



Dice

Environmental

Artificial Lighting Assessment

Land East of Chickenhall Lane, Eastleigh
Artificial Lighting Impact Assessment

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Executive Summary

Dice Environmental were commissioned by Highwood Ventures 7 Limited to undertake an Artificial Lighting Impact Assessment in support of a full planning application being made to Eastleigh Borough Council (EBC) relating to land east of Chickenhall Lane, Eastleigh.

The proposals comprise for full planning application for a proposed 70-bed care home (Use Class C2), associated parking, landscaping, access, drainage, and other associated works following demolition of existing structures.

As part of the proposed development a number of artificial lights will be installed across the site for various uses including street lighting, security lighting and decorative lighting. Subsequently, there is potential for the proposals to cause impacts at nearby sensitive receptors as a result of the proposed artificial lighting. An Artificial Lighting Impact Assessment is therefore required in order to determine baseline conditions at the site, assess site suitability for the proposed end-use and assess the potential impacts as a result of the proposed development.

Modelling was undertaken in order to predict impacts associated with changes in lighting levels at sensitive locations across the site.

The modelling results indicated that there are no exceedances of 0.5lx predicted at any of the nearby sensitive ecological receptors. Additionally all residential receptors are located at a greater distance away from the proposed development than the ecological receptors and as such lighting impacts are unlikely to occur at the nearby residential receptors.

Based on the assessment results, artificial lighting is not considered a constraint to planning consent for the proposed development.

1. Introduction

1.1. Background

Dice Environmental has been commissioned by Highwood Ventures 7 Limited to provide an Artificial Lighting Impact Assessment in support of a full planning application being made to Eastleigh Borough Council (EBC) relating to land east of Chickenhall Lane, Eastleigh, to be referred to hereafter as the “site”.

The site is located in Eastleigh and is identified as a potential site for development.

The Proposed Development is located at Chickenhall Lane, Eastleigh at approximate National Grid Reference (NGR) 446200, 119100. Reference should be made to Figure 1 within Appendix I for a location plan.

The proposals comprise for a proposed 70-bed care home (Use Class C2), associated parking, landscaping, access, drainage, and other associated works following demolition of existing structures.

As part of the proposal, a number of artificial lights will be introduced in close proximity to a number of existing residential and ecological sensitive receptors. Subsequently, the Proposed Development has the potential to cause impacts at nearby sensitive receptor locations as a result of light spill during the operational phase.

An Artificial Lighting Impact Assessment is therefore required to quantify baseline conditions, consider the suitability of the site for the proposed end-use and assess potential impacts as a result of the development. This is detailed in the following report..

1.2. Limitations

All limitations of this report are presented in Appendix I.

1.3. Confidentiality

Dice Environmental has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed.

2. Legislation, Guidance and Policy

The following legislation, guidance and policy will be considered and adhered to during the preparation of the Lighting Impact Assessment:

- The National Planning Policy Framework (NPPF), updated on 20th December 2023
- The National Planning Practice Guidance (NPPG), relevant chapters updated on 1st November 2019
- Clean Neighbourhoods and Environmental Act
- Guidance Notes for the Reduction of Obtrusive Light, Institution of Lighting Professionals, 2021
- Lighting in the Countryside: Towards Good Practice, Department for Communities and Local Government, 2005
- Bats and Artificial Lighting in the UK, Institute of Lighting Professionals, BATS Conservation Trust Lighting Guidance, 2008
- Environmental Protection Act, 1990

2.1. Local Planning Policy

The Eastleigh Borough Council (EBC) Local Plan¹ was adopted in April 2022 and outlines the following policy in relation to artificial lighting.

"Policy DM8, Pollution

1. Development will not be permitted if it is likely to cause loss of amenity or impact on public health or other unacceptable environmental impacts through:

- a. air pollution (including odours or particulate emissions);*
- b. pollution of surface, underground, coastal waters or other watercourses;*
- c. noise or vibration;*
- d. light intrusion, both generally and with respect to the South Downs National Park's status as an International Dark Night Skies reserve; or***
- e. land contamination.*

2. Development susceptible to particular forms of pollution will not be permitted:

- a. where it will be adversely affected by such pollution, unless measures can be taken that adequately mitigate the polluting effects; or*
- b. where it would inhibit existing economic or other activities giving rise to acceptable polluting effects.*

3. Where a development site is known or suspected to be contaminated, before the site is developed the Borough Council will require the contamination to be remediated to a standard where as a

¹ Eastleigh Borough Local Plan (2016-2036): Adopted April 2022 (<https://www.eastleigh.gov.uk/media/11806/to-be-published-final-local-plan-april-2022-v4.pdf>)

minimum it cannot be defined as 'contaminated land' under Part IIA of the Environmental Protection Act 1990."

"Policy DM14, Parking

1. New residential development will be required to provide off-highway parking which is adequate in terms of highway safety/traffic management. Provision will take account of the adopted Eastleigh Borough Council's Residential Parking Standards SPD which sets out minimum requirements for parking provision. Over provision relative to car ownership levels or which would create an ineffective use of space will be avoided. Applications with parking levels which deviate away from the expected standard should be substantiated by robust evidence contained within the transport statement/assessment/travel plan.
2. For out-of-centre development proposals, parking needs will be assessed based on the impacts of the development on neighbouring town, district or local centre or a neighbourhood parade.
3. Within town, district and local centres and in neighbourhood parades, parking needs will be assessed in relation to wider needs within the centre/parade. Where existing provision is inadequate, the provision of additional parking may be permitted subject to a financial contribution towards measures to assist on-street parking management, public transport, cycling and walking.
4. Proposals to provide new car parks, extend existing car parks or provide workplace park and ride facilities will be permitted if:
 - a. it can be demonstrated that this is the only way the transport requirements driving the proposals for car parking provision can be met;
 - b. the proposals form part of a strategy aimed at managing use of the private car, such as a workplace travel plan; and
 - c. transport and other environmental assessments demonstrate that the benefits of the proposal (e.g. reduction of on-street parking pressures, reduction of traffic congestion) outweigh any adverse effects; and
 - d. the design, layout, planting and landscaping and lighting provision addresses visual and landscape impacts, noise, lighting and impacts on residential amenity; and**
 - e. the developer pays for any off-site highway improvements necessary from traffic generated by the proposal, and any additional works necessitated by an inability to meet workplace travel plan targets; and
 - f. for sites outside the urban edge and in accordance with other policies in the Plan, they are subject to a sequential approach prioritising sites within the urban edge. Proposals in settlement gaps will only be acceptable in exceptional cases (see strategic policy S6)."

Reference has been made to these policies by assessing impacts on existing sensitive receptors as a result of the proposals as well as assessing the suitability of the site for the proposed end use in regard to amenity.

3. Methodology

The Artificial Lighting Impact Assessment included the production of a computational model of the development and an evaluation of associated impacts. This included assessment of light trespass at ecological receptor locations.

In order to assess the potential impacts of proposed artificial lighting in the area, a model of assumed lighting design, has been constructed using the Relux Lighting Software (V2024.1.12.0). The calculations performed within the assessment assumed the worst-case effect of the proposed development lighting on existing receptors.

The methodology for each element of the assessment is outlined in the following subsections.

3.1. Baseline

Existing lighting conditions in the vicinity of the development site were identified in order to provide a reference for assessment. The Lighting in the Countryside document states the following items should be considered during the determination of baseline:

- A review of the area and landscape together with any designations;
- An overview of existing lighting;
- Identification of potential receptors; and
- Environmental Zone Classification.

The Institution of Lighting Professionals (ILP) has developed an Environmental Zone classification system for the categorisation of assessment locations. This is summarised in Table 1.

Table 1: Environmental Zone Classification

Category	Description	Examples
E0	Dark landscapes	UNESCO Starlight Reserves and IDA Dark Sky Parks
E1	Intrinsically dark landscapes	National Parks, Areas of Outstanding National Beauty, etc
E2	Low district brightness areas	Village or relatively dark outer suburban locations
E3	Medium district brightness	Small town centres or suburban locations
E4	High district brightness areas	Town/city centres with high levels of night-time activity

The criteria shown in Table 1 were utilised to determine the most appropriate Environmental Zone for the development location.

3.2. Impact Significance

The development was assessed for the disturbance and/or nuisance to nearby existing ecological receptors due to artificial lighting.

Light trespass was considered for the relevant Environmental Zone, as previously outlined in Table 1. Obtrusive light limitations for exterior lighting installations, relevant to this assessment, have been determined by the ILP. These are summarised in Table 2:

Table 2: Obtrusive Light Limitations for Exterior Lighting Installations

Environmental Zones	Light Trespass (into Windows) E_v (lux) ^(a)		Maximum Luminous Intensity (cd)		Maximum Building Luminance (cd/m ²)
	Pre-Curfew	Post-Curfew ^(b)	Pre-Curfew	Post-Curfew ^(b)	
E0	0	0	0	0	0
E1	2	1 ^(b)	2500	0	0
E2	5	1	7500	500	5
E3	10	2	10000	1000	10
E4	25	5	25000	2500	25

NOTE: (a) Vertical Illuminance measured flat at the glazing at the centre of the window.

(b) From public road lighting installations only.

The criteria in Table 2 were utilised to determine the potential for adverse impacts of light trespass at sensitive locations across the development.

3.3. Lighting Classes

All selection procedures and parameters present within the assessment are assessed using guidelines outlined within CEN TR 13201-1 2014 "Road lighting - Part 1: Guidelines on selection of lighting classes".

The assessment of classes is based upon the inherit speeds of proposed or existing highway networks and vehicle use. For lighting classes M and C typical road designations range from motorways (very high, >100km/h) to urban roads. Whereas lighting class P is considered for a range of low speeds roads (<40km/h) to pedestrianised paths and cycle routes.

The adaptive lighting level(s) should maintain average luminance or illuminance in line with lighting limits established in BS EN 13201-2:2015 "Road lighting – Part 2: Performance requirements" of the selected M, C or P classes.

4. Baseline

Existing lighting conditions in the vicinity of the proposed development site were identified in order to provide a baseline for assessment. These are detailed in the following sections.

4.1. Existing Lighting Environment

4.1.1. Surrounding Area

The surrounding area has a mix of uses. To the north are the Bishopstoke Road Playing Fields and The Hub, also the home of Eastleigh Rugby Club and the Youth Options youth club. To the east of the site is the River Barton a tributary of the River Itchen which is both a Site of Special Scientific Interest and a Special Area of Conservation. Beyond the river to the east is the Youth Options outdoor learning centre. To the northwest is a tall building containing offices of Abri and other employment buildings. Beyond are residences in Dutton Lane further to the northwest. West of the site are industrial, warehouse and other employment and business uses at Barton Farm and Barton Park Industrial Estates, accessed off of Chickenhall Lane.

4.1.2. Environmental Zone

The Surrounding area is classified as category E3 medium district brightness “Small town centres or suburban locations.”.

4.2. Road Lighting Classification

The development is proposed to be a residential care home with an associated car park with a total of 24 car parking spaces. As such Class P (for pedestrian and low speed areas) has been utilised to determine the level of artificial light required for the internal road system.

Table 3: Parameters for the Selection of Lighting Class P

Parameter	Option	Description	Weighting Value
Travel Speed	Very low (walking speed)	Very low, walking speed	0
Use Intensity	Quiet		-1
Traffic Composition	Pedestrians, cyclists and motorised traffic		2
Parked Vehicles	Present		1
Ambient Luminosity	Moderate	Normal situation	0
Total			2

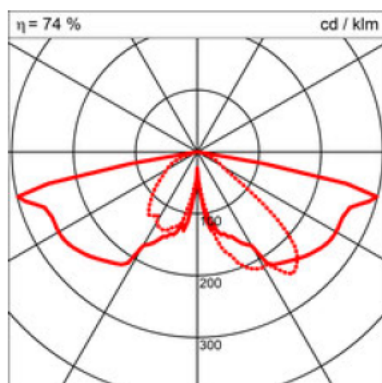
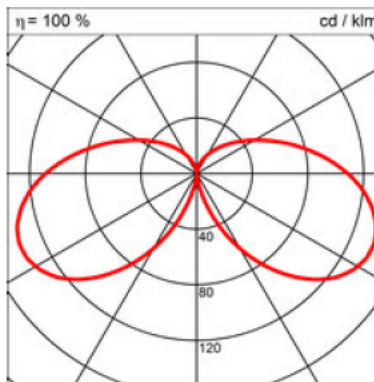
As such a class of P4 has been used for the assessment of the lighting requirements for the internal road network.

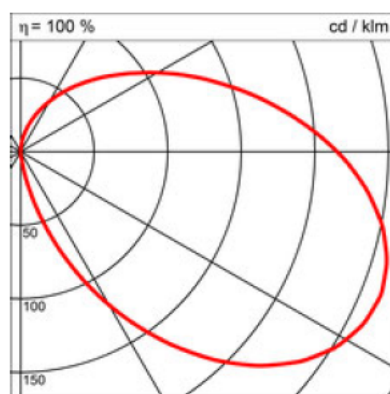
4.3. Proposed Artificial Lighting

Based on the finding of the previous sections, a selection of luminaires have been indicated which allow for adequate illuminance across the road/ parking network. Table 4 indicates the proposed forms of artificial light which will be utilised across the proposed development including luminaires which will be installed around the site to provide security and ease of access for future users.

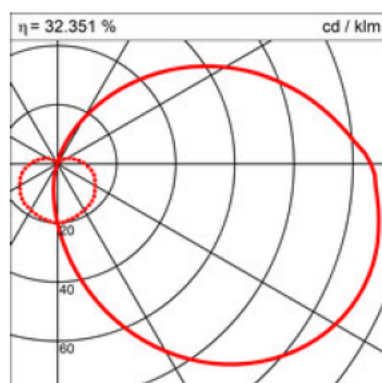
The products specified within Table 4 are examples which are used to determine the required specifications which the final products should mirror. It should be noted that all products will maintain a colour temperature of 2700K to minimise impacts at surrounding ecological receptors

Table 4: Proposed Artificial Lighting

Luminaire	Luminaire Data	LDC
1. Philips - Jargeau LED gen3-BDP651 FG T15_827		
	LiTG Class	A30
	CIE Flux Codes	33 70 96 100 74
	Efficiency	74 %
	System Power	12.8 W
	Luminaire Output	80.9 lm/W
	System Light Flux	1036 lm
	Protection Class	-
	Protection Degree	IP 66
		
2. ESYLUX - ALVA BL-EL10820441		
	LiTG Class	B11
	CIE Flux Codes	13 40 72 68 100
	Efficiency	Absolute Photometry
	System Power	17 W
	Luminaire Output	60.6 lm/W
	System Light Flux	1030 lm
	Protection Class	Protection Class I
	Protection Degree	IP 65
		
3. ESYLUX - ALVA BL-EL10820601		

	LiTG Class	B11	
	CIE Flux Codes	13 40 71 65 104	
	Efficiency	104.2%	
	System Power	16 W	
	Luminaire Output	49.5 lm/W	
	System Light Flux	792 lm	
	Protection Class	Protection Class I	
	Protection Degree	IP 65	

| 4. Ansell - BULKHEADS - Vision 3 HP LED-AVILED/HP/GR/M3+Sld_Eyld | | | |

	LiTG Class	B11	
	CIE Flux Codes	20 46 74 65 32	
	Efficiency	32.3 %	
	System Power	31 W	
	Luminaire Output	38.1 lm/W	
	System Light Flux	1180 lm	
	Protection Class	Protection Class I	
	Protection Degree	IP 65	

The proposed Luminaire 1 as detailed in Table 4 is to be located at a height of 4m (or as close as practically possible) near to the entrance and exit points, and at a height of 5m around the carpark, as displayed in Figure 3. These will provide sufficient light to for future users to access the buildings without the need of additional lighting, it will also provide a level of security. These luminaires should be attached to outdoor light sensors to ensure they are switched on when it gets dark or alternatively, synced up to the nearby existing street lighting schedule.

The proposed Luminaire 2 as detailed in Table 4 is a bollard luminaire to be located around the site, alongside the walkway and communal gardens as shown in Figure 3. The purpose of these Luminaires are to light the foot paths and allow for easy navigation around the site for future users. As with Luminaire 1, these luminaires should be attached to outdoor light sensors to ensure they are switched on when it gets dark or alternatively scheduled on timers for when needed. Furthermore, Luminaire 3 is a similar type of bollard luminaire, but with a 180o directional light pattern (as opposed to the 360o directional light cast from Luminaire 2). This Luminaire has been chosen to protect the nearby ecological receptor and direct the light away from the tree line and onto the path. Luminaire 3 should be treated as Luminaire 1 and attached to either a light sensor or a timer.

The proposed Luminaire 4 as detailed in Table 4 is to be located along the faces of the building as shown in Figure 3 at a height of 1.8m (or as close as practically possible). These luminaires are present to illuminate the building and surrounding footpaths for safety and security. As with the previous luminaires, these luminaires should be attached to outdoor light sensors to ensure they are turned on when it is dark, or attached to timers, scheduled to turn off and on at set points.

4.4. Sensitive Receptors

A sensitive ecological receptor is defined as any ecological area which may be affected by changes in lux levels as a result of a development. Similarly, a residential receptor is a residential unit which may also be affected. As the ecological receptors are acceptable, it can be confirmed that the residential units at a greater distance will also be acceptable. As such, further mention of residential receptors has been omitted from this report.

4.5. Operational Phase Sensitive Receptors

A desk-top study was undertaken in order to identify any sensitive ecological or residential receptor locations in the vicinity of the site that require specific consideration during the assessment and are summarised in Table 5.

Table 5: Sensitive Receptor Locations

Sensitive Receptor	NGR (m)	
	X	Y
Ecological (Eco) 1	446240	119150
Ecological (Eco) 2	446170	119150

Eco 1 from Table 5, is the River Itchen which is both a Site of Special Scientific Interest and a Special Area of Conservation. Eco 2 is an area of land and trees within the site boundary, adjacent to the river, that is a sensitive corridor not just for bats, that needs to be protected from artificial lighting impacts.

The sensitive receptors identified in Table 5 represent worst-case locations. However, this is not an exhaustive list and there may be other locations within the vicinity of the site that may experience artificial lighting impacts as a result of the proposed development that have not been individually identified above.

Reference should be made to Figure 5 within Appendix I for a graphical representation of operational phase artificial lighting sensitive ecological receptor locations..

5. Assessment

There is the potential for artificial lighting impacts on residential and ecological receptors as a result of the operation of the Proposed Development. These are assessed in the following Sections.

5.1. Operational Phase Assessments

Additional artificial lighting associated with the operation of the proposed development has the potential to impact upon ecological receptors either from direct light or light spill. An assessment was therefore undertaken using dispersion modelling in order to quantify potential lux levels at sensitive ecological locations in the vicinity of the site. It should be noted that all residential receptors are at a greater distance from the site than the ecological receptors and as such would only need to be assessed where exceedances are experienced at the ecological locations.

Predicted lux levels across the nearby ecological receptors are summarised in Table 6. Exceedances of 0.5lx are highlighted in **bold**.

Table 6: Modelling Results – Lux Levels

Sensitive Receptor	Minimum Lux Levels	Maximum Lux Levels	Average Lux Levels
Eco 1	0.00	0.06	0.06
Eco 2	0.01	0.50	0.06

The predicted concentrations shown in Table 6 indicate that there were no exceedances of 0.5lx at any of the sensitive receptor locations. As such it is considered that these locations do not require the implementation of any further mitigation measures to protect local ecology or residential amenity. Predicted lux levels across the site are shown in Figures 4 & 5.

It should also be noted that all luminaire on site have been modelled at 2700k to reflect the proposed reduced impact at local ecological receptors. Based on the above results of the lighting impact assessment and worse case assumptions used, the site is not considered to significantly impact on sensitive ecological or residential receptors within and along the site boundary. As such artificial lighting impacts from the development are not considered to require any further mitigation and should not be considered a constraint to planning.

6. Best Practice Measures

The model takes into account an amount of best practice measures to ensure artificial lighting impacts at ecological and residential receptors are not significant. The following best practice measures have been included within this assessment and should be implemented as much as practically possible during construction and operational phases in order to keep lighting levels at sensitive ecological designation below the ILP criteria and away from residential units.

Measure to include:

- The use of luminaires that lack UV elements;
- LED luminaires are used due to their sharp cut-off, lower intensity, good colour rendition and dimming capability;
- A warm white spectrum (ideally <2700Kelvin) has been adopted and luminaires should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats;
- Internal luminaires should be recessed in proximity to windows to reduce light spill;
- Column heights of 6m on street lighting should be installed to minimise light spill;
- Only luminaires with an upward light ratio of 0% and with good optical control should be used;
- Any external security lighting should be set on motion-sensors and 1 minute timers.

It should be noted that a number of these considerations may also have financial and environmental benefits to the future residence as a result of reduced electricity usage.

There are a number of additional best practice measures that can be implemented to help further reduce impacts at ecological designations.

- Provide information booklets to future residents to provide information on the local ecosystem and actions they can do/avoid to promote sustainable coexistence.
- Accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only to where it is needed in the event that further lighting is installed.

7. Conclusion

Dice Environmental has been commissioned by Highwood Ventures 7 Limited to provide an Artificial Lighting Impact Assessment in support of a full planning application being made to Eastleigh Borough Council (EBC) relating to land east of Chickenhall Lane, Eastleigh.

Modelling was undertaken in order to predict impacts associated with changes in artificial lighting levels at sensitive ecological and residential locations within and along the site boundary.

The modelling results indicated that there are no exceedances of 0.5lx predicted at any of the nearby sensitive ecological receptors. Additionally all residential receptors are located at a greater distance away from the proposed development than the ecological receptors and as such lighting impacts are unlikely to occur at the nearby residential receptors..

Based on the assessment results, artificial lighting is not considered a constraint to planning consent for the proposed development.

Appendix I – Limitations

1. This report and its findings should be considered in relation to the terms of reference and objectives agreed between Dice Environmental and the Client as indicated in Section 1.2.
2. The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.
3. Dice Environmental cannot be held responsible for any use of the report or its contents for any purpose other than that for which it was prepared. The copyright in this report and other plans and documents prepared by Dice Environmental is owned by them and no such plans or documents may be reproduced, published or adapted without written consent. Complete copies of this may, however, be made and distributed by the client as is expected in dealing with matters related to its commission. Should the client pass copies of the report to other parties for information, the whole report should be copied, but no professional liability or warranties shall be extended to other parties by Dice Environmental in this connection without their explicit written agreement there to by Dice Environmental.

Appendix II – Glossary of Acoustic Terminology

Table A1: Terminology

Descriptor	Explanation
EBC	Eastleigh Borough Council
ILP	Institution of Lighting Professionals
NGR	National Grid Reference
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance

Appendix III – Figures



Figure 1: Site Location and Context



Figure 2: Sensitive Receptor Locations



Figure 3: Luminaire Locations

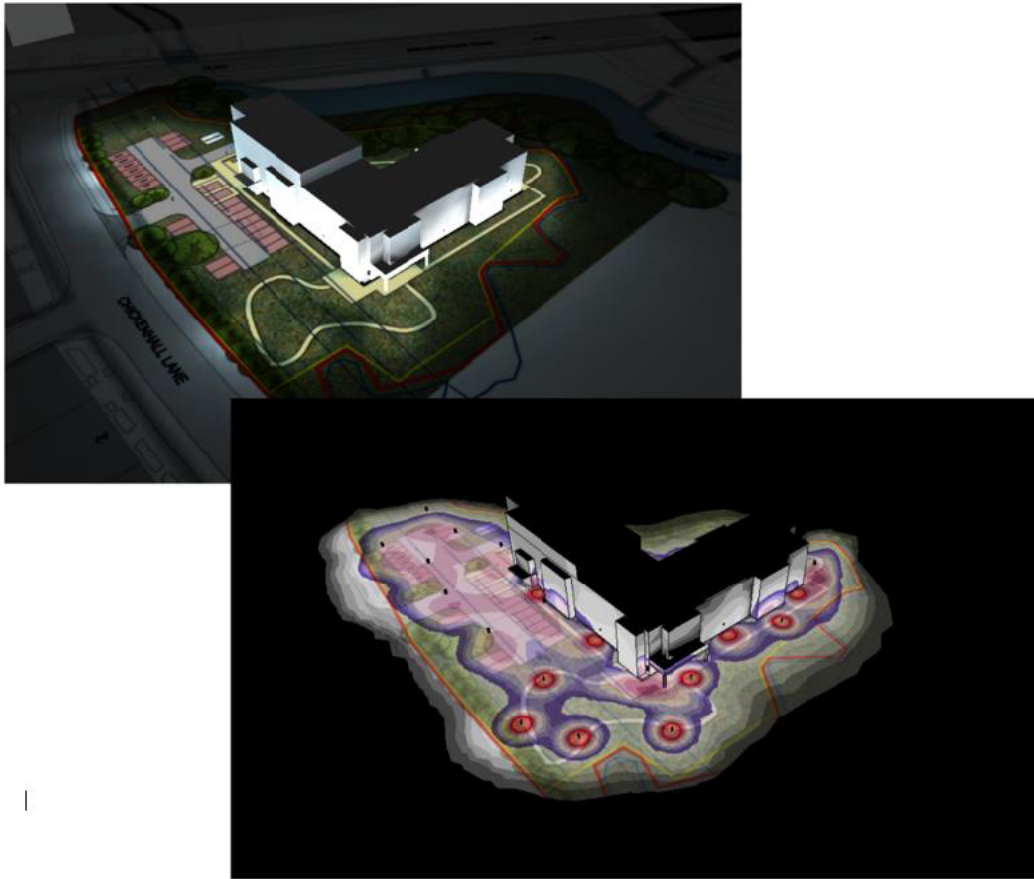


Figure 4: Predicted Lux Level (0m) West and South Faces

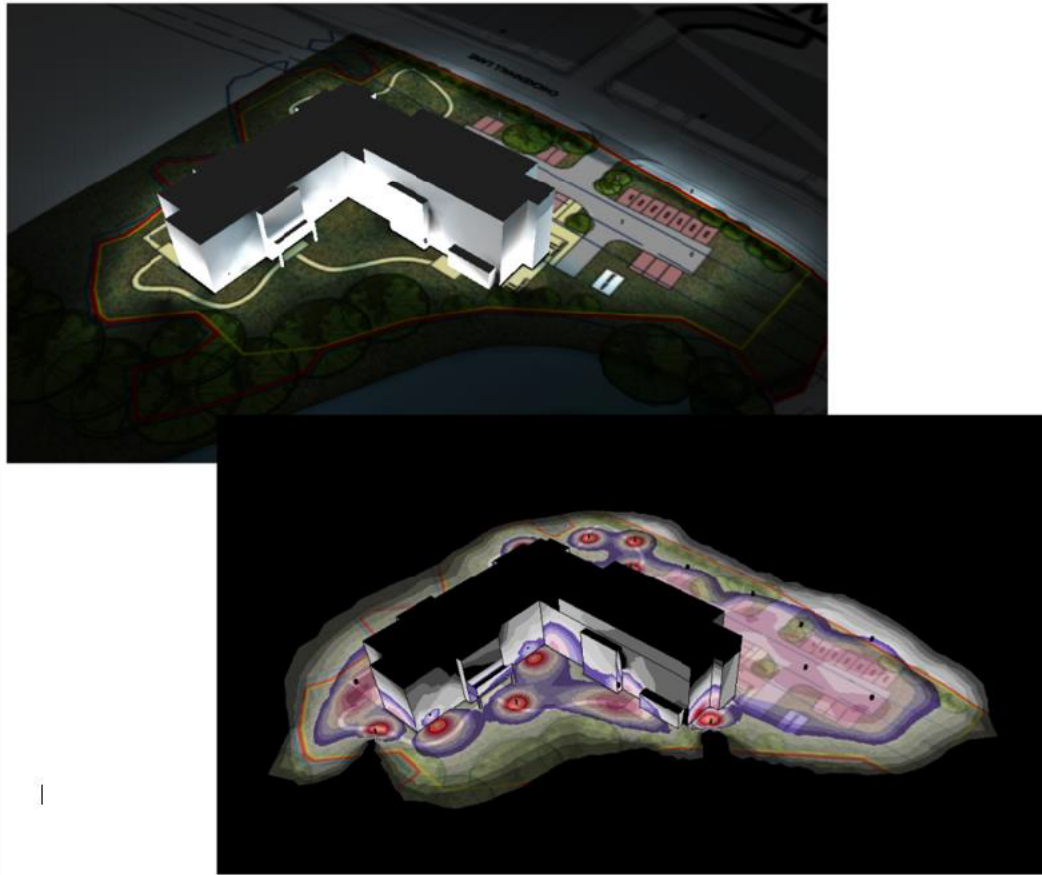


Figure 5: Predicted Lux Level (0m) North and East Faces

Appendix IV – Parts List

Luminaire No	ID	Company	Product Name	X	Y	Z (m)	Directional Angle
1	1	Philips	Jargeau LED gen3	446142.45	119133.05	5	297
1	2	Philips	Jargeau LED gen4	446151.50	119145.20	5	173
1	3	Philips	Jargeau LED gen5	446151.85	119124.55	5	298
1	4	Philips	Jargeau LED gen6	446155.10	119112.85	5	343
1	5	Philips	Jargeau LED gen7	446157.45	119134.65	5	124
1	6	Philips	Jargeau LED gen8	446162.30	119099.40	5	283
1	7	Philips	Jargeau LED gen9	446166.45	119127.00	5	90
1	8	Philips	Jargeau LED gen10	446173.10	119105.60	5	120
1	9	Philips	Jargeau LED gen11	446187.80	119125.00	4	316
1	10	Philips	Jargeau LED gen12	446187.85	119084.10	4	152
1	11	Philips	Jargeau LED gen13	446228.00	119106.55	4	243
2	12	ESYLUX	ALVA BL 940/170 OP 360° 800 830 MD IR DALI AN	446165.60	119079.55	-	-
2	13	ESYLUX	ALVA BL 940/170 OP 360° 800 830 MD IR DALI AN	446170.55	119089.20	-	-
2	14	ESYLUX	ALVA BL 940/170 OP 360° 800 830 MD IR DALI AN	446174.40	119074.30	-	-
2	15	ESYLUX	ALVA BL 940/170 OP 360° 800 830 MD IR DALI AN	446189.25	119072.15	-	-
2	16	ESYLUX	ALVA BL 940/170 OP 360° 800 830 MD IR DALI AN	446195.70	119083.50	-	-
2	17	ESYLUX	ALVA BL 940/170 OP 360° 800 830 MD IR DALI AN	446204.10	119118.70	-	-
2	18	ESYLUX	ALVA BL 940/170 OP 360° 800 830 MD IR DALI AN	446216.50	119094.25	-	-
3	19	ESYLUX	ALVA BL 940/170 TR 180° 600 830 AN	446175.95	119136.25	-	207
3	20	ESYLUX	ALVA BL 940/170 TR 180° 600 830 AN	446227.05	119116.30	-	188
4	21	Ansell	BULKHEADS - Vision 3 High Output	446173.45	119114.97	1.8	-
4	22	Ansell	BULKHEADS - Vision 3 High Output	446182.15	119098.07	1.8	-
4	23	Ansell	BULKHEADS - Vision 3 High Output	446198.52	119107.60	1.8	-
4	24	Ansell	BULKHEADS - Vision 3 High Output	446204.93	119094.15	1.8	-
4	25	Ansell	BULKHEADS - Vision 3 High Output	446218.02	119117.70	1.8	-
4	26	Ansell	BULKHEADS - Vision 3 High Output	446222.03	119103.00	1.8	-