

Town of Grand Lake, Colorado Lighting Management Plan

Introduction	<p>The Town of Grand Lake is committed to bringing all public-owned lighting into full compliance with all International Dark Sky Community mandates, including its 2018 Guidelines, within the prescribed five-year period. The Town of Grand Lake's Lighting Plan is in full conformance with IDA 2018 guidelines. In addition, the Town of Grand Lake will implement a vigorous and ongoing lighting management program to encourage and enlist residents, visitors, and businesses in the creation of a dark sky community that is exceptionally dedicated to protecting and restoring the night.</p>
Lighting Management Plan	
<p>Title, purpose, and objectives of Grand Lake's Light Management Plan</p>	<p>The purpose of the plan is to ensure adequate exterior lighting for the safety, security, enjoyment, and function of land use, while also conserving energy and resources, reducing light trespass, reducing glare, artificial night glow, and obtrusive light, and protecting the local natural ecosystem from the damaging effects of light pollution. This plan is important as it will ensure that current and future development projects comply with the goals of the Town of Grand Lake regarding light pollution, it's Six Pillars of Character, the night-time lighting needs of the community, residents, visitors, and businesses. Specifically:</p> <p><u>Residential and Commercial Lighting</u></p> <ol style="list-style-type: none"> 1. Light only if you need it 2. Light only when you need it. 3. All outdoor lighting must be fully shielded and focused downward. 4. All residential outside porch lighting should be either turned off at night or placed on a motion sensor to minimize community ambient lighting and protect dark night sky. 5. All commercial lighting must adhere to the requirements mandated by Town of Grand Lake's Lighting Plan.

	<p><u>Residential and Commercial Construction</u></p> <ol style="list-style-type: none"> 1. All new building or remodel of existing structure must adhere to the requirements mandated by Town of Grand Lake Lighting Plan. 2. All existing, nonconforming, private and commercial outdoor light luminaries shall strive to come into conformance within 10-years of enactment of the Town's lighting Plan. <p><u>Ongoing Educational and Experiential Events</u></p> <ol style="list-style-type: none"> 1. Maintain a Coalition for the Stars through collaboration of Town leaders, dark sky advocates, local clubs, societies, educational institutions, and residents, to protect and restore the Town of Grand Lake's natural night sky. 2. Added attention will be given to teaching our community members, residents, and youth to protect the night sky by reducing and eliminating light pollution. 3. Extend collaborative efforts with the Colorado Headwaters Land Trust, Rocky Mountain Folk School, and Rock Mountain Wooden Boat School. 4. Establish and maintain communication and collaboration with Rocky Mountain National Park. 5. Establish and extend collaborative efforts with Grand County Tourism Board, Economic Development, Chamber of Commerce, and Mountain Parks Electric. 6. Align efforts to protect the night sky with the Town of Grand Lake's Six Pillars of Character: Citizenship, Trustworthiness, Respect, Responsibility, Fairness, and Caring, with specific focus on Citizenship, Responsibility, and Caring.
Lighting Plan	
General Provisions	This Plan shall apply within the Town of Grand Lake limits, hereinafter referred to as "Town."

	Nothing herein shall be construed as preventing or limiting the Town from applying this Plan within the surrounding areas where the Town asserts powers of extraterritorial jurisdiction through agreements with property owners, or as a term affixed to a conditional use approval (or a variance).
New Public Lighting	New Public lighting, owned and operated by the Town of Grand Lake, either streetlights, walkway lights, or external building lighting shall be allowed as recommended by the Town Planner in situations where a public health hazard exists which can only be mitigated by artificial light at night. A lumen cap of 6000 lumens per lamp shall be imposed on new public outdoor lighting installations along with adaptive controls or curfews.
Shielding	<p>Fully shielded" is defined as a light source screened and its light directed in such a way that none is emitted above the horizontal plane passing through its lowest light-emitting part</p> <ol style="list-style-type: none"> (1) All outdoor light shall be full shielded unless exempted elsewhere in this Plan. (2) Full shielding of all lighting fixtures over 450 lumens (40W) (3) New streetlights shall be fully shielded fixtures of approved design, utilizing a minimum output consistent with the safety of drivers and pedestrians. (4) Mounting height or topography or proximity to other properties may cause public or private outdoor light fixtures to require additional shielding to prevent glare, light trespassing, or an unsafe condition on properties other than the one on which it is installed. (5) Greenhouses with grow lights shall be fully covered with blackout tarps or covers so that no light spills from the premises onto adjacent lands or into the night sky. Greenhouses not full covered shall be dimmed to 20% of lamp's initial lumens and between 10 pm and 6 am local time. (6) Maximum allowed amounts of unshielded lighting. On no parcel shall the amount of allowed unshielded lighting exceed, in the aggregate, the following values per net acre according to lighting class: <ol style="list-style-type: none"> (i) For nonresidential / mixed use / industrial property: (1000) lumens.

	<p>(ii) For multi-unit residential property: (1000) lumens.</p> <p>(iii) For residential single-family property: (1000) lumens.</p>
Color Temperature	A limit on the emission of short-wavelength light must not exceed the correlated color temperature (CCT) of 3000 Kelvins.
Lumen Caps	<p>The lumen per net acre values are an upper limit and not a design goal. For all lighting design the goal should be the lowest levels of lumens necessary to meet the requirement of the task. Lumen per net acre values exclude governmental owned streetlights used for illumination of public rights-of-way and outdoor recreation facilities.</p> <p>(1) Nonresidential Property. Total outdoor light output installed on any nonresidential property shall not exceed 25,000 lumens per net acre. Fixtures shall be limited to 1600 lumens each.</p> <p>(2) Residential Property (Single-family). Total outdoor light output installed on any residential property shall not exceed 6,500 lumens per net acre. Fixtures shall be limited to 450 (40W) lumens each.</p> <p>(3) For multiple-family and two-family dwellings the total amount of outdoor lighting shall not exceed 20,000 lumens per net acre. Each fixture shall be limited to 450 (40W) lumens each.</p> <p>Lumens per Net Acre is the total outdoor light output, as defined in this Plan, divided by the number of acres, or part of an acre with outdoor illumination. Undeveloped, non-illuminated portions of the property may not be included in the net acreage calculation.</p>
Curfew	<p>Curfew is defined as a period of time at night during which lighting must be significantly dimmed in output or extinguished in accordance with an expected decrease in human presence.</p> <p>General Curfew All Nonresidential Property:</p> <p>(1) All privately owned exterior lighting not adaptively controlled shall be extinguished by 10:00 p.m. or within one (1) hour of the end of normal business hours, whichever occurs later unless needed to mitigate a safety hazard as determined by the Town Planner.</p>

	<p>(2) Exterior lighting with adaptive controls shall reduce lighting to 25% or less of the total outdoor light output allowed by 10:00 p.m. or within one (1) hour of the end of normal business hours, whichever occurs later. Adaptive controls may be used to activate lights and resume normal light output when motion is detected and be reduced back to 25% or less of total outdoor light output allowed within 5 minutes after activation has ceased, and the light shall not be triggered by activity off property.</p> <p>(3) Businesses whose normal operating hours are (24) twenty-four hours per day are exempt from this provision. All publicly owned lighting not adaptively controlled must be fully extinguished by 11:00 p.m., or within one (1) hour of the end of occupancy of the structure or area to be lit, whichever is later unless needed for public safety as determined by the Town Planner.</p> <p>(4) All outdoor lighting is encouraged to be turned off when no one is present to use the light.</p>
Light Trespassing	<p>Light trespass refers to measurable light extending beyond the boundary of its intended usage area. This causes annoyance, loss of privacy, or other nuisances. Often light trespass is referring to outdoor lighting, but light spilling outdoors through windows or other translucent surfaces also contributes to light trespass.</p> <p>All outdoor light sources in the Town shall be located and optically cutoff such that the point light source shall not be visible from adjacent property or public right-of-way during hours of curfew. Additionally, interior point light sources shall not be visible from the property line during hours of curfew. Methods encouraged for interior and exterior light sources to meet these light trespassing limits include shielding, dimming, timers, and window shades.</p> <p>(1) Light trespass is prohibited. No luminaire installed within the Town limits, except governmental-owned streetlights, shall create conditions of light trespass.</p> <p>(2) All outdoor lighting, except governmental-owned streetlights, shall be aimed and shielded so that the direct illumination is confined to the property boundaries of the source and not visible from any other property.</p> <p>(3) Residential and multiple-family dwellings shall not exceed 0.1 footcandle at the property line.</p>

	<p>(4) Nonresidential property shall not exceed 0.5 footcandle at the property line.</p> <p>To measure vertical light trespass for any property, a light meter shall be placed at 5- feet above grade and aimed perpendicular at the property line, pointed towards the light source. Multiple readings shall be taken to ensure compliance around the property line. When bordering with public right-of-way, the property line shall be considered five feet beyond the actual property line. Any location a measurement is taken along the property line shall meet these light classification standards. These classification standards apply at all locations along the property line.</p> <p>Class 1 Lighting (High Activity Areas): Lighting used for highways, outdoors sales, or eating areas, assembly or repair areas, signage, recreational facilities, and other similar applications where accurate color rendition is important to preserve the effectiveness of the activity.</p> <p>Class 2 Lighting (Security and Public Safety): Lighting used for illumination of local roadways, walkways, bike paths, equipment yards, parking lots, and outdoor security where general illumination for safety or security of the grounds is the primary purpose.</p> <p>Class 3 Lighting (Decorative and Accent) Lighting used for decorative effective such as architectural illumination, flag and monument lighting, and illumination of landscaping elements.</p> <p>Multi-Class Lighting. Lighting used for more than one purpose such that the use falls within more than one class as defined for Class 1, 2, or 3 lighting. Multi-class lighting must conform to the standards that apply to the most restrictive included class.</p>
Outdoor Sports Facilities	<p>Outdoor recreational and/or athletic field lighting may be exempted from the strict shielding and short-wavelength emission requirements above provided that all of the following conditions are met:</p> <ol style="list-style-type: none"> (1) Illuminating Engineering Society (IES) lighting guidelines (RP-6) are followed according to the appropriate class of play (2) Field lighting is provided exclusively for illumination of the surface of play and viewing stands, and not for any other applications (3) Illuminance levels must be adjustable based on the task (e.g., active play vs field maintenance)

	<p>(4) Off-site impacts of the lighting will be limited to the greatest practical extent possible</p> <p>(5) A strict curfew requirement of all lights must be extinguished by 10 p.m. or one hour after the end of play, whichever is later, is observed</p> <p>(6) Timers must be installed to prevent lights being left on accidentally overnight by automatically extinguishing them</p>
GP: Towers	<p>No lighting of towers and associated facilities is allowed, except by permit, and except as required by the Federal Aviation Administration or other federal or state agency. In coordination with the applicable federal or state agency, the applicant shall determine the maximum height of the tower that would not require lighting. If a proposed tower would require lighting, the applicant shall demonstrate that a tower height that requires lighting is necessary. Such justification shall include documentation showing:</p> <p>Coverage limitations:</p> <ul style="list-style-type: none"> (1) Type of system (e.g. cellular, radio, television); (2) Technical and engineering details of the lighting to be installed; and (3) Requirements of federal, state, and local agencies. <p>If a tower height that requires lighting is justified, slowly blinking red lights must be used at night. White strobe lights at night are prohibited.</p> <p>Color Temperature:</p> <ul style="list-style-type: none"> (1) The correlated color temperature (CCT) of luminaries shall not exceed 3000 Kelvins. (2) Luminaries rated below 3000 Kelvin are encouraged for better nighttime visibility.

GP: Flagpoles, Monuments, Sculptures	<p>Property owners are encouraged to not illuminate flags at night, but rather to hoist flags after dawn and lower flags before sunset. If flags and other outdoor objects are illuminated at night, lighting of up to a total of two (2) objects per density is permitted with the following conditions:</p> <p>(1) Flagpoles with a height greater than 20 feet above ground level shall be illuminated only from above. This may be achieved by utilizing a luminaire attached to the top of the flagpole or a luminaire mounted above the top of the flagpole on a structure within fifteen (15) feet of the flagpole and must comply with all sections of this Plan. The total light output from any luminaire mounted on top of or above a flagpole shall not exceed 800 lumens.</p>
Canopies and Overhands	<p>Commercial and private canopies, carwash buildings, and overhangs are Class One Lighting. All luminaires mounted on or recessed into the lower surface of fuel station canopies or other overhangs shall be fully shielded and utilize only flat lenses or windows. Shielding must be provided by the luminaire itself, and not by surrounding structures such as canopy edges. Light directed on fuel station pumps may be angled to illuminate the pump to the level of federal standards and to shield the light from normal view.</p> <p>(1) Gas Station Canopies allowance is 10,000 lumens per two-sided pump</p> <p>(2) Outdoor dining canopies and overhangs allowance is 8 lumens per square foot of illuminated hardscape for outdoor dining. Luminaries shall be within 6 feet of the hardscape area of outdoor dining.</p> <p>(3) Building entrances allowance is 1000 lumens per door. Luminaires shall be located (or mounted) within 20 feet of the door</p> <p>(4) Nighttime loading allowance is 4000 lumens per door. Luminaries shall be located (or mounted) within 20 feet of the door</p>
Sign Illumination	<p>An illuminated sign is defined as any informational or advertising sign that is illuminated by either internal or external means. Descriptive terms are adjusted here according to the type of illumination.</p> <p>There must be restrictions on the installation and operation of illuminated signs, including all of the following:</p>

	<p>(1) Luminance levels for operation between sunset and sunrise shall not exceed 100 nits (100 candelas per square meter, cd/m²) as measured under conditions of a full white display; and</p> <p>(2) During the first hour after sunset and during the last hour immediately preceding sunrise, sign luminance shall not exceed 100 nits (100 candelas per square meter, cd/m²); and</p> <p>(3) Signs may only be illuminated while the associated activity is taking place; for businesses, sign illumination must be extinguished completely during the hours the business is closed; and,</p> <p>(4) The luminous or illuminated surface area of an individual sign must not exceed 18.6 square meters (200 square feet).</p>
Adaptive Controls	<p>Adaptive controls” is defined as devices such as timers, motion sensors, dimmers, and light-sensitive switches used to actively regulate the emission of light from light fixtures.</p> <p>To the greatest practical extent possible, all public park lighting will make appropriate use of adaptive controls to limit the duration, intensity, and/or extent of outdoor lighting.</p>
Prohibitions	<p>The use of the following types of outdoor lighting are prohibited, in addition to those standards set forth in Grand Lake’s Sign Code.</p> <p>(1) Sag-lens or drop lens fixtures</p> <p>(2) Any luminaire that uses mercury vapor lamps</p> <p>(3) Any luminaire that uses sodium lamps</p> <p>(4) Searchlights, sky beams, and any upward- oriented lighting</p> <p>(5) Any light that dynamically varies its output. (Blinking, flashing, moving, revolving, scintillating, flickering, changing intensity, and changing.</p> <p>(6) Non-shielded floodlights</p> <p>(7) Outdoor lighting used in any manner that could interfere with the safe movement of motor vehicles on public thoroughfares</p>

	<p>(8) Aerial lasers, beacons, and searchlights, except for emergency use</p> <p>(9) Inefficient lamps or LED luminaires shall be prohibited for outdoor use.</p> <p>(10) Usage for outlining buildings and signage</p>
Warranting	New installations of public outdoor lighting will only be installed on public properties and rights-of-way upon the determination by the Town Planner that a public safety hazard exist in the area to be lit, and that the hazard can only be effectively mitigated through the use of outdoor lighting and not through some other passive means, including, but not limited to reflectorized roadway paint or markers.
Exemptions	<ol style="list-style-type: none"> 1. Flashing holiday lights are prohibited on nonresidential properties 2. Holiday lights may be illuminated one additional seven (7) day period per calendar year 3. Holiday flood lighting on private and residential properties shall be prohibited 4. Underwater lighting of swimming pools and similar water features. 5. This Plan shall not apply to the following: <ol style="list-style-type: none"> a) Decorative holiday lighting / continuous string lighting, low-intensity string lights, whose luminous output does not exceed fifty (50) lumens per linear foot, and fully shielded floodlights not exceeding 1000 lumen per floodlight lamp, where the total outdoor holiday light output does not exceed six thousand (6,000) lumens. Decorative lighting is aimed and oriented in such a way as to not create light trespass onto another property nor into the night sky, operated only during prescribed periods of time during the calendar year. b. Decorative holiday lighting from November 15 through the next March 15 during the hours of 6:00 a.m. to 11:00 pm each day c. Lighting required by law to be installed on surface vehicles and aircraft d. Airport lighting required by law e. Lighting required by federal or state laws or regulations f. Temporary emergency lighting needed by law enforcement, fire and other emergency services, as well as building egress lighting whose electric power is provided by either battery or generator

	<p>g. Lighting employed during emergency repairs of roads and utilities provided such lighting is deployed, positioned and aimed such that the resulting glare is not directed toward any other roadway or highway or residence not being repaired</p> <p>h. Temporary lighting, other than security lighting, at construction projects provided such lighting is deployed, positioned and aimed such that the resulting glare is not directed toward any roadway or highway or residence not involved in said construction</p> <p>i. Governmental facilities where compelling needs are demonstrated</p>
Festoon Lighting	<p>Festoon Lighting. Also known as bistro or ping-pong lighting. Festoon lighting is allowable for outdoor Installation when it is fully shielded or partially shielded and non-frosted appearance. This lighting shall not create dangerous glare on adjacent streets or properties, shall be maintained in an attractive condition, and shall not constitute a fire hazard. This is not seasonal lighting and is not intended to allow the use of other types of seasonal lighting year-round.</p> <p>(1) Festoon lighting is allowed over patios, decks, pedestrian plazas, outdoor dining, and other pedestrian walkways where permanent, decorative lighting would be beneficial</p> <p>(2) Festoon lighting shall not be higher than 12 feet. Height of the festoon lighting shall be the measured vertical distance from finished grade or from the most adjacent walking surface below the luminaire up to the centerline of the luminaire</p> <p>(3) Festoon lighting shall not be used to wrap trees or define architectural features</p> <p>(4) Festoon lighting is subject to the curfew requirements:</p> <ol style="list-style-type: none"> Residential Uses: Curfew hours shall be 10pm to 1am Non- residential Uses: Curfew hours of 10pm to 1am shall apply to all businesses unless normal operating hours end or begin within the hours of curfew. If so, the curfew applies until one hour after closing or one hour before opening. <p>(5) Festoon lighting requirements apply to all Planned Developments unless standards are otherwise stated in the planned development approvals</p>

Lighting Plan Permitting	<p>Any application for a compliance review or building permit under this Plan, intending to install new outdoor lighting or update existing outdoor lighting, shall file a lighting plan with the Town Planner. A lighting plan shall be filed at the same time as any other plans required by the Town. The submittal shall contain, but shall not necessarily be limited to the following:</p> <ol style="list-style-type: none"> (1) Plans indicating the number and location of proposed and existing light fixtures (2) Light fixture / luminaire (the manufacturer's order number): lamp type, Kelvin rating, initial lumens produced (3) Mounting height for each fixture. (4) whether adaptive controls are used (5) Building elevations for all structures (6) The number of acres or part of an acre that is to be illuminated contiguously, the square footage of the footprint for each structure within the area to be illuminated (7) Other evidence to show compliance in the proposed installation with this Plan (8) Lighting Plan review by the Town Planner to determine compliance with this Plan, taking into account factors, including levels of illuminance, luminance, glare, safety hazards, light trespass, and light pollution (9) The Town Planner may seek input from community members knowledgeable about outdoor lighting during the review process (10) The Town Planner shall approve or reject the lighting plan within 30 days of submission, returning it to the applicant with an explanation. (11) The applicant shall not move forward with the outdoor lighting project until the lighting plan is approved. After the lighting plan is approved, no substitutions may be made for approved light fixtures without re-submitting the plan for review with the substitutions
Temporary Permitting	<p>Temporary lighting means non-permanent lighting installations installed and operated for a duration not to exceed thirty (30) days.</p> <ol style="list-style-type: none"> (1) Lighting such as that needed for theatrical, television, performance areas, or events may be allowed by temporary exemption.

	<p>(2) Temporary lighting that does not conform to the provisions of this Plan may be approved at the discretion Town Board of Trustees or the Town Planner subject to submission of an acceptable Temporary Outdoor Lighting Permit</p> <p>(2) Permit term and renewal. Permits issued shall be valid for no more than seven (7) calendar days and subject to no more than one renewal, at the discretion of the Town Planner, for an additional seven (7) calendar days.</p> <p>(3) Conversion to a permanent status. Any lighting allowed by Temporary Outdoor Lighting Permit that remains installed after fourteen (14) calendar days from the issue date of the permit is declared permanent and is immediately subject to all of the provisions of this article</p> <p>(4) Permit contents. A request for a Temporary Outdoor Lighting Permit for a temporary exemption to any provision of this article must list the specific exemption requested and the start and end date of the exemption. Search lights, sky beams, and similar lighting will not be allowed. The Town Planner may ask for any additional information which would enable a reasonable evaluation of the request for temporary exemption.</p>
Nonconforming Existing Outdoor Lighting	<p>Lights which were lawfully existing and in use at the time they became nonconforming with the requirements of this Plan by virtue of the initial adoption of this Plan, subsequent amendment to this Plan or by annexation into the Town, may continue to be used and operated subject to the limitations of this Plan.</p> <p>The right to operate lawful nonconforming fixtures and or lawful nonconforming lamps shall terminate upon any of the following:</p> <p>(1) Replacement of the light fixture or lamp.</p> <p>(2) Damage to the light fixture so that the cost of repair is 50% or more of the cost to replace it with a conforming fixture.</p> <p>All nonconforming Nonresidential / Commercial, Residential (Single Family and Multiple), public, and private lighting either, owned or leased shall strive to be brought into compliance with this Plan within 10 years from the effective date of this Plan.</p>

	<p>Nonconforming outdoor lighting shall strive to be brought into conformance with this Plan as follows:</p> <ol style="list-style-type: none"> (1) Commercial and Mixed-Use Application. All existing outdoor lighting located on a subject property that is part of an application for a rezoning application, conditional use permit, subdivision approval, or a building permit for a major addition is required to be brought into conformance with this Plan before final inspection, issuance of a certificate of occupancy. For the following permits issued by the Town, the applicant shall have a maximum of 90 days from date of permit issuance to bring the lighting into conformance. (2) Residential addition or remodel. Nothing herein shall be construed to terminate a residential property's nonconforming status as a result of an addition or remodel. However, all outdoor residential lighting that is affixed to a construction project requiring a building permit is required to conform to the standards established by this Plan. (3) Abandonment of nonconforming. A nonconforming structure shall be deemed abandoned if the structure remains vacant for a continuous period of one year. In that instance, the nonconforming status expires and the structure's previously nonconforming outdoor lighting must be removed and may only be replaced in conformity with the standards of this Plan. (4) All new construction and/or new luminaires installed (including replacements for existing fixtures) shall comply after the adoption of this Plan.
Public Nuisance	Any violation of this Plan that results in light trespass or an unreasonable interference with the common and usual use of neighboring property is hereby declared to be a public nuisance. See Town of Grand Lake Municipal Code, Chapter 7, Article 4.
Amendment	This Plan may be amended by Resolution of the Board of Trustees from time to time as light pollution is reduced, local conditions change, and as changes occur in the recommendations of nationally recognized organizations such as the Illuminating Engineering Society of North America and the International Dark-Sky Association, if the Town wishes to do so.
Definitions	The following definitions are hereby adopted for the purposes of this Plan:

Adaptive controls mechanical or electronic devices, when used in the context of outdoor lighting systems, intended to actively regulate the switching, duration, and/or intensity of light emitted by the outdoor lighting system. Examples of adaptive controls include timers, dimmers, and motion-sensing switches.

Correlated Color Temperature (CCT) a measure of the color properties of light emitted by lamps, being equal to the temperature, expressed in Kelvins (K). CCT values are typically provided on lighting manufacturer packaging or data sheets.

Decorative holiday lighting / continuous string lighting low-intensity string lights, whose luminous output does not exceed fifty (50) lumens per linear foot, and fully shielded floodlights, whose luminous output does not exceed one thousand (1,000) lumens and which are aimed and oriented in such a way as to not create light trespass onto another property nor into the night sky.

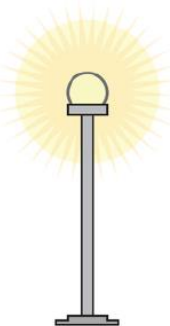
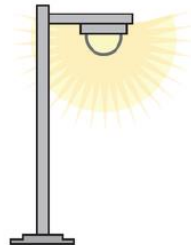
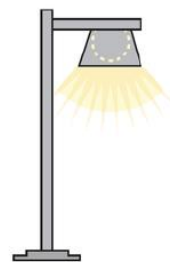
Existing light fixtures those outdoor light fixtures already installed at the time this Plan is adopted.

Foot candle is a unit of light intensity. It measure the illuminance on a one-square foot surface from a uniform source of light. Each foot candle is equivalent to approximately 10.764 lumens per square foot.

Fully Shielded an outdoor luminaire constructed so that in its installed position, all of the light emitted from the light fixture is projected below the horizontal plane passing through the lowest light emitting part of the fixture.

Light trespass light emitted from fixtures designed or installed in a manner that unreasonably causes light to fall on a property other than the one where the light is installed, in a motor vehicle drivers' eyes, or upwards toward the sky. If the light appears star-like from another property or the public roadway, the light is creating light trespass. It is expected that the illumination produced by a light source may be viewed from other properties but the light source itself should not be visible from other properties.

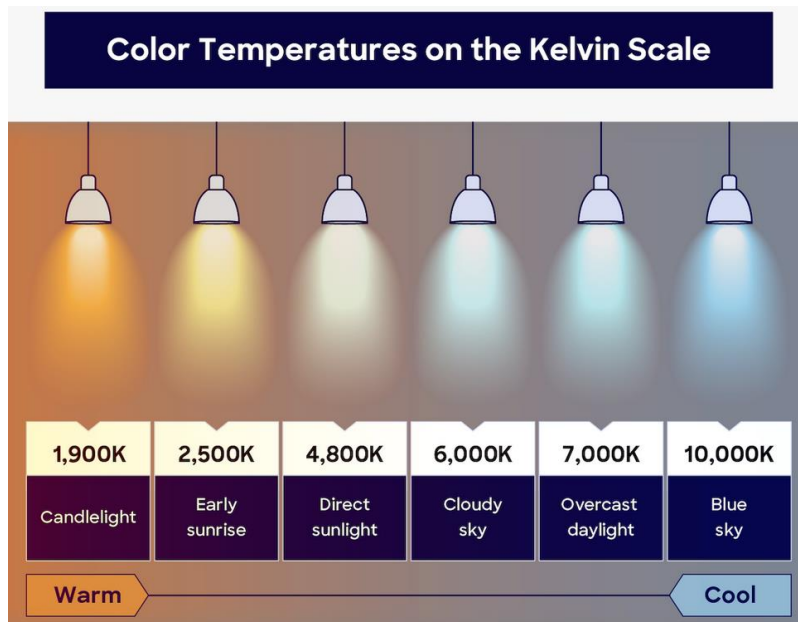
Lumen the unit of measurement used to quantify the amount of light produced by a bulb or emitted from a light source. Lumen values are typically provided on lighting manufacturer packaging or data sheets. For the purposes of this Plan, unless otherwise stated, the lumen output values shall be the initial lumen output ratings as defined by the manufacturer, multiplied by the lamp efficiency. Lamp efficiency of 95% shall be used for all solid-state lamps and 80% for all other lamps, unless an alternate efficiency rating is supplied by the manufacturer.

	<p>Lumens per Net Acre the total outdoor light output, as defined in this Plan, divided by the number of acres, or part of an acre with outdoor illumination. Undeveloped, non-illuminated portions of the property may not be included in the net acreage calculation.</p> <p>Luminaire a complete lighting assembly or lighting fixture, consisting of a lamp, housing, optic(s), and other structural elements, but not including any mounting pole or surface.</p> <p>Nit is the standard unit of measure of luminance used for internally illuminated signs, digital signs, or electronic message displays.</p> <p>Sag-lens or drop-lens fixture a fixture, typically seen on older streetlights or parking lot lights, where the lens extends below the lowest opaque part of the fixture such that light is scattered above the horizontal plane.</p> <p>Total outdoor light output the total amount of light, measured in lumens, from all outdoor light fixtures within the illuminated area of a property. The lumen value to be used in the calculation is the initial output lumen value for each lamp. To calculate, add the lumen outputs attributed to each lamp together.</p>
Exhibits	
Shielding	<div> <div>UNSHIELDED</div>  </div> <div> <div>PARTIALLY SHIELDED</div>  </div> <div> <div>FULLY SHIELDED</div>  </div>

Watt & Lumens Conversion Chart

LED CONVERSION CHART <small>COMMERCIAL LIGHTING</small>				
Lumens (approx.)	Standard	Halogen	CFL	LED
250-400	25W	18W	6W	2-4W
450-560	40W	28W	9W	3-6W
740-800	60W	42W	13W	7-10W
970-1100	75W	53W	18W	10-15W
1380-1600	100W	72W	23W	15-20W
2000-2600	150W	100W	42W	20-30W

Kelvins



Vertical Light
Trespass

