Proposed Strategic Housing Development (Alterations to Phase 1 Residential and Proposed Phase 2 Residential Development)	HOMAN O'BRIEN *Engineering Excellence.*

Project Ref.	Document Title	Rev	Prepared by:	Issue Date	Checked by:
1713.1	Site Lighting Report	P1	AC	27-08-2020	SB

1.0 INTRODUCTION

This report documents the approach taken by Homan O' Brien to develop an external lighting design for the proposed Frascati Residential Phase 2 development, an apartment development above the existing Frascati Shopping Centre carpark structure.

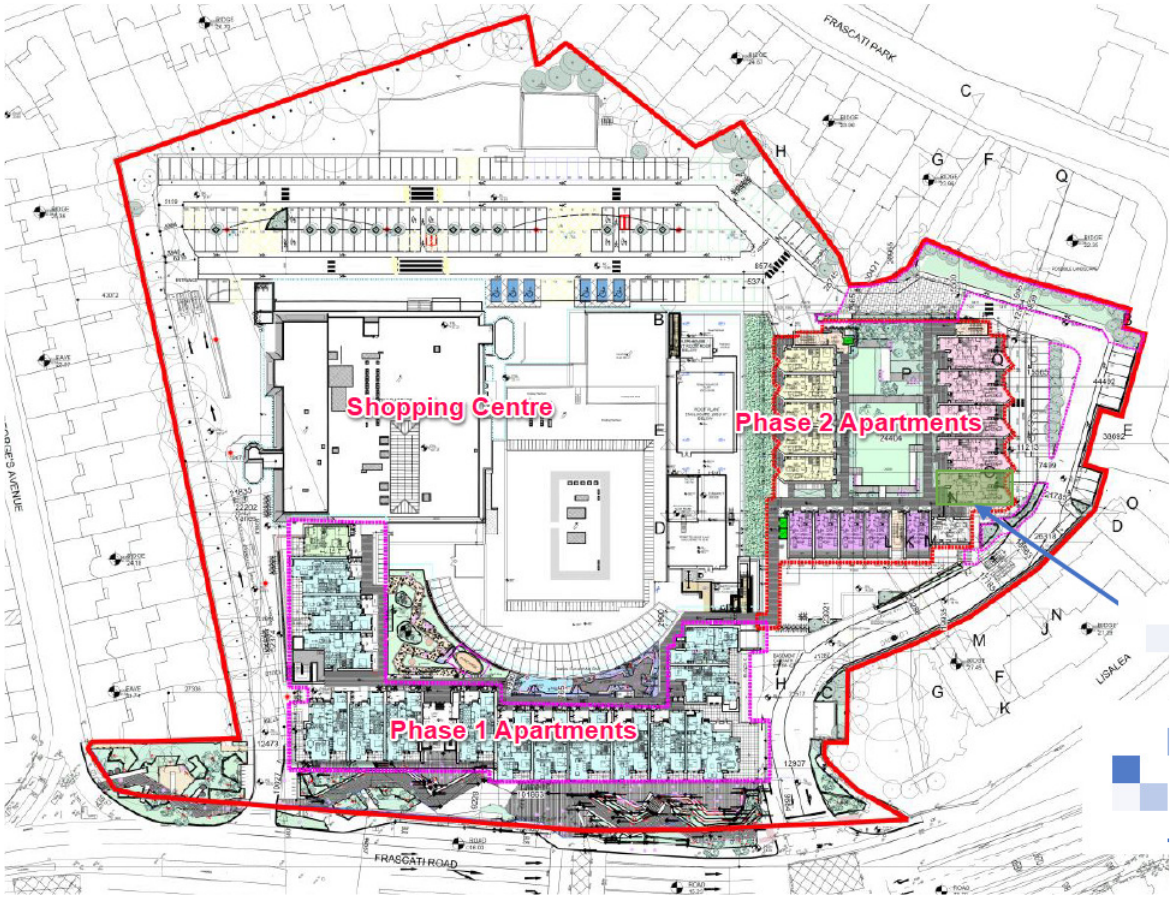


Figure 1: The Frascati Centre site map.

Development Description

The proposal relates to alterations to the Phase 1 permission for 45 no. apartments (Reg. Ref.: D17A/0950 & ABP Ref.: 300745-18), from second to fourth floor level of the rejuvenated Frascati Centre. The proposed development also includes the provision of 57 no. additional apartments, as an extension of the Phase 1 permission, located above the existing / permitted podium car park to the north west of the centre, as a Phase 2 residential development. The subject application therefore relates to a total of 102 no. residential units.

The proposed alterations to the 45 no. apartments (Block A and B) and associated development, permitted under the Phase 1 residential development, includes the following:

- Internal rationalisation of the permitted units, including changes in overall unit size and internal layouts, and associated external alterations including the provision of winter gardens.
- Provision of an external walkway connection between the Phase 1 and Phase 2 residential blocks at second floor level.
- The refuse, car and cycle parking facilities permitted at lower ground floor level will be altered to cater for the additional residential units, including the introduction of a barrier control system.
- The main entrance to the Phase 1 residential scheme from Frascati Road will serve both the permitted and proposed units.
- A concierge facility room to serve the overall residential development is proposed at second floor level near the main core of Phase 1, with an associated minor reduction in the area of the permitted communal terrace at second floor level.
- The communal open space for Phase 1 and 2 will be accessible to all residents.
- Alterations to the cycle parking provision at lower ground floor / basement level and at the first-floor level podium car park.

The Phase 2 proposal consists of 20 no. studios, 22 no. 1 beds and 15 no. 2 beds (57 no. apartments) in three no. blocks (Block D, E & F), arranged around a central communal courtyard space, above the existing and permitted podium car park to the north west of the centre. Block D is a five storey block, Block E is a part two to part four storey block and Block F is a part two to part three storey block, all above three levels of podium / basement car park. Balconies / winter gardens are provided to all apartments (on the north western, north eastern, south western elevations and into the internal courtyard) and access to the blocks is via stair / lift cores and an external walkway fronting the communal courtyard. A roof terrace is also proposed at fifth floor level of Block E.

The proposal includes the allocation of 57 no. car parking spaces at lower ground floor level and 214 no. bicycle parking spaces at lower ground and surface level for the 102 no. residential units. The proposal includes alterations to existing surface car parking to provide additional landscaping and bicycle spaces, a bin storage area and stair / lift cores are proposed within the existing / permitted basement / podium car parks below the Phase 2 residential units, and the proposal includes all associated ancillary site development works. The proposal also includes alterations to the location of 30 no. permitted cycle parking spaces associated with the rejuvenation of the Frascati Centre, Reg. Ref.: D14A/0134, as amended.

2.0 PROPOSED APPROCH

The key lighting design principles are outlined below for new external lighting to the development. The lighting design should conform to all standards listed below.

General design principles for the entire development are as follows –

1. Lighting Lux Levels.
2. Ensure design ensures reduced energy use, light pollution, sky glow, light spillage and visual glare.
3. Provide adequate illumination to contribute towards the safe use of the site by both vehicles and pedestrians.
4. Lighting need to enhance orientation, security and safe movement throughout including safe access to fire assembly points.
5. Use enhanced base lighting for pedestrian and public spaces to reduce fear of crime and enhance sense of well-being.

Standards

- BS 5489-1:2013 Code of practice for the design of road lighting Part 1: Lighting of roads and Public amenity areas.
- EN 12464-2 2014 - Light and lighting. Lighting of workplaces. Outdoor workplaces
- SLL Code of Lighting 2012
- SLL Lighting Handbook 2018
- Cibse Lighting Guide 6 – Exterior environment
- Cibse Lighting Guide 9 – Lighting for communal residential buildings
- I.S 3217:2013
- Building Regulations Part M
- ETCI National Rules for Electrical Installations ET 101 2008

Proposed Lux Levels -

Conflict Area	20 Lux	0.40 Uniformity
Roadways / pedestrian crossing (Conflict Area)	15 Lux average.	0.40 Uniformity
Roadways	5 Lux average	0.25 Uniformity
Carparks(shopping centre)	20 Lux average	0.25 Uniformity
Internal Courtyards	5 Lux	0.25 Uniformity
Pedestrian Walkways	10 Lux	0.25 Uniformity
Steps/Pedestrian Ramps	10 Lux	0.25 Uniformity

2.1 DESIGN CRITERIA

The Frascati Centre is a lighting class E3' environment in accordance with IS EN 12464-2:2014. The following lighting criteria must be adhered to when designing a lighting installation for an E3 environment

Table 2 — Maximum obtrusive light permitted for exterior lighting installations

Environmental zone	Light on properties		Luminaire intensity		Upward light ratio	Luminance	
	E_v lx		I cd		R_{UL} %	L_b cd·m^{-2}	L_s cd·m^{-2}
	Pre-curfew[a]	Post-curfew	Pre-curfew	Post-curfew		Building facade	Signs
E1	2	0	2 500	0	0	0	50
E2	5	1	7 500	500	5	5	400
E3	10	2	10 000	1 000	15	10	800
E4	25	5	25 000	2 500	25	25	1 000

Obtrusive Light 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)

- 10,000 pre-curfew
- 1,000 post-curfew

Upward Light (ULR %)

- The recommended ULR for an E3 environmental zone is 15%.

Lighting Controls

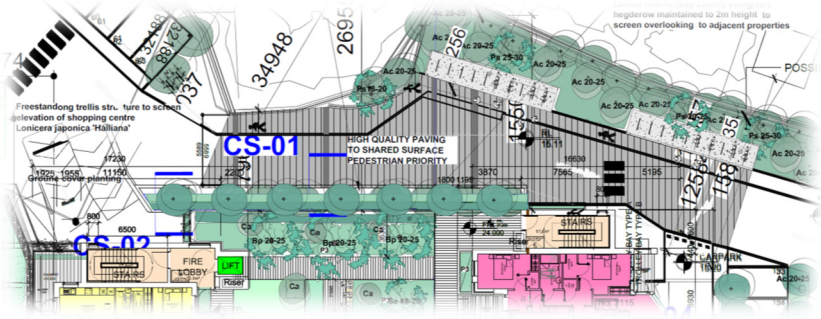
Lighting controls are essential for all exterior lights. A dimming control system is recommended to allow the light levels to be reduced during the hours of curfew (2am to 6am). A photo-electric cell (PEC) is proposed for automatic switch-on at dusk and off with time control. Presence detection in areas may 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 movement is detected, full illumination is restored.

3.0 PROPOSED LIGHTING

Design principles are as follows –

Carpark and driveways.

The driveway and carpark at Frascati Centre consists of existing single head 6 Meter lamp standards and wall mounted fixture at the perimeter which will be retained. Existing lighting will be supplemented with additional building mounted lighting to the area indicated below which will be a pedestrian priority section of driveway, containing 40W LED lamps, fed from landlord main distribution board with central dali dimmable lighting, time schedules and photocell control.



Apartment roof level courtyards

Generally, a higher decorative specification for this central area. Will consist of decorative 0.9Meter lighting bollards containing 15W LED lamp. All fed from landlord main distribution board with central on/off lighting, time schedules and photocell control. Lights will be turned off during post curfew hours.

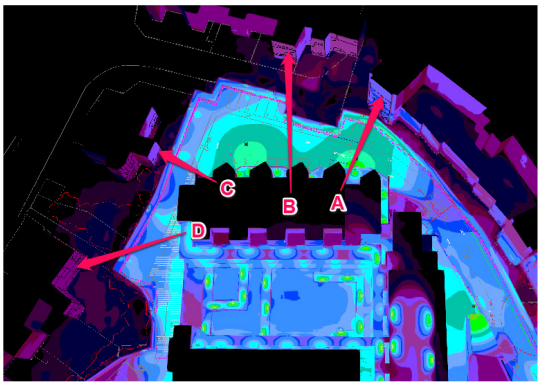
Apartment external walkways

Generally consists of ceiling mount fittings on mid level floors with covered walkways and wall recessed asymmetric lighting on top floors were walkways are not covered, containing 10W LED lamps, fed from landlord main distribution board with central on/off lighting, time schedules and photocell control.

3.1 PROPOSED LIGHTING CALCULATIONS

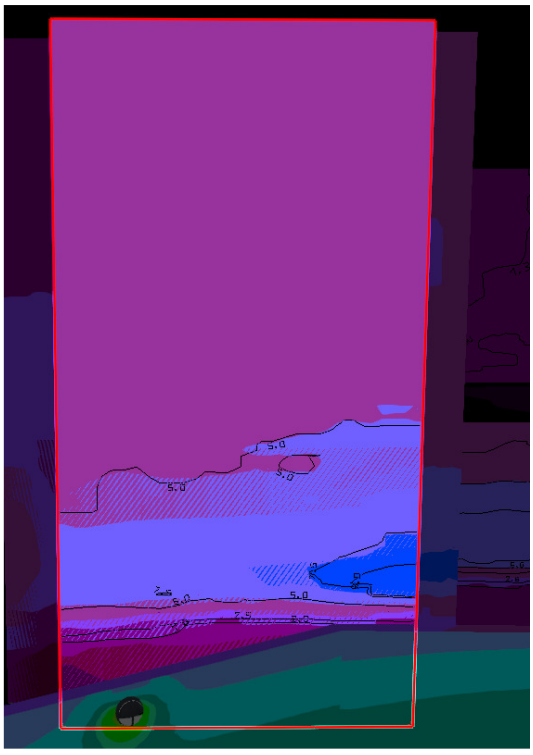
Figures below taken from light calculation result's generated by Dialux EVO indicating perimeter lighting levels to surrounding properties for the Phase 2 development.

The adjacent key indicates the four locations A, B, C, D

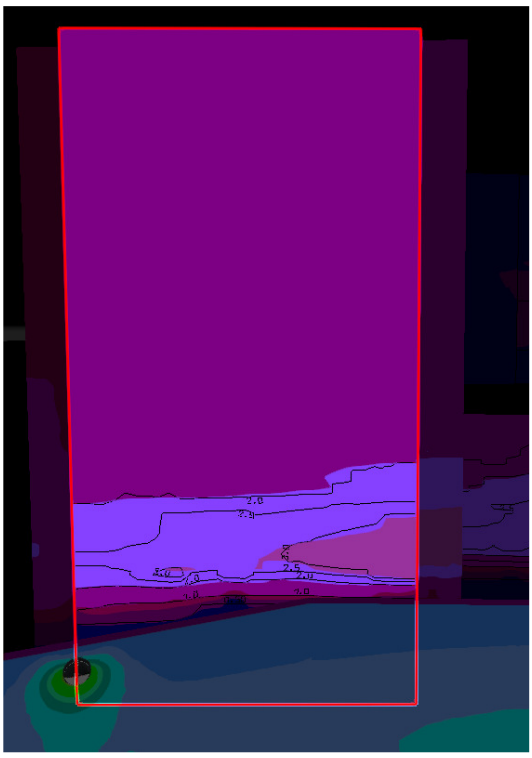


Pre-Curfew Max – 10lux
Post-Curfew Max – 2lux

<u>Location A Lighting levels</u>



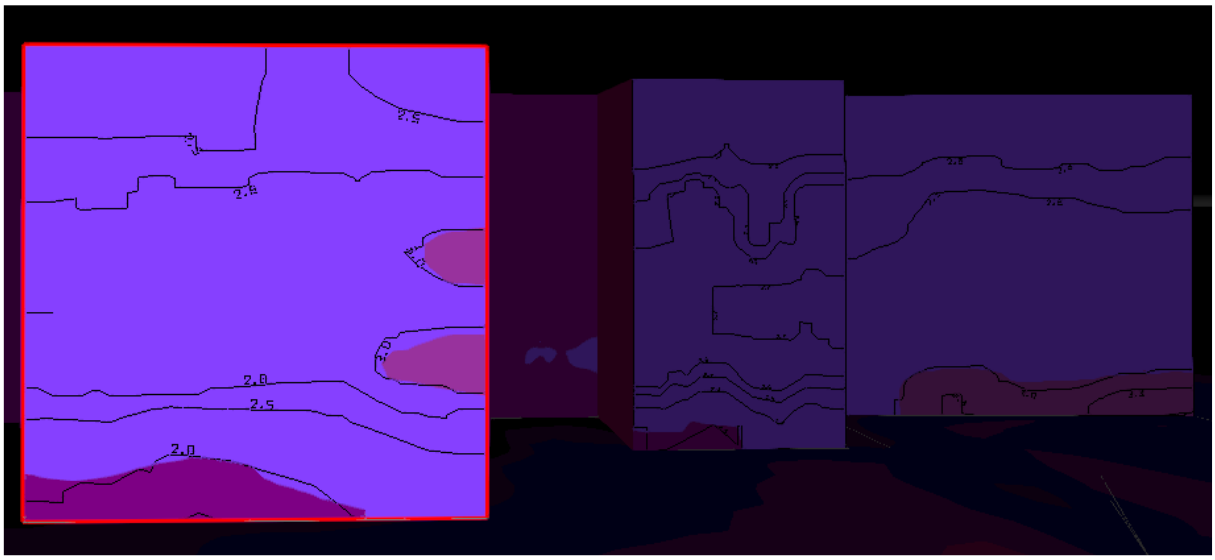
Pre-Curfew – Emax 8lux



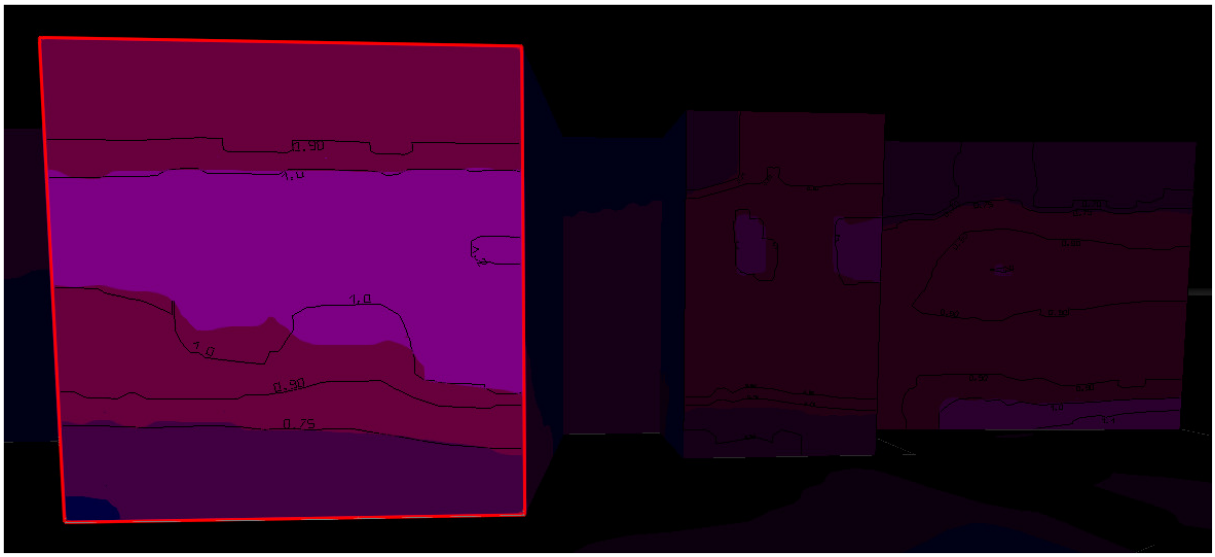
Post-Curfew – Emax 3lux

Lighting levels under max limits for pre curfew to neighboring property at location A above. Existing 6m lamp standard can be provided with local shielding to ensure post curfew light levels will not be exceeded to neighboring property at location A above. Existing landscaping/ trees at neighboring property bounding and new landscaping to carpark deck will aid with shielding of existing lamp standard and lighting from carpark deck.

Location B Lighting levels



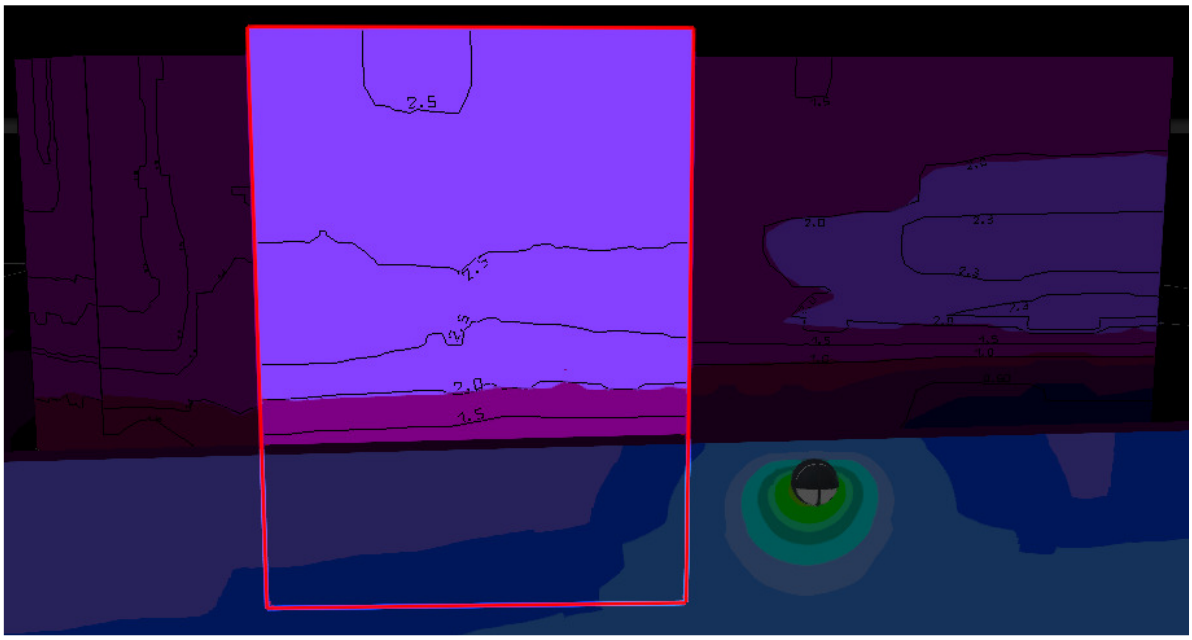
Pre-Curfew – Emax 3.0lux



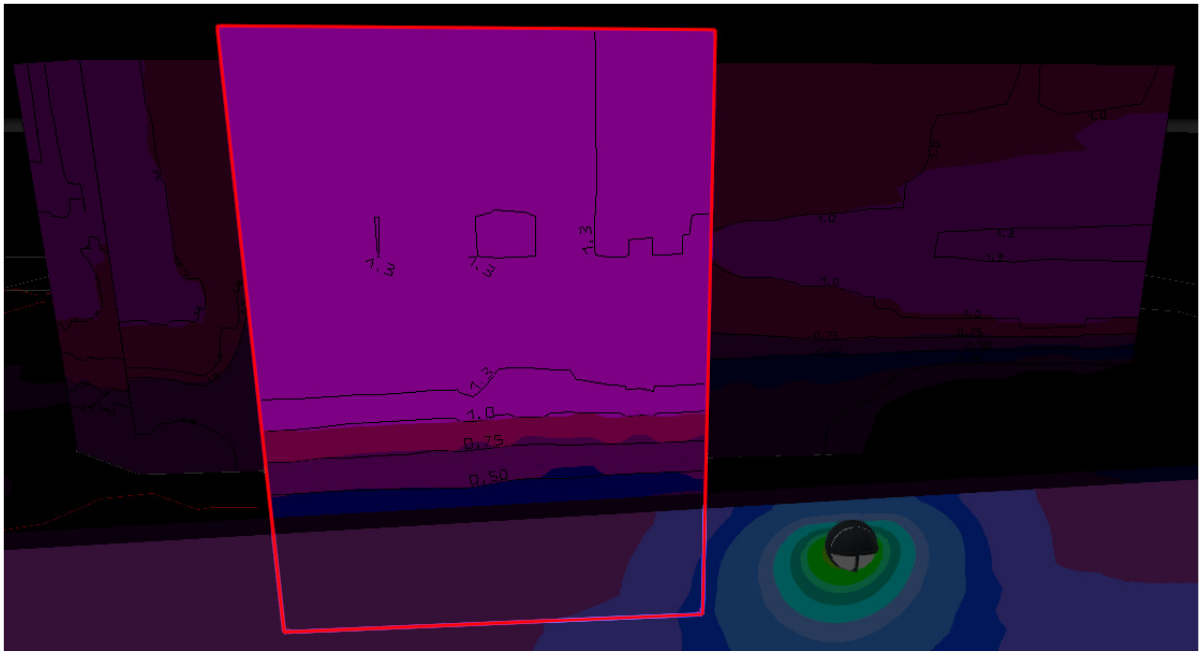
Post-Curfew – Emax 1.2lux

Lighting levels under max limits for pre & post curfew to neighboring property at location B above.

Location C Lighting levels



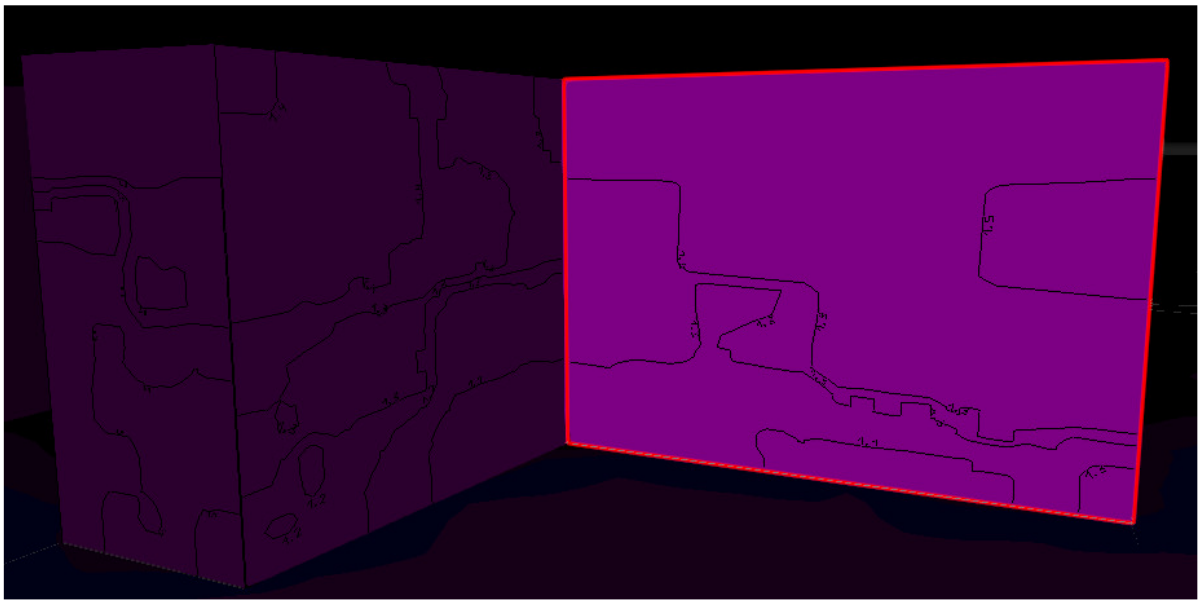
Pre-Curfew – Emax 2.5lux



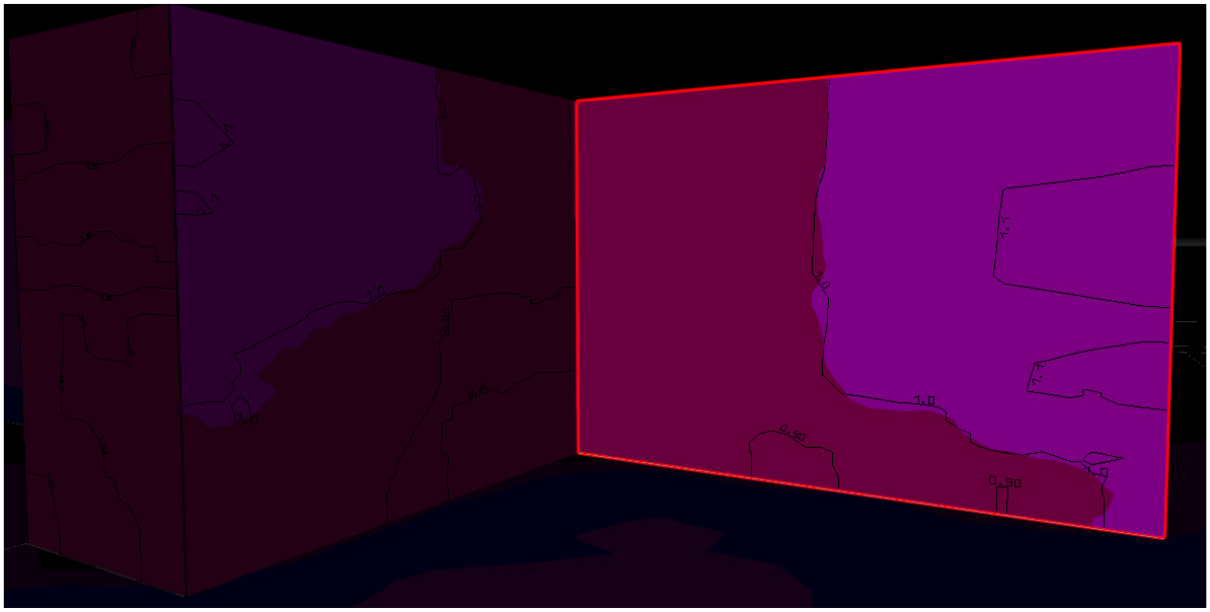
Post-Curfew – Emax 1.3lux

Lighting levels under max limits for pre & post curfew to neighboring property at location C above.

Location C Lighting levels



Pre-Curfew – Emax 1.5lux

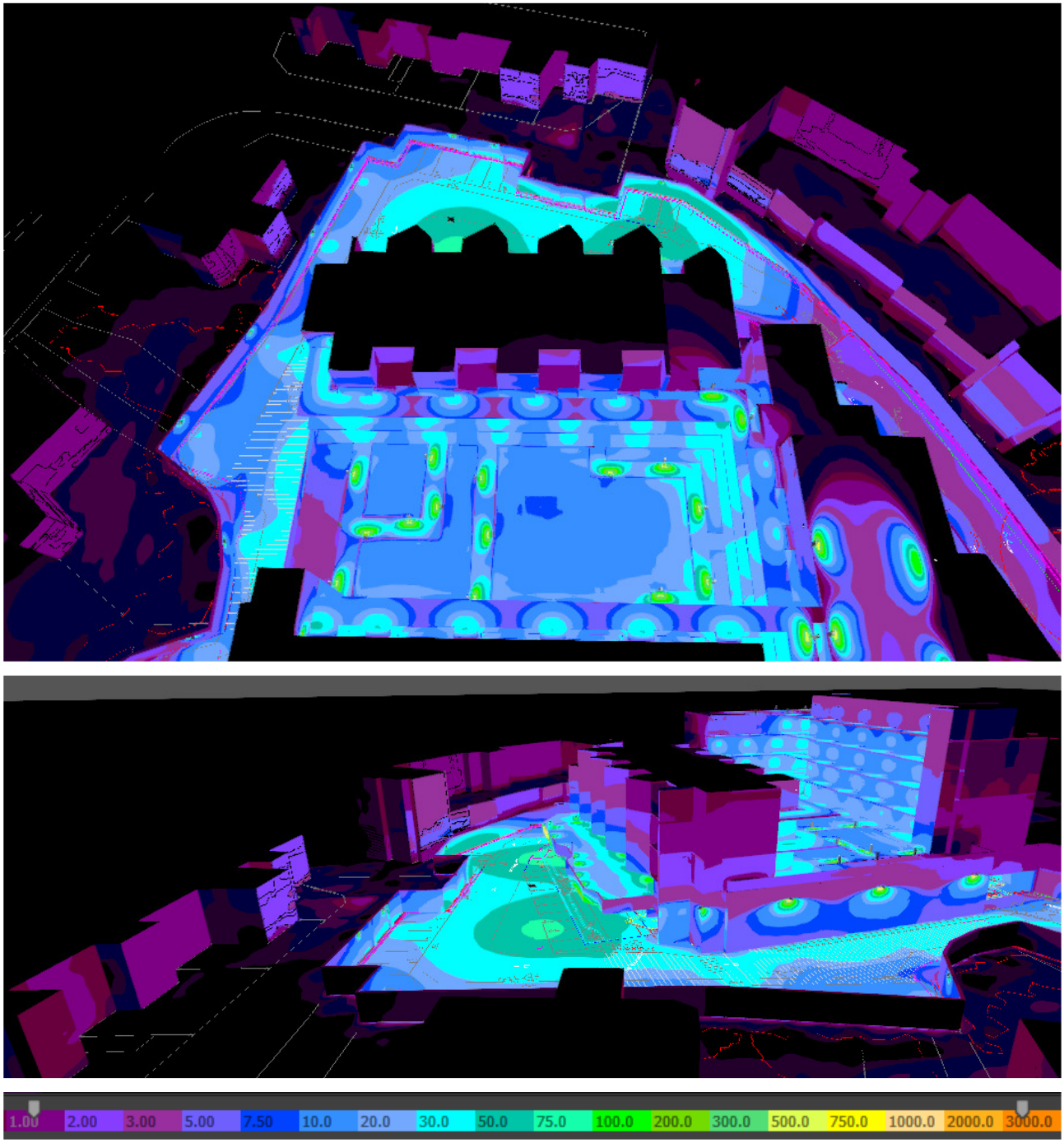


Post-Curfew – Emax 1.1lux

Lighting levels under max limits for pre & post curfew to neighboring property at location D above.

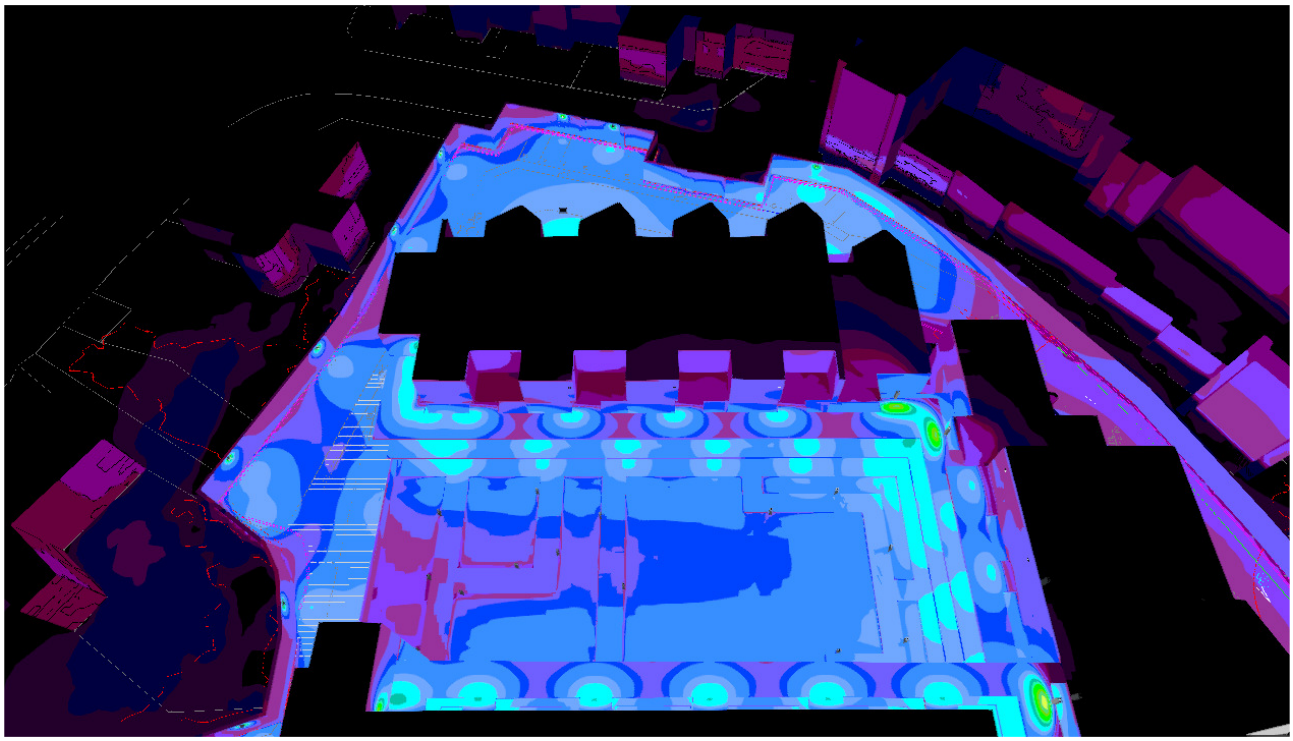
Pre-Curfew

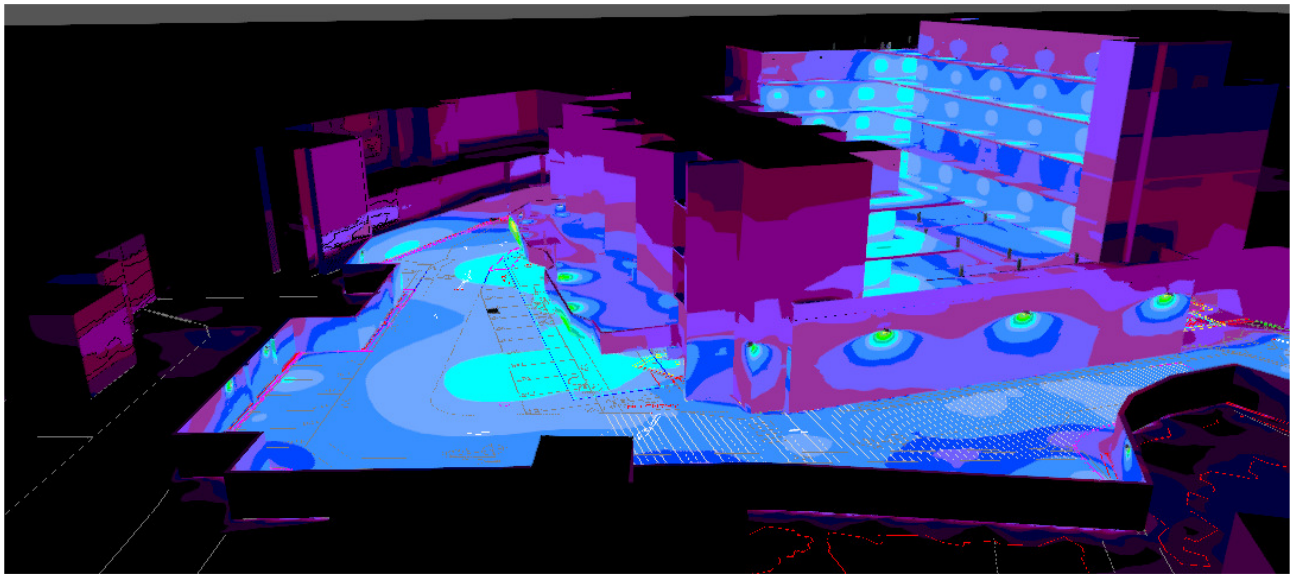
- All external lighting 100%

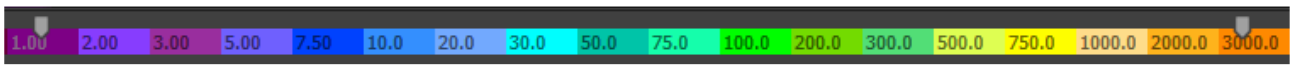


Post-Curfew

- Street lighting columns dimmed to 50%
- Internal carpark lighting controlled via PIR dimmed 10%
- External courtyard lighting turned off







4.0 CONCLUSION

The proposed lighting layout will comply all the required design criteria with some modification/shielding to existing lamp standard as noted above. Dialux calculations indicate that there will be no light pollution on surrounding properties. The upward light is kept to a minimum but is well below the 15% maximum for an E3 environment. The proposed layout offers lighting resulting in an aesthetically pleasing environment for occupants.