

Light and Light Pollution

This ordinance was compiled from a comparison of several towns' ordinances. The towns used are surrounded by hills or mountains, and are similar to Ojai in their rural, tourist dependent and size qualities. The towns were Santa Ynez, CA; San Jose, CA; Santa Cruz, CA; Santa Monica, CA ; and Tucson, AZ, Ketchum ,ID, and Boulder ,CO

Proposed Revised Ojai Lighting Ordinance

1. Objective

Ojai is a rural city located in a beautiful valley with historical architecture, scenic mountains, surrounded by national forest and a rich view of the sky. At night it is important that lighting enhances this beauty without taking away the ambiance of neighboring properties and natural environments. Lighting should offer a coalescent appearance for the Ojai's residential and commercial neighborhoods while still preserving the City's rural character and natural elements.

It is important that illumination is intelligently planned to complement this setting, both during the day, when luminaires are visible, and at night, when the quality of light creates a safe environment for pedestrians and vehicles. It is also important to consider the difference between the quality of light versus the quantity. Adding new luminaries adds more light to an existing environment. Therefore less light is required from each light source when integrating new lighting installations into existing environments. Appropriate lighting should always consider the brightness of surrounding conditions.

These guidelines are intended to promote high quality lighting, efficient use of energy and reduce negative aspects of lighting such as light pollution and wasted energy. These guidelines are intended to provide assistance to property owners and occupants in bringing nonconforming lighting into conformance with efficient and cost effective lighting which promotes safety and security.

The design policies and examples set forth in these Guidelines are not intended to discourage unique and inventive design solutions; they serve to assist the City's decision makers and staff, architects, lighting designers, and applicants with an understanding of concepts behind good lighting design and a means to achieve that goal by establishing parameters enabling reviewers to determine that the intent of the Ordinance and Guidelines has been met.

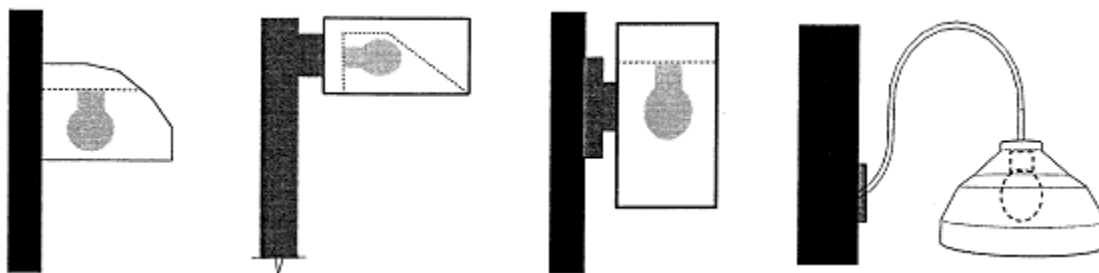
2. Definition of Terms

- **Area Light:** Light that produces over 1800 lumens. Area lights include, but are not limited to, street lights, parking lot lights and yard lights.
- **Artificial Light:** Any illumination produced from a man-made light source.
- **Candela (cd):** Unit of luminous intensity.

- **Direct light:** Light emitted directly from a light source.
- **Directional Lighting Methods:** Direction of light downward, rather than upward or outward, with the intention of directing light where it is needed; on the ground. Downward lighting also prevents unnecessary and unwanted spillover of light to adjacent areas and properties.
- **Eighty-five (85) Degree Full Cut Off Type Fixtures:** Fixtures that do not allow light to escape above and 85 degree angle measured from a vertical line from the center of the lamp extended to the ground.
- **Exterior Lighting:** Temporary or permanent lighting that is installed, located or used in such a manner to cause light rays to shine outside. Fixtures that are installed indoors that are intended to light something outside are considered exterior lighting for the intent of this Ordinance.
- **Existing lighting:** Any and all lighting installed prior to the effective date of this Ordinance.
- **Fossil Fuel Lighting:** Fossil fuel light produced directly or indirectly by the combustion of natural gas or other utility-type fossil fuels, for example: gas, propane and ceresin lighting.
- **Fixture:** The assembly that holds a light source and may include an assembly housing, a mounting bracket or pole socket, a lamp holder, a ballast, a reflector or mirror, and a refractor or lens
- **Flood Light :** Light that produces up to 1800 lumens and is designed to “flood” a well-defined area with light. Generally, flood lights produce from 1000 to 1800 lumens.
- **Flux (radiant flux):** Unit is erg/sec or watts.
- **Footcandle:** A unit of illumination produced on a surface, all points of which are one foot from a uniform point source of one candle.
- **Full Cut-Off Fixture:** Fixtures, as installed, that are designed or shielded in such a manner that all light rays emitted by the fixture, either directly from the lamps or indirectly from the fixture, are projected below a horizontal plane running through the lowest point on the fixture where light is emitted.
- **Fully Shielded:** Outdoor light fixtures with a solid barrier that emit no light rays above the horizontal plane and effectively obscure the visibility of the lamp.



Examples of fully shielded fixtures



- **Glare:** Direct light emitted by a luminaire that causes reduced vision, discomfort, or momentary blindness to neighbors, pedestrians or motorists.



*Intense glare from rooftop-mounted floodlights shines out from this lumberyard.
Can you read the sign?*

- **High intensity discharge lamp:** High pressure sodium, mercury vapor, metal halide, low pressure sodium, and other similar lamps.
- **Horizontal Plane:** Planes of the property and acknowledgment that there are different plane levels for each property based on vertical influence and placement.
- **Holiday Lighting:** Festoon type lights, limited to small individual bulbs on a string where the spacing of bulbs is not closer than three inches and where the output per bulb is greater than 15 lumens.
- **IESNA:** Illuminating Engineering Society of North America (IES or IESNA). The professional society of lighting engineers, including those from manufacturing companies, and other professionally involved in lighting.
- **Illumination:** The level of light measured at a surface

- **Indirect Light:** Light reflected from light source or light refracted through a material that transmits light
- **Lamp:** The component of a luminaire that produces the light.
- **Light-:** The form of radiant energy acting on the retina of the eye to make sight possible, brightness, illumination, a lamp (as defined below).
- **Light diffuser:** Any material that reduces the light intensity after it leaves the light source
- **Light emitting surface:** Any part of a fixture (lamp, diffuser) which emits light
- **Light pollution:**
 - Obstructed visibility of the sky due to a visible glow of light in the atmosphere caused by illumination from artificial light sources
 - Glare
 - Illumination that extends beyond the intended area of illumination or beyond property boundaries
 - Light sources that are left on when they no longer serve a useful function
- **Light shield:** Any attachment which interrupts and blocks the path of light emitted, transmitted through, or reflected from a light source
- **Light source:** Any source of artificial light, such as incandescent, compact fluorescent, halogen or other vapor bulbs, neon or fluorescent tubes, or light emitting diodes (LED's).
- **Light stress:** The effect of long term, artificial light on a biological species.



A tree in fall, showing light-stress. The half of the tree nearest the light has retained its leaves while the other half is going into its natural fall dormancy. Long term, artificial light can weaken a tree due to late entrance and early emergence from dormancy.

- **Light trespass:** Light emitted by a luminaire that shines beyond the boundaries of the property on which the luminaire is located
- **Lighting:** Any or all parts of a luminaire that function to produce light.
- **Lumen:** A unit of measurement of light emitted from a light source
- **Luminaire:** The complete lighting system, including the lamp and the fixture
- **Luminaire full cutoff:** A luminaire that allows no direct light emissions above a horizontal plane through the luminaire's lowest light-emitting part
- **Luminance:** The complete lighting unit, including the lamp, the fixture, and other parts.
- **Luminous Tube Lighting:** Gas filled glass tubing which when subjected to high voltage becomes luminescent in a color characteristic of the gas used (neon, argon, etc.)
- **Non-Essential Lighting:** Lighting that is not necessary for an intended purpose after the purpose has been served. Does not include any lighting used for safety and/or public circulation purposes. Examples: lighting for a business sign is considered essential during business hours; however, is considered non-essential once the business is closed. Or if the business is essentially open 24/7 hours then motion sensors and/or timers would be installed to create some non-essential lighting. .
- **Outdoor light fixtures:** Outdoor artificial illuminating devices, installed or portable, used for floodlighting, general illumination, or advertisement. Such devices shall include but are not limited to outdoor lighting for
 - Building and structures
 - Recreational facilities
 - Parking lots
 - Landscape lighting
 - Billboards and other signs
 - Street lighting
 - Walkway lighting
- **Outdoor Recreation Facility:** An area designated for active recreation, whether publicly or privately owned, including but not limited to, baseball, and softball diamonds, soccer and football fields, equestrian arenas, golf courses, tennis courts and swimming pools.
- **Partially-Shielded:** The bulb of the fixture is shielded by a translucent siding and the bulb is not visible at all. Light may be emitted at the horizontal level of the bulb.
- **Permanent outdoor luminaire:** Any fixed luminaire or system of luminaries that is outdoors and this is intended to be used for seven (7) days or longer

- **Recessed** – When a light is built into a structure or portion of a structure such that the light is fully cut off and no part of the light extends or protrudes beyond the underside of a structure or portion of a structure.
- **Roadway lighting:** Permanent outdoor luminaries that are specifically intended to illuminate roadways for automotive vehicles
- **Shielded** – When the light emitted from the fixture is projected below a horizontal plane running through the lowest point of the fixture where light is emitted. The bulb is not visible with a shielded light fixture, and no light is emitted from the sides of the fixture. This is also considered a full cut off fixture.



A comparison between unshielded acorn lights and full-cutoff lights.

- **Security lighting:** Permanent outdoor luminaries that are specifically intended to deter crime
- **Standard methods:** Methods that measure illumination from a light source of measurement established by a nationally recognized Board.
- **Uplighting** – Lighting that is directed in such a manner as to shine light rays above the horizontal plane.
- **Unshielded:** Unshielded means light fixtures lacking any means to restrict light emitted above the horizontal plane.



Example of unshielded light fixture

3. Purposes:

The general purpose of this Ordinance is to protect and promote the public health, safety and welfare, the quality of life, and the ability to view the night sky, by establishing regulations and a process of review for exterior lighting. This Ordinance establishes standards for exterior lighting in order to accomplish the following:

- 3.1. To save energy in an attempt to ensure Ojai's sustainability;
- 3.2. To protect against direct glare and excessive lighting;
- 3.3. To provide safe roadways for motorists, cyclists and pedestrians, trees, and animal life;
- 3.4. To protect and reclaim the ability to view the night sky, and thereby help preserve the quality of life and the tourist experience of this desirable visual resource;
- 3.5. To prevent light trespass in all areas of the City and neighboring areas;
- 3.6. To promote efficient and cost effective lighting;
- 3.7. To ensure that sufficient lighting can be provided where needed to promote safety and security;
- 3.8. To allow for flexibility in the style of lighting fixtures;
- 3.9. To provide lighting guidelines for efficient and moderate use;
- 3.10. To provide assistance to property owners and occupants in bringing nonconforming lighting into conformance with this Ordinance; and,
- 3.11. To work with other jurisdictions within Ventura County to meet the purposes of this Ordinance.

4. Applicability

- 4.1. These Guidelines apply to all new land uses, developments, buildings, and structures that require a building permit or a site plan review. All outdoor lighting fixtures shall meet the requirements of this code.
- 4.2. All applications for Design Review, Conditional Use, Subdivision and/or Building Permits shall include lighting plans showing location, type, height, and lumen output of all proposed and existing fixtures. The applicant shall provide enough information to verify that lighting conforms to the provisions of this Ordinance. The Planning and

Zoning Administrator, Commission and/or Building Official shall have the authority to request additional information in order to achieve the purposes of this Ordinance.

- 4.3. If a property or use with nonconforming lighting is abandoned, then all outdoor lighting shall be reviewed and brought into compliance with this Code before a new use is approved.
- 4.4. Any new lighting shall meet the requirements of this section with regards to shielding:
 - 4.4.1. Any lamp installed must be shielded such that the light is projected below the horizontal plane created by the shield.
 - 4.4.2. All light fixtures shall be installed and maintained in such a manner that the shielding does not permit light trespass beyond the property boundary.
 - 4.4.3. Any fixed objects that reflect or refract light (such as windows, mirrors or other reflective objects must not permit light trespass from light sources on the property.
- 4.5. The City of Ojai may require that any new lighting or existing lighting that comes before them meet the standards for footcandle output as established by the IESNA.
- 4.6. All non-essential exterior commercial and residential lighting is encouraged to be off after business hours and/or when not in use. Lights on a timer are encouraged. Sensor activated lights are encouraged to replace existing lighting that is desired for security purposes.
- 4.7. All area lights, including street lights and parking area lighting, shall be full cut-off fixtures and are encouraged to be eighty-five (85) degree full cut-off type fixtures . Street lights shall be high pressure sodium, low pressure sodium, or metal halide, unless otherwise determined by the Council that another type is more efficient. Street lights along residential streets shall be limited to a 70 watt high pressure sodium (hps) light. Street lights along nonresidential streets or at intersections shall be limited to 100 watts hps, except that lights at major intersections on state highways shall be limited to 200 watts hps. If the Council permits a light type other than high pressure sodium, then the equivalent output shall be the limit for the other light type . For example: a 100 watt high pressure sodium lamp has a roughly equivalent output as a 55 watt low pressure sodium lamp, or a 100 watt metal halide lamp.
- 4.8. All exterior lighting shall be full cut-off fixtures with the light source fully shielded, with the following exceptions:
 - 4.8.1. Luminaires that have a maximum output of 260 lumens per fixture, regardless of number of bulbs, (equal to one 20 watt incandescent light), may be left unshielded provided the fixture has an opaque top to keep light from shining directly up. (See Figure 5).
 - 4.8.2. Luminaires that have a maximum output of 1,000 lumens per fixture, regardless of number of bulbs, (equal to one 60 watt incandescent light) may be partially shielded, provided the bulb is not visible, and the fixture has an opaque top to keep light from shining directly up. (See Figure 3).
 - 4.8.3. Flood lights with external shielding may be angled provided that no light escapes above a 25 degree angle measured from the vertical line from the center of the light

extended to the ground, and only if the light does not cause glare or light to shine on adjacent property or public rights-of-way. (See Figure 6). Flood lights with directional shielding are encouraged. (See Figure 7). Photocells with timers that allow a floodlight to go on at dusk and off by 11:00 p.m. are encouraged.

- 4.8.4. Holiday lights as defined are exempt from the requirements of this Ordinance except that flashing holiday lights are prohibited on commercial properties. Flashing holiday lights on residential properties are discouraged. Holiday lights are encouraged to be turned off after bedtime and after close of businesses. A 60 day limit exists for holiday lights.
- 4.8.5. Sensor activated lighting may be unshielded provided it is located in such a manner as to prevent direct glare and lighting into properties of others or into a public right-of-way, and provided the light is set to only go on when activated and to go off within five minutes after activation has ceased, and the light shall not be triggered by activity off the property.
- 4.8.6. Vehicular lights and all temporary emergency lighting needed by the Fire and Police Departments, or other emergency services shall be exempt from the requirements of this Ordinance.
- 4.9. **Light Trespass:** It is the intent of this Ordinance to eliminate and prevent light trespass through the proper installation of lighting fixtures. All existing and/or new exterior lighting shall not cause light trespass and shall be such as to protect adjacent properties from glare and excessive lighting.
- 4.10. **Parking** area lights are encouraged to be greater in number, lower in height and lower in light level, as opposed to fewer in number, higher in height and higher in light level. Parking lot lighting shall not exceed IESNA recommended footcandle levels.
- 4.11. **Luminaire Mounting Height:** Free standing luminaires shall be no higher than 25 feet above the stand/pole base, except that luminaires used for playing fields shall be exempt from the height restriction provided all other provisions of this Ordinance are met and the light is used only while the field is in use, and except that street lights used on major roads may exceed this standard if necessary as determined by the City Council, as advised by a lighting engineer. Building mounted luminaires shall be attached only to walls, and the top of the fixture shall not exceed the height of the parapet or roof, whichever is greater.
- 4.12. **Uplighting:** Uplighting is prohibited in all zoning districts, except in cases where the fixture is shielded by a roof overhang or similar structural shield from the sky and a licensed architect or engineer has stamped a prepared lighting plan that ensures that the light fixture(s) will not cause light to extend beyond the structural shield, and except as specifically permitted in this Ordinance.
- 4.13. **Flag Poles:** Upward flagpole lighting is permitted for governmental flags only, and provided that the maximum lumen output is 1300 lumens. Flags are encouraged to be taken down at sunset to avoid the need for lighting.

- 4.14. **Service Stations:** The average footcandle lighting level for new and existing service stations is required to be no greater than 30 footcandles, as set by the IESNA for urban service stations.
- 4.15. **Canopy Lights:** All lighting shall be recessed sufficiently so as to ensure that no light source is visible from or causes glare on public rights-of-way or adjacent property.
- 4.16. **Landscape Lighting:** Lighting of vegetation is discouraged and shall be in conformance with this Ordinance. Uplighting is prohibited.
- 4.17. **Towers:** All radio, communication, and navigation towers that require lights shall have dual lighting capabilities. For daytime, the white strobe light may be used, and for nighttime, only red lights shall be used.
- 4.18. **Temporary Lighting:** Temporary lighting that conforms to the requirements of this Ordinance shall be allowed. Nonconforming temporary exterior lighting may be permitted by the Planning and Zoning Administrator only after considering 1) the public and/or private benefits which will result from the temporary lighting; 2) any annoyance or safety problems that may result from the use of the temporary lighting; and, 3) the duration of the temporary nonconforming lighting. The applicant shall submit a detailed description of the proposed temporary nonconforming lighting to the Planning and Zoning Administrator. The Administrator shall provide written notice of said request to owners of property immediately adjacent to the subject property. Said notice shall inform adjacent property owners they may comment on the request during a period of not less than ten (10) days after mailing of the notice and prior to final action on said request.
- 4.19. **Neon Lights:** Neon lights are only permitted pursuant to the Sign Ordinance, Section TBD.
- 4.20. The attached figures and information sheets shall be incorporated into this Ordinance as guidelines for the public and the City for use in meeting the intent of this Ordinance. The figures and information sheets only serve as examples. The City does not endorse or discriminate against any manufacturer or company that may be shown, portrayed or mentioned by the examples. Additional information is provided at the Ojai Planning Department.

5. General Requirements:

All non-exempt light fixtures requiring a County permit for their installation shall be subject to the following general requirements:

- 5.1. All outdoor light fixtures installed after the effective date of this article and thereafter maintained upon private property, public property, or within the public right-of-way shall be fully shielded.
- 5.2. All replaced or repaired lighting fixtures requiring a permit shall be subject to the requirements of this ordinance.

- 5.3. Light trespass and glare shall be reduced to the maximum extent feasible through directional lighting methods with additional methods of motion sensors and timers installed if needed to comply.
- 5.4. Externally illuminated signs, advertising displays and building identification shall use top mounted light fixtures which shine downward and are fully shielded with motion sensors or timers if needed.
- 5.5. Outdoor light fixtures used for outdoor recreational facilities shall be fully shielded except when such shielding would cause an impairment to the visibility required in the intended recreational activity. In such cases, partially shielded fixtures and downward lighting methods shall be utilized to limit light pollution, glare, and light trespass to a reasonable level as determined by the Planning and Development Department.
- 5.6. Illumination from recreational facility light fixtures shall be shielded to minimize glare extending towards roadways where impairment of motorist vision might cause a hazard.

6. Prohibited Lights:

- 6.1. All illuminated advertising signs on and off premises shall be off between 11:00PM and sunrise, except on-premises signs that may be illuminated while the business is open to the public. If the business is a 24/7 used facility, such as a self storage, then the lights should have motion sensors and/or timers after 11:00PM.
- 6.2. All outside illumination that is not fully shielded of any building and/or surrounding landscape, public or private, for aesthetic and decorative purposes is prohibited between 9:00PM and sunrise. This includes all uplighting which is under overhangs.
- 6.3. No outdoor recreational facility with lights that are not fully shielded shall be illuminated between 9:00PM and sunrise except to complete a specific organized recreational event, in progress and under illumination in conformance with this ordinance at 9:00Pm. Shielded lights are not subject to a time restriction.

7. Exemptions: The following are exempt from the provisions of this ordinance:

- 7.1. Lighting for public roadways for traffic control such as signals and other devices installed prior to this ordinance are exempt from the shielding requirements of this ordinance.
- 7.2. All outdoor lighting fixtures existing and legally installed prior to the effective date of this ordinance are exempt from the shielding requirements of this ordinance. Existing lighting fixtures shall be subject to the requirements of Section -4.2 requiring lights that are not fully shielded to be turned off at 9:00 PM. Shielded lights are not subject to a turn-off time.
- 7.3. Lighting in historic districts may be exempted from these regulations.
- 7.4. Seasonal decorations using typical unshielded low wattage lamps shall be permitted no longer than 60 days.

- 7.5. Individuals may file for a temporary exception with the City Building Department. This request must contain the following information:
 - 7.5.1. Duration of requested exemption
 - 7.5.2. Address and location of light sources at points of use
 - 7.5.3. Purpose of proposed light use, and reason for request for exemption
 - 7.5.4. Previous temporary exemptions allowed on premises
- 7.6. Fossil fuel light.
- 7.7. Temporary emergency lighting such as fire, police, public works)
- 7.8. Moving vehicle lights.
- 7.9. Navigation lights such as radio/television towers.
- 7.10. Temporary lighting for agricultural activities of a limited duration, not including unshielded arena lights.
- 7.11. Security lights of any wattage that are controlled by a motion-sensor switch and which do not remain on longer than 10 to 12 minutes after activation.
- 7.12. Projects with approved construction plans prior to the effective date of this ordinance are excluded from compliance with the ordinance in the initial installation only.
- 7.13. Solar walkway lights.