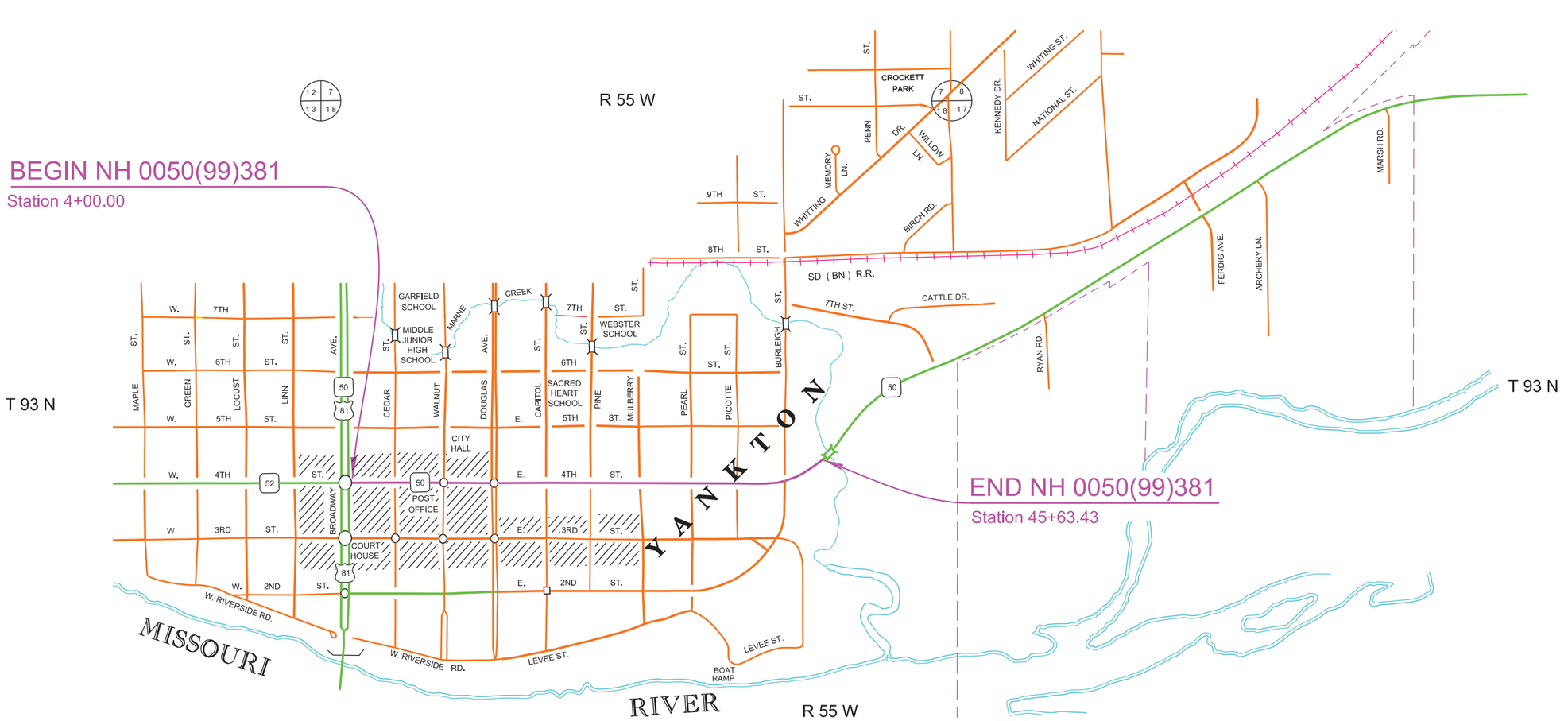
Section L: Lighting Plans

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0050(99)381	L1	L49

Plotting Date: 6/30/2015

INDEX OF SHEETS



SECTION L ESTIMATE OF QUANTITIES

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
110E1520	Remove Signal Equipment	Lump Sum	LS
110E1530	Remove Signal Pole Footing	8	Each
110E1540	Remove Luminaire Pole Footing	32	Each
110E5100	Salvage Luminaire Pole	32	Each
420E0400	Structure Excavation, Miscellaneous	22	Cu Yd
462E0100	Class M6 Concrete	6.3	Cu Yd
480E0200	Epoxy Coated Reinforcing Steel	651	Lb
635E0040	Breakaway Base Luminaire Pole with Arm, 40' Mounting Height	1	Each
635E0900	Decorative Luminaire Pole	54	Each
635E2130	Signal Pole with 30' Mast Arm and Luminaire Arm	2	Each
635E2140	Signal Pole with 40' Mast Arm and Luminaire Arm	2	Each
635E3410	Decorative Luminaire, 400 Watt	54	Each
635E3800	Roadway Luminaire, LED	5	Each
635E4030	3 Section Vehicle Signal Head	16	Each
635E5020	2' Diameter Footing	196	Ft
635E5030	3' Diameter Footing	44	Ft
635E5302	Type 2 Electrical Junction Box	70	Each
635E5303	Type 3 Electrical Junction Box	1	Each
635E5304	Type 4 Electrical Junction Box	14	Each
635E5400	Electrical Service Cabinet	2	Each
635E5420	Circuit Control Center	2	Each
635E5515	Signal Head Battery Backup and Flash System	2	Each
635E5530	Preformed Detector Loop	8	Each
635E5550	Detector Unit	4	Each
635E5560	Emergency Vehicle Preemption Unit	1	Each
635E5570	Optical Detector	4	Each
635E5900	Pedestrian Push Button	16	Each
635E5910	Pedestrian Push Button Pole	16	Each
635E5922	Pedestrian Signal Head with Countdown Timer	16	Each
635E5930	Pedestrian Crossing Sign	16	Each
635E7530	Relocate Signal Equipment	Lump Sum	LS
635E8115	1.5" Rigid Conduit, Schedule 40	340	Ft
635E8120	2" Rigid Conduit, Schedule 40	10,070	Ft
635E8125	2.5" Rigid Conduit, Schedule 40	215	Ft
635E8130	3" Rigid Conduit, Schedule 40	50	Ft
635E8150	5" Rigid Conduit, Schedule 40	30	Ft
635E8220	2" Rigid Conduit, Schedule 80	2,800	Ft
635E8225	2.5" Rigid Conduit, Schedule 80	150	Ft
635E8230	3" Rigid Conduit, Schedule 80	505	Ft
635E9001	1/C #000 AWG Copper Wire	745	Ft
635E9013	1/C #3 AWG Copper Wire	250	Ft
635E9014	1/C #4 AWG Copper Wire	1,050	Ft
635E9016	1/C #6 AWG Copper Wire	43,395	Ft
635E9018	1/C #8 AWG Copper Wire	9,195	Ft
635E9020	1/C #10 AWG Copper Wire	1,635	Ft
635E9504	4/C #14 AWG Copper Tray Cable, K2	3,865	Ft
635E9507	7/C #14 AWG Copper Tray Cable, K2	700	Ft
635E9519	19/C #14 AWG Copper Tray Cable, K2	700	Ft
635E9600	#16 AWG Copper Twisted Shielded Pair	750	Ft
635E9710	2/C #10 AWG Copper Pole and Bracket Cable	1,625	Ft
635E9800	Preemption Cable	1,730	Ft
635E9948	48 Strand Fiber Optic Cable	4,560	Ft

SUPPLYING AS BUILT PLANS

If the traffic signal systems or roadway lighting systems are constructed differently than what is stated in the plans, the Contractor shall supply as built plans to the Engineer and a copy shall be sent to the Traffic Design Engineer. The as built plans may include conduit layouts, wiring diagrams, or other drawings depicting the changes from the original plans.

SHOP DRAWING AND CATALOG CUTS SUBMITTALS

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

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

Norris.Leone@state.sd.us
John.Less@state.sd.us
Tallon.Cazer@state.sd.us
Pete.Longman@state.sd.us

SALVAGE LUMINAIRE POLE

Existing luminaire poles SEL1-SEL29 AND SEL50 shall be salvaged and delivered to the City of Yankton by the Contractor. The Contractor shall notify the City 5 days before the delivery of the salvaged luminaire poles. The City contact is Brad Moser at (605) 668-5255.

Existing luminaire poles SEL51-SEL52 shall be salvaged and placed on adjoining property (Parcel A33) by the Contractor. The Contractor shall contact the property owner at least 5 days before the removal and placement of salvaged poles on property.

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

REMOVE SIGNAL EQUIPMENT

All existing signal equipment removed and not relocated as part of this project or salvaged by the SDDOT or City of Yankton shall become the property of the Contractor.

All costs for work involved in the removal of existing signal equipment shall be incidental to the contract lump sum price for "Remove Signal Equipment".

REMOVE LUMINAIRE POLE FOOTING

The footings of existing luminaire poles SEL1-SEL29 AND SEL50-52 shall be removed by the Contractor to a minimum of 2' below the ground surface. Restoration of the disturbed area shall be to the satisfaction of the Engineer.

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

ON-SITE INSPECTION

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

TABLE OF FOOTING DATA

Site Designation	Footing Diameter	* Footing Depth	**Spiral Diameter	**Spiral Length	Vertical Reinforcement
L1, L2, L4, L6, L8, L10, L12-L47, L49, L51-L54	2' - 0"	4' - 0"	1' - 8"	33' - 9"	8-#7 x 3' - 6"
L61	2' - 0"	8' - 0"	1' - 8"	54' - 9"	8-#7 x 7' - 6"
B1-B4	3' - 0"	11' - 0"	2' - 8"	112' - 6"	14-#8 x 10' -6"

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

Decorative Luminaire Poles L3, L5, L7, L9, L11, L48, and L50 have been identified as locations that will require spread footings. Estimate of Quantities has been based on the following design, per each spread footing:

Structure Excavation, Miscellaneous: 3.1 Cu Yd
Class M6 Concrete: 0.9 Cu Yd
Epoxy Coated Reinforcing Steel: 93 Lb

The spread footings for Decorative Luminaire Poles L3, L5, L7, L9, and L11 shall be colored Class M6 Concrete. The concrete shall be integrally colored per manufacturer recommendations. The color shall be Solomon 242 – Sandalwood SRI 24 or equivalent and shall match the color used for the colored concrete sidewalk. The Contractor shall submit a sample piece of colored concrete to the Field Engineer for approval before placing the colored concrete. All costs for coloring shall be incidental to the contract unit price per cubic yard for "Class M6 Concrete".

Two coats of a non-yellowing acrylic curing and sealing compound shall be applied to the surface of the colored concrete. The curing and sealing compound shall be the product listed below or an equal approved by the Engineer.

DECRA-SEAL
W.R. Meadows, Inc.
1-800-342-5976
www.wrmeadows.com

All cost for furnishing, handling, and applying the curing and sealing compound, including the materials, equipment, labor and incidentals necessary shall be incidental to the contract unit price per cubic yard for "Class M6 Concrete".

SUBSURFACE CONDITIONS

The subsurface soils along SD50 within the project limits consist of brown silt-clay to clay-silt with an occasional gravel layer below 5 feet. Groundwater was encountered in the boring placed at station 67+00 – 24.5' Lt at a depth of 6.7 feet. All other borings conducted within the limits of the project were dry at the time of the investigation but caved between 7.3 feet and 17.1 feet below the surface.

The subsurface conditions at the intersection of SD50/4th St. & Douglas St. consist of 8 feet to 12.5 feet of brown silt-clay to clay-silt over a 6 inch or less gravel layer resting on brown sand-silt with gravel to 24.5 feet below the surface. The boring conducted near the southwest corner of the intersection obtained refusal at 16 feet below the surface. Borings were dry at the time of the investigation but caved between 7.3 feet and 17.1 feet.

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. If caving soils are encountered during excavation, casing may be required to construct the cylindrical footings.

Concrete shall not be dropped through standing water. If water is present in the excavation it shall be removed prior to concrete placement or the concrete shall be tremied. If caving occurs during dewatering the concrete shall be placed through a tremie or by means of a casing.

The boring logs and laboratory tests are available for review at the Central Office in Pierre. If questions arise or additional information is needed contact the Geotechnical Engineering Activity in Pierre at 605.773.3401.

POLES

New Signal Poles B1-B4 and Luminaire Pole L61 shall be self-weathering.

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

Signal poles shall have rotatable mast arms.

Signal pole luminaire extension (B1-B4) shall have a 40 Ft. mounting height with 8 Ft. arm.

Decorative Luminaire Poles (L1-L54) and Luminaire poles (L61) shall have a convenience duplex festoon outlet receptacle (15 amp, 3 wire) suitable for outdoor use.

DECORATIVE LUMINAIRE POLES

Decorative luminaire poles L1-L54 shall have identical color and shall match the appearance of existing decorative luminaire poles along US Highway 81 (Broadway Street) installed as part of project NH-PH 0081(23)0.

The Decorative Luminaire poles L1-L54 shall have a mounting height of 14 Ft.

The following luminaire pole or **equivalent** meets the requirements for this design:

14 Ft. Holophane North Yorkshire Series
Model # NYA-14-FTJ-20-PO7-LAB-GN-R162A-S156C-E120C-FGIUS_S-DG-BA-24-BO-H-4-GN
Pole: North Yorkshire, fluted, tapered, 14 Ft. mounting height
Tenon: 3 in. O.D. x 3 in. long
Base: 20" round anchor bolt style with 15" diameter bolt circle
Pole and Base Material: Aluminum
Receptacle: Dark green, wet location, with weatherproof-while-in-use cover
Banner Arm: Bolt-on, cast aluminum, 24 in. length, 1 in. diameter half sphere finial
Eye Bolt: Bolt-on eyebolt at bottom of banner
Finish: Dark green polyester powder coat – all components

LUMINAIRE POLES

Roadway luminaire pole L61 shall be self-weathering steel and match the appearance of existing self-weathering poles in the City of Yankton, SD.

Roadway luminaire pole L61 shall have 40 Ft. mounting height with 6 Ft. davit arm.

The following luminaire pole or **equivalent** meets the requirements for this design:

Millerbernd Manufacturing Company LDTB6-400-SD-DOT-CE-SW
Davit Arm
Breakaway transformer base
6 Ft. luminaire arm
40 Ft. mounting height
Festoon duplex receptacle with in-use cover
Cor Ten self-weathering steel

LUMINAIRES

The accepted design for the roadway luminaires L1-L54 shall provide 1.2 and greater average maintained foot-candles and a uniformity ratio (average maintained to minimum maintained foot-candles) of 3:1 and less using the following parameters:

Setback:	3 Ft.
Lamp Loss Factor (LLF):	0.7
Width of Lighted Area:	55 Ft. (Edge of travel lane to edge of travel lane)
Spacing:	156 Ft.
Configuration:	Opposite
Luminaire Mounting Height:	14 Ft.
Light Center:	16 Ft.
Lamp:	400W Pulse MH

The following luminaire or **equivalent** meets the requirements for this design

a.) Holophane: Test No. WA400MH00X4X4.IES
Washington Postlite Acorn Style Luminaire with Finial
Model # WA-400PM-24-N-4-N-4-V-73531
400W pulse-start metal halide
45 7/8" tall by 17 1/4" wide
Prismatic borosilicate glass reflector and refractor
IES Type IV, Medium, Non-Cutoff distribution
Housing and Finial: Cast aluminum
Housing and Trim Color: Dark green polyester powder coat
400W Pulse Start Metal Halide Clear Lamp

The accepted design for the roadway luminaires L61 shall provide 1.2 and greater average maintained foot-candles and a uniformity ratio (average maintained to minimum maintained foot-candles) of 3:1 and less using the following parameters:

Setback:	0 Ft.
Lamp Loss Factor (LLF):	0.7
Width of Lighted Area:	60 Ft. (Edge of travel lane to edge of travel lane)
Spacing:	149 Ft.
Configuration:	One-sided
Mounting Height:	40 Ft.
Lamp:	LED

The following LED roadway luminaires meet the requirements for this design:

a.) American Electric Lighting:
Test No. ATB2_80BLEDE10_XXXXX_R3_5K.IES
ATB2 Autobahn LED
Model # ATB2-80BLEDE10-MVOLT-R3-5K
Roadway Type III, Medium, Full Cutoff Distribution
Luminaire Watts: 284W
Luminaire Absolute Lumens: 25,425
Luminaire Efficacy: 89.5 lm/W
Finish: Gray polyester powder coat

b.) Cooper Lighting:
Test No. NVN-AE-05-E-U-SL3.IES
Model # NVAE-05-E-U-SL3-AP
Roadway Type III, Medium, Non-Cutoff Distribution
Luminaire Watts: 264W
Luminaire Absolute Lumens: 25,888
Luminaire Efficacy: 98 lm/W
Finish: Gray polyester powder coat

Three copies of the isofootcandle charts and utilization curves shall be furnished to the Engineer for approval. The Contractor must get approval from the Engineer prior to installation of the luminaires.

The approved isofootcandle data for each case shall be used to determine the correct socket position at each site. Each luminaire shall be installed with its lamp socket in the proper position and in a level attitude.

REGISTERED PROFESSIONAL ENGINEER
11769
JONATHAN D. WIEGAND
2/11/13
SOUTH DAKOTA

TRAFFIC SIGNAL CONTROLLER

The existing traffic signal controller and cabinet at the SD50/4th Street and Walnut Avenue intersection shall be salvaged and relocated to the SD50/4th Street and Douglas Avenue intersection.

The controller cabinet shall be pad mounted.

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

All costs for salvaging and relocating the existing traffic signal controller and cabinet at the SD50/4th Street and Walnut Avenue intersection to the SD50/4th Street and Douglas Avenue intersection shall be incidental to the contract lump sum price for “Relocate Signal Equipment”.

All costs for constructing the concrete pad and footing, materials, labor, and installing the relocated controller cabinet shall be incidental to the contract lump sum price for “Relocate Signal Equipment”.

MASTER CONTROLLER

The existing north-south US81/Broadway Street alignment fiber optic cable interconnect connection to the master controller shall be modified to provide for the additional interconnection along SD50/4th Street, east of US81/Broadway Street.

The additional east-west SD50/4th Street interconnect shall connect the existing master controller in the southwest quadrant of the US81/Broadway Street with the relocated traffic signal controller at Douglas Avenue and existing traffic signal controller at Burleigh Street. See additional notes regarding FIBER OPTIC CABLE CONNECTION AT US81/BROADWAY STREET.

CONTROLLER PROGRAMMING

The existing controller at Burleigh Street and relocated controller at Douglas Avenue shall be reprogrammed to use the patterns and timings specified on the Signal Timing Sheets by a qualified technician. Costs for reprogramming the controllers shall be incidental to the contract lump sum price for “Relocate Signal Equipment”.

The Contractor shall furnish the Road Design Office with a copy of the data programmed into the new and existing Controller prior to the full operation of the Controller for approval. The address is as follows:

Pete Longman
Tallon Cazer
John Less
Norris Leone
Traffic Design Engineer
Office of Road Design
700 East Broadway
Pierre, SD 57501

TRAFFIC SIGNAL METER SOCKETS

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

SIGNAL BACKPLATES

Signal backplates shall 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 shall be sized to permit the separate adjustment of the vehicle and pedestrian signal indication and may be less than 4 inches.

BATTERY HOUSING

The Contractor shall supply a cabinet for housing the battery backup at the traffic signal controllers.

All work involved in supplying and installing the cabinets shall be incidental to the contract unit price per each for “Signal Head Battery Backup and Flash System.”

FIBER OPTIC CABLE MODEM

The Contractor shall furnish and install fiber optic modems in the existing controller at Burleigh Street and relocated controller at Douglas Avenue.

All costs for furnishing and installing fiber optic modems in new and existing controllers shall be incidental to the contract lump sum price for “Relocate Signal Equipment”.

SD50/4th STREET AND BURLEIGH STREET INTERSECTION

The work at the Burleigh Street intersection includes the removal of existing pedestrian push buttons and pedestrian signals.

The Existing Signal Layout sheet and Conduit Layout sheets reflects the information provided in the record drawings and project survey. The Contractor shall be responsible for field verifying existing traffic signal components to complete the work.

The Signal Wiring Diagram sheet reflects the record drawings for the existing intersection, based on project PH 0050(18)384. A field inspection was not completed to verify wire colors. The contractor shall be responsible for field verifying wire colors to complete the work.

1. Pedestrian Push Buttons

Existing pedestrian push buttons are mounted on signal poles and shall be removed.

New pedestrian push buttons shall be installed on new pedestrian push button poles as shown on the Signal Layout sheet.

New 4/c cable shall be installed from the traffic signal controller to each new pedestrian push button pole as shown on the Conduit Layout sheet. The 4/c cable shall be continuous (no splices) from the traffic signal controller to each pedestrian push button pole.

New conduit shall be installed between each new pedestrian push button pole and the respective existing signal junction box as shown on the Conduit Layout sheet. Existing conduit shall be used between the existing signal junction boxes.

All cost for labor and materials to fill or cover holes, to the satisfaction of the Engineer, in existing signal poles from the removed pedestrian push buttons shall be incidental to the contract lump sum price for “Relocate Signal Equipment”.

All costs for labor and material to pull new 4/c cable from the traffic signal controller to each pedestrian push button pole through new and existing conduit shall be incidental to the contract unit price per foot for “4/C #14 AWG Copper Tray Cable, K2.”

All costs for labor and material to connect new pedestrian push button conduit to existing junction boxes shall be incidental to the contract unit price per foot for “2” Rigid Conduit, Schedule 40.”

2. Countdown Pedestrian Signal Heads

New countdown pedestrian signal heads shall use existing conductors.

Disconnect existing pedestrian signal head cable and connect to new pedestrian signal head - applies to pedestrian signal heads 18-24

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
11769
JONATHAN D. WIEGAND
2/11/15
SOUTH DAKOTA

FIBER OPTIC CABLE

The fiber optic cable shall be a 48 strand fiber optic cable with 24 singlemode and 24 multimode with each buffer containing six fibers. The buffer tubes shall be color coded according to EIA/TIA specifications.

Fiber optic cable provided on this project shall meet the latest applicable EIA/TIA Specifications for multimode and REA PE-90 Specifications for single mode. All fiber optic cable shall be rated for outdoor use.

Multimode optical cable shall have the following optical and physical characteristics:

1. Core diameter of 62.5 µm +/- 3µm.
2. Cladding diameter of 125µm +/- 2µm.
3. Numerical aperture of 0.275 +/- 0.015.
4. The fibers shall be coated with a UV Acrylate.
5. The fibers shall be strippable, using mechanical methods.
6. The attenuation coefficient of 3.8 dB per kilometer or less at 850nm and 1.2 dB per kilometer or less at 1300 nm.
7. The Information Transmission Capacity (ITC) or bandwidth, of the cable shall be greater than or equal to 160 MHz per kilometer at 850 nm and 600 MHz per kilometer at 1300nm.
8. One factory fusion splice per kilometer per fiber shall be allowed.

Singlemode optical cable shall have the following optical and physical characteristics:

1. Cladding diameter of 125µm +/- 2µm.
2. Zero dispersion slope shall be 0.092 ps/ (nm^2•km) or less.
3. Zero dispersion wavelength, 1300 to 1322 nm.
4. Cutoff wavelength, less than 1250 nm.
5. Maximum attenuation at 1310 nm shall be 0.4 dB per Kilometer.
6. The outside diameter shall be less than 22.1 nm.
7. One factory fusion splice per kilometer per fiber shall be allowed.

The fiber optic cable shall have a seven-core configuration, dielectric central strength member, and thermoplastic tubes. The minimum bending radii of the cable shall be 209.5 mm under a static load and 419.1 mm during installation. The installation tensile load rating shall be 2.7 kPa.

The cable core interstices shall be filled with water blocking material. If a gel compound is used, the gel compound shall be readily removable with a nontoxic solvent.

Fiber optic cable shall be terminated in the controller cabinet with a wall mounted distribution enclosure. The distribution enclosure shall be dust and moisture resistant. The size of the distribution enclosure shall be adequate for the number of fibers to be used. The distribution enclosure shall be mounted in the controller cabinet where it does not interfere with normal cabinet maintenance. The fiber optic cable shall be prepared in accordance with the manufacturer's recommendations and have sufficient length to reach the interface panel. Only fibers needed to operate the equipment plus two spare shall be terminated with ST connectors with less than 0.9 dB loss for multimode and FC-PC connectors with less than 0.4 dB loss for singlemode. The connector loss after 1000 matings shall be less than 0.2 dB. The connector return loss shall not be greater than 45 dB for singlemode and greater than 35 dB for multimode. All other fibers shall be capped and sealed in accordance with the manufacturer's recommendations.

The fiber optic cable shall be installed in accordance with the manufacturer's recommendations and the NEC. Slack cable shall be left in each controller and junction box. All junction boxes except for the junction at the controller shall have 6.5' of slack. The junction box at the controller cabinet shall have 19.5' of slack. Controller cabinets shall have 2' of slack. Slack cable shall be coiled and tied in a minimum of three places around the coil. No splices shall be allowed in the fiber optic cable except in the controllers. Splices shall be of the epoxy/polish type.

The contractor shall test the fiber optic cable after the installation to verify the integrity of the fiber.

The supplier of the fiber optic cable shall supervise the installation and testing of the fiber optic cable. The supplier of the fiber optic cable shall provide training to personnel of the City in the installation and maintenance of the fiber optic cable.

The payment for supplying, installing, testing, and training of city personnel shall be incidental to the contract unit price per foot for "48 Strand Fiber Optic Cable".

FIBER OPTIC CABLE CONNECTION AT US81/BROADWAY STREET

The Conduit Layout sheet reflects the information provided in the record drawings for project NH-PH0081(23)0 and project survey. A field inspection was not completed to verify cable, conduit or wire colors. The Contractor shall be responsible for field verifying existing traffic signal components, cable, conduit, and wire colors to complete the work.

The fiber optic interconnect shall be connected to the existing master controller along US81/Broadway Street with the following order of work. The Contractor shall:

1. Install fiber optic cable in new conduit from the east through the new junction box JF1 to the existing traffic signal junction box (JFA1) in the southeast quadrant of the US81/Broadway Street intersection.
2. Route new fiber optic cable through existing traffic signal conduit from the junction box JFA1 across the south leg of the US81/Broadway Street intersection to the existing traffic signal junction box JFA2 in southwest quadrant of the intersection.
3. Route new fiber optic cable through the existing traffic signal junction box JFA2 to the traffic signal controller in the southwest quadrant of the US81/Broadway Street intersection.
4. Modify existing fiber optic cable connections within existing US81 master controller cabinet to provide for communication interconnection between the SD50/4th Street intersections of US81/Broadway Avenue, Douglas Avenue, and Burleigh Street.

All costs for modifications to the Master Controller, including disconnecting and connecting existing fiber optic cable within the control box and restoring the signal interconnect to the operational communication link, in order to make the interconnection complete and fully operational shall be incidental to the contract lump sum price for "Relocate Signal Equipment".

FIBER OPTIC CABLE INTERCONNECTION

The Contractor shall install fiber optic cable communication along SD50/4th Street between the existing traffic signal controller at Burleigh Street, new traffic signal controller at Douglas Avenue, and the existing Master Controller at US81/Broadway Street.

All costs for interconnecting the traffic signal controllers along SD50/4th Street, at Douglas Avenue and Burleigh Street intersections, to the Master Controller shall be incidental to the contract lump sum price for "Relocate Signal Equipment."

CIRCUIT CONTROL CENTERS

The Circuit Control Centers CCC1-CCC2 shall provide centralized control of roadway luminaires as shown on the plans. The Circuit Control Centers shall provide power to the roadway luminaires and duplex receptacles mounted on the luminaire poles.

For each Circuit Control Center, refer to applicable wiring diagrams, elementary control wiring diagrams, and Circuit Control Center equipment lists in Section L for components of each controller.

The location of service meter shall be installed as noted below for each Circuit Control Center.

Circuit Control Center 1 (CCC1)
A single meter feeds the service point at approx. STA 12+50 for CCC1 and the traffic signal controller at Douglas Avenue.

Refer to detail and wiring diagram for service point at approx. STA 12+50. Costs associated with furnishing and installing service entrance conductors, conduit and fittings between meter and CCC1 (#3/0, #3, and 2" SCH 40) shall be included in the contract unit price per foot for the various wire and conduit items.

Circuit Control Center 2 (CCC2)
The meter is mounted to the CCC2 cabinet.

Service entrance conductors #1/0, conduit, and fittings are incidental to the installation of CCC2.

Unless otherwise noted, all costs associated with furnishing and installing the new Circuit Control Centers shall be included in the contract unit price per each for "Circuit Control Center".

ELECTRICAL SERVICE CABINET

See detail and wiring diagram for service point at approx. STA 12+50. All costs associated with furnishing and installing the new service point at approx. STA 12+50 shall be included in the contract unit price per each for "Electrical Service Cabinet".

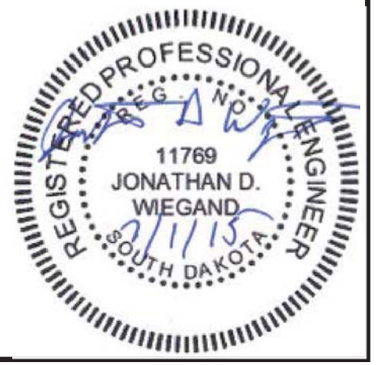


TABLE OF CONDUIT AND CABLE QUANTITIES

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA | PROJECT: NH 0050(99)381 | SHEET: L6 | TOTAL SHEETS: L49

Plotting Date: 6/23/2015

Location to Location		Rigid Conduit: Schedule 40 2" Ft	Rigid Conduit: Schedule 40 5" Ft	Rigid Conduit: Schedule 80 2" Ft	Rigid Conduit: Schedule 80 3" Ft	Copper Wire: 1/C #4 AWG Ft	Copper Wire: 1/C #6 AWG Ft	IMSA Copper Cable, K2: #14 AWG 4/C Ft	IMSA Copper Cable, K2: #14 AWG 7/C Ft	IMSA Copper Cable, K2: #14 AWG 19/C Ft	Twisted Shielded Pair: #16 AWG Ft	Pole and Bracket Cable: 2/C #10 AWG Ft	Preemption Cable Ft	Fiber Optic Cable Ft
SD 50 and Douglas Avenue														
JB1	Service Cabinet	180				555								
JB1	Controller		30			105		280	180	180	180		280	
JB1	Signal Pole B1	20					75		25	25			50	
JB1	JB2	20									50			
JB1	Ped PB Pole PB1	15						20						
JB2	Ped PB Pole PB2	10						15						
JB1	JB3				85		270	180	90	90			180	
JB3	Ped PB Pole PB3	10						15						
JB3	Ped PB Pole PB4	20						25						
JB3	Signal Pole B2	10					15		15	15			30	
JB1	JB6				120		250	500	250	250	250		500	
JB6	Ped PB Pole PB7	15						20						
JB6	Ped PB Pole PB8	10						15						
JB6	Signal Pole B4	10					45		15	15			30	
JB6	JB4				105		330	220	110	110	220		220	
JB4	JB5	20									50			
JB4	Ped PB Pole PB5	15						20						
JB4	Ped PB Pole PB6	20						25						
JB4	Signal Pole B3	10					45		15	15			30	
Signal Pole	B1							165				55	110	
Signal Pole	B2							155				55	95	
Signal Pole	B3							165				55	110	
Signal Pole	B4							155				55	95	
Ped PB Pole	PB1							10						
Ped PB Pole	PB2							10						
Ped PB Pole	PB3							10						
Ped PB Pole	PB4							10						
Ped PB Pole	PB5							10						
Ped PB Pole	PB6							10						
Ped PB Pole	PB7							10						
Ped PB Pole	PB8							10						
Subtotal:		385	30	0	310	660	1030	2055	700	700	750	220	1730	0

TABLE OF CONDUIT AND CABLE QUANTITIES

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA | PROJECT: NH 0050(99)381 | SHEET: L7 | TOTAL SHEETS: L49

Plotting Date: 6/23/2015

Location to Location		Rigid Conduit: Schedule 40 2" Ft	Rigid Conduit: Schedule 40 5" Ft	Rigid Conduit: Schedule 80 2" Ft	Rigid Conduit: Schedule 80 3" Ft	Copper Wire: 1/C #4 AWG Ft	Copper Wire: 1/C #6 AWG Ft	IMSA Copper Cable, K2 #14 AWG: 4/C Ft	7/C Ft	19/C Ft	Twisted Shielded Pair: #16 AWG Ft	Pole and Bracket Cable: 2/C #10 AWG Ft	Preemption Cable Ft	Fiber Optic Cable Ft
SD 50 and Burleigh Street														
Controller	JB4							240						
JB4	Ped PB Pole PS5	10						15						
JB4	Ped PB Pole PS6	20						25						
JB4	JB1							660						
JB1	Ped PB Pole PS7	10						15						
JB1	Ped PB Pole PS8	25						30						
JB1	JB2							440						
JB2	Ped PB Pole PS1	10						15						
JB2	Ped PB Pole PS2	20						25						
JB2	JB3							220						
JB3	Ped PB Pole PS3	10						15						
JB3	Ped PB Pole PS4	25						30						
Ped PB Pole	PS1							10						
Ped PB Pole	PS2							10						
Ped PB Pole	PS3							10						
Ped PB Pole	PS4							10						
Ped PB Pole	PS5							10						
Ped PB Pole	PS6							10						
Ped PB Pole	PS7							10						
Ped PB Pole	PS8							10						
Fiber														
US81 Controller	JFA2													30
JFA2	JFA1													165
JFA1	JF1	325		105										445
JF1	JF2	325		95										435
JF2	JF3	335												350
JF3	JF4			100										220
JF4	TSC - Douglas	25												70
JF3	JF5			110										120
JF5	JF6	325												335
JF6	JF7	325		120										460
JF7	JF8	335		95										445
JF8	JF9	340		95										450
JF9	JF10	335		170										525
JF10	JF11	310												320
JF11	JF12	100												110
JF12	JB4	35												45
JB4	TSC - Burleigh													35
Subtotal:		3245	0	890	0	0	0	1810	0	0	0	0	0	4560
Traffic Signals Total:		3630	30	890	310	660	1030	3865	700	700	750	220	1730	4560

TABLE OF CONDUIT AND CABLE QUANTITIES

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0050(99)381	L8	L49

Plotting Date: 6/23/2015

Location to Location		Rigid Conduit												Copper Wire							Pole and Bracket Cable		
					Schedule 40					Schedule 80													
					1.5" Ft	2" Ft	2.5" Ft	3" Ft		2" Ft	2.5" Ft	3" Ft		1/C #000 AWG Ft	1/C #3 AWG Ft	1/C #4 AWG Ft	1/C #6 AWG Ft	1/C #8 AWG Ft	1/C #10 AWG Ft		2/C #10 AWG Ft	
Lighting: CCC1 - West																							
JL1	L1				5													10	25				
JL1	JL3					135											700						
JL3	L3				5													10	25				
JL3	JL5					60				100							990						
JL5	L5				5													10	25				
JL5	JL7					175											1085						
JL7	L7				5													10	25				
JL7	JL9					125											775						
JL9	L9				5													10	25				
JL9	JL11									115							715						
JL11	L11				5													10	25				
JL11	JL13					155											960						
JL13	L13				5													10	25				
JL13	JL15					145											900						
JL15	L15				5													10	25				
JL15	JL17					70											435						
JL2	L2				10													15	45				
JL2	JL4					85											450						
JL4	L4				5													10	25				
JL4	JL6					35				100							835						
JL6	L6				40													45	165				
JL6	L61				20													25	85				
JL6	JL8					235											1455						
JL8	L8				5													10	25				
JL8	JL10					100											620						
JL10	L10				5													10	25				
JL10	JL12									115							715						
JL12	L12				5													10	25				
JL12	JL14					145											900						
JL14	L14				5													10	25				
JL14	JL16					160											990						
JL16	L16				5													10	25				
JL16	JL18					50																	
JL18	JL17											100				310	825						
JL17	CCC1							25								80	515						
Service Cabinet	CCC1					240								745	250								
JL17	JB1					25											80						
Subtotal:					140	1940	0	25		430	0	100		745	250	390	13945	225	645			0	

TABLE OF CONDUIT AND CABLE QUANTITIES

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0050(99)381	L9	L49

Plotting Date: 6/23/2015

Location to Location		Rigid Conduit											Copper Wire							Pole and Bracket Cable	
					Schedule 40					Schedule 80											
					1.5" Ft	2" Ft	2.5" Ft	3" Ft		2" Ft	2.5" Ft	3" Ft	1/C #000 AWG Ft	1/C #3 AWG Ft	1/C #4 AWG Ft	1/C #6 AWG Ft	1/C #8 AWG Ft	1/C #10 AWG Ft		2/C #10 AWG Ft	
Lighting: CCC1 - East																					
JL17	JL19									100						620					
JL19	JL20					75										465					
JL20	L17				5												10	25			
JL20	JL22					160										990					
JL22	L19				5												10	25			
JL22	JL24					135										835					
JL24	L21				5												10	25			
JL24	JL26					35				110						900					
JL26	L23				5												10	25			
JL26	JL28					175										1085					
JL28	L25				5												10	25			
JL28	JL30					135										835					
JL30	L27				5												10	25			
JL30	JL32					55				90						750					
JL32	L29				5												10	25			
JL18	JL21									160						990					
JL21	L18				5												10	25			
JL21	JL23					175										1085					
JL23	L20				5												10	25			
JL23	JL25					105										650					
JL25	L22				5												10	25			
JL25	JL27					70				110						1115					
JL27	L24				5												10	25			
JL27	JL29					175										1085					
JL29	L26				5												10	25			
JL29	JL31					125										775					
JL31	L28				5												10	25			
JL31	JL33					75				85						825					
JL33	L30				5												10	25			
Lighting: CCC2 - West																					
JL34	L31				5												10	25			
JL34	JL36					135										700					
JL36	L33				5												10	25			
JL36	JL38					70				80						930					
JL38	L35				5												10	25			
JL38	JL40					175										1085					
JL40	L37				5												10	25			
JL40	JL42					110										680					
JL42	L39				5												10	25			
JL42	JL44					65				90						960					
JL44	L41				5												10	25			
JL44	JL46					165										1020					
JL46	L43				5												10	25			
JL46	JL48					135										835					
Subtotal:					105	2350	0	0		825	0	0	0	0	0	19215	210	525		0	

TABLE OF CONDUIT AND CABLE QUANTITIES

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0050(99)381	L10	L49

Plotting Date: 6/23/2015

Location to Location		Rigid Conduit											Copper Wire							Pole and Bracket Cable	
					Schedule 40					Schedule 80											
					1.5" Ft	2" Ft	2.5" Ft	3" Ft		2" Ft	2.5" Ft	3" Ft	1/C #000 AWG Ft	1/C #3 AWG Ft	1/C #4 AWG Ft	1/C #6 AWG Ft	1/C #8 AWG Ft	1/C #10 AWG Ft		2/C #10 AWG Ft	
Lighting: CCC2 - West (cont)																					
JL48	L45				5												10	25			
JL48	JL50									95						590					
JL50	JL51											95				590	490				
JL35	L32				5												10	25			
JL35	JL37					115										595					
JL37	L34				5												10	25			
JL37	JL39					80				80						990					
JL39	L36				5												10	25			
JL39	JL41					180										1115					
JL41	L38				5												10	25			
JL41	JL43					115										715					
JL43	L40				5												10	25			
JL43	JL45					85				80						90					
JL45	L42				5												10	25			
JL45	JL47					175										1085					
JL47	L44				5												10	25			
JL47	JL49					115										715					
JL49	L46				5												10	25			
JL49	JL51					50				80						805					
Power Feed	JL100										85										
JL100	JL101						175														
JL101	JL102										65										
JL102	CCC2/Meter						40														
CCC2	JL51							25								285	260				
Lighting: CCC2 - East																					
JL50	JL52					65										70	335				
JL52	L47				5												10	25			
JL52	JL54					170										180	880				
JL54	L49				10												15	45			
JL54	JL56					80										85	415				
JL56	JL59									180						190	930				
JL59	L51				10												15	45			
JL59	JL61					145										150	750				
JL61	L53				5												10	25			
JL61	JL63					105										110	440				
JL51	JL53					90										95	465				
JL53	L48				5												10	25			
JL53	JL55					160										165	825				
JL55	L50				5												10	25			
JL55	JL57					80										85	415				
JL57	JL58									140						145	725				
Subtotal:					85	1810	215	25		655	150	95	0	0	0	8850	7090	415		0	

TABLE OF CONDUIT AND CABLE QUANTITIES

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0050(99)381	L11	L49

Plotting Date: 6/23/2015

Location to Location		Rigid Conduit Schedule 40 1.5" Ft	Rigid Conduit Schedule 40 2" Ft	Rigid Conduit Schedule 40 2.5" Ft	Rigid Conduit Schedule 40 3" Ft	Rigid Conduit Schedule 80 2" Ft	Rigid Conduit Schedule 80 2.5" Ft	Rigid Conduit Schedule 80 3" Ft	Copper Wire 1/C #000 AWG Ft	Copper Wire 1/C #3 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	Pole and Bracket Cable 2/C #10 AWG Ft
Lighting: LC2 - East (cont)															
JL58	JL60		85									90	440		
JL60	L52	5											10	25	
JL60	JL62		145									150	750		
JL62	L54	5											10	25	
JL62	JL64		110									115	460		
Luminaire Pole															
Luminaire Pole	L1														25
Luminaire Pole	L2														25
Luminaire Pole	L3														25
Luminaire Pole	L4														25
Luminaire Pole	L5														25
Luminaire Pole	L6														25
Luminaire Pole	L7														25
Luminaire Pole	L8														25
Luminaire Pole	L9														25
Luminaire Pole	L10														25
Luminaire Pole	L11														25
Luminaire Pole	L12														25
Luminaire Pole	L13														25
Luminaire Pole	L14														25
Luminaire Pole	L15														25
Luminaire Pole	L16														25
Luminaire Pole	L17														25
Luminaire Pole	L18														25
Luminaire Pole	L19														25
Luminaire Pole	L20														25
Luminaire Pole	L21														25
Luminaire Pole	L22														25
Luminaire Pole	L23														25
Luminaire Pole	L24														25
Luminaire Pole	L25														25
Luminaire Pole	L26														25
Luminaire Pole	L27														25
Luminaire Pole	L28														25
Luminaire Pole	L29														25
Luminaire Pole	L30														25
Luminaire Pole	L31														25
Luminaire Pole	L32														25
Luminaire Pole	L33														25
Luminaire Pole	L34														25
Luminaire Pole	L35														25
Luminaire Pole	L36														25
Luminaire Pole	L37														25
Luminaire Pole	L38														25
	Subtotal:	10	340	0	0	0	0	0	0	0	0	355	1670	50	950

TABLE OF CONDUIT AND CABLE QUANTITIES

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0050(99)381	L12	L49

Plotting Date: 6/23/2015

Location to Location		Rigid Conduit												Copper Wire							Pole and Bracket Cable	
					Schedule 40					Schedule 80												
					1.5" Ft	2" Ft	2.5" Ft	3" Ft		2" Ft	2.5" Ft	3" Ft		1/C #000 AWG Ft	1/C #3 AWG Ft	1/C #4 AWG Ft	1/C #6 AWG Ft	1/C #8 AWG Ft	1/C #10 AWG Ft		2/C #10 AWG Ft	
Luminaire Pole	L39																				25	
Luminaire Pole	L40																				25	
Luminaire Pole	L41																				25	
Luminaire Pole	L42																				25	
Luminaire Pole	L43																				25	
Luminaire Pole	L44																				25	
Luminaire Pole	L45																				25	
Luminaire Pole	L46																				25	
Luminaire Pole	L47																				25	
Luminaire Pole	L48																				25	
Luminaire Pole	L49																				25	
Luminaire Pole	L50																				25	
Luminaire Pole	L51																				25	
Luminaire Pole	L52																				25	
Luminaire Pole	L53																				25	
Luminaire Pole	L54																				25	
Luminaire Pole	L61																				55	
Subtotal:					0	0	0	0		0	0	0		0	0	0	0	0	0		455	
Lighting Total:					340	6,440	215	50		1,910	150	195		745	250	390	42,365	9,195	1,635		1,405	

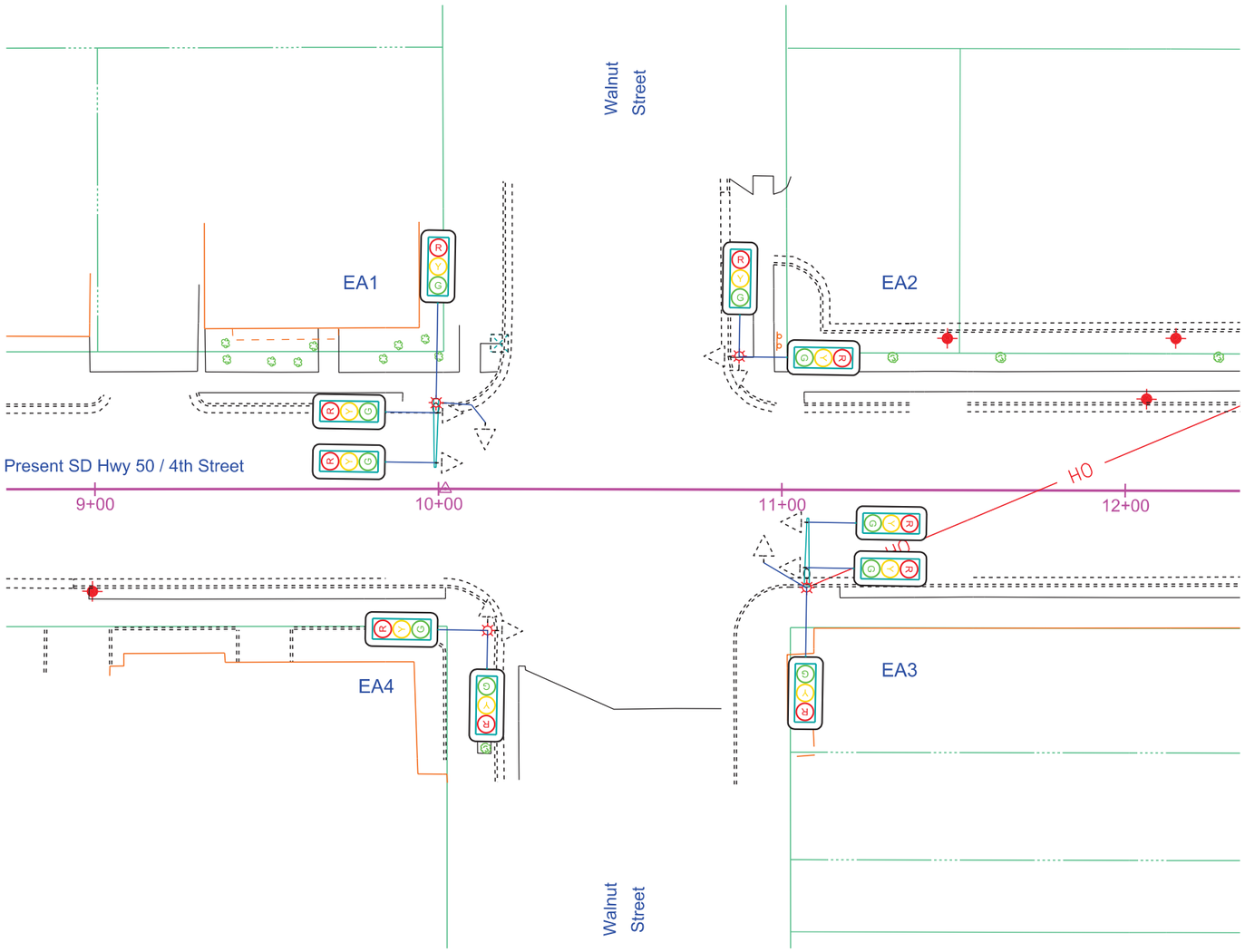
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0050(99)381	L13	L49

Plotting Date: 7/1/2015

FOR BIDDING PURPOSES ONLY

EXISTING SIGNAL LAYOUT

SD HWY 50 / 4TH STREET & WALNUT STREET



REMOVE SIGNAL EQUIPMENT	
KEY	ITEM
	PEDESTAL SIGNAL POLE (EA2, EA4)
	SIGNAL POLE W/20' MAST ARM & LUMIN EXT (EA1, EA3)
	ROADWAY LUMINAIRE, 400W WITH P.E. (EA1, EA3)
	3 SECTION VEHICLE SIGNAL HEAD

SALVAGE SIGNAL EQUIPMENT	
KEY	ITEM
	TRAFFIC SIGNAL CONTROLLER (FOR RELOCATION TO DOUGLAS AVENUE INTERSECTION)

ESTIMATE OF QUANTITIES			
KEY	ITEM	EST QUANT	UNIT
	REMOVE SIGNAL EQUIPMENT	LUMP SUM	LS
	REMOVE SIGNAL POLE FOOTING (EA1-EA4)	4	EACH
	SALVAGE SIGNAL EQUIPMENT	LUMP SUM	LS

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
11769
JONATHAN D. WIEGAND
7/1/15
SOUTH DAKOTA

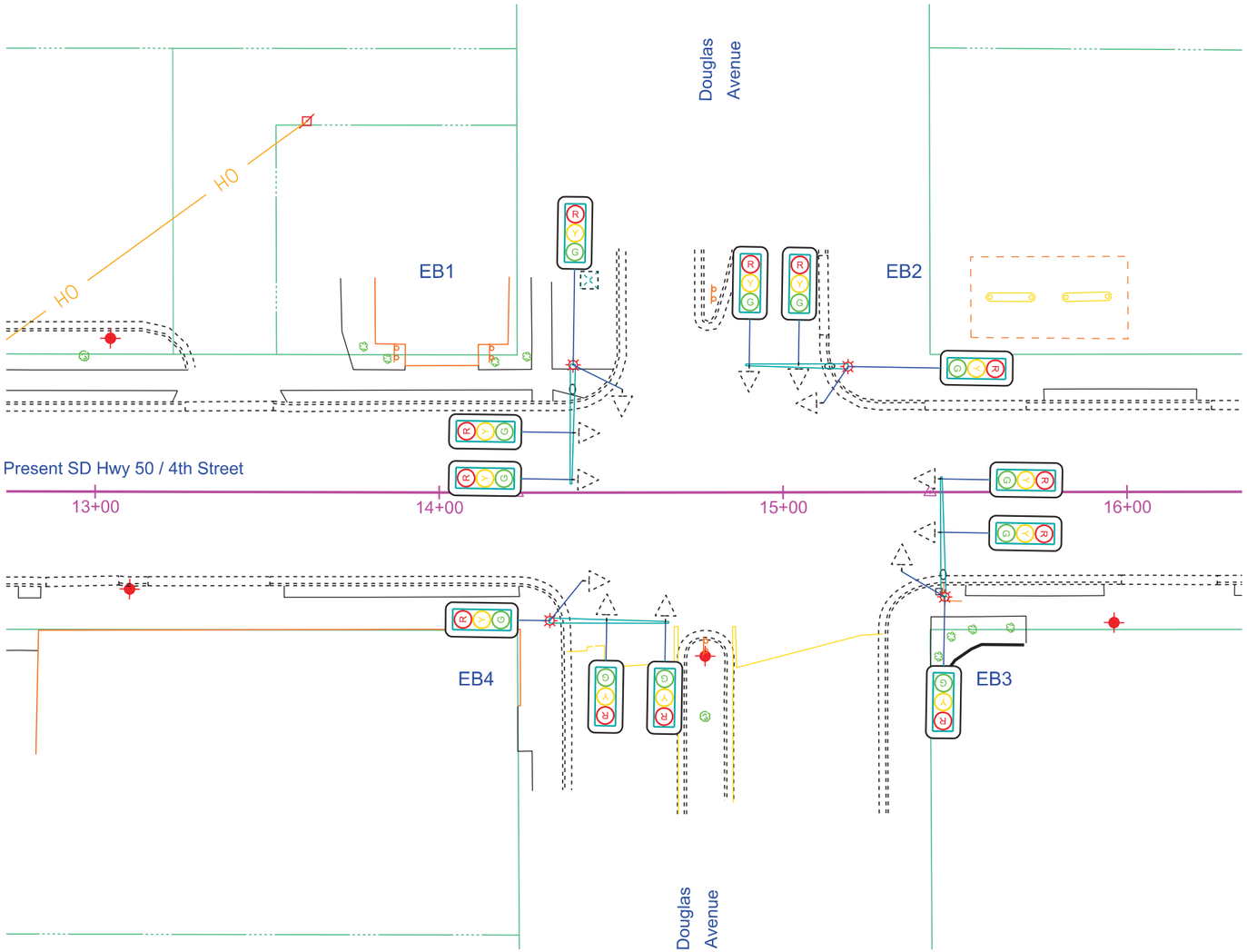
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0050(99)381	L14	L49

Plotting Date: 7/1/2015

FOR BIDDING PURPOSES ONLY

EXISTING SIGNAL LAYOUT

SD HWY 50 / 4TH STREET & DOUGLAS AVENUE



REMOVE SIGNAL EQUIPMENT	
KEY	ITEM
	SIGNAL POLE W/30' MAST ARM & LUMIN EXT (EB2, EB4)
	SIGNAL POLE W/35' MAST ARM & LUMIN EXT (EB1, EB3)
	ROADWAY LUMINAIRE, 400W WITH P.E. (EB1-EB4)
	3 SECTION VEHICLE SIGNAL HEAD
	TRAFFIC SIGNAL CONTROLLER

ESTIMATE OF QUANTITIES			
KEY	ITEM	EST QUANT	UNIT
	REMOVE SIGNAL EQUIPMENT	LUMP SUM	LS
	REMOVE SIGNAL POLE FOOTING (EB1-EB4)	4	EACH

REGISTERED PROFESSIONAL ENGINEER
11769
JONATHAN D.
WIEGAND
SOUTH DAKOTA
2/11/15

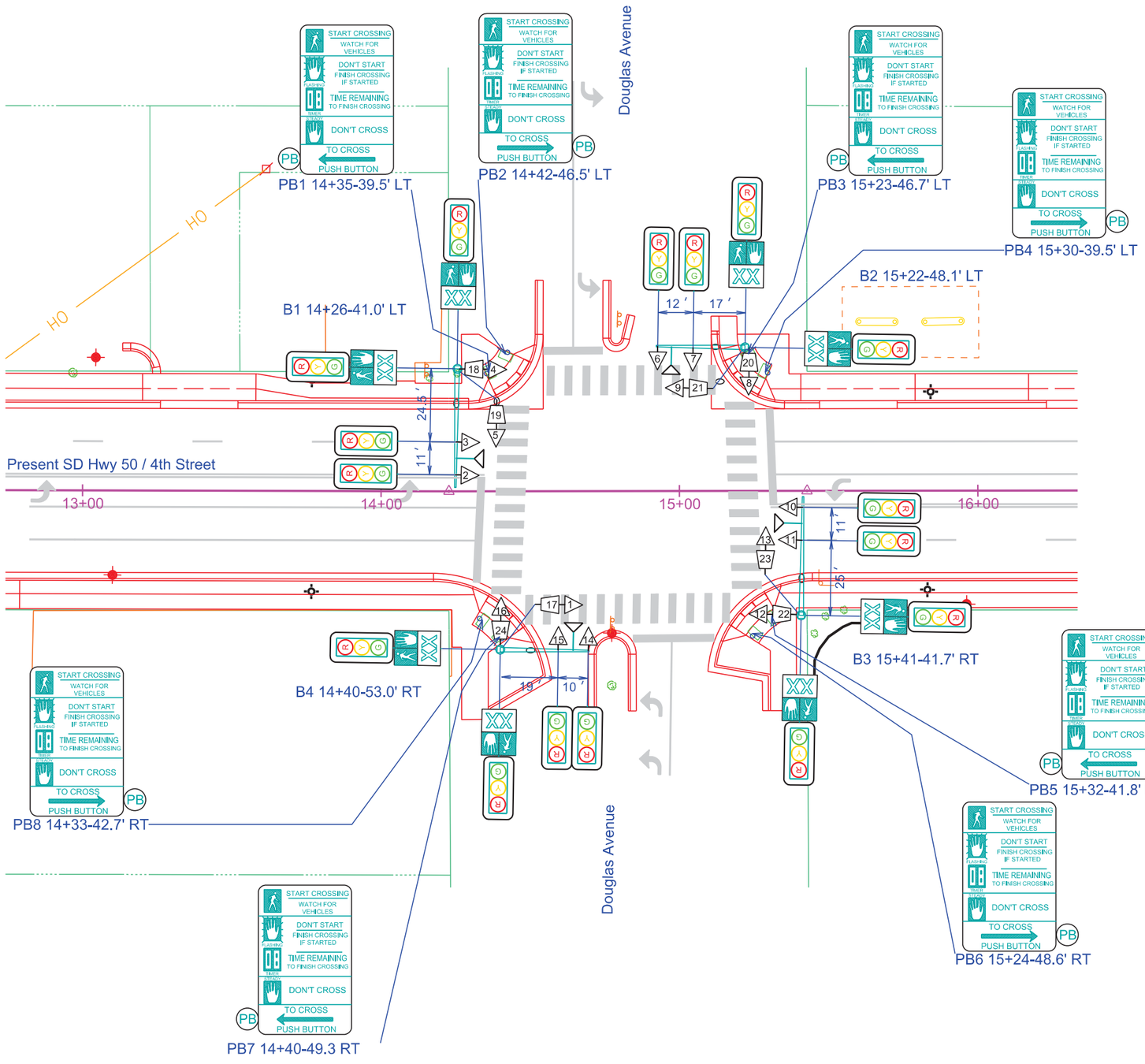
SIGNAL LAYOUT

FOR BIDDING PURPOSES ONLY

SD HWY 50 / 4TH STREET & DOUGLAS AVENUE

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0050(99)381	L15	L49

Plotting Date: 7/1/2015



ESTIMATE OF QUANTITIES

KEY	ITEM	EST QUANT	UNIT
	SIGNAL POLE W/30' MAST ARM & LUMIN EXT W/8' ARM, 40' MT HT (B2, B4)	2	EACH
	SIGNAL POLE W/40' MAST ARM & LUMIN EXT W/8' ARM, 40' MT HT (B1, B3)	2	EACH
	3 SECTION VEHICLE SIGNAL HEAD (1-16)	16	EACH
	EMERGENCY VEHICLE PREEMPTION UNIT (4-CHANNEL)	1	EACH
	OPTICAL DETECTOR	4	EACH
PB	PEDESTRIAN PUSH BUTTON	8	EACH
	PEDESTRIAN PUSH BUTTON POLE (PB1-PB8)	8	EACH
	PEDESTRIAN SIGNAL HEAD W/COUNTDOWN TIMER (17-24)	8	EACH
	PEDESTRIAN CROSSING SIGN R10-3e (LEFT - 4 / RIGHT - 4)	8	EACH
	ROADWAY LUMINAIRE, LED (B1, B2, B3, B4)	4	EACH
	SIGNAL HEAD BATTERY BACKUP AND FLASH SYSTEM	1	EACH

REGISTERED PROFESSIONAL ENGINEER
11769
JONATHAN D. WIEGAND
SOUTH DAKOTA
7/1/15

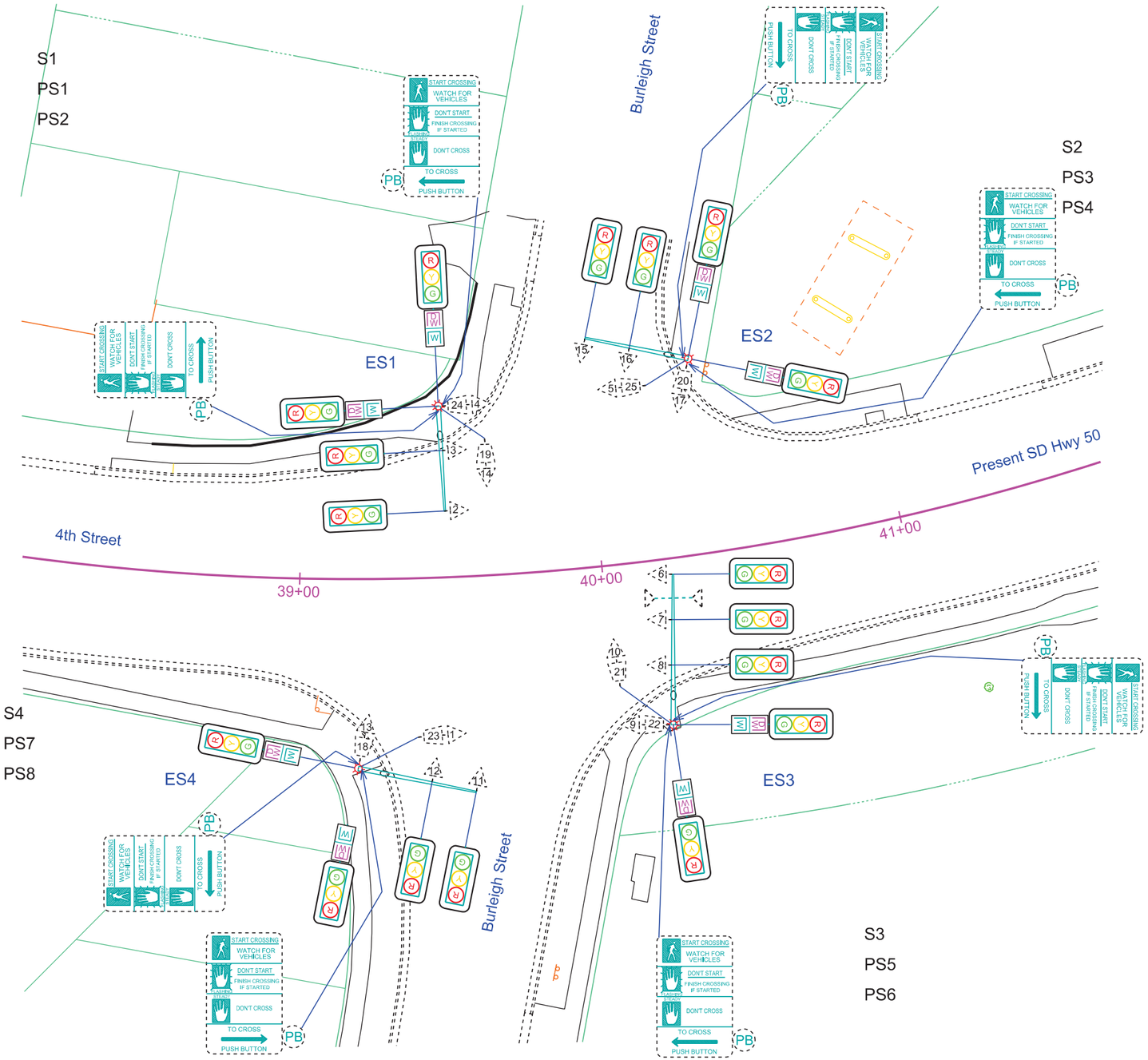
EXISTING SIGNAL LAYOUT

SD HWY 50 / 4TH STREET & BURLEIGH STREET

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0050(99)381	L16	L49

Plotting Date: 7/1/2015



REMOVE SIGNAL EQUIPMENT

KEY	ITEM
PB	PEDESTRIAN PUSH BUTTON (2 EA FROM ES1-ES4)
	PEDESTRIAN SIGNAL HEAD (18-25)
	PEDESTRIAN CROSSING SIGN (LEFT - 4 / RIGHT - 4)

ESTIMATE OF QUANTITIES

KEY	ITEM	EST QUANT	UNIT
	REMOVE SIGNAL EQUIPMENT	LUMP SUM	LS

REGISTERED PROFESSIONAL ENGINEER
11769
JONATHAN D. WIEGAND
SOUTH DAKOTA
7/1/15

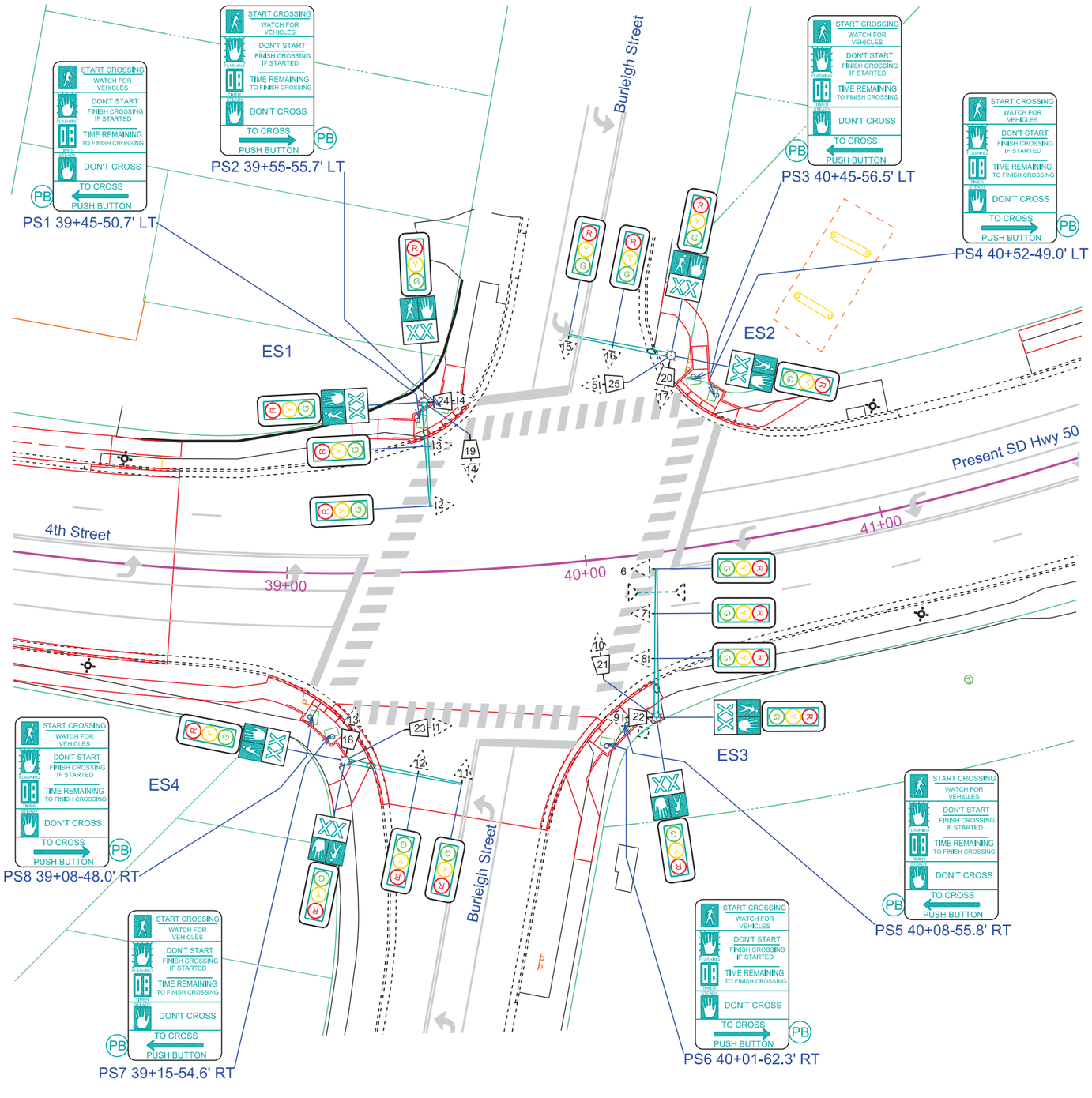
SIGNAL LAYOUT

FOR BIDDING PURPOSES ONLY

SD HWY 50 / 4TH STREET & BURLEIGH STREET

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0050(99)381	L17	L49

Plotting Date: 7/1/2015



ESTIMATE OF QUANTITIES

KEY	ITEM	EST QUANT	UNIT
PB	PEDESTRIAN PUSH BUTTON	8	EACH
○	PEDESTRIAN PUSH BUTTON POLE (PS1-PS8)	8	EACH
	PEDESTRIAN SIGNAL HEAD W/COUNTDOWN TIMER (18-25)	8	EACH
	PEDESTRIAN CROSSING SIGN R10-3e (LEFT - 4 / RIGHT - 4)	8	EACH
	SIGNAL HEAD BATTERY BACKUP AND FLASH SYSTEM	1	EACH

REGISTERED PROFESSIONAL ENGINEER
11769
JONATHAN D. WIEGAND
SOUTH DAKOTA
7/1/15

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0050(99)381	L18	L49

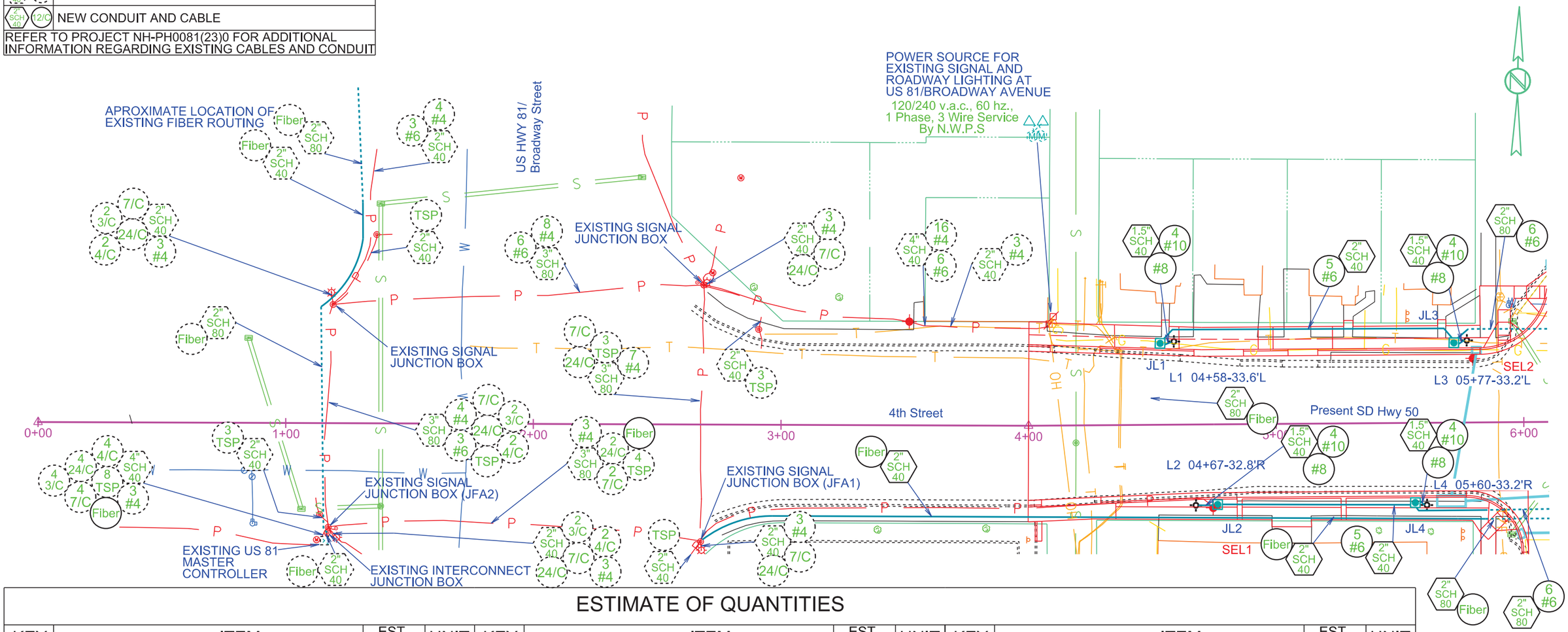
Plotting Date: 7/1/2015

CONDUIT LAYOUT

FOR BIDDING PURPOSES ONLY

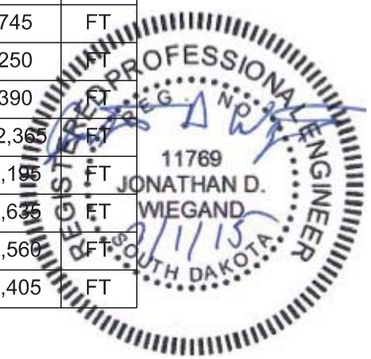
SD HWY 50 / 4TH STREET

KEY	LEGEND ITEM
2" SCH 40 / 12/C	EXISTING CONDUIT AND CABLE
2" SCH 40 / 12/C	NEW CONDUIT AND CABLE
REFER TO PROJECT NH-PH0081(23)0 FOR ADDITIONAL INFORMATION REGARDING EXISTING CABLES AND CONDUIT	



ESTIMATE OF QUANTITIES

KEY	ITEM	EST QUANT	UNIT	KEY	ITEM	EST QUANT	UNIT	KEY	ITEM	EST QUANT	UNIT
	REMOVE LUMINAIRE POLE FOOTING	32	EACH		TYPE 2 ELECTRICAL JUNCTION BOX (JL1-16, JL18-JL50, JL52-JL64, JL100-JL102)	65	EACH	2.5" SCH 80	2.5" RIGID CONDUIT, SCHEDULE 80	150	FT
	SALVAGE LUMINAIRE POLE (SEL1-SEL29, SEL50-SEL52)	32	EACH		TYPE 4 ELECTRICAL JUNCTION BOX (JF1-JF12, JL17, JL51)	14	EACH	3" SCH 80	3" RIGID CONDUIT, SCHEDULE 80	195	FT
	BREAKAWAY BASE LUMINAIRE POLE WITH ARM, 40' MOUNTING HT (L61)	1	EACH		ELECTRICAL SERVICE CABINET	1	EACH	3 #3/0	1/C #000 AWG COPPER WIRE	745	FT
	DECORATIVE LUMINAIRE POLE (L1-L54)	54	EACH		CIRCUIT CONTROL CENTER (CCC1 - CCC2)	2	EACH	#3	1/C #3 AWG COPPER WIRE	250	FT
	DECORATIVE LUMINAIRE, 400 WATT (L1-L54)	54	EACH		METER SOCKET (NOT A BID ITEM)	2	EACH	#4	1/C #4 AWG COPPER WIRE	390	FT
	ROADWAY LUMINAIRE, LED (L61)	1	EACH	1.5" SCH 40	1.5" RIGID CONDUIT, SCHEDULE 40	340	FT	#6	1/C #6 AWG COPPER WIRE	42,365	FT
	2' DIAMETER FOOTING (L1, L2, L4, L6, L8, L10, L12-L47, L49, L51-L54)	196	FT	2" SCH 40	2" RIGID CONDUIT, SCHEDULE 40	9,555	FT	#8	1/C #8 AWG COPPER WIRE	9,195	FT
	STRUCTURE EXCAVATION, MISCELLANEOUS (L3, L5, L7, L9, L11, L48, L50)	22	Cu Yd	2.5" SCH 40	2.5" RIGID CONDUIT, SCHEDULE 40	215	FT	#10	1/C #10 AWG COPPER WIRE	1,635	FT
	CLASS M6 CONCRETE (L3, L5, L7, L9, L11, L48, L50)	6.3	Cu Yd	3" SCH 40	3" RIGID CONDUIT, SCHEDULE 40	50	FT	Fiber	48 STRAND FIBER OPTIC CABLE	4,560	FT
	EPOXY COATED REINFORCING STEEL (L3, L5, L7, L9, L11, L48, L50)	651	Lb	2" SCH 80	2" RIGID CONDUIT, SCHEDULE 80	2,800	FT		POLE AND BRACKET CABLE	1,405	FT



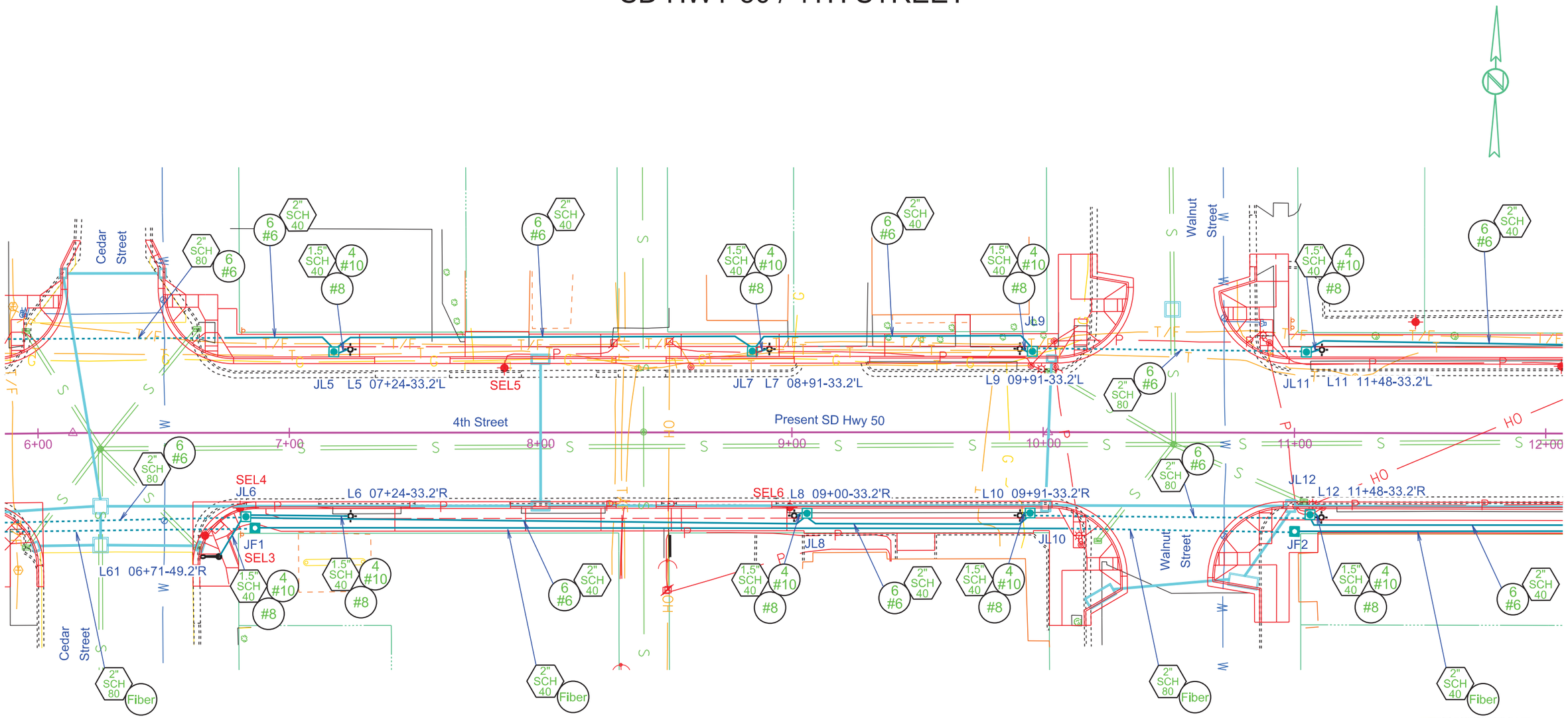
CONDUIT LAYOUT

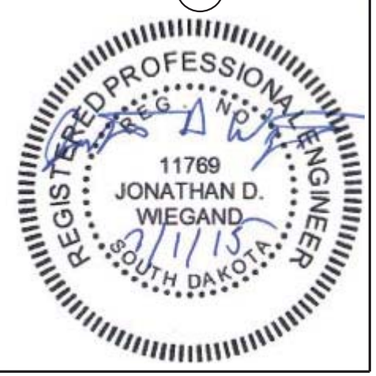
FOR BIDDING PURPOSES ONLY

SD HWY 50 / 4TH STREET

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0050(99)381	L19	L49

Plotting Date: 7/1/2015





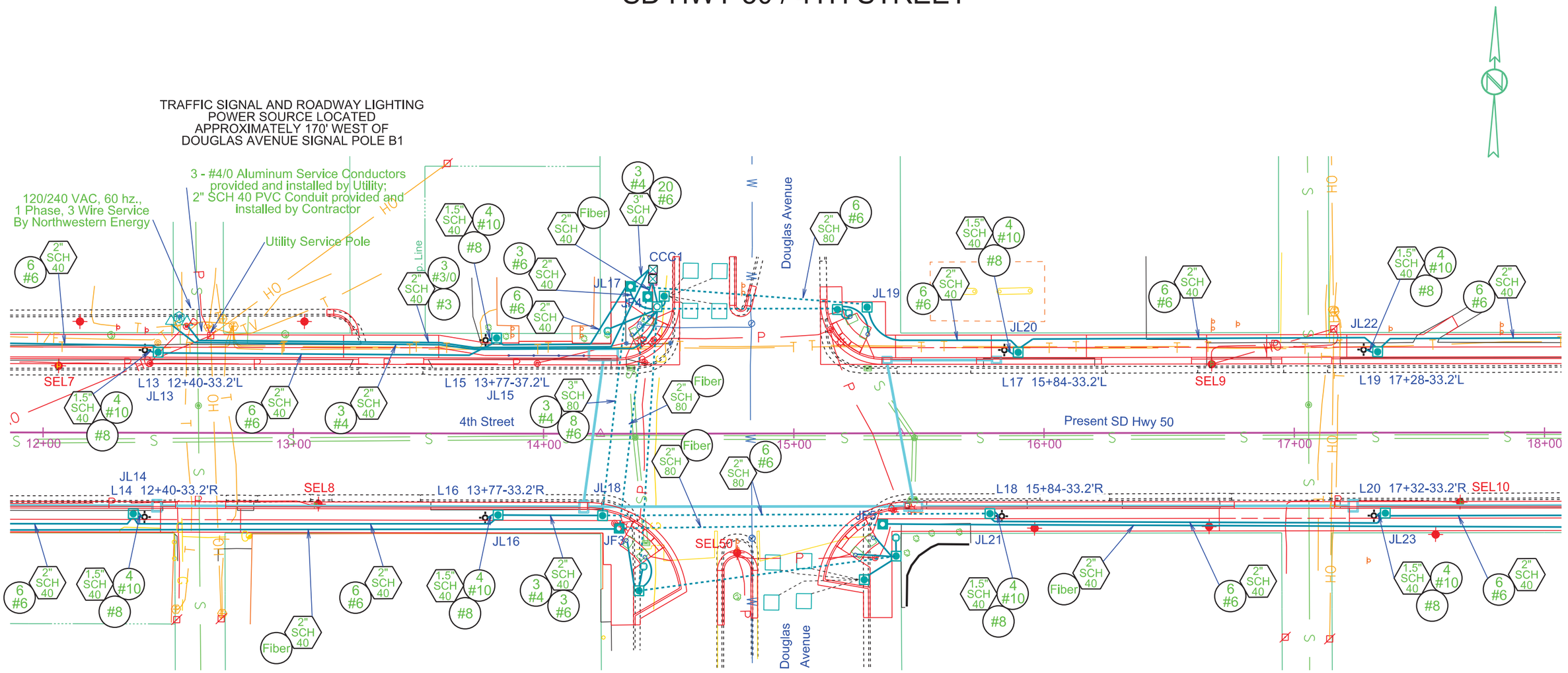
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0050(99)381	L20	L49

Plotting Date: 7/1/2015

CONDUIT LAYOUT

FOR BIDDING PURPOSES ONLY

SD HWY 50 / 4TH STREET



See sheet L21 for traffic signal conduit, cables, and quantities.

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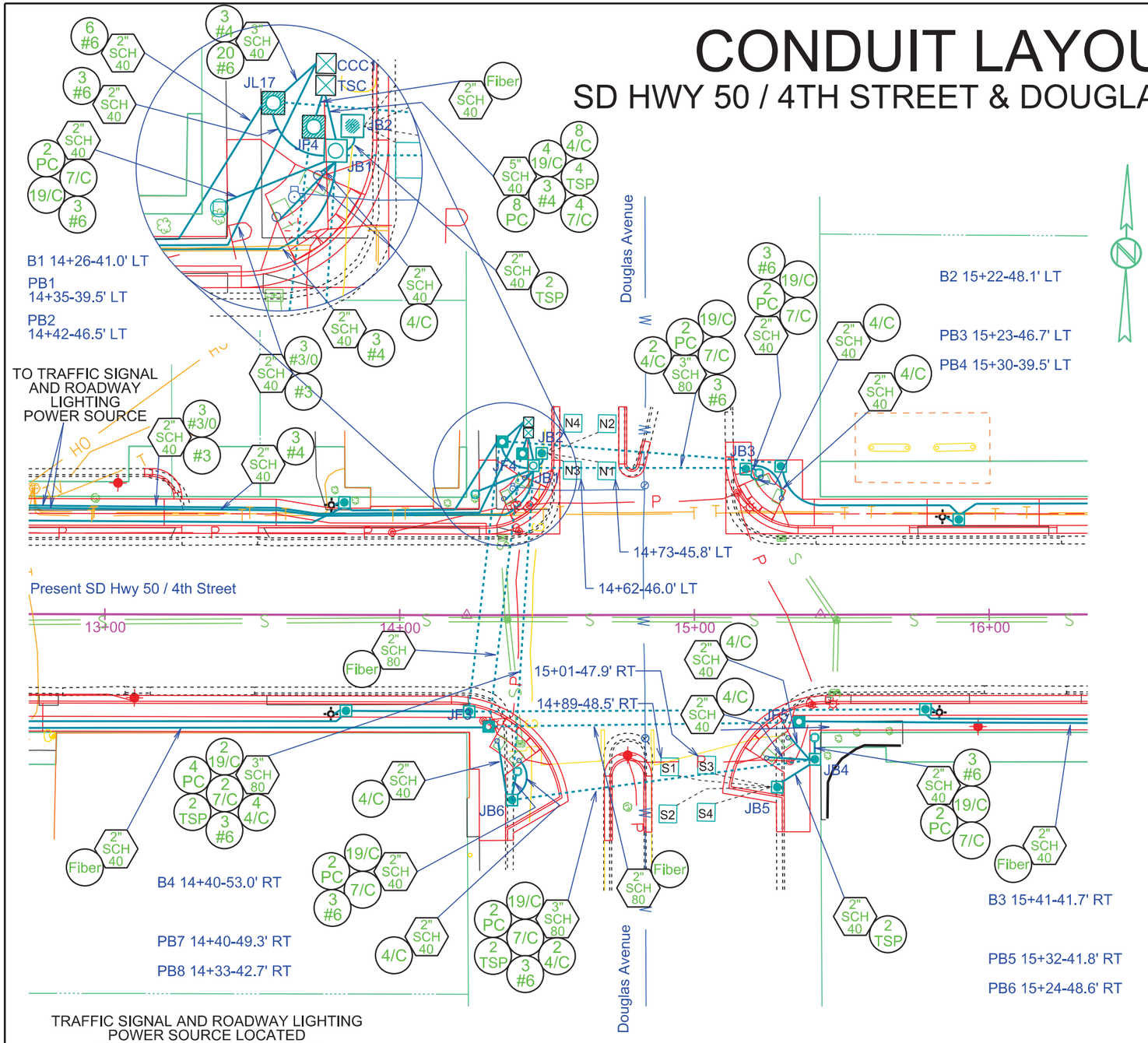
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0050(99)381	L21	L49

Plotting Date: 7/1/2015

CONDUIT LAYOUT

FOR BIDDING PURPOSES ONLY

SD HWY 50 / 4TH STREET & DOUGLAS AVENUE



ESTIMATE OF QUANTITIES

KEY	ITEM	EST QUANT	UNIT
	3' DIAMETER FOOTING (B1-B4)	44	FT
	TYPE 2 ELECTRICAL JUNCTION BOX (JB2-JB6)	5	EACH
	TYPE 3 ELECTRICAL JUNCTION BOX (JB1)	1	EACH
	ELECTRICAL SERVICE CABINET	1	EACH
	PREFORMED DETECTOR LOOP (N1-N4, S1-S4)	8	EACH
	DETECTOR UNIT	4	EACH
2" SCH 40	2" RIGID CONDUIT, SCHEDULE 40	385	FT
5" SCH 40	5" RIGID CONDUIT, SCHEDULE 40	30	FT
3" SCH 80	3" RIGID CONDUIT, SCHEDULE 80	310	FT
#4	1/C #4 AWG COPPER WIRE	660	FT
#6	1/C #6 AWG COPPER WIRE	1,030	FT
4/C	4/C #14 AWG COPPER TRAY CABLE, K2	2,055	FT
7/C	7/C #14 AWG COPPER TRAY CABLE, K2	700	FT
19/C	19/C #14 AWG COPPER TRAY CABLE, K2	700	FT
TSP	#16 AWG COPPER TWISTED SHIELDED PAIR	750	FT
	2/C #10 AWG COPPER POLE & BRACKET CABLE	220	FT
PC	PREEMPTION CABLE	1,730	FT
	RELOCATE SIGNAL EQUIPMENT	LS	LUMP SUM

RELOCATE SIGNAL EQUIPMENT

KEY	ITEM
	TRAFFIC SIGNAL CONTROLLER (TSC) (RELOCATE FROM WALNUT AVENUE)

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7/1/15

See sheet L20 for roadway lighting and fiber optic conduit, cables, and quantities.

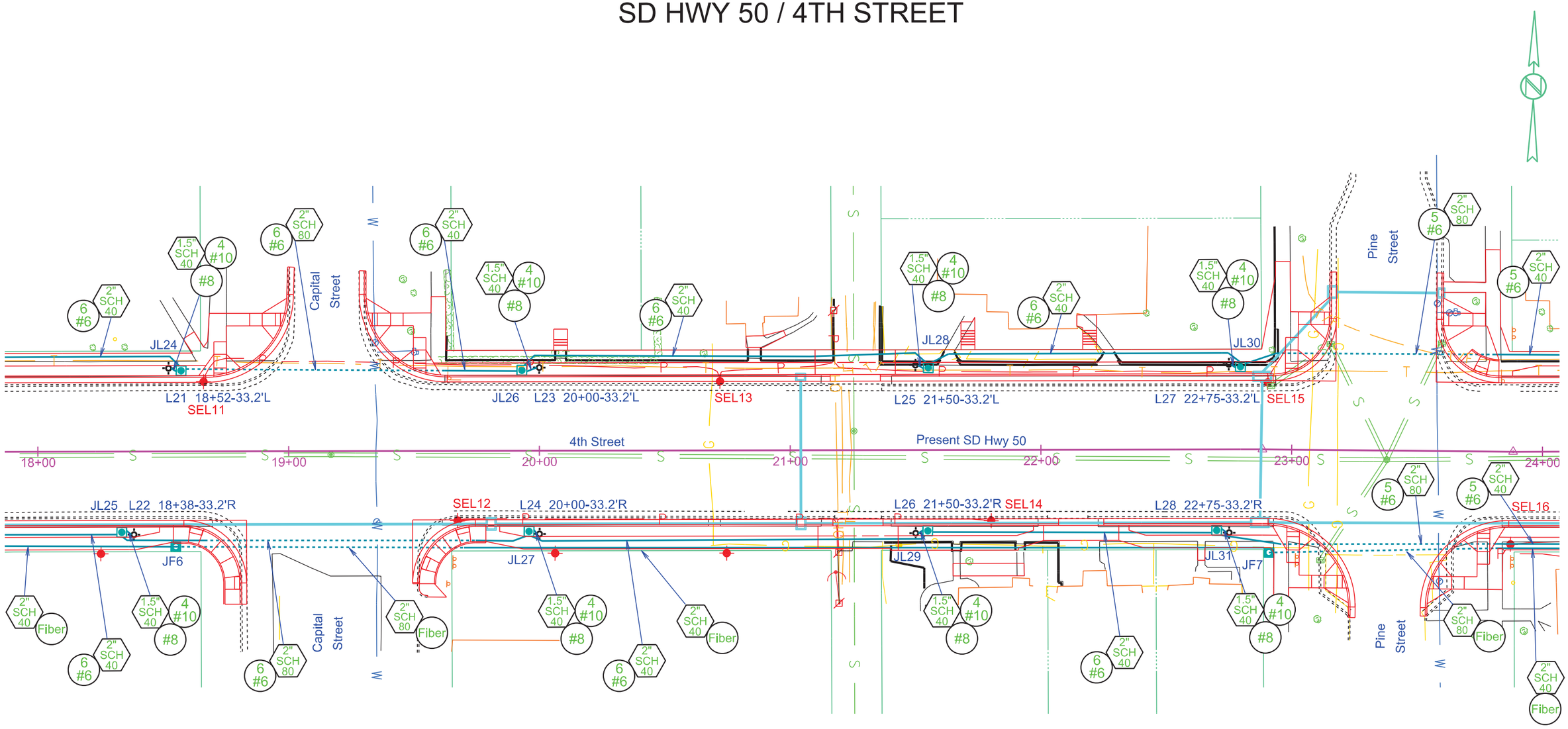
CONDUIT LAYOUT

SD HWY 50 / 4TH STREET

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0050(99)381	L22	L49

Plotting Date: 7/1/2015



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7/1/15

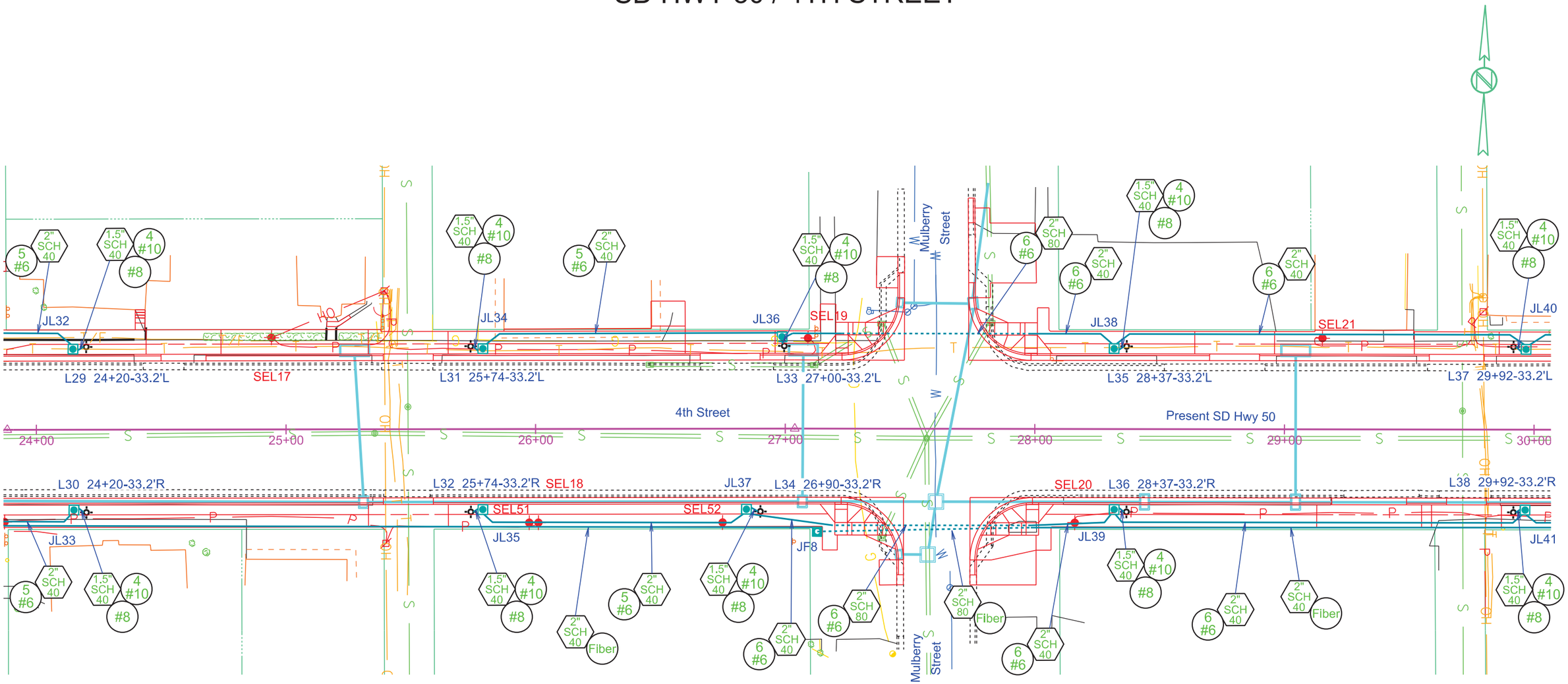
CONDUIT LAYOUT

FOR BIDDING PURPOSES ONLY

SD HWY 50 / 4TH STREET

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0050(99)381	L23	L49

Plotting Date: 7/1/2015



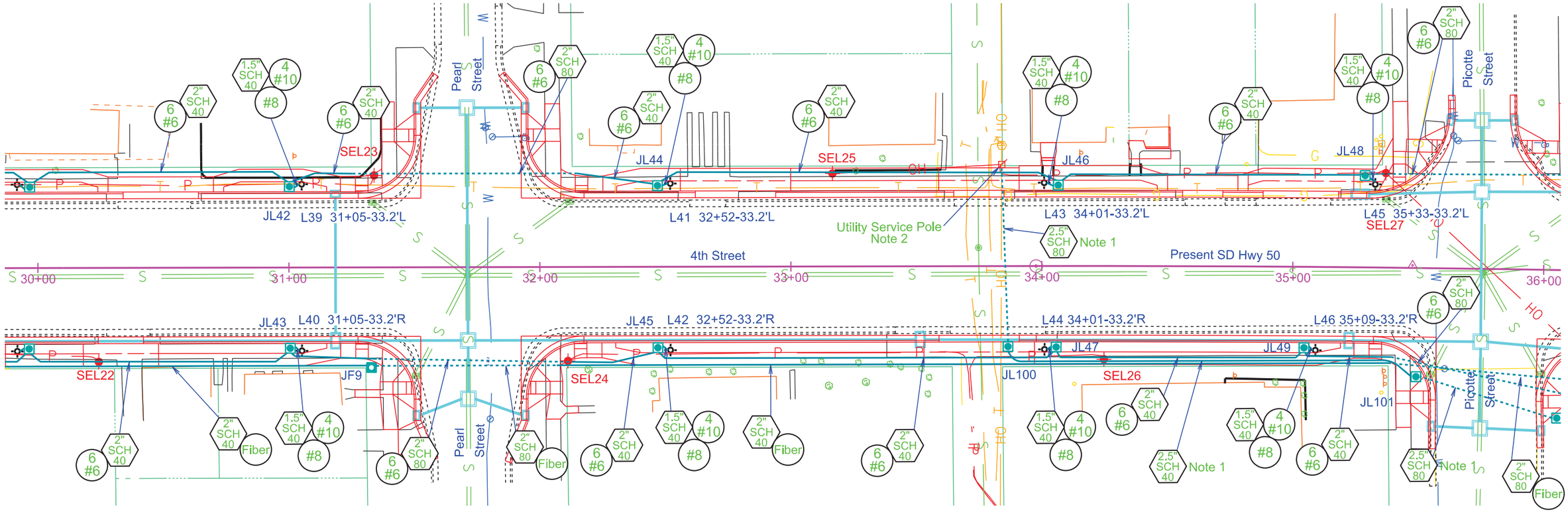
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0050(99)381	L24	L49

Plotting Date: 7/1/2015

FOR BIDDING PURPOSES ONLY

CONDUIT LAYOUT

SD HWY 50 / 4TH STREET



NOTES
1. 3 - 250 kcmil Aluminum Service Conductors provided and installed by Utility. PVC conduit and junction boxes provided and installed by Contractor. Conduit size and type as indicated.
2. Route conduit to base of pole.

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7/1/15

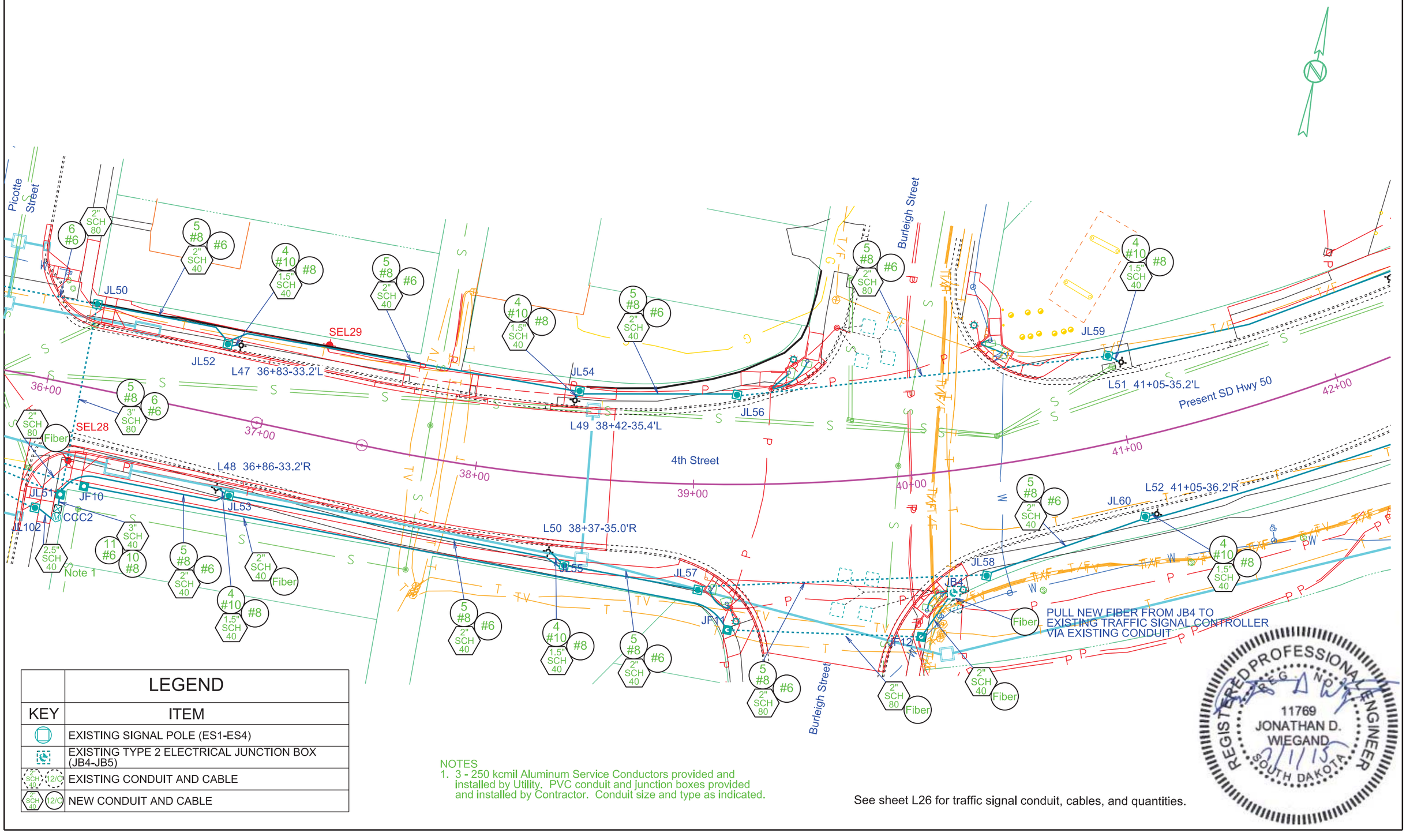
CONDUIT LAYOUT

FOR BIDDING PURPOSES ONLY

SD HWY 50 / 4TH STREET

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0050(99)381	L25	L49

Plotting Date: 7/1/2015



	LEGEND
KEY	ITEM
	EXISTING SIGNAL POLE (ES1-ES4)
	EXISTING TYPE 2 ELECTRICAL JUNCTION BOX (JB4-JB5)
SCH 40 / 12/C	EXISTING CONDUIT AND CABLE
SCH 40 / 12/C	NEW CONDUIT AND CABLE

NOTES
1. 3 - 250 kcmil Aluminum Service Conductors provided and installed by Utility. PVC conduit and junction boxes provided and installed by Contractor. Conduit size and type as indicated.

See sheet L26 for traffic signal conduit, cables, and quantities.

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7/1/15

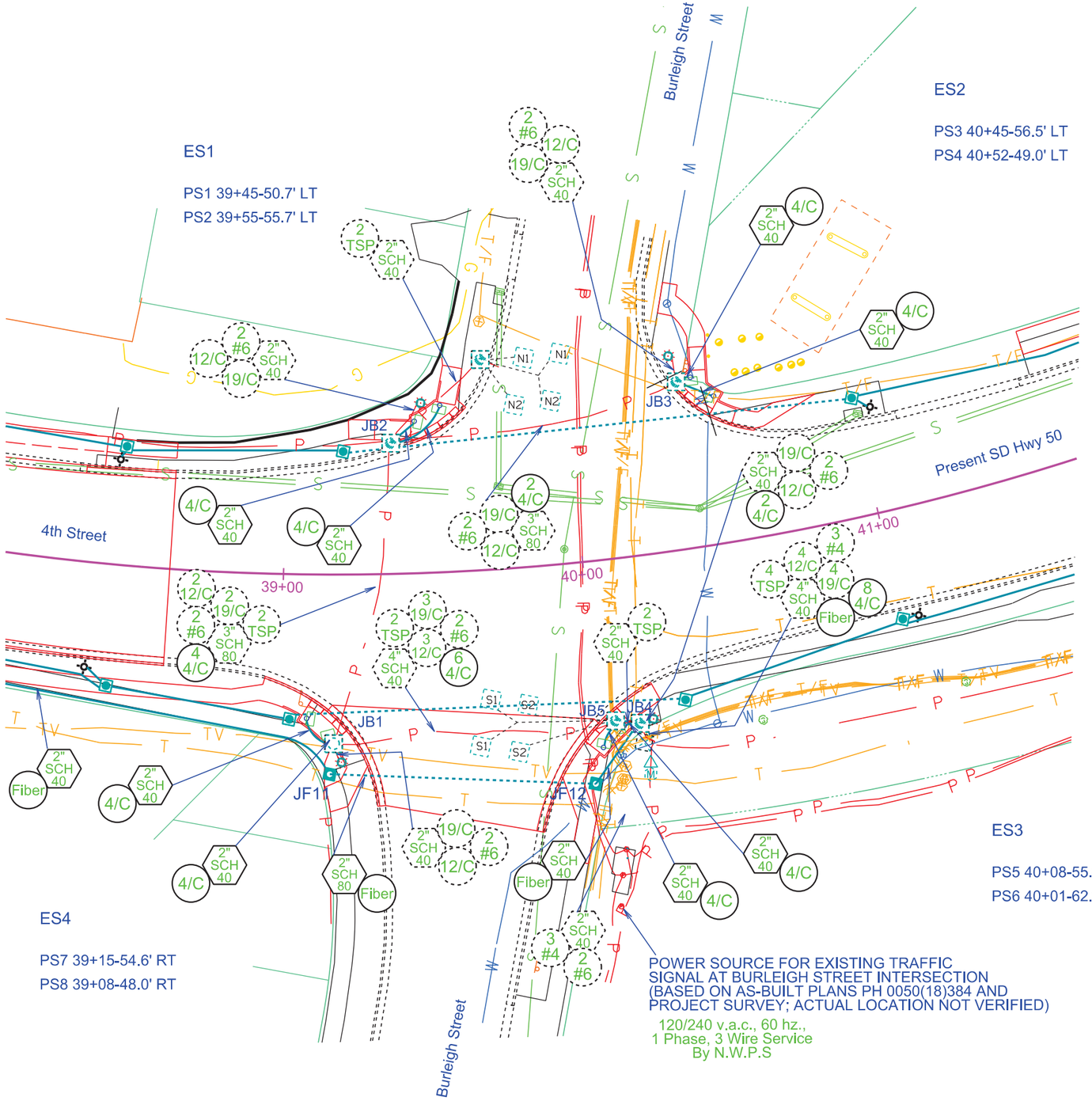
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0050(99)381	L26	L49

Plotting Date: 7/1/2015

CONDUIT LAYOUT

FOR BIDDING PURPOSES ONLY

SD HWY 50 / 4TH STREET & BURLEIGH STREET



	LEGEND
KEY	ITEM
	EXISTING SIGNAL POLE (ES1-ES4)
	EXISTING TYPE 2 ELECTRICAL JUNCTION BOX (JB2-JB5)
	EXISTING TYPE 3 ELECTRICAL JUNCTION BOX (JB1)
2" SCH 40 / 12/C	EXISTING CONDUIT AND CABLE
2" SCH 40 / 12/C	NEW CONDUIT AND CABLE

ESTIMATE OF QUANTITIES

KEY	ITEM	EST QUANT	UNIT
2" SCH 40	2" RIGID CONDUIT, SCHEDULE 40	130	FT
4/C	4/C #14 AWG COPPER TRAY CABLE, K2	1,810	FT

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SOUTH DAKOTA

CONDUIT LAYOUT

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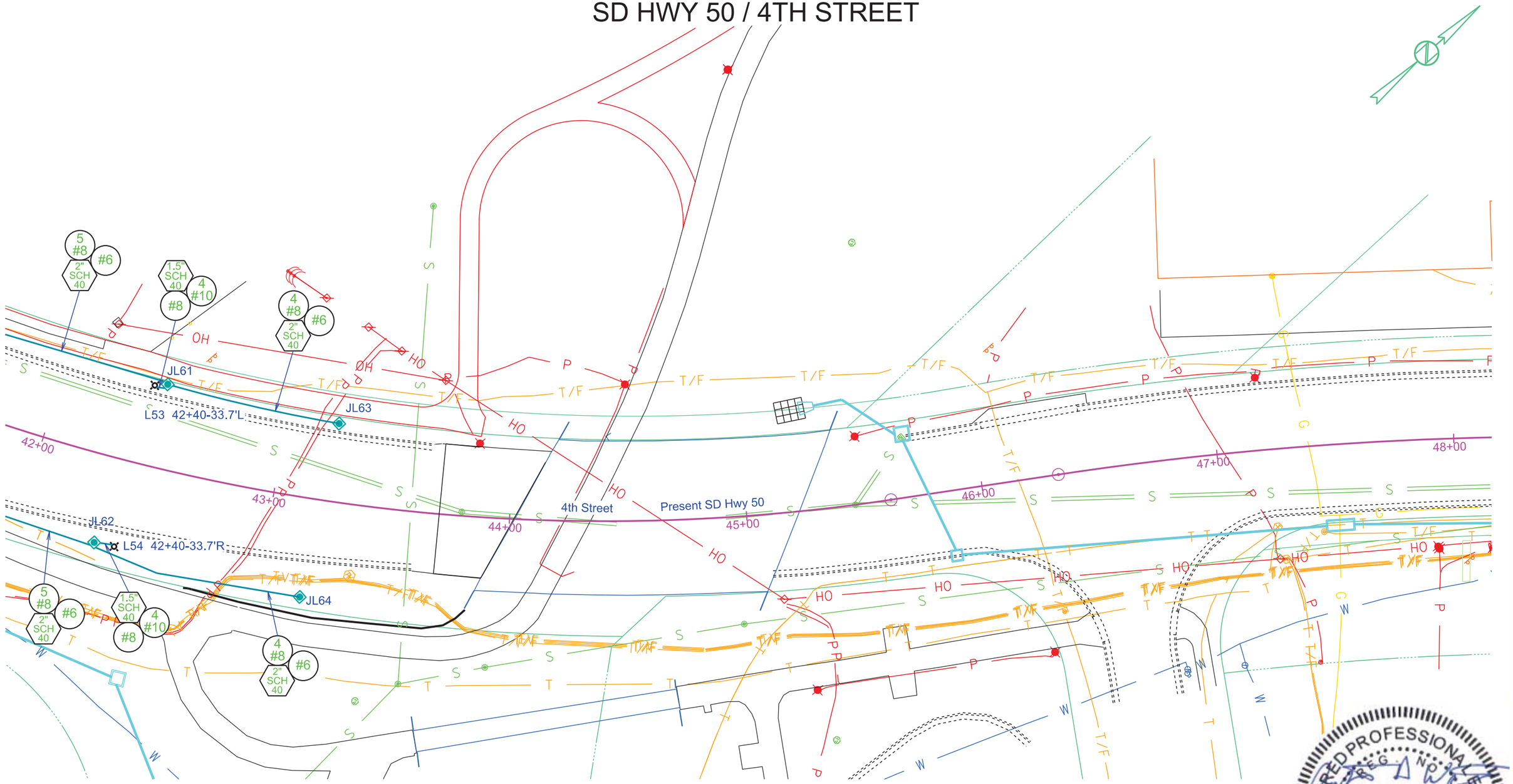
SD HWY 50 / 4TH STREET

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0050(99)381	L27	L49

Plotting Date: 7/1/2015



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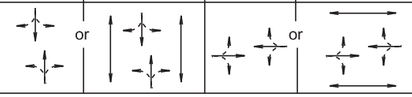
JONATHAN D. WIEGAND
SOUTH DAKOTA
7/1/15

Plotting Date: 7/1/2015

SIGNAL TIMING

FOR BIDDING PURPOSES ONLY

SD HWY 50 / 4TH STREET & DOUGLAS AVENUE

PHASING AND SEQUENCING															
INTERVAL / SIGNAL HEAD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	FLASH DISPLAY
NB: 5,6,7,8	G	Y		G	G	Y									R
SB: 13,14,15,16	G	Y		G	G	Y									R
EB: 9,10,11,12								G	Y		G	G	Y		Y
WB: 1,2,3,4								G	Y		G	G	Y		Y
NB & SB: 19,20,23,24	DW	DW	DW	W	F DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	NO DISPLAY
EB & WB: 17,18,21,22	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	W	F DW	DW	DW	NO DISPLAY
MOVEMENTS	2&6			2&6 W/PED				4&8			4&8 W/PED				
PHASES															

CONTROLLER TIMINGS (FREE OPERATION)								
MOVEMENT	1	2	3	4	5	6	7	8
PHASE		↓		←		↑		→
MIN GREEN		12		12		12		12
ADDED INITIAL								
MAX INITIAL								
PASSAGE TIME		3				3		
MAXIMUM 1		20		40		20		40
MAXIMUM 2								
TIME BEFORE								
TIME TO REDUCE								
MINIMUM GAP								
YELLOW CHANGE		4		4		4		4
RED CLEARANCE		2		2		2		2
WALK		7		7		7		7
PED CLEARANCE		16		16		16		16

TIMING PLAN 1	
TIME OF DAY (TOD)	PATTERN (C/S/O)
6:00 - 23:00	1/1/1
23:00 - 6:00	FLASH

TIMING PLAN 2	
TIME OF DAY (TOD)	PATTERN (C/S/O)
6:00 - 23:00	1/1/1
23:00 - 6:00	FLASH

WEEKLY PROGRAM							
	SUN	MON	TUE	WED	THU	FRI	SAT
TIMING PLAN	2	1	1	1	1	1	2

COORDINATION TIMING								
CYCLE 1 = 65 SEC								
MOVEMENT	1	2	3	4	5	6	7	8
PHASE		↓		←		↑		→
TIME - SPLIT 1		20		45		20		45
COORDINATED PHASE		X				X		
OFFSET 1 = 20 SEC								

DETECTOR SETTINGS								
DETECTOR LABEL	AMPLIFIED CHANNEL DETECTOR	DETECTOR TYPE	DETECTOR OPERATION			LOCKING CALL	MOVEMENT CALLED	MOVEMENT EXTENDED
			CALLS & EXTENDS	CALLS ONLY	EXTENDS ONLY			
N1,N2	1	PREFORMED	X				2	2
N3,N4	2	PREFORMED	X				2	2
S1,S2	3	PREFORMED	X				6	6
S3,S4	4	PREFORMED	X				6	6

NOTE: CONTRACTOR SHALL VERIFY OFFSET AT US81/ BROADWAY ST. & 4TH ST. IS 0.

Plot Scale - 1:40

Plotted From - kmay

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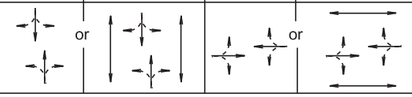
SIGNAL TIMING

FOR BIDDING PURPOSES ONLY

SD HWY 50 / 4TH STREET & BURLEIGH STREET

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0050(99)381	L29	L49

Plotting Date: 7/1/2015

PHASING AND SEQUENCING															
INTERVAL / SIGNAL HEAD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	FLASH DISPLAY
NB: 14,15,16,17	G	Y		G	G	Y									R
SB: 10,11,12,13	G	Y		G	G	Y									R
EB: 5,6,7,8,9								G	Y		G	G	Y		Y
WB: 1,2,3,4								G	Y		G	G	Y		Y
NB & SB: 18,19,20,21	DW	DW	DW	W	F DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	NO DISPLAY
EB & WB: 22,23,24,25	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	W	F DW	DW	DW	NO DISPLAY
MOVEMENTS	2&6			2&6 W/PED				4&8			4&8 W/PED				
PHASES															

CONTROLLER TIMINGS (FREE OPERATION)								
MOVEMENT	1	2	3	4	5	6	7	8
PHASE		↓		←		↑		→
MIN GREEN		12		12		12		12
ADDED INITIAL								
MAX INITIAL								
PASSAGE TIME		3				3		
MAXIMUM 1		20		40		20		40
MAXIMUM 2								
TIME BEFORE								
TIME TO REDUCE								
MINIMUM GAP								
YELLOW CHANGE		4		4		4		4
RED CLEARANCE		2		2		2		2
WALK		8		8		8		8
PED CLEARANCE		26		20		26		20

TIMING PLAN 1	
TIME OF DAY (TOD)	PATTERN (C/S/O)
6:00 - 23:00	1/1/1
23:00 - 6:00	FLASH

TIMING PLAN 2	
TIME OF DAY (TOD)	PATTERN (C/S/O)
6:00 - 23:00	1/1/1
23:00 - 6:00	FLASH

WEEKLY PROGRAM							
	SUN	MON	TUE	WED	THU	FRI	SAT
TIMING PLAN	2	1	1	1	1	1	2

COORDINATION TIMING								
CYCLE 1 = 65 SEC								
MOVEMENT	1	2	3	4	5	6	7	8
PHASE		↓		←		↑		→
TIME - SPLIT 1		25		40		25		40
COORDINATED PHASE		X				X		
OFFSET 1 = 56 SEC								

DETECTOR SETTINGS								
DETECTOR LABEL	AMPLIFIED CHANNEL DETECTOR	DETECTOR TYPE	DETECTOR OPERATION			LOCKING CALL	MOVEMENT CALLED	MOVEMENT EXTENDED
			CALLS & EXTENDS	CALLS ONLY	EXTENDS ONLY			
N1	1	EXISTING	X				2	2
N2	2	EXISTING	X				2	2
S1	3	EXISTING	X				6	6
S2	4	EXISTING	X				6	6

NOTE: CONTRACTOR SHALL VERIFY OFFSET AT US81/ BROADWAY ST. & 4TH ST. IS 0.

Plot Scale - 1:40

Plotted From - kmay

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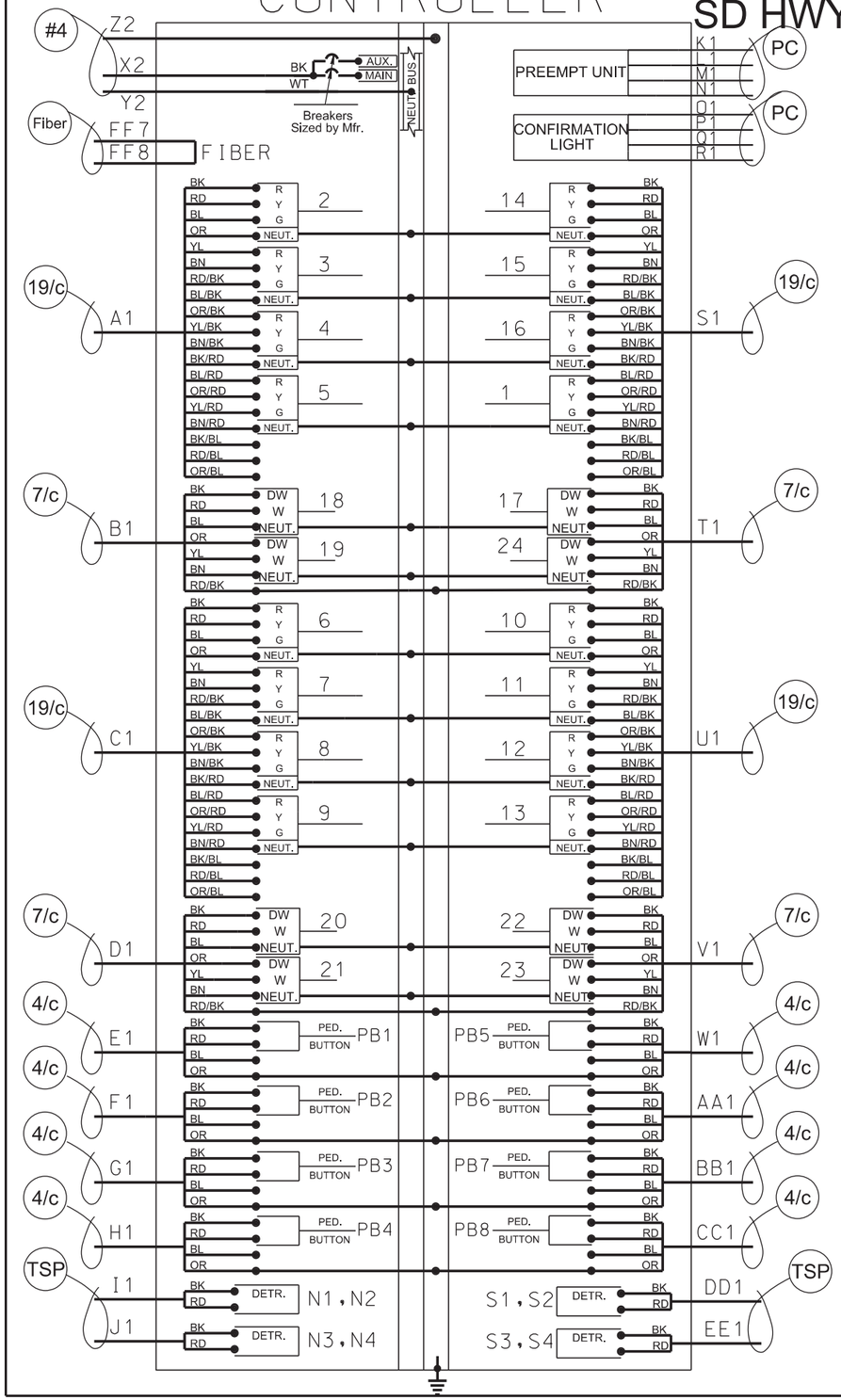
WIRING DIAGRAM

FOR BIDDING PURPOSES ONLY

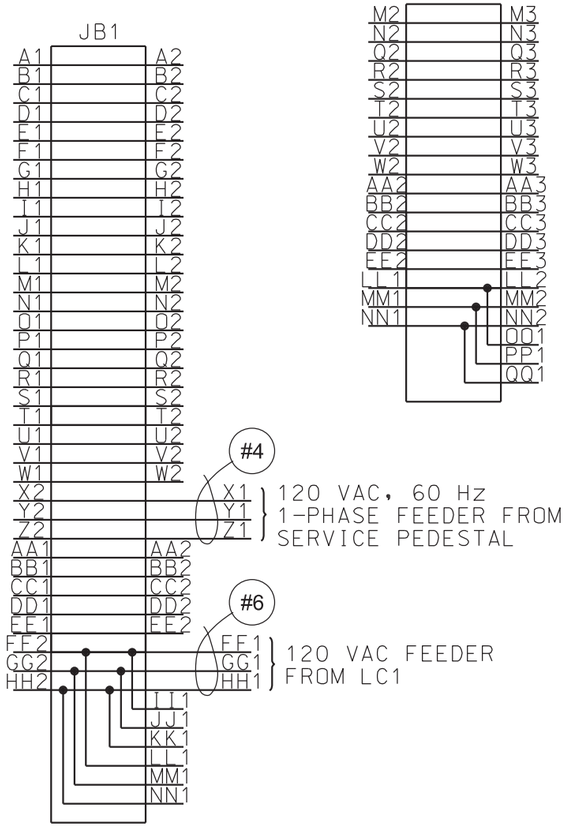
SD HWY 50 / 4TH STREET & DOUGLAS AVENUE

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0050(99)381	L30	L49

CONTROLLER



JB1

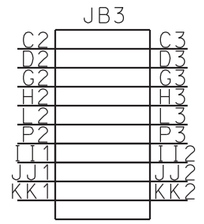


#4
X1
Y1
Z1
120 VAC, 60 Hz
1-PHASE FEEDER FROM
SERVICE PEDESTAL

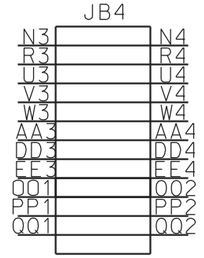
#6
FF1
GG1
HH1
120 VAC FEEDER
FROM LC1

JB6

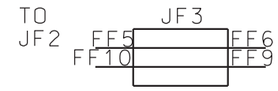
JB3



JB4



JF3



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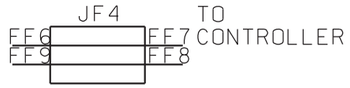
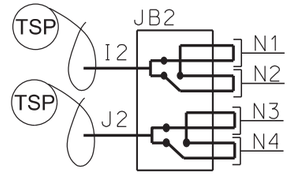
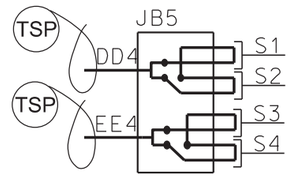


JF5

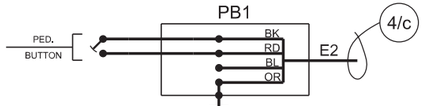
JB2



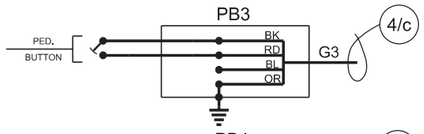
JB5



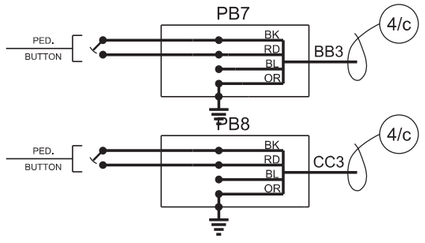
PB1



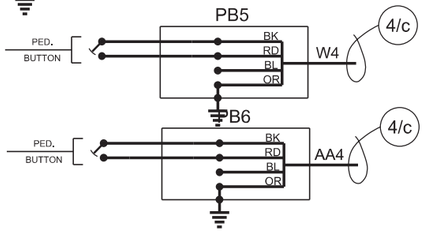
PB3



PB7



PB5



LEGEND:

FUSE: 6 amp. Non-Time Delay or 2 8/10 amp. Dual Element

LUMINAIRE: LED

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

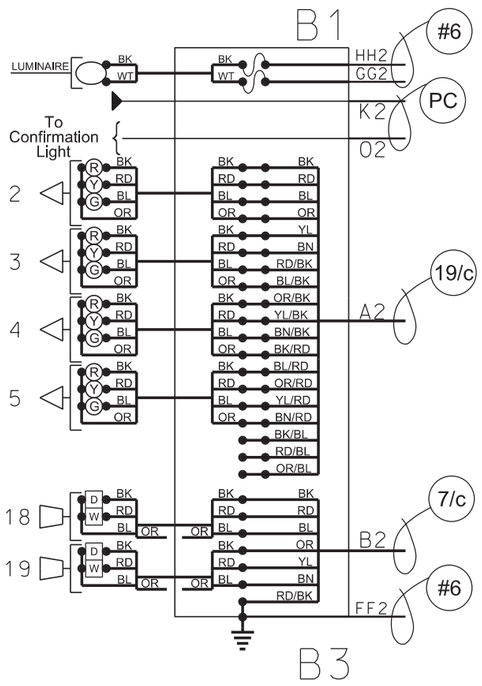
REGISTERED PROFESSIONAL ENGINEER
11769
JONATHAN D. WIEGAND
SOUTH DAKOTA
2/11/15

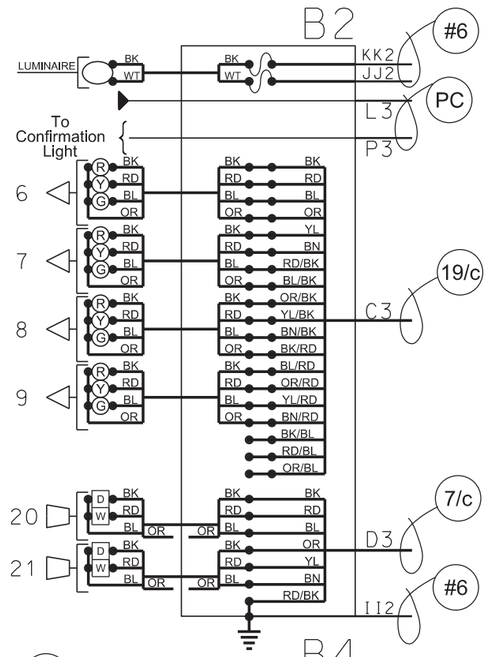
WIRING DIAGRAM

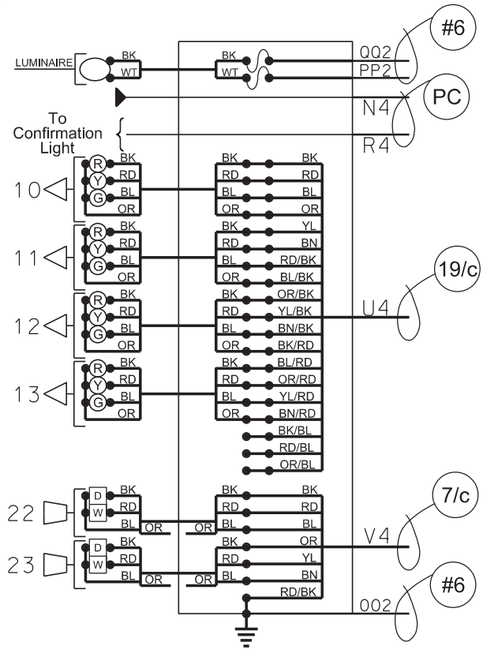
FOR BIDDING PURPOSES ONLY

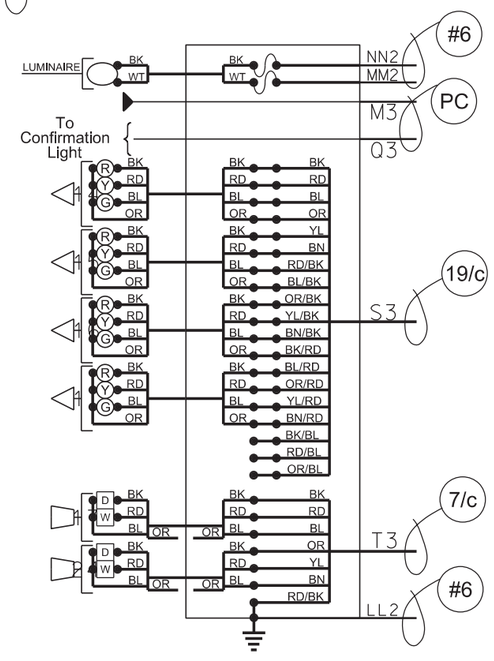
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0050(99)381	L31	L49

SD HWY 50 / 4TH STREET & DOUGLAS AVENUE









LEGEND:

FUSE: 6 amp. Non-Time Delay
or
2 8/10 amp. Dual Element

LUMINAIRE: LED

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

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

LEGEND:
FUSE: 6 amp. Non-Time Delay or 2 8/10 amp. Dual Element
LUMINAIRE: 400 watt High Pressure Sodium Lamp

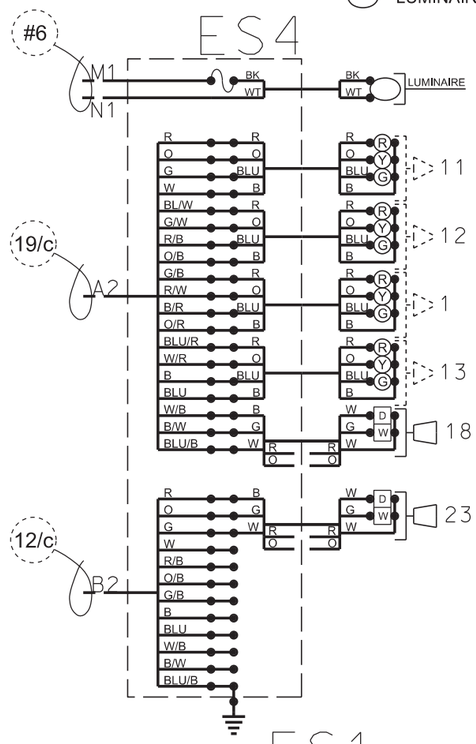
WIRING DIAGRAM

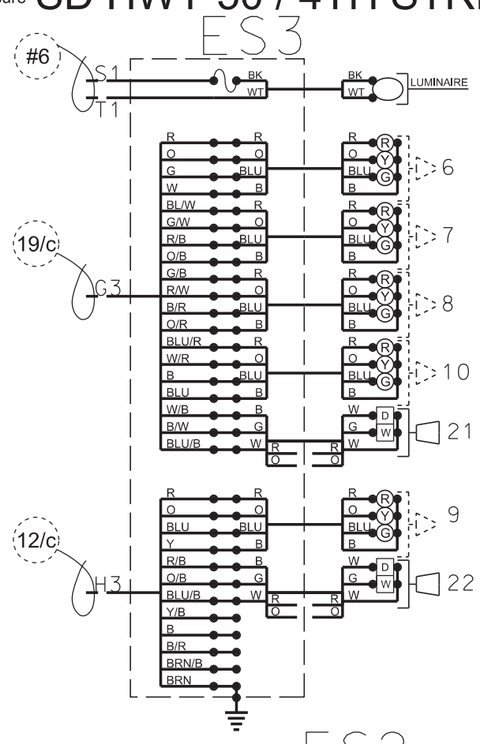
FOR BIDDING PURPOSES ONLY

SD HWY 50 / 4TH STREET & BURLEIGH STREET

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0050(99)381	L32	L49

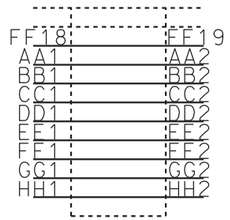
Plotting Date: 7/1/2015

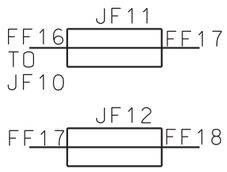


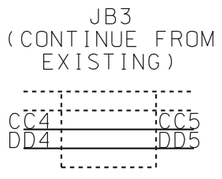


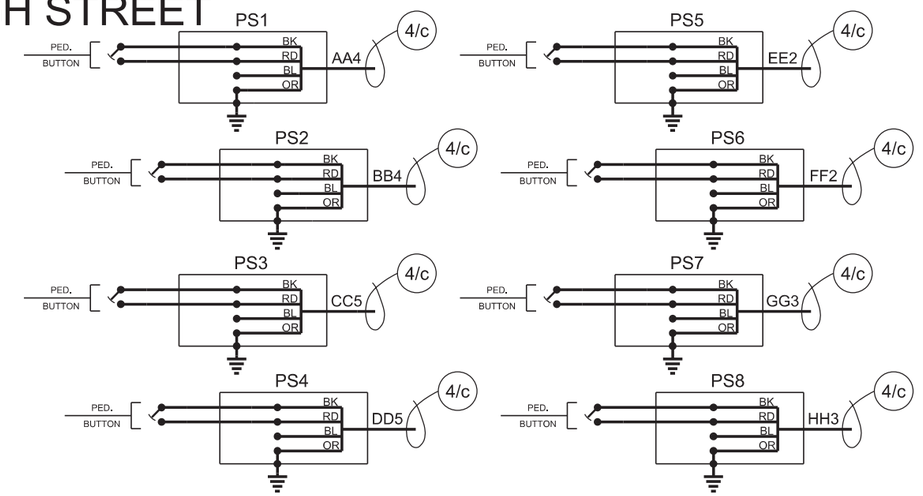
SEE NOTE 1

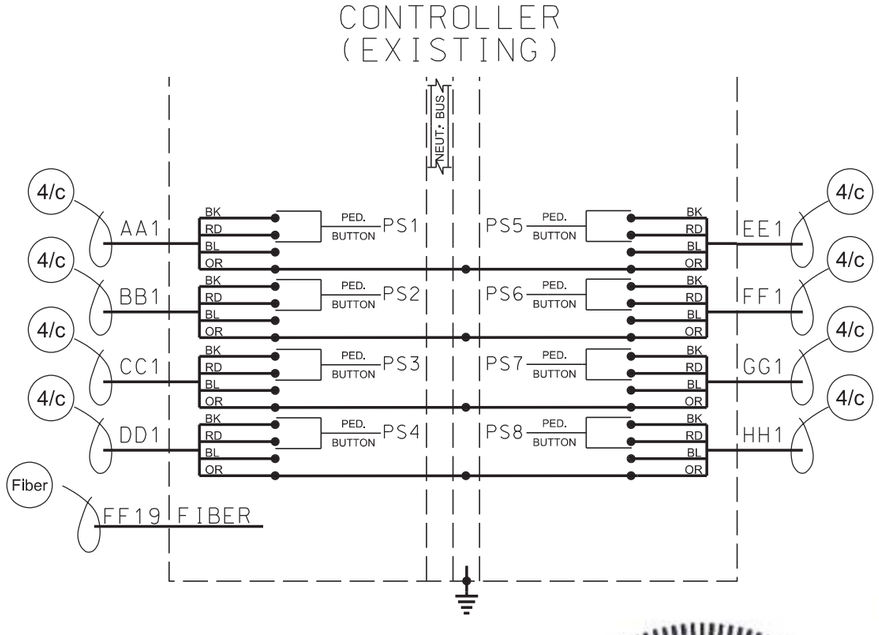
SEE NOTE 1

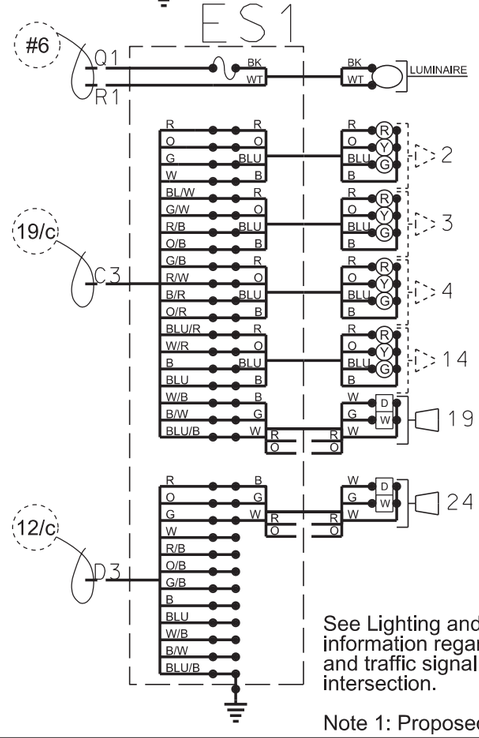


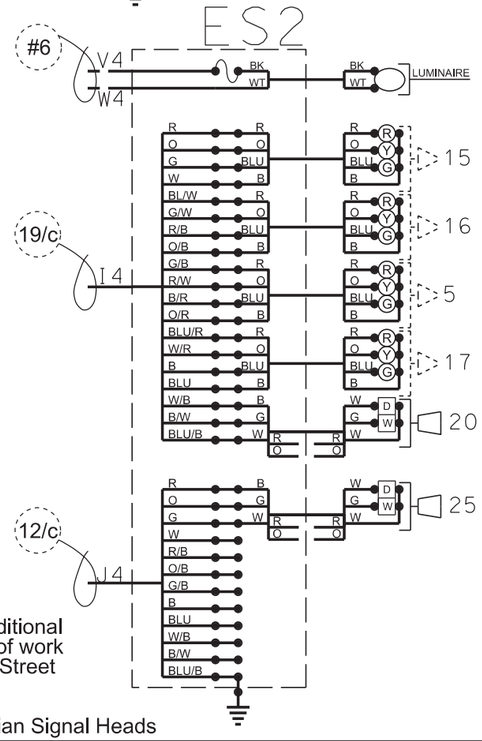






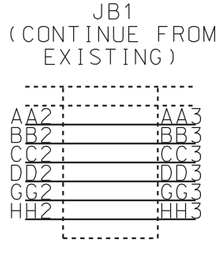


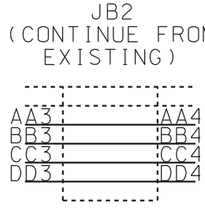




SEE NOTE 1

SEE NOTE 1





See Lighting and Signals Notes for additional information regarding proposed order of work and traffic signal items at the Burleigh Street intersection.

Note 1: Proposed Countdown Pedestrian Signal Heads

WIRING DIAGRAM

FOR BIDDING PURPOSES ONLY

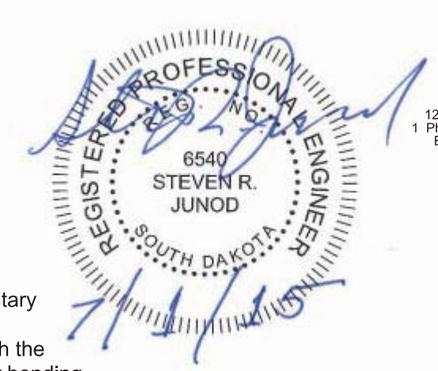
SD HWY 50 / 4TH STREET

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0050(99)381	L33	L49

Plotting Date: 7/1/2015

LEGEND:

- LUMINAIRE: 400 watt Metal Halide Post-top
- LUMINAIRE: 284 watt LED Cobrahead
- FUSE
- OUTLET



NOTES
1. See Sheet L50 for equipment list and elementary control diagram for lighting controller.
2. All circuits shall be bonded in accordance with the NATIONAL ELECTRICAL CODE. Quantities for bonding conductors are not included in these plans.

WIRING DIAGRAM

SD HWY 50 / 4TH STREET

FOR BIDDING PURPOSES ONLY

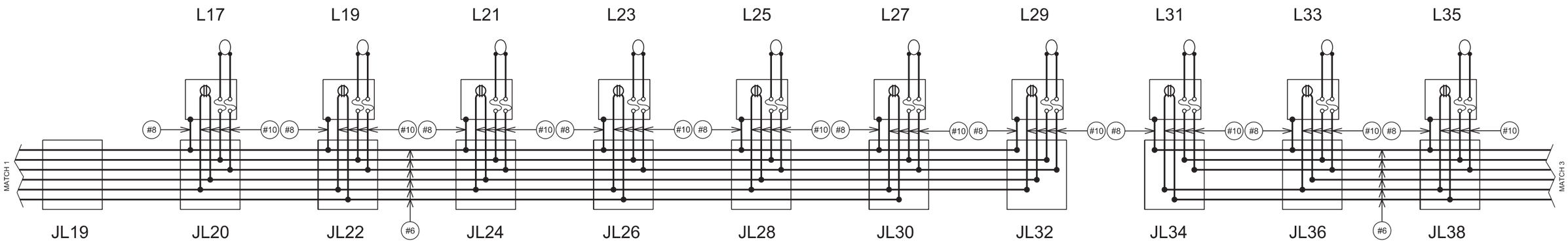
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0050(99)381	L34	L49

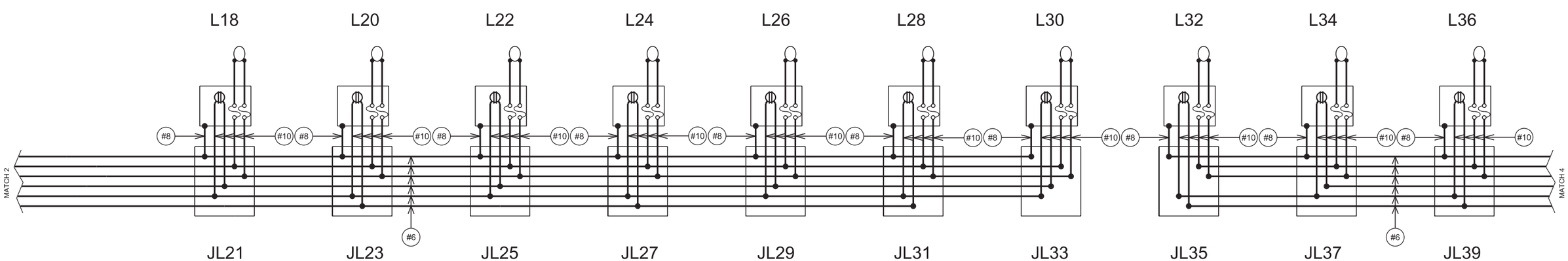
Plotting Date: 7/1/2015

LEGEND:

- LUMINAIRE: 400 watt Metal Halide Post-top
- LUMINAIRE: 284 watt LED Cobrahead
- FUSE
- OUTLET

REGISTERED PROFESSIONAL ENGINEER
6540
STEVEN R. JUNOD
SOUTH DAKOTA





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

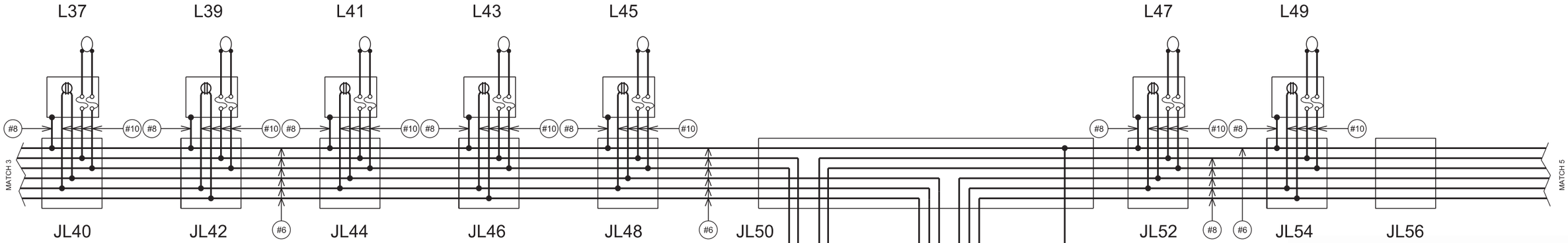
WIRING DIAGRAM

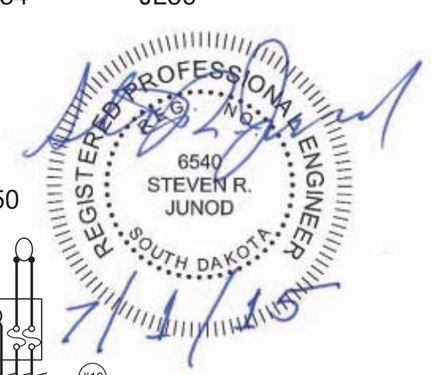
FOR BIDDING PURPOSES ONLY

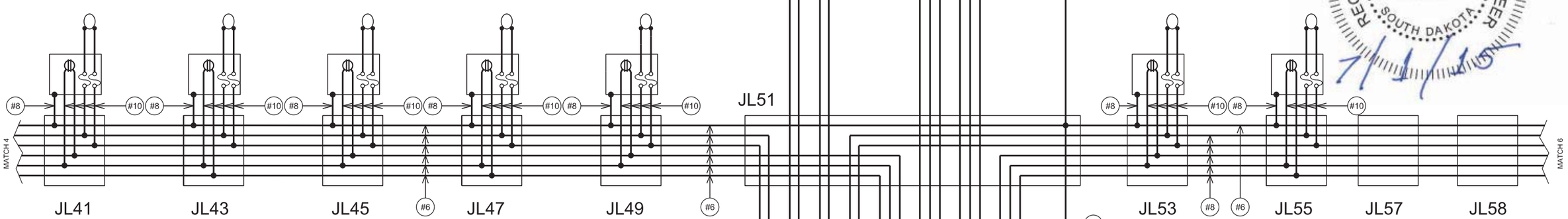
SD HWY 50 / 4TH STREET

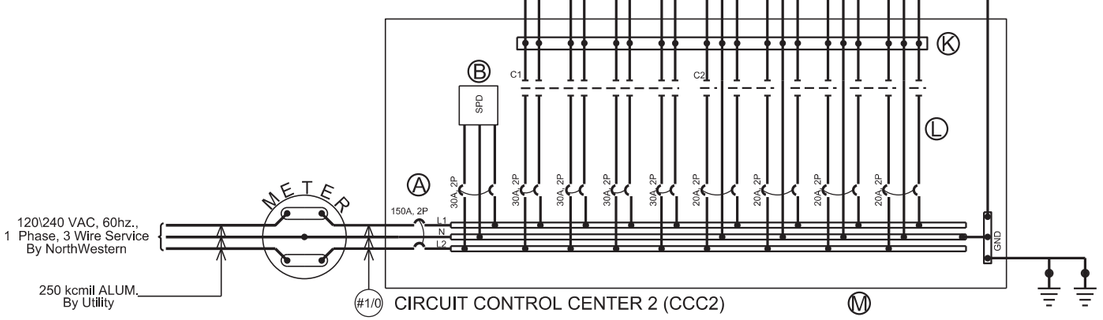
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0050(99)381	L35	L49

Plotting Date: 7/1/2015









LEGEND:

- LUMINAIRE: 400 watt Metal Halide Post-top
- LUMINAIRE: 284 watt LED Cobrahead
- FUSE
- OUTLET

NOTES

1. See Sheet L50 for equipment list and elementary control diagram for lighting controller.
2. All circuits shall be bonded in accordance with the NATIONAL ELECTRICAL CODE. Quantities for bonding conductors are not included in these plans.
3. Service entrance conductors #1/0, conduit, and fittings are incidental to the installation of Circuit Control Center 2.

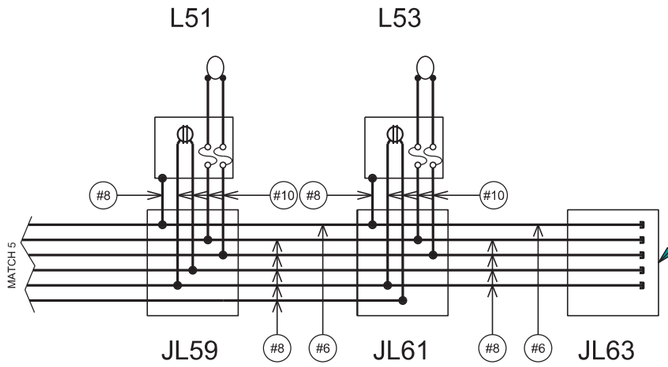
WIRING DIAGRAM

SD HWY 50 / 4TH STREET

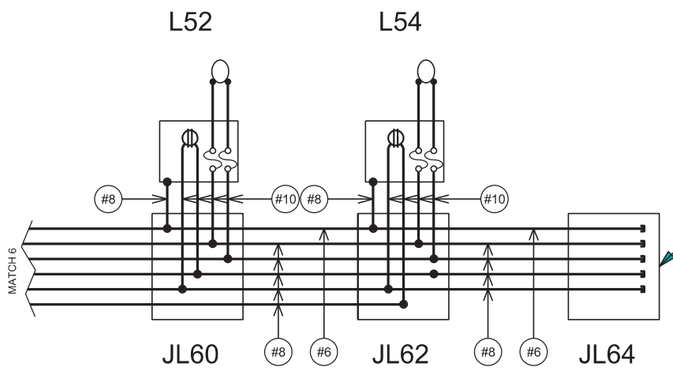
FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0050(99)381	L36	L49

Plotting Date: 7/1/2015



PROVIDE 10' OF LEAD LENGTH FOR EACH CONDUCTOR, WATERPROOF WIRE-NUT EACH CONDUCTOR END, COIL CONDUCTORS IN JUNCTION BOX FOR FUTURE EXTENSION.



PROVIDE 10' OF LEAD LENGTH FOR EACH CONDUCTOR, WATERPROOF WIRE-NUT EACH CONDUCTOR END, COIL CONDUCTORS IN JUNCTION BOX FOR FUTURE EXTENSION.

LEGEND:

- LUMINAIRE: 400 watt Metal Halide Post-top
- LUMINAIRE: 284 watt LED Cobrahead
- FUSE
- OUTLET

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

REGISTERED PROFESSIONAL ENGINEER
REG. NO.
6540
STEVEN R. JUNOD
SOUTH DAKOTA

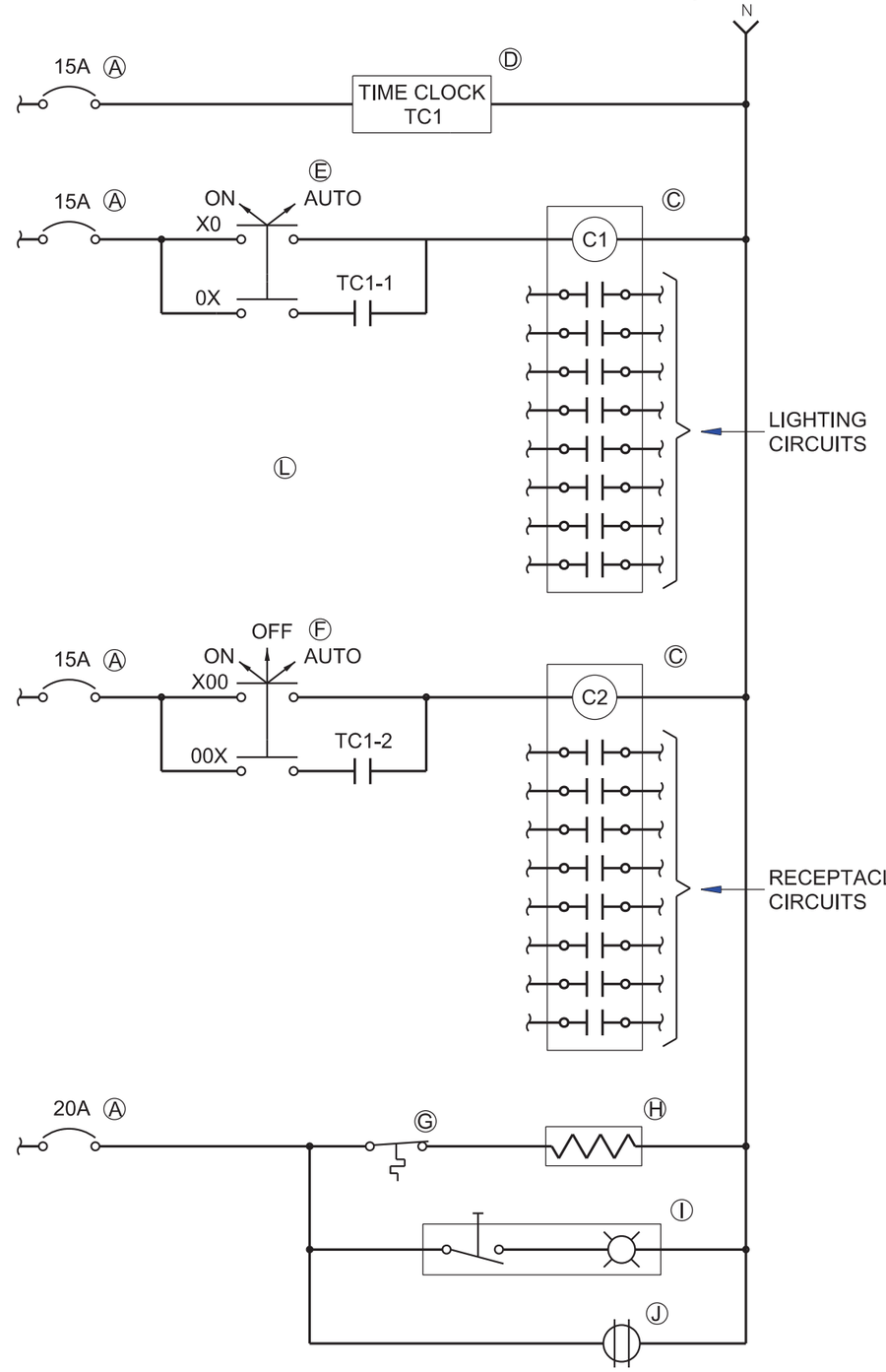
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0050(99)381	L37	L49

FOR BIDDING PURPOSES ONLY

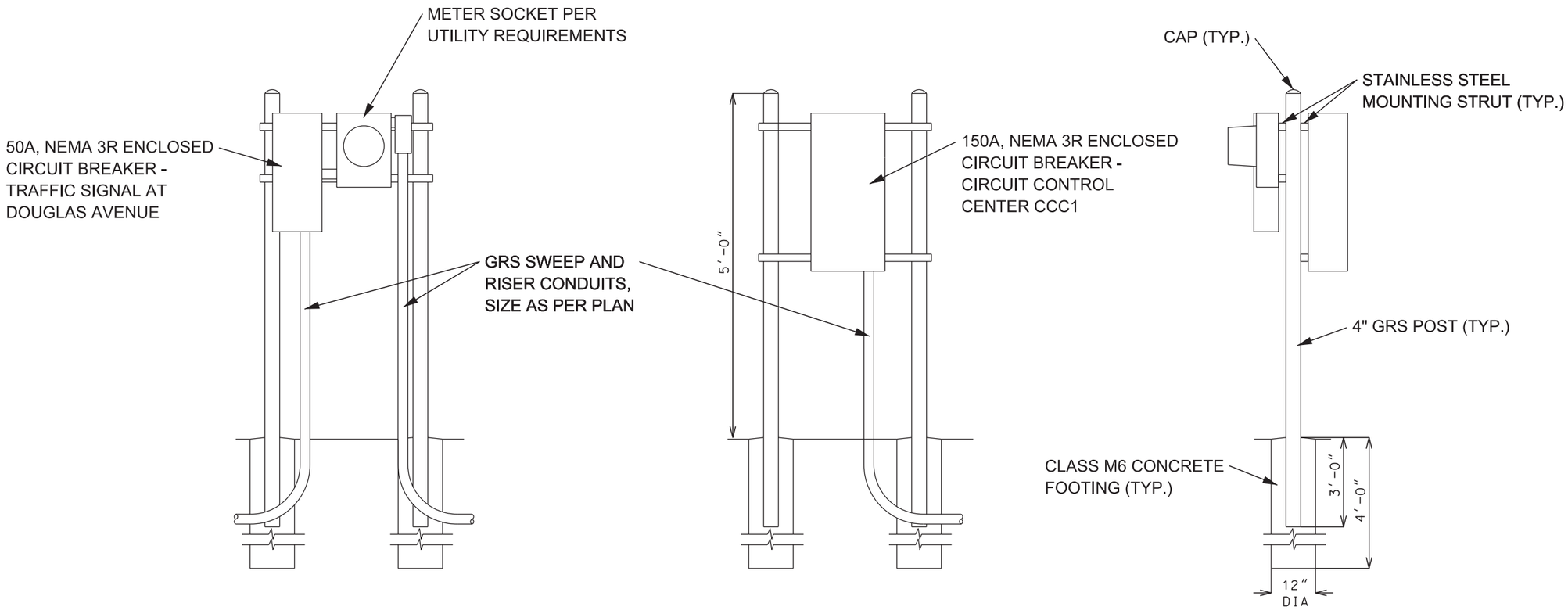
Plotting Date: 7/1/2015

LIGHTING CONTROLLER EQUIPMENT LIST

ITEM	DESCRIPTION
A	Branch Circuit Panel: Interior only, mounted in controller cabinet on cabinet back panel. Include copper line/neutral/ground buses, with main circuit breaker and bussing sized as indicated. Service-entrance rated. Provide indicated lighting/receptacle/control branch circuit breakers, bolt-on type. Branch panel sized for circuit breakers plus min. four extra spaces. 22k AIC series rating.
B	Surge Protection Device: Modes of protection L-L, L-N, N-G; 160kA per phase, 80kA per mode. Mount in cabinet minimizing lead length.
C	Lighting Contactor: Electrically held, provide each with minimum of 8 poles and capable of expanding to 12 poles (provide LC1 lighting contactor with 9 poles), 30A rated contacts, 120VAC coil.
D	Time Clock: electronic microprocessor based programmable astronomical type with minimum of two output contacts each independently programmable, contacts rated 120VAC, 5A min. 7-day and 5/2-day repeat cycle scheduling, full year control with automatic daylight savings and leap year adjustment, integral keypad and LED display, non-volatile program memory, battery backed time and calendar functions. Locate inside control cabinet. Intermatic Model ET70215C, or equal.
E	Selector Switch: 2-position, 2-pole, NEMA 4/12. Provide legend plate with function and position labels. Mount inside control cabinet.
F	Selector Switch: 3-position, 2-pole, NEMA 4/12. Provide legend plate with function and position labels. Mount inside control cabinet.
G	Thermostat to control operation of heater.
H	Strip Heater: 120VAC, sized to maintain cabinet interior at 10 deg. above ambient for condensation protection.
I	Cabinet Light: 120VAC fluorescent light assembly with integral plunger switch, mounted at top of door opening to turn on light when door is opened.
J	Duplex convenience receptacle with surface-mount box and cover, mounted inside cabinet.
K	Terminal Block(s): Provide terminal block(s) to land incoming circuit conductors.
L	Internal Wiring: insulated, stranded copper conductors for power and control, sized per NEC for connected overcurrent protection device.
M	Enclosure: Base-mount type NEMA 3R stainless steel or aluminum with equipment mounting back panel, enclosure sized to contain branch circuit panel and all other control elements/components. Provide with rotating handle latching mechanism(s) with integral keyed cylinder lock(s). Provide anchor bolts.



ELEMENTARY CONTROL WIRING DIAGRAM
(TYPICAL FOR ALL CONTROLLERS)



FRONT VIEW

BACK VIEW

SIDE VIEW

SERVICE PEDESTAL AT STA 12+50

FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0050(99)381	L39	L49

SPECIAL DETAIL
SPREAD FOOTING FOR LUMINAIRES

SPECIFICATIONS

1.Design Specifications: AASHTO Standard Specifications, 2002 Edition with 2009 interims. AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, Sixth Edition 2013.

2.Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 2015 Edition and required Provisions, Supplemental Specifications, and Special Provisions as included in the Proposal.

GENERAL NOTES

1. Unit Stresses: Concrete fc = 1600 p.s.i.
   Reinforcing Steel fs = 24000 p.s.i.

2. All concrete shall be Class M6 conforming to Section 462 and shall be colored as specified in the plan notes.

3. All reinforcing steel shall conform to ASTM A615 Grade 60.

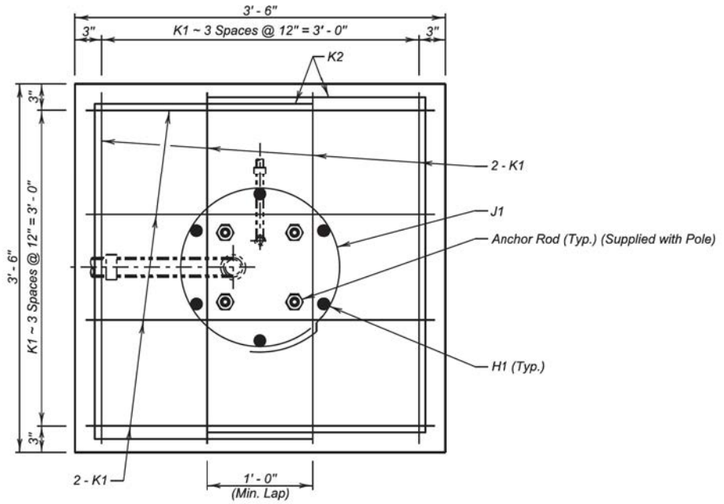
4. All exposed edges shall be chamfered ¾ inch.

5. Use 3 inch clear cover on all reinforcing steel EXCEPT as shown.

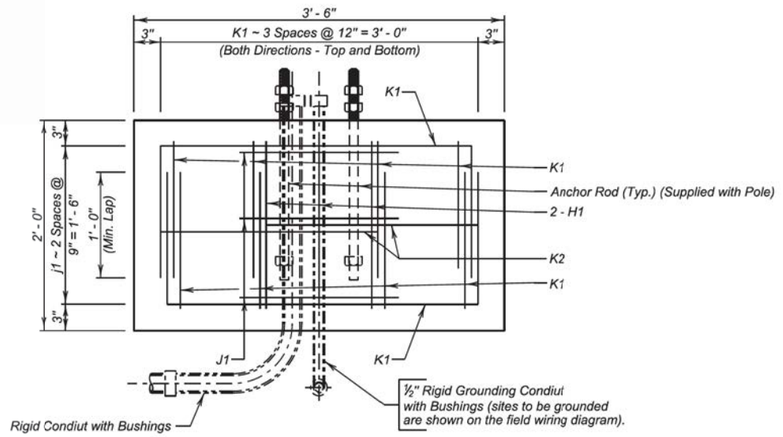
6. The embedment depth to the bottom of the footing shall be 2 ft. The footing shall be undercut 4 inches and backfilled with granular material conforming to the specifications for aggregate base course in Section 882 of the Specifications.

7. No signs shall be added to decorative Luminaire Poles.

8. Footing is designed for maximum Banner size of 24” wide by 50” high, with the top of the Banner mounted at 12’-0” above the top of the concrete footing.



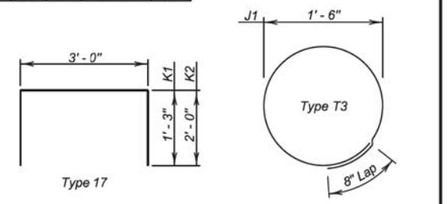
PLAN



ELEVATION

REINFORCING SCHEDULE
(For One Footing)

Mk.	No.	Size	Length	Type	Bending Details
H1	6	6	1' - 6"	Str.	
J1	3	4	5' - 5"	T3	
K1	16	4	5' - 6"	17	
K2	2	4	7' - 0"	17	



NOTE:
All dimensions are out to out of bars.

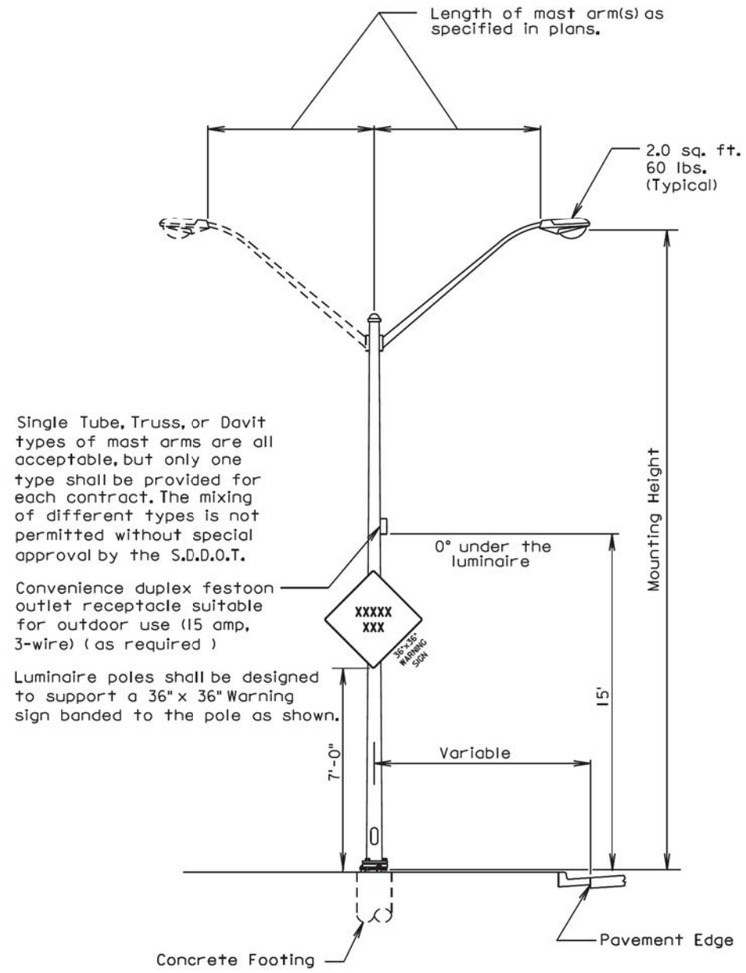
INFORMATIONAL QUANTITIES
(For One Footing)

ITEM	UNIT	QUANTITY
Epoxy Coated Reinforcing Steel	Lb.	93
Class M6 Concrete	Cu.Yd.	0.9
Structure Excavation, Miscellaneous	Cu.Yd.	3.1

LUMINAIRE FOOTING DETAILS
FOR
SPREAD FOOTING FOR LUMINAIRES
NH 0050(99)381
YANKTON COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2014

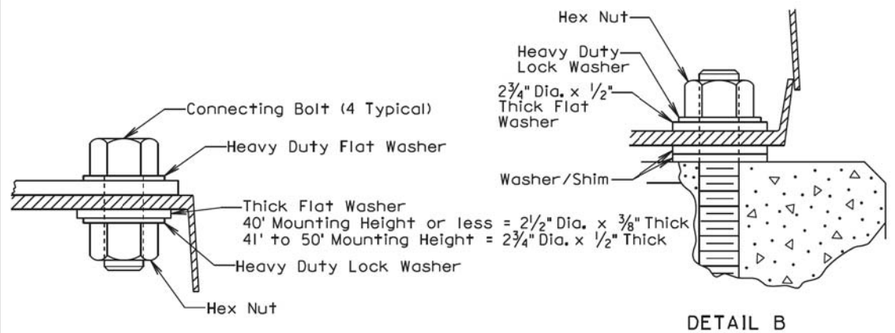
PLANS BY :
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

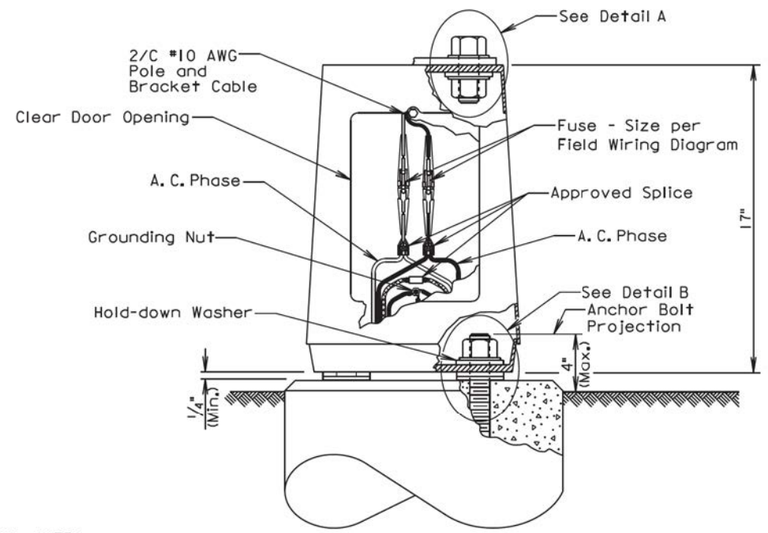
DESIGNED BY	CK. DES. BY	DRAFTED BY	
JSM	TB	GW	Kevin N Boeder
YANK6926	6926WA01		BRIDGE ENGINEER



March 31, 2000

Published Date: 2nd Qtr. 2015	SDDOT	STEEL ROADWAY LUMINAIRE POLE WITH MAST ARM(S)	PLATE NUMBER 635.01
			Sheet 1 of 1





GENERAL NOTES:

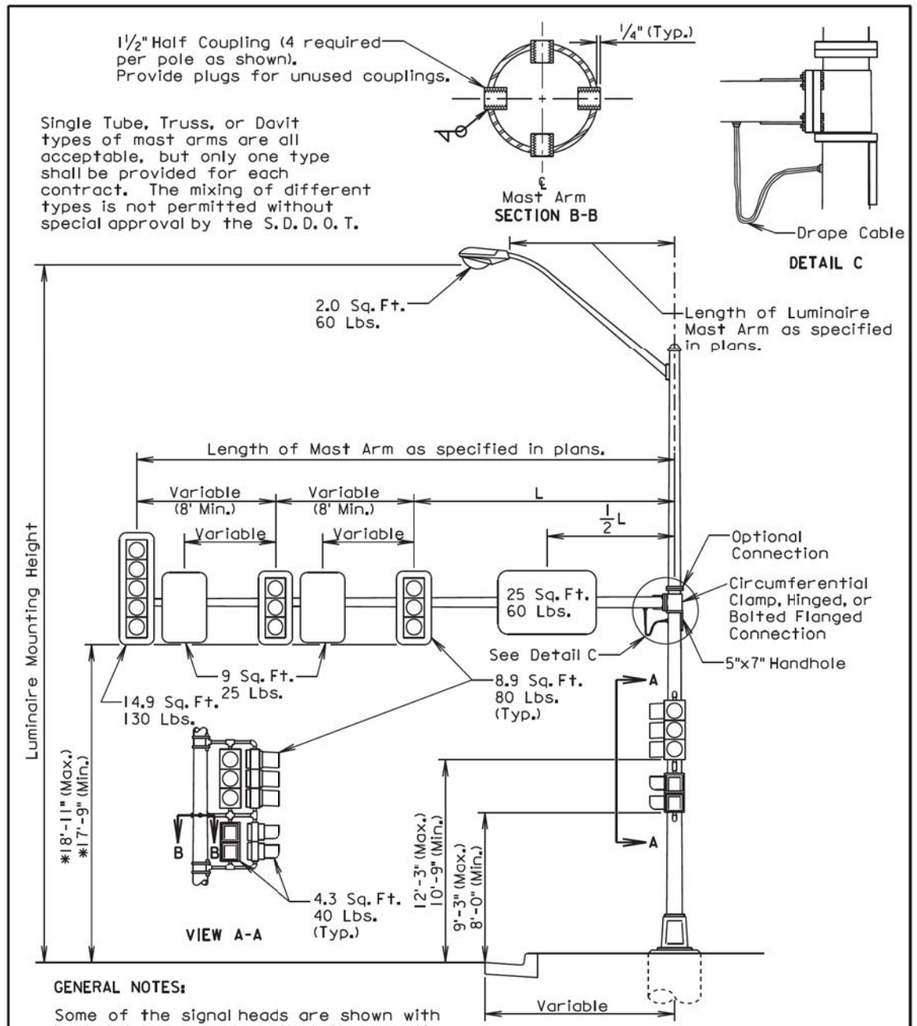
Base details are provided for example only and are not intended to be a complete design.

Connectors shall be breakaway type.

The Contractor shall install "U" shaped shims or round flat washers if shimming is necessary to install the light poles plumb and level. The washers and shims shall be installed around the anchor bolts.

June 26, 2013

Published Date: 2nd Qtr. 2015	SDDOT	ROADWAY LUMINAIRE POLE BREAKAWAY TRANSFORMER BASE	PLATE NUMBER 635.21
			Sheet 1 of 1



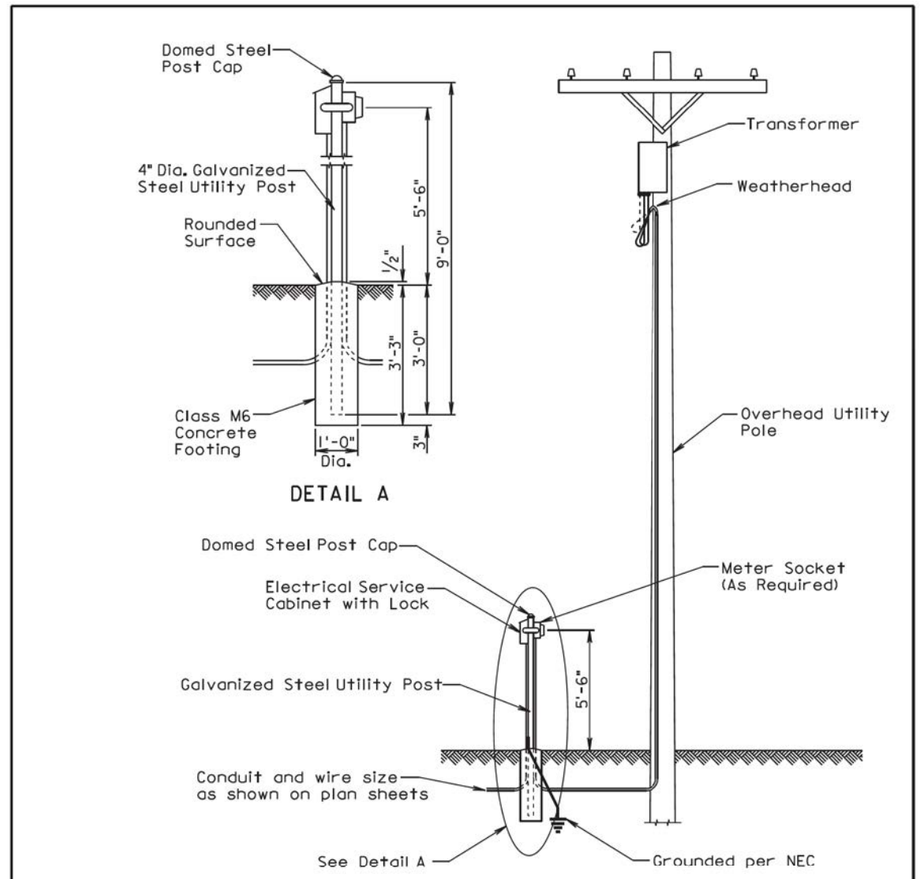
GENERAL NOTES:

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

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

December 23, 2008

Published Date: 2nd Qtr. 2015	SDDOT	SIGNAL POLE (WITH MAST ARM AND LUMINAIRE EXTENSION)	PLATE NUMBER 635.32 Sheet 1 of 1



ELEVATION

GENERAL NOTES:

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

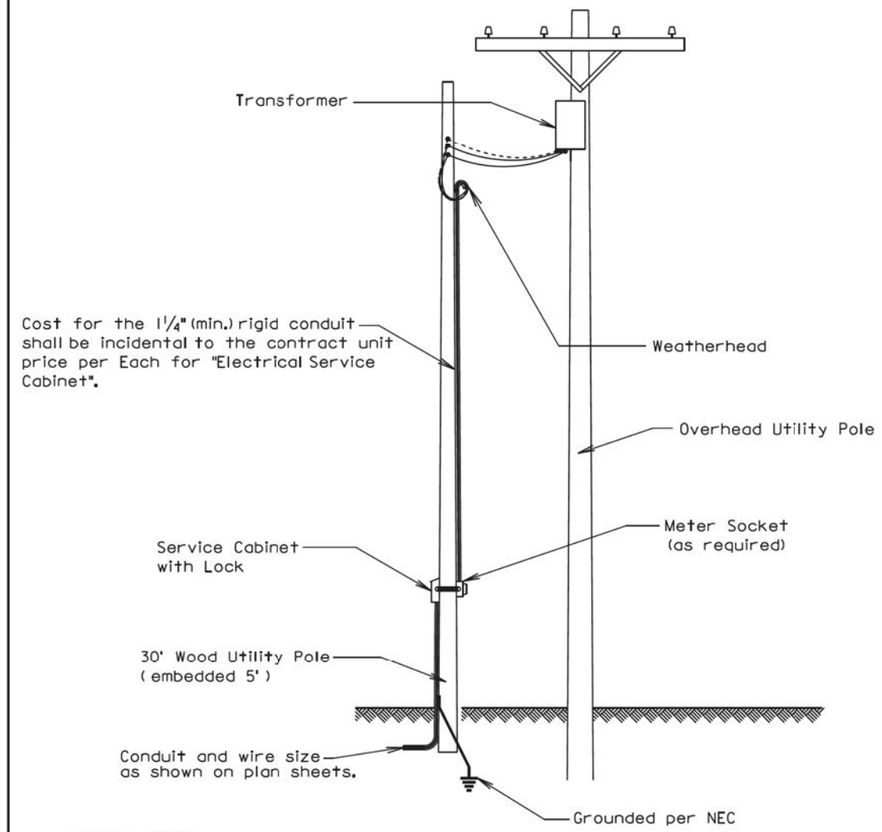
The 4" diameter galvanized steel utility post shall be 9' long and shall be in conformance with AASHTO Standard Specifications M181. The post shall be Type 1 and either Grade 1 or Grade 2. The domed steel post cap shall be in conformance with AASHTO Standard Specifications M181 and shall be Type 1.

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

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

June 26, 2006

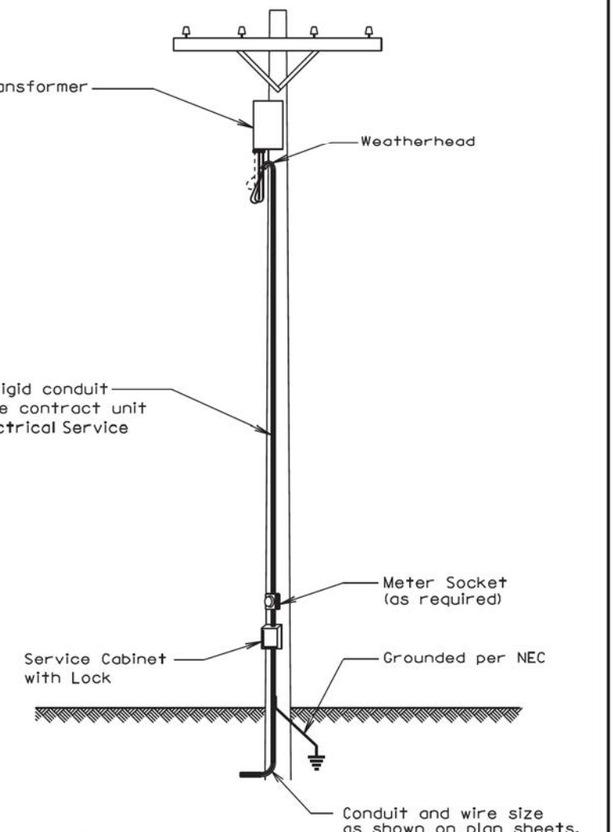
Published Date: 2nd Qtr. 2015	SDDOT	GALVANIZED STEEL UTILITY POST WITH OVERHEAD UTILITY POLE	PLATE NUMBER 635.35 Sheet 1 of 1



GENERAL NOTE:
All materials and labor on secondary side of transformer shall be supplied by the Contractor.

March 31, 2000

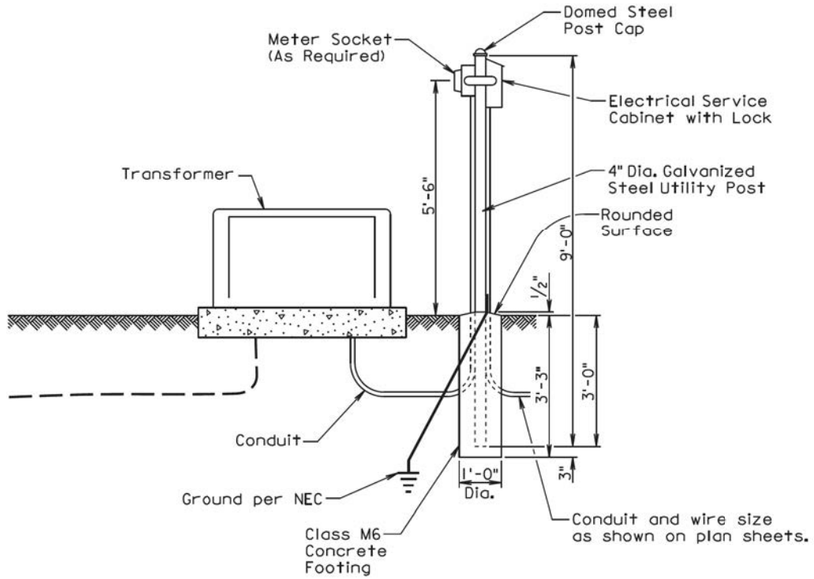
Published Date: 2nd Qtr. 2015	SDDOT	30' WOOD UTILITY POLE WITH OVERHEAD UTILITY POLE	PLATE NUMBER 635.37
			Sheet 1 of 1



GENERAL NOTE:
All materials and labor on secondary side of transformer shall be supplied by the Contractor.

March 31, 2000

Published Date: 2nd Qtr. 2015	SDDOT	SERVICE CABINET ON OVERHEAD UTILITY POLE	PLATE NUMBER 635.40
			Sheet 1 of 1



ELEVATION

GENERAL NOTES:

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

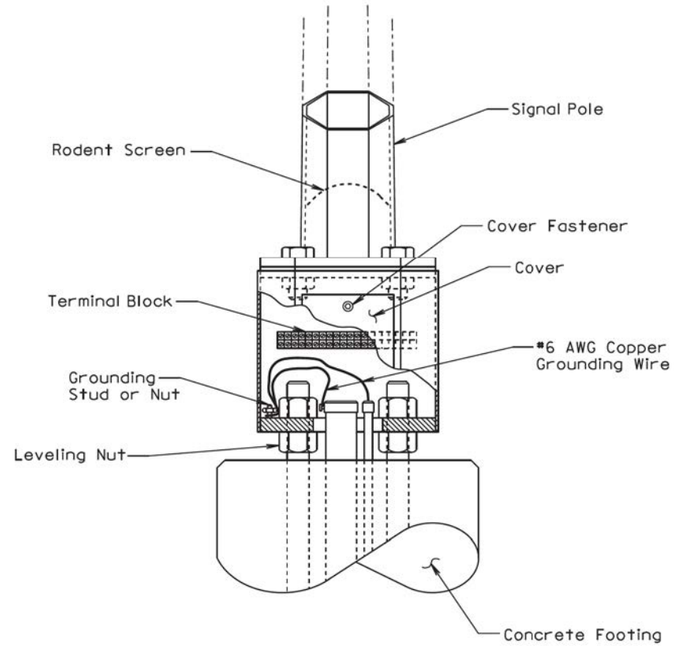
The 4" diameter galvanized steel utility post shall be 9' long and shall be in conformance with AASHTO Standard Specifications M181. The post shall be Type 1 and either Grade 1 or Grade 2. The domed steel post cap shall be in conformance with AASHTO Standard Specifications M181 and shall be Type 1.

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

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

June 26, 2006

Published Date: 2nd Qtr. 2015	SDDOT	***SERVICE FROM PAD MOUNTED TRANSFORMER WITH METER ON A GALVANIZED STEEL UTILITY POST***	*PLATE NUMBER* 635.41
			Sheet 1 of 1



GENERAL NOTES:

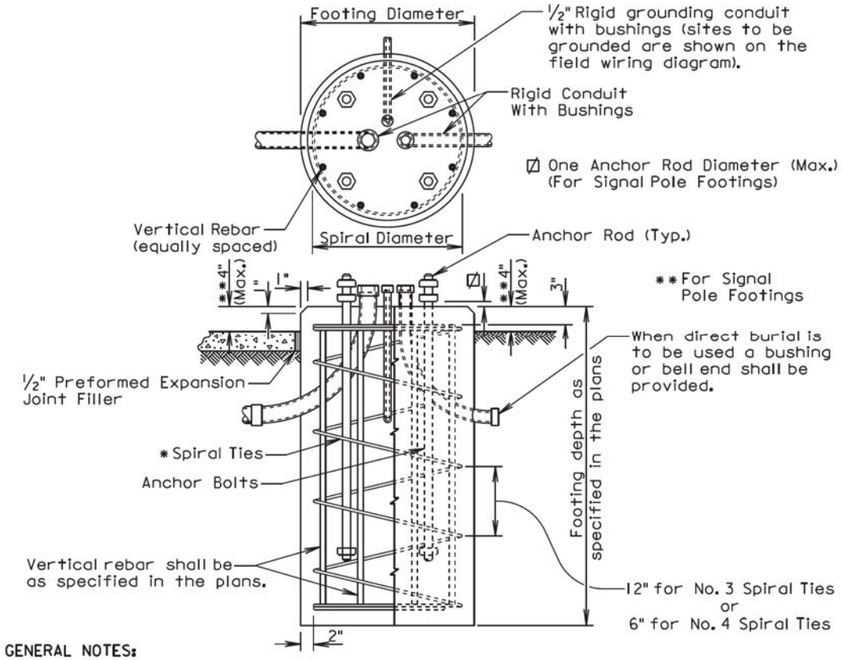
Base details are provided for example only and are not intended to be a complete design.

The Contractor shall furnish and install a rodent screen in the signal pole above the tranformer base. The rodent screen shall be a galvanized steel mesh with a maximum opening size of 1/4 inch. The rodent screen shall be friction fitted or installed by other methods approved by the Engineer.

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

December 23, 2008

Published Date: 2nd Qtr. 2015	SDDOT	***TRANSFORMER SIGNAL POLE BASE***	*PLATE NUMBER* 635.50
			Sheet 1 of 1



GENERAL NOTES:

* The tie sizes are specified in the plans. Circular ties may be used in lieu of the spiral ties. The No. 3 ties shall be spaced 12 inches apart except for the top two which shall be spaced 6 inches apart. The No. 4 ties shall be spaced 6 inches apart except for the top two which shall be spaced 3 inches apart. The ties shall be lapped 18 inches and the laps shall be staggered around the cage.

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

See section 985 of the Standard Specifications for footing materials.

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

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

The anchor rods shall fit inside the reinforcing steel cage. If the anchor rods designed by the Pole Manufacturer do not fit, contact the Office of Bridge Design for footing redesign. No additional payment will be made for the redesigned footing.

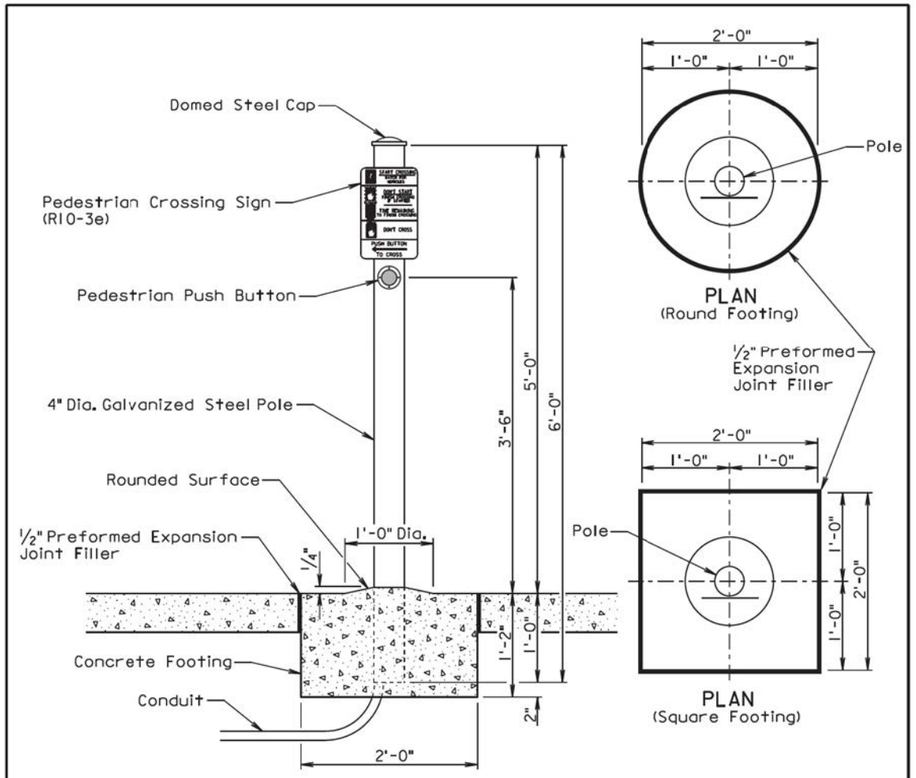
Costs of conduit and conduit bushings shown on footing detail shall be incidental to the footing bid item(s).

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

The contour of the area surrounding the breakaway pole shall be flat, though not necessarily level for a distance of 5 feet in all directions. The Contractor may be required to provide finish grading at some breakaway pole locations.

September 6, 2013

Published Date: 2nd Qtr. 2015	SDDOT	POLE FOOTING	PLATE NUMBER 635.55
			Sheet 1 of 1



GENERAL NOTES:

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

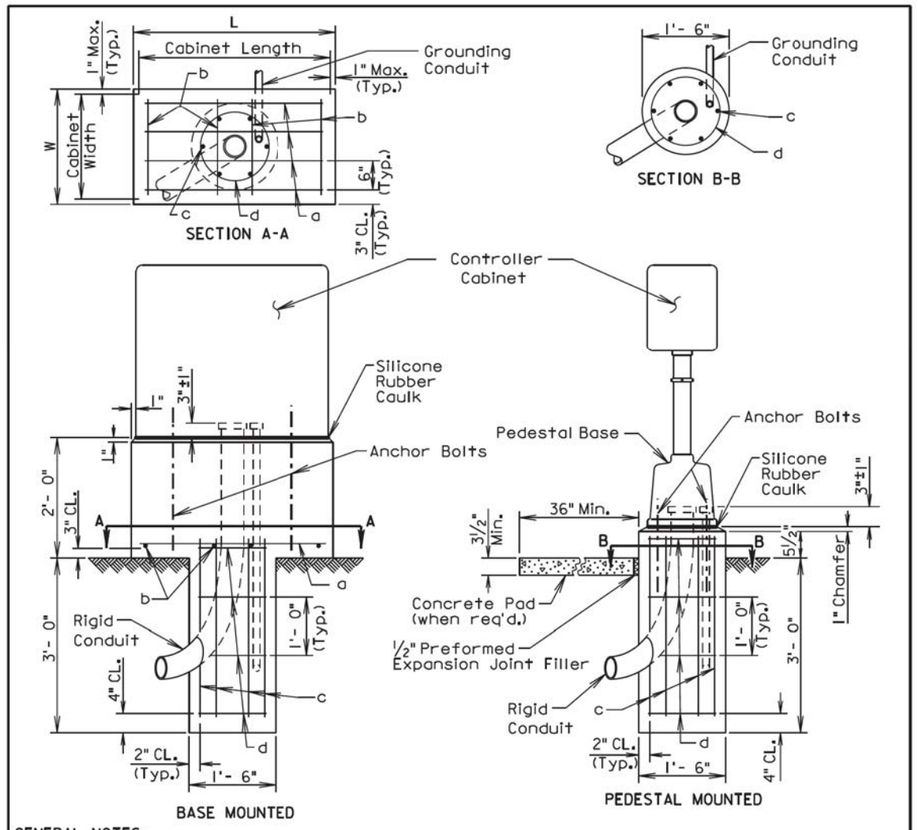
The concrete for the footing shall be class M6 concrete.

The 4" diameter galvanized steel pole shall be 6' long and shall be in conformance with AASHTO Standard Specifications M181. The pole shall be Type 1 and either Grade 1 or Grade 2. The domed steel pole cap shall be in conformance with AASHTO Standard Specifications M181 and shall be Type 1.

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

February 14, 2010

Published Date: 2nd Qtr. 2015	SDDOT	PEDESTRIAN PUSH BUTTON POLE	PLATE NUMBER 635.57
			Sheet 1 of 1



GENERAL NOTES:

The above ground portion of the footing shall conform to the base of the controller to the satisfaction of the Engineer.

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

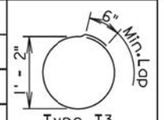
If the controller is not located within or adjacent to an existing sidewalk, the Contractor shall provide a concrete pad as directed by the Engineer.

Anchor bolts and related hardware shall conform to the controller manufacturer's requirements and recommendations.

A continuous bead of silicone rubber caulk shall provide a weather-tight seal between the base and the concrete.

Reinforcing Schedule (for one footing)

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



Note: Dimensions are out to out of bar

* Vary number of bars as required by footing size.

March 31, 2000

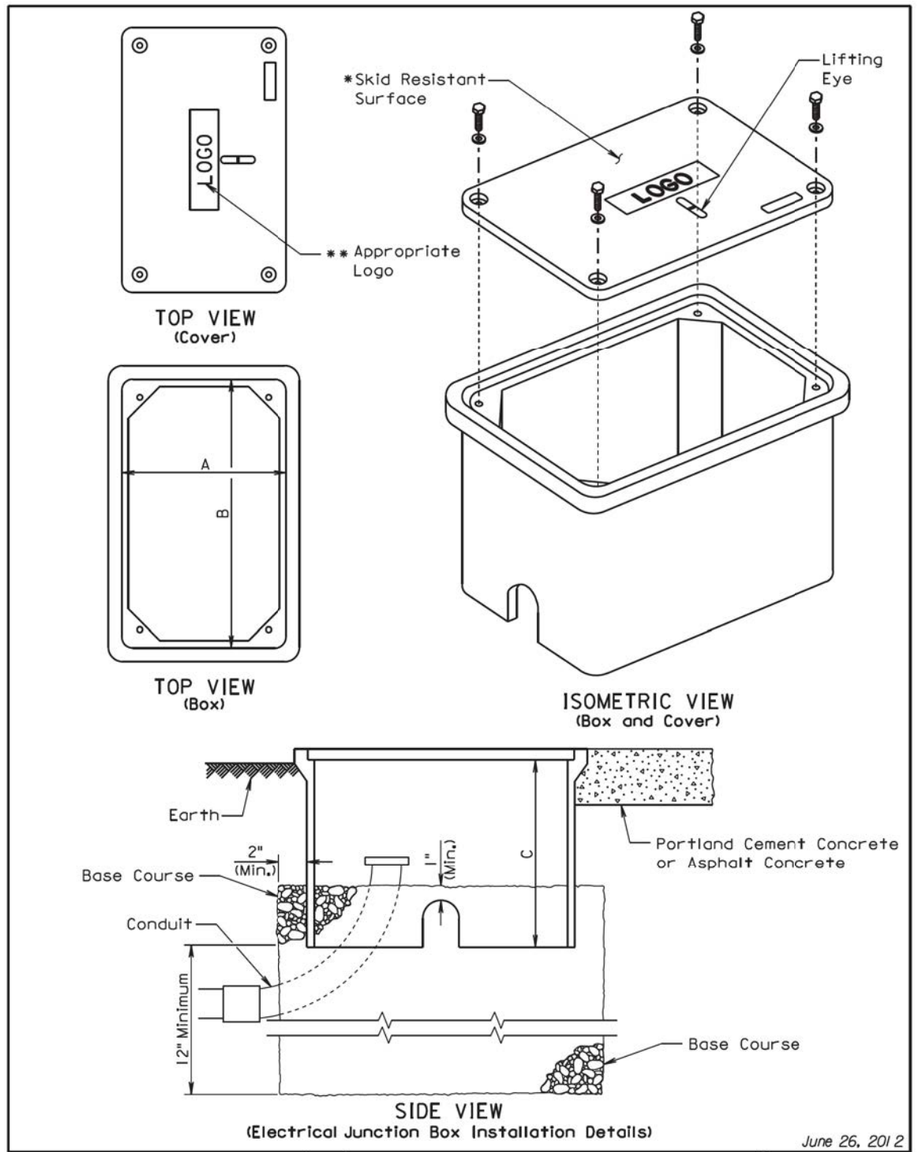
Published Date: 2nd Qtr. 2015

SDDOT

CONTROLLER CABINET AND FOOTING

PLATE NUMBER 635.60

Sheet 1 of 1



June 26, 2012

Published Date: 2nd Qtr. 2015	SDDOT	ELECTRICAL JUNCTION BOXES TYPE 1 THROUGH TYPE 4	PLATE NUMBER 635.65
			Sheet 1 of 2

ELECTRICAL JUNCTION BOX

TYPE	DESCRIPTION	DIMENSIONS		
		A	B	C
1	Open Bottom with Gasket	11"-15"	18"-21"	18" (Min.)
2	Open Bottom with Gasket	13"-18"	23"-28"	18" (Min.)
3	Open Bottom with Gasket	17"-22"	24"-30"	18" (Min.)
4	Open Bottom with Gasket	28"-33"	36"-48"	24" (Min.)

GENERAL NOTES:

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

The cover shall have a lifting eye.

* The surface of the cover shall have a minimum wet and dry coefficient of friction value of 0.5 as determined by ASTM F 609.

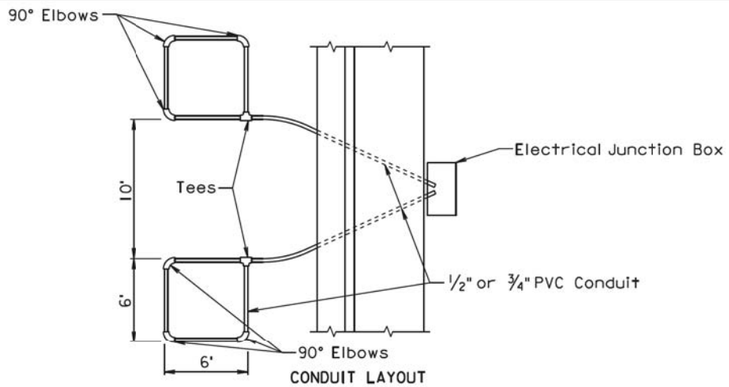
** The cover of the junction box shall have the appropriate logo in one inch size letters and shall be recessed. When the junction box contains cables or wires for a traffic signal then the logo shall be "Signal". When the junction box contains lighting conductors then the logo shall be "Lighting".

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

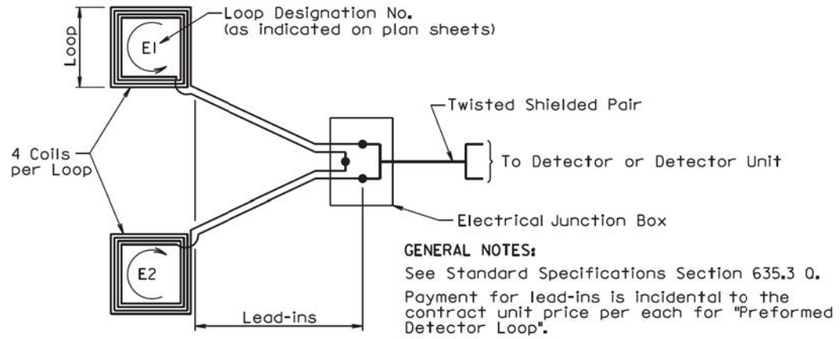
The electrical junction boxes shall be UL listed.

June 26, 2012

Published Date: 2nd Qtr. 2015	SDDOT	ELECTRICAL JUNCTION BOXES TYPE 1 THROUGH TYPE 4	PLATE NUMBER 635.65
			Sheet 2 of 2



CONDUIT LAYOUT

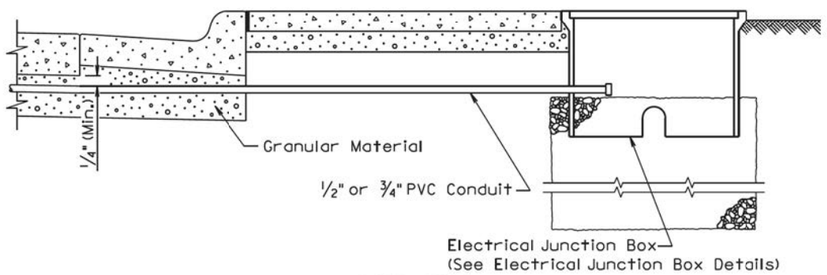


GENERAL NOTES:

See Standard Specifications Section 635.3 O.

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

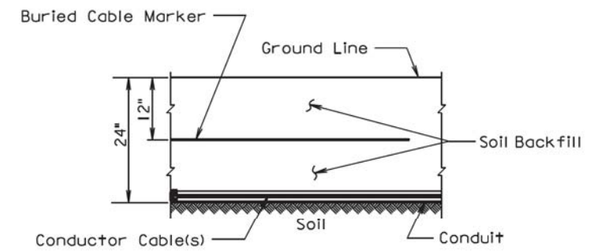
WIRING DIAGRAM



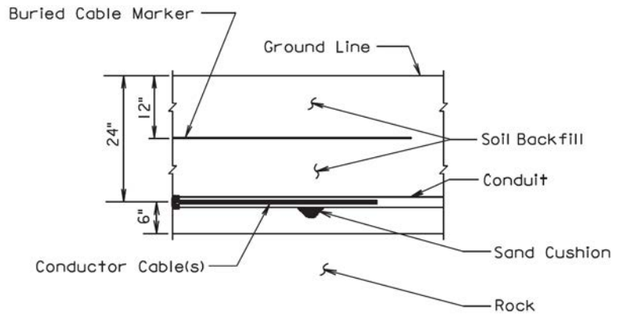
LEAD-IN DETAIL

February 14, 2011

Published Date: 2nd Qtr. 2015	SDDOT	PREFORMED DETECTOR LOOP	PLATE NUMBER 635.70
			Sheet 1 of 1



SECTION VIEW



SECTION VIEW

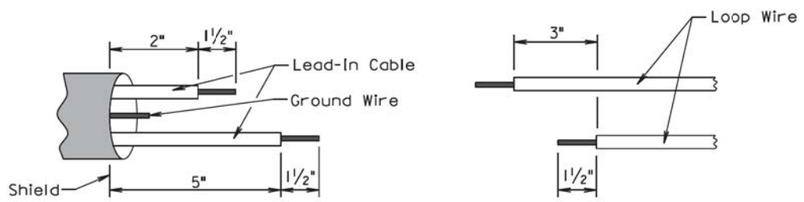
GENERAL NOTE:

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

March 31, 2000

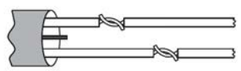
Published Date: 2nd Qtr. 2015	SDDOT	CONDUIT INSTALLATION	PLATE NUMBER 635.76
			Sheet 1 of 1

Step 1. Strip loop wires and lead-in cable.



Step 2. Connect and solder.

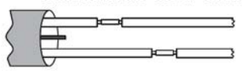
Twist bare conductors together



and solder with 60/40 (tin/lead) resin solder

OR

Crimp bare conductors together with an uninsulated butt connector



and solder with 60/40 (tin/lead) resin solder

Step 3. Insulate each solder joint seperately.

Electrical Tape

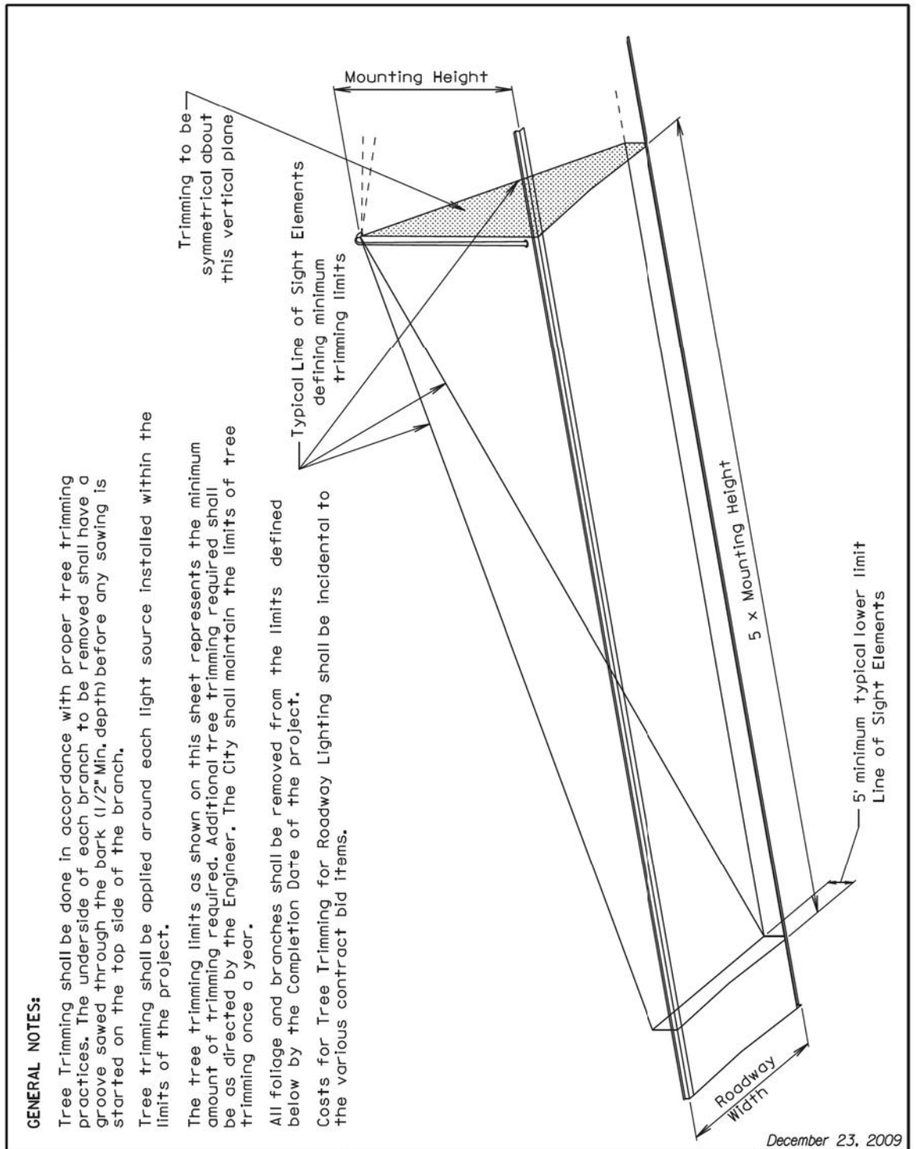
OR

Shrink Tube

Step 4. Environmentally seal total splice against weather, moisture and abrasion. Methods for environmentally sealing the splice include heat-shrinkable tubing, special sealing kits, special forms to be filled by sealant, and tape and coating.

June 20, 2000

Published Date: 2nd Qtr. 2015	SDDOT	DETECTOR LOOP WIRE SPLICING	PLATE NUMBER 635.77
			Sheet 1 of 1



GENERAL NOTES:

Tree Trimming shall be done in accordance with proper tree trimming practices. The underside of each branch to be removed shall have a groove sawed through the bark (1/2" Min. depth) before any sawing is started on the top side of the branch.

Tree trimming shall be applied around each light source installed within the limits of the project.

The tree trimming limits as shown on this sheet represents the minimum amount of trimming required. Additional tree trimming required shall be as directed by the Engineer. The City shall maintain the limits of tree trimming once a year.

All foliage and branches shall be removed from the limits defined below by the Completion Date of the project.

Costs for Tree Trimming for Roadway Lighting shall be incidental to the various contract bid items.

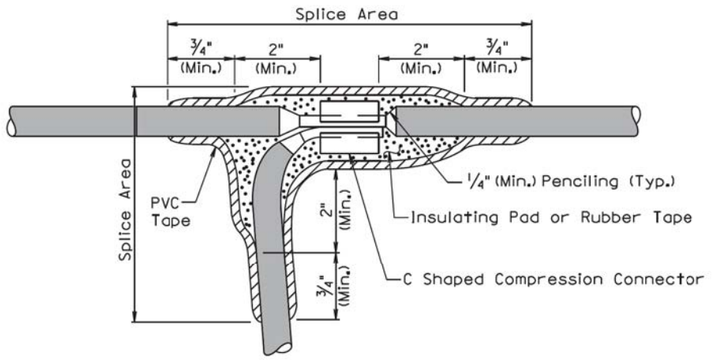
December 23, 2009

Published Date: 2nd Qtr. 2015	SDDOT	TREE TRIMMING FOR ROADWAY LIGHTING	PLATE NUMBER 635.99
			Sheet 1 of 1

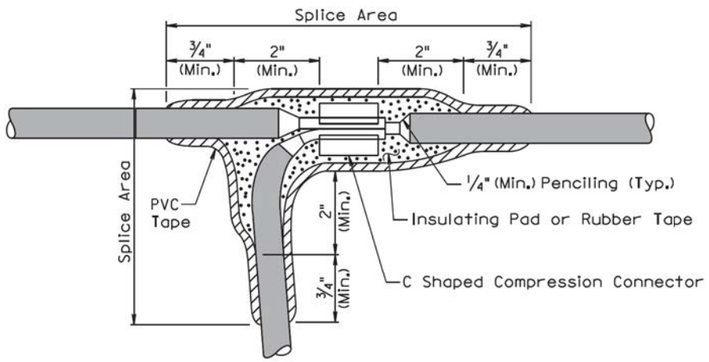
FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0050(99)381	L49	L49

Plotting Date: 7/1/2015



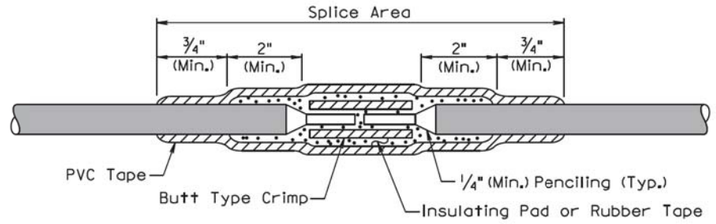
TYPE C SPLICE
(Between 1 free end and 1 through conductor)



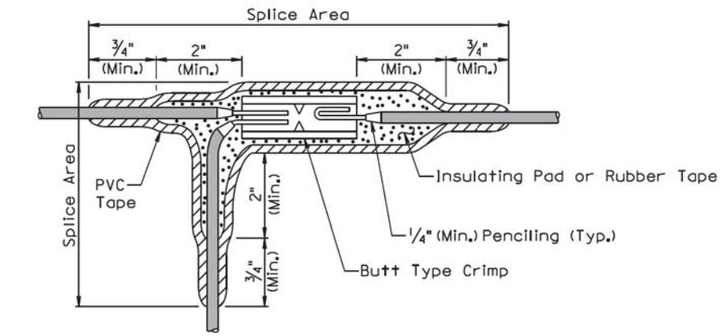
TYPE T SPLICE
(For 3 free ends)

February 14, 2010

Published Date: 2nd Qtr. 2015	SDDOT	WIRE SPLICING FOR LIGHTING (LOW VOLTAGE CIRCUITS (0 to 600 V))	PLATE NUMBER 635.80
			Sheet 1 of 2



TYPE S SPLICE
(Between 2 free ends)



TYPE ST SPLICE
(For 3 free ends)

GENERAL NOTES:

The splice shall be environmentally sealed for protection from weather, moisture, and abrasion in accordance with the method stated below.

The rubber tapes shall be rolled after application.

Method for insulating splice area:

1. The splice area shall be completely covered with electrical insulating coating and dried.
2. Apply two layers of 1/8" minimum thickness electrical insulating pad or two layers of half lapped synthetic oil resistant self fusing rubber tape.
3. Three layers of half lapped polyvinyl chloride tape shall be applied.
4. The entire splice area shall be covered with electrical insulating coating and dried.

February 14, 2010

Published Date: 2nd Qtr. 2015	SDDOT	WIRE SPLICING FOR LIGHTING (LOW VOLTAGE CIRCUITS (0 to 600 V))	PLATE NUMBER 635.80
			Sheet 2 of 2