

**TOWN OF FAIRFAX
STAFF REPORT
Department of Planning and Building Services**

TO: Fairfax Town Council
FROM: Jim Moore, Director of Planning and Building Services
DATE: February 6, 2013
SUBJECT: Discussion/Consideration of a request from a citizen for the Town Council to consider the adoption of a Light Pollution Ordinance

RECOMMENDATION

The Town Council may take any of the following actions on this proposal:

1. Direct staff to prepare a draft Ordinance for consideration by the Town Council at a future meeting, date to be determined, for inclusion in the Town Code.
2. Direct staff to prepare a Resolution of Intention, per Town Code § 17.004.030, for adoption at the March 6, 2013 Town Council meeting directing staff to prepare an ordinance for circulation and consideration by the Fairfax Planning Commission and then the Town Council for inclusion in the Zoning Ordinance.
3. Continue the matter off calendar for future discussion at a meeting date to be determined.
4. Deny the request for preparation and consideration of a Light Pollution Ordinance.

BACKGROUND

Sophia Lahey, a Fairfax resident and a member of the junior class at Drake High School, has been researching this matter and is requesting that the Town Council adopt such an ordinance [**Exhibit A** – Letter received 1/28/13 (this is similar to a request previously received by Town Council in an undated letter)].

At the October 3, 2012 Town Council meeting during the public comments period Sophia Lahey requested to be put on a Town Council agenda to further present her advocacy for regulating outdoor light pollution in the Town of Fairfax. Subsequent to the October 3rd Town Council meeting, on January 17th staff met with Sophia Lahey and Councilperson Weinsoff to discuss this matter further. As a result of that meeting, Councilperson Weinsoff requested that staff place this item on the next Town Council agenda and prepare a short report.

DISCUSSION

The Town of Fairfax does not currently have an ordinance that regulates outdoor lighting: Though the Planning Commission, on occasion, regulates outdoor lighting for residential and commercial properties as part of its “conditions of approval” as appropriate.

Certain communities in California and across America are adopting Ordinances to limit the light pollution being created by development citing its impacts on wildlife, human health and increased energy usage. Such an Ordinance can be placed in either the Zoning Ordinance or the Town Code should the Town Council vote to consider such an ordinance.

Larger towns with extensive industrial and commercial zones treat light pollution as a zoning issue with more restrictive regulations in residential areas because of distinct separation between the two different types of development.

A Light Pollution Ordinance could be placed somewhere in the Zoning Ordinance. Staff is not of the opinion that this is the appropriate place for such an ordinance because of the small size of the Town and the fact that we have residences in most of our commercially zoned areas.

Staff recommends that if the Council chooses to go forward with considering such an ordinance, it be placed in the general Health and Safety section of the Town Code, Chapter 8, Health and Safety (in which case it is not required to go before the Planning Commission since it would not be in the Zoning Ordinance section of the Town Code).

ATTACHMENTS

Exhibit A – Letter from Sophia Lahey, received January 28, 2013

Exhibit B - Village of Homer Glen Ordinance and Model Lighting Ordinance (International Dark-sky Association)

Note: This is a formal request to be properly agenized for the February agenda

Dear:

My name is Sophia Lahey. I live in Fairfax and I'm a junior at Sir Francis Drake High School. I'm writing this letter explaining my goals and sending it to the entire Fairfax Town Council. I hope you will support my efforts to propose a light pollution control ordinance in our town. At the October Town Council meeting I made a request to be on the agenda to present to the Council during a coming Town Council meeting. To date I have not been on the agenda for either the November and December meetings. I've followed up with emails to the Town Clerk but no information was provided as to why my request to be on the agenda hasn't yet been honored. I'm not sure how the process works but perhaps you can help with this.

As an astronomy enthusiast, I became aware of the serious problem of light pollution and its negative effects. What is light pollution? Simply put light pollution is the glow in the sky caused by artificial lighting. Most of this artificial lighting is unnecessary and inefficiently used. It seemed to me that education and government ordinances outlining the uses of public lighting are the best ways to change peoples understanding and use of exterior night lighting. I was surprised to learn that despite its obvious and widespread effects most people – even people dedicated to environmental issues – don't know much about light pollution and don't seem to be that concerned about it.

I've learned that light pollution disrupts ecosystems including a wide range of animal behaviors, such as mating, migration, and feeding. Birds, bats, insects, amphibians, and even turtles have evolved critical biological functions that depend on natural darkness. Studies show many of these creatures are being adversely affected by light pollution. Human beings are also affected by light pollution. It interrupts circadian rhythms and melatonin production essential for good health and has been linked to cancer production in humans. In December 2010 the National oceanic Atmospheric Administration released a study linking sky glow with air pollution. Data showed that artificial light at night can inhibit the breakdown of air particulates. And, light pollution wastes energy! The International Dark Sky Association estimates over 2 BILLION dollars is wasted in the US each year on energy consumed by stray light. So it seems logical that the nocturnal environment is an essential part of a healthy planet and should be promoted as such. Enclosed please find a brochure I created summarizing this information.

I propose the Fairfax Town Council consider a lighting ordinance similar to the plan adopted by the town of Homer Glen, Illinois. See this link for the sample ordinance <http://www.homerglenil.org/Ordinances/OR11-018LightingOrdinanceAmends10-038.pdf>. Homer Glen was approved as an International Dark Sky Community by the International Dark Sky Association. Fairfax has been a leader in sustainable issues in the past so a light pollution control resolution and/or ordinance seems like a great match for our town. I am hoping for advice and support from you. I hope to briefly present this information at a Town Council meeting in the near future. I hope to hear from you soon!

Regards,

Sophia Lahey laheysp@comcast.net

Save our Night Sky

40 Willow Avenue, Fairfax CA 415-458-2822

TOWN OF FAIRFAX

JAN 28 2013

RECEIVED

EXHIBIT # A

**THE VILLAGE OF HOMER GLEN,
WILL COUNTY, ILLINOIS**

**ORDINANCE
NUMBER 11-018**

**AN ORDINANCE AMENDING ORDINANCE
NUMBER 10-038 ENTITLED OUTDOOR
LIGHTING IN THE VILLAGE OF HOMER GLEN**

**JAMES P. DALEY, Village President
Gale Skrobuton, Village Clerk**

**MICHAEL COSTA
MARCIA DEVIVO
TEDD KAGIANAS
MARY NIEMIEC
MARGARET SABO
GEORGE YUKICH**

Trustees

AN ORDINANCE AMENDING ORDINANCE NUMBER -07-068 ENTITLED
OUTDOOR LIGHTING IN THE VILLAGE OF HOMER GLEN

WHEREAS, the Village of Homer Glen, Will County, Illinois (the "Village") is a home rule municipality pursuant to Section 6(a), Article VII of the 1970 Constitution of the State of Illinois, and as such may exercise any power and perform any function pertaining to its government and affairs (the "Home Rule Powers"); and

WHEREAS, the safety and welfare of pedestrians, cyclists, and motorists depend upon the reduction of glare and the establishment of consistent and well-defined levels of lighting; and

WHEREAS, the Village Board has determined that certain amendments to Ordinance 10-038 are now required in order to make compliance with certain standards of the Ordinance more practicable; and

WHEREAS, proper direction and use of light will minimize energy wasted on unnecessary and indiscriminate illumination; and

WHEREAS, the corporate authorities recognize the night sky as a natural resource; and

WHEREAS, the corporate authorities and the Homer Glen Green Vision recognize the need to preserve rural character, aesthetic value, and the unique quality of life of Homer Glen residents by preserving and enhancing the ability to view the night sky; and

WHEREAS, the corporate authorities and the Village of Homer Glen Comprehensive Plan recognize the need to define limits and protect residents and business owners from the trespass of excessive and misdirected light from adjacent properties; and

WHEREAS, establishing a predetermined standard for outdoor illumination will provide residents, business owners, and developers with a clear set of guidelines by which to follow; and

WHEREAS, a clear set of guidelines for outdoor lighting will eliminate the need for commercial establishments to compete for visual attention by escalating outdoor lighting levels; and

WHEREAS, the corporate authorities wish to promote sound environmental policies which will benefit residents and serve as a positive example to surrounding communities; and

WHEREAS, excessive illumination can have a detrimental effect to wildlife that depend on the natural cycle of day and night for survival.

NOW, THEREFORE, BE IT ORDAINED BY THE PRESIDENT AND VILLAGE BOARD OF TRUSTEES OF THE VILLAGE OF HOMER GLEN, WILL COUNTY, ILLINOIS, BY AND THROUGH ITS HOME RULE POWERS, THAT:

1.0 APPLICABILITY

All zoning lots in all existing zoning districts and in all zoning districts that maybe created after the effective date of this ordinance shall comply with the provisions of this ordinance unless specifically exempted herein.

For clarity and organization, references are made within this ordinance to Residential Lighting Zones, Commercial Lighting Zones, and Industrial Lighting Zones. These lighting zones are defined in Section 8 of this ordinance.

2.0 CONFORMANCE

2.1 Compliance Deadline for All Non Conforming Uses

Any existing luminaire or lighting installation used for outdoor lighting in any zoning district that does not presently comply with the requirements of this Ordinance will be considered a non-conforming use. Except as setforth in sections 2.2 and 2.3, such nonconforming uses must comply with the requirements of this ordinance or must be removed on or before November 10, 2018.

2.2 Criteria Requiring Compliance with Certain Sections or Removal

Any non-conforming luminaire or light installation existing on any zoning lot must comply with the requirements of sections 3.2, 3.3, 3.4, 3.5, 4.1, 5.0, 6.0 and 7.1 or must be removed within 30 days if any of the following criteria are met:

1. The height or location of the luminaire is changed; or
2. The luminaire is changed or replaced (excluding routine maintenance and bulb replacement of equal light output) except if it is part of a parking lot lighting installation consisting of an array of 3 or more identical luminaires and poles or supporting structures; or
3. The supporting structure for the luminaire is changed or replaced except if it is part of a parking-lot lighting installation consisting of an array of 3 or more identical luminaires and poles or supporting structures; or
4. The use of the luminaire is resumed after a period of abandonment of more than 180 days. A written request for an extension of this 180 day time period may be granted by the Village Board for a period not to exceed an additional 180 days.
5. The luminaire is producing glare that is deemed by the Village to create a hazard or nuisance.

2.3 Criteria Requiring Full Compliance or Complete Removal

In the event any of the following criteria are met:

1. A cumulative total of twenty-five percent (25%) or more of the non-conforming luminaires or their supporting structures are changed, replaced (excluding routine maintenance and bulb replacement of equal light output), or relocated; or
2. A "Principal Structure" (as defined in the Village of Homer Glen Zoning Ordinance) on said zoning lot is expanded by an amount equal to or greater than

25% of the total square footage of the structure immediately prior to such expansion; or

3. There is a change in zoning of said zoning lot.

3.0 ILLUMINATION STANDARDS

3.1 GROSS EMISSION OF LIGHT

Commercial and Industrial Lighting Zones

The total light output from all luminaires used for outdoor lighting on any zoning lot in a commercial lighting zone, except for street lighting, outdoor display lots, lighting installations for non-internally illuminated signage not exceeding 800 lumens, and outdoor lighting of playing fields on public property, shall not exceed 100,000 lumens per net acre. Lighting installations located under canopies shall only contribute fifty percent (50%) toward this limit. For the purpose of this ordinance the lamp lumen output is defined as the initial lumen rating declared by the manufacturer, which consist of the lumen rating of a lamp at the end of 100 hours of operation.

Exemptions

1. Lighting for outdoor athletic fields, courts or tracks and outdoor display lots shall be exempt from the lumen per acre limits of Section 3.1.

3.2 LIGHT INTENSITY AND UNIFORMITY

3.2.1 Commercial and Industrial Lighting Zones

During permitted hours of operation as defined within this Ordinance, outdoor lighting on any zoning lot in a commercial or industrial lighting zone shall meet the following requirements for light level as measured in the plane of the illuminated surface:

1. The maximum to minimum light level ratio shall not exceed 15:1.
2. Automobile service-station pumping areas shall be required to meet a minimum standard of 10 footcandles and not exceed a maximum of 30 footcandles.
3. Drive-in and drive-through canopies shall not exceed a maximum of 15 footcandles.

3.2.2 Outdoor Dynamic Display

The luminance for any outdoor dynamic display shall not exceed 5000 Nits during daylight hours or 150 Nits at all other times. Brightness must be measured from the brightest element of the sign's face. The applicant shall provide written certification from the sign manufacturer that the light intensity has been factory pre-set so that it will not exceed the luminance levels for day and night.

3.3 LIGHT DIRECTION & CONTROL

Residential, Commercial, and Industrial Lighting Zones

Any luminaire which is used for uplighting on any zoning lot in a residential, commercial, or industrial lighting zone shall have the necessary shielding and/or beam-angle control and/or

shall be aimed to substantially confine the directed light to the object intending to be illuminated. Uplighting shall only be permitted for landscape lighting, architectural lighting, flag lighting, and lighting of ground-mounted signs that are not internally illuminated. Uplighting applications shall meet the following requirements:

Uplighting Application	Maximum Inclination	Maximum Light Output
Landscape Lighting	60°	1100 lumens [†] (up to 45°) 800 lumens ^{††} (up to 60°)
Architectural Lighting	45°	1100 lumens [†]
Flag Lighting*	60°	1100 lumens [†] (up to 45°) 800 lumens ^{††} (up to 60°)
Sign Lighting **	45°	1100 lumens [†]

* The tradition of lowering flags at sunset is encouraged to avoid the need for lighting.

** Ground-mounted, non-internally-illuminated signs only.

† Typical 75W incandescent bulb or 50W low-voltage halogen landscape bulb.

†† Typical 60W incandescent bulb or 35W low-voltage halogen landscape bulb.

Residential Lighting Zones

Any luminaire with a light output exceeding 1100 lumens which is used for outdoor lighting on any zoning lot in a residential lighting zone shall have the necessary shielding and/or beam-angle control and/or shall be aimed so that the direction of all directly emitted light is at or below horizontal. If a motion-activated sensor that illuminates the luminaire for no more than 5 minutes upon activation is used, however, said luminaire may have a light output of up to 2200 lumens.

Any luminaire with a light output exceeding 2200 lumens which is used for outdoor lighting on any zoning lot in a residential lighting zone shall have the necessary shielding and/or beam-angle control and/or shall be aimed so that the light source is not visible along any property line, as viewed at a height of 60 inches above grade.

Commercial or Industrial Lighting Zones

Except as otherwise stated herein, any luminaire on any zoning lot in a commercial or industrial lighting zone which emits light directed at a building, sign, billboard, or other outdoor feature shall be located at or above the top of said object and aimed and controlled so that the direction of all emitted light is at or below horizontal and the directed light is substantially confined to the object intending to be illuminated.

3.4 LIGHT TRESPASS

Except for street lighting, light emitted from outdoor lighting on any zoning lot shall not cause the light level along any property line, as measured at a height of 60 inches above grade in a plane at any angle of inclination, to exceed the following limits:

Emitting Zoning Lot	Impacted Zoning Lot	Maximum Light Level
Residential Lighting Zone	Residential Lighting Zone	0.1 footcandles
Residential Lighting Zone	Commercial/Industrial Lighting Zone	0.5 footcandles
Commercial/Industrial Lighting Zone	Residential Lighting Zone	0.1 footcandles
Commercial/Industrial Lighting Zone	Commercial/Industrial Lighting Zone	0.5 footcandles

Any property used for governmental, recreational and public purposes shall not exceed 0.1 footcandles at all property lines.

3.5 PERMITTED HOURS FOR OUTDOOR LIGHTING

Commercial and Industrial Lighting Zones

Except for street lighting, outdoor lighting (including, but not limited to, parking lot, area, architectural, landscape, etc.) on any zoning lot in a commercial or industrial lighting zone is permitted to be lighted between one-half hour before sunset and 10:00 p.m. or 1 hour after the close of business based on normal hours of operation of the business, whichever is later. Thereafter, for safety and security purposes, security lighting is permissible at a total light output not greater than 25% of the total light output from all outdoor lighting located on the zoning lot during permitted outdoor lighting hours. During security lighting hours, no luminaire may exceed its light output exhibited during permitted outdoor lighting hours.

Property Used for Governmental & Public Purposes

Any zoning lot in any zoning district used for governmental or public purposes, except for street lighting, shall comply with the permitted hours and security lighting limitations for commercial lighting zones. In addition, outdoor lighting of the playing field of an organized sporting event on public property that is in progress at the close of permitted outdoor lighting hours shall be allowed to remain illuminated until 30 minutes after the conclusion of the event but no later than 11:00 p.m. No outdoor lighting of the playing field for any sport or recreational purpose shall be initiated after 10:00 p.m.

4.0 LUMINAIRE STANDARDS

4.1 FULL-CUTOFF REQUIREMENT

Commercial and Industrial Lighting Zones

Except for uplighting applications permitted within this ordinance, any luminaire used for outdoor lighting in a commercial or industrial lighting zone shall be a full-cutoff luminaire and shall be installed in the proper orientation to achieve full-cutoff performance with respect to a horizontal plane.

Street Lighting

Any luminaire used for street lighting shall be a full-cutoff 70 watt high pressure sodium (HPS) luminaire and shall be installed in the proper orientation to achieve full-cutoff performance with respect to a horizontal plane at intersections only. Said luminaire, as well as any poles, brackets, supports, and mounting hardware shall comply with current Village design standards.

4.2 INSTALLED HEIGHT

The installed height of any luminaire used for outdoor lighting on any zoning lot, except for street lighting, shall not exceed the following limits:

Zoning Lot	Maximum Installed Height*
Residential Lighting Zone	20 ft
Commercial/Industrial Lighting Zone	25 ft

* A maximum installed height of 50 ft shall be permitted for lighting of playing fields on public property.

5.0 PROHIBITED OUTDOOR LIGHTING

The following outdoor lighting applications are prohibited in all zoning districts:

1. The use of laser light source;
2. The use of flickering, flashing, blinking, scrolling, or rotating lights and any illumination that changes intensity;
3. The use of upward directed lighting, except as otherwise permitted herein;
4. Architectural lighting of any portion of a building or structure with a polished or glass exterior surface that uses uplighting;
5. The use of searchlights;
6. The use of neon light to accent buildings or architectural features;
7. The use of Mercury vapor light source except for existing uses in A-1 or A-2 zoning districts used for "Agriculture" as defined in the Village of Homer Glen Zoning Ordinance;
8. The use of light sources above 3300 degree Kelvin for new lighting installations; except for playing fields, outdoor display lots; and
9. Any luminaire creating glare that is deemed by the Village to create a hazard or nuisance.

6.0 EXEMPT OUTDOOR LIGHTING

The following outdoor lighting applications are exempt from all requirements of this ordinance:

1. Underwater lighting used for the illumination of swimming pools and fountains;
2. Lighting required by county, state, or federal law;
3. Temporary lighting used for holiday decoration;
4. Decorative yard lighting characterized by a flame source;
5. Portable lighting temporarily used for maintenance or repair that is not deemed by the Village to create a hazard or nuisance;
6. Emergency lighting used by police, firefighting, emergency management, or medical personnel at their discretion as long as the emergency exists;
7. Lighting approved by the Village for temporary events such as carnivals, circuses, festivals, picnics, fairs, civic events, and exhibitions; and
8. Temporary lighting required for road construction or other public improvements.

7.0 PROCEDURAL REQUIREMENTS

7.1 PLAN SUBMISSION

For subdivision and land-development applications where outdoor lighting is required or proposed, lighting plans shall be submitted to the Village for review and approval and shall include:

1. A site plan complete with all structures, parking spaces, building entrances, traffic areas (both vehicular and pedestrian), vegetation that might interfere with lighting, and all adjacent uses. The site plan shall show, by location, and identify each existing and proposed luminaire and shall specify its installed height, pole foundation details, and mounting methods;
2. Iso-footcandle plots for individual lighting installations, or 10' x 10' illuminance-grid plots for multi-fixture lighting installations, which demonstrate compliance with all applicable requirements set forth within this Ordinance. The plots shall indicate the location of each existing and proposed luminaire, the installed height of said luminaires, and the overall light levels in foot candles on the entire zoning lot and at the property lines;
3. A summary table identifying the maximum and minimum light levels for all parking areas, entryways, signs, and walkways.
4. A description of each luminaire identified in the site plan including the manufacturer, model number, a photograph or catalog cut, photometric data verifying any compliance requirements specified within this ordinance, light output in initial lumens, shielding or glare reduction devices, lamp type, and on/off control devices.

7.2 POST-APPROVAL ALTERATIONS

Post-approval alterations to lighting plans or intended substitutions for approved lighting equipment shall be submitted to the Village for review and approval, with all plan submission requirements set forth within this Ordinance, prior to installation.

7.3 RIGHT OF INSPECTION

The Village shall have the right to conduct a post-installation inspection to verify compliance with the requirements of this Ordinance and, if appropriate, to require remedial action at the expense of the applicant.

7.4 ADMINISTRATIVE VARIANCE

The Community Development Director or Village Board designee may grant administrative variances only in cases where it is demonstrated that unusual practical difficulties exist on the subject property; therefore, making the full requirements of this Ordinance impractical to implement fully. An administrative variance shall not exceed five percent (5%) of the overall site lighting level requirements. An administrative variance shall not be available or applicable for the following Outdoor Lighting Ordinance requirements:

1. The type of lighting fixtures used;

2. The light trespass requirements;
3. The full cutoff requirement;
4. The installed height of a fixture;
5. An after-the-fact variance request or to correct a zoning violation.

The applicant shall demonstrate with an administrative variance application and supporting evidence that the strict application of the regulations of this ordinance would produce undue hardship on the applicant and subject property.

8.0 DEFINITIONS

ABANDONMENT: Discontinuance in the usage of a lighting installation, or portion thereof, with no intention to resume the usage of such lighting. A lighting installation or portion thereof, that has not been operated for a period of 180 days or longer, shall be considered to be abandoned.

ADMINISTRATIVE VARIANCE: An administrative dispensation, reviewed and approved by the Community Development Director or Village Board designee, permitted on individual parcels or property as a method of alleviating unnecessary hardship by allowing a reasonable use of the building, structure or property, which, because of unusual or unique circumstances or the regulating standards of other regulating agencies, is denied by the terms of this Ordinance.

ARCHITECTURAL LIGHTING: Outdoor lighting directed at buildings, facades, structures, monuments, and other architectural features.

AUTOMOBILE SERVICE STATION (GAS STATION): Any building or premises used for dispensing or offering for sale automotive fluids or oils, having pumps and underground storage tanks; also, where battery, tire, and other similar services are rendered, but only if rendered wholly within a building. Automobile service stations shall not include the sales or storage (new or used) of automobiles, trailers, or other vehicles. Automobile service stations may include mini-marts as a Special Use.

AUTOMOBILE SERVICE STATION PUMPING AREA: The drivable surface of an automobile service station, in the immediate vicinity of a fuel pump, where vehicles are parked during fueling.

BILLBOARD: A surface whereon advertising matter is set in view conspicuously and which advertising does not apply to premises or any use of premises wherein it is displayed or posted.

CANOPY: A roofed structure that is open on at least three sides and typically provides protection from the sun or weather that is associated with the sale of commercial goods or services.

COMMERCIAL LIGHTING ZONE: Any zoning lot in any zoning district that does not have as its primary use a single-family residential dwelling, a two-family residential

dwelling, land used for "Agriculture," or land used for "Industrial" as defined in the Village of Homer Glen Zoning Ordinance.

DIRECTIONALLY SHIELDED: A luminaire which uses shielding, lenses, or other means to provide a distinct focused beam of emitted light.

FOOTCANDLE: A unit of measure of luminous flux.

FULL-CUTOFF LUMINAIRE: A luminaire having a light distribution (excluding not more than 0.5% incidental uplight from poles, mounting brackets, and other supporting structures), as determined by photometric test and certified by the manufacturer, such that no light is emitted at or above an angle of 90° above nadir in any direction and the luminous flux emitted in the band between 80° and 90° above nadir in all directions is no more than 10% of the total luminous flux for the luminaire.

GLARE: A visual disturbance produced by a distinct light source within the visual field that is sufficiently brighter than the level to which the eyes are adapted.

HID LIGHTING: A high-intensity discharge family of lighting that includes high-pressure sodium, fluorescent, mercury vapor, and metal halide type bulbs.

IESNA: Illumination Engineering Society of North America.

ILLUMINANCE: The amount of luminous flux falling onto a unit of surface area, correlating to the perception of brightness by the human eye. Illuminance is typically measured in lumens per square foot (footcandles) or lumens per square meter (lux).

INDUSTRIAL LIGHTING ZONE: A lighting area on any zoning lot in an Industrial zoning district that is used typically relating to, concerning or arising from the manufacturing, assembling, fabrication, finishing, packaging, processing of goods.

INSTALLED HEIGHT: The height above grade of the lowest point on an installed luminaire.

INTERNALLY ILLUMINATED SIGN: A sign illuminated by a light source internal to the sign enclosure which is not directly visible externally. For the purposes of this ordinance, a neon-light sign is considered an internally illuminated sign.

KELVIN: A unit increment of temperature and is used as a color temperature scale of a light bulb (symbol "K"),

LAMP: The source of light being emitted from a luminaire, such as a bulb.

LANDSCAPE LIGHTING: Outdoor lighting directed at trees, shrubs, plants, flower beds, fountains, gardens, and other natural or landscaped features.

LIGHT: Electromagnetic radiation within a range of wavelengths sufficient for visual perception by the normal unaided human eye.

LIGHT LEVEL: The illuminance as measured in accordance with the practices contained in the IESNA Lighting Handbook, Eight Edition.

LIGHT OUTPUT: Luminous Flux (see definition for Luminous Flux).

LIGHTING INSTALLATION: An arrangement of one or more luminaires including any mounting hardware, brackets, and supporting structures.

LUMEN: A unit of measure of luminous flux. For the purposes of this ordinance, "lumens" denotes initial lumens for HID lighting applications.

LUMINAIRE: An individual lighting assembly including the lamp and any housings, reflectors, globes, lenses, shields or other components designed to block or distribute light. For the purposes of this ordinance, an internally illuminated sign is not considered a luminaire.

LUMINANCE: A measure of the brightness of a surface which is emitting light. The unit of measurement most commonly used is candelas per square meter, often referred to as nits in the USA (1 nit = 1 cd/m²). The nocturnal appearance and environmental effect of objects such as internally lit signs may be analyzed both by total light output (lumens) and by their surface brightness (nits).

LUMINANCE METER (or nit gun): A special instrument that directly measures luminance.

LUMINOUS FLUX: The power emitted from a source of electromagnetic radiation, such as a light bulb, in the form of visible light. Luminous flux is measured in lumens (or lux) and is typically specified by the manufacturer for a given lamp or luminaire. Typical luminous flux values for incandescent bulbs are 100W: 1550 lumens, 75W: 1080 lumens, 60W: 780 lumens, and 40W: 450 lumens.

MOTION-ACTIVATED SENSOR: A sensor which causes a luminaire to become illuminated automatically upon the presence of motion or infrared radiation or a combination thereof within its field of view.

NADIR: The direction pointing directly downward from the light source of the luminaire that originates from a horizontal plane at the lowest point on the luminaire.

NEON LIGHT: Brightly colored light generated by using electric current to excite a gas or gas mixture (including neon, argon, helium, or other gases) typically contained in a tube which can be bent into various forms for use as decoration or signs. For the purposes of this ordinance, fluorescent tubes are not considered neon light.

NET ACREAGE: "Net Acreage" as defined in the Village of Homer Glen Zoning Ordinance.

NIT(s): A unit of measure of luminance (see luminance).

OUTDOOR DISPLAY LOT: An outdoor area whose primary function is the sale of displayed merchandise, often requiring accurate color perception by customers.

ORGANIZED SPORTING EVENT: A prearranged sports or recreational event involving at least one group or team with a published roster and schedule.

OUTDOOR LIGHTING: Light generated from an indoor or outdoor source that provides illumination to a surface, building, sign, structure, device, or other outdoor feature which is visible to an observer located outdoors. For the purposes of this ordinance, the light source inside an internally illuminated sign is not considered outdoor lighting.

PLAYING FIELD: An open outdoor field or court used for playing sports such as baseball, soccer, football, tennis, skate park, volleyball, and basketball.

PUBLIC PARKING AREA: A drivable surface intended for use by the general public for parking of motorized vehicles.

RESIDENTIAL LIGHTING ZONE: Any zoning lot in a residential or agricultural zoning district that has as its primary use a single-family residential dwelling or a two-family residential dwelling, as defined in the Village of Homer Glen Zoning Ordinance.

SEARCHLIGHT: A lighting installation designed to project a high-intensity beam of approximately parallel rays of light that is typically used to sweep the sky for promotional purposes.

STREET LIGHTING: One or more luminaires or light installations designed to illuminate a public roadway or intersection.

UPLIGHTING: Lighting applications which direct light above a horizontal plane.

VARIANCE: A dispensation permitted on individual parcels or property as a method of alleviating unnecessary hardship by allowing a reasonable use of the building, structure or property, which, because of unusual or unique circumstances, is denied by the terms of this Ordinance.

VISIBLE LIGHT: See "Light"

ZONING LOT: "Zoning Lot" as defined in the Village of Homer Glen Zoning Ordinance.

ZONING OFFICER: The individual appointed by the Village President, by and with the consent of the Village Board, to administer and enforce the Zoning Ordinance of the Village.

APPEALS FOR VARIATIONS

Request for variation from the requirements of this Ordinance may be initiated by written application which seeks to vary the provisions of this Ordinance. The application requesting a variation shall be accompanied by a fee equal to the fee charged for a zoning variation and

shall be submitted to the Plan Commission for initial consideration. The Application shall indicate the specific provisions of this Ordinance which the applicant seeks to vary. The Plan Commission will schedule a public hearing concerning the Application. The public hearing will be conducted in accordance with the notice and hearing requirements of Village of the Homer Glen Zoning Ordinance as they pertain to and concern public hearings for variations. The Plan Commission may also establish appropriate procedures and filing requirements for the applicants requesting variations to follow. After the Plan Commission conducts the public hearing it shall make a written, recommendation to the Village Board concerning the requested variation. Without further public hearing, the Village Board may grant, deny or amend the recommendation for variation.

CAPTIONS

The section headings appearing in this Ordinance are for convenience of reference only and are not intended, to any extent and for any purpose, to limit or define the text of any section or any subsection hereof.

VIOLATION AND PENALTY

Any person, firm, corporation or business entity who violates any provision of this Ordinance shall be subject to a fine of not less than \$250.00 and not more than \$750.00 for each separate offense. A separate offense shall be deemed committed on each day a violation occurs or continues to occur.

ENFORCEMENT

The Chief Building Official, Deputy Building Official and such other persons who are duly appointed as Code Enforcement Officers are hereby authorized to inspect luminaires and lighting installations in the zoning districts subject to this Ordinance to determine compliance with the applicable provisions and, if necessary, to issue notices of violation to the owner, operator or other person or entity responsible for maintenance of the luminaire or lighting installation, if the luminaire or lighting installation fails to comply with the provisions of this Ordinance. The notice of violation shall set forth an appropriate time period of not less than thirty (30) days for compliance. In the event the violation is not corrected within the time limits set forth in the notice of violation, proceedings to enforce compliance with the provisions of this Ordinance may be initiated and conducted in accordance with and pursuant to the provisions of Ordinance 07-051 which is the Village ordinance establishing a code hearing department for building code violations, or by the filing of an appropriate lawsuit seeking legal and equitable relief in a court of competent jurisdiction.

REPEALER

All ordinances or portions of Ordinances previously passed or adopted by the Village of Homer Glen that conflict with or are inconsistent with the provisions of this Ordinance are hereby repealed to extent of such conflict or inconsistency.

SEVERABILITY

The various provisions of this Ordinance are hereby expressly declared to be severable and if any part or portion of this Ordinance shall be held to be invalid by any court of competent

jurisdiction, such decision shall not affect the validity of the remaining provisions of this Ordinance, which shall be enforced to the fullest extent possible.

EFFECTIVE DATE

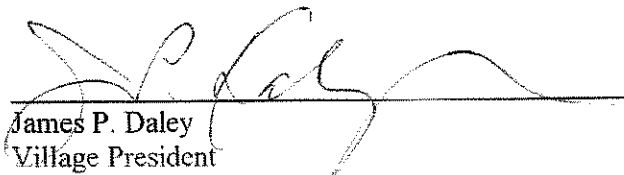
This Ordinance shall be in full force and effect from and after its passage and approval.

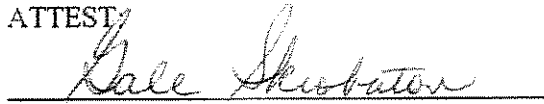
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Adopted this 14th day of June, 2011 pursuant to a roll call vote as follows:

	YES	NO	ABSENT	PRESENT
Costa	X			
DeVivo	X			
Kagianas	X			
Niemiec	X			
Sabo	X			
Yukich	X			
Daley (Village President)				
TOTAL	6	0	0	

APPROVED by the Village President on June 14, 2011.


James P. Daley
Village President

ATTEST

Gale Skroboton
Village Clerk



Illuminating
ENGINEERING SOCIETY



JOINT IDA - IES

**MODEL
LIGHTING
ORDINANCE
(MLO)**

with USER'S GUIDE

June 15, 2011

The User Notes

The User Notes are intended to clarify the sections of the MLO for the various audiences who will use it: lighting designers, city officials, engineers, citizen groups, and others. Every effort has been made to keep the language technically accurate and clear, but since different disciplines may use the same term in different ways, or have different interpretations, some guidance may be helpful. While these Notes can not be a full tutorial on modern lighting design, it is hoped that the Notes will help facilitate the dialogue necessary to adopt the MLO.

Background

The problems of light pollution first became an issue in the 1970s when astronomers identified the degradation of the night sky due to the increase in lighting associated with development and growth. As more impacts to the environment by lighting have been identified, an international "dark sky" movement is advocating for the precautionary approach to outdoor lighting design.

Many communities have passed anti-light-pollution laws and ordinances. However, there is little or no agreement among these laws, and they vary considerably in language, technical quality, and stringency. This is confusing for designers, engineers, and code officials. The lack of a common basis prevents the development of standards, educational programs, and other means of achieving the goal of effective lighting control.

This MLO will allow communities to drastically reduce light pollution and glare and lower excessive light levels. The recommended practices of the IES can be met using readily available, reasonably priced lighting equipment. However, many conventional lighting practices will no longer be permitted, or will require special permits.

This Model Lighting Ordinance (MLO) is the result of extensive efforts by the International Dark Sky Association (IDA) and the Illuminating

Engineering Society of North America (IES). Among its features is the use of lighting zones (LZ0-4) which allow each governing body to vary the stringency of lighting restrictions according to the sensitivity of the area as well as accommodating community intent. In this way, communities can fine-tune the impact of the MLO without having to customize the MLO. The MLO also incorporates the Backlight-Uplight-Glare (BUG) rating system for luminaires, which provides more effective control of unwanted light.

**Joint IDA-IESNA
Model Outdoor Lighting
Ordinance (MLO)**

June 15, 2011

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CHAPTER 10. MODEL LIGHTING ORDINANCE

Adoption of this ordinance should follow the established development, review, and approval processes of the adopting authority. If no such processes are in place, this ordinance may be adopted as a new independent section of the Municipal Code.

The MLO is probably best adopted as an "overlay zoning" ordinance. This means that it overlays, but is different from, land-use zoning. It can be added to or integrated into existing ordinances or codes and cross-referenced to other applicable codes and ordinances such as the electrical code, the sign code, planning ordinances, etc.

The MLO may best be managed by assigning it to planning officials and using existing administrative structures.

Because of the diverse community and lighting needs across large areas, this MLO is not intended for adoption as a state, provincial or national ordinance. Regional coordination is encouraged. Light pollution knows no boundaries, and the effects of polluting light persist as far as 200 kilometers (about 120 miles) from the source.

One large city could adopt the MLO and dramatically affect a region, but adoption in suburbs and small towns must be part of a regional effort to achieve significant improvements in the overall quality of the night sky.

Adopting agencies should also consider that the MLO, like all other modern codes, is designed to evolve over time. Lighting technology will change, and MLO changes will be needed every few years. On-going renewal cycles are strongly recommended as any part of an adopting ordinance.

MLO Development and Task Force Members

This Model Lighting Ordinance has been developed as a joint undertaking by the Illuminating Engineering Society and the International Dark-Sky Association.

The Joint Task Force responsible for developing the MLO include

- | | |
|-------------------------|----------------|
| IDA | IES |
| Co-Chair: Jim Benya | Naomi Miller |
| Co-Chair: Nancy Clanton | Cheryl English |
| Leslie Lipstein | Denis Lavoie |
| Leo Smith | Eric Gibson |
| Michael Mutmansky | |

John Walter representing the electric utility industry also contributed as a member of the Joint Task Force.

PREAMBLE - Ordinance Text

In general, the preamble is part of the ordinance but is typically not part of the code. It establishes the reasons why the municipality is undertaking these regulations.

Local governments may add other purposes to the Preamble including established local government environmental or energy goals that support the model lighting ordinance. The environmental impacts of outdoor lighting fall into two categories: carbon footprint (energy used in the life of a lighting product) and obtrusive light.

CARBON FOOTPRINT	OBTUSIVE LIGHT
Cost & Impact of Mining the Materials Used	Impact on Humans
Energy Used in Production	Impact on the Environment
Energy Used during Product Life	
Disposal/Recycling Costs	

LIGHTING ZONES - Ordinance Text

Lighting zones reflect the base (or ambient) light levels desired by a community. The use of lighting zones (LZ) was originally developed by the International Commission on Illumination (CIE) and appeared first in the US in IES Recommended Practice for Exterior Environmental Lighting, RP-33-99.

It is recommended that lower lighting zone(s) be given preference when establishing zoning criteria. Selection of lighting zone or zones should be based not on existing conditions but rather on the type of lighting environments the jurisdiction seeks to achieve. For instance, new development on previously rural or undeveloped land may be zoned as LZ-1. Using lighting zones allows a great deal of flexibility and customization without the burden of excessive regulation. For example, a jurisdiction may choose to establish vertical lighting zones with the lighting zone at street level at a higher zone than the residential housing on upper levels.

I. PREAMBLE - Ordinance Text

The purpose of this Ordinance is to provide regulations for outdoor lighting that will:

- a. Permit the use of outdoor lighting that does not exceed the minimum levels specified in IES recommended practices for night-time safety, utility, security, productivity, enjoyment, and commerce.
- b. Minimize adverse offsite impacts of lighting such as light trespass, and obtrusive light.
- c. Curtail light pollution, reduce skyglow and improve the nighttime environment for astronomy.
- d. Help protect the natural environment from the adverse effects of night lighting from gas or electric sources.
- e. Conserve energy and resources to the greatest extent possible.

II. LIGHTING ZONES - Ordinance Text

The Lighting Zone shall determine the limitations for lighting as specified in this ordinance. The Lighting Zones shall be as follows:

LZ0: No ambient lighting

Areas where the natural environment will be seriously and adversely affected by lighting. Impacts include disturbing the biological cycles of flora and fauna and/or detracting from human enjoyment and appreciation of the natural environment. Human activity is subordinate in importance to nature. The vision of human residents and users is adapted to the darkness, and they expect to see little or no lighting. When not needed, lighting should be extinguished.

LIGHTING ZONES (cont.) - Ordinance Text

However, if an adjacent use could be adversely impacted by allowable lighting, the adopting authority may require that a particular site meet the requirements for a lower lighting zone. For example, the authority could specify Lighting Zone 1 or 2 requirements if a commercial development were adjacent to a residence, hospital or open space, or to any land assigned to a lower zone.

Lighting zones are best implemented as an overlay to the established zoning especially in communities where a variety of zone districts exists within a defined area or along an arterial street. Where zone districts are cohesive, it may be possible to assign lighting zones to established land use zoning. It is recommended that the lighting zone includes churches, schools, parks, and other uses embedded within residential communities.

Zone	Recommended Uses or Areas	Zoning Considerations
LZ-0	Lighting Zone 0 should be applied to areas in which permanent lighting is not expected and when used, is limited in the amount of lighting and the period of operation. LZ-0 typically includes undeveloped areas of open space, wilderness parks and preserves, areas near astronomical observatories, or any other area where the protection of a dark environment is critical. Special review should be required for any permanent lighting in this zone. Some rural communities may choose to adopt LZ-0 for residential areas.	Recommended default zone for wilderness areas, parks and preserves, and undeveloped rural areas. Includes protected wildlife areas and corridors.
LZ-1	Lighting Zone 1 pertains to areas that desire low ambient lighting levels. These typically include single and two family residential communities, rural town centers, business parks, and other commercial or industrial/storage areas typically with limited nighttime activity. May also include the developed areas in parks and other natural settings.	Recommended default zone for rural and low density residential areas. Includes residential single or two family; agricultural zone districts; rural residential zone districts; business parks; open space include preserves in developed areas.

II. LIGHTING ZONES (cont.) - Ordinance Text

LZ1: Low ambient lighting

Areas where lighting might adversely affect flora and fauna or disturb the character of the area. The vision of human residents and users is adapted to low light levels. Lighting may be used for safety and convenience but it is not necessarily uniform or continuous. After curfew, most lighting should be extinguished or reduced as activity levels decline.

LZ2: Moderate ambient lighting

Areas of human activity where the vision of human residents and users is adapted to moderate light levels. Lighting may typically be used for safety and convenience but it is not necessarily uniform or continuous. After curfew, lighting may be extinguished or reduced as activity levels decline.

LZ3: Moderately high ambient lighting

Areas of human activity where the vision of human residents and users is adapted to moderately high light levels. Lighting is generally desired for safety, security and/or convenience and it is often uniform and/or continuous. After curfew, lighting may be extinguished or reduced in most areas as activity levels decline.

LZ4: High ambient lighting

Areas of human activity where the vision of human residents and users is adapted to high light levels. Lighting is generally considered necessary for safety, security and/or convenience and it is mostly uniform and/or continuous. After curfew, lighting may be extinguished or reduced in some areas as activity levels decline.

LIGHTING ZONES (FOR THE USER'S GUIDE)

Zone	Recommended Uses or Areas	Zoning Considerations
LZ-2	Lighting Zone 2 pertains to areas with moderate ambient lighting levels. These typically include multifamily residential uses, institutional residential uses, schools, churches, hospitals, hotels/motels, commercial and/or businesses areas with evening activities embedded in predominately residential areas, neighborhood serving recreational and playing fields and/or mixed use development with a predominance of residential uses. Can be used to accommodate a district of outdoor sales or industry in an area otherwise zoned LZ-1.	Recommended default zone for light commercial business districts and high density or mixed use residential districts. Includes neighborhood business districts; churches, schools and neighborhood recreation facilities; and light industrial zoning with modest nighttime uses or lighting requirements.
LZ-3	Lighting Zone 3 pertains to areas with moderately high lighting levels. These typically include commercial corridors, high intensity suburban commercial areas, town centers, mixed use areas, industrial uses and shipping and rail yards with high night time activity, high use recreational and playing fields, regional shopping malls, car dealerships, gas stations, and other nighttime active exterior retail areas.	Recommended default zone for large cities' business district. Includes business zone districts; commercial mixed use; and heavy industrial and/or manufacturing zone districts.
LZ-4	Lighting zone 4 pertains to areas of very high ambient lighting levels. LZ-4 should only be used for special cases and is not appropriate for most cities. LZ-4 may be used for extremely unusual installations such as high density entertainment districts, and heavy industrial uses.	Not a default zone. Includes high intensity business or industrial zone districts.

III. GENERAL REQUIREMENTS - USER'S GUIDE

III. GENERAL REQUIREMENTS - Ordinance Text

This Section sets out the requirements that apply to all lighting, both residential and non-residential.

Each adopting jurisdiction should incorporate their existing standards as to when compliance with new regulations is required, when repair or remodeling triggers compliance and if the new ordinance will be retroactive to existing development. The Applicability section of this model ordinance should serve as a guide if the adopting jurisdiction does not have standards or policies in place. Likewise, the adopting jurisdiction should use their existing policies and definitions of what constitutes public monuments, and temporary and/or emergency lighting. Community attitudes and precedents should be taken into account in deciding to regulate seasonal holiday lighting.

EXEMPTIONS - USER'S GUIDE

This is standard language intended to prevent conflict of laws and to give the community the ability to set specific lighting requirements in special plans and under use permits. It can be amended to conform to similar language in other ordinances. For example, while public monuments, statuary, and flags should be lighted, the lighting also should be limited to avoid excess.

Lighting for streets, roads, and highways is usually regulated by a street lighting ordinance, and is not covered by this model ordinance. However, since street lighting can affect nearby areas, some recognition of its effect is appropriate. (See Section XI)

SIGN LIGHTING - USER'S GUIDE

A sign lighting ordinance is strongly recommended if not already in place. It should carefully limit lighting to prevent over-lighted signs from being used to circumvent lighting ordinances.

A. Conformance with All Applicable Codes
All outdoor lighting shall be installed in conformance with the provisions of this Ordinance, applicable Electrical and Energy Codes, and applicable sections of the Building Code.

B. Applicability
Except as described below, all outdoor lighting installed after the date of effect of this Ordinance shall comply with these requirements. This includes, but is not limited to, new lighting, replacement lighting, or any other lighting whether attached to structures, poles, the earth, or any other location, including lighting installed by any third party.

Exemptions from III.(B). The following are not regulated by this Ordinance
 a. Lighting within public right-of-way or easement for the principal purpose of illuminating streets or roads. No exemption shall apply to any lighting within the public right of way or easement when the purpose of the luminaire is to illuminate areas outside the public right of way or easement, unless regulated with a streetlighting ordinance.

Note to adopting agency: if using the street lighting ordinance (Section XI), this exemption should read as follows:
 Lighting within the public right-of-way or easement for the principal purpose of illuminating roads and highways. No exemption shall apply to any street lighting and to any lighting within the public right of way or easement when the purpose of the luminaire is to illuminate areas outside of the public right of way or easement.

- b. Lighting for public monuments and statuary.
- c. Lighting solely for signs (lighting for signs is regulated by the Sign Ordinance).
- d. Repairs to existing luminaires not exceeding 25% of total installed luminaires.

III. GENERAL REQUIREMENTS (cont.) - Ordinance Text

- e. Temporary lighting for theatrical, television, performance areas and construction sites;
 - f. Underwater lighting in swimming pools and other water features
 - g. Temporary lighting and seasonal lighting provided that individual lamps are less than 10 watts and 70 lumens.
 - h. Lighting that is only used under emergency conditions.
 - i. In lighting zones 2, 3 and 4, low voltage landscape lighting controlled by an automatic device that is set to turn the lights off at one hour after the site is closed to the public or at a time established by the authority.
- Exceptions to III. (B.)* All lighting shall follow provisions in this ordinance; however, any special requirements for lighting listed in a) and b) below shall take precedence.

- a. Lighting specified or identified in a specific use permit.
- b. Lighting required by federal, state, territorial, commonwealth or provincial laws or regulations.

C. Lighting Control Requirements

1. Automatic Switching Requirements

Controls shall be provided that automatically extinguish all outdoor lighting when sufficient daylight is available using a control device or system such as a photoelectric switch, astronomical time switch or equivalent functions from a programmable lighting controller, building automation system or lighting energy management system, all with battery or similar backup power or device.

LIGHTING CONTROLS - User's Guide

This section requires all outdoor lighting to have lighting controls that prohibit operation when sufficient daylight is available, and to include the capability, either through circuiting, dimming or alternating sources, to be able to reduce lighting without necessarily turning all lighting off.

CURFEW REQUIREMENTS - User's Guide

The intent is to reduce or eliminate lighting after a given time. Benefits include reduced environmental impact, longer hours of improved astronomy, energy savings, and improved sleeping conditions for residents. Additionally, some police departments have indicated that post-curfew light reductions make drive-by patrolling easier because it allows them to see further into and through a site.

The authority should determine the time of curfew and the amount of lighting reduction based on the character, norms and values of the community.

Typically, curfews go into effect one hour after the close of business. Restaurants, bars and major entertainment facilities such as sports stadiums, may require the curfew go into effect two hours after the close of business. The authority may elect to have no curfew for facilities with shift workers and 24 hour operations, or to extend the curfew time to meet specific needs. The MLO can be modified to address those concerns.

Areas without street lights or with very low ambient light levels should consider turning off all non-emergency lighting at curfew while commercial areas or urban areas may prefer a reduction in lighting levels. A reduction of at least 30% is recommended for most uses.

III. GENERAL REQUIREMENTS (cont.) - Ordinance Text

Exceptions to III.(C) 1. Automatic lighting controls are not required for the following:

- a. Lighting under canopies.
- b. Lighting for tunnels, parking garages, garage entrances, and similar conditions.

2. Automatic Lighting Reduction Requirements

The Authority shall establish curfew time(s) after which total outdoor lighting lumens shall be reduced by at least 30% or extinguished.

Exceptions to III.(C) 2. Lighting reductions are not required for any of the following:

- a. With the exception of landscape lighting, lighting for residential properties including multiple residential properties not having common areas.
- b. When the outdoor lighting consists of only one luminaire.
- c. Code required lighting for steps, stairs, walkways, and building entrances.
- d. When in the opinion of the Authority, lighting levels must be maintained.
- e. Motion activated lighting.
- f. Lighting governed by special use permit in which times of operation are specifically identified.
- g. Businesses that operate on a 24 hour basis.

IV. NON-RESIDENTIAL LIGHTING - USER'S GUIDE

This section addresses non-residential lighting and multiple-family residences having common spaces, such as lobbies, interior corridors or parking. Its intent is to:

- Limit the amount of light that can be used
- Minimize glare by controlling the amount of light that tends to create glare
- Minimize sky glow by controlling the amount of uplight
- Minimize the amount of off-site impacts or light trespass

This MLO provides two methods for determining compliance. The *prescriptive method* contains precise and easily verifiable requirements for luminaire light output and fixture design that limit glare, uplight, light trespass and the amount of light that can be used. The *performance method* allows greater flexibility and creativity in meeting the intent of the ordinance. Note that both the prescriptive and the performance method limit the *amount* of light that can be used, but do not control *how* the lighting is to be used.

Most outdoor lighting projects that do not involve a lighting professional will use the prescriptive method, because it is simple and does not require engineering expertise.

For the prescriptive method, the initial luminaire lumen allowances defined in Table A (Parking Space Method) or B (Hardscape Area Method) will provide basic lighting (parking lot and lighting at doors and/or sensitive security areas) that is consistent with the selected lighting zone. The prescriptive method is intended to provide a safe lighting environment while reducing sky glow and other adverse offsite impacts. The Per Parking Space Method is applicable in small rural towns and is a simple method for small retail "mom and pop" operations without drive lane access and where the parking lot is immediately adjacent to the road. A jurisdiction may

IV. NON-RESIDENTIAL LIGHTING - Ordinance Text

For all non-residential properties, and for multiple residential properties of seven domiciles or more and having common outdoor areas, all outdoor lighting shall comply either with Part A or Part B of this section.

also allow a prescriptive method for classes of sites, such as car dealerships, gas stations, or other common use areas.

Note that the values are for initial luminaire lumens, not footcandles on the target (parking lot, sidewalk, etc). Variables such as the efficiency of the luminaire, dispersion, and lamp wear can affect the actual amount of light so the lumens per square foot allowance is not equal to footcandles on the site. By specifying initial luminaire lumen values, it is easier for officials to verify that the requirement is being met. Initial luminaire lumens are available from photometric data. Each initial luminaire lumens calculation should be supplied on the submittal form.

Solid state luminaires, such as LEDs, do not have initial lamp lumens, only initial luminaire lumens (absolute photometry). Other luminaires tested with relative photometry will have initial luminaire lumens which can be calculated by multiplying initial lamp lumens by the luminaire efficiency. In this example, three types of luminaires are used to light a parking area and building entry in a light commercial area. Two of these three luminaires use metal halide lamps: 70 watt wall mounted area lights and 150 watt pole mounted area lights. For these, the Initial Luminaire Lumens is equal to the initial lamp lumens multiplied by the luminaire efficiency. These values are entered into the compliance chart. The lumen value for the building mounted LED luminaires is equal to the lumens exiting the luminaire. Therefore, the value already represents the Initial Luminaire Lumens and no luminaire efficiency is needed. The total Luminaire Lumens for the site is equal to 247,840.

The allowable lumens are based on the lighting zone and the total hard-scape area. Referencing Table B, the allowed lumens are 2.5/SF for LZZ. Multiplying this by the total hardscape square footage gives a value of 250,000 lumens allowed. Because this value is greater than the value calculated for the site, the project complies. Listed below is an example on a typical compliance worksheet for the Prescriptive Method.

IV. NON-RESIDENTIAL LIGHTING (cont.) - Ordinance Text

A. Prescriptive Method

An outdoor lighting installation complies with this section if it meets the requirements of subsections 1 and 2, below.

1. Total Site Lumen Limit

The total installed initial luminaire lumens of all outdoor lighting shall not exceed the total site lumen limit. The total site lumen limit shall be determined using either the Parking Space Method (Table A) or the Hardscape Area Method (Table B). Only one method shall be used per permit application, and for sites with existing lighting, existing lighting shall be included in the calculation of total installed lumens.

The total installed initial luminaire lumens is calculated as the sum of the initial luminaire lumens for all luminaires.

IV. NON-RESIDENTIAL LIGHTING (cont.) - Ordinance Text

In this example, three types of luminaires are used to light a parking area and building entry in a light commercial area. Two of these three luminaires use metal halide lamps: 70 watt wall mounted area lights and 150 watt pole mounted area lights. For these, the Initial Luminaire Lumens is equal to the initial lamp lumens multiplied by the luminaire efficiency. These values are entered into the compliance chart. The lumen value for the building mounted LED luminaires is equal to the lumens exiting the luminaire. Therefore, the value already represents the Initial Luminaire Lumens and no luminaire efficiency is needed. The total Luminaire Lumens for the site is equal to 247,840. The allowable lumens are based on the lighting zone and the total hardscape area. Referencing Table B, the allowed lumens are 2.5/SF for LZ2. Multiplying this by the total hardscape square footage gives a value of 250,000 lumens allowed. Because this value is greater than the value calculated for the site, the project complies.

PRESCRIPTIVE METHOD EXAMPLE - COMPLIANCE CHART			
Lamp Descriptions	QTY	Initial Luminaire Lumens	Total
70 W Metal Halide	8	3,920	31,360
150 W Metal Halide	20	9,600	192,000
18 W LED	24	1,020	24,480
TOTAL INITIAL LUMINAIRE LUMENS			247,840
SITE ALLOWED TOTAL INITIAL LUMENS*			250,000
PROJECT IS COMPLIANT?			YES

* Listed below is the method of determining the allowed total initial lumen for non-residential outdoor lighting using the hardscape areamethod. (Table B).

SITE ALLOWED TOTAL INITIAL LUMENS	
Site Description	Light Commercial
Lighting Zone	LZ-2
Hardscape Area (SF)	100,000
Allowed Lumens per SF of Hardscape (Table B)	2.5
Site Allowed Total Initial Lumens (lumens per SF X hardscape area)	250,000

IV. NON-RESIDENTIAL LIGHTING (cont.) - Ordinance Text

IV. NON-RESIDENTIAL LIGHTING (cont.) - Ordinance Text

PRESCRIPTIVE METHOD

The prescriptive method of the MLO restricts uplighting, including upward light emitted by decorative luminaires. A jurisdiction may choose to preserve some types of lighting, including lighting of monuments or historic structures. In this case, the adopting jurisdiction should exempt or otherwise regulate these types of lighting carefully so that it does not inadvertently allow glaring or offensive lighting systems.

Offsite effects of light pollution include glare, light trespass, sky glow, and impacts on the nocturnal environment . All of these are functions of the fixture or luminaire design and installation. This document replaces the previous luminaire classification terminology of full cut-off, semi cut-off, and cut-off because those classifications were not as effective in controlling offsite impacts as with the new IESNA luminaire classification system as described in TM-15-07.

A traditional method of defining light trespass is to identify a maximum light level at or near the property line. However, this method does not address offensive light that is not directed toward the ground, or the intensity of glaring light shining into adjacent windows. The requirements defined in Table C limit the amount of light in all quadrants that is directed toward or above the property line. The Backlight/Uplight/ Glare (BUG) rating will help limit both light trespass and glare. (A detailed explanation of the BUG system is provided in the section on Table C.)

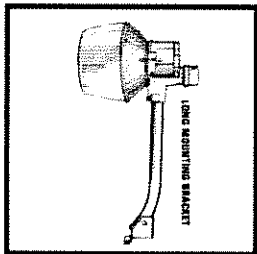
The limits for light distribution established in Table C (for the BUG rating system) prevent or severely limit all direct upward light. A small amount of uplight reflected by snow, light-colored pavement or a luminaire's supporting arms is inevitable and is not limited by the prescriptive method of this ordinance.

- 2. Limits to Off Site Impacts
All luminaires shall be rated and installed according to Table C.
- 3. Light Shielding for Parking Lot Illumination
All parking lot lighting shall have no light emitted above 90 degrees.

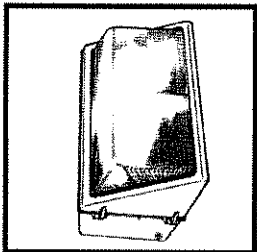
Exception:
a) Ornamental parking lighting shall be permitted by special permit only, and shall meet the requirements of Table C-1 for Backlight, Table C-2 for Uplight, and Table C-3 for Glare, without the need for external field-added modifications.

IV. NON-RESIDENTIAL LIGHTING

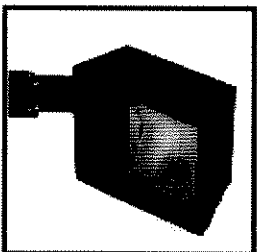
A seemingly non-compliant fixture, such as a post-top translucent acorn luminaire, may in certain cases meet the BUG ratings, as long as it has proper interior baffling within the acorn globe. However, the BUG ratings in Table C will limit the use of the following types of luminaires in all lighting zones:



Barn Lights



Non-Shielded Wall Packs



Floodlights or lights not aimed downward

IV. NON-RESIDENTIAL LIGHTING (cont.) - Ordinance Text

PERFORMANCE METHOD - USER'S GUIDE

The performance method is best for projects with complex lighting requirements or when the applicant wants or needs more flexibility in lighting design. The performance method is also used when any lighting designer plans to aim or direct any light fixture upward (above 90 degrees). An engineer or lighting professional generally will be required to design within the performance method. An adopting jurisdiction may also wish to hire an engineer or lighting professional to review and approve projects using this method and/or incorporate review of the performance method into special review procedures.

The Performance Method is also best for projects where higher lighting levels are required compared to typical area lighting. An example might be a car sales lot where more light might be required on the new cars than would be needed for a standard parking lot. Another example is a gas station canopy requiring more light than a building entrance canopy.

The first step in the Performance Method regulates overlighting by establishing the Total Initial Site Lumens (Table D) that are allowed.

Allowances include the summation of the following (Table D):

- 1) Initial lumen allowance per site
- 2) Per area (SF) of hardscape

Table E allows additional lumens for unique site conditions.

Examples of allowances include:

- 1) Per building entrance/exit
- 2) Per length (linear feet) of Outdoor Sales Frontage Perimeter
- 3) Per area (SF) of Vehicle Service Station Canopy
- 4) Plus more ...

The Site Total Initial Site Lumens allowed are a combination of allowances from Table D and Table E.

IV. NON-RESIDENTIAL LIGHTING (cont.) - Ordinance Text

B. Performance Method

1. Total Site Lumen Limit

The total installed initial luminaire lumens of all lighting systems on the site shall not exceed the allowed total initial site lumens. The allowed total initial site lumens shall be determined using Tables D and E. For sites with existing lighting, existing lighting shall be included in the calculation of total installed lumens.

The total installed initial luminaire lumens of all is calculated as the sum of the initial luminaire lumens for all luminaires.

IV. NON-RESIDENTIAL LIGHTING (cont.) - USER'S GUIDE

MINIMUM OFF-SITE ILLUMINANCE

The second step in the Performance Method is to determine if the proposed luminaires are producing off site impacts such as glare, sky glow and light trespass. One may either use Option A which are the Maximum Allowable BUG Ratings in Table C, or Option B through computer lighting calculations show compliance with Maximum Vertical Illuminance at any point in the plane of the property line in Table F. Option B will be required for all non-residential luminaires that

- A) do not have BUG ratings, or
- B) exceed the BUG ratings,
- C) are not fully shielded, or
- D) have adjustable mountings.

For the performance method, Option B (2) requires photometric calculations for the site perimeter, to a height of no less than 33 feet (10 meters) above the tallest luminaire. Vertical illuminances at eye height (5 feet above grade) will give values that can be used to verify compliance by comparing actual site conditions to the photometric plan submitted during review. Note that the MLO specifies 'total initial luminaire lumens' as a measurement in addition to footcandles/lux. The footcandle (lux) is equal to one lumen per square meter. Lux is the metric unit and is equal to one lumen per square meter.

IV. NON-RESIDENTIAL LIGHTING (cont.) - Ordinance Text

PERFORMANCE METHOD

2. Limits to Off Site Impacts

All luminaires shall be rated and installed using either Option A or Option B. Only one option may be used per permit application.

Option A: All luminaires shall be rated and installed according to Table C.

Option B: The entire outdoor lighting design shall be analyzed using industry standard lighting software including inter-reflections in the following manner:

- 1) Input data shall describe the lighting system including luminaire locations, mounting heights, aiming directions, and employing photometric data tested in accordance with IES guidelines. Buildings or other physical objects on the site within three object heights of the property line must be included in the calculations.
- 2) Analysis shall utilize an enclosure comprised of calculation planes with zero reflectance values around the perimeter of the site. The top of the enclosure shall be no less than 33 feet (10 meters) above the tallest luminaire. Calculations shall include total lumens upon the inside surfaces of the box top and vertical sides and maximum vertical illuminance (footcandles and/or lux) on the sides of the enclosure.

The design complies if:

- a) The total lumens on the inside surfaces of the virtual enclosure are less than 15% of the total site lumen limit; and
- b) The maximum vertical illuminance on any vertical surface is less than the allowed maximum illuminance per Table F.

The application form will require information about the number of luminaires, the number of lamps in each luminaire, the initial luminaire lumens for each luminaire and the initial lumen output for each lamp (based on the wattage and type of lamp selected) as well as plans showing the site area measurements. This will allow the reviewer to verify that the lumen output of all the luminaires does not exceed the allowance.

Field verification can be achieved by asking the applicant and/or owner to verify that the luminaire type, lamp type and wattages specified have been used. Also ask the applicant for photometric data for each luminaire, since the initial luminaire lumens and B-U-G ratings are stated on the photometric report.

However, if a jurisdiction requires additional on-site verification, it may also request a point-by-point photometric plan. While this will not be a true measure of compliance with the criteria of this Ordinance, comparing the actual measured levels on site to the photometric plan can be an indication whether or not the installed lighting varies from the approved design.

V. RESIDENTIAL LIGHTING - USER'S GUIDE

This section applies to single family home, duplexes, row houses, and low rise multi-family buildings of 6 dwelling units or less.

RESIDENTIAL LIGHTING EXCEPTIONS

The exceptions allow for typical lighting that might exceed the specified limits.

Landscape Lighting - While not common in residential areas, it can cause light pollution and light trespass if it is not controlled.

Lighting controlled by Vacancy (Motion) Sensor - Reduces light pollution and light trespass and should be encouraged.

RESIDENTIAL LIGHTING EXAMPLE

In this example on the following page, five different luminaires are used on a residential property. Each luminaire must comply to meet the requirements. The site plan following shows luminaire types followed by a tabulation of each luminaire, whether or not it is fully shielded, lamp type, and initial luminaire lumens. If the luminaire lumens are not known, multiply the initial lamp lumens by the luminaire efficiency. If the efficiency is not known, multiply the initial lamp lumens by 0.7 as a reasonable assumption. The maximum allowable lumen values come from Table G, based on the shielding classification and location on the site. In this case, each luminaire complies with the requirements of Table G.

Comparison of efficacy by power (120 Volt Incandescent lamps)

Output (Lumens)	Power (Watt)		
	Incand	CFL	LED
500	40	8 - 10	9
850	60	13 - 18	12 - 15
1,200	75	18 - 22	15
1,700	100	23 - 28	18

V. RESIDENTIAL LIGHTING - Ordinance Text

A. General Requirements

For residential properties including multiple residential properties not having common areas, all outdoor luminaires shall be fully shielded and shall not exceed the allowed lumen output in Table G, row 2.

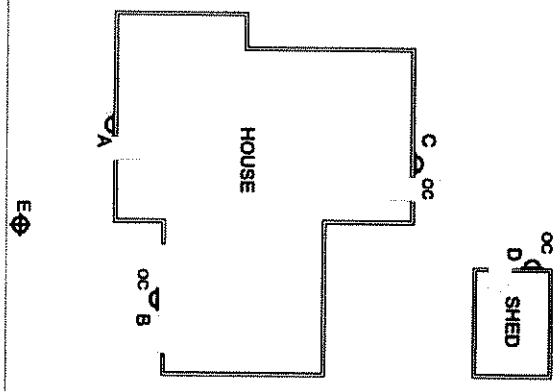
Exceptions

1. One partly shielded or unshielded luminaire at the main entry, not exceeding the allowed lumen output in Table G row 1.
2. Any other partly shielded or unshielded luminaires not exceeding the allowed lumen output in Table G row 3.
3. Low voltage landscape lighting aimed away from adjacent properties and not exceeding the allowed lumen output in Table G row 4.
4. Shielded directional flood lighting aimed so that direct glare is not visible from adjacent properties and not exceeding the allowed lumen output in Table G row 5.
5. Open flame gas lamps.
6. Lighting installed with a vacancy sensor, where the sensor extinguishes the lights no more than 15 minutes after the area is vacated.
7. Lighting exempt per Section III (B.).

B. Requirements for Residential Landscape Lighting

1. Shall comply with Table G.
2. Shall not be aimed onto adjacent properties.

RESIDENTIAL LIGHTING - USER'S GUIDE



- ▲ WALL SCENCE
- ◆ POST TOP LUMINAIRE
- oc OCCUPANCY SENSOR

Property Type: Residential Lighting Zone 1								
Luminaire Type	Location	Luminaire Description	Fully Shielded	Lamp Type	Initial Luminaire Lumens*	Maximum Allowed Initial Luminaire Lumens (Table G)	Controls	Compliant
A	Front Entry	Decorative wall sconce	No	9W CFL	420	420	None	Yes
B	Garage Door	Fully shielded wall pack	Yes	23W CFL	1050	1260	Occupancy Sensor	Yes
C	Back Entry	Decorative wall sconce	No	7W CFL	280	315	Occupancy Sensor	Yes
D	Shed Entry	Fully shielded wall pack	Yes	40W INC	343	1260	Occupancy Sensor	Yes
E	Driveway	Fully shielded post top	Yes	13W CFL	1280	1260	None	Yes

*Initial Luminaire Lumens are calculated by multiplying the total initial lamp lumens by the luminaire efficiency. If the luminaire efficiency is not known, assume an efficiency of 70% and multiply the lamp lumen value by 0.7.

V. LIGHTING BY SPECIAL PERMIT ONLY - USER'S GUIDE

This section addresses types of lighting that are intrusive or complex in their impacts and need a higher level of scrutiny and/or site sensitivity.

It should be noted that safety could be compromised if lighting conforming to this ordinance is located adjacent to excessively bright and/or glaring lighting.

It is important that the authority set clear and reasonable guidelines for applying for a special lighting use permit, and establish rules and procedures for granting or refusing them. They may differ from existing special use policies, in which case one or the other may be changed to achieve the overall goal of effective lighting without glare, sky glow, or light trespass.

SPECIAL LIGHTING

For athletic and sports fields, the appropriate level of lighting will depend on the Class of Play and Facilities. Class of Play is divided into 4 categories, depending on the number of fixed spectator seats. (Competition play intended for nighttime TV broadcast may require higher lighting levels).

CLASS I: Competition play at facilities with 5,000 or more fixed spectator seats. (Professional, Colleges & Universities, some Semi-Professional & Large Sports Clubs)

CLASS II: Games at facilities with over 1,500 fixed spectator seats. (Smaller Universities and Colleges, some Semi-pro, large amateur leagues and high schools with large spectator facilities)

CLASS III: Games at facilities with over 500 fixed spectator seats. (Sports Clubs and amateur leagues, some high schools and large training professional training facilities with spectator sections)

CLASS IV: Competition or recreational play at facilities with 500 fixed spectator seats or less. Class IV Class of Play applies to games at which family and close friends of the players and staff are usually the majority of spectators. (Smaller amateur leagues, park and recreation department facilities, most Little Leagues smaller high schools, elementary and middle schools, and social events)

VI. LIGHTING BY SPECIAL PERMIT ONLY - Ordinance Text

A. High Intensity and Special Purpose Lighting

The following lighting systems are prohibited from being installed or used except by special use permit:

1. Temporary lighting in which any single luminaire exceeds 20,000 initial luminaire lumens or the total lighting load exceeds 160,000 lumens.
2. Aerial Lasers.
3. Searchlights.
4. Other very intense lighting defined as having a light source exceeding 200,000 initial luminaire lumens or an intensity in any direction of more than 2,000,000 candelas.

B. Complex and Non-Conforming Uses

Upon special permit issued by the Authority, lighting not complying with the technical requirements of this ordinance but consistent with its intent may be installed for complex sites or uses or special uses including, but not limited to, the following applications:

1. Sports facilities, including but not limited to unconditioned rinks, open courts, fields, and stadiums.
2. Construction lighting.
3. Lighting for industrial sites having special requirements, such as petrochemical manufacturing or storage, shipping piers, etc.
4. Parking structures.
5. Urban parks
6. Ornamental and architectural lighting of bridges, public monuments, statuary and public buildings.
7. Theme and amusement parks.
8. Correctional facilities.

To obtain such a permit, applicants shall demonstrate that the proposed lighting installation:

- a. Has sustained every reasonable effort to mitigate the effects of light on the environment and surrounding properties, supported by a signed statement describing the mitigation measures. Such statement shall be accompanied by the calculations required for the Performance Method.

SPECIAL PERMIT ONLY

When Class of Play is above Class IV, a dual control should be installed to limit illumination to Class IV levels during practices where spectators are fewer than 500.

(See IES Recommended Practice for Sports and Recreational Area Lighting RP-6)

VII. EXISTING LIGHTING - USER'S GUIDE

Adoption of this section on existing lighting is strongly encouraged.

If the adopting jurisdiction has criteria in place that require a property to come into compliance with the current zoning ordinance, it is recommended that the criteria also be applied to bringing existing lighting into compliance. If there are no established criteria, this section of the MLO is recommended.

Amortization allows existing lighting to gradually and gracefully come into compliance. Substantial changes or additions to existing properties are considered the same as new construction, and must comply.

Most outdoor lighting can be fully depreciated once it is fully amortized, usually no longer than 10 years, if not sooner, from the date of initial installation. Some jurisdictions may prefer to require phase-out in a substantially shorter period. The Authority may also wish to require compliance much sooner for "easy fixes" such as re-aiming or lowering lumen output of lamps. Where lighting is judged to be a safety hazard, immediate compliance can be required.

VI. LIGHTING BY SPECIAL PERMIT ONLY (cont.) - Ordinance Text

- b. Employs lighting controls to reduce lighting at a Project Specific Curfew ("Curfew") time to be established in the Permit.
- c. Complies with the Performance Method after Curfew.

The Authority shall review each such application. A permit may be granted if, upon review, the Authority believes that the proposed lighting will not create unwarranted glare, sky glow, or light trespass.

VII. EXISTING LIGHTING - Ordinance Text

Lighting installed prior to the effective date of this ordinance shall comply with the following.

A. Amortization

On or before [amortization date], all outdoor lighting shall comply with this Code.

B. New Uses or Structures, or Change of Use

Whenever there is a new use of a property (zoning or variance change) or the use on the property is changed, all outdoor lighting on the property shall be brought into compliance with this Ordinance before the new or changed use commences.

C. Additions or Alterations

1. Major Additions.

If a major addition occurs on a property, lighting for the entire property shall comply with the requirements of this Code. For purposes of this section, the following are considered to be major additions:

VII. EXISTING LIGHTING (cont.) - Ordinance Text

Additions of 25 percent or more in terms of additional dwelling units, gross floor area, seating capacity, or parking spaces, either with a single addition or with cumulative additions after the effective date of this Ordinance.

Single or cumulative additions, modification or replacement of 25 percent or more of installed outdoor lighting luminaires existing as of the effective date of this Ordinance.

2. Minor Modifications, Additions, or New Lighting Fixtures for Non-residential and Multiple Dwellings

For non-residential and multiple dwellings, all additions, modifications, or replacement of more than 25 percent of outdoor lighting fixtures existing as of the effective date of this Ordinance shall require the submission of a complete inventory and site plan detailing all existing and any proposed new outdoor lighting.

Any new lighting shall meet the requirements of this Ordinance.

3. Resumption of Use after Abandonment

If a property with non-conforming lighting is abandoned for a period of six months or more, then all outdoor lighting shall be brought into compliance with this Ordinance before any further use of the property occurs.

VIII. ENFORCEMENT & PENALTIES - Ordinance Text

(Reserved)

VII. ENFORCEMENT AND PENALTIES - USER'S GUIDE

Enforcement and penalties will vary by jurisdiction. There are, however, certain practices that will promote compliance with lighting regulations. Education is a key tool in promoting compliance. Proactive enforcement procedures can include providing a copy of the lighting regulations to every contractor at the time they visit to obtain a building permit. Another effective tool is a requirement that the builder or developer acknowledge in writing that the he or she is familiar with the lighting requirements and will submit a lighting plan for approval.

VII. ENFORCEMENT AND PENALTIES (cont.) - User's Guide

Submission of the Lighting Plan should be required as a precondition to any approvals. The Lighting Plan should include the location and BUG rating for each luminaire, specify whether compliance is by the performance or prescriptive method, and a worksheet to show that the luminaires and their BUG ratings are compliant.

IX. TABLES - User's Guide

The tables are to be reviewed periodically by a joint committee of the IES and IDA, and adjusted as standards and technology permit. If more research on the impacts of outdoor lighting shows the effects of light pollution to be a significant concern, then the values in the tables may be modified. Such changes will have no significant impact to the balance of the language of the Ordinance or Code.

VIII. ENFORCEMENT & PENALTIES - Ordinance Text

IX. TABLES - Ordinance Text

Table A - Allowed Total Initial Luminaire Lumens per Site for Non-residential Outdoor Lighting, Per Parking Space Method
 May only be applied to properties up to 10 parking spaces (including handicapped accessible spaces).

LZ-0	LZ-1	LZ-2	LZ-3	LZ-4
350 lms/space	490 lms/space	630 lms/space	840 lms/space	1,050 lms/space

Table B - Allowed Total Initial Lumens per Site for Non-residential Outdoor Lighting, Hardscape Area Method
 May be used for any project. When lighting intersections of site drives and public streets or road, a total of 600 square feet for each intersection may be added to the actual site hardscape area to provide for intersection lighting.

LZ-0	LZ-1	LZ-2	LZ-3	LZ-4
Base Allowance				
0.5 lumens per SF of Hardscape	1.25 lumens per SF of Hardscape	2.5 lumens per SF of Hardscape	5.0 lumens per SF of Hardscape	7.5 lumens per SF of Hardscape

IX. TABLES - Ordinance Text

Table B - Lumen Allowances, in Addition to Base Allowance

	LZ 0	LZ 1	LZ 2	LZ 3	LZ 4
Additional allowances for sales and service facilities. No more than two additional allowances per site, Use it or Lose it.					
Outdoor Sales Lots. This allowance is lumens per square foot of uncovered sales lots used exclusively for the display of vehicles or other merchandise for sale, and may not include driveways, parking or other non sales areas. To use this allowance, luminaires must be within 2 mounting heights of sales lot area.	0	4 lumens per square foot	8 lumens per square foot	16 lumens per square foot	16 lumens per square foot
Outdoor Sales Frontage. This allowance is for lineal feet of sales frontage immediately adjacent to the principal viewing location(s) and unobstructed for its viewing length. A corner sales lot may include two adjacent sides provided that a different principal viewing location exists for each side. In order to use this allowance, luminaires must be located between the principal viewing location and the frontage outdoor sales area.	0	0	1,000 per LF	1,500 per LF	2,000 per LF
Drive Up Windows. In order to use this allowance, luminaires must be within 20 feet horizontal distance of the center of the window.	0	2,000 lumens per drive-up window	4,000 lumens per drive-up window	8,000 lumens per drive-up window	8,000 lumens per drive-up window
Vehicle Service Station. This allowance is lumens per installed fuel pump.	0	4,000 lumens per pump (based on 5 feet horitz)	8,000 lumens per pump (based on 10 feet horitz)	16,000 lumens per pump (based on 20 feet horitz)	24,000 lumens per pump (based on 20 feet horitz)

IX TABLES TABLE C-1 BUG RATING, UPLIGHT AND GLARE

Work on the BUG system started in 2005 when the IES upgraded the roadway cutoff classification system. The original system, which included the ratings full cutoff, semi-cutoff and non cutoff, had been designed as a rating system focused on brightness and glare control. However, with increasing demand for control of uplight and light trespass in addition to glare, IES realized that a more comprehensive system was needed. IES developed TM-15 Luminaire Classification System for *Outdoor Luminaires*.

As this is a relatively new rating system, and many people may not be familiar with it, more explanation of how the rating system works is provided here. For example, some people are familiar with terms such as "full cutoff" and they may expect the MLO to include those terms. It will be very important that all groups recognize that older terms and concepts are inadequate for the complex tasks of controlling light pollution. It is recommended that the new rating system adopted in TM-15, as followed herein by the MLO, be used intact and exclusively.

BUG requires downlight only with low glare (better than full cut off) in lighting zones 0, 1 and 2, but allows a minor amount of uplight in lighting zones 3 and 4. In lighting zones 3 and 4, the amount of allowed uplight is enough to permit the use of very well shielded luminaires that have a decorative drop lens or chimney so that dark sky friendly lighting can be installed in places that traditional-appearing luminaires are required. BUG typically cannot be used for residential luminaires unless they have been photometrically tested. For non-photometrically tested residential luminaires, shielding description is used instead.

The lumen limits established for each lighting zone apply to all types of lighting within that zone. This includes, but is not limited to, specialty lighting, facade lighting, security lighting and the front row lighting for auto dealerships. BUG rating limits are defined for each luminaire and

IX TABLES (cont.) - Ordinance Text

Table C - Maximum Allowable Backlight, Uplight and Glare (BUG) Ratings

May be used for any project. A luminaire may be used if it is rated for the lighting zone of the site or lower in number for all ratings B, U and G. Luminaires equipped with adjustable mounting devices permitting alteration of luminaire aiming in the field shall not be permitted.

TABLE C-1	Lighting	Lighting	Lighting	Lighting
	Zone	Zone	Zone	Zone
Allowed Backlight Rating*	0	1	2	3
Greater than 2 mounting heights from property line	B1	B3	B4	B5
1 to less than 2 mounting heights from property line and ideally oriented**	B1	B2	B3	B4
0.5 to 1 mounting heights from property line and ideally oriented**	B0	B1	B2	B3
Less than 0.5 mounting height to property line and property oriented**	B0	B0	B0	B1
				B2

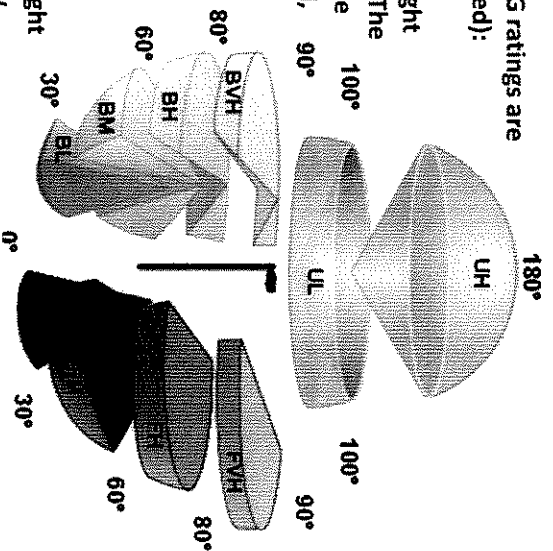
*For property lines that about public walkways, bikeways, plazas, and parking lots, the property line may be considered to be 5 feet beyond the actual property line for purpose of determining compliance with this section. For property lines that about public roadways and public transit corridors, the property line may be considered to be the center-line of the public roadway or public transit corridor for the purpose of determining compliance with this section. NOTE: This adjustment is relative to Table C-1 and C-3 only and shall not be used to increase the lighting area of the site.

** To be considered 'ideally oriented', the luminaire must be mounted with the backlight portion of the light output oriented perpendicular and towards the property line of concern.

are based on the internal and external design of the luminaire, its aiming, and the initial luminaire lumens of the specified luminaires. The BUG rating limits also take into consideration the distance the luminaire is installed from the property line in multiples of the mounting height (See Table C).

The three components of BUG ratings are based on IES TM-15-07 (revised):

Backlight which creates light trespass onto adjacent sites. The B rating takes into account the amount of light in the BL, BM, BH and BVH zones, which are in the direction of the luminaire **OPPOSITE** from the area intended to be lighted.



Uplight, which causes artificial sky glow. Lower uplight (zone UL) causes the most sky glow and negatively affects professional and academic astronomy. Upper uplight (UH) not reflected off a surface is mostly energy waste. The U rating defines the amount of light into the upper hemisphere with greater concern for the light at or near the horizontal angles (UL).

Glare, which can be annoying or visually disabling. The G rating takes into account the amount of frontlight in the FH and FVH zones as well as BH and BVH zones.

BUG ratings apply to the Lighting Zone of the property under consideration.

IX. TABLES (cont.) - Ordinance Text

(Key: UH=Uplight High, UL=Uplight Low, BVH=Backlight Very High, BH=Backlight High, BM=Backlight Medium, BL=Backlight Low, FVH=Forward Light Very High, FH=Forward Light High, FM=Forward Light Medium, FL=Forward Light Low.)

In general, a higher BUG rating means more light is allowed in solid angles, and the rating increases with the lighting zone. However, a higher B (backlight) rating simply indicates that the luminaire directs a significant portion of light behind the pole, so B ratings are designated based on the location of the luminaire with respect to the property line. A high B rating luminaire maximizes the spread of light, and is effective and efficient when used far from the property line. When luminaires are located near the property line, a lower B rating will prevent unwanted light from interfering with neighboring properties.

At the 90-180 degree ranges:

- Zone 0 allows no light above 90 degrees.
- Zone 1 allows only 10 lumens in the UH and UL zones, 20 lumens total in the complete upper hemisphere. (This is roughly equivalent to a 5 W incandescent lamp).
- Zone 2 allows only 50 lumens in the UH and UL zones, 100 lumens total (less than a 25W incandescent lamp).
- Zone 3 allows only 500 lumens in the UH and UL zones, 1000 lumens total (about the output of a 75W incandescent bulb).
- Zone 4 allows only 1,000 lumens in the UH and UL zones, 2000 lumens total (about the output of a 100W incandescent bulb).

IX. TABLES (cont.) - Ordinance Text

Table C - 2 Maximum Allowable Uplight (BUG) Ratings - Continued

TABLE C-2	Lighting Zone				
	0	1	2	3	4
Allowed Uplight Rating	U0	U1	U2	U3	U4
Allowed % light emission above 90° for street or Area lighting	0%	0%	0%	0%	0%

Table C - 3 Maximum Allowable Glare (BUG) Ratings - Continued

TABLE C-3	Lighting Zone				
	0	1	2	3	4
Allowed Glare Rating	G0	G1	G2	G3	G4
Any luminaire not ideally oriented*** with 1 to less than 2 mounting heights to any property line of concern	G0	G0	G1	G1	G2
Any luminaire not ideally oriented*** with 0.5 to 1 mounting heights to any property line of concern	G0	G0	G0	G1	G1
Any luminaire not ideally oriented*** with less than 0.5 mounting heights to any property line of concern	G0	G0	G0	G0	G1

*** Any luminaire that cannot be mounted with its backlight perpendicular to any property line within 2X the mounting heights of the luminaire location shall meet the reduced Allowed Glare Rating in Table C-3.

TABLE D SAMPLE PERFORMANCE METHOD USER'S GUIDE

The first step in the Performance Method is to establish the Site Total Initial Site Lumens which regulates overlighting. The performance method allows layers of light depending on the complexity of the site.

Table D establishes the basic total initial site lumens allowed. These lumen allowances are added together for a total initial site lumen allowance. Allowances include:

- 1) Initial lumen allowance per site
- 2) Per area (SF) of hardscape

IX. TABLES (cont.) - Ordinance Text

Table D Performance Method Allowed Total Initial Site Lumens

May be used on any project.

Lighting Zone	LZ 0	LZ 1	LZ 2	LZ 3	LZ 4
Allowed Lumens Per SF	0.5	1.25	2.5	5.0	7.5
Allowed Base Lumens Per Site	0	3,500	7,000	14,000	21,000

Table E Performance Method Additional Initial Luminaire Lumen Allowances. All of the following are "use it or lose it" allowances.
All area and distance measurements in plan view unless otherwise noted.

Lighting Application	LZ 0	LZ 1	LZ 2	LZ 3	LZ 4
Additional Lumens Allowances for All Buildings except service stations and outdoor sales facilities. A MAXIMUM OF THREE (3) ALLOWANCES ARE PERMITTED. THESE ALLOWANCES ARE "USE IT OR LOSE IT".					
Building Entrances or Exits. This allowance is per door. In order to use this allowance, luminaires must be within 20 feet of the door.	400	1,000	2,000	4,000	6,000
Building Facades. This allowance is lumens per unit area of building facade that are illuminated. To use this allowance, luminaires must be aimed at the facade and capable of illuminating it without obstruction.	0	0	8/SF	16/SF	24/SF

TABLE E - PERFORMANCE METHOD - USER'S GUIDE

The allowable light levels for these uses defined in Table E may be used to set a prescriptive lighting allowance for these uses in each lighting zone. It should be noted that the lighting allowance defined in Table E is only applicable for the area defined for that use and cannot be transferred to another area of the site. For some uses, such as outdoor sales, the jurisdiction is encourages to define a percentage of the total hardscape area that is eligible for the additional lighting allowance. For example, a set percentage of a car dealership's lot may be considered a display area and receive the additional lighting allowance where the remainder of the lot would be considered storage, visitor parking, etc. and cannot exceed the base light levels defined in Table A.

TABLE EXAMPLE - PERFORMANCE METHOD - USER'S GUIDE

IX. TABLES (cont.) - Ordinance Text

Table E - Performance Method Additional Initial Lumen Allowances (cont.)

Lighting Application	LZ 0	LZ 1	LZ 2	LZ 3	LZ 4
Sales or Non-sales Canopies. This allowance is lumens per unit area for the total area within the drip line of the canopy. In order to qualify for this allowance, luminaires must be located under the canopy.	0	3/SF	6/SF	12/SF	18/SF
Guard Stations. This allowance is lumens per unit area of guardhouse plus 2000 sf per vehicle lane. In order to use this allowance, luminaires must be within 2 mounting heights of a vehicle lane or the guardhouse.	0	6/SF	12/SF	24/SF	36/SF
Outdoor Dining. This allowance is lumens per unit area for the total illuminated hardscape of outdoor dining. In order to use this allowance, luminaires must be within 2 mounting heights of the hardscape area of outdoor dining.	0	1/SF	5/SF	10/SF	15/SF
Drive Up Windows. This allowance is lumens per window. In order to use this allowance, luminaires must be within 20 feet of the center of the window.	0	2,000 lumens per drive-up window	4,000 lumens per drive-up window	8,000 lumens per drive-up window	8,000 lumens per drive-up window
Additional Lumens Allowances for Service Stations only. Service stations may not use any other additional allowances.					
Vehicle Service Station Hardscape. This allowance is lumens per unit area for the total illuminated hardscape area less area of buildings, area under canopies, area off property, or areas obstructed by signs or structures. In order to use this allowance, luminaires must be illuminating the hardscape area and must not be within a building below a canopy, beyond property lines, or obstructed by a sign or other structure.	0	4/SF	8/SF	16/SF	24/SF

IX. TABLES (cont.) - Ordinance Text

Table E - Performance Method Additional Initial Lumen Allowances (cont.)

Lighting Application	LZ 0	LZ 1	LZ 2	LZ 3	LZ 4
Vehicle Service Station Canopies. This allowance is lumens per unit area for the total area within the drip line of the canopy. In order to use this allowance, luminaires must be located under the canopy.	0	8/SF	16/SF	32/SF	32/SF
Additional Lumens Allowances for Outdoor Sales facilities only. Outdoor Sales facilities may not use any other additional allowances. NOTICE: lighting permitted by these allowances shall employ controls extinguishing this lighting after a curfew time to be determined by the Authority.					
Outdoor Sales Lots This allowance is lumens per square foot of uncovered sales lots used exclusively for the display of vehicles or other merchandise for sale, and may not include driveways, parking or other non sales areas and shall not exceed 25% of the total hardscape area. To use this allowance, luminaires must be within 2 mounting heights of the sales lot area.	0	4/SF	8/SF	12/SF	18/SF
Outdoor Sales Frontage. This allowance is for lineal feet of sales frontage immediately adjacent to the principal viewing location(s) and unobstructed for its viewing length. A corner sales lot may include two adjacent sides provided that a different principal viewing location exists for each side. In order to use this allowance, luminaires must be located between the principal viewing location and the frontage outdoor sales area.	0	0	1,000/LF	1,500/LF	2,000/LF

IX. TABLES (cont.) - Ordinance Text

Table F Maximum Vertical Illuminance at any point in the plane of the property line

Lighting Zone 0	Lighting Zone 1	Lighting Zone 2	Lighting Zone 3	Lighting Zone 4
0.05 FC or 0.5 LUX	0.1 FC or 1.0 LUX	0.3 FC or 3.0 LUX	0.8 FC or 8.0 LUX	1.5 FC or 15.0 LUX

IX. TABLES (cont.) - Ordinance Text

Table G - Residential Lighting Limits

Lighting Application	LZ 0	LZ 1	LZ 2	LZ 3	LZ 4
Row 1 Maximum Allowed Luminaire Lumens* for Unshielded Luminaires at one entry only	Not allowed	420 lumens	630 lumens	630 lumens	630 lumens
Row 2 Maximum Allowed Luminaire Lumens* for each Fully Shielded Luminaire	630 lumens	1,260 lumens	1,260 lumens	1,260 lumens	1,260 lumens
Row 3 Maximum Allowed Luminaire Lumens* for each Unshielded Luminaire excluding main entry	Not allowed	315 lumens	315 lumens	315 lumens	315 lumens
Row 4 Maximum Allowed Luminaire Lumens* for each Landscape Lighting	Not allowed	Not allowed	1,950 lumens	2,100 lumens	2,100 lumens
Row 5 Maximum Allowed Luminaire Lumens* for each Shielded Directional Flood Lighting	Not allowed	Not allowed	1,260 lumens	2,100 lumens	2,100 lumens
Row 6 Maximum Allowed Luminaire Lumens* for each Low Voltage Landscape Lighting	Not allowed	Not allowed	525 lumens	525 lumens	525 lumens

* Luminaire lumens equals Initial Lamp Lumens for a lamp, multiplied by the number of lamps in the luminaire

TABLE G - RESIDENTIAL LIGHTING - USER'S GUIDE

Residential Light Levels

Most residential lighting has traditionally used incandescent lamps which are identified by their wattage. However, since new technologies provide more light for fewer watts, it is no longer possible to regulate residential lighting solely by providing a maximum wattage. Table G, therefore, lists maximum initial luminaire lumens only.

X. DEFINITIONS - USER'S GUIDE

Definitions are typically generally added to any code when new code sections are added. The definitions are legally required and play a significant role in the interpretation of the ordinance and code.

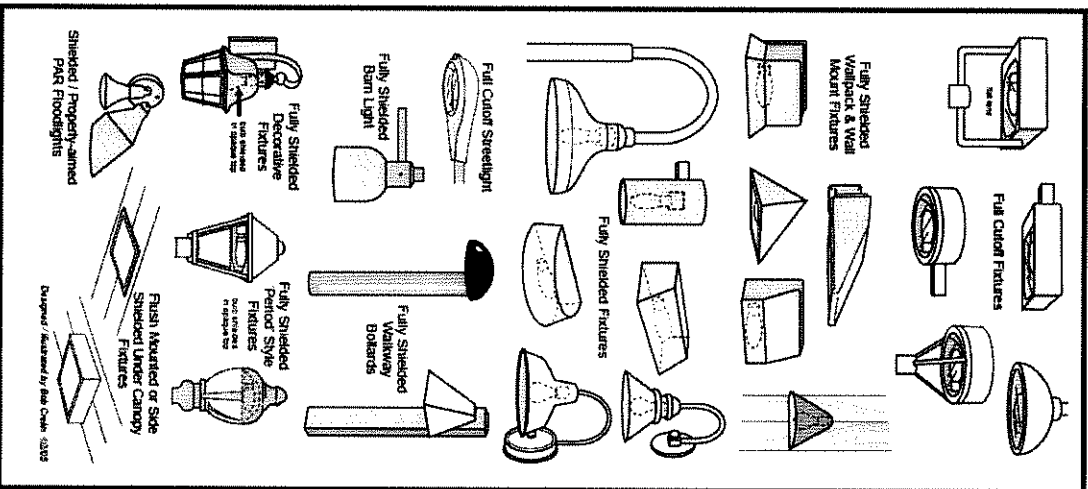
Most city attorneys will not accept references to outside sources regardless of credibility, such as the IES Handbook. Thus as a general rule, a definition for an unfamiliar term (e.g. lumens) must be added by the adopting ordinance.

When adopting or integrating the MLO definitions, be sure to retire conflicting technical terminology. In particular, the latest IES Luminaire Classification System as defined in IES TM-15-07 is likely to need attention.

X. DEFINITIONS - Ordinance Text

Absolute Photometry	Photometric measurements (usually of a solid-state luminaire) that directly measures the footprint of the luminaire. Reference Standard IES LM-79
Architectural Lighting	Lighting designed to reveal architectural beauty, shape and/or form and for which lighting for any other purpose is incidental.
Authority	The adopting municipality, agency or other governing body.
Astronomic Time Switch	An automatic lighting control device that switches outdoor lighting relative to time of solar day with time of year correction.
Backlight	For an exterior luminaire, lumens emitted in the quarter sphere below horizontal and in the opposite direction of the intended orientation of the luminaire. For luminaires with symmetric distribution, backlight will be the same as front light.
BUG	A luminaire classification system that classifies backlight (B), upright (U) and glare (G).
Canopy	A covered, unconditioned structure with at least one side open for pedestrian and/or vehicular access. (An unconditioned structure is one that may be open to the elements and has no heat or air conditioning.)
Common Outdoor Areas	One or more of the following: a parking lot; a parking structure or covered vehicular entrance; a common entrance or public space shared by all occupants of the domiciles.
Curfew	A time defined by the authority when outdoor lighting is reduced or extinguished.

Examples of Fully Shielded Luminaires



X. DEFINITIONS - Ordinance Text

<p>Emergency conditions</p>	<p>Generally, lighting that is only energized during an emergency; lighting fed from a backup power source; or lighting for illuminating the path of egress solely during a fire or other emergency situation; or, lighting for security purposes used solely during an alarm.</p>
<p>Footcandle</p>	<p>The unit of measure expressing the quantity of light received on a surface. One footcandle is the illuminance produced by a candle on a surface one foot square from a distance of one foot.</p>
<p>Forward Light</p>	<p>For an exterior luminaire, lumens emitted in the quarter sphere below horizontal and in the direction of the intended orientation of the luminaire.</p>
<p>Fully Shielded Luminaire</p>	<p>A luminaire constructed and installed in such a manner that all light emitted by the luminaire, either directly from the lamp or a diffusing element, or indirectly by reflection or re-fraction from any part of the luminaire, is projected below the horizontal plane through the luminaire's lowest light-emitting part.</p>
<p>Glare</p>	<p>Lighting entering the eye directly from luminaires or indirectly from reflective surfaces that causes visual discomfort or reduced visibility.</p>
<p>Hardscape</p>	<p>Permanent hardscape improvements to the site including parking lots, drives, entrances, curbs, ramps, stairs, steps, medians, walkways and non-vegetated landscaping that is 10 feet or less in width. Materials may include concrete, asphalt, stone, gravel, etc.</p>
<p>Hardscape Area</p>	<p>The area measured in square feet of all hardscape. It is used to calculate the Total Site Lumen Limit in both the Prescriptive Method and Performance Methods. Refer to Hardscape definition.</p>

X. DEFINITIONS - Ordinance Text

<i>Hardscape Perimeter</i>	The perimeter measured in linear feet is used to calculate the Total Site Lumen Limit in the Performance Method. Refer to Hardscape definition.
<i>IDA</i>	International Dark-Sky Association.
<i>IESNA</i>	Illuminating Engineering Society of North America.
<i>Impervious Material</i>	Sealed to severely restrict water entry and movement
<i>Industry Standard Lighting Software</i>	Lighting software that calculates point-by-point illuminance that includes reflected light using either ray-tracing or radiosity methods.
<i>Lamp</i>	A generic term for a source of optical radiation (i.e. "light"), often called a "bulb" or "tube". Examples include incandescent, fluorescent, high-intensity discharge (HID) lamps, and low pressure sodium (LPS) lamps, as well as light-emitting diode (LED) modules and arrays.
<i>Landscape Lighting</i>	Lighting of trees, shrubs, or other plant material as well as ponds and other landscape features.
<i>LED</i>	Light Emitting Diode.
<i>Light Pollution</i>	Any adverse effect of artificial light including, but not limited to, glare, light trespass, sky-glow, energy waste, compromised safety and security, and impacts on the nocturnal environment.

X. DEFINITIONS - Ordinance Text

<i>Light Trespass</i>	Light that falls beyond the property it is intended to illuminate.
<i>Lighting</i>	"Electric" or "man-made" or "artificial" lighting. See "lighting equipment".
<i>Lighting Equipment</i>	Equipment specifically intended to provide gas or electric illumination, including but not limited to, lamp(s), luminaire(s), ballast(s), poles, posts, lens(s), and related structures, electrical wiring, and other necessary or auxiliary components.
<i>Lighting Zone</i>	An overlay zoning system establishing legal limits for lighting for particular parcels, areas, or districts in a community.
<i>Lighting Equipment</i>	Equipment specifically intended to provide gas or electric illumination, including but not limited to, lamp(s), luminaire(s), ballast(s), poles, posts, lens(s), and related structures, electrical wiring, and other necessary or auxiliary components.
<i>Low Voltage Landscape Lighting</i>	Landscape lighting powered at less than 15 volts and limited to luminaires having a rated initial luminaire lumen output of 525 lumens or less.
<i>Lumen</i>	The unit of measure used to quantify the amount of light produced by a lamp or emitted from a luminaire (as distinct from "watt," a measure of power consumption).
<i>Luminaire</i>	The complete lighting unit (fixture), consisting of a lamp, or lamps and ballast(s) (when applicable), together with the parts designed to distribute the light (reflector, lens, diffuser), to position and protect the lamps, and to connect the lamps to the power supply.

X. DEFINITIONS - Ordinance Text

<p>Luminaire Lumens</p>	<p>For luminaires with relative photometry per IES, it is calculated as the sum of the initial lamp lumens for all lamps within an individual luminaire, multiplied by the luminaire efficiency. If the efficiency is not known for a residential luminaire, assume 70%. For luminaires with absolute photometry per IES LM-79, it is the total luminaire lumens. The lumen rating of a luminaire assumes the lamp or luminaire is new and has not depreciated in light output.</p>
<p>Lux</p>	<p>The SI unit of illuminance. One lux is one lumen per square meter. 1 Lux is a unit of incident illuminance approximately equal to 1/10 footcandle.</p>
<p>Mounting height</p>	<p>The height of the photometric center of a luminaire above grade level.</p>
<p>New lighting</p>	<p>Lighting for areas not previously illuminated; newly installed lighting of any type except for replacement lighting or lighting repairs.</p>
<p>Object</p>	<p>A permanent structure located on a site. Objects may include statues or artwork, garages or canopies, outbuildings, etc.</p>
<p>Object Height</p>	<p>The highest point of an entity, but shall not include antennas or similar structures.</p>
<p>Ornamental lighting</p>	<p>Lighting that does not impact the function and safety of an area but is purely decorative, or used to illuminate architecture and/or landscaping, and installed for aesthetic effect.</p>

Mounting Height: The horizontal spacing of poles is often measured in units of "mounting height". Example: "The luminaires can be spaced up to 4 mounting heights apart."

X. DEFINITIONS - Ordinance Text

<p><i>Ornamental Street Lighting</i></p>	<p>A luminaire intended for illuminating streets that serves a decorative function in addition to providing optics that effectively deliver street lighting. It has a historical period appearance or decorative appearance, and has the following design characteristics:</p> <ul style="list-style-type: none"> · designed to mount on a pole using an arm, pendant, or vertical tenon; · opaque or translucent top and/or sides; · an optical aperture that is either open or enclosed with a flat, sag or drop lens; · mounted in a fixed position; and · with its photometric output measured using Type C photometry per IESNA LM-75-01.
<p><i>Outdoor Lighting</i></p>	<p>Lighting equipment installed within the property line and outside the building envelopes, whether attached to poles, building structures, the earth, or any other location; and any associated lighting control equipment.</p>
<p><i>Partly shielded luminaire</i></p>	<p>A luminaire with opaque top and translucent or perforated sides, designed to emit most light downward.</p>
<p><i>Pedestrian Hardscape</i></p>	<p>Stone, brick, concrete, asphalt or other similar finished surfaces intended primarily for walking, such as sidewalks and pathways.</p>
<p><i>Photoelectric Switch</i></p>	<p>A control device employing a photocell or photodiode to detect daylight and automatically switch lights off when sufficient daylight is available.</p>
<p><i>Property line</i></p>	<p>The edges of the legally-defined extent of privately owned property.</p>

X. DEFINITIONS - Ordinance Text

Relative photometry	Photometric measurements made of the lamp plus luminaire, and adjusted to allow for light loss due to reflection or absorption within the luminaire. Reference standard: IES LM-63.
Repair(s)	The reconstruction or renewal of any part of an existing luminaire for the purpose of its on-going operation, other than relamping or replacement of components including capacitor, ballast or photocell. Note that retrofitting a luminaire with new lamp and/or ballast technology is not considered a repair and for the purposes of this ordinance the luminaire shall be treated as if new. "Repair" does not include normal relamping or replacement of components including capacitor, ballast or photocell.
Replacement Lighting	Lighting installed specifically to replace existing lighting that is sufficiently broken to be beyond repair.
Sales area	Uncovered area used for sales of retail goods and materials, including but not limited to automobiles, boats, tractors and other farm equipment, building supplies, and gardening and nursery products.
Seasonal lighting	Temporary lighting installed and operated in connection with holidays or traditions.
Shielded Directional Luminaire	A luminaire that includes an adjustable mounting device allowing aiming in any direction and contains a shield, louver, or baffle to reduce direct view of the lamp.
Sign	Advertising, directional or other outdoor promotional display of art, words and/or pictures.

X. DEFINITIONS - Ordinance Text

<i>Sky Glow</i>	The brightening of the nighttime sky that results from scattering and reflection of artificial light by moisture and dust particles in the atmosphere. Skyglow is caused by light directed or reflected upwards or sideways and reduces one's ability to view the night sky.
<i>Temporary lighting</i>	Lighting installed and operated for periods not to exceed 60 days, completely removed and not operated again for at least 30 days.
<i>Third Party</i>	A party contracted to provide lighting, such as a utility company.
<i>Time Switch</i>	An automatic lighting control device that switches lights according to time of day.
<i>Translucent</i>	Allowing light to pass through, diffusing it so that objects beyond cannot be seen clearly (not transparent or clear).
<i>Unshielded Luminaire</i>	A luminaire capable of emitting light in any direction including downwards.
<i>Uplight</i>	For an exterior luminaire, flux radiated in the hemisphere at or above the horizontal plane.
<i>Vertical Illuminance</i>	Illuminance measured or calculated in a plane perpendicular to the site boundary or property line.

This section was added since the first public review. It is designed to work closely with the proposed revision to ANSI/IES RP-8 Standard Practice for Roadway and Street Lighting.

Street and roadway lighting is one of the world's largest causes of artificial skyglow. Many adopting agencies will recognize that the MLO will make privately owned lighting more efficient and environmentally responsible than their street lighting systems. But because the process of designing street lighting often requires more precise lighting calculations, applying the MLO directly to street lighting is not advised. Using existing standards of street lighting is recommended, particularly IES RP-8 and AASHTO standards.

Until a new recommended practice for street lighting can be developed, this section can serve to prevent most of the uplight of street lighting systems without setting specific requirements for the amount of light, uniformity of light, or other performance factors. Adopting agencies should include these basic improvements to street lighting along with regulations to private lighting.

Lighting streets with "period" ornamental luminaires that evoke the look of a time when the light source was a gas flame can cause glare if high-lumen lamps are used. Such ornamental street lights should not exceed a BUG rating of G1. If additional illuminance and/or uniformity is desired, the ornamental fixtures should be supplemented by higher mounted fully shielded luminaires, as illustrated in RP-33-99.

Few street lighting warranting processes exist. The adopting agency needs to gauge whether a complex warranting systems is required, or if a simple one using posted speeds, presence of pedestrians, or other practical considerations is sufficient.

Examples of a current street lighting warranting system are included in the Transportation Association of Canada's Guide for the Design of Roadway Lighting 2006.

XI. OPTIONAL STREETLIGHT ORDINANCE - Ordinance Text

Note to the adopting authority: the intent of this section is that it only applies to streets and not to roadways or highways.

A. Preamble

The purpose of this Ordinance is to control the light pollution of street lighting, including all collectors, local streets, alleys, sidewalks and bike-ways, as defined by ANSI/IES RP-8 Standard Practice for Roadway and Street Lighting and in a manner consistent with the Model Lighting Ordinance.

B. Definitions

Roadway or Highway lighting is defined as lighting provided for freeways, expressways, limited access roadways, and roads on which pedestrians, cyclists, and parked vehicles are generally not present. The primary purpose of roadway or highway lighting is to help the motorist remain on the roadway and help with the detection of obstacles within and beyond the range of the vehicle's headlights.

Street lighting is defined as lighting provided for major, collector, and local roads where pedestrians and cyclists are generally present. The primary purpose of street lighting is to help the motorist identify obstacles, provide adequate visibility of pedestrians and cyclists, and assist in visual search tasks, both on and adjacent to the roadway.

Ornamental Street Lighting is defined as a luminaire intended for illuminating streets that serves a decorative function in addition to providing optics that effectively deliver street lighting. It has a historical period appearance or decorative appearance, and has the following design characteristics:

- designed to mount on a pole using an arm, pendant, or vertical tenon;
- opaque or translucent top and/or sides;
- an optical aperture that is either open or enclosed with a flat, sag or drop lens;
- mounted in a fixed position; and
- with its photometric output measured using Type C photometry per IESNA LM-75-01.

XI. OPTIONAL STREETLIGHT ORDINANCE - Ordinance Text

C. Scope

All street lighting not governed by regulations of federal, state or other superceding jurisdiction.

EXCEPTION: lighting systems mounted less than 10.5 feet above street level and having less than 1000 initial lumens each.

D. Master Lighting Plan

The Authority shall develop a Master Lighting Plan based on the American Association of State Highway and Transportation Officials (AASHTO) Roadway Lighting Design Guide GL-6, October 2005, Chapter 2. Such plan shall include, but not be limited to, the Adoption of Lighting Zones and:

1. Goals of street lighting in the jurisdiction by Lighting Zone
2. Assessment of the safety and security issues in the jurisdiction by Lighting Zone
3. Environmentally judicious use of resources by Lighting Zone
4. Energy use and efficiency by Lighting Zone
5. Curfews to reduce or extinguish lighting when no longer needed by Lighting Zone

E. Warranting

The Authority shall establish a warranting process to determine whether lighting is required. Such warranting process shall not assume the need for any lighting nor for continuous lighting unless conditions warrant the need. Lighting shall only be installed where warranted.

XI. OPTIONAL STREETLIGHT ORDINANCE - Ordinance Text

F. Light Shielding and Distribution

All street lighting shall have no light emitted above 90 degrees.

Exception: Ornamental street lighting for specific districts or projects shall be permitted by special permit only, and shall meet the requirements of Table H below without the need for external field-added modifications.

Table H - Uplight Control Requirements for Ornamental Street Lights - by Special Permit Only

Lighting Zone	Maximum Uplight Rating
LZ-0	U-0
LZ-1	U-1
LZ-2	U-2
LZ-3	U-3
LZ-4	U-4