EXHIBIT A – DRAFT ORDINANCE Chapter 1330. Lighting Standards

1330.010 Purpose and Intent

- **A.** It is the purpose and intent of this Chapter to encourage the use of lighting design practices and systems that will: 1) minimize glare, light trespass and light pollution; 2) conserve energy and resources while maintaining nighttime safety, security and productivity; and 3) to curtail the degradation of the nighttime visual environment.
- **B.** It is the purpose and intent of this Chapter to establish clear and comprehensive outdoor lighting standards with an emphasis on reducing glare and light trespass by requiring, in most circumstances, the installation of both *semi-cutoff (minimum required)* and full cut-off (preferred) lighting fixtures.
- **C.** It is the purpose and intent of this Chapter to allow for outdoor lighting that is appropriate for the task and to establish light fixture height limits that will help prevent light trespass to adjacent properties.
- **D.** It is the purpose and intent of this Chapter to establish specific standards for certain land uses that typically have unique lighting requirements, such as (but not limited to) automotive dealerships, service stations, and outdoor sporting facilities.

1330.020 Applicability

This outdoor lighting standard applies to the development of all new multi-family housing, new major residential and non-residential subdivisions, non-residential construction, and the construction of parking lots where such developments include the installation of new outdoor lighting fixtures or the replacement of existing lighting fixtures. *All new construction projects shall have enough exterior lighting to meet the minimum safety and security requirements of the Southern Building Code (SBC), National Electrical Code (NEC) and North Carolina Building Code (NCBC).* The replacement of an existing lighting fixture is defined as a change of the type of fixture; a change in the mounting height of a fixture on a pole, building, or other structure; or a change in the location of a lighting fixture. All of these applications require compliance with this section. Routine lighting fixture maintenance such as replacement of lamps, ballast, starter, photo control, or similar components will not constitute the need to comply with this ordinance, and is permitted provided such changes do not result in a higher wattage or higher lumen output.

1330.030 General Exemptions

The following lighting applications are exempt from the requirements of this Section:

- **A.** Emergency lighting: Lighting required for public safety, in the reasonable determination of the inspection official holding authority.
- **B.** Decorative lighting: Low-wattage fixtures (comprised of lamps less than eight [8] watts each or other lamps of output less than one hundred [100] lumens each) used for holiday decoration.
- **C.** DOT lighting: Department of Transportation highway signage luminaires, which must comply with national D.O.T. standards.

1330.040 Light Measurement Technique

Measurements shall be made at finished grade (ground level), with the light registering portion of the meter held parallel to the ground, pointing up. The meter shall 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 one (1) year. Light levels are specified, calculated and measured

in footcandles (FC), and should be taken after a one hundred (100) hour burn-in time, which will more accurately read "maintained" lighting levels.

1330.050 General Lighting Standards

All outdoor lighting (other than lighting for automotive dealerships and outdoor sporting facilities) shall comply with the following standards: All exterior lighting should be provided as to minimize the amount of light that is distributed towards an adjacent property, thereby limiting light trespass.

- **A.** All new lighting installations adjacent to a residential property (and renovations to existing lighting fixtures), shall show the intent to limit FC levels at property lines to a maximum amount of one (1) footcandle maintained. All new lighting installations adjacent to a commercial property (and renovations to existing lighting fixtures), shall show the intent to limit FC levels at property lines to a maximum amount of two (2) footcandles maintained.
- **B.** The maximum light level allowed at any point on a given parcel or property (with the exception of automobile dealerships and sporting facilities) shall not exceed twenty (20) footcandles maintained. The maximum light level allowed at any point on an automobile dealership (display or parking area) shall not exceed fifty (50) footcandles maintained. All outdoor sporting facilities shall be illuminated to Illuminating Engineering Society North America (IESNA) standards, with great care taken to minimize spill light at the property lines. Refer to section 1330.080, subsection B, for guidelines applying to outdoor sporting facilities.
- **C.** All lighting fixtures, (regular lamps and flood lamps) rated 150 watts or less may be used without restriction to light distribution (non-cutoff classification) except when the luminaire creates direct glare perceptible to persons on a public right of way, or into the window openings of a residential dwelling unit. Care should be taken to minimize light trespass across property lines. Internal louvers or "glare shields" should be provided where the emitted light becomes a hinderence.
- **D.** All lighting fixtures rated between 175 watts and 400 watts (inclusive) shall be at a minimum "semicutoff", and preferably installed as a "full cutoff" type.
- E. All lighting fixtures (regular lamps and flood lamps) rated above 400 watts (exclusive) shall be listed as a "full cutoff" distribution only, and shall not emit any light above the horizontal plane of the fixture. With exception of sporting facilities, the light source should not be visible (within reason) from adjacent properties or the public street right-of-way.
- **F.** All building wall mounted lighting fixtures, or "wallpacks", shall be of the full cutoff type.
- **G.** All lighting fixtures illuminating building facades, steeples, trees, billboards, signs, flags, etc. (vertical surfaces lighted from the bottom up) SHALL NOT exceed 175 watts, with the exception of Department of Transportation highway signage luminaires, which must comply with National D.O.T. standards. Lighting fixtures shall be selected, located, aimed and shielded so that direct illumination is focused exclusively on the item being illuminated, and away from adjacent properties and the public street right-of-way.
- **H.** All new lighting fixtures shall be mounted of metal poles with underground utilities for all new developments, redevelopments, and subdivisions accept when:
 - 1. New lights are proposed within existing subdivision where utility poles and overhead utilities exists; an
 - 2. New security lights are proposed on commercial property where utility poles and overhead utilities exist;

1330.060 General Standards for Lighting Fixtures

A. Fully shielded (full cutoff) lighting fixtures and partially shielded (semi-cutoff) lighting fixtures are required for most applications, but are preferred for all outdoor lighting applications. All outdoor lighting fixtures rated above 150 watts shall utilize one of these two lighting fixture classifications. Fixtures rated 150 watts and below may fall into the "non-cutoff" classification.

Figure 1: Full cutoff style light fixture (left) versus non-cutoff style (right)



B. The maximum fixture height (grade to top of fixture) for all ground mounted lighting fixtures, except those used for sports facilities, shall be as follows:

Commercial - 32 feet Residential - 20 feet Pedestrian Pathways/Sidewalks - 12 feet

1330.070 Prohibited Uses of Lighting

- **A.** Unshielded flood lights, except for residential flood lights rated 100 watts or less, that are permitted but must be aimed towards the ground and not towards adjacent properties.
- **B.** Unshielded lamps or fixtures, except for those used for swimming pools, hot tubs, semienclosed decks or porches and similar accessory structures.
- **C.** Searchlights used for advertising purposes.
- **D.** Laser sourced lighting fixtures used for advertising purposes.
- **E.** Other than architecturally aesthetic neon signs, all exposed neon "striping" on or around commercial buildings shall be prohibited.

EXHIBIT A – DRAFT ORDINANCE 1330.080 Standards for Specific Uses

A. Gas and Service Station Canopies

1. All lighting fixtures mounted on the underside of canopies must be "full-cutoff" classified, being either completely recessed/flush in the canopy, or having solid sides on a surface mounted fixture (canopy edges do not qualify as shielding).



Figure 2: Recessed (full cutoff) service station lighting on the left; surface mounted (non-cutoff) on the right.

- 2. The light source shall be metal halide, ceramic metal halide or LED.
- **3.** Lighting levels under the canopy shall be no greater than thirty (30) footcandles. Areas outside the pump island canopy shall be illuminated as to provide proper safety to customers, but shall be limited and not exceed ten (10) footcandles maintained. General Outdoor Sporting Facility/Performance Area Lighting Standards

B. General Outdoor Sporting Facility/Performance Area Lighting Standards

- **1.** The mounting height of outdoor sports field and outdoor performance area lighting fixtures shall not exceed eighty (80) feet from finished grade unless approved prior to construction by the Board of Adjustment or Town Council.
- **2.** All outdoor sports field and outdoor performance area lighting fixtures shall be equipped with a glare control package (louvers, shields, visors or similar devices). The fixtures must be aimed so that their beams are directed and fall within the primary playing field or performance area.
- **3.** The hours of operation for the FIELD lighting system for any game or event shall not exceed one (1) hour after the end of the event. The security and egress illumination lighting systems may remain turned on for any amount of time deemed necessary to remove people safely.
- 4. Light levels for sports field illumination shall comply with, but not exceed IESNA standards. Where new sporting facility lighting is installed adjacent to an existing residential property, the INTENT shall be made for all installations to limit property line light levels to a maximum of two (2) footcandles at grade level. When not installed adjacent to a residential property, light levels at the property line shall

not exceed four (4) footcandles at grade level. ALL possible means of shielding must be applied if this level has not been met. Owner must prove to the appropriate permitting authority that these means have been exhausted, and the intent has been made to meet these goals.

C. Security and Display Lighting

- **1.** Outdoor security lighting should be designed to provide safety to a building occupant, while effectively allowing proper surveillance, though not to exceed lighting levels described in Section 1330.050, subsections A and B.
- **2.** The use of motion sensors, timers, photocells or other means to activate lighting during nighttime hours is required to conserve energy, provide safety, and promote compatibility between different land uses.
- **3.** In order to direct light downward and minimize the amount of spill light, all security lighting fixtures shall be shielded and aimed so that the main beam is directed toward the ground or designated area where security lighting is needed.
- **4.** Security Lighting for ATM's shall be consistent the Illuminating Engineering Society North America (IESNA) standards for that industry.

D. Architectural Accent Lighting

- Lighting fixtures used to accent architectural features, materials, colors, style of buildings, landscaping or art shall be located, aimed and shielded so that light is directed only on those features. Such fixtures shall be aimed or shielded to minimize light spill from the source in conformance with the luminaire standards.
- **2.** Accent lighting shall not generate excessive light levels, cause glare, or direct light beyond the façade onto neighboring properties, streets or night sky.
- **3.** National flags may be illuminated from below provided such lighting is focused primarily on the individual flag or flags, and to limit light spill into the night sky. These fixtures must conform with Section 1330.050, subsection G of this document.

E. Temporary Outdoor Lighting

Any temporary outdoor lighting that conforms to the requirements of this Chapter shall be allowed. Any temporary lighting that does not conform to these outdoor lighting standards may be permitted after considering: (a) the public and/or private benefits that will arise from the temporary lighting; (b) any annoyance or safety problems that may result from the use of the temporary lighting, and (c) the duration of the temporary nonconforming lighting. The applicant shall provide a detailed description of the proposed temporary outdoor lighting to the Town Engineer for review and approval.

F. Public and Private Roadways

All streets and sidewalks shall be sufficiently illuminated to ensure the security of the street rightof-way and safety of pedestrians present in the area.

- **1.** Street lighting must be included on all new residential and commercial streets. In addition, street lighting must be installed on the perimeter of the development along a thoroughfare or boulevard, as well as any collector road.
- **2.** For a new subdivision, a lighting layout and overall design is required in the subdivision design submittal documents. Lighting submittals shall include the fixture, lamp, pole height and the method of shielding being used.
- **3.** Subdivision developers are required to have the lighting design approved by the Planning Department, and shall then submit the approved design to the power company prior to installing the assemblies. An accurate scale reference must be included on all layout drawings.
- **4.** In general, the layout of roadway lighting should conform to the RP-8-00 Roadway Lighting Manual and the following standards:
 - **a.** All light poles shall be placed approximately 200 feet apart. Due to geometric limitations, this distance between poles can be adjusted up to forty (40') feet. Light fixture assemblies shall be placed on the side of the street where the sidewalk is located. If both sides have a sidewalk, lights shall be alternated.
 - **b.** All corners shall have at least one light fixture assembly for a three-way intersection, and two light fixture assemblies for a four-way intersection.
 - **c.** All cul-de-sacs shall have a minimum of one light fixture assembly, located such that the entire cul-de-sac right-of-way has an ample amount of illumination.
 - **d.** Lights should be placed on the outside of the curve and the spacing should be lessened.
- **5.** Photometric calculations shall be required by the Town of Indian Trail for outdoor lighting applications. Average footcandle values shall be taken from the table below:

Figure 3: "Roadway Lighting Handbook", U.S. Department of Transportation, Federal Highway Administration 1978, as revised.

Recommendations for Roadway Average Maintained Horizontal Illumination						
Vehicular Roadway Classification	Commercial		Urban Intermediate		Residential	
	Foot-candle	Lux	Foot-candle	Lux	Foot-candle	Lux
Freeway*	0.6	6	0.6	6	0.6	6
Expressway*	1.4	15	1.2	13	1.0	11
Major	2.0	22	1.4	15	1.0	11
Collector	1.2	13	0.9	10	0.6	6
Local	.9	10	0.6	6	0.4	4
Alleys	0.6	6	0.4	4	0.4	4

Note: The recommended illumination levels shown are only meaningful when designed in conjunction with other elements. The most critical elements as described in this practice are as follows: Illumination depreciation; b. Quality; c. Uniformity; d. Luminaire mounting heights; e. Spacing; f. Traverse location of luminaire; g. Luminaire selection; h. Traffic conflict areas; i. Border areas; j. Transition lighting; k. Alleys; l. Roadway lighting layouts.

* Both the mainline of freeways and expressways and the ramps.

- **6.** All new lighting fixtures must be installed on new metal poles. Wood poles shall not be *permitted except when installing light fixtures within an existing residential subdivision where wood utility poles exist.*
 - **a.** New residential subdivision street lights or street lights within the Downtown Overlay District shall be *semi or full cutoff fixtures incompliance with Section 1330.050*. Poles shall be free standing painted black. Refer to Section 1330.060 for allowable pole heights. No overhead service wires shall be allowed.

Figure 4: Decorative street lighting fixture (example) with semi-cutoff classification. Internal glare shielding preferred for residential applications.





b. Collector and thoroughfare lighting shall be AEL 125 full cutoff style cobrahead, 400 watt high pressure sodium or metal halide, and shall conform to NC DOT standards. Sag lens shall not be allowed. Poles shall be free standing with an aluminum finish. No overhead service wires shall be allowed.

Figure 5: Collector or thoroughfare cobrahead lighting fixture (example) with full cutoff style.



1330.090 Compliance

- **A.** A photometric site plan and lighting fixture cut sheets for all proposed exterior fixtures shall be included with the required application for a subdivision of land or a site plan. Depending on the size and type of the project, the Director of Planning and Development shall require that the photometric site plan include the following:
 - **1.** The location of lighting relative to the principal land uses and relative to the abutting streets.
 - 2. The zoning district classifications of all properties abutting the site.
 - **3.** The location and site coverage of service station canopies and outdoor sales and display areas.
 - **4.** The location and height of all lighting poles, building mounted lights, and ground mounted lighting fixtures.
 - **5.** A photometric diagram showing the predicted levels of illumination from the proposed lighting fixtures.
 - **6.** The manufacturer's product descriptions showing that the proposed lighting fixtures meet the requirements of this Code.
- **B.** The Director of Planning and Development shall require the installation of full-cutoff shielding or directional shielding when a zoning applicant proposes repairing or replacement of any component of any luminaire where the Town has found that the existing lighting fixture has created a public hazard due to excessive glare or light trespass.

1330.100 Violations

A. Any person, firm or company, whether principal, agent, employee or otherwise, who violates any of the provisions of this Section shall be fined an amount not to exceed Three Hundred Dollars (\$300.00) for each such violation, such fine shall be paid to the Town of Indian Trail. Each day of the documented existence after written notification of any situation held to be in violation shall be deemed an equal and separate offense.

The Town may withhold certificates of occupancy or business license issuance or renewal, for any use that installs luminaries that do not comply with this Section.