

## ORDINANCE 46-2010

### ORDINANCE OF THE BOROUGH OF MADISON AMENDING CHAPTER 195 OF THE BOROUGH CODE, LAND DEVELOPMENT ORDINANCE, SECTION 25.6 ENTITLED "LIGHTING"

**WHEREAS**, the Borough Planner has recommended amending Chapter 195 of the Borough Code, the Madison Land Development Ordinance, Section 195-25.6, entitled "Lighting"; and

**WHEREAS**, the Borough Council has considered the proposed amendment to the Madison Land Development Ordinance and wishes to amend the Code.

**NOW, THEREFORE, BE IT ORDAINED**, by the Council of the Borough of Madison, in the County of Morris and State of New Jersey that Chapter 195 of the Borough Code entitled "Madison Land Development Ordinance" shall be amended as follows:

**SECTION 1:** Section 195-25.6, entitled "Lighting" is hereby amended as follows:

#### § 195-25.6. Exterior Lighting

- A. Purpose. Regulation of outdoor lighting is necessary to permit reasonable uses of outdoor lighting for nighttime safety, utility, security, and enjoyment while preserving the ambiance of the night. It is necessary to prevent light trespass, to reduce unnecessary glare caused by inappropriate or misaligned light fixtures and to prevent the cause of unnecessary skyglow. These standards are intended to protect adjacent residential neighborhoods from unnecessary lighting impacts, to encourage energy efficiency, to discourage the waste of electricity and to improve or maintain nighttime public safety, utility and security.
- B. All outdoor lighting fixtures (luminaires) shall be installed in conformance with this Regulation and with the provisions of the Building Code, the Electrical Code, and the Sign Code, as applicable and under permit and inspection, if such is required.
- C. Standards. All outdoor light fixtures installed and thereafter maintained, other than those serving one- and two-family dwellings, shall comply with the following requirements:
  1. Illumination levels shall not exceed those recommended in the:
    - a. IESNA Lighting Handbook, 9th Edition, as amended from time to time.
    - b. IESNA publication, RP-33-99, Lighting for Exterior Environments, as amended from time to time.
    - c. IESNA publication, RP-08-, Roadway Lighting, as amended from time to time.
    - d. IESNA publication, RP-6-01, Reaffirmed 2009, Sports and Recreational Area Lighting, as amended from time to time.

2. Light trespass (nuisance light).
  - a. All light fixtures, except street lighting maintained by a governmental authority, and those used on one- or two-family dwellings, shall be designed, installed and maintained to prevent light trespass, as specified below:
    - 1) The maximum illumination at property lines shall be 0.1 footcandle at grade.
    - 2) Illumination occurring above a height of five feet above the property line of the subject property shall not exceed 0.1 footcandle in a vertical plane on residentially zoned property.
    - 3) Outdoor light fixtures properly installed and thereafter maintained shall be directed so that there will not be any direct glare source visible from any property.
3. Outdoor lighting energy conservation.
  - a. All exterior lighting shall be designed so as not to exceed the exterior lighting unit power allowances of ASHRAE/IESNA Standard 90.1-2004, or the version currently adopted by the New Jersey Department of Energy.
  - b. All outdoor lighting not essential for safety and security purposes or to illustrate changes in grade or material shall be activated by automatic control devices and turned off during non-operating hours. Illuminated signs are excluded from this requirement.
  - c. Exterior retail and merchandise display lighting shall not remain on after 10:00 p.m. Reduced levels of lighting in interior show or display windows may remain on for security purposes; provided, however, that these levels shall not exceed 25% of the normal artificial lighting levels in the interior display or show windows.
  - d. Exterior lighting for recreational areas, athletic fields and courts shall not remain on after 10:00 p.m., except as necessary for completion of scheduled games as may occur from time to time.
  - e. Exterior lighting serving accredited educational institutions, not including recreational areas, athletic fields and courts, shall not remain on after 11:00 p.m.
4. Only shielded light fixtures shall be used. Any fixture mounted above 10 feet shall have no more than 10% of its light distribution at a vertical angle of 80° above nadir and 2.5% at an angle of 90° above nadir.
5. Light fixtures used to illuminate flags, statues or other objects mounted on a pole, pedestal or platform shall have their candlepower curve plotted such that 100% of the beam angle used is not greater than the size of the object to be illuminated.
6. Other upward-directed architectural, landscape or decorative direct-light emissions shall have at least 90% of their total distribution pattern within the profile of the illuminated structure.
7. Description of outdoor lamp/luminaire combinations, including component specifications such as lamps, reflectors, optics, angle of cutoff, supports, poles and include manufacturer's catalog cuts.

Submission of plans. Except for detached single family and detached two family dwellings, plans and evidence of compliance shall include the following;

- a. Locations and description of every outdoor enclosed light fixture and hours of operation, their aiming angles and mounting heights.
- b. Foundation details for light poles.
- c. Lighting calculations for site lighting and general exterior applications shall be provided that identify the following elements; (See Section 195-25.6-D3(c) below for lighting calculation requirements for recreational and sports lighting)
  - 1) Initial horizontal illuminances at grade and vertical illuminances where vertical surfaces are being illuminated such as building facades. Illuminances shall be illustrated in footcandles (before depreciation).
    - a) Average footcandles, during operating and non-operating hours.
    - b) Maximum footcandles.
    - c) Minimum footcandles.
    - d) Average to minimum uniformity ratio.
    - e) Maximum to minimum uniformity ratio
  - 2) Average maintained horizontal illuminances at grade and vertical illuminances where vertical surfaces are being illuminated such as building facades. Illuminances shall be illustrated in footcandles. Define re-lamping and cleaning cycles to illustrate light loss factors to account for lumen depreciation and reduced optical system performance of over time to arrive at maintained values of illumination.
    - a) Average footcandles, during operating and non-operating hours.
    - b) Maximum footcandles.
    - c) Minimum footcandles.
    - d) Average to minimum uniformity ratio.
    - e) Maximum to minimum uniformity ratio
  - 3) Computer-generated photometric grid showing maintained footcandle readings every 10 feet and the average maintained footcandles. Depending upon the design application, for both vertical and horizontal illumination levels. Illustrate the initial and maintained horizontal and vertical illuminances at 5 feet above grade at any adjacent residential property line.

#### D. Lighting Applications

1. Where used for roadways and parking lots and walkways or security purposes.
  - a. Average maintained illuminances shall not exceed IESNA recommendations.
  - b. Only outdoor enclosed light fixtures shielded from public view and having the performance characteristics of a cutoff light fixture shall be used.

- c. For parking lots, light poles that are visible to the public shall not exceed 20 feet in height (base plus pole).
  - d. For walkways and other pedestrian areas, light poles that are visible to the public shall not exceed 12 feet in height (base plus pole).
  - e. Freestanding lights shall be so located and protected to avoid being damaged by vehicles. Foundations supporting lighting poles installed less than four feet behind the curb shall not be less than 24 inches above the ground.
  - f. The style of the light and light standards shall be consistent with the architectural style of the principal building or surrounding area.
  - g. Floodlight-type fixtures attached to buildings shall be prohibited.
  - h. All wiring shall be laid underground.
2. Where used for private, commercial and industrial purposes such as in merchandise display areas, work areas, platforms, signs, architectural, landscape or sports or recreational facilities.
- a. All light fixtures shall be equipped with automatic timing devices and shall comply with the following:
  - b. Externally illuminated signs, including building identification or other similar illuminated signs, shall comply with the following:
    - 1) Top-mounted light fixtures shall have illumination levels plotted such that 100% of the beam angle used is not greater than the size of the externally illuminated sign, and are preferred over any other positioned light fixtures.
    - 2) When top-mounted light fixtures are not feasible for good cause shown, illumination from other positioned light fixtures shall continue to be restricted to the sign area. Visors or other directional control devices shall be used to eliminate any spill light. Furthermore, when any signage is viewed from the opposite side of that being illuminated, luminous portions of light fixtures, and stray light, shall not be visible.
    - 3) Detailed plans are to be provided to illustrate floodlight distribution patterns. Once properly installed, the fixtures are to be aimed, permanently affixed, and maintained in the approved position according to the terms of approval outlined in the approving resolution.
  - c. Outdoor light shall not be attached or mounted to public property (i.e., public buildings, utility poles, telephone poles, streetlights, road/street signs). Furthermore, these fixtures shall not tap or extend power from sources servicing public lighting and/or power devices. Temporary holiday lighting shall be exempt.
  - d. All outdoor lighting during non-operating hours of the business on site, not necessary for safety and security purposes, shall have reduced light levels, activated by motion-sensors, photocells, timers, or other lighting control devices, or turned off.
3. Where used for sports and recreational lighting.
- a. Design Considerations. Nighttime sports and recreational lighting is proliferating and controls must be place to minimize the negative impact on the community environment and to minimize the utility power demand.

- 1) Outdoor Lighting Systems. Outdoor lighting systems primarily consist of direct distribution floodlights aimed at the playing surface.
  - a) Light sources. Metal Halide (MH) High Intensity discharge (HID) is the preferred source. High Pressure Sodium (HPS) should be used only in conjunction with metal halide.
  - b) Luminaires. General purpose or heavy duty luminaires with full cutoff optical systems to provide superior visibility for the players and to reduce off-site impacts.
  - c) Poles. The location and height of poles have a major impact on lighting system effectiveness and quality and off-site impact. Contrary to public understanding, the lower the mounting height, the higher the aiming angle and the more light that is delivered off site. The higher the pole (with limits) the lower the aiming angle and less light is delivered off site.
  - d) Design factors. Outdoor lighting is generally visible far beyond facility boundaries and careful consideration should be given to:
    - i) Spill light encroaching on neighboring properties
    - ii) Light that contributes to skyglow
    - iii) Durability of equipment and wiring subject to continuous outdoor exposure
    - iv) Electrical power, voltage, and system selection
    - v) Controls for multiple sports and energy conservation
- b. Standards. All outdoor sports and recreational lighting shall comply with the following requirements:
  - 1) Only light fixtures shielded with internal and/or external shields shall be used. The upper limit of the defined beam should be no more than 80 degrees above nadir and no more than 5% of the luminaires used should violate this rule.
  - 2) Illumination levels shall not exceed those recommended in the IESNA Lighting Handbook, 9th Edition, as amended from time to time, and IESNA publication RP 6-01(Reaffirmed 2009), "Recommended Practice for Sports and Recreational Area Lighting", as amended from time to time.
  - 3) Where used for sports or recreational facilities, all lighting fixtures shall comply with the following:
    - a) For field sports such as football, soccer, baseball and track and field, a minimum pole height shall be 70 feet and a maximum pole height shall be 85 feet.
    - b) The minimum distance of the pole to any property line shall be twice the height of the pole. For example, an eighty-foot pole must be a minimum of 160 feet from any property line.
    - c) Trespass lighting shall not be more than 0.1 footcandle at any adjacent residential property line at grade.
    - d) A natural landscape buffer shall be required to sufficiently screen the source of light and the lit object from any adjacent residences. The buffer areas shall consist of a planted berm with a mix of deciduous and

coniferous plants sufficient to provide year-round screening and with plants at least 6 feet in height/ 2.5 DBH at time of planting.

- e) When not in use or under any circumstance not later than 10:00 p.m., all lighting shall be turned off.
- 4) Light fixtures properly installed and thereafter maintained shall be directed so that there will not be any direct glare source visible from any other property.
- c. Lighting calculations for recreational and sports lighting shall be provided that identify the following elements;
- 1) The Class of Play for each playing area
  - 2) Initial horizontal and vertical illuminances for primary playing areas, secondary playing areas and boundary areas (where applicable). Illuminances shall be illustrated in footcandles (before depreciation).
    - a) Average footcandles, during operating and non-operating hours.
    - b) Maximum footcandles.
    - c) Minimum footcandles.
    - d) Average to minimum uniformity ratio.
    - e) Maximum to minimum uniformity ratio
  - 3) Average maintained horizontal and vertical illuminances for primary playing areas, secondary playing areas, and boundary areas (where applicable). Illuminances shall be illustrated in footcandles. Define re-lamping and cleaning cycles to illustrate light loss factors to account for lumen depreciation and reduced optical system performance of over time to arrive at maintained values of illumination.
    - a) Average footcandles, during operating and non-operating hours.
    - b) Maximum footcandles.
    - c) Minimum footcandles.
    - d) Average to minimum uniformity ratio.
    - e) Maximum to minimum uniformity ratio
  - 4) Illustrate recommended levels cited in the IESNA Lighting Handbook, 9th Edition and IESNA publication RP 6-01(Reaffirmed 2009), "Recommended Practice for Sports and Recreational Area Lighting".
    - a) Average footcandles, during operating and non-operating hours.
    - b) Maximum footcandles.
    - c) Minimum footcandles.
    - d) Average to minimum uniformity ratio.
    - e) Maximum to minimum uniformity ratio.

- 5) Computer-generated photometric grid showing footcandle readings every 10 feet and the average footcandles. Depending upon the design application, for both vertical and horizontal illumination levels. Illustrate the initial and maintained horizontal and vertical illuminances at 5 feet above grade at any adjacent residential property line.
4. Where used for new single and two-family residential homes.
    - a. All residential outdoor light fixtures shall comply with the requirements as specified below:
      - 1) Light distributions generated by light fixtures shall be confined to the property on which they are installed.
      - 2) Light fixtures installed within any setback area, including front, rear or side yard setbacks, shall minimize light spillage and glare upward and onto adjacent properties.
      - 3) Shall be properly installed and maintained.
      - 4) Holiday lights on residential properties shall be exempt from these standards.

**SECTION 2:** This Ordinance shall take effect as provided by law.

ADOPTED AND APPROVED  
September 27, 2010

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MARY-ANNA HOLDEN, Mayor

Attest:

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ELIZABETH OSBORNE, Borough Clerk

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