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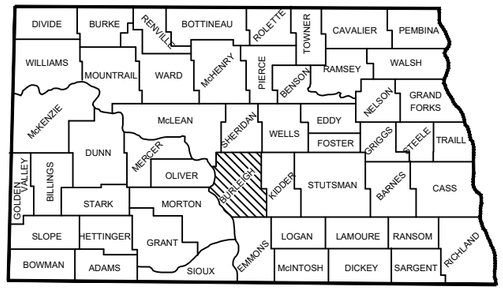
CITY OF BISMARCK

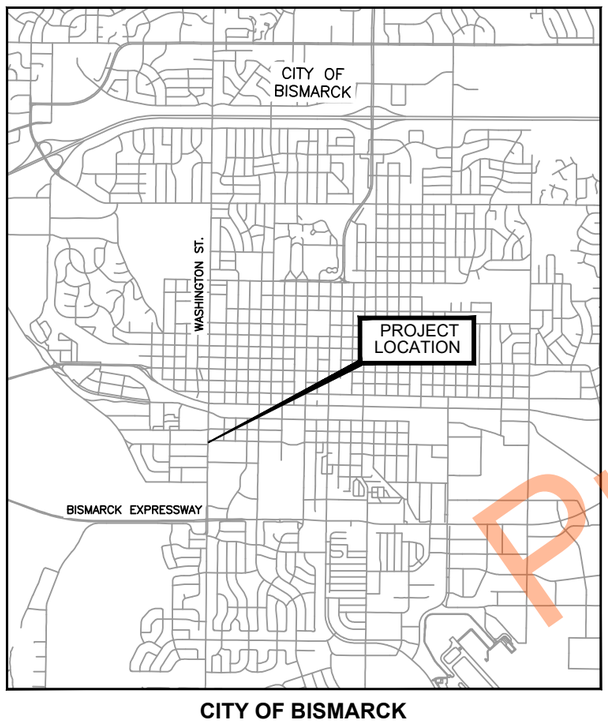
HEU-1-981(147)
Washington Street & Bowen Avenue
City Project HC-172

Burleigh County, North Dakota

Traffic Signal Removal, Rectangular Rapid Flashing Beacon (RRFB), Pedestrian Refuge Island, Curb & Gutter, Sidewalk, Curb Ramps, Signing, Pavement Marking, and Street Lighting Revisions



STATE OF NORTH DAKOTA



CITY OF BISMARCK

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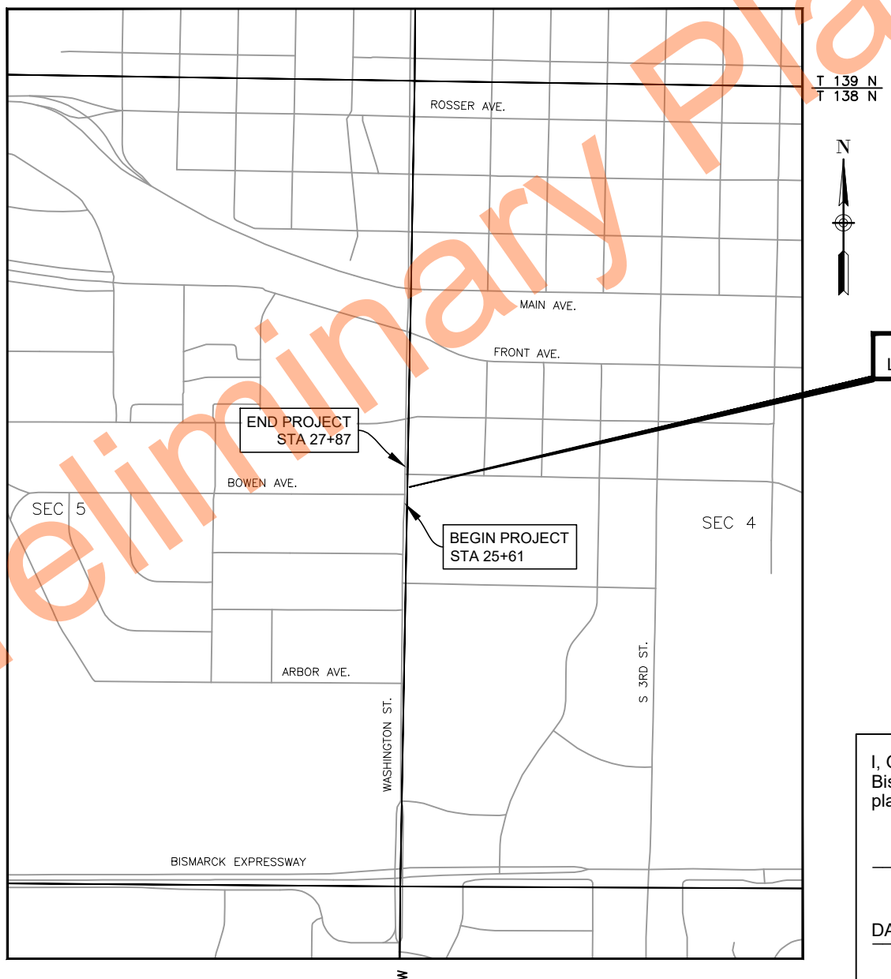

GOVERNING SPECIFICATIONS	Date Published and Adopted by the North Dakota Department of Transportation
Standard Specifications	7/1/2025
Supplemental Specifications	NONE

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
WASHINGTON ST & BOWEN AVE	0.05	0.05

DESIGNER
Gabe Schell
Chris Holzer

I, Gabriel J. Schell, City Engineer for the City of Bismarck, North Dakota, hereby approve these plans.

DATE: 8/14/26

CITY OF BISMARCK

REGISTERED PROFESSIONAL ENGINEER
AARON A. SCHMIDT
PE-10408
DATE 8/13/26
NORTH DAKOTA

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SP 580(25)	Utility Coordination

LIST OF STANDARD DRAWINGS

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D-550-3	Transverse Contraction Joint Details
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D-550-5	Transverse Construction Joint
D-704-7	Breakaway Systems For Construction Zone Signs - Perforated Tube
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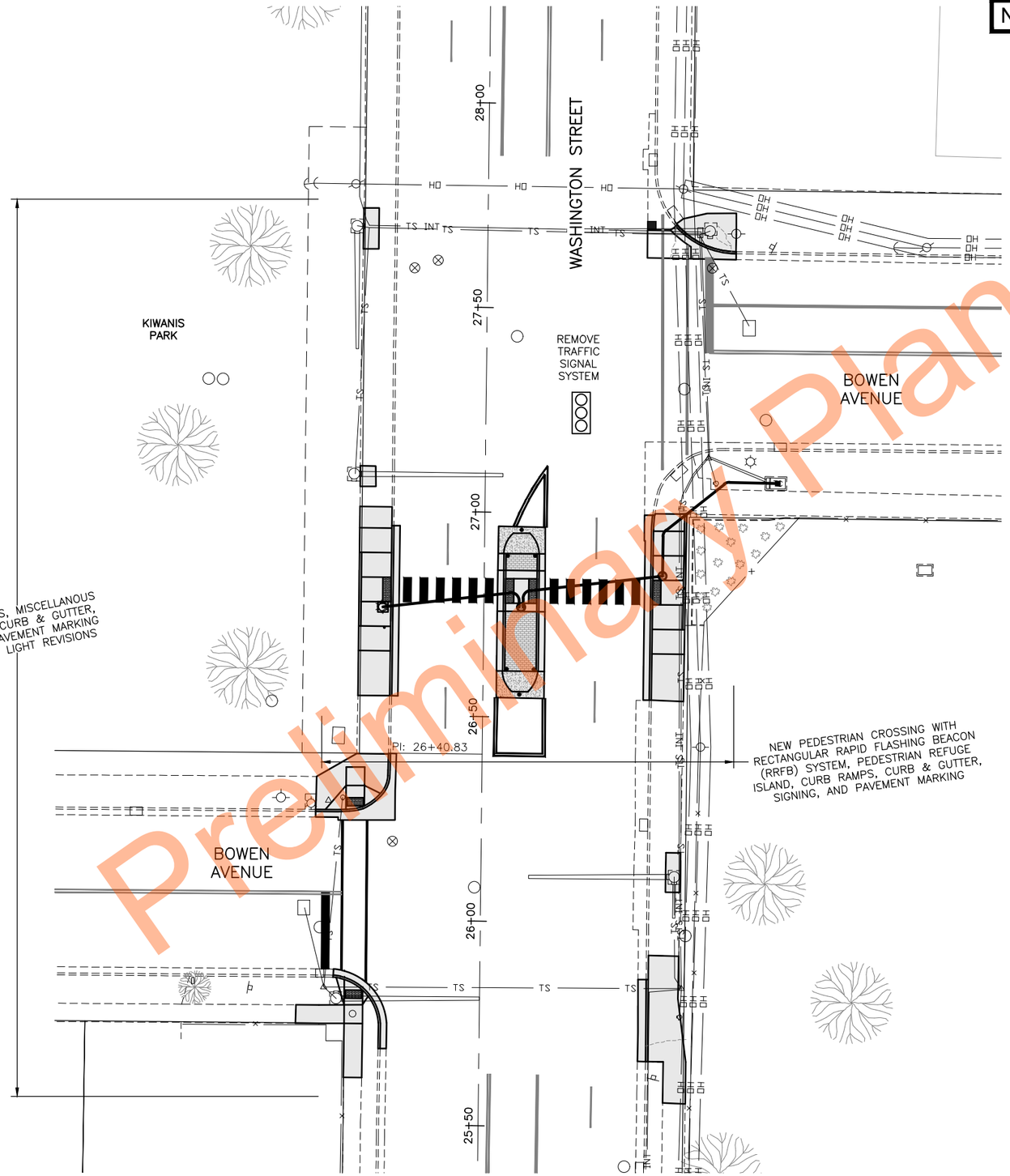

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REGISTERED PROFESSIONAL ENGINEER
AARON A. SCHMIDT
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DATE 8/13/26
NORTH DAKOTA

Bismarck ENGINEERING

SCOPE OF WORK

WASHINGTON STREET
& BOWEN AVENUE

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NOTES

105-P01 PAVEMENT AND SIDEWALK SWEEPING: Sweep paved areas and sidewalk that were used by construction traffic before opening these areas to public traffic.

Sweep all newly constructed pavement and sidewalk no more than 24 hours before a scheduled final inspection.

Use a vacuum or pick-up type sweeper to perform this work in paved areas.

105-P02 UTILITY COORDINATION: A utility coordination meeting is required. Coordinate with utility company to relocate gas line at approximate station 26+77 on the west side of Washington Street (See Section 140).

107-P01 NOISE ORDINANCE: Construction activities are not permitted between the hours of 11:00 p.m. to 7:00 a.m. unless the Contractor obtains written permission from the Engineer. Request permission a minimum of 30 days prior to the work taking place.

The Contractor is allowed to green saw the concrete without written permission from the Engineer if the following stipulations are met:

Prior to the start of construction provide one written notice to all residential dwellings within 500 feet of the project site. Include in the notice increased noise levels may be experienced at night. Use best practices to minimize the sawing of concrete pavement between the hours of 11:00 p.m. to 7:00 a.m.

107-P02 ACCESS: Provide access to all businesses and homeowners at all times and maintain access to driveways at all times.

202-P01 REMOVAL OF CONCRETE: Removal of concrete pavement consists of removing concrete pavements and sidewalks, the depth of which may vary in thickness. There will be no additional compensation for removal of extra thickness. Include all costs for common excavation and removal and disposal of existing concrete and aggregate base in the bid price for “REMOVAL OF CONCRETE PAVEMENT”.

202-P02 REMOVAL OF CURB & GUTTER: Curb and gutter designated for removal may vary in width and thickness. There will be no additional compensation for removal of extra width or thickness. Include all costs for removal and disposal of existing curb and gutter, aggregate, and common excavation in the bid price for “REMOVAL OF CURB & GUTTER”.

203-P01 COMMON EXCAVATION: Include any common excavation necessary to bring concrete pavement and sidewalk areas to appropriate subgrade. Use equipment with a smooth cutting edge to minimize disturbance to underlying soils and materials. Do not scarify the bottom of the subcut or subgrade. Excess excavation must be disposed of off-site by the CONTRACTOR. Include all costs for common excavation and disposal in the bid price for “REMOVAL OF CONCRETE PAVEMENT”.

251-P01 SEEDING CLASS III: Provide seeding in all disturbed areas, except hard surfaced areas, with the following:

Use: Boulevards and other areas requiring salt resistance Application Rate: 6 PLS/1000 sf		
Variety and Species of Seed	% by Weight	% Pure Live Seed
Fairway Crested	50	85
Sheep Fescue	30	85
Perennial Ryegrass	20	85

302-P01 WATER: Include the equipment, labor, and water used to control dust and to compact aggregate bases in the cost for “AGGREGATE BASE COURSE”.

302-P02 AGGREGATE BASE COURSE: Use Class 5 for “AGGREGATE BASE COURSE”.

704-P01 TRAFFIC CONTROL: Maintain one through lane of traffic in all directions at all times with a minimum lane width of 11 feet. The basis of estimate is shown in Section 100. Should the Contractor elect to proceed in a manner other than as shown in Section 100, approval will be required from the Engineer and no additional compensation will be made for additional traffic control devices.

Lane closures shall only be allowed while active work is being performed or while concrete cure time is being met. Cure time shall be no more than seven (7) calendar days. If more than five (5) calendar days pass without work being performed or beyond concrete cure time, remove traffic control and lane closures.

Parking of Contractor equipment and vehicles is not to be done in public parking spots unless approved by the Engineer.

708-P01 INLET PROTECTION SPECIAL: Place inlet protection into inlets prior to the start of construction. Inlet Protection to be Top Guard by ERTEC, Flexstorm, Dandy Curb Sack, or approved equivalent. Include all costs for furnishing, installing, maintaining (cleaning), and removal of a drainage inlet filter assembly to collect sediment in surface storm water runoff. The item also includes the disposal of debris or silt that has accumulated in the bag. Include periodic cleaning of the filter in the bid price.

Keep the filter in place until after the gradient surfaces are stabilized and the surrounding street is clean of debris. Include all costs related to the material, installation, maintenance, replacement and removal in the price bid for "INLET PROTECTION-SPECIAL".

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NOTES

748-P01 CURB & GUTTER: Construct curb & gutter separate from adjacent concrete pavement unless shown otherwise on the plans. Match existing curb height when connecting to existing curb & gutter. Include jointing, rebar, dowels, and sealing in the price bid for "CURB & GUTTER-TYPE 1".

748-P02 CONCRETE PAVEMENT AND CURB & GUTTER: Keyways will only be allowed when placing concrete forms.

Pour curb & gutter separate from adjacent concrete pavement.

Jointing, rebar, dowels, and sealing are to be included in the price bid for "CURB & GUTTER".

750-P01 CONCRETE MEDIAN NOSE PAVING: Drill and epoxy tie bars and dowel bars where existing pavement abuts new pavement and curb & gutter. Clean the holes with compressed air before injecting the epoxy resin. Rotate bars 180 degrees to 360 degrees during insertion. Match the placement of proposed joints with the location of existing joints where possible.

Include all costs for labor, materials, and equipment necessary for drilling and installing tie bars, jointing, rebar, dowels, and joint sealing in the price bid for "CONCRETE MEDIAN NOSE PAVING".

750-P02 PIGMENTED IMPRINTED CONCRETE: Install pigmented and imprinted concrete at locations shown in the plans. Develop a mix design using any size coarse aggregate specified in Section 802.01 C.2, "Coarse Aggregate" and with a 60-40 fine aggregate coarse aggregate ratio.

Form a pattern in the concrete using platform stamping pads or rollers to obtain the brick pattern. Stamp the surface after it is troweled and floated, and while the concrete is still in the plastic state. Do not trowel the surface more than once. Provide a 6-inch by 12-inch brick pattern. Other brick dimensions require approval. Use a form release agent on the equipment used to stamp the concrete. Match sawed joints to the adjacent sidewalk.

Provide a pigment to the concrete at the ratio recommended by the manufacturer and add the pigment directly into the mixer along with the aggregate, cement, and water. Add pigment while the mixer is operating at mixing speed. Continue mixing between 50 and 100 revolutions. Cure and seal concrete using slip and fade resistant curing compound. Apply two coats per manufacturer's recommendations. Provide a pigment from the following list:

- Number 413 Terra Cotta, produced by Soloman Colors, Inc.
- Number 1117 Tile Red, produced by Davis Colors

Include all costs for labor, equipment, and materials required to complete this work as well as jointing, rebar, and joint sealing in the price bid for "PIGMENTED IMPRINTED CONCRETE".

750-P03 DETECTABLE WARNING PANELS: Provide yellow, cast iron detectable warning panels as specified in Section 885 of the Specifications manufactured by EJ Iron Works, Neenah Foundry, or approved equivalent.

754-P01 FLEXIBLE DELINEATORS-TYPE D: Provide and install yellow Omega Post High Speed Delineator from Impact Recovery Systems or approved equal, with surface mount base and 36" height.

754-P02 SIGN REMOVAL: The City of Bismarck Public Works Department will remove all existing signs and supports as identified by the Engineer in accordance with the project. Notify the Public Works Department 48 hours prior to needing the signs removed.

762-050 PAVEMENT MARKING: If the Engineer and Contractor agree, plan quantity will be used as the measurement for payment for pavement marking items.

770-P01 REMOVE & SALVAGE LIGHT STANDARD: Remove existing light standard, mast arm, luminaire, and concrete foundation/pad to the full depth. Salvage light standard and mast arm and deliver to the City of Bismarck landfill (2111 North 52nd Street). Contact Street Light and Traffic Signal Superintendent 355-1700 for delivery. Provide a 48-hour notice prior to delivery.

770-P02 EXISTING LIGHTING SYSTEM: Maintain the existing lighting system during the work. Include all costs to keep the existing lighting system operational in the price bid for "REMOVE LIGHT STANDARD".

770-P03 LIGHT STANDARD 40FT MOUNTING HEIGHT BREAKAWAY: Provide one piece, 40-ft davit type steel pole with aluminum breakaway transformer base and 6-ft mast arm. Mast arm to have tenon adaptor to mount existing LED luminaire. Pole and mast arm to have a galvanized finish. Acceptable manufacturers and model numbers include:

- MillerberND Manufacturing #RLDB6-400ND
- Valmont Industries, Inc. #DS90 RTS
- Or by prior approval of submittal request

Anchor bolts are to conform to ASTM F1554 Grade 55. Provide anchor bolt templates for foundations. Provide foundation per Section 140 plans and details. Each foundation, rebar, conduits stub-ins, anchor bolts, and ground rods are required to be inspected by the ENGINEER prior to pouring concrete. ENGINEER will test foundations at a minimum of one test per day. Provide anti-seize compound on all transformer base fasteners.

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770-P04 LED LUMINAIRE: Salvage existing LED luminaire from the existing light standard and install on new light standard. Include this cost in the price bid for the Light Standard.

772-P01 EXISTING TRAFFIC SIGNAL SYSTEM: Remove the existing traffic signal system as part of the work and as shown in the plans. Include in the price bid for “REMOVE TRAFFIC SIGNAL SYSTEM” all labor, materials and equipment necessary for the existing traffic signal system to be decommissioned, removed, and disposed of upon construction completion. This includes but is not limited to the removal of the following features where applicable; traffic signal cabinet internal components, signal standards and foundations, signal standard mast arms, type II signal standards and foundations, vehicular and pedestrian heads, law enforcement confirmation lights, video detection system, emergency vehicle pre-emption system, confirmation lights, pedestrian pushbuttons and signs, conduit, cable, appurtenances, and pull boxes. The traffic signal cabinet and foundation is to remain and be re-used for the new flashing beacon system.

Remove and dispose of existing concrete foundations along with anchor bolts, reinforcing steel, ground rods, and conduit to a point three feet below the top of surrounding finished grade, unless otherwise noted on the plans to remove the concrete foundation to its full depth. Backfill and compact the entire depth of the hole in 6 inch lifts. Restore the surface to match adjacent grades and areas. Remove and dispose of existing traffic signal conductor and abandon existing conduit in place unless otherwise shown on the plans. Remove conduit to a point three feet below finished grade and cap.

Salvage all existing traffic signal system equipment (that is deemed salvageable by the ENGINEER) to the City of Bismarck Public Works Service Operations Department-Street Light and Traffic Signal Division at 602 26th Street. Salvage the following items:

- Controller
- MMU
- Camera system
- GPS time clock
- EVP receivers and card

Coordinate delivery with Street Light and Traffic Signal Division Superintendent. The remaining equipment becomes the property of the CONTRACTOR.

Keep the existing traffic signal system operational as long as possible until the new flashing beacon system is installed and ready for operation and before switching power over to the new system.

772-P02 FLASHING BEACON SYSTEM: Include in the price bid for “FLASHING BEACON” all labor, materials and equipment necessary for the Rectangular Rapid Flashing Beacon (RRFB) system to be fully operational as shown in the plans upon construction completion. This work includes but is not limited to, the installation of a feed point in the existing traffic signal cabinet, type II signal standards with transformer bases and foundations, RRFB controller, flashing RRFB lights, APS pedestrian push buttons, utility service and all ancillary hardware, cable, conduit, connections, signs, and appurtenance to install the flashing beacon system completely. Include all costs for sprinkler repairs, exploratory cuts/potholing, and any concrete/asphalt removal and replacement related to conduit installation and boring in the price bid for “FLASHING BEACON”.

All required work is identified on the plan sheets. The control enclosure shall be installed as shown in the plans and details. Provide the smallest size control enclosure to accommodate the system. Program the flash rate and illuminated period of each flash in accordance with the most current version of the MUTCD and NDDOT standards. Provide TAPCO RRFB system and equipment. Provide shop drawings for the flashing beacon equipment to the Engineer prior to ordering materials.

Estimated material quantities are provided for the flashing beacon system. Material quantities shown are estimated, actual quantities required may vary based on field conditions. No payment will be made for additional materials required unless approved by the Engineer.

772-P03 FEED POINT-FLASHING BEACON: Utilize the existing traffic signal cabinet and foundation (at the location indicated on the plans, see Section 150) for the new RRFB feed point system.

Install and securely mount RRFB system controller and equipment inside the existing cabinet. Use existing conduit stub outs in place for RRFB conductors and connections. Maintain and re-use existing traffic signal system service, meter, and disconnect for the new RRFB system.

Connect service for RRFB system inside of cabinet. Coordinate with the electric utility company (Montana Dakota Utilities) for all service related work for the RRFB system. The cost of any utility service work and coordination will be paid by the Contractor.

Include all costs associated with the materials, labor, coordination, utility work, and equipment necessary to furnish and install the feed point and electrical service in the price bid for “FLASHING BEACON”.

772-P04 TYPE II SIGNAL STANDARD POLES: Provide steel or aluminum Type II signal standard poles. If steel is used, provide galvanizing in accordance with AASHTO Specification M111 (ASTM A123). Provide base/pole collar assembly for stability. Include all costs, labor, materials and equipment necessary for furnishing and installing this item in the price bid for “FLASHING BEACON”.

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NOTES

772-P05 Type II SIGNAL STANDARDS BASE: Provide steel or aluminum “T” transformer base for Type II signal standard poles. If steel is used, provide galvanizing in accordance with AASHTO Specification M111 (ASTM A123). Provide base/pole collar assembly for stability. Include all costs, labor, materials and equipment necessary for furnishing and installing this item in the price bid for “FLASHING BEACON”.

772-P06 TERMINAL STRIP PROTECTION: If a terminal strip is used, mount the terminal strip on a ½” thick white plastic backing material and provide a terminal strip protection pipe within the signal transformer base. Provide a 3” to 3½” PVC protection pipe with a minimum length of 12” to cover the entire terminal strip. Cap one end of the PVC pipe. Chamfer the open end of the pipe smooth so wires will not be damaged. Place the terminal strip within the PVC pipe with the cap side up inside the transformer base. Include all materials, labor and equipment necessary to provide and install the terminal strip protection pipe in the price bid “FLASHING BEACON”.

772-P07 ACCESSIBLE PEDESTRIAN SIGNALS (APS) PUSHBUTTON AND SIGN: Provide Pelco Guardian Wave APS pedestrian pushbuttons meeting the requirements for accessible pedestrian signal (APS) pushbuttons. Include one spare APS pushbutton for the project (double arrow icon). Include the cost for the accessible pedestrian pushbutton and sign in the bid item “FLASHING BEACON”.

772-P08 CONDUIT: Install new conduit as shown on the plans. Use HDPE conduit when boring. Seal all conduit with duct seal (at the signal foundation, pull box, cabinet, etc.). Install one spare 2” conduit sweep in each signal standard base. Label direction/destination of all conduits including spare. Cap spare conduits with an oil-tight plug with wing nut and labeled as to which direction they face. Include all costs in the bid price for “FLASHING BEACON”.

772-P09 TRACER WIRE: Provide tracer wire from the control cabinet to all RRFB signal poles and ground the tracer wire in the signal bases. Splicing tracer wire is not allowed.

772-P10 LABEL ALL FIELD CABLES: Coordinate with the City of Bismarck for approved labeling materials. Provide readable labels without moving the cables. Include all costs in the price bid for “FLASHING BEACON”.

772-P11 WIRE SPLICING: No splicing is allowed. Splicing may only take place at a transformer base terminal strip and flashing beacon head terminal blocks.

772-P12 LOCATING AND MARKING UTILITIES: The Contractor shall be responsible for locating and marking all underground circuits associated with the project, throughout the course of the project until after the final walkthrough is completed. Include all costs for locating and marking in the price bid for “FLASHING BEACON”.

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Estimated Quantities

SPEC	CODE	ITEM DESCRIPTION	UNIT	Main						TOTAL
103	0100	CONTRACT BOND	L SUM	1						1
202	0114	REMOVAL OF CONCRETE PAVEMENT	SY	233						233
202	0130	REMOVAL OF CURB & GUTTER	LF	177						177
251	0310	SEEDING CLASS III	SY	324						324
253	0200	HYDRAULIC MULCH	SY	324						324
302	0119	AGGREGATE BASE COURSE	SY	228						228
550	0113	8IN REINF CONCRETE PAVEMENT CL AE	SY	7						7
570	1512	SPALL REPAIR-PARTIAL DEPTH	SF	12						12
702	0100	MOBILIZATION	L SUM	1						1
704	1000	TRAFFIC CONTROL SIGNS	UNIT	526						526
704	1054	SIDEWALK BARRICADE	EA	4						4
704	1058	PEDESTRIAN WALKWAY	LF	176						176
704	1060	DELINEATOR DRUMS	EA	40						40
704	1067	TUBULAR MARKERS	EA	73						73
704	1085	SEQUENCING ARROW PANEL-TYPE A	EA	2						2
704	1500	OBLITERATION OF PAVEMENT MARKING	SF	286						286
704	2108	TEMPORARY CURB RAMP	EA	4						4
708	1540	INLET PROTECTION-SPECIAL	EA	5						5
722	6240	ADJUST UTILITY APPURTENANCE	EA	1						1
748	0140	CURB & GUTTER-TYPE I	LF	233						233
748	0520	CURB-TYPE I	LF	46						46
750	0030	PIGMENTED IMPRINTED CONCRETE	SY	16						16
750	0140	SIDEWALK CONCRETE 6IN	SY	176						176
750	0210	CONCRETE MEDIAN NOSE PAVING	SY	17						17
750	2115	DETECTABLE WARNING PANELS	SF	64						64
754	0110	FLAT SHEET FOR SIGNS-TYPE XI REFL SHEETING	SF	25						25
754	0193	FLEXIBLE DELINEATORS-TYPE D	EA	6						6
754	0206	STEEL GALV POSTS-TELESCOPING PERFORATED TUBE	LF	16						16
762	1255	PREFORMED THERMO PLASTIC PVMT MK 6IN LINE	LF	190						190
762	1270	PREFORMED THERMO PLASTIC PVMT MK 24IN LINE	LF	90						90
762	1305	PREFORMED PATTERNED PVMT MK 4IN LINE-GROOVED	LF	141						141
770	0020	CONCRETE FOUNDATION-HIGHWAY LIGHTING	EA	1						1
770	1076	LT STD 6FT MA 40FT MT HT	EA	1						1
770	4560	REMOVE LIGHT STANDARD	EA	1						1
770	4582	REMOVE CONCRETE FOUNDATION	EA	1						1
772	2160	FLASHING BEACON	EA	1						1
772	3125	REMOVE TRAFFIC SIGNAL SYSTEM	EA	1						1

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BASIS OF ESTIMATE

AGGREGATE BASE COURSE	CLASS 5 (SY)

TOPSOIL

Topsoil shall be removed from excavation areas at an assumed depth of 4 inches. Replace topsoil at a depth of 4 inches in all disturbed areas excluding hard surfaced areas. Removal, stockpiling, and replacing topsoil shall be included as part of "SIDEWALK CONCRETE (_)IN".

SEEDING

All disturbed areas excluding hard surfaced areas.

MULCHING

All disturbed areas excluding hard surfaced areas.

ADDITIONAL QUANTITIES

ITEM DESCRIPTION	UNITS	QUANTITY SHOWN ON PLANS	ADDITIONAL QUANTITY	TOTAL BID QUANTITY
570 1512 SPALL REPAIR-PARTIAL DEPTH	SF	4	8 *	12

* Additional quantity (in addition to locations shown on plan views) that is to be used at the discretion of the Engineer.
* Quantity may not need to be used.

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Bismarck ENGINEERING

BASIS OF ESTIMATE

WASHINGTON STREET
& BOWEN AVENUE

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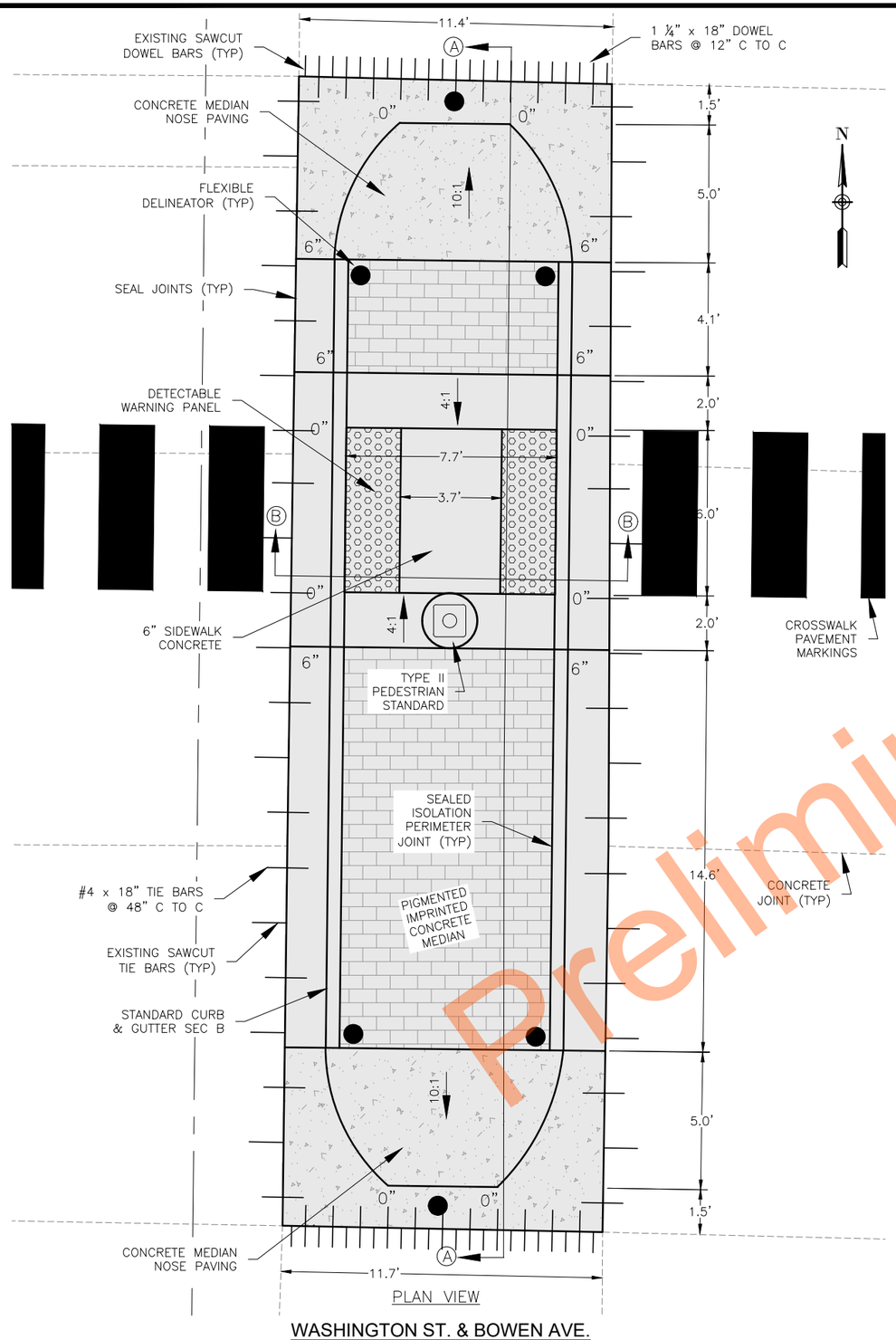
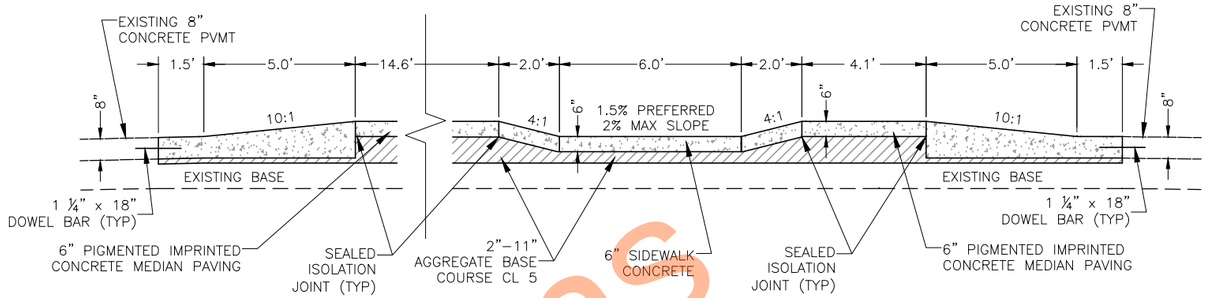
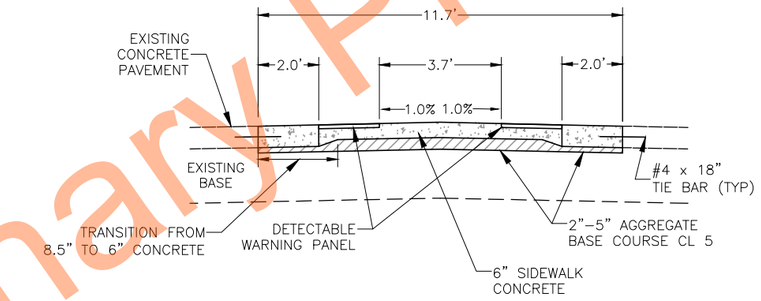


PLAN VIEW

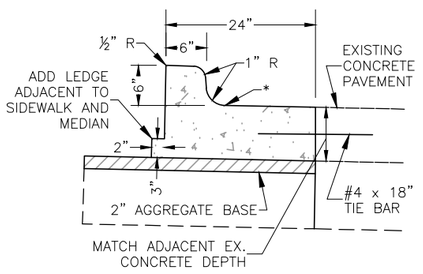


SECTION A–A

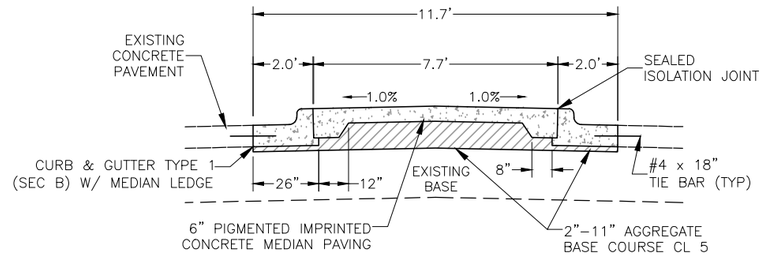


SECTION B–B

* SEC B SHOWN, USE 1" DEPTH FOR CURB & GUTTER IN FLOWLINE



STANDARD CURB & GUTTER



CONCRETE MEDIAN DETAIL

WASHINGTON ST. & BOWEN AVE.
PEDESTRIAN REFUGE ISLAND DETAIL

REGISTERED PROFESSIONAL ENGINEER
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DATE 8/13/26
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Bismarck ENGINEERING

DETAILS

PEDESTRIAN REFUGE ISLAND

WASHINGTON STREET & BOWEN AVENUE

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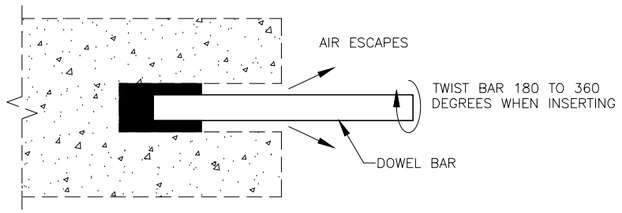
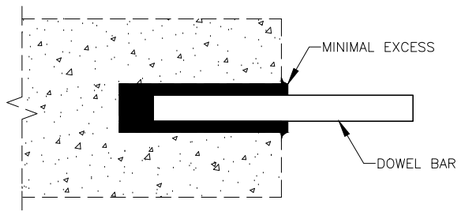




DOWEL BAR & EPOXY INSTALLATION

NOTES

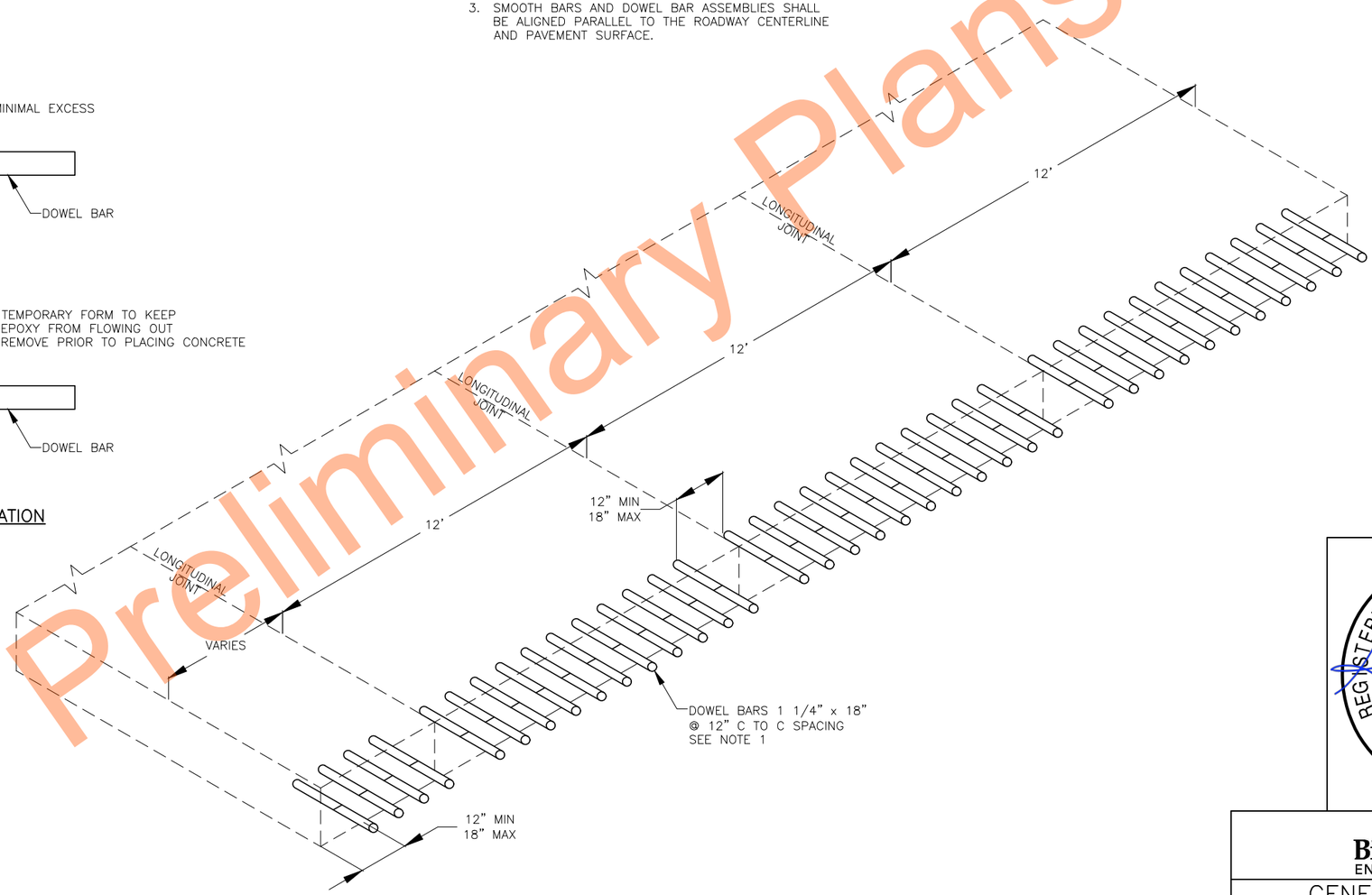
1. DOWEL BARS SHALL BE SPACED AT 12" O.C.

   – DOWEL BARS SHALL BE PLACED NO LESS THAN 12" OR MORE THAN 18" FROM LONGITUDINAL JOINT.

   – IF EXISTING SAW CUT DOWEL BARS ARE PRESENT, DRILLED IN DOWEL BARS SHALL BE PLACED AT THE HORIZONTAL MIDPOINT BETWEEN EXISTING SAW CUT DOWEL BARS.

2. DOWEL BARS SHALL BE PLACED AT THE VERTICAL MIDPOINT OF THE EXISTING PCC PAVEMENT.

3. SMOOTH BARS AND DOWEL BAR ASSEMBLIES SHALL BE ALIGNED PARALLEL TO THE ROADWAY CENTERLINE AND PAVEMENT SURFACE.



DOWEL BAR PLACEMENT

REGISTERED PROFESSIONAL ENGINEER
AARON A. SCHMIDT
PE-10408
DATE 8/13/26
NORTH DAKOTA

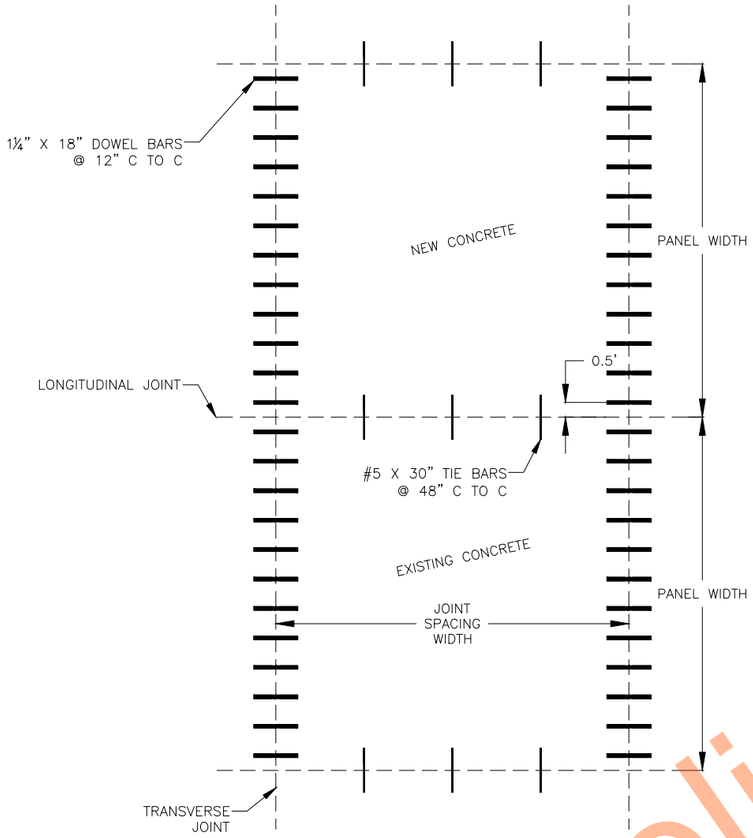
Bismarck ENGINEERING

GENERAL DETAILS

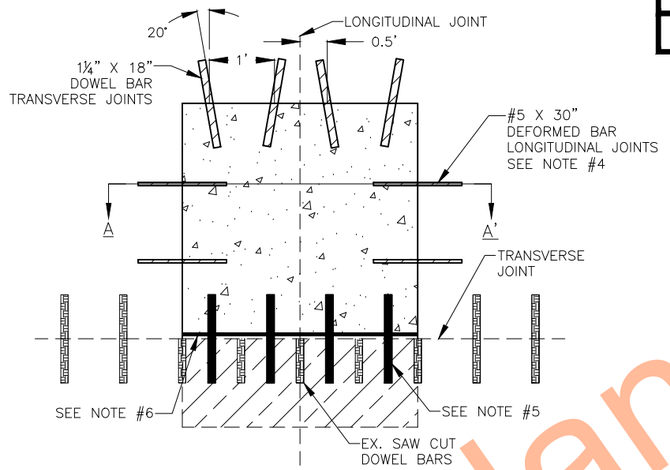
PAVEMENT JOINTING DETAILS

WASHINGTON STREET & BOWEN AVENUE

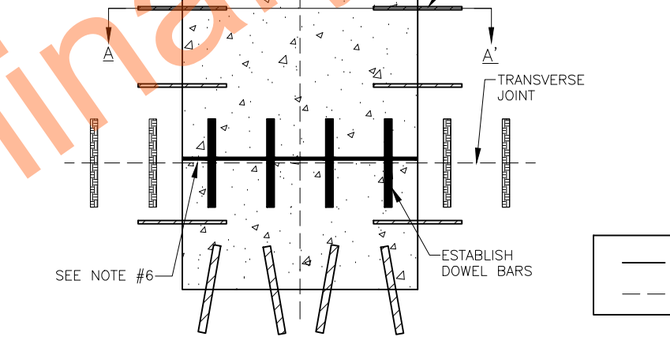
STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	HEU-1-981(147)	24625	20	3



MAINLINE PLAN VIEW

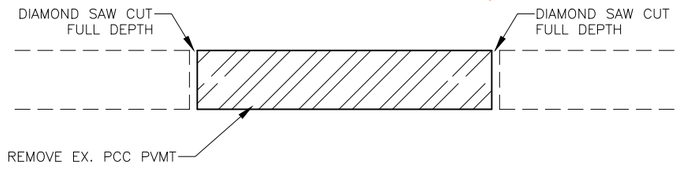


BAR PLACEMENT
EXISTING TO NEW CONCRETE PAVEMENT

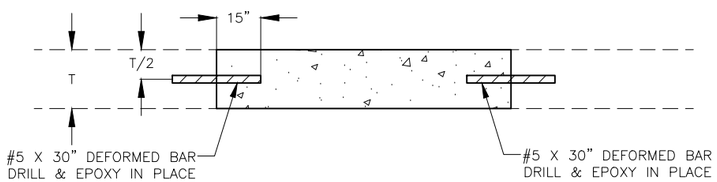


BAR PLACEMENT
NEW TO NEW CONCRETE PAVEMENT

SAW CUT LIMITS
CONCRETE JOINT



PCC PAVEMENT REMOVAL



SECTION A–A'

NOTES

WORK TO BE PERFORMED

1. FULL DEPTH SAW CUT THE MARKED REMOVAL AREA.
2. REMOVE CONCRETE FULL DEPTH, RESTORE IN PLACE BASE IF DISTURBED.
3. FURNISH AND INSTALL 18" LONG 1¼" DOWEL BARS. THE SPACING FOR TRANSVERSE EDGES SHALL BE 12" O.C. AND SKEWED 20° FROM THE FACE OF THE JOINT. TRANSVERSE BARS SHALL BE PLACED NO LESS THAT 6" FROM ANY JOINT OR REPAIR EDGE.
4. FURNISH AND INSTALL 30" LONG NO. 5 DEFORMED BARS. THE SPACING FOR LONGITUDINAL EDGES SHALL BE PARALLEL TO THE JOINT. IF JOINT IS LESS THAN 4' IN LENGTH, USE TWO BARS EVENLY SPACED, IF LONGER THAN 4' SPACE AT 48" O.C. LONGITUDINAL BARS SHALL BE PLACED NO LESS THAT 6" FROM END OF TRANSVERSE BARS.
5. RESTORE DOWEL BARS WHICH SHALL BE DRILLED MID POINT BETWEEN EXISTING SAWED DOWEL BARS, SPACED 12" O.C.
6. CLEAN EXPOSED SURFACE OF INPLACE CONCRETE. COAT EXPOSED SURFACES OF THE DOWEL BARS, IF ANY, WITH GREASE.
7. PLACE, CONSOLIDATE, FINISH, AND CURE CONCRETE.

   – IF DEEMED NECESSARY BY THE ENGINEER, PLACE 260 MIL THICKNESS OF BITUTHENE MEMBRANE OR EQUAL (APPROX. 1/4") AT TRANSVERSE JOINT.
8. RESTORE TRANSVERSE AND LONGITUDINAL JOINTS.
9. CLEAN AND SEAL RESTORED TRANSVERSE AND LONGITUDINAL JOINTS.

REGISTERED PROFESSIONAL ENGINEER
AARON A. SCHMIDT
PE-10408
DATE 8/13/26
NORTH DAKOTA

Bismarck ENGINEERING

GENERAL DETAILS

PAVEMENT JOINTING DETAILS

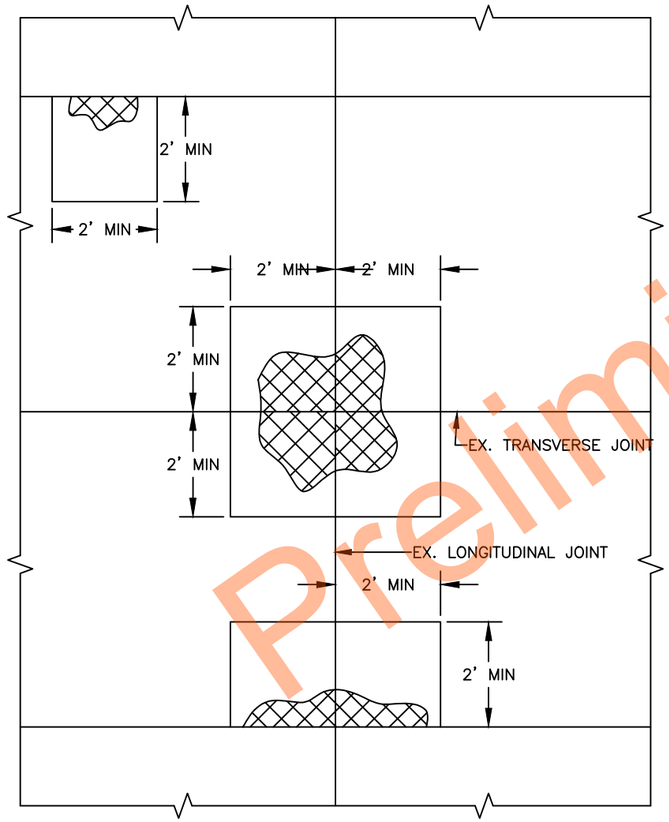
WASHINGTON STREET
& BOWEN AVENUE

STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	HEU-1-981(147)	24625	20	4

NOTES

1. EXISTING CONCRETE SHALL BE REMOVED WITH A CHIPPING HAMMER OR OTHER METHODS, AS APPROVED BY THE ENGINEER. A MILLING MACHINE MAY BE USED, AS APPROVED BY THE ENGINEER, BUT SAWING AND CHIPPING SHALL STILL BE REQUIRED TO FINISH THE REMOVAL.
2. GROUT SHALL BE APPLIED TO THE SIDES, EXCLUDING JOINT FACES, AND BOTTOM OF THE REPAIR AREA.
3. A SPACER MATERIAL, AS APPROVED BY THE ENGINEER, SHALL BE PLACED ON THE JOINT FACE TO MAINTAIN THE JOINT DURING REPAIR. THE MATERIAL SHALL HAVE THE CAPABILITY OF MAINTAINING A WIDTH EQUAL TO THAT OF THE EXISTING JOINT, AND BEING EASILY REMOVED AFTER THE POUR. IN THE CASE OF REPAIR ON BOTH SIDES OF THE JOINT EACH SIDE SHALL BE POURED SEPARATELY.

   IN THE CASE OF REPAIR ON ONE SIDE OF THE JOINT, IF DEEMED NECESSARY BY THE ENGINEER, A BITUTHENE WATERPROOFING MEMBRANE WILL BE PLACED ON THE FACE OF THE EXISTING JOINT IN LIEU OF THE SPACER MATERIAL AND PRIOR TO THE CONCRETE POUR.
4. IN THE CASE OF REPAIR ON BOTH SIDES OF THE JOINT, IF DEEMED NECESSARY BY THE ENGINEER, A BITUTHENE WATERPROOFING MEMBRANE SHALL BE PLACED ON THE FACE OF THE NEWLY POURED JOINT IN LIEU OF THE SPACER MATERIAL PRIOR TO THE CONCRETE POUR. THAT MATERIAL SHALL BE A MINIMUM OF 260 MIL (APPROX. 1/4") THICK, OR EQUAL TO THE WIDTH OF THE EXISTING JOINT, WHICHEVER IS LARGER. THE MATERIAL SHALL BE CUT TO FIT OVER THE ENTIRE FACE OF THE EXISTING JOINT. THE MATERIAL SHALL BE PLACED TO PROVIDE FOR EXPANSION AND TO PREVENT WATER FROM ENTERING THE EXISTING JOINT THROUGH THE SIDES OR BOTTOM. THE MATERIAL SHALL BE HAND PRESSED INTO PLACE TO CONFORM TO THE FACE OF THE EXISTING JOINT. IN THE CASE OF REPAIR ON BOTH SIDES OF THE JOINT, A BACKER BOARD MATERIAL, AS APPROVED BY THE ENGINEER, SHALL BE PLACED OVER THE BITUTHENE MATERIAL ON THE SIDES FACING THE SECOND POUR PRIOR TO THE SECOND POUR. THE BACKER BOARD SHALL BE REMOVED AFTER THE REPAIR IS COMPETED.



SPALL

CONCRETE REMOVAL AREA

SPALL REPAIR DETAIL

NOTES

1. EXISTING CONCRETE SHALL BE REMOVED WITH A CHIPPING HAMMER OR OTHER METHODS, AS APPROVED BY THE ENGINEER. A MILLING MACHINE MAY BE USED, AS APPROVED BY THE ENGINEER, BUT SAWING AND CHIPPING SHALL STILL BE REQUIRED TO FINISH THE REMOVAL.
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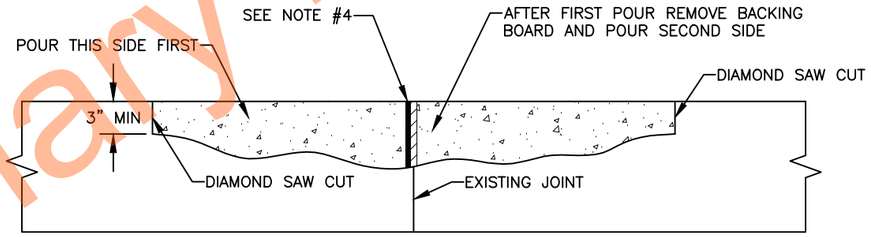
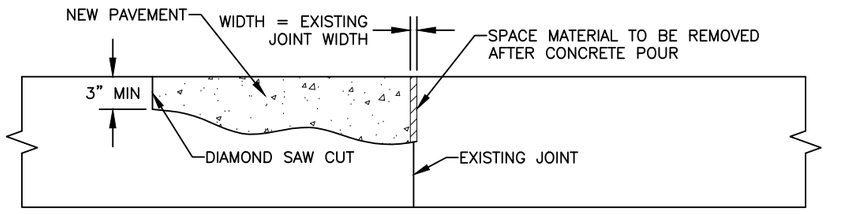
4. IN THE CASE OF REPAIR ON BOTH SIDES OF THE JOINT, IF DEEMED NECESSARY BY THE ENGINEER, A BITUTHENE WATERPROOFING MEMBRANE SHALL BE PLACED ON THE FACE OF THE NEWLY POURED JOINT IN LIEU OF THE SPACER MATERIAL PRIOR TO THE CONCRETE POUR. THAT MATERIAL SHALL BE A MINIMUM OF 260 MIL (APPROX. 1/4") THICK, OR EQUAL TO THE WIDTH OF THE EXISTING JOINT, WHICHEVER IS LARGER. THE MATERIAL SHALL BE CUT TO FIT OVER THE ENTIRE FACE OF THE EXISTING JOINT. THE MATERIAL SHALL BE PLACED TO PROVIDE FOR EXPANSION AND TO PREVENT WATER FROM ENTERING THE EXISTING JOINT THROUGH THE SIDES OR BOTTOM. THE MATERIAL SHALL BE HAND PRESSED INTO PLACE TO CONFORM TO THE FACE OF THE EXISTING JOINT. IN THE CASE OF REPAIR ON BOTH SIDES OF THE JOINT, A BACKER BOARD MATERIAL, AS APPROVED BY THE ENGINEER, SHALL BE PLACED OVER THE BITUTHENE MATERIAL ON THE SIDES FACING THE SECOND POUR PRIOR TO THE SECOND POUR. THE BACKER BOARD SHALL BE REMOVED AFTER THE REPAIR IS COMPETED.



CROSS SECTION – REPAIR AREA ON BOTH SIDES OF THE JOINT



CROSS SECTION – REPAIR AREA ON ONE SIDE OF THE JOINT

REGISTERED PROFESSIONAL ENGINEER
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PE-10408
DATE 8/13/26
NORTH DAKOTA

Bismarck ENGINEERING

GENERAL DETAILS

SPALL REPAIR DETAILS

WASHINGTON STREET & BOWEN AVENUE

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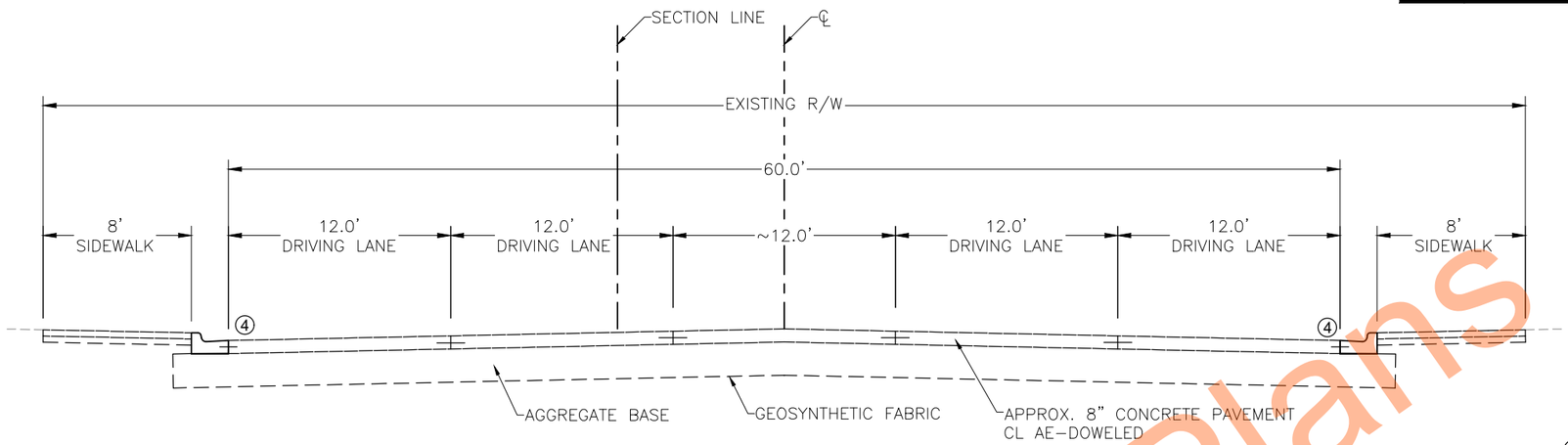
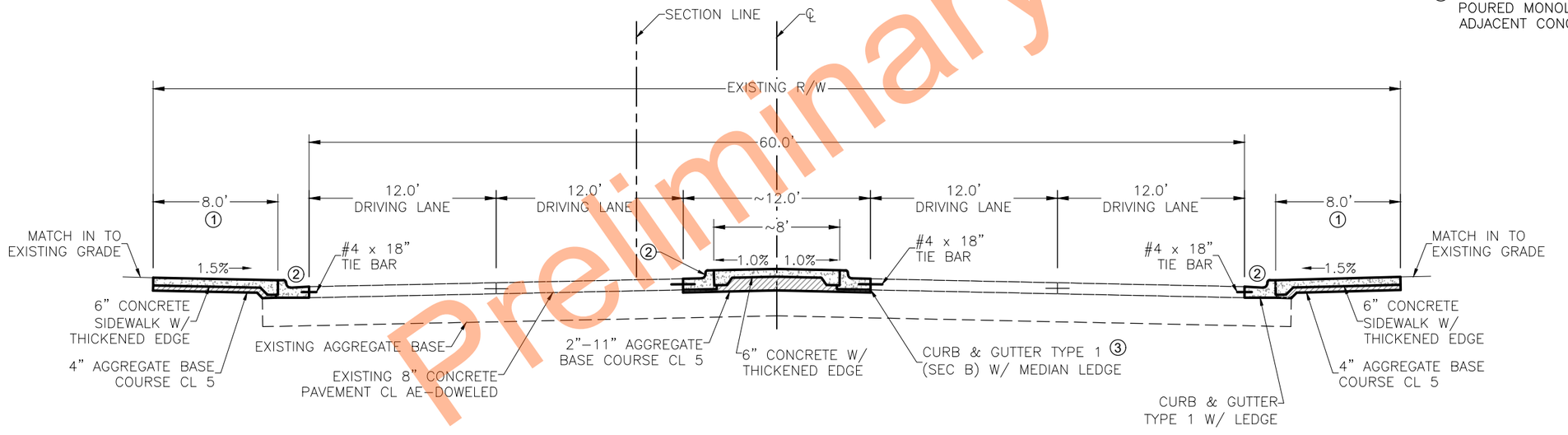
ND	HEU-1-981(147)	24625	30	1



WASHINGTON STREET
EXISTING TYPICAL SECTION
STA 26+55 - STA 26+97



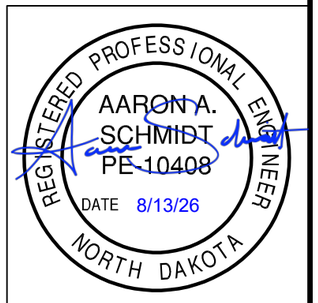
WASHINGTON STREET
PROPOSED TYPICAL SECTION
STA 26+55 - STA 26+97

① BOULEVARD WIDTH CAN VARY.

② HEIGHT OF CURB/MEDIAN ISLAND VARIES.

③ CURB & GUTTER USED ONLY ON A PORTION OF MEDIAN ISLAND (SEE MEDIAN ISLAND DETAIL).

④ SOME EXISTING CURB & GUTTER WAS POURED MONOLITHICALLY WITH THE ADJACENT CONCRETE PAVEMENT PANEL.



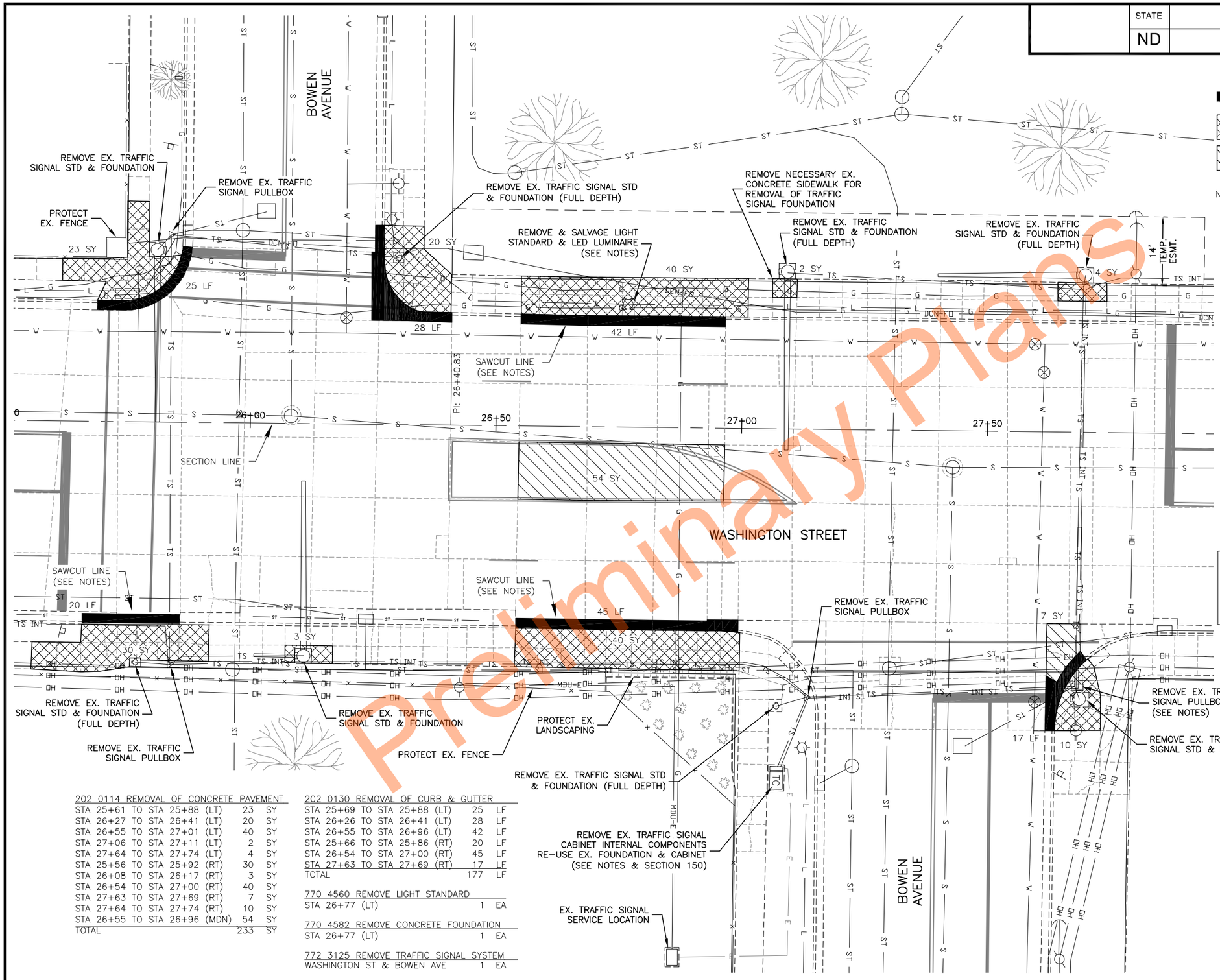
Bismarck ENGINEERING

TYPICAL SECTIONS

EXISTING & PROPOSED

WASHINGTON STREET
& BOWEN AVENUE

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEU-1-981(147)	40	1



LEGEND

- REMOVAL OF CURB & GUTTER
- REMOVAL OF CONC SIDEWALK
- REMOVAL OF CONC PAVEMENT

NOTES:

1. SOME EXISTING CURB & GUTTER TO BE REMOVED WAS POURED MONOLITHICALLY WITH THE ADJACENT CONCRETE PAVEMENT PANEL. SAWCUT NEW LINE 2-FT FROM THE BACK OF CURB.
2. ELECTRICAL FOUNDATION, CABINET, METER, DISCONNECT, AND SERVICES FOR THE EXISTING TRAFFIC SIGNAL CABINET SHALL BE PRESERVED AND UTILIZED FOR RECTANGULAR RAPID FLASHING BEACON SYSTEM (SEE SECTION 150).
3. INCLUDE REMOVAL OF EXISTING TRAFFIC SIGNAL SYSTEM AND EQUIPMENT AS PART OF SIGNAL WORK.
4. REMOVE ALL EXISTING TRAFFIC SIGNAL CONDUCTOR CABLE FROM CONDUITS. CUT EXISTING "TWISTED PAIR CABLE" IN THE NE CORNER PULLBOX, REMOVE CABLE FROM THE PULLBOX TO THE SIGNAL CABINET, ABANDON CABLE RUNNING WEST FROM THE PULLBOX AND REMOVE THE PULLBOX.
5. SEE SECTION 140 FOR ALL REVISIONS TO THE STREETLIGHT SYSTEM IN THE AREA.
6. PAYMENT FOR SIDEWALK CONCRETE REMOVAL IS INCLUDED AS CONCRETE PAVEMENT REMOVAL.

N

0 10 20

CAUTION

THE LOCATIONS OF EXISTING UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. NOT ALL EXISTING UTILITIES ARE SHOWN. CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK AND SHALL BE RESPONSIBLE FOR PROTECTING ALL UTILITIES OR REPAIRING ANY DAMAGE WHICH OCCURS DUE TO THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL EXISTING UTILITIES.

202 0114 REMOVAL OF CONCRETE PAVEMENT

STA 25+61 TO STA 25+88 (LT)	23	SY
STA 26+27 TO STA 26+41 (LT)	20	SY
STA 26+55 TO STA 27+01 (LT)	40	SY
STA 27+06 TO STA 27+11 (LT)	2	SY
STA 27+64 TO STA 27+74 (LT)	4	SY
STA 25+56 TO STA 25+92 (RT)	30	SY
STA 26+08 TO STA 26+17 (RT)	3	SY
STA 26+54 TO STA 27+00 (RT)	40	SY
STA 27+63 TO STA 27+69 (RT)	7	SY
STA 27+64 TO STA 27+74 (RT)	10	SY
STA 26+55 TO STA 26+96 (MDN)	54	SY
TOTAL	233	SY

202 0130 REMOVAL OF CURB & GUTTER

STA 25+69 TO STA 25+88 (LT)	25	LF
STA 26+26 TO STA 26+41 (LT)	28	LF
STA 26+55 TO STA 26+96 (LT)	42	LF
STA 25+66 TO STA 25+86 (RT)	20	LF
STA 26+54 TO STA 27+00 (RT)	45	LF
STA 27+63 TO STA 27+69 (RT)	17	LF
TOTAL	177	LF

770 4560 REMOVE LIGHT STANDARD

STA 26+77 (LT)	1	EA

770 4582 REMOVE CONCRETE FOUNDATION

STA 26+77 (LT)	1	EA

772 3125 REMOVE TRAFFIC SIGNAL SYSTEM

WASHINGTON ST & BOWEN AVE	1	EA

REGISTERED PROFESSIONAL ENGINEER
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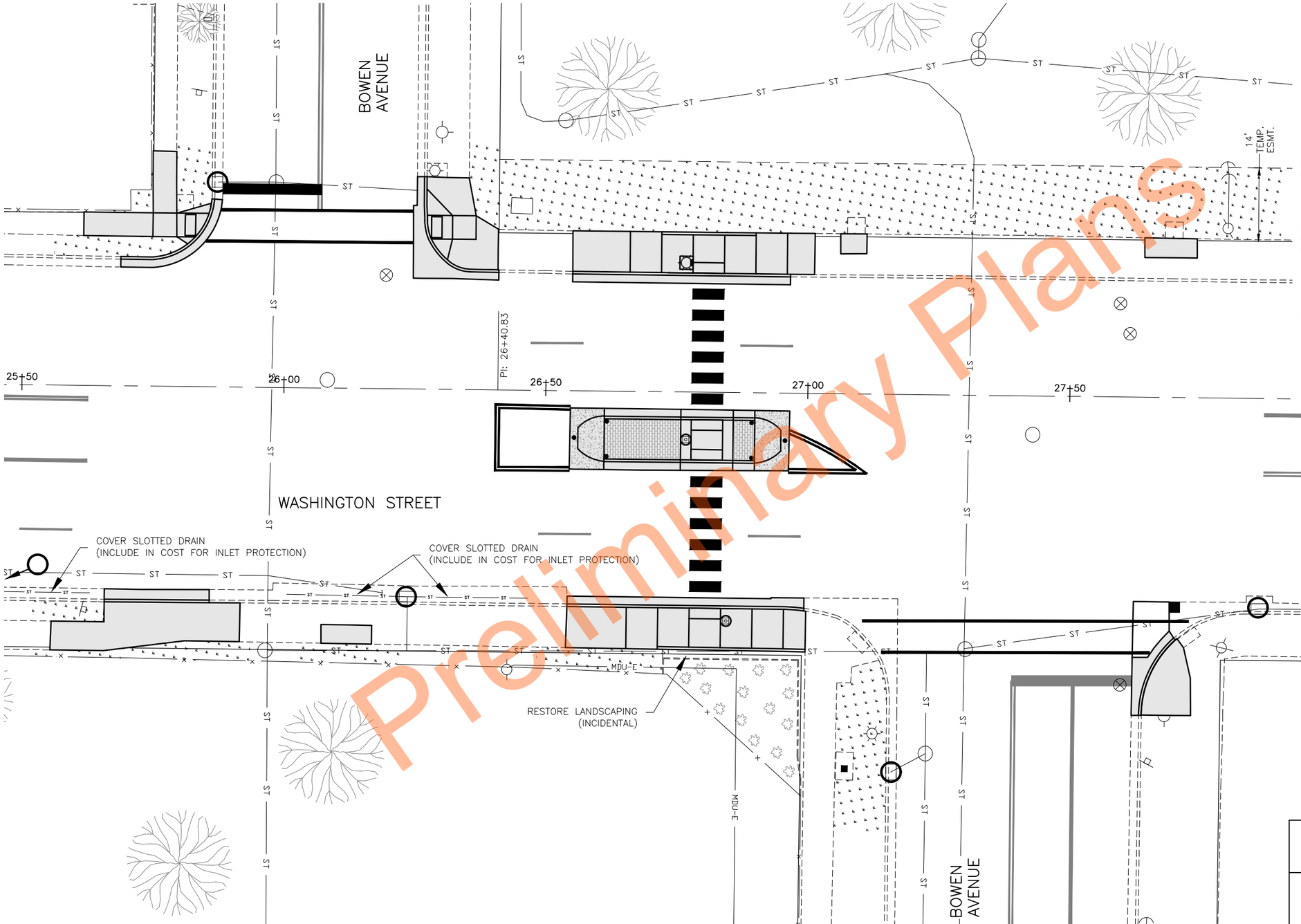
DATE 8/13/26
NORTH DAKOTA

Bismarck ENGINEERING

REMOVALS

WASHINGTON STREET & BOWEN AVENUE

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEU-1-981(147)	77	1



LEGEND

INLET PROTECTION

SEEDING & HYDRO MULCH

251 0310 SEEDING CLASS III		
SW INTERSECTION CORNER	23	SY
NW INTERSECTION CORNER & WEST SIDE	232	SY
EAST SIDE	38	SY
SE INTERSECTION CORNER	31	SY
TOTAL	324	SY

253 0200 HYDRAULIC MULCH		
SW INTERSECTION CORNER	23	SY
NW INTERSECTION CORNER & WEST SIDE	232	SY
EAST SIDE	38	SY
SE INTERSECTION CORNER	31	SY
TOTAL	324	SY

708 1540 INLET PROTECTION–SPECIAL		
STA 25+40 (RT)	1	EA
STA 25+87 (LT)	1	EA
STA 26+24 (RT)	1	EA
STA 27+17 (RT)	1	EA
STA 27+87 (RT)	1	EA
TOTAL	5	EA

REGISTERED PROFESSIONAL ENGINEER
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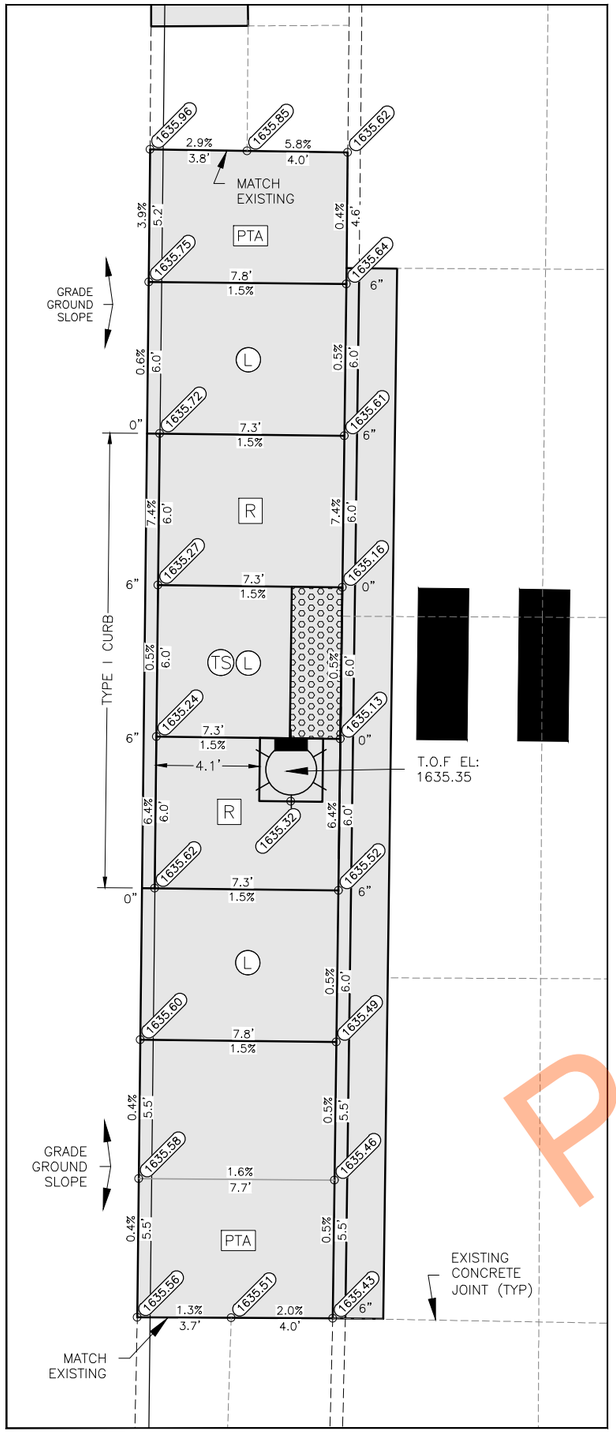
DATE 8/19/26
NORTH DAKOTA

Bismarck ENGINEERING

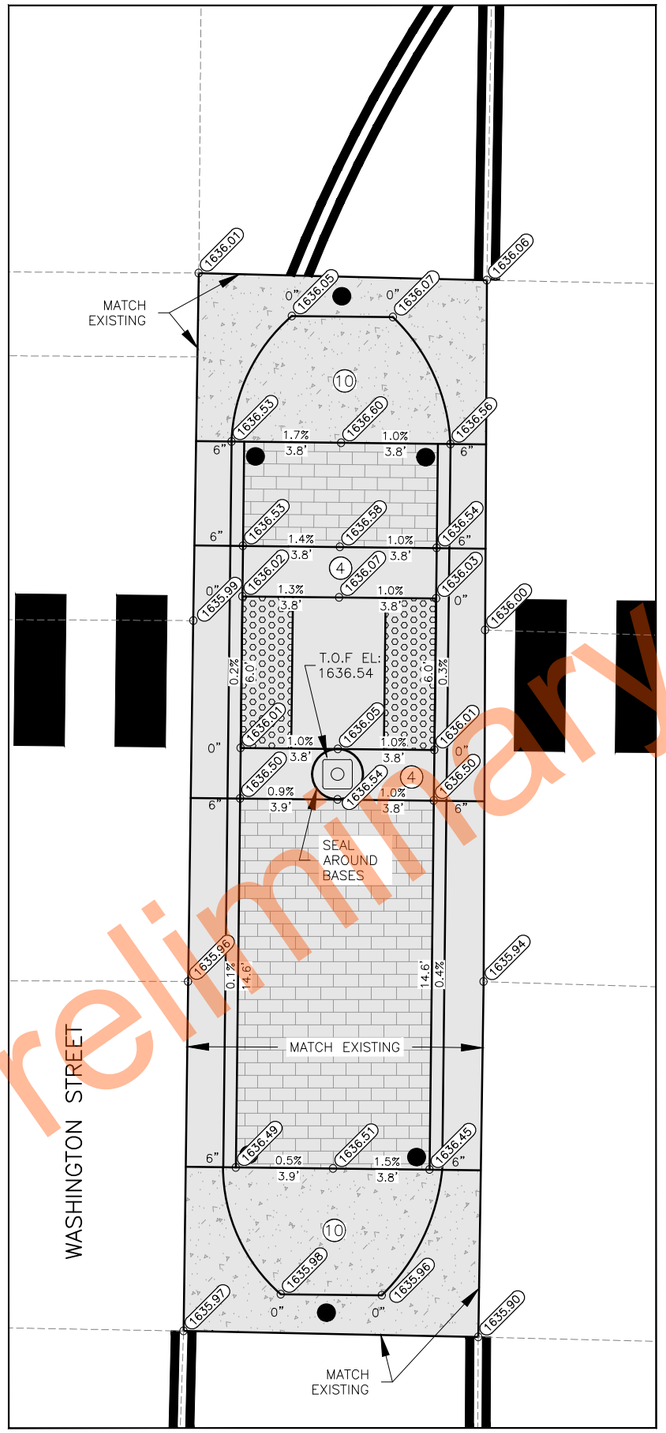
EROSION CONTROL

WASHINGTON STREET
& BOWEN AVENUE

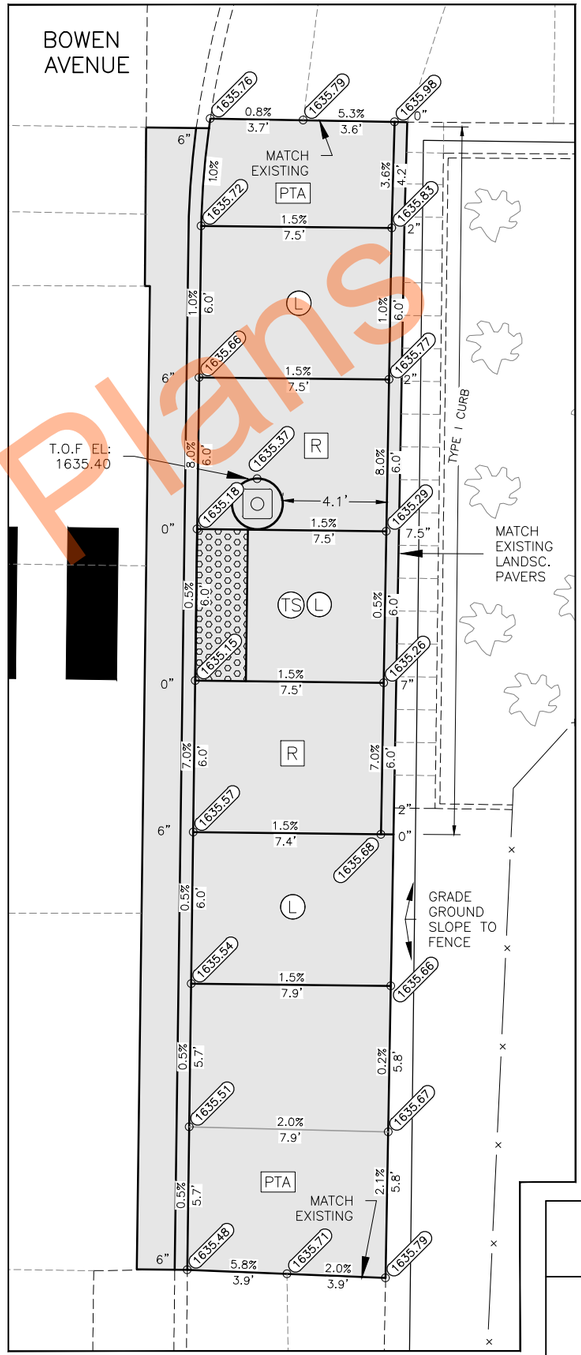
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEU-1-981(147)	80	1



WEST SIDE
WASHINGTON STREET



MEDIAN ISLAND
WASHINGTON STREET



EAST SIDE
WASHINGTON STREET

LEGEND

- CONCRETE SIDEWALK (6")
- CONCRETE MEDIAN NOSE PAVING
- PIGMENTED IMPRINTED CONCRETE MEDIAN
- DETECTABLE WARNING PANEL
- CURB AND GUTTER
- (TS) (L) TURNING SPACE/LANDING
- (10) 10:1 MAXIMUM SLOPE
- (4) 4:1 MAXIMUM SLOPE
- (B) 1.5% PREFERRED CROSS SLOPE
  2% MAX. CONSTR. CROSS SLOPE
  RUNNING SLOPE CONSISTENT W/ EPF
  4.7% PREF. MAX COUNTER SLOPE
  5% MAX CONSTR. COUNTER SLOPE
- PTA PEDESTRIAN ACCESS TRANSITION AREA
  RUNNING SLOPE LESS THAN 4.9%
  TRANSITION CROSS SECTION AT 1/2 PERCENT PER FOOT FROM THE RAMP TO EXISTING PEDESTRIAN FACILITY
- R 5%–7.5% PREFERRED RAMP GRADE
  8.3% MAXIMUM RAMP GRADE
  1.5% PREFERRED CROSS SLOPE
  2% MAXIMUM CROSS SLOPE
  15' MAXIMUM LENGTH
- 0", 6" CURB/CONCRETE HEIGHT
- (1800.00) FINISHED CONCRETE ELEVATION

N

REGISTERED PROFESSIONAL ENGINEER
AARON A. SCHMIDT
PE-10408
DATE 8/13/26
NORTH DAKOTA

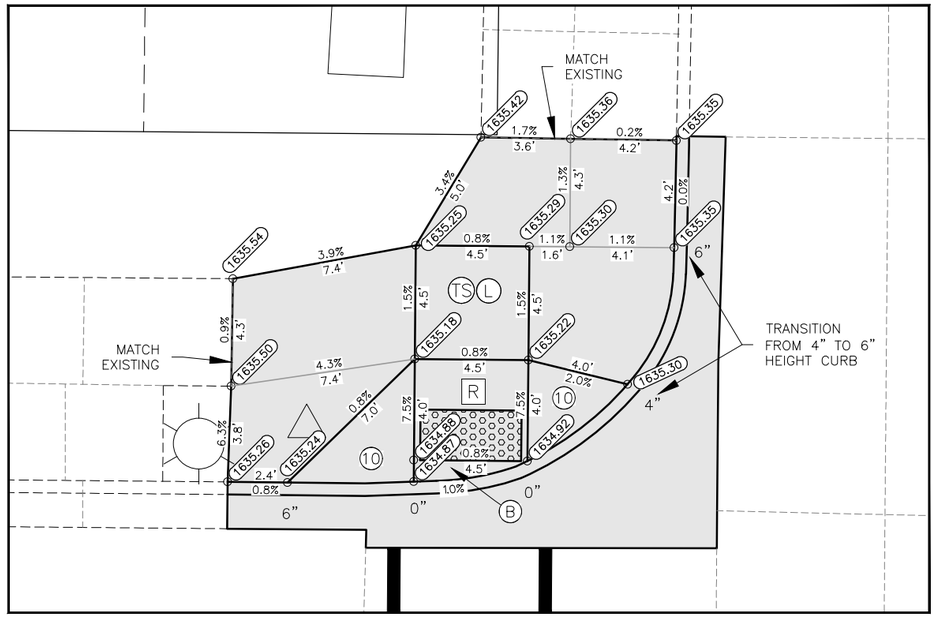
Bismarck ENGINEERING

LAYOUTS

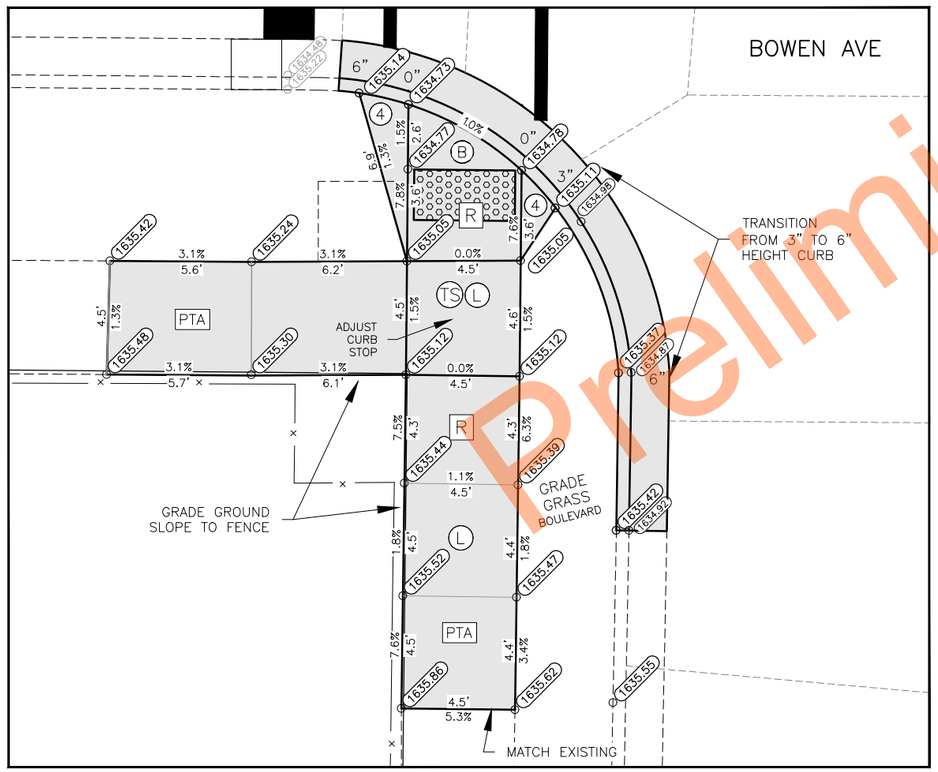
MEDIAN CROSSING CURB RAMP LAYOUTS

WASHINGTON STREET
& BOWEN AVENUE

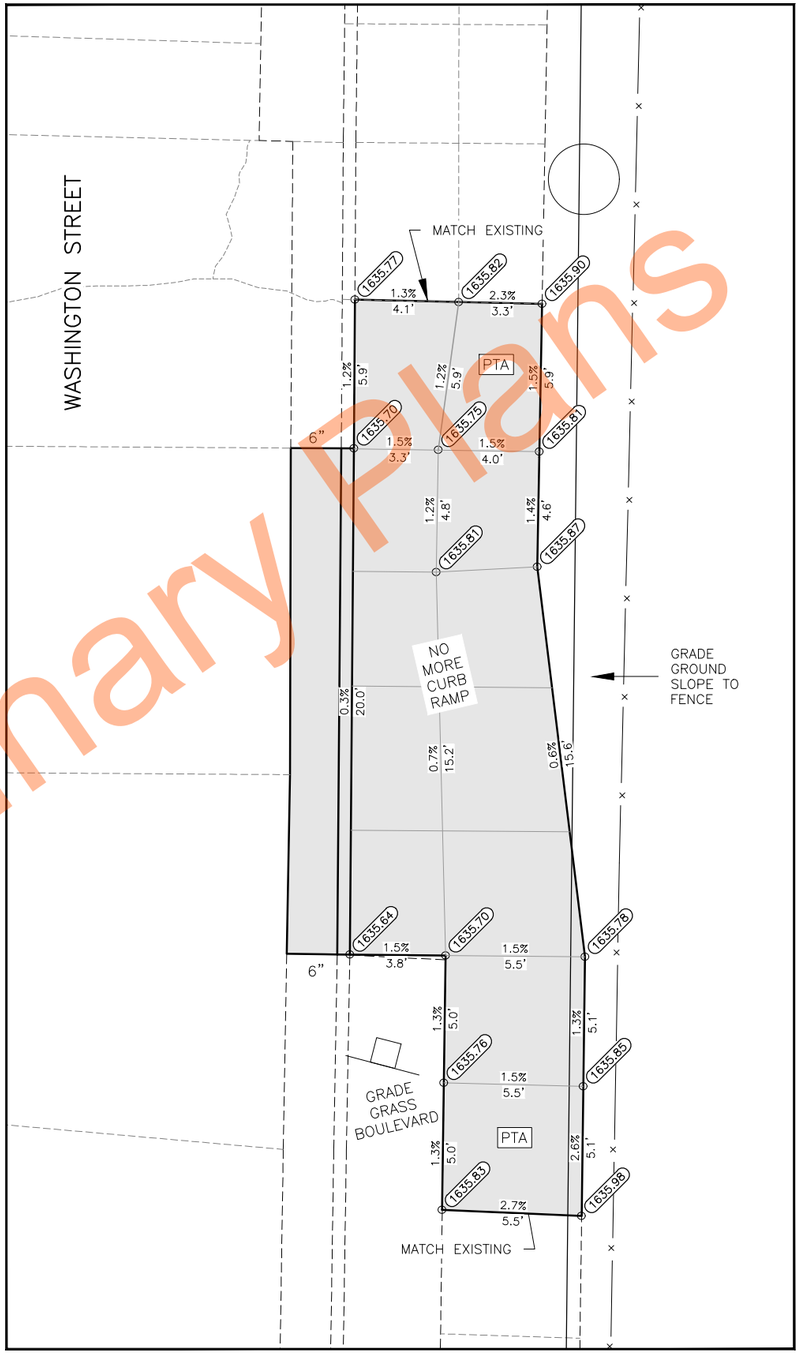
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEU-1-981(147)	80	2



NW CORNER
WASHINGTON STREET & BOWEN AVENUE



SW CORNER
WASHINGTON STREET & BOWEN AVENUE



SE CORNER
WASHINGTON STREET & BOWEN AVENUE

LEGEND

- CONCRETE SIDEWALK (6")
- CONCRETE MEDIAN NOSE PAVING
- PIGMENTED IMPRINTED CONCRETE MEDIAN
- DETECTABLE WARNING PANEL
- CURB AND GUTTER
- (TS) (L) TURNING SPACE/LANDING
- (10) 10:1 MAXIMUM SLOPE
- (4) 4:1 MAXIMUM SLOPE
- (B) 1.5% PREFERRED CROSS SLOPE; 2% MAX. CONSTR. CROSS SLOPE; RUNNING SLOPE CONSISTENT W/ EPF; 4.7% PREF. MAX COUNTER SLOPE; 5% MAX CONSTR. COUNTER SLOPE
- PTA PEDESTRIAN ACCESS TRANSITION AREA; RUNNING SLOPE LESS THAN 4.9%; TRANSITION CROSS SECTION AT 1/2 PERCENT PER FOOT FROM THE RAMP TO EXISTING PEDESTRIAN FACILITY
- (R) 5%–7.5% PREFERRED RAMP GRADE; 8.3% MAXIMUM RAMP GRADE; 1.5% PREFERRED CROSS SLOPE; 2% MAXIMUM CROSS SLOPE; 15' MAXIMUM LENGTH
- 0", 6" CURB/CONCRETE HEIGHT
- (1800.00) FINISHED CONCRETE ELEVATION

N

REGISTERED PROFESSIONAL ENGINEER
AARON A. SCHMIDT
PE-10408
DATE 8/19/26
NORTH DAKOTA

Bismarck ENGINEERING

LAYOUTS

CURB RAMP & CURB RAMP REMOVAL LAYOUTS

WASHINGTON STREET
& BOWEN AVENUE

STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	HEU-1-981(147)	24625	81	1

HORIZONTAL ALIGNMENT

POINT	STATION	NORTHING	EASTING
BOP	00+00.00	411506.866	1894735.752
PI 1	26+40.80	414147.512	1894764.628
EOP	52+81.65	416788.188	1894794.473

HORIZONTAL ALIGNMENT

POINT	STATION	NORTHING	EASTING

CURVE DATA

ARC DEFINITION

SURVEY CONTROL POINTS

PNT	NORTHING	EASTING	ELEV	STATION	OFFSET	CONTROL POINT DESCRIPTION
NWC S4	416788.188	1894794.473	1702.30	52+81.65	00.0' LT	1" BRASS CAP ROSSER AVE
W ¼ S4	414147.512	1894764.628	1635.71	26+40.80	00.0' RT	1" BRASS CAP NEAR W. BOWEN AVE

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PE-10408
DATE 8/13/26
NORTH DAKOTA

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

NOTES: Geodetic Control Network: Contractors shall verify all initial layout positions against established City network. Utilize the official City of Bismarck Survey & GPS Control Information Network or provide verification.

Online Control Catalog: A complete spatial catalog of local control monuments and positional datasheets is accessible online via the City of Bismarck Survey & GPS Control Information portal.

Date Survey Completed: 6/30/26

☐ Assumed Coordinates

☒ All coordinates on this sheet are derived from the NAD83(2011) North Dakota South Zone

Horizontal Datum: Horizontal project positions are referenced to the North American Datum of 1983 (NAD83), utilizing the 2011 adjustment NAD83(2011).

Coordinate Projection: Coordinates are calculated using the North Dakota State Plane Coordinate System, South Zone (FIPS Zone 3302).

☒ NAVD-88

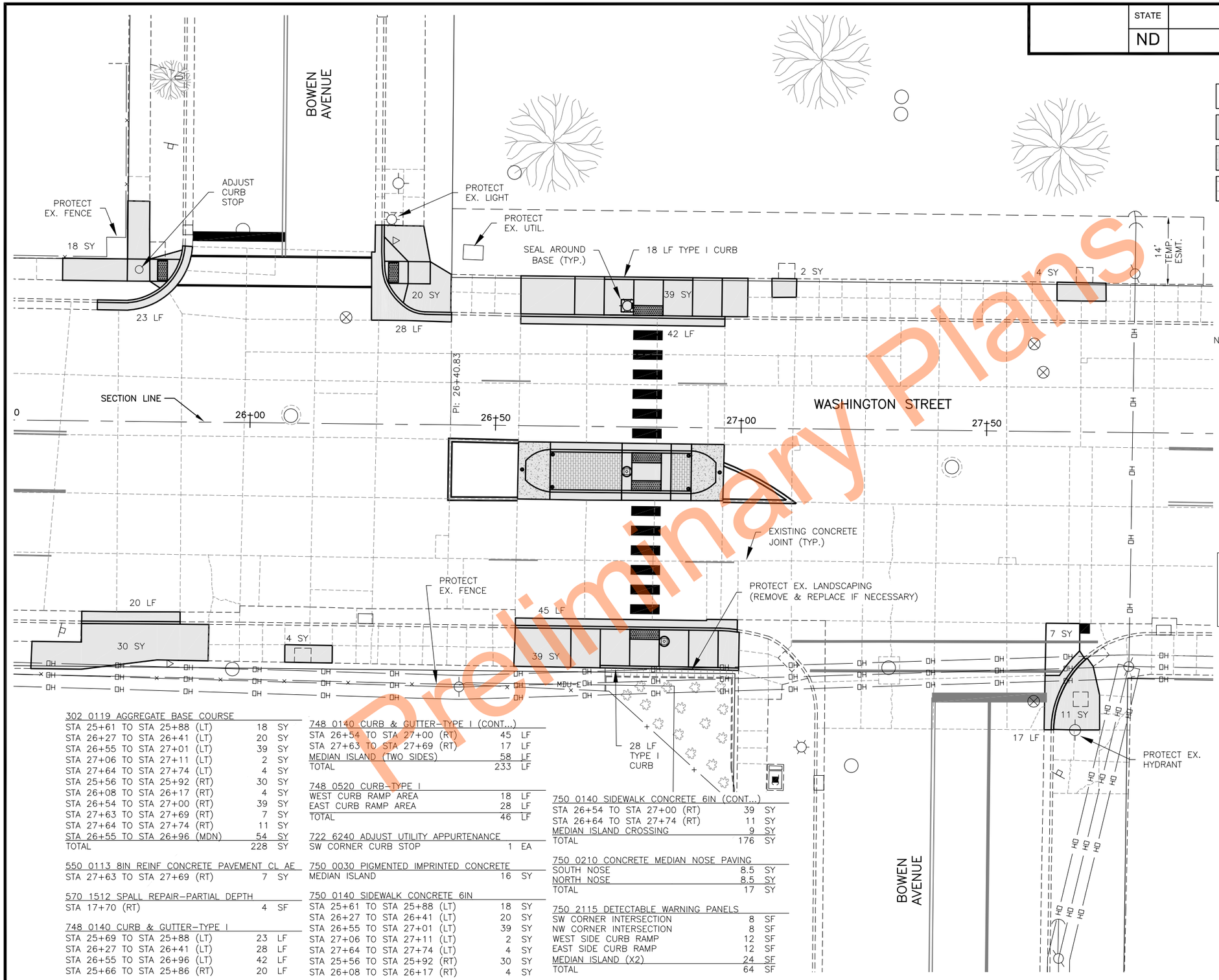
☐ NGVD-29 GEOID 12B

☒ ENGLISH UNITS

Bismarck ENGINEERING

SURVEY COORDINATE AND CURVE DATA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEU-1-981(147)	90	1



LEGEND

- CONCRETE PAVEMENT (8")
- CONCRETE SIDEWALK (6")
- CONCRETE MEDIAN NOSE PAVING
- PIGMENTED IMPRINTED CONCRETE MEDIAN
- DETECTABLE WARNING PANEL
- CURB AND GUTTER
- SPALL REPAIR

NOTES:

1. FOR MEDIAN ISLAND: SEE TYPICAL SECTIONS AND DETAILS FOR MORE INFORMATION.
2. SEE SECTION 80 FOR CURB RAMP DETAILS.
3. CONCRETE FOR FLASHING BEACONS/FEEDPOINT IS PART OF SIGNAL WORK (SEE SECTION 150).
4. SEAL CONCRETE AROUND SIGNAL FOUNDATIONS.

0 10 20

CAUTION

THE LOCATIONS OF EXISTING UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. NOT ALL EXISTING UTILITIES ARE SHOWN. CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK AND SHALL BE RESPONSIBLE FOR PROTECTING ALL UTILITIES OR REPAIRING ANY DAMAGE WHICH OCCURS DUE TO THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL EXISTING UTILITIES.

302 0119 AGGREGATE BASE COURSE

STA 25+61 TO STA 25+88 (LT)	18	SY
STA 26+27 TO STA 26+41 (LT)	20	SY
STA 26+55 TO STA 27+01 (LT)	39	SY
STA 27+06 TO STA 27+11 (LT)	2	SY
STA 27+64 TO STA 27+74 (LT)	4	SY
STA 25+56 TO STA 25+92 (RT)	30	SY
STA 26+08 TO STA 26+17 (RT)	4	SY
STA 26+54 TO STA 27+00 (RT)	39	SY
STA 27+63 TO STA 27+69 (RT)	7	SY
STA 27+64 TO STA 27+74 (RT)	11	SY
STA 26+55 TO STA 26+96 (MDN)	54	SY
TOTAL	228	SY

550 0113 8IN REINF CONCRETE PAVEMENT CL AE

STA 27+63 TO STA 27+69 (RT)	7	SY

570 1512 SPALL REPAIR-PARTIAL DEPTH

STA 17+70 (RT)	4	SF

748 0140 CURB & GUTTER-TYPE I

STA 25+69 TO STA 25+88 (LT)	23	LF
STA 26+27 TO STA 26+41 (LT)	28	LF
STA 26+55 TO STA 26+96 (LT)	42	LF
STA 25+66 TO STA 25+86 (RT)	20	LF

748 0140 CURB & GUTTER-TYPE I (CONT...)

STA 26+54 TO STA 27+00 (RT)	45	LF
STA 27+63 TO STA 27+69 (RT)	17	LF
MEDIAN ISLAND (TWO SIDES)	58	LF
TOTAL	233	LF

748 0520 CURB-TYPE I

WEST CURB RAMP AREA	18	LF
EAST CURB RAMP AREA	28	LF
TOTAL	46	LF

722 6240 ADJUST UTILITY APPURTENANCE

SW CORNER CURB STOP	1	EA

750 0030 PIGMENTED IMPRINTED CONCRETE

MEDIAN ISLAND	16	SY

750 0140 SIDEWALK CONCRETE 6IN

STA 25+61 TO STA 25+88 (LT)	18	SY
STA 26+27 TO STA 26+41 (LT)	20	SY
STA 26+55 TO STA 27+01 (LT)	39	SY
STA 27+06 TO STA 27+11 (LT)	2	SY
STA 27+64 TO STA 27+74 (LT)	4	SY
STA 25+56 TO STA 25+92 (RT)	30	SY
STA 26+08 TO STA 26+17 (RT)	4	SY

750 0140 SIDEWALK CONCRETE 6IN (CONT...)

STA 26+54 TO STA 27+00 (RT)	39	SY
STA 26+64 TO STA 27+74 (RT)	11	SY
MEDIAN ISLAND CROSSING	9	SY
TOTAL	176	SY

750 0210 CONCRETE MEDIAN NOSE PAVING

SOUTH NOSE	8.5	SY
NORTH NOSE	8.5	SY
TOTAL	17	SY

750 2115 DETECTABLE WARNING PANELS

SW CORNER INTERSECTION	8	SF
NW CORNER INTERSECTION	8	SF
WEST SIDE CURB RAMP	12	SF
EAST SIDE CURB RAMP	12	SF
MEDIAN ISLAND (X2)	24	SF
TOTAL	64	SF

REGISTERED PROFESSIONAL ENGINEER
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DATE 8/19/26
NORTH DAKOTA

Bismarck ENGINEERING

PAVING LAYOUT

WASHINGTON STREET & BOWEN AVENUE

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEU-1-981(147)	100	1

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED BY PHASE NO. 1	2	3		TOTAL AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
E5-1-48	48"x48"	EXIT GORE						35	
G20-1-60	60"x24"	ROAD WORK NEXT __ MILES						28	
G20-1b-60	60"x24"	NO WORK IN PROGRESS (Sign and installation only)						18	
G20-2-48	**48"x24"**	**END ROAD WORK**	**2**	**2**	**2**		**2**	**26**	**52**
G20-4-36	36"x18"	PILOT CAR FOLLOW ME (Mounted to back of pilot car)						18	
G20-4b-36	36"x30"	WAIT FOR PILOT CAR						18	
G20-50a-72	72"x36"	ROAD WORK NEXT __ MILES RT & LT ARROWS						43	
G20-52a-72	72"x24"	ROAD WORK NEXT __ MILES RT or LT ARROW						36	
G20-55-96	96"x48"	SPEED LIMIT ENFORCED - MINIMUM FEE $150 WHEN WORKERS PRESENT						59	
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)						11	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)						10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)						10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)						7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)						7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)						7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)						7	
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)						7	
M4-9-30	30"x24"	DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT						15	
M4-10-48	48"x18"	DETOUR (INSIDE ARROW) RIGHT or LEFT (Mounted on barricade)						7	
M5-1-21	21"x15"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)						7	
M5-1-30	30"x21"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)						9	
M6-1-21	21"x15"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)						7	
M6-1-30	30"x21"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)						9	
M6-3-21	21"x15"	DIRECTIONAL ARROW UP (Mounted on route marker post)						7	
R1-1-48	48"x48"	STOP						32	
R1-2-60	60"x60"	YIELD						29	
R2-1-36	36"x48"	SPEED LIMIT __ (Portable only)						30	
R2-1-48	**48"x60"**	**SPEED LIMIT __**	**2**	**2**	**2**		**2**	**39**	**78**
R2-1aP-24	**24"x18"**	**MINIMUM FEE $150 (Mounted on Speed Limit post)**	**2**	**2**	**2**		**2**	**10**	**20**
R3-2-48	48"x48"	NO LEFT TURN						35	
R4-1-48	48"x60"	DO NOT PASS						39	
R4-7-48	48"x60"	KEEP RIGHT						39	
R5-1-48	48"x48"	DO NOT ENTER						35	
R6-1-54	54"x18"	ONE WAY RIGHT or LEFT (Mounted on STOP or DO NOT ENTER post)						14	
R7-1-12	12"x18"	NO PARKING ANY TIME						11	
R9-9-24	**24"x12"**	**SIDEWALK CLOSED (Mounted on barricade)**		**4**	**4**		**4**	**3**	**12**
R10-6-24	24"x36"	STOP HERE ON RED						16	
R11-2-48	48"x30"	ROAD CLOSED (Mounted on barricade)						12	
R11-2a-48	48"x30"	STREET CLOSED (Mounted on barricade)						12	
R11-3a-60	60"x30"	ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)						15	
R11-3c-60	60"x30"	STREET CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)						15	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC (Mounted on barricade)						15	
W1-3-48	48"x48"	REVERSE TURN RIGHT or LEFT						35	
W1-4-48	48"x48"	REVERSE CURVE RIGHT or LEFT						35	
W1-4b-48	48"x48"	TWO LANE REVERSE CURVE RIGHT or LEFT						35	
W1-6-48	48"x24"	ONE DIRECTION LARGE ARROW						26	
W3-1-48	48"x48"	STOP AHEAD						35	
W3-3-48	48"x48"	SIGNAL AHEAD						35	
W3-4-48	48"x48"	BE PREPARED TO STOP						35	
W3-5-48	48"x48"	SPEED REDUCTION AHEAD						35	
W4-2-48	**48"x48"**	**LANE ENDS RIGHT or LEFT**	**2**	**2**	**2**		**2**	**35**	**70**
W5-1-48	48"x48"	ROAD NARROWS						35	
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE						35	
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW						35	
W6-3-48	48"x48"	TWO WAY TRAFFIC						35	
W8-1-48	48"x48"	BUMP						35	
W8-3-48	48"x48"	PAVEMENT ENDS						35	
W8-7-48	48"x48"	LOOSE GRAVEL						35	
W8-11-48	48"x48"	UNEVEN LANES						35	
W8-12-48	48"x48"	NO CENTER LINE						35	
W8-17-48	48"x48"	SHOULDER DROP-OFF SYMBOL						35	
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY						35	
W8-54-48	48"x48"	TRUCKS ENTERING AHEAD or __ FT or _ MILE						35	
W8-55-48	48"x48"	TRUCKS CROSSING AHEAD or __ FT or _ MILE						35	
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY						35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL						35	
W12-1-48	**48"x48"**	**DOUBLE ARROW**	**2**				**2**	**35**	**70**
W13-1P-30	30"x30"	__ MPH ADVISORY SPEED PLAQUE (Mounted on warning sign post)						14	
W14-3-64	64"x48"	NO PASSING ZONE						28	
W16-2P-30	30"x24"	__ FEET PLAQUE (Mounted on warning sign post)						10	
W16-7P-21	**21"x15"**	**LEFT or RIGHT DIAGONAL ARROW (Mounted on device)**	**2**	**2**			**2**	**7**	**14**
W20-1-48	**48"x48"**	**ROAD WORK AHEAD or _FT or _ MILE**	**4**	**4**	**4**		**4**	**35**	**140**
W20-2-48	48"x48"	DETOUR AHEAD or __ FT or _ MILE						35	
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or __ FT or _ MILE						35	
W20-4-48	48"x48"	ONE LANE ROAD AHEAD or __ FT or _ MILE						35	
W20-5-48	**48"x48"**	**RIGHT or CENTER or LEFT LANE CLOSED AHEAD or __ FT or _ MILE**	**2**	**2**	**2**		**2**	**35**	**70**
W20-7-48	48"x48"	FLAGGER						35	
W20-8-18	18"x18"	STOP - SLOW PADDLE Back to Back						5	
W20-52P-54	54"x12"	NEXT __ MILES (Mounted on warning sign post)						12	
W21-1-48	48"x48"	WORKERS						35	
W21-2-48	48"x48"	FRESH OIL						35	
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or __ FT or _ MILE						35	

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED BY PHASE NO. 1	2	3		TOTAL AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
W21-5-48	48"x48"	SHOULDER WORK						35	
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED						35	
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or __ FT or _ MILE						35	
W21-6-48	48"x48"	SURVEY CREW						35	
W21-50-48	48"x48"	BRIDGE PAINTING AHEAD or __ FT						35	
W21-51-48	48"x48"	MATERIAL ON ROADWAY						35	
W21-52-48	48"x48"	PAVEMENT BREAKS						35	
W21-53-48	48"x48"	RUMBLE STRIPS AHEAD						35	
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK						35	
W24-1-48	48"x48"	DOUBLE REVERSE CURVE						35	

SPECIAL SIGNS

SPEC & CODE

704-1000	**TRAFFIC CONTROL SIGNS**	**TOTAL UNITS 526**

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY BY PHASE NO. 1	2	3		TOTAL QUANTITY
704-0100	FLAGGING	MHR					
704-1048	PORTABLE RUMBLE STRIPS	EACH					
704-1050	TYPE I BARRICADES	EACH					
704-1052	TYPE III BARRICADES	EACH					
704-1054	**SIDEWALK BARRICADE**	EACH		**4**	**4**		**4**
704-1058	**PEDESTRIAN WALKWAY**	LF		**176**	**175**		**176**
704-1060	**DELINEATOR DRUMS**	EACH	**40**	**12**	**12**		**40**
704-1065	TRAFFIC CONES	EACH					
704-1067	**TUBULAR MARKERS**	EACH	**60**	**73**	**49**		**73**
704-1070	DELINEATOR	EACH					
704-1072	FLEXIBLE DELINEATORS	EACH					
704-1080	STACKABLE VERTICAL PANELS	EACH					
704-1081	VERTICAL PANELS - BACK TO BACK	EACH					
704-1085	**SEQUENCING ARROW PANEL - TYPE A**	EACH	**2**	**2**	**2**		**2**
704-1086	SEQUENCING ARROW PANEL - TYPE B	EACH					
704-1087	SEQUENCING ARROW PANEL - TYPE C	EACH					
704-1500	**OBLITERATION OF PVMT MK**	SF	**286**				**286**
704-2108	**TEMPORARY CURB RAMP**	EACH		**1**	**4**		**4**
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF					
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH					
762-0200	RAISED PAVEMENT MARKERS	EACH					
762-0420	SHORT TERM 4IN LINE - TYPE R	LF					
762-0430	SHORT TERM 4IN LINE - TYPE NR	LF					

NOTE:
If additional signs are required, units will be calculated using the formula from Section III-18.06 of the Design Manual.
http://www.dot.nd.gov/

REGISTERED PROFESSIONAL ENGINEER
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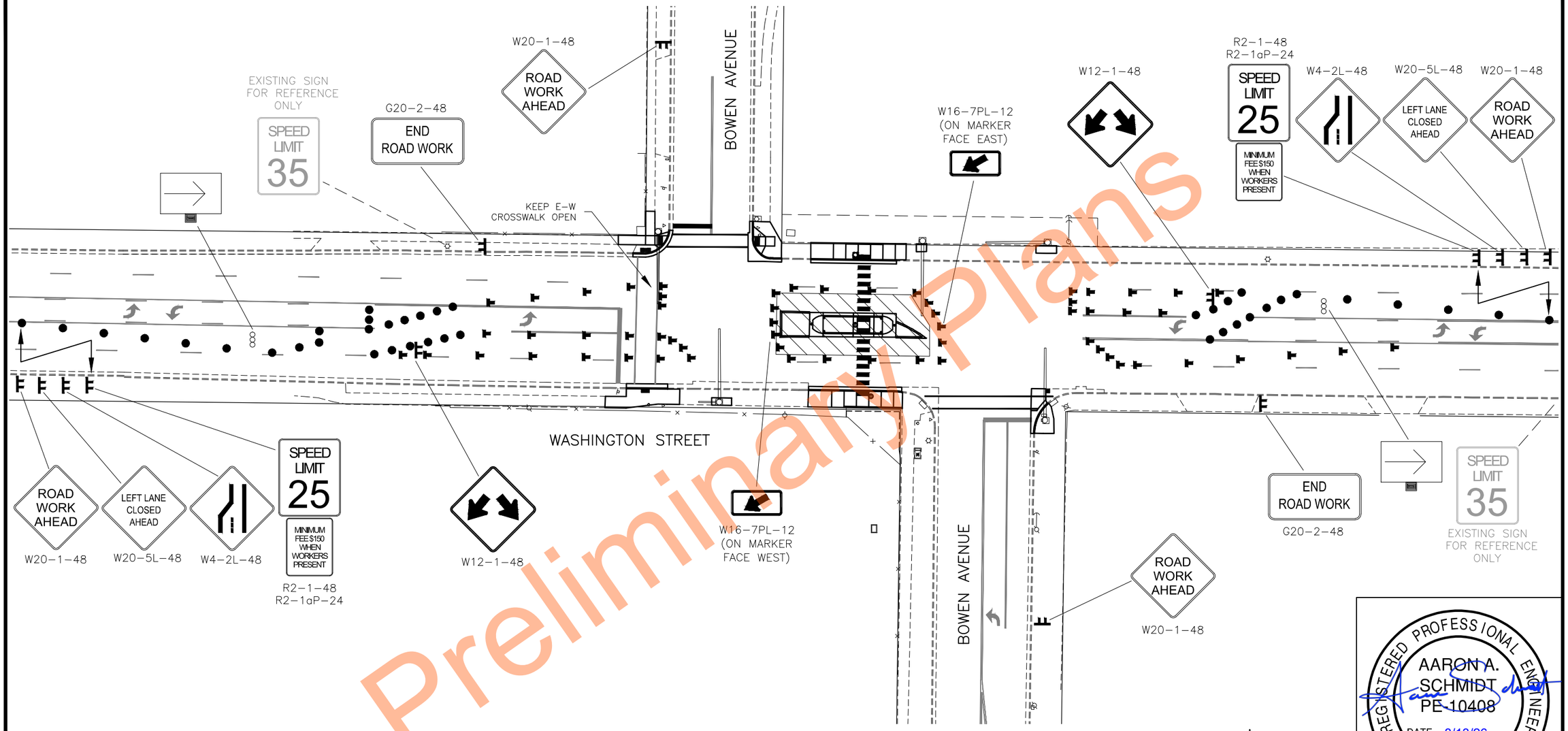
DATE 8/13/26
NORTH DAKOTA

Traffic Control Devices List

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEU-1-981(147)	100	2



NOTES:

1. LANE CLOSURES WILL ONLY BE ALLOWED WHILE WORK IS BEING PERFORMED.
2. MAINTAIN SIDEWALK ACCESS.
3. 100-FT MINIMUM SPACING BETWEEN ADVANCED WARNING SIGNS.

WORK ZONE
SIDEWALK BARRICADE
TYPE III BARRICADE
TUBULAR MARKER
DELINEATOR DRUM
SEQUENCING ARROW PANEL

REGISTERED PROFESSIONAL ENGINEER
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DATE 8/13/26
NORTH DAKOTA

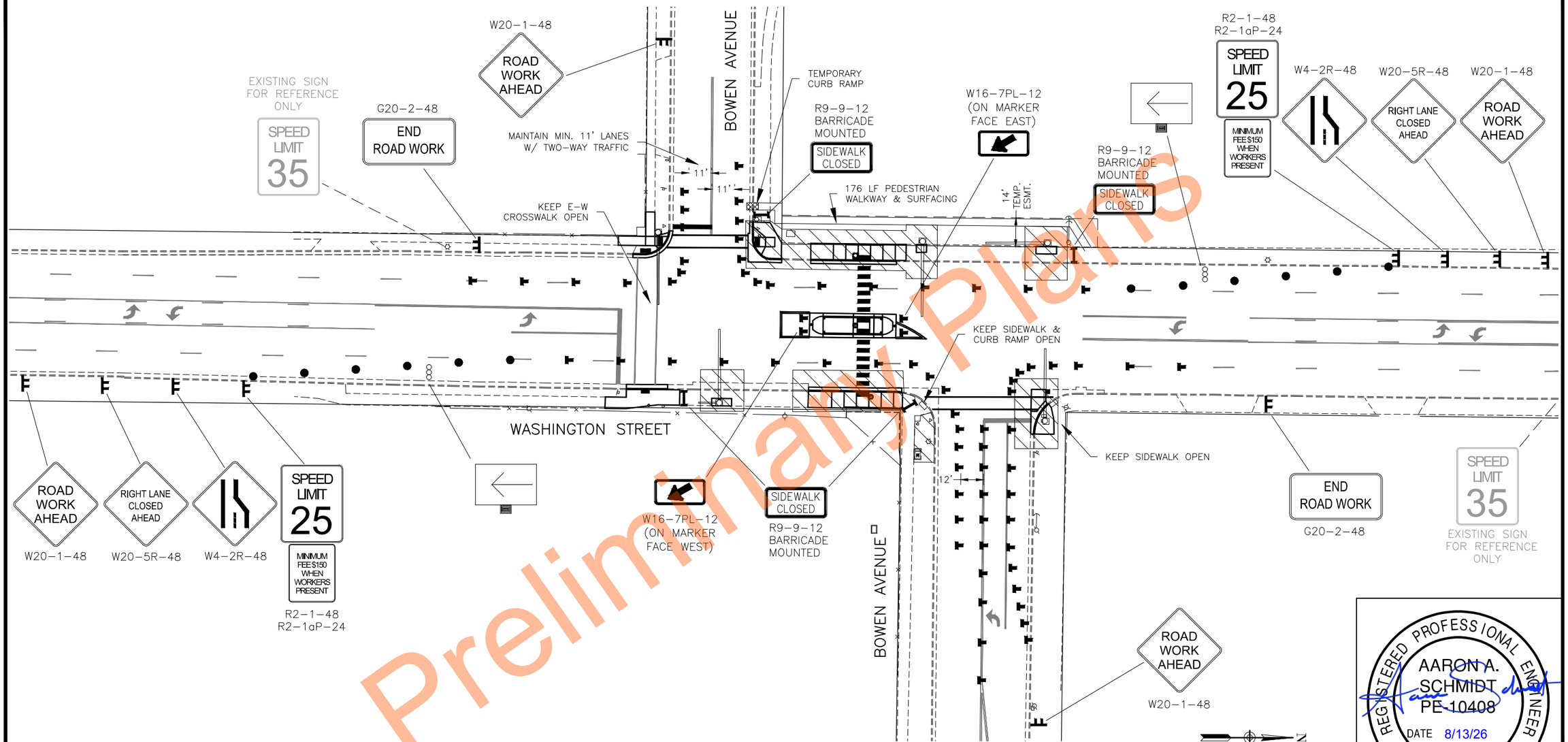
Bismarck ENGINEERING

WORK ZONE TRAFFIC CONTROL

PHASE 1

WASHINGTON STREET & BOWEN AVENUE

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEU-1-981(147)	100	3



NOTES:

1. LANE CLOSURES WILL ONLY BE ALLOWED WHILE WORK IS BEING PERFORMED.
2. MAINTAIN SIDEWALK ACCESS.
3. 100-FT MINIMUM SPACING BETWEEN ADVANCED WARNING SIGNS.

- WORK ZONE
- SIDEWALK BARRICADE
- TYPE III BARRICADE
- TUBULAR MARKER
- DELINEATOR DRUM
- SEQUENCING ARROW PANEL

REGISTERED PROFESSIONAL ENGINEER
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DATE 8/13/26
NORTH DAKOTA

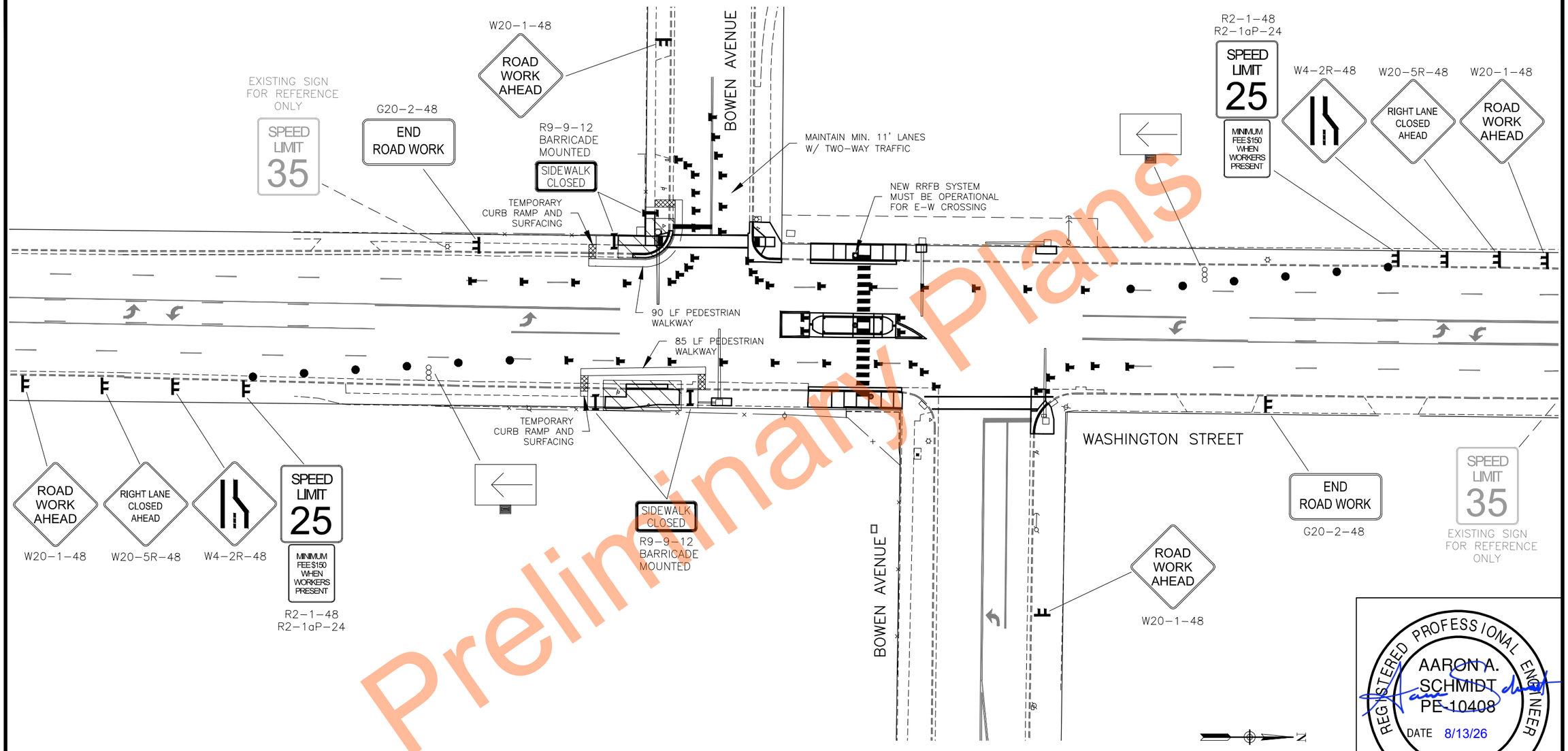
Bismarck ENGINEERING

WORK ZONE TRAFFIC CONTROL

PHASE 2

WASHINGTON STREET & BOWEN AVENUE

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEU-1-981(147)	100	4



NOTES:

1. LANE CLOSURES WILL ONLY BE ALLOWED WHILE WORK IS BEING PERFORMED.
2. MAINTAIN SIDEWALK ACCESS.
3. 100-FT MINIMUM SPACING BETWEEN ADVANCED WARNING SIGNS.

WORK ZONE
SIDEWALK BARRICADE
TYPE III BARRICADE
TUBULAR MARKER
DELINEATOR DRUM
SEQUENCING ARROW PANEL

REGISTERED PROFESSIONAL ENGINEER
AARON A. SCHMIDT
PE-10408
DATE 8/13/26
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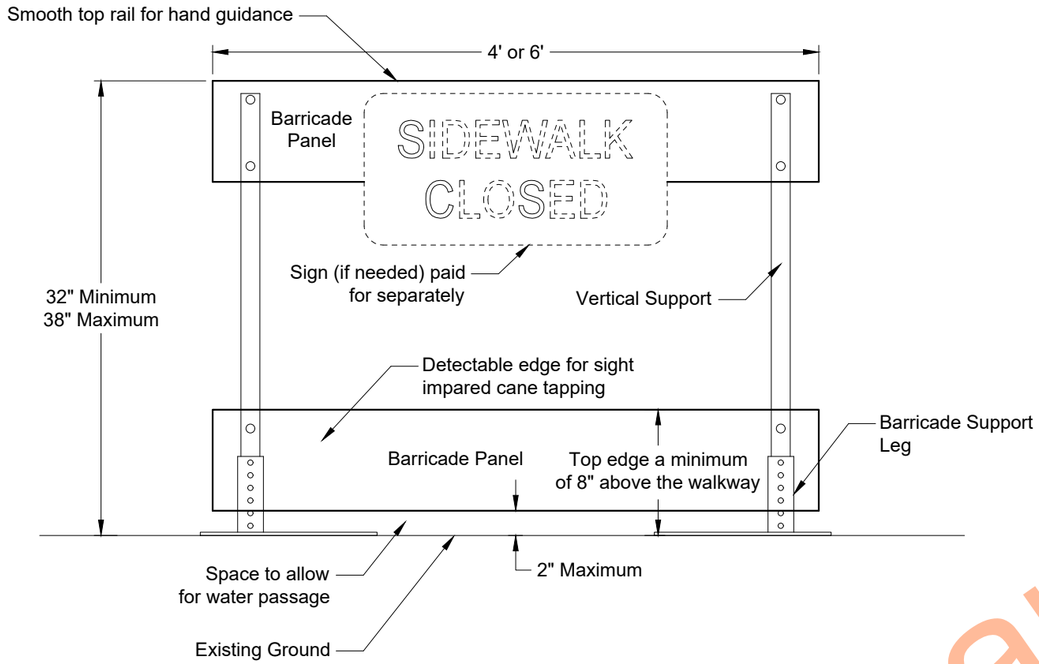
Bismarck ENGINEERING

WORK ZONE TRAFFIC CONTROL

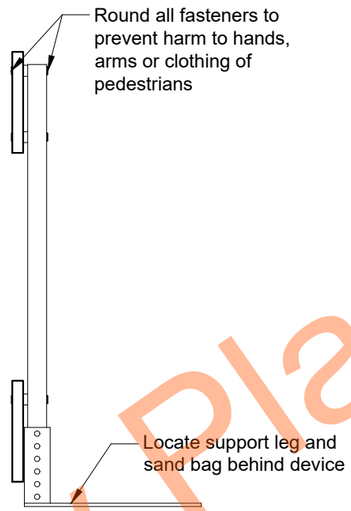
PHASE 3

WASHINGTON STREET & BOWEN AVENUE

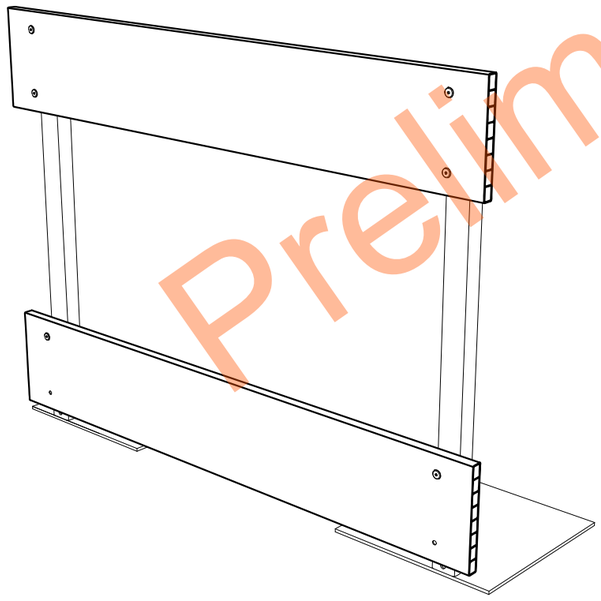
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEU-1-981(147)	100	5



Front View



End View



Perspective View

NOTES:

Sidewalk Barricades

1. Provide self standing sidewalk barricade with no supports extending into the pedestrians path.
2. Use orange or orange and white diagonal striped barricade panels contrasting with the walkway surface.
3. Provide ADA compliant and NCHRP 350 or Mash Test Level 3 (TL3) approved sidewalk barricades.
4. Include all costs to furnish, maintain and remove sidewalk barricades in the price bid for "Sidewalk Barricade".

REGISTERED PROFESSIONAL ENGINEER
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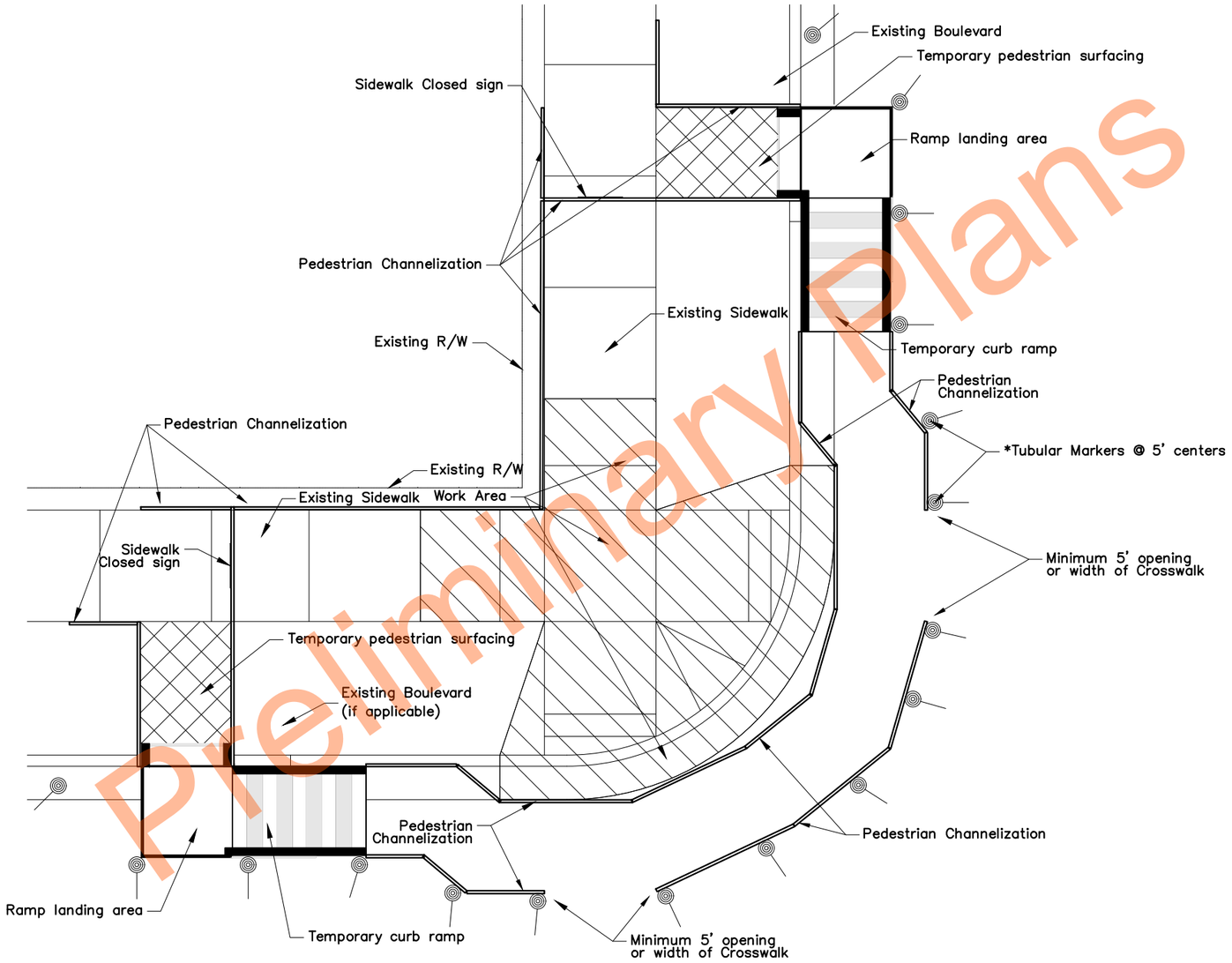
Bismarck ENGINEERING

WORK ZONE TRAFFIC CONTROL

SIDEWALK BARRICADE

WASHINGTON STREET & BOWEN AVENUE

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEU-1-981(147)	100	6



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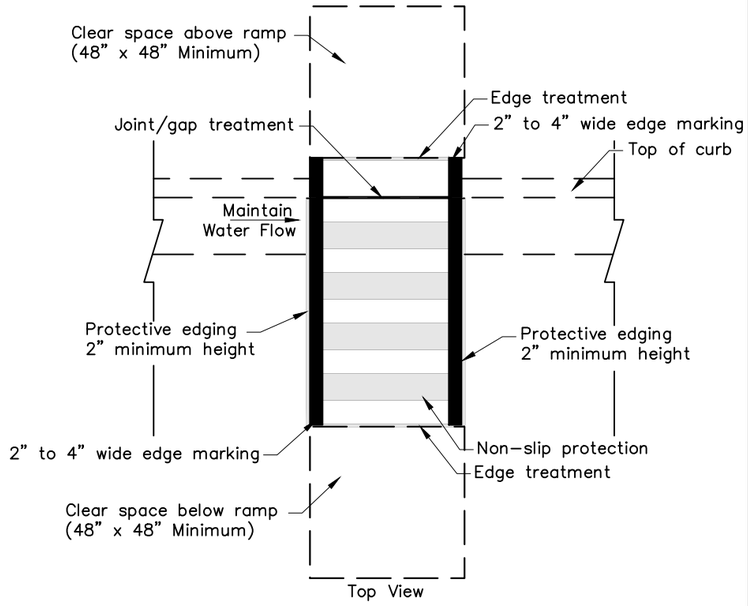
Bismarck ENGINEERING

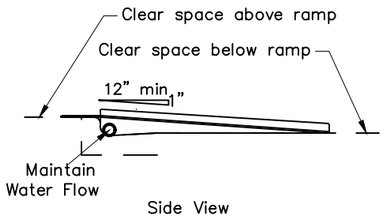
WORK ZONE TRAFFIC CONTROL

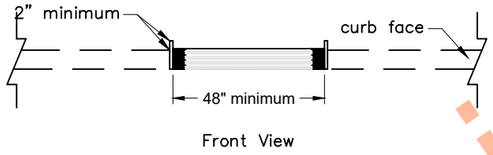
TYPICAL TEMPORARY PEDESTRIAN ACCESS ROUTE DETAIL

WASHINGTON ST & BOWEN AVE

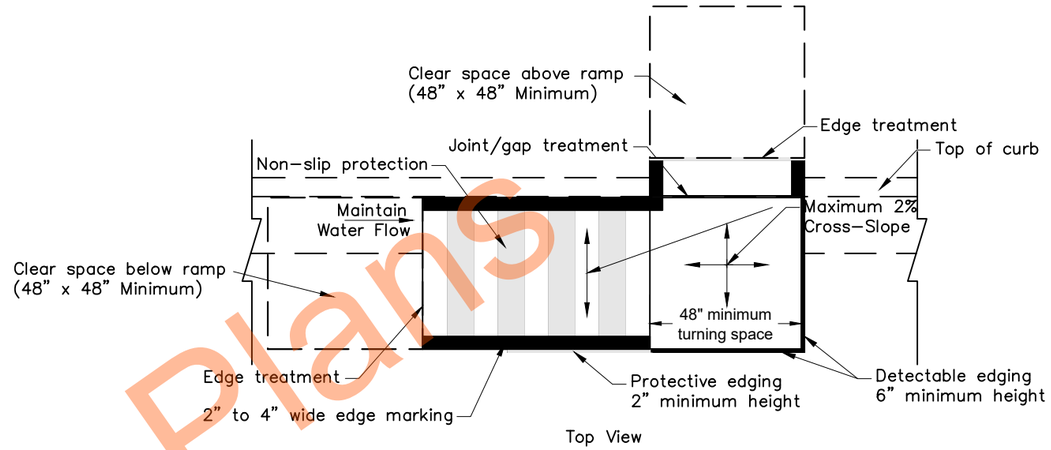
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEU-1-981(147)	100	7

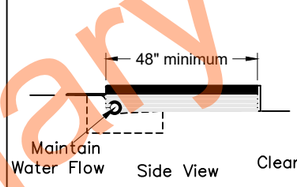


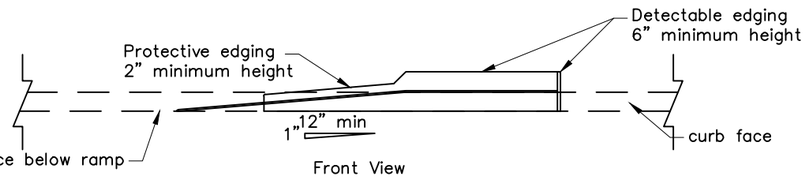




Temporary Perpendicular Curb Ramp

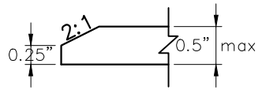






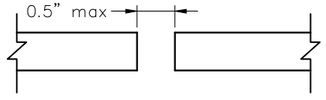
Temporary Parallel Curb Ramp

Edge Treatment



Maximum Surface
Height Change Detail

Joint/Gap Treatment



Maximum Width
Lateral Joints or Gaps

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AARON A. SCHMIDT
PE-10408
DATE 8/13/26
NORTH DAKOTA

Bismarck ENGINEERING

WORK ZONE TRAFFIC CONTROL

TYPICAL TEMPORARY PEDESTRIAN CURB RAMP DETAILS

WASHINGTON ST & BOWEN AVE

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
N.D.	HEU-1-981(147)	110	1

Station / RP	Sign No.	Assembly No.	Flat Sheet For Signs IV SF	Flat Sheet For Signs XI SF	Sign Support Length 1st LF	2nd LF	3rd LF	4th LF	Vert Clear-ance FT	Support Size	Max Post Len LF	Sleeve Length 1st LF	2nd LF	3rd LF	4th LF	Sleeve Size	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments
24+39 Rt	W11-2-30	56		9.3	11.2				7.0	2.5 x 2.5 10 ga	13.7						1	4	3 x 3 7 ga			1	Mount with W16-9P-24
26+77 Lt	W11-2-30																						Mount on Light Standard w/ R10-25-9 & W16-7P-21 (See Sec. 150)
26+77 Rt	W11-2-30																						x2. Mount on RRFB w/ R10-25-9 & W16-7P-21 (See Sec. 150)
26+77 Rt	R4-7-18			3.0					7.0														Mount on Signal Face South
26+77 Rt	R4-7-18			3.0																			Mount on Signal Face North
26+85 Rt	W11-2-30																						Mount on RRFB w/ R10-25-9 & W16-7P-21 (See Sec. 150)
28+76 Lt	W11-2-30	56		9.3					7.0														Mount on Light Standard. Mount with W16-9P-24.
Sub Total			0.0	24.6		**Total**	11.2										**Total**	4.0		0	0	1	
Grand Total			**0.0**	**24.6**		**Total**	**11.2**										**Total**	**4**	**0**	**0**	**0**	**1**	

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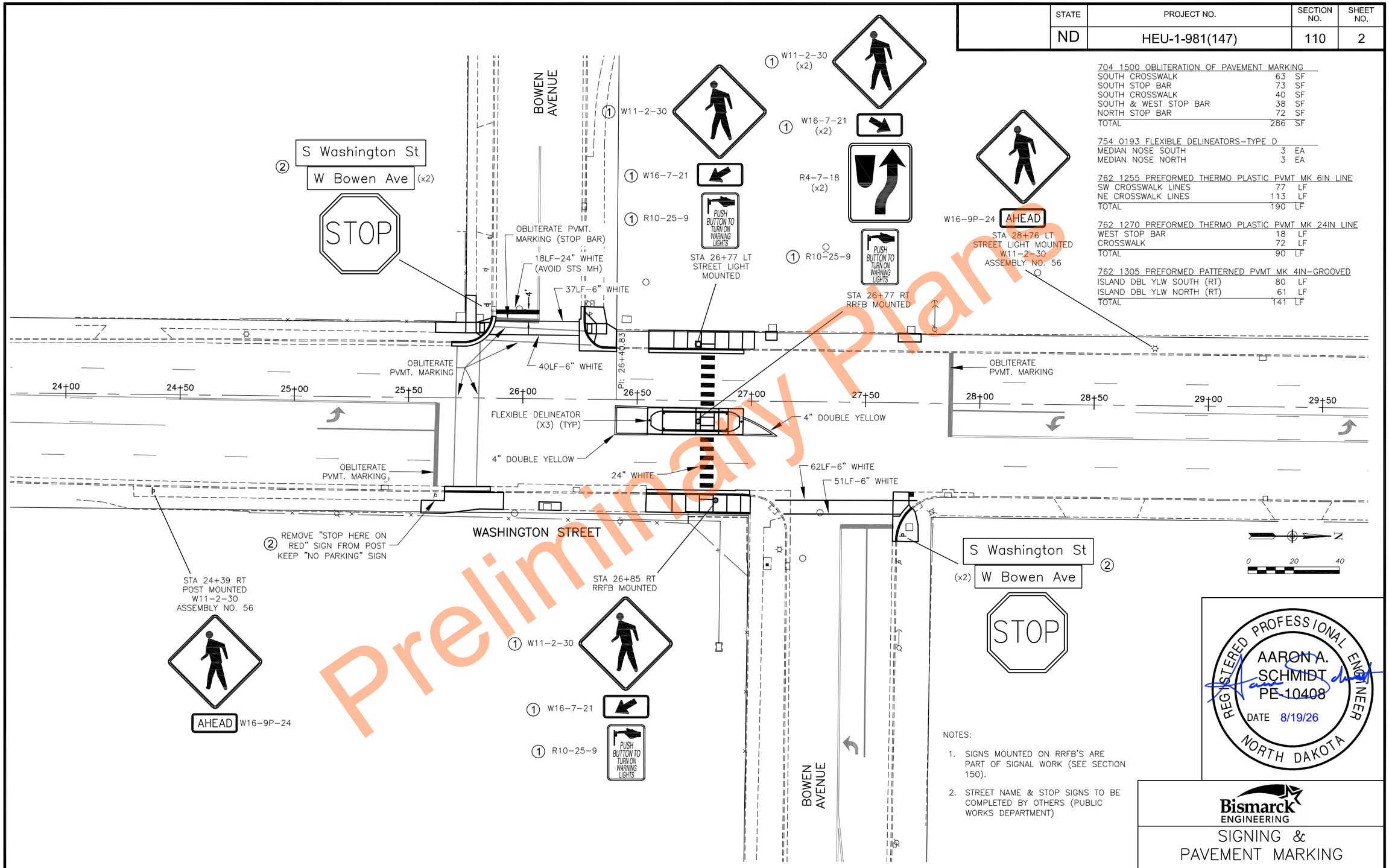
PE-10408
DATE 8/13/26
NORTH DAKOTA

Sign Summary
Perforated Tube

PCN: 24625

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEU-1-981(147)	110	2



704 1500 OBLITERATION OF PAVEMENT MARKING

SOUTH CROSSWALK	63	SF
SOUTH STOP BAR	73	SF
SOUTH CROSSWALK	40	SF
SOUTH & WEST STOP BAR	38	SF
NORTH STOP BAR	72	SF
TOTAL	286	SF

754 0193 FLEXIBLE DELINEATORS-TYPE D

MEDIAN NOSE SOUTH	3	EA
MEDIAN NOSE NORTH	3	EA

762 1255 PREFORMED THERMO PLASTIC PVMT MK 6IN LINE

SW CROSSWALK LINES	77	LF
NE CROSSWALK LINES	113	LF
TOTAL	190	LF

762 1270 PREFORMED THERMO PLASTIC PVMT MK 24IN LINE

WEST STOP BAR	18	LF
CROSSWALK	72	LF
TOTAL	90	LF

762 1305 PREFORMED PATTERNED PVMT MK 4IN-GROOVED

ISLAND DBL YLW SOUTH (RT)	80	LF
ISLAND DBL YLW NORTH (RT)	61	LF
TOTAL	141	LF

NOTES:

1. SIGNS MOUNTED ON RRFB'S ARE PART OF SIGNAL WORK (SEE SECTION 150).
2. STREET NAME & STOP SIGNS TO BE COMPLETED BY OTHERS (PUBLIC WORKS DEPARTMENT)

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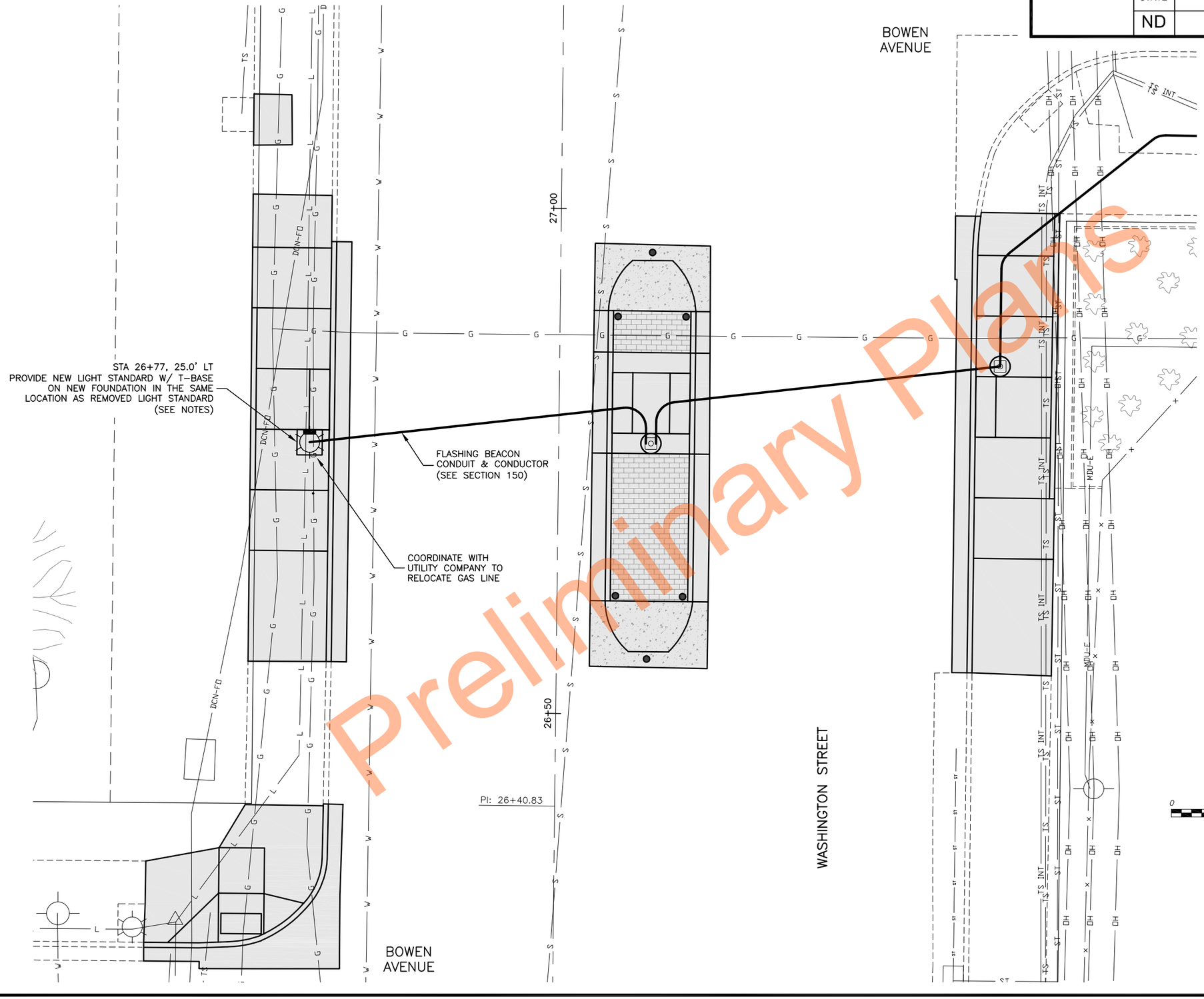
Bismarck ENGINEERING

SIGNING & PAVEMENT MARKING

WASHINGTON STREET & BOWEN AVENUE

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEU-1-981(147)	140	1



LEGEND

- EX. TRAFFIC SIGNAL FOUNDATION
- PROPOSED PEDESTRIAN STANDARD
- PROPOSED LIGHT STANDARD

NOTES:

1. STREETLIGHT IS FED FROM AN EXISTING FEEDPOINT LOCATED TO THE NORTH AT 209 S. WASHINGTON STREET. VERIFY PRIOR TO STARTING WORK.
2. KEEP EXISTING LIGHTING SYSTEM OPERATIONAL DURING THE WORK. PROVIDE TEMPORARY MEANS TO DO SO IF NECESSARY.
3. USE THE EXISTING LIGHTING CONDUCTORS TO MAKE CONNECTIONS IN THE LIGHT STANDARD.
4. RRFB & PEDESTRIAN PUSHBUTTON CONDUCTORS TO BE PULLED TO AND THROUGH LIGHT STANDARD AND RRFB TO BE MOUNTED ON LIGHT STANDARD. SEE SECTION 150.
5. SALVAGE EXISTING LIGHT STANDARD TO BISMARCK PUBLIC WORKS ELECTRICAL DEPARTMENT. SEE SECTION 6 NOTES.
6. INSTALL EXISTING LED LUMINAIRE FROM THE REMOVED LIGHT STANDARD TO THE NEW LIGHT STANDARD. INCLUDE THIS IN THE COST FOR THE NEW LIGHT STANDARD.

770 0020 CONCRETE FOUNDATION-HWY LIGHTING	
STA 26+77	1 EA
770 1076 LT STD 6FT MA 40FT MT HT	
STA 26+77	1 EA

CAUTION

THE LOCATIONS OF EXISTING UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. NOT ALL EXISTING UTILITIES ARE SHOWN. CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK AND SHALL BE RESPONSIBLE FOR PROTECTING ALL UTILITIES OR REPAIRING ANY DAMAGE WHICH OCCURS DUE TO THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL EXISTING UTILITIES.

N

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REGISTERED PROFESSIONAL ENGINEER
AARON A. SCHMIDT
PE-10408
DATE 8/19/26
NORTH DAKOTA

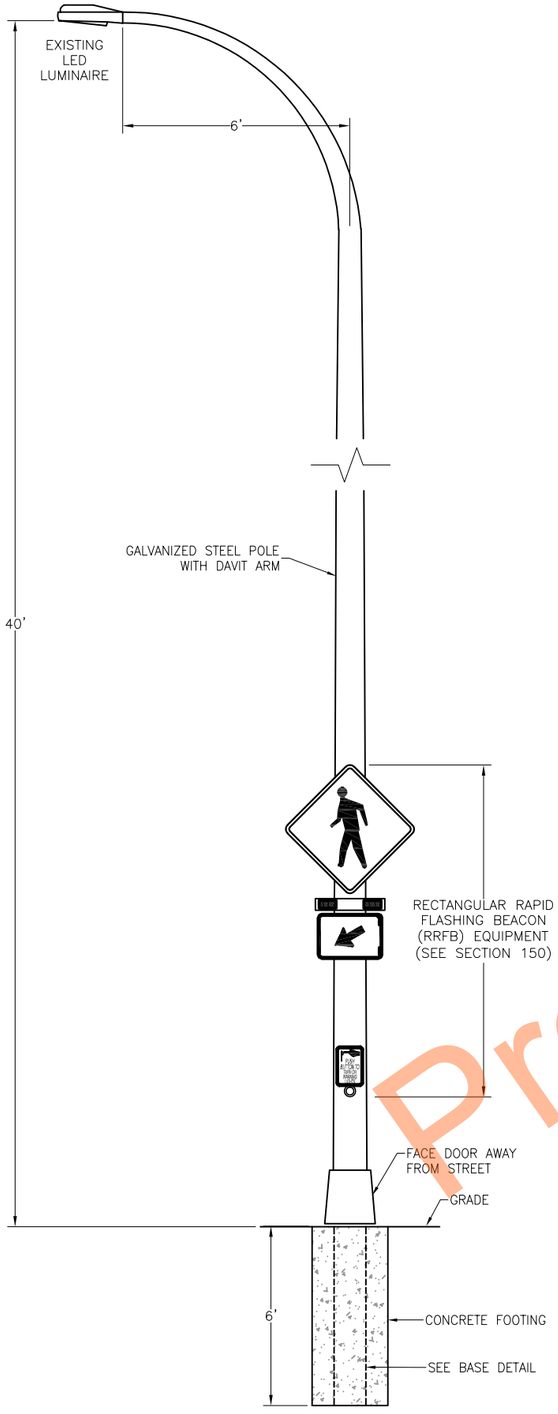
Bismarck ENGINEERING

LIGHTING

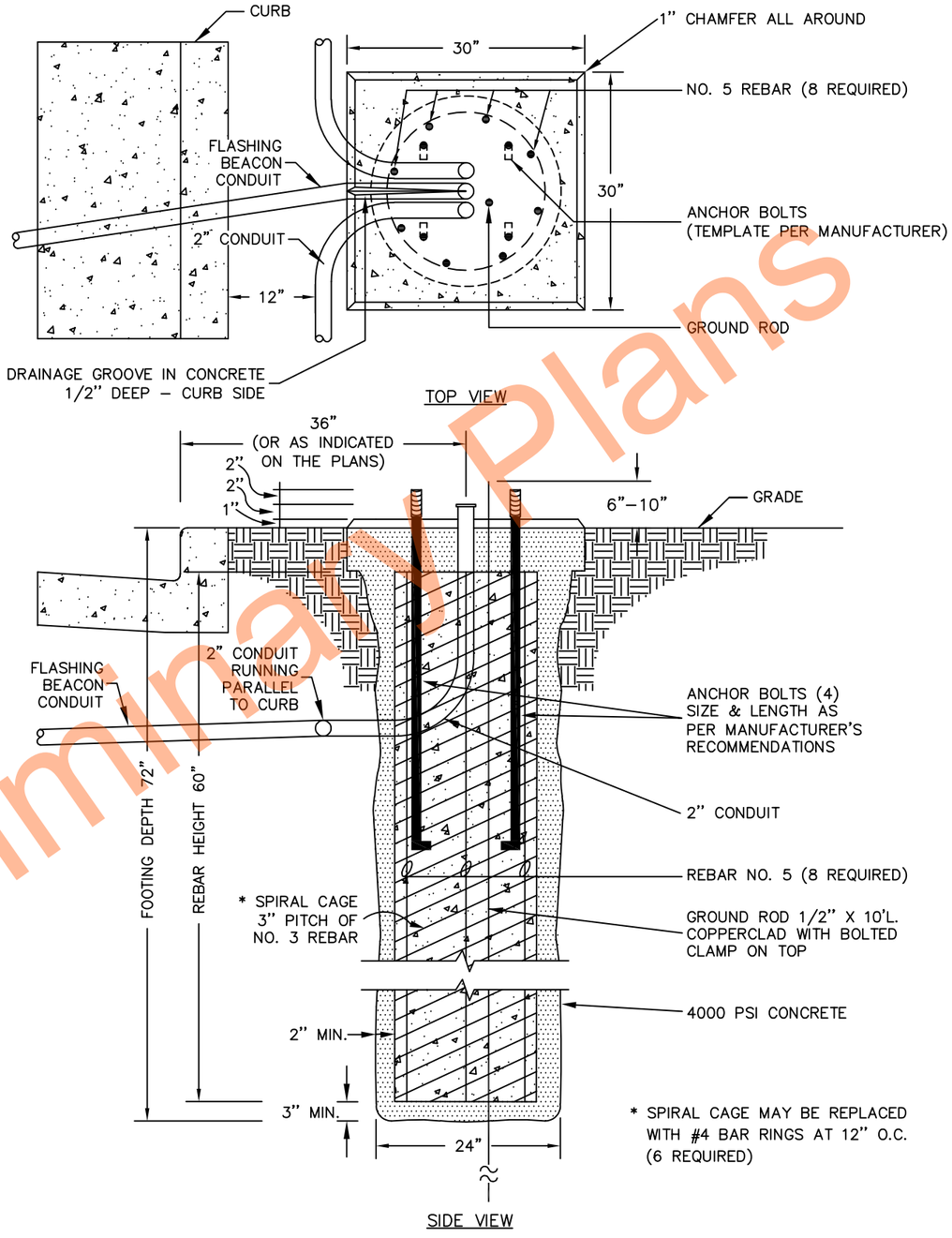
STREETLIGHT REVISIONS

WASHINGTON STREET
& BOWEN AVENUE

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEU-1-981(147)	140	2



LIGHT STANDARD
NOT TO SCALE



LIGHT STANDARD BASE
NOT TO SCALE

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DATE 8/13/26
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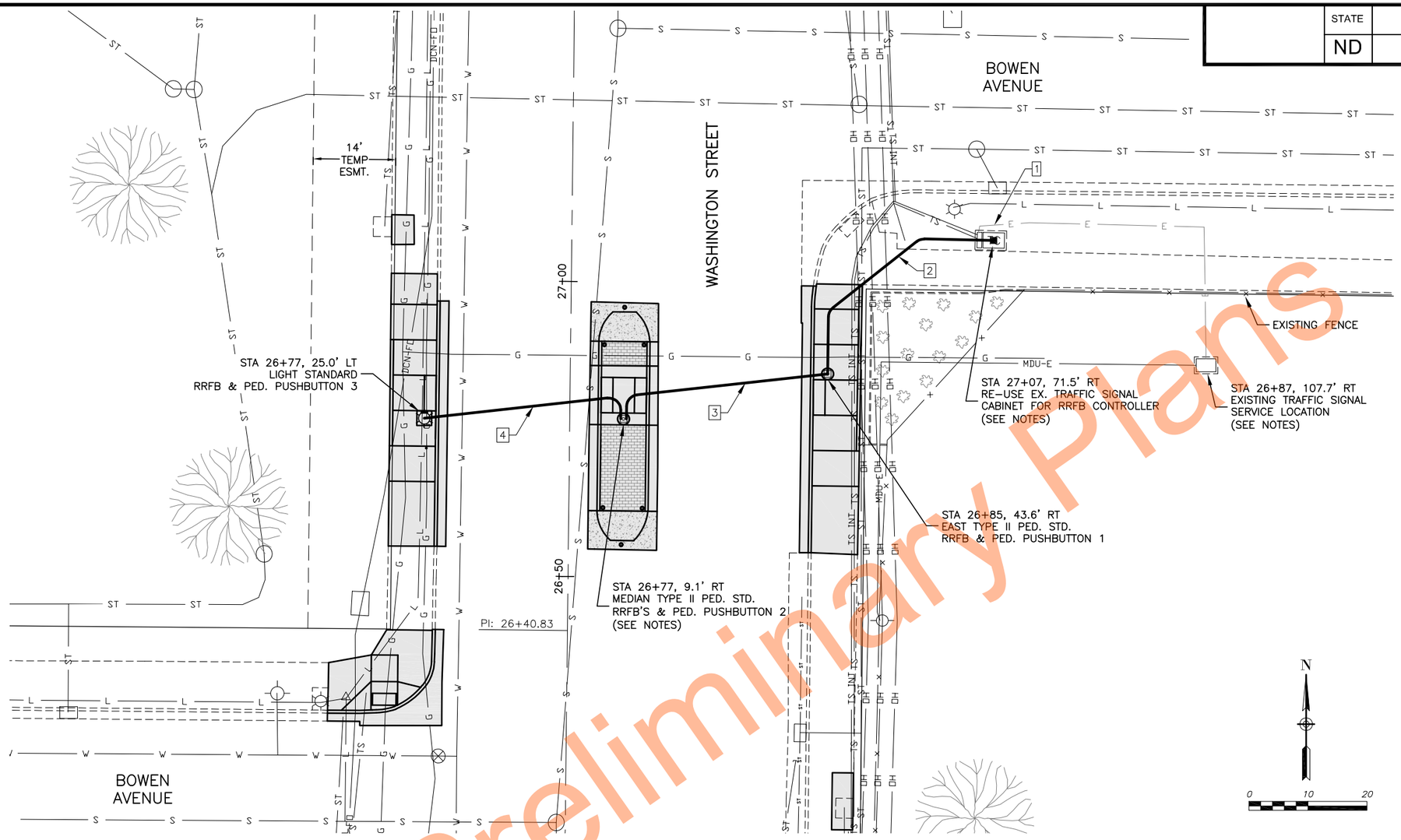
Bismarck ENGINEERING

LIGHTING

STREETLIGHT DETAILS

WASHINGTON STREET & BOWEN AVENUE

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEU-1-981(147)	150	1



LEGEND

- EX. TRAFFIC SIGNAL FOUNDATION
- PROPOSED PEDESTRIAN STANDARD
- EX. PULL BOX

NOTES:

1. MAINTAIN AND RE-USE EXISTING TRAFFIC SIGNAL SYSTEM SERVICE, METER, & DISCONNECT FOR NEW RRFB SYSTEM.
2. REMOVE EXISTING TRAFFIC SIGNAL CABINET INTERNAL COMPONENTS AND INSTALL RRFB SYSTEM CONTROLLER AND EQUIPMENT INSIDE SIGNAL CABINET IN PLACE. INTERCEPT AND UTILIZE EXISTING CONDUIT FROM OUTSIDE CABINET FOUNDATION FOR RRFB CONDUCTOR.
3. CABLE AND CONDUIT LENGTHS SHOWN ARE APPROXIMATE. ACTUAL LENGTHS MAY VARY.
4. CABLE & CONDUIT SCHEDULE INCLUDES INTERNAL CABLE LENGTHS FOR TYPE II PEDESTRIAN STANDARDS.
5. SET FLASHER DURATION TO 30 SECONDS.
6. PROVIDE DOUBLE ARROW ICON FOR PEDESTRIAN PUSHBUTTON 2.
7. PROVIDE ONE SPARE PEDESTRIAN PUSHBUTTON (DOUBLE ARROW ICON).
8. SPLICING RRFB WIRE IS NOT ALLOWED.

772 2160	FLASHING BEACON	
	WASHINGTON ST & BOWEN AVE	1 EA

CAUTION

THE LOCATIONS OF EXISTING UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY. NOT ALL EXISTING UTILITIES ARE SHOWN. CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK AND SHALL BE RESPONSIBLE FOR PROTECTING ALL UTILITIES OR REPAIRING ANY DAMAGE WHICH OCCURS DUE TO THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL EXISTING UTILITIES.

CABLE & CONDUIT SCHEDULE

#	RUN ITEM		RUN STATION, OFFSET	CONDUIT SIZE (IN)	CONDUIT LF	CONDUIT NOTES	CABLE LF in Cond	CABLE Origin	CABLE Destination	CABLE # of Cables	CABLE SIZE/TYPE	CABLE Total LF	CABLE TITLE
1	*Origin*	Ex. Service Location	26+87, 107.7' RT					Ex. Service Location	Feedpoint	CONDUIT & CONDUCTOR BY OTHERS AS NEEDED			Service
	Destination	Feedpoint	27+07, 71.5' RT										
N/A	*Origin*	Feedpoint	27+07, 71.5' RT				5	Feedpoint	RRFB Controller	2	UNDERGROUND CONDUCTOR NO6-TYPE RHW	38	Power
	Destination	RRFB Controller	27+07, 71.5' RT					Feedpoint	RRFB Controller	1	UNDERGROUND CONDUCTOR NO6-TYPE THW	19	Power
2	*Origin*	RRFB Controller	27+07, 71.5' RT	3	43		43	RRFB Controller	East Type II Pedestrian Std	3	MANUFACTURER RRFB CONDUCTOR CABLE	193	RRFB W, M, E
	Destination	East Type II Pedestrian Std	26+85, 43.6' RT					RRFB Controller	East Type II Pedestrian Std	3	14 AWG 5 CONDUCTOR CABLE	187	Ped. Pushbutton 1, 2, 3
								RRFB Controller	East Type II Pedestrian Std	1	UNDERGROUND CONDUCTOR NO14-TYPE THW	61	Tracer Wire
3	*Origin*	East Type II Pedestrian Std	26+85, 43.6' RT	3	38		38	East Type II Pedestrian Std	Median Type II Pedestrian Std	2	MANUFACTURER RRFB CONDUCTOR CABLE	138	RRFB M & W
	Destination	Median Type II Pedestrian Std	26+77, 9.1' RT					East Type II Pedestrian Std	Median Type II Pedestrian Std	2	14 AWG 5 CONDUCTOR CABLE	132	Ped. Pushbutton 2 & 3
								East Type II Pedestrian Std	Median Type II Pedestrian Std	1	UNDERGROUND CONDUCTOR NO14-TYPE THW	64	Tracer Wire
4	*Origin*	Median Type II Pedestrian Std	26+77, 9.1' RT	3	37		37	Median Type II Pedestrian Std	West Light Std	1	MANUFACTURER RRFB CONDUCTOR CABLE	73	RRFB W
	Destination	West Light Std	26+77, 25.0' LT					Median Type II Pedestrian Std	West Light Std	1	14 AWG 5 CONDUCTOR CABLE	67	Ped. Pushbutton 3
								Median Type II Pedestrian Std	West Light Std	1	UNDERGROUND CONDUCTOR NO14-TYPE THW	63	Tracer Wire

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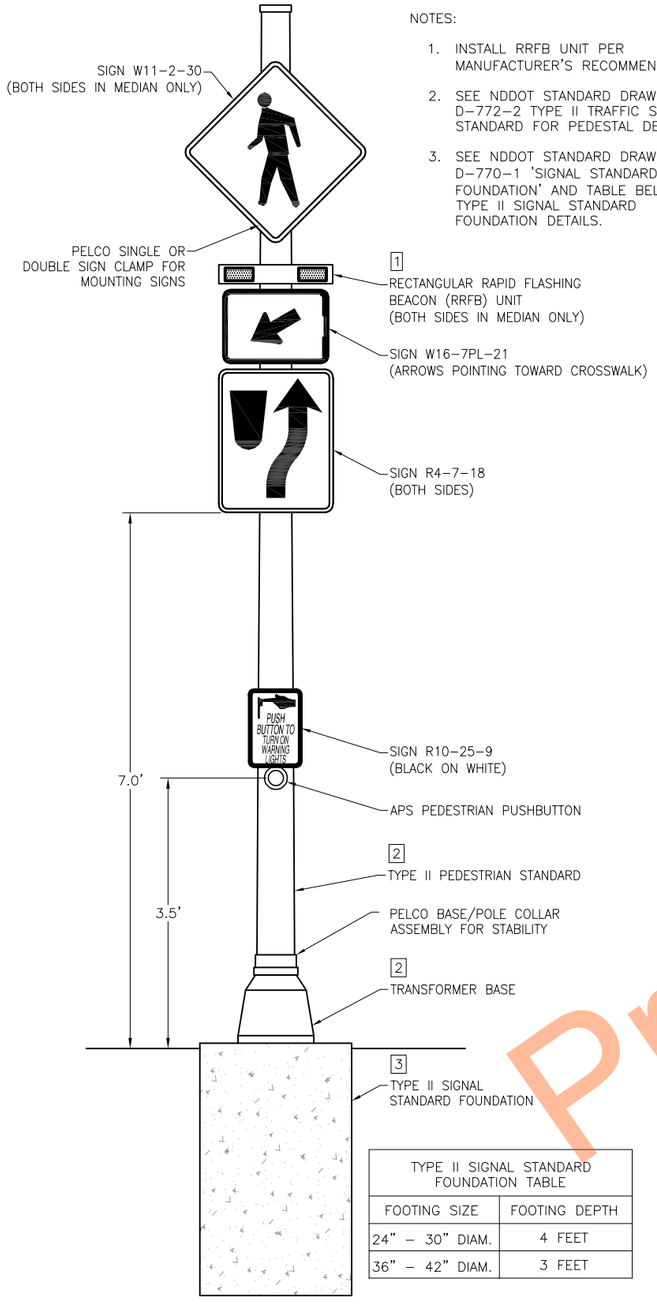
Bismarck ENGINEERING

SIGNALS

FLASHING BEACON LAYOUT

WASHINGTON STREET & BOWEN AVENUE

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEU-1-981(147)	150	2



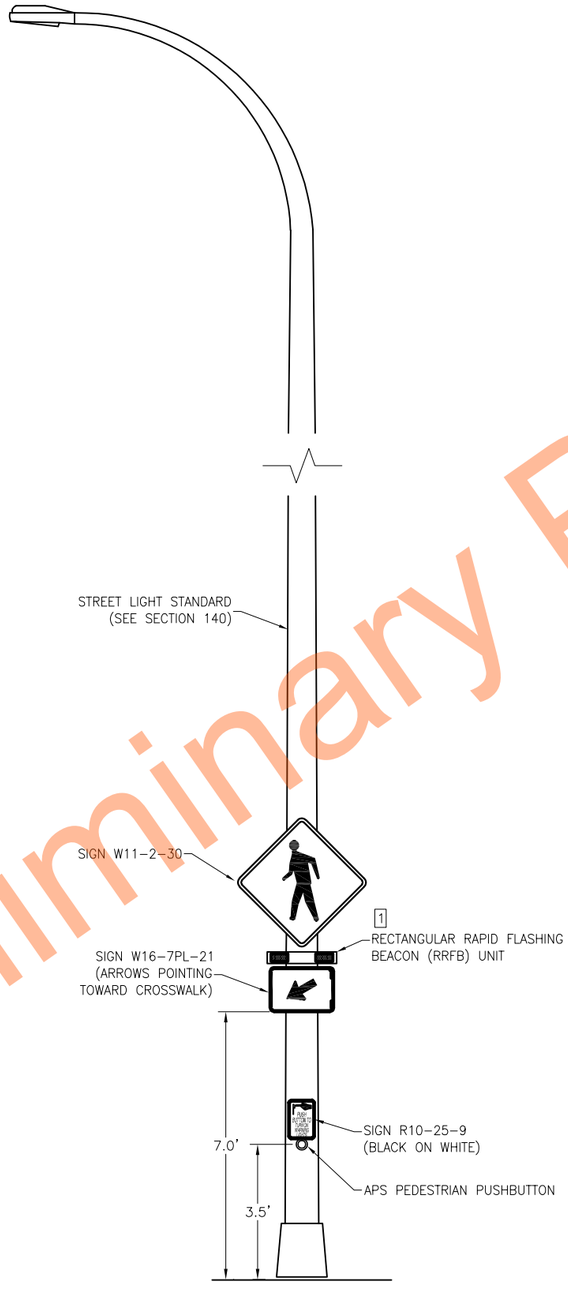
NOTES:

1. INSTALL RRFB UNIT PER MANUFACTURER'S RECOMMENDATIONS.
2. SEE NDDOT STANDARD DRAWING D-772-2 TYPE II TRAFFIC SIGNAL STANDARD FOR PEDESTAL DETAILS.
3. SEE NDDOT STANDARD DRAWING D-770-1 'SIGNAL STANDARD FOUNDATION' AND TABLE BELOW FOR TYPE II SIGNAL STANDARD FOUNDATION DETAILS.

TYPE II SIGNAL STANDARD FOUNDATION TABLE	
FOOTING SIZE	FOOTING DEPTH
24" – 30" DIAM.	4 FEET
36" – 42" DIAM.	3 FEET

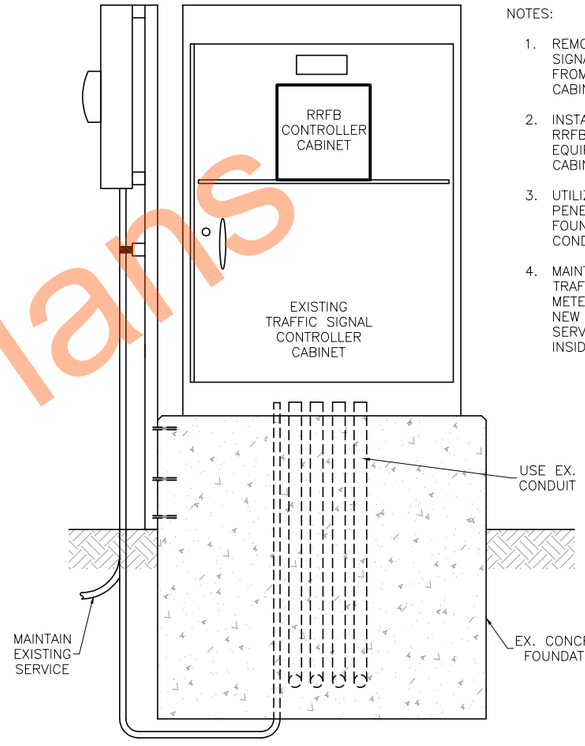
TYPICAL TYPE II PEDESTRIAN STANDARD MOUNTED RRFB ASSEMBLY

NOT TO SCALE



LIGHT STANDARD MOUNTED RRFB ASSEMBLY

NOT TO SCALE



NOTES:

1. REMOVE ALL EXISTING TRAFFIC SIGNAL RELATED COMPONENTS FROM INSIDE THE EXISTING CABINET.
2. INSTALL AND SECURELY MOUNT RRFB SYSTEM CONTROLLER AND EQUIPMENT INSIDE EXISTING CABINET.
3. UTILIZE EXISTING CONDUIT PENETRATION THROUGH CABINET FOUNDATION FOR RRFB CONDUCTORS.
4. MAINTAIN AND RE-USE EXISTING TRAFFIC SIGNAL SYSTEM SERVICE, METER, AND DISCONNECT FOR THE NEW RRFB SYSTEM. CONNECT SERVICE FORR RRFB SYSTEM INSIDE OF EXISTING CABINET.

RRFB FEEDPOINT (RE-USE TRAFFIC SIGNAL CABINET)

NOT TO SCALE

REGISTERED PROFESSIONAL ENGINEER
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Bismarck ENGINEERING

SIGNALS

RRFB DETAILS

WASHINGTON STREET
& BOWEN AVENUE

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEU-1-981(147)	150	3

Items shall be included in the corresponding price bid for "FLASHING BEACON"		
ITEM DESCRIPTION	UNIT	QUANTITY
CONCRETE FOUNDATION-TRAFFIC SIGNALS	EA	2
3-INCH CONDUIT	LF	118
UNDERGROUND CONDUCTOR NO6-TYPE RHW	LF	38
UNDERGROUND CONDUCTOR NO6-TYPE THW	LF	19
UNDERGROUND CONDUCTOR NO14-TYPE THW	LF	188
MANUFACTURER RRFB CONDUCTOR CABLE	LF	404
NO14 AWG 5 CONDUCTOR CABLE	LF	386
TYPE II SIGNAL STD	EA	2
FEED POINT-FLASHING BEACON	EA	1
FEED POINT-SERVICE	EA	1
RRFB LIGHT & SIGNS	EA	4
RRFB CONTROLLER	EA	1
APS PEDESTRIAN PUSHBUTTON & SIGN	EA	3
All quantities are approximate and shall be verified by the contractor.		
Items shown above are for informational purposes, contractor shall provide all labor and equipment necessary for the RRFB system to be fully operational as shown in the plans.		

NOTES:

1. MAJOR WORK ITEMS SHOWN ONLY, NOT MEANT TO BE A FULL LIST OF WORK ITEMS. OTHER ITEMS SUCH AS CONCRETE, SEEDING, MULCHING, AND SPRINKLER REPAIR NOT SHOWN.
2. ITEMS SHOWN ARE FOR INFORMATIONAL PURPOSES, PROVIDE ALL LABOR AND EQUIPMENT NECESSARY FOR THE FLASHING BEACON SYSTEM TO BE FULLY OPERATIONAL AS SHOWN ON THE PLANS.

REGISTERED PROFESSIONAL ENGINEER
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PE-10408
DATE 8/13/26
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Bismarck ENGINEERING

SIGNALS

QUANTITIES

WASHINGTON STREET
& BOWEN AVENUE