

Concorde,  
Naas Road,  
Dublin 12.



Project Ref.	Document Title	Rev	Prepared by:	Issue Date	Checked by:
1856	Site Lighting Report	02	C.H	17/04/2019	S.O.B

**1.0 INTRODUCTION**

This report documents the approach taken by Homan O' Brien to develop a proposed external lighting design for Concorde (mixed-use residential), located at the existing Concorde Industrial Estate, Naas Road, Walkinstown, Dublin 12. Homan O' Brien carried out lighting calculations with the Dialux (4.13) lighting simulation software platform. The results of the calculation were compared to figures detailed in industry design standards. The design philosophy is detailed below and the lighting layout drawing is attached within the supporting documentation section.



**Figure 1 Concorde Industrial Estate, site map.**

The site is bounded to the north by the Naas Road, to the east by an un-named public access road (cul de sac), to the west by an ESB high voltage mast & compound and to the south by a car yard as well as Drimnagh Castle playing fields. The main point of access to the site will be via the un-named road to the east which, in turn, is accessed from the Naas Road via a proposed new signalised junction.

## **2.0 PROPOSED APPROACH**

There were five key lighting design elements reviewed in advance of carrying out lighting calculations. The lighting design should conform to all standards listed below.

### **Design Criteria**

1. Lighting Lux Levels, and uniformity on walkways
2. Light pollution on surrounding properties
3. Luminaire intensity
4. Up Light Ratio (ULR)
5. Lighting Controls

### **Standards**

- EN 12464-2 2014 - Light and lighting. Lighting of work places. Outdoor work places
- SLL Code of Lighting 2012
- SLL Lighting Handbook 2018
- SLL Lighting Guide 6 – Exterior environment
- SLL Lighting Guide 9 – Lighting for communal residential buildings
- I.S 3217:2013
- Building Regulations Part M

## **2.1 DESIGN CRITERIA**

Concorde mixed-use residential development is classified as an 'E3' environment in accordance with IS EN 12464-2:2014. This represents medium district brightness areas, such as industrial or retail suburbs. The following lighting criteria must be adhered to when designing a lighting installation for an E3 environment.

### **Light Pollution on Surrounding Properties**

- 10 lux pre-curfew (maximum value of vertical illuminance on properties)
- 2 lux post-curfew (maximum value of vertical illuminance on properties)

### **Luminaire Intensity (cd - candela)**

- 10000 pre-curfew
- 1000 post-curfew

### **Upward Light (ULR %)**

- 15%

General Task Lighting allows occupants navigate through the site and around building pedestrian pathways. General lighting is required during the normal operation of the building while emergency lighting is required in the case were the normal lighting operation fails due to power loss. The CIBSE lighting guides and IS EN 12464-2: 2014 recommend lighting values for external path ways.

### **General Lighting Values**

- Walkways exclusively for pedestrians – 5 lux (Illuminance)
- Regular Vehicle traffic – 20 lux (Illuminance)
- GRI – 50 (Glare Rating)
- Ra – 20 Ra (Colour Rendering)

I.S 3218:2013 and CIBSE LG6 recommend Emergency lighting levels for external walkways.

- Clearly defined Routes – 0.2 lux minimum
- Immediate Vicinity of Exits – 1 lux minimum

### **Lighting Controls**

Lighting controls are essential for all exterior lights. A photo-electric cell (PEC) is proposed for automatic switch-on at dusk and off with time control. Presence detection may also be incorporated for safety purposes, e.g. when nobody is outside, after a set interval time lighting reduces to a pre-determined level, e.g. 50%, but as soon as human or vehicular movement is detected, full illumination is restored.

**3.0 PROPOSED LIGHTING**

Task and Architectural lighting is proposed for the areas around the Concorde mixed use residential development. Wall mounted façade luminaires are proposed for the task lighting while bollard and pole top lighting is proposed for the carpark and walkway / communal vicinity's. The proposed lights are utilized to meet all the aforementioned design criteria (minimum lux levels, glare, colour rendering etc.) at the same time providing an aesthetically pleasing ambient lighting environment. Lighting specification sheets can be seen in the appendices.



**Figure 2 Pole Top Luminaire Example**



**Figure 3 Architectural pole Top Lighting Example**



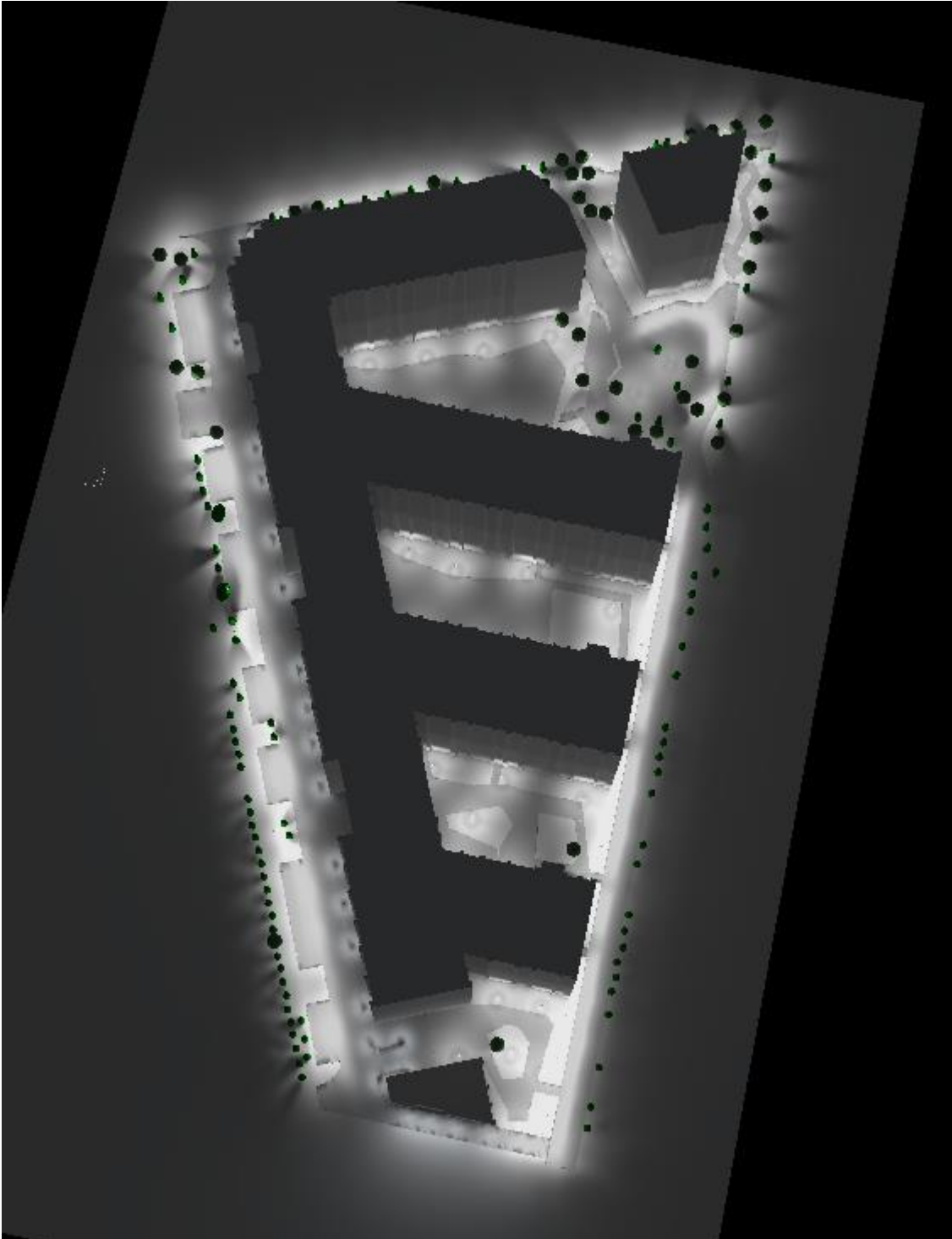
**Figure 4 Wall Mounted Luminaire Example**



**Figure 5 Bollard Lighting Example**

### 3.1 PROPOSED LIGHTING CALCULATIONS

Figures 6 and 7 below detail the lighting calculation results generated by Dialux. Figure 6. Illustrates the 3D light distribution on the site. After reviewing lighting results, it's clear little or no light pollution on adjacent properties exist, as a result of the directional nature of the fittings. and luminaires selected.



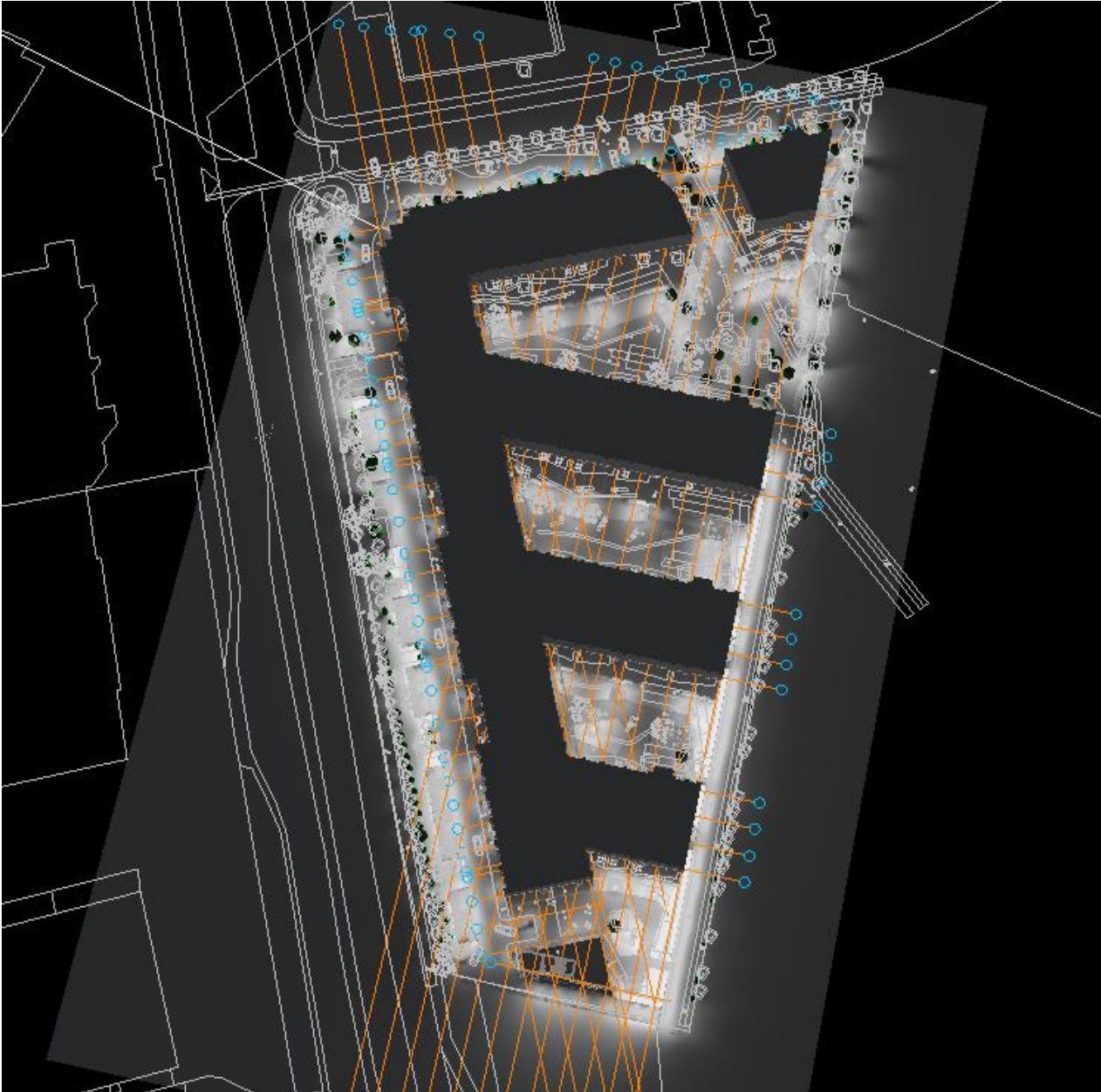
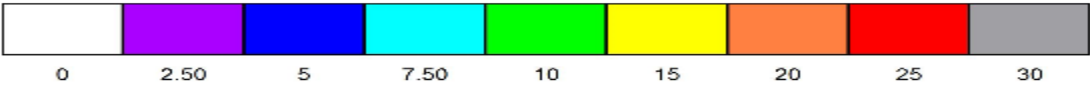
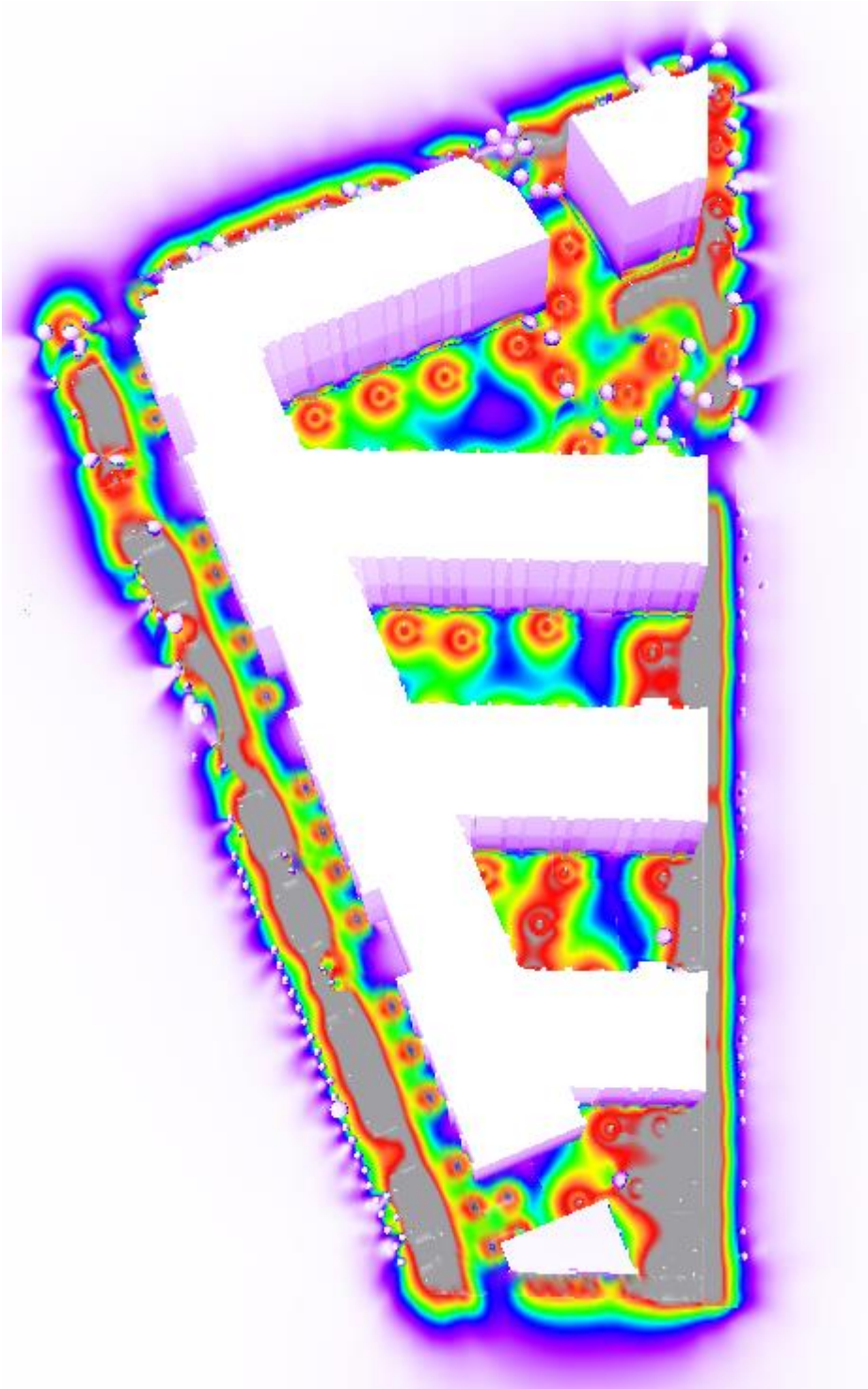


Figure 6 3D Dialux Lighting Output





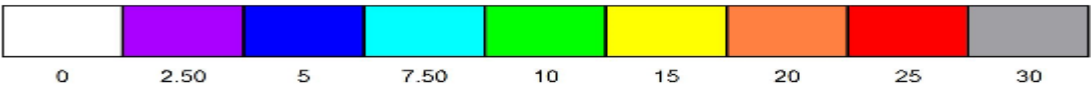
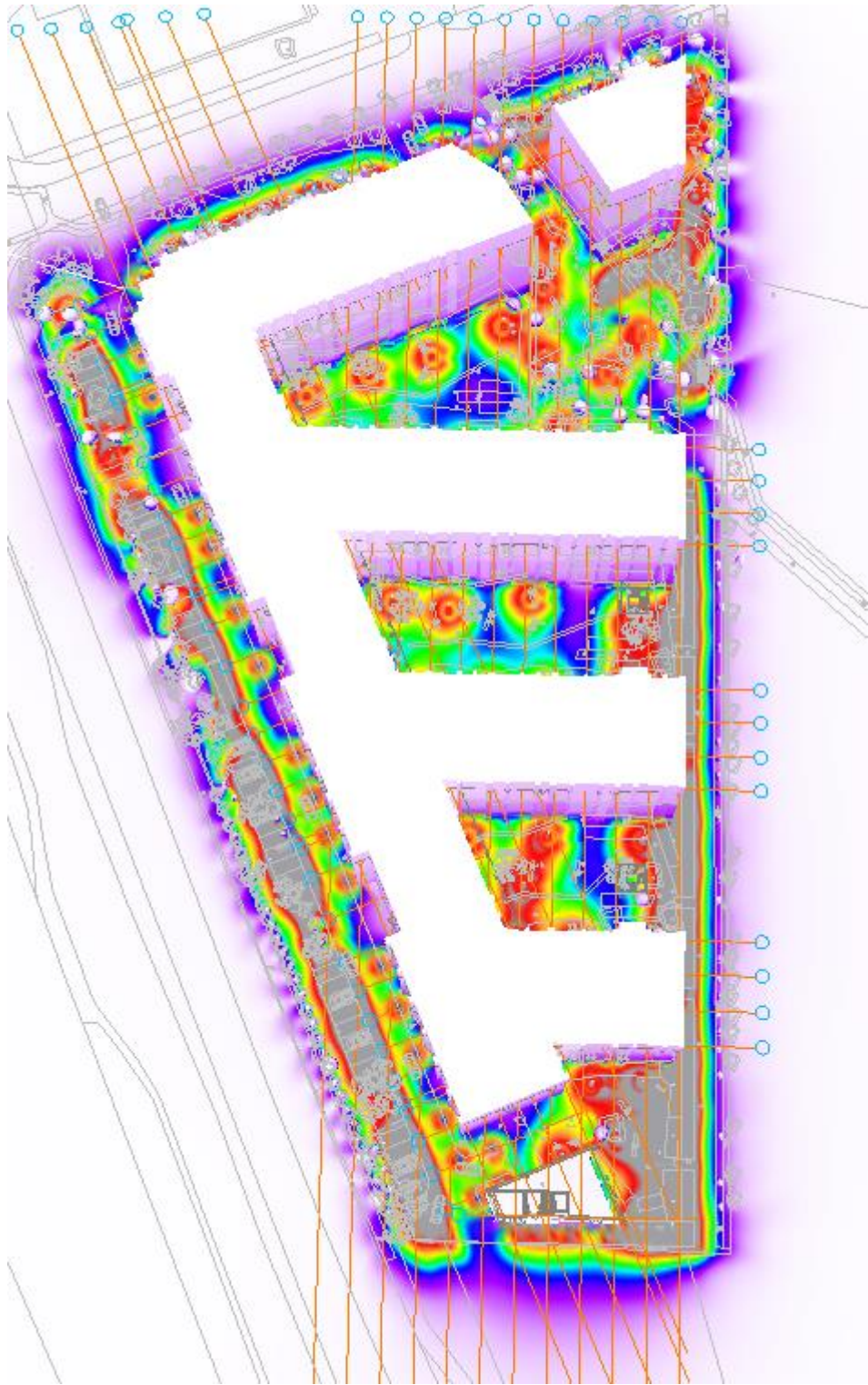
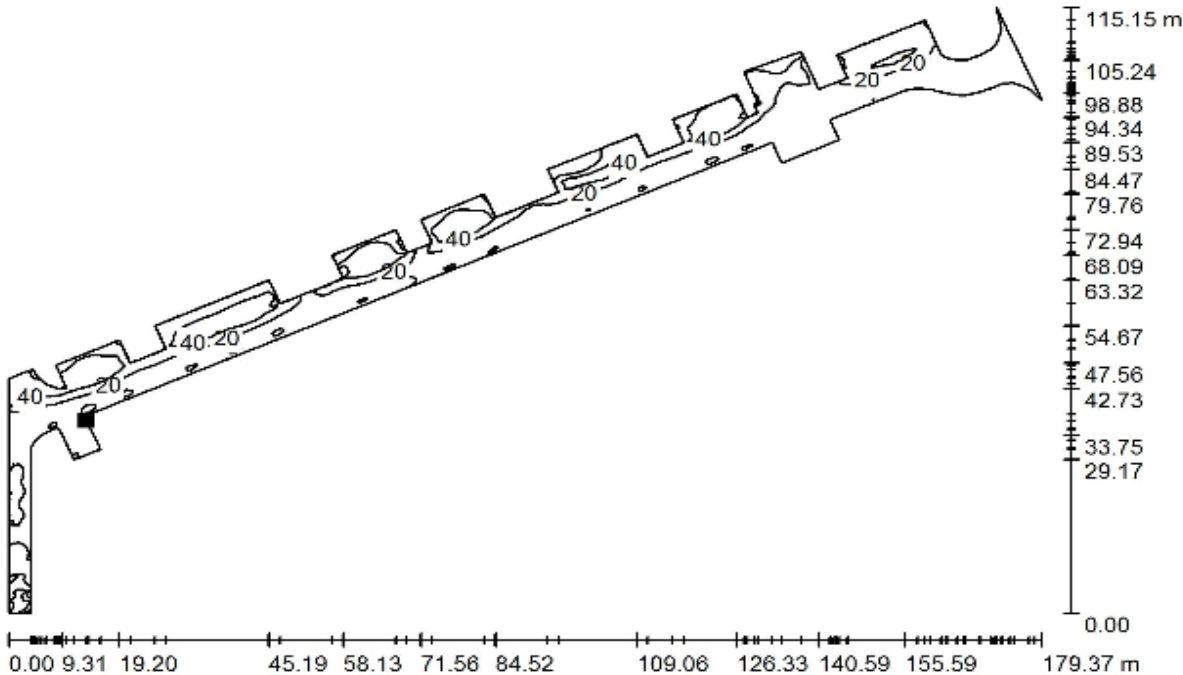


Figure 7 Dialux Lighting Lux 3D Output

Figure 7. Illustrates calculated light lux levels around the development. All walkways show a light level greater than the minimum of 5 lux as per design criteria requirements and all intended vehicle roadways achieve 20 lux or above.

The ULR has been calculated at 1.5% which is less than the design criteria maximum of 15% for an E3 environment. The uniformity factor is also less than 0.25  $U_o$ .

**Figure 8 Dialux Calculation Output: Roadway adjacent Naas Road**



Position of surface in external scene:  
Marked point: (-100.529 m, -80.622 m, 0.000 m)



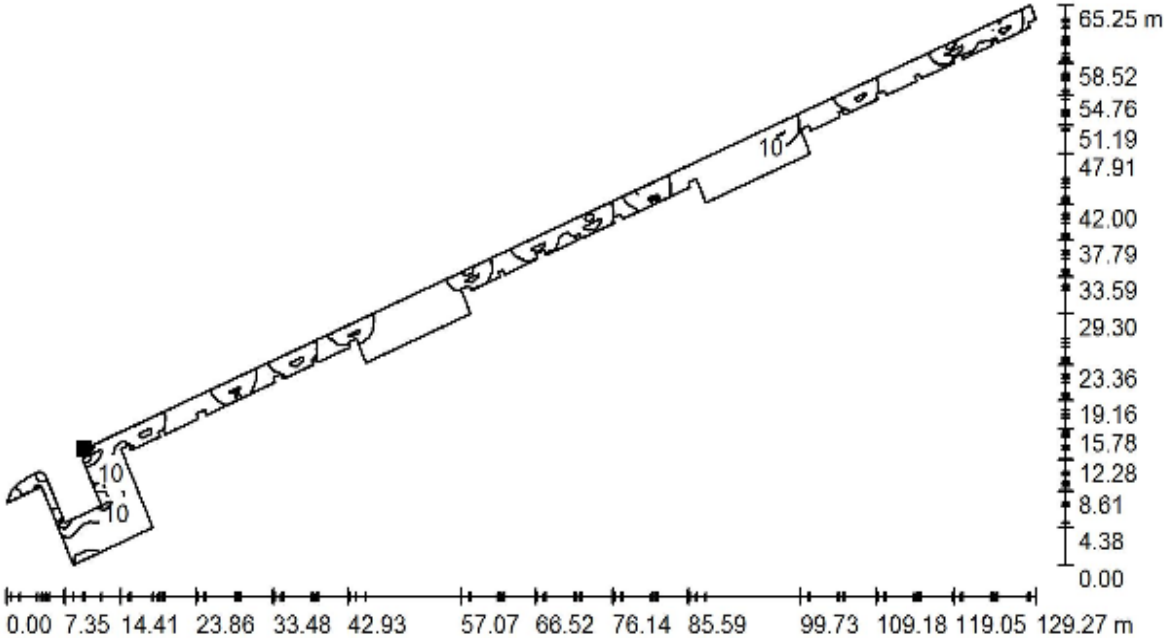
Grid: 128 x 128 Points

$$E_{av} [lx]$$

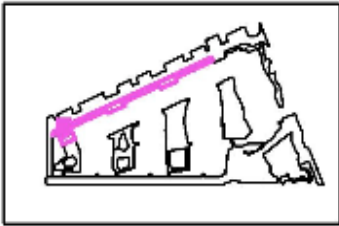
23

Figure 8. Illustrates calculated light lux levels on the carpark roadway bound to Naas Road. The roadway shows a light level greater than the minimum of 20 lux as per design criteria requirements.

Figure 9 Dialux Calculation Output: Walkway Parallel with Roadway in Figure 8:



Position of surface in external scene:  
Marked point: (-100.266 m, -79.409 m, 0.000 m)



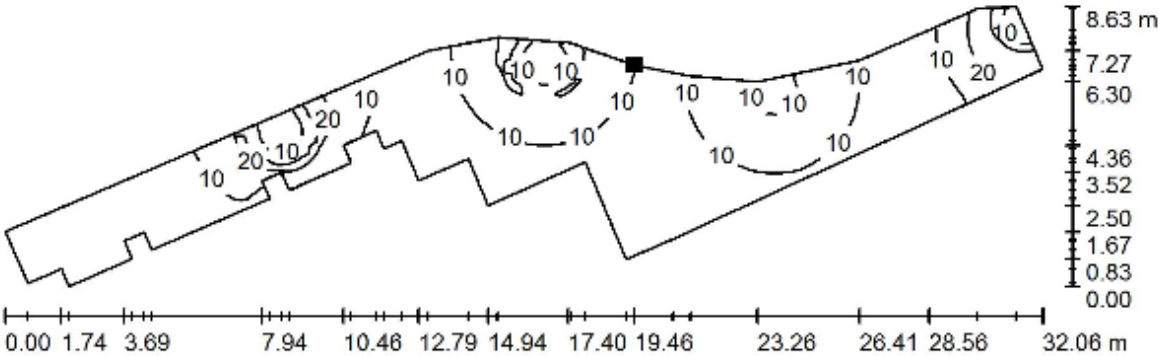
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$$E_{av} [lx]$$

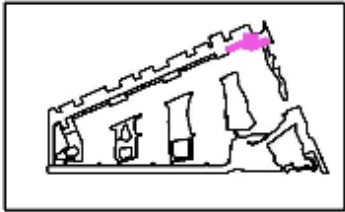
8.99

Figure 9. Illustrates calculated light lux levels around building pedestrian walkways. All walkways show a light level greater than the minimum of 5 lux as per design criteria requirements.

**Figure 10 Dialux Calculation Output: North East Pedestrian Walkway:**



Position of surface in external scene:  
 Marked point: (47.896 m, -18.177 m, 0.000 m)



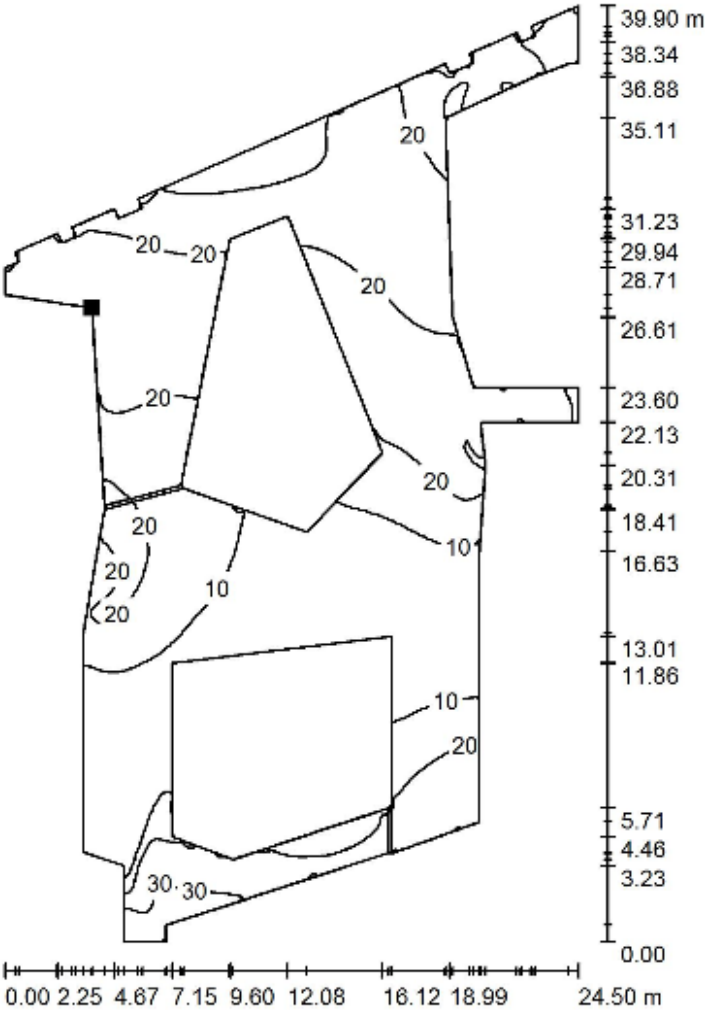
Grid: 128 x 64 Points

$$E_{av} \text{ [lx]}$$

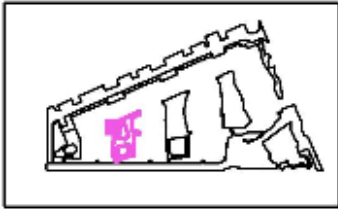
9.32

Figure 10. Illustrates calculated light lux levels along the north eastern pedestrian walkway. The walkways show a light level greater than the minimum of 5 lux as per design criteria requirements.

**Figure 11 Dialux Calculation Output: Communal Open Space Area:**



Position of surface in external scene:  
Marked point: (-60.700 m, -88.206 m, 0.000 m)



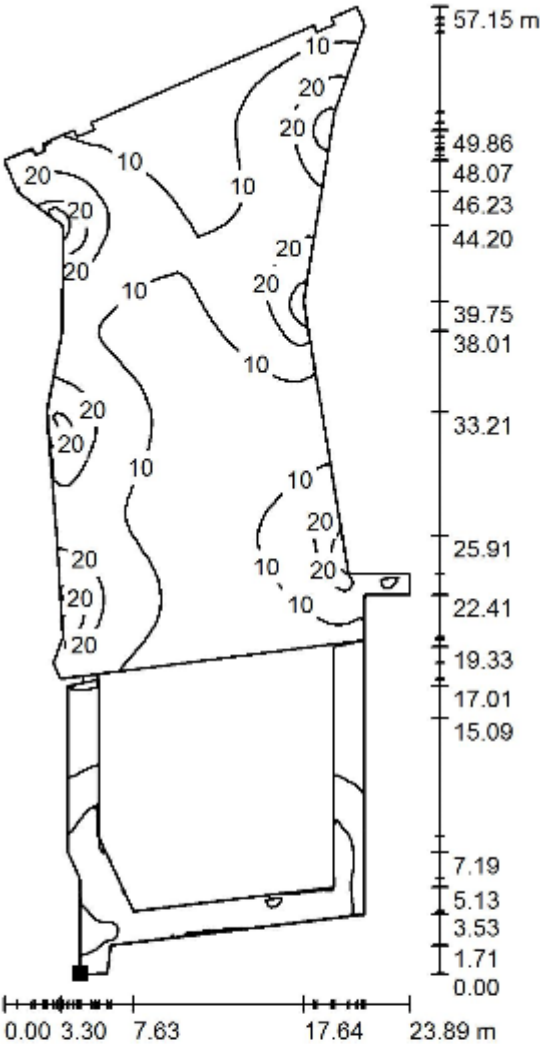
Grid: 128 x 128 Points

$$E_{av} [lx]$$

16

Figure 11. Illustrates the communal open space area calculated light lux levels between blocks B & C. The space show a light level greater than the minimum of 5 lux as per design criteria requirements.

**Figure 12 Dialux Calculation Output: Communal Open Space Area:**



Position of surface in external scene:  
Marked point: (-16.700 m, -115.206 m, 0.000 m)

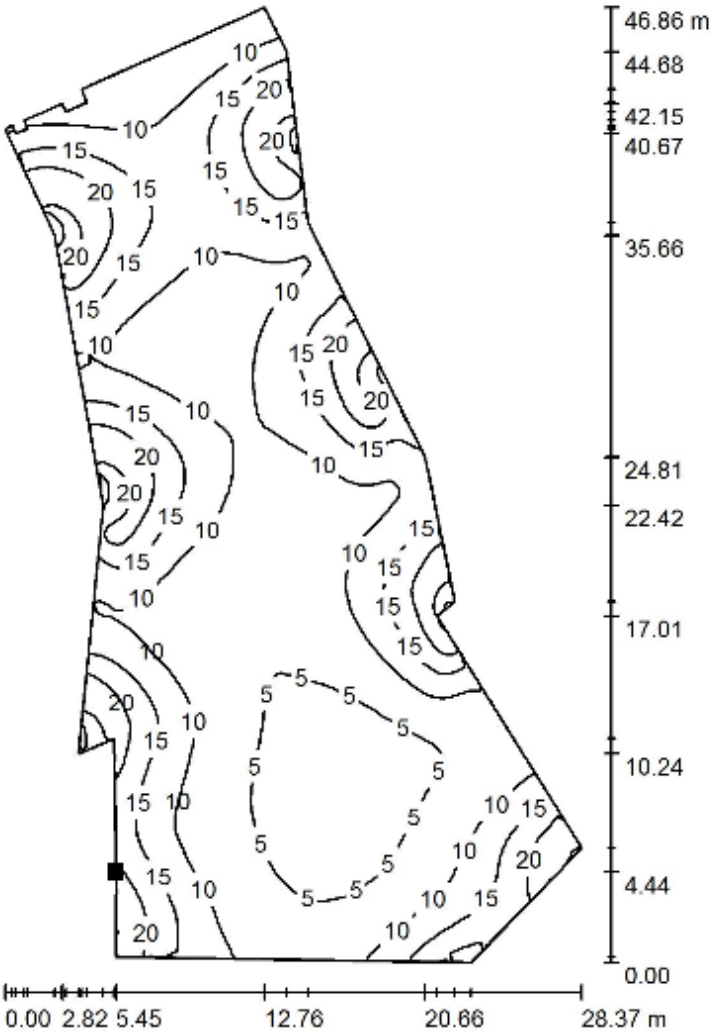
Grid: 128 x 128 Points

$$E_{av} [lx]$$

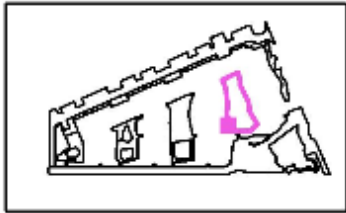
13

Figure 12. Illustrates the communal open space area calculated light lux levels between blocks C & D. The space show a light level greater than the minimum of 5 lux as per design criteria requirements

**Figure 13 Dialux Calculation Output: Communal Open Space Area:**



Position of surface in external scene:  
Marked point: (28.225 m, -84.416 m, 0.000 m)



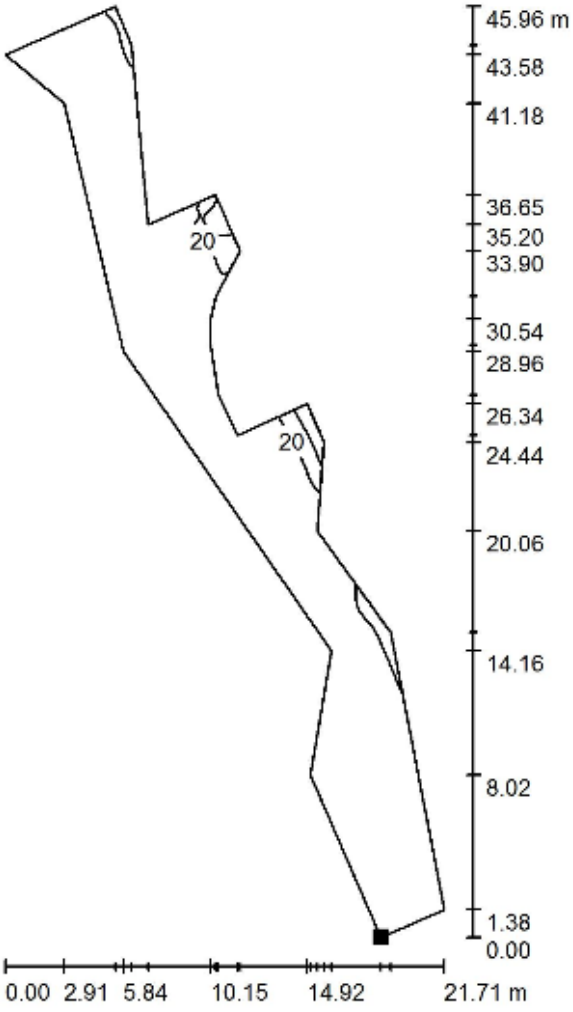
Grid: 128 x 128 Points

$$E_{av} [lx]$$

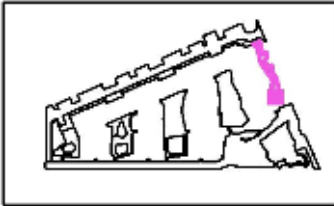
11

Figure 13. Illustrates the communal open space area calculated light lux levels between blocks D & E. The space show a light level greater than the minimum of 5 lux as per design criteria requirements

**Figure 14 Dialux Calculation Output: Pedestrian Walkway Adjacent Un-named Road:**



Position of surface in external scene:  
Marked point: (73.066 m, -64.844 m, 0.000 m)



Grid: 128 x 64 Points

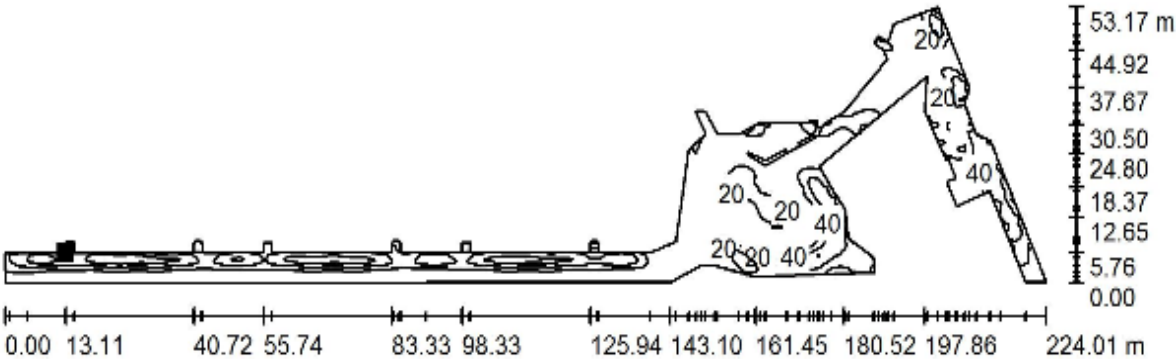
$$E_{av} [lx]$$

$$5.15$$

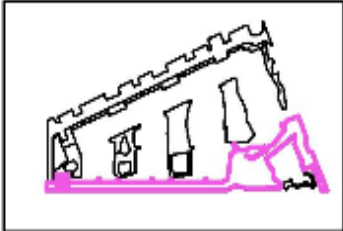
Figure 14. Illustrates the calculated light lux levels for the pedestrian walkway adjacent the un-named road. The space show a light level greater than the minimum of 5 lux as per design criteria requirements.



**Figure 15 Dialux Calculation Output: Southern Fire Tender Access Route & Playground:**



Position of surface in external scene:  
Marked point: (-101.956 m, -117.201 m, 0.000 m)



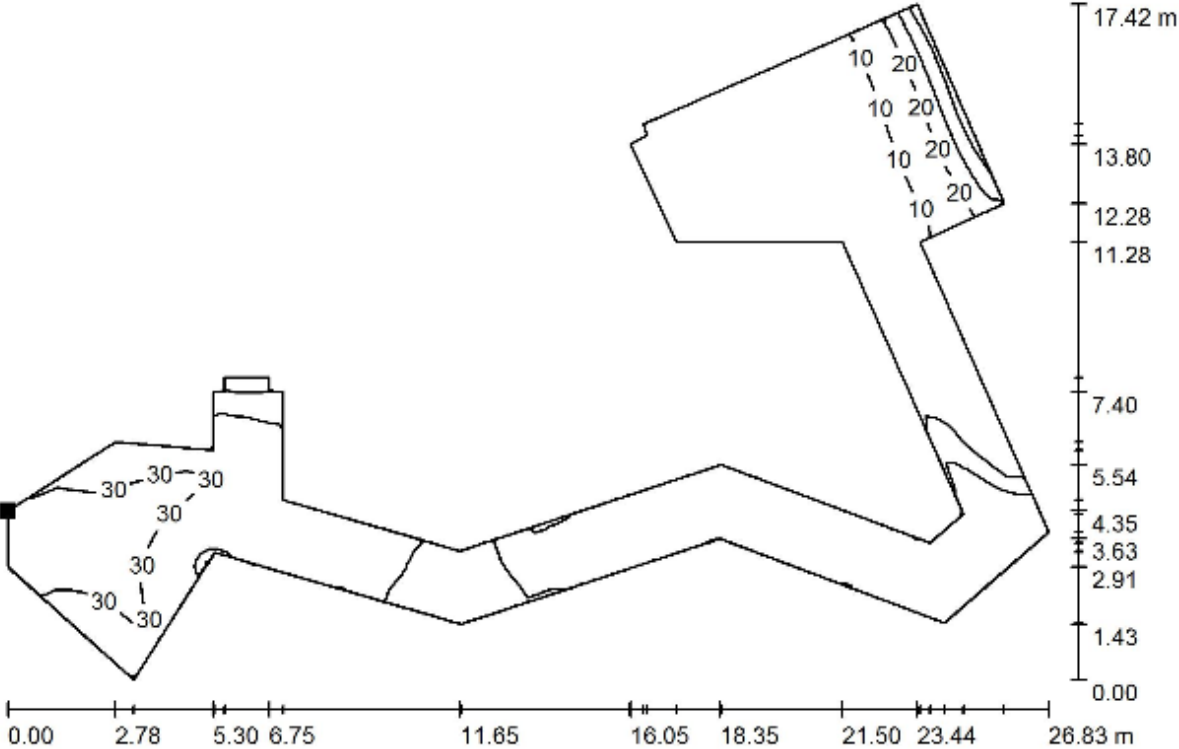
Grid: 128 x 128 Points

$$E_{av} \text{ [lx]}$$

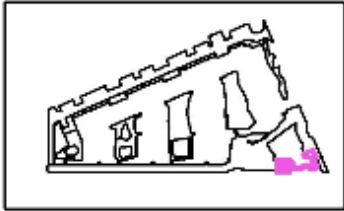
24

Figure 15. Illustrates the calculated light lux levels for the southern fire tender access route & playground area. The space show a light level greater than the minimum of 20 lux as per design criteria requirements.

**Figure 16 Dialux Calculation Output: Communal Open Space Area:**



Position of surface in external scene:  
Marked point: (73.350 m, -118.249 m, 0.000 m)



Grid: 128 x 64 Points

$$E_{av} [lx]$$

18

Figure 16. Illustrates the block F communal open space area calculated light lux levels. The space show a light level greater than the minimum of 5 lux as per design criteria requirements

#### **4.0 CONCLUSION**

The proposed lighting layout complies with all of the required design criteria. Dialux calculations indicate there will be minimal as far as practical light pollution on surrounding properties. The up light is estimated at 1.5% which is far below the 15% maximum for an E3 environment. The proposed layout offers task lighting in addition to architectural lighting resulting in an aesthetically pleasing installation for occupants. Homan O' Brien believe the proposed layout will blend seamlessly into the surrounding environment.

APPENDIX

Figure 17 - Luminaire Schedule & Specification

20 Pieces	<p>BEGA 99570K4 LED 16,9W            Article No.: 99570K4            Luminous flux (Luminaire): 753 lm            Luminous flux (Lamps): 753 lm            Luminaire Wattage: 17.0 W            Luminaire classification according to CIE: 92            CIE flux code: 01 23 74 92 100            Fitting: 1 x LED 14,4W (Correction Factor 1.000).</p>
4 Pieces	<p>Glamox O85-S410 LED 2300 840            Article No.:            Luminous flux (Luminaire): 2340 lm            Luminous flux (Lamps): 2340 lm            Luminaire Wattage: 34.0 W            Luminaire classification according to CIE: 100            CIE flux code: 46 78 95 100 101            Fitting: 1 x LED O85 1800 840 (Correction Factor 1.000).</p>
46 Pieces	<p>IGUZZINI BILB_BY94_X102 Twilight 31.2W            Article No.: BILB_BY94_X102            Luminous flux (Luminaire): 3180 lm            Luminous flux (Lamps): 3180 lm            Luminaire Wattage: 31.2 W            Luminaire classification according to CIE: 100            CIE flux code: 31 71 96 100 100            Fitting: 1 x A24C (Correction Factor 1.000).</p>
2 Pieces	<p>IGUZZINI E253 Street 24W            Article No.: E253            Luminous flux (Luminaire): 2920 lm            Luminous flux (Lamps): 2920 lm            Luminaire Wattage: 24.0 W            Luminaire classification according to CIE: 100            CIE flux code: 41 76 97 100 100            Fitting: 1 x A97Y (Correction Factor 1.000).</p>
44 Pieces	<p>IGUZZINI EF72 Street 35.8W            Article No.: EF72            Luminous flux (Luminaire): 4400 lm            Luminous flux (Lamps): 4400 lm            Luminaire Wattage: 35.8 W            Luminaire classification according to CIE: 100            CIE flux code: 36 80 98 100 100            Fitting: 1 x B45I (Correction Factor 1.000).</p>



Figure 18 Proposed Lighting Layout

