

PROPOSAL PACKAGE

**City Wide Street Lighting Upgrades
Various Locations in City of Duluth**

**City of Duluth, Minnesota
411 West 1st Street
Duluth, MN 55802**

City Project # 1493

Bid # 15-0641

Opening Date: November 12, 2015

Time: 2:00 PM

Place (Submit Bids): Room 100

CITY OF DULUTH INVITATION TO BID (ENG)

PROJECT NAME/DESCRIPTION: City Wide Street Lighting Upgrades

PROJECT NUMBER: 1493

BID NUMBER: 15-0641

Sealed bids will be received by the City Purchasing Agent in and for the Corporation of the City of Duluth, Minnesota, at her office, Room 100 City Hall, Duluth, Minnesota, 55802, (218) 730-5340 until 2:00 local time on November 12, 2015 for the above named project. Immediately thereafter, bids will be publicly opened and read aloud.

NOTICE TO BIDDERS: 1) A Project Labor Agreement (PLA) will be required for any bid that is over or could virtually go over \$150,000; and 2) Unless a Certificate of Exemption is provided, any out-of-state bidder receiving a bid award will have 8% retained from invoice payments on any contracts over \$50,000. Submit a signed copy from the State of Minnesota when submitting Payment and Performance Bonds. This form may be found at the following web address: http://taxes.state.mn.us/Forms_and_Instructions/sde.pdf

Work consists of retrofitting or replacing 482 existing roadway luminaries with new City furnished LED equipment at various locations within the City of Duluth.

Questions pertaining to this project should be directed to: Ken Taillon, Project Manager SEH, 651.765.2980.

Each bidder must review the 2015 Edition of the City of Duluth Public Works & Utilities Department/Engineering Division "Construction Standards" available on the city website (www.duluthmn.gov) as these Specifications are incorporated by reference and are deemed to be a part hereof this project as if fully incorporated and set forth herein.

Plans and specifications may be secured from the City Engineering office, Room 211 City Hall, 411 West 1st St., Duluth, MN 55802, upon payment of a check, draft or money order in the amount of \$20.00 made payable to the City of Duluth. (This payment will not be refunded.) Plans may be obtained at the City of Duluth website, <http://www.duluthmn.gov/purchasing/bids-requestfor-proposals/> free of charge.

Plans and specifications are on file for inspection at the City Engineering office, Duluth Builders Exchange, F.W. Dodge Plan Room, and Minneapolis Builders Exchange.

A certified check or bank draft, payable to the order of the City of Duluth, negotiable U.S. Government Bonds (at par value), or a satisfactory bid bond executed by the bidder and acceptable surety, in an amount equal to five per cent (5%) of the total bid, shall be submitted with each bid.

Attention is called to the fact that not less than the minimum salaries and prevailing wages as set forth in the contract documents must be paid on this project. The contractor must take affirmative action to ensure that the employees and applicants for employment are not discriminated against because of their race, color, creed, sex or national origin, and must meet the affirmative action goals. Contractors are encouraged to subcontract with Disadvantaged Business Enterprises, when possible.

Contractor will comply with all applicable Equal Employment Opportunity laws and regulations.

The City of Duluth is an Equal Opportunity employer.

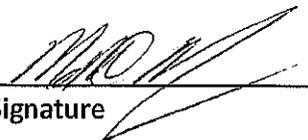
CITY OF DULUTH
Purchasing Division

Date posted to web: 10/22/2015

SPECIAL PROVISIONS
City Job Number: 1493
City Wide Street Lighting Upgrades
October 2015

CERTIFICATION

I HEREBY CERTIFY THAT THIS plan, SPECIFICATION or report was 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.



Signature

 Matt Bolf

Typed or Printed Name

 10/19/15

Date

 43913

License No.

SPECIAL PROVISIONS
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October 2015

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DIVISION SL – ELECTRICAL LIGHTING SYSTEM

Appendix AProject Location Map and Lighting Details

Attachments:

- Instructions to Bidders – Engineering 03/17/15
- Data for Labor Cost Bidding
- Prevailing Wage Rates: USDOL Highway 07/31/2015
- Project Insurance Requirements 2/16/11
- Request for Bids form

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The following forms and regulations/rules/statutes and interpretations, which are incorporated by reference in this contract, are available on the World Wide Web at the sites listed below. The City of Duluth will use its best efforts to ensure that the most recent, applicable forms and regulations/rules/statutes and interpretations are included on the web sites provided; however, if you are the successful bidder, prior to signing the contract, you are responsible for comparing the versions of the forms and regulations/rules/statutes and interpretations attached to the contract which you are signing with the versions on the web to ensure conformity. Hard copies of all forms are available at the Engineering Division.

THE VERSIONS OF THE FORMS AND REGULATIONS/RULES/STATUTES and INTERPRETATION ATTACHED TO THE CONTRACT WILL BE CONTROLLING.

FORM	FUND	WEB SITE
Affidavit of Non-Collusion (required by awarded contractor only)	All	http://www.duluthmn.gov/engineering/standard-construction-specifications/construction-documents/
Affirmative Action Policy Statement/Certificate - EEO (required by awarded contractor only)	All	http://www.duluthmn.gov/engineering/standard-construction-specifications/construction-documents/
Bidder's Label for submitting project bids	All	http://www.duluthmn.gov/engineering/standard-construction-specifications/construction-documents/
Certified Payroll Form WH347	All	www.dol.gov/whd/forms/WH347.pdf
Contractor's Haul Route	All	http://www.duluthmn.gov/engineering/standard-construction-specifications/construction-documents/
Debarment/Suspension Notice (most current version)	All	www.dot.state.mn.us/pre-letting/prov/order/suspension.pdf
IC-134 form	All	http://www.revenue.state.mn.us/Forms_and_Instructions/ic134.pdf
IC-134 on-line submittal	All	https://www.mndor.state.mn.us/tp/contractoraffidavit/
MN Rules 5200.1105	All	https://www.revisor.mn.gov/rules/?id=5200.1105
MN Rules 5200. 1106	All	https://www.revisor.mn.gov/rules/?id=5200.1106
MN Statutes 177.41 to 177.44	All	www.revisor.mn.gov/statutes/?id=177
Notice to Bidders - Prompt Payment to Subs – CITY (MS 471.425)	All	http://www.duluthmn.gov/engineering/standard-construction-specifications/construction-documents/
One-Call Instructions	All	http://www.duluthmn.gov/engineering/standard-construction-specifications/construction-documents/
Request to Sublet TP-21834	All	http://www.dot.state.mn.us/const/labor/forms.html
Request to Sublet Summary	All	http://www.dot.state.mn.us/const/labor/forms.html
Responsible Contractor Certification (MS 16C.285)	All	http://www.duluthmn.gov/engineering/standard-construction-specifications/construction-documents/
Statement of Compliance Form (8-2013)	All	www.dot.state.mn.us/const/labor/forms.html
Supplemental General Conditions Part II 4/15/11	All	http://www.duluthmn.gov/engineering/standard-construction-specifications/construction-documents/

SPECIAL PROVISIONS
City Job Number: 1493
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SP-1 NOTICE TO ALL BIDDERS

The 2015 Edition of the City of Duluth Public Works & Utilities Department/Engineering Division "Construction Standards" book and any addendums or supplements is incorporated by reference and is deemed to be a part hereof as if fully incorporated and set forth herein. The 'Construction Standards' is available on the City website at: <http://www.duluthmn.gov/engineering/standard-construction-specifications/>.

SP-2 SCOPE OF WORK

Work consists of retrofitting or replacing 482 existing roadway luminaries with new City furnished LED equipment at various locations within the City of Duluth.

SP-3 CONTACT INFORMATION

Questions regarding this project should be directed to: Ken Taillon, Project Manager, SEH, 651.765.2980.

SP-4 RESPONSIBLE CONTRACTOR VERIFICATION AND CERTIFICATION OF COMPLIANCE

A reminder to potential bidders that the Responsible Contractor Verification and Certification of Compliance is required by Minnesota Statute to be submitted with your Bid Proposal. Refer to sections S-14 and 1801 of the City's "Construction Standards" and the bid documents.

SP-5 (1504) COORDINATION OF CONTRACT DOCUMENTS

The first paragraph of MN/DOT 1504 is deleted and replaced with the following:

A requirement appearing in one of the Contract documents is as binding as though the requirement appears in all. If discrepancies exist between the Contract documents, the following order of precedence applies:

- (1) Addenda,
- (2) Special Provisions,
- (3) Project-Specific Plan Sheets,
- (4) City of Duluth Standard Construction Details,
- (5) City of Duluth Standard Construction Specifications,
- (6) MN/DOT Supplemental Specifications,
- (7) MN/DOT Standard Plan Sheets and Standard Plates,
- (8) MN/DOT Standard Specifications.

SP-6 (1505) COOPERATION BY CONTRACTORS

There is no other known work in the area by Contractors or Utility Companies.

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SP-7 (1507) UTILITY PROPERTY AND SERVICE

There are no known utility relocations required within the project limits.

SP-8 (1702) PERMITS, LICENSES, AND TAXES

None

SP-9 (1806) DETERMINATION AND EXTENSION OF CONTRACT TIME

The Contract Time will be determined in accordance with the provisions of MN/DOT 1806 and the following:

1. Construction operations shall be started on or before December 21st, 2015 or within ten (10) calendar days after the date of Notice to Proceed, whichever is later.
2. Substantial Completion. All work under this Contract shall be substantially complete on or before June 3rd, 2016. For this project, Substantial Completion shall be deemed to include ALL work in the Contract.
3. Final Completion. ALL work required under this Contract shall be complete on or before June 3rd, 2016.
4. The third exemption listed under the second paragraph of the provisions of MN/DOT 1806.3 is modified to the extent that the phrase "(3) During the inclusive period from November 15 through April 15, except as specified in 1806.1..." is deleted.
5. No work which will restrict or interfere with traffic shall be performed between 12:00 noon on the day preceding and 6:30 a.m. on the day following any consecutive combination of a Saturday, Sunday, and legal holiday without written permission from the Engineer.

(A) If the Contractor chooses not to work at all on the day preceding the holiday period, no working day charges will be assessed.

(B) If the Contractor chooses to work prior to 12:00 noon on the day preceding the holiday period or if the Contractor obtains written permission to work after 12:00 noon on the day preceding the holiday period, working day charges will be assessed only for the actual hours worked.
6. When all, or a portion, of the Contract Time is specified as a calendar completion date, the time is presumed to have been determined by considering the Proposal quantities, normal weather for the locality and season of the year, and the necessity of having the work completed by the specified date. The time may be extended by the Engineer only if the delay is considered "Excusable" in accordance with MN/DOT 1806.2 Types of Delays.

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October 2015

SP-10 (1807) FAILURE TO COMPLETE WORK ON TIME

The provisions of MN/DOT 1807 shall apply in full to both the Substantial Completion Date and the Final Completion Date.

- END -

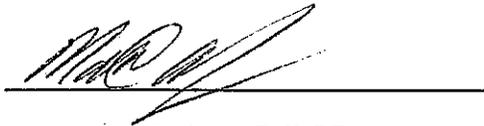
**SPECIAL PROVISIONS FOR
ROADWAY LIGHTING
DULUTH, MINNESOTA**

DIVISION SL – ELECTRICAL LIGHTING SYSTEM

DIVISION SL – ELECTRICAL LIGHTING SYSTEM

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I hereby certify that the Division SL Special Provisions were prepared by me or under my direct supervision, and that I am a duly Registered Professional Engineer under the laws of the State of Minnesota.



Matthew Bolf, PE

Date: 10/9/15

Registration No. 43913

SPECIAL PROVISIONS

DIVISION SL

ELECTRICAL LIGHTING SYSTEM

SL - 1 COMPLIANCE WITH ELECTRICAL CODES AND STANDARDS

Bidders are advised that the NEC and the 2014 edition of MN/DOT "Standard Specifications for Construction" shall govern. Compliance with provisions of MN/DOT 2545.2A, and the first paragraph of MN/DOT 2545.3a will be particularly enforced in conjunction with the construction of any kind or type of electrical system, conduit or conduit system for the conveyance of the electrical conductors, or the required portions thereof, as specified in the Contract. The Minnesota Electrical Act requires that a permit be obtained for the performance of all such work, including the installation of conduits. The Contractor shall obtain all necessary permits including, but not limited to, an electrical permit. Work shall be inspected and approved by the Engineer and The City of Duluth.

Required Signal and Lighting Certification for all Contractors, Supervisors or Foremen involved in the field installation of the Traffic Signal and/or Lighting portion of this Project. Signal and Lighting Certification is available through the MnDOT Office of Traffic, Safety, and Technology (OTST). Questions regarding certification or past certification may be directed to the MnDOT Office of Traffic, Safety, and Technology (OTST) at Telephone No. (651) 234-7055.

All material shall meet the requirements of the National Electrical Code (N.E.C.), National Electrical Manufacturers Association (NEMA) specifications, and local codes and ordinances, and shall be Underwriter's Laboratories listed, where U.L. standards for such products exist.

All work shall be under the direct supervision of a master electrician.

SL - 2 (2545) ELECTRICAL SYSTEM

The provisions of MN/DOT 2471, 2545, and 2565 shall apply in addition to the following:

SL-2.1 Definitions

- A. Definitions are in accordance with MN/DOT 2545.1B and as follows:
1. HPS – High Pressure Sodium.
 2. LED – Light Emitting Diode.
 3. Luminaire
The complete HPS luminaire mounted to the top of the light pole and includes housing, lamp, lens and ballast assembly.
 4. Luminaire Retrofit Kit
The components necessary to retrofit the luminaire housing and lens with an LED array. Includes LED array, dimmable driver and surge suppressor.
 5. Shop Drawing
A detailed document showing how a specific product will be fabricated and constructed. This document will also include required material specifications and requirements.

SL-2.2 **Scope of Work**

A. Description:

1. The work included in the project shall include the furnishing of all required labor and materials (except those materials furnished by the City of Duluth) for a complete and operable electrical system as indicated on the accompanying Plans and as required by the project manual inclusive of all appurtenances not specifically shown or covered by the specifications but required for complete operation of the electrical system as defined in the documents. The work shall also include the testing, adjustment, start-up and troubleshooting of the electrical equipment and the training of the City's operating personnel in its operation and maintenance.
2. It shall be the responsibility of the Contractor to furnish a complete and fully operating system. The Contractor shall be responsible for all details which may be necessary to properly install, adjust and place in operation the complete installation. The Contractor shall assume full responsibility for additional costs which may result from unauthorized deviations from the contract documents.
3. Electrical equipment is to be furnished and installed as shown in the Plans and including but not limited to the following items:
 - luminaires (City furnished)
 - luminaire retrofit kits (City furnished)
 - powerline lighting controllers (City furnished)
 - inline fuse holders and fuses
 - splice equipment
 - pole wiring conductors

B. Verification of Drawings:

1. The contract documents indicate the required size of conductors. The locations of equipment shall be verified in the field by the Contractor. In the event it should become necessary to change the location of any work, consult with the Engineer before making any changes. The Contractor shall determine and be responsible for the proper location and character of all electrical equipment, unless specifically detailed otherwise.
2. The drawings indicate the extent and general location of the work to be performed. The drawings are drawn to the scale indicated, but the drawings shall not take precedence over field measurements.

C. Quality:

1. All work shall be installed in a neat and workmanlike manner and shall be approved by the Engineer before final acceptance by the City.
2. If equipment is furnished having power and control requirements other than as specified, the Contractor shall make all necessary changes and furnish a complete set of drawings for installing the alternate equipment. The installation shall comply with the requirements of the 2014 edition of the National Electrical Code, local and state codes and ordinances. Where the contract documents call for workmanship or materials in excess of code requirements, the project manual shall take precedence. Electrical equipment and materials shall be Underwriter's Laboratory listed, where U.L. standards for such products exist.

3. All equipment to be installed on the project shall be new and unused except those items identified as relocated.
4. The Contractor shall keep the premises clean and orderly during installation of this work, remove rubbish periodically and as may be directed by the Engineer. Upon completion of this part of the project, remove all dirt, debris, tools, scaffolding, etc. used or resulting from this work.

D. Coordination:

1. It shall be the sole responsibility of the Contractor to coordinate with the appropriate City staff who will be providing equipment and electrical system access for the project. The coordination shall include, but not be limited to, operators, power requirements, etc.
2. Schedule work to enable the operation of all luminaires in the lighting system, existing and new, to function every night. Overnight outages are not allowed.
3. Contract unit prices shall reflect all construction costs.

SL-2.3 General

The distribution circuits of the Lighting Systems consist of conductors installed in RSC and PVC. Two load conductors and one neutral conductor constitute two 120-volt lighting circuits, and a fourth conductor shall be used as an equipment ground.

Power supply to the lighting systems is 120/240-volt, single phase, alternating current. The systems are metered.

SL-2.4 Shop Drawings & Submittals

The Contractor shall submit to the City for approval, a complete list of electrical system components. This list shall include the names of all suppliers and manufacturers and catalog numbers for the various components. This list must be approved by the City prior to the commencement of work on the Lighting System.

The Contractor shall furnish to the City electronic shop detail drawings, in accordance with the provisions of MN/DOT 2471.3B. The shop detail drawings shall be identified by The City of "Duluth" and the fabricator. The drawings shall be distributed, after approval to the following:

- (1) Contractor
- (2) Project Engineer
- (3) City

Submittals shall include the following:

- (1) Product Data:
 - a) Conductors
 - b) Fuse Holders
 - c) Fuses
 - d) Splice equipment

Approval of shop drawings and submittals shall not relieve the Contractor from the responsibility for deviations from the drawings or specifications unless he has, in writing, called the City's attention to the deviations at the time of submission, and secured written approval, nor shall it relieve him from the responsibility for errors in shop drawings or submittals.

SL-2.5 Materials

The City reserves the right to sample, test, inspect, and accept or reject any of the materials used for the Lighting Systems based on its own tests. However, the City may at their option, accept materials on the basis of listing by Underwriters Laboratories, Inc.

1. The Contractor shall follow manufacturer's instructions regarding installation and operation of powerline controller, LED luminaire, and LED retrofit kit installation.
 2. The Contractor shall coat all threaded hardware with an approved zinc-based anti-seize compound prior to assembly or reassembly.
 3. The contractor shall make minor repairs to existing luminaires and pole handhole doors damaged during the installation of LED retrofit equipment and pole conductors. Work shall include repairs such as set screw extraction and thread tapping operations required to maintain reliable mounting of handhole doors and luminaire components.
 4. The lighting units and luminaires shall be installed in a workable first class condition, and shall include all miscellaneous hardware required for a complete and operational installation.
- A. Luminaires and Luminaire Retrofit Kits (City Furnished):
1. The Contractor shall install City furnished luminaires and retrofit kits, and furnish necessary accessories as required by the contract documents and in accordance with the legend and Details on the Plans.
 2. The Contractor shall follow manufacturer's instructions regarding LED luminaire and LED retrofit kit installation.
 3. The Contractor shall coat all threaded hardware with an approved zinc-based anti-seize compound prior to assembly.
 4. The luminaire shall be installed in a workable first class condition, and shall include all miscellaneous hardware required for a complete lighting installation.
- B. Powerline Controllers (City Furnished):
1. The Contractor shall install City furnished powerline controllers and necessary accessories as required by the contract documents and in accordance with the manufacturer's requirements, and legend and Details on the Plans.
 2. The Contractor shall follow manufacturer's instructions regarding controller installation.
 3. The Contractor shall furnish a mounting bracket to enable the controller to be located within the base of the pole. Provide the Engineer for review, a detailed drawing of controller mounting equipment and method.
- C. Single Conductor Wires:
- Luminaire and dimming control conductors shall have Class B stranded annealed uncoated copper conductors and be listed by UL as Type USE-2. Single conductor wires connecting the luminaires to the distribution circuits shall be 1/c #12 stranded wire.

The insulation on each conductor shall be colored red, black, white or green. Dimming control wires shall be gray and violet. See wiring schematic details in the Plan.

D. Fuses:

1. The single-pole fuse holders for the 120-volt luminaires shall be a Bussman Catalog No. HEB-AA and equipped with a 6-amp fuse
2. Fuse holders shall be installed in the phase wires of their respective circuits at the access handhole of the light standards. Connect fuse holders to the branch circuiting with 1/c #10 pigtails.
3. The fuses holders shall be accessible at the handhole. The Contractor shall provide 18 to 24 inches of conductor to enable the withdrawal of the connected fuse holder from the pole base for servicing. The grounding wires shall not be fused. Fuses and fuse holders shall be "UL" listed and shall be installed in such a manner that the fuse stays with the load side when holder is separated. In addition, the Contractor shall form loops in the leads on each side of the fuse holders and so position the fuse holders so that they may be easily removed or inserted through the access hole. See wiring schematic details in the Plan.

E. Grounding:

1. The equipment grounding conductor shall be bonded to the foundation ground rod where shown on the Plans, and to the grounding lug of the light at every decorative light standard. An insulated (green) copper conductor shall be used. The size of the ground conductor shall be as required by the National Electrical Code or No. 6 AWG, whichever is larger. The metal frame of the luminaires shall also be grounded to the pole.

SL-2.6 Construction Requirements

A. Maintaining Existing Roadway Lighting

Maintain and keep in operation lighting systems in accordance with 2545.3 B and as follows:

Except during any periods of authorized work suspension, the Contractor is responsible for all maintenance of the existing lighting, temporary, and newly constructed lighting systems, within the limits of the construction project, during the duration of the lighting project in accordance with the applicable provisions of MnDOT 1514. This maintenance includes....

1. Luminaires and lamps (after 30% or more of the lamps are burned out)
2. Electrical cable
3. Damage and knockdowns (due to Contractor operations)

.... until final written acceptance of the project by the Engineer (MnDOT 1716). This work is considered incidental work.

Maintain and repair any damage that in the opinion of the Engineer has occurred by someone other than the Contractors operation. The City will pay for this work in accordance with MnDOT 1403 (EXTRA WORK). During any periods of authorized work suspension, the City will provide and maintain all items of the existing lighting system.

When disconnecting and salvaging luminaires, and ballast and lamp assemblies in an existing lighting circuit, maintain the electrical integrity of the circuit. No splices shall be installed underground or in handholes. Unless otherwise noted all splices shall be installed in pole bases.

PROVIDE TO THE CITY THE NAMES AND PHONE NUMBERS OF CONTACT PERSONNEL FOR BOTH DAY AND NIGHT OPERATION FOR THE MAINTENANCE OF THE EXISTING, TEMPORARY, AND NEWLY CONSTRUCTED LIGHTING SYSTEM.

B. General Removal of Miscellaneous Structures.

This work shall consist of removing or salvaging miscellaneous equipment in accordance with the provisions of MnDOT 2104 and the following:

Salvaged items shall be stored and protected from damage by the contractor until ready for delivery to storage. Any damage resulting from the Contractor's operations shall be repaired or replaced like in kind or better to that condition existing prior to the salvage operation.

C. Salvaging Lighting Equipment

1. Salvaging Luminaire Lamp and Ballast Assemblies

- a. Disconnect and salvage existing luminaire lamp and ballast assemblies at locations indicated in the Plan where new LED retrofit kits are to be installed. Remove only the components necessary to enable the complete retrofit of new LED equipment. Remove and dispose of internal pole wiring, splice blocks, fuses and fuse holders. Salvaged lamp and ballast assemblies shall be delivered to storage location as specified herein, or as directed by the Engineer. Any damage to the salvaged equipment resulting from the hauling operation shall be repaired or replaced at the Contractor's expense. Keep equipment organized in groups of like equipment. Provide identification to the City regarding the style of luminaire and location where the equipment was salvaged from. The salvage and delivery of lamp and ballast assemblies is incidental to the installation of City furnished LED retrofit kits.

2. Salvage Luminaires

- a. Disconnect and salvage existing luminaires, lamps and arm assemblies at locations indicated in the Plan where new LED luminaires are to be installed. Remove and dispose of internal pole wiring, splice blocks, fuses and fuse holders. Salvaged luminaires and arm assemblies shall be delivered to storage location as specified herein, or as directed by the Engineer. Any damage to the salvaged equipment resulting from the hauling operation shall be repaired or replaced at the Contractor's expense. The salvage and delivery of luminaires is incidental to the installation of City furnished LED luminaires.

D. Delivery of Salvaged Material

Salvaged materials shall be disassembled as directed by the Engineer and, unless otherwise specified, shall be delivered to City of Duluth Traffic Operation, 1532 West Michigan Street, Duluth, MN., 55811. The Contractor shall notify Mr. Earl Stewart (218.730.4421) at least three (3) normal working days in advance of the time the Contractor intends to deliver the salvaged materials.

Any damage to the salvaged materials resulting from the hauling operation shall be

repaired and replaced at the Contractor's expense.

E. Installation:

1. The Contractor shall furnish, install, wire and start up equipment as required by the contract documents. The manufacturer's installation recommendations shall be observed, and the completed assembly shall meet applicable code requirements.

F. Conductor Installation:

1. No splices shall be made in underground distribution wiring except in pole bases. Wiring shall be terminated as required in the contract documents.
2. All wire and cable shall be tested for grounds and continuity before the circuit is energized. The Contractor shall assume full responsibility for damage done to the equipment due to circuit grounds or open circuits.

G. Splicing:

1. Clean conductor surfaces before installing connectors.
2. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
3. Splices shall be made only in the light standard bases. At each pole handhole, provisions shall be made for convenient splicing of the conductors. This shall be performed by providing ample length (18 to 24 inches) of conductor ends and securing the splices with split-bolt pressure connectors. The splice connections shall be completed using the following process:
 - a. The individual conductors at their terminals shall be wrapped with a half lapped layer of Scotch 130C Linerless Rubber Splicing Tape, according to the manufacturer's recommendations, around approximately one inch of the end of the cable jacketing and continuing around the group of bared conductors and connector.
 - b. The individual conductors shall then be suitably wrapped with Scotch Super 33+ Vinyl Electrical Tape, around approximately 1 inch of the end of the cable jacketing and continuing around the group of bared conductors and connector. Thoroughly coat the tape and all crevices with 3M Scotchkote Electrical Coating.
 - c. No splicing shall be performed within handholes.
 - d. Wire-nuts are not an acceptable method of splicing within pole base.

H. Installation of Luminaires:

1. Disconnect and salvage existing luminaire.
2. Install City furnished LED luminaires on existing poles at locations shown on plans. Provide all mounting hardware and adapters required to install a complete and operational unit.
3. Provide five 1/c No. 12 stranded wires in pole to connect the LED driver and dimming leads to their respective branch conductors and controllers in the pole base. Provide each luminaire with new fuse holder, fuse and splicing equipment. Luminaires shall be protected by one 6-amp fuse in each load conductor.
4. Install luminaire as specified on existing bridge and bridge decorative features in locations shown on plans. Provide all mounting hardware and adapters required to install a complete and operational unit.

I. Installation of LED Retrofit Kits

1. Disconnect and salvage existing luminaire lamp and ballast assembly.
2. Install City furnished LED luminaire retrofit kits in existing luminaires at locations shown on plans. Provide all mounting hardware and adapters required to install a complete and operational unit. Follow manufacturer's recommendation for equipment installation.
3. Provide five 1/c No. 12 stranded wires in pole to connect the retrofitted LED driver and dimming leads to their respective branch conductors and controllers in the pole base. Provide each luminaire with new fuse holder, fuse and splicing equipment. Luminaires shall be protected by one 6-amp fuse in each load conductor.
4. Install luminaire as specified on existing bridge and bridge decorative features in locations shown on plans. Provide all mounting hardware and adapters required to install a complete and operational unit.
5. Clean optical chamber, glass and reflector to remove dust, dirt and insect debris.

J. Installation of Powerline Controllers

1. The Contractor shall install City furnished luminaire control equipment within the pole base of each lighting unit per Details in the Plan. One powerline lighting controller shall be installed within the base of the light pole at locations indicated in the Plan and in accordance with the manufacturer's requirements and the Details in the Plan.
2. The Contractor shall furnish and install a stainless steel strap or mounting bracket to enable the controller to be mounted within the transformer base. The grounding lug or a pole flange bolt may be used as an anchoring point. The controller shall be mounted such that its conductors are oriented downward to avoid water intrusion. The location of the controller shall not interfere with typical maintenance practices.
3. The controller shall be connected to the luminaire circuiting in accordance with the wiring detail in the Plan, and shall use the luminaire's fuse assembly as over-current protection.
4. One gray and one violet stranded No. 12 AWG Type USE-2 conductor shall be connected between the controller and luminaire driver dimming leads.
5. The Contractor shall maintain records of the unique controller ID numbers relative the pole into which they are installed. An adhesive identification tag shall be removed from the controller and applied to a clean copy of the Plan at each respective pole location indicated on the Plan. This Plan shall be furnished to the City at the completion of the project.

K. Wiring of Luminaires Controllers:

1. Each luminaire/poweline controller combination in the 120-volt system shall be fused with one 6 amp fuse in accordance with the Details in the Plan. Fuse connectors shall be installed in the phase wires of their respective circuits at the access handhole of the light standards.
2. All splices must take place in the base of the light standard.

L. Painting:

1. Contractor shall touch-up all lighting equipment damaged during transportation and installation with a color-matched finish.

M. Rust Inhibitor:

1. A thorough application of an approved rust inhibitor shall be used to grease or otherwise protect the threads of the anchor rod, prior to pouring the concrete foundation to ensure that the concrete does not mold to the threaded portion of the rod.
2. All threaded stainless steel hardware and dissimilar metal, threaded hardware shall be coated with an approved zinc-based anti-seize compound by the Contractor prior to assembly.

SL - 3 **WARRANTY**

The Contractor shall guarantee the operation of the installation and that the contractor furnished materials and workmanship be free from defects for a period of one (1) year from the date of acceptance, providing the equipment has been operated and maintained in accordance with the manufacturer's recommendations. If a dispute exists regarding whether the equipment has been maintained according to the manufacturer's recommendations, the Engineer's decision will be final. The guarantee shall include all parts and labor necessary to return the system to normal operation. The guarantee on all equipment shall start after formal acceptance of equipment as defined by the General Conditions and after successful completion of start-up procedures.

SL - 4 **ASBUILT DRAWINGS AND O & M MANUAL**

The Contractor shall collect, gather and assemble into one book the installation details, instructions, schematics of actual equipment and operations directions supplied by the manufacturer with all equipment. Final acceptance of the work will be withheld until such data has been presented complete to the City. The manual shall be available for instruction of operations and maintenance of equipment and systems.

SL - 5 **SYSTEM TESTING**

The Contractor shall test the equipment installed under these specifications and shall demonstrate its proper operation to City staff.

No equipment shall be tested, or operated for any purpose until it has been fully prepared, connected and made ready for normal operation. Any damage to equipment occasioned by improper or ill-timed operation or testing shall be made good, at the Contractor's own expense, before final inspection and acceptance.

END OF SPECIAL PROVISIONS