

Preservation of Our Night Sky

The Town of Mississippi Mills is proud to be a leader in the preservation of our night sky.

The Town of Mississippi Mills recognizes that the night sky is a precious natural resource that needs protection. The quality of our night sky is vastly superior to that found in most areas of the province. It is a defining element of rural, small town character that is under threat and in many respects is no different than our farmland and our wetlands. It requires action in order to preserve the quality of the night sky that we enjoy.

The Town is home to the Fred Lossing Observatory located at the Mill of Kintail Conservation Area. This observatory is maintained and operated by the Royal Astronomical Society of Canada and was built by the scientific community with high-quality optics from the National Research Council of Canada. The high quality of the night sky available at the observatory has led to the discovery of five comets, the most by any observatory in Canada.

Direct light upwards not only erodes the quality of our night sky, it also wastes up to 30% of the energy of the lighting product, creates glare and a traffic hazard, wastes money and creates a health hazard for all of us. Recognizing this, in 2003 the Town of Mississippi Mills passed a by-law to preserve the quality of our night sky by requiring new exterior lighting to meet a 'full cut-off' standard.

Please see our Good Neighbour Lighting Brochure for helpful suggestions and products which can ensure you do your part in protecting the quality of our night sky.

THE CORPORATION OF THE TOWN OF MISSISSIPPI MILLS

BY-LAW NO. 03 – 62

BEING a By-law to Regulate Outdoor Illumination and Control Light Pollution to ensure responsible lighting, light pollution abatement and the conservation of the night sky environment.

WHEREAS Section 129 of the Municipal Act 2001, S.O. 2001 c.25 provides municipalities with the authority to prohibit and regulate with respect to noise, vibration, odour, dust, and outdoor illumination, including indoor lighting that can be seen outdoors.

AND WHEREAS the Council of the Corporation of the Town of Mississippi Mills deems it desirable to enact a by-law respecting the regulation and control of outdoor illumination, and control light trespass, as well as to ensure the continued astronomical importance of the Fred Lossing Observatory, located at the Mill of Kintail;

AND WHEREAS properly designed light fixtures do not emit undesirable illuminating light rays into the night sky and thus protect the night-time environment;

NOW THEREFORE the Council of the Corporation of the Town of Mississippi Mills enacts as follows:

SECTION 1: DEFINITIONS

For the purposes of this By-Law, terms used shall be defined as follows:

Direct Light means light emitted directly from the lamp, off the reflector or luminaire.

Fixture means the assembly that houses the lamp or lamps and can include all or some of the following parts: a housing, a mounting bracket or pole socket.

Flood or Spot light means any light fixture or lamp that incorporates a reflector or a refractor to concentrate the light output into a directed beam in a particular direction.

Footcandle means a measure of luminance per unit area used in IESNA standard measurements i.e. one footcandle (fc) equates to one lumen per square foot.

Full-Cut-Off Fixture means a luminaire or light fixture that; by design of the housing, does not allow any light dispersion or direct glare to shine above a horizontal plane from the base of the fixture where light is emitted and must be installed in a horizontal position as designed. These fixtures produce no glare or stray light due to the exposure of the bulb light source because the source is recessed or shielded.

Glare means light emitting from a luminaire with an intensity great enough to reduce a viewer's ability to see, and in extreme cases causing momentary blindness.

Grandfathered Luminaires means luminaires not conforming to this code that were in effect prior to the passage of this by-law.

Height of Luminaire means the height of a luminaire as calculated by the vertical distance from the ground directly below the centerline of the luminaire to the lowest direct-light-emitting part of the luminaire.

IESNA means the Illumination Engineers Society of North America, which is the standards committee for responsible outdoor lighting. This is an organization that recommends lighting levels and lighting fixtures.

Indirect Light means direct light that has been reflected or has scattered off other surfaces.

Lamp means the component of a luminaire that produces the actual light.

Light Trespass means the shining of light produced by a luminaire beyond the boundaries of the property on which it is located.

Lumen means a unit of luminous flux equal to the light emitted in a unit solid angle by a uniform point source.

Luminaire means a complete lighting system, including a lamp or lamps and a fixture.

Outdoor Light Fixtures means outdoor artificial illuminating devices, installed or portable, used for flood lighting, general illumination or advertisement.

Pole Spacing Ratio means the ratio of the inter-pole distance per effective height of lamp on the pole.

Sharp-Cut-Off Fixture means the same as Full-Cut-Off Fixture.

Town means the Corporation of the Town of Mississippi Mills.

Uniformity Ratio of Lighting means the average level of illumination in relation to the lowest level of illumination for a given area.

WallPack Light Fixture means flood light fixtures on exterior walls of buildings

SECTION 2: REGULATIONS

2.1 General Regulation

Any person who installs outdoor lighting within the boundaries of the Town shall do so in conformity with the requirements of this By-Law. If conflicts arise regarding control and maintenance of outdoor lighting, this By-Law shall be the governing document.

2.2 Luminaire Design Factors For Outdoor Areas

Any person installing an outdoor lighting fixture shall be required to use completely shielded Full-Cut-Off fixtures, as identified in Appendix I attached hereto and forming part of this by-law. Outdoor lighting fixtures shall include, but are not limited to, lights for: buildings and structures, including canopies and overhangs; recreational areas; parking lot lighting; landscape lighting; billboards and signs; public and private street lighting; display and service area lighting; public and private walkway lighting; rural barn lights; residential yard lights; and outdoor lighting for all residential, commercial, industrial, institutional and provincial and federal government uses not otherwise specified.

2.2.1 Municipal Street Lights and Residential Areas

The Town shall strive to maintain outdoor street lights that have the following:

1. Uniform light levels within the urban area that do not exceed uniformity ratios recommended by the IESNA
2. Minimum light used for safety that does not exceed IESNA recommendations.
3. Full-Cut-Off fixtures examples of which are identified in Appendix I
4. The recommended values for average surface illumination and uniformity ratios for illuminated areas as identified in Table I of Appendix I.

2.3 Street Lighting Design

All new municipal outdoor street lighting must be Full-Cut-Off Fixtures installed in accordance with IESNA standards. Any existing grandfathered partially cut-off street lighting shall be replaced by Sharp-Cut-Off fixtures when lamp replacement is required. The lamp wattage design requirements for both new and grandfathered street lighting shall be as follows:

- a) 70 W for Residential
- b) 100 W for Intersections
- c) 100-200 W for major thoroughfares
- d) 200 W for pole spacing ration of greater than 5:1
- e) Pole spacing ratio not to exceed IESNA luminance and uniformity factors
- f) Pole spacing ratio assumes values 3:1 to 10:1 based on usage (traffic, residential, etc)

2.4 Structural Illumination

2.4.1 All new wall-mounted commercial lighting shall be Full-Cut-Off fixtures.

- 2.4.2 All existing grandfathered wall-mounted lights shall be encouraged to adhere to the requirements of Section 2.2. Property owners whose structures are furnished with unshielded wall-packs shall be encouraged to shield such fixtures.
- 2.4.3 All architectural lighting and building accent lighting shall be mounted such that the accent light is aimed down. There shall be no glare emanating from the fixture in accordance with fully shielded design.
- 2.4.4 The use of low wattage lights for decoration purposes such as Christmas lighting and property ornamentation shall be exempt from Section 2.4.3.

2.5 Property Illumination

All artificial lighting for yards and parking areas shall be arranged so as to eliminate light trespass. Light trespass may be reported to the Mississippi Mills Outdoor Illumination Committee for problem resolution.

2.6 Provisions For Shielding Exterior Lighting to reduce Light Trespass

Applications may be made to the Mississippi Mills Outdoor Illumination Committee to obtain advice for proper shielding in the form of visors, rotational adjustments, etc. to street lighting that cause light trespass. Examples are provided in Appendix I.

2.7 Lighting Of Outdoor Advertising Signs

The Town's Sign By-law No. 02-98 Section 5.2 shall regulate the lighting of outdoor advertising signs.

2.8 Recreational Facilities

- 2.8.1 Any light source permitted by this By-law may be used for lighting of outdoor public or private recreational facilities, such as, but not limited to, football fields, soccer fields, baseball fields, softball fields, tennis courts, or show areas, provided all of the following conditions are met:
- a. All fixtures used for event lighting shall be Full-Cut-Off Fixtures, or be designed or provided with sharp cut-off capability by a shielding retrofit, so as to minimize up-light, spill-light, and glare.
 - b. A facility's lighting shall be turned off when not in use.
 - c. Owners of grandfathered lighting fixtures at outdoor recreational facilities are encouraged to install shielding fixtures when maintenance and replacement occurs.

2.9 Prohibitions

2.9.1 Laser Source Light

The use of laser source light or any similar high intensity light for outdoor advertising or entertainment purposes is prohibited.

2.9.2 Searchlights

The operation of searchlights for advertising or entertainment purposes is prohibited.

2.9.3 Outdoor Advertising Off-Site Signs

Electrical illumination of outdoor advertising off-site signs along roadways is prohibited after business hours.

2.10 Request For Exemption For Temporary Events

Any person may submit a written request on a form prepared by the Outdoor Illumination Committee for a temporary exemption to the requirements imposed by this By-law.

The request for lighting exemption for temporary events shall contain the following information:

- a. Specific exemption requested (i.e. searchlights)
- b. Type and use of exterior light involved
- c. Date of the event
- d. Duration of time for requested exemption
- e. Proposed location of exterior light
- f. Physical size of exterior light

2.11 Grandfathering of Nonconforming Luminaires

2.11.1 All luminaires and luminous advertising signs lawfully in place prior to the date of passing of the By-law shall be grandfathered. Any luminaire that replaces, modifies, or moves a grandfathered luminaire shall be required to meet the provisions of this By-law.

2.11.2 Existing luminaires which are determined by the Outdoor Illumination Committee to direct light toward streets or parking lots and cause glare to motorists or cyclists and therefore deemed to be a public safety concern, shall be either shielded or re-directed within 90 days of notification to the owner.

2.12 Establishment of the Mississippi Mills Outdoor Illumination Committee

The maintenance of this By-law shall be the responsibility of a committee known as the Mississippi Mills Outdoor Illumination Committee. The Committee's responsibility is to help enforce this By-law in both new and existing developments by:

- a. providing consultation on outdoor and building lighting design
- b. providing outdoor lighting problem resolution (light trespass and light pollution)
- c. conducting standards research and area investigation
- d. examining submissions for new lighting developments

2.13 Conservation Of Night Sky Environment Near The Fred Lossing Observatory (FLO)

Due to the light sensitive nature of the astronomical operation of the Fred Lossing Observatory, zoned protection shall be implemented appropriate to the existing and planned land use within four (4) kilometers of this site. Any new development within four (4) kilometres of FLO must comply with the provisions as outlined in Table 2 of Appendix 1, attached hereto and forming part of this By-law and provide documentation indicating the types and number of fixtures to be installed. Existing luminaries shall be compliant within five (5) years from the date of adoption of this provision and shall not be grandfathered. The Outdoor Illumination Committee shall address and resolve problems with unshielded illumination in this area.

SECTION 3: NEW DEVELOPMENT INVOLVING OUTDOOR LIGHTING

3.1 Submission Contents

The applicant for a permit required by this By-law involving outdoor lighting fixtures shall submit to the Outdoor Illumination Committee as part of the application for permit, evidence that the proposed work will comply with this By-law. The submission shall contain, but shall not necessarily be limited to, the following:

- a. Plans indicating the location of lighting on the premises, and the type of illuminating devices, fixtures, lamps, supports, reflectors, and other devices;
- b. Description of the illuminating devices, fixtures, lamps, supports, reflectors, and other devices and the description may include, but is not limited to, catalogue cuts by manufacturers and drawings (including sections where required);
- c. Photometric data, such as that furnished by manufacturers, or similar documentation showing the angle of cut off or light emissions.

The above required plans, descriptions and data shall be sufficiently complete to enable the Mississippi Mills Outdoor Illumination Committee to readily determine compliance with the provisions of this By-law. If the information is deemed to comply with the provisions of the By-law, a permit will be issued by the Outdoor Illumination Committee. If such plans, descriptions and data are not sufficient to allow the Outdoor Illumination Committee to determine compliance by reason of the nature or configuration of the devices, fixtures, or lamps proposed, the applicant shall consult with the Mississippi Mills Outdoor Illumination Committee to find an acceptable solution.

3.2 Lamp or Fixture Substitution

Should it be necessary for any outdoor light fixture, or the light source therein to be changed after the permit has been issued, a change request must be submitted to the Chief Building Official and forwarded to the Outdoor Illumination Committee for approval, together with adequate information to enable the Outdoor Illumination Committee to ensure the provisions of this By-law are met, prior to implementing the installation.

SECTION 4: OFFENCES AND PENALTIES

- 4.1 Whenever the By-law Enforcement Officer, after inspecting lighting including portable lighting, finds such lighting to be in violation of the provisions of this By-law, he/she shall notify the owner of the property and the owner of the sign in writing by registered mail, or by causing a notice to be delivered personally to such owner(s) requiring them to repair, alter, change, or remove such lighting within ten (10) days from the receipt of such notice.
- 4.2 Where the repair, alteration change or removal of lighting is a matter of extreme urgency so as to be a danger to the public, or motorists or any other situation deemed to be dangerous, the By-law Enforcement Officer may give notice verbally and may reduce the period within which, in his/her sole discretion, is adequate, taking into account the circumstances at the time the notice is given.
- 4.3 Where removal is required, the notice as provided for in Sections 4.1 and 4.2. above shall terminate any existing permit.
- 4.4 Refusal by the owner to comply with Section 4.1 or 4.2 will allow the Town to remove the offending lighting at the expense of the owner and the expenses incurred may be recovered in like manner as municipal taxes.
- 4.5 Every person who contravenes any provisions of this By-law is guilty of an offence and on conviction is liable to a fine as provided in the Provincial Offences Act, Chapter P.33, R.S.O. 1990 as amended.

SECTION 5: SEVERABILITY

Should any part, section, subsection or portion of this By-law be repealed or declared by a court of competent jurisdiction to be illegal, the same shall not affect the validity of the By-law as a whole or in part thereof, except for that which was declared to be invalid.

SECTION 6: EFFECTIVE DATE

This By-Law shall take effect upon the date of passing thereof.

READ a first time this 9th day of September, 2003.

READ a second time this 9th day of September, 2003.

READ a third time, passed, signed and sealed in open Council this 9th day of September, 2003.

F.R. (Ron) Pettem, Mayor

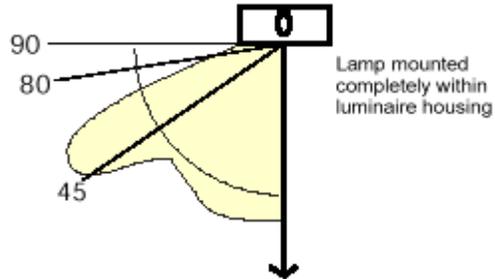
Cynthia Halcrow, Clerk

APPENDIX 1 TO BY-LAW NO. 03-62

Full or Sharp Cut Off Definition

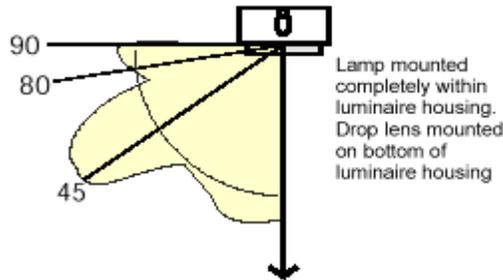
IES Full - Cut-Off Flat Lens

To comply with IES. Cut-off criteria. No greater than ten percent of the maximum lumen output shall eighty degrees from the luminaire.



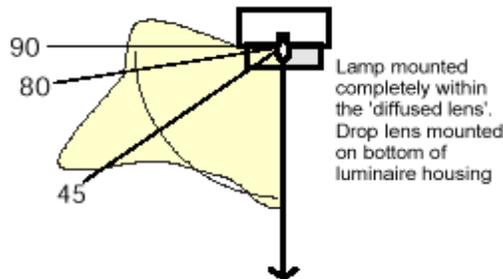
Semi Cut-Off Drop Diffused Lens

Luminaires Containing lens refractors that 'drop' below the luminaire will produce significant glare and light output above eighty degrees.



Semi Cut-Off Drop Diffused Lens

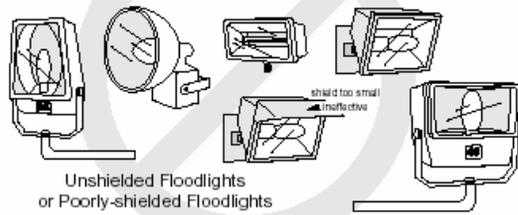
Luminaires Containing lens refractors that 'drop' below the luminaire will produce significant glare and light output above ninety degrees.



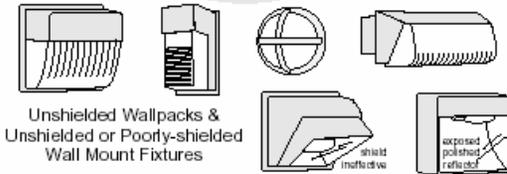
Examples of Acceptable / Unacceptable Lighting Fixtures

Unacceptable / Discouraged

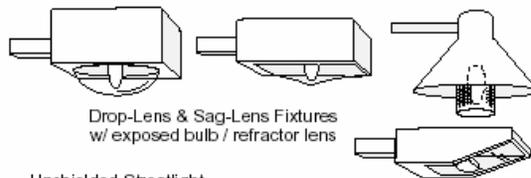
Fixtures that produce glare and light trespass



Unshielded Floodlights or Poorly-shielded Floodlights



Unshielded Wallpacks & Unshielded or Poorly-shielded Wall Mount Fixtures

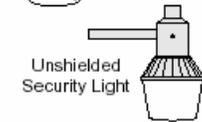


Drop-Lens & Sag-Lens Fixtures w/ exposed bulb / refractor lens

Unshielded Streetlight



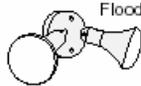
Unshielded Security Light



Unshielded 'Period' Style Fixtures



Unshielded PAR Floodlights

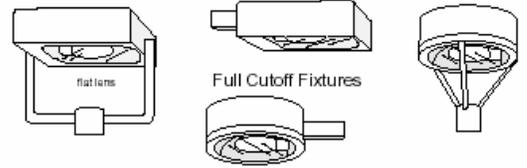


Drop-Lens Canopy Fixtures



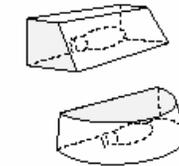
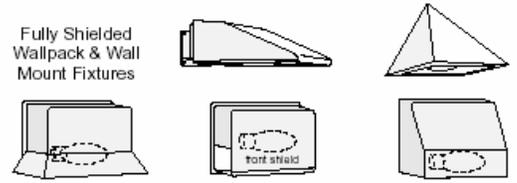
Acceptable

Fixtures that shield the light source to minimize glare and light trespass and to facilitate better vision at night



Flat Lens Full Cutoff Fixtures

Fully Shielded Wallpack & Wall Mount Fixtures

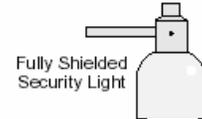


Fully Shielded Fixtures

Full Cutoff Streetlight



Fully Shielded Security Light



Fully Shielded 'Period' Style Fixtures

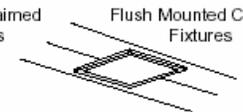


bulb shielded in opaque top

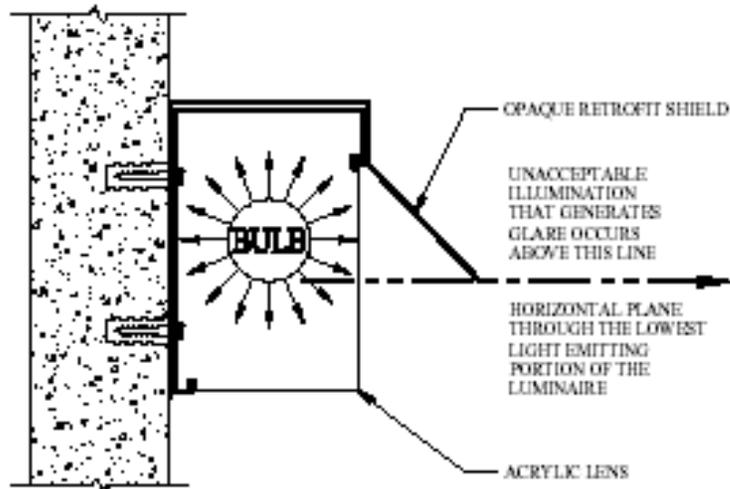
Shielded / Properly-aimed PAR Floodlights



Flush Mounted Canopy Fixtures



SHIELDING SOLUTIONS FOR EXISTING FIXTURES



**TYPICAL WALLPACK LUMINAIRE
USING OPAQUE SHIELD RETROFIT**

Figure 1

Shielding Solution for existing Street lamp – Kanata Ontario - 2003



The following sources of illumination have been rated by preferential order for outdoor use:

| | |
|---------------------------------------|-----------------|
| Low Pressure Sodium (LPS) | 1 - Recommended |
| High Pressure Sodium (HPS) | 2 - Acceptable |
| Other High Intensity Discharge Lights | 3 |
| Incandescent | 4 |
| Fluorescent | 5 |
| Quartz Halogen lights | 6 |

Notes:

HID sources include mercury vapor, metal halide, high-pressure sodium and low-pressure sodium. The benefits of HID sources are their high efficacy in lumens per watt and long lamp life (20,000 hours). HID is also a point source, which provides the opportunity for better light control. Light can be better directed where it is needed.

Most lamps on the market today can be categorized into three groups: high intensity discharge (HID), incandescent and fluorescent.

1. Low Pressure Sodium (LPS) is HID. It is good because the monochromatic yellow light emitted can be filtered out at the telescope. It is also the single most efficient light source (30% more efficient than HPS).
2. High Pressure Sodium (HPS) also HID, is used in the standard street light luminaire – accepted when fixture is a Full-Cut-Off Fixture
3. Other HID lights (Metal Halide, Mercury Vapour) can be classified as accepted only if properly shielded. Certain applications requiring whiter light use these sources. These should be in totally enclosed luminaires.
4. Incandescent lights are accepted if fully shielded. It should be noted that warm white natural lights are usually preferred over fluorescent lights. Note also that for outdoor applications, these are less efficient than HPS or LPS .Incandescent is a spectral continuum of light, and therefore cannot be filtered
5. Fluorescent light – normally incandescent is preferred for the warmer white light and is accepted if shielded.
6. Quartz Halogen lights are normally used in security applications. They are high power flood lamps and produce significant radiation both in the visible and non-visible spectrum. They are not recommended. They should be replaced by properly shielded HID (High Intensity Discharge) lights.

APPENDIX 1**TABLE 1**

The following IESNA standards have been adapted for outdoor lighting and light levels in Mississippi Mills. These values serve as design guidelines when considering development of new outdoor lighting as well as standard criteria when measuring existing areas of outdoor illumination.

| Roadway Lighting | Average Maintained Illuminance (fc) | Uniformity Ratio |
|-------------------------|-------------------------------------|------------------|
| Major Road | 0.6 – 1.6 | 3:1 |
| Collector Road | 0.4 – 1.1 | 4:1 |
| Local Road | 0.3 – 0.8 | 6:1 |

| Public Spaces and Usage Levels | Horizontal Illuminance (fc) | Uniformity Ratio |
|--|-----------------------------|------------------|
| Community Shopping Centres Cultural, Civic or Recreational Events Office Parking Airports, Commuter Lots, etc. Residential Complex Parking Hospital Parking | 0.6 – 2.4 | 4:1 |
| Neighbourhood Shopping Industrial Employee Parking Educational Facilities Churches | 0.2 – 0.8 | 4:1 |

TABLE 2**Outdoor Illumination Control for Fred Lossing Observatory (FLO)**

Table 2 details unshielded or inappropriate outdoor lighting sources which shall not be permitted within four (4) kilometers of the FLO site.

| Lighting Requirements | Within 4km radius of FLO | Beyond 4km radius of FLO |
|------------------------------|---------------------------------|---------------------------------|
| Illuminated Signs | Prohibited | Permitted |
| NON-Full Cutoff Cobra | Prohibited | Permitted |
| Pole Spacing Ratio < 10 | Prohibited | Permitted |