

DESIGN DATA			
Traffic	Average Daily		
Current 2015	Pass: 6,985	Trucks: 890	Total: 7,875
Forecast 2035	Pass: 10,410	Trucks: 1,330	Total: 11,740
Clear Zone Distance: 18'		Design Speed: 40	
Minimum Sight Dist. for Stopping: 305'		Bridges: HL-93	
Sight Dist. for No Passing Zone: N/A			
Pavement Design Life: 30 years (Option #1 - Concrete Surfacing)			
Design Accumulated Heavy Trucks: 6,643,670 (Option #1 - Concrete Surfacing)			
Pavement Design Life: 20 years (Option #2 - Asphalt Surfacing)			
Design Accumulated One-way Flexible ESALs: 2,727,076 (Option #2 - Asphalt Surfacing)			

JOB # 39
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

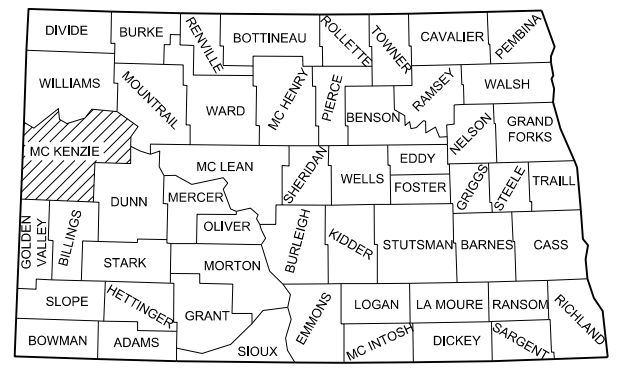
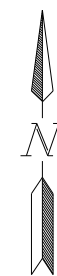
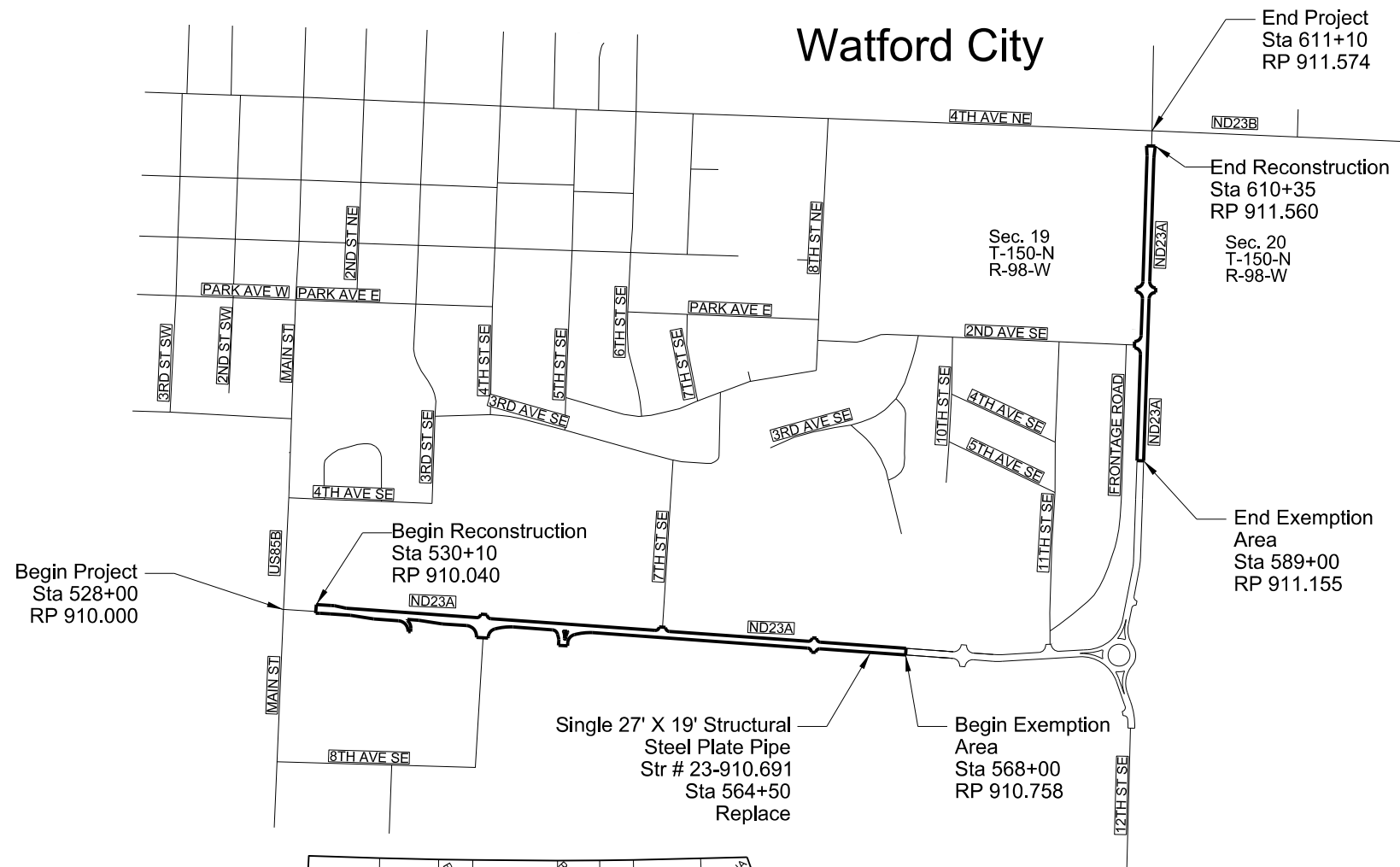
SOIB-CPU-7-023(050)910

McKenzie County
 ND Hwy 23A from Jct US85B to Jct ND23B
 Grading, Concrete / HMA Option, Curb & Gutter,
 Shared Use Path, Structure Replacement, Storm Drain, Lighting

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GOVERNING SPECIFICATIONS:
 2014 Standard Specifications adopted by the North Dakota Department of Transportation and the Supplemental Specifications effective on the date the project is advertised.

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
SOIB-CPU-7-023(050)910	1.123	1.574



STATE COUNTY MAP

DESIGNERS
Gary Brennan /s/
William Doerr /s/
Lucas Doerr /s/
Jon Brosz /s/

APPROVED DATE 08/29/2017
 Roger Weigel /s/
 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 08/25/2017
 William Doerr /s/
 BROSZ ENGINEERING, INC.

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SPECIAL PROVISIONS

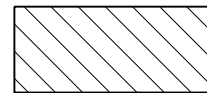
Number	Description
SP 003(14)	Temporary Erosion and Sediment Best Management Practices
SP 004(14)	Federal Migratory Bird Treaty Act
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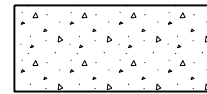
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Number	Description	Number	Description
D-101-1	NDDOT Abbreviations	D-714-28	Transverse Mainline Pipe Installation Detail for Pipes Installed in New Embankment Areas
D-101-2	NDDOT Abbreviations	D-720-1	Standard Monuments And Right Of Way Markers
D-101-3	NDDOT Abbreviations	D-722-1B	Inlet - Special
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D-101-32	Symbols	D-752-1	Standard Barbed Wire Fence
D-203-8	Standard Rural Approaches	D-752-2	Chain Link Fence
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D-704-5	Contractor Sign Detail	D-754-25	Mounting Details Perforated Tube
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D-704-15	Road Closure Layouts	D-754-55	Sign Punching, Stringer And Support Location Details - Route Marker Signs
D-704-19	Road Closure And Lane Closure On A Two Way Road Layouts	D-754-83	Object Markers - Culverts
D-704-20	Terminal And Seal Coat Sign Layouts	D-762-1	Pavement Marking Message Details
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D-704-50	Portable Sign Support Assembly	D-770-3	Pull Box Details
D-706-1	Bituminous Laboratory	D-770-4	Lighting And Signal Details
D-708-6	Erosion And Siltation Controls - Median Or Ditch Inlet Protection	D-770-5	Light Standard Details
D-714-1	Reinforced Concrete Pipe Culverts And End Sections (Round Pipe)		
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D-714-22	Concrete Pipe Or Precast Concrete Box Culvert Ties		
D-714-25	Transverse Mainline Pipe Installation Detail for Pipes More Than 4 Feet Below Top of the Proposed Subgrade		
D-714-25M	Transverse Mainline Pipe Installation Detail for Multiple Pipes More Than 4 Feet Below the Top of Subgrade		
D-714-26	Transverse Mainline Pipe Installation Detail for Pipes 4 Feet or Less Below Top of the Proposed Subgrade		
D-714-26M	Transverse Mainline Pipe Installation Detail for Multiple Pipes 4 Feet or Less Below Top of Subgrade		
D-714-27	Pipe Installation Detail for Longitudinal Mainline Pipe or Pipe Not Under the Roadway		
D-714-27M	Pipe Installation Detail for Multiple Longitudinal Mainline Pipe or Pipe Not Under Roadway		

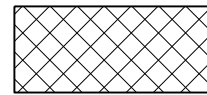
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Shared Use Path

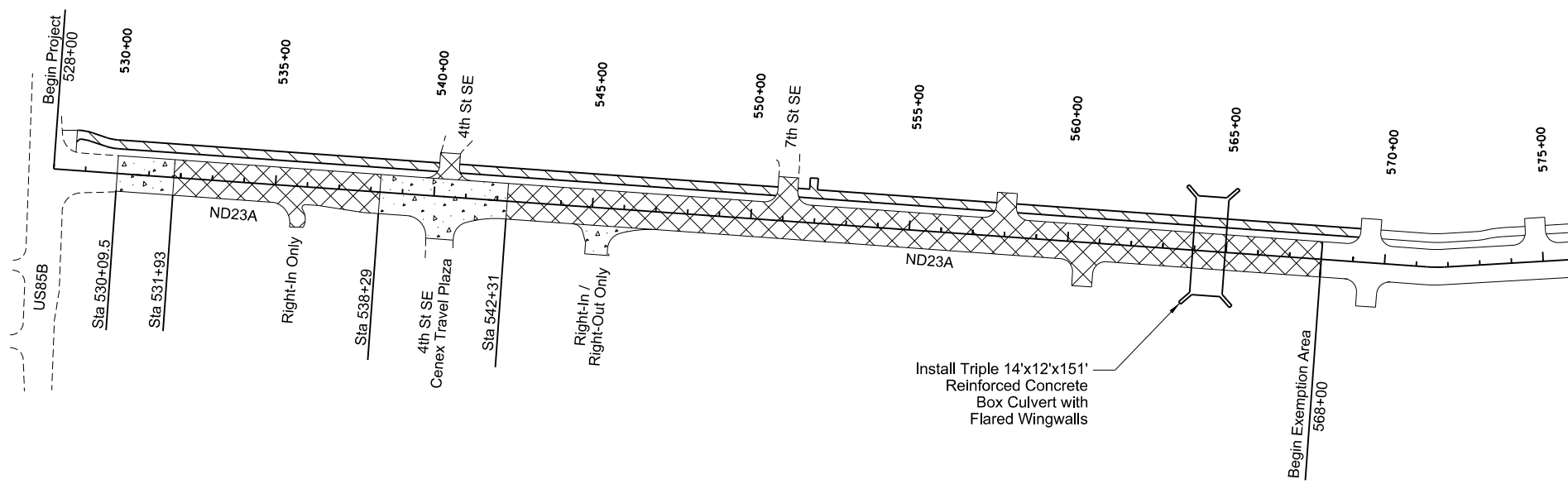
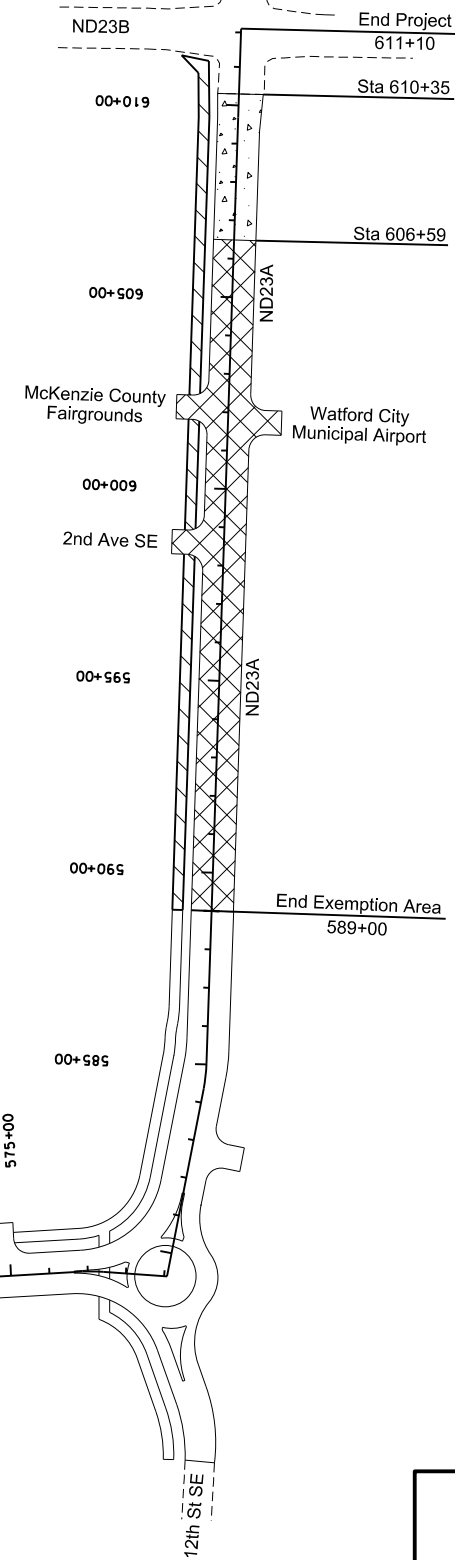


Reconstruction, Concrete Surfacing, Curb & Gutter, Storm Drain, Lighting



Reconstruction, Optional Surfacing*, Curb & Gutter, Storm Drain, Lighting

* Option 1: 9" Non-Reinforced Concrete Pavement - Doweled
Option 2: 6" Superpave FAA 45



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Scope of Work
ND23A
US85B to ND23B

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NOTES

- 100-P01 MCKENZIE COUNTY FAIR: Do not perform any construction activities between the intersections of 2nd Avenue SE and ND 23B during the 2018 McKenzie County Fair; July 5th, 6th and 7th. Provide and maintain full, two-way access to the Fairgrounds via the approach at Station 601+42 Lt. and the 2nd Avenue SE intersection.
- 105-110 PAVEMENT SWEEPING: Sweep paved areas that were used by construction traffic before opening these areas to public traffic. Sweep all newly constructed pavement no more than 24 hours before a scheduled final inspection. Use a vacuum or pick-up type sweeper to perform this work.
- 105-200 UTILITY COORDINATION: A utility coordination meeting is required.
- 105-P01 WATER LINE ADJUSTMENTS: Coordinate with McKenzie County Water Resource District and Western Area Water Supply Authority regarding the water main adjustments that are required from Station 589+00 Rt to 609+50 Rt. Phase your construction activities to allow them the opportunity and work area necessary to relocate their water mains by June 16, 2018.
- 107-P01 MAINTAINING TRAFFIC –DROP-OFFS: If, at the end of the work-day, drop-offs greater than 2 inches and less than 18 inches or slopes steeper than 4:1 exist between the edge of a traffic lane and the outside edge of the proposed roadway, perform one of the following actions:
- Construct a traversable wedge in the area of the drop-off or steep slope; or
 - Close the lane adjacent to the drop-off or steep slope and provide 24-hour flagging or pilot car operations.
- When constructing a wedge, construct a wedge composed of aggregate or earthen materials with a 4:1 or flatter slope along the entire length of the area. Compact materials using Type C compaction, as specified in 203.04 E.4, "Compaction Control Type C".
- Install stackable vertical panels that meet the requirements of Section 704.03 H, "Stackable Vertical Panels", along the edge of the driving lane closest to the wedge.
- The Engineer will measure stackable vertical panels as specified in Section 704.05, "Method of Measurement" and will pay for panels as specified in Section 704.06, "Basis of Payment".
- The Engineer will not measure material used to construct the wedge. Include the cost of materials, equipment, labor, and incidentals required for this operation in the price bid for "Salvaged Base Course."
- If a 4:1 or flatter wedge is not installed, provide 24 hour flagging or pilot car operations and associated traffic control at no additional cost to the Department.
- The requirements of Section 704.04 O, "Traffic Control for Uneven Pavement" apply to drop-offs created by milling or the placement of hot mix asphalt.
- 108-100 WEEKLY PLANNING & REPORTING MEETING: A weekly planning and reporting meeting is required.
- 202-P01 REMOVAL OF PAVEMENT: The tonnage of "Removal of Pavement" is based on the existing typical section shown in Section 30. The tonnage includes the entire bituminous surfacing and the entire aggregate base except the bottom one inch. The quantity of "Removal of Pavement" has been deducted from the excavation quantity.
- 203-010 SHRINKAGE: 25 percent additional volume is included for shrinkage in earth embankment.

- 203-P01 COMMON EXCAVATION TYPE A: There will be approximately 24,899 CY and 23,847 CY of excess excavation for Options 1 and 2 respectively, as shown on the Earthwork Summary Tables in Section 11. Remove the excess excavation from the project. Include all costs to accomplish this work, including securing a Contractor furnished waste site, loading, hauling and disposing of the excess excavation, in the unit price bid for "Common Excavation-Type A."
- Common Excavation will be measured by recross after each phase of the project.
- 203-P02 TEMPORARY BYPASS: The earthwork quantities necessary to construct the Temporary Bypass are shown in Phase 1 of the Earthwork Summary. The earthwork quantities necessary to remove the Temporary Bypass are shown in Phase 3 of the Earthwork Summary.
- 203-P03 CONTRACTOR FURNISHED BORROW: Furnish the Borrow Excavation material necessary to complete the project.
- 203-P04 PROCTORS: Determine the optimum moisture and density, as specified in ND T 180, for each type of material encountered that requires compaction control. Perform a multi-point test. Submit the results to the Engineer along with a split sample of each material.
- The Engineer will perform comparison tests using the same procedure on the split sample. The Engineer's results will be used for determining in place density of material.
- 302-110 BASE COURSE: Trim base course as specified in Section 302.04 C.1, "Surface Tolerance Type B."
- 302-P01 TRAFFIC SERVICE AGGREGATE: Do not remove the Traffic Service Aggregate installed on the widened subgrade shown on Section 30; Sheet 4. Instead, leave this material in place to be used as embankment for the finished roadway section. The volume of Traffic Service Aggregate left in place is reflected in the earthwork quantities.
- Remove the Traffic Service Aggregate installed on the Temporary Bypass shown on Section 30; Sheet 5. Include all costs to remove and dispose of the Traffic Service Aggregate in the unit price bid for "Traffic Service Aggregate."
- 430-100 HMA LONGITUDINAL JOINTS: Construct the joints within the final lift of pavement as detailed within this note. Place a longitudinal joint at the centerline of the roadway. Construct each lane and the adjoining shoulder using a single pass or a hot seam. A hot seam is defined as follows:
- Constructed using two pavers simultaneously;
 - No more than 300 feet between pavers; and
 - Roll the seam between paver passes in a manner such that the seam is not visible.
- 430-P01 COMMERCIAL GRADE ASPHALT: Commercial Grade Asphalt and the associated Special Provision are only applicable to the contract being awarded for Option #1 – Concrete Surfacing.
- 704-100 TRAFFIC CONTROL SUPERVISOR: Provide a Traffic Control Supervisor.

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704-255 TRAFFIC CONTROL FOR SHOULDER DROP-OFF: If the shoulder and adjacent driving lane are not even at the end of the day, the following criteria will apply:

Place the following sign assembly at the locations listed below.

Sign Assembly: Sign No. W8-9a-48 "Shoulder Drop Off" and supplemental plate Sign No. W20-52-54 to identify the distance.

Locations:

- In advance of the drop off;
- Spaced at each mile from the advance sign; and
- At major intersections (CMC routes, state and US highways, and Interstate Ramps). If the difference in elevation between the shoulder and driving lane is 2" or greater, construct a slough on the driving lane that is 4:1 or flatter.

If the difference in elevation between the shoulder and driving lane is less than 2", no slough is required. Sign assemblies will be measured and paid for according to Section 704 "Temporary Traffic Control".

704-P01 TRAFFIC CONTROL: Maintain two-way, two-lane traffic at all times with exception of the tie-in locations. Provide two-way, two-lane traffic at the end of each work day throughout the project. The traffic control devices will comply with the following Standard Drawings:

- D-704-7, 8, 9, 10, 11, 13, 14 and 50
- D-704-15, Layout Type A
- D-704-19, Layout Type F
- D-704-20, Layout Type G
- D-704-22, Layout Type K and Type L
- D-704-24, Layout U
- D-704-26, Layout Type BB, EE and FF

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 will be the Contractor's responsibility.

704-P02 TRAFFIC CONTROL PHASING: The traffic control phases are as follows:

Phase I: Maintain traffic on the existing roadway. Perform earthwork operations on the left side of the roadway. Do not place embankment to final elevations but instead extend the proposed mainline subgrade out to the over-widened point shown in Section 30. Install storm drain and inlets left of the existing roadway. Install traffic service aggregate and dust palliative material. Construct the temporary bypass for the structure replacement.

Phase II: Maintain traffic on the over-widened, temporary road and temporary bypass constructed in Phase I. Complete all improvements on the proposed roadway and on the right side of the proposed roadway to final stages, including but not limited to: earthwork operations, approaches, culverts, storm drain, inlets, salvaged base course, curb & gutter, pavement surfacing, topsoil, pavement markings, signs and box culvert installation.

Phase III: Maintain traffic on the finished roadway constructed in Phase II. Complete all improvements on the left side of the roadway to final stages, including but not limited to: earthwork operations, removal of over-widening, removal of temporary bypass, culverts, storm drain, inlets, salvaged base course, shared use path and topsoil.

See Section 100 for additional details.

706-P01 FIELD OFFICE: Provide a field office that meets the following requirements:

1. Minimum total area of 450 square feet
2. Minimum cabinet space of 32 cubic feet
3. Minimum counter space of 40 square feet
4. Air conditioner with a minimum of 20,000 BTU's
5. Lighting with a minimum of 110 foot-candles
6. Minimum of 3 phone jacks
7. Fax Machine
8. Photocopy machine/scanner/printer capable of 11X17 photocopies, scanning, and printing with toner to last the duration of the project. The Engineer will be responsible to furnish the paper.
9. Hookups for heat, electricity, sewer, and water. The Contractor will be responsible to pay the utility bill for these services.
10. Indoor bathroom facilities
11. Broadband internet services with wi-fi.

Place the field office on the project, or as close to the project as possible. The Engineer must approve the location and condition of the field office. The Contractor will be responsible to pay any rental fees.

The field office will be available for occupancy at the start of the project and remain available to project completion. The Engineer will be responsible to furnish the office equipment. The Engineer will be responsible to furnish and pay the utility bill for the Telephone and FAX services.

All requirements of the Field Office are subject to approval by the Engineer. Payment for the field office is under the bid item "Field Office".

714-P01 STORM DRAIN: Provide gaskets for all joints capable of remaining watertight and that meet the following requirements:

- ASTM C443 for concrete pipe
- ASTM D1056 for spiral ribbed steel pipe

714-P02 EXISTING STORM SEWER: Remove 14 LF of the existing 30" concrete storm sewer located at Sta 594+14 Lt. Furnish and install a 30" Reinforced Concrete Flared End Section that has a female end at the connection point.

720-P01 REMOVE PINS AND MARKERS: Include the cost to remove the existing Iron Pins and Right of Way Markers identified in the plans in the contract unit price bid for related items.

722-P01 STORM DRAIN INLETS AND MANHOLES: Remove all storm drain that protrudes more than 2 inches past the inner wall of the inlet or manhole. Include all costs to accomplish this work in the price bid for the respective inlet or manhole.

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724-P01 WATERLINE: To conform to the City of Watford City's standards, furnish and install waterline materials that meet the following:

- Water piping and fittings that conform to the latest standards issued by ASTM, AWWA, NSF/ANSI and AASHTO.
- SDR-18, Class 235 PVC that meets the requirements of AWWA C 900. Use an internally restrained pipe, JM Eagle LOC or approved equal.
- Polyethylene Pipe for water service must meet AWWA Specification C901 and be DR 11 Class 200.
- Joints and fittings meeting the requirements of AWWA that are ductile iron pipe with nominal 10 mils Fusion Epoxy Coated exterior surfaces, ANSI Schedule 40 meeting the requirements of ASTM 53, cement lined inside in accordance to ANSI/AWWA C104/A21.4.
- Polyethylene encasement for gray and ductile cast iron piping on all joints, fittings, valves, fire hydrant risers, etc. Polyethylene film meeting the material requirements of the latest revision of ANSI/AWWA C105/A21.5 having a minimum thickness of 0.008 in (8 mils). Seal all ends to the adjoining pipe.
- ROMAC Alpha Restrained Joint or Hymax Grip Wide Range Restrained Couplings or approved equal for all unions, connections and end caps.
- Install fittings 4 inch and larger with MEGALUG Joint Restraints. Use compression fittings for pipe smaller than 4 inches.
- Stainless steel hardware, including all nuts, bolts and washers.
- Fire hydrants must comply with AWWA C-502 with three (3) nozzles (steamer & (2)-hose line). Use a minimum seven (7) foot bury depth. Install the fire hydrant on an 18" X 18" X 6" concrete block, with a concrete thrust block and 1/2 cubic yard rock bedding to act as a drain field for the water discharged during closure. Fire hydrants must be Waterous WB-67.
- Gate valves 2 inches and larger that are iron body, brass mounted and conform to Clow Resilient Wedge Valve or approved equal that meet all pertinent requirements of AWWA Standard C500 or to Fed. Spec. WW V 58, Class A. Gate valves designed for a minimum water working pressure of 150 psi. Use valves with mechanical joint ends. Use valves with a clear waterway equal to the full nominal diameter of the valves, opened by turning the system counter-clockwise. Cast an arrow in the metal of the operating nut that indicates the direction of opening. Cast the maker's initials, pressure rating and year of manufacture into the body of each valve. Prior to shipment from the factory, test each valve by hydraulic pressure equal to twice the specified water working pressure.
- Valve boxes constructed of cast iron complete with a standard non-locking covers stamped "WATER". Provide valve boxes of screw extension type for vertical adjustment with threaded base for Minneapolis Pattern Curb Stops and of flared and saddle base type for all larger valves such as main line valves, etc.
- Furnish Curb Stops that are a single piece bronze tee head and stem, designed to withstand pipe strain. Checks or stops cast in body must allow ninety (90) degrees motion and be enclosed and protected. Furnish extension-type curb boxes for Minneapolis Patter Curb Stops. Lids must have brass pentagon head plug.
- 12 AWG solid, PRO-TRACE HF-CCS PE45 tracer wire for open-trench installation. Use soft-drawn, 21% IACS, copper clad steel conductor with a AISI 1006 low carbon steel core (required to meet break load and flexibility), with break load of 282 lbs (55,000 psi). Extrude the conductor with a 45 mil high density polyethylene that meets the APWA color code blue. Use tracer wire rated for direct burial use at 30 volts and RoHS compliant. Use PRO-TRACE, HF-CCS PE45 tracer wire as manufactured by PRO-Line Safety Products and made in the USA, or an approved equal. Install tracer wire with 2 Color Coded Copperhead Snake Pit Magnetized Heavy Duty Roadway Tracer Boxes at all gate valves or fire hydrants. Include all costs to furnish and install the tracer wire in the corresponding waterline bid items.

- Do not discharge chlorinated disinfection water into a stream or tributary. De-chlorinate prior to discharge.
- Provide a detailed plan for all operations and equipment needed to complete any water shutdown, including an emergency plan to the City of Watford City.

724-P02 AIR RELIEF VALVE & MANHOLE: Furnish a 2-inch A.R.I. D-040-P or approved equal air release & vacuum valve equipped with a shutoff valve. The float must be stainless steel 304SS standard, the balance of internal parts must be stainless steel and Delrin, and the seals must be nitrile rubber or Viton. The valves must be accessible for maintenance without removing the device from the line. Install a T-post service marker with the top 3 feet painted blue next to the manhole. Include all costs associated with the labor and materials necessary to construct the system including, but not limited to: air relief valve and vacuum valve; shutoff valves; 48 inch concrete manhole; D & L A-1172 valve manhole frame with insulated locking lid; fittings, pipe, tees, bends, valves, reducers located within the manhole; drain pipe; service marker; drainage rock, in the unit price bid for "Air Relief Valve & Manhole".

748-P01 CURB & GUTTER DEPTH: Construct all curb and gutter and valley gutter to the depth of the concrete pavement adjacent to the gutter.

920-P01 DUST PALLIATIVE MATERIAL: Upon placement of the Traffic Service Aggregate, incorporate a dust control solution into the top 4" of the aggregate material. Provide a solution containing a minimum of 30% Magnesium Chloride or Calcium Chloride. Apply the liquid solution in two separate applications. Apply the first application at a rate of 0.5 Gallons per Square Yard of aggregate surfacing, allow the solution to penetrate to a 4" depth and then immediately compact the aggregate. Apply the second application at a rate of 0.3 GAL/SY at a later date to be determined by the Engineer. Apply the second application to the compacted surface. Include all labor, materials and equipment associated with the placement in the unit price bid for "Dust Palliative Material".

Only apply the Magnesium Chloride or Calcium Chloride solution to the Traffic Service Aggregate as shown in Section 30. Apply water at a rate of 25 MGal/Mile for Dust Palliative at all other locations.

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NOTES

770-P01 BREAKAWAY LIGHTING STANDARDS 6FT MA 40FT MT HT. Refer to standard drawing D-770-5. Provide light standards that have a davit type mast arm and have factory installed internal vibration dampeners. Provide all light standards with a transformer type base and ensure bases are installed on a concrete foundation. Breakaway type base is required. Duct seal all conduit stubs in the concrete foundation. Install hand holes so that they face opposite the side towards the curb or roadway edge. Provide and apply an anti-corrosion compound to all anchor bolts and nuts. Anchor bolt spacing to accommodate poles shall be verified in the field prior to pouring foundations. Provide and install a spare conduit sweep in foundations with only one conduit run shown to them or as shown on the plans.

770-P02 BREAKAWAY LIGHTING STANDARDS 3FT MA 15FT MT HT. Refer to standard drawing D-770-5. Provide light standards that have a davit type mast arm and have factory installed internal vibration dampeners. Provide all light standards with a transformer type base and ensure bases are installed on a concrete foundation. Breakaway type base is required. Duct seal all conduit stubs in the concrete foundation. Install hand holes so that they face opposite the side towards the curb or roadway edge. Provide and apply an anti-corrosion compound to all anchor bolts and nuts. Anchor bolt spacing to accommodate poles shall be verified in the field prior to pouring foundations. Provide and install a spare conduit sweep in foundations with only one conduit run shown to them or as shown on the plans.

770-P03 CONDUIT: Conduit types may be either schedule 40 PVC or HDPE conduit with a wall thickness equivalent to schedule 40 (Refer to NDDOT specification 895.02 for more details). HDPE conduit to be UL listed and be the color red.

770-P04 LED LUMINAIRES: Install luminaires that use light-emitting diodes (LED) as a light source for installation on a light standard with a tenon adapter. Provide luminaires with a die-cast aluminum housing, a powder coated gray finish, and a universal slip fitter mount.

Meet the lighting level requirements set forth by AASHTO for the pole locations shown using the criteria listed below. Provide luminaires with an asymmetric light distribution that provide the following light levels with a light loss factor of 0.69:

Road	Begin Station	End Station	Average Maintained Illuminance	Maximum permitted Illuminance Uniformity Ratio
ND 23A	530+00	568+00	1.0 footcandles minimum	4.0:1 avg/min
12 th St. SE	589+00	610+00	1.0 footcandles minimum	4.0:1 avg/min

Type 2 Luminaires (See Light Standard Schedule)
Provide luminaires rated a minimum of 29,000 delivered lumens. Provide luminaires with an input power equal to or less than 360W. Provide luminaires that meet ANSI C136.37 standards for solid state light sources. Provide luminaires that meet ANSI C136.31 luminaire vibration standards for bridge/overpass applications (3G rated). Provide luminaires that are photometrically tested by certified independent testing laboratories in accordance with IES LM-79 testing procedures. Use a correlated color temperature (CCT) of 3000 K and a minimum color rendering index (CRI) of 70. Use LEDs that are mercury and lead free. Use LEDs that are tested in accordance with IES LM-80 testing procedures. Use LEDs rated at a minimum of 60,000 hours of life at 25°C, L70. Submit a TM-21 report for the LEDs.

Wire luminaires for 240-volt operation. Provide multi-volt (120-277V) universal driver. Provide access to electrical components without the use of tools and provide a bubble

level indicator. Do not provide a photocontrol receptacle integral to luminaire. Provide luminaires that are listed in the US (NRTL) for use in wet locations and rated for an operating ambient temperature range of -40°C to +40°C.

Provide a minimum 10 year warranty for the entire luminaire assembly including material, workmanship, photometrics, power supply, and LED modules. If more than 10% of the individual LED's fail within the warranty period the luminaire must be repaired and replaced. Adjust luminaires at night in the presence of the engineer and/or owner. Adjust luminaires so they are level from side to side to limit glare. Mount luminaires level and with no tilt.

LED luminaires that meet the above requirements include:

- American Electric Lighting, Autobahn model, Model ATB2-80BLEDE10-MVOLT-R2-3K-BL-NR
- Lithonia Lighting, DSX model, Model DSX2 LED-100C-1000-30K-T2M-MVOLT-HS-DNAXD
- Or approved equivalent. Equivalents will not be reviewed without a submitted electronic ".ies" file of the exact luminaire to be used.

Type 4 Luminaires (See Light Standard Schedule)
Provide luminaires rated a minimum of 10,000 delivered lumens. Provide luminaires with an input power equal to or less than 140W. Provide luminaires that meet ANSI C136.37 standards for solid state light sources. Provide luminaires that meet ANSI C136.31 luminaire vibration standards for bridge/overpass applications (3G rated). Provide luminaires that are photometrically tested by certified independent testing laboratories in accordance with IES LM-79 testing procedures. Use a correlated color temperature (CCT) of 3000 K and a minimum color rendering index (CRI) of 70. Use LEDs that are mercury and lead free. Use LEDs that are tested in accordance with IES LM-80 testing procedures. Use LEDs rated at a minimum of 60,000 hours of life at 25°C, L70. Submit a TM-21 report for the LEDs.

Wire luminaires for 240-volt operation. Provide multi-volt (120-277V) universal driver. Provide access to electrical components without the use of tools and provide a bubble level indicator. Do not provide a photocontrol receptacle integral to luminaire. Provide luminaires that are listed in the US (NRTL) for use in wet locations and rated for an operating ambient temperature range of -40°C to +40°C.

Provide a minimum 10 year warranty for the entire luminaire assembly including material, workmanship, photometrics, power supply, and LED modules. If more than 10% of the individual LED's fail within the warranty period the luminaire must be repaired and replaced. Adjust luminaires at night in the presence of the engineer and/or owner. Adjust luminaires so they are level from side to side to limit glare. Mount luminaires level and with no tilt.

LED luminaires that meet the above requirements include:

- American Electric Lighting, Autobahn model, Model ATB0-30BLEDE10-MVOLT-R4-3K-BL-NR

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NOTES

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- Lithonia Lighting, DSX model, Model DSX1 LED-40-1000-30K-T3M-MVOLT-MA-DNAXD
- Or approved equivalent. Equivalents will not be reviewed without a submitted electronic ".ies" file of the exact luminaire to be used.

770-P05

MODIFY EXISTING FEED POINT: Connect the new lighting circuit to the existing feed point where shown in the plans. Provide a new 2 pole 50A breaker and new lighting contactor to connect the new lighting circuit where shown in the plans. The proposed contactor shall be connected to the existing photoeye controls. Provide all the necessary breakers, wires, conduit, and equipment as required.

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ENVIRONMENTAL NOTES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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ENVIRONMENTAL NOTES (EN): The North Dakota Department of Transportation and the Federal Highway Administration have made environmental commitments to secure approval of this project. The following environmental notes are requirements to comply with these commitments:

EN-1 SPAWNING RESTRICTION: Do not work within Cherry Creek or its tributary from April 15 to June 1.

EN-2 AQUATIC NUISANCE SPECIES (ANS): Equipment that was last used outside of North Dakota or within a Class I infested waterbody (identified on the North Dakota Game and Fish Department (NDGFD) website) requires an inspection by NDGFD. Notify the NDGFD at least 10 business days prior to pumps, watercraft, or any equipment entering a public water to allow the NDGFD sufficient time to inspect any and all such equipment for ANS. Contact the NDGFD ANS Coordinator, Jessica Howell by e-mail jmhowell@nd.gov for equipment inspections. Supply one of the following to the engineer as proof of compliance prior to work taking place in the water: (1) the NDGFD inspection report, (2) documented NDGFD correspondence (email or signed letter). If an inspection is not required, no follow up documentation is required.

EN-3 TEMPORARY WETLAND IMPACT: Temporary impact areas within wetlands and or other waters are incorporated into the plans for this project. Remove temporary fill placed and sedimentation in wetlands or other waters. Restore these wetlands to preconstruction contours.

NOTIFICATIONS TO BE FILED BY CONTRACTOR:

EN-4 Notification is required for work within 3 nautical miles of the airport. Complete the Federal Aviation Administration Notice of Proposed Construction or Alteration Form 7460-1 in accordance with 14 CFR 77.7 and 77.9 (at least 45 days before the start date of the proposed construction or alteration or the date an application for a construction permit is filed, whichever is earliest) (online at <http://oeaaa.faa.gov>).

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ESTIMATE OF QUANTITIES

	STATE	PROJECT NO.	SECTION	SHEET
	ND	SS-7-023(050)910	8	1

SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE	CITY WATER	CITY STREET	TOTAL
103	0100	CONTRACT BOND	L SUM	1			1
201	0330	CLEARING & GRUBBING	L SUM	1			1
201	0370	REMOVAL OF TREES 10IN	EA	2			2
201	0380	REMOVAL OF TREES 18IN	EA	2			2
201	0390	REMOVAL OF TREES 30IN	EA	10			10
202	0105	REMOVAL OF STRUCTURE	L SUM	1			1
202	0114	REMOVAL OF CONCRETE PAVEMENT	SY	999			999
202	0130	REMOVAL OF CURB & GUTTER	LF	327			327
202	0136	REMOVAL OF PAVEMENT	TON	14,915			14,915
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES	LF	1,350			1,350
210	0050	BOX CULVERT EXCAVATION	EA	1			1
210	0210	FOUNDATION FILL	CY	2,612			2,612
210	0405	FOUNDATION PREPARATION-BOX CULVERT	EA	1			1
216	0100	WATER	M GAL	179			179
230	0165	SUBGRADE PREPARATION-TYPE A-12IN	STA	57.1			57.1
251	0200	SEEDING CLASS II	ACRE	20.35			20.35
253	0201	HYDRAULIC MULCH	ACRE	20.35			20.35
253	0301	BONDED FIBER MATRIX	ACRE	18.05			18.05
255	0103	ECB TYPE 3	SY	3,876			3,876
256	0200	RIPRAP GRADE II	CY	355			355
261	0112	FIBER ROLLS 12IN	LF	10,795			10,795
261	0113	REMOVE FIBER ROLLS 12IN	LF	5,520			5,520
302	0050	TRAFFIC SERVICE AGGREGATE	TON	8,021			8,021
302	0100	SALVAGED BASE COURSE	TON	3,553		848	4,401
550	0305	9IN NON-REINF CONCRETE PVMT CL AE-DOWELED	SY	4,360		1,836	6,196
606	1412	14FT X 12FT PRECAST RCB CULVERT	LF	151			151
606	3412	DBL 14FT X 12FT PRECAST RCB CULVERT	LF	151			151
606	7412	DBL 14FT X 12FT PRECAST RCB END SECTION	EA	2			2
702	0100	MOBILIZATION	L SUM	1			1
704	0100	FLAGGING	MHR	2,500			2,500
704	1000	TRAFFIC CONTROL SIGNS	UNIT	3,368			3,368
704	1052	TYPE III BARRICADE	EA	45			45
704	1060	DELINEATOR DRUMS	EA	109			109
704	1067	TUBULAR MARKERS	EA	124			124
704	1080	STACKABLE VERTICAL PANELS	EA	130			130
704	1081	VERTICAL PANELS-BACK TO BACK	EA	232			232
704	1500	OBLITERATION OF PAVEMENT MARKING	SF	22			22
706	0400	FIELD OFFICE	EA	1			1
706	0500	AGGREGATE LAB	EA	1			1
708	1540	INLET PROTECTION-SPECIAL	EA	46			46
708	1541	REMOVE INLET PROTECTION-SPECIAL	EA	46			46
709	0100	GEOSYNTHETIC MATERIAL TYPE G	SY	960			960
709	0151	GEOSYNTHETIC MATERIAL TYPE R1	SY	1,640			1,640
709	0155	GEOSYNTHETIC MATERIAL TYPE RR	SY	699			699
714	3030	END SECT-CONC REINF 30IN	EA	1			1
714	4092	PIPE CONDUIT 12IN-STORM DRAIN	LF	16			16
714	4099	PIPE CONDUIT 18IN-APPROACH	LF	65			65
714	4101	PIPE CONDUIT 18IN-STORM DRAIN	LF	674			674
714	4106	PIPE CONDUIT 24IN-APPROACH	LF	119			119
714	4107	PIPE CONDUIT 24IN-STORM DRAIN	LF	941			941
714	4116	PIPE CONDUIT 36IN-APPROACH	LF	163			163

ESTIMATE OF QUANTITIES

	STATE	PROJECT NO.	SECTION	SHEET
	ND	SS-7-023(050)910	8	2

SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE	CITY WATER	CITY STREET	TOTAL
714	4117	PIPE CONDUIT 36IN-STORM DRAIN	LF	100			100
714	4120	PIPE CONDUIT 42IN	LF	80			80
714	4121	PIPE CONDUIT 42IN-STORM DRAIN	LF	208			208
714	4122	PIPE CONDUIT 42IN-APPROACH	LF	230			230
714	4126	PIPE CONDUIT 48IN-STORM DRAIN	LF	1,132			1,132
714	4155	PIPE CONDUIT 84IN	LF	100			100
714	4276	PIPE CONDUIT ARCH 58IN X 36IN-APPROACH	LF	106			106
714	5315	PIPE CORR STEEL .109IN 42IN	LF	36			36
714	5330	PIPE CORR STEEL .109IN 60IN	LF	84			84
714	9659	REMOVE & RELAY PIPE-ALL TYPES & SIZES	LF	68			68
714	9660	REMOVE & RELAY END SECTIONS-ALL TYPES & SIZES	LF	6			6
720	0110	RIGHT OF WAY MARKERS	EA	13			13
720	0125	ALIGNMENT MONUMENTS	EA	1			1
720	0130	IRON PIN R/W MONUMENTS	EA	7			7
720	0135	IRON PIN REFERENCE MONUMENTS	EA	2			2
722	3510	INLET-TYPE 2	EA	29			29
722	3701	INLET SPECIAL-TYPE 2 48IN	EA	2			2
722	3761	INLET SPECIAL-TYPE 2 60IN	EA	8			8
722	3766	INLET SPECIAL-TYPE 2 72IN	EA	6			6
722	3768	INLET SPECIAL-TYPE 2 84IN	EA	2			2
722	6200	ADJUST MANHOLE	EA	1			1
722	6240	ADJUST UTILITY APPURTENANCE	EA	2			2
722	6695	AIR RELIEF VALVE & MANHOLE	EA		1		1
724	0210	FITTINGS-DUCTILE IRON	LBS	412	250		662
724	0270	REMOVE GATE VALVE & BOX	EA	1			1
724	0300	GATE VALVE & BOX 6IN	EA	2	1		3
724	0310	GATE VALVE & BOX 8IN	EA	1	3		4
724	0314	GATE VALVE & BOX 12IN	EA	2			2
724	0400	HYDRANT-INSTALL 6IN	EA	2			2
724	0807	PLUG 8IN WATERMAIN	EA	3			3
724	0810	WATERMAIN 6IN PVC	LF	41	30		71
724	0830	WATERMAIN 8IN PVC	LF	40	2,577		2,617
724	0850	WATERMAIN 12IN PVC	LF	112			112
724	0944	CONNECTION TO EXISTING MAIN	EA	5	4		9
724	0960	WATER SERVICE CONNECTION 2IN	EA	2			2
724	6825	8IN 45.0 DEG BEND	EA		10		10
724	6826	8IN 90.0 DEG BEND	EA		1		1
724	6999	6IN 22.5 DEG BEND	EA		1		1
724	7010	8IN X 6IN REDUCER	EA		2		2
748	0140	CURB & GUTTER-TYPE I	LF	2,171			2,171
750	0115	SIDEWALK CONCRETE 4IN	SY	6,642			6,642
750	0200	CONCRETE MEDIAN PAVING	SY	65			65
750	2115	DETECTABLE WARNING PANELS	SF	220			220
752	0660	FENCE CHAIN LINK REMOVE & RESET	LF	495			495
752	0922	FENCE REMOVE & RESET	LF	140			140
752	2110	RESET VEHICLE GATE	EA	1			1
754	0110	FLAT SHEET FOR SIGNS-TYPE XI REFL SHEETING	SF	115.6			115.6
754	0112	FLAT SHEET FOR SIGNS-TYPE IV REFL SHEETING	SF	91.4			91.4
754	0206	STEEL GALV POSTS-TELESCOPING PERFORATED TUBE	LF	366.7			366.7
754	0592	RESET SIGN PANEL	EA	1			1
754	0805	OBJECT MARKERS - CULVERTS	EA	78			78

ESTIMATE OF QUANTITIES

	STATE	PROJECT NO.	SECTION	SHEET
	ND	SS-7-023(050)910	8	3

<u>SPEC</u>	<u>CODE</u>	<u>ITEM DESCRIPTION</u>	<u>UNIT</u>	<u>MAINLINE</u>	<u>CITY WATER</u>	<u>CITY STREET</u>	<u>TOTAL</u>
762	0122	PREFORMED PATTERNED PVMT MK-MESSAGE(GROOVED)	SF	448			448
762	1305	PREFORMED PATTERNED PVMT MK 4IN LINE-GROOVED	LF	17,576			17,576
762	1307	PREFORMED PATTERNED PVMT MK 6IN LINE-GROOVED	LF	652			652
762	1309	PREFORMED PATTERNED PVMT MK 8IN LINE-GROOVED	LF	2,485			2,485
762	1325	PREFORMED PATTERNED PVMT MK 24IN LINE-GROOVED	LF	281			281
764	2020	REMOVE 3-CABLE GUARDRAIL & POSTS	LF	313			313
770	0001	LIGHTING SYSTEM	EA	1			1
900	1000	TEMPORARY STREAM DIVERSION	EA	1			1
920	1500	DUST PALLIATIVE MATERIAL	GAL	17,682			17,682

Option #1 - Concrete Surfacing

203	0101	COMMON EXCAVATION-TYPE A	CY	62,316			62,316
203	0109	TOPSOIL	CY	26,271			26,271
203	0140	BORROW-EXCAVATION	CY	33,084			33,084
216	0100	WATER	M GAL	1,197			1,197
302	0100	SALVAGED BASE COURSE	TON	12,148			12,148
430	0500	COMMERCIAL GRADE HOT MIX ASPHALT	TON	234			234
550	0305	9IN NON-REINF CONCRETE PVMT CL AE-DOWELED	SY	22,679			22,679
748	0140	CURB & GUTTER-TYPE I	LF	10,080			10,080
748	1020	VALLEY GUTTER 36IN	SY	182			182

Option #2 - Asphalt Surfacing

203	0101	COMMON EXCAVATION-TYPE A	CY	66,080			66,080
203	0109	TOPSOIL	CY	27,038			27,038
203	0140	BORROW-EXCAVATION	CY	26,699			26,699
216	0100	WATER	M GAL	1,486			1,486
302	0100	SALVAGED BASE COURSE	TON	27,886			27,886
401	0050	TACK COAT	GAL	2,261			2,261
401	0060	PRIME COAT	GAL	5,882			5,882
401	0160	BLOTTER MATERIAL CL 44	TON	185			185
430	0045	SUPERPAVE FAA 45	TON	7,793			7,793
430	1000	CORED SAMPLE	EA	56			56
430	5828	PG 58-28 ASPHALT CEMENT	TON	167			167
430	6434	PG 64-34 ASPHALT CEMENT	TON	309			309
706	0550	BITUMINOUS LABORATORY	EA	1			1
706	0600	CONTRACTOR'S LABORATORY	EA	1			1
748	0140	CURB & GUTTER-TYPE I	LF	10,080			10,080
748	1020	VALLEY GUTTER 36IN	SY	182			182

Removals

Bituminous @ 2.0 Ton/CY
 Concrete @ 2.0 Ton/CY
 Aggregate @ 1.875 Ton/CY

Surfacing

Salvaged Base Course @ 1.875 Ton/CY
 Tack Coat @ 0.05 Gal/SY
 Prime Coat @ 0.25 Gal/SY
 Blotter Material CI 44 @ 15 lbs/SY
 PG 58-28 Asphalt Cement @ 6.0% (bottom 2")
 PG 64-34 Asphalt Cement @ 6.0% (top 4")
 Superpave FAA 45 @ 2.0 Ton/CY
 Commercial Grade Hot Mix Asphalt @ 2.0 Ton/CY
 Dust Palliative Material @ 0.5 Gal/SY (first application)
 Dust Palliative Material @ 0.3 Gal/SY (second application)

Water

25 MGal/Mile for Subgrade Preparation
 25 MGal/Mile for Dust Palliative
 20 Gal/Ton for Aggregates
 10 Gal/CY for Embankment

Subgrade Preparation - Type A - 12 In			
Location			Quantity (Sta)
Station	to	Station	
530+10	to	563+43	33.3
565+57	to	568+00	2.4
589+00	to	610+35	21.4
Total =			57.1

Salvage Base Course Summary - Option 1: Concrete Surfacing				
Removal of Pavement (1) (Ton)	Removal of Concrete Pavement (1) (Ton)	Total Material Removed (Ton)	Total Salvaged Base Required for Project (Base Bid plus Option 1) (Ton)	Virgin Aggregate Required for Project (Ton)
A	B	C=A+B	D	E=D-C
14,915	749	15,664	16,573	909

Salvage Base Course Summary - Option 2: Asphalt Surfacing				
Removal of Pavement (1) (Ton)	Removal of Concrete Pavement (1) (Ton)	Total Material Removed (Ton)	Total Salvaged Base Required for Project (Base Bid plus Option 2) (Ton)	Virgin Aggregate Required for Project (Ton)
A	B	C=A+B	D	E=D-C
14,915	749	15,664	32,522	16,858

(1) See Section 40 for Quantities

HBP Cored Samples							
Specification Section	A	B	C	D	Quantity (D x 2)	Quantity (1 per mile)	Unit
	Distance (Ft)÷2000	Lanes	Lifts	Sublots (A x B x C)			
430.04 I.2.b(1), "General"	3	3	3	27	54	N/A	EA
430.04 I.2.b(2), "Pavement Thickness Determination Cores"					N/A	2	EA
				Total	54	2	EA

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Basis of Estimate

 ND23A

 US85B to ND23B

Remove Iron Pin R/W Monuments					
Alignment	Station	Offset	Description	Iron Pin	R/W Marker
PR23A	537+97.97	99.26' Lt	R/W	N	Y
PR23A	556+63.48	99.97' Lt	R/W	Y	N
PR23A	600+54.10	74.39' Lt	R/W	N	Y
PR23A	604+52.79	99.67' Lt	R/W	N	Y
PR23A	604+52.28	75.25' Lt	R/W	Y	Y

Iron Pin R/W Monuments					
Alignment	Station	Offset	Description	Iron Pin	R/W Marker
PR23A	532+88.68	99.92' Rt	R/W	N	Y
PR23A	533+11.21	100.36' Lt	R/W	N	Y
PR23A	546+93.21	99.24' Lt	R/W	N	Y
PR23A	548+36.13	99.96' Rt	PROP	N	Y
PR23A	563+45.15	100' Lt	R/W	Y	Y
PR23A	563+45.15	130' Lt	R/W	Y	Y
PR23A	565+45.15	130' Lt	R/W	Y	Y
PR23A	565+45.15	100' Lt	R/W	Y	Y
PR23A	609+10.33	100' Rt	R/W	Y	Y
PR23A	609+58.59	147.03' Lt	R/W	Y	Y
PR23A	610+09.82	200' Rt	R/W	Y	Y

Iron Pin Reference Monuments					
Alignment	Station	Offset	Description	Iron Pin	R/W Marker
PR23A	553+47.64	100' Lt	1/4 Line Xing	Y	Y
PR23A	553+55.26	100' Rt	1/4 Line Xing	Y	Y

Alignment Monuments			
Alignment	Station	Offset	Description
PR23A	553+51.45	0	1/4 Line Xing

Object Markers - Culverts					
Station	Quantity		Station	Quantity	
	Lt	Rt		Lt	Rt
530+00	1	0	561+75	1	1
530+12	1	1	561+93	1	1
532+70	1	1	589+30	1	0
533+31	1	0	590+60	1	1
535+17	1	1	592+85	1	1
535+39	0	2	594+14	1	0
537+86	1	1	595+10	1	1
539+38	0	2	597+20	1	1
539+81	2	0	597+42	1	0
540+89	2	0	598+41	1	0
541+09	0	2	600+48	1	1
544+00	1	0	601+11	1	0
544+63	0	2	601+16	0	2
545+97	0	2	601+69	0	2
547+15	1	0	601+75	1	0
550+15	1	1	602+40	0	1
550+63	2	0	602+75	1	1
551+78	2	0	602+92	1	0
553+75	1	1	603+00	1	0
556+27	1	1	606+75	1	1
557+72	1	0	608+50	1	1
558+29	1	0	609+35	1	0
559+00	1	1	609+45	1	0
560+24	0	1	610+04	1	0
560+86	0	1			
Total			78		

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Basis of Estimate
ND23A
US85B to ND23B

Option 1 Earthwork Summary (Concrete Surfacing)

Alignment	Location	A	B	C = B-A	Topsoil (CY) [Pay Item]
		Common Excavation Type A (CY) [Pay Item]	Embankment (CY)	Borrow Excavation (CY) [Pay Item]	
PR23A	East/West Phase 1	10,602	31,471	20,869	7,699
PR23A	North/South Phase 1	6,384	9,393	3,009	3,057
Bypass	---	33	9,240	9,207	1,150
Totals		17,020	50,104	33,084	11,906

Alignment	Location	A	B	C = B-A	Topsoil (CY) [Pay Item]
		Common Excavation Type A (CY) [Pay Item]	Embankment (CY)	Borrow Excavation (CY) [Pay Item]	
PR23A	East/West Phase 2	11,075	9,951	-1,124	8,260
PR23A	North/South Phase 2	17,363	3,718	-13,645	6,105
Bypass	---	0	0	0	0
Totals		28,438	13,669	-14,769	14,365

Alignment	Location	A	B	C = B-A	Topsoil (CY) [Pay Item]
		Common Excavation Type A (CY) [Pay Item]	Embankment (CY)	Borrow Excavation (CY) [Pay Item]	
PR23A	East/West Phase 3	4,111	4,154	43	0
PR23A	North/South Phase 3	3,507	2,641	-866	0
Bypass	---	9,240	33	-9,208	0
Totals		16,858	6,828	-10,030	0

Note: 25 percent additional volume is included for shrinkage in earth embankment.

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Earthwork Summary
Option 1: Concrete Surfacing

ND23A

US85B to ND23B

OPTION 1 EARTHWORK VALUES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	11	2

	End Areas (SF)		Volume (CY)		
	Exca	Fill	Exca	Fill	Mass Ordinate
528+65	0.9	0.9	0.0	0.0	0
529+00	0.0	229.7	0.6	186.8	-186
529+50	0.0	290.2	0.0	601.7	-788
530+00	0.0	218.0	0.0	588.1	-1376
530+10	2.8	186.4	0.5	93.6	-1469
530+34	10.2	164.7	5.7	193.4	-1657
530+50	13.1	143.1	7.0	115.5	-1765
531+00	27.7	215.7	37.8	415.4	-2143
531+21	44.7	193.3	28.2	198.8	-2314
531+50	61.6	180.4	57.1	250.9	-2507
531+93	56.2	172.4	93.8	351.1	-2765
532+00	52.7	170.0	14.1	55.5	-2806
532+22	52.3	158.7	42.7	167.0	-2930
532+50	49.8	145.1	53.0	197.3	-3075
533+00	50.7	119.6	93.0	306.3	-3288
533+50	43.6	93.7	87.3	246.8	-3448
533+66	47.5	91.8	26.9	68.5	-3489
534+00	48.4	91.2	60.5	144.3	-3573
534+50	27.9	88.7	70.7	208.3	-3710
535+00	19.5	96.0	43.9	213.7	-3880
535+16	16.7	97.5	10.7	71.4	-3941
535+50	15.2	93.6	20.1	150.7	-4072
536+00	17.8	109.1	30.5	234.6	-4276
536+40	15.9	117.0	24.9	209.0	-4460
536+50	16.6	119.4	6.1	55.1	-4509
537+00	24.6	130.6	38.2	289.3	-4760
537+50	30.2	139.3	50.8	312.4	-5022
537+84	34.9	144.6	40.9	223.1	-5204
538+00	36.2	148.7	21.1	109.0	-5292
538+50	32.3	156.0	63.4	352.6	-5581
539+00	45.5	167.4	72.1	374.3	-5883
539+34	49.0	164.5	59.4	260.7	-6084
539+50	61.9	164.4	33.0	122.3	-6174
540+00	0.0	17.9	57.3	211.0	-6327
540+50	0.0	19.0	0.0	42.7	-6370
541+00	71.8	147.5	66.4	192.7	-6496
541+50	62.2	146.9	124.0	340.7	-6713
542+00	64.6	143.5	117.4	336.1	-6931
542+16	65.0	143.8	37.6	104.2	-6998
542+50	62.4	140.9	81.0	226.4	-7143
543+00	74.7	130.9	126.9	314.6	-7331
543+50	81.8	128.0	144.9	299.6	-7486
544+00	85.1	122.6	154.6	290.1	-7621
544+50	90.9	119.8	163.0	280.5	-7739
544+56	91.4	119.1	19.6	32.1	-7751
545+00	101.7	114.9	158.1	239.4	-7833
545+50	108.6	114.5	194.8	265.5	-7903

546+00	119.3	102.0	211.0	250.5	-7943
546+50	144.5	95.9	244.2	229.0	-7928
547+00	113.3	100.5	238.7	227.3	-7916
547+02	99.1	101.0	7.8	9.2	-7918
547+50	143.9	110.6	216.1	235.2	-7937
548+00	118.8	105.2	243.2	249.7	-7943
548+50	112.8	100.7	214.4	238.2	-7967
549+00	91.6	94.6	189.2	226.0	-8004
549+50	78.0	91.5	157.0	215.4	-8062
550+00	71.4	95.1	138.3	216.0	-8140
550+50	83.9	70.2	143.8	191.3	-8187
551+00	241.5	0.1	301.3	81.3	-7967
551+50	141.4	0.1	354.5	0.2	-7613
552+00	0.0	93.5	130.9	108.3	-7591
552+50	0.0	107.8	0.0	233.0	-7824
553+00	40.8	70.8	37.8	206.7	-7992
553+50	0.0	221.9	37.8	338.8	-8294
554+00	0.0	109.2	0.0	383.3	-8677
554+50	84.8	62.7	78.6	199.0	-8797
555+00	85.3	61.2	157.5	143.5	-8783
555+50	88.6	57.7	161.0	137.7	-8760
556+00	93.3	54.0	168.4	129.3	-8721
556+50	99.3	59.0	178.3	130.8	-8673
557+00	82.8	69.6	168.6	148.9	-8653
557+50	69.1	79.9	140.7	173.0	-8686
558+00	33.2	102.1	94.7	210.6	-8802
558+50	56.7	103.6	83.2	238.1	-8957
559+00	88.0	115.0	134.0	253.1	-9076
559+50	224.0	236.1	288.9	406.3	-9193
560+00	240.3	259.8	429.9	573.9	-9337
560+50	312.7	73.8	512.0	386.1	-9211
561+00	277.0	237.2	546.0	359.9	-9025
561+50	171.2	281.7	415.0	600.6	-9211
562+00	45.7	322.9	200.8	699.8	-9710
562+50	84.2	232.5	120.3	642.9	-10232
563+00	88.9	262.7	160.4	573.2	-10645
563+50	116.2	316.9	189.9	670.8	-11126
564+00	15.7	352.3	122.1	774.5	-11779
564+50	12.8	1670.5	26.4	2341.2	-14093
565+00	21.0	502.5	31.3	2515.1	-16577
565+50	29.1	420.2	46.3	1068.0	-17599
566+00	31.8	530.3	56.3	1100.1	-18643
566+50	37.7	414.7	64.3	1093.7	-19672
567+00	41.7	280.0	73.6	804.0	-20402
567+50	134.2	179.8	162.9	532.2	-20772
568+00	174.8	151.2	286.1	383.2	-20869

Option 1, Phase 1 East/West Segment Totals	Volume (CY)		
	Exca	Fill	Mass Ordinate
	10,602	31,471	

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OPTION 1 EARTHWORK VALUES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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	End Areas (SF)		Volume (CY)		Mass Ordinate
	Exca	Fill	Exca	Fill	
589+00	68.7	121.1	0.0	0.0	0
589+50	109.9	10.9	165.4	152.7	13
590+00	92.2	68.8	187.2	92.2	108
590+50	73.2	144.0	153.2	246.3	15
591+00	67.1	139.2	129.9	327.7	-183
591+50	67.0	133.3	124.2	315.4	-374
592+00	70.0	129.8	126.8	304.5	-552
592+50	78.0	123.8	137.0	293.5	-709
593+00	88.4	120.3	154.0	282.4	-837
593+50	97.5	115.3	172.1	272.7	-938
594+00	101.1	114.7	183.9	266.2	-1020
594+50	100.9	104.0	187.0	253.1	-1086
595+00	103.9	82.5	189.6	215.8	-1112
595+50	107.1	57.1	195.3	161.5	-1078
596+00	100.3	59.8	192.0	135.3	-1022
596+50	93.6	54.7	179.5	132.5	-975
597+00	104.8	31.6	183.7	99.9	-891
597+50	148.6	0.1	234.6	36.7	-693
598+00	248.8	0.1	368.0	0.1	-325
598+50	77.1	33.1	301.8	38.4	-62
599+00	71.0	43.5	137.1	88.7	-13
599+50	71.3	43.0	131.7	100.1	19
600+00	79.8	42.8	139.9	99.3	59
600+50	80.1	51.1	148.1	108.7	98
601+00	79.9	60.1	148.2	128.7	118
601+50	184.5	0.1	244.8	69.6	293
602+00	70.7	77.0	236.3	89.1	440
602+50	71.4	88.3	131.6	191.3	381
603+00	67.6	115.7	128.8	236.1	273
603+50	91.9	97.6	147.7	246.9	174
604+00	75.3	107.9	154.8	237.9	91
604+50	70.7	122.0	135.1	266.0	-40
605+00	66.4	146.0	126.9	310.2	-223
605+50	60.6	141.1	117.6	332.3	-438
606+00	61.3	138.5	112.9	323.5	-648
606+50	57.0	135.8	109.6	317.4	-856
607+00	48.2	139.6	97.4	318.8	-1078
607+50	45.4	141.0	86.7	324.9	-1316
608+00	48.9	139.4	87.3	324.5	-1553
608+50	47.9	142.2	89.6	325.8	-1789
609+00	24.5	149.9	67.0	338.0	-2060
609+50	6.2	182.6	28.3	384.8	-2417
609+60	6.9	155.5	2.2	71.8	-2486
610+00	2.5	132.2	7.1	271.9	-2751

610+13	2.9	115.3	1.3	72.5	-2822
610+35	0.0	145.6	1.2	134.9	-2956
610+50	0.1	4.0	0.0	51.9	-3008
610+56	1.1	0.7	0.1	0.7	-3009
Option 1, Phase 1 North/South Segment Totals	Volume (CY)				
	Exca	Fill	Mass Ordinate		
	6,384	9,393			

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OPTION 1 EARTHWORK VALUES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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	End Areas (SF)		Volume (CY)		
	Exca	Fill	Exca	Fill	Mass Ordinate
528+65	0.0	0.0	0.0	0.0	0
529+00	0.0	0.0	0.0	0.0	0
529+50	0.0	0.0	0.0	0.0	0
530+00	0.0	0.0	0.0	0.0	0
530+10	9.9	71.0	1.8	16.4	-15
530+34	29.5	90.0	17.3	88.7	-86
530+50	32.9	82.9	18.7	64.9	-132
531+00	49.6	63.1	76.4	169.0	-225
531+21	49.8	48.0	38.7	54.0	-240
531+50	61.0	31.9	59.5	53.6	-234
531+93	88.6	13.5	119.1	45.1	-160
532+00	92.0	11.8	23.4	4.1	-141
532+22	104.4	10.0	79.9	11.0	-72
532+50	113.9	7.3	113.4	11.2	30
533+00	123.3	7.0	219.7	16.6	233
533+50	120.9	4.9	226.2	13.7	446
533+66	123.9	4.7	72.3	3.5	514
534+00	123.8	4.2	156.2	7.0	664
534+50	118.5	10.7	224.3	17.2	871
535+00	114.7	5.8	215.9	19.1	1068
535+16	118.2	10.5	68.8	6.0	1130
535+50	153.0	9.3	171.0	15.6	1286
536+00	292.4	28.2	412.4	43.4	1655
536+40	88.3	74.2	281.6	94.6	1842
536+50	87.6	73.0	32.8	34.3	1840
537+00	59.2	109.7	136.0	211.4	1765
537+50	46.9	138.1	98.3	286.8	1576
537+84	40.7	156.9	55.1	231.8	1400
538+00	40.0	165.2	24.0	119.8	1304
538+50	45.1	187.3	78.8	408.0	975
539+00	47.8	199.6	86.1	447.8	613
539+34	43.6	202.0	57.5	315.5	355
539+50	42.5	187.8	25.6	144.9	236
540+00	3.0	86.8	42.1	317.8	-40
540+50	0.0	19.0	2.8	122.4	-160
541+00	29.4	194.9	27.3	247.6	-380
541+50	61.2	169.7	83.9	422.0	-718
542+00	96.4	114.2	145.9	328.6	-901
542+16	105.8	113.5	58.6	82.6	-925
542+50	109.7	105.8	137.1	174.3	-962
543+00	136.5	90.9	227.9	227.6	-962
543+50	128.9	78.9	245.7	196.5	-912
544+00	114.7	76.2	225.5	179.5	-866
544+50	129.1	74.8	225.8	174.7	-815
544+56	131.0	77.1	28.0	20.4	-808
545+00	38.3	167.9	138.5	250.7	-920
545+50	31.2	184.4	64.3	407.7	-1263

546+00	91.6	115.9	113.7	347.5	-1497	
546+50	106.4	76.9	183.4	223.1	-1537	
547+00	129.6	60.0	218.6	158.4	-1477	
547+02	129.9	59.8	9.5	5.5	-1473	
547+50	123.2	57.2	225.1	130.0	-1378	
548+00	122.5	56.9	227.5	132.1	-1282	
548+50	149.4	53.7	251.8	128.0	-1158	
549+00	178.3	52.2	303.5	122.5	-977	
549+50	163.0	51.9	316.0	120.4	-782	
550+00	163.1	50.3	301.9	118.3	-598	
550+50	177.3	47.0	315.2	112.6	-396	
551+00	214.5	40.6	362.8	101.4	-134	
551+50	172.8	20.6	358.6	70.8	154	
552+00	87.5	54.0	241.0	86.3	308	
552+50	58.2	67.4	134.9	140.6	303	
553+00	40.8	70.8	91.7	160.0	234	
553+50	44.3	105.7	78.8	204.3	109	
554+00	53.8	81.2	90.9	216.3	-17	
554+50	139.2	29.7	178.8	128.3	34	
555+00	154.1	38.4	271.6	78.7	227	
555+50	168.3	38.2	298.6	88.6	437	
556+00	172.2	34.9	315.3	84.6	667	
556+50	144.4	36.0	293.1	82.1	879	
557+00	83.8	41.9	211.3	90.2	1000	
557+50	88.9	56.9	159.9	114.3	1045	
558+00	103.5	67.5	178.2	143.9	1079	
558+50	104.2	75.0	192.3	164.9	1107	
559+00	113.8	87.7	201.8	188.3	1120	
559+50	0.0	0.0	105.3	101.5	1124	
560+00	0.0	0.0	0.0	0.0	1124	
560+50	0.0	0.0	0.0	0.0	1124	
561+00	0.0	0.0	0.0	0.0	1124	
561+50	0.0	0.0	0.0	0.0	1124	
562+00	0.0	0.0	0.0	0.0	1124	
562+50	0.0	0.0	0.0	0.0	1124	
563+00	0.0	0.0	0.0	0.0	1124	
563+50	0.0	0.0	0.0	0.0	1124	
564+00	0.0	0.0	0.0	0.0	1124	
564+50	0.0	0.0	0.0	0.0	1124	
565+00	0.0	0.0	0.0	0.0	1124	
565+50	0.0	0.0	0.0	0.0	1124	
566+00	0.0	0.0	0.0	0.0	1124	
566+50	0.0	0.0	0.0	0.0	1124	
567+00	0.0	0.0	0.0	0.0	1124	
567+50	0.0	0.0	0.0	0.0	1124	
568+00	0.0	0.0	0.0	0.0	1124	
Option 1, Phase 2 East/West Segment Totals				Volume (CY)		
				Exca	Fill	Mass Ordinate
				11,075	9,951	

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OPTION 1 EARTHWORK VALUES

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610+13	33.4	52.1	533.5	136.3	13658
610+35	0.0	0.0	13.8	27.0	13645
610+50	0.0	0.0	0.0	0.0	13645
610+56	0.0	0.0	0.0	0.0	13645
			Volume (CY)		
Option 1, Phase 2 North/South Segment Totals			Exca	Fill	Mass Ordinate
			17,363	3,718	

	End Areas (SF)		Volume (CY)		Mass Ordinate
	Exca	Fill	Exca	Fill	
589+00	79.7	84.0	0.0	0.0	0
589+50	147.7	28.0	210.6	129.6	81
590+00	134.7	88.8	261.5	135.1	207
590+50	183.1	81.7	294.3	197.3	304
591+00	216.9	74.4	370.3	180.7	494
591+50	229.8	68.3	413.6	165.1	742
592+00	230.9	63.9	426.6	153.0	1016
592+50	234.4	56.0	430.8	138.8	1308
593+00	232.2	51.1	432.0	123.9	1616
593+50	231.1	47.9	428.9	114.5	1930
594+00	242.3	43.8	438.3	106.0	2263
594+50	252.9	40.4	458.6	97.4	2624
595+00	261.4	38.4	476.2	91.2	3009
595+50	265.7	37.6	488.0	87.9	3409
596+00	257.3	38.0	484.2	87.5	3806
596+50	266.9	36.5	485.3	86.2	4205
597+00	284.9	35.6	510.9	83.5	4632
597+50	290.0	32.5	532.4	78.8	5086
598+00	294.3	28.5	541.1	70.5	5556
598+50	276.4	26.5	528.4	63.7	6021
599+00	256.7	27.0	493.6	61.9	6453
599+50	230.2	25.8	450.9	61.1	6843
600+00	213.1	26.1	410.5	60.1	7193
600+50	191.2	31.3	374.4	66.4	7501
601+00	182.0	21.5	345.6	61.1	7786
601+50	335.3	0.1	479.0	24.9	8240
602+00	169.9	48.2	467.7	55.9	8652
602+50	140.3	57.3	287.2	122.2	8817
603+00	200.6	60.5	315.6	136.4	8996
603+50	219.4	52.2	388.8	130.5	9254
604+00	236.1	49.6	421.7	117.8	9558
604+50	235.7	49.9	436.9	115.2	9880
605+00	244.8	53.6	444.9	119.8	10205
605+50	226.2	42.8	436.1	111.6	10529
606+00	213.6	24.5	407.3	77.9	10859
606+50	201.6	4.5	384.4	33.6	11210
607+00	217.8	0.6	388.3	5.9	11592
608+00	229.5	0.1	828.3	1.6	12419
608+50	229.0	0.1	424.5	0.2	12843
609+00	222.3	0.1	417.8	0.3	13261

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OPTION 1 EARTHWORK VALUES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	11	6

	End Areas (SF)		Volume (CY)		
	Exca	Fill	Exca	Fill	Mass Ordinate
528+65	0.0	0.0	0.0	0.0	0
529+00	0.0	0.0	0.0	0.0	0
529+50	0.0	0.0	0.0	0.0	0
530+00	0.0	0.0	0.0	0.0	0
530+10	1.0	43.8	0.2	10.1	-10
530+34	1.0	43.8	0.9	48.2	-57
530+50	1.0	43.8	0.6	32.9	-90
531+00	1.0	43.8	1.9	101.4	-189
531+21	3.0	42.5	1.6	42.0	-230
531+50	11.4	34.2	7.8	51.5	-273
531+93	41.7	29.8	42.3	63.7	-295
532+00	46.3	30.5	11.4	9.8	-293
532+22	45.1	30.8	37.2	31.1	-287
532+50	43.3	31.5	45.9	40.5	-281
533+00	39.9	32.6	77.1	74.2	-279
533+50	36.9	33.4	71.2	76.3	-284
533+66	36.2	33.6	21.6	24.7	-287
534+00	34.8	33.9	44.8	53.2	-295
534+50	33.7	34.2	63.4	78.8	-311
535+00	33.7	34.2	62.4	79.1	-327
535+16	34.0	34.1	20.0	25.2	-332
535+50	34.9	33.9	43.4	53.6	-342
536+00	36.9	33.4	66.4	77.8	-354
536+40	38.5	32.9	55.8	61.3	-359
536+50	38.9	32.8	14.4	15.3	-360
537+00	40.8	32.3	73.8	75.4	-362
537+50	42.6	31.8	77.3	74.1	-359
537+84	43.7	31.4	54.3	49.6	-354
538+00	44.3	31.2	26.2	23.3	-351
538+50	45.8	30.7	83.3	71.6	-339
539+00	46.9	30.3	85.8	70.5	-324
539+34	47.4	30.0	59.2	47.4	-312
539+50	47.6	30.0	28.3	22.3	-306
540+00	7.2	0.3	50.8	35.1	-291
540+50	48.2	29.7	51.3	34.8	-274
541+00	48.0	29.8	89.1	68.9	-254
541+50	47.8	29.9	88.8	69.0	-234
542+00	47.6	29.9	88.4	69.2	-215
542+16	47.6	30.0	27.6	21.7	-209
542+50	47.4	30.0	60.4	47.7	-197
543+00	47.3	30.1	87.7	69.6	-178
543+50	47.1	30.2	87.3	69.8	-161
544+00	46.8	30.3	86.9	70.0	-144
544+50	46.6	30.4	86.6	70.2	-128
544+56	46.6	30.4	10.0	8.2	-126
545+00	46.4	30.4	76.1	62.2	-112
545+50	46.1	30.5	85.7	70.6	-97

546+00	45.8	30.7	85.2	70.8	-82
546+50	45.5	30.8	84.6	71.1	-69
547+00	45.1	30.9	83.9	71.4	-56
547+02	45.1	30.9	3.3	2.8	-56
547+50	44.8	31.0	80.0	68.9	-45
548+00	44.4	31.2	82.6	72.0	-34
548+50	44.1	31.3	81.9	72.3	-24
549+00	43.7	31.4	81.3	72.6	-16
549+50	43.3	31.5	80.6	72.9	-8
550+00	42.9	31.7	79.8	73.1	-1
550+50	42.5	31.8	79.1	73.4	4
551+00	42.1	31.9	78.4	73.7	9
551+50	41.7	32.0	77.6	74.0	13
552+00	27.0	16.8	63.7	56.5	20
552+50	32.4	16.8	55.0	38.8	36
553+00	42.2	16.8	69.0	38.8	66
553+50	53.3	16.8	88.4	38.8	116
554+00	40.5	16.8	86.8	38.8	164
554+50	28.1	35.4	63.5	60.4	167
555+00	27.5	35.5	51.5	82.1	136
555+50	26.9	35.6	50.3	82.3	104
556+00	26.7	35.7	49.6	82.5	71
556+50	27.7	35.5	50.3	82.4	39
557+00	29.9	35.0	53.3	81.6	11
557+50	32.6	34.4	57.9	80.4	-11
558+00	35.2	33.8	62.8	79.0	-28
558+50	37.6	33.2	67.4	77.6	-38
559+00	39.8	32.6	71.7	76.2	-42
559+50	0.0	0.0	36.9	37.7	-43
560+00	0.0	0.0	0.0	0.0	-43
560+50	0.0	0.0	0.0	0.0	-43
561+00	0.0	0.0	0.0	0.0	-43
561+50	0.0	0.0	0.0	0.0	-43
562+00	0.0	0.0	0.0	0.0	-43
562+50	0.0	0.0	0.0	0.0	-43
563+00	0.0	0.0	0.0	0.0	-43
563+50	0.0	0.0	0.0	0.0	-43
564+00	0.0	0.0	0.0	0.0	-43
564+50	0.0	0.0	0.0	0.0	-43
565+00	0.0	0.0	0.0	0.0	-43
565+50	0.0	0.0	0.0	0.0	-43
566+00	0.0	0.0	0.0	0.0	-43
566+50	0.0	0.0	0.0	0.0	-43
567+00	0.0	0.0	0.0	0.0	-43
567+50	0.0	0.0	0.0	0.0	-43
568+00	0.0	0.0	0.0	0.0	-43
Option 1, Phase 3 East/West Segment Totals			Volume (CY)		
			Exca	Fill	Mass Ordinate
			4,111	4,154	

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OPTION 1 EARTHWORK VALUES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	11	7

	End Areas (SF)		Volume (CY)		Mass Ordinate
	Exca	Fill	Exca	Fill	
589+00	42.29	31.85	0	0	0
589+50	42.97	31.64	79	73	5.46
590+00	43.63	31.42	80	73	12.66
590+50	44.3	31.2	81.4	72.5	22
591+00	44.2	31.2	82.0	72.3	31
591+50	44.1	31.3	81.8	72.3	41
592+00	43.9	31.4	81.4	72.5	50
592+50	43.7	31.4	81.0	72.6	58
593+00	43.5	31.5	80.7	72.8	66
593+50	43.3	31.5	80.3	72.9	73
594+00	43.1	31.6	79.9	73.1	80
594+50	42.9	31.7	79.6	73.3	86
595+00	42.7	31.7	79.2	73.4	92
595+50	42.4	31.8	78.8	73.6	97
596+00	42.2	31.9	78.4	73.7	102
596+50	42.0	31.9	78.0	73.9	106
597+00	41.8	32.0	77.6	74.0	110
597+50	41.6	32.1	77.2	74.2	113
598+00	41.4	32.1	76.8	74.3	115
598+50	41.2	32.2	76.4	74.5	117
599+00	40.9	32.3	76.0	74.6	119
599+50	40.7	32.3	75.6	74.8	120
600+00	40.6	32.4	75.3	74.9	120
600+50	41.1	32.2	75.6	74.8	121
601+00	42.2	31.9	77.2	74.2	124
601+50	43.4	31.5	79.3	73.3	130
602+00	44.5	31.1	81.4	72.5	139
602+50	45.6	30.8	83.4	71.6	150
603+00	46.5	16.8	85.2	55.0	181
603+50	47.4	16.8	86.9	38.8	229
604+00	48.2	16.8	88.5	38.8	278
604+50	49.0	16.8	90.0	38.8	330
605+00	43.0	34.7	85.1	59.6	355
605+50	50.0	16.8	86.0	59.6	382
606+00	50.2	16.8	92.8	38.8	436
606+50	50.5	16.8	93.3	38.8	490
607+00	50.8	16.8	93.8	38.8	545
607+50	51.0	16.8	94.2	38.8	600
608+00	51.2	16.8	94.6	38.8	656
608+50	51.5	16.8	95.1	38.8	712
609+00	52.0	16.8	95.8	38.8	769
609+50	50.7	16.8	95.1	38.8	826
609+60	51.4	16.8	17.3	7.1	836
610+00	28.0	16.8	60.0	31.7	864

610+13	21.1	16.8	11.5	9.8	866
610+35	0.0	0.0	8.7	8.7	866
610+50	0.0	0.0	0.0	0.0	866
610+56	0.0	0.0	0.0	0.0	866
Option 1, Phase 3 North/South Segment Totals	Volume (CY)				
	Exca	Fill			Mass Ordinate
	3,507	2,641			

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Option 1 - Phase 1 Total

Embankment =	40864
Excavation =	16987
Borrow =	23877
Topsoil Fill =	5461
Topsoil Cut =	5294
Cubic Yard Sta. =	258484
Cubic Yards =	19563
Average Haul =	13.2

Option 1 - Phase 2 Total

Embankment =	13669
Excavation =	28438
Borrow =	-14769
Topsoil Fill =	2922
Topsoil Cut =	11442
Cubic Yard Sta. =	134334
Cubic Yards =	14960
Average Haul =	9.0

Option 1 - Phase 3 Total

Embankment =	6795
Excavation =	7618
Borrow =	-823
Topsoil Fill =	0
Topsoil Cut =	0
Cubic Yard Sta. =	7908
Cubic Yards =	1148
Average Haul =	6.9

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Mass Haul Diagram
Option 1: Concrete Surfacing

ND23A
US85B to ND23B

NOTE: A BALANCE POINT OCCURS EACH TIME THE MASS DIAGRAM ELEMENT CROSSES THE HORIZONTAL AXIS. AS THE GRAPH OF THE MASS DIAGRAM ELEMENT DECLINES, THE EMBANKMENT FOR THAT SECTION EXCEEDS THE EXCAVATION, RESULTING IN A NEGATIVE EARTHWORK VOLUME. WHERE THE CHARTED MASS DIAGRAM ELEMENT INCREASES, POSITIVE NET EARTHWORK VOLUMES ARE BEING GENERATED AS THE EXCAVATION EXCEEDS THE EMBANKMENT.

Option 2 Earthwork Summary (Asphalt Surfacing)

Alignment	Location	A	B	C = B-A	Topsoil (CY) [Pay Item]
		Common Excavation Type A (CY) [Pay Item]	Embankment (CY)	Borrow Excavation (CY) [Pay Item]	
PR23A	East/West Phase 1	12,087	29,191	17,104	8,099
PR23A	North/South Phase 1	7,042	7,430	389	3,061
Bypass	---	33	9,240	9,207	1,150
Totals		19,162	45,861	26,699	12,309

Alignment	Location	A	B	C = B-A	Topsoil (CY) [Pay Item]
		Common Excavation Type A (CY) [Pay Item]	Embankment (CY)	Borrow Excavation (CY) [Pay Item]	
PR23A	East/West Phase 2	13,427	9,425	-4,002	8,644
PR23A	North/South Phase 2	18,671	3,762	-14,909	6,085
Bypass	---	0	0	0	0
Totals		32,098	13,187	-18,911	14,729

Alignment	Location	A	B	C = B-A	Topsoil (CY) [Pay Item]
		Common Excavation Type A (CY) [Pay Item]	Embankment (CY)	Borrow Excavation (CY) [Pay Item]	
PR23A	East/West Phase 3	3,146	5,727	2,581	0
PR23A	North/South Phase 3	2,433	4,124	1,690	0
Bypass	---	9,240	33	-9,208	0
Totals		14,820	9,884	-4,936	0

Note: 25 percent additional volume is included for shrinkage in earth embankment.

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Earthwork Summary
Option 2: Asphalt Surfacing

ND23A
US85B to ND23B

OPTION 2 EARTHWORK VALUES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	11	10

	End Areas (SF)		Volume (CY)		
	Exca	Fill	Exca	Fill	Mass Ordinate
528+65	0.9	1.2	0.0	0.0	0
529+00	0.0	187.9	0.6	153.2	-153
529+50	0.0	273.1	0.0	533.5	-686
530+00	0.0	211.3	0.0	560.6	-1247
530+10	6.0	116.3	1.1	75.8	-1321
530+34	21.5	105.8	12.1	122.3	-1432
530+50	26.6	89.0	14.5	73.1	-1490
531+00	43.9	174.2	65.3	304.6	-1730
531+21	60.6	159.1	40.7	162.0	-1851
531+50	69.8	157.2	70.0	212.3	-1993
531+93	59.4	147.4	102.9	303.3	-2194
532+00	55.7	144.4	14.9	47.3	-2226
532+22	55.0	133.4	45.0	141.2	-2322
532+50	52.0	120.0	55.6	164.5	-2431
533+00	51.8	94.6	96.2	248.4	-2583
533+50	45.7	70.6	90.3	191.3	-2684
533+66	49.6	68.9	28.2	51.5	-2708
534+00	50.2	68.4	62.9	108.2	-2753
534+50	29.1	65.6	73.4	155.1	-2835
535+00	20.2	72.5	45.7	159.8	-2949
535+16	17.3	73.8	11.1	54.0	-2992
535+50	16.1	70.0	21.1	113.4	-3084
536+00	18.9	85.0	32.5	179.4	-3231
536+40	17.0	92.4	26.6	164.1	-3368
536+50	17.7	94.7	6.5	43.6	-3405
537+00	26.0	105.5	40.5	231.7	-3597
537+50	31.9	113.9	53.6	254.0	-3797
537+84	36.6	118.9	43.0	182.9	-3937
538+00	38.1	122.8	22.2	89.9	-4005
538+50	32.3	156.0	65.2	322.7	-4262
539+00	45.5	167.4	72.1	374.3	-4564
539+34	49.0	164.5	59.4	260.7	-4766
539+50	61.9	164.4	33.0	122.3	-4855
540+00	125.0	102.5	173.1	308.9	-4991
540+50	121.0	48.8	227.8	175.1	-4938
541+00	71.8	147.5	178.5	227.1	-4987
541+50	62.2	146.9	124.0	340.7	-5203
542+00	64.6	143.5	117.4	336.1	-5422
542+16	65.0	143.8	37.6	104.2	-5488
542+50	66.4	115.8	83.5	206.4	-5611
543+00	79.3	106.6	134.9	257.4	-5734
543+50	86.7	104.0	153.7	243.7	-5824
544+00	90.1	98.8	163.7	234.7	-5895
544+50	96.3	96.4	172.6	226.0	-5948
544+56	96.8	95.8	20.8	25.9	-5953
545+00	107.3	92.0	167.1	192.0	-5978
545+50	114.3	91.8	205.3	212.7	-5986

546+00	125.2	79.6	221.8	198.3	-5962
546+50	150.9	74.1	255.6	177.8	-5884
547+00	118.9	78.0	249.8	176.0	-5811
547+02	104.6	78.4	8.2	7.1	-5810
547+50	149.2	88.0	225.7	185.1	-5769
548+00	124.3	82.8	253.2	197.8	-5713
548+50	118.4	78.7	224.7	187.0	-5676
549+00	97.7	73.2	200.1	175.9	-5651
549+50	82.8	69.0	167.1	164.6	-5649
550+00	75.6	72.0	146.6	163.3	-5666
550+50	89.8	49.0	153.1	140.1	-5653
551+00	268.4	0.1	331.6	56.8	-5378
551+50	168.1	0.1	404.2	0.1	-4974
552+00	0.0	72.2	155.7	83.7	-4902
552+50	0.0	84.5	0.0	181.4	-5083
553+00	0.0	115.0	0.0	230.9	-5314
553+50	0.0	189.3	0.0	352.1	-5666
554+00	0.6	83.9	0.6	316.2	-5982
554+50	88.1	43.2	82.1	147.0	-6047
555+00	88.1	41.4	163.2	97.9	-5981
555+50	91.5	38.1	166.3	91.9	-5907
556+00	96.3	34.5	173.8	84.0	-5817
556+50	102.4	39.4	183.9	85.5	-5719
557+00	85.5	49.1	174.0	102.4	-5647
557+50	71.8	58.6	145.7	124.7	-5626
558+00	35.0	79.2	98.9	159.5	-5687
558+50	59.5	81.1	87.5	185.6	-5785
559+00	91.7	92.6	140.1	201.1	-5846
559+50	238.4	220.9	305.7	362.9	-5903
560+00	249.3	239.3	451.5	532.6	-5984
560+50	324.7	56.3	531.5	342.1	-5795
561+00	295.1	225.7	573.9	326.5	-5548
561+50	192.1	273.1	451.1	577.4	-5674
562+00	67.2	315.0	240.1	680.7	-6114
562+50	107.3	225.9	161.6	626.0	-6579
563+00	111.4	255.6	202.5	557.3	-6934
563+50	139.8	311.0	232.5	655.8	-7357
564+00	38.5	345.6	165.0	760.0	-7952
564+50	33.3	1890.6	66.4	2588.2	-10474
565+00	44.7	496.7	72.2	2763.1	-13165
565+50	52.8	414.5	90.3	1054.6	-14129
566+00	54.6	523.5	99.4	1085.7	-15115
566+50	60.0	407.5	106.1	1077.5	-16087
567+00	65.0	273.8	115.7	788.4	-16759
567+50	157.6	173.7	206.1	517.9	-17071
568+00	205.7	145.2	336.4	369.0	-17104
Option 2, Phase 1 East/West Segment Totals	Volume (CY)				
	Exca	Fill	Mass Ordinate		
	12,087	29,191			

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OPTION 2 EARTHWORK VALUES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	11	11

	End Areas (SF)		Volume (CY)		Mass Ordinate
	Exca	Fill	Exca	Fill	
589+00	72.4	97.8	0.0	0.0	0
589+50	126.3	0.1	184.0	113.3	71
590+00	98.9	48.0	208.5	55.6	224
590+50	77.5	120.6	163.3	195.1	192
591+00	72.5	115.7	138.9	273.5	57
591+50	71.3	110.1	133.1	261.4	-71
592+00	74.6	106.9	135.1	251.1	-187
592+50	82.8	101.1	145.8	240.8	-282
593+00	93.4	97.9	163.2	230.4	-349
593+50	102.7	93.2	181.6	221.1	-389
594+00	105.9	92.2	193.1	214.5	-410
594+50	105.9	81.8	196.1	201.4	-416
595+00	110.2	61.7	200.1	166.2	-382
595+50	115.1	38.1	208.6	115.5	-289
596+00	107.8	40.3	206.3	90.7	-173
596+50	101.5	35.8	193.8	88.1	-67
597+00	114.9	14.9	200.4	58.6	75
597+50	175.3	0.1	268.7	17.3	326
598+00	275.5	0.1	417.4	0.1	743
598+50	91.4	21.1	339.7	24.5	1058
599+00	82.7	28.8	161.2	57.7	1162
599+50	82.3	27.6	152.8	65.3	1249
600+00	90.0	26.6	159.5	62.7	1346
600+50	88.9	33.4	165.7	69.5	1442
601+00	87.8	41.0	163.6	86.1	1520
601+50	211.8	0.1	277.4	47.5	1750
602+00	77.1	55.5	267.5	64.3	1953
602+50	77.0	65.6	142.6	140.2	1955
603+00	71.2	90.7	137.2	180.8	1912
603+50	98.6	75.3	157.3	192.1	1877
604+00	81.6	84.7	166.8	185.2	1859
604+50	76.9	98.3	146.7	211.8	1794
605+00	72.1	121.5	138.0	254.4	1677
605+50	66.5	116.5	128.3	275.4	1530
606+00	68.0	114.5	124.5	267.3	1387
606+50	63.9	111.8	122.1	261.9	1247
607+00	54.6	115.0	109.7	262.5	1094
607+50	51.8	116.3	98.5	267.8	925
608+00	55.7	114.9	99.5	267.6	757
608+50	54.8	117.6	102.3	269.1	590
609+00	30.1	123.5	78.5	279.1	390
609+50	11.3	157.6	38.3	325.4	103
609+60	12.8	130.4	4.1	61.1	46
610+00	7.0	105.2	14.9	222.7	-162

610+13	8.1	91.0	3.5	57.5	-216
610+35	0.0	146.5	3.3	122.8	-336
610+50	0.1	4.3	0.0	52.4	-388
610+56	1.1	1.0	0.1	0.8	-389
Option 2, Phase 1 North/South Segment Totals	Volume (CY)				
	Exca	Fill	Mass Ordinate		
	7,042	7,430			

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OPTION 2 EARTHWORK VALUES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	11	12

	End Areas (SF)		Volume (CY)		
	Exca	Fill	Exca	Fill	Mass Ordinate
528+65	0.0	0.0	0.0	0.0	0
530+10	0.0	69.3	111.1	232.6	-121
530+34	0.0	86.1	44.1	85.6	-163
530+50	3.0	80.3	36.7	62.4	-189
531+00	3.0	53.7	128.3	155.0	-215
531+21	3.0	44.4	58.4	47.7	-205
531+50	3.0	25.9	86.6	47.2	-165
531+93	3.0	10.3	159.2	36.0	-42
532+00	5.4	9.3	29.9	3.2	-15
532+22	28.0	7.8	100.3	8.7	76
532+50	32.2	5.4	139.7	8.6	207
533+00	31.4	5.0	267.0	12.0	462
533+50	30.4	0.1	274.2	5.9	731
533+66	28.2	0.1	87.8	0.1	818
534+00	26.1	0.1	189.3	0.1	1008
534+50	25.6	10.1	273.4	11.7	1269
535+00	24.6	2.2	265.1	14.2	1520
535+16	23.8	7.5	84.5	3.6	1601
535+50	23.8	9.2	206.3	13.2	1794
536+00	24.0	24.3	461.2	38.8	2217
536+40	24.7	65.4	315.1	83.0	2449
536+50	26.1	67.4	40.9	30.9	2459
537+00	27.3	100.4	175.3	194.2	2440
537+50	27.5	124.6	135.1	260.4	2315
537+84	28.8	138.9	77.0	207.0	2185
538+00	30.0	144.4	32.8	105.3	2112
538+50	30.7	187.4	91.2	384.0	1819
539+00	31.0	199.6	86.1	447.9	1457
539+34	45.8	202.0	57.5	315.5	1199
539+50	46.9	187.8	25.6	144.9	1080
540+00	47.4	66.1	42.1	293.9	828
540+50	47.6	57.1	9.2	142.6	695
541+00	48.0	194.9	33.6	291.7	437
541+50	48.2	169.8	83.9	422.1	99
542+00	48.0	114.3	145.9	328.7	-84
542+16	47.8	113.5	58.6	82.6	-108
542+50	47.6	87.4	142.7	159.7	-125
543+00	47.6	75.7	247.5	188.8	-66
543+50	32.8	68.7	272.7	167.2	39
544+00	32.7	69.0	259.8	159.4	140
544+50	32.6	68.8	264.0	159.4	244
544+56	32.5	70.8	32.6	18.8	258
545+00	32.3	120.1	197.4	195.3	260
545+50	32.3	142.2	143.8	303.5	100
546+00	32.2	101.4	167.1	281.8	-14
546+50	32.0	69.9	225.6	198.2	13
547+00	31.9	55.5	261.0	145.1	129

547+02	31.7	55.3	11.1	5.1	135
547+50	31.5	52.2	265.2	119.5	281
548+00	31.5	51.6	268.5	120.2	429
548+50	31.3	49.3	293.4	116.8	606
549+00	31.1	47.9	345.9	112.5	839
549+50	30.8	47.7	358.6	110.7	1087
550+00	30.6	46.6	345.1	109.2	1323
550+50	30.4	44.4	359.8	105.4	1577
551+00	30.1	38.2	408.7	95.6	1890
551+50	29.9	18.8	405.2	65.9	2230
552+00	29.6	51.2	287.1	80.9	2436
552+50	29.4	64.1	179.6	133.4	2482
553+00	17.9	67.3	135.7	152.1	2466
553+50	22.4	102.9	123.2	196.9	2392
554+00	29.3	79.6	137.1	211.2	2318
554+50	34.8	27.8	226.0	124.3	2420
555+00	29.0	36.9	318.9	74.8	2664
555+50	19.7	37.0	346.4	85.5	2925
556+00	19.2	34.0	363.6	82.2	3206
556+50	18.7	35.0	341.6	79.8	3468
557+00	18.6	40.0	258.8	86.8	3640
557+50	19.4	53.6	205.5	108.3	3737
558+00	21.0	63.0	221.4	135.0	3823
558+50	23.0	68.7	232.7	152.5	3904
559+00	24.9	79.2	238.5	171.2	3971
559+50	26.6	0.0	122.7	91.6	4002
560+00	28.1	0.0	0.0	0.0	4002
560+50	0.0	0.0	0.0	0.0	4002
561+00	0.0	0.0	0.0	0.0	4002
561+50	0.0	0.0	0.0	0.0	4002
562+00	0.0	0.0	0.0	0.0	4002
562+50	0.0	0.0	0.0	0.0	4002
563+00	0.0	0.0	0.0	0.0	4002
563+50	0.0	0.0	0.0	0.0	4002
564+00	0.0	0.0	0.0	0.0	4002
564+50	0.0	0.0	0.0	0.0	4002
565+00	0.0	0.0	0.0	0.0	4002
565+50	0.0	0.0	0.0	0.0	4002
566+00	0.0	0.0	0.0	0.0	4002
566+50	0.0	0.0	0.0	0.0	4002
567+00	0.0	0.0	0.0	0.0	4002
567+50	0.0	0.0	0.0	0.0	4002
568+00	0.0	0.0	0.0	0.0	4002
Option 2, Phase 2 East/West Segment Totals	Volume (CY)				
	Exca	Fill	Mass Ordinate		
	13,427	9,425			

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OPTION 2 EARTHWORK VALUES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	11	13

610+13	34.3	51.9	31.6	34.2	14875
610+35	34.4	1.6	48.3	27.7	14896
610+50	34.5	0.0	14.2	0.6	14909
610+56	34.3	0.0	0.0	0.0	14909
Option 2, Phase 2 North/South Segment Totals			Volume (CY)		
			Exca	Fill	Mass Ordinate
			18,671	3,762	

	End Areas (SF)		Volume (CY)		
	Exca	Fill	Exca	Fill	Mass Ordinate
589+00	0.0	79.5	0.0	0.0	0
589+50	29.7	25.8	254.8	121.9	133
590+00	30.2	83.5	305.0	126.5	311
590+50	30.6	76.8	335.2	185.5	461
591+00	31.0	70.1	412.1	170.0	703
591+50	31.0	64.1	456.2	155.3	1004
592+00	30.8	59.9	469.4	143.5	1330
592+50	30.7	52.3	474.1	129.9	1674
593+00	30.6	47.9	476.0	116.0	2034
593+50	30.5	44.9	473.6	107.4	2400
594+00	30.4	40.8	483.2	99.2	2784
594+50	30.2	37.7	503.7	90.8	3197
595+00	30.1	36.1	522.0	85.4	3634
595+50	30.0	35.7	534.6	83.2	4085
596+00	29.8	36.3	531.3	83.3	4533
596+50	29.7	35.1	532.8	82.6	4983
597+00	29.6	34.4	558.9	80.4	5462
597+50	29.4	31.8	581.1	76.7	5966
598+00	29.3	28.1	474.1	69.4	6371
598+50	29.2	26.2	461.7	62.9	6770
599+00	29.0	26.9	543.4	61.4	7252
599+50	28.9	25.5	500.7	60.7	7692
600+00	28.7	25.9	460.4	59.5	8093
600+50	28.6	30.9	424.2	65.7	8451
601+00	29.0	21.6	395.7	60.7	8786
602+00	29.7	46.9	749.9	158.5	9378
602+50	30.5	55.6	334.6	118.6	9594
603+00	31.1	58.5	362.3	132.0	9824
603+50	31.7	50.1	435.3	125.6	10134
604+00	32.2	47.1	467.9	112.4	10489
604+50	32.7	47.1	482.4	109.0	10862
605+00	33.1	50.5	489.9	113.0	11239
605+50	33.5	42.1	477.0	107.2	11609
606+00	33.8	24.6	443.5	77.3	11975
606+50	33.9	4.5	427.3	33.7	12369
607+00	34.0	1.1	437.5	6.5	12800
608+00	34.1	0.0	926.7	2.5	13724
608+50	34.2	0.1	475.0	0.1	14199
610+00	34.3	64.7	903.8	224.9	14878

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OPTION 2 EARTHWORK VALUES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	11	14

	End Areas (SF)		Volume (CY)		
	Exca	Fill	Exca	Fill	Mass Ordinate
528+65	0.0	0.0	0.0	0.0	0
529+50	0.0	0.0	0.0	0.0	0
530+00	0.0	0.0	0.0	0.0	0
530+10	3.0	88.9	0.6	20.6	-20
530+34	3.0	85.8	2.6	96.2	-114
530+50	3.0	83.3	1.8	63.4	-175
531+00	3.0	73.4	5.6	181.3	-351
531+21	3.0	58.5	2.4	64.1	-413
531+50	5.4	38.8	4.5	65.3	-474
531+93	28.0	42.0	26.6	80.5	-527
532+00	32.2	42.5	7.8	13.7	-533
532+22	31.4	42.9	25.8	43.4	-551
532+50	30.4	43.6	32.1	56.2	-575
533+00	28.2	44.7	54.2	102.2	-623
533+50	26.1	45.4	50.3	104.3	-677
533+66	25.6	45.7	15.3	33.6	-695
534+00	24.6	46.0	31.7	72.2	-736
534+50	23.8	46.3	44.9	106.8	-798
535+00	23.8	46.0	44.1	106.8	-861
535+16	24.0	46.3	14.1	34.1	-881
535+50	24.7	45.9	30.7	72.7	-923
536+00	26.1	45.4	47.0	105.8	-981
536+40	27.3	44.8	39.5	83.5	-1025
536+50	27.5	45.0	10.2	20.9	-1036
537+00	28.8	44.4	52.2	103.4	-1087
537+50	30.0	43.8	54.4	102.1	-1135
537+84	30.7	43.8	38.1	68.8	-1166
538+00	31.0	43.2	18.3	32.3	-1180
538+50	45.8	30.7	71.0	85.5	-1194
539+00	46.9	30.3	85.8	70.5	-1179
539+34	47.4	30.0	59.2	47.4	-1167
539+50	47.6	30.0	28.3	22.3	-1161
540+00	48.0	29.8	88.5	69.1	-1142
540+50	48.2	29.7	89.1	68.9	-1121
541+00	48.0	29.8	89.1	68.9	-1101
541+50	47.8	29.9	88.8	69.0	-1082
542+00	47.6	29.9	88.4	69.2	-1062
542+16	47.6	30.0	27.6	21.7	-1056
542+50	32.8	42.1	51.1	57.3	-1063
543+00	32.7	42.2	60.6	97.6	-1100
543+50	32.6	42.2	60.4	97.7	-1137
544+00	32.5	42.3	60.2	97.9	-1175
544+50	32.3	42.4	60.0	98.1	-1213
544+56	32.3	42.2	7.0	11.4	-1217
545+00	32.2	42.5	52.8	86.6	-1251
545+50	32.0	42.6	59.5	98.5	-1290
546+00	31.9	43.0	59.2	99.1	-1330

546+50	31.7	42.4	58.8	98.9	-1370
547+00	31.5	42.9	58.5	98.8	-1410
547+02	31.5	39.7	2.3	3.8	-1412
547+50	31.3	43.1	55.8	92.1	-1448
548+00	31.1	43.2	57.7	99.9	-1490
548+50	30.8	43.4	57.3	100.2	-1533
549+00	30.6	43.7	56.9	100.8	-1577
549+50	30.4	44.4	56.4	102.0	-1623
550+00	30.1	43.7	56.0	102.0	-1669
550+50	29.9	43.2	55.6	100.5	-1714
551+00	29.6	44.0	55.1	100.9	-1759
551+50	29.4	43.4	54.6	101.1	-1806
552+00	17.9	28.0	43.8	82.6	-1845
552+50	22.4	28.0	37.4	64.8	-1872
553+00	29.3	28.0	47.9	64.8	-1889
553+50	34.8	28.1	59.3	64.9	-1895
554+00	29.0	28.0	59.1	64.9	-1901
554+50	19.7	47.5	45.1	87.4	-1943
555+00	19.2	47.6	36.0	110.1	-2017
555+50	18.7	47.6	35.1	110.2	-2092
556+00	18.6	47.8	34.6	110.4	-2168
556+50	19.4	47.4	35.2	110.2	-2243
557+00	21.0	47.0	37.4	109.4	-2315
557+50	23.0	46.5	40.8	108.2	-2382
558+00	24.9	45.9	44.4	106.9	-2445
558+50	26.6	45.2	47.7	105.4	-2502
559+00	28.1	44.6	50.7	104.0	-2556
559+50	0.0	0.0	26.0	51.7	-2581
560+00	0.0	0.0	0.0	0.0	-2581
560+50	0.0	0.0	0.0	0.0	-2581
561+00	0.0	0.0	0.0	0.0	-2581
561+50	0.0	0.0	0.0	0.0	-2581
562+00	0.0	0.0	0.0	0.0	-2581
562+50	0.0	0.0	0.0	0.0	-2581
563+00	0.0	0.0	0.0	0.0	-2581
563+50	0.0	0.0	0.0	0.0	-2581
564+00	0.0	0.0	0.0	0.0	-2581
564+50	0.0	0.0	0.0	0.0	-2581
565+00	0.0	0.0	0.0	0.0	-2581
565+50	0.0	0.0	0.0	0.0	-2581
566+00	0.0	0.0	0.0	0.0	-2581
566+50	0.0	0.0	0.0	0.0	-2581
567+00	0.0	0.0	0.0	0.0	-2581
567+50	0.0	0.0	0.0	0.0	-2581
568+00	0.0	0.0	0.0	0.0	-2581

Option 2, Phase 3 East/West Segment Totals	Volume (CY)		Mass Ordinate
	Exca	Fill	
	3,146	5,727	

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OPTION 2 EARTHWORK VALUES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	11	15

	End Areas (SF)		Volume (CY)		Mass Ordinate
	Exca	Fill	Exca	Fill	
589+00	29.7	43.8	0.0	0.0	0
589+50	30.2	43.7	55.5	101.3	-46
590+00	30.6	43.5	56.3	100.9	-91
590+50	31.0	43.3	57.0	100.4	-134
591+00	31.0	43.3	57.3	100.2	-177
591+50	30.8	43.4	57.2	100.3	-220
592+00	30.7	43.4	57.0	100.4	-263
592+50	30.6	43.5	56.8	100.6	-307
593+00	30.5	43.6	56.6	100.7	-351
593+50	30.4	28.0	56.3	82.8	-378
594+00	30.2	43.7	56.1	82.9	-405
594+50	30.1	43.8	55.9	101.2	-450
595+00	30.0	43.8	55.6	101.3	-496
595+50	29.8	43.9	55.4	101.5	-542
596+00	29.7	43.9	55.1	101.6	-588
596+50	29.6	44.0	54.9	101.8	-635
597+00	29.4	44.1	54.6	101.9	-682
597+50	29.3	44.1	54.4	102.1	-730
598+00	29.2	44.2	54.1	102.3	-778
598+50	29.0	44.3	53.8	102.4	-827
599+00	28.9	44.3	53.6	102.6	-876
599+50	28.7	44.4	53.3	102.7	-925
600+00	28.6	44.4	53.1	102.8	-975
600+50	29.0	44.3	53.3	102.7	-1024
601+00	29.7	43.9	54.3	102.1	-1072
601+50	30.5	43.6	55.7	101.3	-1118
602+00	31.1	43.2	57.0	100.4	-1161
602+50	31.7	42.8	58.2	99.6	-1203
603+00	32.2	42.5	59.2	98.7	-1242
603+50	32.7	42.1	60.1	97.9	-1280
604+00	33.1	41.8	61.0	97.1	-1316
604+50	33.5	41.4	61.7	96.3	-1351
605+00	33.8	41.2	62.3	95.6	-1384
605+50	33.9	41.0	62.7	95.1	-1416
606+00	34.0	40.9	62.9	94.8	-1448
606+50	34.1	40.8	63.1	94.6	-1480
607+00	34.2	40.7	63.2	94.4	-1511
607+50	34.3	40.7	63.4	94.2	-1542
608+00	34.3	40.6	63.5	94.1	-1572
608+50	34.4	40.6	63.6	93.9	-1603
609+00	34.5	40.5	63.7	93.8	-1633
609+50	34.3	28.0	63.6	79.2	-1648
609+60	34.4	28.0	11.7	11.9	-1648
610+00	16.0	31.5	38.1	56.2	-1667

610+13	11.7	31.8	6.5	18.6	-1679
610+35	0.0	0.0	4.9	16.5	-1690
610+50	0.0	0.0	0.0	0.0	-1690
610+56	0.0	0.0	0.0	0.0	-1690
Option 2, Phase 3 North/South Segment Totals	Volume (CY)				
	Exca	Fill	Mass Ordinate		
	2,433	4,124			

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Embankment = 2024
 Excavation = 2024
 Topsoil Fill = 346
 Topsoil Cut = 437
 Cubic Yard Sta. = 1197
 Cubic Yards = 332
 Average Haul = 3.6

Embankment = 29191
 Excavation = 12087
 Topsoil Fill = 4237
 Topsoil Cut = 3861
 Cubic Yard Sta. = 162240
 Cubic Yards = 12904
 Average Haul = 12.6

Embankment = 828
 Excavation = 828
 Topsoil Fill = 139
 Topsoil Cut = 217
 Cubic Yard Sta. = 210
 Cubic Yards = 178
 Average Haul = 1.2

Embankment = 4168
 Excavation = 4168
 Topsoil Fill = 673
 Topsoil Cut = 1155
 Cubic Yard Sta. = 12666
 Cubic Yards = 1562
 Average Haul = 8.1

Embankment = 410
 Excavation = 22
 Topsoil Fill = 72
 Topsoil Cut = 22
 Cubic Yard Sta. = 151
 Cubic Yards = 310
 Average Haul = 0.5

Option 2 - Phase 1 Total
 Embankment = 36621
 Excavation = 19129
 Borrow = 17492
 Topsoil Fill = 5468
 Topsoil Cut = 5692
 Cubic Yard Sta. = 176464
 Cubic Yards = 15286
 Average Haul = 11.5

Embankment = 654
 Excavation = 654
 Topsoil Fill = 181
 Topsoil Cut = 484
 Cubic Yard Sta. = 246
 Cubic Yards = 172
 Average Haul = 1.4

Embankment = 867
 Excavation = 867
 Topsoil Fill = 130
 Topsoil Cut = 424
 Cubic Yard Sta. = 100
 Cubic Yards = 101
 Average Haul = 1.0

Embankment = 3554
 Excavation = 3554
 Topsoil Fill = 500
 Topsoil Cut = 2396
 Cubic Yard Sta. = 9958
 Cubic Yards = 1957
 Average Haul = 5.1

Embankment = 1290
 Excavation = 1290
 Topsoil Fill = 234
 Topsoil Cut = 618
 Cubic Yard Sta. = 306
 Cubic Yards = 207
 Average Haul = 1.5

Embankment = 7061
 Excavation = 3060
 Topsoil Fill = 548
 Topsoil Cut = 2894
 Cubic Yard Sta. = 23300
 Cubic Yards = 3409
 Average Haul = 6.8

Embankment = 3762
 Excavation = 18671
 Topsoil Fill = 698
 Topsoil Cut = 5387
 Cubic Yard Sta. = 128000
 Cubic Yards = 11927
 Average Haul = 10.7

Option 2 - Phase 2 Total
 Embankment = 13187
 Excavation = 32098
 Borrow = -18911
 Topsoil Fill = 2291
 Topsoil Cut = 12202
 Cubic Yard Sta. = 161910
 Cubic Yards = 17773
 Average Haul = 9.1

Embankment = 5727
 Excavation = 3146
 Topsoil Fill = 0
 Topsoil Cut = 0
 Cubic Yard Sta. = 32525
 Cubic Yards = 2062
 Average Haul = 15.8

Embankment = 4124
 Excavation = 2433
 Topsoil Fill = 0
 Topsoil Cut = 0
 Cubic Yard Sta. = 15540
 Cubic Yards = 1350
 Average Haul = 11.5

Option 2 - Phase 3 Total
 Embankment = 9851
 Excavation = 5579
 Borrow = 4272
 Topsoil Fill = 0
 Topsoil Cut = 0
 Cubic Yard Sta. = 48066
 Cubic Yards = 3412
 Average Haul = 14.1

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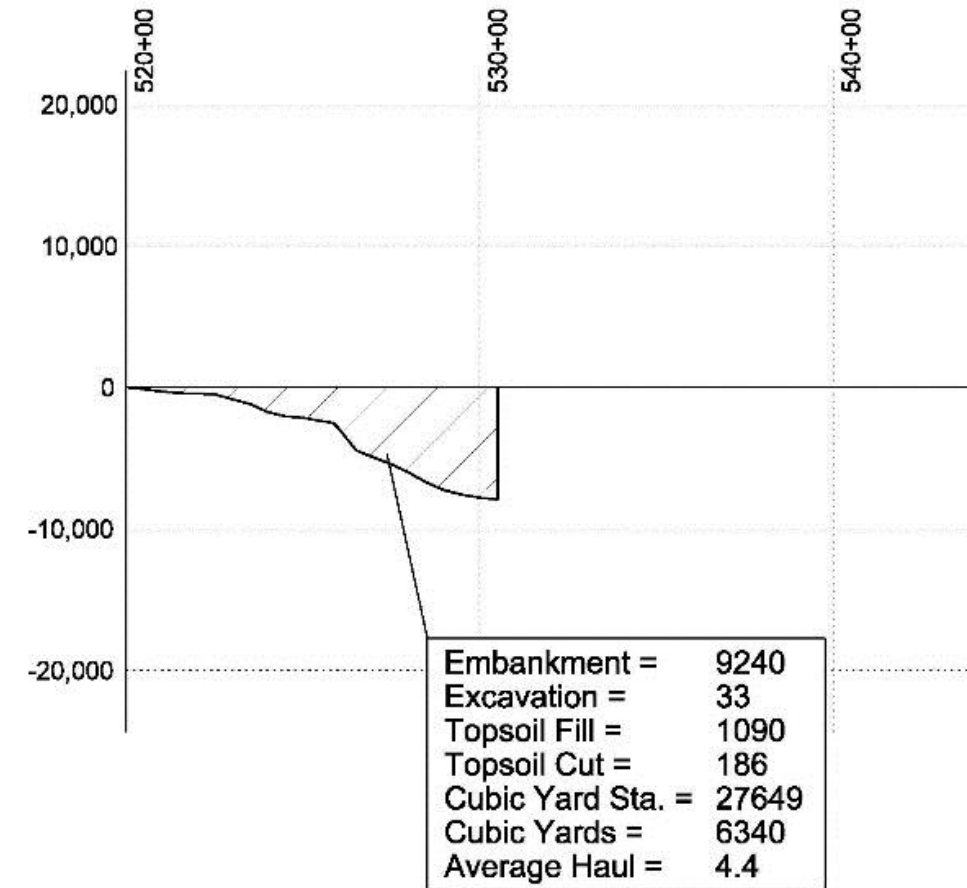
NOTE: A BALANCE POINT OCCURS EACH TIME THE MASS DIAGRAM ELEMENT CROSSES THE HORIZONTAL AXIS. AS THE GRAPH OF THE MASS DIAGRAM ELEMENT DECLINES, THE EMBANKMENT FOR THAT SECTION EXCEEDS THE EXCAVATION, RESULTING IN A NEGATIVE EARTHWORK VOLUME. WHERE THE CHARTED MASS DIAGRAM ELEMENT INCREASES, POSITIVE NET EARTHWORK VOLUMES ARE BEING GENERATED AS THE EXCAVATION EXCEEDS THE EMBANKMENT.

Mass Haul Diagram
 Option 2: Asphalt Surfacing
 ND23A
 US85B to ND23B

TEMPORARY BYPASS EARTHWORK VALUES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	11	17

	End Areas (SF)		Volume (CY)		Mass Ordinate
	Exca	Fill	Exca	Fill	
0+00	0.0	55.7	0.0	0.0	0
0+50	0.0	53.9	0.0	126.8	-127
1+00	0.8	97.7	0.7	175.4	-301
1+50	6.0	1.3	6.3	114.5	-410
2+00	7.9	32.0	12.9	38.5	-435
2+50	0.0	28.2	7.3	69.6	-498
3+00	0.0	274.2	0.0	350.0	-848
3+50	0.0	288.4	0.0	651.1	-1499
4+00	0.0	205.5	0.0	571.6	-2070
4+50	0.0	52.0	0.0	298.0	-2368
5+00	0.0	34.4	0.0	99.9	-2468
5+50	0.0	166.3	0.0	232.3	-2700
6+00	0.0	1099.0	0.0	1464.5	-4165
6+50	0.0	252.7	0.0	1564.4	-5729
7+00	0.0	186.0	0.0	507.7	-6237
7+50	0.0	221.4	0.0	471.5	-6709
8+00	0.0	299.3	0.0	602.7	-7311
8+50	0.0	310.2	0.0	705.5	-8017
9+00	0.0	153.3	0.0	536.5	-8553
9+50	1.2	121.2	1.1	317.7	-8870
10+00	1.9	64.3	2.8	214.7	-9082
10+50	0.0	46.0	1.7	127.7	-9208
Temporary Bypass Totals		Volume (CY)		Mass Ordinate	
		Exca	Fill		
		33	9,240		

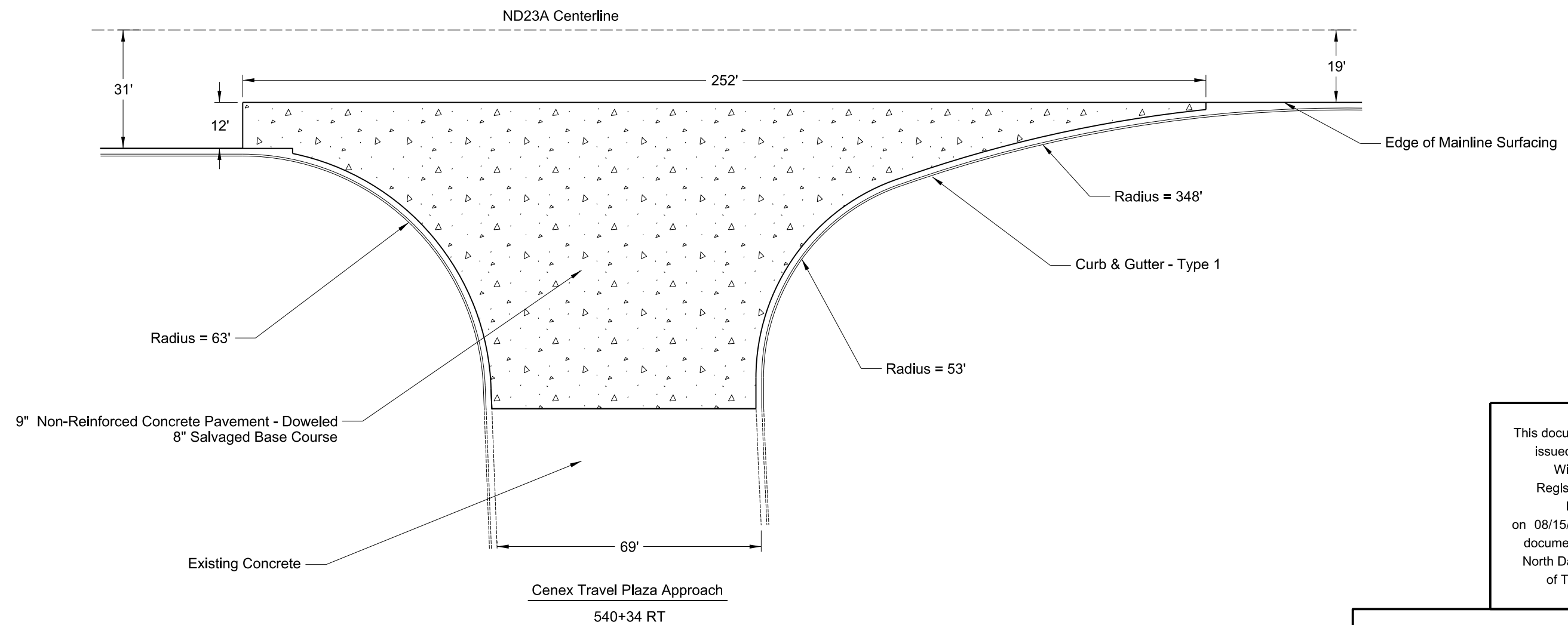


BYPASS

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-7-023(050)910	20	1

SPEC	CODE	BIDE ITEM	QUANTITY	UNIT
302	0100	Salvaged Base Course (Base Material) 540+34 RT	465	TON
550	0305	9IN Non-Reinf Concrete Pvmnt CL AE-Doweled 540+34 RT	1028	SY
748	0140	Curb & Gutter-Type 1 540+34 RT	258	LF

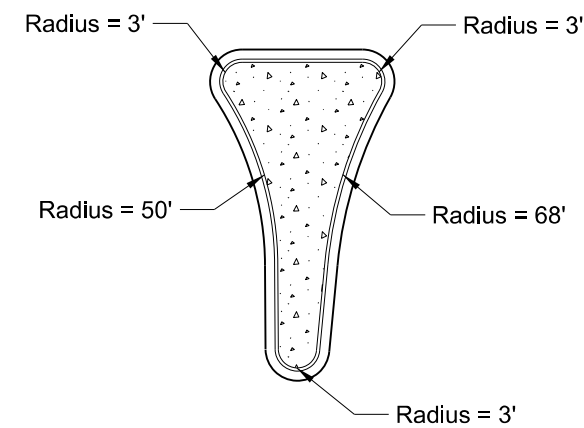
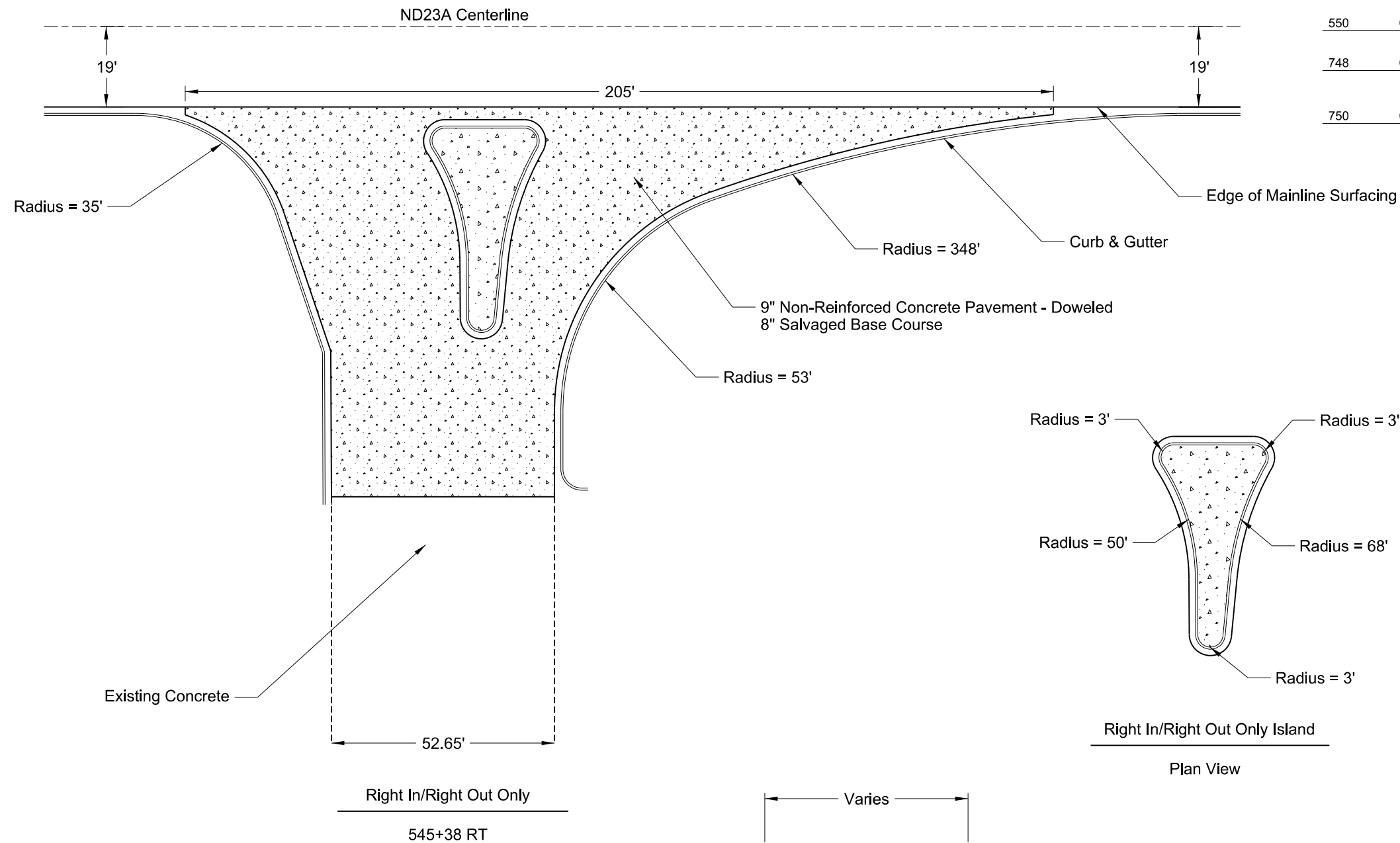


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Cenex Travel Plaza Approach
ND23A
US85B to ND23B

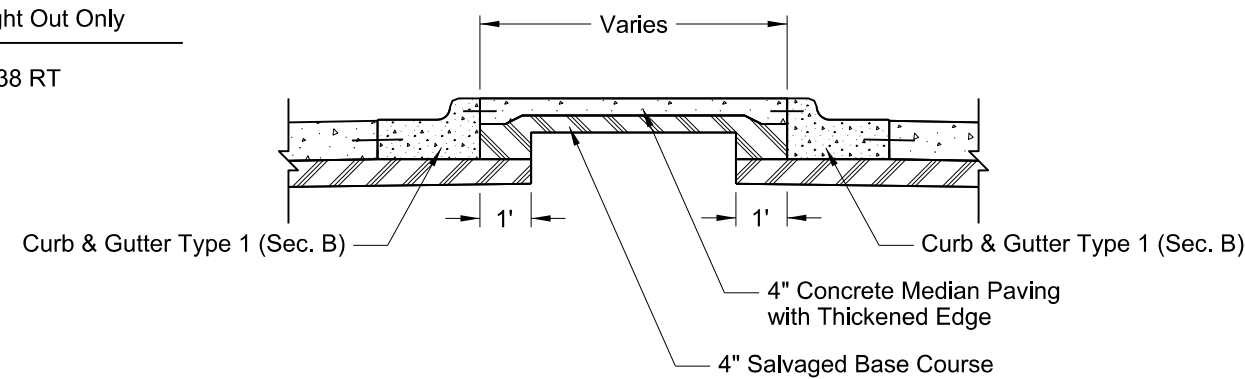
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	20	2

SPEC	CODE	BIDE ITEM	QUANTITY	UNIT
302	0100	Salvaged Base Course (Base Material) 545+38 RT	401	TON
550	0305	9IN Non-Reinf Concrete Pvmnt CL AE-Doweled 545+38 RT	747	SY
748	0140	Curb & Gutter-Type 1 545+38 RT	313	LF
750	0200	Concrete Median Paving 545+38 - RT	125	LF
			63	SY



Right In/Right Out Only Island

Plan View



Right In/Right Out Only Island

Cross Sectional View

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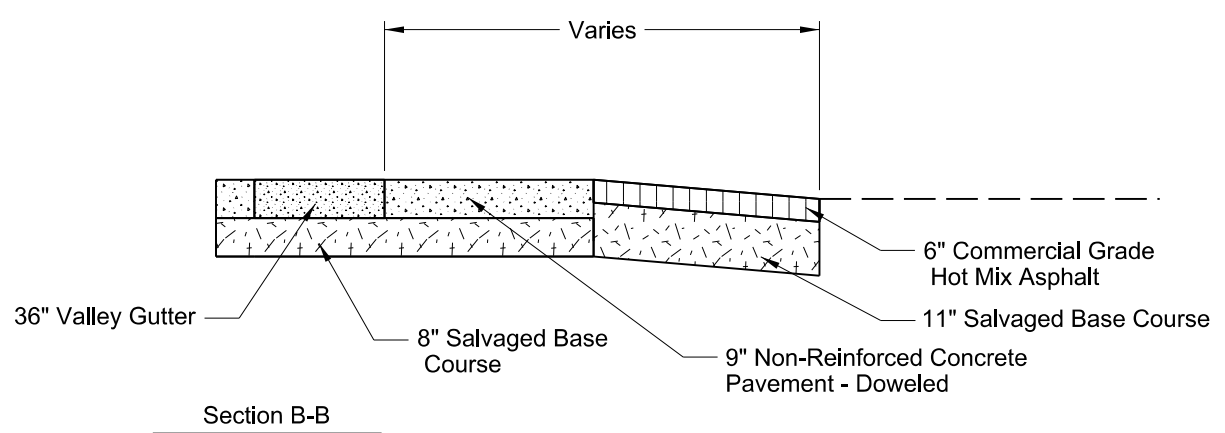
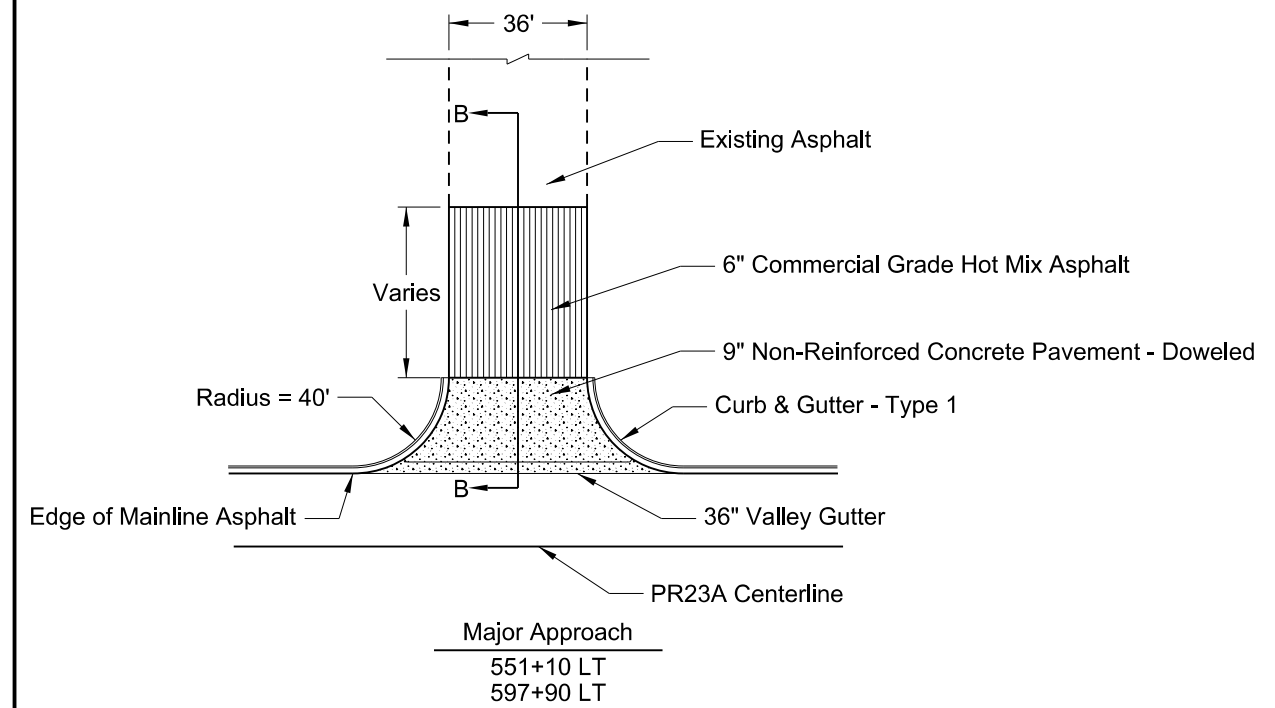
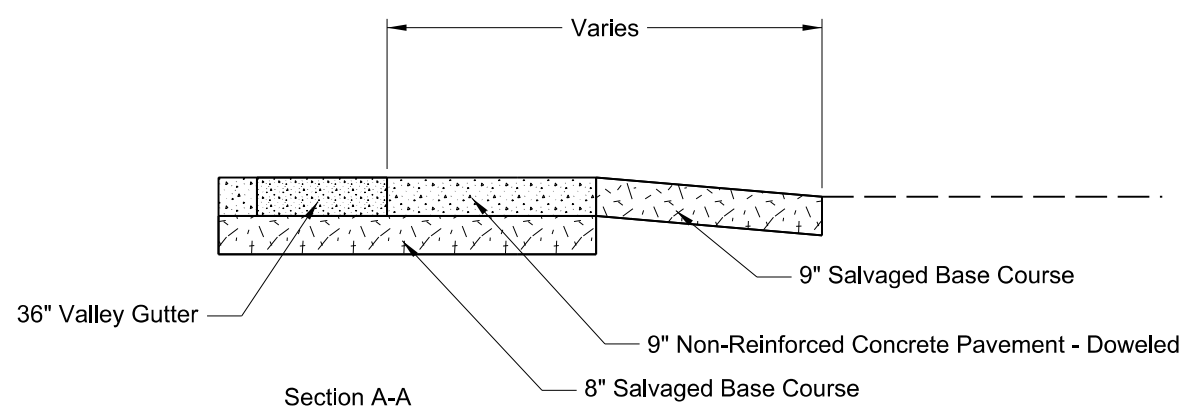
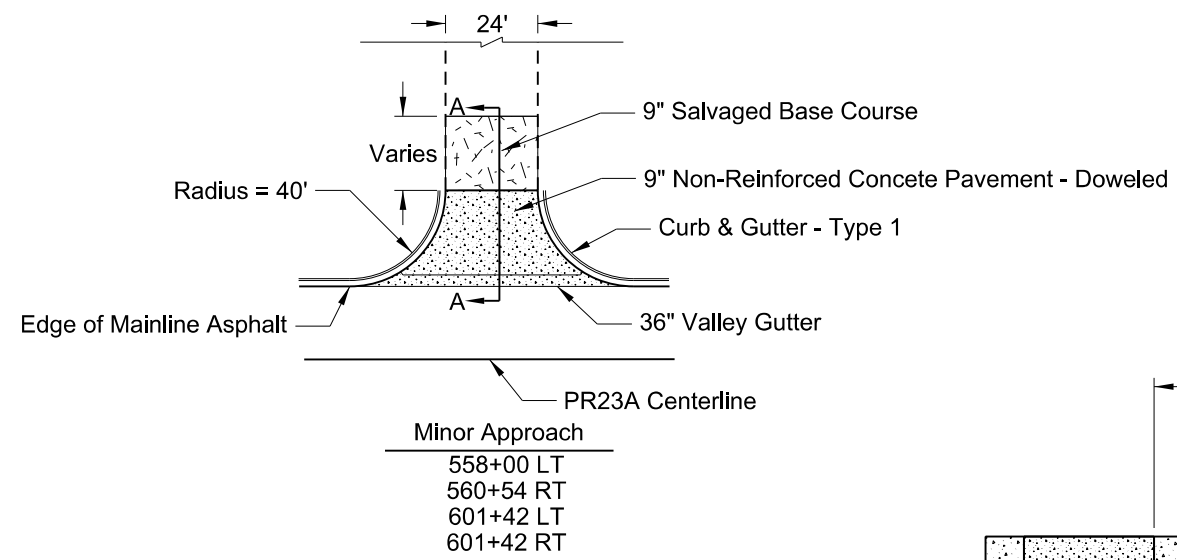
Right In/Right Out Only Approach

ND23A

US85B to ND23B

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-7-023(050)910	20	3

SPEC	CODE	BIDE ITEM	Quantity	Unit
302	0100	Salvaged Base Course (Base Material)		
		551+10 LT	208	TON
		558+00 LT	99	TON
		560+54 RT	99	TON
		597+90 LT	208	TON
		601+42 RT	99	TON
302	0100	Salvaged Base Course (Surfacing Material)		
		558+00 LT	49	TON
		560+54 RT	49	TON
		601+42 RT	49	TON
430	0500	Commercial Grade Hot Mix Asphalt		
		551+10 LT	49	TON
		597+90 LT	49	TON
550	0305	9IN Non-Reinf Concrete Pvmt CL AE-Doweled		
		551+10 LT	219	SY
		558+00 LT	167	SY
		560+54 RT	167	SY
		597+90 LT	219	SY
		601+42 RT	167	SY
748	0140	Curb & Gutter-Type 1		
		551+10 LT	126	LF
		558+00 LT	126	LF
		560+54 RT	126	LF
		597+90 LT	126	LF
		601+42 RT	126	LF
748	1020	Valley Gutter 36IN		
		551+10 LT	33	SY
		558+00 LT	29	SY
		560+54 RT	29	SY
		597+90 LT	33	SY
		601+42 RT	29	SY



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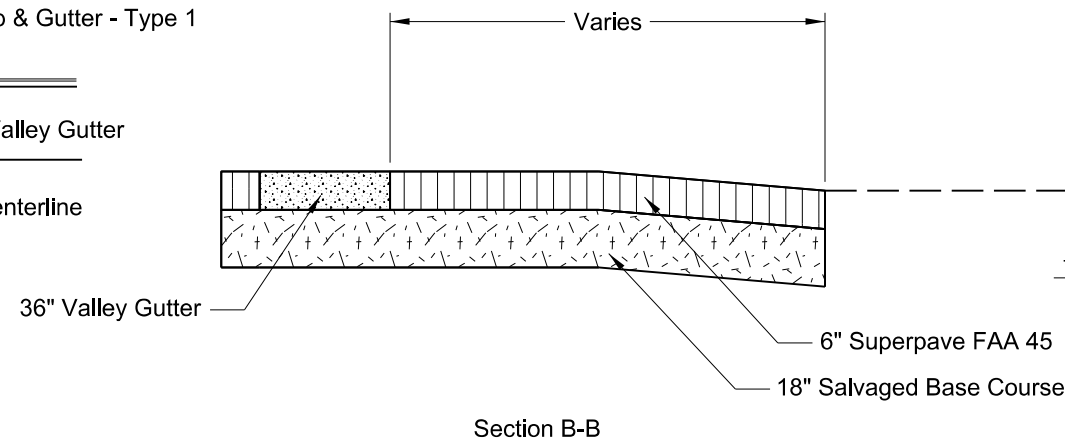
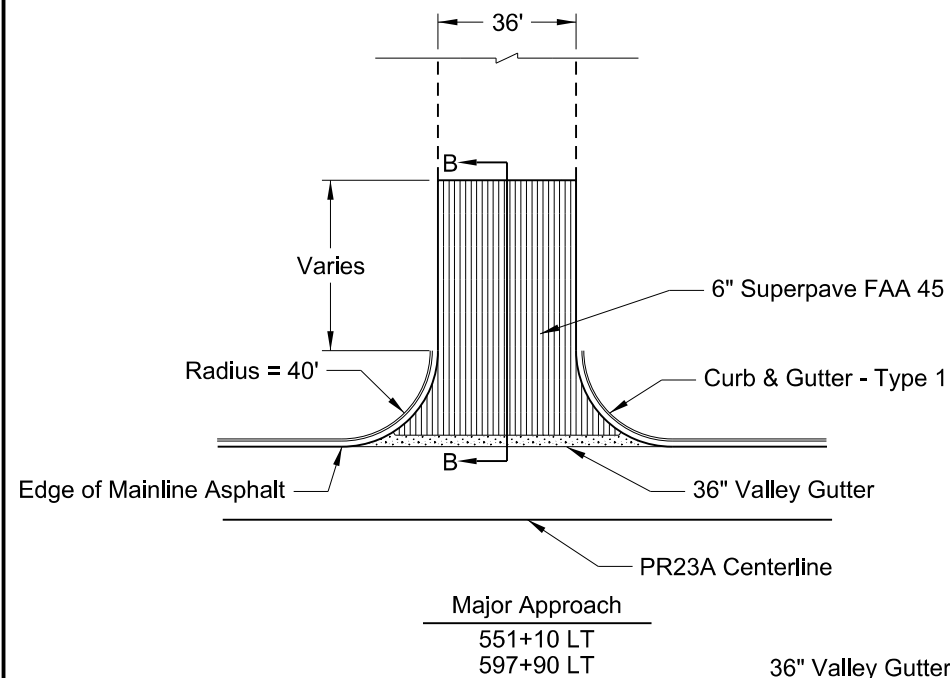
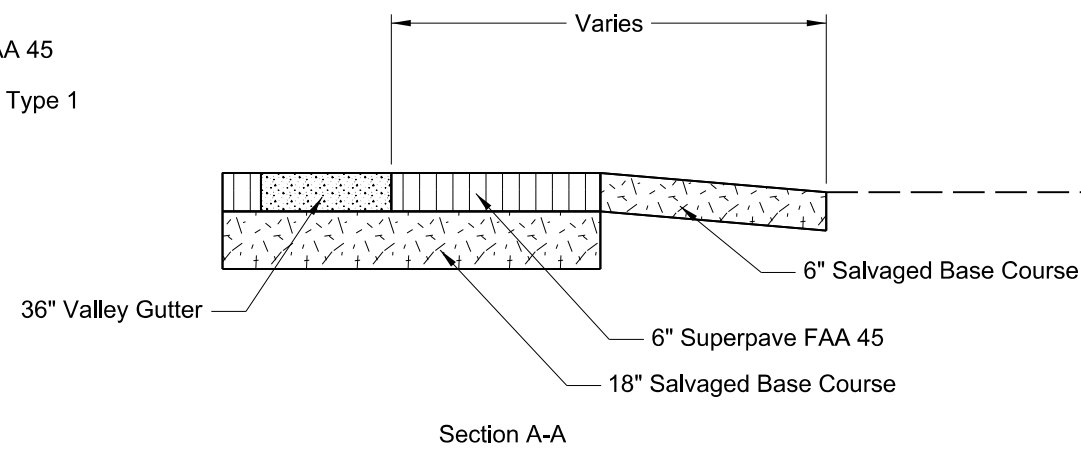
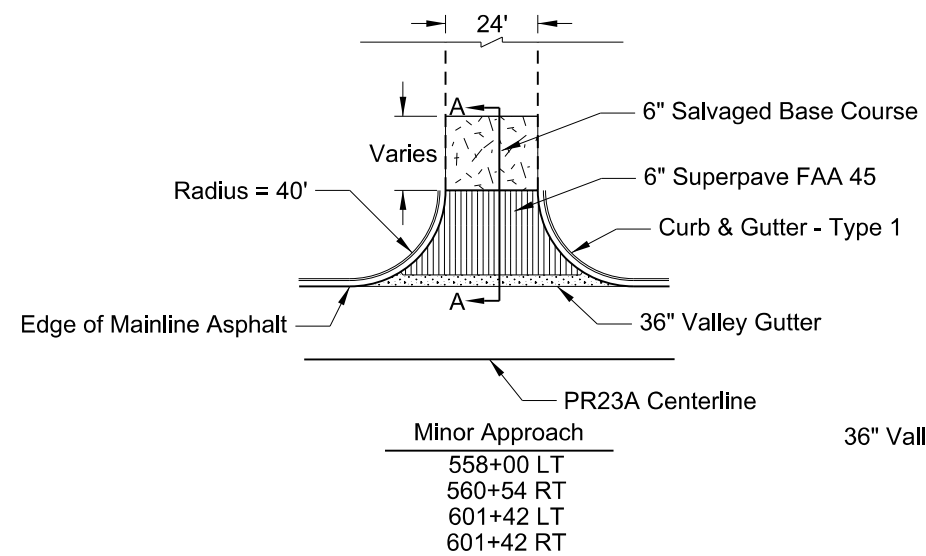
Approach Details
Option 1: Concrete

ND23A

US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	20	4

SPEC	CODE	BIDE ITEM	Quantity	Unit
302	0100	Salvaged Base Course (Base Material)		
		551+10 LT	276	TON
		558+00 LT	224	TON
		560+54 RT	224	TON
		597+90 LT	276	TON
		601+42 RT	224	TON
302	0100	Salvaged Base Course (Surfacing Material)		
		558+00 LT	33	TON
		560+54 RT	33	TON
		601+42 RT	33	TON
401	0060	Prime Coat		
		551+10 LT	92	GAL
		558+00 LT	42	GAL
		560+54 RT	42	GAL
		597+90 LT	92	GAL
		601+42 LT	42	GAL
401	0160	Blotter Material CL 44		
		551+10 LT	3	TON
		558+00 LT	2	TON
		560+54 RT	2	TON
		597+90 LT	3	TON
		601+42 LT	2	TON
401	0050	Tack Coat		
		551+10 LT	37	TON
		558+00 LT	17	TON
		560+54 RT	17	TON
		597+90 LT	37	TON
		601+42 LT	17	TON
430	0045	Superpave FAA 45		
		551+10 LT	122	TON
		558+00 LT	56	TON
		560+54 RT	56	TON
		597+90 LT	122	TON
		601+42 RT	56	TON
430	5828	PG 58-28 Asphalt Cement		
		551+10 LT	3	LF
		558+00 LT	1	LF
		560+54 RT	1	LF
		597+90 LT	3	LF
		601+42 LT	1	LF
430	6434	PG 64-34 Asphalt Cement		
		551+10 LT	5	SY
		558+00 LT	2	SY
		560+54 RT	2	SY
		597+90 LT	5	SY
		601+42 LT	2	SY
748	0140	Curb & Gutter-Type 1		
		551+10 LT	126	SY
		558+00 LT	126	SY
		560+54 RT	126	SY
		597+90 LT	126	SY
		601+42 LT	126	SY
748	1020	Valley Gutter 36IN		
		551+10 LT	33	SY
		558+00 LT	29	SY
		560+54 RT	29	SY
		597+90 LT	33	SY
		601+42 LT	29	SY



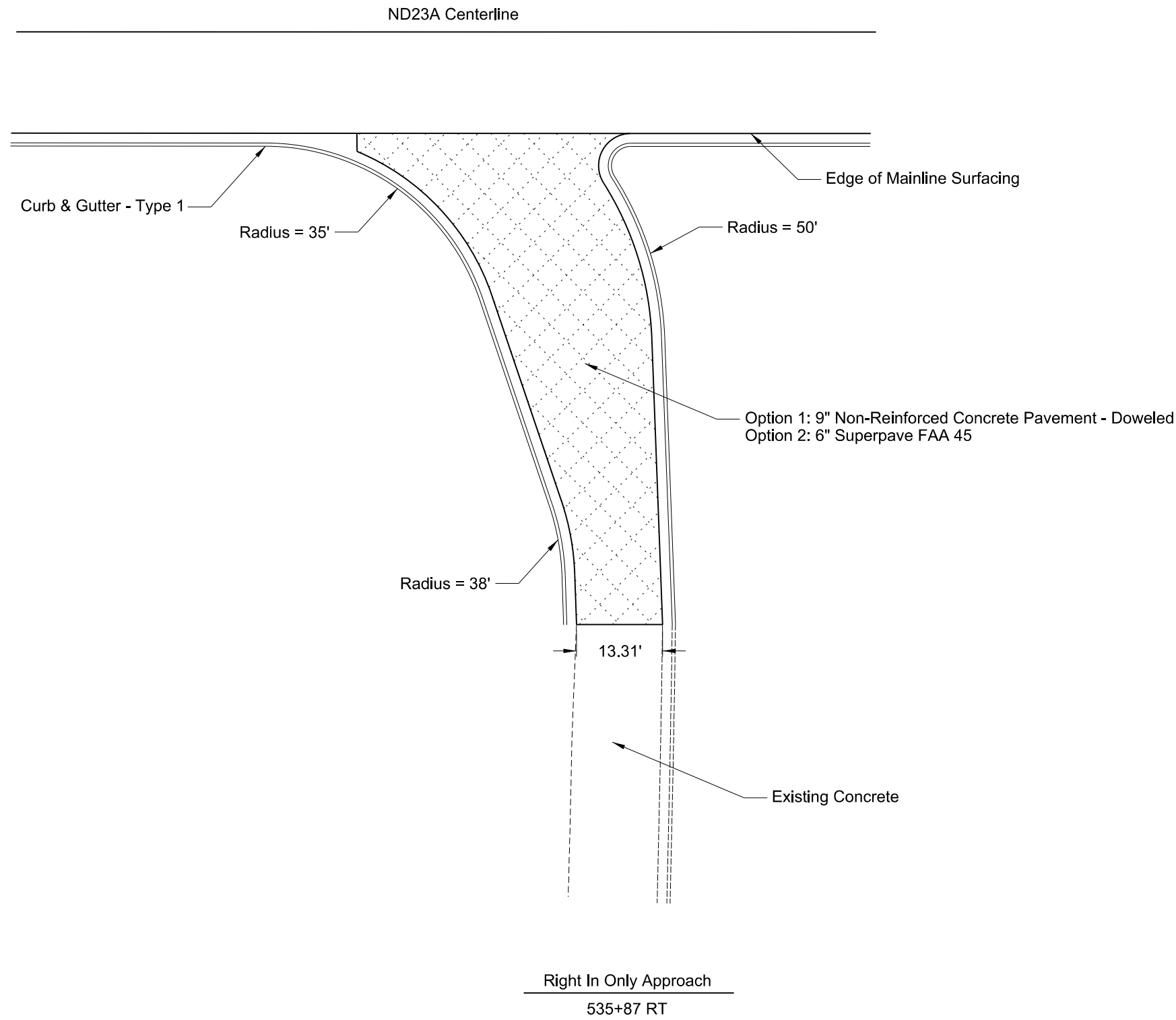
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Approach Details
Option 2: HMA Superpave

ND23A

US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	20	5



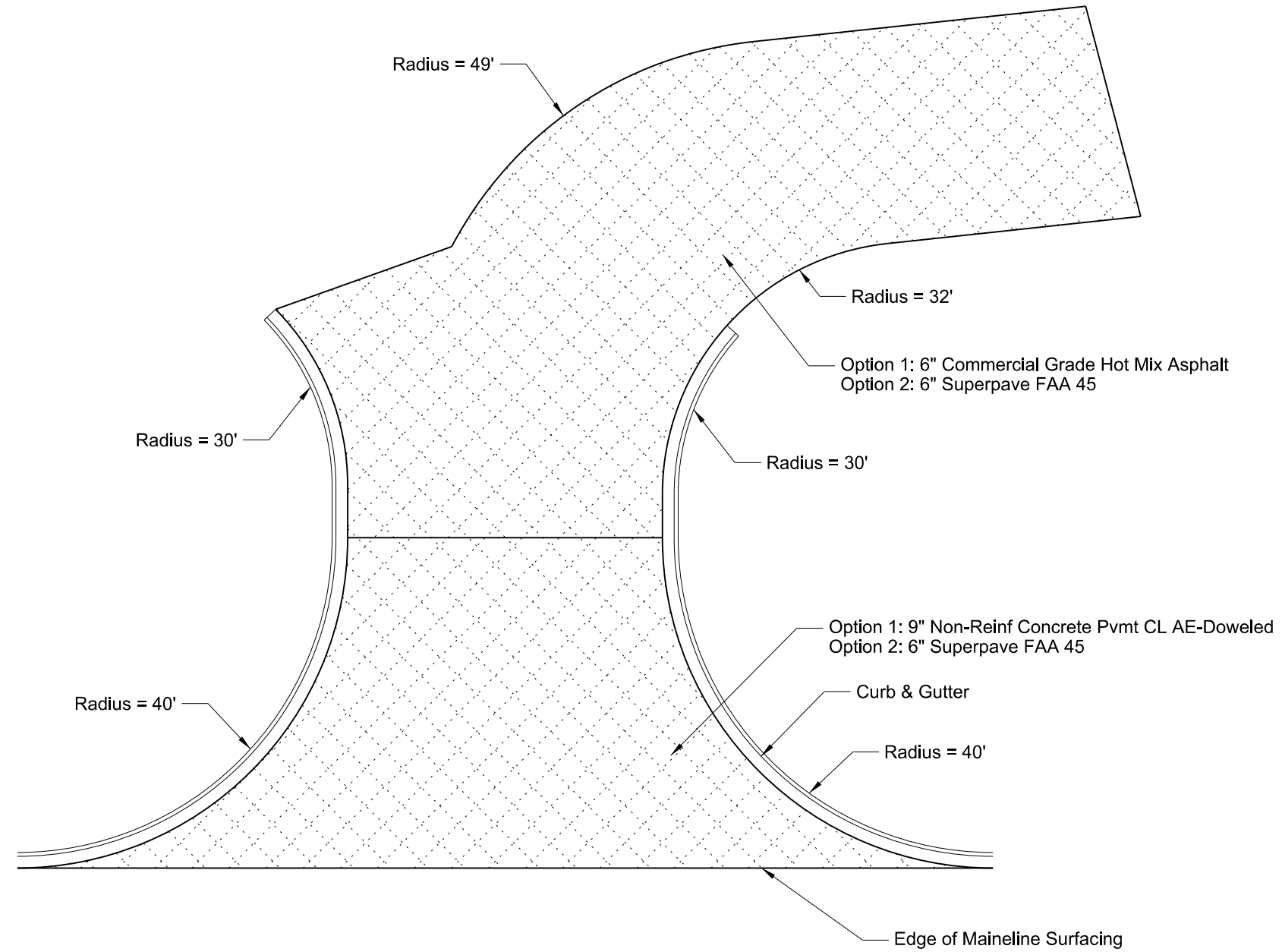
OPTION 1: CONCRETE QUANTITIES				
SPEC	CODE	BID ITEM	QUANTITY	UNIT
302	0100	Salvaged Base Course (Base Material) 535+87 RT	100	TON
550	0305	9IN Non-Reinf Concrete Pvmt CL AE-Doweled 535+87 RT	192	SY
748	0140	Curb & Gutter-Type 1 535+87 RT	175	LF

OPTION 2: HMA SUPERPAVE QUANTITIES				
SPEC	CODE	BID ITEM	QUANTITY	UNIT
302	0100	Salvaged Base Course (Base Material) 535+87 RT	224	TON
401	0050	Tack Coat 535+87 RT	18	GAL
401	0060	Prime Coat 535+87 RT	48	GAL
401	0160	Blotter Material CL 44 535+87 RT	2	TON
430	0045	Superpave FAA 45 535+87 RT	60	TON
430	5828	PG 58-28 Asphalt Cement 535+87 RT	3	TON
430	6434	PG 64-34 Asphalt Cement 535+87 RT	2	TON
748	0140	Curb & Gutter-Type 1 535+87 RT	175	LF

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Right In Only Approach
Option 1: Concrete
Option 2: HMA Superpave
ND23A
US85B to ND23B

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-7-023(050)910	20	6



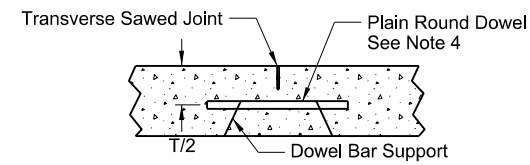
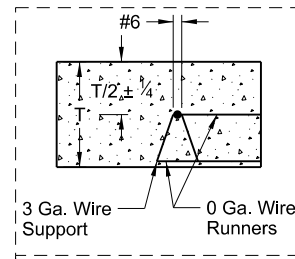
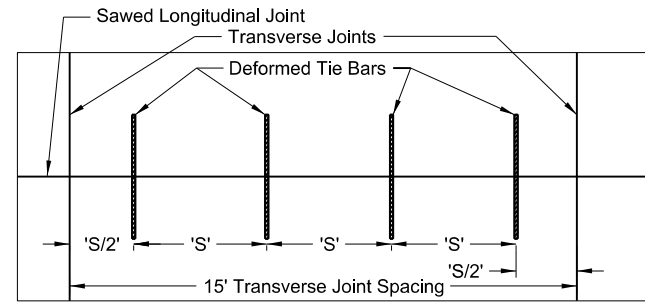
SPEC	CODE	OPTION 1: CONCRETE QUANTITIES BIDE ITEM	QUANTITY	UNIT
302	0100	Salvaged Base Course (Base Material) 540+42 LT	375	TON
430	0500	Commercial Grade Hot Mix Asphalt 540+42 LT	136	TON
550	0305	9IN Non-Reinf Concrete Pvmt CL AE-Doweled 540+42 LT	270	SY
748	0140	Curb & Gutter-Type 1 540+42 LT	183	LF

SPEC	CODE	OPTION 2: HMA SUPERPAVE QUANTITIES BIDE ITEM	QUANTITY	UNIT
302	0100	Salvaged Base Course (Base Material) 540+42 LT	695	TON
401	0050	Tack Coat 540+42 LT	68	GAL
401	0060	Prime Coat 540+42 LT	185	GAL
401	0160	Blotter Material CL 44 540+42 LT	6	TON
430	0045	Superpave FAA 45 540+42 LT	226	TON
430	5828	PG 58-28 Asphalt Cement 540+42 LT	9	TON
430	6434	PG 64-34 Asphalt Cement 540+42 LT	5	TON
748	0140	Curb & Gutter-Type 1 540+42 LT	183	LF

4th St SE North Approach
540+42 LT

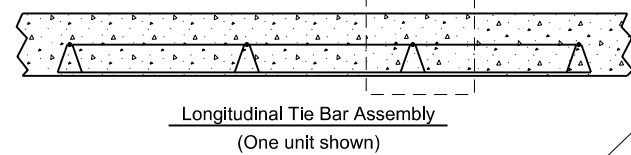
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4th St SE Approach
Option 1: Concrete
Option 2: HMA Superpave
ND23A
US85B to ND23B

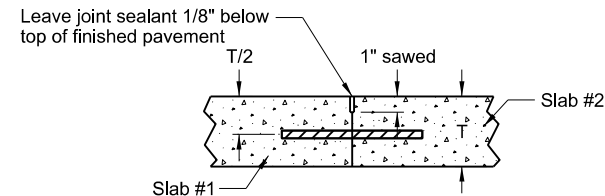


Doweled Transverse Joint

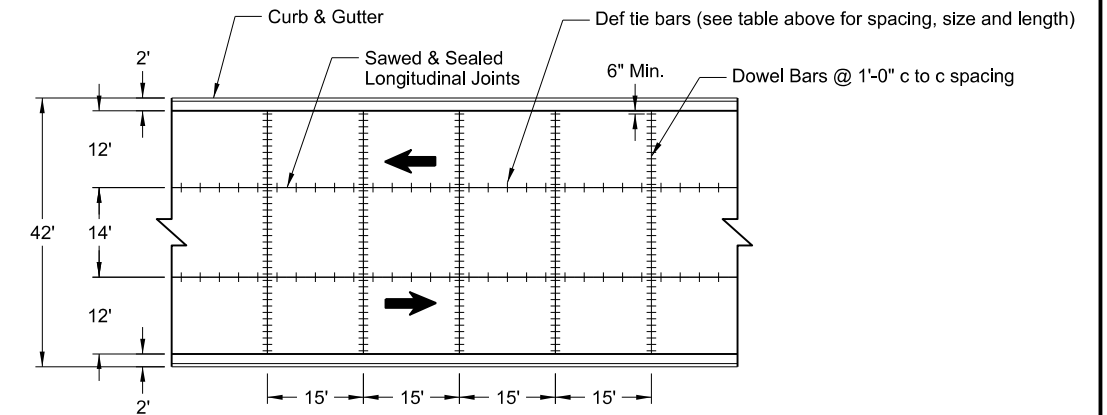
Location	Pavement Thickness	Bar Depth	Steel Grade	Bar Size and Length	Spacing 'S'
Driving Lane	9"	4.5"	40	#6 Bar x 36"	45"
	9"	4.5"	60	#5 Bar x 42"	45"
Center Turn Lane	9"	4.5"	40	#6 Bar x 36"	45"
	9"	4.5"	60	#5 Bar x 42"	45"



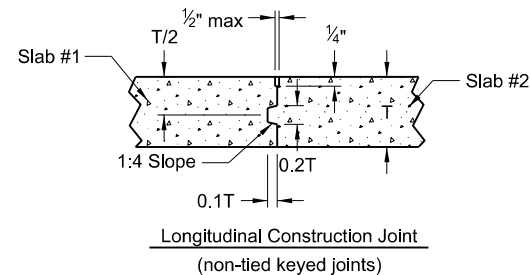
Longitudinal Tie Bar Assembly
(One unit shown)



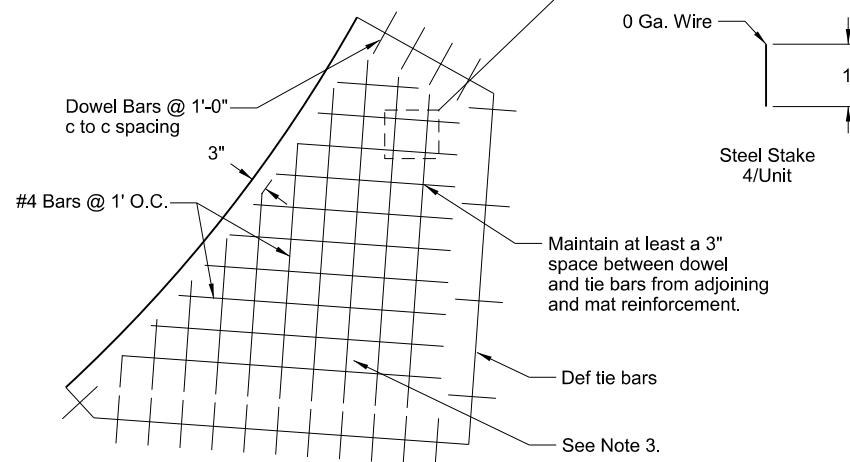
Longitudinal Construction Joint
(tied joints)



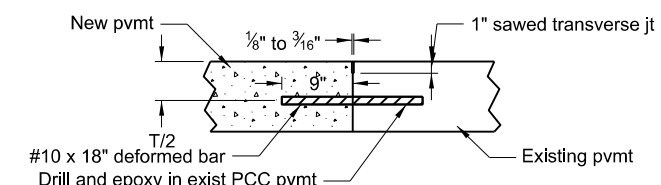
Driving Lanes



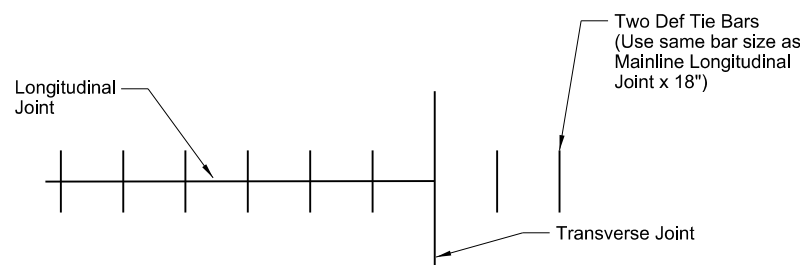
Longitudinal Construction Joint
(non-tied keyed joints)



Full Reinforcement Mat

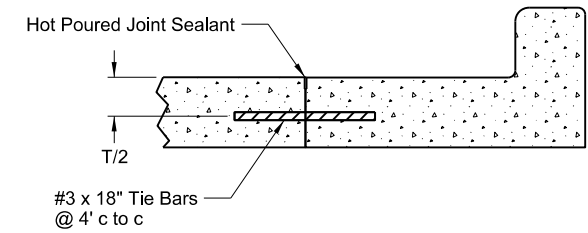


Transverse Construction Joint at Existing Pavement

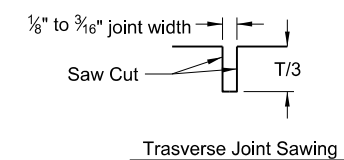


Joint End Ties

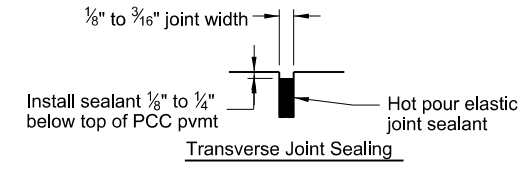
Place two #4 Bar x 18" Def Tie Bar at the end of the joint



Curb & Gutter Sections



Trasverse Joint Sawing



Transverse Joint Sealing

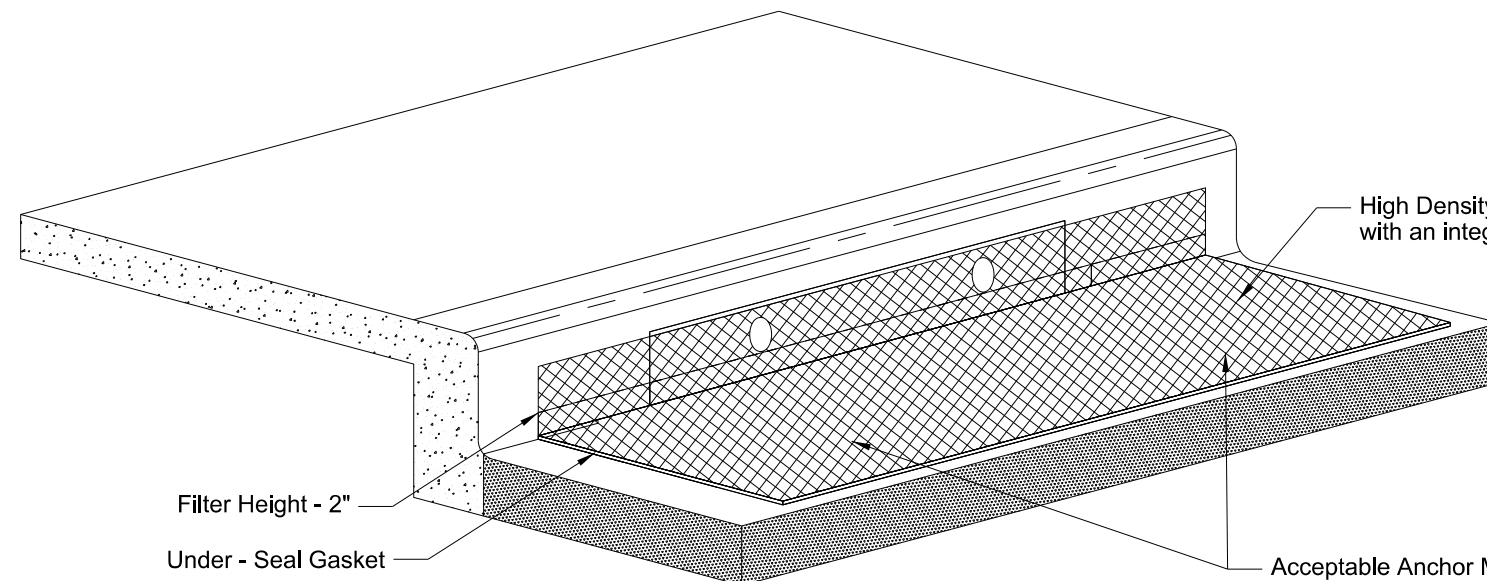
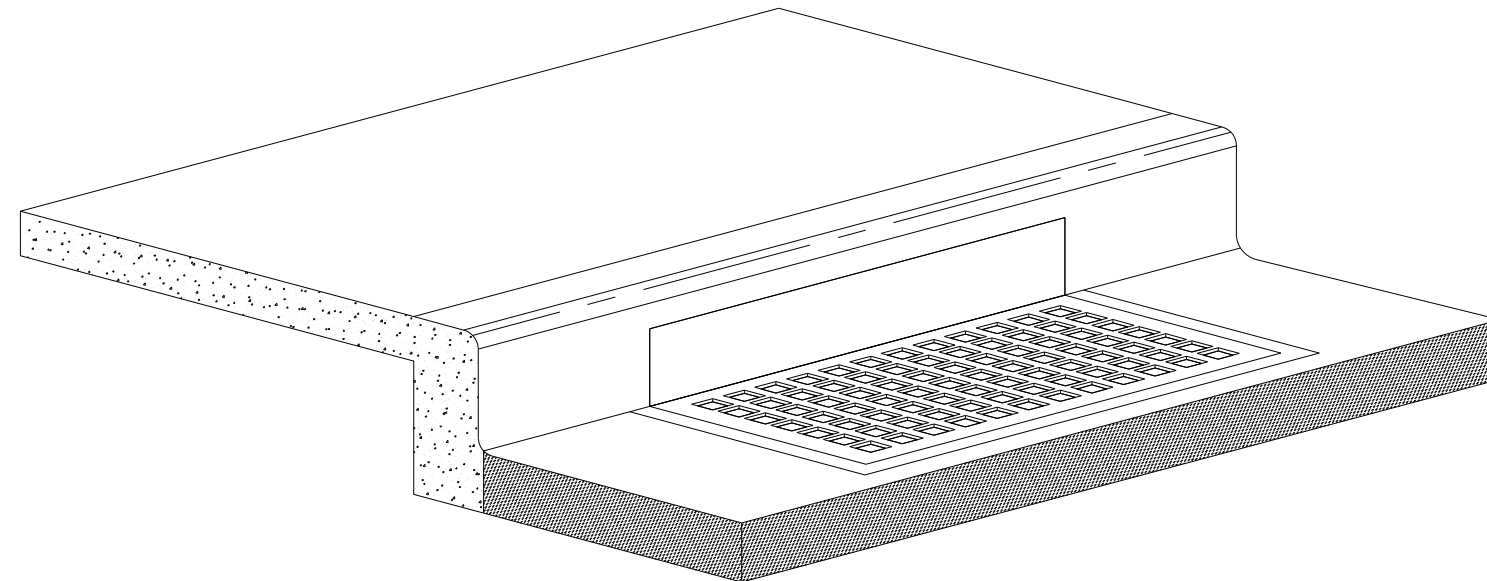
- Notes:
1. T = Pavement Thickness = 9"
 2. Dowel bars shall be 1 1/4" x 18" for T = 9".
 3. Full Reinforcement Mat is included in the unit price bid for 9" Non-Reinforced Concrete Pavement - Doweled.
 4. Coat entire dowel bar length with Multipurpose Lithium Grease (NLGI Grade #2), Tectyl 506 or approved equal.

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PCC Pavement Joint Detail
ND23A
US85B to ND23B

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-7-023(050)910	20	8

SPEC	CODE	BIDE ITEM	QUANTITY	UNIT
708	1540	Inlet Protection-Special		
		Total	46	EA
708	1541	Remove Inlet Protection-Special		
		Total	46	EA



Filter Height - 2"
Under - Seal Gasket

High Density Polyethylene (HDPE) high flow jacket filter (8,000 opening per SY) with an integrated 425 um (micron meter) fine filter particle mesh

Acceptable Anchor Method: Fasten to inlet casting grate with a UV/Weather Resistant Plastic Cable Zip Ties - 16 to 24 in. Install zip ties at each corner of the inlet near the perimeter and two additional zip ties near the middle of the casting. Punch hole through filter and run cable tie downward around grate and back up to fasten.

Inlet Protection Device

Installation Notes:

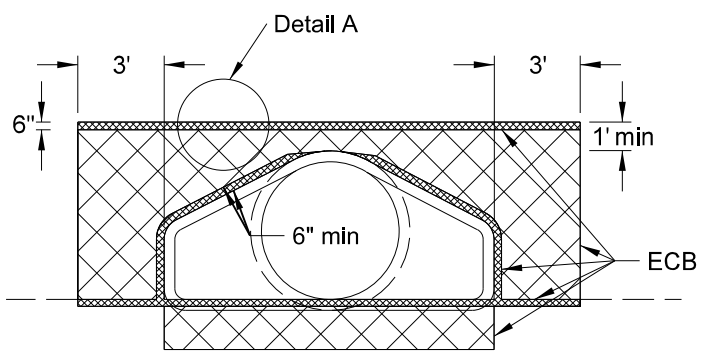
1. Place device tightly against drain opening and cover entire grate. Extend the device at least 2 inches past the grate toward the street.
2. Overlap the segments at longer openings.
3. Anchor the device so that water cannot flow behind it.

General Notes:

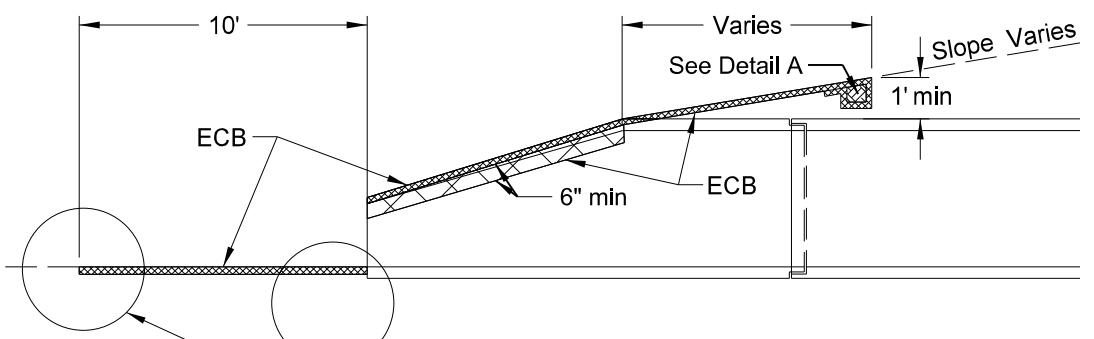
1. Remove material that falls into the inlet during maintenance or removal of the device.

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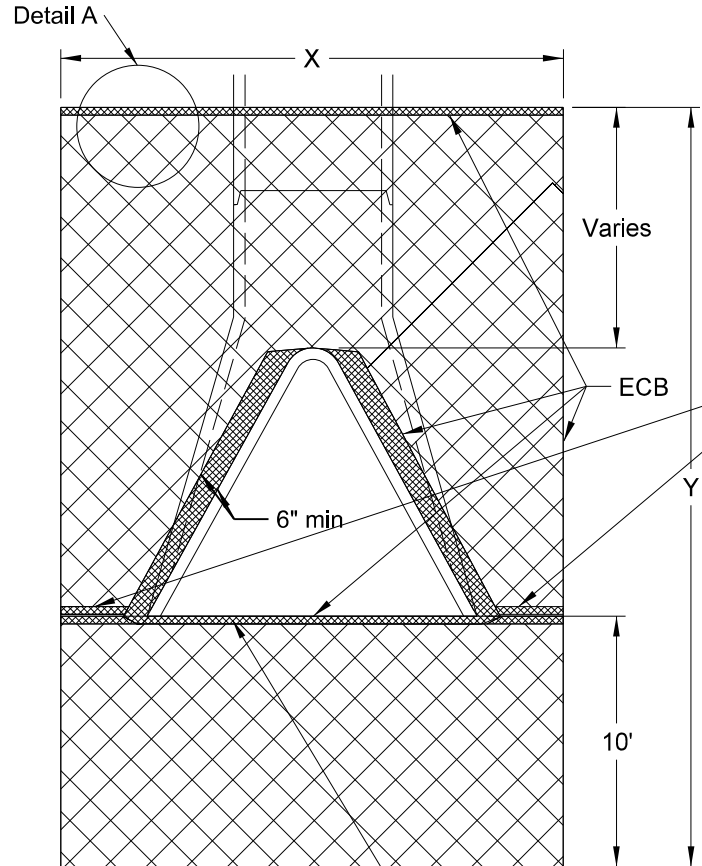
Inlet Protection Device
ND23A
US85B to ND23B



FRONT VIEW

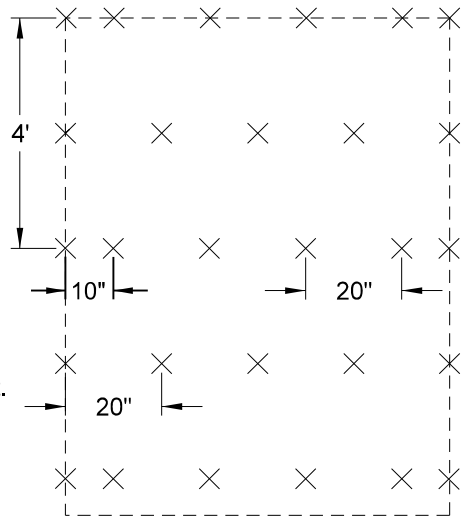


SIDE VIEW



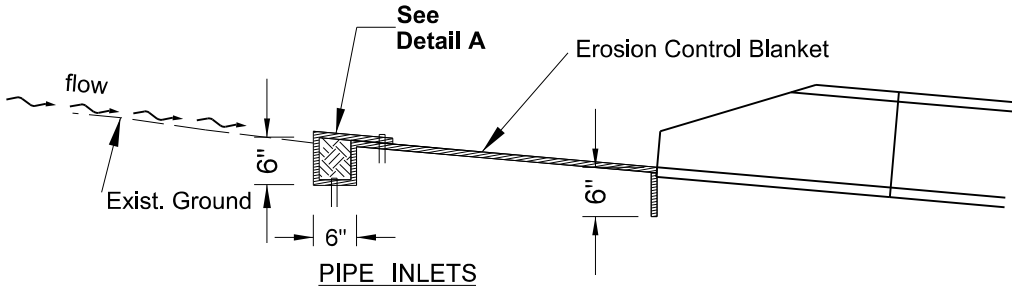
TOP VIEW

Tuck this end a minimum of 6" into the embankment.

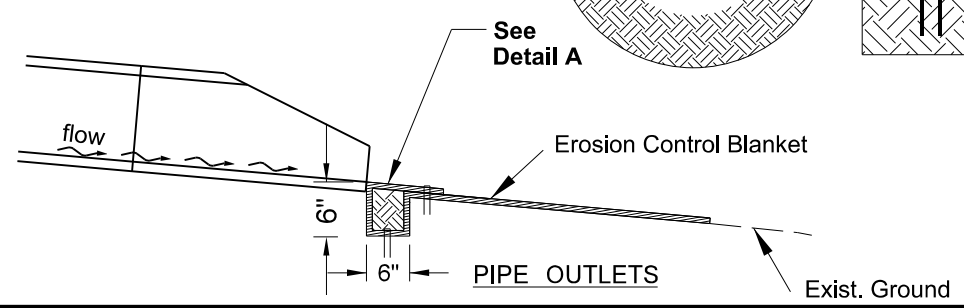


STAPLE PATTERN

NOTE: Tuck the ECB a minimum of 6" into the embankment (against the flared end section) around the opening of the flared end section.



PIPE INLETS



PIPE OUTLETS

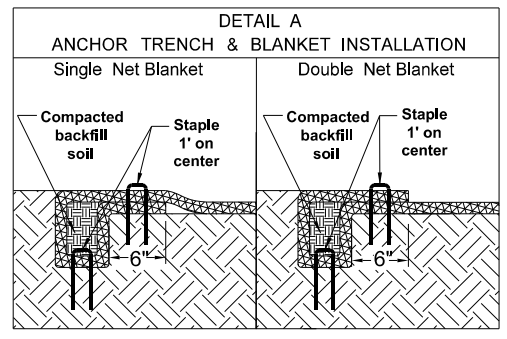
Erosion Control Blanket (ECB)								
Location to be Protected	Culvert Type	Pipe Diam. (Inch)	No	Unit Quantity (SY)	Total Quantity			
					Type 1 (SY)	Type 2 (SY)	Type 3 (SY)	Type 4 (SY)
530+12 Rt	CL	42	1	25	0	0	25	0
540+35 Lt	Appr	42	2	54	0	0	54	0
540+34 Rt	Appr	48	2	58	0	0	58	0
545+37 Rt	Appr	48	2	58	0	0	58	0
551+10 Lt	Appr	42	2	54	0	0	54	0
597+90 Lt	Appr	36	1	30	0	0	30	0
601+42 Lt	Appr	36	1	30	0	0	30	0
601+42 Rt	Appr	Arch 58x36	2	60	0	0	60	0
609+40 Lt	CL	60	2	65	0	0	65	0
610+04 Lt	CL	60	1	35	0	0	35	0
Total (SYs)					0	0	469	0

APPROACH CULVERTS				
DIA	X	Y	Surface area to be protected	ECB
In	Ft	Ft	SF	SY
15	9.0	20.0	176.0	20
18	9.5	20.7	190.7	22
21	9.5	21.0	190.9	22
24	10.5	21.6	214.1	24
27	11.0	22.0	226.3	25
30	11.6	22.5	241.5	27
36	12.7	23.3	268.8	30
42	13.3	23.3	279.7	31
48	13.8	24.0	293.2	33
54	14.5	23.4	300.6	34
60	15.0	23.0	307.5	35
66	15.6	24.0	325.6	37
72	16.2	24.5	340.6	38

Note: Quantities based on 8:1 slope.

CENTERLINE CULVERTS				
DIA	X	Y	Surface area to be protected	ECB
In	Ft	Ft	SF	SY
24	10.5	27.6	172.1	20
27	11.0	18.0	182.3	21
30	11.6	18.5	195.1	22
36	12.7	19.2	216.7	24
42	13.3	19.2	225.2	25
48	13.8	20.0	238.0	27
54	14.5	19.5	244.7	28
60	15.0	19.0	248.3	28
66	15.6	20.0	264.5	30
72	16.2	20.5	276.8	31

Note: Quantities based on 4:1 slope.



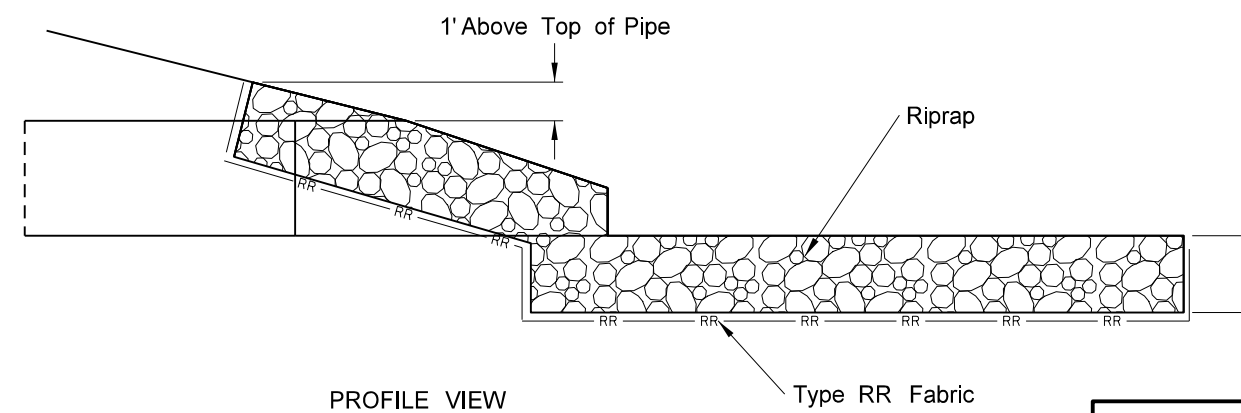
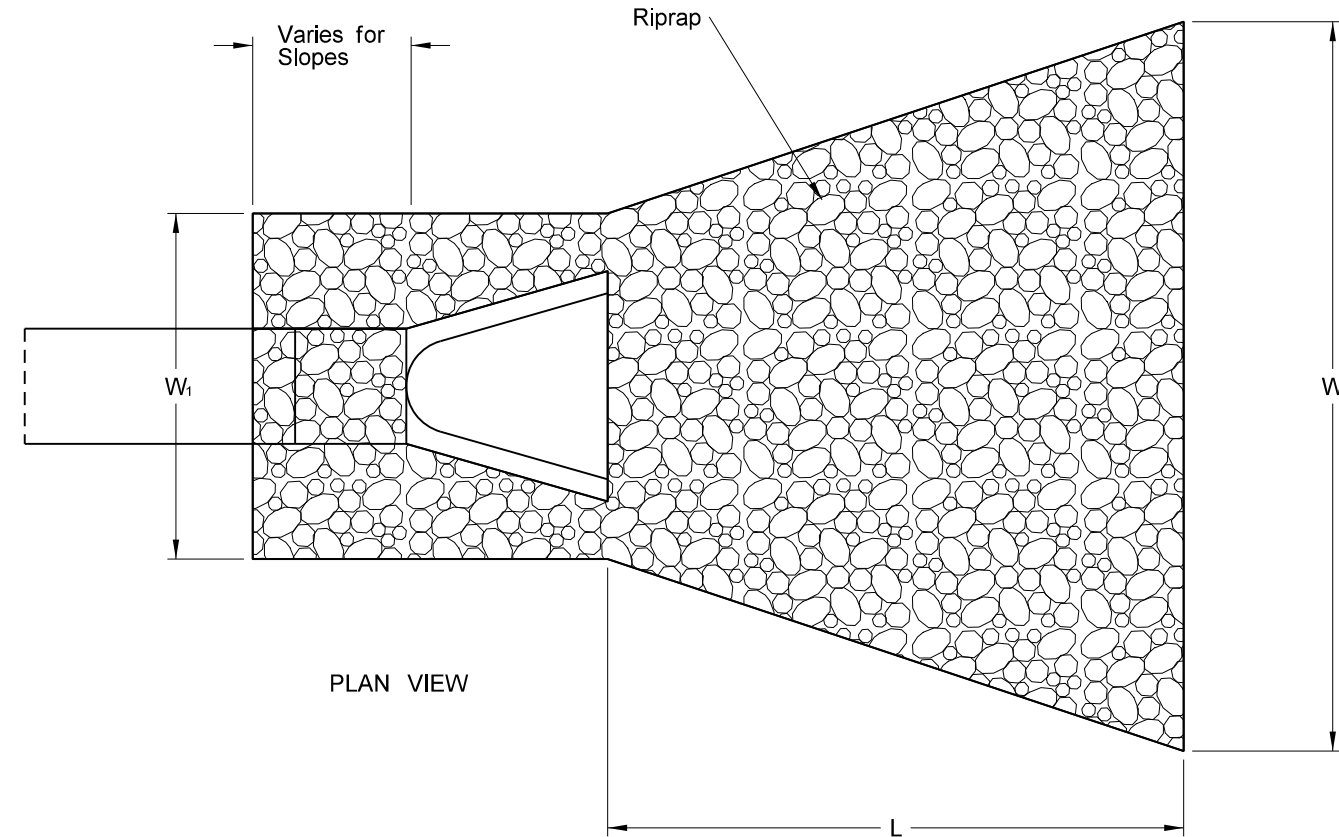
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Erosion Control at Culvert Flared End Sections

ND23A
US85B to ND23B

Riprap Dimensions						
Culvert Diameter (inches)	L (feet)	W ₁ (feet)	W ₂ (feet)	Riprap Depth, D (feet)	RR Fabric (SY)	Riprap (CY)
24	9	6	12	2	26	10
30	12	8	16	2	39	16
36	15	9	19	2	50	22
42	18	11	23	2	63	31
48	19	12	25	2	73	33
60	21	15	29	2	89	47
72	24	18	34	2	106	58
84	27	21	40	2	124	73

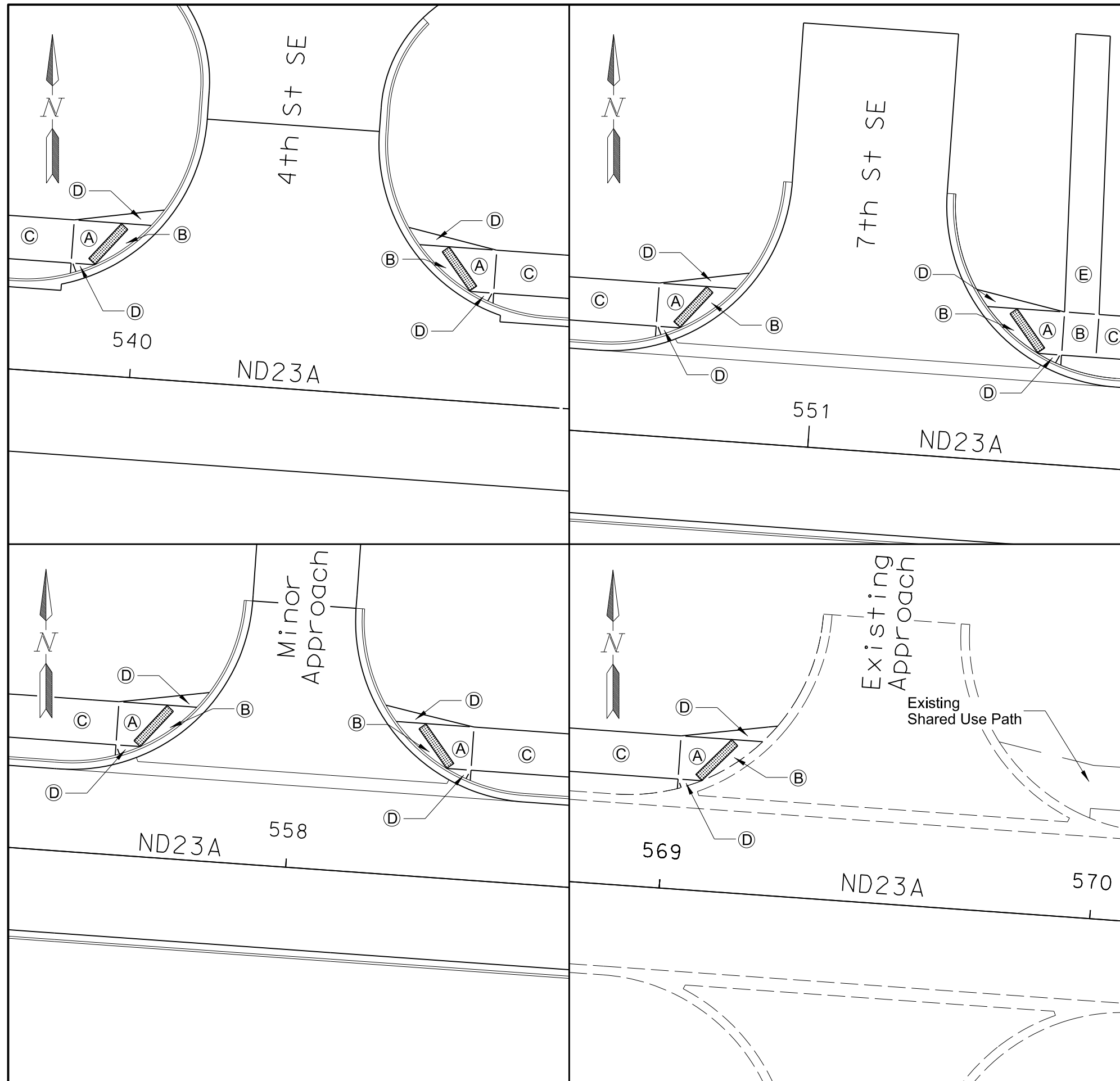
Location of Surface Area to be Protected		Culvert Diameter (inches)	RR Fabric (SY)	Riprap (CY)
Station				
Bypass 3+21	LT	Arch 72	106	58
Bypass 5+85	RT	84	124	73
553+75	RT	48	73	33
561+75	LT	48	73	33
561+93	LT	48	73	33
Totals			449	230



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Culvert End Protection - Riprap
 ND23A
 US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	20	11



Notes:

1. Any ramp found to be in noncompliance shall be removed and replaced by the contractor at their own expense.
2. Dimensions shown may vary from actual. Contractor shall field fit/adjust if maximum slopes cannot be met with dimensions shown.
3. All curb ramp flares are graded unless otherwise noted.
4. See Standard Drawing D-750-3 for more details.

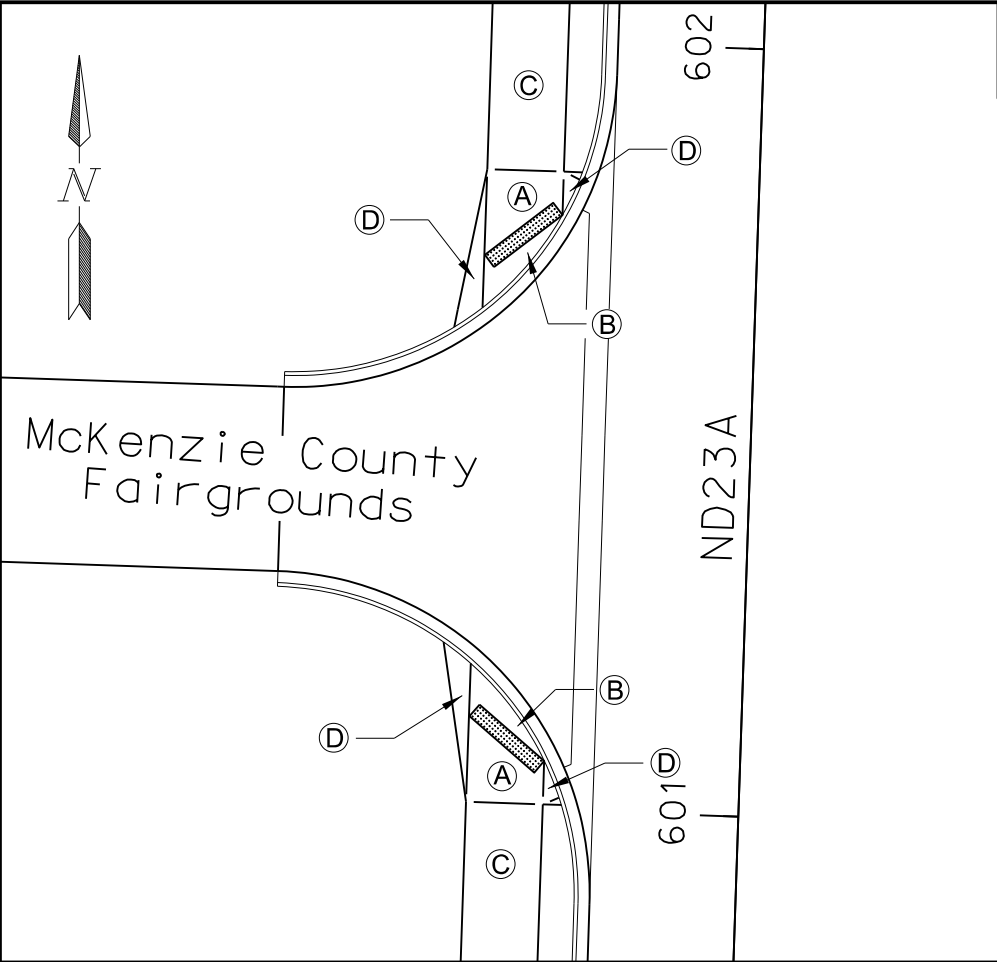
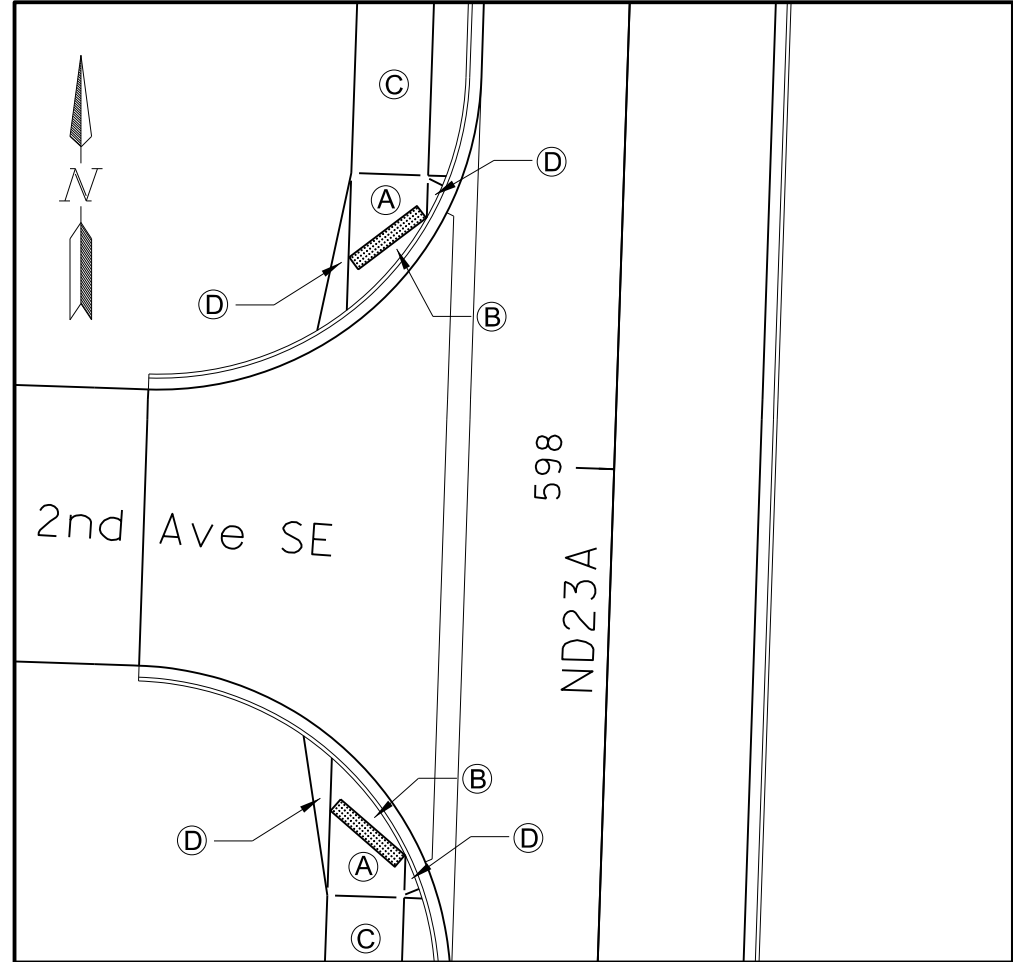
- (A) Curb Ramp
12:1 Maximum Longitudinal Slope
50:1 Maximum Cross Slope
- (B) Landing
50:1 Maximum Longitudinal Slope
50:1 Maximum Cross Slope
4x4 Minimum, Match Width of Shared Use Path
- (C) 10' Shared Use Path
20:1 Maximum Longitudinal Slope
20:1 Maximum Cross Slope
- (D) 4:1 Flare Rate
- (E) 8' Shared Use Path
20:1 Maximum Longitudinal Slope
20:1 Maximum Cross Slope

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ADA Ramp Details

ND23A
US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	20	12



Notes:

1. Any ramp found to be in noncompliance shall be removed and replaced by the contractor at their own expense.
2. Dimensions shown may vary from actual. Contractor shall field fit/adjust if maximum slopes cannot be met with dimensions shown.
3. All curb ramp flares are graded unless otherwise noted.
4. See Standard Drawing D-750-3 for more details.

- (A) Curb Ramp
12:1 Maximum Longitudinal Slope
50:1 Maximum Cross Slope
- (B) Landing
50:1 Maximum Longitudinal Slope
50:1 Maximum Cross Slope
4x4 Minimum, Match Width of Shared Use Path
- (C) 10' Shared Use Path
20:1 Maximum Longitudinal Slope
20:1 Maximum Cross Slope
- (D) 4:1 Flare Rate
- (E) 8' Shared Use Path
20:1 Maximum Longitudinal Slope
20:1 Maximum Cross Slope

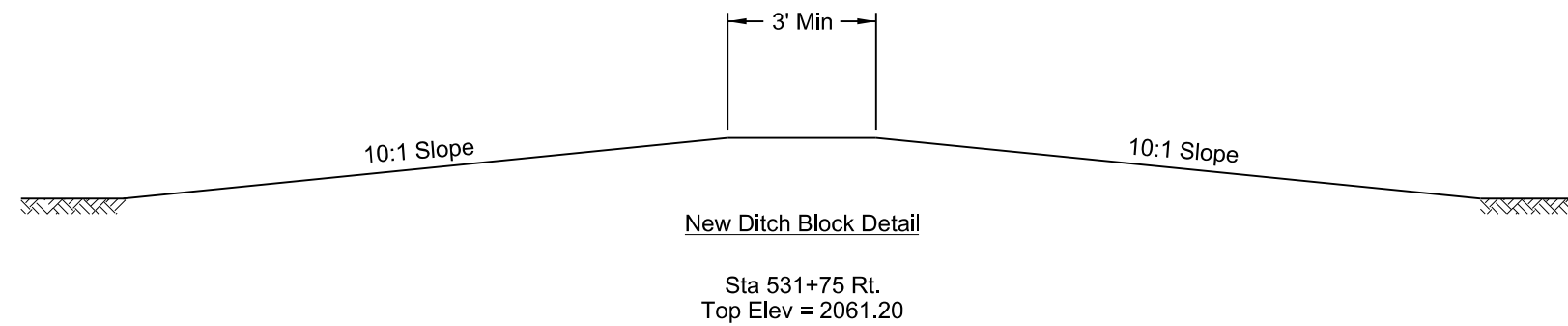
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ADA Ramp Details

ND23A

US85B to ND23B

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-7-023(050)910	20	13



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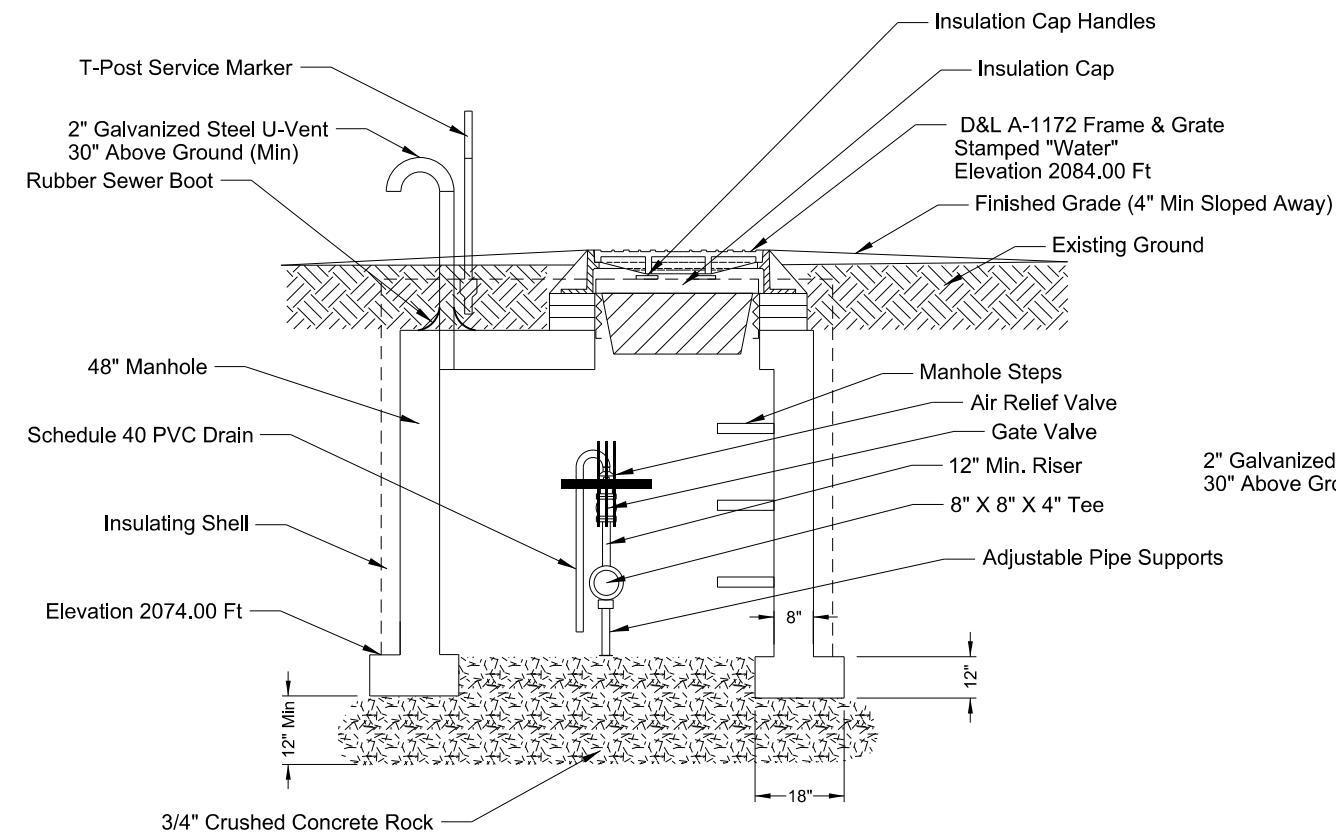
Ditch Block Detail

ND23A

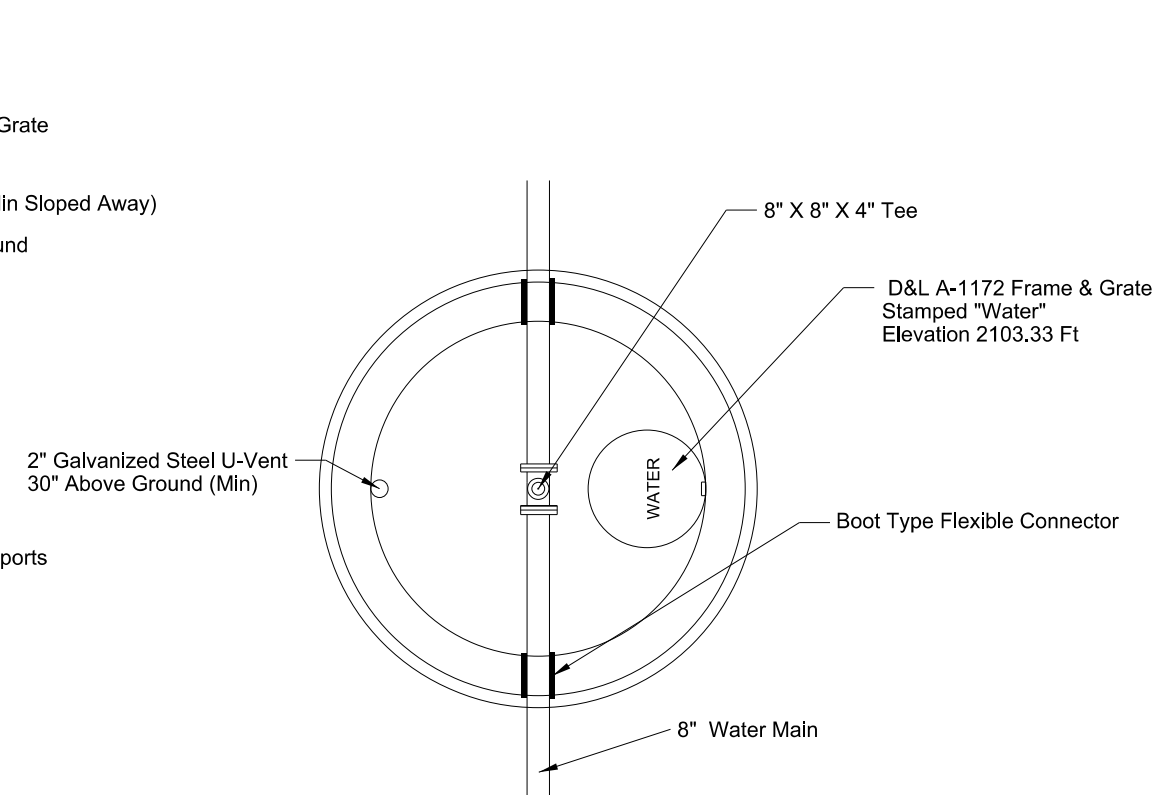
US85B to ND23B

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-7-023(050)910	20	14

Air Relief Valve Details (Side View)



Air Relief Valve Details (Top View)



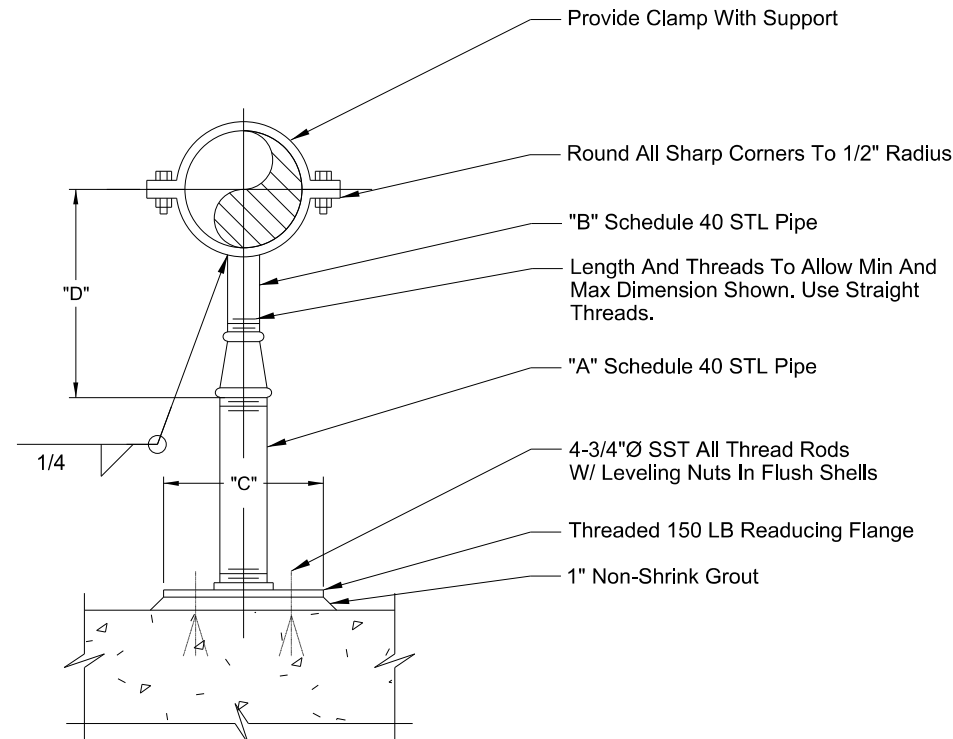
Note:

1. Support Tee Inside Manhole With Adjustable Pipe Supports On Either Side (See Detail On Next Plan Sheet).
Pipe Supports Shall Be Mounted To A 12"x12"x6" Concrete Pad With Rebar Reinforcement.
2. Steps Shall Be Cast Into Manhole For Access.
3. The Manhole Shall Be Wrapped With IPI Urtech Reinsulating Shell, Or Approved Equal. This Shall Include Insulating The Frame & Gate.

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Air Relief Valve Details
ND23A
US85B to ND23B

Adjustable Pipe Supports (Side View)



Note:
1. All Material To Be Stainless Steel.

Adjustable Pipe Saddle Support Schedule Dimensions In Inches					
Size of Supported Pipe	Pipe Size "A"	Pipe Size "B"	"C"	"D"	
				Minimum	Maximum
2 1/2	2 1/2	1 1/2	9	8	13
3	2 1/2	1 1/2	9	8 1/2	13 1/2
3 1/2	2 1/2	1 1/2	9	8 1/2	13 1/2
4	3	2 1/2	9	9 1/2	14
6	3	2 1/2	9	10 1/2	15 1/2
8	3	2 1/2	9	11 1/2	16 1/2
10	3	2 1/2	9	13 1/2	18 1/2
12	3	2 1/2	9	15	19 1/2
14	4	3	11	16 1/2	20 1/2
16	4	3	11	17 1/2	22 1/2
18	6	3 1/2	13 1/2	19 1/2	24
20	6	3 1/2	13 1/2	21	25 1/2
24	6	4	13 1/2	23 1/2	28 1/2
30	6	4	13 1/2	27	31 1/2
32	6	4	13 1/2	28 1/2	32 1/2
36	6	4	13 1/2	30 1/2	34 1/2

* Use 2 1/2" Supports For Pipes Less Than 2 1/2"Ø

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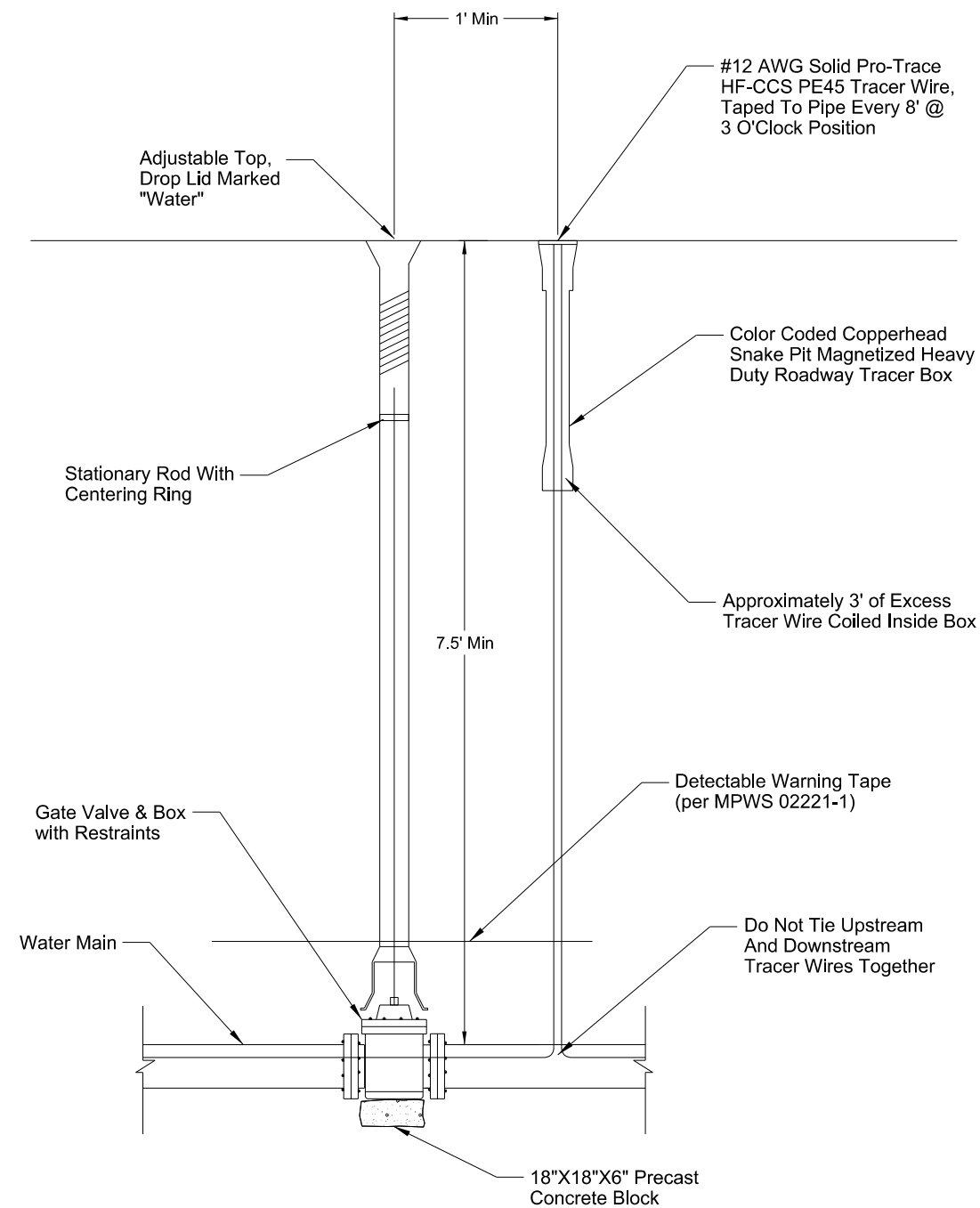
Air Relief Valve Details

ND23A

US85B to ND23B

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-7-023(050)910	20	16

Typical Valve Installation

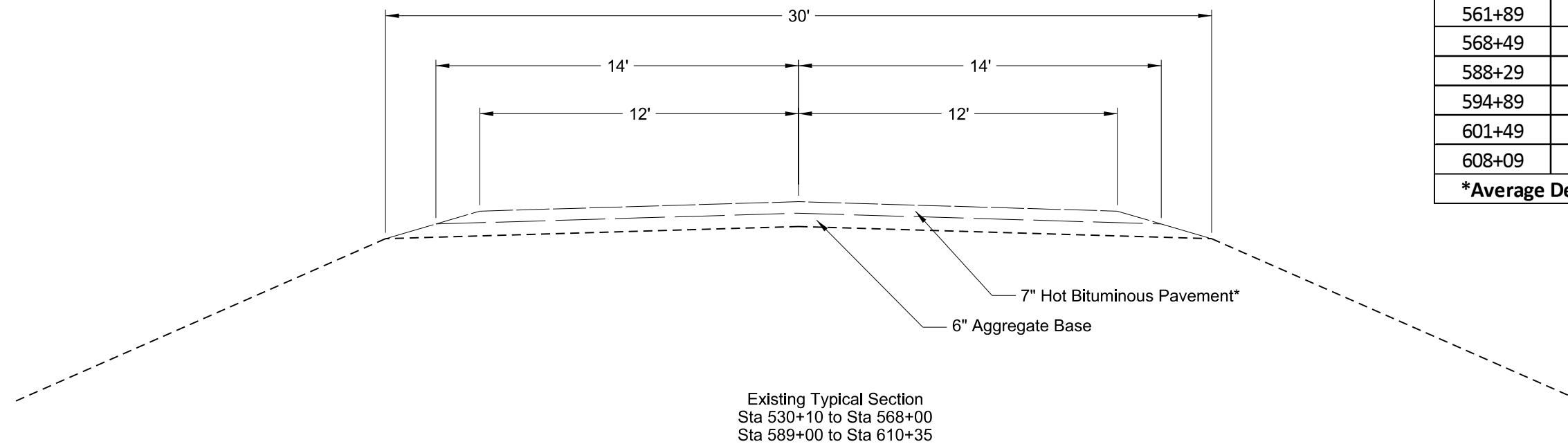


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Gate Valve Details
 ND23A
 US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	30	1

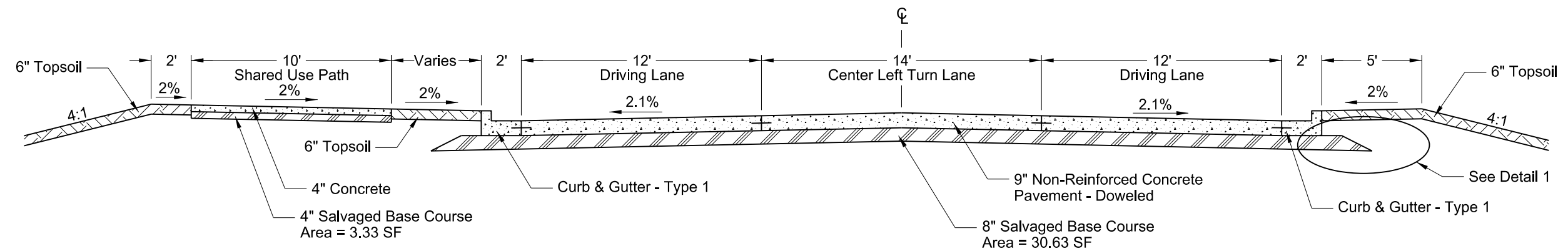
Existing Core Data		
Station (SCL23A Alignment)	Offset	Depth (Inches)
529+27	RT	8.5
535+49	LT	7.5
542+09	RT	6.5
578+69	LT	7.3
555+29	RT	7.5
561+89	LT	5.5
568+49	RT	7.3
588+29	LT	7.5
594+89	RT	7.5
601+49	LT	7.5
608+09	RT	7.0
*Average Depth =		7



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Existing Typical Section
ND23A
US85B to ND23B

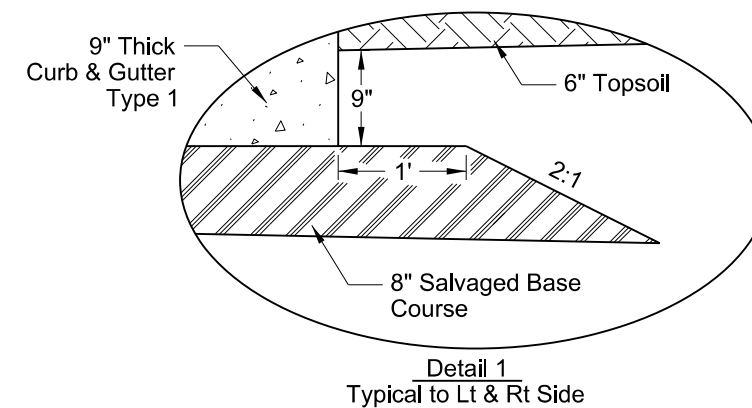
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	30	2



Proposed Typical Section

Base Bid
 Sta 530+10 to Sta 531+79
 Sta 538+29 to Sta 542+31
 Sta 606+59 to Sta 610+35

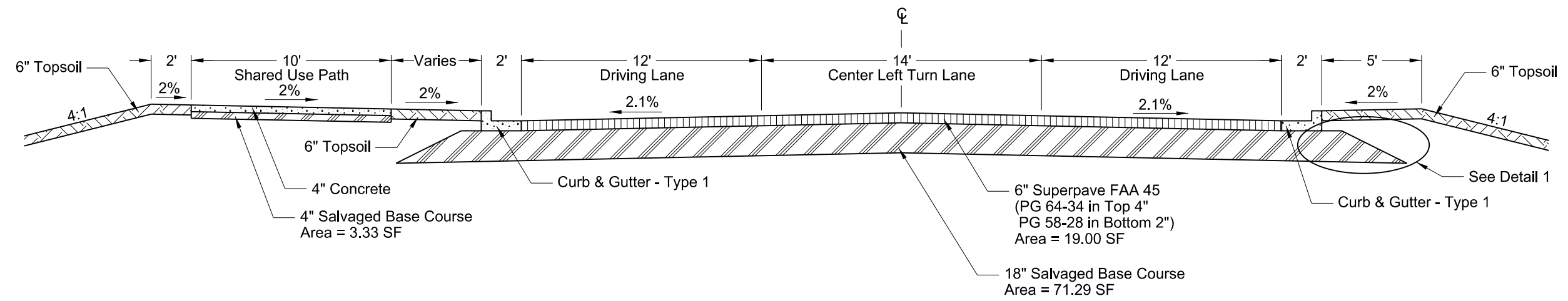
Option 1:
 Sta 531+79 to Sta 538+29
 Sta 542+31 to Sta 568+00
 Sta 589+00 to Sta 606+59



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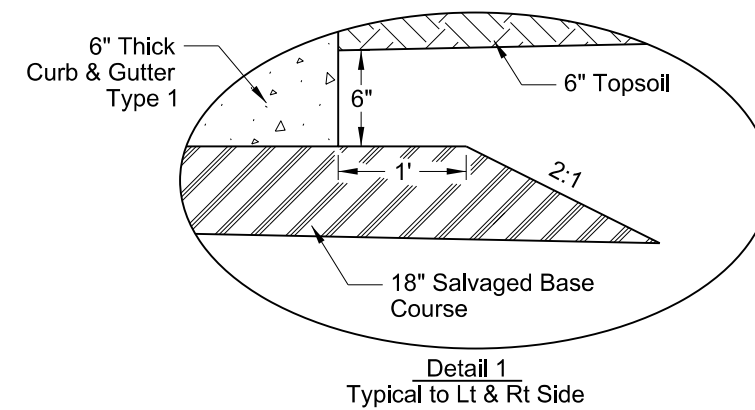
Proposed Typical Section
 Base Bid & Option 1
 Non-Reinforced Concrete Pavement
 ND23A
 US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	30	3



Proposed Typical Section

Option 2:
 Sta 531+79 to Sta 538+29
 Sta 542+31 to Sta 568+00
 Sta 589+00 to Sta 606+59

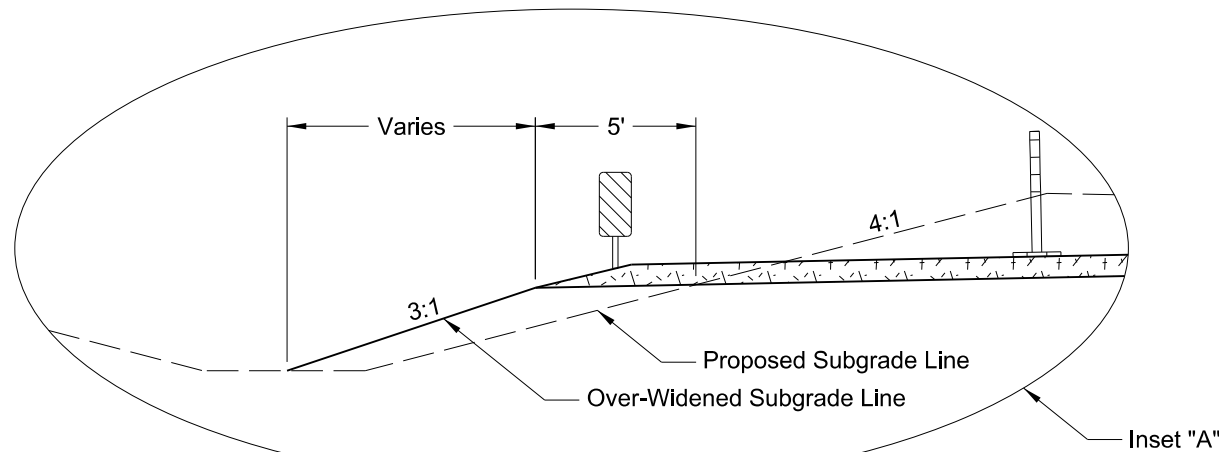
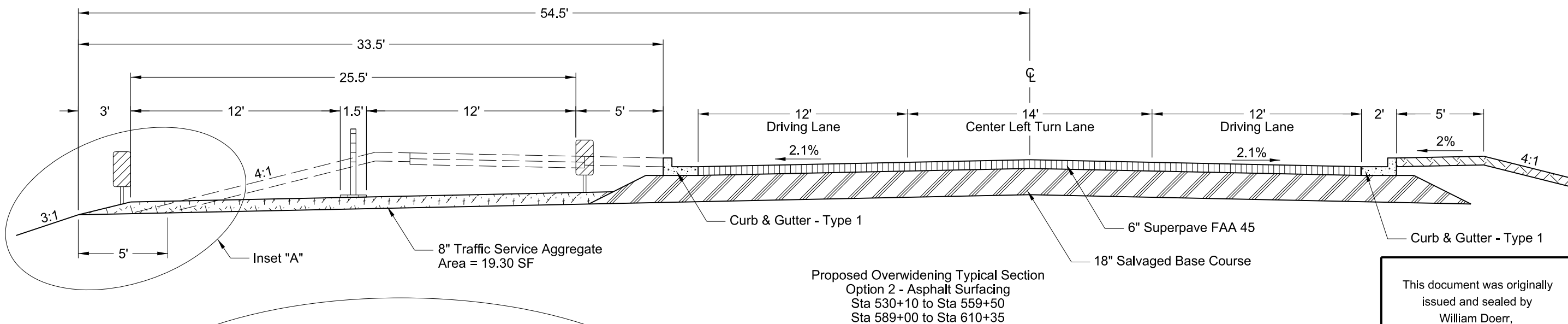
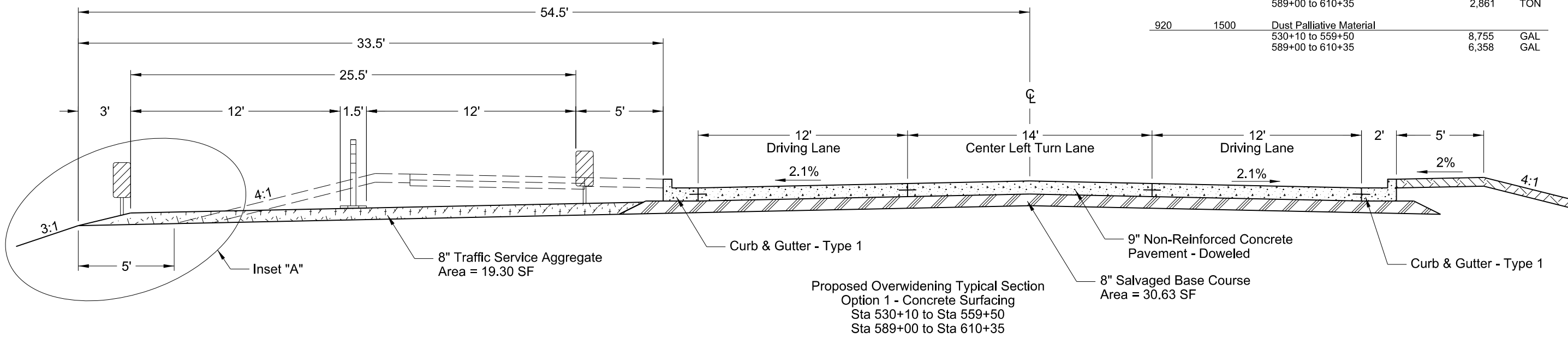


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Proposed Typical Section
 Option 2 - Hot Mix Asphalt
 ND23A
 US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	30	4

SPEC	CODE	BIDE ITEM	QUANTITY	UNIT
302	0050	Traffic Service Aggregate		
		530+10 to 559+50	3,940	TON
		589+00 to 610+35	2,861	TON
920	1500	Dust Palliative Material		
		530+10 to 559+50	8,755	GAL
		589+00 to 610+35	6,358	GAL



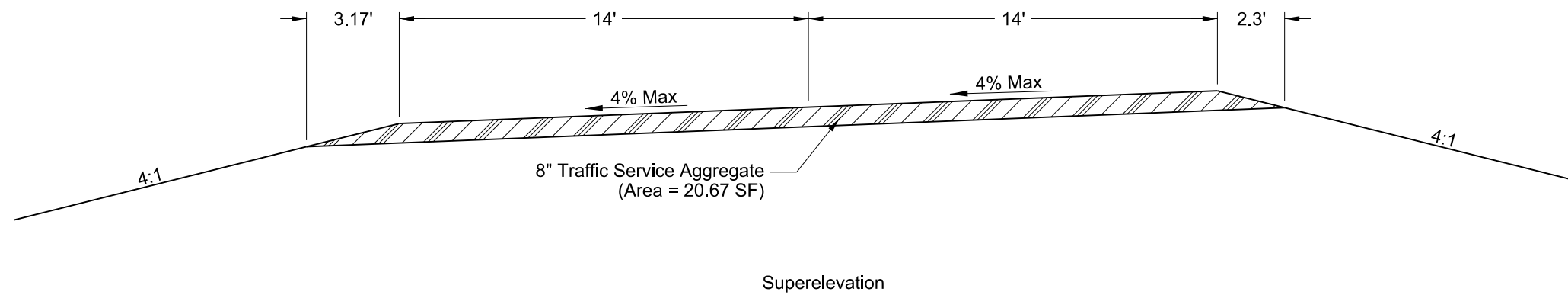
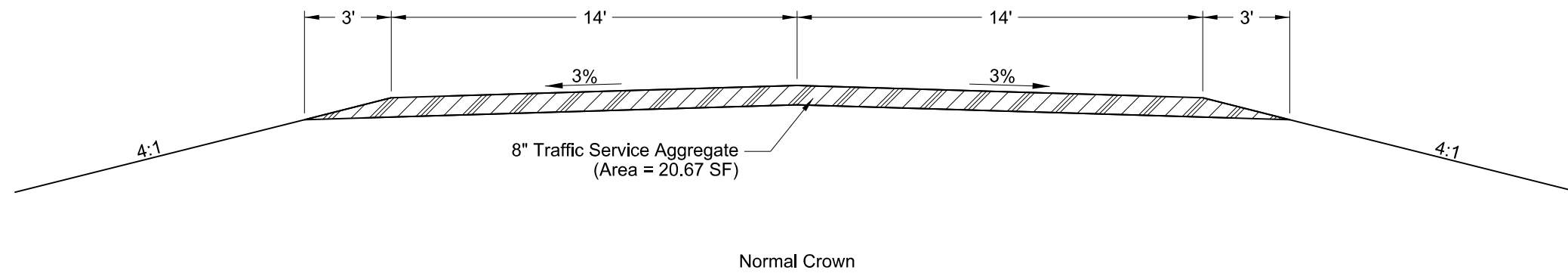
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Proposed Typical Section
Widening to Maintain Traffic
ND23A
US85B to ND23B

*Tie into the Temporary Bypass at Sta 559+50

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	30	5

SPEC	CODE	BIDE ITEM	QUANTITY	UNIT
302	0050	Traffic Service Aggregate 1+50 to 10+00	1,220	TON
920	1500	Dust Palliative Material 1+50 to 10+00	2,569	GAL



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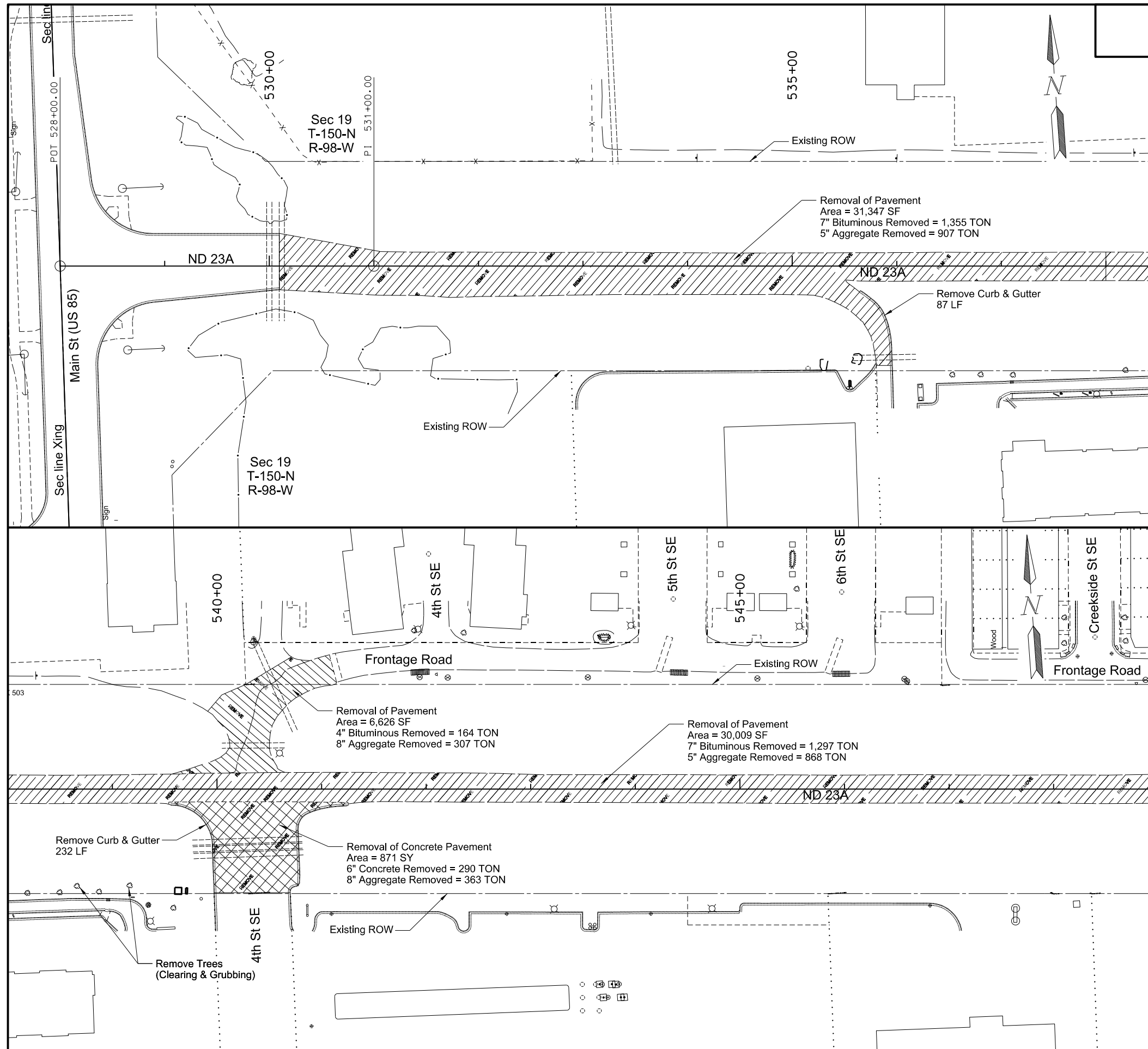
Proposed Typical Section
Temporary Bypass

ND23A



US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	40	1

SPEC	CODE	BID ITEM	QUANTITY	UNIT
202	0114	Removal of Concrete Pavement 540+34 - Rt	871	SY
202	0136	Removal of Pavement 530+10 to 549+00	4,898	TON
202	0130	Removal of Curb & Gutter 536+00 - Rt 540+34 - Rt	87 232	LF LF



LEGEND

-  Removal of Concrete Pavement
-  Removal of Pavement

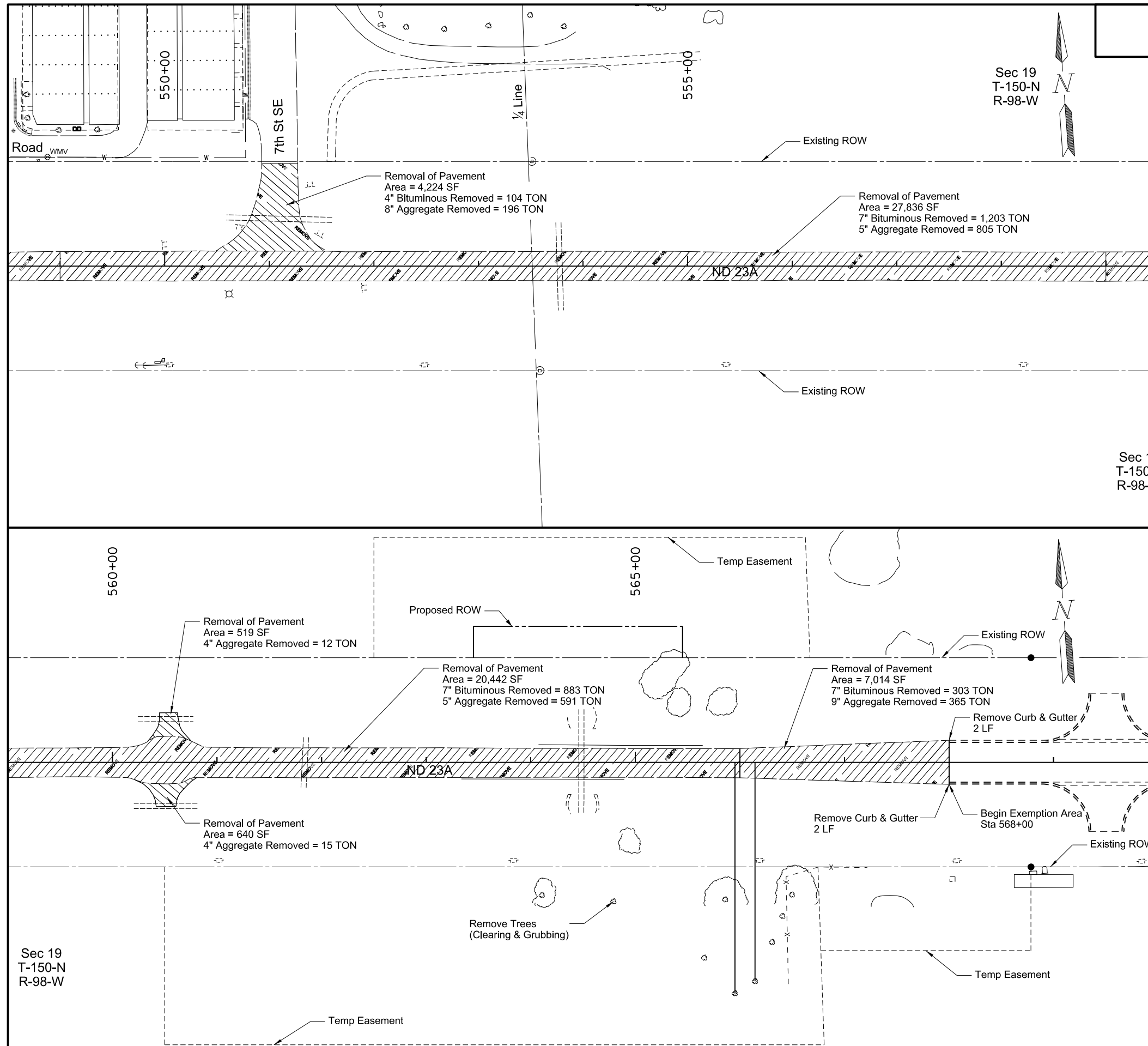
1. It is estimated that Concrete Approaches have 6" of concrete and 8" of aggregate base.
2. It is estimated that Asphalt Approaches have 4" of bituminous and 8" of aggregate base.
3. It is estimated that Gravel Approaches have 4" of aggregate surfacing.

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Removals

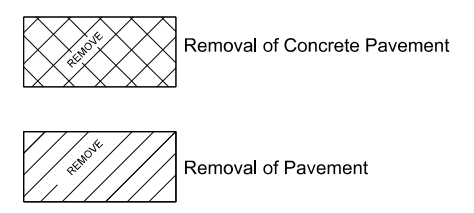
ND23A

US85B to ND23B



SPEC	CODE	BID ITEM	QUANTITY	UNIT
201	0370	Removal of Trees 10IN		
		565+41 - 53' Lt	1	EA
201	0380	Removal of Trees 18IN		
		565+66 - 187' Rt	1	EA
201	0390	Removal of Trees 30IN		
		566+41 - 147' Rt	1	EA
201	0390	564+11 - 127' Rt	1	EA
		564+95 - 77' Rt	1	EA
		565+28 - 84' Lt	2	EA
		565+44 - 62' Lt	1	EA
		565+83 - 58' Lt	3	EA
		565+86 - 131' Rt	1	EA
		566+49 - 126' Rt	1	EA
202	0136	Removal of Pavement	4,477	TON
202	0130	Removal of Curb & Gutter		
		567+98 to 568+00 - Rt	2	LF
		567+98 to 568+00 - Lt	2	LF

LEGEND



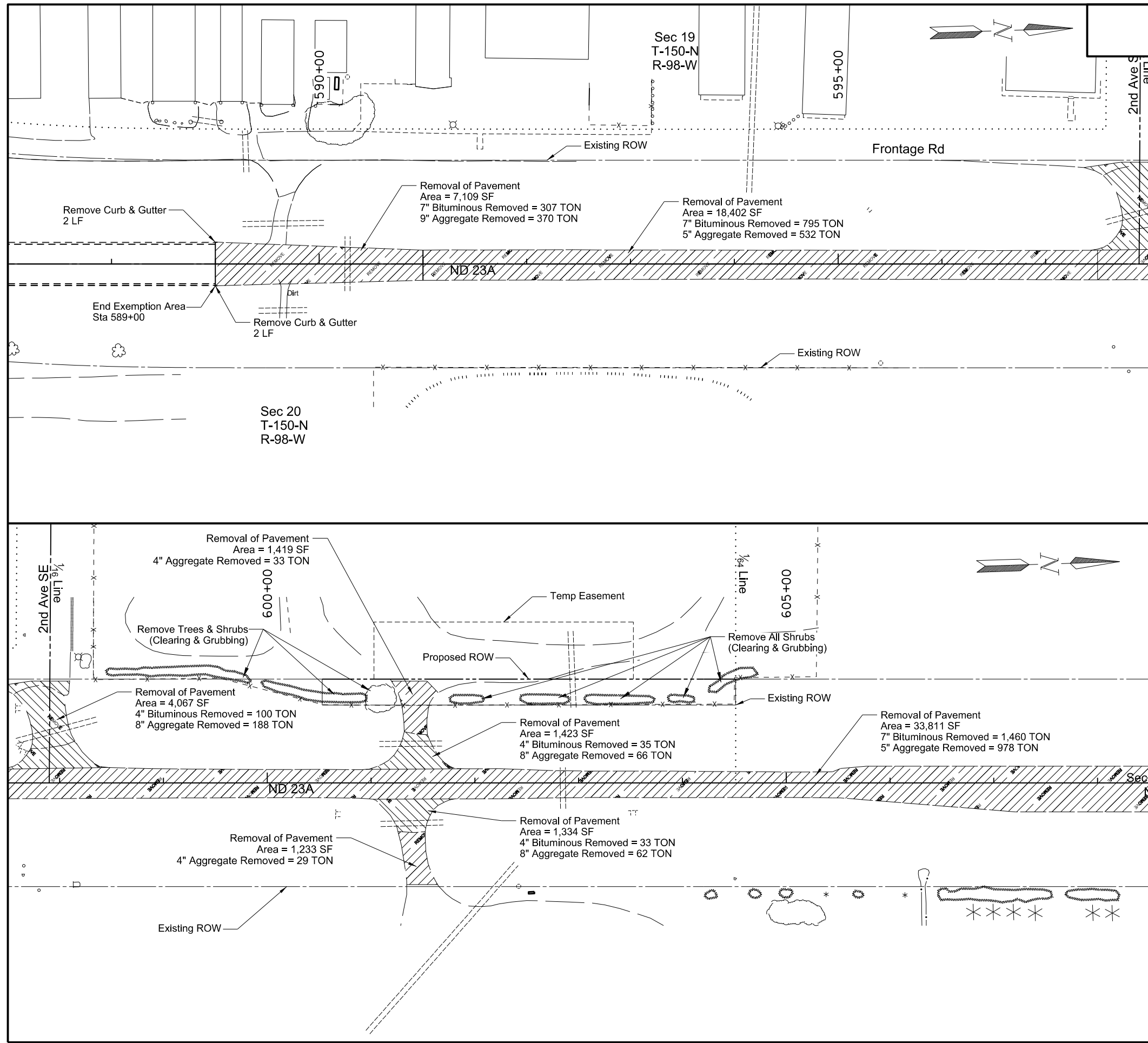
1. It is estimated that Concrete Approaches have 6" of concrete and 8" of aggregate base.
2. It is estimated that Asphalt Approaches have 4" of bituminous and 8" of aggregate base.
3. It is estimated that Gravel Approaches have 4" of aggregate surfacing.

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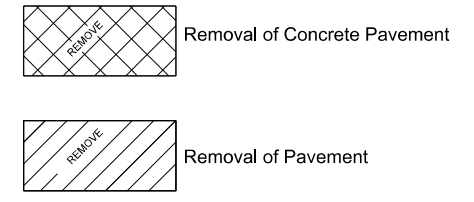
Removals
ND23A
US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	40	3

SPEC	CODE	BID ITEM	QUANTITY	UNIT
202	0136	Removal of Pavement 589+00 to 608+50	4,988	TON
202	0130	Removal of Curb & Gutter 589+00 to 589+02 - Rt 589+00 to 589+02 - Lt	2 2	LF LF



LEGEND

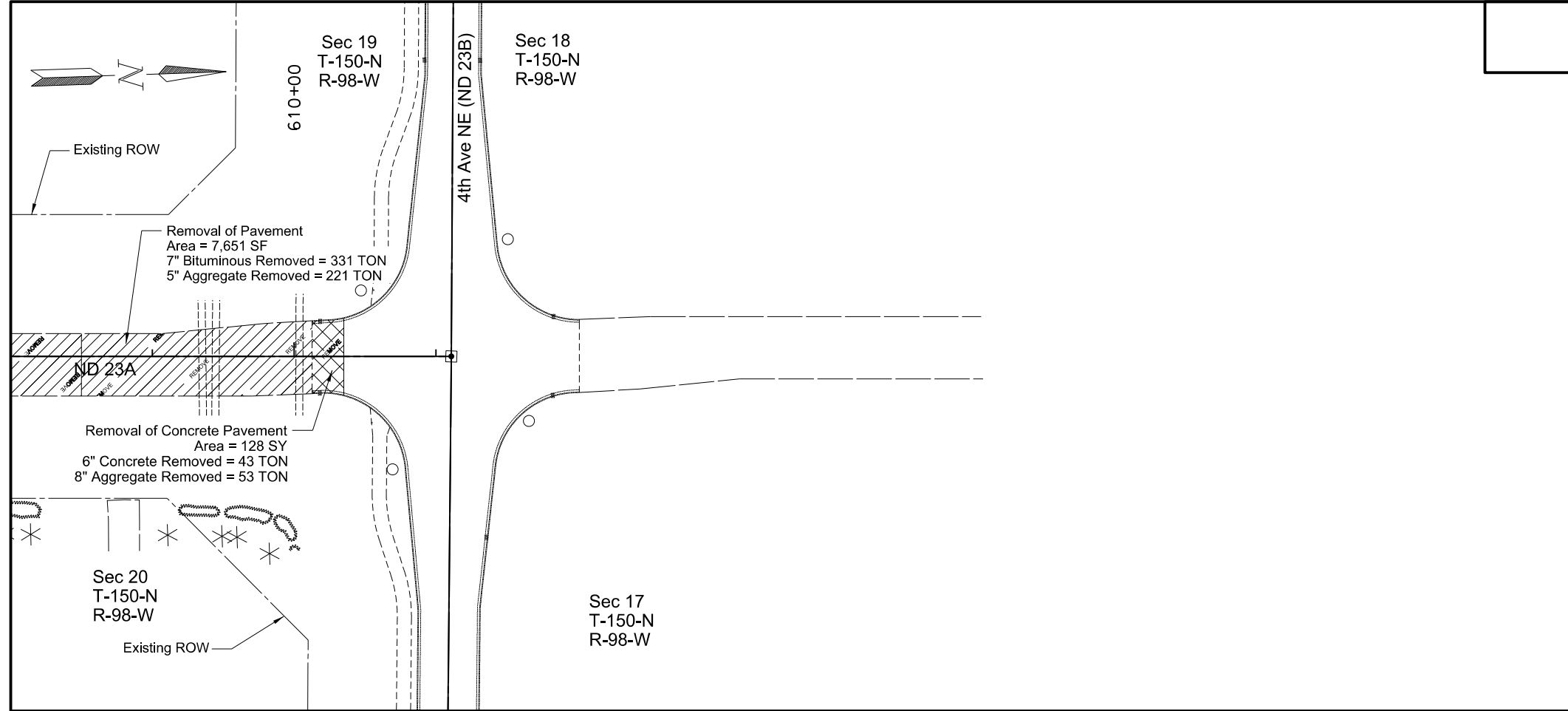


1. It is estimated that Concrete Approaches have 6" of concrete and 8" of aggregate base.
2. It is estimated that Asphalt Approaches have 4" of bituminous and 8" of aggregate base.
3. It is estimated that Gravel Approaches have 4" of aggregate surfacing.

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Removals
ND23A
US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	40	4



SPEC	CODE	BID ITEM	QUANTITY	UNIT
202	0114	Removal of Concrete Pavement 610+12 to 610+35	128	SY
202	0136	Removal of Pavement 608+50 to 610+12	552	TON

LEGEND

-  Removal of Concrete Pavement
-  Removal of Pavement

1. It is estimated that Concrete Approaches have 6" of concrete and 8" of aggregate base.
2. It is estimated that Asphalt Approaches have 4" of bituminous and 8" of aggregate base.
3. It is estimated that Gravel Approaches have 4" of aggregate surfacing.

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Removals
 ND23A
 US85B to ND23B

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-7-023(050)910	50	1

HYDRAULIC DATA FOR SS-7-023(054)910 (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)
530+00	42" CSP	42"	623	96	3.10	7.11	2063.11	114	2063.50
530+12	42" CSP	42"							
553+75	36" RCP	48"	105	114	6.17	9.04	2057.41	124	2057.93
561+84	42" RCP	DBL 48"	875	213	5.10	8.48	2058.10	245	2059.10
590+60	36" RCP	36"	13	1	0.36	2.73	2055.41	6	2055.41
602+75	24" RCP	24"	416	16	2.17	5.20	2053.42	20	2053.92
609+35	60" CSP	60"	703	353	4.97	6.83	2053.74	490	2055.13
609+45	60" CSP	60"							
610+04	60" CSP	60"							

(A) Hydraulic data provided is for smooth-walled type conduits

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Culvert Hydraulic Data
 ND23A
 US85B to ND23B

Inlet No.: 29A	Inlet No.: 29B	Inlet No.: 30A	Inlet No.: 30B	Inlet No.: 31A	Inlet No.: 31B
Inlet Type: Special - Type 2 - 60 In Alignment: PR 23 A Station: 530+12 - 30.2' LT Grate Type: V Grate Elev.: 2070.63 Top Inlet: 2069.54 Base Elev.: 2059.60 Invert Elev.: 2059.68 H' Distance: 9.94	Inlet Type: Special - Type 2 - 60 In Alignment: PR 23 A Station: 530+12 - 21.5' RT Grate Type: V Grate Elev.: 2070.81 Top Inlet: 2069.72 Base Elev.: 2059.29 Invert Elev.: 2059.37 H' Distance: 10.433	Inlet Type: Type 2 Alignment: PR 23 A Station: 532+70 - 20.0' LT Grate Type: V Grate Elev.: 2067.01 Top Inlet: 2066.68 Base Elev.: 2060.84 Invert Elev.: 2061.09 H' Distance: 5.84	Inlet Type: Type 2 Alignment: PR 23 A Station: 532+70 - 20.0' RT Grate Type: V Grate Elev.: 2067.01 Top Inlet: 2066.68 Base Elev.: 2059.19 Invert Elev.: 2059.44 H' Distance: 7.49	Inlet Type: Type 2 Alignment: PR 23 A Station: 535+17 - 20.0' LT Grate Type: V Grate Elev.: 2064.83 Top Inlet: 2064.50 Base Elev.: 2060.09 Invert Elev.: 2060.34 H' Distance: 4.41	Inlet Type: Special - Type 2 - 60 In Alignment: PR 23 A Station: 535+17 - 20.0' RT Grate Type: V Grate Elev.: 2064.83 Top Inlet: 2063.74 Base Elev.: 2058.67 Invert Elev.: 2058.92 H' Distance: 5.073
42 IN Conduit (N) : 2059.71 42 IN Conduit (S) : 2059.68	42 IN Conduit (N) : 2059.40 42 IN Conduit (S) : 2059.37	24 IN Conduit (N) : 2061.09	24 IN Conduit (S) : 2059.44	24 IN Conduit (N) : 2060.34	18 IN Conduit (E) : 2059.12 24 IN Conduit (S) : 2058.92
Inlet No.: 31C	Inlet No.: 32A	Inlet No.: 32B	Inlet No.: 33A	Inlet No.: 33B	Inlet No.: 33C
Inlet Type: Special - Type 2 - 48 In Alignment: PR 23 A Station: 535+92 - 20.0' RT Grate Type: V Grate Elev.: 2065.02 Top Inlet: 2064.19 Base Elev.: 2059.21 Invert Elev.: 2059.42 H' Distance: 4.98	Inlet Type: Type 2 Alignment: PR 23 A Station: 537+86 - 20.0' LT Grate Type: V Grate Elev.: 2065.83 Top Inlet: 2065.50 Base Elev.: 2059.27 Invert Elev.: 2059.52 H' Distance: 6.23	Inlet Type: Type 2 Alignment: PR 23 A Station: 537+86 - 31.9' RT Grate Type: V Grate Elev.: 2065.58 Top Inlet: 2065.25 Base Elev.: 2058.21 Invert Elev.: 2058.46 H' Distance: 7.04	Inlet Type: Special - Type 2 - 60 In Alignment: PR 23 A Station: 540+10 - 80.5' LT Grate Type: V Grate Elev.: 2062.87 Top Inlet: 2061.78 Base Elev.: 2058.17 Invert Elev.: 2058.55 H' Distance: 3.61	Inlet Type: Special - Type 2 - 84 In Alignment: PR 23 A Station: 540+58 - 80.5' LT Grate Type: V Grate Elev.: 2062.88 Top Inlet: 2061.79 Base Elev.: 2058.00 Invert Elev.: 2058.38 H' Distance: 3.79	Inlet Type: Special - Type 2 - 48 In Alignment: PR 23 A Station: 540+58 - 92.8' LT Grate Type: V Grate Elev.: 2063.03 Top Inlet: 2062.11 Base Elev.: 2059.54 Invert Elev.: 2059.79 H' Distance: 2.57
18 IN Conduit (W) : 2059.42	24 IN Conduit (N) : 2059.52	24 IN Conduit (S) : 2058.46	42 IN Conduit (E) : 2058.55 42 IN Conduit (W) : 2058.65	42 IN Conduit (E) : 2058.38 42 IN Conduit (W) : 2058.48 24 IN Conduit (N) : 2058.48	24 IN Conduit (S) : 2059.79 24 IN Conduit (NW) : 2059.89
Inlet No.: 34A	Inlet No.: 35A	Inlet No.: 36A	Inlet No.: 36B	Inlet No.: 37A	Inlet No.: 38A
Inlet Type: Special - Type 2 - 72 In Alignment: PR 23 A Station: 540+73 - 70.0' RT Grate Type: V Grate Elev.: 2063.93 Top Inlet: 2062.84 Base Elev.: 2057.14 Invert Elev.: 2057.56 H' Distance: 5.70	Inlet Type: Type 2 Alignment: PR 23 A Station: 544+00 - 20.0' LT Grate Type: V Grate Elev.: 2064.70 Top Inlet: 2064.37 Base Elev.: 2057.40 Invert Elev.: 2057.65 H' Distance: 6.97	Inlet Type: Special - Type 2 - 72 In Alignment: PR 23 A Station: 544+99 - 72.5' RT Grate Type: V Grate Elev.: 2063.45 Top Inlet: 2062.36 Base Elev.: 2056.19 Invert Elev.: 2056.61 H' Distance: 6.17	Inlet Type: Special - Type 2 - 72 In Alignment: PR 23 A Station: 545+59 - 72.5' RT Grate Type: V Grate Elev.: 2063.28 Top Inlet: 2062.19 Base Elev.: 2056.02 Invert Elev.: 2056.44 H' Distance: 6.17	Inlet Type: Type 2 Alignment: PR 23 A Station: 547+15 - 20.0 LT Grate Type: V Grate Elev.: 2063.29 Top Inlet: 2062.96 Base Elev.: 2056.44 Invert Elev.: 2056.69 H' Distance: 6.52	Inlet Type: Type 2 Alignment: PR 23 A Station: 550+15 - 20.0' LT Grate Type: V Grate Elev.: 2061.88 Top Inlet: 2061.55 Base Elev.: 2055.53 Invert Elev.: 2055.78 H' Distance: 6.02
48 IN Conduit (E) : 2057.56 48 IN Conduit (W) : 2057.66	24 IN Conduit (N) : 2057.65	48 IN Conduit (E) : 2056.61 48 IN Conduit (W) : 2056.71	48 IN Conduit (E) : 2056.44 48 IN Conduit (W) : 2056.54	24 IN Conduit (N) : 2056.69	24 IN Conduit (N) : 2055.78
Inlet No.: 38B	Inlet No.: 39A	Inlet No.: 39B	Inlet No.: 40A	Inlet No.: 40B	Inlet No.: 41A
Inlet Type: Type 2 Alignment: PR 23 A Station: 550+15 - 20.0' RT Grate Type: V Grate Elev.: 2061.88 Top Inlet: 2061.55 Base Elev.: 2055.54 Invert Elev.: 2055.79 H' Distance: 6.01	Inlet Type: Special - Type 2 - 72 In Alignment: PR 23 A Station: 553+75 - 20.0 LT Grate Type: V Grate Elev.: 2060.18 Top Inlet: 2059.09 Base Elev.: 2049.88 Invert Elev.: 2050.30 H' Distance: 9.21	Inlet Type: Special - Type 2 - 72 In Alignment: PR 23 A Station: 553+75 - 20.0' RT Grate Type: V Grate Elev.: 2060.18 Top Inlet: 2059.09 Base Elev.: 2049.58 Invert Elev.: 2050.00 H' Distance: 9.51	Inlet Type: Type 2 Alignment: PR 23 A Station: 556+27 - 20.0' LT Grate Type: V Grate Elev.: 2059.17 Top Inlet: 2058.84 Base Elev.: 2055.47 Invert Elev.: 2055.68 H' Distance: 3.37	Inlet Type: Type 2 Alignment: PR 23 A Station: 556+27 - 20.0' RT Grate Type: V Grate Elev.: 2059.17 Top Inlet: 2058.84 Base Elev.: 2056.63 Invert Elev.: 2056.80 H' Distance: 2.21	Inlet Type: Type 2 Alignment: PR 23 A Station: 559+00 - 20.0' LT Grate Type: V Grate Elev.: 2060.38 Top Inlet: 2060.05 Base Elev.: 2054.63 Invert Elev.: 2054.88 H' Distance: 5.42
24 IN Conduit (S) : 2055.79	48 IN Conduit (S) : 2050.30 48 IN Conduit (N) : 2050.40	48 IN Conduit (S) : 2050.00 48 IN Conduit (N) : 2050.10	18 IN Conduit (N) : 2055.68	12 IN Conduit (S) : 2056.80	24 IN Conduit (N) : 2054.88

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Note: If using a round manhole vs a drop inlet then you must adjust the Top Inlet Elevation to account for cover and adjusting rings.

Note:	Pipe Wall Thickness Chart	12IN	18IN	24IN	36IN	42IN	48IN
	Concrete	0.17	0.21	0.25	0.33	0.38	0.42
	Steel (3" to 1" Corrugation)	0.08	0.08	0.08	0.08	0.08	0.08
	HDPE	0.10	0.17	0.17	0.25	0.25	0.25

Inlet & Manhole Summary

ND23A

US85B to ND23B

Inlet No.: 41B Inlet Type: Type 2 Alignment: PR 23 A Station: 559+00 - 20.0' RT Grate Type: V Grate Elev.: 2060.38 Top Inlet: 2060.05 Base Elev.: 2055.63 Invert Elev.: 2055.88 H' Distance: 4.42 24 IN Conduit (S): 2055.88	Inlet No.: 42A Inlet Type: Special - Type 2 - 84 In Alignment: PR 23 A Station: 561+93 - 20.0' LT Grate Type: V Grate Elev.: 2062.43 Top Inlet: 2061.34 Base Elev.: 2051.78 Invert Elev.: 2052.20 H' Distance: 9.56 48 IN Conduit (N): 2052.20 48 IN Conduit (S): 2052.30 18 IN Conduit (E): 2052.30	Inlet No.: 42B Inlet Type: Special - Type 2 - 72 In Alignment: PR 23 A Station: 561+93 - 20.0' RT Grate Type: V Grate Elev.: 2062.43 Top Inlet: 2061.34 Base Elev.: 2052.28 Invert Elev.: 2052.70 H' Distance: 9.06 48 IN Conduit (N): 2052.70 48 IN Conduit (S): 2052.80	Inlet No.: 43A Inlet Type: Special - Type 2 - 60 In Alignment: PR 23 A Station: 565+00 - 20.0' LT Grate Type: V Grate Elev.: 2070.70 Top Inlet: 2069.61 Base Elev.: 2062.49 Invert Elev.: 2062.70 H' Distance: 7.12 18 IN Conduit (W): 2062.70 18 IN Conduit (E): 2062.80 18 IN Conduit (S): 2062.80	Inlet No.: 43B Inlet Type: Type 2 Alignment: PR 23 A Station: 565+00 - 20.0' RT Grate Type: V Grate Elev.: 2070.70 Top Inlet: 2070.37 Base Elev.: 2062.79 Invert Elev.: 2063.00 H' Distance: 7.58 18 IN Conduit (N): 2063.00	Inlet No.: 44A Inlet Type: Special - Type 2 - 60 In Alignment: PR 23 A Station: 567+00 - 20.0' LT Grate Type: V Grate Elev.: 2076.80 Top Inlet: 2075.71 Base Elev.: 2069.19 Invert Elev.: 2069.40 H' Distance: 6.52 18 IN Conduit (W): 2069.40 18 IN Conduit (S): 2069.50
Inlet No.: 44B Inlet Type: Type 2 Alignment: PR 23 A Station: 567+00 - 20.0' RT Grate Type: V Grate Elev.: 2076.80 Top Inlet: 2076.47 Base Elev.: 2069.49 Invert Elev.: 2069.70 H' Distance: 6.98 18 IN Conduit (N): 2069.70	Inlet No.: 18A Inlet Type: Special - Type 2 - 60 In Alignment: PR 23 A Station: 590+60 - 20.0' LT Grate Type: V Grate Elev.: 2061.04 Top Inlet: 2059.95 Base Elev.: 2054.12 Invert Elev.: 2054.45 H' Distance: 5.83 36 IN Conduit (W): 2054.45 36 IN Conduit (E): 2054.55	Inlet No.: 18B Inlet Type: Special - Type 2 - 60 In Alignment: PR 23 A Station: 590+60 - 20.0' RT Grate Type: V Grate Elev.: 2061.04 Top Inlet: 2059.95 Base Elev.: 2054.42 Invert Elev.: 2054.75 H' Distance: 5.53 36 IN Conduit (W): 2054.75 36 IN Conduit (E): 2054.85	Inlet No.: 19A Inlet Type: Type 2 Alignment: PR 23 A Station: 592+85 - 20.0' LT Grate Type: V Grate Elev.: 2060.09 Top Inlet: 2059.76 Base Elev.: 2053.59 Invert Elev.: 2053.84 H' Distance: 6.17 24 IN Conduit (W): 2053.84	Inlet No.: 19B Inlet Type: Type 2 Alignment: PR 23 A Station: 592+85 - 20' RT Grate Type: V Grate Elev.: 2060.09 Top Inlet: 2059.76 Base Elev.: 2054.13 Invert Elev.: 2054.38 H' Distance: 5.63 24 IN Conduit (E): 2054.38	Inlet No.: 20A Inlet Type: Type 2 Alignment: PR 23 A Station: 595+10 - 20.0' LT Grate Type: V Grate Elev.: 2059.13 Top Inlet: 2058.80 Base Elev.: 2052.82 Invert Elev.: 2053.07 H' Distance: 5.98 24 IN Conduit (W): 2053.07
Inlet No.: 20B Inlet Type: Type 2 Alignment: PR 23 A Station: 595+10 - 20' RT Grate Type: V Grate Elev.: 2059.13 Top Inlet: 2058.80 Base Elev.: 2053.46 Invert Elev.: 2053.71 H' Distance: 5.34 24 IN Conduit (E): 2053.71	Inlet No.: 21A Inlet Type: Type 2 Alignment: PR 23 A Station: 597+20 - 20.0' LT Grate Type: V Grate Elev.: 2058.23 Top Inlet: 2057.90 Base Elev.: 2052.11 Invert Elev.: 2052.36 H' Distance: 5.79 24 IN Conduit (W): 2052.36	Inlet No.: 21B Inlet Type: Type 2 Alignment: PR 23 A Station: 597+20 - 20' RT Grate Type: V Grate Elev.: 2058.23 Top Inlet: 2057.90 Base Elev.: 2052.84 Invert Elev.: 2053.09 H' Distance: 5.06 24 IN Conduit (E): 2053.09	Inlet No.: 22A Inlet Type: Type 2 Alignment: PR 23 A Station: 600+48 - 20.0' LT Grate Type: V Grate Elev.: 2056.99 Top Inlet: 2056.66 Base Elev.: 2051.00 Invert Elev.: 2051.25 H' Distance: 5.66 24 IN Conduit (W): 2051.25	Inlet No.: 22B Inlet Type: Type 2 Alignment: PR 23 A Station: 600+48 - 20' RT Grate Type: V Grate Elev.: 2056.99 Top Inlet: 2056.66 Base Elev.: 2051.87 Invert Elev.: 2052.12 H' Distance: 4.79 24 IN Conduit (E): 2052.12	Inlet No.: 23A Inlet Type: Type 2 Alignment: PR 23 A Station: 602+75 - 20.0' LT Grate Type: V Grate Elev.: 2057.33 Top Inlet: 2057.00 Base Elev.: 2050.40 Invert Elev.: 2050.65 H' Distance: 6.60 24 IN Conduit (W): 2050.65 24 IN Conduit (E): 2050.75
Inlet No.: 23B Inlet Type: Type 2 Alignment: PR 23 A Station: 602+75 - 20' RT Grate Type: V Grate Elev.: 2057.33 Top Inlet: 2057.00 Base Elev.: 2050.70 Invert Elev.: 2050.95 H' Distance: 6.30 24 IN Conduit (W): 2050.95 24 IN Conduit (E): 2051.05	Inlet No.: 24A Inlet Type: Type 2 Alignment: PR 23 A Station: 606+75 - 20.0' LT Grate Type: V Grate Elev.: 2057.46 Top Inlet: 2057.13 Base Elev.: 2048.98 Invert Elev.: 2049.23 H' Distance: 8.15 24 IN Conduit (W): 2049.23	Inlet No.: 24B Inlet Type: Type 2 Alignment: PR 23 A Station: 606+75 - 20' RT Grate Type: V Grate Elev.: 2057.46 Top Inlet: 2057.13 Base Elev.: 2050.02 Invert Elev.: 2050.27 H' Distance: 7.11 24 IN Conduit (E): 2050.27	Inlet No.: 25A Inlet Type: Type 2 Alignment: PR 23 A Station: 608+50 - 20.0' LT Grate Type: V Grate Elev.: 2057.25 Top Inlet: 2056.92 Base Elev.: 2048.42 Invert Elev.: 2048.67 H' Distance: 8.50 24 IN Conduit (W): 2048.67	Inlet No.: 25B Inlet Type: Type 2 Alignment: PR 23 A Station: 608+50 - 20' RT Grate Type: V Grate Elev.: 2057.25 Top Inlet: 2056.92 Base Elev.: 2049.50 Invert Elev.: 2049.75 H' Distance: 7.42 24 IN Conduit (E): 2049.75	

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Note: If using a round manhole vs a drop inlet then you must adjust the Top Inlet Elevation to account for cover and adjusting rings.

Note:	Pipe Wall Thickness Chart	12IN	18IN	24IN	36IN	42IN	48IN
	Concrete	0.17	0.21	0.25	0.33	0.38	0.42
	Steel (3" to 1" Corrugation)	0.08	0.08	0.08	0.08	0.08	0.08
	HDPE	0.10	0.17	0.17	0.25	0.25	0.25

Inlet & Manhole Summary

ND23A

US85B to ND23B

Begin Station / Location	Begin Offset	End Station / Location	End Offset	Pipe Installation (Pay Item)			Allowable Material	Required Diameter	Steel Pipe Coating	Steel Pipe Corrugations or Spiral Rib	Steel Pipe Minimum Thickness	R1 Fabric (Pay Item)	End Section*		Applicable Backfill Detail
				Inch	Bid Item	LF							Begin	End	
530+00	81.3' LT	530+00	61.3' LT	42	Pipe Corr Steel .109IN 42IN	20	Spiral Rib Steel Pipe	42	P	3/4, 1			R & R		D-714-27
530+12	82.5' LT	29A		42	Pipe Corr Steel .109IN 42IN	16	Spiral Rib Steel Pipe	42	P	3/4, 1			R & R		D-714-27
30A		532+70	59.0' LT	24	Pipe Conduit - Storm Drain	38	Reinforced Concrete Pipe - Class III (Barrel Length = 36 LF)	24	P	3/4, 1	0.109			FES	D-714-27
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
30B		532+70	55.0' RT	24	Pipe Conduit - Storm Drain	34	Reinforced Concrete Pipe - Class III (Barrel Length = 32 LF)	24	P	3/4, 1	0.109			FES	D-714-27
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
31A		535+17	53.0' LT	24	Pipe Conduit - Storm Drain	32	Reinforced Concrete Pipe - Class III (Barrel Length = 30 LF)	24	P	3/4, 1	0.109			FES	D-714-27
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
31B		535+17	48.0' RT	24	Pipe Conduit - Storm Drain	26	Reinforced Concrete Pipe - Class III (Barrel Length = 24 LF)	24	P	3/4, 1	0.109			FES	D-714-27
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
31C		31B		18	Pipe Conduit - Storm Drain	72	Reinforced Concrete Pipe - Class III (Barrel Length = 72 LF)	18	P	3/4, 1	0.109				D-714-27
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
535+39	70.0' RT	536+32	70.0' RT	48	Pipe Conduit - Storm Drain	93	Reinforced Concrete Pipe - Class III (Barrel Length = 88.5 LF)	48	P	3/4, 1	0.109		FES	FES	D-714-27
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
535+39	80.0' RT	536+32	80.0' RT	48	Pipe Conduit - Storm Drain	93	Reinforced Concrete Pipe - Class III (Barrel Length = 88.5 LF)	48	P	3/4, 1	0.109		FES	FES	D-714-27
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
539+45	80.0' RT	541+09	80.0' RT	48	Pipe Conduit - Storm Drain	164	Reinforced Concrete Pipe - Class III (Barrel Length = 162 LF)	48	P	3/4, 1	0.109		FES	FES	D-714-27
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
539+45	70.0' RT	34A		48	Pipe Conduit - Storm Drain	126	Reinforced Concrete Pipe - Class III (Barrel Length = 124 LF)	48	P	3/4, 1	0.109		FES		D-714-27
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
34A		541+09	70.0' RT	48	Pipe Conduit - Storm Drain	34	Reinforced Concrete Pipe - Class III (Barrel Length = 34 LF)	48	P	3/4, 1	0.109			FES	D-714-27
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
32A		537+86	61.0' LT	24	Pipe Conduit - Storm Drain	40	Reinforced Concrete Pipe - Class III (Barrel Length = 38 LF)	24	P	3/4, 1	0.109			FES	D-714-27
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
32B		537+86	66.0' RT	24	Pipe Conduit - Storm Drain	33	Reinforced Concrete Pipe - Class III (Barrel Length = 31 LF)	24	P	3/4, 1	0.109			FES	D-714-27
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
539+81	80.5' LT	33A		42	Pipe Conduit - Storm Drain	28	Reinforced Concrete Pipe - Class III (Barrel Length = 26 LF)	42	P	3/4, 1	0.109		FES		D-714-27
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
33A		33B		42	Pipe Conduit - Storm Drain	44	Reinforced Concrete Pipe - Class III (Barrel Length = 44 LF)	42	P	3/4, 1	0.109				D-714-27
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								

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

Corrugation 2 = 2-2/3" x 1/2"
3 = 3" x 1"
5 = 5" x 1"

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

End Sections: R & R = Remove & Relay
FES = Flared End Section
TES = Traversable End Section

NOTE: * Denotes the price bid for "Pipe Conduit" bid items includes end sections. The pipe barrel length shall be bid separately from the end sections for culvert extensions.

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Allowable Pipe List
ND23A
US85B to ND23B

Begin Station / Location	Begin Offset	End Station / Location	End Offset	Pipe Installation (Pay Item)			Allowable Material	Required Diameter	Steel Pipe Coating	Steel Pipe Corrugations or Spiral Rib	Steel Pipe Minimum Thickness	R1 Fabric (Pay Item)	End Section*		Applicable Backfill Detail
				Inch	Bid Item	LF							Begin	End	
33B		540+89	80.5' LT	42	Pipe Conduit - Storm Drain	28	Reinforced Concrete Pipe - Class III (Barrel Length = 26 LF)	42	P	3/4, 1	0.109			FES	D-714-27
					Spiral Rib Steel Pipe										
33C		33B		24	Pipe Conduit - Storm Drain	8	Reinforced Concrete Pipe - Class III (Barrel Length = 8 LF)	24	P	3/4, 1	0.109				D-714-27
					Spiral Rib Steel Pipe										
539+81	70.5' LT	540+89	70.5' LT	42	Pipe Conduit - Storm Drain	108	Reinforced Concrete Pipe - Class III (Barrel Length = 104 LF)	42	P	3/4, 1	0.109		FES	FES	D-714-27
35A		544+00	63.0' LT	24	Pipe Conduit - Storm Drain	42	Reinforced Concrete Pipe - Class III (Barrel Length = 40 LF)	24	P	3/4, 1	0.109			FES	D-714-27
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
544+63	62.5' RT	545+97	62.5' RT	48	Pipe Conduit - Storm Drain	134	Reinforced Concrete Pipe - Class III (Barrel Length = 130 LF)	48	P	3/4, 1	0.109		FES	FES	D-714-27
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
554+63	72.5' RT	36A		48	Pipe Conduit - Storm Drain	35	Reinforced Concrete Pipe - Class III (Barrel Length = 33 LF)	48	P	3/4, 1	0.109		FES		D-714-27
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
36A		36B		48	Pipe Conduit - Storm Drain	56	Reinforced Concrete Pipe - Class III (Barrel Length = 56 LF)	48	P	3/4, 1	0.109				D-714-27
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
36B		545+97	72.5' RT	48	Pipe Conduit - Storm Drain	37	Reinforced Concrete Pipe - Class III (Barrel Length = 35 LF)	48	P	3/4, 1	0.109			FES	D-714-27
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
37A		547+15	61.0' LT	24	Pipe Conduit - Storm Drain	40	Reinforced Concrete Pipe - Class III (Barrel Length = 38 LF)	24	P	3/4, 1	0.109			FES	D-714-27
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
38A		550+15	59.0' LT	24	Pipe Conduit - Storm Drain	38	Reinforced Concrete Pipe - Class III (Barrel Length = 36 LF)	24	P	3/4, 1	0.109			FES	D-714-27
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
38B		550+15	49.0' RT	24	Pipe Conduit - Storm Drain	28	Reinforced Concrete Pipe - Class III (Barrel Length = 26 LF)	24	P	3/4, 1	0.109			FES	D-714-27
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
550+63	79.5' LT	551+78	79.5' LT	42	Pipe Conduit - Approach	115	Reinforced Concrete Pipe - Class III (Barrel Length = 110 LF)	42	P	3/4, 1	0.109		FES	FES	Specification 714.04 A
550+63	67.5' LT	551+78	67.5' LT	42	Pipe Conduit - Approach	115	Reinforced Concrete Pipe - Class III (Barrel Length = 110 LF)	42	P	3/4, 1	0.109		FES	FES	Specification 714.04 A
							Spiral Rib Steel Pipe								
553+75	66.5' LT	39A		48	Pipe Conduit - Storm Drain	44	Reinforced Concrete Pipe - Class III (Barrel Length = 42 LF)	48	P	3/4, 1	0.109		FES		D-714-25
							Spiral Rib Steel Pipe								
39A		39B		48	Pipe Conduit - Storm Drain	36	Reinforced Concrete Pipe - Class III (Barrel Length = 36 LF)	48	P	3/4, 1	0.109	120			D-714-25
							Spiral Rib Steel Pipe								
39B		553+75	58.5' RT	48	Pipe Conduit - Storm Drain	36	Reinforced Concrete Pipe - Class III (Barrel Length = 34 LF)	48	P	3/4, 1	0.109			FES	D-714-25
							Spiral Rib Steel Pipe								

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TES = Traversable End Section

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Allowable Pipe List

ND23A

US85B to ND23B

Begin Station / Location	Begin Offset	End Station / Location	End Offset	Pipe Installation (Pay Item)			Allowable Material	Required Diameter	Steel Pipe Coating	Steel Pipe Corrugations or Spiral Rib	Steel Pipe Minimum Thickness	R1 Fabric (Pay Item)	End Section*		Applicable Backfill Detail
				Inch	Bid Item	LF							Begin EA	End EA	
40A		556+27	51.0' LT	18	Pipe Conduit - Storm Drain	30	Reinforced Concrete Pipe - Class III (Barrel Length = 26 LF)	18	P	3/4, 1	0.109			FES	D-714-27
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
40B		556+27	37.0' RT	12	Pipe Conduit - Storm Drain	16	Reinforced Concrete Pipe - Class III (Barrel Length = 12 LF)	12	P	3/4, 1	0.109			FES	D-714-27
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
41A		559+00	57.0' LT	24	Pipe Conduit - Storm Drain	36	Reinforced Concrete Pipe - Class III (Barrel Length = 34 LF)	24	P	3/4, 1	0.109			FES	D-714-27
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
41B		559+00	43.0' RT	24	Pipe Conduit - Storm Drain	22	Reinforced Concrete Pipe - Class III (Barrel Length = 20 LF)	24	P	3/4, 1	0.109			FES	D-714-27
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
560+26	71.0' LT	560+83	71.0' LT	24	Pipe Conduit - Approach	57	Reinforced Concrete Pipe - Class III (Barrel Length = 53 LF)	24	P	3/4, 1	0.109		FES	FES	Specification 714.04 A
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
560+24	65.0' RT	560+86	65.0' RT	24	Pipe Conduit - Approach	62	Reinforced Concrete Pipe - Class III (Barrel Length = 58 LF)	24	P	3/4, 1	0.109		FES	FES	Specification 714.04 A
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
561+75	70.0' LT	561+75	56.0' RT	48	Pipe Conduit - Storm Drain	126	Reinforced Concrete Pipe - Class III (Barrel Length = 122 LF)	48	P	3/4, 1	0.109	630	FES	FES	D-714-25M
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
561+93	56.0' RT	42B		48	Pipe Conduit - Storm Drain	34	Reinforced Concrete Pipe - Class III (Barrel Length = 32 LF)	48	P	3/4, 1	0.109		FES		D-714-25M
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
42B		42A		48	Pipe Conduit - Storm Drain	36	Reinforced Concrete Pipe - Class III (Barrel Length = 36 LF)	48	P	3/4, 1	0.109				D-714-25M
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
42A		561+93	70.0' LT	48	Pipe Conduit - Storm Drain	48	Reinforced Concrete Pipe - Class III (Barrel Length = 46 LF)	48	P	3/4, 1	0.109			FES	D-714-25M
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
43A		42A		18	Pipe Conduit - Storm Drain	302	Reinforced Concrete Pipe - Class III (Barrel Length = 302 LF)	18	P	3/4, 1	0.109				D-714-27
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
43B		43A		18	Pipe Conduit - Storm Drain	37	Reinforced Concrete Pipe - Class III (Barrel Length = 37 LF)	18	P	3/4, 1	0.109	110			D-714-25
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
44A		43A		18	Pipe Conduit - Storm Drain	196	Reinforced Concrete Pipe - Class III (Barrel Length = 196 LF)	18	P	3/4, 1	0.109				D-714-27
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
44B		44A		18	Pipe Conduit - Storm Drain	37	Reinforced Concrete Pipe - Class III (Barrel Length = 37 LF)	18	P	3/4, 1	0.109	110			D-714-25
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
590+60	47.5' RT	18B		36	Pipe Conduit - Storm Drain	26	Reinforced Concrete Pipe - Class III (Barrel Length = 24 LF)	36	P	3/4, 1	0.109		FES		D-714-26
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
18B		18A		36	Pipe Conduit - Storm Drain	36	Reinforced Concrete Pipe - Class III (Barrel Length = 36 LF)	36	P	3/4, 1	0.109	320			D-714-26
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								

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

Corrugation 2 = 2-2/3" x 1/2"
3 = 3" x 1"
5 = 5" x 1"

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

End Sections: R & R = Remove & Relay
FES = Flared End Section
TES = Traversable End Section

NOTE: * Denotes the price bid for "Pipe Conduit" bid items includes end sections. The pipe barrel length shall be bid separately from the end sections for culvert extensions.

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Allowable Pipe List
ND23A
US85B to ND23B

Begin Station / Location	Begin Offset	End Station / Location	End Offset	Pipe Installation (Pay Item)			Allowable Material	Required Diameter	Steel Pipe Coating	Steel Pipe Corrugations or Spiral Rib	Steel Pipe Minimum Thickness	R1 Fabric (Pay Item)	End Section*		Applicable Backfill Detail	
				Inch	Bid Item	LF							Begin	End		
													SY	EA	EA	Plan/Standard
18A		590+60	59.5' LT	36	Pipe Conduit - Storm Drain	38	Reinforced Concrete Pipe - Class III (Barrel Length = 36 LF)	36	P	3/4, 1	0.109		FES		D-714-26	
							Spiral Rib Steel Pipe									
19A		592+85	61.0' LT	24	Pipe Conduit - Storm Drain	40	Reinforced Concrete Pipe - Class III (Barrel Length = 38 LF)	24	P	3/4, 1	0.109			FES	D-714-27	
							Spiral Rib Steel Pipe									
							High-Density Polyethylene (Type S)									
19B		592+85	47.0' RT	24	Pipe Conduit - Storm Drain	26	Reinforced Concrete Pipe - Class III (Barrel Length = 24 LF)	24	P	3/4, 1	0.109			FES	D-714-27	
							Spiral Rib Steel Pipe									
							High-Density Polyethylene (Type S)									
594+14	69.0' LT	---	---	30	---	0	Reinforced Concrete Pipe - Class III (Barrel Length = 0 LF)	30	---	---	---		FES		---	
20A		595+10	59.0' LT	24	Pipe Conduit - Storm Drain	38	Reinforced Concrete Pipe - Class III (Barrel Length = 36 LF)	24	P	3/4, 1	0.109			FES	D-714-27	
							Spiral Rib Steel Pipe									
							High-Density Polyethylene (Type S)									
20B		595+10	47.0' RT	24	Pipe Conduit - Storm Drain	26	Reinforced Concrete Pipe - Class III (Barrel Length = 24 LF)	24	P	3/4, 1	0.109			FES	D-714-27	
							Spiral Rib Steel Pipe									
							High-Density Polyethylene (Type S)									
21A		597+20	59.0' LT	24	Pipe Conduit - Storm Drain	38	Reinforced Concrete Pipe - Class III (Barrel Length = 36 LF)	24	P	3/4, 1	0.109			FES	D-714-27	
							Spiral Rib Steel Pipe									
							High-Density Polyethylene (Type S)									
21B		597+20	45.0' RT	24	Pipe Conduit - Storm Drain	24	Reinforced Concrete Pipe - Class III (Barrel Length = 22 LF)	24	P	3/4, 1	0.109			FES	D-714-27	
							Spiral Rib Steel Pipe									
							High-Density Polyethylene (Type S)									
597+42	72.0' LT	598+41	72.0' LT	36	Pipe Conduit - Approach	99	Reinforced Concrete Pipe - Class III (Barrel Length = 94 LF)	36	P	3/4, 1	0.109		FES	FES	Specification 714.04 A	
22A		600+48	59.0' LT	24	Pipe Conduit - Storm Drain	38	Reinforced Concrete Pipe - Class III (Barrel Length = 36 LF)	24	P	3/4, 1	0.109			FES	D-714-27	
							Spiral Rib Steel Pipe									
							High-Density Polyethylene (Type S)									
22B		600+48	45.0' RT	24	Pipe Conduit - Storm Drain	24	Reinforced Concrete Pipe - Class III (Barrel Length = 22 LF)	24	P	3/4, 1	0.109			FES	D-714-27	
							Spiral Rib Steel Pipe									
							High-Density Polyethylene (Type S)									
601+11	75.0' LT	601+75	75.0' LT	36	Pipe Conduit - Approach	64	Reinforced Concrete Pipe - Class III (Barrel Length = 60 LF)	36	P	3/4, 1	0.109		FES	FES	Specification 714.04 A	
601+16	65.0' RT	601+69	65.0' RT	58IN x 36IN	Pipe Conduit - Approach	53	Reinforced Concrete Pipe - Class III (Barrel Length = 47 LF)	58IN x 36IN					FES	FES	Specification 714.04 A	
601+16	75.0' RT	601+69	75.0' RT	58IN x 36IN	Pipe Conduit - Approach	53	Reinforced Concrete Pipe - Class III (Barrel Length = 47 LF)	58IN x 36IN					FES	FES	Specification 714.04 A	
23B		602+75	49.0' RT	24	Pipe Conduit - Storm Drain	28	Reinforced Concrete Pipe - Class III (Barrel Length = 26 LF)	24	P	3/4, 1	0.109		FES		D-714-26	
							Spiral Rib Steel Pipe									
23B	23A			24	Pipe Conduit - Storm Drain	38	Reinforced Concrete Pipe - Class III (Barrel Length = 38 LF)	24	P	3/4, 1	0.109	350			D-714-26	
							Spiral Rib Steel Pipe									
23A		602+75	63.0' LT	24	Pipe Conduit - Storm Drain	42	Reinforced Concrete Pipe - Class III (Barrel Length = 40 LF)	24	P	3/4, 1	0.109			FES	D-714-26	
							Spiral Rib Steel Pipe									

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

Corrugation 2 = 2-2/3" x 1/2"
3 = 3" x 1"
5 = 5" x 1"

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

End Sections: R & R = Remove & Relay
FES = Flared End Section
TES = Traversable End Section

NOTE: * Denotes the price bid for "Pipe Conduit" bid items includes end sections. The pipe barrel length shall be bid separately from the end sections for culvert extensions.

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Allowable Pipe List

ND23A

US85B to ND23B

STORM DRAIN CULVERTS

Begin Station / Location	Begin Offset	End Station / Location	End Offset	Pipe Installation (Pay Item)			Allowable Material	Required Diameter	Steel Pipe Coating	Steel Pipe Corrugations or Spiral Rib	Steel Pipe Minimum Thickness	R1 Fabric (Pay Item)	End Section*		Applicable Backfill Detail
				Inch	Bid Item	LF							Begin	End	
													EA	EA	
602+92	146.0' LT	603+00	81.5' LT	18	Pipe Conduit - Approach	65	Reinforced Concrete Pipe - Class III (Barrel Length = 57 LF)	18	P	3/4, 1	0.109		FES	FES	Specification 714.04 A
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
24A		606+75	67.0' LT	24	Pipe Conduit - Storm Drain	46	Reinforced Concrete Pipe - Class III (Barrel Length = 44 LF)	24	P	3/4, 1	0.109			FES	D-714-27
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
24B		606+75	53.0' RT	24	Pipe Conduit - Storm Drain	32	Reinforced Concrete Pipe - Class III (Barrel Length = 30 LF)	24	P	3/4, 1	0.109			FES	D-714-27
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
25A		608+50	71.0' LT	24	Pipe Conduit - Storm Drain	50	Reinforced Concrete Pipe - Class III (Barrel Length = 48 LF)	24	P	3/4, 1	0.109			FES	D-714-27
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
25B		608+50	55.0' RT	24	Pipe Conduit - Storm Drain	34	Reinforced Concrete Pipe - Class III (Barrel Length = 32 LF)	24	P	3/4, 1	0.109			FES	D-714-27
							Spiral Rib Steel Pipe								
							High-Density Polyethylene (Type S)								
609+35	39.6' LT	609+35	59.6' LT	60	Pipe Corr Steel .109IN 60IN	20	Spiral Rib Steel Pipe	60	P	3/4, 1				R & R	D-714-27
609+45	39.6' LT	609+45	63.6' LT	60	Pipe Corr Steel .109IN 60IN	24	Spiral Rib Steel Pipe	60	P	3/4, 1				R & R	D-714-27
610+04	44.0' LT	610+04	84.0' LT	60	Pipe Corr Steel .109IN 60IN	40	Spiral Rib Steel Pipe	60	P	3/4, 1				R & R	D-714-27
3+35 (BYPASS)	25.9' RT	3+05 (BYPASS)	25.9' LT	42	Pipe Conduit	60	Reinforced Concrete Pipe - Class III (Barrel Length = 54 LF)	42	P	2	0.109		FES	FES	Specification 714.04 A
							Corrugated Steel Pipe								
							High-Density Polyethylene (Type S)								
5+76 (BYPASS)	48.2' RT	5+99 (BYPASS)	49.2' LT	84	Pipe Conduit	100	Reinforced Concrete Pipe - Class III (Barrel Length = 96 LF)	84	P	2	0.109		FES	FES	Specification 714.04 A
							Corrugated Steel Pipe								
							High-Density Polyethylene (Type S)								

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

Corrugation 2 = 2-2/3" x 1/2"
3 = 3" x 1"
5 = 5" x 1"

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

End Sections: R & R = Remove & Relay
FES = Flared End Section
TES = Traversable End Section

NOTE: * Denotes the price bid for "Pipe Conduit" bid items includes end sections. The pipe barrel length shall be bid separately from the end sections for culvert extensions.

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Allowable Pipe List

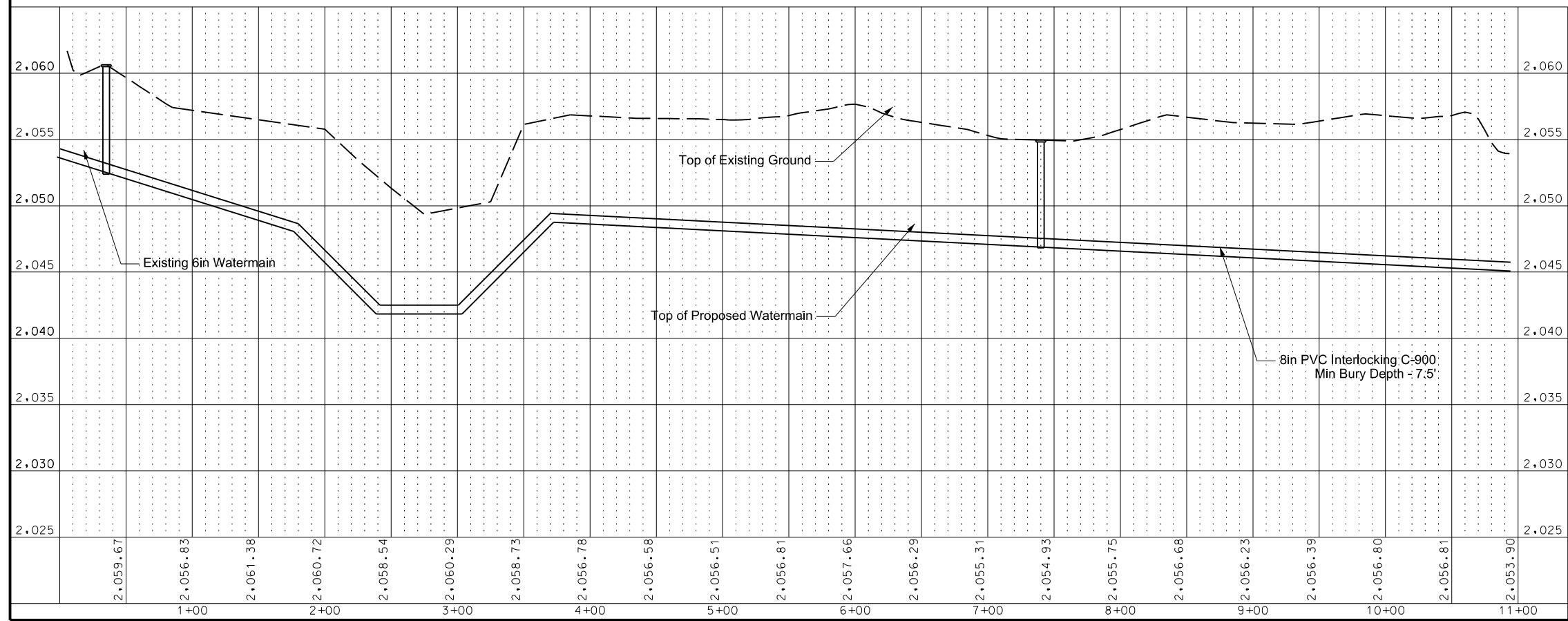
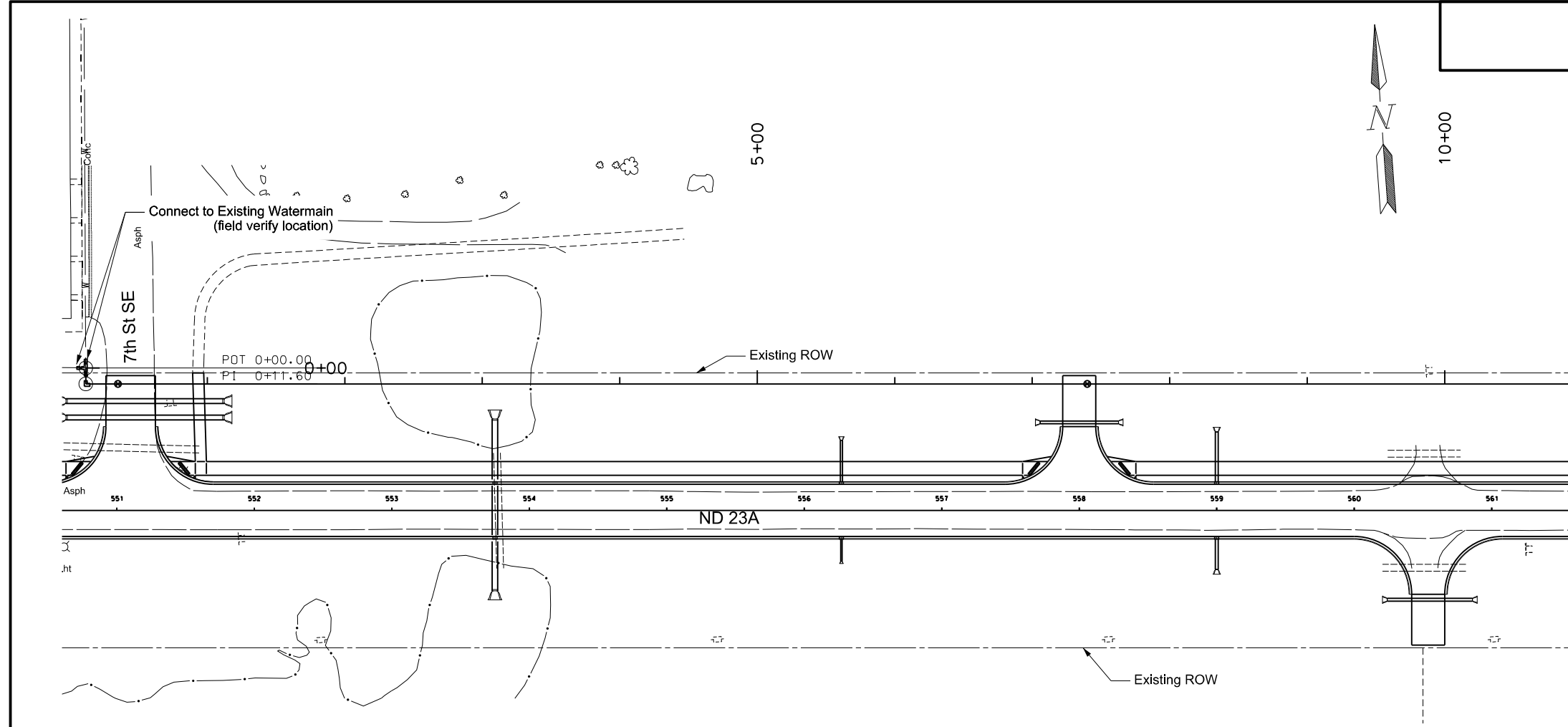
ND23A

US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	55	1

CITY FUNDED WATERMAIN IMPROVEMENTS				
SPEC	CODE	BID ITEM	QUANTITY	UNIT
724	0210	Fittings-Ductile Iron 0+00.00 - CL (6in x 6in x 6in)	125	LBS
724	0310	Gate Valve & Box 8in 0+35.00 - CL 7+40.00 - CL	1 1	EA EA
724	0830	Watermain 8in PVC 0+00.00 to 10+00.00 - CL	1,000	LF
724	0944	Connection to Existing Main 0+00.00 - 5' RT (6in) 0+00.00 - 5' LT (6in)	1 1	EA EA
724	6825	8in 45.0 Deg Bend 1+98.00 - CL 2+60.00 - CL 3+20.00 - CL 3+91.00 - CL	1 1 1 1	EA EA EA EA
724	6826	8in 90.0 Deg Bend 0+11.60 - CL	1	EA
724	7010	8in X 6in Reducer 0+02.00 - CL	1	EA

Note: Contractor must tie into existing elevation on both ends



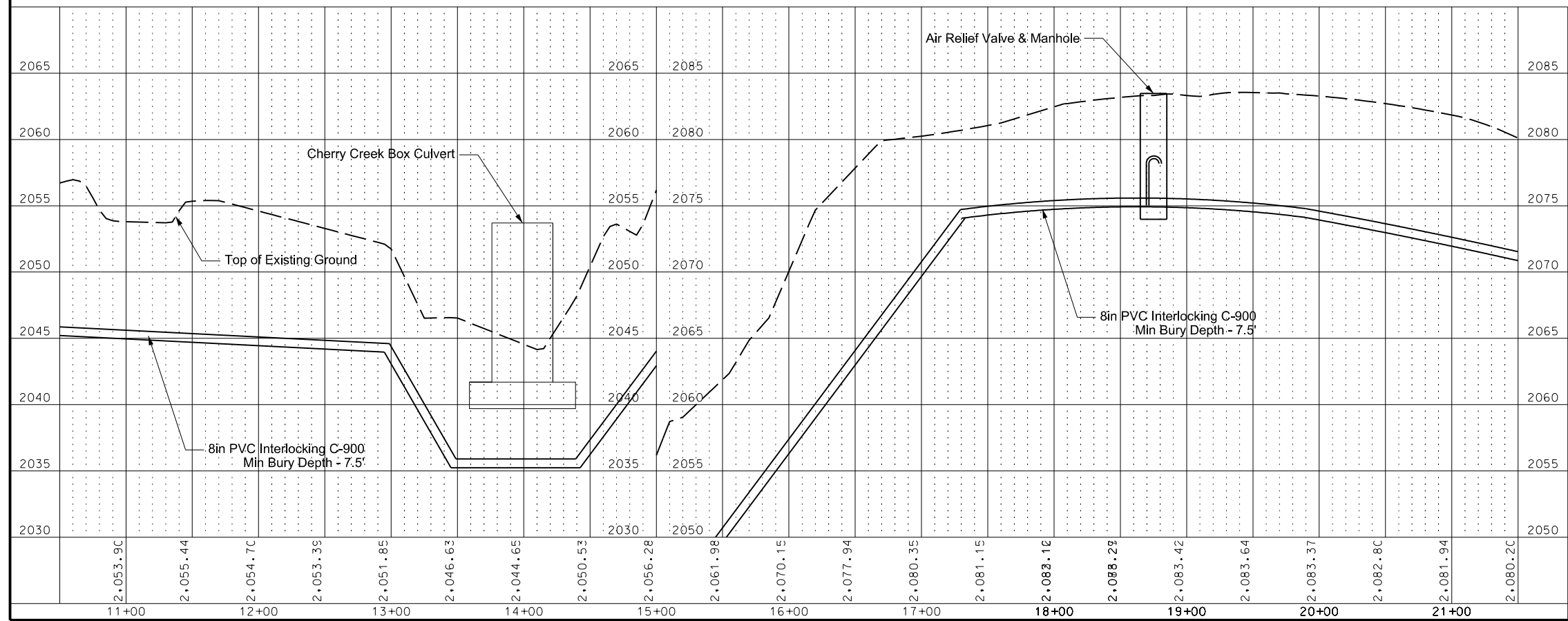
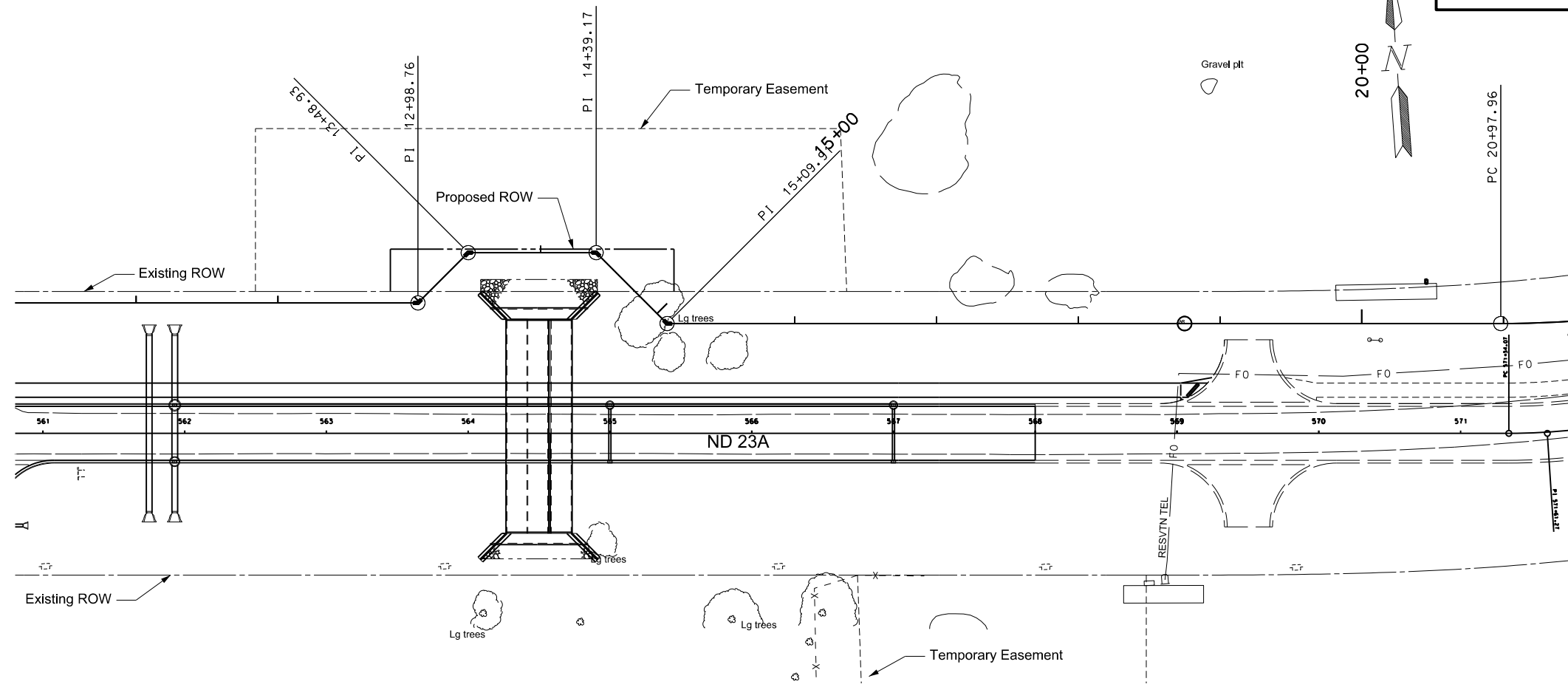
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City Watermain Improvements
7th Street to 11th Street Watermain Loop

ND23A
US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	55	2

CITY FUNDED WATERMAIN IMPROVEMENTS				
SPEC	CODE	BID ITEM	QUANTITY	UNIT
722	6695	Air Relief Valve & Manhole 18+75.00 - CL	1	EA
724	0830	Watermain 8in PVC 10+00.00 to 20+00.00 - CL	1,000	LF
724	6825	8in 45.0 Deg Bend		
		12+98.76 - CL	1	EA
		13+48.93 - CL	1	EA
		14+39.17 - CL	1	EA
		15+09.91 - CL	1	EA
		17+30.00 - CL	1	EA



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City Watermain Improvements
7th Street to 11th Street Watermain Loop

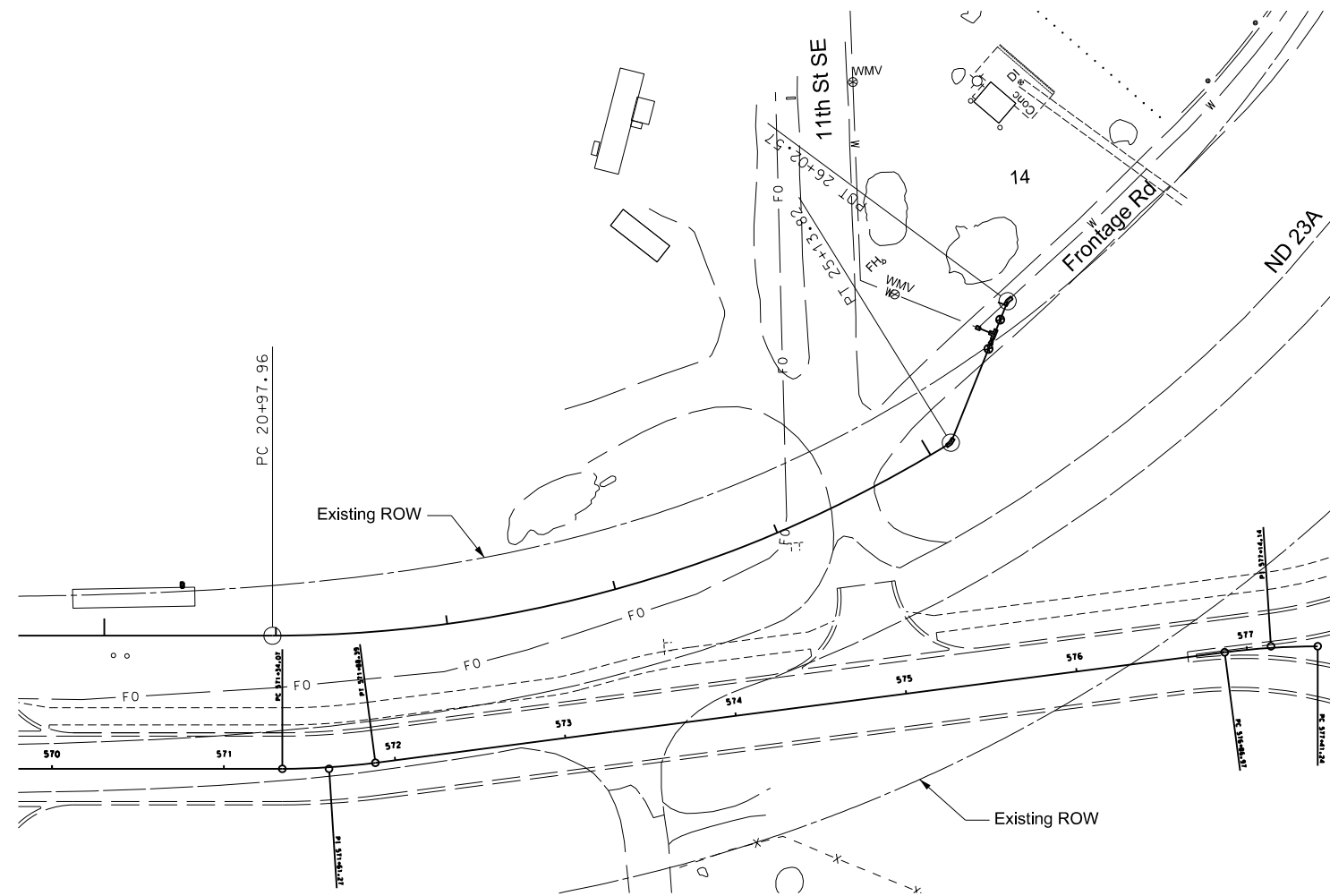
ND23A
US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	55	3

CITY FUNDED WATERMAIN IMPROVEMENTS

SPEC	CODE	BID ITEM	QUANTITY	UNIT
724	0210	Fittings-Ductile Iron 25+82.00 - CL (6in x 6in x 6in)	125	LBS
724	0300	Gate Valve & Box 6in 25+91.00 - CL	1	EA
724	0310	Gate Valve & Box 8in 25+73.00 - CL	1	EA
724	0810	Watermain 6in PVC 25+77.00 to 26+07.00 - CL	30	LF
724	0830	Watermain 8in PVC 20+00.00 to 25+77.00 - CL	577	LF
724	0944	Connection to Existing Main 25+82.00 - 15' LT (6in) 26+07.00 - CL (6in)	1 1	EA EA
724	6999	6in 22.5 Deg Bend 26+02.57 - CL	1	EA
724	6825	8in 45.0 Deg Bend 25+13.82 - CL	1	EA
724	7010	8in x 6in Reducer 25+77.00 - CL	1	EA

Notes: * Contractor must tie into existing elevation on both ends.
* Prior to installing the water main, the existing mains shall be located to assure correct placement of fittings and valves.



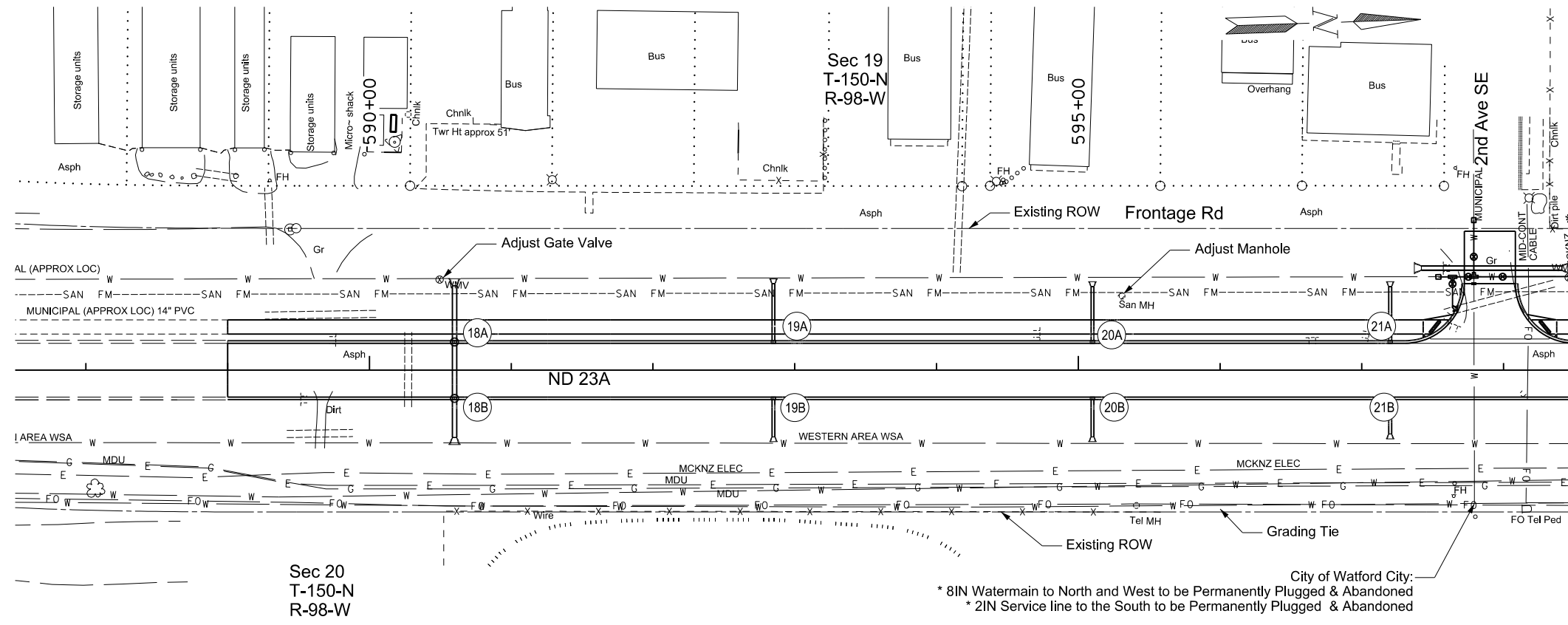
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City Watermain Improvements
7th Street to 11th Street Watermain Loop
ND23A
US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	55	4

SPEC	CODE	BID ITEM	QUANTITY	UNIT
722	6200	Adjust Manhole 595+31.00 - 52.1' LT	1	EA
722	6240	Adjust Utility Appurtenance 590+49.5 - 63.8' LT	1	EA
724	0210	Fittings-Ductile Iron 597+64.0 - 65.8' LT (12in x 12in x 6in) 597+79.0 - 65.8' LT (12in x 12in x 8in)	133 146	LBS LBS
724	0300	Gate Valve & Box 6in 597+64.0 - 60.8' LT	1	EA
724	0310	Gate Valve & Box 8in 597+79.0 - 80.8' LT	1	EA
724	0314	Gate Valve & Box 12in 597+76.0 - 65.8' LT 597+99.0 - 65.8' LT	1 1	EA EA
724	0400	Hydrant - Install 6in 597+64.0 - 45.0' LT	1	EA
724	0807	Plug 8in Watermain 597+79.0 - 60.8' LT	1	EA
724	0810	Watermain 6in PVC 597+64.0 - 45.0' LT to 66' LT	21	LF
724	0830	Watermain 8in PVC 597+79.0 - 65.8' LT to 105.8' LT	40	LF
724	0850	Watermain 12in PVC 597+54.0 - 65.8' LT to 598+00 - 65.8' LT	46	LF
724	0944	Connection to Existing Main 597+54.0 - 65.8' LT (12in) 597+79.0 - 105.8' LT (8in)	1 1	EA EA

Notes: * Contractor must tie into existing elevation.
* Prior to installing the watermain, the existing mains shall be located to assure correct placement of fittings and valves.



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City Watermain Improvements

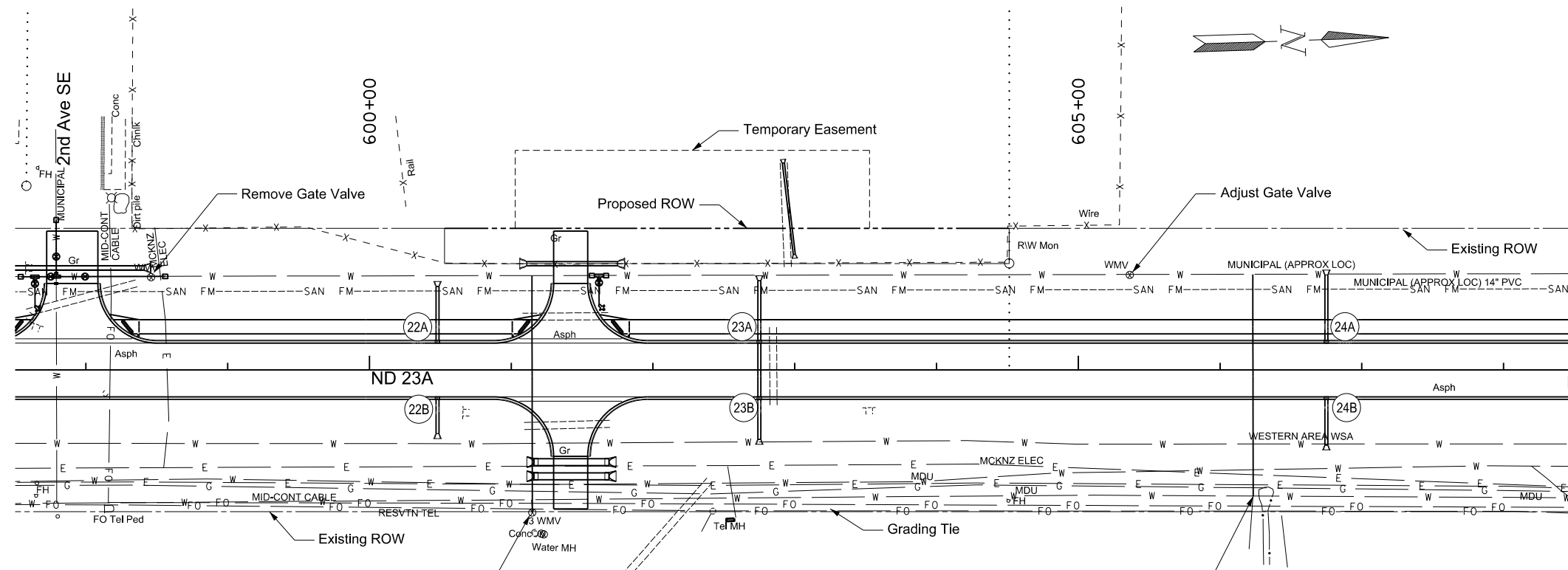
ND23A

US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	55	5

SPEC	CODE	BID ITEM	QUANTITY	UNIT
722	6240	Adjust Utility Appurtenance 605+37.0 - 66.0' LT	1	EA
724	0210	Fittings-Ductile Iron 601+62.0 - 66.0' LT (12in x 12in x 6in)	133	LBS
724	0270	Remove Gate Valve & Box 598+46.0 - 66.0' LT	1	EA
724	0300	Gate Valve & Box 6in 601+62.0 - 61.0' LT	1	EA
724	0400	Hydrant - Install 6in 601+62.0 - 46.0' LT	1	EA
724	0810	Watermain 6in PVC 601+62.0 - 46.0' LT to 66' LT	20	LF
724	0850	Watermain 12in PVC 598+00.0 - 66.0' LT to 598+56.0 - 66.0' LT 601+57.0 - 66.0' LT to 601+67.0 - 66.0' LT	56 10	LF LF
724	0944	Connection to Existing Main 598+56.0 - 66.0' LT (12in) 601+57.0 - 66.0' LT (12in) 601+67.0 - 66.0' LT (12in)	1 1 1	EA EA EA
724	0960	Water Service Connection 2IN 601+15.0 - 66.0' LT to 100.0' RT 606+23.0 - 66.0' LT to 95.0' RT	1 1	EA EA

Notes: * Contractor must tie into existing elevation.
 * Prior to installing the water main, the existing mains shall be located to assure correct placement of fittings and valves.
 * All old mains shall be plugged. If the Contractor trenches through or hits the main which is to be abandoned, they shall plug each end at thier expense.



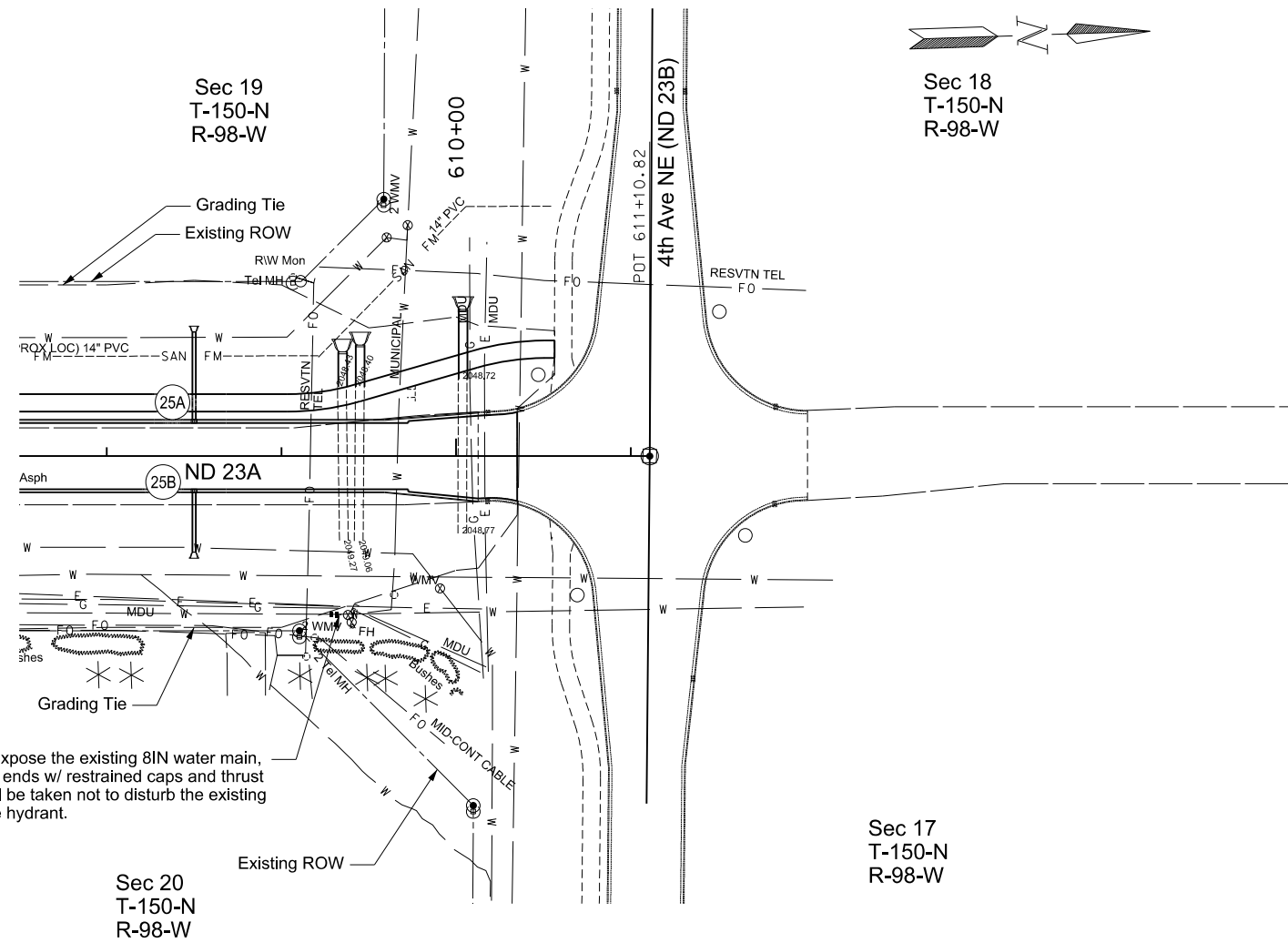
- Water Service Connection 2IN includes:
- * (1) EA - 12IN 306 S.S. Wrap-Around 2-Bolt Saddle w/ Tap
 - * (1) EA - Brass Plug Style Corporation Stop (AWWA/CC x Compression)
 - * (1) EA - Brass Service Union/Fitting (Compression x Compression)
 - * (1) EA - No-Lead Ball Valve & Box Minn. Pattern (Compression)
 - * (166) LF - 2IN Polyethylene Pipe
 - * (1) EA - Plug Abandoned Service Line

- Water Service Connection 2IN includes:
- * (1) EA - 12IN 306 S.S. Wrap-Around 2-Bolt Saddle w/ Tap
 - * (1) EA - Brass Plug Style Corporation Stop (AWWA/CC x Compression)
 - * (1) EA - Brass Service Union/Fitting (Compression x Compression)
 - * (1) EA - No-Lead Ball Valve & Box Minn. Pattern (Compression)
 - * (166) LF - 2IN Polyethylene Pipe
 - * (1) EA - Plug Abandoned Service Line

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City Watermain Improvements
 ND23A
 US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.	
ND	SS-7-023(050)910	55	6	
SPEC	CODE	BID ITEM	QUANTITY	UNIT
724	0807	Plug 8in Watermain		
		609+28.0 - 90.0' RT	1	EA
		609+30.0 - 90.0' RT	1	EA



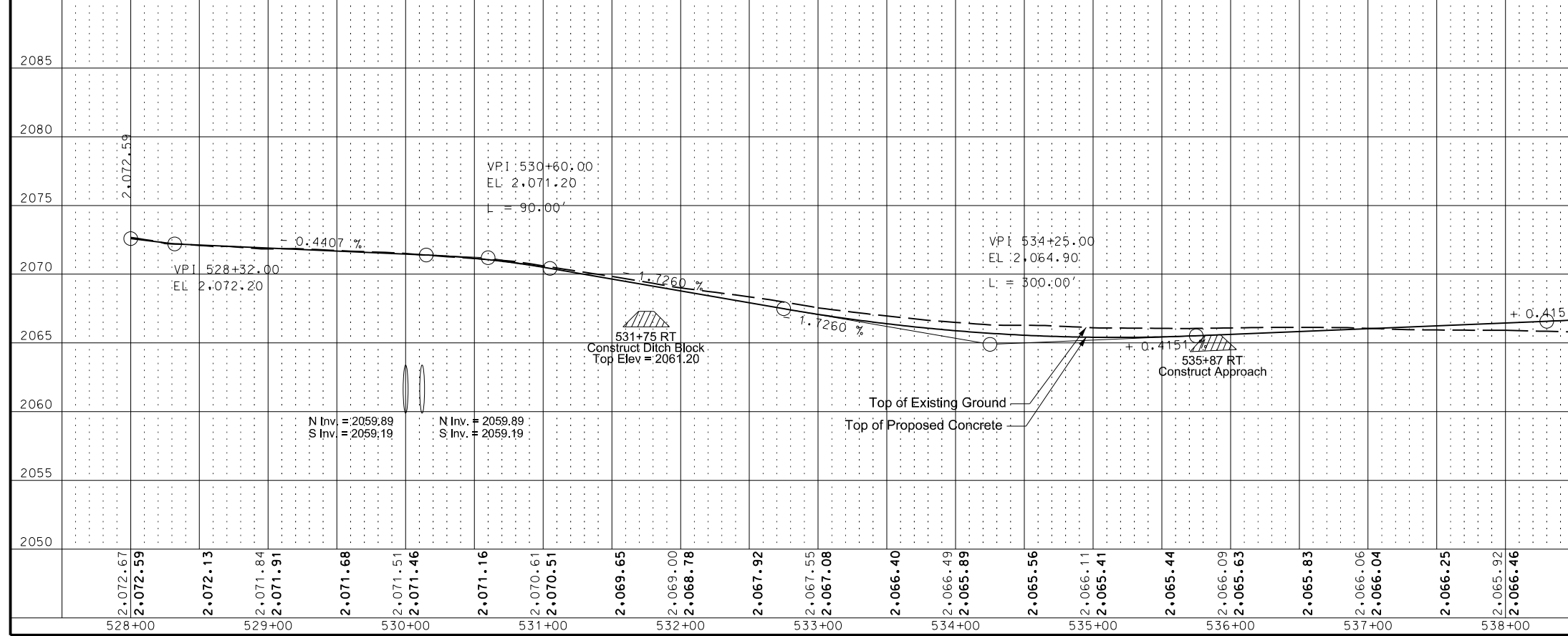
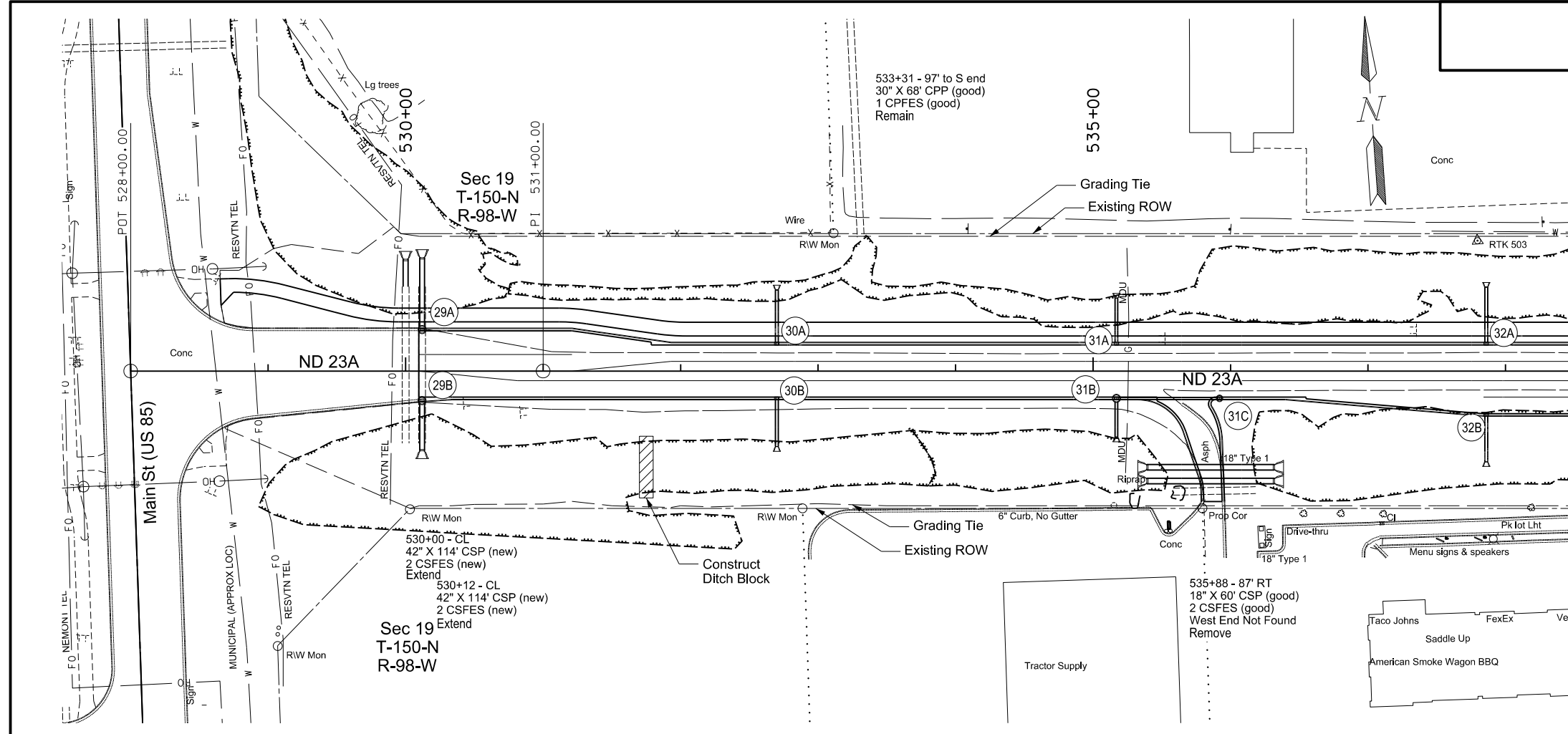
Contractor shall expose the existing 8IN water main, cut and plug both ends w/ restrained caps and thrust blocks. Care shall be taken not to disturb the existing gate valves or fire hydrant.

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City Watermain Improvements
 ND23A
 US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	60	1

SPEC	CODE	BID ITEM	QUANTITY	UNIT
202	0174	Removal of Pipe-All Types & Sizes 536+00 - 86' Rt	60	LF
302	0100	Salvaged Base Course (under sidewalk) 528+87 Lt to 538+00 Lt	218	TON
714	4101	Pipe Conduit 18In-Storm Drain 31B to 31C	72	LF
714	4107	Pipe Conduit 24In-Storm Drain 30A to 532+70-59' Lt 30B to 532+70-55' Rt 31A to 535+17-53' Lt 31B to 535+17-48' Rt 32A to 537+86-61' Lt 32B to 537+86-66' Rt	38 34 32 26 40 33	LF LF LF LF LF LF
714	4126	Pipe Conduit 48In-Storm Drain 535+39 - 70' Rt to 536+32 - 70' Rt 535+39 - 80' Rt to 536+32 - 80' Rt	93 93	LF LF
714	5315	Pipe Corr Steel .109IN 42IN 530+00-61.3' Lt to 530+00-81.3' Lt 530+12-82.5' Lt to 530+12-66.5' Lt	20 16	LF LF
714	9659	Remove & Relay Pipe-All Types & Sizes 29A to 530+12-66.5' Lt 29B to 530+12-58' Rt	34 34	LF LF
714	9660	Remove & Relay End Section-All Type & Sizes 530+00 Lt 530+12 Lt 530+12 Rt	1 1 1	EA EA EA
722	3510	Inlet-Type 2 30A 30B 31A 32A 32B	1 1 1 1 1	EA EA EA EA EA
722	3701	Inlet Special-Type 2 48in 31C	1	EA
722	3761	Inlet Special-Type 2 60in 29A 29B 31B	1 1 1	EA EA EA
750	0115	Sidewalk Concrete 4in 528+87 Lt to 538+00 Lt	1047	SY

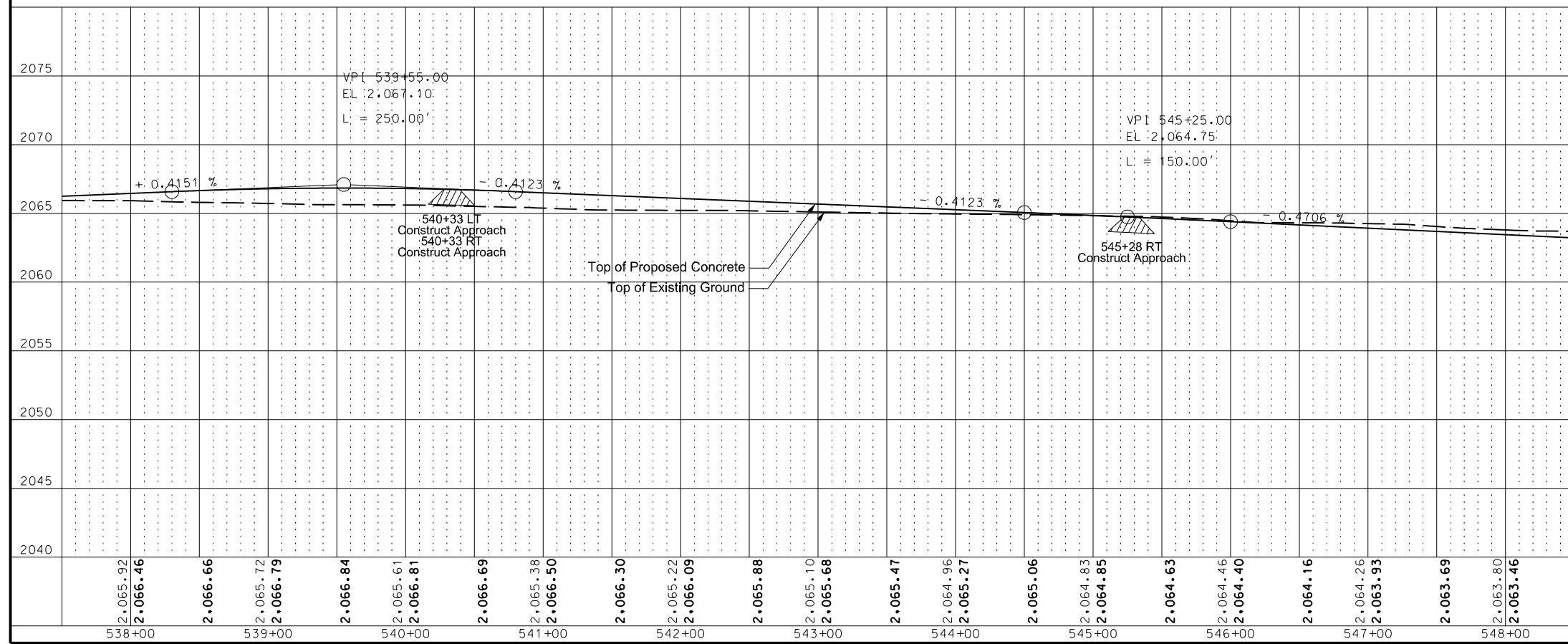
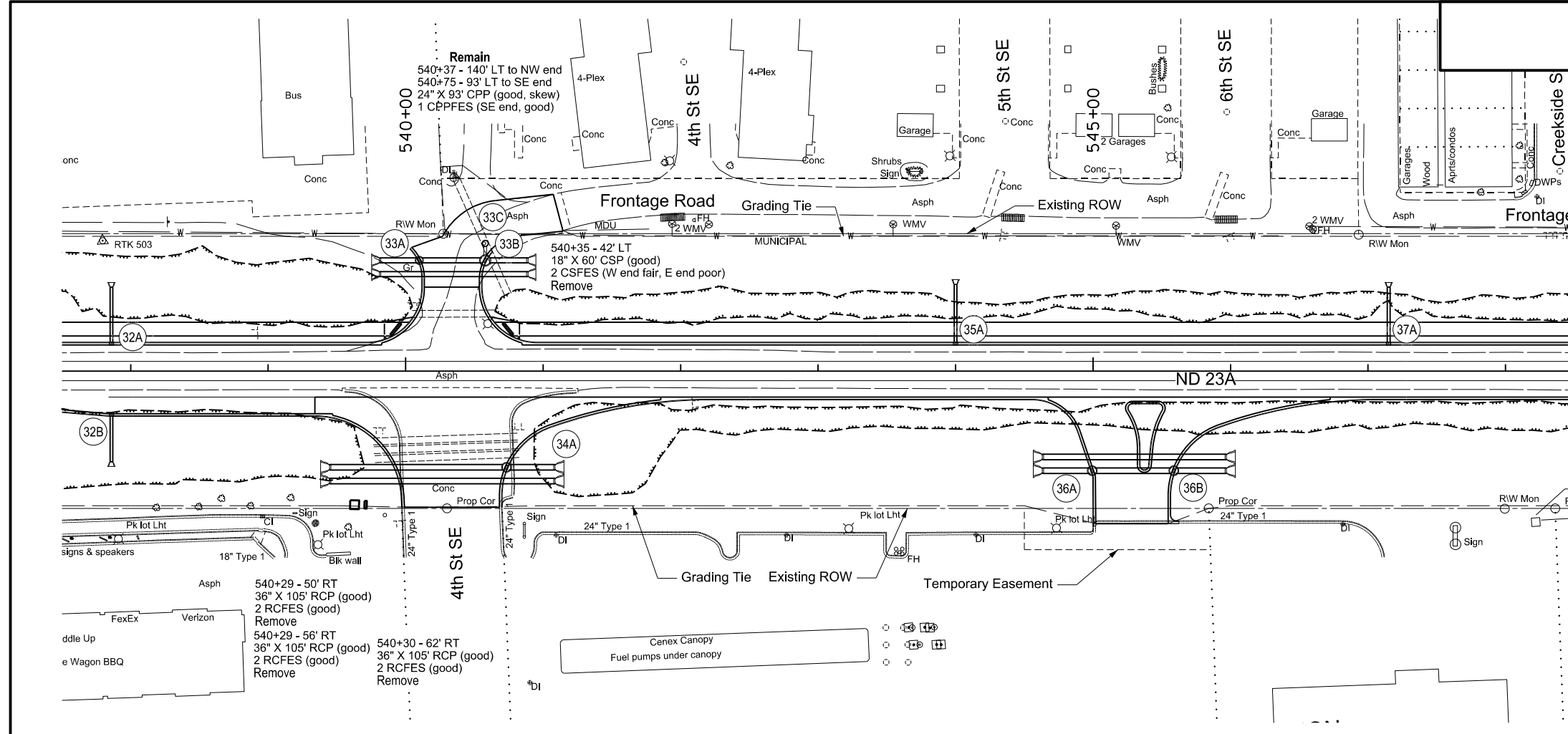


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Plan and Profile

ND23A
US85B to ND23B

SPEC	CODE	BID ITEM	QUANTITY	UNIT
202	0174	Removal of Pipe-All Types & Sizes		
		540+29 - 50' Rt	105	LF
		540+29 - 56' Rt	105	LF
		540+29 - 62' Rt	105	LF
		540+35 - 41' Lt	60	LF
		540+57-94.7' Lt to 540+74.4-55.4' Lt	43	LF
302	0100	Salvage Base Course (under sidewalk)		
		538+00 Lt to 540+12 Lt	49	TON
		540+55 Lt to 548+00 Lt	172	TON
714	4107	Pipe Conduit 24in-Storm Drain		
		33C to 33B	8	LF
		35A to 544+00 - 63' Lt	42	LF
		37A to 547+15 - 61' Lt	40	LF
714	4121	Pipe Conduit 42in-Storm Drain		
		539+81 - 81' Lt to 33A	28	LF
		33A to 33B	44	LF
		33B to 540+89 - 81' Lt	28	LF
		539+81 - 70.5' Lt to 540+89 - 70.5' Lt	108	LF
714	4126	Pipe Conduit 48in-Storm Drain		
		539+45 - 70' Rt to 34A	126	LF
		34A to 541+09 - 70' Rt	34	LF
		539+45 - 80' Rt to 541+09 - 80' Rt	164	LF
		544+63 - 62.5' Rt to 545+97 - 62.5' Rt	134	LF
		544+63 - 72.5' Rt to 36A	35	LF
		36A to 36B	56	LF
		36B to 545+97 - 72.5' Rt	37	LF
722	3510	Inlet-Type 2		
		35A	1	EA
		37A	1	EA
722	3701	Inlet Special-Type 2 48in		
		33C	1	EA
722	3761	Inlet Special-Type 2 60in		
		33A	1	EA
722	3766	Inlet Special-Type 2 72in		
		34A	1	EA
		36A	1	EA
		36B	1	EA
		33B	1	EA
722	3768	Inlet Special-Type 2 84in		
		33B	1	EA

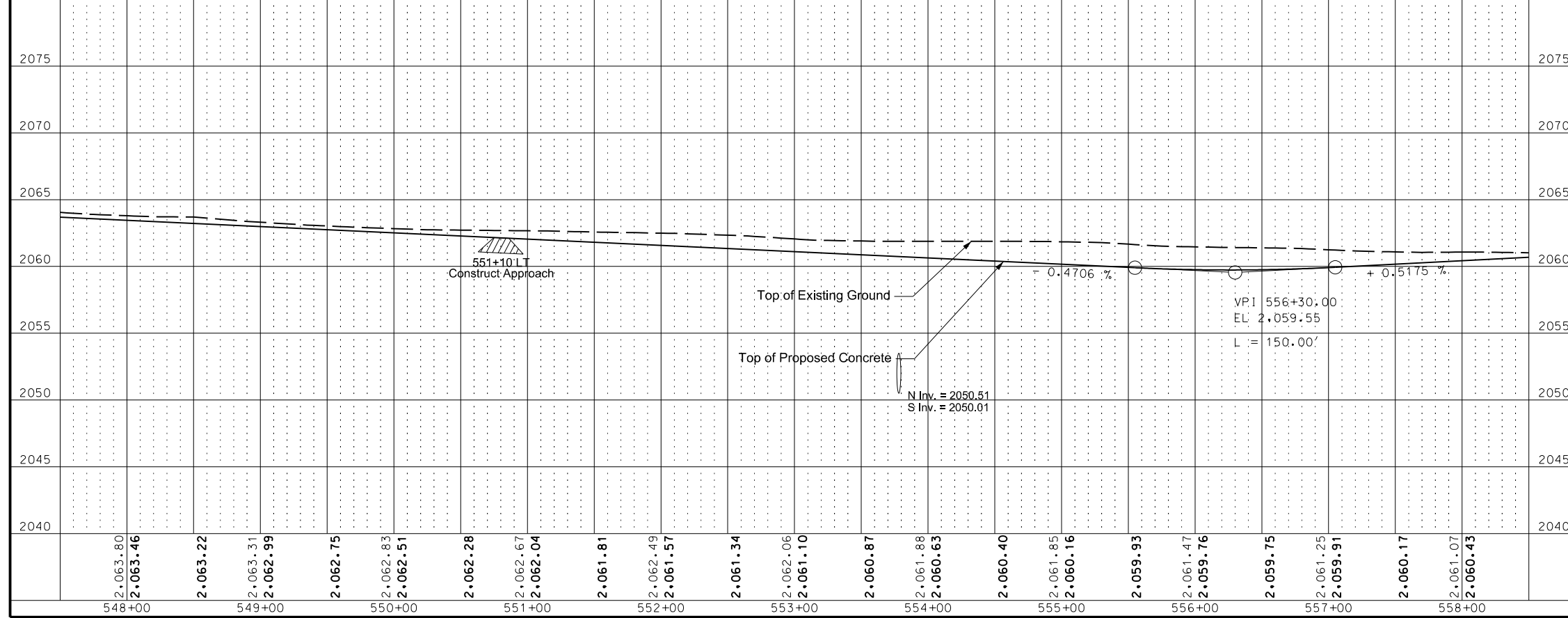
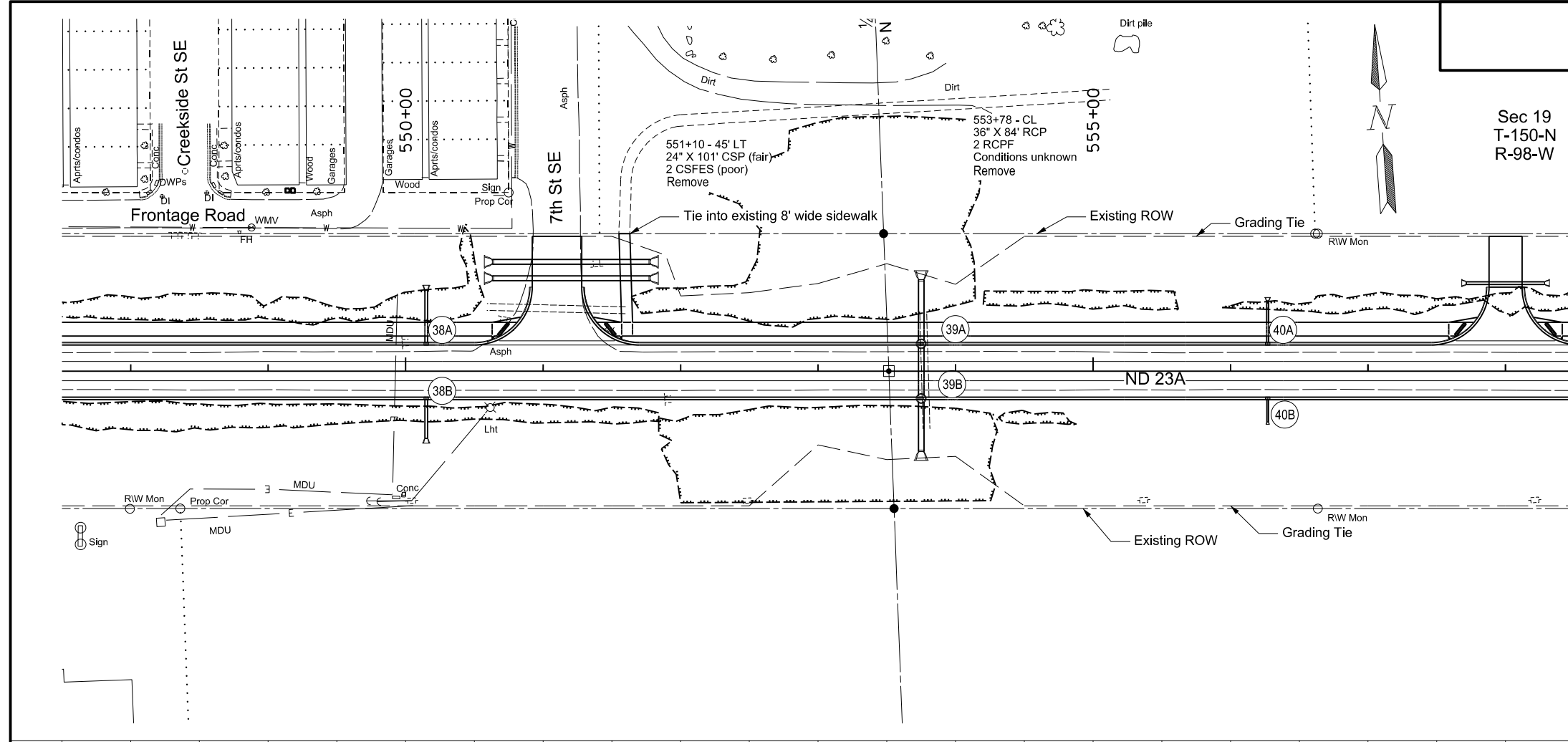


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Plan and Profile
ND23A
US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	60	3

SPEC	CODE	BID ITEM	QUANTITY	UNIT
202	0174	Removal of Pipe-All Types & Sizes		
		551+10 - 45' Lt	101	LF
		553+78 - CL	84	LF
302	0100	Salvage Base Course (under sidewalk)		
		538+00 Lt to 550+88 Lt	67	TON
		551+32 Lt to 558+00 Lt	155	TON
714	4092	Pipe Conduit 12in-Storm Drain		
		40B to 556+27 - 37' Rt	16	LF
714	4101	Pipe Conduit 18in-Storm Drain		
		40A to 556+27 - 51' Lt	30	LF
714	4107	Pipe Conduit 24in-Storm Drain		
		38A to 550+15 - 59' Lt	38	LF
		38B to 550+15 - 49' Rt	28	LF
714	4122	Pipe Conduit 42in-Approach		
		550+63' - 79.5' Lt to 551+78' - 79.5' Lt	115	LF
		550+63' - 67.5' Lt to 551+78' - 67.5' Lt	115	LF
714	4126	Pipe Conduit 48in-Storm Drain		
		553+75 - 66.5' Lt to 39A	44	LF
		39A to 39B	36	LF
		39B to 553+75 - 58.5' Rt	36	LF
722	3510	Inlet-Type 2		
		38A	1	EA
		38B	1	EA
		40A	1	EA
		40B	1	EA
722	3766	Inlet Special-Type 2 72In		
		39A	1	EA
		39B	1	EA
750	0115	Sidewalk Concrete 4in		
		538+00 Lt to 550+88 Lt	320	SY
		551+32 Lt to 558+00 Lt	742	SY
750	2115	Detectable Warning Panels		
		550+82 - 30' Lt	20	SF
		551+38 - 30' Lt	20	SF



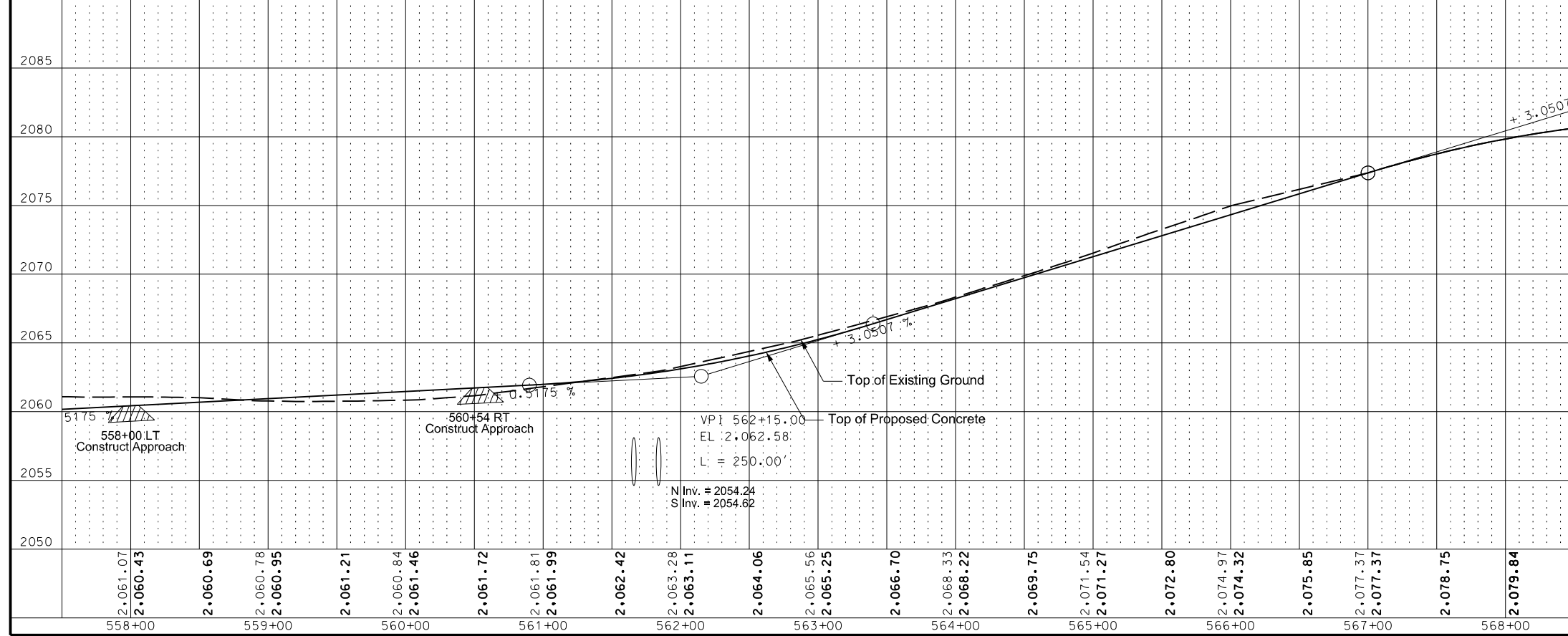
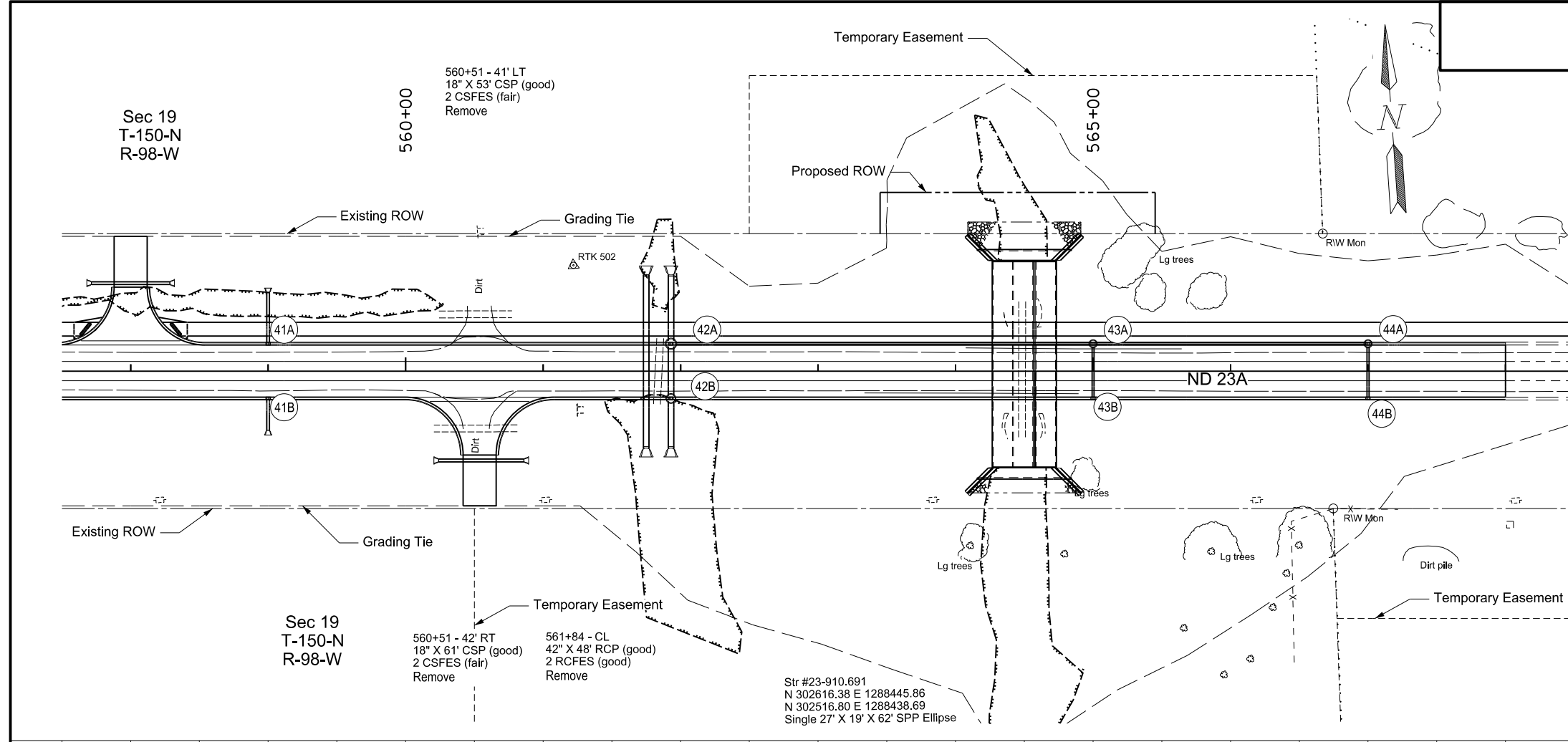
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Plan and Profile
ND23A
US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	60	4

SPEC	CODE	BID ITEM	QUANTITY	UNIT
202	0174	Removal of Pipe-All Types & Sizes		
		560+51 - 41' Lt	53	LF
		560+51 - 42' Rt	61	LF
		561+84 - CL	48	LF
302	0100	Salvage Base Course (under sidewalk)		
		558+00 Lt to 560+38 Lt	55	TON
		560+69 Lt to 569+22 Lt	196	TON
714	4101	Pipe Conduit 18in-Storm Drain		
		42A to 43A	302	LF
		43A to 44A	196	LF
		43A to 43B	37	LF
		44A to 44B	37	LF
714	4106	Pipe Conduit 24in-Approach		
		557+72 - 64' Lt to 558+29 - 64' Lt	57	LF
		560+24 - 65' Rt to 560+86 - 65' Rt	62	LF
714	4107	Pipe Conduit 24in-Storm Drain		
		41A to 559+00 - 57' Lt	36	LF
		41B to 559+00 - 43' Rt	22	LF
714	4126	Pipe Conduit 48in-Storm Drain		
		561+75 - 70' Lt to 561+75 - 56' Rt	126	LF
		561+93 - 70.0' Lt to 42A	48	LF
		42A to 42B	36	LF
		42B to 561+93 - 56.0' Rt	34	LF
722	3510	Inlet-Type 2		
		41A	1	EA
		41B	1	EA
		43B	1	EA
		44B	1	EA
722	3761	Inlet Special-Type 2 60in		
		43A	1	EA
		44A	1	EA
722	3766	Inlet Special-Type 2 72in		
		42B	1	EA
722	3768	Inlet Special-Type 2 84in		
		42A	1	EA

750	0115	Sidewalk Concrete 4in		
		558+00 Lt to 560+38 Lt	263	SY
		560+69 Lt to 569+22 Lt	943	SY
750	2115	Detectable Warning Panels		
		557+67 - 30' Lt	20	SF
		558+32 - 30' Lt	20	SF
		569+11 - 30' Lt	20	SF

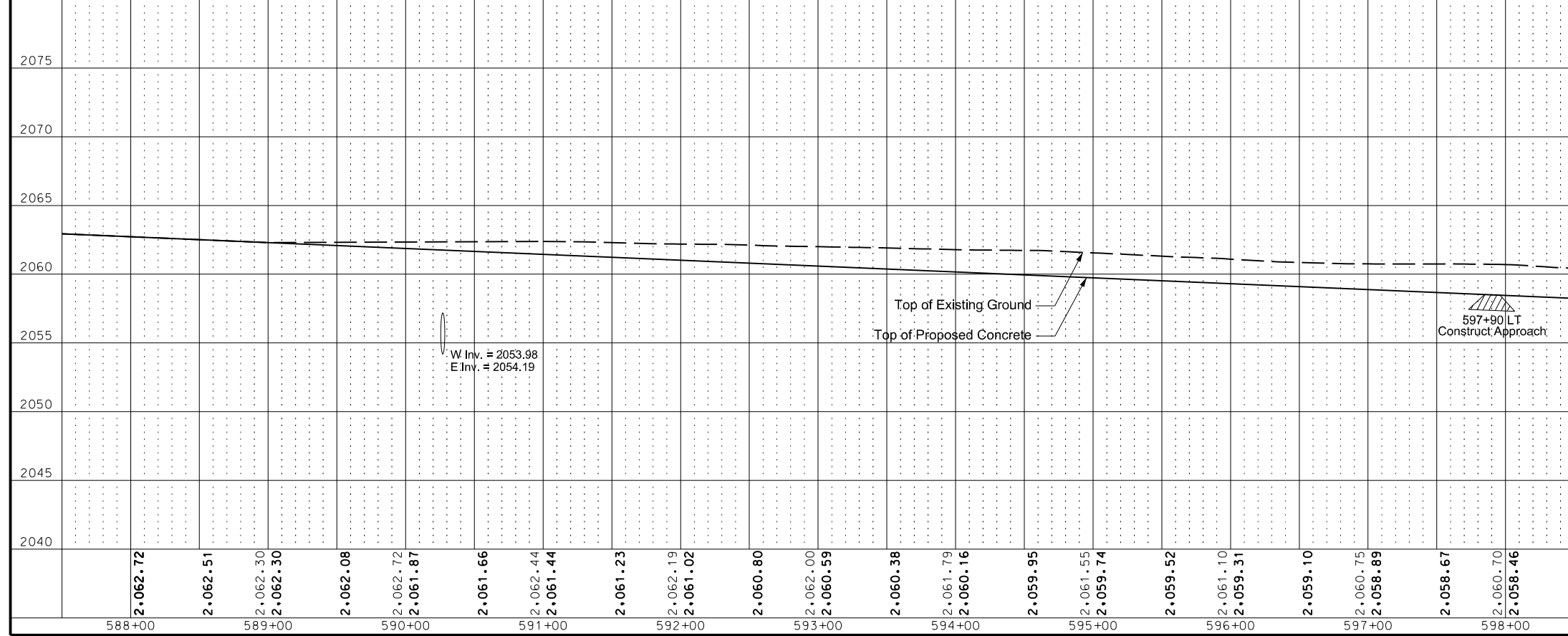
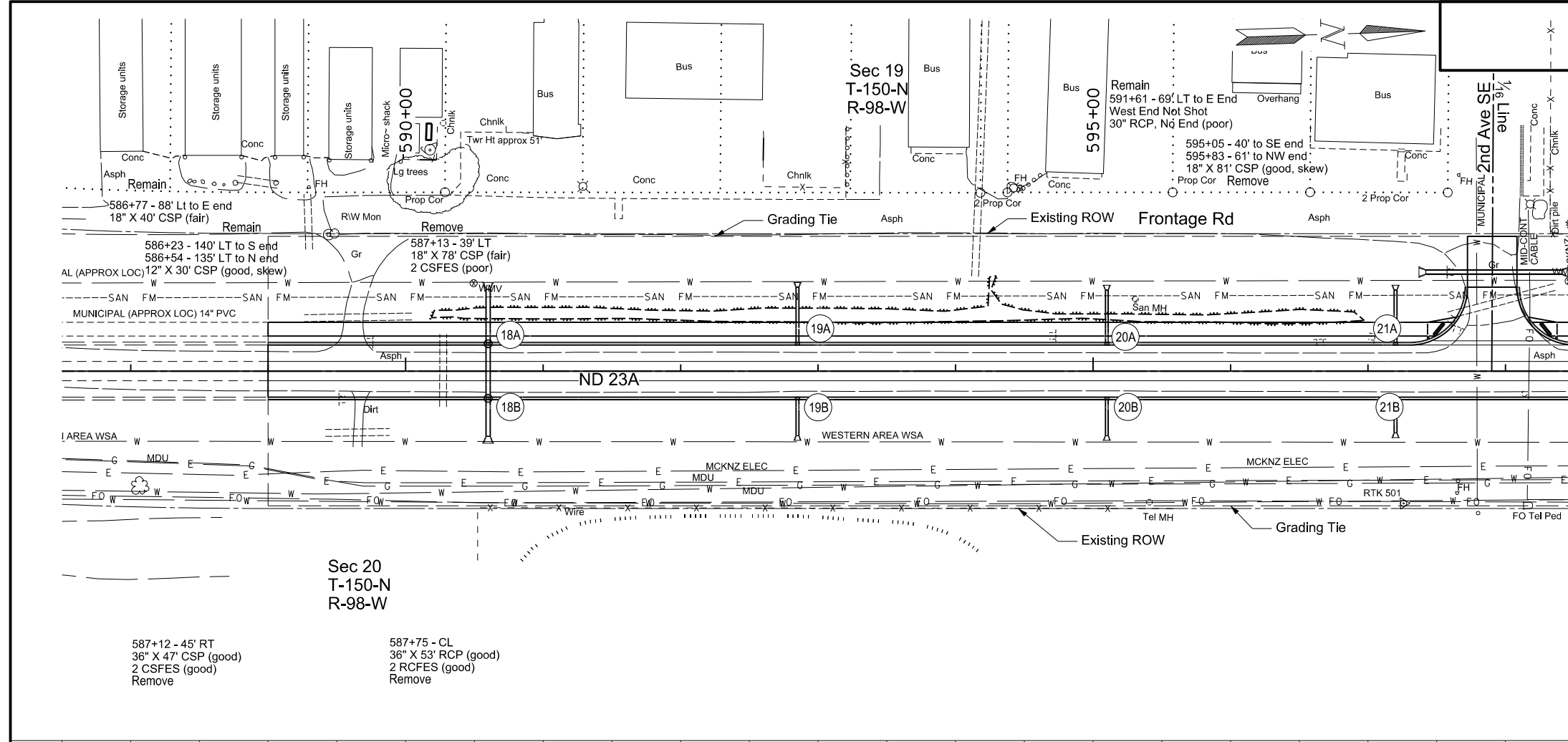


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Plan and Profile
 ND23A
 US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	60	5

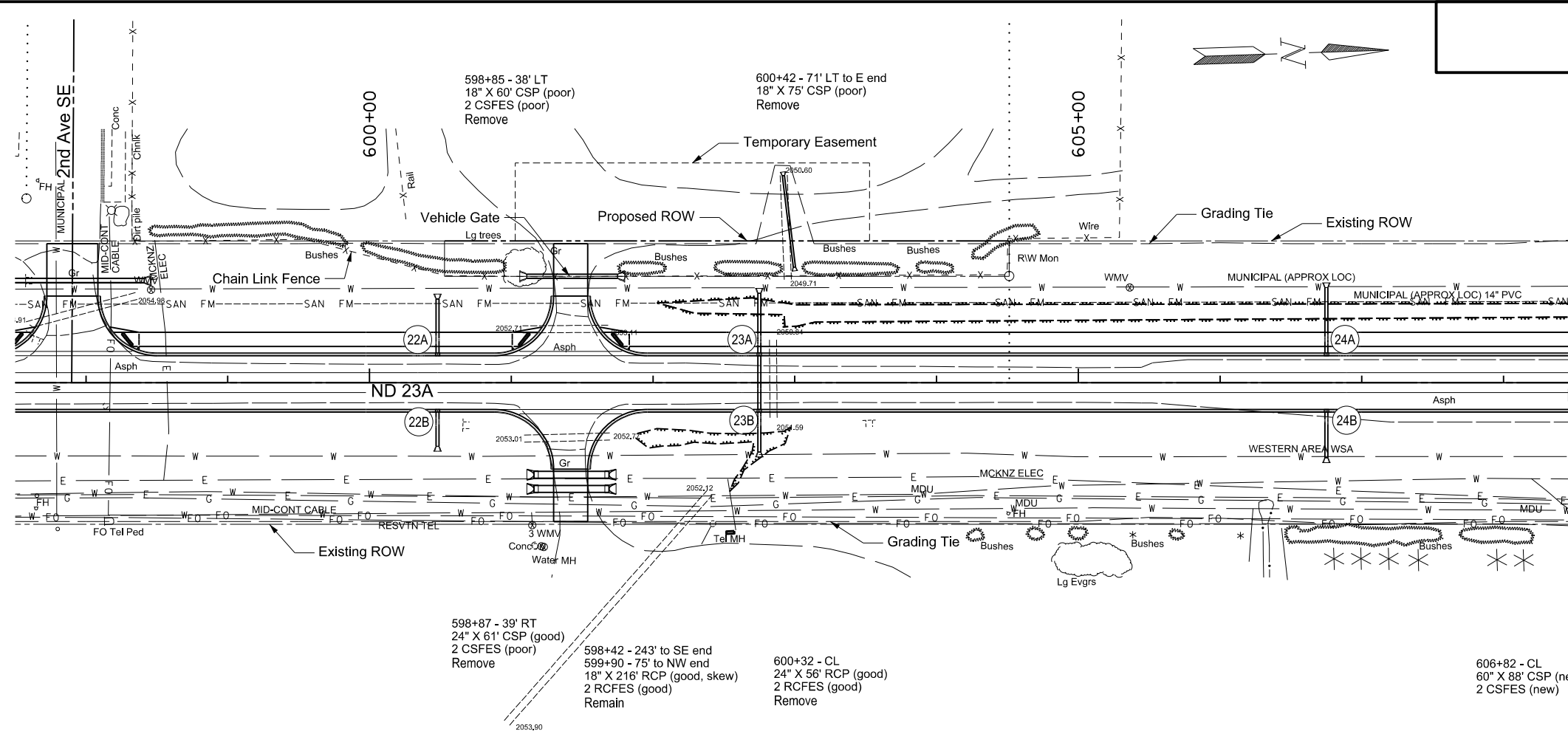
SPEC	CODE	BID ITEM	QUANTITY	UNIT
202	0174	Removal of Pipe-All Types & Sizes		
		589+65 - 39' Lt	78	LF
		589+65 - 45' Rt	47	LF
		590+27 - CL	53	LF
		594+14 - 69' Lt	14	LF
		597+97 - 51' Lt	81	LF
302	0100	Salvage Base Course (under sidewalk)		
		589+00 Lt to 597+62 Lt	198	TON
714	3030	End Sect-Conc Reinf 30IN		
		594+14 - 69' Lt	1	EA
714	4107	Pipe Conduit 24in-Storm Drain		
		19A to 592+85-61' Lt	40	LF
		19B to 592+85-47' Rt	26	LF
		20A to 595+10-59' Lt	38	LF
		20B to 595+10-47' Rt	26	LF
		21A to 597+20-59' Lt	38	LF
		21B to 597+20-45' Rt	24	LF
714	4116	Pipe Conduit 36in-Approach		
		597+42-72' Lt to 598+41-72' Lt	99	LF
714	4117	Pipe Conduit 36in-Storm Drain		
		590+60-59.5' Lt to 18A	38	LF
		18A to 18B	36	LF
		590+60-47.5' Rt to 18B	26	LF
722	3510	Inlet-Type 2		
		19A	1	EA
		19B	1	EA
		20A	1	EA
		20B	1	EA
		21A	1	EA
		21B	1	EA
722	3761	Inlet Special-Type 2 60in		
		18A	1	EA
		18B	1	EA
750	0115	Sidewalk Concrete 4in		
		589+00 Lt to 597+62 Lt	953	SY
750	2115	Detectable Warning Panels		
		597+54 - 30' Lt	20	SF



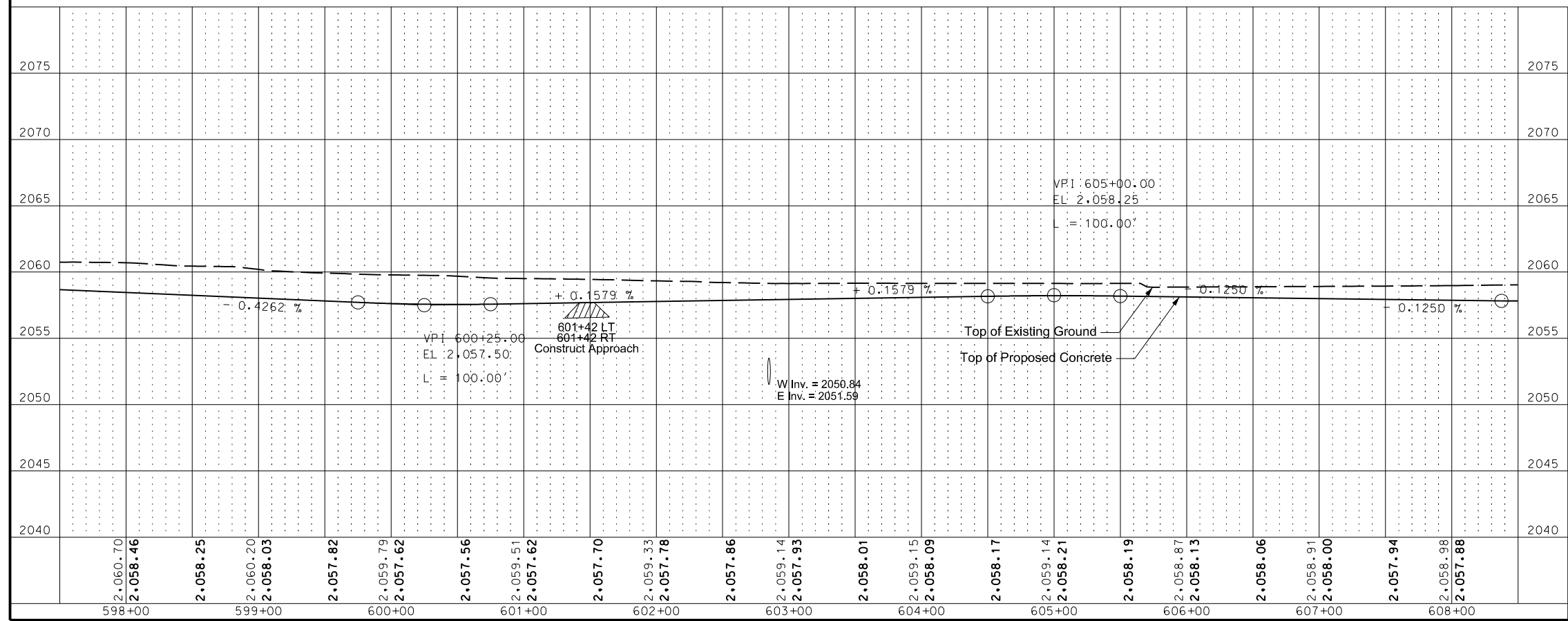
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Plan and Profile
ND23A
US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	60	6

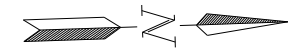
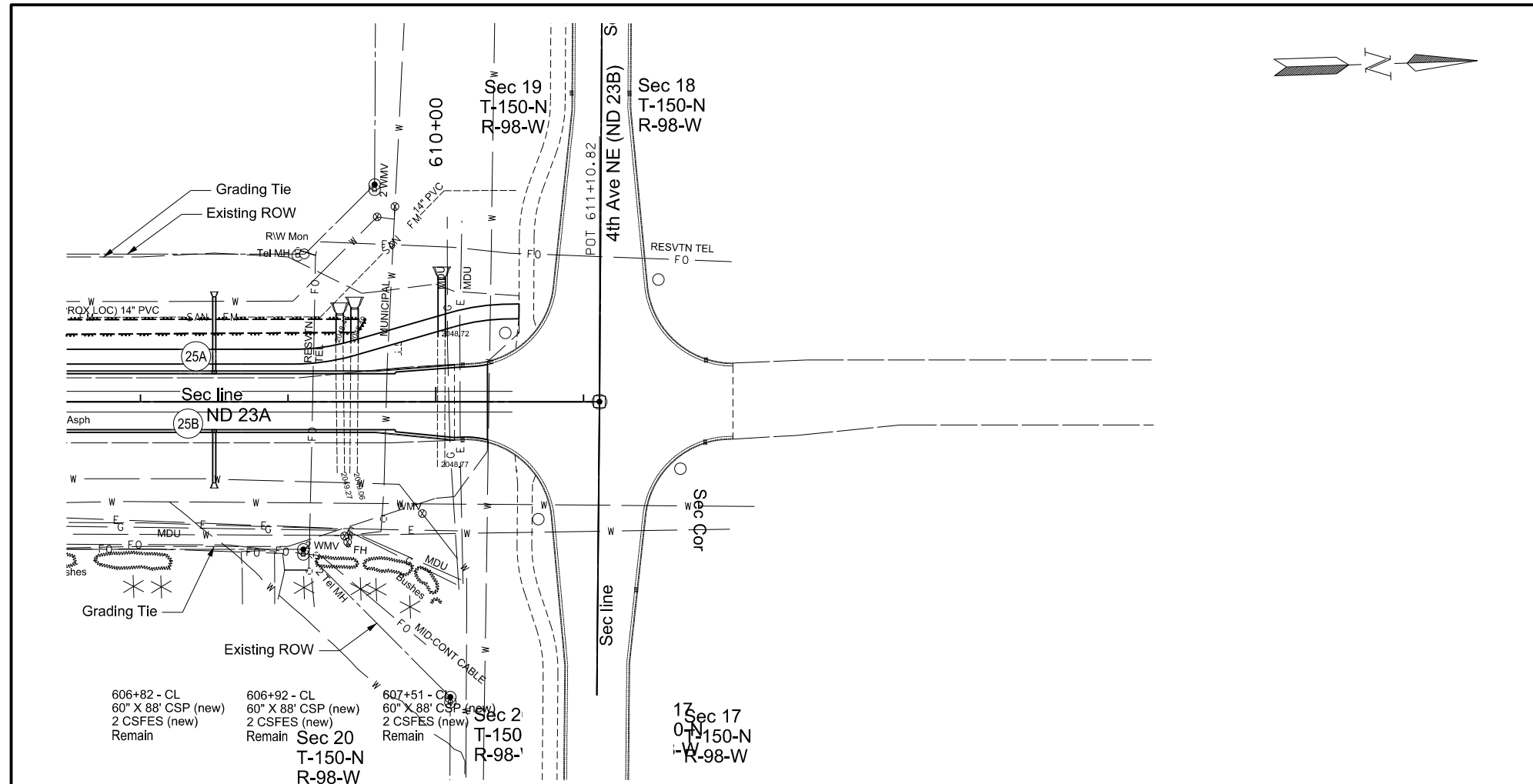


SPEC	CODE	BID ITEM	QUANTITY	UNIT
202	0174	Removal of Pipe-All Types & Sizes		
		601+38 - 38' Lt	60	LF
		601+39 - 39' Rt	61	LF
		602+85 - CL	56	LF
		602+85 - 109' Lt	75	LF
302	0100	Salvage Base Course (under sidewalk)		
		598+19 Lt to 601+20 Lt	68	TON
		601+64 Lt to 608+00 Lt	146	TON
714	4099	Pipe Conduit 18in-Approach		
		602+92-146' Lt to 603+00 - 81.5' Lt	65	LF
714	4107	Pipe Conduit 24in-Storm Drain		
		22A to 600+48-59' Lt	38	LF
		22B to 600+48-45' Rt	24	LF
		23A to 602+75-63' Lt	42	LF
		23A to 23B	38	LF
		23B to 602+75-49' Rt	28	LF
		24A to 606+75-67' Lt	46	LF
		24B to 606+75-53' Rt	32	LF
714	4116	Pipe Conduit 36in-Approach		
		601+11 - 75' Lt to 601+75 - 75' Lt	64	LF
714	4276	Pipe Conduit Arch 58In x 36In-Approach		
		601+16-65' Rt to 601+69-65' Rt	53	LF
		601+16-75' Rt to 601+69-75' Rt	53	LF
722	3510	Inlet-Type 2		
		22A	1	EA
		22B	1	EA
		23A	1	EA
		23B	1	EA
		24A	1	EA
		24B	1	EA
750	0115	Sidewalk Concrete 4in		
		598+19 Lt to 601+20 Lt	325	SY
		601+64 Lt to 608+00 Lt	702	SY
750	2115	Detectable Warning Panels		
		598+27 - 30' Lt	20	SF
		601+11 - 30' Lt	20	SF
		601+73 - 30' Lt	20	SF
752	0660	Fence Chain Link Remove & Reset		
		599+54.3-100.9' Lt to 604+50.3-101.4' Lt	495	LF
752	2110	Reset Vehicle Gate		
		601+41.9 - 100.0' Lt	1	EA



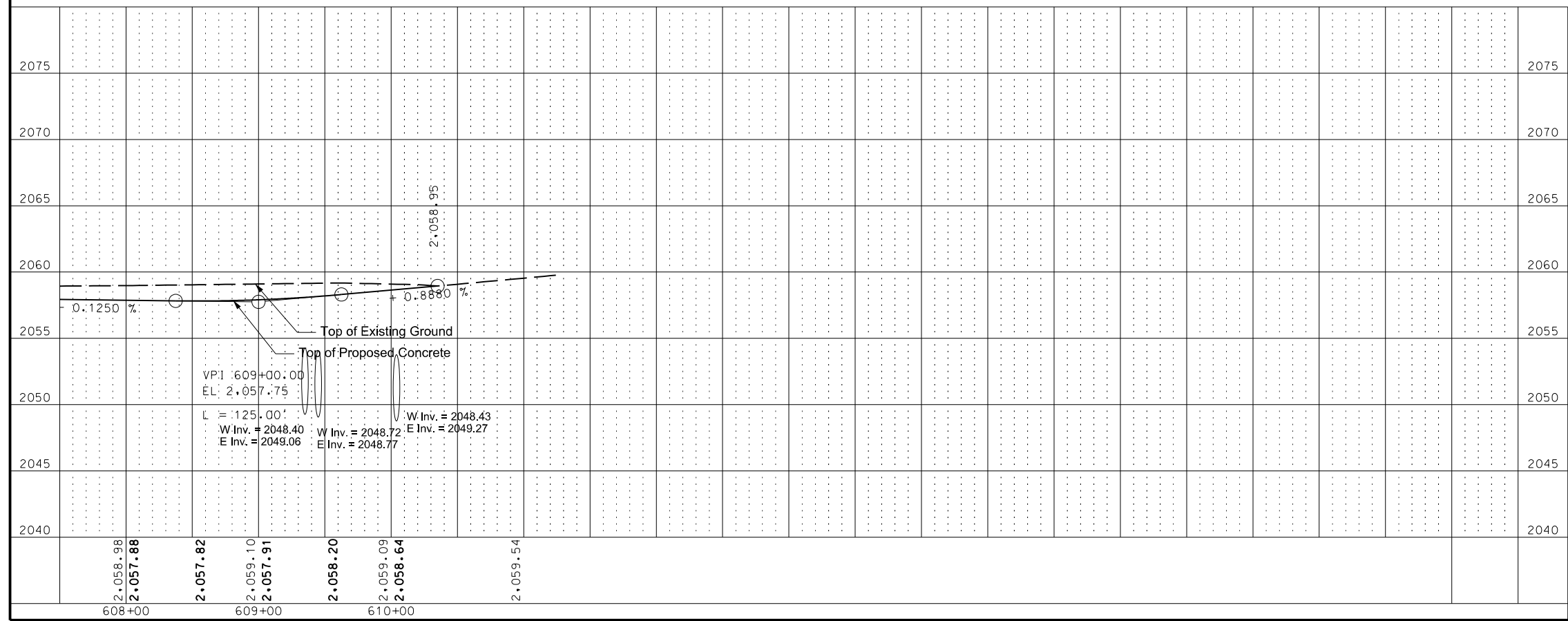
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Plan and Profile
ND23A
US85B to ND23B



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	60	7

SPEC	CODE	BID ITEM	QUANTITY	UNIT
302	0100	Salvaged Base Course (under sidewalk) 608+00 Lt to 610+56 Lt	60	TON
714	4107	Pipe Conduit 24in-Storm Drain 25A to 608+50-71' Lt 25B to 608+50-55' Rt	50 34	LF LF
714	5330	Pipe Corr Steel .109IN 60IN 609+35-39.6' Lt to 609+35-59.6' Lt 609+45-39.6' Lt to 609+45-63.6' Lt 610+04-44.0' Lt to 610+04-84.0' Lt	20 24 40	LF LF LF
714	9660	Remove & Relay End Section-All Type & Sizes 609+35 Lt 609+45 Lt 610+04 Lt	1 1 1	LF LF LF
722	3510	Inlet-Type 2 25A 25B	1 1	EA EA
750	0115	Sidewalk Concrete 4in 608+00 Lt to 610+56 Lt	289	SY

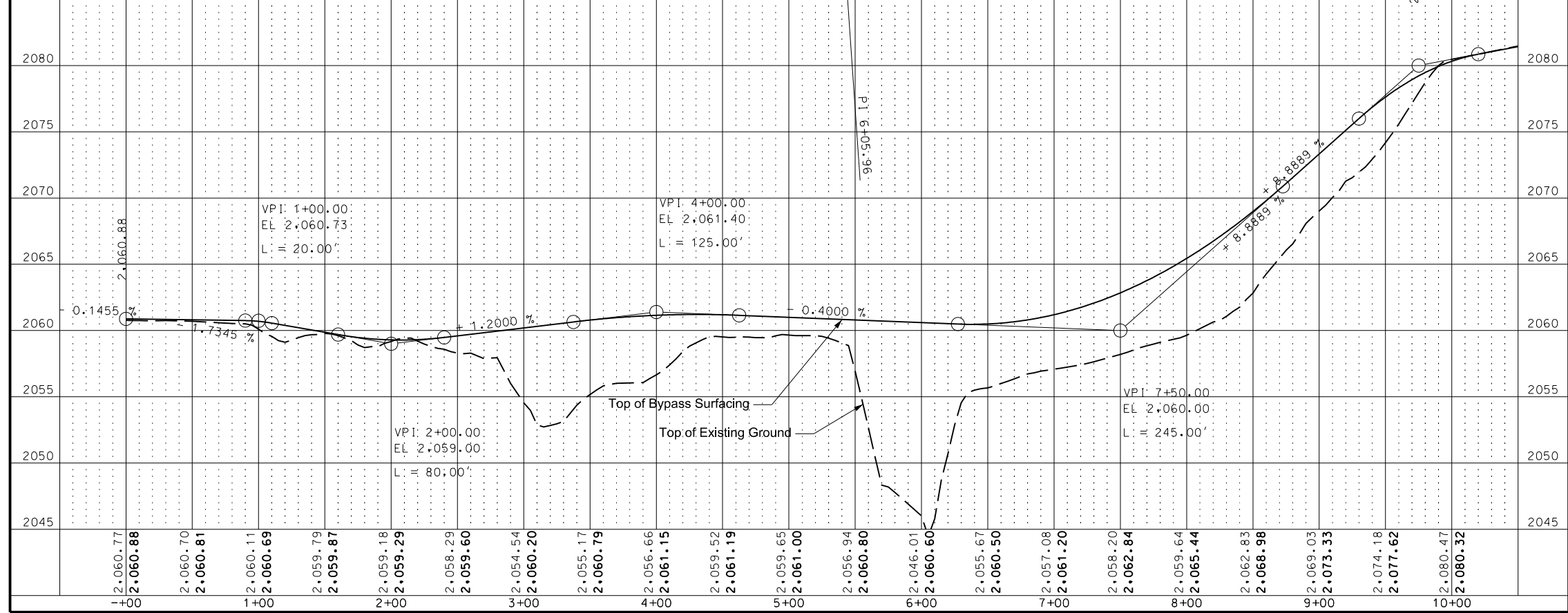
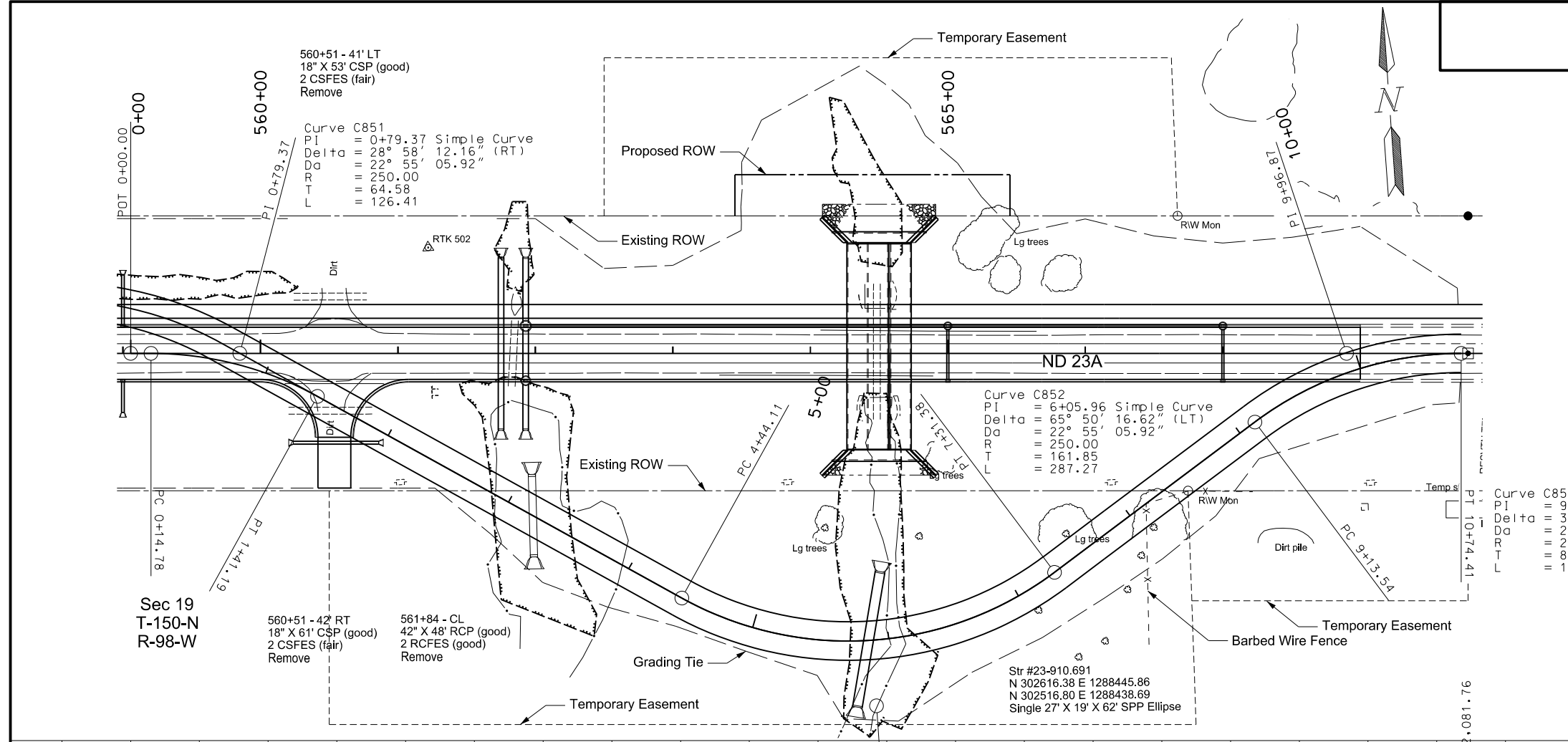


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Plan and Profile
ND23A
US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	60	8

SPEC	CODE	BID ITEM	QUANTITY	UNIT
714	4120	Pipe Conduit 42in 3+20 CL, 30deg Skew RHF	80	LF
714	4155	Pipe Conduit 84in 5+85 CL, 12.5deg Skew LHF	100	LF
752	0922	Fence Remove & Reset 7+78.7 - 50' RT to 8+81.9 - 40' RT	140	LF



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Plan and Profile
Bypass
US85B to ND23A

Wetland Impact Table

Wetland Number	Location	Wetland Feature	USACE Jurisdictional Wetlands ¹	Wetland Impacts Acre(s)		USFWS Easement Impacts Acre(s)		Wetland Mitigation												
				Temp.	Perm.	Temp.	Perm.	Mitigation Required			USACE/11990 Bank		11990 Bank		USFWS Bank		Onsite			
								EO 11990	USACE	USFWS	Location	Acre(s)	Location	Acre(s)	Location	Acre(s)	Mitigation Location; Ratio	Acre(s)	Constructed Site #	Constructed Size Acre(s)
1a	Sec.19, T150N, R98W	Artificial	No	0.00	0.02			N	N	N										
1b	Sec.19, T150N, R98W	Artificial	No	0.00	0.10			N	N	N										
2c	Sec.19, T150N, R98W	Artificial	No	0.00	0.12			N	N	N										
3a	Sec.19, T150N, R98W	Natural	Yes	0.21	0.03			Y	Y	N		0.03								
3b	Sec.19, T150N, R98W	Natural	Yes	0.08	0.03			Y	Y	N		0.03								
3c	Sec.19, T150N, R98W	Natural	Yes	0.00	0.02			Y	Y	N		0.02								
3d	Sec.19, T150N, R98W	Natural	Yes	0.38	0.04			Y	Y	N		0.04								
3e	Sec.19, T150N, R98W	Artificial	Yes	0.00	0.01			N	N	N										
3f	Sec.19, T150N, R98W	Natural	Yes	0.22	0.08			Y	Y	N		0.08								
3g	Sec.19, T150N, R98W	Natural	Yes	0.13	0.10			Y	Y	N		0.10								

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Wetlands Mitigation and Environmental
ND23A
US85B to ND23B

Wetland Impact Table

Wetland Number	Location	Wetland Feature	USACE Jurisdictional Wetlands ¹	Wetland Impacts Acre(s)		USFWS Easement Impacts Acre(s)		Wetland Mitigation															
				Temp.	Perm.	Temp.	Perm.	Mitigation Required			USACE/11990 Bank		11990 Bank		USFWS Bank		Onsite						
								EO 11990	USACE	USFWS	Location	Acre(s)	Location	Acre(s)	Location	Acre(s)	Mitigation Location; Ratio	Acre(s)	Constructed Site #	Constructed Size Acre(s)			
3h	Sec.19, T150N, R98W	Artificial	Yes	0.00	0.04			N	N	N													
3i	Sec.19, T150N, R98W	Artificial	Yes	0.01	0.37			N	N	N													
3j	Sec.19, T150N, R98W	Artificial	Yes	0.21	0.39			N	N	N													
3k	Sec.19, T150N, R98W	Natural	Yes	0.05	0.03			Y	Y	N		0.03											
3l	Sec.19, T150N, R98W	Natural	Yes	0.31	0.06			Y	Y	N		0.06											
3m	Sec.19, T150N, R98W	Artificial	Yes	0.10	0.03			N	N	N													
3n	Sec.19, T150N, R98W	Artificial	Yes	0.12	0.30			N	N	N													
3o	Sec.19, T150N, R98W	Artificial	Yes	0.03	0.33			N	N	N													
4	Sec.19, T150N, R98W	Artificial	No	0.00	0.12			N	N	N													
				1.85	2.22	0.00	0.00					0.39		0.00		0.00		0.00				0.00	

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Wetlands Mitigation and Environmental
ND23A
US85B to ND23B

¹ A wetland Jurisdictional Determination was issued by the USACE on 4/22/2016; NWO-2016-0223-BIS.

Impact Summary Table			
Permanent Impact Summary		Temporary Impacts and additional information	
Wetland Type	Total (Acres)	Wetland Type	Total (Acres/Lf)
Natural/JD	0.39	Temporary JD	1.85
Natural/Non-JD	0.00	Non-JD Temporary	0.00
Artificial/JD	1.47	Permanent JD > 0.10	1.39
Artificial/Non-JD	0.36	Permanent OW	0.00 ac/00 ft.
Total	2.22	Temporary OW	0.00/00

Mitigation Summary Table					
	Location	Onsite Acre(s)	11990 Bank Acre(s)	USACE/11990 Bank Acre(s)	USFWS Bank Acre(s)
USACE Only	NA	0.00		0.00	
EO 11990 Only	NA	0.00	0.00		
USACE/11990	Foss	0.00		0.39	
USFWS	NA				0.00
Total		0.00	0.00	0.39	0.00

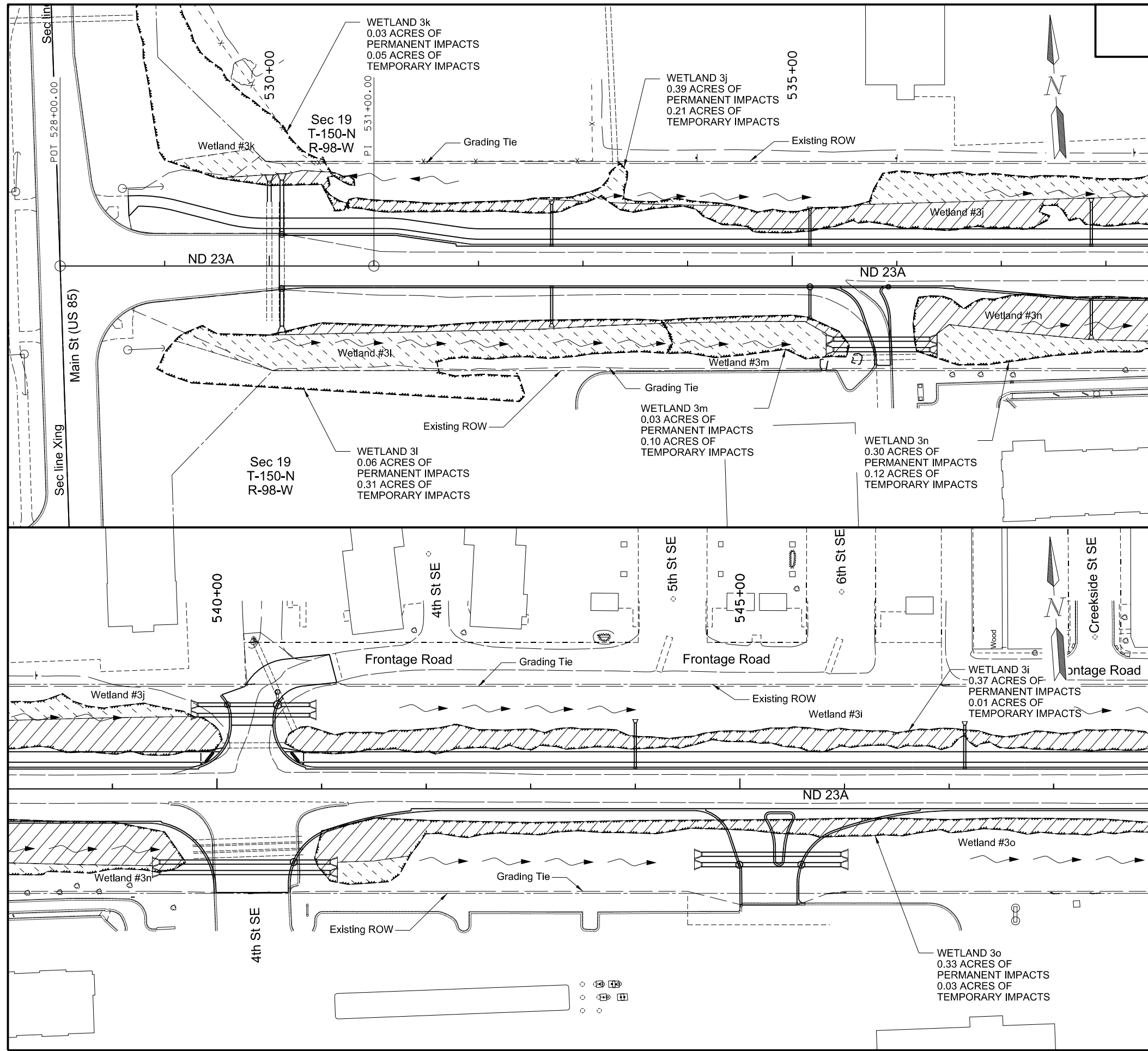
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


Wetlands Mitigation and Environmental

ND23A

US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	75	4



- Legend
-  Permanent Wetland Impact
 -  Temporary Wetland Impact
 -  Flow Arrow

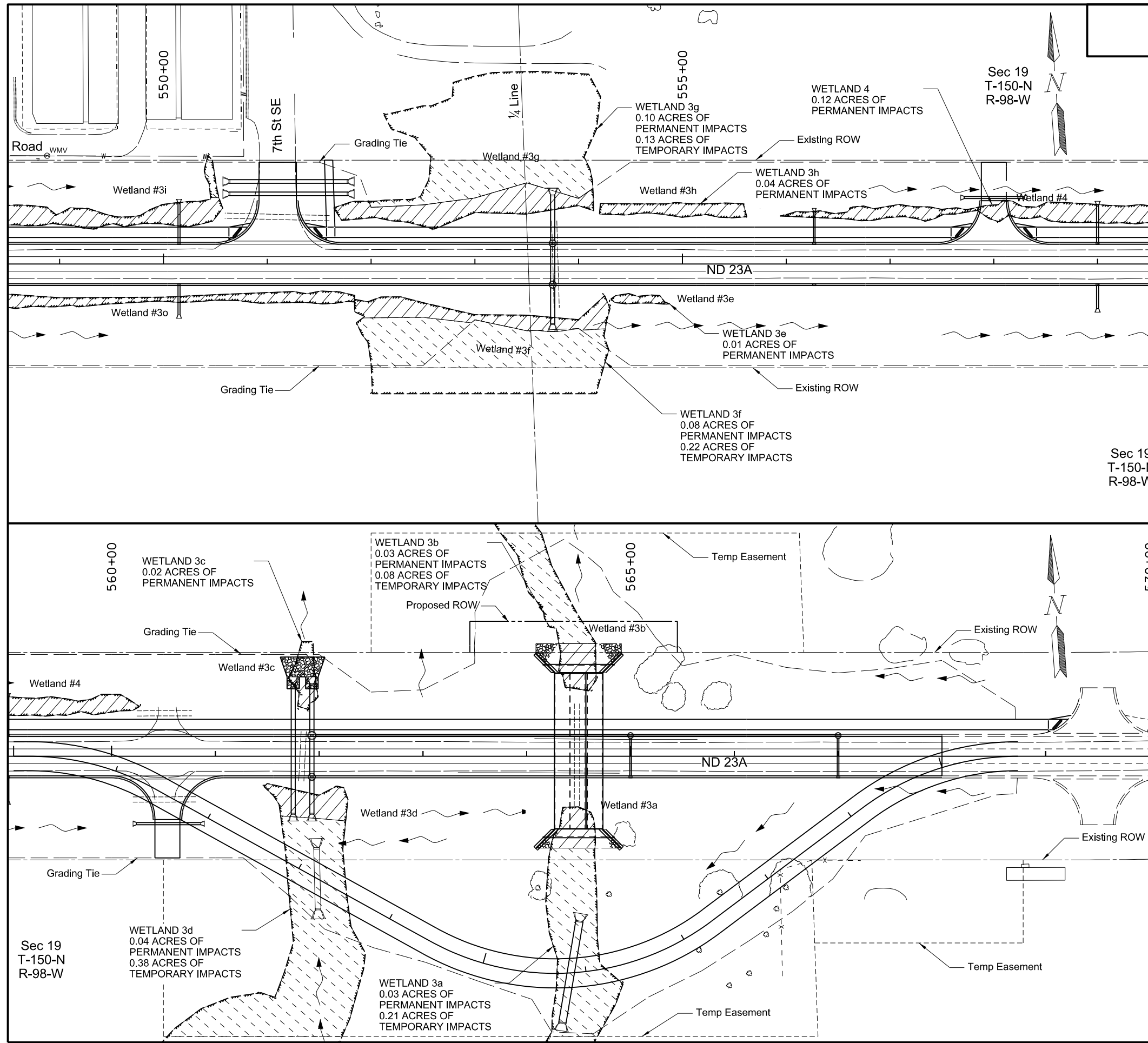
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Wetland Mitigation and Environmental

ND23A

US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	75	5



- Legend
- Permanent Wetland Impact
 - Temporary Wetland Impact
 - Flow Arrow

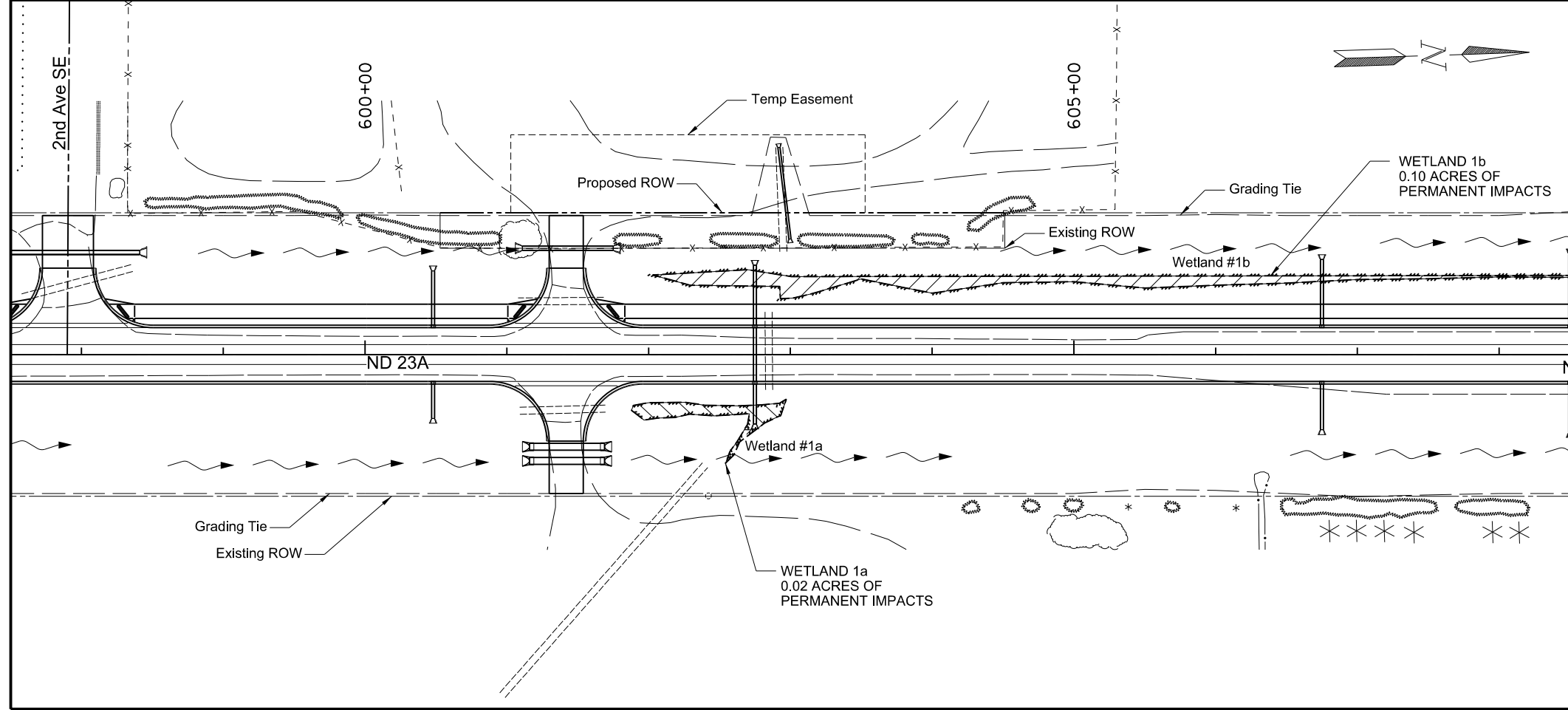
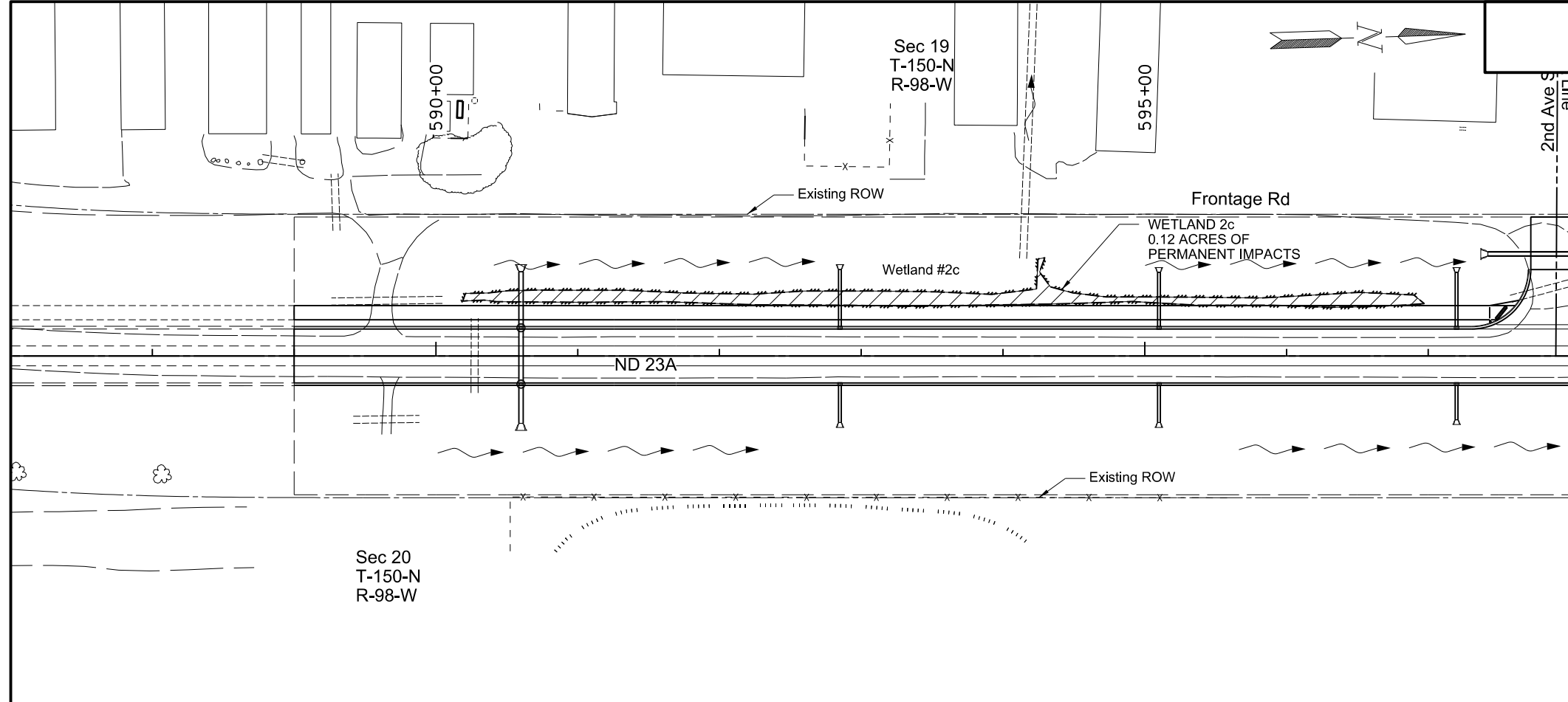
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Wetland Mitigation and Environmental

ND23A

US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	75	6



- Legend
- Permanent Wetland Impact
 - Temporary Wetland Impact
 - Flow Arrow

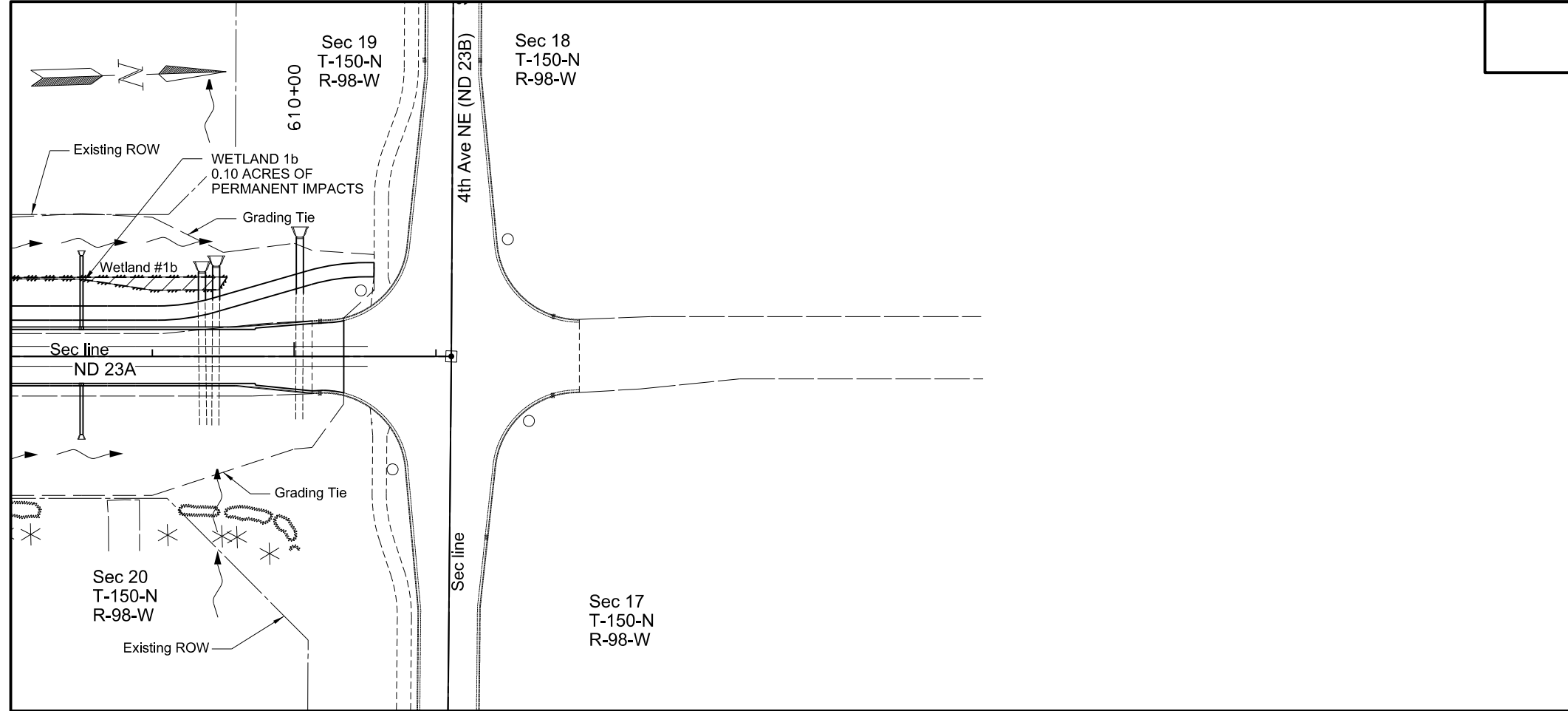
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


Wetland Mitigation and Environmental

ND23A

US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	75	7



- Legend
-  Permanent Wetland Impact
 -  Temporary Wetland Impact
 -  Flow Arrow

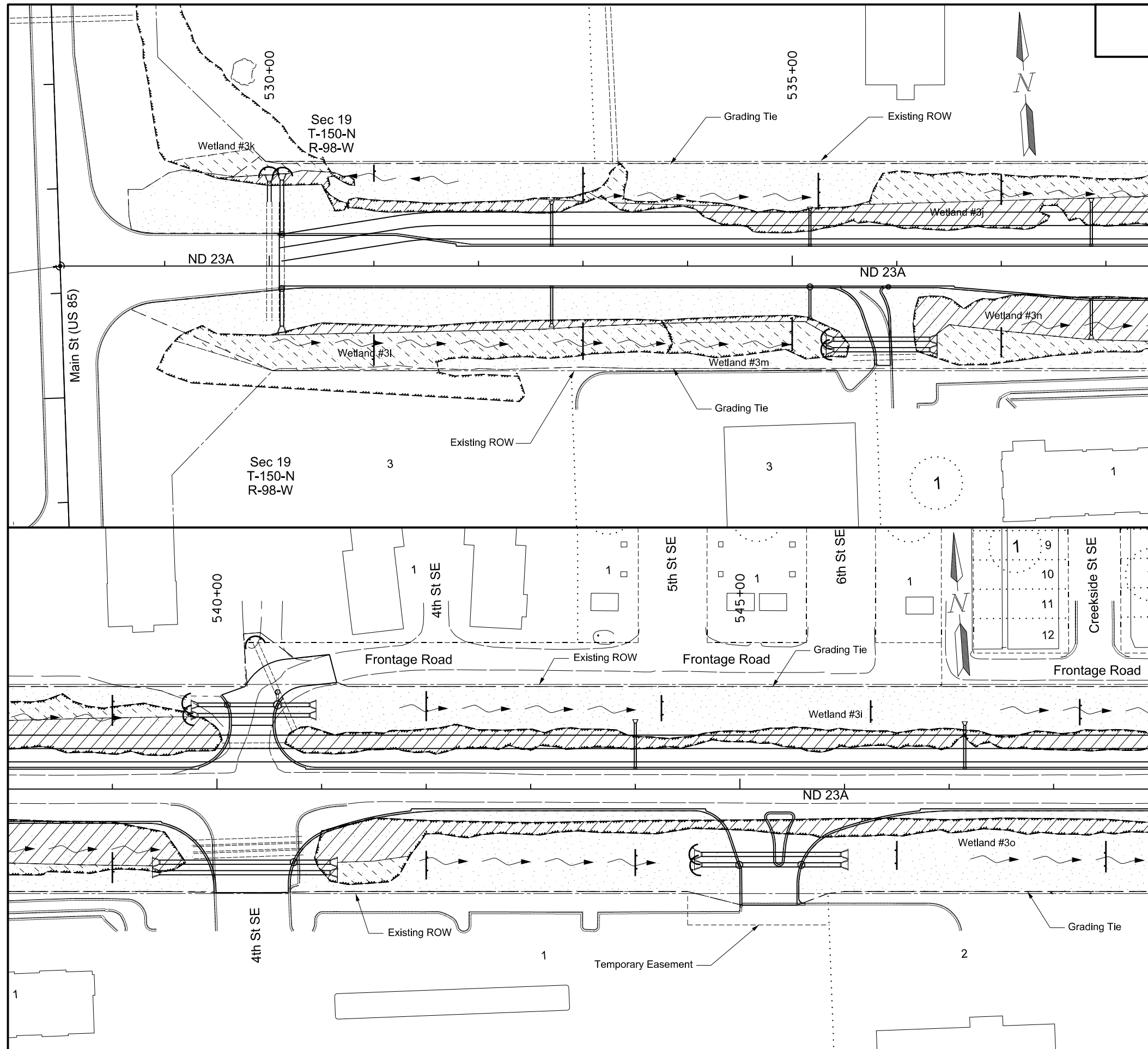
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Wetland Mitigation and Environmental

ND23A

US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	76	1



SPEC	CODE	BID ITEM	QUANTITY	UNIT
253	0301	Bonded Fiber Matrix		
		528+65 to 538+00 Lt	1.15	Acre
		528+69 to 535+77 Rt	1.13	Acre
		535+74 to 538+00 Rt	0.35	Acre
		538+00 to 540+16 Lt	0.23	Acre
		540+52 to 549+00 Lt	1.01	Acre
		538+00 to 539+97 Rt	0.27	Acre
		540+70 to 545+00 Rt	0.71	Acre
		545+57 to 549+00 Rt	0.57	Acre

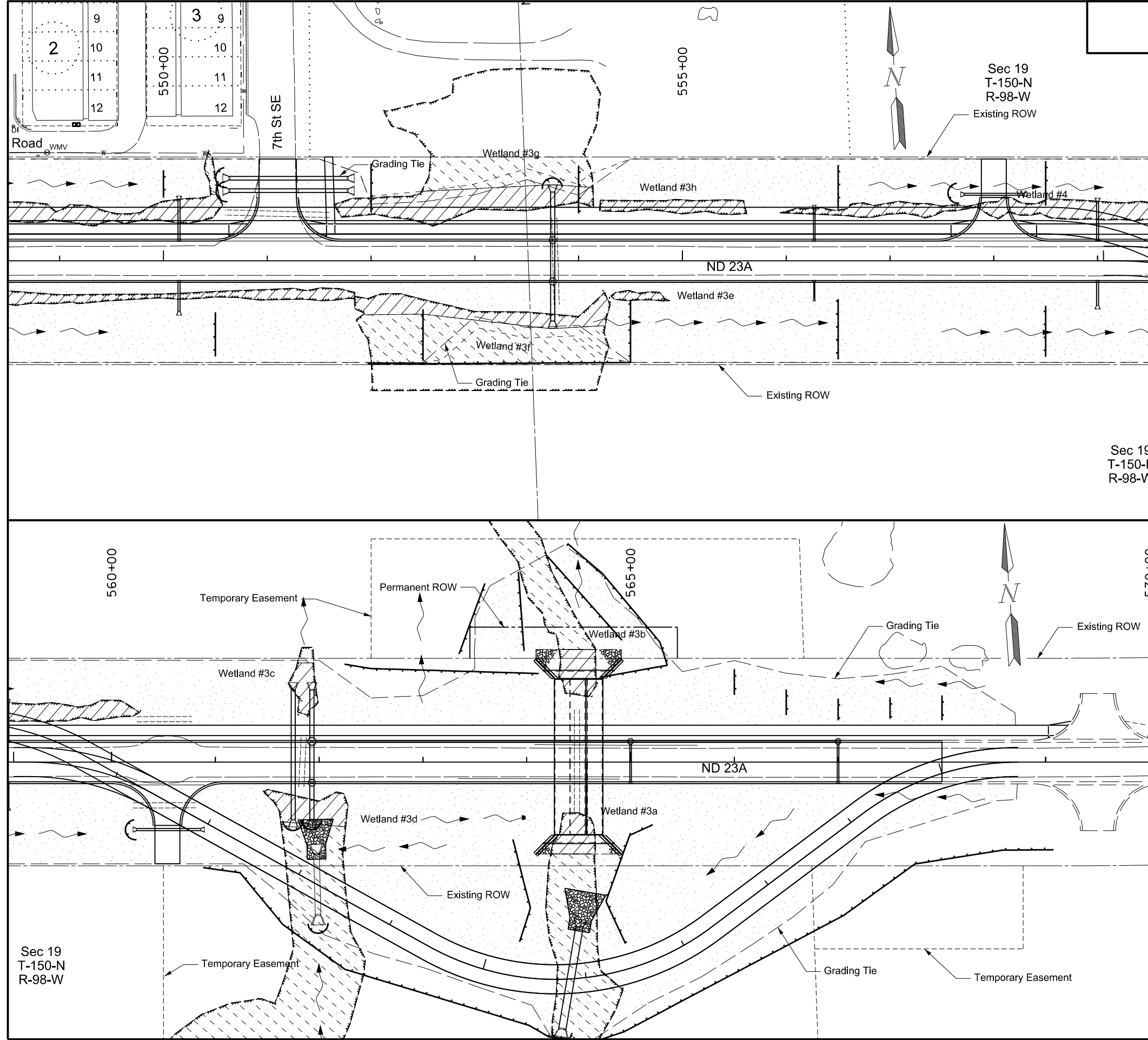
LEGEND

- Delineated Wetland
- Seeding Area
- Flow Arrow
- Fiber Rolls

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Temporary Wetland, Erosion Control & Seeding
 ND23A
 US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	76	2



SPEC	CODE	BID ITEM	QUANTITY	UNIT
253	0301	Bonded Fiber Matrix		
		549+00 to 550+93 Lt	0.23	Acre
		551+27 to 559+00 Lt	0.80	Acre
		549+00 to 559+00 Rt	1.68	Acre
		559+00 to 568+71 Lt	1.48	Acre
		559+00 to 560+42 Rt	0.25	Acre
		560+66 to 568+73 Rt	2.03	Acre

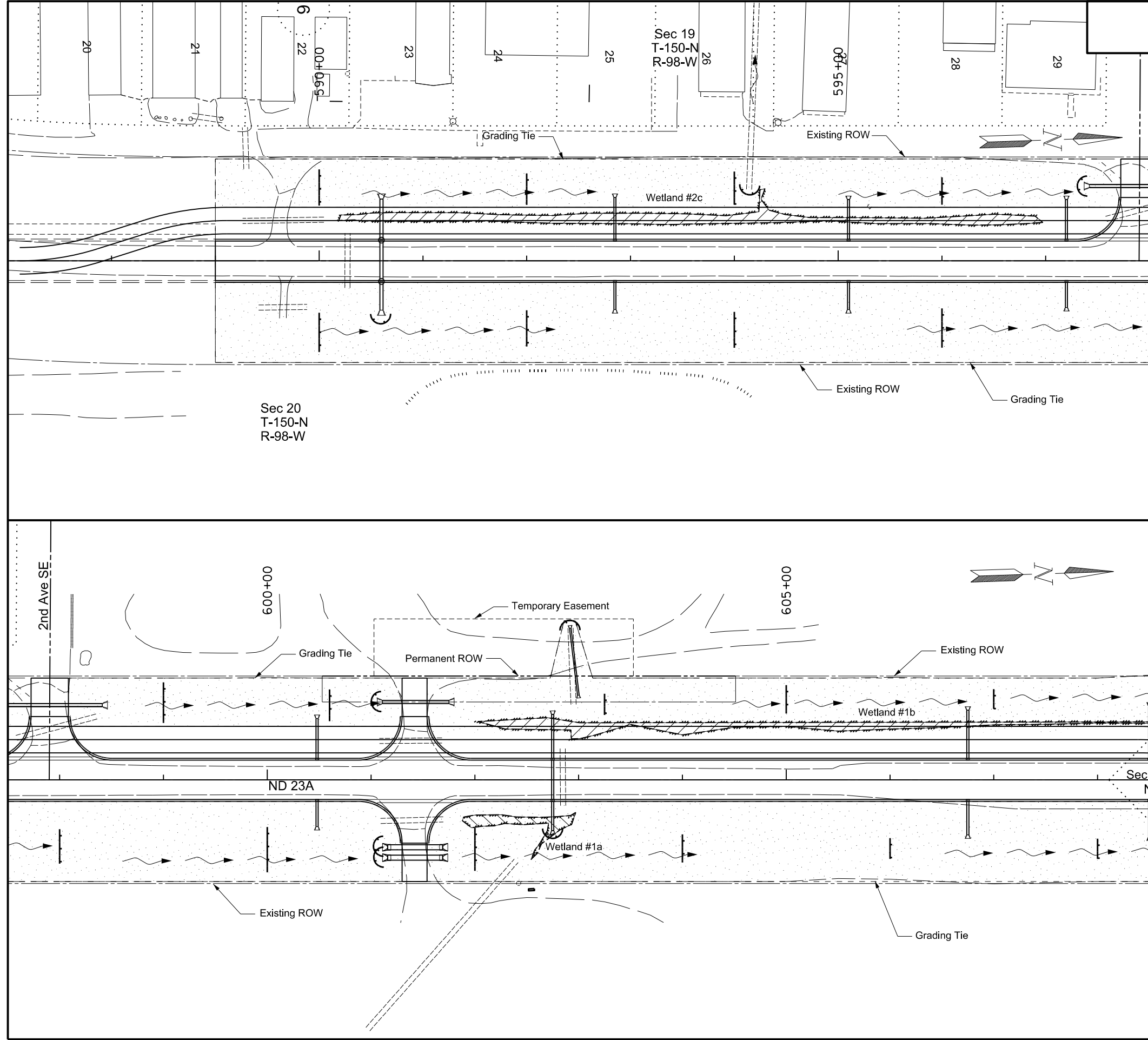
LEGEND

- Delineated Wetland
- Seeding Area
- Flow Arrow
- Fiber Rolls

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



Temporary Wetland, Erosion Control & Seeding
 ND23A
 US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	76	3



SPEC	CODE	BID ITEM	QUANTITY	UNIT
253	0301	Bonded Fiber Matrix		
		589+00 to 597+72 Lt	1.04	Acre
		589+00 to 598+00 Rt	1.59	Acre
		598+08 to 601+30 Lt	0.38	Acre
		601+54 to 608+00 Lt	0.81	Acre
		598+00 to 601+30 Rt	0.57	Acre
		601+54 to 608+00 Rt	1.13	Acre

LEGEND

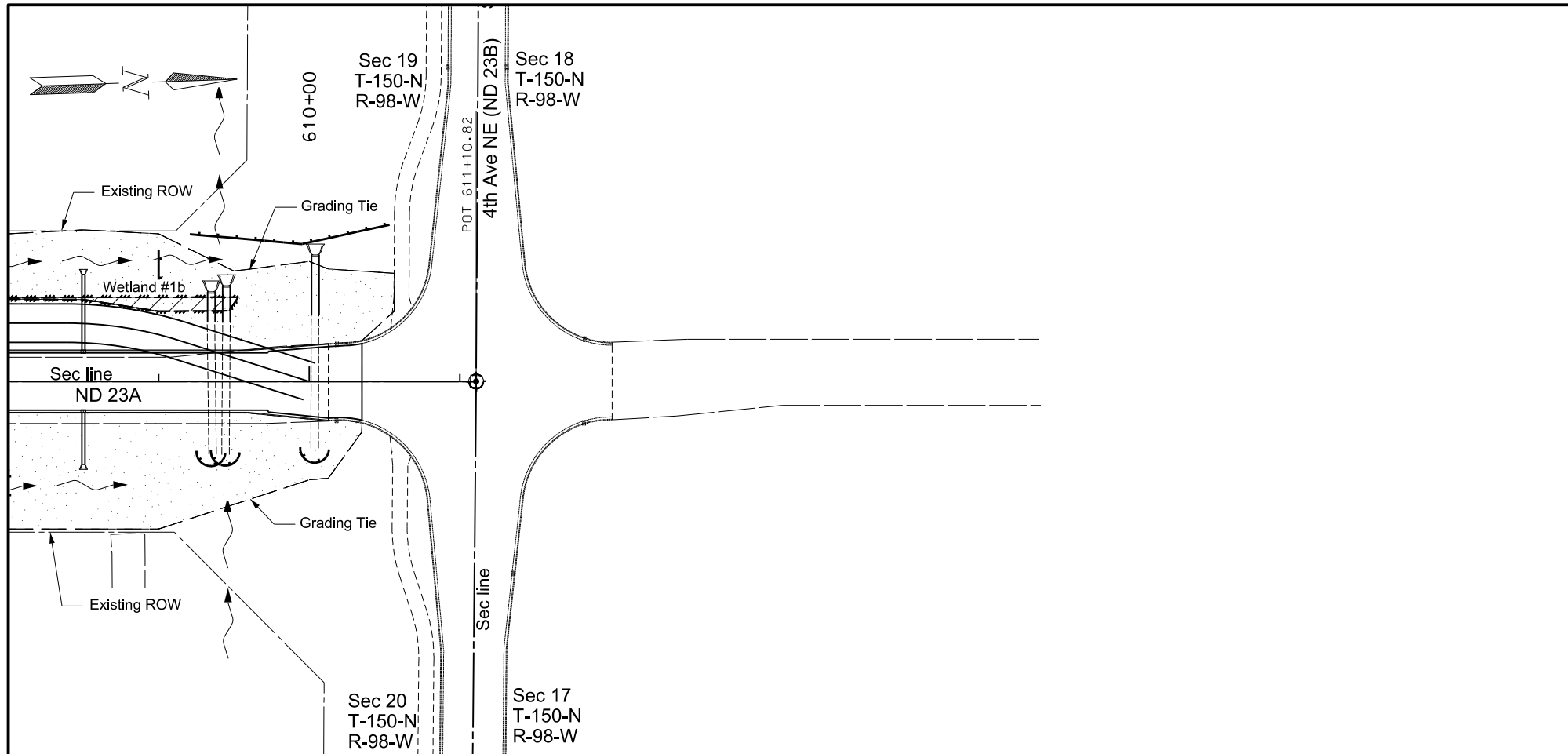
-  Delineated Wetland
-  Seeding Area
-  Flow Arrow
-  Fiber Rolls

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Temporary Wetland, Erosion Control & Seeding

ND23A





US85B to ND23B



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	76	4

SPEC	CODE	BID ITEM	QUANTITY	UNIT
253	0301	Bonded Fiber Matrix		
		608+00 to 610+56 Lt	0.30	Acre
		608+00 to 610+35 Rt	0.34	Acre

LEGEND

-  Delineated Wetland
-  Seeding Area
-  Flow Arrow
-  Fiber Rolls

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Temporary Wetland, Erosion Control & Seeding

ND23A

US85B to ND23B

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-7-023(050)910	76	5

ND23A Mainline			
Station	Offset	12IN Fiber Roll LF	Description
530+00	LT	30	Inlet End Protection
530+12	LT	30	Inlet End Protection
531+00	LT	16	Ditch Check
531+00	RT	30	Ditch Check
533+00	LT	35	Ditch Check
533+00	RT	35	Ditch Check
535+00	RT	35	Ditch Check
535+25	LT	35	Ditch Check
535+34	RT	60	Inlet End Protection
537+00	LT	30	Ditch Check
537+00	RT	30	Ditch Check
539+00	LT	30	Ditch Check
539+00	RT	30	Ditch Check
539+72	LT	60	Inlet End Protection
540+37	LT	30	Inlet End Protection
542+00	LT	28	Ditch Check
542+00	RT	28	Ditch Check
544+00	RT	26	Ditch Check
544+25	LT	26	Ditch Check
544+58	RT	60	Inlet End Protection
546+25	LT	22	Ditch Check
546+50	RT	25	Ditch Check
548+25	LT	25	Ditch Check
548+50	LT	30	Ditch Check
550+00	LT	26	Ditch Check
550+43	LT	60	Inlet End Protection
550+50	LT	42	Ditch Check
552+00	LT	46	Ditch Check
552+00	RT	250	Runoff Protection
552+50	RT	50	Ditch Check
553+75	LT	30	Inlet End Protection
554+00	LT	46	Ditch Check
554+50	RT	60	Ditch Check
556+50	LT	42	Ditch Check
556+50	RT	48	Ditch Check
557+60	LT	30	Inlet End Protection
558+50	LT	42	Ditch Check
558+50	RT	48	Ditch Check
560+20	RT	30	Inlet End Protection
561+75	LT	30	Inlet End Protection
561+93	LT	30	Inlet End Protection
563+30	LT	188	Runoff Protection
563+47	LT	72	Runoff Protection
563+95	LT	76	Runoff Protection
564+00	RT	102	Runoff Protection
564+55	LT	108	Runoff Protection
564+56	RT	136	Runoff Protection
565+00	LT	152	Runoff Protection
565+03	LT	65	Runoff Protection
566+00	LT	25	Ditch Check
566+50	LT	25	Ditch Check
567+00	LT	25	Ditch Check
567+50	LT	25	Ditch Check
568+00	LT	25	Ditch Check
Total:		2720	

ND23A Mainline			
Station	Offset	12IN Fiber Roll LF	Description
590+00	LT	35	Ditch Check
590+00	RT	35	Ditch Check
590+60	RT	30	Inlet End Protection
592+00	LT	35	Ditch Check
592+00	RT	35	Ditch Check
594+00	LT	35	Ditch Check
594+00	RT	35	Ditch Check
549+14	LT	30	Inlet End Protection
596+00	LT	26	Ditch Check
596+00	RT	38	Ditch Check
597+34	LT	30	Inlet End Protection
599+00	LT	40	Ditch Check
600+00	RT	44	Ditch Check
600+50	LT	30	Ditch Check
601+07	LT	30	Inlet End Protection
601+13	RT	60	Inlet End Protection
602+00	RT	42	Ditch Check
602+75	RT	30	Inlet End Protection
602+92	LT	30	Inlet End Protection
603+25	LT	25	Ditch Check
604+00	RT	30	Ditch Check
605+00	LT	30	Ditch Check
606+00	RT	20	Ditch Check
607+00	LT	20	Ditch Check
608+00	RT	20	Ditch Check
609+00	LT	20	Ditch Check
609+36	RT	45	Inlet End Protection
609+44	RT	45	Inlet End Protection
609+95	LT	140	Runoff Protection
610+04	RT	30	Inlet End Protection
Total:		1095	

ND23A Bypass			
Station	Offset	12IN Fiber Roll LF	Description
2+16 - 10+74	RT	915	Runoff Protection
2+99	LT	60	Inlet End Protection
5+73	LT	30	Inlet End Protection
Total:		1005	

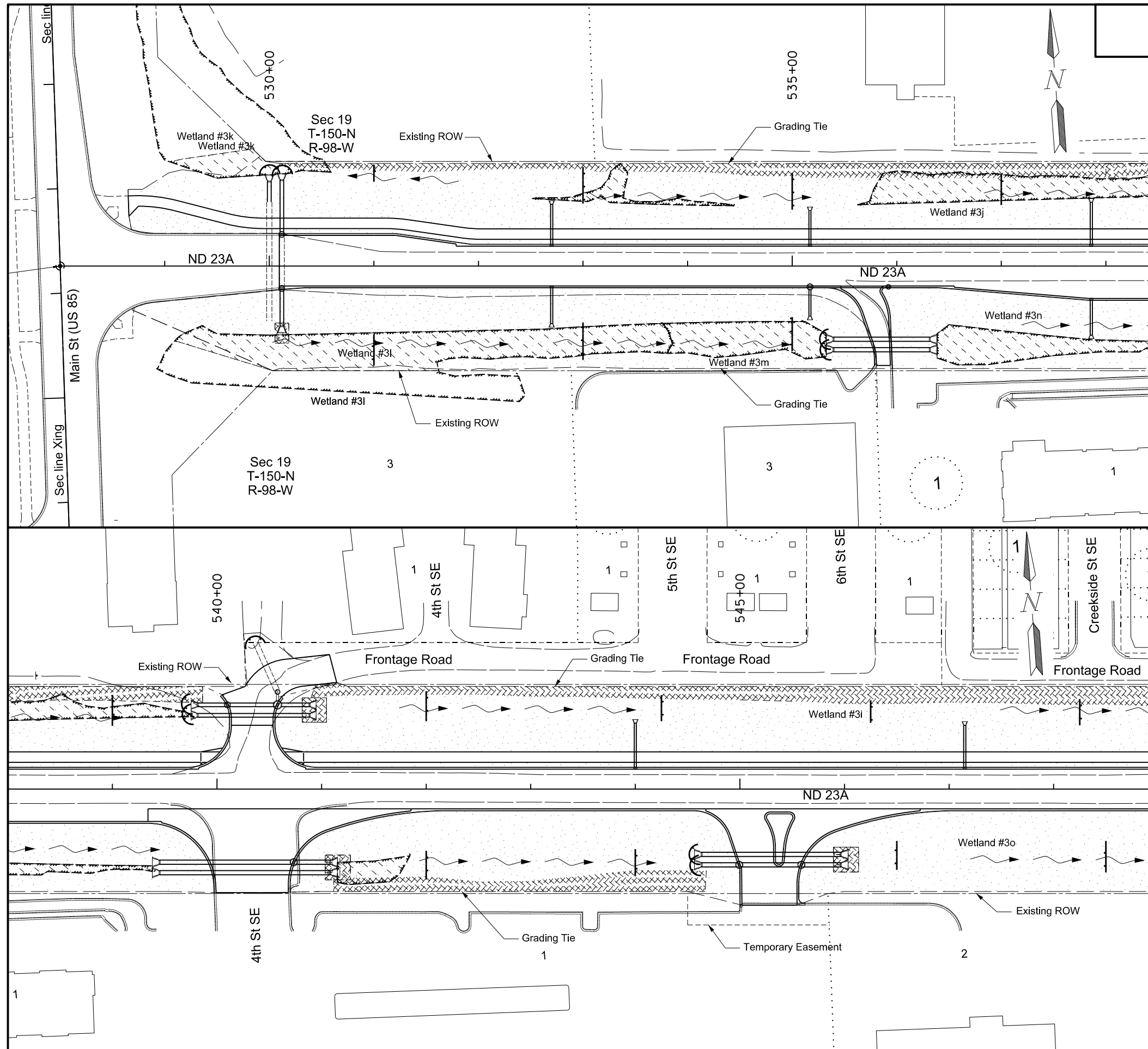
SPEC	CODE	BID ITEM	QUANTITY	UNIT
261	0112	Fiber Rolls 12IN 530+00 to 610+04 2+16 to 10+74 Bypass Discretionary	3815 1005 700	LF LF LF
261	0113	Remove Fiber Rolls 12IN 530+00 to 610+04 2+16 to 10+74 Bypass Discretionary	3815 1005 700	LF LF LF

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Temporary Wetland, Erosion Control and Seeding Tables

ND23A
US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	77	1



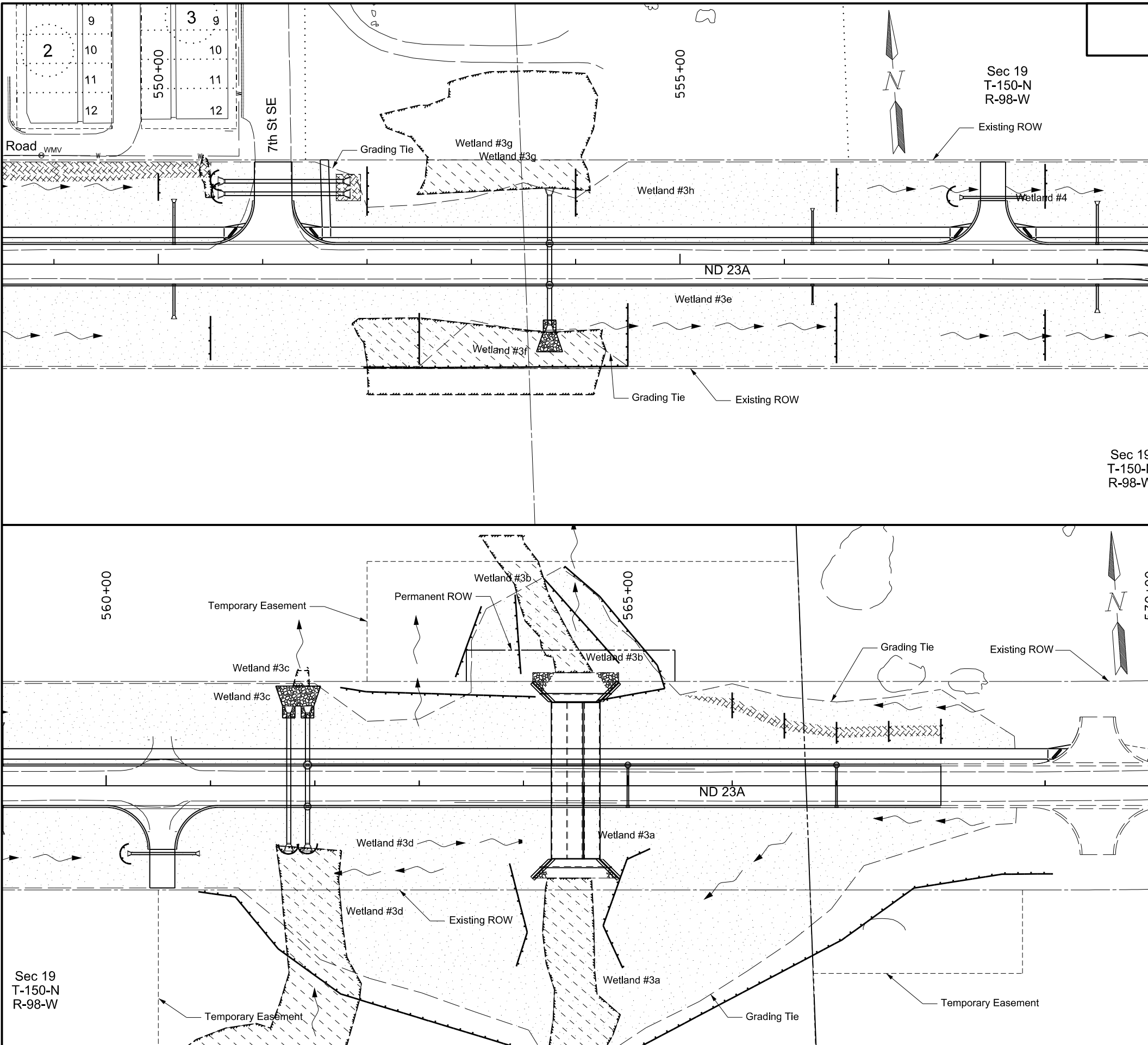
SPEC	CODE	BID ITEM	QUANTITY	UNIT
251	0200	Seeding Class II		
		528+65 to 538+00 Lt	1.36	Acre
		528+69 to 535+79 Rt	1.16	Acre
		535+86 to 538+00 Rt	0.34	Acre
		538+00 to 540+14 Lt	0.32	Acre
		538+00 to 539+97 Rt	0.27	Acre
		540+54 to 549+00 Lt	1.29	Acre
253	0201	Hydraulic Mulch		
		528+65 to 538+00 Lt	1.36	Acre
		528+69 to 535+79 Rt	1.14	Acre
		535+86 to 538+00 Rt	0.34	Acre
255	0103	ECB Type 3		
		530+10 to 538+00 Lt	835	SY
		538+00 to 539+86 Lt	286	SY
		540+90 to 549+00 Lt	1168	SY
		541+12 to 544+68 Rt	572	SY

LEGEND

- Erosion Control Blanket
- Delimited Wetland
- Seeding Area
- Flow Arrow
- Fiber Rolls

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Permanent Wetland, Erosion Control and Seeding
 ND23A
 US85B to ND23B



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	77	2

SPEC	CODE	BID ITEM	QUANTITY	UNIT
251	0200	Seeding Class II		
		549+00 to 550+90 Lt	0.35	Acre
		549+00 to 559+00 Rt	2.06	Acre
		551+30 to 559+00 Lt	1.07	Acre
		559+00 to 560+42 Lt	0.22	Acre
		559+00 to 560+42 Rt	0.25	Acre
253	0201	Hydraulic Mulch		
		549+00 to 550+90 Lt	0.35	Acre
		549+00 to 559+00 Rt	2.06	Acre
		551+30 to 559+00 Lt	1.07	Acre
255	0103	ECB Type 3		
		549+00 to 550+50 Lt	279	SY
		565+50 to 568+00 Lt	267	SY
		560+66 to 568+72 Lt	1.18	Acre
		560+66 to 568+72 Rt	2.44	Acre
		560+66 to 568+72 Rt	2.44	Acre

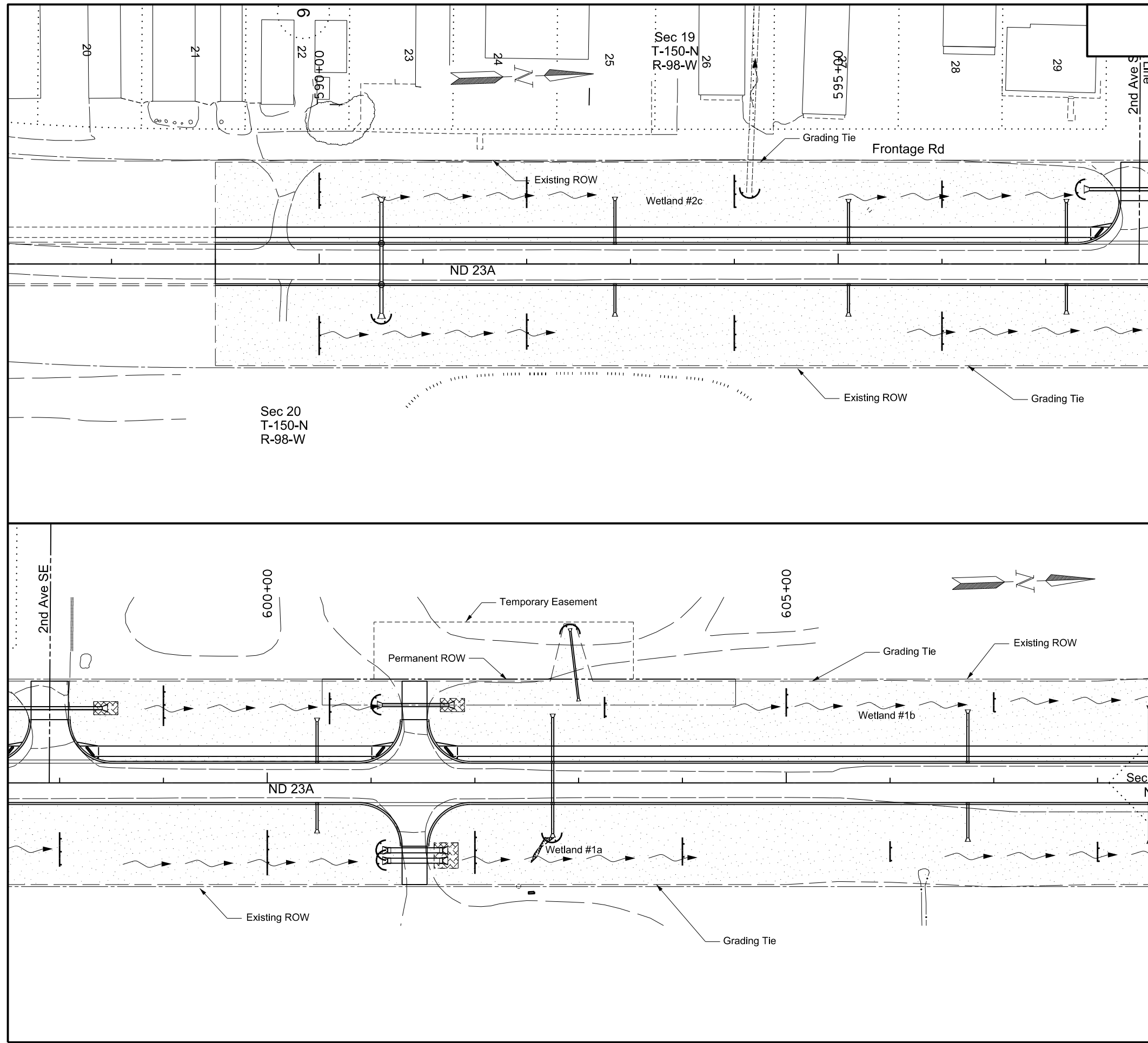
LEGEND

- Erosion Control Blanket
- Delineated Wetland
- Seeding Area
- Flow Arrow
- Fiber Rolls

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Permanent Wetland, Erosion Control & Seeding
 ND23A
 US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	77	3



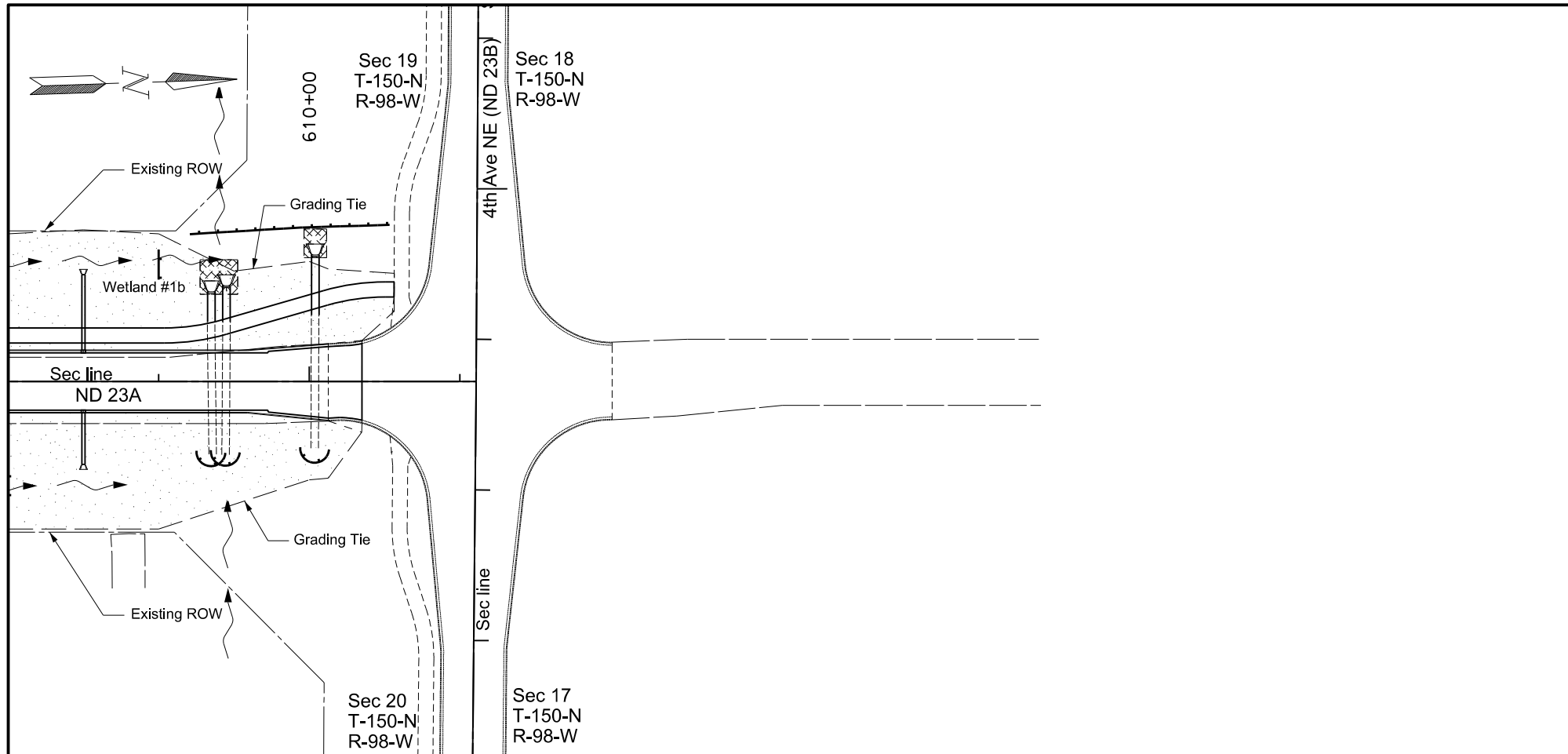
SPEC	CODE	BID ITEM	QUANTITY	UNIT
251	0200	Seeding Class II		
		589+00 to 597+71 Lt	1.32	Acre
		589+00 to 598+00 Rt	1.59	Acre
		598+00 to 601+30 Lt	0.57	Acre
		601+54 to 608+00 Lt	1.02	Acre
253	0201	Hydraulic Mulch		
		589+00 to 597+71 Lt	1.32	Acre
		589+00 to 598+00 Rt	1.59	Acre
		598+00 to 601+30 Lt	0.57	Acre
		601+54 to 608+00 Rt	1.13	Acre

LEGEND

- Erosion Control Blanket
- Delineated Wetland
- Seeding Area
- Flow Arrow
- Fiber Rolls

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Permanent Wetland, Erosion Control & Seeding
 ND23A
 US85B to ND23B



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	77	4

SPEC	CODE	BID ITEM	QUANTITY	UNIT
251	0200	Seeding Class II		
		608+00 to 610+56 Lt	0.31	Acre
		608+00 to 610+35 Rt	0.34	Acre
253	0201	Hydraulic Mulch		
		608+00 to 610+56 Lt	0.31	Acre
		608+00 to 610+35 Rt	0.34	Acre

LEGEND

-  Erosion Control Blanket
-  Delineated Wetland
-  Seeding Area
-  Flow Arrow
-  Fiber Rolls

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Permanent Wetland, Erosion Control & Seeding
 ND23A
 US85B to ND23B

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-7-023(050)910	77	5

ND23A Mainline			
Station	Offset	12IN Fiber Roll LF	Description
530+00	LT	30	Inlet End Protection
530+12	LT	30	Inlet End Protection
531+00	LT	16	Ditch Check
531+00	RT	30	Ditch Check
533+00	LT	35	Ditch Check
533+00	RT	35	Ditch Check
535+00	RT	35	Ditch Check
535+25	LT	35	Ditch Check
535+34	RT	60	Inlet End Protection
537+00	LT	30	Ditch Check
539+00	LT	30	Ditch Check
539+72	LT	60	Inlet End Protection
540+37	LT	30	Inlet End Protection
542+00	LT	28	Ditch Check
542+00	RT	28	Ditch Check
544+00	RT	26	Ditch Check
544+25	LT	26	Ditch Check
544+58	RT	60	Inlet End Protection
546+25	LT	22	Ditch Check
546+50	RT	25	Ditch Check
548+25	LT	25	Ditch Check
548+50	LT	30	Ditch Check
550+00	LT	26	Ditch Check
550+43	LT	60	Inlet End Protection
550+50	LT	42	Ditch Check
552+00	LT	46	Ditch Check
552+00	RT	250	Runoff Protection
552+50	RT	50	Ditch Check
553+75	LT	30	Inlet End Protection
554+00	LT	46	Ditch Check
554+50	RT	60	Ditch Check
556+50	LT	42	Ditch Check
556+50	RT	48	Ditch Check
557+60	LT	30	Inlet End Protection
558+50	LT	42	Ditch Check
558+50	RT	48	Ditch Check
560+20	RT	30	Inlet End Protection
560+88 - 569+08	RT	915	Runoff Protection
561+75	LT	30	Inlet End Protection
561+93	LT	30	Inlet End Protection
563+30	LT	188	Runoff Protection
563+47	LT	72	Runoff Protection
563+95	LT	76	Runoff Protection
564+00	RT	102	Runoff Protection
564+55	LT	108	Runoff Protection
564+56	RT	136	Runoff Protection
565+00	LT	152	Runoff Protection
565+03	LT	65	Runoff Protection
566+00	LT	25	Ditch Check
566+50	LT	25	Ditch Check
567+00	LT	25	Ditch Check
567+50	LT	25	Ditch Check
568+00	LT	25	Ditch Check
Total:		3575	

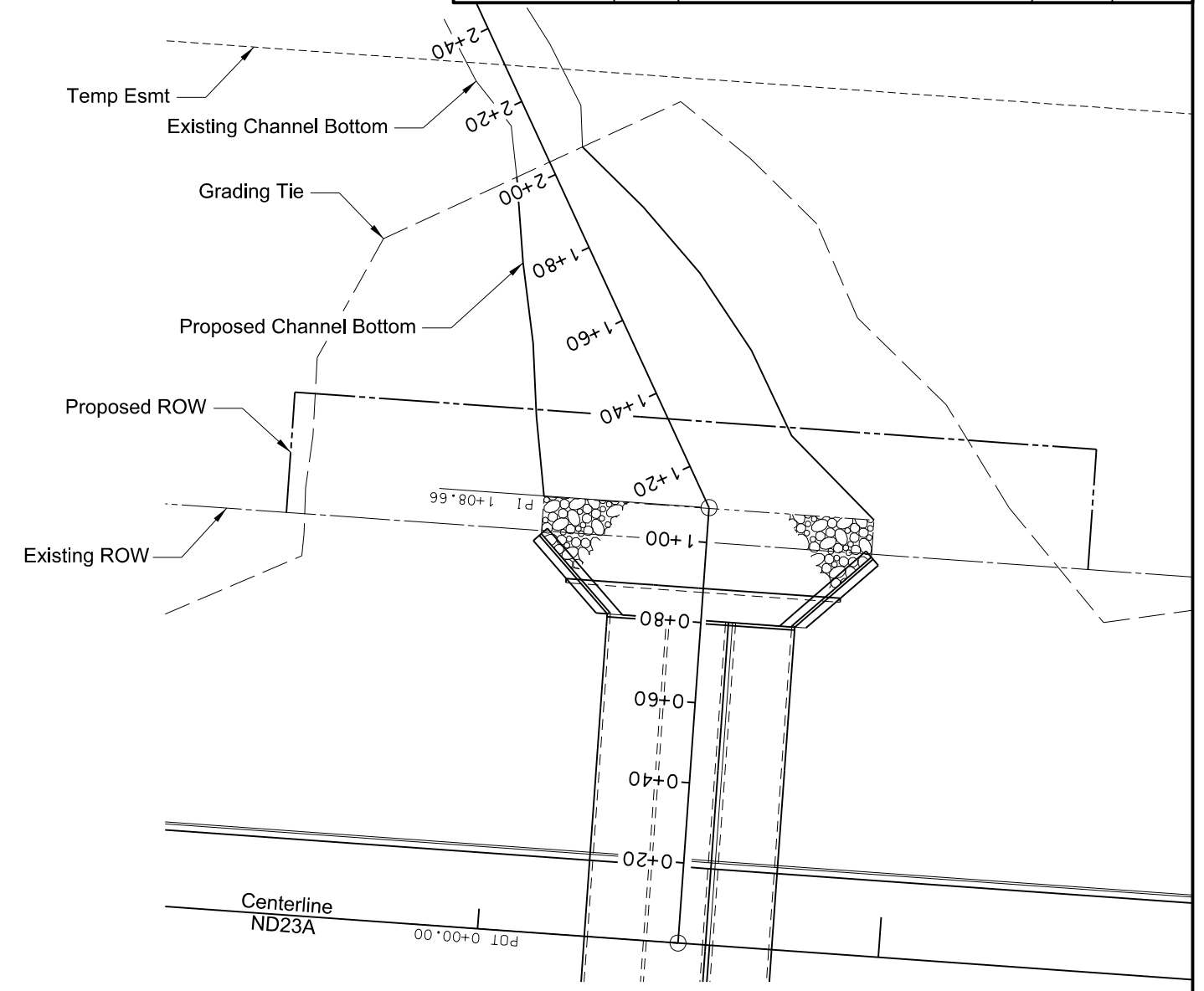
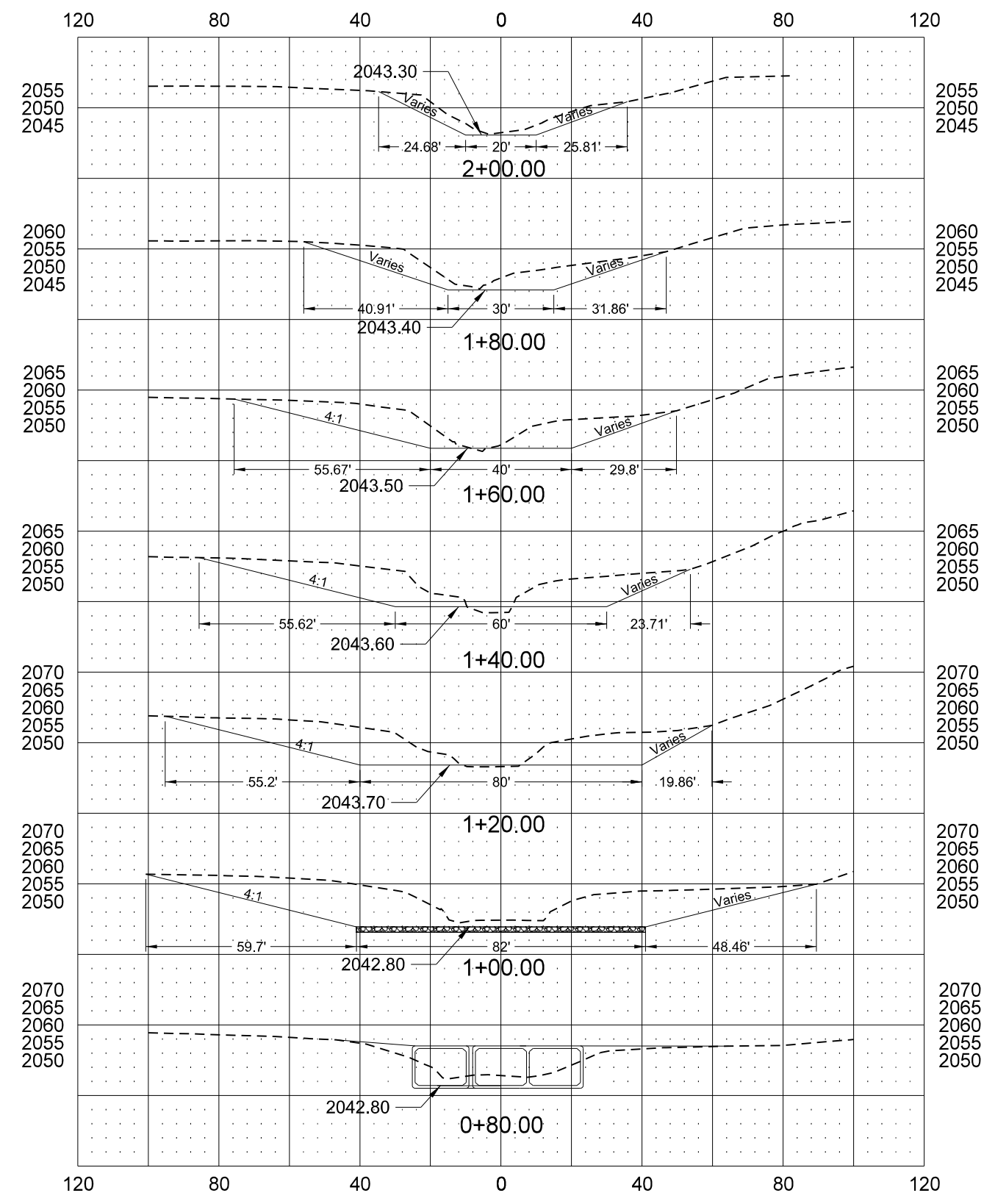
ND23A Mainline			
Station	Offset	12IN Fiber Roll LF	Description
590+00	LT	35	Ditch Check
590+00	RT	35	Ditch Check
590+60	RT	30	Inlet End Protection
592+00	LT	35	Ditch Check
592+00	RT	35	Ditch Check
594+00	LT	35	Ditch Check
594+00	RT	35	Ditch Check
549+14	LT	30	Inlet End Protection
596+00	LT	26	Ditch Check
596+00	RT	38	Ditch Check
597+34	LT	30	Inlet End Protection
598+00	RT	35	Ditch Check
599+00	LT	40	Ditch Check
600+00	RT	44	Ditch Check
600+50	LT	30	Ditch Check
601+07	LT	30	Inlet End Protection
601+13	RT	60	Inlet End Protection
602+00	RT	42	Ditch Check
602+75	RT	30	Inlet End Protection
602+92	LT	30	Inlet End Protection
603+25	LT	25	Ditch Check
604+00	RT	30	Ditch Check
605+00	LT	30	Ditch Check
606+00	RT	20	Ditch Check
607+00	LT	20	Ditch Check
608+00	RT	20	Ditch Check
609+00	LT	20	Ditch Check
609+36	RT	30	Inlet End Protection
609+44	RT	30	Inlet End Protection
609+95	LT	140	Runoff Protection
610+04	RT	30	Inlet End Protection
Total:		1100	

SPEC	CODE	BID ITEM	QUANTITY	UNIT
261	0112	Fiber Rolls 12IN 530+00 to 610+04 Discretionary	4675 600	LF LF

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Permanent Wetland, Erosion Control and Seeding Tables
ND23A
US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	80	1



Beginning chain CREEK description
 =====
 Point 650 N 302,564.8501 E 1,288,443.7072 Sta 0+00.00
 Course from 650 to 651 N 4°04' 57.87" E Dist 108.6644
 Point 651 N 302,673.2388 E 1,288,451.4438 Sta 1+08.66
 Course from 651 to 652 N 24°45' 32.81" W Dist 178.5150
 Point 652 N 302,835.3441 E 1,288,376.6810 Sta 2+87.18
 =====
 Ending chain CREEK description

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Cherry Creek Channel Clean-Out
 Cross-Sections, Alignment Data and Layout
 ND23A
 US85B to ND23B

PRELIMINARY SURVEY COORDINATE AND CURVE DATA - ND 23 Alt; Jct US 85B to ND 23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	81	1

HORIZONTAL ALIGNMENT				CURVE DATA		US PUBLIC LAND SURVEY DATA				SURVEY CONTROL POINTS					
PNT	STATION	NORTHING	EASTING	ARC DEFINITION		DESC.	SEC-TWP-RGE	NORTHING	EASTING	PNT	NORTHING	EASTING	ELEV	STATION	OFFSET
										CONTROL POINT DESCRIPTION					
ND 23A - SCL23A - MCKENZIE				SCS6		NW Cor Sec 19 T-150-N R-98-W				Primary Control					
BEG	528+00.00	302824.72	1284802.97	PI Sta = 579+91.35		NE Cor Sec 19 T-150-N R-98-W									
¼ Line	553+51.45	302643.06	1287347.94	Delta = 92° 10' 07" LT		W ¼ Cor Sec 19 T-150-N R-98-W				GPS 2 280886.56 1284144.28 2270.01 N/A N/A					
TS	568+78.34	302534.35	1288870.96	Da = 6° 59' 44"		C ¼ Cor Sec 19 T-150-N R-98-W				#5 Rebar & Cap					
SC	573+78.34	302549.49	1289368.67	R = 819.02		E ¼ Cor Sec 19 T-150-N R-98-W				GPS 7 308664.46 1300818.42 2085.05 N/A N/A					
PI SCS6	579+91.35	302455.11	1289981.15	LS = 500.00		SW Cor Sec 19 T-150-N R-98-W				#5 Rebar & Cap					
CS	581+95.86	303074.10	1289951.27	SC = 17° 29' 21"		S ¼ Cor Sec 19 T-150-N R-98-W				GPS 501 304341.10 1290140.45 2057.47 594+73 96' Rt					
ST	586+95.86	303567.50	1290018.33	TS = 1,113.01		SE Cor Sec 19 T-150-N R-98-W				#5 Rebar					
Station equation ND 23A (SCL23A) at ND 23B (SCL23B)				L = 817.51											
ND 23A BK Sec Cor - END				608+58.07		305728.51				1290090.55					
ND 23A AH Sec Cor - END				608+57.28		305728.51				1290090.55					
US 85 - SCL85 - MCKENZIE										#5 Rebar					
BEG Rec Sec Cor				2749+51.54		300651.69				1284722.08					
ND 23A				2771+26.08		302824.72				1284802.97					
Rec ¼ Cor				2775+91.11		303289.43				1284820.27					
Sec Cor END				2802+30.74		305927.32				1284916.01					
ND 23B - SCL23B - MCKENZIE															
BEG Sec Cor				19+49.64		305927.32				1284916.01					
¼ Cor				44+89.28		305832.11				1287453.86					
ND 23A Sec Cor				71+28.00		305728.51				1290090.55					
¼ Cor END				97+70.56		305615.86				1292730.71					
NOTES: Sheet 1 of 1 (McKenzie County)						Date Survey Completed 02/10/16				<input type="checkbox"/> Assumed Coordinates <input checked="" type="checkbox"/> All coordinates on this sheet are McKenzie County ground coordinates. They are derived from the NAD83(2011) reference frame; North Dakota North Zone Combination Factor (cf) = 0.9998485					
										All coordinates and measurements on this document derived from the International Foot definition. INITIALIZING BENCH MARK NDGPS Stations (OPUS) <input checked="" type="checkbox"/> NAVD-88 <input type="checkbox"/> NGVD-29 <input type="checkbox"/> GEOID 09 <input type="checkbox"/> _____ <input checked="" type="checkbox"/> GEOID 12A					
										This document was originally issued and sealed by David Nasset, Registration Number LS- 4432 , on 08/15/17 and the original document is stored at the North Dakota Department of Transportation					

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	82	1

Beginning chain PR23A description

Point 800 N 302,824.7200 E 1,284,802.9700 Sta 528+00.00

Course from 800 to 801 S 85°55' 01.58" E Dist 300.0000

Point 801 N 302,803.3601 E 1,285,102.2086 Sta 531+00.00

Course from 801 to PC C802 S 85°55' 02.13" E Dist 4,034.0680

Curve Data

Curve C802
P.I. Station 571+61.27 N 302,514.2100 E 1,289,153.1700
Delta = 7°24' 38.69" (LT)
Degree = 13°38' 30.67"
Tangent = 27.1997
Length = 54.3236
Radius = 420.0000
External = 0.8798
Long Chord = 54.2858
Mid. Ord. = 0.8780
P.C. Station 571+34.07 N 302,516.1465 E 1,289,126.0393
P.T. Station 571+88.39 N 302,515.7890 E 1,289,180.3239
C.C. N 302,935.0807 E 1,289,155.9420
Back = S 85°55' 02.13" E
Ahead = N 86°40' 19.18" E
Chord Bear = S 89°37' 21.47" E

Course from PT C802 to PC C803 N 86°40' 19.18" E Dist 498.5782

Curve Data

Curve C803
P.I. Station 577+14.14 N 302,546.3100 E 1,289,705.1900
Delta = 7°24' 14.06" (RT)
Degree = 13°38' 30.67"
Tangent = 27.1746
Length = 54.2735
Radius = 420.0000
External = 0.8782
Long Chord = 54.2357
Mid. Ord. = 0.8764
P.C. Station 576+86.97 N 302,544.7325 E 1,289,678.0613
P.T. Station 577+41.24 N 302,544.3785 E 1,289,732.2958
C.C. N 302,125.4408 E 1,289,702.4431
Back = N 86°40' 19.18" E
Ahead = S 85°55' 26.76" E
Chord Bear = S 89°37' 33.79" E

Course from PT C803 to 804 S 85°55' 26.76" E Dist 162.1203

Point 804 N 302,532.8553 E 1,289,894.0061 Sta 579+03.36

Course from 804 to PC C805 N 11°03' 01.08" E Dist 533.6310

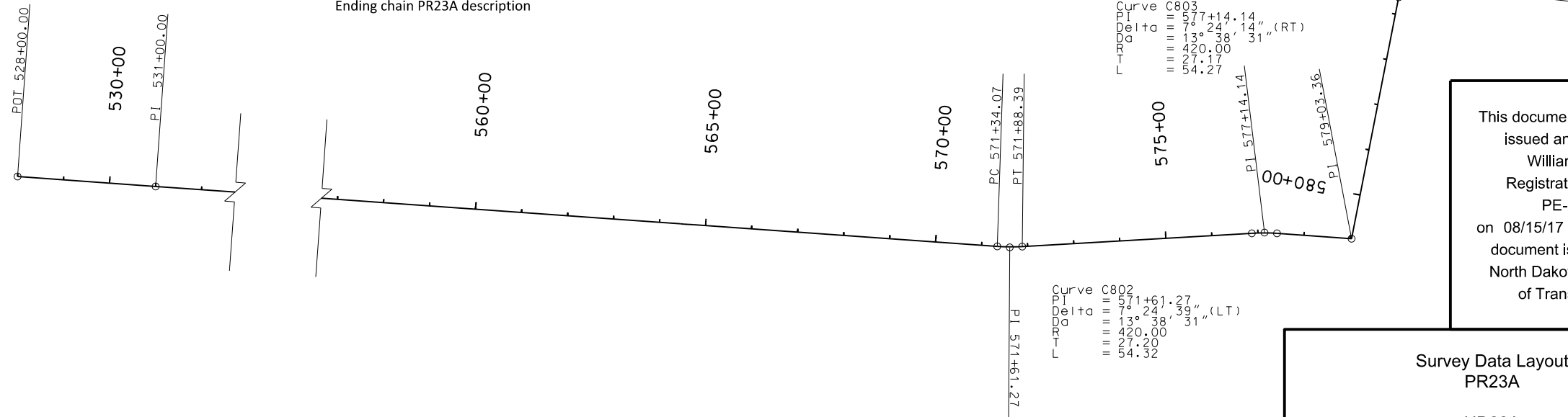
Curve Data

Curve C805
P.I. Station 584+69.36 N 303,088.3930 E 1,290,002.3121
Delta = 8°48' 47.83" (LT)
Degree = 13°38' 30.67"
Tangent = 32.3662
Length = 64.6048
Radius = 420.0000
External = 1.2453
Long Chord = 64.5411
Mid. Ord. = 1.2416
P.C. Station 584+36.99 N 303,056.5925 E 1,289,996.2875
P.T. Station 585+01.60 N 303,120.7412 E 1,290,003.3932
C.C. N 303,134.7706 E 1,289,583.6276
Back = N 10°43' 39.04" E
Ahead = N 1°54' 51.21" E
Chord Bear = N 6°19' 15.13" E

Course from PT C805 to 806 N 1°54' 51.21" E Dist 2,609.2249

Point 806 N 305,728.5100 E 1,290,090.5500 Sta 611+10.82

Ending chain PR23A description



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Survey Data Layout PR23A
ND23A
US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	82	2

Beginning chain BYPASS description

Point 850 N 302,603.6074 E 1,287,900.7227 Sta 0+00.00

Course from 850 to PC C851 S 85°55' 02.11" E Dist 14.7813

Curve Data

Curve C851
P.I. Station 0+79.37 N 302,597.9567 E 1,287,979.8873
Delta = 28°58' 12.16" (RT)
Degree = 22°55' 05.92"
Tangent = 64.5847
Length = 126.4057
Radius = 250.0000
External = 8.2076
Long Chord = 125.0635
Mid. Ord. = 7.9467
P.C. Station 0+14.78 N 302,602.5550 E 1,287,915.4665
P.T. Station 1+41.19 N 302,562.7315 E 1,288,034.0201
C.C. N 302,353.1894 E 1,287,897.6672
Back = S 85°55' 02.11" E
Ahead = S 56°56' 49.95" E
Chord Bear = S 71°25' 56.03" E

Course from PT C851 to PC C852 S 56°56' 49.95" E Dist 302.9192

Curve Data

Curve C852
P.I. Station 6+05.96 N 302,309.2411 E 1,288,423.5748
Delta = 65°50' 16.62" (LT)
Degree = 22°55' 05.92"
Tangent = 161.8497
Length = 287.2722
Radius = 250.0000
External = 47.8176
Long Chord = 271.7262
Mid. Ord. = 40.1400
P.C. Station 4+44.11 N 302,397.5159 E 1,288,287.9174
P.T. Station 7+31.38 N 302,396.8812 E 1,288,559.6429
C.C. N 302,607.0580 E 1,288,424.2703
Back = S 56°56' 49.95" E
Ahead = N 57°12' 53.43" E
Chord Bear = S 89°51' 58.26" E

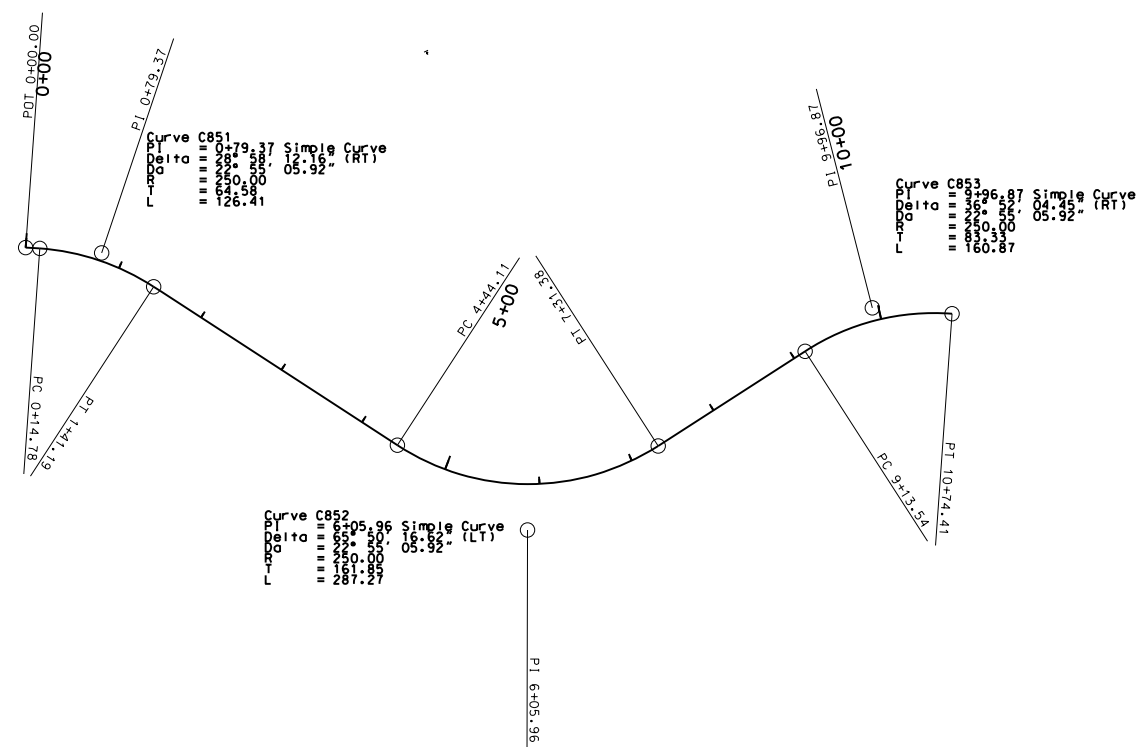
Course from PT C852 to PC C853 N 57°12' 53.43" E Dist 182.1640

Curve Data

Curve C853
P.I. Station 9+96.87 N 302,540.6429 E 1,288,782.8444
Delta = 36°52' 04.45" (RT)
Degree = 22°55' 05.92"
Tangent = 83.3285
Length = 160.8666
Radius = 250.0000
External = 13.5216
Long Chord = 158.1056
Mid. Ord. = 12.8278
P.C. Station 9+13.54 N 302,495.5213 E 1,288,712.7895
P.T. Station 10+74.41 N 302,534.7102 E 1,288,865.9614
C.C. N 302,285.3446 E 1,288,848.1621
Back = N 57°12' 53.43" E
Ahead = S 85°55' 02.11" E
Chord Bear = N 75°38' 55.66" E

Point 854 N 302,534.7102 E 1,288,865.9614 Sta 10+74.41

Ending chain BYPASS description

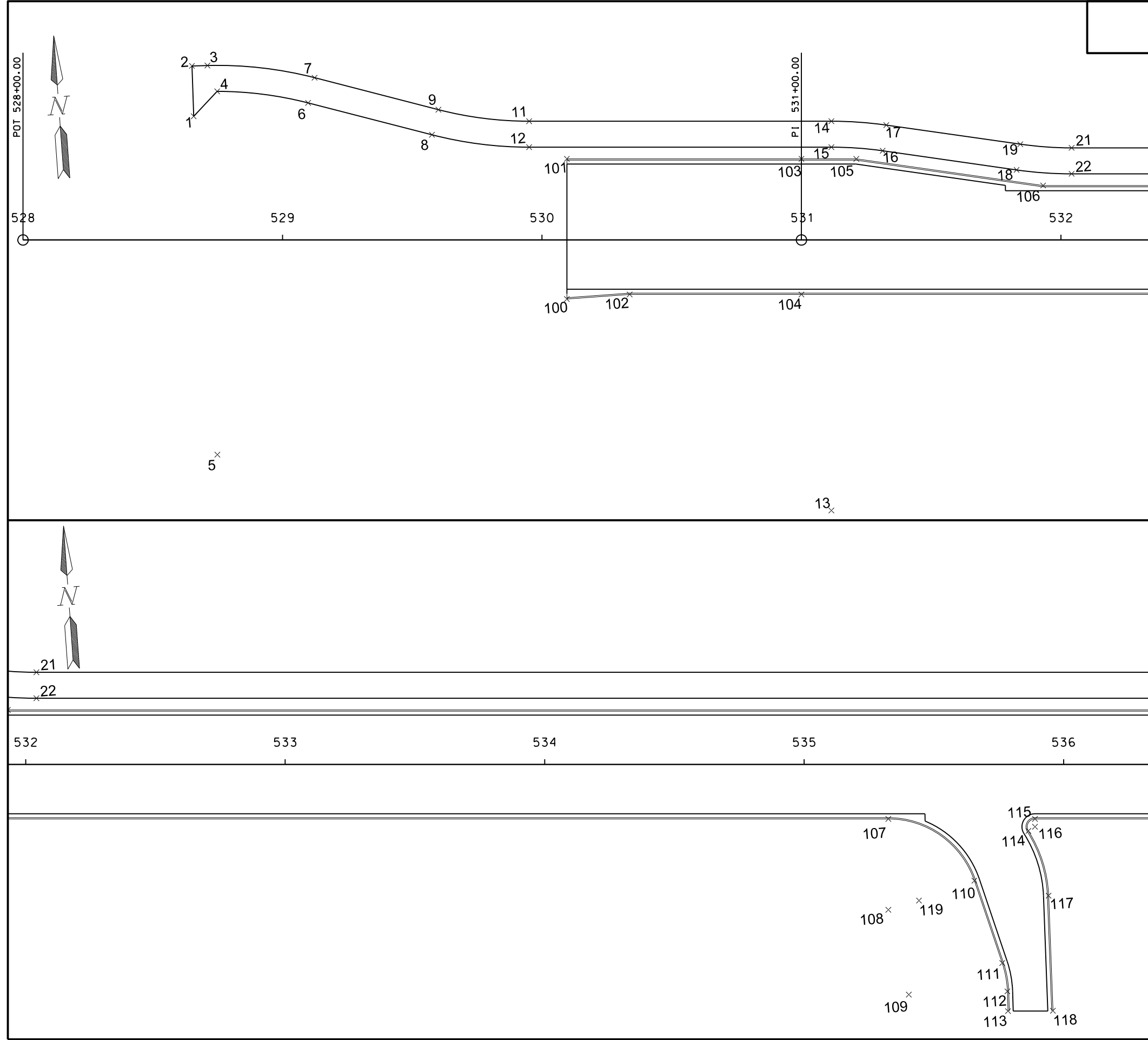


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Survey Data Layout
Temporary Bypass

ND23A

US85B to ND23B



Point	North	East	Station	Offset	Description
1	302867.582	1284871.958	528+65.76	-47.66	Edge of sidewalk
2	302886.982	1284872.681	528+65.10	-67.07	Edge of sidewalk
3	302886.709	1284878.654	528+71.08	-67.22	Edge of sidewalk
4	302876.518	1284881.667	528+74.81	-57.27	Edge of sidewalk
5	302736.867	1284871.788	528+74.90	82.73	Center of radius
6	302869.599	1284916.308	529+09.86	-52.83	Edge of sidewalk
7	302879.080	1284919.488	529+12.35	-62.52	Edge of sidewalk
8	302853.920	1284963.055	529+57.60	-40.52	Edge of sidewalk
9	302863.401	1284966.235	529+60.10	-50.21	Edge of sidewalk
10	302996.134	1285010.755	529+95.05	-185.77	Center of radius
11	302856.489	1285000.787	529+95.05	-45.77	Edge of sidewalk
12	302846.514	1285000.075	529+95.05	-35.77	Edge of sidewalk
13	302698.578	1285106.279	531+11.52	104.23	Center of radius
14	302848.197	1285116.958	531+11.52	-45.77	Edge of sidewalk
15	302838.222	1285116.246	531+11.52	-35.77	Edge of sidewalk
16	302835.414	1285135.871	531+31.30	-34.37	Edge of sidewalk
17	302845.188	1285137.985	531+32.71	-44.27	Edge of sidewalk
18	302824.392	1285186.838	531+82.92	-27.00	Edge of sidewalk
19	302834.166	1285188.952	531+84.33	-36.90	Edge of sidewalk
20	302971.003	1285218.544	532+04.10	-175.50	Center of radius
21	302831.358	1285208.577	532+04.10	-35.50	Edge of sidewalk
22	302821.383	1285207.865	532+04.10	-25.50	Edge of sidewalk

Point	North	East	Station	Offset	Description
100	302787.090	1285010.409	530+09.59	22.76	2071.40 BC
101	302840.991	1285014.256	530+09.59	-31.27	2071.23 BC
102	302787.127	1285034.673	530+33.79	21.00	2071.31 BC
103	302834.554	1285104.435	531+00.00	-31.27	2070.32 BC
104	302782.413	1285100.714	531+00.00	21.00	2070.53 BC
105	302833.049	1285125.520	531+21.14	-31.27	2069.95 BC
106	302817.676	1285196.606	531+93.14	-21.00	2068.92 BC
107	302751.625	1285532.059	535+32.44	21.00	2065.43 BC
108	302716.714	1285529.567	535+32.44	56.00	Center of radius
109	302683.531	1285535.119	535+40.34	88.70	Center of radius
110	302725.544	1285563.435	535+65.60	44.78	2065.64 BC
111	302693.118	1285571.890	535+76.34	76.52	2065.81 BC
112	302682.095	1285573.092	535+78.32	87.43	2065.86 BC
113	302674.461	1285572.803	535+78.58	95.07	2065.90 BC
114	302743.182	1285585.582	535+86.43	25.61	2065.67 BC
115	302747.601	1285588.434	535+88.96	21.00	2065.60 BC
116	302744.609	1285588.221	535+88.96	24.00	Center of radius
117	302717.726	1285591.569	535+94.22	50.58	2065.94 BC
118	302673.371	1285590.078	535+95.89	94.92	2066.39 BC
119	302719.405	1285541.597	535+44.25	52.46	Center of radius

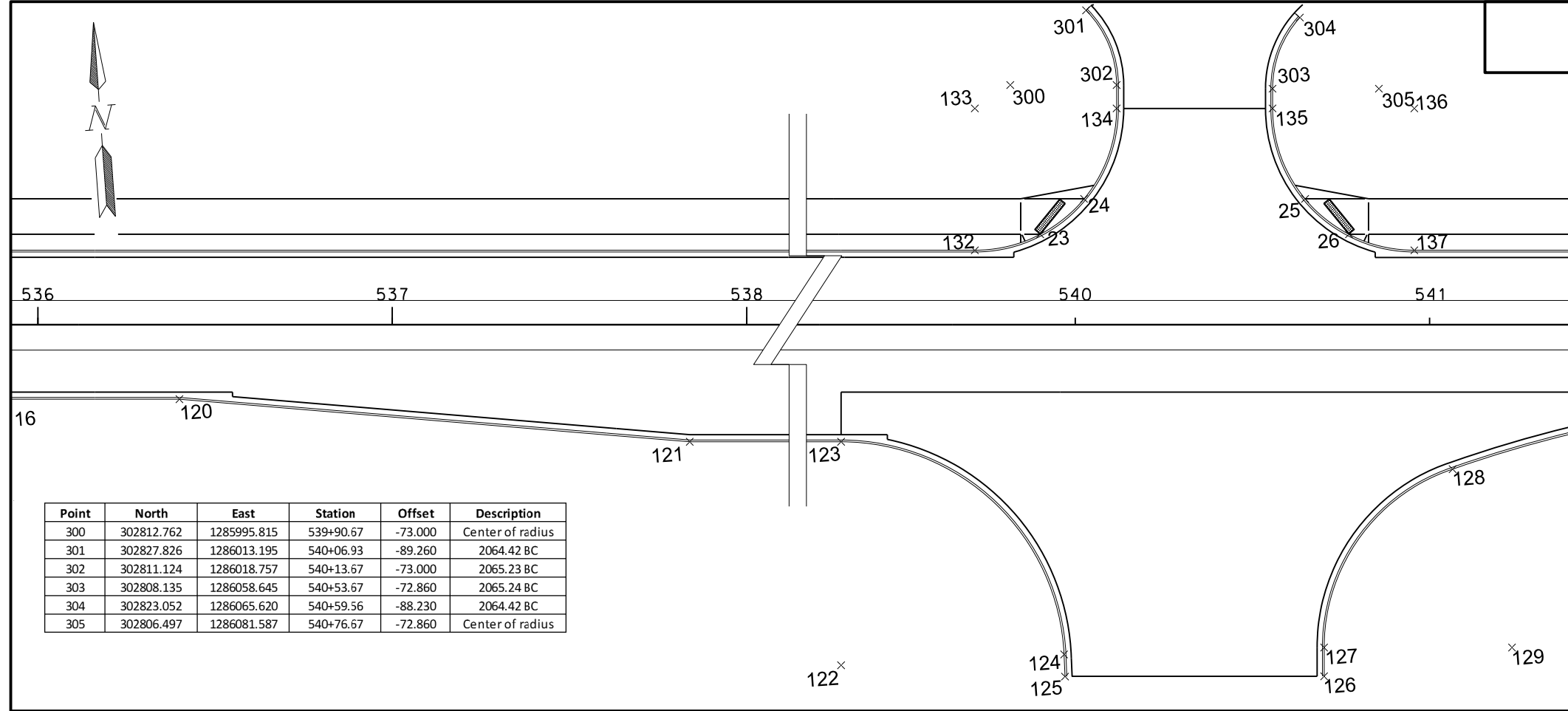
BC= Back of Curb

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Survey Data Layout
528+00 - 536+50

ND23A

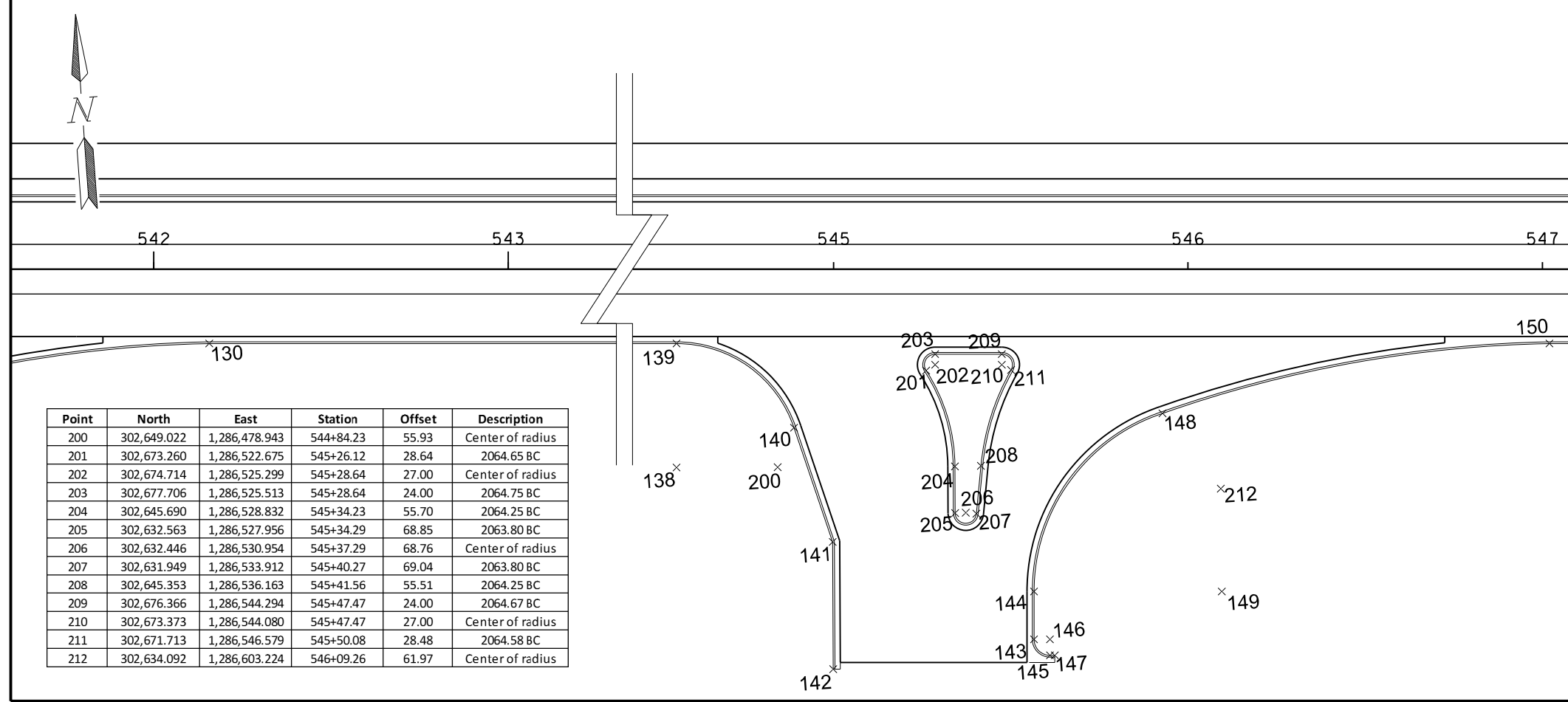
US85B to ND23B



Point	North	East	Station	Offset	Description
300	302812.762	1285995.815	539+90.67	-73.000	Center of radius
301	302827.826	1286013.195	540+06.93	-89.260	2064.42 BC
302	302811.124	1286018.757	540+13.67	-73.000	2065.23 BC
303	302808.135	1286058.645	540+53.67	-72.860	2065.24 BC
304	302823.052	1286065.620	540+59.56	-88.230	2064.42 BC
305	302806.497	1286081.587	540+76.67	-72.860	Center of radius

Point	North	East	Station	Offset	Description
23	302775.423	1285991.867	539+90.10	-25.50	Edge of sidewalk
24	302774.516	1286004.933	540+02.49	-35.50	Edge of sidewalk
25	302770.076	1286067.139	540+64.85	-35.50	Edge of sidewalk
26	302759.219	1286078.781	540+77.24	-25.50	Edge of sidewalk

Point	North	East	Station	Offset	Description
120	302743.972	1285639.281	536+39.94	21.00	2065.81 BC
121	302721.750	1285782.060	537+83.94	33.00	2066.16 BC
122	302648.230	1285927.195	539+33.94	96.00	Center of radius
123	302711.070	1285931.680	539+33.94	33.00	2066.60 BC
124	302646.772	1285990.178	539+96.86	92.97	2064.72 BC
125	302640.526	1285989.978	539+97.11	99.21	2064.60 BC
126	302635.398	1286062.920	540+70.23	99.14	2064.10 BC
127	302643.514	1286063.500	540+70.23	91.00	2064.19 BC
128	302691.087	1286103.233	541+06.48	40.72	2064.91 BC
129	302639.740	1286116.365	541+23.23	91.00	Center of radius
130	302702.981	1286213.558	542+15.68	21.00	2066.05 BC
131	302355.464	1286195.219	542+22.13	368.94	Center of radius
132	302762.247	1285973.161	539+71.67	-21.00	2066.84 BC
133	302802.145	1285976.009	539+71.67	-61.00	Center of radius
134	302799.297	1286015.908	540+11.67	-61.00	2065.46 BC
135	302796.165	1286059.796	540+55.67	-61.00	2065.46 BC
136	302793.317	1286099.694	540+95.67	-61.00	Center of radius
137	302753.418	1286096.847	540+95.67	-21.00	2066.62 BC
138	302650.982	1286450.457	544+55.68	56.00	Center of radius
139	302685.893	1286452.948	544+55.68	21.00	2065.06 BC
140	302659.813	1286484.324	544+88.83	44.78	2064.42 BC
141	302626.884	1286492.910	544+99.74	77.01	2063.87 BC
142	302591.044	1286490.515	544+99.90	112.93	2063.30 BC
143	302595.399	1286547.617	545+56.55	104.52	2063.82 BC
144	302608.889	1286548.579	545+56.55	91.00	2063.68 BC
145	302590.590	1286551.790	545+61.05	109.02	2063.90 BC
146	302595.079	1286552.105	545+61.05	104.52	Center of radius
147	302590.494	1286553.157	545+62.42	109.02	2063.90 BC
148	302656.463	1286588.312	545+92.79	40.72	2064.00 BC
149	302605.116	1286601.445	546+09.55	91.00	Center of radius
150	302668.357	1286698.637	547+01.99	21.00	2063.94 BC
151	302320.840	1286680.298	547+08.44	368.94	Center of radius



Point	North	East	Station	Offset	Description
200	302,649.022	1,286,478.943	544+84.23	55.93	Center of radius
201	302,673.260	1,286,522.675	545+26.12	28.64	2064.65 BC
202	302,674.714	1,286,525.299	545+28.64	27.00	Center of radius
203	302,677.706	1,286,525.513	545+28.64	24.00	2064.75 BC
204	302,645.690	1,286,528.832	545+34.23	55.70	2064.25 BC
205	302,632.563	1,286,527.956	545+34.29	68.85	2063.80 BC
206	302,632.446	1,286,530.954	545+37.29	68.76	Center of radius
207	302,631.949	1,286,533.912	545+40.27	69.04	2063.80 BC
208	302,645.353	1,286,536.163	545+41.56	55.51	2064.25 BC
209	302,676.366	1,286,544.294	545+47.47	24.00	2064.67 BC
210	302,673.373	1,286,544.080	545+47.47	27.00	Center of radius
211	302,671.713	1,286,546.579	545+50.08	28.48	2064.58 BC
212	302,634.092	1,286,603.224	546+09.26	61.97	Center of radius

BC= Back of Curb

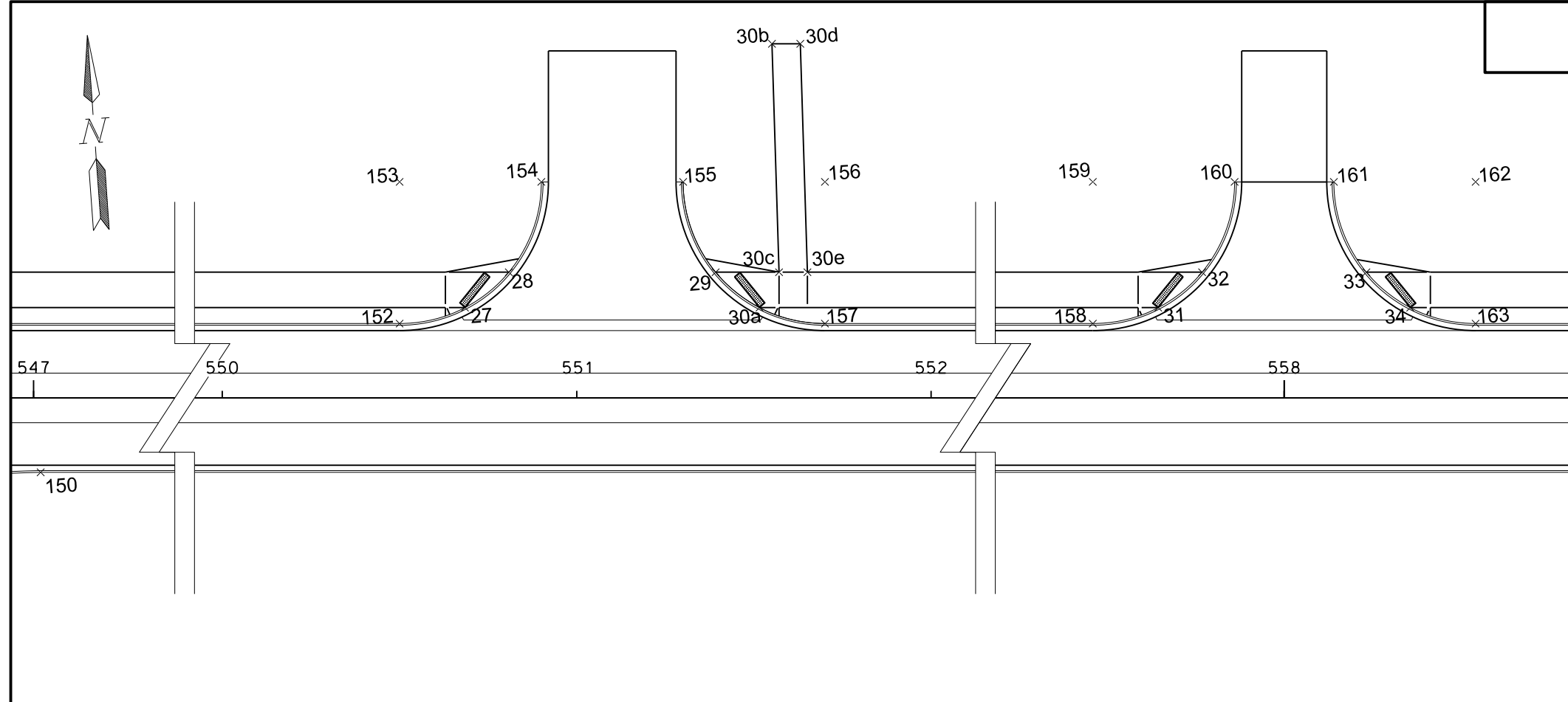
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Survey Data Layout
536+50 - 547+00

ND23A

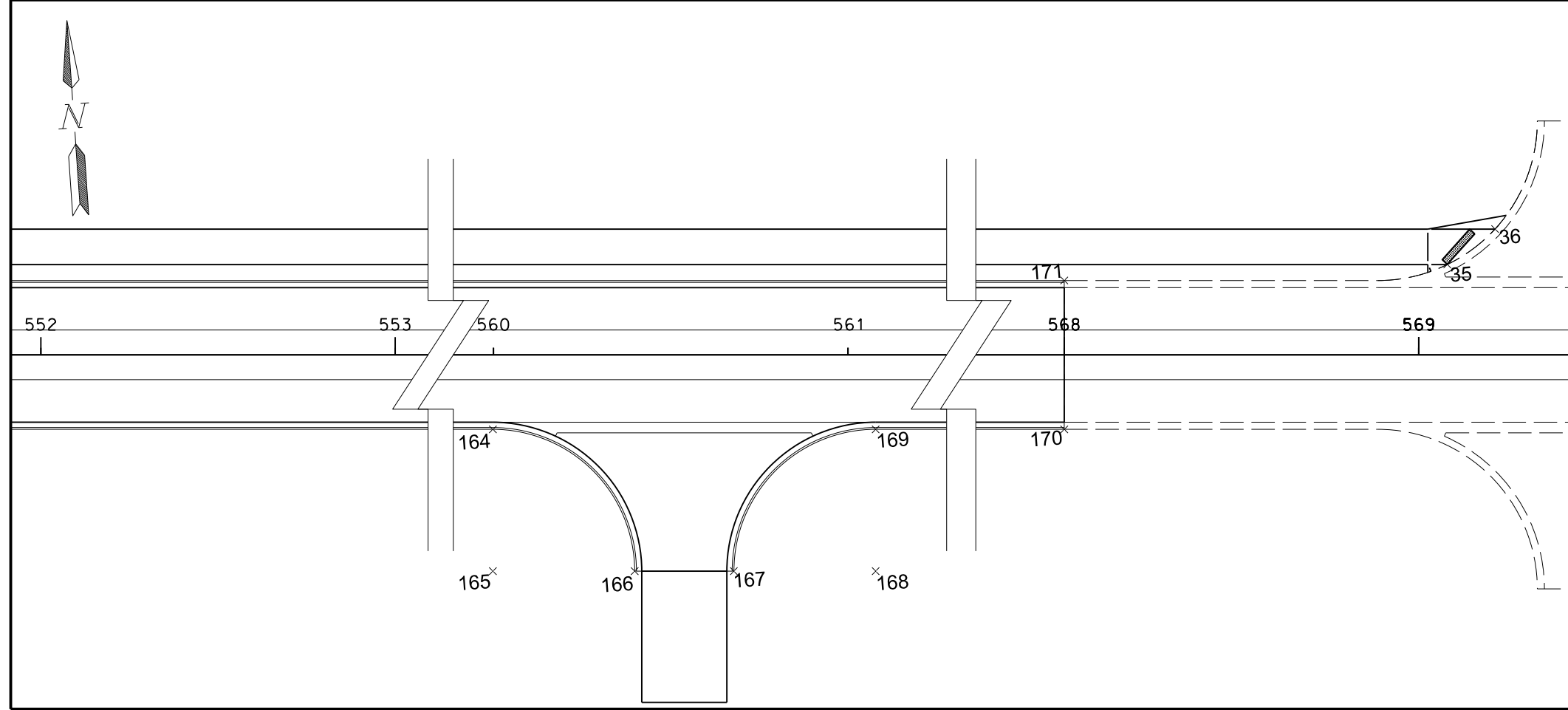
US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	82	5



Point	North	East	Station	Offset	Description
27	302688.646	1287067.499	550+68.47	-25.50	Edge of sidewalk
28	302697.739	1287080.566	550+80.86	-35.50	Edge of sidewalk
29	302693.584	1287138.781	551+39.22	-35.50	Edge of sidewalk
30a	302682.727	1287150.424	551+51.61	-25.50	Edge of sidewalk
30b	302756.788	1287159.226	551+55.11	-100.00	Edge of sidewalk
30c	302692.310	1287156.622	551+57.11	-35.50	Edge of sidewalk
30d	302754.308	1287167.206	551+63.12	-100.00	Edge of sidewalk
30e	302691.740	1287164.605	551+65.11	-35.50	Edge of sidewalk
31	302639.096	1287761.695	557+64.43	-25.50	Edge of sidewalk
32	302648.189	1287774.761	557+76.82	-35.50	Edge of sidewalk
33	302644.888	1287821.007	558+23.18	-35.50	Edge of sidewalk
34	302634.031	1287832.650	558+35.57	-25.50	Edge of sidewalk
35	302557.672	1288902.437	569+08.08	-25.50	Edge of sidewalk
36	302566.687	1288916.586	569+21.55	-35.50	Edge of sidewalk

Point	North	East	Station	Offset	Description
152	302685.470	1287048.793	550+50.04	-21.00	2062.22 BC
153	302725.368	1287051.641	550+50.04	-61.00	Center of radius
154	302722.521	1287091.540	550+90.04	-61.00	2062.66 BC
155	302719.673	1287131.438	551+30.04	-61.00	2062.66 BC
156	302716.825	1287171.337	551+70.04	-61.00	Center of radius
157	302676.926	1287168.489	551+70.04	-21.00	2061.81 BC
158	302635.920	1287742.989	557+46.00	-21.00	2060.17 BC
159	302675.818	1287745.837	557+46.00	-61.00	Center of radius
160	302672.970	1287785.735	557+86.00	-61.00	2059.47 BC
161	302670.977	1287813.664	558+14.00	-61.00	2059.47 BC
162	302668.129	1287853.563	558+54.00	-61.00	Center of radius
163	302628.230	1287850.715	558+54.00	-21.00	2060.73 BC
164	302575.955	1287993.172	559+99.82	21.00	2061.57 BC
165	302556.292	1288022.689	559+99.82	61.00	Center of radius
166	302533.209	1288030.222	560+39.82	61.00	2060.71 BC
167	302531.215	1288058.151	560+67.82	61.00	2060.71 BC
168	302548.300	1288102.260	561+07.82	61.00	Center of radius
169	302566.434	1288115.374	561+07.82	21.00	2061.95 BC
170	302518.985	1288791.324	568+00.00	21.00	2079.86 BC
171	302560.878	1288794.314	568+00.00	-21.00	2079.86 BC



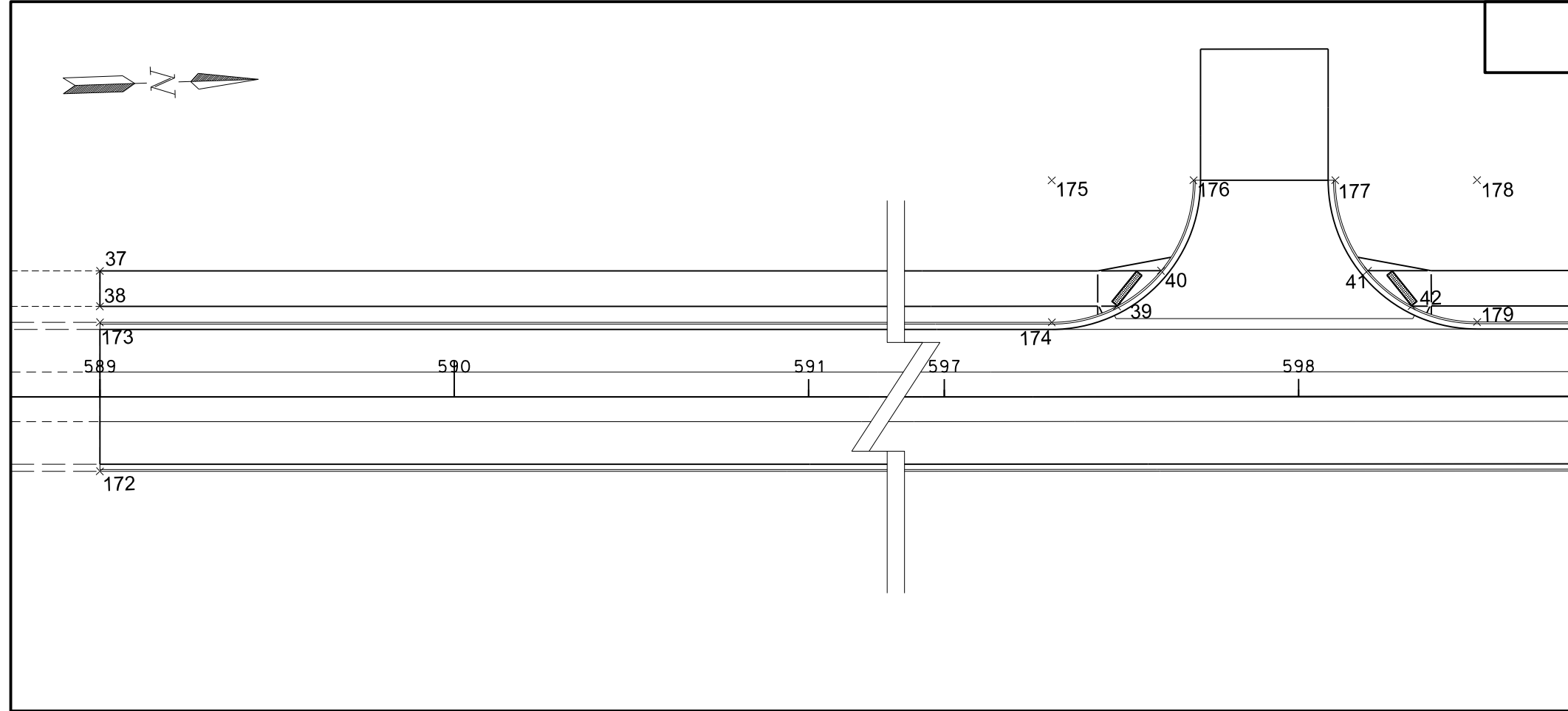
BC= Back of Curb

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Survey Data Layout
547+00 - 569+00

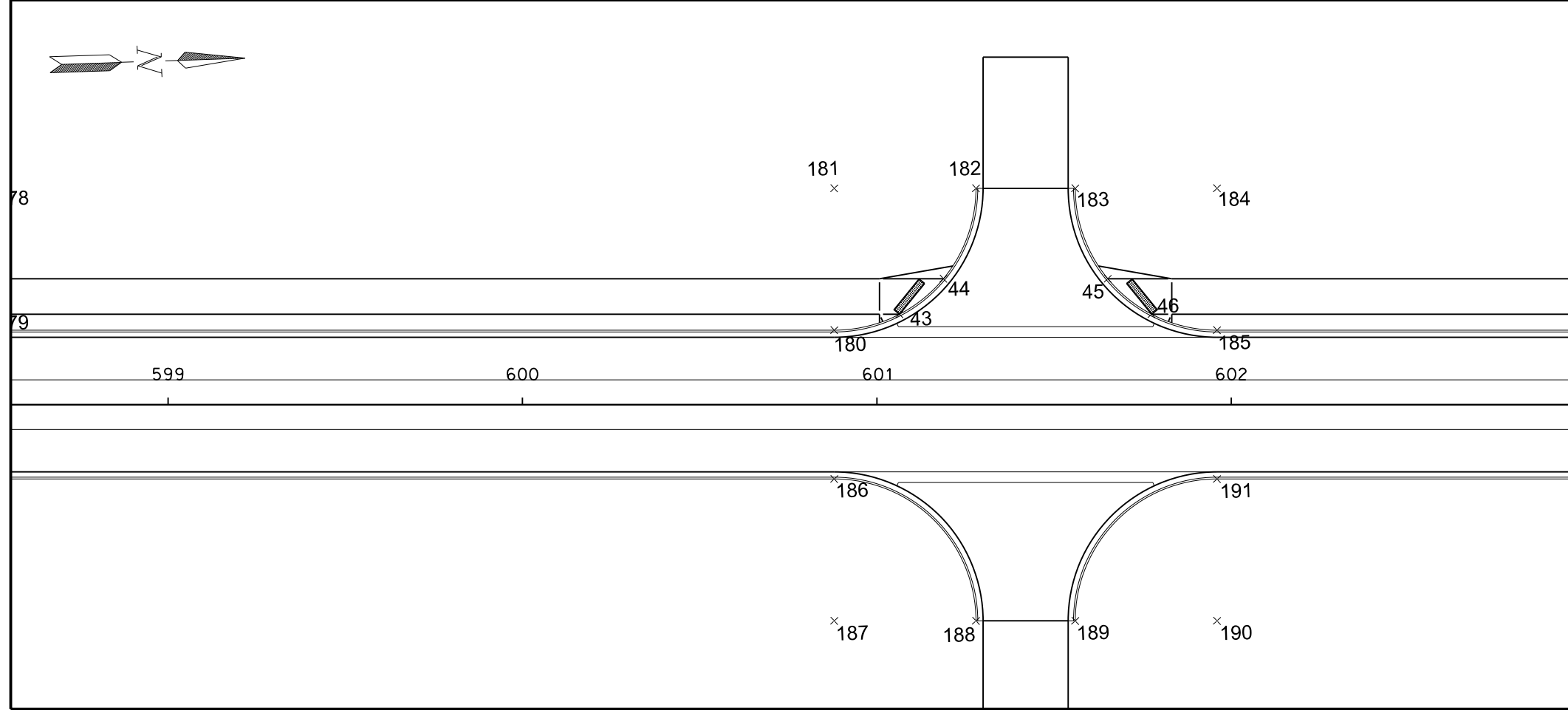
ND23A

US85B to ND23B



Point	North	East	Station	Offset	Description
37	303520.105	1289981.221	589+00.00	-35.50	Edge of sidewalk
38	303519.771	1289991.215	589+00.00	-25.50	Edge of sidewalk
39	304368.093	1290019.568	597+48.80	-25.50	Edge of sidewalk
40	304380.806	1290009.987	597+61.18	-35.50	Edge of sidewalk
41	304439.138	1290011.936	598+19.55	-35.50	Edge of sidewalk
42	304451.182	1290022.345	598+31.93	-25.50	Edge of sidewalk
43	304725.492	1290031.513	601+06.39	-25.50	Edge of sidewalk
44	304740.571	1290031.291	601+18.78	-35.50	Edge of sidewalk
45	304787.961	1290022.853	601+65.14	-35.50	Edge of sidewalk
46	304796.588	1290033.889	601+77.53	-25.50	Edge of sidewalk

Point	North	East	Station	Offset	Description
172	303518.218	1290037.689	589+00.00	21.00	2062.32 BC
173	303519.621	1289995.713	589+00.00	-21.00	2062.32 BC
174	304349.521	1290023.450	597+30.36	-21.00	2058.77 BC
175	304350.857	1289983.472	597+30.36	-61.00	Center of radius
176	304390.835	1289984.808	597+70.36	-61.00	2059.04 BC
177	304430.812	1289986.144	598+10.36	-61.00	2059.04 BC
178	304470.790	1289987.481	598+50.36	-61.00	Center of radius
179	304469.454	1290027.458	598+50.36	-21.00	2058.27 BC
180	304706.919	1290035.395	600+87.96	-21.00	2057.62 BC
181	304708.256	1289995.417	600+87.96	-61.00	Center of radius
182	304748.233	1289996.753	601+27.96	-61.00	2056.87 BC
183	304777.075	1290003.675	601+55.96	-61.00	2056.87 BC
184	304816.195	1289999.025	601+95.96	-61.00	Center of radius
185	304814.859	1290039.002	601+95.96	-21.00	2057.79 BC
186	304705.517	1290077.371	600+87.96	21.00	2057.62 BC
187	304724.511	1290106.126	600+87.96	61.00	Center of radius
188	304804.005	1290099.724	601+27.96	61.00	2057.09 BC
189	304772.142	1290119.620	601+55.96	61.00	2057.09 BC
190	304786.845	1290104.274	601+95.96	61.00	Center of radius
191	304807.196	1290097.268	601+95.96	21.00	2057.79 BC



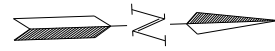
BC= Back of Curb

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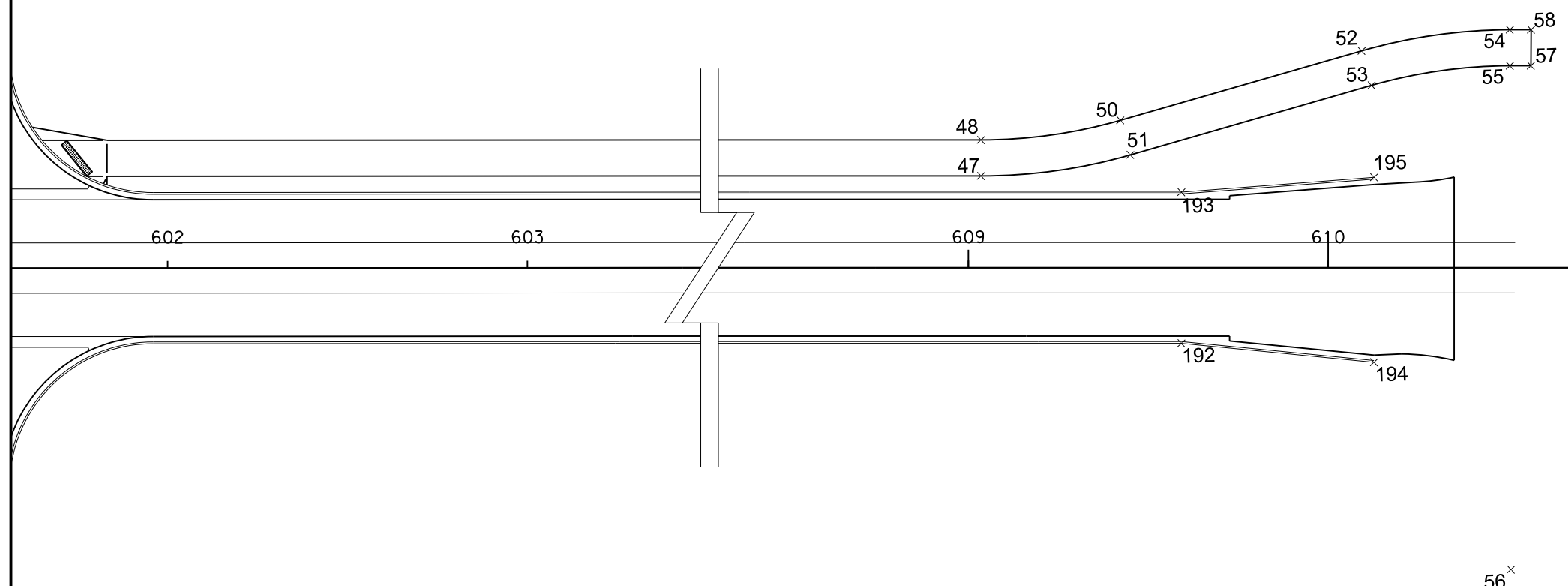
Survey Data Layout
569+00 - 603+00

ND23A

US85B to ND23B



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	82	7



Point	North	East	Station	Offset	Description
47	305522.147	1290058.139	609+03.49	-25.50	Edge of sidewalk
48	305522.481	1290048.144	609+03.49	-35.50	Edge of sidewalk
49	305527.157	1289908.222	609+03.49	-175.50	Center of radius
50	305561.380	1290043.975	609+42.23	-40.97	Edge of sidewalk
51	305563.824	1290053.672	609+45.00	-31.36	Edge of sidewalk
52	305629.017	1290026.924	610+09.26	-60.27	Edge of sidewalk
53	305631.462	1290036.621	610+12.03	-50.66	Edge of sidewalk
54	305670.385	1290022.447	610+50.46	-66.12	Edge of sidewalk
55	305670.055	1290032.442	610+50.46	-56.12	Edge of sidewalk
56	305665.685	1290172.373	610+50.77	83.88	Center of radius
57	305675.898	1290032.623	610+56.31	-56.14	Edge of sidewalk
58	305676.292	1290022.631	610+56.37	-66.14	Edge of sidewalk

Point	North	East	Station	Offset	Description
192	305576.234	1290106.472	609+59.17	21.00	2058.30 BC
193	305577.637	1290064.496	609+59.17	-21.00	2058.30 BC
194	305629.565	1290113.529	610+12.70	26.27	2058.66 BC
195	305631.284	1290062.143	610+12.70	-25.14	2058.68 BC

BC= Back of Curb

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Survey Data Layout
 603+00 - 611+00
 ND23A
 US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	82	8

Chain 23AWATERMAIN contains:
1000 1001 1002 1003 1004 1005 CUR C1006 1007 1008

Beginning chain 23AWATERMAIN description

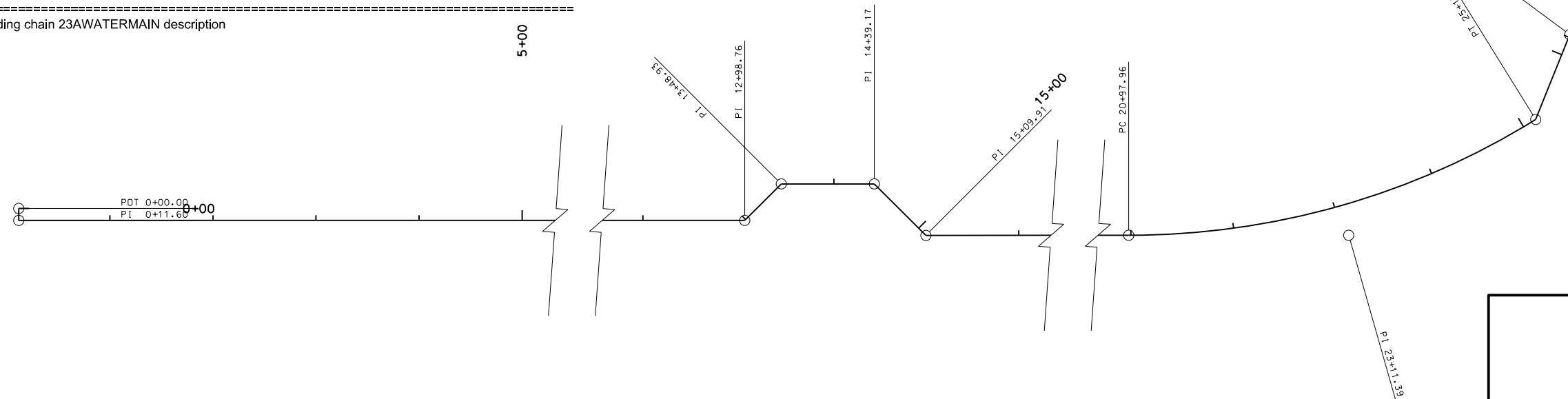
Point 1000 N 302,765.9135 E 1,287,081.9646 Sta 0+00.00
 Course from 1000 to 1001 S 4° 04' 57.88" W Dist 11.6013
 Point 1001 N 302,754.3417 E 1,287,081.1386 Sta 0+11.60
 Course from 1001 to 1002 S 85° 55' 02.11" E Dist 1,287.1614
 Point 1002 N 302,662.6996 E 1,288,365.0336 Sta 12+98.76
 Course from 1002 to 1003 N 49° 04' 57.88" E Dist 50.1633
 Point 1003 N 302,695.5549 E 1,288,402.9398 Sta 13+48.93
 Course from 1003 to 1004 S 85° 55' 02.13" E Dist 90.2403
 Point 1004 N 302,689.1301 E 1,288,492.9511 Sta 14+39.17
 Course from 1004 to 1005 S 40° 55' 02.14" E Dist 70.7418
 Point 1005 N 302,635.6736 E 1,288,539.2847 Sta 15+09.91
 Course from 1005 to PC C1006 S 85° 55' 02.11" E Dist 588.0488

Curve Data

Curve C1006
 P.I. Station 23+11.39 N 302,578.6108 E 1,289,338.7279
 Delta = 31° 46' 10.68" (LT)
 Degree = 7° 38' 21.97"
 Tangent = 213.4283
 Length = 415.8635
 Radius = 750.0000
 External = 29.7766
 Long Chord = 410.5565
 Mid. Ord. = 28.6396
 P.C. Station 20+97.96 N 302,593.8063 E 1,289,125.8412
 P.T. Station 25+13.82 N 302,677.7780 E 1,289,527.7186
 C.C. N 303,341.9030 E 1,289,179.2390
 Back = S 85° 55' 02.11" E
 Ahead = N 62° 18' 47.20" E
 Chord Bear = N 78° 11' 52.54" E

Point 1007 N 302,677.7780 E 1,289,527.7186 Sta 25+13.82
 Course from 1007 to 1008 N 25° 57' 10.85" E Dist 88.7477
 Point 1008 N 302,757.5758 E 1,289,566.5576 Sta 26+02.57

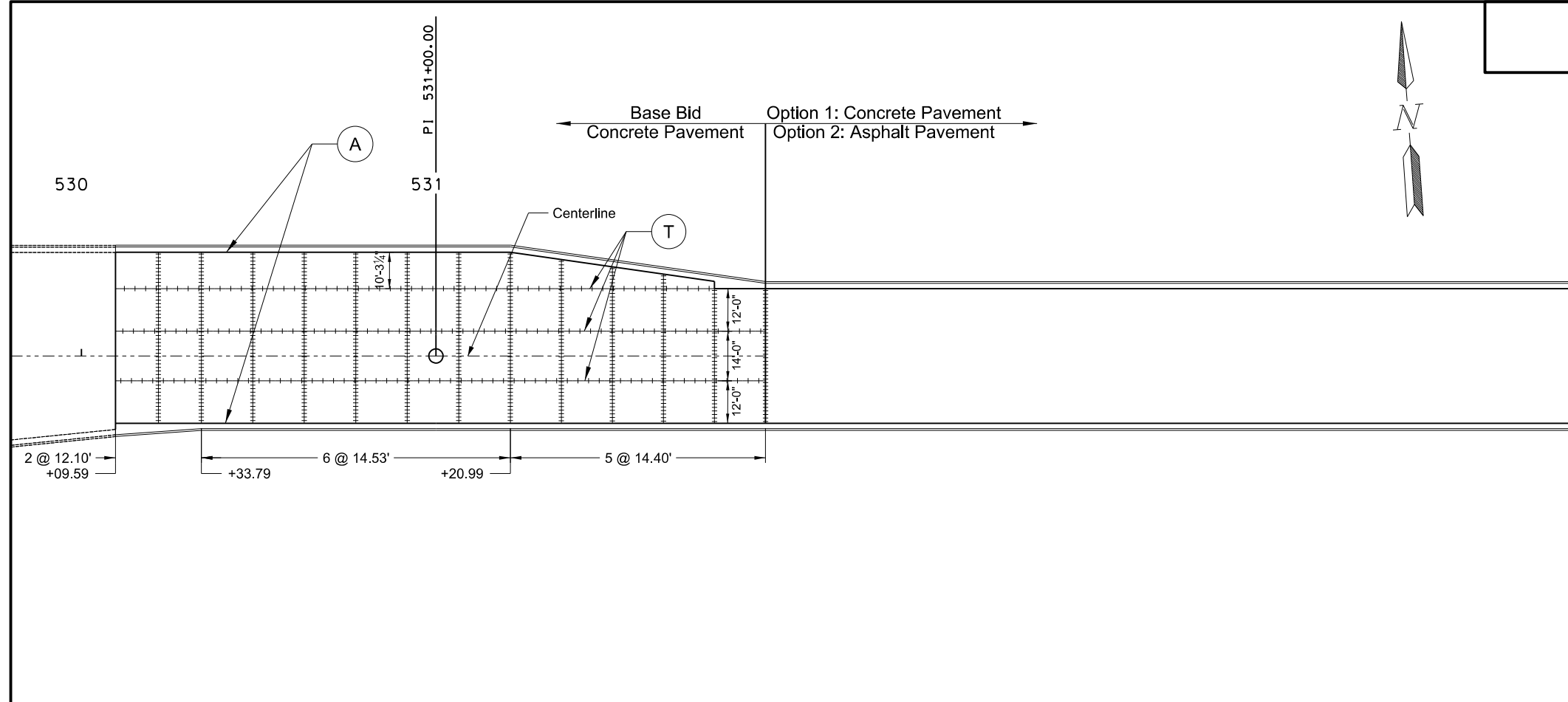
Ending chain 23AWATERMAIN description



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Survey Data Layout
 City Water Main Alignment
 ND23A
 US85B to ND23B

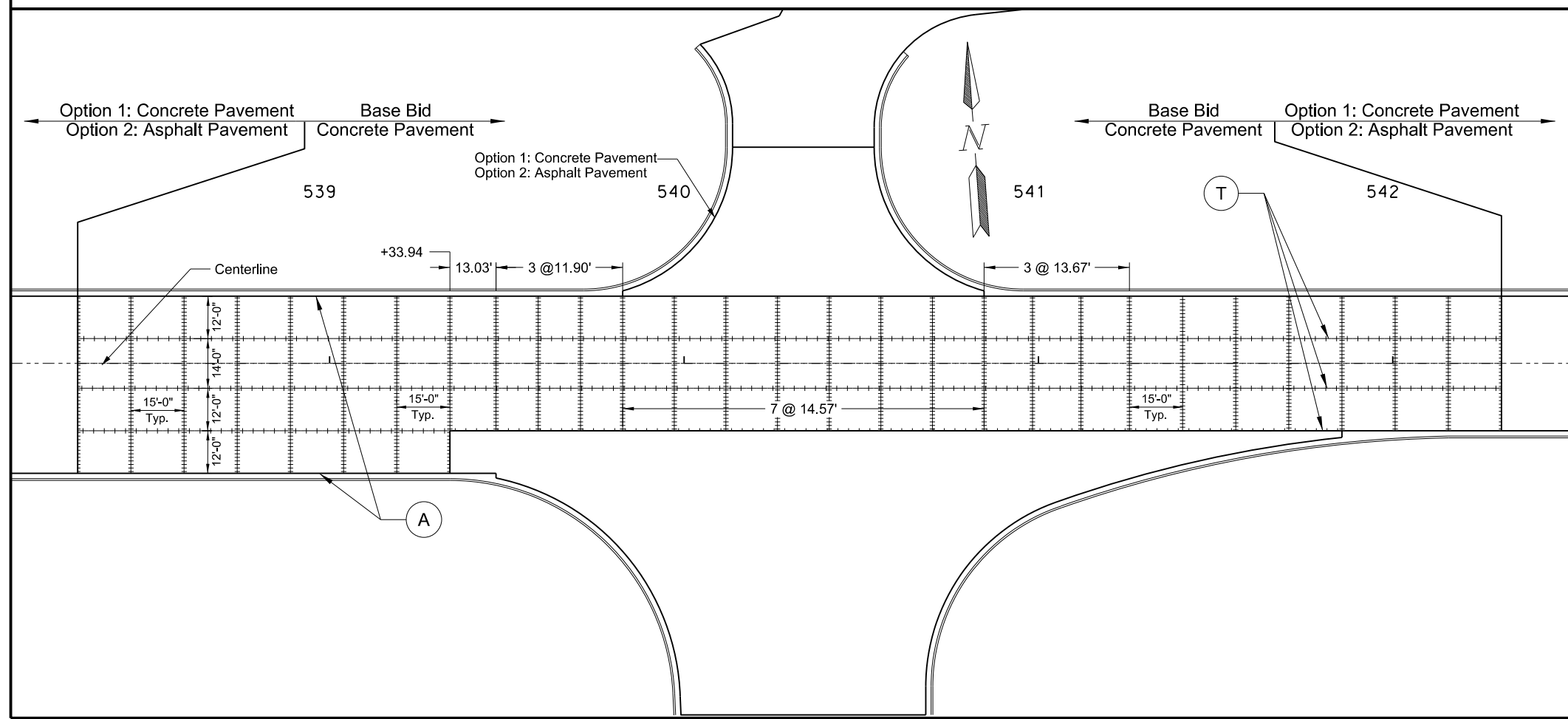
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	90	1



SPEC	CODE	BID ITEM	QUANTITY	UNIT
302	0100	Salvaged Base Course 530+10 to 531+93	470	TON
550	0305	9IN Non-Reinf Concrete Pvmnt CL AE-Doweled 530+10 to 531+93	941	SY
748	0140	Curb & Gutter-Type I 530+10 to 531+93 LT 530+10 to 531+93 RT 538+29 to 539+72 LT 538+29 to 539+34 RT 540+96 to 542+30 LT 542+16 to 542+31 RT	184 184 143 105 134 15	LF LF LF LF LF LF

CITY FUNDED STREET IMPROVEMENTS

SPEC	CODE	BID ITEM	QUANTITY	UNIT
302	0100	Salvaged Base Course 538+29 to 542+31	848	TON
550	0305	9IN Non-Reinf Concrete Pvmnt CL AE-Doweled 538+29 to 542+31	1836	SY



- LEGEND**
- (A) Curb and Gutter (All): No. 3 tie bars, 1'-6" @ 4' c to c (continuous)
 - (T) Tied Joint - See Detail
 - [Grid Pattern] Paving Reinforcement - See Section 20 Detail
 - +++++ Doweled Joint
 - 23A Centerline

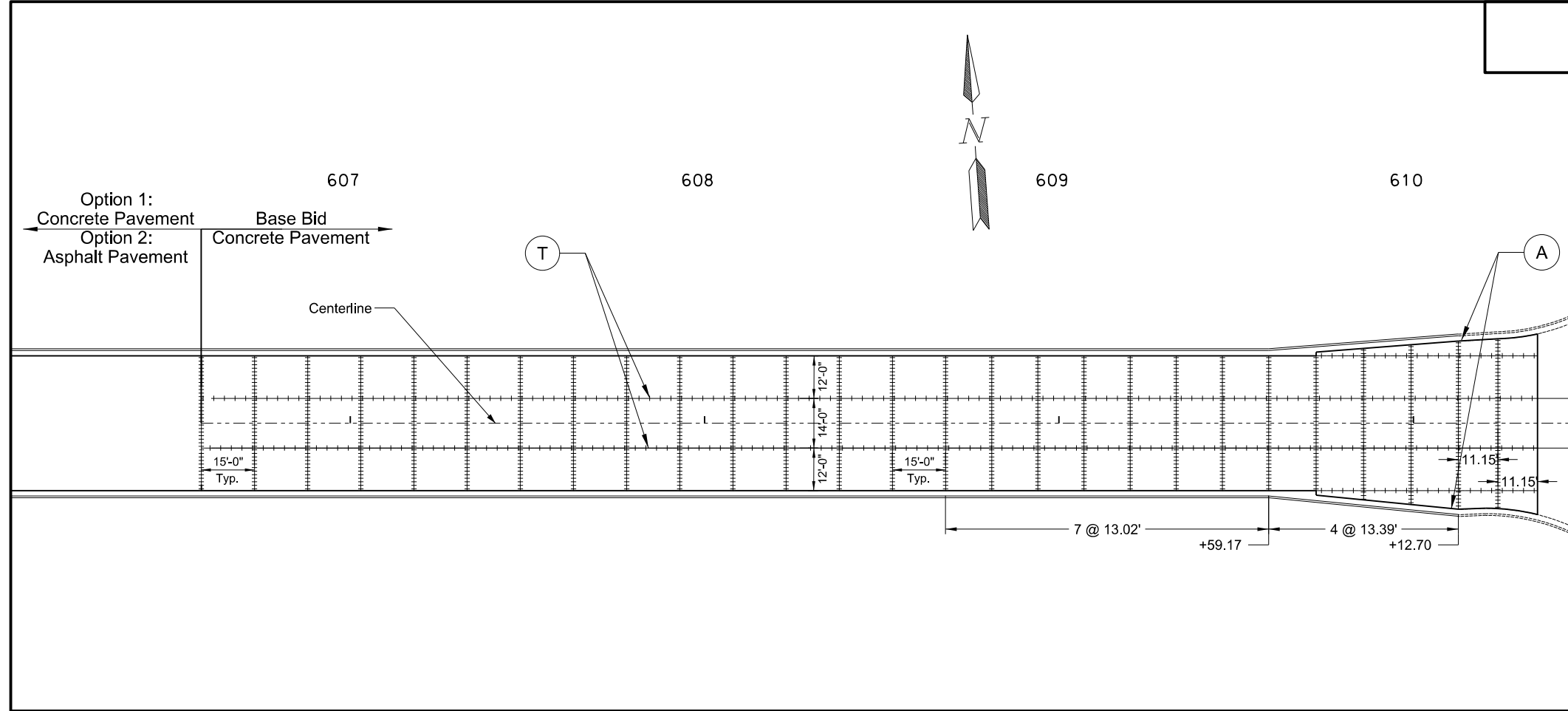
Note: Stations & Offsets from alignment PR23A

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Paving Layout
Base Bid: Concrete Pavement

ND23A
US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	90	2



SPEC	CODE	BID ITEM	QUANTITY	UNIT
302	0100	Salvaged Base Course 606+59 to 610+13	833	TON
550	0305	9IN Non-Reinf Concrete Pvmt CL AE-Doweled 606+59 to 610+13	1644	SY
748	0140	Curb & Gutter-Type I 606+59 to 610+13 LT 606+59 to 610+13 RT	355 355	LF LF

LEGEND

- A Curb and Gutter (All): No. 3 tie bars, 1'-6" @ 4' c to c (continuous)
- T Tied Joint - See Detail
- Paving Reinforcement - See Section 20 Detail
- Doweled Joint
- 23A Centerline

Note: Stations & Offsets from alignment PR23A

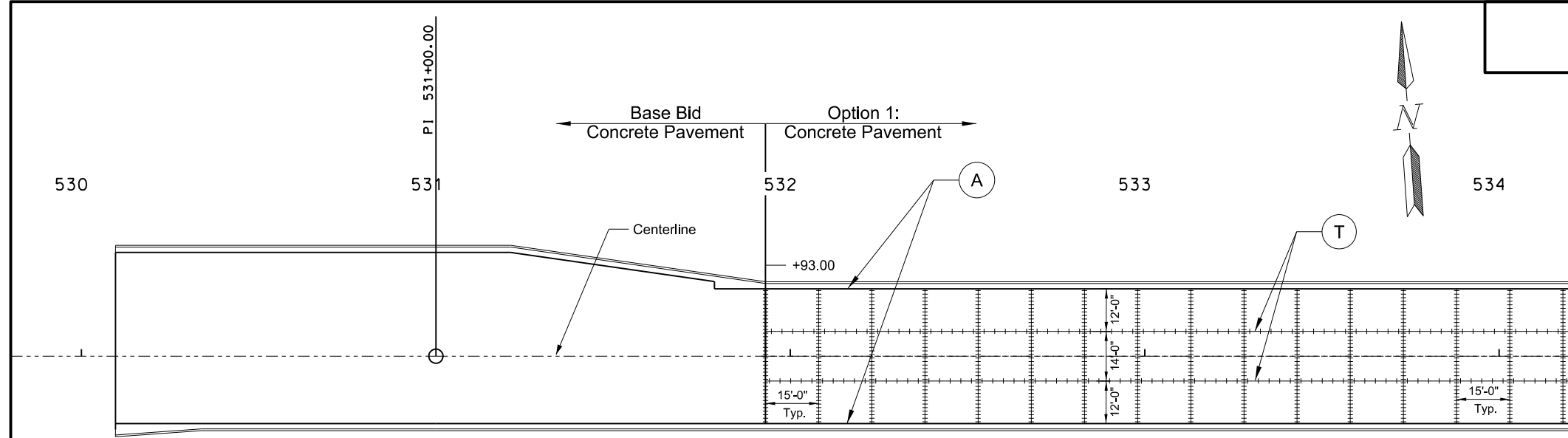
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Paving Layout
Base Bid: Concrete Pavement

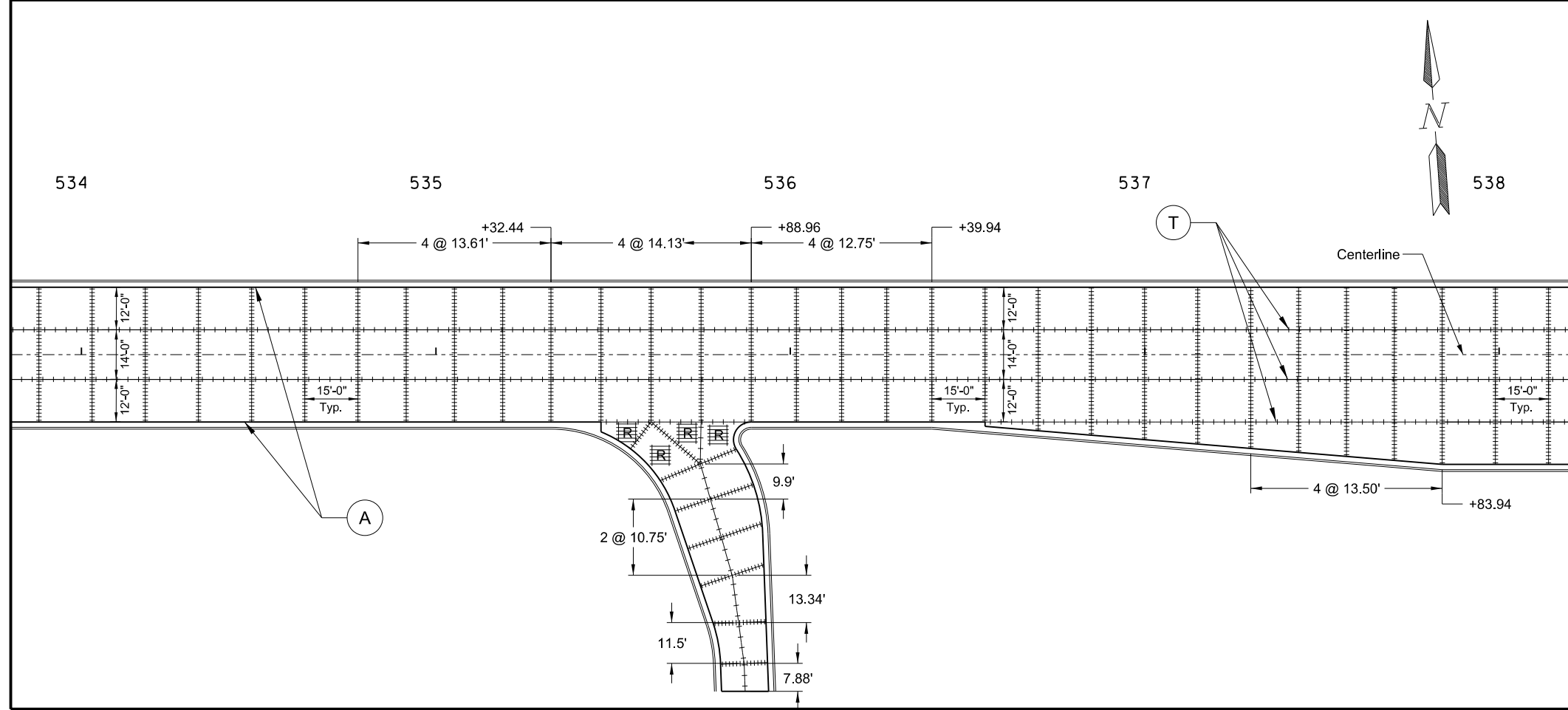
ND23A

US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	90	3



SPEC	CODE	BID ITEM	QUANTITY	UNIT
302	0100	Salvaged Base Course 531+93 to 538+00	1360	TON
550	0305	9IN Non-Reinf Concrete Pvmnt CL AE-Doweled 531+93 to 538+00	2679	SY
748	0140	Curb & Gutter-Type I 531+93 to 538+00 LT 531+93 to 535+32 RT 535+89 to 538+00 RT	608 340 211	LF LF LF



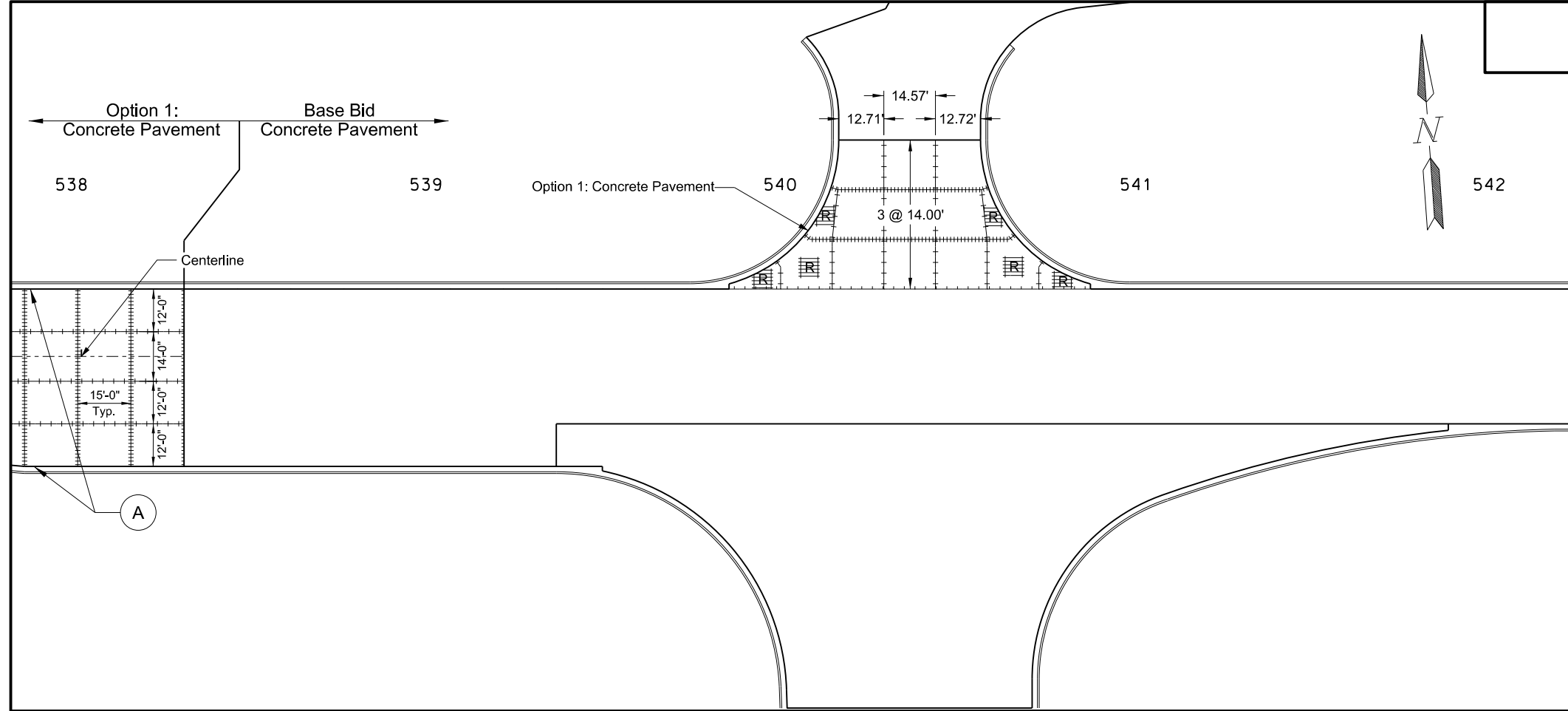
- LEGEND**
- (A) Curb and Gutter (All): No. 3 tie bars, 1'-6" @ 4' c to c (continuous)
 - (T) Tied Joint - See Detail
 - [Reinforcement Symbol] Paving Reinforcement - See Section 20 Detail
 - [Dashed Line Symbol] Doweled Joint
 - [Dashed Line Symbol] 23A Centerline

Note: Stations & Offsets from alignment PR23A

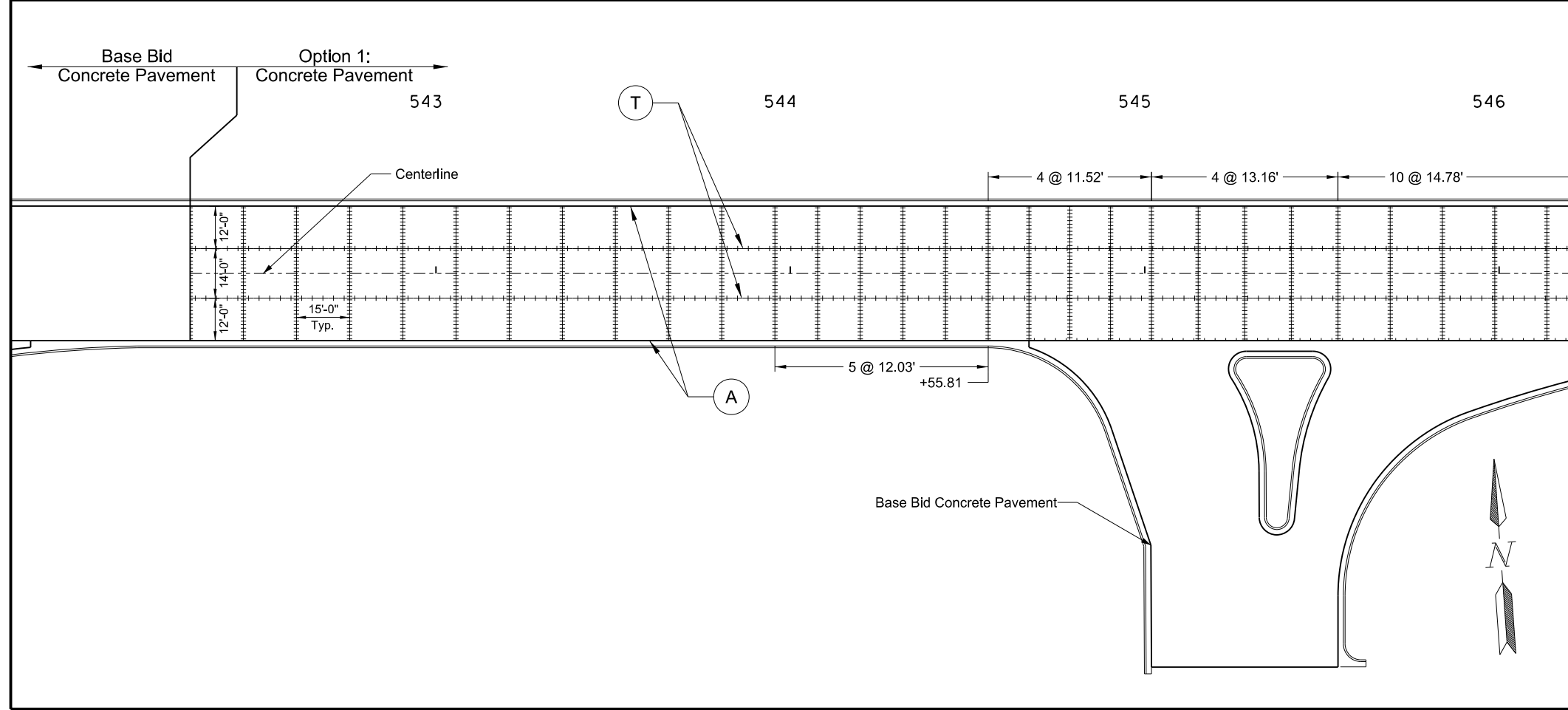
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Paving Layout
Option 1: Concrete Pavement
ND23A
US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	90	4



SPEC	CODE	BID ITEM	QUANTITY	UNIT
302	0100	Salvaged Base Course		
		538+00 to 538+29	79	TON
		542+31 to 546+00	774	TON
550	0305	9IN Non-Reinf Concrete Pvmnt CL AE-Doweled		
		538+00 to 538+29	161	SY
		542+31 to 546+00	1559	SY
748	0140	Curb & Gutter-Type I		
		538+00 to 538+29 RT	29	LF
		538+00 to 538+29 LT	29	LF
		542+31 to 546+00 LT	370	LF
		542+31 to 544+56 RT	225	LF



LEGEND

- A Curb and Gutter (All): No. 3 tie bars, 1'-6" @ 4' c to c (continuous)
- T Tied Joint - See Detail
- Paving Reinforcement - See Section 20 Detail
- Doweled Joint
- 23A Centerline

Note: Stations & Offsets from alignment PR23A

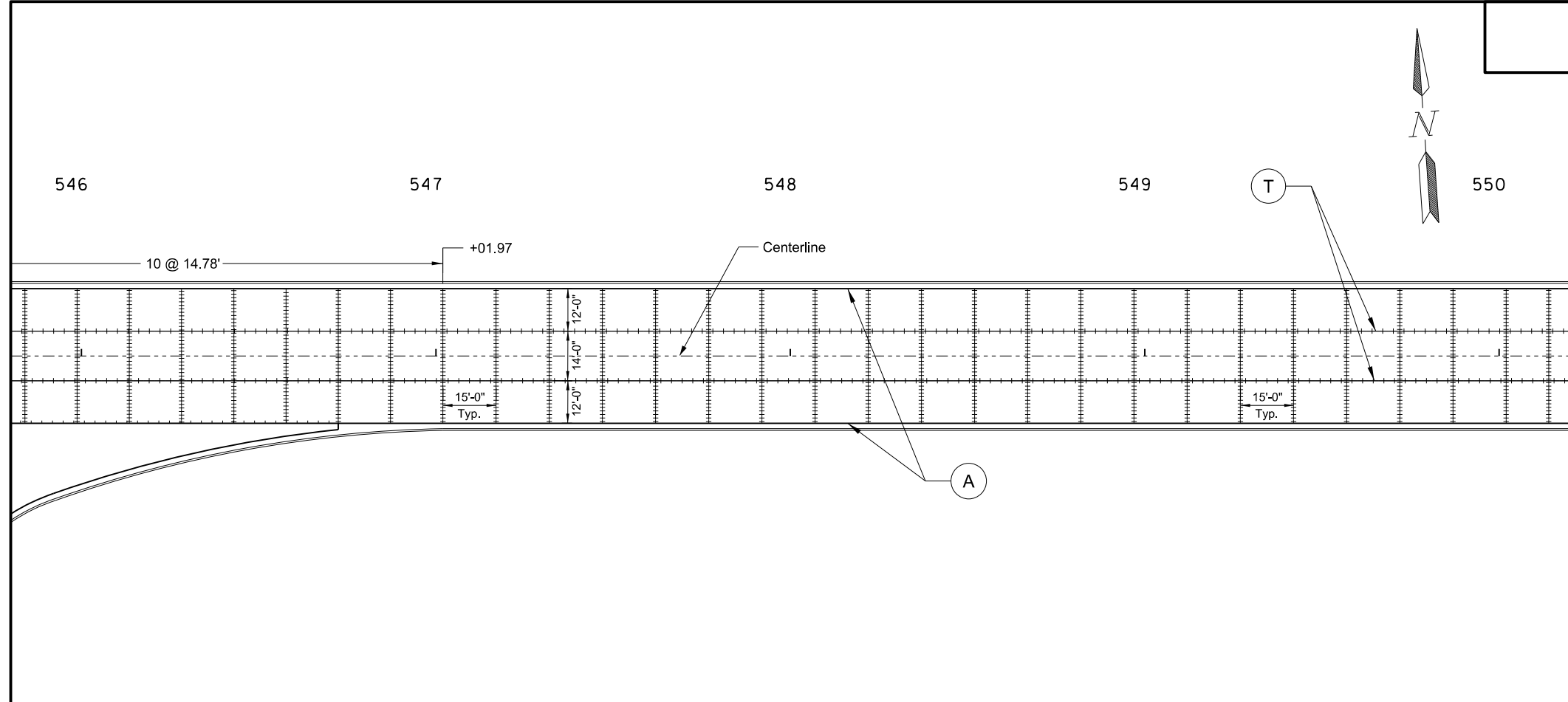
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Paving Layout
Option 1: Concrete Pavement

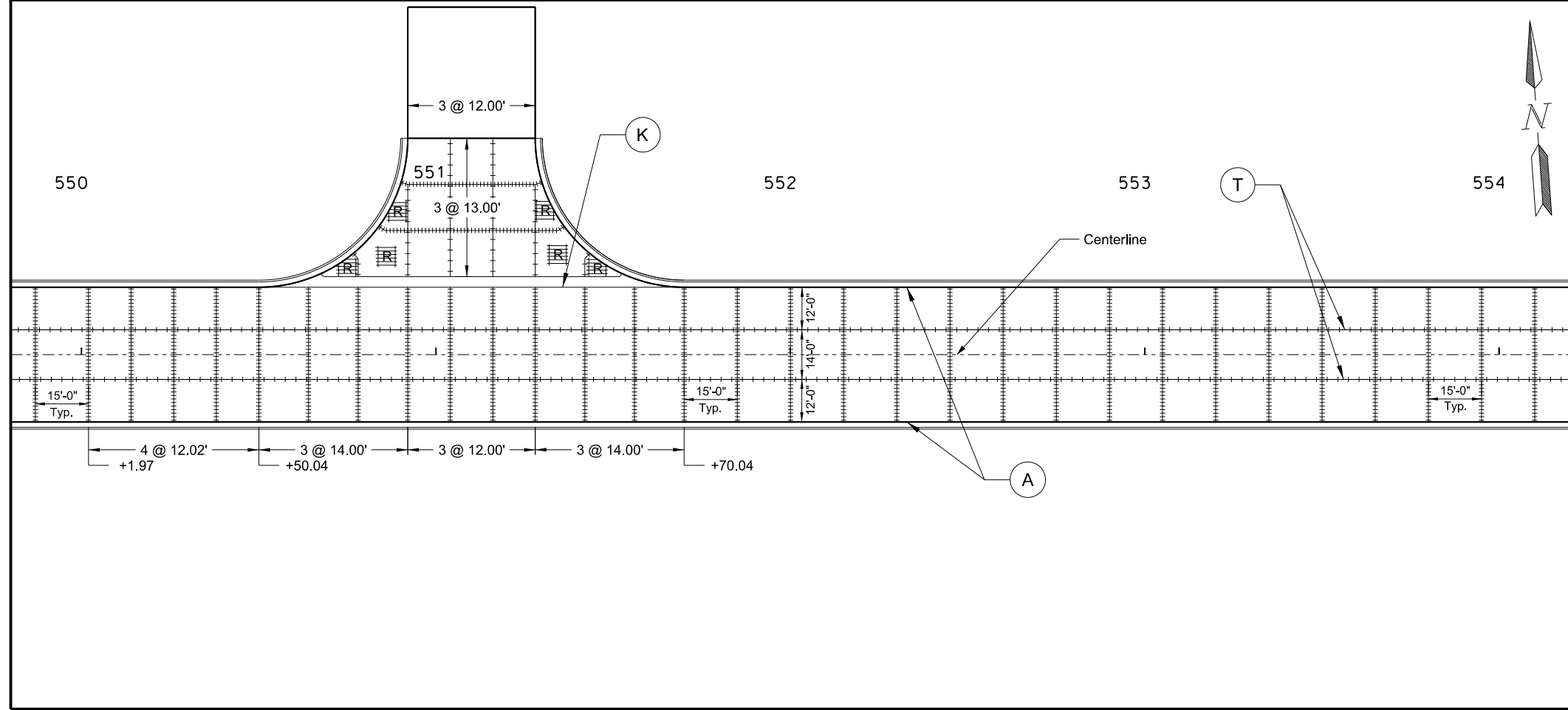
ND23A

US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	90	5



SPEC	CODE	BID ITEM	QUANTITY	UNIT
302	0100	Salvaged Base Course 546+00 to 554+00	1694	TON
550	0305	9IN Non-Reinf Concrete Pvmnt CL AE-Doweled 546+00 to 554+00	3378	SY
748	0140	Curb & Gutter-Type I 546+00 to 550+50 LT 547+02 to 554+00 RT 551+70 to 554+00 LT	450 698 230	LF LF LF



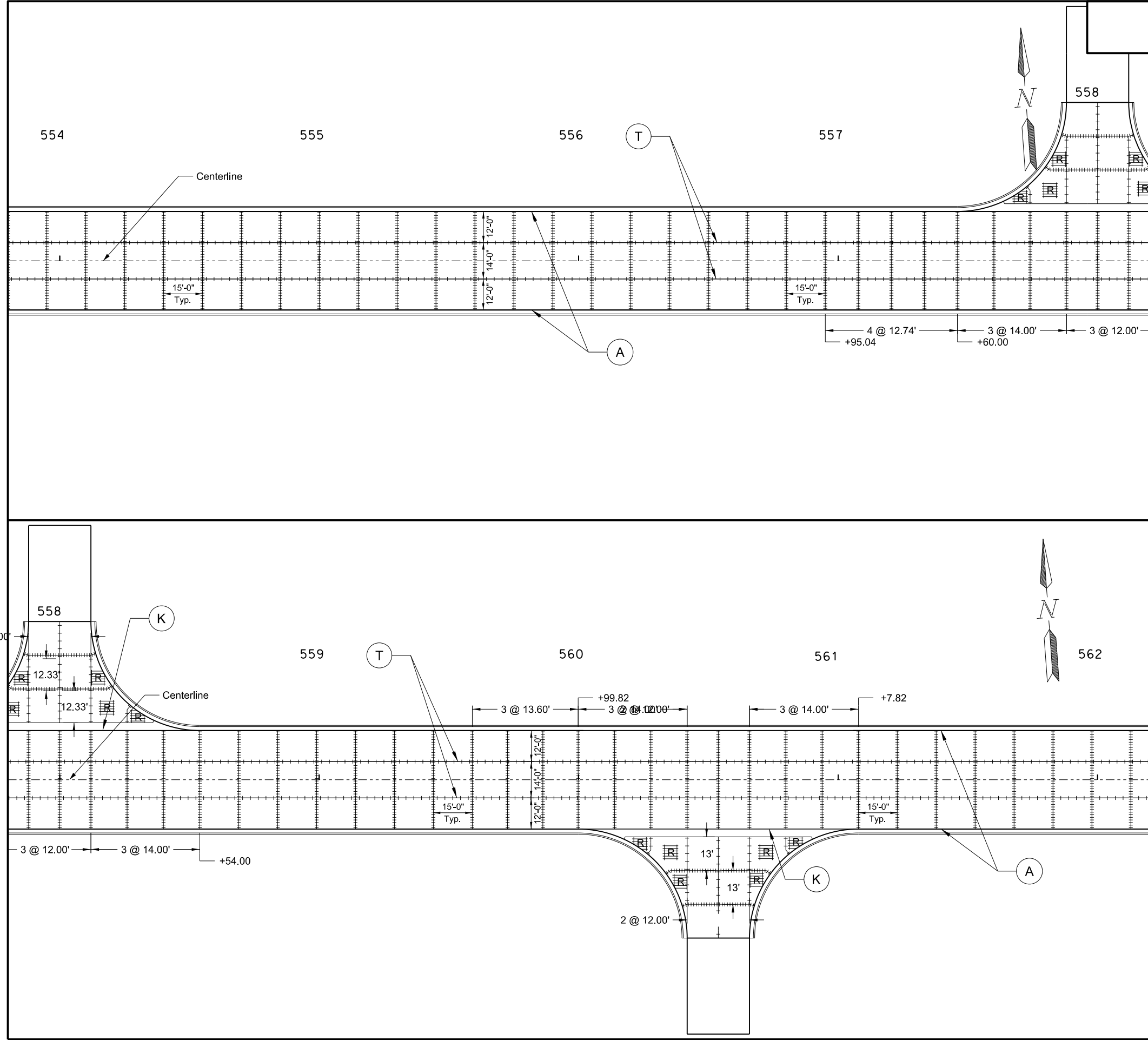
- LEGEND**
- (A) Curb and Gutter (All): No. 3 tie bars, 1'-6" @ 4' c to c (continuous)
 - (T) Tied Joint - See Detail
 - [Hatched Box] Paving Reinforcement - See Section 20 Detail
 - [Dashed Line] Doweled Joint
 - [Dotted Line] 23A Centerline

Note: Stations & Offsets from alignment PR23A

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Paving Layout
 Option 1: Concrete Pavement
 ND23A
 US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	90	6



SPEC	CODE	BID ITEM	QUANTITY	UNIT
302	0100	Salvaged Base Course 554+00 to 562+00	1696	TON
550	0305	9IN Non-Reinf Concrete Pvmnt CL AE-Doweled 554+00 to 562+00	3378	SY
748	0140	Curb & Gutter-Type I 554+00 to 560+02 LT 554+00 to 560+02 RT 561+06 to 562+00 LT 561+06 to 562+00 RT	600 600 94 94	LF LF LF LF

LEGEND

- (A) Curb and Gutter (All): No. 3 tie bars, 1'-6" @ 4' c to c (continuous)
- (T) Tied Joint - See Detail
- [Reinforcement Symbol] Paving Reinforcement - See Section 20 Detail
- [Dashed Line Symbol] Doweled Joint
- [Centerline Symbol] 23A Centerline

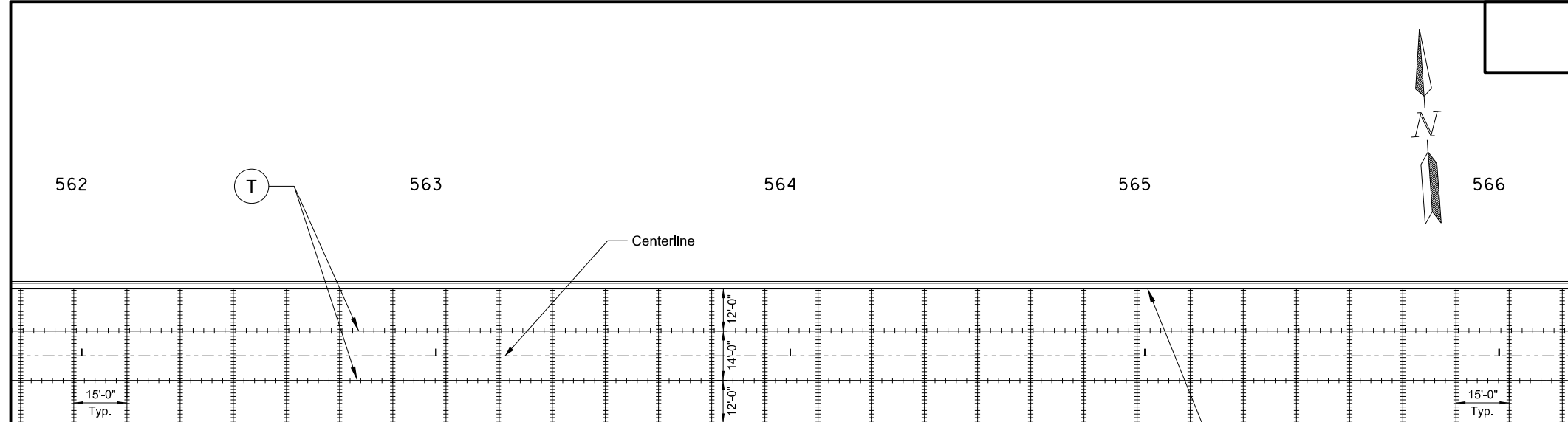
Note: Stations & Offsets from alignment PR23A

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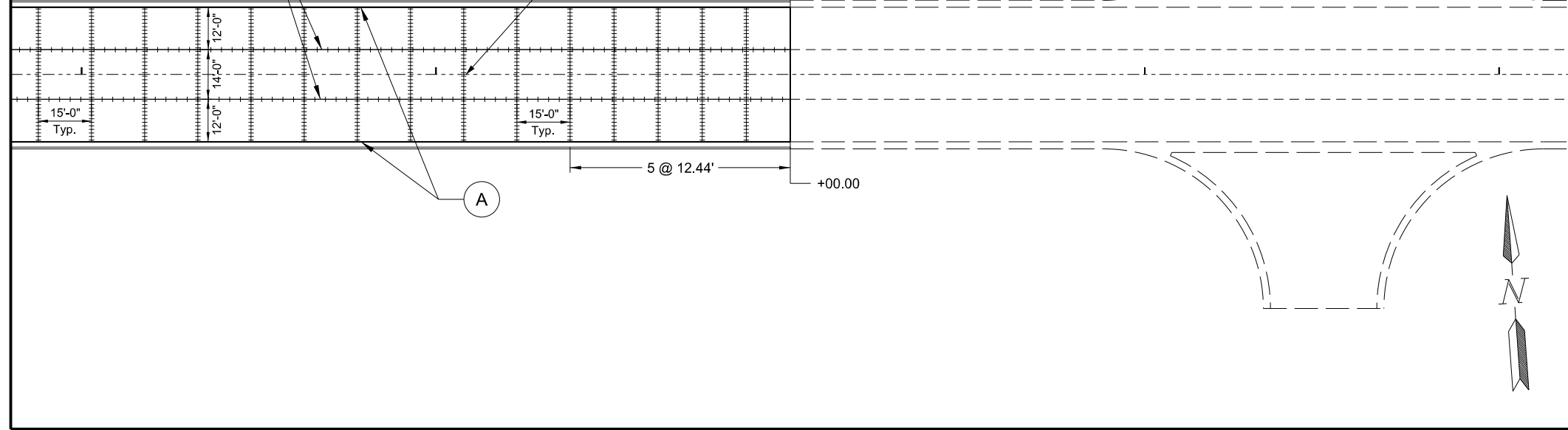
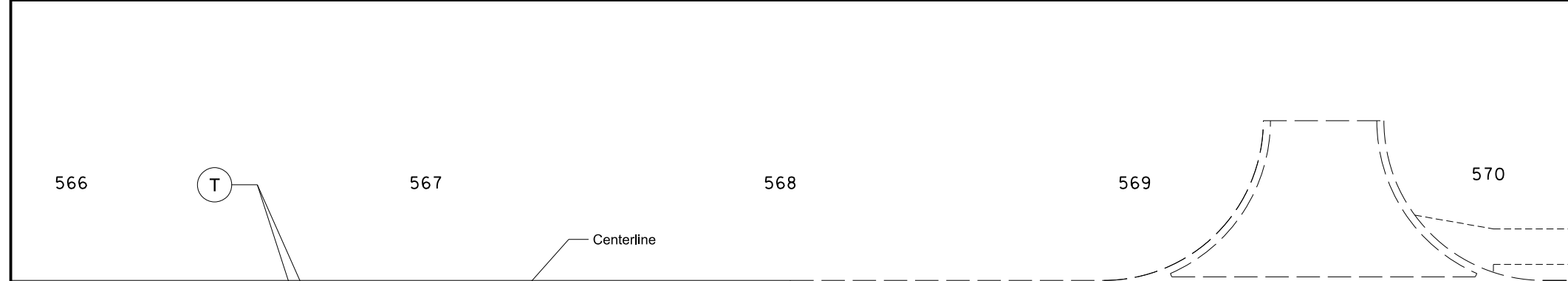
Paving Layout
Option 1: Concrete Pavement

ND23A
US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	90	7



SPEC	CODE	BID ITEM	QUANTITY	UNIT
302	0100	Salvaged Base Course 562+00 to 568+00	1306	TON
550	0305	9IN Non-Reinf Concrete Pvmnt CL AE-Doweled 562+00 to 568+00	2533	SY
748	0140	Curb & Gutter-Type I 562+00 to 568+00 LT 562+00 to 568+00 RT	600 600	LF LF



- LEGEND**
- (A) Curb and Gutter (All): No. 3 tie bars, 1'-6" @ 4' c to c (continuous)
 - (T) Tied Joint - See Detail
 - [Hatched Box] Paving Reinforcement - See Section 20 Detail
 - [Dashed Line] Doweled Joint
 - [Dashed Line] 23A Centerline

Note: Stations & Offsets from alignment PR23A

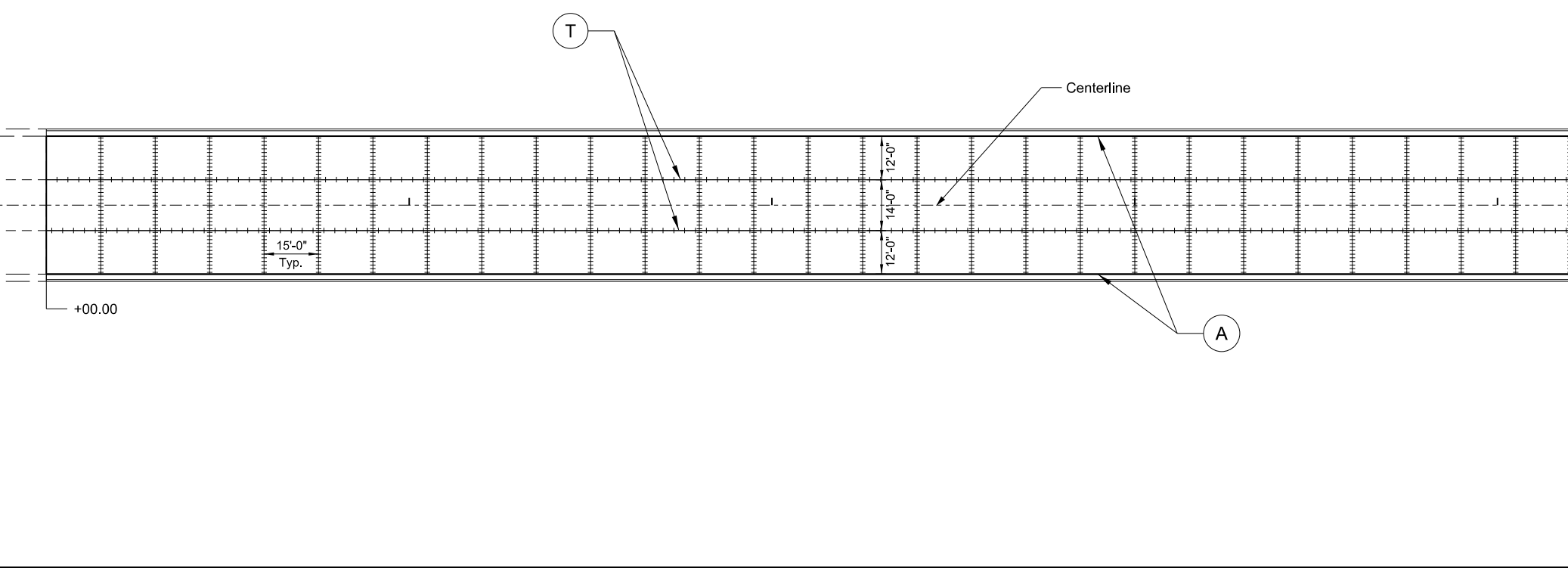
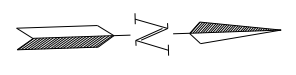
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Paving Layout
Option 1: Concrete Pavement

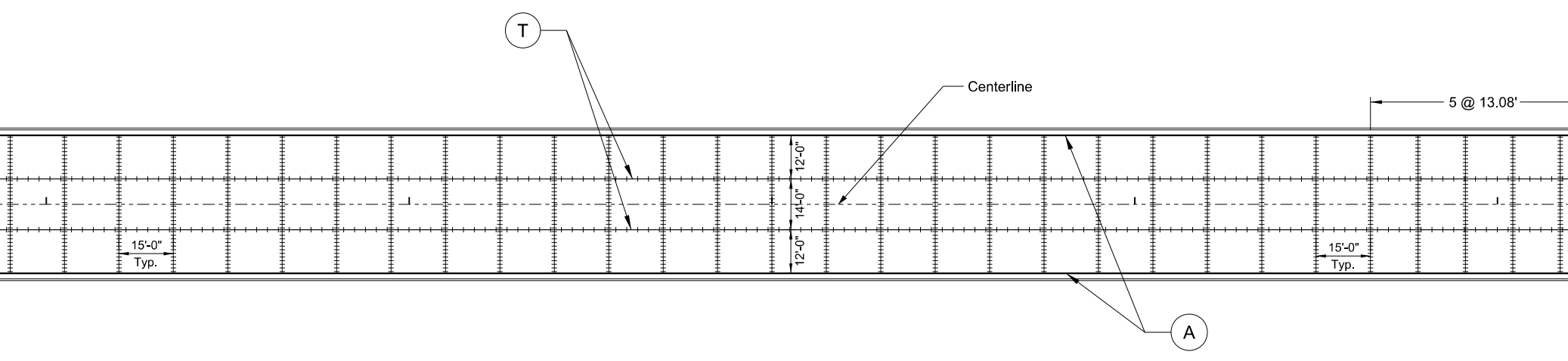
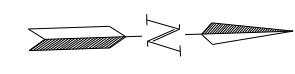
ND23A
US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	90	8

589 590 591 592 593








593 594 595 596 597



SPEC	CODE	BID ITEM	QUANTITY	UNIT
302	0100	Salvaged Base Course 589+00 to 597+00	1741	TON
550	0305	9IN Non-Reinf Concrete Pmnt CL AE-Doweled 589+00 to 597+00	3378	SY
748	0140	Curb & Gutter-Type I 589+00 to 597+00 LT 589+00 to 597+00 RT	800 800	LF LF

LEGEND

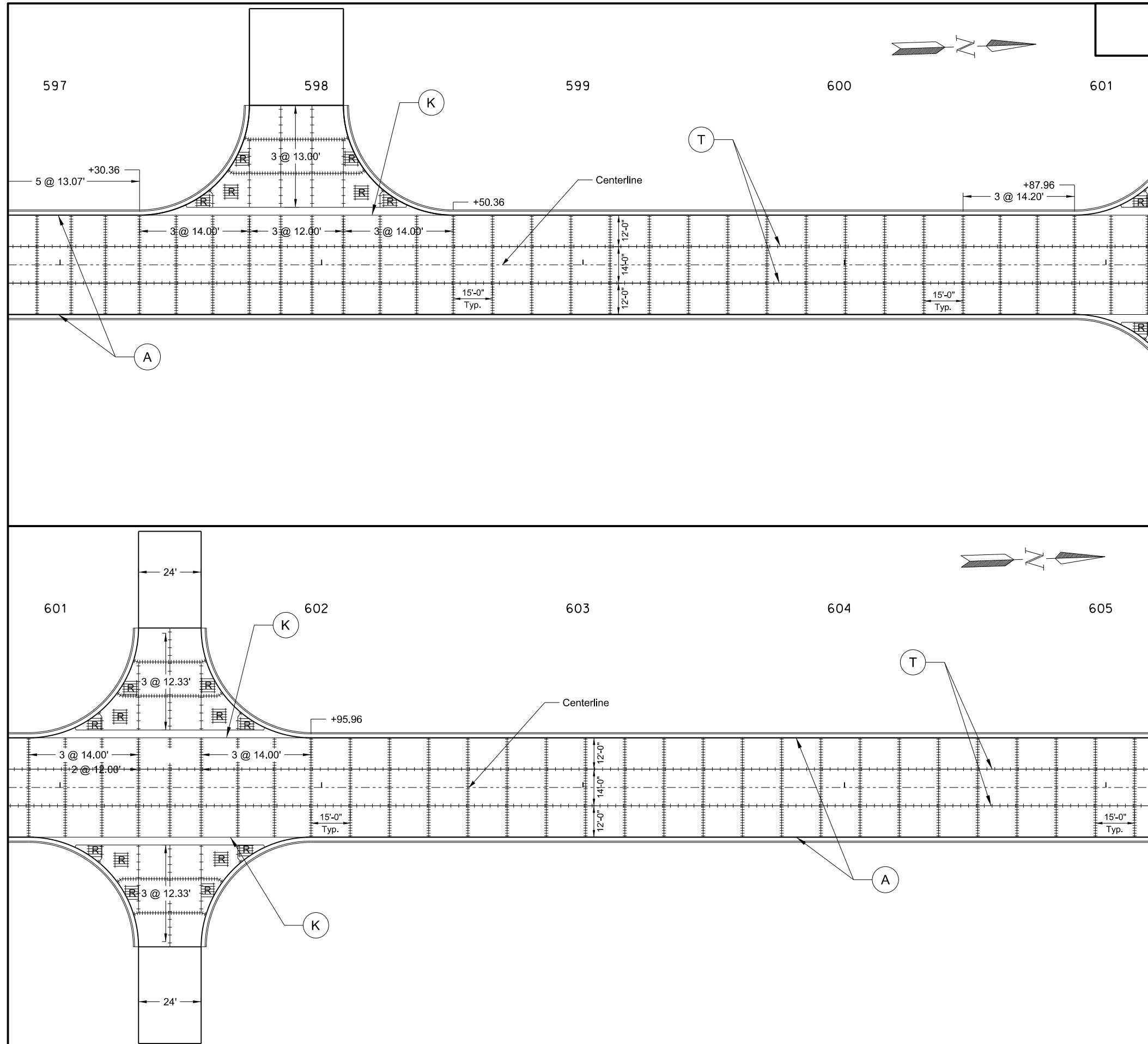
-  Curb and Gutter (All): No. 3 tie bars, 1'-6" @ 4' c to c (continuous)
-  Tied Joint - See Detail
-  Paving Reinforcement - See Section 20 Detail
-  Doweled Joint
-  23A Centerline

Note: Stations & Offsets from alignment PR23A

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Paving Layout
Option 1: Concrete Pavement

ND23A
US85B to ND23B



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	90	9

SPEC	CODE	BID ITEM	QUANTITY	UNIT
302	0100	Salvaged Base Course 597+00 to 605+00	1671	TON
550	0305	9IN Non-Reinf Concrete Pvmnt CL AE-Doweled 597+00 to 605+00	3378	SY
748	0140	Curb & Gutter-Type I 597+00 to 597+30 LT 597+00 to 600+90 RT 598+50 to 600+90 LT 601+94 to 605+00 LT 601+94 to 605+00 RT	30 390 240 306 306	LF LF LF LF LF

LEGEND

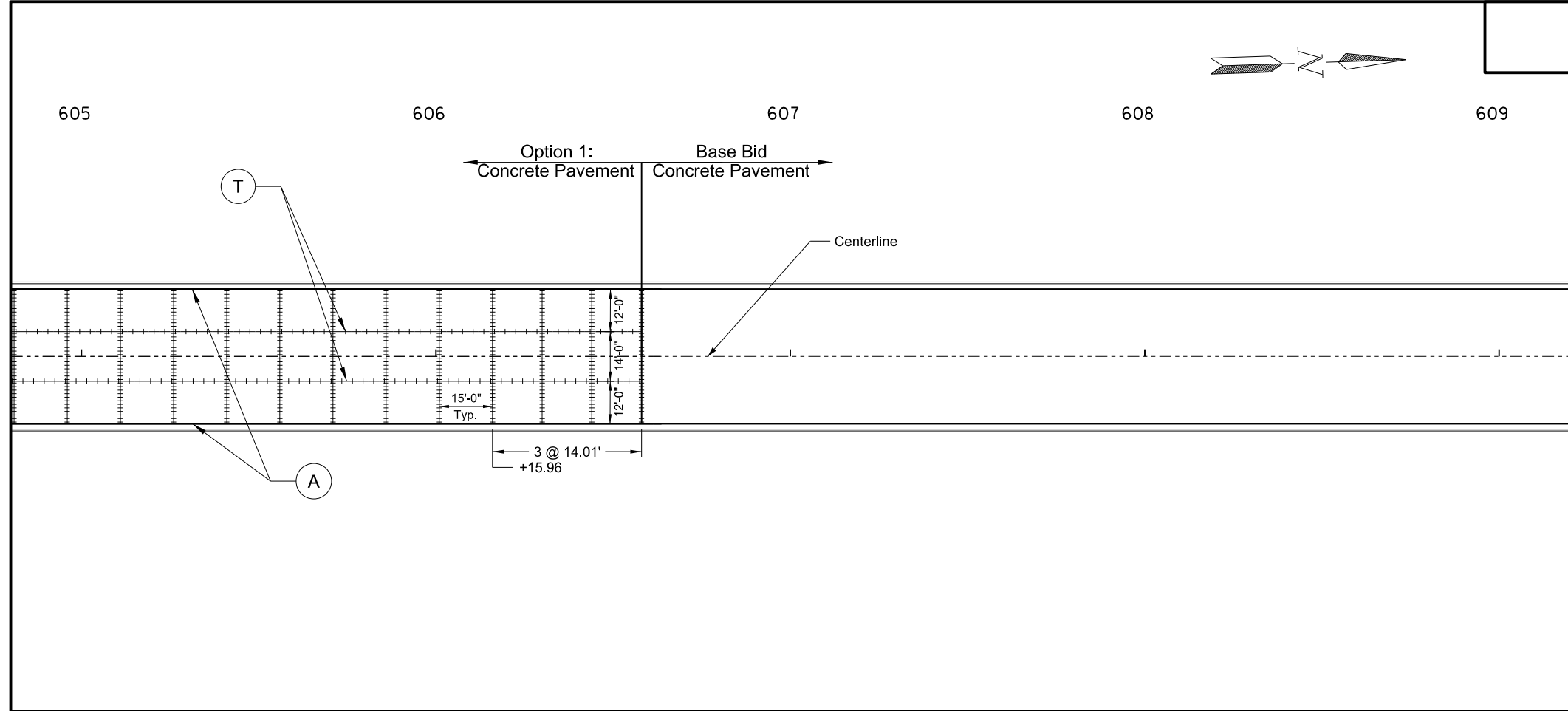
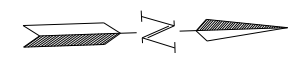
- A Curb and Gutter (All): No. 3 tie bars, 1'-6" @ 4' c to c (continuous)
- T Tied Joint - See Detail
- Paving Reinforcement - See Section 20 Detail
- Doweled Joint
- 23A Centerline

Note: Stations & Offsets from alignment PR23A

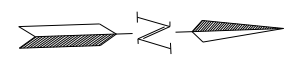
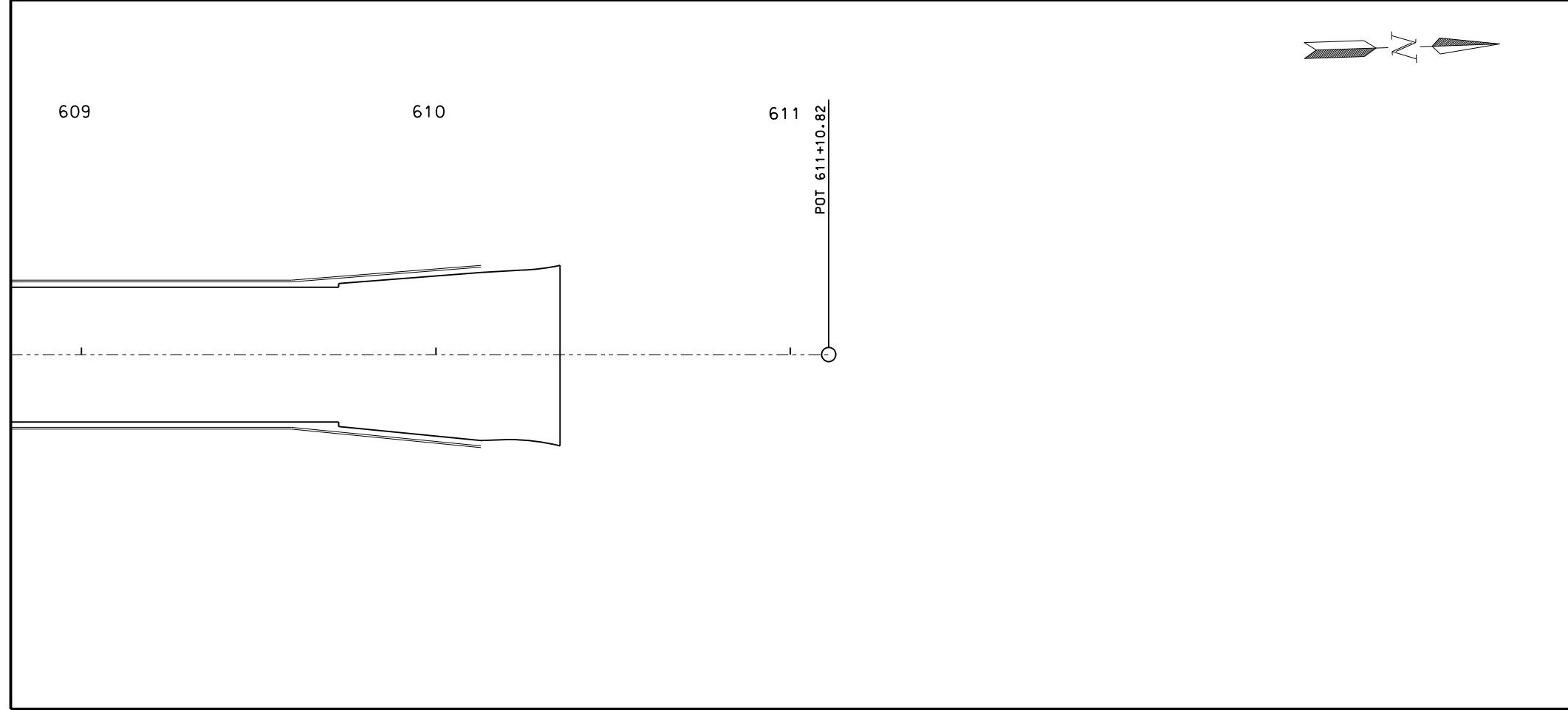
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Paving Layout
 Option 1: Concrete Pavement
 ND23A
 US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	90	10



SPEC	CODE	BID ITEM	QUANTITY	UNIT
302	0100	Salvaged Base Course 605+00 to 606+58	344	TON
550	0305	9IN Non-Reinf Concrete Pmnt CL AE-Doweled 605+00 to 606+58	667	SY
748	0140	Curb & Gutter-Type I 605+00 to 606+58 LT 605+00 to 606+58 RT	158 158	LF LF



LEGEND

- A Curb and Gutter (All): No. 3 tie bars, 1'-6" @ 4' c to c (continuous)
- T Tied Joint - See Detail
- Paving Reinforcement - See Section 20 Detail
- Doweled Joint
- 23A Centerline

Note: Stations & Offsets from alignment PR23A

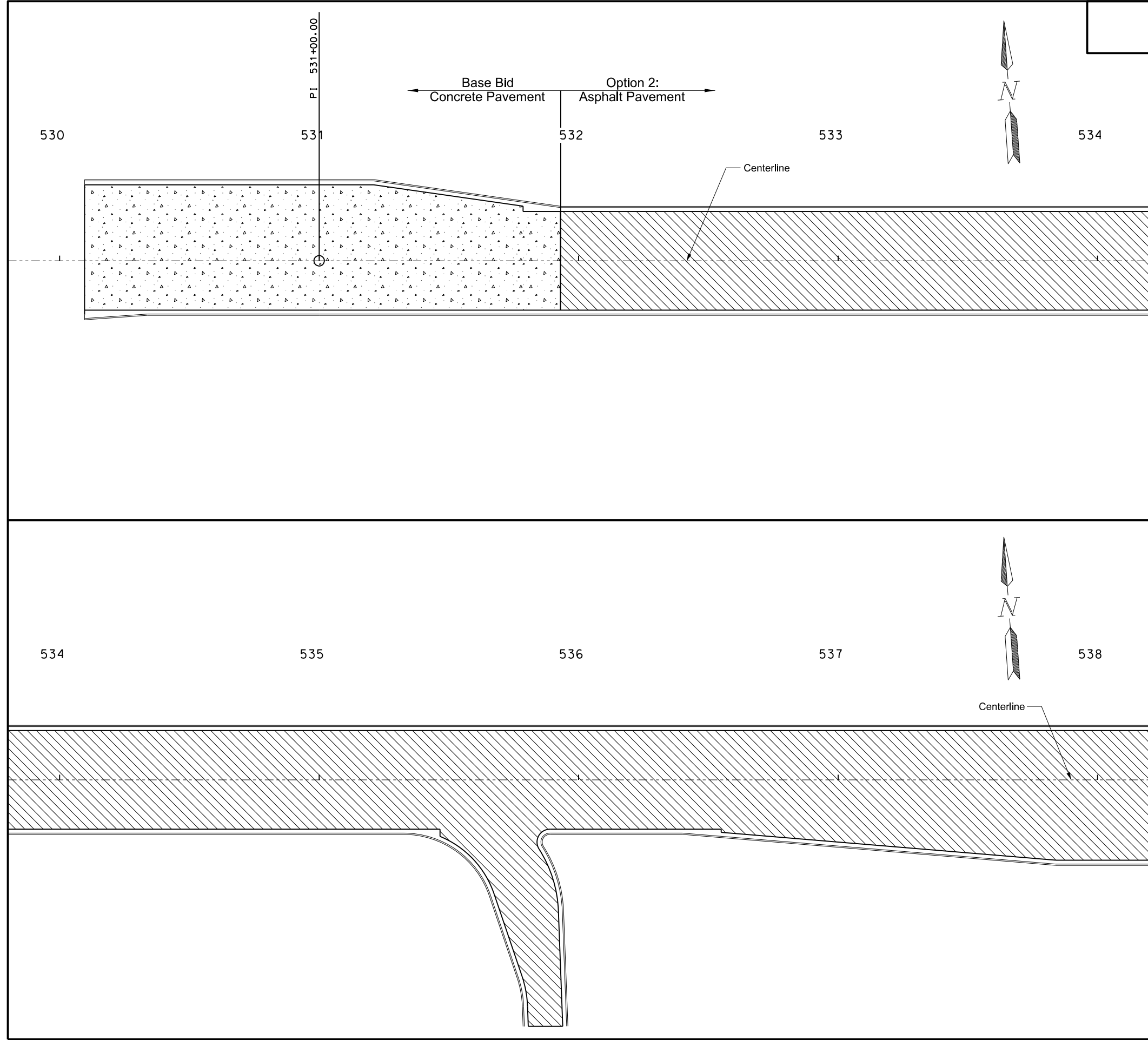
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Paving Layout
Option 1: Concrete Pavement

ND23A

US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	90	11



SPEC	CODE	BID ITEM	QUANTITY	UNIT
302	0100	Salvaged Base Course 531+93 to 538+00	3235	TON
401	0050	Tack Coat 531+93 to 538+00	274	GAL
401	0060	Prime Coat 531+93 to 538+00	685	GAL
401	0160	Blotter Material CL 44 531+93 to 538+00	21	TON
430	0045	Superpave FAA 45 531+93 to 538+00	893	TON
430	5828	PG 58-28 Asphalt Cement 531+93 to 538+00	19	TON
430	6434	PG 64-34 Asphalt Cement 531+93 to 538+00	37	TON
748	0140	Curb & Gutter-Type I 531+93 to 538+00 LT 531+93 to 535+32 RT 535+89 to 538+00 RT	608 340 211	LF LF LF

LEGEND

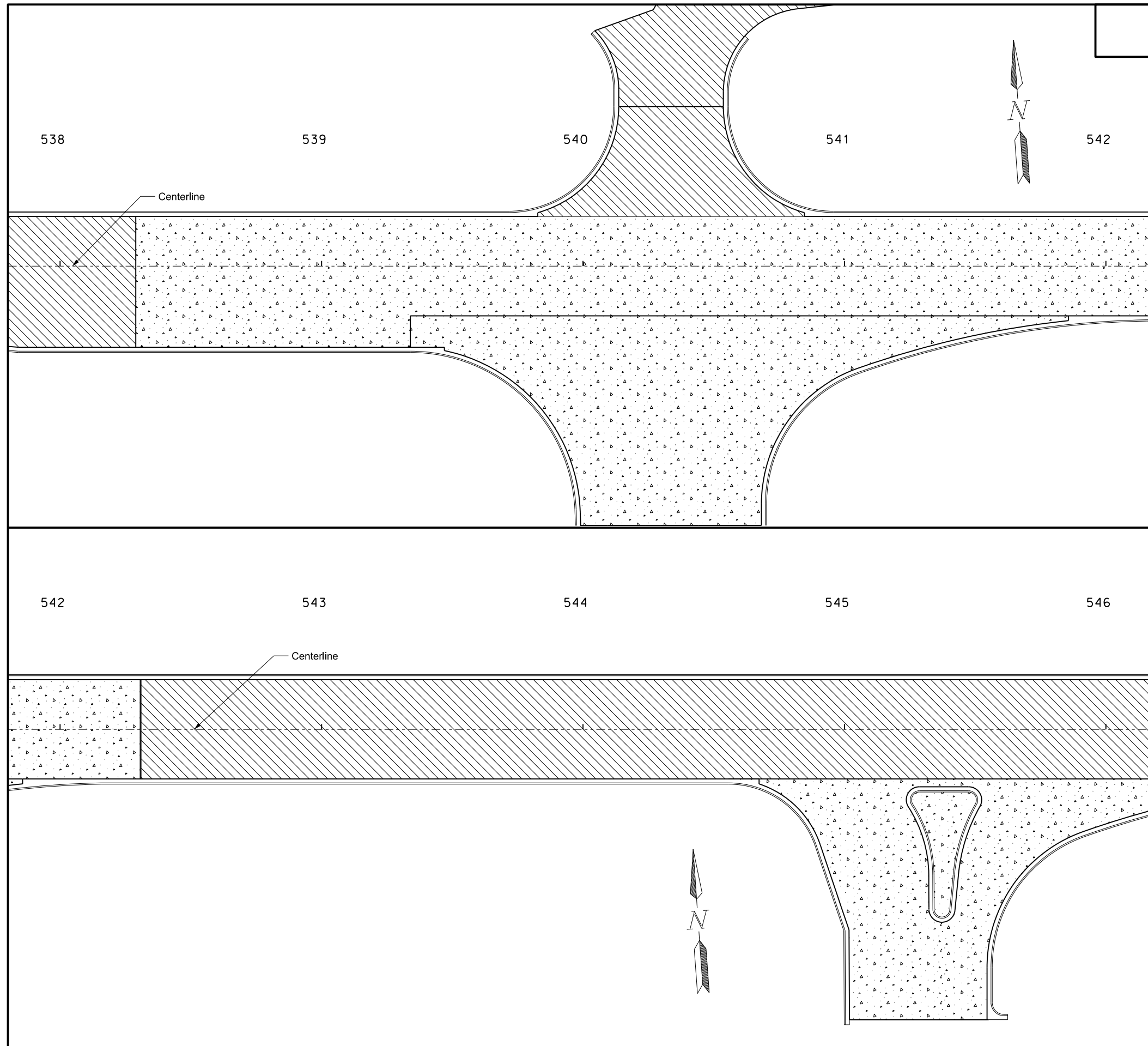
	Superpave FAA 45
	9" Non-Rerforced Concrete Pavement - Doweled
	Salvaged Base Course
	23A Centerline

Note: Stations & Offsets from alignment PR23A

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Paving Layout
Option 2: Asphalt Pavement
ND23A
US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	90	12



SPEC	CODE	BID ITEM	QUANTITY	UNIT
302	0100	Salvaged Base Course		
		538+00 to 538+29	187	TON
		542+31 to 546+00	1833	TON
401	0050	Tack Coat		
		538+00 to 538+29	8	GAL
		542+31 to 546+00	78	GAL
401	0060	Prime Coat		
		538+00 to 538+29	41	GAL
		542+31 to 546+00	390	GAL
401	0160	Blotter Material CL 44		
		538+00 to 538+29	2	TON
		542+31 to 546+00	12	TON
430	0045	Superpave FAA 45		
		538+00 to 538+29	54	TON
		542+31 to 546+00	520	TON
430	5828	PG 58-28 Asphalt Cement		
		538+00 to 538+29	1	TON
		542+31 to 546+00	11	TON
430	6434	PG 64-34 Asphalt Cement		
		538+00 to 538+29	3	TON
		542+31 to 546+00	21	TON
748	0140	Curb & Gutter-Type I		
		538+00 to 538+29 RT	29	LF
		538+00 to 538+29 LT	29	LF
		542+31 to 546+00 LT	370	LF
		542+31 to 544+56 RT	225	LF

LEGEND

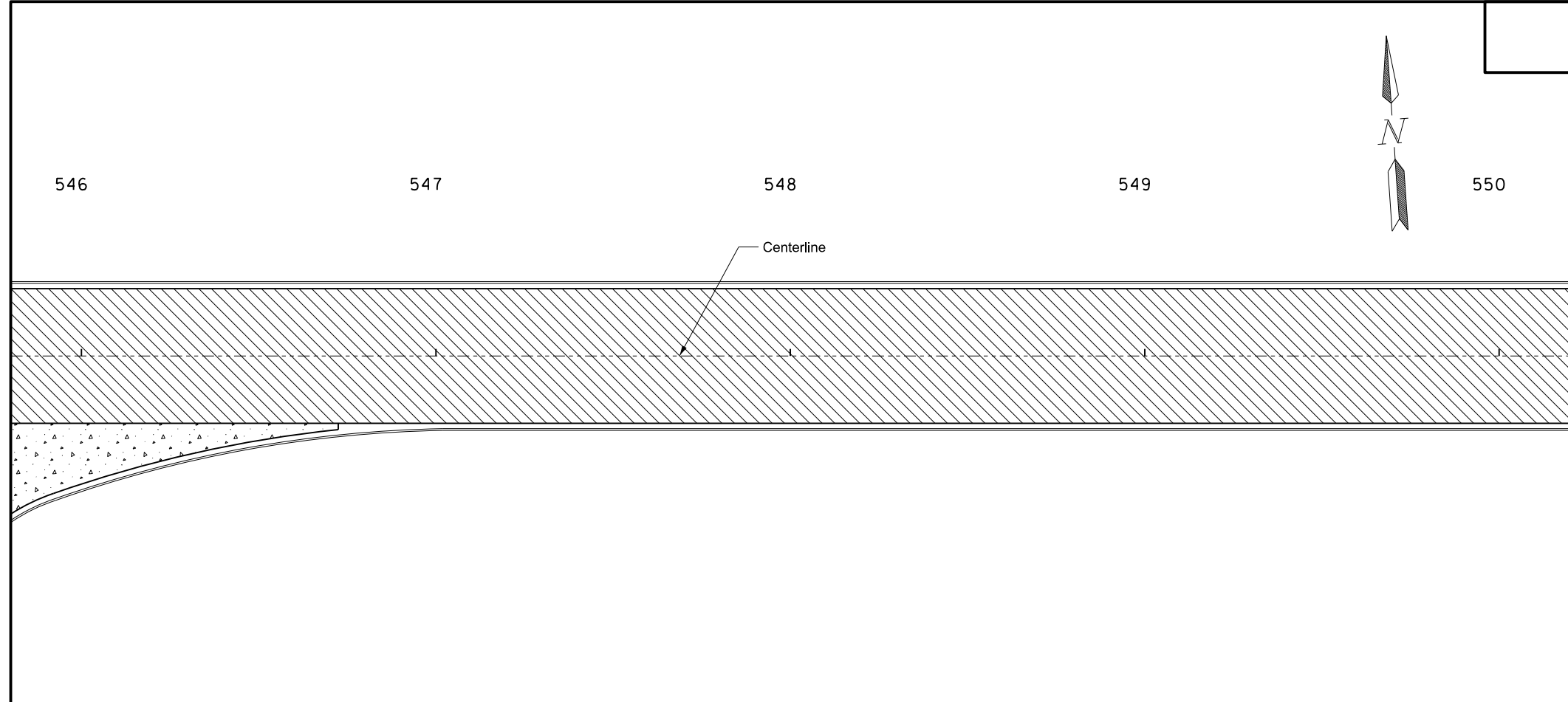
- Superpave FAA 45
- 9" Non-Reinforced Concrete Pavement - Doweled
- Salvaged Base Course
- 23A Centerline

Note: Stations & Offsets from alignment PR23A

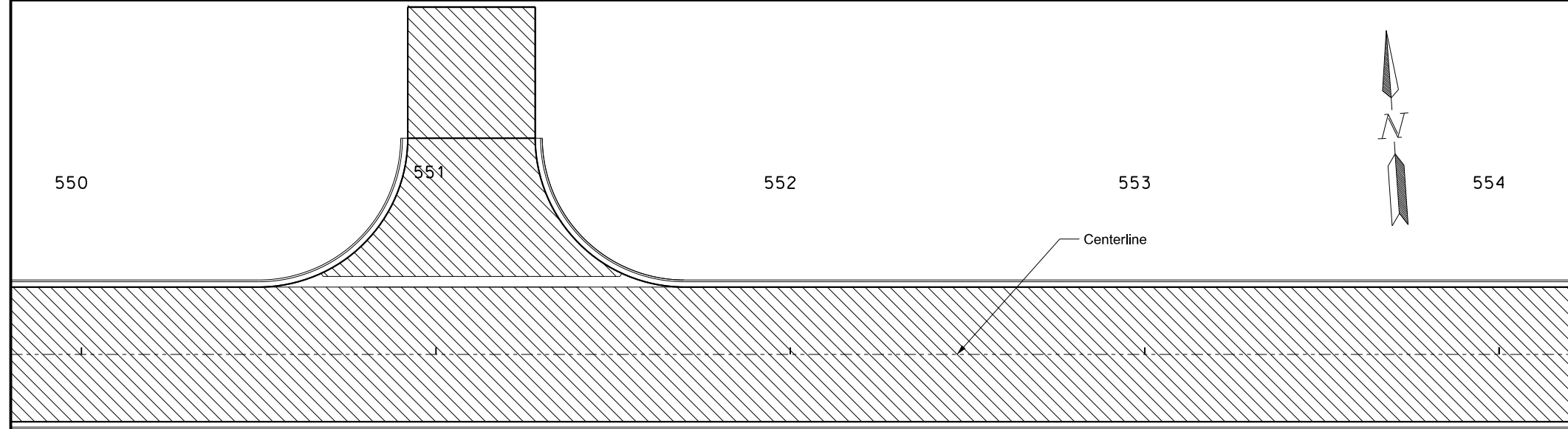
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Paving Layout
Option 2: Asphalt Pavement
ND23A
US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	90	13



SPEC	CODE	BID ITEM	QUANTITY	UNIT
302	0100	Salvaged Base Course 546+00 to 554+00	4028	TON
401	0050	Tack Coat 546+00 to 554+00	338	GAL
401	0060	Prime Coat 546+00 to 554+00	845	GAL
401	0160	Blotter Material CL 44 546+00 to 554+00	26	TON
430	0045	Superpave FAA 45 546+00 to 554+00	1126	TON
430	5828	PG 58-28 Asphalt Cement 546+00 to 554+00	23	TON
430	6434	PG 64-34 Asphalt Cement 546+00 to 554+00	45	TON
748	0140	Curb & Gutter-Type I 546+00 to 550+50 LT 547+02 to 554+00 RT 551+70 to 554+00 LT	450 898 230	LF LF LF



LEGEND

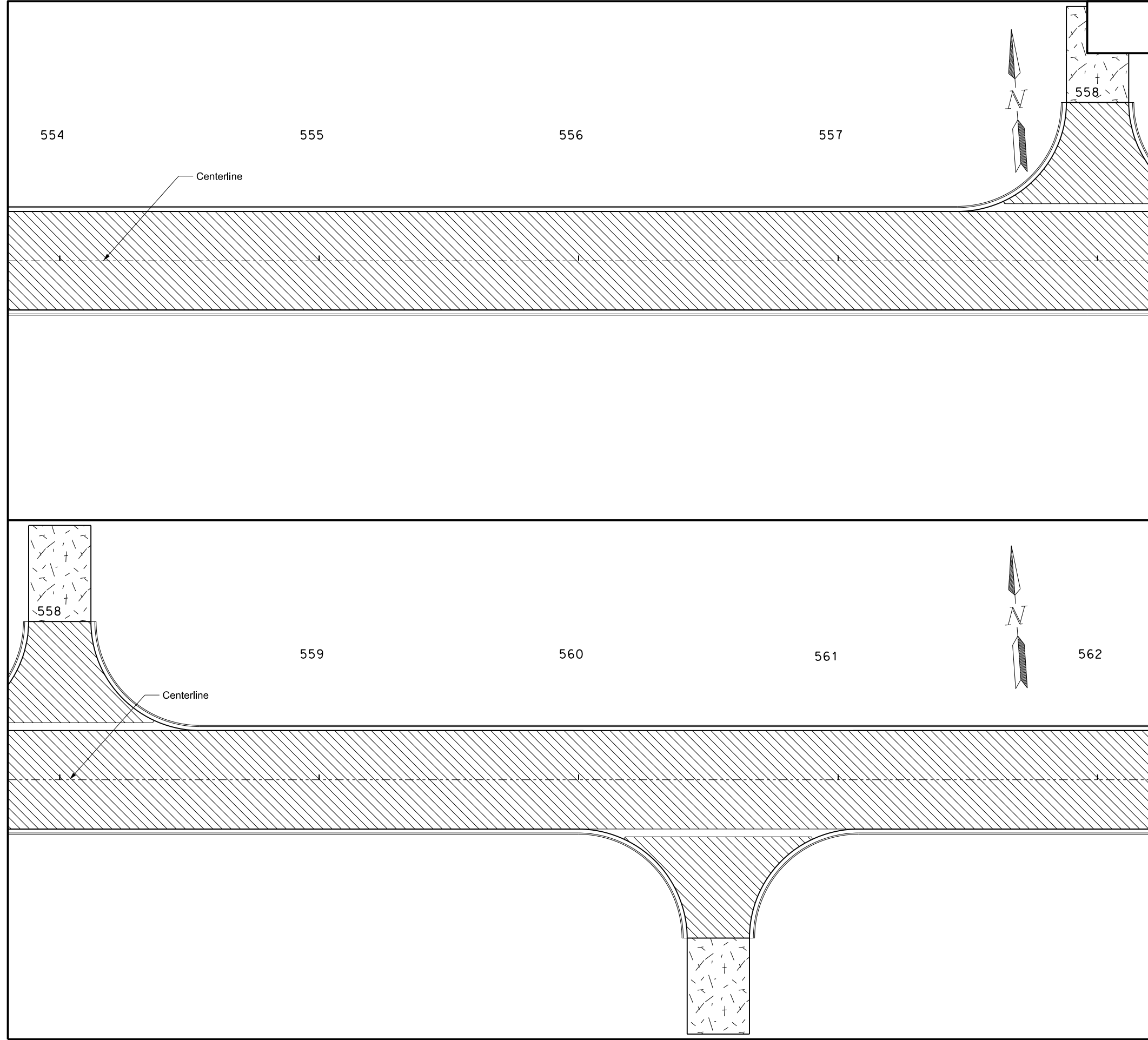
- Superpave FAA 45
- 9" Non-Rerforced Concrete Pavement - Doweled
- Salvaged Base Course
- 23A Centerline

Note: Stations & Offsets from alignment PR23A





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Paving Layout
Option 2: Asphalt Pavement
ND23A
US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	90	14



SPEC	CODE	BID ITEM	QUANTITY	UNIT
302	0100	Salvaged Base Course 554+00 to 562+00	4032	TON
401	0050	Tack Coat 554+00 to 562+00	338	GAL
401	0060	Prime Coat 554+00 to 562+00	845	GAL
401	0160	Blotter Material CL 44 554+00 to 562+00	26	TON
430	0045	Superpave FAA 45 554+00 to 562+00	1126	TON
430	5828	PG 58-28 Asphalt Cement 554+00 to 562+00	23	TON
430	6434	PG 64-34 Asphalt Cement 554+00 to 562+00	45	TON
748	0140	Curb & Gutter-Type I 554+00 to 560+02 LT 554+00 to 560+02 RT 561+06 to 562+00 LT 561+06 to 562+00 RT	600 600 94 94	LF LF LF LF

- LEGEND**
-  Superpave FAA 45
 -  9" Non-Reinforced Concrete Pavement - Doweled
 -  Salvaged Base Course
 -  23A Centerline

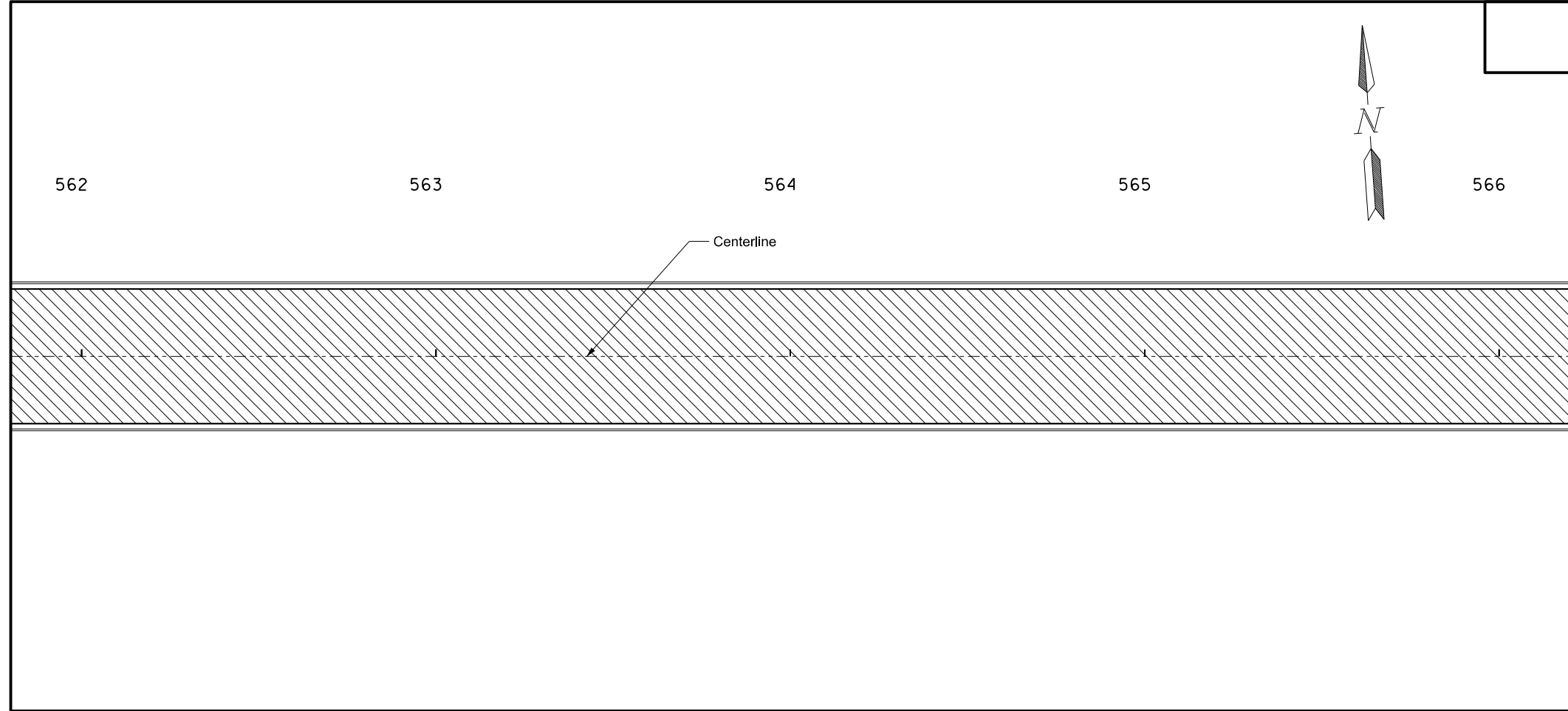
Note: Stations & Offsets from alignment PR23A

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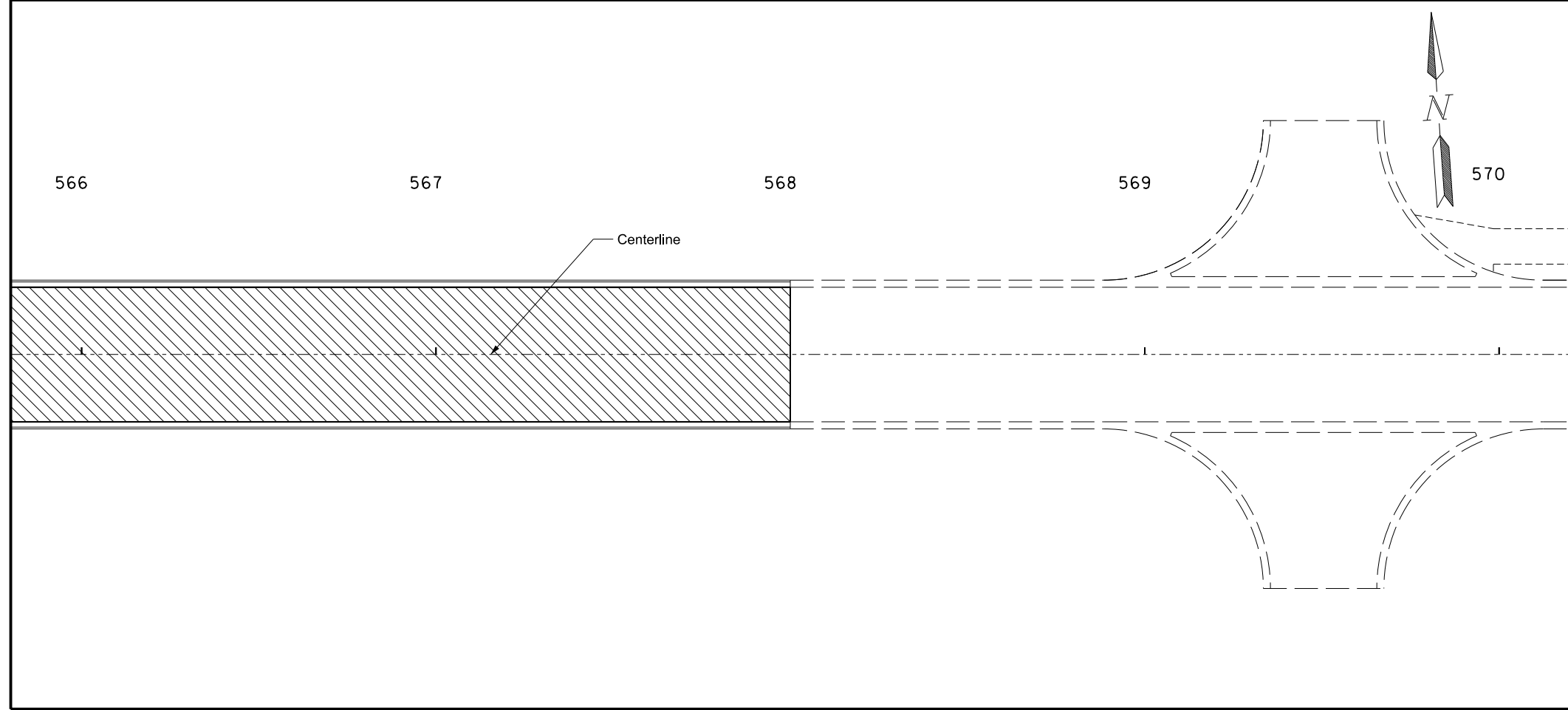
Paving Layout
Option 2: Asphalt Pavement

ND23A
US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	90	15



SPEC	CODE	BID ITEM	QUANTITY	UNIT
302	0100	Salvaged Base Course 562+00 to 568+00	3125	TON
401	0050	Tack Coat 562+00 to 568+00	254	GAL
401	0060	Prime Coat 562+00 to 568+00	633	GAL
401	0160	Blotter Material CL 44 562+00 to 568+00	19	TON
430	0045	Superpave FAA 45 562+00 to 568+00	844	TON
430	5828	PG 58-28 Asphalt Cement 562+00 to 568+00	17	TON
430	6434	PG 64-34 Asphalt Cement 562+00 to 568+00	34	TON
748	0140	Curb & Gutter-Type I 562+00 to 568+00 LT 562+00 to 568+00 RT	600 600	LF LF



LEGEND

- Superpave FAA 45
- 9" Non-Rerforced Concrete Pavement - Doweled
- Salvaged Base Course
- 23A Centerline

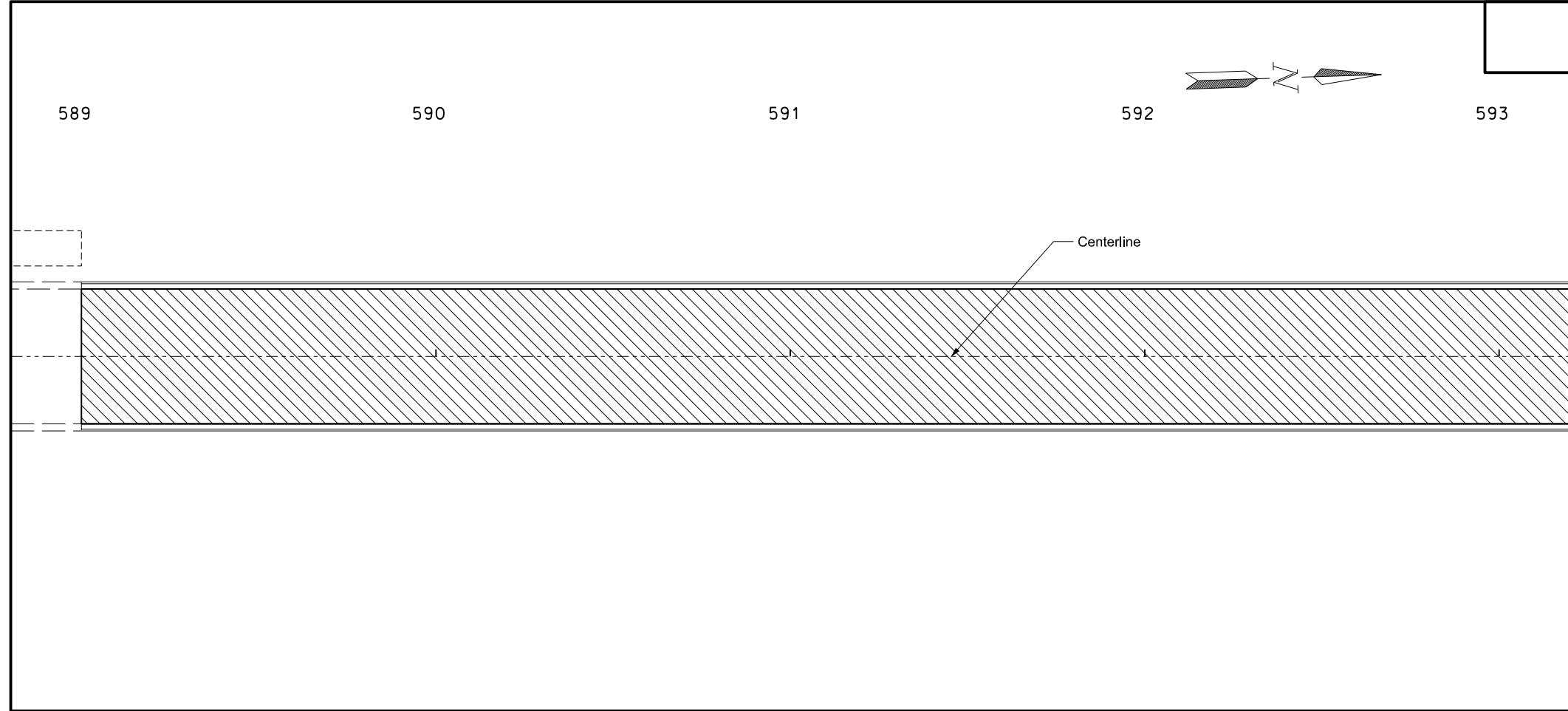
Note: Stations & Offsets from alignment PR23A

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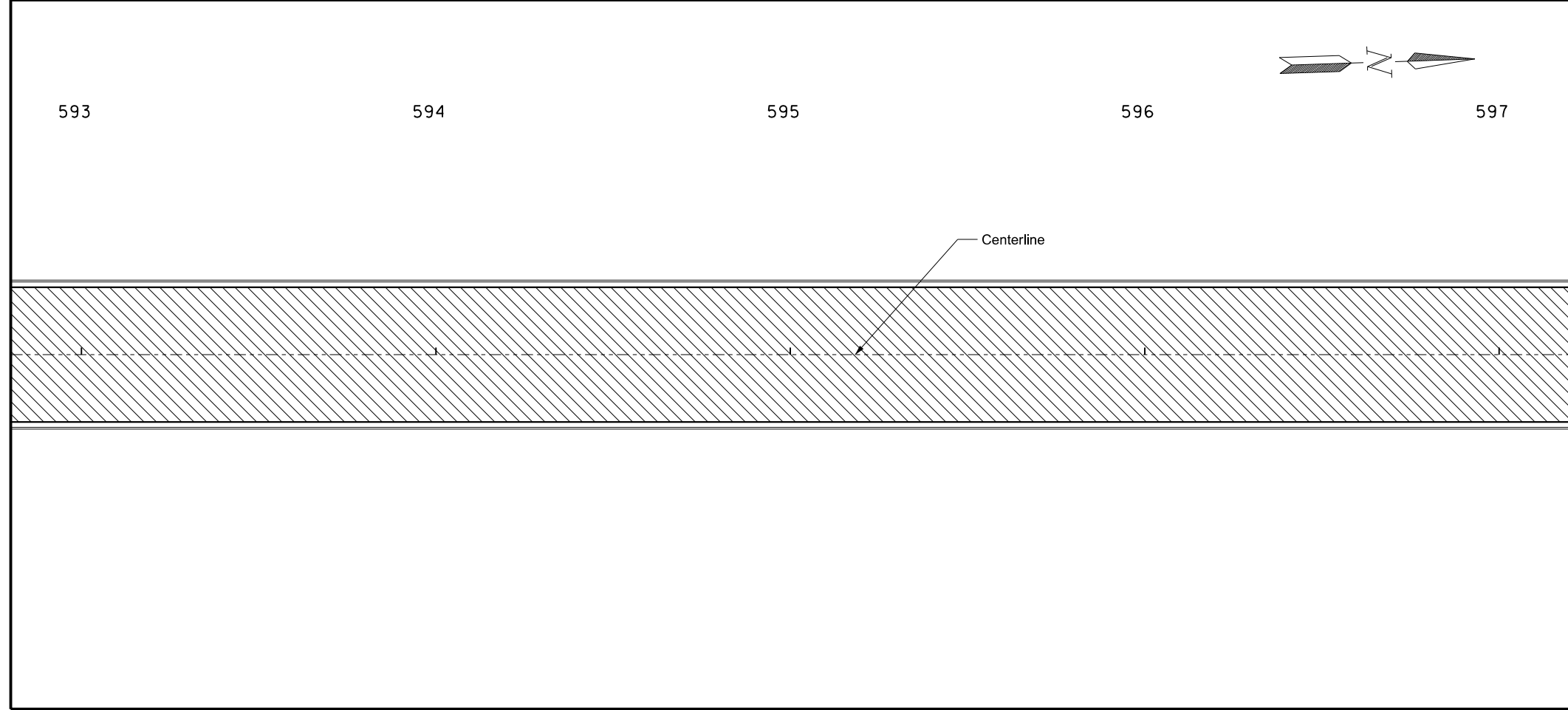
Paving Layout
Option 2: Asphalt Pavement





ND23A
US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	90	16



SPEC	CODE	BID ITEM	QUANTITY	UNIT
302	0100	Salvaged Base Course 589+00 to 597+00	4167	TON
401	0050	Tack Coat 589+00 to 597+00	338	GAL
401	0060	Prime Coat 589+00 to 597+00	845	GAL
401	0160	Blotter Material CL 44 589+00 to 597+00	26	TON
430	0045	Superpave FAA 45 589+00 to 597+00	1126	TON
430	5828	PG 58-28 Asphalt Cement 589+00 to 597+00	23	TON
430	6434	PG 64-34 Asphalt Cement 589+00 to 597+00	45	TON
748	0140	Curb & Gutter-Type I 589+00 to 597+00 LT 589+00 to 597+00 RT	800 800	LF LF



- LEGEND**
-  Superpave FAA 45
 -  9" Non-Rerforced Concrete Pavement - Doweled
 -  Salvaged Base Course
 -  23A Centerline

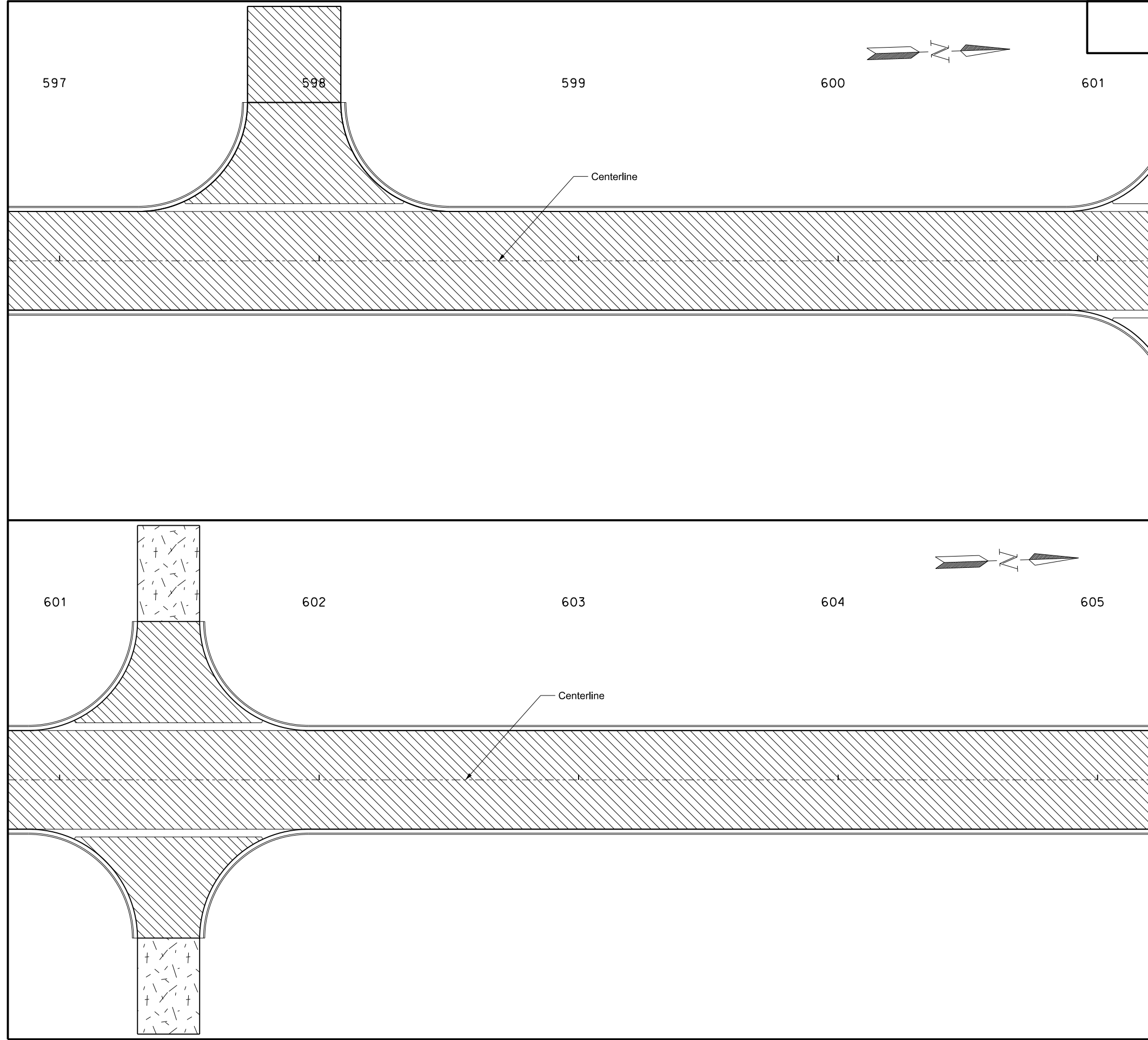
Note: Stations & Offsets from alignment PR23A

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Paving Layout
Option 2: Asphalt Pavement

ND23A
US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	90	17



SPEC	CODE	BID ITEM	QUANTITY	UNIT
302	0100	Salvaged Base Course 597+00 to 605+00	3957	TON
401	0050	Tack Coat 597+00 to 605+00	338	GAL
401	0060	Prime Coat 597+00 to 605+00	845	GAL
401	0160	Blotter Material CL 44 597+00 to 605+00	26	TON
430	0045	Superpave FAA 45 597+00 to 605+00	1126	TON
430	5828	PG 58-28 Asphalt Cement 597+00 to 605+00	23	TON
430	6434	PG 64-34 Asphalt Cement 597+00 to 605+00	45	TON
748	0140	Curb & Gutter-Type I 597+00 to 597+30 LT 597+00 to 600+90 RT 598+50 to 600+90 LT 601+94 to 605+00 LT 601+94 to 605+00 RT	30 390 240 306 306	LF LF LF LF LF

LEGEND

	Superpave FAA 45
	9" Non-Reinforced Concrete Pavement - Doweled
	Salvaged Base Course
	23A Centerline

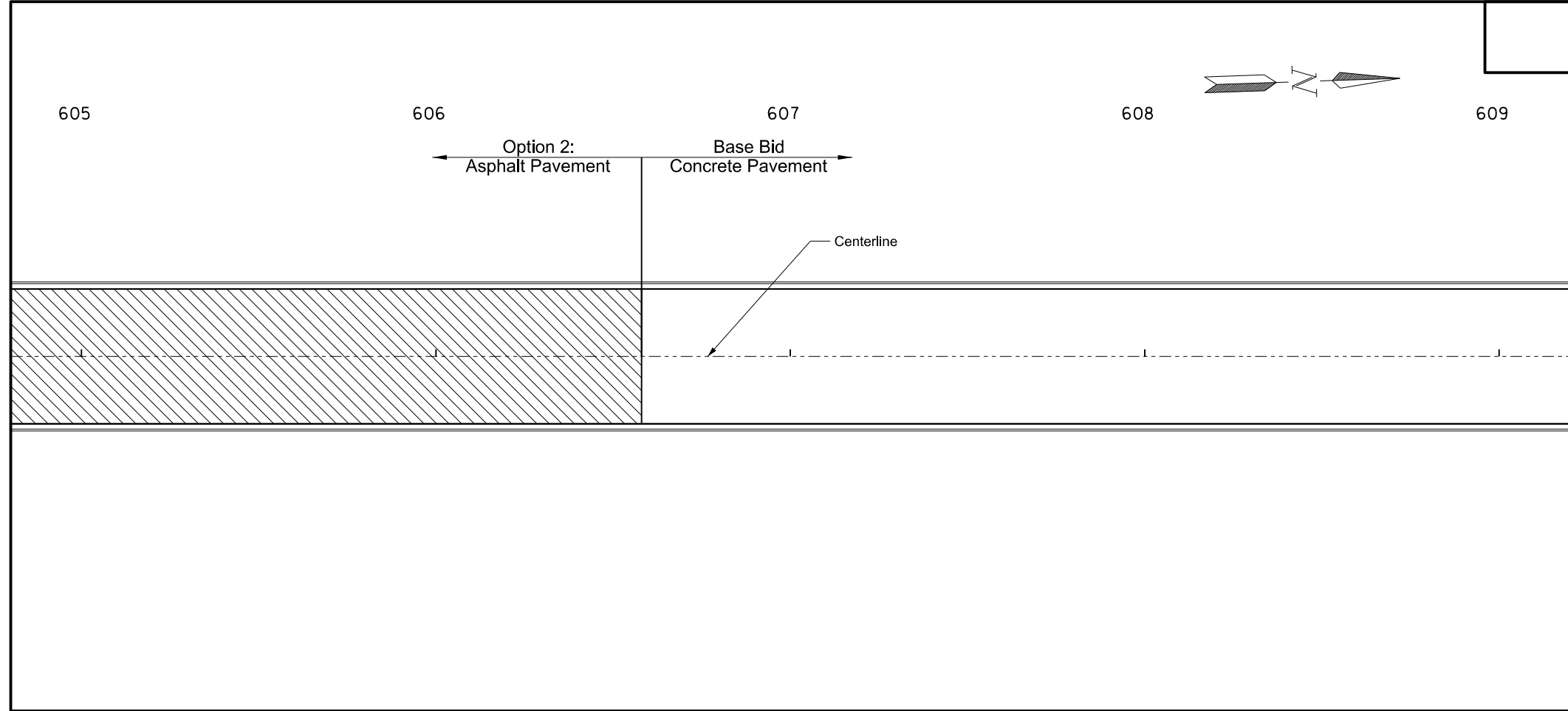
Note: Stations & Offsets from alignment PR23A

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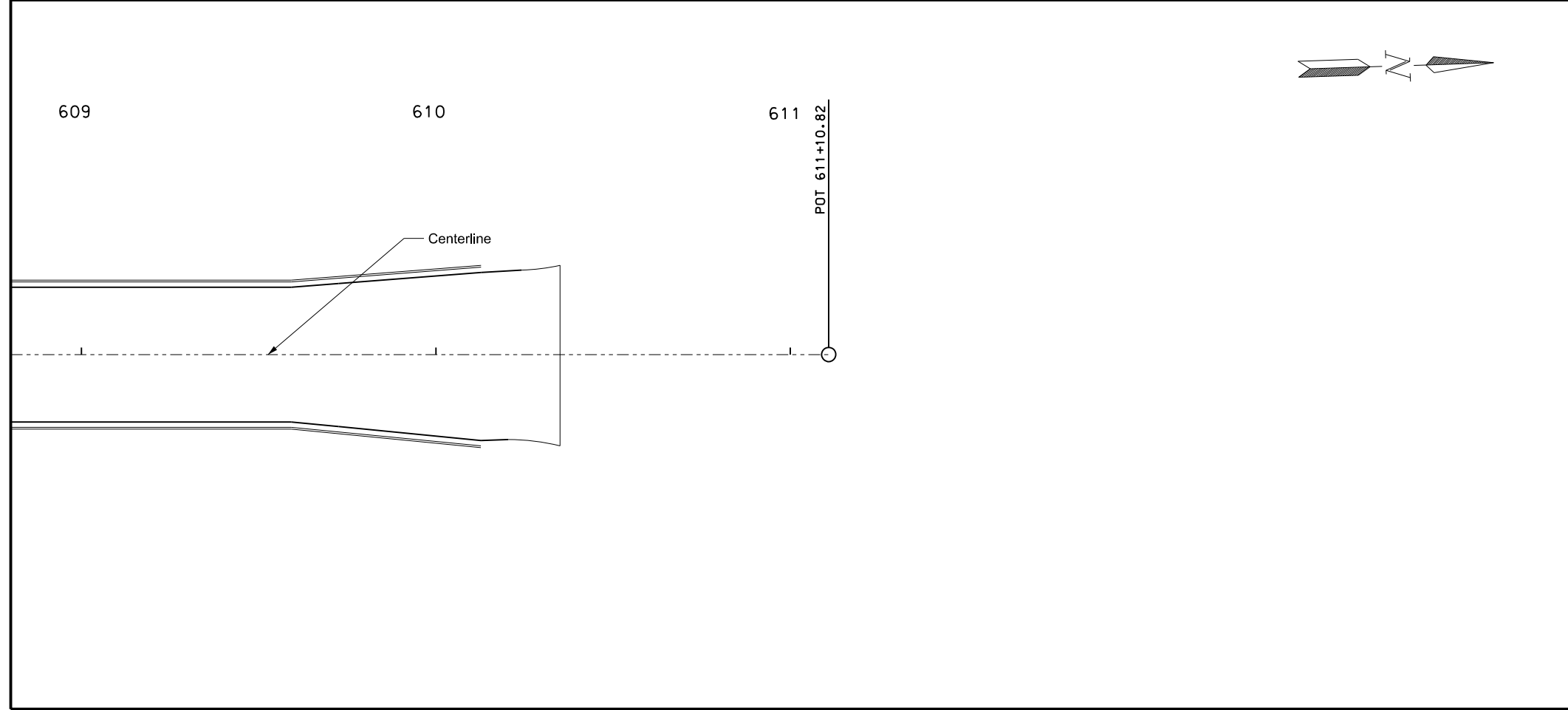
Paving Layout
Option 2: Asphalt Pavement

ND23A
US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	90	18



SPEC	CODE	BID ITEM	QUANTITY	UNIT
302	0100	Salvaged Base Course 605+00 to 606+58	823	TON
401	0050	Tack Coat 605+00 to 606+58	67	GAL
401	0060	Prime Coat 605+00 to 606+58	168	GAL
401	0160	Blotter Material CL 44 605+00 to 606+58	5	TON
430	0045	Superpave FAA 45 605+00 to 606+58	224	TON
430	5828	PG 58-28 Asphalt Cement 605+00 to 606+58	5	TON
430	6434	PG 64-34 Asphalt Cement 605+00 to 606+58	9	TON
748	0140	Curb & Gutter-Type I 605+00 to 606+58 LT 605+00 to 606+58 RT	158 158	LF LF



LEGEND

- Superpave FAA 45
- 9" Non-Reinforced Concrete Pavement - Doweled
- Salvaged Base Course
- 23A Centerline

Note: Stations & Offsets from alignment PR23A

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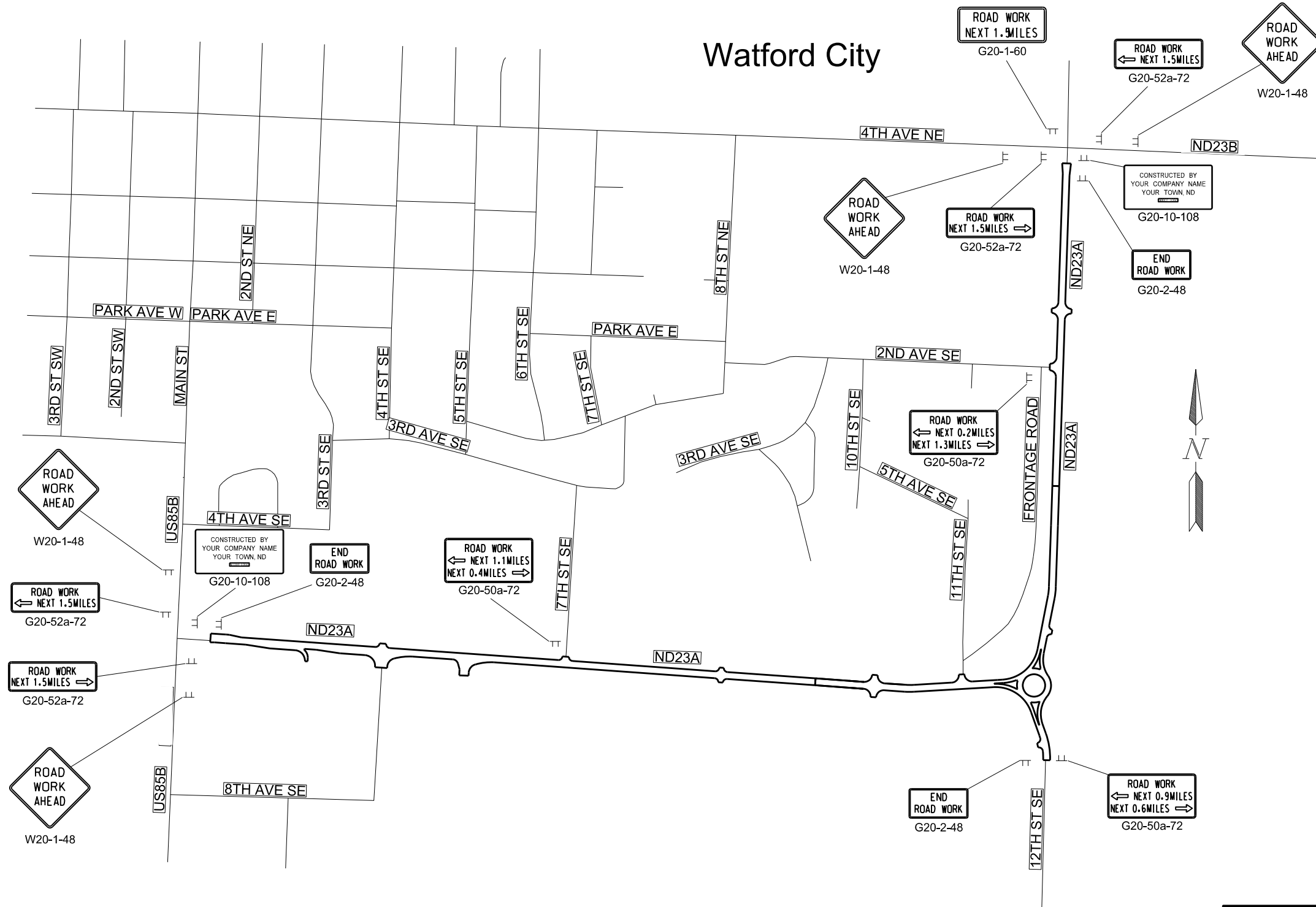
Paving Layout
Option 2: Asphalt Pavement

ND23A

US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	100	2

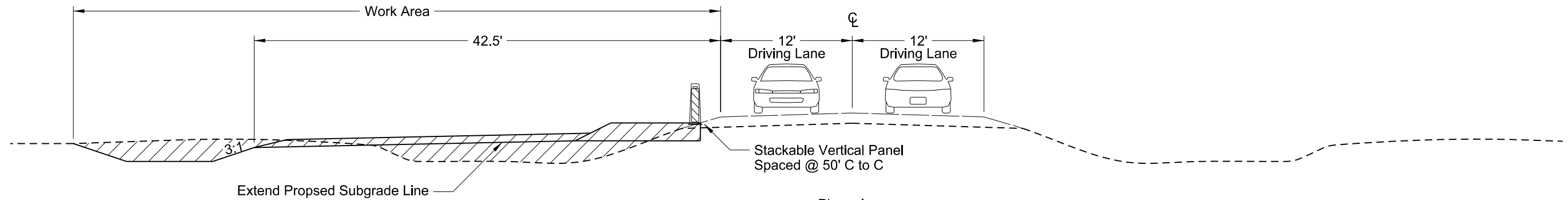
Watford City



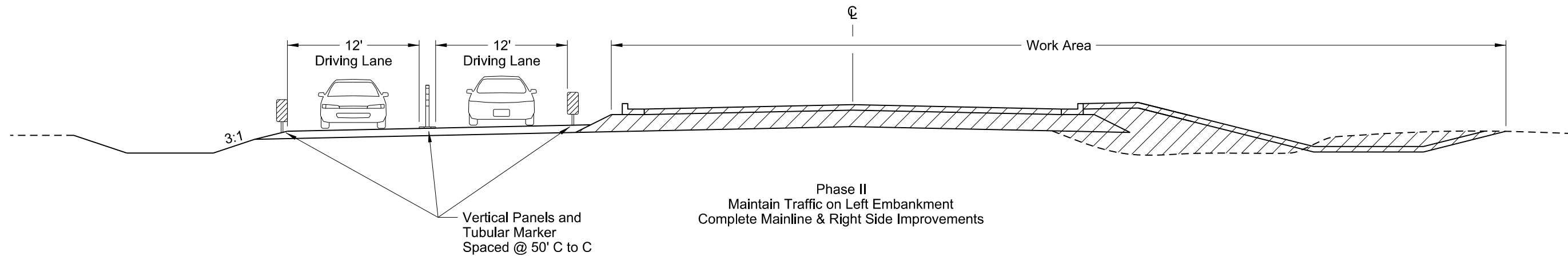
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Work Zone Traffic Control Layout
ND23A
US85B to ND23B

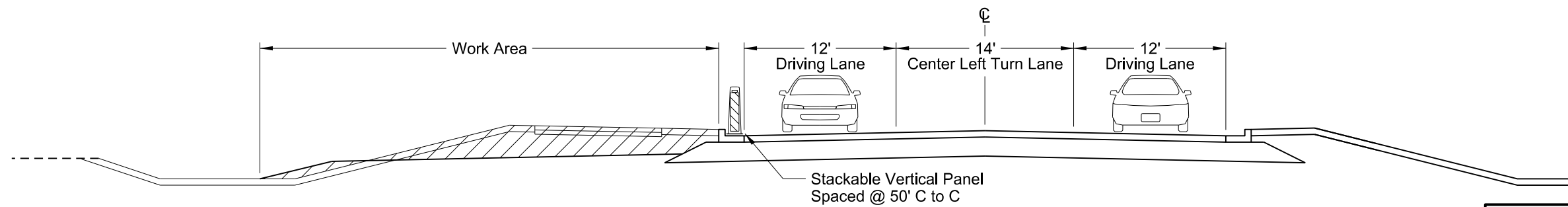
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	100	3



Phase I
 Maintain Traffic on Existing Roadway
 Storm Sewer, Common Excavation, Over-Widened
 Embankment, & Traffic Service Aggregate on Left Side



Phase II
 Maintain Traffic on Left Embankment
 Complete Mainline & Right Side Improvements



Phase III
 Maintain Traffic on Finished Roadway
 Remove Over-Widening, Complete Left Side Improvements



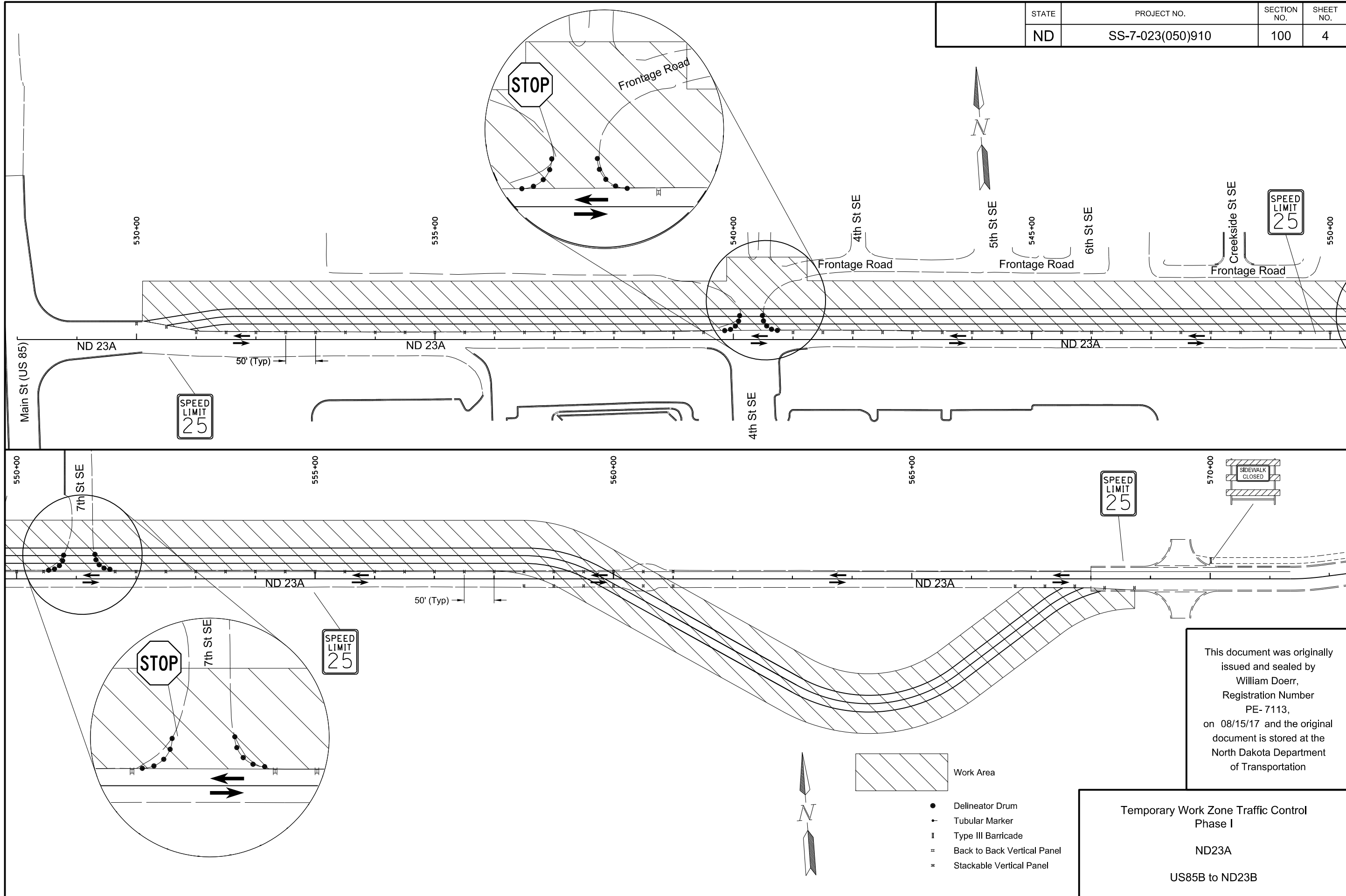
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Traffic Control Phasing Plan
 Typical Sections

ND23A

US85B to ND23B

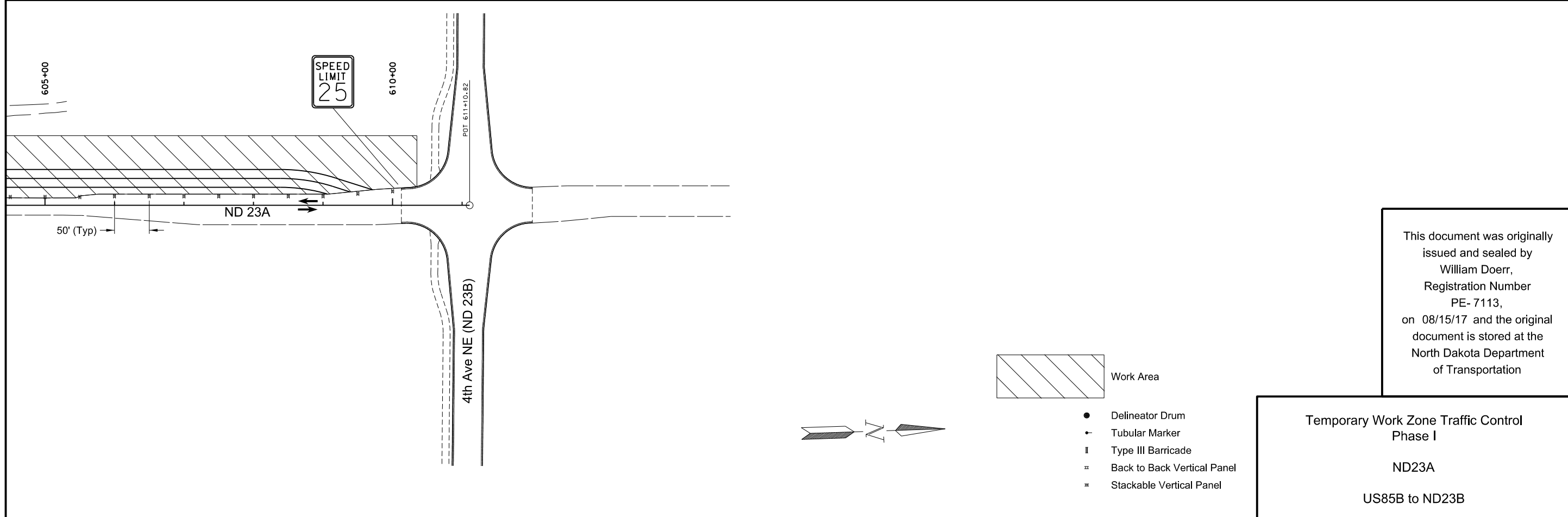
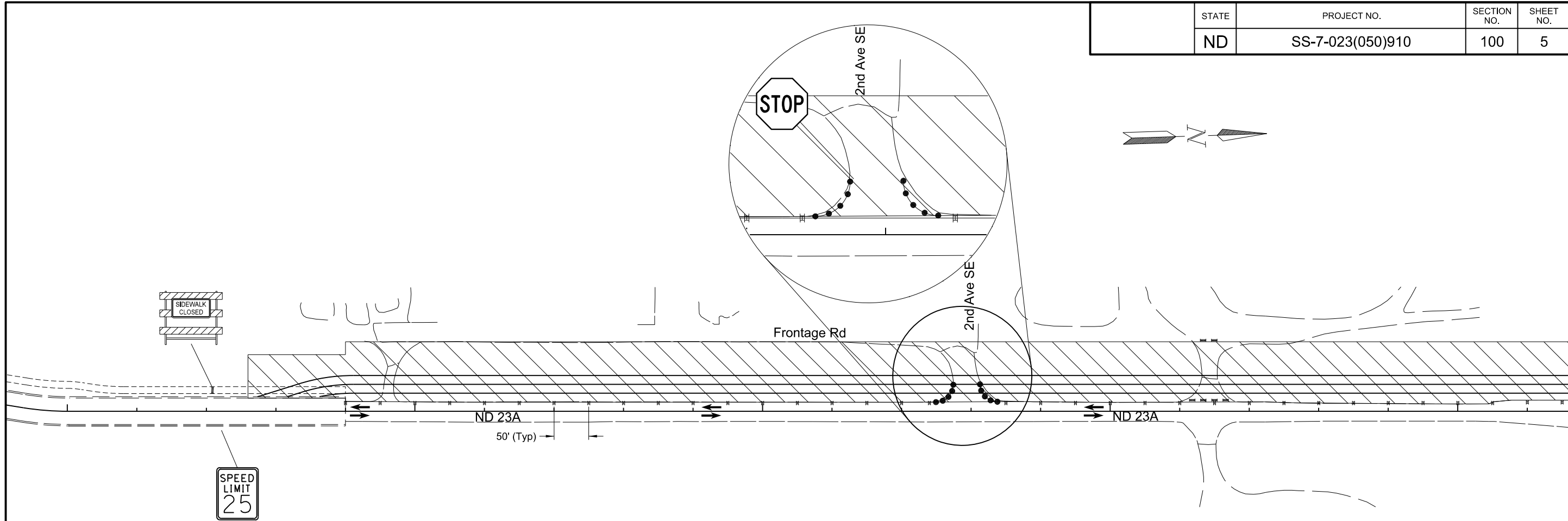
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	100	4



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Temporary Work Zone Traffic Control
Phase I
ND23A
US85B to ND23B

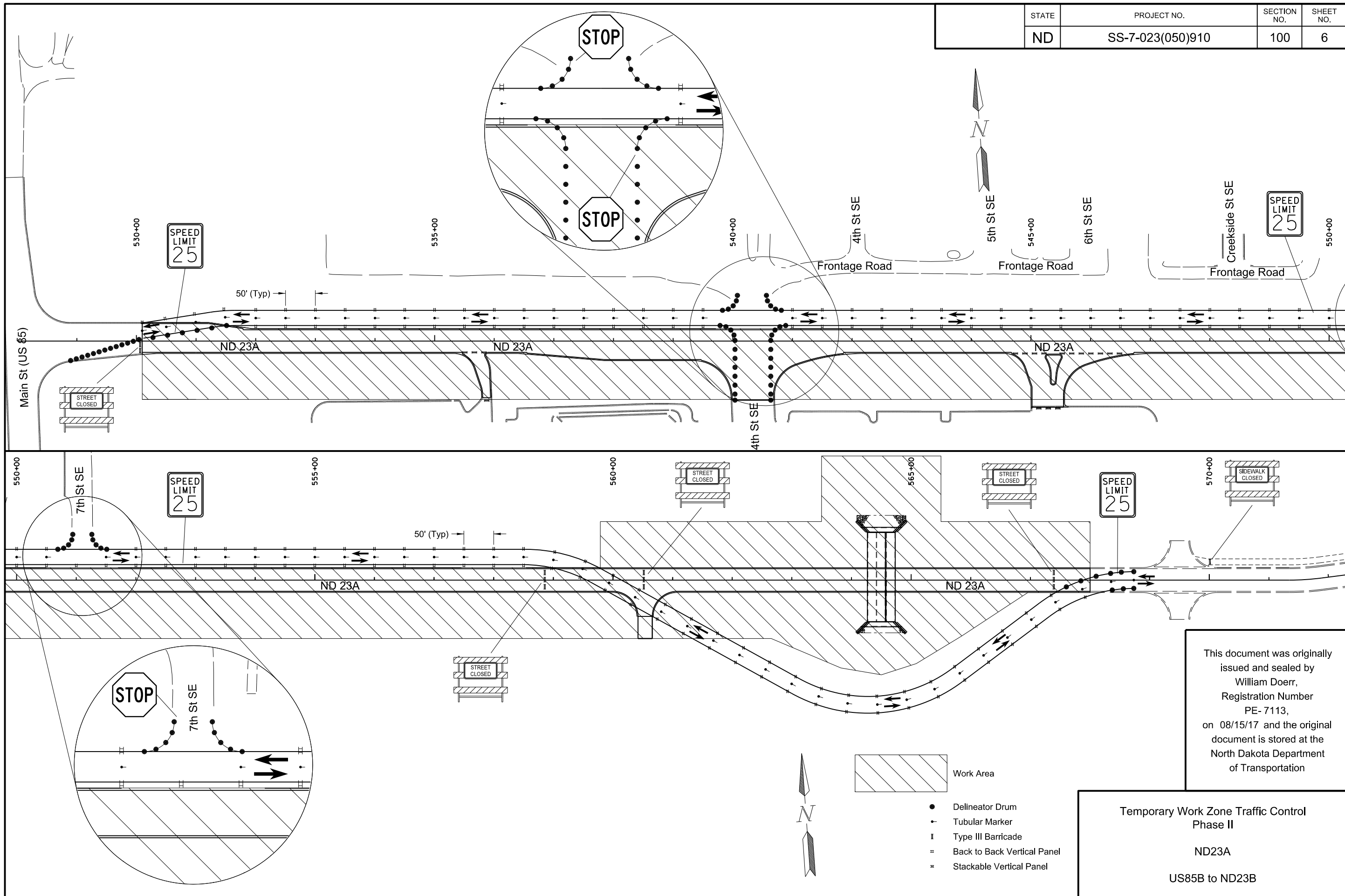
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	100	5



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Temporary Work Zone Traffic Control
Phase I
ND23A
US85B to ND23B

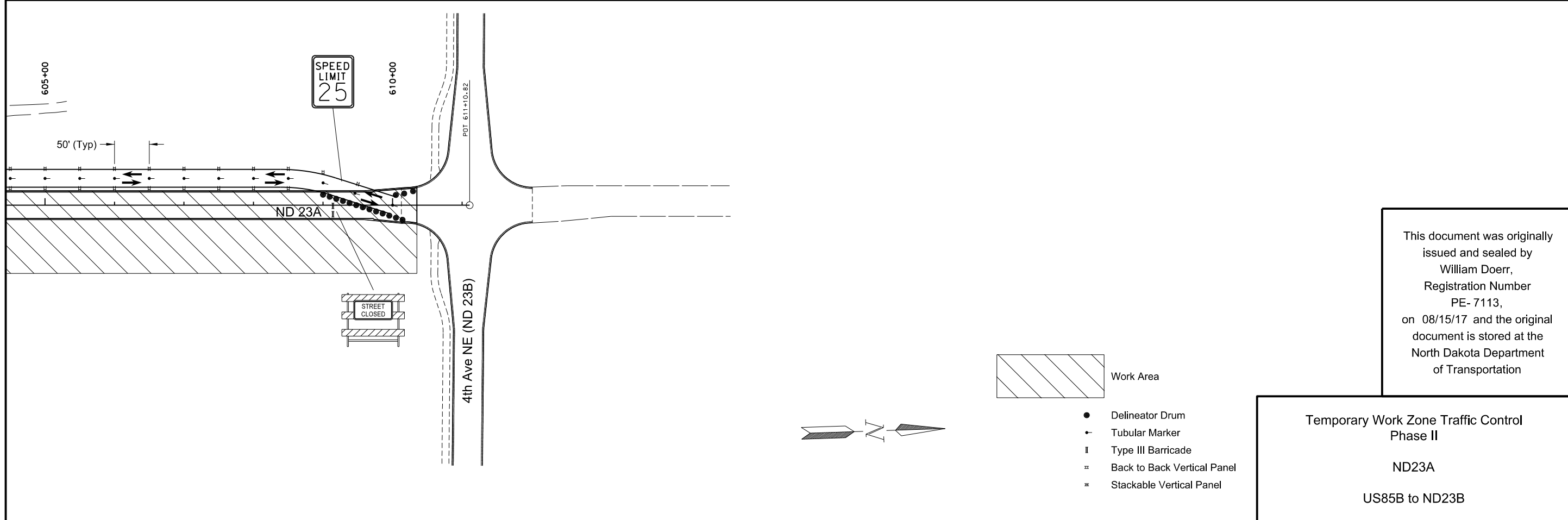
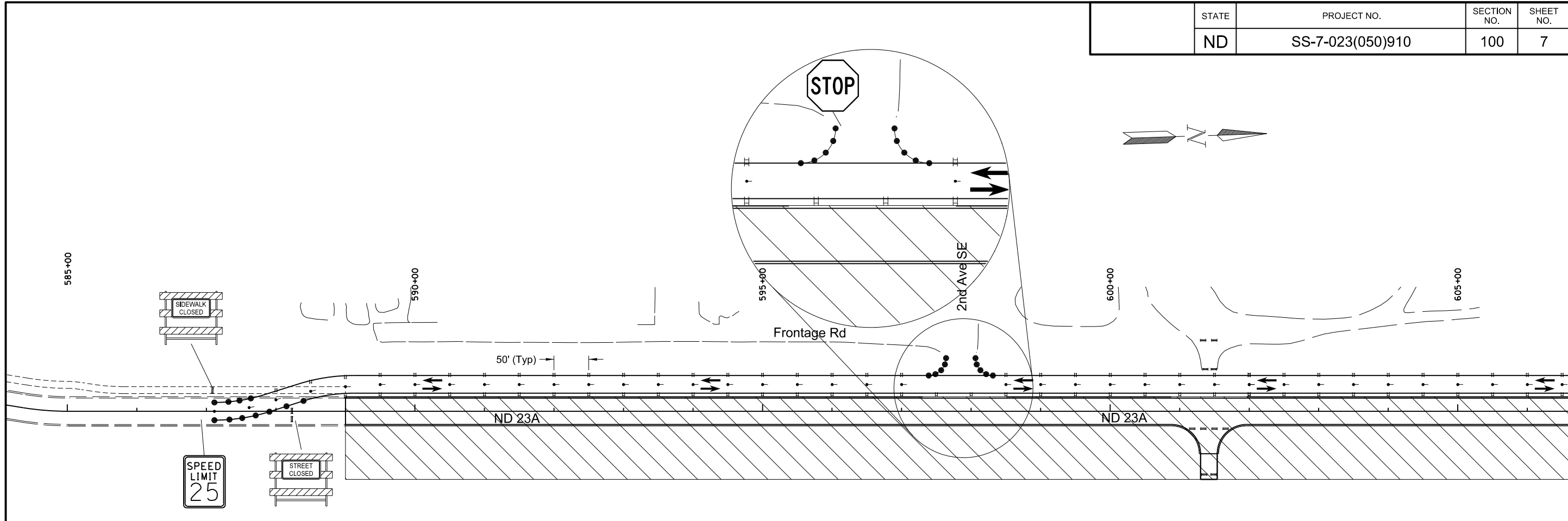
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	100	6



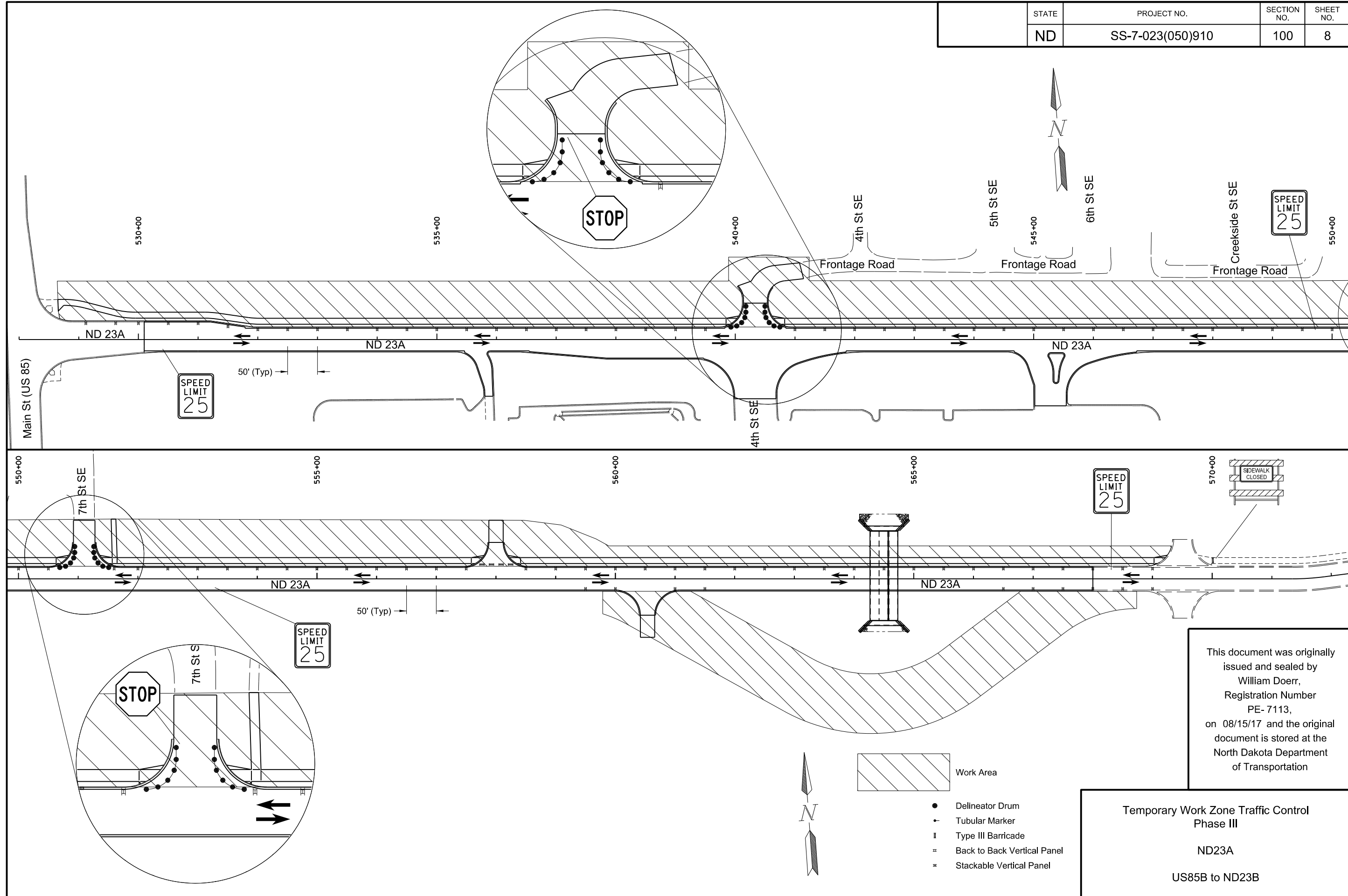
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Temporary Work Zone Traffic Control
Phase II
ND23A
US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	100	7



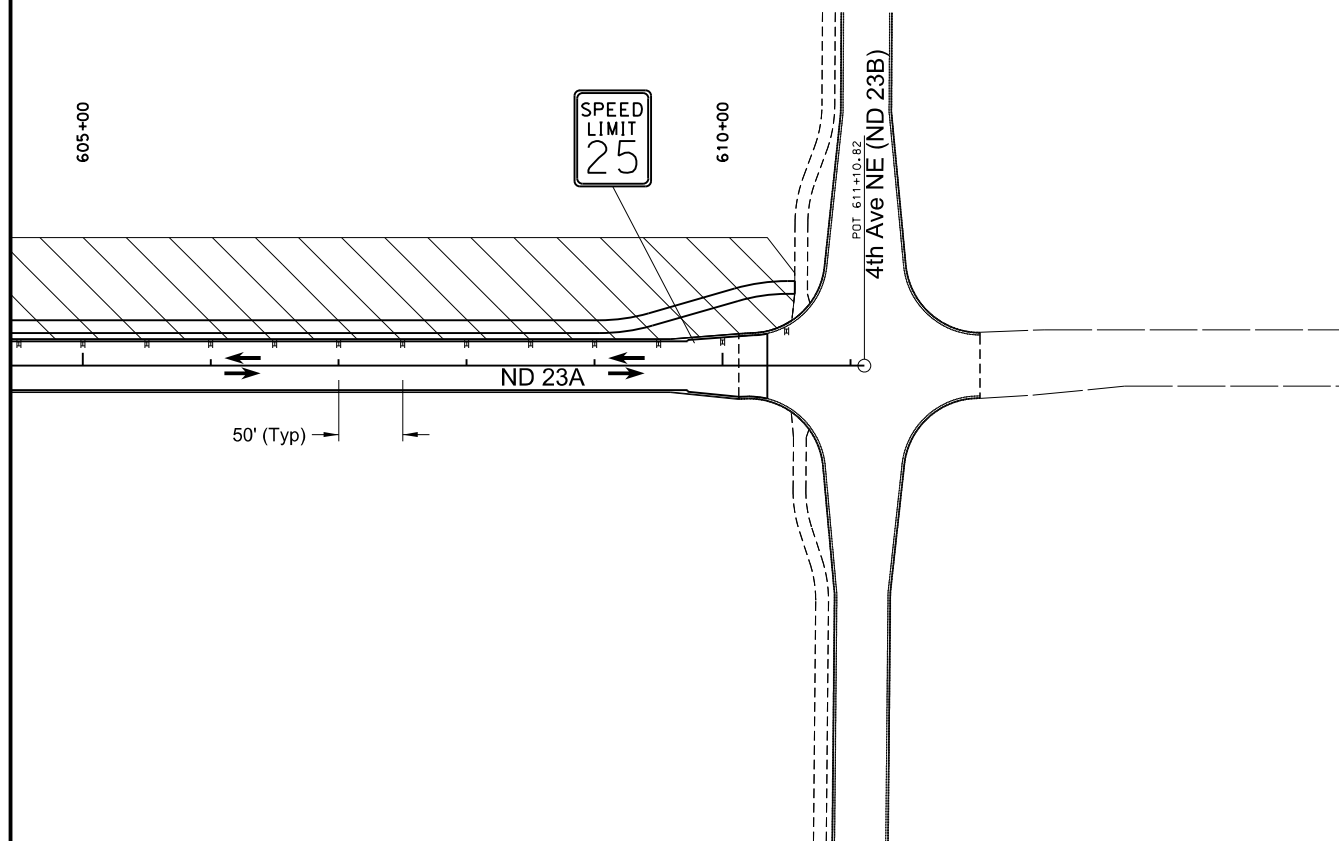
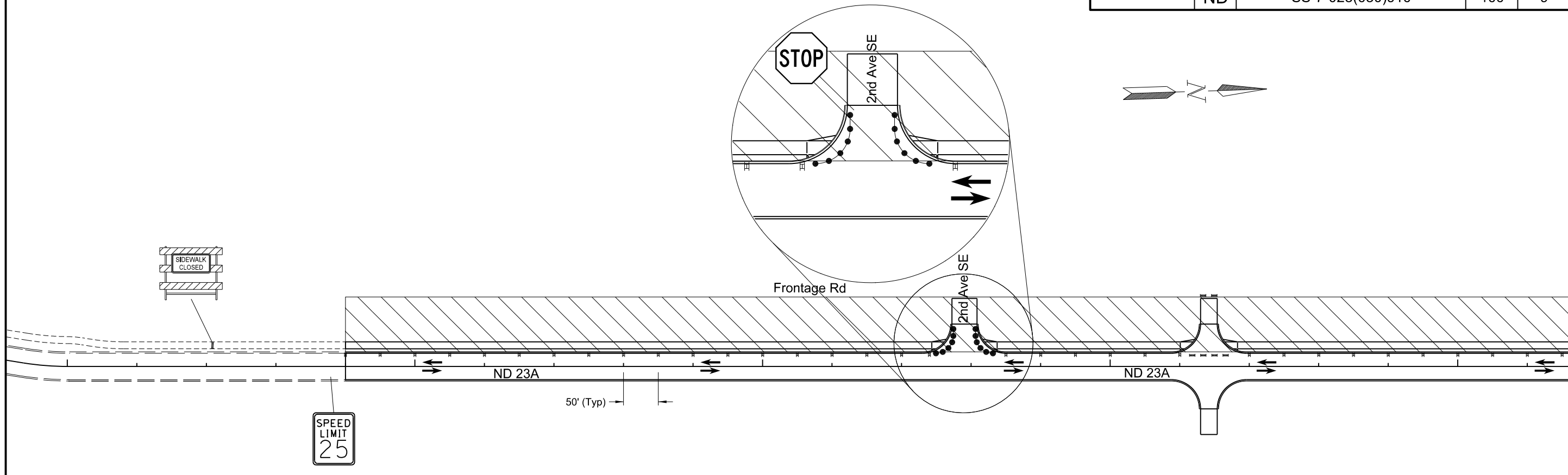
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	100	8

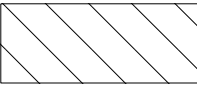


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Temporary Work Zone Traffic Control
Phase III
ND23A
US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	100	9



-  Work Area
- Delineator Drum
- Tubular Marker
- || Type III Barricade
- ≡ Back to Back Vertical Panel
- ≡ Stackable Vertical Panel

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Temporary Work Zone Traffic Control
Phase III

ND23A
US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
N.D.	SS-7-023(050)910	110	1

Sta/RP	Sign No.	Assembly No.	Flat Sheet For Signs		Sign Support Length				Support Size	Max Post Len LF	Sleeve Length				Sleeve Size	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments
			IV SF	XI SF	1st LF	2nd LF	3rd LF	4th LF			1st LF	2nd LF	3rd LF	4th LF								
529+39 Lt	M1-4	387			11.0				2.5 x 2.5 12 ga	11.7	3.5			2.25 x 2.25 12 ga	1	4	3 x 3 7 ga	1		1		
531+00 Rt	R2-1	9		5.0	9.7				2 x 2 12 ga	11.5					1	4	2.25 x 2.25 12 ga					
535+50 Lt	M1-4	395	10.2		12.0				2.5 x 2.5 10 ga	13.2					1	4	3 x 3 7 ga				1	
535+50 Rt	R5-2	14		4.0	9.2				2 x 2 12 ga	13.0					1	4	2.25 x 2.25 12 ga					
538+00 Lt	W3-3	20		9.0	10.4				2.5 x 2.5 10 ga	12.9					1	4	3 x 3 7 ga				1	
539+00 Lt	R2-1	9		5.0	9.7				2 x 2 12 ga	11.5					1	4	2.25 x 2.25 12 ga					
539+94 Rt	R8-3	9		5.0	9.7				2 x 2 12 ga	11.5					1	4	2.25 x 2.25 12 ga					
540+09 Lt	R1-1	1		5.2	9.7				2 x 2 12 ga	10.5					1	4	2.25 x 2.25 12 ga					
540+88 Rt	SA2E		15.0	5.2	11.7				2.5 x 2.5 12 ga	11.8					1	4	3 x 3 7 ga					
543+00 Rt	R2-1	9		5.0	9.7				2 x 2 12 ga	11.5					1	4	2.25 x 2.25 12 ga					
544+30 Lt	SA1D		15.0		9.2				2 x 2 12 ga	13.4					1	4	2.25 x 2.25 12 ga					
546+00 Lt	SA1D		15.0		9.2				2 x 2 12 ga	13.4					1	4	2.25 x 2.25 12 ga					
546+08 Rt	SA A			9.2	11.7				2.5 x 2.5 12 ga	11.9					1	4	3 x 3 7 ga					
547+00 Lt	R3-2	14		4.0	9.2				2 x 2 12 ga	13.0					1	4	2.25 x 2.25 12 ga					
550+00 Lt	R2-1	9		5.0	9.7				2 x 2 12 ga	11.5					1	4	2.25 x 2.25 12 ga					
550+86 Lt	SA2E		15.0	5.2	11.7				2.5 x 2.5 12 ga	11.8					1	4	3 x 3 7 ga					
551+34 Lt	R5-2	14		4.0	9.2				2 x 2 12 ga	13.0					1	4	2.25 x 2.25 12 ga					
553+00 Rt	R2-1	9		5.0	9.7				2 x 2 12 ga	11.5					1	4	2.25 x 2.25 12 ga					
596+00 Lt	R2-1	9		5.0	9.7				2 x 2 12 ga	11.5					1	4	2.25 x 2.25 12 ga					
597+55 Lt	R1-1	1		5.2	9.7				2 x 2 12 ga	10.5					1	4	2.25 x 2.25 12 ga					
597+62 Lt	SA2E		15.0	5.2	11.7				2.5 x 2.5 12 ga	12.3					1	4	3 x 3 7 ga					
601+20 Lt	R1-1	1		5.2	9.7				2 x 2 12 ga	10.5					1	4	2.25 x 2.25 12 ga					
601+64 Rt	R1-1	1		5.2	9.7				2 x 2 12 ga	10.5					1	4	2.25 x 2.25 12 ga					
603+00 Rt	W3-3	20		9.0	10.4				2.5 x 2.5 10 ga	12.9					1	4	3 x 3 7 ga				1	
604+50 Rt	M2-1	391	6.2		10.5				2.25 x 2.25 12 ga	12.7					1	4	2.5 x 2.5 12 ga					
608+00 Lt	R2-1	9		5.0	9.7				2 x 2 12 ga	11.5					1	4	2.25 x 2.25 12 ga					
Sub Total			91.4	115.6		Total	262.7								Total	104			1	0	4	
Grand Total			91.4	115.6		Total	262.7								Total	104			1	0	4	

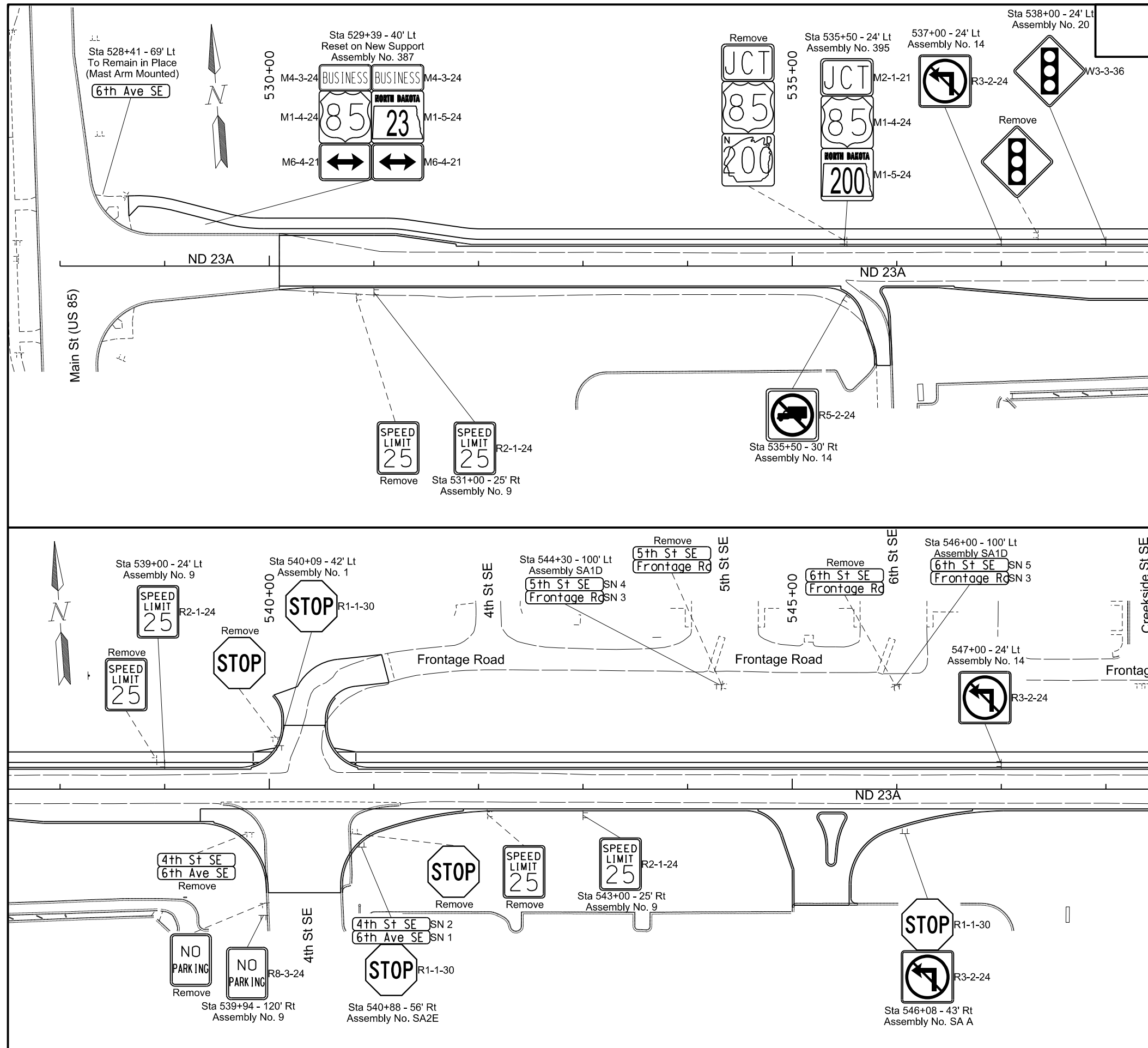
Basis of Estimate
Sign Support Lengths

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

Areas where parking and/or pedestrian movement will occur - 84"
Bike route - 60"

<p>This document was originally issued and sealed by William Doerr, Registration Number 7113, on 8/15/2017 and the original document is stored at the North Dakota Department of Transportation</p>	<p>Sign Summary Perforated Tube</p>
	<p>ND23A US85B to ND23B</p>

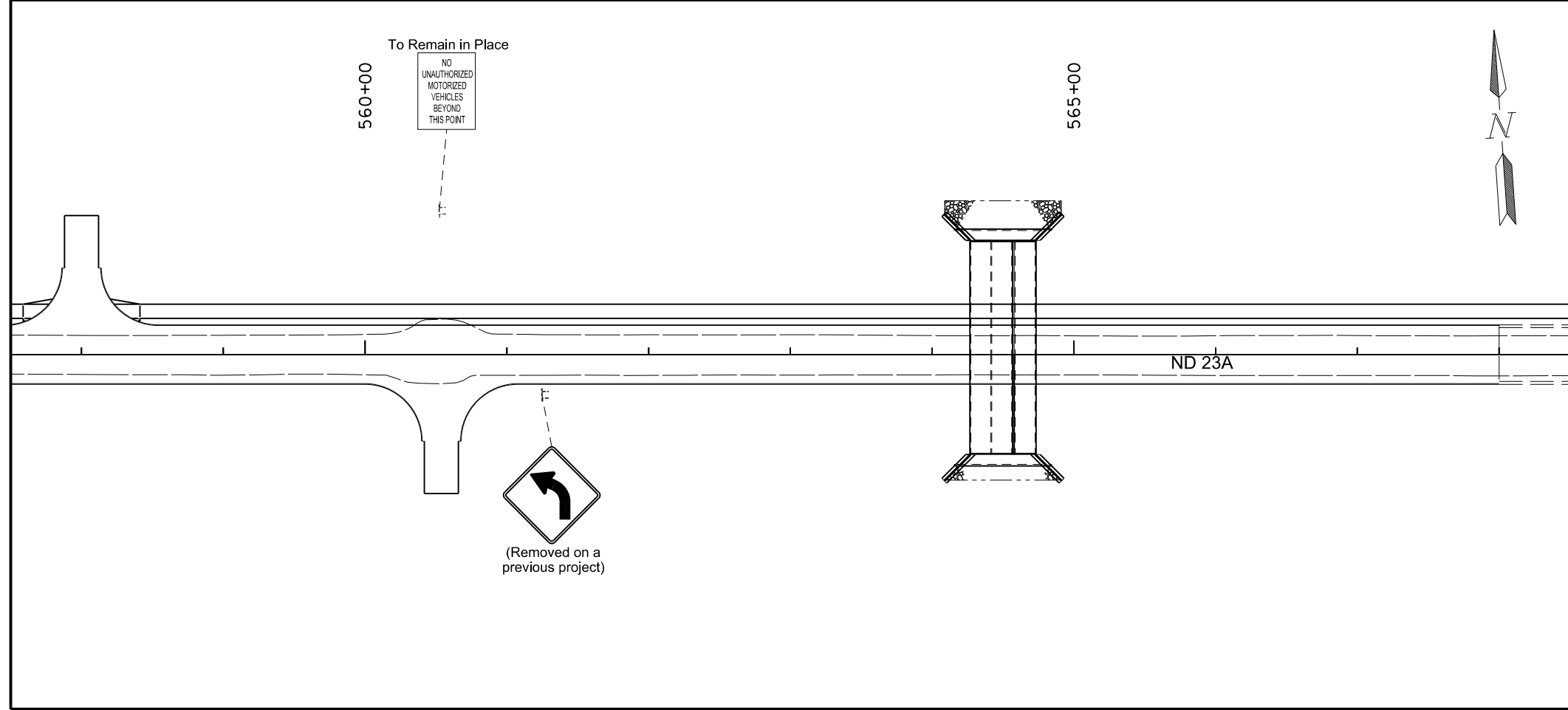
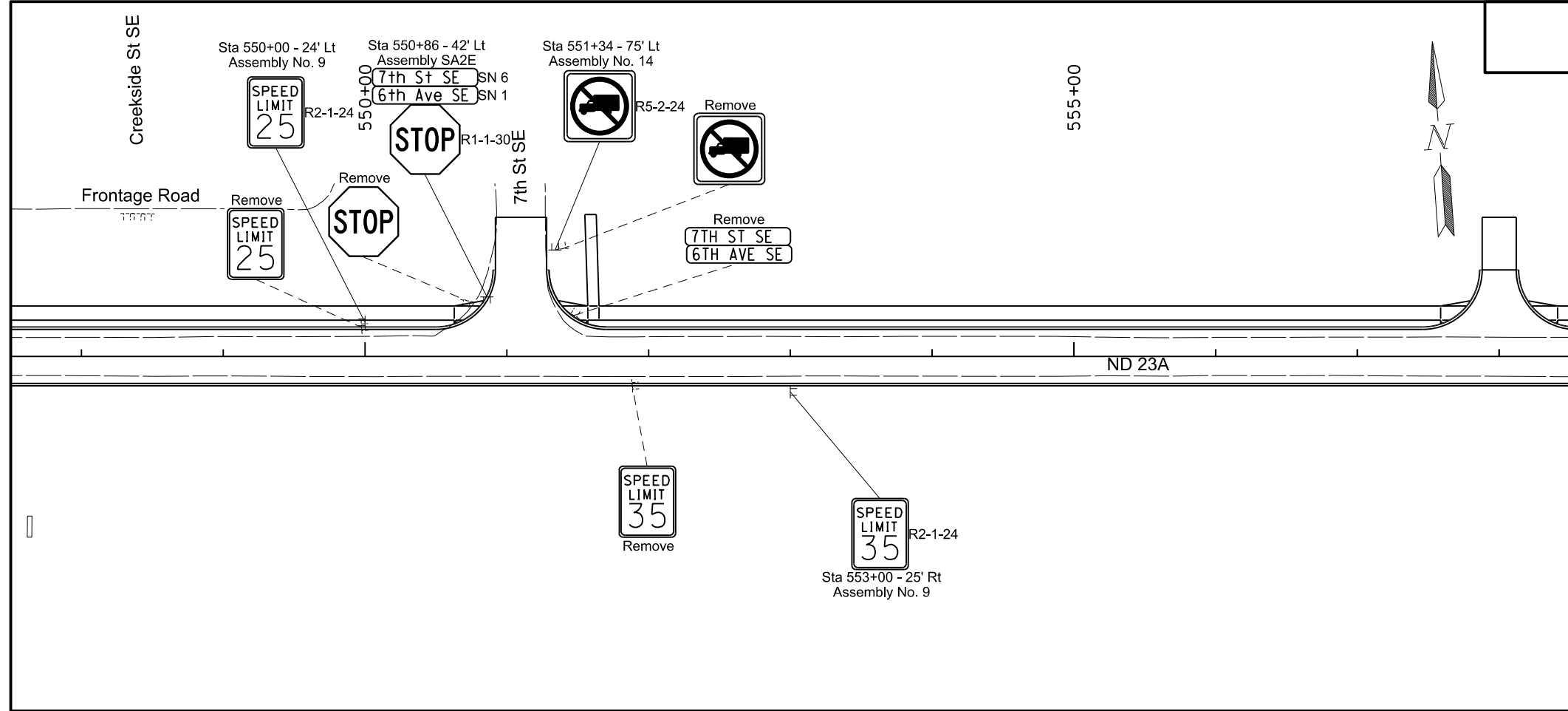
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	110	2



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Sign Layout
ND23A
US85B to ND23B

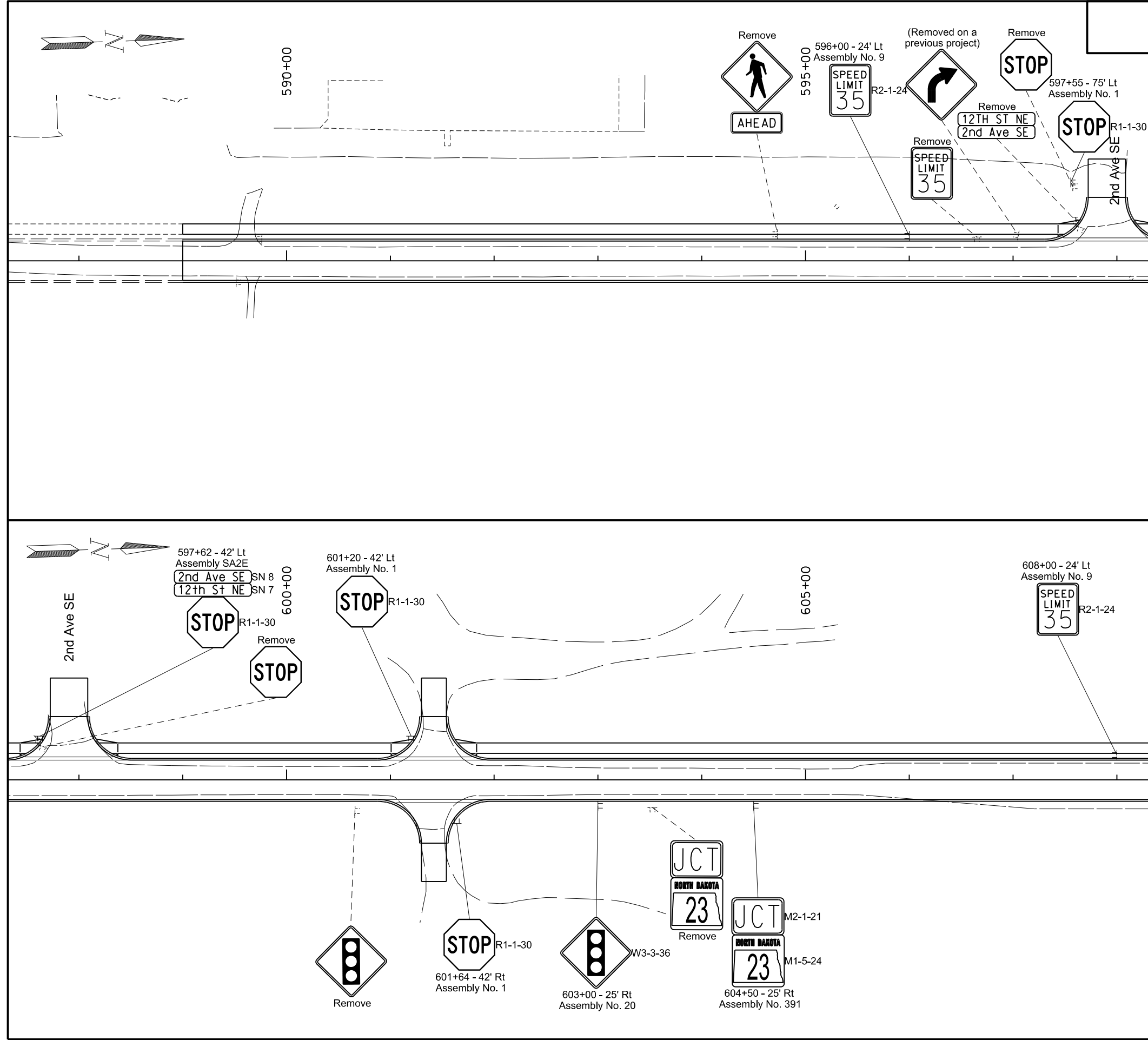
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	110	3



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Sign Layout
 ND23A
 US85B to ND23B

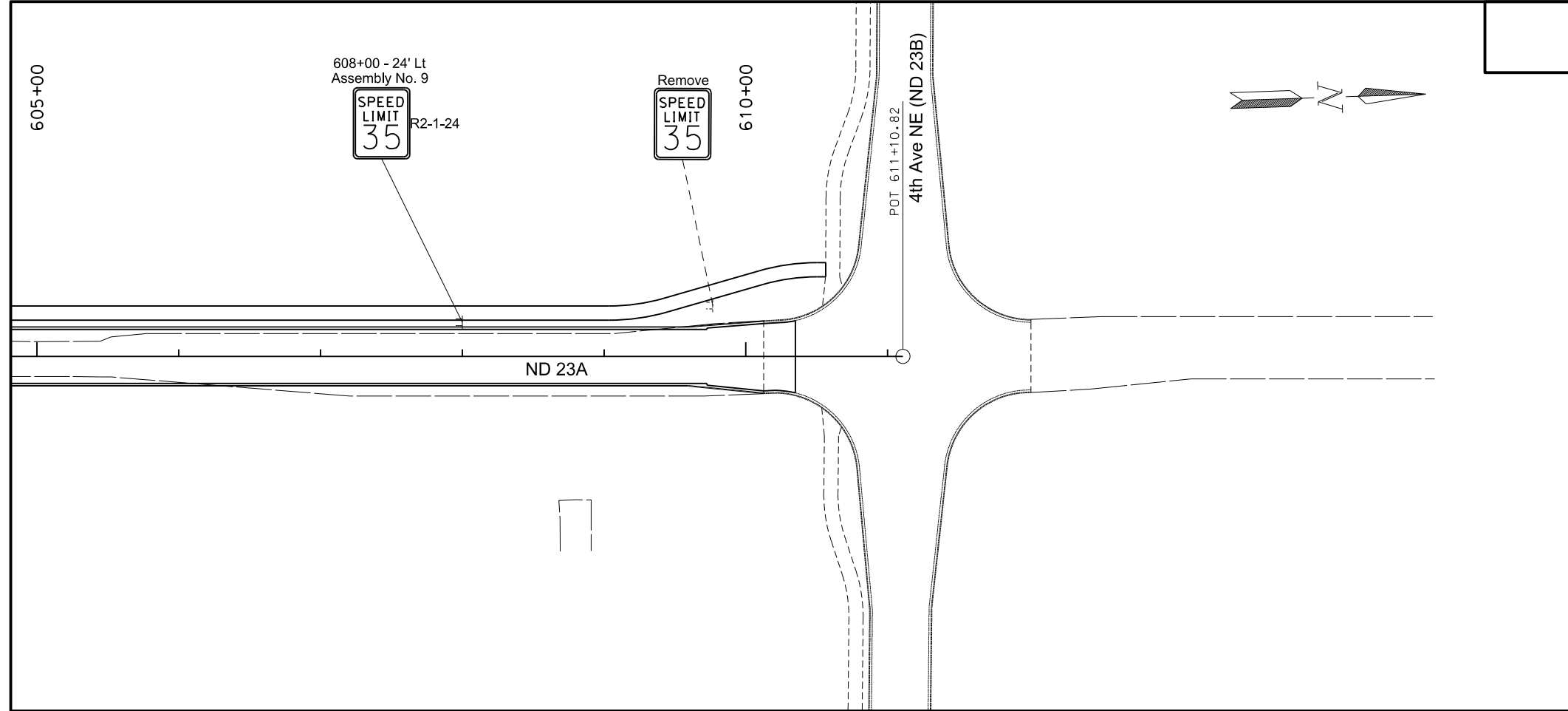
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	110	4



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Sign Layout
 ND23A
 US85B to ND23B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	110	5



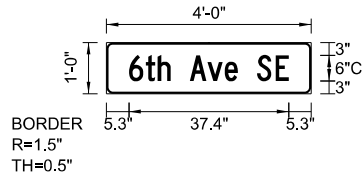
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 of Transportation

Sign Layout
 ND23A
 US85B to ND23B

SIGN NUMBER	SN 1
WIDTH x HEIGHT	4'-0" x 1'-0"
BORDER WIDTH	0.5" (inset 0")
CORNER RADIUS	1.5"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

STATION(S):
540+88 Rt
550+86 Lt

AREA: 4.0 Sq.Ft.



Dimensions are in inches.tenths Letter locations are panel edge to lower left corner

PANEL STYLE:ND_Street_Name_Conv_Border.asl

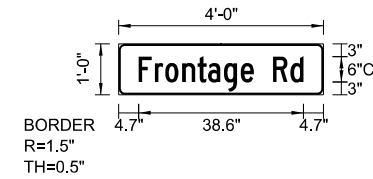
SYMBOL	X	Y	WID	HT	ANGLE

LETTER POSITION (X)											LENGTH	SIZE	SERIES
6	t	h	A	v	e	S	E				37.4	6/4.5	C 2000
5.3	9.2	12	15.1	19.6	23.7	27.7	30.8	35.3	39.7				

SIGN NUMBER	SN 3
WIDTH x HEIGHT	4'-0" x 1'-0"
BORDER WIDTH	0.5" (inset 0")
CORNER RADIUS	1.5"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

STATION(S):
544+30 Lt
546+00 Lt

AREA: 4.0 Sq.Ft.



Dimensions are in inches.tenths Letter locations are panel edge to lower left corner

PANEL STYLE:ND_Street_Name_Conv_Border.asl

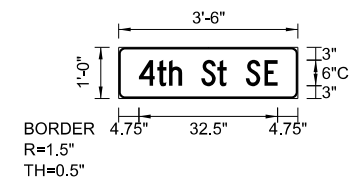
SYMBOL	X	Y	WID	HT	ANGLE

LETTER POSITION (X)											LENGTH	SIZE	SERIES
F	r	o	n	t	a	g	e	R	d		38.6	6/4.5	C 2000
4.7	8.5	10.9	14.9	18.5	20.9	24.7	28.6	31.7	36.2	40.3			

SIGN NUMBER	SN 2
WIDTH x HEIGHT	3'-6" x 1'-0"
BORDER WIDTH	0.5" (inset 0")
CORNER RADIUS	1.5"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

STATION(S):
540+88 Rt

AREA: 3.5 Sq.Ft.



Dimensions are in inches.tenths Letter locations are panel edge to lower left corner

PANEL STYLE:ND_Street_Name_Conv_Border.asl

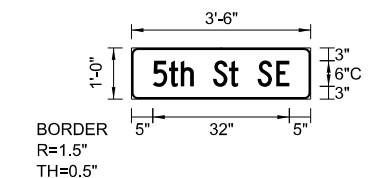
SYMBOL	X	Y	WID	HT	ANGLE

LETTER POSITION (X)											LENGTH	SIZE	SERIES
4	t	h	S	t	S	E					32.5	6/4.5	C 2000
4.7	9.1	11.8	14.9	19.4	23.2	25.3	29.8	34.2					

SIGN NUMBER	SN 4
WIDTH x HEIGHT	3'-6" x 1'-0"
BORDER WIDTH	0.5" (inset 0")
CORNER RADIUS	1.5"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

STATION(S):
544+30 Lt

AREA: 3.5 Sq.Ft.



Dimensions are in inches.tenths Letter locations are panel edge to lower left corner

PANEL STYLE:ND_Street_Name_Conv_Border.asl

SYMBOL	X	Y	WID	HT	ANGLE

LETTER POSITION (X)											LENGTH	SIZE	SERIES
5	t	h	S	t	S	E					32	6/4.5	C 2000
5	8.8	11.6	14.6	19.1	22.9	25.1	29.6	33.9					

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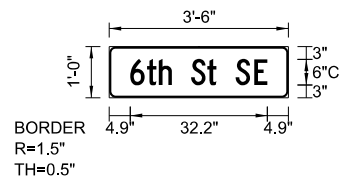
Sign Details

ND23A

US85B to ND23B

SIGN NUMBER	SN 5
WIDTH x HEIGHT	3'-6" x 1'-0"
BORDER WIDTH	0.5" (inset 0")
CORNER RADIUS	1.5"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

STATION(S): 546+00 Lt **AREA:** 3.5 Sq.Ft.



Dimensions are in inches.tenths Letter locations are panel edge to lower left corner

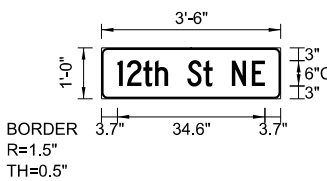
PANEL STYLE:ND_Street_Name_Conv_Border.ssf

SYMBOL	X	Y	WID	HT	ANGLE

LETTER POSITION (X)												LENGTH	SIZE	SERIES
6	t	h		S	t		S	E				32.2	6/4.5	C 2000
4.9	8.9	11.6	14.7	19.2	23	25.1	29.6	34						

SIGN NUMBER	SN 7
WIDTH x HEIGHT	3'-6" x 1'-0"
BORDER WIDTH	0.5" (inset 0")
CORNER RADIUS	1.5"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

STATION(S): 597+62 Lt **AREA:** 3.5 Sq.Ft.



Dimensions are in inches.tenths Letter locations are panel edge to lower left corner

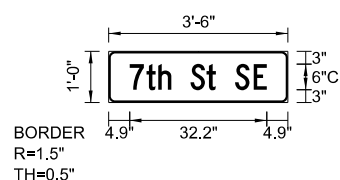
PANEL STYLE:ND_Street_Name_Conv_Border.ssf

SYMBOL	X	Y	WID	HT	ANGLE

LETTER POSITION (X)												LENGTH	SIZE	SERIES
1	2	t	h		S	t		N	E			34.6	6/4.5	C 2000
3.7	6	9.8	12.5	15.6	20.1	23.9	26	30.5	35.2					

SIGN NUMBER	SN 6
WIDTH x HEIGHT	3'-6" x 1'-0"
BORDER WIDTH	0.5" (inset 0")
CORNER RADIUS	1.5"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

STATION(S): 550+86 Lt **AREA:** 3.5 Sq.Ft.



Dimensions are in inches.tenths Letter locations are panel edge to lower left corner

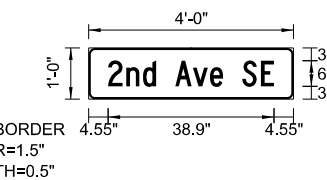
PANEL STYLE:ND_Street_Name_Conv_Border.ssf

SYMBOL	X	Y	WID	HT	ANGLE

LETTER POSITION (X)												LENGTH	SIZE	SERIES
7	t	h		S	t		S	E				32.2	6/4.5	C 2000
4.9	8.9	11.6	14.7	19.2	23	25.1	29.6	34						

SIGN NUMBER	SN 8
WIDTH x HEIGHT	4'-0" x 1'-0"
BORDER WIDTH	0.5" (inset 0")
CORNER RADIUS	1.5"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

STATION(S): 597+62 Lt **AREA:** 4.0 Sq.Ft.



Dimensions are in inches.tenths Letter locations are panel edge to lower left corner

PANEL STYLE:ND_Street_Name_Conv_Border.ssf

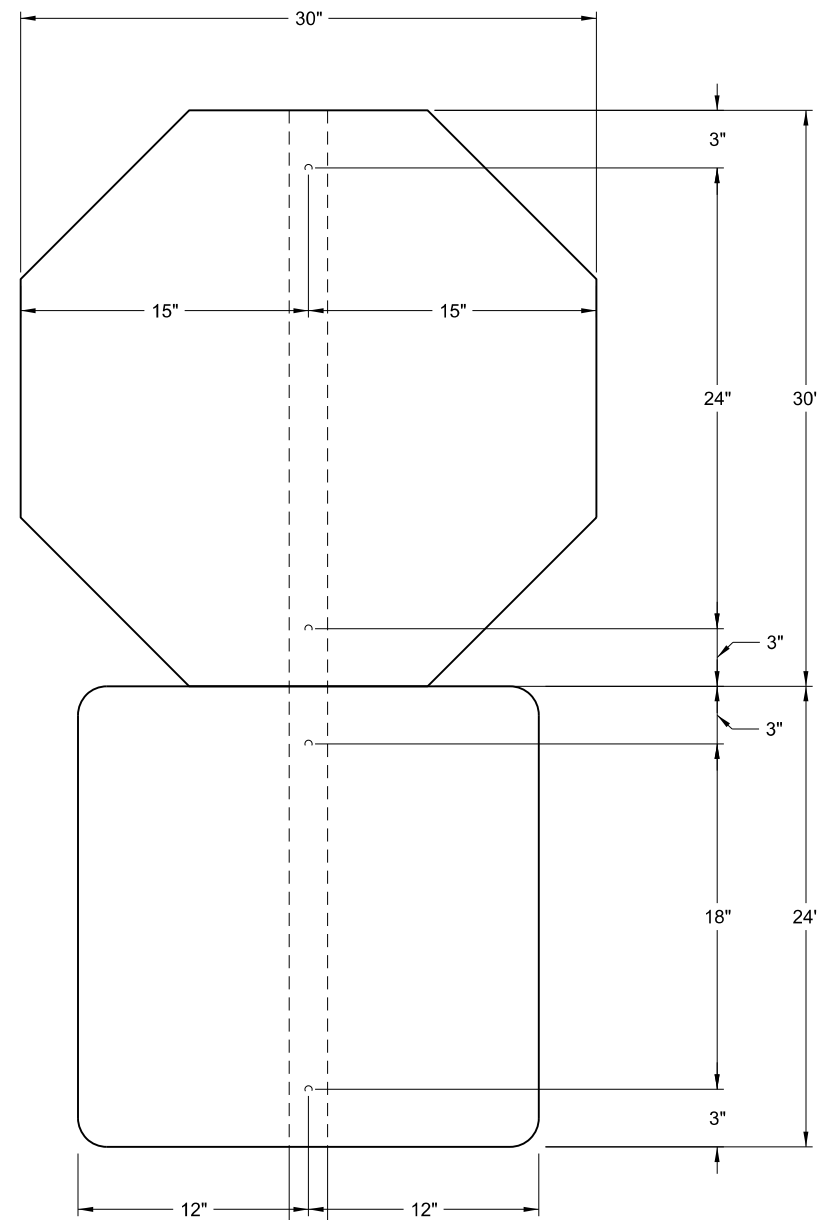
SYMBOL	X	Y	WID	HT	ANGLE

LETTER POSITION (X)												LENGTH	SIZE	SERIES
2	n	d		A	v	e		S	E			38.9	6/4.5	C 2000
4.6	8.8	12.7	15.8	20.3	24.4	28.4	31.5	36	40.4					

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Sign Details
ND23A
US85B to ND23B

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-7-023(050)910	110	8

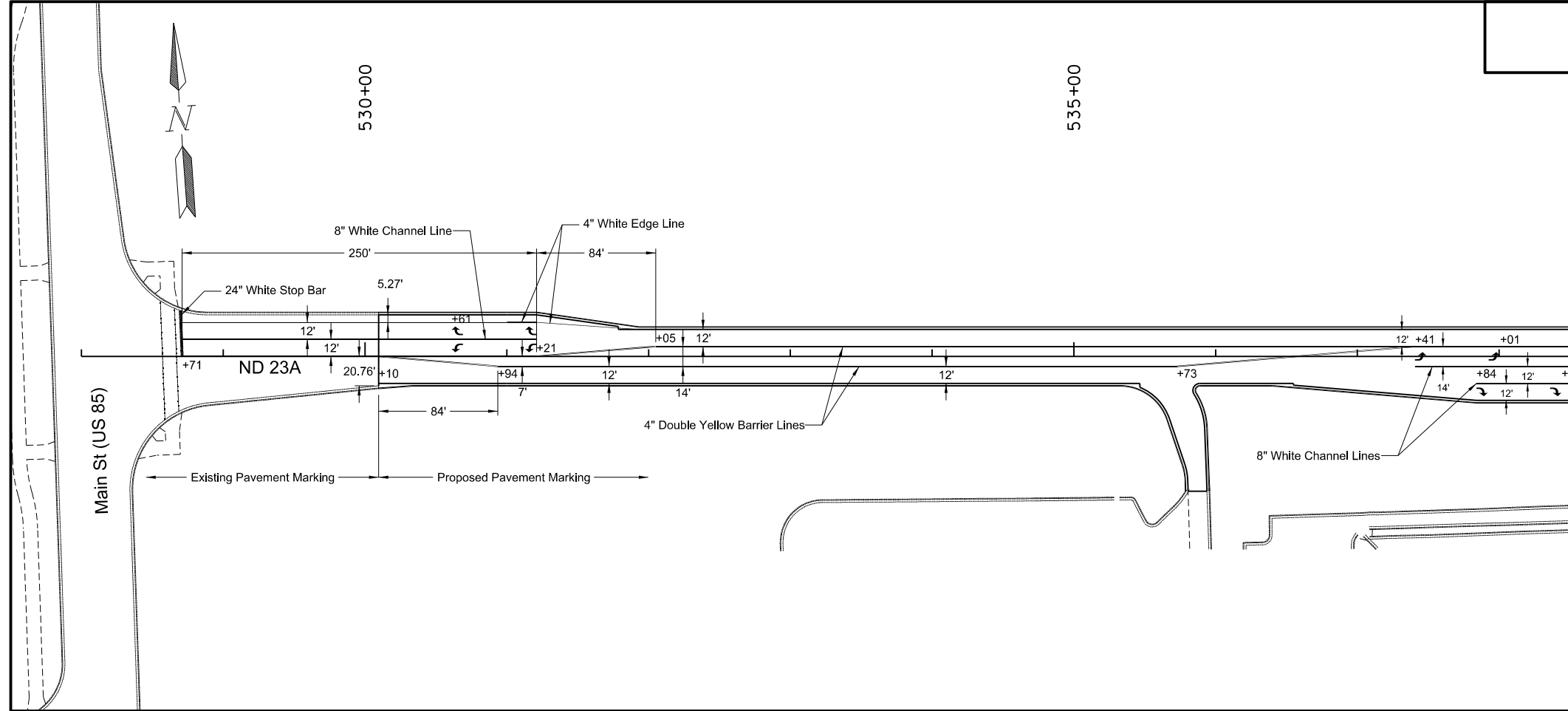


Special Assembly A - 1 Post
Sta 546+08 Rt

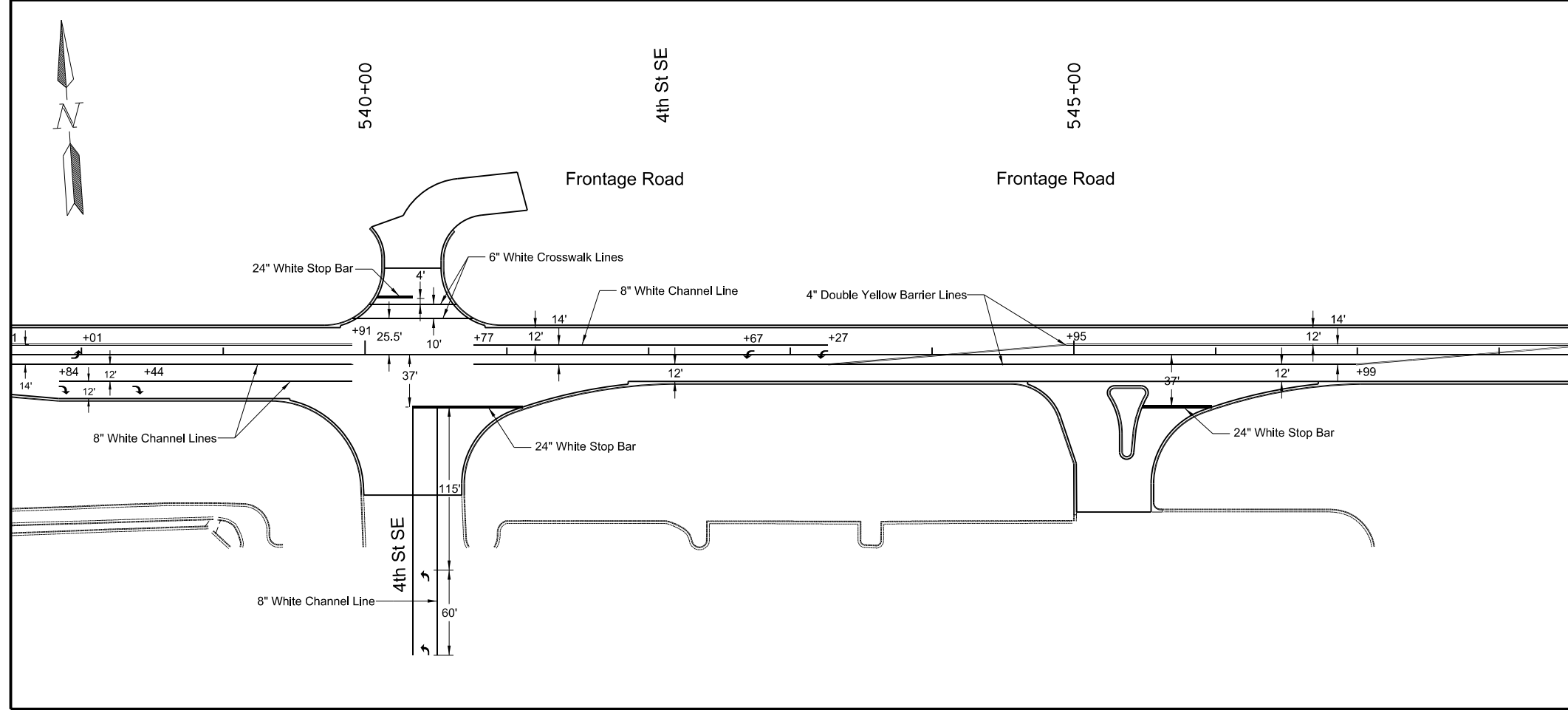
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Special Assembly
ND23A
US85B to ND23B

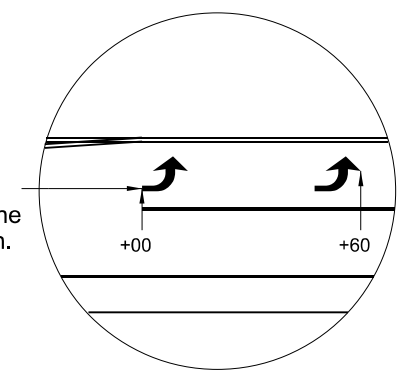
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	120	1



SPEC	CODE	BID ITEM	QUANTITY	UNIT
762	0122	Preformed Patterned Pvmt Mk Message-Grooved		
		8 Left Turn Arrows - White	128	SF
		4 Right Turn Arrows - White	64	SF
762	1305	Preformed Patterned Pvmt Mk 4in Line-Grooved		
		Yellow Double Barrier		
		530+10 to 532+05	783	LF
		532+05 to 535+73	1471	LF
		535+73 to 539+91	1173	LF
		540+77 to 544+95	1173	LF
		544+95 to 547+99	818	LF
		White Edge Line		
		530+10 to 531+93	184	LF
762	1307	Preformed Patterned Pvmt Mk 6in Line-Grooved		
		540+34 LT	146	LF
762	1309	Preformed Patterned Pvmt Mk 8in Line-Grooved		
		530+10 to 531+21	111	LF
		537+41 to 539+91	457	LF
		540+34 RT	175	LF
		540+77 to 543+27	250	LF
762	1325	Preformed Patterned Pvmt Mk 24in Line-Grooved		
		White Stop Bar		
		540+34 LT	25	LF
		540+34 RT	77	LF
		545+73 RT	50	LF



At All Locations:
The station listed for turn lane
arrows refers to this location.



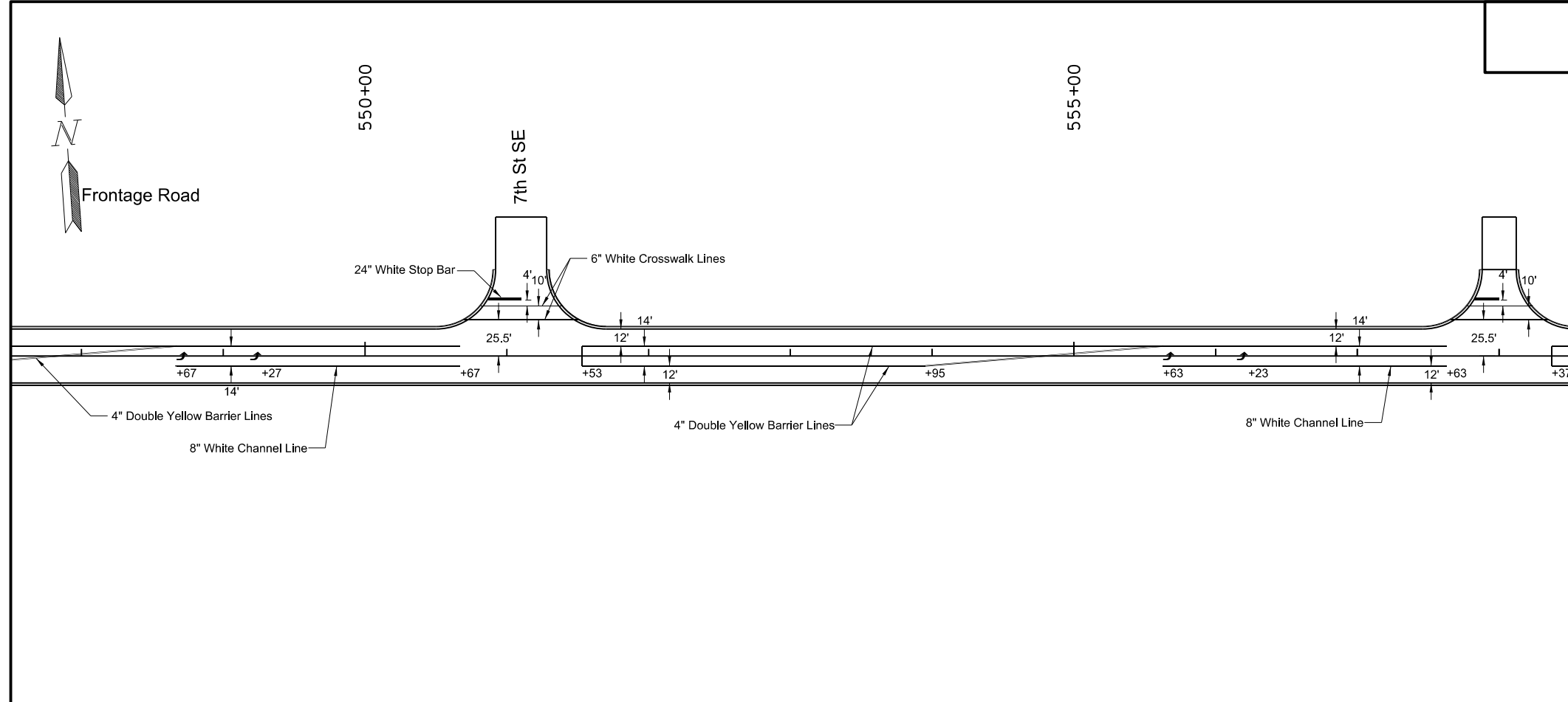
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Pavement Marking

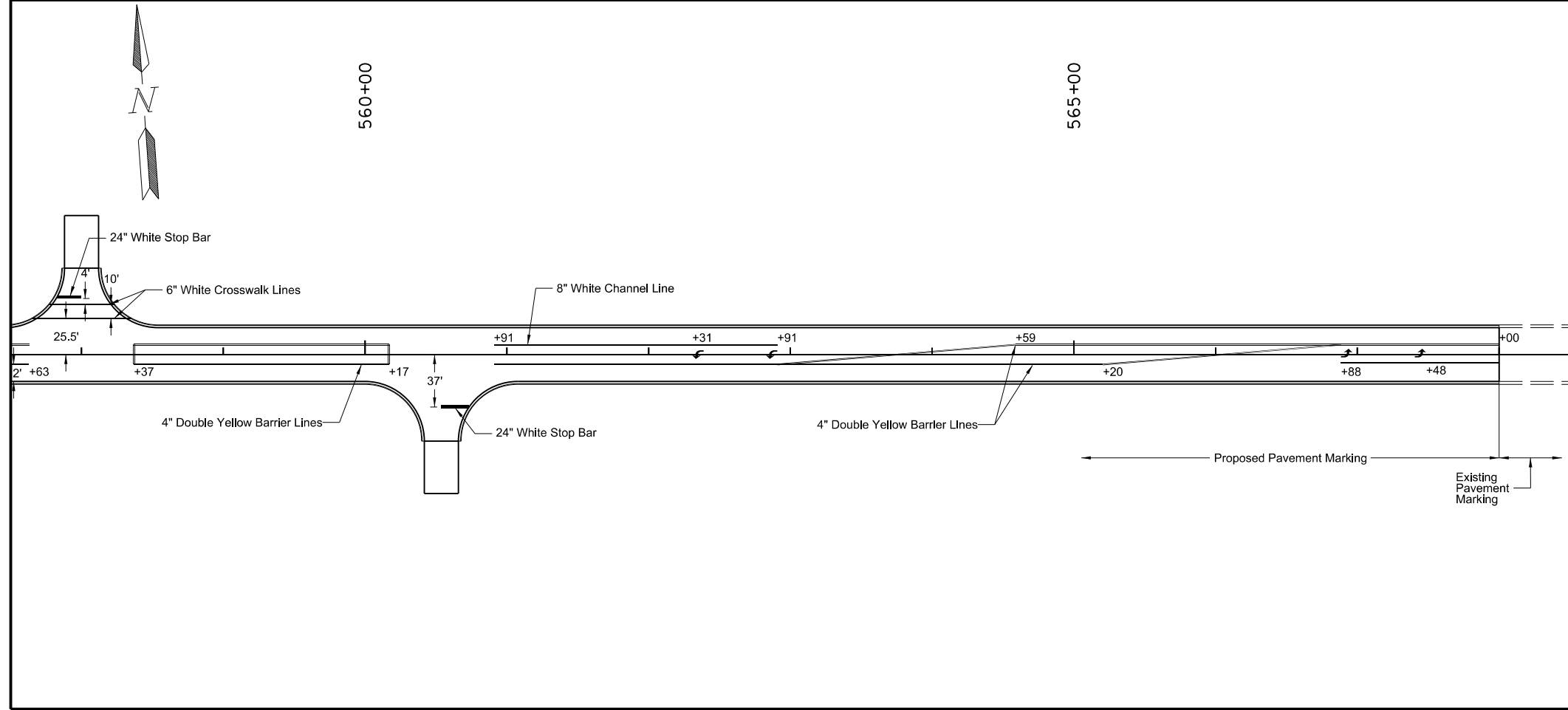
ND23A

US85B to ND23B

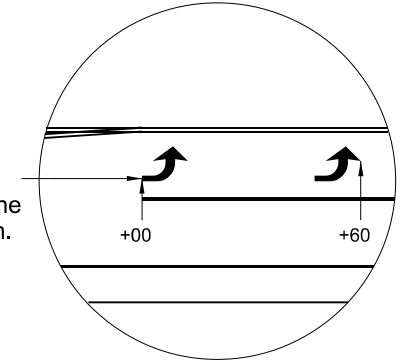
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	120	2



SPEC	CODE	BID ITEM	QUANTITY	UNIT
762	0122	Preformed Patterned Pvmt Mk Message-Grooved 8 Left Turn Arrows - White	128	SF
762	1305	Preformed Patterned Pvmt Mk 4in Line-Grooved Yellow Double Barrier		
		547+99 to 550+67	873	LF
		551+53 to 557+63	2069	LF
		558+37 to 560+17	775	LF
		560+91 to 564+59	1073	LF
		564+59 to 565+20	246	LF
		565+20 to 568+00	896	LF
762	1307	Preformed Patterned Pvmt Mk 6in Line-Grooved		
		551+10 LT	140	LF
		558+00 LT	114	LF
762	1309	Preformed Patterned Pvmt Mk 8in Line-Grooved		
		548+67 to 550+67	200	LF
		555+63 to 557+63	200	LF
		560+91 to 562+91	200	LF
762	1325	Preformed Patterned Pvmt Mk 24in Line-Grooved White Stop Bar		
		551+10 LT	23	LF
		558+00 LT	17	LF
		560+54 RT	20	LF



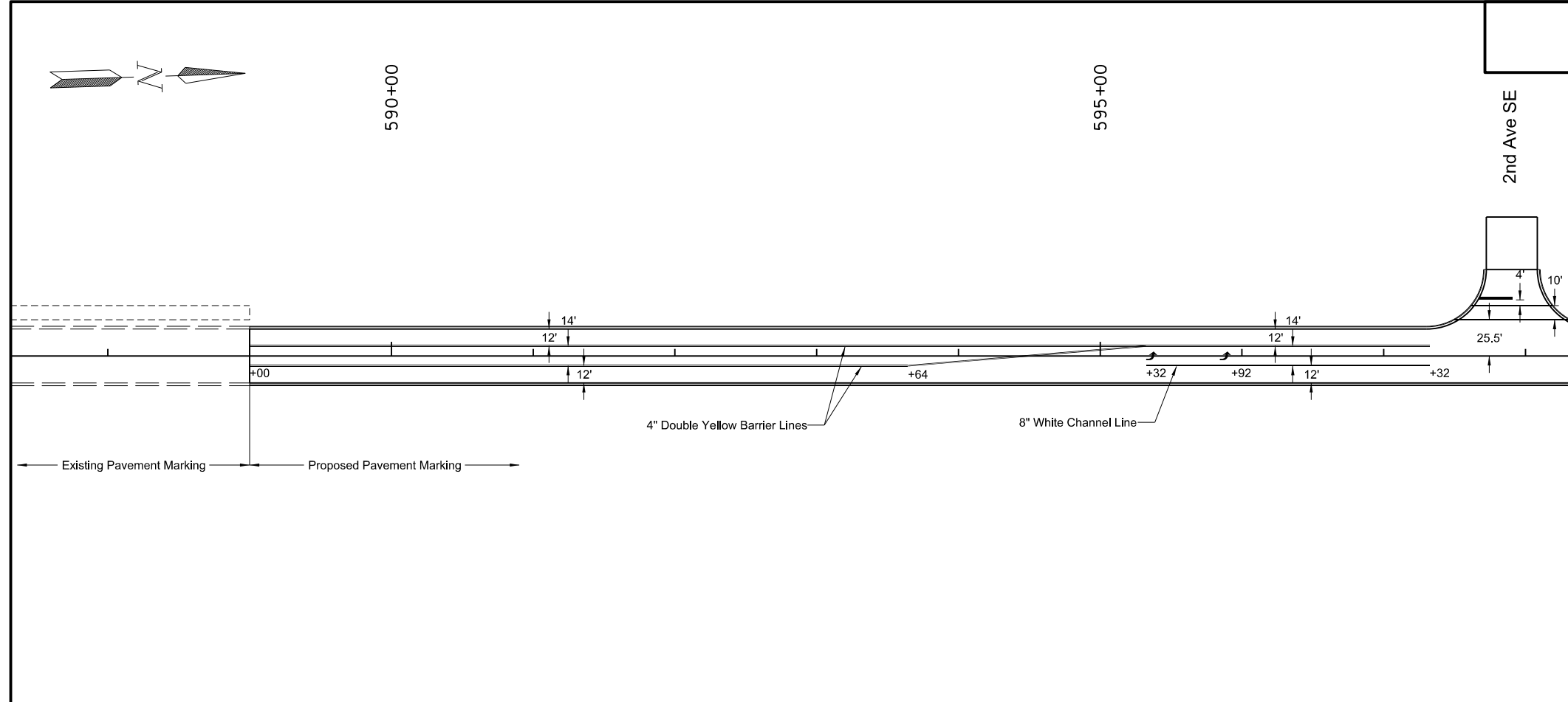
At All Locations:
The station listed for turn lane
arrows refers to this location.



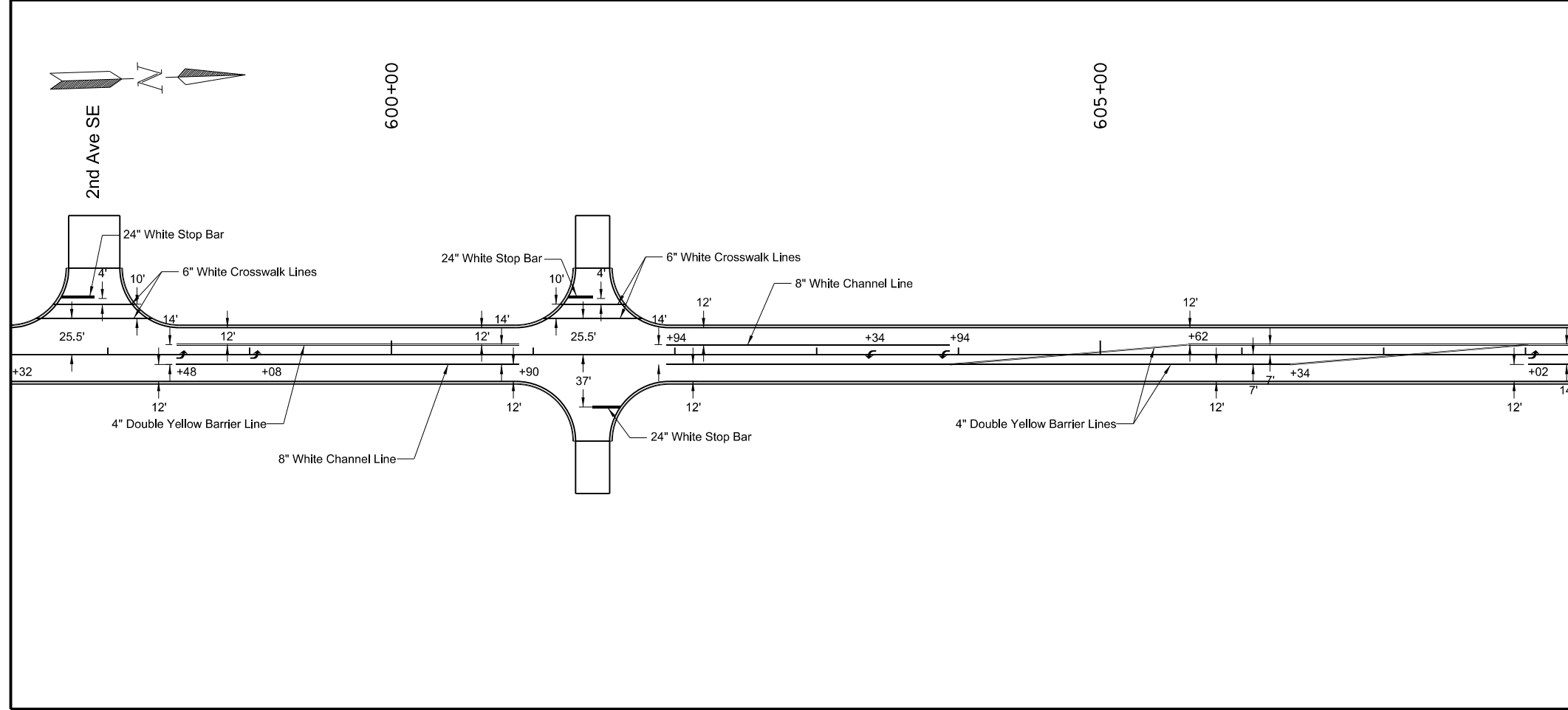
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Pavement Marking
ND23A
US85B to ND23B

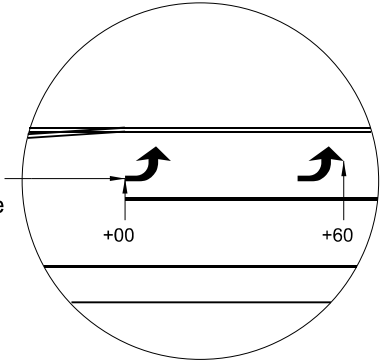
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	120	3



SPEC	CODE	BID ITEM	QUANTITY	UNIT
762	0122	Preformed Patterned Pvmt Mk Message-Grooved 6 Left Turn Arrows - White	96	SF
762	1305	Preformed Patterned Pvmt Mk 4in Line-Grooved Yellow Double Barrier 589+00 to 593+64 593+64 to 597+32 598+48 to 600+90 601+94 to 605+62 605+62 to 606+34	1858 1073 483 1073 288	LF LF LF LF LF
762	1307	Preformed Patterned Pvmt Mk 6in Line-Grooved 597+90 LT 601+42 LT	138 114	LF LF
762	1309	Preformed Patterned Pvmt Mk 8in Line-Grooved 595+32 to 597+32 598+48 to 600+90 601+94 to 603+94	200 242 200	LF LF LF
762	1325	Preformed Patterned Pvmt Mk 24in Line-Grooved White Stop Bar 597+90 LT 601+42 LT 601+42 RT	26 17 19	LF LF LF



At All Locations:
The station listed for turn lane
arrows refers to this location.

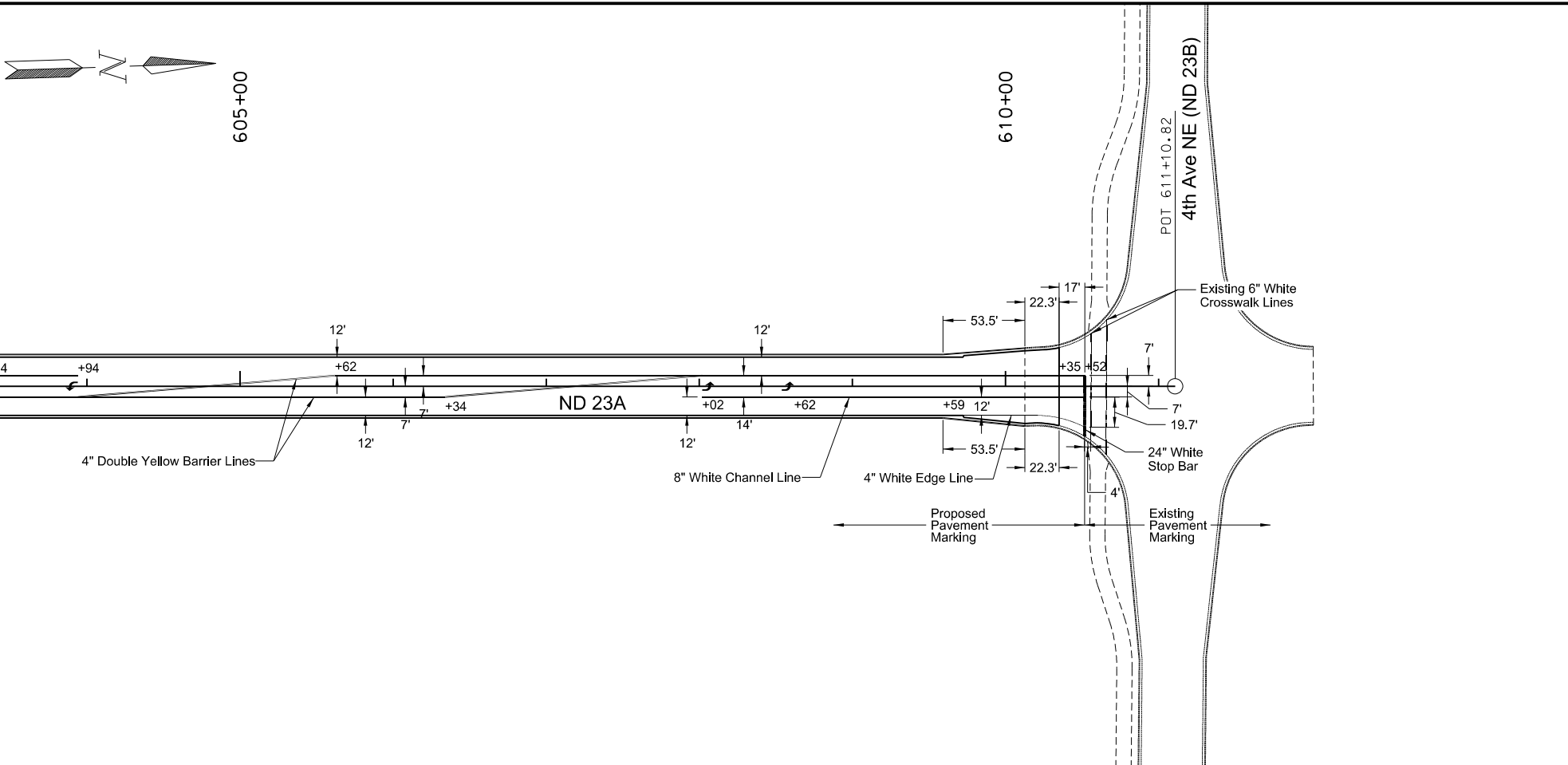


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Pavement Marking

ND23A

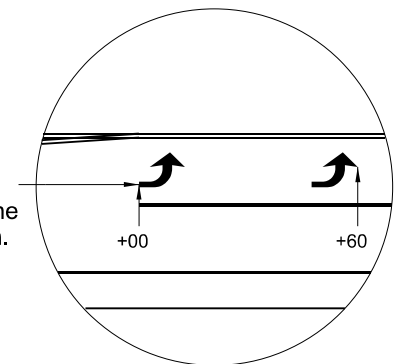
US85B to ND23B



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	120	4

SPEC	CODE	BID ITEM	QUANTITY	UNIT
704	1500	Obliteration of Pavement Marking Yellow Double Barrier 610+35 to 610+52	11	SF
		White Channel Line 610+35 to 610+52	11	SF
762	0122	Preformed Patterned Pvmt Mk Message-Grooved 2 Left Turn Arrows - White	32	SF
762	1305	Preformed Patterned Pvmt Mk 4In Line-Grooved Yellow Double Barrier 606+34 to 610+52	1173	LF
		White Edge Line 609+59 to 610+52 Rt	94	LF
762	1309	Preformed Patterned Pvmt Mk 8in Line-Grooved 608+02 to 610+52	250	LF
762	1325	Preformed Patterned Pvmt Mk 24in Line-Grooved White Stop Bar 610+52	7	LF

At All Locations:
The station listed for turn lane
arrows refers to this location.

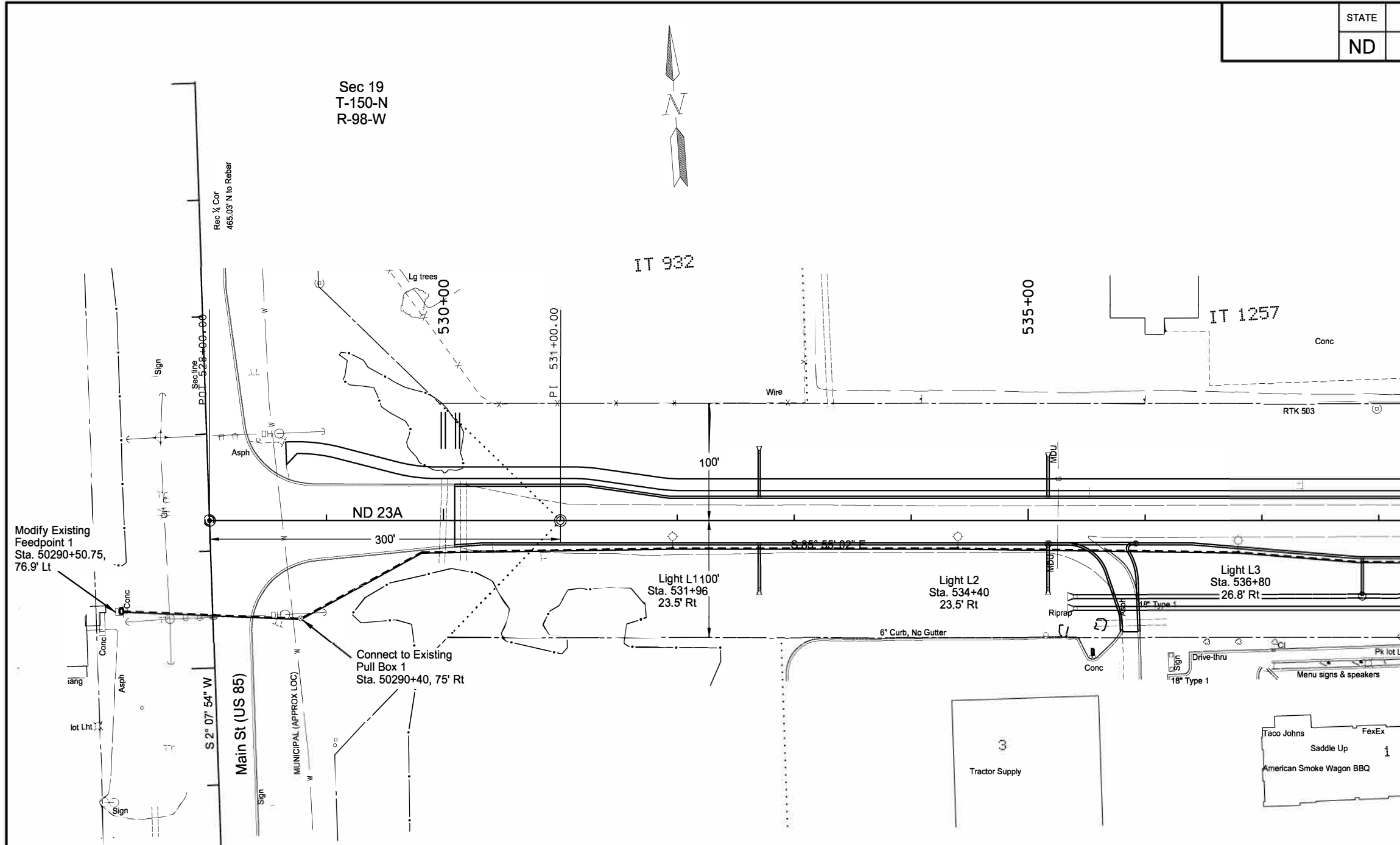


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Pavement Marking

ND23A

US85B to ND23B



Sec 19
T-150-N
R-98-W

IT 932

IT 1257

ND 23A

Main St (US 85)

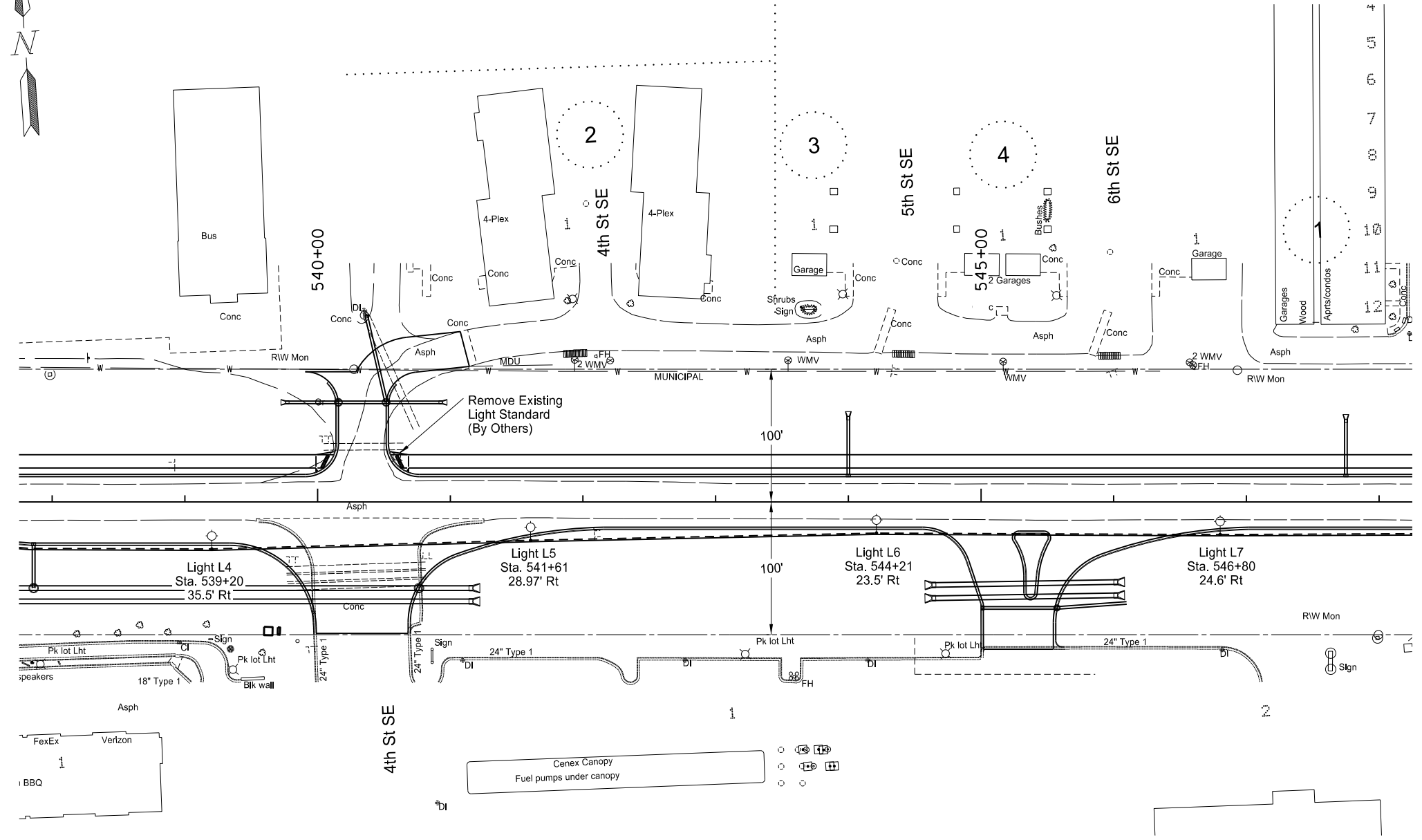
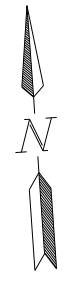
Sec 19

LIGHT STANDARD SCHEDULE						
LIGHT NUMBER	WATTS/TYPE	OPTICS IES-Type	STANDARDS			REMARKS
			TYPE	MTG. HT.	ARM LG.	
L1,L2,L3	LED	II	Round Tapered Steel	40'	6'	Install light standard on concrete foundation, breakaway transformer base. Luminaire operated at 240V.

ITEM	STATION OFFSET	CONDUIT RUN		CABLE RUN	
		TOTAL LF	SIZE (IN)	TOTAL LF	SIZE/TYPE
Existing Feedpoint 1 to Existing Pull Box 1	50290+50.75, 76.9' LT	Existing	2"	332	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW
Existing Pull Box 1 to Existing Pull Box 1	50290+40, 75' RT		2"	680	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW
Existing Pull Box 1 to Light L1	50290+40, 75' RT		2"	340	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW
Light L1 to Light L1	531+96, 23.5' RT		2"	504	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW
Light L1 to Light L2	531+96, 23.5' RT		2"	252	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW
Light L2 to Light L2	534+40, 23.5' RT		2"	498	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW
Light L2 to Light L3	534+40, 23.5' RT		2"	249	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW
Light L3 to Light L3	536+80, 26.8' RT		2"	498	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW
Light L3 to Light L4	536+80, 26.8' RT		2"	249	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW
Light L4	539+20, 35.5' RT		2"	249	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW

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Lighting
Sta 528+00 to Sta 538+00

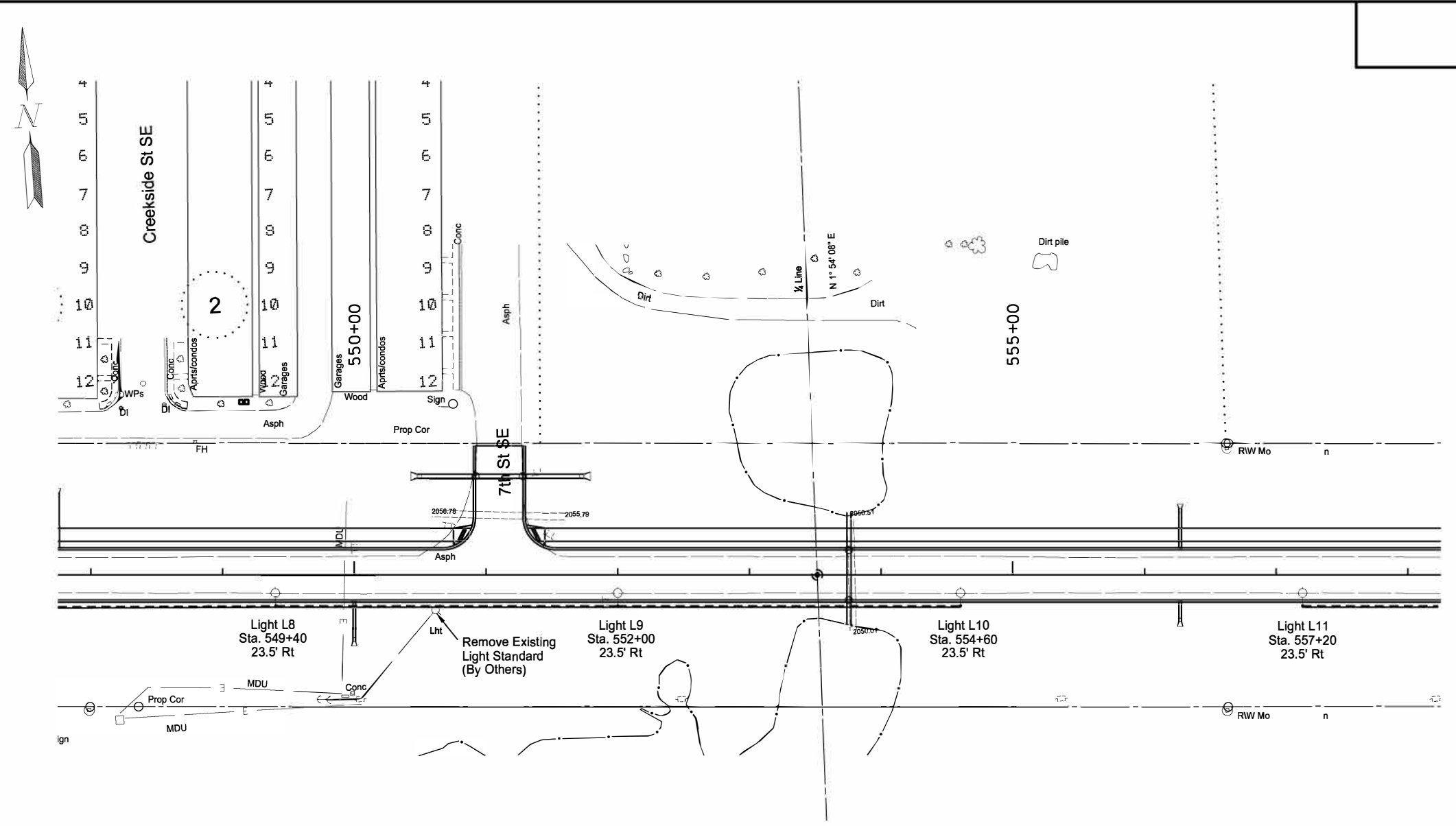


LIGHT STANDARD SCHEDULE						
LIGHT NUMBER	WATTS/TYPE	OPTICS IES-Type	STANDARDS			REMARKS
			TYPE	MTG. HT.	ARM LG.	
L4,L5,L6,L7	LED	II	Round Tapered Steel	40'	6'	Install light standard on concrete foundation, breakaway transformer base. Luminaire operated at 240V.

LIGHTING CABLE & CONDUIT SCHEDULE						
ITEM	STATION OFFSET	CONDUIT RUN		CABLE RUN		
		TOTAL LF	SIZE (IN)	TOTAL LF	SIZE/TYPE	
Light L4 to Light L5	539+20, 35.5' RT to 541+61, 28.97' RT	241	2"	498	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW	
Light L5 to Light L6	541+61, 28.97' RT to 544+21, 23.5' RT	261	2"	538	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW	
Light L6 to Light L7	544+21, 23.5' RT to 546+80, 24.6' RT	259	2"	534	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW	
Light L7 to Light L8	546+80, 24.6' RT to 549+40, 23.5' RT	260	2"	536	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW	

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Lighting
Sta 538+00 to Sta 548+00

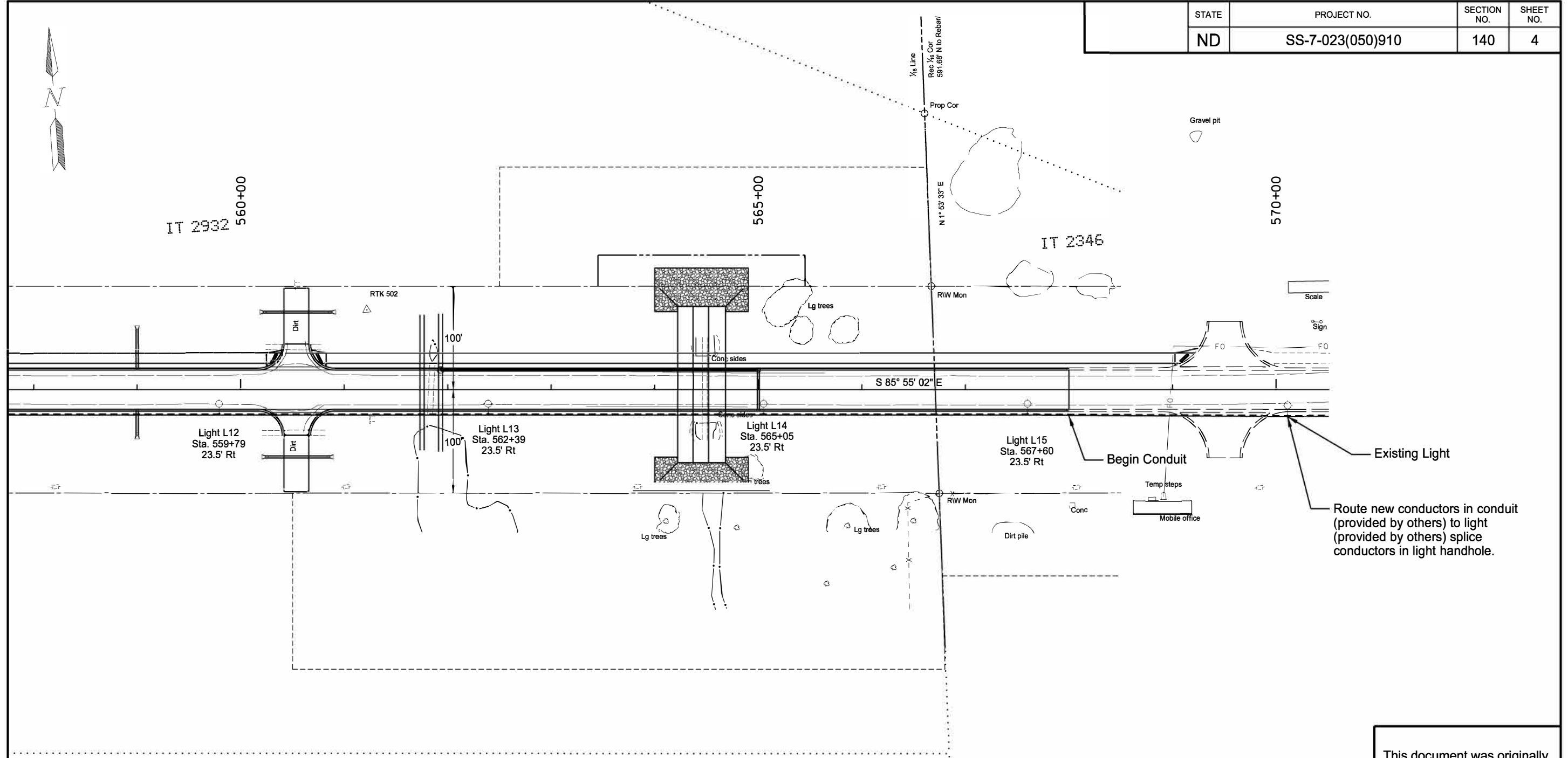


LIGHT STANDARD SCHEDULE						
LIGHT NUMBER	WATTS/TYPE	OPTICS IES-Type	STANDARDS			REMARKS
			TYPE	MTG. HT.	ARM LG.	
L8,L9,L10,L11	LED	II	Round Tapered Steel	40'	6'	Install light standard on concrete foundation, breakaway transformer base. Luminaire operated at 240V.

LIGHTING CABLE & CONDUIT SCHEDULE						
ITEM	STATION OFFSET	CONDUIT RUN		CABLE RUN		
		TOTAL LF	SIZE (IN)	TOTAL LF	SIZE/TYPE	
Light L8 to Light L9	549+40, 23.5' RT 552+00, 23.5' RT	260	2"	536 268	(2) UNDERGROUND CONDUCTOR NO. 2 RHWUSE UNDERGROUND CONDUCTOR NO. 4 THW	
Light L9 to Light L10	552+00, 23.5' RT 554+60, 23.5' RT	261	2"	538 269	(2) UNDERGROUND CONDUCTOR NO. 2 RHWUSE UNDERGROUND CONDUCTOR NO. 4 THW	
Light L10 to Light L11	554+60, 23.5' RT 557+20, 23.5' RT	260	2"	536 268	(2) UNDERGROUND CONDUCTOR NO. 2 RHWUSE UNDERGROUND CONDUCTOR NO. 4 THW	

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Lighting
Sta 548+00 to Sta 558+00



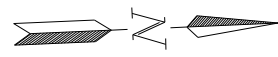
Route new conductors in conduit (provided by others) to light (provided by others) splice conductors in light handhole.

LIGHT STANDARD SCHEDULE						
LIGHT NUMBER	WATTS/TYPE	OPTICS IES-Type	STANDARDS			REMARKS
			TYPE	MTG. HT.	ARM LG.	
L12,L13,L14,L15	LED	II	Round Tapered Steel	40'	6'	Install light standard on concrete foundation, breakaway transformer base. Luminaire operated at 240V.

LIGHTING CABLE & CONDUIT SCHEDULE					
ITEM	STATION OFFSET	CONDUIT RUN		CABLE RUN	
		TOTAL LF	SIZE (IN)	TOTAL LF	SIZE/TYPE
Light L12 to Light L13	559+79, 23.5' RT	260	2"	536	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW
Light L13 to Light L14	562+39, 23.5' RT	266	2"	548	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW
Light L14 to Light L15	565+05, 23.5' RT	255	2"	526	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW
Light L15 to Existing Light	567+60, 23.5' RT	40	2"	510	(2) UNDERGROUND CONDUCTOR NO. 2 RHW/USE UNDERGROUND CONDUCTOR NO. 4 THW

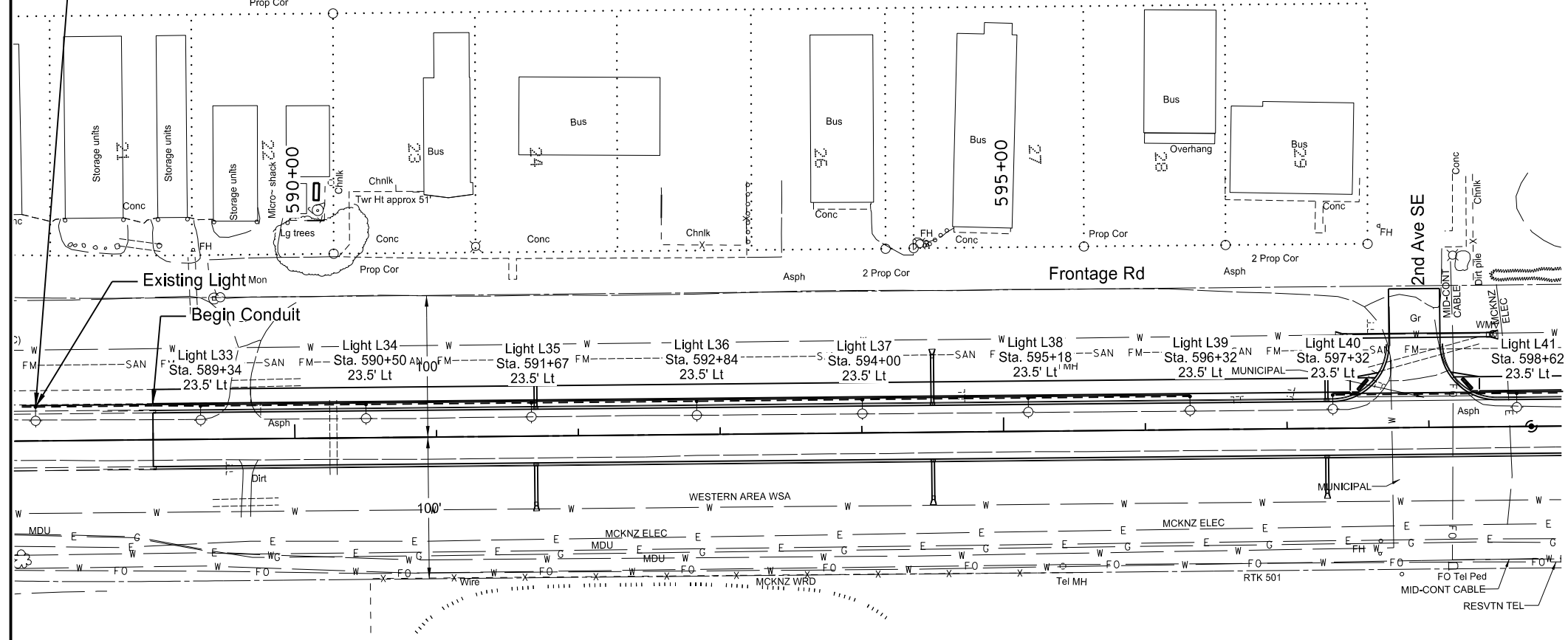
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Lighting
Sta 558+00 to Sta 568+00



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	140	5

Route new conductors in conduit (provided by others) to light (provided by others) splice conductors in light handhole.

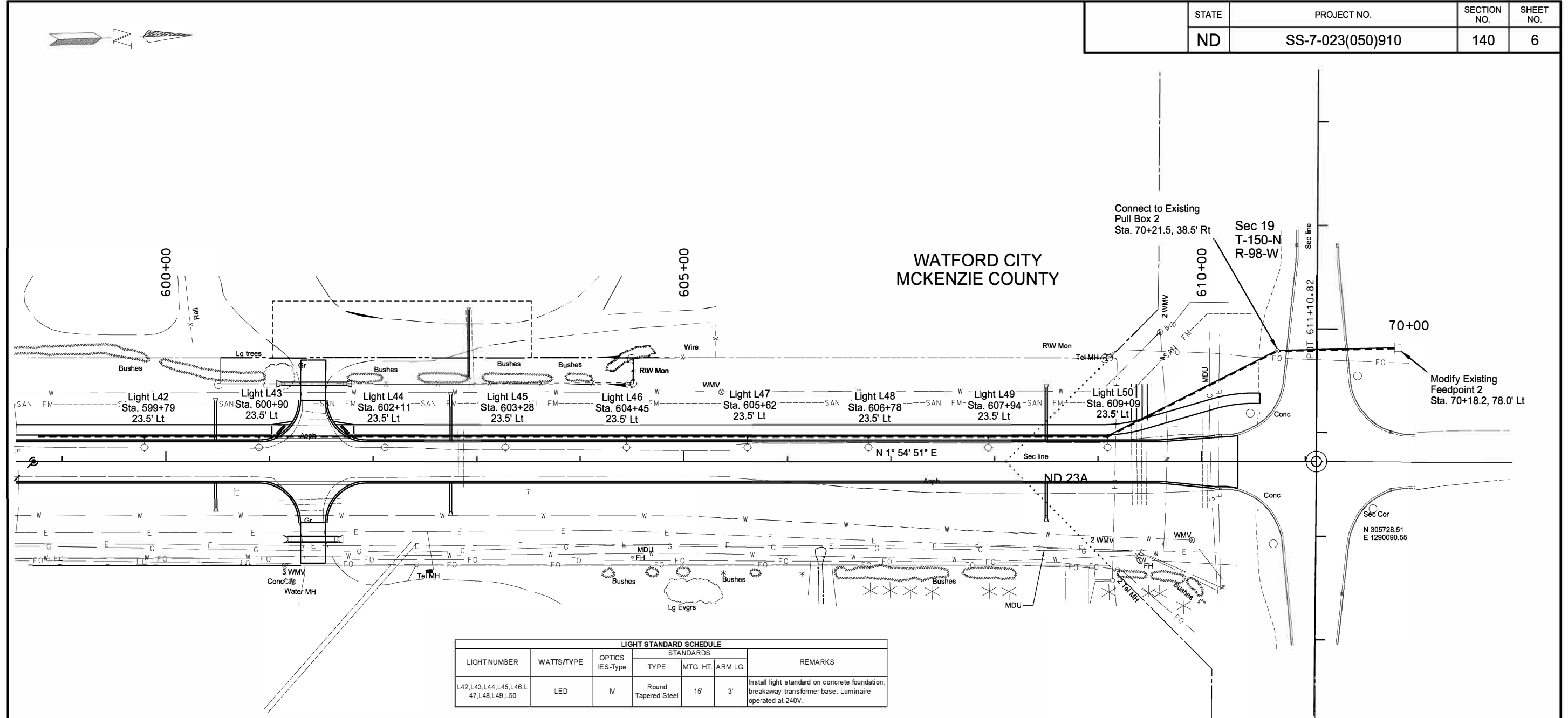


LIGHT NUMBER	WATTS/TYPE	OPTICS IES-Type	STANDARDS			REMARKS
			TYPE	MTG. HT.	ARM LG.	
L33, L34, L35, L36, L37, L38, L39, L40, L41	LED	IV	Round Tapered Steel	15'	3'	Install light standard on concrete foundation, breakaway transformer base. Luminaire operated at 240V.

ITEM	STATION OFFSET	CONDUIT RUN		CABLE RUN	
		TOTAL LF	SIZE (IN)	TOTAL LF	SIZE/TYPER
Existing Light to Light L33	588+17, 24' LT	34	2"	242	(2) UNDERGROUND CONDUCTOR NO. 6 RHW/USE UNDERGROUND CONDUCTOR NO. 6 THW
Light L33 to Light L34	589+34, 23.5' LT	117	2"	250	(2) UNDERGROUND CONDUCTOR NO. 6 RHW/USE UNDERGROUND CONDUCTOR NO. 6 THW
Light L34 to Light L35	590+50, 23.5' LT	117	2"	250	(2) UNDERGROUND CONDUCTOR NO. 6 RHW/USE UNDERGROUND CONDUCTOR NO. 6 THW
Light L35 to Light L36	591+67, 23.5' LT	117	2"	250	(2) UNDERGROUND CONDUCTOR NO. 6 RHW/USE UNDERGROUND CONDUCTOR NO. 6 THW
Light L36 to Light L37	592+84, 23.5' LT	117	2"	250	(2) UNDERGROUND CONDUCTOR NO. 6 RHW/USE UNDERGROUND CONDUCTOR NO. 6 THW
Light L37 to Light L38	594+00, 23.5' LT	117	2"	250	(2) UNDERGROUND CONDUCTOR NO. 6 RHW/USE UNDERGROUND CONDUCTOR NO. 6 THW
Light L38 to Light L39	595+18, 23.5' LT	114	2"	244	(2) UNDERGROUND CONDUCTOR NO. 6 RHW/USE UNDERGROUND CONDUCTOR NO. 6 THW
Light L39 to Light L40	596+32, 23.5' LT	130	2"	278	(2) UNDERGROUND CONDUCTOR NO. 6 RHW/USE UNDERGROUND CONDUCTOR NO. 6 THW
Light L40 to Light L41	597+32, 23.5' LT	130	2"	278	(2) UNDERGROUND CONDUCTOR NO. 6 RHW/USE UNDERGROUND CONDUCTOR NO. 6 THW
Light L41 to Light L42	598+62, 23.5' LT	117	2"	250	(2) UNDERGROUND CONDUCTOR NO. 6 RHW/USE UNDERGROUND CONDUCTOR NO. 6 THW

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Lighting
Sta 584+00 to Sta 595+00



LIGHT NUMBER	WATTS/TYPE	OPTICS IES-Type	STANDARDS			REMARKS
			TYPE	MTG. HT.	ARM LG.	
L42,L43,L44,L45,L46,L47,L48,L49,L50	LED	N	Round Tapered Steel	15'	3'	Install light standard on concrete foundation, breakaway transformer base. Luminaire operated at 240V.

ITEM	STATION OFFSET	CONDUIT RUN		CABLE RUN	
		TOTAL LF	SIZE (IN)	TOTAL LF	SIZE/TYPE
Light L42 to Light L43	599+79, 23.5' LT to 600+90, 23.5' LT	111	2"	238	(2) UNDERGROUND CONDUCTOR NO. 6 RHW/USE UNDERGROUND CONDUCTOR NO. 6 THW
Light L43 to Light L44	600+90, 23.5' LT to 602+11, 23.5' LT	122	2"	260	(2) UNDERGROUND CONDUCTOR NO. 6 RHW/USE UNDERGROUND CONDUCTOR NO. 6 THW
Light L44 to Light L45	602+11, 23.5' LT to 603+28, 23.5' LT	116	2"	248	(2) UNDERGROUND CONDUCTOR NO. 6 RHW/USE UNDERGROUND CONDUCTOR NO. 6 THW
Light L45 to Light L46	603+28, 23.5' LT to 604+45, 23.5' LT	117	2"	250	(2) UNDERGROUND CONDUCTOR NO. 6 RHW/USE UNDERGROUND CONDUCTOR NO. 6 THW
Light L46 to Light L47	604+45, 23.5' LT to 605+62, 23.5' LT	117	2"	250	(2) UNDERGROUND CONDUCTOR NO. 6 RHW/USE UNDERGROUND CONDUCTOR NO. 6 THW
Light L47 to Light L48	605+62, 23.5' LT to 606+78, 23.5' LT	117	2"	250	(2) UNDERGROUND CONDUCTOR NO. 6 RHW/USE UNDERGROUND CONDUCTOR NO. 6 THW
Light L48 to Light L49	606+78, 23.5' LT to 607+94, 23.5' LT	116	2"	248	(2) UNDERGROUND CONDUCTOR NO. 6 RHW/USE UNDERGROUND CONDUCTOR NO. 6 THW
Light L49 to Light L50	607+94, 23.5' LT to 609+09, 23.5' LT	115	2"	246	(2) UNDERGROUND CONDUCTOR NO. 6 RHW/USE UNDERGROUND CONDUCTOR NO. 6 THW
Existing Pull Box 2 to Existing Pull Box 2	70+21.5, 38.5 RT to 70+21.5, 38.5 RT	184	2"	191	(2) UNDERGROUND CONDUCTOR NO. 6 RHW/USE UNDERGROUND CONDUCTOR NO. 6 THW
Existing Feedpoint 2 to Existing Feedpoint 2	70+18.2, 78.0' LT to 70+18.2, 78.0' LT	Existing	2"	254	(2) UNDERGROUND CONDUCTOR NO. 6 RHW/USE UNDERGROUND CONDUCTOR NO. 6 THW

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Lighting
Sta 595+00 to Sta 604+50

EXISTING FEED POINT 1 PANEL SCHEDULE

Existing 100 Amp Main Breaker, 120/240 Volt, 1Ø, All breakers 22 kAIC minimum.

CKT	DESCRIPTION	BRK	V-A	AMPS	Φ	AMPS	V-A	BRK	DESCRIPTION	CKT
1	LC1	50	2,808	11.7	A	11.7	2808	50		LC2
3				11.7	B	11.7				
5	LC3	50	2,592	10.8	A	10.0	2400	45	Traffic Signal Controller	6
7				10.8	B	10.0				
9	LC4	*50	2,736	11.4	A				(Space)	10
11				11.4	B					
13	GFCI Receptacle (Feedpoint Internal)	20	180	1.5	A				(Space)	14
15	Photoeye	15	48	0.4	B				(Space)	16
Total Connected VA and Amps			13,572	57.1						
				56.0						

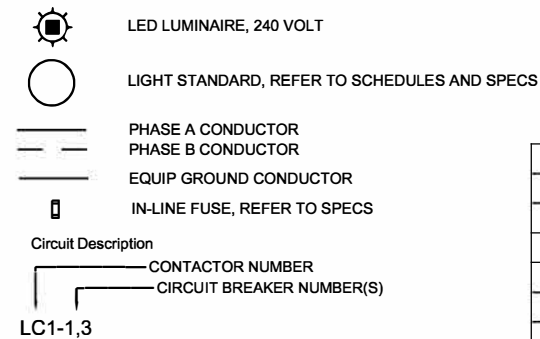
*New Circuit, provide new breakers, contactor and connections as required

EXISTING FEED POINT 2 PANEL SCHEDULE

Existing 100 Amp Main Breaker, 120/240 Volt, 1Ø, All breakers 22 kAIC minimum.

CKT	DESCRIPTION	BRK	V-A	AMPS	Φ	AMPS	V-A	BRK	DESCRIPTION	CKT
1	LC1	50	833	3.5	A	3.5	833	50		LC2
3				3.5	B	3.5				
5	LC3	50	833	3.5	A	10.0	2400	50		LC4
7				3.5	B	10.0				
9	LC5	*50	1,238	5.2	A	10.0	2400	45	Traffic Signal Controller	10
11				5.2	B	10.0				
13	GFCI Receptacle (Feedpoint Internal)	20	180	1.5	A				(Space)	14
15	Photoeye	15	48	0.4	B				(Space)	16
Total Connected VA and Amps			8,765	37.1						
				36.0						

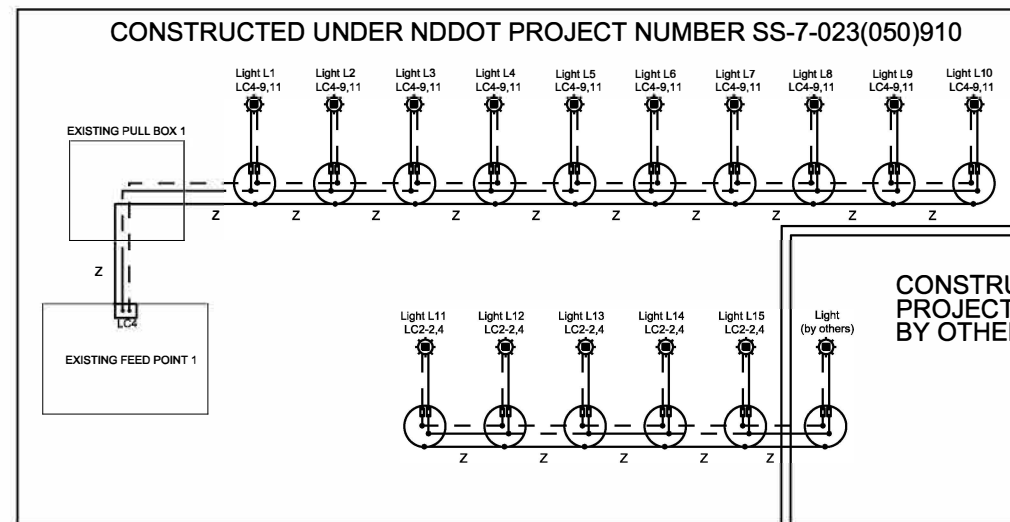
*New Circuit, provide new breakers, contactor and connections as required



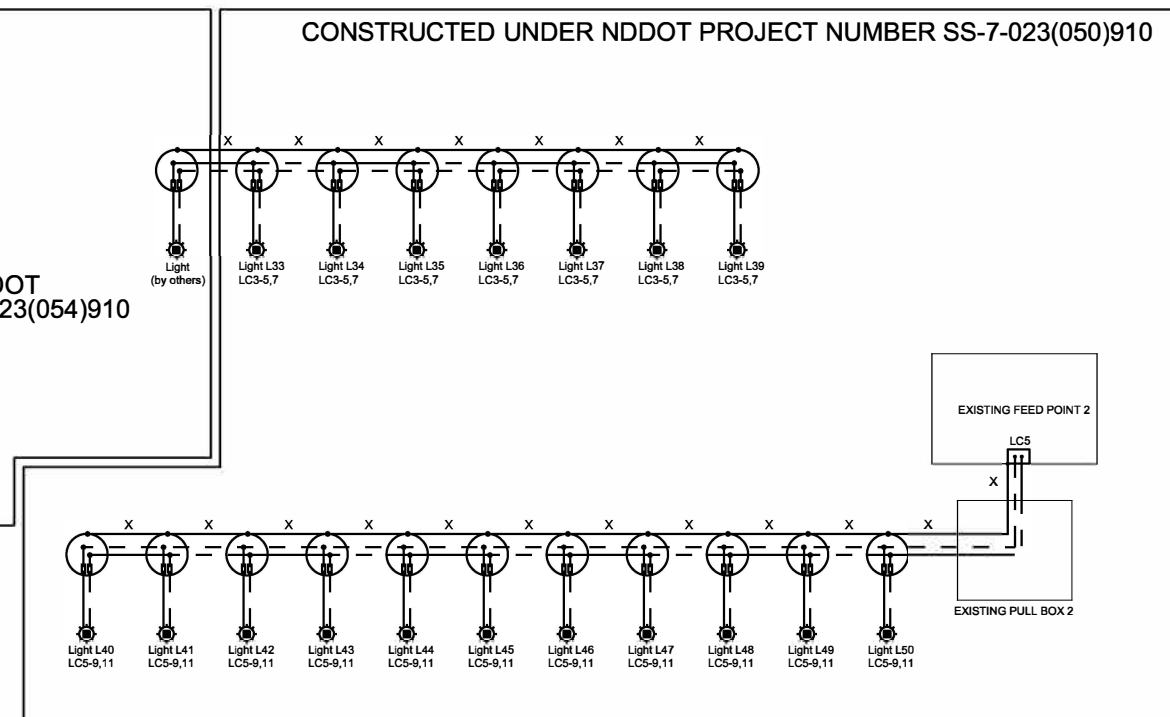
Lighting Quantities

Spec	Code	Item Description	Unit	Qty.
770	0020	CONCRETE FOUNDATION-HIGHWAY LIGHTING	EA	33
770	0330	2IN DIAMETER RIGID CONDUIT	LF	5,777
770	0503	UNDERGROUND CONDUCTOR NO2-TYPE RHW	LF	8,348
770	0505	UNDERGROUND CONDUCTOR NO6-TYPE RHW	LF	4,888
770	0604	UNDERGROUND CONDUCTOR NO4-TYPE THW	LF	4,174
770	0605	UNDERGROUND CONDUCTOR NO6-TYPE THW	LF	2,444
770	1676	LT STD 6FT MA 40FT MT HT BREAKAWAY	EA	15
770	-	LT STD 3FT MA 15FT MT HT BREAKAWAY	EA	18
770	4210	LED LUMINAIRE	EA	33
770	9270	MODIFY EXISTING FEED POINT	EA	2
770	0001	LIGHTING SYSTEM	EA	1

Items shown above are for informational purposes, contractor shall provide all components necessary for each lighting system to be fully operational as shown in the plans. Items shall be included in the corresponding price bid "LIGHTING SYSTEM"



CONSTRUCTED UNDER NDDOT PROJECT NUMBER SOIB-7-023(054)910 BY OTHERS



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ND 23A

WIRING SCHEMATIC
HIGHWAY LIGHTING

LIGHT STANDARD FOUNDATION SELECTION TABLE		
Description	Footing Depth "D"	Footing Depth "D"
	24" & 30" Diameter	36" & 42" Diameter
<u>Light Standard</u>		
15' Mounting Height (3' Single Mast Arm)	6'	5'
40' Mounting Height (6' Single Mast Arm)	8'	7'

NOTES FOR LIGHT STANDARD FOUNDATIONS:

- For Light Standards, use at a minimum the largest of the following scenarios:
 - Anchor bolt cage circle diameter plus 12"
 - Light base plus 6"
 - 24"

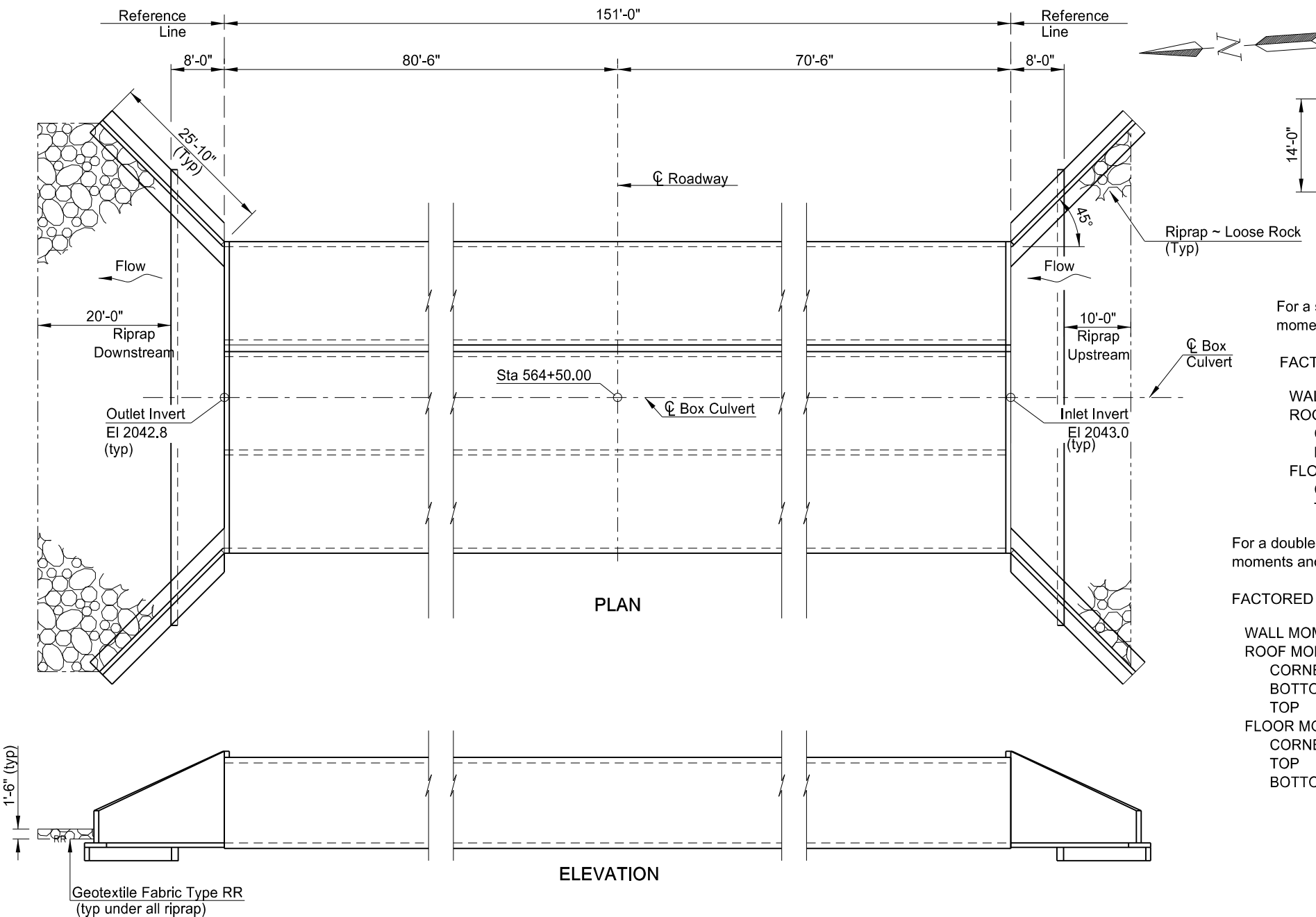
It is the Contractor's responsibility to determine the foundation diameter and include the corresponding costs for the actual diameter in the lump sum price bid for "LIGHTING SYSTEM".

- Provide Class AAE-3 Portland Cement Concrete mixed and proportioned as specified in Section 802.
- Provide Grade 60 reinforcing steel.
- The Contractor may use temporary casing to maintain the opening prior to placement of concrete. The casing will be removed prior to curing of the concrete. If casing is used, it will be of sufficient strength to withstand handling and installation procedures. The Contractor will submit a casing material proposal to the Engineer for review two weeks prior to ordering casing material. Include all costs associated with the temporary casing in the lump sum price bid for "LIGHTING SYSTEM". Permanent casing of the foundation will not be used.
- Include all costs associated with the construction of the foundation in the lump sum price bid for "LIGHTING SYSTEM". This includes but not limited to excavation, concrete, reinforcing steel, anchor bolts and ground rod.
- See Standard Drawing D-770-1 for additional foundation information.
- Light standards will have a minimum of 4 anchor bolts.

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Matthew L. Isley
Registration Number
PE- 10095,
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ND 23A
CONCRETE FOUNDATIONS
HIGHWAY LIGHTING

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	170	1



For a single barrel box culvert with 10" thick roof, 10" floor and 9" walls, the following total factored moments and shears would result from the application of the required loads:

FACTORED DESIGN MOMENTS (SINGLE)		FACTORED DESIGN SHEARS (SINGLE)	
WALL MOMENT	0 ft-lbs	WALL SHEAR	8,400 lbs
ROOF MOMENTS		ROOF SHEARS	
CORNER	-31,214 ft-lbs	CORNER	17,155 lbs
BOTTOM	48,145 ft-lbs		
FLOOR MOMENTS		FLOOR SHEARS	
CORNER	-37,286 ft-lbs	CORNER	21,353 lbs
TOP	51,211 ft-lbs		

For a double barrel box culvert with 10" thick roof, 10" floor and 9" walls, the following total factored moments and shears would result from the application of the required loads:

FACTORED DESIGN MOMENTS (DOUBLE)		FACTORED DESIGN SHEARS (DOUBLE)	
WALL MOMENT	1,930 ft-lbs	WALL SHEAR	8,671 lbs
ROOF MOMENTS		ROOF SHEARS	
CORNER	-27,431 ft-lbs	CORNER	15,080 lbs
BOTTOM	36,731 ft-lbs	WALL	21,043 lbs
TOP	-71,162 ft-lbs	FLOOR SHEARS	
FLOOR MOMENTS		CORNER	19,029 lbs
CORNER	-32,089 ft-lbs	WALL	24,843 lbs
TOP	37,923 ft-lbs		
BOTTOM	-74,724 ft-lbs		

SPECIAL PROVISIONS	
SP 4(14)	MIGRATORY BIRD TREATY ACT
SP 479(14)	TEMPORARY WATER DIVERSION
STANDARD DRAWINGS	
D-714-22	
HL-93 DESIGN LOADING	
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
1 MILE EAST OF US 85B	
PRECAST CONCRETE TRIPLE BOX CULVERT LAYOUT	
CLEAR SPAN 3' x 14' CLEAR HEIGHT 12' MAXIMUM FILL 15'	
PROJECT: SS-7-023(050)910 STATION: 564+50 MCKENZIE COUNTY	
08/29/17	Jon Ketterling

BOX CULVERT BID ITEMS

HYDRAULIC DATA:			SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
Drainage Area	170.7	sq mi	202	0105	REMOVAL OF STRUCTURE	L SUM	1
Stream Gradient	0.0013	ft/ft	210	0050	BOX CULVERT EXCAVATION	EA	1
Design Frequency	50	yr	210	0210	FOUNDATION FILL	CY	2,612
Design Discharge	2321	cfs	210	0405	FOUNDATION PREPARATION-BOX CULVERT	EA	1
Design Headwater Stage	2057.99	ft	256	0200	RIPRAP GRADE II	CY	125
Design Tailwater Stage	2057.14	ft	606	1412	14FT X 12FT PRECAST RCB CULVERT	LF	151
Velocity Through Culvert	5.53	fps	606	3412	DBL 14FT X 12FT PRECAST RCB CULVERT	LF	151
100-Year Frequency Discharge	2829	cfs	606	7412	DBL 14FT X 12FT PRECAST RCB END SECTION	EA	2
100-Year Frequency Headwater	2058.81	ft	709	0100	GEOSYNTHETIC MATERIAL TYPE G	SY	960
Overtopping Stage	2060.17	ft	709	0155	GEOSYNTHETIC MATERIAL TYPE RR	SY	250
Overtopping Discharge	4376.90	cfs	764	2020	REMOVE 3-CABLE GUARDRAIL & POSTS	LF	313

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	170	2

NOTES

100 SCOPE OF WORK: Work at this site consists of removing an existing structure and building a new triple barrel 14' x 12' x 151'-0" precast concrete box culvert.

105 WORK DRAWINGS: Submit work drawings for the precast concrete box culvert to the Engineer for review. Use the following minimum text sizes on all work drawing sheets.

Dimensions and Notes = 0.08"
 Detail Subtitles = 0.09"
 Detail Titles = 0.10"

202 REMOVAL OF STRUCTURE: The existing structure is 27'x19' elliptical structural plate pipe, 62'-0" long with a clear roadway width of 28'-0" with cable guardrail. Include all work required to remove the bridge in the contract unit price for "Removal of Structure."

203 COMMON EXCAVATION: Shape the existing channel at the outlet end of the box to the width and slopes shown in Section 80. The width and slope of the channel varies. Include all work associated with the channel cleanout in the unit price bid for "Common Excavation-Type A." The total excavation volume of channel cleanout is 2,689 CY and this volume is included in the earthwork summary.

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

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

Payment for "Dbl 14Ft X 12Ft Precast RCB End Section" includes the apron, cutoff wall, parapet and wingwalls. Attach the apron to the last barrel section, the wingwalls and the cutoff wall. Attach the wingwalls to the last barrel section. Provide a welded tie type system for the connections of the apron to the box and wingwalls. Connect the wingwalls to the last barrel section by the use of tie bolts, steel-bolted plates or other approved method so the inside corner surface is smooth.

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

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

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

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

MIX DESIGN

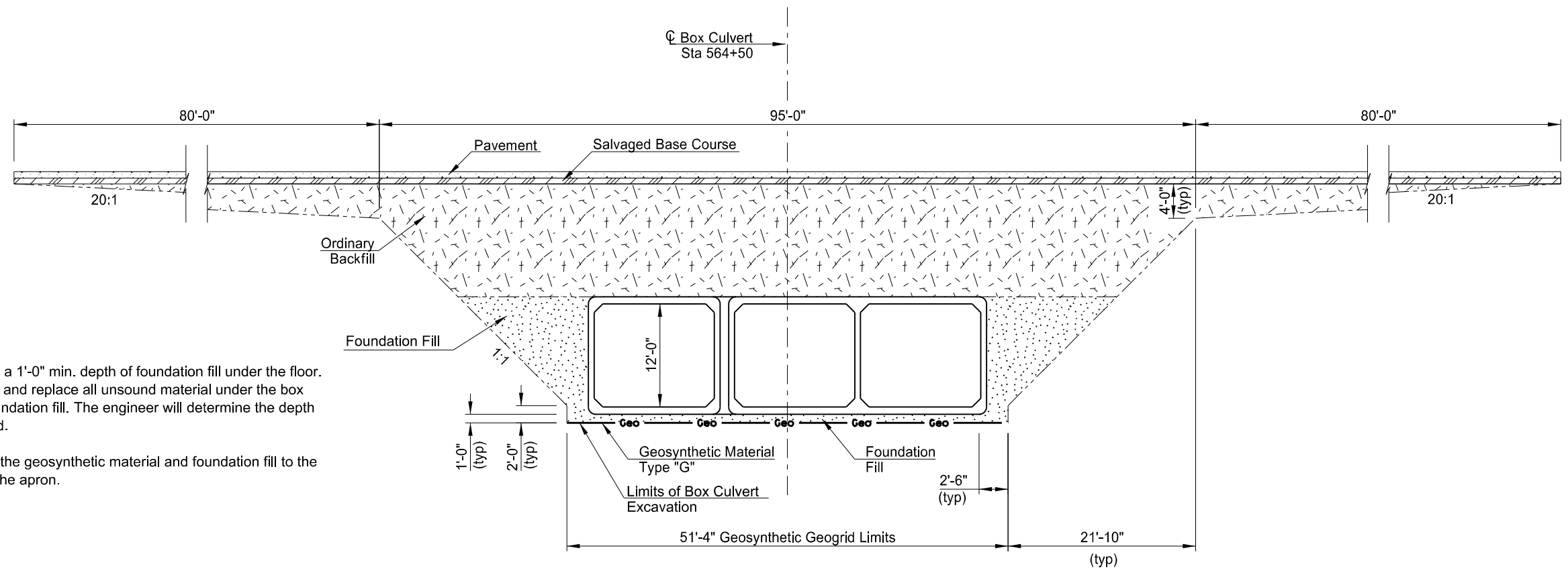
Cement	100 lbs
Fly Ash	300 lbs
Fine Aggregate	2600 lbs
Water	70 gals

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

Include the controlled density backfill and materials used for the 12" cap in the price bid for "Dbl 14Ft X 12Ft Precast RCB Culvert."

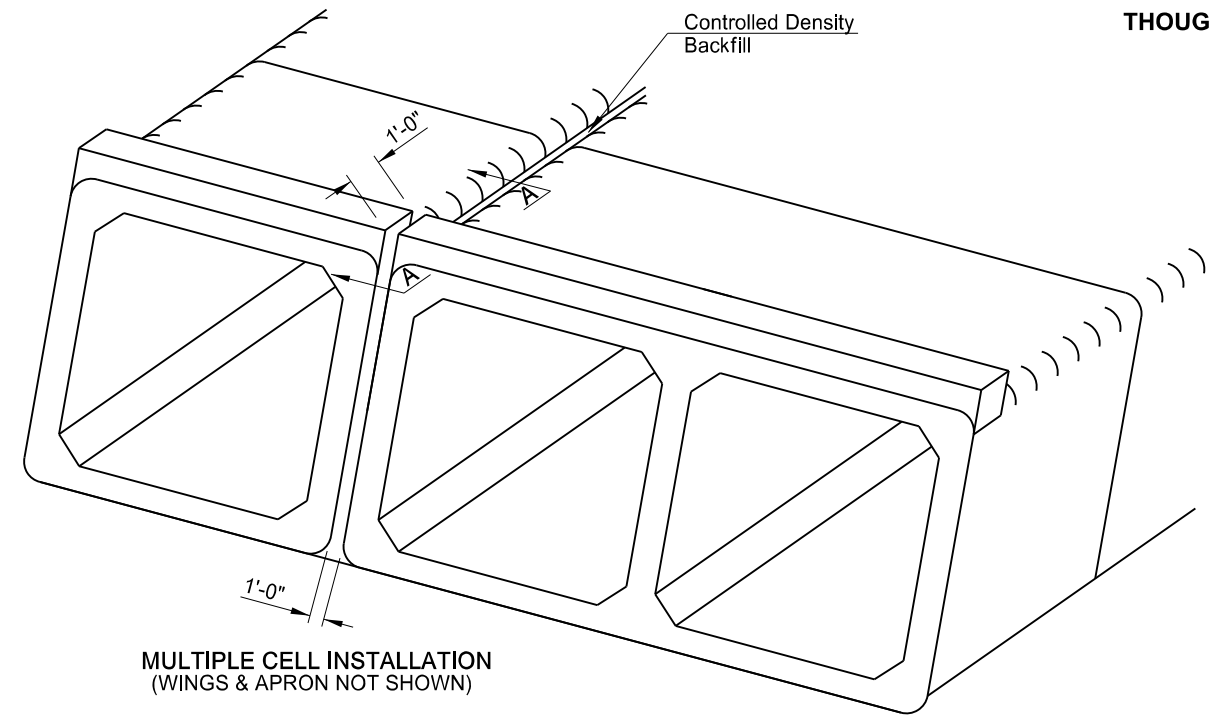
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STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	SS-7-023(050)910	170	3

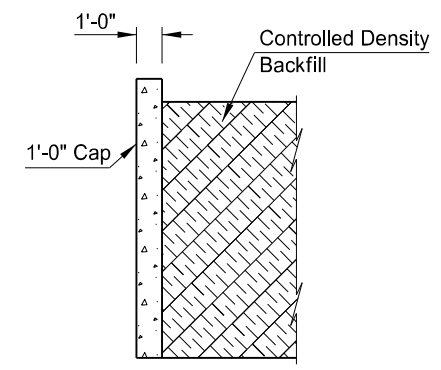


Notes:
 Provide a 1'-0" min. depth of foundation fill under the floor. remove and replace all unsound material under the box with foundation fill. The engineer will determine the depth required.
 Extend the geosynthetic material and foundation fill to the end of the apron.

(SHOWING SECTION ALONG ϕ ROADWAY)
**GEOSYNTHETIC PLACEMENT AND FOUNDATION FILL
 THROUGH EXISTING EMBANKMENT**



**MULTIPLE CELL INSTALLATION
 (WINGS & APRON NOT SHOWN)**



SECTION A-A
 The intent of this drawing is to show only the placement of the controlled density backfill between adjacent barrels. The representation of the number of barrels is arbitrary.

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1 MILE EAST OF US 85B
**EXCAVATION & FOUNDATION FILL
 & CHANNEL CLEANOUT DETAILS**