



**DEPARTMENT OF  
ENVIRONMENT**  
CAYMAN ISLANDS GOVERNMENT

**Turtle Friendly Lighting: Technical Advice Note**

- ❖ How to develop a sea turtle lighting plan
- ❖ Beachfront lighting principles
- ❖ Beachfront lighting specifications

**September 2018**

## Guidance on How to Develop a Sea Turtle Lighting Plan

### Components of a Lighting Plan

An adequate lighting plan for sea turtle protection should ensure that lighting is kept **Low, Shielded and Long** (wavelength). In addition, the following components are necessary items and information that should be included on or with each lighting plan:

1. Plan view depicting all structures (existing and proposed);
2. Elevation view of the property and ancillary structures from the beach looking landward. For existing properties, photographs are normally sufficient.
3. Dimensioned drawing showing the location of all existing and proposed permanent exterior structure and landscape lighting. Fixtures should be clearly marked by distinctive labels (A, a, B, b etc.) and easily identified and enumerated. A Lighting Fixture Schedule (table) should be included documenting each fixture and lamp illustrated on the plan (see template below).
4. Manufacturer cutsheets for each proposed fixture and lamps/ bulbs. Selected model numbers should be indicated on each cut sheet as well as the corresponding label indicated on the dimensioned drawing.
5. The notes section on the dimensioned drawing and construction plans should specify which windows, doors and/or walls will have tinted glass or film with a visible light transmittance value of fifteen (15) percent or less.
6. Additional notes and information regarding spa, pool and pool deck lighting should be included in the description/ summary and plans as indicated below.

### Template Lighting Fixture Schedule

The following template example should be used when developing a lighting fixture schedule for documentation of fixtures and lamps in lighting plans. Example text has been included in the below template for reference.

Fixture Label <sup>1</sup>	Fixture Type	Manufacturer and Catalog No.	Fixture Quantity	Lamp Type Colour and Wattage	Wavelength in Nanometer (nm)	Mounting Type <sup>2</sup> and Height	Fixture Accessories	Location of Fixture <sup>3</sup>	Structure Level <sup>4</sup>	Fixture has been installed (Yes/No)
A	Canister downlight	BK lighting EC-LED-E27-MFL-WHP-12-11-B	10	7.9w Amber LED	580 nm	Wall 8'	Honeycomb louver	B, L, S	Ground	No
B	Louvered steplight	Bega 2038 LED	40	9.0w Amber LED	600 nm	Wall 12"	N/A	B, L, S	Ground	No
C	Bump pathlight	Bega 8671 Amber LED	36	5.0w Amber LED	610nm	At grade	270 degree shield	B	Ground	No

**Notes:**

<sup>1</sup>Fixture labels on lighting plans should be clearly marked with distinctive labels (A, a, B, b etc.) for each fixture type used and ensure that the quantity in the table coincides with the quantity of fixtures indicated on the plans.

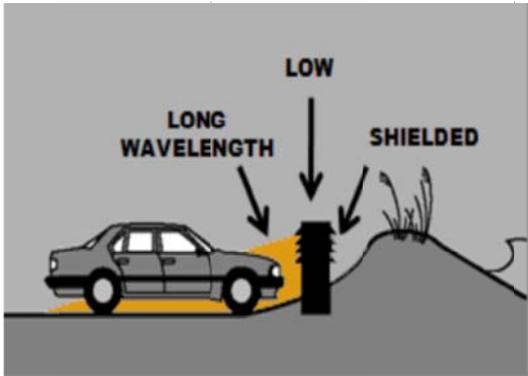
<sup>2</sup>Mounting type should indicate ceiling, wall, or other location; height references distance to the finished floor.

<sup>3</sup>Location of fixture should be indicated relative to the structure and/ or landscape (i.e. Landward side= L (fully shielded by structure), Beach side= B, Shore perpendicular side= S).

<sup>4</sup>Structure level should be indicated as follows: Ground (Level 1), Second, Third, etc., Pool Deck or Roof.

## Beachfront Lighting Principles:

The guiding principles for the best practices for turtle friendly lighting are *Keep it Low*, *Keep it Long*, and *Keep it Shielded*.

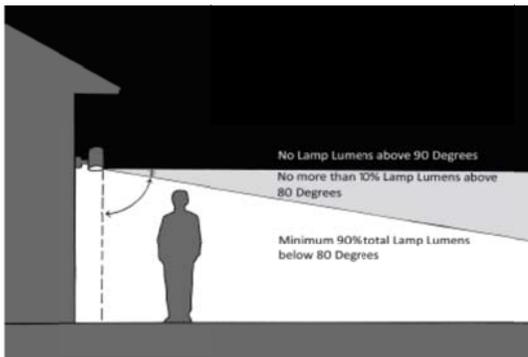


***Keep it Low*** – mount the fixture as low as possible to minimise light trespass, and use the lowest amount of light (lumens) needed for the task.

***Keep it Long*** – use long wavelength light sources (such as amber) in the appropriate lighting wavelength, 560 nm and above.

***Keep it shielded*** – Fully shield the light so bulbs and/or glowing lenses are not visible from the beach.

*Figure 1* shows a bollard fixture that illustrates the three sea turtle friendly lighting principles.



***For shielding fixtures*** – It is recommended that no lamp lumens go above a 90-degree angle with no more than 10% of the lamp lumens exceeding an 80% angle.

*Figure 2* shows an appropriate “full-cut-off” fixture on the exterior of a home.

### Beachfront Lighting Specifications:

All lighting proposed as part of new development on turtle nesting beaches, which can be seen from the beach, should comply with the following principles.

Lights should be **long wavelength** – this means a luminaire emitting light wavelength of 560 nanometres or longer. Examples of long wavelength light sources include: Red or Amber LED bulbs, Low Pressure Sodium (LPS), and true Red Neon. Bright white light, such as metal halide, halogen, fluorescent, mercury vapour and incandescent lamps should **not** be used. Filters are unreliable and should also be avoided. Limited use of shorter wavelength lights may be approved in areas where direct and indirect light or glow could not possibly be visible from the beach.

Turtles are least attracted to long-wavelength lights. However, if the beach is highly illuminated, even by long wavelength 'turtle friendly' lights, hatchling turtles may become misoriented. Therefore all lighting, including fixtures using 'turtle friendly' bulbs, should be low and shielded and the number of lights should be minimised.

### **Exterior Lighting:**

1. All exterior fixtures on the seaward and the shore perpendicular sides of the building (and on the landward side of the building if they are visible from the beach) should be long-wavelength, **shielded**, full cut-off i.e. no light emitted above a 90 degree angle, **downward directed** type fixtures.
2. Generally, lighting affixed to the exterior of permanent structures should not directly, indirectly, or cumulatively illuminate the beach. Exterior lights used expressly for safety or security purposes should be limited to the minimum number and configuration necessary. Lights designed to be activated only when approached (motion detectors) and switch off within two minutes duration are exempt if used for safety or security purposes.
3. Floodlights, uplights, or spotlights used for decorative and accent purposes that are directly visible from the beach, or which indirectly or cumulatively illuminate the beach, should be avoided.
4. Wall-mounted light fixtures should be fitted with hoods, shrouds, visors or louvers so the point source of light or any reflective surface of the light fixture is not directly visible from the beach.
5. Lighting affixed to the exterior of structures should generally be:
  - a. Wall or ceiling down-light fixtures, equipped with a well-recessed light source and interior dark-colored, non-reflective baffles or louvers, mounted at a maximum height of eight feet above the adjacent floor or deck, as measured from the bottom of fixture , or
  - b. Louvered wall fixtures, equipped with downward-directed louvers that completely hide the light source, with the bottom of fixture mounted 12 inches or less above the adjacent floor or deck, or
  - c. Bollard-type fixtures, which do not extend more than 42 inches above the adjacent floor or deck, measured from the bottom of fixture, equipped with downward-directed louvers that completely hide the light source and are externally shielded on the side facing the beach.

6. Interior lighting should not directly, indirectly, or cumulatively illuminate the beach.
7. Windows and glass doors—including those above the first floor of any multi-storey structures—located within line-of-sight of the beach should be designed for a light transmittance value of 15% or less through the use of tinted glass, window film, or screens.
8. The screening or placement of hoods, shrouds, visors or louvers on artificial lights should be consistent with any listing or labelling warnings, standards, requirements, or recommendations provided for the fixture in accordance with relevant Code requirements.
9. Lighted signs should be located on the landward or shore perpendicular side of any structure, and should not illuminate the beach.

**Parking areas:**

1. In parking areas, light fixtures should be positioned or shielded so that the light is cast downward and the light source is not visible from the beach and does not directly or indirectly illuminate the beach. Parking area lighting should be shielded from the beach via vegetation, natural features, or artificial structures rising from the ground that prevent artificial light sources, including but not limited to vehicular headlights, from directly, indirectly, or cumulatively illuminating the beach. If not fully obscured, lighting should be long wavelength, fully shielded, and full cut-off.
2. Parking area lighting should generally consist of
  - a. Ground-level downward-directed fixtures, equipped with interior dark-coloured, non-reflective baffles or louvers, mounted either with a wall mount on walls or piles facing away from the beach, or
  - b. Bollard-type fixtures, which do not extend more than 42 inches above the adjacent floor or deck, measured from the bottom of fixture, equipped with downward-directed louvers that completely hide the light source, and are externally shielded on the side facing the beach, or
  - c. Pole-mounted lights should be located on the landward sides of buildings in locations that will not directly, indirectly, or cumulatively illuminate the beach, or in which they will not directly or indirectly be visible to an observer standing on the beach.
  - d. Full cut-off and downward-directed fixtures.

**Lighting in Outdoor Areas:**

1. Lighting of parks, public beaches and other outdoor areas should be long wavelength and fully shielded.

**Pool, Pond, and Fountain Lights:**

1. Lighting of pool decks, pool facilities, and spas should be long wavelength and fully shielded.

2. Underwater lighting should be long wavelength and horizontally or downward directed (do not direct light up). Underwater lighting should not directly, indirectly, or cumulatively illuminate the beach. During nesting season, it is desirable for lights to be turned off via a timer when the pool is closed.
3. Pond and fountain lights should not be located on the seaward or shore perpendicular sides of any structure.

#### **Docks and Piers:**

1. Lighting of pier structures projecting over the beach or over water should be long wavelength and fully shielded.
2. Lighting of pier structures projecting over the beach or over water should be mounted as low to the deck as possible to prevent light pollution or spillage beyond the walking surface.
3. Lights designed to shine into the water are not turtle friendly.

#### **Temporary construction lighting:**

1. Temporary construction lighting should be turned off when not in use, restricted to the minimal amount necessary, and, where possible, should be shielded and long-wavelength.

#### **ACCEPTABLE LAMPS**

- Low Pressure Sodium (LPS) 18w, 35w
- Red, orange or amber LED (true red, orange or amber diodes, NOT filters)
- True red neon
- Other lighting sources that produce light of 560 nm or longer

Turtle friendly lighting has been a legal requirement in Florida for over 20 years. As a result, the Florida Fish and Wildlife Conservation Commission (FWC) has developed a certification for turtle (wildlife) friendly fixtures and fittings. A list of FWC approved lighting fixtures and fittings can be found at [http://myfwc.com/conservation/you-  
conserve/lighting/certified/](http://myfwc.com/conservation/you-<br/>conserve/lighting/certified/) . The DoE supports the use of FWC certified wildlife friendly fixtures and bulbs as a proven alternative, however certification is not a requirement provided that fixtures are fully compatible with these guidelines in preventing light from directly, indirectly, or cumulatively illuminating the beach, and bulbs produce light of 560 nm or longer.