

## 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, 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. ~~overlay zoning system establishing legal limits for lighting for particular parcels, areas, or districts in a community.~~ **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.**

**Commented [BC1]:** Proposed edit to definition of Lighting Zone by Jeff Roberts so it is not confused with the zoning ordinance.

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

**Commented [L2]:** CLA asked if we can offer an example here of what areas LZ 2 includes. PC said to be careful in case a new zone is developed in future, we don’t want to leave it out. Waiting response from Jeff Roberts

**Commented [L3]:** CLA Clarify with Legal

**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** means work area defined in construction documents is 50% or more of the gross floor area of the building.

**C C 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.

~~**DD. Temporary lighting** means lighting not covered under an electrical permit issued by the City's Inspectional Services Department and installed and operated for periods up to 30 days, and thereafter, completely removed and not operated again for a period of at least 630 days.~~

**Commented [BC4]:** Task Force agreed to remove Temporary Lighting but will need to be reviewed by the Law Department.

**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 C1 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.

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.

**Commented [JCR5]:** I’d advise against calling out specific parts of the zoning ordinance since they could be modified independently of this ordinance. My recommendation would be simply this:

“Requirements in the Cambridge Zoning Ordinance applicable to lighting shall remain in force alongside provisions in this Ordinance and shall not be superseded by this Ordinance.”

**Commented [L6]:** Wording needs to be updated. Careful about keeping this a complaint driven process.

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 initial lumen 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. ~~Any change out replacement of 25% or more of existing outdoor light fixtures shall trigger change out of require all existing outdoor light fixtures to be brought into conformance with this Ordinance.~~

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 standards of this Ordinance, and/or (2) changing the direction of an existing fixture to be directed downward or away from abutting properties.

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

6) **Prescriptive Standards.**

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

**Commented [L7]:** For substantial renovation, please think about the size of the building at 50% you want to trigger. I don’t want to trigger 10KSF buildings with on 5KSF of work being done to use the Performance Standard

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.

Outdoor Lighting Category	Maximum -Allowed Lumens Per Light Fixture	Maximum Height	Shielding and Direction
Unshielded or partly shielded light fixture for entries, work areas, or walkways, placed not less than 4 feet apart	315	12 feet above the surface of the area to be illuminated	Not applicable
<u>Unshielded or partly shielded light fixtures for landscape lighting</u>	<u>525</u>	<u>Not applicable</u>	<u>Not applicable</u>
Unshielded or partly shielded light fixtures located <u>in a front yard between the building and street</u> 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

**Commented [BC8]:** Proposed edit submitted by CLA limits any uplighting to only entries, work areas, and walkways. This eliminates architectural and landscape uplighting in this category. Paul Lutkevich and Glenn Heinmiller raised concerns that detailing the Prescriptive categories to this degree does not improve lighting. The limits need to be placed on the lumens per fixture and type of fixture, not the uses.

**Commented [BC9]:** Paul Lutkevich and Glenn Heinmiller raised concerns that detailing the Prescriptive categories to this degree does not improve lighting. The limits need to be placed on the lumens per fixture and type of fixture, not the uses.

Fully shielded or shielded directional light fixtures for entries and walkways, placed not less than 4 feet apart.	1,050	12 feet above the surface of the area to be illuminated	<u>All light fixtures shall be located, aimed, and shielded so as to greatly minimize light pollution and light trespass across property boundaries.</u>
Fully shielded or shielded directional <del>light fixtures and for architectural, - and landscape lighting.</del>	1,260	Not applicable	<u>All light fixtures shall be located, aimed, and shielded so as to greatly minimize light pollution and light trespass across property boundaries.</u>
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	<u>All light fixtures shall be located, aimed, and shielded so as to greatly minimize light pollution and light trespass across property boundaries. and lighting must also conform to Zoning Ordinance Article 6.41, 6.46, and 6.93 requirements.</u>

**Commented [L10]:** Wording needs to be strengthened.

**Commented [L12]:** Wording needs to be strengthened.

**Commented [L11]:** Update for Landscape lighting via PB

**Commented [L13]:** Wording needs to be strengthened.

**Commented [JCR14]:** See above, I think it might be problematic to refer to sections of the Zoning Ordinance where it might be independently amended by the Council.

**Commented [BC15]:** This is the proposed revision to this section based on comments at the last Task Force meeting but before comments from DRAFT submitted by CLA that move this section under Applicability.

Proposed language for this section submitted by CLA is not included in this draft to allow for readability.

**Commented [BC16]:** Peter Calkins expressed concerns that the language under the Performance Standard could be interpreted to require all property owners meeting size thresholds in Lighting Zone 2 & 3 to prepare and submit a lighting plan to prove that their buildings comply with the LEED Light Pollution Reduction Credit; regardless if a complaint has been filed.

In particular, buildings in Lighting Zone 3 may have been designed based on higher FAR limits and surrounded by similar structures and are not offending the neighboring properties. These structures should not be required to comply with an "arbitrary" limit and be forced to change existing fixtures if a complaint is not filed.

**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.

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 LPC 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.

**Commented [JCR17]:** This entire section may require more detail as to what LEED means, what USGBC means, and how compliance is demonstrated and certified.

**Commented [BC18]:** Peter Caulkins raised concern that this will be interpreted that building owners will automatically be considered out of compliance if a lighting plan is not submitted after 5 years to prove the building is in compliance, even if a complaint has not been raised.

**Commented [BC19]:** Law Department might decide to include the language of the LEED-LPRC in the ordinance rather than referring to the USGBC's version.

## 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 accessible to the general public.
3. Lighting for public monuments, statuary, or the national flag.
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

**Commented [CA20]:** Temporary lighting in this ordinance can last 30 days. Theatrical lighting is intense and should be short-term.

**Commented [BC21]:** Requesting that Law Department remove "Temporary" from this exemption.



performance areas, if an electrical permit has been received from the City's Inspectional Services Department.

- 8. ~~Temporary~~ 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. ~~Temporary lighting or s~~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 required by federal, state, or local laws, rules or regulations.
- ~~13.~~14. Lighting for sports facilities, including but not limited to unconditioned rinks, open courts, fields, and stadiums.

**Commented [BC22]:** Requesting that Law Department remove "Temporary" from this exemption.

**Commented [BC23]:** CLA proposed that "Temporary" be deleted from this exemption.

**Commented [L24]:** We cannot legally stipulate this.

**Commented [BC25]:** Addition of an exemption for sports facilities.

**Section 15.22.060 Administrative Exemption.** The Commissioner of Inspectional Services 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 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, as balanced against the potential hardships 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 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. ~~The ISD shall give fair notice to abutters and others affected by the lighting and provide an opportunity for them to state their case. All decisions on administrative exemptions shall state the reasons clearly and be available as public records of the property applying for an Administrative Exemption.~~

**Commented [JCR26]:** I'm not sure if "hardships on abutters" is an established concept, hardship usually means that for some reason an individual is unduly constrained by having to follow the regulation.

Maybe the intention is meant to be "impacts on abutters" which is more typical as a way to justify the regulation.

Other persons contesting the exemption may be asked to submit any information the Commissioner may reasonably require. In granting or denying the exemption, the Commissioner will place on public file a copy of the decision and the reasons for granting or denying the exemption.

**Commented [L27]:** Example from the Noise Ordinance. Can we add a notification of abutters?

**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](#)