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Our ref.: 5984  
23 August 2011  
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Qld 4006

To Whom it may concern of Gladstone Regional Council,

The following letter provides a design approach and criteria to meet condition 13 of the design approval for the Turtle St Beach development on Curtis Island. Condition 13 is shown below. This letter will be accompanied by a partial external lighting layout.

### **Condition 13**

The lessee must at all times take the necessary precautions to ensure that all lights on or above the leased land are shielded to prevent glare or reflection which may interfere with safe navigation of surrounding waterways or with reasonable enjoyment of neighbouring properties or nesting sites for turtles.

### **Turtle St Beach - DA Compliance Condition 13**

Background.

Within the DA, condition 13 gives no explicit guidelines in relation to illuminance levels, only stating that all lights are shielded to prevent glare or reflection. A literature review of measures that can be taken to minimise light pollution of nesting sites for turtles has been conducted. An approach and criteria for external lighting selection for the development was selected from the reports listed below

- Environmental Protection Authority. Environmental Assessment Guidelines No. 5. *Environmental Assessment Guideline for protection marine turtles from light impacts*. November 2010 WA.
- Queensland Parks and Wildlife Service (QPWS). Department of Environment and Resource Management (DERM). *Turtle Friendly Guide 'Bright lights and marine turtles don't go together'*. BP0059 Sept. 2009. Qld.
- Florida Department of Environmental Protection. Blair E. Witherington and R. Erik Martin. *Understanding, Assessing, and Resolving Light-Pollution Problems on Sea Turtle Nesting Beaches*. FMRI Technical Report TR-2. 1996.
- Mackay Regional Council. Recommendations for reducing the impact of light pollution problems on sea turtle nesting beaches. [www.gbrmpa.gov.au](http://www.gbrmpa.gov.au)

The Gladstone regional council was also contacted for explicit guidelines in relation to illuminance levels. Karen Andrews provided the following two conditions to be followed where turtles nest.

1. During construction any security lighting shall be so designed to ensure that nuisance is not caused to adjoining areas by the spillage of light.
2. Technical parameters, design, installation, operation and maintenance of outdoor lighting are to comply with the requirements of AS4282 – Control of the Obtrusive Effects of Outdoor Lighting in order to restrict spill onto the beach area. The vertical illumination resulting from direct, reflected or other incidental light coming from a site is not to exceed 8 lux when measured at any point 1.5m outside of the boundary of the property at any level from ground level up.

These conditions have been incorporated into the approach and criteria of external lighting selection.

## APPROACH

The points stated above have been considered in our approach to the external lighting design for the Turtle St Beach Resort development. To maximise functionality, while minimising light pollution to the surrounding waterways, neighbouring properties and beach areas the following principles will be implemented.

- No Filters will be used. The filters waste energy, up to 70% of the Light Output Ratio (LOR) is reduced. This reduction in LOR requires up to 3 times as many lighting fixtures for the same amount of light. This has the effect of tripling the wattage (energy usage). The additional building material required and energy consumption make for an unsustainable approach.
- Lights are to be low mounted.
- Low wattage lamps are to be used to avoid visibility from the beach/ocean.
- lowest illumination level possible while still meeting Australian standard, AS1158.
- Lamps and light fittings to be directional with full cut off optics to avoid light spill.
- Orientation of all lights away from the beach/ocean.

## Criteria

To implement the above principles the design must meet the following criteria:

- Comply with AS/NZS 1158.3.1:2005 Category P4
  - o Minimum Average horizontal illuminance - 0.85 lux
  - o Minimum (point horizontal illuminance) - 0.14 lux
  - o Uniformity - 10 (max/average).
- have a minimum spacing of 25m for category P4
- have a mounting height less than 2.5m
- light fitting to have a full cut off, no light above 90deg.
- Comply with AS/NZS 4282
- Maximum average illuminance - 3.0 lux
- light fitting to be a symmetrical - light directed on roadways
- lamps to be low wattage/ intensity.
- Reduced/ eliminated short wavelength light. Low pressure sodium lamp preferred but high pressure sodium lamp and LED can be used.

The following light fittings have been shown to meet said criteria.

- Bega 7834 26.6W LED - 34.5m spacing at 2.5m pole heights.
- We-ef VFL540 S70 38W LED - 26.9m spacing at 2.5m pole heights.

Data sheets have been included for the above fittings.

Yours sincerely,

**Green Leaf Engineers**

**Mark Kinsella**

Design Engineer



# TURTLE STREET BEACH RESORT

## CURTIS ISLAND

### ELECTRICAL SERVICES DRAWING LIST

5894 - E00 COVER SHEET  
 5894 - E01 EXTERNAL LIGHTING LAYOUT 1  
 5894 - E02 EXTERNAL LIGHTING LAYOUT 2

### LIGHTING LEGEND (2 OPTIONS)

SYMBOL	LAMP	DESCRIPTION	MOUNTING	COLOUR	DISRIBUTOR	MODEL
L1 	AMBER XP-E LED 38W, 4000K	SLIM PROFILE POST TOP AREA LIGHT. PROVIDE 2.5m POLE, FOUNDATION AND MOUNTING	POLE MOUNTING MAX HEIGHT 2.5m	TBC	WE-EF	VFL540 S70
	LED 26.6W, 5000K	SLIM PROFILE POST TOP AREA LIGHT. PROVIDE 2.5m POLE, FOUNDATION AND MOUNTING	POLE MOUNTING MAX HEIGHT 2.5m	TBC	BEGA	7834

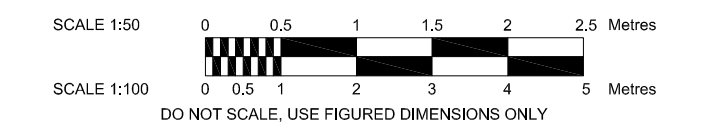
### DRAWING LABELLING LAYOUT 1:5000



NOTE:  
 E01 & E02 HAVE BEEN PROVIDED AS EXAMPLES OF LIGHTING APPROACH TO  
 BE USED THROUGHOUT THE DEVELOPMENT. SUBJECT TO APPROVAL A FULL  
 EXTERNAL LIGHTING LAYOUT WILL BE PROVIDED.

### NOTES:

REV	DATE	DRN/CHD	DA APPROVAL	DESCRIPTION
A	23/08/11	MK	AA	DA APPROVAL



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CLIENT

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ARCHITECT

PROJECT

**TURTLE STREET BEACH**

CONSULTANT



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**ELECTRICAL SERVICES**

**COVER SHEET**

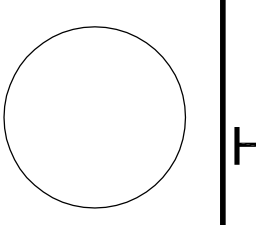
DRAWN \_\_\_\_\_ ENGINEER \_\_\_\_\_

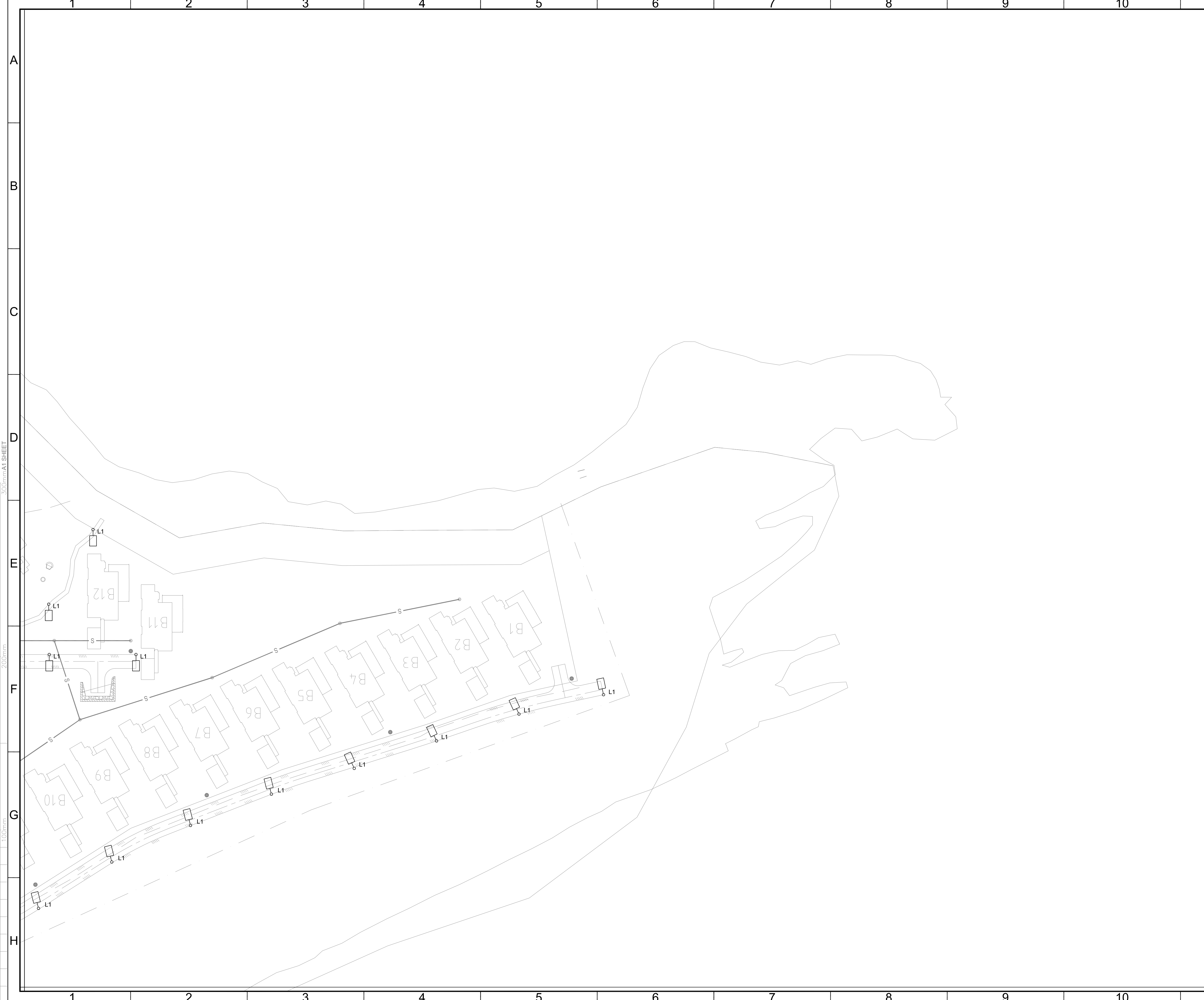
A.A. \_\_\_\_\_ A.A. \_\_\_\_\_  
 CHECKED \_\_\_\_\_ DATE \_\_\_\_\_

R.D. \_\_\_\_\_ AUGUST 2011  
 DRAWING SCALE \_\_\_\_\_

AS SHOWN  
 PROJECT No: \_\_\_\_\_ DRAWING No: \_\_\_\_\_ REVISION \_\_\_\_\_

5894 \_\_\_\_\_ E00 \_\_\_\_\_ A \_\_\_\_\_

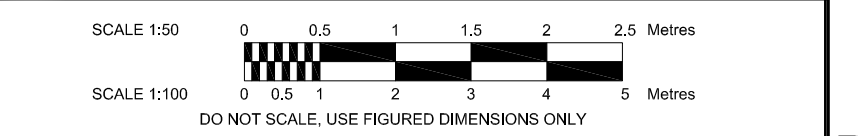




**NOTES:**

1. DO NOT SCALE FROM DRAWINGS. ALL DIMENSIONS & LEVELS TO BE VERIFIED ON SITE BEFORE MANUFACTURE AND/OR CONSTRUCTION.
2. L1 LIGHT SHOWN AT 25m SPACING.

REV	DATE	DRN/CHD	AA	DA APPROVAL	DESCRIPTION
A	23/08/11	MK	AA		DA APPROVAL



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**TURTLE STREET BEACH**

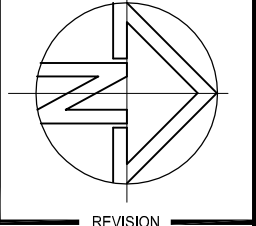
ARCHITECT  
 PROJECT  
**TURTLE STREET BEACH**

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SERVICE  
**ELECTRICAL SERVICES**

DRAWING TITLE  
**EXTERNAL LIGHTING LAYOUT  
 1 OF 7**

DRAWN	ENGINEER	
M.K.	A.A.	
CHECKED	DATE	
R.D.	AUGUST 2011	
DRAWING SCALE		
N.T.S.	1:1000 @ A3	
PROJECT No	DRAWING No	REVISION
<b>5894</b>	<b>E01</b>	<b>A</b>

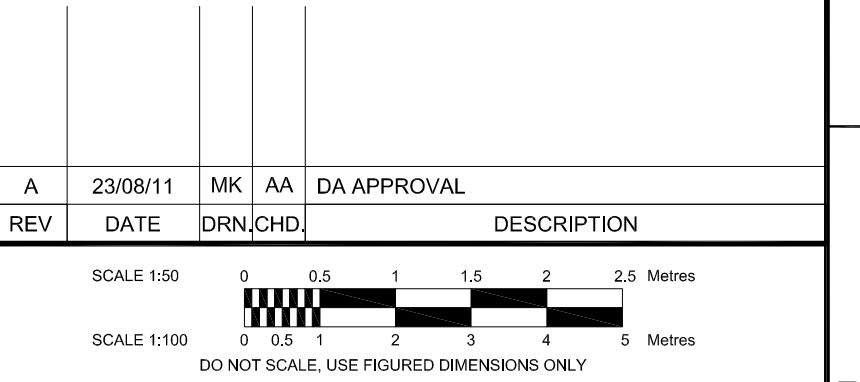
300mm A1 SHEET  
200mm  
100mm





**NOTES:**

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- L1 LIGHT SHOWN AT 25m SPACING.



REV	DATE	DRN/CHD	AA	DA APPROVAL	DESCRIPTION
A	23/08/11	MK	AA		

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**TURTLE STREET BEACH**

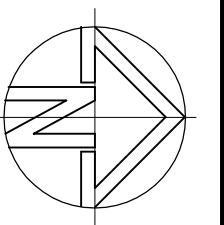
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SERVICE  
**ELECTRICAL SERVICES**

DRAWING TITLE  
**EXTERNAL LIGHTING LAYOUT  
 2 OF 7**

DRAWN	ENGINEER	
M.K.	A.A.	
CHECKED	DATE	
R.D.	AUGUST 2011	
DRAWING SCALE		
1:500 @ A1	1:1000 @ A3	
PROJECT NO.	DRAWING NO.	REVISION
5894	E02	A