



City of Malibu

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Dark Sky Commercial Lighting Plan and Photometrics Submittal

Introduction

The City of Malibu is relatively free of commercial and industrial development and population density which enables the community to be close to wildlife, mountains, and the Pacific Coast. In 2018, the City adopted the Dark Sky Ordinance in order to prevent light pollution. Malibu is the first city in California to declare itself Lighting Zone 1 (LZ1) under California Title 24, the state's building, energy efficiency and environmental codes. Lighting Zone 1 is the most restrictive, limiting outdoor lighting for all properties with few or no exceptions or exemptions. The four primary considerations for commercial properties include:

1. The color temperature of the lighting must be 3000K or lower.
2. The lighting must be fully shielded and directed downward.
3. The lighting must not trespass from one property onto another or onto a street or roadway more than what is allowed.
4. The lighting must meet California Title 24 Part 6 (Energy Efficiency Standards).

Malibu Dark Sky deadline to comply with citywide outdoor lighting standards is October 15, 2022. Generally, the replacement lighting can be installed where non-compliant lighting is currently in place; and because of the energy efficiency of LED lighting, significant wiring changes may not be needed. Before changing lights, submit a plan that includes a photometric study and obtain the necessary permits from the City.

Note: The existing compliance deadlines only pertain to existing outdoor lighting.

Required Submittals

Site Plan / Lighting Plan

Submit a site plan showing the footprint of buildings and structures, paved areas and curbs, walks, planters, and all other features. Topography should be indicated if the site is not reasonably flat. The property lines must be clearly indicated. Building roof heights must be indicated: if the roof is flat, note the roof height; otherwise, note the maximum building roof height. The site plan shall indicate the location and type of lighting, both existing to remain and new lighting, and method and location of control. Note the mounting height of each light fixture.

Building Elevations

Building and structure elevations should be included if they are complex or include signs or other illuminated elements such as bands or other forms of identification. Elevations shall include a height dimension for all standalone light fixtures and fixtures attached to buildings.

Photometric Plan

Using the lighting plan as a base, submit a photometric plan indicating light levels (measured in foot-candles) at night on the property and at the property line. This should be done using point-by-point computer software such as AGI32, Dialux, Visual, or ElumTools. In footcandles and/or lux, the plan must indicate the following.

- Horizontal plane illuminance on the property at grade.
- Vertical plane illuminance at the site perimeter, facing in from the ground up to twenty-five (25) feet above grade.
- If the property is immediately adjacent to and abutting a right of way, the horizontal illuminance and in-facing vertical illuminance along a line on the right of way twenty-five (25) feet from and parallel to the property line.
- Note: light emitted by signs or other brand identification devices is not to be included.

Title 24 Documentation

Title 24 of the California Code of Regulations (24CCR) is the State Building Code. The lighting to be altered to meet the Malibu Dark Sky Ordinance shall comply with the California Electrical Code (Title 24 Part 3) and the Energy Code (Title 24 Part 6) contained in CEC-400-2018-020-CMF, and specifically Section 141.0 Additions, Alterations and Repairs to Existing Non-Residential, High Rise Residential and Hotel/Motel Buildings to existing Outdoor Lighting, and to Internally and Externally Illuminated Signs. Code compliance documentation must be submitted for permit.

Non-Residential, Hotel/Motel, and Multi-Family Projects

All lighting installation must be performed by a contractor with C-10 Electrical License holding a City-issued permit. The contractor's work is subject to City inspection for compliance with the applicable codes and Dark Sky regulations.

Many electrical contractors rely on plans drawn by illuminating engineers, lighting designers, or other qualified professionals. The following is the most likely scenario that property owners will encounter.

1. Site plans for the purposes of complying with Dark Sky may be drawn by an architect, landscape architect, civil engineer, or other qualified person. However, a civil engineer is required for sites with topographic variations of more than five (5) feet across the site in any direction. Note: Architects and/or landscape architects as principal design professionals may rely on consultants for lighting and other specialties as listed below.
2. Using the site plan as a base, lighting designs can be developed by any of the following:
 - a. An independent lighting designer in private practice
 - b. A commercial lighting sales company and/or showroom
 - c. A contractor with in-house engineering
 - d. An electrical engineer in private practice
 - e. A lighting manufacturer's representative

The lighting design must include the specifications of the lights and the type of light at each location, including its mounting height, aiming direction, and other details. The lighting design must also include a photometric analysis of the lighting that demonstrates compliance with Dark Sky.

3. The lighting plan is then forwarded to the electrical contractor, who will prepare permit documents including electrical plans and specifications and Title 24 requirements for both the electrical and lighting work. Some plans may require additional electrical engineering and will be stamped or sealed by the contractor or an electrical engineer.
4. The contractor submits the plans and pays City fees.
5. The contractor installs the lighting and controls, calls for inspections as required, and notifies the City when the installation is complete and ready for City compliance tests.
6. Upon notification by the City, the work is complete and the compliant outdoor lighting may be used as planned.

Special Consideration: Lighting Controls

Lighting levels in Lighting Zone 1 are lower than typically found in the greater Los Angeles metropolitan area. This may result in challenges for buildings and sites as the sun sets and twilight begins. On clear nights the sky glow will persist after sunset, but lights will become increasingly needed as night sets in.

There are three twilight periods that occur in this order in the evening and in opposite order at sunrise:

- Civil twilight which starts at sunset and lasts about 45 minutes when there is still a residual glow to the sky near the horizon and the brightest stars appear on a clear night; and
- Nautical twilight which starts at the end of civil twilight and lasts another 45 minutes until most stars become visible on a clear night; and
- Astronomical twilight which starts at the end of nautical twilight and lasts another 45 minutes. At the end of this period, full night darkness has arrived.

In order to ensure safe lighting through the transition, electric lights may be turned on to a higher level at sunset or during civil twilight as long as the requirements of Dark Sky are met by dimming lights to no more than twice the regulated level at the end of civil twilight and comply with Dark Sky at the end of nautical twilight. The reverse process may also occur at sunrise. To accomplish this process, use a lighting control system approved by the City that incorporates an astronomical clock with battery backup. Verification of compliance will occur at the end of civil twilight and at the end of nautical twilight.

City Plan Check and Permit Process

Start by submitting an [Outdoor Lighting application](#) to the Planning Department. All items indicated on this application submittal packet must be provided at the time of submittal. Incomplete submittals will not be accepted. Upon approval of an Outdoor Lighting Review from Planning, submit a request for plan review to the Building Safety online portal <https://MalibuCity.org/bpapplication>. After any corrections have been addressed in plan check, the applicant can request an electrical permit through the online portal. For questions or assistance, contact staff at 310-456-2489, ext. 390 or Mbuilding@malibucity.org.

SUBCHAPTER 6

NONRESIDENTIAL, HIGH-RISE RESIDENTIAL, AND HOTEL/MOTEL OCCUPANCIES—ADDITIONS, ALTERATIONS, AND REPAIRS

SECTION 141.0 – ADDITIONS, ALTERATIONS, AND REPAIRS TO EXISTING NONRESIDENTIAL, HIGH-RISE RESIDENTIAL, AND HOTEL/MOTEL BUILDINGS, TO EXISTING OUTDOOR LIGHTING, AND TO INTERNALLY AND EXTERNALLY ILLUMINATED SIGNS

Additions, alterations, and repairs to existing nonresidential, high-rise residential, and hotel/motel buildings, existing outdoor lighting for these occupancies, and internally and externally illuminated signs, shall meet the requirements specified in Sections 100.0 through 110.10, and 120.0 through 130.5 that are applicable to the building project, and either the performance compliance approach (energy budgets) in Section 141.0(a)2 (for additions) or 141.0(b)3 (for alterations), or the prescriptive compliance approach in Section 141.0(a)1 (for additions) or 141.0(b)2 (for alterations), for the Climate Zone in which the building is located. Climate zones are shown in FIGURE 100.1-A.

Covered process requirements for additions, alterations and repairs to existing nonresidential, high-rise residential, and hotel/motel buildings are specified in Section 141.1.

EXCEPTION to Section 141.0: Alterations to healthcare facilities are not required to comply with this Section.

NOTE: For alterations that change the occupancy classification of the building, the requirements specified in Section 141.0(b) apply to the occupancy after the alterations.

(a) **Additions.** Additions shall meet either Item 1 or 2 below.

1. **Prescriptive approach.** The envelope and lighting of the addition; any newly installed space-conditioning system, electrical power distribution system, or water-heating system; any addition to an outdoor lighting system; and any new sign installed in conjunction with an indoor or outdoor addition shall meet the applicable requirements of Sections 110.0 through 120.7, 120.9 through 130.5, and 140.2 through 140.9.
2. **Performance approach.**
 - A. The envelope and indoor lighting in the conditioned space of the addition, and any newly installed space-conditioning system, electrical power distribution system, or water-heating system, shall meet the applicable requirements of Sections 110.0 through 120.7, 120.9 through 130.5; and
 - B. Either:
 - i. The addition alone shall comply with Section 140.1; or
 - ii. Existing plus addition plus alteration. The standard design for existing plus addition, plus alteration energy use is the combination of the existing building's unaltered components to remain, existing building altered components that are the more efficient, in TDV energy, of either the existing conditions, or the requirements of Section 141.0(b)2, plus the proposed addition's energy use meeting the requirements of Section 140.1. The proposed design energy use is the combination of the existing building's unaltered components to remain and the altered component's energy features, plus the proposed energy features of the addition.

EXCEPTION 1 to Section 141.0(a): When heating, cooling, or service water heating to an addition are provided by expanding existing systems, the existing systems and equipment need not comply with Sections 110.0 through 120.9, or Sections 140.4 through 140.5.

SECTION 141.0 – ADDITIONS, ALTERATIONS, AND REPAIRS TO EXISTING NONRESIDENTIAL, HIGH-RISE RESIDENTIAL, AND HOTEL/MOTEL BUILDINGS, TO EXISTING OUTDOOR LIGHTING, AND TO INTERNALLY AND EXTERNALLY ILLUMINATED SIGNS

- G. When the requirements of Section 130.1(d) are triggered by the addition of skylights to an existing building and the lighting system is not recircuited, the daylighting control need not meet the multi-level requirements in Section 130.1(d).
- H. New internally and externally illuminated signs shall meet the requirements of Sections 110.9, 130.3 and 140.8.
- I. **Altered Indoor Lighting Systems.** Alterations to indoor lighting systems that include 10% or more of the luminaires serving an enclosed space shall meet the requirements of i, ii, or iii below:
 - i. The alteration shall comply with the indoor lighting power requirements specified in Section 140.6 and the lighting control requirements specified in Table 141.0-F;
 - ii. The alteration shall not exceed 80% of the indoor lighting power requirements specified in Section 140.6, and shall comply with the lighting control requirements specified in Table 141.0-F; or
 - iii. The alteration shall be a one-for-one luminaire alteration within a building or tenant space of 5,000 square feet or less, the total wattage of the altered luminaires shall be at least 40% lower compared to their total pre-alteration wattage, and the alteration shall comply with the lighting control requirements specified in Table 141.0-F.

Alterations to indoor lighting systems shall not prevent the operation of existing, unaltered controls, and shall not alter controls to remove functions specified in Section 130.1.

Alterations to lighting wiring are considered alterations to the lighting system. Alterations to indoor lighting systems are not required to separate existing general, floor, wall, display, or ornamental lighting on shared circuits or controls. New or completely replaced lighting circuits shall comply with the control separation requirements of Section 130.1(a)4 and 130.1(c)1D.

EXCEPTION 1 to Section 141.0(b)2I. Alteration of portable luminaires, luminaires affixed to moveable partitions, or lighting excluded as specified in Section 140.6(a)3.

EXCEPTION 2 to Section 141.0(b)2I. Any enclosed space with only one luminaire.

EXCEPTION 3 to Section 141.0(b)2I. Any alteration that would directly cause the disturbance of asbestos, unless the alteration is made in conjunction with asbestos abatement.

EXCEPTION 4 to Section 141.0(b)2I. Acceptance testing requirements of Section 130.4 are not required for alterations where lighting controls are added to control 20 or fewer luminaires.

EXCEPTION 5 to Section 141.0(b)2I. Any alteration limited to adding lighting controls or replacing lamps, ballasts, or drivers.

EXCEPTION 6 to Section 141.0(b)2I. One-for-one luminaire alteration of up to 50 luminaires either per complete floor of the building or per complete tenant space, per annum.

- J. **Reserved.**
- K. **Reserved.**
- L. Alterations to existing outdoor lighting systems in a lighting application listed in TABLE 140.7-A or 140.7-B shall meet the applicable requirements of Sections 130.0, 130.2(a), 130.2(b), and 130.4, and:
 - i. In alterations that increase the connected lighting load, the added or altered luminaires shall meet the applicable requirements of Section 130.2(c) and the requirements of Section 140.7 for general hardscape lighting or for the specific lighting applications containing the alterations; and
 - ii. In alterations that do not increase the connected lighting load, where the greater of 5 luminaires or 10 percent of the existing luminaires are replaced in a general hardscape or a specific lighting application, the alterations shall meet the following requirements:
 - a. In parking lots and outdoor sales lots where the bottom of the luminaire is mounted 24 feet or less above the ground, the replacement luminaires shall comply with Section 130.2(c)1 AND Section 130.2(c)3;

b. For all other lighting applications and where the bottom of the luminaire is mounted greater than 24 feet above the ground, the replacement luminaires shall comply with Section 130.2(c)1 AND EITHER comply with Section 130.2(c)2 or be controlled by lighting control systems, including motion sensors, that automatically reduces lighting power by at least 40 percent in response to the area being vacated of occupants; and

iii. In alterations that do not increase the connected lighting load, where the greater of 5 luminaires or 50 percent of the existing luminaires are replaced in general hardscape or a specific application, the replacement luminaires shall meet the requirements of subsection ii above and the requirements of Section 140.7 for general hardscape lighting or specific lighting applications containing the alterations.

EXCEPTION to Section 141.0(b)2Liii. Alterations where the replacement luminaires have at least 40 percent lower power consumption compared to the original luminaires are not required to comply with the lighting power allowances of Section 140.7.

EXCEPTION to Section 141.0(b)2L. Acceptance testing requirements of Section 130.4 are not required for alterations where controls are added to 20 or fewer luminaires.

M. Alterations to existing internally and externally illuminated signs that increase the connected lighting load, replace and rewire more than 50 percent of the ballasts, or relocate the sign to a different location on the same site or on a different site shall meet the requirements of Section 140.8.

EXCEPTION to Section 141.0(b)2M. Replacement of parts of an existing sign, including replacing lamps, the sign face or ballasts, that do not require rewiring or that are done at a time other than when the sign is relocated, is not an alteration subject to the requirements of Section 141.0(b)2M.

N. Service water-heating systems shall meet the requirements of Section 140.5, except for the solar water heating requirements.

O. A building shell for which interior walls or ceilings are installed for the first time shall meet the requirements of Section 140.3(c).

P. **Electrical Power Distribution Systems.** Alterations to electrical power distribution systems shall meet the applicable requirements of Section 130.5 as follows:

i. **Service Electrical Metering.** New or replacement electrical service equipment shall meet the requirements of Section 130.5(a) applicable to the electrical power distribution system altered.

ii. **Separation Of Electrical Circuits For Electrical Energy Monitoring.** For entirely new or complete replacement of electrical power distribution systems, the entire system shall meet the applicable requirements of Section 130.5(b).

iii. **Voltage Drop.** Alterations of feeders and branch circuits where the alteration includes addition, modification, or replacement of both feeders and branch circuits, the altered circuits shall meet the requirements of Section 130.5(c).

EXCEPTION to Section 141.0(b)2Piii: Voltage drop permitted by California Electrical Code Sections 647.4, 695.6 and 695.7.

iv. **Circuit Controls for 120-Volt Receptacles and Controlled Receptacles.** For entirely new or complete replacement of electrical power distribution systems, the entire system shall meet the applicable requirements of Section 130.5(d).

3. Performance approach.

A. The altered envelope, space-conditioning system, lighting and water heating components, and any newly installed equipment serving the alteration, shall meet the applicable requirements of Sections 110.0 through 110.9, Sections 120.0 through 120.6, and Sections 120.9 through 130.5.

EXCEPTION 1 to Section 141.0(b)3A Window Films. Applied window films installed as part of an alteration complies with the U-factor, RSHGC and VT requirements of TABLE 141.0-E.