

DIVISION SL

DELETE WHEN FINISHED: Statements in red text are guidelines or instructional in nature. Remove red text before finalizing the spec. The Red text relates to the paragraph immediately following it including indented headings.

All Red text must be removed from the special provisions prior to the special provisions being submitted for project letting.

I hereby certify that the Special Provisions for roadway lighting construction (Division SL) contained in this proposal were prepared by me or under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the State of Minnesota.

Lic. No. **XXXXX** **Engineer Name** Date **MM/DD/YYYY**

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SL-1 (2104) REMOVING MISCELLANEOUS STRUCTURES

SL-1.1 DESCRIPTION

This Work consists of removing, or salvaging, or both, in-place Materials in accordance with 2104 “Removing Pavement and Miscellaneous Structures”, and as specified on the Plans and these Special Provisions. When specified on the Plans and these Special Provisions, this Work also consists of the following:

- (1) Disposing of Materials
- (2) Dismantling and cleaning Materials
- (3) Stockpiling and storing Materials
- (4) Handling, packaging, and loading Materials
- (5) Hauling and unloading Materials
- (6) Disconnecting electrical wiring, equipment, and components
- (7) Performing miscellaneous electrical Work
- (8) Excavating, backfilling depressions, holes, and trenches, and restoration Work
- (9) Other Work of a special nature as specified in the Contract or imposed by laws, ordinances, and regulations

Materials is defined in 2565.1D “Definitions”.

The Department requires in-place underground electrical systems no longer in service be physically removed on the Project to prevent lack of available underground space, hindering repairs to adjacent facilities, confusion when locating active systems, downtime to the construction projects because of unknown status of the system, an overburden on the MnDOT Locating Office and ESS resources to locate and maintain Abandoned systems, and a financial burden on the Department.

SL-1.2 MATERIALS BLANK

SL-1.3 CONSTRUCTION REQUIREMENTS

A Removal Operations

Remove in place Materials as specified on the Plans.

Remove in-place conduit systems, cables and conductors as shown on the Plans except under roadway surfaces and within two feet of the Roadbed.

Except under roadway surfaces and within two feet of the Roadbed, remove in-place conduit systems, cables, and conductors no longer in service that are not shown on the Plans for removal. This Work will be paid for as Extra Work in accordance with 1402.5 "Extra Work".

Do not Abandon the in-place conduit systems, cables, and conductors unless it has been determined by the Engineer, ESS, and the district traffic office that removal operations would have a direct negative impact on a structure, facility, or vegetation listed in 2572.3A "Protecting and Preserving".

Backfill trenches, holes, and depressions caused by removal operations in accordance with 2104.3E "Backfilling Depressions".

Destroy removed structures not containing lead by rendering them unusable to the satisfaction of the Engineer before disposing.

Dispose of Materials in accordance with 2104.3D "Disposal of Materials and Debris".

Submit to the Engineer a receipt from the facility where Materials were delivered and disposed of or recycled.

The Office of Environmental Stewardship sets the policy and procedures for regulated materials management.

Follow the links below to obtain the current work order form and the list of approved waste contractors.

<http://www.dot.state.mn.us/environment/regulatedmaterials/wastemgmt.html>

[**Hazardous Waste Work Order Form \(Word\)**](#)

[MnDOT approved list of waste contractors \(Word\)](#)

Include the following section when materials being removed have peeling or flaking lead based paint. It is the district traffic office's responsibility to know if the peeling or flaking paint is lead based before including this section in the Special Provision. This is to ensure contractors bid this work accordingly for the project.

BEFORE INCLUDING THE FOLLOWING SECTION, first determine if the materials being removed on the project have peeling or flaking paint. If unsure the peeling or flaking paint is lead based then contact OES (Environmental Modeling and Testing Unit, Fort Snelling) to perform testing by completing and submitting a "Work request form" found at:

<http://ihub/environmental-modeling/index.html>

All Red text must be removed from the special provisions prior to the special provisions being submitted for project letting.

A.1 Materials with Lead Based Paint

Handle, transport, and dispose of lead-based painted Materials as follows:

- (1) Read, certify understanding, and agree to abide to the requirements in OSHA 29 CFR 1926.62 and Minnesota Rules Chapter 5206, 7025, 7035, 7045 relating to the removal and disposal of lead based painted Materials as regulated waste at a MnDOT approved waste contractor. See regulated waste contractors list at:

<http://www.dot.state.mn.us/environment/regulatedmaterials/wastemgmt.html>

- (2) Handle, transport, and dispose of Materials with peeling or flaking lead-based paint as hazardous waste in accordance with Occupational Safety & Health Administration (OSHA) and the Minnesota Pollution Control Agency (MPCA) regulations. Peeling or flaking lead based paint chips are required to be collected onsite and disposed of by a MnDOT approved hazardous waste contractor.
- (3) Submit to the Engineer a completed "Transfer of Ownership" found at: <http://www.dot.state.mn.us/environment/regulatedmaterials/ownership.html>

Follow the links below to obtain the current work order form and the list of approved waste contractors.

<http://www.dot.state.mn.us/environment/regulatedmaterials/wastemgmt.html>

[*Hazardous Waste Work Order Form \(Word\)*](#)

[*MnDOT approved list of waste contractors \(Word\)*](#)

B Salvage Operations

Salvage Materials in accordance with 2104.3B "Salvage Operations" and as specified on the Plans. Reference the Plans to determine how Materials will be required for reuse. Reuse means salvaged Materials required for installation under the Project or salvaged Materials not required for installation under the Project are delivered to the Department at a location specified in the Contract.

Clean salvaged materials for reuse. Dismantle salvaged materials when appropriate for storing or hauling. Repair or replace salvaged Materials that were damaged during removal, handling, and storing. Replace missing parts lost during the dismantling, handling, and storing of salvaged materials.

Store and handle salvaged Materials in accordance with 1606 "Storage of Materials", 1607 "Handling Materials" and the manufacturer's requirements. Neatly stockpile salvaged material being stored.

Refer to the Plans and the "Construction Requirements, (2545) Lighting Systems" in these Special Provisions for salvaged materials required for installation on the Project.

Backfill trenches, holes, and depressions caused by salvage operations in accordance with 2104.3E "Backfilling Depressions".

If the salvaged materials will be delivered to a location other than ESS change the note above and below.

All Red text must be removed from the special provisions prior to the special provisions being submitted for project letting.

B.1 Haul Salvaged Materials

Package, handle, load, and unload, and haul salvaged materials not required for installation on the Project to:

MnDOT's Electrical Services Section
6000 Minnehaha Ave
St. Paul MN 55111-4059

Clean and package, when appropriate, salvaged materials before loading.

Repair and replace salvaged Materials damaged or missing caused from hauling operations, at no additional cost to the Department.

Use the following paragraph when salvaged materials are required to be hauled to ESS. If salvage materials are not being hauled to ESS then provide information on the location where materials are to be hauled to.

All Red text must be removed from the special provisions prior to the special provisions being submitted for project letting.

Haul salvaged Materials to the Department at the Electrical Services Section (ESS), 6000 Minnehaha Avenue, St. Paul, MN, 55111. Notify the Engineer before of contacting ESS. Notify ESS at least 3 Business Days before the planned delivery time and date of the salvaged Materials. Obtain a salvaged Material receipt from MnDOT's Central Electrical Inventory Center showing the Department received the salvaged Materials. Submit a copy of this receipt to the Engineer for the permanent Project records.

Use the following paragraph if the contractor is required to unload salvaged material at the location where material is hauled to.

All Red text must be removed from the special provisions prior to the special provisions being submitted for project letting.

Unload and place salvaged Materials in designated areas at the location site as directed by the Department yard worker. Obtain a salvaged Material receipt from the Department yard worker showing the Department received the salvaged Materials. Submit a copy of this receipt to the Engineer for permanent Project records.

SL-1.4 METHOD OF MEASUREMENT

A Remove Materials

The Engineer will measure the removed materials in accordance with 2104.4D "Number (Complete Unit)" except for the removal of conduit systems, conductors and cables the Engineer will measure the length per linear foot.

For Lump Sum the Engineer will measure the removal of Materials in accordance with 2104.4E "Lump Sum".

B Salvage Materials

The Engineer will measure the salvaged materials in accordance with 2104.4D "Number (Complete Unit)".

For Lump Sum the Engineer will measure salvaging of Materials in accordance with 2104.4E "Lump Sum".

C Haul Salvaged Material

No measurement will be made of individual items hauled but rather the Engineer will measure the hauling of all salvaged items together in a single lump sum for which payment is made.

Include in the Basis of Payment section, the specific Contract Items (Pay Items) found on the 2104 Transport Items List that apply to the removal, salvaging and hauling on the project.

All Red text must be removed from the special provisions prior to the special provisions being submitted for project letting.

SL-1.5 BASIS OF PAYMENT

The Contract Unit Prices for remove or salvage includes the cost in accordance with 2104.5 Basis of Payment and the following.

The Contract Unit Price for haul salvaged Materials to the Department at locations specified is paid for under Item No. 2104.601 (HAUL SALVAGED MATERIAL) at the contract Lump Sum price which is payment in full for cost relative to hauling the Materials to, and depositing the Materials, at the location specified in the Contract.

SL-2 (2545) LIGHTING SYSTEMS

SL-2.1 DESCRIPTION

This Work consists of constructing Lighting Systems and electrical systems as specified in 2545 "Lighting Systems", as shown on the Plans and the following.

SL-2.2 ACRONYMS

BLANK

SL-2.3 MATERIALS

A Conduit and Accessories

The subsections from MnDOT Spec. 2565.2A "Conduit and Accessories" are deleted or deleted and replaced as follows:

A.1 Rigid Metal Conduit (RMC)

Specification heading and reference in MnDOT Spec. 2565.2A.1 "Rigid Steel Conduit (RSC) and Conduit Fittings" are deleted and replaced with the heading "Rigid Metal Conduit (RMC) and RMC Fittings" and referred to the "Rigid Metal Conduit (RMC)" section of these Special Provisions.

A.2 Intermediate Metal Conduit (IMC) and Conduit Fittings

Specification heading and reference in MnDOT Spec. 2565.2A.2, "Intermediate Metal Conduit (IMC) and Conduit Fittings" are deleted.

A.3 Non-Metallic Conduit

Specification heading and reference in MnDOT Spec. 2565.2A.3, "Non-Metallic Rigid PVC and HDPE Conduit" are deleted and replaced with the heading "Non-Metallic Conduit" and referred to the "Non-Metallic Conduit" section of these Special Provisions.

A.4 PVC Coated Rigid Metal Conduit (RMC)

Specification heading and reference in MnDOT Spec. 2565.2A.5 "PVC Coated Hot Dipped Galvanized Rigid Steel Conduit (PVC Coated RSC)" are deleted and replaced with the heading "PVC Coated Rigid Metal Conduit (RMC)" and referred to the "PVC Coated Rigid Metal Conduit (RMC)" section of these Special Provisions.

B Rigid Metal Conduit (RMC)

Specification heading and language for MnDOT Spec. 3801, "Rigid Steel Conduit (RSC)" are deleted, and replaced with the heading "Rigid Metal Conduit (RMC) and the following:

Galvanized steel RMC includes the following if specified in the Contract as:

- (1) Rigid Steel Conduit
- (2) RSC
- (3) Hot Dipped Galvanized RSC
- (4) Galvanized Rigid Steel Conduit
- (5) GRC

Provide RMC and associated fittings for electrical systems to construct a threadable raceway for protection and routing of conductors and cables.

Provide conduit hangers, clamps, straps, U-bolts, strut, and bar supports, threaded rod, inserts, and miscellaneous hardware for hanging and surface mounting RMC and PVC coated RMC in accordance with the NEC, as recommended by the conduit manufacturer, and as specified in the Contract, or, if not specified then as directed by the Engineer.

B.1 Galvanized Steel RMC

Provide Galvanized Steel RMC meeting the following:

- (1) UL 6 "UL Standard for Safety Electrical Rigid Metal Conduit-Steel"
- (2) ANSI C80.1 "Electrical Rigid Steel Conduit (ERSC)"
- (3) Hot dip galvanize zinc coated inside and out

B.2 Fittings for Galvanized Steel RMC

Provide conduit bodes and fittings meeting the requirements of UL 514B, "UL Standard for Safety Conduit, Tubing, and Cable Fittings." Fittings included locknuts, bushings, conduit bodies, and elbows.

Provide threaded insulated grounding bushings for terminating the conduit raceway threaded ends inside enclosures such as junction boxes, handholes, and cabinets meeting the following requirements:

- (1) Malleable iron
- (2) Tinned copper lay-in lug
- (3) UL 467 and UL 514B
- (4) RoHS Compliant

C Intermediate Metal Conduit

MnDOT Spec. 3802, "Intermediate Metal Conduit" is deleted.

D Non-Metallic Conduit

Specification heading and language for MnDOT Spec. 3803, "Non-Metallic Rigid PVC and HDPE Conduit" are deleted, and replaced with the heading "Non-Metallic Conduit" and the following:

Provide non-metallic conduit and fittings for electrical systems as specified on the Plans.

D.1 Rigid Polyvinyl Chloride (PVC) Conduit

Use rigid PVC conduit and fittings meeting the following:

- (1) NRTL listed meeting UL 651, "Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings".
- (2) Gray in color
- (3) Smooth interior and exterior surfaces
- (4) Schedule 80 unless otherwise Schedule 40 on the Plans
- (5) With the following marked on the outside:
 - (a) Manufacturer's name
 - (b) Conduit size
 - (c) Conduit type
 - (d) NRTL certification mark

D.2 High Density Polyethylene (HDPE) Conduit

Use HDPE continuous type conduit and fittings meeting the following:

- (1) NRTL Listed and Labeled meeting UL 651
- (2) Schedule 80
- (3) Red or gray in color
- (4) Smooth interior and exterior surfaces
- (5) Marked with the following on the exterior:

- (a) Manufacturer's name
- (b) Size
- (c) Type
- (d) NRTL certification mark

E PVC Coated Rigid Metal Conduit (RMC)

Specification heading and language in MnDOT Spec. 3805, "PVC Coated Hot Dipped Galvanized Rigid Steel Conduit (RSC)" are deleted and replaced with the heading "PVC Coated Rigid Metal Conduit (RMC)", and the following:

Provide Department approved PVC coated RMC and fittings for electrical systems when specified in the Contract with approved hangers and supports.

E.1 PVC Coated Galvanized Steel RMC

Provide PVC coated galvanized steel RMC listed on *MnDOT's APL-Lighting*.

E.2 PVC Coated RMC Fittings

Provide PVC coated RMC fittings listed on *Approved/Qualified Products List* under "Lighting" used with PVC coated galvanized steel RMC.

Use fittings from the same manufacturer of the PVC coated galvanized steel RMC being used on the Project.

Refer to MnDOT Spec. 3839, "Conduit Expansion and Deflection/Expansion Coupling Fittings", for expansion and deflection/expansion coupling fittings.

E.3 Hangers and Supports for PVC Coated RMC

Use conduit hangers, clamps, straps, U-bolts, strut, and bar supports, threaded rod, inserts, and miscellaneous hardware for PVC coated RMC in accordance with the NEC, as specified by the PVC coated RMC manufacturers, and as shown on the Plans or, if not shown, as directed by the Engineer.

F Lighting Hardware

Specification heading and language in MnDOT Spec. 3812, "Lighting System Equipment" are deleted and replaced with the heading "Lighting Hardware" and the following:

Provide hardware and equipment for Lighting Systems listed on *Approved/Qualified Products List* under Lighting," for the following:

- (1) Luminaire Wire Holders
- (2) Insulated Wire Splice Connector Blocks
- (3) Breakaway Type Fuse Holders
- (4) Photoelectric Controls
- (5) Air Obstruction Light Bolt-On ¼ Inch Hubs
- (6) Power Cable Splice Encapsulation Kits

G Light Foundations and Equipment Pads

Specification heading and language in MnDOT Spec. 3813, "Traffic Signal and Lighting System Anchorages" are deleted and replaced with the heading "Light Foundations and Equipment Pads" and the following:

When allowed in Contract Documents, steel screw-in and precast concrete light foundations, and precast concrete equipment pads may be used instead of cast-in-place (CIP) light foundations and equipment pads for installing light poles and lighting cabinets.

G.1 Steel Screw-In Foundations

Provide approved steel screw-in foundations with manufacturer supplied bolts, nuts, and washers listed on *Approved/Qualified Products List* under “Lighting” for light foundations Design E, H and P in accordance with project Special Provisions.

G.2 Precast Concrete Equipment Pads and Light Foundations

Provide precast equipment pad and light foundation types specified in the Contract from approved precast concrete plants listed on MnDOT’s APL-Lighting (Precast concrete).

H Air Obstruction Lights

Specification language in MnDOT Spec. 3816.1 Scope section is deleted and replaced with the following:

When required by the FAA, provide air obstruction lights used to mark or light MnDOT structures that may conflict with the safe navigation of aircraft.

I Bridge Navigation Lanterns

Specification language in MnDOT Spec. 3817.1 Scope section is deleted and replaced with the following:

Provide bridge navigation lanterns as required by the U.S. Coast Guard (USCG) to clearly mark bridges extending over navigable waterways and improve safety and visibility for marine navigation.

J Grounding Electrodes

Specification language in MnDOT Spec. 3818.1 Scope section is deleted and replaced with the following:

Provide grounding rod and plate electrodes to establish direct contact with the earth for the grounding electrode system, supplemental grounding, and auxiliary grounding on lighting systems, traffic signals systems, and other electrical systems.

Provide ground rod electrodes in accordance with 3818 “Grounding Electrodes” and meeting the following:

- (1) 10 foot long ground rod electrodes for light foundations and equipment pads
- (2) 12 foot long ground rod electrodes in handholes
- (3) 15 foot long ground rod electrodes for barrier and high top light foundations

K Handholes

Specification language in MnDOT Spec. 3819.1 Scope section is deleted and replaced with the following:

Provide handholes for use in MnDOT underground systems.

Specification language in MnDOT Spec. 3819.2 Requirements section is deleted and replaced with the following:

Use only handholes for non-deliberate heavy vehicular traffic unless otherwise shown on the Plans to use a different type of handhole or underground enclosure.

L Junction Boxes for Lighting Systems

Subsections in MnDOT Spec. 3838.2 “Requirements” are deleted and replaced as follows:

Provide and install junction boxes on bridges as shown on the Plans and meeting the following:

L.1 Underpass Luminaire System Junction Boxes

Furnish and install approved PVC coated GRFX Body Type Hot Dipped Galvanized Ferroalloy Junction Boxes listed on MnDOT's APL-Lighting-PVC coated RMC for underpass luminaire systems as shown on the Plans or when specified in the Contract.

L.2 Lighting System Junction Boxes

Furnish and install junction boxes on bridges used for lighting systems other than underpass luminaire systems, meeting the following:

- (1) Hot dip galvanized coated metal, PVC coated hot dip galvanized metal, or stainless steel
- (2) Sized in accordance with NEC Article 314
- (3) NEMA Rated 3R or better
- (4) NRTL Listed and Labeled
- (5) Installed with approved junction box drains and breathers (drilling a hole is not an approved drain and breather)

Ensure junction boxes fit at specified locations under bridge decks, between bridge beams, and between bridge beams and abutments.

Submit shop drawings of proposed junction boxes and mounting details in accordance with MnDOT Spec. 3838.3 "Sample and Testing".

M Conduit Expansion and Deflection/Expansion Coupling Fittings

Specification language in MnDOT Spec.3839.1 Scope section is deleted and replaced with the following:

Provide PVC coated and urethane lined metallic conduit expansion fittings and PVC coated metallic deflection/expansion coupling fittings for PVC coated RMC runs encased in concrete, hanging, or surface mounted.

Include the following when Federal funds are used on the project or Build America Buy America rules are being followed.

All RED text must be removed from the special provisions prior to the special provisions being submitted for project letting.

N Build America Buy America

Use construction materials, and domestically manufactured products that are composed predominately of steel, iron, or both for the permanent installation of MnDOT electrical systems, in accordance with MnDOT Division S Special Provisions (1601) *SOURCE OF SUPPLY AND QUALITY* requirements.

O Temporary Lighting System

Use Department provided materials as specified in the Contract and as directed by the Engineer. Provide additional materials and equipment needed for a complete and operating temporary lighting system.

These materials include:

- (1) Risers
- (2) Weatherheads
- (3) Wood poles
- (4) Overhead quadruplex
- (5) Conduit and conduit fittings
- (6) Ground rod electrodes

Q Anchor Rods

Provide anchor rods in accordance with 3385 "Anchor Rods", except provide rods with both the supplementary requirement S3 for permanent marking and color-coding on the end of the rod with the grade identification.

Include the following language when the lighting system is a 120/240 Volt System with 240 VAC-2 Wire Branch Circuits. Ensure conduit systems with individual conductors include a white grounded conductor even though it will not be used for 240 VAC -2 Wire Branch Circuits.

All Red text must be removed from the special provisions prior to the special provisions being submitted for project letting.

R Double Pole Breakaway Fuse Holders

Provide and install double pole breakaway fuse holders found on MnDOT's APL-Lighting when 120/240-volt systems with 240 VAC- 2 wire branch circuits are required as shown on the Plans.

S Fuses in Light Pole Base Fuse Holders

MnDOT Spec. 2545.3F.2.a, "Light Pole Wiring" 4th paragraph (sentence), "Use 2 amp fast acting fiber body 5AG midget type fuses," is deleted and replaced with the following:

Furnish and install fiber body 6 ¼ Amp, time-delay 5AG midget type fuses in light pole base fuse holders.

T Precast Light Foundations and Equipment Pads

Furnish and install Precast Light Foundations and Equipment Pads in accordance with 2545.3E "Light Foundation and Equipment Pad Installation", 2565.3F "Concrete Foundations and Equipment Pads", Standard Plates, as shown on the Plans, and the following.

Use Precast Light Foundations and Equipment Pads manufactured offsite at an approved permanent manufacturing facility in accordance with 3240 "Precast Concrete Manufacturing" and listed on MnDOT's APL-Lighting-*Light Foundations-MnDOT Precast Concrete Products & Qualified Suppliers*.

Provide Precast Light Foundations and Equipment Pads made from 3V82 concrete mix. This includes Precast Light Foundations and Equipment Pads from the following Standard Plates:

- (1) Precast Equipment Pad B Standard Plate No. 8106
- (2) Precast RLF Equipment Pad Standard Plate No. 8107
- (3) Light Foundation Design E Precast Standard Plate No. 8127
- (4) Light Foundation Design H Precast Standard Plate No. 8128

U Virgin Granular and Aggregate Material

Provide Virgin Granular and Aggregate Material for subbase and backfill in accordance with 3138.2B "Virgin Materials", 3149.2A.1 "Virgin Materials" and the following.

Use only Virgin Granular or Aggregate Material base course for foundations and equipment pads in areas with low spots prone to standing water, negative drainage where the ground is sloped towards the foundations and equipment pads, or areas where Muck as specified in 2106.2A.4 "Excavation-Muck" exists and required to be replaced with Granular or Aggregate Material. Do not use Recycled Material.

U.1 Backfill Material for Foundations

When required in Contract Documents or as directed by the Engineer, use a Granular or Aggregate Material in accordance with 3138 "Aggregate for Surface and Base Courses" or 3149 "Granular Materials" to backfill around foundations, provide Virgin Material as specified. Do not use Recycled Material.

U.2 Subbase Material for Equipment Pads

Provide a 6 inch thick compacted layer of subbase as shown on Standard Plan No. 869 350 "ATCC and SSB Cabinet Equipment Pad- Cast in Place", and Standard Plan No. 870 "352 ATCC and SSB Equipment Pad- Cast in Place", except use Virgin Class 5 Aggregate Material in accordance with 3138 "Aggregate for Surface and Base Courses" instead of Granular Material in accordance with 3149 as shown on the Standard Plans. Do not use Recycled Material.

Provide a 6 inch thick compacted subbase layer of Virgin Class 5 Aggregate Material in accordance with 3138 for all other equipment pads. Do not use Recycled Material.

Excavate equipment pad area and install the subbase layer for equipment pads if shown on the Plans and in accordance with "Equipment Pad Excavation and Subbase" in the Construction Requirements section of these Special Provisions.

U.3 Conduit Buried in Aggregate Material

When required to open trench rigid PVC conduit in an existing aggregate material, provide a trench bedding with a Virgin Aggregate Material bedding in accordance with 3149.2G "Aggregate Bedding". Do not use Recycled Material.

Install the conduit in the open trench with the Virgin Aggregate Material bedding in accordance with Conduit Buried in Aggregate Material and Concrete Encased Conduit in the Construction Requirement section of these Special Provisions.

Include the following paragraph when the District requires rigid steel conduit (RMC) from a pad-mounted transformer SOP to the service cabinet.

All red text must be removed from the Special Provisions prior to the Special Provisions being submitted for project letting.

V Source of Power RMC

Provide galvanized steel RMC from the Source of Power (SOP) to the lighting service cabinet.

Use the following language if the District wants to solely use or allow the option for the Contractor to use steel screw in foundations instead of concrete foundations. Concrete light foundations are required instead of steel screw in foundations at locations where Design E and H foundations will be surrounded by bituminous or concrete. Ensure the Plans show concrete foundations at these locations.

Ensure the companion paragraph for installation of steel screw in foundations posted in the Construction requirements section of these Special Provisions is included and the Installation Steel Screw In Foundation detail sheet found on MnDOT's Cell Lighting Library or Traffic Engineering (OTST) website is included on the Plans.

All Red text must be removed from the special provisions prior to the special provisions being submitted for project letting.

W Light Foundation-Design P, E, and H Steel Screw In

Light Foundations- Design _ Steel Screw In may be used instead of concrete light foundations. Use foundation design type shown on the Plans. Provide Light Foundations- Design _ Steel Screw In listed on MnDOT's APL-Lighting.

<http://www.dot.state.mn.us/products/index.html>

Installers of steel screw in foundations are required to be trained and certified every two years by the manufacturer or the manufacturer's representative of an approved steel screw in foundation listed on MnDOT's Approved/Qualified Products List. Before starting steel screw in foundation installation, submit a current certified installer card issued by the manufacturer for each employee directly performing the installation.

Ensure the soil class types and soil conditions on the Project are acceptable and suitable for proper support and long term stability of steel screw in light foundations.

Before placing an order for steel screw in foundations provide the following:

- (1) Review the Soils Classification for Steel Screw In Foundation Installation table in the Construction Requirements section for acceptable and suitable soils for steel screw in foundations
- (2) Perform an onsite field review of the soils and general locations where light foundations will be installed on the project
- (3) Review the Plans for lighting unit foundations surrounded by concrete or bituminous (e.g., placed in sidewalk or a parking lot)
- (4) Review the Construction Requirements section for Light Foundations-Design_ Steel Screw In

Install concrete light foundations, design type as shown on the Plans, if the District Traffic Office determines the soil conditions or the placement of the staked locations are not suitable for steel screw in foundations.

Install concrete light foundations, design type as shown on the Plans, where Design E or H foundations will be surrounded by bituminous or concrete.

X Light Foundation- Design E Modified

Provide and install Light Foundations- Design E Modified as shown on the Plans.

Y Light Foundation, Design P Modified

Provide and install Light Foundations, Design P Modified as shown on the Plans.

Z Equipment Pad B Modified

Provide and install a complete concrete pad in accordance with MnDOT Standard Plate 8106 and with the modifications shown on the Plans.

Construct the mounting bracket assembly for the required service equipment as shown on the Plans.

Select the cabinet type required on the project from the following. Some electric utilities require cold sequence disconnects while others do not when 240/ 480 VAC systems are installed. Designers must know ahead of time if a cold sequence disconnect is required in the electric utility company's area.

All Red text must be removed from the special provisions prior to the special provisions being submitted for project letting.

AA Type L1 Service Cabinet (120/240 VAC)

Provide and install MnDOT approved Type L1 Service Cabinets (120/240 VAC) listed on MnDOT's Approved/Qualified Products List for Lighting and as specified in the Contract for supplying power to 120 volt lighting systems.

The utility termination lugs are not required in the Xcel Energy service area.

BB Type L1 Service Cabinet (240/480 VAC)

With Cold Sequence Disconnect Before Meter Socket

Provide and install MnDOT approved Type L1 Service Cabinets (240/480 VAC) With Cold Sequence Disconnect Before Meter Socket listed on MnDOT's Approved/Qualified Products List for Lighting and as specified in the Contract for supply power to 240 volt lighting systems.

Do not provide service cabinets with the cold sequence disconnect and utility termination lugs in the Xcel Energy service area unless required by the authority having jurisdiction.

CC Type L2 Service Cabinet (120/240 VAC)

Provide and install MnDOT approved Type L2 Service Cabinets (120/240 VAC) listed on MnDOT's Approved/Qualified Products List for Lighting and as specified in the Contract for supplying power to 120 volt lighting systems.

The utility termination lugs are not required in the Xcel Energy service area.

DD Type L2 Service Cabinet (240/480 VAC)

With Cold Sequence Disconnect Before Meter Socket

Provide and install MnDOT approved Type L2 Service Cabinets (240/480 VAC) With Cold Sequence Disconnect Before Meter Socket listed on MnDOT's Approved/Qualified Products List for Lighting and as specified in the Contract for supply power to 240 volt lighting systems.

Do not provide service cabinets with the cold sequence disconnect and utility termination lugs in the Xcel Energy service area unless required by the authority having jurisdiction.

Service Cabinet Type B is only available in a 120/240 VAC.

All Red text must be removed from the special provisions prior to the special provisions being submitted for project letting.

EE Type B Service Cabinet (120/240 VAC)

Provide and install MnDOT approved Type B Service Cabinets (120/240 VAC) listed on MnDOT's Approved/Qualified Products List for Lighting and as specified in the Contract for supply power to 120 volt lighting systems.

When light poles are going to be installed near fences or sound walls consider 180 degrees below to 90 degrees. 0 degrees is under the davit on the roadside of the pole base. 90 degrees clockwise places the door on the downstream side of the pole.

All Red text must be removed from the special provisions prior to the special provisions being submitted for project letting.

The Plan must indicate the following:

Luminaire Type

Local Smart Photocontrol (when specified)

All Red text must be removed from the special provisions prior to the special provisions being submitted for project letting.

FF Breakaway Light Poles

Provide stainless steel or aluminum davit arm type breakaway light poles in accordance with 3811 "Light Poles", as specified and shown on the Plans, and meeting the following:

- (1) Pole height as specified and shown on the Plans
- (2) Davits type arms with lengths as specified and shown on the Plans
- (3) Single davit or twin (dual) arm type davits as specified and shown on the Plans
- (4) High base or transformer base (T-Base) designed for 1 inch diameter anchor rods with a 15 inch bolt circle high base or T-Base as shown on MnDOT Light Foundation Design E Standard Plate 8127 for 30 foot and 40 foot poles
- (5) High base or T-Base designed for 1 ¼ inch diameter anchor rods with a 17 inch bolt circle as shown on MnDOT Light Foundation Design H Standard Plate 8128 for 49 foot (50 foot) poles

- (6) Use leveling shims specified by the pole manufacturer or in the Construction Requirements of these Special Provisions for leveling the aluminum transformer bases (T-Bases) and aluminum poles

Provide leveling nuts for stainless steel and coated steel high bases and transformer bases to level light poles Use Table SL-2.2 Materials-1 as a guide for understanding pole nomenclature to help identify the pole type designation for breakaway light poles required on the Project.

**Table SL-2.2 MATERIALS-1
 Breakaway Pole Type Designation**

Pole Type Designation *e.g.,	Davit Arm Length (feet) 6 ft., 9 ft., or 12 ft. (as specified on the Plans)	Twin Arm (Dual)** "D" = Twin Arm Davit	Pole Height (feet) 30 ft., 40 ft. or 49 (50) ft. (as specified on the Plans)
9-40	9	—	40
6D-49	6	D	49
* Pole Type Designation shown is an example only. See the Plan for required Pole Type Designation on the Project			
** — Blank denotes Single Arm Davit			

Provide and install a complete lighting unit as specified in the Contract.

Provide MnDOT approved luminaires as specified on the Plan. MnDOT approved luminaires are listed on MnDOT’s Approved/Qualified Products List for Lighting:

<http://www.dot.state.mn.us/products/index.html>

The Plan must include a detail showing the nominal mounting height of the luminaire when the light pole is installed on the bridge structure, barrier, or retaining wall.

All Red text must be removed from the special provisions prior to the special provisions being submitted for project letting.

The Plan must indicate the following:

Luminaire Type

Local Smart Photocontrol (when specified)

All Red text must be removed from the special provisions prior to the special provisions being submitted for project letting.

GG Barrier Mounted Light Poles

Provide and install galvanized steel davit arm type non breakaway light poles in accordance with 3811 Light Poles, as specified and shown on the Plans, and meeting the following:

- (1) Galvanized (coated) steel
- (2) High base style
- (3) Double access openings at 0 degrees and 180 degrees to the mast arms for twin arm (dual) davit poles on median barrier
- (4) Access opening at 0 degrees to the mast arm for single davit arm poles unless otherwise noted on the Plans
- (5) High base designed for one inch anchor bolts in a six bolt cluster and a base plate opening sized as shown on Standard Plate No. 8332 “Anchor Rod Assembly for Light Foundation-Barrier”
- (6) Nominal luminaire mounting height as specified and shown on the Plans

Use Table SL-2.2 Materials-2 as a guide for understanding pole nomenclature to help identify the pole type designation for barrier mount light poles required on the Project.

**Table SL-2.2 MATERIALS-2
 Barrier Pole Type Designation**

Pole Type Designation *e.g.,	Davit Arm Length (feet) 6 ft., 9 ft., or 12 ft. (as specified on the Plans)	“B” Denotes Bridge or Barrier Mount	Twin Arm (Dual) “D” = Twin Arm Davit	Nominal Pole Height (feet) 40 ft. or 49 (50) ft. (as specified on the Plans)
6B-40	6	B	**	40
9BD-49	9	B	D	49
* Pole Type Designation shown is an example only. See the Plan for required Pole Type Designation on the Project ** — Blank denotes Single Arm Davit				

Maintain the nominal mounting height of the luminaire as shown on the Plans when the light pole is mounted on a foundation or structure designed above ground level or roadway surface.

Provide and install a complete lighting unit as specified in the Contract.

Provide MnDOT approved luminaires as specified on the Plan. MnDOT approved luminaires are listed on MnDOT’s Approved/Qualified Products List for Lighting:

<http://www.dot.state.mn.us/products/index.html>

Lighting Unit Options – Non-Breakaway Light Poles

The Plan must indicate the following:

Luminaire Type

Local Smart Photocontrol (if specified)

All Red text must be removed from the special provisions prior to the special provisions being submitted for project letting.

HH Non-Breakaway Light Poles

Provide and install aluminum, galvanized steel, or stainless steel davit arm type non breakaway light poles in accordance with 3811 “Light Poles”, as specified and shown on the Plans, and meeting the following:

- (1) Pole height as specified and shown on the Plans
- (2) Davit type arms with lengths as specified and shown on the Plans
- (3) Single davit or twin (dual) arm type davits as specified and shown on the Plans
- (4) High base or transformer base (T-Base)
- (5) Provide leveling shims as specified by the pole manufacturer or in the Construction Requirements of these Special Provisions for leveling the aluminum transformer bases (T-Bases) and aluminum poles.
- (6) Provide leveling nuts to level stainless steel and coated steel high bases and transformer bases to level the light poles
- (7) 30 foot and 40 foot poles designed to be installed on MnDOT Light Foundations-Design E Standard Plate No. 8127
- (8) 49 foot and 50 foot poles designed to be installed on MnDOT Light Foundations-Design H Standard Plate No. 8128

Use Table SL-2.2 Materials-3 as a guide for understanding pole nomenclature to help identify the pole type designation for non-breakaway light poles required on the Project.

**Table SL-2.2 MATERIALS-3
 Non-Breakaway Pole Type Designation**

	Davit Arm Length (feet) 6 ft., 9ft., or 12 ft. (as specified on the Plans)		Twin Arm (Dual) "D" = Twin Arm Davit		Pole Height (feet) 30 ft., 40 ft. or 49 ft. (50 ft.) as specified and shown on the Plans
6-30	6		**		30
9-40	9		— **		40
* Pole Type Designation shown is an example only. See the Plan for required Pole Type Designation on the Project ** — Blank denotes Single Arm Davit					

Maintain the nominal mounting height of the luminaire as shown on the Plan when the light pole is mounted on a foundation or structure designed above ground level, road, or parking lot surface.

Provide MnDOT luminaires shown on the Plan and on MnDOT's Approved/Qualified Products List for Lighting:

<http://www.dot.state.mn.us/products/index.html>

Provide and install a complete lighting unit as specified in the Contract.

II Rest Area Walkway Light Poles

Provide and install aluminum or stainless steel walkway poles as specified and shown on the Plans.

Provide a walkway light pole with a transformer base or high base of at least 1900 cubic inches designed to be installed on a Design P Foundation with four ¾ inch diameter anchor rods on an 11 inch bolt circle as shown on the Plans.

Provide MnDOT approved Walkway Luminaires as specified on the Plan. MnDOT approved Walkway Luminaires are listed on MnDOT's Approved/Qualified Products List for Lighting:

<http://www.dot.state.mn.us/products/index.html>

Provide and install a complete lighting unit as specified in the Contract.

SL-2.4 CONSTRUCTION REQUIREMENTS

A Submittals

Provide submittals in accordance with MnDOT Spec. 2545.3A "Submittals", and the following.

A.1 Signal and Lighting Certification Submittal

Before the Work begins, submit copies of unexpired Department Signal and Lighting Certification Cards or evidence of valid Department Signal and Lighting Certification for persons on the Project Site performing and directly supervising the Work in accordance with MnDOT Spec. 2545.1A, "Qualifications of Workers" and include it as part of the submittals in accordance with MnDOT Spec. 2545.3A "Submittals".

Department Signal and Lighting Certified persons does not relieve the Contractor's responsibility to provide qualified workers performing electrical Work in accordance with Minnesota Statute 326B.33 "Licenses", and MnDOT Spec. 1802 "Qualifications of Workers".

B Precast Concrete Foundations

Specification language in MnDOT Spec. 2545.3E.1 “Precast Concrete Foundations” is deleted and replaced with the following:

Install precast concrete foundations as specified in the Contract and the following:

- (1) Using an appropriate size earth auger bit, excavate a cylindrical drilled shaft into the ground 6 inches to 12 inches larger in diameter than the diameter of the precast concrete foundation
 - (a) Use auger drilling Equipment with adequate capacity, including power, torque, and down thrust to auger a cylindrical drilled shaft to the depth specified in the Contract
- (2) Level and firmly compact the bottom of the shaft so it is flat and horizontal while maintaining the required depth of the shaft
- (3) Remove the temporary form from the foundation if it is still attached before placing the foundation into the shaft
- (4) Center, set, and level the foundation in the shaft while maintaining a continuous annular void of at least 3 inches and no greater than 6 inches between the foundation and the drilled shaft
- (5) Before backfilling, place the ground rod electrode in the annular void and install the conduit stub-outs
- (6) Completely backfill the annular void with fine filter Aggregate in accordance with 3149.2I.2, “Fine Filter Aggregate” in compacted lifts of 6 inches
 - (a) Use a mechanical pole tamper capable of compacting the fine filter Aggregate in compacted 6-inch lifts for the entire depth of the drilled shaft excavation

C Direct Buried Lighting Cable Installed in Conduit

Install direct buried lighting cable in accordance with MnDOT Spec. 2545.3F.1 “Underground Wiring”, and the following:

If bituminous, concrete, granular material, or other material not considered topsoil will be placed over the direct buried lighting cable run on the Project, then install the cable in rigid PVC or HDPE conduit even if not shown on the Plans and as follows:

Where bituminous, concrete, granular material, or other material not considered topsoil will cross over a segment of direct buried lighting cable, install the cable in three-inch conduit and extend the ends of the conduit two feet beyond the edges of the covering material. Place Department provided ball locators at each end of the conduit before backfilling.

When bituminous, concrete, granular material, or other material not considered topsoil will cover over half of the entire length of direct buried lighting cable run from cabinet to pole or pole to pole, install the cable in a two-inch conduit for the entire length of the cable run. From cabinet to pole, install a two-inch rigid PVC 90 degree sweep elbow and conduit in the equipment pad to connect the two-inch conduit raceway from the cabinet equipment pad to the pole foundation’s required rigid PVC two-inch coupling and sweep elbow. From pole to pole, connect each end of the two-inch conduit raceway to the required rigid PVC two-inch coupling and sweep elbow in the pole foundations. Four AWG individual single conductors in accordance with MnDOT Spec. 3815.2B, “Individual Conductors” may be installed in the conduit raceway instead of direct buried lighting cable upon approval of the District Traffic Office and the Engineer.

D Restoration and Cleanup

Specification reference in MnDOT Spec. 2545.3L “Restoration and Cleanup” is deleted and referred to as follows:

Provide restoration and cleanup in accordance with MnDOT Spec. 2565.3Y, "Restoration and Cleanup."

E Service Equipment Installation

Specification reference in MnDOT Spec. 2545.3P "Service Equipment Installation" and specification language in MnDOT Spec. 2565.3J "Service Equipment Installation" are deleted and replaced with the following:

Install service equipment in accordance with the NEC, local laws and governing ordinances, the electric utility company, MnDOT Spec. 3837 "Service Equipment", and the Plans. Refer to the Plans for approximate location of service points. The Engineer or the electrical utility company will determine the exact location of the service points.

Install lighting service cabinets as specified in the Contract. Place the rubber gaskets sections that are supplied by the cabinet manufacturer between the bottom of the cabinet and the Equipment pad and leave a ½ inch gap in the gasket perimeter to allow for water drainage. When possible, position the twist lock photoelectric control light sensor to face north as instructed by the manufacturer. The photoelectric control light sensor may face east or west only if facing it north is not possible due to service cabinet orientation.

Contact the electric utility company for guidance when installing service Equipment on wood poles. If the electric utility company does not have preference to installation of service Equipment on wood poles, then install service equipment as specified on the Plan and as follows. Place the meter socket directly above the service disconnect. Terminate risers near the top of the wood pole. Cap risers with a weatherhead to prevent the entrance of water. Extend the service entrance conductors beyond the weatherhead with an additional 4 foot length for a drip loop, to allow the electrical utility company to connect at the service point. Coordinate with the electric utility company for the service point connection as specified in the "Service Connection" section of these Special Provisions.

For service equipment installation on mounting bracket assemblies, locate the meter sockets and disconnects as specified in the Contract.

Ensure lugs for terminating conductors are sized according to the conductor wire gauge used. Do not trim strands of conductors to fit into undersized lugs.

F Electric Utility Provided Meter Socket

When the electric utility company provides a meter socket for the meter to be installed at a location other than the Department's lighting service cabinet meter socket, furnish and install electrical Materials as shown on the Plans and the following:

Furnish and install meter socket jumper covers in the meter socket of the Department's lighting service cabinet meeting the following requirements:

- (1) NRTL Listed and Labeled
- (2) 4 Blade; Single Phase
- (3) 320 Ampere capacity
- (4) 600 VAC rated
- (5) Fits ring and ringless sockets
- (6) Silastic seal to provide rainproof installation
- (7) Molded durable polycarbonate cover meeting the following:
 - (a) Provides superior tensile and impact strength
 - (b) Clear
 - (c) Contains an ultraviolet inhibitor

Install the meter socket jumper cover before placing the lighting service cabinet into operation.

Do not makeshift jumpers for temporary or permanent installation into the service cabinet's meter socket.

G Leveling Aluminum Transformer Bases and Light Poles

Level aluminum light poles with aluminum transformer bases using the manufacturer specified leveling shims between the bottom of the transformer base and the top of the foundation. The use of leveling shims is to allow for minor adjustments to the pole to allow for plumb installation.

Use no more than three leveling shims per base corner and no more than six shims total per transformer base. If more shims are needed for a plumb installation, then re-install the foundations level and plumb as specified in Contract Documents.

Only use manufacturer specified leveling shims. If the manufacturer does not provide specified shims, then use shims in accordance with Standard Plate No. 8129. Do not use leveling nuts, ½ inch thick hold down washers, standard washers, spacers, or other miscellaneous hardware to level the poles plumb.

H Light Foundation and Equipment Pad Installation

Construct and install Precast and Cast-in-Place light foundations and equipment pads as shown on the Plans, in accordance with 2545.3E "Light Foundation and Equipment Pad Installations" and Standard Plates and Plans, and the following.

Excavate drilled shafts plumb and ensure foundations are installed plumb, and the top of the foundations are level. If more than three leveling shims are used per aluminum pole transformer base corner or more than six shims total per aluminum transformer base are needed to install the pole plumb, then re-install the foundations level and plumb as specified. If leveling nuts for stainless steel and steel poles exceed the required stand-off distances necessary install the light poles plumb, then reinstall the foundations level and plumb as specified.

H.1 Installation of Precast Concrete Foundations

2545.3E.1 "Precast Concrete Foundations" is deleted and replaced with the following.

Install precast concrete foundations as specified in the Contract and the following:

- (1) Using an appropriate size earth auger bit, excavate a cylindrical drilled shaft into the ground 6 inches to 12 inches larger in diameter than the diameter of the precast concrete foundation
 - (a) Use auger drilling Equipment with the adequate capacity, including power, torque, and down thrust to auger a cylindrical drilled shaft to the depth specified in the Contract
- (2) Level and firmly compact the bottom of the shaft so it is flat and horizontal while maintaining the required depth of the shaft
- (3) Remove the temporary form from the foundation if it is still attached before placing the foundation into the shaft
- (4) Center, set, and level the foundation in shaft while maintaining a continuous annular void of at least 3 inches and no greater than 6 inches between the foundation and the drilled shaft
- (5) Before backfilling, place the ground rod electrode in the annular void and install the conduit stub-outs

- (6) Completely backfill the annular void with Virgin Granular Material in accordance with 3149.2I.2 "Fine Filter Aggregate" in compacted lifts of 6 inches.
 - (a) Use a mechanical pole tamper capable of compacting the fine filter Aggregate in compacted 6- inch lifts for the entire depth of the drilled shaft excavation

H.2 Equipment Pad Excavation and Subbase

Excavate an area and provide a subbase layer that extends beyond each side of the Cast-in-Place or Precast equipment pad at least 6 inches. Provide a 6 inch thick compacted subbase layer.

Use an approved Aggregate Material in accordance with Virgin Granular and Aggregate Material for Foundations and Equipment Pads in the Materials section of these Special Provisions for the subbase layer.

Install Cast-in-Place and Precast equipment pads level. If equipment pads are not level, then reinstall the equipment pads level.

I Conduit Buried in Aggregate Material and Concrete Encased Conduit

MnDOT 2565.3D.5.c "Conduit Encasement" is deleted and replaced with the following.

I.1 Conduit Buried in Existing Aggregate Material

When required to trench rigid PVC conduit in existing aggregate material, provide and install a trench bedding with a minimum 4 inch thick granular material in accordance with 3149.2G "Aggregate Bedding" as specified in the Materials section of these Special Provisions. Ensure the trench with fine filter aggregate bedding meets the minimum 18 inch buried depth requirement as specified in the NEC. Once the fine filter aggregate bedding has been installed, place the conduit in the trench on top of the bedding. Place a minimum 4 inches of Aggregate Material in accordance with Virgin Granular and Aggregate Material for Foundations and Equipment Pads in the Materials section of these Special Provisions over the top of the conduit before backfilling and compacting the trench.

I.2 Concrete Encased Conduit in the Ground

When ground conditions prevent compliance with the NEC conduit depths, provide a concrete covering or encasement in accordance with NFPA 70 National Electrical Code Handbook, Article 300.5 Use mix No. 3G52 concrete for the covering or encasement. Obtain Engineer's approval before performing the Work.

J Storing Materials

Store and handle materials in accordance with 1606 "Storage of Materials", 1607 "Handling Materials" and the manufacturer's requirements.

K Temporary Lighting System Installation and Maintenance

Install Department provided materials as specified in the Contract and additional materials and equipment needed for a complete and operating temporary lighting system.

Pay electric utility costs, including extension of power lines by the electric utility.

Maintain the temporary lighting system in good working order throughout the duration of the Project. This includes knockdowns (poles and service cabinets), light pole damage, luminaire outages, cable, and conductor damages (buried and above ground), foundation damage, and service cabinet component failures.

Costs for maintaining the temporary lighting system are included in the Unit Prices of the Pay Items that are part of the Lighting System.

Include the following language when the lighting system is a 120/240 Volt System with 240 VAC-2 Wire Branch Circuits. Ensure conduit systems with individual conductors include a white insulated grounded conductor even though it will not be used for 240 VAC -2 Wire Branch Circuits.

All Red text must be removed from the special provisions prior to the special provisions being submitted for project letting.

L 120/240 Volt System with 240 VAC-2 Wire Branch Circuits

Install a 120/240 Volt system with 240 VAC -2 wire branch circuits in accordance with 2545.3F "Wiring", 2545.3G.1 "Above Ground Splices", as shown on the Plans, and the following.

2545.3F.2.a "Light Pole Wiring", 7th paragraph is replaced with the following:

Strip the insulation from the end of the white conductor in the UF cable as far back as needed to ensure a safe connection to the "Load" side terminals of the double pole fuse holder. Before terminating apply anti-oxidant joint compound to the end of the conductors. Terminate the conductors to the "Load" sides of the double pole fuse holder in accordance with the fuse holder manufacturer's installation instructions. After terminating, apply two layers of vinyl electrical tape over the terminal ends and extend the wrap at least 1 inch over the incoming conductor insulation.

Mark the exposed white conductor on both ends of the UF cable with red vinyl electrical marking tape to show the conductor is an ungrounded "hot" conductor to the luminaire.

Splice the "white" grounded (neutral) conductors in light pole bases in accordance with 2545.3G "Splices", except install split bolt connectors or approved insulated splice connector blocks. Do not terminate the white conductor of the UF cable for the luminaire to "white" grounded (neutral) circuit conductors in the light pole base. Terminate the white conductor of the UF cable as specified elsewhere in this section of "120/240 Volt System with 240 VAC-2 Wire Branch Circuits".

Where the "white" grounded (neutral) conductor dead ends in the last light pole of the circuit, install a grease filled wire nut rated for the size conductor used.

Ensure the "white" grounded (neutral) circuit conductors are terminated on the neutral bus bar of the lighting service cabinet.

The following Section should only be included in projects when the contractor is going to be required to do excavation work. It should not be included when you are doing a luminaire replacement project.

All Red text must be removed from the special provisions prior to the special provisions being submitted for project letting.

M Maintenance and Operation of New and Existing Electrical Systems

This Work consists of maintaining, operating, and locating new and existing Lighting Systems as specified in 2545.1 "Description" and in accordance with the following:

This Work for the Maintenance and Operation of New and Existing Lighting Systems is included in the Unit Prices of the Pay Items that are part of the Lighting System.

M.1 Maintain and Keep in Operation of New and Existing Lighting Systems

MnDOT Spec. 2545.3C "Maintenance and Operation of New and Existing Lighting Systems" is deleted and replaced with the following:

Maintain and keep in operation the new and existing Lighting Systems by repairing or replacing items in the following list when damaged or not in working order:

- (1) Lighting Units (pole, above ground wiring, luminaire)
- (2) Lighting Service Cabinets
- (3) Photoelectric Controls
- (4) Foundations and Equipment Pads
- (5) Lighting Cable and Conductors
- (6) Conduit
- (7) Poles (knockdown or damaged)

If damage to new or existing Lighting System occurs due to Contractor operations, within 24 hours repair or replace the damage at no additional cost to the Department, in accordance with 1716, "Contractor's Responsibility for Work," and relevant to Specifications for new construction. Failure to repair or replace damage within 24 hours will result in the Department repairing or replacing and deducting costs from Project money entitled to the Contractor.

If the Engineer determines that others, not the Contractor, have damaged the Lighting System, replace or repair damaged items as directed by the Engineer. The Department will pay for the Work to replace or repair for items not damaged by the Contractor as Extra Work in accordance with 1402, "Contract Revisions".

Provide the Department with the names and phone numbers of contact personnel for both day and night operation for the maintenance of the existing Lighting System.

Before an authorized Work suspension begins, ensure existing, temporary, and new electrical systems are in full working order in accordance with the Contract. Maintenance and operations of electrical systems will not be suspended until the following requirements have been met:

- (1) Notify ESS and the district traffic office of Work suspension start and stop dates
- (2) Remedy electrical Work deemed unsafe by the Engineer
- (3) Schedule and provide a walk through with ESS and the district traffic office
- (4) Cover and clearly mark above ground splices not protected by a structure
- (5) Ensure electrical components and devices are in working order
- (6) Submit to the Engineer a current As-Built redlined drawing of the electrical systems (existing, temporary, and new)

Due to the nature of electrical systems, Partial Acceptance will not be granted because of an authorized Work suspension unless the new electrical system Work has been completed and inspected in accordance with the Contract and the new system is fully operational.

When resuming Work after authorized Work suspension, remove temporary construction or Materials that the Department used to maintain the electrical system during the suspension.

M.2 Locating Underground Facilities

Locate underground facilities of existing lighting systems including temporary, and newly constructed systems within the limits of the Project, for the duration of the construction project in accordance with the applicable provisions of MnDOT 1514 and in accordance with Minnesota State Statute 216D.

Responsibility for locating underground lighting system facilities is transferred from the Department to the Contractor on the Project start date as shown on the Proposal.

Request at the start of the Project for MnDOT's locating group to provide an initial locate of the underground system facilities within the project limits. Submit initial locate requests to MnDOT's Locating Office a minimum of four Business Days before the Project start date.

Locate requests that are within the construction Project limits will continue to be received by MnDOT's Locating Office. These locate tickets will be forwarded to the Contractor's representative responsible for coordinating locate requests within the project limits. The locate tickets will be forwarded via email or fax. Confirm receipt of the locate ticket by notifying MnDOT's locating office within two hours of MnDOT sending the locate request.

Repair lighting system facilities damaged as the result of improperly located or unmarked underground lighting system facilities within the project limits.

Repair the damaged underground lighting system facilities in accordance with, 2565.3B and RTMC design and construction requirements.

During periods of authorized Work suspension, the Department will perform GSOC locate requests on the Project in accordance with 1514 "Maintenance During Construction" only if the listed requirements before an authorized work suspension begins in the "Maintain and Keep in Operation New and Existing Lighting Systems" section of these Special Provisions have been met.

Submit to the Engineer a completed *Locating Responsibility Form* included in this section, with contact information including the names and telephone numbers for 24 hours a day, 7 days a week maintenance as defined in this section.

Until final written acceptance of the Project by the Engineer (MnDOT 1716), locate underground lighting facilities as required in this section.

Notify MnDOT's Locating Office to provide contact information and establish assumed responsibility for locating MnDOT's underground lighting system facilities within the Project. Fill out the form in this section and submit to the Engineer at the pre-construction meeting. Send a copy of the completed form to:

Electrical Services Dispatch
Phone: (651)366-5750
Fax: (651)366-5742
E mail: ElectricalServicesDispatch.dot@state.mn.us
6000 Minnehaha Ave. St. Paul, MN 55111-4014
and
Locating Supervisor
Phone: (651)755-9061
Fax: (651)366-5742
E mail: eric.klute@state.mn.us
6000 Minnehaha Ave. St. Paul, MN 55111-4014

(The following Section should be filled out by the specification writer to direct the contractor and project engineer to the correct person in the District.)

All Red text must be removed from the special provisions prior to the special provisions being submitted for project letting.

MnDOT District Signal Operations

Name: _____
Phone: _____
Fax: _____
E mail: _____
Address: _____

Until final written acceptance of the project by the Engineer (MnDOT 1716) locate underground lighting system facilities as required above.

(The following Section should be left on its own page so the contractor can remove it and use the blank page)
All Red text must be removed from the special provisions prior to the special provisions being submitted for project letting.

The following Section should be left on its own page so the contractor can remove it and use the blank page

All Red text must be removed from the special provisions prior to the special provisions being submitted for project letting.

M.3 Locating Responsibility Form

A version of this Excel spreadsheet form can be downloaded here.

https://edocs-public.dot.state.mn.us/edocs_public/DMResultSet/download?docId=27303373

Locating Responsibility Form	
Job S.P. Number	
Job Type	
Start Date	
End Date	
T.H.	
Location	
Lighting/ Signal Inspector	
Contractor	
Contractor (24 Hour Contact)	
Project Manager	
Phone Number	
Fax Number	
Email	
Electrician	
Phone Number	
Locator Area	
Project Engineer	
Phone Number	
Chief Inspector	
Phone Number	
Weekly Meeting	

N Galvanic Corrosion Prevention for Stainless Steel Light Poles

Install the stainless steel light pole manufacturer provided Teflon or Xylan coated structural washers and ½ inch thick washers/spacers used in the light pole anchor rod systems. Place the required washers between the nuts and the baseplate as specified elsewhere in Contract Documents to help isolate the galvanize metal from the stainless steel. Keep the coated washers in the packaging or container until the time of preparing to stand the light poles on the anchorages. Do not install the coated washers before then.

Apply an approved Electrolytic Corrosion Inhibitor lubricant found on MnDOT’s APL-Lighting for anchor rod tightening in accordance with the MnDOT Anchor Rod Tightening Handbook “Lubrication Areas”.

O Anchor Rod Tightening Plan

Schedule a time agreed upon with the Engineer to present an anchor rod tightening plan by the Contractor’s personnel installing the poles specified on the Project and in the presence of the Engineer or Inspector.

This specification ensures all parties are familiar with anchor rod tightening requirements, including the following for the specified poles installed on the project:

- (1) An understanding of the steps in the MnDOT Anchor Rod Tightening Handbook “New Installation Procedures”
- (2) Knowing where and when to apply lubrication on anchor rod joints
- (3) Using the required hardware and the installing in the correct order
- (4) Applying the correct torque values, torque tightening steps, and cross tightening pattern
- (5) Confirming wrenches and equipment used are calibrated and can perform adequately

Sign and date the “Sign-Off Sheet” document included on a separate page in these Special Provisions and submit to the Engineer or Inspector for their signature that they observed the Contractor’s anchor rod tightening plan and determined that the Contractor performing the anchor rod tightening understands the anchor rod tightening requirements in accordance with the Contract. Submit the completed “Sign-Off Sheet” document to the district traffic office before installing poles on the Project.

The “Sign-Off Sheet” document can also be downloaded using the following the link:

https://edocs-public.dot.state.mn.us/edocs_public/DMResultSet/download?docid=34706201

SIGN-OFF SHEET

For Anchor Rod Tightening Plan

This Sign-Off Sheet affirms the Contractor providing the anchor rod tightening has demonstrated to the Engineer or Inspector an understanding and competency in performing anchor rod tightening in accordance with the Contract.

Contractor Rep. Signature: _____
Date: _____

Engineer or Inspector Signature: _____
Date: _____

P Anchor Rod Tightening General Requirements

The sixth paragraph of 2545.3H.1 “Anchor Rod Connections” is deleted and replaced with the following.

Complete the pole installation process as defined in 2545.3H “Pole Installation” in its entirety before standing another pole or provide at least two crews; one crew to stand poles and another crew to complete the required anchor rod tightening procedure in full on the same day of standing the pole.

Use torque wrenches to tighten the top nuts on anchor rods to the required torque values. Submit calibration certification in accordance with 2565.3A.13 “Calibration Requirements for Measurement Tools and Test Equipment” of the torque wrenches and measurement equipment intended to be used for anchor rod tightening no more than two weeks in advance.

Perform the required anchor rod tightening in the presence of the Engineer or Inspector. The *MnDOT Anchor Rod Tightening Handbook “New Installation Procedures”* is required to use and follow along during the installation of light poles. Use the following hyperlink to acquire the *MnDOT Anchor Rod Tightening Handbook*:

[MnDOT Anchor Rod Tightening Handbook \(pdf\)](#)

Complete the required MnDOT Anchor Rod Tightening Form at a rate of one form per every 15 light poles with a minimum of one completed form per Project. Submit the completed forms to the Engineer. The forms are provided on separate pages in the following sections these Special Provision to make extra copies.

Complete the MnDOT Anchor Rod Tightening Forms using one of the following options:

- (1) Screen-fillable PDF form – “fillable” on a computer (Adobe Acrobat Reader required)
- (2) Blank screen-fillable PDF form downloaded and printed hard copies to fill out by hand (Adobe Acrobat Reader required)
- (3) Hard copy of a blank screen fillable form specified and included in the following sub-sections on a separate page and to make additional copies as needed to fill out by hand

For aluminum light poles, fill out the MnDOT ANCHOR ROD TIGHTENING FORM- ALUMINUM POLES (Signal Pedestals and Light Poles). If using the screen fillable form option (1) or the printed hard copy blank screen-fillable form option (2), select the following link:

https://edocs-public.dot.state.mn.us/edocs_public/DMResultSet/download?docId=30927075

For stainless steel and coated steel poles, fill out the MnDOT ANCHOR ROD TIGHTENING FORM- STAINLESS STEEL AND COATED STEEL POLES. If using the screen fillable form option (1) or the printed hard copy blank screen-fillable form option (2), select the following link:

https://edocs-public.dot.state.mn.us/edocs_public/DMResultSet/download?docId=30927235

It is recommended to click on the link, open file, and save as to save the form on the computer hard drive. Then use the screen fillable form option (1) or the printed hard copy blank screen-fillable form option (2) in Adobe Acrobat Reader independently from the browser or internet connection.

Fill out the anchor rod tightening forms during installation and at a rate of one form per every 15 light poles with a minimum of one completed form per Project. Each form requires a signature from the contractor’s employee performing the anchor rod tightening and the date of pole installation on the signature block at the bottom of the form. If using the screen-fillable PDF form option (1), then an electronic signature may be used, or the completed form can be printed with a handwritten signature.

Submit the completed forms to the Engineer. If using option (1), the completed forms may be submitted electronically upon approval of the Engineer or in printed hard copies.

P.1 Anchor Rod Tightening for Aluminum Light Poles with Transformer Bases

2545.3H.1.a “Single-Nut Anchor Rod Connections” is deleted and replaced with the following.

When leveling the pole on the foundation is necessary, level the poles between the T-base and the foundation using no more than three leveling shims per base corner and no more than six shims total per transformer base. If more shims are required to level the pole, re-install the foundation plumb. Do not use leveling nuts, washers, or other miscellaneous hardware between the pole base and foundation to level the poles other than the leveling shims specified by the manufacturer. If the manufacturer does not provide leveling shims, then use shims in accordance with Standard Plate No. 8129.

Follow the MnDOT Anchor Rod Tightening Handbook “New Installation Procedures” only when instructed to on the MnDOT Anchor Rod Tightening Form titled “*MnDOT ANCHOR ROD TIGHTENING FORM-ALUMINUM POLES (Signal Pedestal and Light Poles)*”.

Demonstrate how to install an aluminum transformer base on the foundation to the Engineer before installing poles on foundations for the Project. To ensure there is a basic understanding of single nut connections and tightening anchor rods for aluminum light poles, the demonstration should include the required steps for installing light poles based on the requirements in Contract Documents, MnDOT Anchor Rod Tightening Form titled “*MnDOT ANCHOR ROD TIGHTENING FORM-ALUMINUM POLES (Signal Pedestal and Light Poles)*” included in this section, the manufacturer’s installation requirements, and the manufacturer’s required torque values for tightening anchor rods.

P.2 Anchor Rod Tightening for Stainless Steel and Coated Steel Light Poles

Tighten anchor rods for stainless steel and coated steel light poles using double nut connections and tighten anchor rods in accordance with the manufacturer’s installation requirements, the *MnDOT Anchor Rod Tightening Handbook- New Installation Procedures* and the MnDOT Anchor Rod Tightening Form titled “*MnDOT ANCHOR ROD TIGHTENING FORM-STAINLESS STEEL AND COATED STEEL POLES*”



MnDOT ANCHOR ROD TIGHTENING FORM – ALUMINUM POLES (Signal Pedestal and Light Poles)

Directions: Complete this form when installing aluminum traffic signal pedestal and light poles using a single-nut connection. Follow the MnDOT Anchor Rod Tightening Handbook “New Installation Procedures” steps only when directed on this form. Select “N/A” for specified questions if the question does not apply. Select “YES” or “NO” for response to the following questions in each step.

Date _____ Project No _____ Pole Type _____ Pole No _____
 Contractor _____ Contractor REP. _____ Inspector _____ Wrench calibration cert. date _____

1. Verify the installation Follow Step 1 in Handbook	Followed Step 1 in the Anchor Rod Tightening Handbook “New Installation Procedures”?	Used special washers when required by the pole manufacturer or as specified in contract documents? <input type="checkbox"/> N/A	<input type="checkbox"/> YES <input type="checkbox"/> NO
2. Place pole and base on foundation, install washers, and level using shims	*Do not apply lubricant in this step	Used no more than three leveling shims per base corner and no more than six shims total per base?	<input type="checkbox"/> YES <input type="checkbox"/> NO
3. Lubricate Follow Step 3 in Handbook	Followed Step 3 in the Anchor Rod Tightening Handbook “New Installation Procedures”?	Lubricant applied only to the areas shown in the “Lubrication Areas” section in the Handbook?	<input type="checkbox"/> YES <input type="checkbox"/> NO
4. Hand tighten top nuts in a cross-tightening pattern	Used cross-tightening pattern when hand tightening?		<input type="checkbox"/> YES <input type="checkbox"/> NO
5. Tighten top nuts to the required torque values in accordance with contract documents, in three cycles (steps) as specified in Step 5 of the Handbook	Followed Step 5 in the Anchor Rod Tightening Handbook “New Installation Procedures” and used torque values for aluminum bases as specified in the contract	Used cross-tightening pattern for each of the torque value cycles of 20%, 60%, and 100%?	<input type="checkbox"/> YES <input type="checkbox"/> NO
6. Allow rods to relax for 10 minutes Follow Step 6 in Handbook	Followed Step 6 in the Anchor Rod Tightening Handbook “New Installation Procedures”?		<input type="checkbox"/> YES <input type="checkbox"/> NO
7. Re-tighten to 100% torque Follow Step 7 in Handbook	Followed Step 7 in the Anchor Rod Tightening Handbook “New Installation Procedures”?		<input type="checkbox"/> YES <input type="checkbox"/> NO

Signature _____ Date _____



MnDOT ANCHOR ROD TIGHTENING FORM – STAINLESS STEEL AND COATED STEEL POLES

Directions: Use the MnDOT Anchor Rod Tightening Handbook “New Installation Procedures” with this form when installing stainless steel and coated steel traffic signal and light poles using a double-nut connection. Select “N/A” for specified questions if the question does not apply. Select “YES” or “NO” for response to the following questions in each step.

Date _____ Project No _____ Pole Type _____ Pole No _____
 Contractor _____ Contractor REP. _____ Inspector _____ Wrench calibration cert. date _____

1. Verify the installation	Followed Step 1 in the Anchor Rod Tightening Handbook “New Installation Procedures”?	Used special washers when required by the pole manufacturer or as specified in contract documents? <input type="checkbox"/> N/A	<input type="checkbox"/> YES <input type="checkbox"/> NO
2. Level the leveling nuts and place pole	Followed Step 2 in the Anchor Rod Tightening Handbook “New Installation Procedures”?	Used pole manufacturer’s standoff distance when required? <input type="checkbox"/> N/A	<input type="checkbox"/> YES <input type="checkbox"/> NO
3. Lubricate	Followed Step 3 in the Anchor Rod Tightening Handbook “New Installation Procedures”?	Lubricant applied only to the areas shown in the “Lubrication Areas” section in the Handbook?	<input type="checkbox"/> YES <input type="checkbox"/> NO
4. Hand tighten top nuts and wrench tighten leveling nuts in a cross-tightening pattern	Followed Step 4 in the Anchor Rod Tightening Handbook “New Installation Procedures”?	Used cross-tightening pattern when tightening? Used specified wrench length on Table 1-3 for tightening leveling nuts?	<input type="checkbox"/> YES <input type="checkbox"/> NO
5. Torque top nuts in cycles (STEPS) as specified	Followed Step 5 in the Anchor Rod Tightening Handbook “New Installation Procedures”?	Used cross-tightening pattern for each of the torque value cycles of 20%, 60%, and 100%?	<input type="checkbox"/> YES <input type="checkbox"/> NO
6. Allow rods to relax for 10 minutes	Followed Step 6 in the Anchor Rod Tightening Handbook “New Installation Procedures”?		<input type="checkbox"/> YES <input type="checkbox"/> NO
7. Re-tighten to 100% torque	Followed Step 7 in the Anchor Rod Tightening Handbook “New Installation Procedures”?		<input type="checkbox"/> YES <input type="checkbox"/> NO

Signature _____ Date _____

**Table SL 2.3 CONSTRUCTION-2
 Soil Classification for Steel Screw In Foundation Installation**

Class	Common Soil Type Description	Geological Soil Classification	Typical Blow Count "N" per ASTM-D1586	Installation Requirements
0	Sound hard rock, unweathered	Granite, Basalt, Massive Limestone	N.A.	Do not install, not acceptable or suitable for steel screw-in foundations
1	Very dense and/or cemented sands; coarse gravel and cobbles	Nitrate-bearing gravel/rock	60-100+	Acceptable for steel screw-in foundations. *Pre-drill likely required in Class 1, 2, and 3 soils before installing steel screw in foundations
2	Dense fine sands; very hard silts and clays (may be preloaded)	Basal till; boulder clay; weathered laminated rock	45-60	
3	Dense sands and gravels; hard silts and clays	Glacial till; weathered shales, schist, gneiss, and siltstone	35-50	
4	Medium dense sands and gravels; very stiff to hard silts and clays	Glacial till; hardpan; marls	24-40	Class 4, 5, 6, and 7 soils are suitable for installing steel screw-in foundations *Class 4 may require predrill before installing steel screw in foundations
5	Medium dense coarse sands and sandy gravels; stiff to very stiff silts and clays	Saprolites, residual soils.	14-25	
6	Loose to medium dense fine to coarse sands to stiff clays and silts	Dense hydraulic fill; compacted fill; residual soils	7-14	
7	Loose fine sands; alluvium; loess; medium-stiff and varied clays; fill	Flood plain soils; lake clays; fill	4-8	

8	Peat, organic silts; inundated silts, fly ash, very loose sands, very soft to soft clays	Miscellaneous fill, swamp marsh	0-5	Do not install, not acceptable or suitable for steel screw in foundations
* Pre-drill may be allowed in Class 1, 2, 3 and 4 soils.				

Include the following language when steel screw in foundations are going to be allowed by the District on construction projects. The special provision writer must place the foundation design type in the blank line below. If there will be more than one design type foundation used, duplicate the following language, and have separate paragraphs for each design type of foundation. Make sure the companion paragraph for each foundation type located in the materials section of these special provisions is included.

Plan designers and special provision writers must ensure the Steel Screw In Light Foundation Installation detail sheet which can be found in MnDOT’s cell library for Micro station or on the Traffic Engineering (OTE) Lighting-Home web site page under Detail Sheets is included in the plan set prior to plan turn in.

All Red text must be removed from the special provisions prior to the special provisions being submitted for project letting.

Q Light Foundations-Design__ Steel Screw In (E, H, and P)

Install Light Foundations Design__ Steel Screw In listed on MnDOT’s Approved/Qualified Products List under “Roadway lighting” in accordance with the manufacturers recommended installation instructions, details on the Plans, 2545.3E “Light Foundations and Equipment Pad Installation”, 2451 “Structures Excavations and Backfills”, and the following:

Install foundations using a hydraulic drive head with a gear motor torque rating in accordance with Table 2545-2.

Table SL 2.3 CONSTRUCTION-1	
Hydraulic Drive Head with Gear Motor Minimum Torque Rating	
Foundation Design	Minimum Torque in ft lbf
E and P	10,000
H	15,000

Ensure sufficient clockwise torque and downward pressure when installing foundations into the ground. A two speed drive head is recommended.

To prevent possible damage to the foundation do not exceed a torque capacity of 20,000 foot pounds for a Light Foundation Design E and P, and 30,000 foot pounds for a Light Foundation Design H.

The Department may require a torque measuring device to measure the installation torque to ensure maximum torque values are not exceeded.

Install foundations into undisturbed ground unless predrilling has been approved.

Install foundations in soil classifications in accordance with Table 2545-3.

Pre-drill in certain soil types as specified in the Soil Classification for Steel Screw In Foundation Installation table in this section may be allowed when soils are difficult. Obtain Engineer's approval before predrilling.

When pre-drilling, provide the following.

- (1) 6 inch hole for a Light Foundation Design E and P
- (2) 8 inch hole for a Light Foundation Design H
- (3) Drill no deeper than the length of the foundation
- (4) Before installing steel screw in foundations place the soil back in holes to the level of the surrounding ground surface. Do not compact soil
- (5) Do not install steel screw in foundations in pre-excavated holes or drilled shafts.
- (6) Do not install steel screw in foundations in frozen soils

Original staked locations for foundations may be moved no more than 10 feet in either direction parallel to the Roadway to secure a more desirable location when soil conditions are questionable, or very dense or difficult. Obtain approval from the District Traffic Office before moving staked locations.

When rock or other obstacles are encountered during the installation process that prevents the foundation from being installed in accordance with Contract Documents, relocate the foundation 5 feet to 10 feet in either direction parallel to the roadway from the originally staked location.

Backfill unused holes made during steel screw in foundation installation attempts.

Install a concrete light foundation, design type as specified on the Plan, if the District Traffic Office determines the soil condition or the placement of the staked location is not suitable for a steel screw in foundation.

Install concrete light foundations, design type as specified on the Plan, where Design E and H foundations will be surrounded by bituminous or concrete.

Install preformed joint filler between concrete and the steel screw in foundation, where a Design P foundation will be surrounded by concrete.

Turn the foundations so poles mast arms and davits are perpendicular to the centerline of the roadway unless specified elsewhere in Contract Documents.

Turn the foundation shaft cableways parallel with the roadway unless specified elsewhere in Contract Documents or when directed by the Engineer. Use the notched cableway indicators located on the top of the foundation base plate to achieve the required placement of shaft cableways.

As the foundations are screwed into the ground ensure the shaft alignment is within a tolerance of 1/4 inch per 5 feet of depth. Install foundations plumb. Ensure the foundation base plate is level from side to side and front to back and the top of the foundation is flush with the ground line when the installation is complete. If more than three leveling shims are used per aluminum pole transformer base corner or more than six shims total per transformer base are needed to install the pole plumb, then re-install the foundations level and plumb as specified. If leveling nuts, used to level steel and stainless steel poles do not meet the stand-off distances in AASHTO Specifications or in the manufacturer's installation instructions, then re-install the foundations level and plumb as specified.

Backfill and compact the cable or conduit trench.

R Service Connection

The Department will execute a Change Order and pay for the following Work as Extra Work in accordance with 1402.5 "Extra Work".

Coordinate with the electric utility company to connect power to the service conductors. This Work to coordinate power to the service conductors includes the following:

- (1) Correctly filling out and completing the electric utility company's connecting service application
- (2) Submitting a copy to the Engineer and obtaining approval from the District Traffic Office before returning the application to the electric utility company
- (3) Returning the completed connecting service application to the electric utility company
- (4) Paying the electric utility company invoice in full for work and materials provided on the supply side of the service point by the electric utility company
- (5) Providing a point of contact for the electric utility company during the Project

Ensure the "owner" of the utility information is filled out correctly on the connecting service application. Do not enter the Department (MnDOT) as the owner of the utility (electrical system) if the Department is not the owner of the utility. Use the Plan to identify the owner of the electrical system. The owner is the "Operator" as defined in Minnesota State Law Chapter 216D, 216D.01 "Definitions".

Submit a copy of the completed connecting service application to the Engineer for approval before returning the application to the electric utility company. The Engineer will seek approval from the District Traffic Office and will notify the Contractor when the approval of the completed service application has been granted. Once approved, turn in the completed service application to the electric utility.

Submit to the Engineer the paid receipt of the electric utility company invoice. This receipt will be reimbursed for the full amount plus 10 percent of the invoice price.

S Electrical Service Information Form

Provide documented available fault current calculations in accordance with 2545.3U, 2565.3Z, and the *NFPA 70 NEC Handbook Article 110.24 "Available Fault Current"*, 2565.3Z "Available Fault Current Calculations" and the Electrical Service Information Form.

Fill out and complete the Electric Service Information Form found in this section for Lighting Systems.

Submit four copies of the completed form to the Engineer before final acceptance of the project. The Engineer will distribute copies to the following:

- (1) MnDOT Electrical Services Section
- (2) MnDOT Traffic Electrical Systems Engineer
- (3) MnDOT District Traffic Engineer
- (4) City of _____ or County of _____

The Contractor provided "Electrical Service Information Form for Roadway Lighting Systems", available fault current calculations, and labeling are included in the Unit Prices of the Pay Items that are part of the Roadway Lighting System. Leave the following "Electrical Service Information Form for Roadway Lighting" on a separate page so it can be removed from the special provisions and used by the contractor. See the next page of this document.

All Red text must be removed from the special provisions prior to the special provisions being submitted for project letting.

Electric Service Information Form For Roadway Lighting

Project Number: _____

Contractor: _____

Date: _____

System	MnDOT Feedpoint Number	Meter Address	Transformer Primary Fuse Size and Type	Electric Utility Transformer Size in KVA	Transformer Internal Impedance Z in Percent	Transformer Secondary Voltage Line to Line and Line to Neutral	Size of Conductors In American Wire Gauge (AWG)	Length of conductors in feet from transformer connection to meter socket connection.			Calculated Available Fault Current at the line Side of the Meter Socket	Service Cabinet Main Circuit Breaker Size in AMPS
								L1 =	L2 =	Neutral		
								L1 =	L2 =	Neutral		
								L1 =	L2 =	Neutral		
								L1 =	L2 =	Neutral		
								L1 =	L2 =	Neutral		

NEC Article 110.24

You can download this form by following the link below.

https://edocs-public.dot.state.mn.us/edocs_public/DMResultSet/download?docId=28763571

- T Install Salvaged Lighting Units**
 Install salvaged Lighting Units at locations shown on the Plans or as designated by the Engineer.
- U Install Salvaged Lighting Service Cabinets**
 Install salvaged lighting service cabinets at locations shown on the Plans or as designated by the Engineer.

**Ensure Division S Special Provisions “As-Builts” are included in the Division S Special Provisions.
 This would include the pay item 2011.601.**

2011.601/01000	AS BUILT	AS BUILT	LS	LUMP SUM	2018
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**The District needs to include the verbiage below to trigger installation of Divisions S Special Provisions.
 Add the pay item as shown above to your pay item list. This should be done on every signal or lighting project.**

All Red text must be removed from the special provisions prior to the special provisions being submitted for project letting.

- V As Built Drawings and GPS Coordinates**
 As Built drawings and GPS coordinates in accordance with Division S Special Provisions “AS-Builts” including Pay Item No. 2011.601 (AS BUILT).

SL-2.5 METHOD OF MEASUREMENT

- A Salvage Lighting Unit**
 Salvage lighting unit (includes pole, mast arm, luminaire, transformer base, and foundation) as specified herein, at the location shown on the Plans is measured as an integral unit complete.
- B Salvage Light Foundation**
 Salvage light foundation as specified herein, at the location shown on the Plans is measured as an integral unit complete.
- C Install Salvaged Lighting Unit**
 Install salvaged lighting unit (includes pole, mast arm, luminaire, transformer base, and foundation) as specified at the location shown on the Plans is measured as an integral unit.

This item includes installing salvaged lighting units as specified including the following:

- (1) Foundation
- (2) Luminaire
- (3) Pole base
- (4) Pole and bracket
- (5) Breakaway fuse holder
- (6) Wiring between pole base and luminaires
- (7) Numbering of the light pole
- (8) Miscellaneous items required for a complete installation
- (9) Bonding and grounding materials and connections
- (10) Traffic Control

SL-2.6 BASIS OF PAYMENT

A Lighting Concrete Foundations Contract Unit Price

Specification language for Contract Unit Price for concrete foundations in MnDOT Spec. 2545.5 "Basis of Payment" 7th paragraph is deleted and replaced with the following:

The Contract Unit Price for Lighting concrete foundations includes the cost of excavation, concrete, fine filter aggregate, reinforcement, anchor rods, ground rod, grounding electrode conductors, grounding and bonding connections, conduit elbows, bushings, and other miscellaneous materials required for a complete installation of light foundations.

B Salvage Lighting Unit

Salvage lighting unit (includes pole, mast arm, luminaire, transformer base, and foundation) is paid for under pay Item No. 2104.502 (SALVAGE LIGHTING UNIT) at the Contract price per EACH, which price is compensation in full.

C Salvage Light Foundation

Salvage light foundation as specified herein, at the location shown on the Plans is paid for under pay Item No. 2104.502 (SALVAGE LIGHT FOUNDATION) at the Contract price per EACH, which price is compensation in full.

D Install Salvaged Lighting Unit

Install salvaged lighting unit (includes pole, mast arm, luminaire, transformer base, and foundation) as specified herein, at the location shown on the Plans is paid for under pay Item No. 2545.602 (INSTALL LIGHTING UNIT) at the Contract price per EACH, which price is compensation in full.

This item includes installing salvaged lighting units as specified including the following:

- (1) Foundation
- (2) Luminaire
- (3) Pole base
- (4) Pole and bracket
- (5) Breakaway fuse holder
- (6) Wiring between pole base and luminaires
- (7) Numbering of the light pole
- (8) Miscellaneous items required for a complete installation
- (9) Bonding and grounding materials and connections
- (10) Traffic control