

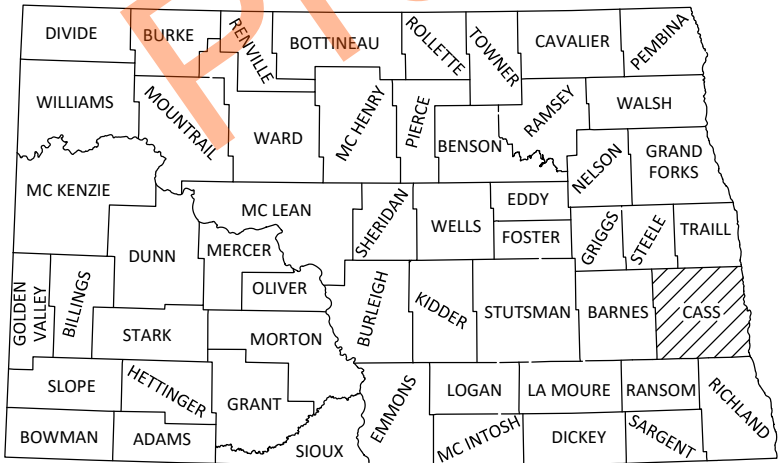
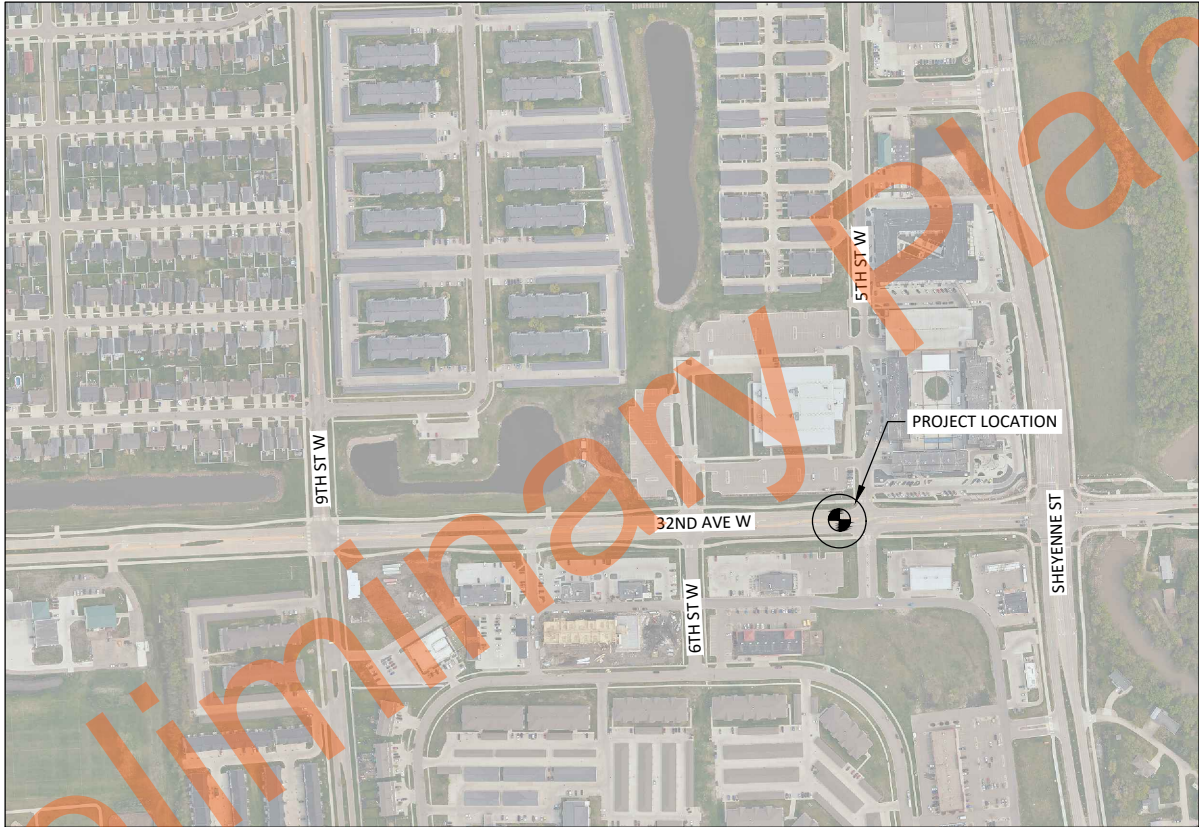
STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	TMACR-8-992(059)	25003	1	1

CITY OF WEST FARGO

TMACR-8-992(059)
City Improvement District Number 9067
CASS COUNTY
WEST FARGO, NORTH DAKOTA
32ND AVE W & 5TH ST W RRFBS AND MEDIAN REFUGE

GOVERNING SPECIFICATIONS	Date Published and Adopted
NDDOT Standard Specifications	7/1/2025

<u>PROJECT NUMBER</u> TMACR-8-992(059)	<u>NET MILES</u> 0.011	<u>GROSS MILES</u> 0.011
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STATE COUNTY MAP

DESIGNERS
Marisa Shiland
Jordan Reihe

City of West Fargo

Date 8/21/26

Bolton & Menk. INC.



EXISTING TOPOGRAPHIC SYMBOLS

	ACCESS GRATE		REGULATION STATION GAS
	AIR CONDITION UNIT		SATELLITE DISH
	ANTENNA		SIGN TRAFFIC
	AUTO SPRINKLER CONNECTION		SIGNAL CONTROL CABINET
	BARRICADE PERMANENT		SOIL BORING
	BASKETBALL POST		SIREN
	BENCH		TELEPHONE BOOTH
	BIRD FEEDER		TILE INLET
	BOLLARD		TILE OUTLET
	BUSH		TILE RISER
	CATCH BASIN RECTANGULAR CASTING		TRANSFORMER-ELECTRIC
	CATCH BASIN CIRCULAR CASTING		TREE-CONIFEROUS
	CURB STOP		TREE-DEAD
	CLEAN OUT		TREE-DECIDUOUS
	CULVERT END		TREE STUMP
	DRINKING FOUNTAIN		TRAFFIC ARM BARRIER
	DOWN SPOUT		TRAFFIC SIGNAL
	ELECTRIC CAR CHARGE STATION		TRASH CAN
	FILL PIPE		UTILITY MARKER
	FIRE HYDRANT		VALVE
	FLAG POLE		VALVE POST INDICATOR
	FLARED END / APRON		VALVE VAULT
	FUEL PUMP		VAULT
	GRILL		VENT PIPE
	GUY WIRE ANCHOR		WATER SPIGOT
	HANDHOLE		WELL
	HANDICAP SPACE		WETLAND DELINEATED MARKER
	IRRIGATION SPRINKLER HEAD		WETLAND
	IRRIGATION VALVE BOX		WET WELL
	LIFT STATION CONTROL PANEL		YARD HYDRANT
	LIFT STATION		
	LIGHT POLE		
	MAILBOX		
	MANHOLE-COMMUNICATION		
	MANHOLE-ELECTRIC		
	MANHOLE-GAS		
	MANHOLE-HEAT		
	MANHOLE-RECLAIMED WATER		
	MANHOLE-SANITARY SEWER		
	MANHOLE-STORM SEWER		
	MANHOLE-UTILITY		
	MANHOLE-WATER		
	METER		
	DRIVE-THRU MICROPHONE		
	PARKING METER		
	PAVEMENT MARKING		
	PEDESTAL-COMMUNICATION		
	PEDESTAL-ELECTRIC		
	PEDESTRIAN PUSH BUTTON		
	PICNIC TABLE		
	POLE-UTILITY		
	POST		
	RAILROAD SIGNAL POLE		

PROPOSED TOPOGRAPHIC SYMBOLS

	CLEANOUT
	MANHOLE
	LIFT STATION
	STORM SEWER CIRCULAR CASTING
	STORM SEWER RECTANGULAR CASTING
	STORM SEWER FLARED END / APRON
	STORM SEWER OUTLET STRUCTURE
	STORM SEWER OVERFLOW STRUCTURE
	CURB BOX
	FIRE HYDRANT
	WATER VALVE
	WATER REDUCER
	WATER BEND
	WATER TEE
	WATER CROSS
	WATER SLEEVE
	WATER CAP / PLUG
	RIP RAP
	DRAINAGE FLOW
	TRAFFIC SIGNS

SURVEY SYMBOLS

	BENCHMARK LOCATION		CAST IRON MONUMENT
	CONTROL POINT		STONE MONUMENT
	MONUMENT FOUND		

EXISTING TOPOGRAPHIC LINES

	RETAINING WALL
	FENCE
	FENCE-DECORATIVE
	GUARD RAIL
	TREE LINE
	BUSH LINE

SURVEY LINES

	CONTROLLED ACCESS
	BOUNDARY
	CENTERLINE
	EXISTING EASEMENT LINE
	PROPOSED EASEMENT LINE
	EXISTING LOT LINE
	PROPOSED LOT LINE
	EXISTING RIGHT-OF-WAY
	PROPOSED RIGHT-OF-WAY
	SETBACK LINE
	SECTION LINE
	QUARTER LINE
	SIXTEENTH LINE
	TEMPORARY EASEMENT

EXISTING UTILITY LINES

	FORCEMAIN
	SANITARY SEWER
	SANITARY SERVICE
	STORM SEWER
	STORM SEWER DRAIN TILE
	WATERMAIN
	WATER SERVICE
	RECLAIMED WATER

PROPOSED UTILITY LINES

	FORCEMAIN
	SANITARY SEWER
	SANITARY SERVICE
	STORM SEWER
	STORM SEWER DRAIN TILE
	WATERMAIN
	WATER SERVICE
	PIPE CASING
	TRENCHLESS PIPE (PLAN VIEW)
	TRENCHLESS PIPE (PROFILE VIEW)

GRADING INFORMATION

	EXISTING CONTOUR MINOR
	EXISTING CONTOUR MAJOR
	PROPOSED CONTOUR MINOR
	PROPOSED CONTOUR MAJOR
	PROPOSED GRADING LIMITS / SLOPE LIMITS
	PROJECT LIMITS
	PROPOSED SPOT ELEVATION
	RISE:RUN (SLOPE)

HATCH PATTERNS

	BITUMINOUS		GRAVEL
	CONCRETE		

EXISTING PRIVATE UTILITY LINES

NOTE:
EXISTING UTILITY INFORMATION SHOWN ON THIS PLAN HAS BEEN PROVIDED BY THE UTILITY OWNER. THE CONTRACTOR SHALL FIELD VERIFY EXACT LOCATIONS PRIOR TO COMMENCING CONSTRUCTION AS REQUIRED BY STATE LAW. NOTIFY GOPHER STATE ONE CALL, 1-800-252-1166 OR 651-454-0002.

THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D UNLESS OTHERWISE NOTED. THIS UTILITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-22, ENTITLED "STANDARD GUIDELINE FOR INVESTIGATING AND DOCUMENTING EXISTING UTILITIES".

	UNDERGROUND FIBER OPTIC
	UNDERGROUND ELECTRIC
	UNDERGROUND GAS
	UNDERGROUND COMMUNICATION
	OVERHEAD ELECTRIC
	OVERHEAD COMMUNICATION
	OVERHEAD UTILITY

UTILITIES IDENTIFIED WITH A QUALITY LEVEL :

LINE TYPES FOLLOW THE FORMAT: UTILITY TYPE - QUALITY LEVEL
EXAMPLE: UNDERGROUND GAS, QUALITY LEVEL A
UTILITY QUALITY LEVEL (A,B,C,D) DEFINITIONS CAN BE FOUND IN CI/ASCE 38-22.

UTILITY QUALITY LEVELS:

QUALITY LEVEL D: PROVIDES THE MOST BASIC LEVEL OF INFORMATION. IT INVOLVES COLLECTING DATA FROM EXISTING UTILITY RECORDS. RECORDS MAY INCLUDE AS-BUILT DRAWINGS, DISTRIBUTION AND SERVICES MAPS, EXISTING GEOGRAPHIC INFORMATION SYSTEM DATABASES, CONSTRUCTION PLANS, ETC.

QUALITY LEVEL C: INVOLVES SURVEYING VISIBLE SUBSURFACE UTILITY STRUCTURES SUCH AS MANHOLES, HAND-HOLES, UTILITY VALVES AND METERS, FIRE HYDRANTS, PEDESTALS AND UTILITY MARKERS, AND THEN CORRELATING THE INFORMATION WITH EXISTING UTILITY RECORDS TO CREATE COMPOSITE DRAWINGS. INCLUDES QUALITY LEVEL D ACTIVITIES.

QUALITY LEVEL B: INVOLVES DESIGNATING THE HORIZONTAL POSITION OF SUBSURFACE UTILITIES THROUGH SURFACE DETECTION METHODS AND COLLECTING THE INFORMATION THROUGH A SURVEY METHOD. INCLUDES QUALITY LEVEL C AND D TASKS.

QUALITY LEVEL A: PROVIDES THE HIGHEST LEVEL OF ACCURACY. IT INVOLVES LOCATING OR POTHOLING UTILITIES AS WELL AS ACTIVITIES IN QUALITY LEVELS B, C, AND D. THE LOCATED FACILITY INFORMATION IS SURVEYED AND MAPPED AND THE DATA PROVIDES PRECISE PLAN AND PROFILE INFORMATION.

ABBREVIATIONS

A	ALGEBRAIC DIFFERENCE	GRAV	GRAVEL	RSC	RIGID STEEL CONDUIT
ADJ	ADJUST	GU	GUTTER	RT	RIGHT
ALT	ALTERNATE	GV	GATE VALVE	SAN	SANITARY SEWER
B-B	BACK TO BACK	HDPE	HIGH DENSITY POLYETHYLENE	SCH	SCHEDULE
BIT	BITUMINOUS	HH	HANDHOLE	SERV	SERVICE
BLDG	BUILDING	HP	HIGH POINT	SHLD	SHOULDER
BMP	BEST MANAGEMENT PRACTICE	HWL	HIGH WATER LEVEL	STA	STATION
BR	BEGIN RADIUS	HYD	HYDRANT	STD	STANDARD
BV	BUTTERFLY VALVE	I	INVERT	STM	STORM SEWER
CB	CATCH BASIN	K	CURVE COEFFICIENT	TC	TOP OF CURB
C&G	CURB AND GUTTER	L	LENGTH	TE	TEMPORARY EASEMENT
CIP	CAST IRON PIPE	LO	LOWEST OPENING	TEMP	TEMPORARY
CIPP	CURED-IN-PLACE PIPE	LP	LOW POINT	TNH	TOP NUT HYDRANT
CL	CENTER LINE	LT	LEFT	TP	TOP OF PIPE
CL.	CLASS	MAX	MAXIMUM	TYP	TYPICAL
CLVT	CULVERT	MH	MANHOLE	VCP	VITRIFIED CLAY PIPE
CMP	CORRUGATED METAL PIPE	MIN	MINIMUM	VERT	VERTICAL
C.O.	CHANGE ORDER	MR	MID RADIUS	VPC	VERTICAL POINT OF CURVE
COMM	COMMUNICATION	NIC	NOT IN CONTRACT	VPI	VERTICAL POINT OF INTERSECTION
CON	CONCRETE	NMC	NON-METALLIC CONDUIT	VPT	VERTICAL POINT OF TANGENT
CSP	CORRUGATED STEEL PIPE	NTS	NOT TO SCALE	WM	WATERMAIN
DIA	DIAMETER	NWL	NORMAL WATER LEVEL		
DIP	DUCTILE IRON PIPE	OHW	ORDINARY HIGH WATER LEVEL		
DWY	DRIVEWAY	PC	POINT OF CURVE	AC	ACRES
E	EXTERNAL CURVE DISTANCE	PCC	POINT OF COMPOUND CURVE	CF	CUBIC FEET
ELEC	ELECTRIC	PE	PERMANENT EASEMENT	CV	COMPACTED VOLUME
ELEV	ELEVATION	PED	PEDESTRIAN, PEDESTAL	CY	CUBIC YARD
EOF	EMERGENCY OVERFLOW	PERF	PERFORATED PIPE	EA	EACH
ER	END RADIUS	PERM	PERMANENT	EV	EXCAVATED VOLUME
ESMT	EASEMENT	PI	POINT OF INTERSECTION	LB	POUND
EX	EXISTING	PL	PROPERTY LINE	LF	LINEAR FEET
FES	FLARED END SECTION	PRC	POINT OF REVERSE CURVE	LS	LUMP SUM
F-F	FACE TO FACE	PT	POINT OF TANGENT	LV	LOOSE VOLUME
FF	FINISHED FLOOR	PVC	POLYVINYL CHLORIDE PIPE	SF	SQUARE FEET
F&I	FURNISH AND INSTALL	PVMT	PAVEMENT	SV	STOCKPILE VOLUME
FM	FORCEMAIN	R	RADIUS	SY	SQUARE YARD
FO	FIBER OPTIC	R/W	RIGHT-OF-WAY		
F.O.	FIELD ORDER	RCP	REINFORCED CONCRETE PIPE		
GRAN	GRANULAR	RET	RETAINING		

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1	1	Title Sheet & Legend	D-261-1	Erosion Control - Fiber Roll Placement Details					
2	1	Table of Contents	D-704-7	Breakaway Systems For Construction Zone Signs - Perforated Tube					
4	1	Scope of Work	D-704-8	Breakaway Systems For Construction Zone Signs - U-Channel Post					
6	1 - 2	Notes	D-704-9	Construction Sign Details - Terminal And Guide Signs					
8	1	Quantities	D-704-13	Barricade And Channelizing Device Details					
20	1 - 2	General Details	D-704-14	Construction Sign Punching And Mounting Details					
30	1	Typical Sections	D-704-25	Lane Closures On Urban Streets Layouts					
40	1	Removals	D-704-50	Portable Sign Support Assembly					
76	1	Temporary Erosion Control	D-748-1	Curb & Gutter And Valley Gutter					
77	1	Permanent Erosion Control	D-750-2	Sidewalk					
80	1	ADA Ramp Layouts	D-750-3	Curb Ramp Retrofit Details					
100	1 - 5	Work Zone Traffic Control	D-750-4	Curb Ramp Retrofit Transitional Area Details					
110	1 - 2	Signing	D-754-23	Perforated Tube Assembly Details					
120	1	Pavement Marking	D-754-24, 25	Mounting Details Perforated Tube					
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			D-754-28	Sign Punching, Stringer and Support Location Details Regulatory, Warning and Guide Signs					
			D-754-80	Light Standard, Signal Standard, and Span Wire Mounted Sign Assembly Detail					
			D-770-1	Concrete Foundations (Traffic Signals & Highway Lighting)					
			D-772-2	Traffic Signal Standards					
SPECIAL PROVISIONS									
Number	Description								
SP 598(25)	Utility Coordination								



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- Remove concrete sidewalk on north and south side of 32nd Ave, west of 5th St W. Remove existing raised median.
- Install concrete sidewalk and pedestrian ramps for 32nd Ave crossing.
- No changes to roadway pavement section.
- Install overhead RRFB system.
- Install roadway striping and signage.

32ND AVE W & 5TH ST W
RRFBS & MEDIAN REFUGE

SCOPE OF WORK



NOTES

GENERAL NOTES

- 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 will be performed during these hours unless otherwise approved by the Engineer. Submit request to Engineer a minimum of 48 hours in advance
- 100-P02 CONTRACTOR PARKING / STAGING AREA RESTRICTIONS: Parking of personal vehicles, construction equipment, storage of construction materials, or work areas on private property is prohibited without written permission by the property owner.
- Staging of construction materials, storing of personal vehicles or construction equipment in the City's Right-of-Way outside of the construction work zone is prohibited.
- 100-P03 SAND VEIN: Existing sand veins may exist in the project area and portions of the project area may be affected. The sand vein may cause water infiltration when excavating, and dewatering will be needed in these areas. The contractor will be responsible for any additional temporary casing requirements for the signal foundation installation.
- 105-P01 PAVEMENT SWEEPING: Sweep paved areas that were used by construction traffic before opening these areas to public traffic. Sweep pedestrian detour routes as needed to the satisfaction of the Engineer. 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-P02 PLAN STATIONING: All stations and offsets are measured from 32nd Avenue West.
- 105-P03 TOPSOIL: Restore topsoil depths and existing ground surface within grading limits to pre-construction condition or better. Salvage existing topsoil and stockpile for re-use onsite after improvements are complete. Volume of topsoil to salvage & stockpile assumes existing depth is 6-inches. After improvements are complete spread stockpiled topsoil at an even depth equal to or greater than 6-inches. The cost to salvage, stockpile, and spread topsoil to be included in the price bid for "SEEDING CLASS III".
- 202-P01 PAVEMENT REMOVALS: Removal of pavement consists of concrete median pavement, concrete sidewalk and associated steel reinforcing tie/dowl bars. Existing pavement thicknesses are averaged based on historical plan set as-built information and maintenance data. Include all costs, materials, equipment, and labor in the contract unit price for "REMOVAL OF CONCRETE PAVEMENT".
- 202-P02 CURB AND GUTTER REMOVALS: Any saw cutting required for curb and gutter removals shall be included in the price bid for "REMOVAL OF CURB & GUTTER".
- 202-P03 COMMON EXCAVATION: Removals of underlying aggregate base and subgrade may be required below existing concrete median, curb & gutter, and proposed concrete sidewalk. Include all costs, materials, equipment, and labor in the contract unit price for "REMOVAL OF CONCRETE PAVEMENT".
- 251-P01 SEEDING: Use the following sunny seed mix for all permanent seeding.

Species	Pounds Live Seed / Acre
Kentucky Bluegrass	120
Fine Lead Perennial Ryegrass	60
Creeping Red Fescue	20

Rate of seeding = 200 lbs / Acre = 4 to 6 lbs./1,000 sq. ft.

- Prior to or during grading and tillage operations, rake and clear the ground surface of all brush, sticks, roots, stones larger than ½ inch in diameter, concrete chunks, rebar, wire or any other material that may hinder seeding operations and future maintenance operations such as mowing. Dispose of any accumulated material at no additional cost to the City.
- Spread seed mixture evenly to the ground either by hand or with equipment. Ensure embedment within the topsoil so the seed does not blow away. Apply fertilizer and hydraulic mulch after seed application.
- Seeding to occur between August 10th and September 30th to ensure proper germination. Areas of turf that do not germinate or survive the winter will be reseeded in the spring at the Contractor's cost.
- Include all costs for labor, equipment and materials (including fertilizer) necessary to complete the work in the contract unit price for "SEEDING CLASS III".
- 704-P01 TRAFFIC CONTROL PHASING: The traffic control devices and signing required are shown in the traffic control devices layout within plan section 100. No construction traffic may block vehicular or pedestrian traffic outside of the marked construction areas at any time. Include all costs for labor, equipment and materials necessary to complete the work in the contract unit price for "TEMPORARY TRAFFIC CONTROL".
- Phase 1: Phase 1 work consists of all work within the median area. Set up and maintain single lane closures on 32nd Ave directly adjacent to the work area. Keep the intersection open at all times.
- Phase 2: Phase 2 work consists of all work within the south boulevard area. Set up and maintain single lane closures on 32nd Ave directly adjacent to the work area(s). Keep the intersection open at all times. Phase 2 & 3 can not occur concurrently.
- Phase 3: Phase 3 work consists of all work within the north boulevard area. Set up and maintain single lane closures on 32nd Ave directly adjacent to the work area(s). Keep the intersection open at all times. Phase 2 & 3 can not occur concurrently.
- 708-P01 INLET PROTECTION SPECIAL: Place inlet protection as per the details. Include all costs for furnishing, installing, maintaining (cleaning), and replacing damaged devices in the bid price for "INLET PROTECTION SPECIAL". Keep all installed devices in place until the turf has been established.
- 748-P01 CURB AND GUTTER TYPE I: Place tie bars, at the interface of existing curb and gutter with new curb and gutter, into pre-drilled holes that have been cleaned and filled with an approved epoxy. Include all costs, materials, equipment, and labor in the contract unit price for "CURB & GUTTER TYPE I".
- 750-P01 SIDEWALK CONCRETE 5IN: Place tie bars, at the interface of existing sidewalk with new sidewalk, into pre-drilled holes that have been cleaned and filled with an approved epoxy. Include all costs, materials, equipment, and labor in the contract unit price for "SIDEWALK CONCRETE 5IN".
- See Section 20 detail for continuous steel reinforcement bars in sidewalk concrete. Reinforcement is considered incidental to sidewalk construction.
- 750-P02 SIDEWALK CONCRETE 6IN: Place tie bars, at the interface of existing sidewalk with new sidewalk, into pre-drilled holes that have been cleaned and filled with an approved epoxy. Include all costs, materials, equipment, and labor in the contract unit price for "SIDEWALK CONCRETE 6IN".
- See Section 20 detail for continuous steel reinforcement bars in sidewalk concrete. The cost of reinforcement bars will be included in the price bid for "SIDEWALK CONCRETE 6IN".



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- 750-P03

CURB RAMPS AND LANDINGS: Ensure that all reconstructed curb ramps and landings meet current design standards. Landings & ADA ramp thickness is to be 6-inches, matching sidewalk section thickness.

The concrete landings, as designated in Section 80 detail sheets and labeled “B”, must be installed first prior to adjacent curb ramps and/or sidewalks allowing for a minimum of 24 hours of cure time.

Adjust the elevations of the landings so that maximum grades are not exceeded. Any reconstructed sidewalk, curb ramp, or landing found to exceed maximum grades will be considered “non-compliant” and be required to be removed and replaced with the correct grades by the Contractor at their own expense.

Construct sidewalks, curb ramps and landings in accordance with the detail layouts shown in Section 80. See Section 20 detail for continuous steel reinforcement bars in sidewalk concrete.
- 750-P04

DETECTABLE WARNING PANELS: Install cast-iron detectable warning panels. Color to be unpainted iron.
- 750-P05

Aggregate base course material will be required for sidewalk concrete and concrete curb and gutter. Include all costs, materials, equipment, labor in the contract unit price for “SIDEWALK CONCRETE 5IN, “SIDEWALK CONCRETE 6IN” and “CURB AND GUTTER-TYPE I”.
- 772-P01

RAPID RECTANGULAR FLASHING BEACON (RRFB) SYSTEM – MA MOUNTED: Install two complete overhead, mast arm-mounted, solar-powered RRFB system(s) at the locations shown in the plans. The RRFB system shall include MUTCD-compliant LED flash beacons with alternating flash patterns and required visibility distances, weatherproof and corrosion-resistant housings. Solar power components including a minimum 50-watt solar panel, a replaceable 12-volt sealed battery with a minimum capacity of 60 amp-hours. Wireless activation and synchronization equipment with a minimum operating range of 250 feet, and a controller with adjustable flash duration, circuit protection for solar, battery, and load circuits, and clearly labeled wiring connections.

The work shall include, but is not limited to, traffic signal standards, mast arms, RRFB assemblies, pedestrian pushbuttons, pushbutton posts, vehicular and pedestrian indications, controller cabinet, foundations, solar panels, batteries, conduit, cable, wiring, mounting hardware, system testing, commissioning, site restoration, and all appurtenant materials required for a complete and operational system. The manufacturer shall provide a minimum five-year warranty on all system components. Refer to Section 150 plans for additional information. Bid in the contract unit price for “RAPID RECTANGULAR FLASHING BEACON SYSTEM – MA MOUNTED”.
- 772-P02

PEDESTRIAN PUSHBUTTON UNITS: Mount each pedestrian sign and pushbutton on one framed enclosure to the signal pole or bolt directly to the pedestrian pushbutton post. Do not use bandit for this purpose. Do not extend the top of the pushbutton signs above the top of the pedestrian pushbutton post. Accessible pedestrian push buttons shall be ADA and PROWAG compliant and include a tactile arrow, visual confirmation indicator, and audible locator tone. Orient the pushbutton and its sign (with arrow) in accordance with the positioning shown in the plans. One spare pushbutton unit is required per intersection. All equipment will be black in color.

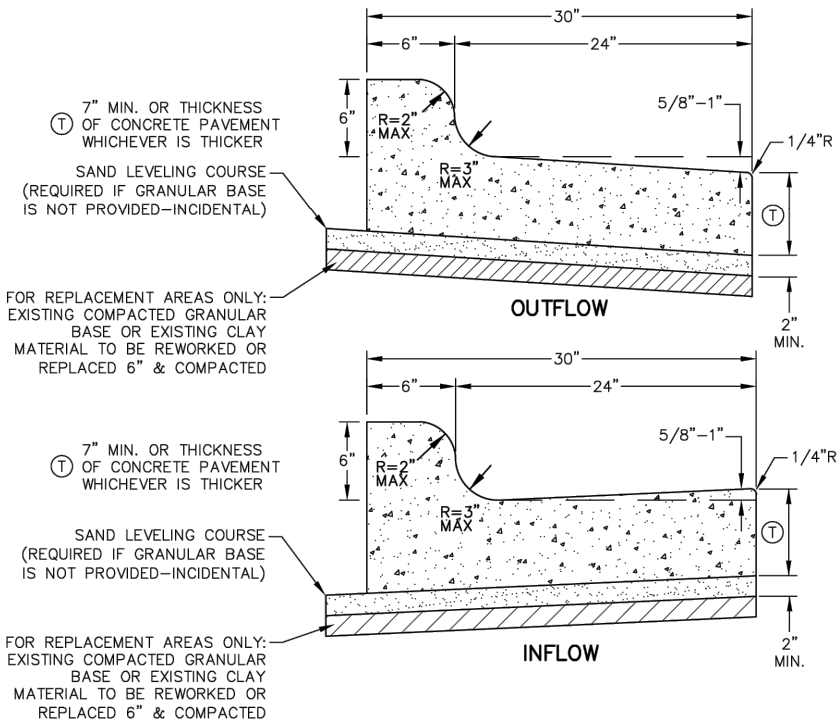
Pedestrian push button posts will be manufactured by Frey Manufacturing or Pelco Part #PB-5237-SCH40-5-P33, will be black in color. Post will be mounted onto concrete according to manufactures specifications and will include all parts to tether post to an anchor bolt.

Include the cost for labor, materials, and equipment necessary for furnishing, and installing the pedestrian pushbutton units in the contract unit included for “RAPID RECTANGULAR FLASHING BEACON SYSTEM – MA MOUNTED”.



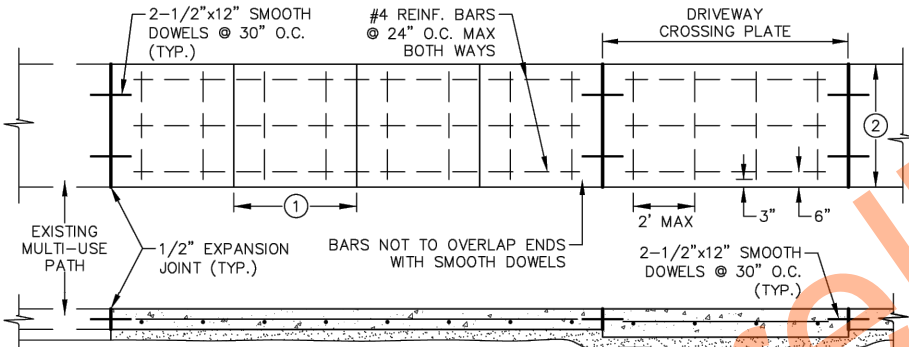
Estimated Quantities						STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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SPEC	CODE	ITEM DESCRIPTION	UNIT	Quantity	TOTAL				
103	0100	CONTRACT BOND	L SUM	1	1				
201	0370	REMOVAL OF TREES 10IN	EA	1	1				
202	0114	REMOVAL OF CONCRETE PAVEMENT	SY	136	136				
202	0130	REMOVAL OF CURB & GUTTER	LF	113	113				
251	0310	SEEDING CLASS III	SY	200	200				
253	0200	HYDRAULIC MULCH	SY	200	200				
261	0112	FIBER ROLLS 12IN	LF	150	150				
261	0113	REMOVE FIBER ROLLS 12IN	LF	150	150				
261	0200	WEIGHTED FIBER ROLLS	LF	5	5				
261	0201	REMOVE WEIGHTED FIBER ROLLS	LF	5	5				
702	0100	MOBILIZATION	L SUM	1	1				
704	1000	TRAFFIC CONTROL SIGNS	UNIT	581	581				
704	1052	TYPE III BARRICADE	EA	1	1				
704	1054	SIDEWALK BARRICADE	EA	4	4				
704	1060	DELINEATOR DRUMS	EA	34	34				
704	1085	SEQUENCING ARROW PANEL-TYPE A	EA	1	1				
708	1540	INLET PROTECTION-SPECIAL	EA	1	1				
708	1541	REMOVE INLET PROTECTION-SPECIAL	EA	1	1				
748	0140	CURB & GUTTER-TYPE I	LF	107	107				
750	0125	SIDEWALK CONCRETE 5IN	SY	157	157				
750	0140	SIDEWALK CONCRETE 6IN	SY	44	44				
750	2115	DETECTABLE WARNING PANELS	SF	160	160				
754	0110	FLAT SHEET FOR SIGNS-TYPE XI REFL SHEETING	SF	53	53				
754	0206	STEEL GALV POSTS-TELESCOPING PERFORATED TUBE	LF	91	91				
762	0135	EPOXY PVMT MK 24IN LINE-GROOVED	LF	260	260				
762	0136	EPOXY PVMT MK MESSAGE-GROOVED	SF	54	54				
772	2170	RAPID RECT FLASHING BEACON SYSTEM-MA MOUNTED	EA	2	2				

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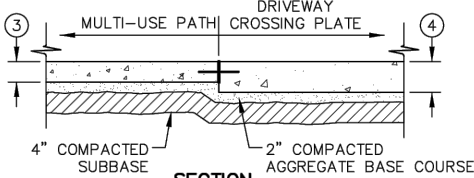


CURB AND GUTTER TYPE I

NO SCALE



SECTION

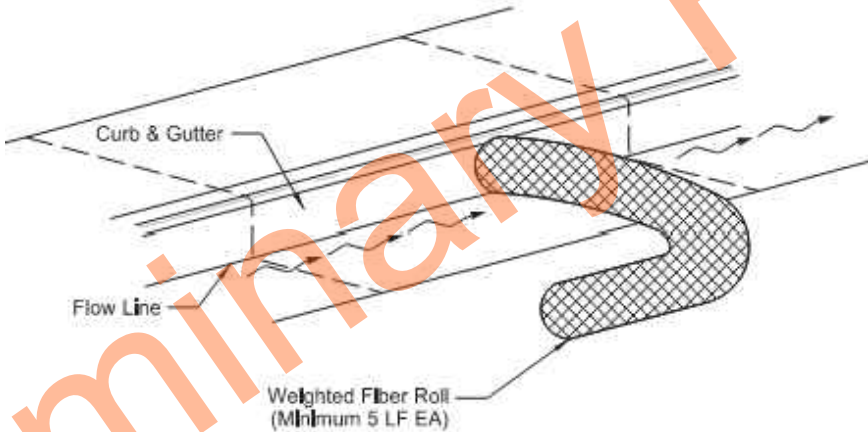


NOTATIONS:

- JOINTS TO BE SPACED AT 5'.
- AS SHOWN ON PLANS.
- 5" THICK FOR MULTI-USE PATH.
- SAME AS ADJACENT DRIVEWAY.

CONCRETE MULTI-USE PATH

NO SCALE



Installation Notes:

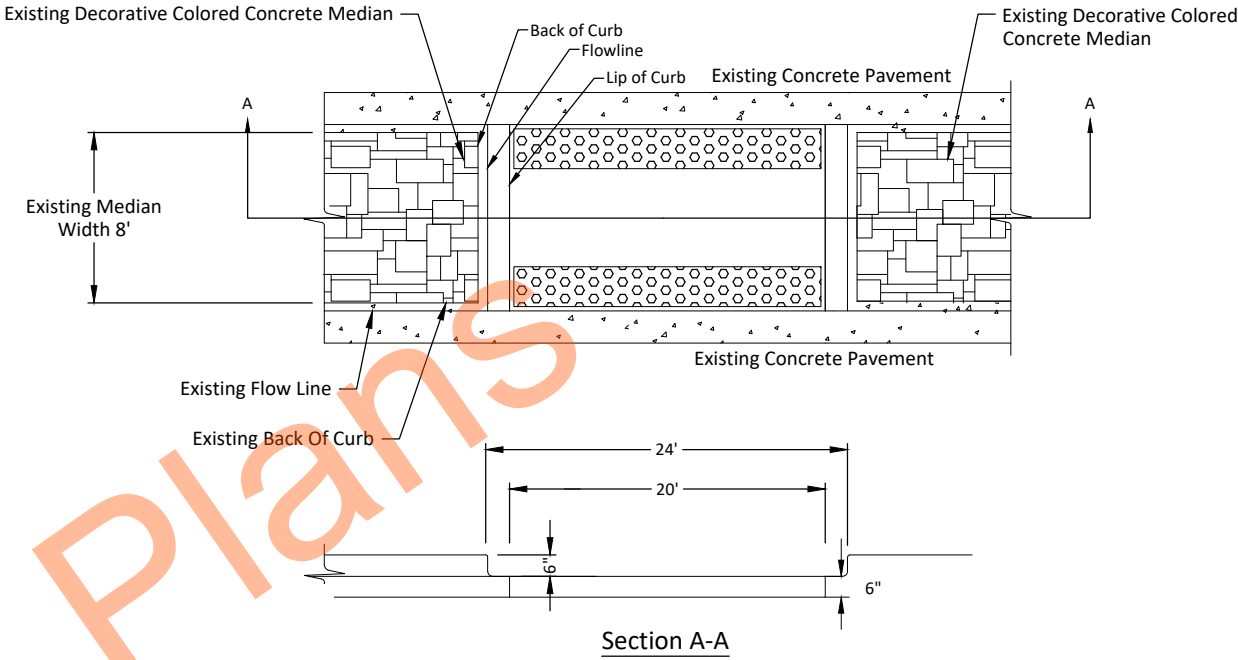
- Place device tightly against pavement, curb and gutter, to prevent gaps.
- Place downstream from unprotected workzones.

General Notes:

- Remove and properly dispose of material accumulated by device after a rain event or as necessary to maintain effectiveness of device.
- Provide materials that meet the following specifications:
A photo degradable extruded netting tube filled with wood curled excelsior and weighted inner core.
Roll Diameter: 6 Inches
Weight: Not less than 8.33 Pounds per Linear Foot
- Remove weighted fiber rolls after the up gradient surfaces are stabilized and surrounding streets and gutters are clean of debris. Costs related to this work to be included in the unit price bid for "Weighted Fiber Rolls".
- See Section 76 of the plans for locations.

WEIGHTED FIBER ROLL

NO SCALE



MEDIAN REFUGE ISLAND

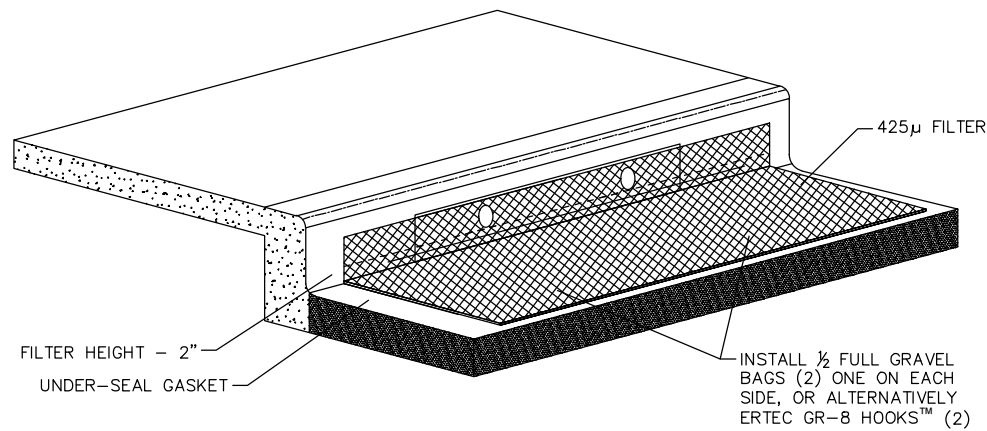
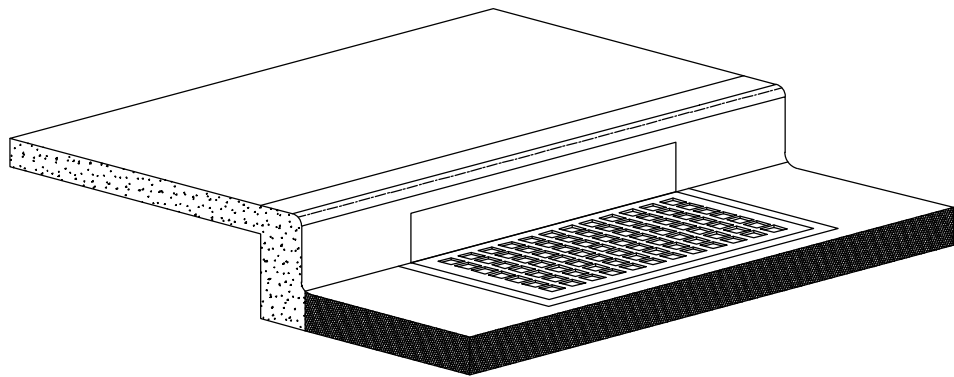
NO SCALE

32ND AVE W & 5TH ST W
RRFBS & MEDIAN REFUGE

GENERAL DETAILS



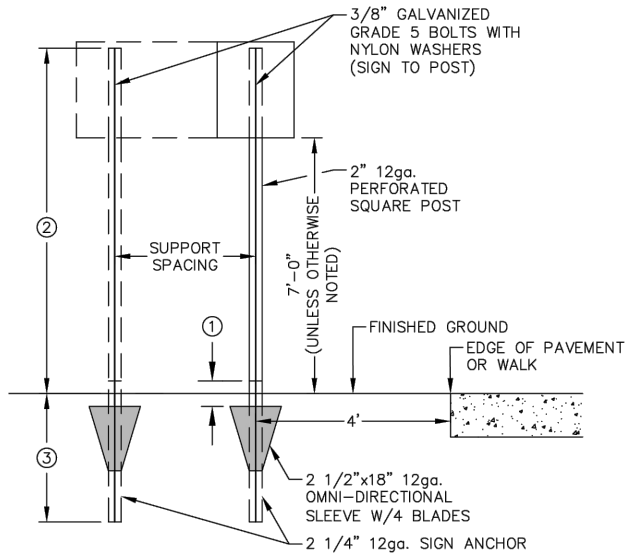
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TMACR-8-992(059)	20	2



- NOTES**
- INLET PROTECTION SHALL BE MAINTAINED BY THE CONTRACTOR THROUGHOUT THE PROJECT.
 - MANUFACTURED ALTERNATIVES APPROVED AND LISTED ON THE MINNESOTA DEPARTMENT OF TRANSPORTATION'S EROSION CONTROL PRODUCT ACCEPTABILITY LIST MAY BE SUBSTITUTED.
 - WHEN REMOVING OR MAINTAINING INLET PROTECTION, CARE SHALL BE TAKEN SO THAT THE SEDIMENT TRAPPED ON THE GEOTEXTILE FABRIC DOESN NOT FALL INTO THE INLET. ANY MATERIAL FALLING INTO THE INLET SHALL BE REMOVED IMMEDIATELY.
- INSTALLATION NOTES:**
- PLACE DEVICE TIGHTLY AGAINST DRAIN OPENING AND COVER ENTIRE GRATE. THE DEVICE SHOULD EXTEND AT LEAST 2 INCHES PAST GRATE TOWARD STREET.
 - OVERLAP THE SEGMENTS AT LONGER OPENINGS.
 - ANCHOR THE DEVICE SO THAT WATER CANNOT FLOW BEHIND IT.

INLET PROTECTION-CURB GRATE

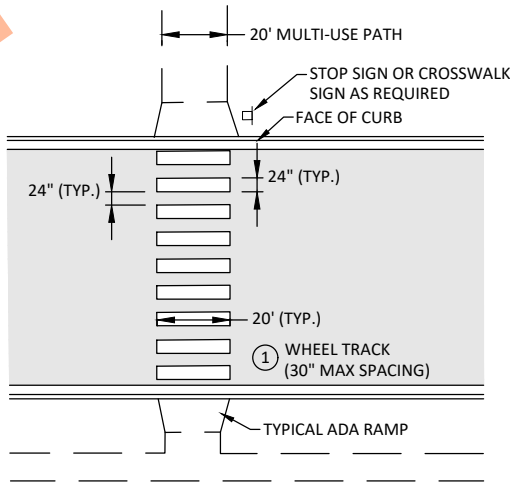
NO SCALE



- POST AND ANCHOR OVERLAP INSIDE OF OMNI-DIRECTIONAL SLEEVE SHALL BE A MINIMUM OF 6"..
- POST.
- 4' ANCHOR.
- REFER TO NDDOT STANDARD DRAWING D-754-24 FOR SIGN POST MOUNTING DETAILS ON PERFORATED TUBE ANCHOR AND SLEEVE.
- REFER TO NDDOT STANDARD DRAWING D-754-24 FOR SURFACE MOUNT BASE DETAIL. USE WHERE APPLICABLE (i.e. MEDIANS).
- STANDARD ROADWAY SIGNS: 84".
ACCESSIBLE PARKING: 60" MIN. - 66" MAX.
MULTI-USE PATH: 48" MIN. - 60" MAX.
OTHERS: 48" MIN. - 84" MAX.

SIGN PLACEMENT - PAVEMENT & WALK

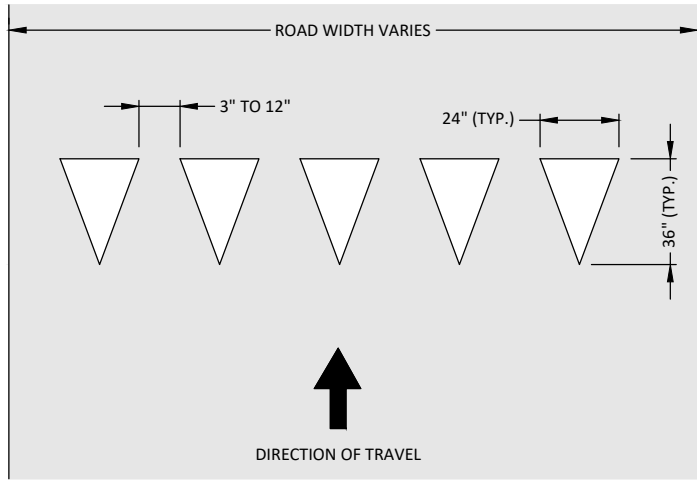
NO SCALE



- NOTE:**
- SPACE CROSSWALK OPENING SUCH THAT THEY CORRESPOND WITH EXISTING WHEEL TRACKS IF POSSIBLE.

CROSSWALK STRIPING

NO SCALE



- NOTE:**
- TRIANGLE HEIGHT IS EQUAL TO 1.5 TIMES THE DIMENSION.

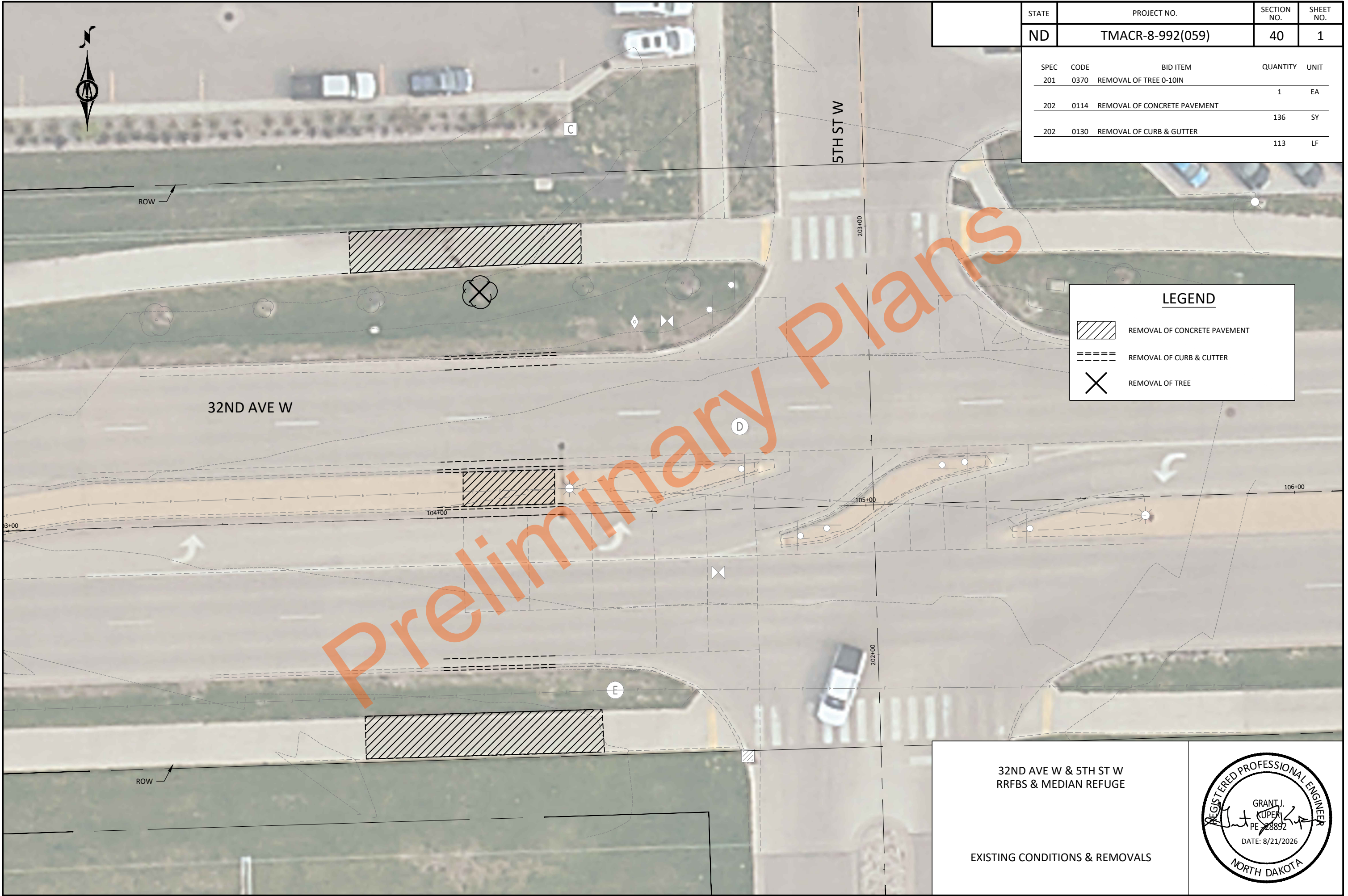
YIELD LINE LAYOUT

NO SCALE

32ND AVE W & 5TH ST W
RRFBS & MEDIAN REFUGE

GENERAL DETAILS





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TMACR-8-992(059)	40	1
SPEC	CODE	BID ITEM	QUANTITY	UNIT
201	0370	REMOVAL OF TREE 0-10IN	1	EA
202	0114	REMOVAL OF CONCRETE PAVEMENT	136	SY
202	0130	REMOVAL OF CURB & GUTTER	113	LF

LEGEND

REMOVAL OF CONCRETE PAVEMENT

REMOVAL OF CURB & CUTTER

32ND AVE W & 5TH ST W
RRFBS & MEDIAN REFUGE

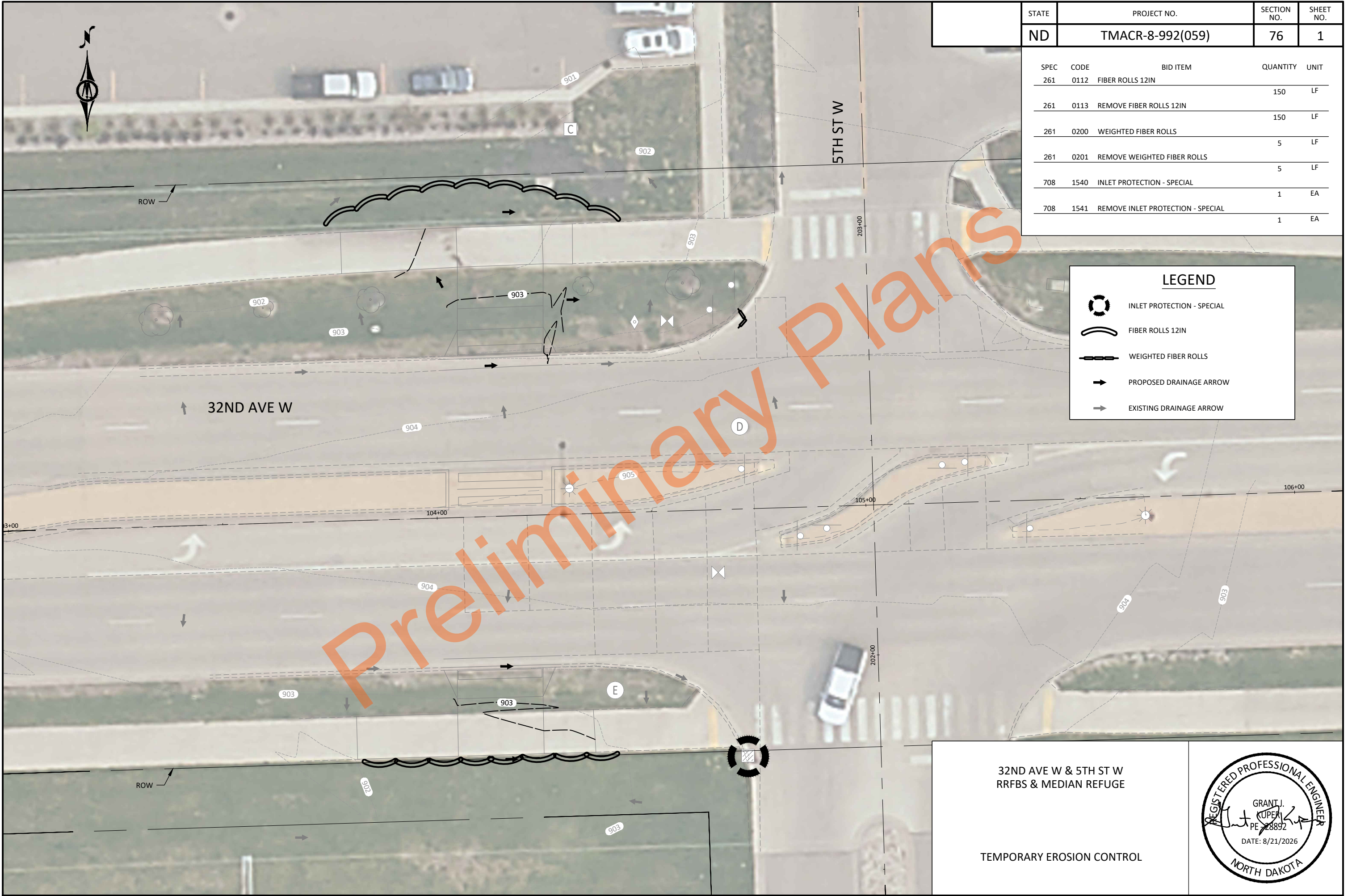
EXISTING CONDITIONS & REMOVALS

REGISTERED PROFESSIONAL ENGINEER

GRANT J. KUPER
PE 28892

DATE: 8/21/2026

NORTH DAKOTA



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TMACR-8-992(059)	76	1

SPEC	CODE	BID ITEM	QUANTITY	UNIT
261	0112	FIBER ROLLS 12IN	150	LF
261	0113	REMOVE FIBER ROLLS 12IN	150	LF
261	0200	WEIGHTED FIBER ROLLS	5	LF
261	0201	REMOVE WEIGHTED FIBER ROLLS	5	LF
708	1540	INLET PROTECTION - SPECIAL	1	EA
708	1541	REMOVE INLET PROTECTION - SPECIAL	1	EA

LEGEND

INLET PROTECTION - SPECIAL

FIBER ROLLS 12IN

WEIGHTED FIBER ROLLS

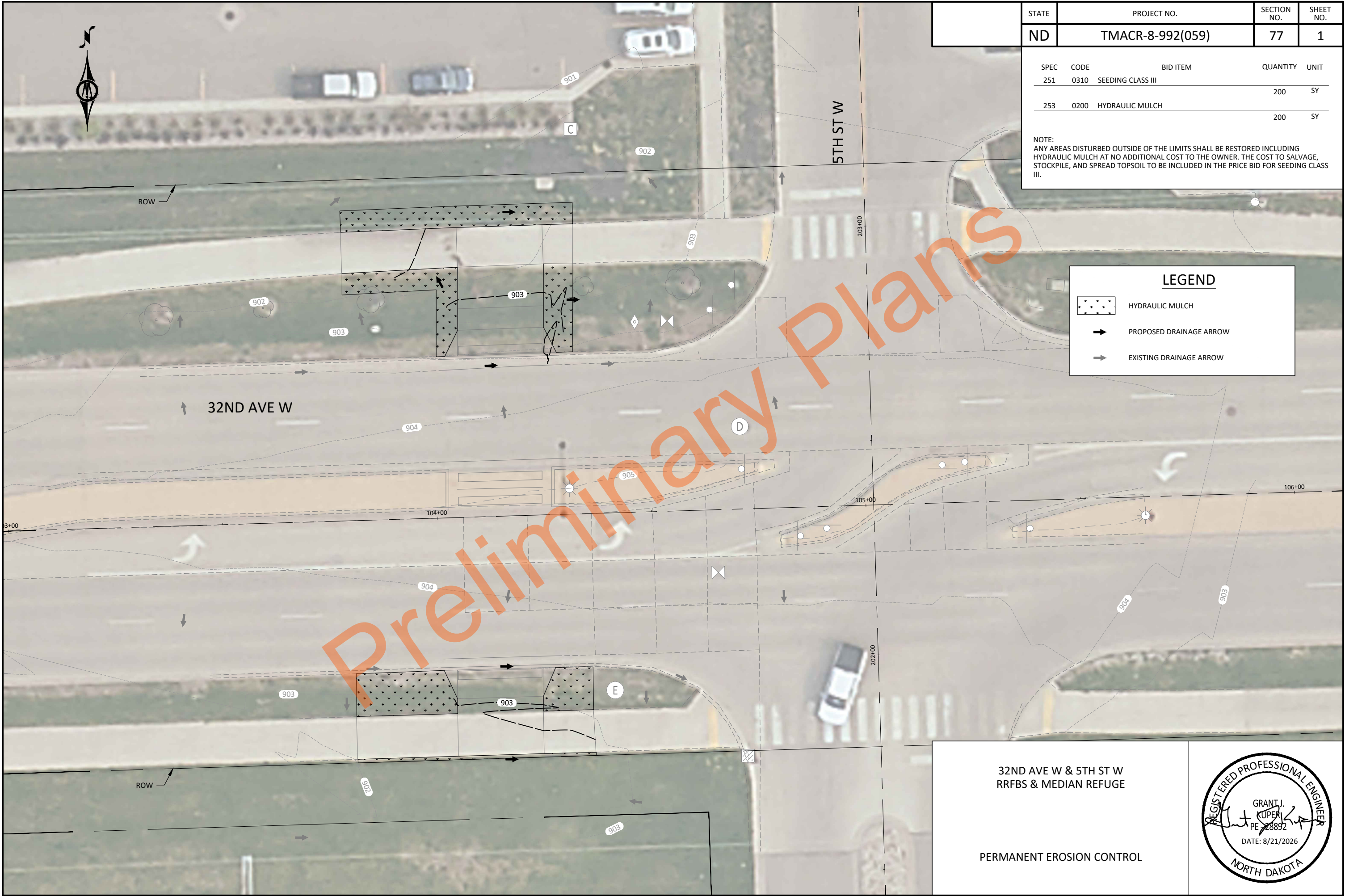
PROPOSED DRAINAGE ARROW

EXISTING DRAINAGE ARROW

32ND AVE W & 5TH ST W
RRFBS & MEDIAN REFUGE

TEMPORARY EROSION CONTROL





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TMACR-8-992(059)	77	1

SPEC	CODE	BID ITEM	QUANTITY	UNIT
251	0310	SEEDING CLASS III	200	SY
253	0200	HYDRAULIC MULCH	200	SY

NOTE:
ANY AREAS DISTURBED OUTSIDE OF THE LIMITS SHALL BE RESTORED INCLUDING HYDRAULIC MULCH AT NO ADDITIONAL COST TO THE OWNER. THE COST TO SALVAGE, STOCKPILE, AND SPREAD TOPSOIL TO BE INCLUDED IN THE PRICE BID FOR SEEDING CLASS III.

LEGEND

HYDRAULIC MULCH

PROPOSED DRAINAGE ARROW

EXISTING DRAINAGE ARROW

32ND AVE W & 5TH ST W
RRFBS & MEDIAN REFUGE

PERMANENT EROSION CONTROL



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TMACR-8-992(059)	100	1

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
E5-1-48	48"x48"	EXIT GORE		35	
G20-1-60	60"x24"	ROAD WORK NEXT ___ MILES		28	
G20-1b-60	60"x24"	NO WORK IN PROGRESS (Sign and installation only)		18	
G20-2-48	48"x24"	END ROAD WORK	4	26	104
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	1	35	35
R4-1-48	48"x60"	DO NOT PASS		39	
R4-7-48	48"x60"	KEEP RIGHT		39	
R5-1-48	48"x48"	DO NOT ENTER		35	
R6-1-54	54"x18"	ONE WAY RIGHT or LEFT (Mounted on STOP or DO NOT ENTER post)		14	
R7-1-12	12"x18"	NO PARKING ANY TIME		11	
R9-9-24	24"x12"	SIDEWALK CLOSED (Mounted on barricade)	2	3	6
R9-10-24	24"x12"	SIDEWALK CLOSED USE OTHER SIDE (Mounted on barricade)	2	3	6
R10-6-24	24"x36"	STOP HERE ON RED		16	
R11-2-48	48"x30"	ROAD CLOSED (Mounted on barricade)		12	
R11-2a-48	48"x30"	STREET CLOSED (Mounted on barricade)		12	
R11-3a-60	60"x30"	ROAD CLOSED ___ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-3c-60	60"x30"	STREET CLOSED ___ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC (Mounted on barricade)		15	
W1-3-48	48"x48"	REVERSE TURN RIGHT or LEFT		35	
W1-4-48	48"x48"	REVERSE CURVE RIGHT or LEFT		35	
W1-4b-48	48"x48"	TWO LANE REVERSE CURVE RIGHT or LEFT		35	
W1-6-48	48"x24"	ONE DIRECTION LARGE ARROW		26	
W3-1-48	48"x48"	STOP AHEAD		35	
W3-3-48	48"x48"	SIGNAL AHEAD		35	
W3-4-48	48"x48"	BE PREPARED TO STOP		35	
W3-5-48	48"x48"	SPEED REDUCTION AHEAD		35	
W4-2-48	48"x48"	LANE ENDS RIGHT or LEFT	2	35	70
W5-1-48	48"x48"	ROAD NARROWS		35	
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE		35	
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW		35	
W6-3-48	48"x48"	TWO WAY TRAFFIC		35	
W8-1-48	48"x48"	BUMP		35	
W8-3-48	48"x48"	PAVEMENT ENDS		35	
W8-7-48	48"x48"	LOOSE GRAVEL		35	
W8-11-48	48"x48"	UNEVEN LANES		35	
W8-12-48	48"x48"	NO CENTER LINE		35	
W8-17-48	48"x48"	SHOULDER DROP-OFF SYMBOL		35	
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY		35	
W8-54-48	48"x48"	TRUCKS ENTERING AHEAD or ___ FT or ___ MILE		35	
W8-55-48	48"x48"	TRUCKS CROSSING AHEAD or ___ FT or ___ MILE		35	
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY		35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL		35	
W13-1P-30	30"x30"	___ MPH ADVISORY SPEED PLAQUE (Mounted on warning sign post)		14	
W14-3-64	64"x48"	NO PASSING ZONE		28	

[illegible][illegible]

SPEC & CODE			
704-1000	TRAFFIC CONTROL SIGNS	TOTAL UNITS	581

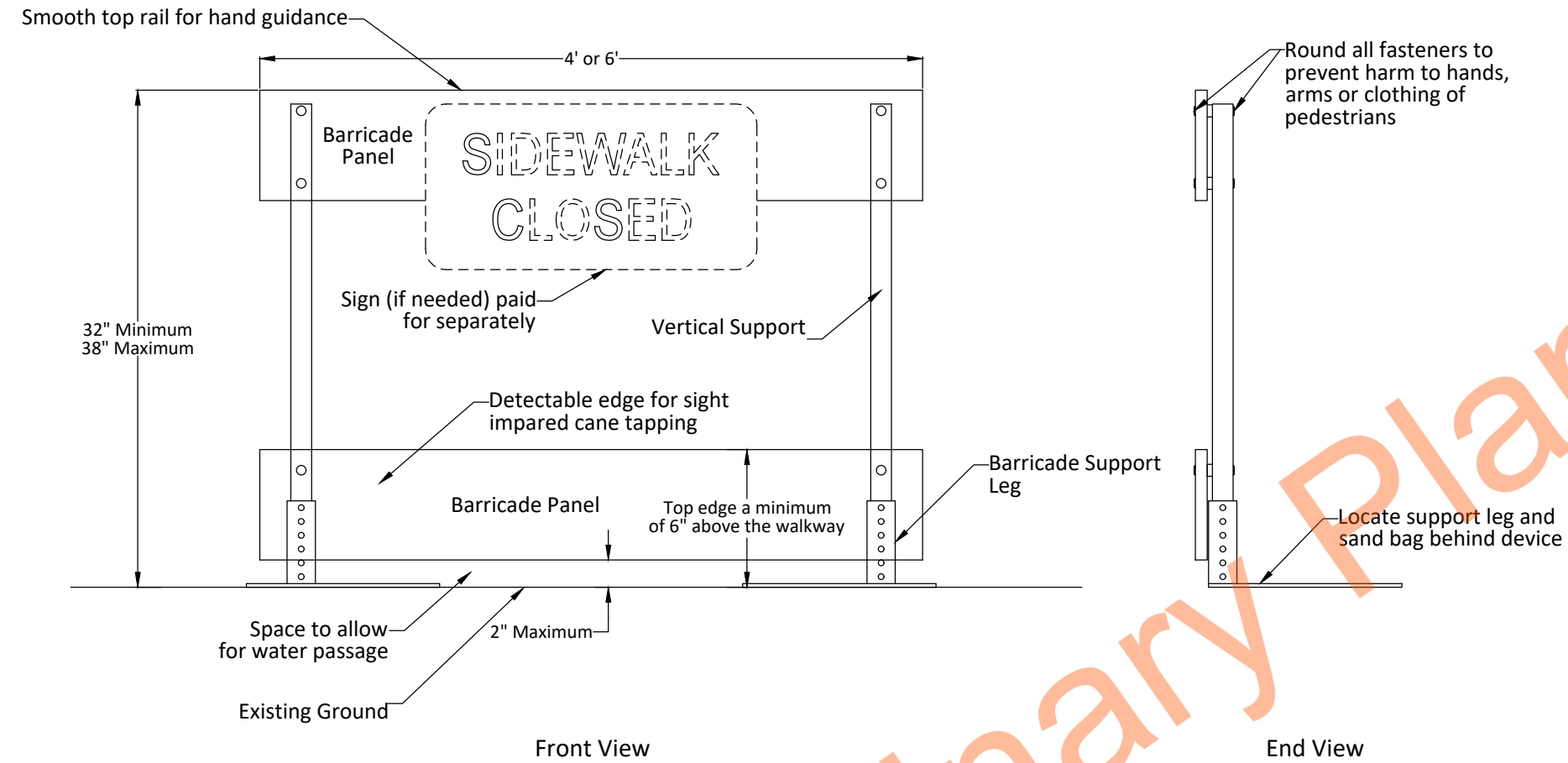
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NOTE:
If additional signs are required, units will be calculated using the formula from Section III-18.06 of the Design Manual.
<http://www.dot.nd.gov/>



Traffic Control Devices List

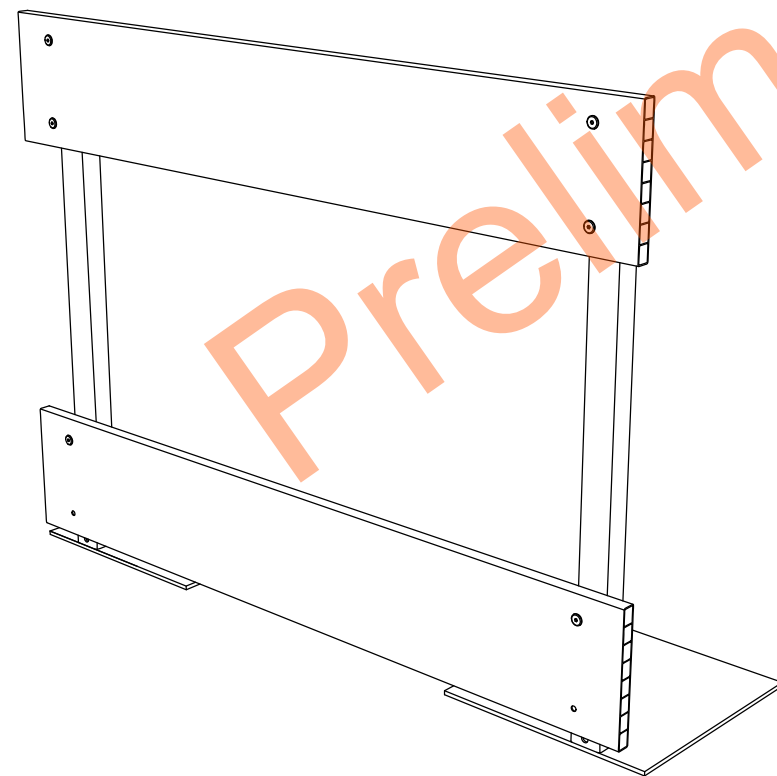
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TMACR-8-992(059)	100	2



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".

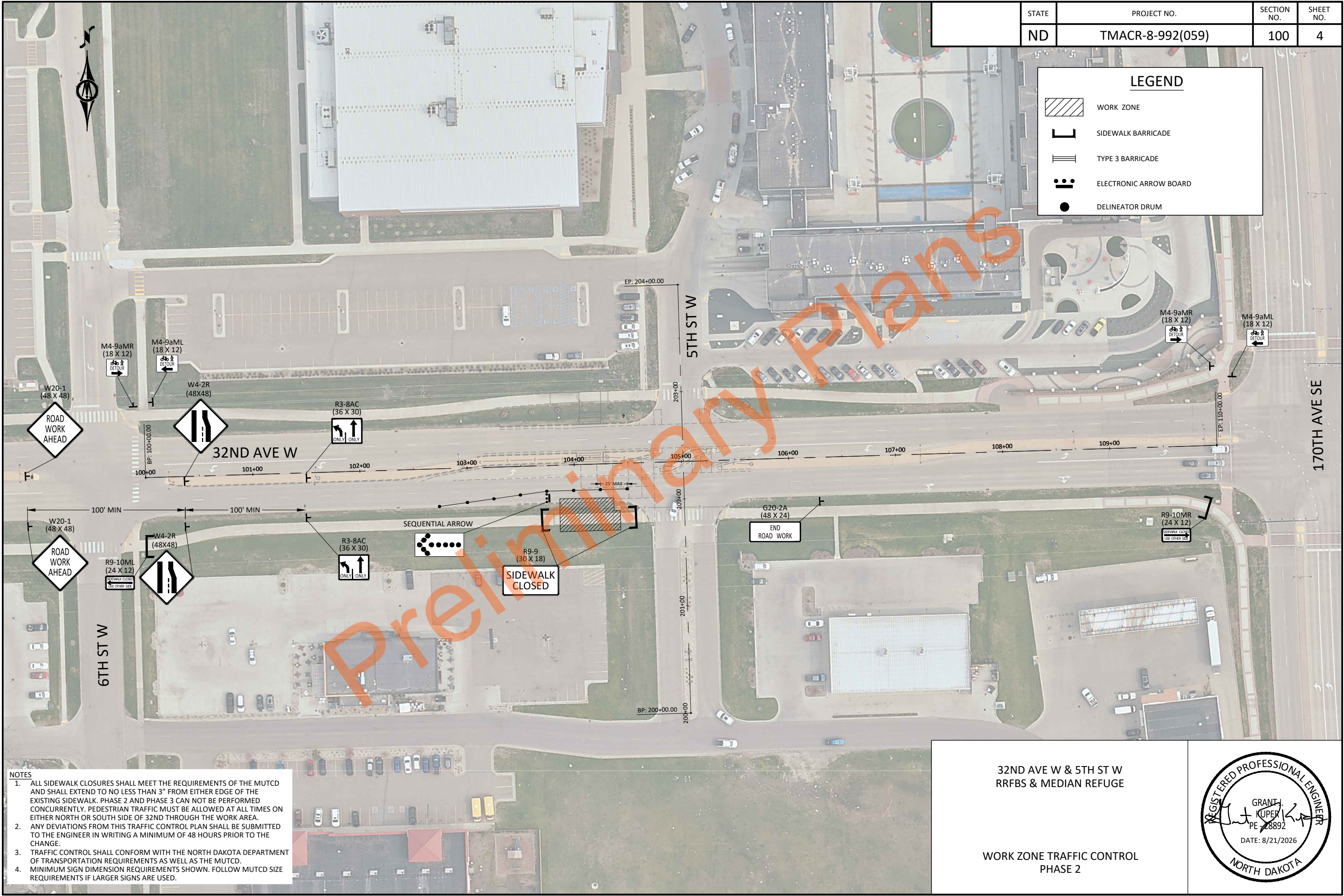


Perspective View

32ND AVE W & 5TH ST W
RRFBS & MEDIAN REFUGE

SIDEWALK BARRICADE





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TMACR-8-992(059)	100	4

LEGEND

WORK ZONE

SIDEWALK BARRICADE

TYPE 3 BARRICADE

ELECTRONIC ARROW BOARD

DELINEATOR DRUM

- NOTES
1.

ALL SIDEWALK CLOSURES SHALL MEET THE REQUIREMENTS OF THE MUTCD AND SHALL EXTEND TO NO LESS THAN 3" FROM EITHER EDGE OF THE EXISTING SIDEWALK. PHASE 2 AND PHASE 3 CAN NOT BE PERFORMED CONCURRENTLY. PEDESTRIAN TRAFFIC MUST BE ALLOWED AT ALL TIMES ON EITHER NORTH OR SOUTH SIDE OF 32ND THROUGH THE WORK AREA.
2.
- ANY DEVIATIONS FROM THIS TRAFFIC CONTROL PLAN SHALL BE SUBMITTED TO THE ENGINEER IN WRITING A MINIMUM OF 48 HOURS PRIOR TO THE CHANGE.

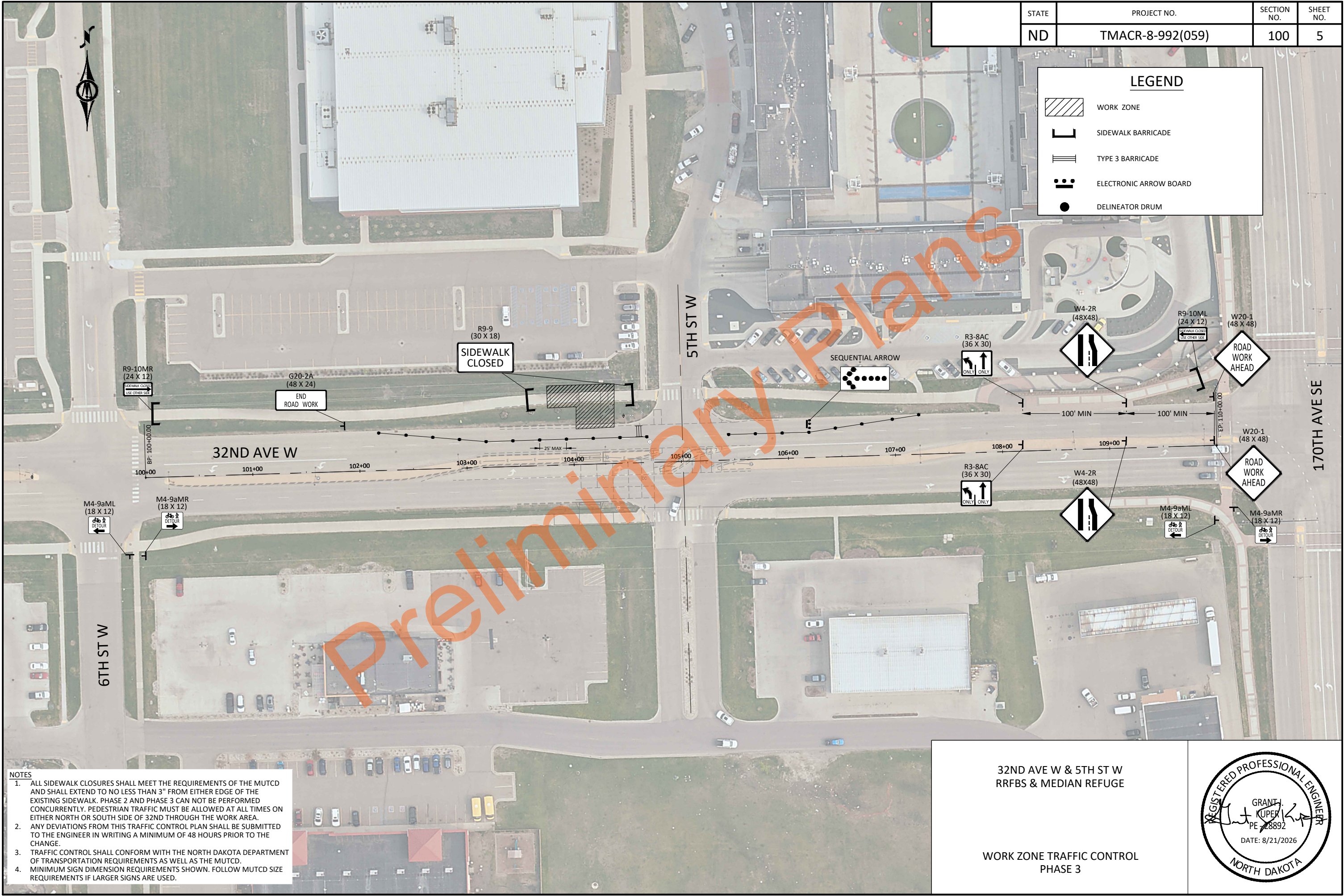
3.

4.

32ND AVE W & 5TH ST W
RRFBS & MEDIAN REFUGE

WORK ZONE TRAFFIC CONTROL
PHASE 2





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TMACR-8-992(059)	100	5

LEGEND

WORK ZONE

SIDEWALK BARRICADE

TYPE 3 BARRICADE

ELECTRONIC ARROW BOARD

DELINEATOR DRUM

- NOTES
1.

ALL SIDEWALK CLOSURES SHALL MEET THE REQUIREMENTS OF THE MUTCD AND SHALL EXTEND TO NO LESS THAN 3" FROM EITHER EDGE OF THE EXISTING SIDEWALK. PHASE 2 AND PHASE 3 CAN NOT BE PERFORMED CONCURRENTLY. PEDESTRIAN TRAFFIC MUST BE ALLOWED AT ALL TIMES ON EITHER NORTH OR SOUTH SIDE OF 32ND THROUGH THE WORK AREA.
2.
- ANY DEVIATIONS FROM THIS TRAFFIC CONTROL PLAN SHALL BE SUBMITTED TO THE ENGINEER IN WRITING A MINIMUM OF 48 HOURS PRIOR TO THE CHANGE.

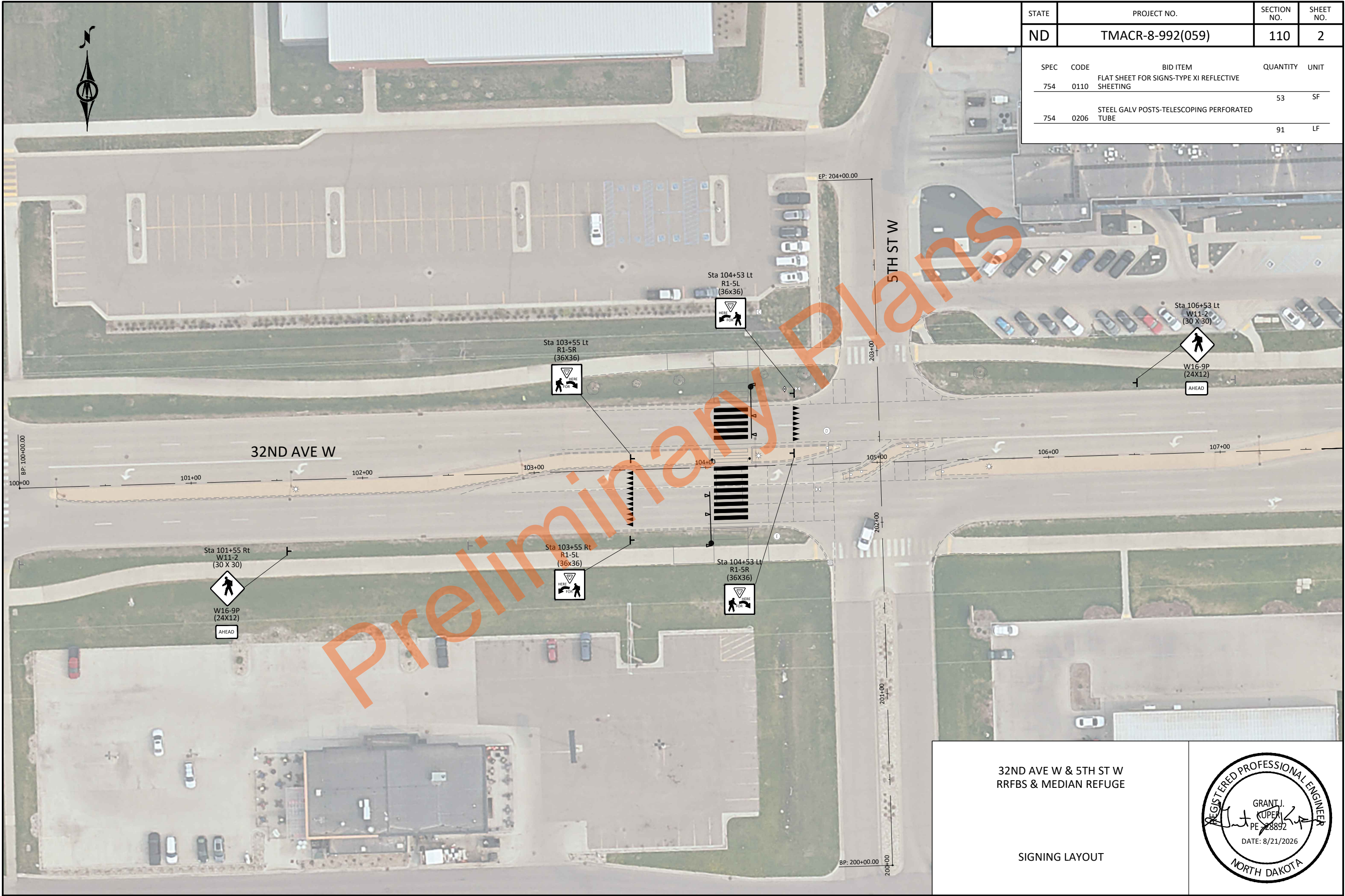
3.

4.

32ND AVE W & 5TH ST W
RRFBS & MEDIAN REFUGE

WORK ZONE TRAFFIC CONTROL
PHASE 3



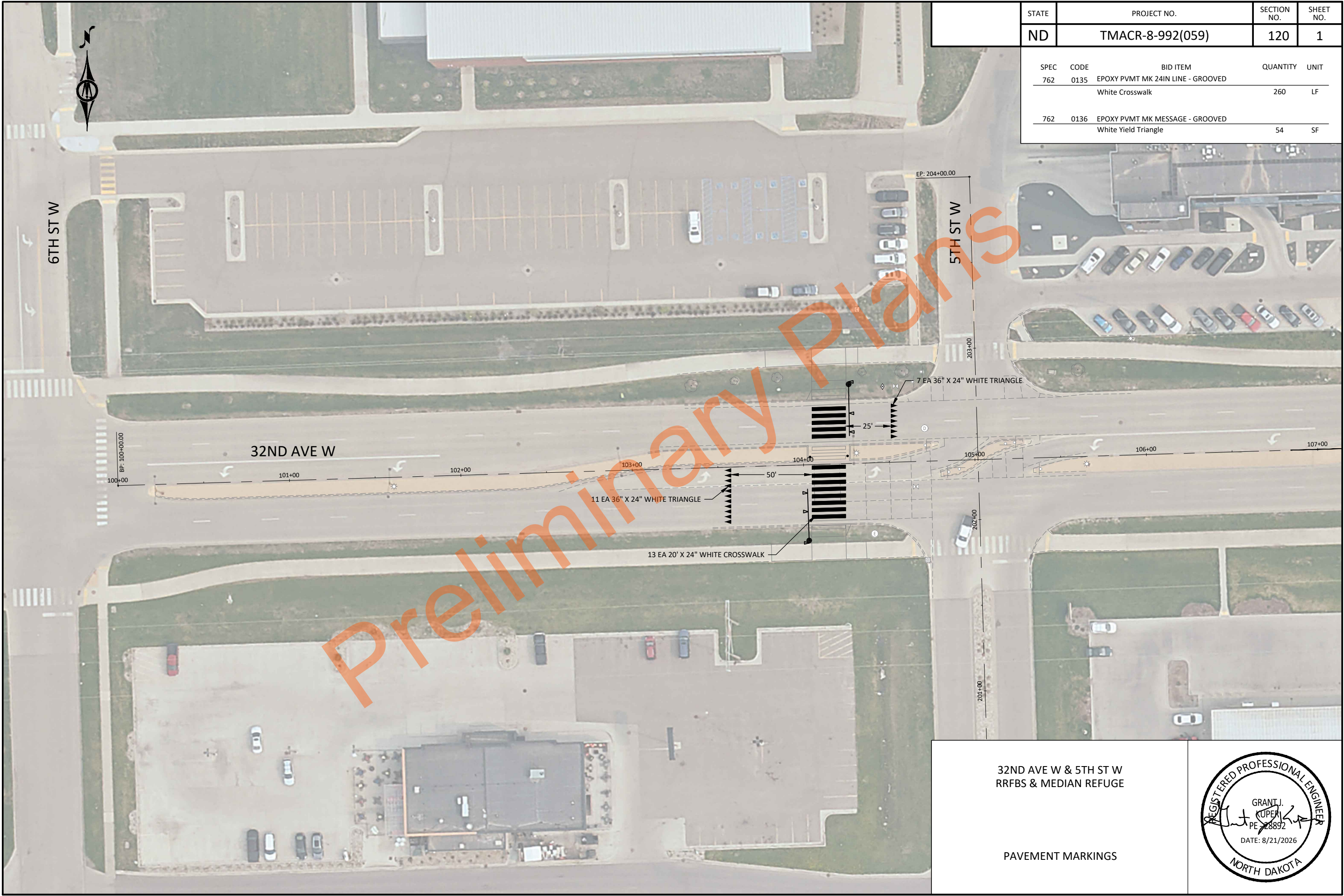


		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	TMACR-8-992(059)	110	2
SPEC	CODE	BID ITEM		QUANTITY	UNIT
754	0110	FLAT SHEET FOR SIGNS-TYPE XI REFLECTIVE SHEETING		53	SF
754	0206	STEEL GALV POSTS-TELESCOPING PERFORATED TUBE		91	LF

32ND AVE W & 5TH ST W
RRFBS & MEDIAN REFUGE

SIGNING LAYOUT





		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	TMACR-8-992(059)	120	1
SPEC	CODE	BID ITEM		QUANTITY	UNIT
762	0135	EPOXY PVMT MK 24IN LINE - GROOVED			
		White Crosswalk		260	LF
762	0136	EPOXY PVMT MK MESSAGE - GROOVED			
		White Yield Triangle		54	SF

32ND AVE W & 5TH ST W
RRFBS & MEDIAN REFUGE

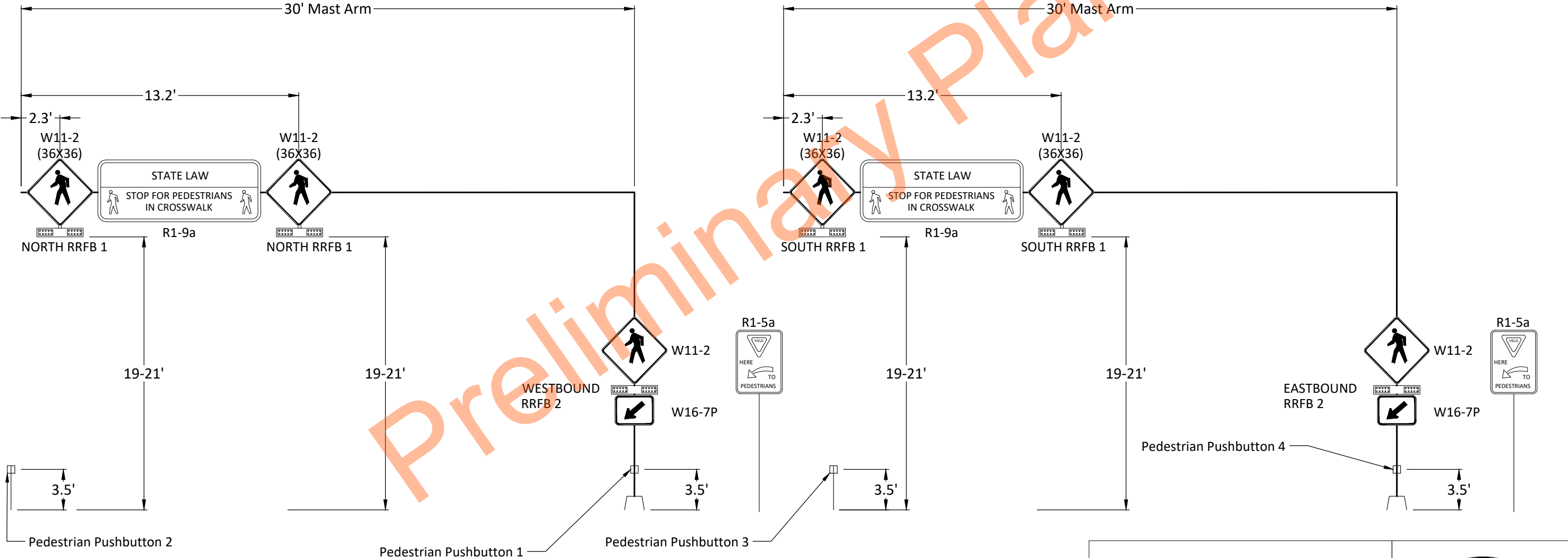
PAVEMENT MARKINGS



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TMACR-8-992(059)	150	1

Westbound Pedestrian
Std. RRFB

Eastbound Pedestrian
Std. RRFB

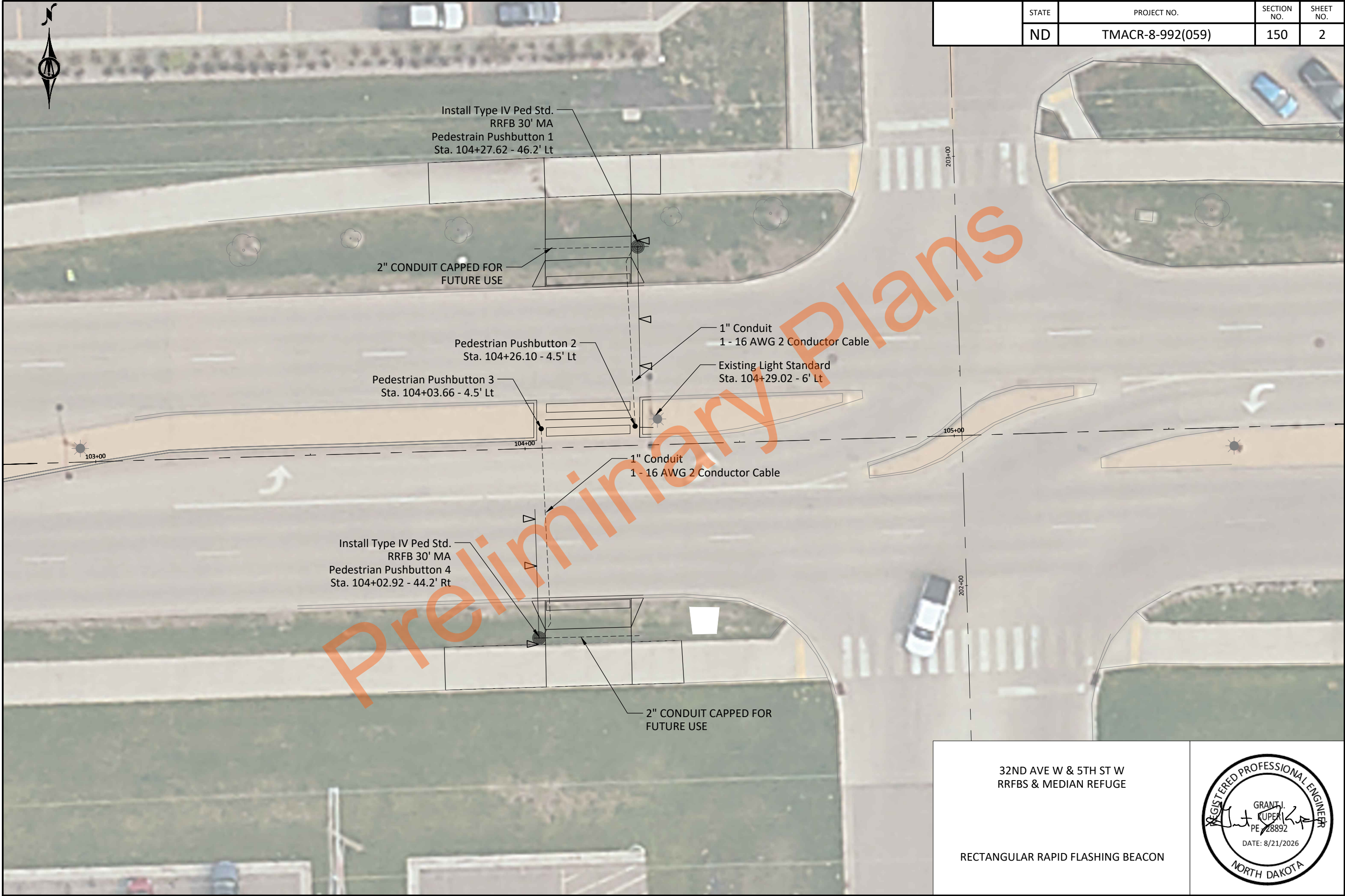


32ND AVE W & 5TH ST W
RRFBS & MEDIAN REFUGE

RECTANGULAR RAPID FLASHING BEACON

REGISTERED PROFESSIONAL ENGINEER
GRANT L. RUPPE
PE 28892
DATE: 8/21/2026
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TMACR-8-992(059)	150	2

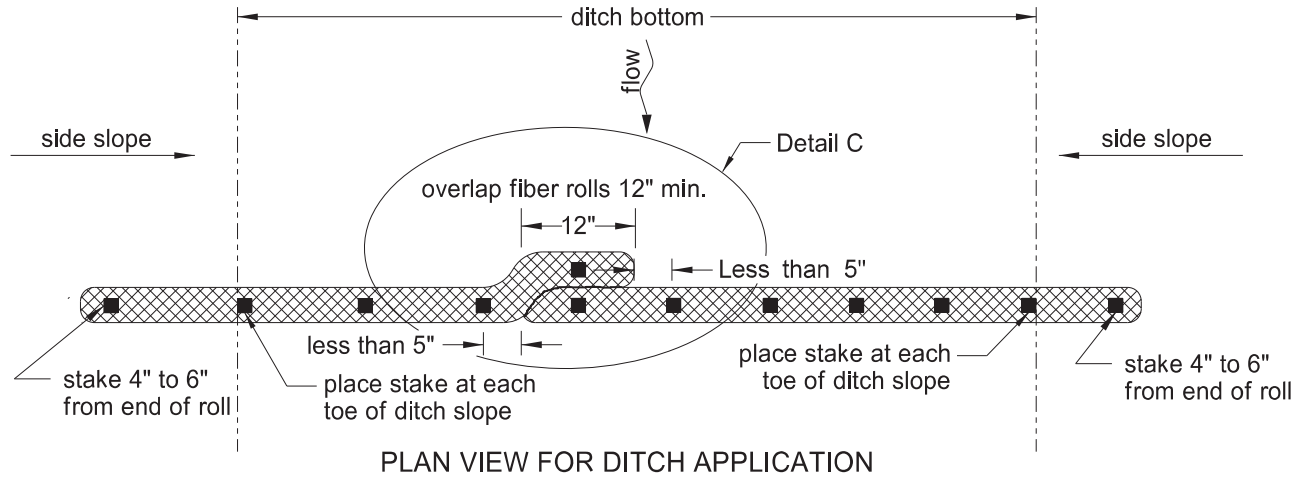


32ND AVE W & 5TH ST W
RRFBS & MEDIAN REFUGE

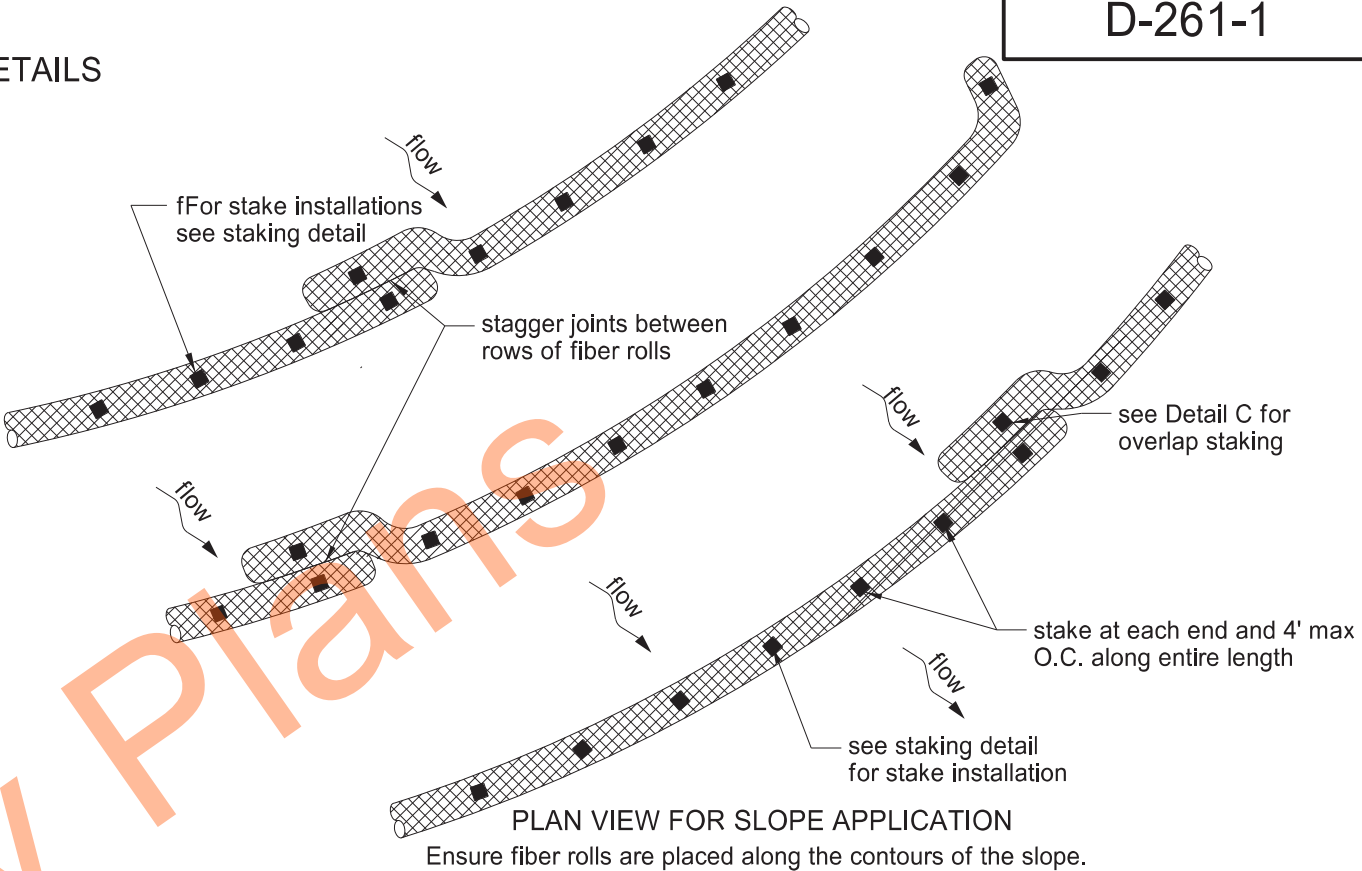
RECTANGULAR RAPID FLASHING BEACON



EROSION CONTROL
FIBER ROLL PLACEMENT DETAILS

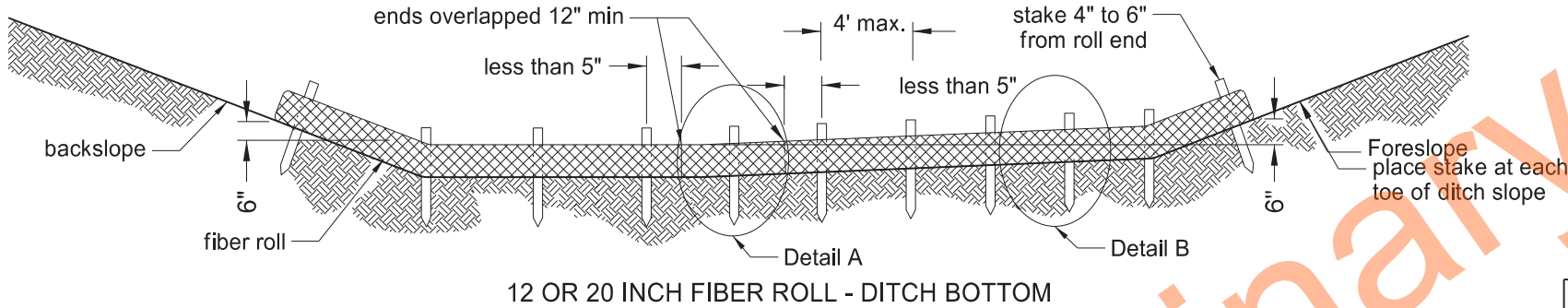


PLAN VIEW FOR DITCH APPLICATION

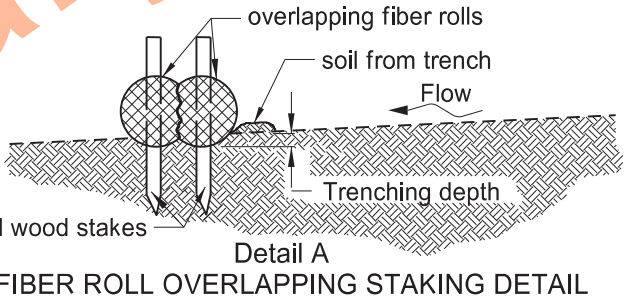


PLAN VIEW FOR SLOPE APPLICATION

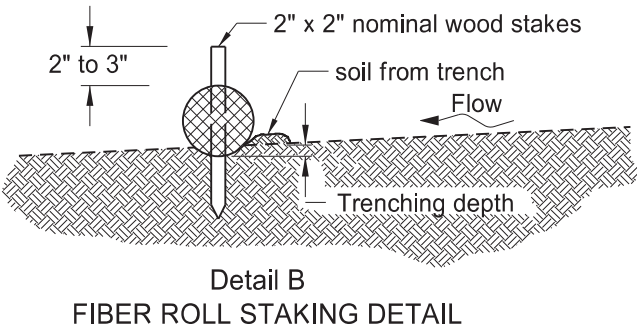
Ensure fiber rolls are placed along the contours of the slope.



12 OR 20 INCH FIBER ROLL - DITCH BOTTOM

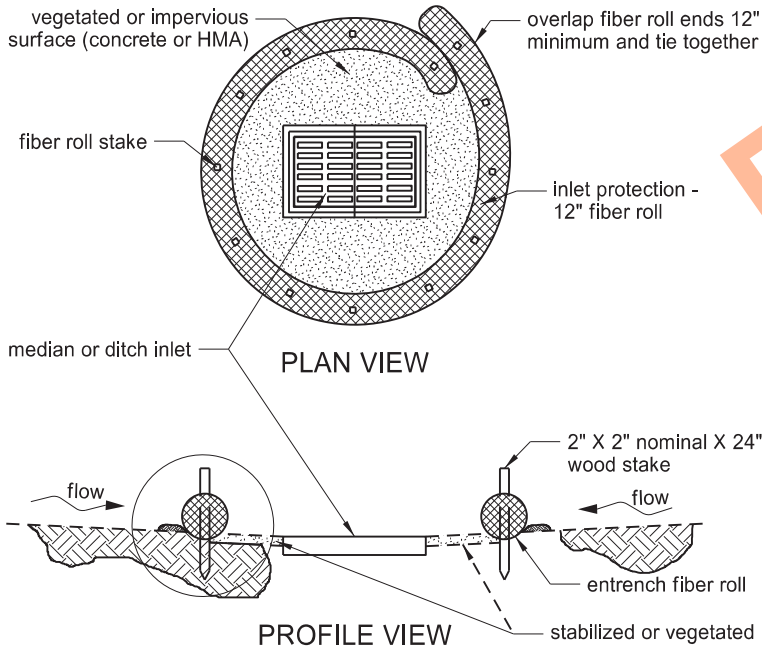


Detail A
FIBER ROLL OVERLAPPING STAKING DETAIL



Detail B
FIBER ROLL STAKING DETAIL

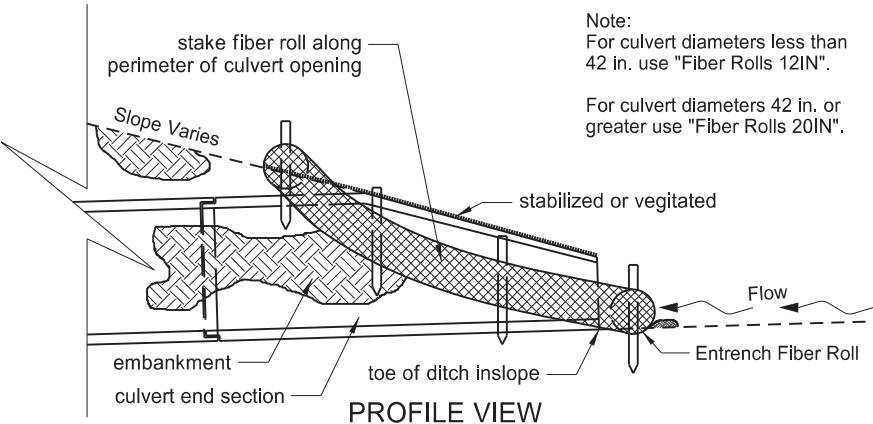
NOTE: Do not allow runoff to run under or around roll.



PLAN VIEW

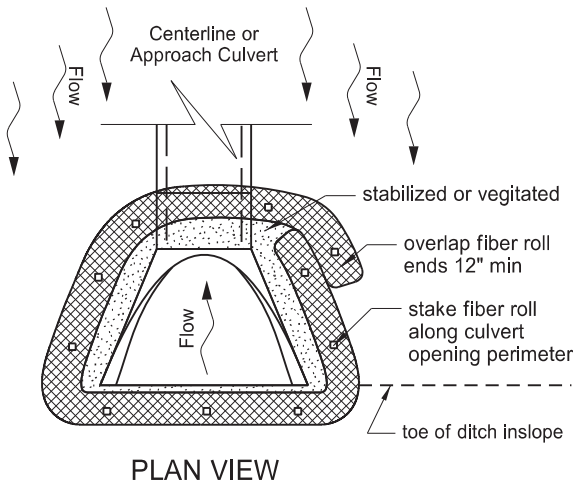
PROFILE VIEW

FIBER ROLL PROTECTION (MEDIAN OR DITCH INLET)



PROFILE VIEW

FIBER ROLL PROTECTION (INLET OF CULVERT)



PLAN VIEW

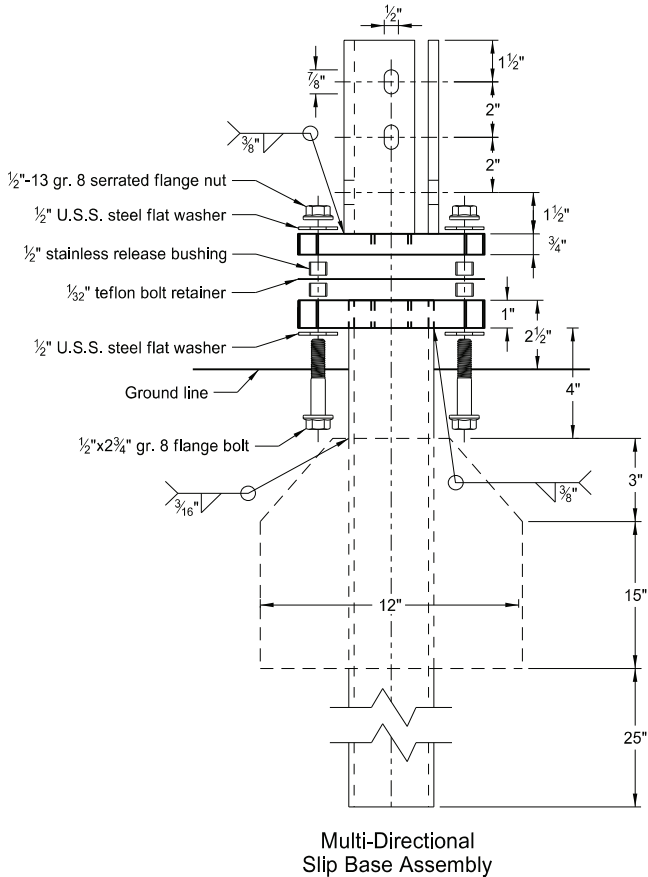
FIBER ROLL DIAMETER	NOMINAL STAKE SIZE	MINIMUM STAKE LENGTH	TRENCH DEPTH	
			MINIMUM	MAXIMUM
12"	2" x 2"	24"	2"	3"
20"	2" x 2"	36"	3"	5"

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-18-10	
REVISIONS	
DATE	CHANGE
06-10-13	Added plan view for ditch and slope application. Added table with values for stake and trench dimensions.
10-04-13	Revised fiber roll overlap detail.
06-26-14	Changed standard drawing number from D-708-7 to D-261-1.
08-27-19	New Design Engineer PE Stamp.
04-22-24	Slope Plan View-overlap change.
03-13-25	Added D-708-6 Culvert Inlet detail.
09-02-25	Added D-708-6 Inlet detail.

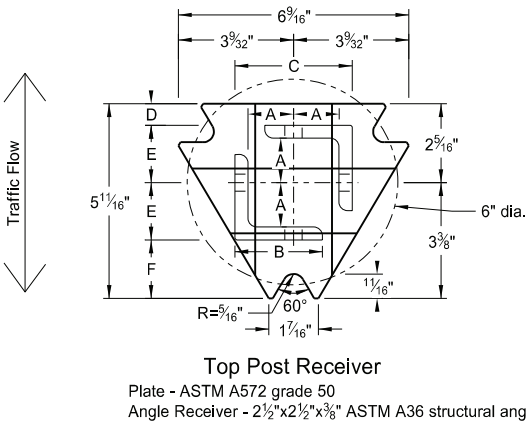


BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-7



Perforated Tube



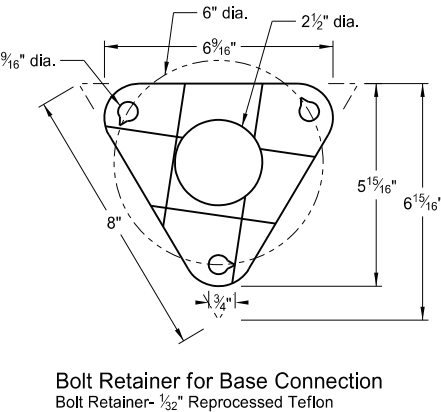
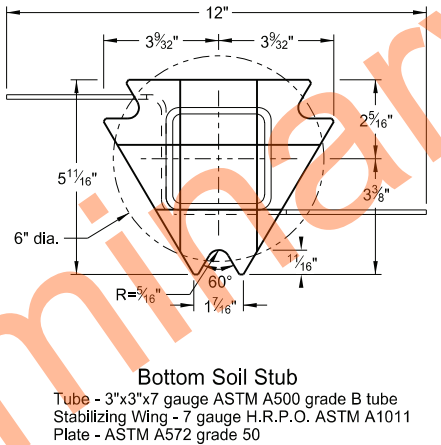
Notes:

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.

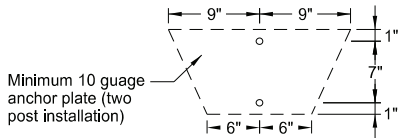
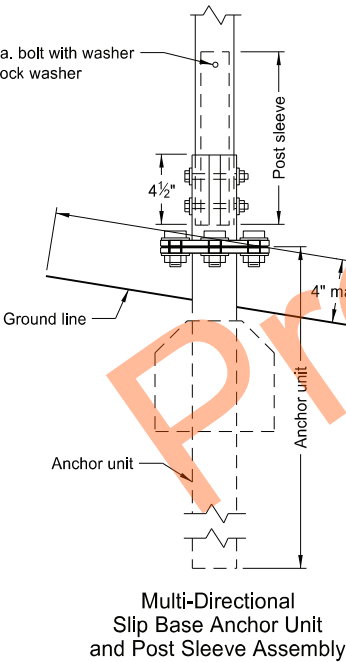
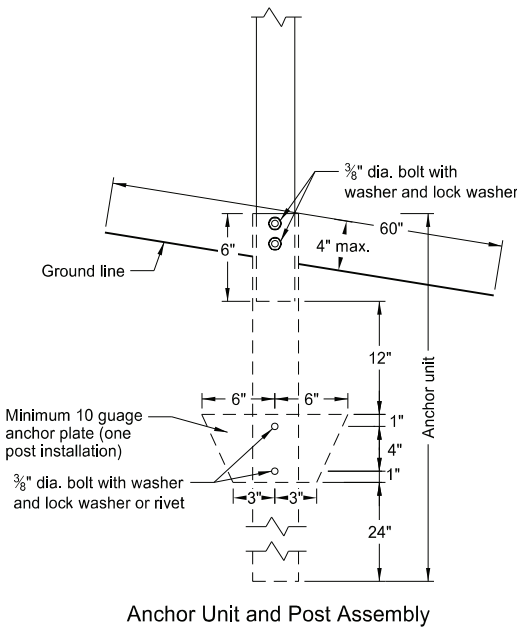
Telescoping Perforated Tube						
Number of Posts	Post Size in.	Wall Thickness Gauge	Sleeve Size in.	Wall Thickness Gauge	Slip Base	Anchor Size without Slip Base in.
1	2	12			No	2 1/4
1	2 1/4	12			No	2 1/2
1	2 1/2	12			(A)	3
1	2 1/2	10			Yes	
1	2 1/4	12	2	12	Yes	
1	2 1/2	12	2 1/4	12	Yes	
2	2	12			No	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	
2	2 1/2	12	2 1/4	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 1/32"	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

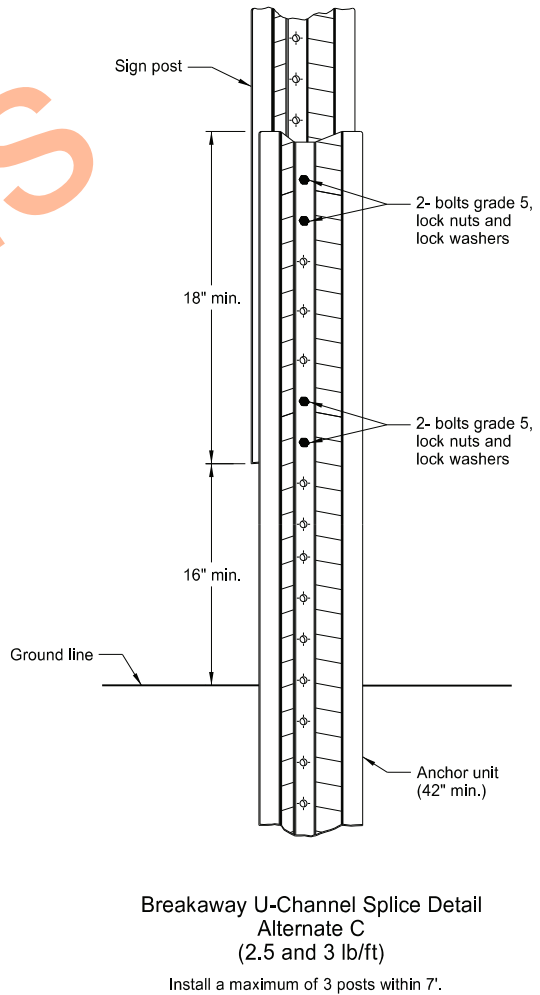
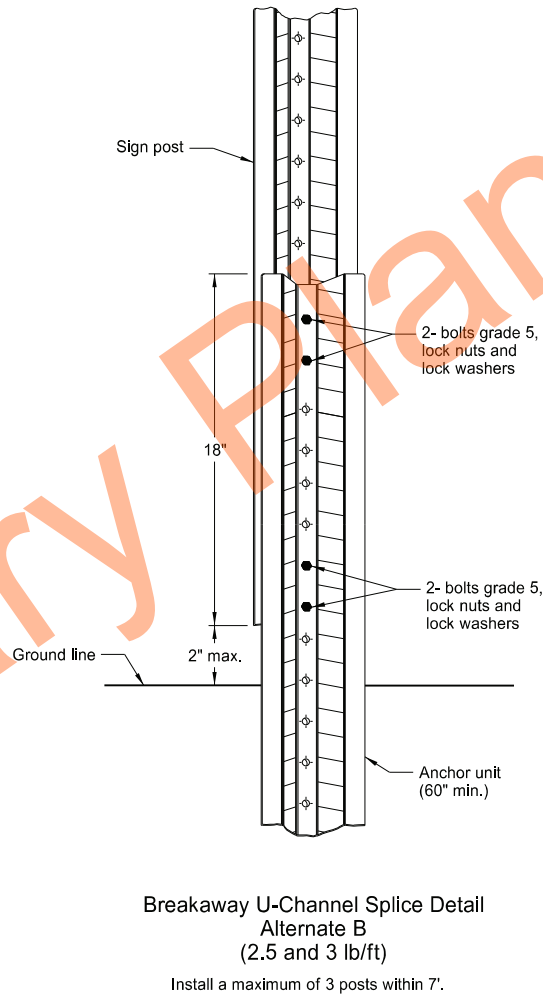
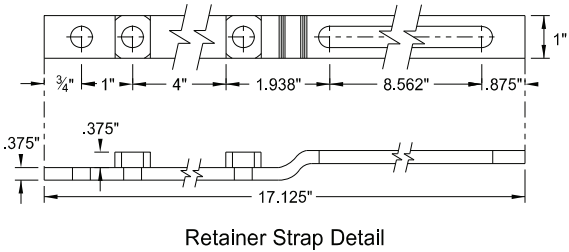
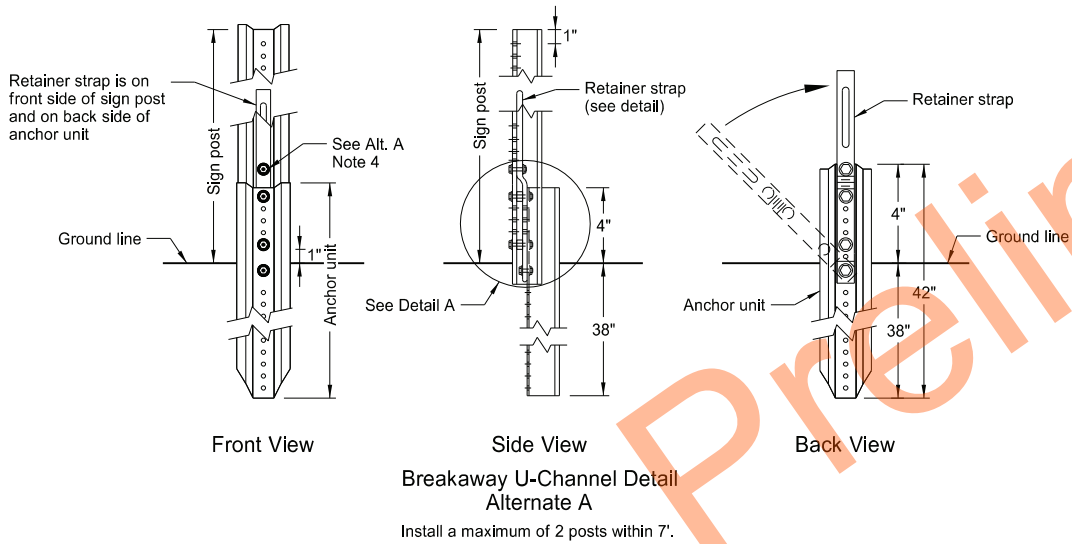
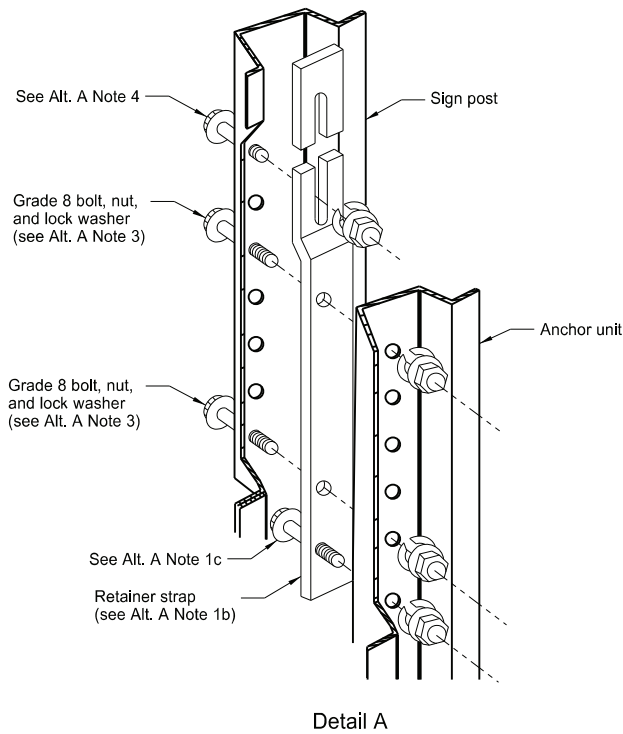


08/01/24

BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

U-Channel Post



Alternate A Steps of Installation:

- Drive anchor unit to within 12" of ground level.
 - Establish proper assembly by lining up bottom hole of retainer strap with 6th hole from the top of the anchor unit.
 - Assemble strap to back of anchor unit using 5/16"x2" bolt, lock washer and nut.
 - Rotate strap 90° to left.
- Drive anchor unit to 4" above ground.
 - Rotate strap to vertical position.
- 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.
 - Alternately tighten two connector bolts.
- Complete assembly by tightening 5/16"x2" bolt (this fastens sign post to retainer strap).
- 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

Technical drawing of a rectangular traffic sign with dimensions and mounting details. The sign is white with a black border and contains the text "ROAD WORK" in large, bold, black capital letters, and "NEXT XX MILES" in smaller, bold, black capital letters below it. The dimensions are as follows:

- Overall width: 60"
- Overall height: 24"
- Top mounting holes: 3 3/4" from the top edge, 6" center-to-center, 4 1/2" from the bottom edge, and 3 3/4" from the bottom edge.
- Text "ROAD WORK" is 19" wide and 19" high.
- Text "NEXT XX MILES" is 24 3/16" wide and 24 1/4" high.
- Mounting holes on the left side: 3/8" and 5/8" from the left edge.
- Corner radius: R 1 1/2"
- Part number: G20-1-60

Technical drawing of a rectangular sign with rounded corners. The sign has a black border and the text "NO WORK IN PROGRESS" in bold, black, sans-serif capital letters. The dimensions are as follows:

- Overall width: 60"
- Distance from left edge to center of "NO": 15¹⁵/₁₆"
- Distance from center of "NO" to center of "IN": 22⁹/₁₆"
- Distance from center of "IN" to right edge: 22⁹/₁₆"
- Overall height: 24"
- Distance from top edge to center of "NO": 3³/₄"
- Distance from center of "NO" to center of "IN": 6"
- Distance from center of "IN" to bottom edge: 4¹/₂"
- Distance from bottom edge to center of "IN": 6"
- Distance from bottom edge to center of "IN": 3³/₄"
- Left side dimensions: 3⁸/₁₆" (top), 5⁶/₁₆" (bottom), and R 1¹/₂" (corner radius).

Technical drawing of a rectangular road sign with dimensions and text. The sign is oriented horizontally and contains the following text and graphics:

- Top Text:** "ROAD WORK" in large, bold, sans-serif capital letters.
- Bottom Text:** "NEXT XX MILES" in large, bold, sans-serif capital letters, repeated on both the left and right sides.
- Left Arrow:** A large, solid black arrow pointing left, positioned between the two "NEXT XX MILES" text blocks.
- Right Arrow:** A large, solid black arrow pointing right, positioned between the two "NEXT XX MILES" text blocks.

Dimensions (in inches):

- Overall Width:** 72"
- Overall Height:** 36"
- Top Margin:** 5"
- Bottom Margin:** 5"
- Left Margin:** 5/8" (top), 7/8" (bottom)
- Right Margin:** 5"
- Text and Arrow Spacing:**
 - Top text "ROAD WORK" is centered with a 19" gap from the left edge and a 19" gap from the right edge.
 - Bottom text "NEXT XX MILES" is centered with a 33" gap from the left edge and a 33" gap from the right edge.
 - Left arrow is 14 5/8" wide.
 - Right arrow is 14 5/8" wide.
 - Text "NEXT" is 15 7/16" wide.
 - Text "MILES" is 15 7/16" wide.
 - Text "XX" is 2 15/16" wide.

Other Labels:

- R 2 1/4"**: A dimension line indicating the radius of the bottom-left corner.
- G20-50a-72**: A label at the bottom center of the drawing.
- See ARROW DETAILS**: A label at the bottom right with a line pointing to the right arrow.

Technical drawing of a rectangular road sign with dimensions and callouts:

- Overall width: 72"
- Overall height: 24"
- Top mounting holes: 3/8" and 5/8" from the top edge.
- Text "ROAD WORK" in large, bold, sans-serif font.
- Text "NEXT XX MILES" in large, bold, sans-serif font.
- Right-pointing arrow with callout (A).
- Dimensions for text and arrow:
 - "ROAD WORK" width: 19" (each word).
 - "NEXT XX MILES" width: 33" (total), 15 7/16" (from "MILES" to arrow).
 - Arrow width: 14 5/8".
 - Arrow height: 2 15/16".
- Vertical dimensions on the right: 4 1/2" (top margin), 6"C (margin), 3" (margin), 6"C (margin), 4 1/2" (bottom margin).
- Bottom left corner radius: R 1 1/2".

Technical drawing of a rectangular sign with dimensions. The sign is 48" wide and 24" high. The text "END ROAD WORK" is centered. The word "END" is 19 1/4" wide, and "ROAD WORK" is 20" wide. The word "END" is 3 3/4" high, and "ROAD WORK" is 6" high. The sign has a 3/8" thick border. The mounting holes are 5 7/8" from the top and 6 1/2" from the right. The sign is mounted on a 2 1/2" wide base. The sign is labeled "R 1 1/2" on the left.

Technical drawing of a rectangular sign with a black border and a white background. The sign is divided into two horizontal sections by a thick black line. The top section contains the text "SPEED LIMIT ENFORCED" in bold, black, sans-serif capital letters. The bottom section contains the text "MINIMUM FEE \$150 WHEN WORKERS PRESENT" in bold, black, sans-serif capital letters. The sign has a total width of 96 inches and a total height of 48 inches. Dimensions for text placement and spacing are provided in inches and fractions of an inch.

Overall dimensions: 96" (width) x 48" (height).

Top section: "SPEED LIMIT ENFORCED"

- Text "SPEED" width: 40⁷/₈"
- Text "LIMIT" width: 40⁷/₈"
- Text "ENFORCED" width: 33³/₁₆"
- Spacing between "SPEED" and "LIMIT": 6"
- Spacing between "LIMIT" and "ENFORCED": 6"
- Left margin: 20¹/₁₆"
- Right margin: 33³/₁₆"

Bottom section: "MINIMUM FEE \$150 WHEN WORKERS PRESENT"

- Text "MINIMUM" width: 32⁹/₁₆"
- Text "FEE" width: 32⁹/₁₆"
- Text "\$150" width: 14¹/₂"
- Text "WHEN" width: 27⁷/₈"
- Text "WORKERS" width: 25¹/₂"
- Text "PRESENT" width: 24³/₁₆"
- Spacing between "MINIMUM" and "FEE": 6"
- Spacing between "FEE" and "\$150": 6"
- Spacing between "WHEN" and "WORKERS": 5"
- Spacing between "WORKERS" and "PRESENT": 5"
- Left margin: 14¹/₁₆"
- Right margin: 37¹/₁₆"

Vertical dimensions (from top to bottom):

- Top border: 7¹⁵/₁₆"
- Section separator: 6"
- Section separator: 1¹/₄"
- Section separator: 5¹⁵/₁₆"
- Section separator: 6"
- Section separator: 3"
- Section separator: 5"
- Bottom border: 7⁷/₁₆"

Other dimensions:

- Left border: 3¹/₄"
- Left border: 1¹/₄"
- Right border: 7¹⁵/₁₆"

Technical drawing of a rectangular sign with rounded corners. The sign has a black border and the text "WAIT FOR PILOT CAR" in bold, black, sans-serif capital letters. The dimensions are as follows:

- Overall width: 36"
- Overall height: 30"
- Top border: 1"
- Right border: 3 1/2"
- Bottom border: 3 1/2"
- Left border: 1 1/4"
- Text "WAIT" width: 14 5/16"
- Text "FOR" width: 11 7/8"
- Text "PILOT" width: 8 15/16"
- Text "CAR" width: 8 15/16"
- Vertical spacing between "WAIT" and "FOR": 6"
- Vertical spacing between "FOR" and "PILOT": 2 1/2"
- Vertical spacing between "PILOT" and "CAR": 6"
- Horizontal spacing between "WAIT" and "FOR": 6 1/16"

Technical drawing of an E5-1(L or R)-48 exit sign. The sign is square with a 48-inch width and height. It features the word "EXIT" in bold, black, sans-serif capital letters at the top, and a large black arrow pointing diagonally down and to the right below it. The arrow has a 60-degree angle. Dimensions are provided for the text and arrow placement. The sign has a 1-inch border and a 3-inch radius on the corners. The background is white, and the text and arrow are black. The sign is labeled E5-1(L or R)-48.

Legend: white
Background: green (orange optional)

Diagram of a rectangular sign with the word "DETOUR" in bold, black, sans-serif capital letters. The sign has a white background and a black border. Dimensions are indicated by arrows and text:

- Overall width: 36"
- Overall height: 18"
- Text height: 9"
- Text width: 29.7"
- Left margin: 3.15"
- Right margin: 3.15"
- Top margin: 4.5"
- Bottom margin: 4.5"

Technical drawing of a mechanical part with the following dimensions:

- Top horizontal segments: $10\frac{7}{8}"$ and $7\frac{1}{8}"$
- Top fillet: $R\ 1\frac{1}{16}"$
- Left vertical segments: $5\frac{3}{32}"$ and $5\frac{3}{32}"$
- Internal horizontal segments: $3\frac{1}{2}"$ and $5\frac{1}{2}"$
- Bottom horizontal segments: $3\frac{1}{2}"$ and $9"$
- Right vertical segments: $4"$ and $4"$
- Internal horizontal segment on the right: $\frac{9}{16}"$

Technical drawing of a tapered shaft with a fillet. The shaft has a total length of 30 inches. The left end has a diameter of 16 $\frac{3}{4}$ inches. The right end has a diameter of 13 $\frac{3}{4}$ inches. The shaft is tapered at a rate of $\frac{1}{2}$ inch per foot. A fillet with a radius of R $\frac{3}{4}$ inch is used to transition between the two diameters. The fillet starts 1 $\frac{1}{2}$ inches from the left end and ends 4 $\frac{1}{2}$ inches from the right end. The maximum height of the fillet is 8 $\frac{3}{8}$ inches above and below the centerline. The distance from the left end to the start of the fillet is 16 $\frac{3}{4}$ inches. The distance from the end of the fillet to the right end is 13 $\frac{3}{4}$ inches. The distance from the start of the fillet to the end of the fillet is 14 inches.

E5-1-48

Technical drawing of a tapered shaft. The shaft has a total length of $9\frac{3}{4}"$. The tapered section has a length of $5\frac{1}{4}"$. The diameter of the larger section is $3"$, and the diameter of the smaller section is $2\frac{5}{8}"$. The taper length is $\frac{3}{8}"$. The fillet radius is $R\ \frac{1}{2}"$. The drawing shows the shaft with a centerline and a dashed line indicating the taper.

Technical drawing of a mechanical part with dimensions:

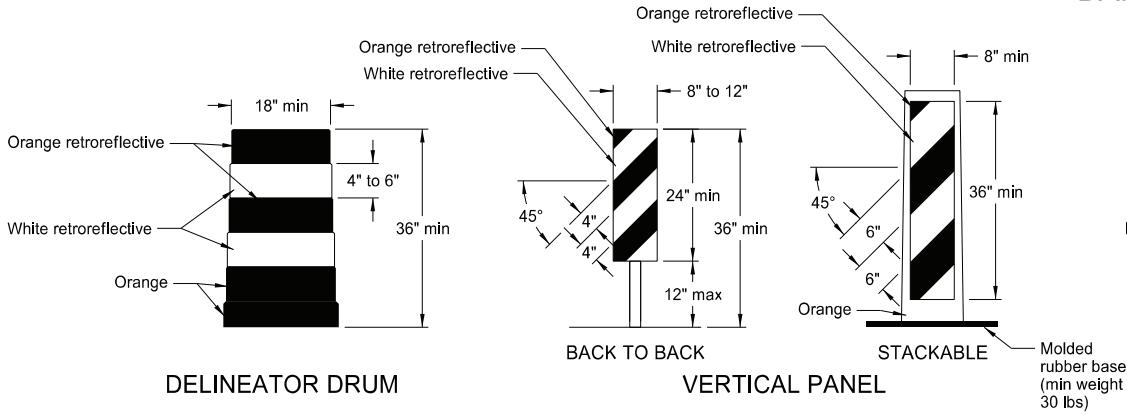
- Overall length: $10\frac{7}{8}"$
- Overall width: $7\frac{1}{8}"$
- Radius: $R\ 1\frac{1}{16}"$
- Top flat section height: $4"$
- Bottom flat section height: $4"$
- Top flat section width: $3\frac{1}{2}"$
- Bottom flat section width: $1\frac{3}{4}"$
- Internal width: $9\frac{1}{16}"$

ARROW DETAILS

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

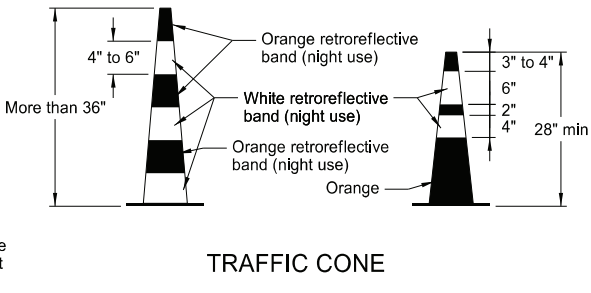


BARRICADE AND CHANNELIZING DEVICE DETAILS

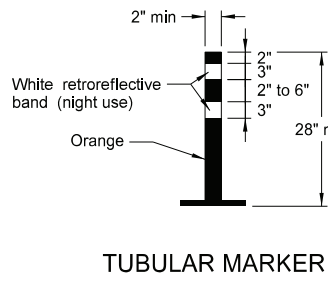


Provide horizontal, circumferential, alternating orange and white retroreflective stripes 4" to 6" wide for drum markings. Use a minimum of two orange and two white stripes with the top stripe being orange for each drum. Do not exceed 3" nonretroreflective spaces between the horizontal orange and white 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.

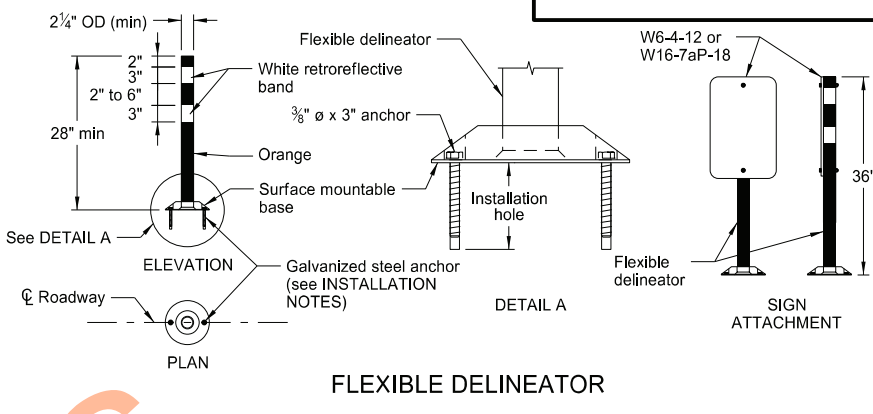
Provide alternating orange and white retroreflective stripes, sloping downward in direction vehicular traffic is to pass. Place retroreflective sheeting on both sides of panel with a minimum of 270 square inches of retroreflective area facing vehicular traffic. Where the height of the retroreflective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



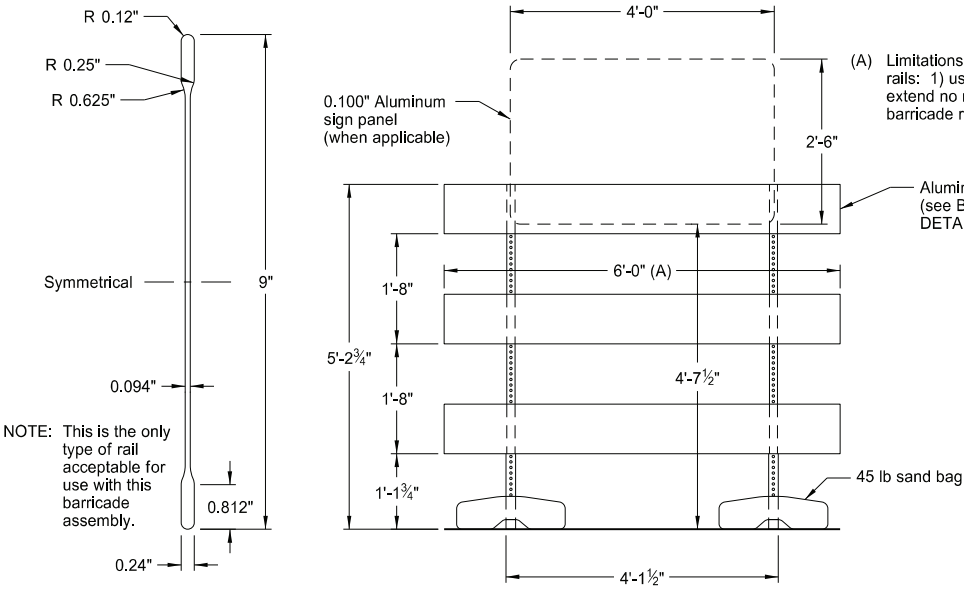
Provide retroreflectorization of cones more than 36" in height by alternating orange and white retroreflective stripes. Use a minimum of two orange and two white stripes for each cone with the top stripe being orange. Use maximum 3" nonretroreflective space between the orange and white stripes.



Provide retroreflectorization 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.



- 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.



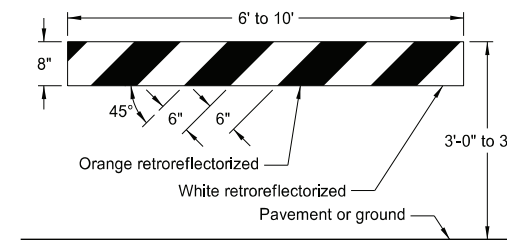
BARRICADE BLADE DETAIL

ELEVATION VIEW

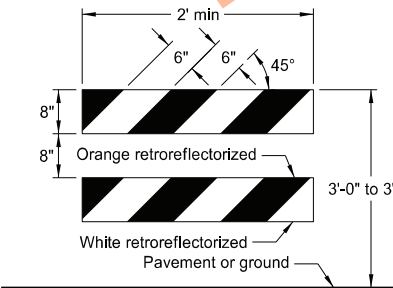
SIDE VIEW

BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)

NOTE: For barricade markings use alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Place retroreflective sheeting on both sides of the rails with a minimum of 270 square inches of visible retroreflective area facing vehicular traffic. When the barricade length is less than 36", use a rail stripe width of 4".

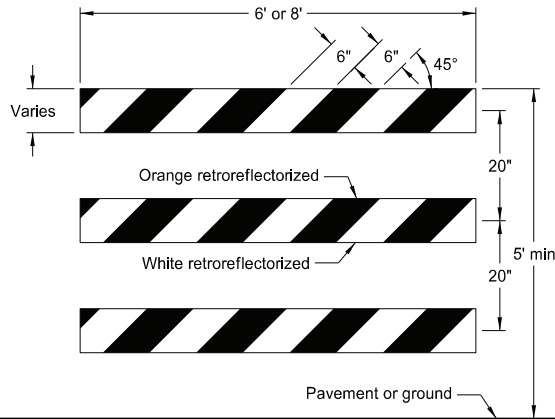


TYPE I BARRICADE

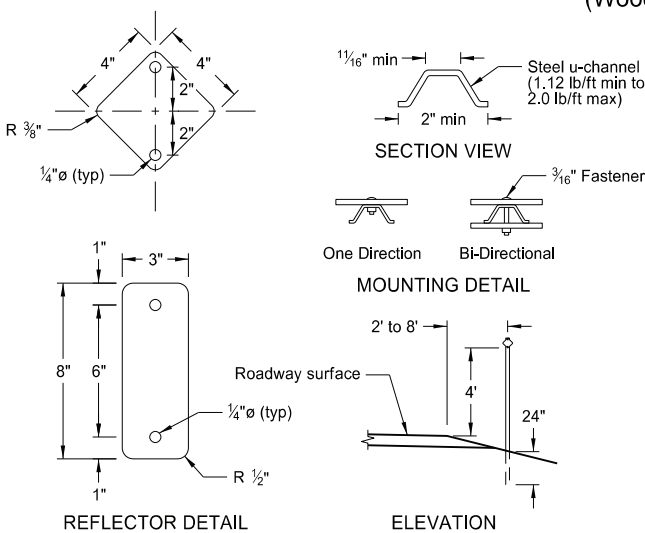


TYPE II BARRICADE

BARRICADE RAIL DETAILS



TYPE III BARRICADE



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

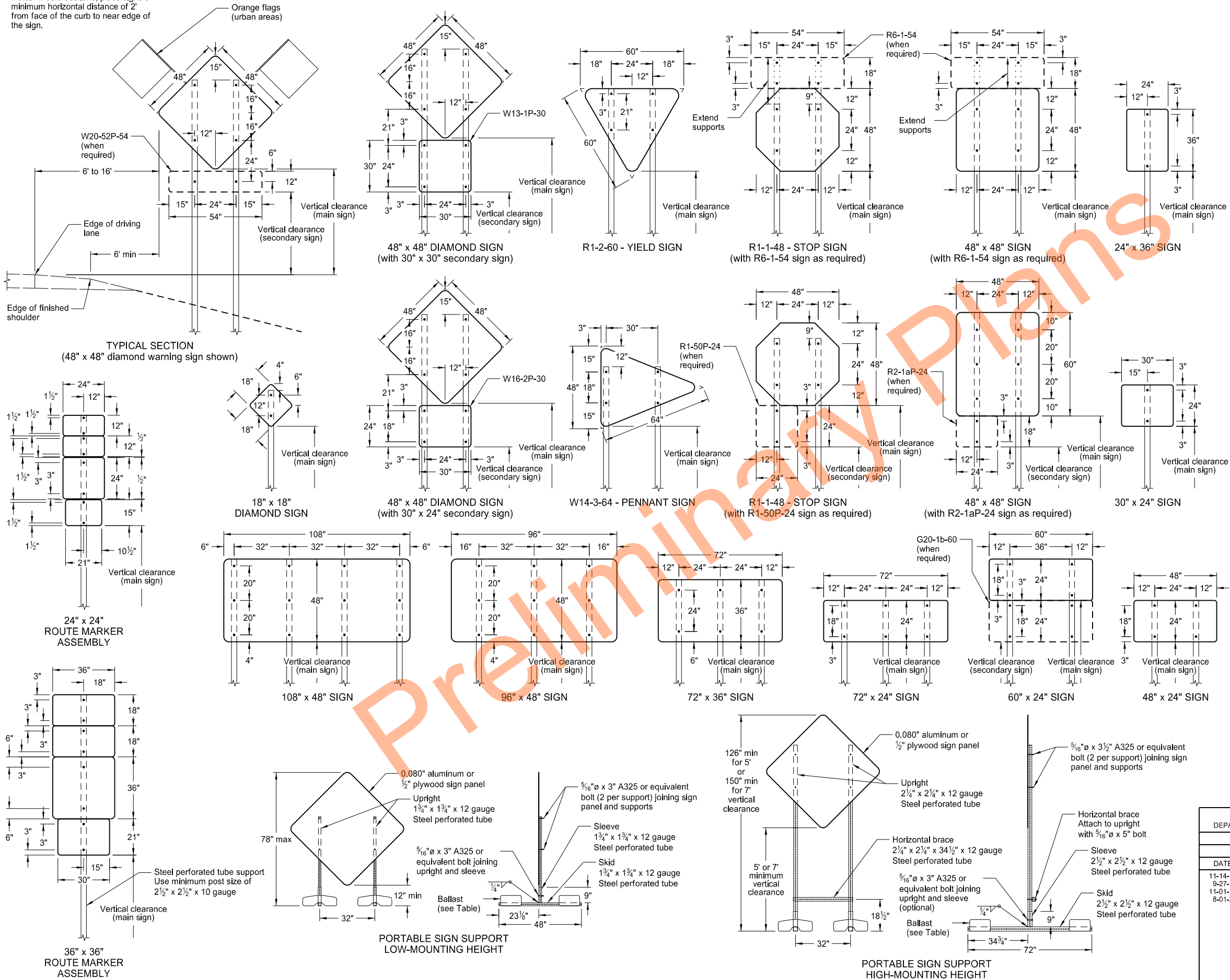
Note: Number of sandbags based on a wind speed of 55 MPH. Sandbags assumed to be placed at or near the ends of the skids.

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



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.



NOTES:

1. 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 2½" x 2½" 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.
2. Sign Panels: Provide sign panels made of 0.100" aluminum, ½" plywood, or other approved material, except where noted. Punch all holes round for ⅜" bolts.
3. 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)
4. 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

5. 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.

6. 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

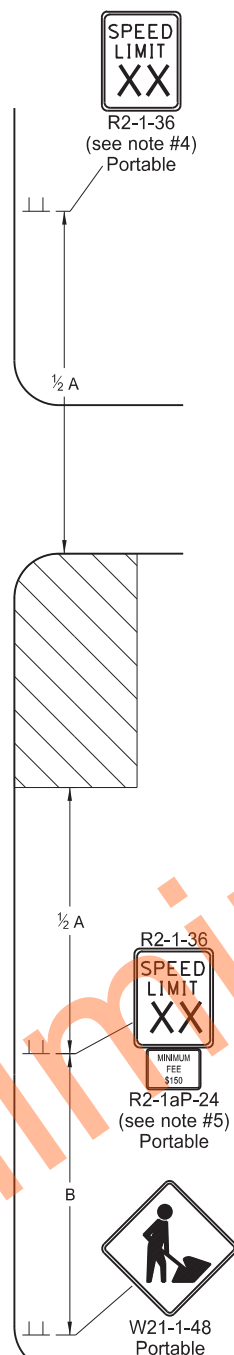
Note: The number of sandbags are based on a wind speed of 55 MPH. Place sandbags at or near the ends of skids.

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

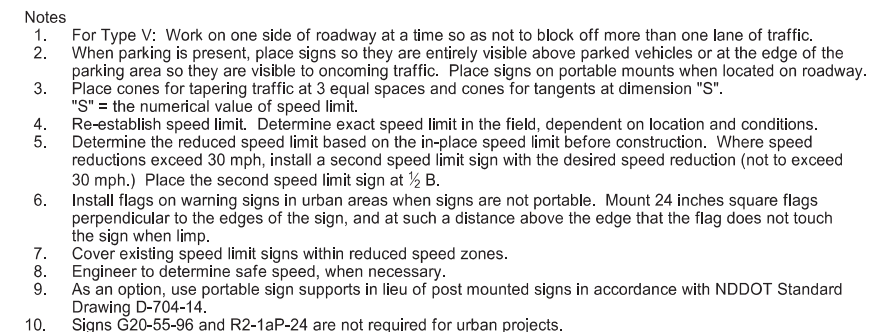


08/01/24

D-704-25



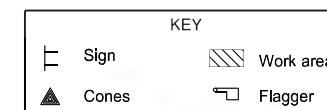
TYPE W
WORK BEYOND CURB ON URBAN STREET
Work area outside driving lane and no closure necessary.



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

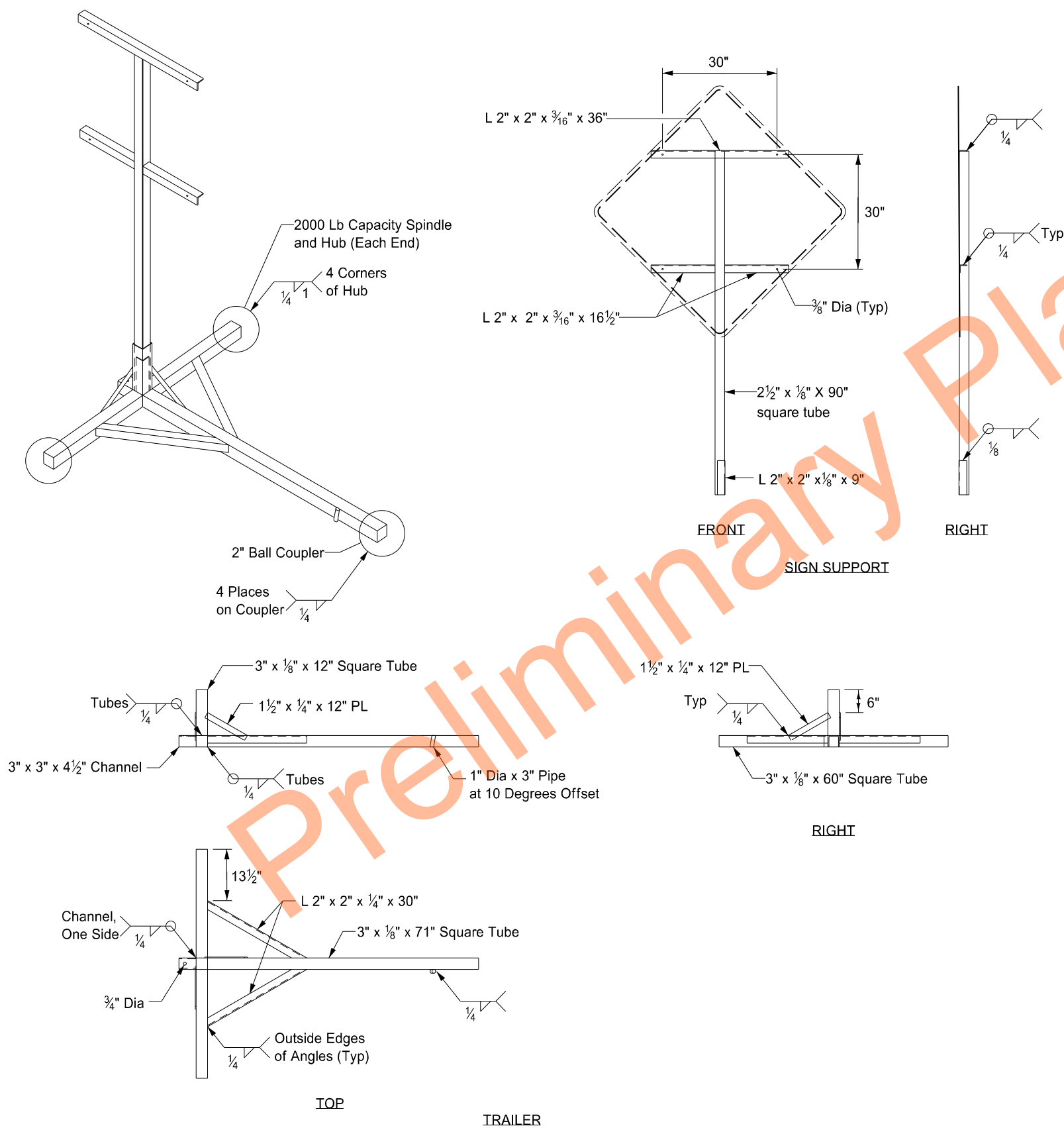
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway 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	
9-27-13	
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



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.

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REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
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12 02 2020

10/30/24

SIDEWALK

D-750-2

NOTES:

1. Curb ramp and detectable warning panel layouts for informational purposes only. See Standard Drawing D-750-3 for curb ramp and detectable warning panel details.
2. Joint Spacing: Vary transverse contraction joint spacing from 4' to 6' to create approximate square panels.

Use longitudinal contraction joints when sidewalk width is 8' or greater, and space at half the sidewalk width.

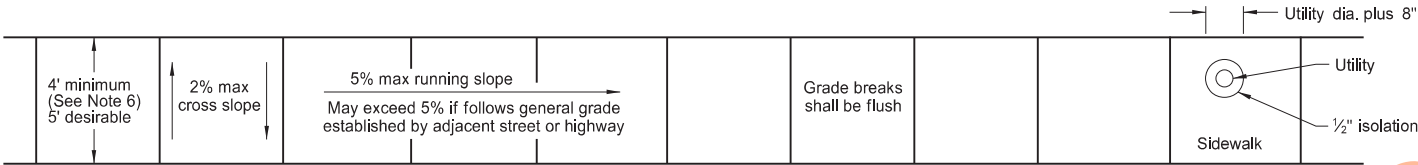
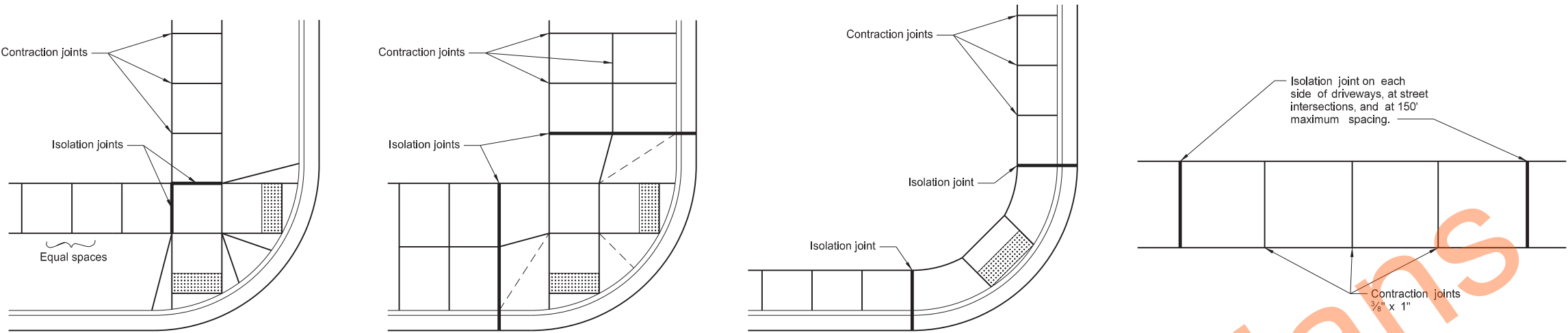
Saw or groove contraction joints to a minimum depth of 1/3 the depth of the concrete.

When sidewalk is adjacent to curb & gutter, vary the sidewalk joint spacing to match curb & gutter joints.

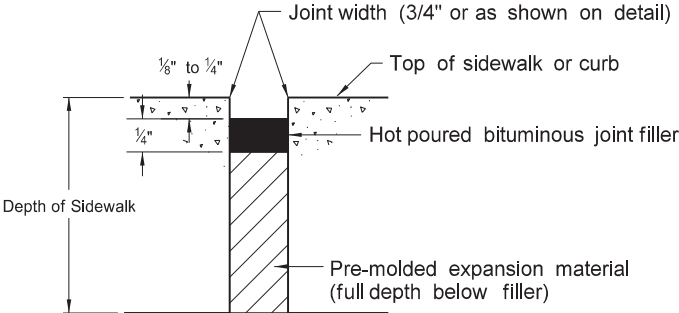
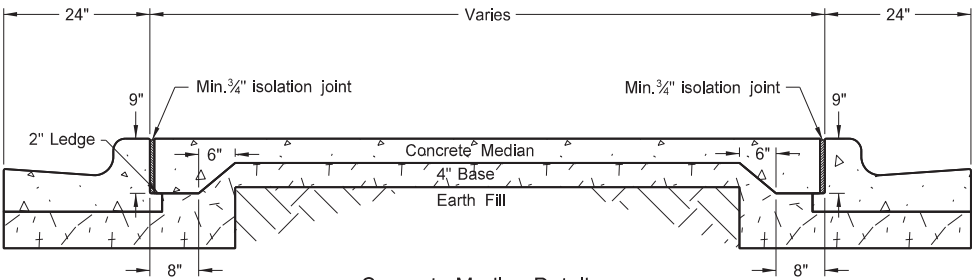
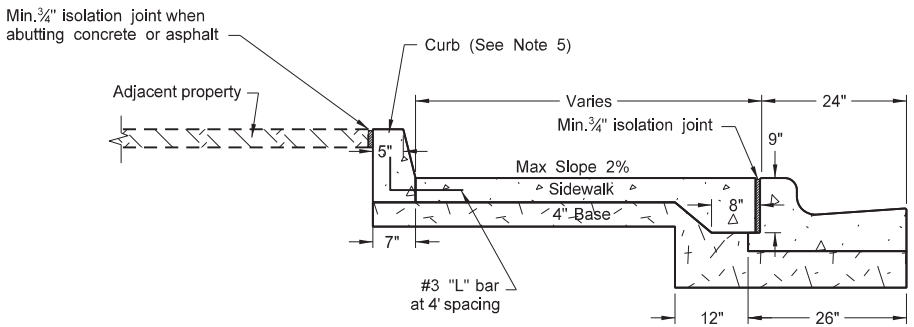
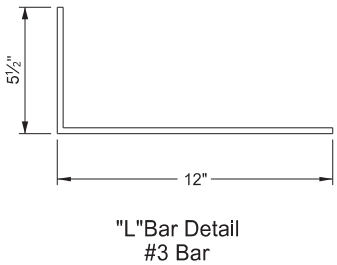
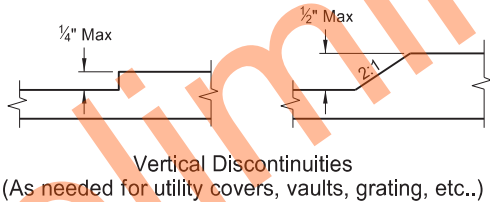
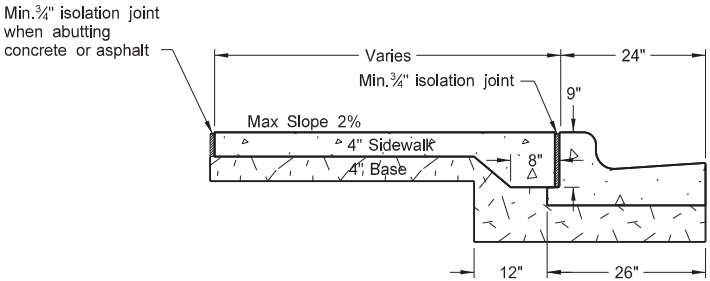
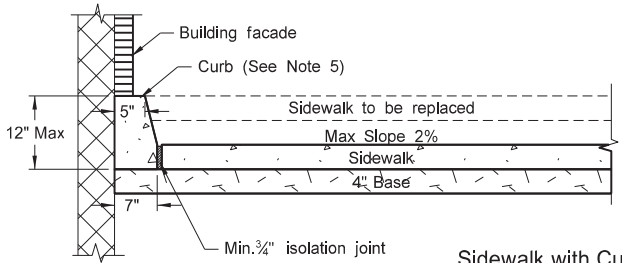
Use isolation joints between separate concrete pours, or between old and new concrete.
3. Include all costs for labor, equipment, and material necessary to construct contraction and isolation joints in the price bid for sidewalk concrete.
4. Use 4" sidewalk concrete thickness unless otherwise specified.
5. Use 4" base material thickness unless otherwise specified. Include all costs for labor and materials necessary to place the base material in the price bid for "Salvage Base Course" or "Aggregate Base Course CL 5."

Modify existing ground slope with landscaping as needed. If not possible, such as adjacent buildings, use a vertical curb as shown in the detail below. The Engineer will measure curb at the unit price bid for "Curb - Type I" per lineal foot.
6. Sidewalk Width & Grade: Provide a continuous 4' min clear width pedestrian access route with max 2% concrete cross slope, excluding flares. The width of the curb cannot be counted as part of the pedestrian access route.

When clear width of pedestrian access routes is less than 5.0', provide passing spaces at a maximum of 200' with a minimum size of 5.0' by 5.0'.



Utility Blockout



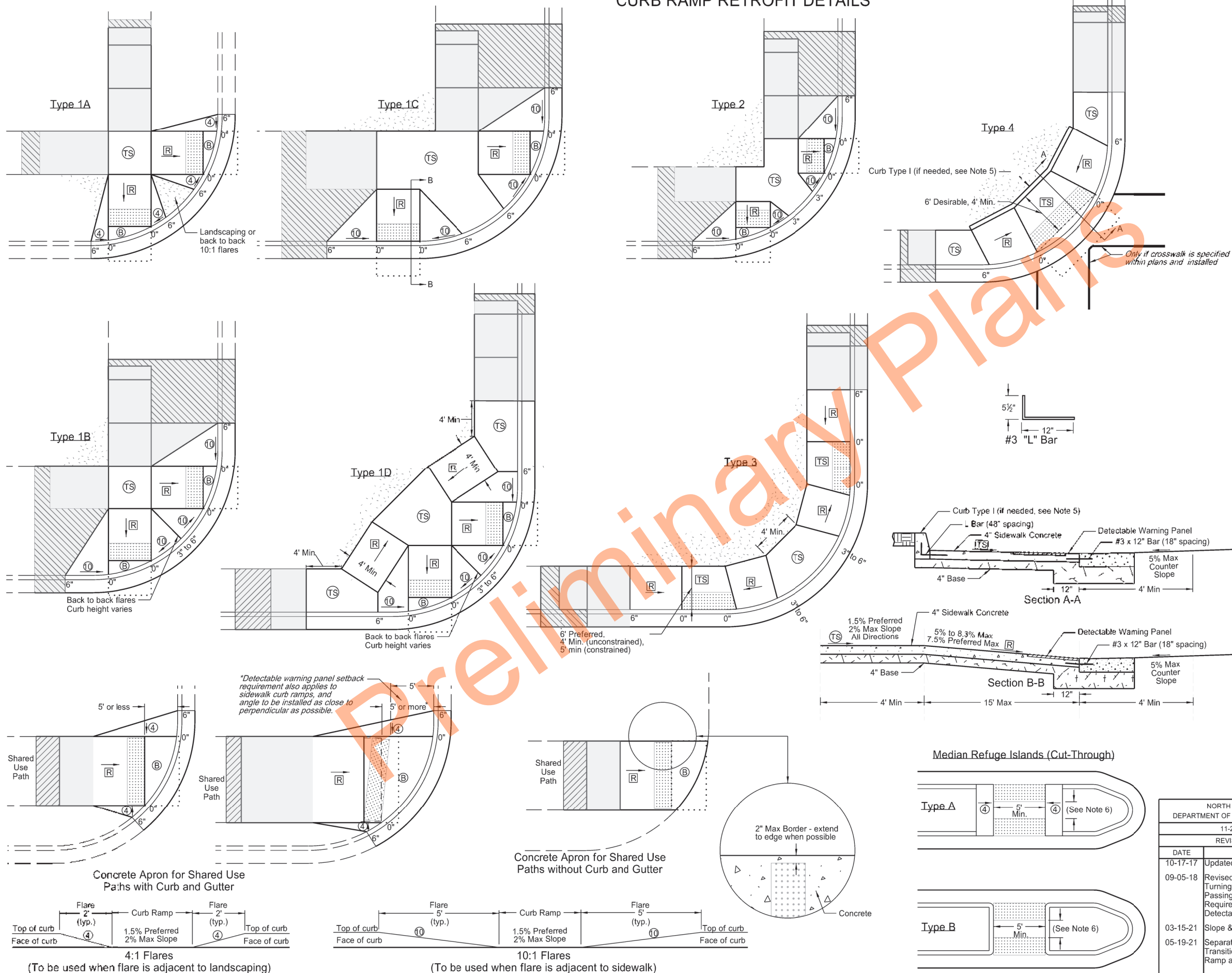
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-26-13	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
09-05-18	Added sidewalk details for width & grade & passing lane requirements.
08-27-19	New Design Engineer PE Stamp.
08-09-24	Electronic Stamp/Signature.



08/09/24

CURB RAMP RETROFIT DETAILS

D-750-3



- NOTES:
1. Ramp width is the useable portion of the ramp, excluding flares. Match curb ramp width to Existing Pedestrian Facility (EPF) width (4' minimum or 5' for island ramps.) Match ramp width to existing shared use path width. Maximum ramp length is 15'.
 2. Provide turning space with desirable 5' x 5' size or larger and minimum 4' x 4' unconstrained size, for any change of direction. Provide landing 5' long x width of path at the bottom and top of parallel ramps and at the top of perpendicular ramps. Turning spaces and Landings may overlap.
 3. Match detectable warning panel width to ramp width. Radial panels are allowed. Place detectable warning panel within the lower turning space.
 4. Provide a continuous 4' minimum width EPF with 1.5% preferred cross slope and max 2% constructed cross slope.
 5. Modify existing ground slope with landscaping, as needed. If not possible, use a vertical curb as detailed on Standard D-750-2. The Engineer will measure curb at the unit price bid for "Curb - Type I" per lineal foot.
 6. Islands: If the profile of the island curb ramp is 2% or less, provide a minimum distance of 2' between warning panels. If the profile of the island curb ramp is steeper than 2%, provide a turning space between the ramps.
 7. Provide generally planar vertical alignments. Provide grade breaks, perpendicular to the direction of the pedestrian travel, at the top and bottom of curb ramps (1.5% preferred, 2% max constructed cross slope).
 8. See Curb Ramp Retrofit Transition Details Standard D-750-4 for additional information. Also See PROWAG for full compliance in the curb ramp area.
 9. Grade transitions shall be flush.

LEGEND:

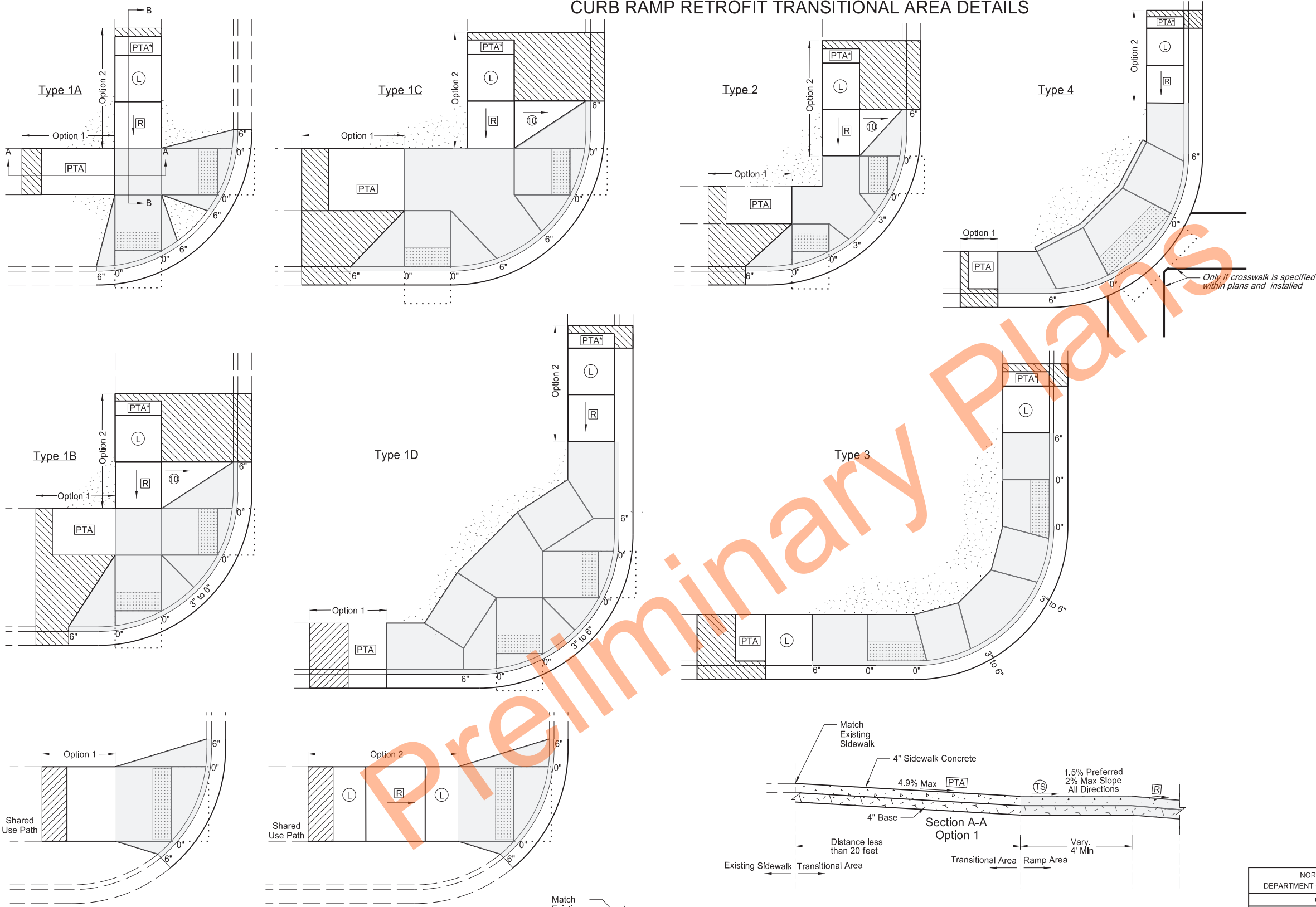
- [Pattern] : Detectable Warning Panel.
- [Pattern] : Landscaping.
- [Pattern] : Transitional tie-in to nearest joint, if needed.
- [Pattern] : Curb Ramp Retrofit Transitional Area (See Standard Drawing D750-4)
- [Symbol] : 4' long x width of EPF or 4' minimum Clear space outside traffic lanes of travel. 1.5% preferred cross slope 2% maximum cross slope 4.7% preferred running and counter slope 5% maximum running and counter slope
- (TS) : Turning Space Use at top of ramp or when changing directions. 1.5% preferred slope (2% maximum) all directions.
- (R) : Preferred Ramp Grade = 5% to 7.5%. Maximum Constructed Grade = 8.3%. Preferred Cross Slope = 1.5%. Maximum Constructed Cross Slope = 2%.
- (B) : 1.5% preferred cross slope 2% maximum constructed cross slope running slope consistent with the EPF 4.7% preferred max counter slope 5.0% max constructed counter slope
- (10) : 10:1 maximum constructed slope.
- (4) : 4:1 maximum constructed slope.
- 0", 3", or 6" : Curb Height.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-26-13	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
09-05-18	Revised Notes, Revision for Turning Space, Added Passing Space Requirements, Turned Detectable Warning Panel
03-15-21	Slope & other clarifications.
05-19-21	Separate Curb Ramp Transition Area from Curb Ramp area

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05 19 2021

CURB RAMP RETROFIT TRANSITIONAL AREA DETAILS

D-750-4



Transition Areas for Shared Use Paths

NOTES:

1. Curb Ramp Transitional Areas are to transition from the Curb Ramp area into the Existing Pedestrian Facility (EPF). Each layout shows example transitions. Use any combination for transitions from the Ramp Area into the EPF that allows for similar or gentler slopes to that of the existing condition, yet transitions in the shortest distance possible. In some cases, if grades allow, the Ramp area can immediately transition into the EPF and no transitional area is needed.
2. Option 1: Use this transition when existing running slope grades are less than 5%. Transition from the ramp area to the EPF using the Pedestrian Access Transition Area (PTA) transition rates and in less than 20 feet.
3. Option 2: Use this transition when existing running slopes are greater than 5% and option 1 is not able to be met.

Add a ramp and a landing immediately after the ramp area. Then transition from the compliant landing into the EPF using the PTA rates (preferred), or in less than 15 feet (which ever is shorter).
4. Transitional Areas for Shared Use Paths can be concrete or asphalt.
5. See Curb Ramp Retrofit Details Standard D-750-3 for additional information.

LEGEND:

- [Pattern] : Detectable Warning Panel.
- [Pattern] : Landscaping.
- [Pattern] : Transitional tie-in to nearest joint, if needed.
- [Pattern] : Curb Ramp Retrofit Area (See Standard Drawing D750-3)
- [Pattern] : 4' long x width of EPF or 4' minimum Clear space outside traffic lanes of travel. 1.5% preferred cross slope 2% maximum cross slope 4.7% preferred running slope 5% maximum running slope
- [PTA] : Pedestrian Access Transition Area Running Slope less than 4.9%. Transition Cross Section at 1/2 percent per foot from the from Ramp Area to EPF.
- [L] [TS] : Turning Space/Landing Use at top of ramp or when changing directions. 1.5% preferred slope (2% maximum) all directions.
- [R] : Preferred Ramp Grade = 5% to 7.5%. Maximum Constructed Grade = 8.3%. Preferred Cross Slope = 1.5%. Maximum Constructed Cross Slope = 2% Maximum Length = 15 feet
- [10] : 10:1 maximum constructed slope.
- [4] : 4:1 maximum constructed slope.
- 0", 3", or 6" : Curb Height.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
05-19-21	
REVISIONS	
DATE	CHANGE



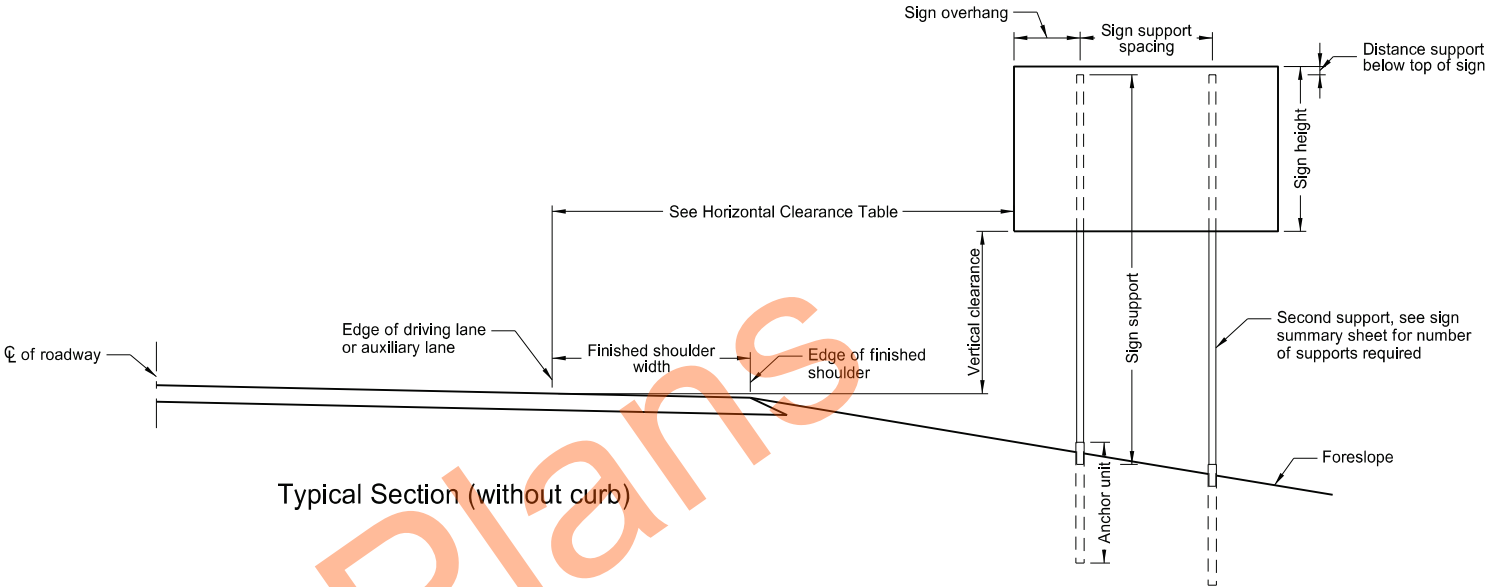
05 19 2021

PERFORATED TUBE ASSEMBLY DETAILS

D-754-23

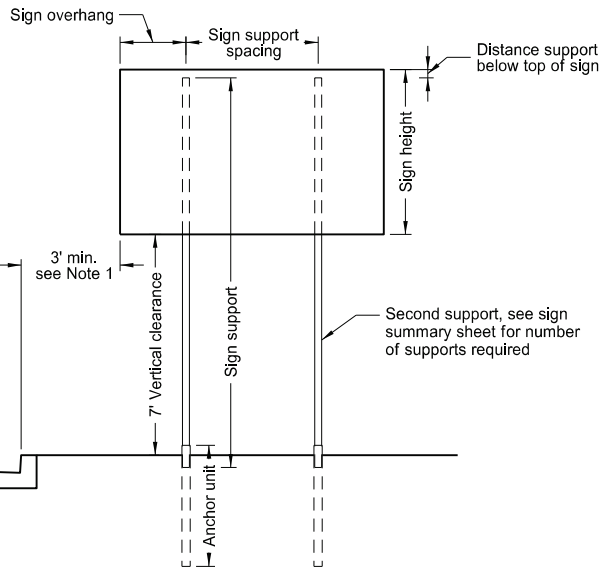
Notes:

1. Curbed Roadways: Use a 3' clearance from face of the curb except where right of way or sidewalk width is limited; Use a minimum 2' clearance. Increase the horizontal clearance if required to maintain a minimum sidewalk clear width of 4' from the sign support, not including any attached curb.
2. Minimum vertical clearance: Provide at least 5' measured from the bottom of the sign to the edge of the driving lane or auxiliary lane at the side of the road in rural districts. Provide at least 7' clearance to the bottom of the sign, where parking or pedestrian movements occur.
- Install signs on expressways a minimum height of 7'.
- Install adopt-a-highway signs on Freeways at least 7' above the edge of the driving lane.
- Maximum vertical clearance is 6" greater than the minimum vertical clearance.
3. Offset signs: Use a vertical clearance of 5' above the edge of the driving lane for signs placed 30 feet or more from the edge of the traveled way.
4. Provide a horizontal clearance from edge of shared use path to edge of sign of 3', except where width is limited. Provide a minimum clearance of 2'.

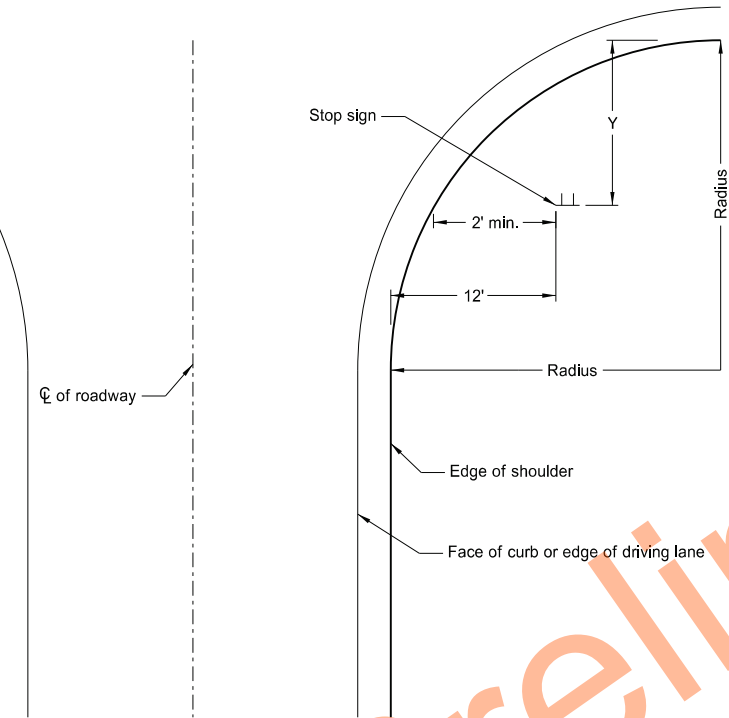


Typical Section (without curb)

Horizontal Clearance Table	
Shoulder Width ft	Offset ft
0 to 2	16
>2 to 4	18
>4 to 6	20
>6 to 8	22
>8 to 10	24

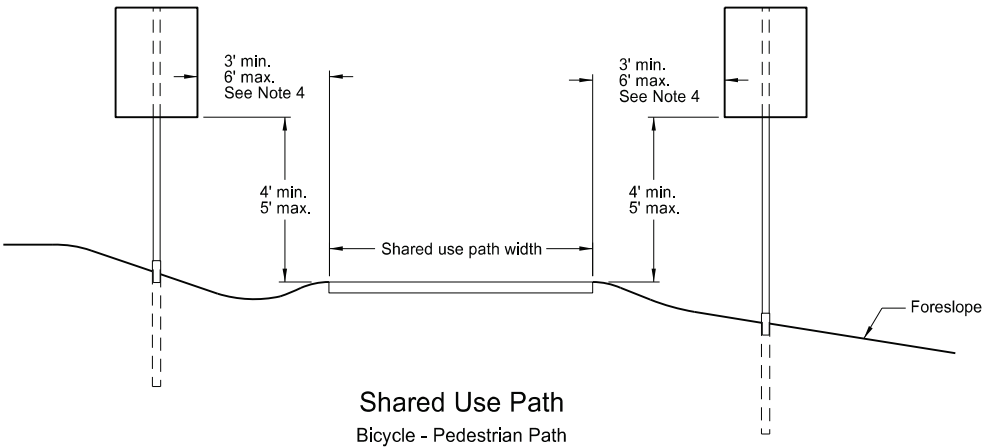


Typical Section (with curb)
Residential or Business District



Stop Sign Location
Wide Throat Intersection
Use layout for the placement of "Stop" signs.

Radius ft.	Y-max. ft.	Y-min. ft.
40	50	15
45	50	18
50	50	21
55	50	25
60	50	28
65	50	32
70	50	35
75	50	39
80	50	43



Shared Use Path
Bicycle - Pedestrian Path

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
7-8-14	Revised note 2, added note 4.
8-30-18	Updated notes to active voice.
8-29-19	New Design Engineer PE Stamp.
8-05-24	Electronic Stamp/Signature.



08/05/24

Breakaway Coupler System
for Perforated Tubes

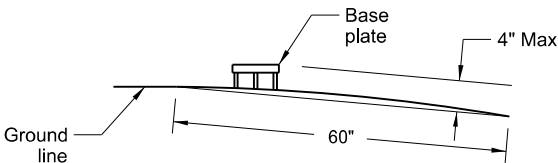
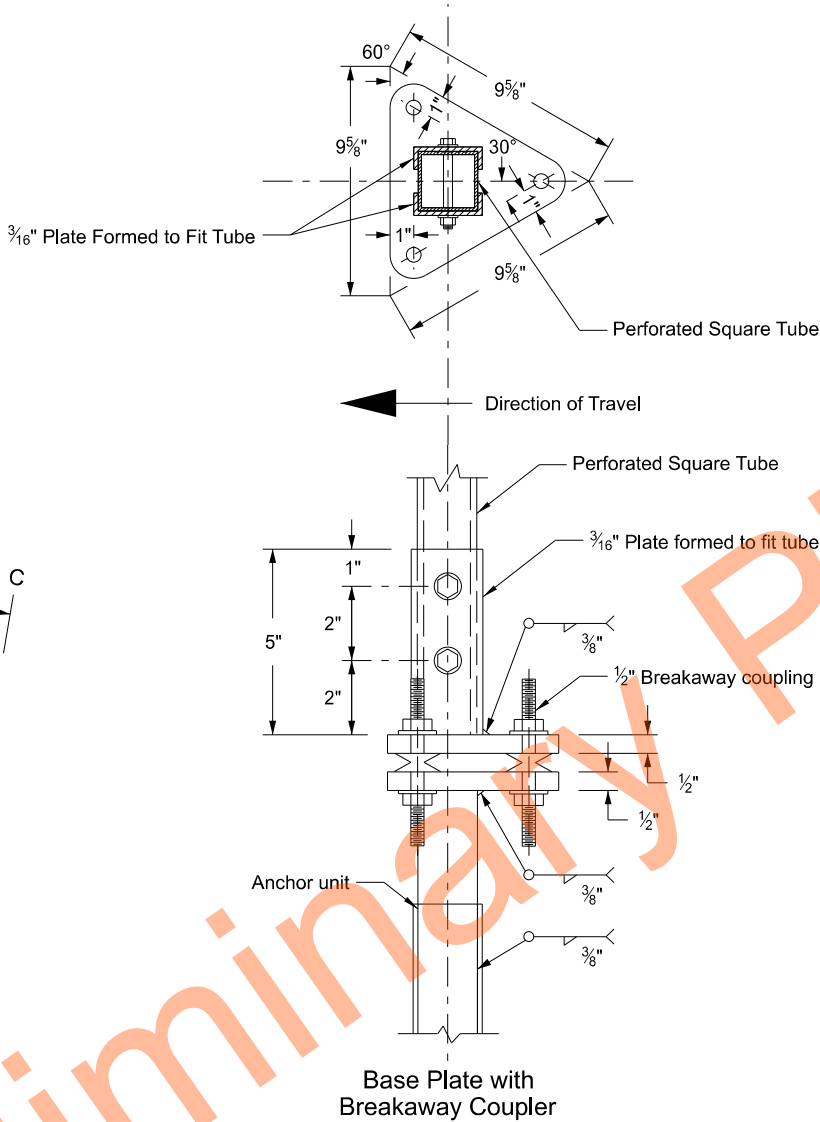
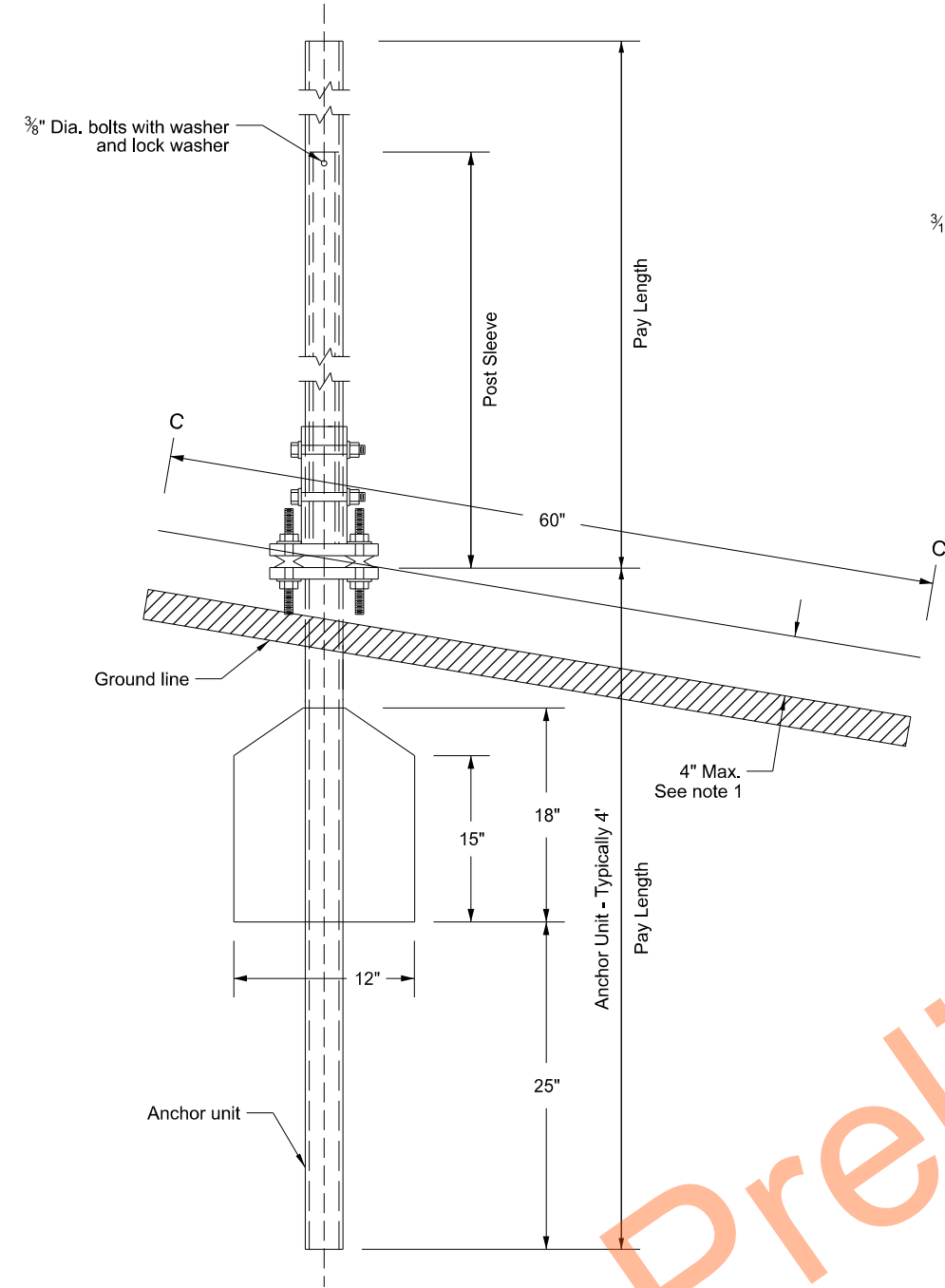
Notes:

1. 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.
2. Use anchor unit of the same size and specification as the post.
3. Provide a minimum 8' distance between the first and fourth post on four post signs.
4. Use the breakaway base system on standard D-754-24 or the breakaway coupling system manufactured from material meeting the requirements of ASTM A325 fasteners with the special requirements specified by DENT BREAKAWAY IND., INC. which meets the test requirements of NCHRP Report 350.

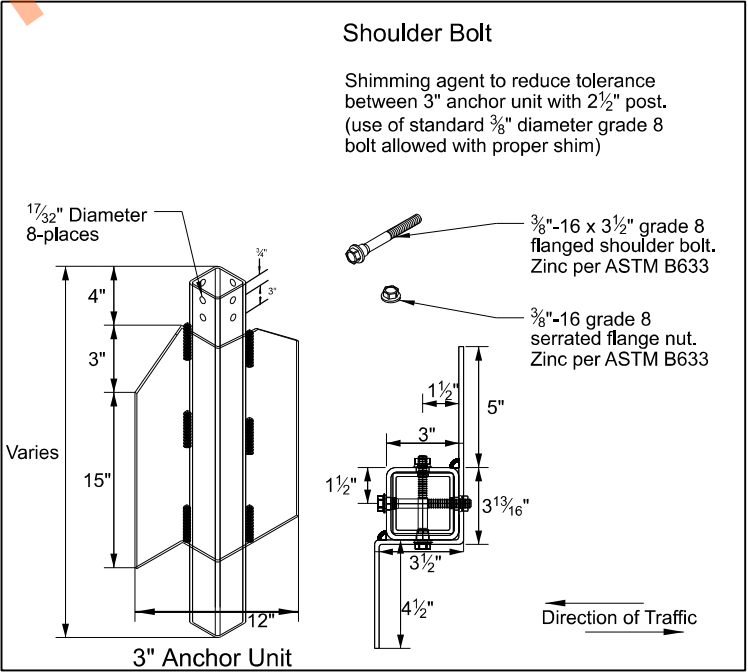
Number of Posts	Telescoping Perforated Tube						
	Post Size In.	Wall Thick-ness Gauge	Sleeve Size In.	Wall Thick-ness Gauge	Slip Base	Anchor Size Without Slip Base In.	Anchor Wall Thickness Gauge
1	2	12			No	2¼	12
1	2¼	12			No	2½	12
1	2½	12			(B)	3(C)	7
1	2½	10			Yes		7
1	2¼	12	2	12	Yes		7
1	2½	12	2¼	12	Yes		7
2	2½	10			Yes		7
2	2¼	12	2	12	Yes		7
2	2½	12	2¼	12	Yes		7
3 & 4	2½	12			Yes		7
3 & 4	2½	10			Yes		7
3 & 4	2½	12	2¼	12	Yes		7
3 & 4	2¼	12	2	12	Yes		7
3 & 4	2½	10	2¾	10	Yes		7

(B) - 2½" 12 gauge posts do not need breakaway bases unless support is placed in boggy, wet, or loose soil areas.

(C) - 3" anchor unit



Max projection of the stub post is 4" above a 60" chord aligned radially to the center line of the highway and connecting any point, within the length of the chord, on the ground surface on one side of the support to a point in the ground surface on the other side.

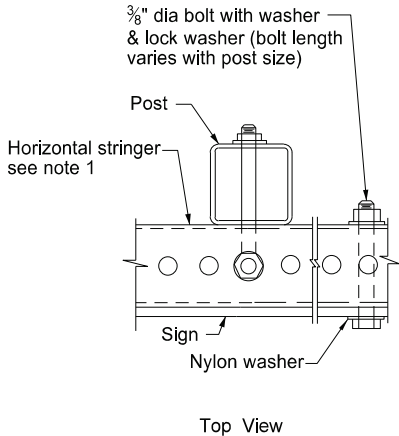
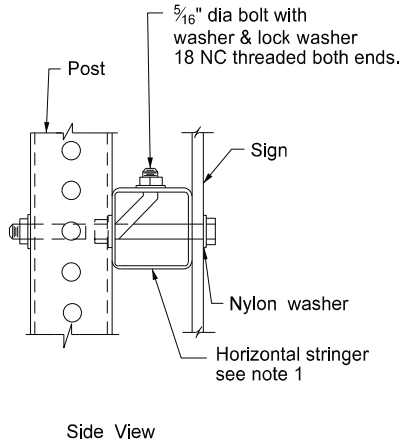


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-2013	
REVISIONS	
DATE	CHANGE
08-30-18	Updated notes to active voice.
08-30-19	New Design Engr PE Stamp.
08-05-24	Electronic Stamp/Signature.
07-22-25	Corrected "typo" in C-C note.

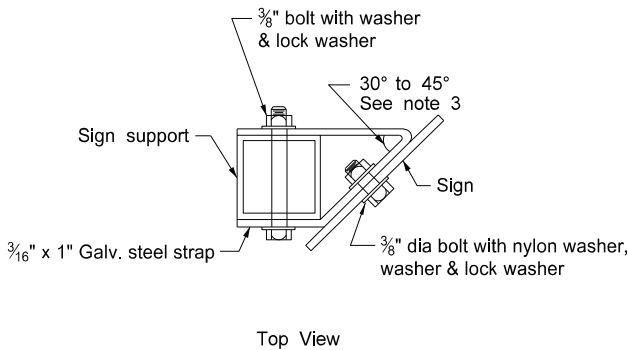
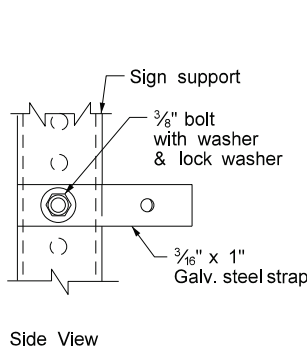


07/22/25

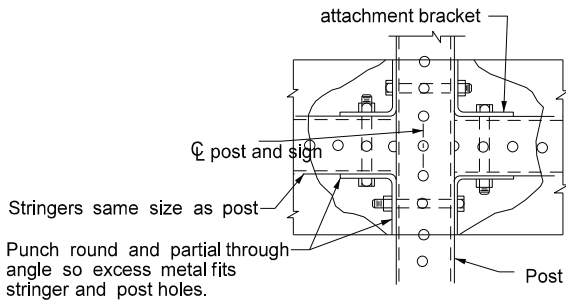
Mounting Details Perforated Tube



STRINGER MOUNTING
(WITH STRINGER IN FRONT OF POST)



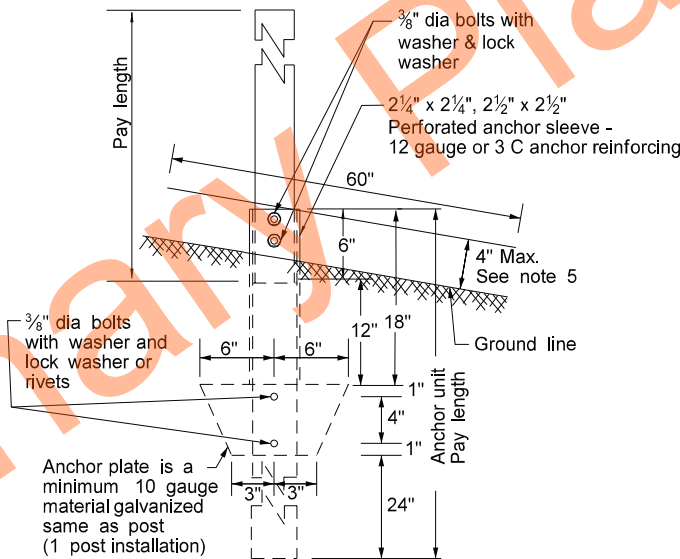
STRAP DETAIL



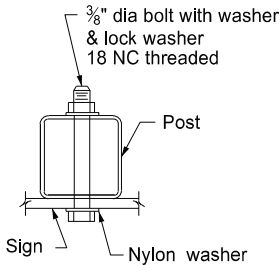
STREET NAME SIGNS AND ONE WAY SIGNS
SINGLE POST ASSEMBLY
ONE STRINGER OR BACK TO BACK MOUNTING

Note:

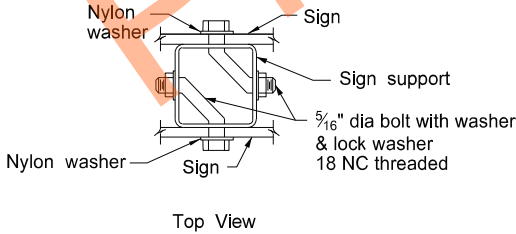
1. Horizontal stringers - Use perforated tubes or 1 3/4" x 3/16" thick, 1.08 lbs./ft aluminum or 3.16 lbs./ft steel z bar stringers.
2. Use minimum outside diameter 5/16" ± 1/16" and 10 gauge thick metal washers on sign face.
3. Place No Parking signs with directional arrows at a 30 to 45 degree angle 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.
4. 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.
5. 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.



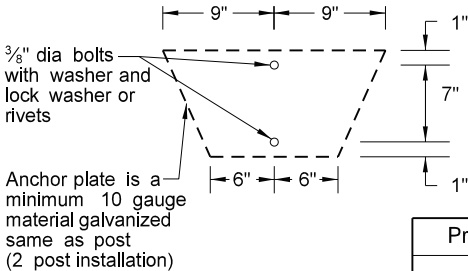
ANCHOR UNIT AND POST ASSEMBLY



BOLT MOUNTING



BACK TO BACK MOUNTING



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.

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

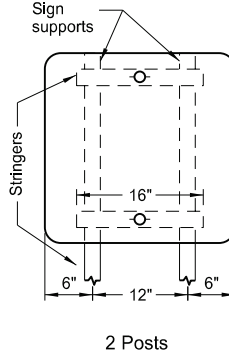
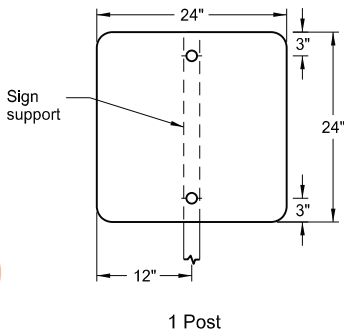
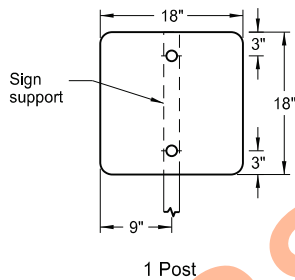
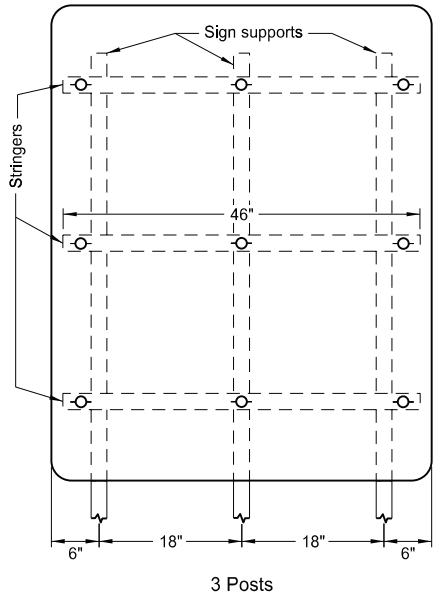
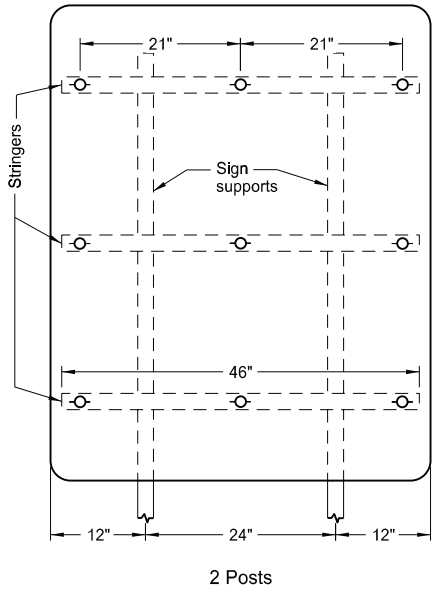
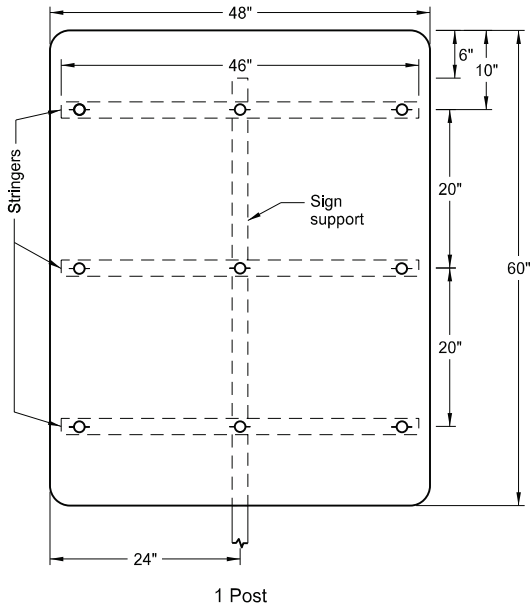
(B) - When placing 2 1/2", 12 gauge posts in standard soils without breakaway bases, provide a shim as specified by the manufacturer. Provide breakaway base when placing the support in weak soils. Engineer will determine if soils are weak. Weak soils are classified as boggy, wet, or loose soil areas.
(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

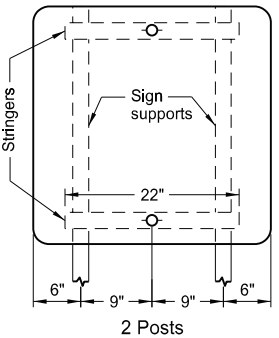
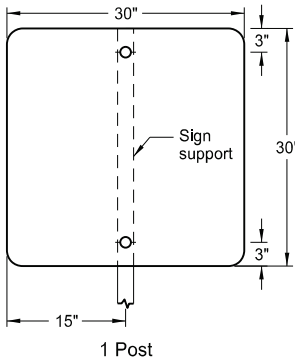
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION
DETAILS REGULATORY, WARNING AND GUIDE SIGNS



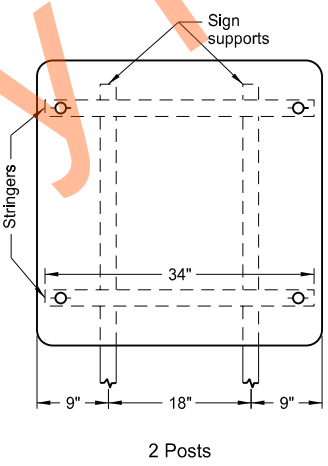
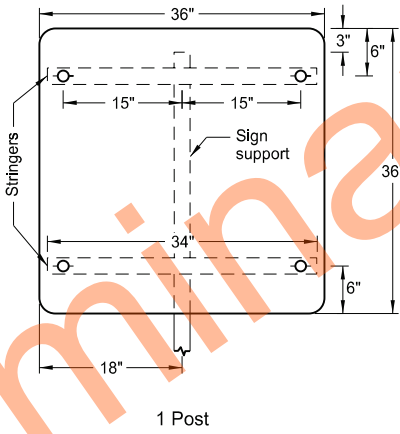
Assembly No. 12

Assembly No. 13

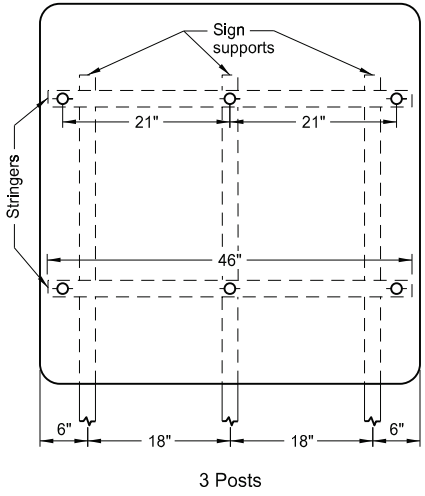
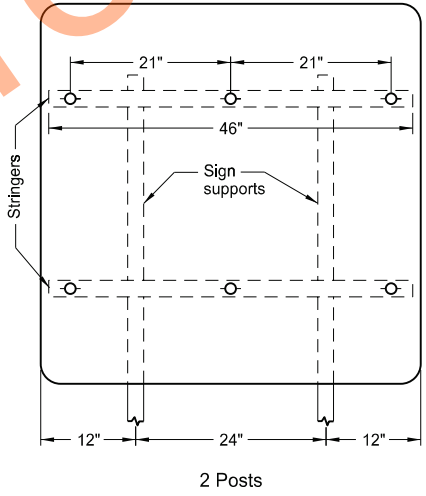
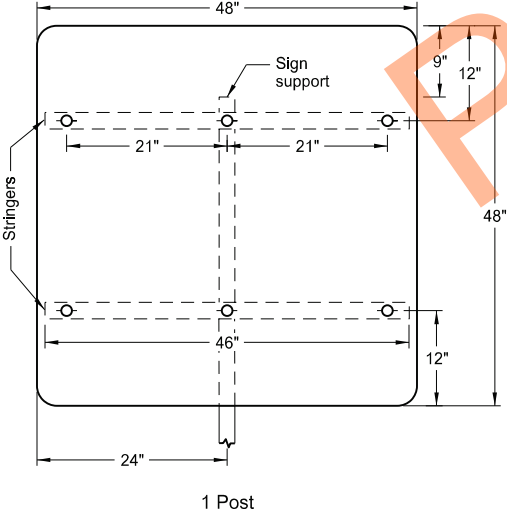
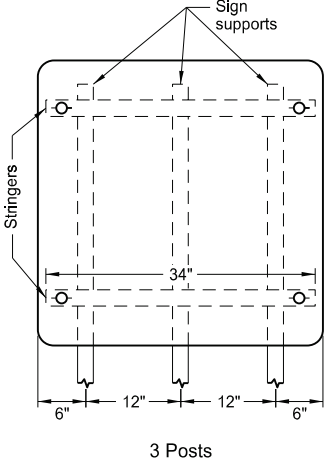
Assembly No. 14



Assembly No. 15



Assembly No. 16



Assembly No. 17

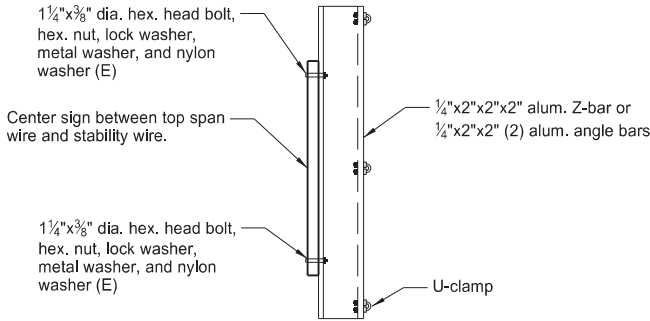
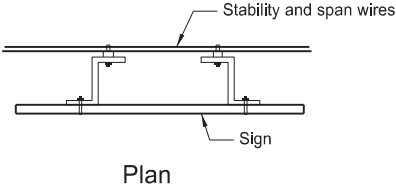
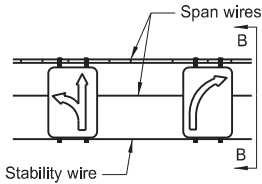
- Notes:
1. Use 0.100 inch minimum thickness sign backing material.
 2. Use 1 1/2" x 1 1/2" perforated square tube stringers.
 3. Punch holes round for 3/8" bolt.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
8-30-18	Updated to active voice & changed Assembly 16 post spacing.
8-30-19	New Design Engineer PE Stamp.
8-06-24	Electronic Stamp/Signature.

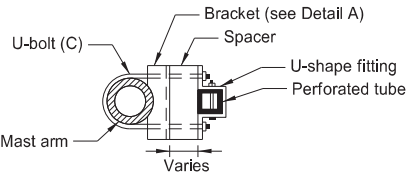


08/06/24

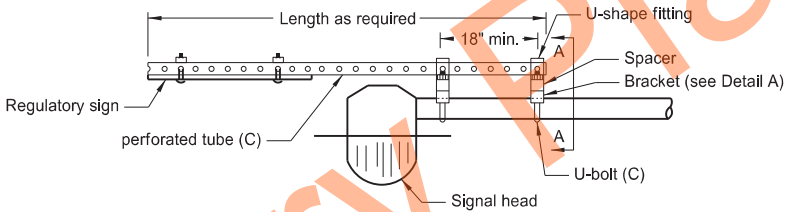
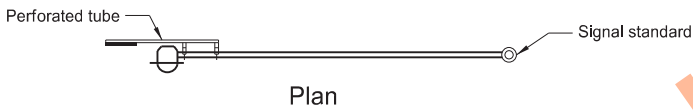
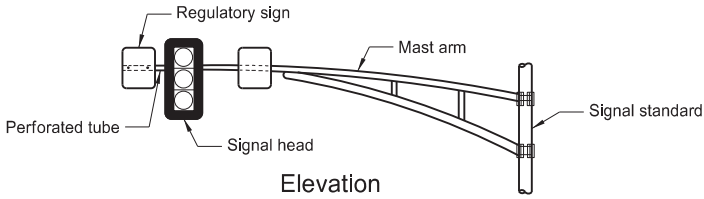
LIGHT STANDARD, SIGNAL STANDARD,
AND SPAN WIRE MOUNTED SIGN
ASSEMBLY DETAIL



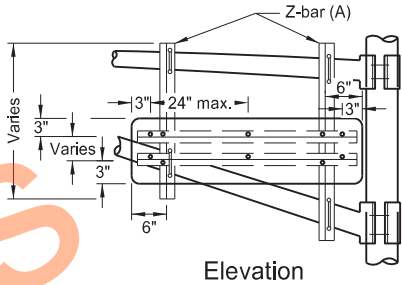
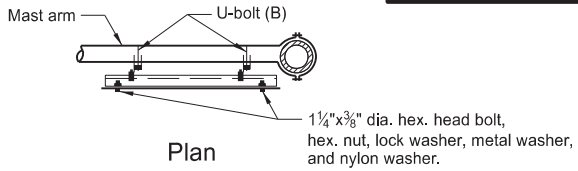
Section B-B
Span Wire Mounted Sign Detail



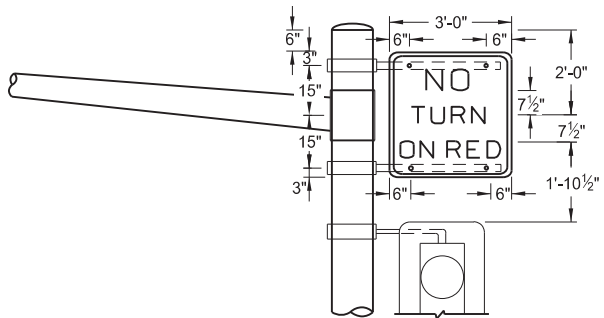
Section A-A



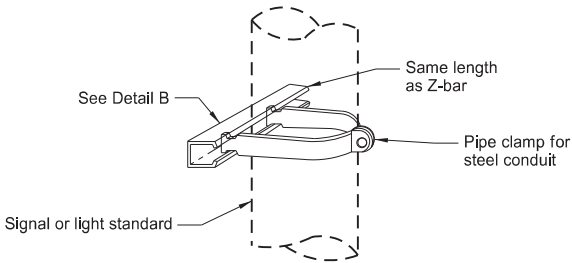
Sign Mounted Beyond End of Mast Arm Detail



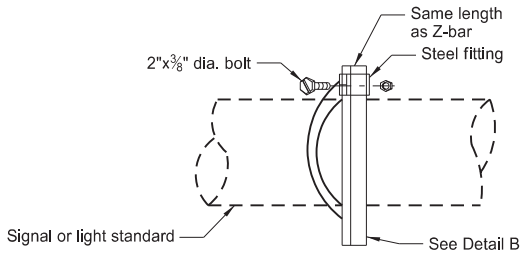
Mast Arm Mounted Street Name Sign Detail



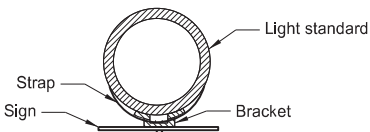
Signal Standard Mounted Sign Attachment Detail



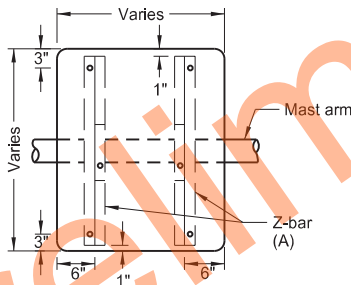
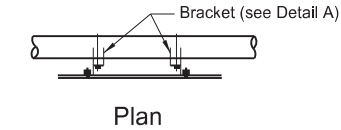
Vertical Mounting
(Use 2 clamps per sign)



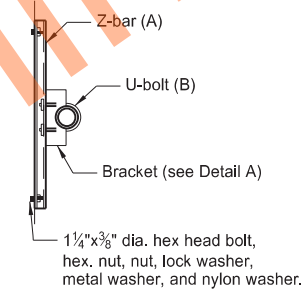
Horizontal Mounting
alternate clamp mounting
(Use 2 clamps per sign)



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

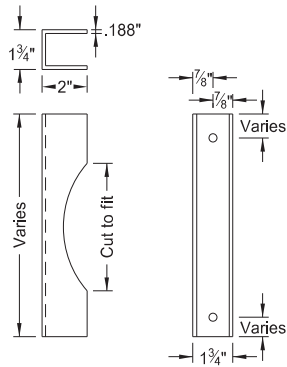


Elevation

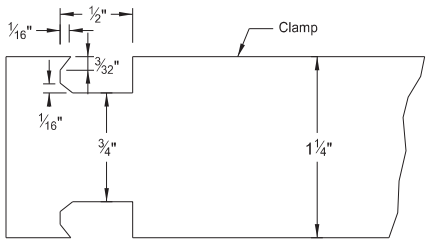


Side View

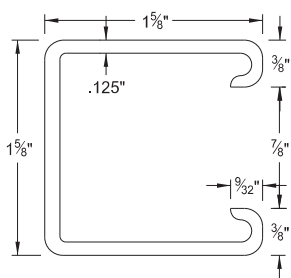
Mast Arm Mounted Regulatory Sign Detail



Detail A



Clamp Detail



Detail B
Steel Channel

Post Size dia.	Clamp Gauge min.
3 1/2" to 5"	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

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



- Notes:
- (A) Use 1 3/4"x3/16" thick 1.08 lb/ft aluminum alloy Z-bar. In place of Z-bar, use two 1 3/4"x1 3/4"x3/16" angles bolted together or a 1 3/4"x2"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"x2" maximum support length 9.9'
 - 2 1/4"x2 1/4" maximum support length 12.6'
 - 2 1/2"x2 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.

CONCRETE FOUNDATIONS
(TRAFFIC SIGNALS & HIGHWAY LIGHTING)

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.

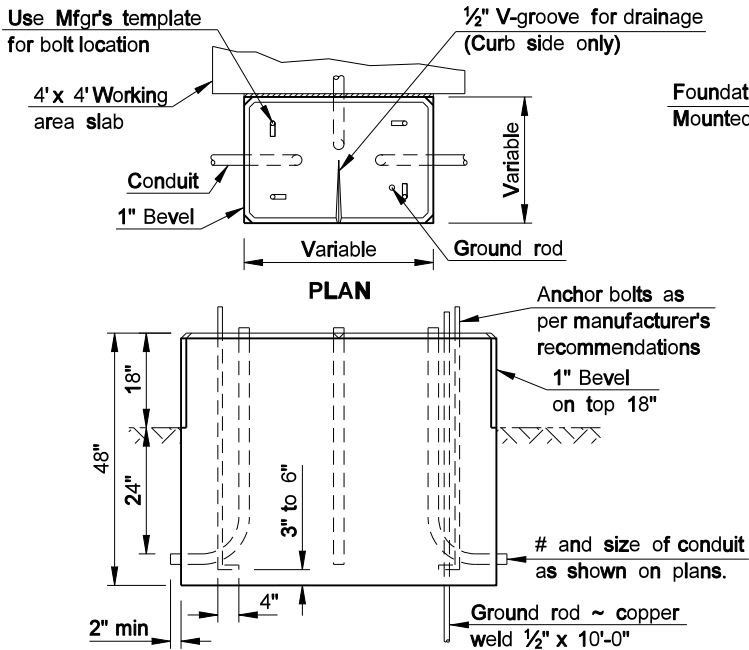
WORKING AREA SLAB: The materials and preparation of this slab shall be as approved by the Engineer in the field.

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.

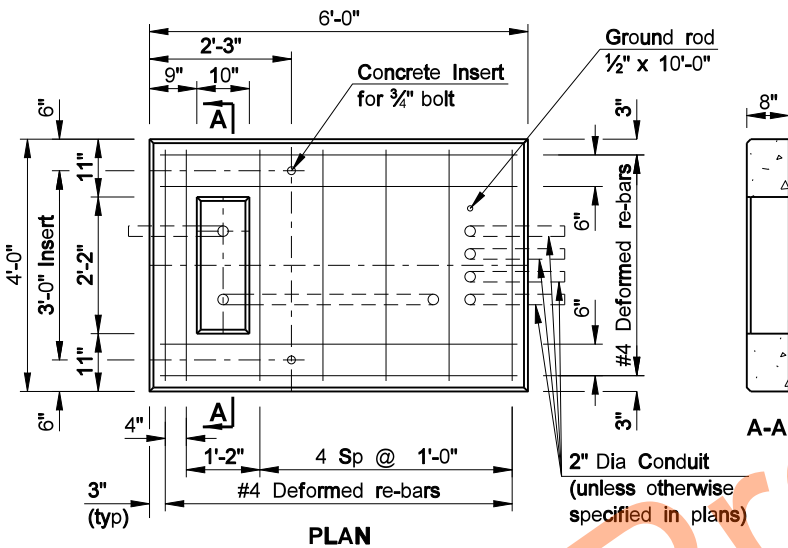
LIGHT & SIGNAL FOUNDATION TABLE	
FOOTING DEPTH (ft)	LONGITUDINAL REINFORCING
≤ 12	8 - #5
13 - 14	8 - #6
15 - 16	8 - #7
17 - 19	8 - #8

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



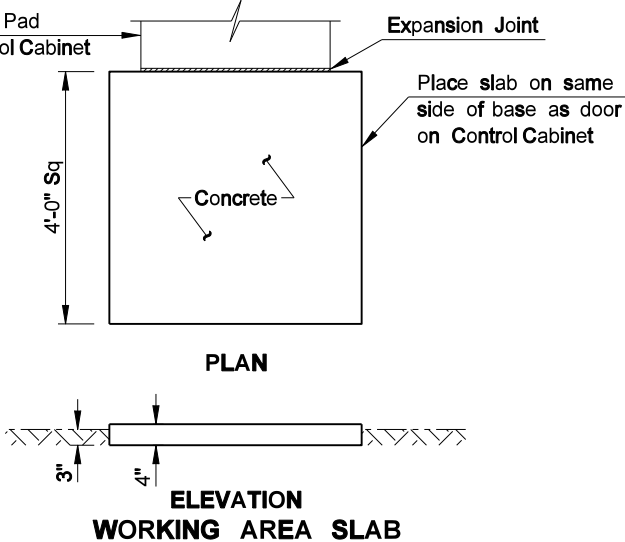
CONTROLLER CABINET FOUNDATION PAD MOUNT

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

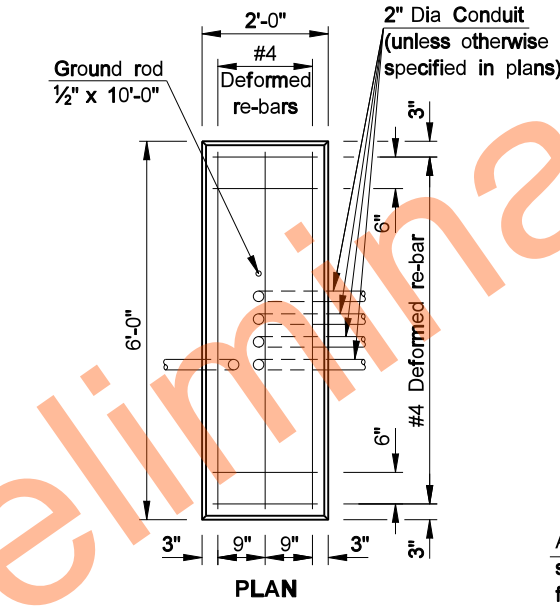


TRANSFORMER & FEED POINT
CABINET FOUNDATION PAD MOUNT

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

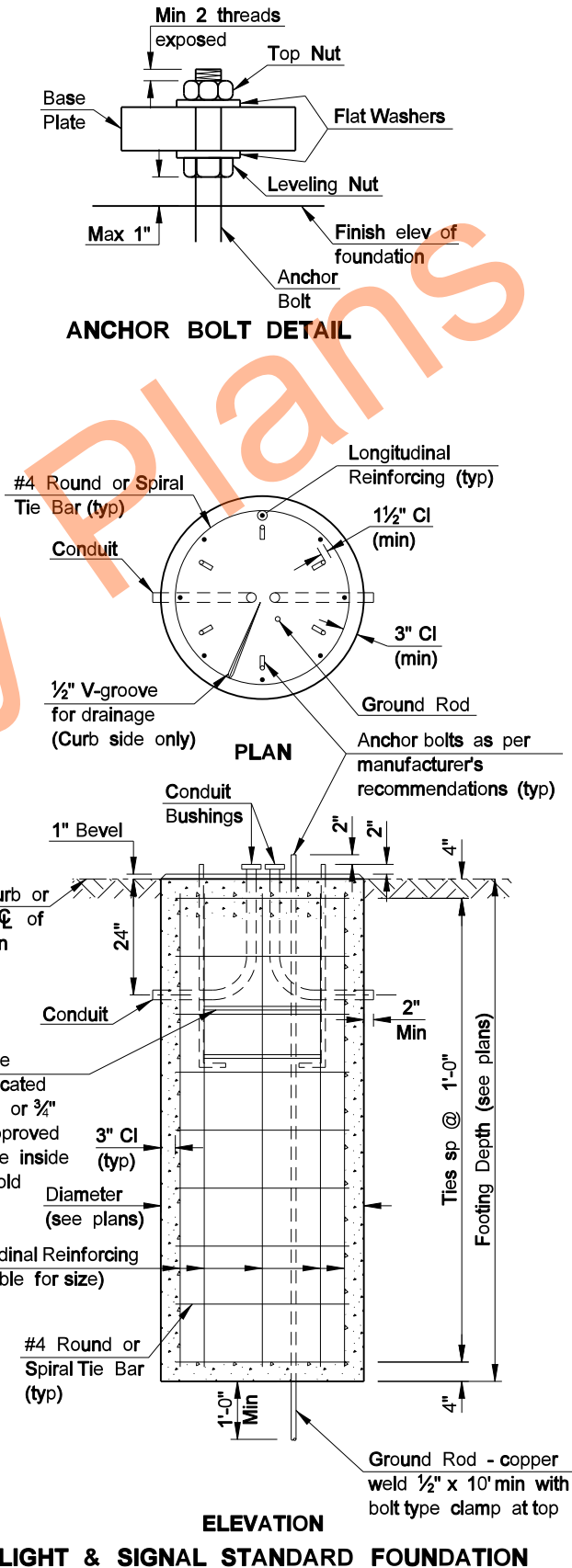


The Working Area Slab shall be installed where shown on the plans and shall not be bid separately but shall be included in the price bid for Concrete Foundation - Traffic Signals.



FEED POINT CABINET
FOUNDATION PAD MOUNT

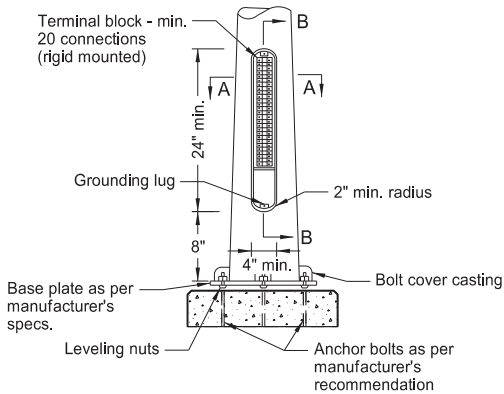
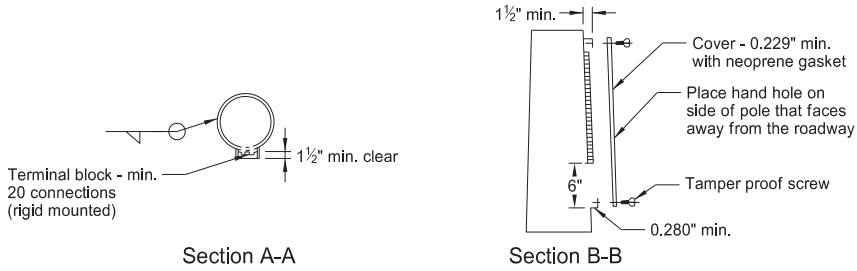
The Feed Point Cabinet Foundation Pad Mount shall be bid as Concrete Foundation ~ Feed Point ~ Type B.



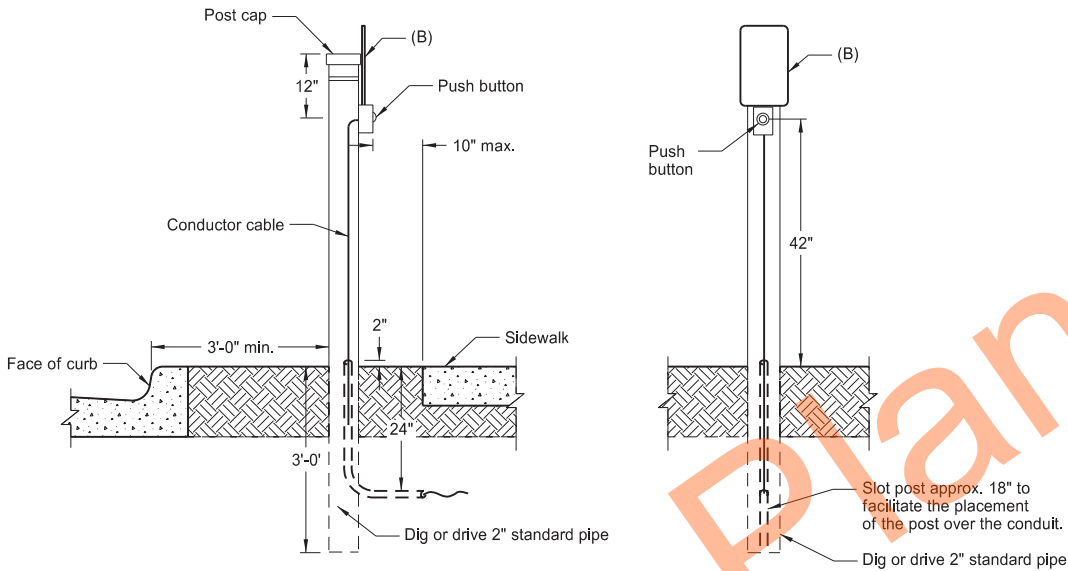
LIGHT & SIGNAL STANDARD FOUNDATION

TRAFFIC SIGNAL STANDARDS

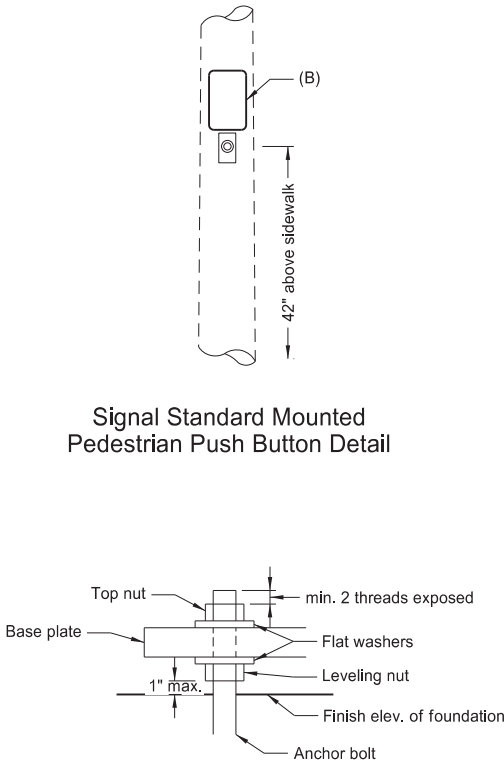
D-772-2



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



Pedestrian Push Button Post Details (A)



- (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.

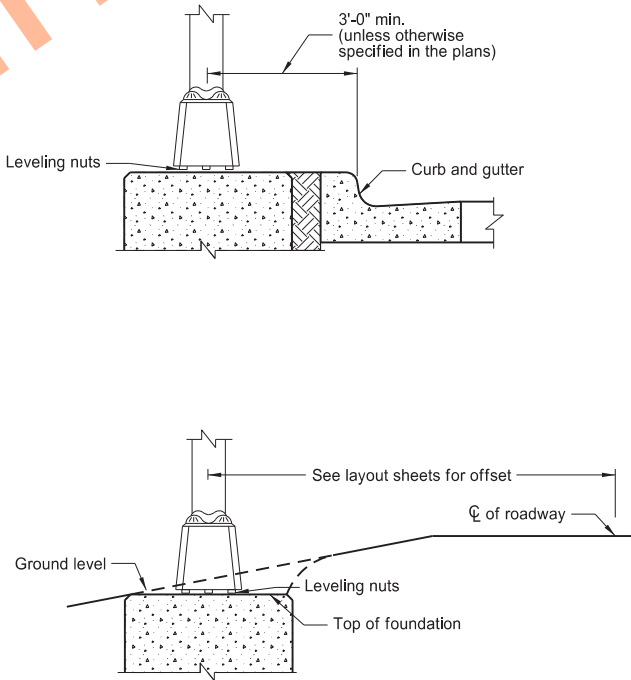
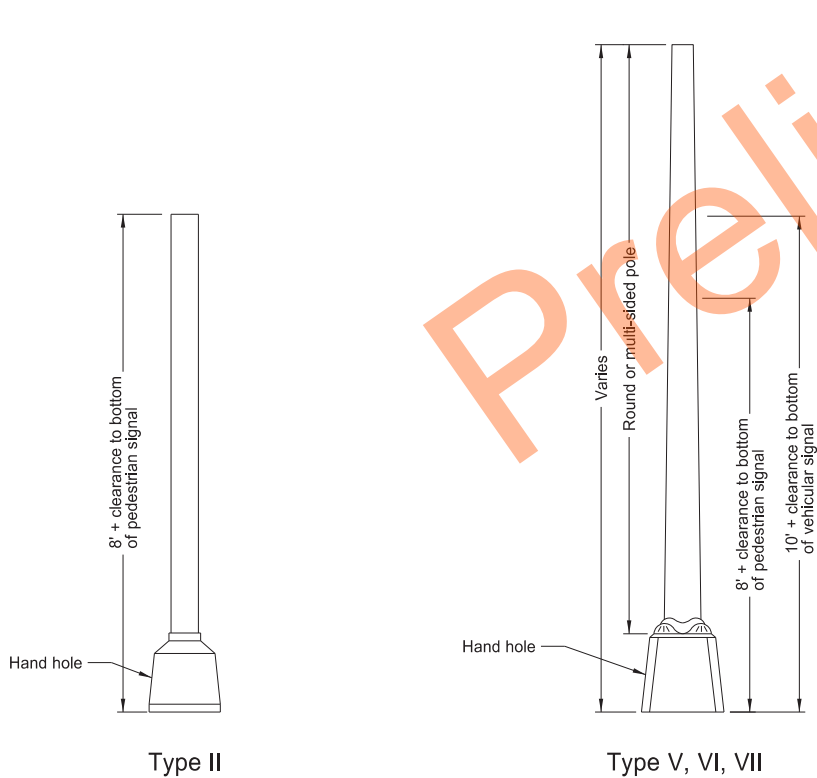
Notes:

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.



Signal Standard Minimum Clearance Details

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
08-20-25	Added physical stamp & signature



08/20/25