

Chapter 15.22 Outdoor Lighting

Section 15.22.010 Short Title. This Ordinance may be cited as the “Outdoor Lighting Ordinance” of the City of Cambridge (the “City”).

Section 15.22.020 Purpose. The purpose of this Outdoor Lighting Ordinance is to regulate outdoor lighting, as defined in this Ordinance, in the City, the intent being to permit an amount of outdoor lighting that is appropriate to allow for the safe use and enjoyment of outdoor areas, while also mitigating potential nuisance in the form of light trespass and glare to abutters and the public at large, reducing light pollution, and promoting energy conservation.

Section 15.22.030 Definitions.

- A. **Architectural lighting** means lighting designed to reveal architectural beauty, shape and/or form and for which lighting for any other purpose is secondary.
- B. **Building envelope** means the separator between the interior and exterior of a building. Components of the envelope are typically: walls, floors, roofs, fenestrations and doors.
- C. **Correlated color temperature (“CCT”)** means a specification of the color appearance of the light emitted by a lamp, relating its color to the color of light from a reference source when heated to a particular temperature, measured in Kelvin (K).
- ~~D. **Emergency lighting** means lighting that is only activated during an emergency; 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.~~
- ~~E. **Fully shielded light fixture** means a light fixture constructed, installed and maintained in such a manner that all light emitted by the light fixture, either directly from the lamp or a diffusing element, or indirectly by reflection or refraction from any part of the light fixture, is projected below the horizontal plane through the light fixture's lowest light-emitting part.~~
- F. **Glare** means lighting entering the eye directly from luminaires or indirectly from reflective surfaces that causes visual discomfort or reduced visibility.

Carol Lynn Alpert 12/14/2015 5:09 PM

Comment [1]:

Definitions no longer mentioned in ordinance can be deleted: "emergency lighting," "fully shielded light fixture," "lighting pollution" (it's used as "light pollution" - the standard use).

Definitions missing that should be here:
Light Pollution Reduction credit of the U.S. Green Building Council's LEED v4 BD+C rating system

Carol Lynn Alpert 12/14/2015 2:42 PM

Comment [2]: Phrase used nowhere in Ordinance. "Lighting used solely under emergency conditions" appears in the Exemptions, and defines itself.

Carol Lynn Alpert 12/14/2015 2:43 PM

Comment [3]: This category is no longer referred to in this ordinance.

- G. **High Intensity Discharge (“HID”)** means a discharge lamp where the emitted energy (light) is produced by the passage of an electric current through a gas. HID includes mercury, metal halide, and high pressure sodium (“HPS”) lamps.
- H. **Illuminance** means the density of the luminous flux incident on a surface; it is the quotient of the luminous flux by the area of the surface when the latter is uniformly illuminated.
- I. **Lamp** means a source of optical radiation, often called a “bulb” or “tube,” such as incandescent, fluorescent lamps, high-intensity discharge (“HID”) lamps, and low pressure sodium (“LPS”) lamps, as well as light-emitting diode (“LED”) modules and arrays.
- J. **Landscape lighting** means lighting of trees, shrubs, or other plant material as well as ponds and other landscape features.

Light Pollution Reduction credit of the U.S. Green Building Council's LEED v4 BD+C rating system

- K. **Light bulb.** See “Lamp.”
- L. **Light fixture** See “Luminaire” means a complete lighting unit consisting of one or more light bulbs together with the parts designed to distribute the light, to position and protect the lamps and to connect the lamps to the power supply. Sometimes this includes ballasts or drivers, and photocells. For the purpose of this Ordinance, light fixture shall be synonymous with luminaire.
- M. **Light trespass** means lighting that falls beyond the boundaries of the property it is intended to illuminate.
- N. **Lighting** means electric, man-made, or artificial lighting. See lighting equipment.
- O. **Lighting equipment** means equipment specifically intended to provide gas or electric illumination, including but not limited to, lamp(s), luminaire(s), ballast(s), poles, posts, lens(es), electrical wiring, and related structures or other necessary or auxiliary components.
- P. **Lighting plan** means a site plan depicting the property lines of all properties for which lighting is proposed, the location and specification of all exterior light fixtures to be installed within the property, their lumen values, mounting heights, shielding and directionality, controls and the location of all adjacent streets, the uses of abutting properties and properties located directly across a street, any relevant project site conditions, vertical illuminance calculations at property boundaries or LEED project boundaries, ~~lighting boundaries,~~ and any additional information required to demonstrate compliance with applicable standards.
- Q. **Lighting** ~~Light pollution~~ means adverse effects of lighting, as defined in this Ordinance, including, but, not limited to, glare, light trespass, sky glow, energy waste, compromised safety and security, and impacts on the nocturnal environment.

Carol Lynn Alpert 12/14/2015 5:45 PM

Comment [4]: This phrase should be added to the Definitions.

Carol Lynn Alpert 12/14/2015 5:16 PM

Comment [5]: This would be required for Prescriptive Standards.

Carol Lynn Alpert 12/14/2015 5:15 PM

Comment [6]: This term is not used anywhere. "LEED project boundary" is used in the LEED language and may require definition.

Carol Lynn Alpert 12/14/2015 5:16 PM

Comment [7]: "Lighting pollution" is not used in the Ordinance. Only the more proper phrase "Light pollution" is used.

Carol Lynn Alpert 12/14/2015 5:16 PM

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- R. Lighting Zone (“LZ”)** means an area or district within which particular lighting standards apply as set forth in this Ordinance. Lighting Zones are delineated by reference to the districts established with the Zoning Map of the City of Cambridge. **Lighting Zone 3 includes the following applicable zoning districts:** Residence C-3, C-3A or C-3B; Office 2, 2A or 3; Business B or C; Industry B, B-1, B-2 or C; Special Districts 1, 3, 4, 4A, 5, 6, 7, 8, 11, 15 and any other Special District whose general zoning limitations derive from one of the previously listed base zoning districts; Mixed-Use Development District: Kendall Square (MXD) and Cambridgeport Revitalization Development District (CRDD); all Planned Unit Development (PUD) districts and Alewife Overlay Districts (AOD). **Lighting Zone 2 includes the zoning districts not listed under Lighting Zone 3.**
- S. Low-Pressure Sodium (“LPS”)** means a discharge lamp where the light is produced by radiation from sodium vapor at a relatively low partial pressure (about 0.001 torr). LPS is a “tube source” and is monochromatic light.
- T. Lumen** means the unit of measure used to quantify the amount of light produced by a lamp or emitted from a luminaire or light fixture (as distinct from “watt” or other measure of a lamp’s power consumption).
- U. Luminaire** See **“Light Fixture.”** means a complete lighting fixture, consisting of a lamp, or lamps and ballast(s) (when applicable), together with the parts designed to distribute the light from the fixture (i.e., reflector, lens, diffuser), to position and protect the fixture, and to connect the fixture to the power supply.
- V. Lux** means the SI (International System of Units) unit of illuminance. One lux equals one lumen per square meter and is approximately equal to 1/10 of a foot candle.
- W. New lighting** means lighting for areas not previously illuminated, or newly installed lighting of any type, except for replacement lighting or lighting repairs.
- X. Outdoor or exterior lighting** means lighting equipment installed within the property line and outside the building envelope of a subject property, whether attached to poles, building structures, the earth, or any other location, and any associated lighting control equipment.
- Y. Partly shielded light fixture** means a light fixture with opaque top and translucent or perforated sides, designed and maintained to emit most light downward.
- Z. PUBLIC WAY**
- AA. Replacement lighting** means lighting equipment, fixtures, or parts thereof, including lamps and light bulbs, installed in order to replace existing lighting equipment.

Carol Lynn Alpert 12/14/2015 2:46 PM

Comment [8]: awaiting definition

Carol Lynn Alpert 12/14/2015 5:18 PM

Comment [9]: These clarifications rescue the definition from being a tautology and have meaning later on when we use them to get rid of paragraph 3 under General Requirements.

BB. Seasonal lighting means holiday lighting in use for not longer than a six week period in any calendar year.

CC. Shielded directional light fixture means a fixed or adjustable light fixture that also contains a shield, hood, cowl, louver, or baffle to reduce direct view of the lamp.

DD. Substantial renovation means work area defined in construction documents is 50% or more of the gross floor area of the building or 50% of the gross ~~façade~~ of a building.

EE. Sky glow means the brightening of the nighttime sky that results from scattering and reflection of artificial light by moisture and dust particles in the atmosphere, caused by light directed or reflected upwards or sideways, and which reduces ability to view the night sky.

FF. Unshielded light fixture means a light fixture capable of emitting light in any direction.

GG. Vertical illuminance means illuminance measured or calculated in a plane perpendicular to the property boundary or property line of a subject property.

Section 15.22.040 Effective Date This Ordinance shall take effect on three (3) months from the date of enactment.

Section 15.22.050 General Requirements.

- 1) **Conformance with all Applicable Codes.** ~~Except as otherwise provided in this Ordinance,~~ all outdoor lighting, as defined in this Ordinance, shall be installed and maintained in conformance with all applicable federal, state, and local laws, rules, and regulations, including, but not limited to, applicable sections of the Massachusetts Building Code, the Cambridge Zoning Ordinance, and the Cambridge Municipal Code
- 2) **Applicability.** Except as set forth in this Ordinance, all outdoor lighting installed after the effective date of this Ordinance shall comply with the requirements of this Ordinance. This includes, but is not limited to, new lighting ~~equipment, light fixtures,~~ replacement lighting, ~~replacement lamps or bulbs,~~ or any other lighting whether attached to structures, poles, the earth, or any other location, including lighting installed by any third party that receives an electrical permit from the City's Inspectional Services Department. Except as otherwise provided in this Ordinance, all outdoor lighting installed prior to the effective date of this Ordinance shall be altered or replaced so as to comply with these requirements within five (5) years of the effective date of this Ordinance.
- 3) ~~**Replacement of Light Fixtures and Light Bulbs.** When any outdoor light fixture is replaced, the replacement light fixture shall comply with this Ordinance. Where a light bulb is replaced within an existing non-compliant light fixture, and the light fixture itself is not~~

Carol Lynn Alpert 12/14/2015 2:55 PM

Comment [10]: Façade IS defined to mean mainly the front public face of a building. We should substitute "outer covering" or "exterior walls or curtain walls" or "exterior envelope"

Carol Lynn Alpert 12/14/2015 5:32 PM

Comment [11]: This phrase can be interpreted to mean that the terms of the lighting ordinance supersede those of the Zoning Ordinance. (That opposite-than-intended interpretation is lent support by the explicit exemptions regarding federal and state laws and the sign provisions in the Zoning Ordinance.) Therefore, we should reinsert the additional sentence written into the 12/3 simplified version: "Nothing herein shall be deemed to supersede the requirements of the Cambridge Zoning Ordinance, including but not limited to those found in Articles 6.0 and 7.0 thereof, which requirements shall remain in full force and effect. In the event of a conflict between this Ordinance and the Cambridge Zoning Ordinance, the more stringent provision(s) shall prevail."

Carol Lynn Alpert 12/14/2015 5:19 PM

Comment [12]: These words can be removed if the definition of "replacement lighting" is altered as previously shown. Together, these refinements eliminate the need for provision 3, below.

Carol Lynn Alpert 12/14/2015 5:35 PM

Comment [13]: We no longer need this confusingly-drafted provision. Replacement fixtures are already covered in "2) Applicability" so we need only add replacement bulbs to that list or add them to the definition of "replacement lighting."

In addition, paragraph 4 below, "Interim Modifications," covers the circumstances we agreed to cover that are not driven by the need to replace a fixture.

Paragraph 3 only added confounding language -- and, it could be read so as to explicitly allow non-compliant fixtures if the bulbs have been changed - beyond the 5 years.

replaced or repaired—aside from the replacement of the light bulb, the light fixture may remain—provided that the replacement light bulb is compliant with the applicable Standards set forth in this Ordinance, and provided that the light fixture is not otherwise altered to be in greater non-compliance with the requirements of this Ordinance.

- 4) **Interim Modifications.** Within six months of the effective date of this Ordinance, property owners shall make improvements to eliminate or substantially ameliorate light trespass onto adjacent lots by: (1) replacing a light bulb(s) within an existing light fixture to be in conformance with the Standards this Ordinance, and/or (2) changing the shielding or direction of elements of an existing fixture to be directed downward or away from abutting properties.
- 5) **Light Color Standard.** Correlated color temperature of any outdoor light source shall not exceed 3500 Kelvins, unless introduced as part of an architectural lighting scheme designed to produce deep blue or violet hues.
- 6) **Substantial Renovation.** If any substantial renovation of an existing building or property occurs after the effective date of this Ordinance, then that property shall be required to meet either the Prescriptive or Performance Standards set forth in this Ordinance.
- 7) **Prescriptive Standard and Performance Standard Standards and Performance Standards.**

Carol Lynn Alpert 12/14/2015 5:36 PM
Comment [14]: Typically one would be changing directionality or shielding not of the fixture itself, but of one of its lamps.

Carol Lynn Alpert 12/14/2015 5:36 PM
Comment [15]: This qualification is introduced in response to Glenn Heinmiller's concern about intentionally blue lighting for architectural design. I agree with his concern.

Carol Lynn Alpert 12/14/2015 4:49 PM
Comment [16]: We should be consistent about referring to each of these as a "Standard" and to more than one as "Standards"

As set forth below, all outdoor lighting must comply with one of the two following standards, the Prescriptive Standard or the Performance Standard, as well as the Light Color Standard.

7a) Prescriptive Standard Standards

Outdoor Lighting Category	Maximum -Allowed Lumens Per Light Fixture	Maximum Height	Shielding and Direction
Unshielded or partly shielded light fixture placed not less than 4 feet apart	315	12 feet above the surface of the area to be illuminated	Not applicable

Up to two unshielded or partly shielded light fixtures located at a main entry, placed not less than 4 feet apart.	630	12 feet above the surface of the area to be illuminated	Not applicable
Shielded directional light fixtures for entries, walkways, and architectural lighting, placed not less than 4 feet apart.	1,050	12 feet above the surface of the area to be illuminated	All light fixtures shall be located, aimed, and shielded so as to prevent direct light trespass and greatly minimize reflective light trespass across property boundaries.
Shielded directional light fixtures for parking areas, driveways, or outdoor loading bays.	1260	14 feet above the surface of the parking area, driveway or loading bay	All light fixtures shall be located, aimed, and shielded so as to prevent direct light trespass and greatly minimize reflective light trespass across property boundaries.

7b) Performance Standard. Standards

1. Standards.

The project must meet the requirements of the Light Pollution Reduction credit of the U.S. Green Building Council's LEED v4 BD+C rating system,

Application Requirements.

In order to apply the Performance Standard, a lighting plan as defined in this Ordinance or as required to that meets the requirements of the Light Pollution Reduction credit of the U.S. Green Building Council's LEED v4 BD+C rating system LPR credit certification must be prepared by a registered architect or professional engineer licensed in the Commonwealth of Massachusetts, and submitted to the Inspectional

Carol Lynn Alpert 12/14/2015 5:37 PM
Comment [17]: We should keep formatting in accordance with 7a above.

Carol Lynn Alpert 12/14/2015 4:51 PM
Comment [18]: We should be careful to refer to the Prescriptive Standard and the Performance Standard, not Standards - unless referring to more than one of them.

Carol Lynn Alpert 12/14/2015 4:41 PM
Comment [19]: This phrase should be added to the Definitions.

Services Department with accompanying calculations certifying that the lighting depicted in the lighting plan shall conform to the Performance Standards set forth in this Ordinance. The Performance Standards shall not be applied unless such a lighting plan has been approved by the Commissioner of Inspectional Services or her/his designee. Nevertheless, should the lighting as installed and maintained fail to meet the minimum LEED v4 BD+C LPR credit requirements and be determined to be in violation of the light trespass protections afforded in the LEED LPR system, than that lighting shall be considered in violation of this Ordinance.

8) Exemptions from Applicability.

- A.** Lighting within public ways for the principal purpose of illuminating public ways. No exemption shall apply to any lighting within a public way when the purpose of the luminaire or light fixture is to illuminate areas outside the public way, other than as provided in this Ordinance.
- B.** Lighting for public parks or public art that is accessible to the general public and is commissioned, owned, or operated by a city, state, or federal entity, or that is required by the City, by special permit, or otherwise by law.
- C.** Lighting for public monuments, statuary, or the national flag in cases where compliance with the Standards of this Ordinance are specifically prohibited by law or conflicting with superseding requirements.
- D.** Architectural lighting that has received a Certificate of Appropriateness from the Cambridge Historical Commission or neighborhood conservation district commission.
- E.** Architectural lighting of structures or buildings listed on the National Register of Historical Places.
- F.** Lighting solely for signs as regulated under Article 7 of the Cambridge Zoning Ordinance.
- G.** Lighting for theatrical or television production or performance areas, if an electrical permit has been received from the City's Inspectional Services Department.
- H.** Lighting for work areas at construction sites, if an electrical permit has been received from the City's Inspectional Services Department.
- I.** Underwater lighting in swimming pools and other water features.
- J.** Seasonal lighting as defined in this Ordinance.
- K.** Lighting that is only used under emergency conditions.
- L.** Lighting required by federal, state, or local laws, rules or regulations.

M. Lighting for sports facilities, including but not limited to unconditioned rinks, open courts, fields, and stadiums. However, all light fixtures shall be located, aimed, and shielded so as to prevent direct light trespass and greatly minimize reflective light trespass across property boundaries, ~~except if aimed and directed in a way that causes unnecessary light trespass and sky glow.~~ Lighting for the playing surfaces must be turned off after the activities have ceased

Carol Lynn Alpert 12/14/2015 5:38 PM
Comment [20]: Use the same language as in the Prescriptive Standard table.

Section 15.22.060 Administrative Exemption.

1. The Commissioner of Inspectional Services (ISD) shall have the authority to grant a partial or complete waiver of the requirements of this Ordinance where the property owner has submitted an Application for Administrative Exemption.
2. Any person seeking an exemption to this Ordinance shall file an application with ISD. The Application for Administrative Exemption must demonstrate that: a) bringing the source of light for which the administrative exemption is sought into compliance with this Ordinance would constitute a demonstrably unreasonable hardship on the applicant, as balanced against the potential impacts on abutters and others affected by the lighting; or b) bringing the source of light for which the administrative exemption is sought into compliance with this Ordinance would result in conditions that are detrimental to public health, safety, or welfare. The property owner seeking the administrative exemption shall file the Application for Administrative Exemption with the Inspectional Services Department demonstrating one of the two requirements for an administrative exemption listed above.
3. ISD shall then give fair notice to abutters. Any individual who claims to be adversely affected by allowance of the exemption may file a statement with ISD containing any information to support his/her claim.
4. In determining whether to grant or deny the application, the Commissioner of Inspectional Services shall balance the hardship to the applicant and the community, of not granting the exemption, against the adverse impact on the health, safety, and welfare of persons affected, the adverse impact on property affected, and any other adverse impacts of granting the special exemption. Applicants for exemption and other persons contesting exemption may be required to submit any information the Commissioner of Inspectional Services may reasonably require. In granting or denying an application, the Commissioner shall place on public file a copy of the decision and the reasons for denying the exemption.
5. Exemptions shall be granted by notice to the applicant containing all necessary conditions, including a time limit on the permitted activity. The exemption shall not become effective until all conditions are agreed to by the applicant. Noncompliance with any condition of the exemption shall terminate it and subject the person holding it to those provisions of this Ordinance.
6. The Administrative Exemption may be reviewed, adjusted, or repealed by the Commissioner of Inspectional Services, if appropriate, after two years.
7. The Commissioner of Inspection Services may issue guidelines defining the procedures to be followed in applying for Administrative Exemption ~~a special variance~~ and the criteria to be considered in deciding whether to grant Administrative Exemption. ~~a special variance.~~

Carol Lynn Alpert 12/14/2015 4:56 PM
Comment [21]: "variance" has not been used to date.

Section 15.22.070 Enforcement.

- A. Enforcement Officials.** The Commissioner of Inspectional Services or her/his designee shall be the authorized enforcement personnel charged with the enforcement of the provisions of this Ordinance.
- B. Complaints.** The Inspectional Services Department shall provide a system for receiving and responding to complaints of non-compliance with this Ordinance in a timely manner.
- C. Violations.** Authorized enforcement personnel may order and specify remedial actions to be taken by a violator of this Ordinance to achieve compliance, or issue citations, pursuant to G. L. c. 40, § 21D, for violations of these provisions, assessing fines of three hundred dollars for each such violation. Each day such a violation continues shall constitute a separate offense. Additionally, any person found to be in violation of any of the provisions of this Ordinance may be prosecuted for a misdemeanor and upon conviction thereof shall be fined three hundred dollars for each such misdemeanor.
- D. Injunction.** As an additional remedy, any outdoor lighting installed or maintained in violation of any provision of this Ordinance may be subject to abatement summarily by a restraining order or injunction issued by a court of competent jurisdiction.
- E. Suspension or Revocation of Permit.** As an additional remedy, any enforcement official hereunder may summarily suspend, and after a hearing may revoke, any license or permit, including a building, demolition, or electrical permit.

Carol Lynn Alpert 12/14/2015 5:42 PM

Comment [22]: I believe we need this if this is to be a "complaint-driven" process.