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**From:** Bogdan, Grace x6414  
**Sent:** Wednesday, October 21, 2015 8:21 AM  
**To:** Allen, Carol x5178  
**Subject:** FW: Revised draft of Design Guidelines  
**Attachments:** County Lighting Design Guidelines 8.27.2015 mira notes.doc

-----Original Message-----

*From:* Wm. Bruce Weaver PhD [<mailto:bw@mira.org>]

*Sent:* Wednesday, September 02, 2015 1:19 AM

*To:* Bogdan, Grace x6414

*Cc:* "Chester, Craig C (US SSA)" -- Craig Chester; [craig.chester@saic.com](mailto:craig.chester@saic.com); Whitney Shane; [wh@mira.org](mailto:wh@mira.org); Arthur Babcock; [tami@mira.org](mailto:tami@mira.org); Alan Crockett

*Subject:* Re: Revised draft of Design Guidelines

*Hi Grace,*

*Here are some notes I hope you will find helpful. A few are just typo corrections. There were two issues of substance:*

*1. The change of wattage to intensity throughout. CA Code Title 24, Part 6 is directed at energy savings, so the appropriate measure is wattage -- power, which is energy/time. These guidelines are concerned with light pollution so the appropriate measure is the brightness of the light sources -- intensity of the light -- despite what type of lighting is used. Of course, for a particular type of light bulb, lower intensity and lower wattage are correlated.*

*2. The rule of thumb has to relate to the position of the observer. If the observer is directly below a well-shielded light, you would expect to see the bulb. Hence a reference to the location of the observer.*

*If you have any questions concerning these suggestions or any other related issues you'd like to discuss, please let us know. This topic is very important to us.*

*thanks,*

*Bruce*

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*Wm. Bruce Weaver, Ph.D.*

*Director*

*Monterey Institute for Research in Astronomy*

*200 Eighth Street, Marina CA 93933*

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*Dedicated to Research and Education in Astronomy For 40 Years.*

# Monterey County RMA- Planning

## DRAFT Design Guidelines: Exterior Lighting

### 1. Purpose

The purpose of this section is to establish a set of performance criteria to review exterior lighting fixture design for a variety of uses, including path lighting, building mounted lighting, and safety lighting. Future development in Monterey County will result in additional new nighttime lighting, which may result in additional light trespass, glare, and light pollution. Light pollution can be minimized by utilizing proper shielding for new exterior lighting, and as a result will lessen impacts to flora and fauna and the night sky, and reduce energy consumption within Monterey County.

### 2. Applicability

All new development that proposes exterior lighting fixtures within the inland planning areas of the County should be reviewed for consistency with this document, with the following exceptions:

- a. Navigational lighting (airports, heliports, communication towers)
- b. Seasonal lighting
- c. Temporary lighting
- d. All exterior lighting permitted prior to \*\*, 2015, however replacement of previously permitted exterior lighting should be consistent with Sections 4-6
- e. Lighting for national monuments and parks
- f. Historic Sites

### 3. Definitions

*Direct Illumination* – the direct view of a light source

*Fully shielded* - shielding that does not allow the light source to protrude outside the shield

*Glare* – Direct Illumination of intensity great enough to reduce a viewer’s ability to see

*Light fixture* – a complete lighting unit consisting of a lamp or lamps together with the parts designed to distribute the light, position and protect the lamps, and connect to a power supply

*Light source* – source of artificial light in the form of a bulb or lamp

*Light trespass* – direct illumination that can be seen from adjacent property

*Light pollution* – artificial light which causes a detrimental effect on the environment, astronomical research or enjoyment of the night sky or causes undesirable glare or unnecessary illumination of adjacent property

*Shielding* – a barrier around a fixture that helps to conceal the light source and direct light to an intended area

*Temporary lighting* – lighting used for activities of a limited duration, e.g., emergency activities, construction, agriculture, etc.

*Translucent* – allowing the passage of diffused light

*Transparent* – allowing the direct passage of light

# Monterey County RMA- Planning

## DRAFT Design Guidelines: Exterior Lighting

### 4. Energy Efficiency

The Board of Supervisors adopted California Code Title 24, Part 6 as the Energy Code for Monterey County in Section 18.08.010 of Monterey County Code (MCC) in December of 2010. This code implements two things: 1) default lighting zones for the entire state, and 2) mandatory lighting standards for non residential projects. These standards include wattage allowance for projects according to the lighting zones (state parks, rural, urban areas). The purpose of the zones is to appropriately limit wattage for projects within the area to the surrounding environment. Additionally, these standards include mandatory requirements for exterior lighting, such as time-switch lighting controls, daylighting controls, and motion sensing controls. RMA-Building Services ensures consistency of these regulations through review of construction permits.

Utilization of energy efficient light bulbs provides long term financial benefits and lessens impact on the environment. Typical energy efficient light bulbs include halogen incandescent, compact fluorescent lamps (CFL), and light emitting diode (LED). These light bulbs will provide the same illumination while using significantly less energy and have a longer life expectancy than an average light bulb. Other elements of energy efficient lighting are proper fixture design, placement, and best management practices. If a light is properly shielded and directed, the energy is being used more efficiently to light the intended area.

Best management practices include:

- Retrofitting less energy efficient bulbs (incandescent)
- Turning off lights when not in use
- Utilizing motion sensors on all exterior lights

### 5. Performance criteria

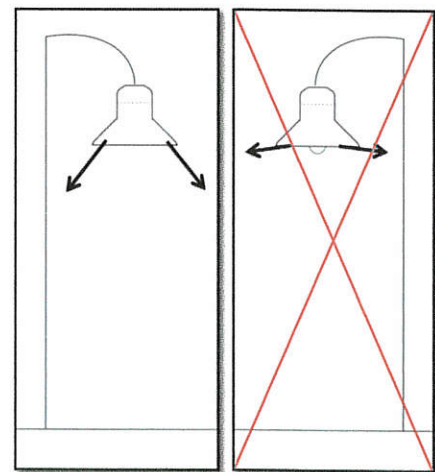
Implementation of the following performance criteria will result in exterior lighting that limits offsite glare, reduces energy consumption, and lessens impacts to light pollution and flora and fauna:

#### a. Location & Direction of fixtures

- angled vertically downward
- directed at an intended area
- located/mounted on existing structures, poles, or ground
- fixture placement will not result in direct illumination of adjacent properties

#### b. Fixture Design

- Fully shielded
- Opaque shielding material is optimal
- Shielding material may be translucent for residential fixtures of low intensity
- Fixture should not utilize sag lens or refracted light components



# Monterey County RMA- Planning

## DRAFT Design Guidelines: Exterior Lighting

### c. Number of fixtures

- minimum fixtures necessary (for safety and as required by MCC Building Code) to achieve lighting of intended area(s)

## 6. Examples of acceptable light fixtures

The following images represent fixtures that utilize the performance criteria in Section 5, in comparison to fixtures that do not. Acceptable fixtures are not limited to those contained in this Section; the online resources below can guide applicants to fixtures that are nighttime friendly. The general theme is that the acceptable fixtures *fully shield* the light source to ensure the light cascades downward. This is accomplished by placing the light bulb inside a fixture shield that light cannot pass through. If the design of a fixture does not provide adequate shielding, the light may direct upwards into the sky as opposed to the intended area. These unacceptable fixtures contain features like sag lens and refractors that extend the light source outside of the fixture shield, resulting in light that projects outward, upward, and downward. Unacceptable fixtures produce glare, are less energy efficient, and contribute to light pollution.



**RULE OF THUMB: if you can see the light bulb extending below the fixture from outside the area intended to be illuminated, the shielding is inadequate. Search acceptable fixtures [here](#).**

- Path lighting:** Acceptable bollards utilize shielded hoods and are directed downwards towards the path. Many unacceptable bollards build the lighting into the bollard without shielding, which directs the light outward instead of onto the path.
- Building mounted:** Building mounted lighting is used in industrial and commercial settings, and typically doubles as safety lighting which requires a higher intensity bulb. Fully shielded lights are of utmost importance here, as utilizing translucent fixtures will not sufficiently minimize glare from a high intensity bulb. Light fixtures that utilize drop-lens or sag-lens are not acceptable, as the light source is then exposed and results in glare.
- Residential lighting:** There are many forms of decorative fixtures for residential lighting, both pole and building mounted. Key components would be to utilize recessed lighting elements. Residential lighting that use translucent material to cover the light source may be acceptable if the bulbs are of sufficiently low intensity.
- Street lighting, Ped/Bike & Vehicle:** Pedestrian and Vehicle street lighting differ in that vehicle lighting poles tend to be taller and spaced farther apart. Pedestrian lighting can be fixed on shorter poles and placed closer together to create a pedestrian scale setting. In both cases, bulbs are typically of a high intensity and require fully shielded fixtures. The light source should only be seen if walking under the pole. Both street and pedestrian lighting is typically permitted through larger developments such as subdivisions or in community services areas. These discretionary processes will allow for public participation of a particular style of fixture design; however the fixtures will need to comply with Section 5 of this document.

# Monterey County RMA- Planning

## DRAFT Design Guidelines: Exterior Lighting

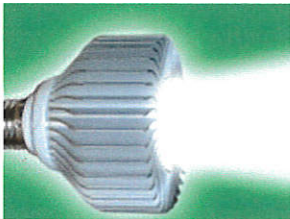

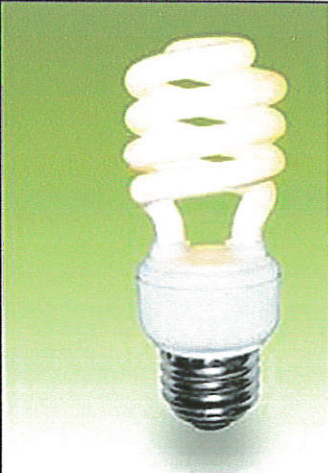
- e. **Canopy Lighting:** Canopy lighting is utilized under awnings and canopies in both residential and commercial areas. Commercial examples are for bank ATM's and covered walkways, and residential canopies are used on decks and outdoor patios. In either case, the light fixture should be recessed into the ceiling or have shielded sides if mounted onto the ceiling.
- f. **Safety lighting:** Typical lights used for safety are floodlights and barn lights. A common mistake with safety lighting is an attempt to use only one or two high intensity lights to provide sufficient illumination for an entire property. These lights are installed and angled outward and/or upward to light into the distance; however this only produces a significant amount of glare that can be viewed directly offsite and from a distance. Floodlights require shield hoods and should be directed downward. If necessary, appropriately shielded lights should be installed at intervals to cover the property's safety needs.
- g. **Sign lighting:** Appropriate sign lighting depends heavily on the surrounding environment. Fixtures should be attached to the top ~~or bottom~~ of the sign and angled directly at the sign. Urban and/or commercial areas tend to be more illuminated at night, and signs in this environment may utilize backlighting.
- h. **Landscape lighting:** Lighting is often used to accentuate landscape features such as art fixtures, statues, and gardens in both residential and commercial areas. The County of Monterey does not encourage the use of landscaping fixtures that result in upward lighting. Landscape lighting may be allowed in limited circumstances, where there is an intended area to be lit and the fixture achieves the Performance Criteria in Section 5. These fixtures come in many forms, including solar pavers and pillar lighting. The key to providing aesthetically pleasing landscape lighting is to utilize shielding, low intensity bulbs, and minimize usage.

**From:** Bogdan, Grace x6414  
**Sent:** Wednesday, October 21, 2015 8:21 AM  
**To:** Allen, Carol x5178  
**Subject:** FW: exterior lighting  
**Attachments:** ext lighting comments 092715.pdf; sign lighting good example1.jpg; sign lighting good example2.jpg; sign lighting good example3.jpg; sign lighting bad example1.jpg; sign lighting bad example2.jpg

**From:** Michael L. Waxer [<mailto:mlwaxer@sbcglobal.net>]  
**Sent:** Sunday, September 27, 2015 10:21 PM  
**To:** Bogdan, Grace x6414  
**Cc:** 'Michael Waxer A.I.A.'; [mlwaxer@sbcglobal.net](mailto:mlwaxer@sbcglobal.net); Novo, Mike x5192; Holm, Carl P. x5103  
**Subject:** exterior lighting

Grace, good evening,  
 As promised, here are a few comments regarding the draft ordinance.  
 Once again, I must tell you how impressed I am with how clear and correct the Draft Guidelines are, with the explanatory pictures, and the goal explained and easy to understand.

Regarding Landscape lighting, there should be a certain maximum number of lumens which should just be exempt, which should cover the very common small solar path lights, which are typically 1-10 lumens. Realistically I could see that anything under, say, 50 lumens should be able to just be categorically exempt. I am attaching this table that looks about right, that I got from a simple Google search.  
 You can infer from the table that an incandescent of 5 watts would generate about 50 lumens. I think that as long as you pick a number that is at least 20 lumens, you are probably okay, however.

<b><u>Light Output</u></b>			
	<b>Light Emitting Diodes (LEDs)</b>	<b>Incandescent Light Bulbs</b>	<b>Compact Fluoresc (CFLs)</b>
<b>Lumens</b>	<b>Watts</b>	<b>Watts</b>	<b>Watts</b>
<b>450</b>	<b>4-5</b>	<b>40</b>	<b>9-13</b>

<b>800</b>	<b>6-8</b>	<b>60</b>	<b>13-15</b>
<b>1,100</b>	<b>9-13</b>	<b>75</b>	<b>18-25</b>
<b>1,600</b>	<b>16-20</b>	<b>100</b>	<b>23-30</b>
<b>2,600</b>	<b>25-28</b>	<b>150</b>	<b>30-55</b>

I am also attaching some photos of some good and bad sign lighting, which you can use to supplement your sign page. I have found many examples of bottom sign lighting that work very well.

The Quail sign, however, is an example of a bad lighting execution, as the sign lights are clearly visible to cars and pedestrians along Valley Greens, and they are quite bright and glaring.

Good examples can be found at the corner signs, where the light is shielded, and it is further disguised amongst low landscaping and it provides a very effective non-glare sign lighting.

The same is true, of a good example, for the Tehama Clubhouse sign. Due to the location selected, the sign light is not visible to anyone people may normally be, nor from the nearby road.

I am also including a markup of the one sheet, so you can consider adding a good example of ground lighted signs.

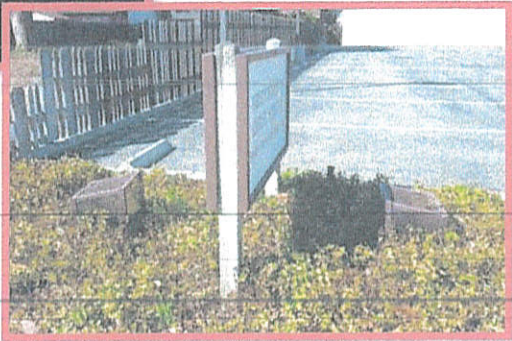
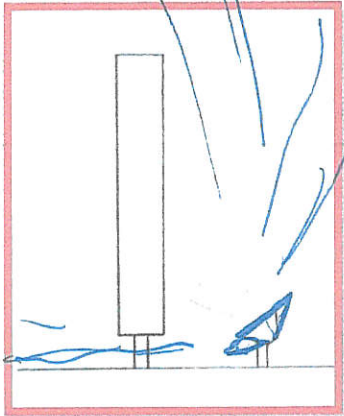
Grace, please let me know if you have any questions or comments on this, and again, thank you for a very professional job.

Respectfully,  
 -- Michael

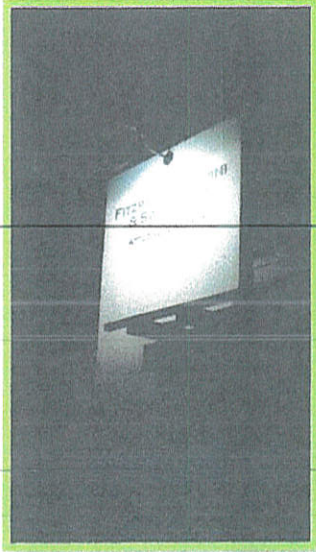
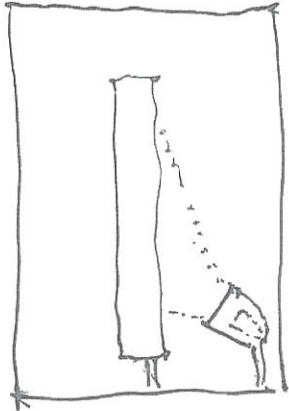
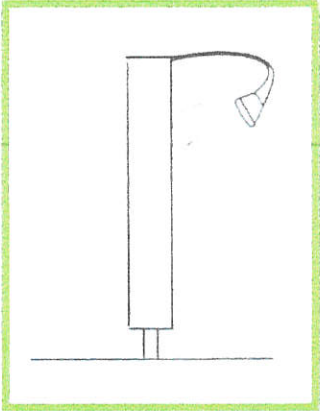
# 6.g. SIGN LIGHTING

Appropriate sign lighting depends heavily on the surrounding environment. Fixtures should be attached to the top of the sign and angled directly at the sign. Urban and/or commercial areas tend to be more illuminated at night, and signs in this environment may utilize backlighting at the discretion of the RMA-Director of Planning.

## UNACCEPTABLE



## ACCEPTABLE



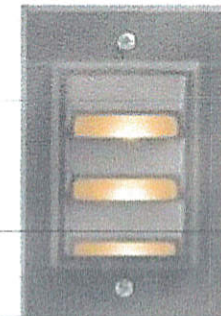


# 6.h. LANDSCAPE LIGHTING

Lighting is often used to accentuate landscape features such as art fixtures, statues, and gardens in both residential and commercial areas. The County of Monterey does not encourage the use of landscaping fixtures that result in upward lighting. Landscape lighting may be allowed in limited circumstances, where there is an intended area to be lit and the fixture achieves the Performance Criteria in Section 5. These fixtures come in many forms, including solar pavers and pillar lighting. The key to providing aesthetically pleasing landscape lighting is to utilize shielding, low intensity bulbs, and minimize usage.



*Note: Solar powered  
Landscape Lighting  
that is less than  
50 Lumens is  
exempt.*



*Sign Lighting Good Example #1*

200  
CLOCKTOWER PLACE



*Sign Lighting Good Example #2*



*Sign Lighting Good Example #3*



*Sign Lighting Bad Example #1*



*Sign Lighting Bad Example #2*

