SECTION L: SIGNAL AND LIGHTING PLANS

KLJ	STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
		NH-CR-EM 0018(195)103 P 0407(05)01	L1	L43

Plotting Date: 8/1/2024

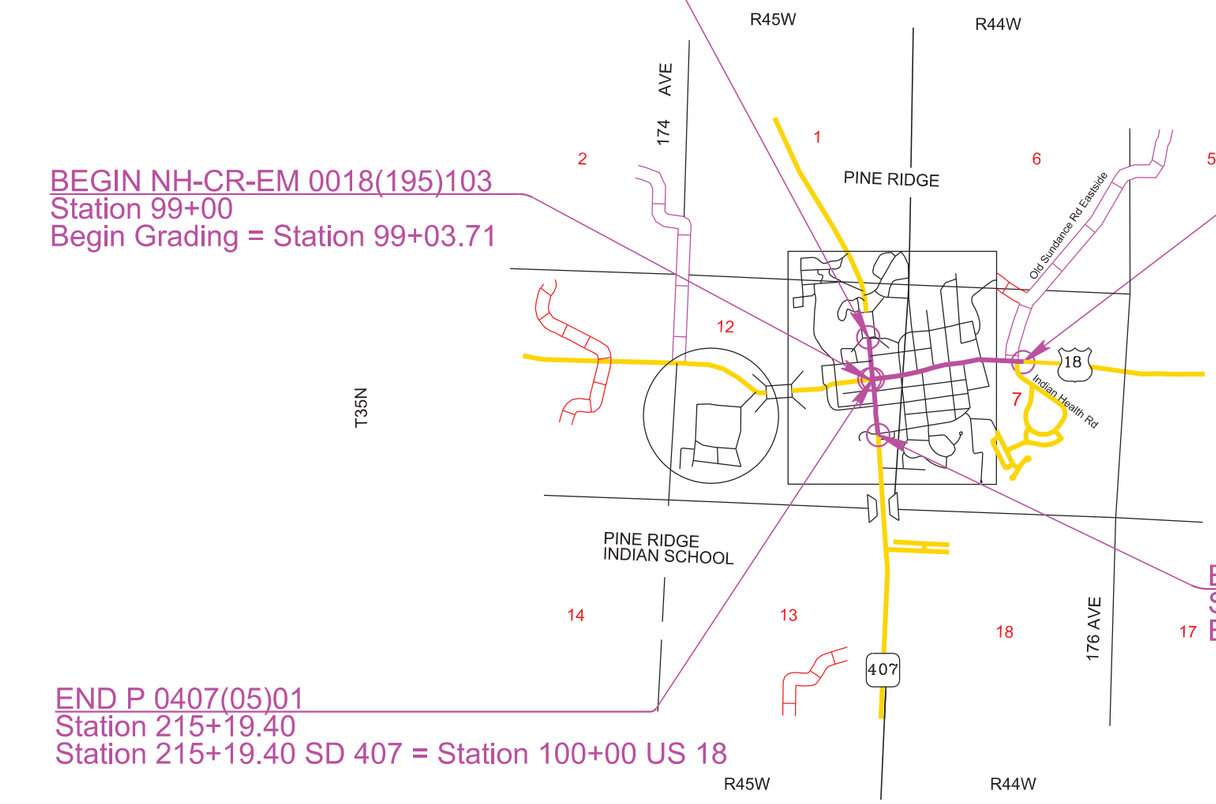
Rev. 8/2/2024 CMW

INDEX OF SHEETS

END NH-CR-EM 0018(195)103
Station 228+00
End ADA Upgrades = Station 228+00

BEGIN NH-CR-EM 0018(195)103
Station 99+00
Begin Grading = Station 99+03.71

END NH-CR-EM 0018(195)103
Station 136+50
End Grading = Station 136+50



BEGIN P 0407(05)01
Station 200+00
Begin ADA Upgrades = Station 200+00

END P 0407(05)01
Station 215+19.40
Station 215+19.40 SD 407 = Station 100+00 US 18

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
16904
CAITLIN M.
WOTRUBA
SOUTH DAKOTA
8/2/24

Plot Scale - 1:200

Plotted From - caitlinwotruba

File - ...\Sections\SectionL\titleL.dgn

SECTION L ESTIMATE OF QUANTITIES

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
110E1520	Remove Signal Equipment	Lump Sum	LS
110E1530	Remove Signal Pole Footing	8	Each
110E1540	Remove Luminaire Pole Footing	19	Each
110E5100	Salvage Luminaire Pole	17	Each
110E5105	Salvage Luminaire	17	Each
110E5110	Salvage Signal Equipment	Lump Sum	LS
635E0040	Breakaway Base Luminaire Pole with Arm, 40' Mounting Height	20	Each
635E2000	Pedestal Signal Pole	2	Each
635E2025	Signal Pole with 25' Mast Arm	1	Each
635E2030	Signal Pole with 30' Mast Arm	1	Each
635E2035	Signal Pole with 35' Mast Arm	2	Each
635E2125	Signal Pole with 25' Mast Arm and Luminaire Arm	3	Each
635E2130	Signal Pole with 30' Mast Arm and Luminaire Arm	1	Each
635E2135	Signal Pole with 35' Mast Arm and Luminaire Arm	3	Each
635E2140	Signal Pole with 40' Mast Arm and Luminaire Arm	1	Each
635E3700	Roadway Luminaire, LED with Photoelectric Cell	8	Each
635E4030	3 Section Vehicle Signal Head	36	Each
635E5020	2' Diameter Footing	164.0	Ft
635E5030	3' Diameter Footing	137.0	Ft
635E5301	Type 1 Electrical Junction Box	16	Each
635E5302	Type 2 Electrical Junction Box	13	Each
635E5303	Type 3 Electrical Junction Box	3	Each
635E5400	Electrical Service Cabinet	2	Each
635E5405	Electrical Service Cabinet with Secondary Disconnect	2	Each
635E5430	Traffic Signal Controller	3	Each
635E5515	Battery Backup System for Traffic Signal	3	Each
635E5530	Preformed Detector Loop	78	Each
635E5562	Siren Emergency Vehicle Preemption System	3	Each
635E5880	Accessible Pedestrian Signal	24	Each
635E5910	Pedestrian Push Button Pole	25	Each
635E5922	Pedestrian Signal Head with Countdown Timer	24	Each
635E5930	Pedestrian Crossing Sign	24	Each
635E5980	Rectangular Rapid Flashing Beacon System	1	Each
635E7500	Remove and Reset Luminaire Pole	8	Each
635E8110	1" Rigid Conduit, Schedule 40	355	Ft
635E8120	2" Rigid Conduit, Schedule 40	5,785	Ft
635E8140	4" Rigid Conduit, Schedule 40	40	Ft
635E8220	2" Rigid Conduit, Schedule 80	1,320	Ft
635E8230	3" Rigid Conduit, Schedule 80	640	Ft
635E8240	4" Rigid Conduit, Schedule 80	220	Ft
635E9011	1/C #1 AWG Copper Wire	12,980	Ft
635E9012	1/C #2 AWG Copper Wire	6,405	Ft
635E9016	1/C #6 AWG Copper Wire	5,055	Ft
635E9018	1/C #8 AWG Copper Wire	1,440	Ft
635E9024	1/C #14 AWG Copper Wire	1,600	Ft
635E9502	2/C #14 AWG Copper Tray Cable, K2	3,820	Ft
635E9504	4/C #14 AWG Copper Tray Cable, K2	1,575	Ft
635E9506	6/C #14 AWG Copper Tray Cable, K2	140	Ft
635E9525	25/C #14 AWG Copper Tray Cable, K2	1,700	Ft
635E9600	#16 AWG Copper Twisted Shielded Pair	5,695	Ft
635E9710	2/C #10 AWG Copper Pole and Bracket Cable	1,580	Ft

SUPPLYING AS BUILT PLANS

If the traffic signal systems or roadway lighting systems are 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.

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:

Stacy.Bartlett@state.sd.us
Tonya.Huber@kljeng.com

ON-SITE INSPECTION

An on-site inspection of the traffic signals will be conducted before acceptance of the project, once the traffic signals are completed and operational. The on-site inspection will be conducted by the Project Engineer or Region Traffic Engineer with the Contractor, and the Traffic Design Engineer present.

REMOVE SIGNAL POLE FOOTING

The footings of existing signal poles EA1- EA4 and EB1-EB4 will be removed by the Contractor to a minimum of 2’ below the ground surface. Restoration of the disturbed area will be to the satisfaction of the Engineer.

All costs for removing the footings of the existing signal poles will be incidental to the contract unit price per each for “Remove Signal Pole Footing”.

REMOVE LUMINAIRE POLE FOOTING

The footings of existing luminaire poles EL1-EL17, EP20 & EP21 will be removed by the Contractor to a minimum of 2’ below the ground surface. Restoration of the disturbed area will be to the satisfaction of the Engineer.

All costs for removing the footings of the existing luminaire poles will be incidental to the contract unit price per each for “Remove Luminaire Pole Footing”.

SALVAGE LUMINAIRE POLE

Existing luminaire poles EL1-EL17 will be salvaged and delivered to the City of Allen by the Contractor. The Contractor will notify the City 5 days before the delivery of the salvaged luminaire poles. The City contact is Oglala Sioux Tribe Department of Transportation at (605)-867-5376. The poles will be delivered to:

Allen Maintenance Yard
Allen, SD

Poles damaged during salvaging or delivery will be repaired or replaced by the Contractor at no cost to the State.

All costs for work involved in the salvage and delivery of the existing luminaire poles will be incidental to the contract unit price per each for “Salvage Luminaire Pole”.

SALVAGE LUMINAIRE

Existing luminaires on poles EL1-EL17 will be salvaged and delivered to the OST DOT by the Contractor. The Contractor will notify the City 5 days before the delivery of the salvaged luminaires. The City contact is Oglala Sioux Tribe Department of Transportation at (605)-867-5376. The luminaires will be delivered to:

OSTDOT Office
Pine Ridge Village, SD

Luminaires damaged during salvaging or delivery will be repaired or replaced by the Contractor at no cost to the State.

All costs for work involved in the salvage and delivery of the existing luminaires will be incidental to the contract unit price per each for “Salvage Luminaire”.

SALVAGE SIGNAL EQUIPMENT

The complete existing traffic controller cabinets along with LED displays from the signal heads will be salvaged and delivered to the South Dakota DOT Rapid City Region by the Contractor. The Contractor will notify the SD DOT Rapid City Region 5 days before the delivery of the salvaged signa[illegible] SD DOT Rapid City Region contact is Nick Wuebben at [illegible] equipment will be delivered to:

SD DOT Rapid City Region
South Yard
5801 S Hwy 79
Rapid City, SD 57701

Any equipment damaged during salvaging or deliver[illegible] replaced by the Contractor at no cost to the State.

All costs for work involved in the salvage and delivery of the existing signal equipment will be incidental to the contract lump sum price for “Salvage Signal Equipment”.

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
16904
CAITLIN M.
WOTRUBA
SOUTH DAKOTA
8/2/24

SIGNAL POLES

Cantilever traffic signal supports, including anchor bolts, will be designed for fatigue in accordance with Fatigue Importance Category III without galloping and truck induced gusts.

Signal poles will have rotatable mast arms.

Luminaire extension(s) will have a 40-foot mounting height with 8-foot arm.

The pole fabricator will be responsible for determining the diameter, length, and number of anchor bolts.

LUMINAIRE POLES

Luminaire poles L1 to L20 will have a mounting height of 40-feet with 8-feet arms.

The pole fabricator will be responsible for determining the diameter, length, and number of anchor bolts.

Luminaire poles will be designed to include loadings created by banners that are 30 inches wide by 80 inches long, mounted 15 feet from the top of footing to the bottom of the banner and will be able to support decorations that are 45 lbs. with 6'x 6' dimensions, mounted 15' from the top of footing to the bottoms of the holiday decoration.

Luminaire poles L1-L20 will have a convenience duplex festoon outlet receptacle (15-amp, 3 wire) suitable for outdoor use. The festoons will be located on the side or on the back of the luminaire pole.

REMOVE AND RESET PATHWAY LUMINAIRES

Pathway luminaire poles EP1, EP5, EP6, EP9-EP11 will need to be removed and reset as REP1, REP5, REP6, REP9-REP11 as shown on the plan sheets.

As built records show the existing poles are Class 3 treated wood poles conforming to RUS Bulletin 1728F-700 and installed per RUS requirements.

Luminaire poles and luminaires damaged during removal or resetting will be repaired or replaced by the Contractor at no cost to the State. Replacement poles will be in conformance with PUS Bulletin 1728F-700, issued 04/2022.

All costs involved with removing and resetting the existing luminaire poles including associated hardware, will be incidental to the contract unit price per each for "Remove and Reset Luminaire Pole".

REMOVE AND RESET LIGHT POLES INDIAN HEALTH ROAD

Existing light poles EP20 & EP21 along Indian Health Road will need to be removed and reset as REP20 & REP21 as shown on the plan sheets.

The poles were originally installed with the project PINE RIDGE COMPREHENSIVE HEALTH CARE FACILITY and were fabricated by:

Beacon Products
2041 58th Ave Circle East
Bradenton, FL 34203
Phone: (800) 345-4928

As built records show the existing anchor bolts are four galvanized anchor bolts per pole with minimum yield of 55,000 psi with galvanized hardware with two washers and two nuts per bolt for leveling. Anchor bolts shall be 1" x 36" x 4".

Luminaire poles and luminaires damaged during removal or resetting will be repaired or replaced by the Contractor at no cost to the State.

All costs involved with removing and resetting the existing luminaire poles including new anchor bolts with associated hardware, will be incidental to the contract unit price per each for "Remove and Reset Luminaire Pole".

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 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.

LUMINAIRES

The lighting design used the following parameters and provides 1.3 and greater average maintained foot-candles and uniformity ratios of 3:1 (average maintained to minimum maintained foot-candles) and 4:1 (maximum to minimum maintained foot candles:

Pole Setback:	2 Ft.
Lamp Loss Factor (LLF):	0.8
Width of Lighted Area:	39 Ft.
Spacing:	175 Ft.
Configuration:	One-Sided
Mounting Height:	40 Ft.
Arm Length	8 Ft.
Light Source:	LED

The following LED luminaires or an approved equivalent that meets the requirements for this design are acceptable:

a.) Acuity Brands: ATB2-P601-MVOLT-R3
3 Pin NEMA Photocontrol Receptacle

(Standard)

b.) Acuity Brands: RSX2 LED P5 40K R3
DLL127F 1.5 JU Photocell -SSL twist-lock

SIGNAL BACKPLATES

All new vehicle signal heads will have backplates with retroreflective border. The vehicle signal head backplates will have a factory applied 3-inch wide yellow retroreflective border. Sheeting for the border will be Type XI or Type IX in conformance with ASTM D4956. Backplates will be polycarbonate, aluminum, or aluminum-composite. Minimum material thicknesses are:

Polycarbonate, 0.10-inch
Aluminum, 0.06-inch
Aluminum-Composite, 0.08-inch

Signal backplates will extend not less than 5 inches from the edge of the signal head at the top, bottom, and sides. The bottom of the backplate on vehicle signal faces mounted directly above pedestrian signal indications will be sized to permit the separate adjustment of the vehicle and pedestrian signal indication and may be less than 4 inches.

All costs involved with furnishing and installing backplates with retroreflective border for the new vehicle signal heads will be incidental to the contract unit price per each for "3 Section Vehicle Signal Head".

TABLE OF FOOTING DATA

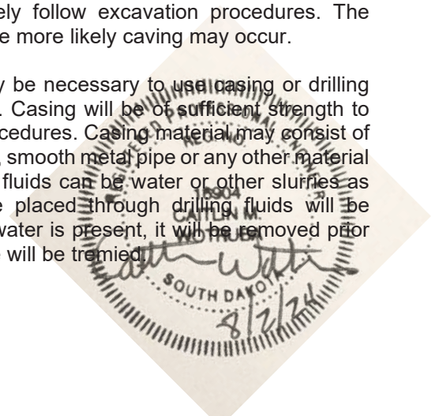
Site Designation	Footing Diameter	* Footing Depth	**Spiral Diameter	**Spiral Length	Vertical Reinforcement
L1 to L20	2' - 0"	7' - 0"	1' - 8"	49' - 6"	8-#7 x 6' - 6"
R1, R2, REP20 & REP21	2' - 0"	6' - 0"	1' - 8"	44' - 3"	8-#7 x 5' - 6"
A1 - A4, B4, C1 & C3	3' - 0"	11' - 0"	2' - 8"	112' - 6"	14-#8 x 10' -6"
B1, B2, B3, C2 & C4	3' - 0"	12' - 0"	2' - 8"	120' - 9"	14-#8 x 11' -6"

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

Subsurface conditions along the length of the corridor may vary to include alluvium and terrace deposits, gravel, silt clay soils, and in-place White River Formation. Groundwater was not encountered in the borings during the soils investigation conducted in September 2020. Caving was recorded 13.4 feet below the ground surface.

Concrete placement operations closely follow excavation procedures. The longer the excavations are left open the more likely caving may occur.

If caving soils are encountered, it may be necessary to use casing or drilling fluids to maintain an open excavation. Casing will be of sufficient strength to withstand handling and installation procedures. Casing material may consist of Sonotube, corrugated metal pipe, PVC, smooth metal pipe or any other material as approved by the Engineer. Drilling fluids can be water or other slurries as approved by the Engineer. Concrete placed through drilling fluids will be tremied. If caving is not an issue but water is present, it will be removed prior to concrete placement, or the concrete will be tremied.



ELECTRICAL SERVICE WITH METER SOCKET AT STATION 116+65.45

The Contractor is responsible for contacting Nebraska Public Power 90 days prior needing service with meter. Payment for Nebraska Public Power service installation will be required of Contractor and is incidental to the electrical service cabinet. Contractor to install 1 - 2" Schedule 40 PVC conduit from the power pole to each meter socket location shown on the plans for the signal and lighting services.

CONDUIT UNDER INDIAN HEALTH ROAD AT STATION 25+02.81

Underground power crosses the existing location of Indian Health Road at approximately 24+85-85' Rt and is approximately 4-foot deep. It is anticipated this facility will be impacted by construction. This is a 3-phase 7200/12470 Volt line that is the main feed to the hospital and everything east of Pine Ridge Village. The line is currently in a 4-inch conduit.

The Contractor will be responsible for installing new 4" schedule 80 PVC conduit below the proposed location of Indian Health Road as shown in Section L. The Contractor must contact Jay Theis (jay.theis@state.sd.us) of the SDDOT and submit an Electric Service Design Application (ESDA) through Nebraska Public Power's online system 6 months prior to beginning construction on Indian Health Road. Nebraska Public Power will provide the Contractor further details for the installation of the new 4" PVC conduit. Nebraska Public Power will set junction boxes outside the grading limits within the temporary construction easement prior to work in the area and install new wiring through the new 4" PVC conduit installed by the Contractor.

The Contractor is responsible for payment to Nebraska Public Power to install the junction boxes and new wiring within the associated conduit. All costs for furnishing and installing the 4" Schedule 80 PVC conduit including materials, equipment, labor, hauling, storage, and incidentals will be incidental to the unit price per foot for "4" Rigid Conduit, Schedule 80."

ELECTRICAL SERVICE CABINET WITH SECONDARY DISCONNECT

The electrical service cabinet will be a standard electrical service cabinet located adjacent to the power source.

The Contractor will install a NEMA 3R rainproof, 60 amp rated, non-fused safety switch (with lock) adjacent to the traffic signal cabinet. The secondary disconnect will be mounted on a galvanized steel post in accordance with standard plate 635.41.

METER SOCKETS FOR TRAFFIC SIGNALS

The meter sockets provided for traffic signals by the Contractor will be a 200 amp, positive by-pass.

TRAFFIC SIGNAL CONTROLLER

The Contractor is responsible for programming controllers with the signal timings provided in these plans.

Controllers and flashers are not required to have dimming capability.
Anchor bolts for traffic signal cabinets may have hooked ends.

All costs for the detector units necessary to operate the signal as shown in these plans, constructing the concrete pad and footing, materials, labor, and furnishing and installing the controller cabinet will be incidental to the contract unit price per each for "Traffic Signal Controller"

BATTERY BACKUP CABINET

The Contractor will supply cabinets with concrete pad and footing for housing the battery backup system for traffic signal systems at US Hwy 18 and SD Hwy 407 intersection, US Hwy 18 and Eastridge Road Intersection, and US Hwy 18 and Indian Health Road Intersection. The cabinets will be an aluminum NEMA 3R type. The cabinet will have a thermostatically controller exhaust fan. The cabinet will be securely attached to the concrete pad with steel anchors and to the back wall of the controller cabinet using chase nipples as approved by the Engineer.

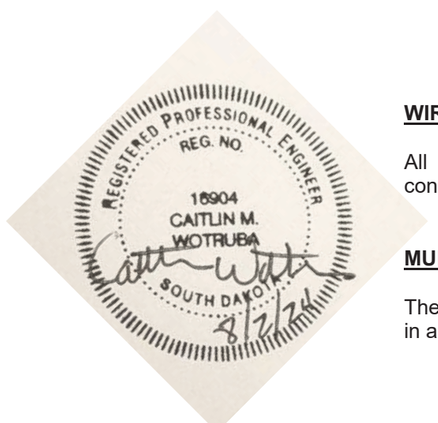
All costs for constructing the concrete pad and footing, materials, labor, and furnishing and installing the battery backup cabinet will be incidental to the contract unit price per each for "Battery Backup System for Traffic Signal."

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.



ACCESSIBLE PEDESTRIAN SIGNAL (Continued)

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.

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"

PEDESTRIAN PUSH BUTTON POLE

Pedestrian 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 MASH. A grounding lug will be provided in the base.

The pole 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 with 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.

Anchor bolts for pedestrian push button poles may have hooked ends.

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.

MULTICONDUCTOR CONTROL CABLE FOR SIGNAL CIRCUITS

The Conductor Jackets for the multiconductor control cables will be color coded in accordance with ICEA S-73-532 Table E2.

DETECTOR LOOP WIRE SPLICING

Detector loop wire splices will be made using wire nuts over soldered connections and sealed in 3M Scotchcast 3570G-N connector sealing packs or an approved equal. The drain wire of the TSP cable will be left unattached to the ground lug in the traffic signal controller.

EVP CONFIRMATION LIGHT

The EVP confirmation light will be installed facing the intersection associated with the corresponding detector. The confirmation light will be mounted as close to the last head on the mast arm as possible.

Electrical cable from the confirmation light to the controller cabinet will be a 16AWG (minimum) 2-conductor cable that meets the Specifications.

RECTANGULAR RAPID FLASHING BEACON SYSTEM

A Rectangular Rapid Flashing Beacons (RRFB) system will be in conformance with the current MUTCD and will consist of the following components:

- Individual RRFB displays as shown in the plans
- Accessible Pedestrian Signal push buttons as shown in the plans
- W11-2 (pedestrian crossing) signs as shown in the plans
- W16-7P (diagonal arrow) plaques as shown in the plans
- R10-25 (push button) signs as shown in the plans
- All necessary electronic programming and flash units, hardware, and wiring to make the system operational

One RRFB system is necessary for each pedestrian crossing location shown in the plans.

The programmed flash time will be 20-sec.

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.

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”.

Individual RRFB that are mounted on luminaire and signal poles 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.

CONDUIT AND CABLE QUANTITIES

KLJ	STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
		NH-CR-EM 0018(195)103 P 0407(05)01	L6	L43

Rev. 8/2/2024 CMW

		Rigid Conduit						Copper Wire					AWG Copper Cable, K2				Twisted Shielded Pair		Pole and Bracket Cable			Preemption Cable Not a Bid Item
		Schedule 40			Schedule 80								#14 AWG									
Location to Location		1" Ft	2" Ft	4" Ft	2" Ft	3" Ft	4" Ft	1/C #1 AWG Ft	1/C #2 AWG Ft	1/C #6 AWG Ft	1/C #8 AWG Ft	1/C #14 AWG Ft	2/C Ft	4/C Ft	6/C Ft	25/C Ft	#16 AWG Ft		2/C #10 AWG Ft			Ft
US HWY 18 & SD HWY 407 (SIGNAL)																						
SERVICE CABINET	JA0		10							220												
JA0	CONTROLLER			10						65			165			85	250					85
JA0	JA1		95		30												275					
JA0	JA2				75					250			165			85	250					85
JA2	JA3		120		65												390					
JA0	A1		20													30						30
JA0	PA1	30											40									
JA0	PA2	10											20									
JA2	A2		20							85			30			30						30
JA2	PA4	20											30									
JA0	JA7					100				320			425			215	635					215
JA7	A4		10													20						20
JA7	PA7	15											25									
JA7	PA8	10											25									
JA7	JA8		125														135					
JA7	JA4					95				320			215			110	320					110
JA4	A3		15							65						25						25
JA4	PA5	20											30									
JA4	PA6	15											25									
JA4	JA5		40														140					
JA5	JA6		60		55												125					
SIGNAL POLE	A1													110								55
SIGNAL POLE	A2												10	105					60			50
SIGNAL POLE	A3													120					60			65
SIGNAL POLE	A4													115								60
PED PB POLE	PA1												10									
PED PB POLE	PA2												10									
PED PB POLE	PA4												10									
PED PB POLE	PA5												10									
PED PB POLE	PA6												10									
PED PB POLE	PA7												10									
PED PB POLE	PA8												10									
TOTAL (SD HWY 407 SIGNAL)		**120**	**515**	**10**	**225**	**195**				**1,325**			**1,275**	**450**		**600**		**2,520**			**120**		**830**

CONDUIT AND CABLE QUANTITIES

KLJ	STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
		NH-CR-EM 0018(195)103 P 0407(05)01	L7	L43

Rev. 8/2/2024 CMW

		Rigid Conduit							Copper Wire						AWG Copper Cable, K2					Twisted Shielded Pair			Pole and Bracket Cable				Preemption Cable Not a Bid Item
		Schedule 40			Schedule 80										#14 AWG												
		1"	2"	4"	2"	3"	4"		1/C #1 AWG	1/C #2 AWG	1/C #6 AWG	1/C #8 AWG	1/C #14 AWG		2/C	4/C	6/C	25/C		#16 AWG			2/C #10 AWG				
Location to Location		Ft	Ft	Ft	Ft	Ft	Ft		Ft	Ft	Ft	Ft	Ft		Ft	Ft	Ft	Ft		Ft			Ft				Ft
US HWY 18 & EASTRIDGE ROAD (SIGNAL)																											
POWER POLE	SERVICE CABINET		75																								
SERVICE CABINET	JB0		100								765																
JA0	DISCONNECT		10								215																
JB0	CONTROLLER CABINET			10							195				175			90		175							90
JB0	B1		10								50							20									20
JB0	PB1	15													25												
JB0	PB2	20													30												
JB0	JB1					60					210				140			70		210							70
JB1	B2		10								50							20									20
JB1	PB3	20													30												
JB1	PB4	10													20												
JB1	JB2		105																	115							
JB0	JB5					80					260				345			170		345							175
JB5	B4		10															20									20
JB5	PB7	5													15												
JB5	PB8	15													25												
JB5	JB6		125																	135							
JB7	JB31					75					255				170			85		85							85
JB3	B3		15								65							25									25
JB3	PB5	10													20												
JB3	PB6	15													25												
JB3	JB4		30																	40							
SIGNAL POLE	B1															115							60				120
SIGNAL POLE	B2															125							60				120
SIGNAL POLE	B3															125							60				120
SIGNAL POLE	B4															100											100
PED PB POLE	PB1														10												
PED PB POLE	PB2														10												
PED PB POLE	PB3														10												
PED PB POLE	PB4														10												
PED PB POLE	PB5														10												
PED PB POLE	PB6														10												
PED PB POLE	PB7														10												
PED PB POLE	PB8														10												
TOTAL (EASTRIDGE RD SIGNAL)		**110**	**490**	**10**		**215**					**2,065**				**1,100**	**465**		**500**		**1,105**			**180**				**965**

CONDUIT AND CABLE QUANTITIES

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
KLJ	NH-CR-EM 0018(195)103 P 0407(05)01	L8	L43

Rev. 8/2/2024 CMW

		Rigid Conduit						Copper Wire					AWG Copper Cable, K2				Twisted Shielded Pair		Pole and Bracket Cable		Preemption Cable Not a Bid Item
		Schedule 40			Schedule 80								#14 AWG								
Location to Location		1" Ft	2" Ft	4" Ft	2" Ft	3" Ft	4" Ft	1/C #1 AWG Ft	1/C #2 AWG Ft	1/C #6 AWG Ft	1/C #8 AWG Ft	1/C #14 AWG Ft	2/C Ft	4/C Ft	6/C Ft	25/C Ft	#16 AWG Ft		2/C #10 AWG Ft		Ft
RECTANGULAR RAPID FLASHING BEACON US HWY 18 & SIOUX NATION AVE/ WHITE TAIL DEER RD (RRFB)																					
JL1	R1		10												20						
JL1	PR1		10							60			40		20						
JL1	JL2				70								80		80						
JL2	R2		10												20						
JL2	PR2		5										15								
TOTAL (RRFB)			**35**		**70**					**60**			**135**		**140**						

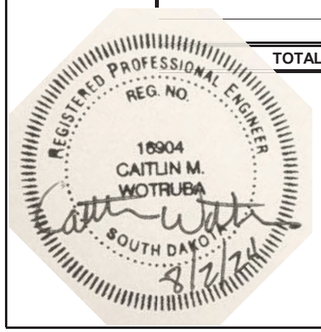
REGISTERED PROFESSIONAL ENGINEER
REG. NO.
18904
CAITLIN M.
WOTRUBA
SOUTH DAKOTA
8/2/24

CONDUIT AND CABLE QUANTITIES

KLJ	STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
		NH-CR-EM 0018(195)103 P 0407(05)01	L9	L43

Rev. 8/2/2024 CMW

		Rigid Conduit							Copper Wire						AWG Copper Cable, K2					Twisted Shielded Pair			Pole and Bracket Cable			Preemption Cable Not a Bid Item
		Schedule 40			Schedule 80										#14 AWG											
Location to Location		1" Ft	2" Ft	4" Ft	2" Ft	3" Ft	4" Ft		1/C #1 AWG Ft	1/C #2 AWG Ft	1/C #6 AWG Ft	1/C #8 AWG Ft	1/C #14 AWG Ft		2/C Ft	4/C Ft	6/C Ft	25/C Ft		#16 AWG Ft			2/C #10 AWG Ft			Ft
US HWY 18 & INDIAN HEALTH ROAD (SIGNAL)																										
SERVICE CABINET	JC0		580							3650																
JC0	DISCONNECT		10								435															
JC0	CONTROLLER			10							255				165			85		230						65
JC1	C4		10								50							20								20
JC1	JC0			10							180				160			80		250						60
JC1	PC7	10													20											
JC1	PC8	10													20											
JC1	JC7					90					300				200			100		400						100
JC7	C3		10								50							20								20
JC7	PC5	10													20											
JC7	PC6	20													30											
JC7	JC6		135																	285						
JC9	JC3					80					270				360			180		360						90
JC3	C1		15								65							25								25
JC3	PC1	10													20											
JC3	PC2	15													25											
JC3	JC2		30																	40						
JC3	JC4					60									135			70		205						
JC4	C2		10															20								
JC4	PC3	20													30											
JC4	PC4	30													45											
JC4	JC5		150																	160						
JC0	JC8		130																	140						
SIGNAL POLE	C1															105							60			50
SIGNAL POLE	C2															345										
SIGNAL POLE	C3															110							60			50
SIGNAL POLE	C4															100							60			45
PED PB POLE	PC1														10											
PED PB POLE	PC2														10											
PED PB POLE	PC3														10											
PED PB POLE	PC4														10											
PED PB POLE	PC5														10											
PED PB POLE	PC6														10											
PED PB POLE	PC7														10											
PED PB POLE	PC8														10											
TOTAL (INDIAN HEALTH RD SIGNAL)		**125**	**1,080**	**20**		**230**				**3,650**	**1,605**				**1,310**	**660**		**600**		**2,070**			**180**			**525**



CONDUIT AND CABLE QUANTITIES

KLJ	STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
		NH-CR-EM 0018(195)103 P 0407(05)01	L10	L43

Rev. 8/2/2024 CMW

Location to Location		Rigid Conduit						Copper Wire					AWG Copper Cable, K2				Twisted Shielded Pair		Pole and Bracket Cable		Preemption Cable Not a Bid Item
		Schedule 40			Schedule 80								#14 AWG								
		1" Ft	2" Ft	4" Ft	2" Ft	3" Ft	4" Ft	1/C #1 AWG Ft	1/C #2 AWG Ft	1/C #6 AWG Ft	1/C #8 AWG Ft	1/C #14 AWG Ft	2/C Ft	4/C Ft	6/C Ft	25/C Ft	#16 AWG Ft		2/C #10 AWG Ft		Ft
US HWY 18 & EASTRIDGE CIRCUIT 1 L1 - L11 (LIGHTING)																					
POWER POLE	SERVICE		75																		
SERVICE	JL3		20		75			480													
JL3	L11		20					95													
L11	L10		140		50			740													
L10	L9		90					350													
L9	L8		145		50			780													
L8	L7		25		65			345													
L7	L6		15		65			285													
L6	L5		195					780													
L5	JL1		130		55			755													
JL1	L4		25					105													
L4	L3		10		55			235													
L3	L2		175		30			815													
L2	L1		105		95			790													
US HWY 18 & EASTRIDGE CIRCUIT 2 L12-L20 (LIGHTING)																					
SERVICE	JL3		15		75			450													
JL3	L12		280		70			1385													
L12	L13		135					540													
L13	L14				65			255													
L14	L15		160					635													
L15	L16		140		45			725													
L16	L17				75			300													
L17	L18		170					670													
L18	L19		180					715													
L19	JL4		160					650													
JL4	L20		20					100													
INDIAN HEALTH ROAD LUMINAIRE (LIGHTING)																					
REP20	REP21		300								900										
REP21	REP22		180								540										
PATHWAY LUMINAIRE (LIGHTING)																					
REP1	EP2		165						495												
REP5	REP6		130		70				600												
REP6	EP7		140		45				565												
REP9	REP10		140		40				545												
REP10	REP11		180						550												
TOTAL			3,665		1,025			12,980	2,755		1,440										

CONDUIT AND CABLE QUANTITIES

KLJ	STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
		NH-CR-EM 0018(195)103 P 0407(05)01	L11	L43

Rev. 8/2/2024 CMW

Location to Location		Rigid Conduit						Copper Wire					AWG Copper Cable, K2				Twisted Shielded Pair		Pole and Bracket Cable		Preemption Cable Not a Bid Item
		Schedule 40			Schedule 80								#14 AWG								
		1" Ft	2" Ft	4" Ft	2" Ft	3" Ft	4" Ft	1/C #1 AWG Ft	1/C #2 AWG Ft	1/C #6 AWG Ft	1/C #8 AWG Ft	1/C #14 AWG Ft	2/C Ft	4/C Ft	6/C Ft	25/C Ft	#16 AWG Ft		2/C #10 AWG Ft		Ft
LUMINAIRE POLES (LIGHTING)																					
LUMINAIRE POLE	L1											80							55		
LUMINAIRE POLE	L2											80							55		
LUMINAIRE POLE	L3											80							55		
LUMINAIRE POLE	L4											80							55		
LUMINAIRE POLE	L5											80							55		
LUMINAIRE POLE	L6											80							55		
LUMINAIRE POLE	L7											80							55		
LUMINAIRE POLE	L8											80							55		
LUMINAIRE POLE	L9											80							55		
LUMINAIRE POLE	L10											80							55		
LUMINAIRE POLE	L11											80							55		
LUMINAIRE POLE	L12											80							55		
LUMINAIRE POLE	L13											80							55		
LUMINAIRE POLE	L14											80							55		
LUMINAIRE POLE	L15											80							55		
LUMINAIRE POLE	L16											80							55		
LUMINAIRE POLE	L17											80							55		
LUMINAIRE POLE	L18											80							55		
LUMINAIRE POLE	L19											80							55		
LUMINAIRE POLE	L20											80							55		
CONDUIT UNDER INDIAN HEALTH ROAD																					
JP1	JP2						220														
	LIGHTING SUBTOTAL		**3,665**		**1,025**		**220**		**12,980**	**2,755**		**1,440**	**1,600**								**1,100**			
	TOTAL	**355**	**5,785**	**40**	**1,320**	**640**	**220**		**12,980**	**6,405**	**5,055**	**1,440**	**1,600**		**3,820**	**1,575**	**140**	**1,700**		**5,695**			**1,580**			**2,320**

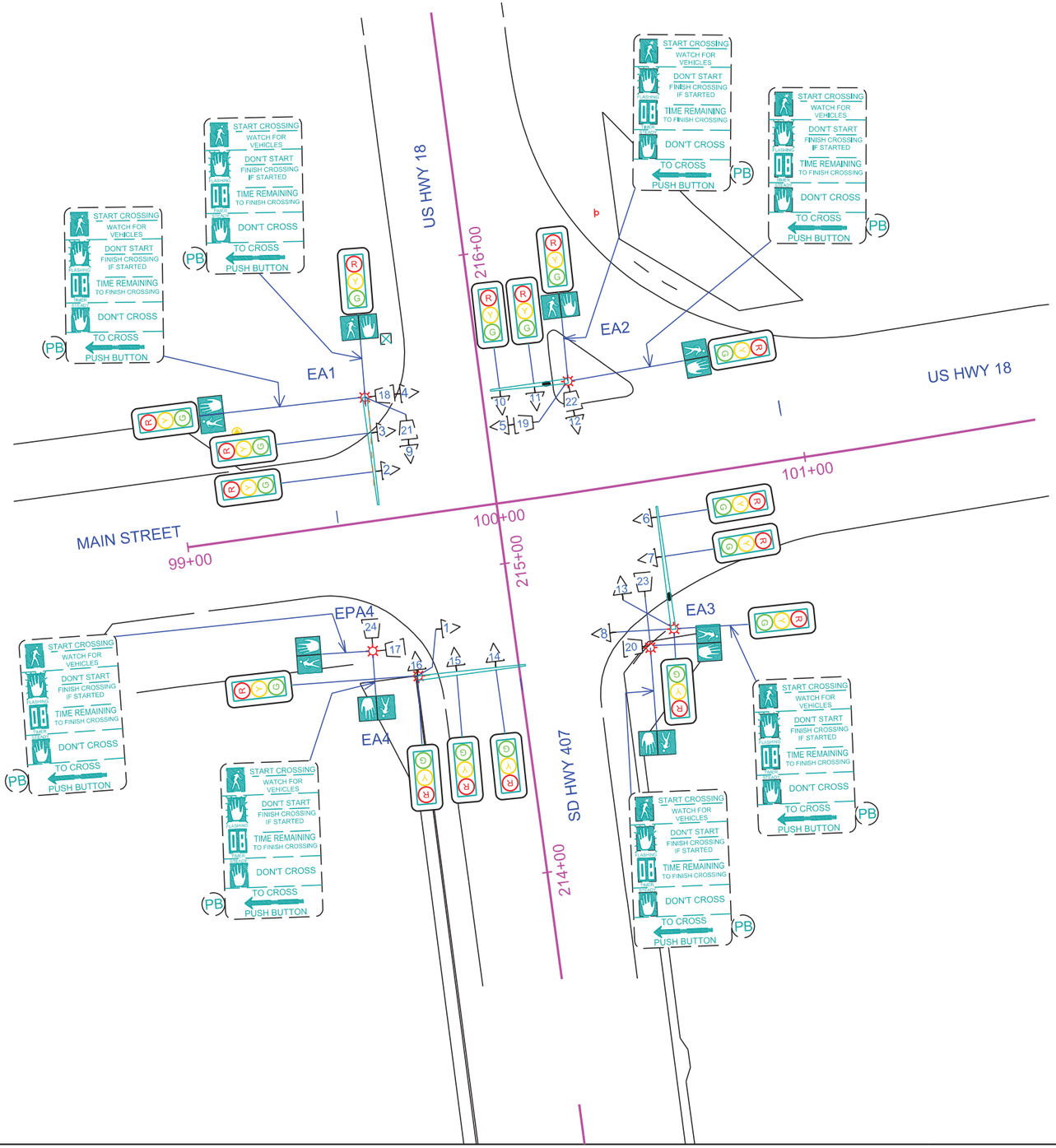
EXISTING SIGNAL LAYOUT

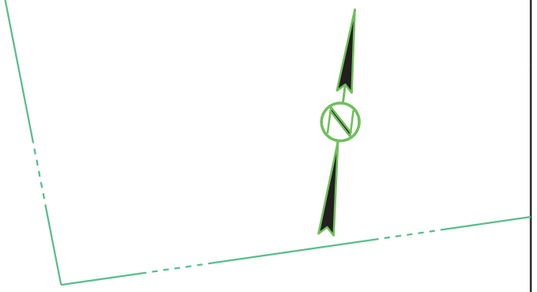
US HWY 18 & SD HWY 407

KLJ	STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
		NH-CR-EM 0018(195)103 P 0407(05)01	L12	L43

Plotting Date: 8/1/2024

Rev. 8/2/2024 CMW





ESTIMATE OF QUANTITIES

KEY	ITEM	EST QUANT	UNIT
	Salvage Signal Equipment	LUMP SUM	LS
	Remove Signal Equipment	LUMP SUM	LS
	Remove Signal Pole Footing	4	EA

REMOVAL

KEY	ITEM
	Signal Pole w/ Mast Arm & 8' Lumin Arm (EA2 & EA3)
	Signal Pole w/ Mast Arm (EA1 & EA4)
	Roadway Luminaire, 250w with P.E. (EA2 & EA3)
	Remove Signal Pole Footing (EA1-EA4)
	Remove Pedestrian Signal Head (17-24)
(PB)	Remove Pedestrian Pushbuttons
	Remove Pedestrian Crossing Signs

SALVAGE

KEY	ITEM
	Controller Cabinet
	LED Signal Heads

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
18904
CAITLIN M.
WOTRUBA
SOUTH DAKOTA
8/2/24

Plot Scale - 1:40

Plotted From - caitlinwotruba

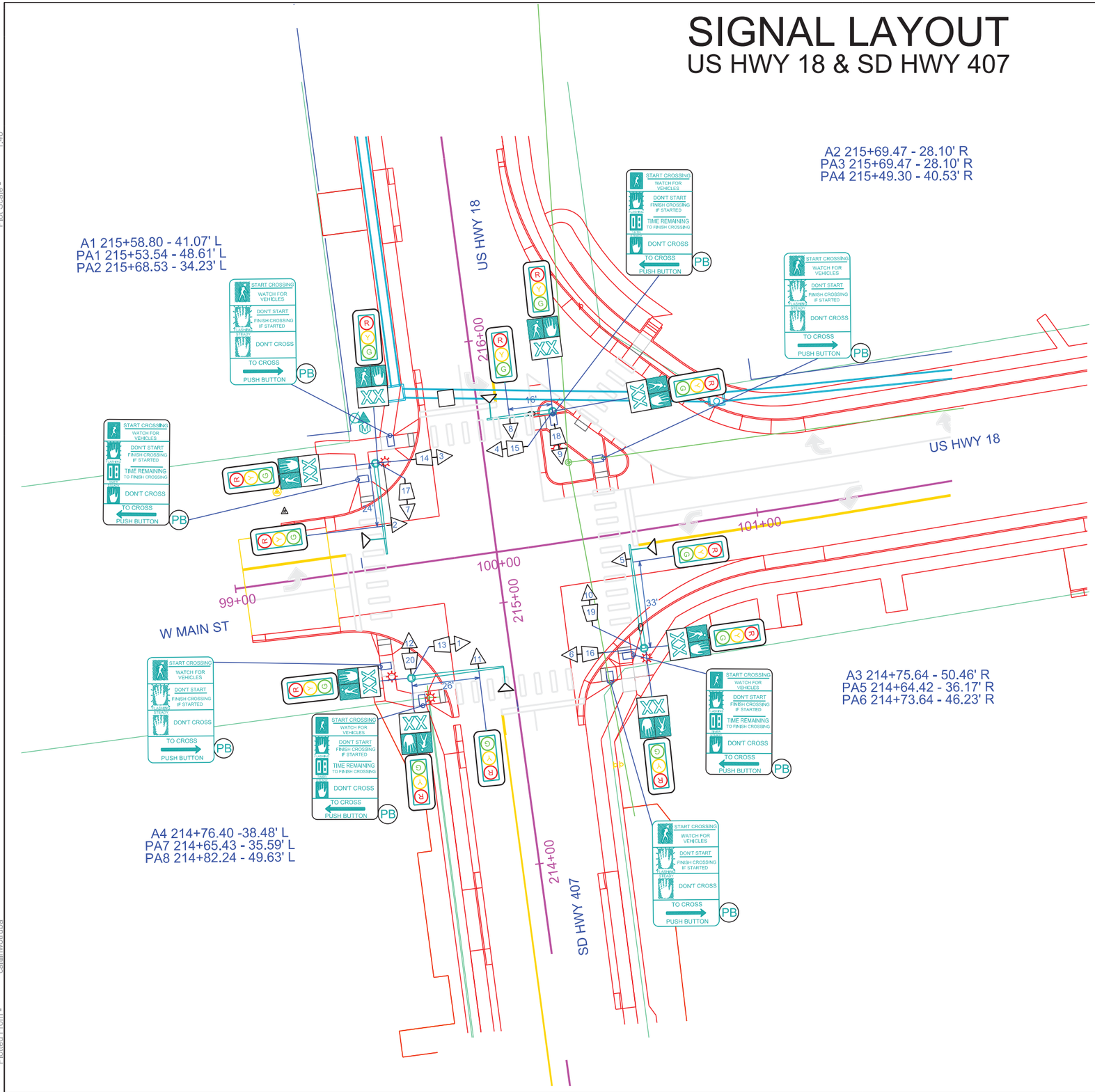
File - ...\Sections\Section\L110Dexs.dgn

SIGNAL LAYOUT
US HWY 18 & SD HWY 407

KLJ	STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
		NH-CR-EM 0018(195)103 P 0407(05)01	L13	L43

Plotting Date: 8/1/2024

Rev. 8/2/2024 CMW



KEY	ESTIMATE OF QUANTITIES	QUANT EST	UNIT
	ITEM		
	Signal Pole w/35' Mast Arm (A1& A4)	2	EACH
	Signal Pole w/25' Mast Arm & 8' Lumin Arm (A2)	1	EACH
	Signal Pole w/40' Mast Arm & 8' Lumin Arm (A3)	1	EACH
	Roadway Luminaire, LED with P.E. (A2 & A3)	2	EACH
	3 Section Vehicle Signal Head (1-12)	12	EACH
	Siren Activated EVP Detector Not a Bid Item	4	EACH
PB	Accessible Pedestrian Signal	8	EACH
	Pedestrian Push Button Pole (PA1-PA2, PA4-PA8)	7	EACH
	Pedestrian Signal Head w/Countdown Timer (13-20)	8	EACH
	Pedestrian Crossing Sign R10-3e (Left - 4 /Right - 4)	8	EACH

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
16904
CAITLIN M.
WOTRUBA
SOUTH DAKOTA
8/2/24

Plot Scale - 1:40

Plotted From - caitlinwotruba

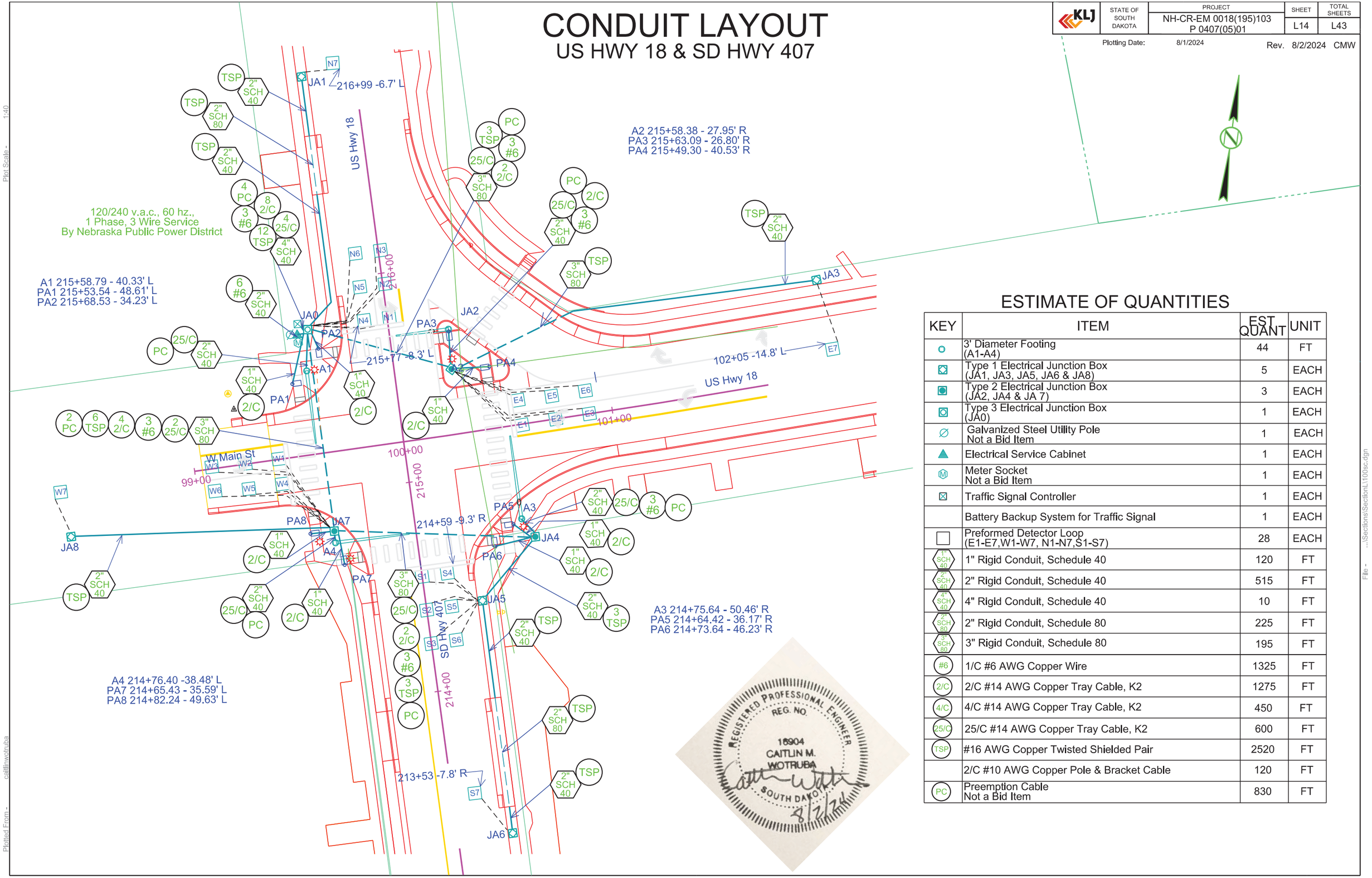
File - ...\Sections\SectionL1100s.dgn

CONDUIT LAYOUT
US HWY 18 & SD HWY 407

KLJ	STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
		NH-CR-EM 0018(195)103 P 0407(05)01	L14	L43

Plotting Date: 8/1/2024

Rev. 8/2/2024 CMW



ESTIMATE OF QUANTITIES

KEY	ITEM	EST QUANT	UNIT
	3' Diameter Footing (A1-A4)	44	FT
	Type 1 Electrical Junction Box (JA1, JA3, JA5, JA6 & JA8)	5	EACH
	Type 2 Electrical Junction Box (JA2, JA4 & JA 7)	3	EACH
	Type 3 Electrical Junction Box (JA0)	1	EACH
	Galvanized Steel Utility Pole Not a Bid Item	1	EACH
	Electrical Service Cabinet	1	EACH
M	Meter Socket Not a Bid Item	1	EACH
	Traffic Signal Controller	1	EACH
	Battery Backup System for Traffic Signal	1	EACH
	Preformed Detector Loop (E1-E7,W1-W7, N1-N7,S1-S7)	28	EACH
1" SCH 40	1" Rigid Conduit, Schedule 40	120	FT
2" SCH 40	2" Rigid Conduit, Schedule 40	515	FT
4" SCH 40	4" Rigid Conduit, Schedule 40	10	FT
2" SCH 80	2" Rigid Conduit, Schedule 80	225	FT
3" SCH 80	3" Rigid Conduit, Schedule 80	195	FT
#6	1/C #6 AWG Copper Wire	1325	FT
2/C	2/C #14 AWG Copper Tray Cable, K2	1275	FT
4/C	4/C #14 AWG Copper Tray Cable, K2	450	FT
25/C	25/C #14 AWG Copper Tray Cable, K2	600	FT
TSP	#16 AWG Copper Twisted Shielded Pair	2520	FT
	2/C #10 AWG Copper Pole & Bracket Cable	120	FT
PC	Preemption Cable Not a Bid Item	830	FT

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
16904
CAITLIN M.
WOTRUBA
SOUTH DAKOTA
8/2/24

Plot Scale - 1:40

Plotted From - caitlinwotruba

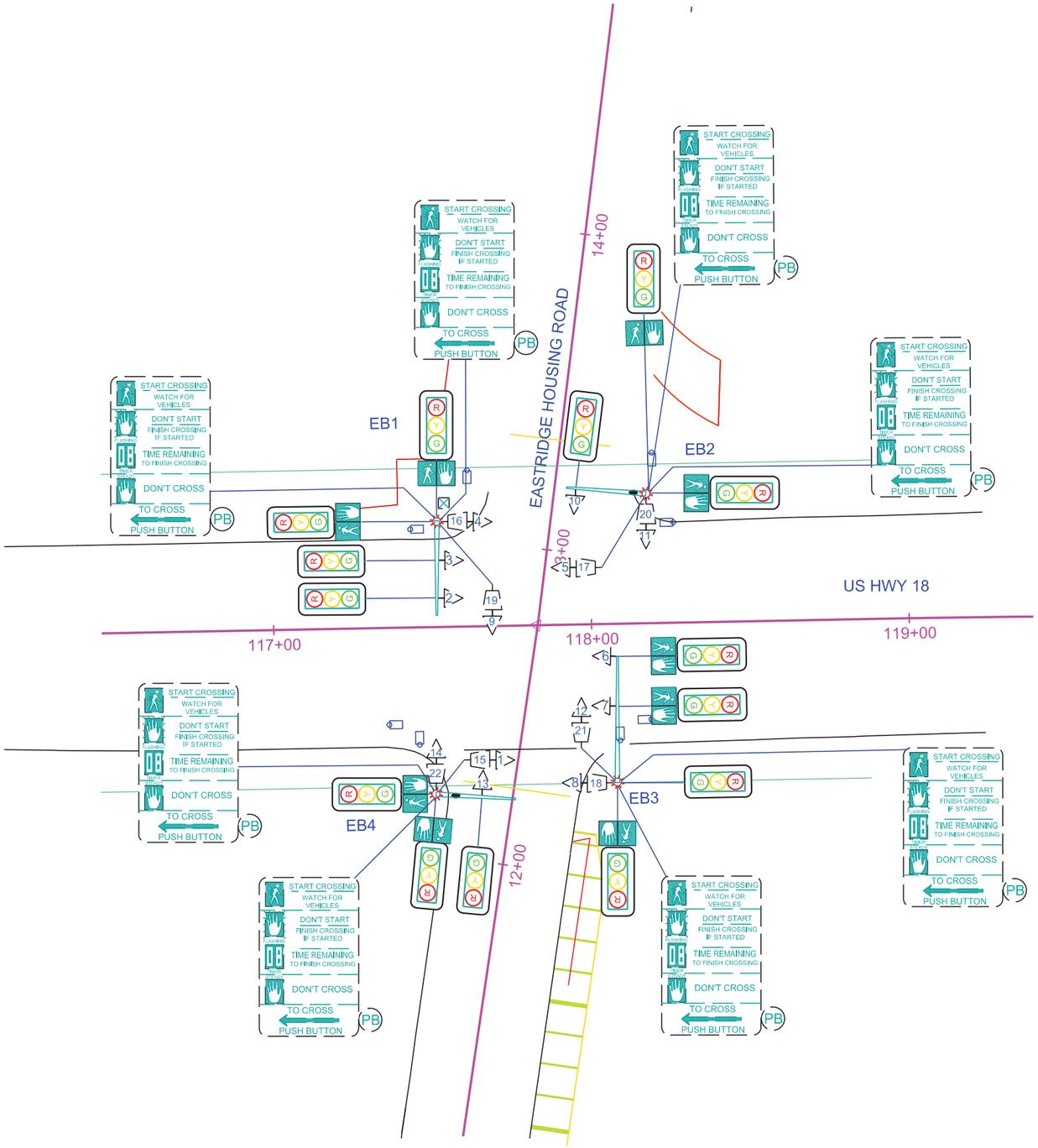
File - ...\Sections\SectionL1100sc.dgn

EXISTING SIGNAL LAYOUT
US HWY 18 & EASTRIDGE HOUSING RD

KLJ	STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
		NH-CR-EM 0018(195)103 P 0407(05)01	L15	L43

Plotting Date: 8/1/2024

Rev. 8/2/2024 CMW



ESTIMATE OF QUANTITIES

KEY	ITEM	EST QUANT	UNIT
	Salvage Signal Equipment	LUMP SUM	LS
	Remove Signal Equipment	LUMP SUM	LS
	Remove Signal Pole Footing	4	EACH

REMOVAL

KEY	ITEM
	Signal Pole w/ Mast Arm & 8' Lumin Arm (EB2 & EB4)
	Signal Pole w/ Mast Arm (EB1 & EB3)
	Roadway Luminaire, 250w with P.E. (EB2 & EB4)
	Remove Pedestrian Signal Head (15-22)
(PB)	Remove Pedestrian Pushbuttons
	Remove Pedestrian Crossing Signs

SALVAGE

KEY	ITEM
	Controller Cabinet
	LED Signal Heads

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 18904
CAITLIN M. WOTRUBA
SOUTH DAKOTA
8/2/24

Plot Scale - 1:40
Plotted From - caitlinwotruba
File - ...\Sections\Section\L1118exs.dgn

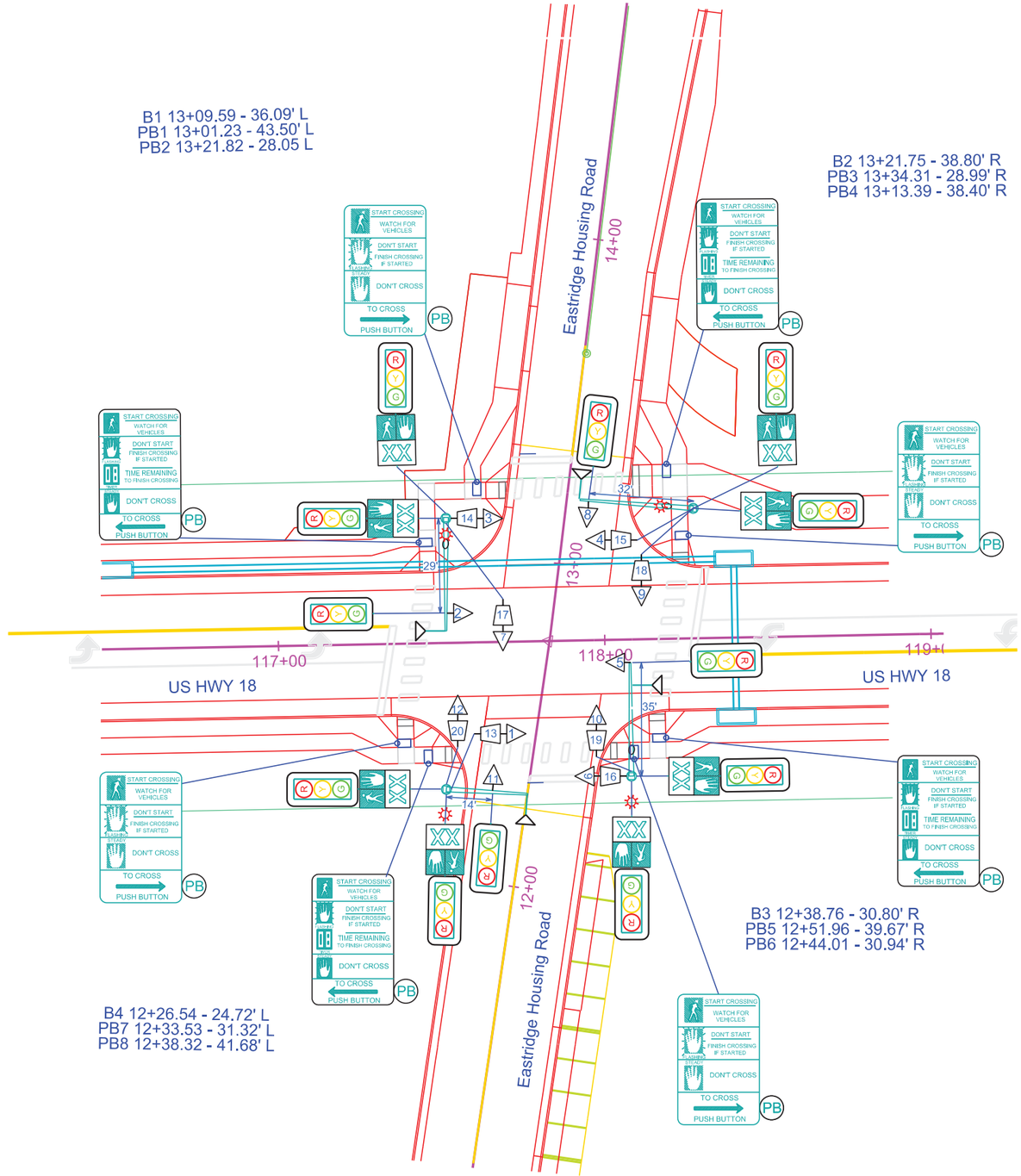
SIGNAL LAYOUT

US HWY 18 & EASTRIDGE HOUSING RD

KLJ	STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
		NH-CR-EM 0018(195)103 P 0407(05)01	L16	L43

Plotting Date: 8/1/2024

Rev. 8/2/2024 CMW



ESTIMATE OF QUANTITIES

KEY	ITEM	QUANT EST	UNIT
	Signal Pole w/35' Mast Arm & 8' Lumin Arm (B1, B2 & B3)	3	EACH
	Signal Pole w/25' Mast Arm (B4)	1	EACH
	Roadway Luminaire, LED with P.E. (B1,B2 & B3)	3	EACH
	3 Section Vehicle Signal Head (1-12)	12	EACH
	Siren Activated EVP Detector Not a Bid Item	4	EACH
PB	Accessible Pedestrian Signal	8	EACH
	Pedestrian Push Button Pole (PB1-PB8)	8	EACH
	Pedestrian Signal Head w/Countdown Timer (13-20)	8	EACH
	Pedestrian Crossing Sign R10-3e (Left - 4 / Right - 4)	8	EACH

Plot Scale - 1:40

Plotted From - caitlinwotruba

File - ...\Sections\Section\L1116s.dgn

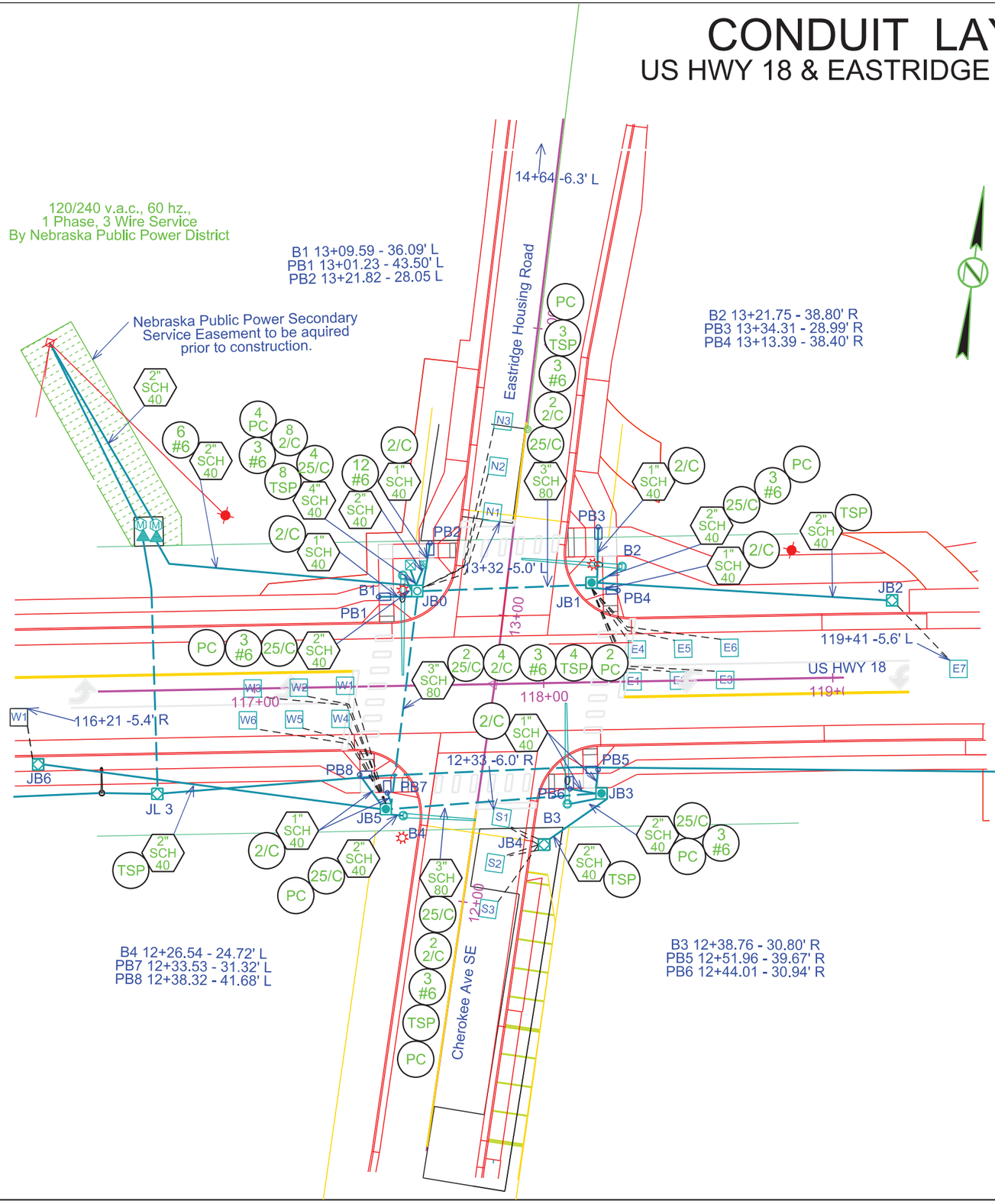
CONDUIT LAYOUT

US HWY 18 & EASTRIDGE HOUSING RD

KLJ	STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
		NH-CR-EM 0018(195)103 P 0407(05)01	L17	L43

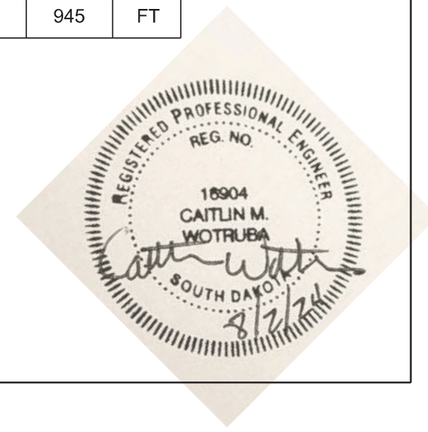
Plotting Date: 8/1/2024

Rev. 8/2/2024 CMW



ESTIMATE OF QUANTITIES

KEY	ITEM	EST QUANT	UNIT
	3' Diameter Footing (B1-B4)	47	FT
	Type 1 Electrical Junction Box (JB2, JB4 & JB6)	6	EACH
	Type 2 Electrical Junction Box (JB1, JB3 & JB5)	4	EACH
	Type 3 Electrical Junction Box (JB0)	1	EACH
	Electrical Service Cabinet w/ Secondary Disconnect	1	EACH
	Secondary Disconnect (Cost included in Electrical Service Cabinet)	1	EACH
M	Meter Socket Not a Bid Item	1	EACH
	Traffic Signal Controller	1	EACH
	Battery Backup System for Traffic Signal	1	EACH
	Preformed Detector Loop (E1-E7,W1-W7, N1-N3,S1-S3)	20	EACH
1" SCH 40	1" Rigid Conduit, Schedule 40	110	FT
2" SCH 40	2" Rigid Conduit, Schedule 40	490	FT
4" SCH 40	4" Rigid Conduit, Schedule 40	10	FT
3" SCH 80	3" Rigid Conduit, Schedule 80	215	FT
#6	1/C #6 AWG Copper Wire	2065	FT
2/C	2/C #14 AWG Copper Tray Cable, K2	1100	FT
4/C	4/C #14 AWG Copper Tray Cable, K2	465	FT
25/C	25/C #14 AWG Copper Tray Cable, K2	500	FT
TSP	#16 AWG Copper Twisted Shielded Pair	1105	FT
	2/C #10 AWG Copper Pole & Bracket Cable	180	FT
PC	Preemption Cable Not a Bid Item	945	FT

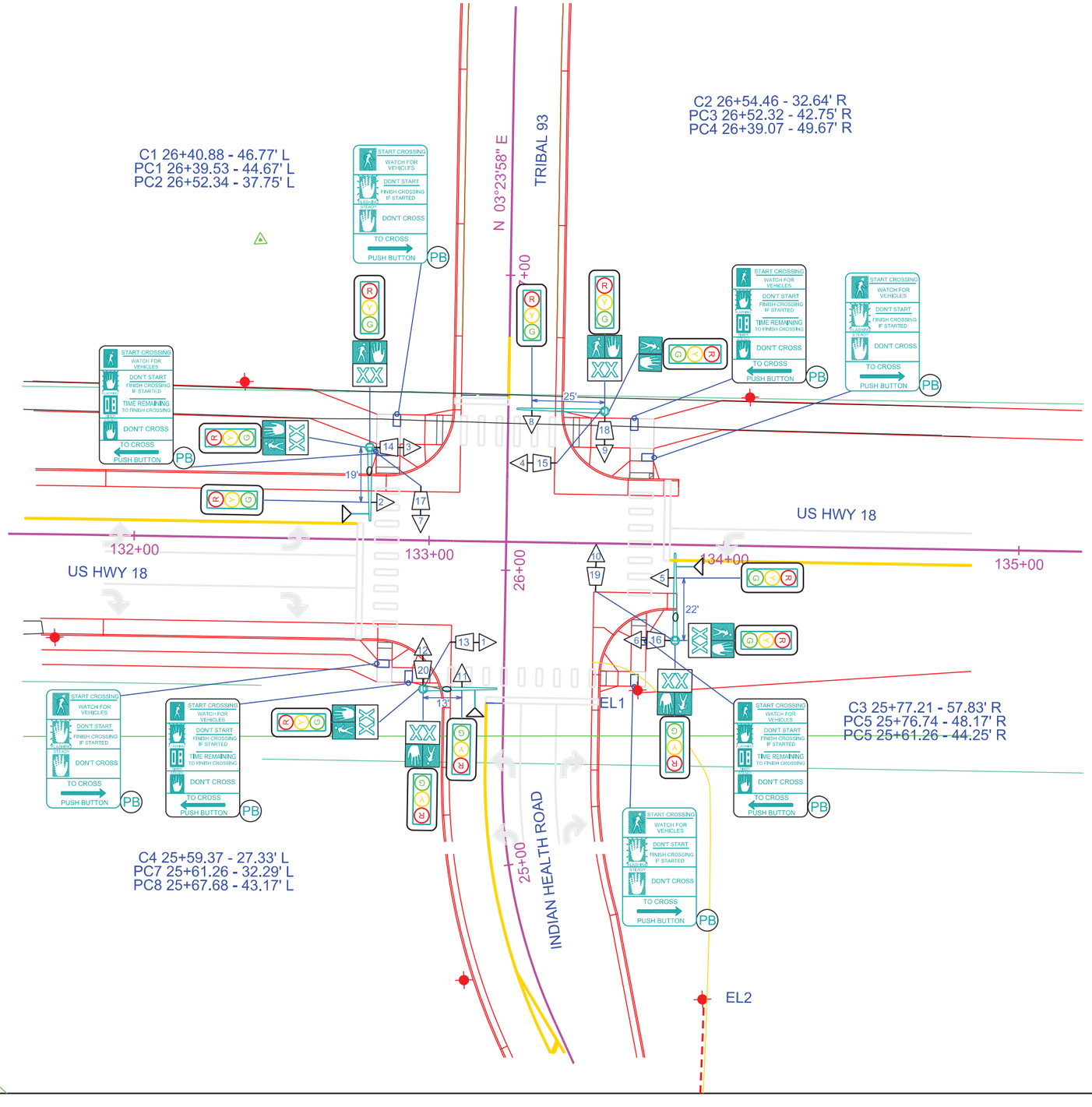


SIGNAL LAYOUT
US HWY 18 & INDIAN HEALTH RD

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-CR-EM 0018(195)103 P 0407(05)01	L18	L43

Plotting Date: 8/1/2024

Rev. 8/2/2024 CMW



ESTIMATE OF QUANTITIES

KEY	ITEM	QUANT EST	UNIT
	Signal Pole w/25' Mast Arm & 8' Lumin Arm (C1 & C4)	2	EACH
	Signal Pole w/30' Mast Arm (C2)	1	EACH
	Signal Pole w/30' Mast Arm & 8' Lumin Arm (C3)	1	EACH
	Roadway Luminaire, LED with P.E. (C1,C3 & C4)	3	EACH
	3 Section Vehicle Signal Head (1-12)	12	EACH
	Siren Activated EVP Detector Not a Bid Item	3	EACH
PB	Accessible Pedestrian Signal	8	EACH
	Pedestrian Push Button Pole (PC1-PC8)	8	EACH
	Pedestrian Signal Head w/Countdown Timer (13-20)	8	EACH
	Pedestrian Crossing Sign R10-3e (Left - 4 /Right - 4)	8	EACH

Plot Scale - 1:40

Plotted From - caitlinwotruba

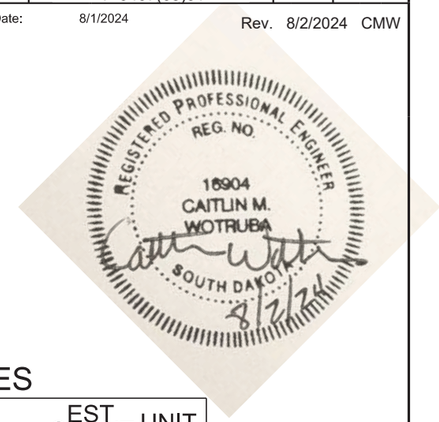
File - ...\Sections\Section\L1133s.dgn

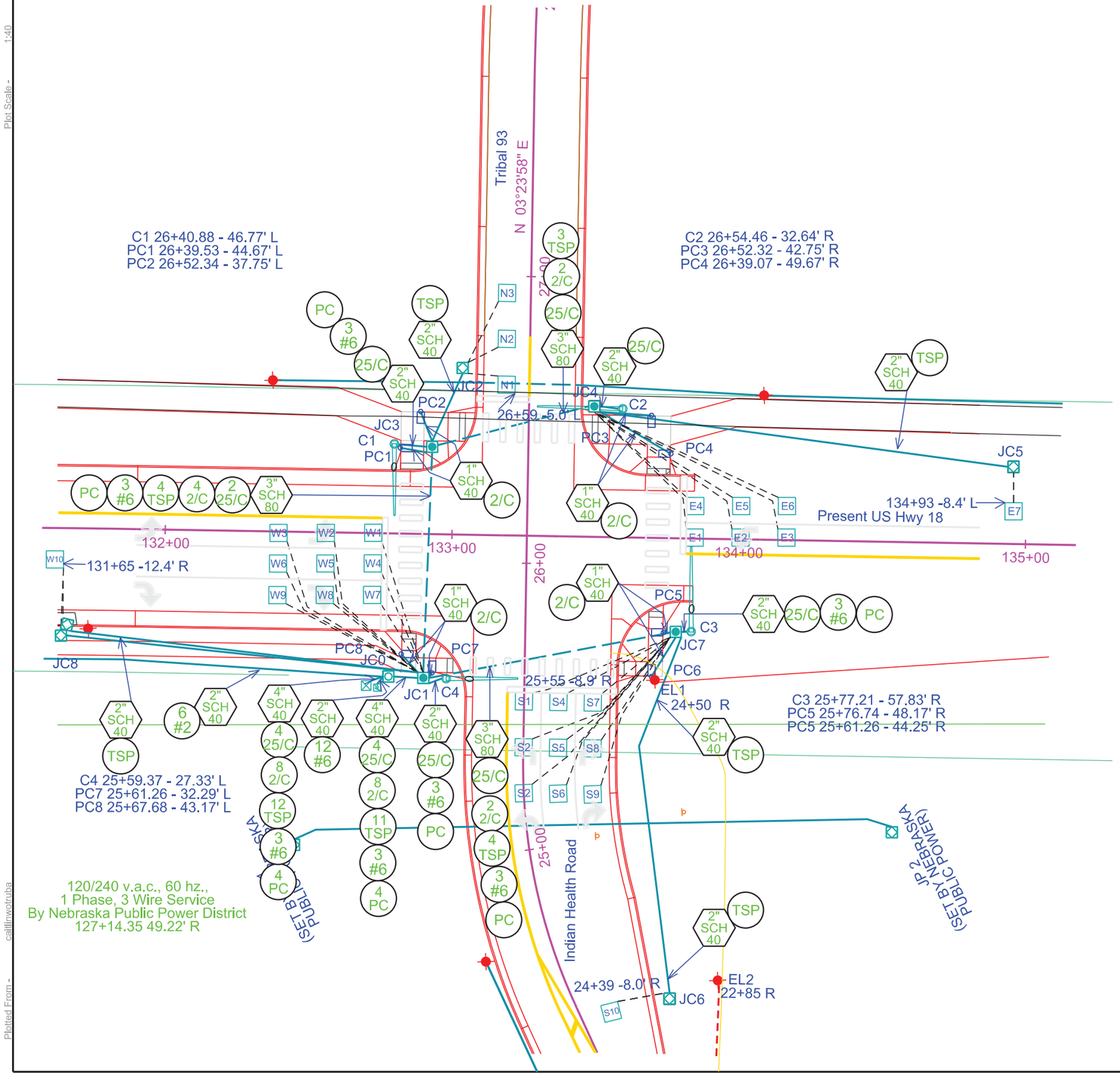
CONDUIT LAYOUT
US HWY 18 & INDIAN HEALTH RD

KLJ	STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
		NH-CR-EM 0018(195)103 P 0407(05)01	L19	L43

Plotting Date: 8/1/2024

Rev. 8/2/2024 CMW





ESTIMATE OF QUANTITIES

KEY	ITEM	EST QUANT	UNIT
	3' Diameter Footing (C1-C4)	46	FT
	Type 1 Electrical Junction Box (JC2, JC5, JC6 & JC8)	4	EACH
	Type 2 Electrical Junction Box (JC1, JC3, JC4, & JC7)	4	EACH
	Type 3 Electrical Junction Box (JC0)	1	EACH
	Galvanized Steel Utility Pole Not a Bid Item	1	EACH
	Electrical Service Cabinet w/Secondary Disconnect	1	EACH
	Secondary Disconnect (Cost included in Electrical Service Cabinet)	1	EACH
M	Meter Socket Not a Bid Item	1	EACH
	Traffic Signal Controller	1	EACH
	Battery Backup System for Traffic Signal	1	EACH
	Preformed Detector Loop (E1-E7,W1-W10, N1-N3,S1-S10)	30	EACH
1" SCH 40	1" Rigid Conduit, Schedule 40	125	FT
2" SCH 40	2" Rigid Conduit, Schedule 40	1080	FT
4" SCH 40	4" Rigid Conduit, Schedule 40	20	FT
3" SCH 80	3" Rigid Conduit, Schedule 80	230	FT
#2	1/C #2 AWG Copper Wire	3650	FT
#6	1/C #6 AWG Copper Wire	1605	FT
2/C	2/C #14 AWG Copper Tray Cable, K2	1310	FT
4/C	4/C #14 AWG Copper Tray Cable, K2	660	FT
25/C	25/C #14 AWG Copper Tray Cable, K2	600	FT
TSP	#16 AWG Copper Twisted Shielded Pair	2070	FT
	2/C #10 AWG Copper Pole & Bracket Cable	180	FT
PC	Preemption Cable Not a Bid Item	525	FT

CONDUIT LAYOUT
US HWY 18

KLJ	STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
		NH-CR-EM 0018(195)103 P 0407(05)01	L20	L43

Plotting Date: 8/1/2024 Rev. 8/2/2024 CMW

ESTIMATE OF QUANTITIES

KEY	ITEM	EST QUANT	UNIT
	Salvage Luminaire Pole (EL1-EL17)	17	EACH
	Remove Luminaire Pole Footing (EL1-EL17, EP20, EP21)	19	EACH
	Breakway Base Luminaire Pole w/ 8' Arm 40' Mounting Height (L1-L20)	20	EACH
	2' Diameter Footing (L1-L20, REP20, REP21)	164	FT
	1.5' Diameter Footing (REP20-REP21)	12	FT
	Electrical Service Cabinet	1	EACH
	Type 1 Electrical Junction Box (JL3)	1	EACH
2" SCH 40	2" Rigid Conduit, Schedule 40	3665	FT

KEY	ITEM	EST QUANT	UNIT
2" SCH 80	2" Rigid Conduit, Schedule 80	1025	FT
4" SCH 80	4" Rigid Conduit, Schedule 80	220	FT
#1	1/C #1 AWG Copper Wire	12980	FT
#2	1/C #2 AWG Copper Wire	2755	FT
#8	1/C #8 AWG Copper Wire	1440	FT
	1/C #14 AWG Copper Wire	1600	FT
	2/C #10 AWG Copper Pole & Bracket Cable	1100	FT
	Remove and Reset Luminaire Pole (EP1, EP5,EP6, EP9-EP11, EP20, EP21, REP1, REP5, REP6, REP9-REP11, REP20, REP21)	8	EACH

BEGIN NH-CR 0018(195)103
END P 0407(00)01

Begin Grading
Station 101+22.65

Present US Hwy 18

Present SD Hwy 407

100+00 101+00 102+00 103+00 104+00 105+00 106+00

215+00 216+00

66' 66'

L1 102+06 -35.1' R
L2 103+98 -35.1' R
L3 105+96 -38.0' R

EL1 EL2 EL3

N1 N2 N3 N4 N5 N6 N7

E1 E2 E3 E4 E5 E6 E7

S1 S2 S3 S4 S5 S6 S7

2" SCH 80 4 #1

2" SCH 40 4 #1

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
16904
CAITLIN M.
WOTRUBA
SOUTH DAKOTA
8/2/24

Plot Scale - 1:40

Plotted From - caitlinwotruba

File - ...\Sections\SectionL1100c.dgn

CONDUIT LAYOUT
US HWY 18

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-CR-EM 0018(195)103 P 0407(05)01	L21	L43

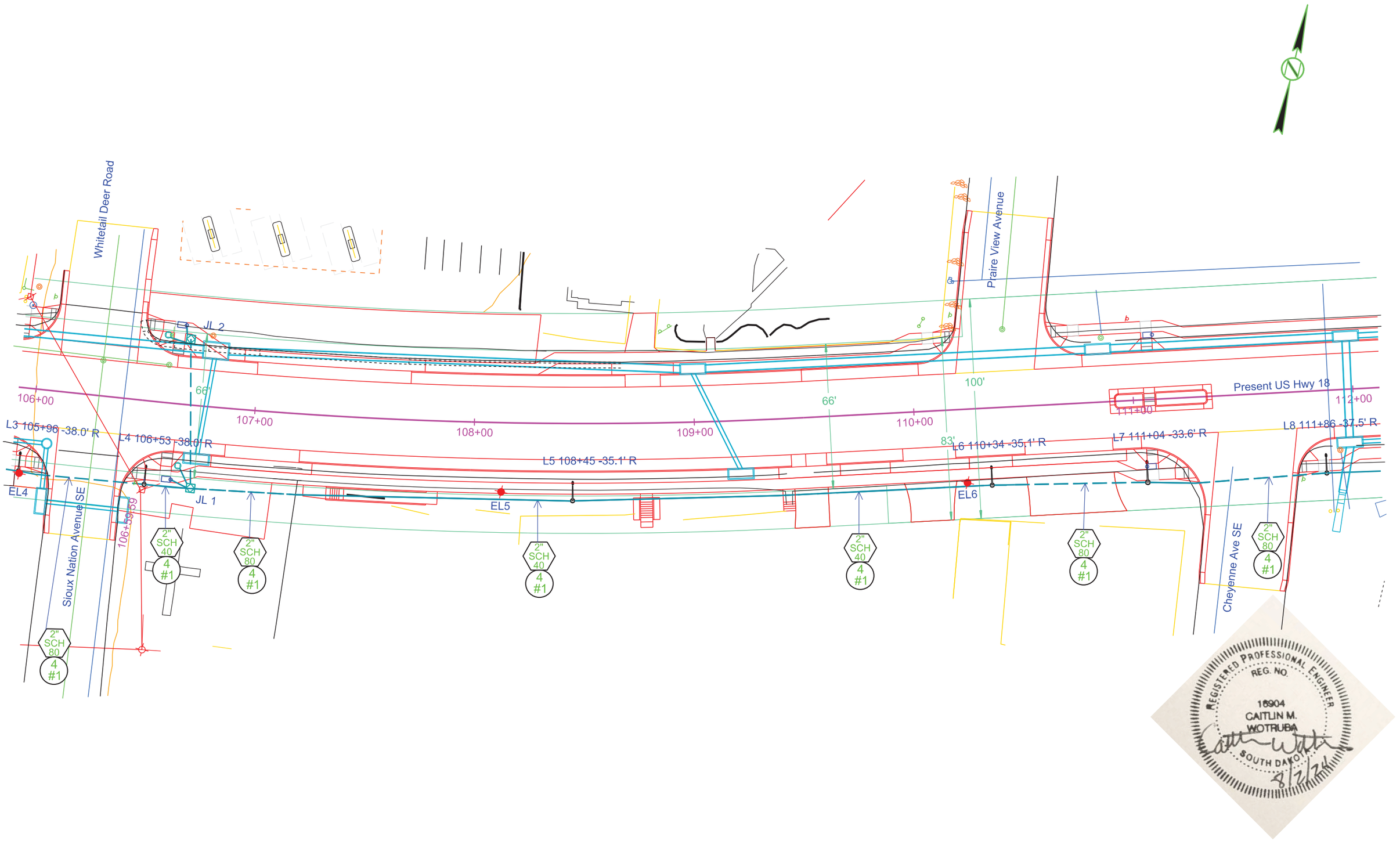
Plotting Date: 8/1/2024

Rev. 8/2/2024 CMW

Plot Scale - 1:40

Plotted From - caitlinwotruba

File - ...\Sections\SectionL\106c.dgn



REGISTERED PROFESSIONAL ENGINEER
REG. NO.
16904
CAITLIN M.
WOTRUBA
SOUTH DAKOTA
8/2/24

RECTANGULAR RAPID FLASHING BEACONS & SIGNS LAYOUT
US 18 & SIOUX NATION AVE/WHITE TAIL DEER RD

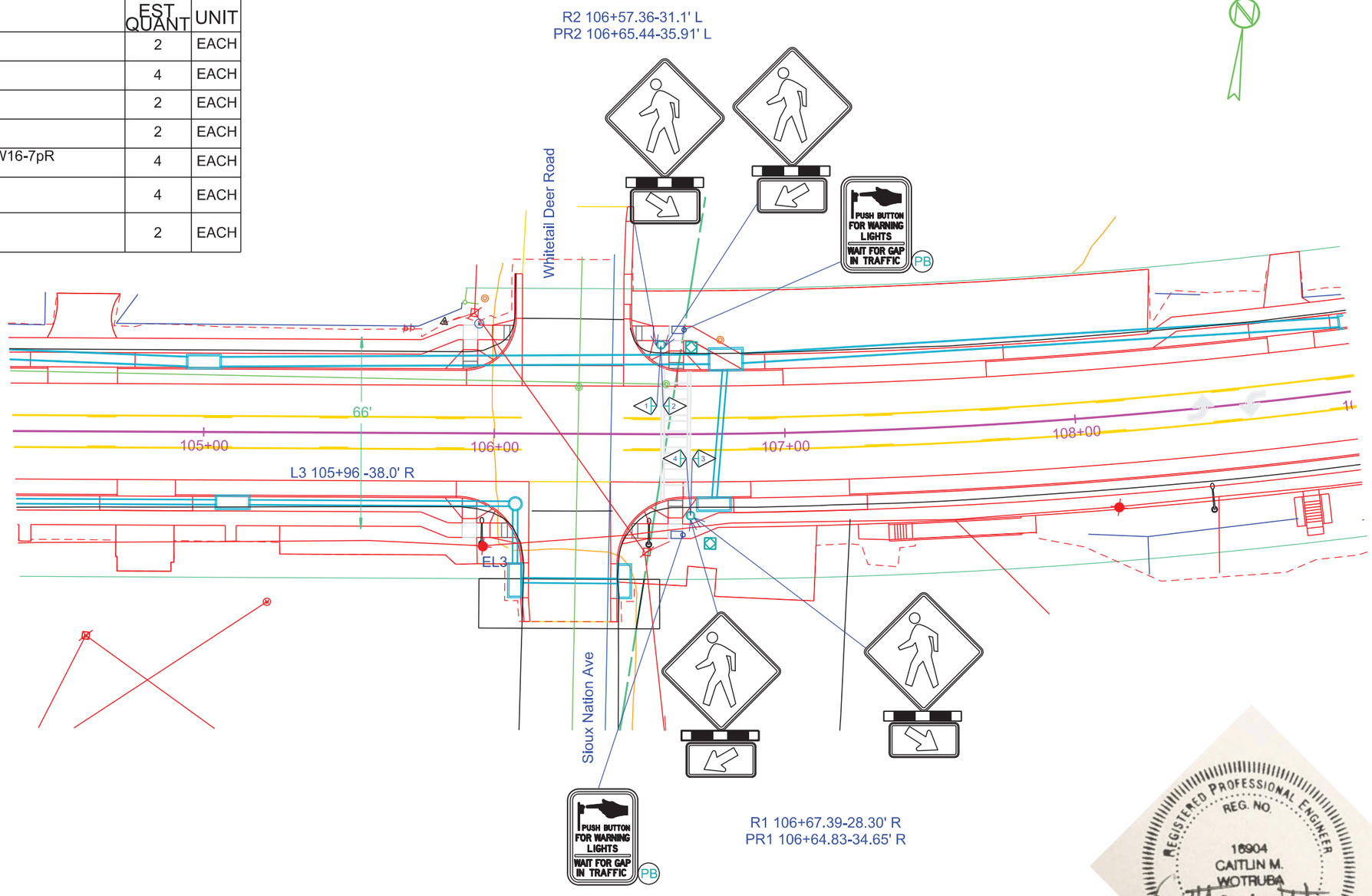
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-CR-EM 0018(195)103 P 0407(05)01	L22	L43

Plotting Date: 8/1/2024

Rev. 8/2/2024 CMW

ESTIMATE OF QUANTITIES

KEY	ITEM	EST QUANT	UNIT
	Pedestal Signal Pole (R1, R2)	2	EACH
	Rectangular Rapid Flashing Beacon (1-4) Incidental to RRFB System	4	EACH
PB	Accessible Pedestrian Signal Incidental to RRFB System	2	EACH
	Pedestrian Push Button Pole (PR1, PR2)	2	EACH
	Pedestrian Directional Sign W16-7pL/W16-7pR Incidental to RRFB System	4	EACH
	Pedestrian Sign W11-2 Incidental to RRFB System	4	EACH
	Pedestrian Crossing Sign (R10-25) Incidental to RRFB System	2	EACH



REGISTERED PROFESSIONAL ENGINEER
REG. NO.
16904
CAITLIN M.
WOTRUBA
SOUTH DAKOTA
8/2/24

Plot Scale - 1:40

Plotted From - caitlinwotruba

File - ...\106rapidflashingbeacon.dgn

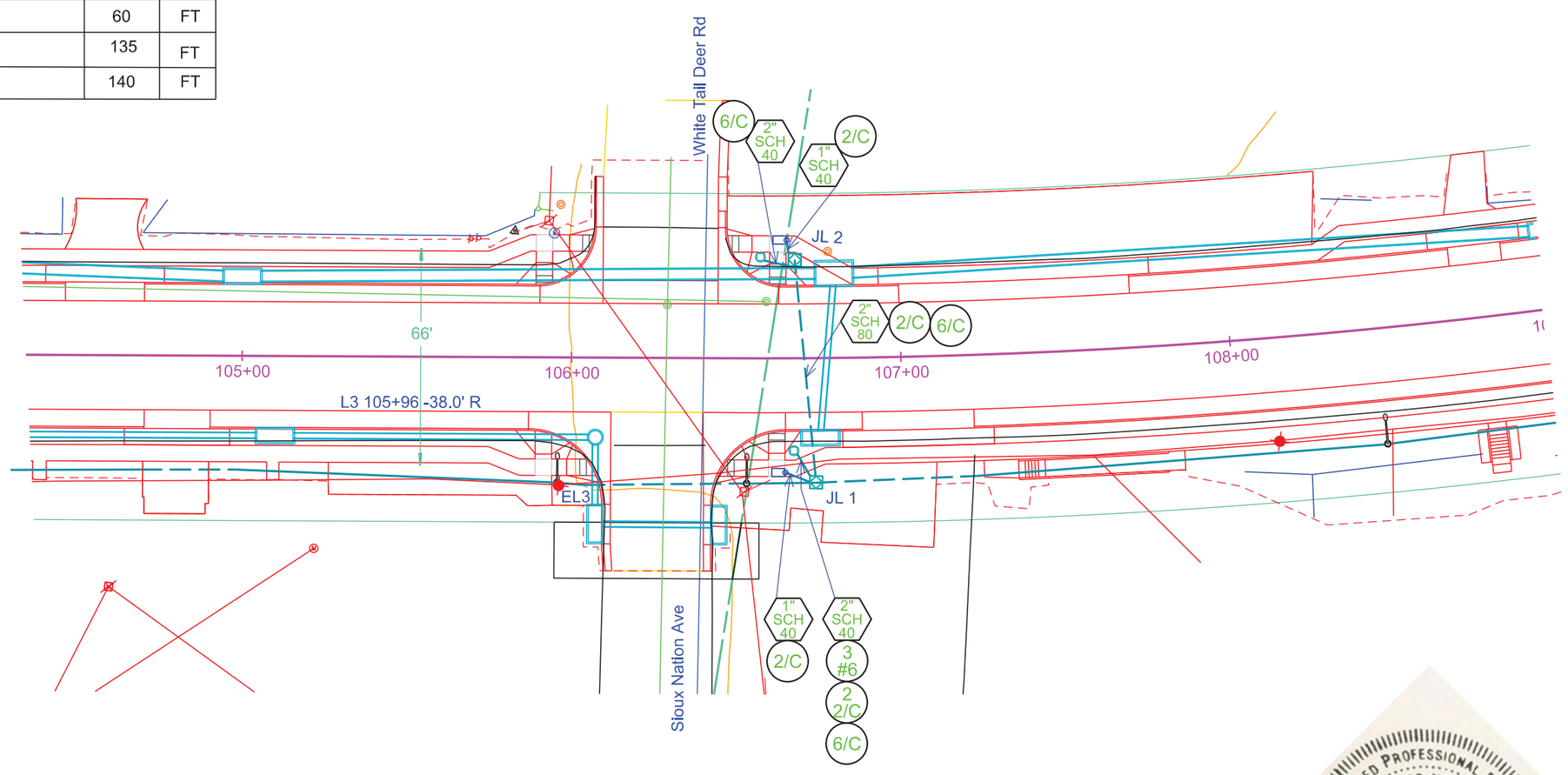
KLJ	STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
		NH-CR-EM 0018(195)103 P 0407(05)01	L23	L43

Plotting Date: 8/1/2024 Rev. 8/2/2024 CMW

CONDUIT LAYOUT
US 18 & SIOUX NATION AVE/WHITE TAIL DEER RD

ESTIMATE OF QUANTITIES

KEY	ITEM	EST QUANT	UNIT
	2' Diameter Footing (R1, R2)	12	FT
	Type 2 Electrical Junction Box (JL1-JL2)	2	EACH
2" SCH 40	2" Rigid Conduit, Schedule 40	35	FT
2" SCH 80	2" Rigid Conduit, Schedule 80	70	FT
#6	1/C #6 AWG Copper Wire	60	FT
2/C	2/C #14 AWG Copper Tray Cable, K1	135	FT
6/C	6/C #14 AWG Copper Tray Cable, K1	140	FT



REGISTERED PROFESSIONAL ENGINEER
REG. NO.
16904
CAITLIN M.
WOTRUBA
SOUTH DAKOTA
8/1/24

Plot Scale - 1:40
Plotted From - caitlinwotruba
File - ...1106rapidflashingbeaconc.dgn

CONDUIT LAYOUT
US HWY 18

KLJ	STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
		NH-CR-EM 0018(195)103 P 0407(05)01	L24	L43

Plotting Date: 8/1/2024

Rev. 8/2/2024 CMW

120/240 v.a.c., 60 hz.,
1 Phase, 3 Wire Service
By Nebraska Public Power District

Nebraska Public Power Secondary
Service Easement to be aquired
prior to construction.

Irving Road

Eastridge Housing Road

Present US Hwy 18

112+00 113+00 114+00 115+00 116+00 117+00 118+00

100'

L8 111+89 -37.5' R

L9 113+79 -35.1' R

L10 114+65 -35.1' R

L11 116+47 -35.1' R

40' Drive
138A

28' Drive
134A

28' Drive
134A

EL7 EL8 EL9

JL 3

W1 W2 W3 W4 W5 W6 W7

S1 S2 S3

13+00 12+00

2" SCH 40 — 4 #1
2" SCH 80 — 4 #1
2" SCH 40 — 4 #1
2" SCH 40 — 4 #1
2" SCH 80 — 4 #1
2" SCH 40 — 4 #1
2" SCH 40 — 4 #1
2" SCH 40 — 4 #1
2" SCH 40 — 6 #2
2" SCH 40 — 6 #2
2" SCH 80 — 6 #2
2" SCH 80 — 3 #6

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
16904
CAITLIN M.
WOTRUBA
SOUTH DAKOTA
8/2/24

Plot Scale - 1:40

Plotted From - caitlinwotruba

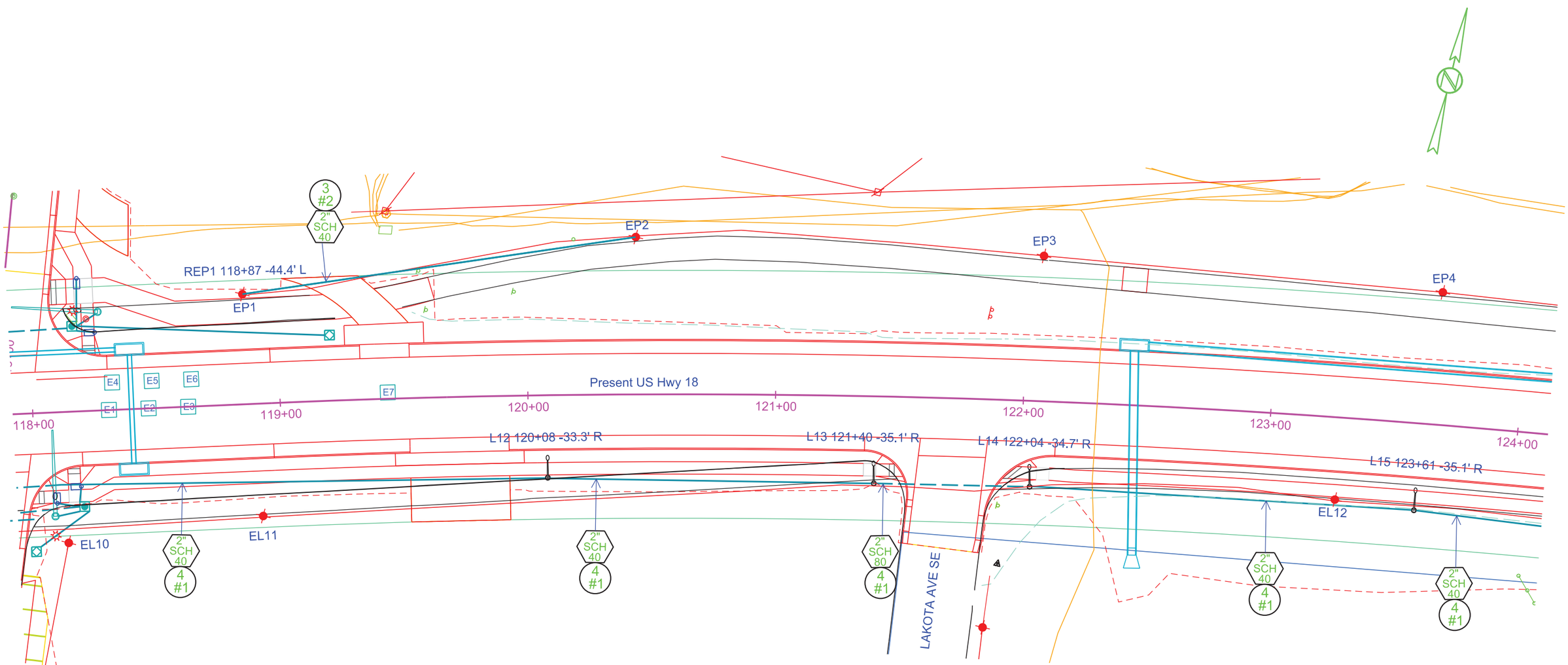
File - ...\Sections\Section\L1112c.dgn

CONDUIT LAYOUT
US HWY 18

KLJ	STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
		NH-CR-EM 0018(195)103 P 0407(05)01	L25	L43

Plotting Date: 8/1/2024

Rev. 8/2/2024 CMW



REGISTERED PROFESSIONAL ENGINEER
REG. NO.
18904
CAITLIN M.
WOTRUBA
SOUTH DAKOTA
8/2/24

Plot Scale - 1:40

Plotted From - caitlinwotruba

File - ...\Sections\SectionL1118c.dgn

CONDUIT LAYOUT
US HWY 18

KLJ	STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
		NH-CR-EM 0018(195)103 P 0407(05)01	L26	L43

Plotting Date: 8/1/2024

Rev. 8/2/2024 CMW

Plot Scale - 1:40

Plotted From - caitlinwotruba

File - ...\Sections\Section\L1124c.dgn

Sitting Bull Road

REP5 125+26 -52.2' L
EP5

REP6 127+11 -48.6' L
EP6

EP7

Present US Hwy 18

124+00
125+00
126+00
127+00
128+00
129+00
130+00

L16 125+40 -38.5' R
L17 126+14 -38.6' R
L18 127+80 -35.1' R
L19 129+57 -35.1' R

EL13
EL14
EL15

3 #2 2" SCH 80
3 #2 2" SCH 40
3 #2 2" SCH 40
3 #2 2" SCH 80
3 #2 2" SCH 40

2" SCH 40 4 #1
2" SCH 40 4 #1
2" SCH 80 4 #1
2" SCH 80 4 #1
2" SCH 40 4 #1
2" SCH 40 4 #1
2" SCH 40 4 #1

120/240 v.a.c., 60 hz.,
1 Phase, 3 Wire Service
By Nebraska Public Power District

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
16904
CAITLIN M.
WOTRUBA
SOUTH DAKOTA
8/2/24

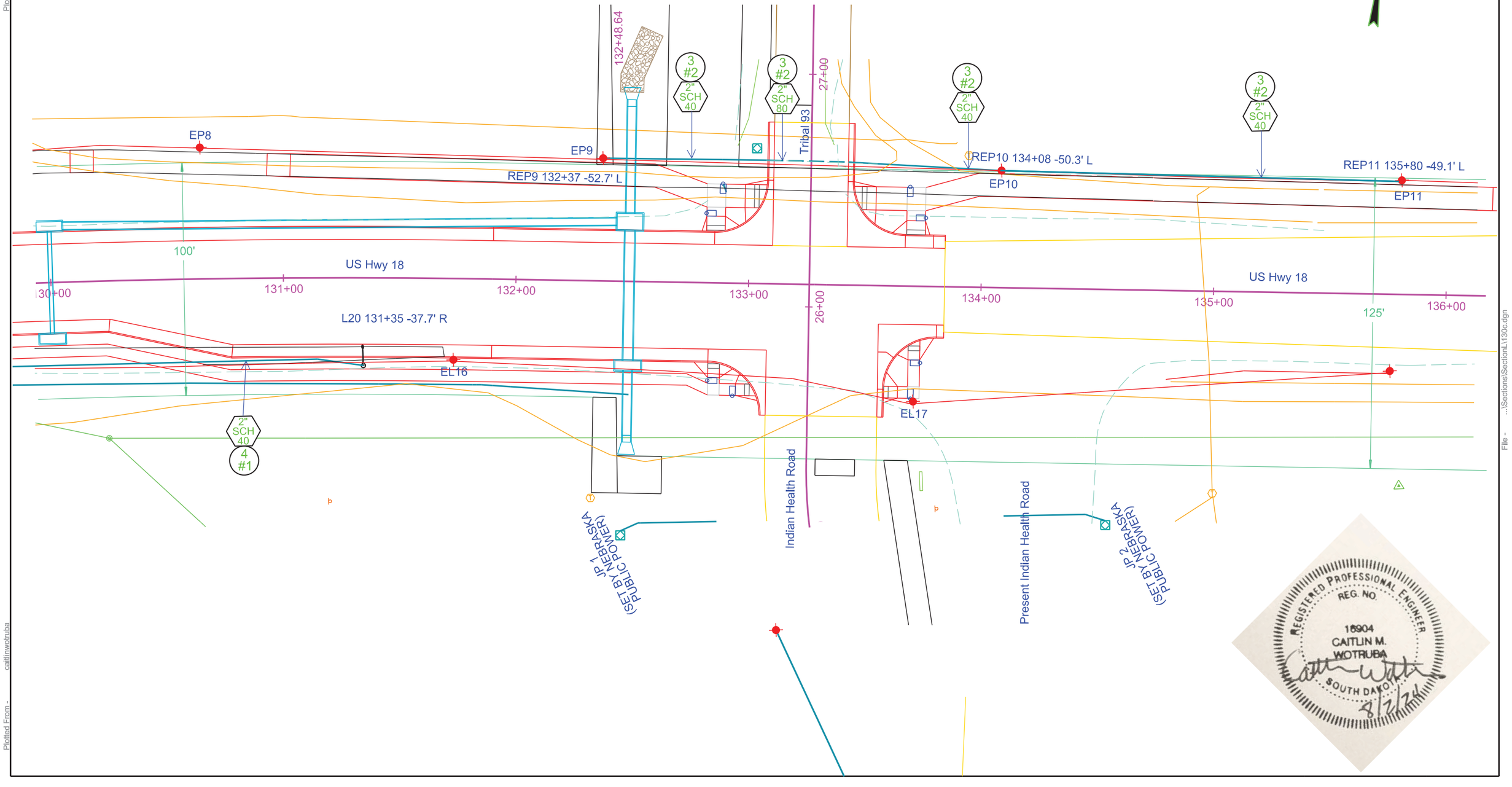
CONDUIT LAYOUT
US HWY 18

KLJ	STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
		NH-CR-EM 0018(195)103 P 0407(05)01	L27	L43

Plotting Date: 8/1/2024

Rev. 8/2/2024 CMW

Plot Scale - 1:40



REGISTERED PROFESSIONAL ENGINEER
REG. NO. 16904
CAITLIN M. WOTRUBA
SOUTH DAKOTA
8/2/24

Plotted From - caitlinwotruba

File - ...\Sections\Section\L130c.dgn

CONDUIT LAYOUT
INDIAN HEALTH ROAD

KLJ	STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
		NH-CR-EM 0018(195)103 P 0407(05)01	L28	L43

Plotting Date: 8/1/2024

Rev. 8/2/2024 CMW

Plot Scale - 1:40

Plotted From - caitlinwotruba

File - ...\Sections\SectionLlxr133_0c.dgn

1/4 Line

3 #8 1" SCH 40

3 #8 1" SCH 40

REP21 22+84 -20.8' L

REP20 24+67 -23.7' L

EP22

EP21

EP20

Present Indian Health Road

Indian Health Road

20+00

21+00

22+00

23+00

24+00

25+00

JP 1
(SET BY NEBRASKA PUBLIC POWER)

4" SCH 80

JP 2
(SET BY NEBRASKA PUBLIC POWER)

134+00

Present US Hwy 18

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
16904
CAITLIN M.
WOTRUBA
SOUTH DAKOTA
8/2/24

SIGNAL TIMING
US HWY 18 & SD HWY 407

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
KLJ	NH-CR-EM 0018(195)103 P 0407(05)01	L29	L43

Plotting Date: 8/1/2024

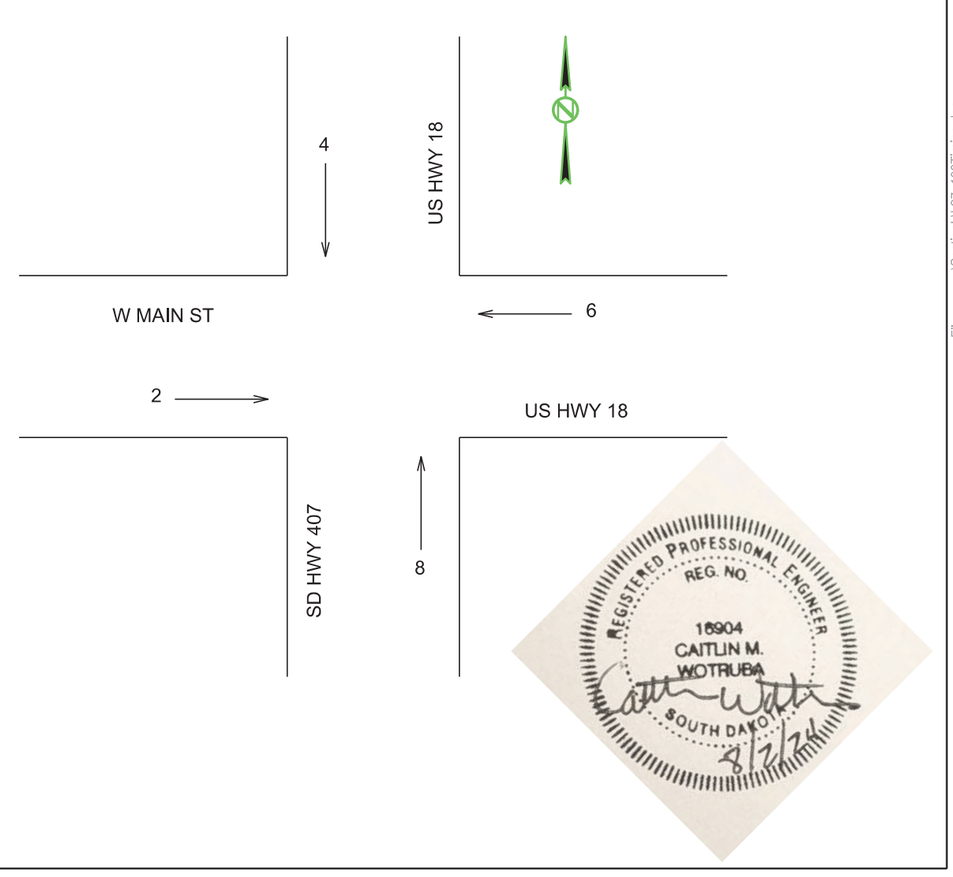
Rev. 8/2/2024 CMW

BASIC INTERVALS								
Phase	1	2	3	4	5	6	7	8
Movement		EB		SB		WB		NB
Lag								
Min Green		10		10		10		10
Extension		3.0		3.0		3.0		3.0
Max 1		30		30		30		30
Max 2								
Time Before								
Time to Reduce								
Minimum Gap								
Yellow		3.5		3.5		3.5		3.5
All Red		1		1		1		1
Walk		7		7		7		7
Ped Clearance		16		15		14		18
Recall		MIN		NO		MIN		NO
Prog Flash Display		R		R		R		R
Start Up Ø		X				X		

PREEMPTION				
Plan	3	4	5	6
Calls Ø	8	2	4	6
Output	CH13R	CH14R	CH15R	CH16R

RING AND BARRIER DESIGN			
Φ1	Φ2	Φ3	Φ4
Φ5	Φ6	Φ7	Φ8

DETECTOR TABLE															
		Phase Called (Call/Call Locking/Extend)												Controller Settings	
Local Detector	Controller Detector #	1	2	3	4	5	6	7	8	9	10	11	12	Extend	Delay
N1-N3	1				C/E										
N1-N6	2				C/E										
N7	3				E										
E1-E3	4						C/E								
E4-E6	5						C/E								
E7	6						E								
W1-W3	7		C/E												
W4-W6	8		C/E												
W7	9		E												
S1-S3	10								C/E						
S4-S6	11								C/E						
S7	12								E						



REGISTERED PROFESSIONAL ENGINEER
REG. NO.
16904
CAITLIN M.
WOTRUBA
SOUTH DAKOTA
8/2/24

Plot Scale - 1:200

Plotted From - caitlinwotruba

File - ...\Section\L27_100Timing.dgn

SIGNAL TIMING
US HWY 18 & EASTRIDGE HOUSING RD

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
KLJ	NH-CR-EM 0018(195)103 P 0407(05)01	L30	L43

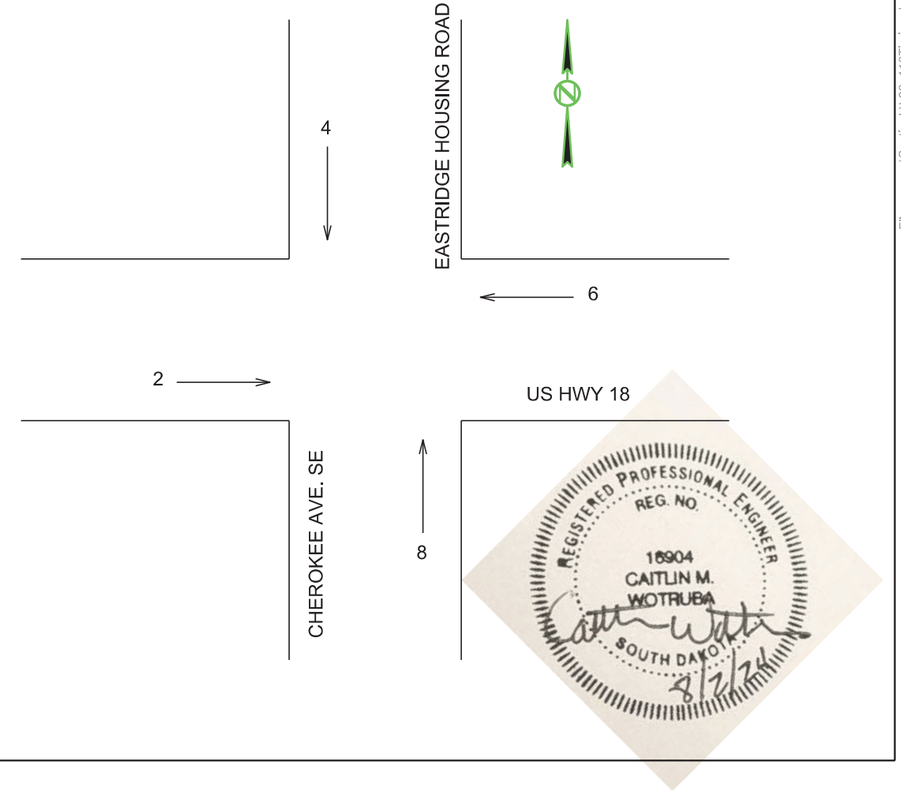
Plotting Date: 8/1/2024 Rev. 8/2/2024 CMW

BASIC INTERVALS								
Phase	1	2	3	4	5	6	7	8
Movement		EB		SB		WB		NB
Lag								
Min Green		10		10		10		10
Extension		3.0		3.0		3.0		3.0
Max 1		30		15		30		15
Max 2								
Time Before								
Time to Reduce								
Minimum Gap								
Yellow		3.5		3.5		3.5		3.5
All Red		1		1		1		1
Walk		7		7		7		7
Ped Clearance		13		13		11		13
Recall		MIN		NO		MIN		NO
Prog Flash Display		R		Y		R		Y
Start Up Ø		X				X		

PREEMPTION				
Plan	3	4	5	6
Calls Ø	8	2	4	6
Output	CH13R	CH14R	CH15R	CH16R

RING AND BARRIER DESIGN			
Φ1	Φ2 	Φ3	Φ4 
Φ5	Φ6 	Φ7	Φ8 

DETECTOR TABLE															
Phase Called (Call/Call Locking/Extend)														Controller Settings	
Local Detector	Controller Detector #	1	2	3	4	5	6	7	8	9	10	11	12	Extend	Delay
N1, N2	1				C/E										
E1-E3	2						C/E								
E4-E6	3						C/E								
E7	4						E								
W1-W3	5		C/E												
W4-W6	6		C/E												
W7	7		E												
S1, S2	8								C/E						



REGISTERED PROFESSIONAL ENGINEER
REG. NO.
18904
CAITLIN M.
WOTRUBA
SOUTH DAKOTA
8/2/24

Plot Scale - 1:200
Plotted From - caitlinwotruba
File - ...\Section\L\L28_118Timing.dgn

SIGNAL TIMING
US HWY 18 & INDIAN HEALTH RD

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
KLJ	NH-CR-EM 0018(195)103 P 0407(05)01	L31	L43

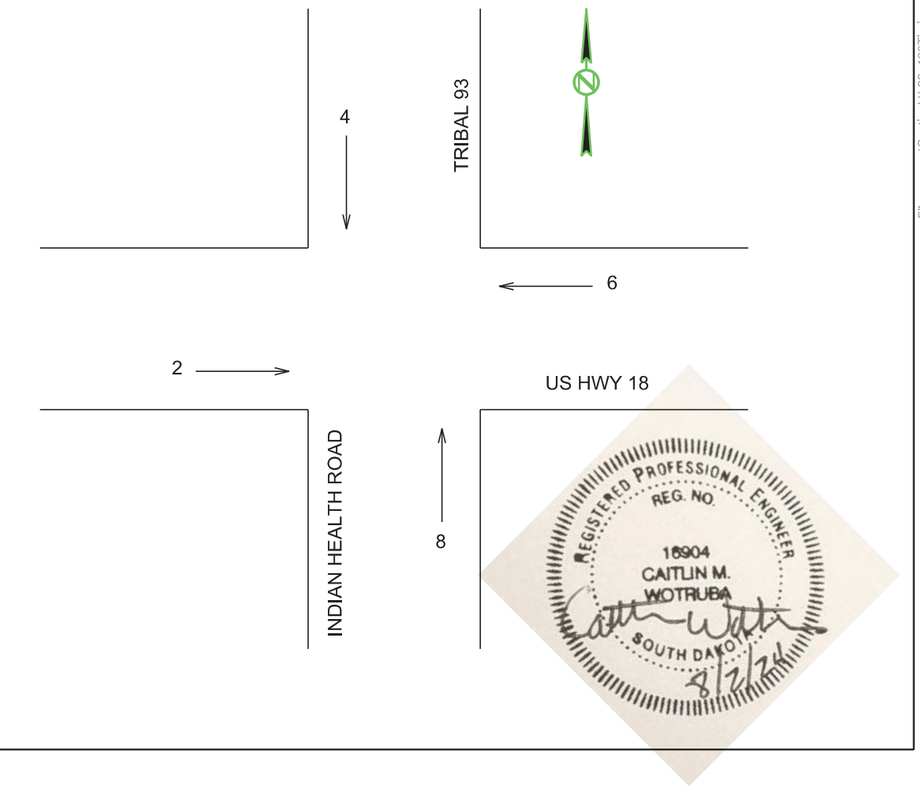
Plotting Date: 8/1/2024 Rev. 8/2/2024 CMW

BASIC INTERVALS								
Phase	1	2	3	4	5	6	7	8
Movement		EB		SB		WB		NB
Lag								
Min Green		10		10		10		10
Extension		3.0		3.0		3.0		3.0
Max 1		30		15		30		15
Max 2								
Time Before								
Time to Reduce								
Minimum Gap								
Yellow		3.5		4		3.5		3.5
All Red		1		1		1		1
Walk		7		7		7		7
Ped Clearance		16		16		12		13
Recall		MIN		NO		MIN		NO
Prog Flash Display		R		Y		R		Y
Start Up Ø		X				X		

PREEMPTION				
Plan	3	4	5	6
Calls Ø	8	2		6
Output	CH13R	CH14R	CH15R	CH16R

RING AND BARRIER DESIGN			
Φ1	Φ2	Φ3	Φ4
Φ5	Φ6	Φ7	Φ8

DETECTOR TABLE															
		Phase Called (Call/Call Locking/Extend)												Controller Settings	
Local Detector	Controller Detector #	1	2	3	4	5	6	7	8	9	10	11	12	Extend	Delay
N1-N3	1				C/E										
E1-E3	2						C/E								
E4-E6	3						C/E								
E7	4						E								
W1-W3	5		C/E												
W4-W6	6		C/E												
W7-W9	7		C/E												
W10	8		E												
S1-S3	9								C/E						
S4-S6	10								C/E						
S7-S9	11								C/E						15
S10	12								E						



Plot Scale - 1:200
Plotted From - caitlinwotruba
File - ...\Section\L\L29_133Timing.dgn

TRAFFIC SIGNAL WIRING TABLES

US HWY 18 & SD HWY 407

KLJ	STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
		NH-CR-EM 0018(195)103 P 0407(05)01	L32	L43

Plotting Date: 8/1/2024

Rev. 8/2/2024 CMW

POLE: A1 CABLE SIZE: 25/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	ø
6R	Red	R	R	2	6
6Y	Orange	O	Y	2	6
6G	Blue	BL	G	2	6
N	Black	BK	N	2	6
6R	Red/Black	R	R	3	6
6Y	Orange/Black	O	Y	3	6
6G	Blue/Black	BL	G	3	6
N	Yellow/Black	BK	N	3	6
8R	Red/Blue	R	R	7	8
8Y	Orange/Red	O	Y	7	8
8G	Blue/Red	BL	G	7	8
N	Black/Blue	BK	N	7	8
11R	Red/Orange	R	DW	14	6P
11G	Orange/Blue	BL	W	14	6P
N	Black/Orange	BK	N	14	6P
10R	Yellow/Red	R	DW	17	4P
10G	Yellow/Blue	BL	W	17	4P
N	Black/Red	BK	N	17	4P
	Brown/Blue				
	Brown/Red				
	Brown/Black				
	Yellow				
	Brown				
	Yellow/Orange				
	Blue/Orange				

POLE: A2 CABLE SIZE: 25/C

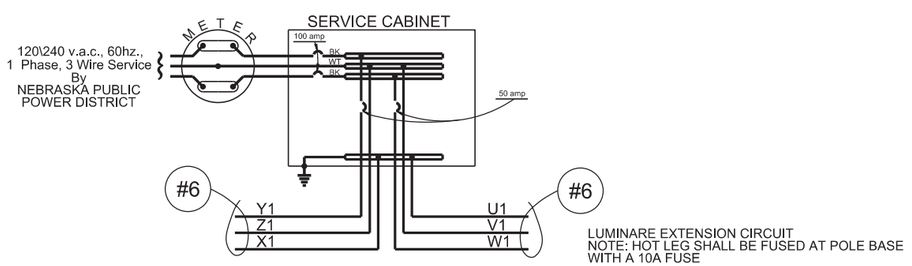
CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	ø
2R	Red	R	R	4	2
2Y	Orange	O	Y	4	2
2G	Blue	BL	G	4	2
N	Black	BK	N	4	2
8R	Red/Black	R	R	8	8
8Y	Orange/Black	O	Y	8	8
8G	Blue/Black	BL	G	8	8
N	Yellow/Black	BK	N	8	8
8R	Red/Blue	R	R	9	8
8Y	Orange/Red	O	Y	9	8
8G	Blue/Red	BL	G	9	8
N	Black/Blue	BK	N	9	8
11R	Red/Orange	R	DW	15	6P
11G	Orange/Blue	BL	W	15	6P
N	Black/Orange	BK	N	15	6P
12R	Yellow/Red	R	DW	18	8P
12G	Yellow/Blue	BL	W	18	8P
N	Black/Red	BK	N	18	8P
	Brown/Blue				
	Brown/Red				
	Brown/Black				
	Yellow				
	Brown				
	Yellow/Orange				
	Blue/Orange				

POLE: A3 CABLE SIZE: 25/C

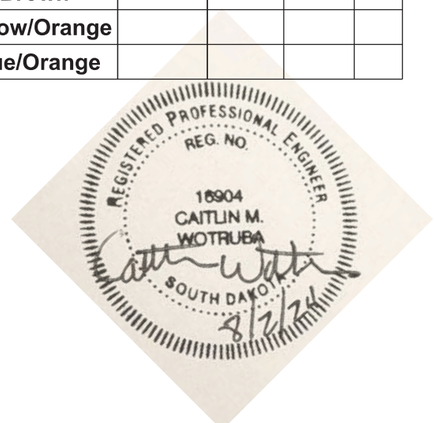
CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	ø
2R	Red	R	R	5	2
2Y	Orange	O	Y	5	2
2G	Blue	BL	G	5	2
N	Black	BK	N	5	2
2R	Red/Black	R	R	6	2
2Y	Orange/Black	O	Y	6	2
2G	Blue/Black	BL	G	6	2
N	Yellow/Black	BK	N	6	2
4R	Red/Blue	R	R	10	4
4Y	Orange/Red	O	Y	10	4
4G	Blue/Red	BL	G	10	4
N	Black/Blue	BK	N	10	4
9R	Red/Orange	R	DW	16	2P
9G	Orange/Blue	BL	W	16	2P
N	Black/Orange	BK	N	16	2P
12R	Yellow/Red	R	DW	19	8P
12G	Yellow/Blue	BL	W	19	8P
N	Black/Red	BK	N	19	8P
	Brown/Blue				
	Brown/Red				
	Brown/Black				
	Yellow				
	Brown				
	Yellow/Orange				
	Blue/Orange				

POLE: A4 CABLE SIZE: 25/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	ø
6R	Red	R	R	1	6
6Y	Orange	O	Y	1	6
6G	Blue	BL	G	1	6
N	Black	BK	N	1	6
4R	Red/Black	R	R	11	4
4Y	Orange/Black	O	Y	11	4
4G	Blue/Black	BL	G	11	4
N	Yellow/Black	BK	N	11	4
4R	Red/Blue	R	R	12	4
4Y	Orange/Red	O	Y	12	4
4G	Blue/Red	BL	G	12	4
N	Black/Blue	BK	N	12	4
9R	Red/Orange	R	DW	13	2P
9G	Orange/Blue	BL	W	13	2P
N	Black/Orange	BK	N	13	2P
10R	Yellow/Red	R	DW	20	4P
10G	Yellow/Blue	BL	W	20	4P
N	Black/Red	BK	N	20	4P
	Brown/Blue				
	Brown/Red				
	Brown/Black				
	Yellow				
	Brown				
	Yellow/Orange				
	Blue/Orange				



LUMINARE EXTENSION CIRCUIT
NOTE: HOT LEG SHALL BE FUSED AT POLE BASE WITH A 10A FUSE



Plot Scale - 1:40

Plotted From - caitlinwotruba

File - ...\Section\LwiringDetail.dgn

TRAFFIC SIGNAL WIRING TABLES

US HWY 18 & EASTRIDGE HOUSING RD

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
KLJ	NH-CR-EM 0018(195)103 P 0407(05)01	L33	L43

Plotting Date: 8/1/2024

Rev. 8/2/2024 CMW

Plot Scale - 1:40

POLE: B1 CABLE SIZE: 25/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	ø
6R	Red	R	R	2	6
6Y	Orange	O	Y	2	6
6G	Blue	BL	G	2	6
N	Black	BK	N	2	6
6R	Red/Black	R	R	3	6
6Y	Orange/Black	O	Y	3	6
6G	Blue/Black	BL	G	3	6
N	Yellow/Black	BK	N	3	6
8R	Red/Blue	R	R	7	8
8Y	Orange/Red	O	Y	7	8
8G	Blue/Red	BL	G	7	8
N	Black/Blue	BK	N	7	8
11R	Red/Orange	R	DW	14	6P
11G	Orange/Blue	BL	W	14	6P
N	Black/Orange	BK	N	14	6P
10R	Yellow/Red	R	DW	17	4P
10G	Yellow/Blue	BL	W	17	4P
N	Black/Red	BK	N	17	4P
	Brown/Blue				
	Brown/Red				
	Brown/Black				
	Yellow				
	Brown				
	Yellow/Orange				
	Blue/Orange				

POLE: B2 CABLE SIZE: 25/C

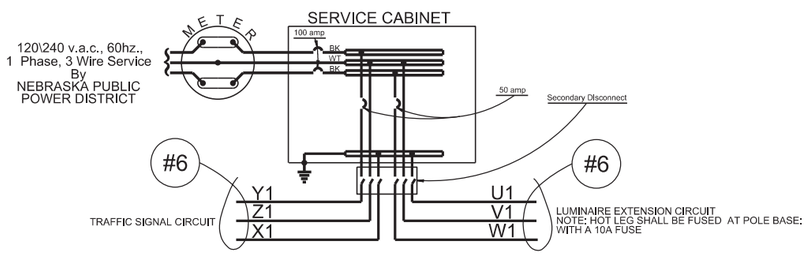
CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	ø
2R	Red	R	R	4	2
2Y	Orange	O	Y	4	2
2G	Blue	BL	G	4	2
N	Black	BK	N	4	2
8R	Red/Black	R	R	8	8
8Y	Orange/Black	O	Y	8	8
8G	Blue/Black	BL	G	8	8
N	Yellow/Black	BK	N	8	8
8R	Red/Blue	R	R	9	8
8Y	Orange/Red	O	Y	9	8
8G	Blue/Red	BL	G	9	8
N	Black/Blue	BK	N	9	8
11R	Red/Orange	R	DW	15	6P
11G	Orange/Blue	BL	W	15	6P
N	Black/Orange	BK	N	15	6P
12R	Yellow/Red	R	DW	18	8P
12G	Yellow/Blue	BL	W	18	8P
N	Black/Red	BK	N	18	8P
	Brown/Blue				
	Brown/Red				
	Brown/Black				
	Yellow				
	Brown				
	Yellow/Orange				
	Blue/Orange				

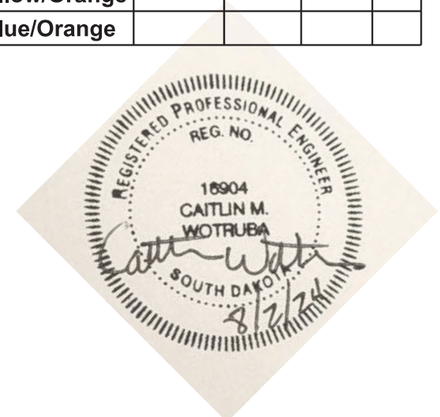
POLE: B3 CABLE SIZE: 25/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	ø
2R	Red	R	R	5	2
2Y	Orange	O	Y	5	2
2G	Blue	BL	G	5	2
N	Black	BK	N	5	2
2R	Red/Black	R	R	6	2
2Y	Orange/Black	O	Y	6	2
2G	Blue/Black	BL	G	6	2
N	Yellow/Black	BK	N	6	2
4R	Red/Blue	R	R	10	4
4Y	Orange/Red	O	Y	10	4
4G	Blue/Red	BL	G	10	4
N	Black/Blue	BK	N	10	4
9R	Red/Orange	R	DW	16	2P
9G	Orange/Blue	BL	W	16	2P
N	Black/Orange	BK	N	16	2P
12R	Yellow/Red	R	DW	19	8P
12G	Yellow/Blue	BL	W	19	8P
N	Black/Red	BK	N	19	8P
	Brown/Blue				
	Brown/Red				
	Brown/Black				
	Yellow				
	Brown				
	Yellow/Orange				
	Blue/Orange				

POLE: B4 CABLE SIZE: 25/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	ø
6R	Red	R	R	1	6
6Y	Orange	O	Y	1	6
6G	Blue	BL	G	1	6
N	Black	BK	N	1	6
4R	Red/Black	R	R	11	4
4Y	Orange/Black	O	Y	11	4
4G	Blue/Black	BL	G	11	4
N	Yellow/Black	BK	N	11	4
4R	Red/Blue	R	R	12	4
4Y	Orange/Red	O	Y	12	4
4G	Blue/Red	BL	G	12	4
N	Black/Blue	BK	N	12	4
9R	Red/Orange	R	DW	13	2P
9G	Orange/Blue	BL	W	13	2P
N	Black/Orange	BK	N	13	2P
10R	Yellow/Red	R	DW	20	4P
10G	Yellow/Blue	BL	W	20	4P
N	Black/Red	BK	N	20	4P
	Brown/Blue				
	Brown/Red				
	Brown/Black				
	Yellow				
	Brown				
	Yellow/Orange				
	Blue/Orange				





Plotted From - caitlinwotruba

File - ...\Section\Wiring\Detail.dgn

TRAFFIC SIGNAL WIRING TABLES

US HWY 18 & INDIAN HEALTH RD

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
KLJ	NH-CR-EM 0018(195)103 P 0407(05)01	L34	L43

Plotting Date: 8/1/2024

Rev. 8/2/2024 CMW

POLE: C1 CABLE SIZE: 25/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	ø
6R	Red	R	R	2	6
6Y	Orange	O	Y	2	6
6G	Blue	BL	G	2	6
N	Black	BK	N	2	6
6R	Red/Black	R	R	3	6
6Y	Orange/Black	O	Y	3	6
6G	Blue/Black	BL	G	3	6
N	Yellow/Black	BK	N	3	6
8R	Red/Blue	R	R	7	8
8Y	Orange/Red	O	Y	7	8
8G	Blue/Red	BL	G	7	8
N	Black/Blue	BK	N	7	8
11R	Red/Orange	R	DW	14	6P
11G	Orange/Blue	BL	W	14	6P
N	Black/Orange	BK	N	14	6P
10R	Yellow/Red	R	DW	17	4P
10G	Yellow/Blue	BL	W	17	4P
N	Black/Red	BK	N	17	4P
	Brown/Blue				
	Brown/Red				
	Brown/Black				
	Yellow				
	Brown				
	Yellow/Orange				
	Blue/Orange				

POLE: C2 CABLE SIZE: 25/C

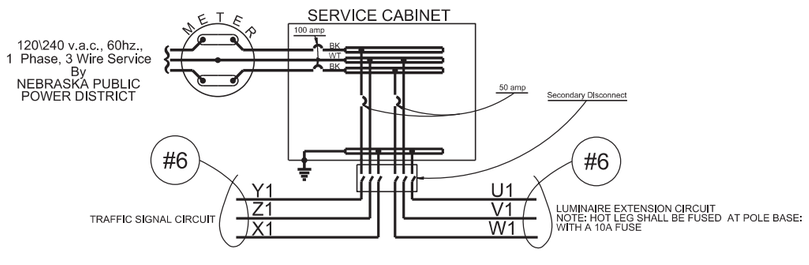
CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	ø
2R	Red	R	R	4	2
2Y	Orange	O	Y	4	2
2G	Blue	BL	G	4	2
N	Black	BK	N	4	2
8R	Red/Black	R	R	8	8
8Y	Orange/Black	O	Y	8	8
8G	Blue/Black	BL	G	8	8
N	Yellow/Black	BK	N	8	8
8R	Red/Blue	R	R	9	8
8Y	Orange/Red	O	Y	9	8
8G	Blue/Red	BL	G	9	8
N	Black/Blue	BK	N	9	8
11R	Red/Orange	R	DW	15	6P
11G	Orange/Blue	BL	W	15	6P
N	Black/Orange	BK	N	15	6P
12R	Yellow/Red	R	DW	18	8P
12G	Yellow/Blue	BL	W	18	8P
N	Black/Red	BK	N	18	8P
	Brown/Blue				
	Brown/Red				
	Brown/Black				
	Yellow				
	Brown				
	Yellow/Orange				
	Blue/Orange				

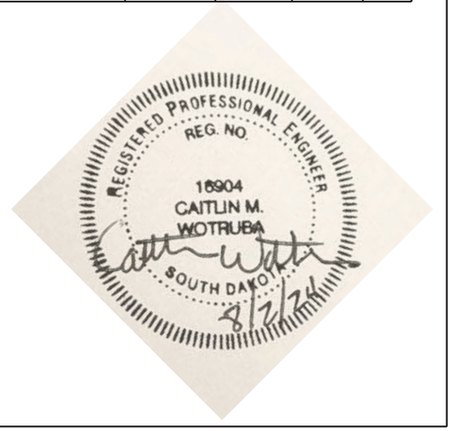
POLE: C3 CABLE SIZE: 25/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	ø
2R	Red	R	R	5	2
2Y	Orange	O	Y	5	2
2G	Blue	BL	G	5	2
N	Black	BK	N	5	2
2R	Red/Black	R	R	6	2
2Y	Orange/Black	O	Y	6	2
2G	Blue/Black	BL	G	6	2
N	Yellow/Black	BK	N	6	2
4R	Red/Blue	R	R	10	4
4Y	Orange/Red	O	Y	10	4
4G	Blue/Red	BL	G	10	4
N	Black/Blue	BK	N	10	4
9R	Red/Orange	R	DW	16	2P
9G	Orange/Blue	BL	W	16	2P
N	Black/Orange	BK	N	16	2P
12R	Yellow/Red	R	DW	19	8P
12G	Yellow/Blue	BL	W	19	8P
N	Black/Red	BK	N	19	8P
	Brown/Blue				
	Brown/Red				
	Brown/Black				
	Yellow				
	Brown				
	Yellow/Orange				
	Blue/Orange				

POLE: C4 CABLE SIZE: 25/C

CABINET TERM.	CABLE CONDUCTOR COLOR	POLE COND. COLOR	HEAD TERM.	HEAD NO.	ø
6R	Red	R	R	1	6
6Y	Orange	O	Y	1	6
6G	Blue	BL	G	1	6
N	Black	BK	N	1	6
4R	Red/Black	R	R	11	4
4Y	Orange/Black	O	Y	11	4
4G	Blue/Black	BL	G	11	4
N	Yellow/Black	BK	N	11	4
4R	Red/Blue	R	R	12	4
4Y	Orange/Red	O	Y	12	4
4G	Blue/Red	BL	G	12	4
N	Black/Blue	BK	N	12	4
9R	Red/Orange	R	DW	13	2P
9G	Orange/Blue	BL	W	13	2P
N	Black/Orange	BK	N	13	2P
10R	Yellow/Red	R	DW	20	4P
10G	Yellow/Blue	BL	W	20	4P
N	Black/Red	BK	N	20	4P
	Brown/Blue				
	Brown/Red				
	Brown/Black				
	Yellow				
	Brown				
	Yellow/Orange				
	Blue/Orange				





Plot Scale - 1:40

Plotted From - caitlinwotruba

File - ...\Section\wiringDetail.dgn

WIRING DIAGRAM
SD HWY 407

KLJ	STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
		NH-CR-EM 0018(195)103 P 0407(05)01	L35	L43

Plotting Date: 8/1/2024

Rev. 8/2/2024 CMW

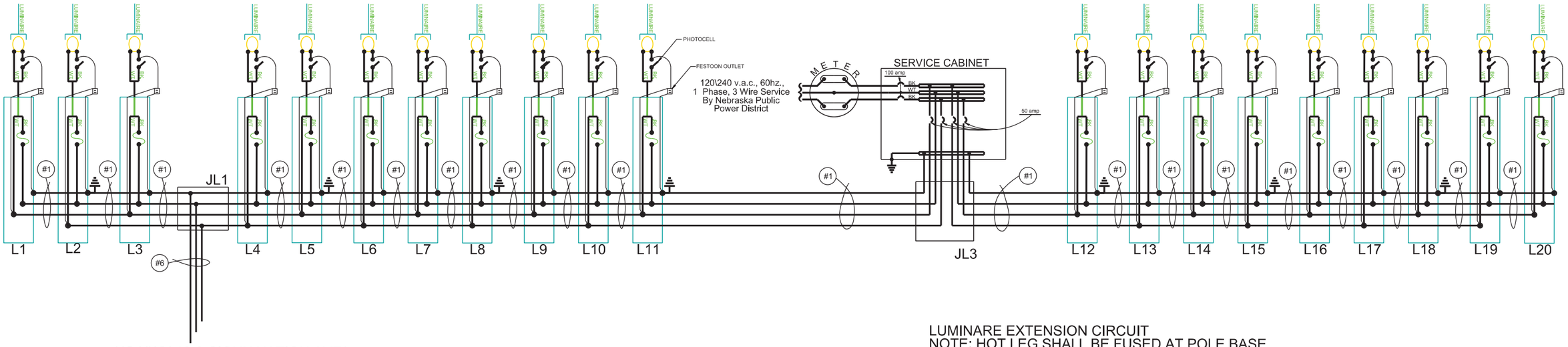
LEGEND:

FUSE: 10 amp.

LUMINAIRE: LED

PHOTOCELL

NOTE:
All circuits shall be bonded in accordance with the NATIONAL ELECTRICAL CODE. Quantities for bonding conductors are not included in these plans.



US HWY 18 & SIOUX NATION AVE/
WHITE TAIL DEER RD RRFB

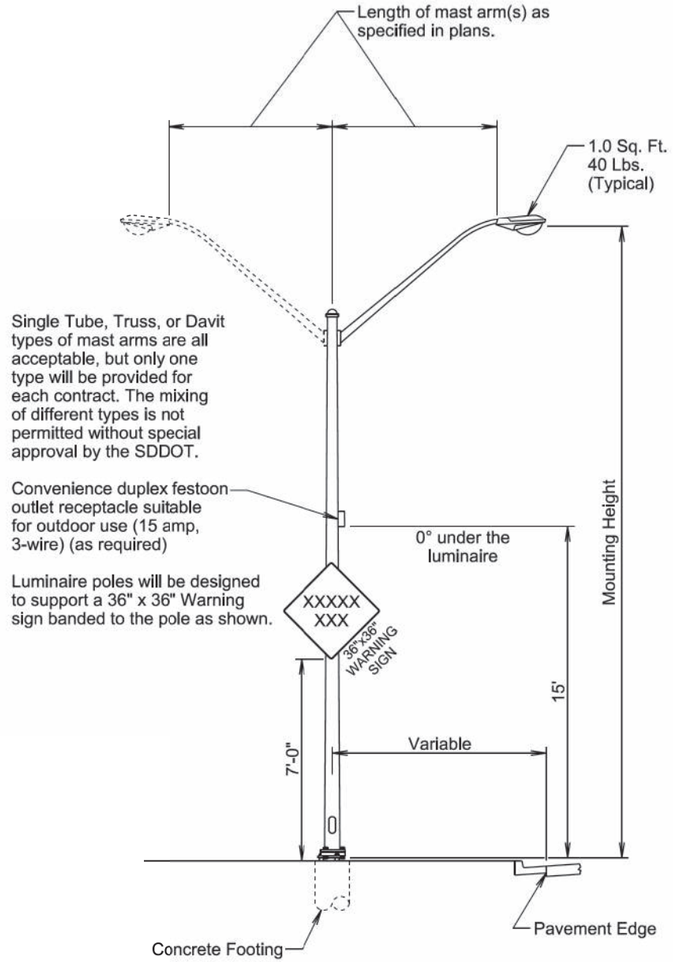
LUMINARE EXTENSION CIRCUIT
NOTE: HOT LEG SHALL BE FUSED AT POLE BASE WITH A 10A FUSE

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
16904
CAITLIN M.
WOTRUBA
SOUTH DAKOTA
8/2/24

Plot Scale - 1:40

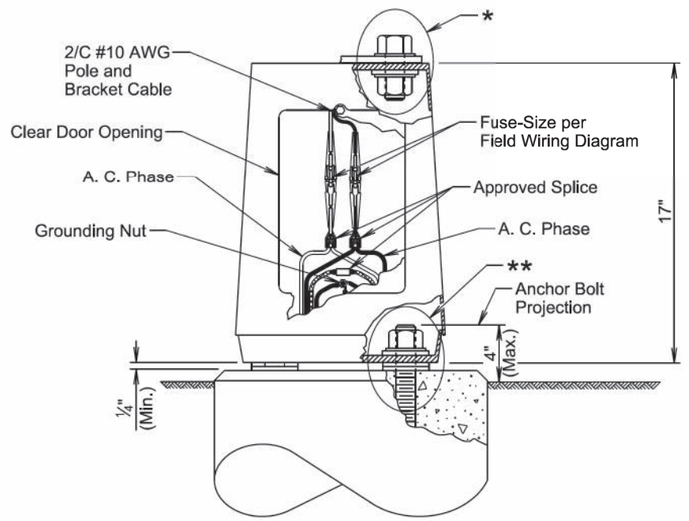
Plotted From - caitlinwotruba

File - ...\Section\Lighting\Detail.dgn



November 19, 2022

Published Date: 2025	SDDOT	STEEL ROADWAY LUMINAIRE POLE WITH MAST ARM(S)	PLATE NUMBER 635.01
			Sheet 1 of 1



GENERAL NOTES:

Base details are provided for example only and are not intended to be a complete design.

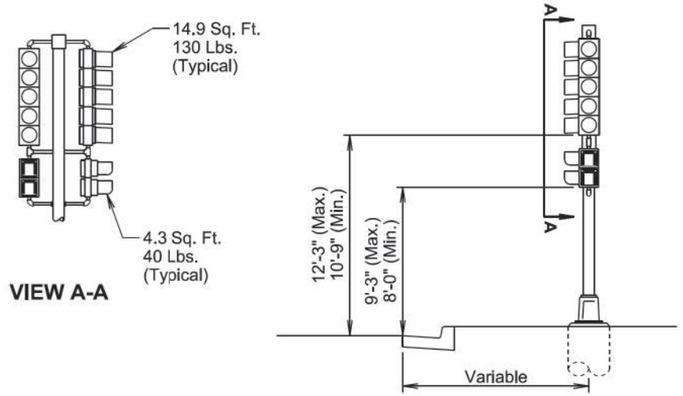
Fused connectors will be breakaway type.

*Hardware connecting the pole to the base will be installed in accordance with the manufacturer's recommendation.

**Hardware connecting the base to the footing will be installed in accordance with the manufacturer's recommendation. The Contractor will install leveling devices in accordance with the manufacturer's recommendation if shimming is necessary to install the light poles plumb and level. The washers and shims will be installed around the anchor bolts.

November 19, 2022

Published Date: 2025	SDDOT	ROADWAY LUMINAIRE POLE BREAKAWAY TRANSFORMER BASE	PLATE NUMBER 635.21
			Sheet 1 of 1

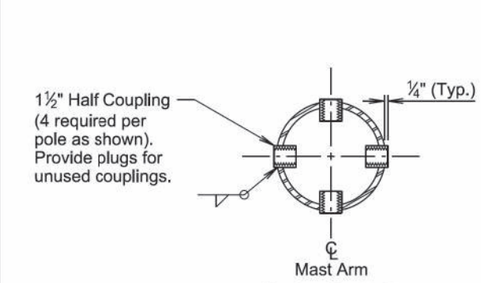


GENERAL NOTE:

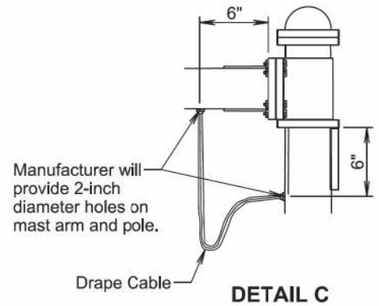
The signal heads are shown with backplates removed so that the mounting hardware is visible.

November 19, 2022

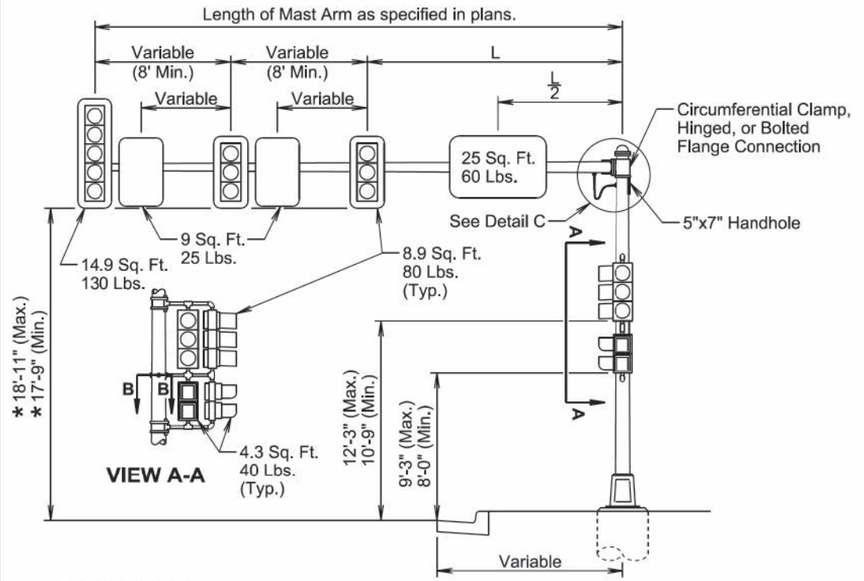
Published Date: 2025	SDDOT	SIGNAL POLE (PEDESTAL)	PLATE NUMBER 635.30
			Sheet 1 of 1



SECTION B-B



DETAIL C



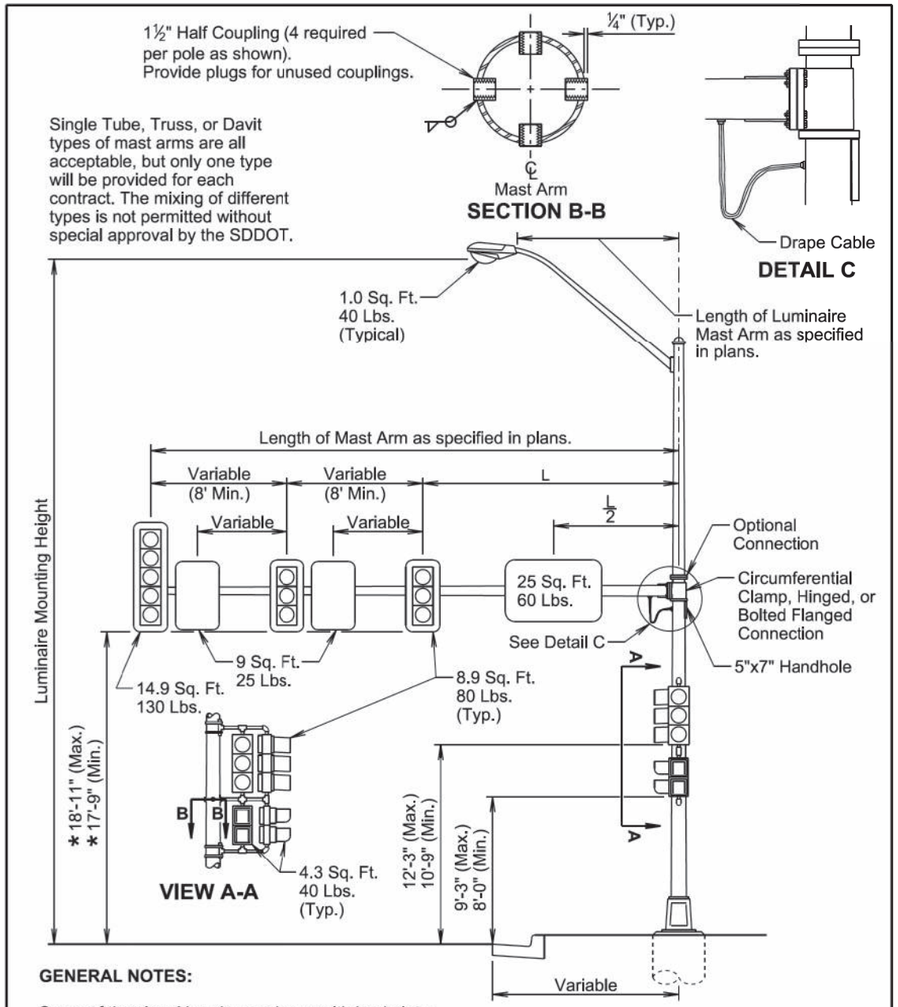
GENERAL NOTES:

Some of the signal heads are shown with backplates removed so that the mounting hardware is visible.

* The signal height allowances shown above are based on a horizontal distance greater than 53' between the signals and stop line. For horizontal distance of 53' and less between the signals and the stop line, the height allowances will be as specified in Section 4D.15 of the MUTCD.

November 19, 2022

Published Date: 2025	SDDOT	SIGNAL POLE (WITH MAST ARM)	PLATE NUMBER 635.31
			Sheet 1 of 1



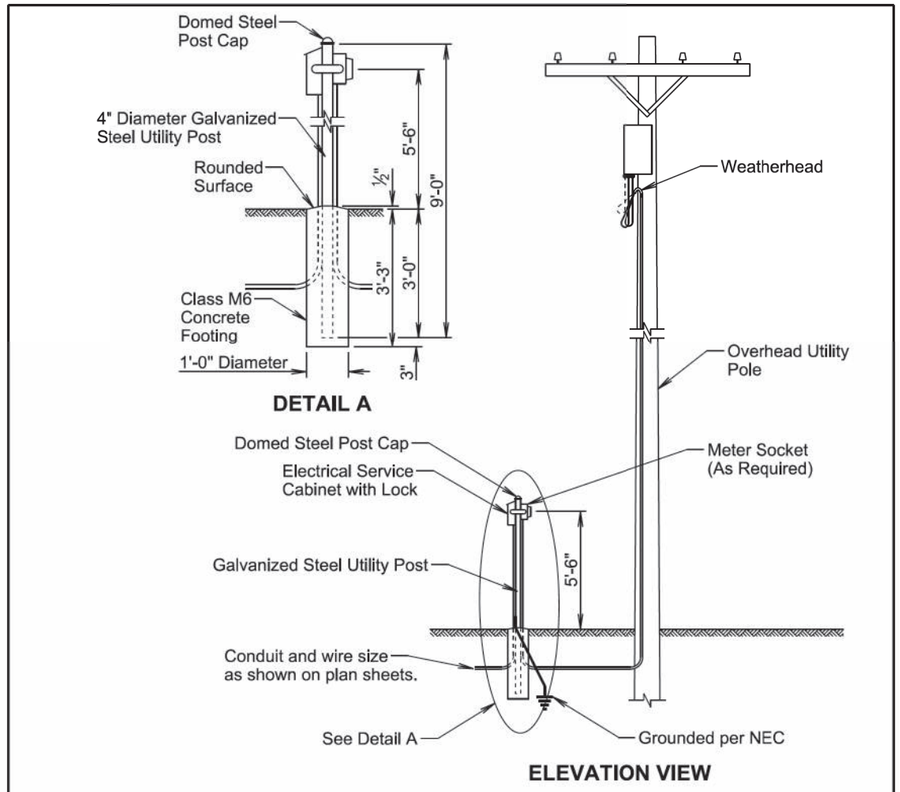
GENERAL NOTES:

Some of the signal heads are shown with backplates removed so that the mounting hardware is visible.

* The signal height allowances shown above are based on a horizontal distance greater than 53' between the signals and stop line. For horizontal distance of 53' and less between the signals and the stop line, the height allowances will be as specified in Section 4D.15 of the MUTCD.

November 19, 2022

Published Date: 2025	SDDOT	SIGNAL POLE (WITH MAST ARM AND LUMINAIRE EXTENSION)	PLATE NUMBER 635.32
			Sheet 1 of 1



GENERAL NOTES:

The concrete for the post footing will be class M6 concrete.

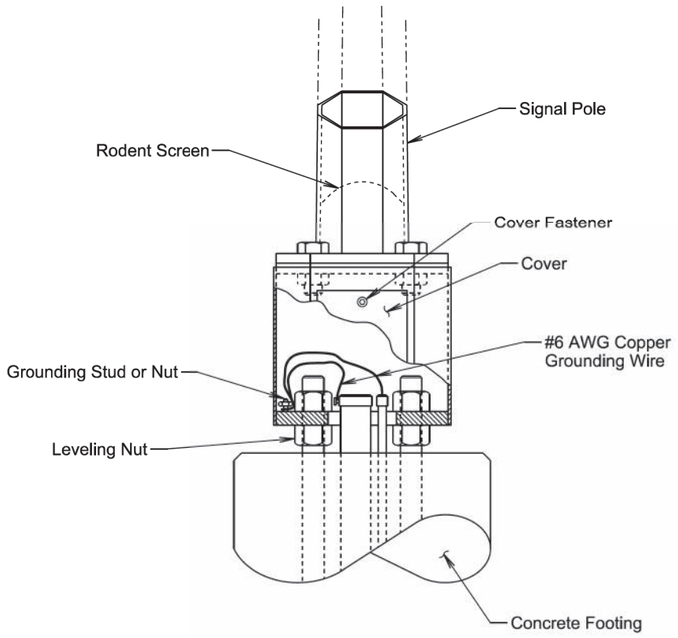
The 4" diameter galvanized steel utility post will be 9' long and will be in conformance with AASHTO Standard Specifications M181. The post will be Type 1 and either Grade 1 or Grade 2. The domed steel post cap will be in conformance with AASHTO Standard Specifications M181 and will be Type 1.

The Contractor will contact and coordinate his/her work with the Utility Companies regarding hookup requirements, fees, materials, and equipment necessary.

All costs for furnishing and installing all materials from the electrical service cabinet to the transformer including labor, equipment, hookup fees, all items within the cabinet, lockable enclosure with receptacle outlet, lock and keys, post, concrete footing, post cap, meter socket if required, conduit, and incidentals will be incidental to the contract unit price per each for "Electrical Service Cabinet".

March 31, 2024

Published Date: 2025	SDDOT	GALVANIZED STEEL UTILITY POST WITH OVERHEAD UTILITY POLE	PLATE NUMBER 635.35
			Sheet 1 of 1



GENERAL NOTES:

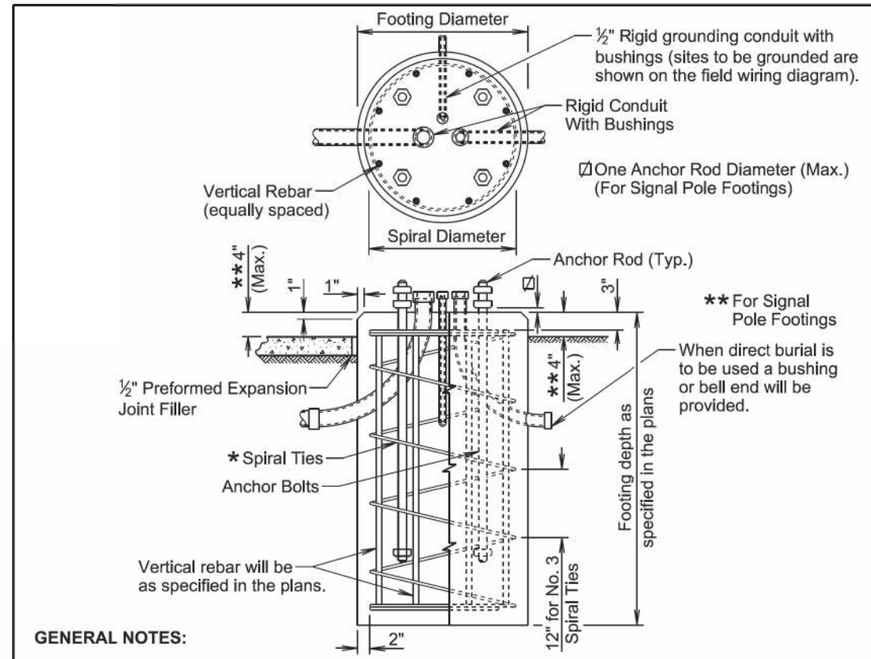
Base details are provided for example only and are not intended to be a complete design.

The Contractor will furnish and install a rodent screen in the signal pole above the tranformer base. The rodent screen will be a galvanized steel mesh with a maximum opening size of ¼ inch. The rodent screen will be friction fitted or installed by other methods approved by the Engineer.

All costs for furnishing and installing the rodent screen including labor, equipment, and materials will be incidental to the contract unit price per each for the corresponding signal pole contract item.

February 14, 2020

Published Date: 2025	SDDOT	TRANSFORMER SIGNAL POLE BASE	PLATE NUMBER 635.50 Sheet 1 of 1



GENERAL NOTES:

* Circular ties may be used in lieu of the spiral ties. The No. 3 ties will be spaced 12 inches apart except for the top two which will be spaced 6 inches apart. The ties will be lapped 18 inches and the laps will be staggered around the cage.

Spiral ties will have 1-1/2 extra turns at each end.

See Section 985 of the Specifications for footing materials.

Conduits and bushings may project 2½ inches to 6 inches above footing for fixed base poles but will not project above the slip plane or fracture plane for breakaway poles.

Conduits will be sealed water-tight during all phases of construction until poles are in place.

The anchor rods will 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.

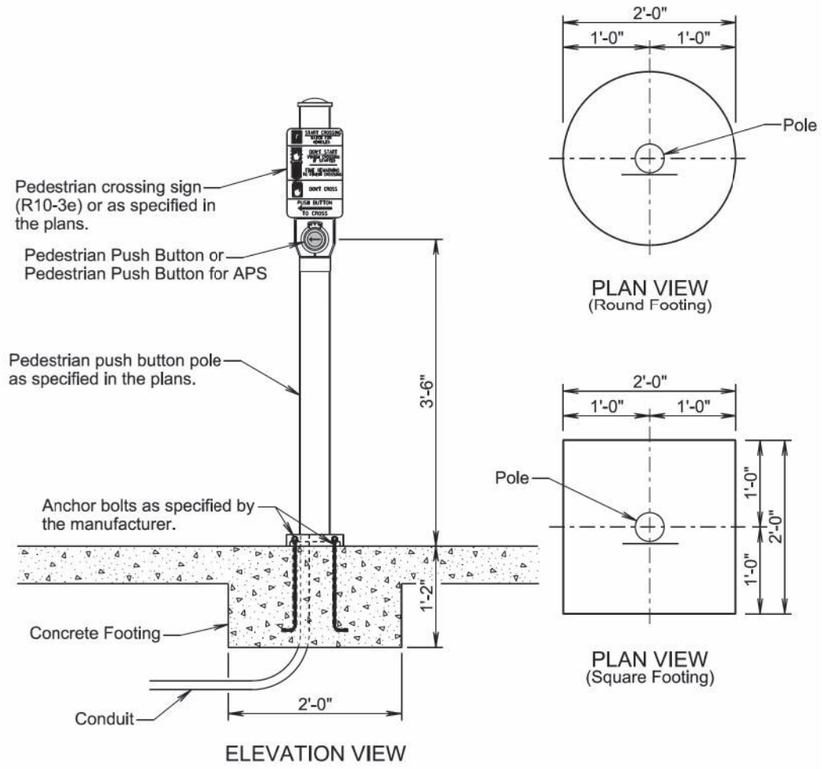
Costs of conduit and conduit bushings shown on footing detail will be incidental to the footing bid item(s).

The pole will not be installed until the concrete has attained design strength (4000 psi).

The contour of the area surrounding the breakaway pole will 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.

November 19, 2022

Published Date: 2025	SDDOT	POLE FOOTING	PLATE NUMBER 635.55 Sheet 1 of 1



GENERAL NOTES:

The pedestrian push button pole will be as specified in the plans.

The Contractor will install either the round or the square concrete footing. For informational purpose, the quantity of concrete for one footing is 0.14 cubic yards for the round footing and 0.17 cubic yards for the square footing.

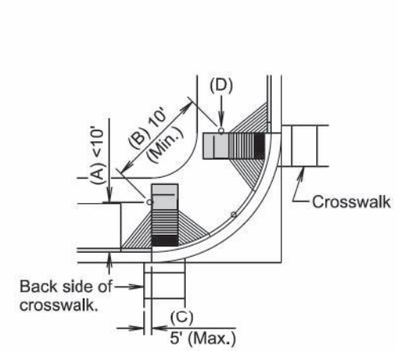
The concrete for the footing will be class M6 concrete.

All costs for furnishing and installing the concrete footing will be incidental to the contract unit price per square foot for the corresponding concrete sidewalk bid item.

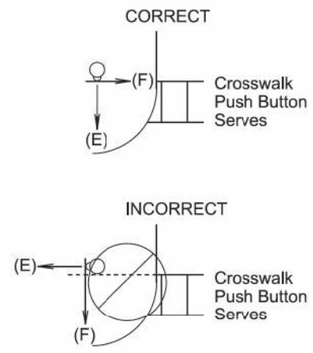
All costs for furnishing and installing the pedestrian push button pole including labor, equipment, and materials including the pole, cap, and the conduit in the footing will be incidental to the contract unit price per each for "Pedestrian Push Button Pole".

May 9, 2020

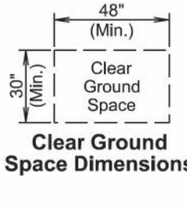
Published Date: 2025	SDDOT	PEDESTRIAN PUSH BUTTON POLE	PLATE NUMBER 635.57
			Sheet 1 of 2



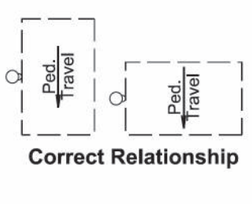
Push Button Relationship To Curb Ramp And Crosswalk



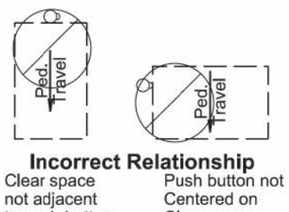
Push Button Orientation To Crosswalk



Clear Ground Space Dimensions



Correct Relationship



Incorrect Relationship

Clear space not adjacent to push button

Push button not Centered on Clear space

General Notes:

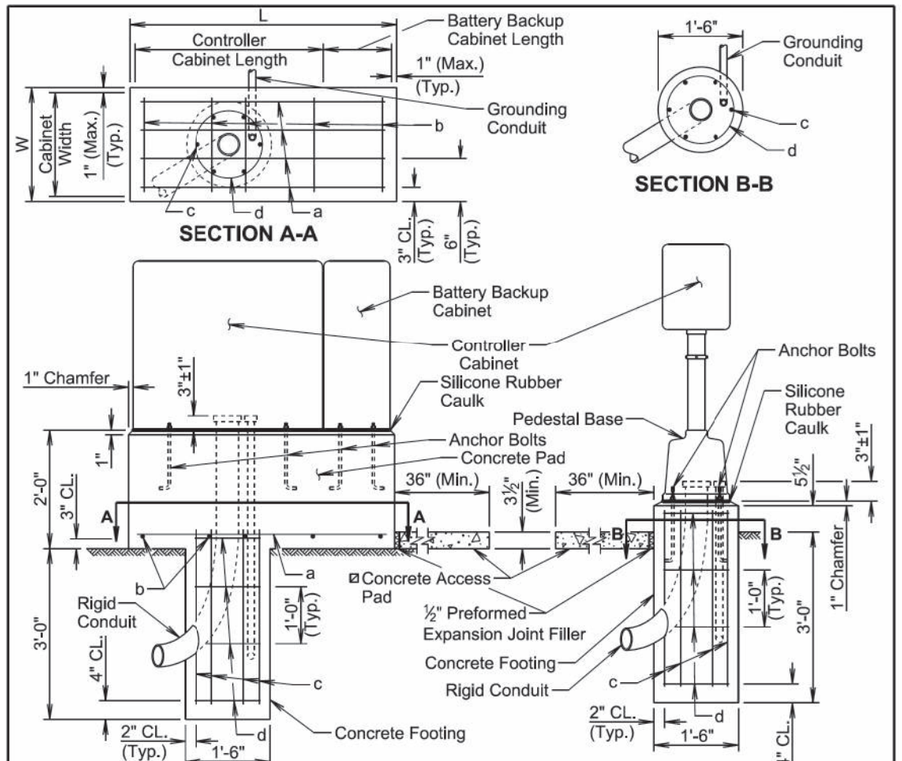
Pedestrian Push Buttons Location and Orientation Requirements:

(A) Within 10 feet from the front face of curb.
(B) Where two push buttons are provided, the push buttons should have at least 10 feet of separation from each other.
(C) If two curb ramps are used, the push button should be within 5 feet of the backside of the crosswalk.
(D) The push button should be mounted adjacent to a clear ground space (within 10 inches maximum reach). The clear ground space will be a least 30 inches x 48 inches and will slope no more than 50:1 (2%) in any direction. The push button will be centered on either side of the clear ground space (either the 30 inch or 48 inch side). The 30 inch x 48 inch clear ground space shouldn't touch the detectable warning panel.
(E) The push button should face the edge of roadway.
(F) The push button face should be parallel to the crosswalk being used.

The push button poles will not interfere with the minimum clear width of the Pedestrian Access Route.

May 9, 2020

Published Date: 2025	SDDOT	PEDESTRIAN PUSH BUTTON POLE	PLATE NUMBER 635.57
			Sheet 2 of 2



GENERAL NOTES:

The concrete pad will conform to the base of the controller and battery backup cabinets to the satisfaction of the Engineer.

Conduits will be sealed water-tight until the conductor cables are installed.

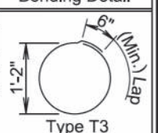
☑ If the controller and battery backup concrete pad and footing is not located within or adjacent to an existing sidewalk, the Contractor will provide a concrete access pad as directed by the Engineer.

Anchor bolts and related hardware will conform to the controller and battery backup cabinets manufacturer's specifications.

A continuous bead of silicone rubber caulk will provide a weather-tight seal between the concrete pad or footing, and the cabinet or base.

REINFORCING SCHEDULE
(for one footing)

Mk.	No.	Size	Length	Type	Bending Detail
a	*	3	L-4"	Str.	
b	*	3	W-4"	Str.	
c	6	6	3'-0"	Str.	
d	4	3	4'-0"	T3	

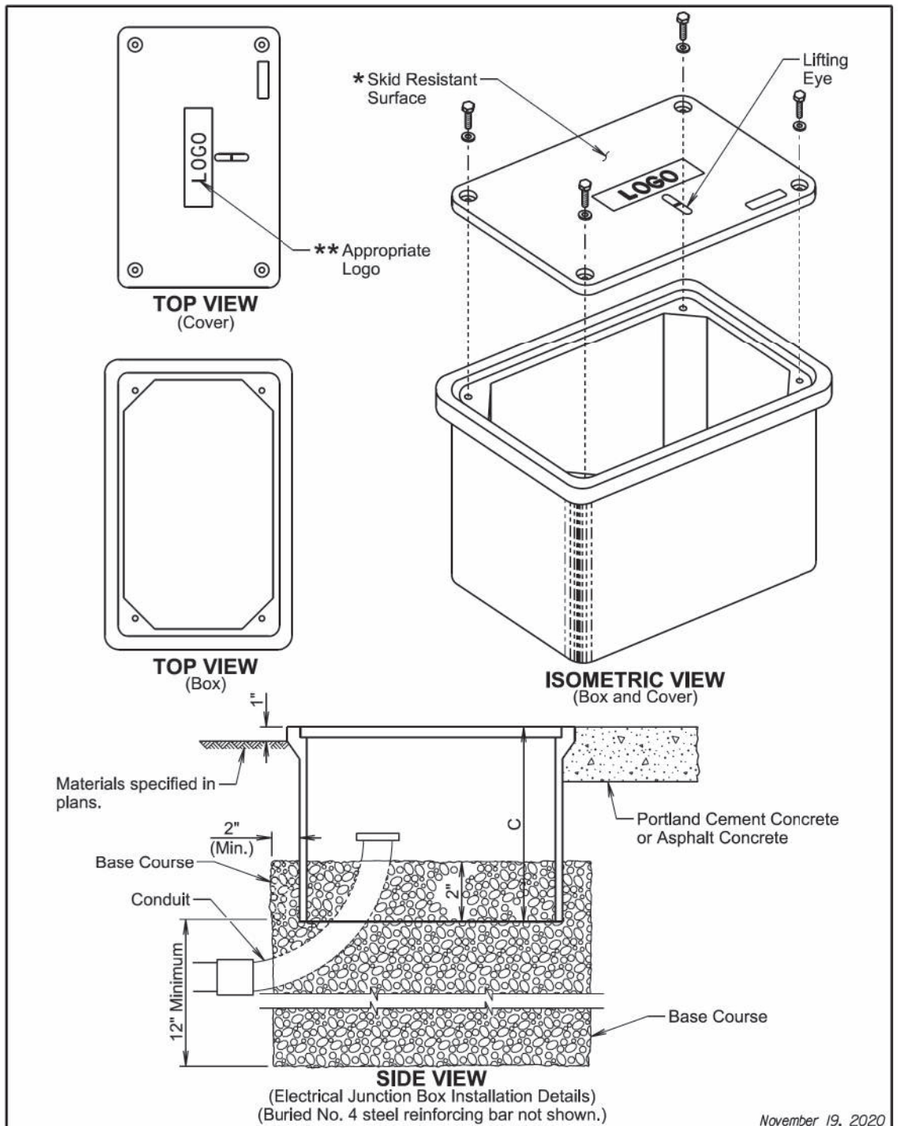


Type T3

Note: Dimensions are out to out of bar
* Vary number of bars as required by footing size.

November 19, 2022

Published Date: 2025	SDDOT	CONTROLLER CABINET AND FOOTING	PLATE NUMBER 635.60
			Sheet 1 of 1



November 19, 2020

Published Date: 2025	SDDOT	ELECTRICAL JUNCTION BOXES TYPE 1 THROUGH TYPE 4	PLATE NUMBER 635.65
			Sheet 1 of 2

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"
3A	Open Bottom with Gasket	24"x36"***	24"
4	Open Bottom with Gasket	30"x48"***	24"

GENERAL NOTES:

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

The cover will have a lifting eye.

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

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

*** Two piece covers will be used for Type 3A and Type 4 junction boxes.

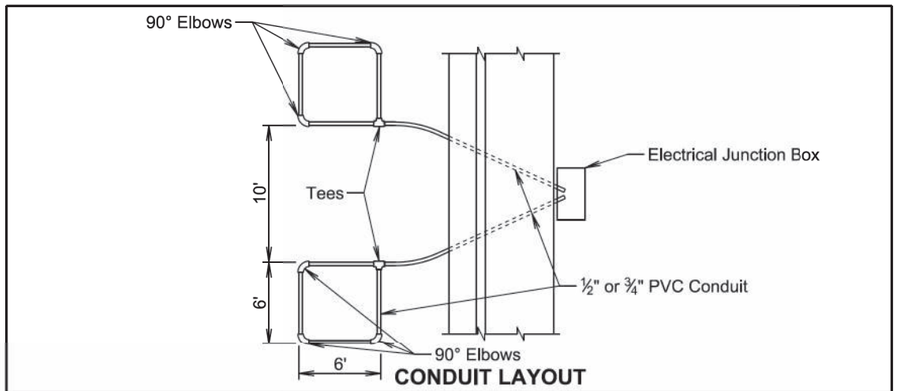
The electrical junction boxes will comply with the American National Standards Institute (ANSI)/Society of Cable Telecommunications Engineers (SCTE) 77 2007 Specification for Underground Enclosure Integrity. The loading requirement for all electrical junction boxes and covers will be Tier 22 of ANSI/SCTE 77 2007.

The electrical junction boxes will be UL listed.

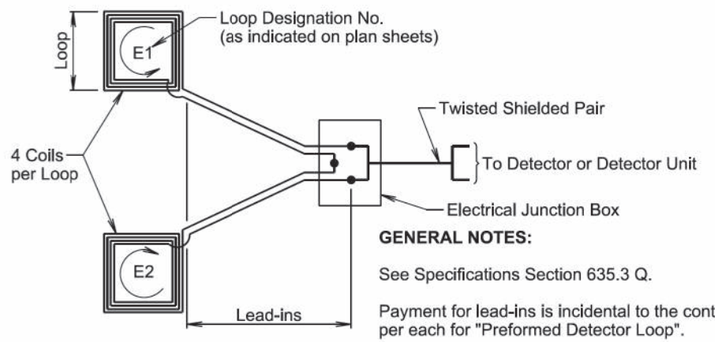
For junction boxes located outside of pavement, a No. 4 steel reinforcing bar with a minimum length of 18" will be buried adjacent to the long side of the junction box. All costs associated with furnishing and placing the steel reinforcing bar will be incidental to the contract unit price per each for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

November 19, 2020

Published Date: 2025	SDDOT	ELECTRICAL JUNCTION BOXES TYPE 1 THROUGH TYPE 4	PLATE NUMBER 635.65
			Sheet 2 of 2



CONDUIT LAYOUT

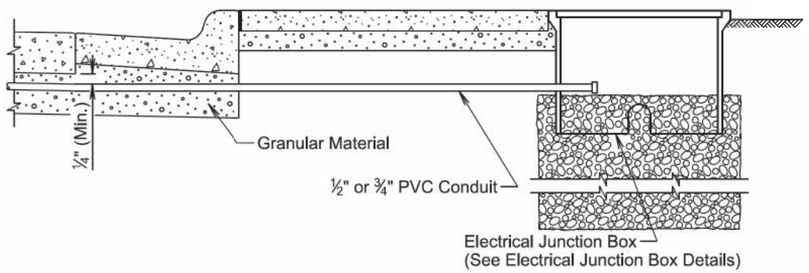


GENERAL NOTES:

See Specifications Section 635.3 Q.

Payment for lead-ins is incidental to the contract unit price per each for "Preformed Detector Loop".

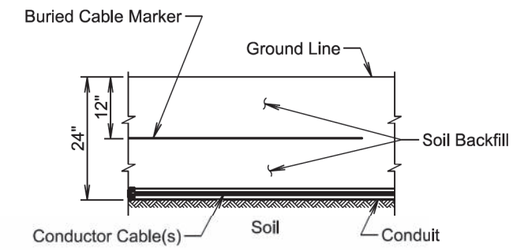
WIRING DIAGRAM



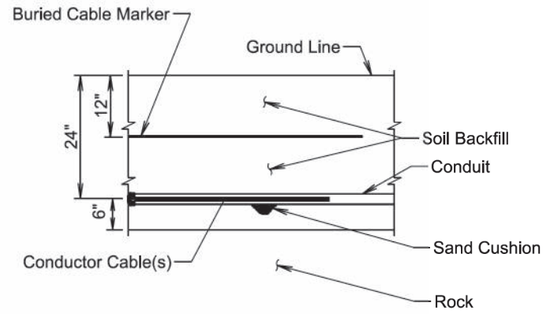
LEAD-IN DETAIL

November 19, 2022

Published Date: 2025	SDDOT	PREFORMED DETECTOR LOOP	PLATE NUMBER 635.70
			Sheet 1 of 1



SECTION VIEW



SECTION VIEW

GENERAL NOTE:

The Buried Cable Marker will be plastic, approximately 6" wide, and will be capable of sustaining a minimum of a 350% tolerance of elongation without tearing. The Buried Cable Marker will 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 will be printed in a contrasting color on the cable marker. The Buried Cable Marker will be subject to approval by the Engineer. All costs associated with furnishing and installing the Buried Cable Marker will be incidental to the contract unit price per foot for the bid item used for the electrical conductor.

November 19, 2022

Published Date: 2025	SDDOT	CONDUIT INSTALLATION	PLATE NUMBER 635.76
			Sheet 1 of 1