



# **MODEL MUNICIPAL DARK SKY LIGHTING POLICY FOR CONNECTICUT**

**May 2024**

# Introduction

This model municipal dark sky lighting policy for Connecticut is a starting point for local governments seeking to regulate and limit nighttime lighting in their town, city, village, or downtown area. Municipalities that adopt these regulations will help residents, businesses, and property owners to save energy and money, reduce unnecessary carbon emissions associated with wasted light, reduce light pollution, minimize wildlife disruption, and in some cases improve public safety.

This model policy is intended to provide clarity and accuracy for CT towns and cities on current lighting best practices, to guide their rule-making process. It is consistent with CT state law and the CT State Building Code. Local governments should ask their municipal attorney to review the proposed amendment for legal soundness and compliance with existing regulations.

Light pollution in North America is increasing 10 percent annually, according to a 2023 study.<sup>1</sup> Efforts to better regulate and understand changes in light pollution levels have grown in recent years, as communities reevaluate the importance of the natural nighttime environment as habitat for humans and wildlife and flora that have evolved with regular cycles of day and night.

Studies show that excessive nighttime lighting can result in a range of harms, from energy waste, increased energy consumption, and unnecessary greenhouse gas emissions to disrupted ecosystems and avian mortalities linked to building collisions. Some studies have also pointed to the negative human health impacts of light pollution, including disrupted sleep and over-burdening the endocrine system.<sup>2</sup>

**These model lighting standards can be adopted in whole or in part—and adapted to suit the needs of each individual community. As written, they are not retroactive; however, municipalities could adjust them to make certain provisions apply to existing buildings or create a timeline for full compliance (for example, within 5 years).** This policy emphasizes the importance of reviewing lighting plans during the permitting process and following internationally recognized standards.

Several towns and cities in Connecticut have adopted robust lighting standards to limit light pollution through their municipal codes and ordinances, including Greenwich and New Haven.<sup>3</sup> However, these regulations vary considerably in their standards and

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<sup>1</sup> Christopher C. M. Kyba *et al.*, “Citizen scientists report global rapid reductions in the visibility of stars from 2011 to 2022.” *Science* **379**, 265–268 (2023). DOI: [10.1126/science.abq7781](https://doi.org/10.1126/science.abq7781)

<sup>2</sup> American Medical Association, “AMA adopts guidance to reduce harm from high intensity street lights,” June 14, 2016, [www.ama-assn.org/press-center/press-releases/ama-adopts-guidance-reduce-harm-high-intensity-street-lights](https://www.ama-assn.org/press-center/press-releases/ama-adopts-guidance-reduce-harm-high-intensity-street-lights); United Nations Environmental Programme, “Global light pollution is affecting ecosystems—what can we do?,” March 13, 2020, [www.unep.org/news-and-stories/story/global-light-pollution-affecting-ecosystems-what-can-we-do](https://www.unep.org/news-and-stories/story/global-light-pollution-affecting-ecosystems-what-can-we-do)

<sup>3</sup> Town of Greenwich, Building Zone Regulations, “Proposed Zoning Text Amendment to Revise Division 14 Lighting Requirements. Application PLPZ 2023 00405, approved at the PZC’s 3/19/2024 Meeting,” March 19, 2024, <https://www.greenwichct.gov/442/Building-Zone-Regulations>; and City of New Haven,

comprehensiveness, creating a patchwork of different codes and policies, which can be confusing for designers, engineers, and code officials who work across jurisdictions. There is a need for a common state-wide standard for limiting unnecessary nighttime lighting, which these model regulations aim to provide.

These regulations are informed by lighting regulations in different CT towns and cities as well as the [Five Principles for Responsible Outdoor Lighting](#) developed by DarkSky International and Illuminating Engineering Society of North America (IES).<sup>4</sup> These principles emphasize that nighttime lighting should be useful, properly shielded, at the right light levels (as measured in lumens), controlled by adaptive technologies such as timers and motion sensors, and warm spectrum (under 2,700 kelvin).



Most often, this model policy will be adopted by a local government as an amendment to the existing zoning regulations or municipal code. However, it can easily be adapted to fit into other municipal sustainability initiatives and energy conservation measures, including incentivized sustainability programs.

Zoning Ordinance, Sec. 60.1 – Exterior Lighting, [https://library.municode.com/ct/new\\_haven/codes/zoning?nodeId=ZOOR\\_ARTVIISIRE\\_S60.1EXLI](https://library.municode.com/ct/new_haven/codes/zoning?nodeId=ZOOR_ARTVIISIRE_S60.1EXLI)

<sup>4</sup> In 2011, the International Dark Sky Association (now DarkSky) and IES released a Model Lighting Ordinance,<sup>4</sup> which was the result of extensive efforts by national lighting experts to identify prevailing best practices. However, its complexity and identification of multiple lighting zones requiring different standards did not always match community intent for a straightforward, easy-to-follow law.

## Section 1. Dark Sky Lighting.

### A. PURPOSE.

The purpose of these regulations is to set lighting standards to reduce glare, raise public awareness of energy conservation, avoid sky glow caused by upward illumination, avoid light trespass onto adjacent properties and public streets, improve public safety through proper lighting, and reduce light pollution, which is known to contribute to wildlife mortality, reduced visibility of the night sky, and adverse impacts on human health.

### B. APPLICABILITY

These standards apply in all zones and districts whenever an applicant is required to obtain a building permit or whenever exterior lighting is installed, modified, refurbished, repaired, or serviced, as well as to interior lighting at non-residential buildings as set forth in Section 1.E.1, except as herein provided.

### C. SUBMITTAL REQUIREMENTS FOR COMMERCIAL AND SUBDIVISION

Commercial and subdivision projects subject to lighting regulations shall submit the following:

1. A site plan indicating the location of all outdoor lighting fixtures.
2. A description of each lighting fixture. This description includes, but may not be limited to, manufacturer's catalog cuts and drawings (including sections if requested), lamp types, lamp color ratings and lumen output ratings.
3. Photometric plans, prepared, stamped and signed by a licensed professional engineer qualified in outdoor lighting, depicting the location of all outdoor lighting fixtures and building-mounted lighting fixtures and a maximum ten-foot by ten-foot grid of both the initial and maintained lighting levels on the site, including any impact on adjacent properties.
4. A project lighting plan indicating how the lighting complies with the requirements set out in the Connecticut State Building Code for outdoor and indoor lighting. Under state law, all exterior lighting must comply with the requirements of the Connecticut State Building Code, which incorporates the Light Pollution Controls amendment to the International Building Code (Sec. 2703), requiring all exterior luminaires to be full cutoff with limited exceptions, and the 2021 International Energy Conservation Code provisions on exterior lighting controls (C405.2.7).

5. The project lighting plan shall indicate how lighting has been coordinated with any associated landscaping plan to prevent site planning conflicts.
6. Any other information the governing authority may determine is necessary to ensure that the proposed lighting complies with the provisions of these requirements.

## D. Outdoor Lighting Standards.

All outdoor lighting and light sources in all zones and districts must be designed, located, installed, and directed in the following manner, unless otherwise exempt or prohibited:

1. **Light Trespass.** Luminaires shall be located and optically cutoff so that the light source shall not be visible from an adjacent property or the public right-of-way.
2. **Targeted light.** When mounted, the light-emitting part of the luminaire must emit the light exclusively downward.
  - a. Lighting fixtures for building security purposes shall be installed:
    - i. top downward (not upward or sideways), and
    - ii. full cut off or fully recessed (flush mounted).
3. **Illumination Level.** The luminaire and bulb must use the lowest level of light sufficient for the intended purpose. (Refer to the Illuminating Engineering Society's recommended lighting levels for that application.)
4. **Lighting Control.** All outdoor luminaires must be controlled with a timer or motion sensor that automatically:
  - a. Turns lights off from 11:00 p.m. to 6:00 a.m., or
  - b. Turn lights off after 15 minutes of no activity, or
  - c. Reduces the power output by 75% after 15 minutes of no detected activity.
  - d. All outdoor lighting fixtures necessary for security purposes or off-hour access shall be activated by motion-sensor devices that turn the light off after 15 minutes of no activity.
5. **Correlated Color Temperature.** All light sources shall have a correlated color temperature of 2700 kelvin or less as rated on the manufacturer's specification sheet. For areas adjacent to waterways or nature preserves, only lights with a correlated color temperature rating of 2000K or less shall be used.
6. **Exempt Lighting.** The following types of lights are exempt from these regulations:
  - a. Critical lighting used by the Police Department, Fire Department, or Emergency Services.
  - b. Short-term lighting authorized by a special event permit for a fair, carnival or similar function.

- c. Flagpole lighting, provided all luminaires or combination of luminaires are shielded so that the light source is not visible from the property line.
  - d. Temporary holiday or festoon lighting, provided it is used for no more than 60 days in a 12-month period and is off between the hours of 11:00 p.m. and sunrise.
7. **Prohibited Lighting.** The following types of lights are prohibited:
- a. Strips of light intended to outline or highlight a structure, whether composed of linear light tubes or a sequence of individual illumination sources.
  - b. Light sources that oscillate or vary in intensity or color to the degree that the modulation is perceptible to the human eye (e.g., strobe lighting).
  - c. Lasers.
  - d. Luminous tube lights.
  - e. Searchlights.
  - f. Illumination of entire buildings. Facade illumination shall be limited to security lighting or lighting of specific architectural features.
  - g. Electronic sign boards (i.e. digital billboards) and dynamic electronic signs.
  - h. Floodlights that project above the horizontal plane.
  - i. Billboards and roof-top signs.

## E. ADDITIONAL STANDARDS FOR COMMERCIAL

1. **Large expanses of internally illuminated windows or wall openings.** Large expanses of internally illuminated windows or wall openings visible from the property boundary are to be avoided. Interior light fixtures at buildings with a window-to-wall ratio greater than 35% shall be controlled by
  - a. an occupant sensor control to automatically turn off within 20 minutes after all occupants have left the space; or
  - b. time-switch controls that automatically turn off within one hour of close of business or no later than 12:00 a.m. (midnight), whichever is earlier. The control must feature a minimum seven-day clock, backup capability in the event of power interruption, and “holiday” programming.
  - c. Exceptions:
    - i. Where patient care is directly provided.
    - ii. Where an automatic shutoff would directly endanger occupant safety or security.
    - iii. Instructional shops and laboratory classrooms.
2. **Illumination of Signs.** All new or replacement sign lighting shall use light fixtures positioned above the sign and pointed downwards. Uplighting of signs and internally illuminated exterior signs are prohibited. Sign lighting requirements apply to both a freestanding sign and a sign attached to a building. These requirements do not apply to temporary signs of 30 days or less.

3. **Parking Lots, Sidewalks, and other Areas Accessible to Pedestrians and Automobiles.** Parking lots, sidewalks, and other areas accessible to pedestrians and automobiles on properties with four or more units, mixed-use development, and non-residential development shall be illuminated with uniform and adequate intensity. Typical standards to achieve uniform and adequate intensity are:
  - a. Average horizontal maintained illumination shall not be more than three foot-candles,
  - b. Maximum-to-minimum ratio shall be between 6:1 and 10:1, but not more than 10:1.

## F. SPORTS-FIELD LIGHTING.

Where outdoor playing fields or other special outdoor activity areas are to be illuminated, lighting fixtures shall be specified, mounted and aimed so that:

1. Their beams fall within the primary playing area and immediate surroundings, so that no direct illumination is visible off the site.
2. The design and installation of lighting for outdoor recreation, sport courts, or athletic fields shall follow the illuminance and uniformity guidelines of the Illuminating Engineering Society according to the appropriate class of play;
3. The correlated color temperature of the lighting shall be no more than 4,200K, as listed on the lamp or luminaire manufacturer specification sheets;
4. The luminaires shall utilize internal or external shielding in order to minimize uplight and off-site direct visibility of the light sources (however, a small amount of uplighting is permitted for those activities where the playing unit (ball, etc.) can exceed the height of the luminaires);
5. Field lighting is provided exclusively for the illumination of the surface of play and viewing stands and not for other applications, and shall not exceed 50% of the full light output when the field is being utilized for other than practice and tournament play;
6. All power for field lighting shall be reduced by at least 75% within one hour of the conclusion of each game and turned off within two hours of the conclusion of each game.

## G. BOAT LAUNCH AND DOCK LIGHTING.

1. All lighting intended to illuminate an area used as a boat launch or a dock shall have a manufacturer's BUG rating of U0 and, when installed, the light emitting part of the fixture shall be pointed straight down.
2. Nautical dock surface lighting shall have a maximum mounting height of 48" from the surface of the dock.

3. Unshielded lighting intended to serve as a nautical dock pilot light shall be attached directly to the piling and use the lowest level of light sufficient for the intended purpose.

## H. GREENHOUSES.

Greenhouses that use interior grow lights at night shall require the installation of screens that block:

7. 98% of artificial light directed through the roof and
8. 95% of artificial light emanating through the greenhouse's exterior walls or fenestration.

## I. STREETLIGHTS.

1. Streetlight installation or placement shall be limited to locations where the need for a streetlight has been determined, based on objective criteria. (Adoption of a municipal streetlight warranting policy is recommended for establishing the objective criteria.)
2. Prior to streetlight installation or replacement, the Town or City Engineer shall determine whether reflective roadway markings or reflective signage are appropriate and safe for the situation in lieu of street lighting. Reflectorized roadway markings, lines, warning signs, informational signs or other passive means shall be utilized in place of street lighting except at intersections of two or more streets or highways.



## DEFINITIONS

**Artificial sky glow** – That part of the sky glow which is attributable to artificial sources of radiation (e.g., outdoor electric lighting), including radiation that is emitted directly upwards and radiation that is reflected from the earth's surface.

**BUG** – Stands for “backlight, upright, and glare.” *Backlight* is the light directed behind the fixture, *uplight* is any light directed upward above the horizontal plane of the luminaire, and *glare* is the amount of light emitted from the luminaire at high angles.

**Correlated Color Temperature** – A specification of the color appearance of light emitted by a light source, measured in degrees kelvin (K). Higher kelvin ratings appear bluer in color, while lower kelvin ratings appear more amber in color. For comparison purposes, candle light has a color temperature of approximately 1800 kelvin.

**Dimmer** – A dimmer is a device connected to a light fixture and used to lower the brightness of the light.

**Direct Light** – Light that is visible from either the light source or reflected off the fixture's housing.

**Internally Illuminated Exterior Sign** – Sign illuminated from within, where the bulbs and light fittings are contained inside the signage.

**Facade Lighting** – Facade lighting is used to illuminate the exterior facade of a building.

**Fixture** – A gas-powered, battery-powered, solar-powered or electrically powered device that is secured to a wall, ceiling, pole, or post that is used to hold one or more lamps (or jets) and is intended to emit light.

**Flood Light** – Any light fixture or lamp that incorporates a reflector or a refractor to concentrate light output into a directed beam in a particular direction.

**Foot-candle** – A unit of illuminance. One footcandle is one lumen per square foot ( $\text{lm}/\text{ft}^2$ ).

**Full Cutoff** – Fully shielded or emitting no light above the lowest light-emitting horizontal plane of the fixture.

**Glare** – The effect of visual discomfort resulting from insufficiently shielded light sources shining horizontally in the field of view; intense and sometimes blinding light that reduces visibility.

**Grow Lights** – Artificial light sources that mimic natural sunlight and provide plants with the necessary light energy for growth.

**Illumination level** – The measured amount of illumination after approximately one hundred (100) hours of burn-in time.

**Landscape Lighting** – The outdoor illumination system in public or private spaces for purposes of enhancing safety, security, aesthetics, event applications, and recreation.

**Light Pollution** – A form of excessive nighttime light that can cause adverse effects and degrade environmental quality.

**Light Trespass** – Light that strays from the intended purpose and becomes an annoyance, a nuisance, or a deterrent to visual performance. As such, light trespass should always be considered negative, unlike spill light, which can have positive or negative attributes. Light trespass is the encroachment of light causing annoyance, loss of privacy or other nuisance.

**Luminaire** – The complete lighting unit designed to distribute the light, position and protect the light sources, and connect the light sources to the power supply. A light fixture consists of a lamp, a ballast, and a lens. Another word for a “light fixture.”

**Maintained Illumination** – The amount of illumination below which the light level is not supposed to fall throughout system life measured at seventy percent (70%) of rated lamp life.

**Motion-Sensor Device** – A motion-sensor device is programmed to turn on when motion is detected and to turn off typically after 15 minutes of no activity.

**Mounted Fixture Height** – The height of a complete fixture from the top point of any part of the fixture to the ground directly below where the supporting pole or wall or other support structure meets the ground surface.

**Outdoor Lighting** – The night-time illumination of an outside area or object by any manufactured device located outdoors that produces light by any means.

**Recessed Light Fixture** – Recessed lighting is mounted and installed into the precise hole in the ceiling or overhang. Fixtures emit downward light from the hole in the ceiling.

**Shielding** – A design feature or device applied to a luminaire to prevent its luminous output from being visible from selected locations or horizontal and/or vertical angles.

**Subdivision** – The division of a tract or parcel of land into three or more parts or lots for the purpose, whether immediate or future, of sale or building development, expressly excluding development for municipal, conservation or agricultural purposes, and includes resubdivision.

**Temporary Lighting** – Any lighting fixture or instrument producing light that can be moved or relocated in a moment’s notice and not exceed 30 continuous days of use in a calendar year.

**Timer** – A light-switch timer is an electronic mechanism that controls lighting within any environment. Often installed to save energy, they can be controlled either manually or electronically via a digital display.

**Window-to-Wall Ratio** – The percentage of a building's exterior wall area that is made of glass or other transparent materials (“glazing”), on windows, doors, curtain walls, architectural features, skylights, etc. It is calculated by dividing the total area of glass and any other transparent materials on the exterior wall by the total area of that wall. This includes the roof, which is considered a building's fifth exterior wall.

SOURCES: DARKSKY PRINCIPLES & LOCAL LIGHTING LAWS IN CT

See DarkSky International's *Five Principles for Responsible Outdoor Lighting*:  
[darksky.org/resources/guides-and-how-tos/lighting-principles/](https://darksky.org/resources/guides-and-how-tos/lighting-principles/)

See "Examples of Local Lighting Laws in CT," Lights Out CT:  
[www.lightsoutct.org/sample-ct-local-lighting-laws](http://www.lightsoutct.org/sample-ct-local-lighting-laws)