

Part C. SCOPE OF WORK

Specifications

I. GENERAL

The Supplier shall furnish Light Emitting Diode (LED) luminaires including, but not limited to, lamps, housings, fixtures, wiring, photoelectric control receptacles, and shorting caps. Supplier shall also furnish all hardware required for installation on mast arms or poles including, but not limited to, mounting brackets, leveling brackets, and adaptors.

LED luminaires furnished by Supplier shall conform to the City of Elk Grove Standard Drawings dated October 10, 2007 (herein referred to as Standard Drawings), and these specifications. Where conflicts exist between Standard Drawings and these specifications, these specifications shall govern.

Actual equipment delivered shall be as specified on individual purchase orders from the City. Lead time for equipment manufacturing and delivery shall take a maximum of fifty-six (56) calendar days from the date a purchase order is issued.

Unless otherwise approved by City, all LED luminaire products must be listed on the most recent version of the Qualified Products List of the Design Lights Consortium (DLC) (<http://designlights.org>), which is required by the Sacramento Municipal Utility District (SMUD) for obtaining incentives. Supplier shall ensure that products not currently listed on the Qualified Products List of the DLC shall be submitted by the product's manufacturer to the DLC for consideration within thirty (30) calendar days from the date a contract is awarded to the Supplier.

LED luminaires shall be of the type listed in Attachment A: Bidding Schedule or approved equal.

Proposed Equal Product Substitutions

In order for proposed equal products to be considered they must be listed on the most recent version of the Qualified Products List of the DLC (<http://designlights.org>), must meet the LED luminaire requirements listed in Part III of these specifications, and the Supplier shall provide the City with the following:

- Proof of products meeting the required Standards and Tests listed in Section III, Part D of these specifications.
- IESNA LM-79 (Initial Photometric Performance Data) - testing must be done by a third-party laboratory that has been qualified, verified, and contracted for US Department of Energy CALiPER LM-79 testing. Laboratories can be found at: http://www1.eere.energy.gov/buildings/ssl/test_labs.html.
- Photometric data per IESNA LM-79-08 and formatted per IESNA LM-63-02 as an .ies file to be provided.
- Photometric Layout of the proposed equal products on the City's representative road cross sections provided by the City upon request. At a minimum, the photometric layout shall show the following: note the existing wattage (for HPS luminaires), listing/identification of the proposed luminaire type(s), lighting distribution(s), total luminaire wattage and driver amperage, ground level foot candle distribution, average maintained foot candles, maximum uniformity ratio, and maximum veiling luminance ratio.
- IESNA LM-80 (Lumen Depreciation Performance Data) - test data must be provided by the Supplier from the manufacturer of the LED emitters. This must include a statement from LED emitter manufacturer that their lumen maintenance projections derived from the ISTMT are consistent with those developed by the emitter manufacturer.

- Luminaire lumen depreciation data derived from Luminaire in-situ temperature measurement testing (i.e. LED chip package temperature (TS) measurement obtained with the LED chip package operating in given luminaire and in a given stabilized ambient environment) under UL 1598 environments and directly correlated to LED package manufacturers IESNA LM-80-08 data.
- LED Luminaire Lumen Depreciation Data sets created using correlated in-situ luminaire test methods (i.e. LED chip package temperature (TS) measurement obtained with the LED chip package operating in given luminaire and in a given stabilized ambient environment. The TS temperature is correlated directly to the LED chip package manufacturer's LM-80 data to form data sets predicting luminaire lumen depreciation for various luminaire average ambient operating conditions.) for 25,000, 50,000 and 100,000 hour operating durations and for average luminaire operating ambient conditions as follows: 5°C, 10°C, 15°C, 20°C, 25°C
- Actual physical sample of proposed equal luminaires

II. SUPPLIER QUALIFICATIONS

The Supplier is required to be a manufacturer's authorized distributor. The Supplier shall provide and attach documentation to the bid verifying their status as a manufacturer's authorized distributor for the proposed LED luminaire products. Such documentation shall include a written certification from the manufacturer(s) for the proposed LED luminaire products that the manufacturer is capable of furnishing LED luminaire products to the Supplier and that Supplier is capable of furnishing said products to the City within 8 weeks of issuance of a formal purchase by the City.

Any Supplier that fails to provide the required proof of qualifications shall have their bid declared "Non-Responsive" and their bid shall not be considered for this procurement. By submission of a bid, the Supplier has agreed that the City shall make the sole determination as to the Supplier meeting these minimum qualifications.

III. LED LUMINAIRE REQUIREMENTS

A. GENERAL

- Decorative LED luminaires shall be of the same style and color of existing City of Elk Grove decorative luminaires in conformance with Standard Drawings SL-30, SL-31, SL-32, SL-33, SL-34, SL-35, SL-40, SL-42, SL-43, SL-46, and/or SL-47.
- Common Type, Series A Cobrahead LED luminaires shall have a slim, low profile design that minimizes wind load requirements ($EPA \leq 1$ SF). Fixture housing shall be constructed from rugged aluminum components. LED drivers shall be mounted in the housing which shall be suitable for wet listed operation (per UL 1508 requirements). A high performance heat-sink shall be specifically designed for LED 'Street Light' applications.
- Common Type, Series B, post-top mounted LED luminaires shall be of the same style and color of existing City of Elk Grove Common Type, Series B, post-top mounted luminaires.
- Finish color shall be as shown in Standard Drawings, or as specified by the City for the individual luminaire types and shall include an E-coat epoxy primer with an ultra-durable powder topcoat providing excellent resistance to corrosion and ultraviolet degradation and abrasion, exceeding a rating of six per ASTM D1654 after 1,000 hours of testing per ASTM B117. "Laguna West Luminaires" (Standard Drawing SL-43) shall be Aqua Marine, federal standard color #14516. Color matching for luminaires shall be provided by the Supplier as requested by the City. The City shall furnish color samples to the Supplier for color matching.

- All luminaires and luminaire components, including, but not limited to, lamps, fuses, and housings, shall be new, unused, and of the manufacturer's latest design and model available at the time the Contract is awarded, unless otherwise specified by the City. Existing decorative luminaires may be retrofitted with LED components provided the specific retrofit kit is listed in Attachment A: Bidding Schedule or the retrofit kit is accepted as an approved equal product pursuant to the requirements of these specifications. Retrofitting of common type luminaires (cobrahead or post-top mounted) shall not be allowed.
- All Standard Equipment shall be provided. All necessary parts not mentioned, but needed for operation and/or installation of the items specified, shall be supplied.
- Luminaires shall be fully assembled and electrically tested before shipment from the factory.
- Luminaires shall be individually packaged to prevent damage during shipping, storage, and casual handling prior to installation. Each package shall be legibly marked with:
 - Manufacturer's name
 - Manufacturer's catalog number
 - Product description
 - Date of manufacture (month and year)
 - City's purchase order number
- Luminaires shall have an external label per ANSI C136.15 (Luminaire Field Identification). If applicable, luminaires shall have an internal label per ANSI C136.22 (Internal Labeling of Luminaires).
- Luminaires and all components shall be UL and/or CSA listed.
- All wiring shall be neat, bundled, and kept away from excess heat.
- On some streetlight luminaires, one or more third-party devices may be wired to the photocontrol receptacle or to the same power feed as the luminaire. For example, third-party devices include WiFi equipment and traffic cameras. Manufacturer's luminaire warranty must allow for such attachments.

B. MECHANICAL SPECIFICATIONS

- Luminaire housing components shall be low-copper aluminum, with high performance heat sink(s) designed specifically for LED luminaires. No active cooling features (fans, etc.) are permitted.
- Luminaire configuration shall allow for modular upgradability and/or field repair of all electrical components (i.e. LED modules, Driver(s), etc.).
- Luminaire shall have phenolic terminal block for power input suitable for #6 - #14 AWG wire.
- Cobrahead LED luminaires shall be capable of mounting to existing mast arms, poles, and tenons in conformance with Standard Drawing SL-20.
- Common Type, Series B, post-top mounted LED luminaires shall be capable of mounting to existing poles in conformance with Standard Drawing SL-22.
- Decorative LED luminaires shall be capable of mounting to existing City of Elk Grove poles and tenons for similar luminaires in conformance with Standard Drawings SL-30, SL-31, SL-32, SL-33, SL-34, SL-35, SL-40, SL-42, SL-43, SL-46, and/or SL-47.

- Luminaire shall have an integral leveling bubble, or other method to facilitate proper installation.
- Luminaire shall have lens gasket designed to prevent entrance of foreign material into the sealed optical system.
- Luminaire shall allow for:
 - Tool-less access to LED Driver compartment
 - Unit shall provide tool-free access to all electrical components.
- For cobrahead luminaires, the Effective Projected Area (EPA) of luminaires shall not exceed 1.0 square feet, and shall withstand 100 mph wind gusts when mounted on a standard 8' aluminum mounting bracket arm without additional reinforcement.
- Gasket seals shall be designed to prevent intrusion by birds, insects, moisture, and environmental contaminants.
- Mounting and housing bolts shall be of non-corrosive material.
- Luminaires shall be weatherproofed and meet the Minimum National Electrical Manufacturers Association (NEMA) Ingress Protection (IP) rating of 55 for the lamp cavity and 24 for the gear cavity.
- Mechanical design of protruding external surfaces (heat sink fins) shall facilitate hose-down cleaning and discourage debris accumulation.
- For cobrahead luminaires, refractors or lenses shall be made from UV inhibited high impact optical grade material that is resistant to scratching.
- The luminaire shall incorporate a heavy duty latching system to keep luminaire closed (no wire latches). Latching system shall be of non-corrosive material.
- For cobrahead luminaires, total luminaire weight shall be less than 30 pounds.
- House shield option shall be available for field-installable house-side light control for all luminaires.

C. ELECTRICAL SPECIFICATIONS

- Total LED luminaire system wattage shall be 50 percent or less of the existing high pressure sodium (HPS) luminaire currently installed in City fixtures, except as otherwise approved by the City.
- Drivers shall be Class 1. Driver requirements include:
 - Electronic
 - Input Voltage range 120-277 \pm 10%
 - Output Current 0.35A dc – 1.0A dc (+/- 5%)
 - Input Frequency 50/60 Hz
 - Power Factor >90% at full load
 - THD <20% at full load
 - Load regulation: +/- 1% from no load to full load
 - Output ripple <10%
 - Output should be isolated
 - Case temperature: rated for -40°C through +80°C
 - Overheat protection, self-limited short circuit protection and overload protected
 - Primary fused

- Driver Life Rating - less than 0.5% failure rate at 100,000 operating hours (at full rated power and operating ambient temperature of 25°C)
 - Rated case temperature suitable for operation in a luminaire operating in the ambient temperatures indicated above.
 - Same rated life as the luminaire. If the driver's lifetime is less than that quoted for the luminaire, the driver's lifetime must be used instead.
 - Thermally separated from the LED chips.
 - Upon receiving a 0-10V signal, LEDs shall dim down to at least 10% power. Driver must include leads to accept a 0–10 V signal.
- Units to be provided with integral 10 kV surge suppression protection standard, as tested in accordance with ANSI/IEEE C62.41.2 and ANSI standard C136.37.
 - Electromagnetic interference meets the requirements of 47 CFR part 15/18, class A.
 - LED circuitry shall prevent visible flicker to the unaided eye over typical voltage fluctuations.
 - Individual LEDs shall be constructed such that a catastrophic loss or failure of one LED will not result in the loss of the entire luminaire.
 - Units shall have quick disconnect harness to be provided on power feed to driver for ease of maintenance.
 - Luminaire Operating Ambient Range: -40°C to +40°C
 - Active Thermal Monitoring: Both driver and optical unit shall have thermal sensors to detect over-temperature conditions.
 - Off-state power consumption shall be < 0.5 watts, excluding lighting controls.
 - Average rated life of the luminaire and all electrical components shall be greater than or equal to 100,000 hrs.

D. STANDARDS AND TESTS

- Luminaire shall meet the requirements of the following standards and tests:
 - UL 1598, UL 1598C for retrofit conversion kits, and UL 8750 safety standards.
 - IEC60598, IEC62031 and IEC60950 safety standards.
 - ASTM B117 500-hour Salt Fog
 - ASTM G53 UVB313 1000-hour UV
 - IEC60068-2 Thermal Shock
 - IEC60068-14 High Temperature / High Humidity
 - ANSI C136.31 Vibration
 - IEC61000, EN55015 and CISPR15 for radiated emissions and electrical noise.
 - FCC Title 47, Part 15
 - International Dark-Skies Association BUG ratings
 - European Directive on Reduction of Hazardous Substances (RoHS).
 - IEEE C62.41.2 Category C-Medium Surge Protection
 - NEMA SSL 3-2010, high power white LED binning for general illumination

E. PHOTOMETRIC PERFORMANCE

- Minimum average maintained illuminance measured between the project limits on a given roadway shall be in conformance with Standard Drawing SL-2.

- Minimum average maintained illuminance for intersections shall be as follows:
 - In urban areas, 1.6 horizontal lux (0.16 fc) on the area normally bounded by the crosswalks, and 6.5 horizontal lux (0.65 fc) at the intersection of centerlines of the entering streets.
 - In rural areas, 1.1 horizontal lux on the area normally bounded by the crosswalks, and 3.2 horizontal lux at the intersection of centerlines of the entering streets.
- Light pattern (distribution) shall be type II or type III, except that “Old Town” decorative luminaires (OTB) shall be type V, or as approved by City.
- Maximum backlight, uplight, and glare (BUG) ratings per IES TM-15-11 (Luminaire Classification System for Outdoor Luminaires) for the various luminaires shall be as follows:

Luminaire Type	Backlight Rating	Uplight Rating	Glare Rating
Common Type, Series A (Cobrahead)	B2	U0	G2
Common Type, Series B (Post-top mounted)	B1	U3	G1
All Decorative Types	B3	U3	G3

- Retrofitted decorative luminaires shall be internally shielded at the top to minimize uplight.
- Zonal Lumen Density: 100%: 0–90°, ≤10%: 80–90° (DLC qualification)
- Correlated Color Temperature (CCT) and Color Rendering Index (CRI):
 - CCT = 4000K ±300
 - CRI ≥ 70 for cobraheads, CRI ≥ 65 for all other luminaire types
- L70 Lumen Maintenance: 100,000 hrs; using IES LM-80
- Minimum initial delivered lumens per watt requirements 70 lm/W (DLC qualification; using IES LM-79)

F. PHOTOELECTRIC CONTROL DEVICES

- A 7 pin photocontrol receptacle in full compliance with ANSI C136.41-2013 shall be accessible, installed, and prewired in each luminaire. For cobrahead and Common Type, Series B, post top mounted luminaires, photocontrol receptacles shall be mounted on the top of the fixture.
- A photocontrol receptacle shorting cap shall be included with each LED luminaire.

Note: The photocontrol requirements described in this section may not apply to retrofitted luminaires.

IV. **WARRANTY**

All electrical components including, but not limited to, light emitting diodes and drivers shall be warranted by the luminaire’s manufacturer for a minimum of ten (10) years from the date the City accepts delivery. All manufacturer supplied components of the quoted luminaire shall have an included minimum 10 year full warranty. Each LED streetlight luminaire shall have a unique serial/tracking number sufficient for use by the Supplier and the City to track warranty start and end dates. If the warranty is not a full 10 year warranty on all luminaire components in the finished luminaire assembly, the luminaire will be determined to not meet City specifications and will be rejected.

If any LED fails within a given luminaire upon initial installation, the luminaire shall be considered failed and eligible for replacement under the warranty. Post initial installation, if 10% or more of the LEDs within

a given luminaire cease to be operational or demonstrate negligible light output within the warranty period, the luminaire shall be considered failed and eligible for replacement under the warranty.

Luminaire finish shall also be warranted by the luminaire's manufacturer for a minimum of ten (10) years from the date the City accepts delivery.

The awarded Supplier, as the contracting party, shall be responsible to the City for full replacement of LED streetlight luminaries that fail during the warranty period as determined by the City irrespective of whether Supplier is an agent, broker, fabricator, or manufacturer's dealer. All replacement LED streetlight luminaries shall be warranted for an additional ten (10) year period from the date the City accepts delivery. The Supplier shall not be responsible for installing the replacement luminaries. The City will install replacement luminaires using its own forces.

Delivery location for replacement luminaires shall be as specified by the City at the time of shipment. Prior to shipping replacement luminaires the Supplier shall confirm the delivery location with the City.