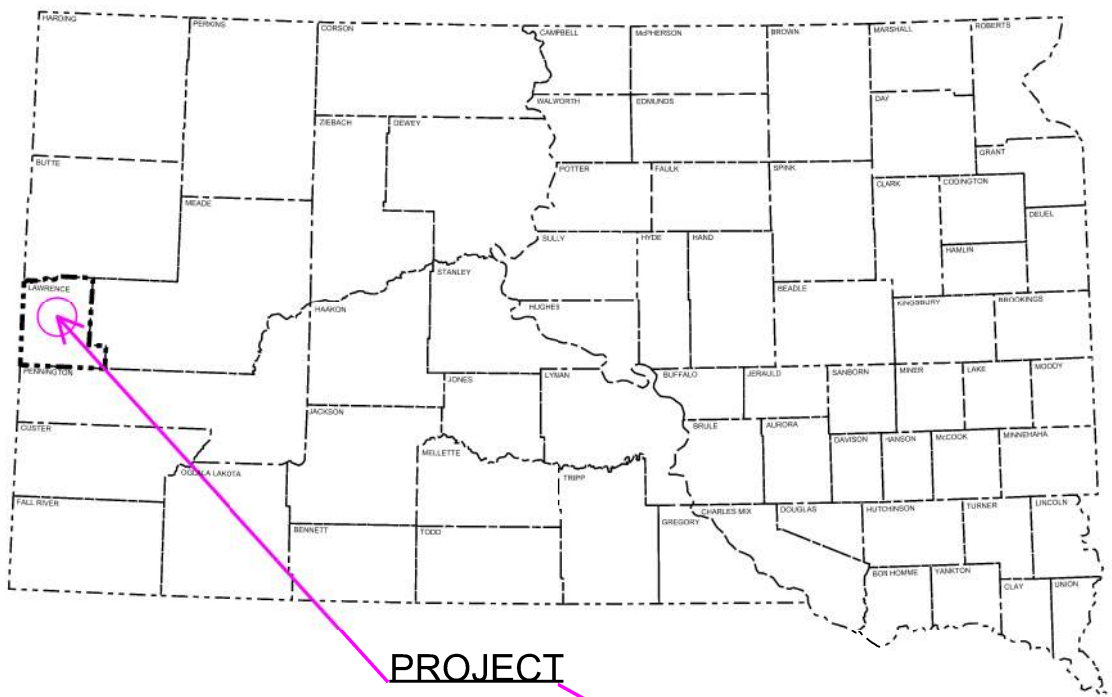


Plot Scale - 1/200

Plotted From - TRRC12216

Plotted From -



STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION
PLANS FOR PROPOSED

PROJECT 085-451
US HIGHWAY 85
LAWRENCE COUNTY

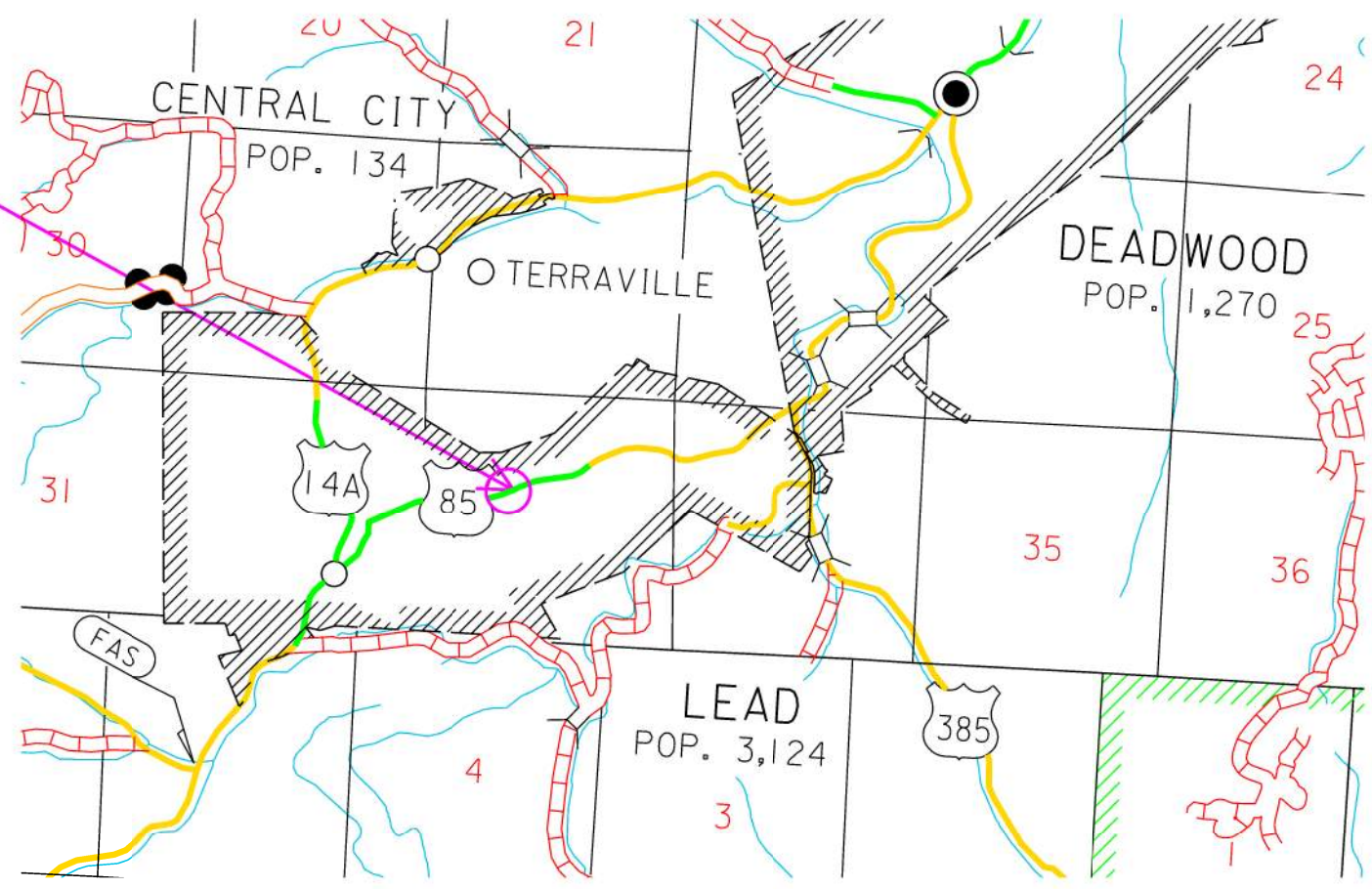
TYPE OF CONSTRUCTION
Rectangular Rapid Flashing Beacon
PCN i67U

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	085-451	1	21
Plotting Date:		12/08/2020	

INDEX OF SHEETS

1	General Layout with Index
2-7	Estimate with General Notes & Tables
8-13	Layouts
14-16	Special Details
17-21	Standard Plates

PROJECT



DESIGN DESIGNATION

US85 - MRM 24.62	
AADT (2019)	4197
AADT (2039)	5679
DHV	930
D	50%
DHV T%	3.5%
AADT T%	7.7%
V	25 MPH

STORM WATER PERMIT

No Permit Required

Gross Length	500 Feet	0.10 Miles
Length of Exceptions	0 Feet	0 Miles
Net Length	500 Feet	0.10 Miles

File - ...i67U_TitleSheet.dgn

ESTIMATE OF QUANTITIES

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
110E0130	Remove Traffic Sign	1	Each
110E7150	Remove Sign for Reset	1	Each
632E1320	2.0"x2.0" Perforated Tube Post	9.5	Ft
632E1340	2.5"x2.5" Perforated Tube Post	11.0	Ft
632E3205	Flat Aluminum Sign, Nonremovable Copy Super/Very High Intensity	22.0	SqFt
632E3500	Reset Sign	1	Each
633E0030	Cold Applied Plastic Pavement Marking, 24"	82	Ft
633E5051	Surface Preparation for Pavement Marking	164	SqFt
634E0010	Flagging	20.0	Hour
634E0110	Traffic Control Signs	169.0	SqFt
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E2000	Longitudinal Pedestrian Barricade	64	Ft
635E2000	Pedestal Signal Pole	2	Each
635E5020	2' Diameter Footing	12.0	Ft
635E5301	Type 1 Electrical Junction Box	2	Each
635E5980	Rectangular Rapid Flashing Beacon System	1	Each
635E8120	2" Rigid Conduit, Schedule 40	10	Ft
635E8220	2" Rigid Conduit, Schedule 80	65	Ft
635E9020	1/C #10 AWG Copper Wire	10	Ft
635E9502	2/C #14 AWG Copper Tray Cable, K2	90	Ft
635E9506	6/C #14 AWG Copper Tray Cable, K2	90	Ft

SPECIFICATIONS

Standard Specifications for Roads and Bridges, 2015 Edition and Required Provisions, Supplemental Specifications, and Special Provisions as included in the Proposal.

ENVIRONMENTAL COMMITMENTS

The SDDOT is committed to protecting the environment and uses Environmental Commitments as a communication tool for the Engineer and Contractor to ensure that attention is given to avoid, minimize, and/or mitigate an environmental impact. Environmental commitments to various agencies and the public have been made to secure approval of this project. An agency with permitting authority can delay a project if identified environmental impacts have not been adequately addressed. Unless otherwise designated, the Contractor’s primary contact regarding matters associated with these commitments will be the Project Engineer. These environmental commitments are not subject to change without prior written approval from the SDDOT Environmental Office.

Additional guidance on SDDOT’s Environmental Commitments can be accessed through the Environmental Procedures Manual found at: <https://dot.sd.gov/media/documents/EnvironmentalProceduresManual.pdf>

For questions regarding change orders in the field that may have an effect on an Environmental Commitment, the Project Engineer will contact the Environmental Office at 605-773-3098 or 605-773-4336 to determine whether an environmental analysis and/or resource agency coordination is necessary.

COMMITMENT B: FEDERALLY THREATENED, ENDANGERED, AND PROTECTED SPECIES

COMMITMENT B2: WHOOPING CRANE

The Whooping Crane is a spring and fall migratory bird in South Dakota that is about 5 feet tall and typically stops on wetlands, rivers, and agricultural lands along their migration route. An adult Whooping Crane is white with a red crown and a long, dark, pointed bill. Immature Whooping Cranes are cinnamon brown. While in flight, their long necks are kept straight and their long dark legs trail behind. Adult Whooping Cranes' black wing tips are visible during flight.

Action Taken/Required:

Harassment or other measures to cause the Whooping Crane to leave the site is a violation of the Endangered Species Act. If a Whooping Crane is sighted roosting in the vicinity of the project, borrow pit, or staging site associated with the project, cease construction activities in the affected area until the Whooping Crane departs and contact the Project Engineer. The Project Engineer will contact the Environmental Office so that the sighting can be reported to USFWS.

COMMITMENT E: STORM WATER

Construction activities constitute less than 1 acre of disturbance.

Action Taken/Required:

At a minimum and regardless of project size, appropriate erosion and sediment control measures must be installed to control the discharge of pollutants from the construction site.

COMMITMENT H: WASTE DISPOSAL SITE

The Contractor will furnish a site(s) for the disposal of construction and/or demolition debris generated by this project.

Action Taken/Required:

Construction and/or demolition debris may not be disposed of within the Public ROW.

The waste disposal site(s) will be managed and reclaimed in accordance with the following from the General Permit for Construction/Demolition Debris Disposal Under the South Dakota Waste Management Program issued by the Department of Environment and Natural Resources.

The waste disposal site(s) will not be located in a wetland, within 200 feet of surface water, or in an area that adversely affects wildlife, recreation, aesthetic value of an area, or any threatened or endangered species, as approved by the Project Engineer.

If the waste disposal site(s) is located such that it is within view of any ROW, the following additional requirements will apply:

1. Construction and/or demolition debris consisting of concrete, asphalt concrete, or other similar materials will be buried in a trench completely separate from wood debris. The final cover over the construction and/or demolition debris will consist of a minimum of 1 foot of soil capable of supporting vegetation. Waste disposal sites provided outside of the Public ROW will be seeded in accordance with Natural Resources Conservation Service recommendations. The seeding recommendations may be obtained through the appropriate County NRCS Office. The Contractor will control the access to waste disposal sites not within the Public ROW through the use of fences, gates, and placement of a sign or signs at the entrance to the site stating “No Dumping Allowed”.

2. Concrete and asphalt concrete debris may be stockpiled within view of the ROW for a period of time not to exceed the duration of the project. Prior to project completion, the waste will be removed from view of the ROW or buried and the waste disposal site reclaimed as noted above.

The above requirements will not apply to waste disposal sites that are covered by an individual solid waste permit as specified in SDCL 34A-6-58, SDCL 34A-6-1.13, and ARSD 74:27:10:06.

Failure to comply with the requirements stated above may result in civil penalties in accordance with South Dakota Solid Waste Law, SDCL 34A-6-1.31.

All costs associated with furnishing waste disposal site(s), disposing of waste, maintaining control of access (fence, gates, and signs), and reclamation of the waste disposal site(s) will be incidental to the various contract items.

COMMITMENT I: HISTORICAL PRESERVATION OFFICE CLEARANCES

The SDDOT has obtained concurrence with the State Historical Preservation Office (SHPO or THPO) for all work included within the project limits and all department designated sources and designated option material sources, stockpile sites, storage areas, and waste sites provided within the plans.

Action Taken/Required:

All earth disturbing activities not designated within the plans require review of cultural resources impacts. This work includes but is not limited to: Contractor furnished material sources, material processing sites, stockpile sites, storage areas, plant sites, and waste areas.

The Contractor will arrange and pay for a cultural resource survey and/or records search. The Contractor has the option to contact the state Archaeological Research Center (ARC) at 605-394-1936 or another qualified archaeologist, to obtain either a records search or a cultural

**COMMITMENT I: HISTORICAL PRESERVATION OFFICE
CLEARANCES – CONT'D**

resources survey. A record search might be sufficient for review; however, a cultural resources survey may need to be conducted by a qualified archaeologist.

The Contractor will provide ARC with the following: a topographical map or aerial view on which the site is clearly outlined, site dimensions, project number, and PCN. If applicable, provide evidence that the site has been previously disturbed by farming, mining, or construction activities with a landowner statement that artifacts have not been found on the site. The Contractor will submit the records search or cultural resources survey report and if the location of the site is within the current geographical or historic boundaries of any South Dakota reservation to SDDOT

Environmental Engineer, 700 East Broadway Avenue, Pierre, SD 57501-2586 (605-773-3180). SDDOT will submit the information to the appropriate SHPO/THPO. Allow **30 Days** from the date this information is submitted to the Environmental Engineer for SHPO/THPO review.

If evidence for cultural resources is uncovered during project construction activities, then such activities will cease and the Project Engineer will be immediately notified. The Project Engineer will contact the SDDOT Environmental Engineer in order to determine an appropriate course of action.

SHPO/THPO review does not relieve the Contractor of the responsibility for obtaining any additional permits and clearances for Contractor furnished material sources, material processing sites, stockpile sites, storage areas,

plant sites, and waste areas that affect wetlands, threatened and endangered species, or waterways. The Contractor will provide the required permits and clearances to the Project Engineer at the preconstruction meeting.

SCOPE OF WORK

The work on this project includes, but is not limited to, furnishing and installing new rectangular rapid flashing beacon system, foundations, conduit, pedestal poles with pedestrian push buttons, aluminum signs, pavement markings, and associated electrical work.

SEQUENCE OF OPERATIONS

The Contractor will submit a sequence of operations for approval two weeks prior to the preconstruction meeting.

SUPPLYING AS BUILT PLANS

If the RRFB system is constructed differently than what is stated in the plans, the Contractor will supply as built plans to the Engineer and a copy will be sent to the Traffic Design Engineer. The as built plans may include conduit layouts, wiring diagrams, or other drawings depicting the changes from the original plans. All costs for supplying As Built Plans will be incidental to other contract items.

SHOP DRAWING AND CATALOG CUTS SUBMITTALS

The Contractor will submit shop drawings and catalog cuts in accordance with Section 985 of the Specifications.

Adobe PDF submittals will be sent to the following email addresses:

Jon.Suomala@state.sd.us
Auston.Harris@state.sd.us
John.Less@state.sd.us

GENERAL PERMANENT SIGNING NOTES

New sign installations will be staked in the field by the Contractor and checked by the Engineer. The Contractor will give the Engineer a minimum of one week to check staked locations prior to signpost installation. Lateral offset of signs will be as shown in the plans or as directed by the Engineer. The Contractor will be responsible for contacting South Dakota One Call to locate the utilities at the staked sign installation locations.

When signs are vertically mounted in succession, they will be 1-2 inches apart. The minimum spacing between multiple signposts is 7 feet.

Prior to ordering signposts, the Contractor will verify post lengths. The height of the post must not exceed the minimum height needed by more than 0.5 feet. Any portion that extends above the sign will be cut off. No separate payment will be made for cutting the post or for that length cut off.

Prior to ordering signs, the Contractor will verify dimensions, background, border, and legend of the signs.

Prior to use, the Contractor will provide documentation for the sign support devices showing they meet the applicable NCHRP 350 or MASH requirements.

NEW PERMANENT SIGNING

All signs will be manufactured in accordance with the sheeting manufacturer's recommendations utilizing a matched component system, including inks, electronic cuttable films, and protective overlay films. Digitally printed signs will not be accepted.

All Flat Aluminum Signs, Nonremovable Copy Super/Very High Intensity will have sheeting in conformance with the requirements of ASTM D4956 Type XI.

Aluminum U-Channel stiffeners will be used on all signs 36 inches or greater in width and will conform to ASTM B221 Alloy 6063-T6 or 6061-T6. The U-Channel will be 2 inches in width and free of holes. The U-Channel stiffeners will also be used to connect various signs together so that an entire sign assembly can be erected on a single installation.

Stiffeners may be fastened to signs by use of 1/4-inch diameter drive rivets. Refer to the Breakaway Sign Supports diagram for typical sign and stiffener details. The Contractor will use 3/8-inch diameter rust proof machine sign bolts, flat metal washers, neoprene washers (against the sign sheeting), lock washers, and nuts to fasten the sign to the channel aluminum and posts. A minimum of two bolts will extend through each post.

All costs associated with furnishing and installing the new permanent signs, and with furnishing and installing stiffeners and hardware will be incidental to the contract unit price per square foot for Flat Aluminum Sign, Nonremovable Copy Super/Very High Intensity.

REMOVE TRAFFIC SIGN

Existing signs that are shown as being removed in the Permanent Signing Table will become the property of the Contractor. Existing signposts and bases will be removed in their entirety. All existing signs, posts, and/or hardware removed will not be reused. Holes remaining from the removal of wood posts will be backfilled and compacted with material placed in layers not to exceed 6 inches in depth.

All costs associated with the removal of existing signs, posts, hardware, and backfilled holes will be incidental to the contract unit price per each for Remove Traffic Sign. Quantities will be per assembly at the contract unit price per each.

REMOVE SIGN FOR RESET AND RESET SIGN

Signs that are scheduled for reset will be dismantled and reassembled to the extent needed by the Contractor to properly reset the sign. Signs will be handled with care so that the existing signs, posts, and bases are not damaged during the relocation process. The Contractor will replace and pay for any reset signs damaged in their care. The Contractor will remove and dispose of any existing posts for all reset signs that require use of new posts as shown in the Table of Permanent Signing.

All costs for removing, dismantling, and disposing of any existing posts will be incidental to the contract unit price per each for "Remove Sign for Reset". All costs for resetting the existing signs will be incidental to the contract unit price per each for "Reset Sign". All quantities for Remove Sign for Reset and Reset Sign will be per assembly at the contract unit price per each.

SQUARE TUBE POST SLEEVE – 2.5”x 2.5”

All 2.5” x 2.5”, 10 Gauge perforated tube post will be sleeved with a 2-3/16” x 2-3/16” x 4’, 10 Gauge perforated tube post.

SQUARE TUBE ANCHOR SLEEVE- 2.0”x 2.0”

The Contractor will furnish and install new 2.5” x 2.5” x 18”, 12 Gauge square tube anchor sleeve or equivalent components as approved by the Engineer. A 2.25” x 2.25” x 4’, 12 Gauge perforated tube post will be used as the anchor post for installation with the square tube anchor sleeve.

SURFACE MOUNT FOR SQUARE STEEL POST

The Contractor will use Xcessories Squared brand (or equivalent) Kleen Break Sign Support Surface Mount Installation for square steel posts when mounting any signs to a concrete surface. The surface mounted bases will be installed as per the manufacturer's recommendations.

All cost for labor, equipment, and materials for surface mounted bases for square steel posts will be incidental to other contract items.

POLE MOUNTED SIGNS

Signs that are mounted on luminaire will be attached with high strength stainless steel bands or galvanized pole clamps. Signs will be attached as recommended by the manufacturer. All sign mounting hardware will be stainless steel or galvanized steel. Pole mounted signs will be mounted a minimum of 7 ft above the ground. Mounting heights are measured to the bottom of the signs.

All costs for pole sign mounting hardware will be incidental to the contract unit price per square foot for “Flat Aluminum Sign, Nonremovable Copy Super/Very High Intensity”.

TABLE OF FOOTING DATA

Site Designation	Footing Diameter	* Footing Depth	**Spiral Diameter	**Spiral Length	Vertical Reinforcement
C1, C2	2’ - 0”	6’ - 0”	1’ - 8”	44’ - 3”	8-#7 x 5’ - 6”

* Footing depth will be below ground level.
** The size of all spirals will be #3.

COLD APPLIED PLASTIC PAVEMENT MARKING

All materials will be applied as per the manufacturer’s recommendations. Cold Applied Plastic Pavement Markings will be 3M Series 380 AW or an approved equal.

SURFACE PREPARATION FOR PAVEMENT MARKING

The Contractor will prepare the pavement surface prior to applying the durable pavement marking in accordance with the following.

In areas where the existing groove meets the required depth and existing markings are still in place, the Contractor will clean the existing groove without adding additional depth beyond the required depth for the new pavement marking, including reflective media as noted below.

Description	Specification	Tolerance
Depth of Groove	Marking Thickness ¹ + 15 mils	+ 5 mils

¹ Marking thickness will include the thickness of marking material and reflective media.

The cleaning will result in the existing pavement marking being adequately scuffed, abraded, and removed by light grinding or abrasive blasting or both to allow proper adhesion of the new durable pavement marking as per the manufacturer’s recommendations to comply with product warranties.

Existing grooves not meeting the required depth will be re-grooved to the required depth for the new pavement marking, including reflective media. Equipment for grooving will be capable of the following:

- Grooving the total width of the groove in one pass or uniform depths with multiple passes.
- Grooving without causing damage to the pavement joints or joint sealant material.

- Provide uniform alignment and depth.
- Moving continuously to permit a mobile traffic work operation.

All costs associated with cleaning of the existing groove, including re-grooving, if needed, will be included in the contract unit price per foot for Surface Preparation for Pavement Marking”. Surface preparation will be measured as square feet.

GENERAL TRAFFIC CONTROL

Existing guide, route, informational logo, regulatory, and warning signs will be temporarily reset and maintained during construction. Removing, relocating, covering, salvaging, and resetting of existing traffic control devices, including delineation, will be the responsibility of the Contractor. Cost for this work will be incidental to the contract unit prices for the various items unless otherwise specified in the plans. Any delineators and signs damaged or lost will be replaced by the Contractor at no cost to the State.

All temporary traffic control sign locations will be set in the field by the Contractor and verified by the Engineer prior to installation.

Portable sign supports will not be located on sidewalks, bicycle facilities, or other areas designated for pedestrian or bicycle traffic.

All construction operations will be conducted in the general direction of traffic movement.

If there is a discrepancy between the traffic control plans, standard plates, and the MUTCD, whichever is more stringent will be used, as determined by the Engineer.

Unless otherwise stated in these plans, work will not be allowed during hours of darkness.

Traffic Control Signs, as shown in the Estimate of Quantities, are estimates. Contractor’s operation may require adjustments in quantities, either more or less. Payment will be for those signs actually ordered by the Engineer and used.

Fixed location signing placed more than 4 calendar days prior to the start of construction will be covered or laid down until the time of construction. The covers must be approved by the Engineer prior to installation. The cost of materials, labor, and equipment necessary to complete this work will be incidental to other contract items. No separate payment will be made.

All fixed location signs, sign posts, and breakaway bases will be removed within 7 calendar days following pavement marking.

FLAGGING

Operations will be conducted so that the traveling public will not have to wait longer than 15 minutes at the flagger station.

Additional flagger warning signs and flagger hours have been included in the Estimate of Quantities for use on intersecting roads. These flaggers will be used as directed by the Engineer and will be used primarily during daytime hours.

It is required that the flaggers and pilot car operators be able to communicate with one another. If an emergency vehicle needs to pass through the project, the Contractor will be required to expedite traffic movement. All costs associated with this will be incidental to the contract unit price per hour for “Flagging”.

LONGITUDINAL PEDESTRIAN BARRICADE

Longitudinal pedestrian barricades should not be used to provide positive protection for pedestrians.

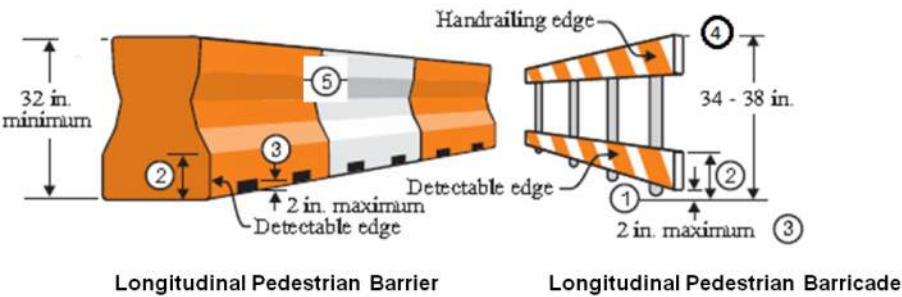
To prevent any tripping hazard to pedestrians, ballast will be located behind or internal to the device.

When longitudinal pedestrian barricades are combined in a series, the maximum gap between devices that do not interlock will be one inch. Joints between devices that do interlock will be closed and flush to prevent canes or small wheels from being trapped and to facilitate safe hand trailing. When used as a sidewalk closure mechanism, longitudinal pedestrian barricade must run the entire width of the sidewalk. Longitudinal pedestrian barricade should provide a color contrasting pattern. Black should not be used to color any base on a device. The devices should comply with the general color and stripe pattern requirements of Section 6F.68 of the MUTCD.

Longitudinal pedestrian barricade will have continuous bottom and top surfaces. The top surface will be smooth to allow safe hand trailing. Both upper and lower surfaces will share a common vertical plane.

All costs will be incidental to the contract unit price per foot for “Longitudinal Pedestrian Barricade”.

PEDESTRIAN CHANNELIZING DEVICE DETAILS



- Barricade rail supports may not extend into the pedestrian walkway more than 4 inches from the face of the barricade.
- The top edge of the bottom portion will be a minimum of 8 inches above the walkway.
- Devices will not block water drainage from the walkway. A gap height or opening from the walkway surface up to a maximum of 2 inches in height is allowed for drainage purposes.
- The top edge of the longitudinal pedestrian barricade is to be used as a guiderail to provide visual and tactile guidance to pedestrians along a designated route. The top surface should have a minimum width of 0.5 inches to allow the hand to feel the surface. The surface should be smooth and free of any sharp or abrasive elements to allow safe hand trailing.
- Longitudinal pedestrian barrier used to provide positive protection from traffic to pedestrians should be crashworthy.

ITEMIZED LIST FOR TRAFFIC CONTROL

SIGN CODE	SIGN DESCRIPTION	CONVENTIONAL ROAD			
		NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT
R9-9	SIDEWALK CLOSED	4	24" x 12"	2.0	8.0
R9-11a	SIDEWALK CLOSED (ARROW L or R) CROSS HERE	4	24" x 12"	2.0	8.0
W3-4	BE PREPARED TO STOP	2	48" x 48"	16.0	32.0
W20-1	ROAD WORK AHEAD	2	48" x 48"	16.0	32.0
W20-7	FLAGGER (symbol)	2	48" x 48"	16.0	32.0
W21-5	SHOULDER WORK	3	48" x 48"	16.0	48.0
G20-2	END ROAD WORK	2	36" x 18"	4.5	9.0
		CONVENTIONAL ROAD			
		TRAFFIC CONTROL SIGNS SQFT			
		169.0			

UTILITIES

The Contractor will contact the involved utility companies through South Dakota One Call (1-800-781-7474) prior to starting work. It will be the responsibility of the Contractor to coordinate work with the utility owners to avoid damage to existing facilities.

If utilities are identified near the improvement area through the SD One Call Process as required by South Dakota Codified Law 49-7A and Administrative Rule Article 20:25, the Contractor will contact the Project Engineer to determine modifications that will be necessary to avoid utility impacts.

WIRE SPLICING FOR LIGHTING

All wire splices for lighting will be made using TE Connectivity GTAP connectors, NSI Industries Polaris Blue connectors, or an approved equal.

TYPE 1 ELECTRICAL JUNCTION BOX

Junction box - JB1 will be placed to intercept the existing 2" lighting system conduit as shown on the plans. The existing conduits will be located, exposed, and modified to properly enter the new junction box. The Contractor will disconnect, gently pull back the existing wires from the existing decorative light located at approximate Sta. 38+05 – 35'Lt, splice on new wires for RRFB system, and reconnect wiring to the decorative light. Contact the City Administrator - Mike Stahl (605)584-1401 with the City of Lead to get access to shut off power.

All costs associated with exposing the existing conduit, modifying the existing conduit and wiring, and placing the new junction box will be incidental to the contract unit price per each for "Type 1 Electrical Junction Box."

PEDESTAL SIGNAL POLES

Pedestal signal poles may be aluminum. Aluminum poles will conform to the following requirements:

Aluminum will conform to ASTM B221, Alloy 6061, and Temper T6.

Poles will be round with a minimum outside pole diameter of 4 inches, and the pole assembly will have a square, cast aluminum base with aluminum access door. The base will conform to the breakaway requirements of NCHRP 350 or MASH. A grounding lug will be provided in the base.

The pole to base connection will be a threaded connection; threads will be 8 TPI, NPT. A collar (integral or non-integral) to prevent wind-induced loosening of pole will be provided. All bolt and connection threads will be coated with a commercially available anti-seize compound intended for use in aluminum-to-aluminum and steel-to-aluminum connections.

The pole finish will either be brushed satin or spun. The top of the pole will be sealed by the traffic signal head mounting hardware or by an aluminum cap.

Measurement and payment for aluminum poles will be as specified in Specifications Section 635.

ACCESSIBLE PEDESTRIAN SIGNAL

The work will consist of furnishing and installing accessible pedestrian signals (APS). Each APS will consist of an interactive vibrotactile pedestrian pushbutton with speaker, an informational sign, a latching light emitting diode (LED) indicator light, a solid-state electronic control board, a power supply, wiring, and all necessary mounting hardware. The operation and performance of the APS units will meet the requirements of MUTCD Sections 4E.08 to 4E.13. and the applicable sections of NEMA Standards Publication TS-2.

The APS units will be capable of supporting a minimum of 16 push button stations.

All mounting fasteners will be stainless steel; all threads will be coated with anti-seize compound meeting the requirements of USA Dept. of Defense specification MIL-PRF-907F. The push button component of APS will meet the requirements of Section 985.1 S of the Specifications except that all housings and external hardware will be aluminum, powder coated yellow.

The APS control unit will include capability to monitor the push buttons and pedestrian signal head displays. Conflicts will cause the channel to be powered off.

The APS control unit will include capability to monitor communications with the push buttons. Communication faults will automatically reset the control unit.

Two licensed copies of any APS programming software will be furnished. All software programming, firmware updates, and audio message programming of the APS will be through USB port or Ethernet connection.

PEDESTRIAN PUSH BUTTON POLE

Pedestrian push button poles will be one of the following types, or an approved equal:

Product	Manufacturer
Crosswalk Pedestal CP6ACT4840TCSS	Frey Manufacturing Corp. Norwood, MN 55368-9675 Phone: 1-952-467-4402 www.freymfgcorp.com
Ped Poles SP-3022-NY-SP0001	Pelco Products, Inc Edmond, OK 73013 Phone: 1-405-340-3434 www.pelcoinc.com
GP3 APS Pole B-GP3-7-7-10-AA-4T	TIP Indications 22480 County Rd 75 St. Cloud, MN 56301 www.tipindications.com

RECTANGULAR RAPID FLASHING BEACON SYSTEM

This item will consist of the following:

- Individual Rectangular Rapid Flashing Beacons (RRFB) as shown on the plans
- Pedestrian push buttons mounted to Pedestal Signal Pole as shown on the plans
- 4 – Pedestrian crossing warning signs (W11-2 - 36”X36”) – Fluorescent yellow/green as shown on the plans
- 4 - Downward (2 Rt & 2 Lt) diagonal arrow plaques (W16-7P – 24”X12”) – Fluorescent yellow/green as shown on the plans
- 2 - Push Button signs (R10-25) as shown on the plans
- Stepdown transformer
- All necessary electronic programming & flash units, hardware, and wiring to make the system operational

1. Beacon Dimensions and Placement in Sign Assembly:

Each individual (RRFB) will consist of two rectangular-shaped yellow indications, each with an LED-array-based light source. The size of each indication will be at least 5 inches wide by at least 2 inches high.

The two indications will be aligned horizontally, with the longer dimension horizontal and with a minimum space between the two indications of at least 7 inches, measured from the nearest edge of one indication to the nearest edge of the other indication.

The outside edges of the RRFB will not project beyond the outside edges of the crossing warning sign (W11-2).

Each RRFB will be located between, and immediately adjacent to, the bottom of the crossing warning sign (W11-2) and the top of the downward diagonal arrow plaque (W16-7P).

2. Beacon Flashing Requirements:

When actuated, the indications in each RRFB will flash in a rapidly flashing sequence. The RRFB will provide 75 flashing sequences per minute. During each 800-millisecond flashing sequence, the left and right RRFB indications will operate using the following sequence:

- The indication on the left-hand side will be illuminated for approximately 50 milliseconds.
- Both indications will be dark for approximately 50 milliseconds.
- The indication on the right-hand side will be illuminated for approximately 50 milliseconds.
- Both indications will be dark for approximately 50 milliseconds.
- The indication on the left-hand side will be illuminated for approximately 50 milliseconds.
- Both indications will be dark for approximately 50 milliseconds.
- The indication on the right-hand side will be illuminated for approximately 50 milliseconds.

- Both indications will be dark for approximately 50 milliseconds.
- Both indications will be illuminated for approximately 50 milliseconds.
- Both indications will be dark for approximately 50 milliseconds.
- Both indications will be illuminated for approximately 50 milliseconds.
- Both indications will be dark for approximately 250 milliseconds.

The light intensity of the indications during daytime conditions will meet the minimum specifications for Class 1 yellow peak luminous intensity in the Society of Automotive Engineers (SAE) Standard J595 (Directional Flashing Optical Warning Devices for Authorized Emergency, Maintenance, and Service Vehicles) dated January 2005.

Each RRFB will be equipped with an automatic signal dimming device to reduce illumination levels during periods of reduced ambient light.

3. Beacon Operation:

Each RRFB will be normally dark, will initiate operation only upon pedestrian actuation, and will cease operation 18 seconds after the pedestrian actuation.

All RRFB indications will simultaneously commence operation and simultaneously cease operation.

The programmed operation period will be immediately initiated upon each pedestrian actuation, including when the actuation occurs while the RRFB are already flashing and when the actuation occurs immediately after the indications have ceased flashing.

A “Push Button to Turn on Warning Lights” (R10-25) sign will be installed adjacent to, or integral with, the pedestrian pushbutton and on the backside of the pedestal pole for pedestrians approaching from the backside.

A small light directed at and visible to pedestrians in the crosswalk will be installed integral to the RRFB or push button, to give confirmation that each beacon is in operation.

4. Control Enclosure:

All enclosures will be aluminum and comply with the requirements for NEMA 3R type.

All materials and installation costs necessary for the operation of each system will be incidental to the contract unit price per each for “Rectangular Rapid Flashing Beacon System.”

All costs for furnishing and installing the accessible pedestrian signal including labor, materials, and equipment, will be incidental to the contract unit price per each for “Accessible Pedestrian Signal”.

PERMANENT SIGNING - Hwy #: 85 MRM: 24.62																			
EXISTING STA. (Approx.)	NEW STA. (Approx.)	SIGN								POST					SIGN DESCRIPTION	WORK TO BE DONE	2.0" TELESPAR (FT)	2.5" TELESPAR (FT)	FLAT ALUM TYPE XI (SQ FT)
		Number	Width (in)	Height (in)	Facing Traffic	New Sign	Remove Existing	Square Footage	Sheeting Type	New Post	Length (ft)	Size (in)	# of Posts	Shear Slip Base					
	36+79 RT	W 11-2	36	36	SOUTHBOUND	FLAT ALUM	NO	9.0	XI	YES	11	2.5	1	YES	PEDESTRIAN CROSSING - SYMBOL (FLUORESCENT YELLOW/GREEN)	INSTALL NEW SIGN ON NEW POST AND FLUSH MOUNT BREAKAWAY BASE	0.0	11.0	9.0
	36+79 RT	W 16-9P	24	12	SOUTHBOUND	FLAT ALUM	NO	2.0	XI	YES	-	-	-	-	AHEAD (FLUORESCENT YELLOW/GREEN)	INSTALL NEW SIGN BELOW PED CROSSING SIGN	0.0	0.0	2.0
38+14 RT	39+09 RT	R1-1	30	30	EASTBOUND	NO	YES	5.2	XI	YES	9.5	2.0	1	NO	STOP	REMOVE EXISTING SIGN AND RESET ON NEW POST AND BASE - 4 FT IN ADVANCE OF NEW STOP BAR ON JULIUS ST.	9.5	0.0	0.0
39+47 LT	SAME	W 11-2	36	36	NORTHBOUND	FLAT ALUM	YES	9.0	XI	YES	-	-	-	-	PEDESTRIAN CROSSING - SYMBOL (FLUORESCENT YELLOW/GREEN)	REMOVE EXISTING SIGN ON LIGHT POLE AND INSTALL NEW SIGN	0.0	0.0	9.0
	39+47 LT	W 16-9P	24	12	NORTHBOUND	FLAT ALUM	NO	2.0	XI	YES	-	-	-	-	AHEAD (FLUORESCENT YELLOW/GREEN)	INSTALL NEW SIGN BELOW PED CROSSING SIGN	0.0	0.0	2.0
																TOTAL =	9.5	11.0	22.0

CONDUIT AND CABLE QUANTITIES

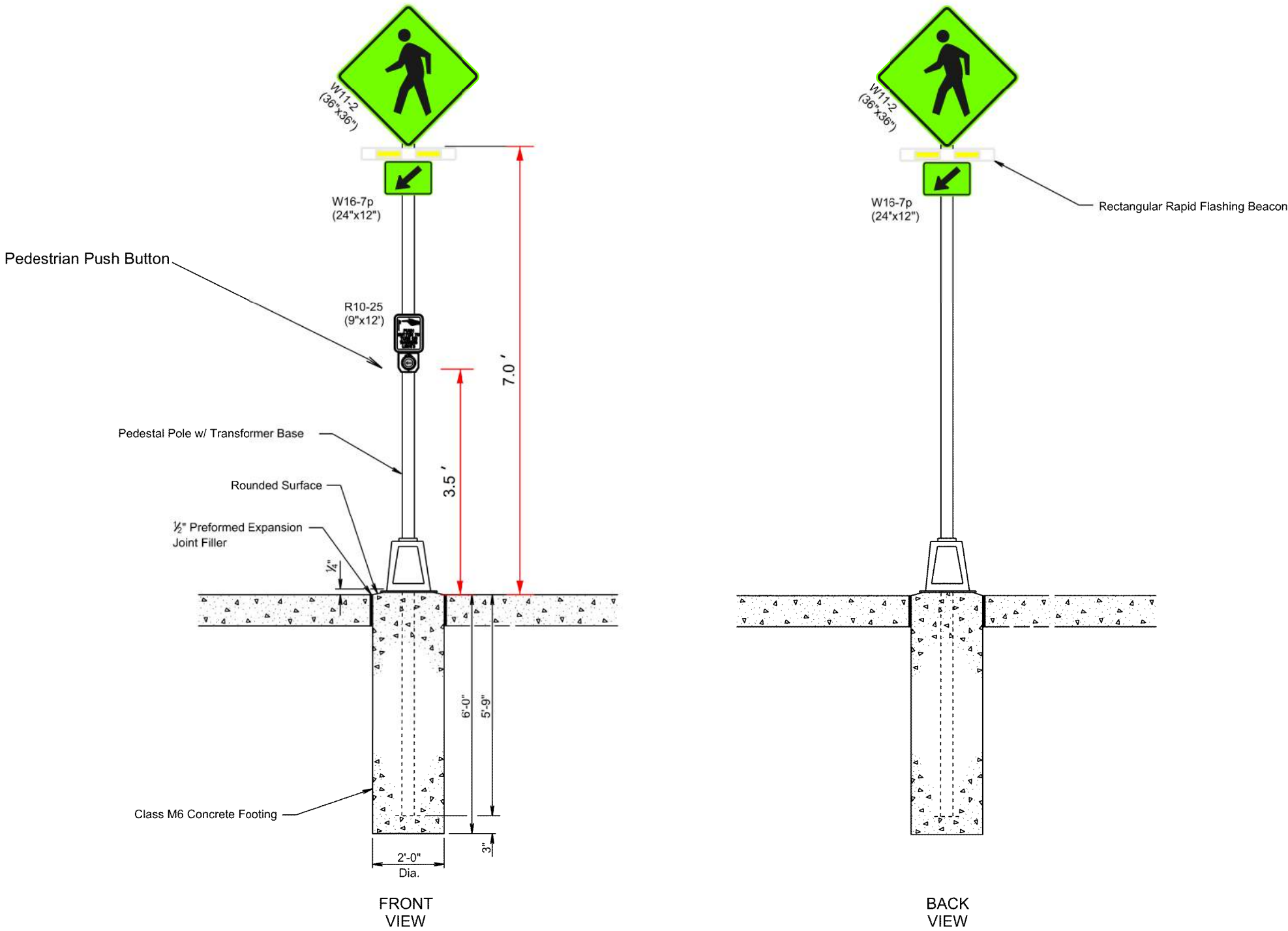
Location to Location	Rigid Conduit			Copper Wire		Copper Tray Cable, K2	
	Schedule 40	Schedule 80				#14 AWG	
	2"	2"		1/C #10 AWG Ft		2/C	6/C
	Ft	Ft					
US HWY 85 & JULIUS ST.							
JB1	C1	5		10		10	10
JB1	JB2		65			70	70
JB2	C2	5				10	10
Total:	10	65		10		90	90

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	085-451	8	21

Plotting Date: 12/07/2020

SPECIAL DETAIL

RECTANGULAR RAPID FLASHING BEACONS & SIGNS



Plot Scale - 1:18,883

Plotted From - TRRC122/16

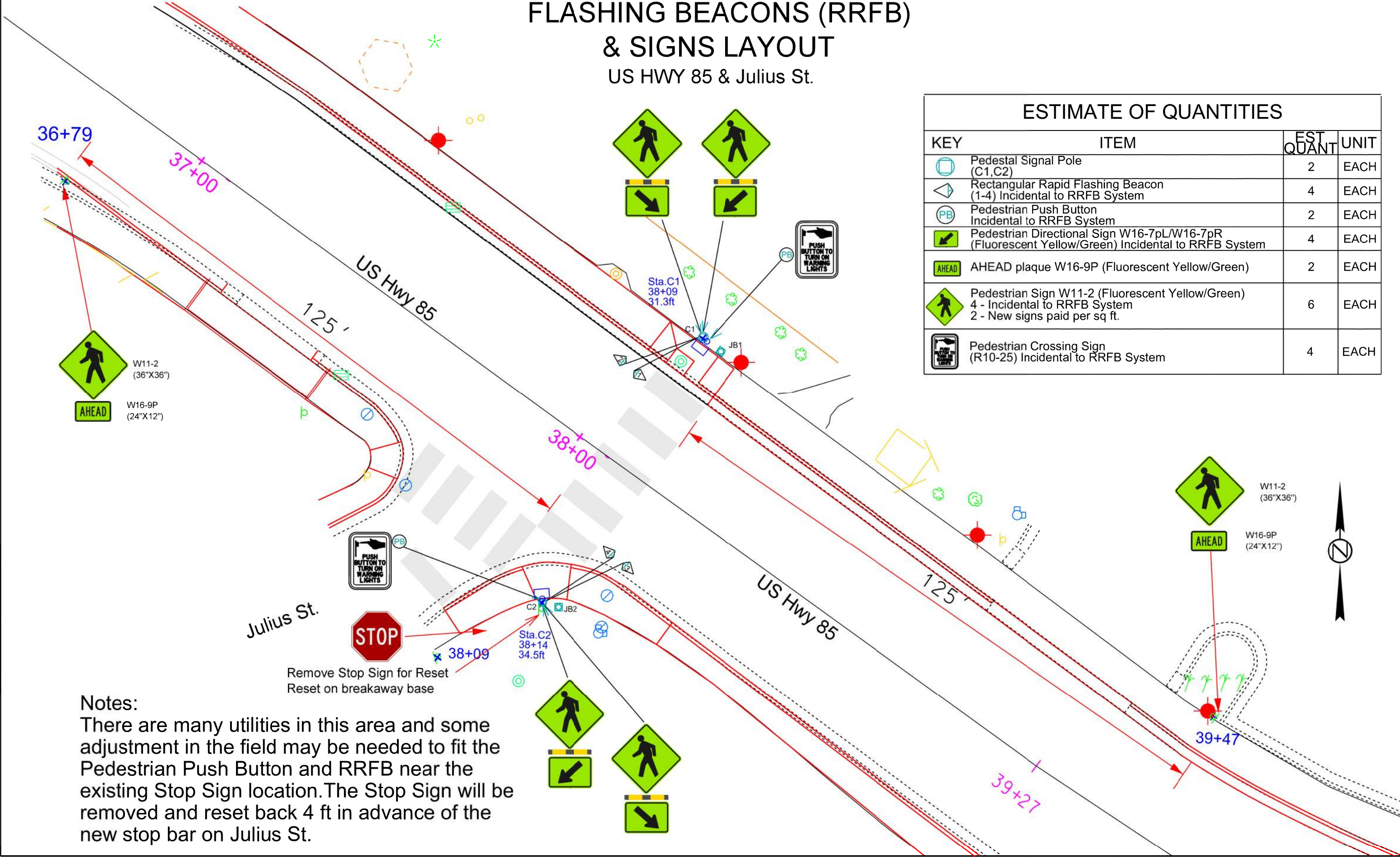
RECTANGULAR RAPID FLASHING BEACONS (RRFB) & SIGNS LAYOUT

US HWY 85 & Julius St.

STATE OF SOUTH DAKOTA	PROJECT 085-451	SHEET 9	TOTAL SHEETS 21
-----------------------	-----------------	---------	-----------------

Plotting Date: 12/07/2020

ESTIMATE OF QUANTITIES			
KEY	ITEM	EST QUANT	UNIT
	Pedestal Signal Pole (C1,C2)	2	EACH
	Rectangular Rapid Flashing Beacon (1-4) Incidental to RRFB System	4	EACH
	Pedestrian Push Button Incidental to RRFB System	2	EACH
	Pedestrian Directional Sign W16-7pL/W16-7pR (Fluorescent Yellow/Green) Incidental to RRFB System	4	EACH
	AHEAD plaque W16-9P (Fluorescent Yellow/Green)	2	EACH
	Pedestrian Sign W11-2 (Fluorescent Yellow/Green) 4 - Incidental to RRFB System 2 - New signs paid per sq ft.	6	EACH
	Pedestrian Crossing Sign (R10-25) Incidental to RRFB System	4	EACH



Notes:
There are many utilities in this area and some adjustment in the field may be needed to fit the Pedestrian Push Button and RRFB near the existing Stop Sign location. The Stop Sign will be removed and reset back 4 ft in advance of the new stop bar on Julius St.

Remove Stop Sign for Reset
Reset on breakaway base

File - ...RRFB and Sign layout.dgn

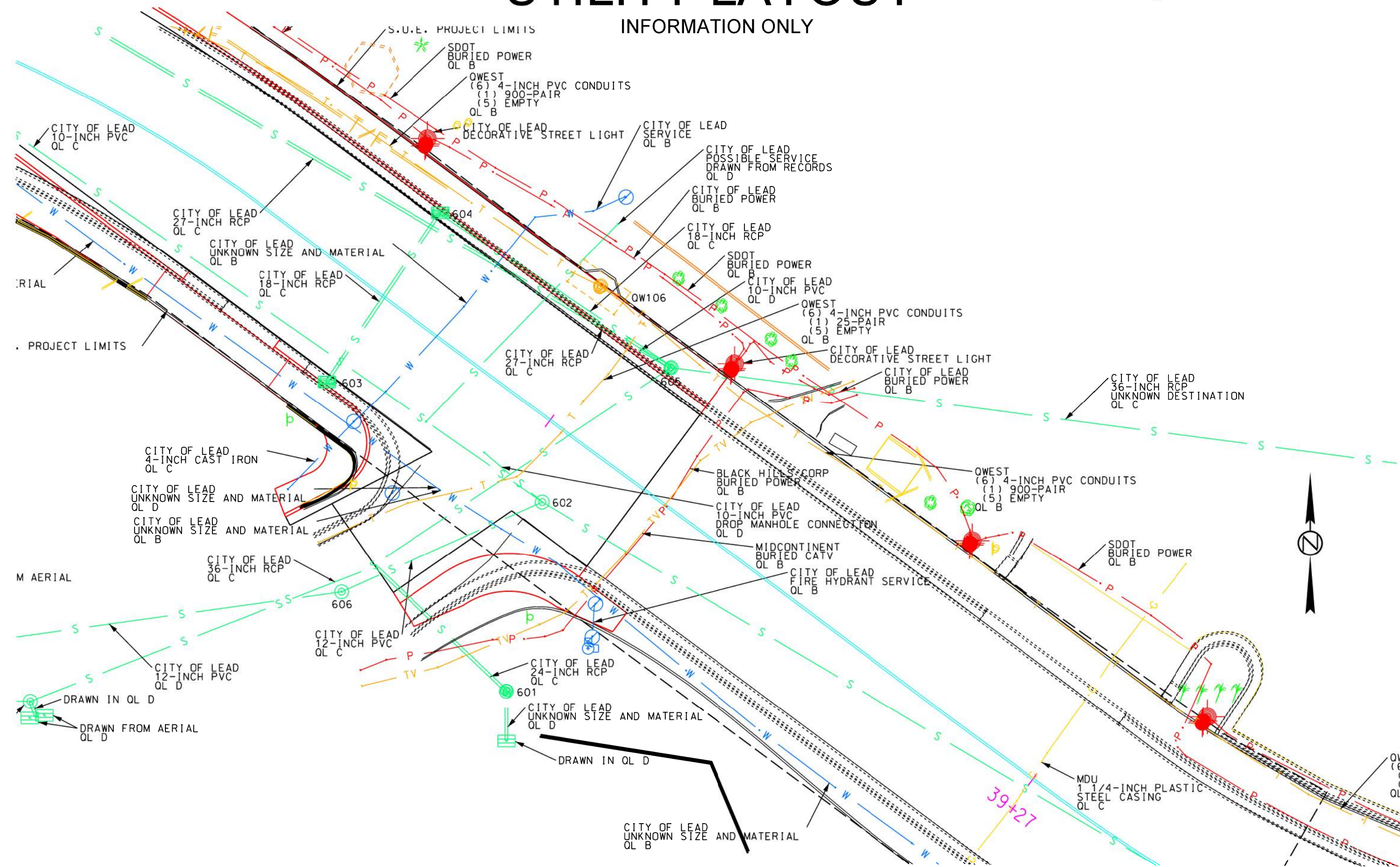
UTILITY LAYOUT

INFORMATION ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	085-451	11	21
Plotting Date: 12/07/2020			

Plot Scale - 1:18,884.3

Plotted From - TRRC122/16



File - ...le028L.dgn

Plot Scale - 1:18,8958

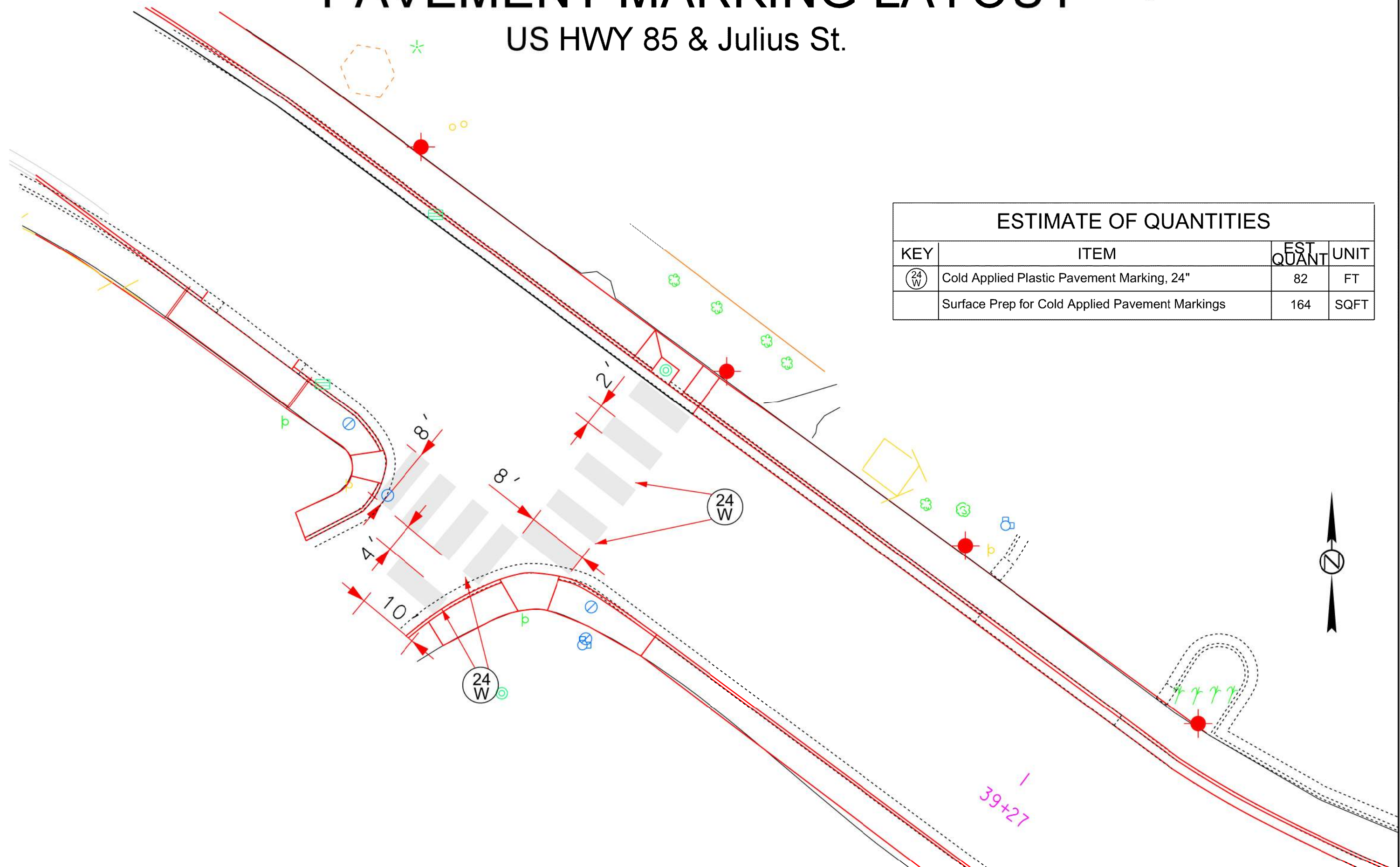
Plotted From - TRRC122/16

PAVEMENT MARKING LAYOUT

US HWY 85 & Julius St.

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	085-451	12	21
Plotting Date: 12/07/2020			

ESTIMATE OF QUANTITIES			
KEY	ITEM	EST QUANT	UNIT
(24 W)	Cold Applied Plastic Pavement Marking, 24"	82	FT
	Surface Prep for Cold Applied Pavement Markings	164	SQFT



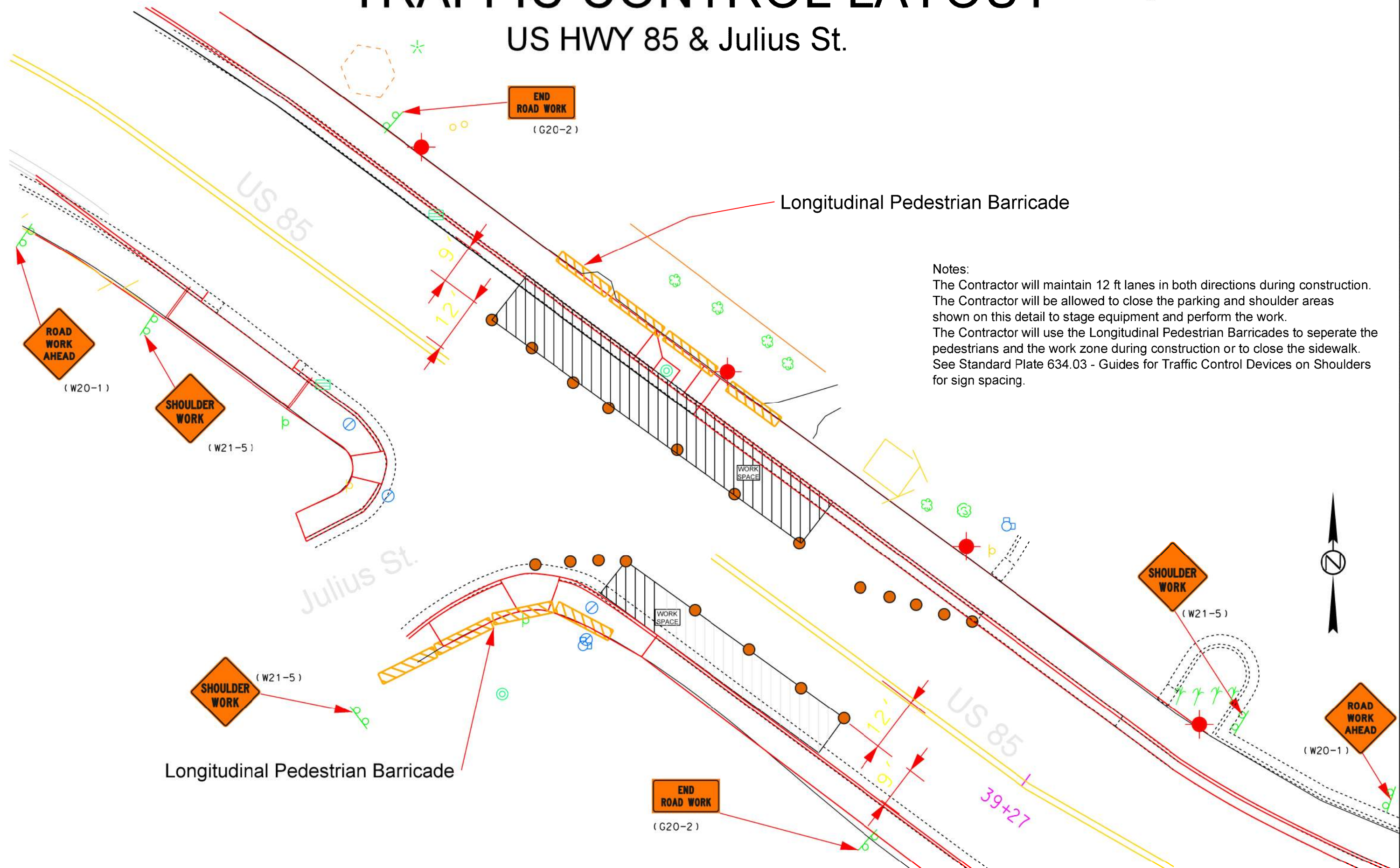
TRAFFIC CONTROL LAYOUT

US HWY 85 & Julius St.

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	085-451	13	21
Plotting Date:		12/08/2020	

Plot Scale - 1:18,8958

Plotted From - TRRC122/16



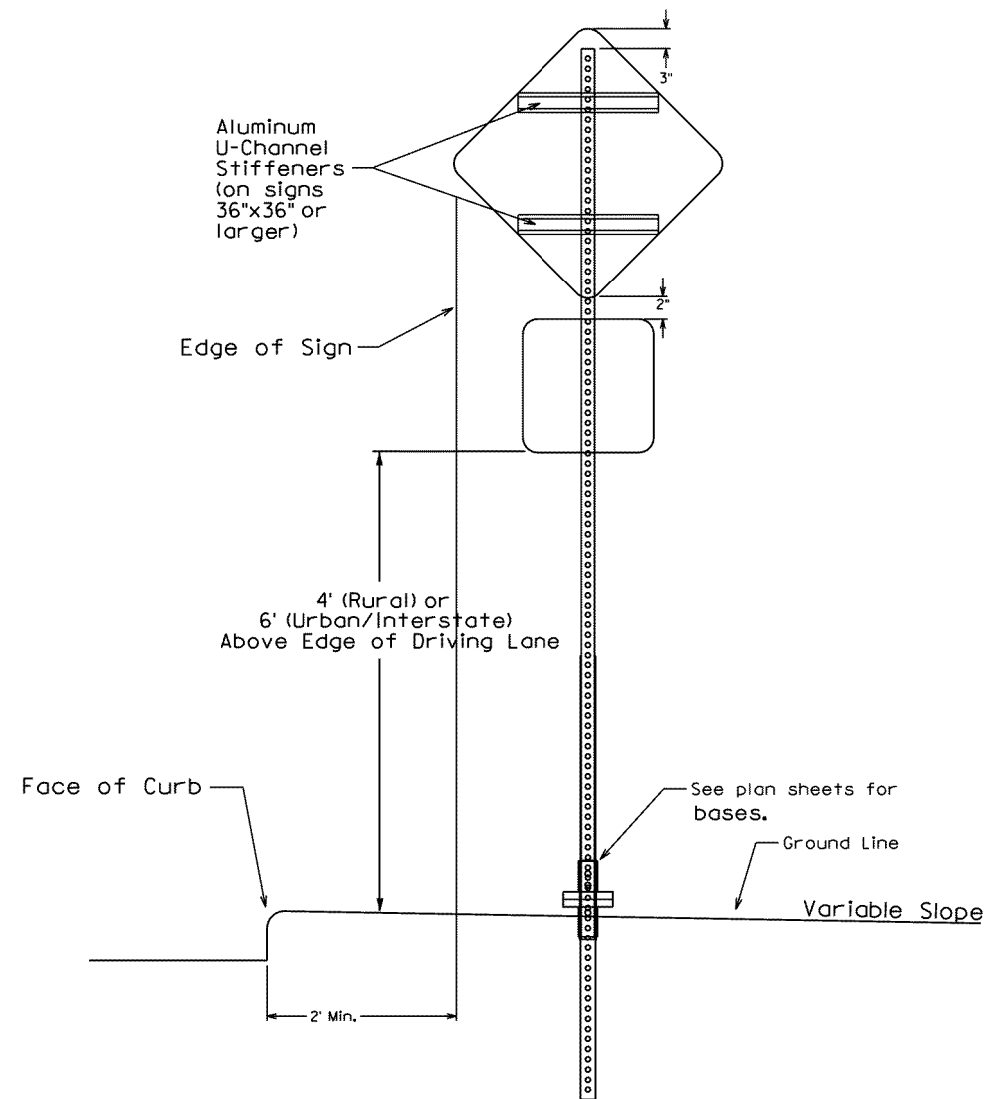
Notes:
The Contractor will maintain 12 ft lanes in both directions during construction.
The Contractor will be allowed to close the parking and shoulder areas shown on this detail to stage equipment and perform the work.
The Contractor will use the Longitudinal Pedestrian Barricades to separate the pedestrians and the work zone during construction or to close the sidewalk.
See Standard Plate 634.03 - Guides for Traffic Control Devices on Shoulders for sign spacing.

File - ...Traffic Control Layout.dgn

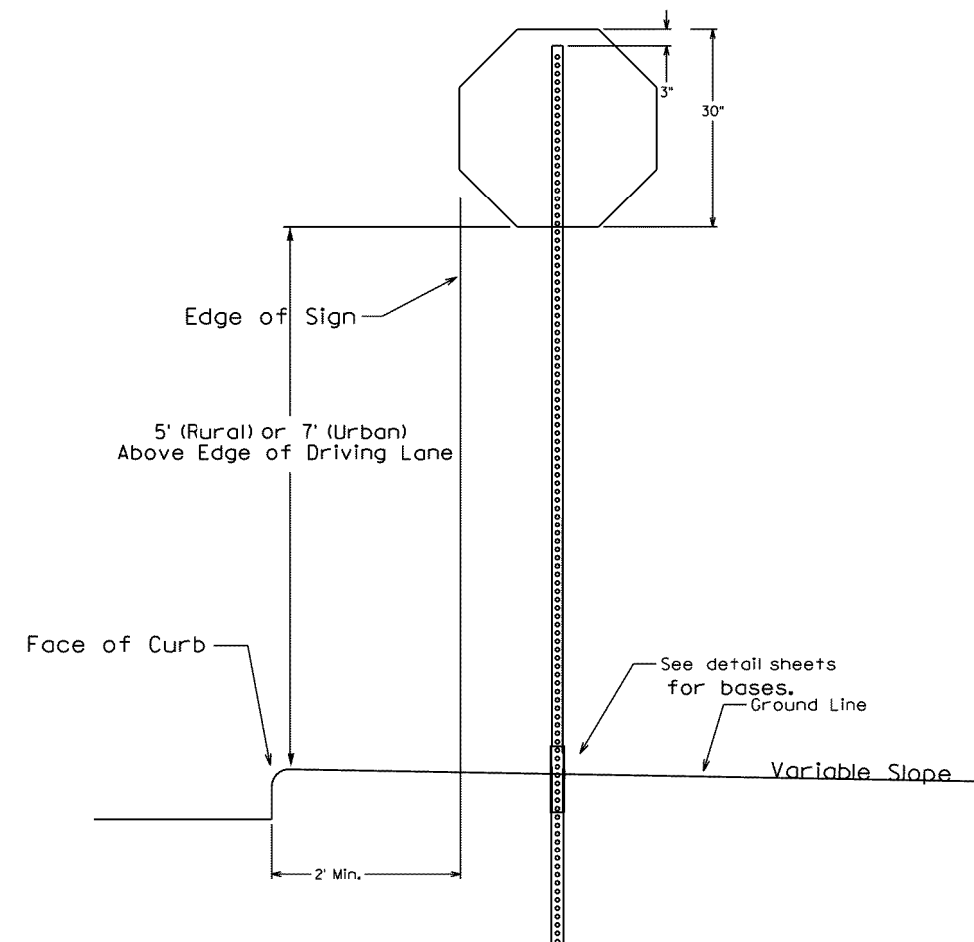
SIGN SUPPORT DETAILS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	085-451	14	21

Plotting Date: 12/07/2020



WARNING SIGN WITH SUPPLEMENTAL SIGN
(Drawing shown from face of sign)



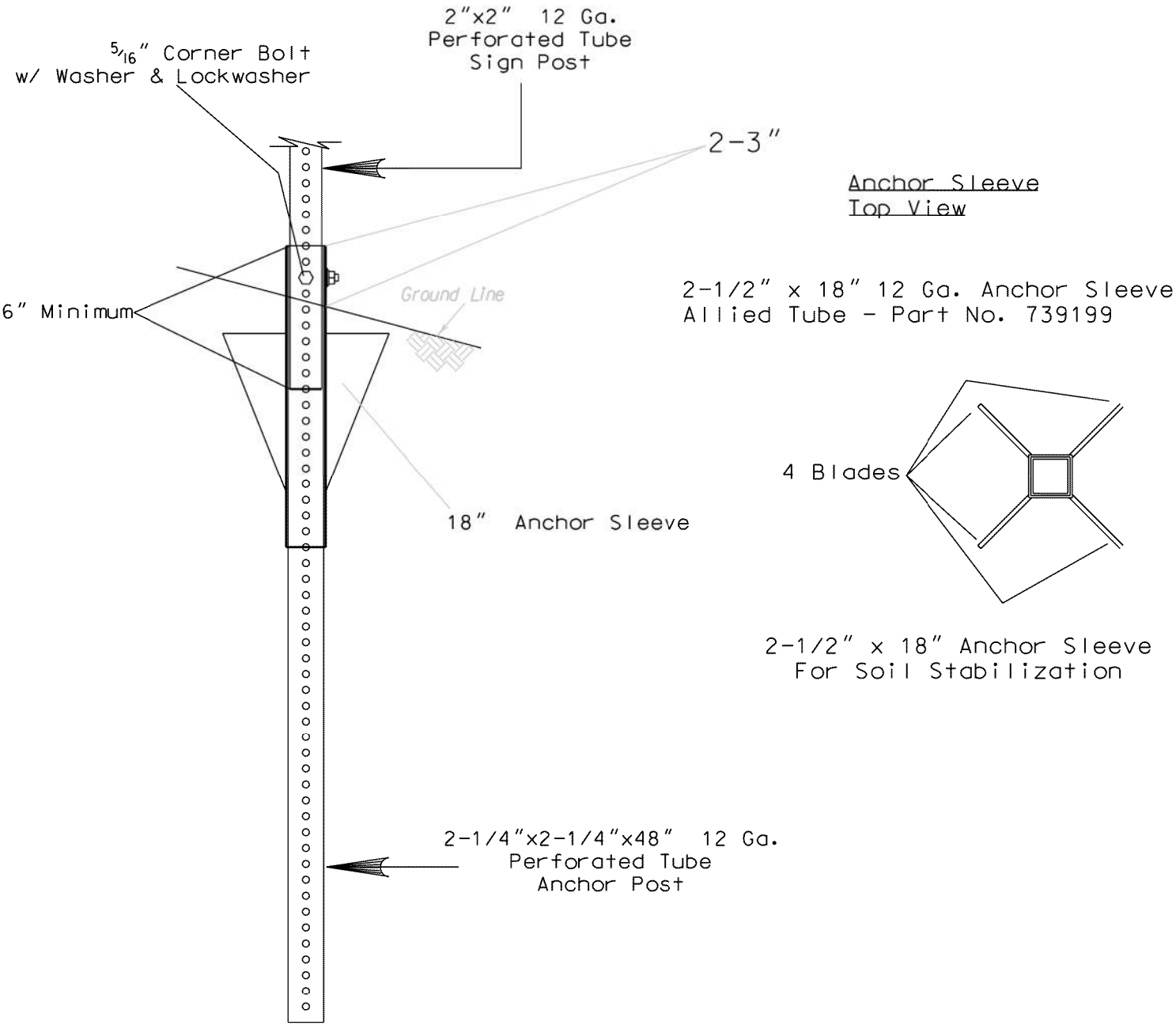
TYPICAL ERECTION DETAILS FOR STOP SIGNS

SIGN SUPPORT DETAILS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	085-451	15	21

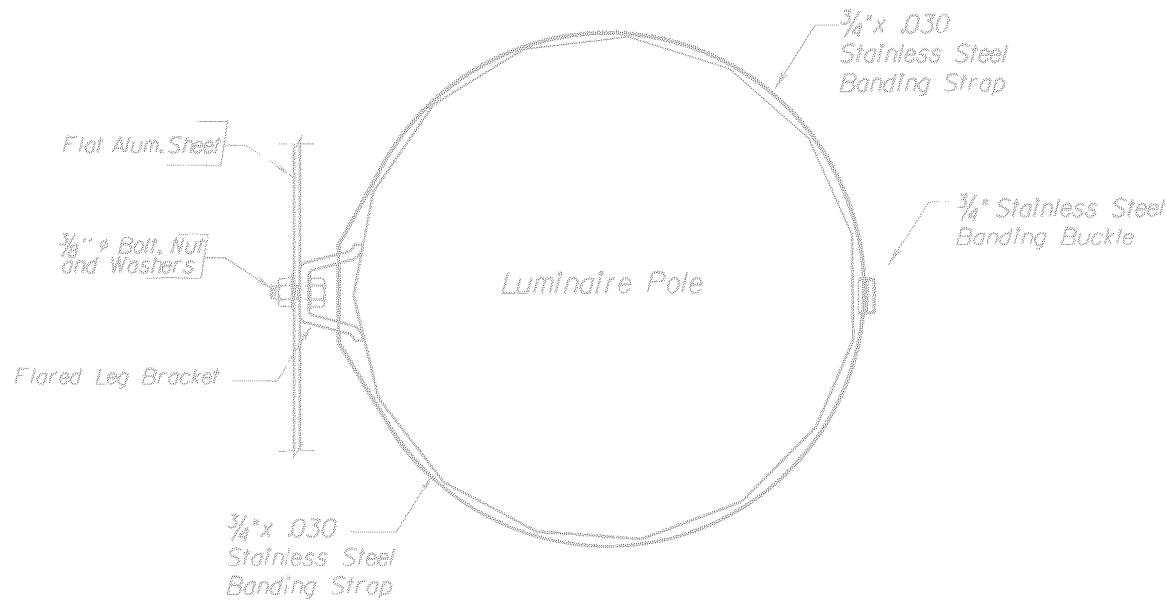
Plotting Date: 12/07/2020

SIGN BASE DETAILS FOR A 2" SIGN POST

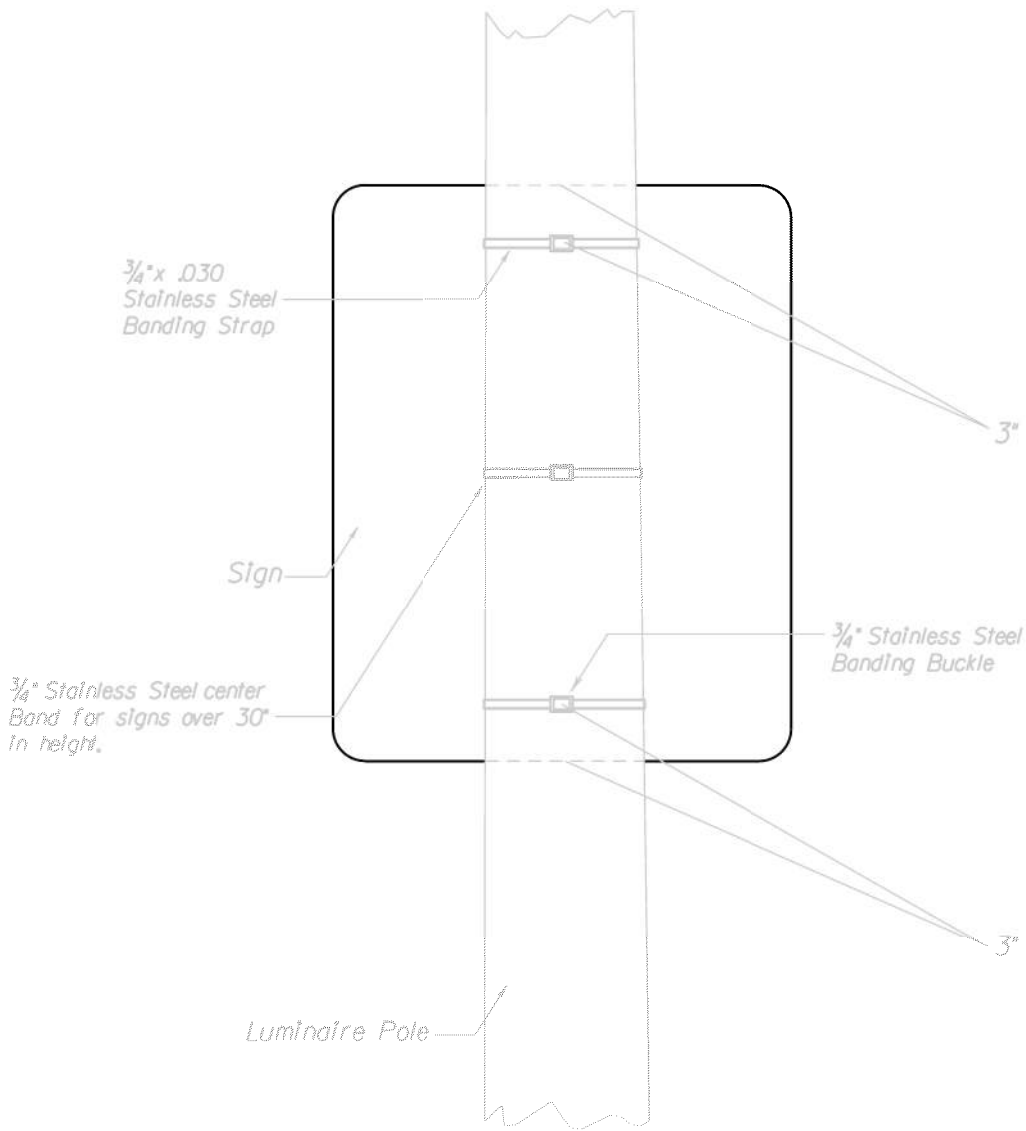


SIGN BANDING TO LUMINAIRE/SIGNAL POLE

Top View

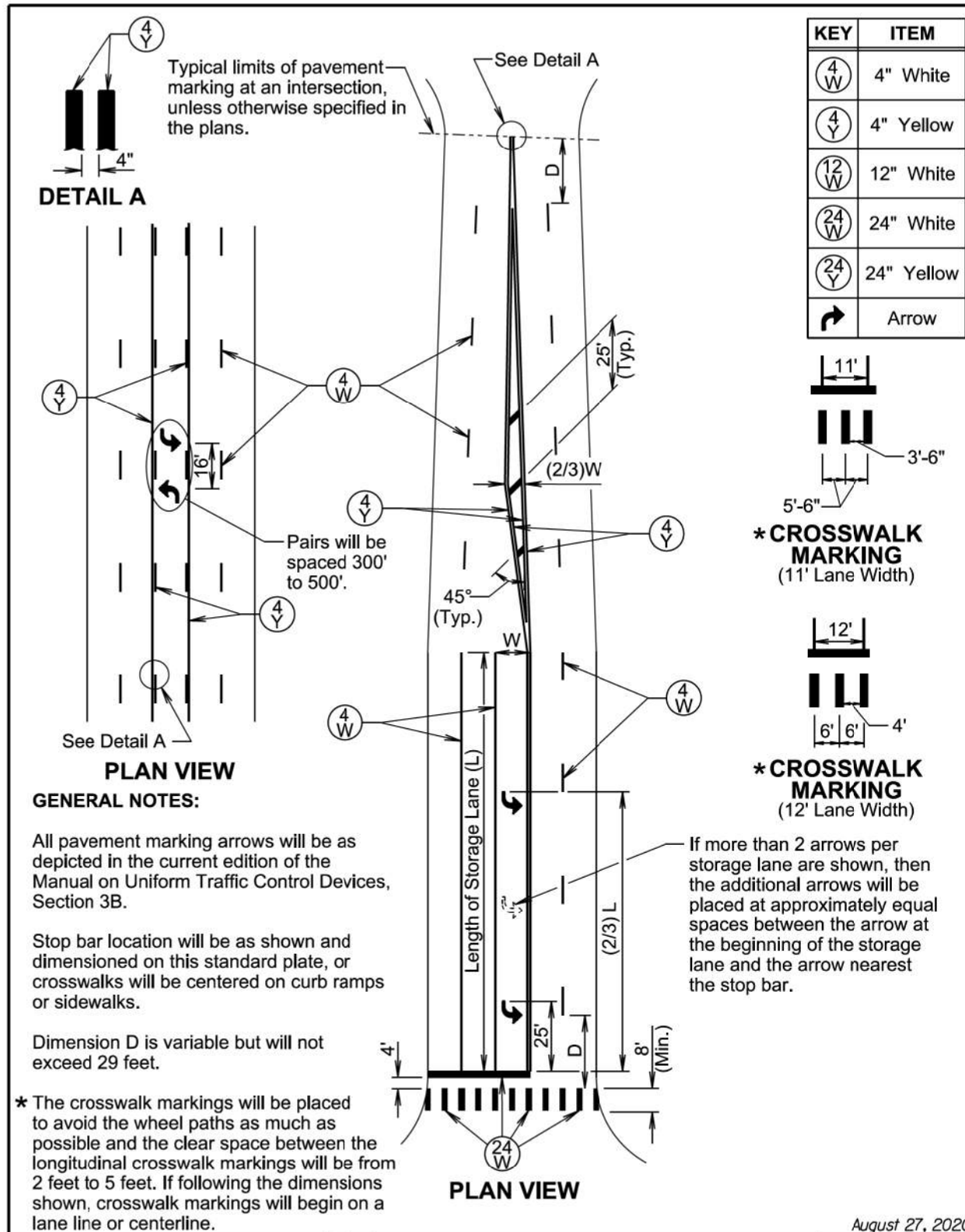


Back View



Ø A plastic washer, as recommended by the sheeting manufacturer, shall be installed between the sign face and the metal washer shown.

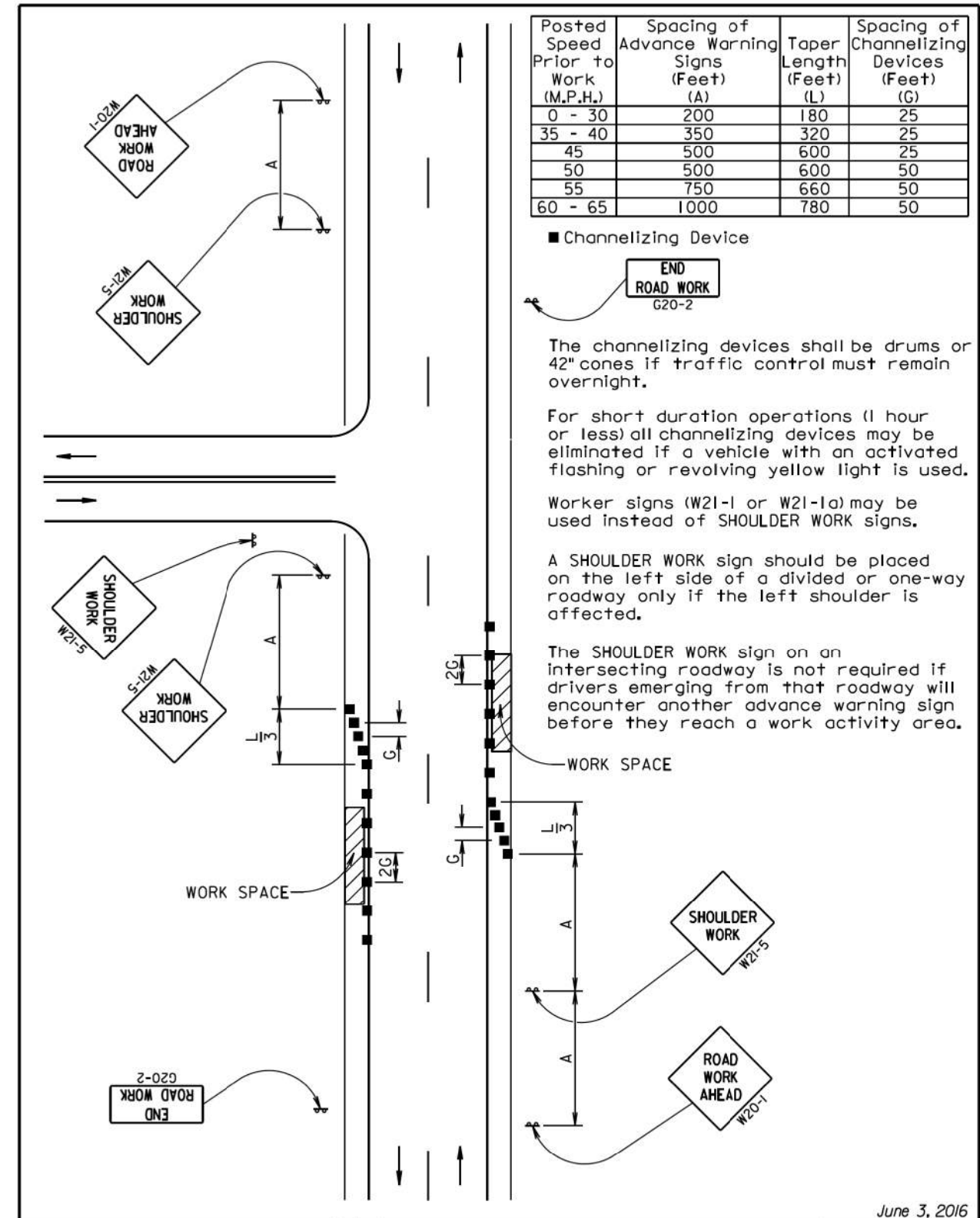
Plotting Date: 12/07/2020



August 27, 2020

S D D O T	PAVEMENT MARKINGS FOR ADJACENT INTERSECTIONS AND CENTER TURN LANE	PLATE NUMBER 633.01
		Sheet 1 of 1

Published Date: 4th Qtr. 2020



June 3, 2016

S D D O T	GUIDES FOR TRAFFIC CONTROL DEVICES WORK ON SHOULDERS	PLATE NUMBER 634.03
		Sheet 1 of 1

Published Date: 4th Qtr. 2020

Conditions represented are for work that requires closings during daytime hours only.

This application is intended for a planned temporary closing not to exceed 15 to 20 minutes.

September 6, 2015

S D D O T	GUIDES FOR TRAFFIC CONTROL DEVICES TEMPORARY ROAD WORK	PLATE NUMBER 634.30
		Sheet 1 of 1

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A)
0 - 30	200
35 - 40	350
45 - 50	500
55	750
60 - 65	1000

Flagger

END ROAD WORK G20-2 (Optional)

Posted Speed Prior to Work (M.P.H.)	Length of Longitudinal Buffer Space (Feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645

Buffer space dependent on work site limitations.

Only the traffic control devices controlling pedestrian flows are shown. Other devices may be needed to control traffic on the streets. Use lane closure signing or ROAD NARROWS signs, as needed.

Signs may be placed along a temporary diversion to guide or direct pedestrians. Examples include KEEP RIGHT and KEEP LEFT signs.

Additional advance warning may be necessary.

For nighttime closures, Type A flashing warning lights may be used on barricades supporting signs and closing sidewalks. Type C steady-burn lights may be used on channelizing devices separating the temporary pedestrian diversion from vehicular traffic.

Street lighting should be considered.

Longitudinal Pedestrian Barricade and

PEDESTRIAN DETOUR

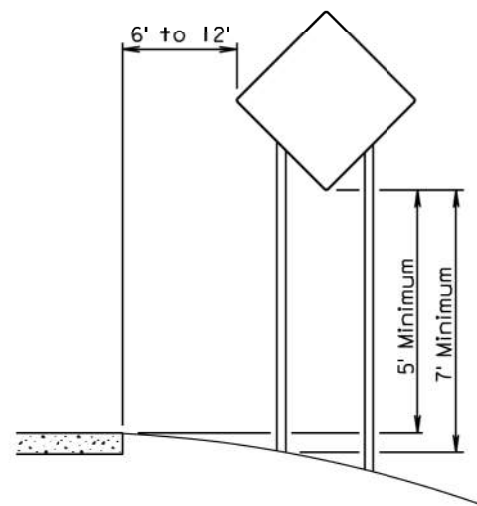
PEDESTRIAN DIVERSION

September 14, 2016

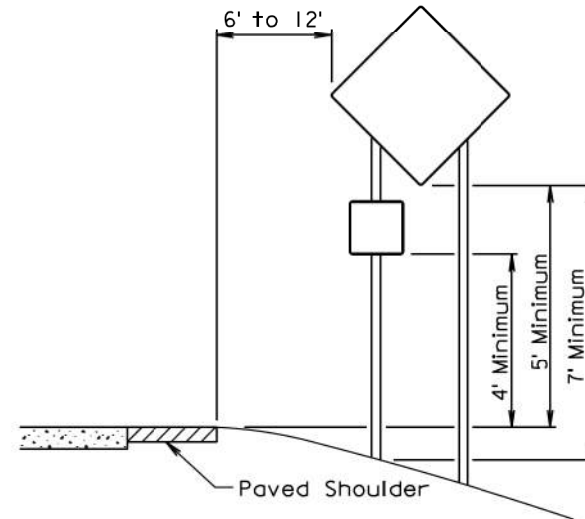
S D D O T	GUIDES FOR TRAFFIC CONTROL DEVICES PEDESTRIAN DETOUR AND PEDESTRIAN DIVERSION	PLATE NUMBER 634.34
		Sheet 1 of 1

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	085-451	19	21

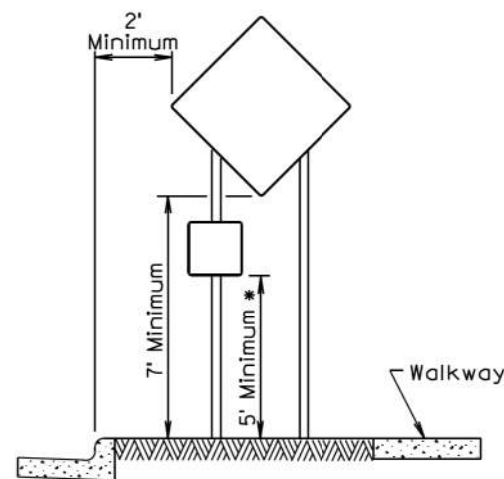
Plotting Date: 12/07/2020



RURAL DISTRICT

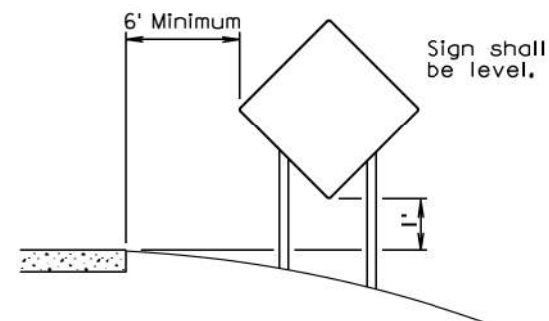


RURAL DISTRICT WITH
SUPPLEMENTAL PLATE



URBAN DISTRICT

* If the bottom of supplemental plate is mounted lower than 7 feet above a pedestrian walkway, the supplemental plate should not project more than 4" into the pedestrian facility.

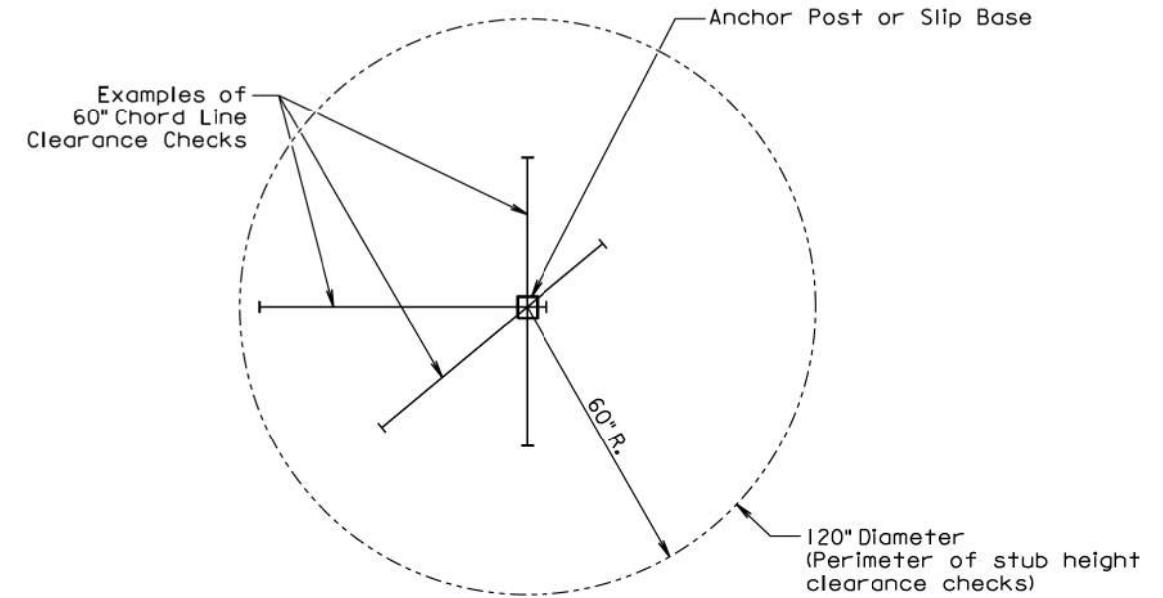


RURAL DISTRICT
3 DAY MAXIMUM

(Not applicable to regulatory signs)

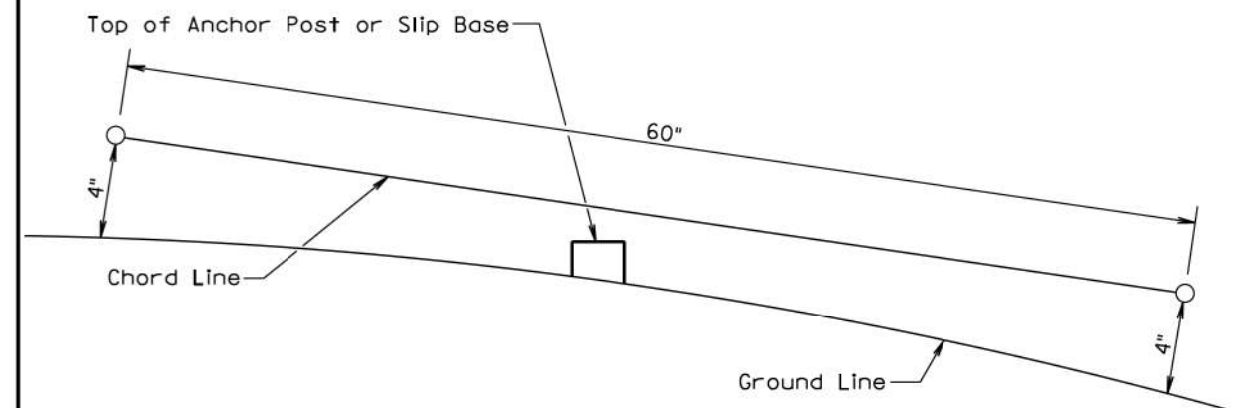
September 22, 2014

Published Date: 4th Qtr. 2020	S D D O T	CRASHWORTHY SIGN SUPPORTS (Typical Construction Signing)	PLATE NUMBER 634.85
			Sheet 1 of 1



PLAN VIEW

(Examples of stub height clearance checks)



ELEVATION VIEW

GENERAL NOTES:

The top of anchor posts and slip bases SHALL NOT extend above a 60" chord line within a 120" diameter circle around the post with ends 4" above the ground.

At locations where there is curb and gutter adjacent to the breakaway sign support, the stub height shall be a maximum of 4" above the ground line at the localized area adjacent to the breakaway support stub.

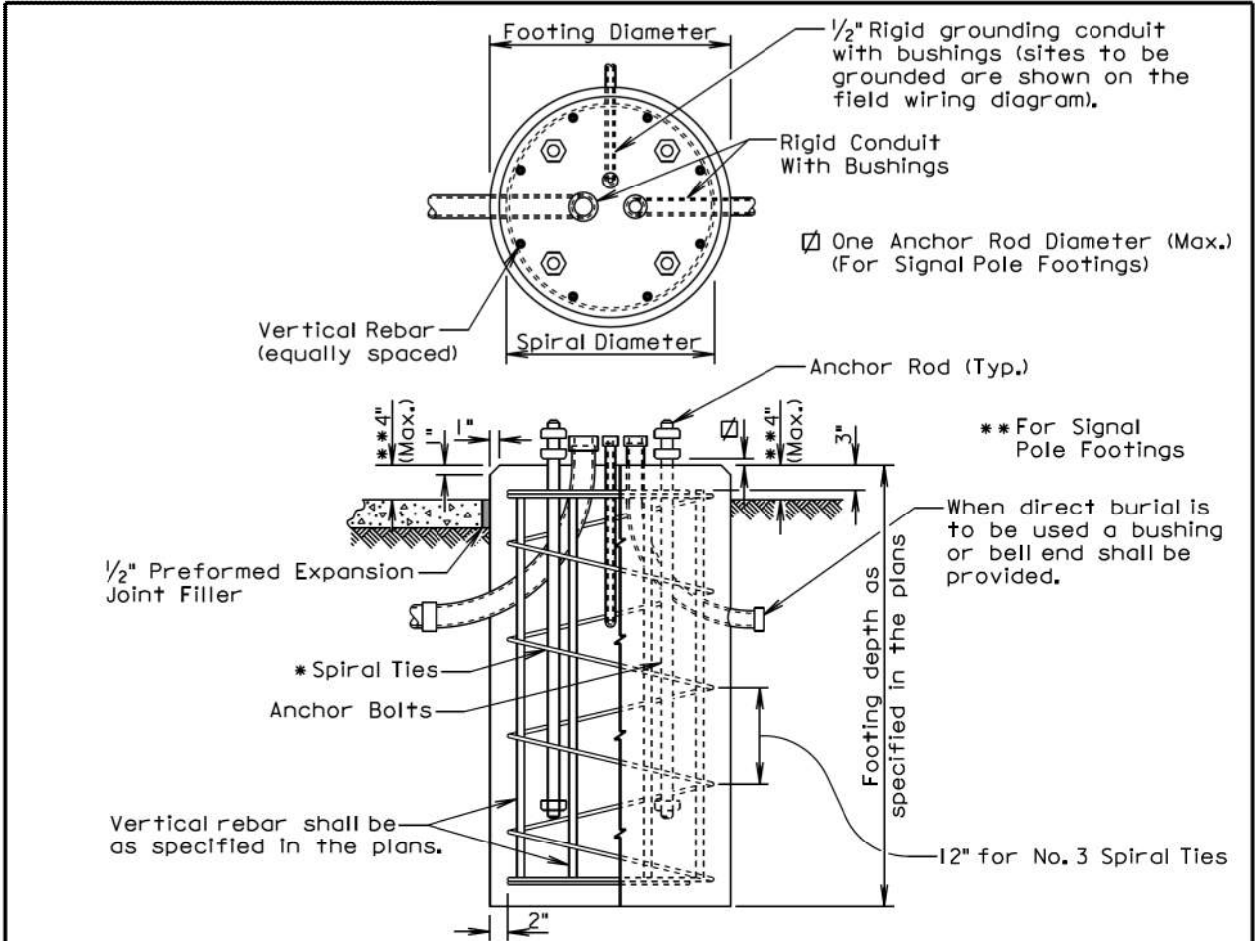
The 4" stub height clearance is not necessary for U-channel lap splices where the support is designed to yield (bend) at the base.

July 1, 2005

Published Date: 4th Qtr. 2020	S D D O T	BREAKAWAY SUPPORT STUB CLEARANCE	PLATE NUMBER 634.99
			Sheet 1 of 1

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	085-451	20	21

Plotting Date: 12/07/2020

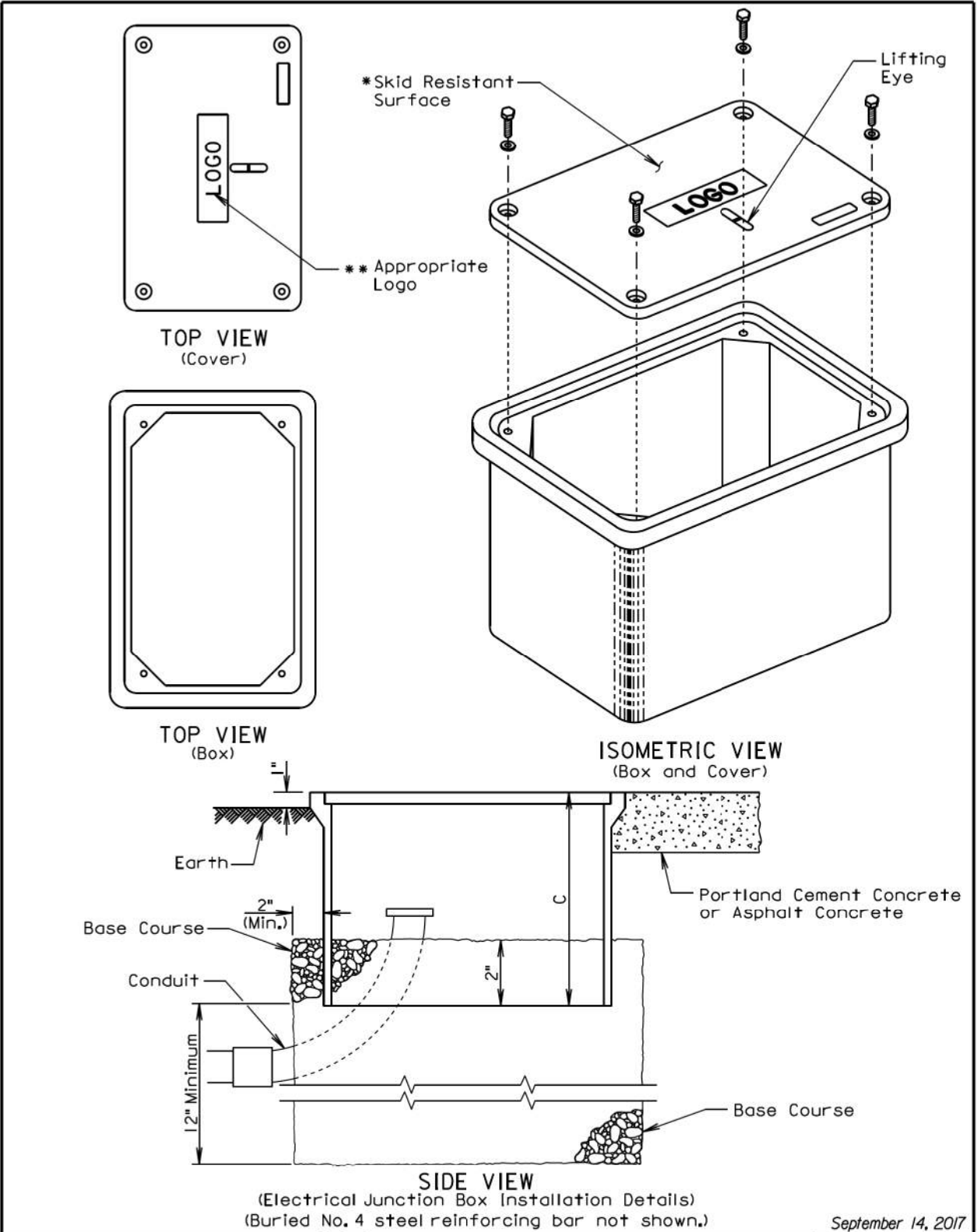


GENERAL NOTES:

- * Circular ties may be used in lieu of the spiral ties. The No. 3 ties shall be spaced 12 inches apart except for the top two which shall be spaced 6 inches apart. The ties shall be lapped 18 inches and the laps shall be staggered around the cage.
- Spiral ties shall have 1-1/2 extra turns at each end.
- See Section 985 of the Specifications for footing materials.
- Conduits and bushings may project 2 1/2 inches to 6 inches above footing for fixed base poles but shall not project above the slip plane or fracture plane for breakaway poles.
- Conduits shall be sealed water-tight during all phases of construction until poles are in place.
- The anchor rods shall fit inside the reinforcing steel cage. If the anchor rods designed by the Pole Manufacturer do not fit, contact the Office of Bridge Design for footing redesign. No additional payment will be made for the redesigned footing.
- Costs of conduit and conduit bushings shown on footing detail shall be incidental to the footing bid item(s).
- The pole shall not be installed until the concrete has attained design strength (4000 psi).
- The contour of the area surrounding the breakaway pole shall be flat, though not necessarily level for a distance of 5 feet in all directions. The Contractor may be required to provide finish grading at some breakaway pole locations.

June 26, 2015

Published Date: 4th Qtr. 2020	S D D O T	POLE FOOTING	PLATE NUMBER
			635.55
			Sheet 1 of 1



September 14, 2017

Published Date: 4th Qtr. 2020	S D D O T	ELECTRICAL JUNCTION BOXES TYPE 1 THROUGH TYPE 4	PLATE NUMBER
			635.65
			Sheet 1 of 2

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	085-451	21	21

Plotting Date: 12/07/2020

ELECTRICAL JUNCTION BOX

TYPE	DESCRIPTION	APPROXIMATE COVER SIZE	MINIMUM DEPTH (C)
1	Open Bottom with Gasket	11"x18"	18"
2	Open Bottom with Gasket	13"x24"	18"
3	Open Bottom with Gasket	17"x30"	18"
4	Open Bottom with Gasket	30"x48"	24"

GENERAL NOTES:

The cover shall be gasketed with a minimum of two stainless steel bolts and washers.

The cover shall have a lifting eye.

*The surface of the cover shall have a minimum wet and dry coefficient of friction value of 0.5 as determined by ASTM F609.

**The cover of the junction box shall have the appropriate logo in one inch size letters and shall be recessed. When the junction box contains cables or wires for a traffic signal then the logo shall be "Signal". When the junction box contains lighting conductors then the logo shall be "Lighting".

The electrical junction boxes shall comply with the American National Standards Institute (ANSI)/Society of Cable Telecommunications Engineers (SCTE) 77 2007 Specification for Underground Enclosure Integrity. The loading requirement for all the electrical junction boxes shall be Tier 8 of ANSI/SCTE 77 2007.

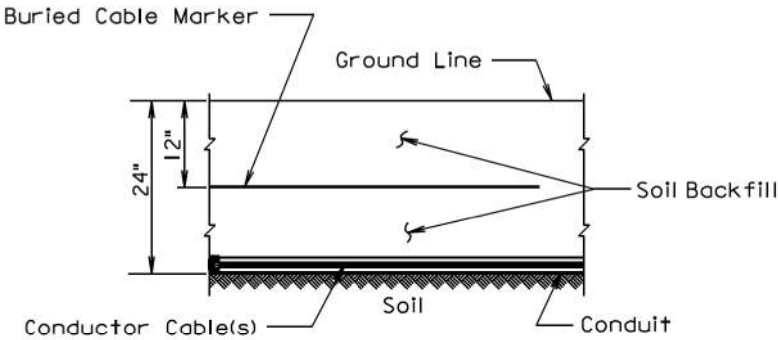
The electrical junction boxes shall be UL listed.

For junction boxes located outside of pavement, a No. 4 steel reinforcing bar with a minimum length of 18" shall be buried adjacent to the long side of the junction box. All costs associated with furnishing and placing the steel reinforcing bar shall be incidental to the contract unit price per each for "Type - Electrical Junction Box".

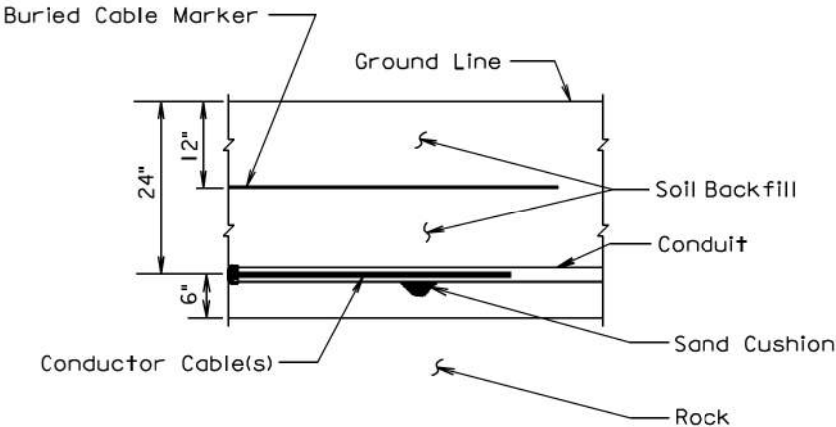
September 14, 2017

SD DOT	ELECTRICAL JUNCTION BOXES TYPE 1 THROUGH TYPE 4	PLATE NUMBER 635.65
		Sheet 2 of 2

Published Date: 4th Qtr. 2020



SECTION VIEW



SECTION VIEW

GENERAL NOTE:

The Buried Cable Marker shall be plastic, approximately 6" wide, and shall be capable of sustaining a minimum of a 350% tolerance of elongation without tearing. The Buried Cable Marker shall have a life expectancy approximately equal to that of the conductor(s) beneath it. A phrase indicating the presence of a buried electric circuit below shall be printed in a contrasting color on the cable marker. The Buried Cable Marker shall be subject to approval by the Engineer. All costs associated with furnishing and installing the Buried Cable Marker shall be incidental to the contract unit price per Foot for the bid item used for the electrical conductor.

March 31, 2000

SD DOT	CONDUIT INSTALLATION	PLATE NUMBER 635.76
		Sheet 1 of 1

Published Date: 4th Qtr. 2020