

A RESOLUTION ADOPTING A STATEMENT
EXPLAINING THE BOARD OF ALDERMEN'S REASONS FOR ADOPTING AN
AMENDMENT TO THE TEXT OF THE CARRBORO LAND USE ORDINANCE
Resolution No. 94/2009-10

WHEREAS, an amendment to the text of the Carrboro Land Use Ordinance has been proposed, which amendment is described or identified as follows: AN ORDINANCE REVISING ARTICLE XV THE CARRBORO LAND USE ORDINANCE WITH RESPECT TO OUTDOOR LIGHTING STANDARDS

NOW THEREFORE, the Board of Aldermen of the Town of Carrboro Resolves:

Section 1. The Board concludes that the above described amendment is consistent with Carrboro Vision 2020, policies 2.42, 2.51, 3.1, and 3.25

Section 2. The Board concludes that its adoption of the above described amendment is reasonable and in the public interest because the Town seeks to maintain its distinctive town character, support implementation of the Northern Study Area plan, minimize negative environmental impact, and improve lighting in the downtown and other areas.

Section 3. This resolution becomes effective upon adoption.

A RESOLUTION ADOPTING A STATEMENT
EXPLAINING THE BOARD OF ALDERMEN'S REASONS FOR REJECTING AN
AMENDMENT TO THE TEXT OF THE CARRBORO LAND USE ORDINANCE

WHEREAS, an amendment to the text of the Carrboro Land Use Ordinance has been proposed, which amendment is described or identified as follows: AN ORDINANCE REVISING ARTICLE XV THE CARRBORO LAND USE ORDINANCE WITH RESPECT TO OUTDOOR LIGHTING STANDARDS

NOW THEREFORE, the Board of Aldermen of the Town of Carrboro Resolves:

Section 1. The Board concludes that the above described amendment is not consistent with Town policies and regulations.

Section 2. The Board concludes that its rejection of the above described amendment is reasonable and in the public interest because existing regulations are appropriate.

Section 3. This resolution becomes effective upon adoption.

****DRAFT******AN ORDINANCE REVISING ARTICLE XV THE CARRBORO LAND USE
ORDINANCE WITH RESPECT TO OUTDOOR LIGHTING STANDARDS**

THE BOARD OF ALDERMEN OF THE TOWN OF CARRBORO ORDAINS:

Section 1. All references in this ordinance are to Chapter 15 of the Carrboro Town Code, the Carrboro Land Use Ordinance.

Section 2. The Title of Article XV of the Carrboro Land Use Ordinance is rewritten to read as follows:

**ARTICLE XV
WATER AND WASTEWATER, OUTDOOR LIGHTING, AND MISCELLANEOUS
UTILITIES
PART 1. WATER AND WASTEWATER**

Section 3. The Carrboro Land Use Ordinance is amended by rewriting Sections 15-242 and 15-243 to read as follows:

PART II. OUTDOOR LIGHTING

Section 15-242 Purpose and Intent

(a) The Board finds that outdoor lighting serves a number of beneficial purposes. For work or recreation, it enables people to see essential detail in order that they may undertake their activities at night. It facilitates the safety and security of persons and property, for example through lighting on roads and pathways and the entrances to buildings. It may be used to emphasize features of architectural or historical significance, and to light parks and gardens. It is used for advertising or display to promote products or services, or to call attention to commercial premises by means of area lighting or signs. However, excessive or inappropriately directed lighting may create unwanted glare, interfere with observation of the nighttime sky, waste valuable energy supply, and otherwise interfere with the use or enjoyment of adjoining or nearby public or private property.

(b) It is the intent of this part to preserve, protect, and enhance the lawful nighttime use and enjoyment of any and all property through the use of appropriate lighting practices and systems by providing for the installation of individual fixtures and lighting systems that are designed and installed to maintain safety, security and productivity, and to curtail the degradation of the nighttime visual environment.

Section 15-242.1 Definitions

Unless otherwise specifically provided, or unless clearly required by the context, the words and phrases defined in this section shall have the meaning indicated when used in this part.

- (1) Direct Light: Light emitted directly from the lamp, off of the reflector diffuser, or through the refractor or diffuser lens, of a luminaire.
- (2) Fixture: The assembly that houses the lamp or lamps and can include all or some of the following parts: a housing, a mounting bracket or pole socket, a lamp holder, a ballast, a reflector or mirror, and/or a refractor or lens.
- (3) Floodlight: A form of lighting designated to direct its output more or less in a specific direction.
- (4) Footcandle: (fc) The total amount of light or illuminance cast on a surface and equivalent to the light produced by a source of one (1) candle measured at a distance of one (1) foot
- (5) Full cut-off luminaires: A luminaire designed and installed where no light is emitted at or above a horizontal plane running through the lowest point on the luminaire.
- (6) Fully Shielded: Outdoor light fixtures with opaque top and sides, capable of only emitting light in the lower photometric hemisphere as installed.
- (7) Glare: Light emitting from a luminaire with an intensity great enough to reduce a viewer's ability to see, or cause annoyance and discomfort, and, in extreme cases, causing momentary blindness.
- (8) IESNA: Illuminating Engineering Society of North America, a non-profit society of professional lighting specialists that has developed a series of recommended standards for a variety of lighting applications.
- (9) Lamp: The component of the luminaire that produces the light and commonly referred to as the "bulb."
- (10) Light Trespass: The shining of light produced by a luminaire beyond the boundaries of the property on which it is located.
- (11) Lumen: The unit used to quantify the amount of light energy produced by a lamp at the lamp. Lumen output of most lamps is listed on the packaging. For example, a 60-watt incandescent lamp produces 950 lumens while a 55-watt low-pressure sodium lamp produces 8000 lumens.
- (12) Luminaire: A complete lighting system that includes light source and all necessary mechanical, electrical, and decorative parts.
- (13) Maintained Foot Candle: Illuminance of lighting fixtures adjusted for dirt buildup and lamp output depreciation.

- (14) Wall Pack: A type of light fixture typically flush-mounted on a vertical wall surface.

Section 15-242.2 Applicability

(a) The provisions of this part apply to developments for which permits are issued after the effective date of this part; therefore developments that exist on the effective date of this part that do not comply with its provisions shall not be regarded as nonconforming. However, when new luminaries are installed or existing luminaries are replaced, they shall comply with this part.

(b) Notwithstanding the provisions of subsection (a) of this section, luminaires installed prior to the effective date of this part that violate the following provisions shall be brought into compliance or removed within three months after the date of notification of the violation:
Section 15-242.5 (d).

(c) Regulations applicable to the lighting of signs are found in Article XVII of this chapter, particularly Section 15-281.

(d) The provisions of this part do not apply to:

- (1) Streetlights installed on public streets.
- (2) Traffic control signals and devices.
- (3) Temporary emergency lighting (i.e. fire, police, repair workers, etc.).
- (4) Moving vehicle lights.
- (5) Navigation lights (i.e. airports, heliports, radio/television towers, etc.).
- (6) Seasonal decorations with individual lights in place no longer than 60 consecutive days.
- (7) Security lights that are controlled by a motion-sensor switch that does not allow the lights to remain on longer than 12 minutes after activation, so long as the lamps do not exceed 150 watts and 2,200 lumens.

Section 15-242.3 Minimum Lighting Requirements for Security

(a) All streets, sidewalks, and other common areas or facilities in subdivisions shall be sufficiently illuminated to ensure the security of property and the safety of persons using such streets, sidewalks, and other common areas or facilities.

(b) All roads, driveways, sidewalks, parking lots, and other common areas or facilities in unsubdivided developments shall be sufficiently illuminated to ensure the security of property and the safety of persons using such roads, driveways, sidewalks, and other common areas or facilities.

(c) All entrances and exits in buildings used for non-residential purposes and in multi-family residential dwellings containing more than four dwelling units shall be adequately lighted to ensure the safety of persons and the security of such buildings.

Section 15-242.4 Subdivisions

(a) With respect to street lighting for subdivision streets that (i) are located on property within the town at or about the time of final plat approval, and (ii) are intended to be dedicated to the town, the developer shall coordinate with the electric utility company to ensure that all facilities necessary for the installation of street lights in accordance with the town's street lighting policy are put in place. "As a condition of construction plan approval, all public street lighting is to be installed by the developer prior to street acceptance by the town. The developer shall be responsible for all installation cost and monthly billing until the public streets are accepted onto the town's street maintenance system."

(b) With respect to street lighting for subdivision streets that (i) are located on property that is not within the town at or about the time of final plat approval, and (ii) are intended to be dedicated to the public (i.e. to the N.C. Department of Transportation initially and eventually to the town when the subdivision is annexed), the developer shall coordinate with the electric utility company to see that all facilities necessary for the installation of street lights in accordance with the town's street lighting policy are put in place. The installation of street lights that are consistent with town policies may then be provided for either by an arrangement between the developer or a property owners association and the electric utility company until such time as the subdivision is annexed.

(c) With respect to street lighting for subdivision streets that are not intended to be dedicated to the town, the developer shall provide for the installation and maintenance (either by the developer or a successor property owners association) of a street lighting system that will provide sufficient lighting for safety and security purposes to an extent substantially equivalent to that provided for town streets under the town's street lighting policy.

Section 15-242.5 General Standards

(a) Unless otherwise specified, under no circumstances may the light level at a lot line exceed .2 foot candles. A limitation of 2.0 footcandles shall generally apply to lot lines in the B-1(c) and B-1(g) zoning districts. However, a limitation of .2 footcandles shall apply to lot lines of properties zoned B-1(c) or B-1(g) under any of the following circumstances:

(1) Where such lot lines separate properties zoned B-1(c) or B-1(g) from properties zoned residential;

(2) If and to the extent that properties zoned residential lie directly across a street from the lot lines of properties zoned B-1(c) or B-1(g);

(3) Where such lot lines separate properties zoned B-1(c) or B-1(g) from properties that are not zoned residential but that are used for residential purposes and were so used on the effective date of this subsection;

(4) If and to the extent that properties that are not zoned residential but are used for residential purposes and were so used on the effective date of this subsection lie directly across a street from the lot lines of properties zoned B-1(c) or B-1(g).

(b) Vegetative buffers shall not be used to satisfy the standards set forth in subsection (a) of this section.

(c) Any luminaire with a lamp or lamps rated at a total of more than 1,800 lumens shall be fully shielded and shall be located to prevent glare and light trespass beyond the property boundary (including onto adjacent streets).

(d) The recommended maximum light output is 70,000 lumens per acre for lots developed for commercial or multi-family purposes and 6,500 lumens per acre for lots developed for all other purposes. This recommended maximum does not apply to those uses regulated by Sections 15-242.6, 15-242.7, and 15-242.8.

(e) Floodlights with external shielding shall be angled provided that no light is directed above a twenty-five (25) degree angle measured from the vertical line from the center of the light extended to the ground, and only if the luminaire does not cause glare or light to shine on adjacent property or public or private rights-of-way. Photocells with timers that allow a floodlight to go on at dusk and off by 11:00 p.m are encouraged.

(f) The presumptive standard for the maximum height of light poles is fifteen (15) feet in height. The Board recognizes that due to the particularities of any given development, the inflexible application of a height maximum for lighting fixtures may result in a development with excessive energy consumption or light fixtures that are incompatible with the scale or style of a development. These situations can result in a waste of money that could more desirably be used for valuable development amenities or environmentally useful features. Therefore, the permit-issuing authority may permit deviations from the presumptive requirements and may require shorter light fixtures or allow taller light fixtures whenever it finds that such deviations are more likely to satisfy the standard set forth in subsections 15-242 (a) and (b) and that the lighting complies in all other respects with the requirements of this part.

(1) Without limiting the generality of the foregoing, the permit-issuing authority may allow or require deviations from the light fixture height maximum set forth in Subsection 15-242.5 (f) when it finds that:

- a. An existing multi-family residential development is seeking to improve security and safety for residents by increasing the number of light fixtures and is also seeking utilize light fixtures that are similar in size and style to existing fixtures; or.

- b. Lighting fixtures on neighboring property are substantially lower in height than the maximum that would be allowed and taller light fixtures would result in a discernible negative impact in terms of excessive illumination and glare.

(2) Whenever the permit-issuing authority allows or requires a deviation from the presumptive lighting fixture height requirements set forth in Subsection 15-242.5(e) it shall enter on the face of the permit the lighting fixture height requirement that it imposes and the reasons for allowing or requiring the deviation.

(g) All wall packs shall be fully shielded.

(h) All luminaires shall be shielded or oriented in such a way as to direct light toward the earth's surface and away from reflective surfaces.

(i) Luminaires designed to illuminate building facades, architectural features, or landscaping shall be oriented and shielded so that direct illumination is focused exclusively on such building façade, architectural feature, or landscaping and away from adjoining properties, public or private way, and the night sky.

(j) Upward flagpole lighting is permitted for governmental flags, either publicly or privately owned, provided that the maximum lumen output is 1,300 lumens. It is encouraged that flags be taken down at sunset to avoid the need for lighting.

(k) Any luminaire must be installed in such a manner that the light emitting source is not visible from any residence not located on the same lot as the luminaire or from any public street.

Section 15-242.6 Vehicular Canopies

(a) The light level beneath vehicular canopies (e.g. for gas stations or convenience stores) shall not exceed 10 foot candles average maintained at the perimeter of the canopy and measured at ground level. Acceptable ways of achieving this objective include, but are not limited to, one or more of the following:

- (1) Recessed fixtures incorporating a lens cover that is either recessed or flush with the bottom surface (ceiling) of the vehicular canopy.
- (2) Surface mounted fixtures incorporating a flat glass that provides a full cut-off or fully shielded light distribution.
- (3) Indirect lighting where light is beamed upward and then reflected down from the underside of the vehicular canopy. Such fixtures shall be shielded such that direct illumination is focused exclusively on the underside of the vehicular canopy.

(4) Any other method approved by the permit issuing authority that achieves an effect similar to the foregoing illustrations.

(b) During hours when the business is not open, the lighting level shall be reduced to security lighting only.

Section 15-242.7 Outdoor Display Areas

(a) All display area lighting shall utilize fully shielded luminaires that are installed in a fashion that maintains the fully shielded characteristics.

(b) Display area lighting shall be installed such that glare is not visible from residential properties.

(c) The display area shall not be illuminated in a manner that exceeds the minimal illuminance levels for the activity as recommended by the Illuminating Engineering Society of North America (IESNA Rp-33, or as updated).

(d) For purposes of this section, an "outdoor display area" is an outdoor area where nighttime sales activity regularly occurs and where accurate color perception of merchandise by customers is required. Examples include sales areas for automobiles, boats, building supplies, or plants.

(e) During hours when the business is not open, the lighting level shall be reduced to security lighting only.

Section 15-242.8 Outdoor Sports Fields and Performance Areas

(a) The mounting height of outdoor sports field and outdoor performance area lighting fixtures shall not exceed 80 feet from finished grade unless approved by the permit issuing authority after receipt of substantial information justifying the need for additional height.

(b) All outdoor sports field and outdoor performance area lighting fixtures shall be equipped with a glare control package (louvers, shields, or similar devices). The fixtures must be aimed so that their beams are directed and fall within the primary playing or performance area.

(c) Outdoor sports field and performance area lighting systems shall not be operated between the hours of eleven p.m. and sunrise.

Section 15-242.9 Prohibited Uses of Light

The following are prohibited:

- (1) The use of laser source light or any similar high intensity light for outdoor advertising or entertainment, when projected above the horizon;
- (2) The operation of searchlights for advertising purposes;
- (3) Use of mercury vapor luminaires.

Section 15-242.10 Light Measurement Techniques

a) —Light measurements shall be made at finished grade (ground level), with the light-registered portion of the meter held parallel to the ground pointing up. The meter shall have cosine and color correction and have an accuracy tolerance of no greater than plus or minus five (5) percent. Measurements shall be taken with a light meter that has been calibrated within the year. Light levels are specified, calculated and measured in footcandles (FC). All FC values are maintained footcandles unless otherwise specified.

b) Compliance with an approved light plan associated with a permit can be verified in the field by confirming that the light fixtures and bulbs do not exceed those shown on the engineered plans. When there is no approved light plan then compliance can be verified by enforcing that the light source is blocked and/or directed in compliance with this Part or by the owner obtaining and providing a professional engineer's certification that verifies that the existing conditions comply with the ordinance.

Section 15-243 RESERVED

Section 4. A new Article XV, Part III is established at the beginning of Section 15-244 as follows:

PART III: MISCELLANEOUS UTILITIES

Section 5. Appendix A, Section A-6(b)(15) is rewritten to read as follows:

- (15) Outdoor illumination, including the following information:
 - a. Plans showing the location, type, and height of luminaires including both building and ground fixtures. The plan shall include a point-by-point footcandle array in a printout format indicating the location and aiming of illuminating devices, and indicate compliance with the maximum maintained footcandles required by Section 15-242.4 of this chapter.
 - b. A description of the luminaires, including lamps, supports, reflectors, raised foundations, poles or other supports and shielding devices, which may be provided as electric utility catalogue illustrations,

sheets and/or drawings, and product specifications from the manufacturer.

- c. Photometric data, such as that furnished by the manufacturer, showing the angle of light emission; and
- d. A demonstration or showing that the applicant has attempted to reduce energy consumption through the selection of energy efficient luminaires, timers, or other methods (such as fixtures that automatically change wattage output).

Section 6. All provisions in conflict with these changes are hereby repealed.

Section 7. This ordinance is effective upon adoption.



TOWN OF CARRBORO

NORTH CAROLINA

MEMORANDUM

PLANNING DEPARTMENT

DELIVERED VIA: HAND MAIL FAX EMAIL

To: Steve Stewart, Town Manager
Mayor and Board of Aldermen

From: Patricia J. McGuire, Planning Administrator

Date: April 16, 2010

Subject: Outdoor Lighting Standards Ordinance

This staff memo provides information in follow-up to questions and comments reviewed at the March 23rd continuation of a public hearing on a draft ordinance related to outdoor lighting. The information provided in the memo is as follows: responses to the March 15th recommendations of the Northern Transition Area Advisory Committee; discussion of how multi-family residential, other residential, and commercial uses are included in the draft ordinance; a report on disposal issues of LED vs. MH or HPS; information on recreational lighting requirements and the types and cost of ballfield lighting; information on street lighting types and cost; summary description of the draft ordinance.

NTAAC MARCH 15 COMMENTS. Each comment is followed by a response in italic text.

The NTAAC has reviewed the proposed lighting ordinance and makes the following recommendations:

1. Section 15-242.2(b)) should be changed to read as follows:

“Notwithstanding the provisions of subsection (a) of this section, luminaries installed prior to the effective date of this part that violate the provisions of this ordinance shall be non-conforming.” Staff considered this approach, but did not find it to be the most beneficial. Article VIII of the Carrboro Land Use Ordinance addresses how nonconformities are treated. Section 15-122 of the LUO allows nonconforming situations, such as lighting, to continue, subject to restrictions and qualifications specified in Sections 15-123 through 128. If subject to these provisions, lighting nonconformities would have to be reviewed whenever other changes to property that includes a nonconformity are proposed, even if no changes to lighting are included. More complicated questions of interpretation and enforcement arise if existing lighting is made nonconforming by adoption of the ordinance.

The approach included in the draft ordinance requires that whenever new luminaires are installed or existing lights are replaced, they shall comply with the outdoor lighting standards. This more simplified approach recognizes the embedded costs associated with a lighting system and provides a clear requirement to residents and property owners.

2. Wall pack lighting such as that which is located on the walls of the Morris Grove School should not be allowed under the ordinance. *Decorative round wall packs were included on Morris Grove Elementary and were reviewed as part of the lighting plan for compliance with pole height, light spillage, and shielding. The lights do not comply with the draft ordinance definition of "fully shielded" luminaires, as they exceed 3,200 lumens per fixtures. Under the draft ordinance, full shielding or lower lumen levels would be needed if similar lighting is proposed.*
3. Sections 15-242.3 nullify the intent and protections against light pollution of the ordinance and should be removed. *Section 15-242 describes the purpose and intent of the outdoor lighting standards and these are multipurpose, ranging from safety and security to enjoyment and energy conservation. Safety and security are principle purposes of outdoor lighting (primarily at nighttime, but also at other times where conditions limit natural lighting) of the ordinance. The broad statements included in Section 15-242.3 call for minimum illumination of streets, sidewalks and other common areas so that users of these facilities can travel safely on, along, or through them. Such lighting is used to allow for safe navigation and avoidance of hazards such as ditches, curbing, people, other vehicles, et cetera.*
4. Sections 15-242.4 (a) and (b) seem out of place because it is not about protections for light pollution. They should be relocated to the town's "street lighting policy". *Section 15-242, Purpose and Intent, describes outdoor lighting as serving a variety of beneficial purposes. A description of the manner in which street lights is to be provided in subdivisions is a reasonable and necessary part of the regulation of land use and is appropriately placed within the draft ordinance.*
5. In Section 15-242.4 c, the words, "...to the extent substantially equivalent to that provided for town streets under the town's street lighting policy" should be removed, on the basis that flexibility in street light, especially for private road situations, needs to be allowed. *The subsection as written provides flexibility in evaluating street lighting for private road situations. The word 'substantial' is understood to mean "for the most part," and the word 'equivalent' to mean "corresponding or virtually identical especially in effect or function."*
6. The word "directly" should be removed from Section 15-242.5 (a) (2) and (4). *The word 'directly' is needed as it clarifies the geographic limits of the requirement.*

7. Under 15-242.5(d), luminaires should not exceed fifteen (15) feet in height in commercial as well as non-commercial areas. *The draft ordinance includes a presumptive standard of 15 feet for all locations. The permit-issuing authority may permit deviations from the presumptive requirements and may require shorter or allow taller light fixtures whenever it finds that such deviations are more likely to satisfy the standard set forth in subsections 15-242 (a) and (b).*
8. Under 15-242.6(a), the NTAAC questions why the light level beneath vehicular canopies should exceed the general standards for foot candles. *The footcandle limitations included in Section 15-242.5 apply at the property line and will still apply to developments that include vehicular canopies. The footcandle limitations under a canopy, included in Section 15-242.6, seek to prevent excessive illumination in that portion of a property.*
9. In 15-242.8, height for outdoor sports field lighting fixtures should not exceed 60 feet from the finished grade. The following additional language should be added:
 “Notwithstanding the exemptions for lumens per acre and height limits in this lighting ordinance, all other general standards as recited herein shall apply to lighting for outdoor sports fields and performance areas.” *See discussion of recreational field lighting below.*
10. The NTAAC expresses its concern that policy affecting lighting in the entire town, ETJ and the Northern Transition Area is being set due to the request of a property management company representative and governed in part by the limited lighting options of Duke Power. *The draft ordinance was prepared in response to the directions of the Board of Aldermen, following a recommendation from the Northern Transition Area Advisory Committee. The ordinance follows closely the NTAAC's recommendations.*

HOW MULTI-FAMILY RESIDENTIAL, OTHER RESIDENTIAL, AND COMMERCIAL USES ARE INCLUDED IN THE DRAFT ORDINANCE. The draft ordinance distinguishes between these types of uses only in Section 15-242.5(d) where recommended maximum light output levels are as follows: 70,000 lumens per acre for commercial or multi-family and 6,500 lumens per acre for all other uses. An earlier version of the draft ordinance proposed a different lighting fixture height for single-family residential and multi-family/commercial. The presumptive standard was proposed as an alternative that allows flexibility to be evaluated on a case by case basis. The circumstances noted are illustrative; applicants for development approval could request deviations or the permit-issuing authority could require deviations for reasons not specified. Other than the slightly higher footcandle limits in the B-1(c) and B-1(g) districts, and the provisions associated with vehicular canopies, outdoor performance/sports, and outdoor display, a need to differentiate between uses was not identified.

REPORT ON DISPOSAL ISSUES OF LED VS. MH OR HPS. The most significant waste disposal issue associated with outdoor lighting fixtures seems to be the metals and toxic chemicals contained in many energy-efficient lamps, including metal halide, high-pressure sodium, induction, and compact fluorescents. Mercury is the metallic element most often mentioned in connection with disposal of these fixtures. Most of the components of these lamps are recyclable, including the mercury, but the possibility of breakage and mercury spillage represents an environmental risk.

These lamps should not be disposed of landfills, but should be recycled. Here in Orange County, per <http://www.co.orange.nc.us/recycling/hhw.asp>, lamps produced by households and businesses that produce less than 220 pounds of hazardous waste per year may be treated as household hazardous waste. A directory of hazardous waste recyclers for others is available from the DENR Division of Pollution Prevention at <http://www.p2pays.org/dmrm/start.aspx?id=129>.

The Mascaro Center for Sustainable Innovation at the University of Pittsburgh¹ completed a life cycle cost assessment of four street lighting technologies in 2009. The study was undertaken to assist a task force in its recommendations to the Pittsburgh City Council regarding replacement and/or retrofitting street lighting. The assessment comprehensively evaluated the four technologies, high-pressure sodium (HPS), metal halide (MH), induction, and light-emitting diode (LED) streetlight technologies with a focus on the categories of global warming, ecotoxicity, and respiratory effects.

The Executive Summary states the following:

We found the manufacture of induction and LED could have environmental impacts three times higher than HPS and MH. However, because induction and LED lights use half the electrical power of HPS and MH, they have a lower overall impact. Induction and LED also have lower maintenance costs because their lifespan is up to five times that of HPS and MH. We also found that adding wind-generated electricity can significantly lower the impacts of any streetlight technology. Induction lights last up to twice as long as LED and use slightly less electricity. However, the efficiency of induction lighting appears to have been maximized, while LED lighting efficiency is increasing rapidly

INFORMATION ON RECREATIONAL LIGHTING REQUIREMENTS. The following chart prepared by the Major League Baseball association provides general lighting guidelines for recreational fields. Carrboro's recreational fields would be classified in the High School/Youth (competitive) or Recreational tiers.

General Lighting Guidelines Based on Field Level

Field Level	Horizontal Illumination Foot-Candles (Lumens)*	
	Infield	Outfield
International/Olympics	150 (1,500)	100 (1,000)
Minor Leagues – AAA and AA	100 (1,000)	70 (700)
Minor Leagues – A and Rookie	70 (700)	50 (500)
College – non-televised	70 (700)	50 (500)

¹ 2009. Hartley Douglas, Jurgens, Cassie and Eric Zatcoff. Life Cycle Assessment of Streetlight Technologies. University of Pittsburgh.

Field Level	Horizontal Illumination Foot-Candles (Lumens)*	
	Infield	Outfield
College – televised	100 (1,000)	70 (700)
High School, Youth(competitive)	50 (500)	30 (300)
Recreational	30 (300)	20 (200)

Each facility is lighted according to engineered specs depending on the type of facility to provide even light coverage. For example, you don't want a dark spot in the outfield of a baseball field that may cause someone to lose sight of a fly ball and get hit in the head. During the recent upgrade of lighting at Wilson Park, BNK Engineers prepared specifications and design so as to achieve a consistent level of illumination across the entire ballfield. Those specifications call for a 50 lumen infield average, 30 lumen outfield average.

Glare becomes less of an issue with taller poles; light deflectors are also used to focus and concentrate the light on playing fields to maximize the illumination. The original fixtures at Anderson Park (installed in 1981) were shorter in height and glare was a consistent issue with participants. Approximate heights of our various light fixtures are as follows:

Anderson Park:

Field 1: 60ft Hooded light deflectors present

Field 2: 60ft Hooded light deflectors present

Field 3: 60ft Hooded light deflectors present

Field 4: 50ft

Basketball Courts: 35ft

Wilson:

Ball Field: 60 Hooded light deflectors present

Tennis Courts: 40

Smith Soccer Field: 80 and 100 ft Hooded light deflectors present

INFORMATION ON PUBLIC LIGHTING TYPES AND COST. See attached sheets for number, type and costs for street and ballfield lighting.

DRAFT ORDINANCE

The draft ordinance includes two sections, one of which repeals existing ordinance language and establishes the provisions for a new article, entitled Outdoor Lighting Standards. The second section amends the information required with an application. A summary of the ordinance is provided here. Italic text indicates where substantive edits have been made to the version of the ordinance presented at the opening of the public hearing in January, 2010.

- 1) Rewrites Sections 15-242 and reserves 15-243 for future use.

- 2) Establishes three Parts to Article XV, entitled Water and Wastewater, Outdoor Lighting, and Miscellaneous Utilities
- 3) Section 15-242 -states the purpose and intent of lighting provisions.
- 4) Section 15-242.1 - defines 14 terms related to the lighting. *A clearer definition of 'fully shielded' lighting has been included.*
- 5) Section 15-242.2 -establishes applicability of the ordinance to new development and to additions or renovations of existing development. Nonconforming floodlights are to be brought into compliance or removed within three months after the date of notification of the violation. States uses/activities to which the standards do not apply.
- 6) Section 15-242.3 – states minimum security lighting standards for subdivisions with public streets, subdivisions and unified developments with private streets, and non-residential buildings and multi-family dwellings.
- 7) Section 15-242.4 - delineates the role of the Town and developers in the installation of street lights associated with new public or private streets.
- 8) Section 15-242.5 -establishes general standards for lighting fixtures, levels, trespass, and pole placement. *Modification makes the maximum lumen levels recommendations rather than requirements. Staff feels more time is needed to evaluate this provision. As a recommendation, staff will be able to monitor how these proposed levels relate to lighting plans that are submitted. The second modification in this section creates a presumptive lighting fixture height standard, allowing the permit-issuing authority some flexibility in requiring lower or allowing higher lighting fixture heights. This standard has been simplified to refer to the height of light poles (as is done in the current LUO provision) and to establish the presumption that 15 feet is the maximum regardless of location on lots used for residential or non-residential purposes.*
- 9) Section 15-242.6 -specifies light limits, fixture types, and lighting schedules associated with vehicular canopies typically found at gas stations or convenience stores. *Modification deletes one lighting fixture option that would have allowed some spillage of light from beneath the vehicular canopies.*
- 10) Section 15-242.7 – establishes lighting parameters for outdoor display areas; refers to IESNA publication on recommended illuminance levels.
- 11) Section 15-242.8 – specifies sports and performance area lighting.
- 12) Section 15-242.9 – prohibits the use of laser source lights, searchlights for advertising purpose, and mercury vapor luminaries.
- 13) Section 15-242.10 – describes light measurement techniques. *Modification clarifies the methods that would be used for determining compliance with approved lighting plans.*
- 14) Appendix A-rewrites the description of the information that is needed to document how a land use permit application complies with the lighting requirement.

STAFF RECOMMENDATION

The ordinance included in the public hearing agenda packet includes several edits, including additions and deletions from the version provided at the time the public hearing on this matter was set in November. These changes are summarized above (italic text) in the section describing the draft ordinance. Staff recommends adopting the ordinance with these changes.

Street Light Cost Breakdown

	Lumens	kwh (usage)	Cost per kv	Monthly Energy Cost	Lease Costs - Existing Pole	Total Cost - Existing Pole	Lease Costs - New Pole	Total Cost - New Pole	Lease Costs - New Pole UG	Total Cost - New Pole UG
Duke	9,500	47	0.024	\$1.13	\$8.76	\$9.89	\$9.98	\$11.11	\$10.84	\$11.97
Duke	16,000	70	0.024	\$1.68	\$9.00	\$10.68	\$10.22	\$11.90	\$11.08	\$12.76
Duke	27,500	104	0.024	\$2.50	\$10.14	\$12.64	\$11.36	\$13.86	\$12.22	\$14.72
Duke	50,000	156	0.024	\$3.74	\$11.66	\$15.40	\$12.88	\$16.62	\$13.74	\$17.48
Piedmont	9,500	40	0.043	\$1.72	\$8.78	\$10.50				
Piedmont	16,000	61	0.043	\$2.62	\$9.18	\$11.80				
Piedmont	27,500	100	0.043	\$4.30	\$11.40	\$15.70				
Piedmont	50,000	156	0.043	\$6.71	\$12.19	\$18.90				

*Piedmont has a different cost structure for new poles and installations, which is based on an initial upfront cost instead of a monthly lease payment.

G. Seiz
4/5/2010

Lighting Information for BOA follow up on April 20, 2010

Ball fields, tennis courts, basketball lighting costs

	FY 08/09	
Anderson Park	\$4,355	All fields & courts on one meter
Wilson Park	\$3,832	All fields & courts on one meter
Smith School	\$2,802	1 Field
	\$10,989	

Street Light Costs

For FY 08/09	\$134,385
3 yr Ave. 06/07 thru 08/09	\$131,825

Approximate number of street lights broken out by provider.

Piedmont Electric							
			250 WHPS	150 WHPS	175 WMV	100 WHPS	Total SL
			48	20	4	9	81

Duke Energy							
	400 WHPS	250 WHPS	400 WMV	150 WHPS	100 WHPS	175 WMV	Total
	3	332	2	128	320	102	887

W-Watt Approx. # total SL 968
HPS - High Pressure Sodium
MV - Mercury Vapor

*Public works is working to retrofit outdated Mercury Vapor fixtures/lights with cobra cut-off fixtures and lower wattage bulbs (from 175 W to 100W) - Look to convert @12 -15 per year.

*Duke Energy and Piedmont electric no longer offer Mercury Vapor as a new lighting option.

*Public works receives on average 2-4 requests per year about street lighting. Sometimes lights are added and other times pruning of trees or re-orientation of the lighting may address concern.

*Lights are added to the system when we accept new roadways onto the town's street system.

Street Light Rates - Schedule GI (NC) - Governmental Lighting Service

Flat rate which includes energy costs, maintenance and repair over the life of the unit

Per month per luminaire

Watts	Lumens	Existing Pole	New Pole	New Pole Served undergnd.
100W	9,500	\$9.89	\$11.11	\$11.97
150W	16,000	\$10.68	\$11.90	\$12.76
250W	27,500	\$12.64	\$13.86	\$14.72
400W?	40,000	\$15.40	\$16.62	\$17.48

The "Existing Pole" rate is applicable to a luminaire installed on a pole which does not solely support the luminaire, or for an additional luminaire on the same pole as another luminaire.

**CONTINUATION OF A PUBLIC HEARING ON A LAND USE ORDINANCE TEXT AMENDMENT
REVISING OUTDOOR LIGHTING STANDARDS (ITEM B(3))**

A draft ordinance modifying outdoor lighting provisions was presented. The Board of Aldermen must receive public comment before taking action.

Trish McGuire, the town's Planning Administrator, made the presentation.

Jay Bryan, Chair of the Northern Transition Area Advisory Committee, discussed the NTAAC's recommendations.

Shannon Brummet, representing five apartment communities, asked for 25-foot poles. He said they simply cannot afford to provide for sufficient lighting using 15-foot poles.

Jim Edmunds, Duke Energy's light specialist, stated that Duke Energy does offer LED lighting but it is very expensive. He offered his assistance to the town in considering this text amendment.

MOTION WAS MADE BY DAN COLEMAN AND SECONDED BY JOAL HALL BROWN TO CONTINUE THIS PUBLIC HEARING TO APRIL 20, 2010 WITH THE REQUEST FOR THE FOLLOWING INFORMATION:

- Staff comments on NTAAC recommendations;
- Information on separating multi-family and commercial or residential in land use ordinance;
- Information on disposal issues of LED versus MH or HPS lights;
- Information on costs of Duke Energy lights and cost of ballfield lights;
- Information on player glare

VOTE: AFFIRMATIVE ALL
