

This set of special provisions is put together as a standalone project where the District wants to construct a standalone temporary lighting system. If the District wants to construct a temporary lighting system as part of a larger project where a roadway lighting system is being replaced the pieces of this document should be cut and pasted into the Division SL special provisions of the project.

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

DIVISION SL

SL-1 (2545) TEMPORARY LIGHTING SYSTEM

This work consists of removing and salvaging miscellaneous structures in accordance with MnDOT 2104; installing salvaged lighting units, and furnishing labor, equipment, and materials for construction of a temporary lighting system in accordance with MnDOT 2545, the Plan, and the following:

SL-1.1 GENERAL

The following provisions are provided for temporary lighting systems. Unless otherwise stated below, specifications and provisions for permanent lighting systems apply to temporary lighting systems.

A 2545 ABBREVIATIONS

GLOSSARY OF ACRONYMS AND ABBREVIATIONS

Acronyms and abbreviation used in the Contract to represent full text in accordance with 1102 "Abbreviations and Measurement Units" and as shown in Table 2545-1:

Table 2545-1 Acronyms and Abbreviations Used	
Acronym or Short Form	Full Name or Meaning
APL	Approved/Qualified Products List

B Remove Miscellaneous Structures

Remove and salvage miscellaneous structures in accordance with MnDOT 2104, the Plan, and the following:

Store and protect salvaged items from damage until ready for reinstallation. Any damage resulting from the Contractor's operations repair or replace like in kind or better to that condition existing prior to the salvage operation.

SL-1.2 MATERIALS

Arc-Flash Hazard Warning Labels

Provide 4 in H x 6 in W vinyl or polyester labels meeting the following:

- (1) White background,
- (2) Orange background behind the WARNING text,
- (3) Black text,
- (4) Self-adhesive,
- (5) Machine printed letters and numbers, and
- (6) Water-resistant.

Figure 1 is for information and reference only.

Figure 1: Arc-Flash Warning Label – Category



The following paragraph should be included when the District wants the contractor to use steel screw in foundations.

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

A Light Foundation-Design E Steel Screw In

Light Foundations- Design E Steel Screw In may be used instead of concrete Light Foundations- Design E Standard Plate 8127. Provide Light Foundations- Design E Steel Screw In listed on MnDOT's Approved/Qualified Products List under "Roadway 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:

- (1) Contact the District Soils Engineer to access the Project's;
 - (a) Soils Logs,
 - (b) Plans with borings, and
 - (c) Soils Test Reports,
- (2) 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,
- (3) Perform an onsite field review of the soils and general locations where light foundations will be installed on the project,
- (4) Review the Plans for lighting unit foundations surrounded by concrete or bituminous (e.g., placed in sidewalk or a parking lot), and

- (5) Review the Construction Requirements section for Light Foundations-Design E Steel Screw In.

If there are no project soils logs, borings, and soils test reports, then provide to the District Soils Engineer the control section of the Project to reference materials design reports from past projects that are within the general area of the Project. If no soils information for the Project can be obtained, then soils testing is recommended at no cost to the Department.

Provide the soils information obtained from the District Soils Engineer or the recommended soils testing, and the onsite field review to the Department upon request.

Install concrete light foundations, design type as shown on the Plans, at no additional cost to the Department 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.

B Temporary Overhead Lighting Cable

Provide Temporary Overhead Lighting Cable in accordance with 3815.C.2 for overhead power distribution circuits.

Use temporary overhead lighting cable with breakaway light poles located within the clear zone and installed behind concrete barrier or guardrail, protected from vehicle impact.

Route the temporary wiring underground in instances where breakaway light poles installed within the clear zone are not protected from vehicle impact.

Do not use temporary overhead lighting cable with the new permanent lighting system breakaway light poles.

C Light Pole Type 9-40 (Breakaway)

Provide and install stainless steel or aluminum breakaway light poles as specified in the Contract and meeting the following:

- (1) 9 foot davit or mast arm type as shown on the Plans,
- (2) 40 foot nominal luminaire mounting height, and
- (3) High base plate or bottom of T Base designed for 1 in diameter anchor rods on a
- (4) 15 in bolt circle as shown on MnDOT Light Foundation Design E Standard Plate 8127.

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

The Plan must indicate the following:

Operating Voltage

Mounting height 40 foot or 49 foot LED

Local Smart Photocontrol

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

The District should include the following when wood pole lighting units are to be used for all or portions of the temporary roadway lighting system.

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

D Wood Pole Lighting Unit

Provide wood pole lighting unit for roadway lighting in accordance with the following specifications:

- (1) Wood poles

- (a) In accordance with 3840,
 - (b) 50 feet in length;
- (2) Luminaire Mast Arms
- (a) Designed for wood pole mounting;

Luminaires

The Plan must indicate the following:

**New or salvaged Luminaires,
Mounting Height**

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

E Non-Breakaway Lighting Unit

Provide Non-Breakaway Lighting Units.

Non-Breakaway Lighting Units consists of the following:

- (a) Meets the applicable provisions of MnDOT 2545.2 W.
- (b) AASHTO Specifications.
- (c) Fabricated from stainless steel, aluminum, or galvanized steel.
- (d) As detailed in the Plan.
- (e) Designed for anchor bolts in a four bolt cluster as shown in one of the following MnDOT Standard Plates:
- (f) 8127, or
- (g) 8128 or
- (h) Anchor bolts in a six bolt cluster as shown in Standard Plates No .8308 and No. 8309.
- (i) High base or transformer base with access.

Luminaires

The Plan must indicate the following:

**New or salvaged Luminaires,
Mounting Height**

This paragraph needs modification so the specific type of light pole being salvaged and reused is clearly defined. This is a very general Paragraph. Specifically Item 5 Needs attention.

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

F Light Pole Type 6B-40 (Barrier Mount, Non Breakaway)

Provide and install galvanized steel non breakaway light poles as specified in the Contract and meeting the following:

- (1) Meet the applicable provisions of MnDOT 2545.2 W.
- (2) Galvanized steel in accordance with MnDOT 3394.
- (3) Non-breakaway.
- (4) High base style with double access.
- (5) Designed for one inch anchor bolts in a six (6) bolt cluster as shown in MnDOT's Standard Plate No. 8332 with ground rod electrodes, provided by others, in each Light Foundation.
- (6) As detailed in the Plans.
- (7) A 40 foot nominal luminaire mounting height.
- (8) Six (6) foot davit type mast arm with 2 3/8 inch tenon.

Provide doors in the base of bridge or median mounted light poles at 0 degrees and 180 degrees to the mast arm.

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.

Maintain the nominal mounting height of the luminaire as indicated in the Plan 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.

The Plan must indicate the following:

Operating Voltage

Mounting height 40 feet or 49 feet LED

Local Smart Photocontrol

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

SL-1.3 SL-1.3 CONSTRUCTION REQUIREMENTS

A Conduit Underground

Place conduit underground in accordance with 2565.3.D.2.b "Underground" and as follows:

Place conduit at least 24 in below roadway surfaces.

B Remove Light Foundation

Item 2104.502 (Remove Light Foundation) consists of removing the in place light foundation as indicated in the Plan.

Backfill in accordance with 2545.3C all holes remaining from the removal of the light pole foundation.

Keep the paragraph below if the District intends to reuse salvaged light foundations for the temporary lighting system.

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

C Salvage Light Foundation

Item 2104.502 (Salvage Light Foundation) consists of salvaging existing light foundations as shown on the Plan and as directed by the Engineer.

Any damage to the salvaged materials resulting from the Contractor's operations shall be repaired and replaced at the Contractor's expense. Repair or replace any damage to the salvaged materials resulting from the Contractor's operations at the Contractor's expense.

D Salvage Lighting Unit

Item 2104.502 (Salvage Lighting Unit) consists of salvaging existing lighting units as shown on the Plan and as directed by the Engineer.

The lighting unit includes pole, mast arm, luminaire, lamp if present, and transformer base.

Repair or replace any damage to the salvaged materials resulting from the Contractor's operations at the Contractor's expense.

E Light Pole White "Neutral" Terminations

Terminate the white neutral grounded conductor in light pole in accordance with 2545.3G.3 and as follows:

Provide and install split bolt connectors for splicing the white neutral grounded conductor. Do not use insulated wire splice connector blocks.

F Rodent Intrusion Barrier

Rodent intrusion barrier listed on MnDOT's Approved Products List may be installed instead of stainless steel woven wire cloth as specified in 2545.3.W for double-nut connection light pole bases with a 10 3/4 inch diameter base plate opening. Install the barrier in accordance with manufacturer's installation instructions.

Install the MnDOT APL barrier in accordance with manufacturer's installation instructions. Fill gaps between the barrier and base plate, and between the barrier and the foundation with 100% clear silicone sealant.

G Arc-Flash Hazard Warning Labeling

- (1) Calculate available fault current in accordance with 2545.3X and 2565.3 CC.
- (2) Establish available fault current and apply the appropriate label as follows.
- (3) Use the current edition of NFPA 70E "Standard for Electrical Safety in the Workplace" to determine the required PPE category and personal protective equipment.
- (4) If the available fault current is $\leq 25,000$ amps then provide a label with the following information shown in Example 1.

Example 1

<p>Warning Arc Flash Hazard</p> <table><tr><td></td><td>Appropriate PPE Required</td></tr><tr><td>Arc Flash Boundary</td><td><u>19 inches</u></td></tr><tr><td>Arc Flash PPE Category</td><td><u>1</u></td></tr><tr><td>Working Distance</td><td><u>18 Inches</u></td></tr></table> <p>Arc Flash Personal Protection Equipment (PPE)</p> <p>List required clothing, Min Arc Rating of 4 cal/cm², and protective equipment in accordance with the PPE Table from the current edition of NFPA 70E Standard for Electrical Safety in the Workplace</p> <p>Equipment ID</p>		Appropriate PPE Required	Arc Flash Boundary	<u>19 inches</u>	Arc Flash PPE Category	<u>1</u>	Working Distance	<u>18 Inches</u>
	Appropriate PPE Required							
Arc Flash Boundary	<u>19 inches</u>							
Arc Flash PPE Category	<u>1</u>							
Working Distance	<u>18 Inches</u>							

- (5) If the available fault current is $> 25,000$ amps:
 - (a) Determine PPE requirements in accordance with the current edition of NFPA 70E Standard for Electrical Safety in the Workplace, and
 - (b) Provide a label with the following information shown in Example 2. Fill in the ____ **(blank)** with the required arc-flash PPE category and arc-flash boundary distance.

Example 2

<p>Warning Arc Flash Hazard Appropriate PPE Required Arc Flash Boundary _____ Feet Arc Flash PPE Category _____ Working Distance 18 Inches Arc Flash Personal Protection Equipment (PPE)</p> <p>List required clothing, Min Arc Rating of ___ cal/cm², and protective equipment in accordance with the PPE Table from the current edition of NFPA 70E Standard for Electrical Safety in the Workplace</p> <p>Equipment ID</p>

- (6) Install labels on the front of the dead front door of the electric service cabinet at eye level.

The verbiage below needs to be included when steel screw in foundations are going to be allowed by the District on construction projects. The specification writer needs to place the foundation design type in the blank line below. If there will be more than one design type foundation used, duplicate the verbiage below 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 (OTST) 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.

H Light Foundations-Design E Steel Screw In

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 in the Plan, 2545.3 F.2 "Light Foundations", 2451 "Structures Excavations and Backfills", and the following:

Use a hydraulic drive head with a gear motor minimum torque rating of 15,000 ft lbf to 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:

- (1) 20,000 ft lbf for a Light Foundation Design E and P, and
- (2) 30,000 ft lbf 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.

<p>Table SL CONSTRUCTION REQUIREMENTS Soil Classification for Steel Screw In Foundation Installation</p>
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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, <u>not</u> 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 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
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	
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, <u>not</u> acceptable or suitable for steel screw in foundations
* Pre-drill may be allowed in Class 1, 2, 3 and 4 soils.				

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.

Predrill the area of install meeting the following requirements:

- (1) Pre-drill without removing the soil,
- (2) Use an auger with a maximum diameter of:
 - (a) 6 in for a Light Foundation Design E and P,
 - (b) 8 in for a Light Foundation Design H,
- (1) Drill no deeper than the length of the foundation, and
- (2) Before installing steel screw in foundations place the soil back in holes to the level of the surrounding ground surface. Do not compact soil.

Do not install steel screw in foundations in pre-excavated holes or drilled shafts.

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 conflicts 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 in 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. Installation of the concrete light foundation is at no additional cost to the Department.

Install concrete light foundations, design type as specified in 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 that mast arms and davits of light poles 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 in 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.

Backfill and compact the cable or conduit trench.

I Install Salvaged Light Foundation

Install salvage light foundations as indicated on the Plan and as directed by the Engineer.

J Install Salvaged Lighting Units

Install salvaged light units as indicated in the Plan and as directed by the Engineer. Include all miscellaneous hardware required for a complete lighting unit installation.

The salvaged lighting units shall be installed, and shall include all miscellaneous hardware required for a complete lighting unit installation.

The District should include the following when wood poles are to be used for all or portions of the temporary roadway lighting system.

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

K Breakaway Lighting Unit

Install breakaway units as indicated in the Plan and as directed by the Engineer. Include all miscellaneous hardware required for a complete lighting unit installation.

L Wood Pole Lighting Unit

Install wood pole lighting unit as indicated in the plans and as directed by the Engineer. Include all miscellaneous hardware required for a complete lighting unit installation.

Install wood poles in accordance with 2565.3.N.

Place wood poles behind barrier or guardrail, protected from vehicle impact when located within the clear zone.

(1) Luminaire Mast Arms

Place wood pole lighting unit luminaire mast arms in accordance with manufacturer's installation instructions.

- (2) Luminaires

Place luminaires in accordance with 2545.3.

M Non-Breakaway Lighting Unit

Place non-breakaway four bolt cluster lighting units behind barrier or guardrail, protected from vehicle impact when located within the clear zone.

Place non-breakaway six bolt cluster lighting units on barrier or retaining wall foundations.

N Remove Temporary Lighting System

Remove the temporary lighting system in accordance with MnDOT 2104 prior to the project completion date. Removing the temporary lighting system is considered incidental work and no direct payment will be made therefore.

SL-1.4 SL-2.4 MEASUREMENT AND PAYMENT

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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After the July 2015 Project letting date the As-Builts verbiage should automatically be included in Division S Special Provisions by MnDOT's Project Management & Technical Support Office. 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.

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

A 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).

B Install Light Foundations

Installing salvaged light foundations units at the locations indicated in the Plan will be measured as an integral unit complete in place and will each be paid for separately under Item No. 2545.602 (INSTALL LIGHT FOUNDATION) at the Contract price per EACH, which price shall be compensation in full for all costs incidental thereto.

C Install Lighting Units

Installing salvaged lighting units at the locations indicated in the Plan will be measured as an integral unit complete in place and will each be paid for separately under Item No. 2545.602 (INSTALL LIGHTING UNIT) at the Contract price per EACH, which price shall be compensation in full for all costs incidental thereto.

THIS ITEM INCLUDES THE FOLLOWING:

- (1) Installing salvaged lighting units as specified including lamps if required, luminaires, pole bases, pole and bracket, inline fuses, wiring between pole bases and fixtures, numbering of the light standards, and all miscellaneous items required for a complete installation.
- (2) Bonding and grounding materials and connections.
- (3) Traffic Control.