

STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	HEU-8-992(049)	24052	1	1

CITY OF WEST FARGO

HEU-8-992(049)

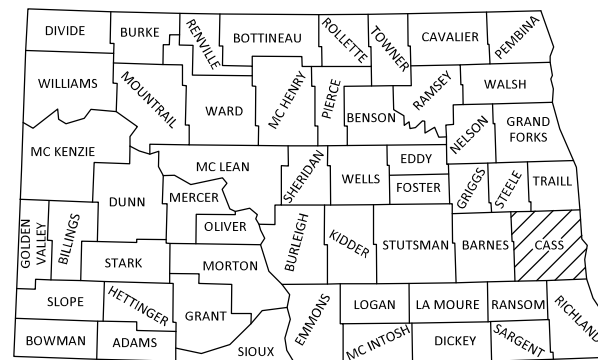
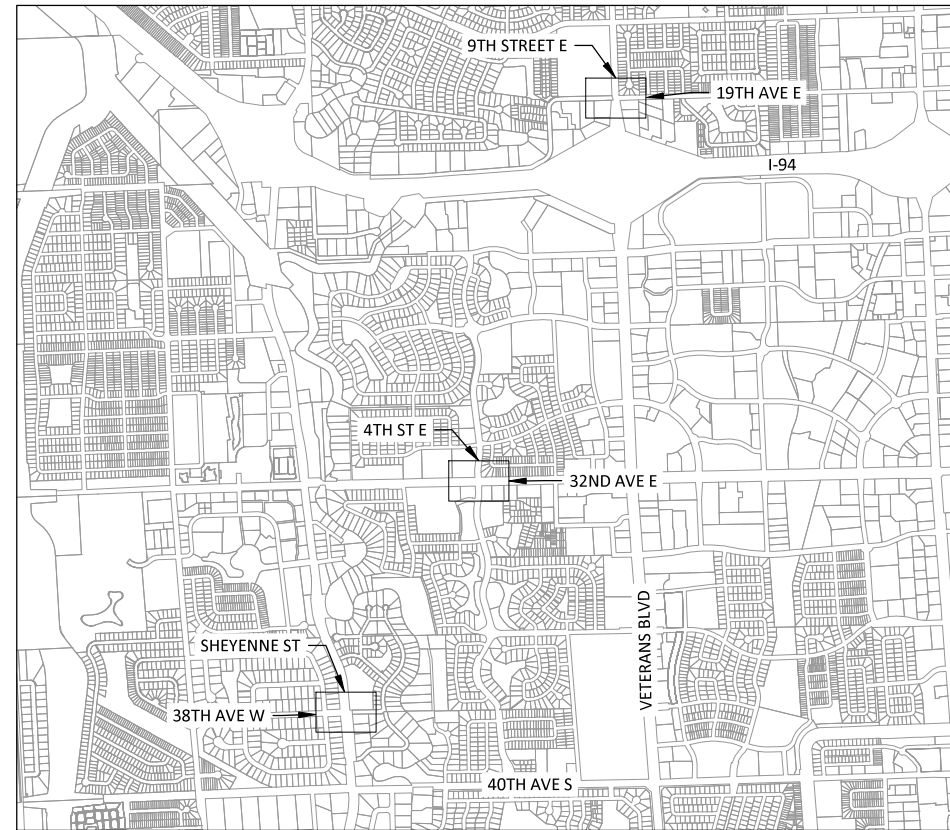
City Project Number 2284

CASS COUNTY

WEST FARGO, NORTH DAKOTA

9th St E & 19th Ave E, 32nd Ave E & 4th St E, Sheyenne St & 38th Ave W
Signal, Turn Lane, Lighting, and Pavement Marking Modifications

GOVERNING SPECIFICATIONS	Date Published and Adopted by the North Dakota Department of Transportation
Standard Specifications	7/1/2024
Supplemental Specifications	NONE



STATE COUNTY MAP

DESIGNER Max Olson
DESIGNER Jake Rick
DESIGNER Jordan Reihe
DESIGNER Ryan Genz
DESIGNER Matt Clevenger

Bolton & Menk. INC.



City of West Fargo

Jerry Wallace
Jerry Wallace

08/21/25
Date

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PLAN SECTIONS

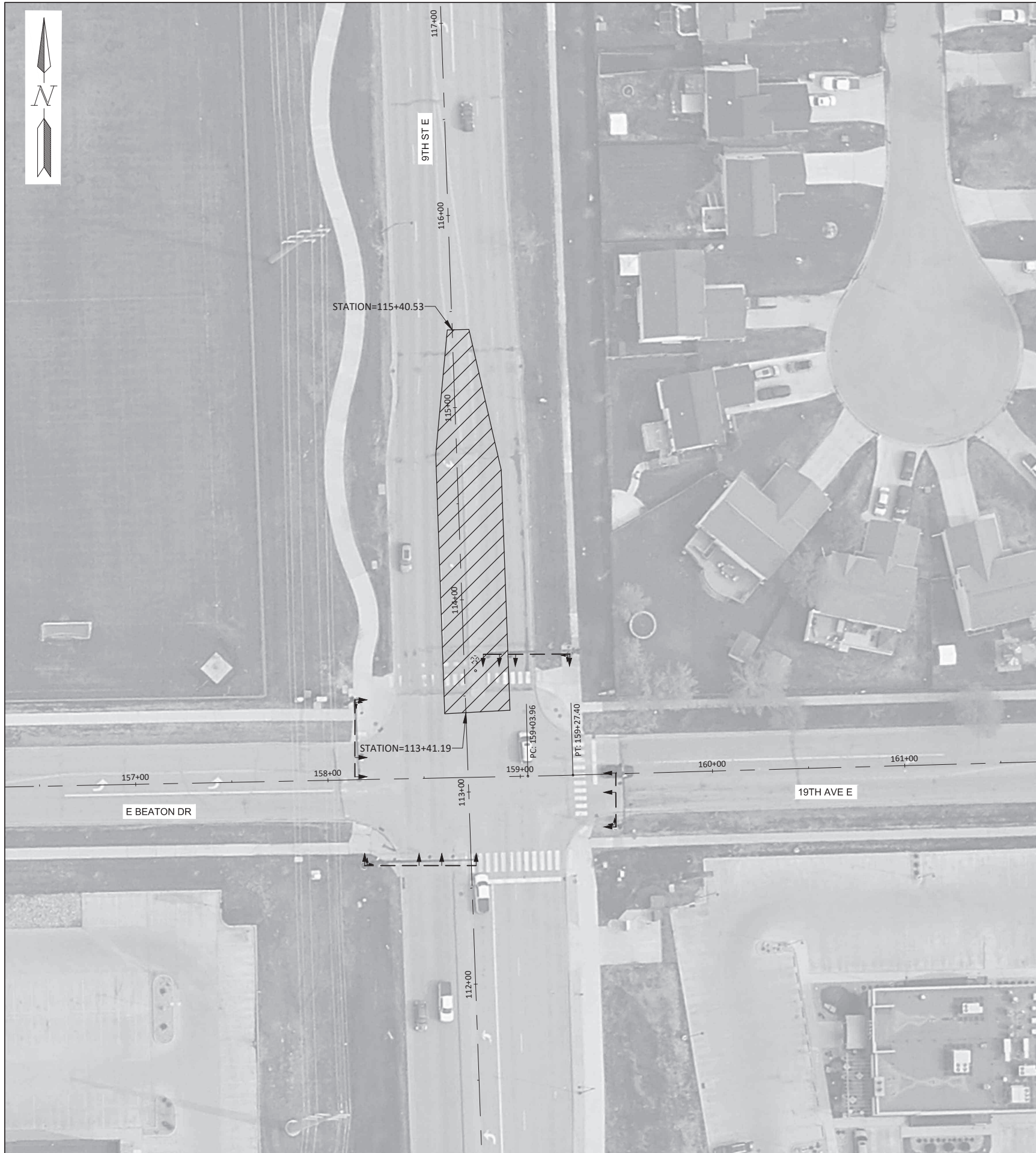
Section	Page(s)	Description
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D-101-30, 31,32,33	Symbols
D-704-7	Breakaway Systems For Construction Zone Signs - Perforated Tube
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D-704-9	Construction Sign Details - Terminal And Guide Signs
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D-772-1	Feed Point - Traffic Signals
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D-772-3	Traffic Signal Standards (Mast Arm Type)
D-772-4	Traffic Signal Head Mounting

SPECIAL PROVISIONS

Number	Description
SP 653(24)	Commercial Grade Hot Mix Asphalt



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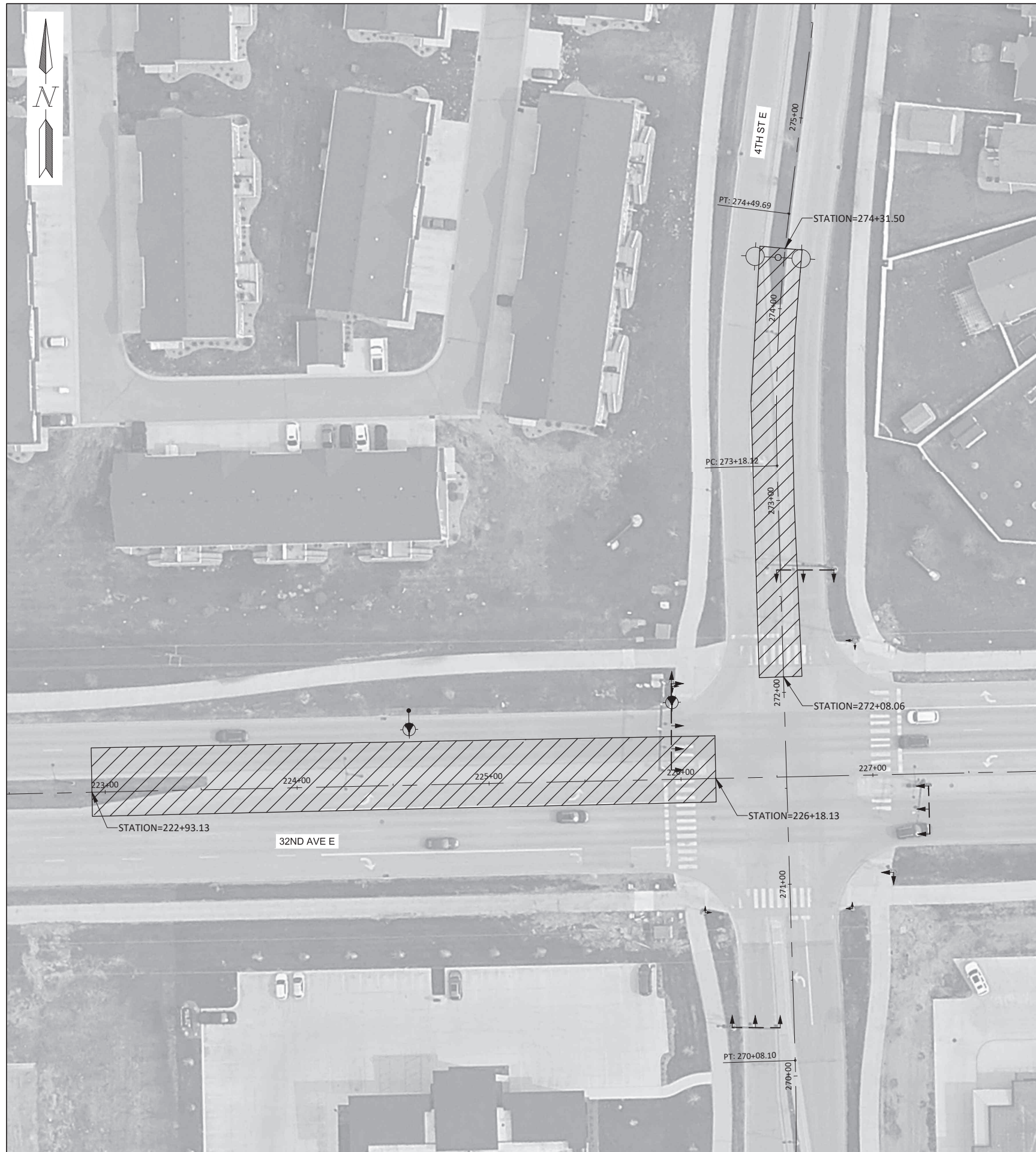
- Remove existing raised median on north leg of intersection, replace with aggregate base & SUPERPAVE FAA 43 pavement, restripe left turn lane and gore area.
- Change the five section stack signal heads to four section flashing yellow arrow heads for all directions.
- Install mast arm extension on southbound signal to center over reconstructed left turn lane.
- Existing cables will accommodate the new flashing yellow arrows with a splice to West Fargo flashing yellow arrow wiring specifications.
- Configure existing cabinet and controller to flashing yellow arrow movements.
- Adjust video camera detection zones.
- Remove traffic signal pull box and pedestrian push button that exist in the raised median on the north leg of the intersection.
- Adjust pedestrian crossing timing.
- Street lighting not affected by improvements.

Various West Fargo Intersections
Signal & Turn Lane Modifications

9th St E & 19th Ave E - Site 1

Scope of Work





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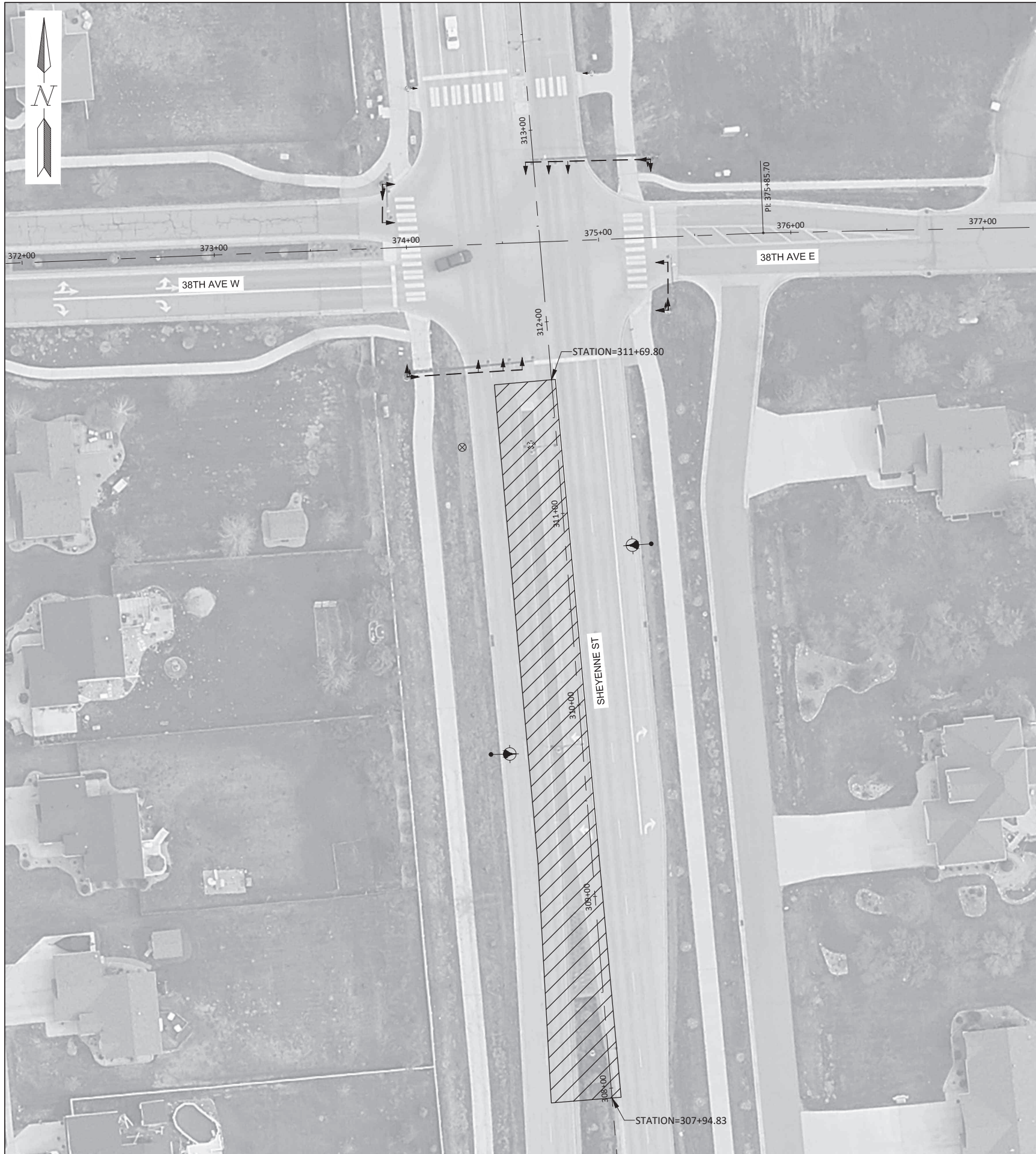
- Remove existing raised median on west and north legs of intersection, replace with aggregate base & concrete pavement, restripe left turn lane and gore area.
- No changes to roadway on south or east legs of the intersection.
- Remove traffic signal pull box and pedestrian push button that exists in the raised median on the west leg of the intersection.
- Adjust pedestrian crossing timing.
- Install mast arm extension on the eastbound signal to center existing four section head over reconstructed turn lane.
- Adjust video camera detection zones.
- Remove one street light in the west median and replace with new lighting on the north side of 32nd.
- Relocate one street light in the north median to the north within the same median.

Various West Fargo Intersections
Signal & Turn Lane Modifications

32nd Ave E & 4th St E - Site 2

Scope of Work





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- Remove existing raised median on south leg of intersection, replace with aggregate base & concrete pavement, restripe left turn lane and gore area.
- No changes to roadway on west, north, or east legs of the intersection.
- Remove traffic signal pull box that exists in the raised median on the south leg of the intersection.
- Remove two street lights in the south median and replace with new lighting on east and west sides of Sheyenne.
- Install four section flashing yellow arrow heads to northbound and southbound signals.
- Install mast arm extension on northbound signal to center over reconstructed left turn lane.
- Existing cables will accommodate the new flashing yellow arrows with a splice to West Fargo flashing yellow arrow wiring specifications.
- Configure existing cabinet and controller to flashing yellow arrow movements.
- Adjust video camera detection zones.

Various West Fargo Intersections
Signal & Turn Lane Modifications

Sheyenne St & 38th Ave - Site 3

Scope of Work



NOTES

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- 100-P01 NOISE ORDINANCE: A noise ordinance is in effect within the City of West Fargo between the hours of 10 pm and 6:30 am. No work, other than relief sawing of newly poured concrete, will be performed during these hours unless otherwise approved by the Engineer. Submit a request to the Engineer a minimum of 48 hours in advance.
- 100-P02 CONTRACTOR PARKING / STAGING AREA RESTRICTIONS: Do not park personal vehicles, construction equipment, storage of construction materials, or work areas on private property without written permission by the property owner.

Do not stage construction materials or store personal vehicles or construction equipment in the City's Right-of-Way outside of the construction work zone.
- 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-P01 PROTECTION OF UTILITIES: Assume all vertical and horizontal utility locations shown in the plans are approximate. Do not rely on plan locations as exact for bidding or construction purposes. Cover and protect all manholes, catch basins, water gate valve boxes, monument boxes, and appurtenances during removal and paving operations.
- 202-P01 REMOVAL OF CONCRETE PAVEMENT: Removal of concrete pavement consists of existing concrete median pavement, median nose pavement and associated steel reinforcing tie/dowel bars. Existing pavement thicknesses are averaged based on historical plan set as-built information and maintenance data. The existing concrete pavement is shown in the typical sections. Include all costs, materials, equipment, and labor in the contract unit price for "REMOVAL OF CONCRETE PAVEMENT".
- 704-P01 TEMPORARY TRAFFIC CONTROL: Conform with the NDDOT and MUTCD traffic control requirements. Ensure all sidewalk closures meet MUTCD requirements and extend to no less than 3" from either edge of the existing sidewalk. Submit any deviations from the traffic control plan to the Engineer in writing a minimum of 48 hours prior to the change.

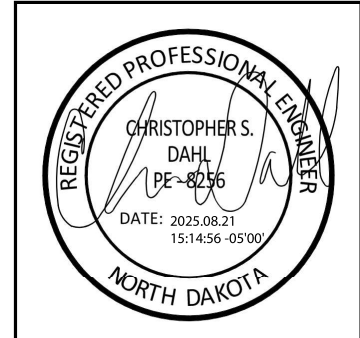
- 704-P02 TRAFFIC CONTROL PHASING: Implement project traffic control in three phases, with Site 2 divided into sub-phases 2A and 2B to maintain sidewalk access. Work can proceed simultaneously at all sites, and the traffic control devices required to do so were accounted for in Section 8. Refer to the Work Zone Traffic Control Summary for the required devices needed for the phases described below and the Traffic Control Devices layout for signing and device placement. Do not block vehicle or pedestrian traffic outside the marked construction areas at any time.

Phase 1: Set up and maintain single lane closures on the northbound and southbound lanes adjacent to the median on 9th Street East at the intersection of E Beaton Dr/ 19th Avenue. Keep the intersection open at all times.

Phase 2A: Set up and maintain single lane closures on the westbound and eastbound lanes adjacent to the median on 32nd Ave E at the intersection of 4th St E. Keep the intersection open at all times.

Phase 2B: Set up and maintain a left turn lane closure on the southbound lane adjacent to 4th St E at the intersection of 32nd Ave E. Keep the intersection open at all times.

Phase 3: Set up and maintain single lane closures on the northbound and southbound lanes adjacent to the median on Sheyenne St at the intersection of 38th Ave. Keep the intersection open at all times.
- 708-P01 INLET PROTECTION SPECIAL: Place inlet protection as per the details. Include all costs for furnishing, installing, maintaining (cleaning), replacing damaged devices, and removing devices in the bid price for "INLET PROTECTION-SPECIAL". Keep all installed devices in place until the paving and street sweeping operations are complete.
- 762-050 PAVEMENT MARKING: If the Engineer and Contractor agree, use plan quantity as the basis for payment for pavement marking items.



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- 770-P01 LIGHTING STANDARD: Provide Millerbernd Part # 8-SDN(B)3-8-300-2 & 001 black in color Decorative Stainless Lighting Standard with Decorative Scroll Brace. See Detail Drawings for Light standards. Include cost for labor, materials, and equipment for furnishing and installing lighting standards in the contract unit price for "LIGHTING SYSTEM (ROADWAY)".
- 770-P02 SIGNAL LIGHTING EXTENSION: Furnish and install 30' mounting height decorative lighting extension onto the NW signal standard, extension with match existing combo signal standard style and color of the intersection. Extensions will have the following:
- S210/DN/FS610 Luminaire Extension-Can mount 16-Sided 17.0 DOC, with (2) SKA610 Mounting Plates (90 degrees & 270 degrees from HH)
 - (2) Holophane Annapolis Series AW6-CA/BKH mounting arm.
 - DN8 Decorative luminaire arm with scroll brace.
- Include cost for labor, materials, equipment for furnishing and installing lighting standards, and removing and reinstalling existing Pan Tilt Zoom (PTZ) camera will be in the contract unit price for "LIGHTING SYSTEM (ROADWAY)".
- 770-P03 LIGHTING LUMINAIRE: See Section 20 of the City of West Fargo Standards, Specifications, and Detail Drawings for Light standards.
- "LED LUMINAIRE - TYPE A" – Use Holophane ESP-150-4J-B-4 or approved equal.
 - "LED LUMINAIRE - TYPE B" – Use Holophane ARUE-100-4K-AS-G3-B-S or approved equal.
- Include cost for labor, materials, and equipment for furnishing and installing lighting standards in the contract unit price for "LIGHTING SYSTEM (ROADWAY)".
- 770-P04 CONDUIT: Seal all conduits with duct seal at the feed points and at the street lighting foundations. Proposed Conduit will be bored. Install one spare 1.5" conduit sweep in each new street light foundation. Cap spare conduits with expansion type plug and label as to which direction they face. Include all costs, labor, materials and equipment necessary for furnishing and installing this item in the price bid for "LIGHTING SYSTEM (ROADWAY)".
- 772-P01 REMOVE AND SALVAGED SIGNAL AND LIGHTING EQUIPMENT: Any removed and salvaged equipment shown on the plans for Sites 1-3, will be delivered to the City of West Fargo Sign Shop located at 327 34th Ave E, West Fargo, ND 58078. Coordinate delivery with the City of West Fargo Sign Shop Foreman, Dan Birnbaum or Scott Tiffany-701-515-5400 a minimum of 24 hours in advance.
- 772-P02 REVISE TRAFFIC SIGNAL SYSTEM SITES 1 & 3: Furnish and Install 4 (SITE 1) and 2 (SITE 3) Reno Model LS-200-SS or EDI equal Solid State Load Switches, 2 (SITE 1) and 1 (SITE 3) new Reno TR-200 or EDI equal Flash Transfer Relay, program existing controllers, and install the correct jumpers in the existing MMU to modify both sites for Flashing Yellow Arrow according to plans. Include the cost for labor, materials and equipment necessary in the contract unit price for "TRAFFIC SIGNAL SYSTEM-SITE X"

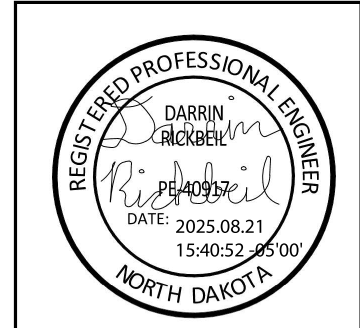
- 772-P03 TRAFFIC SIGNAL STANDARD MODIFICATION SITE 2: Furnish and install new "T-Base" assembly onto existing foundation, existing T-Base is a Millerbernd part number 390D64-17. Furnish and install new upright post that will accommodate a double arm signal adding an additional new 10' mast arm, existing post is a Millerbernd part number 320B514 with a 22' mast arm. Reinstall existing 4 section head to new 10' Mast Arm with new mounting bracket. New signal structures will be manufactured by Millerbernd Manufacturing. Reinstall existing post mounted 4 section head onto new 10' mast arm with new mounting hardware, and cable will be furnished to mount at the end of the mast arm. Reinstall existing 22' mast arm, and existing lighting extension onto new post, existing lighting extension is a Millerbernd part number S210/DN-2/FS610 Twin Luminaire Extension-Cam MT 16-Sided 11.54. All labor, materials, cable terminations, and labeling for a fully operational signal and lighting system will be included in the price for "TRAFFIC SIGNAL SYSTEM-SITE 2"

- 772-P04 LABEL ALL FIELD CABLES: Provide labeling materials as approved by the City. Install the labels so they are readable without moving the cables. Label all field cables with the cable designations:

TYPE	LABEL	LABEL LOCATION
Communication Cable	Comm./address of the other end	Within 12" of conduit
Pedestrian Pushbutton	Phase/Location (i.e. NW, SW, etc.)	Within 6" of terminals
Video Camera Cables	Detection Zone (i.e. D2-1, D2-2, etc.)	Within 6" of terminals
Control Cable	Cable number & Location (i.e. NW, SW, etc.)	Within 12" of conduit
Opticom Cable	Preempt #/location (i.e. NW, SW, etc.)	Within 6" of terminals

Include the cost for labor, materials, and equipment necessary for labeling field cables in the contract unit price for "TRAFFIC SIGNAL SYSTEM-SITE X"

- 772-P05 WARRANTY: All materials, work, and equipment to be guaranteed until the date of final acceptance. Any warranty issues must be repaired or corrected within 72 hours, or within 2 hours if public safety is affected. If these issues are not resolved within the specified timeframes, the City of West Fargo reserves the right to engage an alternative contractor, with associated costs charged to the original contractor. Additionally, an extended warranty of four years—totaling five years from the date of acceptance—to be provided by the controller equipment supplier and manufacturer for the Econolite Cobalt controller. All manufacturer warranties and guarantees related to materials, parts, workmanship, or performance must be secured and included with the work drawing submittal.

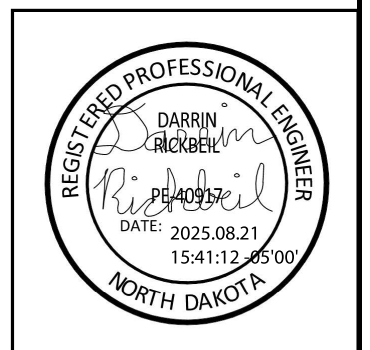


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772-P06 VEHICULAR TRAFFIC SIGNAL HEADS: Use 12" vehicular signal heads with aluminum housings for each section. All traffic signal back plates will be louvered aluminum and will require 1" DG3 yellow tape outlining. Equip all sections with General Electric GTx LED illuminating elements conforming to the Institute of Transportation Engineers Equipment and Materials Standards and Specifications. Include the cost for labor, materials and equipment necessary for furnishing and installing the vehicular traffic signal heads in the contract unit price for "TRAFFIC SIGNAL SYSTEM-SITE X"

772-P07 TRAFFIC SIGNAL HEAD MOUNTINGS: Furnish all hardware to mount the vehicle and pedestrian signal heads to the side of the poles. Do not mount heads directly to the pole or on the face of the pole directly adjacent to the street. No banding permitted. Mount all to manufactures specifications. Include the cost for labor materials, and equipment necessary for installing traffic signal heads in the contract unit price for "TRAFFIC SIGNAL SYSTEM-SITE X".

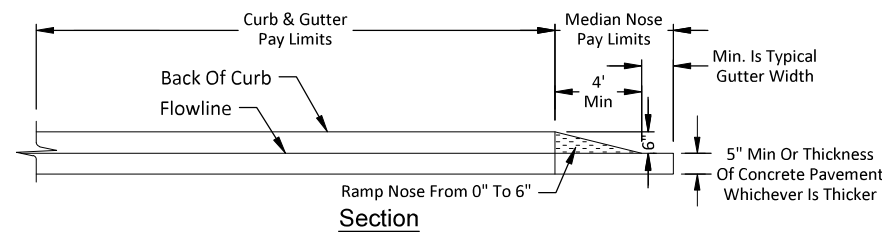
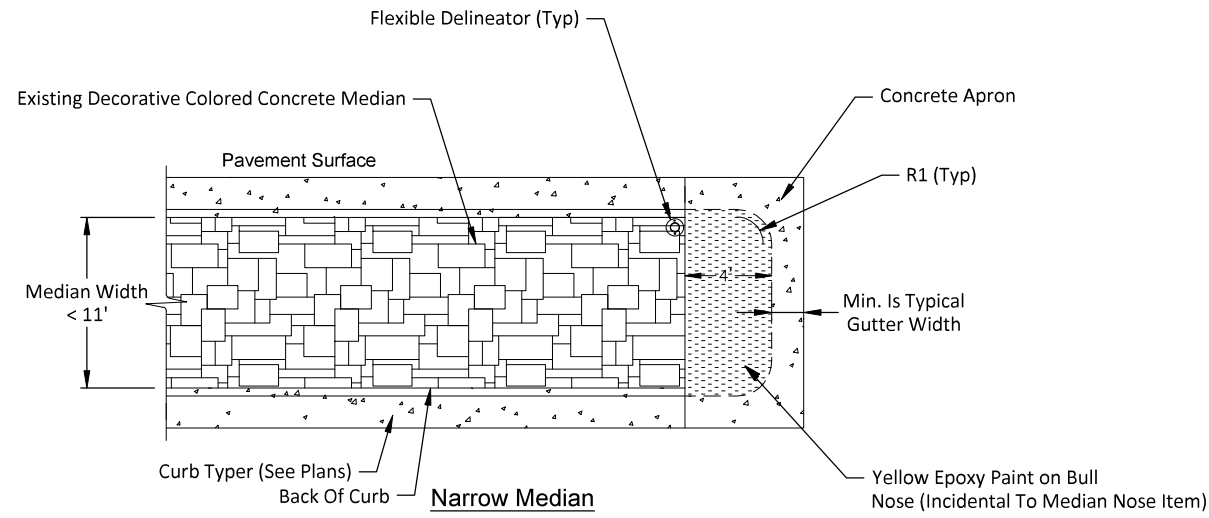


Estimated Quantities

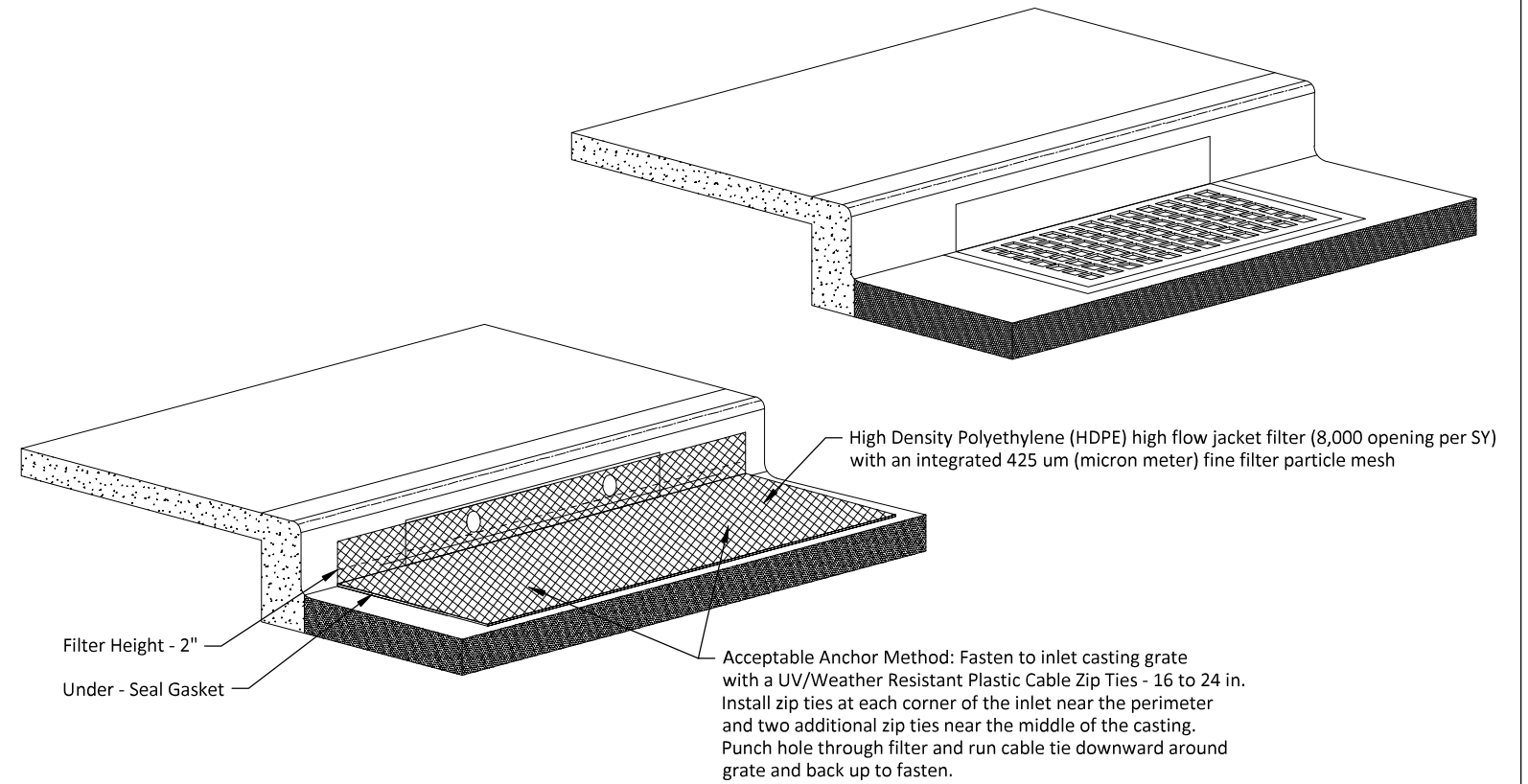
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SPEC	CODE	ITEM DESCRIPTION	UNIT	HEU-8-992(049)	TOTAL
103	0100	CONTRACT BOND	L SUM	1	1
202	0114	REMOVAL OF CONCRETE PAVEMENT	SY	587	587
202	0130	REMOVAL OF CURB & GUTTER	LF	1558	1558
203	0113	COMMON EXCAVATION-WASTE	CY	432	432
302	0121	AGGREGATE BASE COURSE CL 5	CY	262	262
430	0500	COMMERCIAL GRADE HOT MIX ASPHALT	TON	84	84
550	0300	8IN NON-REINF CONCRETE PVMT CL AE-DOWELED	SY	172	172
550	0310	10IN NON REINF CONCRETE PVMT CL AE-DOWELED	SY	644	644
702	0100	MOBILIZATION	L SUM	1	1
704	1000	TRAFFIC CONTROL SIGNS	UNIT	934	934
704	1052	TYPE III BARRICADE	EA	12	12
704	1054	SIDEWALK BARRICADE	EA	4	4
704	1060	DELINEATOR DRUMS	EA	145	145
704	1500	OBLITERATION OF PAVEMENT MARKING	SF	333	333
708	1540	INLET PROTECTION-SPECIAL	EA	10	10
709	0151	GEOSYNTHETIC MATERIAL TYPE R1	SY	1000	1000
750	0210	CONCRETE MEDIAN NOSE PAVING	SY	42	42
754	0110	FLAT SHEET FOR SIGNS-TYPE XI REFL SHEETING	SF	75	75
754	0149	RESET DELINEATOR	EA	4	4
754	0592	RESET SIGN PANEL	EA	3	3
754	0593	RESET SIGN SUPPORT	EA	2	2
762	0110	EPOXY PVMT MK 4IN LINE-GROOVED	LF	2044	2044
762	0132	EPOXY PVMT MK 8IN LINE-GROOVED	LF	1816	1816
762	0135	EPOXY PVMT MK 24IN LINE-GROOVED	LF	132	132
762	0136	EPOXY PVMT MK MESSAGE-GROOVED	SF	112	112
770	9400	LIGHTING SYSTEM (ROADWAY)	L SUM	1	1
772	9811	TRAFFIC SIGNAL SYSTEM - SITE 1	EA	1	1
772	9812	TRAFFIC SIGNAL SYSTEM - SITE 2	EA	1	1
772	9813	TRAFFIC SIGNAL SYSTEM - SITE 3	EA	1	1

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MEDIAN NOSE



Notes

1. Inlet protection shall be maintained or replaced at the direction of the Engineer.
2. Remove material that falls into the inlet during maintenance or removal of the device.

Installation notes:

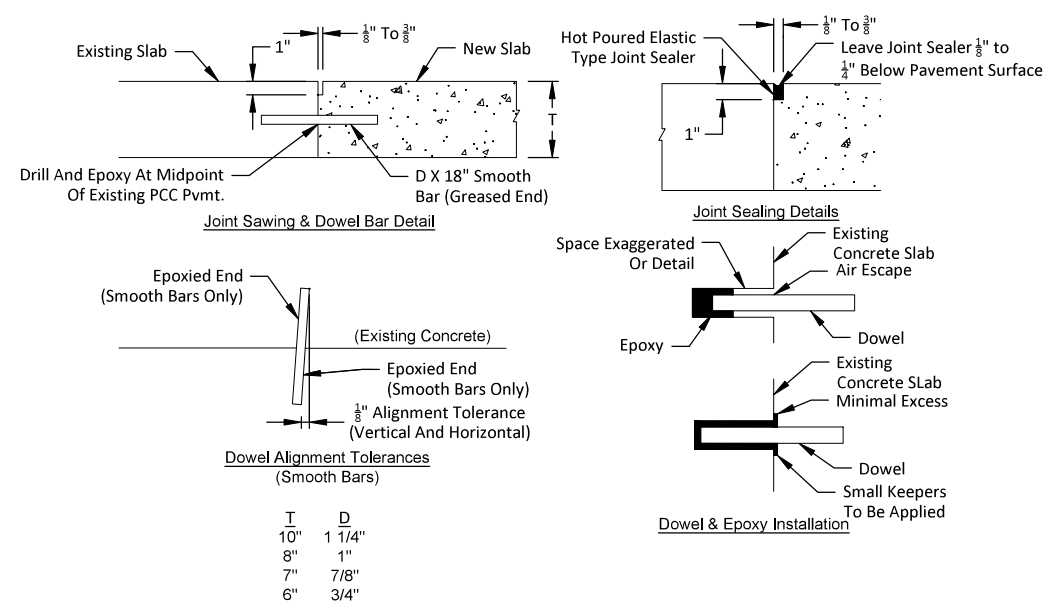
1. Place device tightly against drain opening and cover entire grate. the device should extend at least 2 inches past grate toward street.
2. Overlap the segments at longer openings.
3. Anchor the device so that water cannot flow behind it.

Inlet Protection Device

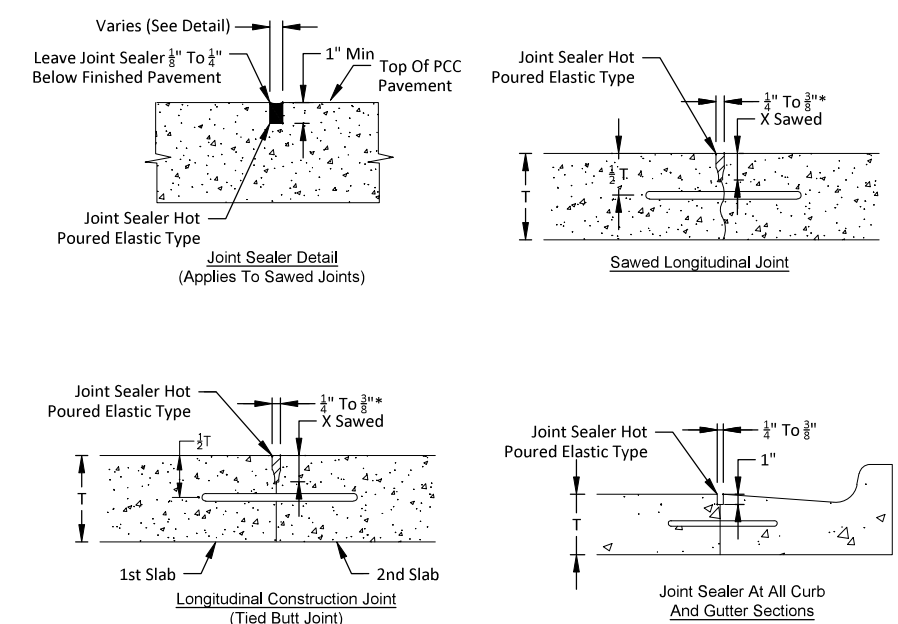
Various West Fargo Intersections
Signal & Turn Lane Modifications

Inlet Protection - Special
Paving & Inlet Protection Details





DOWELED CONSTRUCTION JOINT
NO SCALE PAVING 01.14.22



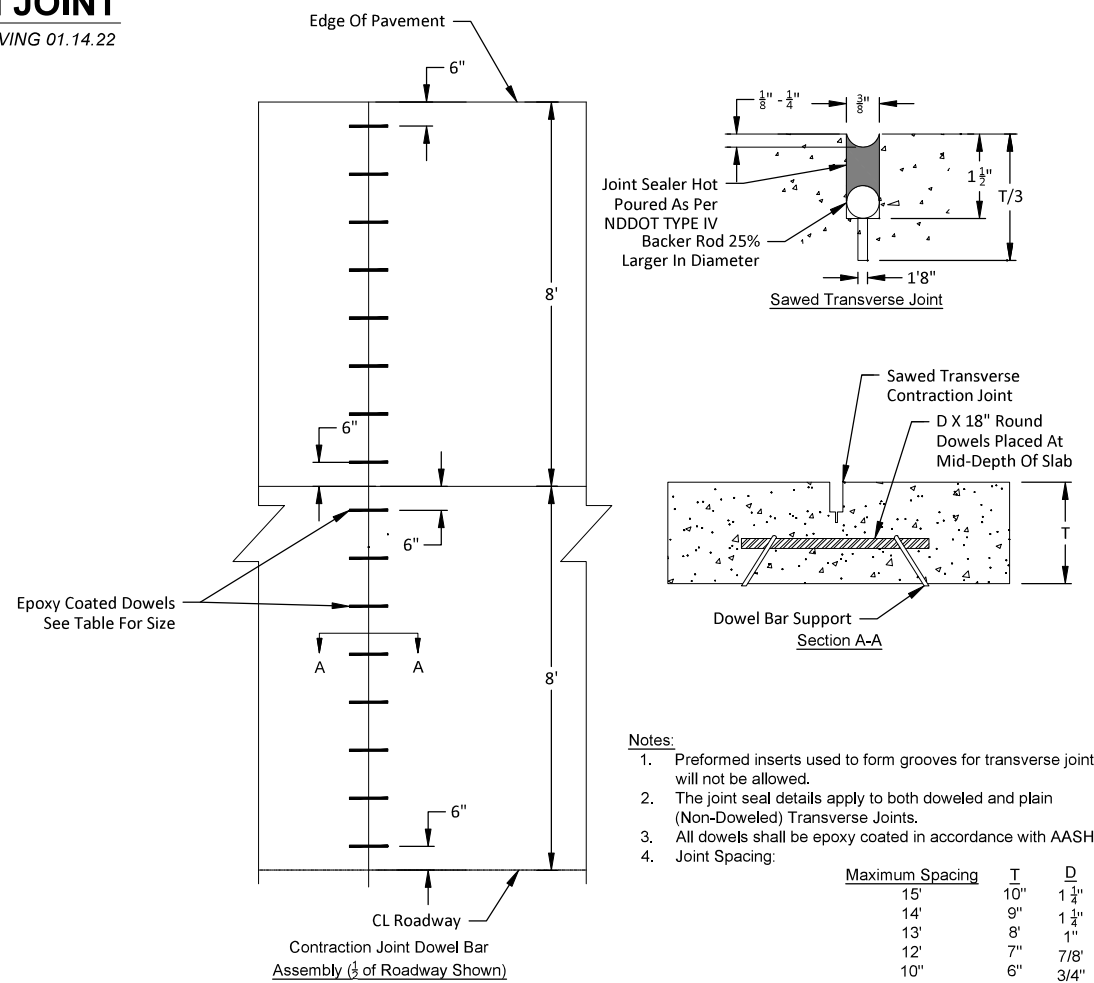
X = One-Third thickness of PCC pavement plus 1/4"

* = Width requirement for top 1" only; bottom portion of sawcut may be narrower.

T/4 = One-Fourth thickness of PCC pavement.

- Notes:**
- The hot poured elastic type joint sealer shall be in accordance with section 826.02A.2 of the standard specification.
 - The tied longitudinal joints and hot poured seal shall be included in the price bid for the pavement.
 - Tiebars shall not be placed within 15 (fifteen) inches of a transverse joint.
 - Where tiebars are installed bent and later straightened grade 40 steel shall be used
 - Tiebar spacings can be increased up to 10% to facilitate construction.
 - 48" maximum bar spacing.
 - Joint spacing:
- | Maximum Spacing | T |
|-----------------|-----|
| 15' | 10" |
| 14' | 9" |
| 13' | 8" |
| 12' | 7" |
| 10' | 6" |

LONGITUDINAL JOINT
NO SCALE



- Notes:**
- Preformed inserts used to form grooves for transverse joints will not be allowed.
 - The joint seal details apply to both doweled and plain (Non-Doweled) Transverse Joints.
 - All dowels shall be epoxy coated in accordance with AASHTO M-254 Type B.
 - Joint Spacing:
- | Maximum Spacing | T | D |
|-----------------|-----|--------|
| 15' | 10" | 1 1/4" |
| 14' | 9" | 1 1/4" |
| 13' | 8" | 1" |
| 12' | 7" | 7/8" |
| 10" | 6" | 3/4" |

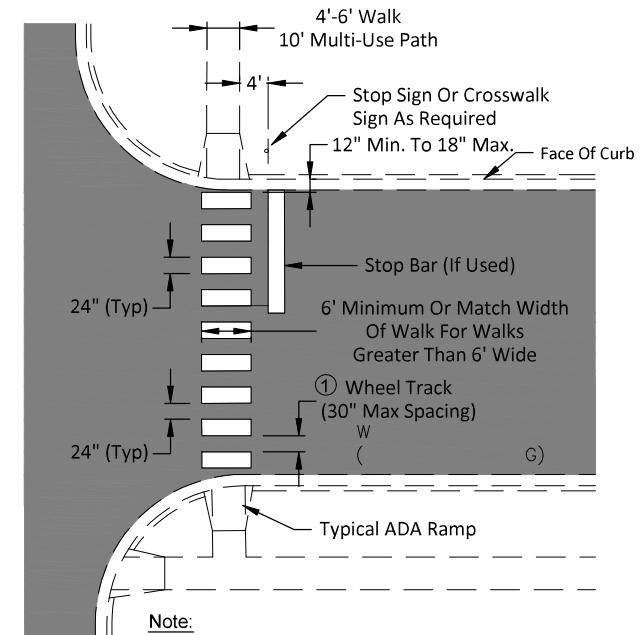
TRANSVERSE CONTRACTION JOINT
NO SCALE

Various West Fargo Intersections
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Jointing Details



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Note:
 ① Space crosswalk openings such that they correspond with existing wheel tracks if possible

CROSSWALK STRIPING - CONTINENTAL

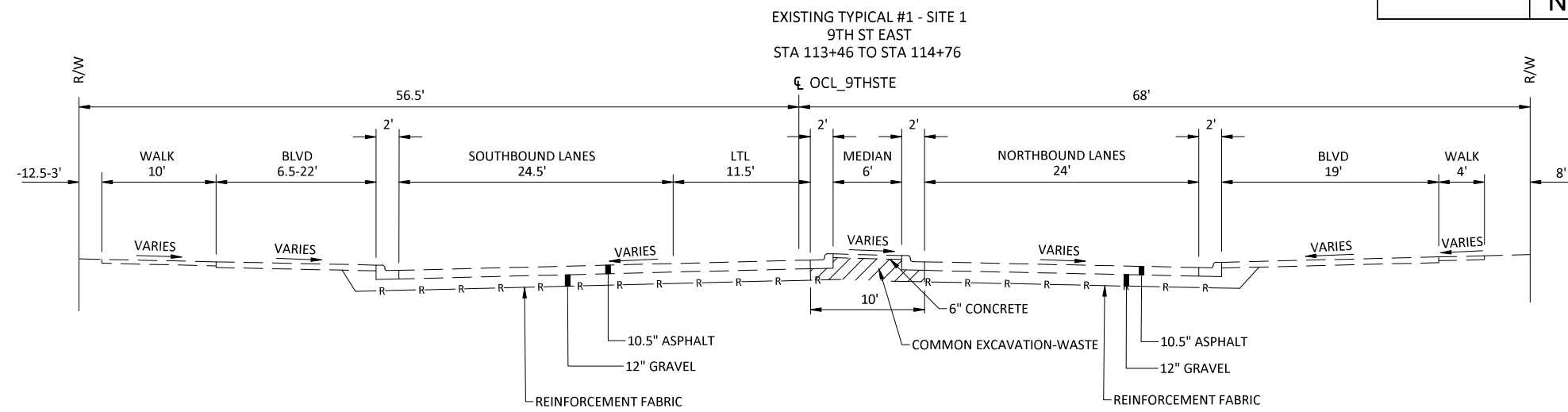
NO SCALE

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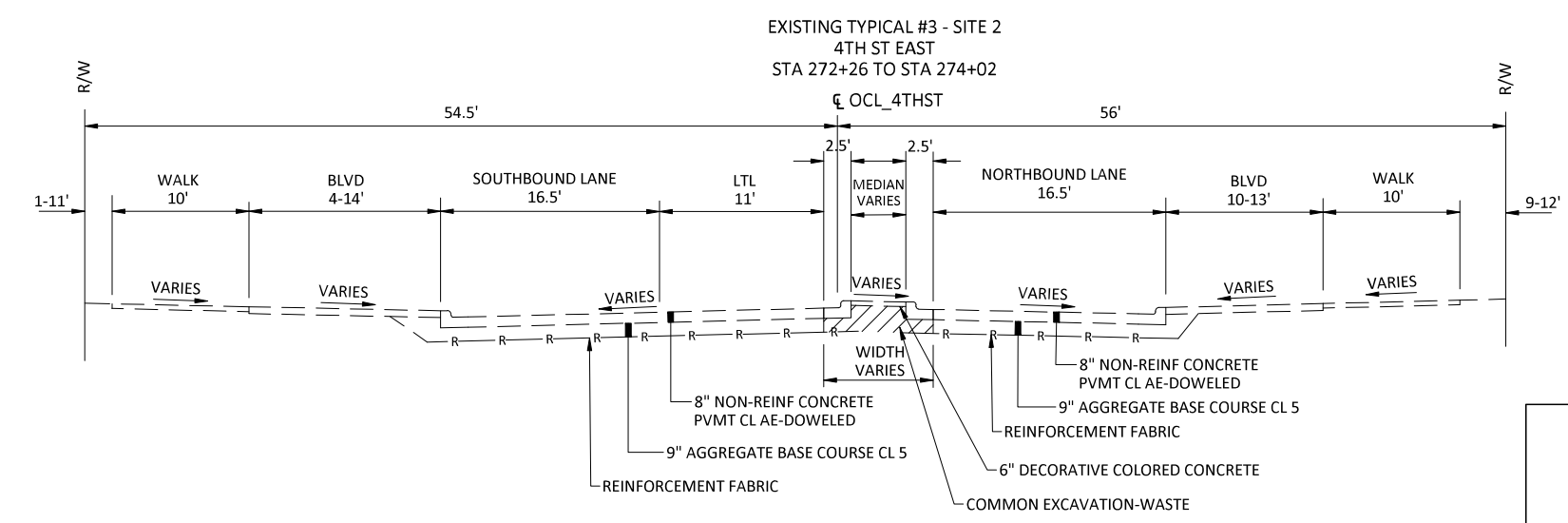
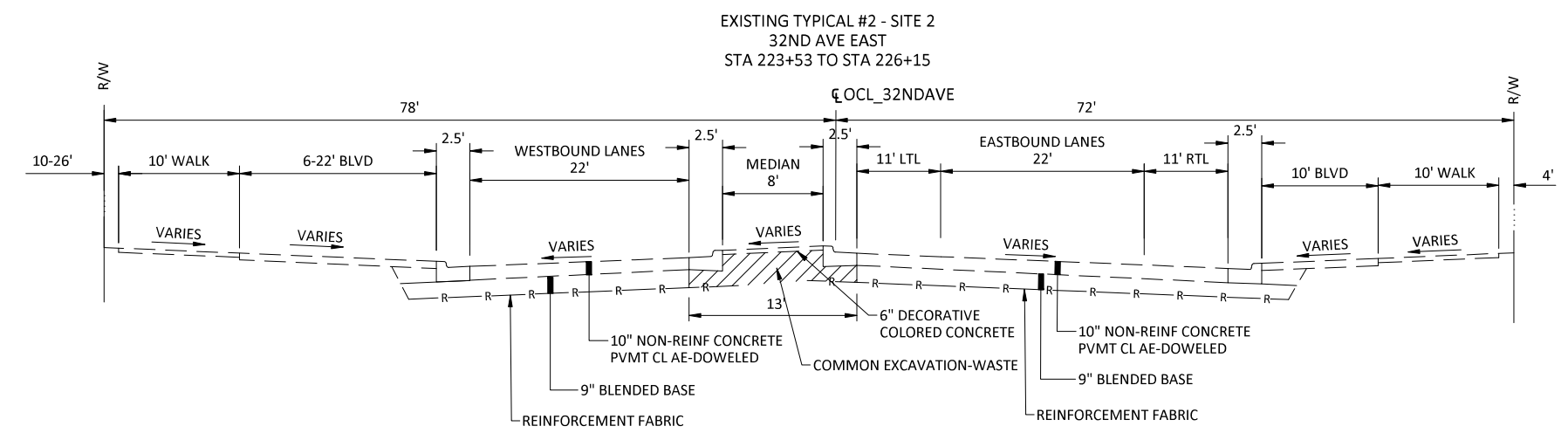
Paving & Striping Details



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- NOTE:
1. THE CONCRETE MEDIAN PAVEMENT THICKNESS AT SITE 1 IS ASSUMED TO BE 6 INCHES, BASED ON TYPICAL SECTION DETAILS AT THE OTHER SITES
 2. COMMON EXCAVATION-WASTE IS NOT REQUIRED IF THE EXISTING BASE MATERIAL BENEATH THE CONCRETE MEDIAN AND CURB AND GUTTER CONSISTS OF AGGREGATE



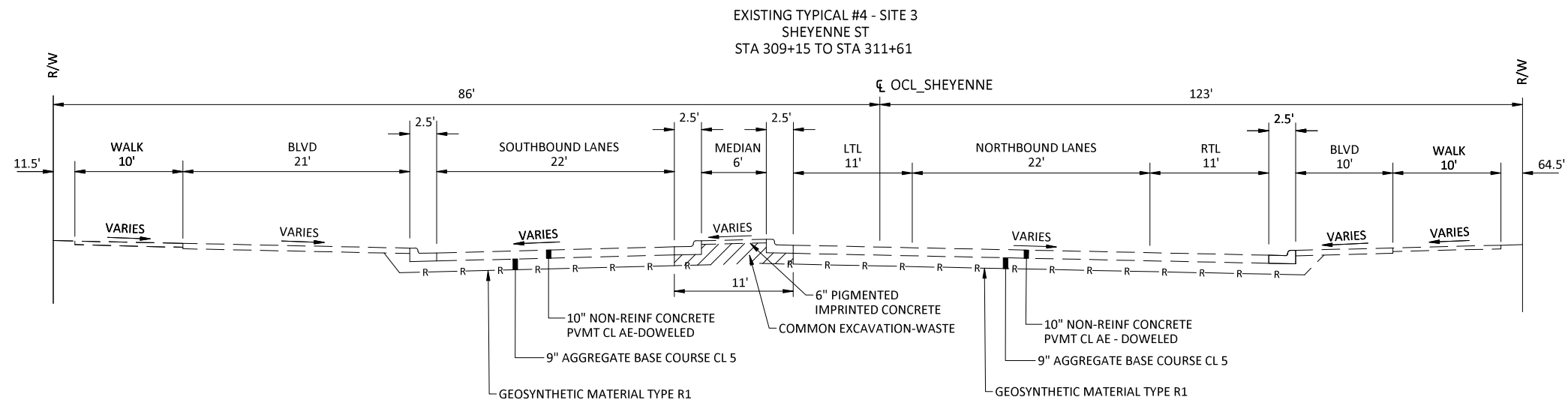
Various West Fargo Intersections
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Existing Typical Sections



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NOTE:
 1. COMMON EXCAVATION-WASTE IS NOT REQUIRED IF THE EXISTING BASE MATERIAL BENEATH THE CONCRETE MEDIAN AND CURB AND GUTTER CONSISTS OF AGGREGATE

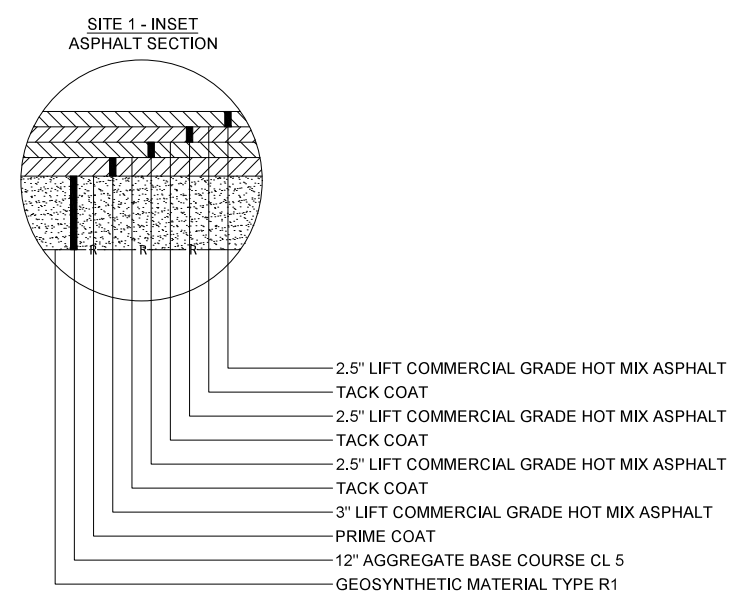
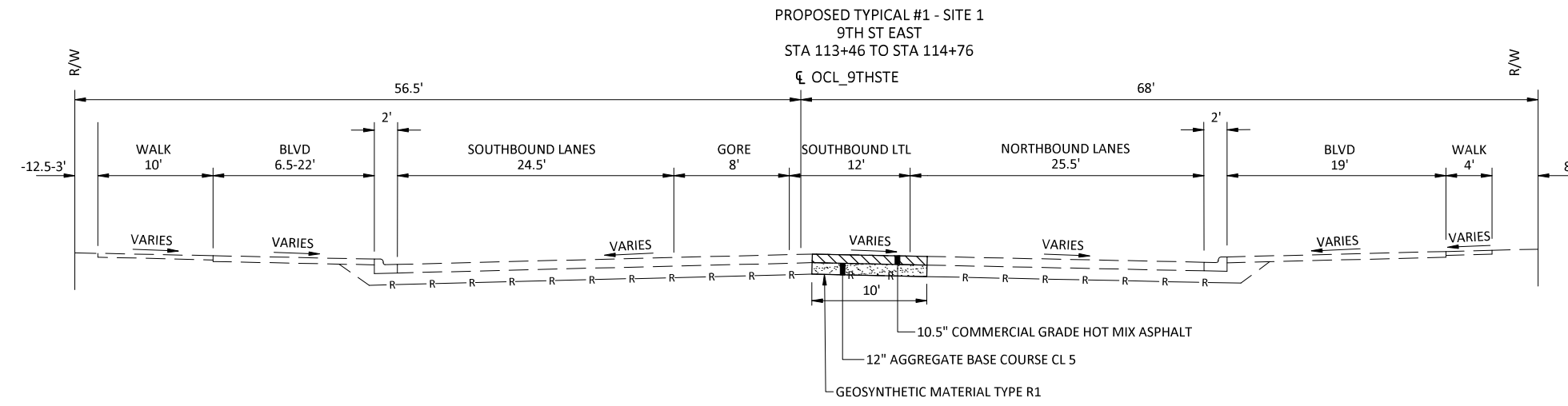


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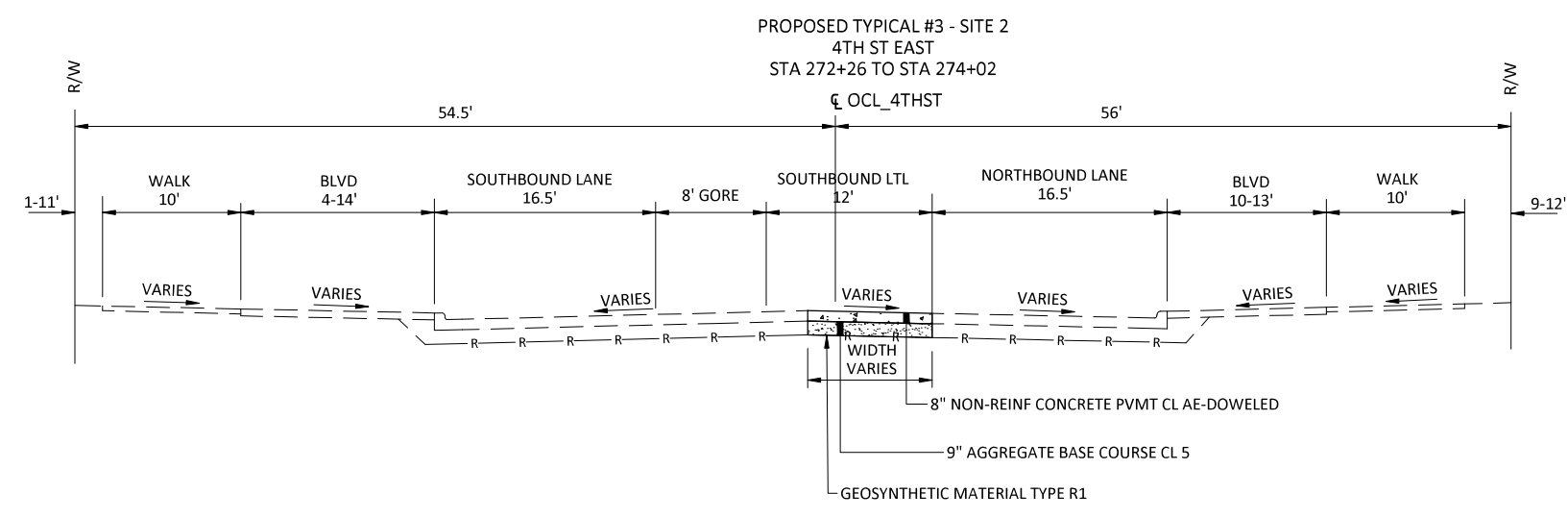
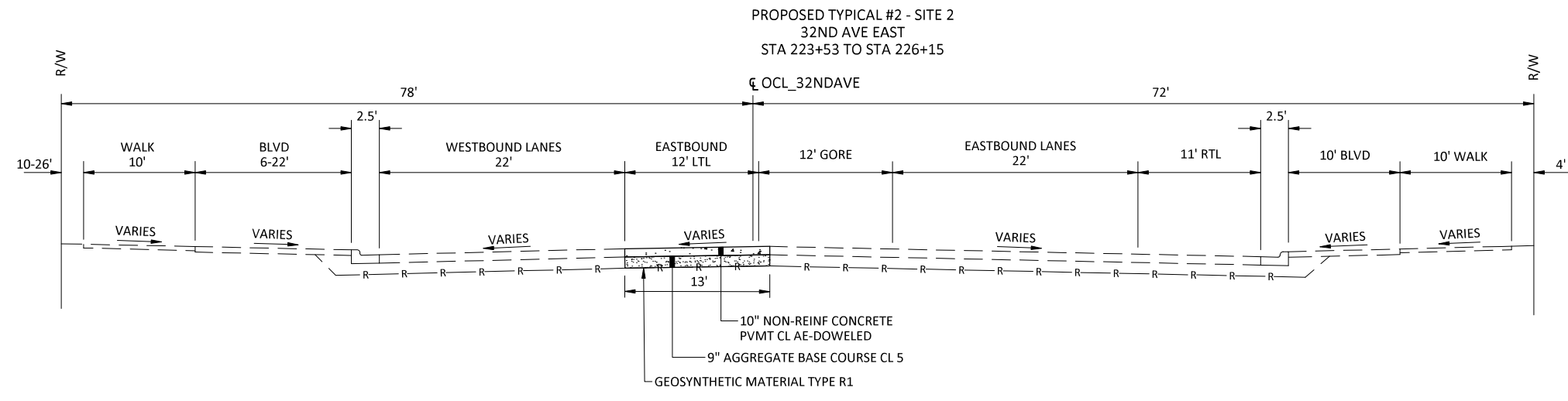
Existing Typical Sections



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- NOTE:
1. USE TACK OIL FOR PRIME COAT
 2. APPLY PRIME AND TACK COATS AT 0.05 GALS/SY
 3. AGGREGATE BASE COURSE CL 5 IS NOT REQUIRED IF THE EXISTING BASE MATERIAL IS A SUITABLE AGGREGATE AND REMAINS IN PLACE



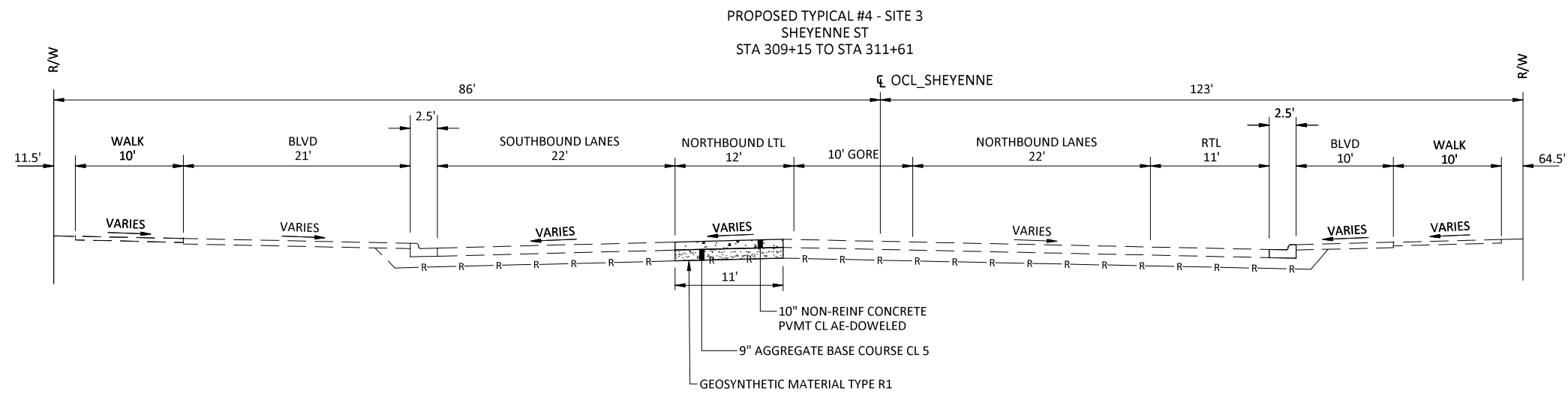
Various West Fargo Intersections
Signal & Turn Lane Modifications

Proposed Typical Sections



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEU-8-992(049)	30	4

NOTE:
 1. AGGREGATE BASE COURSE CL 5 IS NOT REQUIRED IF THE EXISTING BASE MATERIAL IS A SUITABLE AGGREGATE AND REMAINS IN PLACE



Various West Fargo Intersections
 Signal & Turn Lane Modifications

Proposed Typical Sections



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEU-8-992(049)	40	1

SPEC	CODE	BID ITEM	QTY	UNIT
202	0114	REMOVAL OF CONCRETE PAVEMENT Sta 113+46 to 114+76	91	SY
202	0130	REMOVAL OF CURB & GUTTER Sta 113+53 to 114+70	233	LF
203	0113	COMMON EXCAVATION-WASTE Sta 113+46 to 114+76	74	CY

Excavation Calculations:

817 SF (median pavement & nose removal) * (22.5/12) ft (depth of excavation) = 1532 CF
 233 ft (c&g removal) * 2 ft (width of c&g) * (12/12) ft (depth of excavation) = 466 CF
 1532 CF + 466 CF = 1998 CF
 1998 CF / 27 = 74 CY

NOTE:

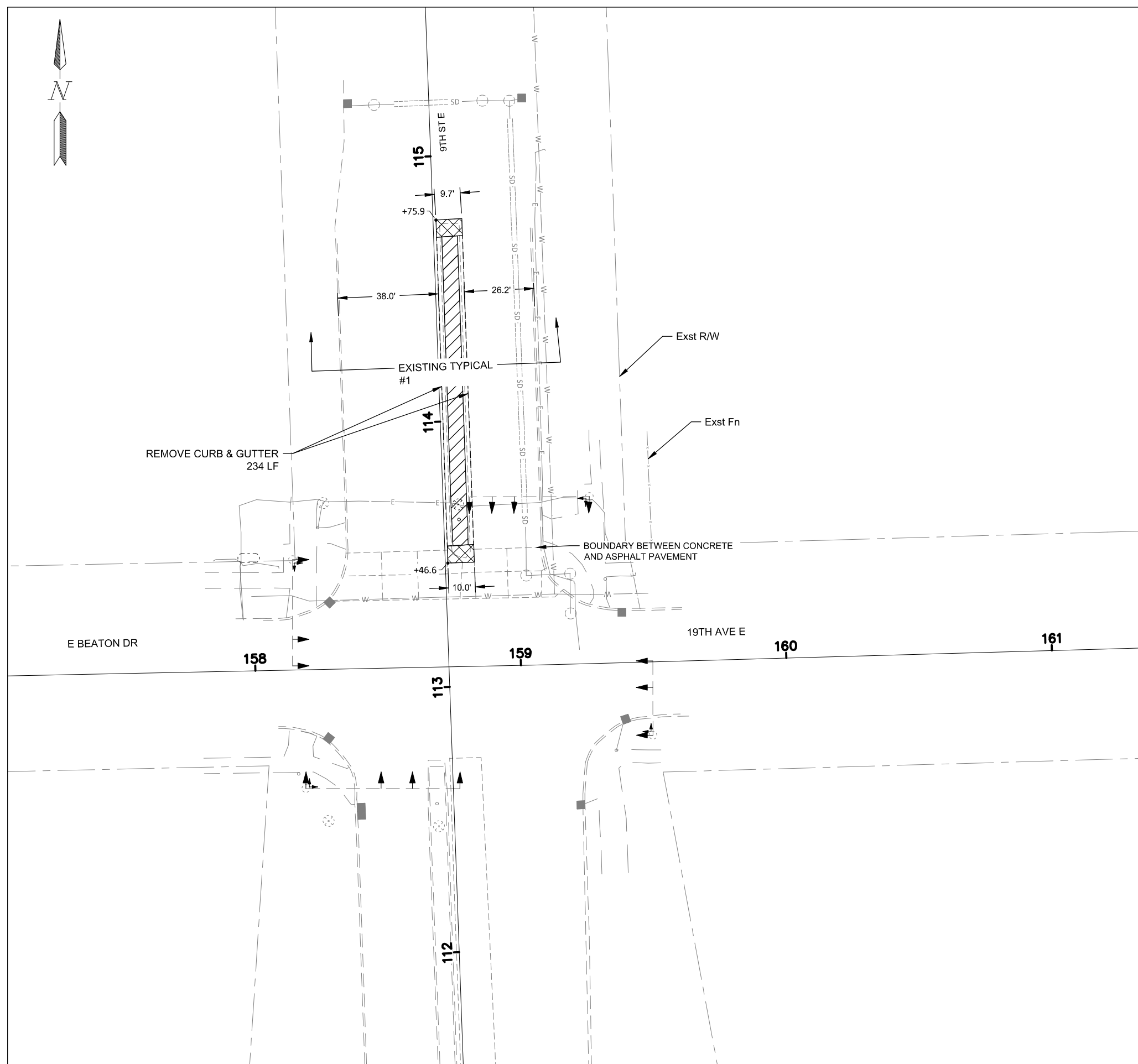
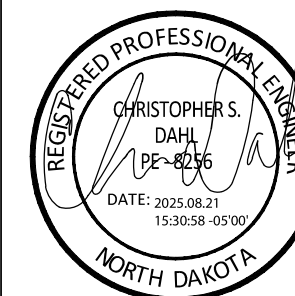
- SEE EXISTING TYPICAL - SECTION 30
- COMMON EXCAVATION-WASTE IS NOT REQUIRED IF THE EXISTING BASE MATERIAL BENEATH THE CONCRETE MEDIAN AND CURB AND GUTTER CONSISTS OF AGGREGATE.

LEGEND	
	REMOVAL OF CONCRETE PAVEMENT (MEDIAN NOSE)
	REMOVAL OF CONCRETE PAVEMENT (MEDIAN)
	REMOVE CURB & GUTTER

Various West Fargo Intersections
Signal & Turn Lane Modifications

9th St E & 19th Ave E - Site 1

Removals



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEU-8-992(049)	40	2

SPEC	CODE	BID ITEM	QTY	UNIT
202	0114	REMOVAL OF CONCRETE PAVEMENT		
		Sta 223+56 to 226+15 (OCL_32NDAVE)	228	SY
		Sta 272+26 to 274+02 (OCL_4THST)	102	SY
202	0130	REMOVAL OF CURB & GUTTER		
		Sta 223+56 to 226+09 (OCL_32NDAVE)	505	LF
		Sta 272+32 to 274+02 (OCL_4THST)	340	LF
203	0113	COMMON EXCAVATION-WASTE		
		Sta 223+56 to 226+15 (OCL_32NDAVE)	156	CY
		Sta 272+26 to 274+02 (OCL_4THST)	72	CY

Excavation Calculations:

OCL_32NDAVE 2051 SF (median pavement & nose removal) * (19/12) ft (depth of excavation) = 3248 CF
505 ft (c&g removal) * 2.5 ft (width of c&g) * (9/12) ft (depth of excavation) = 947 CF
3248 CF + 947 CF = 4195 CF
4195 CF / 27 = 156 CY

OCL_4THST 911 SF (median pavement & nose removal) * (17/12) ft (depth of excavation) = 1291 CF
340 ft (c&g removal) * 2.5 ft (width of c&g) * (9/12) ft (depth of excavation) = 638 CF
1291 CF + 638 CF = 1929 CF
1929 CF / 27 = 72 CY

NOTE:

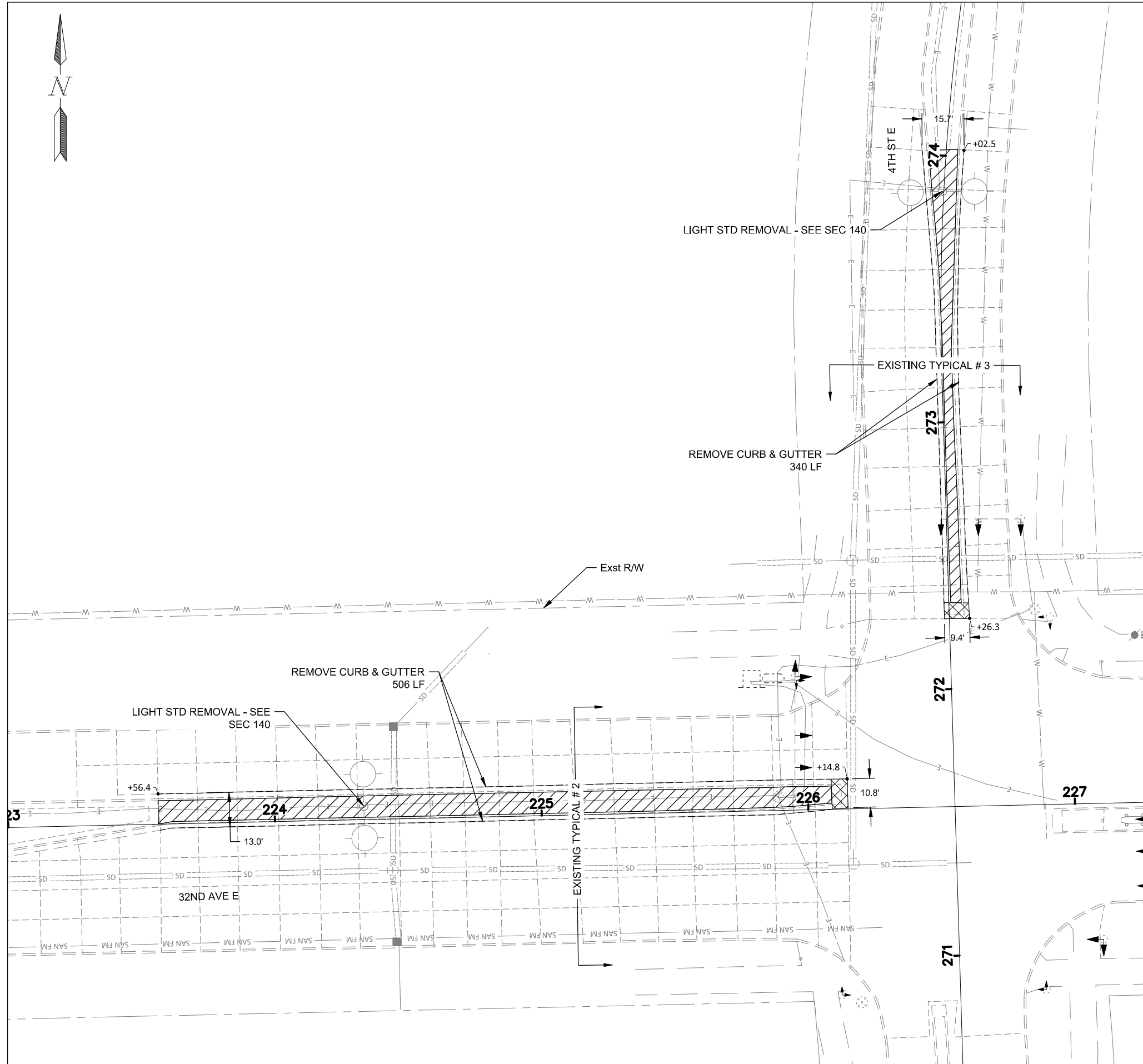
- SEE EXISTING TYPICAL - SECTION 30
- COMMON EXCAVATION-WASTE IS NOT REQUIRED IF THE EXISTING BASE MATERIAL BENEATH THE CONCRETE MEDIAN AND CURB AND GUTTER CONSISTS OF AGGREGATE.

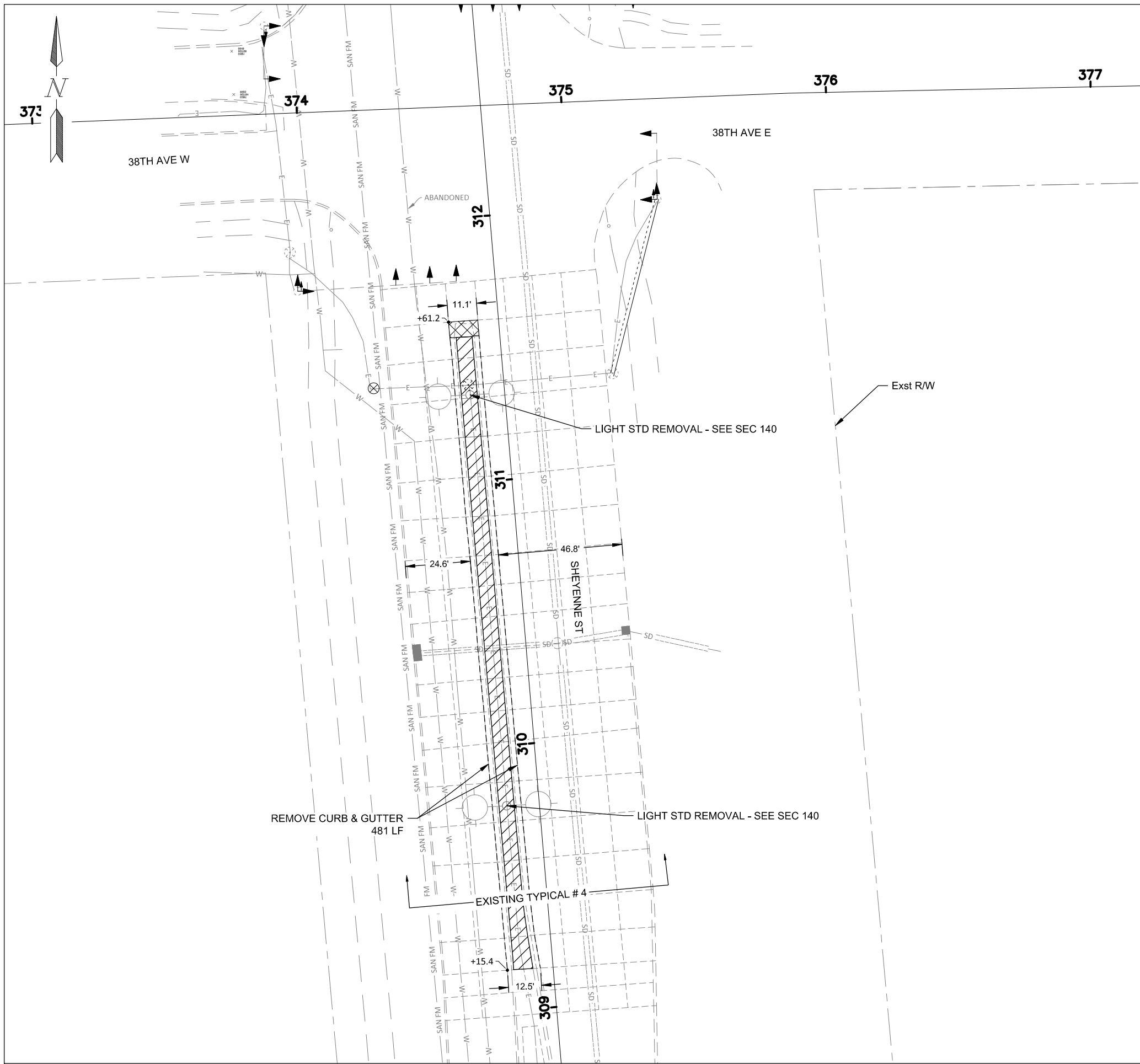
LEGEND	
	REMOVAL OF CONCRETE PAVEMENT (MEDIAN NOSE)
	REMOVAL OF CONCRETE PAVEMENT (MEDIAN)
	REMOVE CURB & GUTTER

Various West Fargo Intersections
Signal & Turn Lane Modifications

32nd Ave E & 4th St E - Site 2

Removals





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEU-8-992(049)	40	3

SPEC	CODE	BID ITEM	QTY	UNIT
202	0114	REMOVAL OF CONCRETE PAVEMENT Sta 309+15 to 311+61	166	SY
202	0130	REMOVAL OF CURB & GUTTER Sta 309+15 to 311+55	480	LF
203	0113	COMMON EXCAVATION-WASTE Sta 309+15 to 311+55	130	CY

Excavation Calculations:
 1486 SF (median pavement & nose removal) * (19/12) ft (depth of excavation) = 2353 CF
 480 ft (c&g removal) * 2.5 ft (width of c&g) * (9/12) ft (depth of excavation) = 900 CF
 2353 CF + 900 CF = 3253 CF
 3253 CF / 27 = 121 CY

- NOTE:
- SEE EXISTING TYPICAL - SECTION 30
 - COMMON EXCAVATION-WASTE IS NOT REQUIRED IF THE EXISTING BASE MATERIAL BENEATH THE CONCRETE MEDIAN AND CURB AND GUTTER CONSISTS OF AGGREGATE.

LEGEND	
	REMOVAL OF CONCRETE PAVEMENT (MEDIAN NOSE)
	REMOVAL OF CONCRETE PAVEMENT (MEDIAN)
	REMOVE CURB & GUTTER

Various West Fargo Intersections
 Signal & Turn Lane Modifications

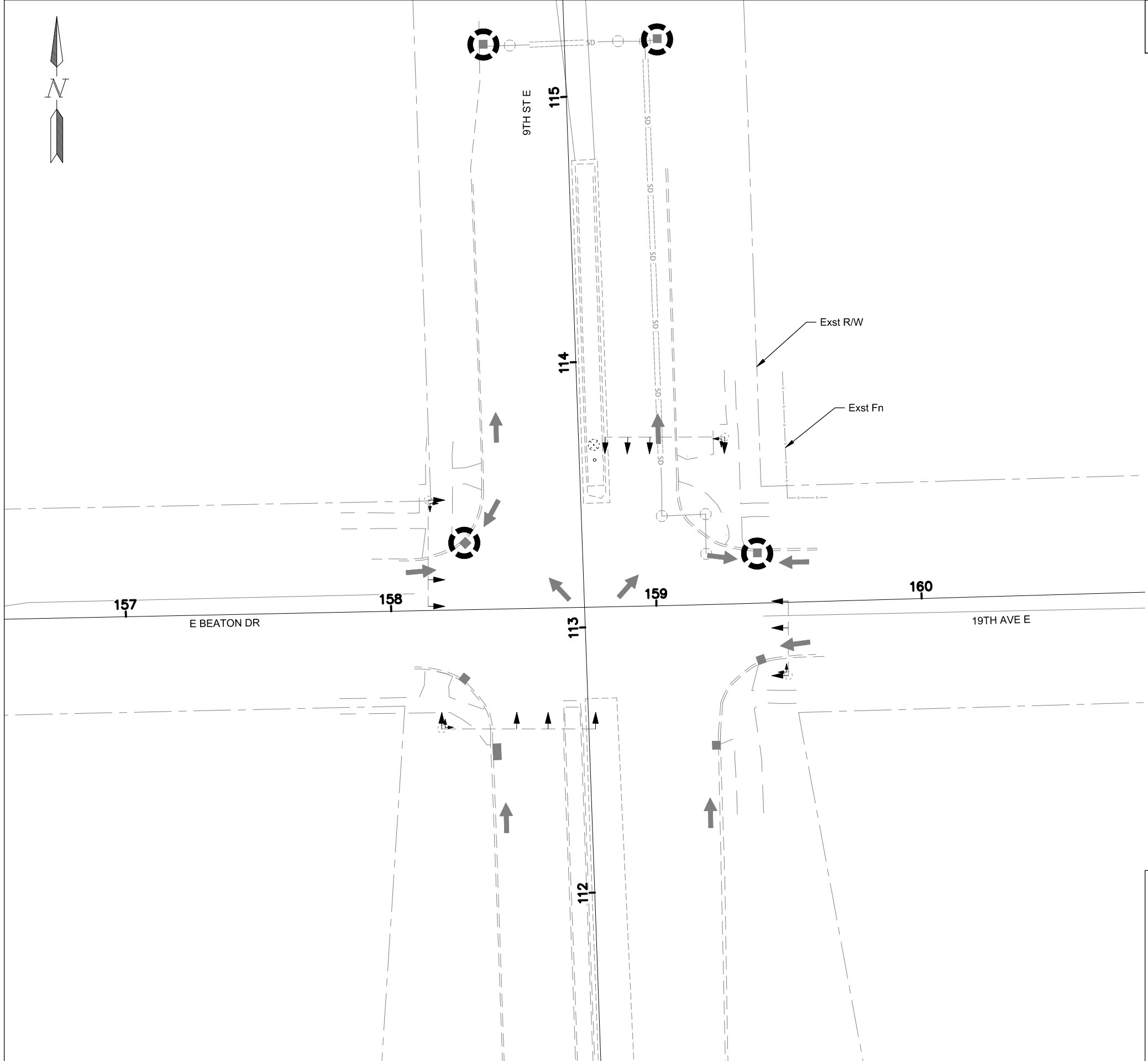
Sheyenne St & 38th Ave - Site 3

Removals



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEU-8-992(049)	76	1

SPEC	CODE	BID ITEM	QTY	UNIT
708	1540	INLET PROTECTION-SPECIAL		
		Sta 158+28 Lt	1	EA
		Sta 159+39 Lt	1	EA
		Sta 115+20 Rt	1	EA
		Sta 115+20 Lt	1	EA



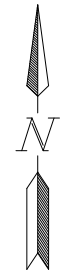
LEGEND	
	INLET PROTECTION - SPECIAL
	FLOW DIRECTION

Various West Fargo Intersections
Signal & Turn Lane Modifications

9th St E & 19th Ave E - Site 1

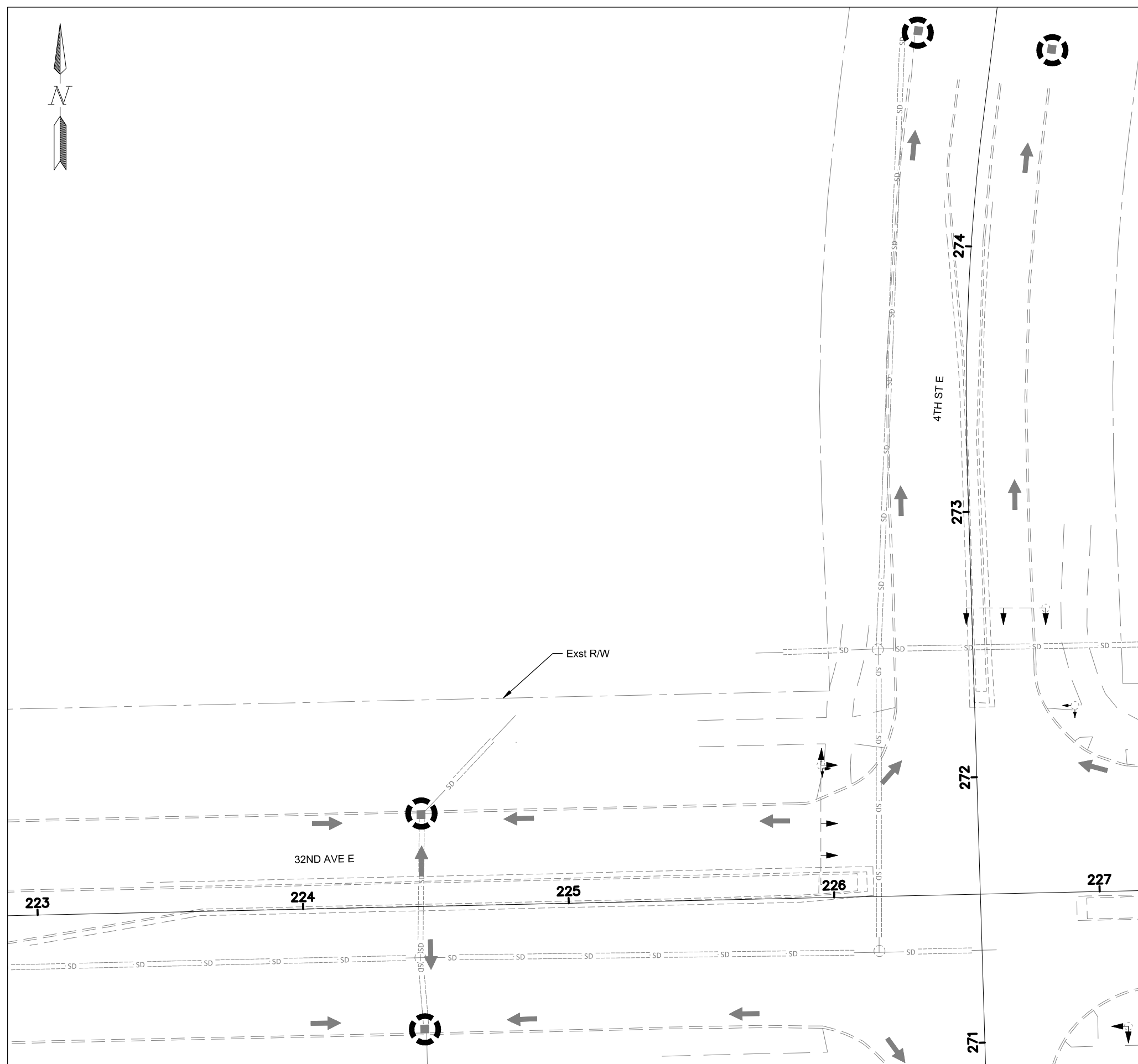
Temporary Erosion Control







STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEU-8-992(049)	76	2

SPEC CODE	BID ITEM	QTY	UNIT
708 1540	INLET PROTECTION-SPECIAL		
	Sta 224+45 Lt	1	EA
	Sta 224+45 Rt	1	EA
	Sta 274+77 Lt	1	EA
	Sta 274+77 Rt	1	EA



LEGEND

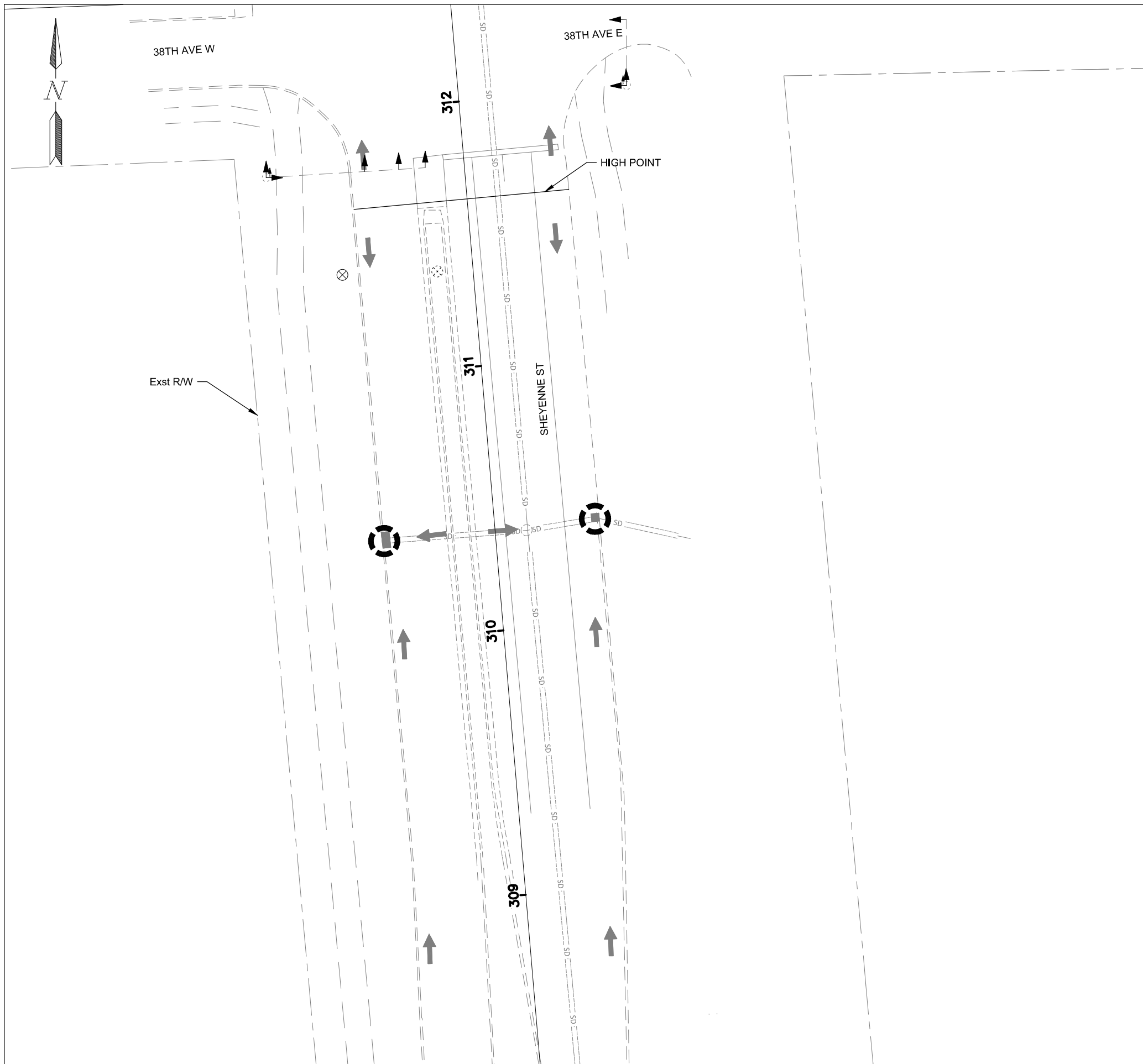
-  INLET PROTECTION - SPECIAL
-  FLOW DIRECTION

Various West Fargo Intersections
Signal & Turn Lane Modifications

32nd Ave E & 4th St E - Site 2

Temporary Erosion Control







STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEU-8-992(049)	76	3

SPEC	CODE	BID ITEM	QTY	UNIT
708	1540	INLET PROTECTION-SPECIAL		
		Sta 310+37 Lt	1	EA
		Sta 310+39 Rt	1	EA

LEGEND

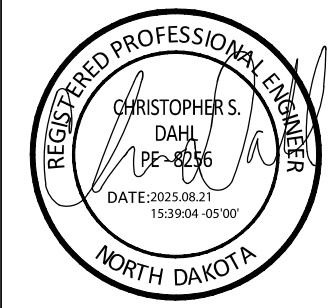
 INLET PROTECTION - SPECIAL

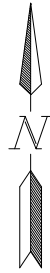
 FLOW DIRECTION

Various West Fargo Intersections
Signal & Turn Lane Modifications

Sheyenne St & 38th Ave - Site 3

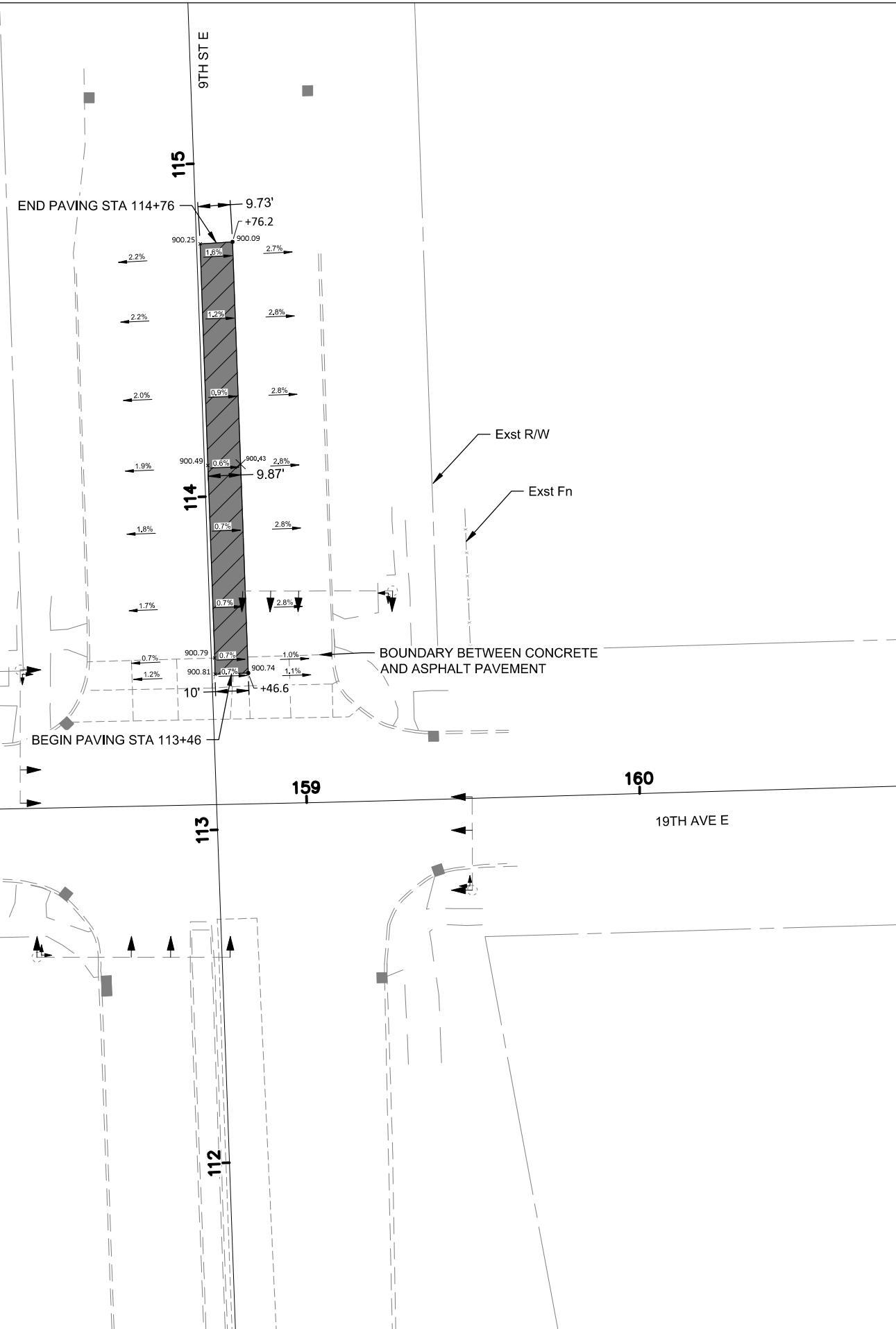
Temporary Erosion Control





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEU-8-992(049)	90	1

SPEC	CODE	BID ITEM	QTY	UNIT
302	0121	AGGREGATE BASE COURSE CL 5 Sta 113+46 to 114+76	48	CY
430	0500	COMMERCIAL GRADE HOT MIX ASPHALT Sta 113+46 to 114+76	84	TON
709	0151	GEOSYNTHETIC MATERIAL TYPE R1 Sta 113+46 to 114+76	142	SY



- NOTE:
- SEE TYPICAL SECTION FOR AGGREGATE BASE THICKNESS, TACK & PRIME COATS, AND LIFT THICKNESS - SECTION 30
 - AGGREGATE BASE COURSE CL 5 IS NOT REQUIRED IF THE EXISTING BASE MATERIAL IS A SUITABLE AGGREGATE AND REMAINS IN PLACE

LEGEND	
	COMMERCIAL GRADE HOT MIX ASPHALT

Various West Fargo Intersections
Signal & Turn Lane Modifications

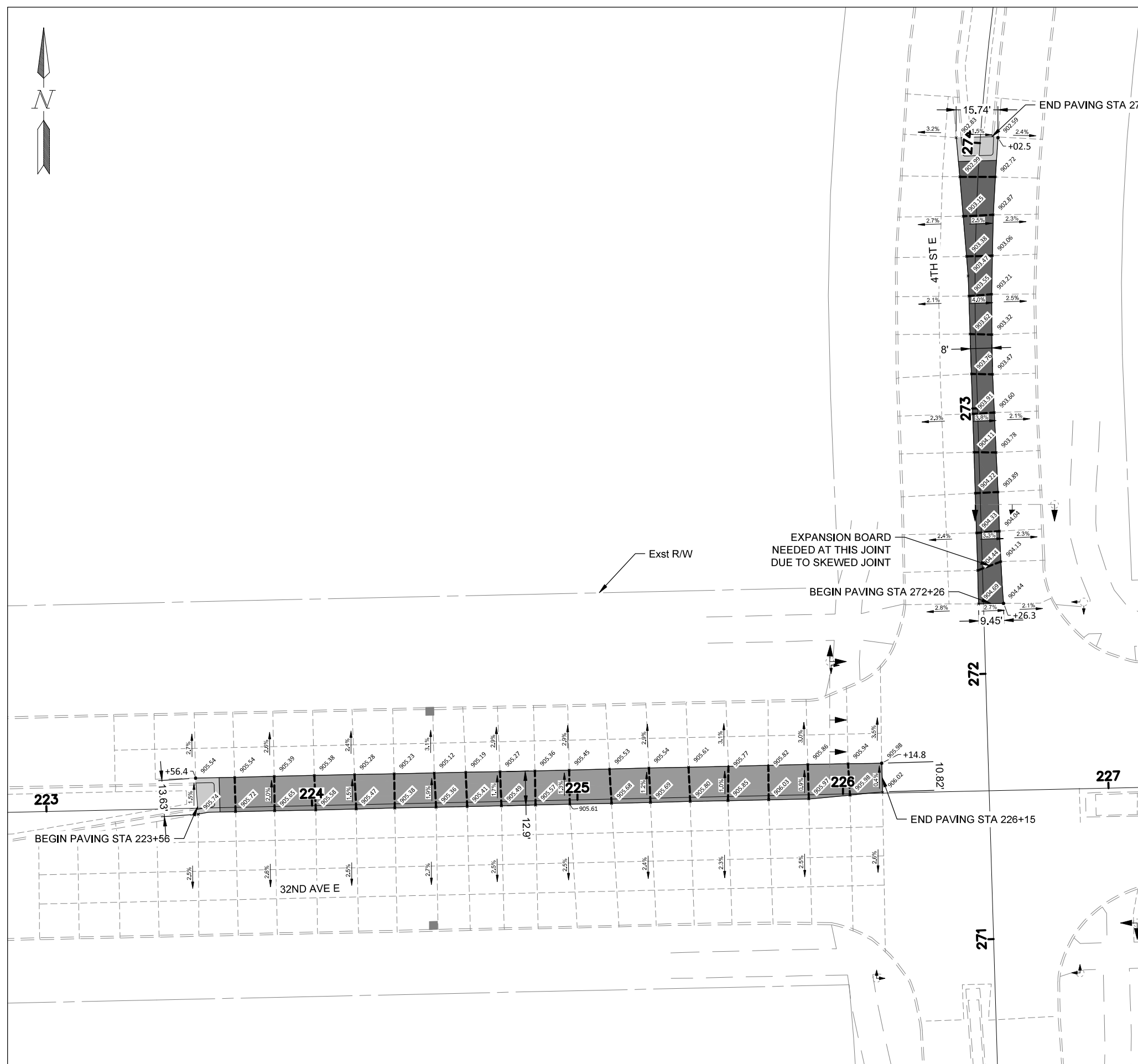
9th St E & 19th Ave E - Site 1
Proposed Typical #1

Paving Layouts





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEU-8-992(049)	90	2



SPEC	CODE	BID ITEM	QTY	UNIT
302	0121	AGGREGATE BASE COURSE CL 5		
		Sta 223+56 to 226+15 (OCL_32NDAVE)	92	CY
		Sta 272+26 to 274+02 (OCL_4THST)	47	CY
550	0300	8IN NON-REINF CONCRETE PVMT CL AE-DOWELED		
		Sta 272+26 to 273+93 (OCL_4THST)	172	SY
550	0310	10IN NON-REINF CONCRETE PVMT CL AE-DOWELED		
		Sta 223+65 to 226+15 (OCL_32NDAVE)	356	SY
709	0151	GEOSYNTHETIC MATERIAL TYPE R1		
		Sta 223+56 to 226+15 (OCL_32NDAVE)	369	SY
		Sta 272+26 to 274+02 (OCL_4THST)	188	SY
750	0210	CONCRETE MEDIAN NOSE PAVING		
		Sta 223+56 to 223+65 (OCL_32NDAVE)	13	SY
		Sta 273+93 to 274+02 (OCL_4THST)	16	SY

NOTE:

1. JOINT SPACING IS NOT A CONSISTENT NUMBER. CONNECT NEW JOINTS TO EXISTING JOINTS.
2. SEE MEDIAN NOSE AND CONCRETE PAVEMENT JOINTING DETAILS - SECTION 20
3. SEE TYPICAL SECTION FOR AGGREGATE BASE THICKNESS - SECTION 30
4. AGGREGATE BASE COURSE CL 5 IS NOT REQUIRED IF THE EXISTING BASE MATERIAL IS A SUITABLE AGGREGATE AND REMAINS IN PLACE

LEGEND

	8IN NON-REINF CONCRETE PVMT CL AE-DOWELED
	10IN NON-REINF CONCRETE PVMT CL AE-DOWELED
	CONCRETE MEDIAN NOSE PAVING
	PROPOSED CONCRETE JOINT
	EXISTING CONCRETE JOINT

Various West Fargo Intersections
Signal & Turn Lane Modifications

32nd Ave E & 4th St E - Site 2
West Leg - Proposed Typical #2
North Leg - Proposed Typical #3

Paving Layouts





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEU-8-992(049)	90	3

SPEC	CODE	BID ITEM	QTY	UNIT
302	0121	AGGREGATE BASE COURSE CL 5 Sta 309+15 to 311+61	75	CY
550	0305	10IN NON-REINF CONCRETE PVMT CL AE-DOWELED Sta 309+24 to 311+61	288	SY
709	0151	GEOSYNTHETIC MATERIAL TYPE R1 Sta 309+15 to 311+61	301	SY
750	0210	CONCRETE MEDIAN NOSE PAVING Sta 309+15 to 309+24	13	SY

- NOTE:
- JOINT SPACING IS NOT A CONSISTENT NUMBER. CONNECT NEW JOINTS TO EXISTING JOINTS.
 - SEE MEDIAN NOSE AND CONCRETE PAVEMENT JOINTING DETAILS - SECTION 20
 - SEE TYPICAL SECTION FOR AGGREGATE BASE THICKNESS - SECTION 30
 - AGGREGATE BASE COURSE CL 5 IS NOT REQUIRED IF THE EXISTING BASE MATERIAL IS A SUITABLE AGGREGATE AND REMAINS IN PLACE

LEGEND	
	10IN NON-REINF CONCRETE PVMT CL AE-DOWELED
	CONCRETE MEDIAN NOSE PAVING
	PROPOSED CONCRETE JOINT
	EXISTING CONCRETE JOINT

Various West Fargo Intersections
Signal & Turn Lane Modifications

Sheyenne St & 38th Ave - Site 3
South Leg - Proposed Typical #4

Paving Layouts



SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED				TOTAL AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
			BY PHASE NO.						
			1	2A	2B	3			
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 ___					39		
R2-1aP-24	24"x18"	MINIMUM FEE \$150 (Mounted on Speed Limit post)					10		
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		
R9-10-24	24"x12"	SIDEWALK CLOSED USE OTHER SIDE (Mounted on barricade)	2	2	2	2	19	38	
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	1	1	1	1	26	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					35		
W5-1-48	48"x48"	ROAD NARROWS	1	1	1	1	35	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		
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		
W20-1-48	48"x48"	ROAD WORK AHEAD or ___ FT or ___ MILE	2	2	2	2	35	70	
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					35		
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		
W20-X18-48	48"x48"	LEFT TURN LANE CLOSED	1	1	1	1	35	35	
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		
W21-5-48	48"x48"	SHOULDER WORK					35		

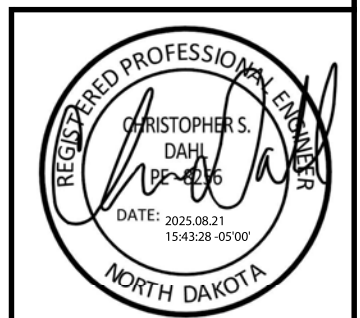
SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED				TOTAL AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
			BY PHASE NO.						
			1	2A	2B	3			
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED					35		
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or ___ FT or ___ MILE					35		
W21-6-48	48"x48"	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									
SIGN NUMBER	SIGN SIZE	DESCRIPTION	1	2A	2B	3	TOTAL AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
R3-8ACA-54	54"x30"	ADVANCE INTERSECTION LANE CONTROL	1	1	1		1	29	29
R3-30DCA-54	54"x30"	ADVANCE INTERSECTION LANE CONTROL		1	1		1	29	29
R3-8EE-24	24"x24"	ADVANCE INTERSECTION LANE CONTROL	1				1	21	21

SPEC & CODE		TOTAL UNITS
704-1000	TRAFFIC CONTROL SIGNS	335

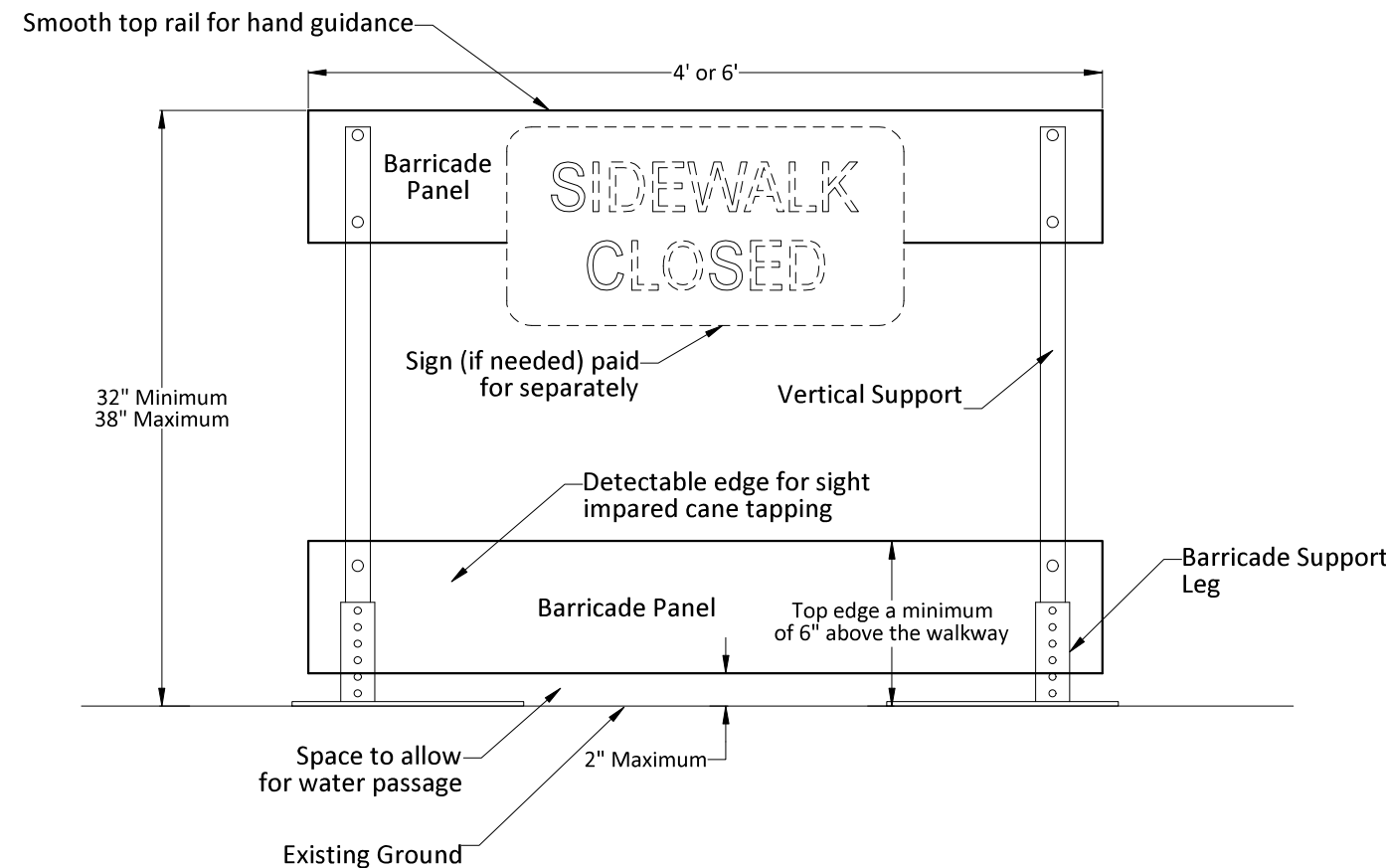
SPEC & CODE	DESCRIPTION	UNIT	QUANTITY				TOTAL QUANTITY
			BY PHASE NO.				
			1	2A	2B	3	
704-0100	FLAGGING	MHR					
704-1048	PORTABLE RUMBLE STRIPS	EACH					
704-1050	TYPE I BARRICADES	EACH					
704-1052	TYPE III BARRICADES	EACH	4	4	1	4	4
704-1054	SIDEWALK BARRICADE	EA	2	2	2		2
704-1060	DELINEATOR DRUMS	EACH	43	47	19	55	55
704-1065	TRAFFIC CONES	EACH					
704-1067	TUBULAR MARKERS	EACH					
704-1070	DELINEATOR	EACH					
704-1072	FLEXIBLE DELINEATORS	EACH					
704-1080	STACKABLE VERTICAL PANELS	EACH					
704-1081	VERTICAL PANELS - BACK TO BACK	EACH					
704-1085	SEQUENCING ARROW PANEL - TYPE A	EACH					
704-1086	SEQUENCING ARROW PANEL - TYPE B	EACH					
704-1087	SEQUENCING ARROW PANEL - TYPE C	EACH					
704-1500	OBLITERATION OF PVMT MK	SF					
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:
Total quantity and units are listed as if each phase is worked on at separate times. However, all phases are able to be worked on simultaneously with the exception of Phase 2A and 2B, which must be sequenced to maintain sidewalk access. Section 8 reflects the total number of traffic control devices required if all sites were active simultaneously.

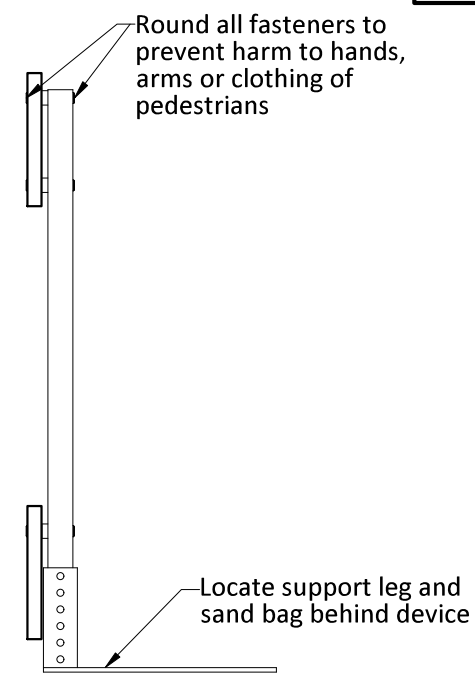


Traffic Control Devices List
Various West Fargo Intersections
Signal & Turn Lane Modifications
Sites 1, 2, & 3

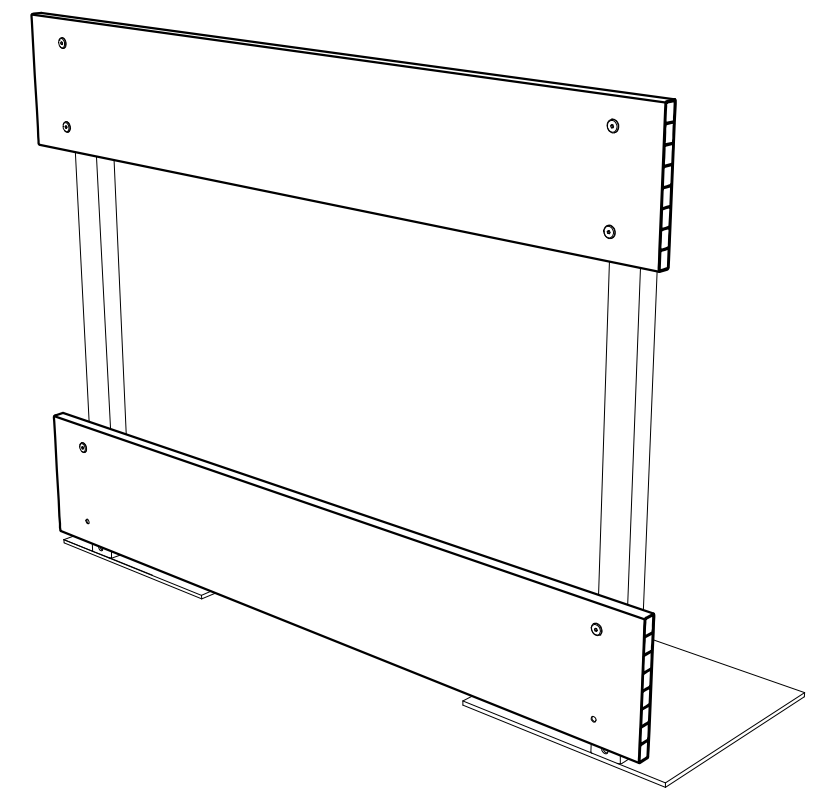
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEU-8-992(049)	100	2



Front View



End View



Perspective View

NOTES:

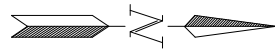
Sidewalk Barricades

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".

Various West Fargo Intersections
Signal & Turn Lane Modifications

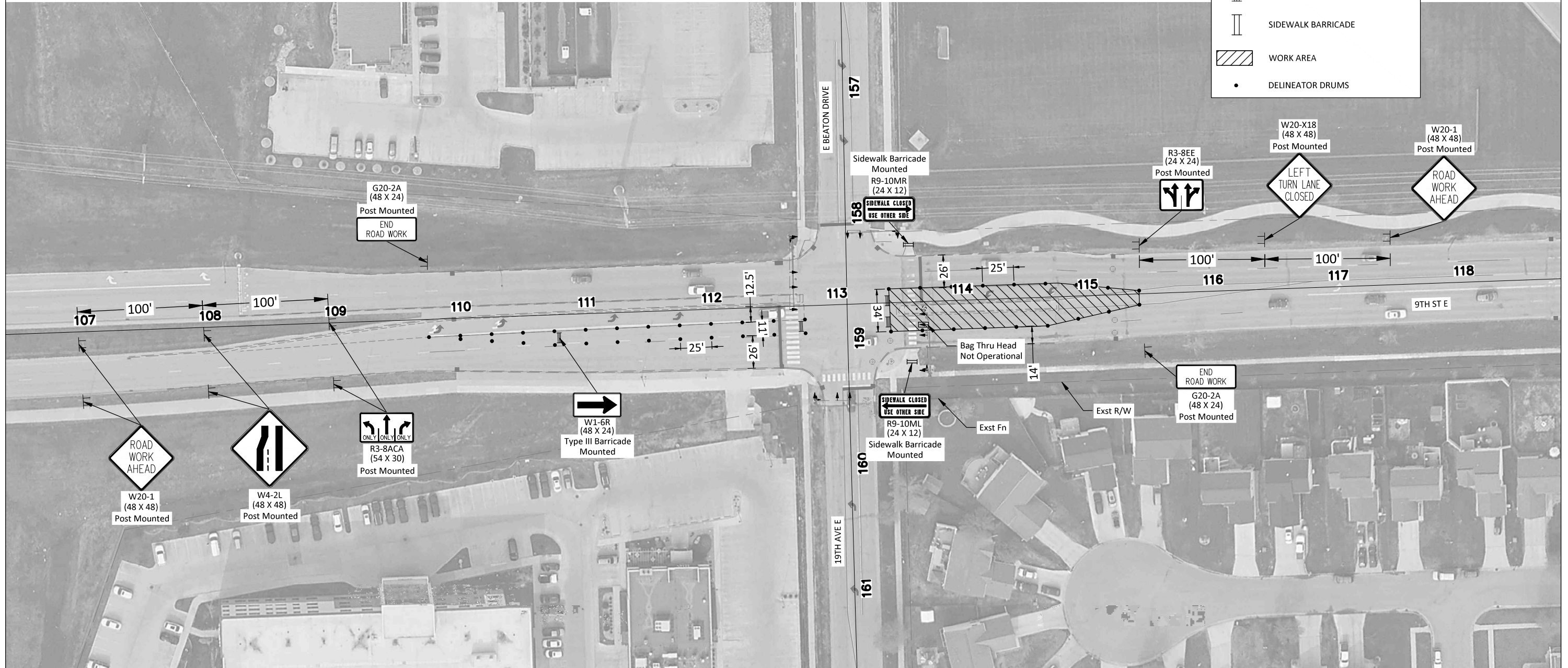
Sidewalk Barricade





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEU-8-992(049)	100	3

LEGEND	
	SIGN POST
	TYPE 3 BARRICADE
	SIDEWALK BARRICADE
	WORK AREA
	DELINEATOR DRUMS



NOTES

1. THE INTERSECTION OF 9TH ST & 19TH AVE MUST REMAIN OPEN AT ALL TIMES. NO CONSTRUCTION TRAFFIC MAY BLOCK VEHICULAR TRAFFIC OUTSIDE OF THE MARKED CONSTRUCTION AREAS AT ANY TIME.

Various West Fargo Intersections
Signal & Turn Lane Modifications

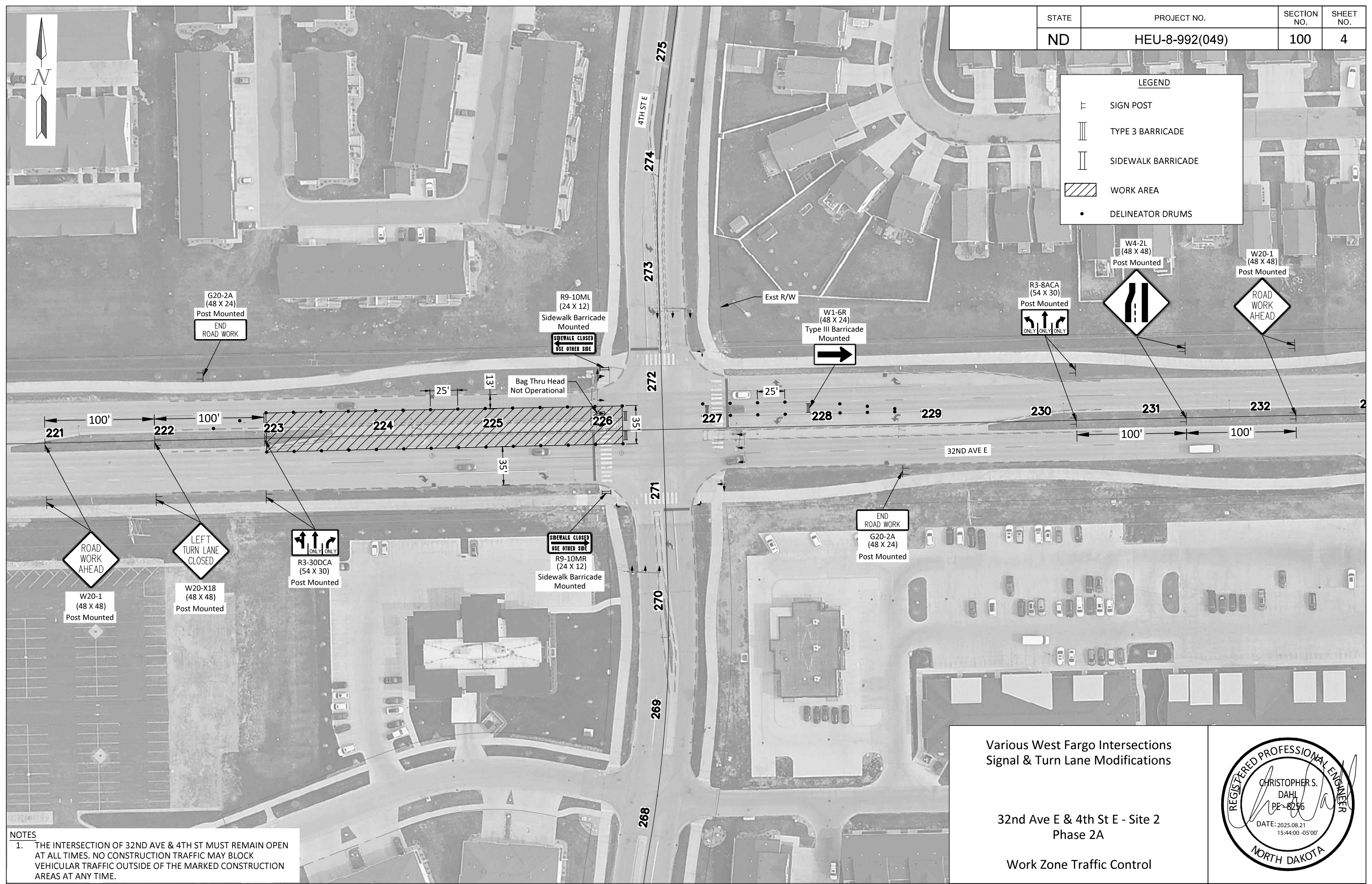
9th St E & 19th Ave E - Site 1
Phase 1

Work Zone Traffic Control



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEU-8-992(049)	100	4

LEGEND	
	SIGN POST
	TYPE 3 BARRICADE
	SIDEWALK BARRICADE
	WORK AREA
	DELINEATOR DRUMS



NOTES
 1. THE INTERSECTION OF 32ND AVE & 4TH ST MUST REMAIN OPEN AT ALL TIMES. NO CONSTRUCTION TRAFFIC MAY BLOCK VEHICULAR TRAFFIC OUTSIDE OF THE MARKED CONSTRUCTION AREAS AT ANY TIME.

Various West Fargo Intersections
 Signal & Turn Lane Modifications

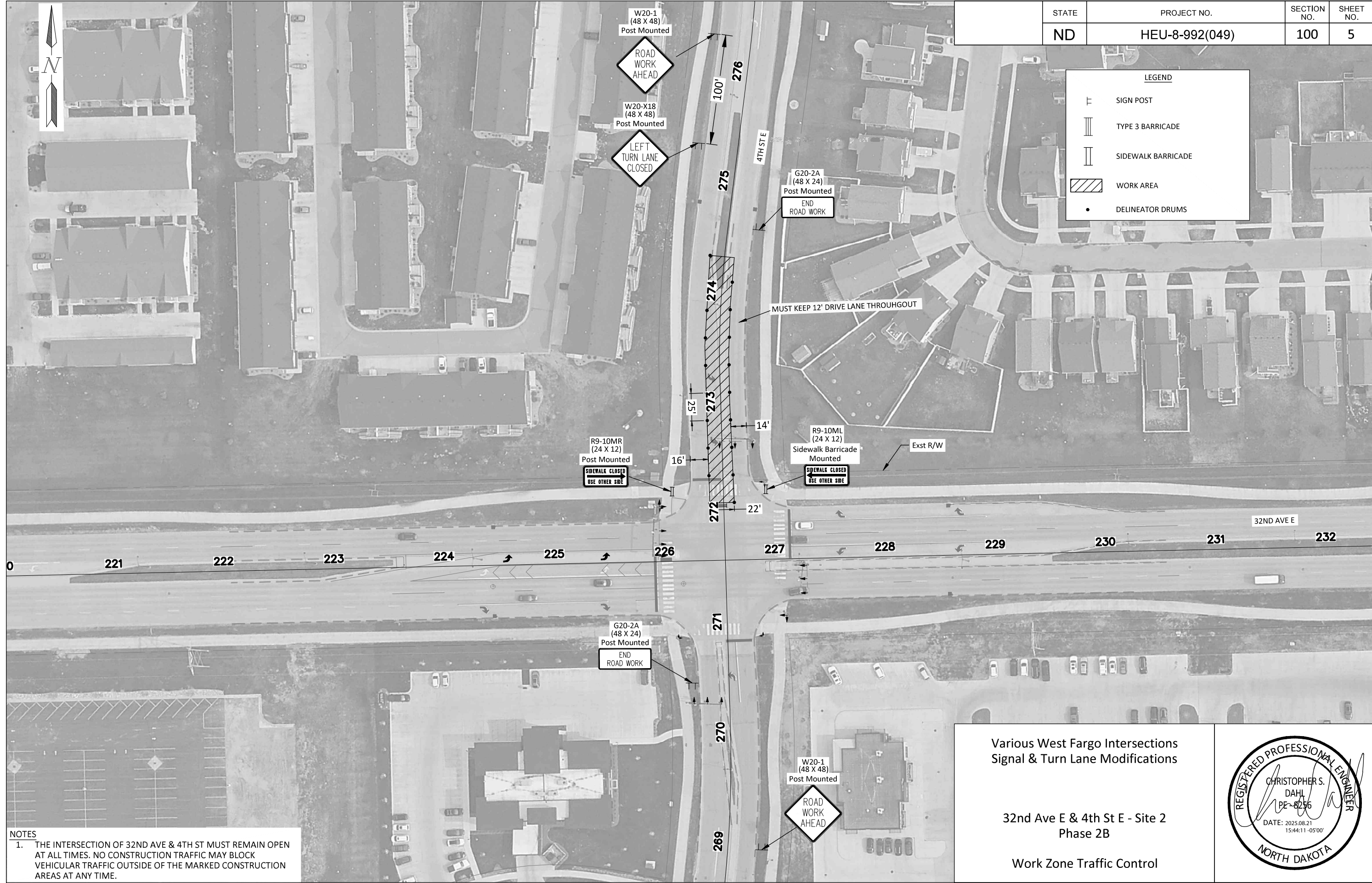
32nd Ave E & 4th St E - Site 2
 Phase 2A

Work Zone Traffic Control



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEU-8-992(049)	100	5

LEGEND	
	SIGN POST
	TYPE 3 BARRICADE
	SIDEWALK BARRICADE
	WORK AREA
	DELINEATOR DRUMS



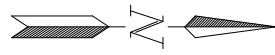
NOTES
 1. THE INTERSECTION OF 32ND AVE & 4TH ST MUST REMAIN OPEN AT ALL TIMES. NO CONSTRUCTION TRAFFIC MAY BLOCK VEHICULAR TRAFFIC OUTSIDE OF THE MARKED CONSTRUCTION AREAS AT ANY TIME.

Various West Fargo Intersections
 Signal & Turn Lane Modifications

32nd Ave E & 4th St E - Site 2
 Phase 2B

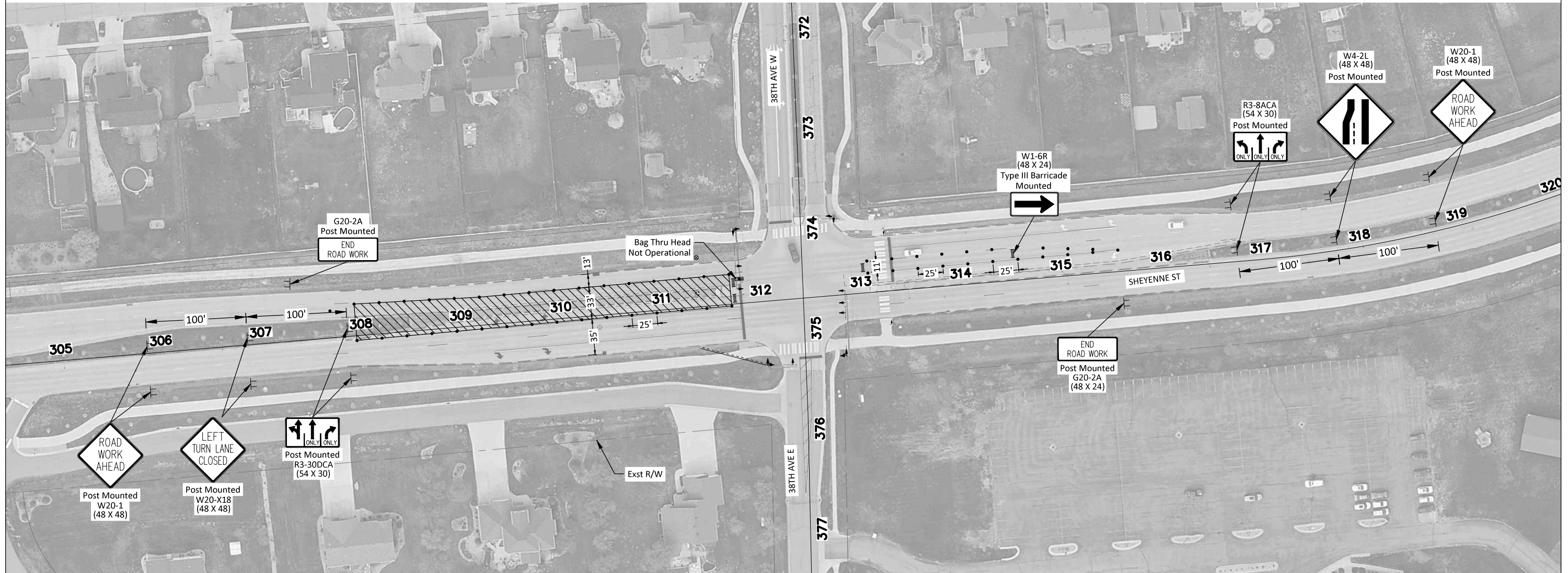
Work Zone Traffic Control





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEU-8-992(049)	100	6

LEGEND	
	SIGN POST
	TYPE 3 BARRICADE
	WORK AREA
	DELINEATOR DRUMS



NOTES

1. THE INTERSECTION OF SHEYENNE ST & 38TH AVE MUST REMAIN OPEN AT ALL TIMES. NO CONSTRUCTION TRAFFIC MAY BLOCK VEHICULAR TRAFFIC OUTSIDE OF THE MARKED CONSTRUCTION AREAS AT ANY TIME.

Various West Fargo Intersections
Signal & Turn Lane Modifications

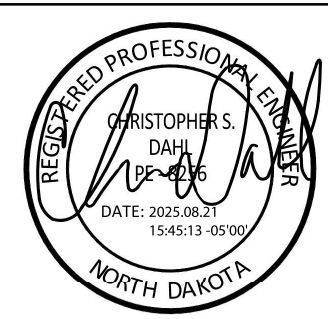
Sheyenne St & 38th Ave - Site 3
Phase 3

Work Zone Traffic Control



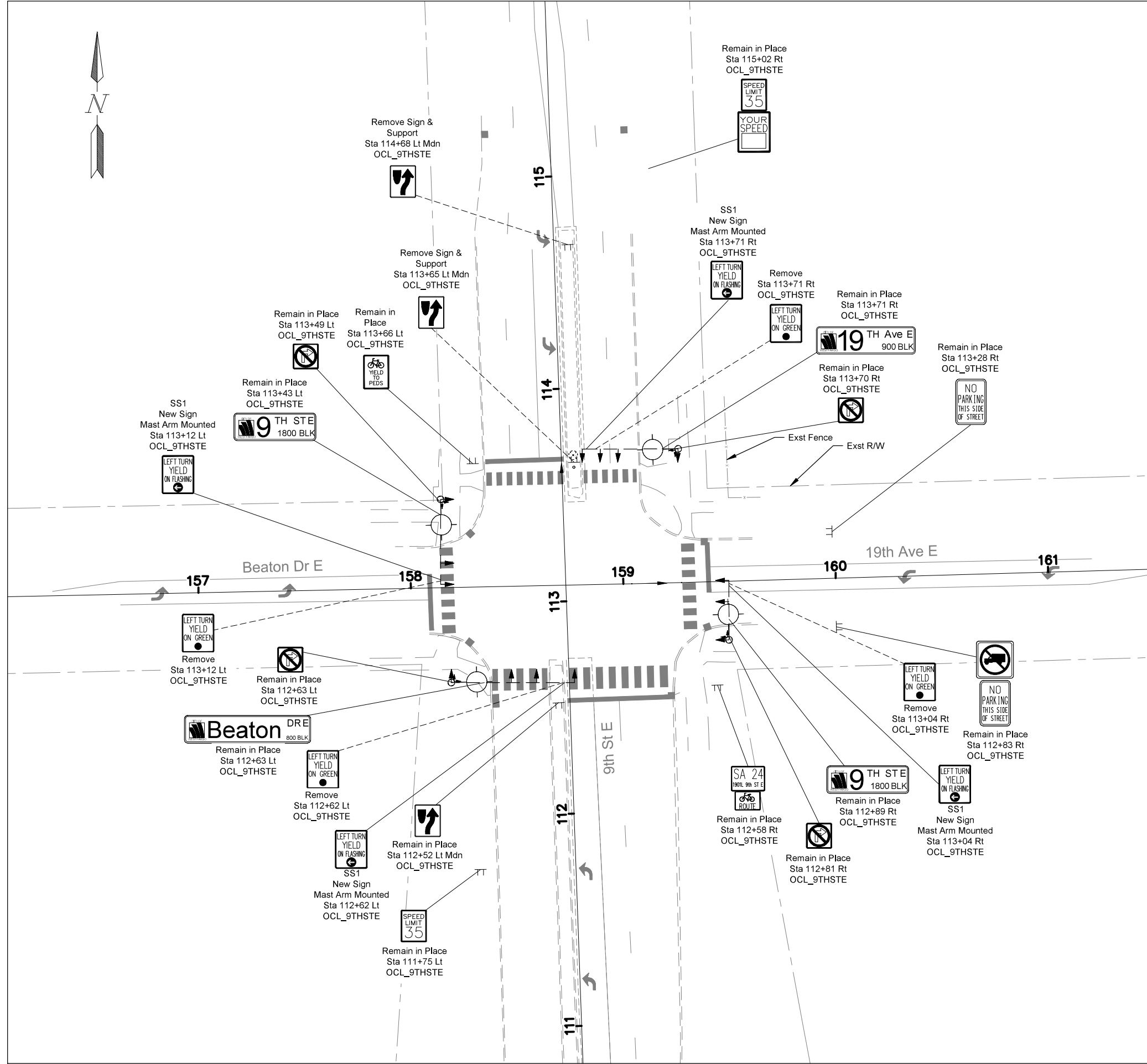
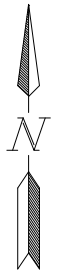
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
N.D.	HEU-8-992(049)	110	1

Station / RP	Sign No.	Assembly No.	Flat Sheet For Signs		Sign Support Length				Vert Clearance FT	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								
Site 1: 9th St E & 19th Ave E																							
112+62 Lt	SS1	10		7.5																		Mount on Mast Arm	
113+04 Rt	SS1	10		7.5																		Mount on Mast Arm	
113+12 Lt	SS1	10		7.5																		Mount on Mast Arm	
113+71 Rt	SS1	10		7.5																		Mount on Mast Arm	
Sub Total			0.0	30.0	Total	0.0																	
Site 2: 32nd Ave E & 4th St E																							
223+33 Lt mdn	RESET	9						7.0	2 x 2 12 ga											1	1		
225+95 Lt	SS1	10		7.5																		Mount on Mast Arm	
227+29 Lt mdn	SS1	10		7.5																		Mount on Mast Arm	
270+26 Lt	SS1	10		7.5																		Mount on Mast Arm	
272+64 Lt	SS1	10		7.5																		Mount on Mast Arm	
274+25 Lt mdn	RESET	9																		1		Mount on Light Standard	
Sub Total			0.0	30.0	Total	0.0															2	1	0
Site 3: Sheyenne St & 38th Ave W																							
308+95 Lt	RESET	9						7.0	2 x 2 12 ga											1	1		
311+76 Lt	SS1	10		7.5																		Mount on Mast Arm	
312+84 Lt	SS1	10		7.5																		Mount on Mast Arm	
Sub Total			0.0	15.0	Total	0.0															1	1	0
Grand Total			0.0	75.0	Total	0.0															3	2	0



Sign Summary
 Perforated Tube
 Various West Fargo Intersections
 Signal & Turn Lane Modifications

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEU-8-992(049)	110	2

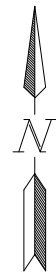


Various West Fargo Intersections
Signal & Turn Lane Modifications

9th St E & 19th Ave E - Site 1

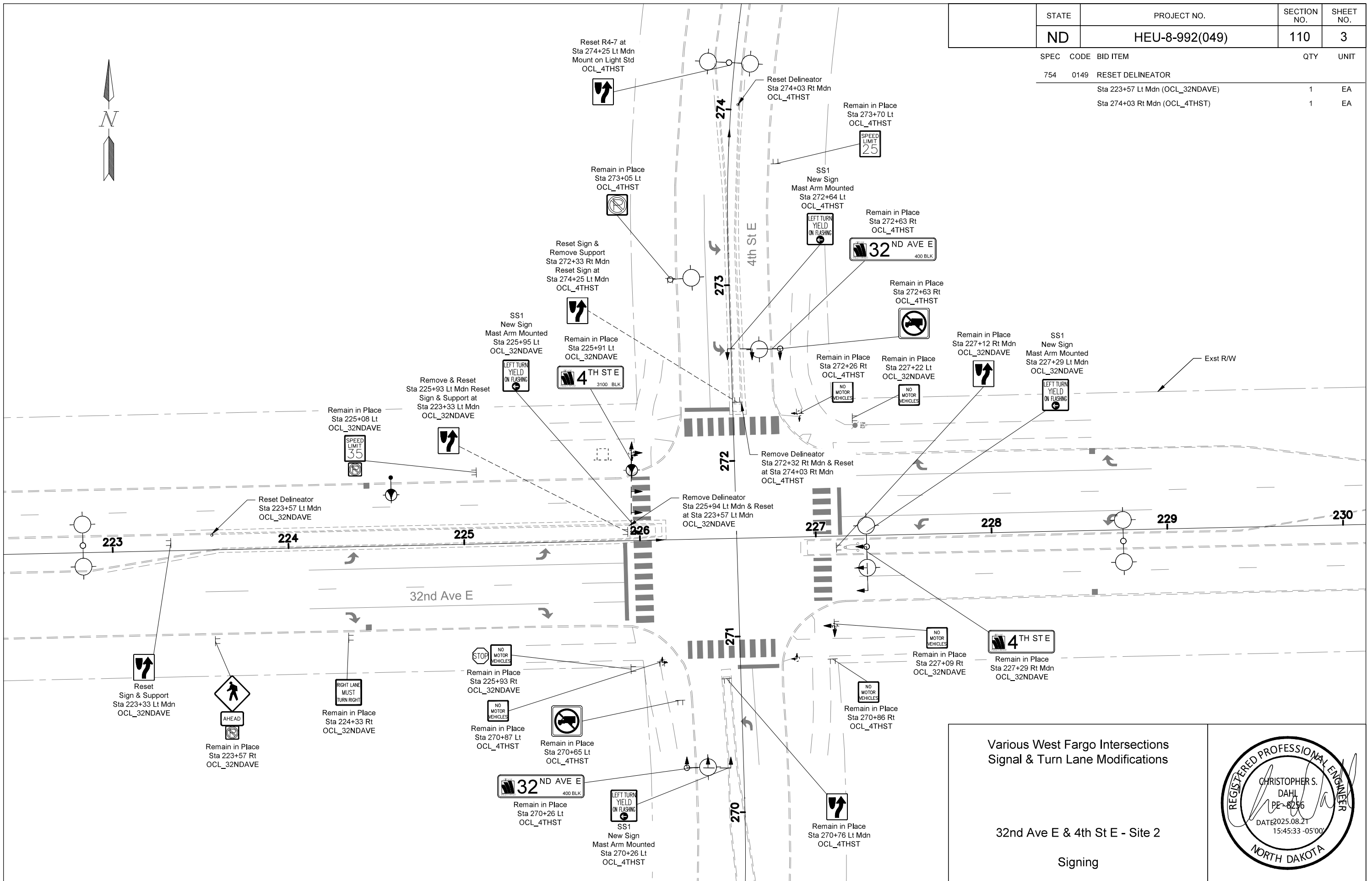
Signing





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEU-8-992(049)	110	3

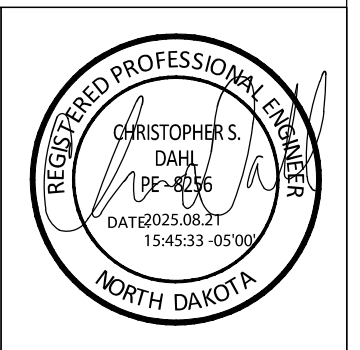
SPEC	CODE	BID ITEM	QTY	UNIT
754	0149	RESET DELINEATOR		
		Sta 223+57 Lt Mdn (OCL_32NDAVE)	1	EA
		Sta 274+03 Rt Mdn (OCL_4THST)	1	EA

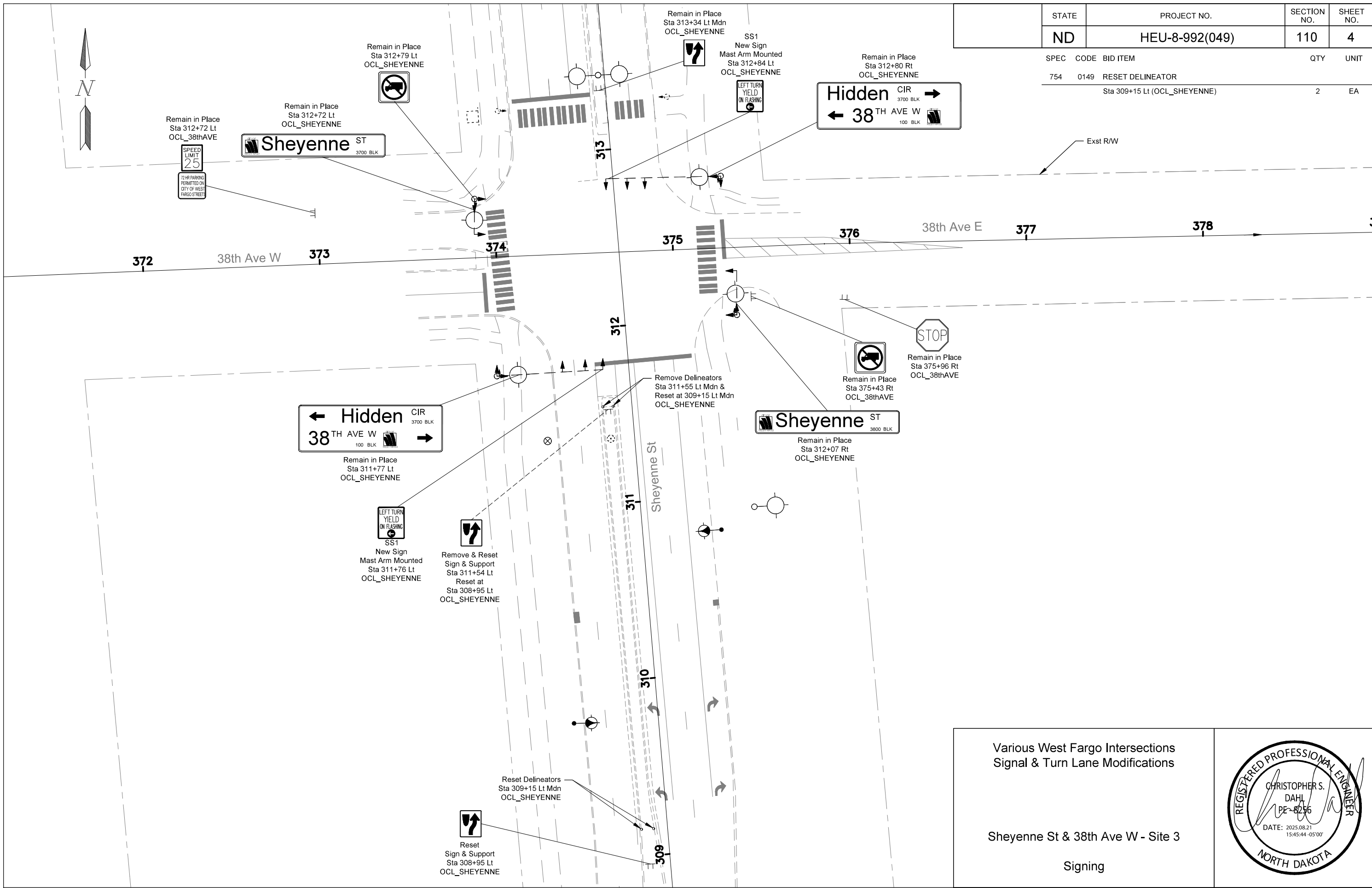


Various West Fargo Intersections
Signal & Turn Lane Modifications

32nd Ave E & 4th St E - Site 2

Signing





Various West Fargo Intersections
Signal & Turn Lane Modifications

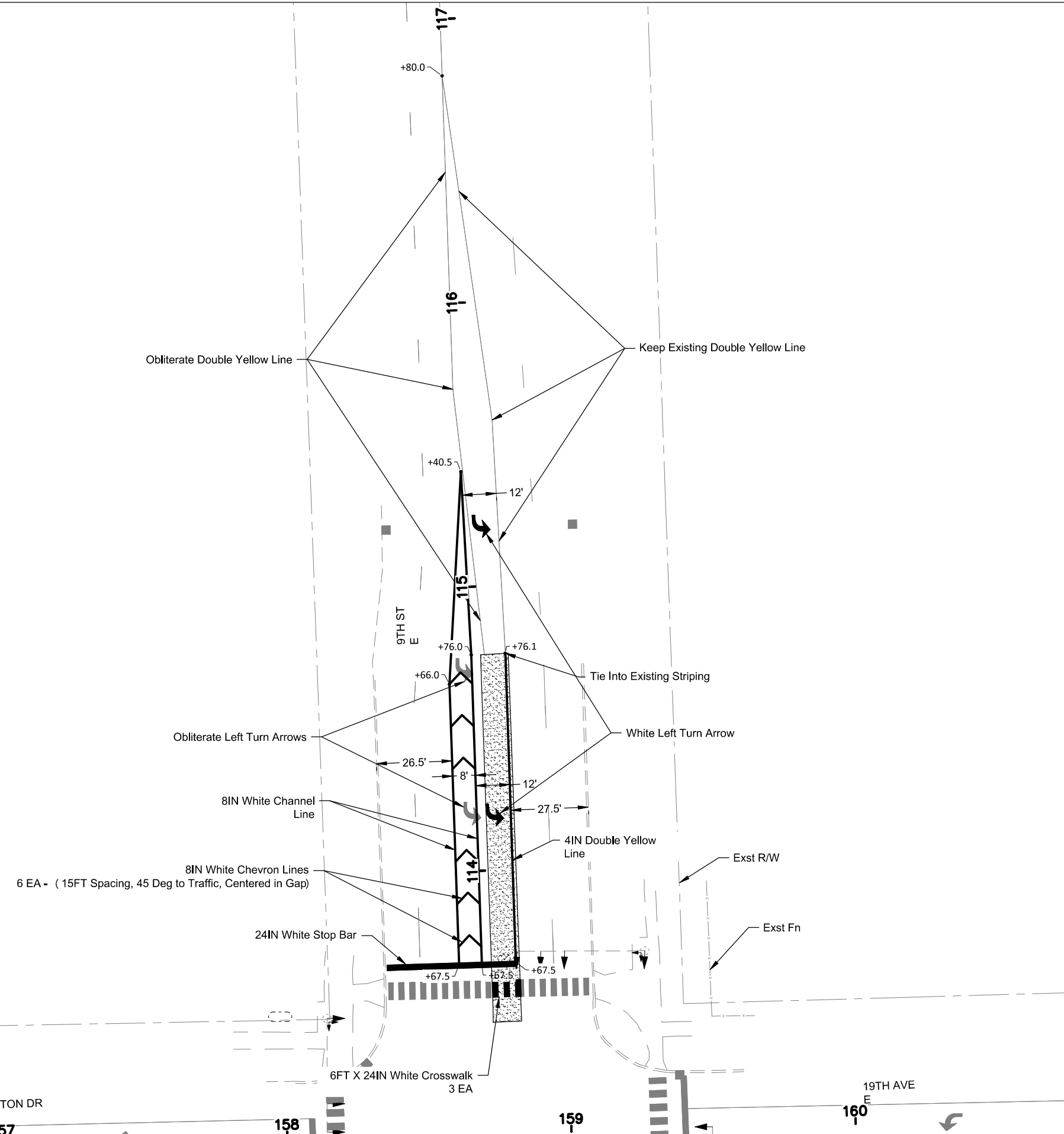
Sheyenne St & 38th Ave W - Site 3

Signing



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEU-8-992(049)	120	1

SPEC CODE	BID ITEM	QTY	UNIT
704 1500	OBLITERATION OF PAVEMENT MARKING		
	Left Turn Arrows	32	SF
	Double Yellow Line	137	SF
762 0110	EPOXY PVMT MK 4IN LINE-GROOVED		
	Double Yellow Line	218	LF
762 0132	EPOXY PVMT MK 8IN LINE-GROOVED		
	White Channel Line	347	LF
	White Chevron Line	69	LF
762 0135	EPOXY PVMT MK 24IN LINE-GROOVED		
	White Stop Bar	46	LF
	White Crosswalk	18	LF
762 0136	EPOXY PVMT MK MESSAGE-GROOVED		
	White Left Turn Arrows	32	SF



LEGEND	
	EXISTING PAVEMENT MARKINGS
	PROPOSED PAVEMENT MARKINGS
	PROPOSED ROADWAY PAVEMENT

Various West Fargo Intersections
Signal & Turn Lane Modifications

9th St E & 19th Ave E - Site 1
North Leg

Pavement Markings

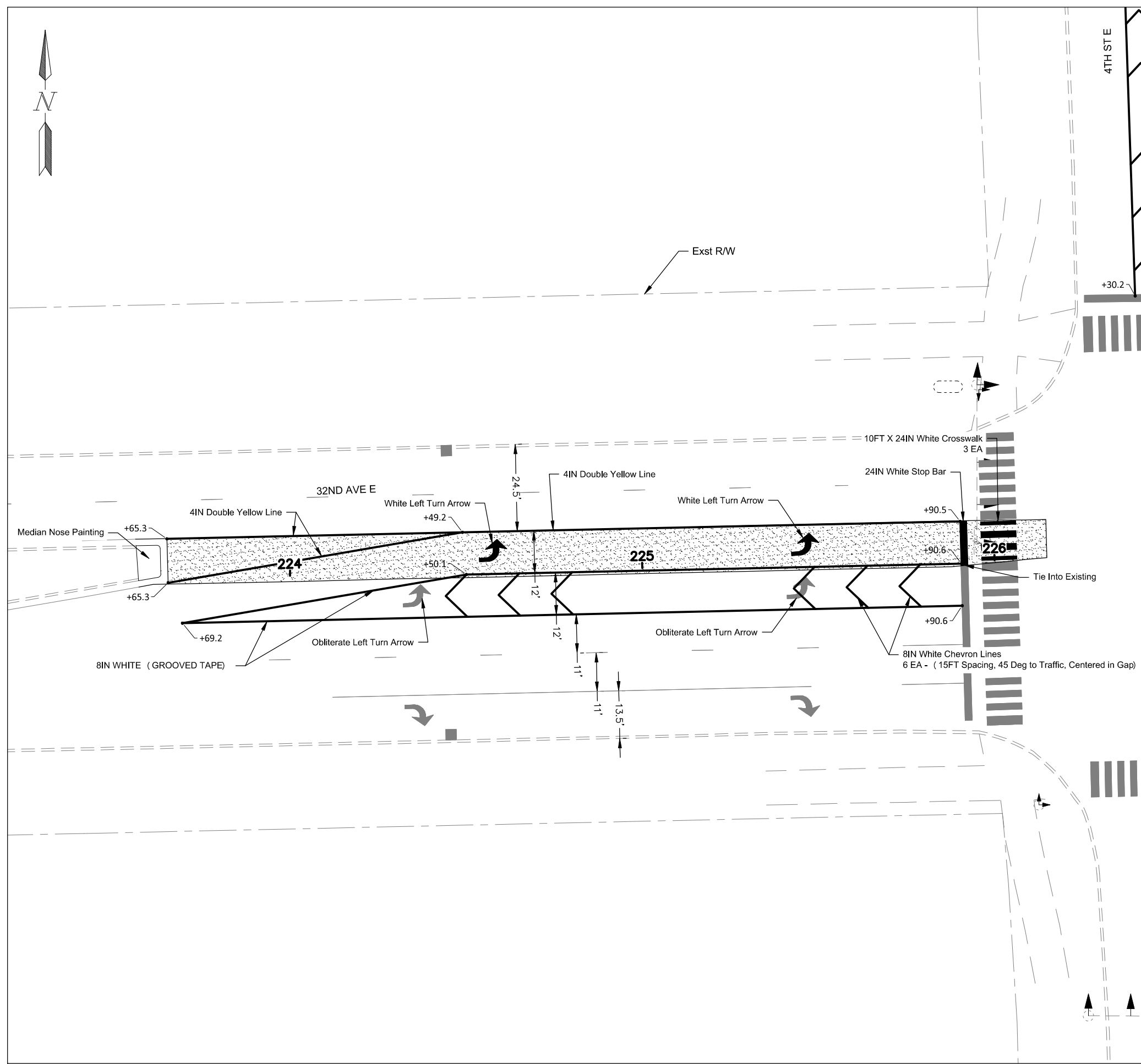




STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEU-8-992(049)	120	2

SPEC CODE	BID ITEM	QTY	UNIT
704 1500	OBLITERATION OF PAVEMENT MARKING Left Turn Arrows	32	SF
762 0110	EPOXY PVMT MK 4IN LINE-GROOVED Double Yellow Line	620	LF
762 0132	EPOXY PVMT MK 8IN LINE-GROOVED White Channel Line White Chevron Line	444 102	LF LF
762 0135	EPOXY PVMT MK 24IN LINE-GROOVED White Stop Bar White Crosswalk	13 30	LF LF
762 0136	EPOXY PVMT MK MESSAGE-GROOVED White Left Turn Arrows	32	SF

NOTE:
1. MEDIAN NOSE PAINTING (YELLOW EPOXY TO BE INCIDENTAL TO BID ITEM 750 0210 CONCRETE MEDIAN NOSE PAVING.



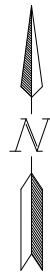
LEGEND	
	EXISTING PAVEMENT MARKINGS
	PROPOSED PAVEMENT MARKINGS
	PROPOSED ROADWAY PAVEMENT

Various West Fargo Intersections
Signal & Turn Lane Modifications

32nd Ave E & 4th St E - Site 2
West Leg

Pavement Markings

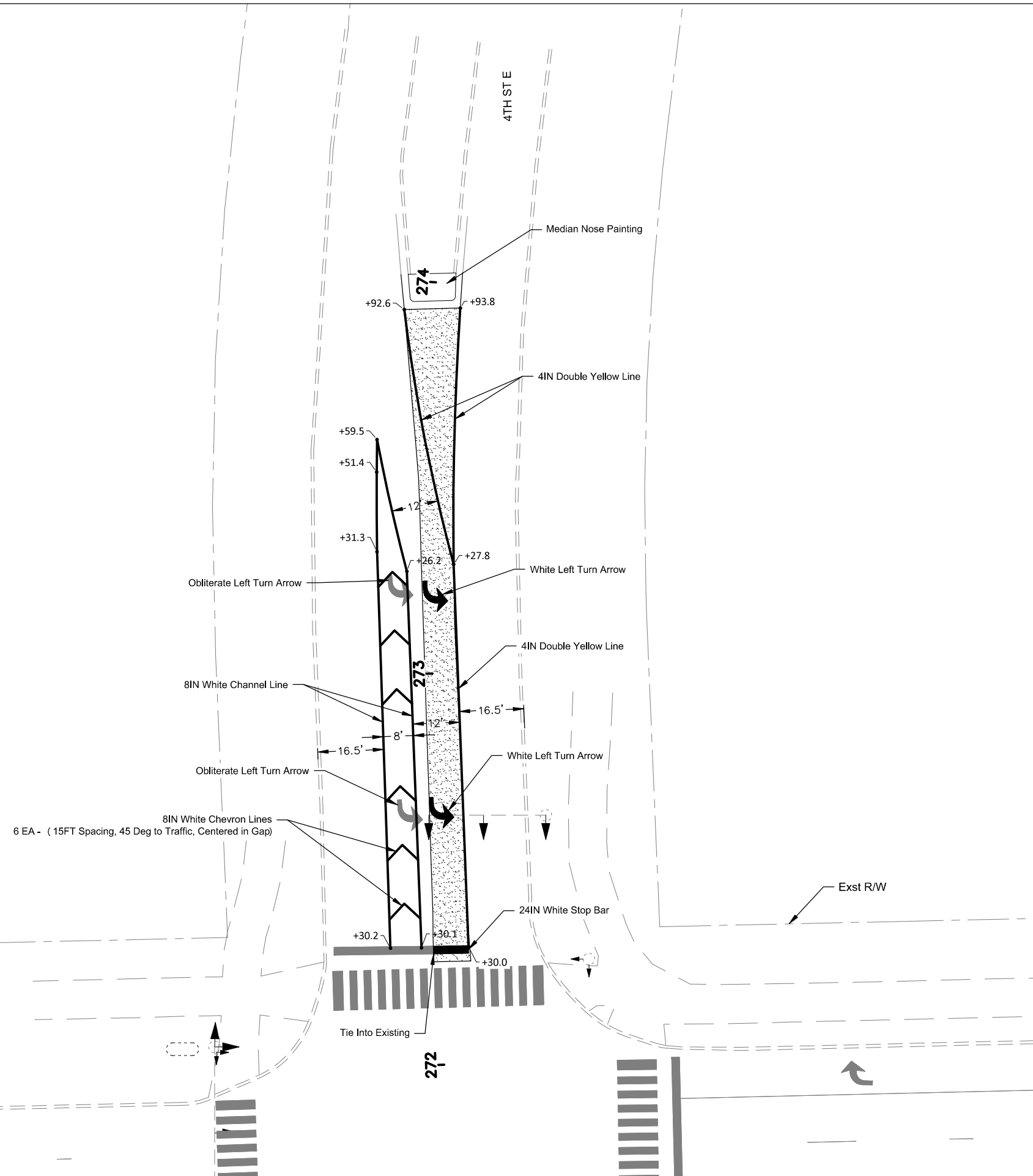




	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEU-8-992(049)	120	3

SPEC CODE	BID ITEM	QTY	UNIT
704 1500	OBLITERATION OF PAVEMENT MARKING Left Turn Arrows	32	SF
762 0110	EPOXY PVMT MK 4IN LINE-GROOVED Double Yellow Line	460	LF
762 0132	EPOXY PVMT MK 8IN LINE-GROOVED White Channel Line White Chevron Line	261 64	LF LF
762 0135	EPOXY PVMT MK 24IN LINE-GROOVED White Stop Bar	9	LF
762 0136	EPOXY PVMT MK MESSAGE-GROOVED White Left Turn Arrows	32	SF

NOTE:
1. MEDIAN NOSE PAINTING (YELLOW EPOXY) TO BE INCIDENTAL TO BID ITEM 750 0210 CONCRETE MEDIAN NOSE PAVING.

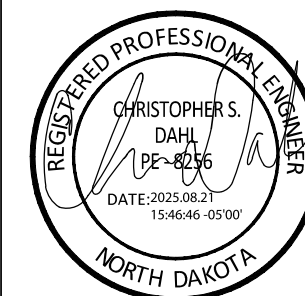


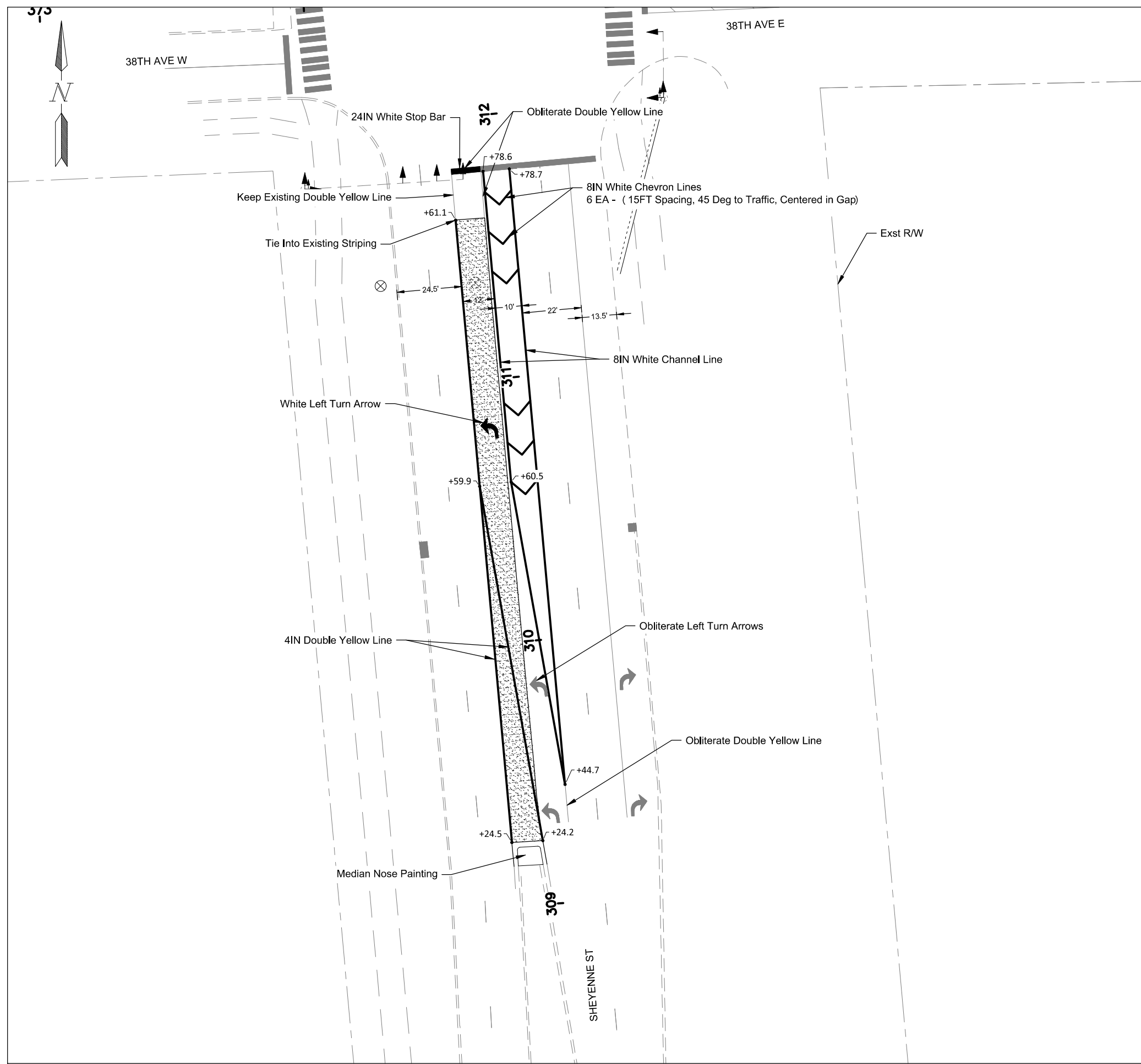
LEGEND	
	EXISTING PAVEMENT MARKINGS
	PROPOSED PAVEMENT MARKINGS
	PROPOSED ROADWAY PAVEMENT

Various West Fargo Intersections
Signal & Turn Lane Modifications

32nd Ave E & 4th St E - Site 2
North Leg

Pavement Markings





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEU-8-992(049)	120	4

SPEC CODE	BID ITEM	QTY	UNIT
704 1500	OBLITERATION OF PAVEMENT MARKING		
	Left Turn Arrows	16	SF
	Double Yellow - Solid	20	SF
	White Channel Line	64	SF
762 0110	EPOXY PVMT MK 4IN LINE-GROOVED		
	Double Yellow Line	746	LF
762 0132	EPOXY PVMT MK 8IN LINE-GROOVED		
	White Channel Line	449	LF
	White Chevron Line	80	LF
762 0135	EPOXY PVMT MK 24IN LINE-GROOVED		
	White Stop Bar	16	LF
762 0136	EPOXY PVMT MK MESSAGE-GROOVED		
	White Left Turn Arrows	16	SF

NOTE:
 1. MEDIAN NOSE PAINTING (YELLOW EPOXY) TO BE INCIDENTAL TO BID ITEM 750 0210 CONCRETE MEDIAN NOSE PAVING.

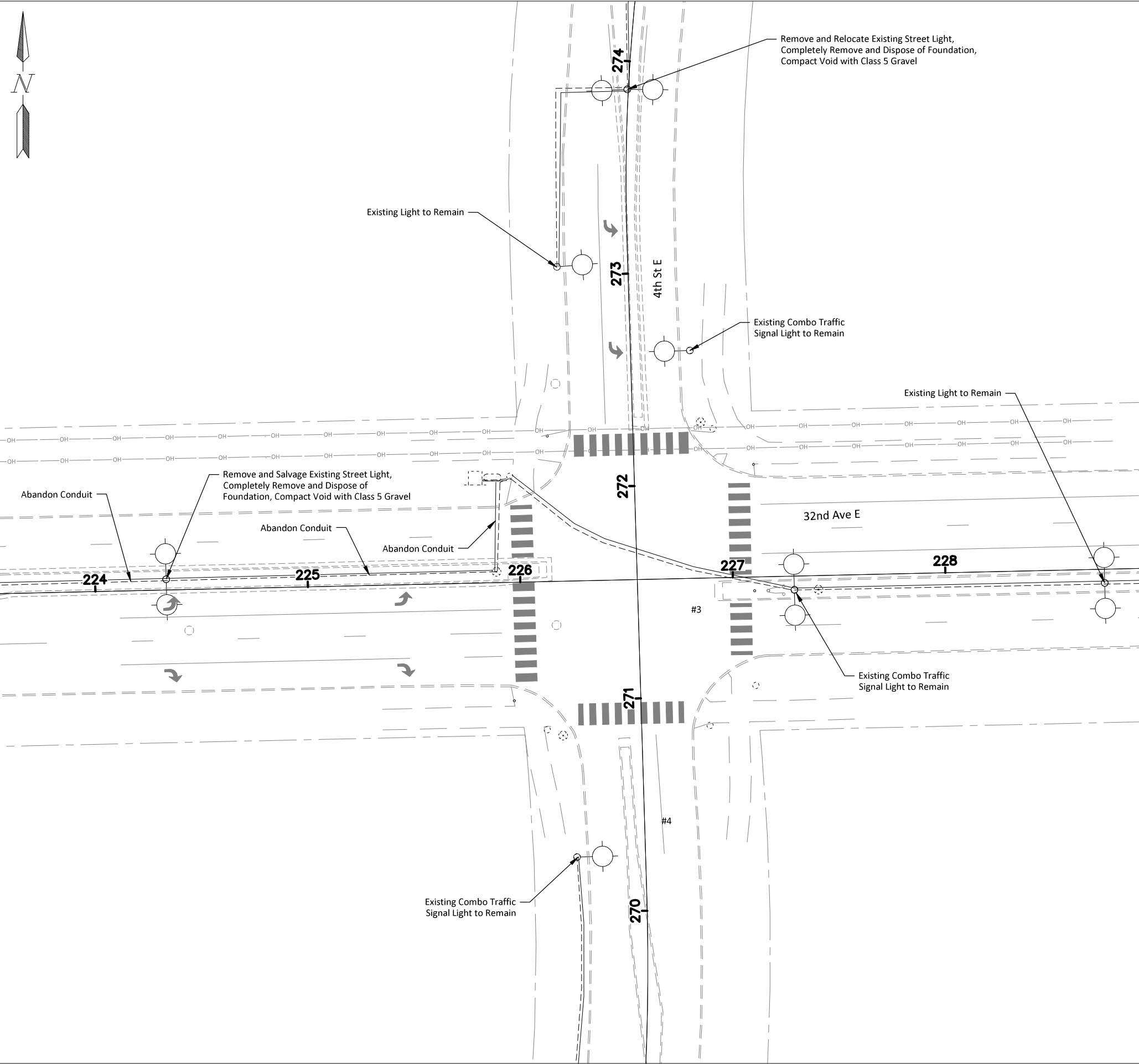
LEGEND	
	EXISTING PAVEMENT MARKINGS
	PROPOSED PAVEMENT MARKINGS
	PROPOSED ROADWAY PAVEMENT

Various West Fargo Intersections
 Signal & Turn Lane Modifications

Sheyenne St & 38th Ave - Site 3
 South Leg

Pavement Markings





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEU-8-992(049)	140	1

- Legend**
- Existing Controller and Cabinet
 - Existing Feedpoint
 - Existing Conduit & Wire
 - Existing Pull Box
 - Existing Light Standard
 - Existing Signal Standard Foundation
 - Existing Pedestrian Pushbutton Post

LIGHTING QUANTITIES	
REMOVE LIGHT STANDARD	
EA	
1	

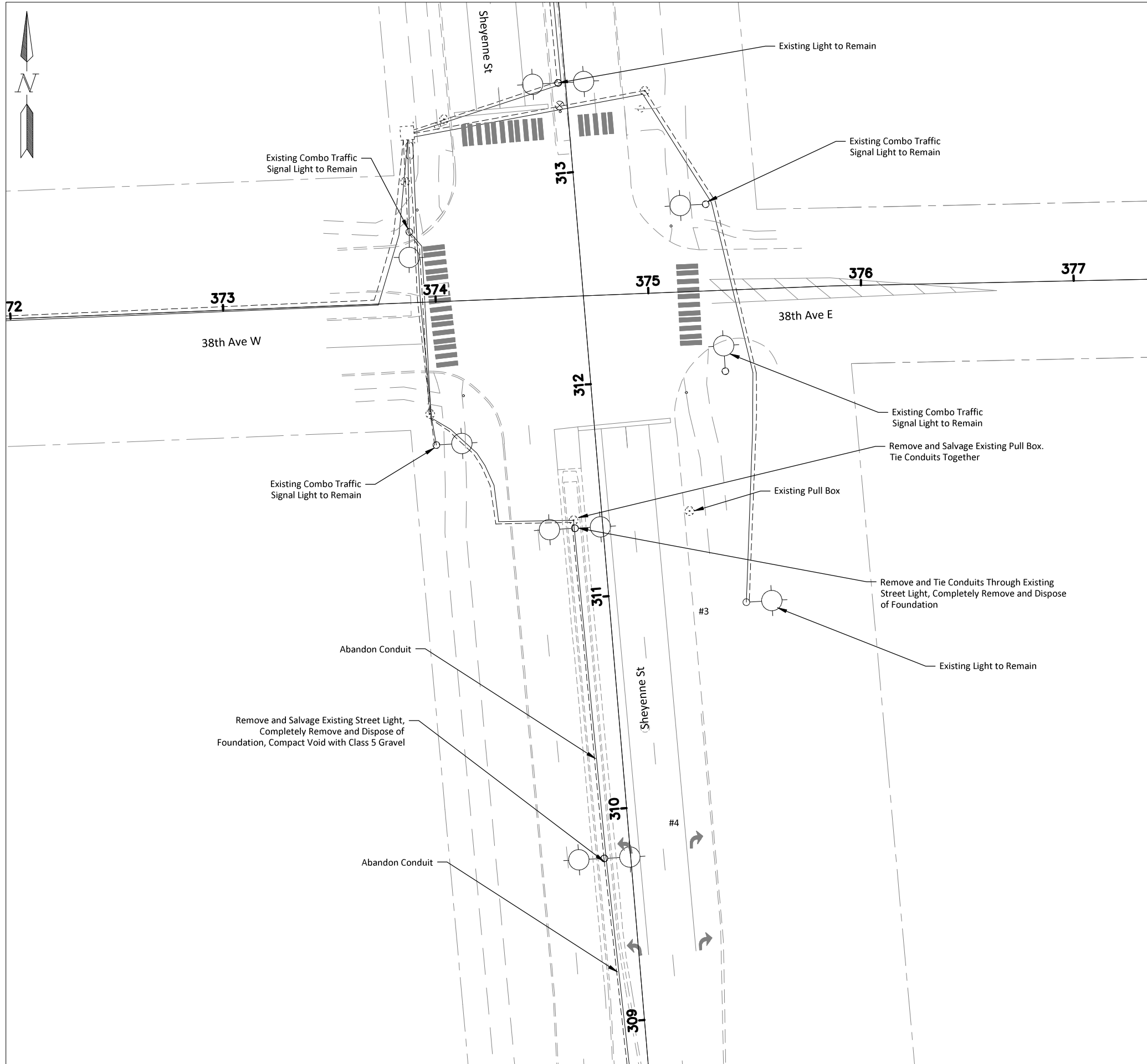
Items shall be included in the corresponding price bid "LIGHTING SYSTEM (ROADWAY)"

Various West Fargo Intersections
Signal & Turn Lane Modifications

32nd Ave E & 4th St E - Site 2
Lighting Removals

Lighting System





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEU-8-992(049)	140	2

- Legend**
- Existing Controller and Cabinet
 - Existing Feedpoint
 - Existing Conduit & Wire
 - Existing Pull Box
 - Existing Light Standard
 - Existing Signal Standard Foundation
 - Existing Pedestrian Pushbutton Post

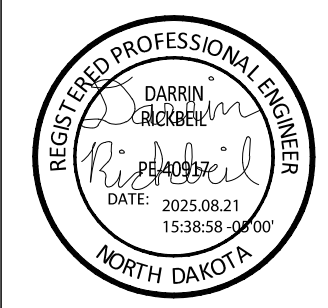
LIGHTING QUANTITIES	
REMOVE LIGHT STANDARD	
EA	
2	

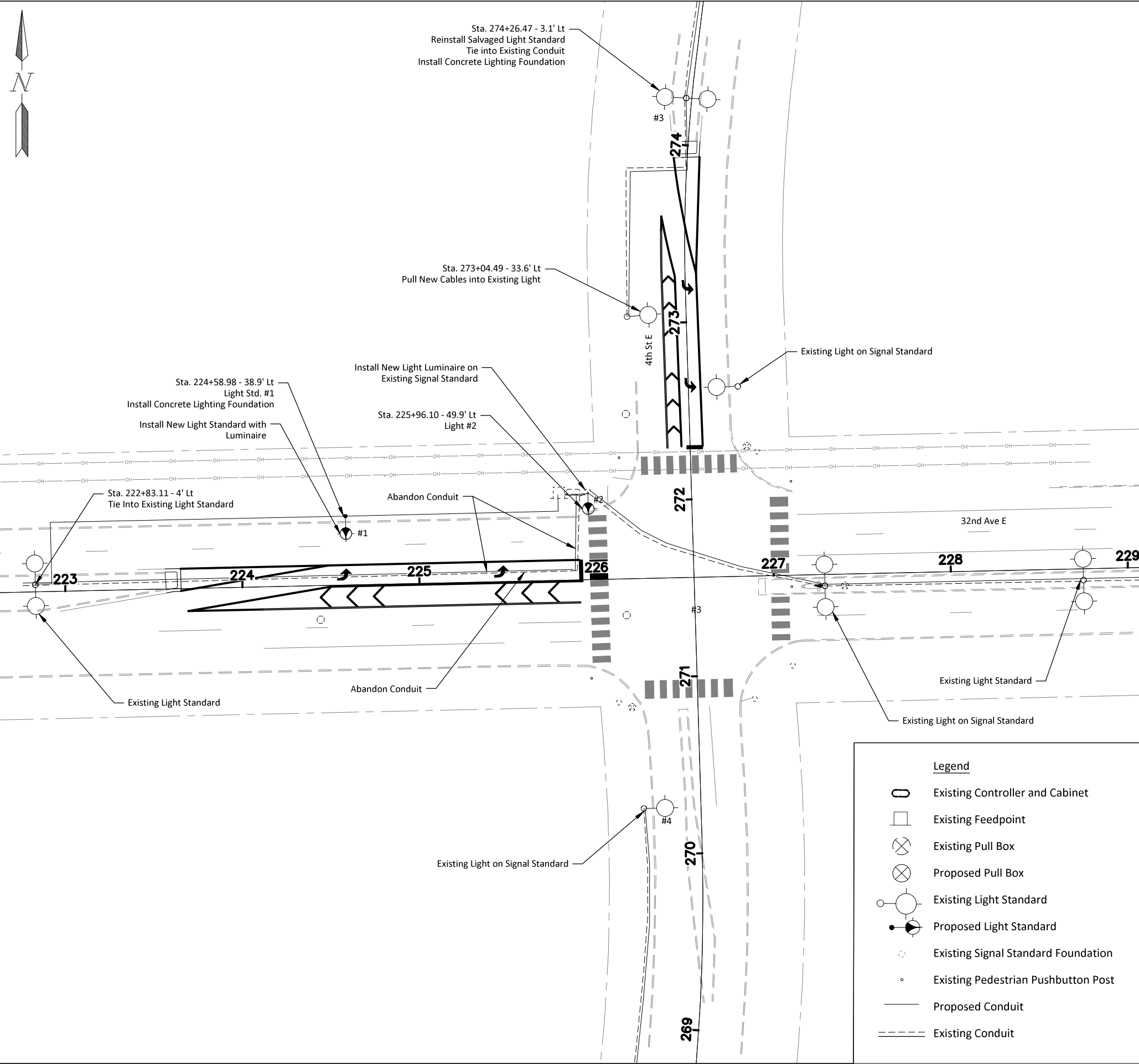
Items shall be included in the corresponding price bid "LIGHTING SYSTEM (ROADWAY)"

Various West Fargo Intersections
Signal & Turn Lane Modifications

Sheyenne St & 38th Ave - Site 3
Lighting Removals

Lighting System





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEU-8-992(049)	140	3

Light Standards and Pull Boxes					
Light Std/Pull Box Number	Station	Conduit Runs		Cable Runs	
		LF	Dia	LF	Type
Existing Feedpoint TO	225+79.75 - 49.4' Lt	130	2"	800	5 - NO 4 TYPE RHW
Light Std. #1	224+58.98 - 38.9' Lt			130	1 - NO 6 TYPE RHW *
Light Std. #1 TO	224+58.98 - 38.9' Lt	211	2"	1205	5 - NO 4 TYPE RHW
Existing Light Standard	222+83.11 - 4' Lt			211	1 - NO 6 TYPE RHW *
Existing Cabinet TO	225+88.09 - 49.4' Lt			114	3 - NO 6 TYPE RHW *
Light Std. #2	225+96.10 - 48.9' Lt				
Existing Light Standard TO	273+04.49 - 33.6' Lt		2"	558	3 - NO 6 TYPE RHW *
Light Std. #3	274+26.47 - 3.1' Lt				

* - NO 12 Tracer Wire

Light Standards					
No.	Station	Offset	Wattage	Pole Ht.	Note
1	224+58.98	38.9' Lt	57	30'	
2	225+96.10	49.9' Lt	57	30'	Installed on Existing Signal Standard
3	274+26.47	3.1' Lt	57	30'	Reinstalled Salvaged Light Standard from Median

LIGHTING QUANTITIES (LIGHTING SYSTEM (ROADWAY))						
CONCRETE FOUNDATION-COMMERCIAL STREET LIGHT	2IN DIAMETER HDPE or PVC CONDUIT	UNDERGROUND CONDUCTOR NO4-TYPE RHW	UNDERGROUND CONDUCTOR NO6-TYPE RHW	LT STD 6FT MA 30FT MT HT	LED LUMINAIRE	LT STD EXTENSION 6FT MA 30FT MT HT
EA	LF	LF	LF	EA	EA	EA
2	341	2005	1013	1	2	1

Items shall be included in the corresponding price bid "LIGHTING SYSTEM (ROADWAY)"

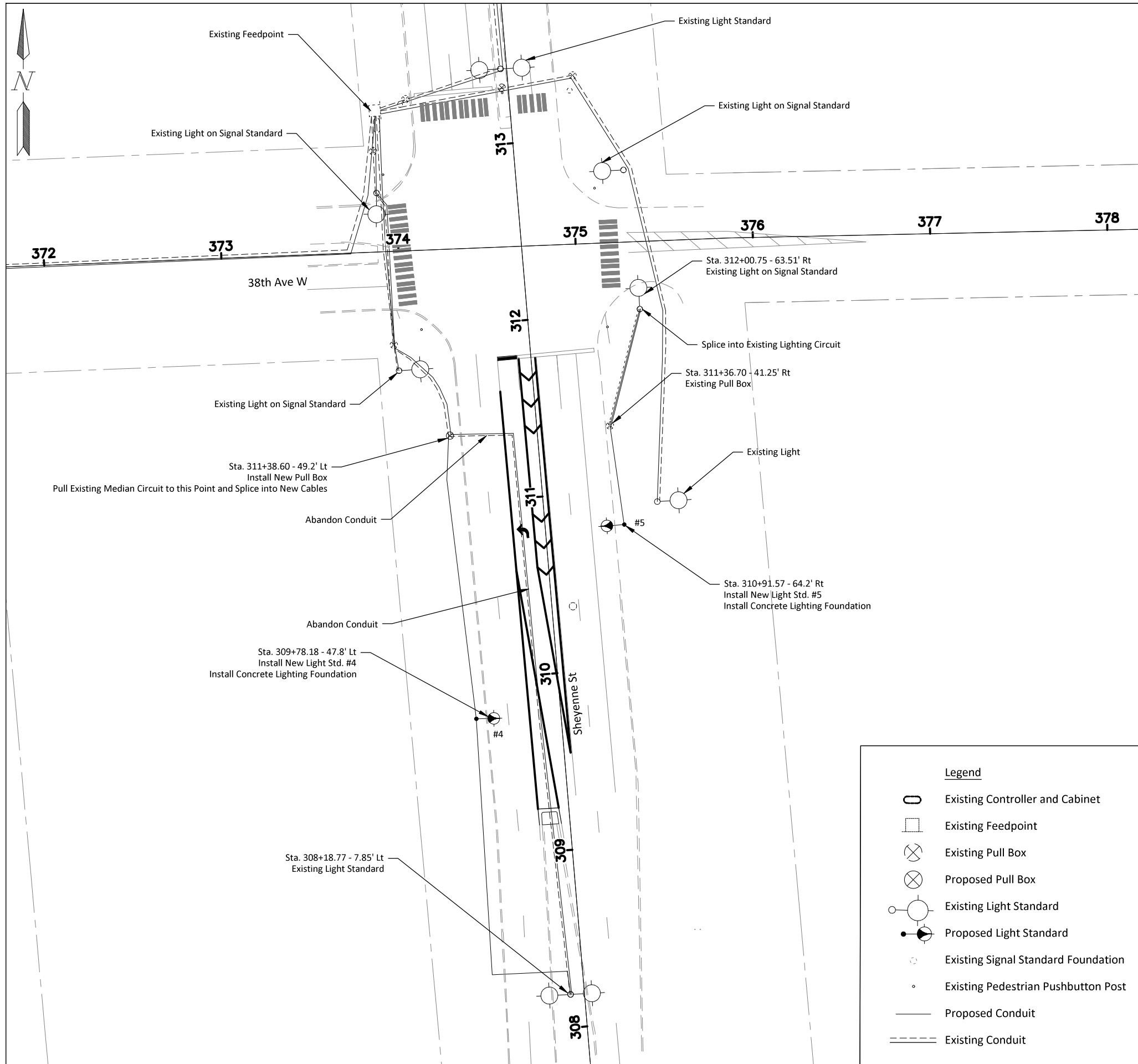
Note: Install new lighting circuits before removing existing lighting to minimize light outage

Various West Fargo Intersections
Signal & Turn Lane Modifications

32nd Ave E & 4th St E - Site 2
Lighting Layout

Lighting System





	STATE ND	PROJECT NO. HEU-8-992(049)	SECTION NO. 140	SHEET NO. 4
--	--------------------	--------------------------------------	---------------------------	-----------------------

Light Standards and Pull Boxes					
Light Std/Pull Box Number	Station	Conduit Runs		Cable Runs	
		LF	Dia	LF	Type
Existing Light Standard	308+18.77 - 7.85' Lt	202	2"	1210	5 - NO 6 TYPE RHW *
Light Std. #4	309+78.18 - 47.8' Lt				
Light Std. #4 TO	309+78.18 - 47.8' Lt	161	2"	855	5 - NO 6 TYPE RHW *
New Pull Box	311+38.60 - 49.2' Lt				
Existing Signal Standard	312+00.75 - 63.51' Rt	57	2"	675	5 - NO 6 TYPE RHW *
Light Std. #5	310+91.57 - 64.2' Rt				

* - NO 12 Tracer Wire

Light Standards					
No.	Station	Offset	Wattage	Pole Ht.	Note
4	311+31.17	47.8' Lt	57	30	
5	310+91.57	64.2' Rt	57	30	

LIGHTING QUANTITIES (LIGHTING SYSTEM (ROADWAY))						
CONCRETE FOUNDATION-COMMERCIAL STREET LIGHT	PULL BOX	2IN DIAMETER HDPE or PVC CONDUIT	UNDERGROUND CONDUCTOR NO6-TYPE RHW	6" LT STD 6FT MA 30FT MT HT	LED LUMINAIRE	RELOCATE LIGHT STANDARD
EA	EA	LF	LF	EA	EA	EA
2	1	420	2740	2	2	1

Items shall be included in the corresponding price bid "LIGHTING SYSTEM (ROADWAY)"

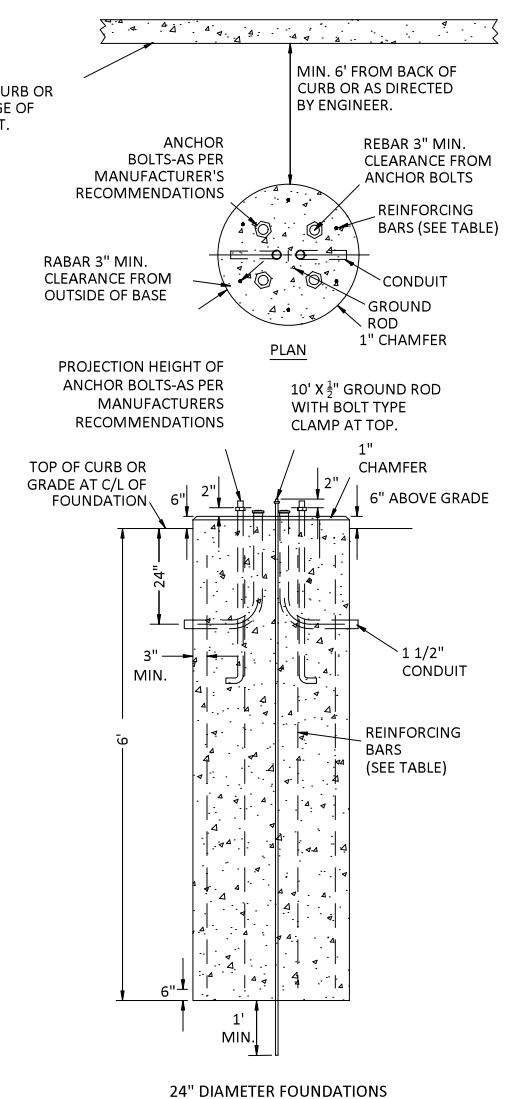
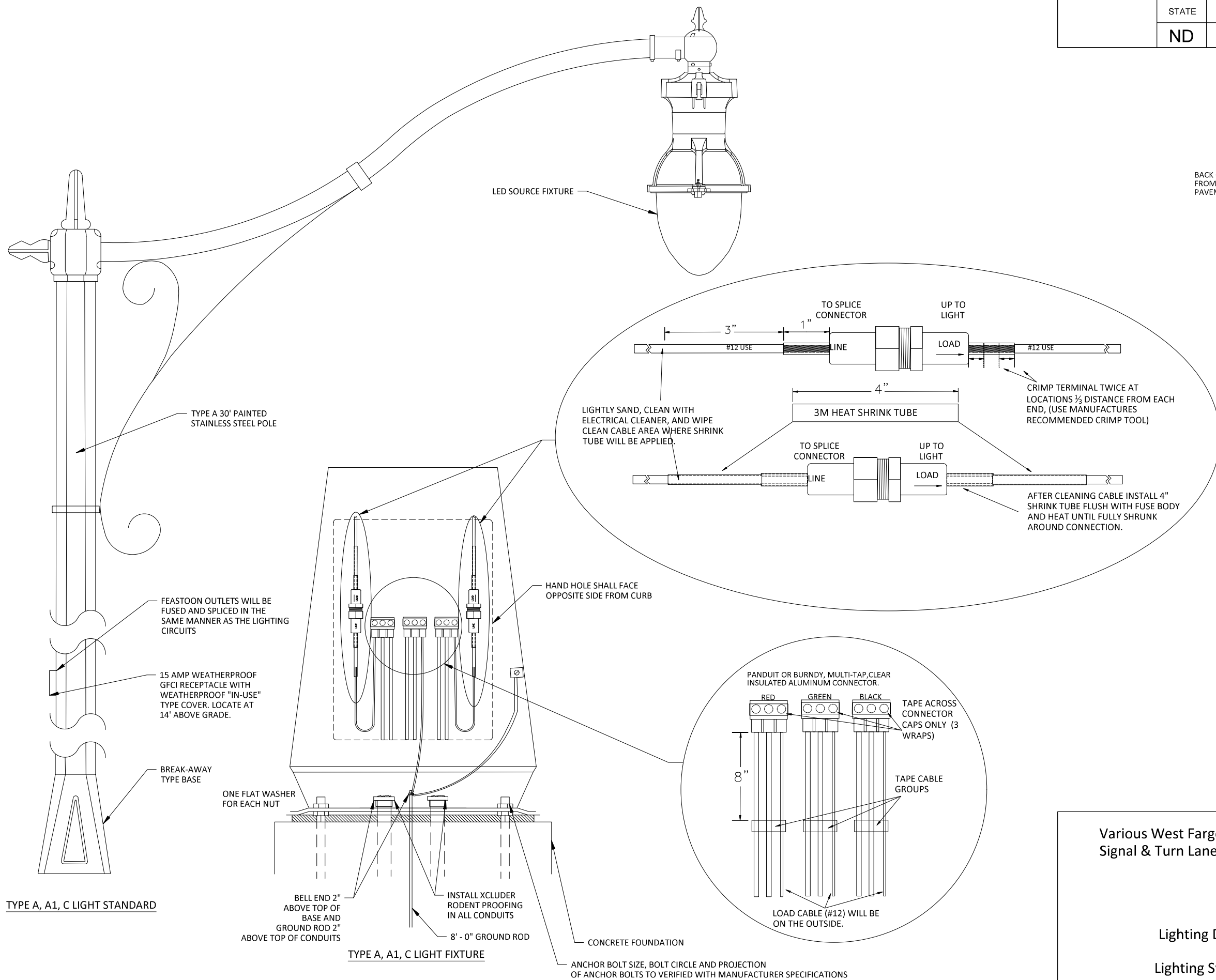
Note: Install new lighting circuits before removing existing lighting to minimize light outage

**Various West Fargo Intersections
Signal & Turn Lane Modifications**

**Sheyenne St & 38th Ave - Site 3
Lighting Layout**

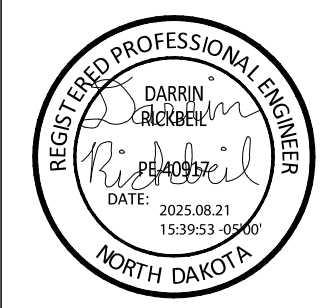
Lighting System

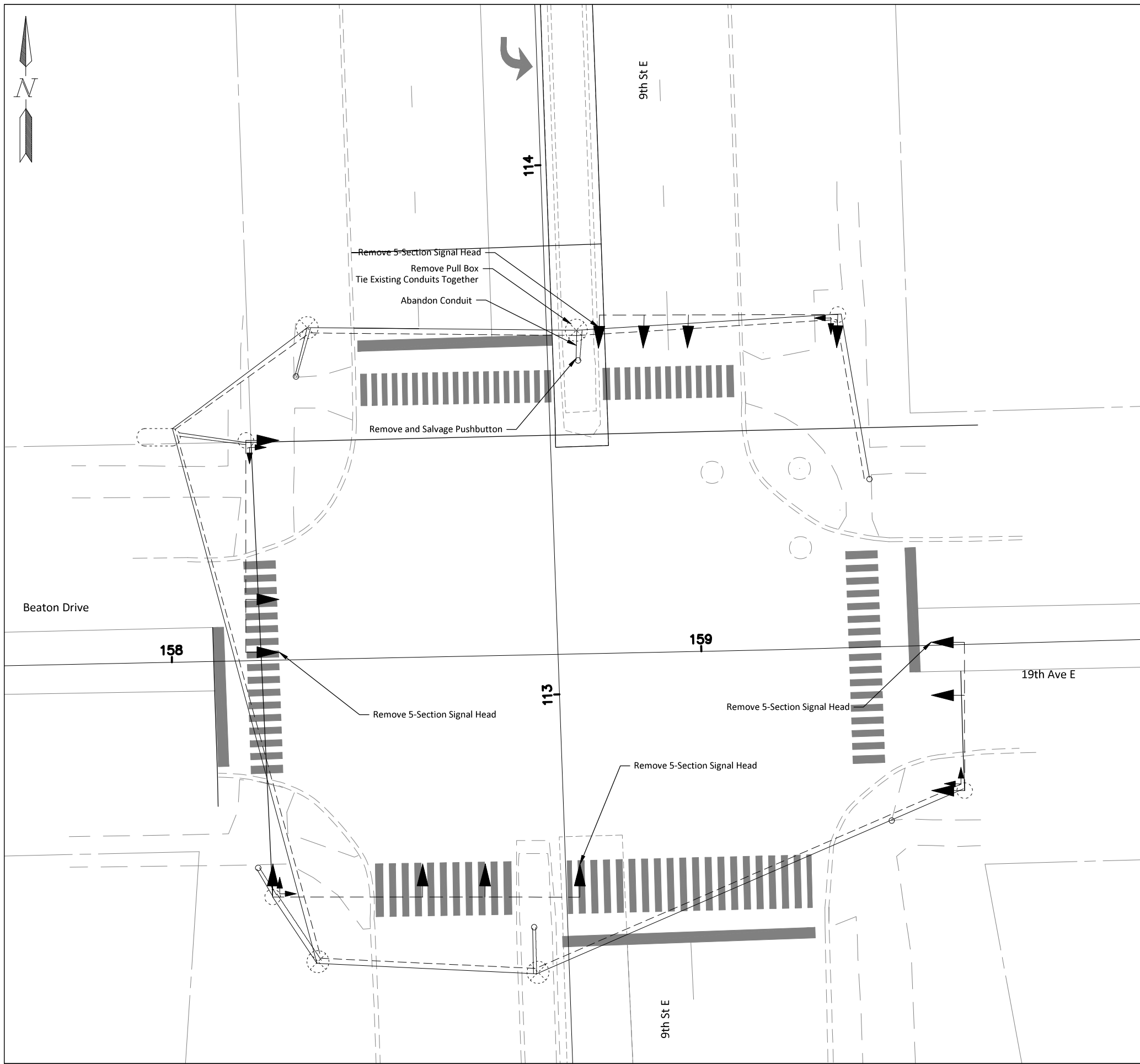
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEU-8-992(049)	140	5



Various West Fargo Intersections
Signal & Turn Lane Modifications

Lighting Detail
Lighting System





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEU-8-992(049)	150	1

- Legend**
- Existing Signal Mast Arm
 - Existing Signal Std. Pole
 - ▶ Signal Head
 - ⋯ Existing Controller and Cabinet
 - ⊗ Existing Pull Box
 - Existing Pushbutton

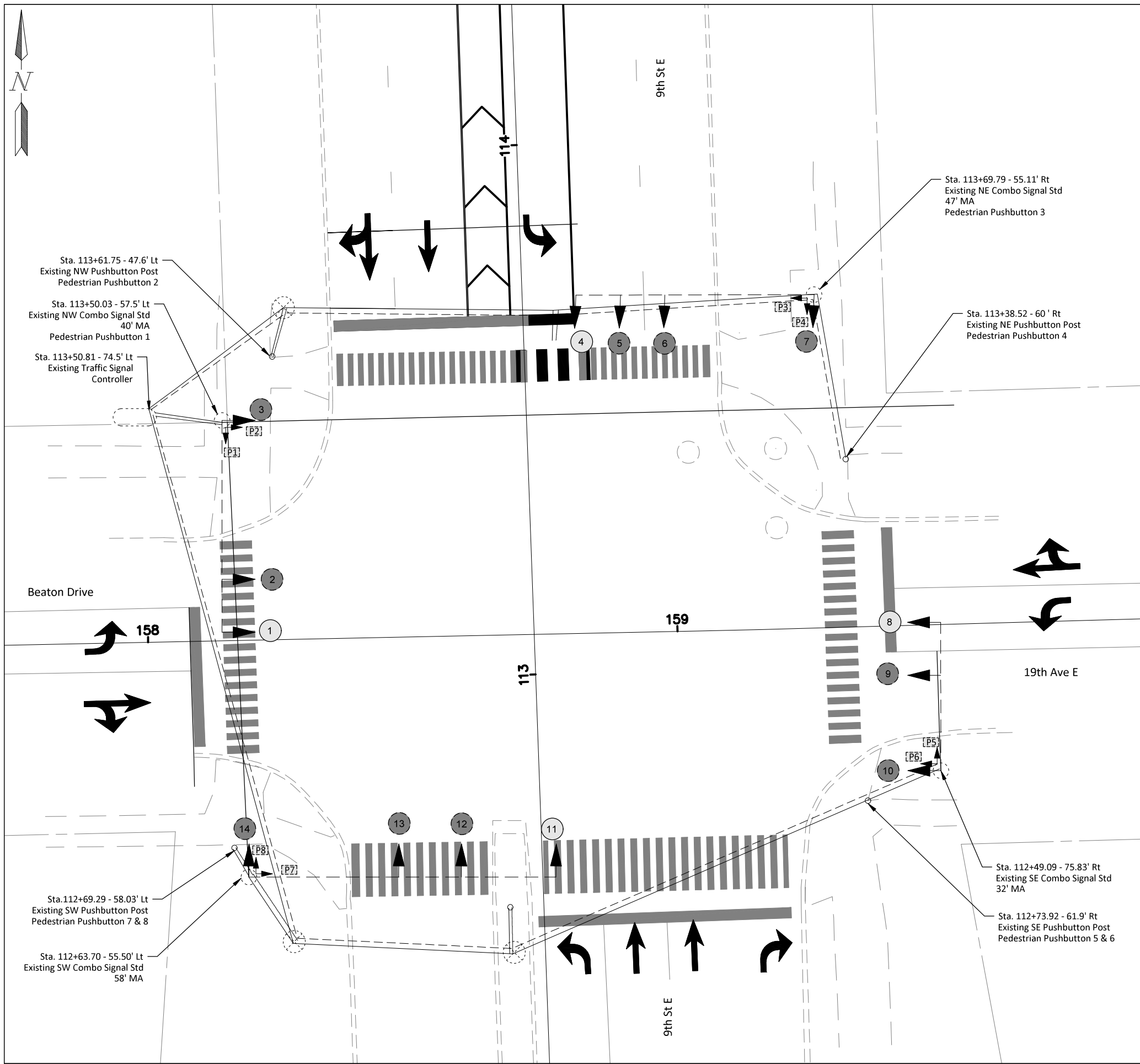
Note: Salvaged items will be dropped off at the West Fargo City Yard (810 12th Ave NW, West Fargo, ND 58078)

Various West Fargo Intersections
Signal & Turn Lane Modifications

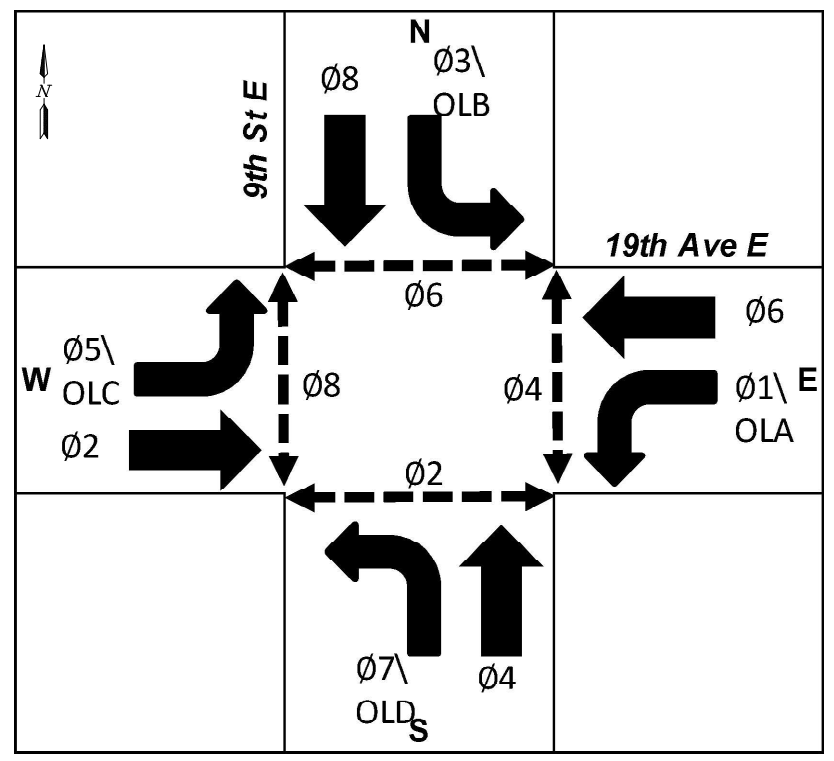
9th St E & 19th Ave E - Site 1
Signal Removals

Traffic Signal






STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEU-8-992(049)	150	2




Note: See section 150 sheet 16 for new wire quantities.

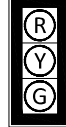
Legend

- 13 New Signal Head Number
 - 14 Existing Signal Head Number
 - P1 Existing Pedestrian Head Number
 - Existing Signal Mast Arm
 - Existing Signal Std. Pole
 - Signal Head
 - Existing Controller and Cabinet
 - New Wire
 - Existing Pullbox
 - Existing Pushbutton
- 


Head 7



Heads 1, 4, 8, 11



Heads 2, 3, 5, 6, 9, 10, 12, 13, 14



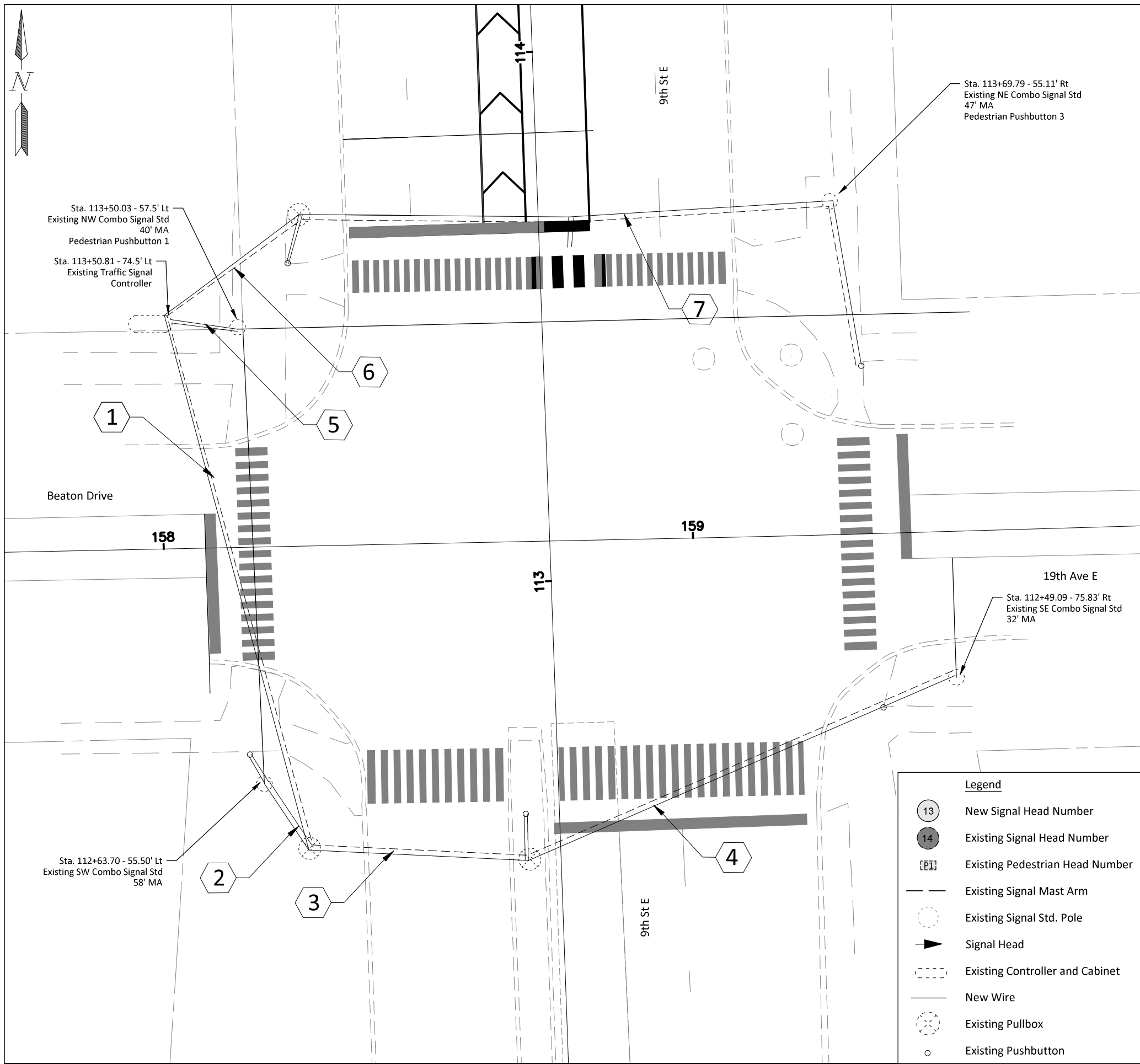
Countdown Pedestrian Heads P1, P2, P3, P4, P5, P6, P7, P8

Various West Fargo Intersections Signal & Turn Lane Modifications

9th St E & 19th Ave E - Site 1
Signal Layout

Traffic Signal





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEU-8-992(049)	150	3

- 1** Pull 2 NO. 14 AWG 20 Conductor Cable from Cabinet to Existing SW Pullbox (250') in each existing 4" Conduit.
 Existing Cables:
 Conduit #1:
 1 - NO. 14 AWG 12 Conductor
 3 - NO. 14 AWG 2 Conductor
 EVP Detector Wire
 Autoscope Wire
 PTZ Camera
 Conduit #2:
 1 - NO. 14 AWG 12 Conductor
 4 - NO.14 AWG 2 Conductor
 EVP Detector Cable
 Autoscope Wire
- 2** Pull 1 NO. 14 AWG 20 Conductor Cable from SW Pullbox to Existing SW Signal Standard (23') in Existing 4" Conduit.
 Existing Cables:
 1 - NO. 14 AWG 12 Conductor
 3 - NO. 14 AWG 2 Conductor
 EVP Detector Wire
 Autoscope Wire
 PTZ Camera Wire
- 3** Pull 1 NO. 14 AWG 20 Conductor Cable from SW Pullbox to Pullbox in South Median (55') in Existing 4" Conduit.
 Existing Cables:
 1 - NO. 14 AWG 12 Conductor
 3 - NO. 14 AWG Conductor
 EVP Detector Wire
 Autoscope Wire
- 4** Pull 1 NO. 14 AWG 20 Conductor Cable from South Median Pullbox to Existing SE Signal Standard (98') in Existing 3" Conduit.
 Existing Cables:
 1 - NO. 14 AWG 12 Conductor
 3 - NO. 14 AWG 2 Conductor
 EVP Detector Wire
 Autoscope Wire
- 5** Pull 1 NO. 14 AWG 20 Conductor Cable from Cabinet to Existing NW Signal Standard (33') in Existing 4" Conduit.
 Existing Cables:
 1 - NO. 14 AWG 12 Conductor
 3 - NO. 14 AWG 2 Conductor
 EVP Detector Wire
 Autoscope Wire
- 6** Pull 1 NO. 14 AWG 20 Conductor Cable from Cabinet to Existing NW Pullbox (55') in Existing 4" Conduit.
 Existing Cables:
 1 - NO. 14 AWG 12 Conductor
 5 - NO. 14 AWG 2 Conductor
 EVP Detector Wire
 Autoscope Wire
 Fiber Optic Cable
- 7** Existing 4" Conduit.
 Existing Cables:
 1 - NO. 14 AWG 20 Conductor
 5 - NO. 14 AWG 2 Conductor
 EVP Detector Wire
 Autoscope Wire

Legend

	New Signal Head Number
	Existing Signal Head Number
	Existing Pedestrian Head Number
	Existing Signal Mast Arm
	Existing Signal Std. Pole
	Signal Head
	Existing Controller and Cabinet
	New Wire
	Existing Pullbox
	Existing Pushbutton

Various West Fargo Intersections
Signal & Turn Lane Modifications

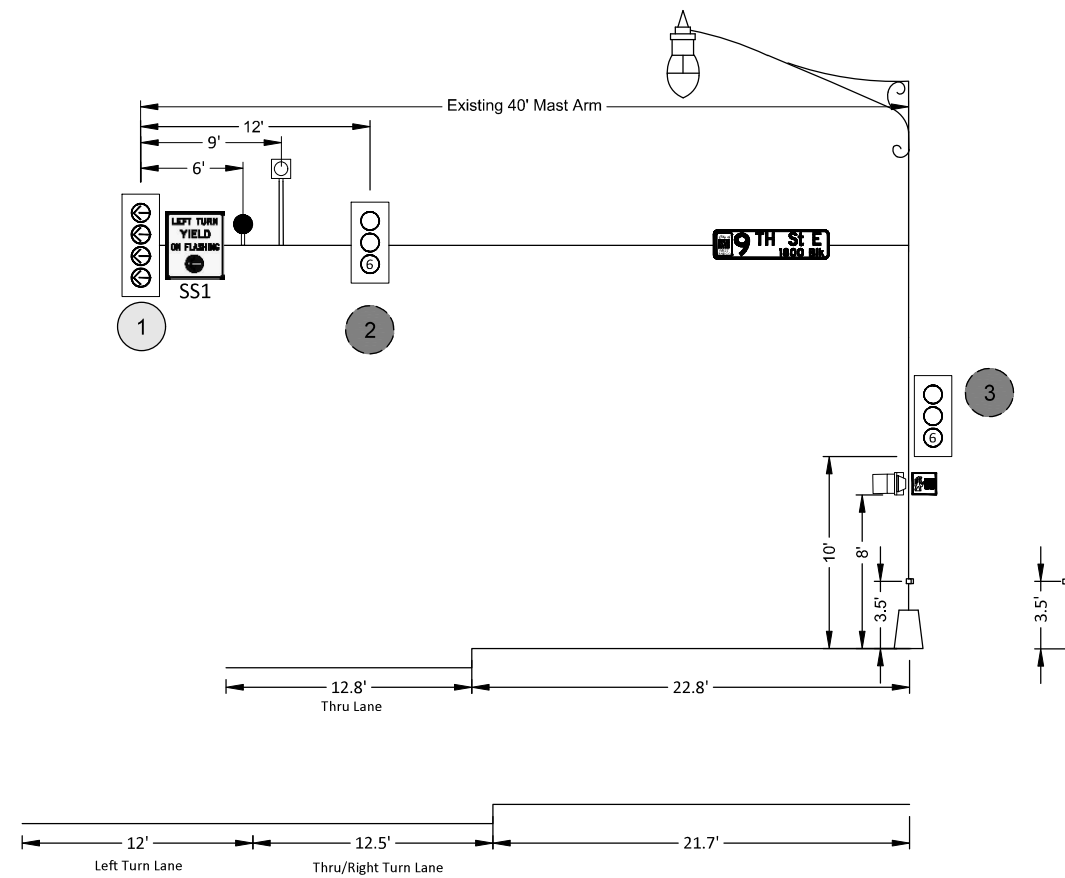
9th St E & 19th Ave E - Site 1
Conduit Layout

Traffic Signal

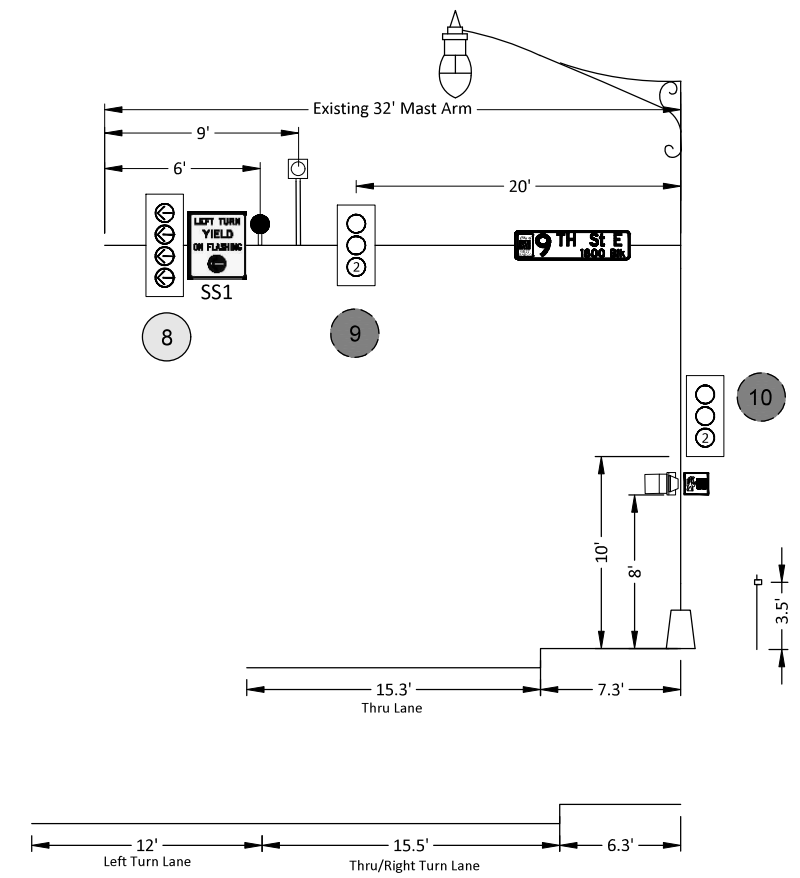


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEU-8-992(049)	150	4

Northwest Combo Signal Standard



Southeast Combo Signal Standard



Various West Fargo Intersections
Signal & Turn Lane Modifications

9th St E & 19th Ave E - Site 1
Signal Standard & Head Locations

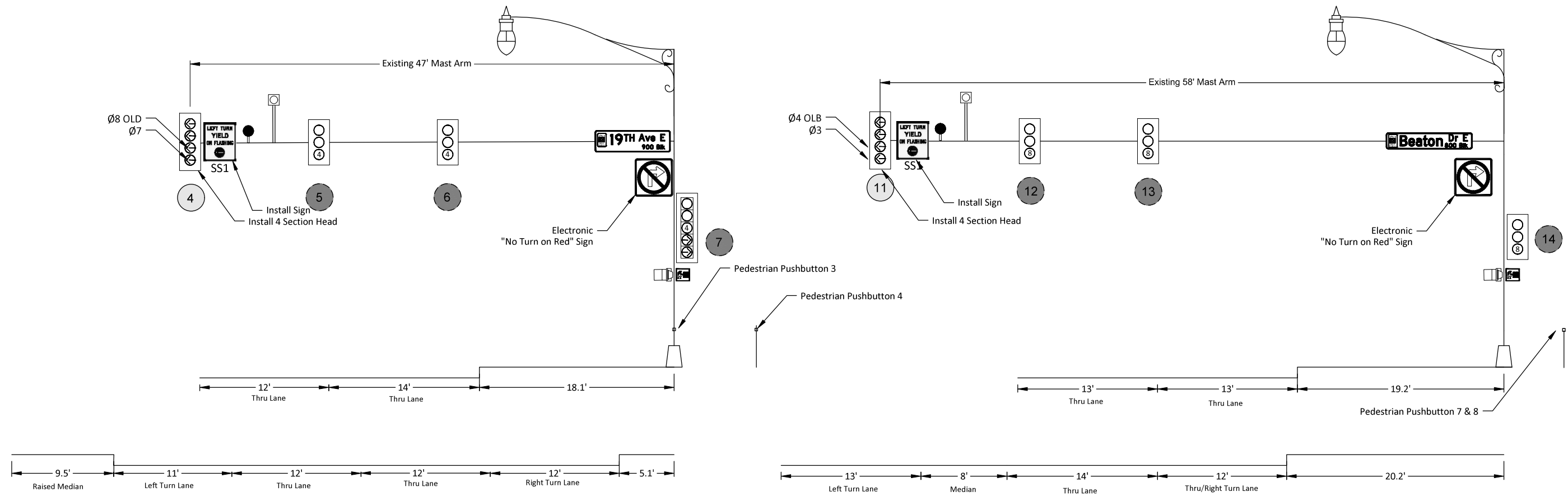
Traffic Signal



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEU-8-992(049)	150	5

Northeast Combo Signal Standard

Southwest Combo Signal Standard



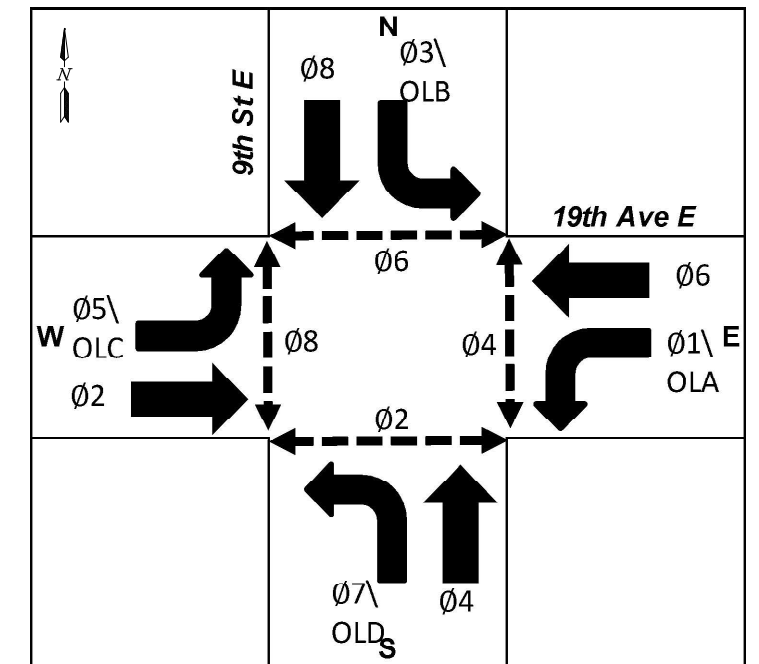
Various West Fargo Intersections
Signal & Turn Lane Modifications

9th St E & 19th Ave E - Site 1
Signal Standard & Head Locations

Traffic Signal



Conductor		NE Combo Signal 20 No. 14 AWG		SE Combo Signal 20 No. 14 AWG		SW Combo Signal 20 No. 14 AWG		NW Combo Signal 20 No. 14 AWG		
Base	Tracer	Head	Indication	Head	Indication	Head	Indication	Head	Indication	
1	Black	P3	Ø4 Walk	P5	Ø4 Walk	P8	Ø8 Walk	P1	Ø8 Walk	
2	White		Neutral		Neutral		Neutral		Neutral	
3	Red	5,6,7	Ø4 Red	9,10	Ø2 Red	12,13,14	Ø8 Red	2,3	Ø6 Red	
4	Green		Ground		Ground		Ground		Ground	
5	Orange	5,6,7	Ø4 Yellow	9,10	Ø2 Yellow	12,13,14	Ø8 Yellow	2,3	Ø6 Yellow	
6	Blue	5,6,7	Ø4 Green	9,10	Ø2 Green	12,13,14	Ø8 Green	2,3	Ø6 Green	
7	White	Black	P3	Ø4 Don't Walk	P5	Ø4 Don't Walk	P7	Ø8 Don't Walk	P1	Ø8 Don't Walk
8	Red	Black		Spare		Spare		Spare		Spare
9	Green	Black	P4	Ø6 Walk	P6	Ø2 Walk	P7	Ø2 Walk	P2	Ø6 Walk
10	Orange	Black		Spare		Spare		Spare		Spare
11	Blue	Black		Spare		Spare		Spare		Spare
12	Black	White	P4	Ø6 Don't Walk	P6	Ø2 Don't Walk	P7	Ø2 Don't Walk	P2	Ø6 Don't Walk
13	Red	White		Spare		Spare		Spare		Spare
14	Green	White	EVP	PE4 Ind Light	EVP	PE2 Ind Light	EVP	PE8 Ind Light	EVP	PE2 Ind Light
15	Blue	White		Spare		Spare		Spare		Spare
16	Black	Red		Spare		Spare		Spare		Spare
17	White	Red	4	Ø8 OLD←	8	Ø6 OLC←	11	Ø4 OLB←	1	Ø2 OLA←
18	Orange	Red	4	Ø7 Yellow←	8	Ø5 Yellow←	11	Ø3 Yellow←	1	Ø1 Yellow←
19	Blue	Red	4	Ø7 Green←	8	Ø5 Green←	11	Ø3 Green←	1	Ø1 Green←
20	Red	Green	4	Ø7 Red←	8	Ø5 Red←	11	Ø3 Red←	1	Ø1 Red←



INTERNAL MAST ARM/STANDARD SIGNAL HEAD CABLE

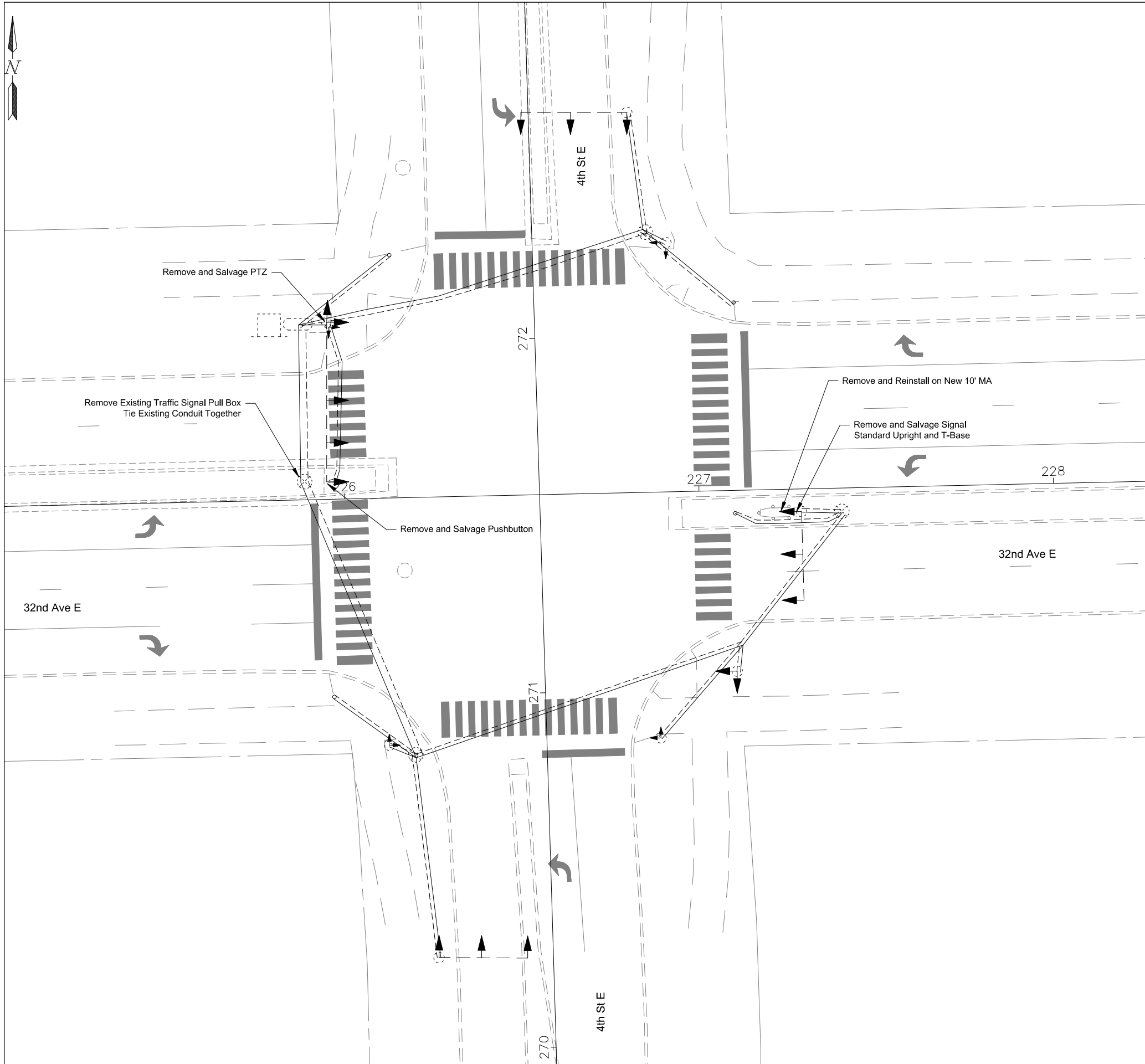
Origin	Destination	# of Cables	SIZE/TYPE	Total LF
Northeast Combo Signal Std Transformer Base	Vehicle Head 4	1	14 AWG 7 CONDUCTOR CABLE	74
Northwest Combo Signal Std Transformer Base	Vehicle Head 1	1	14 AWG 7 CONDUCTOR CABLE	69
Southeast Combo Signal Std Transformer Base	Vehicle Head 8	1	14 AWG 7 CONDUCTOR CABLE	59
Southwest Combo Signal Std Transformer Base	Vehicle Head 11	1	14 AWG 7 CONDUCTOR CABLE	79

Various West Fargo Intersections
Signal & Turn Lane Modifications

9th St E & 19th Ave E - Site 1
Conductor Schedule

Traffic Signal





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEU-8-992(049)	150	7

Legend

- Existing Signal Mast Arm
- Existing Signal Std. Pole
- ▶ Signal Head
- ⊞ Existing Controller and Cabinet
- ⊗ Existing Pull Box
- Existing Pushbutton

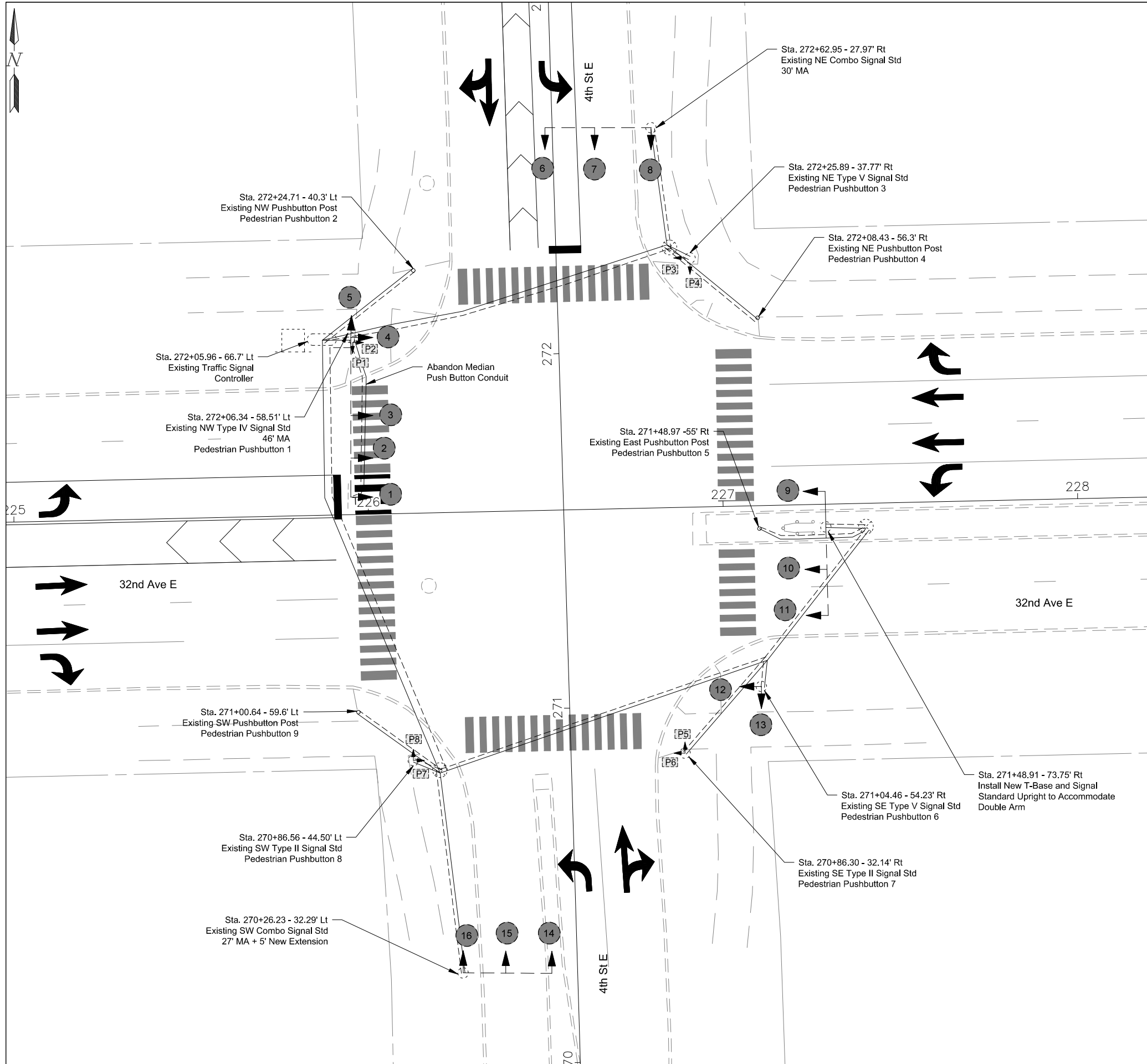
Note: Salvaged items will be dropped off at the West Fargo City Yard (810 12th Ave NW, West Fargo, ND 58078)

Various West Fargo Intersections
Signal & Turn Lane Modifications

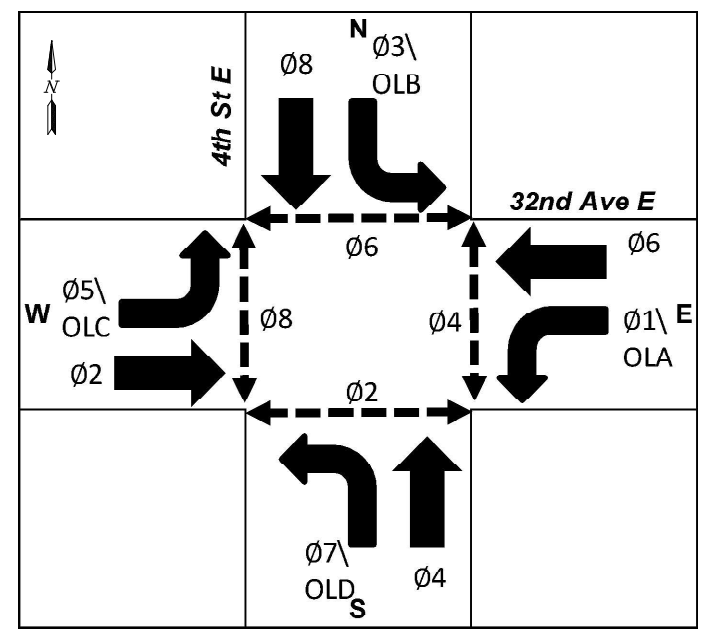
32nd Ave E & 4th St E - Site 2
Signal Removals

Traffic Signal





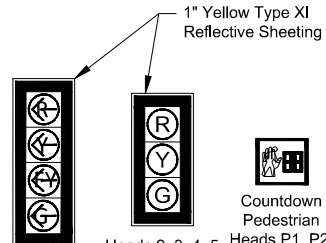
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEU-8-992(049)	150	8



Note: See section 150 sheet 16 for new wire quantities.

Legend

- 13 New Signal Head Number
- 14 Existing Signal Head Number
- [P1] Existing Pedestrian Head Number
- Existing Signal Mast Arm
- Proposed Signal Mast Arm
- Existing Signal Std. Pole
- ▶ Signal Head
- Existing Controller and Cabinet
- New Wire
- Existing Pull Box
- Existing Pushbutton



1" Yellow Type XI Reflective Sheeting

Countdown Pedestrian Heads P1, P2, 7, 8, 10, 11, 12, P3, P4, P5, P6, P7, P8

Various West Fargo Intersections
Signal & Turn Lane Modifications

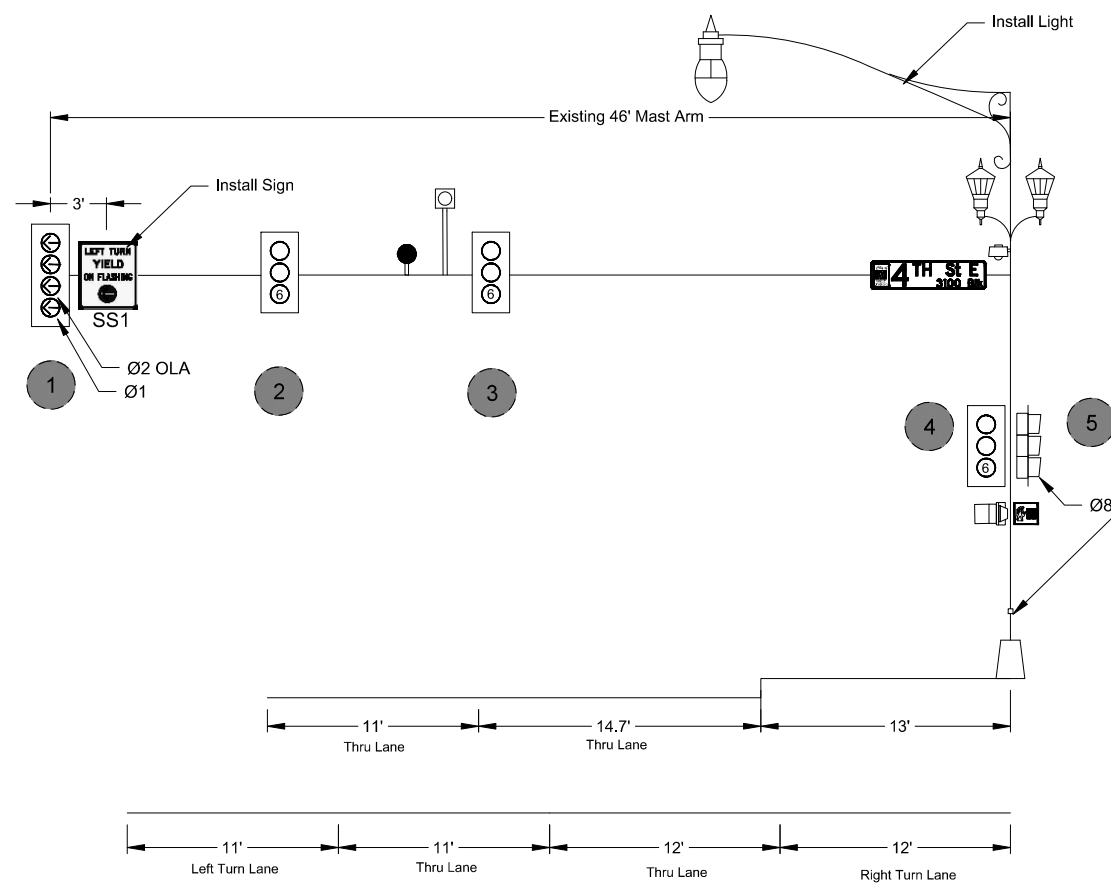
32nd Ave E & 4th St E - Site 2
Signal Layout

Traffic Signal

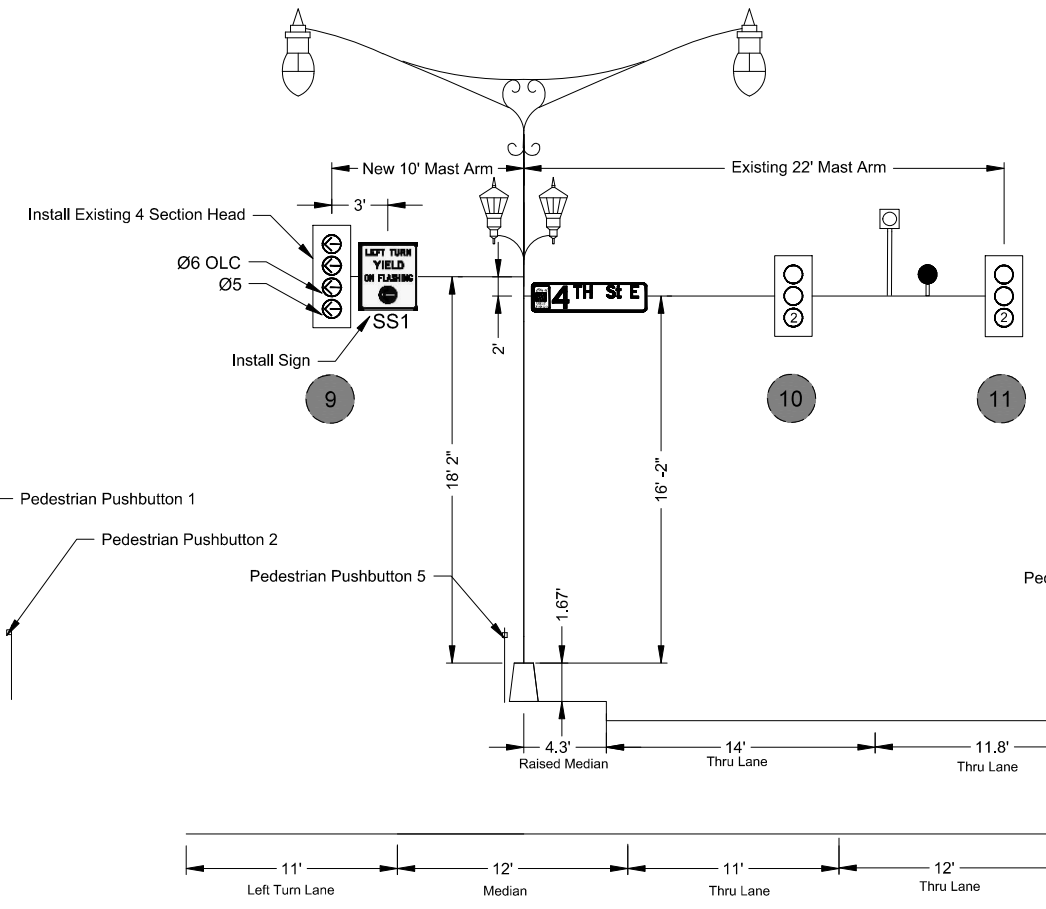


STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEU-8-992(049)	150	9

Northwest Type IV Signal Standard

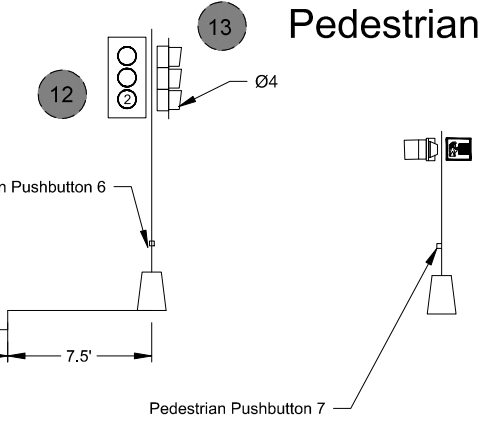


Southeast Combo Signal Standard



Southeast Type V Signal Standard

Southeast Type II Pedestrian Standard



Various West Fargo Intersections
Signal & Turn Lane Modifications

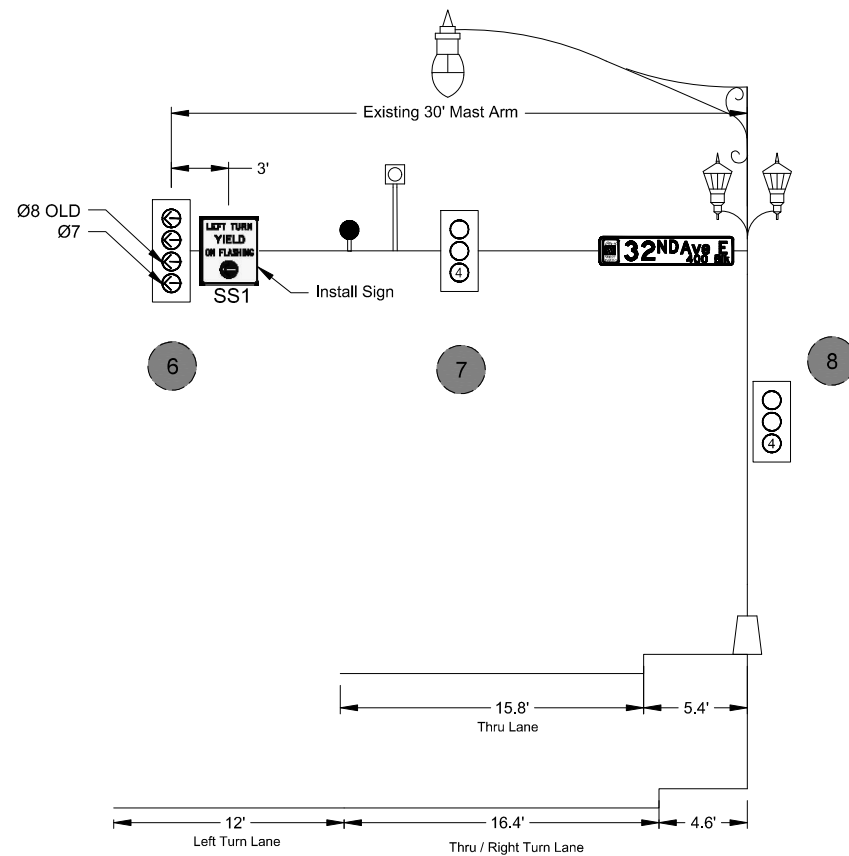
32nd Ave E & 4th St E - Site 2
Signal Standard & Head Locations

Traffic Signal

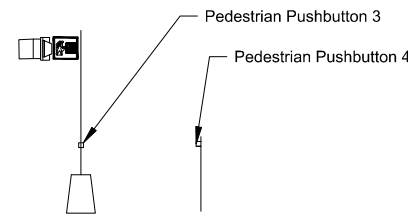


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEU-8-992(049)	150	10

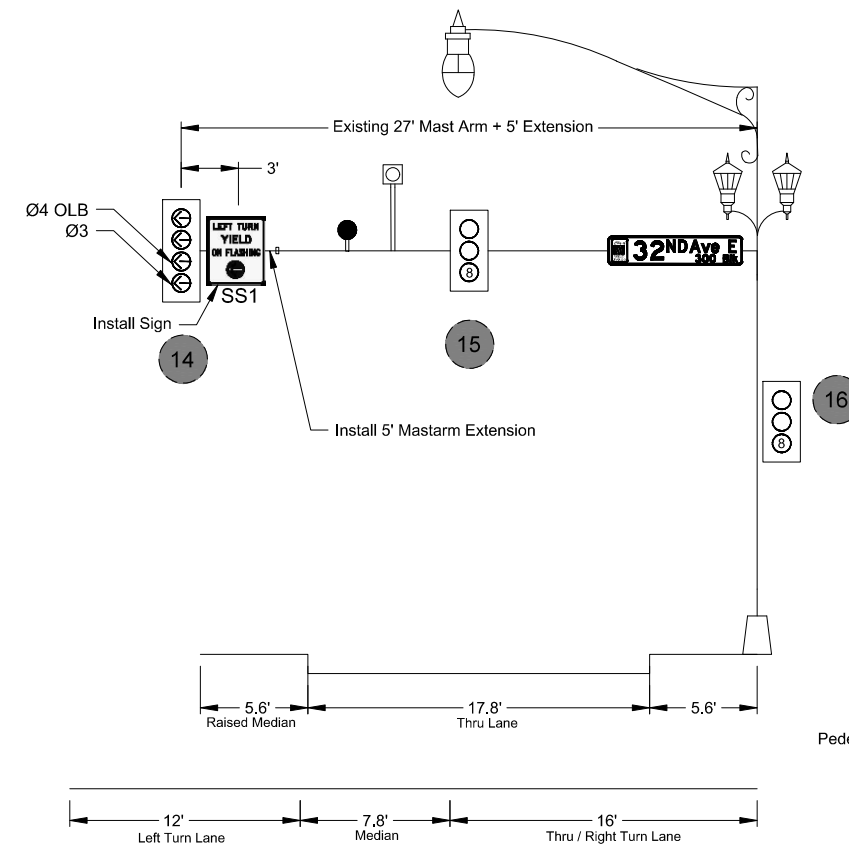
Northeast Combo Signal Standard



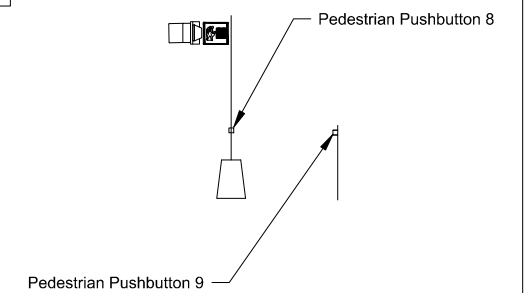
Northeast Type V Pedestrian Standard



Southwest Combo Signal Standard



Southwest Type II Pedestrian Standard

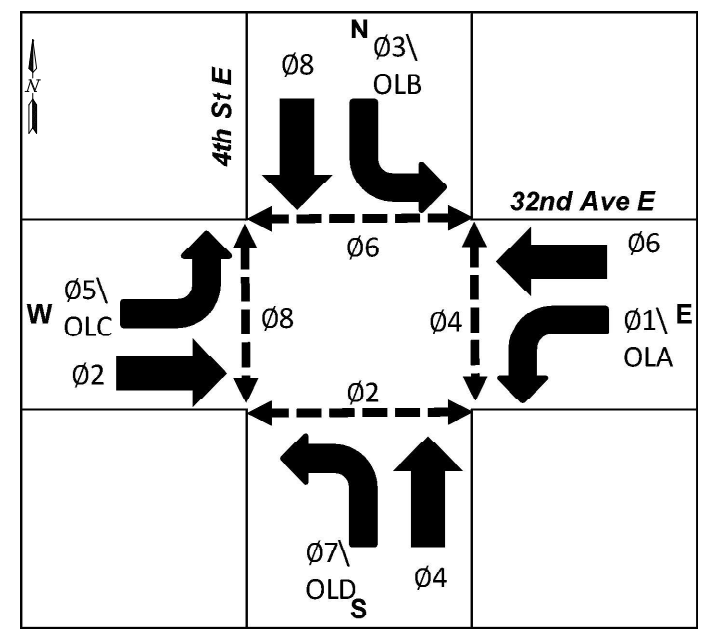


Various West Fargo Intersections
Signal & Turn Lane Modifications

32nd Ave E & 4th St E - Site 2
Signal Standard & Head Locations

Traffic Signal





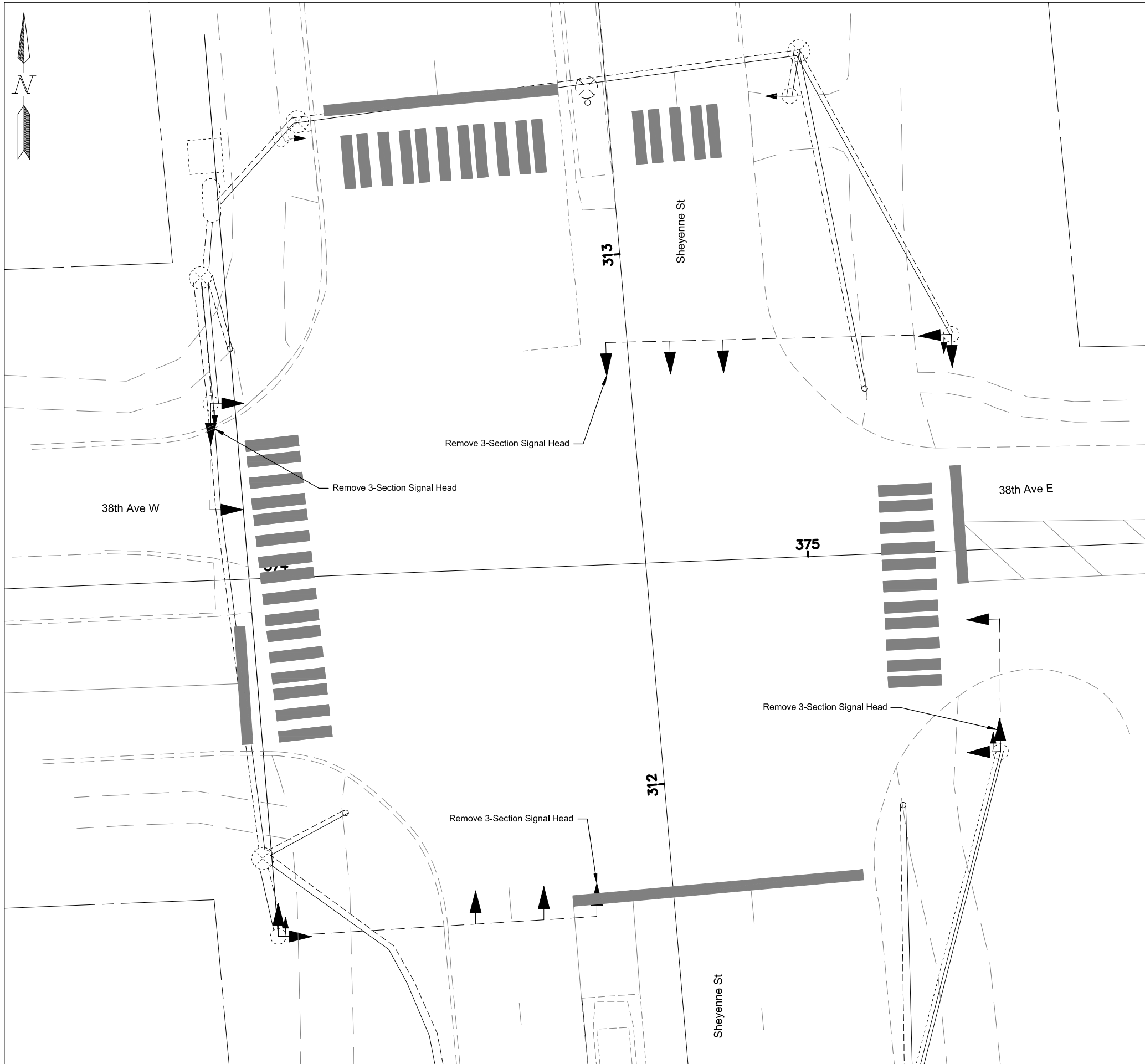
Conductor		Cable NWS 1 NW Combo Signal Existing 12 No. 14 AWG		Cable NWS 2 NW Combo Signal Existing 12 No. 14 AWG		Cable NES NE Combo Signal Existing 12 No. 14 AWG		Cable NEP NE Type V Ped Std Existing 7 No. 14 AWG	
Base	Tracer	Head	Indication	Head	Indication	Head	Indication	Head	Indication
1	Black		Spare	P1	Ø8 Walk			P3	Ø6 Walk
2	White		Neutral		Neutral		Neutral		Neutral
3	Red	2,3,4	Ø6 Red	P1	Ø8 Don't Walk	7,8	Ø8 Red	P3	Ø6 Don't Walk
4	Green		Ground		Ground		Ground		Ground
5	Orange	2,3,4	Ø6 Yellow	P2	Ø8 Don't Walk	7,8	Ø8 Yellow	P4	Ø4 Don't Walk
6	Blue	2,3,4	Ø6 Green	P2	Ø6 Walk	7,8	Ø8 Green	P4	Ø4 Walk
7	White	Black	Spare		Spare		Spare		Spare
8	Red	Black	1	Ø1 Red←	5	Ø8 Red	6	Ø7 Red←	
9	Green	Black		Spare		Spare		Spare	
10	Orange	Black	1	Ø1 Yellow←	5	Ø8 Yellow	6	Ø7 Yellow←	
11	Blue	Black	1	Ø2 OLA←		Spare	6	Ø8 OLD←	
12	Black	White	1	Ø1 Green←	5	Ø8 Green	6	Ø7 Green←	

Conductor		Cable SES1 East Median Combo Signal Existing 12 No. 14 AWG		Cable SES2 SE Type V Signal Existing 12 No. 14 AWG		Cable SEP SE Type V Ped Std Existing 7 No. 14 AWG		Cable SWS2 SW Combo Signal Existing 12 No. 14 AWG		Cable SEP SW Type V Ped Std Existing 7 No. 14 AWG	
Base	Tracer	Head	Indication	Head	Indication	Head	Indication	Head	Indication	Head	Indication
1	Black		Spare		Spare	P5	Ø4 Walk		Spare	P7	Ø2 Walk
2	White		Neutral		Neutral		Neutral		Neutral		Neutral
3	Red	10,11	Ø2 Red	12	Ø2 Red	P5	Ø4 Don't Walk	15,16	Ø8 Red	P7	Ø2 Don't Walk
4	Green		Ground		Ground		Ground		Ground		Ground
5	Orange	10,11	Ø2 Yellow	12	Ø2 Yellow	P6	Ø2 Don't Walk	15,16	Ø8 Yellow	P8	Ø8 Don't Walk
6	Blue	10,11	Ø2 Green	12	Ø2 Green	P6	Ø2 Walk	15,16	Ø8 Green	P8	Ø8 Walk
7	White	Black	Spare		Spare		Spare		Spare		Spare
8	Red	Black	9	Ø5 Red←	13	Ø4 Red		14	Ø3 Red←		
9	Green	Black		Spare		Spare			Spare		
10	Orange	Black	9	Ø5 Yellow←	13	Ø4 Yellow		14	Ø3 Yellow←		
11	Blue	Black	9	Ø6 OLC←		Spare		14	Ø4 OLB←		
12	Black	White	9	Ø5 Green←	13	Ø4 Green		14	Ø3 Green←		

Various West Fargo Intersections
Signal & Turn Lane Modifications

32nd Ave E & 4th St E - Site 2
Conductor Schedule

Traffic Signal



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEU-8-992(049)	150	12

Legend

- Existing Signal Mast Arm
- Existing Signal Std. Pole
- ▶ Signal Head
- ⊞ Existing Controller and Cabinet
- ⊗ Existing Pull Box
- Existing Pushbutton

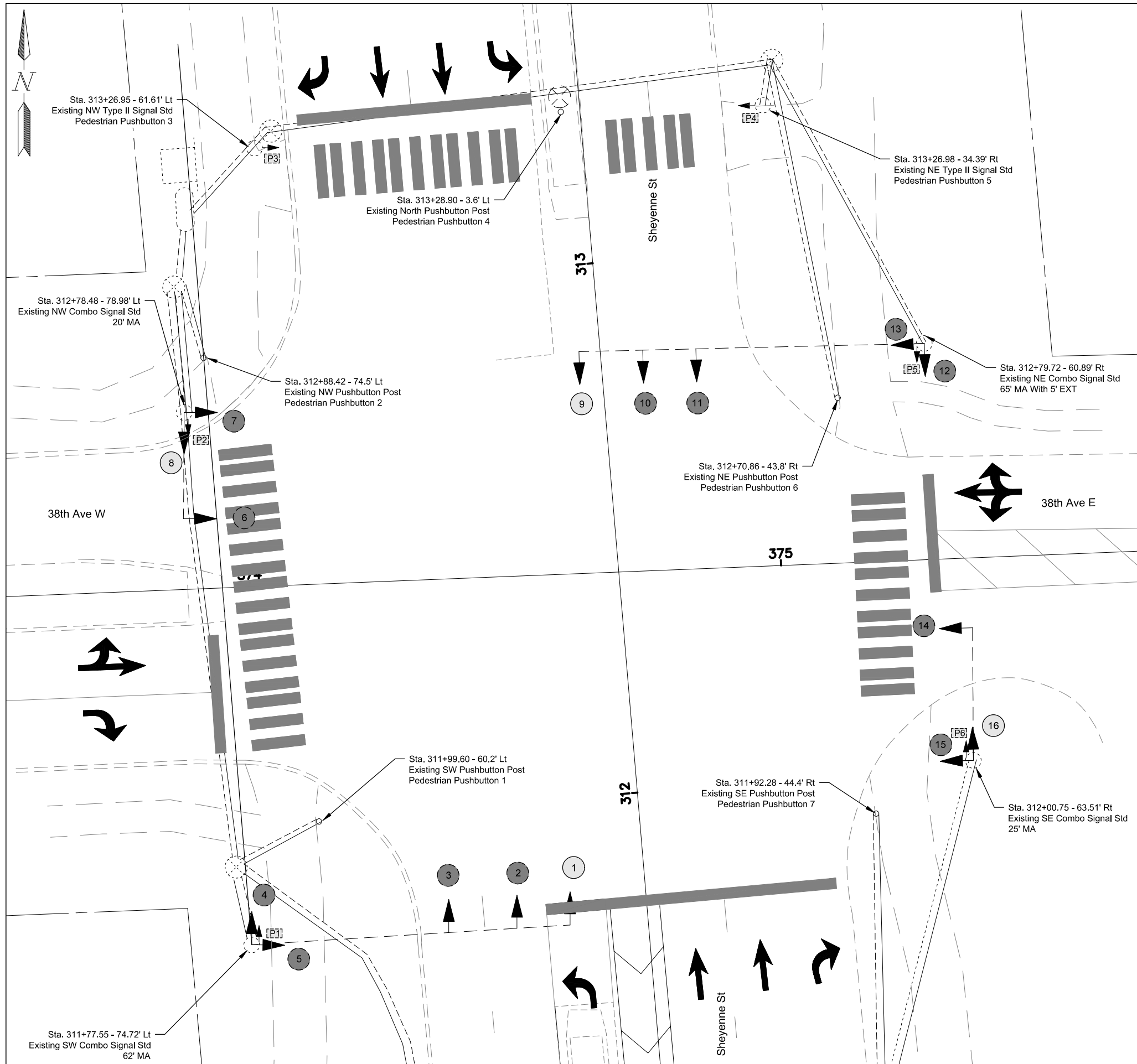
Note: Salvaged items will be dropped off at the West Fargo City Yard (810 12th Ave NW, West Fargo, ND 58078)

Various West Fargo Intersections
Signal & Turn Lane Modifications

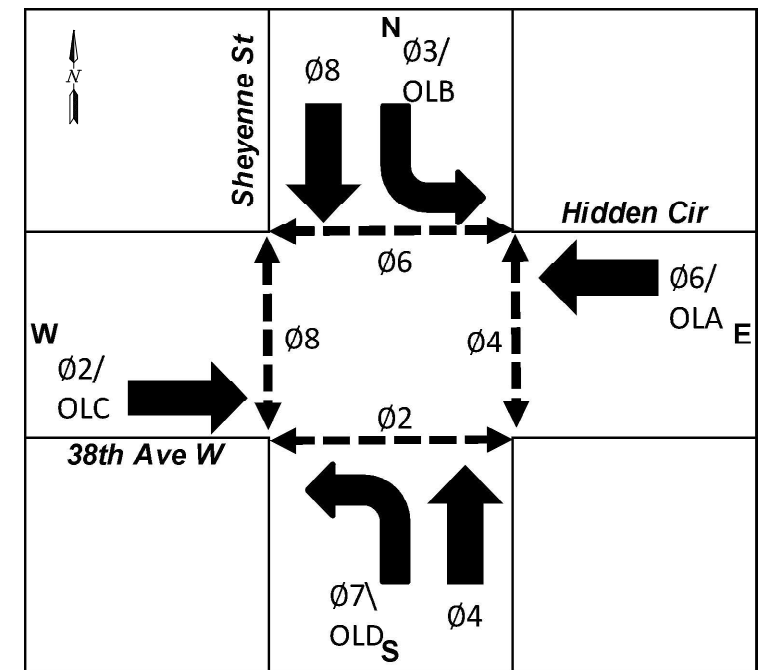
Sheyenne St & 38th Ave - Site 3
Signal Removals

Traffic Signal



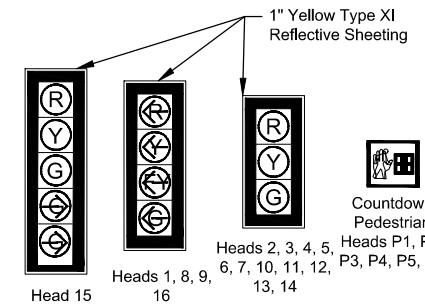


STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEU-8-992(049)	150	13



Note: See section 150 sheet 16 for new wire quantities.

Legend

- 13 New Signal Head Number
 - 14 Existing Signal Head Number
 - [P1] Existing Pedestrian Head Number
 - Existing Signal Mast Arm
 - Existing Signal Std. Pole
 - Signal Head
 - Existing Controller and Cabinet
 - New Wire
 - Existing Pull Box
 - Existing Pushbutton
- 

1" Yellow Type XI Reflective Sheeting

Countdown Pedestrian

Heads 1, 8, 9, 13, 14

Heads 2, 3, 4, 5, 6, 7, 10, 11, 12, P3, P4, P5, P6

Various West Fargo Intersections
Signal & Turn Lane Modifications

Sheyenne St & 38th Ave - Site 3
Signal Layout

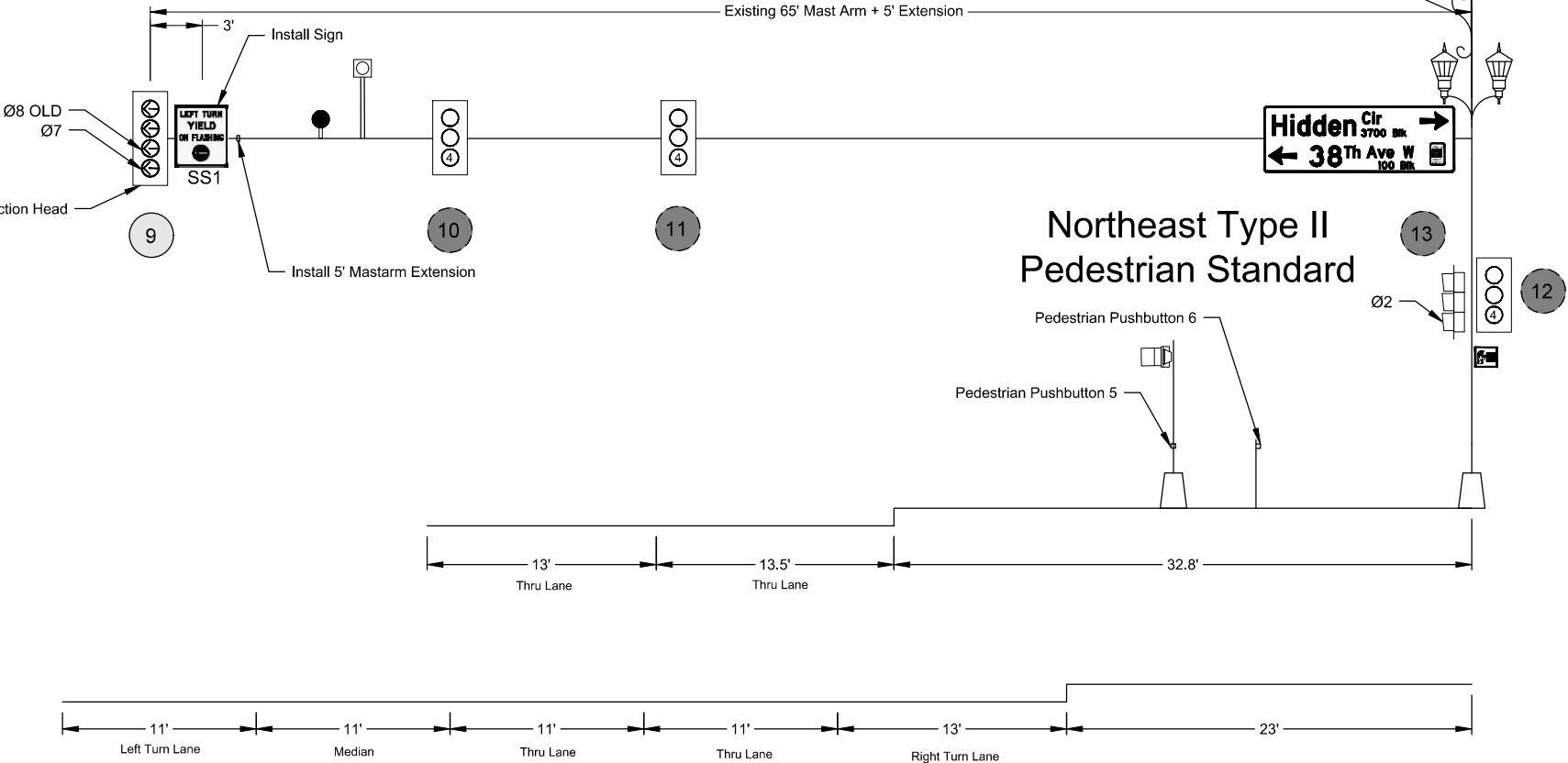
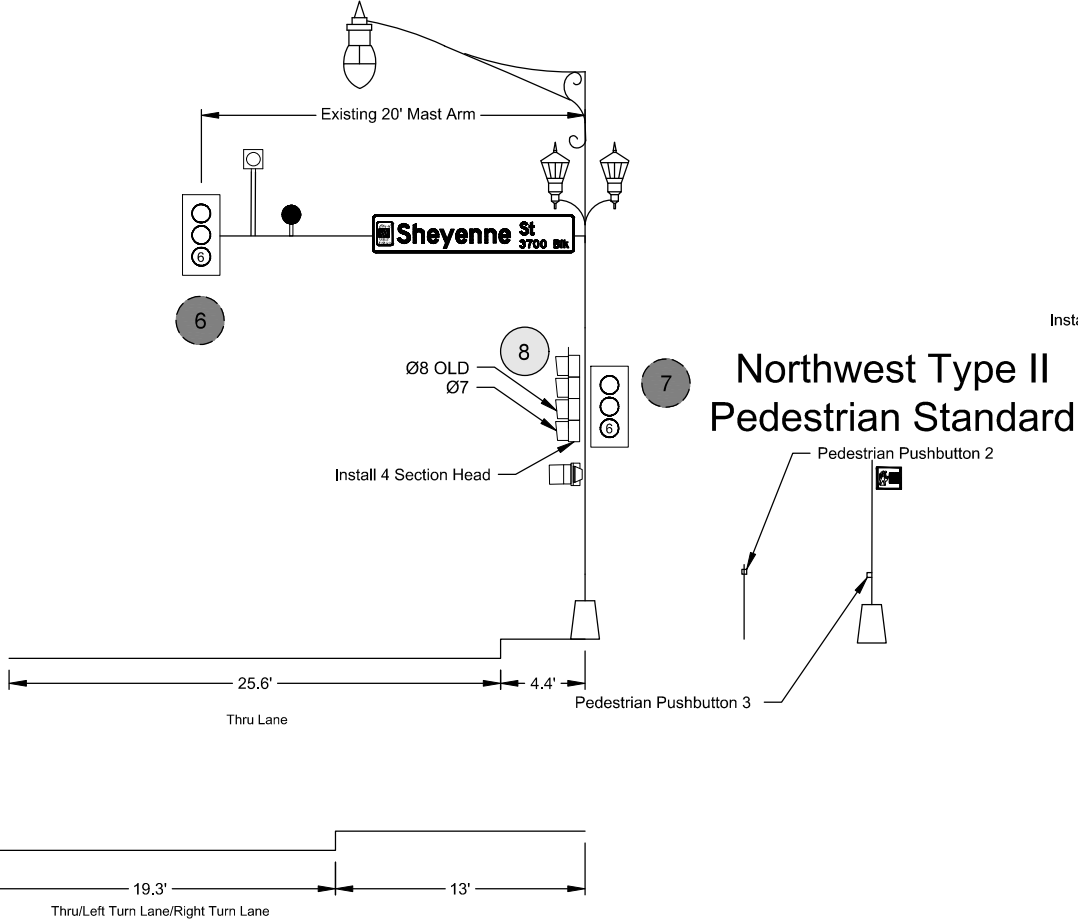
Traffic Signal



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEU-8-992(049)	150	14

Northwest Combo Signal Standard

Northeast Combo Signal Standard



Northwest Type II Pedestrian Standard

Northeast Type II Pedestrian Standard

Various West Fargo Intersections
Signal & Turn Lane Modifications

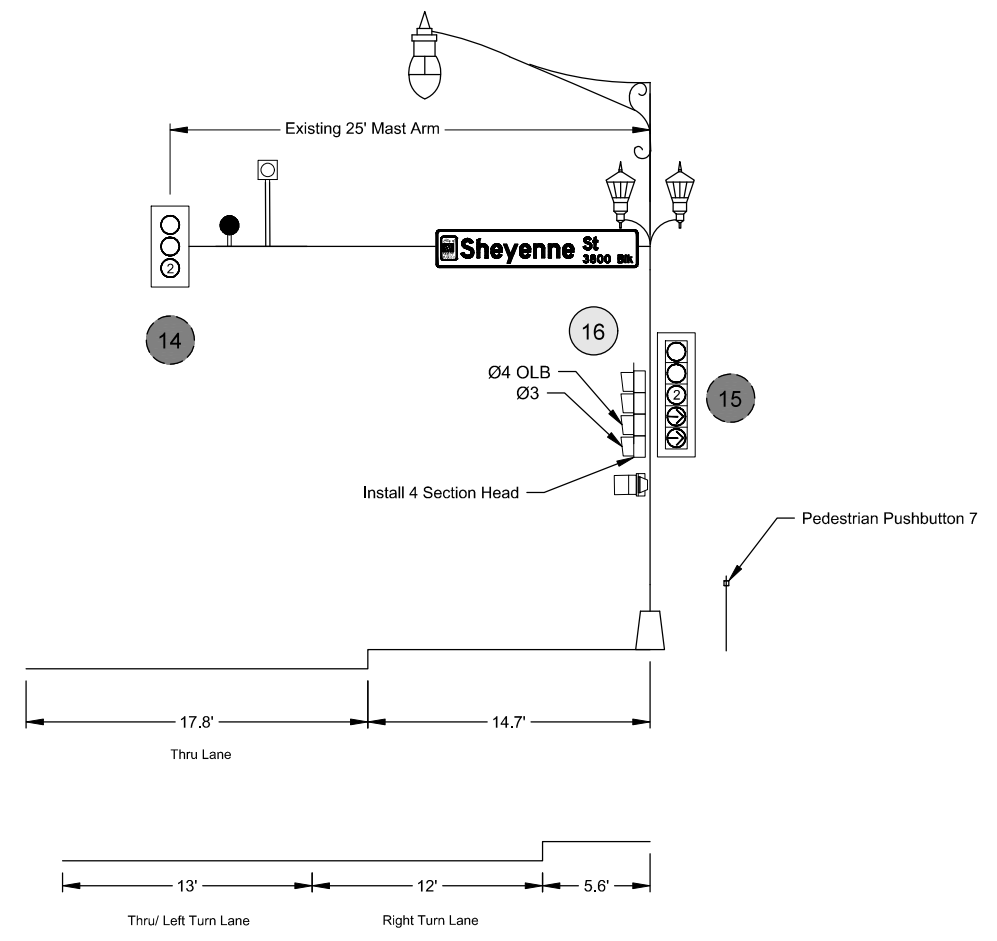
Sheyenne St & 38th Ave - Site 3
Signal Standard & Head Locations

Traffic Signal

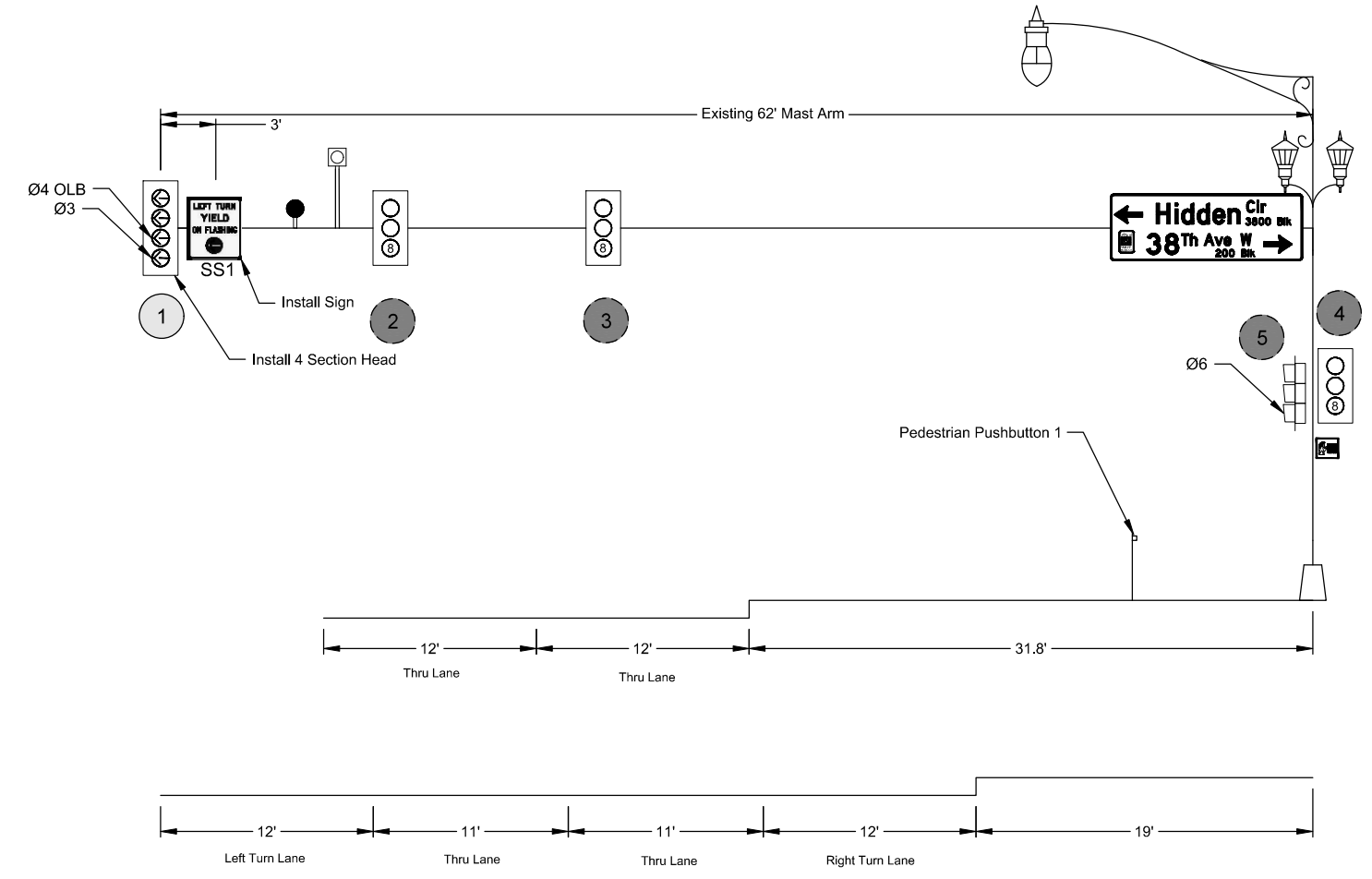


STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	HEU-8-992(049)	150	15

Southeast Combo Signal Standard



Southwest Combo Signal Standard



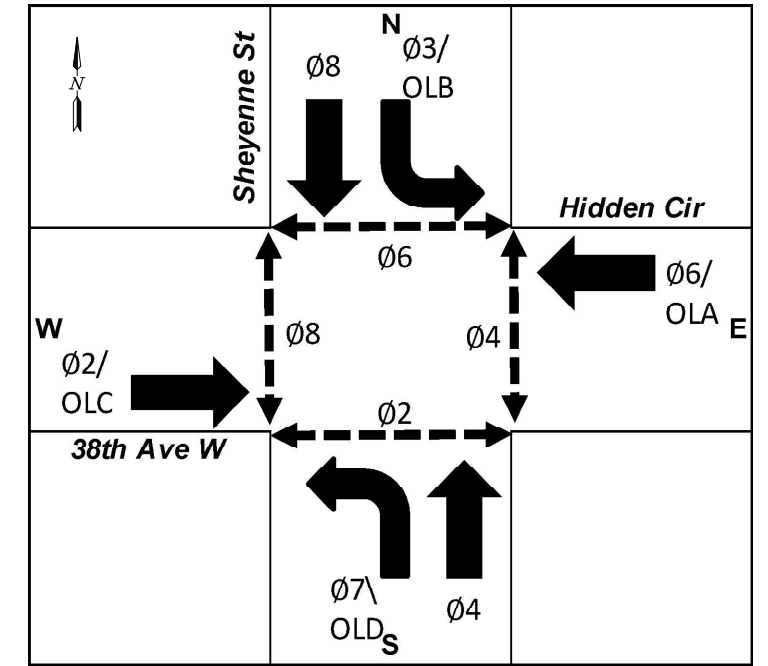
Various West Fargo Intersections
Signal & Turn Lane Modifications

Sheyenne St & 38th Ave - Site 3
Signal Standard & Head Locations

Traffic Signal



Conductor		Cable SWS 1 SW Combo Signal Existing 12 No. 14 AWG		Cable SWS 2 SW Combo Signal Existing 12 No. 14 AWG		Cable NWS 1 NW Combo Signal Existing 12 No. 14 AWG		Cable NWS 2 NW Combo Signal Existing 12 No. 14 AWG		Cable NWP NW Type II Ped Signal Existing 5 No. 14 AWG	
Base	Tracer	Head	Indication	Head	Indication	Head	Indication	Head	Indication	Head	Indication
1	Black		Spare		Spare		Spare	P2	Ø8 Walk	P3	Ø6 Walk
2	White		Neutral		Neutral		Neutral		Spare		Neutral
3	Red	2,3,4	Ø8 Red	5	Ø6 Red	6,7	Ø6 Red	P2	Ø8 Don't Walk	P3	Ø6 Don't Walk
4	Green		Ground		Ground		Ground		Spare		Ground
5	Orange	2,3,4	Ø8 Yellow	5	Ø6 Yellow	6,7	Ø6 Yellow		Spare		Spare
6	Blue	2,3,4	Ø8 Green	5	Ø6 Green	6,7	Ø6 Green		Spare		Spare
7	White	Black	1	Ø3 Red←		Spare		Spare	Spare		Spare
8	Red	Black		Spare	P1	Ø8 Don't Walk	8	Ø7 Red←		Spare	Spare
9	Green	Black	1	Ø3 Yellow←		Spare		Spare		Spare	Spare
10	Orange	Black	1	Ø3 Green←		Spare	8	Ø7 Yellow←		Spare	Spare
11	Blue	Black	1	Ø4 OLB←		Spare	8	Ø8 OLD←		Spare	Spare
12	Black	White		Spare	P1	Ø8 Walk	8	Ø7 Green←		Spare	Spare



Conductor		Cable NEP NE Type II Ped Signal Existing 5 No. 14 AWG		Cable NES 1 NE Combo Signal Existing 12 No. 14 AWG		Cable NES 2 NE Combo Signal Existing 12 No. 14 AWG		Cable SES 1 SE Combo Signal Existing 12 No. 14 AWG		Cable SES 2 SE Combo Signal Existing 5 No. 14 AWG	
Base	Tracer	Head	Indication	Head	Indication	Head	Indication	Head	Indication	Head	Indication
1	Black	P4	Ø6 Walk		Spare		Spare	15	Ø7 Green→	P6	Ø4 Walk
2	White		Neutral		Neutral		Spare		Neutral		Neutral
3	Red	P4	Ø6 Don't Walk	10,11,12	Ø4 Red	13	Ø2 Red	14,15	Ø2 Red	P6	Ø4 Don't Walk
4	Green		Ground		Ground		Spare		Ground		Ground
5	Orange		Spare	10,11,12	Ø4 Yellow	13	Ø2 Yellow	14,15	Ø2 Yellow		Spare
6	Blue			10,11,12	Ø4 Green	13	Ø2 Green	14,15	Ø2 Green		
7	White	Black			Spare		Spare	15	Ø7 Yellow→		
8	Red	Black		9	Ø7 Red←	P5	Ø4 Don't Walk	16	Ø3 Red←		
9	Green	Black			Spare		Spare		Spare		
10	Orange	Black		9	Ø7 Yellow←		Spare	16	Ø3 Yellow←		
11	Blue	Black		9	Ø8 OLD←		Spare	16	Ø4 OLB←		
12	Black	White		9	Ø7 Green←	P5	Ø4 Walk	16	Ø3 Green←		

INTERNAL MAST ARM/STANDARD SIGNAL HEAD CABLE

Origin	Destination	# of Cables	SIZE/TYPE	Total LF
Northeast Combo Signal Std Transformer Base	Vehicle Head 9	1	14 AWG 7 CONDUCTOR CABLE	94
Northwest Combo Signal Std Transformer Base	Vehicle Head 8	1	14 AWG 7 CONDUCTOR CABLE	20
Southeast Combo Signal Std Transformer Base	Vehicle Head 16	1	14 AWG 7 CONDUCTOR CABLE	20
Southwest Combo Signal Std Transformer Base	Vehicle Head 1	1	14 AWG 7 CONDUCTOR CABLE	91

Various West Fargo Intersections
Signal & Turn Lane Modifications

Sheyenne St & 38th Ave - Site 3
Conductor Schedule

Traffic Signal



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	HEU-8-992(049)	150	17

ITEM DESCRIPTION	Unit	SITE 1	SITE 2	SITE 3	Total
REMOVE PULL BOX	EA	1	1	1	3
NO14 AWG 20 CONDUCTOR CABLE	LF	627	0	0	627
1-WAY 4 SEC HEAD W/12IN LENS-POST MTD	EA	0	0	2	2
1-WAY 4 SEC HEAD W/12IN LENS-MA MTD	EA	4	0	2	6
REMOVE VEHICULAR HEADS	EA	4	0	4	8
REMOVE PEDESTRIAN PUSHBUTTON	EA	1	1	0	2
10FT TRAFFIC SIGNAL MA	EA	0	1	0	1
REVISE TRAFFIC SIGNAL SYSTEM	EA	1	0	1	2

Items shown above are for informational purposes, contractor is to provide all labor and equipment necessary for the signal system to be fully operational as shown in the plans.

Items shall be included in the corresponding price bid "Traffic Signal System - Site X".

Various West Fargo Intersections
Signal & Turn Lane Modifications

Quantities

Traffic Signal



NDDOT ABBREVIATIONS

? This is a special text character used in the labeling of existing features. It indicates a feature that has an unknown characteristic, potentially based on: lack of description, location accuracy or purpose.

Abn abandoned
 Abut abutment
 Adj adjusted
 Aggr aggregate
 Ahd ahead
 ARV air release valve
 Align alignment
 Al alley
 Alt alternate
 Alum aluminum
 ADA Americans with Disabilities Act
 & and
 Appr approach
 Approx approximate
 ACP asbestos cement pipe
 Asph asphalt
 AC asphalt cement
 Assmd assumed
 @ at
 Atten attenuation
 ATR automatic traffic recorder
 Ave Avenue
 Avg average
 ADT average daily traffic

Bk back
 BF back face
 Balc balcony
 B Wire barbed wire
 Barr barricade
 Btry battery
 BI beehive inlet
 Beg begin
 BG below grade
 BM bench mark
 Bkwy bikeway
 Bit bituminous
 Blk block
 BH bore hole
 Bot bottom
 Blvd Boulevard
 Bndry boundary
 Brkwy breakaway
 Br bridge
 Bldg building
 Bus. business
 BV butterfly valve
 Byp bypass

C Gdrl cable guardrail
 Calc calculate
 CIP cast iron pipe
 CB catch basin
 CRS cationic rapid setting
 C Gd cattle guard
 C To C center to center
 CL or C centerline
 Ch chain
 Chnlk chain-link
 Ch Blk channel block
 Ch Ch channel change
 Chk check
 Chsld chiseled
 Cir circle
 Cl class
 Clnt clean-out
 Clr clear
 Cl&gr clearing & grubbing
 Comb. combination
 Coml commercial
 Compr compression
 CADD computer aided drafting & design
 Conc concrete
 CECB concrete erosion control blanket
 Cond conductor
 Const construction
 Cont continuous
 CSB continuous split barrel sample
 Contr contraction
 Contr contractor
 CP control point
 Coord coordinate
 Cor corner
 Corr corrected
 CAES corrugated aluminum end section
 CAP corrugated aluminum pipe
 CMES corrugated metal end section
 CMP corrugated metal pipe
 CPVCP corrugated poly-vinyl chloride pipe
 CSES corrugated steel end section
 CSFES corrugated steel flared end section
 CSP corrugated steel pipe
 CSTES corrugated steel traversable end section
 Co County
 Crse course
 Ct Court
 Xarm cross arm
 Xbuck cross buck
 Xsec cross sections
 Xing crossing
 Xrd crossroad
 Crn crown

Culv culvert
 C&G curb & gutter
 CI curb inlet
 CR curb ramp
 C cut
 Dd Ld dead load
 Defl deflection
 Defm deformed
 DInt delineate
 DIntr delineator
 Depr depression
 Desc description
 Det detail
 DWP detectable warning panel
 Dtr detour
 Dia or \emptyset diameter
 Dir direction
 Dist distance
 DM disturbed material
 DB ditch block
 DG ditch grade
 Dbl double
 Dn down
 Dwg drawing
 Dr drive
 Drwy driveway
 DI drop inlet
 D dry density
 Ea each
 Esmt easement
 E East
 EB Eastbound
 Elast elastomeric
 EL electric locker
 E Mtr electric meter
 EVSE electric vehicle supply equipment
 Elec electric/al
 EDM electronic distance meter
 Elev or El elevation
 Ellipt elliptical
 Emb embankment
 Emuls emulsion/emulsified
 ES end section
 Engr engineer
 ESS environmental sensor station
 Eq equal
 Evgr evergreen
 Exc excavation
 Exst existing
 Exp expansion
 Expy Expressway
 E external of curve
 Extru extruded

FOS factor of safety
 Fed Federal
 FP feed point
 Fn fence
 Fn P fence post
 FO fiber optic
 FD field drive
 F fill
 FAA fine aggregate angularity
 FH fire hydrant
 Fl flange
 Flrd flared
 FES flared end section
 F Bcn flashing beacon
 FA flight auger sample
 FL flow line
 Ftg footing
 FM force main
 Fnd found
 Fdn foundation
 Frac fractional
 Frwy freeway
 Frt front
 FF front face
 F Disp fuel dispenser
 FFP fuel filler pipes
 FLS fuel leak sensor
 Furn furnish/ed

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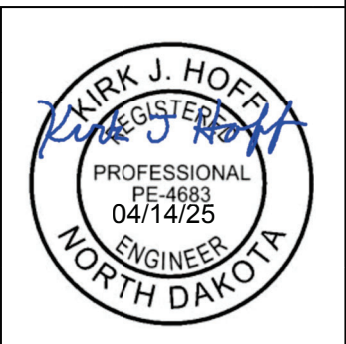


NDDOT ABBREVIATIONS

D-101-2

Galv	galvanized	Ln	lane	Obsc	obscure(d)	Qty	quantity
Gar	garage	Lg	large	Ocpd	occupied	Qtr	quarter
Gs L	gas line	Lat	latitude	Ocpy	occupy		
G Reg	gas line regulator	Lt	left	O/s	offset		
GMV	gas main valve	Lens	lenses	OC	on center	Rad or R	radius
G Mtr	gas meter	Lvl	level	C	one dimensional consolidation	RR	railroad
GSV	gas service valve	Lvng	leveling	OC	organic content	Rlwy	railway
GVP	gas vent pipe	Lht	light	Orig	original	Rsd	raised
GV	gate valve	LP	light pole	O To O	out to out	RC	rapid curing
Ga	gauge	Ltg	lighting	OD	outside diameter	Rec	record
Gov	government	Liq	liquid	OH	overhead	Recy	recycle
Grd	graded/grade	LL	liquid limit			RAP	recycled asphalt pavement
Grnd	ground	Loc	location			RPCC	recycled portland cement concrete
GWM	ground water monitor	Long.	longitude	PMT	pad mounted transformer	Ref	reference
Gdrl	guardrail	Lp	loop	Pg	pages	R Mkr	reference marker
Gtr	gutter	LD	loop detector	Pntd	painted	RM	reference monument
		Lum	luminaire	Pr	pair	RP	reference point
				Pnl	panel	Refl	reflectorized
H Plg	H piling			Pk	park	RCB	reinforced concrete box
Hdwl	headwall	Mb	mailbox	PSD	passing sight distance	RCES	reinforced concrete end section
Ht	height	ML	main line	Pvmt	pavement	RCFES	reinforced concrete flared end section
Hel	helical	MH	manhole	Ped	pedestal	RCP	reinforced concrete pipe
HDPE	high density polyethylene	Mkd	marked	Ped	pedestrian	RCPS	reinforced concrete pipe sewer
HM	high mast	Mkr	marker	PPP	pedestrian pushbutton post	RCTES	reinforced concrete traversable end section
HP	high pressure	Mkg	marking	Pen.	penetration	Reinf	reinforcement
HPS	high pressure sodium	MA	mast arm	Perf	perforated	Res	reservation
HTCG	high tension cable guardrail	Matl	material	Per.	perimeter	Res	residence
Hwy	highway	Max	maximum	Perm	permanent	Ret	retaining
Hor	horizontal			PL	pipeline	Rev	reverse
HBP	hot bituminous pavement	Meas	measure	PI	place	Rt	right
HMA	hot mix asphalt	Mdn	median	P&P	plan & profile	R/W	right of way
Hyd	hydrant	MD	median drain	PL	plastic limit	Riv	river
Ph	hydrogen ion content	MC	medium curing	Pl or \bar{P}	plate	Rd	road
		MGS	Midwest Guardrail System	Pt	point	Rdbd	road bed
		MM	mile marker	PE	polyethylene	Rdwy	roadway
Id	identification	MP	mile post	PVC	polyvinyl chloride	RWIS	roadway weather information system
Incl	inclinometer tube	Min	minimum	PCC	Portland Cement concrete	Rk	rock
IMH	inlet manhole	Misc	miscellaneous	PP	power pole	Rt	route
ID	inside diameter	Mon	monument	Preempt	preemption		
Inst	instrument	Mnd	mound	Prefab	prefabricated		
Intchg	interchange	Mtbl	mountable	Prfmd or Pref	performed		
Intmdt	intermediate	Mtd	mounted	Prep	preparation		
Intscn	intersection	Mtg	mounting	Press.	pressure		
Inv	invert	Mk	muck	PRV	pressure relief valve		
IP	iron pipe			Prestr	prestressed		
				Pvt	private		
				PD	private drive		
Jt	joint	Neop	neoprene	Prod.	production/produce		
Jct	junction	Ntwk	network	Prog	programmed		
		N	North	Prop.	property		
		NE	Northeast	Ppsd	proposed		
		NW	Northwest	PB	pull box		
		NB	Northbound				
		No. or #	number				

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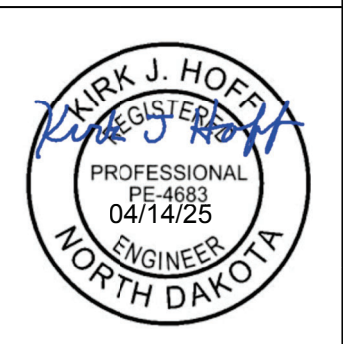


NDDOT ABBREVIATIONS

D-101-3

Salv	salvage(d)	Tel	telephone
San	sanitary sewer line	Tel B	Telephone Booth
Sec	section	Tel P	telephone pole
SL	section line	Tv	television
Sep	separation	Temp	temperature
Seq	sequence	Temp	temporary
Serv	service	TBM	temporary bench mark
Sht	sheet	T	thinwall tube sample
Shtng	sheeting	Ts	topsoil
Shldr	shoulder	Traf	traffic
Sw or Sdwk	sidewalk	TSCB	traffic signal control box
SD	sight distance	Tr	trail
SN	sign number	Transf	transformer
Sig	signal	Trans	transition
Sgl	single	TT	transmission tower
SRCP	slotted reinforced concrete pipe	TES	traversable end section
SC	slow curing	Trans	transverse
SS	slow setting	Trtd	treated
Sm	small	Trmt	treatment
S	South	Qc	triaxial compression
SE	Southeast	TERO	tribal employment rights ordinance
SW	Southwest	Tpl	triple
SB	Southbound	Typ	typical
Sp	spaces		
Spcl	special	Qu	unconfined compressive strength
SA	special assembly	Ugrnd	underground
SP	special provisions	Util	utility
G	specific gravity		
Spk	spike	VG	valley gutter
SB	split barrel sample	Vap	vapor
SH	sprinkler head	Vert	vertical
SV	sprinkler valve	VCP	vitrified clay pipe
Sq	square	Vol	volume
Stk	stake	VSFS	vehicle speed feedback sign
Std	standard		
N	standard penetration test	Wkwy	walkway
Std Specs	standard specifications	W	water content
Stm L	steam line	WGV	water gate valve
SEC	steel encased concrete	WL	water line
SMA	stone matrix asphalt	WM	water main
SSD	stopping sight distance	WMV	water main valve
SD	storm drain	W Mtr	water meter
St	street	WSV	water service valve
SPP	structural plate pipe	WW	water well
SPPA	structural plate pipe arch	Wrng	wearing
Str	structure	WIM	weigh in motion
Subd	subdivision	W	west
Sub	subgrade	WB	westbound
Sub Prep	subgrade preparation	Wrng	wiring
Ss	subsoil	W/	with
SS	supplement specification	W/o	without
Supp	supplemental		
Surf	surfacing		
Surv	survey		
Sym	symmetrical		

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NDDOT ABBREVIATIONS

D-101-4

MEASUREMENTS

ac acres
 A ampere
 Bd Ft board feet
 Cd candela
 cm centimeter
 C coulomb
 CF cubic feet
 m3 cubic meter
 m3/s cubic meters per second
 CY cubic yard
 CY/mi cubic yards per mile
 D or Deg degree
 F Fahrenheit
 F farad
 ft feet/foot
 Gal gallon
 G giga
 Ha hectare
 H henry
 Hz hertz
 hr hour(s)
 in. inch
 J joule
 K kelvin
 kN kilo newton
 kPa kilo pascal
 kg kilogram
 kg/m3 kilogram per cubic meter
 km kilometer
 K Kip(s)
 LF linear foot
 L litre
 Lm lumen
 L sum lump sum
 Lx lux
 M Hr man hour
 M mega
 m meter
 m/s meters per second
 mi mile
 mL milliliter
 mm millimeter
 mm/hr millimeters per hour
 n nano
 N newton
 Pa pascal
 lb pounds
 sec seconds
 S siemens
 SF square feet
 km2 square kilometer
 m2 square meter
 SY square yard
 Sta Yd station yards
 SI Systems International

T tesla
 T/mi tons per mile
 V volt
 W watt
 Wb weber

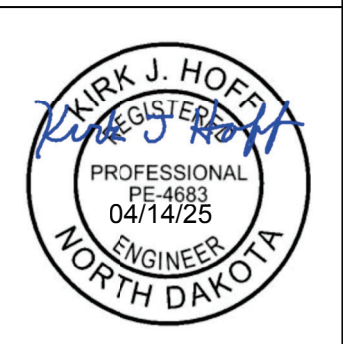
SURVEY DESCRIPTIONS

Az azimuth
 Bs backsight
 Brg bearing
 BP Cap blue plastic cap
 BS both sides
 BC brass cap
 CC closing corner
 CS curve to spiral
 Eq equation
 E external of curve
 FS far side
 FB field book
 Fs foresight
 Geod geodetic
 GIS Geographical Information System
 GPS Global Positioning System
 HI height of instrument
 IM iron monument
 I Pn iron pin
 LS Land Surveyor (licensed)
 LSIT Land Surveyor In Training
 L length of curve
 LC long chord
 LB level book
 MC meander corner
 Mer meridian
 M mid ordinate of curve
 NGS National Geodetic Survey
 NS near side
 Obsn observation
 Off Loc office location
 OP Cap orange plastic cap
 PK Parker-Kalon nail
 P Cap plastic cap
 PP Cap pink plastic cap
 PCC point of compound curve
 PC point of curve
 PI point of intersection
 PRC point of reverse curvature
 PT point of tangent
 POC point on curve
 POT point on tangent
 RTP random traverse point
 Rge range
 RP Cap red plastic cap
 SC spiral to curve
 SC standard corner
 ST spiral to tangent
 Sta station
 SE superelevation
 Tan tangent
 T tangent (semi)
 TS tangent to spiral
 Twp township
 TB transit book
 TP traverse point
 TP turning point
 USC&G US Coast & Geodetic Survey
 USGS US Geologic Survey
 VC vertical curve
 WC witness corner
 WGS World Geodetic System
 YP Cap yellow plastic cap
 Z zenith

SOIL TYPES

Cl clay
 Cl F clay fill
 Cl Hvy clay heavy
 Cl Lm clay loam
 Co S coal slack
 C Gr coarse gravel
 CS coarse sand
 FS fine sand
 Gr gravel
 Lig Co lignite coal
 Lig Sl lignite slack
 Lm loam
 Rk rock
 Sd sand
 Sdy Cl sandy clay
 Sdy Cl Lm sandy clay loam
 Sdy Fl sandy fill
 Sdy Lm sandy loam
 Sc scoria
 Sh shale
 Si Cl silt clay
 Si Cl Lm silty clay loam
 Si Lm silty loam

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NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

702COM 702 Communications
 ACCENT Accent Communications
 AGASSIZ WU Agassiz Water Users District
 AGC Associated General Contractors of America
 ALL PL Alliance Pipeline
 ALL SEAS WU All Seasons Water Users District
 AMOCO PI Amoco Pipeline Company
 AMRDA HESS Amerada Hess Corporation
 AT&T AT&T Corporation
 B PAW Bear Paw Energy Incorporated
 BAKER ELEC Baker Electric
 BASIN ELEC Basin Electric Cooperative Incorporated
 BEK TEL Bek Communications Cooperative
 BELLE PL Belle Fourche Pipeline Company
 BLM Bureau of Land Management
 BNSF Burlington Northern Santa Fe Railway
 BOEING Boeing
 BRNS RWD Barnes Rural Water District
 BURK-DIV ELEC Burke-Divide Electric Cooperative
 BURL WRD Burleigh County Water Resource District
 CABLE ONE Cable One
 CABLE SERV Cable Services
 CAP ELEC Capital Electric Cooperative Incorporated
 CASS CO ELEC Cass County Electric Cooperative
 CASS RWU Cass Rural Water Users District
 CAV ELEC Cavalier Rural Electric Cooperative
 CBLCOM Cablecom Of Fargo
 CENEX PL Cenex Pipeline
 CENT PL WATER DIST Central Pipe Line Water District
 CENT PWR ELEC Central Power Electric Cooperative
 CENTURYLINK CenturyLink
 COE Corps of Engineers
 CONS COMM Consolidated Communications
 CONS TELCOM Consolidated Telcom
 CONT RES Continental Resource Inc
 CPR Canadian Pacific Railway
 D O E Department Of Energy
 DAK CARR Dakota Carrier Network
 DAK CENT TEL Dakota Central Telephone
 DAK RWD Dakota Rural Water District
 DGC Dakota Gasification Company
 DICKEY R NET Dickey Rural Networks
 DICKEY WRD Dickey County Water Resource District
 DICKEY TEL Dickey Telephone
 DNRR Dakota Northern Railroad
 DOME PL Dome Pipeline Company
 DVELEC Dakota Valley Electric Cooperative
 DVMW Dakota, Missouri Valley & Western
 E CENT REG WD East Central Water District
 ENBRDG Enbridge Pipelines Incorporated
 ENVENTIS Enventis Telephone
 EQUINOR Equinor Pipeline
 FALK MNG Falkirk Mining Company
 FHWA Federal Highway Administration
 G FKS-TRL WD Grand Forks-traill Water District
 GETTY TRD & TRAN Getty Trading & Transportation
 GLDN W ELEC Golden West Electric Cooperative

GTR RAMSEY WD Greater Ramsey Water District
 GT PLNS NAT GAS Great Plains Natural Gas Company
 HALS TEL Halstad Telephone Company
 IDEA1 Idea1
 INT-COMM TEL Inter-Community Telephone Company
 KANEB PL Kaneb Pipeline Company
 KEM ELEC Kem Electric Cooperative Incorporated
 KOCH GATH SYS Koch Gathering Systems Incorporated
 LKHD PL Lakehead Pipeline Company
 LWR YELL R ELEC Lower Yellowstone Rural Electric
 LUMEN Lumen Technologies Incorporated
 MCKENZ CON McKenzie Consolidated Telcom
 MCKNZ ELEC McKenzie Electric Cooperative
 MCKNZ WRD McKenzie County Water Resource District
 MCLEOD McLeod USA
 MCLN ELEC McLean Electric Cooperative
 MCLN-SHRDN R WAT McLean-Sheridan Rural Water District
 MDU Montana-dakota Utilities
 MIDCO MidContinent Communications
 MIDSTATE TEL Midstate Telephone Company
 MINOT CABLE Minot Cable Television
 MINOT TEL Minot Telephone Company
 MISS VALL COMM Missouri Valley Communications Incorporated
 MISS W W S Missouri West Water System
 MNKOTA PWR Minnkota Power
 MOR-GRAN-SOU ELEC Mor-gran-sou Electric Cooperative
 MOUNT-WILLI ELEC Mountrail-williams Electric Cooperative
 MLGC Moore & Liberty - Griggs County
 MUNICIPAL City Water And Sewer
 MUNICIPAL City Of '.....'
 N CENT ELEC North Central Electric Cooperative
 N PRAIR REG WD North Prairie Regional Water District
 ND PKS & REC North Dakota Parks And Recreation
 ND TEL North Dakota Telephone Company
 NDDOT North Dakota Department of Transportation
 NE REG WD Northeast Regional Water District
 NDSU SOIL SCI DEPT NDSU Soil Science Department
 NEMONT TEL Nemont Telephone
 NODAK R ELEC Nodak Rural Electric Cooperative
 NOON FRMS TEL Noonan Farmers Telephone Company
 NPR Northern Plains Railroad
 NSP Northern States Power
 NTHN BRDR PL Northern Border Pipeline
 NTHN PLNS ELEC Northern Plains Electric Cooperative Incorporated
 NTHWSTRN REF Northwestern Refinery Company
 NW COMM Northwest Communication Cooperation
 NWRWD Northwest Rural Water District
 ONEOK Oneok gas
 OSHA Occupational Safety and Health Administration
 OTTR TL PWR Otter Tail Power Company
 PAAP Plains All American Pipeline
 P L E M Prairielands Energy Marketing
 POLAR COM Polar Communications
 PVT ELEC Private Electric
 QWEST Qwest Communications
 R&T REG WD R & T Water District

RED RIV COMM Red River Communications
 RESVTN TEL Reservation Telephone
 ROBRTS TEL Roberts Company Telephone
 R-RIDER ELEC Roughrider Electric Cooperative
 RRVW Red River Valley & Western Railroad
 S CENT REG WD South Central Regional Water District
 SE W U Southeast Water Users Incorporated
 SCOTT CABLE Scott Cable Television Dickinson
 SHERDN ELEC Sheridan Electric Cooperative
 SHEYN VLY ELEC Sheyenne Valley Electric Cooperative
 SKYTECH Skyland Technologies Incorporated
 SLOPE ELEC Slope Electric Cooperative Incorporated
 SOURIS RIV TELCOM Souris River Telecommunications
 ST WAT COMM State Water Commission
 STATE LN WATER State Line Water Cooperative
 STER ENG Sterling Energy
 STUT RWD Stutsman Rural Water District
 SW PL PRJ Southwest Pipeline Project
 SWWA Southwest Water Authority
 SUNOCO Sunoco LP
 T M C Turtle Mountain Communications
 TCI TCI of North Dakota
 TESORO GHG PLNS PL Tesoro High Plains Pipeline
 TRI-CNTY WU Tri-County Water Users Incorporated
 TRL CO WRD Traill County Water Resource District
 UNTD TEL United Telephone
 UPPR SOUR WD Upper Souris Water District
 US SPRINT U.S. Sprint
 USAF MSL CABLE U.S.A.F. Missile Cable
 USFWS US Fish and Wildlife Service
 USW COMM U.S. West Communications
 VRNDRY ELEC Verendrye Electric Cooperative
 W RIV TEL West River Telephone Incorporated
 WAPA Western Area Power Administration
 WAWSA Western Area Water Supply Authority
 WEB W. E. B. Water Development Association
 WILLI WRD Williams County Water Resource District
 WILSTN BAS PL Williston Basin Interstate Pipeline Company
 WLSH RWD Walsh Water Rural Water District
 WOLVRTN TEL Wolverton Telephone
 XLENER Xcel Energy
 YSVR Yellowstone Valley Railroad

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LINE STYLES

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Existing Topography

- Existing Ground Void
- Existing Cemetery Boundary
- Existing Box Culvert Bridge
- Existing Concrete Surface
- Existing Drainage Structure
- Existing Gravel Surface
- Existing Riprap
- Existing Dirt Surface
- Existing Asphalt Surface
- Existing Tie Point Line
- Existing Railroad Centerline
- Existing Guardrail Cable
- Existing Guardrail Metal
- Existing Edge of Water
- Existing Fence
- Existing Railroad
- Existing Field Line
- Exst Flow
- Existing Curb
- Existing Valley Gutter
- Existing Driveway Gutter
- Existing Curb and Gutter
- Existing Mountable Curb and Gutter

Proposed Topography

- Existing 3-Cable w Posts
- Site Boundary
- Existing Berm, Dike, Pit, or Earth Dam
- Existing Ditch Block
- Existing Tree Boundary
- Existing Brush or Shrub Boundary
- Existing Retaining Wall
- Existing Planter or Wall
- Existing W-Beam Guardrail with Posts
- Existing Railroad Switch
- Gravel Pit - Borrow Area
- Existing Wet Area-Vegetation Break
- Existing High Tension Cable Guardrail
- Existing High Tension Cable Guardrail with Posts
- 3-Cable w Posts
- Flow
- Fence
- Remove Line
- Wall
- Retaining Wall (Plan View)
- W-Beam w Posts
- High Tension Cable Guardrail with Posts

Existing Utilities

- Existing Electrical
- Existing Fiber Optic Line
- Existing TV Fiber Optic
- Existing Gas Pipe
- Existing Overhead Utility Line
- Existing Power
- Existing Fuel Pipeline
- Existing Undefined Above Ground Pipe Line
- Existing Sanitary Sewer
- Existing Sanitary Force Main
- Existing Storm Drain
- Existing Storm Drain Force Main
- Existing Culvert
- Existing Telephone Line
- Existing TV Line
- Existing Water or Steam Line
- Existing Under Drain
- Existing Slotted Drain
- Existing Conduit
- Existing Conductor
- Existing Down Guy Wire Down Guy
- Existing Underground Vault or Lift Station

Proposed Utilities

- 24 Inch Pipe
- Reinforced Concrete Pipe
- Under Drain
- Edge Drain

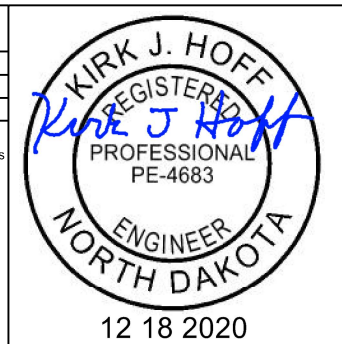
Traffic Utilities

- Conductor
- Fiber Optic
- Existing Loop Detector
- Existing Double Micro Loop Detector
- Micro Loop Detector Double
- Existing Micro Loop Detector
- Micro Loop Detector
- Signal Head with Mast Arm
- Existing Signal Head with Mast Arm

Sign Structures

- Existing Overhead Sign Structure
- Existing Overhead Sign Structure Cantilever
- Overhead Sign Structure Cantilever

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LINE STYLES

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Right Of Way

- Easement
- Existing Easement
- Right of Way
- Existing Right of Way
- Existing Right of Way Railroad
- Existing Right of Way Not State Owned
- Existing Government Lot Line
- Existing Adjacent Block Lines
- Existing Adjacent Lot Lines
- Existing Adjacent Property Line
- Existing Adjacent Subdivision Lines
- Sight Distance Triangle Line
- Dimension Leader

Boundary Control

- ////// Existing City Corporate Limits or Reservation Boundary
- Existing State or International Line
- Existing Township
- Existing County
- Existing Section Line
- Existing Quarter Section Line
- Existing Sixteenth Section Line
- Existing Centerline
- Tangent Line

Cross Sections and Typical

- Existing Ground
- Existing Topsoil (Cross Section View)
- void - void - void - v Existing Ground Void (Not Surveyed)
- Existing Concrete
- Existing Aggregate (Cross Section View)
- Existing Curb and Gutter (Cross Section View)
- Existing Asphalt (Cross Section View)
- Existing Reinforcement Rebar

Geotechnical

- D ----- D ----- Geotextile Fabric Type D
- **Geo** ----- **Geo** ----- Geogrid
- R ----- R ----- Geotextile Fabric Type R
- R ----- R ----- Geotextile Fabric Type R1
- RR ----- RR ----- Geotextile Fabric Type RR
- S ----- S ----- Geotextile Fabric Type S

Countours

- Depression Contours
- Supplemental Contour

Profile

- Subgrade, Subcut or Ditch Grade
- Topsoil Profile

Striping

- Centerline Pavement Marking
- ===== Barrier with Centerline Pavement Marking
- ===== Barrier Pavement Marking
- - - - - Stripe 4 IN Dotted Extension White
- - - - - Stripe 8 IN Dotted Extension White
- - - - - Stripe 8 IN Lane Drop

Pavement Joints

- ===== Doweled Joint
- +++++ Tie Bar 30 Inch 4 Foot Center to Center
- +++++ Tie Bar 18 Inch 3 Foot Center to Center
- +++++ Tie Bar at Random Spacing

Bridge Details

- Small Hidden Object
- Large Hidden Object
- Phantom Object
- Existing Conditions Object
- Centerline Main
- Centerline Secondary
- Excavation Limits
- Proposed Ground
- Sheet Piling

Erosion Control

- Limits of Const Transition Line
- Bale Check
- Rock Check
- s ----- s ----- Floating Silt Curtain
- SF ----- SF ----- Silt Fence
- Excavation Limits
- Fiber Rolls

Environmental

- Wetland Mitigation
- Existing Wetland Easement USFWS
- Existing Wetland Jurisdictional
- Existing Wetland
- Tree Row

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SYMBOLS



North Arrow (Half Scale)



Alignment Data Point



Alignment Monument



Spot Elevation



Existing Miscellaneous Spot



Existing Access Control Arrow



Existing Benchmark



Reset USGS Marker



Iron Monument Found



Iron Pin R/W Monument



Property Corner



Iron Pin Reference Monument



Right of Way Marker (Exst, Ppsd, Reset)



Existing Federal Reference Corner



Existing Section Corner (Full, Quarter, Sixteenth, Meander)



Existing Witness Corner



Existing Control Point (CP, GPS-RTK, TRI)



Existing Traverse PI Aerial Panel



Existing Reference Marker Point NGS



Existing EFB Misc



Existing Bush or Shrub



Existing Large Evergreen Tree



Existing Small Evergreen Tree



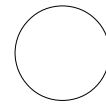
Existing Large Tree



Existing Small Tree



Existing Tree Trunk



Cairn or Stone Circle



Existing Artifact



Existing Satellite Dish



Existing Weather Station



Existing Windmill or Tower



Reinforced Pavement



Continuous Split Barrel Sample



Flight Auger Sample



Split Barrel Sample



Thinwall Tube Sample



Standard Penetration Test



Inclinometer Tube



Excavation Unit









































































Existing Ground Water Well Bore Hole

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
12-18-20	General Revisions

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 REGISTERED
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 NORTH DAKOTA
 12 18 2020

SYMBOLS

D-101-32

 Existing Luminaire  Luminaire LED  Existing Light Standard Luminaire  Relocate Light Standard  Light Standard Light LED Luminaire  Light Standard 35 Watt High Pressure Sodium Vapor Luminaire  Light Standard 50 Watt High Pressure Sodium Vapor Luminaire  Light Standard 70 Watt High Pressure Sodium Vapor Luminaire  Light Standard 100 Watt High Pressure Sodium Vapor Luminaire  Light Standard 150 Watt High Pressure Sodium Vapor Luminaire  Light Standard 200 Watt High Pressure Sodium Vapor Luminaire  Light Standard 250 Watt High Pressure Sodium Vapor Luminaire  Light Standard 310 Watt High Pressure Sodium Vapor Luminaire  Light Standard 400 Watt High Pressure Sodium Vapor Luminaire  Light Standard 700 Watt High Pressure Sodium Vapor Luminaire  Light Standard 1000 Watt High Pressure Sodium Vapor Luminaire  Emergency Vehicle Detector  Video Detection Camera	  High Mast Light Standard 3 Luminaire (Exst, Ppsd)   High Mast Light Standard 4 Luminaire (Exst, Ppsd)   High Mast Light Standard 5 Luminaire (Exst, Ppsd)   High Mast Light Standard 6 Luminaire (Exst, Ppsd)   High Mast Light Standard 7 Luminaire (Exst, Ppsd)   High Mast Light Standard 8 Luminaire (Exst, Ppsd)   High Mast Light Standard 9 Luminaire (Exst, Ppsd)   High Mast Light Standard 10 Luminaire (Exst, Ppsd)  Overhead Sign Structure Load Center (Exst, Ppsd)  Traffic Signal Controller (Exst, Ppsd)  Pad Mounted Traffic Signal Controller (Exst, Ppsd)  Flashing Beacon (Exst, Ppsd)  Concrete Foundation (Exst, Ppsd)  Pipe Mounted Flasher (Exst, Ppsd)  Pad Mounted Feed Point (Exst, Ppsd)  Pipe Mounted Feed Point with Pad (Exst, Ppsd)  Pole Mounted Feed Point (Exst, Ppsd)  Junction Box (Exst, Ppsd)  Existing Pedestrian Head with Number  Existing Signal Head  Pole Mounted Head  Existing Lighting Standard Pole	 Existing Traffic Signal Standard    Pull Box (Exst-Ppsd-Undefined)   Intelligent Transportation Pull Box (Exst, Ppsd)   Transformer (Exst, Ppsd)    Power Pole (Exst-Ppsd-with Transformer)   Wood Pole (Exst, Ppsd)   Pedestrian Push Button Post (Exst, Ppsd)  Existing Pole  Existing Telephone Pole  Existing Post     Connection Conductor (Ground, Neutral, Phase 1, Phase 2)
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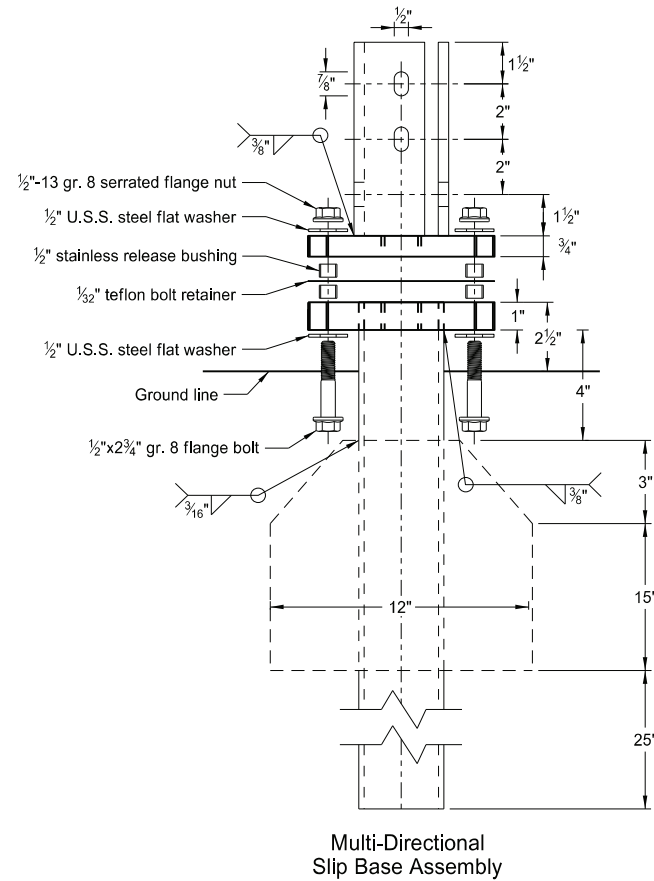
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
12-18-20	General Revisions



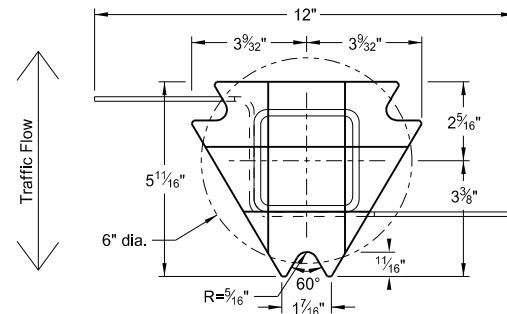
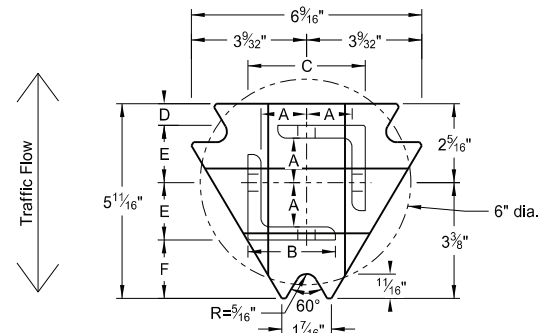
KIRK J. HOFF
REGISTERED
PROFESSIONAL
ENGINEER
NORTH DAKOTA
12 18 2020

BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

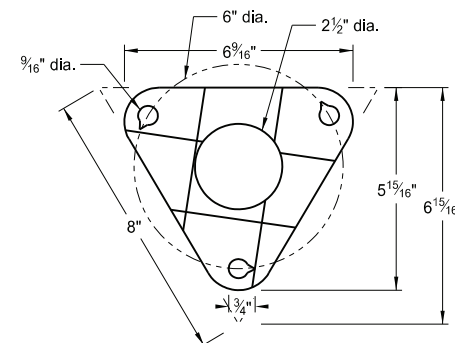
D-704-7



Perforated Tube



Bottom Soil Stub
Tube - 3"x3"x7 gauge ASTM A500 grade B tube
Stabilizing Wing - 7 gauge H.R.P.O. ASTM A1011
Plate - ASTM A572 grade 50



Notes:

1. Torque slip base bolts as specified by manufacturer.
2. Use anchor with 43.9 KSI yield strength and 59.3 KSI tensile strength.
3. Provide 4" vertical clearance for anchor or breakaway base. Measure the 4"x60" measurement above and below post location and back and ahead of post.
4. In concrete sidewalk, use same anchor without wings.
5. Provide more than 7' between the first and fourth posts of a four post sign.

Telescoping Perforated Tube

Number of Posts	Post Size in.	Wall Thickness Gauge	Sleeve Size in.	Wall Thickness Gauge	Slip Base	Anchor Size without Slip Base in.
1	2	12			No	2 1/4
1	2 1/4	12			No	2 1/2
1	2 1/2	12			(A)	3
1	2 1/2	10			Yes	
1	2 1/4	12	2	12	Yes	
1	2 1/2	12	2 1/4	12	Yes	
2	2	12			No	2 1/4
2	2 1/4	12			No	2 1/2
2	2 1/2	12			Yes	
2	2 1/2	12			Yes	
2	2 1/4	10	2	12	Yes	
3 & 4	2 1/2	12			Yes	
3 & 4	2 1/2	10			Yes	
3 & 4	2 1/2	12	2 1/4	12	Yes	
3 & 4	2 1/4	12	2	12	Yes	
3 & 4	2 1/2	10	2 3/16	10	Yes	

Properties of Telescoping Perforated Tube

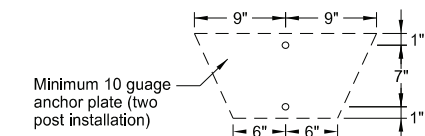
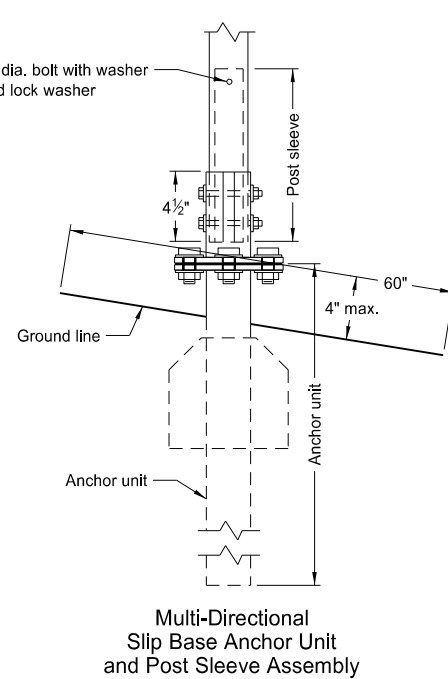
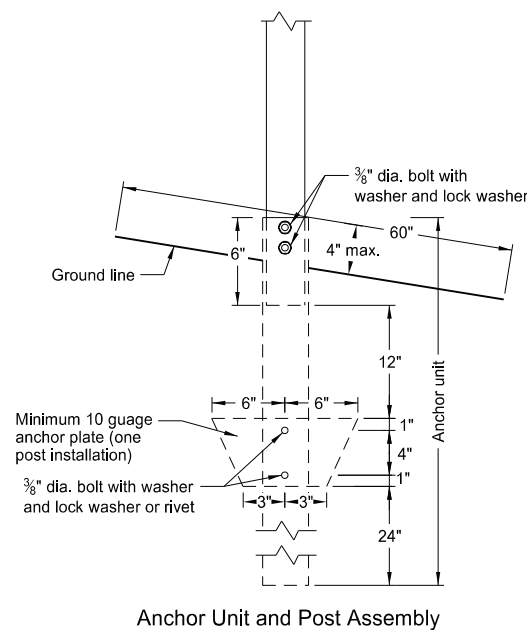
Tube Size in.	Wall Thickness in.	U.S. Standard Gauge	Weight per Foot lbs.	Moment of Inertia in. ⁴	Cross Sec. Area in. ²	Section Modulus in. ³
1 1/2 x 1 1/2	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2 1/4 x 2 1/4	0.105	12	2.773	0.561	0.695	0.499
2 3/16 x 2 3/16	0.135	10	3.432	0.605	0.841	0.590
2 1/2 x 2 1/2	0.105	12	3.141	0.804	0.803	0.643
2 1/2 x 2 1/2	0.135	10	4.006	0.979	1.010	0.785

Top Post Receiver Data Table

Square Post Sizes (B)	A	B	C	D	E	F
2 3/16"x10 ga.	1 5/64"	2 1/2"	3 1/32"	2 5/32"	1 33/64"	1 7/8"
2 1/2"x10 ga.	1 3/32"	2 1/2"	3 5/16"	5/8"	1 21/32"	1 3/4"

(A) Use breakaway base when support is placed in weak soils. Engineer determines if soils are weak.

(B) For additional wind load, insert the 2 3/16"x10 ga. into 2 1/2"x10 ga.



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
10-03-19	New Design Engr PE Stamp
8-01-24	Electronic Stamp/Signature

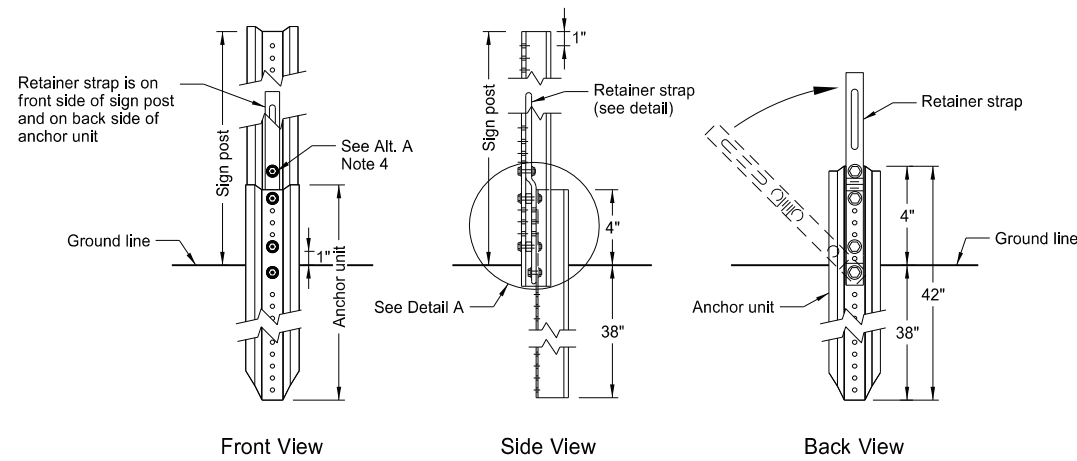
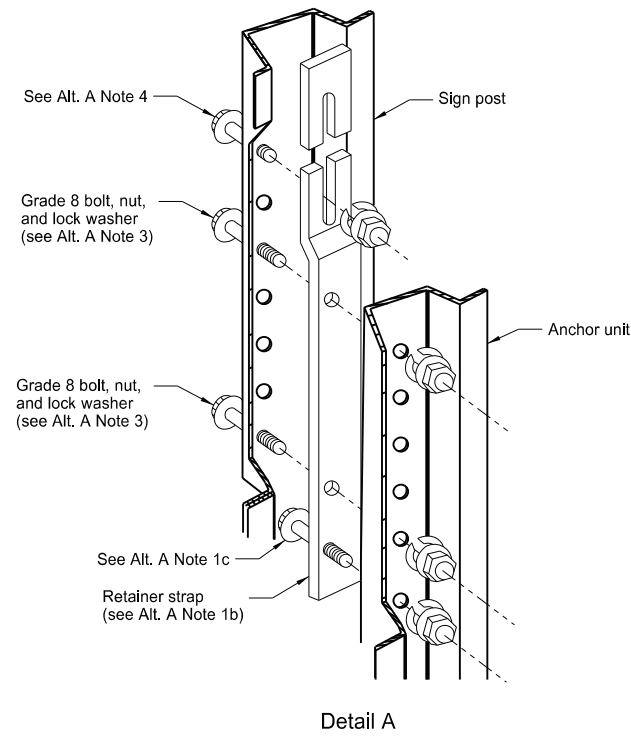


08/01/24

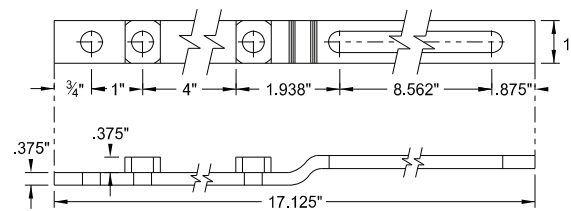
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

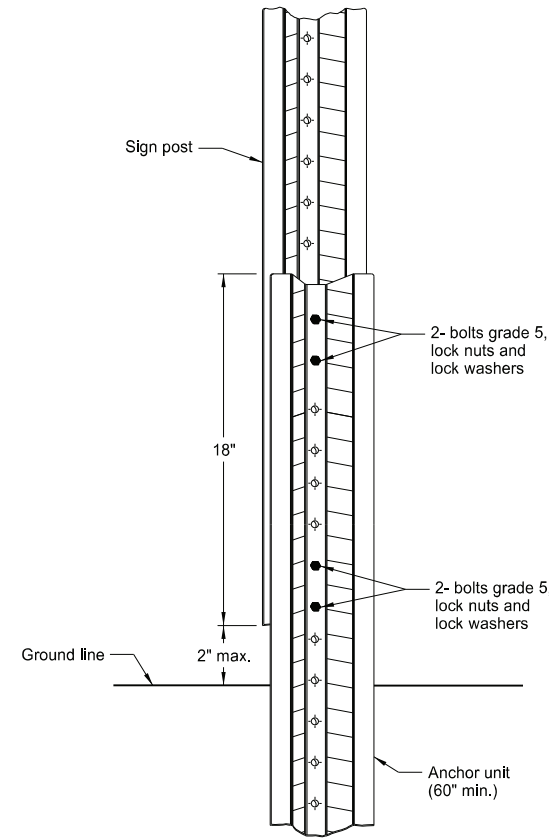
U-Channel Post



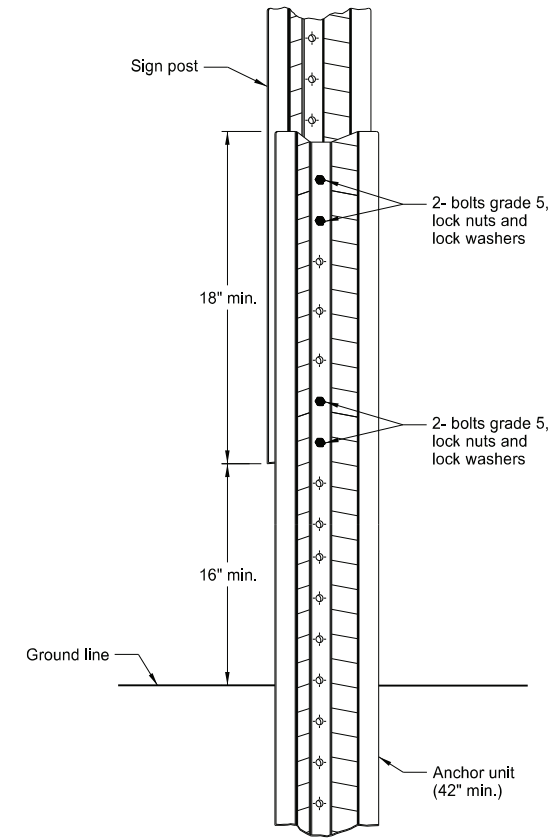
Breakaway U-Channel Detail Alternate A
Install a maximum of 2 posts within 7'.



Retainer Strap Detail



Breakaway U-Channel Splice Detail Alternate B
(2.5 and 3 lb/ft)
Install a maximum of 3 posts within 7'.



Breakaway U-Channel Splice Detail Alternate C
(2.5 and 3 lb/ft)
Install a maximum of 3 posts within 7'.

Alternate A Steps of Installation:

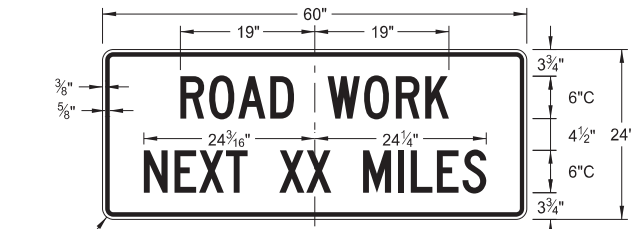
1. a) Drive anchor unit to within 12" of ground level.
b) Establish proper assembly by lining up bottom hole of retainer strap with 6th hole from the top of the anchor unit.
c) Assemble strap to back of anchor unit using 5/16"x2" bolt, lock washer and nut.
d) Rotate strap 90° to left.
2. a) Drive anchor unit to 4" above ground.
b) Rotate strap to vertical position.
3. a) Place 5/16"x2" bolt, lock washer and nut in bottom of sign post to facilitate alignment of sign post with proper hole in anchor unit.
b) Alternately tighten two connector bolts.
4. Complete assembly by tightening 5/16"x2" bolt (this fastens sign post to retainer strap).
5. Properly nest base post, strap, and sign post. Proper nesting occurs when all flat surfaces of the base post, strap, and sign post at the bolts have full contact across the entire width.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
10-03-19	New Design Engr PE Stamp
8-01-24	Electronic Stamp/Signature

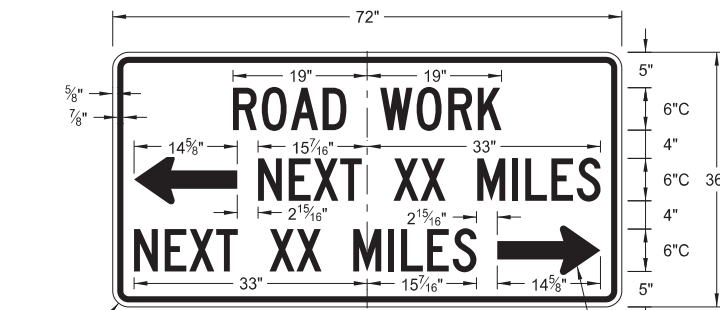


08/01/24

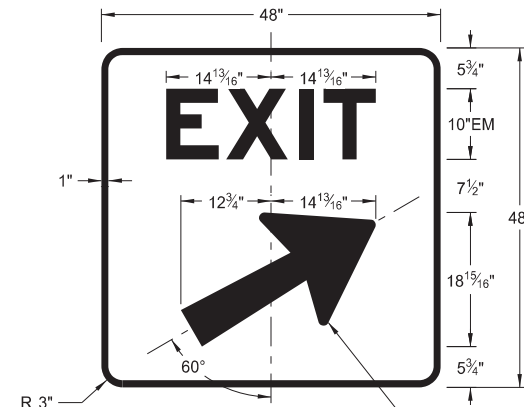
CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS



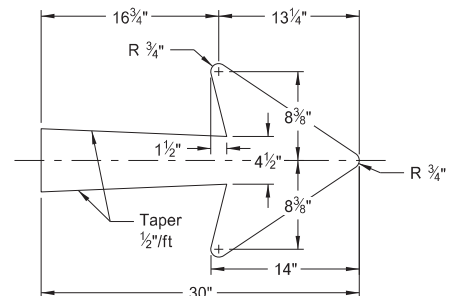
G20-1-60
Legend: black (non-refl)
Background: orange



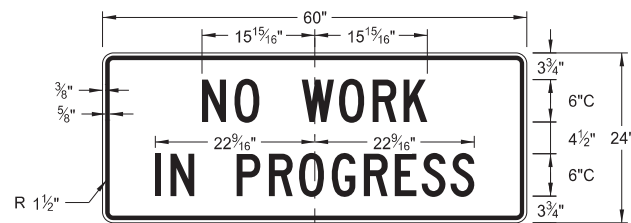
G20-50a-72
Legend: black (non-refl)
Background: orange



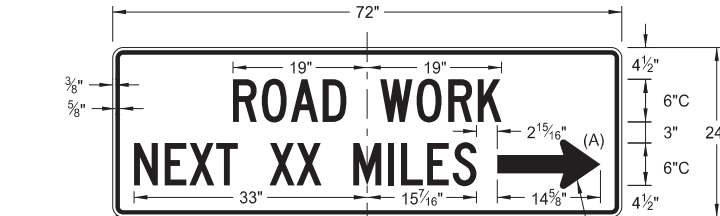
E5-1(L or R)-48
Legend: white
Background: green (orange optional)



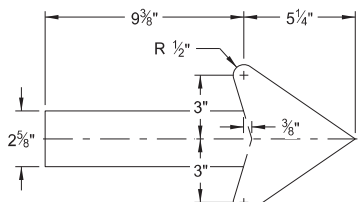
E5-1-48



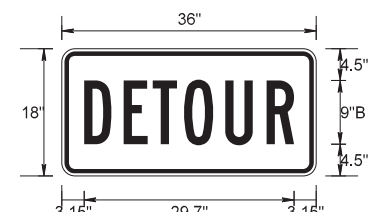
G20-1b-60
Legend: black (non-refl)
Background: orange



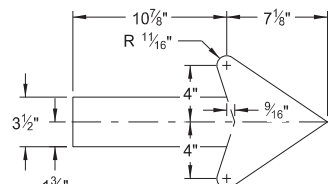
G20-52a-72
Legend: black (non-refl)
Background: orange



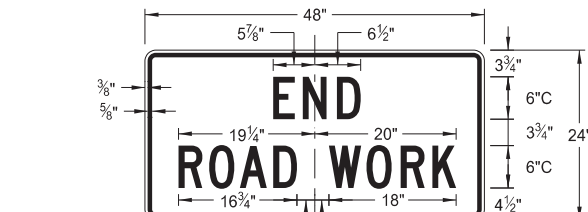
G20-50a-72
G20-52a-72



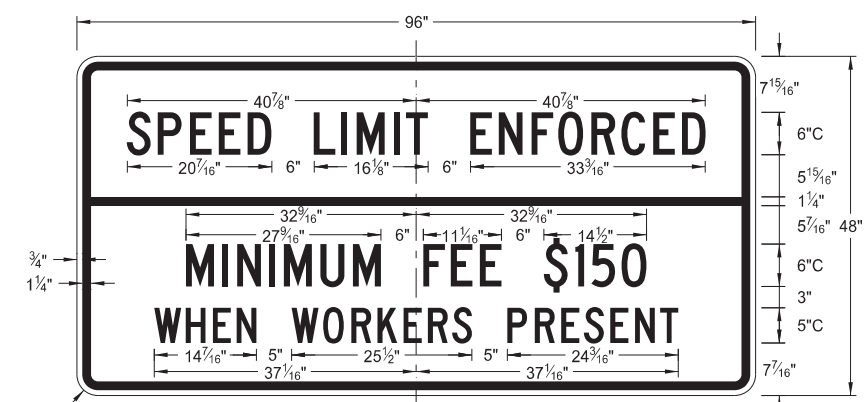
M4-8-36
Legend: black (non-refl)
Background: orange



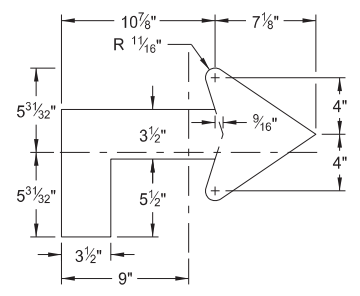
M4-9(L or R)-30
Right or Left



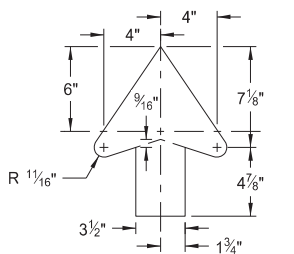
G20-2-48
Legend: black (non-refl)
Background: orange



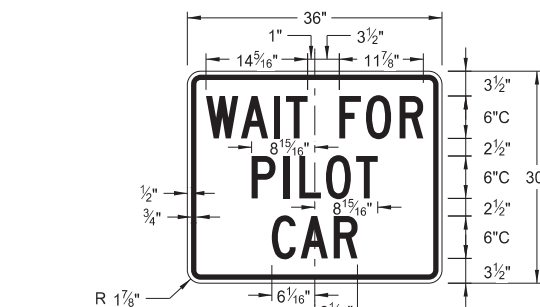
G20-55-96
Legend: black (non-refl)
Background: orange



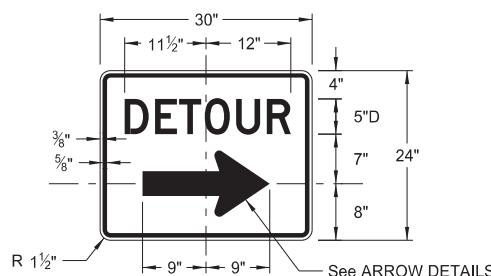
M4-9(L or R)-30
Advanced Right or Left



M4-9-30
Straight



G20-4b-36
Legend: black (non-refl)
Background: orange



M4-9(L or R)-30 &
M4-9-30
Legend: black (non-refl)
Background: orange

ARROW DETAILS

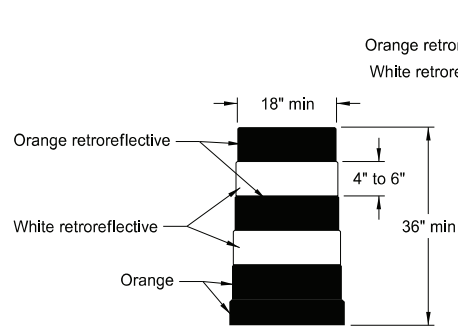
NOTES:

(A) Arrow may be right or left of the legend to indicate construction to the right or left.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
08-17-17	Added sign & background color
10-03-19	New Design Engineer PE Stamp
08-01-24	Electronic Stamp/Signature
06-30-25	Legislative Changes

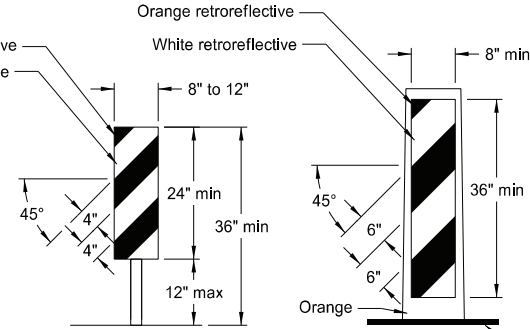


BARRICADE AND CHANNELIZING DEVICE DETAILS



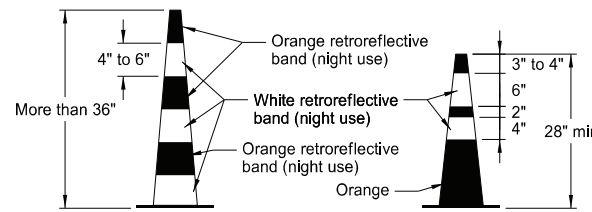
DELINEATOR DRUM

Provide horizontal, circumferential, alternating orange and white retroreflective stripes 4" to 6" wide for drum markings. Use a minimum of two orange and two white stripes with the top stripe being orange for each drum. Do not exceed 3" nonretroreflective spaces between the horizontal orange and white stripes. Avoid placement of stripes on drum ribs or indentations. Use closed top drums that will not allow collection of debris. Do not place ballast on the top of drum.



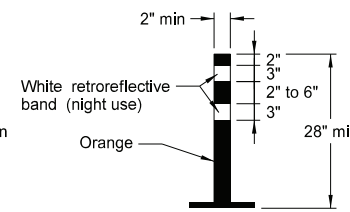
VERTICAL PANEL

Provide alternating orange and white retroreflective stripes, sloping downward in direction vehicular traffic is to pass. Place retroreflective sheeting on both sides of panel with a minimum of 270 square inches of retroreflective area facing vehicular traffic. Where the height of the retroreflective material on the vertical panel is 36 inches or more, use a stripe width of 6 inches.



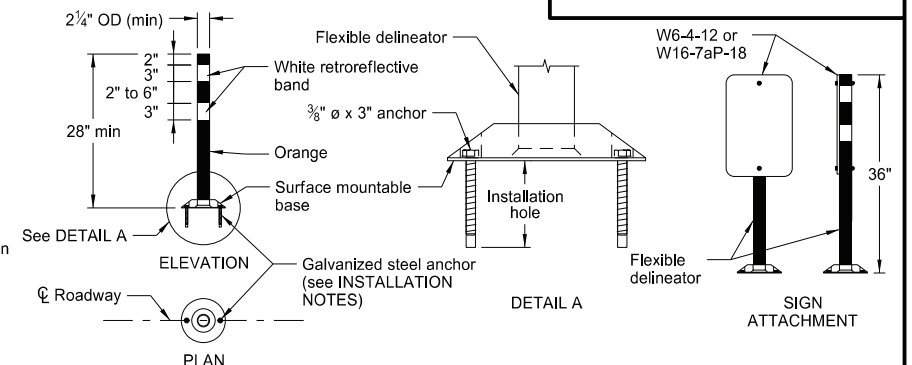
TRAFFIC CONE

Provide retroreflectization of cones more than 36" in height by alternating orange and white retroreflective stripes. Use a minimum of two orange and two white stripes for each cone with the top stripe being orange. Use maximum 3" nonretroreflective space between the orange and white stripes.



TUBULAR MARKER

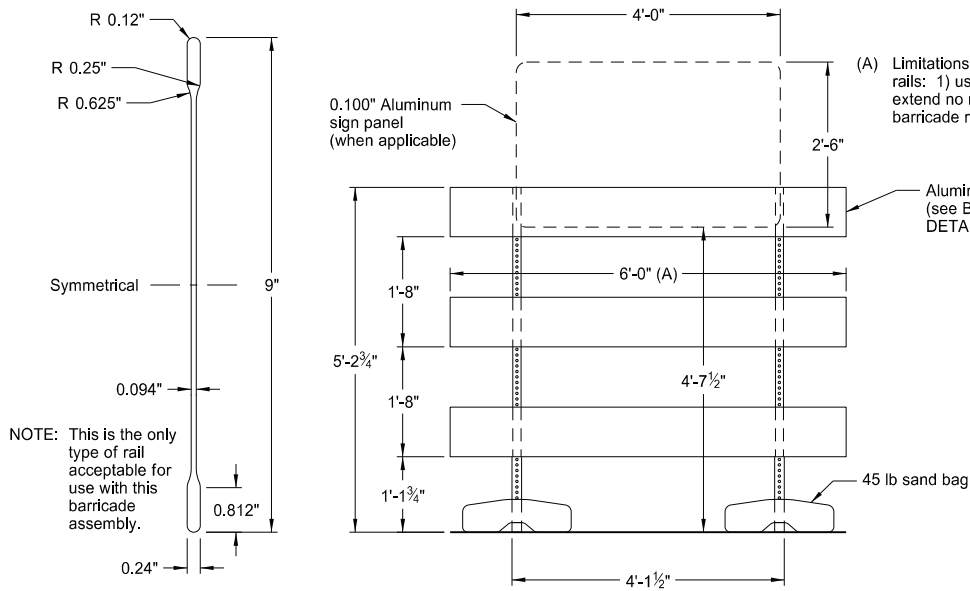
Provide retroreflectization of tubular markers more than 42" in height by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.



FLEXIBLE DELINEATOR

INSTALLATION NOTES:

1. Drill installation holes to diameter and depth required by manufacturer's specifications.
2. For removal, remove anchors and fill installation hole with an epoxy designed to bond to pavement surface.
3. In lieu of bolted down base, use an 8" x 8" butyl pad or hot melt butyl. Remove butyl as close as possible to pavement surface.

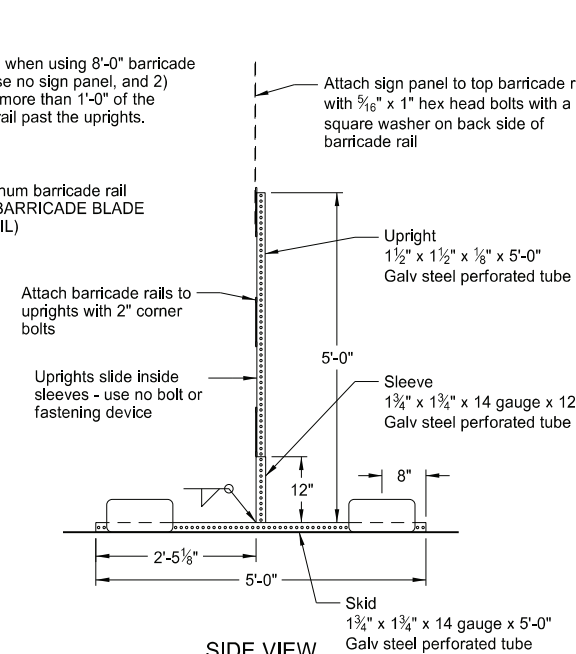


BARRICADE BLADE DETAIL

NOTE: This is the only type of rail acceptable for use with this barricade assembly.

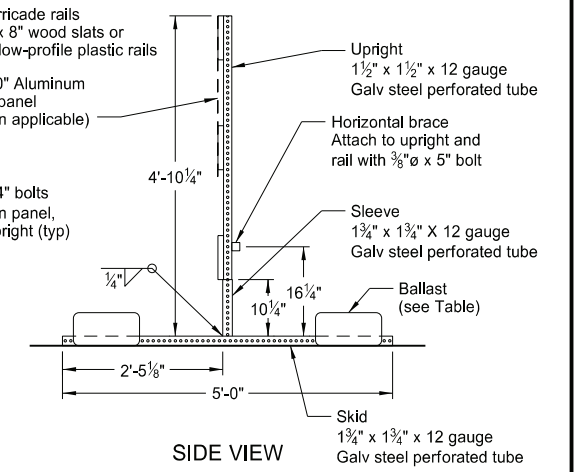
ELEVATION VIEW

BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)



ELEVATION VIEW

BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)

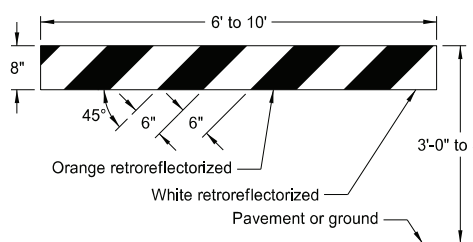


SIDE VIEW

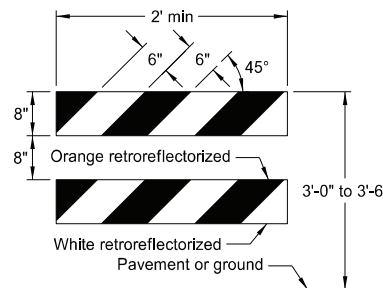
MINIMUM BALLAST (For each side of barricade support)

Without Sign	4 - 25 lb sandbags
With Sign	6 - 25 lb sandbags

Note: Number of sandbags based on a wind speed of 55 MPH. Sandbags assumed to be placed at or near the ends of the skids.

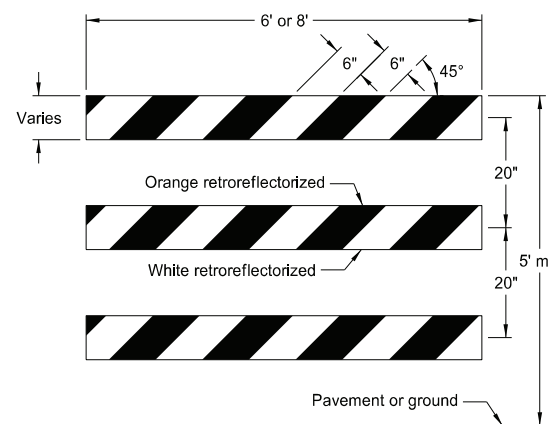


TYPE I BARRICADE

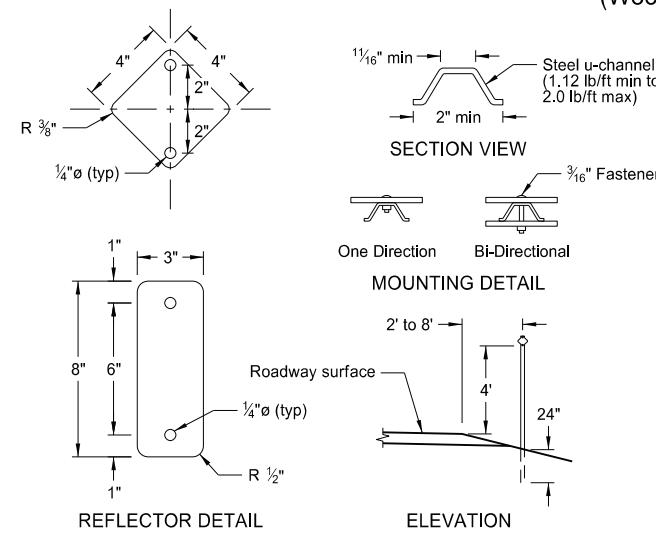


TYPE II BARRICADE

BARRICADE RAIL DETAILS



TYPE III BARRICADE



REFLECTOR DETAIL

ELEVATION

DELINEATORS

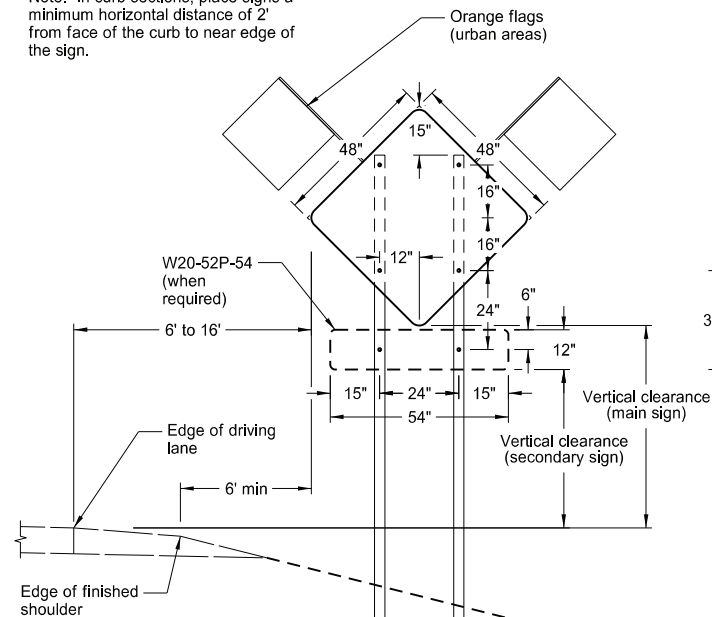
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
11-01-19	Revised details for Flexible Delineator
8-01-24	Electronic Stamp/Signature



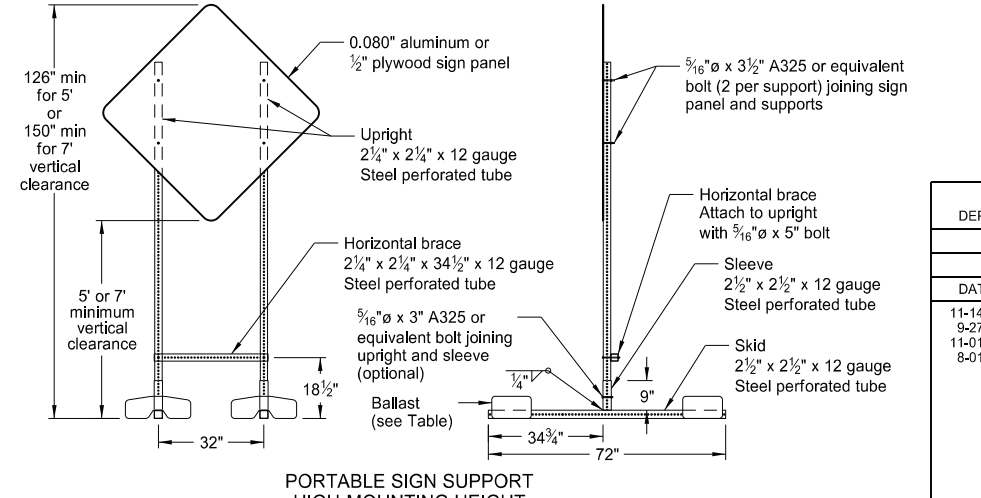
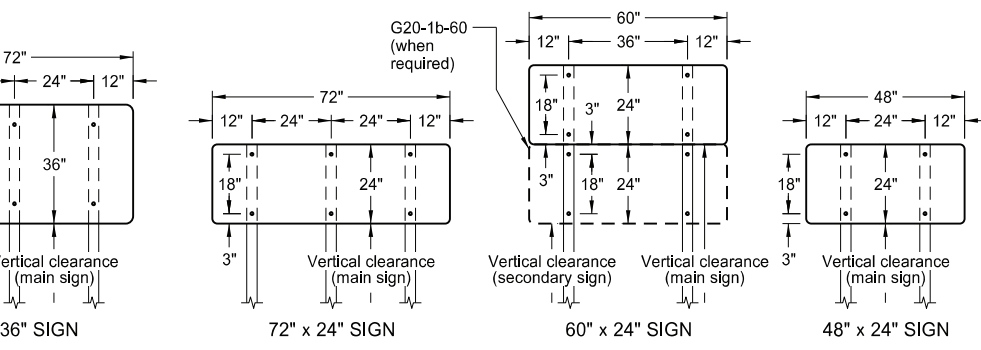
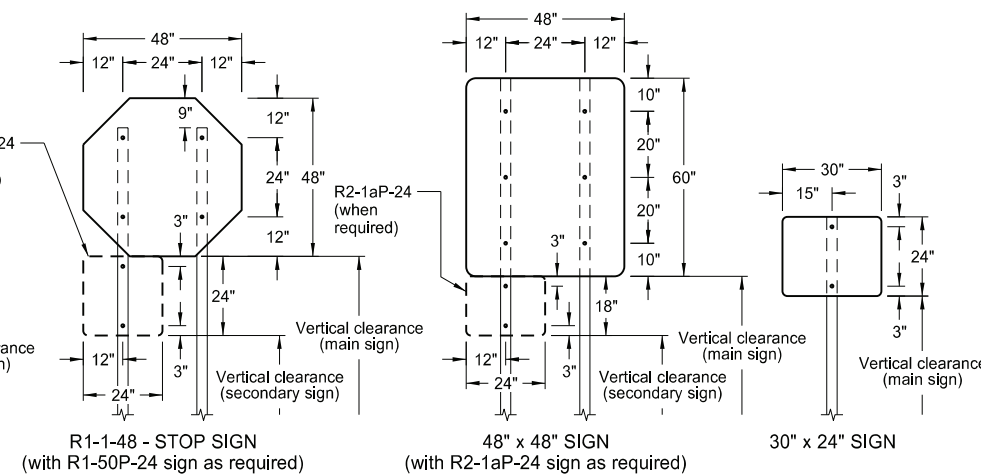
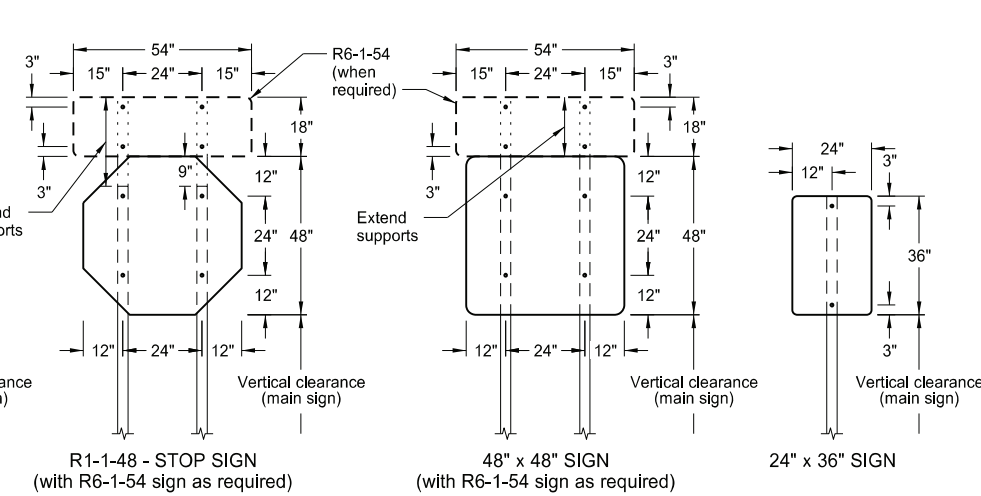
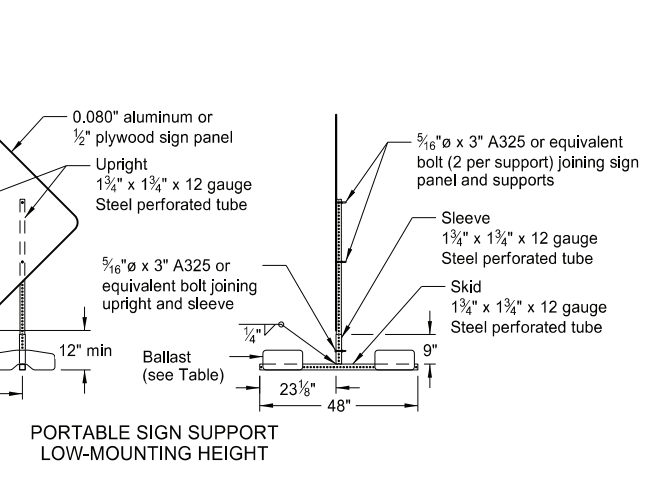
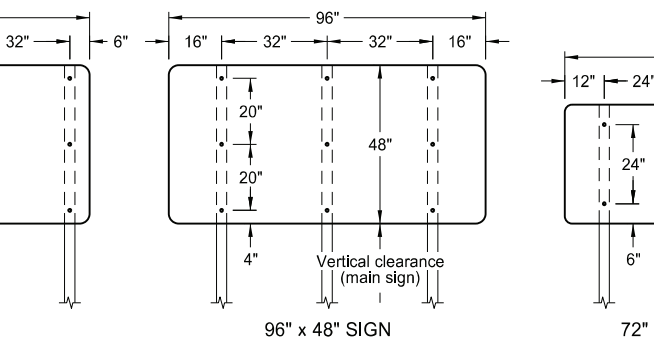
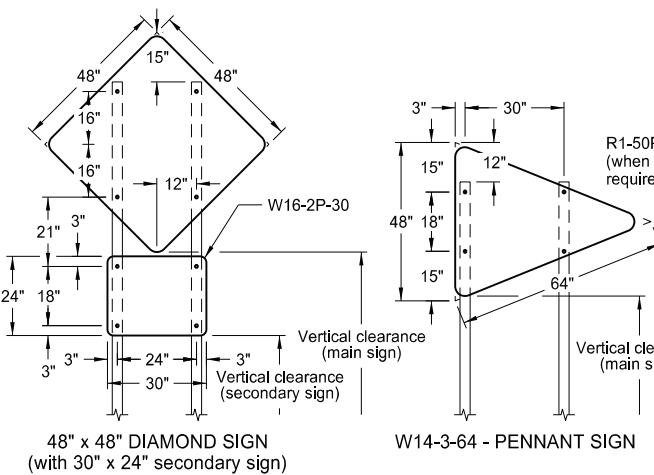
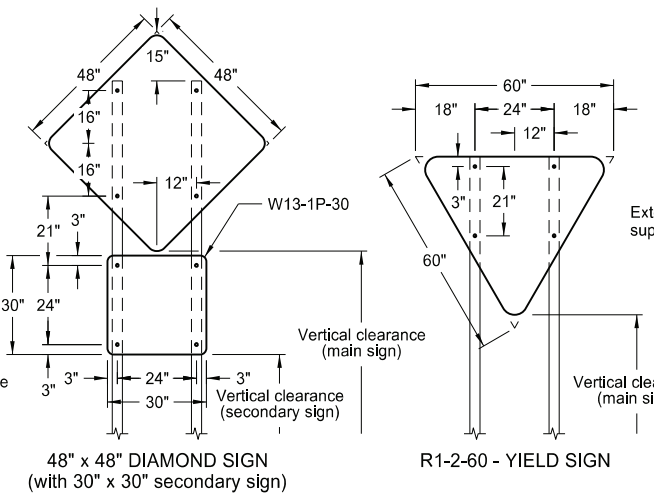
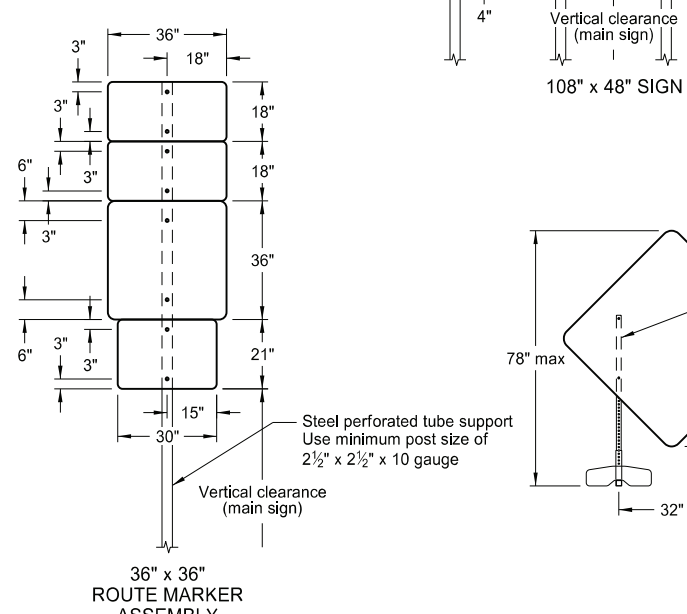
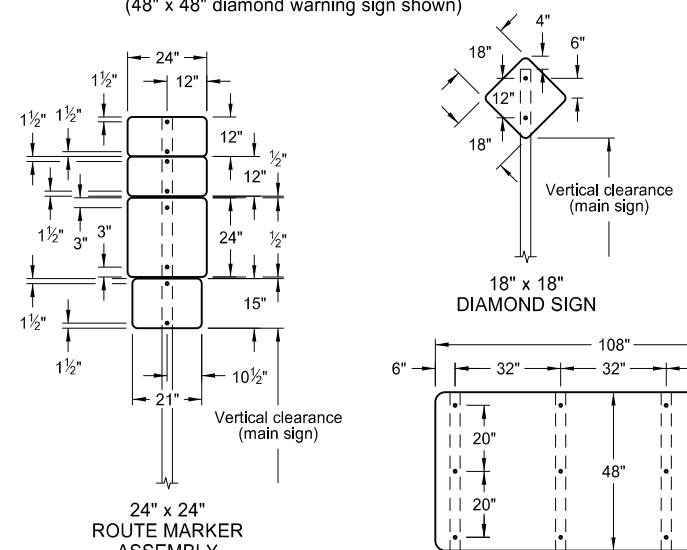
08/01/24

CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

Note: In curb sections, place signs a minimum horizontal distance of 2' from face of the curb to near edge of the sign.



TYPICAL SECTION
(48" x 48" diamond warning sign shown)



- NOTES:
- Sign Supports: Galvanize or paint supports. Minimum post sizes are 2.5 lb/ft u-channel or 2" x 2" x 12 gauge steel perforated tube, except where noted. When installing signs on u-channel, minimum post size for assemblies containing a secondary sign is 3.0 lb/ft. Post sizes based on a wind speed of 55 MPH.
Place signs over 50 square feet on 2 1/2" x 2 1/2" perforated tube supports as a minimum.
Do not attach guy wires to sign supports. Attach wind beams behind sign panels when used with u-posts.
 - Sign Panels: Provide sign panels made of 0.100" aluminum, 1/2" plywood, or other approved material, except where noted. Punch all holes round for 3/8" bolts.
 - Alternate Messages: Install and remove alternate message signs on reflectorized plate (without borders) as required. (i.e. "Left" and "Right" message on lane closure sign)
 - Route Marker Auxiliary Signs: Provide route marker auxiliary signs, such as the cardinal direction and directional arrows, with a background and legend that match the route marker they are used with:
Interstate - white legend on blue background
Interstate Business Loop - white legend on green background
US and State - black legend on white background
County - yellow legend on blue background
 - Vertical Clearance: Install signs with a vertical clearance of 5'-0" (see TYPICAL SECTION.) In areas where parking or pedestrian movements are likely or the view of the sign may be obstructed, install signs with a vertical clearance of 7'-0" from the top of the curb or from the near edge of the driving lane in absence of a curb.
The vertical clearance to secondary signs is 1'-0" less than the vertical clearance stated above.
Provide a minimum clearance of 7'-0" from the ground at the post for signs with an area exceeding 50 square feet.
 - Portable Signs: Provide portable signs that meet the vertical clearance stated above when it is necessary to place signs within the pavement surface.
Use of low-mounting height (minimum 12" vertical clearance) portable signs for 5 days or less, is allowed as long as the view of the sign is not obstructed. Time delays caused by unforeseen circumstances, such as equipment breakdown, rain, subgrade failures, etc., will not accrue towards the 5 day period. Use of R9-8 through R9-11a series, W1-6 through W1-8 series, M4-10, and E5-1 is allowed for longer than 5 days.
Restrict signs mounted on portable sign supports shown in the LOW-MOUNTING HEIGHT and HIGH-MOUNTING HEIGHT details to a maximum surface area of 16 square feet.

MINIMUM BALLAST
(For each side of sign support base)

Sign Panel Mounting Height (ft)	Number of 25 lb sandbags for 4' x 4' sign panel
1'	6
5'	8
7'	10

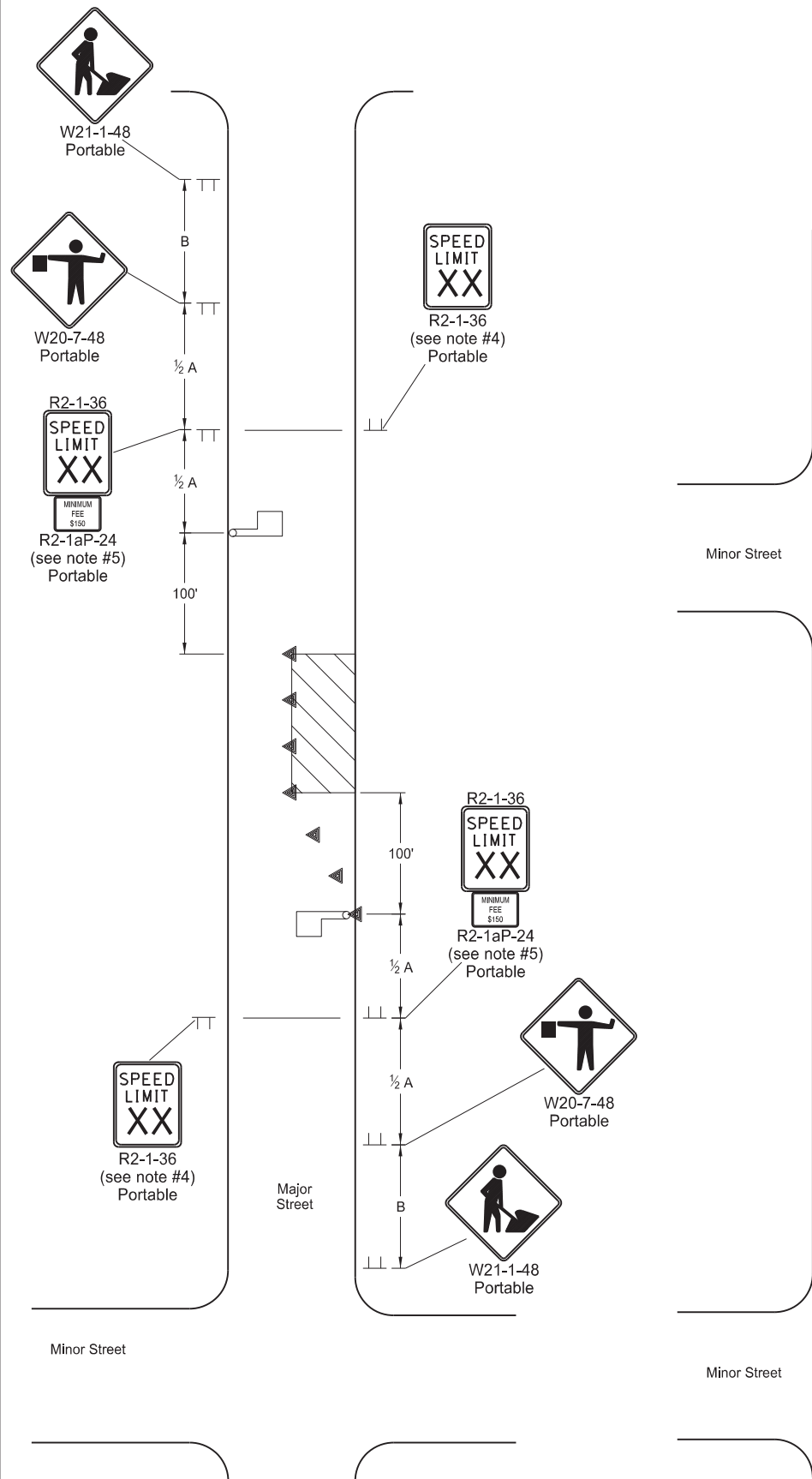
Note: The number of sandbags are based on a wind speed of 55 MPH. Place sandbags at or near the ends of sklds.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-4-13	
REVISIONS	
DATE	CHANGE
11-14-13	Revised Note 6
9-27-17	Updated to active voice
11-01-19	Revised 60"x24" sign detail
8-01-24	Electronic Stamp/Signature



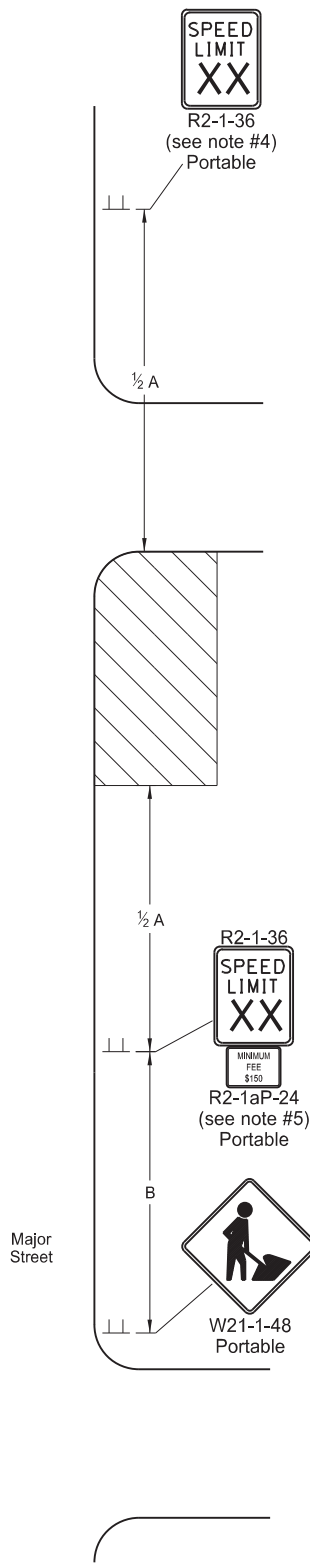
08/01/24

LANE CLOSURES ON URBAN STREETS LAYOUTS



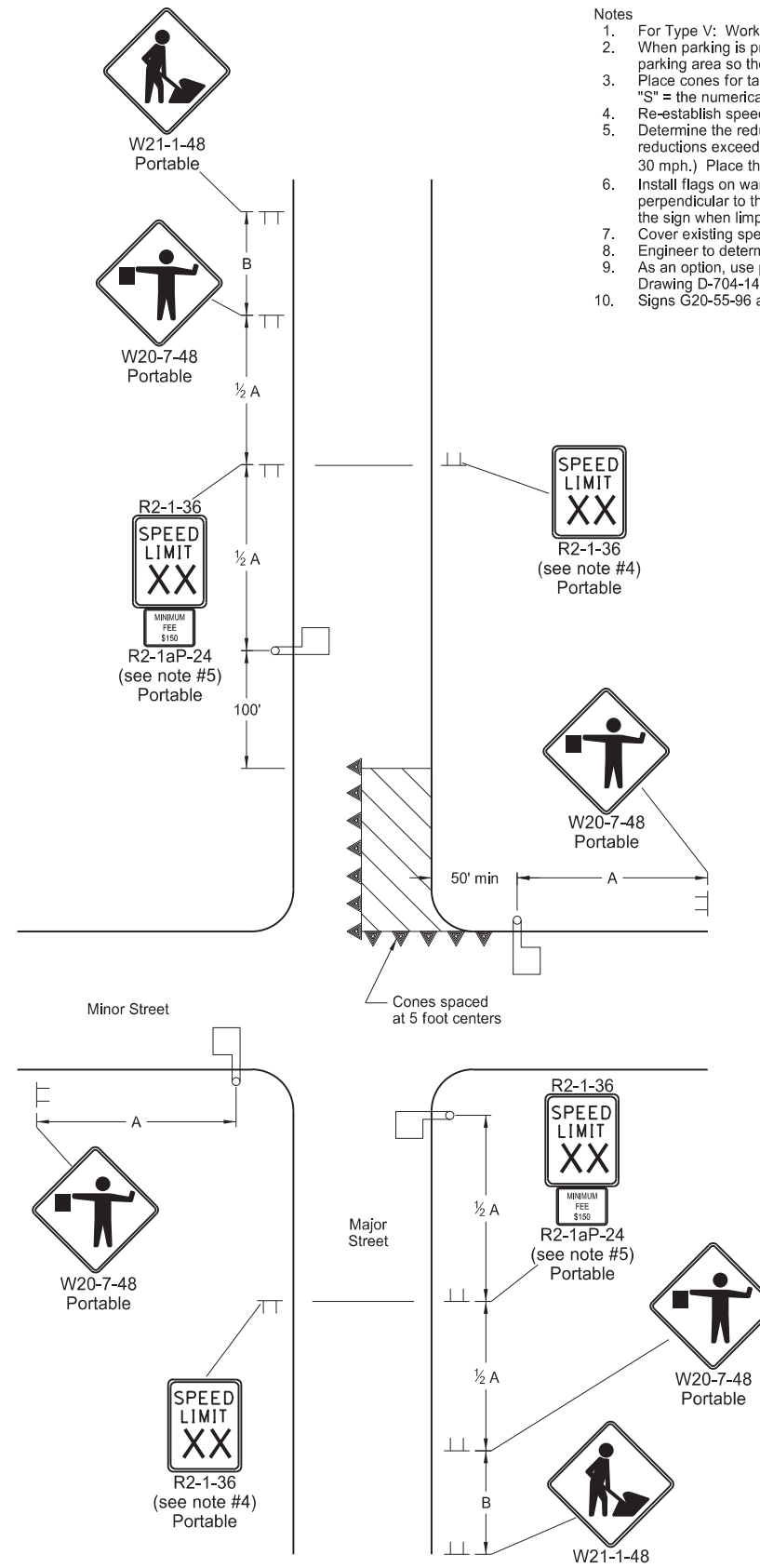
TYPE V
LANE CLOSURE ON URBAN STREET

Portion of roadway closed to traffic only during daylight hours (mid block location).



TYPE W
WORK BEYOND CURB ON URBAN STREET

Work area outside driving lane and no closure necessary.



TYPE X
LANE CLOSURE NEAR INTERSECTION ON URBAN STREET

Portion of roadway closed to traffic only during daylight hours (end block location).

Notes

- For Type V: Work on one side of roadway at a time so as not to block off more than one lane of traffic.
- When parking is present, place signs so they are entirely visible above parked vehicles or at the edge of the parking area so they are visible to oncoming traffic. Place signs on portable mounts when located on roadway.
- Place cones for tapering traffic at 3 equal spaces and cones for tangents at dimension "S". "S" = the numerical value of speed limit.
- Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
- Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at 1/2 B.
- Install flags on warning signs in urban areas when signs are not portable. Mount 24 inches square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
- Cover existing speed limit signs within reduced speed zones.
- Engineer to determine safe speed, when necessary.
- As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
- Signs G20-55-96 and R2-1aP-24 are not required for urban projects.

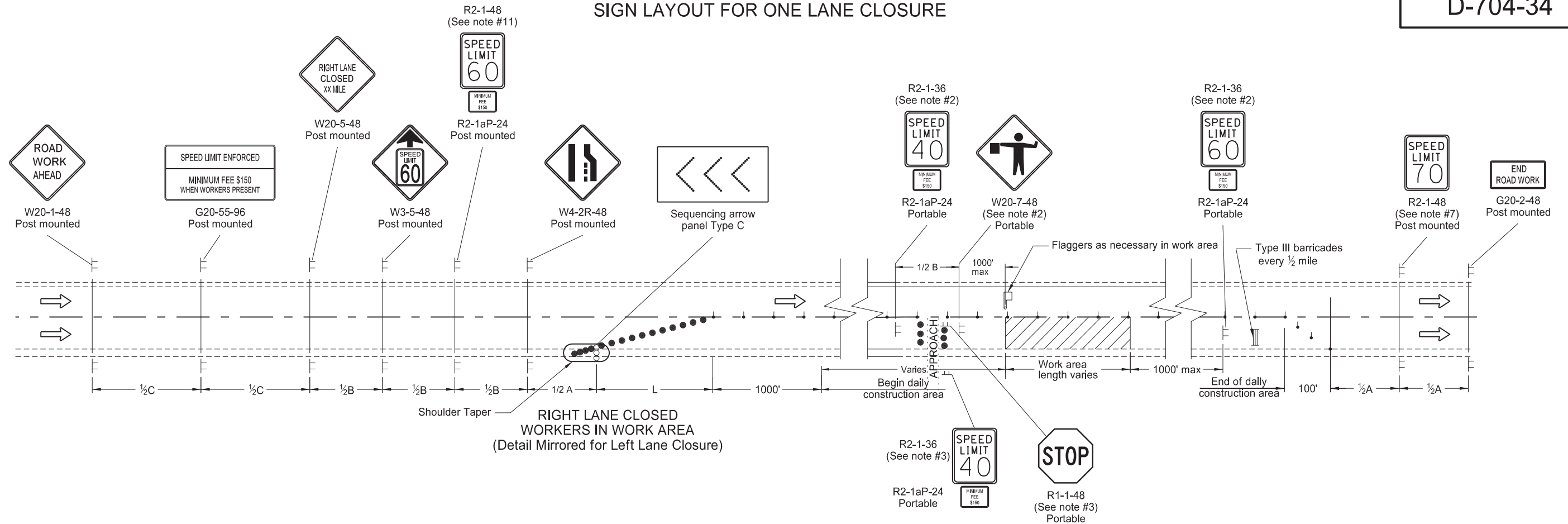
Road Type	ADVANCE WARNING SIGN SPACING		
	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 80 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

KEY	
	Sign
	Work area
	Cones
	Flagger

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
08-17-17	Updated notes & removed signs
11-01-19	Revised note & added Min Fee sign
08-01-24	Electronic Stamp/Signature
06-30-25	Legislative Changes



SIGN LAYOUT FOR ONE LANE CLOSURE



Notes:

1. Install advance signs for flagging when flaggers are flagging.
2. Move the advanced flagger sign and speed limit signs as the work area moves through the construction zone. When the work area is not visible from the flagger, move the flagger station so the work area is visible. Place the 40 mph speed limit sign at 1/2A in advance of the flagger sign and move the 60 mph speed limit sign. Cover or remove the 40 mph speed limit and the Minimum Fee \$150 signs upon completion of the work day or when workers are not present. Determine the exact speed limit in the field, dependent on location and conditions.
3. Approaches: When the work area encompasses an approach, install a 40 mph speed limit sign to control the approach. Cover the existing stop sign and install a new portable stop sign when the approach is on the side of the lane closure. Remove the approach speed limit sign once the main line 40 mph speed zone is moved past the approach.
4. Variables:
 S=Numerical value of speed limit or 85th percentile
 W=The width of taper.
 L=Minimum length of taper, or SxW for freeways, expressways, and all other roads with speeds of 45 mph or greater, or (WxSxS)/60 for urban, residential, and other streets with speeds of 40 mph or less.
5. Space delineator drums for tapering traffic at the dimension "S". Space tubular markers used for tangents at 2 times dimension "S".
6. Place sequencing arrow panels at the beginning of the taper when possible. Where shoulder width does not provide sufficient room, move the panel closer to the work area and place on the roadway surface.
 Use Type A on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
 Use Type B on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).
 Use Type C on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
7. Re-establish the speed limit. Determine the exact speed limit in the field, dependent on location and conditions.
8. Cover existing speed limit signs within a reduced speed zone.
9. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the diamond sign, and at such a distance above the edge that the flag does not touch the sign when limp.
10. Determine the reduced speed limit dependent on the in place speed limit before construction. Where speed limits are to be reduced more than 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at 1/2B.
11. As an option use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
12. Sign G20-55-96 is not required if this layout is part of other traffic control that contains this sign, or the work is less than 15 days.

KEY	
	Type I barricade
	Type II barricade
	Type III barricade
	Sign
	Delineator drum
	Work area
	Flagger
	Sequencing arrow panel
	Tubular markers

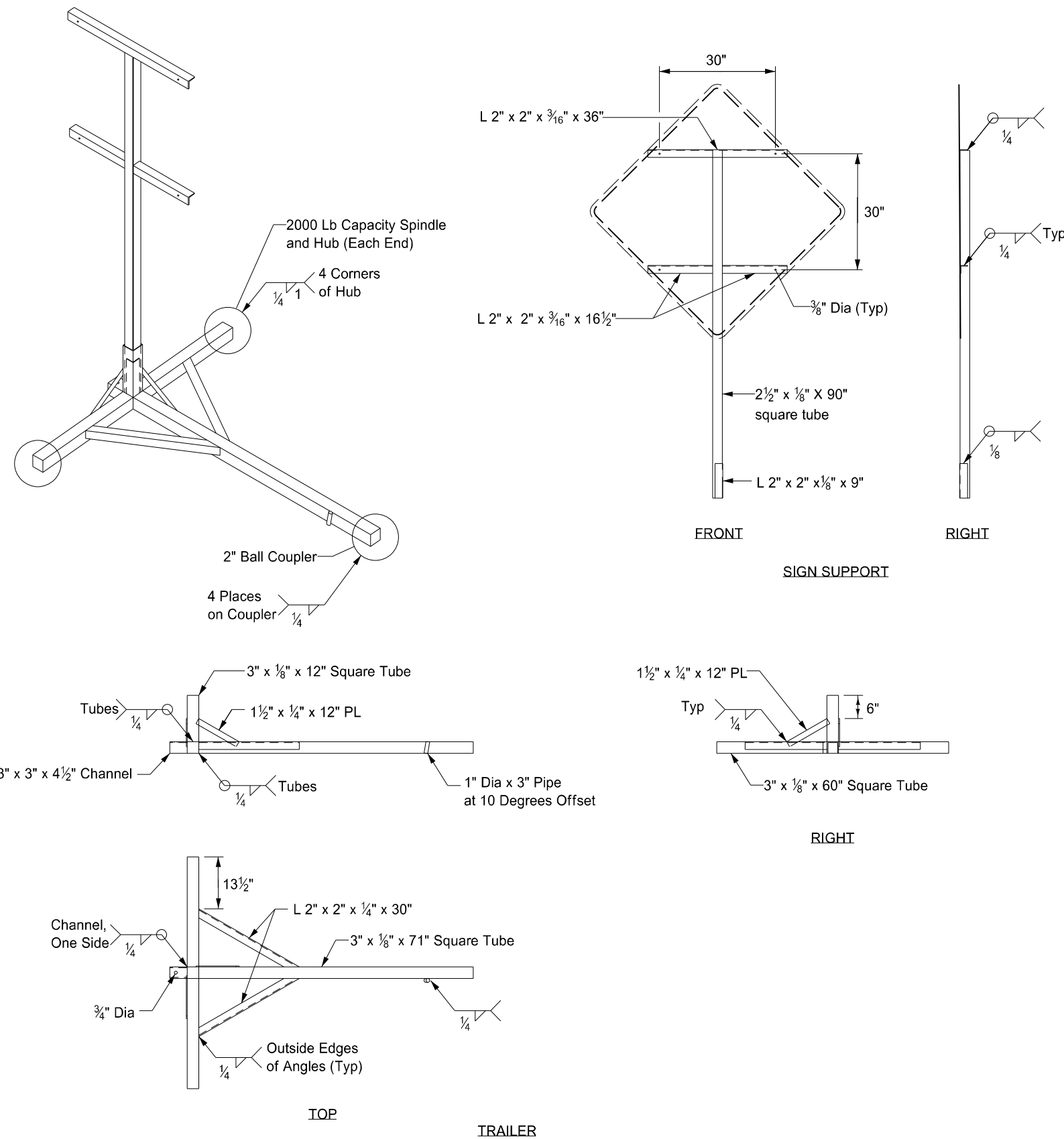
Road Type	Distance Between Signs Min (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 80 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-26-2012	
REVISIONS	
DATE	CHANGE
03-15-16	Removed Do Not Pass signs & updated notes
08-17-17	Updated notes & sign numbers & moved Speed Limit signs
11-01-19	Removed shldr taper details & revised tubular mkr symbol
12-08-21	Switched order of Road Work and Spd Limit Enforced, removed table, & added Dollars At Work
11-29-22	Removed Dollars At Work
06-30-25	Legislative Changes



PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50



Notes:

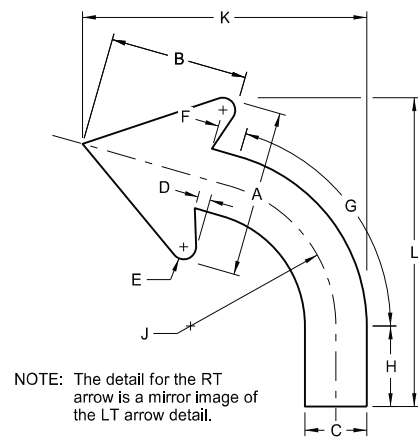
- ① Maximum 250 pound weight of assembly.
- ② Use a 14" wheel and tire.
- ③ Use no automotive and equipment axle assemblies for trailer-mounted sign supports.
- ④ Other NCHRP 350 or MASH crash tested assemblies are acceptable.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-23-10	
REVISIONS	
DATE	CHANGE
12/02/2020	Updated Note to active voice.

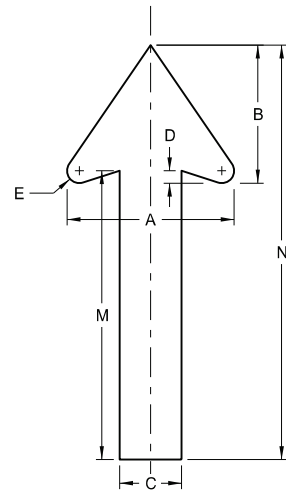
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
12 02 2020

ARROW DETAILS FOR LANE CONTROL AND ARROW-PER-LANE SIGNS

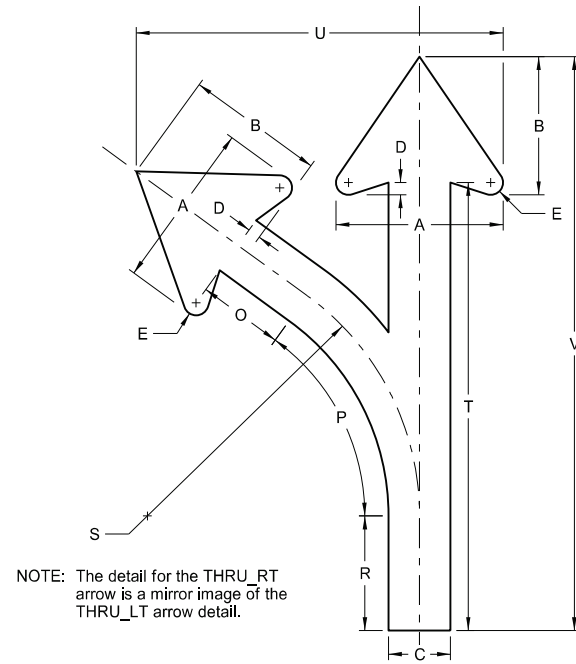
D-754-10



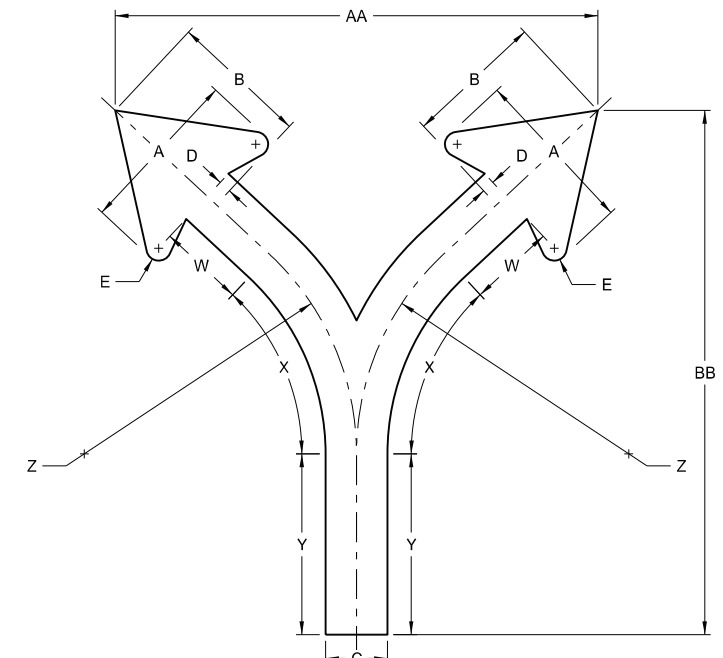
LT



THRU



THRU_LT



SPLIT

ADVANCE INTERSECTION CONTROL

DESIGNATION	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	R	S	T	U	V	W	X	Y	Z	AA	BB
ND_2.5IN	6.75"	5.563"	2.5"	0.5"	0.5"	1.140"	74°	3.279"	5.875"	11.468"	12.478"	13.687"	18.75"	3.480"	54°	4.642"	11"	18.125"	14.813"	23.188"	3.485"	47°	9.313"	11"	19.5"	23.188"
ND_3IN	8.126"	6.688"	3"	0.563"	0.563"	1.444"	74°	3.752"	7.731"	14.376"	15.487"	16.927"	23.052"	3.448"	54°	6.811"	13.2"	22.367"	17.232"	28.492"	3.508"	46°	12.305"	13.2"	21.92"	28.492"
ND_3.75IN	10.126"	8.375"	3.75"	0.75"	0.75"	1.679"	74°	4.889"	8.813"	17.202"	18.717"	20.5"	28.125"	5.195"	54°	6.960"	16.5"	27.157"	22.220"	34.782"	5.198"	47°	13.969"	16.5"	29.25"	34.782"

LANE-USE CONTROL

DESIGNATION	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	R	S	T	U	V	W	X	Y	Z	AA	BB
ND_4.5IN	12.126"	10"	4.5"	0.875"	0.875"	1.519"	72°	6.326"	11.4"	20.25"	23.418"	14.293"	23.418"	3.188"	68°	4"	17"	30.375"	29.5"	39.5"	-	-	-	-	-	-

ARROW-PER-LANE

DESIGNATION	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	R	S	T	U	V	W	X	Y	Z	AA	BB
ND_7.75IN	21"	17.25"	7.75"	1.5"	1.5"	6.701"	66°	14.303"	20"	36.25"	45"	50.25"	66"	11.831"	68°	4.125"	31.875"	50.25"	56"	66"	0.127"	60°	8.190"	43.25"	70.75"	55"

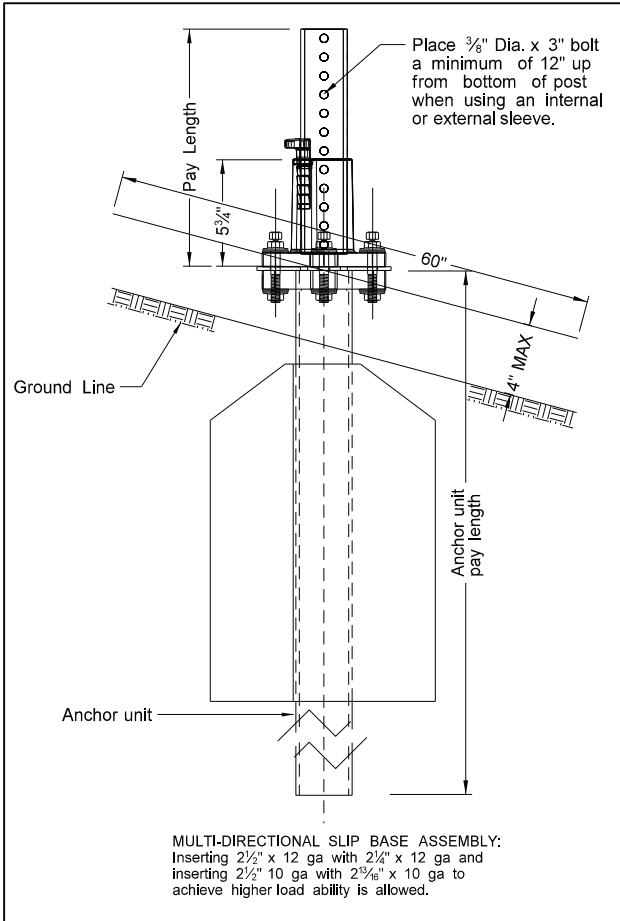
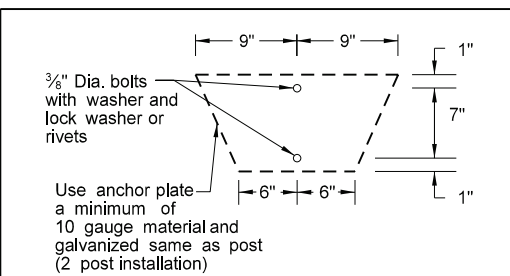
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
4-23-18	
REVISIONS	
DATE	CHANGE
8-29-19	New Desgn Engineer PE Stamp.
8-21-24	Thru Lt/Rt Lane Use Control Arrow



08/21/24

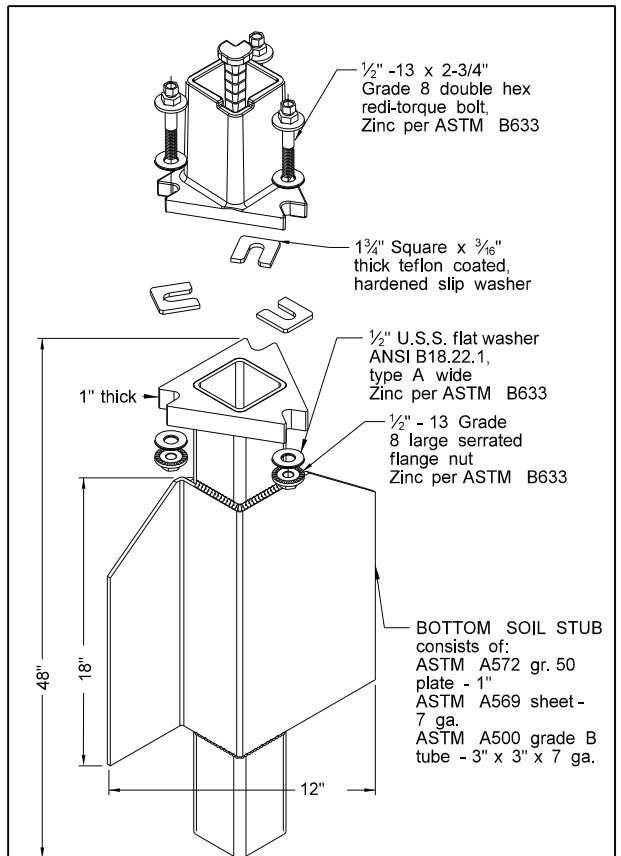
Telescoping Perforated Tube							
Number of Posts	Post Size In.	Wall Thickness Gauge	Sleeve Size In.	Wall Thickness Gauge	Slip Base	Anchor Size Without Slip Base In.	Anchor Wall Thickness Gauge
1	2	12			No	2 1/4	12
1	2 1/4	12			No	2 1/2	12
1	2 1/2	12			(B)	3(C)	7
1	2 1/2	10			Yes		7
1	2 1/4	12	2 1/2(D)	12	Yes		7
1	2 1/2	12	2 1/4	12	Yes		7
2	2 1/2	10			Yes		7
2	2 1/4	12	2 1/2(D)	12	Yes		7
2	2 1/2	12	2 1/4	12	Yes		7
3 & 4	2 1/2	12			Yes		7
3 & 4	2 1/2	10			Yes		7
3 & 4	2 1/2	12	2 1/4	12	Yes		7
3 & 4	2 1/4	12	2 1/2(D)	12	Yes		7
3 & 4	2 1/2	10	2 3/8	10	Yes		7

(B) - Provide a shim as specified by the manufacturer when placing 2 1/2", 12 gauge posts in standard soils without breakaway bases. Provide breakaway base when placing the support in weak soils. The Engineer will determine if the soils are weak. Weak soils are classified as boggy, wet, or loose soil areas.
 (C) - 3" anchor unit
 (D) - 2 1/2" x 12 ga. x 18" minimum length external sleeve required.

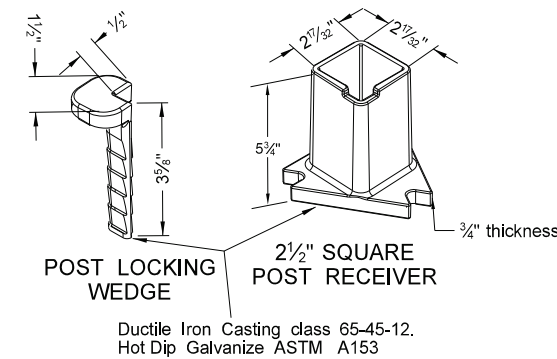


MULTI-DIRECTIONAL SLIP BASE ASSEMBLY:
 Inserting 2 1/2" x 12 ga with 2 1/4" x 12 ga and inserting 2 1/2" 10 ga with 2 3/8" x 10 ga to achieve higher load ability is allowed.

Mounting Details Perforated Tube

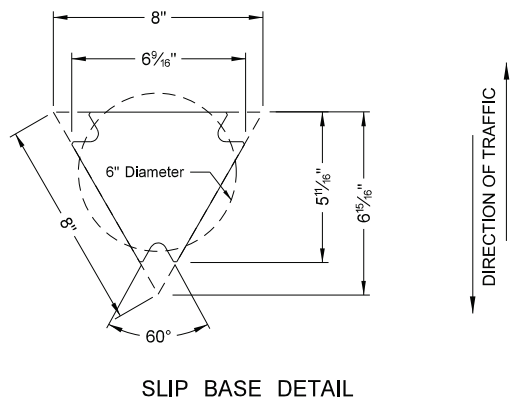


SLIP BASE FOR 2 1/2" POST



POST LOCKING WEDGE
 2 1/2" SQUARE POST RECEIVER

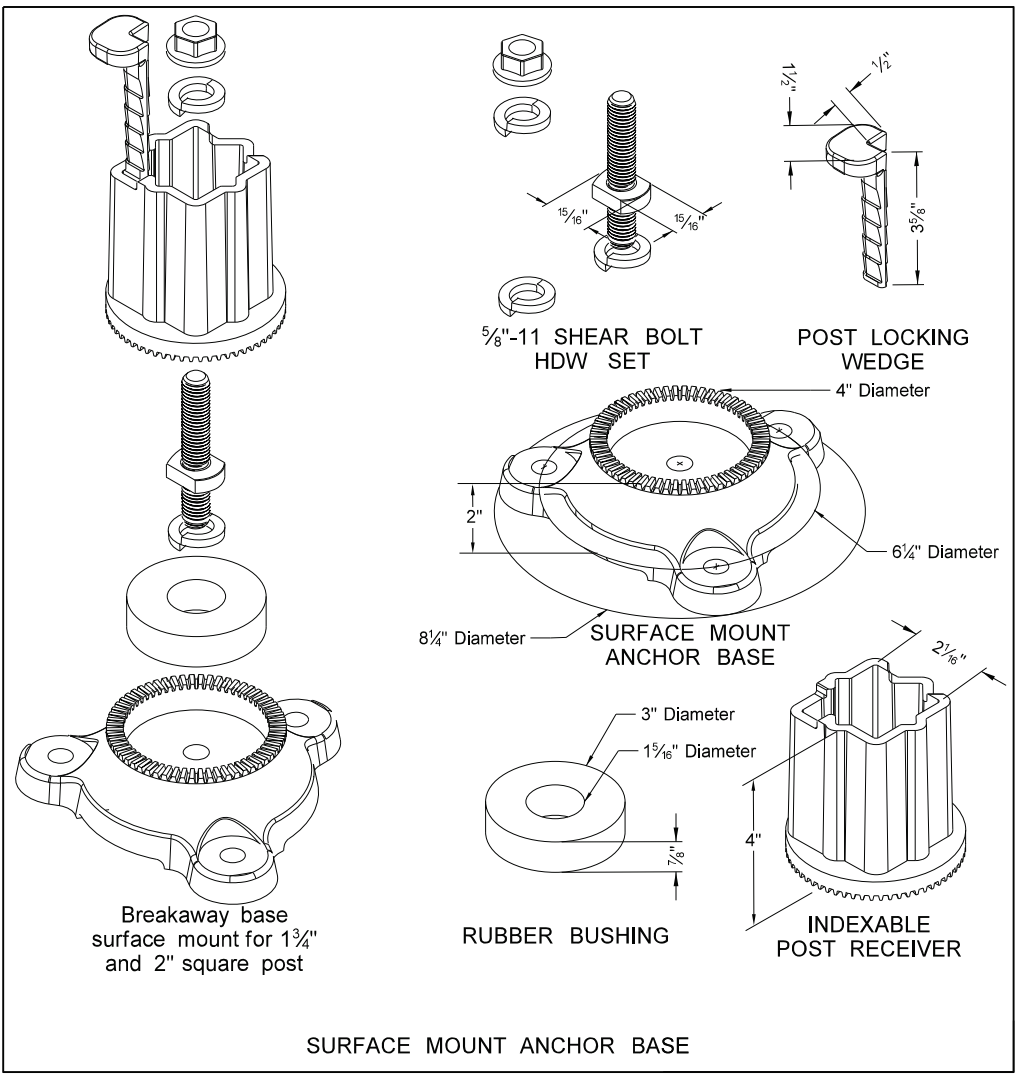
Ductile Iron Casting class 65-45-12, Hot Dip Galvanize ASTM A153



SLIP BASE DETAIL

Properties of Telescoping Perforated Tubes							
Tube Size In.	Wall Thickness In.	U.S. Standard Gauge	Weight Per Foot Lbs.	Moment of Inertia In. ⁴	Cross Sect. Area In. ²	Section Modulus In. ³	
1 1/2 x 1 1/2	0.105	12	1.702	0.129	0.380	0.172	
2 x 2	0.105	12	2.416	0.372	0.590	0.372	
2 1/4 x 2 1/4	0.105	12	2.773	0.561	0.695	0.499	
2 3/8 x 2 3/8	0.135	10	3.432	0.605	0.841	0.590	
2 1/2 x 2 1/2	0.105	12	3.141	0.804	0.803	0.643	
2 1/2 x 2 1/2	0.135	10	4.006	0.979	1.010	0.783	

The 2 3/8" size 10 gauge is shown as 2.19" size on the plans; The 2 1/2" size is shown as 2.51" size on the plans.



SURFACE MOUNT ANCHOR BASE

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-6-09	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice & corrected max height of base.
8-29-19	New Design Engineer PE Stamp.
8-05-24	Electronic Stamp/Signature.

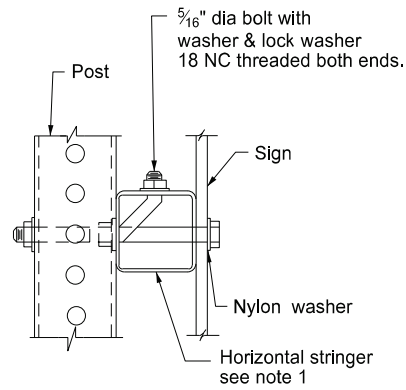


08/05/24

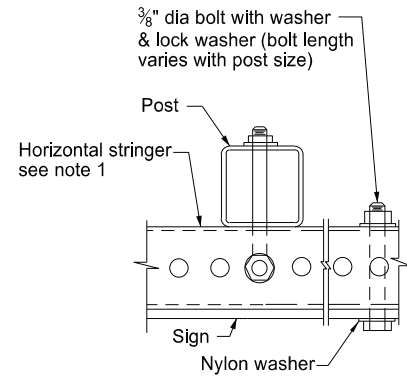
NOTE:

- 4" Vertical clearance of anchor or breakaway base. The 4" x 60" measurement is above and below post location and also back and ahead of post.
- Provide 7 gauge HRPO commercial quality ASTM A569 and 3" x 3" x 7" gauge ASTM A500 grade B anchor material with 43.9 KSI yield strength and 59.3 KSI tensile strength. Hot dip galvanize anchor per ASTM A123/153. Tolerances on anchor unit and slip base bottom assembly are +/- 0.005" unless otherwise noted.
- Eliminate wings when anchor is used in concrete sidewalk.
- Provide a minimum 8" distance between the first and fourth post on four post signs.
- Install in accordance with manufacturers recommendation.
- Use a minimum 1/2" diameter x 4" grade 8 concrete fastener for surface mount breakaway base.

Mounting Details Perforated Tube

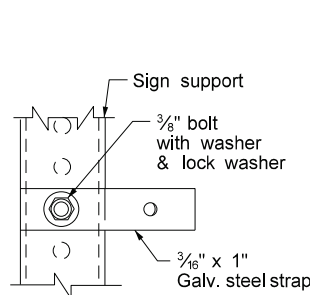


Side View

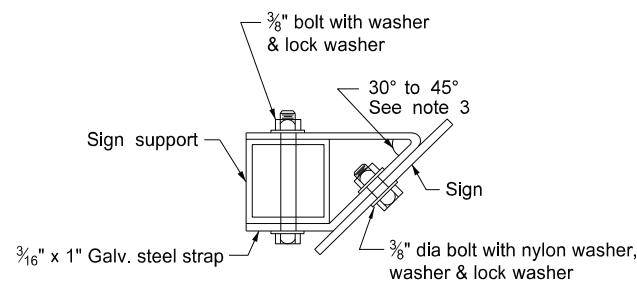


Top View

STRINGER MOUNTING
(WITH STRINGER IN FRONT OF POST)

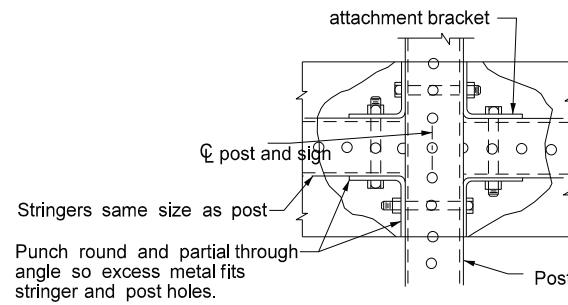


Side View



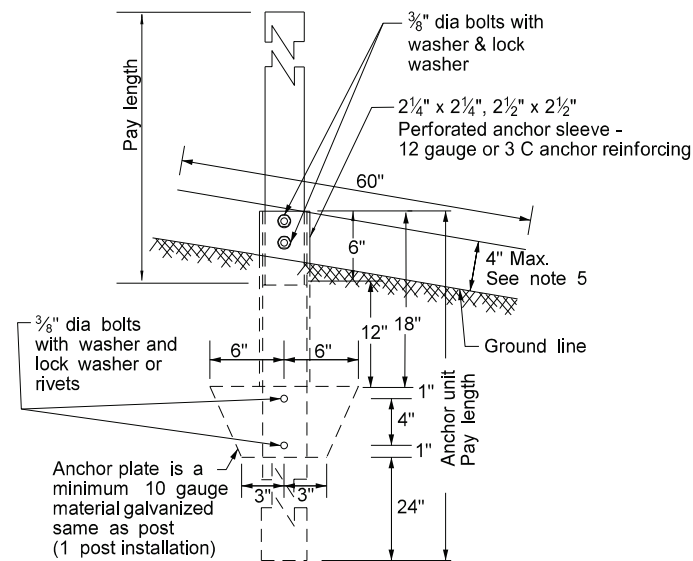
Top View

STRAP DETAIL



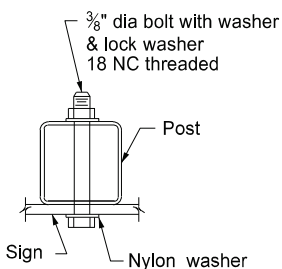
Stringers same size as post
Punch round and partial through angle so excess metal fits stringer and post holes.

STREET NAME SIGNS AND ONE WAY SIGNS
SINGLE POST ASSEMBLY
ONE STRINGER OR BACK TO BACK MOUNTING

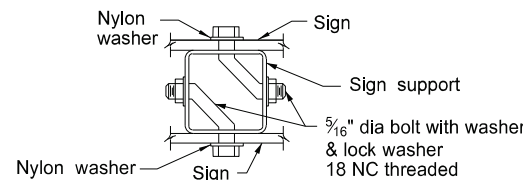


Anchor plate is a minimum 10 gauge material galvanized same as post (1 post installation)

ANCHOR UNIT AND POST ASSEMBLY

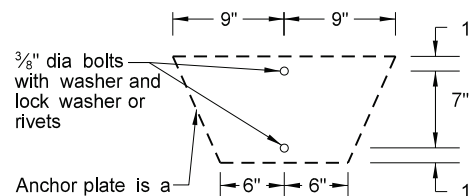


BOLT MOUNTING



Top View

BACK TO BACK MOUNTING



Anchor plate is a minimum 10 gauge material galvanized same as post (2 post installation)

Properties of Telescoping Perforated Tubes						
Tube Size In.	Wall Thickness In.	U.S. Standard Gauge	Weight Per Foot Lbs.	Moment of Inertia In. ⁴	Cross Sect. area In. ²	Section Modulus In. ³
1 1/2 x 1 1/2	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2 1/4 x 2 1/4	0.105	12	2.773	0.561	0.695	0.499
2 3/16 x 2 3/16	0.135	10	3.432	0.605	0.841	0.590
2 1/2 x 2 1/2	0.105	12	3.141	0.804	0.803	0.643
2 1/2 x 2 1/2	0.135	10	4.006	0.979	1.010	0.783

The 2 3/16 size 10 gauge is shown as 2.19" size on the plans.
The 2 1/2 size is shown as 2.51" size on the plans.

Note:

- Horizontal stringers - Use perforated tubes or 1 3/4" x 3/16" thick, 1.08 lbs./ft aluminum or 3.16 lbs./ft steel z bar stringers.
- Use minimum outside diameter 5/16" ± 1/16" and 10 gauge thick metal washers on sign face.
- Place No Parking signs with directional arrows at a 30 to 45 degree angle with the line of traffic flow. Turning the support to the correct angle for No Parking signs requiring the above angles is allowed. If the No Parking sign is placed with another sign that requires placement at a 90 degree angle with the line of traffic flow, use the detailed angle strap to mount the No Parking sign. Use flat washers and lock washers with all nylon washers.
- Punching the sign backing and placing the bolt through the sign, the stringer and the post is allowed in lieu of using the bent bolt to attach the post to the stringer.
- 4" vertical clearance of anchor or breakaway base. The 4" x 60" measurement is above and below post location and also back and ahead of post.

Number of Posts	Telescoping Perforated Tube						
	Post Size In.	Wall Thickness Gauge	Sleeve Size In.	Wall Thickness Gauge	Slip Base	Anchor Size Without Slip Base In.	Anchor Wall Thickness Gauge
1	2	12			No	2 1/4	12
1	2 1/4	12			No	2 1/2	12
1	2 1/2	12			(B)	3(C)	7
1	2 1/2	10			Yes		7
1	2 1/4	12	2 1/2(D)	12	Yes		7
1	2 1/2	12	2 1/4	12	Yes		7
2	2 1/2	10			Yes		7
2	2 1/4	12	2 1/2(D)	12	Yes		7
2	2 1/2	12	2 1/4	12	Yes		7
3 & 4	2 1/2	12			Yes		7
3 & 4	2 1/2	10			Yes		7
3 & 4	2 1/2	12	2 1/4	12	Yes		7
3 & 4	2 1/4	12	2 1/2(D)	12	Yes		7
3 & 4	2 1/2	10	2 3/16	10	Yes		7

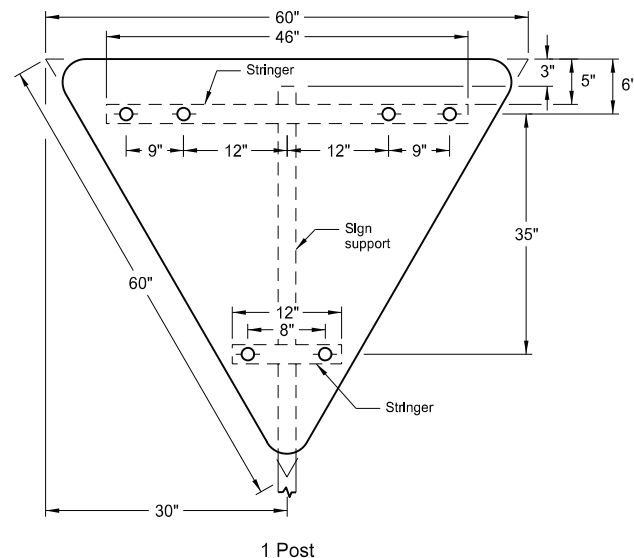
(B) - When placing 2 1/2", 12 gauge posts in standard soils without breakaway bases, provide a shim as specified by the manufacturer. Provide breakaway base when placing the support in weak soils. Engineer will determine if soils are weak. Weak soils are classified as boggy, wet, or loose soil areas.
(C) - 3" anchor unit
(D) - 2 1/2" x 12 ga. x 18" minimum length external sleeve required.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-6-09	
REVISIONS	
DATE	CHANGE
7-8-14	Revised Note 3.
8-30-18	Updated notes to active voice.
8-30-19	New Design Engr PE Stamp.
8-05-24	Electronic Stamp/Signature.

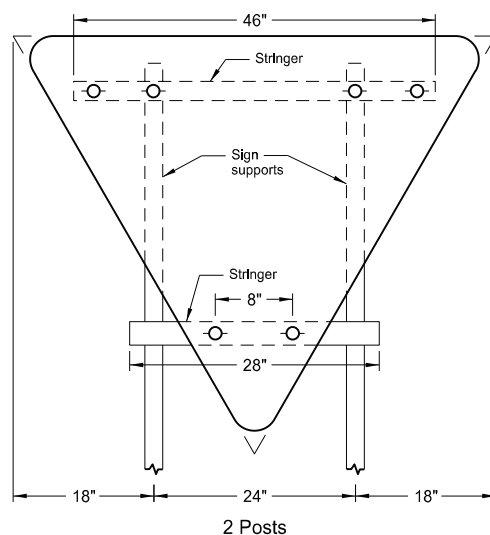


08/05/24

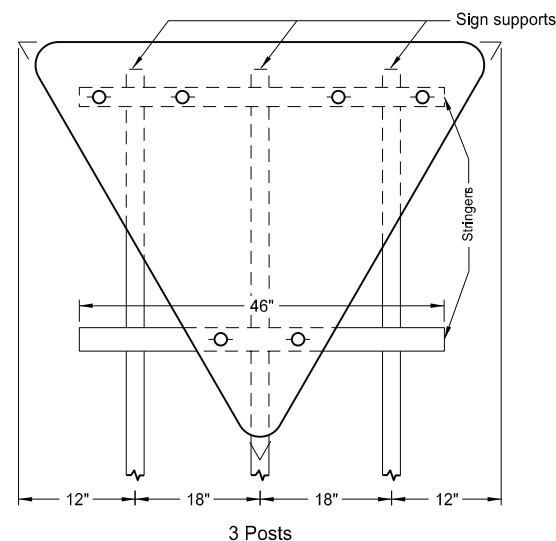
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION
DETAILS REGULATORY, WARNING AND GUIDE SIGNS



1 Post



2 Posts

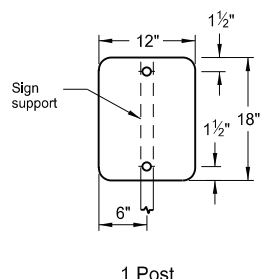


3 Posts

Assembly No. 6

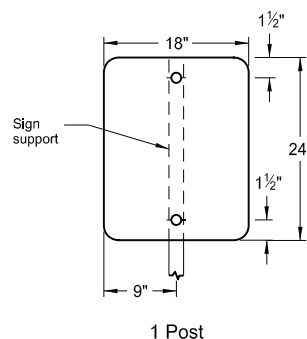
Notes:

1. Use 0.100 inch minimum thickness sign backing material.
2. Use 1½" x 1½" perforated square tube stringers.
3. Punch holes round for ⅜" bolt.



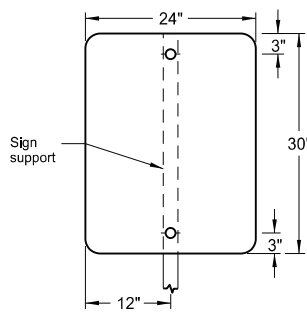
1 Post

Assembly No. 7



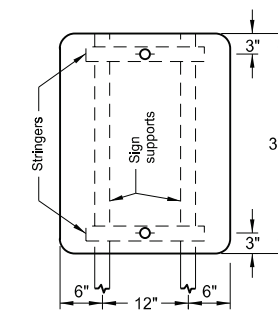
1 Post

Assembly No. 8

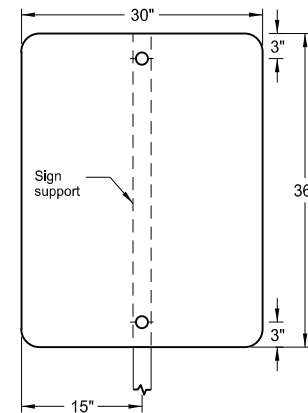


1 Post

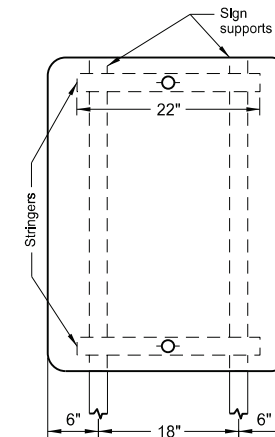
Assembly No. 9



2 Posts

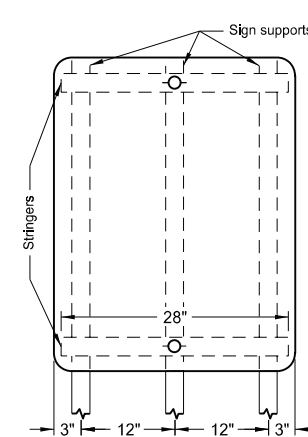


1 Post

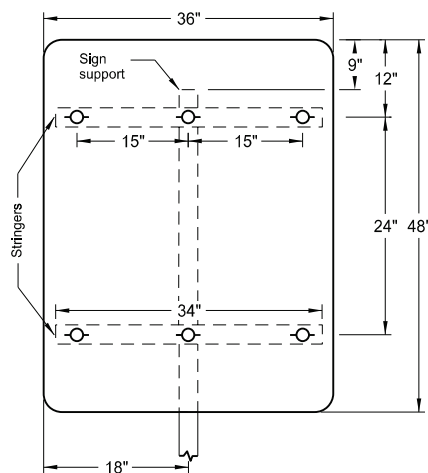


2 Posts

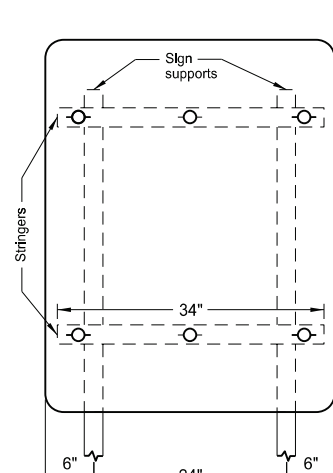
Assembly No. 10



3 Posts

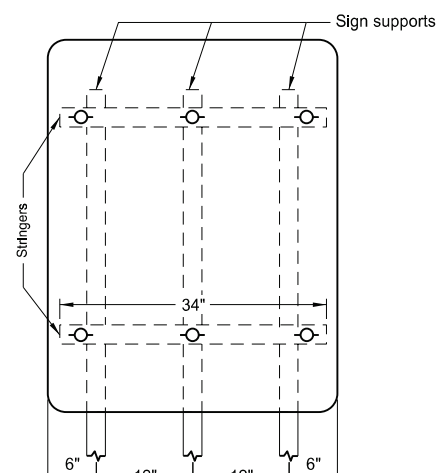


1 Post



2 Posts

Assembly No. 11



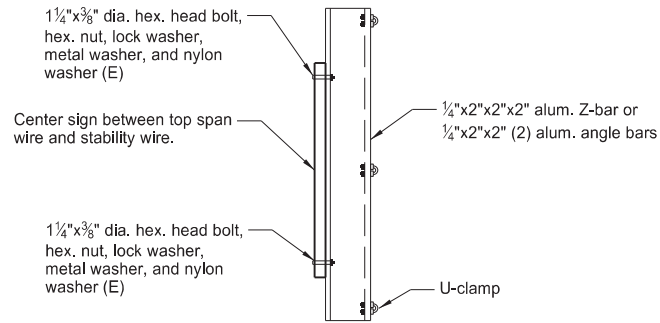
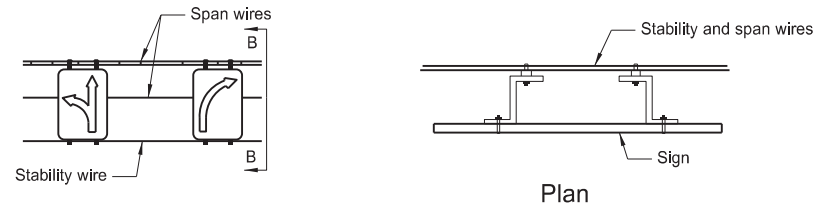
3 Posts

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice.
8-30-19	New Design Engineer PE Stamp.
8-06-24	Electronic Stamp/Signature.

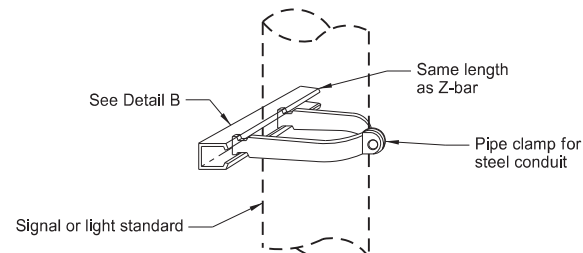


08/06/24

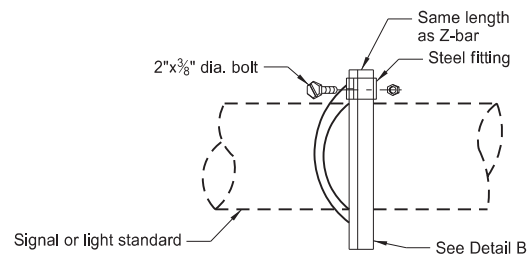
LIGHT STANDARD, SIGNAL STANDARD,
AND SPAN WIRE MOUNTED SIGN
ASSEMBLY DETAIL



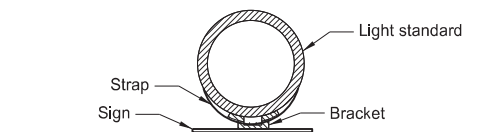
Section B-B
Span Wire Mounted Sign Detail



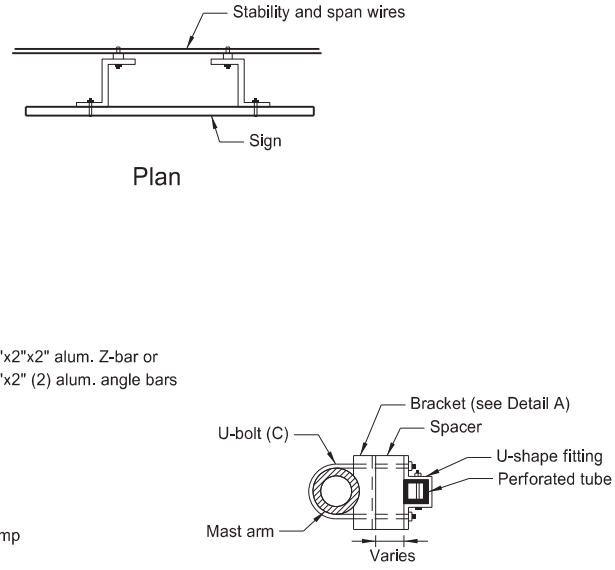
Vertical Mounting
(Use 2 clamps per sign)



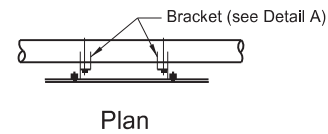
Horizontal Mounting
alternate clamp mounting
(Use 2 clamps per sign)



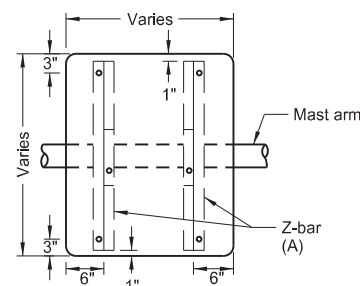
Light Standard Mounted Sign Bracket Detail
Max. 24"x30" signs (D)



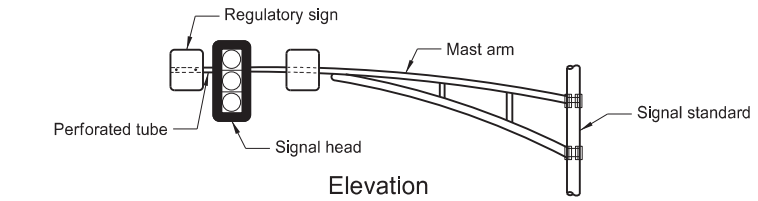
Section A-A



Plan



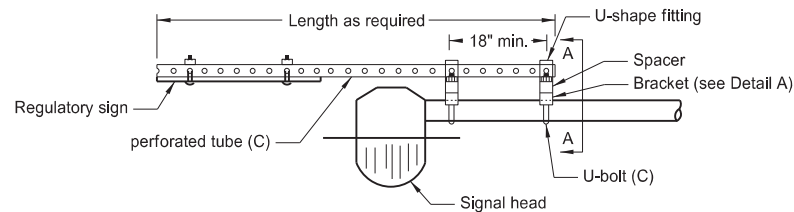
Elevation



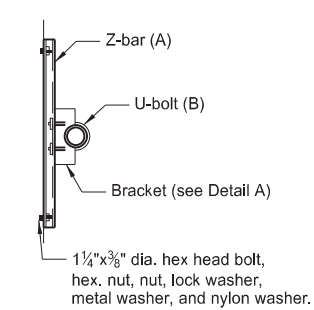
Elevation



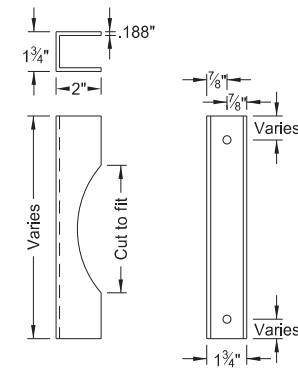
Plan



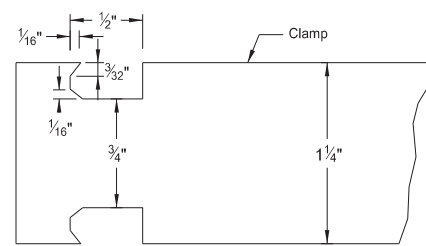
Sign Mounted Beyond End of Mast Arm Detail



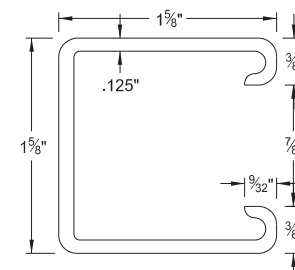
Side View



Detail A



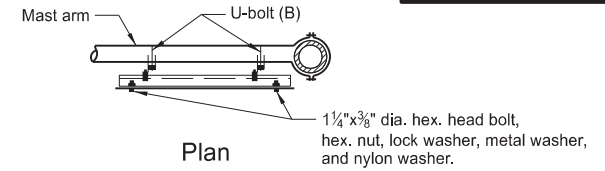
Clamp Detail



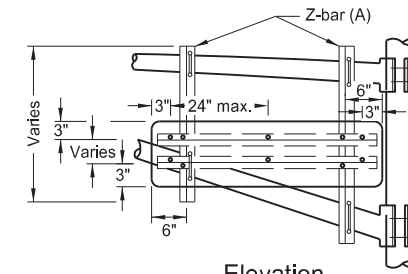
Detail B
Steel Channel

Post Size dia.	Clamp Gauge min.
3 1/2"	11
6" to 12"	10

Clamp	
Post Size dia. in.	D in.
3 1/2	3
4	3 3/16
5	5 1/8
6	7 1/16
8	13 1/16
10	20 3/4
12	29 5/8

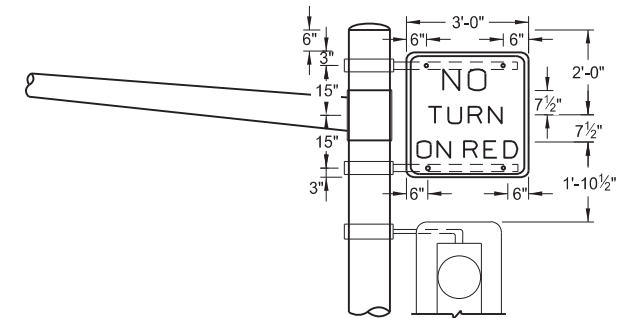


Plan



Elevation

Mast Arm Mounted Street Name Sign Detail



Signal Standard Mounted Sign Attachment Detail

Notes:

- (A) Use 1 3/4" x 3/16" thick 1.08 lb/ft aluminum alloy Z-bar. In place of Z-bar, use two 1 3/4" x 1 3/4" x 3/16" angles bolted together or a 1 3/4" x 2" x .188" channel.
 - (B) 3/8" U-bolt, hex. nut, lock washer, and bracket (U-bolt length depends on dia. of mast arm.)
 - (C) 3/8" U-bolt, hex. nut, lock washer, and bracket (U-bolt length depends on dia. of mast arm.)
- Maximum perforated tube lengths for mounting signs beyond end of mast arm:
 2" x 2" maximum support length 9.9'
 2 1/4" x 2 1/4" maximum support length 12.6'
 2 1/2" x 2 1/2" maximum support length 15.7'
- (D) Use galv. steel strap and sign attachment bracket similar to the one shown in the detail. Include all costs of bracket assembly in the price bid for flat sheet signs. Punch as shown on Standard Drawings. Provide a 7' minimum vertical clearance to the bottom of signs mounted on light standards.
 - (E) Use metal washers and nylon washers with a minimum outside dia. of 1 5/16" ± 1/16" and 10 gauge thickness on sign face.

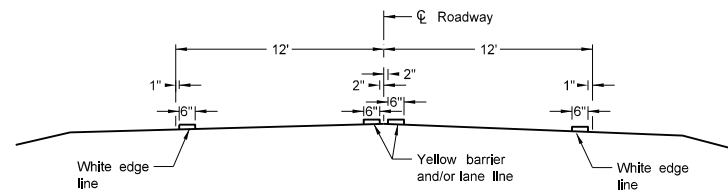
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice.
9-05-19	New Design Engineer PE Stamp.
8-08-24	Electronic Stamp/Signature.



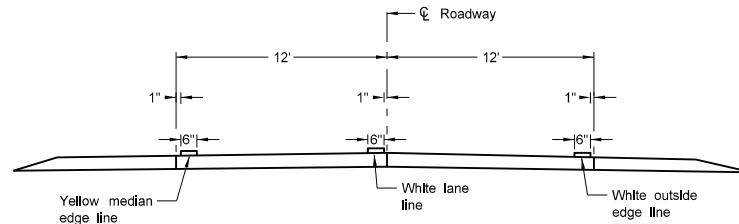
08/08/24

PAVEMENT MARKING

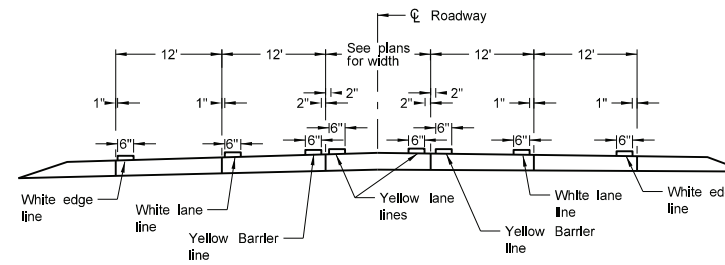
D-762-4



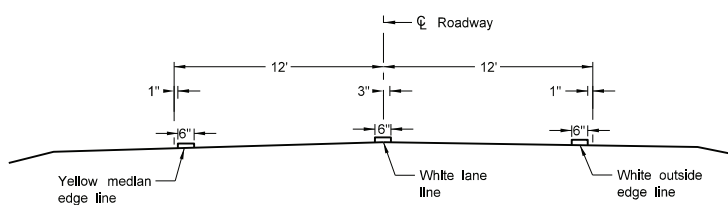
Two Lane Two Way
RURAL ROADWAY



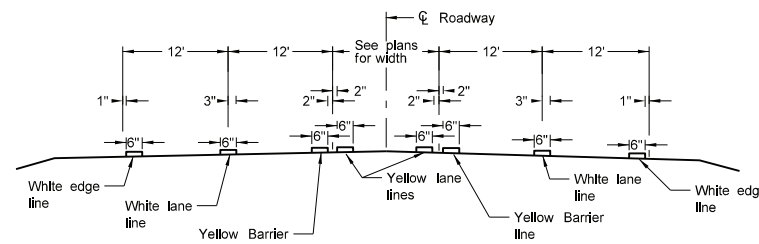
Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



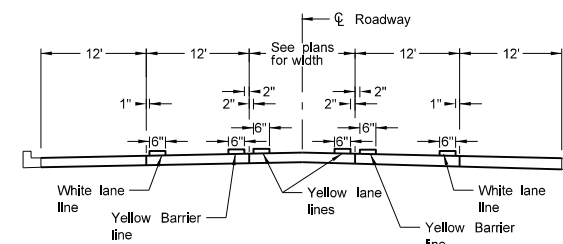
RURAL FIVE LANE ROADWAY
Concrete Section



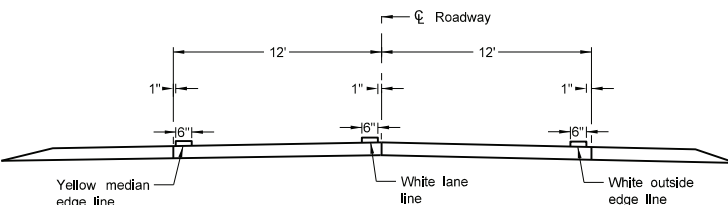
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



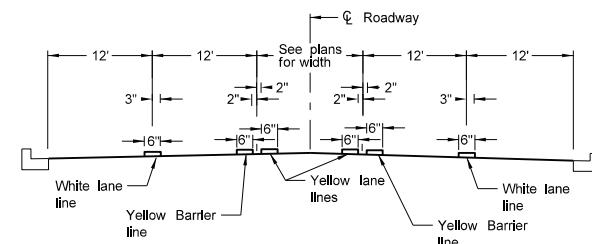
RURAL FIVE LANE ROADWAY
Asphalt Section



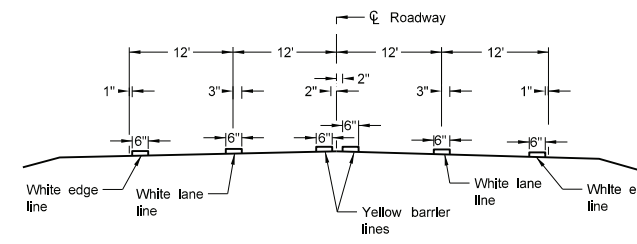
URBAN FIVE LANE SECTION
Concrete Section



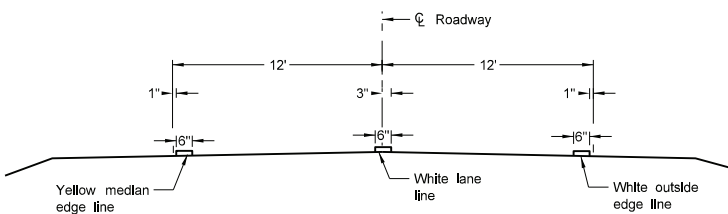
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Concrete Section



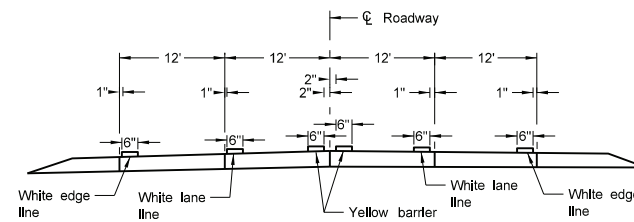
URBAN FIVE LANE SECTION
Asphalt Section



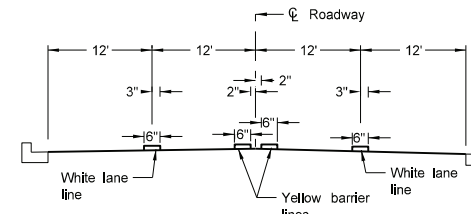
RURAL FOUR LANE ROADWAY
Asphalt Section



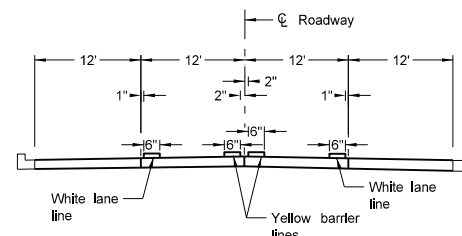
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



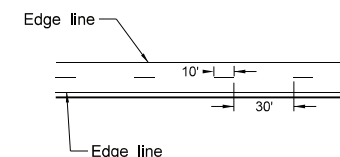
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

NOTES:

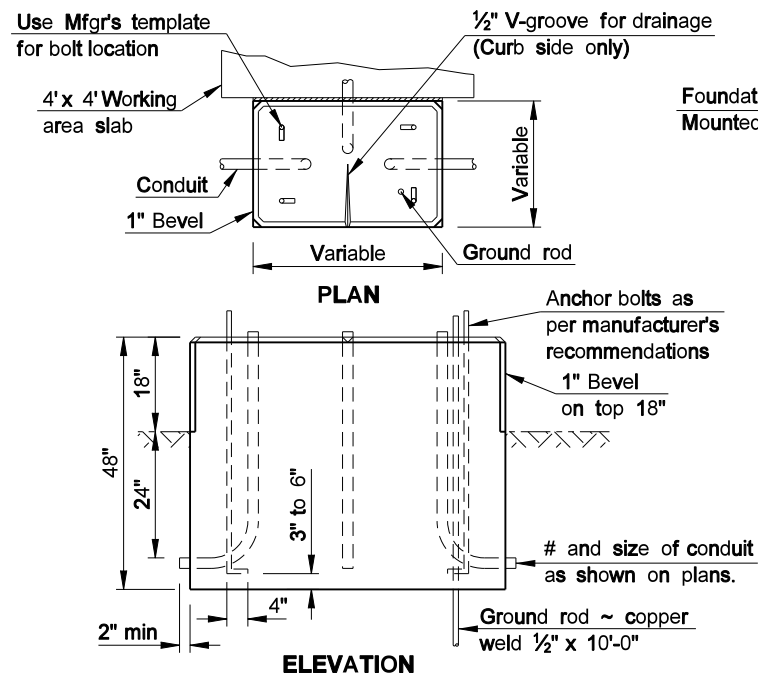
1. Continue edge lines through private drives and field drives. Break edge lines for intersections.

For section lines, county roads, and street approaches, stripe the radii and edge lines of the paved surface within the right of way except where curb and gutter is present.
2. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph,
3. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits < 40 mph.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
08-27-19	New Design Engineer PE Stamp.
11-22-23	Revised pavement marking widths.
07-09-24	Modified Note 1.

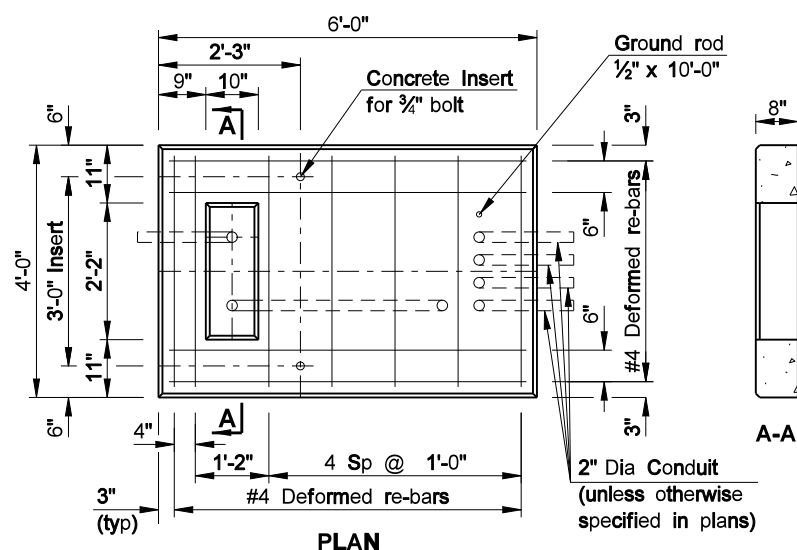


**CONCRETE FOUNDATIONS
(TRAFFIC SIGNALS & HIGHWAY LIGHTING)**

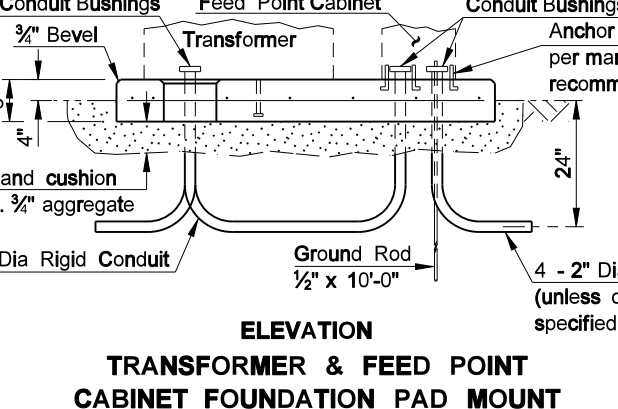


CONTROLLER CABINET FOUNDATION PAD MOUNT

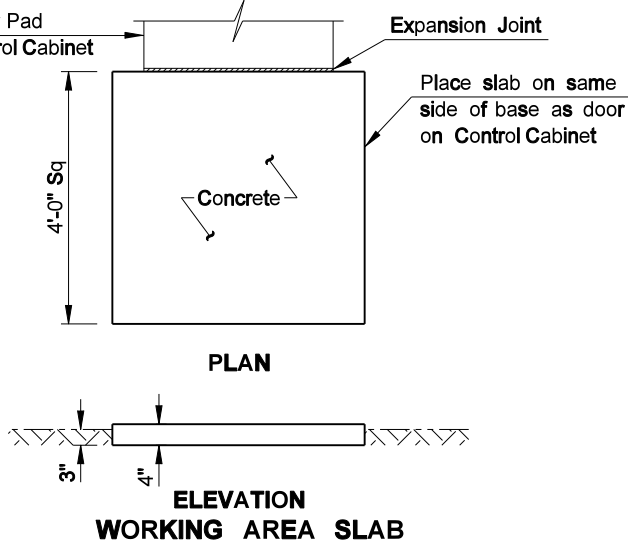
The Controller Cabinet Foundation shall be bid as Concrete Foundation - Traffic Signals.



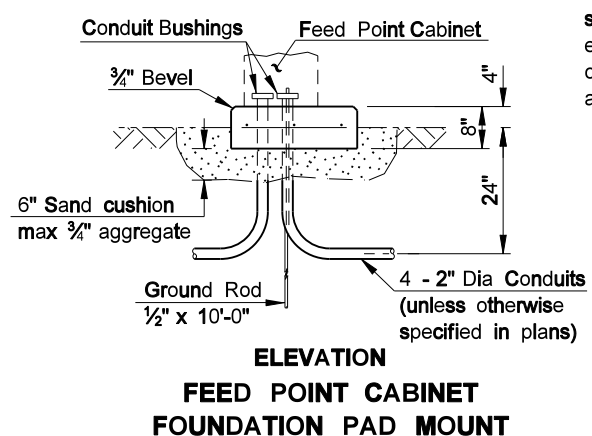
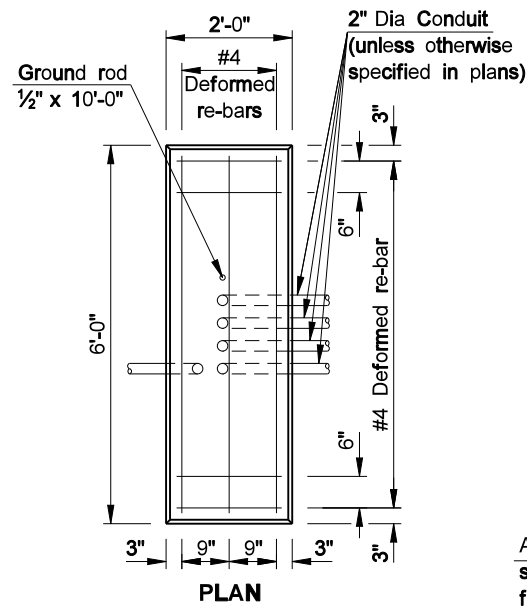
TRANSFORMER & FEED POINT CABINET FOUNDATION PAD MOUNT



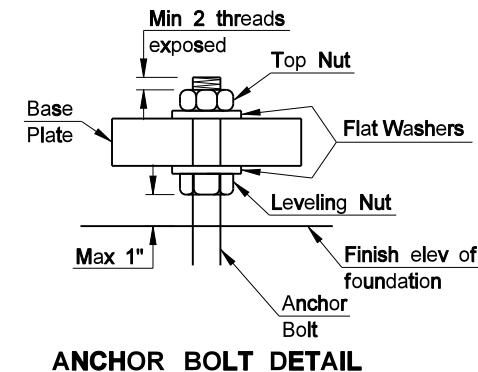
The Transformer & Feed Point Cabinet Foundation Pad Mount shall be bid as Concrete Foundation ~ Feed Point ~ Type A.



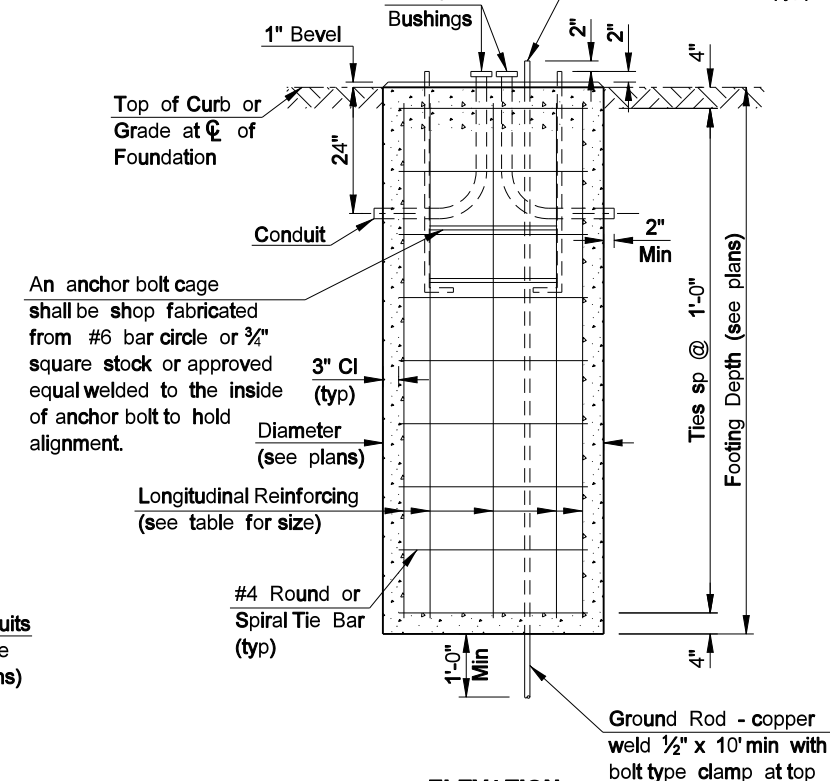
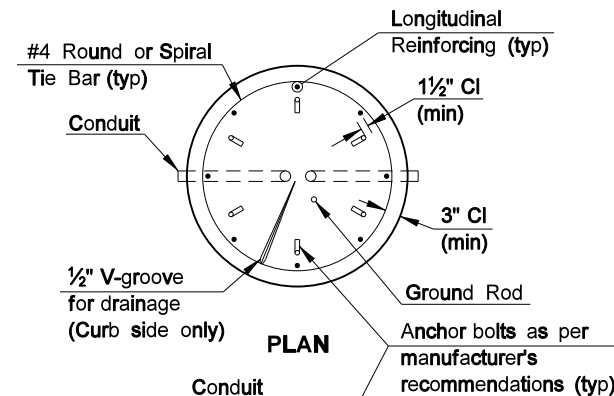
The Working Area Slab shall be installed where shown on the plans and shall not be bid separately but shall be included in the price bid for Concrete Foundation - Traffic Signals.



The Feed Point Cabinet Foundation Pad Mount shall be bid as Concrete Foundation ~ Feed Point ~ Type B.



ANCHOR BOLT DETAIL



LIGHT & SIGNAL STANDARD FOUNDATION

NOTES:
LIGHT & SIGNAL STANDARD FOUNDATIONS: See plans for conduit size, number of bends and correct position for each foundation. When conduit does not continue beyond the foundation, conduit with a 105° bend and bushings on both ends may be substituted for the 90° bends shown. See plans for correct size & location of foundations. The grade and exact location shall be established by the Engineer in the field. All reinforcing shall be Grade 60. Tie bars shall have a minimum of a 12" lap. Reinforcing may be omitted for Type I, II, V, VI & VII signal standard foundations if the anchor bolts extend to within 3" to 6" above the bottom of the foundation. A minimum of 6 anchor bolts shall be used for cantilevered structures.

CONTROLLER CABINET FOUNDATION PAD MOUNT FOUNDATION: See plans for the number of 90° bends per foundation and correct positioning. The foundation for Pad Mounted Controller Cabinet shall be of sufficient size so that there is a minimum of 3" of clearance from the outside edge of cabinet to the outside edge of the foundation on any side. The contractor shall ensure a water-tight seal between the controller cabinet and the foundation by caulking, except for V-groove.

WORKING AREA SLAB: The materials and preparation of this slab shall be as approved by the Engineer in the field.

TRANSFORMER & FEED POINT CABINET FOUNDATION PAD MOUNTED: The foundation shall have a wood float finish. All conduits shown shall be installed. Conduit that is not used at this time shall be plugged with an expandable plug.

FEED POINT CABINET FOUNDATION PAD MOUNTED: The foundation shall have a wood float finish. All conduits shown shall be installed. Conduit that is not used at this time shall be plugged with an expandable plug.

LIGHT & SIGNAL FOUNDATION TABLE	
FOOTING DEPTH (ft)	LONGITUDINAL REINFORCING
≤ 12	8 - #5
13 - 14	8 - #6
15 - 16	8 - #7
17 - 19	8 - #8

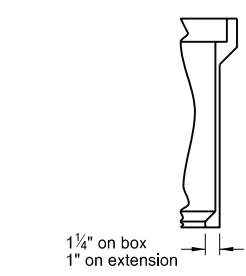
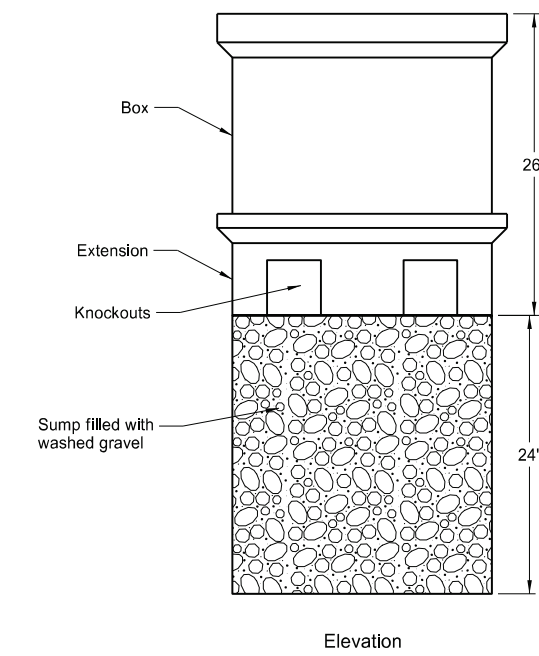
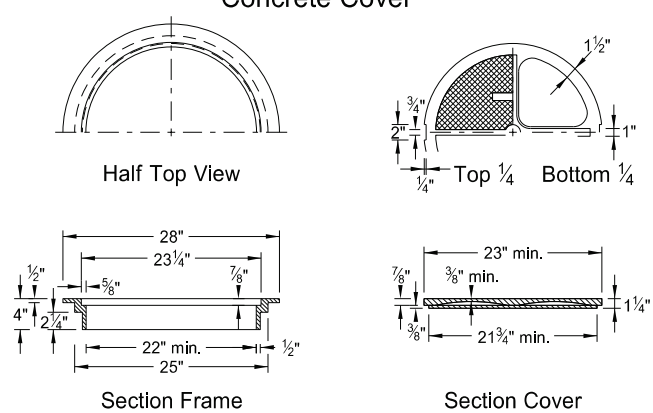
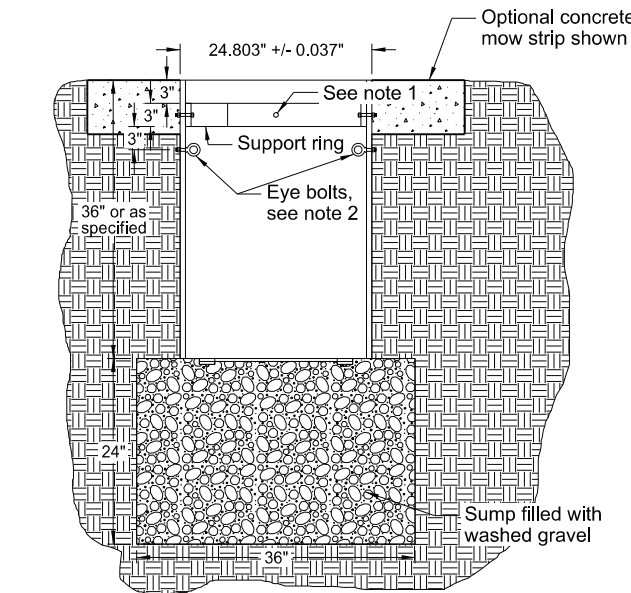
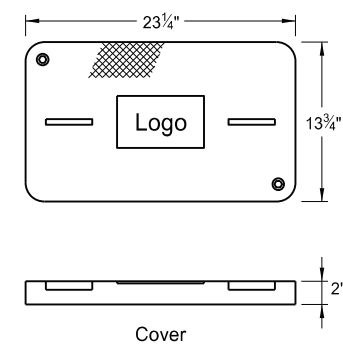
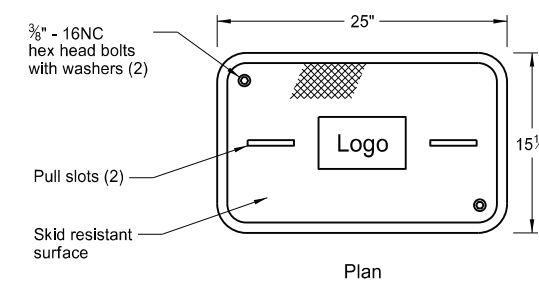
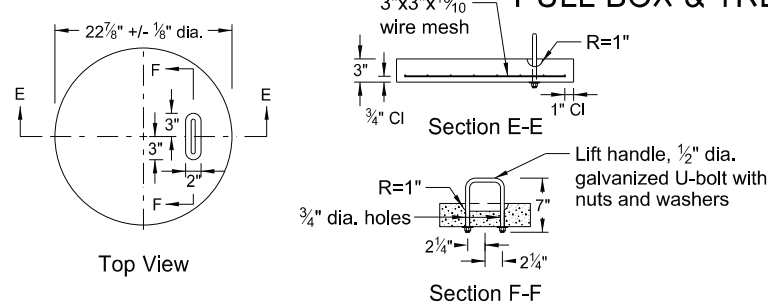
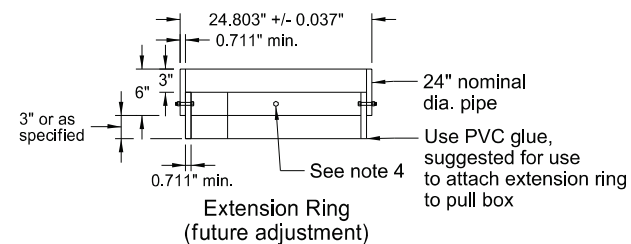
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
6-15-10	
REVISIONS	
DATE	CHANGE

This document was originally issued and sealed by Terrence R. Udland Registration Number PE- 2674 , on 6/15/10 and the original document is stored at the North Dakota Department of Transportation

PULL BOX & TRENCHING DETAILS

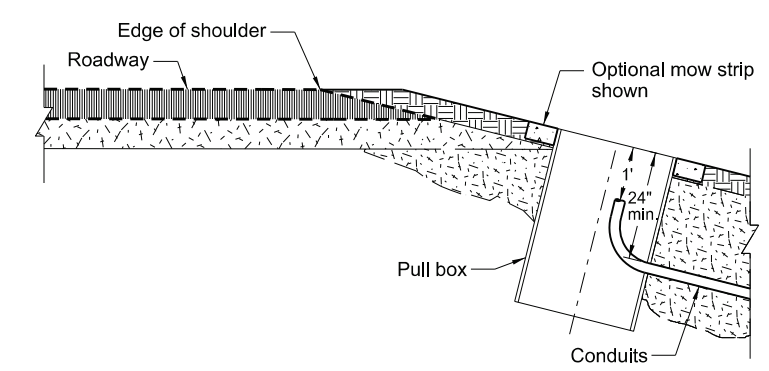
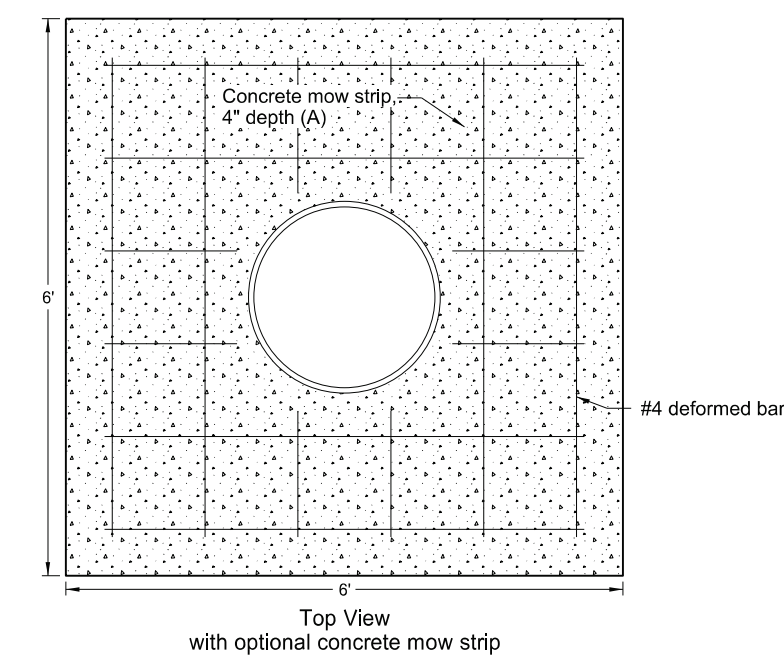
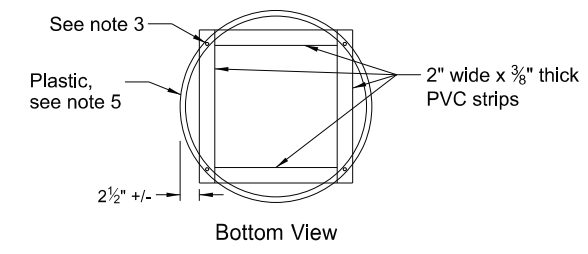
General Pull Box Notes:

1. Duct seal all conduits entering and exiting pull boxes.
2. Ensure all pull boxes are UL listed.



Polymer Concrete Pull Box Notes:

1. Place top of pull box flush with surfaced area and approximately one inch above earth or sodded areas on level surfaces.
2. Provide at least one knockout per side in pull box.
3. Provide Polymer Concrete pull box meeting Tier 22 as per ANSI / SCTE 77.
4. Ensure the pull box constructed of polymer concrete reinforced by a heavy weave fiberglass.



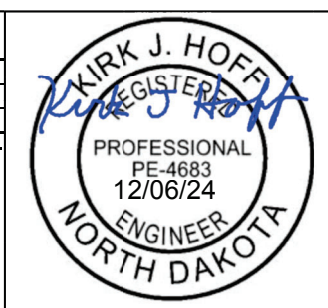
PVC Pull Box Notes:

1. Attach split 24" nominal diameter PVC cover support ring with four 3/8" dia. x 2" long stainless steel hex head bolts with nuts at 90 degrees apart.
2. Two type 2 shoulder eye bolts, 3/8" dia. x 1 1/4" shank length with hex nuts 180 degrees apart (for lifting pull box and supporting electric cable).
3. Four 1/4" x 1 1/4" long galvanized lag screws. Screw assembly together.
4. Attach split 24" nominal diameter PVC cover support extension ring with four 3/8" dia. x 2" long stainless steel hex head bolts with nuts at 90 degrees apart.
5. Bolt assembly together.
6. Size conduit holes located in barrel section no more than 1" larger than size of conduit being used.
7. After pull box and conduit installation, install water tight seal for inside walls and cover.
8. PVC pipe to meet requirements of ASTM F679 or equal.
9. Provide Austenitic Stainless Steel Hex Head bolts and nuts. Other fasteners to be galvanized as per ASTM A153.
10. Install an epoxy coating on the top and sides of the concrete cover. Provide an epoxy protective coating that is light gray, clear, or neutral in color and apply as recommended by the pull box manufacturer. Before application, clean with a wire brush and dry the surfaces of the concrete to which the epoxy protective coating is applied.
11. If a Cast Iron cover is provided, use grey iron as per AASHTO M 306.

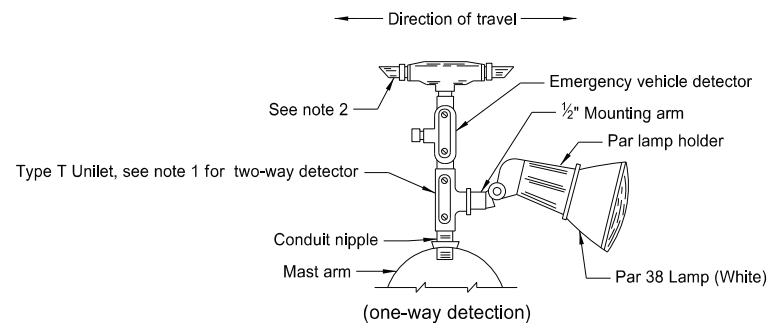
Note: The location of pull box will vary, refer to layout sheets for actual location.

When required, install a mow strip around the pull box. Place expansion material between the foundation and the mow strip. Ensure the mow strip is 4" depth and 2' width from the foundation. Use #4 deformed bars in the mow strip. Space the bars 6" from the outside edge. Place the bars in a grid pattern at 1' apart.

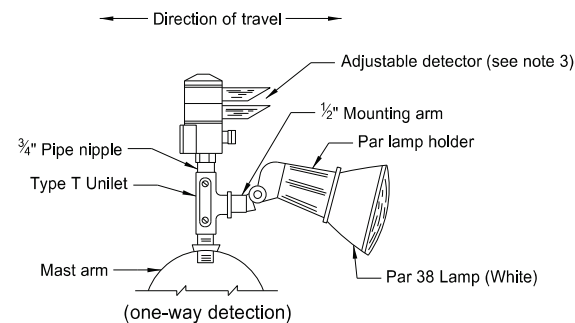
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-8-13	
REVISIONS	
DATE	CHANGE
11-01-24	Updated PVC pull box, trenching.



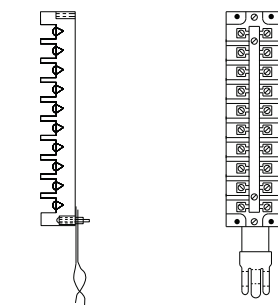
LIGHTING AND SIGNAL DETAILS



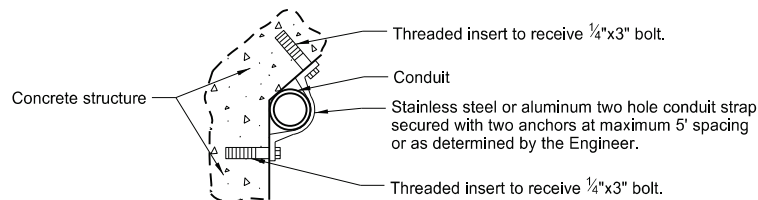
Emergency Vehicle Detector Detail



Alternate Emergency Vehicle Detector Detail (adjustable)

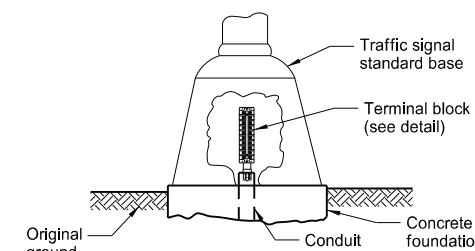


Terminal Block Detail

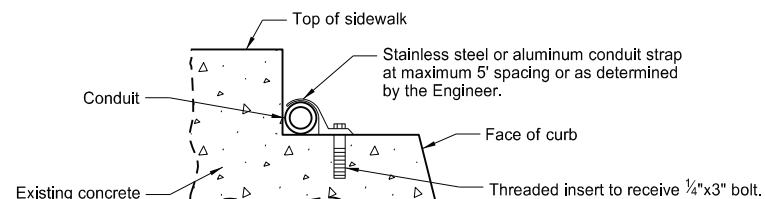


Bridge Mounted Conduit Hanger

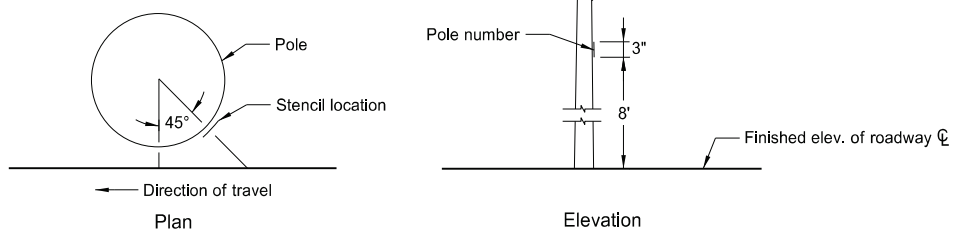
- Notes:
 1. Use Type X Unilet with two Par lamp holders and lamps for Two-way Detectors. (one in each direction).
 2. Plug unused end of One-way Detector with metal pipe plug.
 3. Rotate detector lens to face direction of travel on Two-way Detectors.



Terminal Block (rigid mounted)

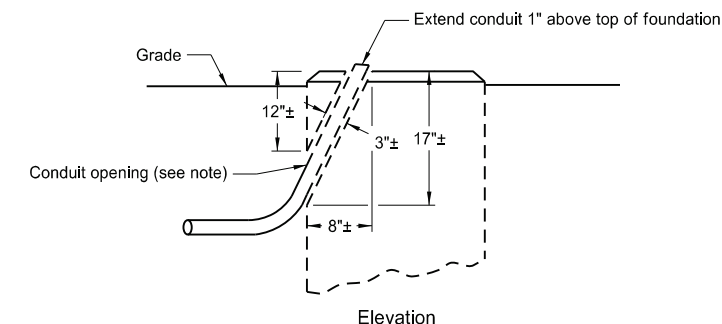


Bridge Curb Mounted Conduit



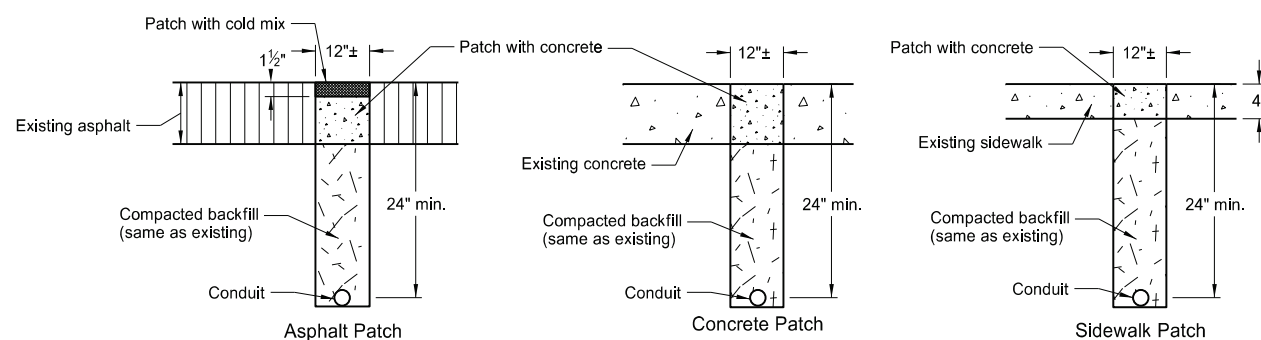
Light Standard Numbering

Note: On the roadway side of each light standard, stencil the pole number using contrasting color paint or an adhesive coated plastic such as Scotchlcal by 3M or as approved by the Engineer. See layout sheets for pole numbers.



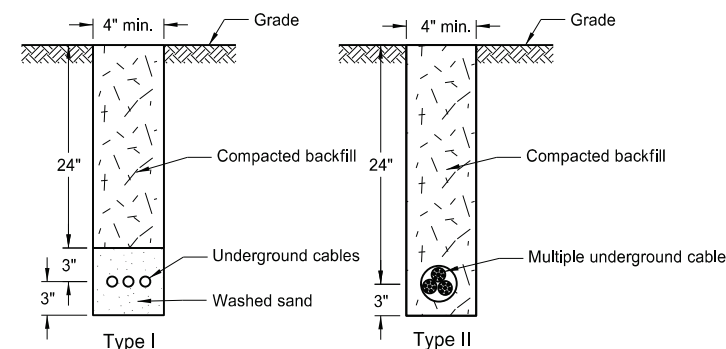
Revise Concrete Foundation

Note: Jackhammer or drill to remove material and provide a location for conduit. Make opening no larger than necessary. Place conduit, fill with concrete and finish foundation to original appearance.



Surface Patch Details

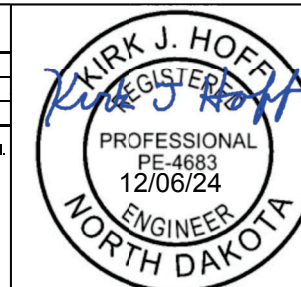
Note: Saw cut trenches. Use PCC pavement for replacement concrete with the coarse aggregate gradation, maximum size and method of curing as approved by the Engineer. Immediately prior to pouring replacement concrete, paint all surfaces with an approved epoxy compound.



Cable Trench

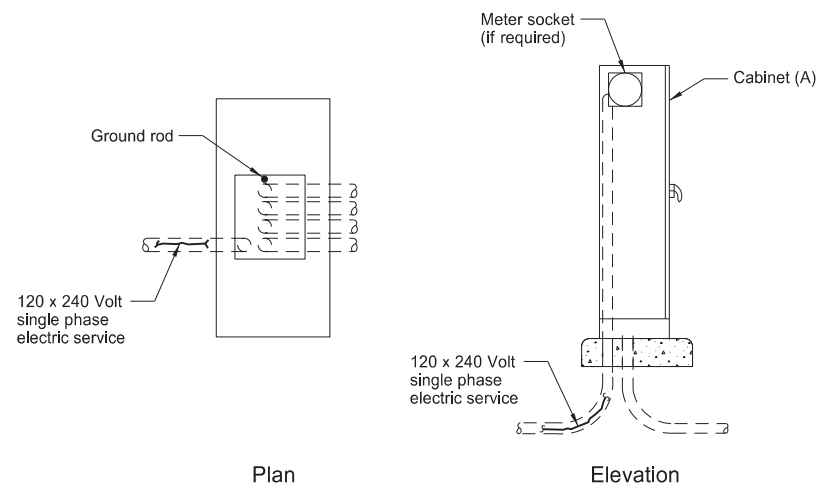
Note: Seed entire area disturbed by trenching.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-8-13	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
10-25-19	Removed conduit under RR detail.
11-01-24	Updated bridge hanger detail.



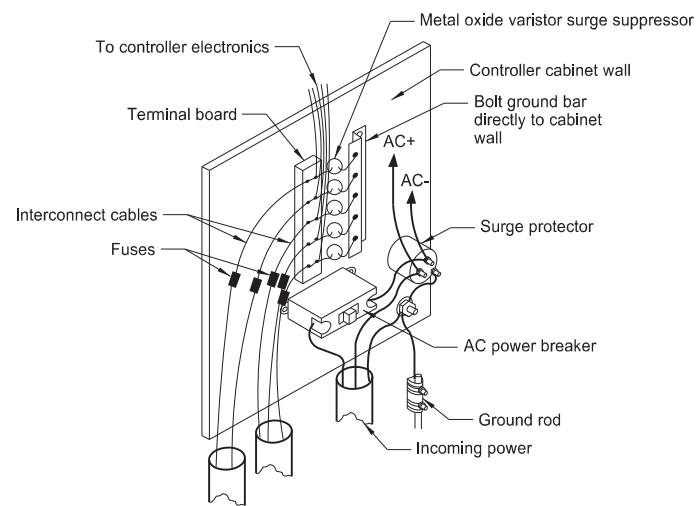
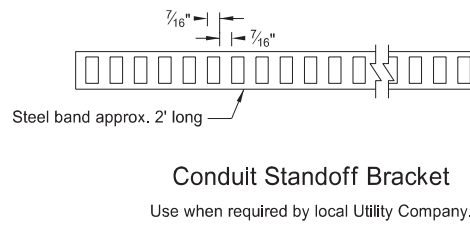
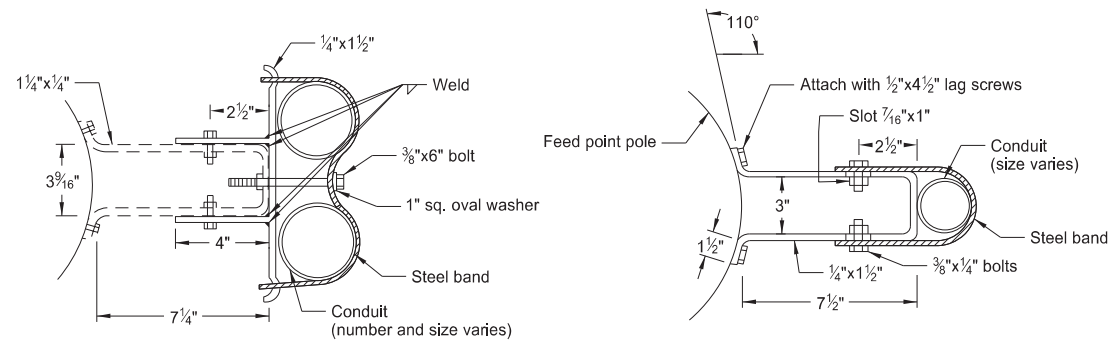
FEED POINT - TRAFFIC SIGNALS

D-772-1

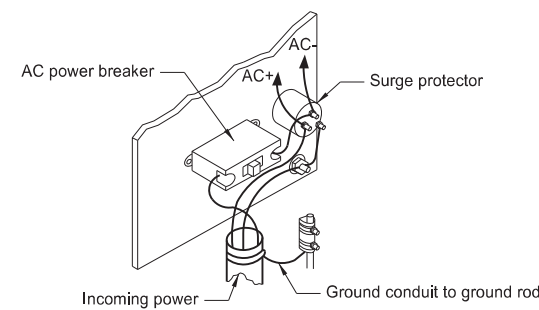


Circuit Breaker Cabinet Pad Mounted

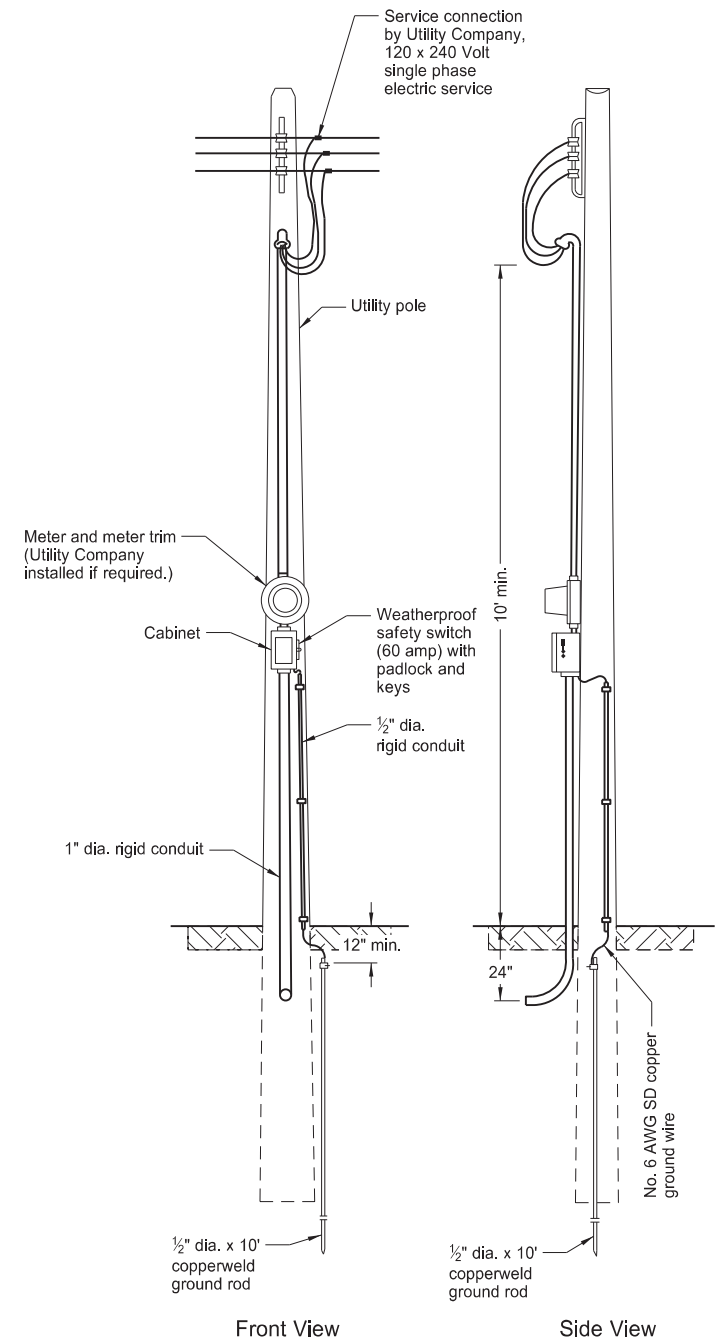
(A) Provide weatherproof cabinet, 56 in. high x 26 in. wide x 14 in. deep, 12 gauge steel (min.) or aluminum with provisions for padlock. Place one coat of primer and two coats of exterior dark green enamel on steel cabinet.



Controller Cabinet Interconnect and Power Cable Lightning Protection



Feed Point Cabinet Lightning Protection



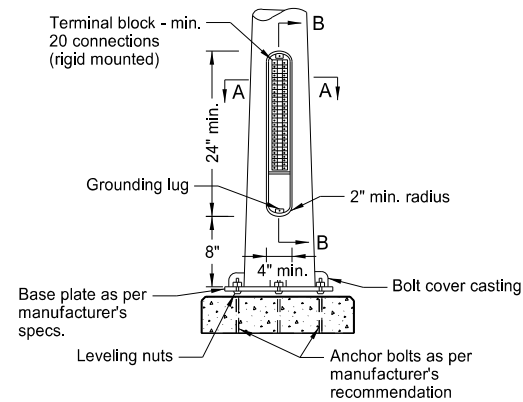
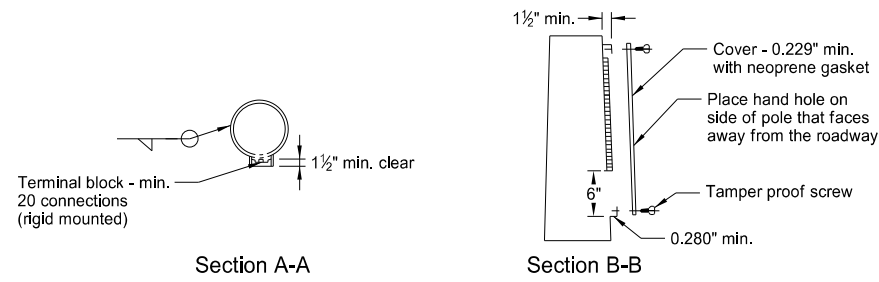
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-14-13	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
8-28-19	New Design Engineer PE Stamp.
8-09-24	Electronic Stamp/Signature.



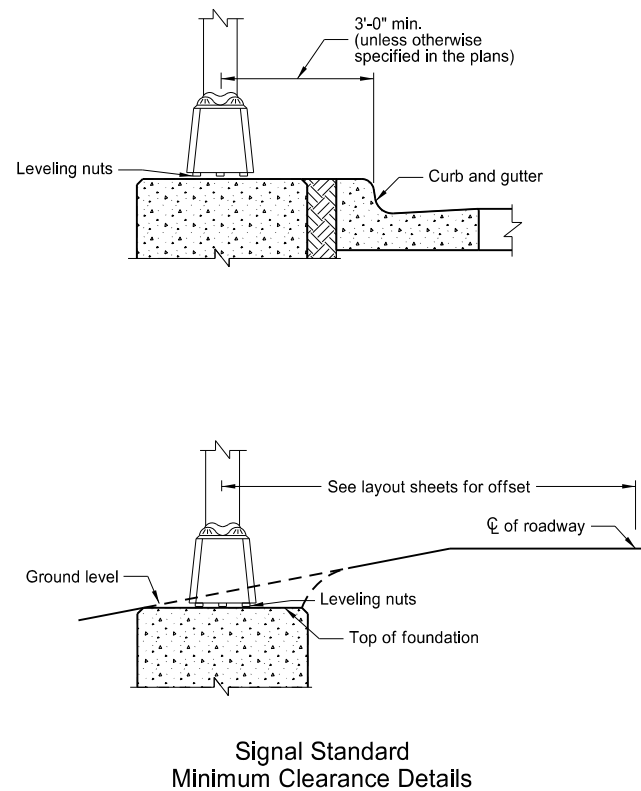
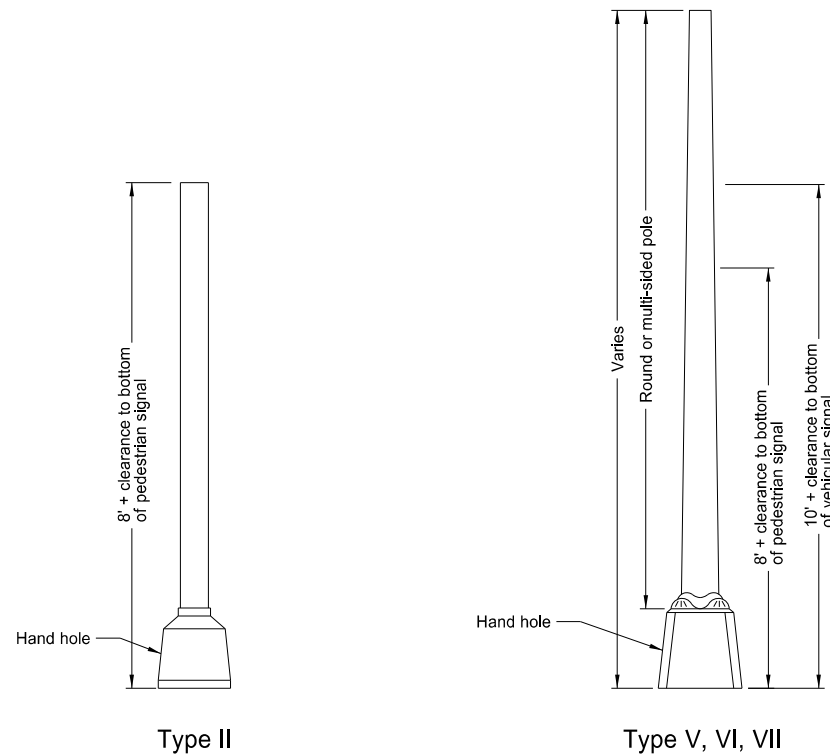
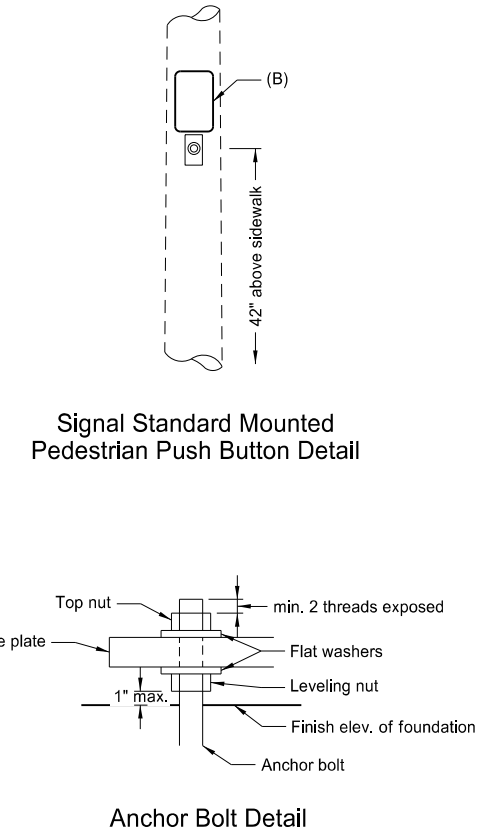
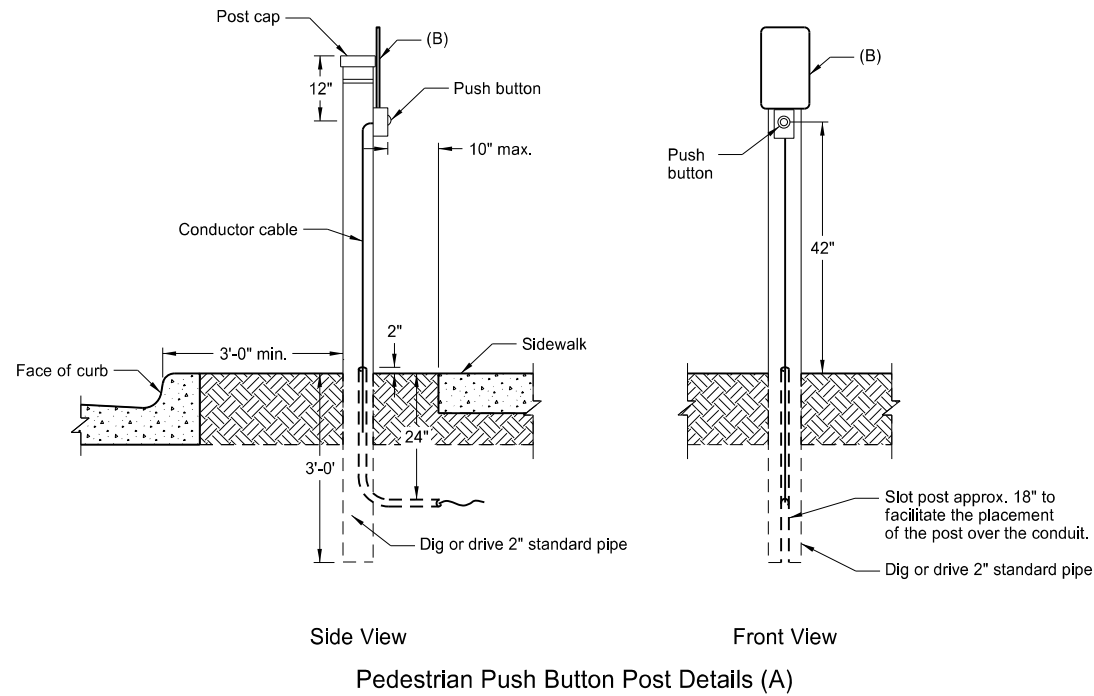
08/09/24

TRAFFIC SIGNAL STANDARDS

D-772-2



Alternate Signal Standard Base
For use only with Type V, VI, and VII signal standards.



- (A) Use positioning of the sign, pushbutton, and direction of arrow to clearly indicate which crosswalk is actuated by the push button. Place type of sign based on the jurisdiction in which placed.
- (B) Attach sign to post using rust resistant 0.081 aluminum bracket and banding. See Standard Signs book for dimensions and legend series. See plans for type of sign.

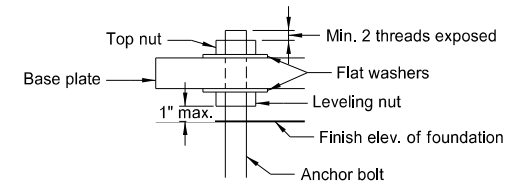
Notes:

- Signal Heads: See traffic signal layout for correct mounting position, number, size, and arrangement of lenses.
- Steel Standards: Place signal standard a minimum of 3 ft. from the face of the curb to center of signal standard, unless shown otherwise on layout sheets.
- Paint: See note sheet for required color of paint.
- Transformer Base: In lieu of transformer base use alternate signal standard base.

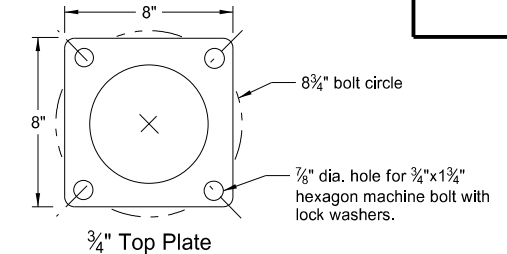
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-14-13	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
10-25-19	Added 10" dim for ped pushbutton.

This document was originally issued and sealed by
Kirk J Hoff,
Registration Number
PE- 4683,
on 10/25/19 and the original document is stored at the North Dakota Department of Transportation

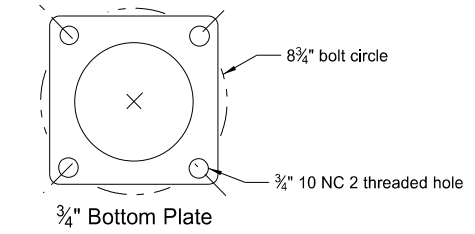
TRAFFIC SIGNAL STANDARDS (MAST ARM TYPE)



Anchor Bolt Detail



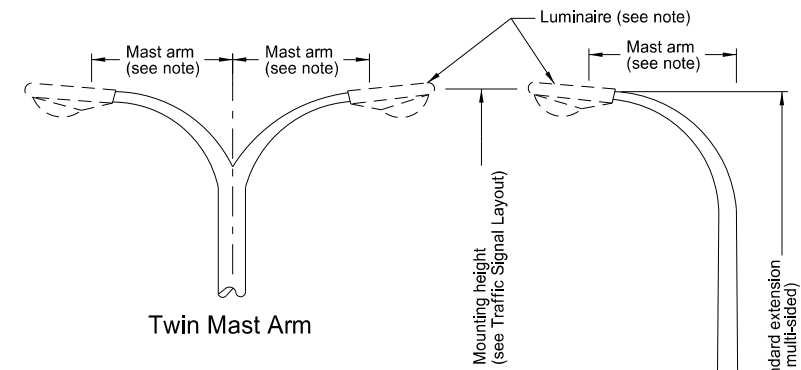
3/4" Top Plate



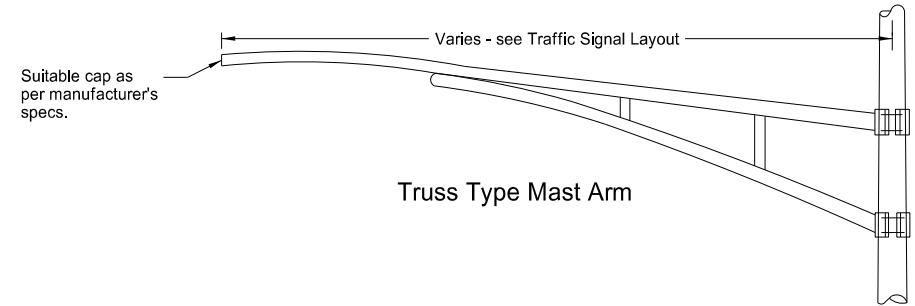
3/4" Bottom Plate

Detail A

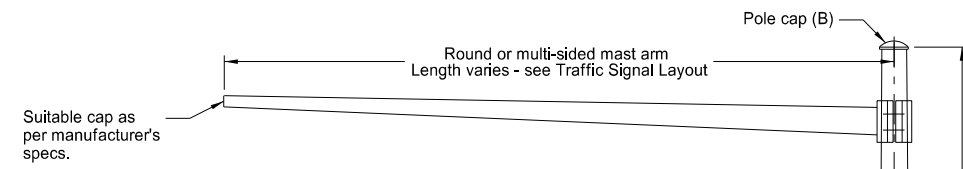
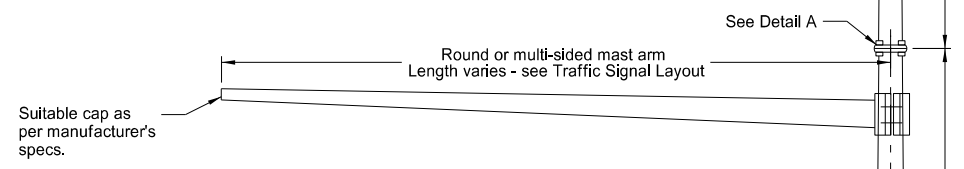
Note: In lieu of the plate type connection, use a telescoping clamp type extension.



Twin Mast Arm



Truss Type Mast Arm

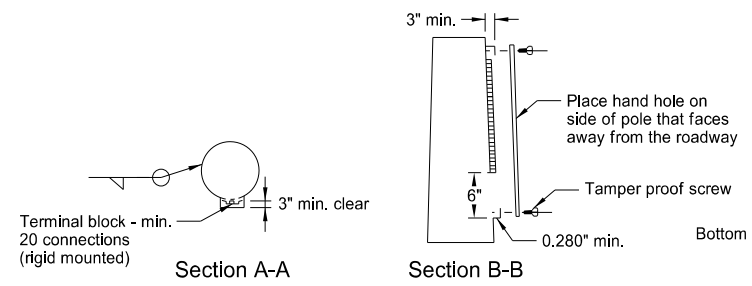


Combination Signal and Light Standard			
Signal Standard Type	Luminaire Mounting height (ft)	Install Light Standard Extension and Luminaire	Luminaire Mast Arm
A	30	yes	single
B	30	(A)	single
C	40	yes	single
D	40	(A)	single
E	30	yes	twin
F	30	(A)	twin
G	40	yes	twin
H	40	(A)	twin
I	50	yes	single
J	50	yes	twin

(A) Install the light standard extension for these signal standards at a later date under a separate contract.

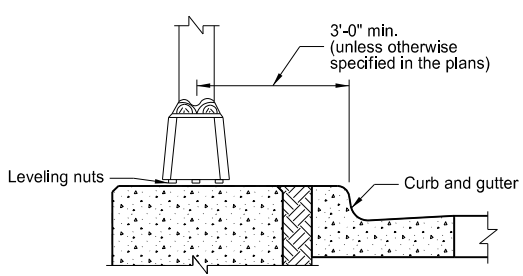
Notes:

- Light standard extension: Mast arm is 6 ft. unless otherwise noted on the plans. Use light standard extension galvanized in accordance with ASTM A 123.
- Luminaire: Use internal ballast - constant wattage 120 x 240 voltage luminaires. See layout sheets for type of luminaire, wattage, and I.E.S. distribution.
- Signal head: See Traffic Signal Layout for correct mounting position, number, size, and arrangement of lenses. Place mast arm mounted signal heads with a clearance between 17 ft. and 19 ft. from the ϕ of the roadway to the bottom of signal heads.
- Multi-sided poles: Provide a means, other than friction, that will not allow the mast arm to be rotated by wind forces. Fabricate the pole so the mast arm is rotatable. This feature to be as approved by the Engineer.
- Transformer base: In lieu of the transformer base, use the alternate signal standard base.

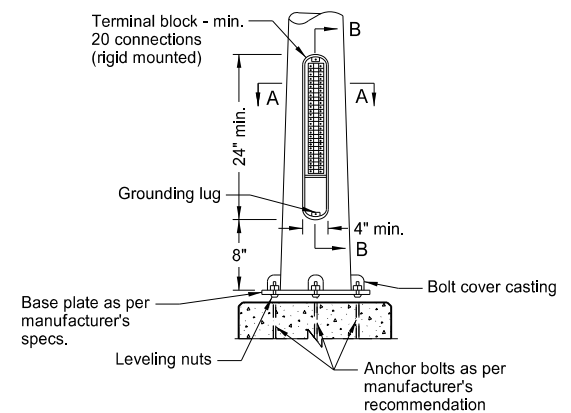


Section A-A

Section B-B

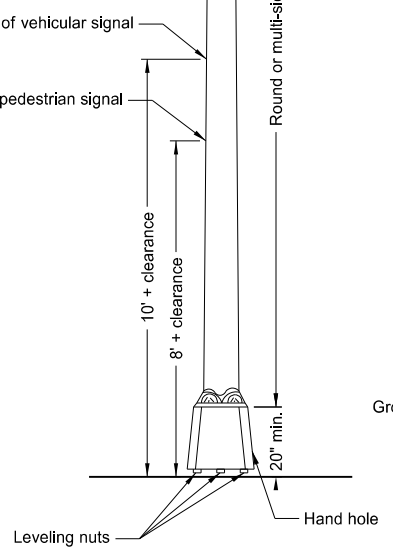


Signal Standard Minimum Clearance Detail

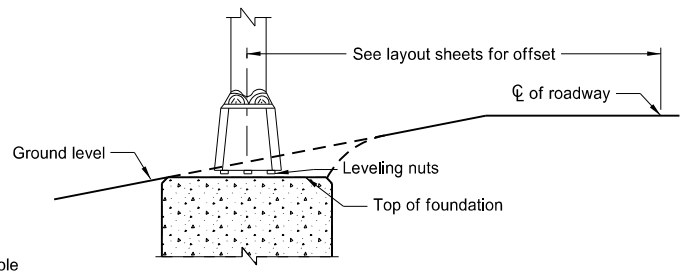


Alternate Signal Standard Base

Note: For use with Type IV and combination signal standards only



Combination Signal and Light Standard



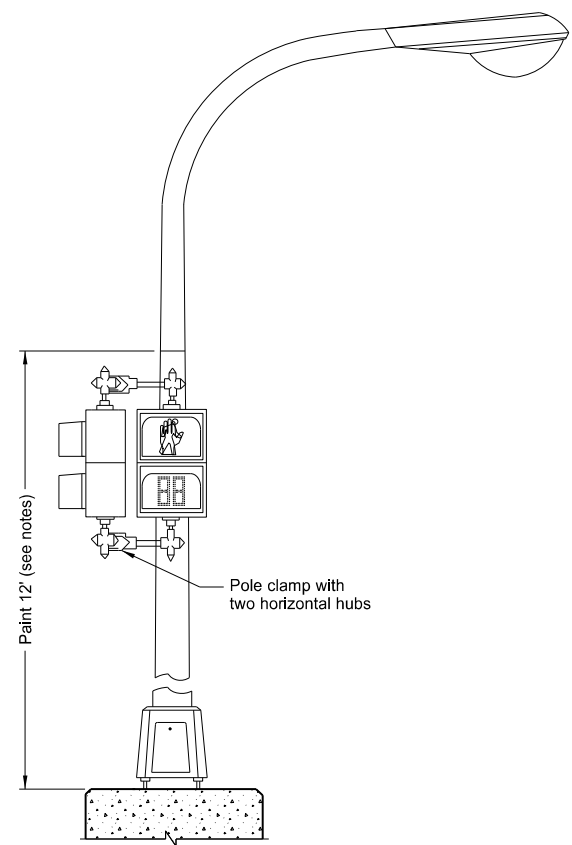
Type IV Signal Standard

(B) On combination signal and light standards Type B, D, F, and H, and on all Type IV signal standards install a suitable pole cap as per manufacturer's specifications.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-14-13	
REVISIONS	
DATE	CHANGE
10-17-17 08-28-19	Updated to active voice. New Design Engineer PE Stamp.

This document was originally issued and sealed by
Kirk J Hoff,
Registration Number
PE- 4683,
on **8/28/19** and the original document is stored at the
North Dakota Department
of Transportation

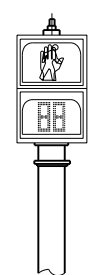
TRAFFIC SIGNAL HEAD MOUNTING



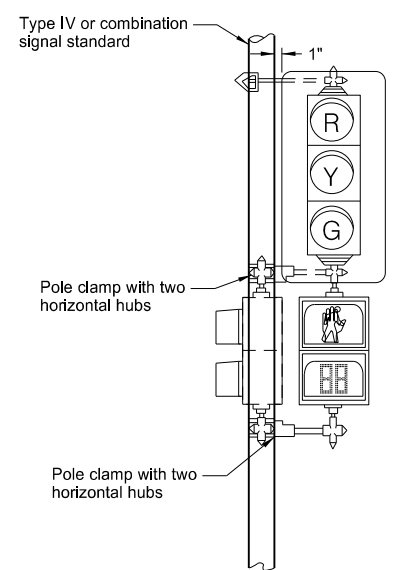
Light Standard Mounted Pedestrian Signal Head (A)



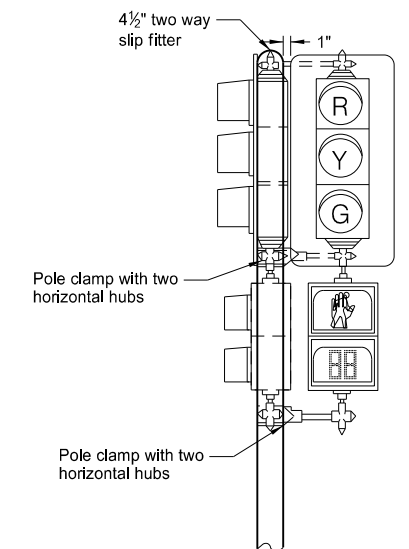
Pedestrian countdown timer
(A) See plans for the appropriate orientation and type of pedestrian signal head to use.



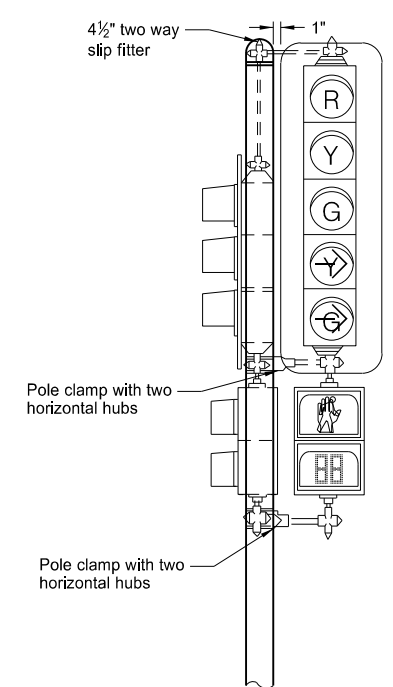
Type II
Pedestal Mounted - Pedestrian (A)



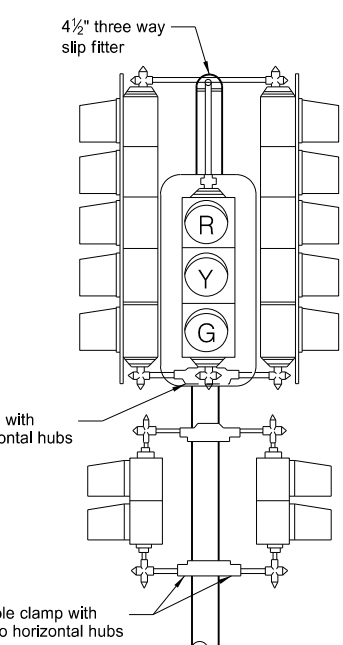
Type IV
Post Mounted - Vehicular
Post Mounted - Pedestrian (A)



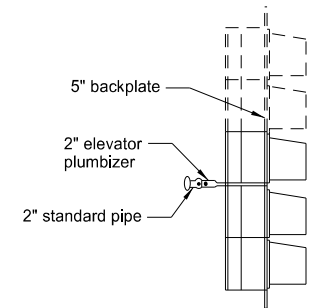
Type V
Post Mounted - Vehicular
Post Mounted - Pedestrian (A)



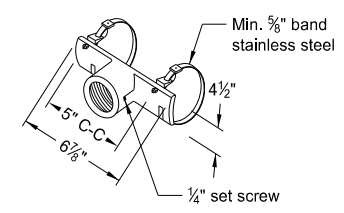
Type VI
Post Mounted - Vehicular
Post Mounted - Pedestrian (A)



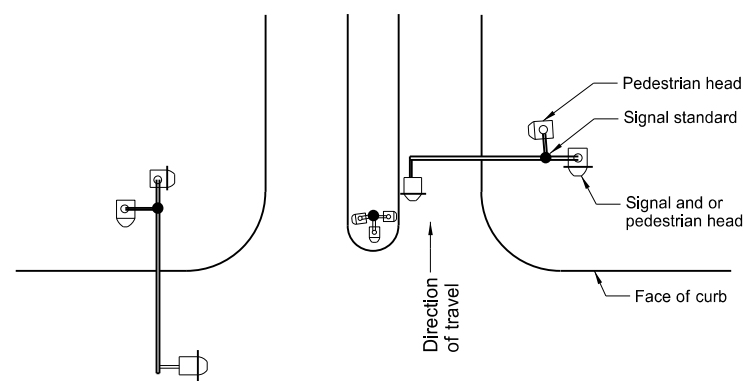
Type VII
Post Mounted - Vehicular
Post Mounted - Pedestrian (A)



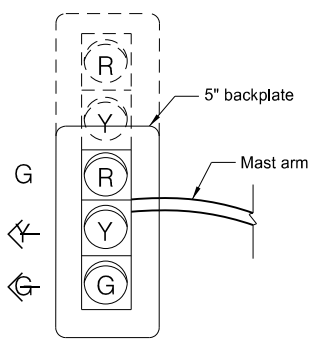
Mid-Span Mounted and Mast Arm Rigid Mounted Signal Heads



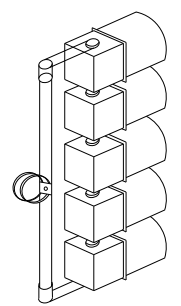
Mast Arm Signal Head Bracket



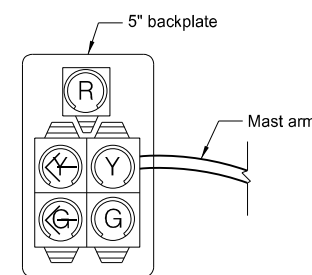
Plan Layout (typical)



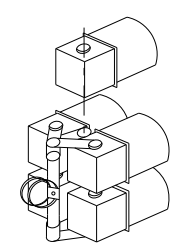
Front View



Isometric View



Front View



Isometric View

End Mounted and Mast Arm Rigid Mounted Signal Heads

- Notes:
- Reinforcing Plates:** Install reinforcing plates where mounting hardware attaches to signal heads when using polycarbonate signal heads. Where a plumbizer is used, place reinforcing plates on each side of the plumbizer.
 - Clearance:** Place the bottom of post or pedestal mounted vehicular signal heads a minimum of 10 ft. and pedestrian signal heads a minimum of 8 ft. above the ground line or sidewalk.
 - Signal Heads:** See traffic signal layout for correct mounting position, numbers, size, and arrangement of lenses.
 - Pole Clamps:** A pole plate with suitable banding material, as approved by the Engineer, is allowed in place of pole clamps. Where traffic signal heads and pedestrian signal heads are mounted one above the other, one pole clamp assembly is allowed.
 - Paint:** Paint signal housing yellow and backplates dull black. Paint pole clamps and signal head mounting hardware the same color as the signal standard shaft.
 - When pedestrian heads are light standard mounted, paint the lower 12 ft. the same color as the other traffic signal standards.
 - Mounting Details:** All signal heads shown viewed from direction of travel.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-14-13	
REVISIONS	
DATE	CHANGE
7-8-14	Added reinforcing plate note
10-17-17	Updated to active voice.
8-28-19	New Design Engineer PE Stamp.

This document was originally issued and sealed by
Kirk J Hoff,
Registration Number
PE- 4683,
on 8/28/19 and the original document is stored at the North Dakota Department of Transportation