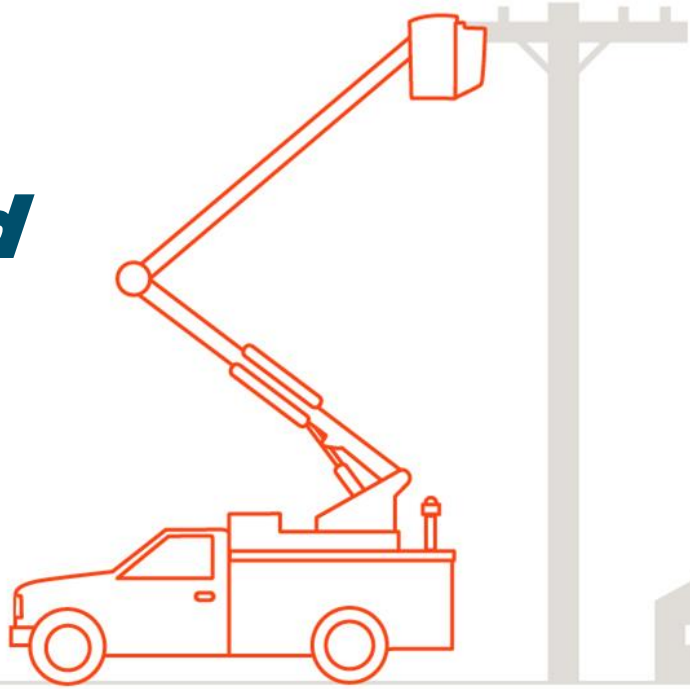
LED Street Light Program

Technical lighting and Installation overview



September 10th, 2020

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Agenda

- Introduction
- LED street light & specifications
- Customer lighting design considerations
- Installation overview
- Wrap-up

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Drivers for LED street light program

Proactive replacement of HPS fixtures to LEDs

- Compliance with Federal Environmental PCB Regulations

- Energy conservation
- Better quality lighting with fewer failures, resulting in improved public safety

- Meet customers' expectations for converting street lights to LEDs

- More efficient than replacing fixtures as HPS lights failed
- Improved coordination with customers

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LED Streetlights

- HPS v LED streetlights
- LED options
- Colour temperature
- Customer lighting design considerations

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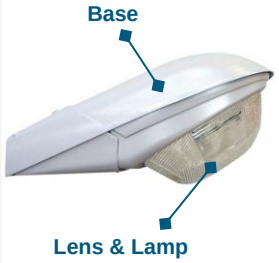
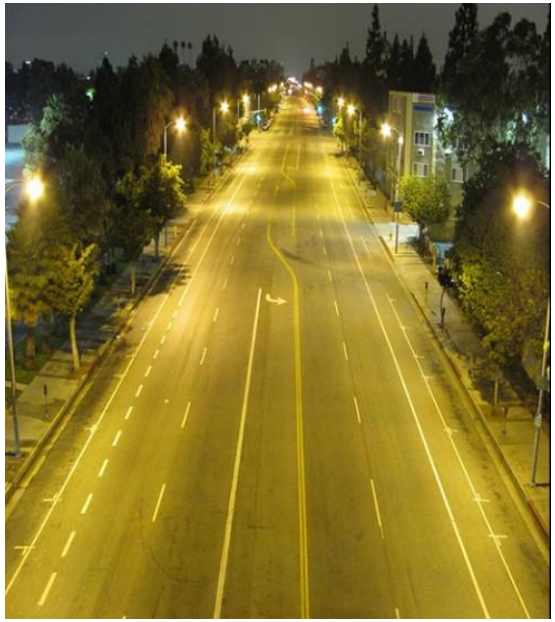
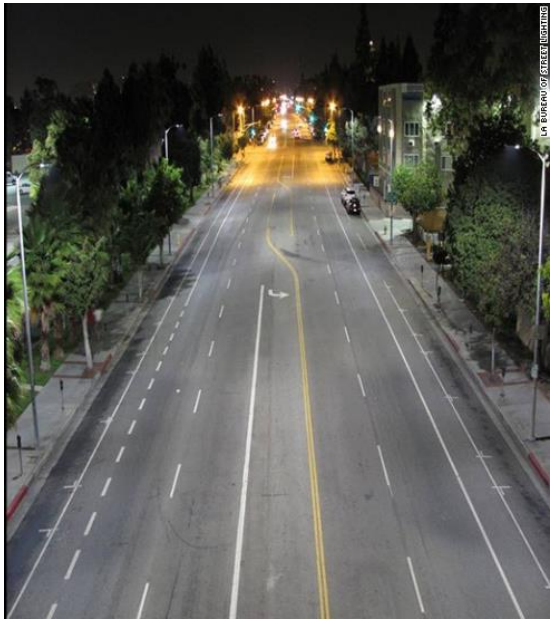
HPS v LED street lights

LEDs improve light quality, use less energy, and require less maintenance







Photocells

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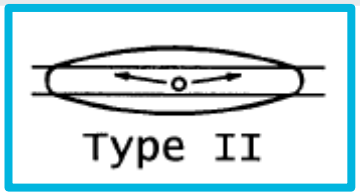
*HPS v LED street photo of Los Angeles from CNN.com

LED street light specifications

Manufacturer: LED Roadway Lighting

Model	LED Wattage	Equivalent Wattage HPS	Colour Temperature (CCT)	Light Distribution	Lumen Output
Lite-S	39W	100W Flat	3000K 4000K	Type II Max Throw	5,150 5,250
	75W	100W Drop	3000K 4000K	Type II Max Throw	7,700 8,500
Lite-M	114W	150W	3000K 4000K	Type II Max Throw	12,700 14,050
	162W	200W	3000K 4000K	Type II Max Throw	16,900 18,650

- .ies files are available for each light option



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Light distribution

How did BC Hydro select the light distributions?

1. Modelled the HPS luminaires to determine limits for:

- Longest pole spacing
- Width of roadway
- Back light and front light for sidewalks
- Intersections

2. Aligned these scenarios with the recommended lighting levels in IES RP-8.

3. Evaluated LED luminaires against existing HPS street lights.

What is colour temperature?

HPS 2300K	LED 3000K Warm	LED 4000K Cool
 	  	  

Customer lighting design considerations

Customers are responsible for their lighting design

- Street light levels and uniformity requirements differ from municipality to municipality
- BC Hydro offers street light service to customers only on existing poles that make up a part of our distribution system backbone
- Pole spacing may vary and may not be optimal for street lighting as such achieving light levels and uniformities may not be possible with street lights on BC Hydro poles alone

Lighting design considerations

What factors should be considered for the lighting design?

- Luminaire specification (lumen output, light distribution type)
- Constraints
- Light loss factors
- Installation parameters
- Industry recommended practice

Lighting design considerations

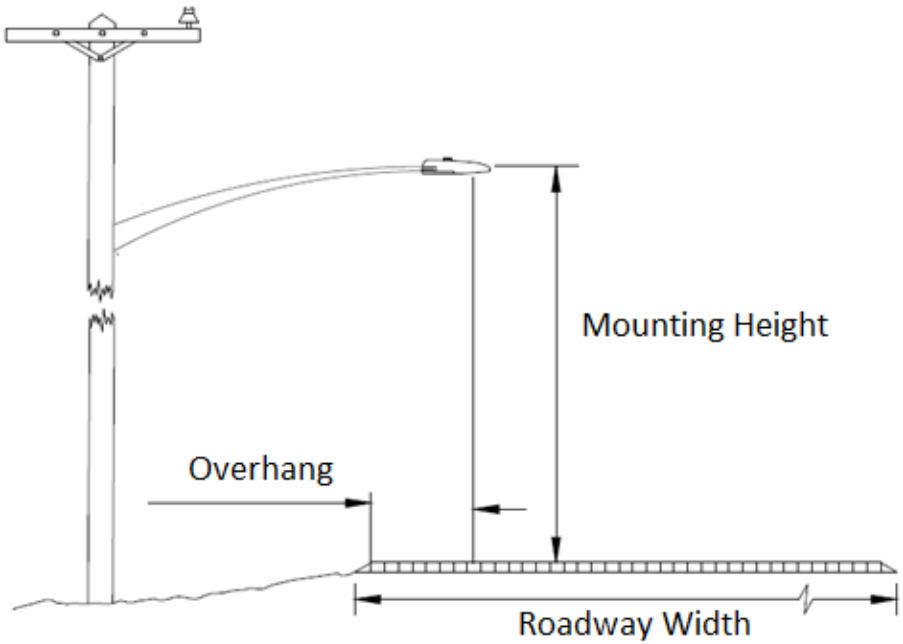
Light Loss Factors

- **Lamp lumen depreciation (LLD):**
  - BC Hydro requires a minimum depreciation factor of 0.8 at the end of life.
  - Actual LLD is between 0.88 – 0.95.
- **Luminaire dirt depreciation (LDD):**
  - Cleaning cycle
  - Location factors (pollution and air quality)
  - Luminaire design
  - IES RES-1-16 *Measure and Report Luminaire Dirt Depreciation (LDD) in LED Luminaires for Street and Roadway Lighting Applications* recommends depreciation of 3% per year for luminaires with individually molded acrylic optics. This results in a LDD factor of 0.70 (assume 10 year cleaning cycle).

Lighting design considerations

Installation Parameters

- Pole spacing
- Mounting height
- Roadway overhang
    - Mounting bracket
    - Pole setback



BC Hydro installation standards will be available on www.bchydro.com in Fall 2020.

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Lighting design considerations

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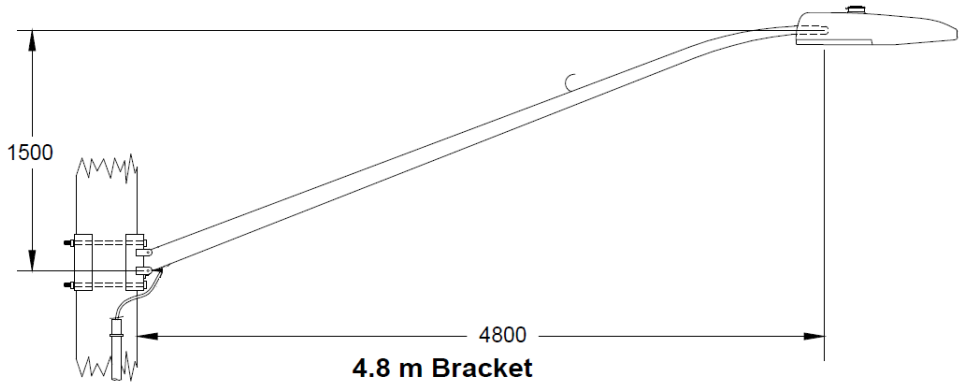

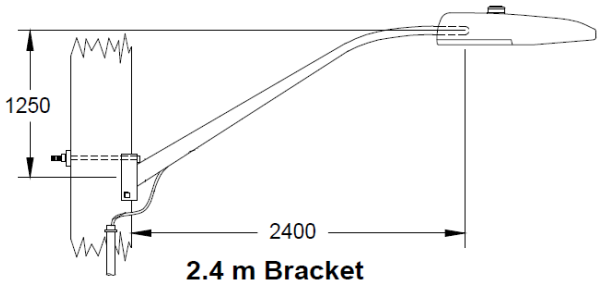

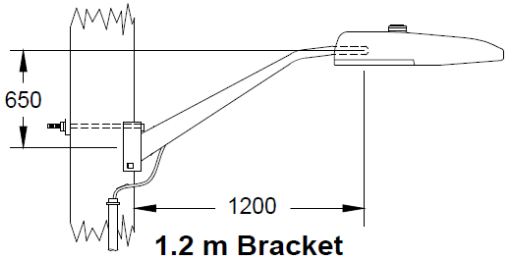

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Lighting design consideration

Industry Recommended Practice

The Illuminating Engineering Society (IES) publishes ANSI/IES RP-8 *Recommended Practice for Design and Maintenance of Roadway and Parking Facility Lighting.*

This recommended practice includes:

- Lighting fundamentals
- Lighting design criteria

Opportunity to add, remove or modify lights

Customers are able to request changes to streetlights through:

- Anytime via **SLIM**
- Street Light Program via the **Customers Selection file** (*detailed selections*)

*Standard design charges will apply

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Customer support

- Lighting Design Consultants - referrals available via BC Hydro's Alliance of Energy Professionals

- bchydro.com/streetlights

Program questions

- E. LightingSupport@BCHydro.com
- P. 1.833.828.2224 (toll-free) Monday to Friday from 8AM to 4PM

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Customer Street Light Selection

- Default versus detailed selection
- How to complete the Customer Detailed Selection excel file

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Default versus detailed selection

Default Selections	• Request already sent to all customers; requested back to BC Hydro by September 18th • *Temporarily* used for **SLIM repair requests** – to know what type of LED street light to use for failed HPS lights **starting in November 2020**
Detailed Selections	• Used for **SLIM repair requests** (*instead of default selection*) • Used for **conversion** of lights to LEDs • Capture street light data issues • Enter requests for the **addition** of new lights plus the **removal** or **modification** of **existing lights**

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LED detailed selection file

Pre-populate detailed selections via global selection table

High Pressure Sodium (HPS) to LED equivalent		
Current High Pressure Sodium Street Light Wattage	Your Requested LED Wattage	Your Requested Colour Temperature
100	75	Warm (3000K)
150	114	Warm (3000K)
200	162	Cool (4000K)

Update table

Select LED wattage and colour temp – via global selection and/or individually

See where the lights are on a map

Existing light info

System ID	Google Map Links	Longitude	Latitude	Pole ID	Type	Wattage	Arm Length (Metres)	LED Wattage	Colour Temperature	Issue Identified (Yes/No)
98510426	Google Map Link	-119.141102	50.53610306	2209046	High Press Sodium	100	4.8	75	Warm (3000K)	No
98510096	Google Map Link	-119.1369864	50.52984027	0089914	High Press Sodium	100	2.4	75	Warm (3000K)	No
98510066	Google Map Link	-119.1442359	50.53409956	2209227	High Press Sodium	100	4.8	75	Warm (3000K)	No
98511151	Google Map Link	-119.1273071	50.55413639	2103098	High Press Sodium	100	2.4	75	Warm (3000K)	No
98510291	Google Map Link	-119.1430938	50.53483097	0090182	High Press Sodium	100	4.8	75	Warm (3000K)	No
98510056	Google Map Link	-119.1455728	50.53261304	0089949	High Press Sodium	100	2.4	75	Warm (3000K)	No
98511176	Google Map Link	-119.1247851	50.55630004	2098001	High Press Sodium	100	2.4	75	Warm (3000K)	No
98510531	Google Map Link	-119.1389524	50.5373888	2561894	High Press Sodium	150	2.4	114	Warm (3000K)	No
98510526	Google Map Link	-119.1395043	50.53711648	2560055	High Press Sodium	100	1.2	75	Warm (3000K)	No

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LED Deployment Selection – File Walkthrough

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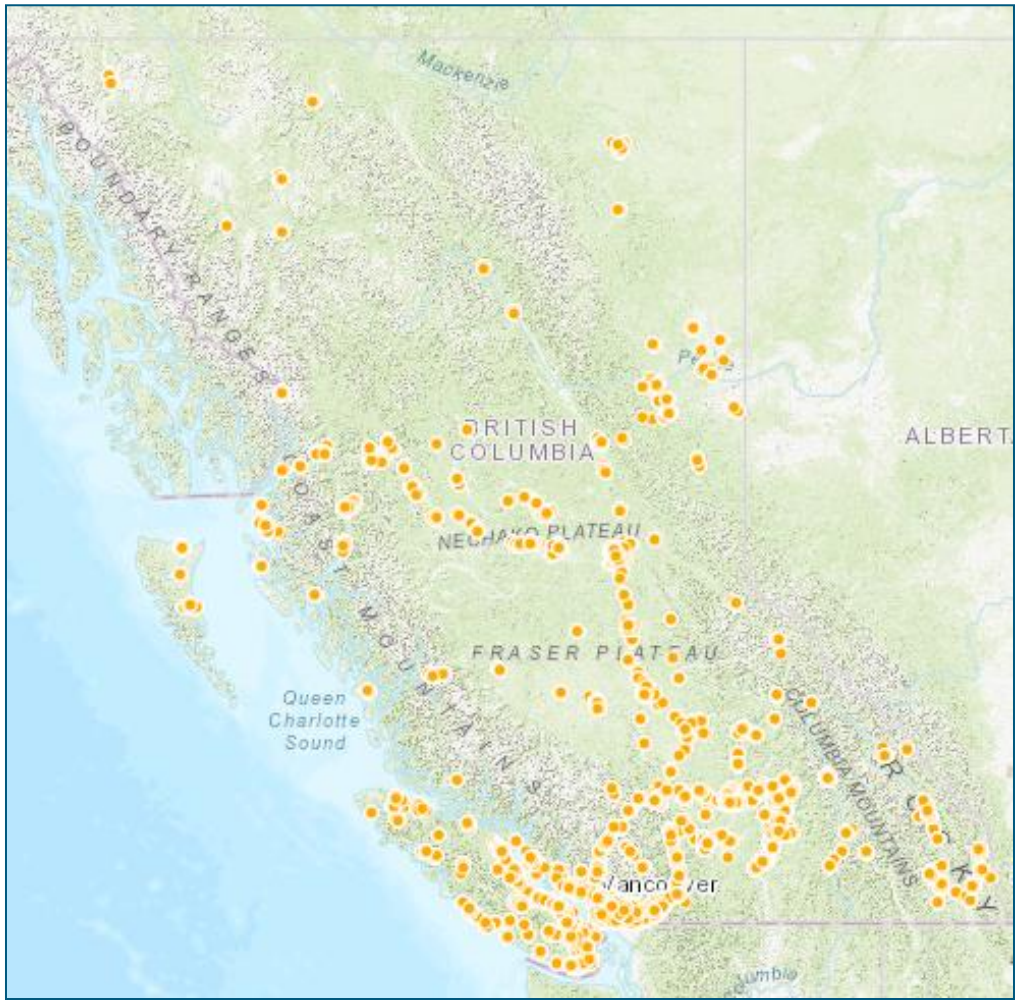
Installation Overview

- Installation statistics
- What does installation look like?
- Before installation
- After installation

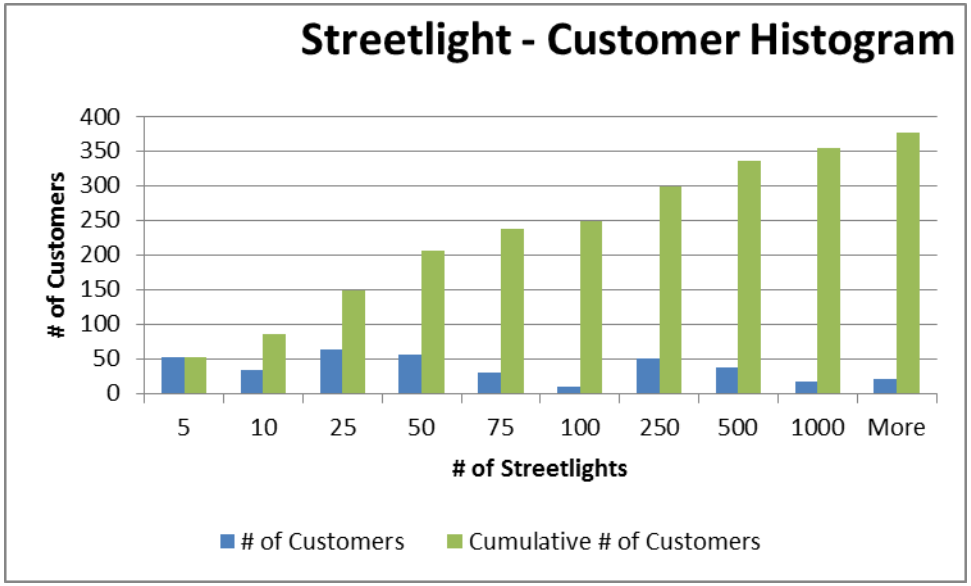


Installation statistics

- ~90,000 streetlights across the province

HPS Wattage	100W	150W	200W
# of Lights	~51,000	~35,000	~2,500

- 380+ customers including ~140 First Nations
- 40% of Customers have <25 lights
- 66% of Customers have <100 lights
- 6% of Customers have >1000 lights



Refining the installation schedule

Factors for managing an efficient and cost-effective roll-out:

- Installations starting in November 2020
- Target completion is June 2023

- **Dependency on receipt of detailed selection files from all customers within a geographical area**

- Multiple installation contractors (3 or more) + Internal BC Hydro crews working concurrently in multiple regions / areas

- Seasonality, specifically for the Interior locations
- Density of lights affecting the number of installations per day / week

Before installation

- Installation will start only after customer detailed LED selections are received
- Planned installation dates will be communicated in advance
- Traffic Control will be arranged
- Highway Use Permit will be obtained where required
- Field crew will be fully trained
- First Nation considerations identified

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Installation process

- The crew will have 2-3 workers, including qualified electrical resources, bucket truck and supporting vehicles for materials and traffic management
- The traffic control -- per Ministry of Transportation, Highway and local regulations -- to ensure safety of public and installation crews

- The crews will be moving from pole to pole to convert lights to LED
- Each light will takes about 20-30 minutes to complete
- Crew will complete ~10-20 streetlights per day
- Installation will be coordinated around events & road closures
- Management of installation exceptions

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After installation

- Removed material will be recycled / properly disposed of
- Customers will receive letters confirming installations are complete

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Support for customers

- Media kits for communicating with general public?
- Handling and supporting general public inquiries?
- Anything missing or additional considerations?

Program support

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