

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.

- 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.
- 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](#), and any additional information required to demonstrate compliance with applicable standards.
- Q. Lighting 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.

- 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.

NEED DEFINITION OF "PUBLIC WAY"

- Z. Replacement lighting** means lighting installed in order to replace existing lighting

Seasonal lighting means holiday lighting in use for not longer than a six week period in any calendar year, ~~except as specified in Article 7, Section 7.20 of the Cambridge Zoning~~

~~Ordinance, where in Residence A, B, C, and C-1 districts no outdoor floodlighting or decorative lighting, except lighting primarily designed to illuminate walks, driveways, outdoor living areas, or outdoor recreational facilities, and except temporary holiday lighting in use for not longer than a four week period in any calendar year, shall be permitted.~~

AA. Shielded directional light fixture means a light fixture that includes an adjustable mounting device allowing aiming in more than one direction and that also contains a shield, hood, cowl, louver, or baffle to reduce direct view of the lamp.

BB. Substantial rehabilitation renovation means work area defined in construction documents is 50% or more of the gross floor area of the building or 50% of the exterior envelope of a building.

CC 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.

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

FF. 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. ~~Provisions in the Cambridge Zoning Ordinance Article 7.20 regarding lighting in residential zones A, B, C, and C-1 shall remain in force alongside provisions in this Ordinance. Provisions in the Cambridge Zoning Ordinance Articles 6.41, 6.46, and 6.93 regarding lighting parking areas and loading bays remain in force alongside provisions in this ordinance. Nothing in this Ordinance shall be construed to override provisions in the Cambridge Zoning Ordinance Article 7.0 on Signs and Illumination. 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 12/3/2015 10:23 AM
Comment [1]: THIS DETAIL IS COMPLETELY UNNECESSARY, SINCE THE ORDINANCE ALREADY SAYS THAT Z.O. 7.20 IS PRIMARY. NO NEED TO SPECIFICALLY CALL IT OUT HERE, SINCE HAVING HOLIDAY LIGHTING FOR AN EXTRA TWO WEEKS IS A TRIVIAL MATTER. WHY GET PEOPLE CONFUSED OR FIRED UP ABOUT THIS DISTINCTION - WHICH IS UNLIKELY TO ADD ANY SIGNIFICANT HARM OR PROTECTION?

Carol Lynn Alpert 12/3/2015 10:26 AM
Comment [2]: "rehabilitation" has a specific meaning in Federal documents - referring to remediation of substandard conditions.

Carol Lynn Alpert 12/3/2015 10:27 AM
Comment [3]: A property owner could renovate the entire exterior or facade of a building without triggering any interior gross floor area calculation unless we include this.

Carol Lynn Alpert 12/3/2015 10:37 AM
Comment [4]: This is the official language advised by Mark Bobrowski who literally "wrote the book" on Mass land use" (from C. Teague)

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, replacement lighting, 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~~ ~~changed~~ so as to comply with these requirements within five (5) years of the effective date of this Ordinance.

Carol Lynn Alpert 12/3/2015 1:43 PM
Comment [5]: Replaced was originally here, and should stay here. 'Changed' means the same thing as "altered."

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

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 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 Prescriptive initial lumen Standards and Light Color Standards ~~or vertical illuminance 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.

Carol Lynn Alpert 12/3/2015 2:04 PM
Comment [6]: This is the wrong place for this because it interrupts the flow of paragraphs about what has to be done when. Instead, it is inserted as #7 below.

4) **Interim Modifications.** Within six months of the effective date of this Ordinance, property owners shall make improvements ~~where possible~~ to eliminate or substantially ameliorate light trespass onto adjacent lots by: (1) replacing a light bulb within an existing light fixture to be in conformance with the ~~lumen~~ Prescriptive Standards of this Ordinance, and/or (2) changing the direction of an existing fixture to be directed downward or away from abutting properties. ~~They may also choose to replace the light fixture to achieve compliance.~~

~~5) **Substantial Rehabilitation-Renovation.** If any substantial renovation of an existing building or property to an existing or new use is to occur after the effective date of this Ordinance, then that property shall be required to meet either the Prescriptive or the Performance Standards set forth in this Ordinance.~~

6) **Light Color Standard.** Correlated color temperature of any outdoor light source shall not exceed 3500 Kelvins.

Carol Lynn Alpert 12/3/2015 2:05 PM
Comment [7]: Please note that the new modified definition of 'Substantial Renovation' in this draft includes "or 50% of the exterior envelope of the building." (Definition BB, pg. 4)

7) Prescriptive Standards and Performance Standards.

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

~~Exterior lighting that meets the standards set forth in the table below shall be permitted in the City; however, for any new construction, or any substantial rehabilitation of an existing building for an existing or new use, that totals 10,000 square feet of Gross Floor Area or more in Lighting Zone 2, or 25,000 square feet of Gross Floor Area or more in Lighting Zone 3 that occurs on a property after the effective date of this Ordinance, then that property shall be required to meet the Performance Standards set forth in this Ordinance. Any other lighting that does not meet the standards set forth in the table below may be permitted in the City if it meets the Performance Standards set forth in this Ordinance.~~

Prescriptive Standards

Outdoor Lighting Category	Max Lumens per light fixture	Max Height	Shielding and Direction
Unshielded or partly shielded light fixtures for entries and walkways , placed not less than 4 feet apart.	315	12 feet above the surface of the area to be illuminated	Not applicable
Unshielded or partly shielded light fixtures for landscape lighting	525	Not applicable	Not applicable
<u>Up to two</u> unshielded or partly shielded light fixtures located in a main entry area, placed not less than 4 feet apart.	630	12 feet above the surface of the area to be illuminated	Not applicable
Fully shielded or 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 greatly minimize <u>prevent</u> light pollution and light trespass across property boundaries.
Fully shielded or shielded directional light fixtures for architectural.	1,260	Not applicable	All light fixtures shall be located, aimed, and shielded so as to greatly minimize light pollution and light trespass across property boundaries.
Fully shielded or 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 greatly minimize <u>prevent</u> light pollution and light trespass across property boundaries. <u>L</u> ighting must also conform to Zoning Ordinance Article 6.41, 6.46, and 6.93 requirements.

Performance Standards.

An outdoor lighting installation may only exceed the limitations set forth in the Prescriptive Standards in this Ordinance if the lighting complies with the Performance Standards in this Ordinance. As set forth above, for any new construction, or any substantial rehabilitation of an existing building for an existing or new use, that totals 10,000 square feet of Gross Floor Area or more in Lighting Zone 2, or 25,000 square feet of Gross Floor Area or more in Lighting Zone 3 that occurs on a property after the effective date of this Ordinance, then that property shall be required to meet the Performance Standards set forth below.

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, including its light trespass limitations.

2. **Application Requirements.** In order to apply the Performance Standards, a lighting plan as defined in this Ordinance or as required to meet LEED LPR credit certification must be prepared by a registered architect or professional engineer licensed in the Commonwealth of Massachusetts, and submitted to the Inspectional 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.

H. Exemptions from Applicability.

1. 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.
2. Lighting for public parks or public art that 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 to be non-conforming with this Lighting Ordinance. ~~accessible to the general public.~~
3. Lighting for public monuments, statuary, or the national flag, except if aimed and directed in a way that causes unnecessary light trespass and sky glow.
4. Architectural lighting that has received a Certificate of Appropriateness from the Cambridge Historical Commission or neighborhood conservation district commission.
5. Architectural lighting of structures or buildings listed on the National Register of Historical Places.
6. Lighting solely for signs as regulated under Article 7 of the Cambridge Zoning Ordinance.
7. Temporary Lighting for theatrical or television production or performance areas, if an electrical permit has been received from the City's Inspectional Services Department.
8. Lighting for work areas at construction sites, if an electrical permit has been received from the City's Inspectional Services Department.
9. Underwater lighting in swimming pools and other water features.
10. Seasonal lighting as defined in this Ordinance.
11. Lighting for hospital emergency departments, including associated helipads.
12. Lighting that is only used under emergency conditions.
13. Lighting that is required by federal, state, or local laws, rules or regulations to be in non-conformance with this Ordinance.
14. Lighting for sports facilities, including but not limited to unconditioned rinks, open courts, fields, and stadiums, except if aimed and directed in a way that causes unnecessary light trespass and sky glow.

Carol Lynn Alpert 12/3/2015 2:06 PM
Comment [8]: Needs definition

Carol Lynn Alpert 12/3/2015 2:09 PM
Comment [9]: If we don't specify some limitation here, this exemption is a trespass and light pollution loophole that allows any governing entity to disregard the intent of the ordinance. Instead, we want these entities to make an effort to conform UNLESS specifically required by some other law or permit to create a non-conforming installation.

Carol Lynn Alpert 12/3/2015 2:07 PM
Comment [10]: False equation of non-conformance lighting with accessibility. We're talking about lighting which makes sites MORE accessible by reducing glare.

Carol Lynn Alpert 12/3/2015 2:10 PM
Comment [11]: Again, unless we add this modifier, this is a carte blanche to light up the sky (light pollution) and to cause trespass into upper stories of apartment houses and buildings.

Carol Lynn Alpert 12/3/2015 11:48 AM
Comment [12]: If we don't specify this, this exemption is a big loophole that allows any governing entity to disregard the intent of the ordinance. We want them to conform UNLESS specifically required to be in non-conformance.

Carol Lynn Alpert 12/3/2015 2:12 PM
Comment [13]: Again, unless we add this modifier, this is a carte blanche to light up the sky (light pollution) and to cause trespass into upper stories of apartment houses and buildings.

Section 15.22.060 Administrative Exemption. The Commissioner of Inspectional Services shall have the authority to grant a brief delay, or a partial or complete waiver of the requirements of this Ordinance where the property owner has submitted an Application for Administrative Exemption demonstrating that: 1) 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 in the short term, as balanced against the potential impacts on abutters and others affected by the lighting; or 2) bringing the source of light for which the administrative exemption is sought into compliance with this Ordinance within the next year 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. **ISD shall then give fair notice to abutters of the property applying for an Administrative Exemption and allow them time to submit any information relevant to the pending petition.** Other persons contesting the exemption may be asked to submit any information the Commissioner may reasonably require. In granting or denying the exemption or negotiating a delay, the Commissioner will place on public file a copy of the decision and the reasons for granting or denying the exemption. All exemptions should be periodically reviewed every three years.

Carol Lynn Alpert 12/3/2015 2:20 PM
Comment [14]: In principle, we can't have it that getting an Administrative Exemption is easier/faster/cheaper than hiring an electrician to replace a few light fixtures. Plus, we can't have this be a lifetime exemption. We should build in the option for the City to grant a brief delay, and we should build in a sunset for the exemption, after which it must be reapplied for.

Carol Lynn Alpert 12/3/2015 11:56 AM
Comment [15]: This should follow the established procedure for zoning exemptions shouldn't it?

Carol Lynn Alpert 12/3/2015 11:58 AM
Comment [16]: Technology is rapidly changing, and new solutions may become available.

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. 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.
- C. 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.
- D. 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.