



**DEPARTMENT OF COMMUNITY DEVELOPMENT SERVICES**

*Planning Division*

**m e m o r a n d u m**

**TO:** Urbana Plan Commission

**FROM:** Jeff Engstrom, AICP, Planner I

**DATE:** January 30, 2009

**SUBJECT:** Plan Case 2081-T-08: Outdoor Lighting Standards Text Amendment to the Urbana Zoning Ordinance

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Plan Case 2081-T-08 is a request to amend the Zoning Ordinance to include standards for outdoor lighting on private properties. This case was first reviewed at the February 5, 2009 Plan Commission meeting, at which the Commission provided comments. Staff has subsequently met with lighting professionals who have provided additional comments on the draft text amendment. City staff has reviewed the comments and revised the text amendment accordingly.

**Changes**

*Definitions.* Staff has added a definition for “spill zone”. After meeting with additional lighting professionals, staff was made aware that lighting requirements could be manipulated if areas beyond the area to be lit were included in average light level calculations. In order to prevent this, the proposed amendment now specifies that light falling outside of the area to be lit (within the spill zone) shall not be included in calculations.

*Applicability and Exceptions.* The Plan Commission suggested clarifying exceptions to the ordinance and placing them all within the section on applicability. Staff moved those exceptions into the applicability section, and specified that those exceptions are not exempt from limits on glare. Staff also removed the exception for flag lighting, as suggested by the Plan Commission. Additionally, staff has learned that lighting of automated teller machines (ATMs) is regulated by state law. Therefore staff removed the exception for ATM lighting. The proposed text amendment still exempts any lighting required by law.

*Requirements.* The original draft of the text amendment provided an exception for single-family and duplex exterior lighting from most of the proposed requirements. Plan Commission asked for separate sections that specified which regulations apply to single-family homes and duplexes, as compared to other properties. Staff has rearranged the requirements into two sections. The first

section specifies requirements for all properties in the City. These requirements include limits on glare and nuisance lighting, a requirement for full cut-off lighting fixtures, and limits on façade and landscape lighting. The next section applies to properties which do not contain a single-family or duplex residence. It addresses the need for a lighting plan, taking lighting context into consideration, and specifies limits for light levels.

Several specific limitations have been modified. The limit on landscape lighting was found to be overly restrictive. Landscape lighting is already subject to limits set by the Illinois Energy Code. This limit is 0.2 watts per square foot. Therefore, the lumen limit on landscape lighting was removed.

The provision requiring lighting plans was moved from applicability into the requirements section. The trigger point was adjusted to specify that lighting systems of less than three fixtures or less than 20 percent of the existing fixtures do not require a lighting plan.

The maximum to minimum uniformity ratio was originally set at 15:1. This is the level recommended by the Illuminating Engineering Society of North America for “enhanced security” situations. In order to meet this ratio, developers will be required to install additional fixtures at a significant cost, or to increase mounting and pole heights, which could lead to unwanted glare on neighboring properties. The IESNA recommends a limit of 20:1 for “basic security” situations. Staff has changed the requirement to the IESNA recommendation.

Security lighting requirements were also changed to match Plan Commission recommendations. Instead of a requirement to turn off two-thirds of the fixtures on a site, security plans may now demonstrate that light output of exterior lights is reduced by two-thirds. This allows for some fixtures to be turned off, individual lights to be dimmed, or any combination thereof. A requirement to dim all lights would not be feasible, as it would require expensive controls for every luminaire.

## **Developer Review**

Staff continues to receive comments on the proposed text amendment from local engineers and lighting professionals. The draft ordinance will also be presented to local developers next week at the City’s Developer Luncheon. **In order to allow for more public input, staff requests that the Plan Commission continue Plan Case 208-T-08 until the March 5, 2009 meeting.**

Attachments:

Exhibit A: Proposed Ordinance

**Section VI-8. Outdoor Lighting Requirements****A. Purpose**

The purpose of this section is to establish regulations and controls which promote the goals, objectives, and policies of the City of Urbana Comprehensive Plan. These controls aim to provide modern lighting standards for private property that protect against light trespass and nuisances, promote energy-efficient lighting, and provide for a safe and secure lighting environment appropriate for the context of the areas to be lit.

**B. Definitions**

*Candela:* A measure of luminous intensity, or power emitted by a light source in a particular direction.

*Cutoff Light Fixture:* A fixture installed such that the luminous flux at 90 degrees above nadir is less than 5 percent of rated lumens, and less than 20 percent of rated lumens at 80 degrees above nadir.

*Fixture (or Luminaire):* A device which directs, diffuses, or modifies the light given out by the illuminating source in such a manner as to make its use more economical, effective and safe to the eye. The fixture includes the assembly that holds the lamp in a lighting system, including elements such as the reflector, refractor, housing, and shielding, ballasts in fluorescent and HID (High Intensity Discharge) units, and stems and canopies where used.

*Floodlight:* a light fixture or lamp which projects light in a wide beam, typically 100 degrees or more.

*Footcandle (fc):* A unit of measure of luminous flux, the illumination which is produced by a one-candela point source on a surface which is exactly one-foot distant from the point source. All measurements of footcandles shall be in the horizontal plane at ground level unless otherwise specified.

*Full Cutoff Light Fixture:* A fixture, as installed, designed or shielded in such a manner that all light rays emitted by the fixture, either directly from the lamp(s) or indirectly from the fixture, are projected below a horizontal plane running through the lowest point on the fixture where light is emitted. The luminous flux emitted in the band between 80 degrees and 90 degrees above nadir in all directions is no more than 10 percent of the total luminous flux for the luminaire. A luminaire that meets the Illumination Engineering Society of North America (IESNA) full-cutoff definition shall be considered full cutoff for the purposes of this Ordinance.

*Glare:* The sensation produced by luminances within the visual field that are sufficiently greater than the luminance to which the eyes are adapted, which causes annoyance, discomfort or loss in visual performance and visibility. Often the result of a direct line of sight to the filament or cathode in a light fixture.

*IESNA Standards:* Lighting guidelines provided by the IESNA, Illuminating Engineering Society of North America. These standards are found in IESNA guidebooks such as RP-33-99, *Lighting for Exterior Environments* and RP-20-98, *Lighting for Parking Facilities*.

*Initial Light Levels:* The amount of light produced on a site upon installation of a new lamp. As lamps age, they become less efficient and produce less light. Initial light levels represent the brightest portion of a lamp's life cycle.

*Lamp:* An artificial source of visible illumination.

*Light Pollution:* term used to describe light trespass, over-illumination, glare, clutter and/or skyglow from an artificial light source

*Light Trespass:* light projected onto a property from a fixture not located on that property.

*Lumen:* quantity of incident luminous flux which will, when uniformly distributed over a surface having an area of one square foot, produce an illumination of one footcandle on every point of the surface. Typical luminous flux values for incandescent bulbs are 100 watts: 1,550 lumens, 75 watts: 1,080 lumens, 60 watts: 780 lumens, and 40 watts: 450 lumens. Note: When luminous flux impinges nonuniformly on a surface, then a lumen is the quantity of luminous flux which will, on a one-square foot surface, produce an average illumination of one footcandle

*Luminance:* a photometric measure of the luminous intensity per unit area of light travelling in a given direction.

*Luminous Flux:* The power emitted from a source of electromagnetic radiation, such as a lamp, in the form of visible light. Luminous flux is measured in lumens (lux) or footcandles (fc) and is typically specified by the manufacturer for a given lamp or luminaire.

*Nadir:* The direction pointing directly downward from the light source of the luminaire.

*Spill Zone:* The area immediately outside of an area intended to be lit, onto which low levels of excess light may spill.

*Spotlight:* A light fixture or bulb which projects light in a narrow beam, typically 45 degrees or less.

*Uniformity Ratio:* A measure of the dispersion of light on an area. For the purposes of this Ordinance, the ratio is measured as maximum light level to minimum light level. Lower uniformity ratios help eliminate places to hide, give better depth perception, and a greater feeling of security to individuals in the area

### **C. Applicability**

1. It shall be unlawful for any person, firm, or institution to install or operate any outdoor light fixture on private property which does not comply with the requirements of this Ordinance. Lighting fixtures on single and two-family residential properties shall not be subject to the requirements of Section IX-8.E.
2. The Zoning Administrator, in consultation with the Building Official, may alter or waive certain requirements of this Section in order to alleviate site security concerns or other practical difficulties. In such cases an alternative lighting plan shall be provided demonstrating that lighting conforms to current IESNA standards.
3. Lighting fixtures installed prior to July 1, 2009 and any of the following types of lighting shall be exempt from the requirements of this Ordinance, except that fixtures found by the Zoning Administrator to be a nuisance or cause excessive glare creating a public hazard can be ordered to be removed or altered at any time.
  - a. All temporary lighting needed by the police, fire, public works, or other public agencies or emergency services.
  - b. Vehicular luminaires.
  - c. All hazard warning luminaires required by law.
  - d. Properly permitted recreational and outdoor event lighting during times that the lighted area is actually in use and for a period of one hour before the event and one half hour after. Nonetheless, recreational and outdoor event lighting shall be installed in a way that minimizes light trespassing onto adjacent property.
  - e. Temporary lighting, such as holiday or special event lighting.
  - f. City street lights, traffic lights, and other lighting required for public safety.
  - g. Other exceptions as required by law.

### **D. General Requirements**

The following shall apply to all properties in the City of Urbana, except as noted in Section VI-8.C:

1. Limits on Glare. Outdoor lighting shall not create a glare that hinders sight to the extent that it is hazardous for motorists, bicyclists, or pedestrians. Lighting shall be aimed or shielded so as not to cause a nuisance to the public or nearby properties.
2. Façade and Landscape Lighting.

- a. Floodlights directed at buildings shall be shielded such that light emitted falls upon the building façade. The initial average exterior building façade luminance shall not exceed five foot candles on the illuminated surface. Floodlights used for facade lighting may be no farther from the building than one-third of the building height. The mounting height of such floodlights shall not exceed the building height.
- b. The lamp of landscape luminaires shall be shielded such that it is not directly visible from any adjacent properties.

### **E. Additional Requirements**

The following shall apply to all properties except for single-family and duplex uses and as noted in Section VI-8.C:

1. **Lighting Plan Submission Requirements.** A lighting plan shall be submitted to and approved by the Urbana Building Safety Division prior to installation or replacement of a lighting system. Lighting plans shall not be required for the installation or replacement of three fixtures or less than 20 percent of the existing fixtures. Lighting plans shall be submitted for review as a part of the building permit process and shall include the following information:
  - a. A site photometric plan indicating initial footcandle levels in a ten-foot by ten-foot point spacing at grade to a distance of 20 feet beyond the lot lines.
  - b. Specifications for all luminaires, poles, luminaire mounting arms, and lighting control products.
  - c. Lighting specifications including footcandle initial averages, and maximum-to-minimum uniformity ratio for the areas to be lit, excluding the spill zone, in conformance with the requirements of paragraph VI-8.E.4.
  - d. The location, mounting height, lamp intensity for all exterior luminaires.
  - e. An after hours security lighting plan indicating reduced light levels as specified in VI-8.E.4.
2. **Luminaires.** In order to prevent unreasonable light pollution, any luminaire and all wall-mounted luminaires used for outdoor area light shall use a non-adjustable, full-cutoff fixture positioned in a way that the cutoff effect is maximized.
3. **Lighting Context.** Outdoor lighting design must take into account existing light sources that impact the site as well as the presence of sensitive land uses that may be impacted by the lighting.

- a. In order to prevent over-lighting, proposed new outdoor lighting should factor in existing light affecting the site.
  - b. Outdoor lighting shall have fixtures that shield residential areas from direct light.
4. Light Levels, Luminaire Mounting Position, and Timing.
- a. In order to help eliminate places to hide, give better depth perception, and a greater feeling of security to individuals in the area, lighting levels shall not exceed an initial maximum to minimum uniformity ratio of 20:1 for the areas to be illuminated. Areas to be illuminated may be different for after-hours security lighting as required in this section.
  - b. Average initial light levels at ground level shall not exceed one footcandle in residential zoning districts and 2.5 footcandles in all other districts.
  - c. Light levels created by proposed new outdoor lighting shall not exceed 0.2 footcandles as measured at a point 6 feet beyond the property line or farther, except that light levels shall not exceed 0.1 footcandles as measured at a point 6 feet beyond the property line or farther where the adjacent property is zoned R-1, R-2, or R-3.
  - d. Canopy lighting. All lighting under a canopy shall be cutoff or recessed, and no luminaires shall extend below the horizontal plane of the canopy. Light levels under the canopy shall not exceed an initial average of 15 footcandles at grade.
  - e. Display areas. Areas dedicated to the display of merchandise may have an initial average light level no greater than ten footcandles while the business on the site is open to the public, and shall have an initial average light level no greater than five footcandles thereafter.
  - f. Building entrance areas and access drives shall have an average light level no greater than ten footcandles.
  - g. All exterior lighting on non-residential properties shall be controlled by a photo sensor, occupancy sensor, or time switch which shall:
    - i) automatically reduce exterior lighting when sufficient daylight is available, and
    - ii) automatically extinguish subject lights no more than one hour following the close of business on subject property, excluding lighting for security purposes. Security lighting shall not exceed 33 percent of the total light output (in lumens) from all outdoor lighting located on the zoning lot. Individual luminaires shall not emit more light for security lighting purposes.