SECTION L: SIGNAL AND LIGHTING PLANS

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L1	L73

Plotting Date: 11/15/2024

INDEX OF SHEETS

END IM-B-CR 2292(101)3

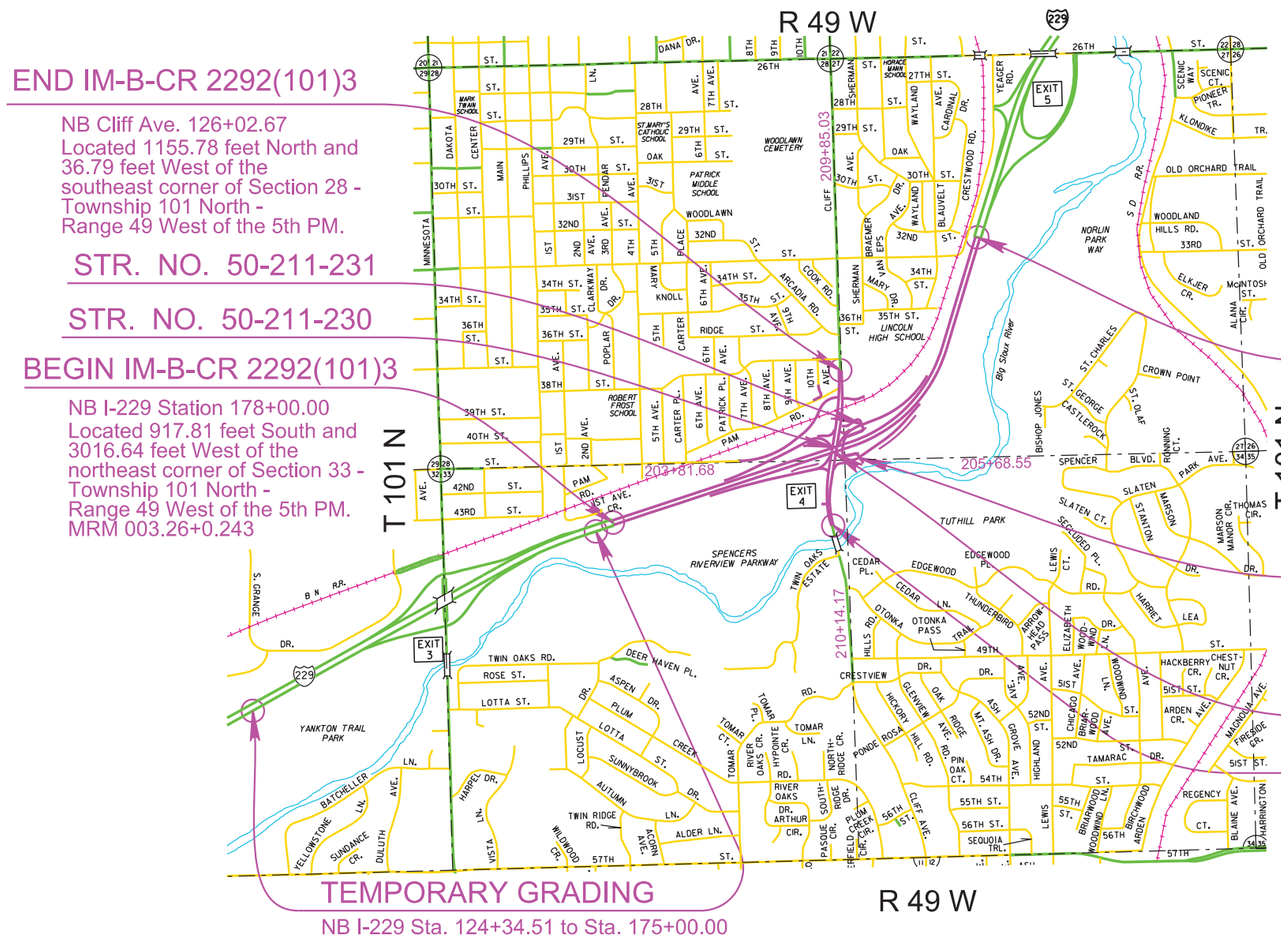
NB Cliff Ave. 126+02.67
Located 1155.78 feet North and 36.79 feet West of the southeast corner of Section 28 - Township 101 North - Range 49 West of the 5th PM.

STR. NO. 50-211-231

STR. NO. 50-211-230

BEGIN IM-B-CR 2292(101)3

NB I-229 Station 178+00.00
Located 917.81 feet South and 3016.64 feet West of the northeast corner of Section 33 - Township 101 North - Range 49 West of the 5th PM.
MRM 003.26+0.243



END IM-B-CR 2292(101)3

NB I-229 Station 245+03.64
Located 2934.62 feet North and 1765.55 feet East of the southwest corner of Section 27 - Township 101 North - Range 49 West of the 5th PM.
MRM 004.37+0.465

STR. NO. 50-210-231

STR. NO. 50-210-230

BEGIN IM-B-CR 2292(101)3

NB Cliff Ave. Station 105+40.80
Located 890.68 feet South and 115.85 feet West of the northeast corner of Section 33 - Township 101 North - Range 49 West of the 5th PM.

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Plot Scale - 1:2000

Plotted From - ngjersvik

File - ...\05FIN_TitleL.dgn

SECTION L ESTIMATE OF QUANTITIES

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L2	L73

Revised Date: 01/14/2025
Initials: NBG

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
110E1530	Remove Signal Pole Footing	9	Each
110E1540	Remove Luminaire Pole Footing	18	Each
110E1550	Remove Light Tower	5	Each
110E5100	Salvage Luminaire Pole	15	Each
110E5105	Salvage Luminaire	23	Each
110E5110	Salvage Signal Equipment	Lump Sum	LS
110E7200	Remove Luminaire Pole for Reset	4	Each
635E0030	Breakaway Base Luminaire Pole with Arm, 30' Mounting Height	1	Each
635E0040	Breakaway Base Luminaire Pole with Arm, 40' Mounting Height	35	Each
635E0050	Breakaway Base Luminaire Pole with Arm, 50' Mounting Height	29	Each
635E0150	Breakaway Base Luminaire Pole with Twin Arms, 50' Mounting Height	28	Each
635E0650	Fixed Base Luminaire Pole with Arm, 50' Mounting Height	4	Each
635E2000	Pedestal Signal Pole	15	Each
635E2025	Signal Pole with 25' Mast Arm	1	Each
635E2030	Signal Pole with 30' Mast Arm	1	Each
635E2135	Signal Pole with 35' Mast Arm and Luminaire Arm	1	Each
635E2145	Signal Pole with 45' Mast Arm and Luminaire Arm	1	Each
635E2150	Signal Pole with 50' Mast Arm and Luminaire Arm	2	Each
635E2155	Signal Pole with 55' Mast Arm and Luminaire Arm	2	Each
635E3545	Under Bridge Deck Luminaire, LED	8	Each
635E3585	Tunnel Luminaire, LED	11	Each
635E3700	Roadway Luminaire, LED with Photoelectric Cell	127	Each
635E4030	3 Section Vehicle Signal Head	39	Each
635E4040	4 Section Vehicle Signal Head	17	Each
635E5020	2' Diameter Footing	580.0	Ft
635E5025	2.5' Diameter Footing	13.3	Ft
635E5030	3' Diameter Footing	52.0	Ft
635E5040	4' Diameter Footing	9.0	Ft
635E5310	Special Electrical Junction Box	84	Each
635E5360	Surface Mounted Junction Box	8	Each
635E5400	Electrical Service Cabinet	3	Each
635E5430	Traffic Signal Controller	3	Each
635E5450	Side Mounted Cabinet	6	Each
635E5515	Battery Backup System for Traffic Signal	3	Each
635E5520	Video Detection System	3	Each
635E5560	Emergency Vehicle Preemption Unit	3	Each
635E5570	Optical Detector	12	Each
635E5600	Surveillance Camera	2	Each
635E5880	Accessible Pedestrian Signal	24	Each
635E5910	Pedestrian Push Button Pole	13	Each
635E5922	Pedestrian Signal Head with Countdown Timer	24	Each
635E5930	Pedestrian Crossing Sign	24	Each

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
635E5980	Rectangular Rapid Flashing Beacon System	4	Each
635E6200	Miscellaneous, Electrical	Lump Sum	LS
635E7505	Reset Luminaire Pole	2	Each
635E8008	0.75" Rigid Galvanized Steel Conduit	270	Ft
635E8010	1" Rigid Galvanized Steel Conduit	211	Ft
635E8020	2" Rigid Galvanized Steel Conduit	655	Ft
635E8108	0.75" Rigid Conduit, Schedule 40	568	Ft
635E8110	1" Rigid Conduit, Schedule 40	6,790	Ft
635E8120	2" Rigid Conduit, Schedule 40	19,493	Ft
635E8130	3" Rigid Conduit, Schedule 40	386	Ft
635E8140	4" Rigid Conduit, Schedule 40	365	Ft
635E8150	5" Rigid Conduit, Schedule 40	25	Ft
635E8220	2" Rigid Conduit, Schedule 80	3,806	Ft
635E8230	3" Rigid Conduit, Schedule 80	1,010	Ft
635E8240	4" Rigid Conduit, Schedule 80	200	Ft
635E8250	5" Rigid Conduit, Schedule 80	60	Ft
635E8420	1.5" Innerduct, SDR 13.5	4,630	Ft
635E8830	2/2/2/4 Aluminum Wire	8,728	Ft
635E9012	1/C #2 AWG Copper Wire	13,476	Ft
635E9014	1/C #4 AWG Copper Wire	6,574	Ft
635E9016	1/C #6 AWG Copper Wire	38,893	Ft
635E9018	1/C #8 AWG Copper Wire	13,201	Ft
635E9020	1/C #10 AWG Copper Wire	9,672	Ft
635E9022	1/C #12 AWG Copper Wire	6,059	Ft
635E9302	2/C #14 AWG IMSA Copper Cable, K1	1,020	Ft
635E9303	3/C #14 AWG IMSA Copper Cable, K1	480	Ft
635E9305	5/C #14 AWG IMSA Copper Cable, K1	1,285	Ft
635E9307	7/C #14 AWG IMSA Copper Cable, K1	8,345	Ft
635E9312	12/C #14 AWG IMSA Copper Cable, K1	1,990	Ft
635E9325	25/C #14 AWG IMSA Copper Cable, K1	2,270	Ft
635E9800	Preemption Cable	7,990	Ft
635E9906	6 Strand Fiber Optic Cable	1,133	Ft
635E9924	24 Strand Fiber Optic Cable	4,745	Ft

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SPECIAL PROVISIONS

The following special provisions are attached to the project specifications and will be reviewed by the Contractor for furnishing and installing the proposed traffic equipment.

- Special Provision for Adaptive Traffic Signal Control System
- Special Provision for Optical Activated Emergency Vehicle Preemption System
- Special Provision for Traffic Signal Controller, Cabinets, Conflict Monitors, and Pedestrian Push Button Units.
- Special Provision for Traffic Signal Heads (LED Modules)

SUPPLYING AS BUILT PLANS

If the traffic signal system(s) or roadway lighting system(s) 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 and City Lighting Department. 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.

PDF submittals will be sent to the following email addresses:

mlyons@sehinc.com

Upon review of the submittals, they will be sent by the Engineer to the following email addresses for concurrence of approvals or remarks:

Stacy.Bartlett@state.sd.us
Ryley.Rapp@state.sd.us
Joseph.Updike@state.sd.us
Hhoftiezer@siouxfalls.org

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, City Traffic Engineer, Consultant Design Engineer, City Light Department, and the Traffic Design Engineer present.

GENERAL

Roadway lighting and traffic signal items will be installed as discussed in the plans and the City of Sioux Falls Standard Specifications for Traffic Signals - Section 635A, and for Roadway Lighting – Section 635B. The following notes are provided for the Contractor's clarification.

- The Standard Specifications can be viewed online at: http://www.siouxfalls.org/public-works/engineering/construction-mgmt/resources/specs-policies-manuals.
- The Contractor will refer to Section A of 635B.3 of the Construction Requirements in the Standard Specifications for the coordination and application process to follow for the electrical services.
- The Contractor will complete both the Roadway Lighting and Traffic Signal Checklists for installation of all items shown on the plans. The checklists can be found at the following website: http://www.siouxfalls.org/public-works/engineering/construction-mgmt/resources/forms-permits.
- The proposed luminaire poles will have breakaway transformer bases and will be installed on concrete footings. Unless noted otherwise.
- The Contractor will furnish and install all traffic signal and street light wire and will pull all wires through the conduits, junction boxes, signal poles, and luminaire poles.
- The Contractor will make all line-to-line connections and will furnish and install all items listed under Section 635B.G (Connectors) in the Standard Specifications for fuses, fuse-holder kits, in-line fuse holders, splice kits, stub connection kits, and multi-cable connectors to be furnished and installed within the junction boxes, light pole bases, and meter locations. This will supersede the requirements stated in the Standard Specifications.
- The City light department will de-energize the lights to be removed.
- #12 AWG Tracer wire will be installed in all traffic conduit and interconnect conduit, and also in lighting conduits not carrying wire.
- The tracer wire will be paid for separately under its respective bid item, unless noted otherwise.
- The Contractor will be responsible for locating all lines, including those that will be removed and/or abandoned, from the start of the project.

MISCELLANEOUS ELECTRICAL

The contract lump sum price for "Miscellaneous Electrical" will include all costs for the following work items:

- Connecting / tying to existing conduits, circuits, and junction boxes
- Removal of existing traffic and lighting junction boxes
- Removal / abandonment of existing lighting and traffic conduits and cables
- Removal of existing fiber optic cable
- Removal of existing service cabinets and meters
- Conduit boring
- 12/2 UF with ground from transformer base to luminaire of each luminaire pole

LABELING CIRCUITS, WIRE, CONDUIT

All wires and/or conduits within junction boxes and light bases will be permanently marked, clearly stating line direction and/or description of opposite end. Circuits will be marked in the breaker panel. The markings will be of sufficient durability to withstand the environment involved.

CONDUIT INSTALLATION

Each end of each conduit will be marked with a ½-inch dia. x 12-inch long reinforcing bar driven flush with the finished grade, except when the conduit end terminates inside a junction box. The ends of each conduit run will be capped to prevent water and soil from entering. This work will be done by the Lighting and Signal Contractor and will not be disturbed by the Grading Contractor.

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REMOVE SIGNAL POLE FOOTING

If existing footings are within the grading limits, verify the footing removal depth with Grading Engineer.

The footings of existing signal poles noted in the plans will be removed by the Contractor to a minimum of 2-feet 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

If existing footings are within the grading limits, verify the footing removal depth with Grading Engineer.

The footings of existing luminaire poles noted in the plans will be removed by the Contractor to a minimum of 2-feet 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”.

REMOVE LIGHT TOWER

This work consists of removing light tower and lowering device at the locations specified. These will include footings and luminaires.

The footing of existing light tower noted in the plans will be removed by the Contractor to a minimum of 2-feet below the ground surface. Restoration of the disturbed area will be to the satisfaction of the Engineer.

All costs for removing the footing of the existing light tower will be incidental to the contract unit price per each for “Remove Light Tower”.

SALVAGE LUMINAIRE POLE

Existing luminaire poles, arms, and luminaires in the plans will be salvaged and delivered to the City of Sioux Falls by the Contractor. The Contractor will notify the City of Sioux Falls Light Department at least 5 days before the delivery of the salvaged luminaire poles. The City contact is:

CITY LIGHT SHOP
Sioux Falls Municipal Light & Power
Contact Jerry Jongeling (telephone 605-373-6979)
2000 N Minnesota Avenue
Sioux Falls SD 57117-7402

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

SALVAGE SIGNAL EQUIPMENT

The existing signal equipment identified on the plans will be salvaged and delivered to the City of Sioux Falls Traffic Shop by the Contractor. The Contractor will notify the City at least 5 days before the delivery of the salvaged signal equipment. The City contact is Heath Hoftiezer at (605) 367-8634. The equipment will be delivered to:

CITY TRAFFIC SHOP
231 N Dakota Avenue
Sioux Falls SD 57104

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”.

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.

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

All poles will have transformer bases.

Signal poles will have rotatable mast arms.

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.

LUMINAIRE POLES

Luminaire poles L1 - L13 and L18 - L32 will have a mounting height of 50-feet with twin 8-feet arms.

Luminaire poles L14 – L17 will have a mounting height of 50-feet with 8-feet arm and be barrier mounted (non-breakaway).

Luminaire poles AL1 to AL7, BL1 to BL7, CL1 to CL7, and DL1 to DL8 will have a mounting height of 50-feet with 8-feet arm.

Luminaire poles CFL1 to CFL13, CFL15 to CFL24 and 41L1 to 41L12 will have a mounting height of 40-feet with 8-feet arm.

Luminaire pole CFL14 will have a mounting height of 30-feet with 8-feet arm.

Luminaire poles (salvage) HSL1 to HSL2 will be removed and reset.

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

VIBRATION DAMPENER

All proposed luminaire poles will be furnished and installed with a vibration dampener that is internal to the pole.

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BRIDGE / BARRIER MOUNTED LUMINAIRE POLE

Luminaire Poles L14, L15, L16, and L17 are barrier mounted poles. The anchor bolt shall be designed by the pole fabricator and shall not exceed the barrier height. Refer to Section E for mounting details.

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

SOILS INFORMATION

Location	Subsurface Soils Below Proposed Signal Location	Anticipated Groundwater Depth
Cliff Ave and 41st St (SP-A1)	0’ - 11’ Brown clay silt 11’-14’ Brown sand and gravel 14’ Refusal, quartzite	10’
Cliff Ave and 41st St (SP-A2)	0’ - 3’ Brown silt clay 3’ - 7’ Brown clay 7’ - 12.5’ Brown sand and gravel 12.5’ - 13.5’ Cobbles and fractured quartzite 13.5’ Refusal, quartzite	8’
Cliff Ave and 41st St (SP-A3)	0’ - 10’ Brown clay 10’ - 16’ Cobbles and fractured quartzite 16’ Refusal, quartzite	Below 7’
Cliff Ave and 41st St (SP-A4)	0’ - 9’ Brown clay 9’ - 15’ Brown sand and gravel 15’ Refusal, quartzite	Below 12’
Cliff Ave and 38th St (SP-A5)	0’ - 2.5’ Brown silt clay 2.5’ - 5’ Brown clay 5’ - 7’ Cobbles and fractured quartzite 7’ Refusal, quartzite	Below 6’
Cliff Ave and 38th St (SP-A6)	0’ - 1.2’ Concrete and gravel surfacing 1.2’ - 3.8’ Gray to brown clay 3.8’ - 4.2’ Cobbles and fractured quartzite 4.2’ Refusal, quartzite	2.0’
Cliff Ave and 38th St (SP-A7)	0’ - 1.7’ Concrete and gravel surfacing 1.7’ - 8.0’ Gray to brown clay 8’ - 11.5’ Cobbles and fractured quartzite 11.5’ Refusal, quartzite	8.0’
Cliff Ave and 38th St (SP-A8)	0’ - 2’ Brown silty sand and gravel 2’ - 7’ Brown to gray clay silt 7’ - 8’ Cobbles and fractured quartzite 8’ Refusal, quartzite	Below 7’

1. Footing locations that have high water tables or contain sand, gravel, or cobbles are potential candidates for caving soils. During construction of the cylindrical footings, concrete placement operations will closely follow excavation procedures. The longer the excavations are left open, the more likely caving will 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 will 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 will not be dropped through standing water. Concrete placed through drilling fluids will be tremied. If caving is not an issue but water is present, it must be removed prior to concrete placement, or the concrete will be tremied.
2. At signal pole location A7, the Contractor will first attempt to install a 4’ x 9’ cylindrical footing. Drilling operations at this location may require pre-bore with a smaller bit before to the final footing diameter. If intact quartzite is encountered at a depth less than 9’ below finished ground a spread footing alternative provided by the Office of Bridge Design will be utilized for the signal pole at this location.

SPREAD FOOTING ON ROCK

The rock surface will be cleaned of all soil and debris prior to placing rock dowels and reinforcing steel for the spread footing. Cleaning will be accomplished by water washing and/or air jetting. Material washed from the rock surface will be directed into a sump or low area and physically removed from the exposed rock surface.

The cost of cleaning the rock will be included in the unit price bid for Structure Excavation. Payment will be considered full compensation for all materials, labor, equipment, and incidentals necessary to satisfactorily complete the work.

The steel dowel for use with the item Install Dowel in Rock is included in the Reinforcing Schedule and will be paid for at the unit price bid for Reinforcing Steel. Install Dowel in Rock will not be measured unless a change is ordered. Payment will be for the lineal foot of embedment into the rock, and will be considered full compensation for all materials, labor, equipment, and incidentals necessary to satisfactorily complete the work.

Dowel bond material will be suitable for bonding steel dowel bars to rock in the existing moisture conditions. The Contractor will submit dowel bonding material product data to the Engineer for approval. Site mixed and cartridge resins will be commercially available and manufactured for rock dowel installation in this rock type. The diameter of the hole, drilled into the rock, will be a maximum of 3/8 inch larger than the diameter of the steel dowel, or as specified by the dowel bond material manufacturer. The drilled holes will be blown out with compressed air using a device that will reach the bottom of the hole to ensure that all debris or loose material has been removed prior to epoxy injection.

TABLE OF FOOTING DATA

Site Designation	Footing Diameter	* Footing Depth	**Spiral Diameter	**Spiral Length	Vertical Reinforcement
A9, A10, A12, A14, A15, A16, A17, A19, A21, A22	2’ - 0”	4’ - 0”	1’ - 8”	33’ - 9”	8-#7 x 3’ - 6”
CFL1 – CFL8, CFL11, CFL14, CFL15, CLF18 – CLF24, 41L1 – 41L12	2’ - 0”	7’ - 0”	1’ - 8”	49’ - 6”	8-#7 x 6’ - 6”
AL1 – AL7, BL1 – B7, CL1 – CL7, DL1 – DL8	2’ - 0”	8’ - 0”	1’ - 8”	54’ - 9”	8-#7 x 7’ - 6”
L1 – L13, L18 – L32, HSL1, HSL2	2’ - 0”	9’ - 0” ***	1’ - 8”	60’ - 0”	8-#7 x 8’ - 6”
A11, A13, A18, A20	2’ - 0”	10’ - 0”	1’ - 8”	65’ - 3”	8-#7 x 9’ - 6”
A3	3’ - 0”	10’ - 0”	2’ - 8”	104’ - 3”	14-#8 x 9’ - 6”
A1, A2, A4	3’ - 0”	12’ - 0”	2’ - 8”	120’ - 9”	14-#8 x 11’ - 6”
**** A7	4’ - 0”	9’ - 0”	3’ - 8”	131’ - 9”	23-#8 x 8’ - 6”
A5, A6, A8	SEE SECTION E FOR SPREAD FOOTING DATA				

* Footing depth will be below ground level.
** The size of all spirals will be #3.
*** For HSL1 & HSL2, 2’ of the 9’ tall footings will be installed above ground.
**** See Section E for spread footing alternative.

During construction of the cylindrical footings, concrete placement operations should closely follow excavation procedures. The longer the excavations are left open, the more likely caving may occur.

Concrete will not be dropped through standing water. If water is present in the excavation, it will be removed prior to concrete placement, or the concrete will be tremied.

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STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L6	L73

FOR BIDDING PURPOSES ONLY

Revised Date: 12/18/2024
Initials: NBG

I-229 LUMINAIRES

The I-229 mainline lighting design used the following parameters to provide 0.80 and greater average maintained foot-candles and uniformity ratio of 4:1 (average maintained to minimum maintained foot-candles):

Light Loss Factor (LLF):	0.8
Configuration:	Median
Mounting Height:	50 Ft.
Arm Length	8 Ft.
Source:	LED

The following luminaires meet the requirements for this design:

American Electric Lighting ATB0_P305_MVOLT_R3_P7_PCLL

I-229 & CLIFF AVENUE RAMPS LUMINAIRES

The I-229 ramp lighting design used the following parameters to provide 0.87 and greater average maintained foot-candles and uniformity ratio of 4:1 (average maintained to minimum maintained foot-candles):

Light Loss Factor (LLF):	0.8
Configuration:	Single side
Mounting Height:	50 Ft.
Arm Length	8 Ft.
Source:	LED

The following luminaires meet the requirements for this design:

American Electric Lighting ATB0_P305_MVOLT_R2_P7_PCLL

American Electric Lighting ATB0_P305_MVOLT_R2_P7_PCLL

CLIFF AVENUE LUMINAIRES (NON-INTERSECTIONS)

The Cliff Avenue (non-intersection) lighting design used the following parameters to provide 1.24 and greater average maintained foot-candles and uniformity ratio of 4:1 (average maintained to minimum maintained foot-candles):

Light Loss Factor (LLF):	0.8
Configuration:	Staggered
Mounting Height:	40 Ft. (30 Ft. for CFL14)
Arm Length	8 Ft.
Source:	LED

The following luminaires meet the requirements for this design:

American Electric Lighting ATB0_P304_MVOLT_R3_ P7_PCLL

CLIFF AVENUE LUMINAIRES (INTERSECTIONS)

The Cliff Avenue (intersection) lighting design used the following parameters to provide 2.10 and greater average maintained foot-candles and uniformity ratio of 4:1 (average maintained to minimum maintained foot-candles):

Light Loss Factor (LLF):	0.8
Configuration:	Varies
Mounting Height:	40 Ft.
Arm Length	8 Ft.
Source:	LED

The following luminaires meet the requirements for this design:

American Electric Lighting ATB0_P453_MVOLT_R3_P7_PCLL

41ST STREET LUMINAIRES

The 41st Street (non-intersection) lighting design used the following parameters to provide 1.23 and greater average maintained foot-candles and uniformity ratio of 4:1 (average maintained to minimum maintained foot-candles):

Light Loss Factor (LLF):	0.8
Configuration:	Single side
Mounting Height:	40 Ft.
Arm Length	8 Ft.
Source:	LED

The following luminaires meet the requirements for this design:

American Electric Lighting ATB0_P302_ MVOLT_R2_P7_PCLL

UNDER DECK LUMINAIRES

The lighting design for underdeck lighting used the following parameters to provide 0.8 and greater average maintained foot-candles and uniformity ratio of 4:1 (average maintained to minimum maintained foot-candles):

Light Loss Factor (LLF):	0.8
Configuration:	Surface mount
Source:	LED

The following luminaire meet the requirements for this design:

Holophane: WCNG P5 40 U4W MVOLT ZT 10KV BZSDP LTCH NPR DF

PEDESTRIAN UNDERPASS LUMINAIRES

The pedestrian underpass lighting design used the following parameters to provide night lighting 6.6 and greater average maintained foot-candles and uniformity ratio of 4:1 (average maintained to minimum maintained foot-candles):

Pedestrian Underpass Lighting

Light Loss Factor (LLF):	0.8
Configuration:	Surface mount
Source:	LED

The following luminaires meet the requirements for this design:

Holophane EMX L24 4000LM FPFL MD MVOLT 40K 80CRI DGXD CR

TRANSFORMER LOCATIONS

Transformer locations shown in the plan are approximate and shall be coordinated with Xcel Energy. If a transformer location is revised, the corresponding meter service shall be moved in kind. Any changes to material quantities as a result of the revised transformer location at the direction of Xcel energy shall be considered incidental.

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TABLE OF LUMINAIRE POLE DATA

Pole Designation	Roadway	Station	Offset	Side
L1	NB I-229	178+93	30’	L
L2	NB I-229	181+13	30’	L
L3	NB I-229	183+33	30’	L
L4	NB I-229	185+53	30’	L
L5	NB I-229	187+73	30’	L
L6	NB I-229	189+93	30’	L
L7	NB I-229	192+13	30’	L
L8	NB I-229	194+33	30’	L
L9	NB I-229	196+53	30’	L
L10	NB I-229	198+78	30’	L
L11	NB I-229	201+03	30’	L
L12	NB I-229	203+29	30’	L
L13	NB I-229	205+54	29	L
L14	NB I-229	207+53	11’	L
L15	SB I-229	208+10	11’	R
L16	NB I-229	209+53	11’	L
L17	SB I-229	210+11	11’	R
L18	NB I-229	211+99	30’	L
L19	NB I-229	214+41	29’	L
L20	NB I-229	216+78	30’	L
L21	NB I-229	219+15	30’	L
L22	NB I-229	221+52	30’	L
L23	NB I-229	223+89	30’	L
L24	NB I-229	226+27	30’	L
L25	NB I-229	228+64	30’	L
L26	NB I-229	230+99	29’	L
L27	NB I-229	233+19	29’	L
L28	NB I-229	235+39	29’	L
L29	NB I-229	237+59	29’	L
L30	NB I-229	239+79	29’	L
L31	NB I-229	241+99	29’	L
L32	NB I-229	244+19	29’	L
AL1	RAMP A	11+85	29’	R
AL2	RAMP A	12+73	43’	L
AL3	RAMP A	14+22	18’	R
AL4	RAMP A	16+86	16’	R
AL5	RAMP A	19+59	16’	R
AL6	RAMP A	22+18	35’	L
AL7	RAMP A	25+13	33’	L
BL1	RAMP B	31+39	19’	L
BL2	RAMP F	16+94	39’	R
BL3	RAMP B	33+86	16’	L
BL4	RAMP B	36+54	16’	L
BL5	RAMP B	39+23	16’	L
BL6	RAMP B	41+94	36’	R
BL7	NB I-229	222+74	69’	R
CL1	RAMP C	52+01	35’	R
CL2	RAMP C	54+77	35’	R
CL3	RAMP C	57+42	15’	L
CL4	RAMP C	60+08	16’	L
CL5	RAMP C	62+78	32’	L
CL6	RAMP G	25+70	49’	R
CL7	RAMP C	65+75	43’	L
DL1	SB I-229	193+36	68’	L
DL2	RAMP D	72+46	35’	L

TABLE OF LUMINAIRE POLE DATA (CONTINUED)

Pole Designation	Roadway	Station	Offset	Side
DL3	RAMP D	74+94	16’	R
DL4	RAMP D	77+43	16’	R
DL5	RAMP D	79+93	16’	R
DL6	RAMP D	82+44	16’	R
DL7	RAMP D	84+36	19’	R
DL8	RAMP H	36+09	36	L
CFL1	NB CLIFF	105+57	27’	R
CFL2	NB CLIFF	108+17	27’	R
CFL3	NB CLIFF	110+34	38’	R
CFL4	NB CLIFF	112+37	38’	R
CFL5	NB CLIFF	114+39	27’	R
CFL6	NB CLIFF	117+38	27’	R
CFL7	NB CLIFF	119+29	31’	R
CFL8	NB CLIFF	120+93	38’	R
CFL9	NB CLIFF	121+97	40’	R
CFL10	NB CLIFF	122+80	29’	R
CFL11	NB CLIFF	125+14	27’	R
CFL12	NB CLIFF	128+11	21’	R
CFL13	SB CLIFF	327+44	21’	L
CFL14	SB CLIFF	326+44.5	22’	L
CFL15	SB CLIFF	324+12	33’	L
CFL16	SB CLIFF	323+01	47’	L
CFL17	SB CLIFF	321+76	38’	L
CFL18	SB CLIFF	320+12	38’	L
CFL19	SB CLIFF	318+42	38’	L
CFL20	SB CLIFF	316+73	27’	L
CFL21	SB CLIFF	313+66	26’	L
CFL22	SB CLIFF	311+38	31’	L
CFL23	SB CLIFF	309+51	29’	L
CFL24	SB CLIFF	306+90	17’	L
41L1	41ST	21+54	25’	R
41L2	41ST	23+15	20’	R
41L3	41ST	24+53	19’	R
41L4	41ST	26+08	20’	R
41L5	41ST	27+63	19’	R
41L6	41ST	29+18	20’	R
41L7	41ST	30+58	20’	R
41L8	41ST	32+14	20’	R
41L9	41ST	34+37	38’	R
41L10	41ST	36+13	39’	R
41L11	41ST	35+21	31’	L
41L12	41ST	33+25	25’	L
HSL1	SCHOOL	41+13	73’	R
HSL2	SCHOOL	41+24	27’	L

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L7	L73

Revised Date: 12/18/2024
Initials: NBG

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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”, “4 Section Vehicle Signal Head”.

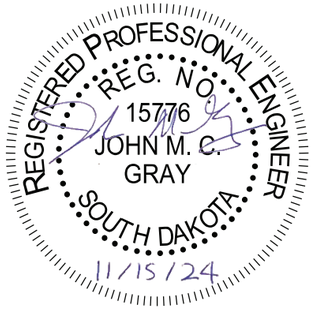
TRAFFIC SIGNAL HEADS

Traffic signal heads for vehicle and pedestrian traffic signal heads will be furnished and installed by the Contractor, as specified in the special provisions.

All costs for the traffic signal heads will be included in the appropriate signal head bid item.

In addition to the special provisions for the traffic signal heads, the following specifications will also apply:

- Vehicle and pedestrian signals heads colors will be Black body, Black doors, Black tunnel visors and Black backplates.
- All hardware associated with mounting the vehicle and pedestrian signals heads will have P33 Gloss Black color.
- Pedestrian signal heads will be two separate 12”x12” signal heads. The man/hand display head will be mounted above the countdown timer display head as shown below.



SURFACE MOUNTED JUNCTION BOXES

Surface mounted junction boxes will be per the City’s Standard Specifications for Roadway Lighting – Section 635B, with the boxes meeting the adopted NEC, in lieu of the 2008 NEC.

Surface Mounted Junction Boxes SJB1 and SJB2 will be equipped with 3M 314 connectors having a minimum of 24 positions and be UL approved.

Surface mounted junction boxes JSM1 – JSM4 will have a fuse holder for underdeck luminaires.

The Contractor will use ¼” concrete inserts with ¼” X 1 ½” bolts and washers to attach the surface mounted junction boxes to the bridges. Bolts and washers will be galvanized.

All costs for attaching the surface mounted junction boxes to the bridges, for the fuse holders, and for the terminal blocks will be incidental to the contract unit price per each for “Surface Mounted Junction Box”.

ATTACHING CONDUIT TO STRUCTURE

The proposed conduits to be installed on the bridge will be coordinated with the bridge Contractor. See Section E for utility chases that have been designed to allow for the conduits to be installed across the bridge. The surface mounted junction boxes for the conduits will be field determined for locations (approximate locations are shown on the plans). The Contractor will verify all locations with the Engineer prior to installation.

The proposed conduits to be installed on the bridge will be attached to the underside of the deck/structure. The proposed conduits will be attached to the bridge in a manner meeting all electrical codes. The conduit connection system will be corrosion resistant. All costs for installing the conduits on the bridge will be incidental to the conduit bid items. Expansion joints will be required to be installed by the Contractor for the conduit being installed on the bridge.

SPECIAL ELECTRICAL JUNCTION BOX

The proposed electrical junction boxes for traffic, innerduct and lighting will be the 18”, 24” or 30” diameter junction boxes as shown on City of Sioux Falls standard plates #635.31, 635.33 and 635.70.

All costs for the junction boxes, regardless of type or size, will be included in the contract unit price per each for “Special Electrical Junction Box”.

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.

The traffic signal controller and controller cabinet will be furnished and installed by the Contractor to meet the specifications discussed in the special provisions. See the diagram below for signal controller cabinet details.

All costs for 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”.

SIDE MOUNTED CABINET (FOR FIBER OPTIC CABLE)

The side mounted cabinet will house the fiber optic cable and will be furnished and installed by the Contractor.

The side mounted cabinet will be mounted on the side of the signal controller cabinet as shown on the diagram on the following sheet. The side mounted cabinet will:

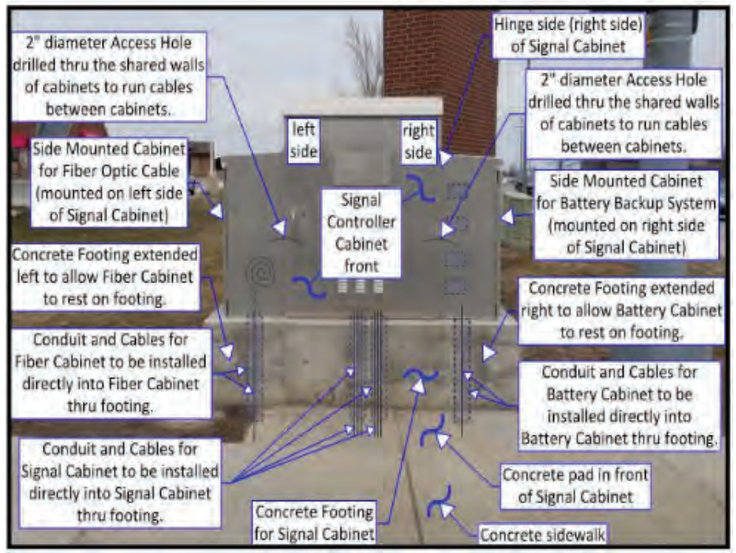
- Meet standards for a NEMA Traffic Enclosure for fiber optic cable
- Have dimensions of 56”H, 26.25”W, 14.625”D
- Be furnished with a door that includes ventilation louvers, fan, and filter
- Be provided with a No. 2 key for the main door with a 3-point locking mechanism which operates from a single easy turning handle
- Include at least 3 adjustable shelves
- Have lockable doors that swing open towards the rear of the main cabinet (hinges located to rear with handle located at front)
- Include LED lighting
- Be manufactured by Southern Manufacturing or approved equal

The side mounted cabinet will be plumb and level in reference to the back side of the signal controller cabinet. The Contractor must take precautions when positioning the side mounted cabinet to avoid damaging wire or equipment within the controller cabinet while drilling the mounting holes and the access hole. The access hole will be two-inch diameter and will be drilled through the side mounted cabinet into the controller cabinet. A grommet or bushing will be installed in the two-inch diameter hole to prevent damage during pull through of the fiber optic cable.

The side mounted cabinet will be mounted and tightened securely to the controller cabinet using a minimum of four bolts. A bead of clear silicon caulking will be placed in all gaps between the side mounted cabinet and controller cabinet to prevent water intrusion into either cabinet.

SIDE MOUNTED CABINET (FOR FIBER OPTIC CABLE) (CONTINUED)

All costs to furnish and install the side mounted cabinet, including the concrete base, will be included in the contract unit price per each for “Side Mounted Cabinet”.



SIDE MOUNTED CABINET (FOR BATTERY BACKUP SYSTEM)

The side mounted cabinet will house the battery backup and flash system will be furnished and installed by the Contractor.

The side mounted cabinet for the battery backup and flash system will be mounted on the side of the signal controller cabinet as shown on the graphic on this sheet. The side mounted cabinet will:

- Meet standards for a NEMA Traffic Enclosure
- Have dimensions of 56”H, 26.25”W, 14.625”D
- Be furnished with a door that includes ventilation louvers, fan, and filter
- Be provided with a No. 2 key for the main door with a 3-point locking mechanism which operates from a single easy turning handle
- Include the optional generator compartment and port / socket
- Include shelves that are sized accommodate 220GXL AlphaCell Gel Top Terminal Batteries and that slide out to provide easy access to batteries for testing
- Include an external LED indication light that will be activated when the cabinet is on generator power and utility power has been restored
- Include LED lighting and a white powder-coated interior
- Will have a thermostatically controlled exhaust fan and air filter
- Be manufactured by Southern Manufacturing or approved equal

The side mounted cabinet will be plumb and level in reference to the back side of the controller cabinet. The Contractor must take precautions when positioning the side mounted cabinet to avoid damaging wire or equipment within the controller cabinet while drilling the mounting holes and the access hole. The access hole will be two-inch diameter and will be drilled through the side mounted cabinet into the controller cabinet. A grommet or bushing will be installed in the two-inch diameter hole to prevent damage during pull through of the battery / power cables.

The side mounted cabinet will be mounted and tightened securely to the controller cabinet using a minimum of four bolts. A bead of clear silicon

caulking will be placed in all gaps between the side mounted cabinet and controller cabinet to prevent water intrusion into either cabinet.

All costs to furnish and install the side mounted cabinet, including the concrete base, will be included in the contract unit price per each for “Side Mounted Cabinet”.

TRAFFIC SIGNAL WIRING

The Contractor will use Buchanan crimp connectors and insulating caps, or approved equal, on all wire terminations in the signal bases.

All costs for this work will be incidental to the signal bid items.

OPTICAL DETECTOR

The optical detectors will be dual head with a single output. The detection eyes of each detector will be aimed at a single approach as directed by the Engineer. All costs associated with providing, installing, and aiming the optical detectors will be incidental to the contract unit price per each for “Optical Detector”.

OPTICAL ACTIVATED EMERGENCY VEHICLE PRE-EMPTION SYSTEM

Optical Activated Emergency Vehicle Preemption (EVP) Systems will be furnished and installed by the Contractor to meet the specifications discussed below and in the special provisions.

The Contractor will furnish and install the EVP Systems on the mast arms or street light poles at the intersections as shown on the plans.

The EVP detector heads and confirmation lights will be mounted to the signal mast arm or street light pole using 3/4-inch NPT electrical pipe materials including a malleable Iron “T” approved for rain-tight locations, threaded nipples, and single lamp holder approved for outdoor use. The use of a PELCO AB-0155-42 Band Mount Mini-Brac, or approved, equal will be used where no integrated threaded outlet exists on the mast arm or street light pole. All equipment will be securely mounted to be level/plumb and retain its alignment.

The Optical Activated Emergency Vehicle Preemption (EVP) Systems will be Model 721 Far Side as manufactured by Global Traffic Technologies or approved equal.

Confirmation lights will be wired with IMSA 19-1, 2, or 3 - #14 AWG stranded wire cable for single direction indication and IMSA 19-1, 3 - #14 AWG stranded wire cable for dual direction indications.

The interface card and card cage for the EVP system will be installed within the controller cabinet’s rack mount. One 4-channel card will be installed in the controller cabinet.

The preemption and conductor cables for the detector heads will be installed without splices from the heads to the controller cabinets.

FIBER OPTIC CABLE MODEM

New controller cabinets will be equipped with a fiber optic modem. The Contractor will also furnish and install a fiber optic modem in the existing controller cabinet at Cliff Avenue/33rd Street signal system.

All costs for furnishing and installing fiber optic modems in new and existing controllers will be incidental to the contract unit price per each for “Traffic Signal Controller”.

FIBER OPTIC ETHERNET SWITCH

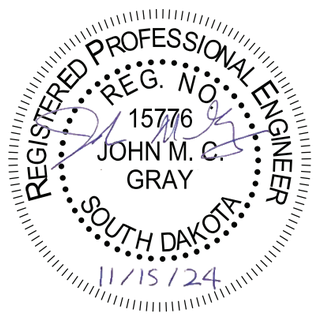
The City of Sioux Falls will supply a field ethernet switch in the following traffic signal cabinets:

Cliff Avenue at Interstate 229 Ramps
Cliff Avenue at 41st Street
Cliff Avenue at 38th Street
Cliff Avenue at 33rd Street

BATTERY BACKUP CABINET

The Contractor will supply cabinets with concrete pad and footing for housing the battery backup system for each new traffic signal system. 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. Anchor bolts for battery backup cabinets may have hooked ends.

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.”



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BATTERY BACKUP SYSTEM

The signal head battery backup and flash system will be furnished and installed by the Contractor.

The signal head battery backup and flash system will be Alpha Backup Power System—2000 VA Power Module as manufactured by Alpha Technologies or approved equal. The battery backup system will also be supplied with an automatic transfer switch to transfer from line power to battery backup and a generator transfer switch to allow switching from line power or battery power to generator power. The transfer switches will be capable of transferring power in under 250 milliseconds permitting the traffic signal to operate normally without interruption to the traffic signal.

A terminal strip for input and output power connections in addition to neutral and ground connections will also be incorporated in the transfer switch design. An interface connector (preferably utilizing a 30-amp, twist lock recessed male plug) allows an external generator or vehicle inverter to be plugged into the system.

Upon loss of utility power, the battery backup system will switch to battery power. In cases of UPS failure, while on utility, the system will auto-bypass and remain in that mode until repaired. Should batteries deplete, while on batteries, the unit will auto-shutdown and return to normal operating mode once the utility power is restored. The By-pass switch will enable removal and replacement of the Traffic UPS without shutting down the traffic control system (i.e., “hot swap” capability). The UPS will support generator input without going to batteries.

The backup battery power system will be sized to accommodate the operation of the signal as shown on the plans for a minimum of 4 hours.

The signal head battery backup and flash system will meet the following specifications:

Standard Features

- Hot-swappable Input/Output Surge Protection
- Intelligent boost operation for brownout protection
- Hot-swappable UPS and batteries
- Noise suppression, FCC Class A
- Multiple mounting configurations
- Rugged, outdoor weather resistant construction
- Lockable enclosure
- NRTL/CSA approved

General Specifications

- Output: Output Voltage Regulation +/-10% over input voltage range
- Waveform sine
- Typical Efficiency >95%
- Typical Output Voltage THD <3%
- Typical Transfer Time < 5 ms typical
- Audible Noise at 1m <55 dbA

Environmental:

Operating Temperature -35°C to +70°C

Agency Compliance:

- Lightning/Surge Protection: Passes ANSI/IEEE C.62.41/C.62.45 Cat A&B
- Safety: EN50091-1
- Low Voltage: EN50091-2

Power Modules

- 2000VA Power Module 60Hz
- Input/Output Voltage nominal 120VAC
- Input/Output Frequency nominal 60Hz
- Input Current 20A
- Input Voltage Variation 85-152VAC
- Output Power 2000VA
- Active Output Power 1500W
- Typical Efficiency >95%
- Max Charge Current 15 Amps
- Battery Backup Time 2–16 hrs

Communications and Alarms

- DB-9 compatible connector/RS-232 interface capable of monitoring, controlling, and calibrating the UPS, using ASCII commands with terminal emulation software.
- External Alarm Signal with relay contacts for: a) line fail, b) low battery warning, and c) UPS needs service.

Brownout Protection

- Boost mode increases voltage by 12% of nominal line voltage if input voltage falls below 12% of nominal.
- All costs for furnishing and installing the signal head battery backup and flash system will be included in the contract unit price per each for “Battery Backup System for Traffic Signal”.

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FISHEYE VIDEO CAMERA DETECTION SYSTEM

The Fisheye Video Camera, Processor Unit, and Cables will be furnished and installed by the Contractor to meet the specifications discussed below.

All costs to furnish and install the complete Fisheye Video Camera Detection System will be included in the contract unit price per each for “Video Detection System”. These costs will include, but not be limited to:

- Fisheye camera, mounting brackets, and hardware
- Processor unit, cabling between processor and controller, Shielded CAT-5e cable or 6 SM fiber optic cable, and antenna
- All equipment required in the controller cabinet to provide a fully functioning fisheye video vehicle detection system
- The Fisheye Video Camera Detection Systems will also be furnished and installed with the Performance Plus Module or approved equal, to allow the Fisheye Video Camera Detection System to be capable of traffic counting and enhanced pedestrian and cyclist detection, as well as functionality for generating reports for traffic counts, length-based classifications, turning movements, red and green occupancy, and cycle lengths. The Performance Plus Module or approved equal will be incidental to the contract unit price per each for “Video Detection System”. The Performance Plus Module or approved equal will be with no subscription fees or any other fees to be paid by the City / Owner for a 10-year time period.
- The Shielded CAT-5e cable or 6 SM fiber optic cable (for cable runs greater than 300 feet from cabinet to camera) for the Fisheye Camera will be installed from the controller cabinet to the camera unit without splices. The Contractor will use only shielded cable approved by the camera manufacturer to protect against Electromagnetic Interference (EMI). Cable will be rated for outdoor use and installed according to the manufacturer’s recommendations. All costs for the Shielded CAT-5e cable and 6 SM fiber optic cable will be incidental to the contract unit price per each for “Video Detection System”.
- The Contractor will coordinate with the City prior to determining the final video camera mounting location. Contact Troy Miller (telephone 605-367-8624) of the City.

SURVEILLANCE CAMERAS

Both a PTZ and a 4-way traffic surveillance camera will be furnished and installed by the Contractor.

The PTZ traffic surveillance camera will be an AXIS Q6155-E PTZ Dome Network Camera 60Hz model as manufactured AXIS Communications or approved equal. The 4-way camera will be an AXIS P3727-PLE Camera model as manufactured AXIS Communications or approved equal. The cameras will be outdoor-ready. The cameras will be pre-equipped from the manufacturer with the following:

- Pole mounting kit AXIS T91L61 or approved equal for the PTZ camera

SURVEILLANCE CAMERAS (CONTINUED)

- Pole mounting kit AXIS T91B67 or approved equal for the 4-way camera
- A power supply
- An outdoor rated power strip
- A lightning suppression device
- Outdoor rated Cat6A cable
- All other required cables, connectors, and jumpers to make a fully functional surveillance camera system

The Contractor will mount the cameras as follows:

- PTZ camera - the mounting bracket is on the luminaire extension as high as possible before the luminaire extension starts to curve or as approved by the engineer.
- 4-way camera - the mounting bracket is directly below the mast arm connection on the signal pole.

All costs to furnish and install the traffic surveillance cameras will be included in the contract unit price per each for “Surveillance Camera”.

The CAT6A cable for the traffic surveillance cameras will be installed from the controller cabinet to the camera without splices. The cable shall be rated for outdoor use and installed according to the manufacturer’s recommendations. All costs for the CAT6A cable will be included in the contract unit price per each for “Surveillance Camera”.

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 the current edition of the MUTCD 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.

The traffic signal cabinet must have four dedicated load switches for the pedestrian phases. If the traffic signal cabinet does not have four dedicated load switches for the pedestrian phases, then the Contractor will furnish and install the necessary number of load switches. All costs associated with furnishing and installing any additional load switches will be incidental to the contract unit price per each for “Accessible Pedestrian Signal”.

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.

In addition, the following requirements will be met for Accessible Pedestrian Signals:

- Accessible pedestrian push buttons will be in compliance with the current MUTCD.
- Shop drawings for approval of the push buttons, including materials, functionality, and color will be submitted.
- Accessible pedestrian signals will have both audible and vibrotactile walk indications and will be capable of recording speech messages.
- Accessible pedestrian signals will be in compliance with all MUTCD and PROWAG guidance.
- Pedestrian crossing signs will be required for each pedestrian push button and are allowed to be furnished with the button as a complete assembly. The pedestrian crossing signs will be paid for separately from the pedestrian push buttons. Shop drawings depicting the proposed pedestrian crossing sign size, design, and language will be submitted.

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 push button poles will be aluminum and will conform to the following requirements:

- Push button poles will use a 48” schedule 40, 4” diameter, aluminum pipe screwed into a frangible pedestal base that is designed to break away at the flange and/or the mid-section around the door to preserve anchor bolts and concrete.
- The pedestal base will have a 6” bolt circle.
- 4 anchors made of stainless steel threaded rod, washers, and nuts will be drilled and epoxied into the concrete.
- A cable tether system will be used to connect the pole to one of the anchor bolts keeping the pole from becoming a projectile in the event of a knock down.
- Shop drawings for approval of the push buttons poles will be submitted.

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

RECTANGULAR RAPID FLASHING BEACON SYSTEM

A Rectangular Rapid Flashing Beacon (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.

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”, except that power cables from the controller cabinet to each RRFB pole will be measured and paid for separately.

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 IMSA 19-1 Table 5.1.

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SOUTH DAKOTA
11/15/24

FIBER OPTIC CABLE

Fiber optic cable will be furnished and installed by the Contractor. Fiber optic cable will meet all requirements discussed in the City's specifications. Each fiber optic cable will have buffer tubes containing 12 fiber strands.

25 feet of fiber cable coil will be installed in the side mounted cabinet. The fiber optic cable will be installed continuous from traffic cabinet to traffic cabinet. No splices will be allowed in the fiber optic cable, except in the cabinets. All terminations and/or splicing will be completed by the City of Sioux Falls fiber optic specialist. For questions regarding the fiber optic cabling, contact Matt Rock at (605) 941-1143.

Note that fisheye cameras with power cable runs greater than 300 feet from traffic signal cabinet to camera will require that 6 strand single mode fiber optic cables be used instead of CAT 5 cables.

The fiber optic cable will be installed in accordance with the manufacturer's recommendations and the NEC. Slack cable will be left in each controller and junction box. All junction boxes will have 50-feet of slack. Slack cable will be over / under coiled. Tying will be loose and kept to a minimum to prevent damage when operating lid. No splices will be allowed in the fiber optic cable except in the controllers. Splices will be of the fusion splice type. All fusion splices will be placed in a splice tray. Terminations will be of the epoxy/polish type, or fusion splice to pig tail type.

No testing will be completed on the fiber optic cable by the Contractor. All testing will be completed by the City outside of this project / contract. If repairs are needed to be completed by the Contractor due to deficiencies found by the City during their testing, the Contractor will repair the fiber optic cable as required to correct these deficiencies at no cost to the City.

INNERDUCT

Innerduct will meet the following requirements:

- Compliant with NFPA70, National Electric Code
- UL listed
- Meets NEMA TC-7
- Have smooth exterior and longitudinally ribbed interior.

The innerduct conduit will be orange in color and longitudinally ribbed on the inside wall.

The innerduct bid items will include furnishing and installing the innerduct, as well as all work to seal the traffic interconnect conduit within the junction boxes.

Innerduct ends will be sealed using a mastic style tape wrapped around the end of the innerduct and fiber optic cable. If innerduct is empty, a heat shrinkable cap will be installed over the end of the innerduct.

All costs for the innerduct will be included in the contract unit price per foot for "1.5" Innerduct SDR 13.5".

TRAFFIC AND FIBER OPTIC CABLE CONDUIT

All nonmetallic conduit open ends will have an approved bell end or bushing installed to prevent damage to cable or conductors, per the City's specifications Section 635A.3.G.6. #12 AWG Tracer wire will be installed in all traffic conduit and interconnect. The tracer wire will be paid for separately under its respective bid item, unless noted otherwise.

SIGNAL AIMING

Signals will be aimed such that all signals for each approach will be continuously visible for the minimum distance listed in the table in Section 4D-12 of the MUTCD.

All costs required for this work are incidental to the "3 Section Vehicle Head" and "4 Section Vehicle Head" pay items.

ELECTRICAL SERVICE CABINET

All costs to furnish and install the Electrical Service Cabinets as shown on the plans and as discussed below will be incidental to the contract unit price per each for "Electrical Service Cabinet".

(Meter 1, 2, 3, 4, 5 and 6)
The electrical service cabinets will be U6281-XL-200-5T9 as manufactured by Milbank or approved equal. The electrical service cabinets will be mounted to 8'-6"x6" ground-contact pressure treated wood post, 3' burial depth. Conduits will be attached to post with strut and clamps at 6" above ground. The City of Sioux Falls standard plates #635.41 and #635.42 are shown in the plans for general guidance for these electrical service cabinets.

REGISTERED PROFESSIONAL ENGINEER
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1/15/25

SIGNAL CONDUIT AND CABLE QUANTITIES

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L13	L73

Plotting Date: 1/14/2025 Revised Date: 1/14/2025
Initials: NBG

Location to Location		Rigid Conduit Galvanized Steel 2" Ft	Rigid Conduit Schedule 40 1" Ft	2" Ft	3" Ft	4" Ft	5" Ft	Rigid Conduit Schedule 80 2" Ft	3" Ft	4" Ft	5" Ft	Innerduct SDR 13.5 1.5" Ft	Fiber Optic Cable 24 Strand FO[4] Ft	6 Strand FO Ft	Copper Wire 1/C #6 AWG Ft	1/C #10 AWG Ft	1/C #12 AWG Ft	IMSA Copper Cable, K1 #14 AWG 2/C Ft	3/C Ft	5/C Ft	7/C Ft	12/C Ft	25/C Ft	Adaptive Cable 6 SM FO[2] Ft	CAT5[2] Ft	CAT6[5] Ft	Preemption Cable EVP & 3C Ft
I-229 MEDIAN WEST SIDE																										
JS29	JS30		597													607										
JS30	JS31		597													607										
JS31	JS32		597													607										
JS32	JS33		597													607										
JS33	JS34		286													307										
JS34	CC3		369					146						525		525										
I-229 MEDIAN EAST SIDE																										
CC3	L18		103					326						439		439								500		
L18	JS35		10													20										
JS35	JS36		592													602										
JS36	JS37		592													602										
JS37	JS38		564													574										
JS38	JS39		597													607										
JS39	JS40		597													607										
JS40	JS41		198													208										
I-229 Median Total:			6,296					472						964		6,919								500		
CLIFF AVENUE & 38TH STREET																										
CC2	M2			20											105											
CC2	JS6					20											35						65				
JS6	JS7								125								130						260				
JS7	A6				25												35						35				
JS7	PB3		27														37										
JS7	PB2		37														47										
JS7	JS8								60								65						65				
JS8	A7				35												45						45				
JS8	PB4		50														60										
CC2	JS10					10											25						45				
JS10	A5				15												25						25				
JS10	PB1		25														35										
JS10	JS9								60								65						65				
JS9	A8				30												40						40				
JS9	PB5		20														30										
CC2	A5																	40	70	80					190		
CC2	A6																	40	130	90				275	470		
CC2	A7																	40	70	80					670		
CC2	A8																	40	120	85				170	370		
A5	PB1																60										
A5	A5 PB																10										
A6	PB3																110										
A6	PB2																110										
A7	PB4																105										
A7	A7 PB																10										
A8	PB5																70										
A8	A8 PB																10										
CC2	JF3 (FIBER)											40	80				35										
JF3 (FIBER)	JF4 (FIBER)											220	160				115										
JF4 (FIBER)	33RD ST CAB												1,800														
Cliff Avenue & 38th Street Total:			159	20	105	30			245			260	2,040			105	824	485	160	390	335		645		445		1,700

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 15776
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SOUTH DAKOTA
1-15-25

1. All cable quantities shown include 5' of slack/coil in each junction box, 5' of slack/coil in each pole base, and 7' of slack/coil in cabinet, unless otherwise noted.
2. CAT5 and 6 SM FO adaptive signal cable is incidental to the "Video Detection System" bid item.
3. See Lighting plan quantities regarding street lighting cable quantities between lighting junction boxes and roadway (non-signal pole mounted) street lights.
4. Coil and store 50' of 24 strand fiber optic cable in each fiber optic junction box.
5. CAT6 adaptive signal cable is incidental to the "Surveillance Camera" bid item.

Plot Scale - 1:200
Plotted From - njersvik
File - ...\05HN_sgHable-conduit.dgn

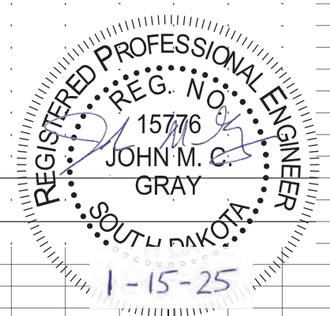
SIGNAL CONDUIT AND CABLE QUANTITIES

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L14	L73

Plotting Date: 1/14/2025 Revised Date: 1/14/2025
Initials: NBG

Location to Location		Rigid Conduit Galvanized Steel 2" Ft	Rigid Conduit Schedule 40 1" Ft	2" Ft	3" Ft	4" Ft	5" Ft	Rigid Conduit Schedule 80 2" Ft	3" Ft	4" Ft	5" Ft	Innerduct SDR 13.5 1.5" Ft	Fiber Optic Cable 24 Strand FO[4] Ft	6 Strand FO Ft	Copper Wire 1/C #6 AWG Ft	1/C #10 AWG Ft	1/C #12 AWG Ft	IMSA Copper Cable, K1 #14 AWG 2/C Ft	3/C Ft	5/C Ft	7/C Ft	12/C Ft	25/C Ft	Adaptive Cable 6 SM FO[2] Ft	CAT5[2] Ft	CAT6[5] Ft	Preemption Cable EVP & 3C Ft
CLIFF AVENUE & 41ST STREET																										
CC1	M			20											105											
CC1	JS1					20											35					65				
JS1	A1				20												30					25				
JS1	PB1		20														30									
JS1	JS2								145								150					150				
JS2	A2				15												25					20				
JS2	PB2		10														20									
CC1	JS5					25											40					75				
JS5	JS4								110								115					230				
JS4	A4				30												40					35				
JS4	PB4		15														20									
JS4	PB5		10														20									
JS4	JS3								150								155					155				
JS3	A3				20												30					25				
JS3	PB3		10														20									
CC1	A1																	40	90	100					270	
CC1	A2																	40	140	180				250	570	
CC1	A3																	40	85	95					810	
CC1	A4																	40	160	105				235	540	
A1	PB1																60									
A1	A1 PB																10									
A2	PB2																45									
A2	A2 PB																10									
A3	PB3																50									
A3	A3 PB																10									
A4	PB4																65									
A4	PB5																55									
CC1	JF1 (FIBER)											80	200				55									
JF1 (FIBER)	JF2 (FIBER)											220	160				115									
JF2 (FIBER)	JF3 (FIBER)											840	470				425									
JF1 (FIBER)	JF5 (FIBER)											360	230				185									
JF5 (FIBER)	JF6 (FIBER)											610	355				310									
EJF1 (FIBER)	JF2 (FIBER)											2,240	1,220				1,120									
Cliff Avenue & 41st Street Total:			65	20	85	45			405			4,350	2,635		105		2,940	305	160	475	480		780		485	2,190



1. All cable quantities shown include 5' of slack/coil in each junction box, 5' of slack/coil in each pole base, and 7' of slack/coil in cabinet, unless otherwise noted.
2. CAT5 and 6 SM FO adaptive signal cable is incidental to the "Video Detection System" bid item.
3. See Lighting plan quantities regarding street lighting cable quantities between lighting junction boxes and roadway (non-signal pole mounted) street lights.
4. Coil and store 50' of 24 strand fiber optic cable in each fiber optic junction box.
5. CAT6 adaptive signal cable is incidental to the "Surveillance Camera" bid item.

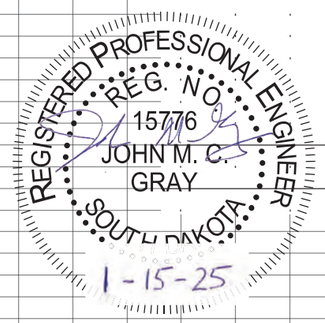
SIGNAL CONDUIT AND CABLE QUANTITIES

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L15	L73

Plotting Date: 1/14/2025 Revised Date: 1/14/2025
Initials: NBG

Location to Location		Rigid Conduit Galvanized Steel 2" Ft			Rigid Conduit Schedule 40 1" Ft	2" Ft	3" Ft	4" Ft	5" Ft		Rigid Conduit Schedule 80 2" Ft	3" Ft	4" Ft	5" Ft		Innerduct SDR 13.5 1.5" Ft		Fiber Optic Cable 24 Strand FO[4] Ft	6 Strand FO Ft		Copper Wire 1/C #6 AWG Ft	1/C #10 AWG Ft	1/C #12 AWG Ft		IMSA Copper Cable, K1 #14 AWG 2/C Ft	3/C Ft	5/C Ft	7/C Ft	12/C Ft	25/C Ft		Adaptive Cable 6 SM FO[2] Ft	CAT5[2] Ft	CAT6[5] Ft	Preemption Cable EVP & 3C Ft		
CLIFF AVENUE & I-229 RAMPS																																							
CC3	M					100															345																		
CC3	JS11							15																30				210	30	30								
JS11	JS12												150											155				1,085	155	155								
JS12	A26					15																		25				45										
JS12	JS13										60													65				65										
JS13	A27					15																		25				45										
JS12	JS14							70																75				375	75	75								
JS14	A25						25																	35					55									
JS14	A24					25																		35				35										
JS14	JS15											145												150				600		150								
JS15	A22						15																	25						45								
JS15	PB3				50																			60														
JS15	A23					100																		110				110										
JS15	JS16											115												120				360										
JS16	A21					20																		30				30										
JS16	PB2				20																			30														
JS16	JS17					85																		90				180										
JS17	A20					15																		25				45										
JS17	JS18										50													55				55										
JS18	A19					15																		25				45										
CC3	JS19								25															40				400	110	40								
JS19	A9					25																		35				55										
JS19	JS20													60										65				650	195	65								
JS20	A10					15																		25				45										
JS20	JS21							100																105				840	315	105								
JS21	A11					15																		25				25										
JS21	PB1				15																			25														
JS21	JS22												50											55				385	165	55								
JS22	SJB1	50																										60	60									
SJB1	NORTH BRIDGE	75																											85									
SJB1	SOUTH BRIDGE	145																										165										
JS22	A12					25																		35				35										
JS22	JS23							55																60				240	120	60								
JS23	A13						35																	45						65								
Cliff Avenue & I-229 Ramps Subtotal:		270			85	470	75	240	25		110	260	200	60							345			1,680				6,185	1,365	845								



1. All cable quantities shown include 5' of slack/coil in each junction box, 5' of slack/coil in each pole base, and 7' of slack/coil in cabinet, unless otherwise noted.
2. CAT5 and 6 SM FO adaptive signal cable is incidental to the "Video Detection System" bid item.
3. See Lighting plan quantities regarding street lighting cable quantities between lighting junction boxes and roadway (non-signal pole mounted) street lights.
4. Coil and store 50' of 24 strand fiber optic cable in each fiber optic junction box.
5. CAT6 adaptive signal cable is incidental to the "Surveillance Camera" bid item.

Plot Scale - 1:200
Plotted From - ...njersvik
File - ...\05HN_sgl-table-conduit.dgn

SIGNAL CONDUIT AND CABLE QUANTITIES

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L16	L73

Plotting Date: 1/14/2025 Revised Date: 1/14/2025
Initials: NBG

		Rigid Conduit			Rigid Conduit					Rigid Conduit					Innerduct	Fiber Optic Cable		Copper Wire			IMSA Copper Cable, K1						Adaptive Cable			Preemption Cable	
		Galvanized Steel			Schedule 40					Schedule 80					SDR 13.5						#14 AWG									EVP & 3C
Location to Location		2" Ft			1" Ft	2" Ft	3" Ft	4" Ft	5" Ft	2" Ft	3" Ft	4" Ft	5" Ft		1.5" Ft	24 Strand FO[4] Ft	6 Strand FO Ft	1/C #6 AWG Ft	1/C #10 AWG Ft	1/C #12 AWG Ft	2/C Ft	3/C Ft	5/C Ft	7/C Ft	12/C Ft	25/C Ft		6 SM FO[2] Ft	CAT5[2] Ft	CAT6[5] Ft	Ft	
CLIFF AVENUE & I-229 RAMPS (CONT'D)																														
JS23	JS24							50												55				220	110						
JS24	A14					80														90				90							
JS24	SJB2	90																						95	95						
SJB2	NORTH BRIDGE	120																						130							
SJB2	SOUTH BRIDGE	175																							190						
JS24	JS25										100									105				315	105						
JS25	A15					15														25				25							
JS25	JS26						75													80				160	80						
JS26	A16						15													25					45						
JS26	JS27					65														70				140							
JS27	A17					15														25				45							
JS27	JS28									70										75				75							
JS28	A18					20														30				50							
CC3	A9																														
CC3	A10																														
CC3	A11																					20									
CC3	A12																					20									
CC3	A13																						60								
CC3	A14																					20									
CC3	A15																					20									
CC3	A16																						20					625		1,250	
CC3	A17																														
CC3	A18																														
CC3	A19																														
CC3	A20																														
CC3	A21																					20									
CC3	A22																					20	60								
CC3	A23																					20									
CC3	A24																					20									
CC3	A25																						20					325		650	
CC3	A26																														
CC3	A27																														
A11	PB1																				45										
A12	A12 PB																				10										
A14	A14 PB																				10										
A15	A15 PB																				10										
A21	PB2																				55										
A22	PB3																				80										
A23	A23 PB																				10										
A24	A24 PB																				10										
CC3	BRIDGE HEADS																						260							2,200	
CC3	JF6 (FIBER)														20	70				35											
CC3	A11				86					73							169		169										250		
Cliff Avenue & I-229 Ramps Subotal:		385			86	195	90	50		143	100				20	70	169		169	615	230	160	420	1,345	625		950		250	4,100	
Cliff Avenue & I-229 Ramps Total:		655			171	665	165	290	25	253	360	200	60		20	70	169	345	169	2,295	230	160	420	7,530	1,990	845	950		250	4,100	
PCN 05HN Signal Total:		655			6,691	705	355	365	25	725	1,010	200	60		4,630	4,745	1,133	555	7,088	6,059	1,020	480	1,285	8,345	1,990	2,270	950	930	750	7,990	

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
15776
JOHN M. C. GRAY
SOUTH DAKOTA
1-15-25

1. All cable quantities shown include 5' of slack/coil in each junction box, 5' of slack/coil in each pole base, and 7' of slack/coil in cabinet, unless otherwise noted.
2. CAT5 and 6 SM FO adaptive signal cable is incidental to the "Video Detection System" bid item.
3. See Lighting plan quantities regarding street lighting cable quantities between lighting junction boxes and roadway (non-signal pole mounted) street lights.
4. Coil and store 50' of 24 strand fiber optic cable in each fiber optic junction box.
5. CAT6 adaptive signal cable is incidental to the "Surveillance Camera" bid item.

Plot Scale - 1:200
Plotted From - ngjersvik
File - ...\05HN_sgHable-conduit.dgn

LIGHTING CONDUIT AND CABLE QUANTITIES

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L17	L73

Plotting Date: 11/15/2024

Location to Location		Rigid Conduit Galvanized Steel 0.75" Ft	Rigid Conduit Galvanized Steel 1" Ft	Rigid Conduit Schedule 40 0.75" Ft	Rigid Conduit Schedule 40 1" Ft	Rigid Conduit Schedule 40 2" Ft	Rigid Conduit Schedule 40 3" Ft	Rigid Conduit Schedule 80 2" Ft	Aluminum Wire Alum. 2/2/2/4 AWG Ft	Copper Wire 1/C #2 AWG Ft	Copper Wire 1/C #4 AWG Ft	Copper Wire 1/C #6 AWG Ft	Copper Wire 1/C #8 AWG Ft	Copper Wire 1/C #10 AWG Ft	Copper Wire 12/2 UF Ft
I-229															
L1	L2					220						690	230		130
L2	L3					220						690	230		130
L3	L4					220						690	230		130
L4	L5					220						690	230		130
L5	L6					220						690	230		130
L6	L7					220						690	230		130
L7	L8					220						690	230		130
L8	L9					220						690	230		130
L9	JL9					82						276	92		130
JL9	L10					140						450	150		
L10	L11					225						705	235		130
L11	L12					225						705	235		130
L12	L13					225						705	235		130
L13	JL48					73						249	83		130
JL48	L14											402	134		
L14	L16									603	201				65
L13	JL47					121						393	131		
JL47	L15											402	134		
L15	L17									606	202				65
JL9	JL15							77				261	87		
JL15	JL16							42				156	52		
JL16	ESC1					84						327	109		
ESC1	SOP						12								
I-229 RAMP C															
CL1	CL2					274						852	284		65
CL2	JL1					139						447	149		65
JL1	JL2							39				147	49		
JL2	CL3					123						399	133		
CL3	CL4					265						825	275		65
CL4	CL5					271						843	281		65
CL5	JL3					215						675	225		65
JL3	CL6							89				297	99		65
CL6	JL44					48						174	58		
JL3	CL7					62						216	72		65
JL2	JL9							79				267	89		
JL9	JL15											261	87		
JL15	JL16											156	52		
JL16	ESC1											327	109		
I-229 RAMP D															
DL1	DL2					284						882	294		65
DL2	JL16					121						393	131		65
JL16	JL15											156	52		
JL15	DL3					123						399	133		65
DL3	DL4					248						774	258		65
DL4	DL5					250						780	260		65
DL5	DL6					250						780	260		65
DL6	DL7					177						561	187		65
DL7	DL8							112				366	122		65
DL7	JL39					98						324	108		
JL16	ESC1											327	109		
Subtotal:						5,883	12	438		1,209	403	22,179	7,393		2,795

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 9362
CHRISTOPHER B. GREEN
SOUTH DAKOTA
11/15/24

Plot Scale - 1:200

Plotted From - ngiersvik

File - ...\05HN_sg\4table-conduit.dgn

LIGHTING CONDUIT AND CABLE QUANTITIES

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L18	L73

Plotting Date: 11/15/2024

Location to Location		Rigid Conduit Galvanized Steel 0.75" Ft	Rigid Conduit Galvanized Steel 1" Ft	Rigid Conduit Schedule 40 0.75" Ft	Rigid Conduit Schedule 40 1" Ft	Rigid Conduit Schedule 40 2" Ft	Rigid Conduit Schedule 40 3" Ft	Rigid Conduit Schedule 80 2" Ft	Aluminum Wire Alum. 2/2/2/4 AWG Ft	Copper Wire 1/C #2 AWG Ft	Copper Wire 1/C #4 AWG Ft	Copper Wire 1/C #6 AWG Ft	Copper Wire 1/C #8 AWG Ft	Copper Wire 1/C #10 AWG Ft	Copper Wire 12/2 UF Ft
I-229															
L17	JL49									402	134				65
JL49	L18					73				249	83				
L16	JL50									402	134				65
JL50	L18					121				393	131				130
L18	L19					238				744	248				130
L19	L20					233				729	243				130
L20	L21					233				729	243				130
L21	JL10					132				426	142				
JL10	L22					98				324	108				130
L22	L23					233				729	243				130
L23	L24					234				732	244				130
L24	L25					233				729	243				130
L25	L26					233				729	243				130
L26	L27					220				690	230				130
L27	L28					220				690	230				130
L28	L29					220				690	230				130
L29	L30					220				690	230				130
L30	L31					220				690	230				130
L31	L32					220				690	230				130
L32	JLE1					45				165	55				
JL10	JL8							109		357	119				
JL8	ESC2					34				132	44				
ESC2	SOP						13								
I-229 RAMP B															
BL1	JL4					17						81	27		65
BL2	JL4							96				318	106		65
BL2	JL17					103						339	113		
JL4	BL3					211						663	221		65
BL3	JL5					25						105	35		
JL5	JSM5			40										160	
JSM5	SPUL1	20												80	
SPUL1	SPUL2	20												80	
SPUL2	SPUL3	30												120	
SPUL3	SPUL4	30												120	
SPUL4	SPUL5	20												80	
BL3	BL4					266						828	276		65
BL4	BL5					267						831	277		65
BL5	JL6					9						57	19		
JL6	JL7							48				174	58		
JL7	BL6					262						816	272		65
BL6	JL8					96						318	106		
JL8	BL7					230						720	240		65
JL8	ESC2											132	44		
Subtotal:		120		40		4,946	13	253		12,111	4,037	5,382	1,794	640	2,535

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 9362
CHRISTOPHER B. GREEN
SOUTH DAKOTA
11/15/24

Plot Scale - 1:200

Plotted From - ngiersvik

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LIGHTING CONDUIT AND CABLE QUANTITIES

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L19	L73

Plotting Date: 11/15/2024

		Rigid Conduit		Rigid Conduit				Rigid Conduit		Aluminum Wire		Copper Wire					
		Galvanized Steel		Schedule 40				Schedule 80									
Location to Location		0.75" Ft	1" Ft	0.75" Ft	1" Ft	2" Ft	3" Ft	2" Ft		Alum. 2/2/2/4 AWG Ft		1/C #2 AWG Ft	1/C #4 AWG Ft	1/C #6 AWG Ft	1/C #8 AWG Ft	1/C #10 AWG Ft	12/2 UF Ft
I-229 RAMP A																	
JL25	AL1							91						303	101		
AL1	JL14					92								306	102		65
AL2	JL14							61						213	71		65
JL14	AL3					134								432	144		65
AL3	JL13					16								78	26		
JL13	JSM6			40												160	
JSM6	NPUL1	20														80	
JSM6	NPUL2	20														80	
NPUL2	NPUL3	30														120	
NPUL3	NPUL4	30														120	
NPUL4	NPUL5	30														120	
NPUL5	NPUL6	20														80	
AL3	AL4					266								828	276		65
AL4	AL5					275								855	285		65
AL5	JL11					128								414	138		
JL11	JL12							41						153	51		
JL12	AL6					120								390	130		65
AL6	AL7					287								891	297		65
JL11	JL10							71						243	81		
JL10	JL8													357	119		
JL8	ESC2													132	44		
CLIFF AVENUE																	
LL1	LL2			3										26	13		
LL2	LL3			3										26	13		
LL3	LL4			64										148	74		
LL4	LL5			3										26	13		
LL5	LL6			3										26	13		
LL6	LL7			15										50	25		
LL7	LL8			3										26	13		
LL8	LL9			3										26	13		
LL9	JL19			60										140	70		
IM2	JL19				83							186		93			
LL10	LL11			3										26	13		
LL11	LL12			3										26	13		
LL12	JL25			20										60	30		
LL18	LL17			3										26	13		
LL17	LL16			3										26	13		
LL16	LL14			8										36	18		
LL14	LL13			3										26	13		
LL13	LL15			3										26	13		
LL15	JL25			21										62	31		
IM1	JL25				16							52	26				
JL25	JL35							270		145		290	435	145			
Subtotal:		150		264	99	1,318		534		145		528	6,957	2,414	760	455	

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 9362
CHRISTOPHER B. GREEN
SOUTH DAKOTA
11/15/24

Plot Scale - 1:200

Plotted From - ngjersvik

File - ...\05HN_sgl-table-conduit.dgn

LIGHTING CONDUIT AND CABLE QUANTITIES

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L20	L73

Plotting Date: 11/15/2024

Location to Location		Rigid Conduit Galvanized Steel 0.75" Ft	Rigid Conduit Galvanized Steel 1" Ft	Rigid Conduit Schedule 40 0.75" Ft	Rigid Conduit Schedule 40 1" Ft	Rigid Conduit Schedule 40 2" Ft	Rigid Conduit Schedule 40 3" Ft	Rigid Conduit Schedule 80 2" Ft		Aluminum Wire Alum. 2/2/2/4 AWG Ft		Copper Wire 1/C #2 AWG Ft	Copper Wire 1/C #4 AWG Ft	Copper Wire 1/C #6 AWG Ft	Copper Wire 1/C #8 AWG Ft	Copper Wire 1/C #10 AWG Ft	Copper Wire 12/2 UF Ft
CLIFF AVENUE (CONT'D)																	
CFL1	CFL2					257				267							65
CFL2	CFL3					211				221							65
CFL3	CFL4					170		33		213							65
CFL4	JL17					95				105							65
JL17	JL18							46		56							
JL18	CFL5					67				77							65
CFL5	JL19					29				39							
JL19	JL20							72		46			94	138	46		
JL20	JL22					214				117			234	351	117		
JL22	JL24							190		105			210	315	105		
JL24	CFL6					20				30							65
CFL6	JL25					30				40							
JL24	JL25					96				58			116	174	58		
JL25	JL26					20		43		73							
JL26	CFL7					95		29		134							65
CFL7	CFL8					168				178							65
CFL8	JL27					69				79							
JL27	JL34							126		136							
JL27	HSL1							57		67							65
HSL1	JL46							99		109							
JL46	HSL2					6				16							65
JL27	JL28					25				35							
JL28	CFL9					4				14							65
JL28	JL29							96		106							
JL29	CFL10					4				14							65
JL29	CFL11					231				241							65
CFL11	JL30					113		101		224							
JL30	JL31					64		48		122							
JL31	CFL12					4				14							65
JL30	EXIST. LIGHT 59					40				230							
JL30	JL32							111		121							
JL32	CFL13					35				45							65
JL34	ESC3					126						156	260	156	104	52	
ESC3	SOP						6										
CFLU1	JSM1		10													40	
CFLU2	JSM1		10													40	
JSM1	JL21		33													132	
JI21	JL23					120				130							
JL23	JSM2		34													136	
JSM2	CFLU3		10													40	
JSM2	CFLU4		10													40	
JL23	JL24							36		46							
LL36	LL35			3										26	13		
LL35	LL34			3										26	13		
LL34	LL33			59										138	69		
LL33	LL32			3										26	13		
LL32	LL31			3										26	13		
LL31	LL30			11										42	21		
LL30	LL29			3										26	13		
LL29	LL28			3										26	13		
LL28	JL42			55										130	65		
JL37	JL36					198				109				218	109		
Subtotal:			107	143		2,511	6	1,087		3,617		156	914	1,818	772	480	975

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 9362
CHRISTOPHER B. GREEN
SOUTH DAKOTA
11/15/24

Plot Scale - 1:200

Plotted From - ngiersvik

File - ...\05HN_sgl-table-conduit.dgn

LIGHTING CONDUIT AND CABLE QUANTITIES

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L21	L73

Plotting Date: 11/15/2024

Location to Location		Rigid Conduit Galvanized Steel 0.75" Ft	Rigid Conduit Galvanized Steel 1" Ft	Rigid Conduit Schedule 40 0.75" Ft	Rigid Conduit Schedule 40 1" Ft	Rigid Conduit Schedule 40 2" Ft	Rigid Conduit Schedule 40 3" Ft	Rigid Conduit Schedule 80 2" Ft		Aluminum Wire Alum. 2/2/2/4 AWG Ft		Copper Wire 1/C #2 AWG Ft	Copper Wire 1/C #4 AWG Ft	Copper Wire 1/C #6 AWG Ft	Copper Wire 1/C #8 AWG Ft	Copper Wire 1/C #10 AWG Ft	Copper Wire 12/2 UF Ft
CLIFF AVENUE (CONT'D)																	
CFL24	CFL23					142		64		216							65
CFL23	CFL22					120		69		199							65
CLF22	JL44					109				119							65
JL44	JL43							66		76							
JL43	CFL21					64				74							65
CFL21	JL42					55				65							
JL42	JL40							144		82				164	82		
JL40	JL38					102				112				224	112		
JL38	JL37					55				65						288	
JL37	CFL20					15				25							65
CFL20	JL36					83				93							
JL36	JL35							201		154				154	77		
JL35	CFL19					15				25							65
CFL19	CFL18					169				179							65
CFL18	JL34					155				165							
JL34	CFL17					4				14							65
JL34	JL33							127		137							65
JL33	CFL16					4				14							
JL33	CFL15					104		12		126							65
CFL15	CFL14					185		43		238							65
CFLU8	JSM4		10													40	
CFLU7	JSM4		10													40	
JSM4	JL41		32													128	
JI41	JL39					132				142							
CFLU6	JSM3		10													40	
CFLU5	JSM3		10													40	
JSM3	JL39		32													128	
JL39	JL38					21				31							
JL39	JL37							43		53							
LL27	LL26			3										26	13		
LL26	LL25			3										26	13		
LL25	LL24			62										144	72		
LL24	LL23			3										26	13		
LL23	LL22			3										26	13		
LL22	LL21			12										44	22		
LL21	LL20			3										26	13		
LL20	LL19			3										26	13		
LL19	JL36			29										78	39		
JL35	JL34					672				346			692	1,038	346		
41ST STREET																	
EXIST. LIGHT 23	41L1					40				221							65
41L1	41L2					168				178							65
41L2	41L3					139				149							65
41L3	41L4					157				167							65
41L4	41L5					157				167							65
41L5	41L6					156				166							65
41L6	41L7					140				150							65
41L7	41L8					161				171							65
41L8	JL41					122				132							
JL41	41L9					107				108							65
41L9	41L10					151				161							65
41L12	41L11					201				211							65
41L11	JL33					225				235							
	Subtotal:		104	121		4,130		769		4,966			692	2,002	828	704	1,430
	Total:	270	211	568	99	18,788	31	3,081		8,728		13,476	6,574	38,338	13,201	2,584	8,190

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 9362
CHRISTOPHER B. GREEN
SOUTH DAKOTA
11/15/24

Plot Scale - 1:200

Plotted From - ngiersvik

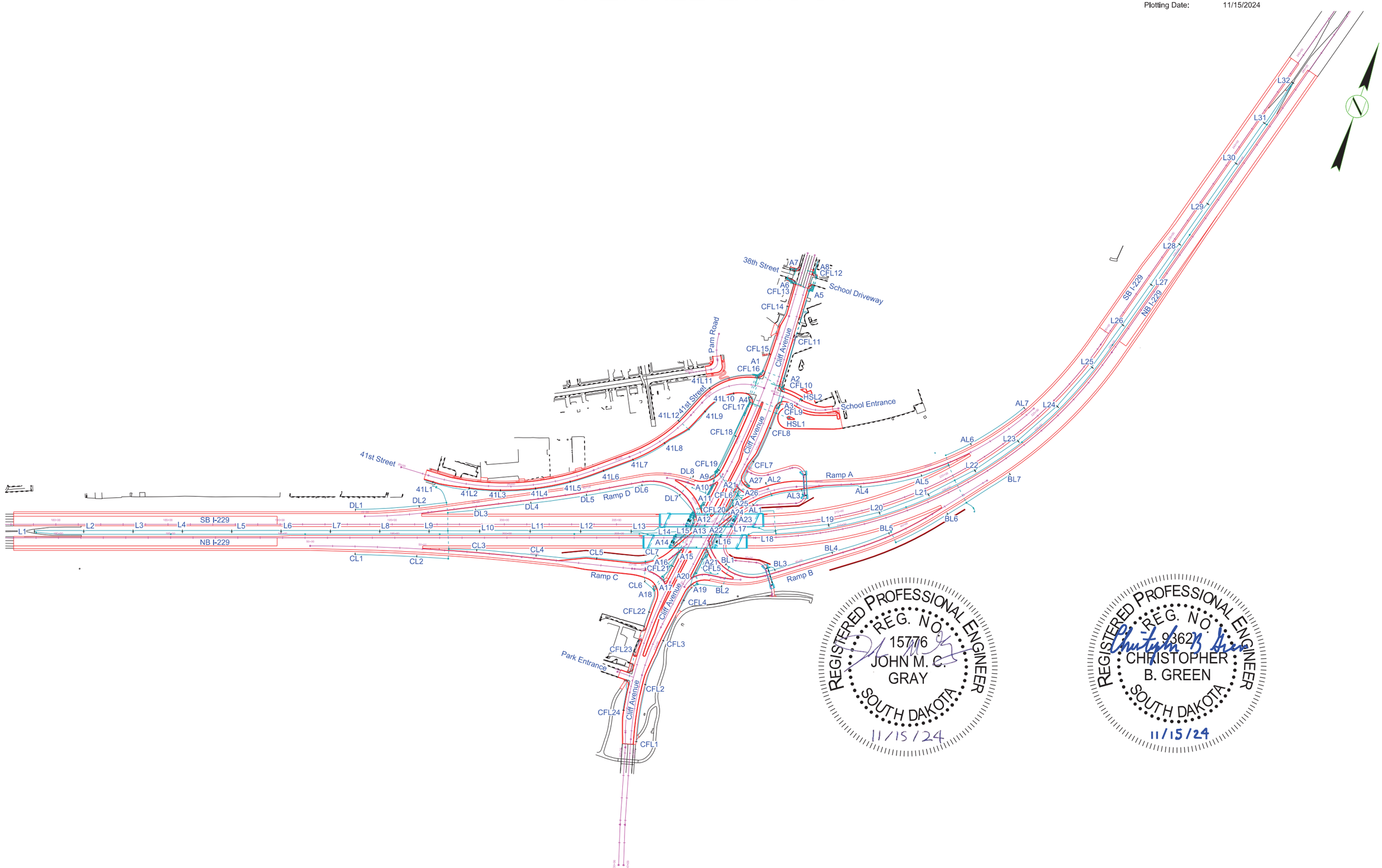
File - ...\05HN_sgl-table-conduit.dgn

OVERALL LAYOUT

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L22	L73

Plotting Date: 11/15/2024



REGISTERED PROFESSIONAL ENGINEER
REG. NO.
15776
JOHN M. C. GRAY
SOUTH DAKOTA
11/15/24

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
9362
CHRISTOPHER B. GREEN
SOUTH DAKOTA
11/15/24

Plot Scale - 1:400

Plotted From - ngjersvik

File - ...\05HN_sgl-overall-layout.dgn

EXISTING SIGNAL LAYOUT

CLIFF AVENUE MID BLOCK (SCHOOL) SIGNAL

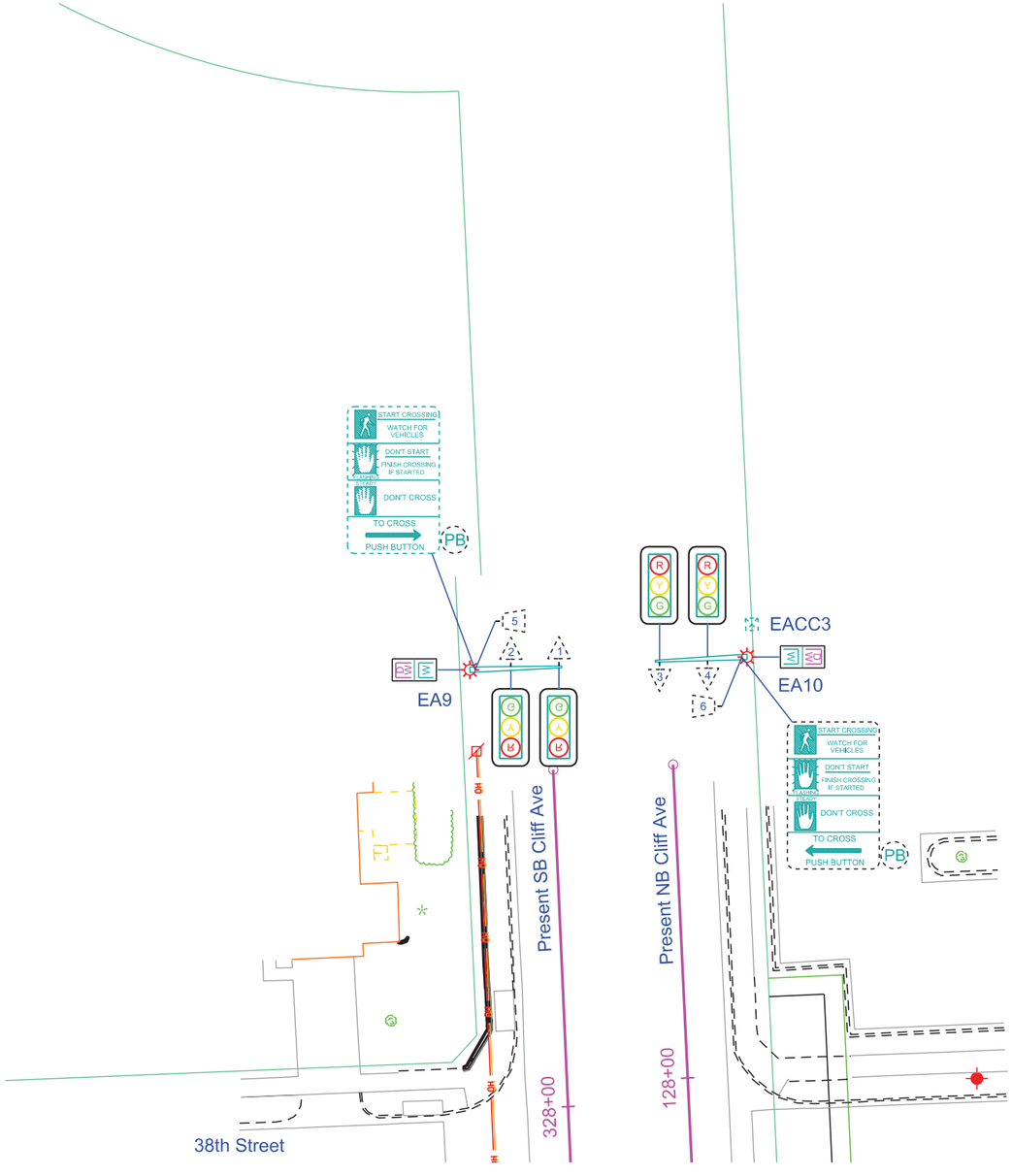
FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L23	L73

Plotting Date: 11/15/2024

SCALE IN FEET

0 20 40



SALVAGE SIGNAL EQUIPMENT			
KEY	ITEM	QUANT	UNIT
	Signal Pole W/25' Mast Arm & Lumin Ext (EA9,EA10)	2	EACH
	3 Section Vehicle Signal Head (1,2,3,4)	4	EACH
	Pedestrian Signal Head (5,6)	2	EACH
	Traffic Signal Controller (EACC3)	1	EACH
PB	Pedestrian Push Button	2	EACH
	Pedestrian Crossing Sign (Left-1, Right-1)	2	EACH

ESTIMATE OF QUANTITIES			
KEY	ITEM	QUANT	UNIT
	Salvage Signal Equipment	LUMP SUM	LS
	Remove Signal Pole Footing (EA9,EA10)	2	EACH

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
15776
JOHN M. C.
GRAY
SOUTH DAKOTA
11/15/24

Plot Scale - 1:40

Plotted From - ngjersvik

File - ...\05HN_sgl.dgn

EXISTING SIGNAL LAYOUT

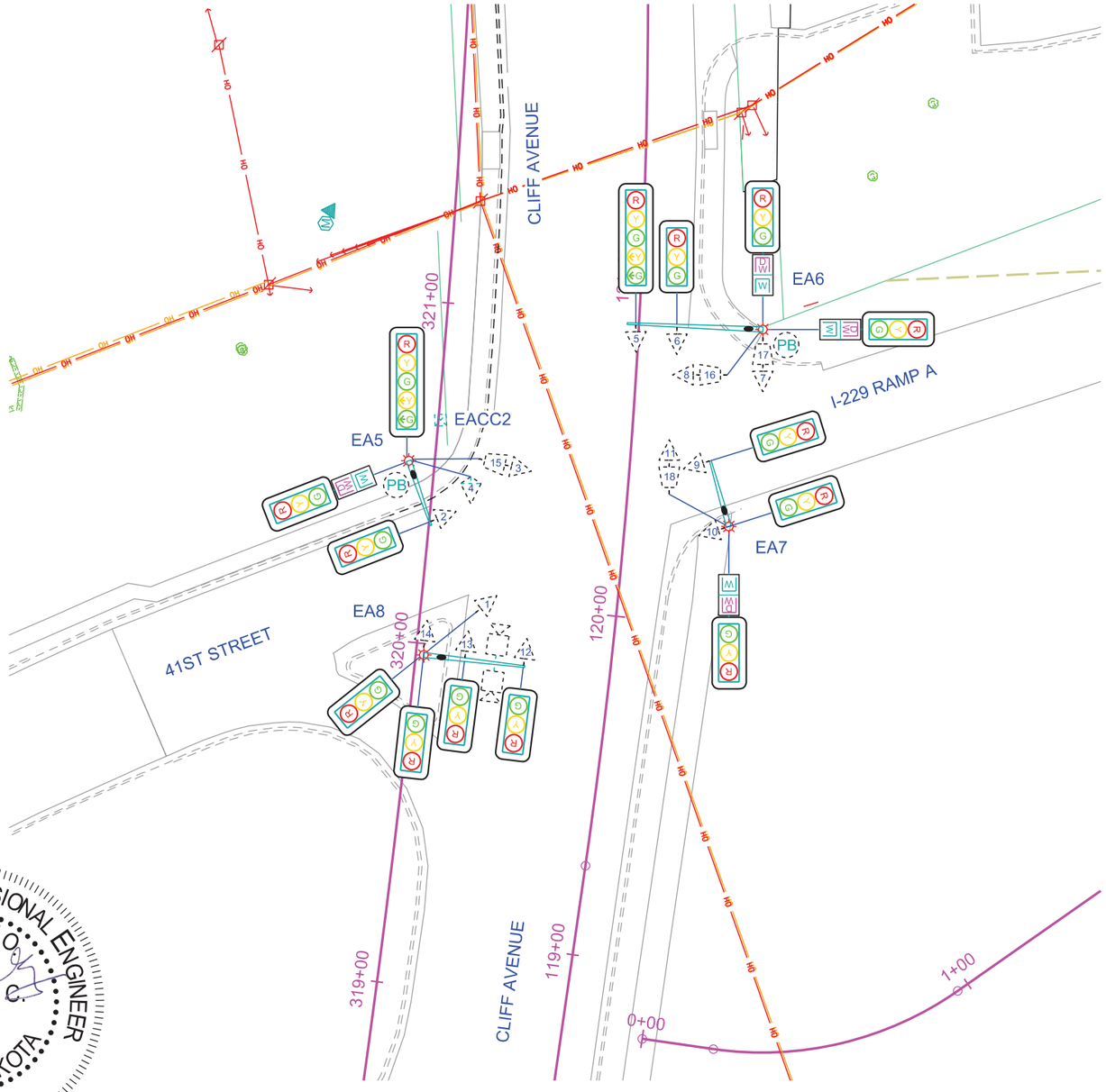
CLIFF AVENUE & I-229 RAMP A / 41ST STREET

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L24	L73

Plotting Date: 11/15/2024

SCALE IN FEET
0 20 40



REGISTERED PROFESSIONAL ENGINEER
REG. NO.
15776
JOHN M. C.
GRAY
SOUTH DAKOTA
11/15/24

SALVAGE SIGNAL EQUIPMENT

KEY	ITEM	QUANT	UNIT
	Signal Pole W/20' Mast Arm & Lumin Ext (EA5,EA7)	2	EACH
	Signal Pole W/30' Mast Arm & Lumin Ext (EA8)	1	EACH
	Signal Pole W/40' Mast Arm & Lumin Ext (EA6)	1	EACH
-	Roadway Luminaire, 400W With P.E. (EA5,EA6,EA7,EA8)	4	EACH
	Optical Detector (2-Way)	1	EACH
	3 Section Vehicle Signal Head (1,2,3,6,7,8,9,10,11,12,13,14)	12	EACH
	5 Section Vehicle Signal Head (4,5)	2	EACH
	Pedestrian Signal Head (15,16,17,18)	4	EACH
	Traffic Signal Controller (EACC2)	1	EACH
PB	Pedestrian Push Button and Sign	2	EACH

ESTIMATE OF QUANTITIES

KEY	ITEM	QUANT	UNIT
	Salvage Signal Equipment	LUMP SUM	LS
	Remove Signal Pole Footing (EA1-EA4)	4	EACH

Plot Scale - 1:40
Plotted From - ...ngiersvik
File - ...\05HN_sgl.dgn

EXISTING SIGNAL LAYOUT

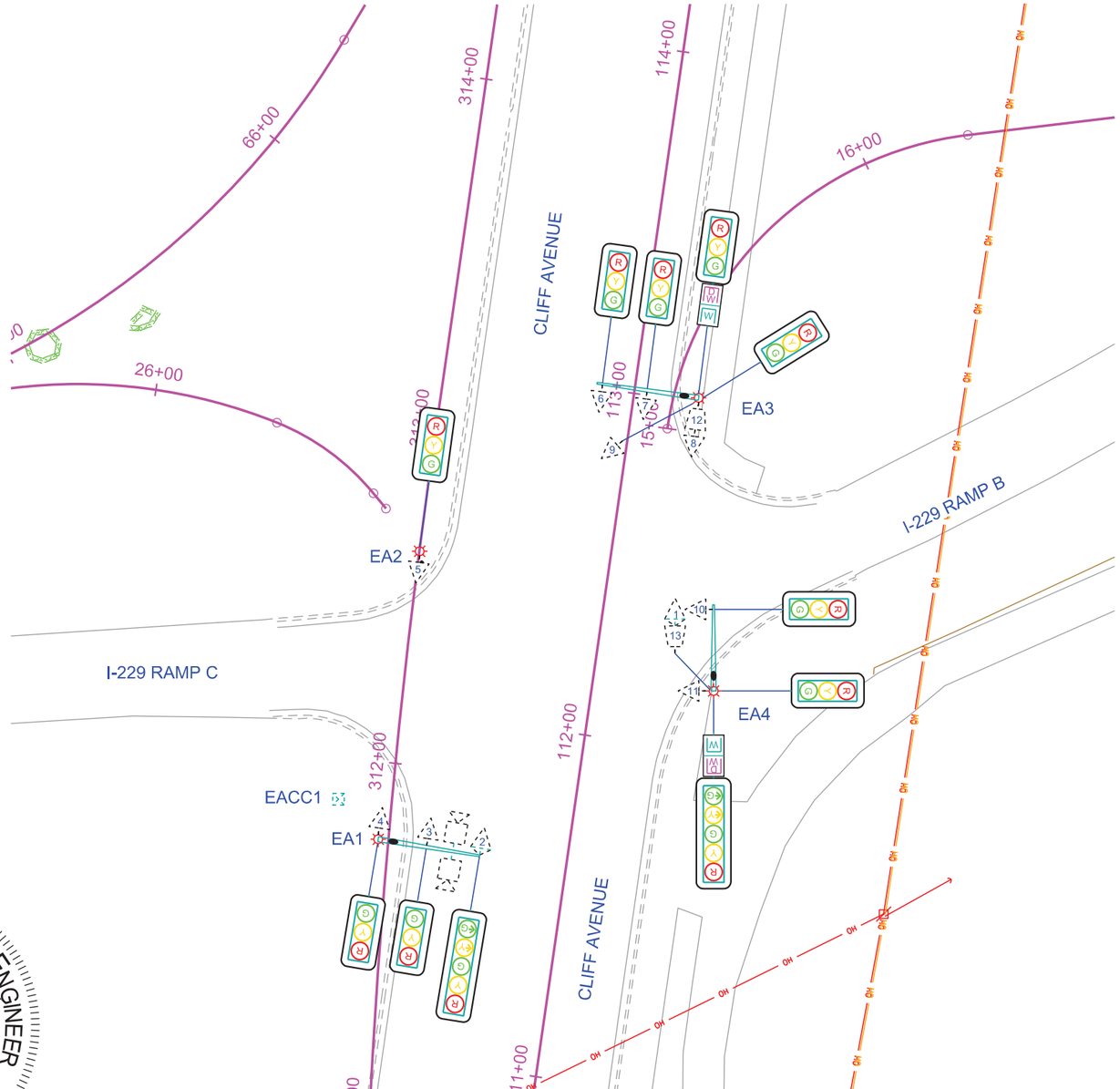
CLIFF AVENUE & I-229 RAMPS B/C

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L25	L73

Plotting Date: 11/15/2024

SCALE IN FEET
0 20 40



SALVAGE SIGNAL EQUIPMENT

KEY	ITEM	QUANT	UNIT
	Signal Pole W/25' Mast Arm & Lumin Ext (EA4)	1	EACH
	Signal Pole W/30' Mast Arm & Lumin Ext (EA1,EA3)	2	EACH
	Roadway Luminaire, 400W With P.E. (EA1,EA2,EA3,EA4)	4	EACH
	Optical Detector (2-Way)	1	EACH
	3 Section Vehicle Signal Head (3,4,5,6,7,8,9,10,11)	9	EACH
	5 Section Vehicle Signal Head (1,2)	2	EACH
	Pedestrian Signal Head (12,13)	2	EACH
	Traffic Signal Controller (EACC1)	1	EACH
	Luminaire Pole (EA2)	1	EACH

ESTIMATE OF QUANTITIES

KEY	ITEM	QUANT	UNIT
	Salvage Signal Equipment	LUMP SUM	LS
	Remove Signal Pole Footing (EA1,EA3,EA4)	3	EACH
	Remove Luminaire Pole Footing (EA2)	1	EACH

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 15776
JOHN M. C. GRAY
SOUTH DAKOTA
11/15/24

Plot Scale - 1:40
Plotted From - ngjersvik
File - ...\05HN_sgl.dgn

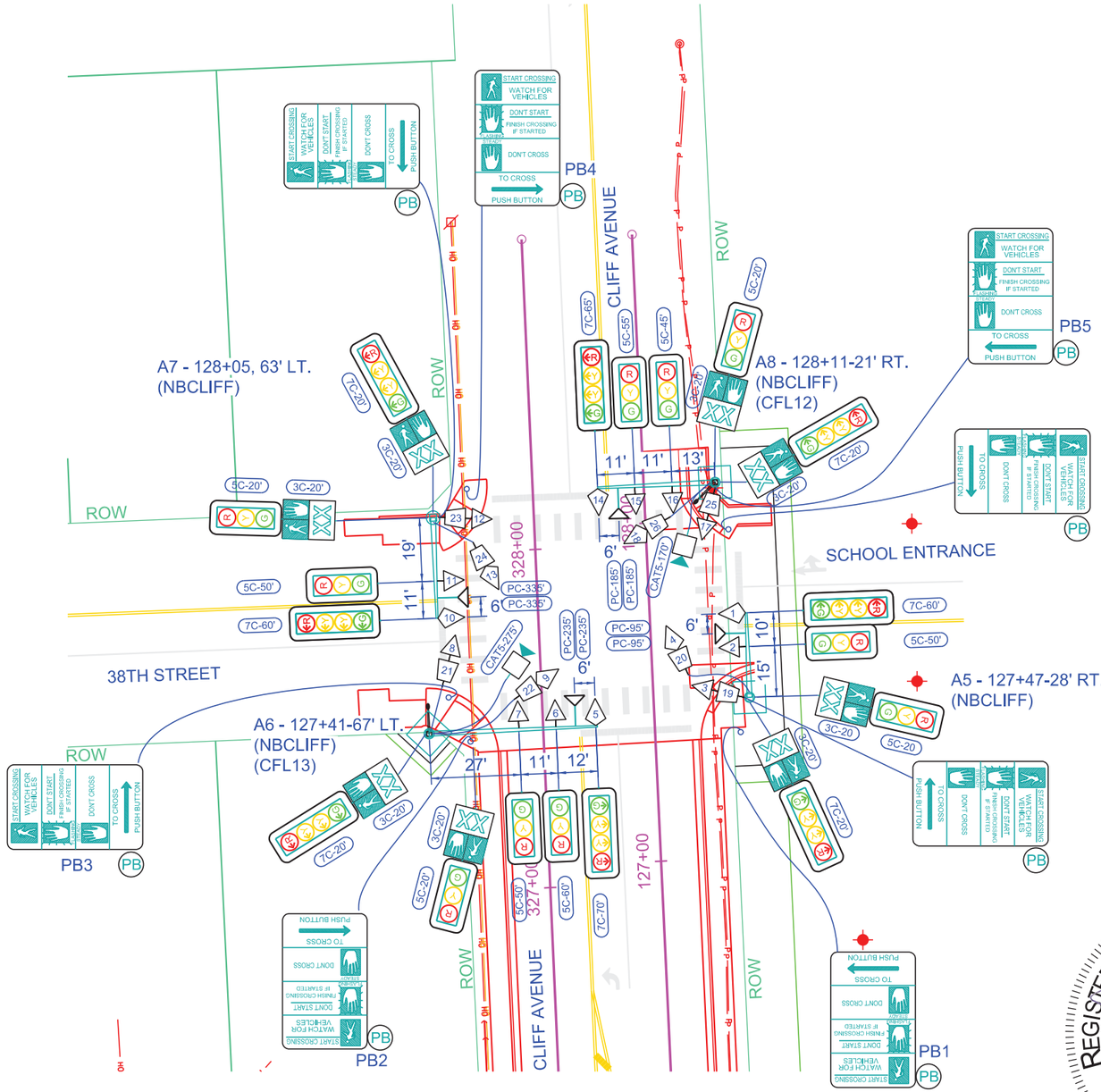
SIGNAL LAYOUT
CLIFF AVENUE & 38TH STREET

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L26	L73

Plotting Date: 12/19/2024 Revised Date: 12/18/2024
Initials: NBG

SCALE IN FEET
0 20 40



NOTES:

1. SEE SECTION E FOR SIGNAL FOOTING DESIGN INFORMATION.
2. DUE TO POTENTIAL OVERHEAD UTILITY CONFLICT, LUMINAIRE CFL14 WILL BE ORIENTED PERPENDICULAR TO 38TH STREET AS SHOWN.
3. CONTRACTOR TO SUPPLY HUB FOR ADAPTIVE SIGNAL CAMERAS AT A6 AND A8.

ESTIMATE OF QUANTITIES

KEY	ITEM	UNIT	EST QUANT
	Signal Pole w/50' Mast Arm & 8' Lumin Arm, 40' Mt Ht (A6)	EACH	1
	Signal Pole w/35' Mast Arm & 8' Lumin Arm, 40' Mt Ht (A8)	EACH	1
	Signal Pole w/25' Mast Arm (A5)	EACH	1
	Signal Pole w/30' Mast Arm (A7)	EACH	1
	3 Section Vehicle Signal Head (2,3,6,7,8,11,12,15,16,17)	EACH	10
	4 Section Vehicle Signal Head (1,4,5,9,10,13,14,18)	EACH	8
	Optical Detector	EACH	4
PB	Accessible Pedestrian Signal Push Button	EACH	8
	Pedestrian Signal Head w/Countdown Timer (19,20,21,22,23,24,25,26)	EACH	8
	Pedestrian Push Button Pole (PB1,PB2,PB3,PB4,PB5)	EACH	5
	Adaptive Signal Camera and Equipment (1 Processor)	EACH	2
	Pedestrian Crossing Sign R10-3b (Left - 4/Right - 4)	EACH	8
	Emergency Vehicle Preemption Unit	EACH	1
	2.5' Diameter Footing (with 9'-6" Square Spread Footing) (A5,A6,A8)	FT	13.25
	4' Diameter Footing (A7)	FT	9.0

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 15776
JOHN M. C. GRAY
SOUTH DAKOTA
12-19-24

Plot Scale - 1:40
Plotted From - ...nglersik
File - ...\06HN_sgl.dgn

SIGNAL LAYOUT

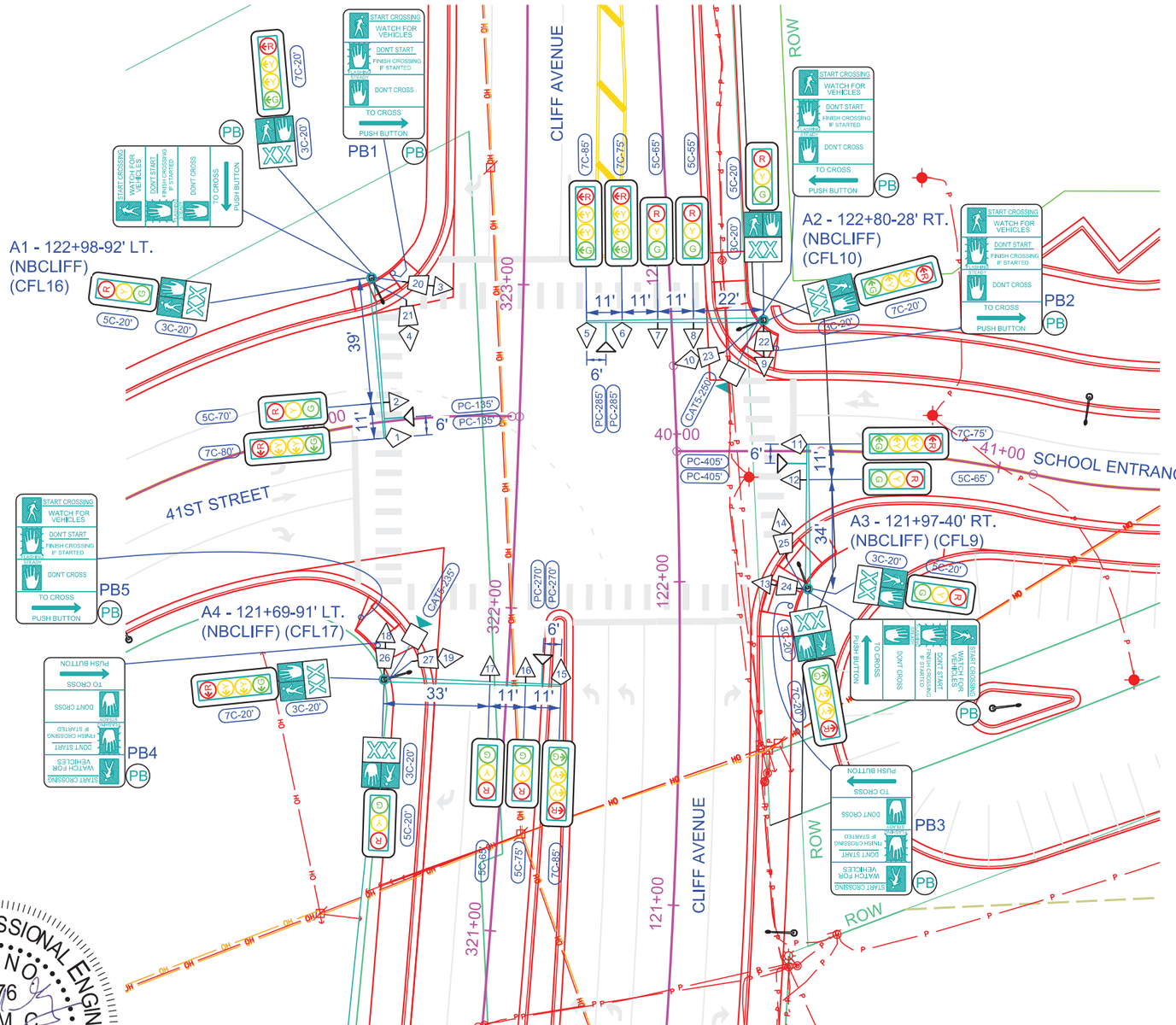
CLIFF AVENUE & 41ST STREET

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L27	L73

Plotting Date: 12/19/2024 Revised Date: 12/18/2024
Initials: NBG

SCALE IN FEET
0 20 40



ESTIMATE OF QUANTITIES

KEY	ITEM	UNIT	EST QUANT
	Signal Pole w/45' Mast Arm & 8' Lumin Arm, 40' Mt Ht (A3)	EACH	1
	Signal Pole w/50' Mast Arm & 8' Lumin Arm, 40' Mt Ht (A1)	EACH	1
	Signal Pole w/55' Mast Arm & 8' Lumin Arm, 40' Mt Ht (A2, A4)	EACH	2
	3 Section Vehicle Signal Head (2,3,7,8,9,12,13,16,17,18)	EACH	10
	4 Section Vehicle Signal Head (1,4,5,6,10,11,14,15,19)	EACH	9
	Optical Detector	EACH	4
PB	Accessible Pedestrian Signal Push Button	EACH	8
	Pedestrian Signal Head w/Countdown Timer (20,21,22,23,24,25,26,27)	EACH	8
	Adaptive Signal Camera and Equipment (1 Processor)	EACH	2
	Pedestrian Push Button Pole (PB1,PB2,PB3,PB4,PB5)	EACH	5
	Pedestrian Crossing Sign R10-3b (Left - 4/Right - 4)	EACH	8
	Emergency Vehicle Preemption Unit	EACH	1
	3' Diameter Footing (A1,A2,A3,A4)	FT	52.0

NOTE:
CONTRACTOR TO SUPPLY HUB FOR
ADAPTIVE SIGNAL CAMERAS AT A2 AND A4.

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SOUTH DAKOTA
12-19-24

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NOTE:
CONTRACTOR TO SUPPLY HUB FOR
ADAPTIVE SIGNAL CAMERAS AT A16 AND A25.

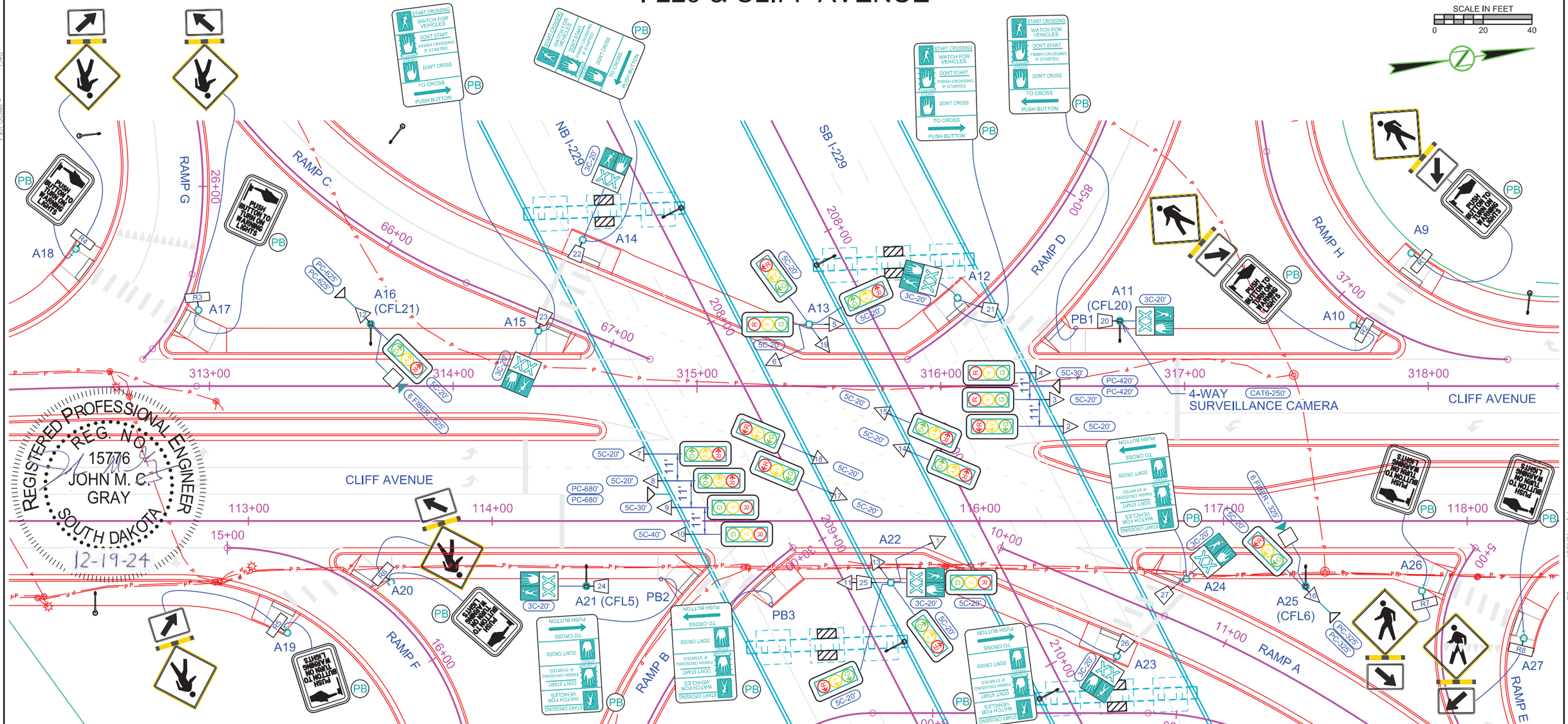
SIGNAL LAYOUT
I-229 & CLIFF AVENUE

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L28	L73

Plotting Date: 12/19/2024 Revised Date: 12/18/2024
Initials: NBG

SCALE IN FEET
0 20 40



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12-19-24

ESTIMATE OF QUANTITIES
(CLIFF AVENUE & I-229 SIGNAL)

KEY	ITEM	EST QUANT	UNIT
○	Pedestal Signal Pole (A9,A10,A12,A13,A14,A15,A17,A18,A19, A20,A22,A23,A24,A26,A27)	15	EACH
⊶	Breakaway Base Luminaire Pole w/ 8' Arm, 40' Mt Ht (A11,A16,A21,A25)	4	EACH
▷	3 Section Vehicle Signal Head (Solid = 3,4,5,9,10,11) (LT = 1,2,6,7,8,12,13,14,15,16,17,18,19)	19	EACH
	4-Way Surveillance Camera (A11)	1	EACH
◁	Optical Detector	4	EACH
PB	Accessible Pedestrian Signal Push Button (on PB1,PB2,PB3,A12,A14,A15,A23,A24)	8	EACH
▱	Pedestrian Signal Head w/Countdown Timer (20,21,22,23,24,25,26,27)	8	EACH
▱	Adaptive Signal Camera and Equipment (1 Processor)	2	EACH
○	Pedestrian Push Button Pole (PB1,PB2,PB3)	3	EACH
	Emergency Vehicle Preemption Unit	1	EACH
	Pedestrian Crossing Sign R10-3b (Left - 4/Right - 4)	8	EACH
○	2' Diameter Footing (Pedestal Pole) (A9,A10,A12,A13,A14,A15,A17,A18,A19,A20, A22,A23,A24,A26,A27)	60	FT
⊶	2' Diameter Footing (Street Light Pole) A11,A16,A21,A25)	40	FT
	Rapid Rectangular Flashing Beacon (RRFB) (R1,R2,R3,R4,R5,R6,R7,R8)	8	EACH
PB	RRFB Accessible Push Button (on R1,R2,R3,R4,R5,R6,R7,R8)	8	EACH
	RRFB Crossing Sign (R10-25) (for R1,R2,R3,R4,R5,R6,R7,R8)	8	EACH

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CONDUIT LAYOUT

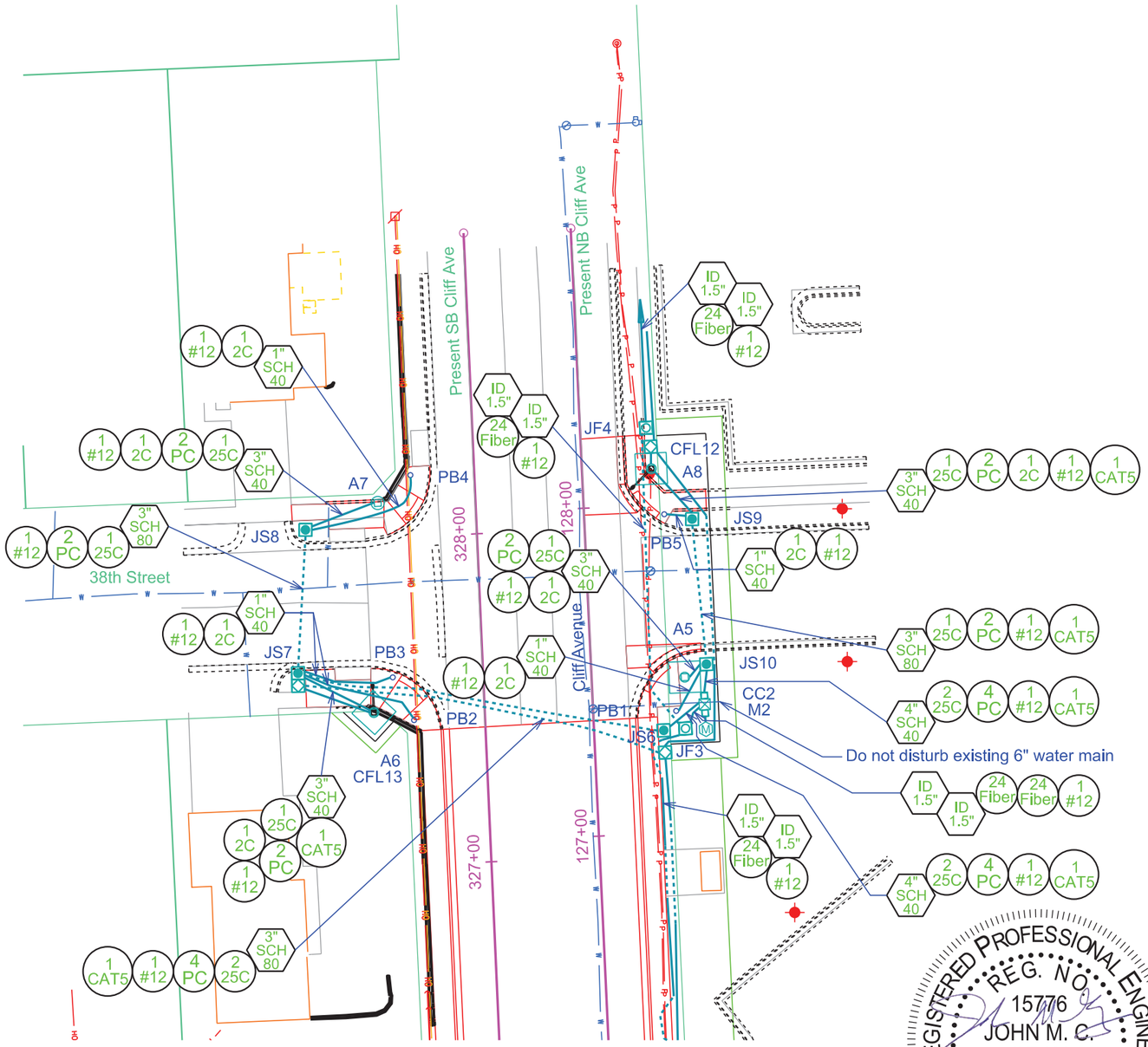
CLIFF AVENUE & 38TH STREET

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L29	L73

Plotting Date: 12/19/2024 Revised Date: 12/18/2024
Initials: NBG

SCALE IN FEET
0 20 40



ESTIMATE OF QUANTITIES (SIGNAL)

KEY	ITEM	EST QUANT	UNIT
	2.5' Diameter Footing (with 9'-6" Square Spread Footing) (A5,A6,A8)	3	EACH
	4' Diameter Footing (A7)	1	EACH
	Type 2 Electrical Junction Box (Traffic) (JS6,JS7,JS8,JS9,JS10)	5	EACH
	Fiber Optic Interconnect Vault/Junction Box (JF3,JF4)	2	EACH
M	Meter Socket Not a Bid Item	1	EACH
	Traffic Signal Controller (CC2)	1	EACH
	Side Mounted Cabinet (For Batter Backup and Flash System) (Installed on Right Side of Cabinet Front)	1	EACH
	Signal Head Battery Backup and Flash System (Installed Within Side Mounted Cabinet) (Installed on Right Side of Cabinet Front)	1	EACH
	Side Mounted Cabinet (For Fiber Optic Cable) (Installed on Left Side of Cabinet Front)	1	EACH
2C	2/C #14 AWG IMSA Copper Cable, K1 (To Ped. Push Buttons)	485	FT
3C	3/C #14 AWG IMSA Copper Cable, K1 (To Ped. Signal Heads)	160	FT
5C	5/C #14 AWG IMSA Copper Cable, K1 (To 3 Section Signal Heads)	390	FT
7C	7/C #14 AWG IMSA Copper Cable, K1 (To 4 Section and 5 Section Signal Heads)	335	FT
25C	25/C #14 AWG IMSA Copper Cable, K1 (To Signal Bases)	645	FT
PC	Preemption Cable (To Optical Detectors) (1 PC for the Preemption Unit) (1 PC for the Confirmation Light)	1700	FT
CAT5	Outdoor Rated CAT5 Cable (To Adaptive Signal Cameras) (Not a Bid Item) (Incidental to Adaptive Signal System)	445	FT

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12-19-24

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CONDUIT LAYOUT

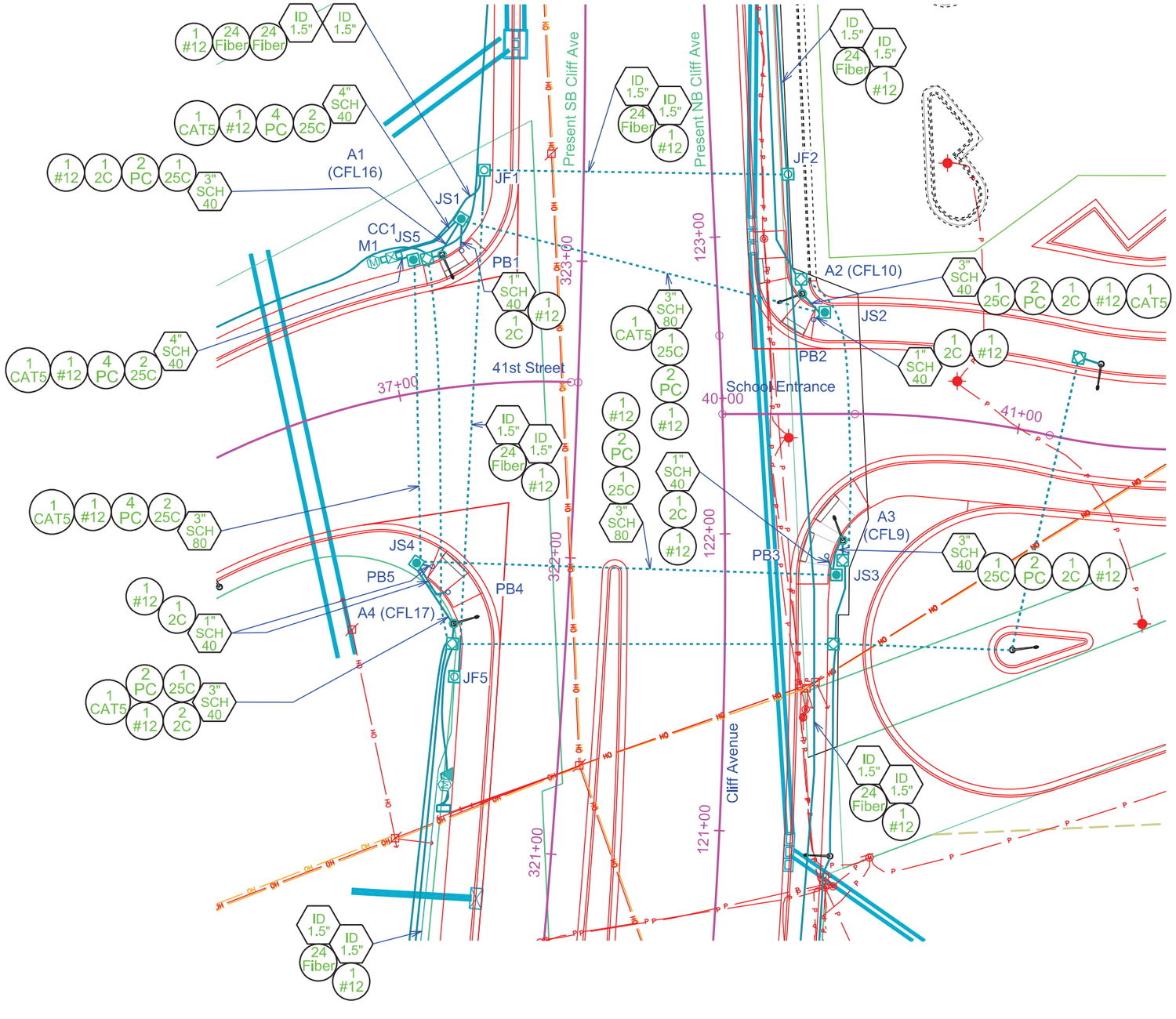
CLIFF AVENUE & 41ST STREET

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L30	L73

Plotting Date: 11/15/2024 Revised Date: 10/30/2024
Initials: NBG

SCALE IN FEET
0 20 40



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SOUTH DAKOTA
11/15/24

ESTIMATE OF QUANTITIES (SIGNAL)

KEY	ITEM	EST QUANT	UNIT
	3' Diameter Footing (A1,A2,A3,A4)	4	EACH
	Type 2 Electrical Junction Box (Traffic) (JS1,JS2,JS3,JS4,JS5)	5	EACH
	Fiber Optic Interconnect Vault/Junction Box (JF1,JF2,JF5)	3	EACH
M	Meter Socket Not a Bid Item	1	EACH
	Traffic Signal Controller (CC1)	1	EACH
	Side Mounted Cabinet (For Batter Backup and Flash System) (Installed on Right Side of Cabinet Front)	1	EACH
	Signal Head Battery Backup and Flash System (Installed Within Side Mounted Cabinet) (Installed on Right Side of Cabinet Front)	1	EACH
	Side Mounted Cabinet (For Fiber Optic Cable) (Installed on Left Side of Cabinet Front)	1	EACH
2C	2/C #14 AWG IMSA Copper Cable, K1 (To Ped. Push Buttons)	305	FT
3C	3/C #14 AWG IMSA Copper Cable, K1 (To Ped. Signal Heads)	160	FT
5C	5/C #14 AWG IMSA Copper Cable, K1 (To 3 Section Signal Heads)	475	FT
7C	7/C #14 AWG IMSA Copper Cable, K1 (To 4 Section and 5 Section Signal Heads)	480	FT
25C	25/C #14 AWG IMSA Copper Cable, K1 (To Signal Bases)	780	FT
PC	Preemption Cable (To Optical Detectors) (1 PC for the Preemption Unit) (1 PC for the Confirmation Light)	2190	FT
CAT5	Outdoor Rated CAT5 Cable (To Adaptive Signal Cameras) (Not a Bid Item) (Incidental to Adaptive Signal System)	485	FT

Plot Scale - 1:40
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CONDUIT LAYOUT
I-229 & CLIFF AVENUE

FOR BIDDING PURPOSES ONLY

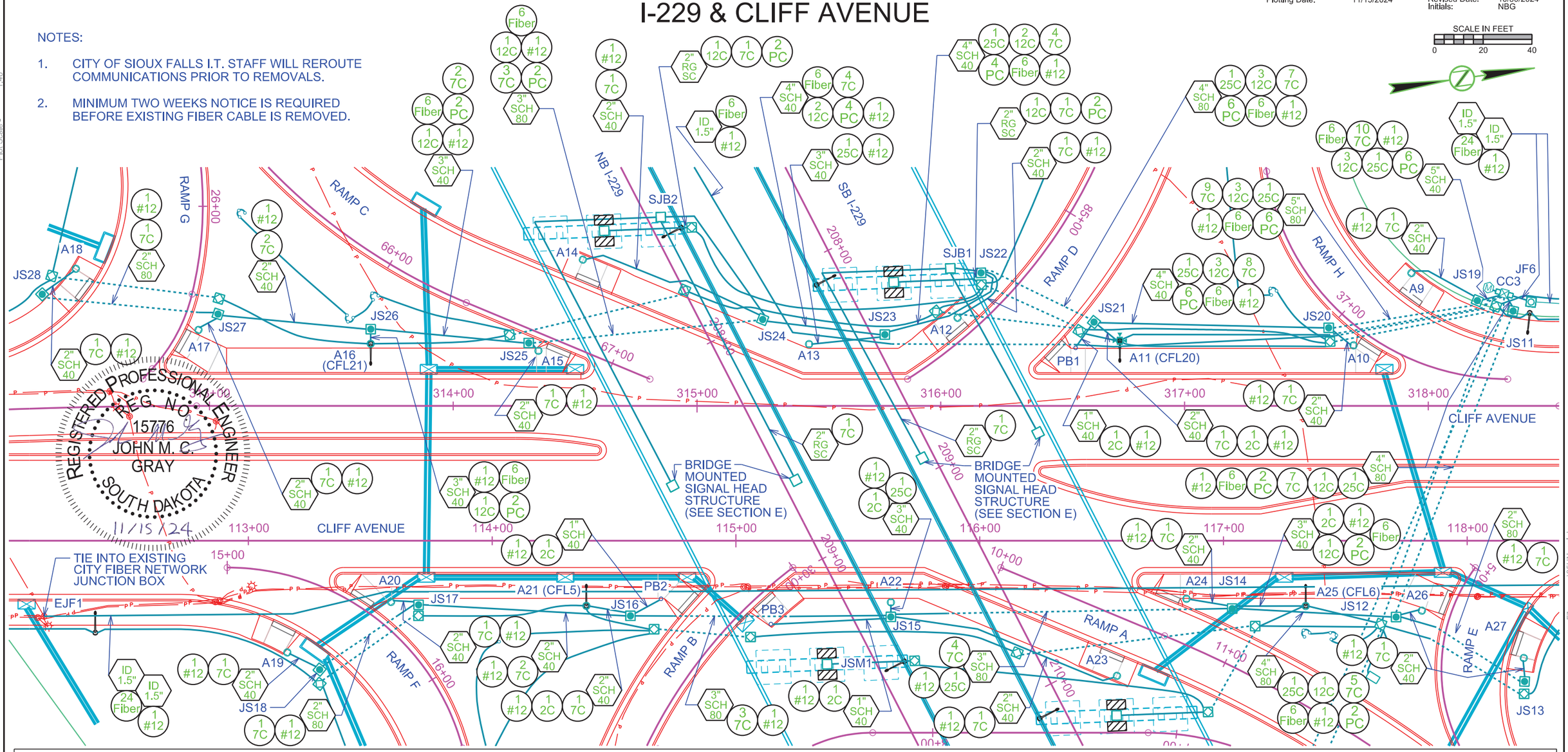
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L31	L73

Plotting Date: 11/15/2024 Revised Date: 10/30/2024
Initials: NBG

SCALE IN FEET
0 20 40

NOTES:

1. CITY OF SIOUX FALLS I.T. STAFF WILL REROUTE COMMUNICATIONS PRIOR TO REMOVALS.
2. MINIMUM TWO WEEKS NOTICE IS REQUIRED BEFORE EXISTING FIBER CABLE IS REMOVED.



ESTIMATE OF QUANTITIES
(CLIFF AVENUE & I-229 SIGNAL)

KEY	ITEM	EST QUANT	UNIT
	Type 2 Electrical Junction Box (Traffic) (JS11-JS28)	18	EACH
	Fiber Optic Interconnect Vault/Junction Box (JF6)	1	EACH
	Surface Mounted Junction Box (on Bridge) (SJB1-SJB2)	2	EACH
M	Meter Socket (Not a Bid Item)	1	EACH
2C	2/C #14 AWG IMSA Copper Cable, K1 (To Ped. Push Buttons)	230	FT
3C	3/C #14 AWG IMSA Copper Cable, K1 (To Ped. Signal Heads)	160	FT

KEY	ITEM	EST QUANT	UNIT
	Traffic Signal Controller (CC3)	1	EACH
	Side Mounted Cabinet (For Batter Backup and Flash System) (Installed on Right Side of Cabinet Front)	1	EACH
	Signal Head Battery Backup and Flash System (Installed Within Side Mounted Cabinet) (Installed on Right Side of Cabinet Front)	1	EACH
	Side Mounted Cabinet (For Fiber Optic Cable) (Installed on Left Side of Cabinet Front)	1	EACH

KEY	ITEM	EST QUANT	UNIT
5C	5/C #14 AWG IMSA Copper Cable, K1 (To 3 Section Signal Heads)	420	FT
7C	7/C #14 AWG IMSA Copper Cable, K1 (To Signal Bases and Overhead)	7530	FT
12C	12/C #14 AWG IMSA Copper Cable, K1 (To Signal Bases and Overhead)	1990	FT
25C	25/C #14 AWG IMSA Copper Cable, K1 (To Signal Bases)	845	FT

KEY	ITEM	EST QUANT	UNIT
PC	Preemption Cable (To Optical Detectors) (1 PC for the Preemption Unit) (1 PC for the Confirmation Light)	4100	FT
6 Fiber	Outdoor Rated 6 SM FO Cable (To Adaptive Signal Cameras) (Not a Bid Item) (Incidental to Adaptive Signal System)	950	FT

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CONDUIT LAYOUT
CLIFF AVENUE

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L32	L73

Plotting Date: 12/19/2024 Revised Date: 12/18/2024
Initials: NBG

REMOVAL OF QUANTITIES (LIGHTING)

KEY	ITEM	EST QUANT	UNIT
2" RG SC	2" Rigid Galvanized Steel Conduit	LUMP SUM*	LS
2" SCH 40	2" Rigid Conduit, Schedule 40	LUMP SUM*	LS
UNKN	Unknow Size Conduit	LUMP SUM*	LS
# 3AL	Triplex Aluminum 2/2/4 Wire	LUMP SUM*	LS
UNKN	Unknown Conductor Number and Size Wire	LUMP SUM*	LS
DBC	Direct Bury Cable	LUMP SUM*	LS
M	Remove Existing Meter Service (EM1)	LUMP SUM*	LS
	Remove Existing Electrical Junction Box (EJL1 - EJL15)	LUMP SUM*	LS
	Salvage Luminaire Pole (EL1 - EL4, EL9 - EL12, EL17 - EL23)	15	EACH
	Salvage Luminaire (From Luminaire Pole) (EL1 - EL4, EL9 - EL12, EL17 - EL23)	15	EACH
	Salvage Luminaire (From Signal Pole) (EL5 - EL8, EL13 - EL16)	8	EACH

REMOVAL OF QUANTITIES (LIGHTING)

KEY	ITEM	EST QUANT	UNIT
	Remove Existing Luminaire Pole Footing (EL1 - EL4, EL9 - EL12, EL17 - EL23, ELHS1, ELHS2)	17	EACH
	Remove Light Tower (ELT1 - ELT5)	5	EACH
	Remove Luminaire Pole for Reset (ELHSL1, ELHSL2)	2	EACH

* INCLUDED IN THE BID ITEM "MISCELLANEOUS ELECTRICAL"

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SOUTH DAKOTA
12/19/24

ESTIMATE OF QUANTITIES (LIGHTING)

KEY	ITEM	EST QUANT	UNIT
	Breakaway Base Luminaire Pole, 30' Mounting Height W/8' Arm (CFL 14)	1	EACH
	Breakaway Base Luminaire Pole, 40' Mounting Height W/8' Arm (CFL1 - CFL 13, CFL 15 - CFL24, 41L1 - 41L12)	35	EACH
	Breakaway Base Luminaire Pole, 50' Mounting Height W/8' Arm (AL1 - AL7, BL1 - BL7, CL1 - CL7, DL1 - DL8)	29	EACH
	Breakaway Base Luminaire Pole, 50' Mounting Height W/8' Twin Arm (L1 - L13, L18 - L32)	28	EACH
	Roadway Underpass Luminaire, LED (CFLU1 - CFLU8)	8	EACH
	Roadway Luminaire, LED with Photoelectric Cell (CFL1 - CFL24, 41L1 - 41L12, L1 - L32, AL1 - AL7, BL1 - BL7, CL1 - CL7, DL1 - DL8, HSL1 - HSL2)	127	EACH
	Pedestrian Underpass Luminaire, LED (NPUL1 - NPUL6, SPUL1 - SPUL5)	11	EACH
	Reset Luminaire Pole, (HSL1 - HSL2)	2	EACH
	2' Diameter Footing (L1 - 13, L18 - L32, AL1 - AL7, BL1 - BL7, CL1 - CL7, DL1 - DL8, CFL1 - CFL24, 41L1 - 41L12, HSL1 - HSL2)	480	FT
	Fixed Base Luminaire Pole with Arm, 50' Mounting Height (L14 - L17)	4	EACH
	Type 2 Electrical Junction Box (Lighting) (JL1 - JL50)	50	EACH
	Surface Mounted Junction Box (JSM1 - JSM6)	6	EACH
M	Meter Socket Not a Bid Item	3	EACH
	Electrical Service Cabinet (ESC1, ESC2, ESC3)	3	EACH
3/4" RG SC	3/4" Rigid Galvanized Steel Conduit	270	FT
3/4" SCH 40	3/4" Rigid Conduit, Schedule 40	568	FT
1" RG SC	1" Rigid Galvanized Steel Conduit	211	FT
1" SCH 40	1" Rigid Conduit, Schedule 40	99	FT
2" SCH 40	2" Rigid Conduit, Schedule 40	18,788	FT
3" SCH 40	3" Rigid Conduit, Schedule 40	31	FT
2" SCH 80	2" Rigid Conduit, Schedule 80	3,081	FT
# 4AL	Quadruplex Aluminum 2/2/2/4 Wire	8,728	FT
# #2	1/C #2 AWG Copper Wire	13,476	FT
# #4	1/C #4 AWG Copper Wire	6,574	FT
# #6	1/C #6 AWG Copper Wire	38,338	FT
# #8	1/C #8 AWG Copper Wire	13,201	FT
# #10	1/C #10 AWG Copper Wire	2,584	FT
* Inside pole	12/2 UF Copper Wire	8,190	FT

Plot Scale - 1:40
Plotted From - ngjersvik
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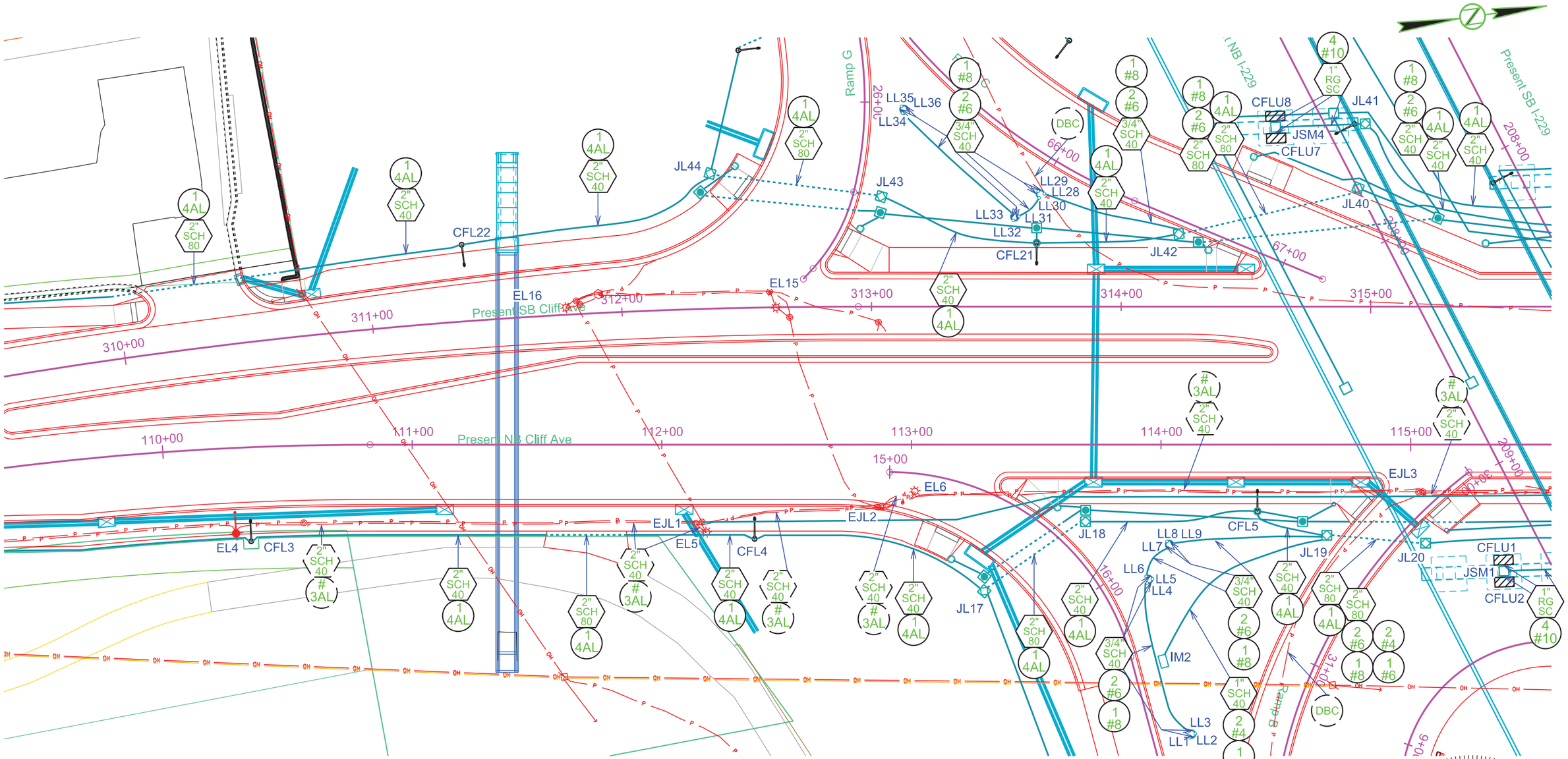
CONDUIT LAYOUT
CLIFF AVENUE

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L33	L73

Plotting Date: 12/19/2024 Revised Date: 12/18/2024
Initials: NBG



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CHRISTOPHER B. GREEN
SOUTH DAKOTA
12/19/24

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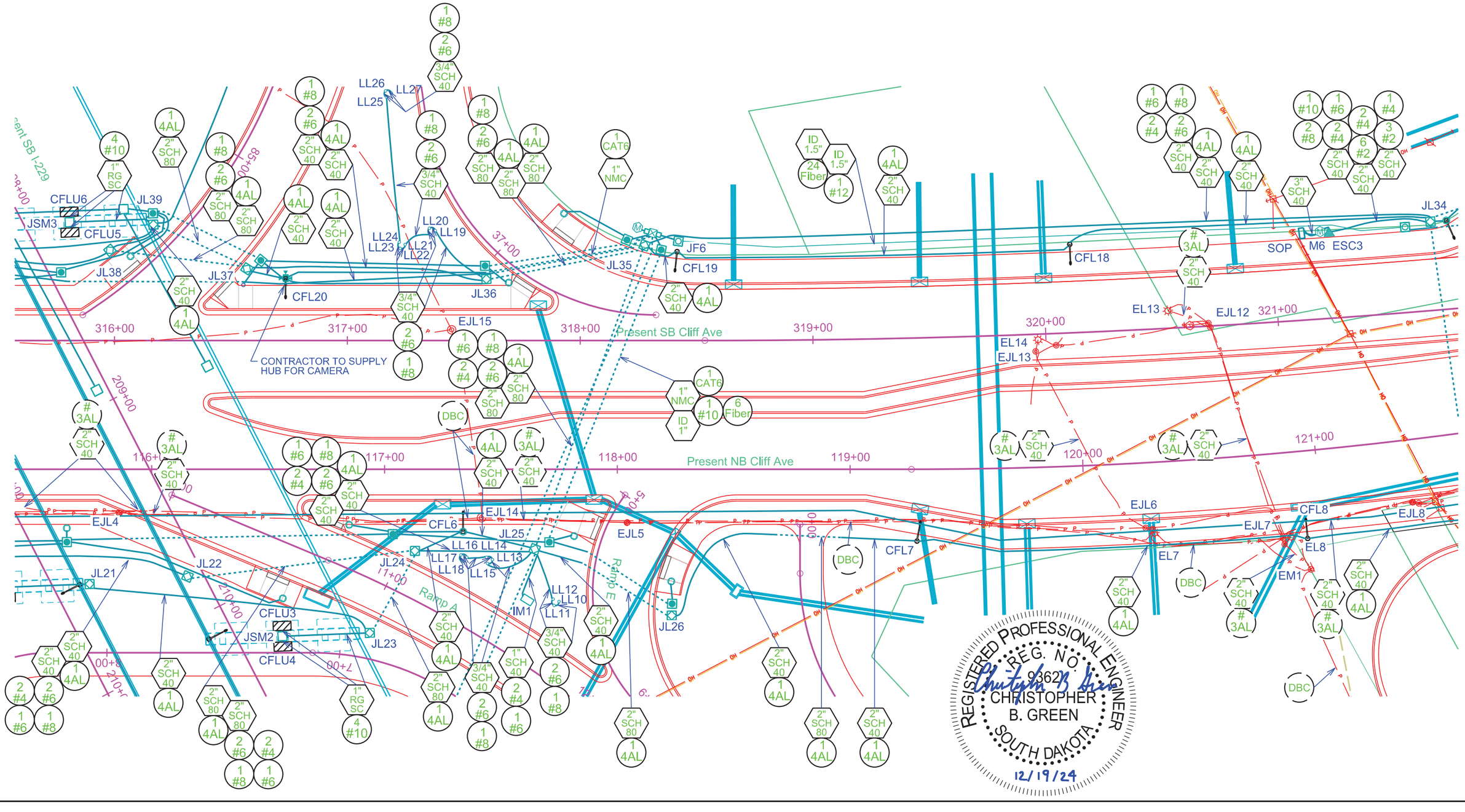
CONDUIT LAYOUT
CLIFF AVENUE

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L34	L73

Plotting Date: 12/19/2024 Revised Date: 12/18/2024
Initials: NBG



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SOUTH DAKOTA
12/19/24

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CONDUIT LAYOUT

CLIFF AVENUE

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L35	L73

Plotting Date: 12/19/2024 Revised Date: 12/18/2024
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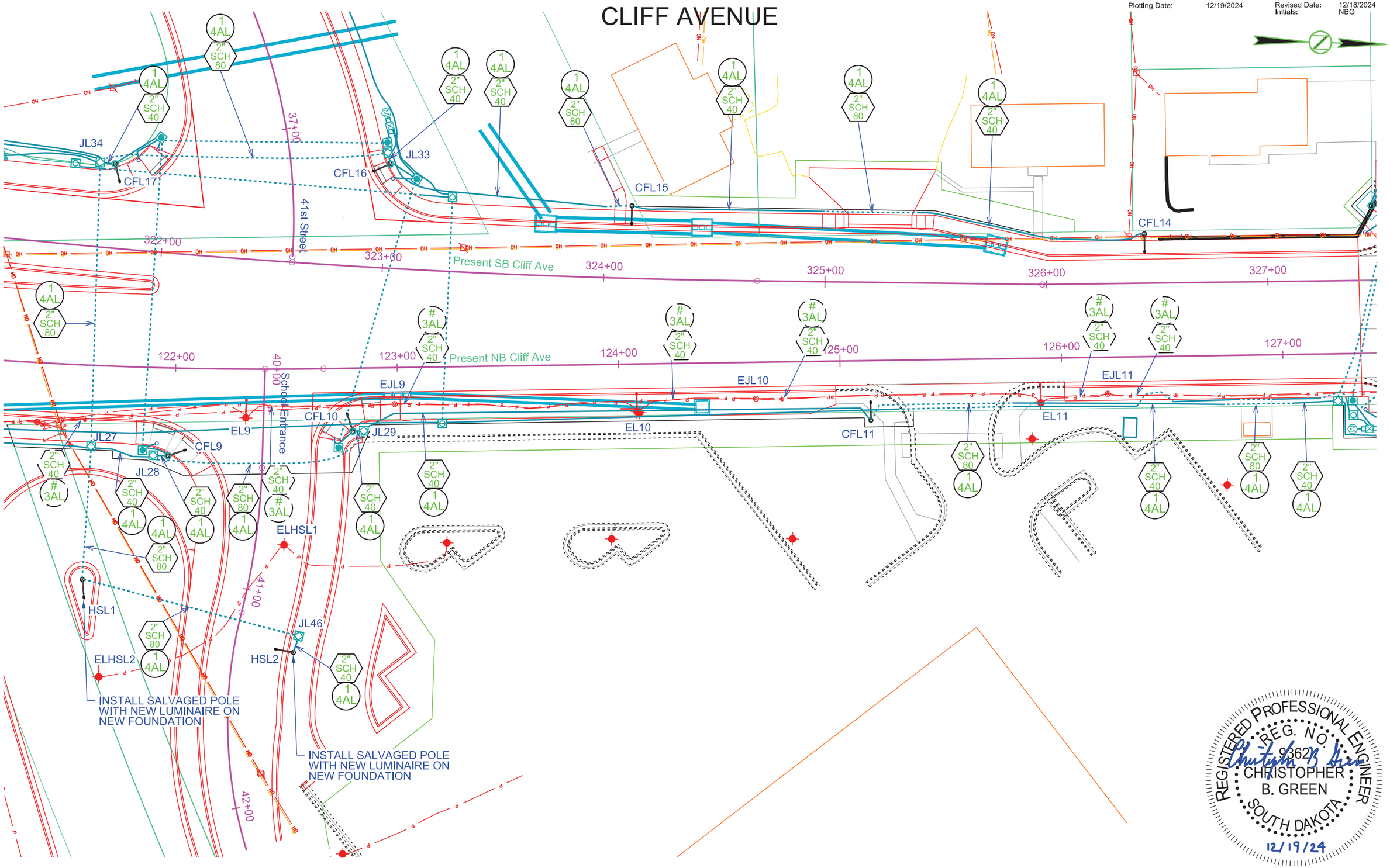

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SOUTH DAKOTA
12/19/24

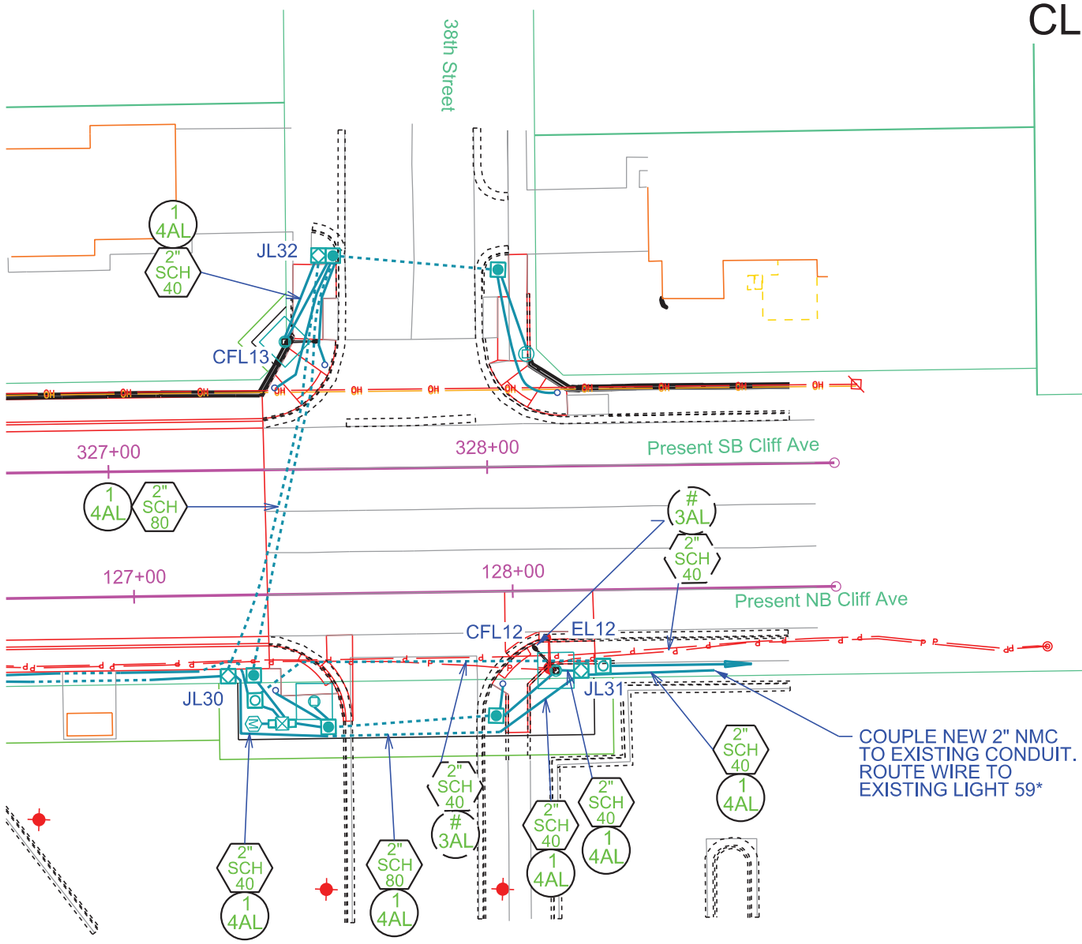
CONDUIT LAYOUT

CLIFF AVENUE

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L36	L73

Plotting Date: 12/19/2024 Revised Date: 12/18/2024
Initials: NBG



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SOUTH DAKOTA
12/19/24

* NUMBER FOR EXISTING LIGHT FOUND ON CITY OF SIOUX FALLS UTILITY MAPPING APPLICATION

Plot Scale - 1:40
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CONDUIT LAYOUT

41ST STREET

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L37	L73

Plotting Date: 11/15/2024

Present 41st Street

21+00 22+00 23+00 24+00 25+00 26+00 27+00

73+00 74+00 75+00 76+00 77+00 78+00

197+00 198+00 199+00 200+00

41L1 EL17

41L2 EL18

41L3 EL19

41L4

COUPLE NEW 2" NMC TO EXISTING 2" RGSC. ROUTE WIRE TO EXISTING LIGHT 23.*

2" SCH 40 1 4AL

2" RG SC # 3AL

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Plot Scale - 1:40

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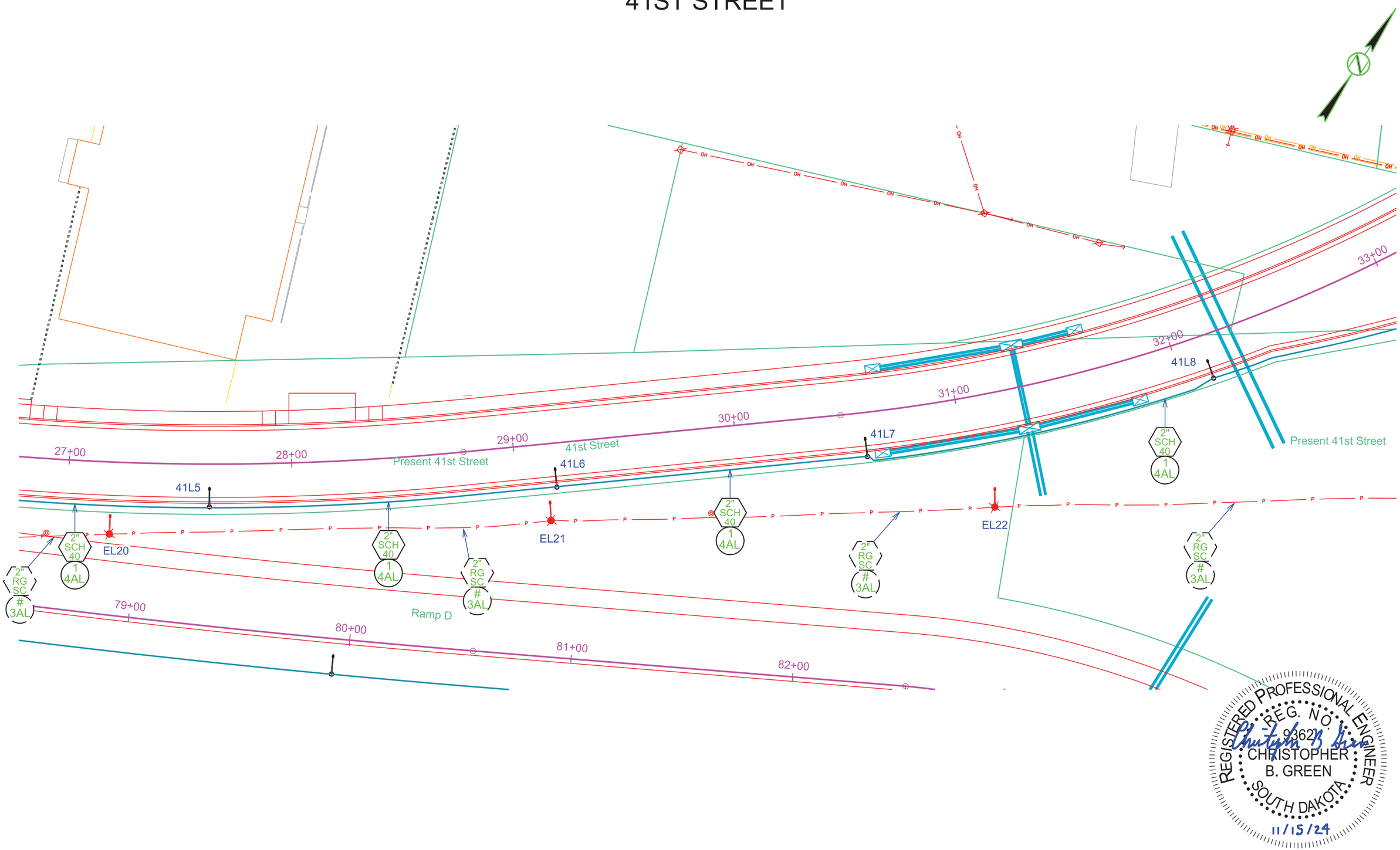
CONDUIT LAYOUT
41ST STREET

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L38	L73

Plotting Date: 11/15/2024

Plot Scale - 1:40



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11/15/24

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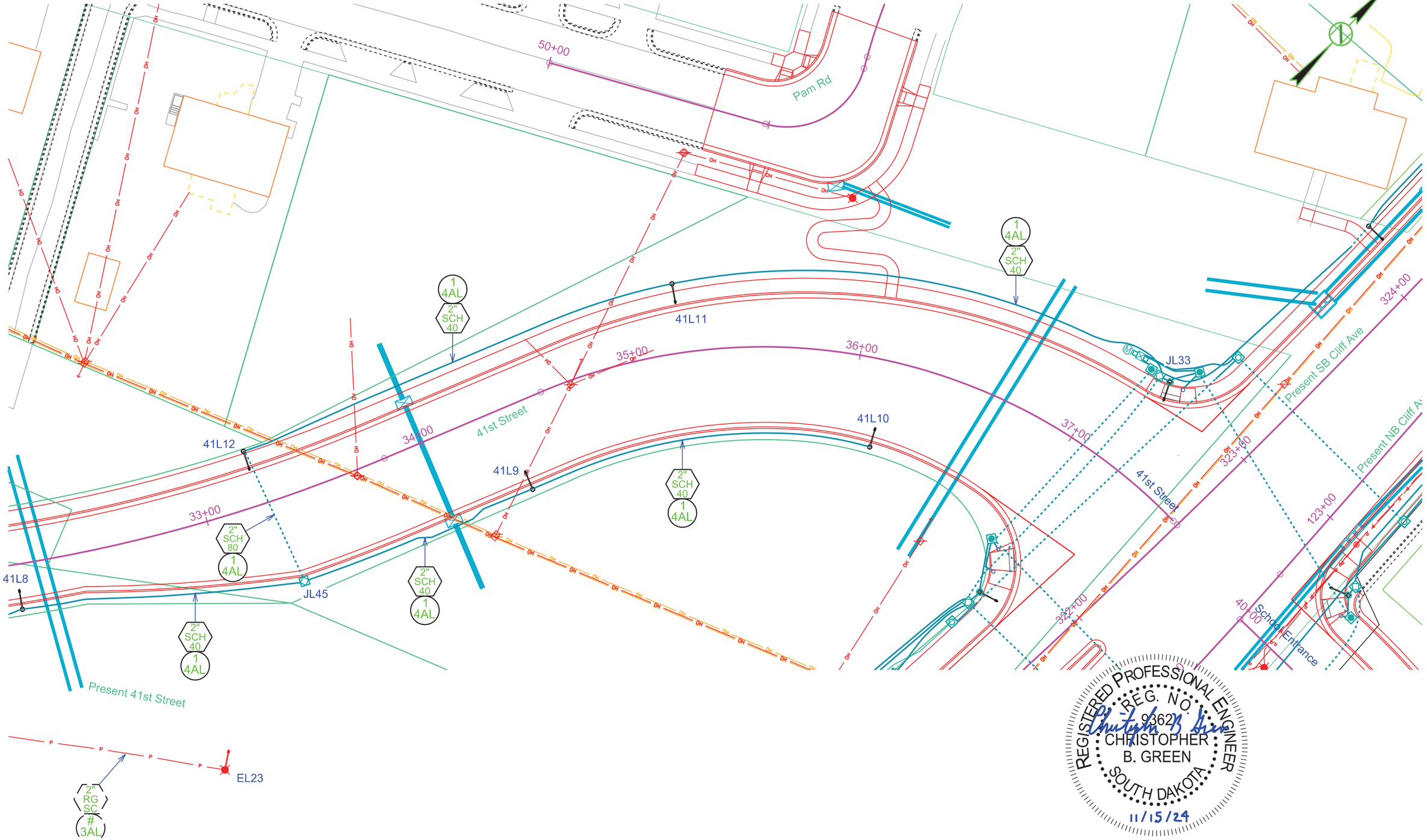
CONDUIT LAYOUT
41ST STREET

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L39	L73

Plotting Date: 11/15/2024



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11/15/24

Plot Scale - 1:40

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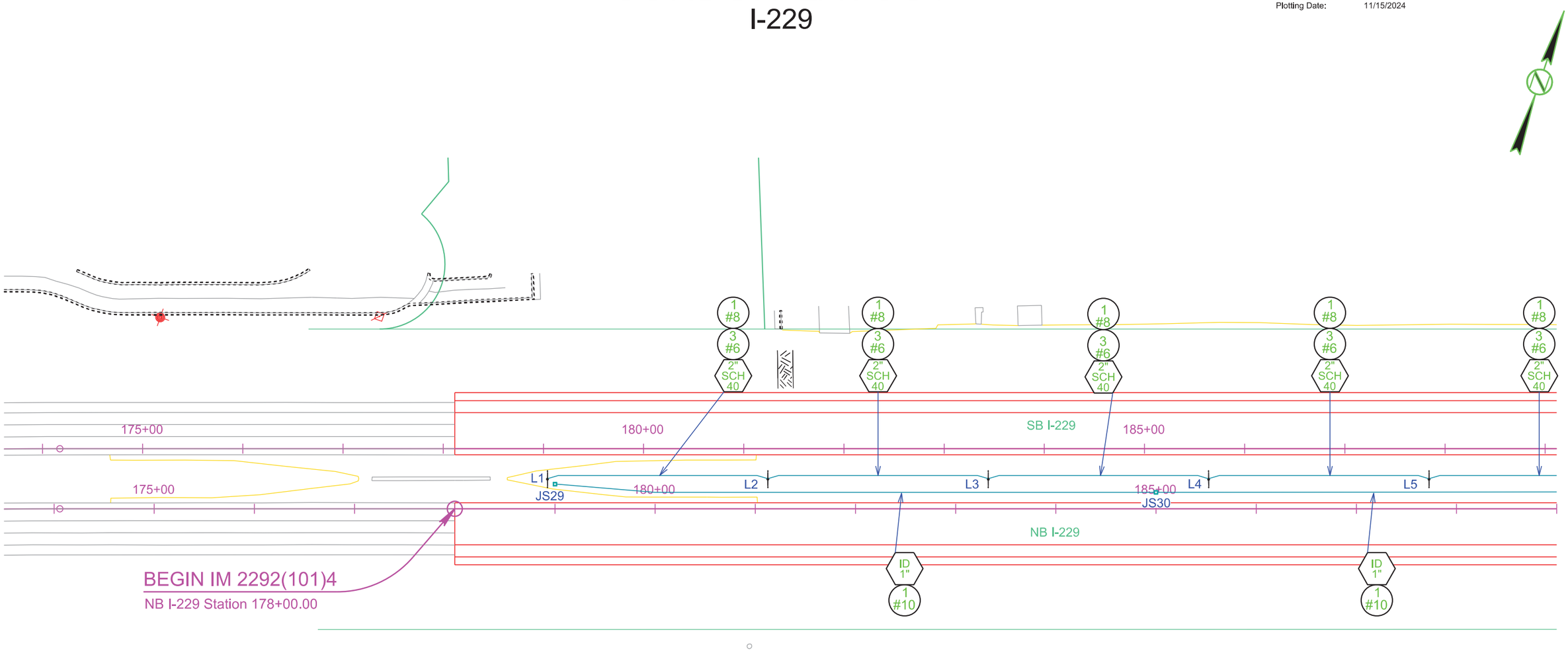
CONDUIT LAYOUT
I-229

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L40	L73

Plotting Date: 11/15/2024



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Plot Scale - 1:100

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File - ...\05HN_sgl.dgn

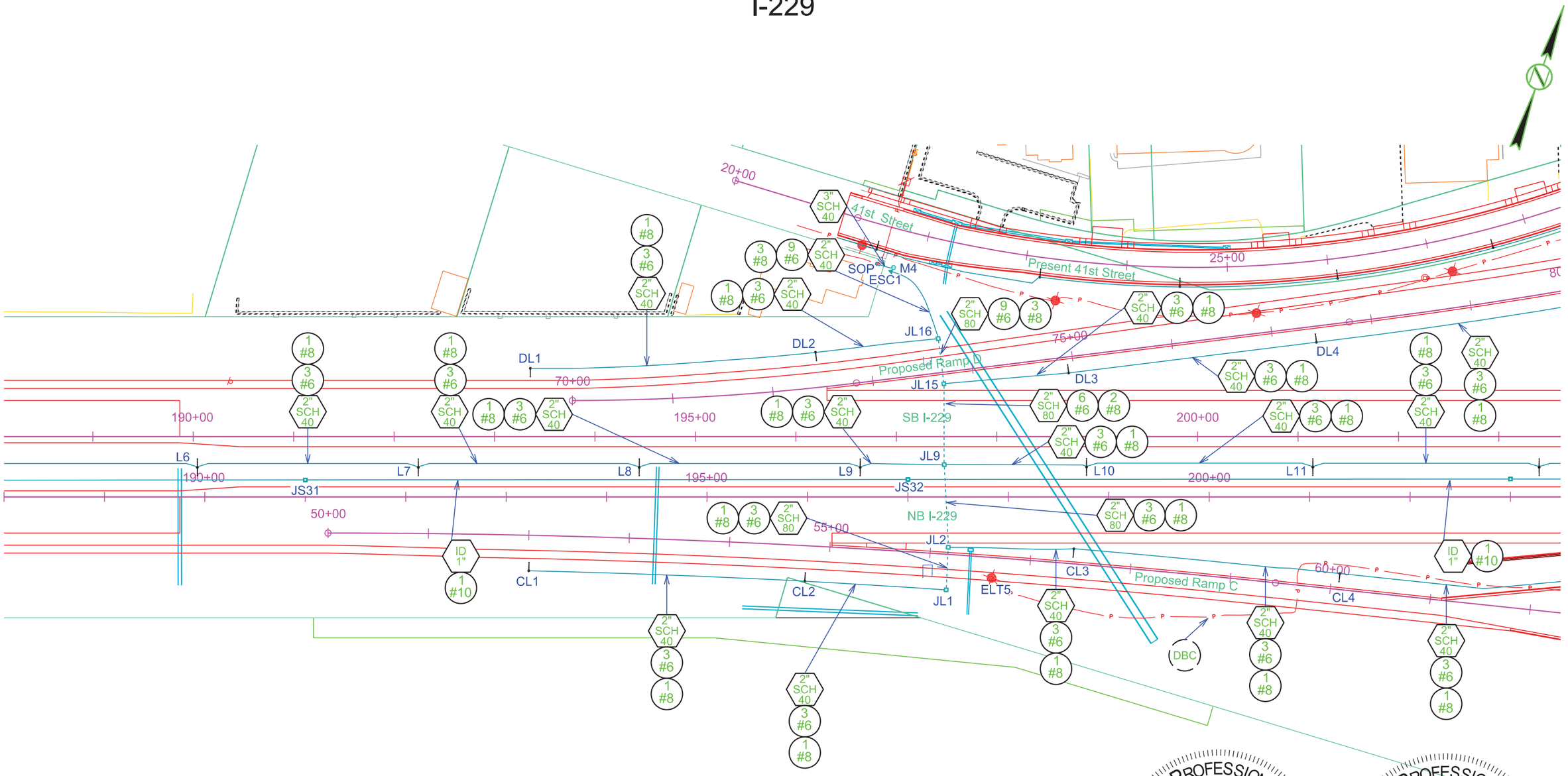
CONDUIT LAYOUT

I-229

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L41	L73

Plotting Date: 11/15/2024



REGISTERED PROFESSIONAL ENGINEER
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JOHN M. C. GRAY
SOUTH DAKOTA
11/15/24

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 9362
CHRISTOPHER B. GREEN
SOUTH DAKOTA
11/15/24

Plot Scale - 1:100

Plotted From - ngjersvik

File - ...\05HN_sgl.dgn

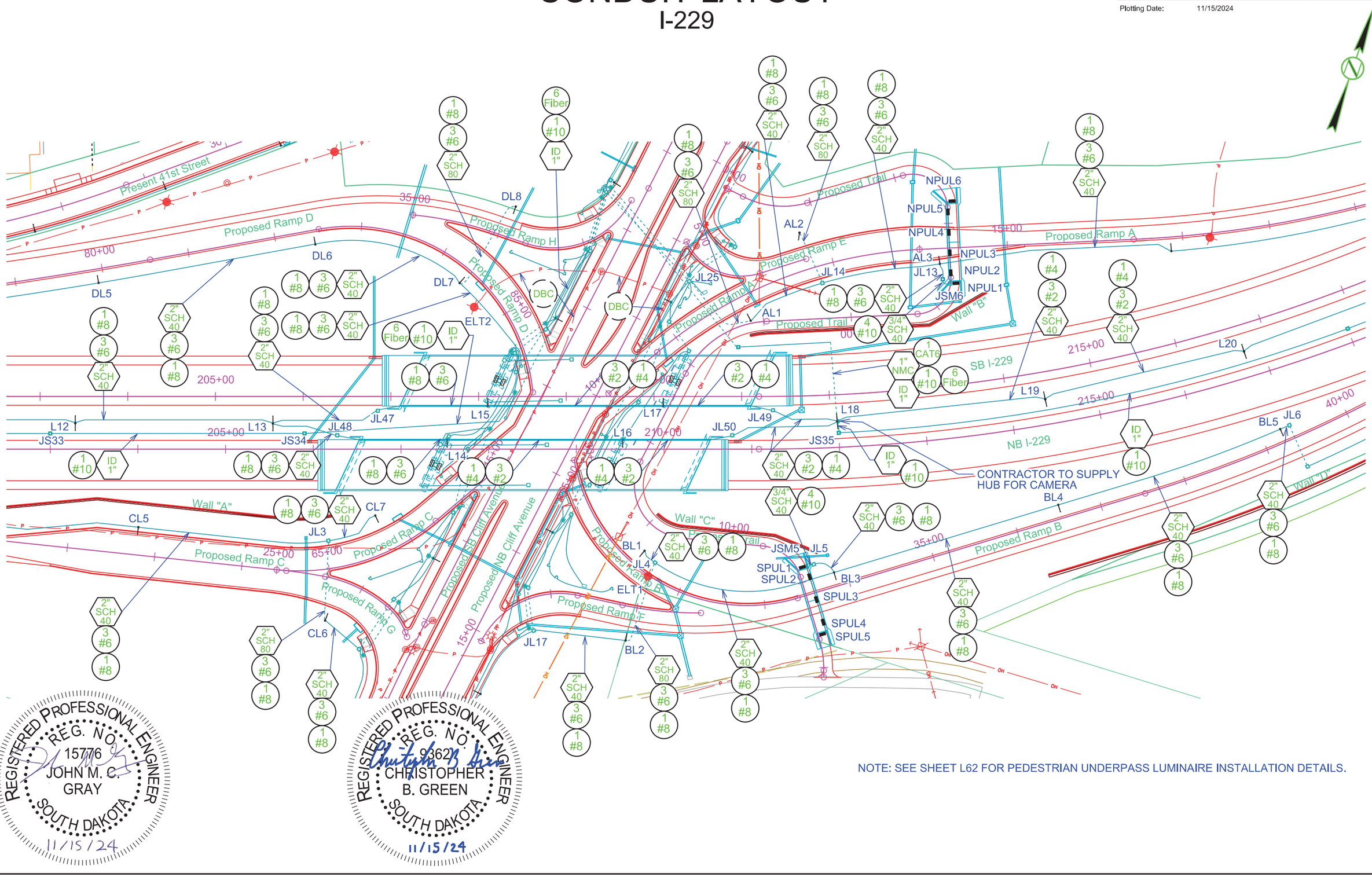
CONDUIT LAYOUT

I-229

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L42	L73

Plotting Date: 11/15/2024



NOTE: SEE SHEET L62 FOR PEDESTRIAN UNDERPASS LUMINAIRE INSTALLATION DETAILS.

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11/15/24

Plot Scale - 1:100

Plotted From - ngjersvik

File - ...\05HN_sgl.dgn

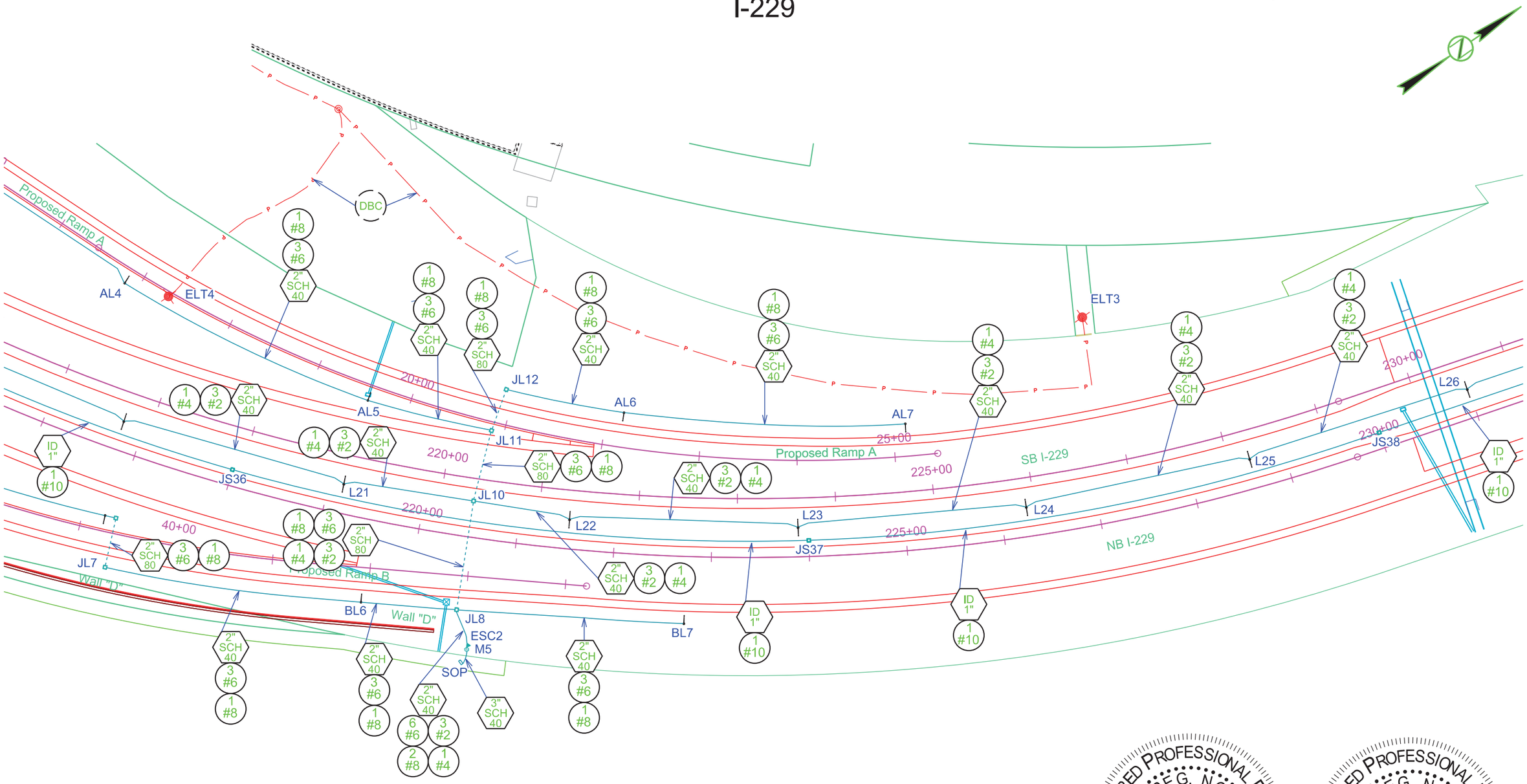
CONDUIT LAYOUT

I-229

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L43	L73

Plotting Date: 11/15/2024



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Plot Scale - 1:100

Plotted From - ngjersvik

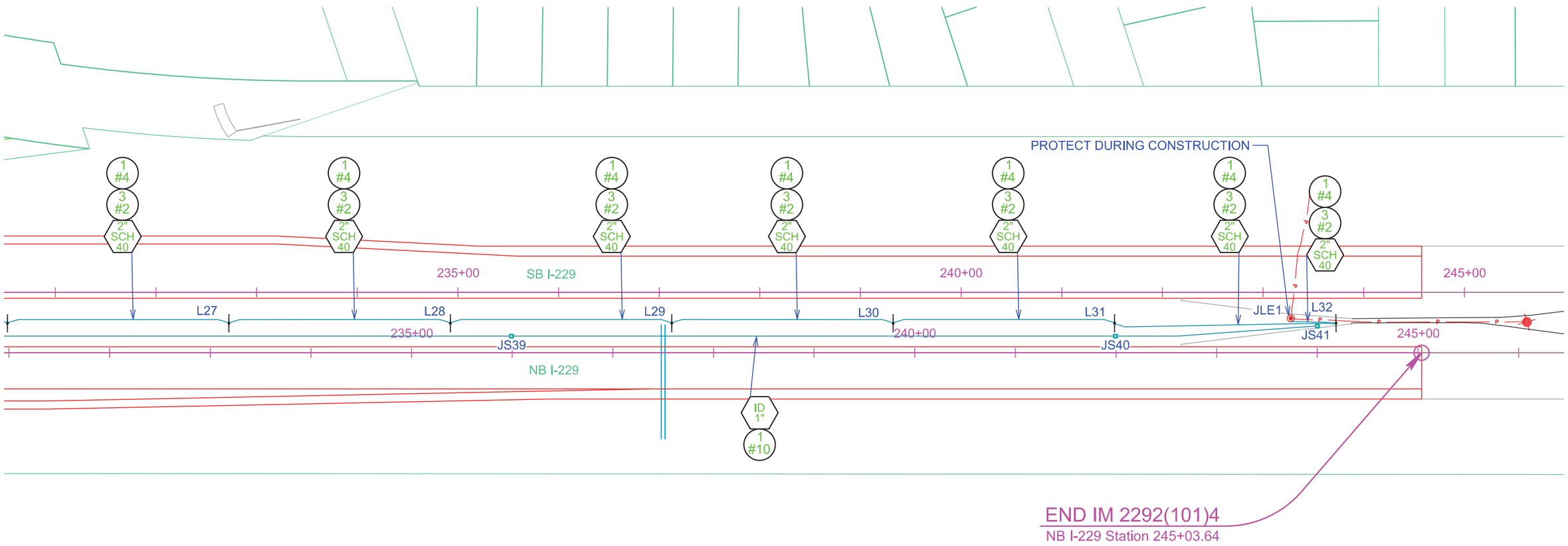
File - ...\05HN_sgl.dgn

CONDUIT LAYOUT
I-229

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L44	L73

Plotting Date: 11/15/2024



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11/15/24

Plot Scale - 1:100
Plotted From - ngjersvik
File - ...\05HN_sgl.dgn

SIGNAL TIMING

FOR BIDDING PURPOSES ONLY

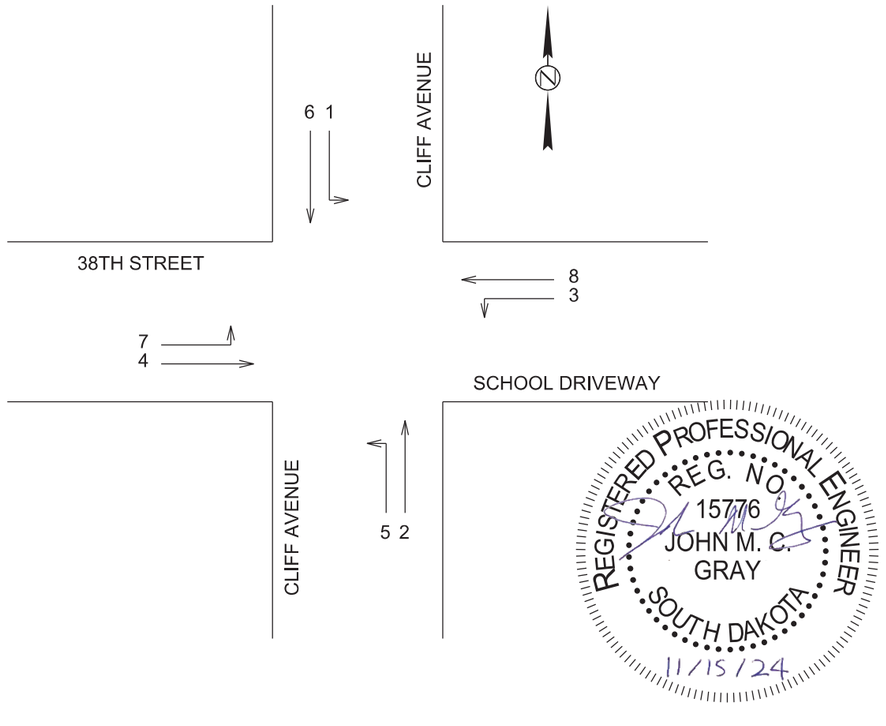
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L45	L73

CLIFF AVENUE & 38TH STREET

BASIC INTERVALS								
Phase	1	2	3	4	5	6	7	8
Movement	SBL	NB	WBL	EB	NBL	SB	EBL	WB
Lag								
Min Green	5	15	5	10	5	15	5	10
Extension								
Max 1	15	45	15	30	15	45	15	30
Max 2								
Time Before								
Time to Reduce								
Minimum Gap								
Yellow	4	3	4	3	4	3	4	3
All Red	2	2	2	2	2	2	2	2
Walk		7		7		7		7
Ped Clearance		17		23		17		23
Recall		MIN				MIN		
Prog Flash Display	R	R	R	R	R	R	R	R
Start Up Ø		X				X		

PREEMPTION				
Plan	3	4	5	6
Calls Ø	3 & 8	4 & 7	5 & 2	1 & 6
Output	CH13R	CH14R	CH15R	CH16R

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



REGISTERED PROFESSIONAL ENGINEER
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11/15/24

SIGNAL TIMING

FOR BIDDING PURPOSES ONLY

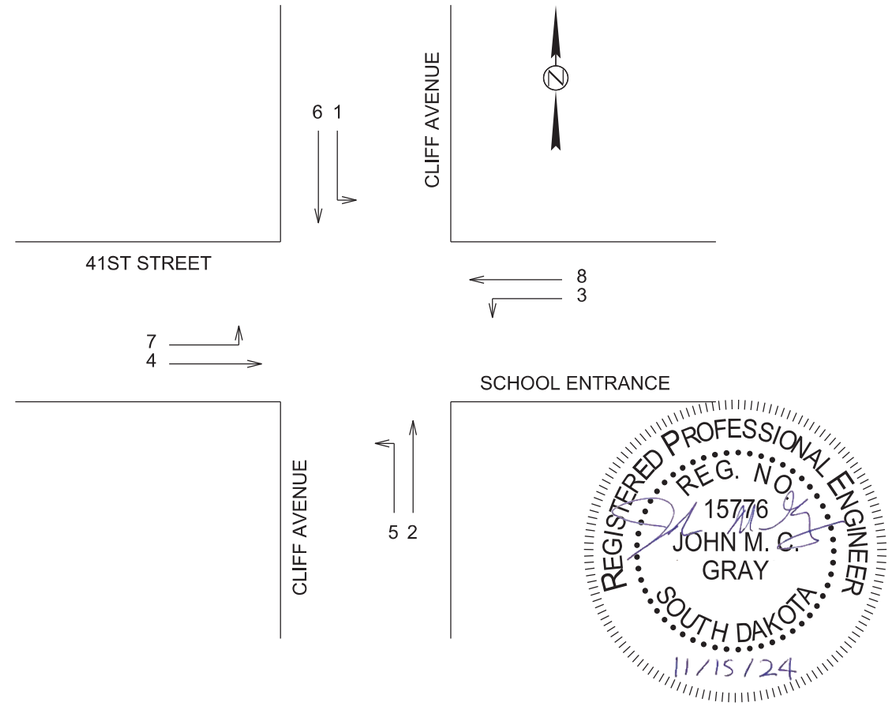
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L46	L73

CLIFF AVENUE & 41ST STREET

BASIC INTERVALS								
Phase	1	2	3	4	5	6	7	8
Movement	SBL	NB	WBL	EB	NBL	SB	EBL	WB
Lag								
Min Green	5	15	5	10	5	15	5	10
Extension								
Max 1	15	45	15	36	15	45	15	36
Max 2								
Time Before								
Time to Reduce								
Minimum Gap								
Yellow	4	3.5	4	3.5	4	3.5	4	3.5
All Red	2	2	2	3	2	2	2	3
Walk		7		7		7		7
Ped Clearance		20		29		26		29
Recall		MIN				MIN		
Prog Flash Display	R	R	R	R	R	R	R	R
Start Up Ø		X				X		

PREEMPTION				
Plan	3	4	5	6
Calls Ø	3 & 8	4 & 7	5 & 2	1 & 6
Output	CH13R	CH14R	CH15R	CH16R

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



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SOUTH DAKOTA
11/15/24

SIGNAL TIMING

FOR BIDDING PURPOSES ONLY

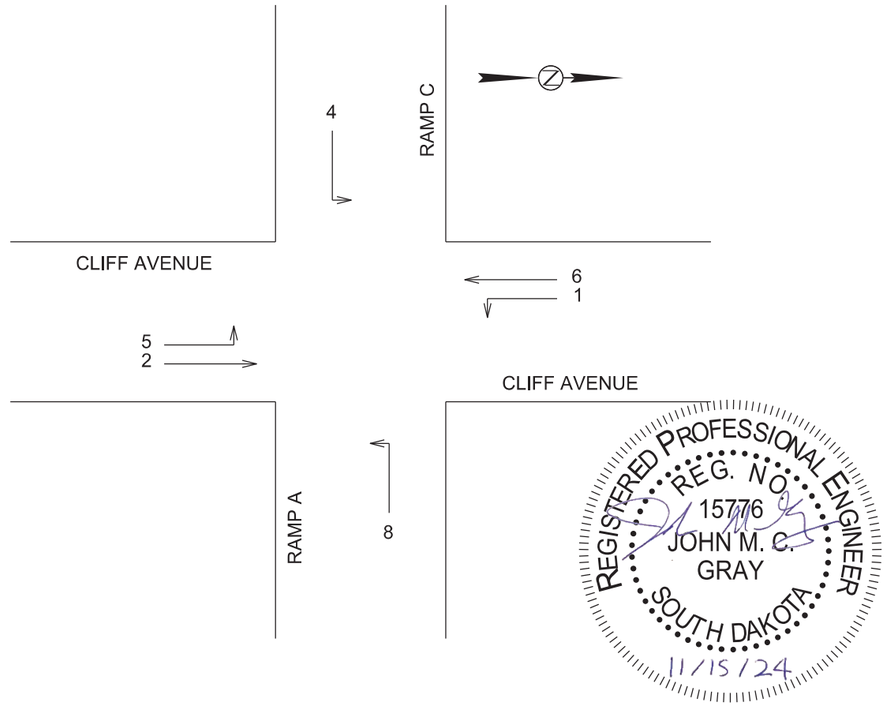
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L47	L73

I-229 & CLIFF AVENUE

BASIC INTERVALS								
Phase	1	2	3	4	5	6	7	8
Movement	SBL	NB	-	EB	NBL	SB	-	WB
Lag								
Min Green	10	15		10	10	15		10
Extension								
Max 1	30	45		30	30	45		30
Max 2								
Time Before								
Time to Reduce								
Minimum Gap								
Yellow	4	4.5		4	4	4.5		4
All Red	2	3		3	2	3		3
Walk		7				7		
Ped Clearance		20				20		
Recall		MIN				MIN		
Prog Flash Display	R	R	-	R	R	R	-	R
Start Up Ø		X				X		

PREEMPTION				
Plan	3	4	5	6
Calls Ø	3 & 8	4 & 7	5 & 2	1 & 6
Output	CH13R	CH14R	CH15R	CH16R

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



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SOUTH DAKOTA
11/15/24

Plot Scale - 1:40
Plotted From - ngjersvik
File - ...\05HN_sgl-timing.dgn

TRAFFIC SIGNAL WIRING DIAGRAM

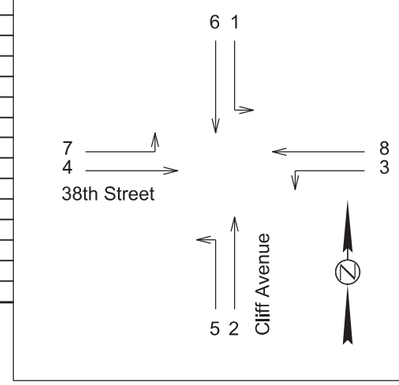
FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L48	L73

CLIFF AVENUE & 38TH STREET

CORNER	A8 - Northeast			CORNER	A5 - Southeast			CORNER	A6 - Southwest			CORNER	A7 - Northwest		
		Cable # or color	Controller			Cable # or color	Controller			Cable # or color	Controller			Cable # or color	Controller
Phase # 2			Terminal	Phase # 4			Terminal	Phase # 6			Terminal	Phase # 8			Terminal
Head No.	Wire Color	Head Color	Designation	Head No.	Wire Color	Head Color	Designation	Head No.	Wire Color	Head Color	Designation	Head No.	Wire Color	Head Color	Designation
15,16,17	Red	Red	2 R	2,3	Red	Red	4 R	6,7,8	Red	Red	6 R	11,12	Red	Red	8 R
	Orange	Amber	2 Y		Orange	Amber	4 Y		Orange	Amber	6 Y		Orange	Amber	8 Y
	Green	Green	2 G		Green	Green	4 G		Green	Green	6 G		Green	Green	8 G
	White	Ground/neutral	CB		White	Ground/neutral	CB		White	Ground/neutral	CB		White	Ground/neutral	CB
Phase # 2 Ped				Phase # 4 Ped				Phase # 6 Ped				Phase # 8 Ped			
Head No.				Head No.				Head No.				Head No.			
25	Black	Don't Walk	9 R	19	Black	Don't Walk	10 R	21	Black	Don't Walk	11 R	23	Black	Don't Walk	12 R
	Blue	Walk	9 G		Blue	Walk	10 G		Blue	Walk	11 G		Blue	Walk	12 G
	White/Black	Ground/neutral	CB		White/Black	Ground/neutral	CB		White/Black	Ground/neutral	CB		White/Black	Ground/neutral	CB
Phase # 8 Ped				Phase # 2 Ped				Phase # 4 Ped				Phase # 6 Ped			
Head No.				Head No.				Head No.				Head No.			
26	Black/White	Don't Walk	12 R	20	Black/White	Don't Walk	9 R	22	Black/White	Don't Walk	10 R	24	Black/White	Don't Walk	11 R
	Blue/Black	Walk	12 G		Blue/Black	Walk	9 G		Blue/Black	Walk	10 G		Blue/Black	Walk	11 G
	White/Black	Ground/neutral	CB		White/Black	Ground/neutral	CB		White/Black	Ground/neutral	CB		White/Black	Ground/neutral	CB
Phase # 5				Phase # 7				Phase # 1				Phase # 3			
Head No.				Head No.				Head No.				Head No.			
14	Red/Black	<< Red <<	5 R	1	Red/Black	<< Red <<	7 R	5	Red/Black	<< Red <<	1 R	10	Red/Black	<< Red <<	3 R
	Orange/Black	<< Amber <<	5 Y		Orange/Black	<< Amber <<	7 Y		Orange/Black	<< Amber <<	1 Y		Orange/Black	<< Amber <<	3 Y
	Black/Red	< FL Amber <-	11 Y		Black/Red	< FL Amber <-	12 7		Black/Red	< FL Amber <-	9 Y		Black/Red	< FL Amber <-	10 Y
	Green/Black	<< Green <<	5 G		Green/Black	<< Green <<	7 G		Green/Black	<< Green <<	1 G		Green/Black	<< Green <<	3 G
	White	Ground/neutral	CB		White	Ground/neutral	CB		White	Ground/neutral	CB		White	Ground/neutral	CB
Phase # 7				Phase # 1				Phase # 3				Phase # 5			
Head No.				Head No.				Head No.				Head No.			
18	Red/Green	<< Red <<	7 R	4	Red/Green	<< Red <<	1 R	9	Red/Green	<< Red <<	3 R	13	Red/Black	<< Red <<	5 R
	Orange/Red	<< Amber <<	7 Y		Orange/Red	<< Amber <<	1 Y		Orange/Red	<< Amber <<	3 Y		Orange/Black	<< Amber <<	5 Y
	Blue/White	< FL Amber <-	12 Y		Blue/White	< FL Amber <-	9 Y		Blue/White	< FL Amber <-	10 Y		Black/Red	< FL Amber <-	11 Y
	Green/White	<< Green <<	7 G		Green/White	<< Green <<	1 G		Green/White	<< Green <<	3 G		Green/Black	<< Green <<	5 G
	White	Ground/neutral	CB		White	Ground/neutral	CB		White	Ground/neutral	CB		White	Ground/neutral	CB
PED. P.B.' s				PED. P.B.' s				PED. P.B.' s				PED. P.B.' s			
	Blue/Red	Phase 2	L 11		Blue/Red	Phase 2	L 11		Blue/Red	Phase 2	L 11		Blue/Red	Phase 2	L 11
	Red/White	Phase 4	L 9		Red/White	Phase 4	L 9		Red/White	Phase 4	L 9		Red/White	Phase 4	L 9
	Blue/Red	Phase 6	Q 11		Blue/Red	Phase 6	Q 11		Blue/Red	Phase 6	Q 11		Blue/Red	Phase 6	Q 11
	Red/White	Phase 8	Q 9		Red/White	Phase 8	Q 9		Red/White	Phase 8	Q 9		Red/White	Phase 8	Q 9
	White/Red	PB common	R 9 ~ 12		White/Red	PB common	R 9 ~ 12		White/Red	PB common	R 9 ~ 12		White/Red	PB common	R 9 ~ 12

PHASING DIAGRAM



REGISTERED PROFESSIONAL ENGINEER
REG. NO.
15776
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GRAY
SOUTH DAKOTA
11/15/24

Plot Scale - 1:40
Plotted From - ...njjersvik
File - ...\05HN_sgl-wiring-tables.dgn

TRAFFIC SIGNAL WIRING DIAGRAM

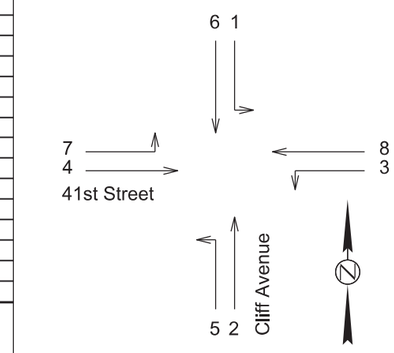
FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L49	L73

CLIFF AVENUE & 41ST STREET

CORNER	A2 - Northeast			CORNER	A3 - Southeast			CORNER	A4 - Southwest			CORNER	A1 - Northwest		
		Cable # or color	Controller			Cable # or color	Controller			Cable # or color	Controller			Cable # or color	Controller
Phase # 2			Terminal	Phase # 4			Terminal	Phase # 6			Terminal	Phase # 8			Terminal
Head No.	Wire Color	Head Color	Designation	Head No.	Wire Color	Head Color	Designation	Head No.	Wire Color	Head Color	Designation	Head No.	Wire Color	Head Color	Designation
7,8,9	Red	Red	2 R	12,13	Red	Red	4 R	16,17,18	Red	Red	6 R	2,3	Red	Red	8 R
	Orange	Amber	2 Y		Orange	Amber	4 Y		Orange	Amber	6 Y		Orange	Amber	8 Y
	Green	Green	2 G		Green	Green	4 G		Green	Green	6 G		Green	Green	8 G
	White	Ground/neutral	CB		White	Ground/neutral	CB		White	Ground/neutral	CB		White	Ground/neutral	CB
Phase # 2 Ped				Phase # 4 Ped				Phase # 6 Ped				Phase # 8 Ped			
Head No.				Head No.				Head No.				Head No.			
22	Black	Don't Walk	9 R	24	Black	Don't Walk	10 R	26	Black	Don't Walk	11 R	20	Black	Don't Walk	12 R
	Blue	Walk	9 G		Blue	Walk	10 G		Blue	Walk	11 G		Blue	Walk	12 G
	White/Black	Ground/neutral	CB		White/Black	Ground/neutral	CB		White/Black	Ground/neutral	CB		White/Black	Ground/neutral	CB
Phase # 8 Ped				Phase # 2 Ped				Phase # 4 Ped				Phase # 6 Ped			
Head No.				Head No.				Head No.				Head No.			
23	Black/White	Don't Walk	12 R	25	Black/White	Don't Walk	9 R	27	Black/White	Don't Walk	10 R	21	Black/White	Don't Walk	11 R
	Blue/Black	Walk	12 G		Blue/Black	Walk	9 G		Blue/Black	Walk	10 G		Blue/Black	Walk	11 G
	White/Black	Ground/neutral	CB		White/Black	Ground/neutral	CB		White/Black	Ground/neutral	CB		White/Black	Ground/neutral	CB
Phase # 5				Phase # 7				Phase # 1				Phase # 3			
Head No.				Head No.				Head No.				Head No.			
5,6	Red/Black	<< Red <<	5 R	11	Red/Black	<< Red <<	7 R	15	Red/Black	<< Red <<	1 R	1	Red/Black	<< Red <<	3 R
	Orange/Black	<< Amber <<	5 Y		Orange/Black	<< Amber <<	7 Y		Orange/Black	<< Amber <<	1 Y		Orange/Black	<< Amber <<	3 Y
	Black/Red	< FL Amber <-	11 Y		Black/Red	< FL Amber <-	12 7		Black/Red	< FL Amber <-	9 Y		Black/Red	< FL Amber <-	10 Y
	Green/Black	<< Green <<	5 G		Green/Black	<< Green <<	7 G		Green/Black	<< Green <<	1 G		Green/Black	<< Green <<	3 G
	White	Ground/neutral	CB		White	Ground/neutral	CB		White	Ground/neutral	CB		White	Ground/neutral	CB
Phase # 7				Phase # 1				Phase # 3				Phase # 5			
Head No.				Head No.				Head No.				Head No.			
10	Red/Green	<< Red <<	7 R	14	Red/Green	<< Red <<	1 R	19	Red/Green	<< Red <<	3 R	4	Red/Black	<< Red <<	5 R
	Orange/Red	<< Amber <<	7 Y		Orange/Red	<< Amber <<	1 Y		Orange/Red	<< Amber <<	3 Y		Orange/Black	<< Amber <<	5 Y
	Blue/White	< FL Amber <-	12 Y		Blue/White	< FL Amber <-	9 Y		Blue/White	< FL Amber <-	10 Y		Black/Red	< FL Amber <-	11 Y
	Green/White	<< Green <<	7 G		Green/White	<< Green <<	1 G		Green/White	<< Green <<	3 G		Green/Black	<< Green <<	5 G
	White	Ground/neutral	CB		White	Ground/neutral	CB		White	Ground/neutral	CB		White	Ground/neutral	CB
PED. P.B.' s				PED. P.B.' s				PED. P.B.' s				PED. P.B.' s			
	Blue/Red	Phase 2	L 11		Blue/Red	Phase 2	L 11		Blue/Red	Phase 2	L 11		Blue/Red	Phase 2	L 11
	Red/White	Phase 4	L 9		Red/White	Phase 4	L 9		Red/White	Phase 4	L 9		Red/White	Phase 4	L 9
	Blue/Red	Phase 6	Q 11		Blue/Red	Phase 6	Q 11		Blue/Red	Phase 6	Q 11		Blue/Red	Phase 6	Q 11
	Red/White	Phase 8	Q 9		Red/White	Phase 8	Q 9		Red/White	Phase 8	Q 9		Red/White	Phase 8	Q 9
	White/Red	PB common	R 9 ~ 12		White/Red	PB common	R 9 ~ 12		White/Red	PB common	R 9 ~ 12		White/Red	PB common	R 9 ~ 12

PHASING DIAGRAM



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15776
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GRAY
SOUTH DAKOTA
11/15/24

Plot Scale - 1:40

Plotted From - ...njjersvik

File - ...\05HN_sgl-wiring-tables.dgn

TRAFFIC SIGNAL WIRING DIAGRAM

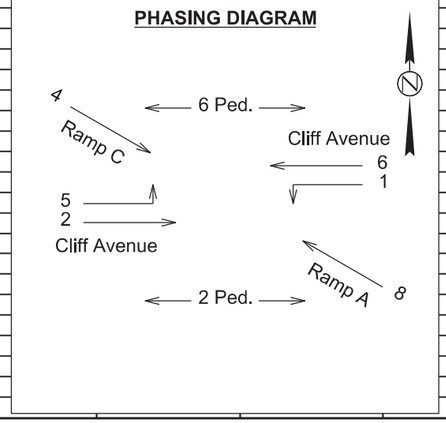
FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L50	L73

I-229 & CLIFF AVENUE

CORNER				CORNER	A11 - Northwest (7/C #14)			CORNER	A21 - Southeast (7/C #14)			CORNER	NB Bridge - NB (12/C #14)		
		Cable # or color	Controller			Cable # or color	Controller			Cable # or color	Controller			Cable # or color	Controller
A9, A10 (7/C #14)															
		Head Color	Terminal	Phase # 6			Terminal	Phase # 2			Terminal	Phase # 2			Terminal
Head No.	Wire Color	RRFB	Designation	Head No.	Wire Color	Head Color	Designation	Head No.	Wire Color	Head Color	Designation	Head No.	Wire Color	Head Color	Designation
R1,R2	Red	RRFB	13 R	20	Red	Don't Walk	11 R	24	Red	Don't Walk	9 R	9,10	Red	Red	2 R
	Orange	RRFB	13 Y		Orange	Walk	11 G		Orange	Walk	9 G		Orange	Amber	2 Y
	Green	RRFB neutral	CB		Green	Neutral	CB		Green	Neutral	CB		Green	Green	2 G
	White	PB neutral	13 G		White	PB neutral	R 9-12		White	PB neutral	R 9-12		White	Ground/neutral	CB
	White/Black	PB	R 13-16		White/Black	PB	Q 11		White/Black	PB	L 11				
												Phase # 5			
A17, A18 (7/C #14)				A13 - Central (25/C #14)				A22 - Central (25/C #14)				Head No.			
Head No.				Phase # 6				Phase # 2				7,8	Red/Black	<< Red <<	5 R
R3,R4	Red	RRFB	14 R	Head No.				Head No.					Orange/Black	<< Amber <<	5 Y
	Orange	RRFB	14 Y	5	Red	Red	6 R	11	Red	Red	2 R		Green/Black	<< Green <<	5 G
	Green	RRFB neutral	CB		Orange	Amber	6 Y		Orange	Amber	2 Y		Black	Ground/neutral	CB
	White	PB neutral	14 G		Green	Green	6 G		Green	Green	2 G				
	White/Black	PB	R 13-16		White	Ground/neutral	CB		White	Ground/neutral	CB	NB Bridge - WB (7/C #14)			
												Phase # 8			
A19, A20 (7/C #14)				Phase # 5				Phase # 2 Ped				Head No.			
Head No.				Head No.				Head No.				17,18	Red	<< Red <<	8 R
R5,R6	Red	RRFB	15 R	6	Red/Black	<< Red <<	5 R	25	Black	Don't Walk	9 R		Orange	<< Amber <<	8 Y
	Orange	RRFB	15 Y		Orange/Black	<< Amber <<	5 Y		Blue	Walk	9 G		Green	<< Green <<	8 G
	Green	RRFB neutral	CB		Green/Black	<< Green <<	5 G		White/Black	Ground/neutral	CB		White	Ground/neutral	CB
	White	PB neutral	15 G		White	Ground/neutral	CB								
	White/Black	PB	R 13-16					Phase # 1				SB Bridge - SB (12/C #14)			
				Phase # 8				Head No.				Phase # 8			
A26, A27 (7/C #14)				Head No.				1	Red/Black	<< Red <<	1 R	Head No.			
Head No.				19	Red/Green	<< Red <<	8 R		Orange/Black	<< Amber <<	1 Y	3,4	Red	Red	6 R
R7,R8	Red	RRFB	16 R		Orange/Red	<< Amber <<	8 Y		Green/Black	<< Green <<	1 G		Orange	Amber	6 Y
	Orange	RRFB	16 Y		Green/White	<< Green <<	8 G		White	Ground/neutral	CB		Green	Green	6 G
	Green	RRFB neutral	CB		White	Ground/neutral	CB						White	Ground/neutral	CB
	White	PB neutral	16 G					Phase # 4							
	White/Black	PB	R 13-16	A12, A14, A15 - Central (7/C #14)				Head No.				Phase # 1			
				Phase # 6				13	Red/Green	<< Red <<	4 R	Head No.			
PED. P.B.' s				Head No.					Orange/Red	<< Amber <<	4 Y	2	Red/Black	<< Red <<	1 R
(25/C #14)	Blue/Red	Phase 2	L 11	21,22,23	Red	Don't Walk	11 R		Green/White	<< Green <<	4 G		Orange/Black	<< Amber <<	1 Y
	Red/White	Phase 4	L 9		Orange	Walk	11 G		White	Ground/neutral	CB		Green/Black	<< Green <<	1 G
	Blue/Red	Phase 6	Q 11		Green	Neutral	CB						Black	Ground/neutral	CB
	Red/White	Phase 8	Q 9		White	PB neutral	R 9-12	A23, A24 - Central (7/C #14)							
	White/Red	PB common	R 9 ~ 12		White/Blue	PB	Q 11	Phase # 2				SB Bridge - EB (7/C #14)			
								Head No.				Phase # 4			
				A16 - Southwest (12/C #14)				26,27	Red	Don't Walk	9 R	Head No.			
				Phase # 4					Orange	Walk	9 G	14,15	Red	<< Red <<	4 R
				Head No.					Green	Neutral	CB		Orange	<< Amber <<	4 Y
				12	Red	<< Red <<	4 R		White	PB neutral	R 9-12		Green	<< Green <<	4 G
					Orange	<< Amber <<	4 Y		White/Blue	PB	L 11		White	Ground/neutral	CB
					Green	<< Green <<	4 G								
					White	Ground/neutral	CB	A25 - Northeast (12/C #14)							
								Phase # 8							
								Head No.							
								16	Red	<< Red <<	8 R				
									Orange	<< Amber <<	8 Y				
									Green	<< Green <<	8 G				
									White	Ground/neutral	CB				

PHASING DIAGRAM



REGISTERED PROFESSIONAL ENGINEER
REG. NO. 15776
JOHN M. C. GRAY
SOUTH DAKOTA
11/15/24

Plot Scale - 1:40

Plotted From - ngjersvik

File - ...\05HN_sgl-wiring-tables.dgn

WIRING DIAGRAM

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L51	L73

Plotting Date: 11/15/2024

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 9362
CHRISTOPHER B. GREEN
SOUTH DAKOTA
11/15/24

120\240 v.a.c., 60hz.,
1 Phase, 3 Wire Service
By Xcel

METER 4

SERVICE CABINET ESC1
200 amp
BK
WT
BK
50 amp

#6
#8
TO AA
SHEET L52
JL16
#6
#8
TO BB
SHEET L52
JL15
#6
#8

L15
LUMINAIRE
BK
WT
#8
#8
#4
JL47
TO KK
SHEET L54
#6
#6
#2

L1 L2 L3 L4 L5 L6 L7 L8 L9 L10 L11 L12 L13

LUMINAIRE A
BK
WT
BK
LUMINAIRE B
#8
#6

JL9

JL48

TO LL
SHEET L54

L14

TO CC
SHEET L52

LEGEND:
- FUSE: 20 amp.
- LUMINAIRE: LED
- Wire nut
- #6 Copper conductor single #6
- #8 Copper conductor single #8
- Splice

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

Plot Scale - 1:40

Plotted From - ngiersvik

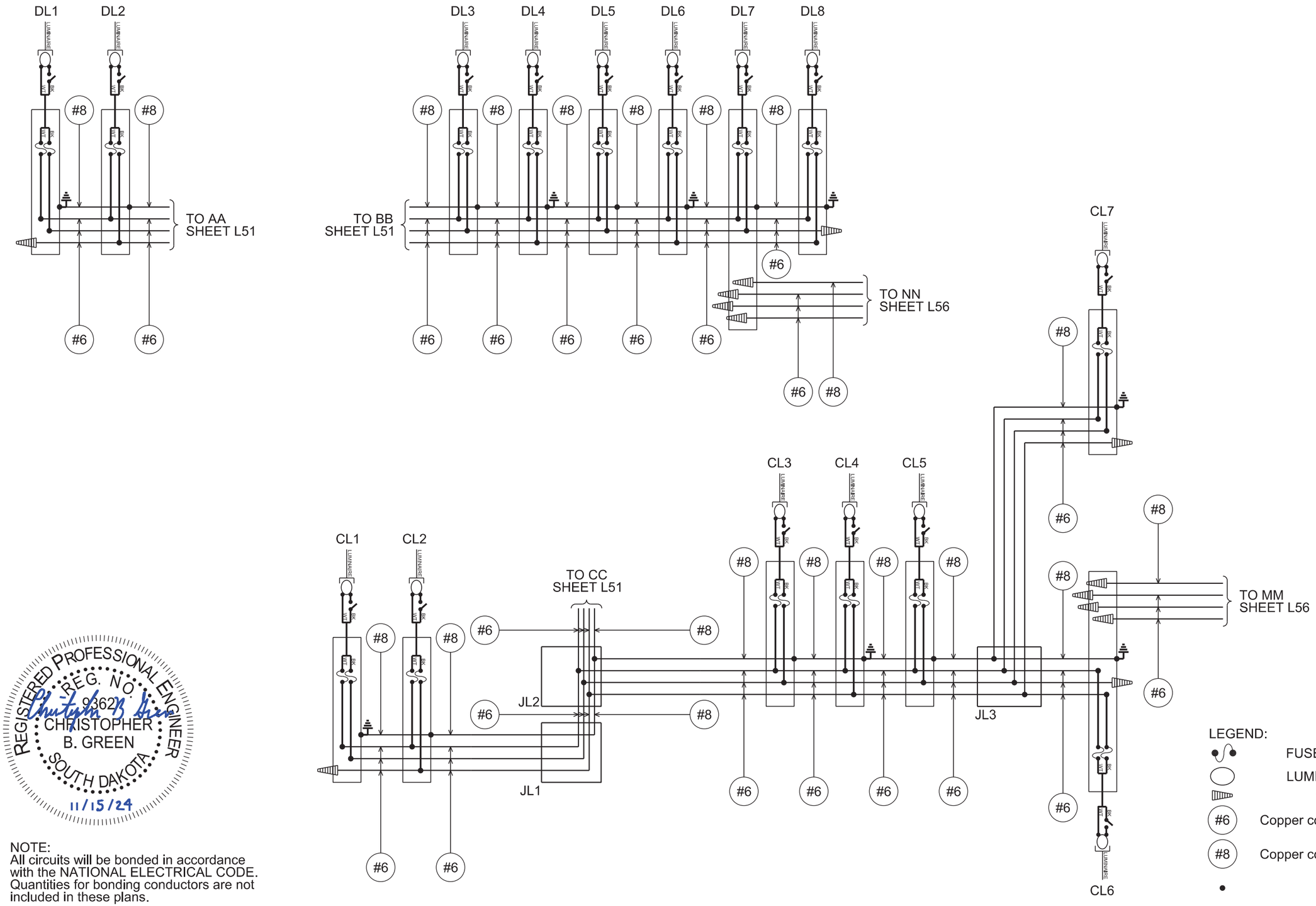
File - ...\05HN_sgl-wiring-diagrams.dgn

WIRING DIAGRAM

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L52	L73

Plotting Date: 11/15/2024



REGISTERED PROFESSIONAL ENGINEER
REG. NO. 9362
CHRISTOPHER B. GREEN
SOUTH DAKOTA
11/15/24

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

LEGEND:

- FUSE: 20 amp.
- LUMINAIRE: LED
- Wire nut
- #6 Copper conductor single #6
- #8 Copper conductor single #8
- Splice

Plot Scale - 1:40

Plotted From - nalersvik

File - ...\05HN_sgl-wiring-diagrams.dgn

WIRING DIAGRAM

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L53	L73

Plotting Date: 11/15/2024

120\240 v.a.c., 60hz.,
1 Phase, 3 Wire Service
By Xcel

METER 5

SERVICE CABINET ESC2
200 amp
BK
WT
BK
50 amp

BL1 BL2 BL3 BL4 BL5 BL6 BL7
LUMINAIRE
WT BK

JL4 JL5 JL6 JL7 JL8 JSM5

#8 #6 #2 #4 #10

TO DD
SHEET L54

TO OO
SHEET L57

SPUL1 SPUL2 SPUL3 SPUL4 SPUL5
LUMINAIRE
WT BK GND

PHOTOCELL
CONTROL
BOX

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
9362
CHRISTOPHER
B. GREEN
SOUTH DAKOTA
11/15/24

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

LEGEND:

- FUSE: 20 amp.
- LUMINAIRE: LED
- Wire nut
- #2 Copper conductor single #2
- #4 Copper conductor single #4
- #6 Copper conductor single #6
- #8 Copper conductor single #8
- #10 Copper conductor single #10
- Splice

Plot Scale - 1:40

Plotted From - ngjersvik

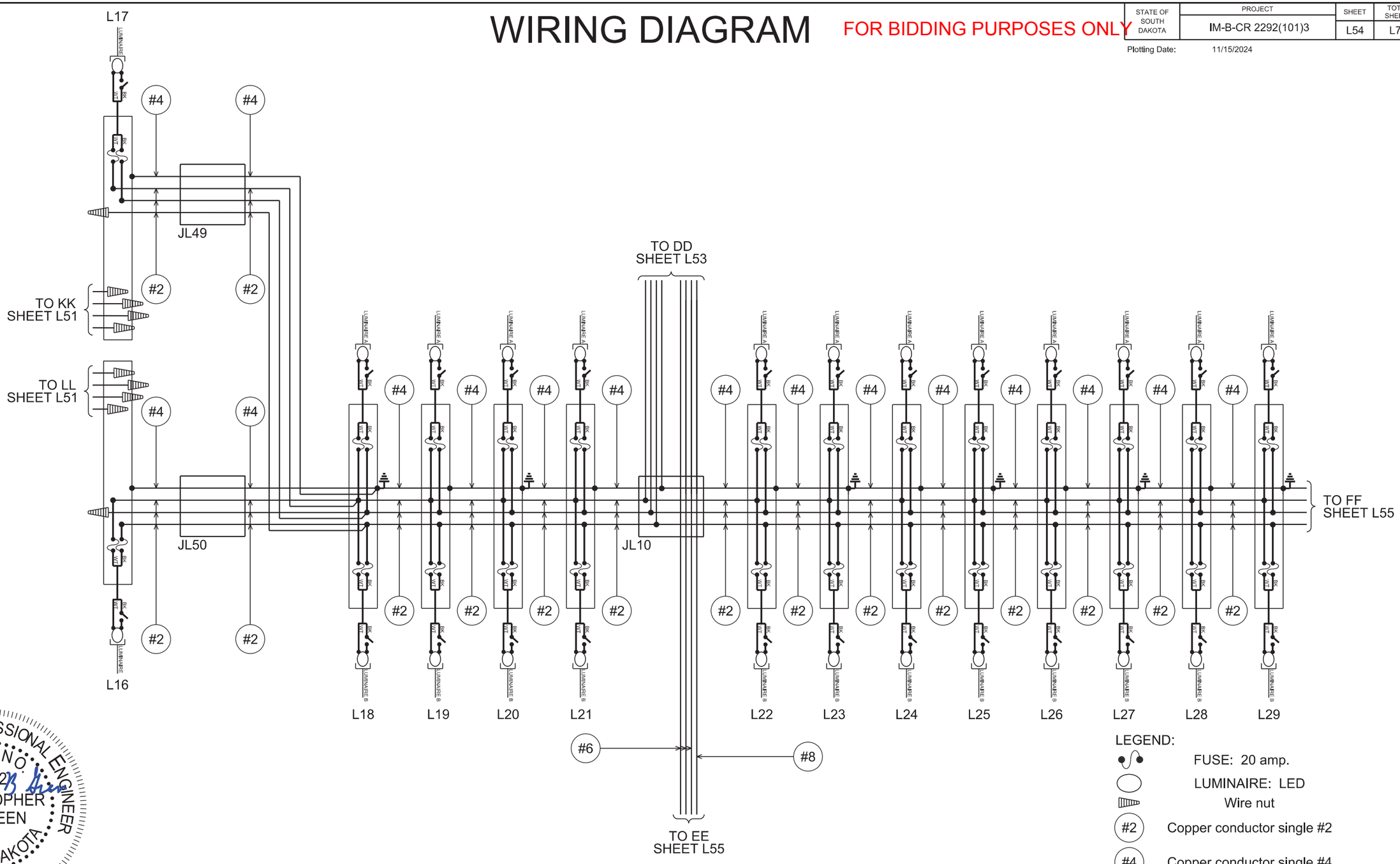
File - ...\05HN_sgl-wiring-diagrams.dgn

WIRING DIAGRAM

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L54	L73

Plotting Date: 11/15/2024



REGISTERED PROFESSIONAL ENGINEER
REG. NO. 9362
CHRISTOPHER B. GREEN
SOUTH DAKOTA
11/15/24

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

LEGEND:

- FUSE: 20 amp.
- LUMINAIRE: LED
- Wire nut
- #2 Copper conductor single #2
- #4 Copper conductor single #4
- #6 Copper conductor single #6
- #8 Copper conductor single #8
- Splice

Plot Scale - 1:40

Plotted From - ngiersvik

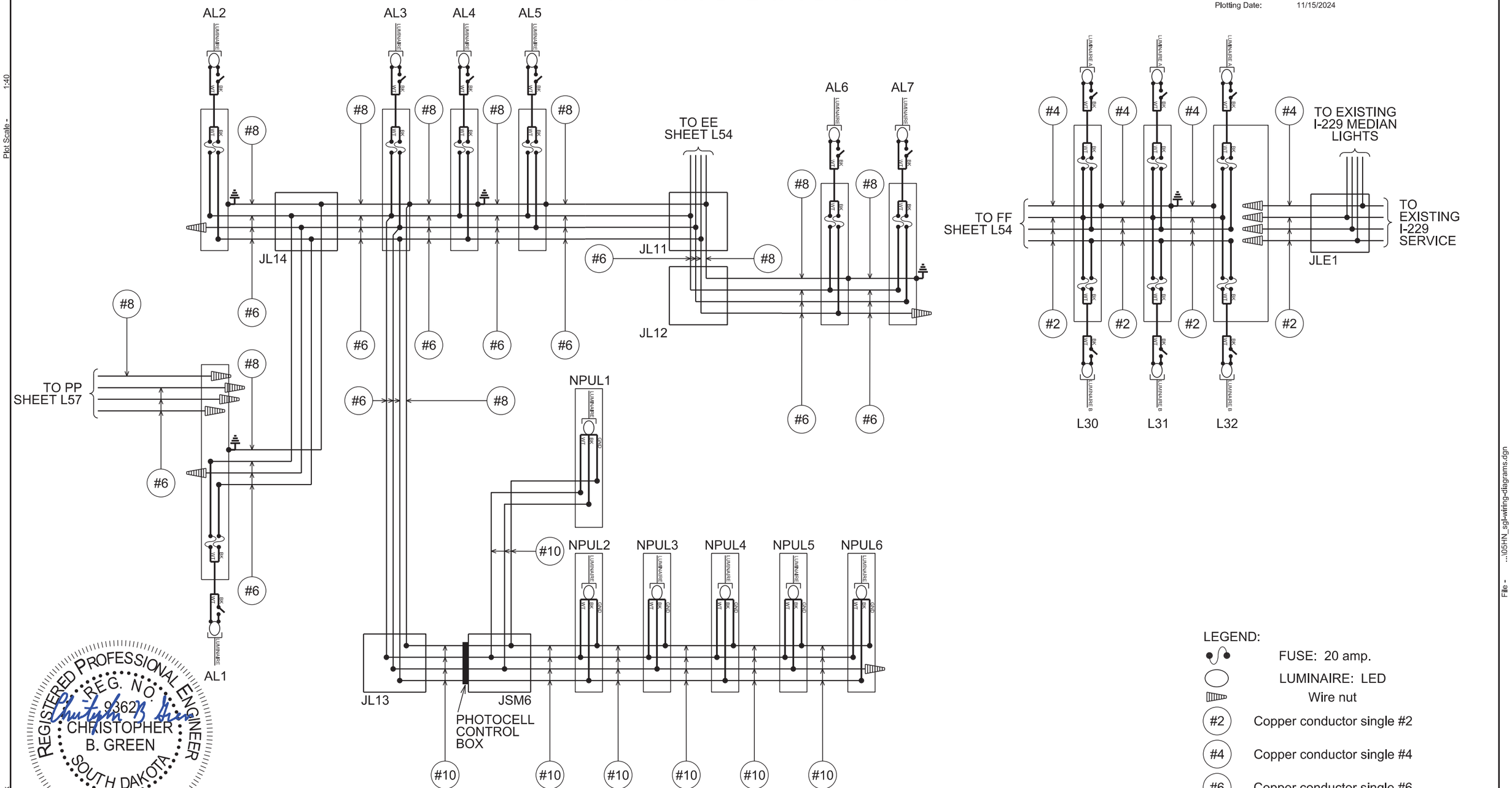
File - ...\05HN_sgl-wiring-diagrams.dgn

WIRING DIAGRAM

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L55	L73

Plotting Date: 11/15/2024



REGISTERED PROFESSIONAL ENGINEER
REG. NO. 9362
CHRISTOPHER B. GREEN
SOUTH DAKOTA
11/15/24

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

LEGEND:

- FUSE: 20 amp.
- LUMINAIRE: LED
- Wire nut
- #2 Copper conductor single #2
- #4 Copper conductor single #4
- #6 Copper conductor single #6
- #8 Copper conductor single #8
- #10 Copper conductor single #10
- Splice

Plot Scale - 1:40

Plotted From - ngiersvik

File - ...\05HN_sgl-wiring-diagrams.dgn

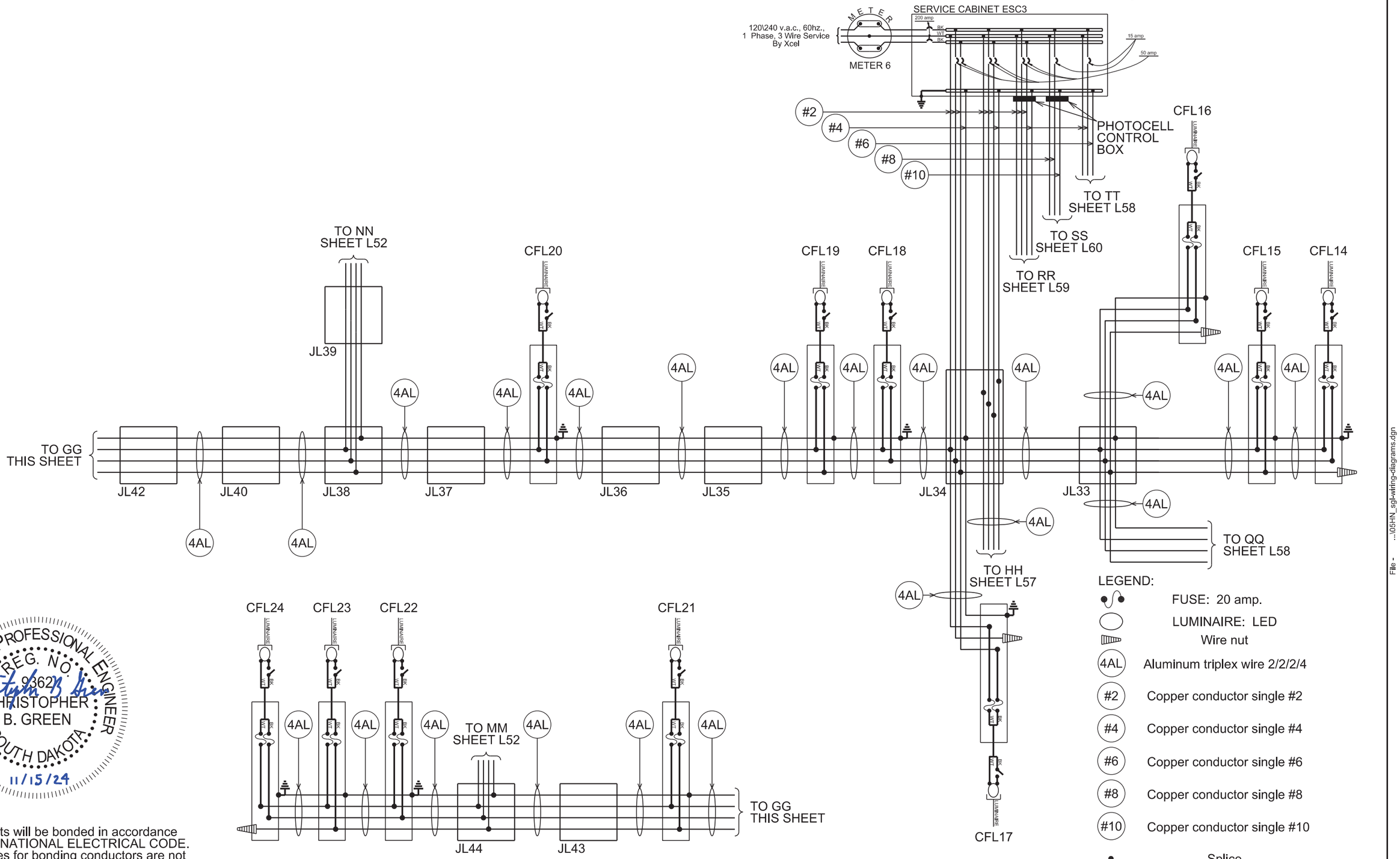
WIRING DIAGRAM

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L56	L73

Plotting Date: 11/15/2024

Plot Scale - 1:40



LEGEND:

- FUSE: 20 amp.
- LUMINAIRE: LED
- Wire nut
- 4AL — Aluminum triplex wire 2/2/2/4
- #2 — Copper conductor single #2
- #4 — Copper conductor single #4
- #6 — Copper conductor single #6
- #8 — Copper conductor single #8
- #10 — Copper conductor single #10
- Splice

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 9362
CHRISTOPHER B. GREEN
SOUTH DAKOTA
11/15/24

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

Plotted From - ngiersvik

File - ...\05HN_sgl-wiring-diagrams.dgn

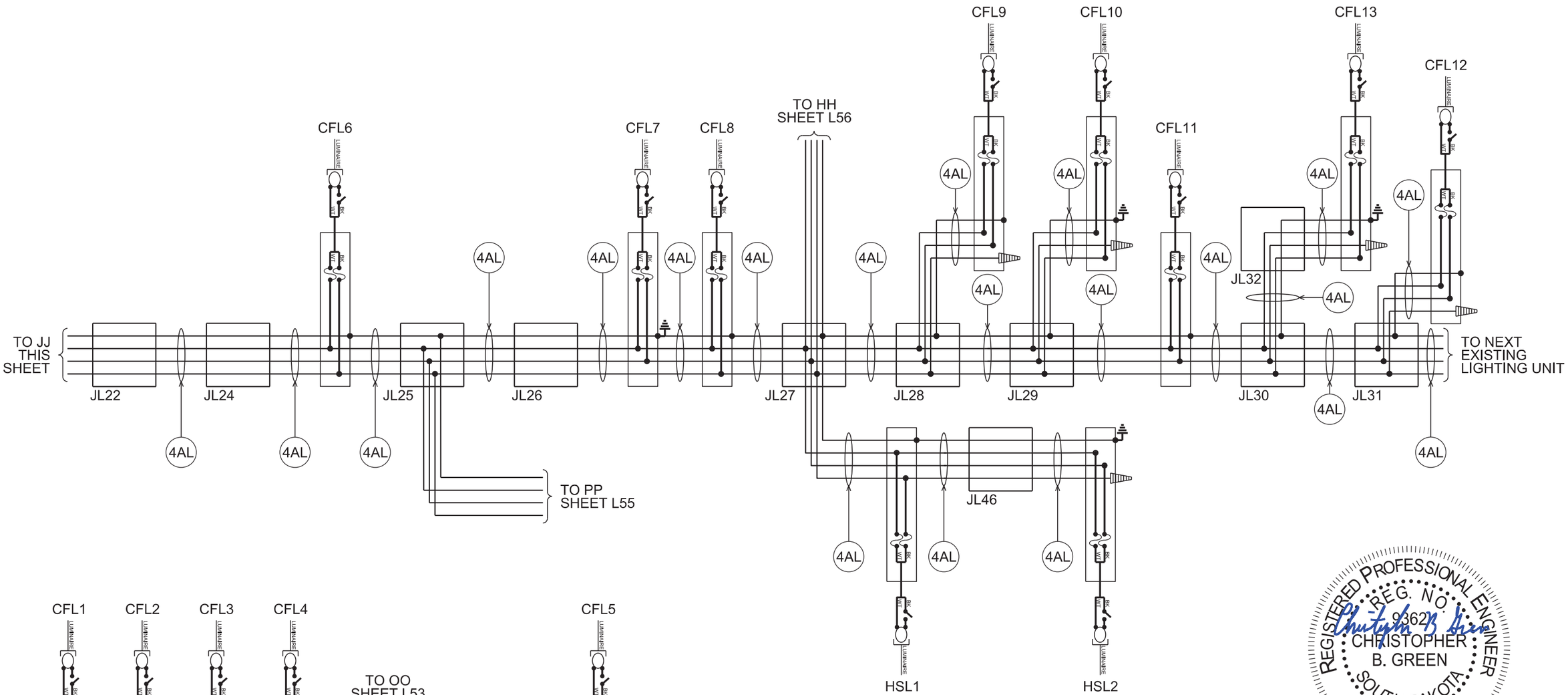
WIRING DIAGRAM

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L57	L73

Plotting Date: 11/15/2024

Plot Scale - 1:40



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

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 9362
CHRISTOPHER B. GREEN
SOUTH DAKOTA
11/15/24

LEGEND:

- FUSE: 20 amp.
- LUMINAIRE: LED
- Wire nut
- 4AL — Aluminum triplex wire 2/2/2/4
- Splice

Plotted From - ngiersvik

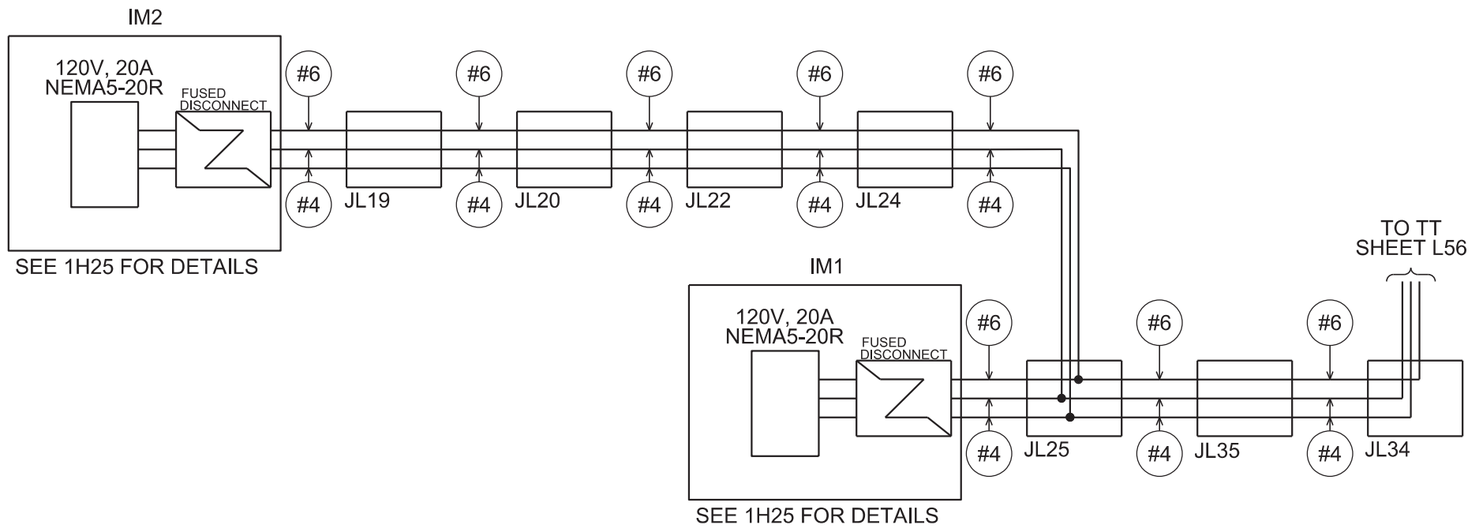
File - ...\05HN_sgl-wiring-diagrams.dgn

WIRING DIAGRAM

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L58	L73

Plotting Date: 11/15/2024



REGISTERED PROFESSIONAL ENGINEER
REG. NO. 9362
CHRISTOPHER B. GREEN
SOUTH DAKOTA
11/15/24

LEGEND:

- FUSE: 20 amp.
- LUMINAIRE: LED
- Wire nut
- #4 Copper conductor single #4
- #6 Copper conductor single #6
- Splice

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

Plot Scale - 1:40

Plotted From - nrjlersvik

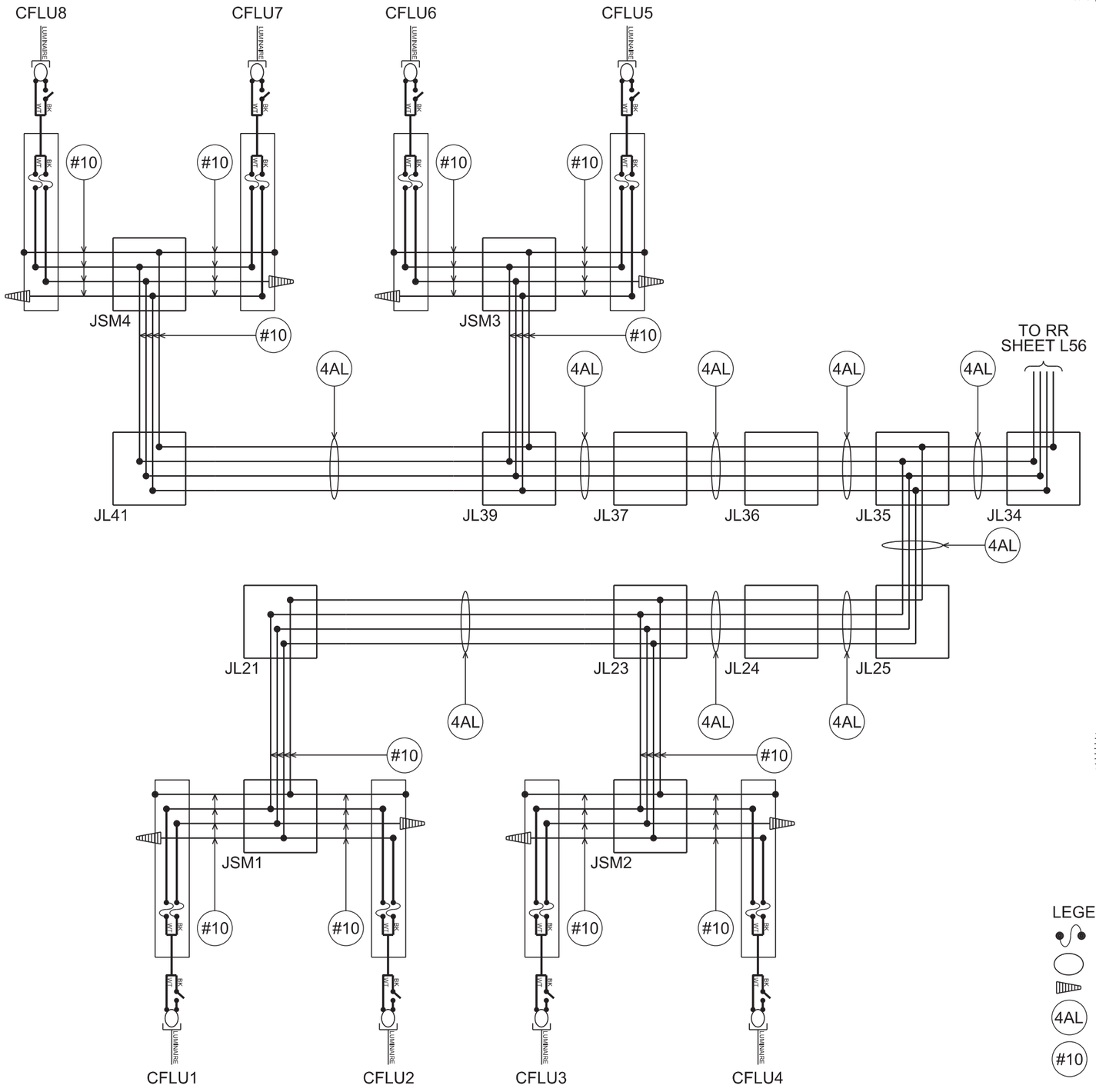
File - ...\05HN_sgl-wiring-diagrams.dgn

WIRING DIAGRAM

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L59	L73

Plotting Date: 11/15/2024



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

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 9362
CHRISTOPHER B. GREEN
SOUTH DAKOTA
11/15/24

LEGEND:

- FUSE: 20 amp.
- LUMINAIRE: LED
- Wire nut
- (4AL) Aluminum triplex wire 2/2/2/4
- (#10) Copper conductor single #10
- Splice

Plot Scale - 1:40

Plotted From - ...njlersvik

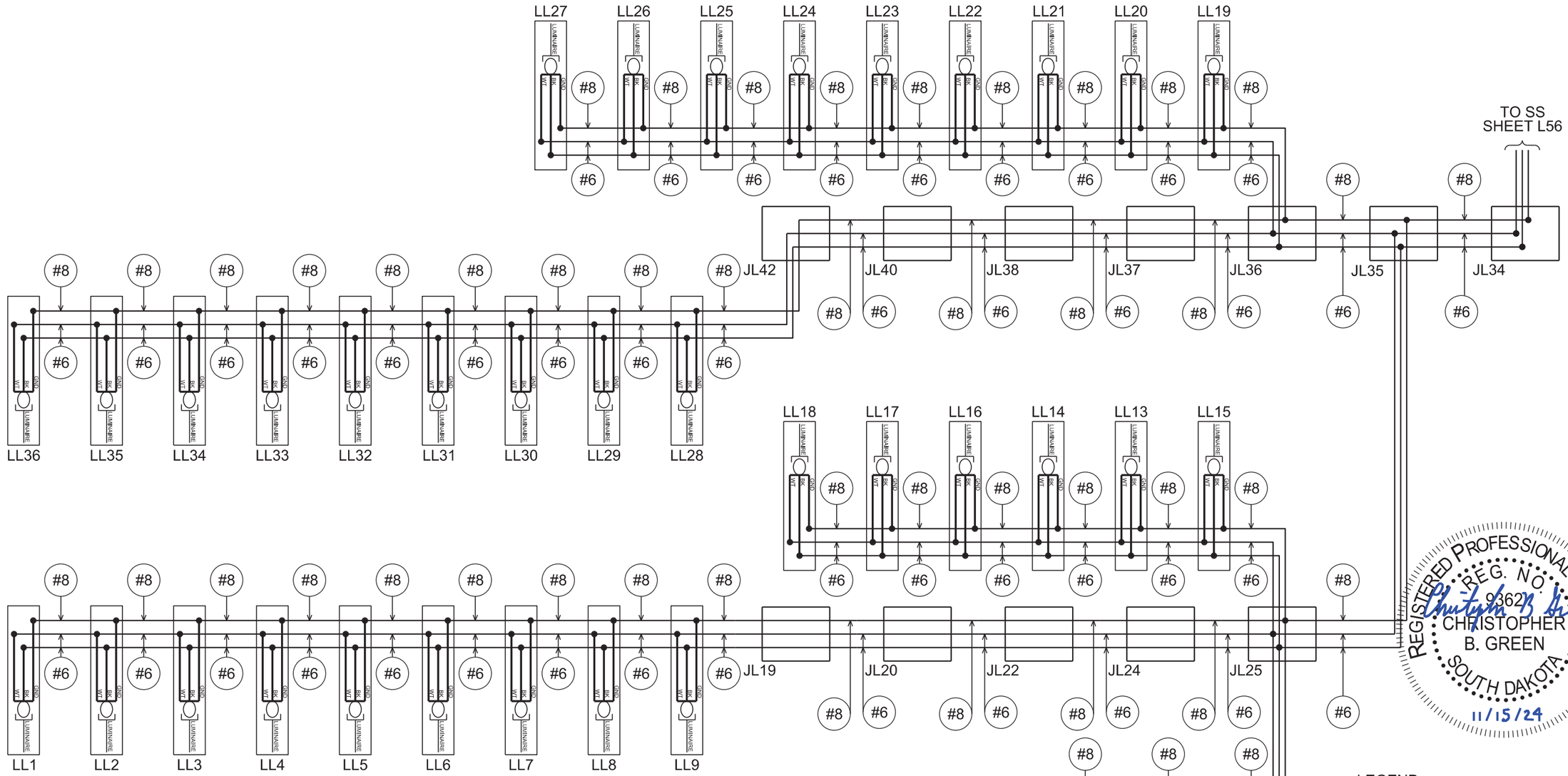
File - ...\05HN_sgl-wiring-diagrams.dgn

WIRING DIAGRAM

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L60	L73

Plotting Date: 11/15/2024



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

REGISTERED PROFESSIONAL ENGINEER
REG. NO. 9362
CHRISTOPHER B. GREEN
SOUTH DAKOTA
11/15/24

LEGEND:

- FUSE: 20 amp.
- LUMINAIRE: LED
- Wire nut
- #6 Copper conductor single #6
- #8 Copper conductor single #8
- Splice

Plot Scale - 1:40

Plotted From - njersvik

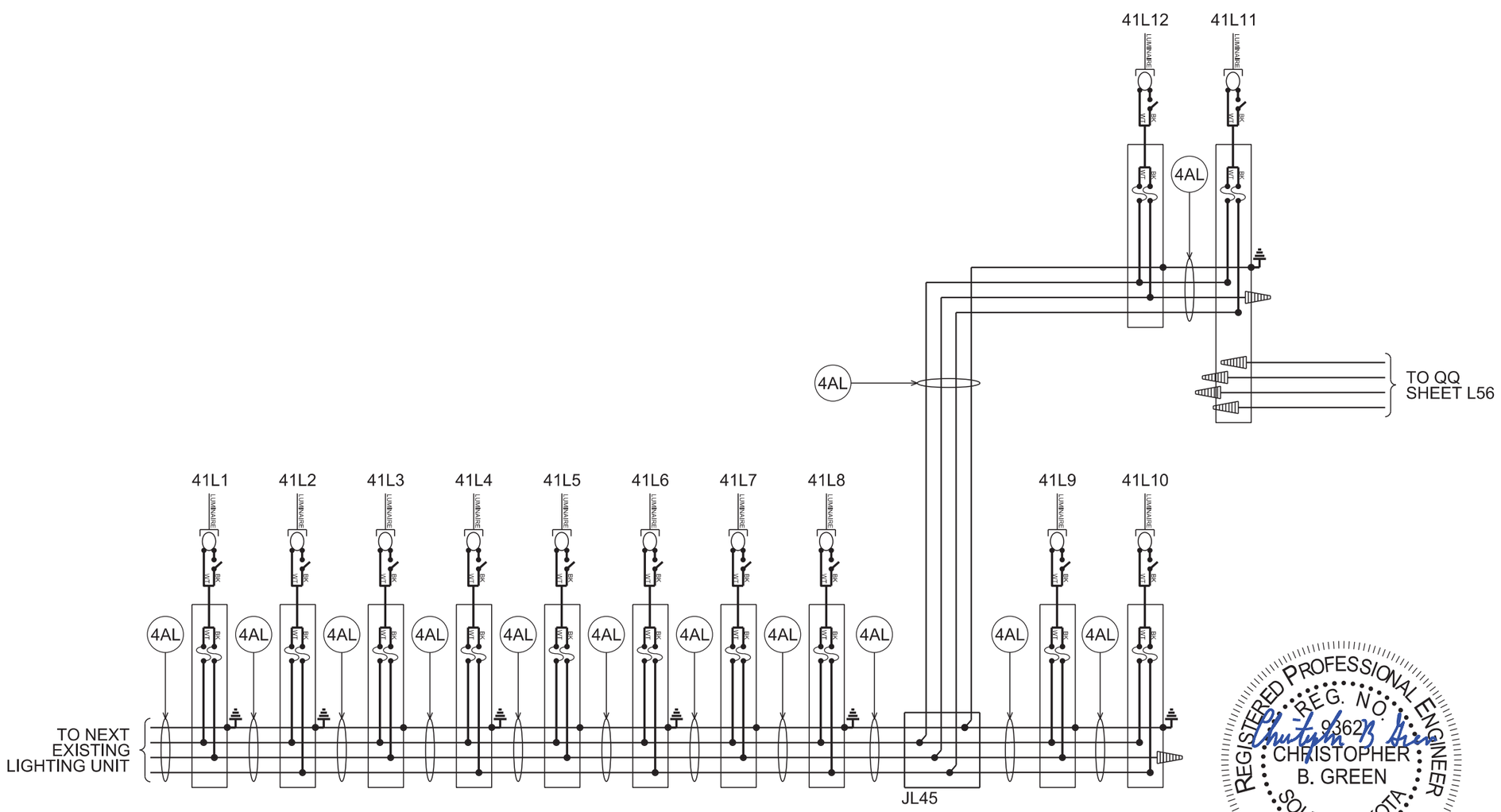
File - ...\05HN_sgl-wiring-diagrams.dgn

WIRING DIAGRAM

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L61	L73

Plotting Date: 11/15/2024



REGISTERED PROFESSIONAL ENGINEER
REG. NO. 9362
CHRISTOPHER B. GREEN
SOUTH DAKOTA
11/15/24

LEGEND:

- FUSE: 20 amp.
- LUMINAIRE: LED
- Wire nut
- 4AL — Aluminum triplex wire 2/2/2/4
- Splice

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

Plot Scale - 1:40

Plotted From - nsjersvik

File - ...\05HN_sgl-wiring-diagrams.dgn

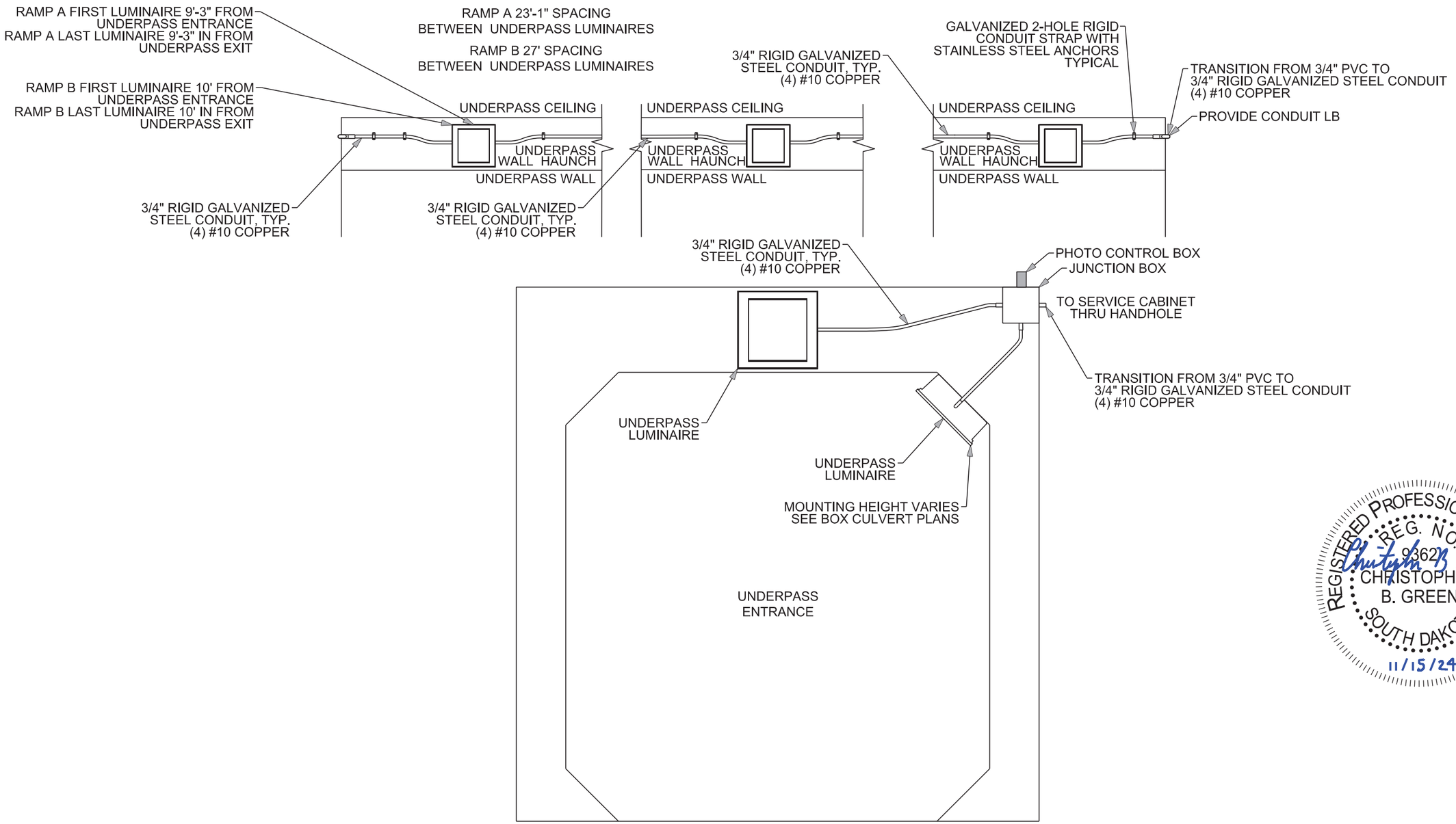
PEDESTRIAN UNDERPASS DETAILS

RAMP A & RAMP B

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-B-CR 2292(101)3	L62	L73

Plotting Date: 11/15/2024



REGISTERED PROFESSIONAL ENGINEER
REG. NO. 9362
CHRISTOPHER B. GREEN
SOUTH DAKOTA
11/15/24

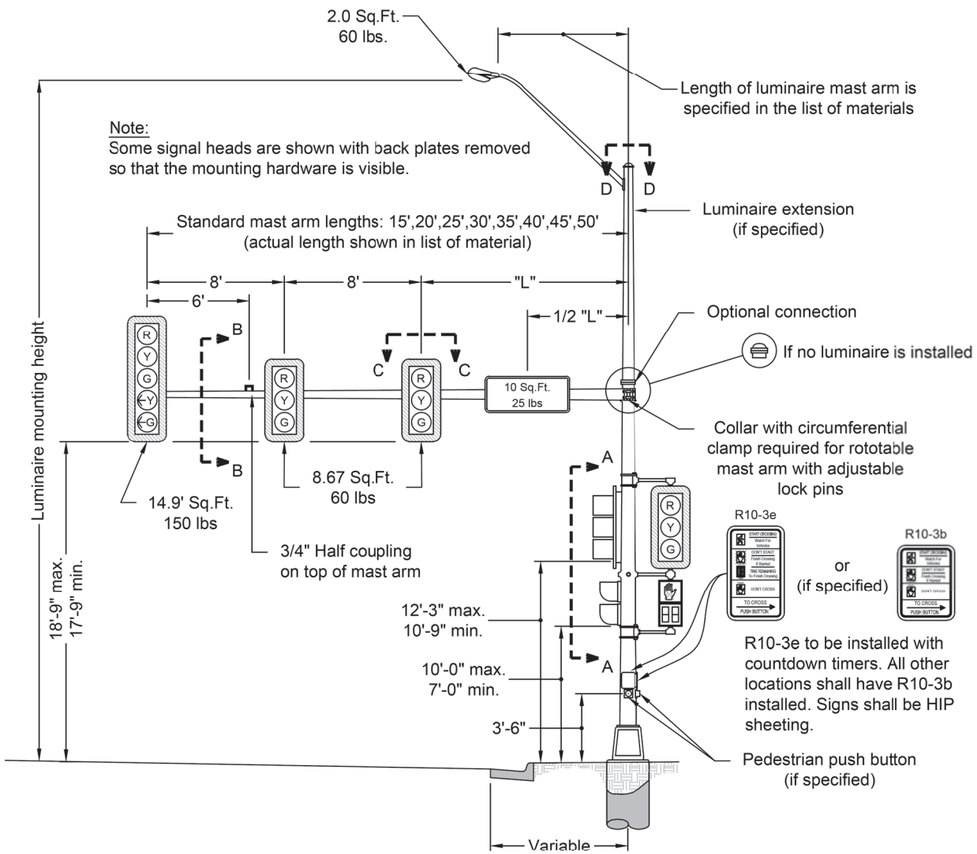
UNDERPASS ELEVATION
UNDERPASS LUMINAIRE MOUNTING DETAIL

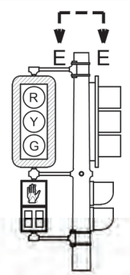
NOT TO SCALE

Plot Scale - 1:200

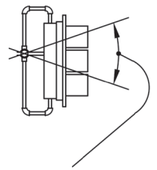
Plotted From - ngjersvik

File - ...\05HN_sg4-dtl-tunnels.dgn





Section A-A

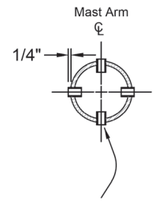


All mast arm mounted signals shall be adjustable about a horizontal axis as shown

Section B-B

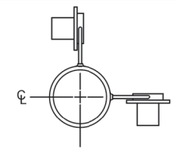
All mast arm mounted signals shall be adjustable about a vertical axis as shown

Section C-C



1 1/2" Half coupling - 4 required per pole as shown - provided plugs for unused couplings.

Section D-D



All traffic signal and pedestrian head mounting brackets shall be mounted behind poles.

Section E-E

Revised: December 2016

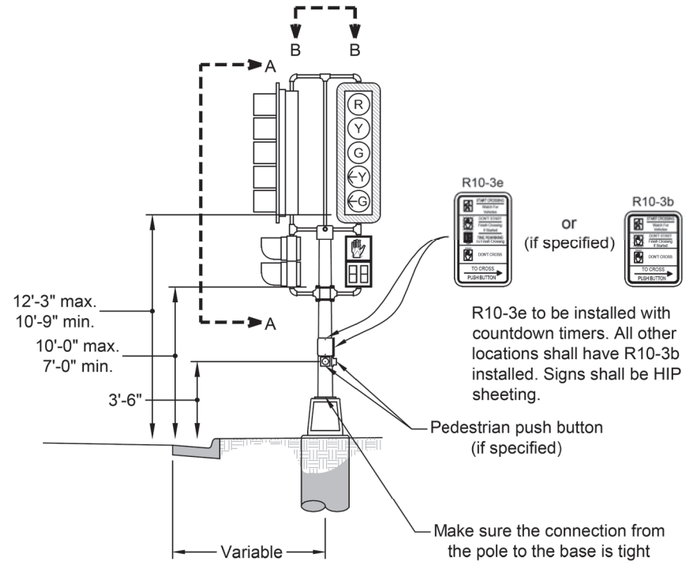
CITY OF SIOUX FALLS
PUBLIC WORKS
Providing a Better Quality of Life for You!

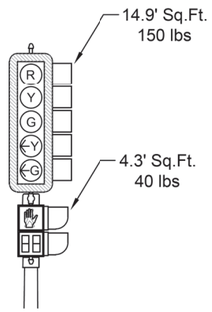
Traffic Signal Pole Shown With Optional Luminaire Extension

Specification Reference
No. 635A

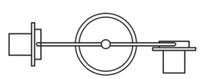
Plate Number
635.01

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





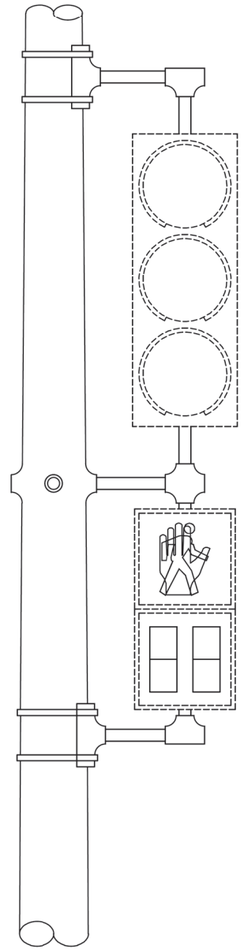
Section A-A



Section B-B

Revised: November 2013

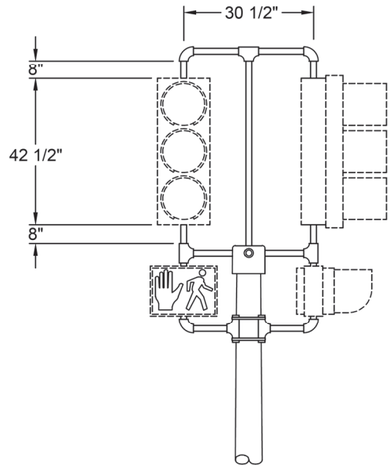
CITY OF SIOUX FALLS PUBLIC WORKS Providing a Better Quality of Life for You!	**Signal Pedestal Pole**	Specification Reference No. 635A	Plate Number 635.04



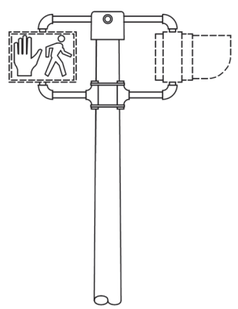
Typical Section
Type 10B

Revised: November 2013

CITY OF SIOUX FALLS PUBLIC WORKS Providing a Better Quality of Life for You!	**Signal and Pedestrian Head Mounting Brackets**	Specification Reference No. 635A	Plate Number 635.05



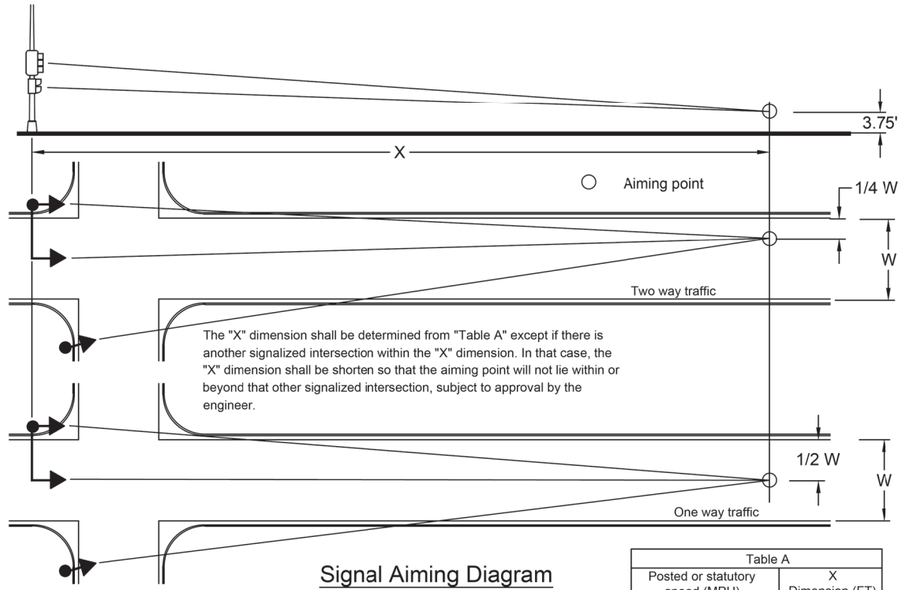
Typical Section
Type 2C



Typical Section
Type 4D

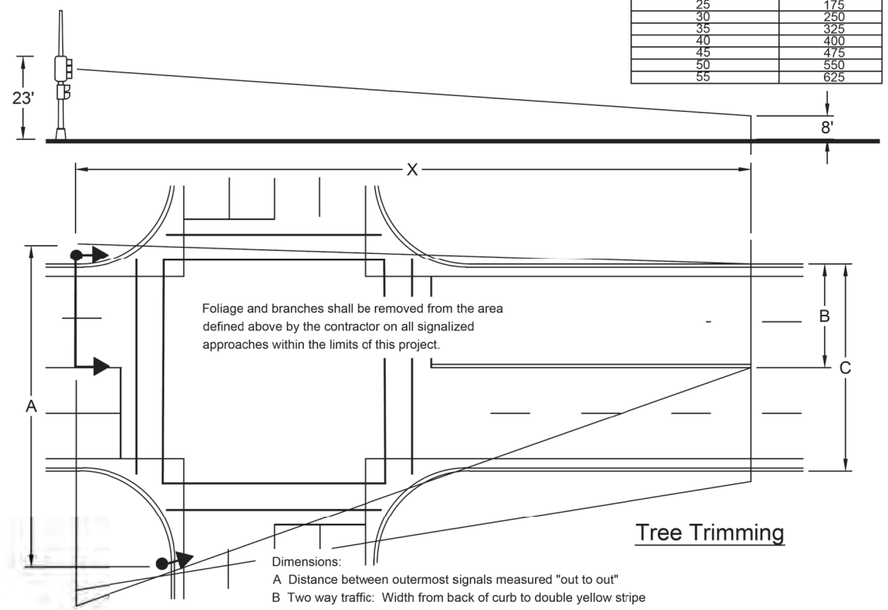
Revised: December 2007

CITY OF SIOUX FALLS PUBLIC WORKS Providing a Better Quality of Life for You!	**Signal and Pedestrian Head Mounting Brackets**	Specification Reference No. 635A	Plate Number 635.06



Signal Aiming Diagram

Table A	
Posted or statutory speed (MPH)	X Dimension (FT)
20	100
25	175
30	250
35	325
40	400
45	475
50	550
55	625

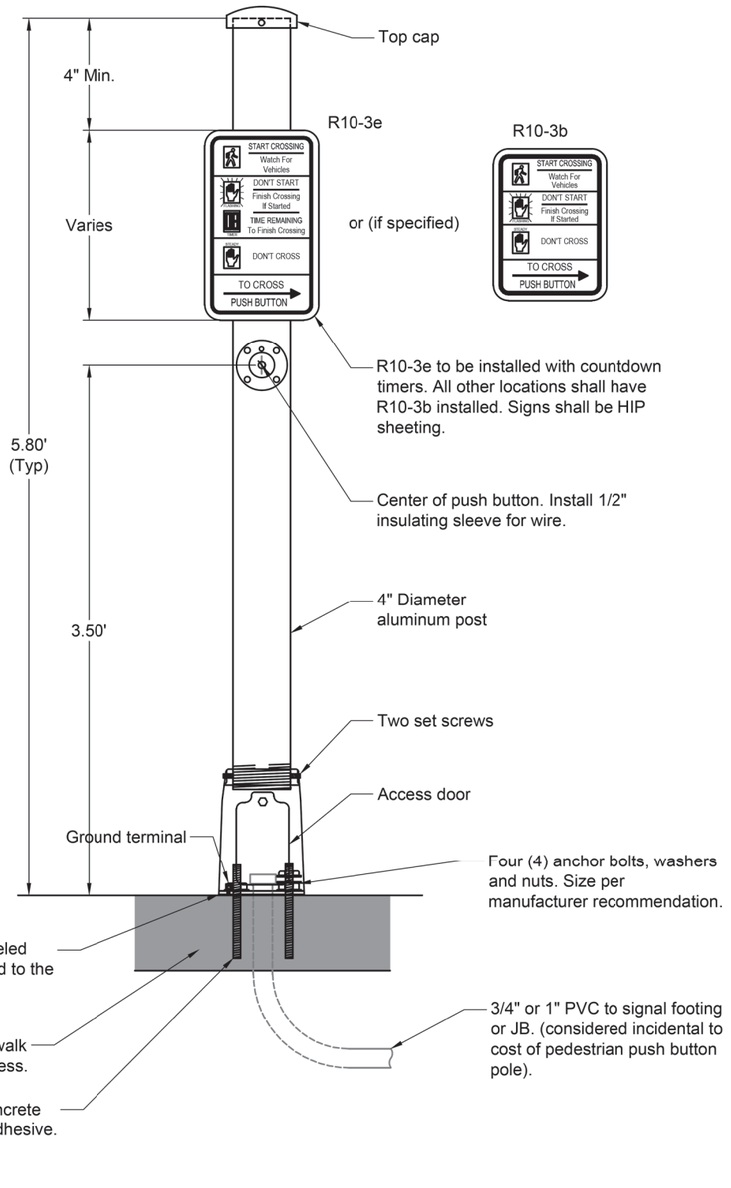


Tree Trimming

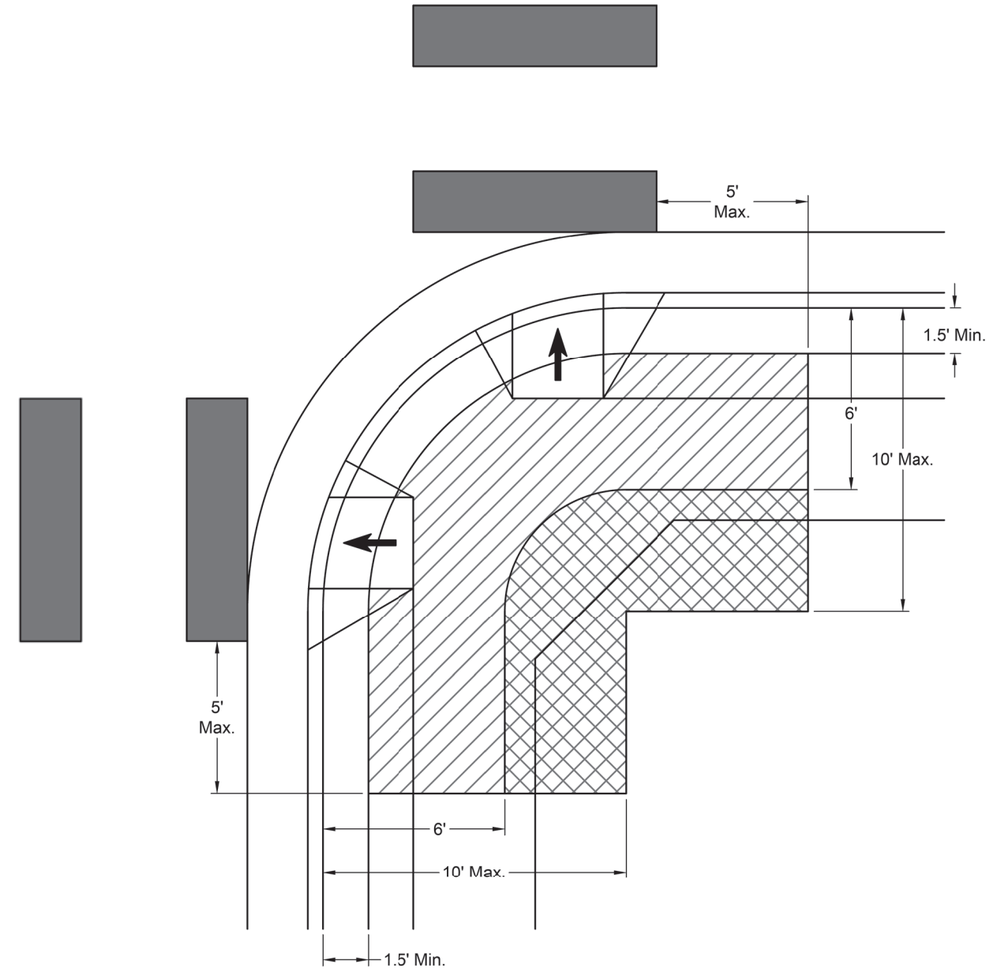
Dimensions:
A Distance between outermost signals measured "out to out"
B Two way traffic: Width from back of curb to double yellow stripe
C One way traffic: Width from back of curb to back of curb

Revised: December 2007

CITY OF SIOUX FALLS PUBLIC WORKS Providing a Better Quality of Life for You!	**Traffic Signal Head Alignment**	Specification Reference No. 635A	Plate Number 635.08



CITY OF SIOUX FALLS PUBLIC WORKS Providing a Better Quality of Life for You!	Pedestrian Push Button, Sign, Post, and Location	Specification Reference No. 635A	Plate Number 635.09



Notes:

* Pushbuttons shall be mounted parallel to crosswalks.
* There shall be at least 10 feet of separation between pushbutton locations.
* Only one pushbutton shall be mounted on a pushbutton pole.

Legend

Recommended pushbutton locations.

If recommended pushbutton locations are impractical, this area is acceptable.

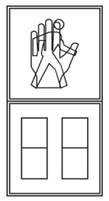
CITY OF SIOUX FALLS PUBLIC WORKS Providing a Better Quality of Life for You!	Pedestrian Push Button, Sign, Post, and Location	Specification Reference No. 635A	Plate Number 635.09

All lenses to be 12" in diameter

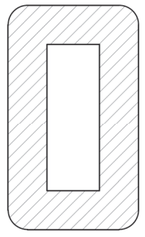
One way 5-section traffic signal

All lenses to be 12" in diameter

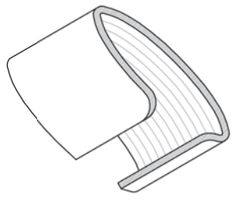
One way 3-section traffic signal



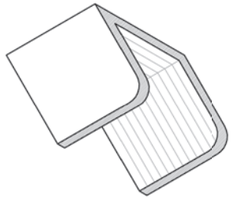
One way 1-section pedestrian signal



Typical 5" back plate



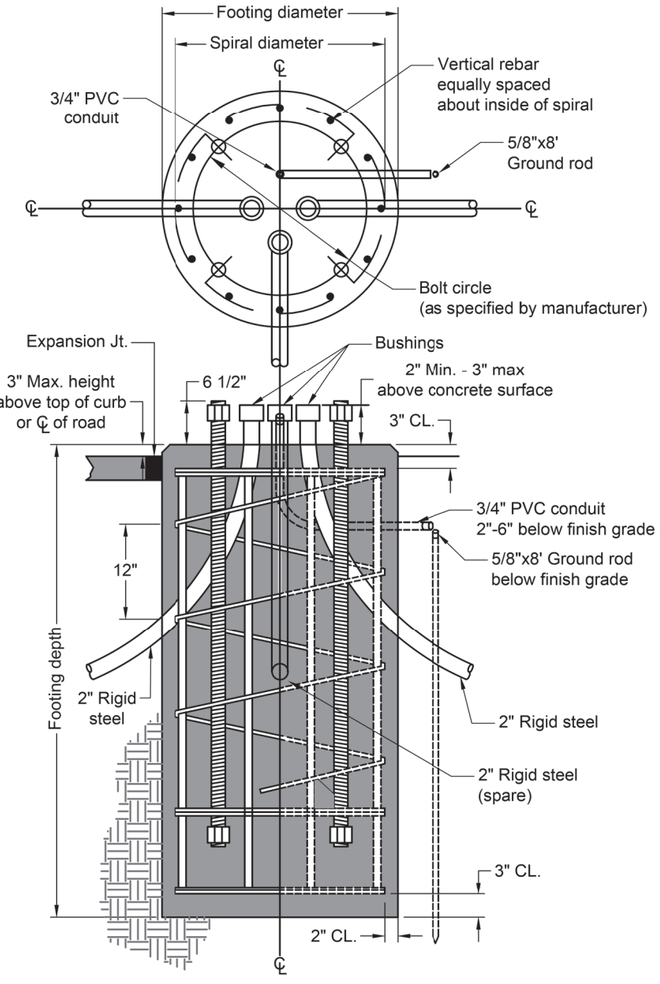
(V-1) Tunnel visor



(V-6) Pedestrian

Revised: November 2013

CITY OF SIOUX FALLS PUBLIC WORKS Providing a Better Quality of Life for You!	**Traffic Signal Head and Pedestrian Head Plate**	Specification Reference No. 635A	Plate Number 635.10



General Notes:

If base of pole is larger then that of the top of footing, then the top one foot of the footing shall be formed mono-lithically to match the pole base.

Expansion joint material - a two-inch (2") expansion strip, asphalt concrete Type "E", compacted as directed by the engineer, shall isolate footing from other concrete. Cost of expansion strip to be included in the bid price for footings.

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

Cost of the RGSC and conduit bushing shown in footings detail to be included in the bid price for footings.

All concrete shall be class M-6

Use current City of Sioux Falls Standard Specifications for traffic signals. Section 635A.

All reinforcing steel shall conform to A.S.T.M. A-615, Grade 40.

Cap all unused conduit.

Finished base will be level and have steel trowel finish.

Anchor bolts shall be threaded at both ends with nuts placed at the bottom.

Anchor bolts shall be equal distance from the center of the footing.

Conduits shall be centered in the footing leaving adequate room for the bushings.

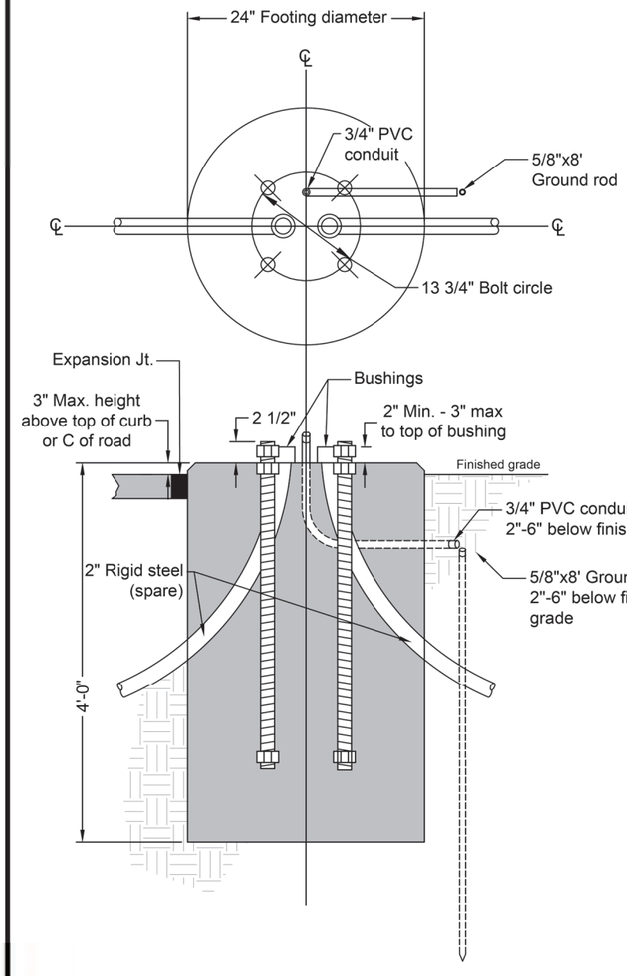
Footing Data

All footings shall be class M6 concrete, Type II cement

Footing diameter	Footing depth	Spiral diameter	Spiral size	Approx. spiral length	Vertical rebar
3'-0"	9'	2'-8"	#3	97'±	12 - #7x8'-6"
3'-0"	10'	2'-8"	#3	106'±	12 - #7x9'-6"
3'-0"	11'	2'-8"	#3	113'±	12 - #7x10'-6"
3'-0"	12'	2'-8"	#3	122'±	12 - #7x11'-6"
3'-0"	13'	2'-8"	#3	130'±	12 - #7x12'-6"
3'-0"	14'	2'-8"	#3	139'±	12 - #7x13'-6"

Revised: October 2020

CITY OF SIOUX FALLS PUBLIC WORKS Providing a Better Quality of Life for You!	**Signal Footing For Mast Arm Signal**	Specification Reference No. 635A	Plate Number 635.12



General Notes:

Expansion joint material - a two-inch (2") expansion strip, asphalt concrete Type "E", compacted as directed by the engineer, shall isolate footing from other concrete. Cost of expansion strip to be included in the bid price for footings.

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

The contractor is responsible for supplying the anchor bolts. Chance #8816, or equivalent (5/8"x16")

Cost of the RGSC and conduit bushing shown in footings detail to be included in the bid price for footings.

All concrete shall be class M-6

Use current City of Sioux Falls Standard Specifications for traffic signals. section 635A.

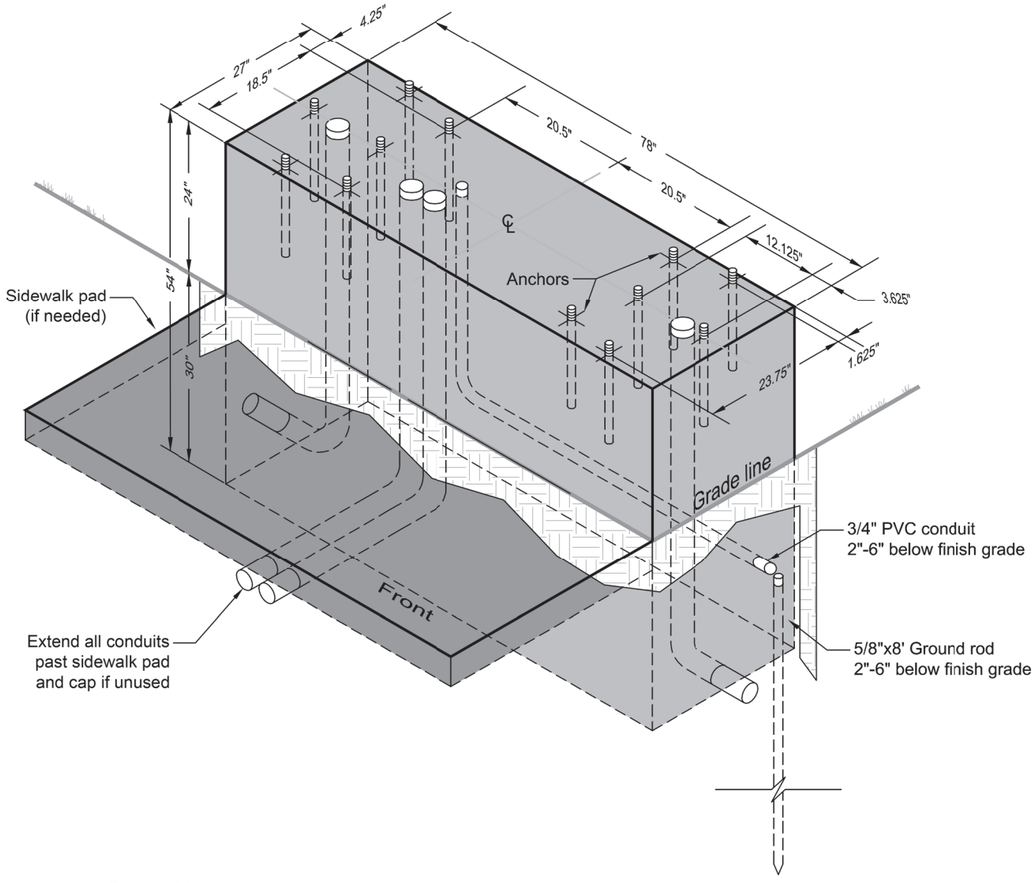
If installed, all reinforcing steel shall conform to A.S.T.M. A-615, Grade 40.

Cap all unused conduit.

Finished base will be level and have steel towel finish.

Revised: November 2013

CITY OF SIOUX FALLS PUBLIC WORKS Providing a Better Quality of Life for You!	Signal Footing For Pedestal Signal	Specification Reference No. 635A	Plate Number 635.13



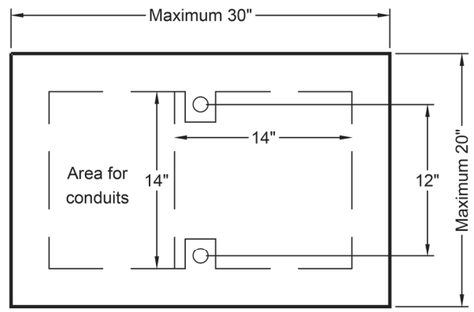
General Notes:

1. Verify anchor bolt placement with cabinet manufacturers and shop drawings.
2. 5/8" Dia. x 18" galvanized anchors shall be 2" above finished concrete.
3. Conduits shall be 2" to 3" above finished concrete.
4. Conduit to be rigid steel and have threads so the grounding bushings can be installed.
5. Concrete shall be level and steel trowel finished.
6. 5/8"x8' Ground rod shall be installed 2"-6" below finished grade.
7. 3/4" PVC conduit shall end adjacent to the ground rod.

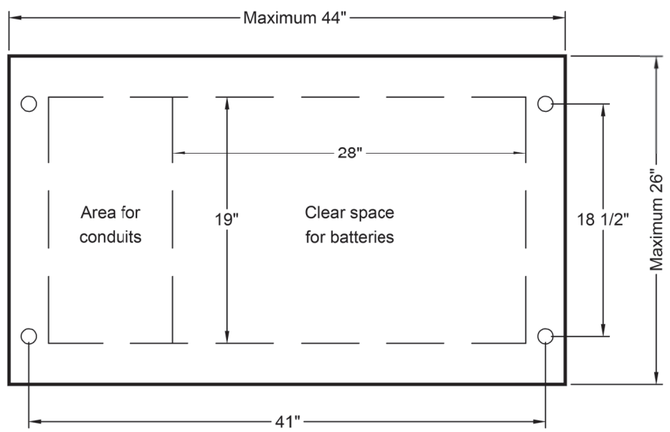
Revised: December 2017

CITY OF SIOUX FALLS PUBLIC WORKS Providing a Better Quality of Life for You!	Controller Cabinet Footing for Eight Phase Signal	Specification Reference No. 635A	Plate Number 635.17

Top View Four-Phase Controller Cabinets:



Top View Eight-Phase Controller Cabinets:



Front

Revised: November 2013

CITY OF SIOUX FALLS PUBLIC WORKS Providing a Better Quality of Life for You!	Traffic Signal Controller Cabinet Size and Bolt Hole Requirements	Specification Reference No. 635A	Plate Number 635.19

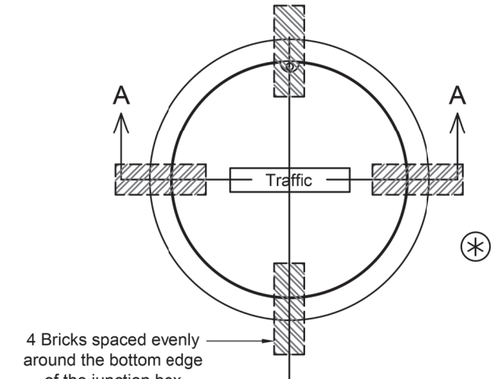
Cast Iron Cover

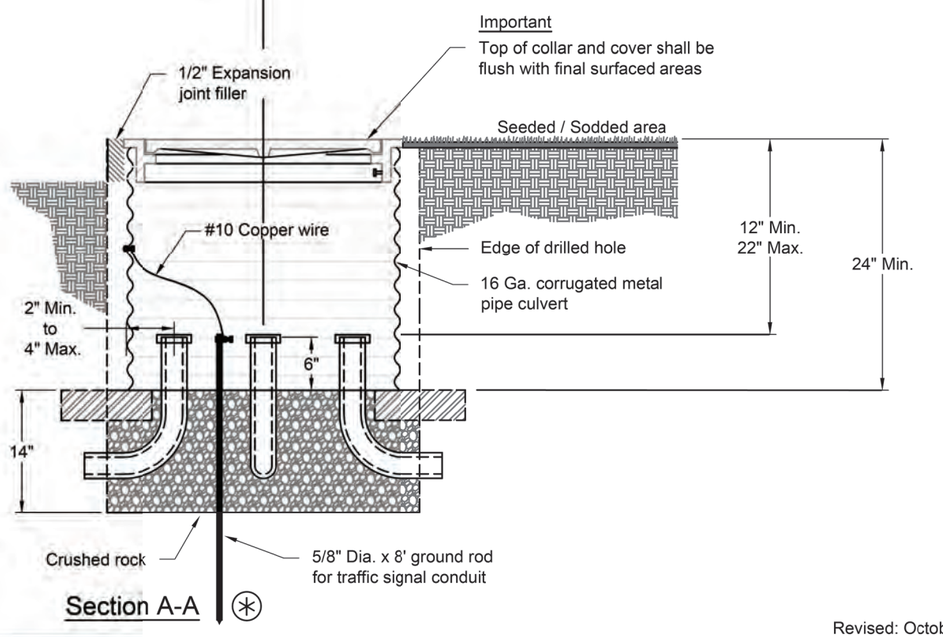
12" JB - Neenah Foundry Co. R-5900-A series or engineer approved.

18" JB - Neenah Foundry Co. R-5900-C series or engineer approved

24" JB - Neenah Foundry Co. R-5900-E series or engineer approved

30" JB - Neenah Foundry Co. R-5900-G series or engineer approved





Section A-A ⊛

Notes:

Allow sufficient slack so that cable ends can be pulled to 30" above junction box.

Number of conduit entrances varies with location of junction box.

Anchor frame to pipe as approved by the engineer.

Cover shall be stamped traffic.

All conduits coming into and leaving the junction box will be rigid steel and for at least (5) feet outside of the junction box. These conduit will have a grounding bushing attached and a grounding wire installed to bond all conduits to the junction box using an appropriately sized terminal lug bolted to the wall of the junction box.

Slots cut in culvert must be repaired. Permanently fastened from the outside and made out of culvert material. Infiltration point shall be sprayed with foam from the outside.

The junction box sizes and quantities are shown on the plan sheets.

⊛ When junction box is used for traffic signal conduit a ground rod will be installed in the bottom of the junction box. It shall not protrude more than (6) inches out of the crushed rock.

Revised: October 2020

CITY OF SIOUX FALLS PUBLIC WORKS Providing a Better Quality of Life for You!	Junction Box - Traffic	Specification Reference No. 635A	Plate Number 635.31

Cast Iron Cover

18" JB - Neenah Foundry Co. R-5900-C series or engineer approved

24" JB - Neenah Foundry Co. R-5900-E series or engineer approved

30" JB - Neenah Foundry Co. R-5900-G series or engineer approved

Notes:

Allow sufficient slack so that cable ends can be pulled to 30" above junction box.

Number of conduit entrances varies with location of junction box.

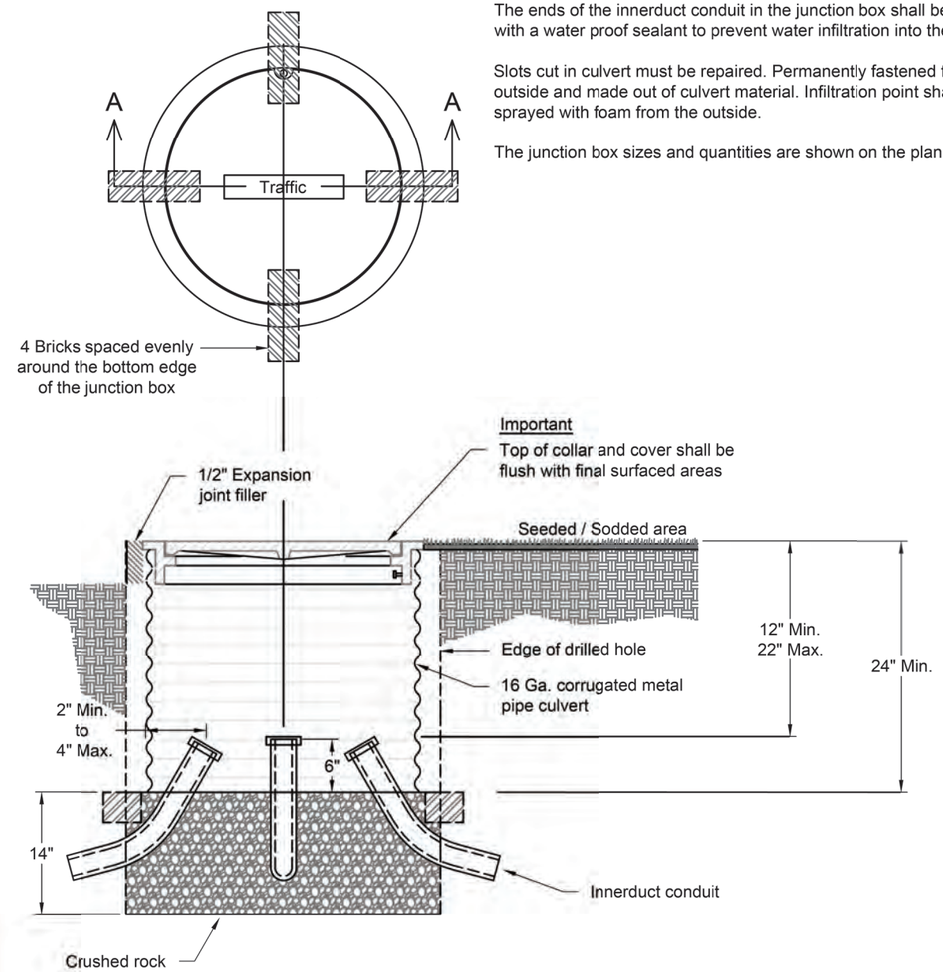
Anchor frame to pipe as approved by the engineer.

Cover shall be stamped traffic.

The ends of the innerduct conduit in the junction box shall be sealed with a water proof sealant to prevent water infiltration into the conduit.

Slots cut in culvert must be repaired. Permanently fastened from the outside and made out of culvert material. Infiltration point shall be sprayed with foam from the outside.

The junction box sizes and quantities are shown on the plan sheets.

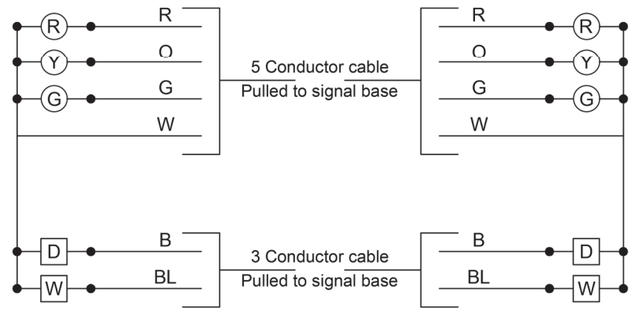


Section A-A

Revised: October 2020

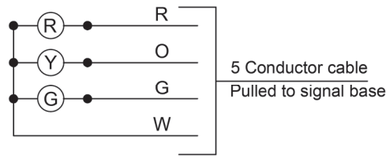
CITY OF SIOUX FALLS PUBLIC WORKS Providing a Better Quality of Life for You!	Junction Box - Innerducts	Specification Reference No. 635A	Plate Number 635.33

Post Top Mounted

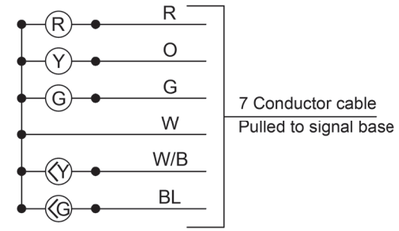


3 Sec. traffic & 2 sec. pedestrian heads

Mast Arm Mounted

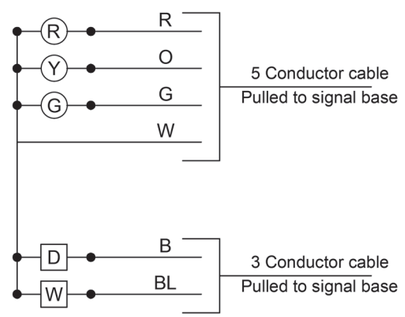


3 Section traffic signal head



5 Section traffic signal head

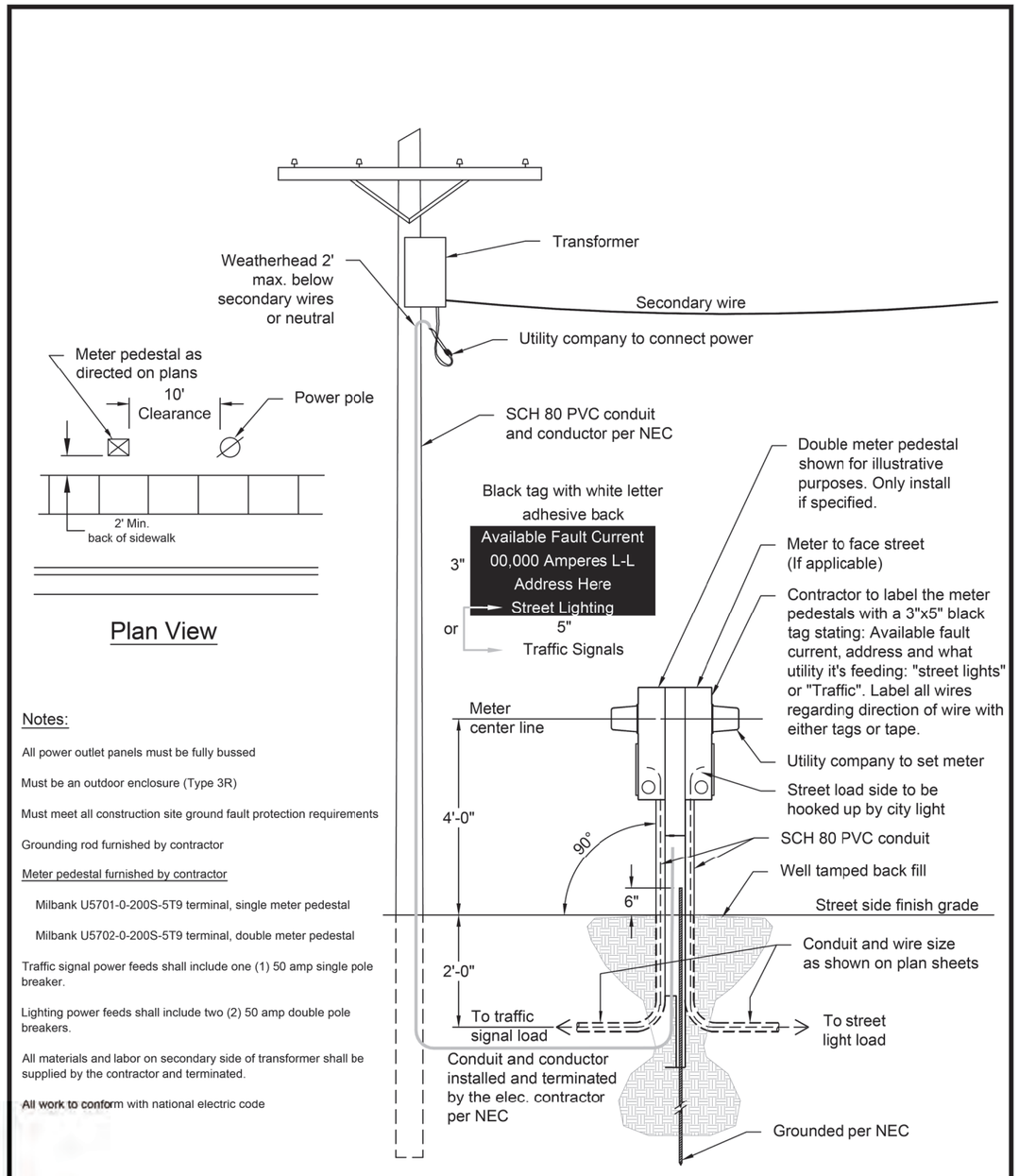
Side of Post Mounted



3 Sec. traffic & 2 sec. pedestrian heads

Revised: November 2013

CITY OF SIOUX FALLS PUBLIC WORKS Providing a Better Quality of Life for You!	Traffic Signal Head Wiring Diagram	Specification Reference No. 635A	Plate Number 635.39



Notes:

All power outlet panels must be fully bussed

Must be an outdoor enclosure (Type 3R)

Must meet all construction site ground fault protection requirements

Grounding rod furnished by contractor

Meter pedestal furnished by contractor

Milbank U5701-0-200S-5T9 terminal, single meter pedestal

Milbank U5702-0-200S-5T9 terminal, double meter pedestal

Traffic signal power feeds shall include one (1) 50 amp single pole breaker.

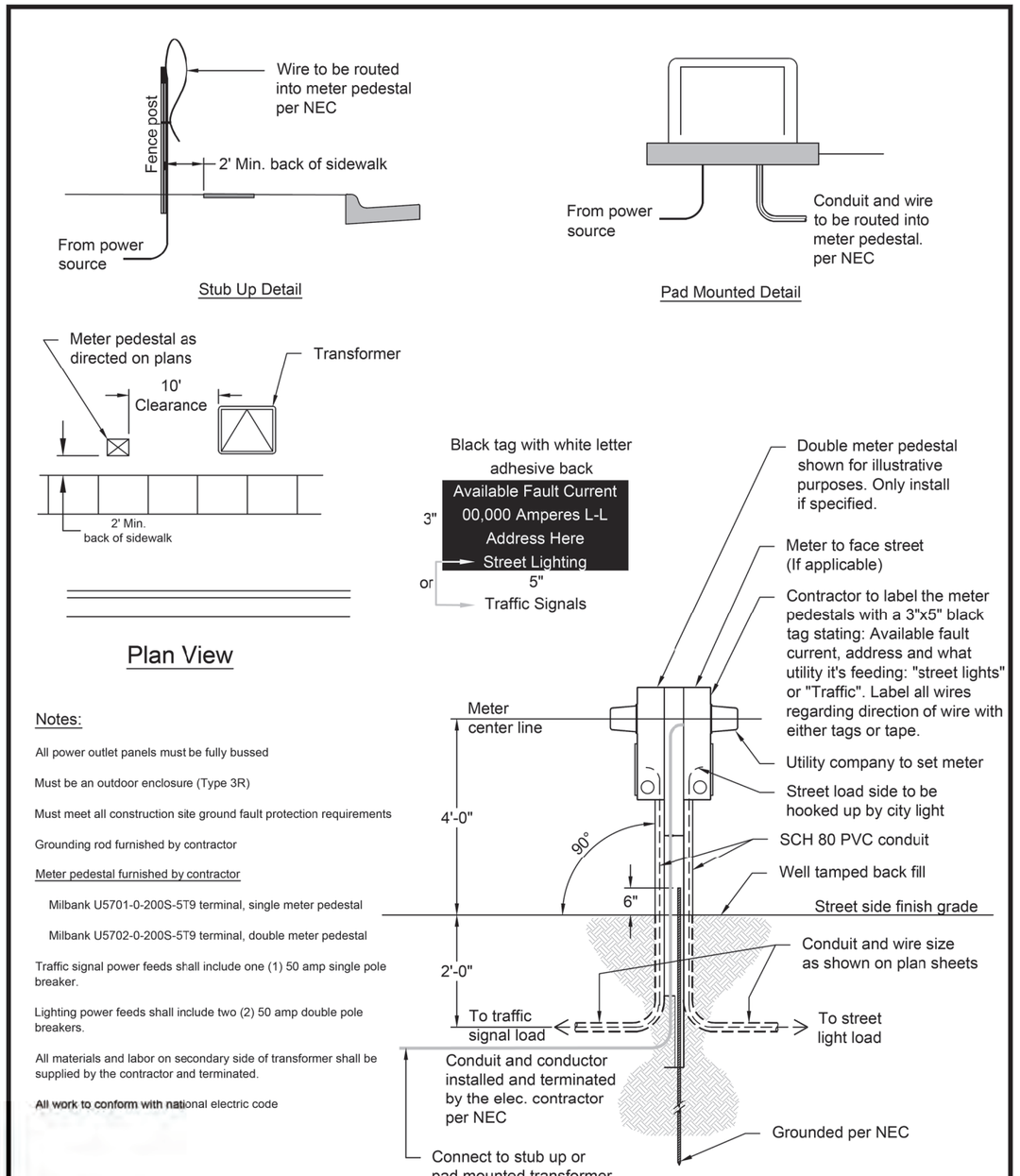
Lighting power feeds shall include two (2) 50 amp double pole breakers.

All materials and labor on secondary side of transformer shall be supplied by the contractor and terminated.

All work to conform with national electric code

Revised: November 2020

CITY OF SIOUX FALLS PUBLIC WORKS Providing a Better Quality of Life for You!	Power Feed From Elevated Transformer	Specification Reference No. 635A/B	Plate Number 635.41



Notes:

All power outlet panels must be fully bussed

Must be an outdoor enclosure (Type 3R)

Must meet all construction site ground fault protection requirements

Grounding rod furnished by contractor

Meter pedestal furnished by contractor

Milbank U5701-0-200S-5T9 terminal, single meter pedestal

Milbank U5702-0-200S-5T9 terminal, double meter pedestal

Traffic signal power feeds shall include one (1) 50 amp single pole breaker.

Lighting power feeds shall include two (2) 50 amp double pole breakers.

All materials and labor on secondary side of transformer shall be supplied by the contractor and terminated.

All work to conform with national electric code

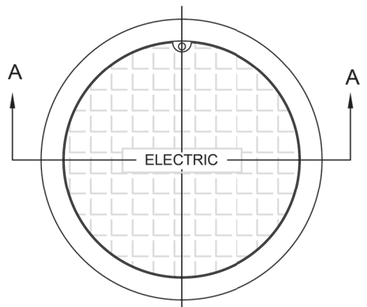
Revised: November 2020

CITY OF SIOUX FALLS PUBLIC WORKS Providing a Better Quality of Life for You!	Power Feed From Ground Power Source	Specification Reference No. 635A/B	Plate Number 635.42

Cast Iron Cover

18" Dia. JB - Neenah Foundry Company
R-5900-C Series or engineer approved.

24" Dia. JB - Neenah Foundry Company
R-5900-E Series or engineer approved.



Notes:

Allow sufficient slack so that cable ends can be pulled to 18" above junction box.

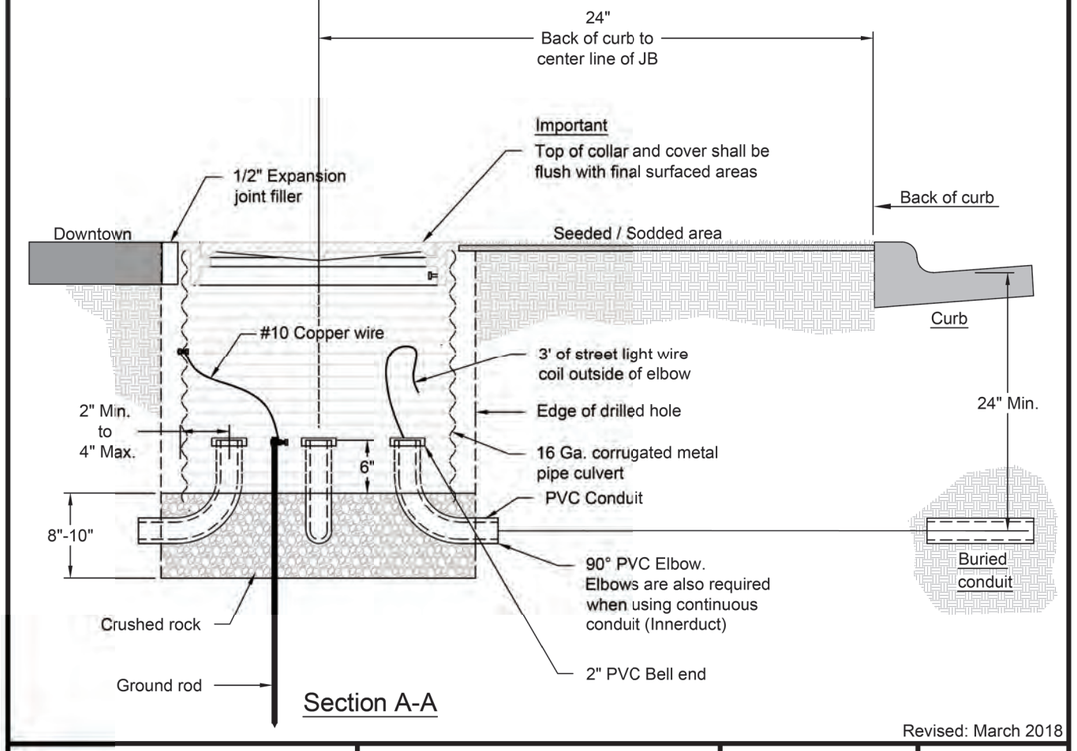
Number of conduit entrances varies with location of junction box.

Cover shall be stamped electric.

The junction box sizes and quantities are shown on plan sheets.

Electrical grounding and bonding contractor shall furnish and install ground rod, #10 stranded copper wire, ground rod clamp and appropriately size copper terminal lug bolted to the inside wall of the junction box.

Label all wires coming out of junction box regarding direction of wire with either tags or tape.

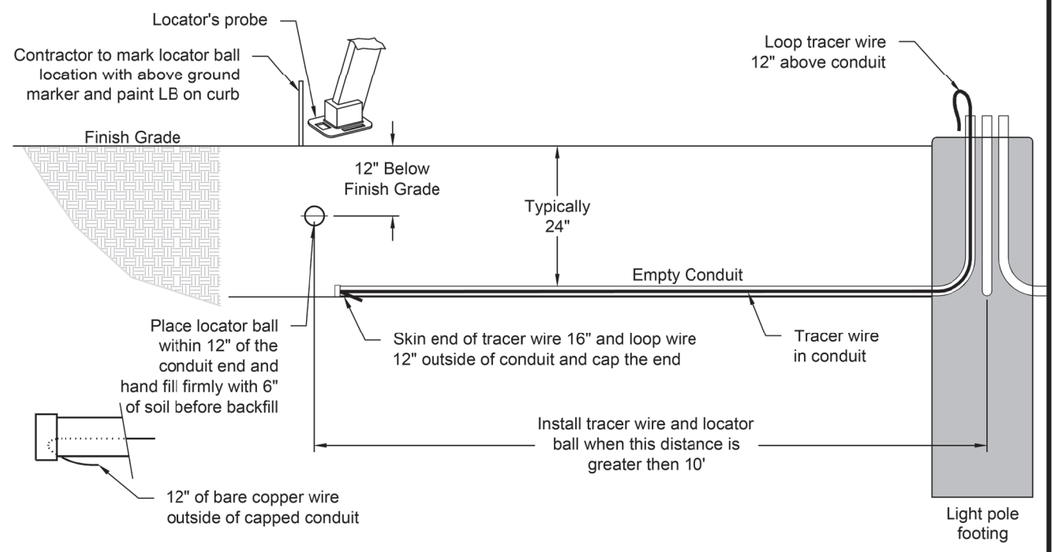


Section A-A

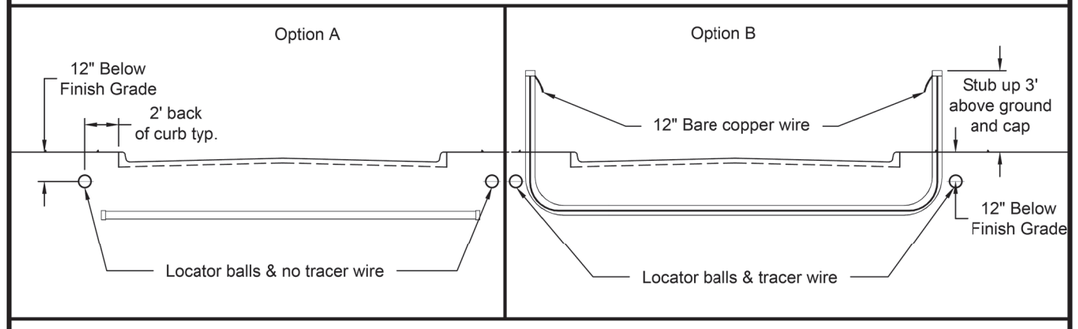
Revised: March 2018

CITY OF SIOUX FALLS PUBLIC WORKS Providing a Better Quality of Life for You!	**Junction Box - Lighting**	Specification Reference No. 635B	Plate Number 635.70

Locator ball & tracer wire detail when used with footings & junction boxes



Street crossings only no footings or junction boxes



Locator Ball Marker Notes:

1. Before placing the locator ball over the key point, decide if a tie-down procedure is necessary to keep it in place. If so, secure the ball by inserting a cable tie through one or both tie-down tabs and to the key point (E.G. pipe or cable)
2. If the key point is metallic, then the locator ball should be separated from it with a minimum of 4 inches of dirt.
3. Otherwise, put the locator ball over the desired point.

   Important: The locator ball cannot reliably reradiate the locator's signal at a separation greater than 5 ft. (1.5M). This is the maximum allowable distance between the locator ball and the locator. This implies that the ball marker should be buried at a distance less than 5 ft. to allow for the distance between the locator's probe and the ground surface.
4. Hand fill at least six inches of soil over the locator ball.
5. Backfill the hole.

Revised: September 2020

CITY OF SIOUX FALLS PUBLIC WORKS Providing a Better Quality of Life for You!	**Locator Ball and Tracer Wire**	Specification Reference No. 635B	Plate Number 635.81