.0	1.0 gr Si Cl	0	6	16	30	+WL 12.0
		4.0 sd sh					
		6.0 Fgr sh					
78	1.0	1.5 gr Si Cl	0	3	10	19	+WL 13.0
		1.5 gr					
		3.0 sd sh					
		1.0 Fgr sh					
		5.0 sd sh					
79	1.0	1.0 sd Si Cl	0	4	14	23	+WL 14.0
		2.0 gr sh Si Cl					
		1.0 gr sh					
		2.0 sd sh					
		2.0 sd					
		3.0 sd sh					
		2.0 sd					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
80	1.0	1.0 sd sh Si Cl	0	1	7	14	+WL 13.0
		1.0 gr sh Si Cl					
		1.0 sd sh					
		2.0 Fgr sh					
		1.0 sd					
		2.0 Fgr					
		4.0 sd sh					
81	1.0	2.0 gr Si Cl	0	7	16	28	+WL 12.0
		4.0 sd sh					
		1.0 sd					
		1.0 sd sh					
		3.0 Fgr					
82	1.0	1.0 gr Si Cl	1	12	23	35	+WL 12.0
		1.0 gr					
		2.0 Fgr sh					
		4.0 gr					
		1.0 gr sh					
		2.0 gr Si Cl					
83	0.5	2.5 gr Si Cl	0	12	25	39	+WL 11.5
		2.0 gr					
		2.0 CS sh					
		3.0 sd					
		1.5 Fgr sh					
84	0.5	1.5 gr Si Cl	0	5	18	31	+WL 12.0
		3.0 gr					
		1.0 gr Si Cl					
		1.0 Fgr sh					
		1.0 sd sh					
		1.0 CS sh					
		3.0 Fgr sh					
85	0.5	1.5 gr Si Cl	0	8	23	38	+WL 10.5
		3.0 gr					
		5.5 sd sh					
86	0.5	2.5 gr sh Si Cl	0	6	18	31	+WL 9.5
		2.0 Fgr sh					
		1.0 gr sh					
		1.0 Fgr sh					
		2.5 gr sh					

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PROSPECTED BY Volk / Nelson

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	**SS-8-046(025)079**	**180**	**5**

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
87	0.5	1.5 gr Si Cl	0	9	18	29	+WL 11.5
		2.0 sd sh					
		4.0 Fgr sh					
		1.0 sd					
		2.0 sd sh					
88	1.0	1.0 gr sh Si Cl	0	3	12	24	+WL 11.0
		1.0 gr sh					
		1.0 Fgr sh					
		1.0 gr sh					
		2.0 sd sh					
		1.0 gr sh					
		3.0 gr					
89	1.5	1.5 gr Si Cl	0	9	18	29	+WL 9.0
		2.0 sd sh					
		1.0 sd					
		2.0 Fgr Co S					
		1.0 Fgr					
90	0.5	1.5 gr Si Cl	0	9	19	29	+WL 7.0
		1.0 gr sh					
		3.0 Fgr sh					
		1.0 gr					
91	1.5	0.5 sd sh Si Cl	0	5	15	31	+WL 10.0
		1.0 Fgr					
		1.0 gr					
		1.0 gr Si Cl					
		4.0 gr sh					
		1.0 sd sh					
92	2.0	1.0 gr Si Cl	0	6	23	42	+WL 11.0
		1.0 gr sh					
		3.0 gr					
		1.0 gr Si Cl					
		2.0 sd Si Cl					
		1.0 gr					
93	1.0	1.0 gr Si Cl	0	7	26	48	+WL 13.0
		6.0 gr					
		5.0 gr sh Si Cl					
94	1.0	3.0 gr	0	6	21	44	+WL 12.0
		3.0 Fgr					
		1.0 Fgr Si Cl					
		1.0 gr Si Cl					
		1.0 sd sh					
		2.0 sd					
95	2.0	2.0 gr Si Cl	0	3	17	31	+WL 8.0
		1.0 sd sh Si Cl					
		2.0 Fgr sh					
		1.0 gr sh					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
96	0.5	2.5 gr Si Cl	0	5	21	37	+WL 10.5
		1.0 Fgr					
		2.0 Fgr sh					
		1.0 sd Si Cl					
		3.5 sd sh					
97	0.5	1.5 gr Si Cl	0	4	17	35	+WL 8.0
		2.0 gr					
		2.0 gr sh Si Cl					
		1.0 sd sh					
		1.0 Fgr sh					
98	1.5	1.5 gr Si Cl	0	6	20	38	+WL 8.0
		2.0 Fgr					
		1.0 gr Si Cl					
		1.0 Fgr sh					
		1.0 sd					
99	0.5	0.5 gr Si Cl	0	4	16	29	+WL 11.0
		3.0 gr					
		2.0 gr Si Cl					
		1.0 gr sh					
		3.0 sd sh					
		1.0 gr sh					
100	1.0	1.0 sd Si Cl	0	5	22	49	+WL 14.0
		1.0 gr sh					
		6.0 gr					
		5.0 gr sh Si Cl					
101	1.0	1.0 gr sh Si Cl	0	8	24	41	+WL 14.5
		6.0 gr sh					
		1.0 Fgr sh					
		1.0 gr sh					
		4.5 sd sh					
102	1.0	1.0 gr Si Cl	0	6	16	27	Si Cl
		3.0 gr sh					
		1.0 Fgr sh					
		2.0 gr sh					
		4.0 sd sh					
		0.5 sd Si Cl					
103	1.0	1.0 gr Si Cl	1	13	33	51	Si Cl
		5.0 gr sh					
		4.0 gr sh Si Cl					
		2.0 gr sh					
104	1.0	1.0 gr Si Cl	0	4	25	52	+WL14.0
		1.0 gr sh					
		5.0 gr					
		1.0 gr Si Cl					
		4.0 gr sh Si Cl					
		1.0 Fgr sh					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
105	0.5	1.5 gr si Cl	1	12	30	52	+WL 14.0
		1.0 gr					
		3.0 gr sh					
		2.0 Fgr sh					
		2.0 Fgr sh Si Cl					
		3.0 gr sh Si Cl					
		1.0 gr					
106	0.5	0.5 gr si Cl	0	4	20	40	+WL 12.0
		5.0 gr					
		1.0 gr Si Cl					
		3.0 gr sh Si Cl					
		2.0 gr sh					
107	0.5	1.5 gr si Cl	0	10	34	56	+WL 12.0
		4.0 gr sh					
		2.0 Fgr sh					
		4.0 gr sh Si Cl					
108	1.0	1.0 gr si Cl	0	6	24	47	Si Cl
		6.0 gr					
		2.0 gr sh					
		1.0 gr sh Si Cl					
109	1.5	3.5 gr si Cl	0	5	15	25	sh
		3.0 sd sh					
		3.0 Fgr					
		1.0 Fgr sh					
		4.0 sd					
110	1.0	1.0 sd sh	0	3	13	21	+WL 18.0
		2.0 gr sh					
		1.0 Fgr sh					
		3.0 gr sh					
		1.0 Fgr sh					
		2.0 gr					
		1.0 sd sh					
		3.0 FS sh					
		1.0 Fgr sh					
		2.0 gr sh					
111	1.5	2.5 gr si Cl	0	6	18	30	+WL 19.0
		1.0 sd Si Cl					
		4.0 gr sh					
		1.0 Fgr					
		1.0 gr sh					
		3.0 sd sh					
		3.0 sd					
		1.0 Fgr sh					
		1.0 sd					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
112	1.0	1.5 gr Si Cl	0	9	25	39	+WL 19.0
		5.5 gr sh					
		3.0 gr					
		2.0 sd sh					
		1.0 CS sh					
		1.0 sd sh					
		4.0 gr sh Si Cl					
113	1.5	2.5 gr Si Cl	1	7	17	27	Si Cl
		1.0 sd Si Cl					
		1.0 gr sh					
		2.0 sd sh					
		2.0 gr					
		1.0 sd					
		1.0 gr					
		4.0 sd sh					
		1.0 sd sh Si Cl					
		1.0 Fgr sh					
114	0.5	2.5 gr Si Cl	0	4	14	27	Si Cl
		1.0 sd sh					
		1.0 gr sh					
		2.0 sd sh					
		2.0 gr sh Si Cl					
		2.0 gr sh					
		1.0 FS sh					
		1.0 sd sh					
		1.0 gr sh					
		1.0 sd sh					
		1.0 gr sh					
115	1.0	2.0 gr Si Cl	0	8	21	39	Si Cl
		2.0 Fgr sh					
		3.0 Fgr sh Si Cl					
		1.5 Fgr sh					
		1.5 Fgr					
		1.0 Fgr sh					

RANGE 54 **TWP** 133 **SEC** NE1/4 7

COUNTY Ransom Sep-13

PROSPECTED BY Volk / Nelson

INSPECTED & APPROVED B. Hoesel Sep-13

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	**SS-8-046(025)079**	**180**	**6**

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
116	0.5	1.5 gr Si Cl	0	4	18	29	+WL 17.0
		3.0 gr sh					
		1.0 sd sh					
		1.0 Fgr sh					
		2.0 sd sh					
		1.0 Fgr					
		2.0 gr sh					
		2.0 sd sh					
		2.0 gr sh					
		1.0 gr Si Cl					
117	0.5	4.5 gr sh Si Cl	1	10	21	31	+WL 18.0
		2.0 gr sh					
		1.0 Fgr sh					
		7.0 sd sh					
		2.0 Fgr sh					
		1.0 gr sh					
118	1.0	3.0 gr sh Si Cl	0	9	19	31	+
		8.0 gr sh					
		5.0 sd sh					
		2.0 gr sh					
		1.0 sd sh					
119	1.0	5.0 gr sh Si Cl	0	8	22	36	Si Cl
		1.0 gr sh					
		1.0 gr Si Cl					
		7.0 sd sh					
		3.0 Fgr sh					
120	2.0	2.0 gr Si Cl	0	4	20	34	+
		3.0 gr sh					
		1.0 sd sh					
		1.0 Fgr sh					
		2.0 sd sh					
		2.0 Fgr sh					
		2.0 sd sh					
		5.0 gr sh					
121	1.0	3.0 gr sh Si Cl	0	7	22	40	+WL 19.0
		2.0 gr sh					
		7.0 Fgr sh					
		1.0 sd sh					
		1.0 sh					
		2.0 Fgr sh					
		2.0 gr sh					
122	1.0	5.0 gr sh Si Cl	0	9	20	34	+WL 19.0
		1.0 gr sh					
		1.0 Fgr sh					
		1.0 gr sh					
		5.0 sd sh					
		2.0 Fgr sh					
		1.0 Fgr Si Cl					
		1.0 sd sh					
		1.0 gr sh					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
123	1.0	3.0 gr sh Si Cl	1	9	22	37	+WL 19.0
		4.0 gr sh					
		3.0 Fgr sh Si Cl					
		2.0 Fgr sh					
		3.0 CS					
		2.0 CS sh					
		1.0 Fgr sh					
124	1.0	3.0 gr Si Cl	0	14	26	38	+WL 19.0
		2.0 gr sh					
		2.0 gr					
		2.0 gr Si Cl					
		3.0 gr sh					
		4.0 sd sh					
		2.0 gr sh					
125	1.0	4.0 gr Si Cl	1	11	26	39	+WL 18.0
		1.0 gr sh					
		3.0 gr sh Si Cl					
		1.0 gr sh					
		3.0 Fgr sh					
		2.0 sd sh					
		2.0 Fgr sh					
		1.0 sd sh					
126	1.0	5.0 gr Si Cl	0	11	30	46	+WL 17.0
		1.0 gr sh					
		1.0 sd sh Si Cl					
		1.0 sd sh					
		5.0 gr sh					
		1.0 gr sh Si Cl					
		2.0 gr sh					
127	1.0	1.0 sd Si Cl	0	2	10	21	Si Cl
		3.0 sd					
		1.0 gr Si Cl					
		2.0 sd sh					
		5.0 Fgr sh					
		2.0 sd sh					
128	2.0	1.0	0	1	9	19	+WL 12.5
		5.0					
		2.0					
		1.0					
		1.0					
		0.5					
129	3.0	4.0 FS	0	0	5	13	+WL 16.0
		2.0 CS					
		1.0 sd sh					
		5.0 Fgr sh					
		1.0 sd sh					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
130	3.0	2.0 sd sh Si Cl	0	0	3	10	+WL 16.5
		2.0 FS sh					
		1.0 CS					
		1.0 sd sh					
		1.0 Fgr sh					
		4.0 sd sh					
		2.0 CS sh					
		0.5 Fgr sh					
131	1.5	1.0 gr Si Cl	0	8	18	32	+WL 13.0
		1.5 sd Si Cl					
		2.0 sd sh					
		1.0 sd					
		1.0 gr sh Si Cl					
		5.0 gr sh					
132	1.0	1.0 sd Si Cl	0	4	11	20	Si Cl
		2.0 sd sh					
		2.0 gr sh					
		3.0 sd sh					
		2.0 Fgr sh					
		3.0 sd sh					
133	1.5	1.5 sd sh	0	6	17	30	Si Cl
		2.0 gr sh					
		2.0 gr sh Si Cl					
		1.0 sd sh					
		3.0 Fgr sh					
134	2.0	1.0 gr Si Cl	0	4	11	20	+WL 13.0
		1.0 gr sh					
		1.0 Fgr sh					
		2.0 sd sh					
		2.0 gr sh					
		2.0 Fgr sh					
		2.0 sd sh					
135	2.0	5.0 FS Si Cl	0	1	9	18	+WL 18.0
		1.0 sd sh					
		2.0 sd					
		1.0 sd sh					
		2.0 Fgr sh					
		1.0 Fgr sh					
		1.0 sd sh					
		1.0 Fgr					
136	1.0	1.0 FS sh	0	1	7	18	+
		2.0 sd sh					
		1.0 gr sh					
		3.0 sd sh					
		3.0 Fgr sh					
		5.0 sd sh					
		4.0 gr sh					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
137	1.0	2.0 gr Si Cl	0	4	11	23	+
		4.0 sd sh					
		2.0 sd sh					
		1.0 CS sh					
		3.0 sd sh					
		3.0 Fgr sh					
		1.0 sd					
		3.0 sd sh					
138	1.0	1.0 gr Si Cl	0	2	13	27	+
		1.0 gr sh					
		3.0 sd sh					
		5.0 gr sh					
		1.0 Fgr sh					
		2.0 gr sh					
		3.0 Fgr sh					
		3.0 gr sh					
139	1.5	1.5 gr sh Si Cl	0	10	20	33	+
		1.0 gr					
		2.0 CS sh					
		6.0 sd sh					
		2.0 Fgr sh					
		6.0 gr					
140	1.0	1.0 gr Si Cl	0	1	8	22	+
		9.0 sd sh					
		1.0 CS sh					
		3.0 gr sh					
		1.0 Fgr					
		4.0 sd sh					
141	1.0	2.0 FS	0	0	3	12	+
		5.0 Fgr sh					
		1.0 CS sh					
		10.0 sd sh					
		1.0 gr					

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COUNTY Ransom Sep-13

PROSPECTED BY Volk / Nelson

INSPECTED & APPROVED B. Hoesel Sep-13

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	**SS-8-046(025)079**	**180**	**7**

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
142	1.0	1.0 gr sh Si Cl	0	1	8	19	+
		1.0 sd sh					
		1.0 Fgr sh					
		1.0 sd sh					
		5.0 Fgr sh					
		2.0 sd					
		5.0 sd sh					
		1.0 Fgr sh					
		2.0 gr sh					
143	2.0	1.0 gr sh Si Cl	0	2	8	18	+
		3.0 Fgr sh					
		5.0 sd sh					
		3.0 sd					
		1.0 Fgr sh					
		1.0 FS sh					
		1.0 Fgr sh					
		3.0 gr sh					
144	1.0	2.0 sd sh	0	4	12	26	+
		1.0 Fgr sh					
		1.0 CS sh					
		1.0 Fgr sh					
		5.0 sd sh					
		2.0 gr sh					
		1.0 CS sh					
		1.0 Fgr sh					
		2.0 gr sh					
		3.0 Fgr sh					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
R1	1.5	1.5 sd Si Cl	0	3	12	26	+
		2.0 sd					
		4.0 Fgr sh					
		3.0 sd sh					
		2.0 Fgr sh					
		2.0 Fgr					
		2.0 Fgr sh					
		1.0 Fgr					
		1.0 gr					
R2	4.0	1.0 sd	0	0	1	5	+
		2.0 FS					
		7.0 sd sh					
		1.0 Fgr sh					
		5.0 sd sh					
R3	1.0	12.5 gr Si Cl	1	17	32	47	Si cl
		1.0 sd sh					
R4	1.0	2.0 gr Si Cl	0	4	21	50	+WL 11.0
		3.0 gr					
		5.0 gr sh Si Cl					
R5	1.0	2.0 gr Si Cl	0	6	20	35	+WL 9.0
		1.0 Fgr sh					
		2.0 gr Si Cl					
		1.0 Fgr sh					
		2.0 Fgr					
R6	1.0	1.0 gr Si Cl	0	4	12	25	+WL 11.0
		1.0 sd					
		1.0 CS sh					
		3.0 Fgr sh					
		2.0 sd sh					
		1.0 gr Co S					
		1.0 Fgr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole

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COUNTY Ransom

PROSPECTED BY Volk / Nelson

INSPECTED & APPROVED B. Hoesel Sep-13

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	180	8

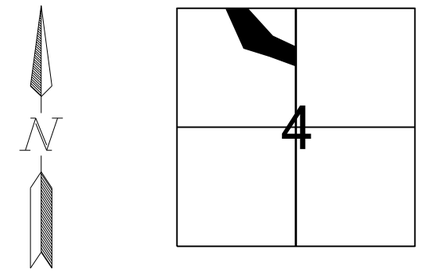
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

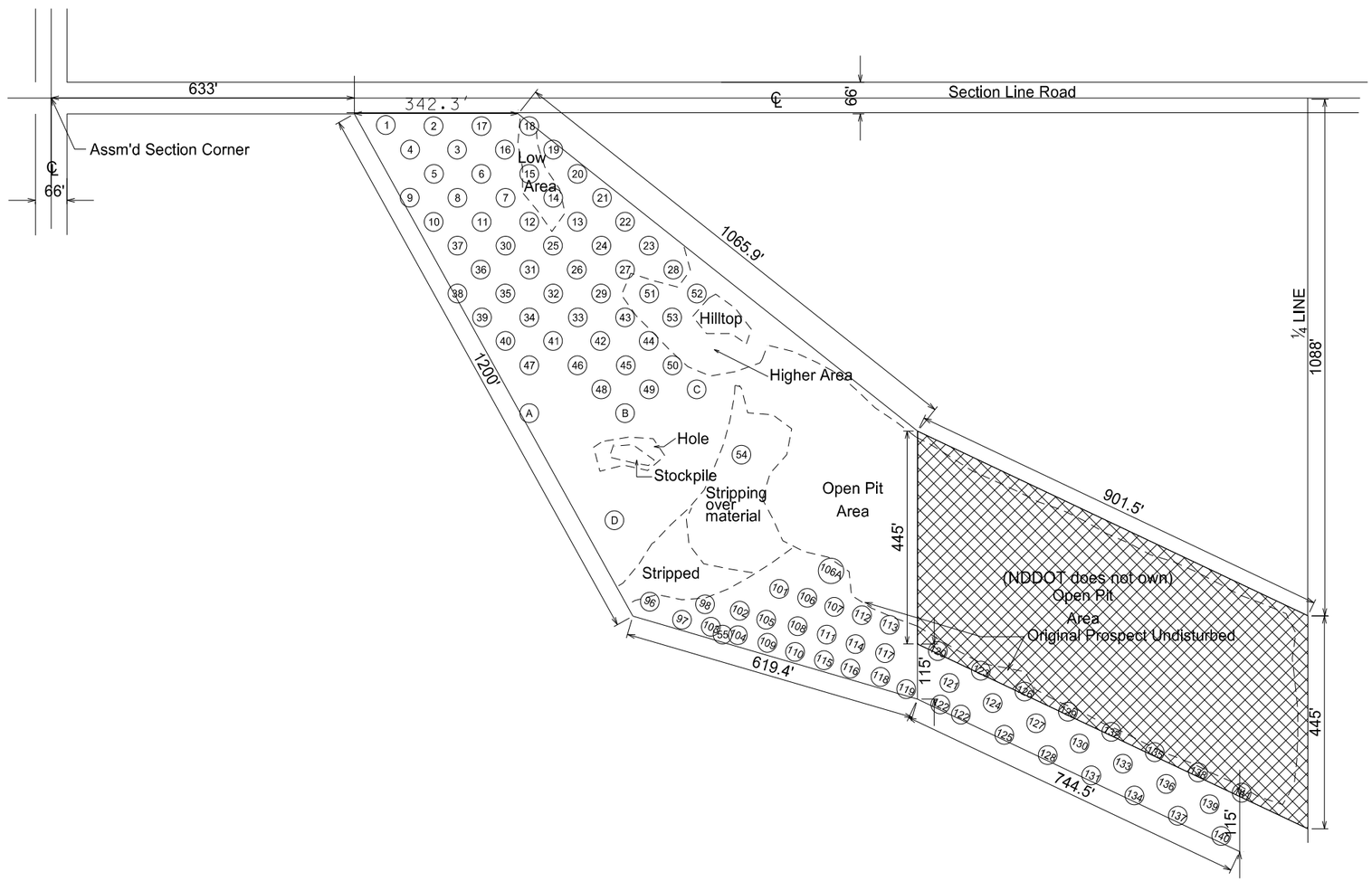
TEST HOLE PLAT

Location: NW ¼ 4-133-54 County: Ransom

Ownership: State Owned

LOCATION OF PIT IN SECTION





Area "A" consists of Test Holes 1- 12
Area "B" consists of Test Holes 14-17,22-25,31,32
Area "C" consists of Test Holes 13,18-21,26-30
Area "D" consists of Test Holes 36-40,46-51,57-59
Area "E" consists of Test Holes 33-35,41-45,52-56
Area "F" consists of Test Holes 64-68,73-77
Area "G" consists of Test Holes 60-63,69-72,78
Area "H" consists of Test Holes 79-88
Area "I" consists of Test Holes 89-100
Area "J" consists of Test Holes 101-109
Area "K" consists of Test Holes 110-121
Area "L" consists of Test Holes 122-129
Area "M" consists of Test Holes 130-141
Area "N" consists of Test Holes A-E

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

1"=300'

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
N.D.	SS-8-046(025)079	180	9

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft.)	Depth of Gravel (Ft.)	% Retained on 1 ½" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on # 4 Screen	Bottom of Test Hole
1	0.5	1.5 grSiCl	0	6	18	29	sd
		3.0 gr					
		2.0 Fgr					
2	0.5	10.5 gr	0	7	18	29	sd
3	0.5	2.5 gr	0	5	13	23	sd
		3.0 Fgr					
		1.0 sd					
		1.5 Fgr					
4	0.5	8.5 gr	0	7	21	36	sd
5	0.5	9.0 Fgr	2	12	23	37	sd
		1.0 sd					
		0.5 Fgr					
6	0.5	7.5 gr	0	5	14	25	sdsh
7	0.5	6.5 gr	0	6	17	31	CS
8	0.5	5.5 gr	0	5	18	31	sdsh
		1.0 CSsh					
		1.0 gr					
9	0.5	4.5 gr	0	8	17	28	sd
		1.0 sd					
		5.0 gr					
10	1.5	8.0 gr	0	2	12	24	sdsh
11	0.5	0.5 gr	0	6	17	33	sd
		1.0 sd					
		8.0 gr					
12	0.5	6.5 gr	0	5	14	26	sd
13	0.5	5.5 gr	0	3	15	28	sdsh
14	0.5	5.0 gr	0	5	15	28	+WL 6.0
		0.5 CSsh					
15	0.5	1.5 gr	0	4	11	21	sd
		2.5 Fgrsh					
16	0.5	1.0 gr	2	8	18	28	sd
		1.0 sd					
		4.5 gr					
		1.0 sd					
		1.0 Fgr					
17	0.5	6.5 gr	0	5	14	24	CS
18	0.5	1.5 Fgr	0	3	11	20	+WL 7.0
		1.0 sd					
		1.0 grSiCl					
		1.0 gr					
		2.0 sdsh					
19	0.5	4.5 FgrSiCl	0	9	21	32	sd
		2.0 gr					
		2.5 grsh					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft.)	Depth of Gravel (Ft.)	% Retained on 1 ½" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on # 4 Screen	Bottom of Test Hole
20	0.5	2.0 sd	0	4	12	22	sd
		0.5 SiCl					
		1.0 Fgr					
		1.5 sd					
		4.5 gr					
21	0.5	2.0 sd	1	8	21	33	sdsh
		3.5 gr					
		1.0 FS					
		3.0 gr					
22	0.5	3.5 Fgr	1	7	22	32	sd
23	0.5	0.5 sd	0	2	10	16	sd
		1.5 Fgr					
24	0.5	6.0 gr	0	5	13	21	sd
25	0.5	1.5 gr	0	3	12	22	sd
		1.0 sd					
		5.0 gr					
26	0.5	1.5 gr	0	3	12	25	sdsh
		2.0 sd					
		1.0 gr					
		5.0 Fgr					
27	0.5	0.5 sd	0	3	10	19	sd
		5.0 Fgr					
		1.0 sd					
		1.0 gr					
		1.0 sd					
		2.0 Fgr					
28	0.5	2.5 gr	3	17	24	33	sdsh
		1.5 sd					
		3.5 gr					
29	0.5	4.5 gr	0	5	18	33	sd
30	0.5	7.5 gr	0	6	18	31	sd
31	0.5	1.5 grSiCl	0	6	18	34	sdsh
		3.0 gr					
32	0.5	0.5 Fgr	0	0	4	11	sd
		5.0 sd					
33	0.5	3.0 gr	0	7	15	29	sd
34	0.5	1.5 gr	0	4	11	24	sd
		2.5 Fgr					
35	0.5	3.5 grSiCl	0	7	21	36	sdsh
		2.5 gr					
36	0.5	5.5 gr	0	6	19	33	sd
37	0.5	5.5 gr	1	10	23	39	sd
38	1.0	3.0 gr	0	4	16	25	sd
		1.0 sd					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft.)	Depth of Gravel (Ft.)	% Retained on 1 ½" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on # 4 Screen	Bottom of Test Hole
39	1.0	1.5 gr	0	2	10	19	sd
		1.5 sd					
40	0.5	1.5 gr	1	9	16	25	sd
		2.0 Fgr					
41	0.5	1.5 Fgr	0	4	9	14	sdsh
		2.0 sd					
42	0.5	2.5 Fgr	1	8	18	30	sd
		1.0 gr					
43	0.5	1.0 gr	0	7	20	34	sd
		1.0 sd					
		4.0 gr					
44	0.5	4.0 gr	0	6	14	22	sdsh
45	0.5	2.5 gr	0	6	16	29	sd
		2.5 Fgr					
46	0.5	0.5 grSiCl	0	1	11	24	sdsh
		1.0 sd					
		3.0 gr					
47	0.5	1.0 gr	0	4	16	32	sd
		1.5 sd					
		3.0 gr					
48	0.5	3.5 gr	0	8	18	30	sd
49	0.5	2.5 gr	0	7	18	31	sdsh
		2.0 Fgrsh					
50	0.5	1.5 gr	0	8	20	35	sd
		1.0 CS					
		4.0 gr					
51	0.5	8.5 grSiCl	0	4	15	26	sd
		1.0 Sicl					
		2.0 gr					
		1.0 sd					
		4.0 gr					
52	0.5	2.5 gr	0	7	19	35	+Fgr
		2.0 CS					
		4.0 gr					
		1.0 CS					
		9.0 gr					
53	0.5	16.0 gr	0	9	22	34	sd
54	8.0	1.0 grSiCl	0	2	13	24	sdsh
		1.0 gr					
		1.0 sdsh					
		5.0 gr					
55	0.5	2.5 grSiCl	0	4	15	30	sd
		1.0 CS					
		2.0 gr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft.)	Depth of Gravel (Ft.)	% Retained on 1 ½" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on # 4 Screen	Bottom of Test Hole
A	0.5	2.0 grSiCl	0	0	8	14	+WL 11.0
		2.5 sd					
		4.0 CS					
		2.0 sd					
B	1.0	2.0 Fgr					sd
C	0.5	0.5 gr	0	0	5	11	+WL 12.5
		4.0 sdsh					
		5.0 sd					
		2.5 gr					
D	0.5	0.5 sdSiCl	0	0	0	1	SiCl
		5.0 sd					
96	1.5	6.5 gr	0	4	8	29	sd
97	1.0	7.0 gr	1	3	8	31	sd
		1.0 sd					
		1.0 gr					
98	3.0	7.5 gr	0	0	2	33	sd
101	1.5	7.5 gr	0	0	3	25	sd
102	1.0	7.0 gr	1	4	6	31	sd
103	1.5	7.5 gr	0	2	4	33	sd
104	1.0	7.0 gr	1	6	11	40	sd
105	1.0	5.0 gr	0	5	7	28	sd
106	1.0	8.0 gr	0	3	6	31	sd
106A	0.5	11.5 gr	0	1	3	24	sd
107	2.0	5.0 gr	0	1	4	27	sd
		2.0 sd					
		1.0 gr					
108	1.0	6.0 gr	0	3	6	29	sd
109	1.5	3.5 gr	0	6	8	28	sd
110	1.5	4.5 gr	0	1	3	37	sd
111	2.0	2.5 gr	0	3	7	24	sd
		1.0 sd					
		1.5 gr					

RANGE 54 **TWP.** 133 **SEC.** 4

RANSOM **COUNTY**

PIT PROSPECTED BY F. Scott Carter 12-99

INSPECTED & APPROVED

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
N.D.	SS-8-046(025)079	180	10

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft.)	Depth of Gravel (Ft.)	% Retained on 1 ½" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on # 4 Screen	Bottom of Test Hole
112	2.0	8.0 gr	0	1	3	23	sd
113	2.0	12.0 gr	0	2	5	32	+ caving
114	1.0	4.0 gr	0	5	10	38	sd
115	2.0	4.0 gr	1	6	11	37	sd
116	4.0	4.0 gr	2	9	11	37	sd
117	2.0	5.0 gr	0	5	9	35	sd
118	1.0	5.0 gr	1	5	8	39	sd
119	1.0	6.0 gr	0	3	9	33	sd
120	4.0	8.5 gr	0	7	11	30	sd
121	3.0	5.0 gr	0	2	6	27	sd
		1.0 sd					
		2.0 gr					
122	1.0	7.5 gr	0	1	4	24	sd
123	2.0	4.0 gr	0	0	2	23	sd
		1.5 sd					
		5.5 gr					
124	5.0	8.0 gr	0	3	6	31	sd
125	2.0	6.5 gr	0	4	8	38	sd
126	7.0	8.0 gr	0	3	9	31	+ caving
127	3.5	2.5 gr	0	4	6	29	sd
		1.0 SiCl					
		3.0 gr					
128	2.0	3.0 gr	0	4	8	27	sd
		1.0 SiCl					
		2.5 gr					
129	3.0	8.0 gr	0	2	5	26	sd
130	3.0	8.0 gr	0	2	6	28	sd
131	2.0	5.0 gr	0	3	5	22	sd
132	4.5	9.5 gr	0	0	3	27	+ caving
133	2.5	6.5 gr	0	1	3	23	sd
		1.0 sd					
		1.0 gr					
134	4.0	5.0 gr	0	3	5	24	sd
		1.0 grsh					
135	4.5	8.5 gr	0	4	5	27	+ caving
136	4.0	8.0 gr	0	3	7	31	sd
137	4.0	5.0 gr	0	2	4	26	sd
138	3.5	8.5 gr	0	3	7	27	sd
139	4.0	10.0 gr	0	6	10	33	+ caving
140	4.0	5.0 gr	0	2	6	29	sd
141	3.0	9.0 gr	0	5	8	28	+ caving

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft.)	Depth of Gravel (Ft.)	% Retained on 1 ½" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on # 4 Screen	Bottom of Test Hole

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft.)	Depth of Gravel (Ft.)	% Retained on 1 ½" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on # 4 Screen	Bottom of Test Hole

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft.)	Depth of Gravel (Ft.)	% Retained on 1 ½" Screen	% Retained on 3/4" Screen	% Retained on 3/8" Screen	% Retained on # 4 Screen	Bottom of Test Hole

RANGE 54 **TWP.** 133 **SEC.** 4

RANSOM **COUNTY**

PIT PROSPECTED BY F. Scott Carter 12-99

INSPECTED & APPROVED

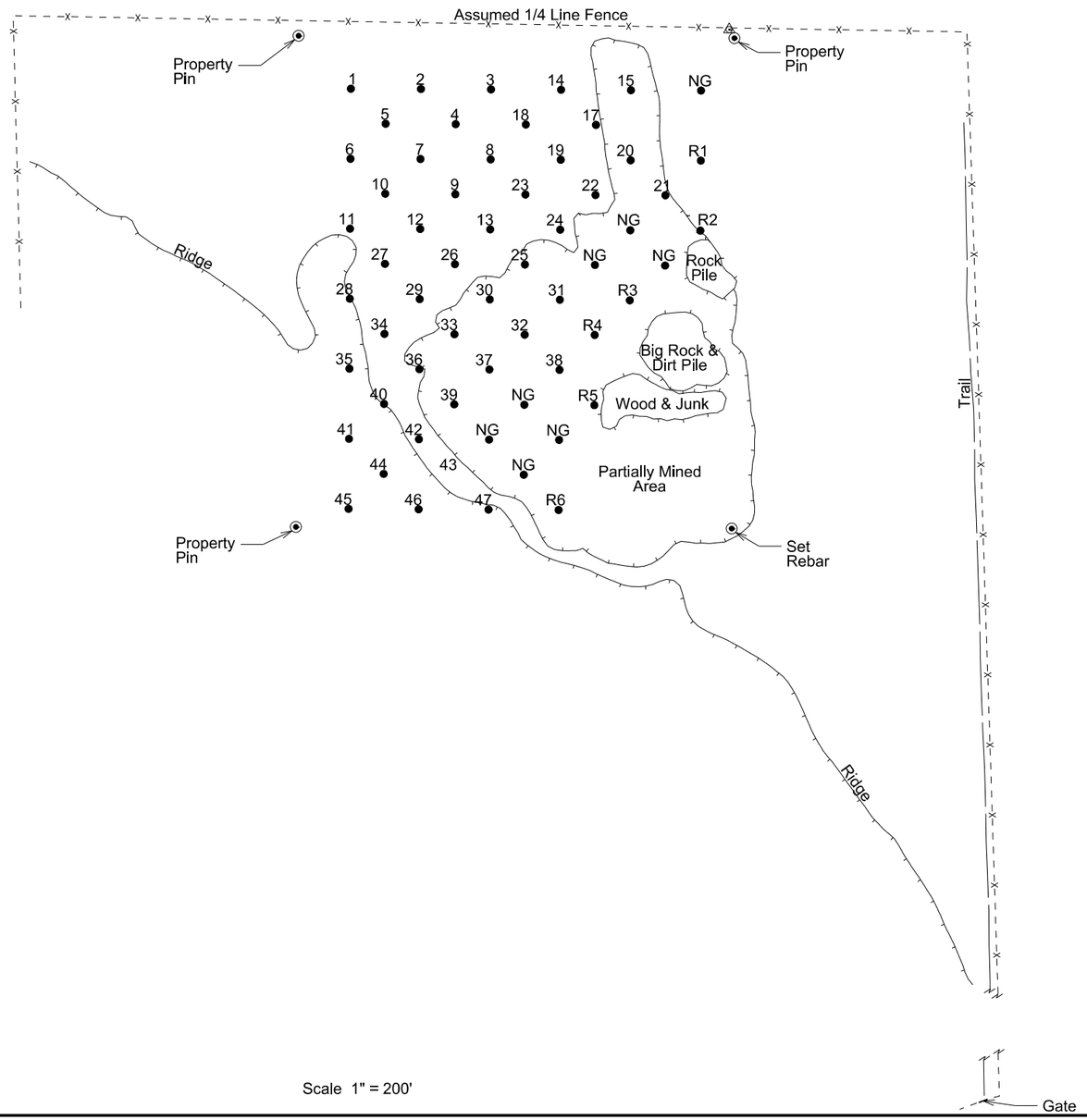
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	180	11

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

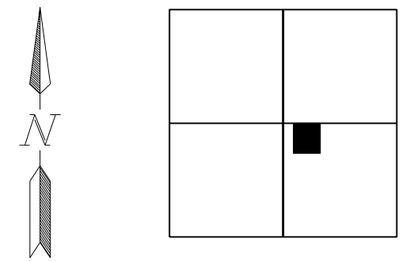
TEST HOLE PLAT

Location: W1/2 SE1/4 3-134-56 County: Ransom

Ownership: State Agreement, LeRoy & Janice Foss, Landowner



LOCATION OF PIT IN SECTION



Area "A" consists of Test Holes 1-13

Area "B" consists of Test Holes 14-24

Area "C" consists of Test Holes 25-34

Area "D" consists of Test Holes 35-47

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	**SS-8-046(025)079**	**180**	**12**

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
1	0.5	1.5 gr sh	0	5	20	42	Si Cl
		1.0 sd sh					
		3.0 Fgr sh					
		1.0 gr sh					
		0.5 Fgr sh					
		1.5 sd sh					
		1.0 gr					
		1.0 Fgr					
		3.0 gr					
		1.0 Fgr					
		2.0 sd					
		1.0 Fgr sh					
2	0.5	2.5 gr	0	3	15	31	FS Si Cl
		1.0 Fgr sh					
		1.0 sd					
		1.0 sd sh					
		3.0 FS					
		1.0 CS					
		8.0 Fgr					
3	0.5	1.5 gr	0	5	14	21	rk
		0.5 Fgr sh					
		1.5 sd					
		2.0 Fgr					
		1.0 Fgr sh					
		2.0 sd sh					
		1.0 sd					
		2.0 sd sh					
		1.0 gr					
		1.0 Fgr Si Cl					
4	1.0	2.0 gr	0	6	20	39	+
		1.0 sd sh					
		2.0 Fgr sh					
		1.0 sd					
		4.0 sd sh					
		1.0 FS sh					
		8.0 gr					
5	0.5	8.5 gr sh	0	10	24	43	+
		3.0 sd sh					
		1.0 gr					
		1.0 Fgr Si Cl					
		2.0 Fgr sh					
		2.0 gr					
		2.0 Fgr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
6	1.0	2.0 gr	0	4	15	29	+
		1.0 sd					
		2.0 Fgr					
		1.0 gr sh					
		1.0 sd					
		2.0 Fgr					
		1.0 gr					
		1.0 gr Si Cl					
		1.0 gr					
		1.0 sd					
		1.0 sd sh					
		2.0 Fgr sh					
		1.0 sd sh					
		2.0 sd					
7	1.0	4.0 gr	0	7	18	29	+
		1.0 Fgr					
		5.0 FS sh					
		1.0 gr					
		1.0 Fgr sh					
		7.0 Fgr					
8	1.0	2.0 gr	0	9	20	37	+
		1.0 Fgr sh					
		1.0 CS sh					
		1.0 Fgr					
		1.0 gr					
		2.0 sd					
		1.0 sd					
		1.0 sd sh					
		1.0 FS sh					
		1.0 sd sh					
		2.0 gr					
		2.0 gr Si Cl					
		2.0 gr					
		1.0 sd					
9	1.0	2.0 gr	0	6	17	29	+
		1.0 Fgr sh					
		2.0 gr					
		1.0 sd					
		3.0 sd sh					
		2.5 FS sh					
		3.5 gr					
		4.0 Fgr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
10	1.0	1.5 gr	0	2	13	30	+
		0.5 Fgr					
		2.0 sd					
		2.0 gr					
		1.0 sd					
		1.0 CS					
		1.0 Fgr					
		3.0 gr					
		1.0 Fgr					
		1.0 CS					
		1.0 sd					
		2.0 Fgr					
		1.0 Fgr sh					
		1.0 sd sh					
		3.0 gr					
		2.0 Fgr sh					
		2.0 gr					
		4.0 Fgr					
		2.0 sd sh					
		3.0 CS					
12	1.0	1.0 gr	0	8	20	38	+
		1.0 gr sh					
		1.0 Fgr sh					
		1.5 Fgr					
		0.5 gr					
		0.5 Fgr					
		3.5 FS					
		8.0 gr					
		2.0 fgr					
13	1.0	1.0 gr	0	3	13	25	+
		3.0 sd sh					
		2.5 gr					
		1.5 sd sh					
		1.0 sd					
		2.0 sd sh					
		3.0 gr					
		4.0 CS					
		1.0 Fgr					
14	0.5	2.5 gr	1	14	25	38	rk
		1.0 Fgr sh					
		3.0 sd sh					
		2.0 Fgr					
		3.0 gr Si Cl					
15	0.5	0.5 Fgr	0	6	19	35	Si Cl
		3.0 gr					
		1.0 Fgr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	
16	1.0	3.0 sd sh	0	1	9	20	FS Si Cl
		3.0 Fgr sh					
17	0.5	1.5 gr	0	4	15	28	Si Cl
		2.0 sd sh					
		1.0 sd sh					
		0.5 Fgr					
		2.5 gr					
		1.0 Fgr					
		1.0 sd sh					
		1.0 Fgr					
18	1.0	2.0 gr	0	4	15	26	rk
		1.0 Fgr sh					
		3.0 sd sh					
		3.0 Fgr					
19	1.0	2.0 gr	0	3	17	29	Si Cl
		1.0 Fgr					
		3.0 sd sh					
		1.0 gr					
		1.0 sd sh					
		1.0 gr sh					
		2.0 gr					
20	0.5	0.5 Fgr	0	6	20	33	Si Cl
		1.0 Fgr sh					
		1.0 Fgr					
		1.0 gr Si Cl					
		1.0 Fgr					
		1.0 CS					
		1.0 Fgr Si Cl					
21	0.5	1.5 Fgr	0	4	14	25	Si Cl
		2.0 sd sh					
		2.0 Fgr					
		1.0 gr					
		1.0 CS					
22	0.5	0.5 gr	0	7	19	33	Si Cl
		1.0 sd sh					
		1.0 Fgr sh					
		2.0 sd sh					
		7.0 Fgr sh					

RANGE 56 **TWP** 134 **SEC** W1/2SE1/4 3

COUNTY Ransom Oct-12

PROSPECTED BY Volk / Nelson

INSPECTED & APPROVED B. Hoesel Nov-12

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	**SS-8-046(025)079**	**180**	**13**

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
23	1.0	2.0 Fgr	0	8	19	34	Si Cl
		3.0 sd sh					
		1.0 Fgr					
		1.0 gr					
		1.0 sd sh					
		2.0 gr					
		1.0 Fgr					
		2.0 gr					
		1.0 CS					
		2.0 gr					
		1.0 Fgr					
		1.0 gr					
24	1.0	1.0 gr	0	9	22	35	Si Cl
		0.5 Fgr					
		2.5 sd					
		2.0 Fgr					
		6.0 gr					
25	0.5	0.5 gr	0	6	17	30	Si Cl
		1.0 Fgr					
		1.0 FS					
		2.0 gr					
		1.5 Fgr					
		1.0 gr					
26	1.0	1.0 gr	0	6	16	26	+
		2.0 sd sh					
		2.0 gr					
		1.0 FS					
		4.0 FS sh					
		1.0 Fgr					
		2.0 gr					
		3.0 sd					
		3.0 Fgr sh					
27	0.5	2.5 gr	0	11	22	34	+
		3.0 sd sh					
		2.0 gr sh					
		1.0 sd sh					
		2.0 Fgr sh					
		3.0 gr					
		2.0 Fgr sh					
		2.0 gr sh					
		2.0 sd sh					
28	1.0	2.0 sd sh	0	4	16	32	+
		1.0 Fgr					
		1.0 gr					
		3.0 sd sh					
		1.0 Fgr sh					
		4.0 gr					
		1.0 CS					
		4.0 gr					
		2.0 Fgr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
29	1.0	1.0 Fgr	0	4	16	30	+
		1.0 sd sh					
		4.0 Fgr sh					
		3.0 FS sh					
		2.0 gr					
		5.0 Fgr sh					
		1.0 gr sh					
		2.0 sd sh					
30	0.5	1.5 gr sh	0	7	16	35	+WL 12.0
		2.0 Fgr					
		2.0 gr					
		1.0 Fgr					
		2.0 CS					
		1.0 Fgr					
		2.0 CS					
31	0.5	2.5 Fgr sh	0	3	14	27	+ Cave
		1.0 sd sh					
		5.0 Fgr sh					
32	0.5	1.5 gr Si Cl	0	3	18	38	+WL 11.5
		2.0 Fgr sh					
		2.0 gr sh					
		5.5 Fgr sh					
33	0.5	0.5 sd sh	0	5	16	34	Si Cl
		1.0 gr sh					
		1.5 Fgr					
		1.5 gr					
		1.0 Fgr					
		1.5 sd sh					
		2.5 Fgr					
		1.0 CS					
		1.0 Fgr					
34	1.0	1.0 gr sh	0	5	19	34	+
		2.0 sd sh					
		3.0 gr sh					
		3.0 sd sh					
		2.0 gr sh					
		6.0 Fgr sh					
		2.0 gr sh					
35	2.0	2.0 sds h	0	10	23	37	Si Cl
		1.0 Fgr sh					
		1.0 gr sh					
		2.0 gr					
36	0.5	4.5 sd sh	0	4	14	26	rk
		4.0 FS sh					
		2.0 gr					
		5.0 Fgr sh					
		1.5 gr					
37	0.5	1.5 Fgr	0	0	9	23	rk
		2.0 CS					
		1.0 sd sh					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
38	0.5	1.5 gr Si Cl	0	0	8	26	+WL 9.0
		1.0 sd Si Cl					
		3.0 Fgr sh					
		2.0 CS sh					
		1.0 Fgr sh					
39	0.5	0.5 Fgr Si Cl	0	3	15	30	Si Cl
		1.0 Fgr sh					
		1.0 sd sh					
		1.0 Fgr					
		1.0 gr Si Cl					
40	1.0	3.0 gr Si Cl	0	13	23	33	Si Cl
		2.5 sd sh					
		1.5 Fgr sh					
		2.0 gr sh					
		2.0 gr					
		3.0 Fgr sh					
		3.0 sd sh					
41	4.0	1.0 gr Si Cl	0	5	15	27	Si Cl
		1.0 Fgr					
		1.0 gr					
		3.0 sd sh					
		1.0 CS					
		1.0 Fgr Si Cl					
42	2.0	2.5 gr Si Cl	0	4	16	31	Si Cl
		1.5 FS					
		7.0 Fgr sh					
		1.0 sd sh					
		1.0 gr sh					
		1.0 Fgr sh					
		2.0 CS					
43	2.0	1.5 gr Si Cl	0	5	19	35	Si Cl
		0.5 gr					
		1.0 Fgr sh					
		1.0 gr					
		1.0 Fgr sh					
		1.0 gr sh					
		1.0 CS					
		1.0 Fgr					
		2.0 CS sh					
		1.0 Fgr					
44	5.0	1.0 Fgr Si Cl	0	5	14	34	Si Cl
		6.0 Fgr sh					
45	4.0	1.0 sd Si Cl	0	4	16	32	Si Cl
		1.0 gr Si Cl					
46	5.0	2.0 sd Si Cl	0	1	11	22	Si Cl
		1.0 sd sh					
		1.0 Fgr sh					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
47	1.5	1.0 sd Si Cl	0	5	18	32	Si Cl
		0.5 sd					
		1.0 Fgr					
		2.0 gr					
		1.0 Fgr sh					
		2.0 sd					

RANGE 56 **TWP** 134 **SEC** W1/2SE1/4 3

COUNTY Ransom Oct-12

PROSPECTED BY Volk / Nelson

INSPECTED & APPROVED B. Hoesel Nov-12

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	**SS-8-046(025)079**	**180**	**14**

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
R1	3.0	1.0 gr	0	6	13	28	Si Cl
		1.0 Fgr					
R2	0.5	4.5 Fgr	0	5	14	26	Si Cl
		1.0 sd sh					
R3	1.0	1.0 Fgr sh					Si Cl
R4	0.5	0.5 Fgr	0	0	5	20	+WL 4.0
		3.0 CS					
R5	0.5	2.5 CS sh	0	1	5	18	+WL 3.0
R6	2.0	2.0 Fgr sh	0	5	14	29	Si Cl

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole

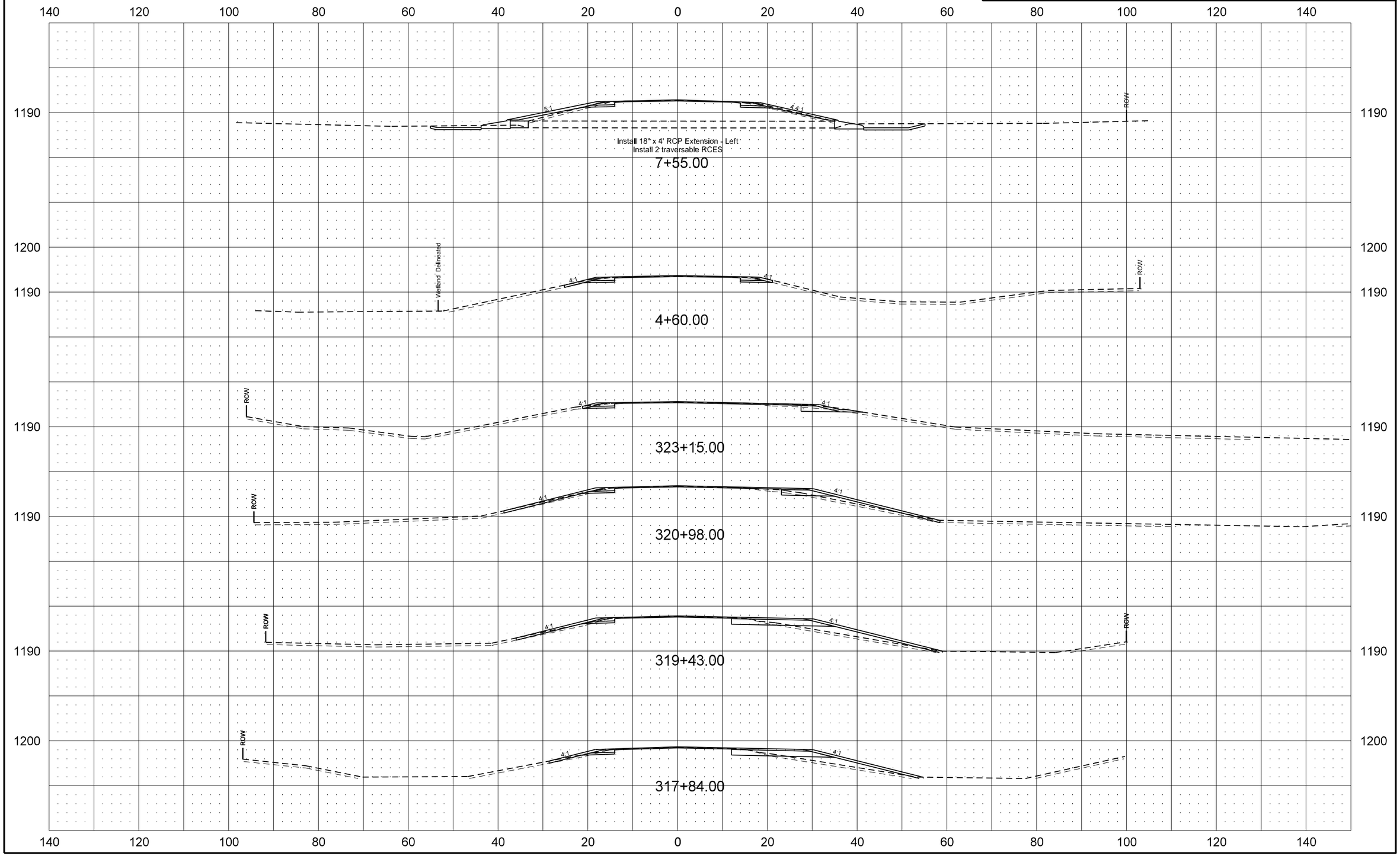
RANGE 56 **TWP** 134 **SEC** W1/2SE1/4 3

COUNTY Ransom Oct-12

PROSPECTED BY Volk / Nelson

INSPECTED & APPROVED B. Hoesel Nov-12

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	200	1



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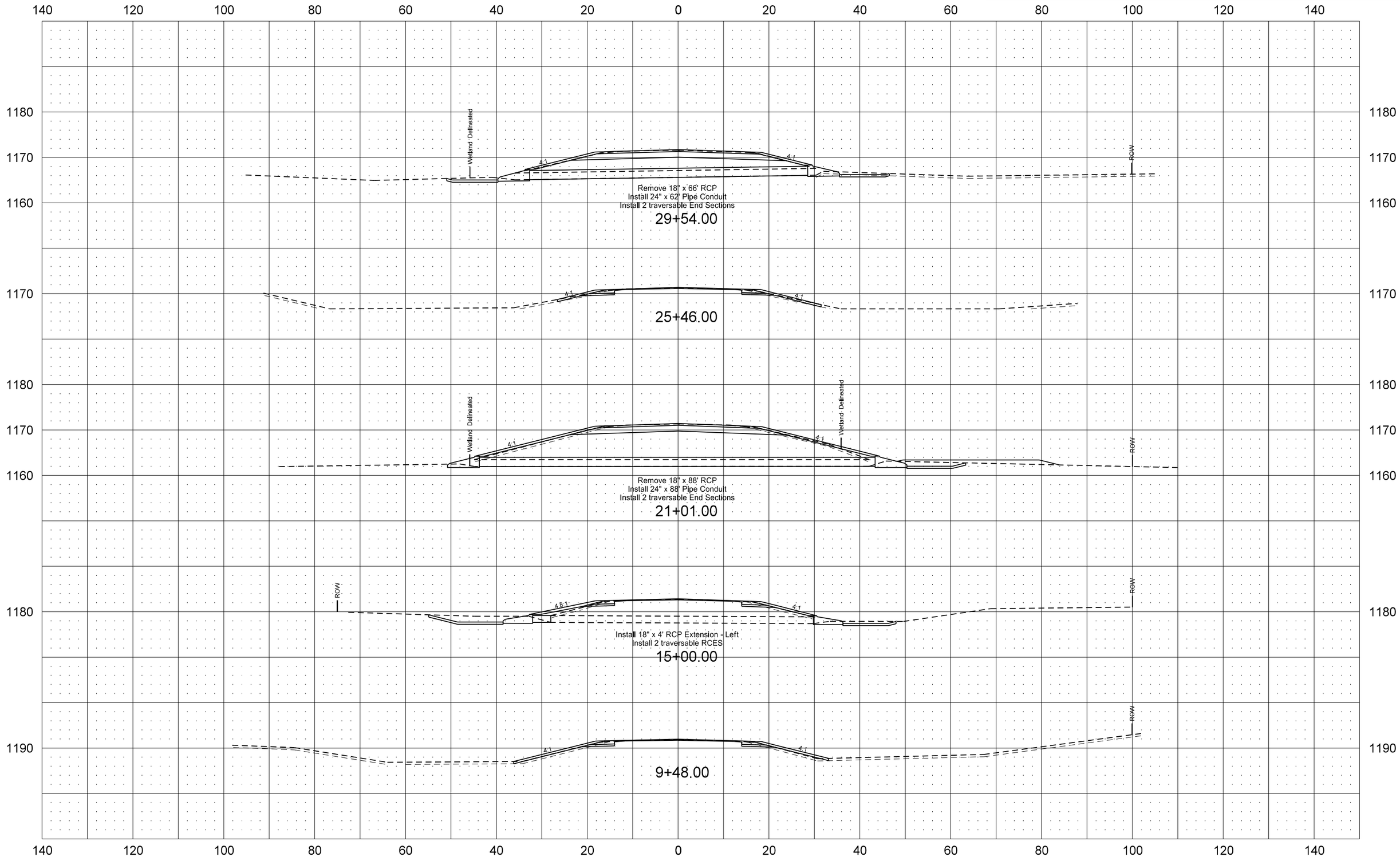
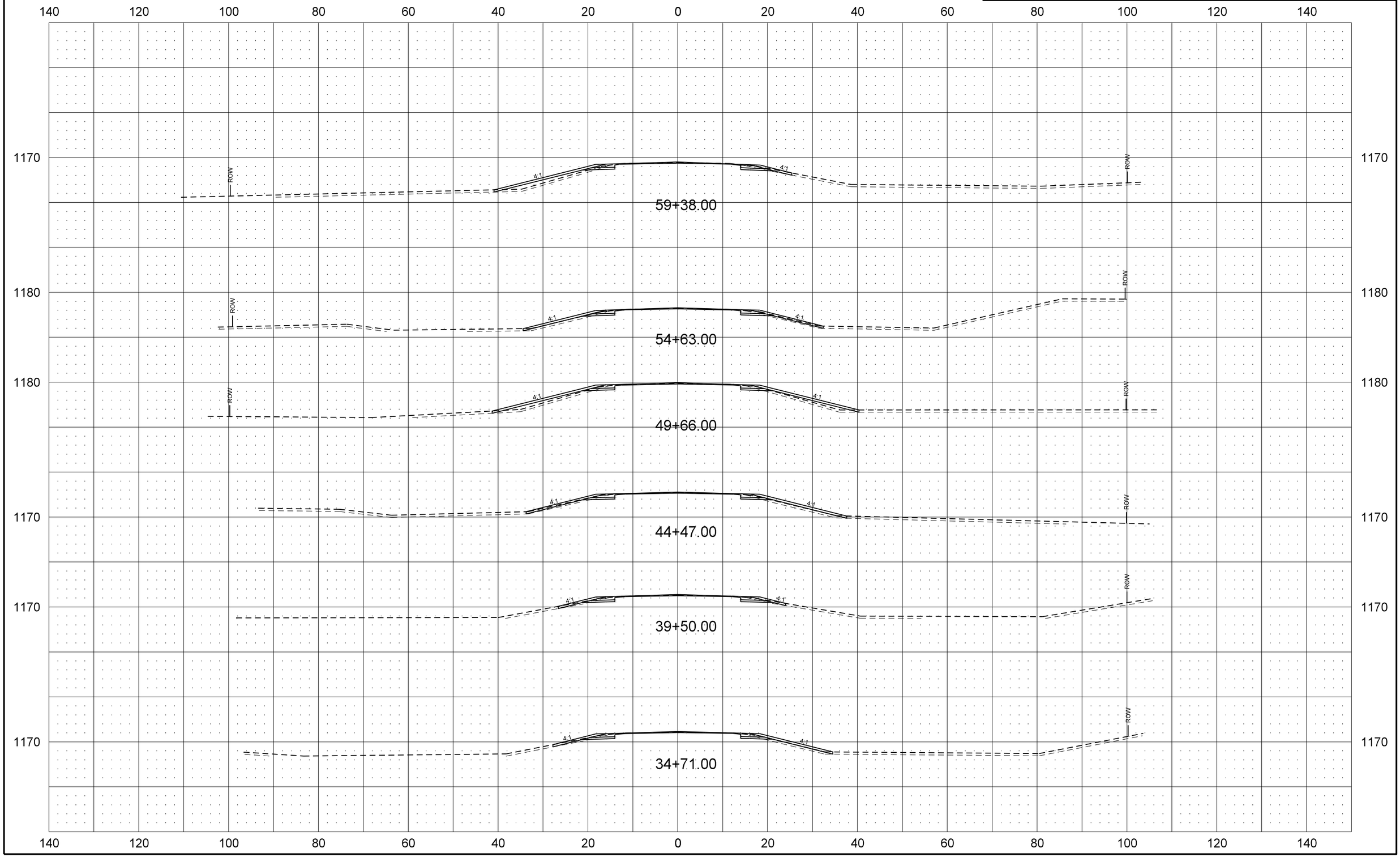
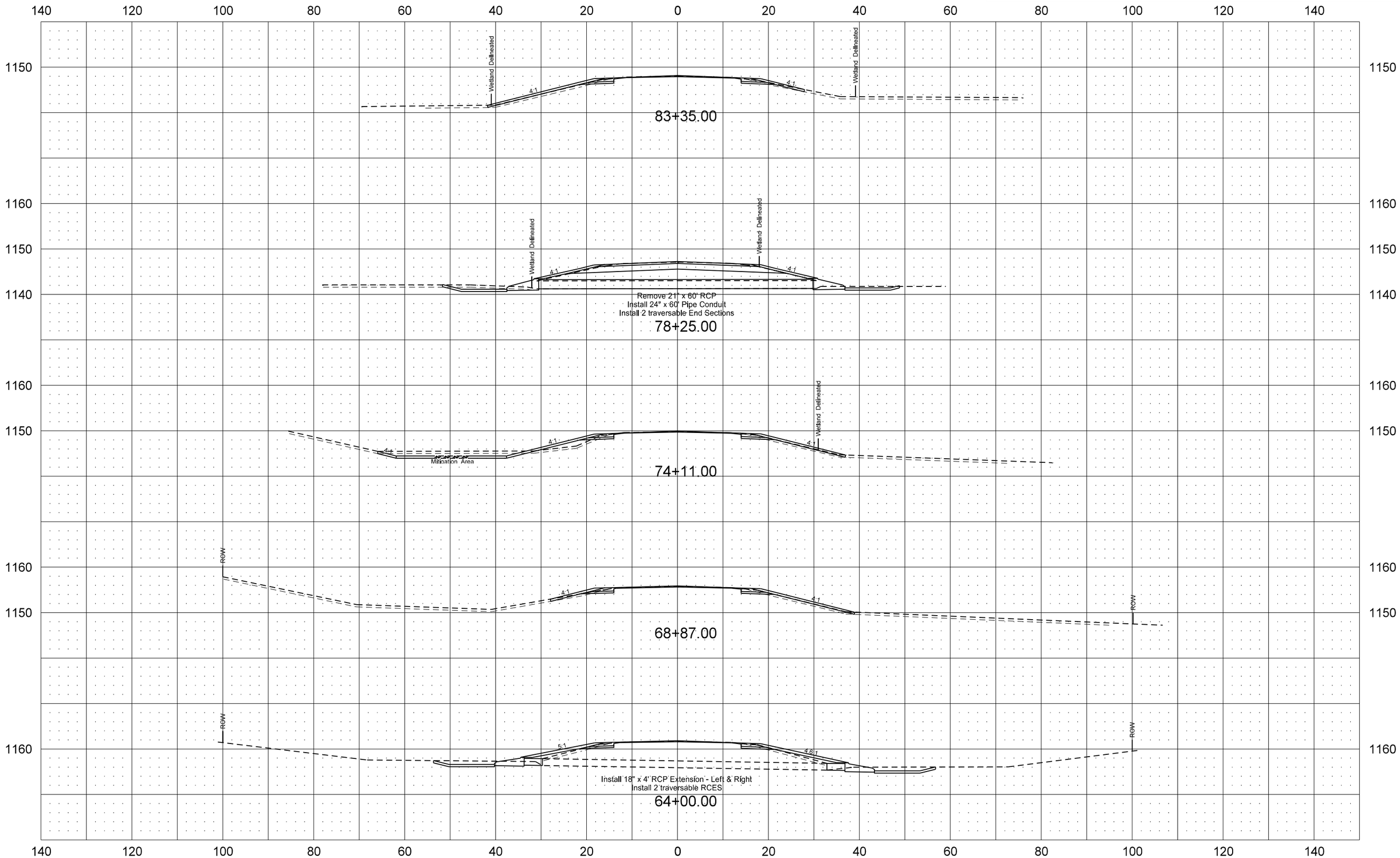
ND	SS-8-046(025)079	200	2



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	200	3



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	200	4



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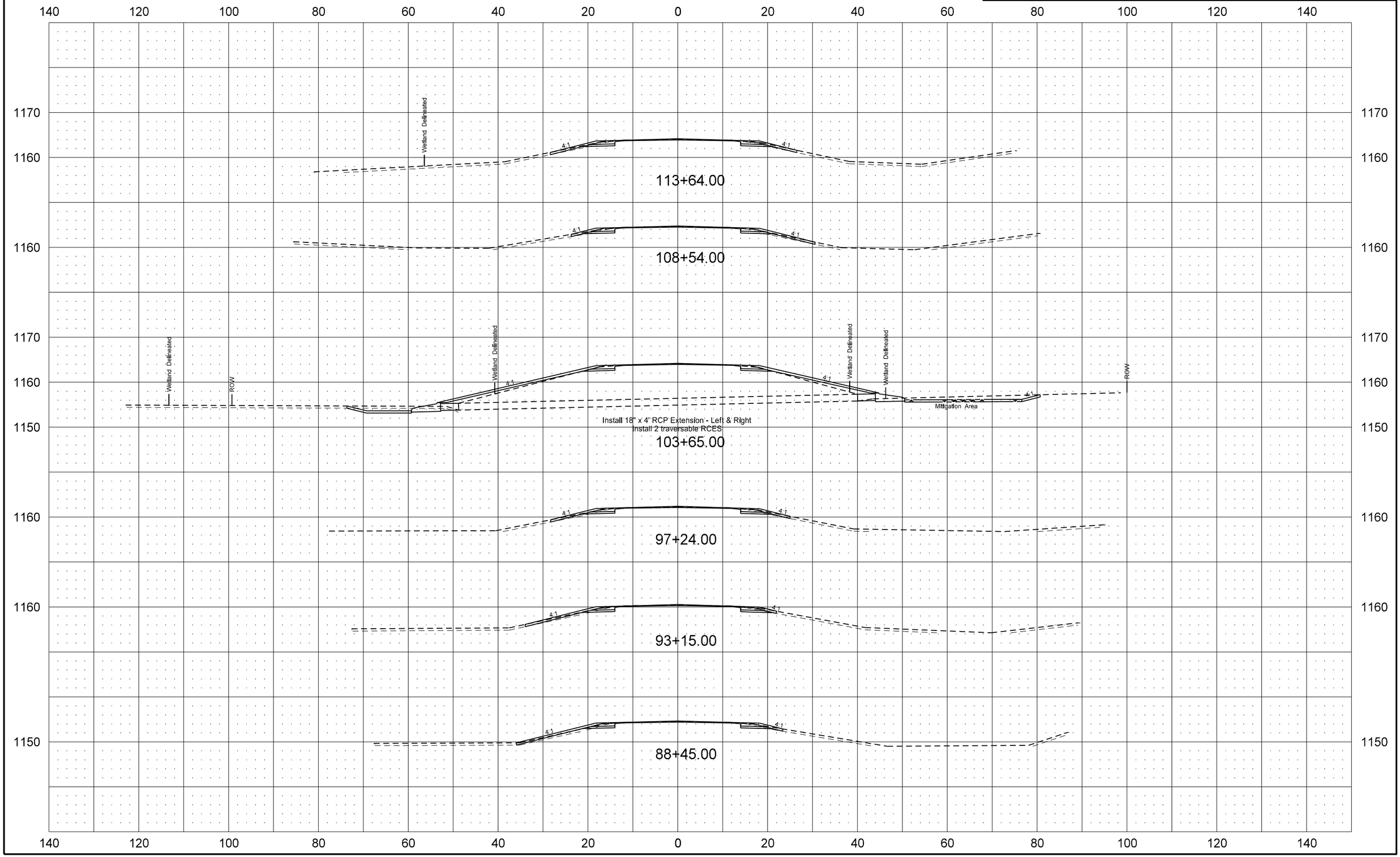
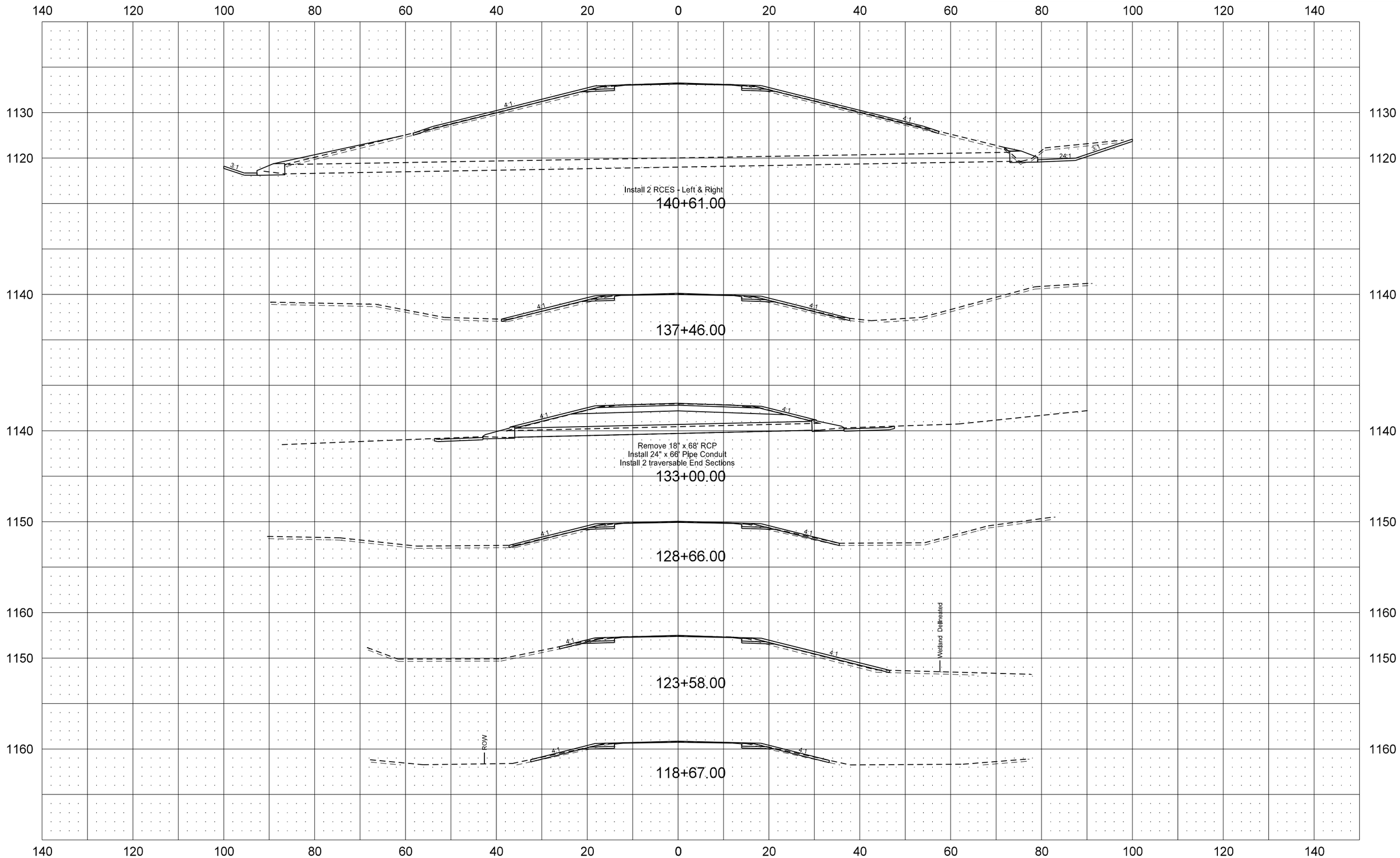
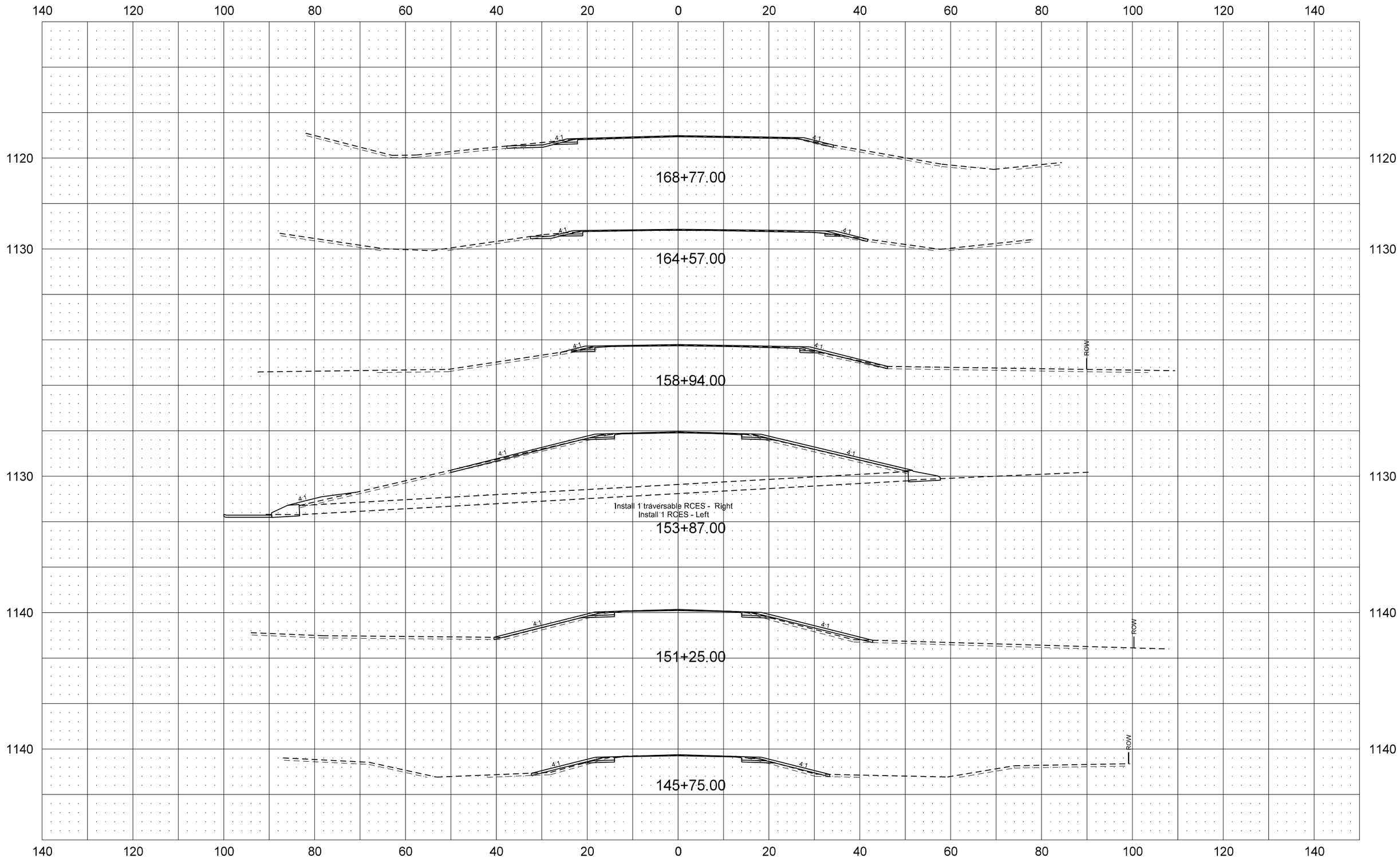
ND	SS-8-046(025)079	200	5



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	200	6



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	200	7



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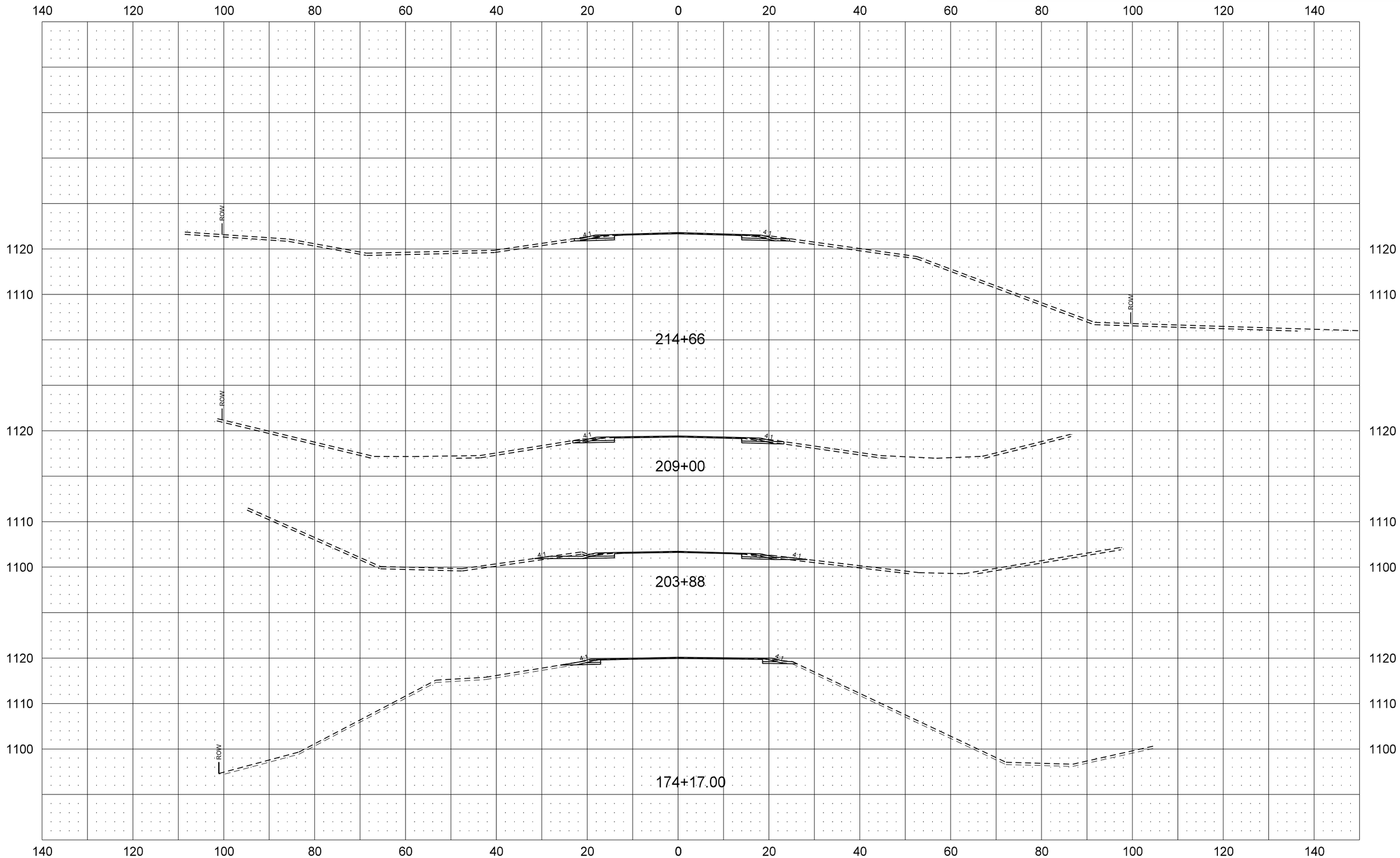
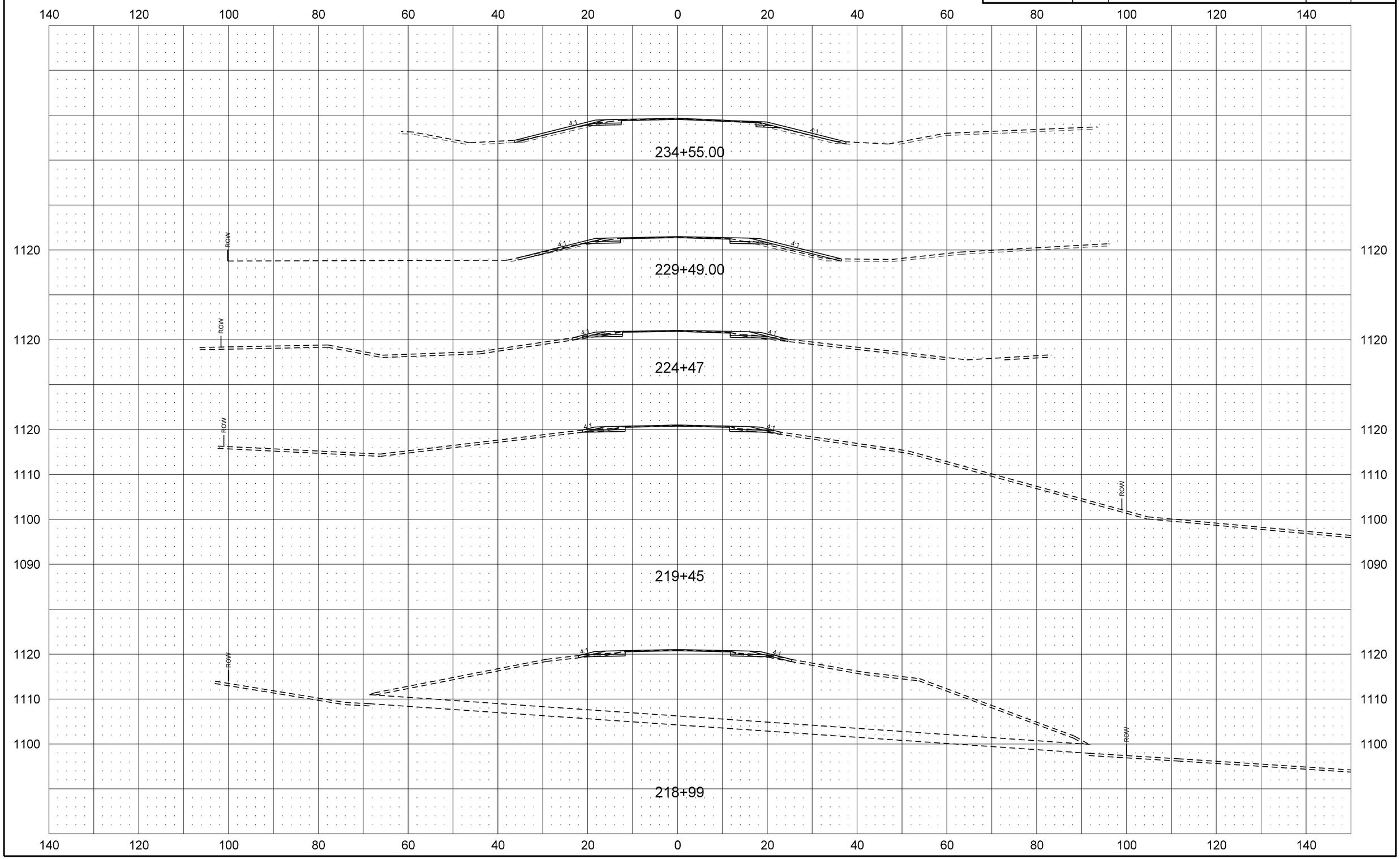
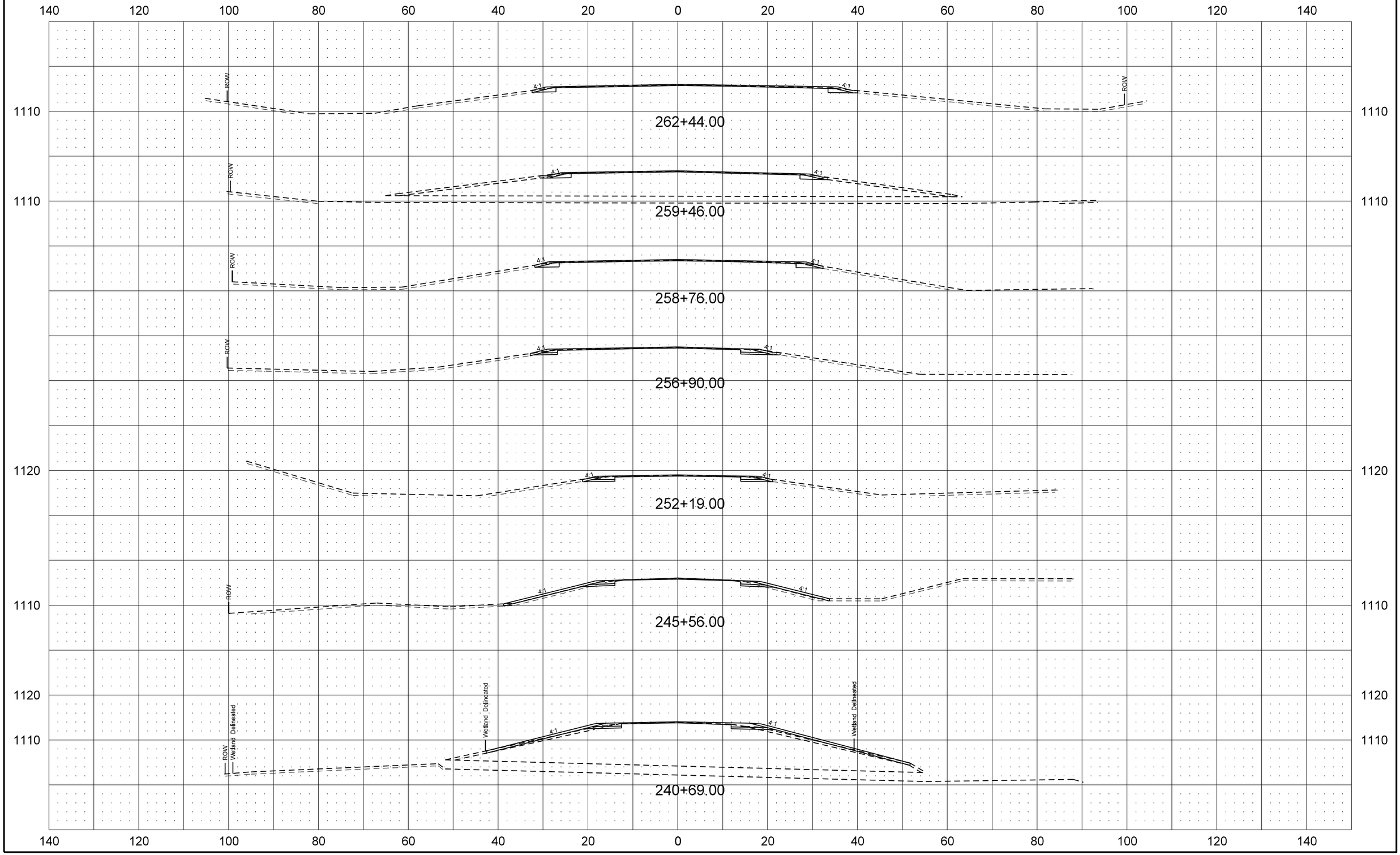
ND	SS-8-046(025)079	200	8



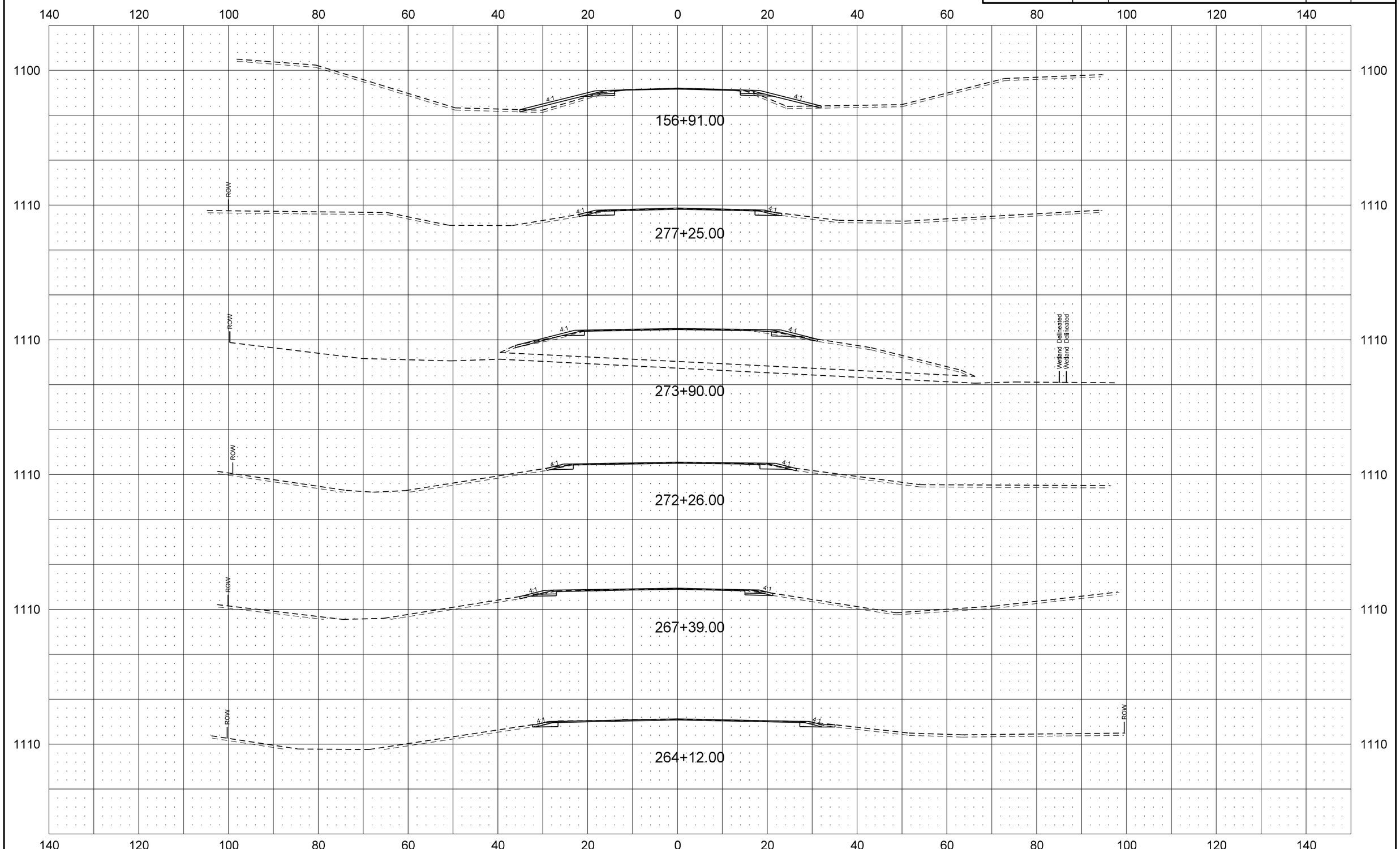
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	200	9



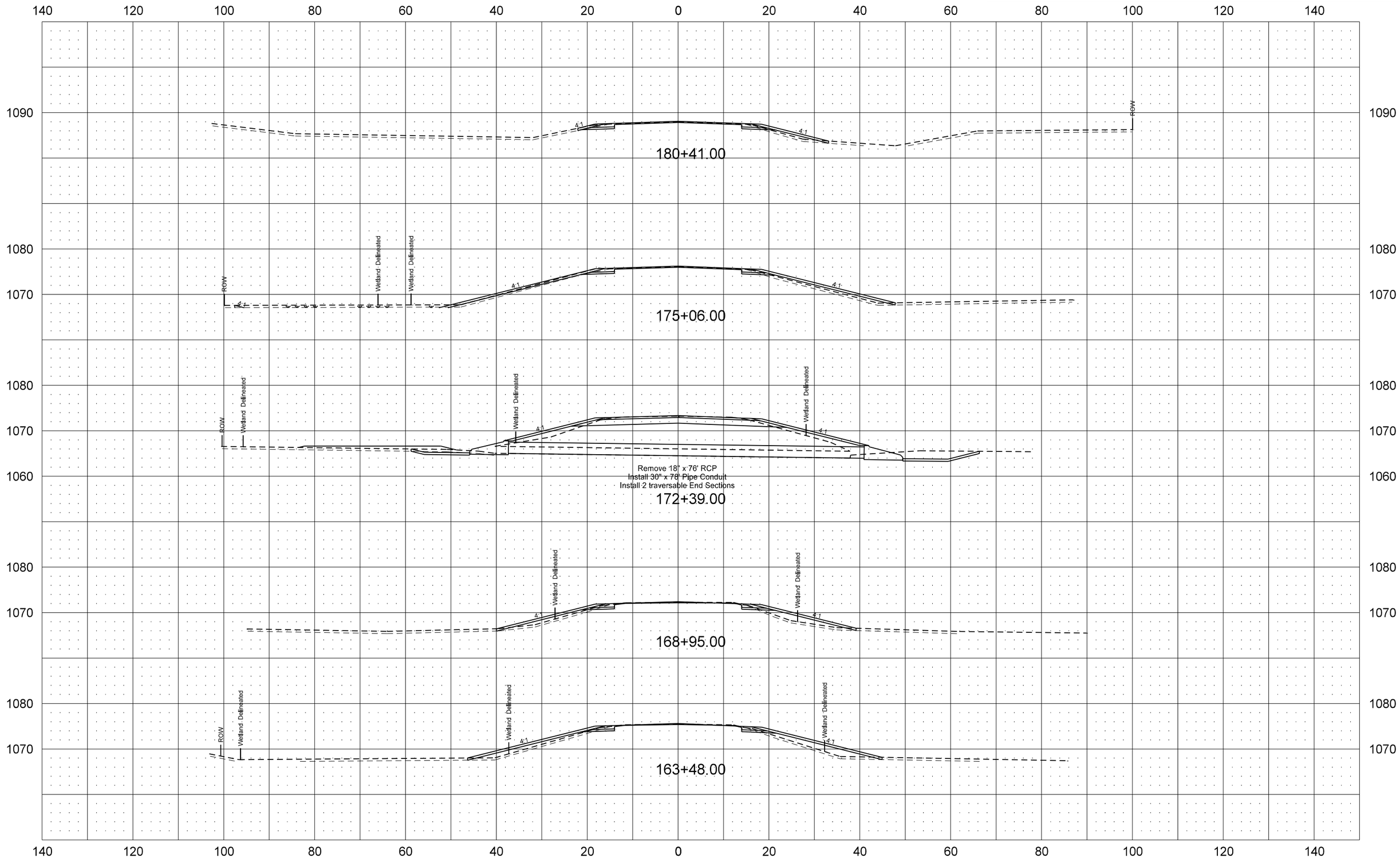
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	200	10



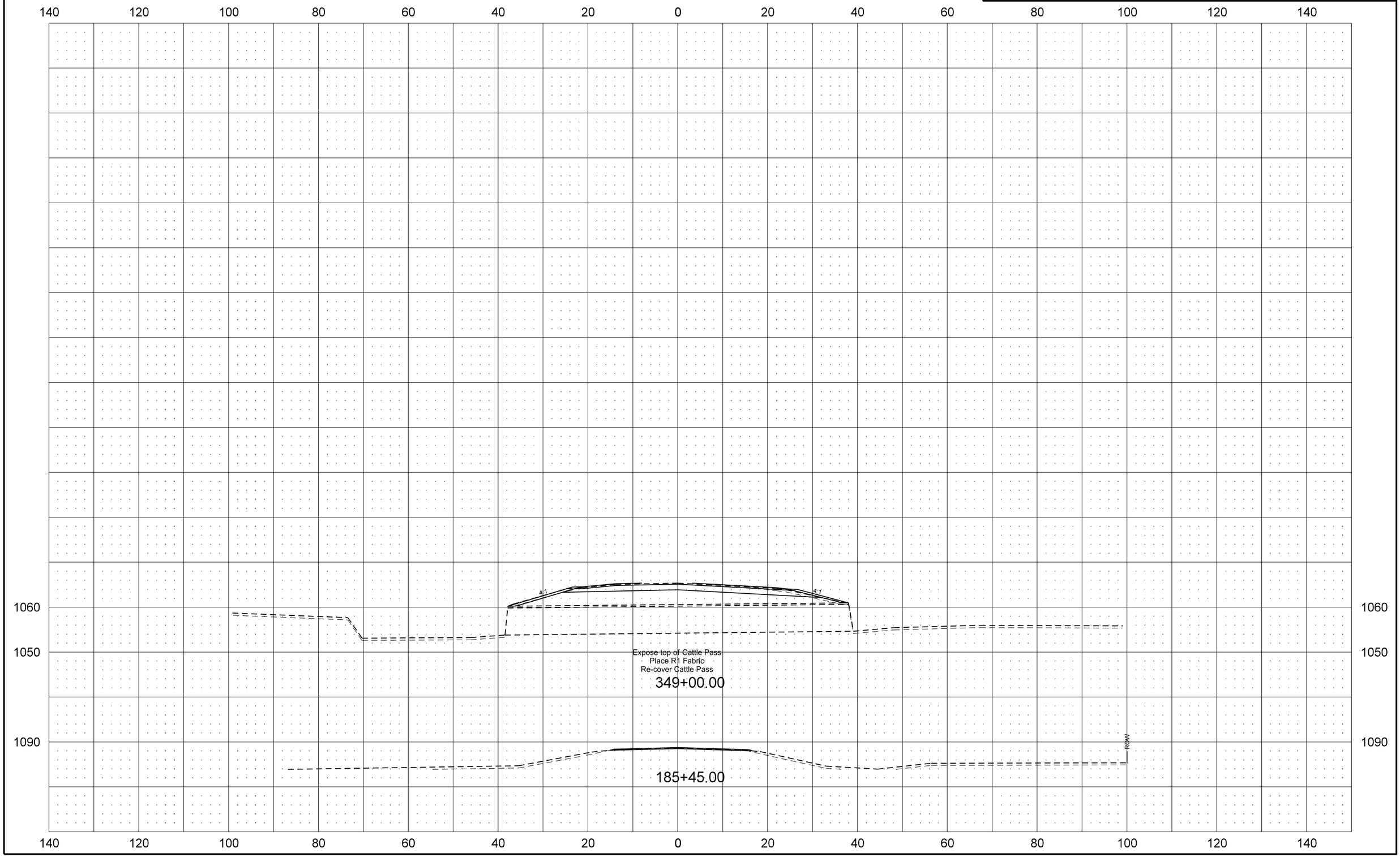
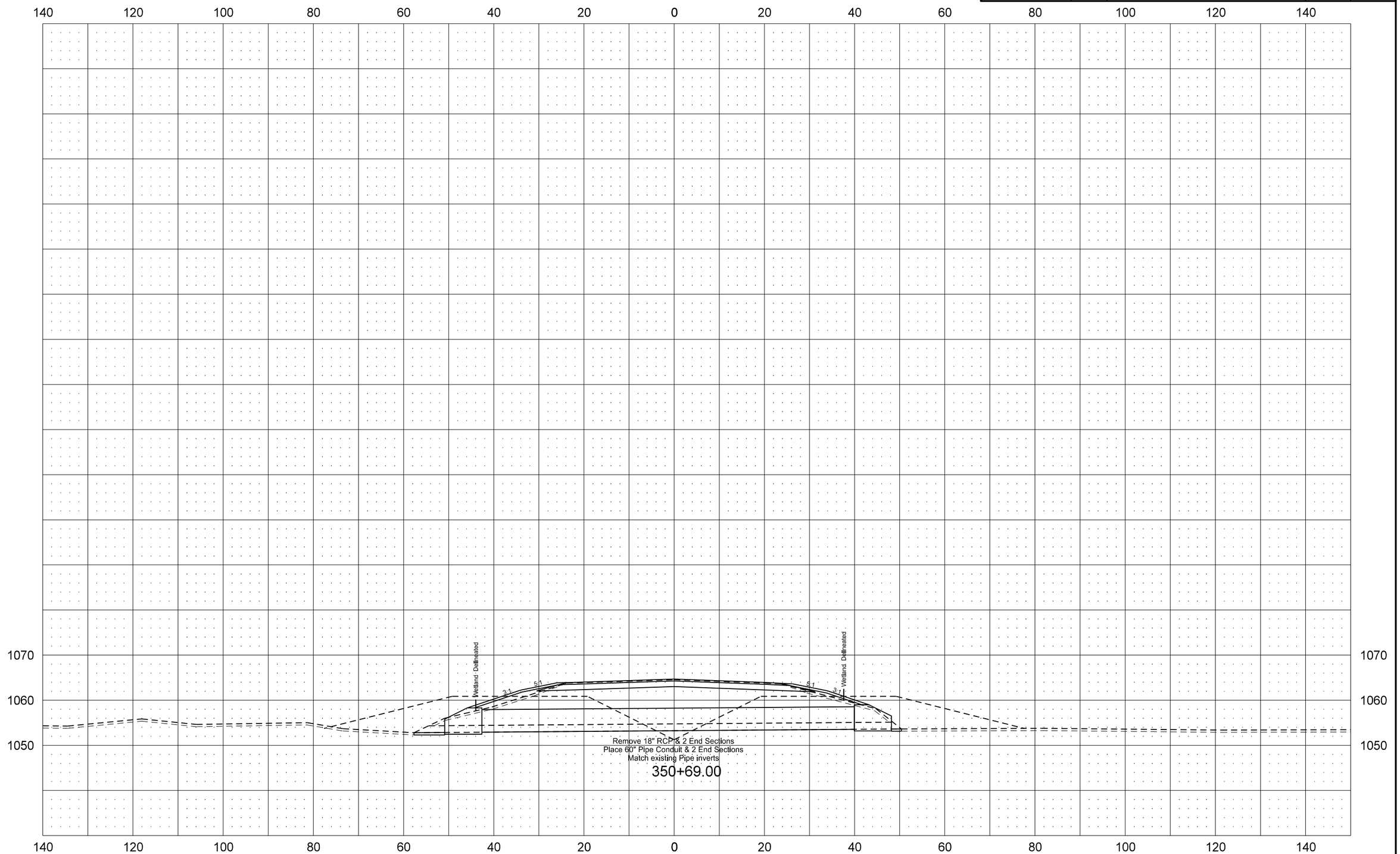
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	200	11



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	200	12



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-8-046(025)079	200	13



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	H-8-046(031)089	200	14