























NO: R121

COUNCIL DATE: May 30, 2016

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**REGULAR COUNCIL**

**TO: Mayor & Council**

**DATE: May 26, 2016**

**FROM: General Manager, Engineering**

**FILE: 5420-01**

**SUBJECT: 2016 LED Roadway Lighting Upgrade Program**

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**RECOMMENDATION**

The Engineering Department recommends that Council:

1. Receive this report for information regarding the significant benefits and environmental assessment of LED roadway lighting;
2. Authorize the product purchase of approximately 6,189 Cobra head style LED roadway lighting fixtures from the Provincial Corporate Supply Arrangement (CSA) to replace existing street light fixtures within City Centre and re-lamp Zone B (see Appendix "I");
  - That LED Roadway Lighting Ltd. be engaged with an upset limit in the amount of \$2,300,000.00, including GST/PST and contingency, for the supply of 5,001 LED fixtures; and
  - That EECOL Electric be engaged with an upset limit in the amount of \$760,000.00, including GST/PST and contingency, for the supply of 1,188 LED fixtures for intersections and other specific locations requiring brighter lighting levels;
3. That LUMCA Inc. be engaged with an upset limit in the amount of \$670,000.00, including GST/PST and contingency, for the supply of 401 City Centre decorative LED fixtures; and
4. That the City's electrical maintenance contractor, Cobra Electric Ltd., be engaged for installation of the LED roadway lighting products in lieu of the contracted re-lamp program at an estimated cost of \$320,000.00, including GST and contingency.

**INTENT**

The purpose of this report is to request authorization of the LED roadway lighting implementation strategy for 2016 and to provide information in response to recent concerns about the environmental impacts of LED roadway lighting.

## **BACKGROUND**

On February 1, 2016, Council approved Corporate Report No. R018;2016, *Roadway Lighting Upgrade Program to LED Technology*, which recommended a five year implementation strategy for LED roadway lighting and submission of a Corporate Report for procurement of the product and labour. This report details the procurement along with product and environmental information.

### **LED Roadway Lighting Products**

The lighting fixtures to be installed in the City as part of the 2016 LED Roadway Lighting Program have been pre-qualified as part of the Province's CSA for the supply and delivery of LED Street Light Luminaires. The CSA is a collaboration of the Province and B.C. Hydro Power Smart to create a centralized procurement offering to assist public entities across the Province in converting to LED street lights.

The LED lighting products offered as part of the CSA process have undergone extensive evaluation related to compliance with applicable standards, including a product's ability to meet:

- Illumination Engineering Society of North America (IESNA) design/testing criteria, including backlight, uplight and glare ratings;
- American National Standards Institute (ANSI) and Institute of Electrical and Electronics Engineers (IEEE) surge voltage and vibration specifications;
- Federal Communications Commission (FCC) 47 CFR part 15 radio emission rules;
- CSA, ULC or ETLc certification;
- Restriction of Hazardous Substances (RoHS) Directive compliance; and
- DesignLights Consortium Qualified Products List qualifications.

City Centre decorative streetlights are specified as LUMCA concept series decorative fixtures. These fixtures are required from the Manufacturer.

## **DISCUSSION**

### **Environmental Benefits / Assessment**

Staff have undertaken considerable research in order to assess the environmental benefits and drawbacks of LED street lights related to wildlife, human sleep patterns, recycling, radio signal waves, and light output coverage/uniformity/property intrusion compared to existing high pressure sodium (HPS) lighting technology.

Staff have also hired a consultant to undertake a literature review of scientific papers investigating the effects of artificial light on wildlife, specifically addressing wildlife in the Pacific Northwest. The consultant will also consider our local context to recommend potential mitigation measures/strategies if issues with respect to wildlife are identified. Submission of their report is expected in early June.

To help address some concerns regarding wildlife and human sleep pattern impacts, the Engineering Department has specified a relatively warm colour temperature output of approximately 4,000 Kelvin (the same colour of light emitted by the moon on a clear night). This colour temperature avoids the blue-rich light that potentially disrupts wildlife and human sleeping/eating/exercising patterns. LED fixtures are also expected to be much less attractive to nocturnal insects compared to HPS lighting technology due to the lack of ultraviolet and infrared light spectrum emitted by LED lighting.

To further reduce human sleep pattern impacts, LED lighting is highly directional and can be distributed with better accuracy than HPS lighting technology. This improved distribution mitigates light trespass into private property and uplight (artificial sky glow) issues inherent to HPS lighting technology.

Unlike HPS lighting technology, LED fixtures do not contain difficult to recycle components (i.e., mercury, lead or hazardous chemicals and gases). LED fixtures are simpler to recycle, consume less electrical power when operating, and can be disposed of with minimal handling requirements.

To address potential interference with radio signal waves, the CSA specified that LED products must meet the FCC 47 CFR part 15 radio emission rules, thereby minimizing the potential of interference with radio signal waves.

The Engineering Department is reviewing the replacement of each individual existing HPS lighting fixture on a case by case basis. This process is intended to:

- Improve existing lighting where possible;
- Minimize potential for light intrusion to private property (i.e., house windows);
- Minimize uplight (artificial sky glow) and glare scenarios; and
- Meet current nationally published roadway lighting standards.

The Engineering Department is confident that this light replacement review will result in better control of light concentration, reduce glare, and improve light uniformity when compared to existing HPS lighting.

### **Product Procurement**

The prices for LED roadway lighting products have been established through the CSA, and purchasing product through the CSA has been endorsed by the City's Purchasing Section. A competitive process for purchasing product is not required, since identical product pricing is offered to all B.C. Hydro customers.

The products chosen for installation in the City were evaluated by an independent engineering consulting firm and were based on:

- Provincial CSA performance criteria;
- Eligibility as direct replacement for HPS lighting fixtures by the B.C. Ministry of Transportation and Infrastructure (*Recognized Products List* – published December 1, 2015);
- Number of available light distribution patterns and user selectable drive currents to meet varying roadway lighting needs;
- Country of origin/manufacture; and
- Purchase price.

Based on the above criteria, the Engineering Department will be installing LED lighting products manufactured by LED Roadway Lighting Ltd. and American Electric Lighting, a division of Acuity Brands Lighting Inc., sold through EECOL Electric Ltd.

These light fixtures include a standardized socket for the implementation of "smart" technology such as dimming, remote connectivity and Wi-Fi. The City is working with PowerTech Labs Inc. (a subsidiary of B.C. Hydro) and will be testing "smart" technologies for future application. In particular, the City plans to pilot Wi-Fi in Newton on 72 Avenue where the LED lights have already been installed.

The estimated quantities of product and related product procurement costs are detailed in Appendix "II". The total estimated product cost for the 2016 LED Roadway Lighting Upgrade Program is \$3,730,000.00, including GST and contingency. Within this total estimated cost, cost sharing available from B.C. Hydro is expected to be \$300,000.00. This results in a net funding requirement of \$3,430,000.00 for the product procurement component of the 2016 LED Roadway Lighting Program.

### **Labour Procurement**

The estimated 2016 contract value for HPS roadway lighting re-lamping activities is approximately \$250,000. As noted in Corporate Report No. R018;2016 approved by Council on February 1, 2016, the Engineering Department recommended eliminating the existing HPS lighting re-lamping program in the current electrical maintenance contract and replacing it with an LED roadway lighting upgrade program.

The City's electrical maintenance contractor, Cobra Electric Ltd., has agreed to replace the labour effort related to HPS roadway lighting re-lamping activities in the current electrical maintenance contract with LED lighting fixture installation activities. Based on revised unit pricing from Cobra Electric Ltd. for LED lighting fixture installation activities, the estimated cost to replace HPS roadway lighting re-lamping activities with LED lighting fixture installation activities is approximately \$320,000.00, including GST and contingency (approximately \$70,000.00 more than currently contracted HPS roadway lighting re-lamping activities). This results in a net funding requirement of \$70,000.00 for the labour component of the 2016 LED Roadway Lighting Program.

In addition, Cobra Electric Ltd. has agreed to take delivery of the LED products acquired by the City through the CSA, provide storage during the installation process and provide environmentally friendly disposal of HPS lighting fixtures at no additional cost.

### **IMPLEMENTATION**

Subject to Council approval, the LED products can be received from the distributor in June. Cobra Electric Ltd. is available to take delivery of the LED products at their facility and can begin installing product immediately after delivery and re-lamping complete by mid-December.

### **SUSTAINABILITY CONSIDERATIONS**

The adoption of LED roadway lighting will assist in achieving the objectives of the City's Sustainability Charter, more particularly the following action items:

- SC11: Public Safety and Security;
- EC3: Sustainable Infrastructure Maintenance and Replacement;
- EC5: Green Infrastructure & Sustainability Grants; and
- EN1: Energy Efficiency.

### **PROJECT FUNDING**

Funding for the 2016 LED Roadway Lighting Upgrade Program is available in the 2016 Roads and Transportation Budget.

## CONCLUSION

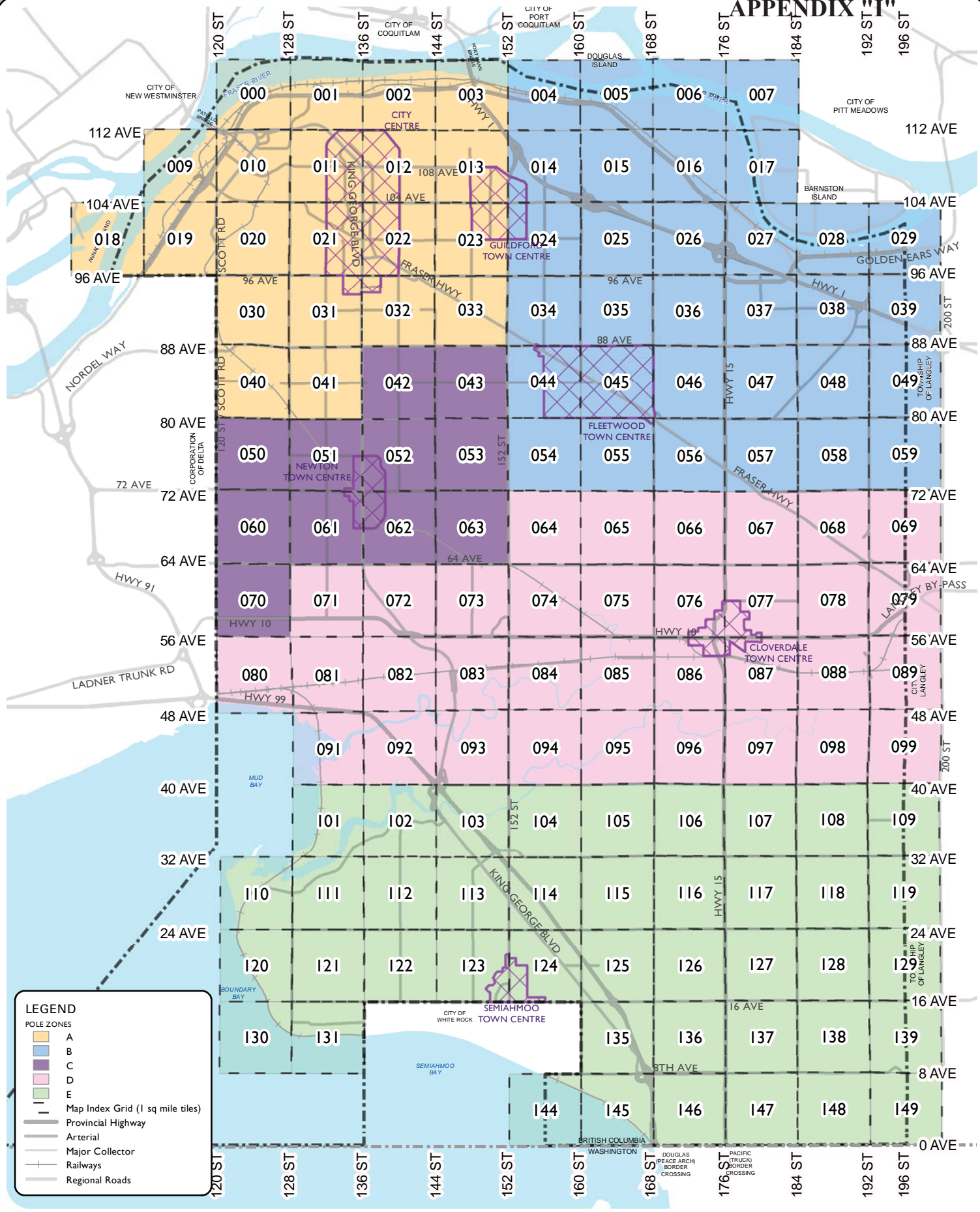
The Engineering Department recommends that Council:

- Receive this report for information regarding the significant benefits and environmental assessment of LED roadway lighting;
- Authorize the product purchase of approximately 6,189 Cobra head style LED roadway lighting fixtures from the Provincial Corporate Supply Arrangement (CSA) to replace existing street light fixtures within City Centre and re-lamp Zone B (see Appendix “I”);
  - That LED Roadway Lighting Ltd. be engaged with an upset limit in the amount of \$2,300,000.00, including GST/PST and contingency, for the supply of 5,001 LED fixtures; and
  - That EECOL Electric be engaged with an upset limit in the amount of \$760,000.00, including GST/PST and contingency, for the supply of 1,188 LED fixtures for intersections and other specific locations requiring brighter lighting levels;
- That LUMCA Inc. be engaged with an upset limit in the amount of \$670,000.00, including GST/PST and contingency, for the supply of 401 City Centre decorative LED fixtures; and
- That the City’s electrical maintenance contractor, Cobra Electric Ltd., be engaged for installation of the LED roadway lighting products in lieu of the contracted re-lamp program at an estimated cost of \$320,000.00, including GST and contingency.

Fraser Smith, P.Eng., MBA  
General Manager, Engineering

JB/SP/RKR/clr/ras

Appendix “I” – Map of Re-lamp Zones  
Appendix “II” - Estimated Product Procurement Cost for HPS Lighting Fixture Replacement in  
North Surrey and City Centre



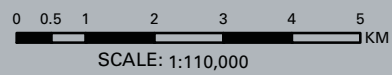
**LEGEND**

**POLE ZONES**

- A
- B
- C
- D
- E

- Map Index Grid (1 sq mile tiles)
- Provincial Highway
- Arterial
- Major Collector
- Railways
- Regional Roads

# RELAMP ZONES



The data provided is compiled from various sources and IS NOT warranted as to its accuracy or sufficiency by the City of Surrey. This information is provided for information and convenience purposes only. Lot sizes, legal descriptions and encumbrances must be confirmed at the Land Title Office. Source: G:\MAPPING\GIS\Maps\Recurring\trnPoles\_GIS\trnPoles\_RelampZones\_A.mxd Cartographer: em9 © City of Surrey Date: 21-Jan-2016



**APPENDIX “II”**

**Estimated Product Procurement Cost for HPS Lighting Fixture Replacement in North Surrey and City Centre**

<b>Vender/Supplier of Led Streetlight Fixture</b>	<b>Number of units to be replaced with LED lighting fixtures</b>	<b>Total Estimated LED Fixture Cost including GST/PST From CSA</b>
LED Roadway Lighting (LRL)	5,001	\$2,300,000.00
American Electric Lighting – EECOL Electric Ltd	1,188	\$760,000.00
LUMCA. -City Centre Specified Decorative Fixtures	401	\$670,000.00
<b>Total number of lighting fixtures to be replaced</b>	<b>6,590</b>	<b>Total estimated cost of product \$3,730,000.00</b>