

**CITY OF WHITEHORSE SERVICING STANDARDS MANUAL
PART 2 – DESIGN CRITERIA
SECTION 2.10 – STREET LIGHTING**

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SECTION 2.10 – STREET LIGHTING

2.10.1 DEFINITIONS

Luminance:	The measurement of the amount of light emitting, passing through or reflected from a particular surface from a solid angle. The SI unit for luminance is candela per square meter (cd/m ²).
Candela:	The SI unit of luminous intensity.
Illuminance:	The measurement of the amount of light falling onto (illuminating) and spreading over a given surface area. The SI unit for illuminance is lux (lx). The non-SI unit for illuminance is foot-candle (fc).
Lumens:	The SI unit of luminous flux.
Unit Power Density (UPD):	The ratio of the connected power for a roadway lighting system to the corresponding area of the roadway. UPD describes the amount of connected electrical power required by the lighting system.

2.10.2 LIGHTING PLACEMENT AND DISTRIBUTION

All new road and walkway lighting within the City of Whitehorse is to be designed appropriately for the intended use, in accordance with these standards, all City bylaws and policies, and in accordance with the current edition of the Transportation Association of Canada (TAC) Guide for Design of Roadway Lighting.

Lighting is required for all urban Arterial, Collector, and Local roadways. All lighting designs are to address current design principles and to:

- Include lighting only where required;
- Avoid over lighting and design lighting for optimum illuminance (lux) for most lighting applications or luminance (cd/m²) for roadways;
- Consider luminaire placement and spacing along streets and roadways to achieve optimal contrast and uniformity;
- Reduce light pollution by minimizing light trespass and controlling glare; and
- Restrict lighting installation in natural areas.
- Consider low Unit Power Density (UPD) values for all lighting installations where practical.

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2.10.3 DESIGN BRIEF

All lighting designs submitted to the City of Whitehorse are to include a design brief consisting of:

- A brief synopsis of the lighting design;
- Reasoning for any deviations from City of Whitehorse design criteria;
- Reasoning for any deviations from TAC Guide for Roadway Lighting;
- Photometric analysis of lighting design indicating luminaire layout and lighting levels.
- When requested, warranting system calculations from the TAC Guide for Roadway Design as it applies to roadways, intersections, roundabouts and mid-block pedestrian crossings.

The warranting for roadway lighting is to be carried out by the road designer, and can be requested at the City's discretion.

Lighting designs are to follow recommendations in the most recent publication of the TAC Guide for Design of Roadway Lighting.

2.10.4 LUMINAIRES AND POLES

In all instances, luminaire and pole selection is to fit the context of the design and meet all requirements of this Section.

Decorative light fixtures are to be considered in areas deemed high pedestrian traffic areas and important commercial areas.

Shielded cobra-head light fixtures are to be provided for all other street and roadway lighting applications.

Roadway lighting poles are to be designed to achieve optimal contrast and uniformity. The height of poles are to be consistent along corridor installations.

All new luminaires to be LED type and to meet the following criteria:

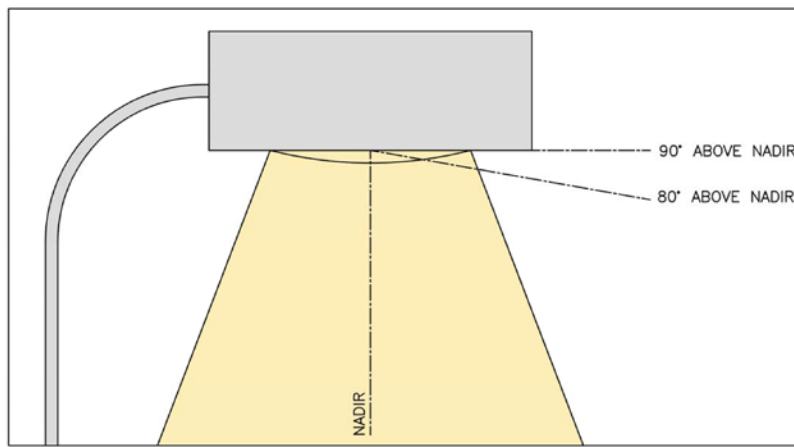
- Color Correlated Temperature (CCT) is not to exceed 3000K;
- Installed hardware to accommodate possible future retrofit to adaptive lighting system;
- Vertical spill light levels to follow the Transportation Association of Canada (TAC) Guide for the Design of Roadway Lighting; and
- Where possible, with exception to sports lights and flood lights, luminaire fixtures are to have the lowest Backlight, Uplight and Glare (BUG) Rating practical for outdoor luminaires:
 - B2-UI-G2 (or G1, if possible) for urban areas
 - B3-U0-G4 for highways and arterial roads

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- B2-U0-G1 for rural areas.

All luminaires are to be installed flat and are to incorporate shielding. Shielding is to be Full Cut-off in accordance with The Illuminating Engineering Society of North America (IESNA) classifications as defined below:

- **Full Cut-off:** The luminous intensity (in candelas) at or above an angle of 90° above nadir is zero, and the luminous intensity (in candelas) at or above a vertical angle of 80° above nadir does not numerically exceed 10% of the luminous flux (in lumens) of the lamp or lamps in the luminaire.



ANGLES REFERENCED BY IESNA
CUTOFF CLASSIFICATIONS

2.10.5 LUMINAIRE REPLACEMENT

Before a neighborhood level luminaire replacement program occurs, a design brief is to be submitted for review and approval.

All existing high pressure sodium luminaires to be replaced with LED luminaires, when the asset is scheduled for replacement.