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Client
Mr Pallab Sengupta

Project
Lighting Design at Gold Street winery, Cobham

Rev

Date 14 June 2024

Background

Work by Here is working on behalf of their client Cobham House Vineyard to develop a new winery building at Gold Street, Cobham, DA12 3AA.

The application site is in an AONB which is within the Kent Downs National Landscape. This type of location places strict limits on light spill and the avoidance of skyglow. The proposed site is also on a hill and visible from a distance.

The external area includes hard standings and turning areas for agricultural buildings.

For these reasons, a sensitive external lighting design is required which satisfies the Health and Safety requirements for staff whilst minimising any visual impact on the landscape.

Alan Tulla Lighting is an independent lighting consultancy specialising in the exterior environment and has been asked to provide a fee proposal addressing these issues.

Executive Summary

We recommend that the rooflights are fitted with automatic blackout blinds which operate when darkness falls. This will ensure that they are not seen from distant viewpoints and will not contribute any upward light.

All the lights on all the building faces are controlled by movement sensors. Therefore, the lighting is OFF except when required for the safe movement of staff.

The east, south and west faces have hard standings which are used by agricultural vehicles. These are illuminated to the recommendations in the H&S workplace standard BS EN 12464-2.

The north face is only used by pedestrians and is lit to a lower level of illumination. Again, it is controlled by movement sensors and will be OFF during most periods of darkness.

Alan Tulla, FSLL, FILP, is a Fellow and Past President of the Society of Light and Lighting and has been awarded the CIBSE/SLL Lighting Diploma. He is also a Fellow of the Institution of Lighting Professionals, ILP and lectures for them on the topic of exterior and amenity lighting. He is author of the Society of Light and Lighting "Guide to the Exterior Environment", LG06.

Exterior lighting design

We are not aware of any ecologically sensitive areas which require special treatment.

Our design is based on the Courtald & Co Architects drawings 26 January 2024.

Due to its location, we assume that the site is classified as an E1 Environmental Zone. This is described by the Institution of Lighting Professionals, ILP, as a "*Natural, Dark, relatively uninhabited rural areas, National Parks, Areas of Outstanding Natural Beauty, IDA buffer zones".*

The E1 classification determines that there should be no upward light emitted directly by the luminaires. The luminaires used in our design meet this criterion. Datasheets for the luminaires used are shown at the end of this report.

This environmental requirement has to be balanced with the Health and Safety of staff working after dark. This particularly applies in the winter months when there may be no daylight in the late afternoon, approximately 16.00 hrs.

In terms of the illumination levels required by the workplace regulations BS EN 12464-2, we understand that the main activities carried out after dark will be tractors turning and unloading grapes. Staff will also park their vehicles on the hard standings.

There are two recommendations that apply. Table 5.7.1 "*Short term handling of large units and raw materials, loading and unloading of solid bulk goods".* This Table specifies an average of 20 lux with a uniformity of 25% Min/Ave on the working area at ground level. Another Table in BS EN 12464-2 which could apply is *"5.5.1 Farmyards".* This also specifies 20 lux but with 10% uniformity.

Our design achieves 20 lux, or more, on the hardstanding areas.

The west, south and east faces have hard standings of various dimensions. None of these areas extends more than 11m from the winery building.

The north face will only be used for pedestrian access. However, it will also be used as the emergency exit route for staff leaving the building. Here, we have designed a 3m wide strip of land using just three bulkhead type units mounted 3m high.

We suggest that the lighting is switched with a movement sensor so it is only ON when required.

Our calculations below show the spread of illumination (lux levels) into the surrounding areas down to 0.5 lux. This is typically the illumination level under a full moon. It is also the level below which the Bat Conservation Trust say is acceptable to bats and other nocturnal wildlife.

Windows and rooflights

Most of the glazing used on the winery building are the rooflights. For obvious reasons these do contribute any spill illumination on to the ground.

However, for periods after dark and when the building is occupied, it means that the luminous rooflights of the building could be seen from distant viewpoints. For this reason,

the UK Dark Skies Partnership recommends that rooflights should use glazing with a visible light transmission, VLT, of no more than 30%.

Note that even with 30% VLT, the rooflights would still be visible against a dark night sky. For this reason, we recommend that the rooflights are fitted with automatic blinds which switch when night falls.

There is also a vertical window on the north face. A small amount of light spills from this window but we understand that it will be obscured by dense planting.
The lux values shown are based on an indoor illumination of 200 lux and a double-glazed window with a VLT of 76% and no reduction from any planting.

The double doors on the east face are also glazed. Views of this are obscured by hedges alongside Gold Street.

These window spill calculations are shown at the end of this report.

Calculation areas.
The winery building measures approximately 40m x 15m and 6m to the eaves.

The calculations are based with all the lights (interior and exterior) on. Since all the lights are controlled by PIR movement sensors, most will be OFF for much of the time.

The calculations are “worst case” as if the land was open and without any mitigating effects from any hedges, fences etc.

All the luminaires are building mounted and are a “flat glass” type which emit no light above 90 degrees. The floodlights are mounted horizontally.

The hardstanding areas where higher levels of illumination are required extend approximately 5m – 11m from the building.

<u>East elevation</u>
This has a large hard standing approximately 11m wide and extending just 5m from the building. It is illuminated using one 45W LEDfit floodlight. This working area achieves 34 lux with 33% uniformity.

<u>South elevation</u>
This has a large hard standing approximately 11m wide and extending 8m from the building. One floodlight is sufficient to light this area to the required level. This working area achieves 26 lux with 25% uniformity.

<u>West elevation</u>
There are two hard standings on this face. They extend 5m – 8m away from the building. We have used one 45W Thorn LEDfit floodlight. Like the other floodlights, this is mounted horizontally and emits no upward light. These two working areas achieve an overall of 25 lux with 24% uniformity but note that this slightly lower value is skewed by a single small area in the SW corner of the hardstanding.

North elevation

We understand that this area is only used by pedestrians. It will also be used as an emergency exit route. We have used three DW Windsor Kirium wall mounted units at 3m to achieve 13 lux with 25% uniformity on a 3m wide strip of land.

South elevation

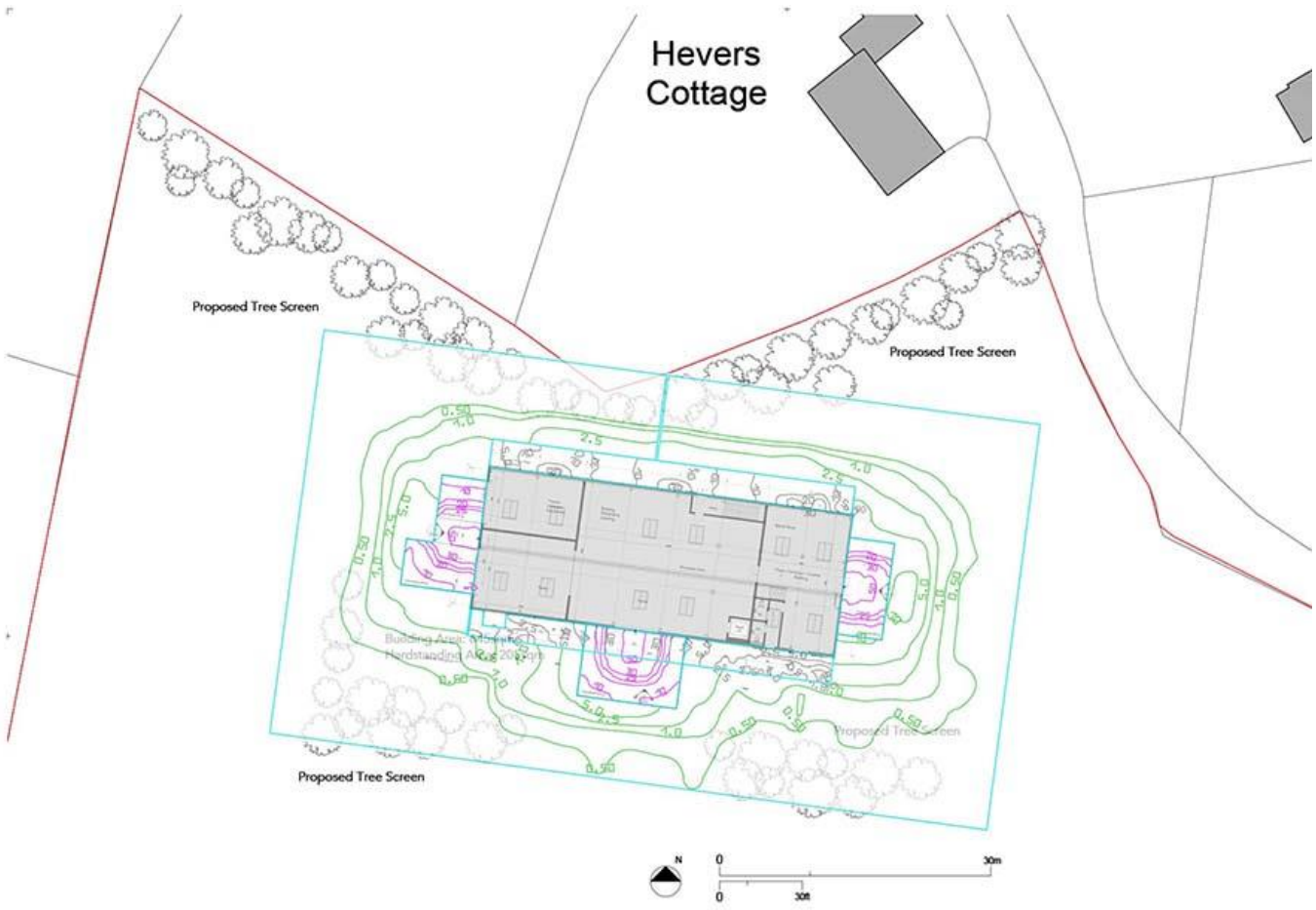
We have included for the same type of wall mounted unit and illumination as the north face. This is to ensure that pedestrians and slow-moving (<10km/hr) vehicles can safely move along the whole 40m width of the building. 3m to achieve 12 lux on a 3m wide strip of land.

Overall spill

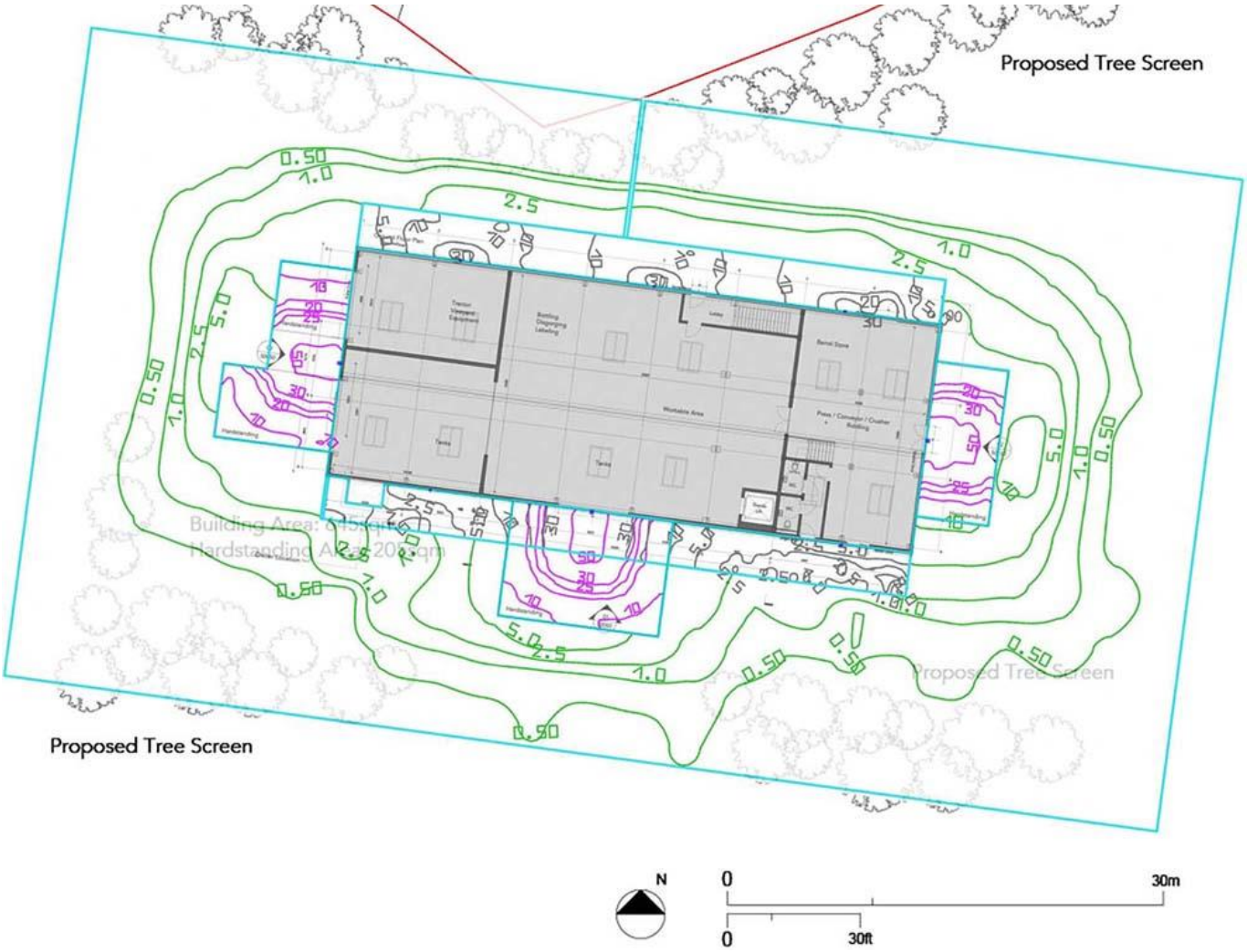
Our spill light calculations also show the spread of light down to a level of 0.5 lux which is generally taken to be the illumination from a full moon. It can be seen than this value is reached within 15m of the building even when all lights are on and at 100% output.

Hardstanding and spill calculation areas

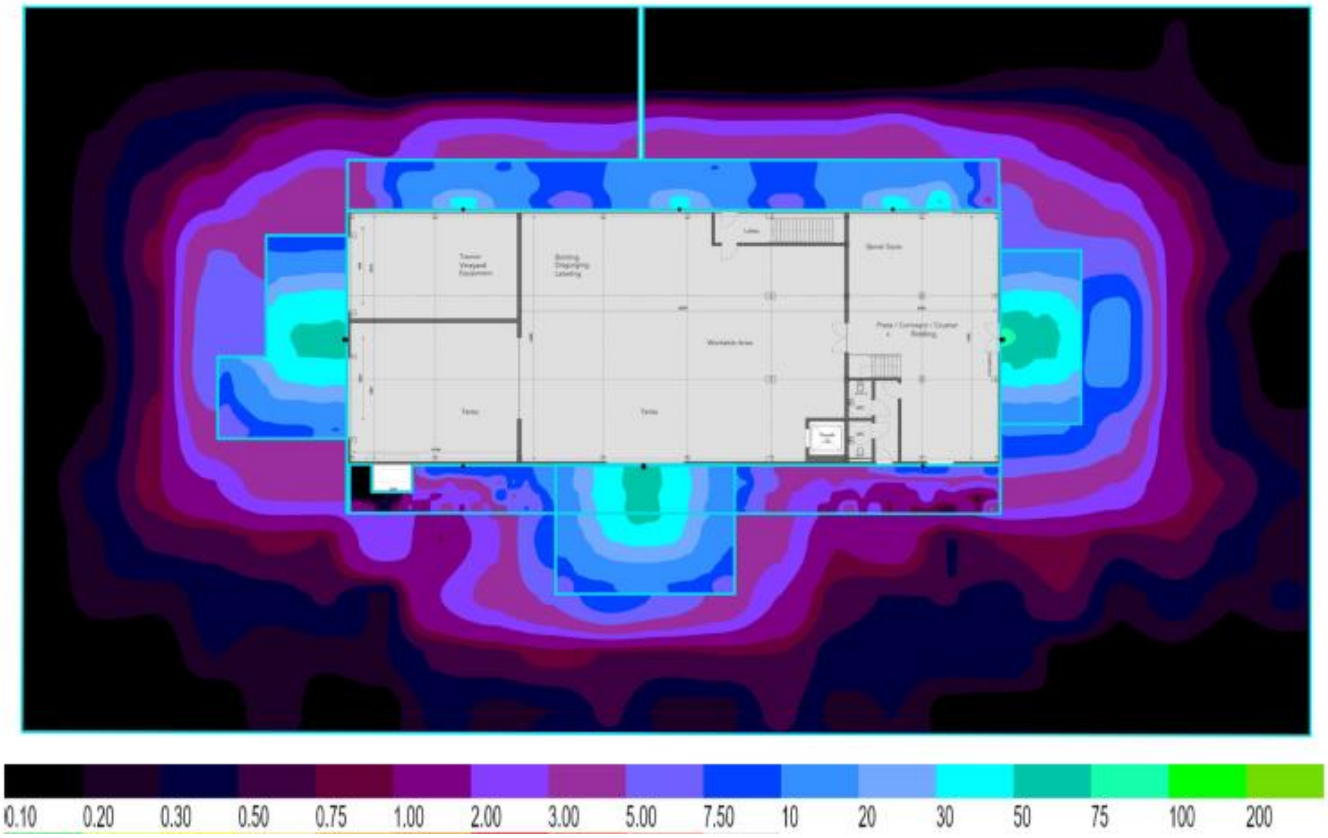
Overall site plan showing hardstanding and spill down to 0.5 lux.



Green areas are spill light. Magenta areas are hardstanding areas. A close-up is below.

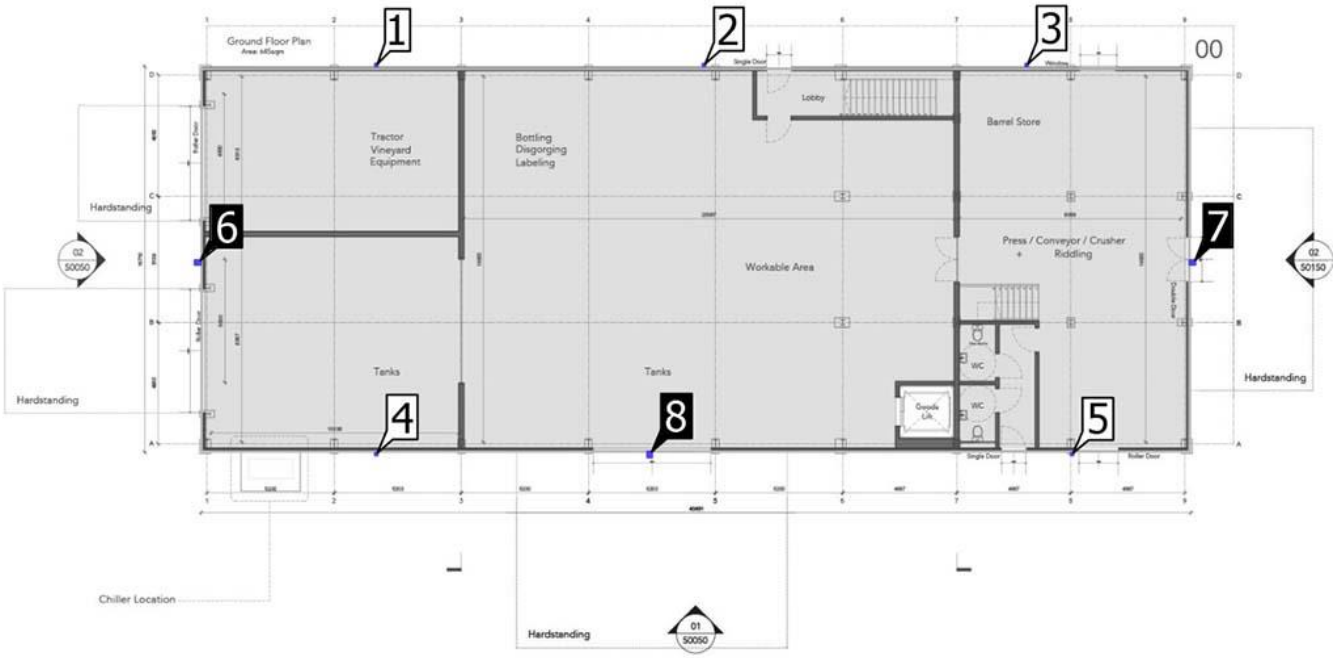


Enlarged view of above.



Lighting positions

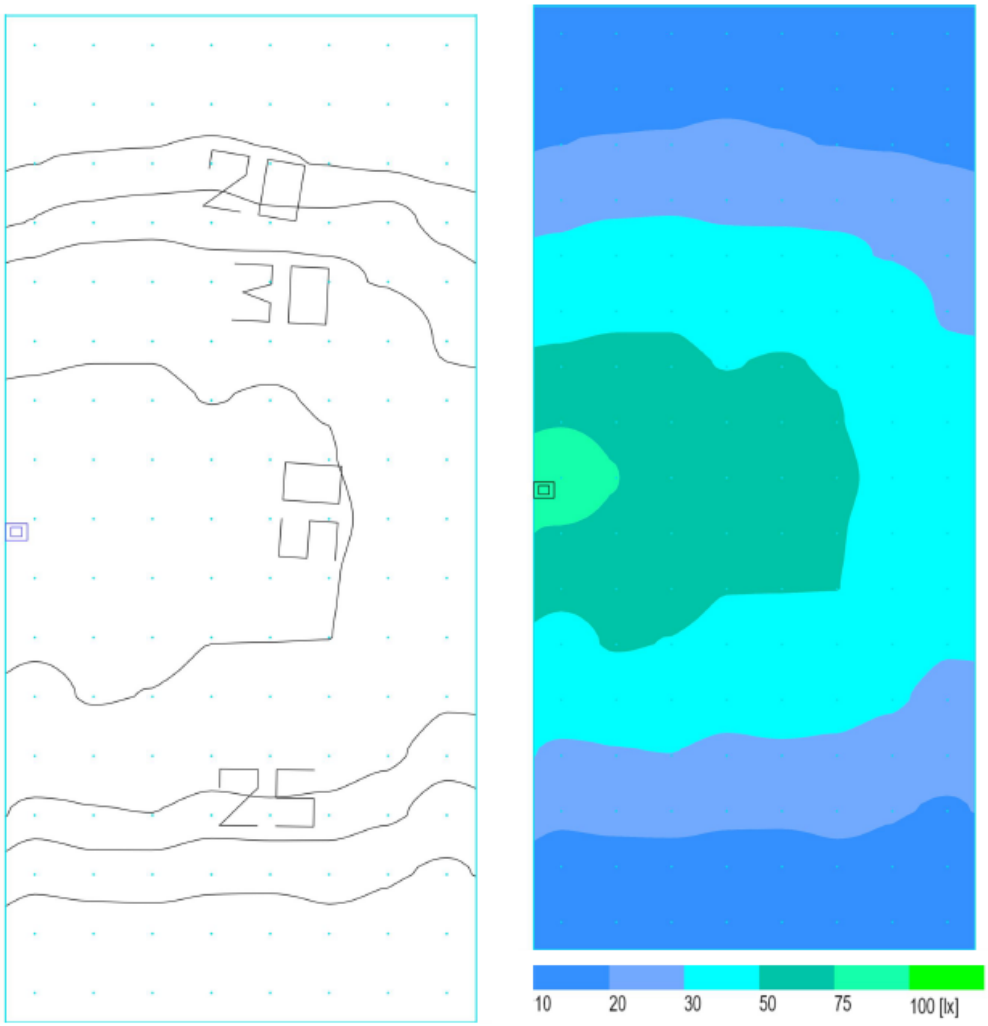
None emit any upward light. All are controlled by movement sensors.



Light fittings 1 - 5 are 6W DW Windsor Kirium and provide low levels of illumination for pedestrian movement and slow-moving traffic (<10 km/hr).

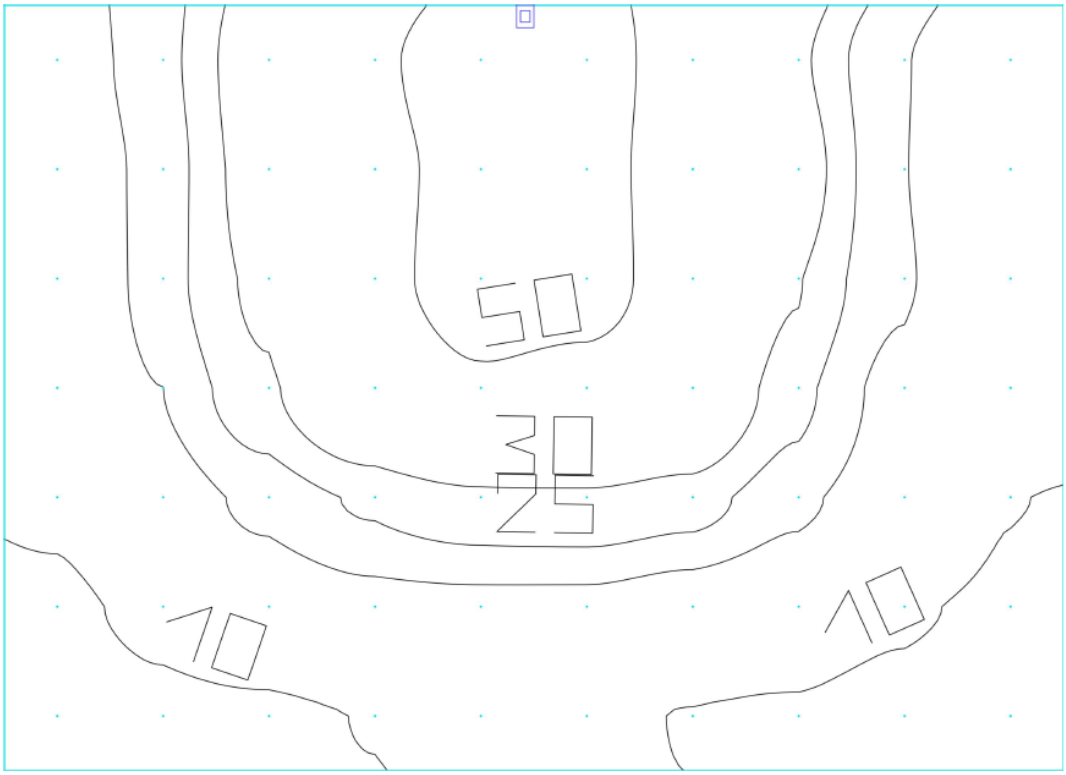
Floodlights 6, 7, 8 are 45W Thorn LEDfit providing working levels of illumination on the hardstanding areas.

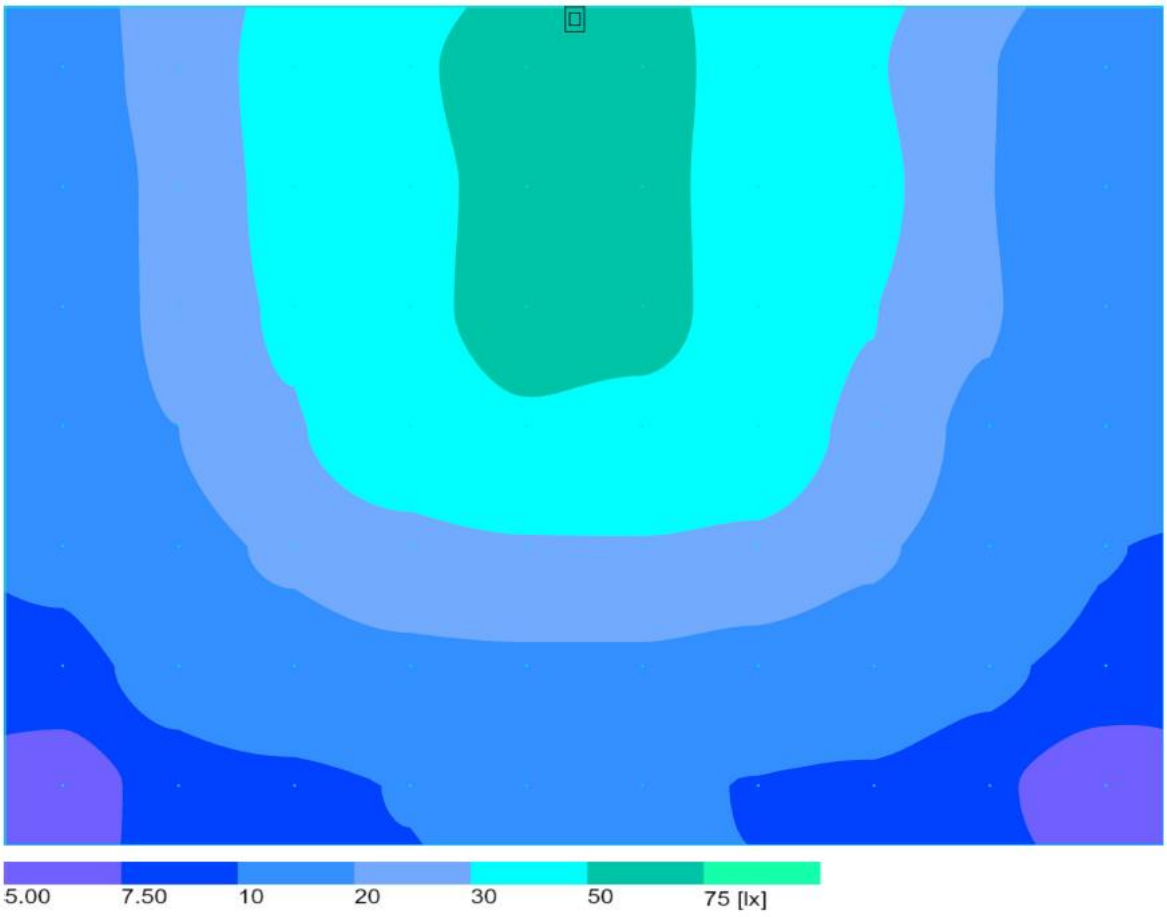
East hardstanding.



Average of 34 lux with 33% uniformity.

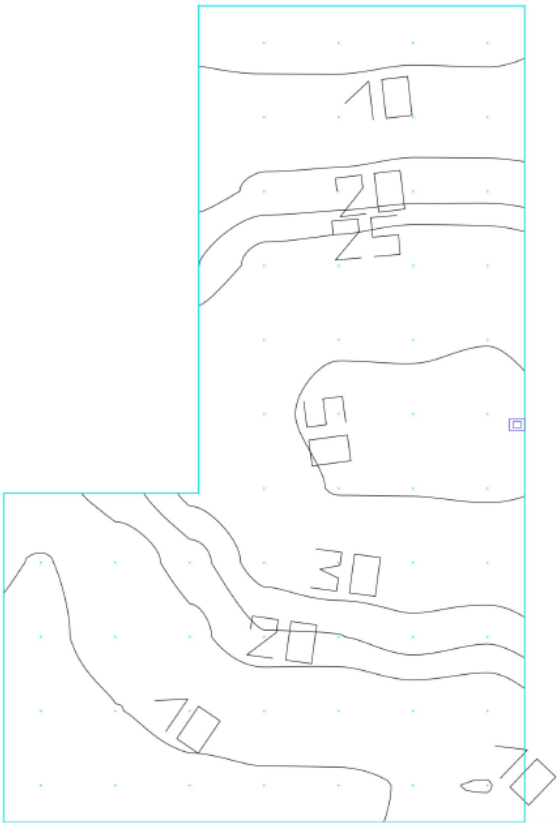
South hardstanding



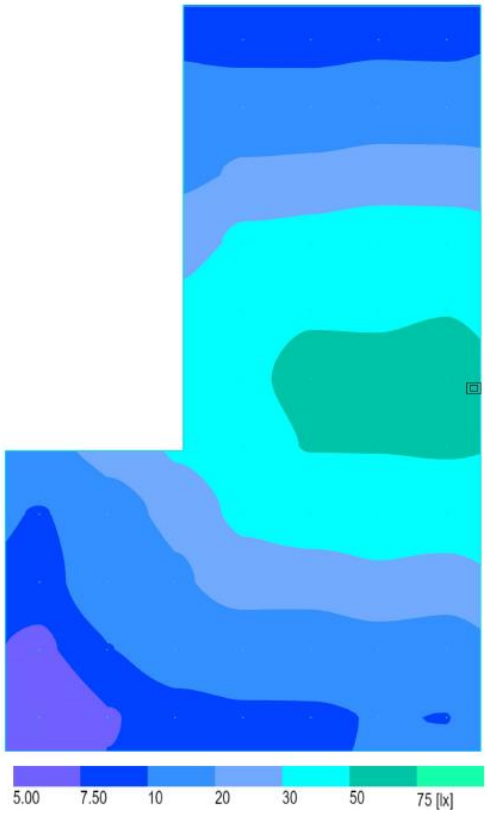


Average of 26 lux and 25% uniformity.

West hardstanding

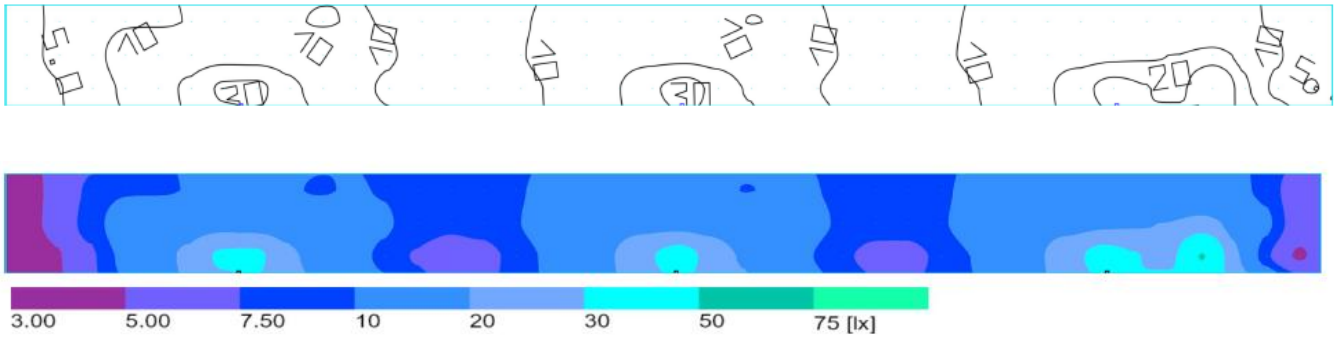


Average of 25 lux and 24% uniformity.



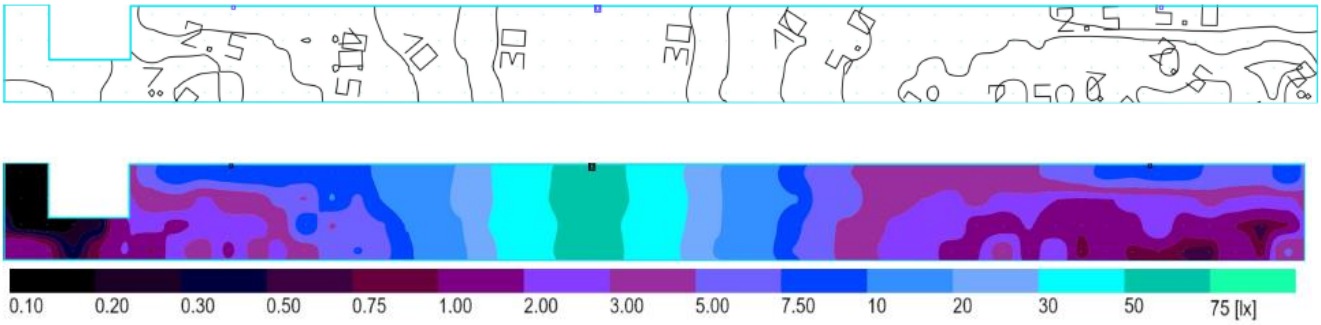
North pedestrian access

This area is only used by pedestrians and can also be used as an emergency escape route.
The fittings used are the Kirium bulkhead type unit.



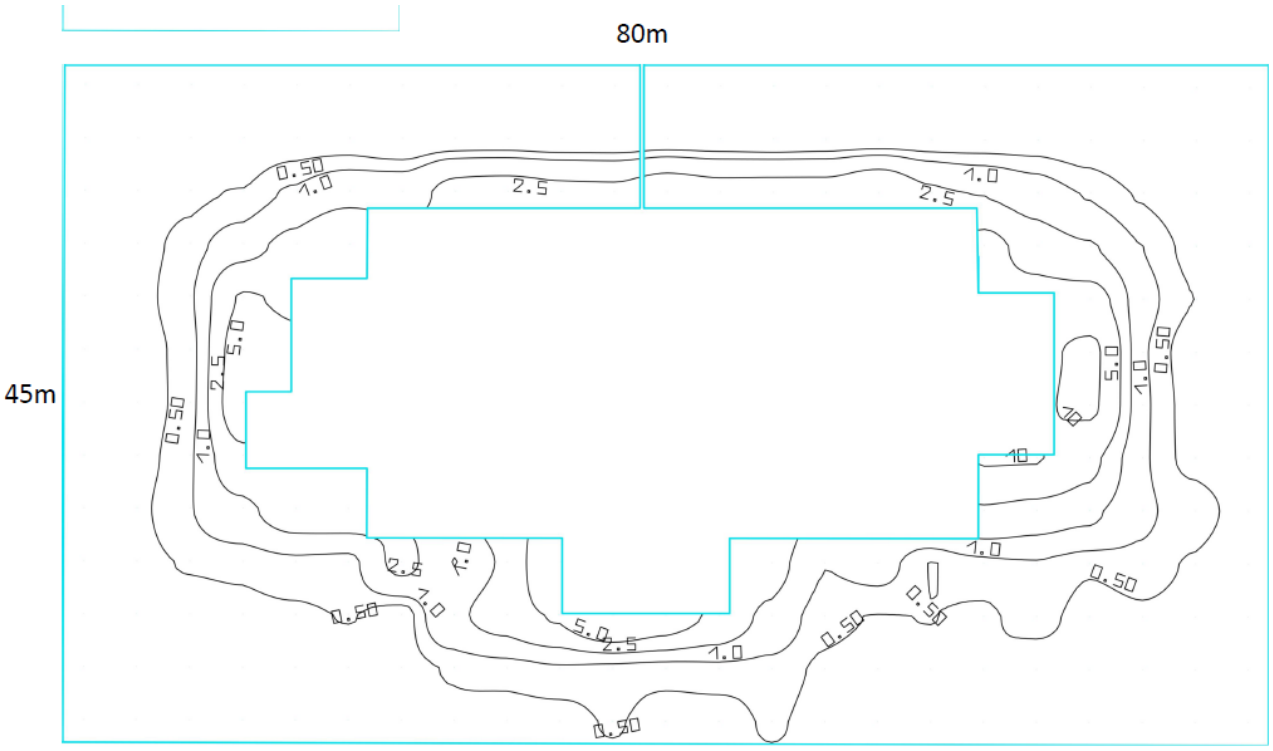
Average of 13 lux with 25% uniformity. This area is 40m wide and extends 3m from the building.

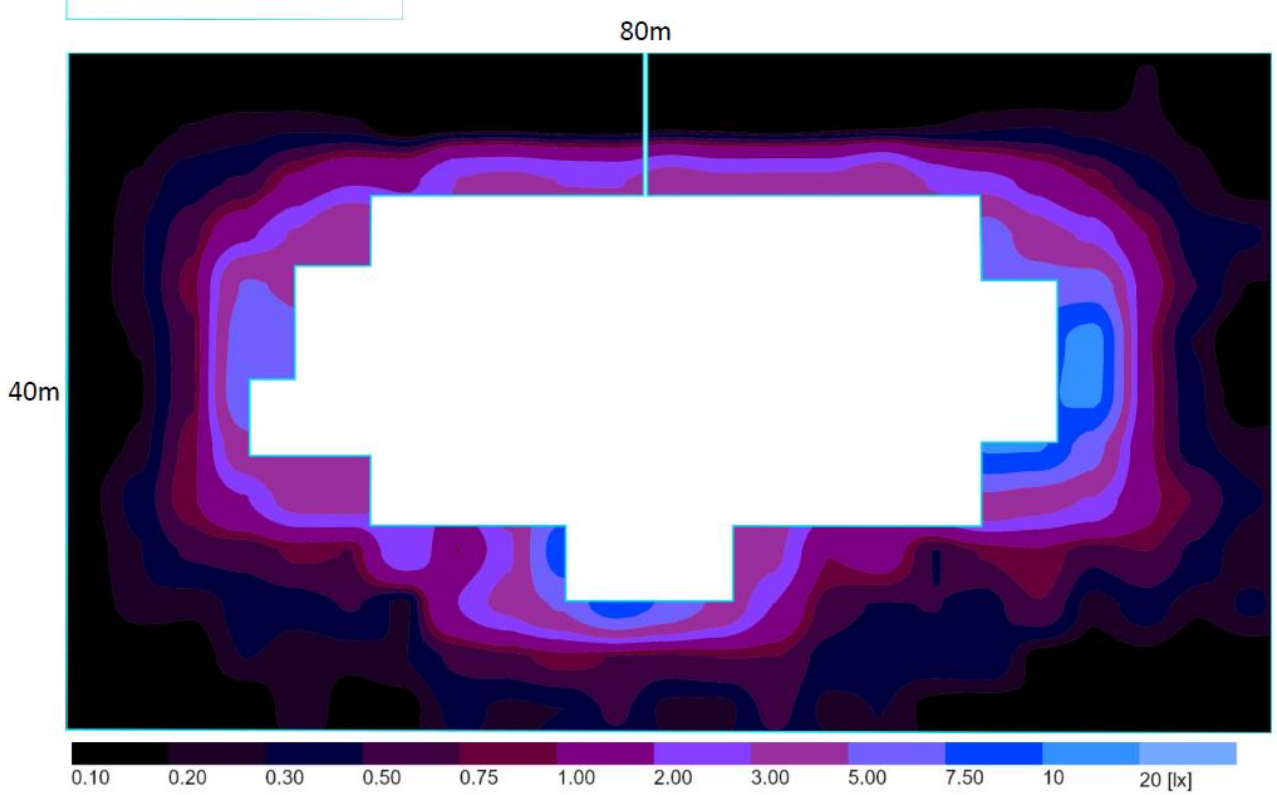
South pedestrian access



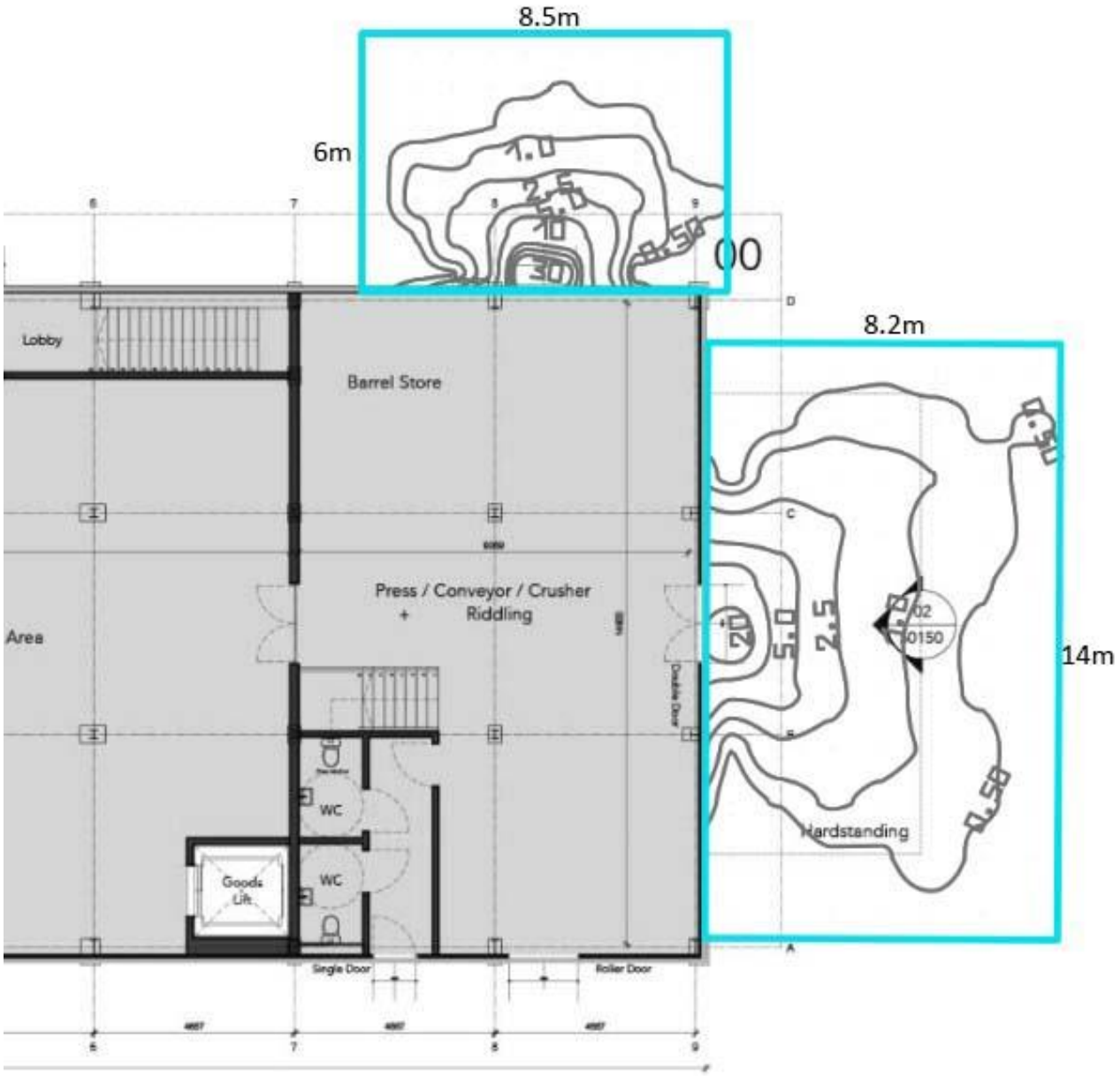
Average of 12 lux. Dark area to the left is caused by shadowing from chiller cover. Higher illumination value in centre is due to illumination on hardstanding. As above, this area is 40m x 3m.

Spill over total area





Spill from inside

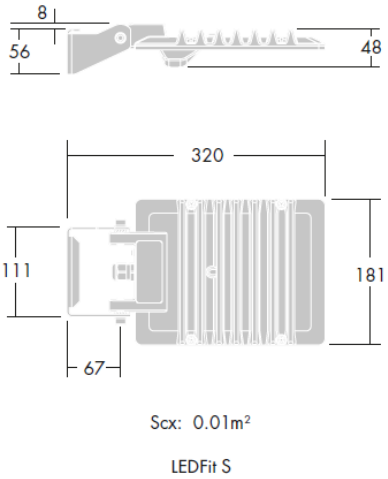


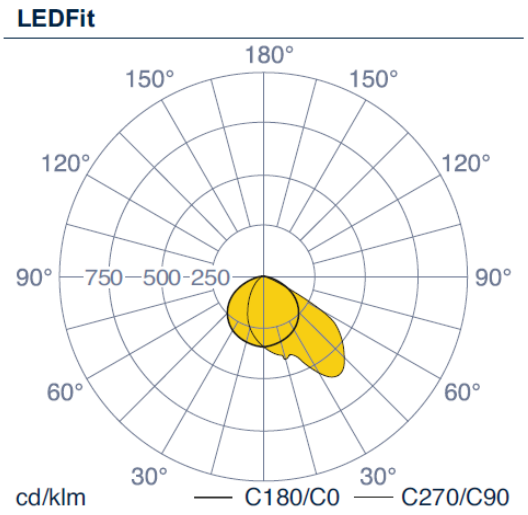
Values shown are lux at ground level and based on an illumination inside of 200 lux.

Equipment used

Thorn LEDfit

Wall mounted - area

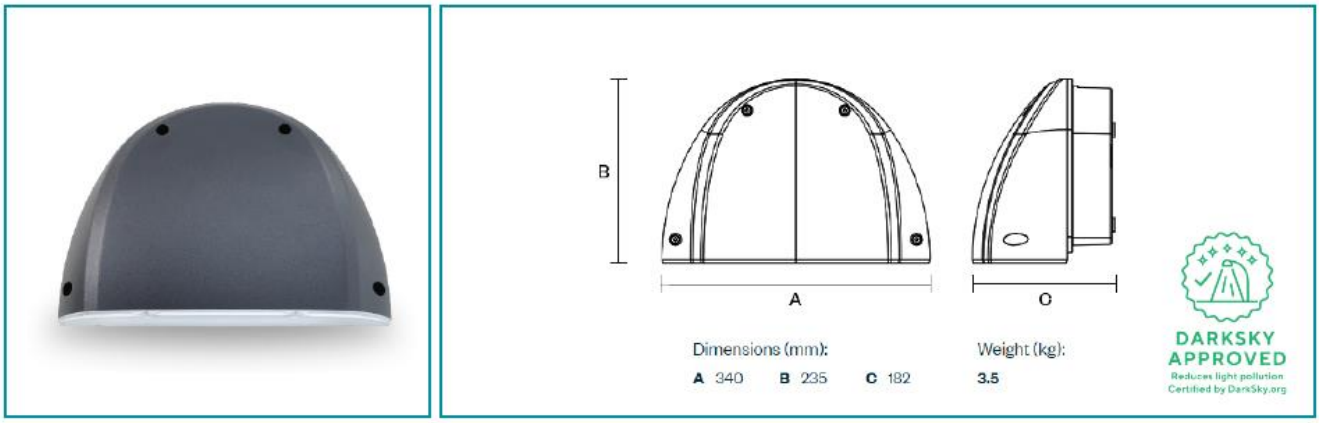




Thorn Lighting LEDfit used on hardstandings. 45W, 4,300 lumens, 3000K. This unit emits no upward light when the glass is horizontal.

DW Windsor

Kirium Wall



6W, 930 lumens, 3000K, mounted on north (3 No) and south (2 No) faces. This unit emits no upward light and has IDA approval.

Glossary of Lighting Terms

Illuminance: this is the SI term for what is normally referred to as Illumination level. It is measured in lux. It refers to the light falling on a surface. Normally this is a horizontal plane such as the ground or desktop. It can also refer to vertical surfaces such as windows and building facades. Illuminance is measured in lux.

Intensity: is measured in candelas, cd, and refers to a point source of light. Intensity values are often used in polar curves to show the distribution of light from a luminaire.

Lumen: is the SI term for luminous flux or quantity of light. A typical 8w LED "bulb" emits 600 lumens; a 1.5m fluorescent lamp emits around 5,500 lm.

Lux: is defined as an illuminance of 1 lumen/m^2. A typical office would measure 300 -500 lux, a major traffic route 20 – 30 lux, a residential road 3 – 10 lux. Note that lux is normally taken to be the horizontal value but the vertical value is often relevant. E.g. vertical illuminance is important in recognising faces or light intrusion on windows.

Luminance: It is a measure of objective brightness and is a function of how much light is emitted by a luminaire or reflected off a surface. It is defined as cd/m^2.

Luminaire: is the term for what is usually referred to as a light fitting. A fixture or lantern are other commonly used terms. These terms are used to distinguish them from the light source or lamp.