

10.13 Lighting

(1). Purpose : The purpose of these outdoor lighting standards is to provide requirements for residential subdivisions and site plans within the Town of Auburn to ensure that each developed site plan will address concerns resulting from light trespass, excessive glare, and to protect the nighttime environment, while at the same time providing adequate safety, energy efficiency and security for nighttime business and industrial operations. The goal of this lighting regulation is to recognize the benefits of outdoor lighting and provide clear guidelines for its installation. Appropriately regulated and properly installed outdoor lighting will maintain the Town's character and contribute to the safety and welfare of the residents of the Town.

(2). Applicability: The lighting requirements of this section shall apply to all outdoor lighting in all residential subdivisions, and to all developments requiring a site plan approval from the Planning Board, as well as new outdoor lighting and alteration of the outdoor lighting on those properties.

(3). Terms and Definitions:

(A). Back Light: The lumen distribution in the back of the luminaire and is defined between 0 and 90 degrees vertical and 0 to 270 degrees horizontal in back of the luminaire. Used to evaluate light trespass for luminaries located near property lines. The Back light is divided into 4 vertical secondary angles: BL (0-30 degrees), BM (30-60 degrees), BH (60-80 degrees), and BVH (80-90 degrees).

(B). BUG Rating: A luminaire classification system that classifies Back Light (B), Uplight (U), and Glare (G) ratings used to evaluate luminaire optical performance; as it relates to light trespass, sky glow and high angle brightness. And have ratings from 0-5, that define maximum lumens at that area.

(C). CRI: Color Rendering Index – A measurement of the amount of color shifts that objects undergo when lighted by a light source as compared with the color of those same objects when seen under a reference light source of comparable color temperature. (Range 0-100).

(D). Curfew: A time defined by the Town when outdoor Curfew lighting is reduced or extinguished. One hour after business closes or night activities cease, lighting shall be reduced to 50% in commercial districts abutting residential districts or residential uses.

(E). Direct Light: Light emitted directly from the lamp, off of the reflector, or the reflector diffuser, or through the refractor or diffuser lens, of a luminaire.

(F). 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/ LED's modules; a ballast/driver, a reflector or mirror; and/or a refractor or lens.

(G). Flashing: A pattern of changing light illumination where the sign illumination alternates between illuminated and non-illuminated.

(H). Flood or Spotlight: Any light fixture or lamp that incorporates a reflector or a refractor to concentrate the light output to a directed beam in a particular direction.

(I). Forward Light: The lumen distribution in the front of the luminaire and is defined between 0 and 90 degrees vertical and 270 to 90 degrees horizontal in front of the luminaire. Used to evaluate distribution of light in front of the luminaire. The forward light is divided into 4 vertical secondary angles: FL (0-30 degrees), FM (30-60 degrees), FH (60-80 degrees), and FVH (80-90 degrees).

(J). Full Cutoff Luminaire: The IES classifications of full cutoff, cutoff - max. semi-cutoff, and non-cutoff have been superseded by the Luminaire Classification System (LCS))

(K). Foot-Candle: Measure of light falling on a given surface. One foot-candle is equal to the amount of light generated by one candle shining on a one (1) square foot surface one (1) foot away. Unless otherwise noted in this Regulation, foot candles are measured on a horizontal surface at ground level.

(L). Glare: Light emitting from a luminaire with an intensity great enough to reduce a viewer's ability to see, and in extreme cases, causing momentary blindness. Lighting entering the eye directly from luminaires or indirectly from reflective surfaces that causes visual discomfort or reduced visibility. Glare / Offensive light is quantified to include luminaire Forward and Back light at angles of 80-90 degrees (BVH and FVH) and Forward and Back light at angles of 60-80 degrees (BH and FH) when describing a luminaire's distribution.

(M). Height of Luminaire: The height of a luminaire shall be the vertical distance from the ground directly below the center line of the luminaire to the lowest direct-light emitting part of the luminaire.

- (N). IESNA: Illuminating Engineering Society of North America.
- (O). Indirect Light: Direct light that has been reflected or has scattered off other surfaces.
- (P). Lamp: The component of a luminaire that produces the actual light.
- (Q). LED: A Light-Emitting Diode is a semiconductor diode that emits light when a voltage is applied to it.
- (R). Light Trespass: The shining of light produced by a luminaire beyond the boundaries of the property on which it is located.
- (S). Lighting Zones: An overlay zoning system establishing legal limits for lighting for particular parcels, areas, or districts as the base or ambient light levels desired by the Town of Auburn.
- (a). LZ0 – No Permanent lighting in undeveloped area of open space, wilderness parks and preserves, areas - Special review shall be required for any permanent lighting in this zone.
 - (b). LZ1 - Low ambient lighting. - Rural and low-density residential areas.
 - (c). LZ2 - Moderate ambient lighting. – Light Commercial business districts and mixed-use and high-density residential districts.
 - (c). LZ3 – Moderately high ambient lighting. - Urban Commercial business districts and Industrial districts.

Town of Auburn		
Zoning Districts		
Zone Name	Short Name	Lighting Zone
Rural	R	LZ1
Residential-One	R-1	LZ1
Residential-Two	R-2	LZ1
Commercial-One	C-1	LZ2
Commercial-Two	C-2	LZ2
Village Center	V	LZ2
Industrial	I	LZ3

(T). Lumen: (A unit of luminous flux) One foot-candle is one (1) lumen per square foot. For the purposes of this Regulation, the lumen output values shall be the INITIAL lumen output ratings of a lamp.

(U). Luminaire: This is a complete lighting system. A lamp or lamps and a fixture.

(V). Luminaire Classification System (LCS): The distribution of lighting from a luminaire/fixture within three primary solid angles. And 10 secondary angles. Primary Solids angles: Back Light, Uplight, Forward Light, are indicators of the optical distribution and used with IES distribution classification provide an analysis of where the light is distributed.

(W). Luminance: The amount of light falling on a surface, measured in lux (lx) or foot candles (fc).

(X). Nit(s): a luminance unit equal to one candela (one candle) per square meter measured perpendicular to the rays from the sources. From the Latin word *nitere*, meaning “shine”, nits are used to measure display intensity, or brightness. Nits, when used in conjunction with contrast ratio and viewing angle, determine the quality of the image in the desired application.

(Y). Outdoor Lighting: The nighttime illumination of an outside area or object by any man-made device located outdoors that produces light by any means.

(Z). Property line: The legally defined extent of privately-owned property.

(AA). Security Lighting: Lighting primarily for safety of persons and property, which is part of an overall security plan for a site which includes at least illumination, surveillance, and response.

(BB). Sign, Electronic Message Display: An electronic changeable sign capable of displaying text, symbols, figures or graphics, which can be electronically or mechanically changed by remote or automatic means and incorporates both Electronic Changeable Copy and/or Electronic Graphic Display signs.

- a. Sign, Electronic Changeable Copy: A sign or portion thereof that displays electronically non-pictorial, text information in which each alphanumeric character or symbol is defined by a small number of matrix elements using different combinations of light emitting diodes (LED's), fiber optics, light bulbs or other illumination devices within the display area. Electronic Changeable Copy includes computer programmable, microprocessor controlled electronic displays. Electronic changeable copy does not include time and temperature signs.

- b. Sign, Electronic Graphic Display: A sign or portion thereof that displays electronic static images, static graphics, or static pictures, with or without text information, defined by a small number of matrix elements using different combinations of light emitting diodes (LED's), fiber optics, light bulbs or other illumination devices within the display area where the message change sequence is accomplished immediately or by means of fade, re-pixelization or dissolve modes. Electronic Graphic Display Signs include computer programmable, microprocessor controlled electronic displays.

(CC). Temporary Outdoor Lighting: The specific illumination of an outside area or object by any man-made device located outdoors that produces light by any means for a period of less than thirty (30) days, with at least one hundred eighty (180) days passing before being used again.

(DD). Uniformity Ratio: The ratio of maximum to minimum luminance or average to minimum luminance.

(EE). Uplight: The lumen distribution above the luminaire and is defined between 90 and 180 degrees vertical and 0 to 360 degrees horizontal around the entire luminaire. Uplight in a luminaire doesn't include the impact of light reflected from ground surfaces and adjacent structures. Use to evaluate distribution of light at or near horizontal and directly above the luminaire. The uplight is divided into 2 vertical secondary angles: UL (90-100 degrees) and UH (90-180 degrees) 360 degrees around the luminaire.

(4). Residential Subdivisions and Site Plans – General Requirements: The intent of this Regulation is to reduce the problems created by improperly designed and installed outdoor lighting, by establishing regulations which limit the areas that certain outdoor lighting luminaires can illuminate, and by limiting the total allowable illumination of commercial and industrial developments located in the Town of Auburn.

(A). Lighting Plans: All plans submitted to the Planning Board shall include a lighting plan, prepared and sealed by a professional engineer with expertise in lighting design, which shows all the exterior lighting to be installed as part of the plan development. Temporary and seasonal lighting plans must also receive approval by the Planning Board.

(i). Code Requirements: All site lighting designs shall conform to the applicable requirements of the NH Energy Code (New Hampshire Code of Administrative Rules, Chapter P.U.C. 1800, New Hampshire Code for Energy Conservation in New

Buildings), The National Electrical Code (NEC), latest edition, and The International Building Code (IBC).

(ii). Lighting Plan Specifications: The lighting plan shall contain:

(a). Details of the lighting fixtures proposed to illuminate all buildings, signs, roadways, service areas, landscaping, parking and pedestrian areas, including the location, height, make, model, lamp type, luminaire lumens, and wattage of each outdoor fixture.

(b). Specifications and illustrations of all proposed lighting fixtures including pole heights, height of luminaire, photometric data, Color Rendering Index (CRI), BUG Rating, and other descriptive information.

(c). Maximum pole mounted light fixture height shall be twelve (12) feet, as measured from the ground to the optics of the fixture, in residentially zoned areas and sites that abut existing, residential uses.

(d). Maximum pole mounted light fixture height shall be twenty (20) feet, as measured from the ground to the optics of the fixture, in commercial/business districts zones, not abutting residentially zoned districts.

(e). Maximum pole mounted light fixture height shall be twenty-five (25) feet, as measured from the ground to the optics of the fixture, in industrial zones, not abutting residentially zoned districts.

(f). Maximum pole height, in all districts, shall not exceed 5' above the maximum fixture height specified in that zoning district (i.e. decorative light poles that extend above the fixture).

(g). A narrative that describes the hierarchy of site lighting and controls, how lighting will be used to provide safety and security and esthetic effects.

(h). All lighting plans shall include the following additional information:

(1) A photometric diagram that shows horizontal illumination levels at ground level on the site from all externally visible lighting sources, including existing sources, to show the

amount of illumination that will be provided and that the standards for light maximum and uniformity set by the Illuminating Engineering Society of North America (IESNA) , will not be exceeded. Where applicable in section 10.13, include a calculation at the property line on the photometric plan.

- (2) As a guide, poles and fixtures should be proportionate to the buildings and spaces they are illuminating and designed with good engineering practices.
- (3) The plan should consider the ultimate size of the trees that could obscure the lighting or create dark spots.
- (4) Lighting shall not “trespass” on to adjacent properties or create dangerous conditions due to glare on adjacent roadways.
- (5) All lighting used in the exterior lighting plans shall have no light emitted above 90 degrees (No upward lighting or bare bulbs). Decorative and/or ornamental light fixtures, and fixtures with exposed bulbs may be approved on a case-by-case basis, with the appropriate waiver request approval (see Section D.ii below).
- (6) Buffers, screen walls, fencing, and other landscape elements should be coordinated with the lighting plan to shield neighboring properties from light trespass.
- (7) Wherever practicable, lighting design should include the installation of timers, photo sensors, and other energy saving devices to reduce the overall energy required for the development and to eliminate unnecessary lighting.
- (8) Electrical service to outdoor lighting fixtures shall be underground except for fixtures mounted directly to utility poles.
- (9) All commercial and industrial outdoor site lighting levels shall be reduced to the lighting levels required for security lighting within one (1) hour after closing.
- (10) All sign related light fixtures, including internal lighting shall be shut off within one (1) hour after closing.
- (11) Where commercial or industrial zones abut residential uses, use the Lighting Zone applicable to the abutting property for maximum vertical illuminance at any point in the vertical plane of the property line measured in ten (10) foot intervals.

Property Line -Illuminance levels	
Lighting Zone	Maximum Vertical Plane illuminance (fc)
LZ0	0.0
LZ1	0.0
LZ2	0.1
LZ3	0.5

(12) Where commercial or industrial zones abut residential uses, lighting from the commercial or industrial site shall produce no glare or reflectance so as to cause a nuisance on the adjacent residential properties. Each site plan bordering residential uses shall have a note stating that “No lighting, glare or reflected lighting from this site shall be allowed to shine or reflect on to neighboring residential properties.”

(B). Luminaire Designs: Any luminaire with a lamp or lamps rated at a total of more than 1800 lumens, and all flood or spot luminaries with a lamp or lamps rated at more than 900 lumens, shall be full cut-off fixtures.

(C). Light Sources: Light Sources shall be selected for optimum color rendering index (CRI) as listed by the manufacturer. Lamps with a CRI lower than 50 are not permitted.

(D). General Exceptions:

(i). Any single luminaire with a single lamp or set of lamps rated at a total of 1800 lumens or less, and all single flood or spot luminaries with a lamp or set of lamps rated at 900 lumens or less, may be used without restriction to light distribution or mounting height, except that if any luminaire of 900 lumens or less is aimed, directed, or focused so as to cause direct light from the luminaire to be directed toward residential buildings on adjacent or nearby land, or to create glare perceptible to persons operating motor vehicles on public ways, the luminaire shall be redirected or its light controlled, as necessary, to eliminate such conditions.

(ii). Decorative and/or ornamental light fixtures (i.e. lantern style, exposed bulbs, bollard light fixtures, etc.) for specific districts or projects may be permitted, on a case-by-case basis, with a waiver request approval, and shall meet the following uplight requirements:

Lighting Zone and Maximum Uplighting Rating:

LZ0 = U0,

LZ1 = U0,

LZ2 = U1

LZ3 = U3

(iii). All hazard warning luminaries required by federal agencies are exempt from the requirements of this regulation to the extent that federal requirements cannot otherwise be achieved.

(iv). Outdoor light fixtures producing light directly by the combustion of fossil fuels, (kerosene, gas, etc.), are exempt from the requirements of this regulation.

(v). Replacement (in kind) of existing light fixtures, including wattage and/or luminaries

(vi). Lighting reductions are not required for any of the following:

- a. With the exception of landscape lighting, lighting for residential properties including multiple residential properties not having common areas.
- b. Code required lighting for steps, stairs, walkways, and building entrances.
- c. When in the opinion of the Board, lighting levels must be maintained.
- d. Motion activated lighting.
- e. Lighting governed by special use permit in which times of operation are specifically identified.
- f. Businesses that have been approved to operate on a 24-hour basis.

(E). Prohibited Lighting in All Districts:

(i) All types of flashing, blinking, rotating and revolving, moving or apparently moving light sources intended to attract attention to a business location are prohibited. Searchlights and laser beam lights for attracting attention are also prohibited

(ii) Any changes made to the display of any sign which occurs more often than once in a twenty (20) minute period, with the exception of a time/temperature display.

(5). Parking Lot Lighting: Parking lot lighting shall be designed to provide the minimum lighting necessary to ensure adequate vision and comfort in parking areas, and to not cause glare or direct illumination onto adjacent properties or streets. All parking lot lighting shall be subject to the following requirements.

(A). All lighting fixtures serving parking lots shall have no light emitted above 90 degrees. Metal halide and LED lamps are preferred for color rendition.

(B). Light poles should be incorporated within planting areas or landscape islands to avoid damage from vehicles and plows.

(C). Should the design for a particular site suggest the use of parking lot lighting fixtures of a particular “period” or architectural style, as either alternatives or supplements to the lighting described above, the alternative fixtures shall either have no light emitted above 90 degrees or the maximum lumens generated by each fixture shall not exceed 2000 lumens, (equivalent to a 150 watt incandescent bulb) and shall have a means to control glare.

(D). Parking lot lighting standards and calculations shall be as follows:

(i).

Parking Lot Lighting				
Lighting Zone	Minimum Average Horizontal illuminance (fc)	Minimum Vertical illuminance (fc)	Uniformity (Ave. to Min.)	Uniformity (Max. to Min.)
LZ1, LZ2, LZ3	Drive Aisles - Parking Areas			
Pre-Curfew	0.5	0.25	4:1	15:1
Post Curfew	0.2	0.1	4:1	15:1
LZ1, LZ2, LZ3	Transaction Area, Pedestrian and Vehicle			
Pre-Curfew	1.0	0.5	4:1	15:1
Post Curfew	0.2	0.1	4:1	15:1

(ii). Vertical illuminance shall be measured in the two primary directions of travel.

(iii). Minimum Illumination Level (at darkest spot in the paved area, not including access roads)

(iv). Minimum CRI – 50.

(6). Lighting of Gasoline Station/Convenience Store Aprons/Canopies: Lighting levels on gasoline station/convenience store aprons and under canopies shall be adequate to facilitate the activities taking place in such locations and shall meet the following requirements:

(A). Areas on the apron away from the gasoline pump islands used for parking or vehicle storage shall be illuminated in accordance with the requirements for parking. If no gasoline pumps are provided the entire apron shall be treated as a parking area.

(B). Areas around and under canopies to ten (10) feet outside the canopy footprint shall be illuminated so that the maximum horizontal luminance at grade level does not exceed thirty (30) foot candles in the service area and is at least one (1.0) foot-candles and no more than eight (8) foot-candles at the edge of the service area. The uniformity ratio (max to min.) shall be at least 15:1.

(C). Light fixtures mounted on canopies shall be recessed so that the lens cover is recessed or flush with the bottom surface (ceiling) of the canopy and luminaire has a U0 rating for uplight, so that light is restrained to no more than eighty-five (85) degrees from vertical. (five (5) degrees below horizontal)

(D). Lights shall not be mounted on the top or side (fascia) of the canopy and the sides of the canopy shall not be illuminated.

(E). Lighting at the Dispensing Islands shall be illuminated per the following:

Lighting Zone	Average Horizontal illuminance (fc)	Average Vertical illuminance (fc)	Uniformity (Ave. to Min.) Horizontal	Uniformity (Ave. to Min.) Vertical
Service Area - Pump/Dispensing Islands				
All Zoning Districts	10	10	4:1	8:1
After Closing	5	5	4:1	8:1

- (7). Lighting of Exterior Sales, and Display Areas: The applicant shall designate on the plan areas to be considered display/sales areas and areas to be used as parking or passive vehicle storage areas. Such areas are subject to the following requirements:

(A). Areas designated as parking or passive vehicle storage areas shall be illuminated in accordance with the requirements for parking areas.

(B). Areas designated as exterior display/sales areas may be illuminated so that the illumination levels do not exceed:

Exterior Sales / Display areas at vehicle storage areas Front row adjacent to roadway frontage				
Lighting Zone	Average Horizontal illuminance (fc)	Average Vertical illuminance (fc)	Uniformity (Ave. to Min.) Horizontal	Uniformity (Ave. to Min.) Vertical
LZ2	15	15	3:1	6:1
LZ3	20	20	3:1	6:1

Only for that area designated as exterior display/sales area.

(C). Light fixtures shall be shall have no light emitted above 90 degrees and shall be located, mounted, aimed and shielded so that direct light is not cast onto adjacent properties.

- (8). Illuminated Exterior Signs: The applicant shall designate on the plan areas to be considered for exterior signage locations. Such areas are subject to the following requirements:

(A) All types of flashing, blinking, rotating and revolving, moving or apparently moving light sources intended to attract attention to a business location are prohibited. Searchlights and laser beam lights for attracting attention are also prohibited

(B) Any changes made to the display of any sign which occurs more often than once in a twenty (20) minute period, with the exception of a time/temperature display.

(i). Electronic Message Displays shall be located at least 100 feet from residential zoned property.

(ii)Transitions from one static message to the next static message may include the use of frame effects, so long as such effects do not utilize flashing, scrolling or in any manner imitate movement;

(iii) Electronic Message Displays shall have automatic dimming technology which automatically adjusts the sign's brightness levels as specified:

(a). Day: 7500 nit; Night: 500nit. Also, all signs shall have automatic phased proportional dimmer and photocells used to reduce the illumination settings to a brightness level of 0.3 foot candles above ambient light conditions.

(iv). The owner/installer of Electronic Message Displays shall certify as part of the application that signs will not exceed the brightness levels specified and is to provide written certification from the sign manufacturer that the light intensity has been factory pre-set not to exceed the daylight and the nighttime settings and that the use of a dimmer and photocell has been properly incorporated into the operation of the Electronic Message Display.

(C). The lighting fixtures utilized to illuminate exterior signs, shall be carefully located, aimed, and shielded so that the light is directed only onto the sign façade. Lighting fixtures shall not be aimed toward adjacent streets, roads, or properties.

(i). Light fixtures illuminating signs shall be of the type such that the light source is not directly visible from adjacent roads, streets or properties.

(ii). To the extent practicable, luminaires used to illuminate signs shall be top mounted and directed downward. (i.e. below the horizontal).

(D). The average level of illumination shining onto the vertical surface of the sign shall not exceed 10 foot-candles, and the uniformity ratio shall not exceed 5:1.

(E). Internally Illuminated Signs in order to prevent internally illuminated signs from becoming light fixtures in their own right, it is the intent of this section that such signs consist of light lettering or symbols on a dark background.

(i). The lettering or symbols shall constitute no more than forty (40) percent of the surface area of the sign.

(ii). The luminous transmittance for the lettering symbols shall not exceed thirty-five (35) percent.

(iii). The luminous transmittance for the background portion of the sign shall not exceed fifteen (15) percent.

- (8). Security Lighting: If security lighting is to be installed, the purpose and need for such lighting must be demonstrated as part of an overall security plan which designates the area to be illuminated for security purposes. The use of sensor (i.e. motion, beam interrupt) activated lights in security systems and dual switching for security purposes is encouraged. Security lighting is also subject to the following requirements:

(A). In addition to the application materials set forth in the general provisions of this Regulation, applications for security lighting installations shall include a written description of the need and purposes for the security lighting. The site plan shall show the area to be secured and the location of all security lighting fixtures, specifications of all fixtures, the horizontal and vertical angles at which the lights will be directed, and adequate details to show how light will be directed only onto the areas to be secured.

(B). All security lighting fixtures shall be shielded and aimed so that illumination is directed only to the designated area and not cast into other areas. In no case shall lighting be directed in a horizontal plane through the top of the lighting fixture and the fixture shall include shields that prevent the light source or lens from being visible from adjacent properties and roadways. The use of general floodlighting fixtures is discouraged.

(C). Security lights intended to illuminate a perimeter (such as a fence line) may include motion sensors and be designed to be off unless triggered by an intruder.

(D). Lighting in designated secure areas shall be as follows:

(i).

Security Lighting						
Lighting Area	Average Horizontal illuminance (fc) Entry/Active Areas	Average Horizontal illuminance (fc) Open Area	Average Horizontal illuminance (fc) Perimeter	Average Vertical illuminance (fc)	Uniformity (Max. to Min.) Horizontal	Uniformity (Ave. to Min.) Horizontal
Non-Critical Gate and Fence Areas	2.0	0.5-0.2	0.2	-	-	3:1
Inspection Stations and Checkpoints	10 or 2 times the surroundings	-	-	-	-	3:1
Fire stations and Emerg. Response Facilities - Event Calls level for a max 5 minutes after vehicles depart/building secured	5.0	-	-	-	-	3:1
Hospitals / Medical Facilities	3.0	-	-	-	-	4:1
Commercial Offices - Non-Retail	2.0	-	-	-	1.1:1	-
Retail Parking - When security is an Issue	5.0	3.0	-	-	-	4:1
ATMS - within 10 ft	30.0	-	-	10.0	-	3:1
Industrial Parks	1.0	0.5-0.2	-	-	-	6:1
Parking Garage - When security is a Issue	6.0	-	-	6.0	-	4:1
Convenience Stores and Gas Stations - When security is a Issue	20.0	6.0	-	6.0	-	3:1
Designated secure areas - after curfew and within one (1) hour after closing.	1.5	-	-	1.5	-	3:1

(ii). Average Illumination Level on Vertical Surface measured five (5) feet above the ground.

(iii). Minimum CRI – 50.

(9). Illumination of Building Facades and Landscaping: In general, the exterior lighting of building facades is discouraged. When buildings are to be illuminated, the design for the illumination shall be approved by the Planning Board and the following provisions shall be met.

(A). Lighting fixtures mounted on the building and intended to “wash” the façade with light are prohibited.

(B). The maximum illumination on any vertical surface or angular roof surface shall not exceed 5.0 foot-candles.

(C). Lighting fixtures shall be carefully located, aimed, and shielded so that light is directed only on the building facade. Lighting fixtures shall not be directed toward adjacent streets, roads or properties.

(D). Lighting fixtures shall be directed downward (i.e. below the horizontal) rather than upward.

(E). When landscaping is to be illuminated, it shall be part of the landscaping plan approved by the Planning Board. The lighting plan shall show the location of all lighting fixtures and what landscaping features each fixture is to illuminate and shall demonstrate that the installation will not generate excessive light levels, cause glare, or direct light beyond the landscaping into the night sky.

(10). Sports Lighting: Sports venue lighting is exempt from any lumens per square foot standards for the playing field only. “Full-cutoff” fixture design with glare and spill light control is required and the light trespass requirements apply. Any lighting provided shall be designed per IES RP-6, Sports and Recreational Area Lighting, and shall be appropriate per classification of play for the venue. Pole heights, and controls shall be subject to review by the Planning Board.

(11). References:

(A). Regional Planning Commission, May 1966.

(B). Route NHOSP Technical Bulletin 16, Outdoor Lighting, Summer, 2001.

(C). Outdoor Lighting Manual for Vermont Municipalities, Chittenden County 101A Community Guidebook, Draft 06/10/02.

(D). NH Citizens for Responsible Lighting, New England Light pollution Advisory Group, International Dark Sky Association & Sample Lighting Ordinances, distributed by NHOSP, April, 2002.

(E). Lighting Improvement Ordinance Framework – The Indiana Council on Outdoor Lighting. - http://home.att.net/~icole/ord_framework.html

(F). Model Site Plan Regulations, Nashua Regional Planning Commission, June, 2002.

(G). IES The Lighting Handbook, Reference and Applications, 10th Edition (2011), Illumination Engineering Society of North America.

(H) TM-15-11, Luminaire Classification System for Outdoor Luminaires (2011), Illumination Engineering Society of North America

(I) ANSI/IES RP-8-18. Recommended Practice for Design and Maintenance of Roadway and Parking Facility Lighting. (2018), Illumination Engineering Society of North America

(I) IES G-1-16. Guide for Security Lighting for People, Property, and Critical Infrastructure. (2016), Illumination Engineering Society of North America