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Engineering Consultants

# Hatfield Aerodrome

## Lighting Impact Assessment

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# Hatfield Aerodrome

## Lighting Impact Assessment

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# 1. Introduction

## 1.1. Scope of the Report

SDS Engineering Consultants have been commissioned by Brett to undertake a Lighting Impact Assessment for the proposed development on land at former BAE Hatfield Aerodrome, Hatfield, Hertfordshire.

The aim of the Lighting Impact Assessment is to provide an assessment of the impact of the external lighting from the proposed development on the existing landscape.

Within this report the proposed land take area for the development will be referred to as the 'site'.

## 1.2. Structure of the Report

This report has been broken down into the following sections:

Section 2 – Outlines the relevant legislation, planning policy and guidance

Section 3 – Summarises the guidance for environmental zone classification and limiting parameters

Section 4 – Describes the methodology of the lighting impact assessment

Section 5 – Outlines the environmental baseline and environmental zone

Section 6 – Outlines the proposed external lighting for the proposed development

Section 7 - Provides an assessment of the impacts of the proposed site lighting

Section 8 - Considers further mitigation proposals for the site

Section 9 - Considers the residual effects

Section 10 - Concludes the lighting impact assessment

## 1.3. Site Location

Hatfield Aerodrome lies between the conurbations of Hatfield to the east and St Albans to the west on land to the north of the A1057. The airfield ceased operation in the 1990's and the easternmost part, on the fringe of Hatfield itself and incorporating the former hangars and other main buildings, was redeveloped in the 1990s/00s. That area now houses a business park, the University of Hertfordshire campus, areas of housing and a landscaped linear park.

## 1.4. Site Location Plan

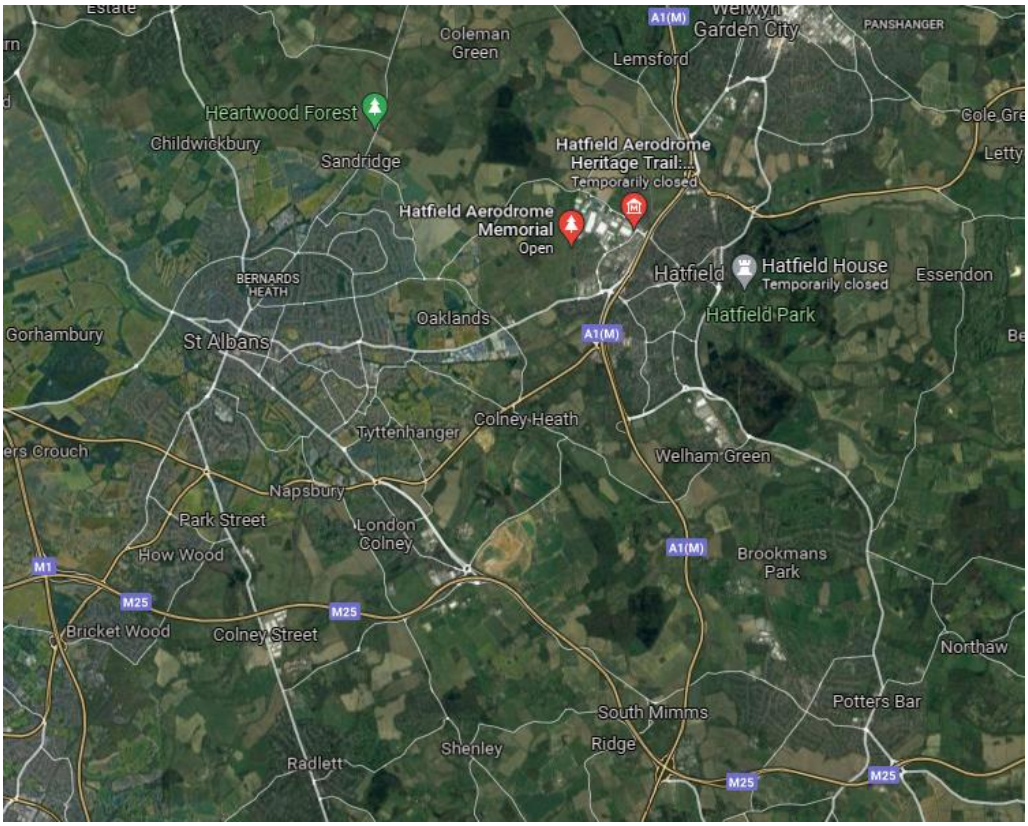


*Figure 1: shows a site wide location plan of Hatfield from Google Maps*

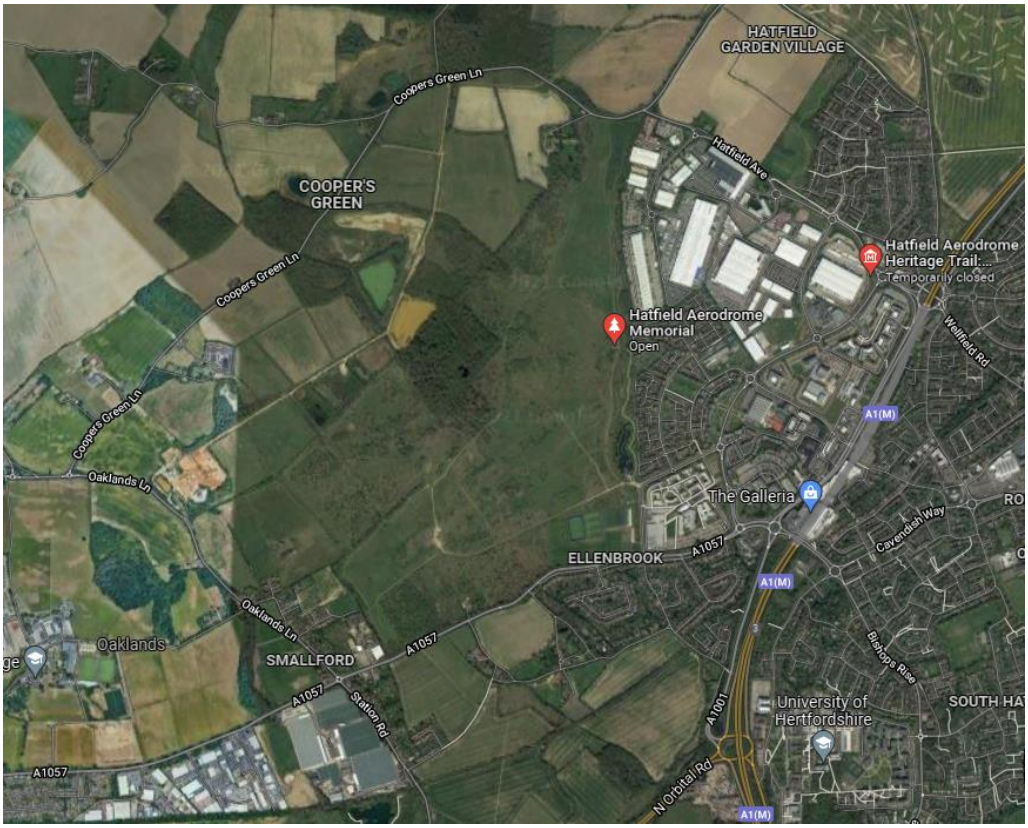


*Figure 2: shows a site wide location plan of BAE Hatfield Aerodrome from Google Maps*

# 2. Legislation, Planning and Policy Guidance

## 2.1. Legislative Background

Light pollution was introduced within the Clean Neighbourhoods and Environment Act (2005) as a form of statutory nuisance under the Environmental Protection Act (the 'EPA', 1990), which was amended in 2006 to include the following nuisance definition:

*"(fb) artificial light emitted from premises so as to be prejudicial to health or nuisance."*

Although light was described as having the potential to cause statutory nuisance, no prescriptive limits or rules were set for impact assessment purposes. Guidance Notes for the Reduction of Obtrusive Light produced by the Institute of Lighting Professionals (ILP) has, therefore, been referred to for the purposes of this assessment.

Guidance produced by Defra, Statutory Nuisance from Insects & Artificial Light (2006) on S101 to S103 of the Clean Neighbourhoods and Environment Act (2005) has also been referred to which places a duty on local authorities to ensure that their areas are checked periodically for existing and potential sources of statutory nuisances - including nuisances arising from artificial lighting. Local authorities must take reasonable steps to investigate complaints of such nuisances from artificial light. Once satisfied that a statutory nuisance exists or may occur or recur, local authorities must issue an abatement notice (in accordance with S80(2) of the EPA 1990), requiring that the nuisance cease or be abated within a set timescale.

## 2.2. Planning Policy Context

The National Planning Policy Framework (NPPF) states that the purpose of the planning system is to contribute to the achievement of sustainable development and constitute the Government's view on what sustainable development in England means in practice for the planning system. A principal concept contained within the NPPF is the presumption in favour of sustainable development and with regard to artificial lighting, the NPPF states:

*"…By encouraging good design, planning policies and decisions should limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation…"*

## 2.3. International Guidance

### 2.3.1 Commission Internationale De L'Eclairage (CIE) 150: Guide on the Limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations (the 'CIE 150', 2003)

The purpose of CIE 150 is to aid in formulating guidelines for assessing the environmental effects of exterior lighting and to provide limits for relevant lighting parameters to control the obtrusive effects of exterior lighting to tolerable levels. CIE 150 also refers to the potentially adverse effects of exterior lighting on both natural and man-made environments.

### 2.3.2 CIE 126: Guidelines for Minimising Sky Glow (1997)

This document gives general guidance for lighting designers and policy makers on the reduction of sky glow. The report gives recommendations about maximum permissible values for exterior lighting installations. These values are regarded as limiting values. Lighting designers should strive to meet the lowest criteria for the design. Practical implementation of the general guidance is left to national regulations.

## 2.4. National Guidance

### 2.4.1 Institute of Lighting Professionals (ILP) (2021) Guidance Notes for the Reduction of Obtrusive Light (the 'ILP Guidance Notes')

The ILP has proposed lighting guidance and criteria for local authorities with a recommendation that these are incorporated at the local plan level. The ILP Guidance Notes define various forms of light pollution and describe a series of environmental zones. The ILP Guidance Notes provide suitable criteria against which the effects of artificial lighting can be assessed. This assessment has been based upon these criteria.

### 2.4.2 Institute of Lighting Professionals (ILP) (2013) PLG 04 Guidance on Undertaking Environmental Lighting Impact Assessments

The aim of this guidance is to outline good practice in lighting design and provide practical guidance on the production and assessment of lighting impacts within new developments.

# 3. Environmental Zone Classification and Parameters

All standards consulted in section 2 are nationally recognised documents, (some internationally, also) which deal with the relevant design issues associated with external lighting.

## 3.1. Environmental Zoning

The CIE Standards, CIBSE and the Society of Light & Lighting guidance documents all apply a common Environmental Zoning system, which is summarised in Table 1 below.

**Table 1: Environmental Zones**

| Zone | Surrounding | Lighting Environment | Examples |
|---|---|---|---|
| E0 | Protected | Dark | UNESCO Starlight Reserves, IDA Dark Sky Parks |
| E1 | Natural | Intrinsically dark | National Parks, Areas of Outstanding Natural Beauty etc. |
| E2 | Rural | Low District brightness | Village or relatively dark outer suburban locations |
| E3 | Suburban | Medium district brightness | Small town centres or suburban locations |
| E4 | Urban | High district brightness | Town/City centres with high levels of night-time activity |

## 3.2. Obtrusive Light Limitation for Exterior Lighting Installations

The ILP Guidance Notes for the Reduction of Obtrusive Light provide guidelines and threshold values applicable to each Environmental Zone, which are reproduced in Table 2 below.

**Table 2: Obtrusive Light Limitations for Exterior Lighting Installations – General Observers**

| Environmental Zone | Sky Glow ULR (max %) (i) | Light Intrusion into Windows $E_v$ (Lux) (ii) | | Luminaire Intensity I (K candelas) (iii) | | Building Luminance L (cd/m²) (iv) |
|---|---|---|---|---|---|---|
| | | Pre-curfew | Post curfew | Pre-curfew | Post-curfew | Pre-curfew |
| E0 | 0 | 0 | 0 | 0 | 0 | 0 |
| E1 | 0 | 2 | 0(1*) | 2.5 | 0 | 0 |
| E2 | 2.5 | 5 | 1 | 7.5 | 0.5 | 5 |
| E3 | 5.0 | 10 | 2 | 10 | 1 | 10 |
| E4 | 15 | 25 | 5 | 25 | 2.5 | 25 |

*(i) Upward light ratio of the installation – maximum permitted percentage of luminaire flux for the total installation that goes directly into the sky*

*(ii) Vertical illuminance measured flat at the glazing at the centre of the window*

*(iii) Light intensity in kilo candelas*

*(iv) Luminance in candelas per square metre (cd/m2)*

*(*) From public road lighting installations only*

## 4. Assessment Methodology and Significance Criteria

The assessment is based on a desktop study only. The extent of the study area for this assessment includes the site and its immediate surroundings and the key sensitive receptors which may be subject to a change in the existing lighting conditions. Sensitive receptors may include local residents, ecological receptors, the night-time amenity, and road users.

The existing baseline conditions on site and in the surrounding area have been considered. The proposed development and its associated lighting have also been considered and an assessment of its impact has been made.

This assessment considers the effects in terms of obtrusive light, including light spill, glare, sky glow and building luminance for the proposed external lighting scheme. Night-time visual impacts of the Proposed Development are not included within this assessment.

A detailed external lighting design has been prepared, including emergency lighting and final exit luminaires. The design shows a suitable lighting design, in accordance with the parameters set out in Section 6 of this report, for the main areas of the site.

The site was modelled, and calculations provided, using industry standard software Relux. Relux is a computer calculation package which utilises 3D modelling to model the real-world output of chosen light fittings. The calculations for obtrusive light are based on the luminaires at full output, with a maintenance factor of 1, to represent the worst-case scenario. From these calculations, drawings illustrating the illuminance levels throughout the site and at the boundary have been produced so that the lighting scheme's impact can be assessed. The calculation model (illustrated by illuminance levels on a drawing) does not include any proposed or existing planting/ hedgerows/ trees on site, or in the surrounding area, and in this instance, it was not deemed necessary to model the site topography.

Any impact from internal lighting has also been excluded from this assessment.

The methodology to determine significance of effect assesses the potential impacts on receptors sensitive to light associated with the Proposed Development, in comparison with the existing baseline conditions. The effect attributed to each impact has been based on the magnitude of change as a result of the Proposed Development, and the sensitivity of the receptor. The criteria used to assess the effects of artificial lighting has been derived from the Institute of Lighting Professionals (ILP) (2021) Guidance Notes for the Reduction of Obtrusive Light, PL04 Guidance on Undertaking Environmental Lighting Impact Assessments and is shown in Table 3 and SLL Lighting Guide 21: Protecting the night-time environment.

The threshold values stated in the obtrusive light standards and guidance (Refer to Table 2) aim to control obtrusive light by limiting:

- the illumination on surrounding properties, referred to as light intrusion, and limited by the vertical illuminance measured at the window of a neighbouring property;
- bright luminaires in the field of view, referred to as glare, and limited by the source intensity;
- sky glow, limited by the upward light ratio (ULR) of the installation; and
- the effects of over lit building facades and signs, referred to as Building Luminance and limited by the average luminance on the surface.

These parameters form the basis for defining the effect criteria (Refer to Table 3).

However, this assessment also gives consideration to light spill, 'over' lighting and energy consumption, as these are also identified as being of environmental concern with regard to lighting installations. The distant view of light across the landscape, particularly in rural or dark landscapes (Light Presence), is another consideration; however night-time visual impacts of the Proposed Development are not included within

this assessment. The effect on Flora and Fauna is another consideration, however this is not included in the assessment as no restrictions have been placed on external lighting due to ecological sensitivities.

These factors are described in more detail below.

### Light Intrusion (into windows)

Light intrusion is light that impacts on to a surface outside of the area designed to be lit by the installation concerned. It is somewhat subjective because it is difficult to define when, where and how much light is unwanted. An example of light intrusion is when spill light from a streetlight enters a window and illuminates an indoor area. The ILP guidance specifies limits for light intrusion entering windows in terms of environmental zones. The values in the table are the suggested maximum and need to also take into account the existing light intrusion at the point of measurement. Light intrusion is measured in illuminance on the vertical plane. Other forms of light intrusion are not specifically limited in the guidance; however, it is becoming increasingly common to assess light spill at the boundary of a development, especially in ecologically sensitive areas.

### Light spill

Light spill, sometimes referred to as stray light, is light emitted by a lighting installation, which falls outside the boundary of the property on which the installation is sited. This is usually measured in illuminance on a horizontal plane.

### Glare

Glare is the uncomfortable brightness of a light source against a darker background. It can cause discomfort or a reduction in the ability to see details or objects, caused by an unsuitable distribution or range of luminance, or to extreme contrasts.

The ILP guidance sets limits for the luminous intensity of each luminaire in a potentially obtrusive direction, outside of the site being lit, in an attempt to control glare. It should only be applied to viewing directions that are likely to cause discomfort or disability glare. The guidance suggests that glare should be minimised by ensuring that the main beam angle of all lights directed towards any potential observer is not more than 70 degrees.

### Sky Glow

Sky glow is the brightening of the night sky caused by outdoor lighting and natural atmospheric and celestial factors. Outdoor lighting contributes to sky glow by producing light that is either emitted directly upward by luminaires or reflected from the ground. This light is then scattered by dust and gas molecules in the atmosphere, producing a luminous background. The part of the sky glow which is attributed to man-made sources of luminous radiation is called Artificial Sky Glow. (Note: this assessment considers the impact of artificial sky glow only.)

A major effect of sky glow at night is to reduce contrast in the sky. It has the effect of reducing one's ability to view the stars. This is the most pervasive form of light pollution and can affect areas many miles from the original light source.

Sky glow is highly variable depending on immediate weather conditions, quality of dust and gas in the atmosphere, amount of light directed skyward, and the direction from which it is viewed.

Measuring and predicting sky glow from artificial lighting is a very challenging task due to the number of factors involved. Sky glow caused by artificial light can be minimised by limiting the upward light output of luminaires used in a lighting installation.

### Building and Signage Luminance

Building and signage luminance should be limited to avoid 'over' lighting and to relate to general district brightness. Building luminance is applicable to buildings directly illuminated as a night time feature as opposed to the illumination of a building caused by spill light from adjacent luminaires or luminaires fixed to the building but used to light an adjacent area.

### 'Over' Lighting

'Over' lighting is when an area is lit to a higher level of illuminance than the task/use requires. It is identified by the ILP guidance as being a major cause of obtrusive light and for wasting energy. Good design practice and adherence to the published lighting standards prevents 'over' lighting areas, which in turn helps to minimise upward reflected light.

### Energy Consumption

Consideration should be given to the energy efficiency of the existing lighting installed on site and to minimising the energy consumption of any proposed lighting. Energy efficient luminaires, light sources and lighting controls should be selected.

### The Effect on Flora and Fauna

Liaison with the project ecologist is required to identify any light sensitive receptors in terms of flora and fauna, so an assessment of the effect can be established.

### The distant view of light across the landscape, particularly in a rural or dark landscape (Light Presence)

This report considers where light emitted from a light source, or light that is projected onto an area or building, can be viewed from outside the area it was provided for. This is light that does not reach an intrusive level, but can be seen, and has been termed "light presence". This light presence may draw attention to the existence of a lighting installation or structure. This light cannot be accurately quantified and is considered to be subjective.

| Table 3: Significance Criteria | | | |
|---|---|---|---|
| **Nature** | **Level of significance** | **Descriptions** | **Remedial Needs** |
| Positive | Major / substantial beneficial effects (Significant) | Significant improvement in night environment and/or a major decrease in the level of sky glow, light spill and glare on to surrounding areas and illuminance levels at the windows of residential properties (light intrusion), resulting in a noticeable or major improvement in baseline conditions and is well within the recommended CIE guidance levels. | None |
| | Moderate beneficial effects (Significant) | Noticeable improvement in the night environment and/or a moderate decrease in the level of sky glow, light spill and glare on to surrounding areas and illuminance levels at the windows of residential properties (light intrusion), resulting in a moderate improvement in the current baseline conditions and recommended CIE guidance levels. | |
| | Minor beneficial effects (Not Significant) | Slight improvement in night environment and/or a minor decrease in the level of sky glow, light spill and glare on to surrounding areas and illuminance levels at the windows of residential properties (light intrusion), resulting in a perceptible improvement in baseline conditions and is within the recommended CIE guidance levels. | |
| Neutral | None / negligible (Not Significant) | No significant effect or overall effects balancing out with a barely perceptible change in the level of sky glow, light spill and glare onto surrounding areas and illuminance levels at the windows of residential properties (light intrusion) and would cause a negligible or barely discernible change to current baseline conditions and is within the recommended CIE guidance levels. | None |
| Negative | Minor adverse effects (Not Significant) | Minor increase in the level of sky glow, light spill and glare on to surrounding areas an illuminance levels at the windows of residential properties (light intrusion), would cause a minor perceptible change in baseline conditions, which are slightly above recommended CIE guidance levels but where current uses could still be maintained. | Develop appropriate levels and type of mitigation |
| | Moderate adverse effects (Significant) | Noticeable increase in visibility of site, moderate increase in the level of sky glow, light spill and glare on to surrounding areas and illuminance levels at the windows of residential properties (light intrusion) and would result in a noticeable effect on baseline conditions moderately in excess of the recommended CIE guidance levels. | |
| | Major adverse effects (Significant) | Significant problems with increase in visibility of site, major increase in the level of sky glow, light spill and glare on to surrounding areas and illuminance levels at the windows of residential properties (light intrusion) and would result in a major effect on baseline conditions significantly in excess of the recommended CIE guidance levels. | |

# 5. Environmental Baseline

## 5.1. Assessment of Existing Environmental Zone

Following reference to the ILP Guidance Notes for the Reduction of Obtrusive Light and considering the site location it is assumed that the site is situated within an E3 Environmental Zone, in accordance with a suburban location, medium district brightness area, small town centres or suburban locations.

# 6. Proposed Lighting

## 6.1. Construction Phase

The primary reasons for lighting provision within the construction site will be for health and safety and security requirements.

The sources of artificial light that have been assumed to be present during the construction phase are:

- Temporary floodlighting particularly during winter months;
- Floodlighting and security lighting associated with site access, on-going work areas, temporary car parking areas and on the exterior of construction compounds;
- Lighting at height associated with construction of structures;
- Interior lighting within any temporary office units within any construction compounds.
- Crane warning lights.

The working hours for construction are anticipated to be typical industry hours (i.e. 08:00 to 18:00 Monday to Friday and 09:00 to 13:00 on Saturday). It is assumed there will be no working on Sundays or Bank Holidays. Therefore, it is likely that temporary sources of artificial lighting will be required to enable the safe continuation of works in the early morning and late afternoons during the winter months when working hours fall within the hours of darkness. Lighting associated with the construction works is assumed to be temporary and intermittent in nature. It is assumed that some level of security lighting will be required at all times during the hours or darkness.

## 6.2. Operational Phase - Proposed Lighting

The external lighting installation has been designed in accordance with industry standards, guidance and recommendations in order to provide an adequate level of illuminance for security, safety and amenity throughout the site, whilst limiting obtrusive light, over-lighting and energy consumption.

The significant sources of lighting for the operational phase of the proposed development will be as follows:

- Perimeter building mounted lighting
- Car parking / lorry parking
- Weighbridge
- Aggregate processing plant
- Concrete Batching plant

Refer to Appendix B and C for drawings and calculations for the indicative lighting design for the site. The drawing in Appendix B show levels of illuminance calculated at maintained levels of design illuminance, and the drawing in Appendix C shows the levels of illuminance with the luminaires at 100% output to represent the worst-case scenario, in order to assess the lighting impact.

### 6.2.1 Recommended Lighting Levels

Table 6.1 summarises the levels of design illuminance and uniformity targeted for the externally lit areas within the Proposed Development. The values have been derived from BS EN 12464 Part 2: 2014 Light and lighting – Lighting of outdoor Work Places.

| Table 4: Recommended Levels of Illuminance | | |
|---|---|---|
| **Description of Area Type** | **Average level of Illuminance required (lux)** | **Uniformity** |
| Perimeter building mounted lighting (footpath) | 5 | 0.25 |
| Car parking | 20 | 0.25 |
| Weighbridge | 20 | 0.40 |
| Aggregate processing plant | 20 | 0.25 |
| Concrete Batching plant | 20 | 0.25 |

### 6.2.2 Strategy for Luminaire Type and Light Source

Luminaires selected within the design have been selected for good light control and cut off angles to reduce light spillage, glare and limit sky glow. Luminaires selected have a low upward light output so that the whole installation has an upward light ratio of less than 5%, in accordance with an Environmental Zone E3.

External luminaires shall be IP66 rated and impact resistant. All equipment and their materials shall be non-corrosive and suitable for the environment or must be specified with the appropriate protection.

It is proposed that all luminaires utilised LED light sources throughout the Proposed Development. LED lighting will provide good colour rendering, greater than 80 Ra, to improve visibility and provide a safer environment. A colour rendering of greater than 80 Ra promotes a feeling of safety for pedestrians. Using these luminaire types will provide an energy efficient solution, with better options for control. Colour temperatures of 3000K warm white shall be utilised.

The lighting design has been based on a combination of 6m column mounted LED luminaires, building mounted LED luminaires and LED floodlights.

Manufacturers information for the luminaires used in this design are shown in Appendix E.

### 6.2.3 External Luminaire Control Strategy

All external lighting will be controlled via 7 day/ 24-hour programmable timeclocks and photocell control preventing the operation of external lighting when there are adequate levels of daylight.

The switching of the lighting circuits shall be via a multi-pole contactor to enable external lighting (except safety and security lighting) to be automatically switched off between 1830 to 0630 Monday to Friday; and 1300 to 0630 on Saturdays and completely switched off Sundays.

An override switch located within the main office, shall be used to switch all the external lights On/Off/Automatic if required.

### 6.2.4 Strategy for Minimising Obtrusive Light

The proposed lighting has been designed in accordance with the limiting criteria for an E3 Environmental Zone, Refer to Table 2, in order to limit obtrusive light and light pollution to an acceptable level.

External back shields will be fitted to all luminaires directly adjacent to the site boundary to limit light spill. The calculations and drawings shown in the appendices do not show the effect of the back-light shields, as there is no photometric data available for the external back shields, however it can be assumed that the back spill will be reduced by 2-3 metres, when considering the 0.5 lux line.

## 6.3. Vehicle Headlights

Assessing the impact from headlights is quite complex, as headlight, lamp, types and outputs, will vary between vehicles, and the beam angle of a headlight is designed to converge. The lumen output of lamps

used within headlights vary, with typical halogen lamps having a lumen output within the range of 700 - 2100 lumens, and HID lamps in the range of 2800-3500.

The working hours are anticipated to be typical industry hours (i.e. 07:00 to 18:00 Monday to Friday and 07:00 to 13:00 on Saturday). It is assumed there will be no working on Sundays or Bank Holidays. Therefore, it is likely that temporary sources of artificial lighting will be required to drive around the site in the early morning and late afternoons during the winter months when working hours fall within the hours of darkness. Lighting associated with vehicles is assumed to be temporary and intermittent in nature.

# 7. Assessment of Impacts

## 7.1. Construction Phase

Construction impacts are temporary in their nature, however prior to mitigation there is potential for the development to result in adverse effects. Mitigation and residual effects are further discussed in Sections 8 and 9.

## 7.2. Operational Phase

It has been assumed that the site is currently classified as Environmental Zone E3, with the proposed lighting for the site being assessed in accordance with the limiting criteria for that zone, Refer to Table 1 in order to limit obtrusive light and light pollution to an acceptable level.

Refer to Appendix D for calculation summary.

### 7.2.1 Assessment of impact in terms of Obtrusive Light

The majority of light spill is shown to be contained within the site boundary. Light spill will be further reduced by the existing/ proposed walls, fencing and landscape features which are not included in the lighting model. Back shields will be applied to the luminaires directly adjacent to the site boundary to further reduce light spill. Due to the nature of the lighting for the vehicular and pedestrian access routes, it is not expected that the horizontal light spill can be completely contained within the site boundary.

The upward light ratio (ULR) of the installation as modelled (excluding the decorate up-lighters), has been calculated to be less than 2%, and therefore complies with the obtrusive light guidance limit of 5% ULR for an Environmental Zone E3, in terms of minimising the effects of sky glow.

The lighting scheme for the proposed development, as described in section 6, has been assessed against the significance criteria shown in section 4 to establish the effects. It can be concluded that the lighting scheme will have Minor Adverse Effects/ Not Significant. Although the impacts in terms of obtrusive light will be within the recommended CIE/ Obtrusive Light guidance levels for an E3 Environmental Zone, the site is currently having a lower density and levels of lighting so there is likely to be a minor perceptible change to current baseline conditions.

# 8. Mitigation Measures

## 8.1. Construction Phase

Mitigation of the effects of the lighting installation during the construction phase will include:

- Specifying working hours, uses of lighting, location of temporary floodlights and construction compound and agreeing these with the local council
- Lighting to be switched off when not required specifically for construction activities or required for health and safety or security
- Glare will be minimised by ensuring that the main beam angle of all luminaires is directed away from any potential observer into the centre of site wherever possible, and angled at less than 70 degrees from the horizontal
- Light spill will be minimised by avoiding poorly sited luminaires located at the boundary of the development
- Sky glow will be minimised by using modern flood lights with good photometric control, angled at less than 70 degrees from the horizontal and by using additional shields as appropriate
- The selection of luminaires, including those required for night-time security, that are designed to minimise any obtrusive light

These measures will form part of a Construction Environmental Management Plan.

## 8.2. Operational Phase

Mitigation of the effects of the lighting installation during the operational phase will be achieved by designing and installing the proposed lighting in accordance with the parameters outlined in this report.

Further mitigation measures beyond this are not deemed to be required.

# 9. Residual effects

## 9.1. Construction Phase

It is predicted that following implementation of the mitigation measures outlined in section 8, overall there will be minor adverse residual effect of lighting at the construction phase, and this effect will be temporary in nature.

## 9.2. Operational Phase

There are no significant residual effects predicted for the operational phase of the Proposed Development.

## 10. Conclusion

The proposed lighting scheme will comply with all relevant British Standards, the Institute of Light and Lighting Guidelines and guidance provided by the Society of Light and Lighting, and will serve to ensure that safety and security of all areas of the development can be effectively maintained.

The assessment is based on the worst-case scenario with lighting output at 100%, i.e. no maintenance factors applied, with all lights switched on simultaneously, and the screening effect of the hedgerow and trees along the boundaries are not included within the model, levels of illuminance will be significantly reduced when these factors are taken into account.

The site has been classified as Environmental Zone E3. Obtrusive light will be limited in accordance with the requirements for this zone.

It can be concluded that the impact from the proposed lighting scheme for the new development in terms of obtrusive light will not be significant.

# Appendix A

## Lighting Terminology

# Lighting Terminology

For the purpose of this report, the definitions given below apply:

**CIBSE:** Chartered Institute of Building Services Engineers

**Colour Rendering Index (CRI):** A scale of the colour appearance of an object under a particular light source compared to its colour appearance under a reference light source. Expressed on a scale of 1 to 100 Ra, where 100 Ra represents the colour rendering of natural daylight i.e. perfect colour.

**Illuminance:** Illuminance is the quantity of light, or luminous flux, falling on a unit area of a surface. It is designated by the symbol E. The unit is the lux (lx). One lux equals one lumen per square metre ($lm/m^2$).

**Light Pollution:** The spillage of light into areas where it is not required.

**Light Trespass (Nuisance):** Light that impacts on a surface outside of the area designed to be lit by a lighting installation.

**Disability Glare:** Glare which impairs the vision of objects but may not cause discomfort.

**Discomfort Glare:** Glare causing discomfort which may not impair the ability to see objects.

**Photocell:** A unit which senses light to control luminaires.

**Curfew:** The time after which stricter requirements (for the control of obtrusive light) will apply; often a condition of use of lighting applied by a government controlling authority, usually the local government (CIE, 2003).

**Environmental Zones:** Area where specific activities take place or are planned and where specific requirements for the restriction of obtrusive light are recommended. Zones are indicated by the zone rating (E1… E4) (CIE, 2003).

**Obtrusive Light:** Spill light which because of quantitative, directional or spectral attributes in a given context, gives rise to annoyance, discomfort, distraction or a reduction in the ability to see essential information (CIE, 2003).

**Residential Property:** Land upon which a dwelling exists (CIE, 2003).

**Sky Glow:** The brightening of the night sky caused by artificial lighting resulting from the reflection of radiation (visible and non-visible), scattered from the constituents of the atmosphere (gas molecules, aerosols and particulate matter), in the direction of observation. It comprises two separate components as follows:

(a) *Natural sky glow* - That part of the sky glow which is attributable to radiation from celestial sources and luminescent processes in the Earth's upper atmosphere.

(b) *Man-made sky glow* - That part of the sky glow which is attributable to man-made sources of radiation (e.g. outdoor electric lighting), including radiation that is emitted directly upwards and radiation that is reflected from the surface of the Earth (CIE, 2003).

**Spill Light (Stray Light):** Light emitted by a lighting installation which falls outside the boundaries of the property for which the lighting installation is designed (CIE, 2003).

**Upward Light Ratio:** The maximum permitted percentage of luminaire flux for the total installation that goes directly into the sky.

# Appendix B

## Site Plan showing Lighting Layout and Levels of Illuminance - Maintained levels of illuminance shown

A1 - DO NOT SCALE

N

Lighting Notes

1. Do not scale from this drawing.
2. All measurements are in millimeters unless stated otherwise.
3. This drawing shall be read in conjunction with all relevant architectural, structural, mechanical and electrical services information.
4. This drawing is provided for planning purposes only to show the external lighting strategy.
5. This drawing should be read in conjunction with the Lighting Impact Assessment report 06249E-SDS-EX-XX-RO-E-7080-01.
6. Levels of illuminance are calculated and shown at ground level with a maintenance factor of 0.84.
7. Isolines contours represent values of illuminance calculated in lux.
8. All equipment has been specified to achieve a 25 year design life.
9. All equipment and their materials shall be non-corrosive and suitable for the environment or must be specified with the appropriate protection
10. All external lighting has been designed to BS EN 12464-2:2014 light and lighting - lighting of outdoor work places.
11. The external lighting has been designed to minimise the impact on the environment. All luminaries have been specified in 3000K warm white. Building mounted luminaries selected have 0% upward light ratio; the complete external lighting scheme as shown, has an upward light ratio of 0%.
12. All external luminaires to be controlled via a photocell and time-clock control preventing operation of the external lighting when there are adequate daylight levels.
13. The site has been assumed to fall into Environmental Zone E3 in accordance with a suburban location.
14. The external lighting shall be in compliance with the ILP Guidance Note 1 for the reduction of obtrusive light 2021 and CIBSE SLL LG21 Protecting the night-time environment.
15. Lighting columns shall comply with all relevant standards, legislation, codes of practice, and industry good practice. In particular, but not limited to, lighting columns shall comply with BS EN 40.
16. The building scheme and internal layouts have not been sufficiently developed to provide detail on the layout of the external emergency lighting and final exit luminaires.These will be developed during the technical design stage by others.
17. All emergency lighting to be developed at technical design stage by others.
18. No signage, facade or decorative architectural lighting is proposed throughout the site.


Table 2 - Obtrusive Limitations for Exterior Lighting Installations - General Observers

| Environmental Zone | Sky Glow ULR [Max %] | Light Intrusion (into Windows) Ev [lux] | | Luminaire Intensity I [candelas] | | Building Luminance Pre-Curfew |
|---|---|---|---|---|---|---|
| | | Pre-Curfew | Post Curfew | Pre-Curfew | Post Curfew | Average L [cc/m²] |
| E0 | 0 | 0 | 0 | 0 | 0 | 0 |
| E1 | 0 | 2 | 0 | 2500 | 0 | 0 |
| E2 | 2.5 | 5 | 1 | 7500 | 500 | 5 |
| E3 | 5.0 | 10 | 2 | 10000 | 1000 | 10 |
| E4 | 15 | 25 | 5 | 25000 | 2500 | 25 |



Luminaires Legend

X1 — 6.0m post top column, IP66, IK09, 3000K luminaire with Asymmetrical Suburban Street Optic (SO5) (5530lm/44W) as Kingfisher Italo 1 or equal and approved.

X2 — 6.0m post top column, IP66, IK09, 3000K luminaire with Asymmetrical Suburban Street Optic (STE-M) (5160lm/39W) as Kingfisher Italo 1 or equal and approved.

X3 — 2.5m building mounted, IP66, IK10 3000K luminaire with street optic (806lm/7.5W) as Kingfisher Quarto 2.0 or equal and approved.

X4 — 6m building mounted gloodlight, IP66, IK10 3000K luminaire (5400lm/47W) as Thorlux Starflood or equal and approved.

X5 — 7.5m building mounted gloodlight, IP66, IK10 3000K luminaire (5400lm/47W) as Thorlux Starflood or equal and approved.

* Denotes where a back light shield will be fitted to the luminaire to further reduce back spill

Isoline Legend

= 20 Lux
= 15 Lux
= 10 Lux
= 5 Lux
= 4 Lux
= 2 Lux
= 1 Lux
= 0.5 Lux

| Rev | Details: | By / Chkd / App | Date |
|---|---|---|---|
| P01 | Preliminary Issue | TB / LO | October 21 |

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Plymouth, Devon, PL1 3JY
Tel +44 (0)1752 255900 | www.sdsolution.co.uk

CLIENT

built on relationships

PROJECT TITLE
Hatfield Aerodrome
Hatfield
Hertfordshire

DRAWING TITLE
Lighting Impact Assessment
External Lighting
(Maintained levels of illuminance shown)

SCALE AT A1
1:1250

DISCIPLINE
Electrical

DRAWING NUMBER
06249L-SDS-EX-XX-DR-E-7080-01
Project - Originator - Zone - Level - Type - Role - NBS class - Sequential Number

STATUS
Preliminary

ISSUE
P01

# Appendix C

## Site Plan showing Lighting Layout and Levels of Illuminance - 100% output shown - for assessment purposes

A1 - DO NOT SCALE

N

## Lighting Notes

1. Do not scale from this drawing.
2. All measurements are in millimeters unless stated otherwise.
3. This drawing shall be read in conjunction with all relevant architectural, structural, mechanical and electrical services information.
4. This drawing is provided for planning purposes only to show the external lighting strategy.
5. This drawing should be read in conjunction with the Lighting Impact Assessment report 06249E-SDS-EX-XX-RO-E-7080-01.
6. Levels of illuminance are calculated and shown at ground level with a maintenance factor of 1.
7. Isolines contours represent values of illuminance calculated in lux.
8. All equipment has been specified to achieve a 25 year design life.
9. All equipment and their materials shall be non-corrosive and suitable for the environment or must be specified with the appropriate protection
10. All external lighting has been designed to BS EN 12464-2:2014 light and lighting - lighting of outdoor work places.
11. The external lighting has been designed to minimise the impact on the environment. All luminaries have been specified in 3000K warm white. Building mounted luminaries selected have 0% upward light ratio; the complete external lighting scheme as shown, has an upward light ratio of 0%.
12. All external luminaires to be controlled via a photocell and time-clock control preventing operation of the external lighting when there are adequate daylight levels.
13. The site has been assumed to fall into Environmental Zone E3 in accordance with a suburban location.
14. The external lighting shall be in compliance with the ILP Guidance Note 1 for the reduction of obtrusive light 2021 and CIBSE SLL LG21 Protecting the night-time environment.
15. Lighting columns shall comply with all relevant standards, legislation, codes of practice, and industry good practice. In particular, but not limited to, lighting columns shall comply with BS EN 40.
16. The building scheme and internal layouts have not been sufficiently developed to provide detail on the layout of the external emergency lighting and final exit luminaires.These will be developed during the technical design stage by others.
17. All emergency lighting to be developed at technical design stage by others.
18. No signage, facade or decorative architectural lighting is proposed throughout the site.

Table 2 - Obtrusive Limitations for Exterior Lighting Installations - General Observers

| Environmental Zone | Sky Glow ULR [Max %] | Light Intrusion (into Windows) Ev [lux] | | Luminaire Intensity I [candelas] | | Building Luminance Pre-Curfew |
|---|---|---|---|---|---|---|
| | | Pre-Curfew | Post Curfew | Pre-Curfew | Post Curfew | Average L [cc/m²] |
| E0 | 0 | 0 | 0 | 0 | 0 | 0 |
| E1 | 0 | 2 | 0 | 2500 | 0 | 0 |
| E2 | 2.5 | 5 | 1 | 7500 | 500 | 5 |
| E3 | 5.0 | 10 | 2 | 10000 | 1000 | 10 |
| E4 | 15 | 25 | 5 | 25000 | 2500 | 25 |




## Luminaires Legend

X1 — 6.0m post top column, IP66, IK09, 3000K luminaire with Asymmetrical Suburban Street Optic (SO5) (5530lm/44W) as Kingfisher Italo 1 or equal and approved.

X2 — 6.0m post top column, IP66, IK09, 3000K luminaire with Asymmetrical Suburban Street Optic (STE-M) (5160lm/39W) as Kingfisher Italo 1 or equal and approved.

X3 — 2.5m building mounted, IP66, IK10 3000K luminaire with street optic (806lm/7.5W) as Kingfisher Quarto 2.0 or equal and approved.

X4 — 6m building mounted gloodlight, IP66, IK10 3000K luminaire (5400lm/47W) as Thorlux Starflood or equal and approved.

X5 — 7.5m building mounted gloodlight, IP66, IK10 3000K luminaire (5400lm/47W) as Thorlux Starflood or equal and approved.

* Denotes where a back light shield will be fitted to the luminaire to further reduce back spill

## Isoline Legend

= 20 Lux
= 15 Lux
= 10 Lux
= 5 Lux
= 4 Lux
= 2 Lux
= 1 Lux
= 0.5 Lux

| Rev | Details: | By / Chkd / App | Date |
|---|---|---|---|
| P01 | Preliminary Issue | TB / LO | October 21 |

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CLIENT
built on relationships

PROJECT TITLE
Hatfield Aerodrome
Hatfield
Hertfordshire

DRAWING TITLE
Lighting Impact Assessment
External Lighting
(100% Full Output Shown)

SCALE AT A1
1:1250

DISCIPLINE
Electrical

DRAWING NUMBER
06249L-SDS-EX-XX-DR-E-7080-02
Project - Originator - Zone - Level - Type - Role - NBS class - Sequential Number

STATUS
Preliminary

ISSUE
P01

# Appendix D

## Calculation Summary

# 06249L-SDS-EX-XX-CA-E-7080-01

## Installation : External Lighting

| | | |
|---|---|---|
| Project number | : | 06249L BG Hatfield Aerodrome |
| Customer | : | Brett |
| Processed by | : | Services Design Solution |
| Date | : | October 2021 |

Engineering Consultants

## Table of contents

# 1 Luminaire data

## 1.1 AEC ILLUMINAZIONE SRL, ITALO 1 0F2H1 S05 4.5-... (44w (3 module) ...)

### 1.1.1 Data sheet

**Manufacturer: AEC ILLUMINAZIONE SRL**

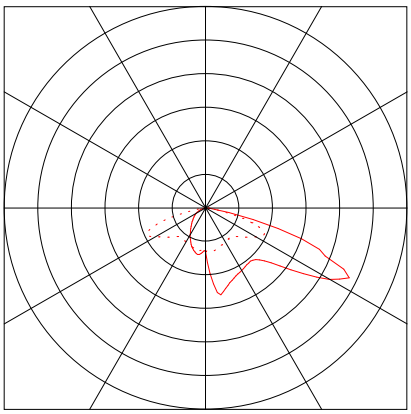
**44w (3 module) 525mA Italo 1 with S05 Optic** **ITALO 1 0F2H1 S05 4.5-3M**

**Luminaire data**

| | | |
|---|---|---|
| Luminaire efficiency | : | 100% |
| Luminaire efficacy | : | 125.68 lm/W |
| Classification | : | A20 ↓100.0% ↑0.0% |
| CIE Flux Codes | : | 27 61 96 100 100 |
| UGR 4H 8H | : | 38.9 / 35.7 |
| Power | : | 44 W |
| Luminous flux | : | 5530 lm |
| Dimensions | : | 220 mm x 120 mm x 1 mm |

**Equipped with**

| | | |
|---|---|---|
| Quantity | : | 1 |
| Designation | : | L-IT1-0F2H1-4000-525-3M |
| Colour | : | |
| Luminous flux | : | 5530 lm |



# 1 Luminaire data

## 1.2 not a Relux Member, Product (*9DFBD*)

### 1.2.1 Data sheet

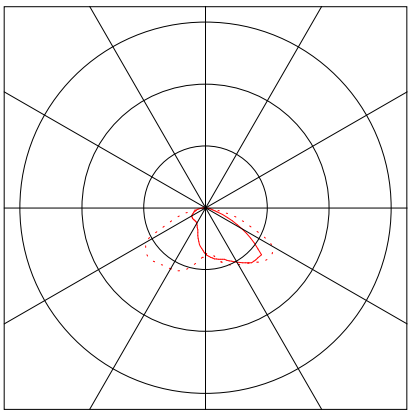
**Manufacturer: not a Relux Member**

***9DFBD*** **Product**
***not licensed***

| **Luminaire data** | | |
|---|---|---|
| Luminaire efficiency | : | 99.9% |
| Luminaire efficacy | : | 100.65 lm/W |
| Classification | : | A30 ↓100.0% ↑0.0% |
| CIE Flux Codes | : | 30 68 95 100 100 |
| UGR 4H 8H | : | 25.9 / 28.7 |
| Power | : | 8 W |
| Luminous flux | : | 805.2 lm |

| **Equipped with** | | |
|---|---|---|
| Quantity | : | 1 |
| Designation | : | 7.5w LED |
| Colour | : | |
| Luminous flux | : | 806 lm |

Dimensions : 175 mm x 175 mm x 1 mm



# 1 Luminaire data

## 1.3 AEC ILLUMINAZIONE SRL, ITALO 1 0F3 STE-M 4.5-... (39w (2 module) ...)

### 1.3.1 Data sheet

**Manufacturer: AEC ILLUMINAZIONE SRL**

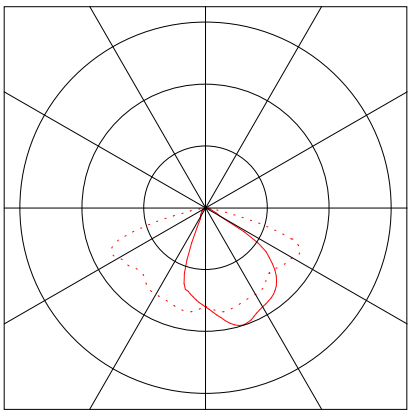
**39w (2 module) 525mA Italo 1 with STE-M Optic** **ITALO 1 0F3 STE-M 4.5-2M**

**Luminaire data**

| | | |
|---|---|---|
| Luminaire efficiency | : | 100% |
| Luminaire efficacy | : | 132.31 lm/W |
| Classification | : | A40 ↓100.0% ↑0.0% |
| CIE Flux Codes | : | 44 79 98 100 100 |
| UGR 4H 8H | : | 32.5 / 39.2 |
| Power | : | 39 W |
| Luminous flux | : | 5160 lm |
| Dimensions | : | 220 mm x 60 mm x 1 mm |

**Equipped with**

| | | |
|---|---|---|
| Quantity | : | 1 |
| Designation | : | L-IT1-0F3-4000-525-2M-70 |
| Colour | | |
| Luminous flux | : | 5160 lm |



# 1 Luminaire data

## 1.4 Thorlux, Starflood LED (STF17571)

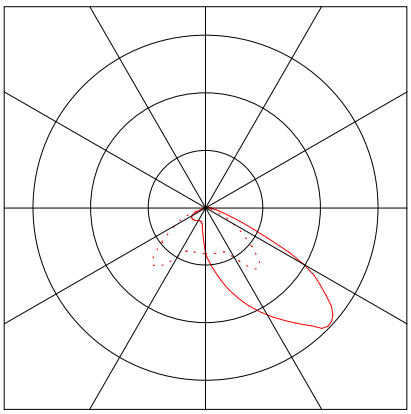
### 1.4.1 Data sheet

**Manufacturer: Thorlux**

**STF17571 Starflood LED**

| **Luminaire data** | | |
|---|---|---|
| Luminaire efficiency | : | 100% |
| Luminaire efficacy | : | 114.89 lm/W |
| Classification | : | A30 ↓98.2% ↑1.8% |
| CIE Flux Codes | : | 34 79 97 98 100 |
| UGR 4H 8H | : | 34.9 / 30.1 |
| Power | : | 47 W |
| Luminous flux | : | 5400 lm |
| Dimensions | : | 240 mm x 380 mm x 135 mm |

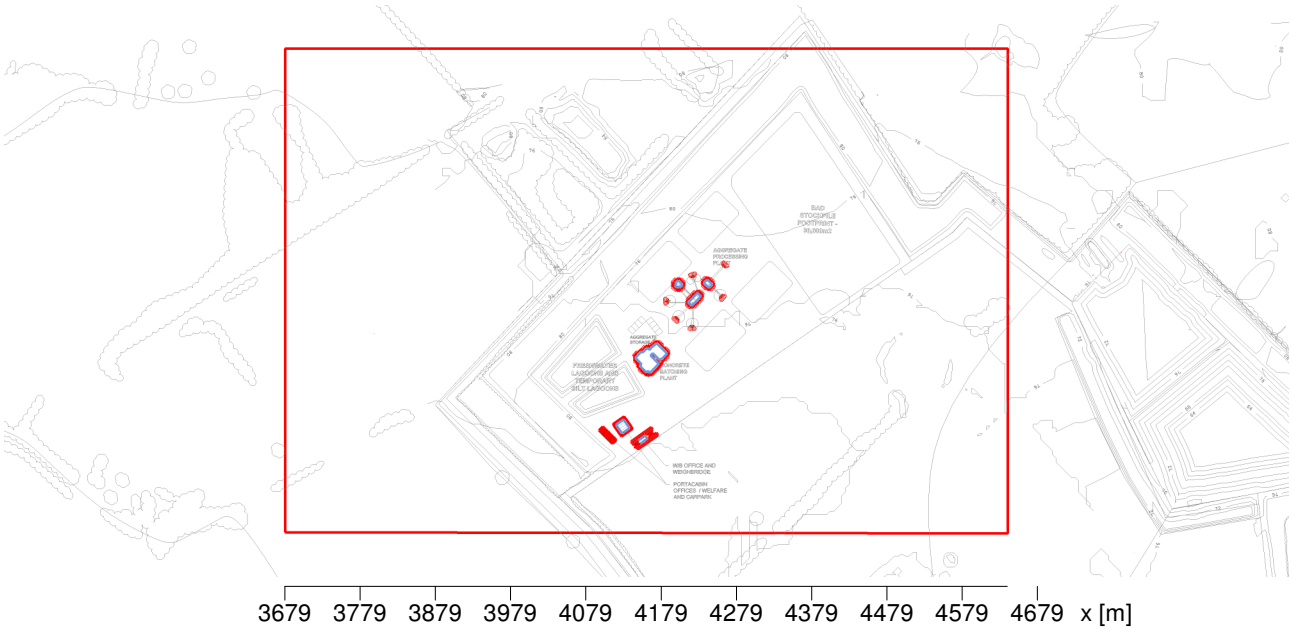
| **Equipped with** | | |
|---|---|---|
| Quantity | : | 1 |
| Designation | : | 42W LED |
| Colour | : | 4000 |
| Luminous flux | : | 5400 lm |
| Colour reproduction | : | 70 |

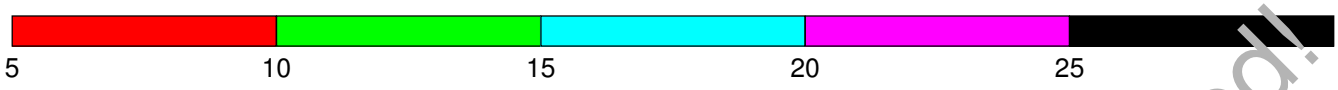


# 2 Exterior 1

## 2.1 Summary, Exterior 1

### 2.1.1 Result overview, Car Park




**General**

| | |
|---|---|
| Calculation algorithm used | Average indirect fraction |
| Height of evaluation surface | 0.00 m |
| Maintenance factor | 0.84 |
| Total luminous flux of all lamps | 226584 lm |
| Total power | 1954 W |
| Total power per area (617040.00 m²) | 0.00 W/m² |
| Upward light ratio (ULR) | 0.01 |

**Illuminance**

| | | |
|---|---|---|
| Average illuminance | Em | 24.5 lx |
| Minimum illuminance | Emin | 8.1 lx |
| Maximum illuminance | Emax | 49.3 lx |
| Uniformity Uo | Emin/Em | 1:3.01 (0.33) |
| Diversity Ud | Emin/Emax | 1:6.07 (0.16) |

**Type No.\Make**

**AEC ILLUMINAZIONE SRL**

1 2

Order No. : 44w (3 module) 525mA Italo 1 with S05 Optic
Luminaire name : ITALO 1 0F2H1 S05 4.5-3M
Equipment : 1 x L-IT1-0F2H1-4000-525-3M-70-25 44 W / 5530 lm

3 4

Order No. : 39w (2 module) 525mA Italo 1 with STE-M Optic
Luminaire name : ITALO 1 0F3 STE-M 4.5-2M
Equipment : 1 x L-IT1-0F3-4000-525-2M-70-25 39 W / 5160 lm

The ULR value has been calculated without obstruction by other objects.

# 2 Exterior 1

## 2.1 Summary, Exterior 1

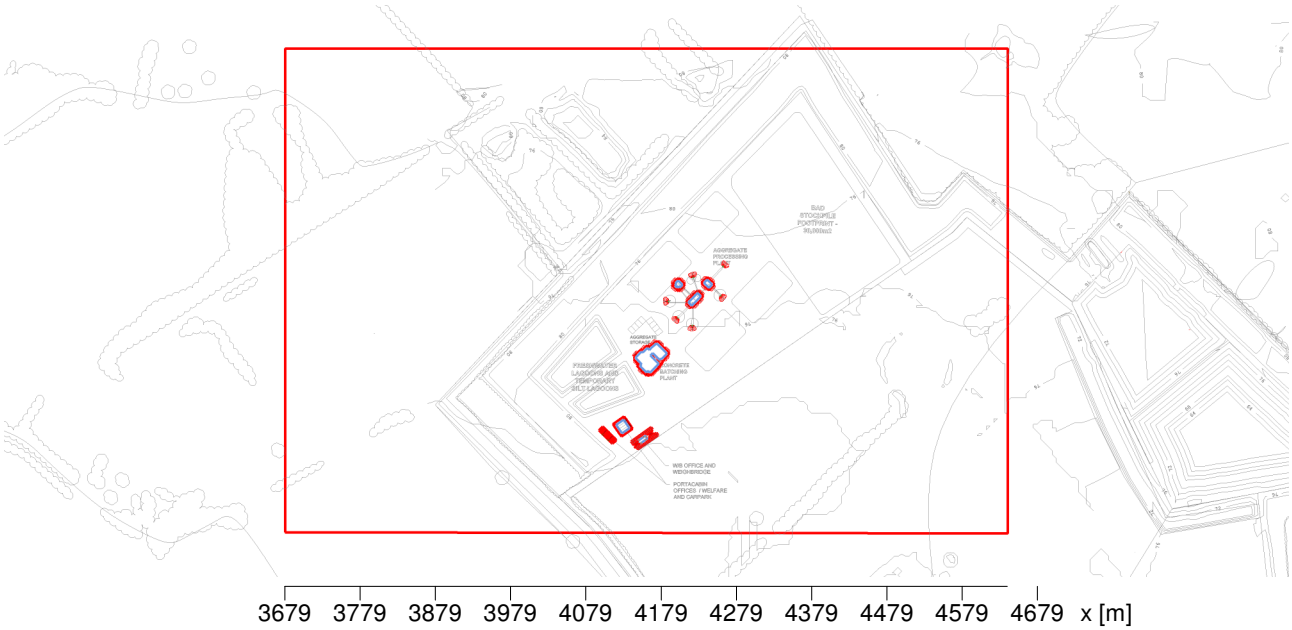
### 2.1.1 Result overview, Car Park

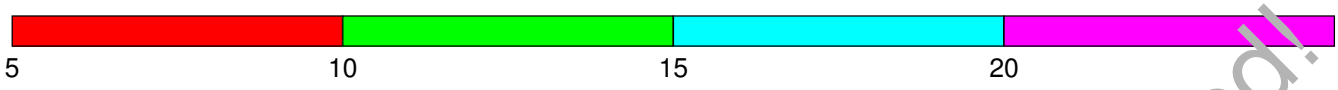
2 14 **not a Relux Member**
Order No. : *9DFBD*
Luminaire name : Product
Equipment : 1 x 7.5w LED 8 W / 806 lm

4 34 **Thorlux**
Order No. : STF17571
Luminaire name : Starflood LED
Equipment : 1 x 42W LED 47 W / 5400 lm

## 2.1 Summary, Exterior 1

### 2.1.2 Result overview, Portacabin 1




Illuminance [lx]

**General**

| | |
|---|---|
| Calculation algorithm used | Average indirect fraction |
| Height of evaluation surface | 0.00 m |
| Maintenance factor | 0.84 |
| Total luminous flux of all lamps | 226584 lm |
| Total power | 1954 W |
| Total power per area (617040.00 m²) | 0.00 W/m² |
| Upward light ratio (ULR) | 0.01 |

**Illuminance**

| | | |
|---|---|---|
| Average illuminance | Em | 15.2 lx |
| Minimum illuminance | Emin | 0.9 lx |
| Maximum illuminance | Emax | 22.3 lx |
| Uniformity Uo | Emin/Em | 1:2.22 (0.45) |
| Diversity Ud | Emin/Emax | 1:3.32 (0.3) |

**Type No.\Make**

**AEC ILLUMINAZIONE SRL**

1 2

Order No. : 44w (3 module) 525mA Italo 1 with S05 Optic
Luminaire name : ITALO 1 0F2H1 S05 4.5-3M
Equipment : 1 x L-IT1-0F2H1-4000-525-3M-70-25 44 W / 5530 lm

3 4

Order No. : 39w (2 module) 525mA Italo 1 with STE-M Optic
Luminaire name : ITALO 1 0F3 STE-M 4.5-2M
Equipment : 1 x L-IT1-0F3-4000-525-2M-70-25 39 W / 5160 lm

The ULR value has been calculated without obstruction by other objects.

## 2.1 Summary, Exterior 1

### 2.1.2 Result overview, Portacabin 1

**not a Relux Member**

2 14

Order No. : *9DFBD*
Luminaire name : Product
Equipment : 1 x 7.5w LED 8 W / 806 lm

**Thorlux**

4 34

Order No. : STF17571
Luminaire name : Starflood LED
Equipment : 1 x 42W LED 47 W / 5400 lm

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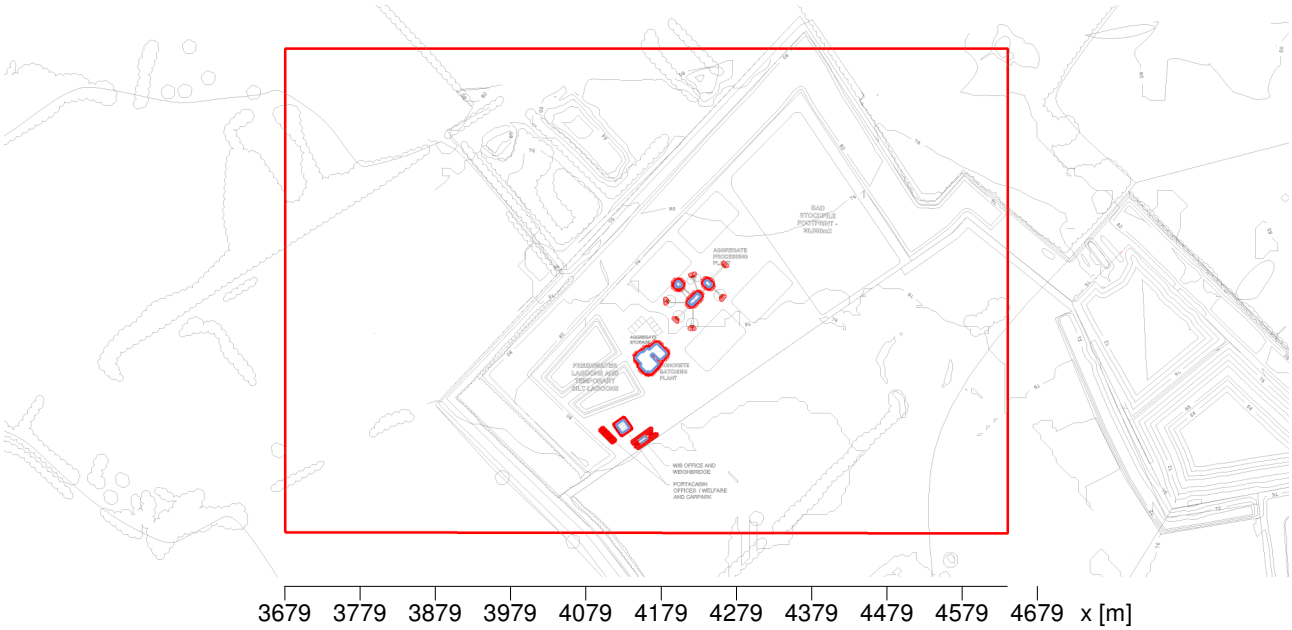
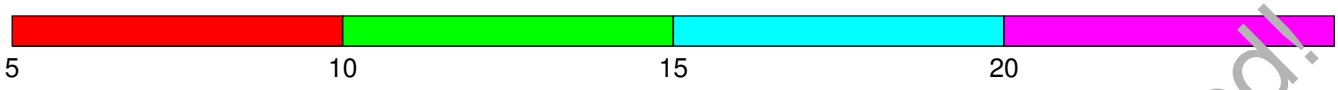
## 2.1 Summary, Exterior 1

### 2.1.3 Result overview, Portacabin 2




Illuminance [lx]

**General**

| | |
|---|---|
| Calculation algorithm used | Average indirect fraction |
| Height of evaluation surface | 0.00 m |
| Maintenance factor | 0.84 |
| Total luminous flux of all lamps | 226584 lm |
| Total power | 1954 W |
| Total power per area (617040.00 m²) | 0.00 W/m² |
| Upward light ratio (ULR) | 0.01 |

**Illuminance**

| | | |
|---|---|---|
| Average illuminance | Em | 16.5 lx |
| Minimum illuminance | Emin | 1.6 lx |
| Maximum illuminance | Emax | 23.2 lx |
| Uniformity Uo | Emin/Em | 1:2.17 (0.46) |
| Diversity Ud | Emin/Emax | 1:3.05 (0.33) |

**Type No.\Make**

**AEC ILLUMINAZIONE SRL**

1 2

Order No. : 44w (3 module) 525mA Italo 1 with S05 Optic
Luminaire name : ITALO 1 0F2H1 S05 4.5-3M
Equipment : 1 x L-IT1-0F2H1-4000-525-3M-70-25 44 W / 5530 lm

3 4

Order No. : 39w (2 module) 525mA Italo 1 with STE-M Optic
Luminaire name : ITALO 1 0F3 STE-M 4.5-2M
Equipment : 1 x L-IT1-0F3-4000-525-2M-70-25 39 W / 5160 lm

The ULR value has been calculated without obstruction by other objects.

## 2.1 Summary, Exterior 1

### 2.1.3 Result overview, Portacabin 2

**not a Relux Member**

2 14

Order No. : *9DFBD*
Luminaire name : Product
Equipment : 1 x 7.5w LED 8 W / 806 lm

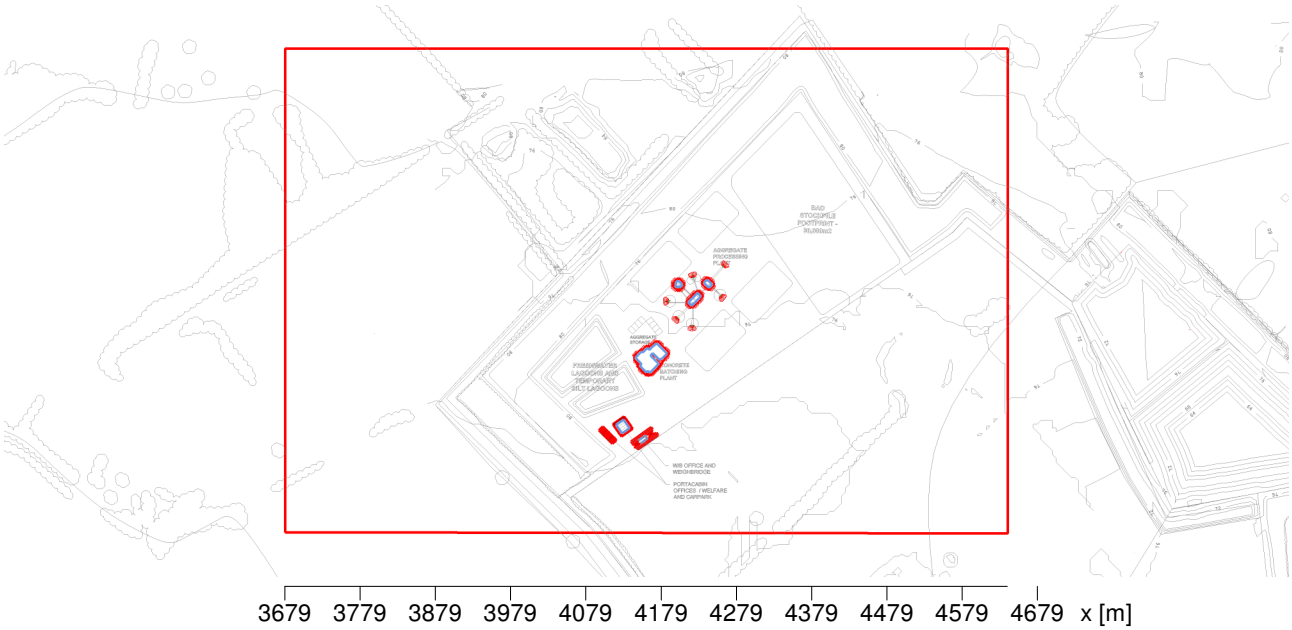
**Thorlux**

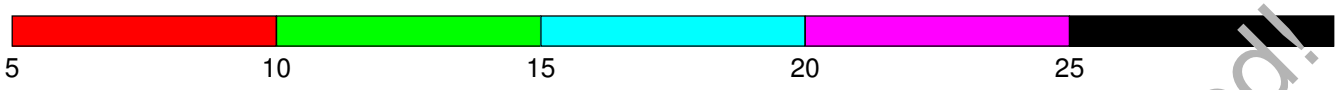
4 34

Order No. : STF17571
Luminaire name : Starflood LED
Equipment : 1 x 42W LED 47 W / 5400 lm

## 2.1 Summary, Exterior 1

### 2.1.4 Result overview, Portacabin 3




Illuminance [lx]

**General**

| | |
|---|---|
| Calculation algorithm used | Average indirect fraction |
| Height of evaluation surface | 0.00 m |
| Maintenance factor | 0.84 |
| Total luminous flux of all lamps | 226584 lm |
| Total power | 1954 W |
| Total power per area (617040.00 m²) | 0.00 W/m² |
| Upward light ratio (ULR) | 0.01 |

**Illuminance**

| | | |
|---|---|---|
| Average illuminance | Em | 15.3 lx |
| Minimum illuminance | Emin | 3.8 lx |
| Maximum illuminance | Emax | 25 lx |
| Uniformity Uo | Emin/Em | 1:2.63 (0.38) |
| Diversity Ud | Emin/Emax | 1:4.32 (0.23) |

**Type No.\Make**

**AEC ILLUMINAZIONE SRL**

1 2

Order No. : 44w (3 module) 525mA Italo 1 with S05 Optic
Luminaire name : ITALO 1 0F2H1 S05 4.5-3M
Equipment : 1 x L-IT1-0F2H1-4000-525-3M-70-25 44 W / 5530 lm

3 4

Order No. : 39w (2 module) 525mA Italo 1 with STE-M Optic
Luminaire name : ITALO 1 0F3 STE-M 4.5-2M
Equipment : 1 x L-IT1-0F3-4000-525-2M-70-25 39 W / 5160 lm

The ULR value has been calculated without obstruction by other objects.

## 2.1 Summary, Exterior 1

### 2.1.4 Result overview, Portacabin 3

**not a Relux Member**

2 14

Order No. : *9DFBD*
Luminaire name : Product
Equipment : 1 x 7.5w LED 8 W / 806 lm

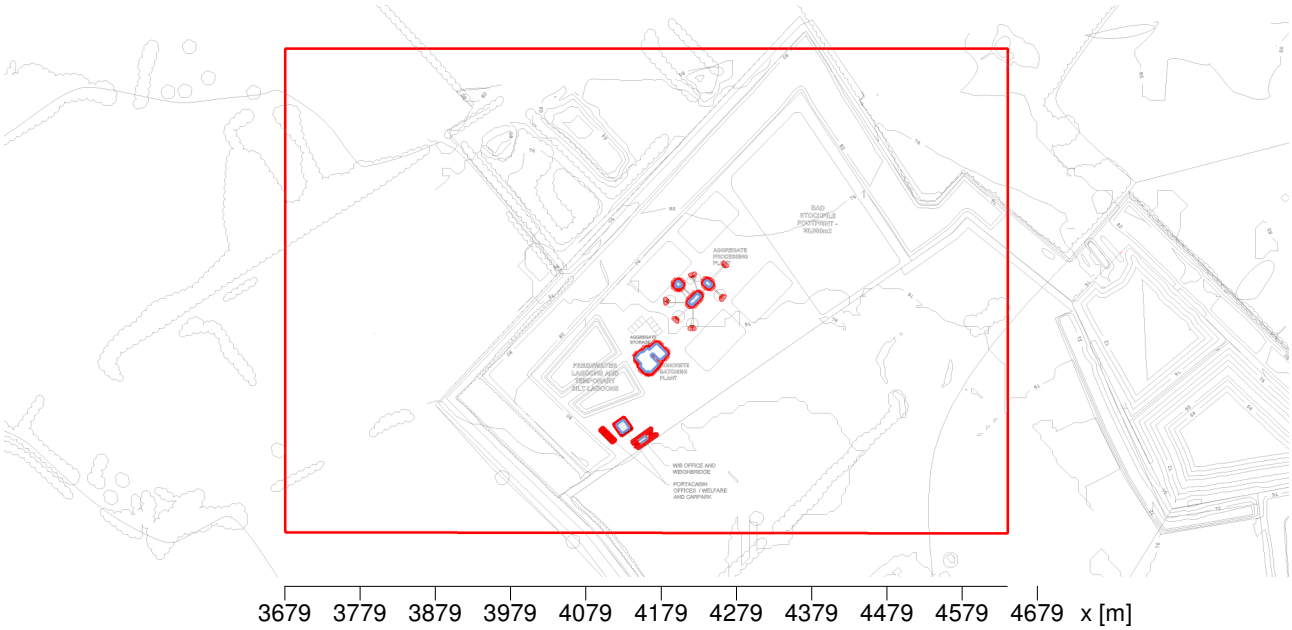
**Thorlux**

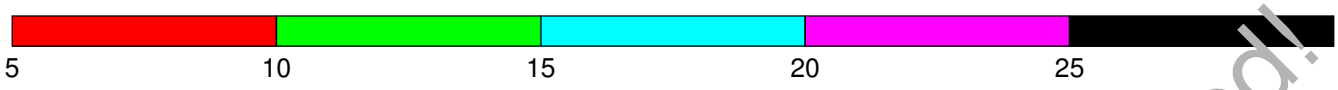
4 34

Order No. : STF17571
Luminaire name : Starflood LED
Equipment : 1 x 42W LED 47 W / 5400 lm

## 2.1 Summary, Exterior 1

### 2.1.5 Result overview, Portacabin 4




Illuminance [lx]

**General**

| | |
|---|---|
| Calculation algorithm used | Average indirect fraction |
| Height of evaluation surface | 0.00 m |
| Maintenance factor | 0.84 |
| Total luminous flux of all lamps | 226584 lm |
| Total power | 1954 W |
| Total power per area (617040.00 m²) | 0.00 W/m² |
| Upward light ratio (ULR) | 0.01 |

**Illuminance**

| | | |
|---|---|---|
| Average illuminance | Em | 15.4 lx |
| Minimum illuminance | Emin | 0.2 lx |
| Maximum illuminance | Emax | 25.1 lx |
| Uniformity Uo | Emin/Em | 1:2.49 (0.4) |
| Diversity Ud | Emin/Emax | 1:4.05 (0.25) |

**Type No.\Make**

**AEC ILLUMINAZIONE SRL**

1 2

Order No. : 44w (3 module) 525mA Italo 1 with S05 Optic
Luminaire name : ITALO 1 0F2H1 S05 4.5-3M
Equipment : 1 x L-IT1-0F2H1-4000-525-3M-70-25 44 W / 5530 lm

3 4

Order No. : 39w (2 module) 525mA Italo 1 with STE-M Optic
Luminaire name : ITALO 1 0F3 STE-M 4.5-2M
Equipment : 1 x L-IT1-0F3-4000-525-2M-70-25 39 W / 5160 lm

The ULR value has been calculated without obstruction by other objects.

## 2.1 Summary, Exterior 1

### 2.1.5 Result overview, Portacabin 4

**not a Relux Member**

2 14

Order No. : *9DFBD*
Luminaire name : Product
Equipment : 1 x 7.5w LED 8 W / 806 lm

**Thorlux**

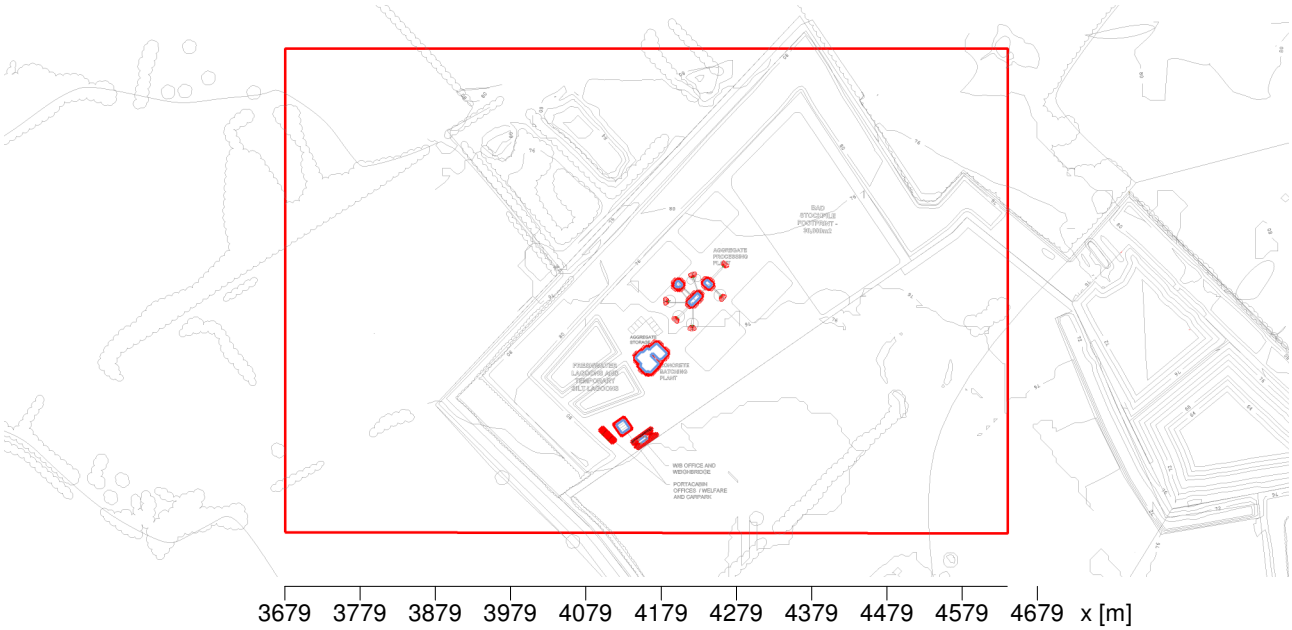
4 34

Order No. : STF17571
Luminaire name : Starflood LED
Equipment : 1 x 42W LED 47 W / 5400 lm

Engineering Consultants

## 2.1 Summary, Exterior 1

### 2.1.6 Result overview, Weighbridge 1





**General**

| | |
|---|---|
| Calculation algorithm used | Average indirect fraction |
| Height of evaluation surface | 0.00 m |
| Maintenance factor | 0.84 |
| Total luminous flux of all lamps | 226584 lm |
| Total power | 1954 W |
| Total power per area (617040.00 m²) | 0.00 W/m² |
| Upward light ratio (ULR) | 0.01 |

**Illuminance**

| | | |
|---|---|---|
| Average illuminance | Em | 22 lx |
| Minimum illuminance | Emin | 10 lx |
| Maximum illuminance | Emax | 42.5 lx |
| Uniformity Uo | Emin/Em | 1:2.19 (0.46) |
| Diversity Ud | Emin/Emax | 1:4.21 (0.24) |

**Type No.\Make**

**AEC ILLUMINAZIONE SRL**

1 2

Order No. : 44w (3 module) 525mA Italo 1 with S05 Optic
Luminaire name : ITALO 1 0F2H1 S05 4.5-3M
Equipment : 1 x L-IT1-0F2H1-4000-525-3M-70-25 44 W / 5530 lm

3 4

Order No. : 39w (2 module) 525mA Italo 1 with STE-M Optic
Luminaire name : ITALO 1 0F3 STE-M 4.5-2M
Equipment : 1 x L-IT1-0F3-4000-525-2M-70-25 39 W / 5160 lm

The ULR value has been calculated without obstruction by other objects.

## 2.1 Summary, Exterior 1

### 2.1.6 Result overview, Weighbridge 1

**not a Relux Member**

2 14

Order No. : *9DFBD*
Luminaire name : Product
Equipment : 1 x 7.5w LED 8 W / 806 lm

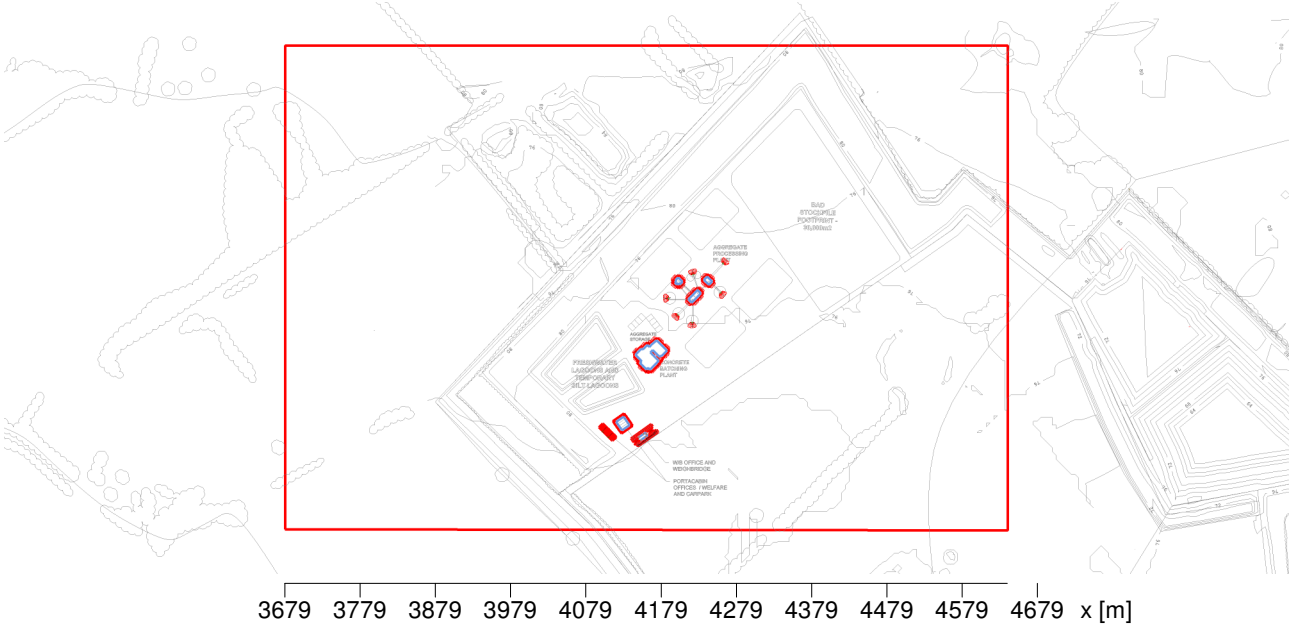
**Thorlux**

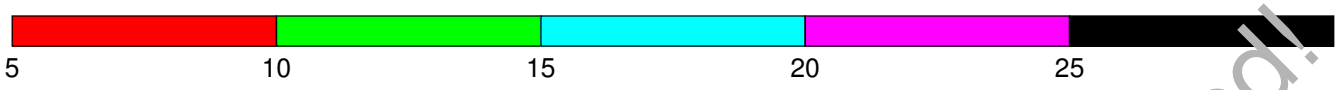
4 34

Order No. : STF17571
Luminaire name : Starflood LED
Equipment : 1 x 42W LED 47 W / 5400 lm

## 2.1 Summary, Exterior 1

### 2.1.7 Result overview, Weighbridge 2




Illuminance [lx]

**General**

| | |
|---|---|
| Calculation algorithm used | Average indirect fraction |
| Height of evaluation surface | 0.00 m |
| Maintenance factor | 0.84 |
| Total luminous flux of all lamps | 226584 lm |
| Total power | 1954 W |
| Total power per area (617040.00 m²) | 0.00 W/m² |
| Upward light ratio (ULR) | 0.01 |

**Illuminance**

| | | |
|---|---|---|
| Average illuminance | Em | 23.2 lx |
| Minimum illuminance | Emin | 9.7 lx |
| Maximum illuminance | Emax | 44.9 lx |
| Uniformity Uo | Emin/Em | 1:2.39 (0.42) |
| Diversity Ud | Emin/Emax | 1:4.63 (0.22) |

**Type No.\Make**

**AEC ILLUMINAZIONE SRL**

1 2

Order No. : 44w (3 module) 525mA Italo 1 with S05 Optic
Luminaire name : ITALO 1 0F2H1 S05 4.5-3M
Equipment : 1 x L-IT1-0F2H1-4000-525-3M-70-25 44 W / 5530 lm

3 4

Order No. : 39w (2 module) 525mA Italo 1 with STE-M Optic
Luminaire name : ITALO 1 0F3 STE-M 4.5-2M
Equipment : 1 x L-IT1-0F3-4000-525-2M-70-25 39 W / 5160 lm

The ULR value has been calculated without obstruction by other objects.

## 2.1 Summary, Exterior 1

### 2.1.7 Result overview, Weighbridge 2

**not a Relux Member**

2 14

Order No. : *9DFBD*
Luminaire name : Product
Equipment : 1 x 7.5w LED 8 W / 806 lm

**Thorlux**

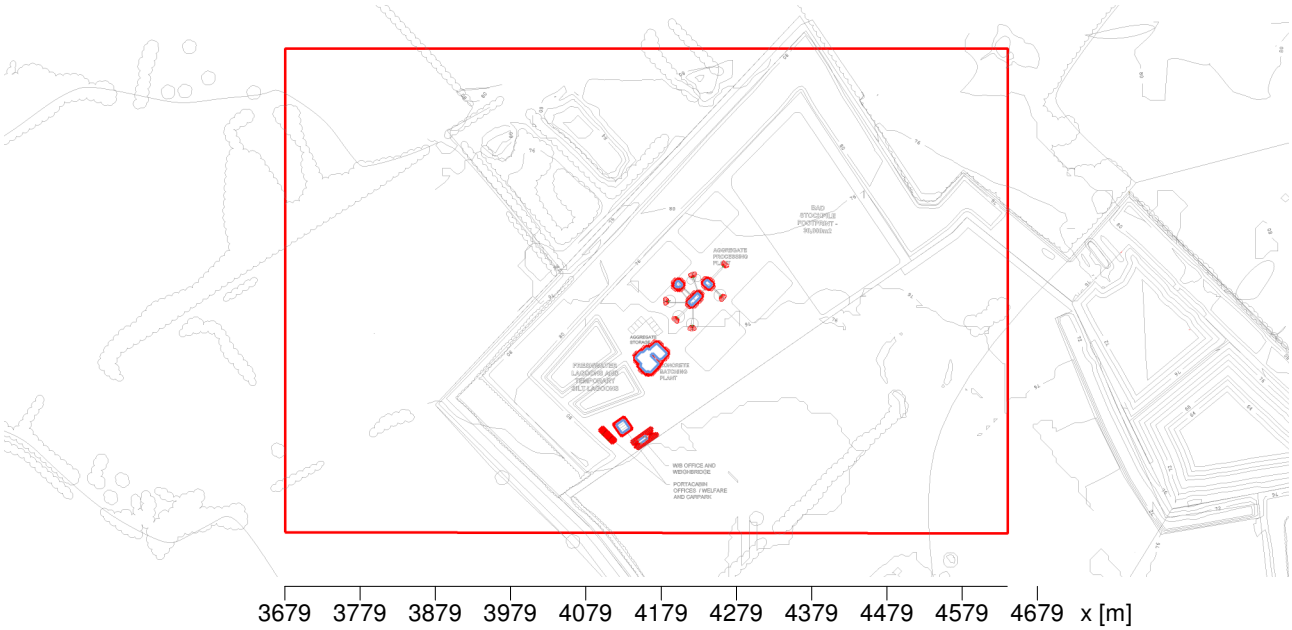
4 34

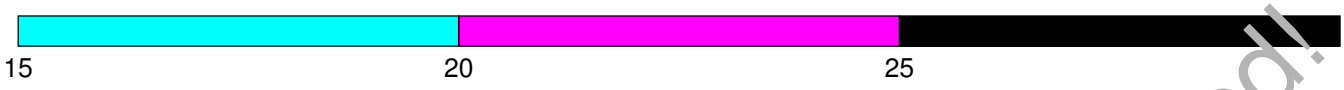
Order No. : STF17571
Luminaire name : Starflood LED
Equipment : 1 x 42W LED 47 W / 5400 lm

Engineering Consultants

## 2.1 Summary, Exterior 1

### 2.1.8 Result overview, Processing Building 1 Perimeter 1




Illuminance [lx]

**General**

| | |
|---|---|
| Calculation algorithm used | Average indirect fraction |
| Height of evaluation surface | -0.00 m |
| Maintenance factor | 0.84 |
| Total luminous flux of all lamps | 226584 lm |
| Total power | 1954 W |
| Total power per area (617040.00 m²) | 0.00 W/m² |
| Upward light ratio (ULR) | 0.01 |

**Illuminance**

| | | |
|---|---|---|
| Average illuminance | Em | 33.7 lx |
| Minimum illuminance | Emin | 17.3 lx |
| Maximum illuminance | Emax | 52.5 lx |
| Uniformity Uo | Emin/Em | 1:1.95 (0.51) |
| Diversity Ud | Emin/Emax | 1:3.04 (0.33) |

**Type No.\Make**

**AEC ILLUMINAZIONE SRL**

1 2

Order No. : 44w (3 module) 525mA Italo 1 with S05 Optic
Luminaire name : ITALO 1 0F2H1 S05 4.5-3M
Equipment : 1 x L-IT1-0F2H1-4000-525-3M-70-25 44 W / 5530 lm

3 4

Order No. : 39w (2 module) 525mA Italo 1 with STE-M Optic
Luminaire name : ITALO 1 0F3 STE-M 4.5-2M
Equipment : 1 x L-IT1-0F3-4000-525-2M-70-25 39 W / 5160 lm

The ULR value has been calculated without obstruction by other objects.

## 2.1 Summary, Exterior 1

### 2.1.8 Result overview, Processing Building 1 Perimeter 1

**not a Relux Member**

2 14

Order No. : *9DFBD*
Luminaire name : Product
Equipment : 1 x 7.5w LED 8 W / 806 lm

**Thorlux**

4 34

Order No. : STF17571
Luminaire name : Starflood LED
Equipment : 1 x 42W LED 47 W / 5400 lm

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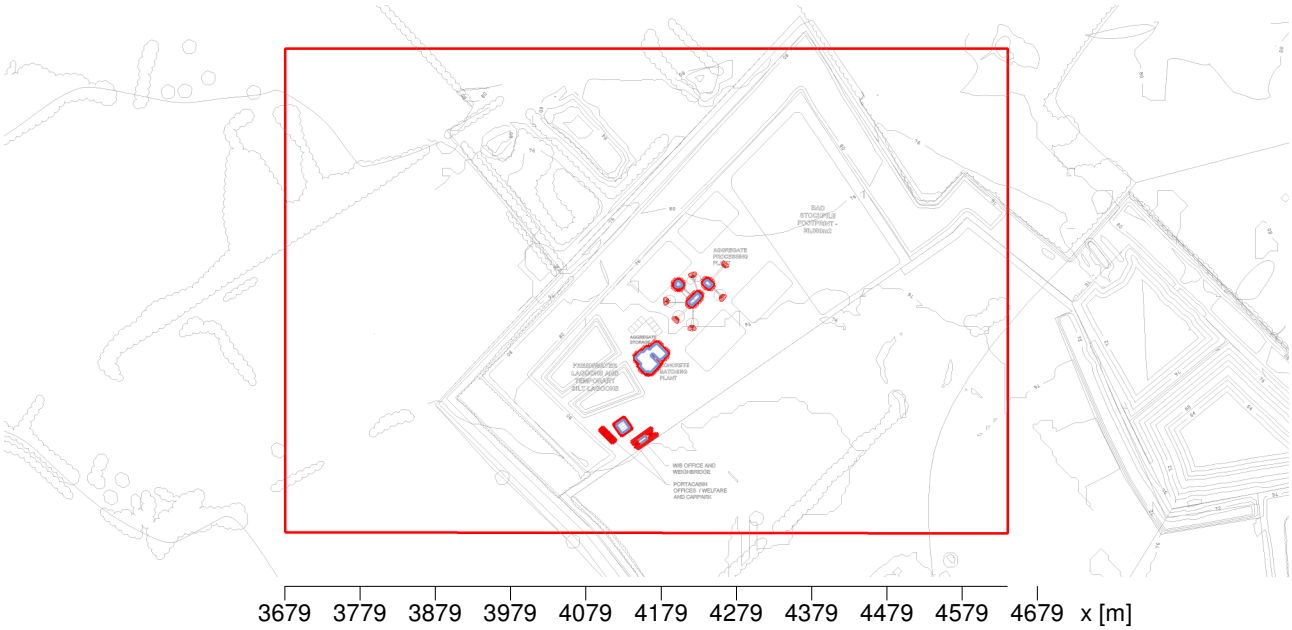
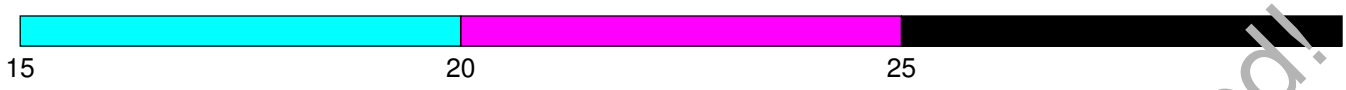
## 2.1 Summary, Exterior 1

### 2.1.9 Result overview, Processing Building 1 Perimeter 2




Illuminance [lx]

**General**

| | |
|---|---|
| Calculation algorithm used | Average indirect fraction |
| Height of evaluation surface | 0.00 m |
| Maintenance factor | 0.84 |
| Total luminous flux of all lamps | 226584 lm |
| Total power | 1954 W |
| Total power per area (617040.00 m²) | 0.00 W/m² |
| Upward light ratio (ULR) | 0.01 |

**Illuminance**

| | | |
|---|---|---|
| Average illuminance | Em | 32.2 lx |
| Minimum illuminance | Emin | 17.6 lx |
| Maximum illuminance | Emax | 51.5 lx |
| Uniformity Uo | Emin/Em | 1:1.83 (0.55) |
| Diversity Ud | Emin/Emax | 1:2.92 (0.34) |

**Type No.\Make**

**AEC ILLUMINAZIONE SRL**

1 2

Order No. : 44w (3 module) 525mA Italo 1 with S05 Optic
Luminaire name : ITALO 1 0F2H1 S05 4.5-3M
Equipment : 1 x L-IT1-0F2H1-4000-525-3M-70-25 44 W / 5530 lm

3 4

Order No. : 39w (2 module) 525mA Italo 1 with STE-M Optic
Luminaire name : ITALO 1 0F3 STE-M 4.5-2M
Equipment : 1 x L-IT1-0F3-4000-525-2M-70-25 39 W / 5160 lm

The ULR value has been calculated without obstruction by other objects.

## 2.1 Summary, Exterior 1

### 2.1.9 Result overview, Processing Building 1 Perimeter 2

**not a Relux Member**

2 14

Order No. : *9DFBD*
Luminaire name : Product
Equipment : 1 x 7.5w LED 8 W / 806 lm

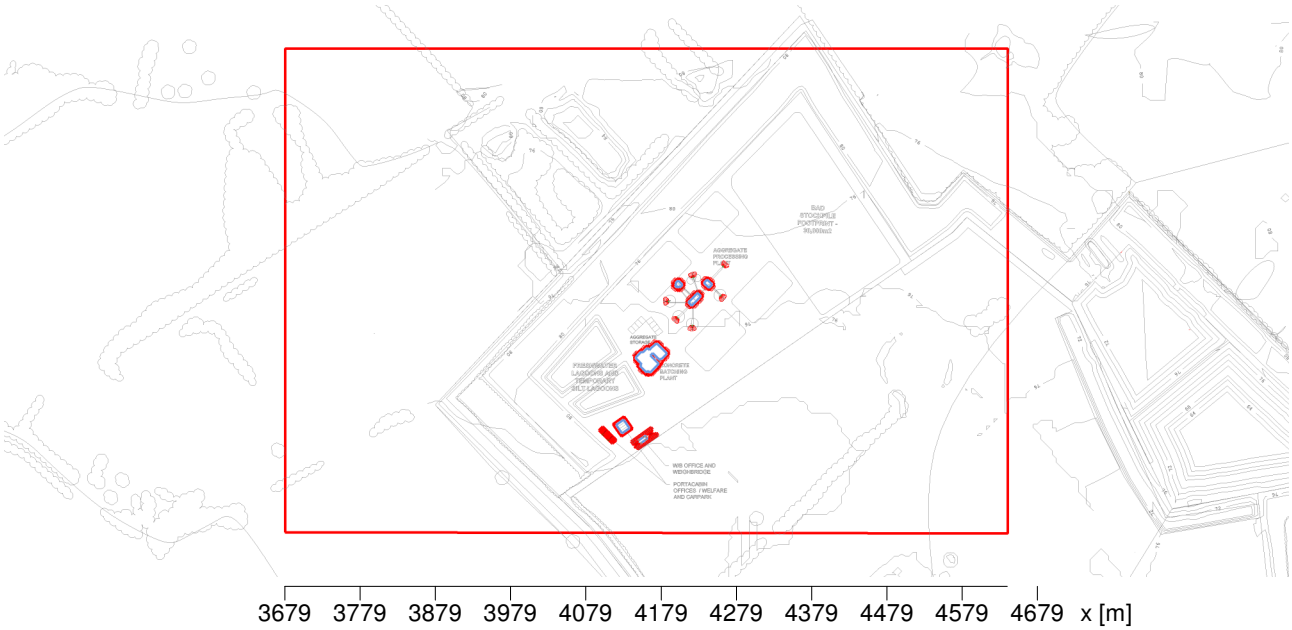
**Thorlux**

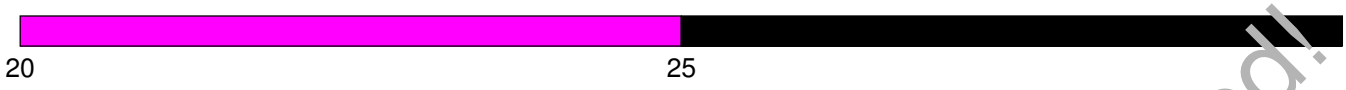
4 34

Order No. : STF17571
Luminaire name : Starflood LED
Equipment : 1 x 42W LED 47 W / 5400 lm

## 2.1 Summary, Exterior 1

### 2.1.10 Result overview, Processing Building 1 Perimeter 3




Illuminance [lx]

**General**

| | |
|---|---|
| Calculation algorithm used | Average indirect fraction |
| Height of evaluation surface | 0.00 m |
| Maintenance factor | 0.84 |
| Total luminous flux of all lamps | 226584 lm |
| Total power | 1954 W |
| Total power per area (617040.00 m²) | 0.00 W/m² |
| Upward light ratio (ULR) | 0.01 |

**Illuminance**

| | | |
|---|---|---|
| Average illuminance | Em | 33.6 lx |
| Minimum illuminance | Emin | 20.7 lx |
| Maximum illuminance | Emax | 40.9 lx |
| Uniformity Uo | Emin/Em | 1:1.62 (0.62) |
| Diversity Ud | Emin/Emax | 1:1.97 (0.51) |

**Type No.\Make**

**AEC ILLUMINAZIONE SRL**

1 2

Order No. : 44w (3 module) 525mA Italo 1 with S05 Optic
Luminaire name : ITALO 1 0F2H1 S05 4.5-3M
Equipment : 1 x L-IT1-0F2H1-4000-525-3M-70-25 44 W / 5530 lm

3 4

Order No. : 39w (2 module) 525mA Italo 1 with STE-M Optic
Luminaire name : ITALO 1 0F3 STE-M 4.5-2M
Equipment : 1 x L-IT1-0F3-4000-525-2M-70-25 39 W / 5160 lm

The ULR value has been calculated without obstruction by other objects.

## 2.1 Summary, Exterior 1

### 2.1.10 Result overview, Processing Building 1 Perimeter 3

**not a Relux Member**

2 14 

Order No. : *9DFBD*
Luminaire name : Product
Equipment : 1 x 7.5w LED 8 W / 806 lm

**Thorlux**

4 34 

Order No. : STF17571
Luminaire name : Starflood LED
Equipment : 1 x 42W LED 47 W / 5400 lm

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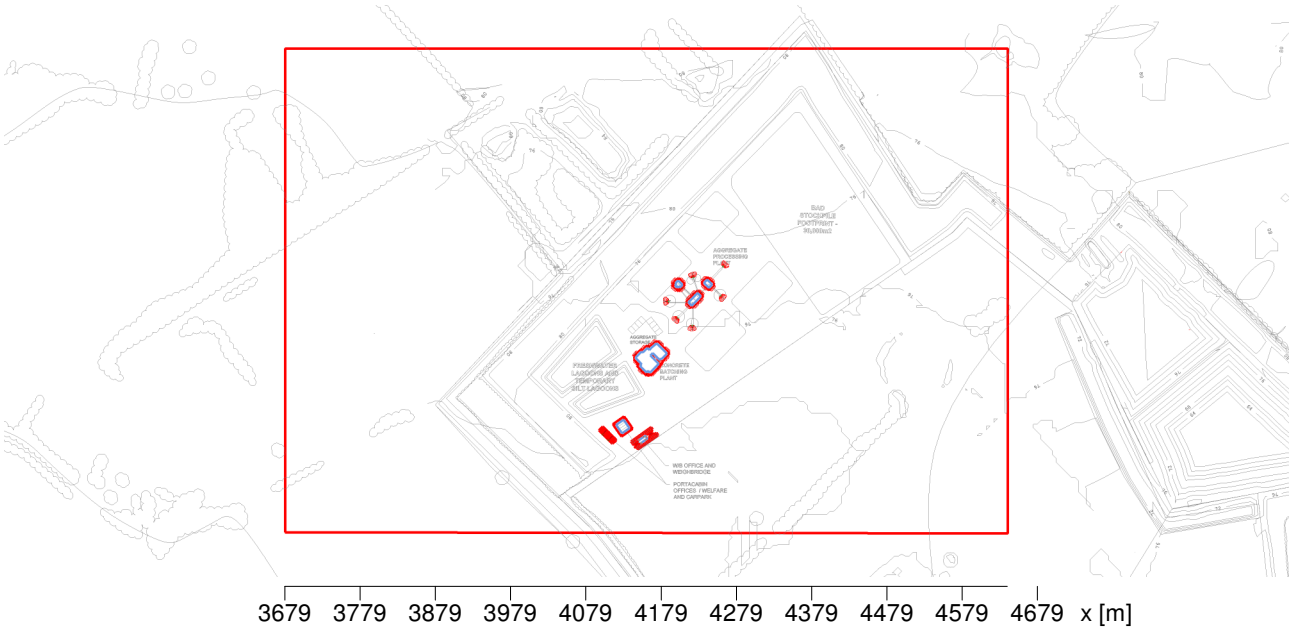
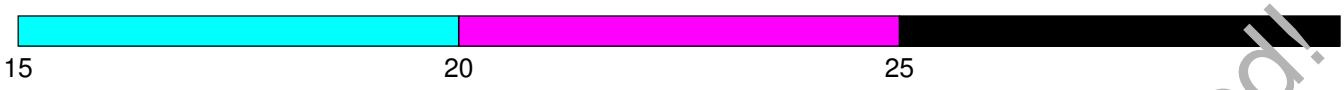
## 2.1 Summary, Exterior 1

### 2.1.11 Result overview, Processing Building 1 Perimeter 4




Illuminance [lx]

**General**

| | |
|---|---|
| Calculation algorithm used | Average indirect fraction |
| Height of evaluation surface | -0.00 m |
| Maintenance factor | 0.84 |
| Total luminous flux of all lamps | 226584 lm |
| Total power | 1954 W |
| Total power per area (617040.00 m²) | 0.00 W/m² |
| Upward light ratio (ULR) | 0.01 |

**Illuminance**

| | | |
|---|---|---|
| Average illuminance | Em | 31.8 lx |
| Minimum illuminance | Emin | 7.[illegible] lx |
| Maximum illuminance | Emax | 42.[illegible] lx |
| Uniformity Uo | Emin/Em | 1:1.87 (0.53) |
| Diversity Ud | Emin/Emax | 1:2.52 (0.4) |

**Type No.\Make**

**AEC ILLUMINAZIONE SRL**

1 2

Order No. : 44w (3 module) 525mA Italo 1 with S05 Optic
Luminaire name : ITALO 1 0F2H1 S05 4.5-3M
Equipment : 1 x L-IT1-0F2H1-4000-525-3M-70-25 44 W / 5530 lm

3 4

Order No. : 39w (2 module) 525mA Italo 1 with STE-M Optic
Luminaire name : ITALO 1 0F3 STE-M 4.5-2M
Equipment : 1 x L-IT1-0F3-4000-525-2M-70-25 39 W / 5160 lm

The ULR value has been calculated without obstruction by other objects.

## 2.1 Summary, Exterior 1

### 2.1.11 Result overview, Processing Building 1 Perimeter 4

**not a Relux Member**

2 14 

Order No. : *9DFBD*
Luminaire name : Product
Equipment : 1 x 7.5w LED 8 W / 806 lm

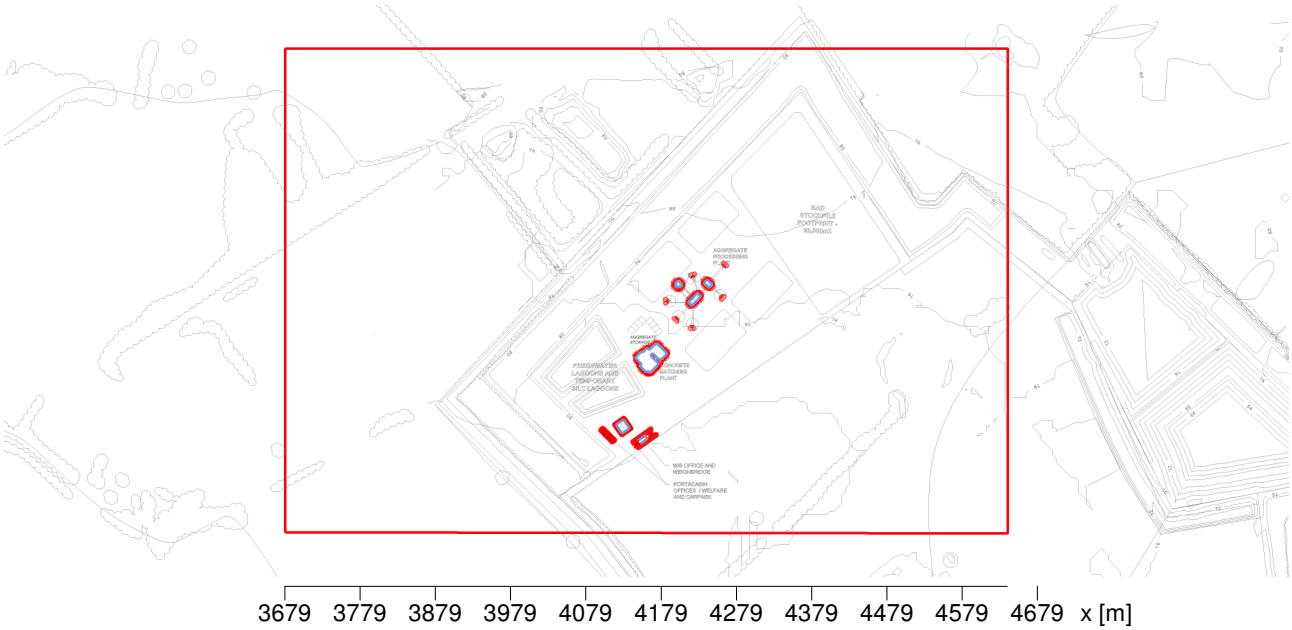
**Thorlux**

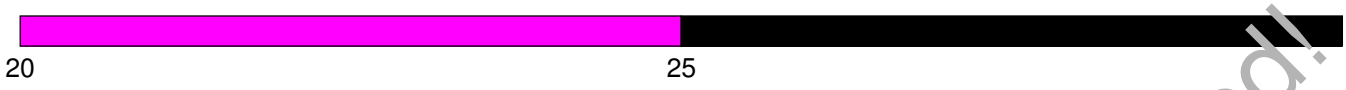
4 34 

Order No. : STF17571
Luminaire name : Starflood LED
Equipment : 1 x 42W LED 47 W / 5400 lm

## 2.1 Summary, Exterior 1

### 2.1.12 Result overview, Processing Building 2 Perimeter 1




Illuminance [lx]

**General**

| | |
|---|---|
| Calculation algorithm used | Average indirect fraction |
| Height of evaluation surface | 0.00 m |
| Maintenance factor | 0.84 |
| Total luminous flux of all lamps | 226584 lm |
| Total power | 1954 W |
| Total power per area (617040.00 m²) | 0.00 W/m² |
| Upward light ratio (ULR) | 0.01 |

**Illuminance**

| | | |
|---|---|---|
| Average illuminance | Em | 31.9 lx |
| Minimum illuminance | Emin | 20.1 lx |
| Maximum illuminance | Emax | 41.9 lx |
| Uniformity Uo | Emin/Em | 1:1.59 (0.63) |
| Diversity Ud | Emin/Emax | 1:2.08 (0.48) |

**Type No.\Make**

**AEC ILLUMINAZIONE SRL**

1 2

Order No. : 44w (3 module) 525mA Italo 1 with S05 Optic
Luminaire name : ITALO 1 0F2H1 S05 4.5-3M
Equipment : 1 x L-IT1-0F2H1-4000-525-3M-70-25 44 W / 5530 lm

3 4

Order No. : 39w (2 module) 525mA Italo 1 with STE-M Optic
Luminaire name : ITALO 1 0F3 STE-M 4.5-2M
Equipment : 1 x L-IT1-0F3-4000-525-2M-70-25 39 W / 5160 lm

The ULR value has been calculated without obstruction by other objects.

## 2.1 Summary, Exterior 1

### 2.1.12 Result overview, Processing Building 2 Perimeter 1

**not a Relux Member**

2 14

Order No. : *9DFBD*
Luminaire name : Product
Equipment : 1 x 7.5w LED 8 W / 806 lm

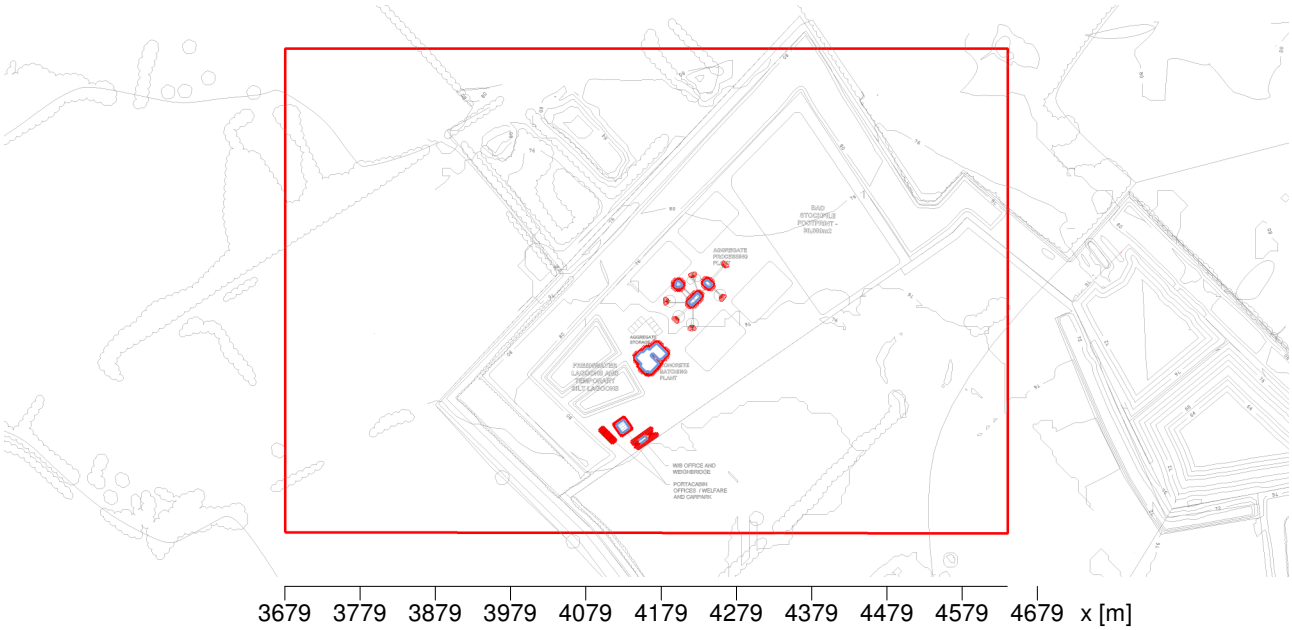
**Thorlux**

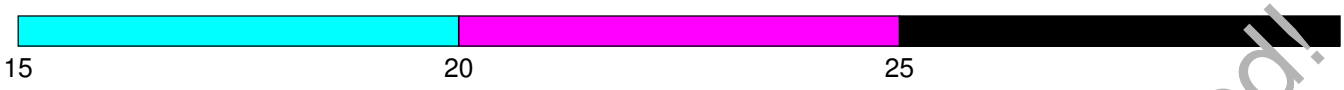
4 34

Order No. : STF17571
Luminaire name : Starflood LED
Equipment : 1 x 42W LED 47 W / 5400 lm

## 2.1 Summary, Exterior 1

### 2.1.13 Result overview, Processing Building 2 Perimeter 2




Illuminance [lx]

**General**

| | |
|---|---|
| Calculation algorithm used | Average indirect fraction |
| Height of evaluation surface | 0.00 m |
| Maintenance factor | 0.84 |
| Total luminous flux of all lamps | 226584 lm |
| Total power | 1954 W |
| Total power per area (617040.00 m²) | 0.00 W/m² |
| Upward light ratio (ULR) | 0.01 |

**Illuminance**

| | | |
|---|---|---|
| Average illuminance | Em | 29.3 lx |
| Minimum illuminance | Emin | 7.4 lx |
| Maximum illuminance | Emax | 39.3 lx |
| Uniformity Uo | Emin/Em | 1:1.69 (0.59) |
| Diversity Ud | Emin/Emax | 1:2.26 (0.44) |

**Type No.\Make**

**AEC ILLUMINAZIONE SRL**

1 2

Order No. : 44w (3 module) 525mA Italo 1 with S05 Optic
Luminaire name : ITALO 1 0F2H1 S05 4.5-3M
Equipment : 1 x L-IT1-0F2H1-4000-525-3M-70-25 44 W / 5530 lm

3 4

Order No. : 39w (2 module) 525mA Italo 1 with STE-M Optic
Luminaire name : ITALO 1 0F3 STE-M 4.5-2M
Equipment : 1 x L-IT1-0F3-4000-525-2M-70-25 39 W / 5160 lm

The ULR value has been calculated without obstruction by other objects.

## 2.1 Summary, Exterior 1

### 2.1.13 Result overview, Processing Building 2 Perimeter 2

**not a Relux Member**

2 14 

Order No. : *9DFBD*
Luminaire name : Product
Equipment : 1 x 7.5w LED 8 W / 806 lm

**Thorlux**

4 34 

Order No. : STF17571
Luminaire name : Starflood LED
Equipment : 1 x 42W LED 47 W / 5400 lm

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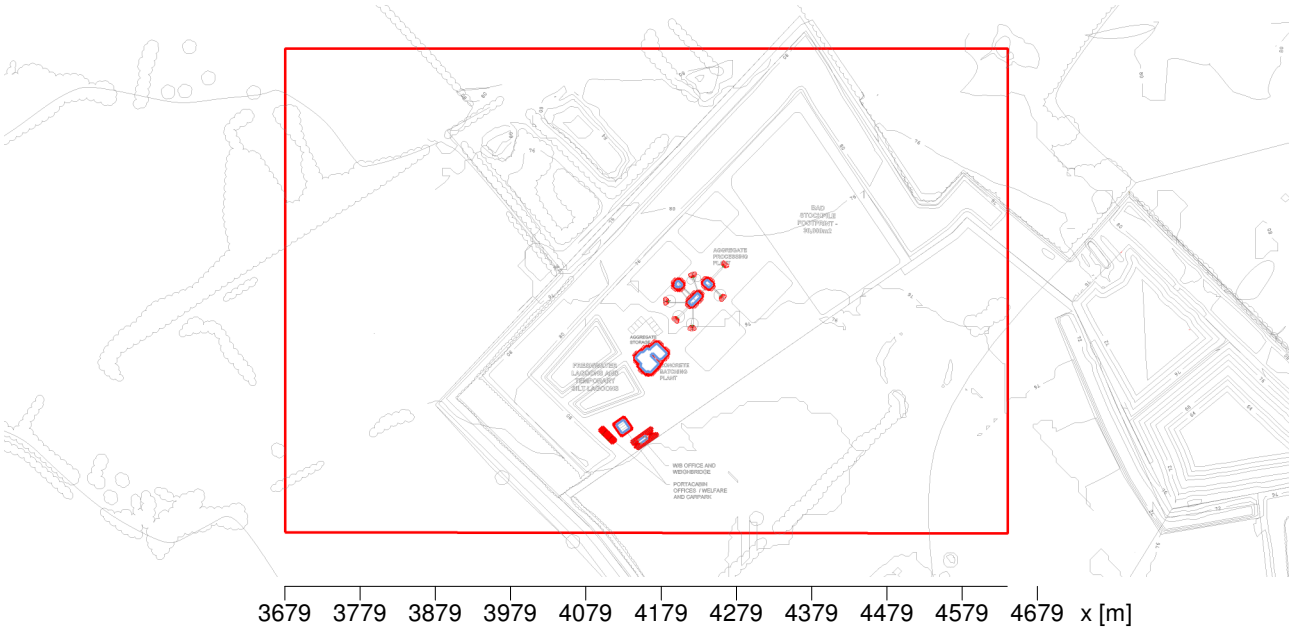
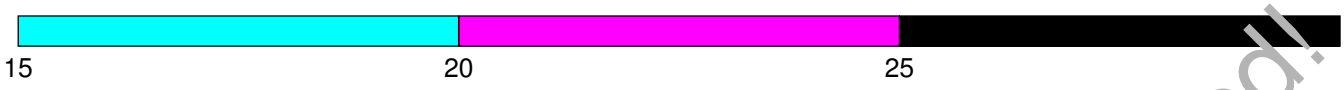
## 2.1 Summary, Exterior 1

### 2.1.14 Result overview, Processing Building 2 Perimeter 3




Illuminance [lx]

**General**

| | |
|---|---|
| Calculation algorithm used | Average indirect fraction |
| Height of evaluation surface | -0.00 m |
| Maintenance factor | 0.84 |
| Total luminous flux of all lamps | 226584 lm |
| Total power | 1954 W |
| Total power per area (617040.00 m²) | 0.00 W/m² |
| Upward light ratio (ULR) | 0.01 |

**Illuminance**

| | | |
|---|---|---|
| Average illuminance | Em | 26.1 lx |
| Minimum illuminance | Emin | 16 lx |
| Maximum illuminance | Emax | 36 lx |
| Uniformity Uo | Emin/Em | 1:1.58 (0.63) |
| Diversity Ud | Emin/Emax | 1:2.17 (0.46) |

**Type No.\Make**

**AEC ILLUMINAZIONE SRL**

1 2

Order No. : 44w (3 module) 525mA Italo 1 with S05 Optic
Luminaire name : ITALO 1 0F2H1 S05 4.5-3M
Equipment : 1 x L-IT1-0F2H1-4000-525-3M-70-25 44 W / 5530 lm

3 4

Order No. : 39w (2 module) 525mA Italo 1 with STE-M Optic
Luminaire name : ITALO 1 0F3 STE-M 4.5-2M
Equipment : 1 x L-IT1-0F3-4000-525-2M-70-25 39 W / 5160 lm

The ULR value has been calculated without obstruction by other objects.

## 2.1 Summary, Exterior 1

### 2.1.14 Result overview, Processing Building 2 Perimeter 3

**not a Relux Member**

2 14 

Order No. : *9DFBD*
Luminaire name : Product
Equipment : 1 x 7.5w LED 8 W / 806 lm

**Thorlux**

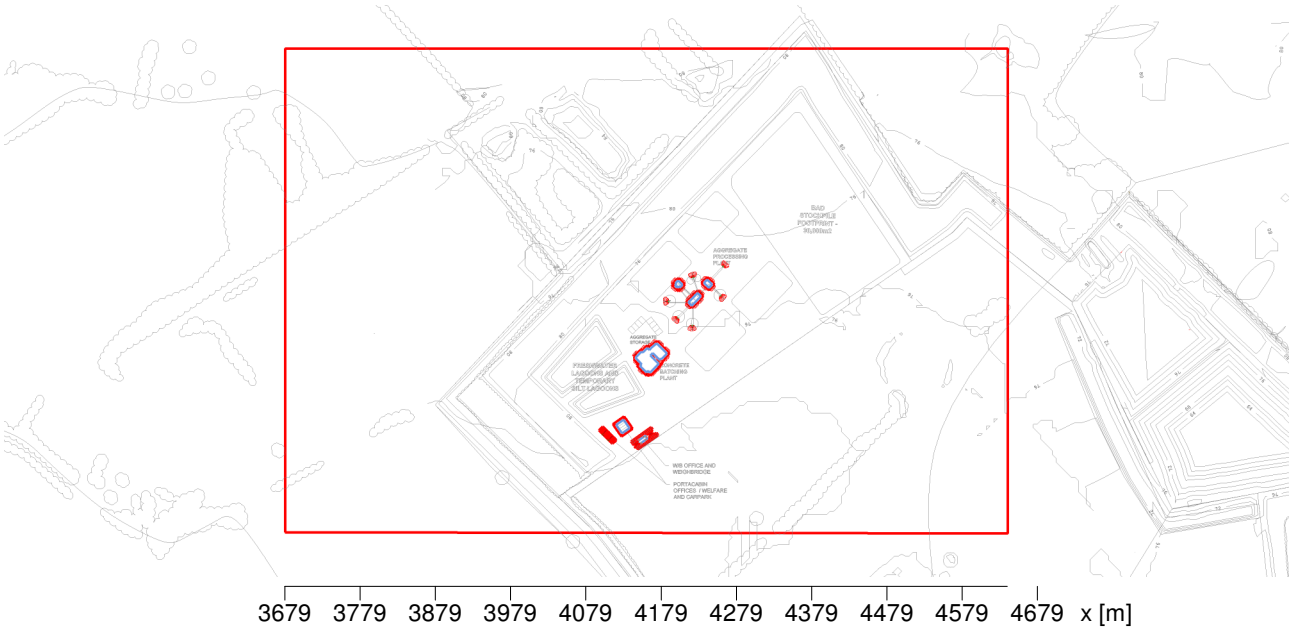
4 34 

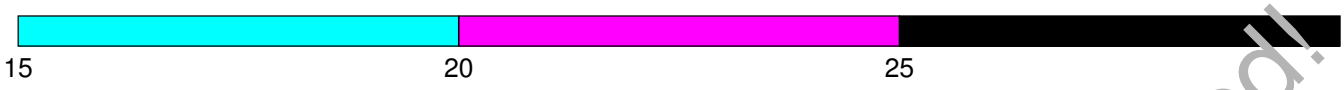
Order No. : STF17571
Luminaire name : Starflood LED
Equipment : 1 x 42W LED 47 W / 5400 lm

Engineering Consultants

## 2.1 Summary, Exterior 1

### 2.1.15 Result overview, Processing Building 2 Perimeter 4




Illuminance [lx]

**General**

| | |
|---|---|
| Calculation algorithm used | Average indirect fraction |
| Height of evaluation surface | -0.00 m |
| Maintenance factor | 0.84 |
| Total luminous flux of all lamps | 226584 lm |
| Total power | 1954 W |
| Total power per area (617040.00 m²) | 0.00 W/m² |
| Upward light ratio (ULR) | 0.01 |

**Illuminance**

| | | |
|---|---|---|
| Average illuminance | Em | 27.5 lx |
| Minimum illuminance | Emin | 7.3 lx |
| Maximum illuminance | Emax | 37.2 lx |
| Uniformity Uo | Emin/Em | 1:1.59 (0.63) |
| Diversity Ud | Emin/Emax | 1:2.15 (0.46) |

**Type No.\Make**

**AEC ILLUMINAZIONE SRL**

1 2

Order No. : 44w (3 module) 525mA Italo 1 with S05 Optic
Luminaire name : ITALO 1 0F2H1 S05 4.5-3M
Equipment : 1 x L-IT1-0F2H1-4000-525-3M-70-25 44 W / 5530 lm

3 4

Order No. : 39w (2 module) 525mA Italo 1 with STE-M Optic
Luminaire name : ITALO 1 0F3 STE-M 4.5-2M
Equipment : 1 x L-IT1-0F3-4000-525-2M-70-25 39 W / 5160 lm

The ULR value has been calculated without obstruction by other objects.

## 2.1 Summary, Exterior 1

### 2.1.15 Result overview, Processing Building 2 Perimeter 4

**not a Relux Member**

2 14 

Order No. : *9DFBD*
Luminaire name : Product
Equipment : 1 x 7.5w LED 8 W / 806 lm

**Thorlux**

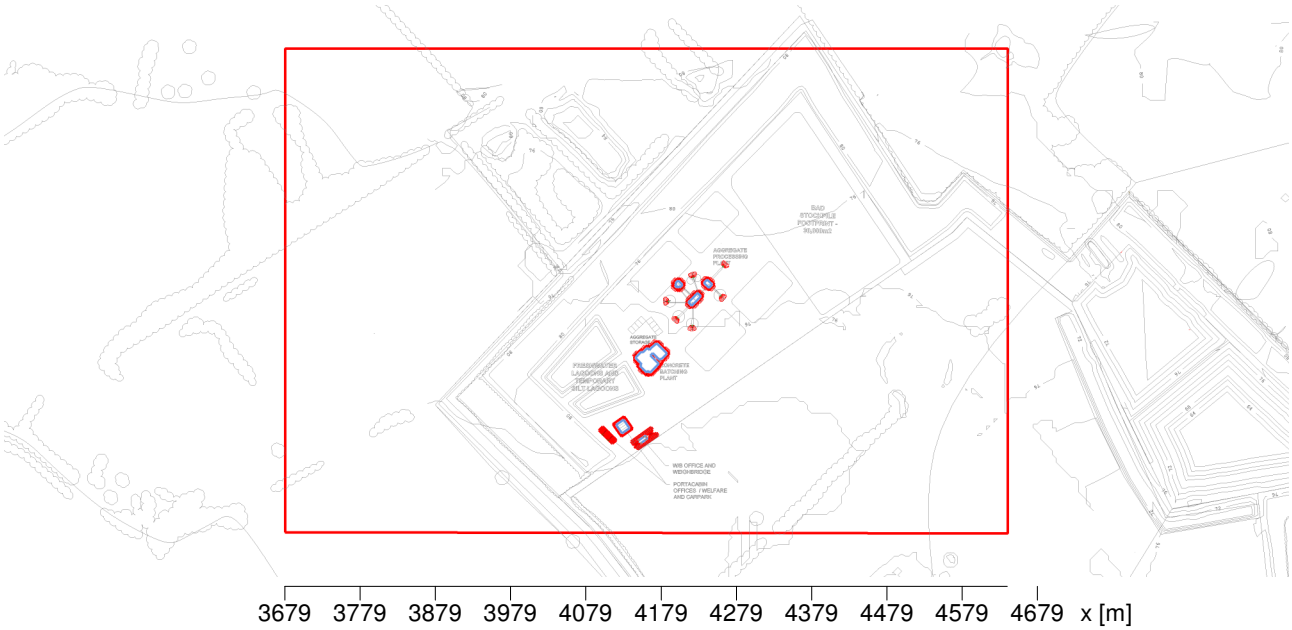
4 34 

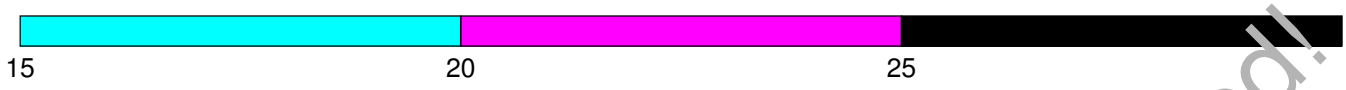
Order No. : STF17571
Luminaire name : Starflood LED
Equipment : 1 x 42W LED 47 W / 5400 lm

Engineering Consultants

## 2.1 Summary, Exterior 1

### 2.1.16 Result overview, Processing Building 3 Perimeter 1




Illuminance [lx]

**General**

| | |
|---|---|
| Calculation algorithm used | Average indirect fraction |
| Height of evaluation surface | 0.00 m |
| Maintenance factor | 0.84 |
| Total luminous flux of all lamps | 226584 lm |
| Total power | 1954 W |
| Total power per area (617040.00 m²) | 0.00 W/m² |
| Upward light ratio (ULR) | 0.01 |

**Illuminance**

| | | |
|---|---|---|
| Average illuminance | Em | 30.5 lx |
| Minimum illuminance | Emin | 9 lx |
| Maximum illuminance | Emax | 40 lx |
| Uniformity Uo | Emin/Em | 1:1.61 (0.62) |
| Diversity Ud | Emin/Emax | 1:2.11 (0.47) |

**Type No.\Make**

**AEC ILLUMINAZIONE SRL**

1 2

Order No. : 44w (3 module) 525mA Italo 1 with S05 Optic
Luminaire name : ITALO 1 0F2H1 S05 4.5-3M
Equipment : 1 x L-IT1-0F2H1-4000-525-3M-70-25 44 W / 5530 lm

3 4

Order No. : 39w (2 module) 525mA Italo 1 with STE-M Optic
Luminaire name : ITALO 1 0F3 STE-M 4.5-2M
Equipment : 1 x L-IT1-0F3-4000-525-2M-70-25 39 W / 5160 lm

The ULR value has been calculated without obstruction by other objects.

## 2.1 Summary, Exterior 1

### 2.1.16 Result overview, Processing Building 3 Perimeter 1

**not a Relux Member**

2 14

Order No. : *9DFBD*
Luminaire name : Product
Equipment : 1 x 7.5w LED 8 W / 806 lm

**Thorlux**

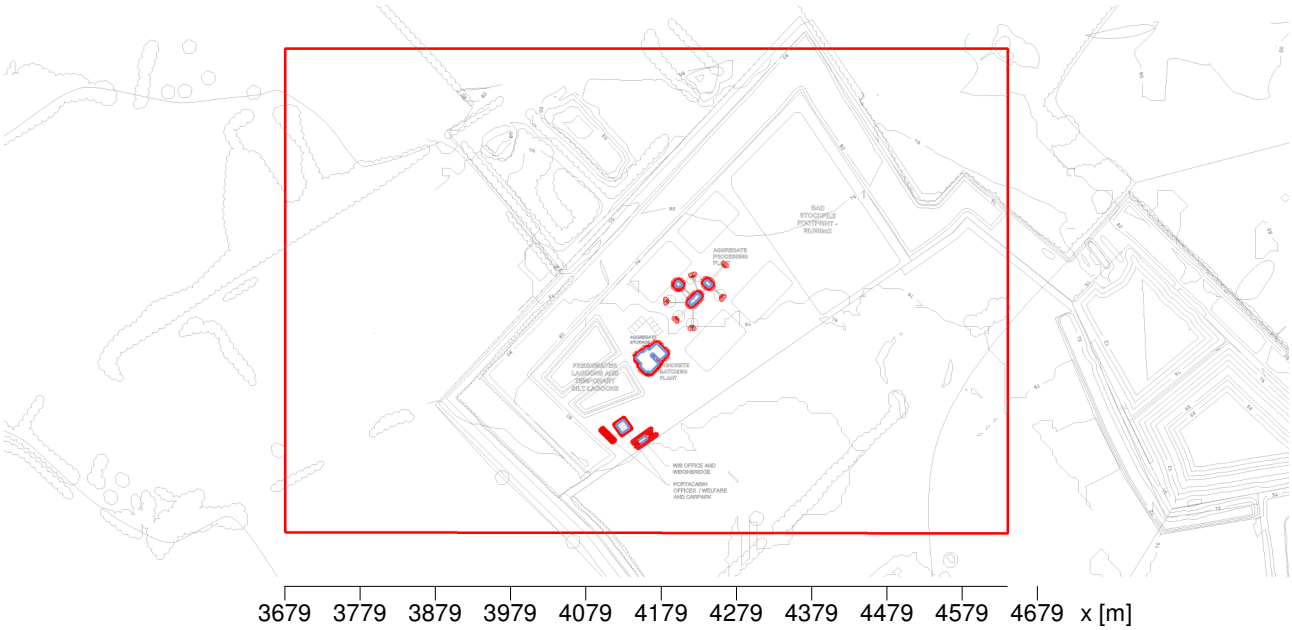
4 34

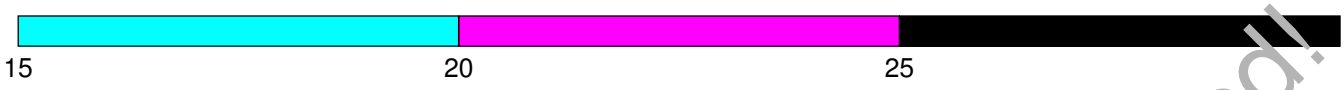
Order No. : STF17571
Luminaire name : Starflood LED
Equipment : 1 x 42W LED 47 W / 5400 lm

Engineering Consultants

## 2.1 Summary, Exterior 1

### 2.1.17 Result overview, Processing Building 3 Perimeter 2




Illuminance [lx]

**General**

| | |
|---|---|
| Calculation algorithm used | Average indirect fraction |
| Height of evaluation surface | -0.00 m |
| Maintenance factor | 0.84 |
| Total luminous flux of all lamps | 226584 lm |
| Total power | 1954 W |
| Total power per area (617040.00 m²) | 0.00 W/m² |
| Upward light ratio (ULR) | 0.01 |

**Illuminance**

| | | |
|---|---|---|
| Average illuminance | Em | 32.5 lx |
| Minimum illuminance | Emin | 16.8 lx |
| Maximum illuminance | Emax | 42.6 lx |
| Uniformity Uo | Emin/Em | 1:1.93 (0.52) |
| Diversity Ud | Emin/Emax | 1:2.53 (0.4) |

**Type No.\Make**

**AEC ILLUMINAZIONE SRL**

1 2

Order No. : 44w (3 module) 525mA Italo 1 with S05 Optic
Luminaire name : ITALO 1 0F2H1 S05 4.5-3M
Equipment : 1 x L-IT1-0F2H1-4000-525-3M-70-25 44 W / 5530 lm

3 4

Order No. : 39w (2 module) 525mA Italo 1 with STE-M Optic
Luminaire name : ITALO 1 0F3 STE-M 4.5-2M
Equipment : 1 x L-IT1-0F3-4000-525-2M-70-25 39 W / 5160 lm

The ULR value has been calculated without obstruction by other objects.

## 2.1 Summary, Exterior 1

### 2.1.17 Result overview, Processing Building 3 Perimeter 2

**not a Relux Member**

2 14

Order No. : *9DFBD*
Luminaire name : Product
Equipment : 1 x 7.5w LED 8 W / 806 lm

**Thorlux**

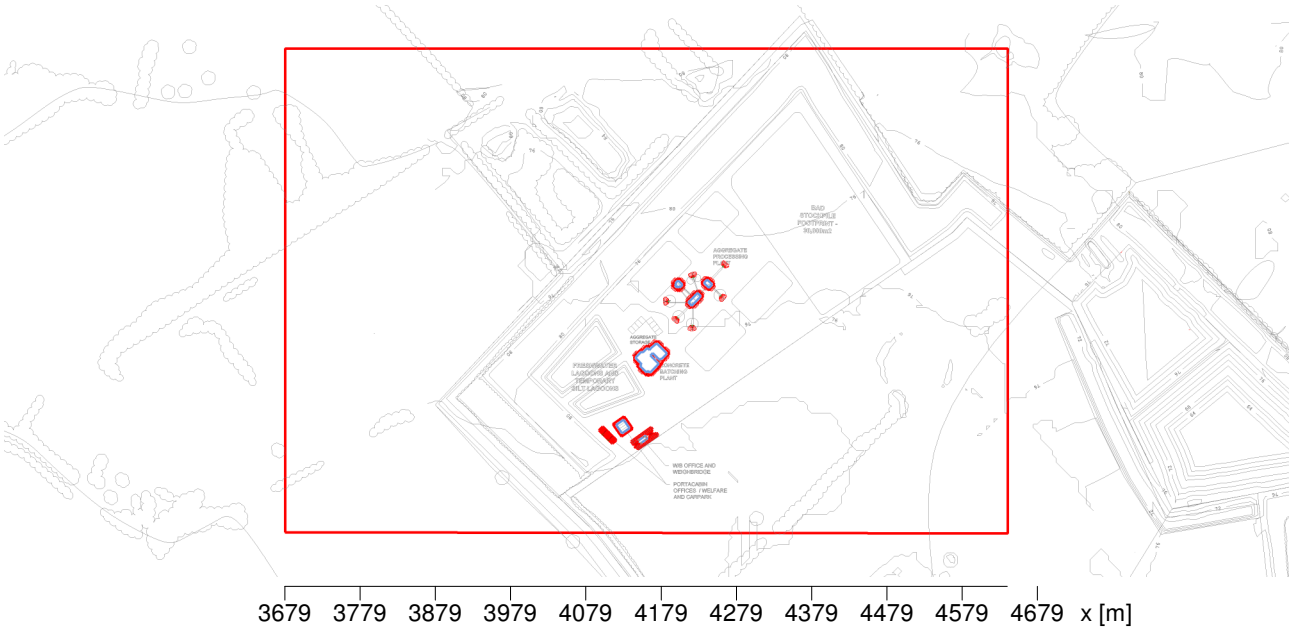
4 34

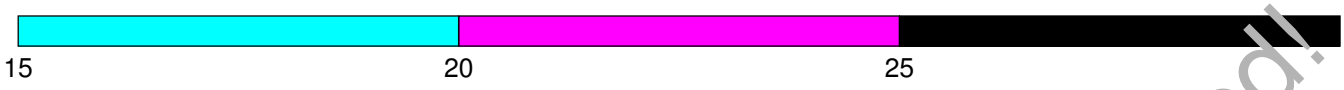
Order No. : STF17571
Luminaire name : Starflood LED
Equipment : 1 x 42W LED 47 W / 5400 lm

Engineering Consultants

## 2.1 Summary, Exterior 1

### 2.1.18 Result overview, Processing Building 3 Perimeter 3




Illuminance [lx]

**General**

| | |
|---|---|
| Calculation algorithm used | Average indirect fraction |
| Height of evaluation surface | -0.00 m |
| Maintenance factor | 0.84 |
| Total luminous flux of all lamps | 226584 lm |
| Total power | 1954 W |
| Total power per area (617040.00 m²) | 0.00 W/m² |
| Upward light ratio (ULR) | 0.01 |

**Illuminance**

| | | |
|---|---|---|
| Average illuminance | Em | 26.5 lx |
| Minimum illuminance | Emin | 16.9 lx |
| Maximum illuminance | Emax | 37.7 lx |
| Uniformity Uo | Emin/Em | 1:1.56 (0.64) |
| Diversity Ud | Emin/Emax | 1:2.19 (0.46) |

**Type No.\Make**

**AEC ILLUMINAZIONE SRL**

1 2

Order No. : 44w (3 module) 525mA Italo 1 with S05 Optic
Luminaire name : ITALO 1 0F2H1 S05 4.5-3M
Equipment : 1 x L-IT1-0F2H1-4000-525-3M-70-25 44 W / 5530 lm

3 4

Order No. : 39w (2 module) 525mA Italo 1 with STE-M Optic
Luminaire name : ITALO 1 0F3 STE-M 4.5-2M
Equipment : 1 x L-IT1-0F3-4000-525-2M-70-25 39 W / 5160 lm

The ULR value has been calculated without obstruction by other objects.

## 2.1 Summary, Exterior 1

### 2.1.18 Result overview, Processing Building 3 Perimeter 3

**not a Relux Member**

2 14 

Order No. : *9DFBD*
Luminaire name : Product
Equipment : 1 x 7.5w LED 8 W / 806 lm

**Thorlux**

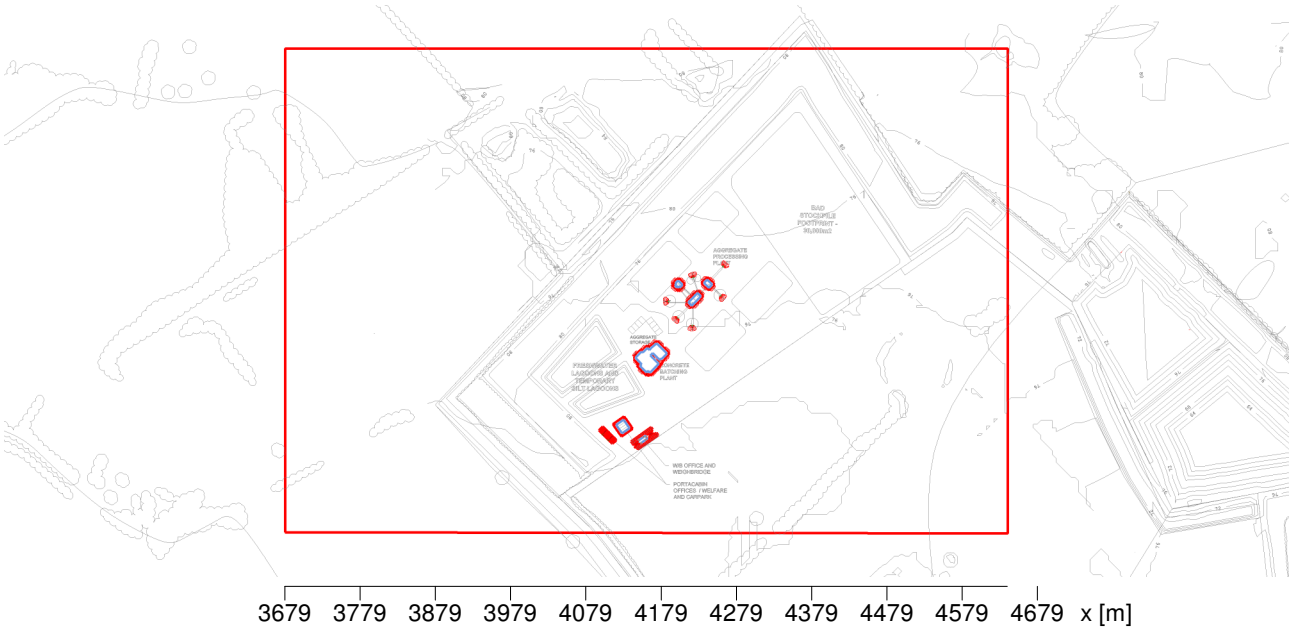
4 34 

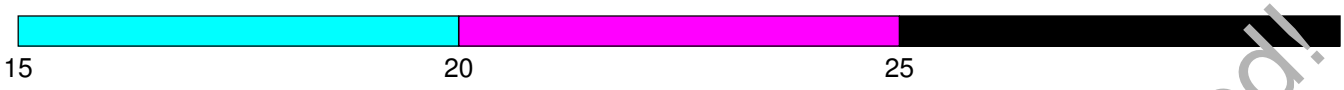
Order No. : STF17571
Luminaire name : Starflood LED
Equipment : 1 x 42W LED 47 W / 5400 lm

Engineering Consultants

## 2.1 Summary, Exterior 1

### 2.1.19 Result overview, Processing Building 3 Perimeter 4




Illuminance [lx]

**General**

| | |
|---|---|
| Calculation algorithm used | Average indirect fraction |
| Height of evaluation surface | -0.00 m |
| Maintenance factor | 0.84 |
| Total luminous flux of all lamps | 226584 lm |
| Total power | 1954 W |
| Total power per area (617040.00 m²) | 0.00 W/m² |
| Upward light ratio (ULR) | 0.01 |

**Illuminance**

| | | |
|---|---|---|
| Average illuminance | Em | 28.7 lx |
| Minimum illuminance | Emin | 18.4 lx |
| Maximum illuminance | Emax | 39.7 lx |
| Uniformity Uo | Emin/Em | 1:1.56 (0.64) |
| Diversity Ud | Emin/Emax | 1:2.12 (0.47) |

**Type No.\Make**

**AEC ILLUMINAZIONE SRL**

1 2

Order No. : 44w (3 module) 525mA Italo 1 with S05 Optic
Luminaire name : ITALO 1 0F2H1 S05 4.5-3M
Equipment : 1 x L-IT1-0F2H1-4000-525-3M-70-25 44 W / 5530 lm

3 4

Order No. : 39w (2 module) 525mA Italo 1 with STE-M Optic
Luminaire name : ITALO 1 0F3 STE-M 4.5-2M
Equipment : 1 x L-IT1-0F3-4000-525-2M-70-25 39 W / 5160 lm

The ULR value has been calculated without obstruction by other objects.

## 2.1 Summary, Exterior 1

### 2.1.19 Result overview, Processing Building 3 Perimeter 4

**not a Relux Member**

2 14 

Order No. : *9DFBD*
Luminaire name : Product
Equipment : 1 x 7.5w LED 8 W / 806 lm

**Thorlux**

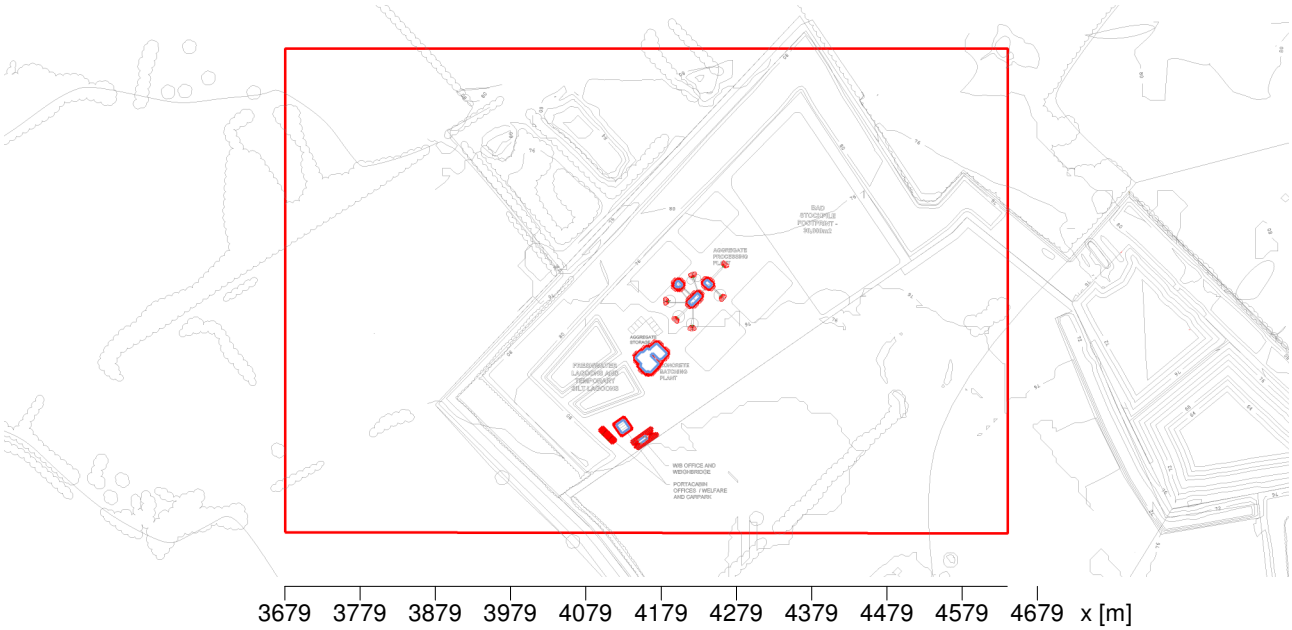
4 34 

Order No. : STF17571
Luminaire name : Starflood LED
Equipment : 1 x 42W LED 47 W / 5400 lm

Engineering Consultants

## 2.1 Summary, Exterior 1

### 2.1.20 Result overview, Batching Plant Perimeter 1





Illuminance [lx]

**General**

| | |
|---|---|
| Calculation algorithm used | Average indirect fraction |
| Height of evaluation surface | 0.00 m |
| Maintenance factor | 0.84 |
| Total luminous flux of all lamps | 226584 lm |
| Total power | 1954 W |
| Total power per area (617040.00 m²) | 0.00 W/m² |
| Upward light ratio (ULR) | 0.01 |

**Illuminance**

| | | |
|---|---|---|
| Average illuminance | Em | 33.4 lx |
| Minimum illuminance | Emin | 13.7 lx |
| Maximum illuminance | Emax | 54.7 lx |
| Uniformity Uo | Emin/Em | 1:2.44 (0.41) |
| Diversity Ud | Emin/Emax | 1:3.99 (0.25) |

**Type No.\Make**

**AEC ILLUMINAZIONE SRL**

1 2

Order No. : 44w (3 module) 525mA Italo 1 with S05 Optic
Luminaire name : ITALO 1 0F2H1 S05 4.5-3M
Equipment : 1 x L-IT1-0F2H1-4000-525-3M-70-25 44 W / 5530 lm

3 4

Order No. : 39w (2 module) 525mA Italo 1 with STE-M Optic
Luminaire name : ITALO 1 0F3 STE-M 4.5-2M
Equipment : 1 x L-IT1-0F3-4000-525-2M-70-25 39 W / 5160 lm

The ULR value has been calculated without obstruction by other objects.

## 2.1 Summary, Exterior 1

### 2.1.20 Result overview, Batching Plant Perimeter 1

**not a Relux Member**

2 14 

Order No. : *9DFBD*
Luminaire name : Product
Equipment : 1 x 7.5w LED 8 W / 806 lm

**Thorlux**

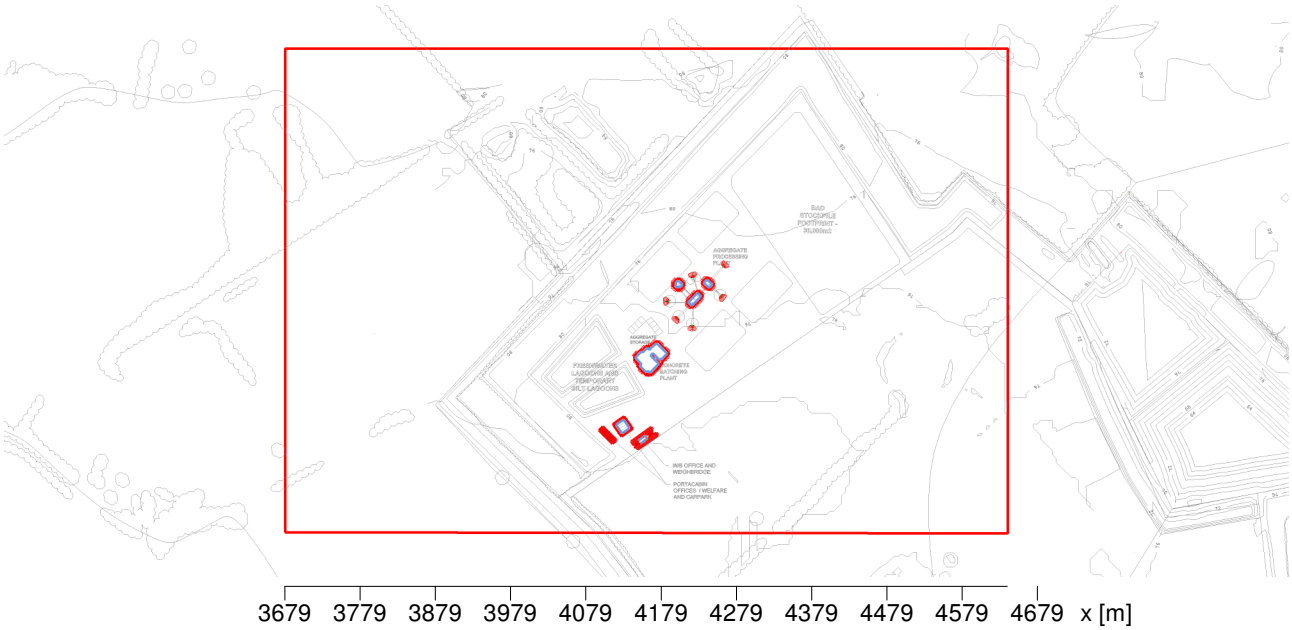
4 34 

Order No. : STF17571
Luminaire name : Starflood LED
Equipment : 1 x 42W LED 47 W / 5400 lm

Engineering Consultants

## 2.1 Summary, Exterior 1

### 2.1.21 Result overview, Batching Plant Perimeter 2





Illuminance [lx]

**General**

| | |
|---|---|
| Calculation algorithm used | Average indirect fraction |
| Height of evaluation surface | 0.00 m |
| Maintenance factor | 0.84 |
| Total luminous flux of all lamps | 226584 lm |
| Total power | 1954 W |
| Total power per area (617040.00 m²) | 0.00 W/m² |
| Upward light ratio (ULR) | 0.01 |

**Illuminance**

| | | |
|---|---|---|
| Average illuminance | Em | 27.6 lx |
| Minimum illuminance | Emin | 3.1 lx |
| Maximum illuminance | Emax | 50.3 lx |
| Uniformity Uo | Emin/Em | 1:2.1 (0.48) |
| Diversity Ud | Emin/Emax | 1:3.86 (0.26) |

**Type No.\Make**

**AEC ILLUMINAZIONE SRL**

1 2

Order No. : 44w (3 module) 525mA Italo 1 with S05 Optic
Luminaire name : ITALO 1 0F2H1 S05 4.5-3M
Equipment : 1 x L-IT1-0F2H1-4000-525-3M-70-25 44 W / 5530 lm

3 4

Order No. : 39w (2 module) 525mA Italo 1 with STE-M Optic
Luminaire name : ITALO 1 0F3 STE-M 4.5-2M
Equipment : 1 x L-IT1-0F3-4000-525-2M-70-25 39 W / 5160 lm

The ULR value has been calculated without obstruction by other objects.

## 2.1 Summary, Exterior 1

### 2.1.21 Result overview, Batching Plant Perimeter 2

**not a Relux Member**

2 14 

Order No. : *9DFBD*
Luminaire name : Product
Equipment : 1 x 7.5w LED 8 W / 806 lm

**Thorlux**

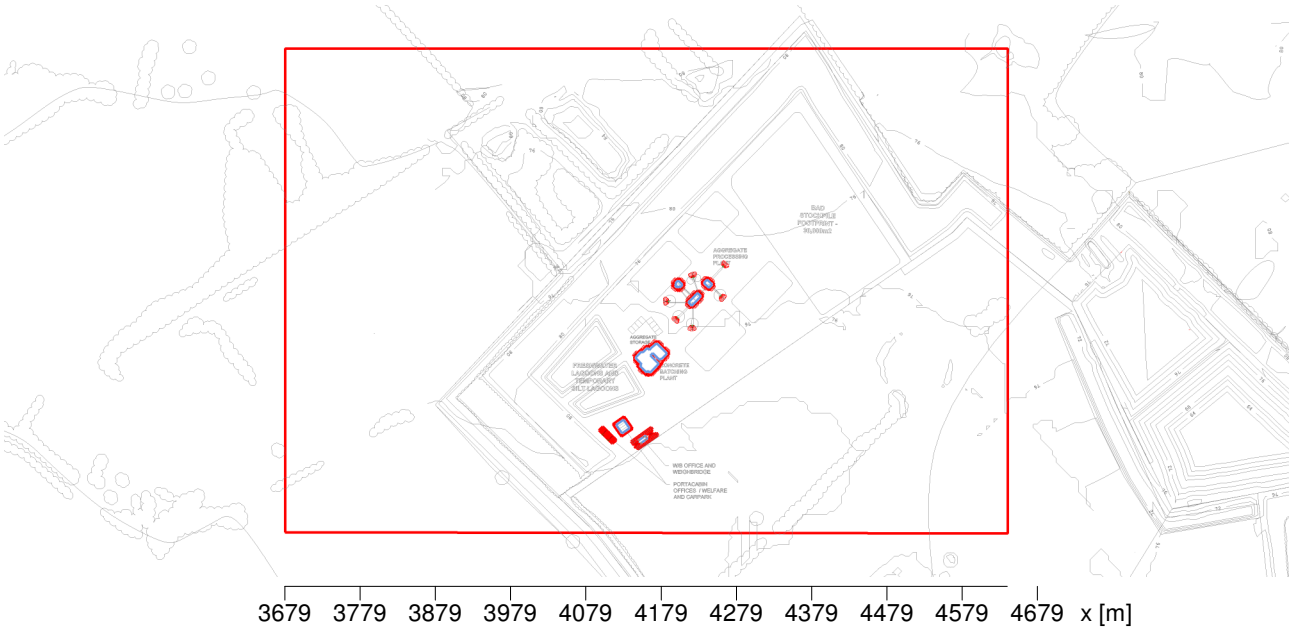
4 34 

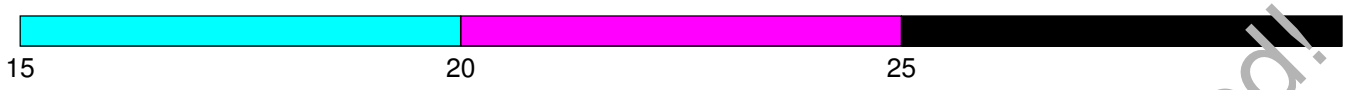
Order No. : STF17571
Luminaire name : Starflood LED
Equipment : 1 x 42W LED 47 W / 5400 lm

Engineering Consultants

## 2.1 Summary, Exterior 1

### 2.1.22 Result overview, Batching Plant Perimeter 3




Illuminance [lx]

**General**

| | |
|---|---|
| Calculation algorithm used | Average indirect fraction |
| Height of evaluation surface | 0.00 m |
| Maintenance factor | 0.84 |
| Total luminous flux of all lamps | 226584 lm |
| Total power | 1954 W |
| Total power per area (617040.00 m²) | 0.00 W/m² |
| Upward light ratio (ULR) | 0.01 |

**Illuminance**

| | | |
|---|---|---|
| Average illuminance | Em | 30.7 lx |
| Minimum illuminance | Emin | 7.8 lx |
| Maximum illuminance | Emax | 45.9 lx |
| Uniformity Uo | Emin/Em | 1:1.77 (0.56) |
| Diversity Ud | Emin/Emax | 1:2.65 (0.38) |

**Type No.\Make**

**AEC ILLUMINAZIONE SRL**

1 2

Order No. : 44w (3 module) 525mA Italo 1 with S05 Optic
Luminaire name : ITALO 1 0F2H1 S05 4.5-3M
Equipment : 1 x L-IT1-0F2H1-4000-525-3M-70-25 44 W / 5530 lm

3 4

Order No. : 39w (2 module) 525mA Italo 1 with STE-M Optic
Luminaire name : ITALO 1 0F3 STE-M 4.5-2M
Equipment : 1 x L-IT1-0F3-4000-525-2M-70-25 39 W / 5160 lm

The ULR value has been calculated without obstruction by other objects.

## 2.1 Summary, Exterior 1

### 2.1.22 Result overview, Batching Plant Perimeter 3

**not a Relux Member**

2 14 

Order No. : *9DFBD*
Luminaire name : Product
Equipment : 1 x 7.5w LED 8 W / 806 lm

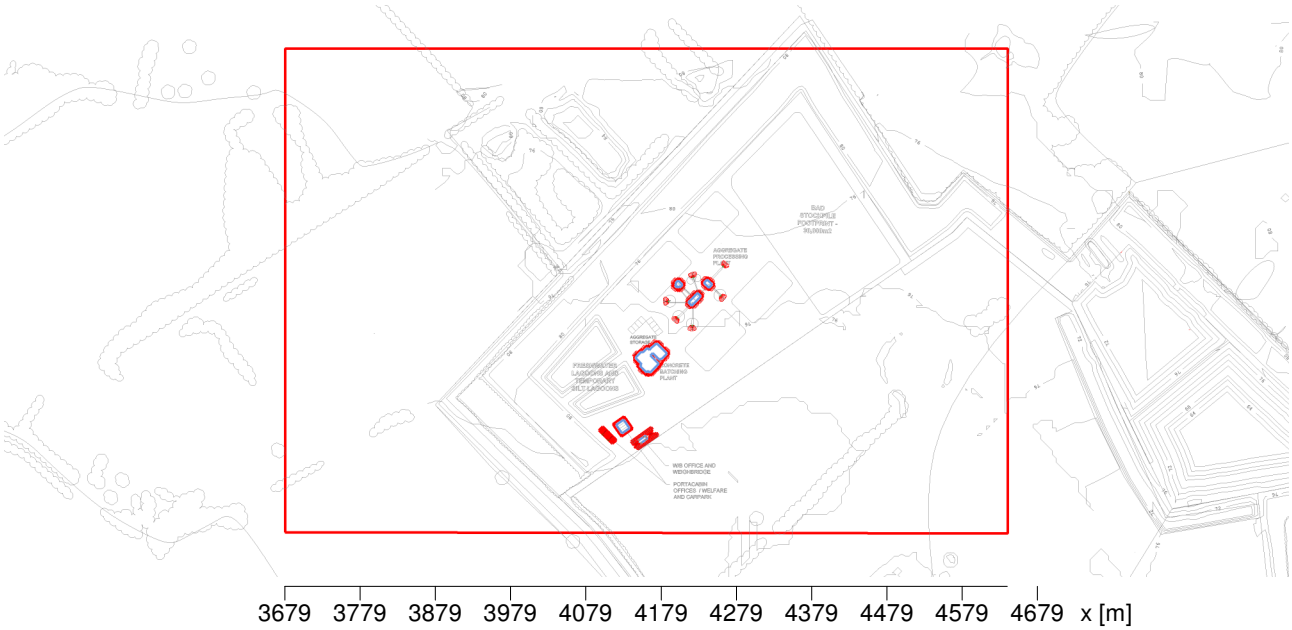
**Thorlux**

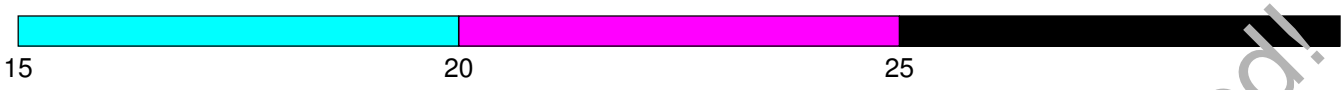
4 34 

Order No. : STF17571
Luminaire name : Starflood LED
Equipment : 1 x 42W LED 47 W / 5400 lm

## 2.1 Summary, Exterior 1

### 2.1.23 Result overview, Batching Plant Perimeter 4




Illuminance [lx]

**General**

| | |
|---|---|
| Calculation algorithm used | Average indirect fraction |
| Height of evaluation surface | 0.00 m |
| Maintenance factor | 0.84 |
| Total luminous flux of all lamps | 226584 lm |
| Total power | 1954 W |
| Total power per area (617040.00 m²) | 0.00 W/m² |
| Upward light ratio (ULR) | 0.01 |

**Illuminance**

| | | |
|---|---|---|
| Average illuminance | Em | 38.5 lx |
| Minimum illuminance | Emin | 19.6 lx |
| Maximum illuminance | Emax | 54.0 lx |
| Uniformity Uo | Emin/Em | 1:1.96 (0.51) |
| Diversity Ud | Emin/Emax | 1:2.8 (0.36) |

**Type No.\Make**

**AEC ILLUMINAZIONE SRL**

1 2

Order No. : 44w (3 module) 525mA Italo 1 with S05 Optic
Luminaire name : ITALO 1 0F2H1 S05 4.5-3M
Equipment : 1 x L-IT1-0F2H1-4000-525-3M-70-25 44 W / 5530 lm

3 4

Order No. : 39w (2 module) 525mA Italo 1 with STE-M Optic
Luminaire name : ITALO 1 0F3 STE-M 4.5-2M
Equipment : 1 x L-IT1-0F3-4000-525-2M-70-25 39 W / 5160 lm

The ULR value has been calculated without obstruction by other objects.

## 2.1 Summary, Exterior 1

### 2.1.23 Result overview, Batching Plant Perimeter 4

**not a Relux Member**

2 14 

Order No. : *9DFBD*
Luminaire name : Product
Equipment : 1 x 7.5w LED 8 W / 806 lm

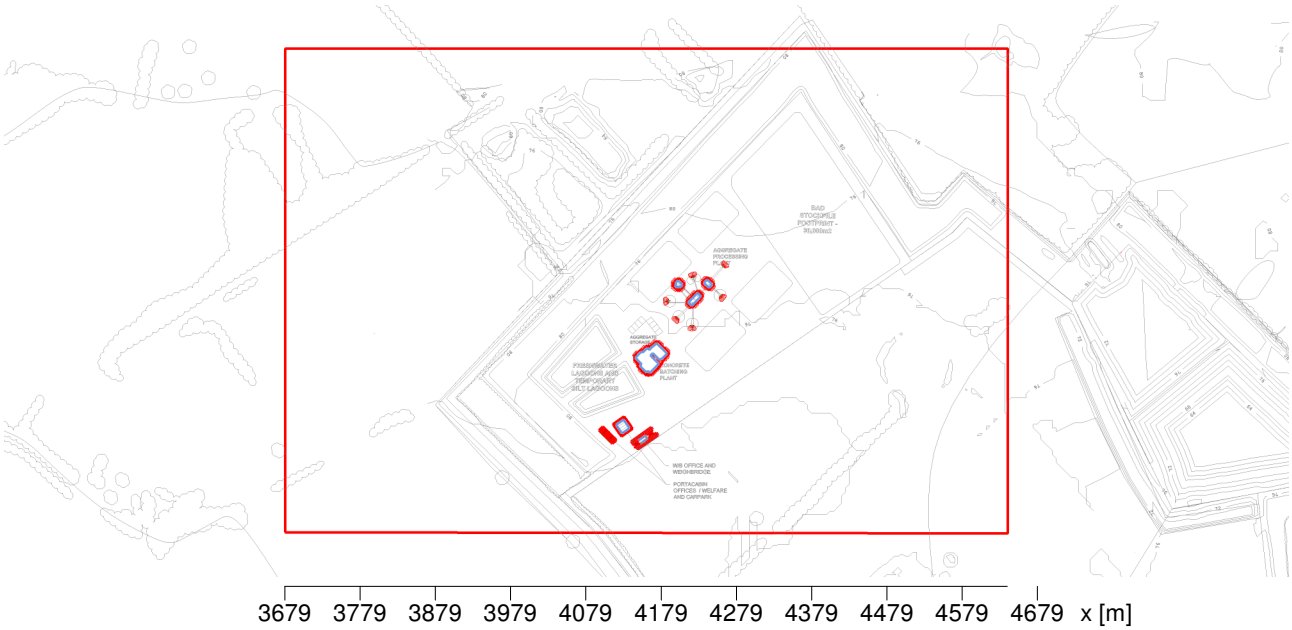
**Thorlux**

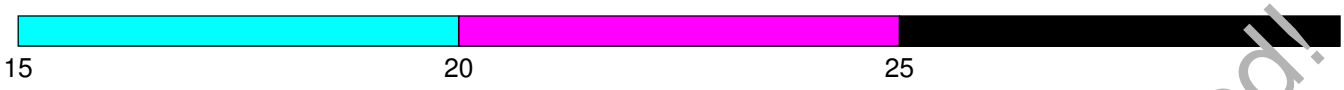
4 34 

Order No. : STF17571
Luminaire name : Starflood LED
Equipment : 1 x 42W LED 47 W / 5400 lm

## 2.1 Summary, Exterior 1

### 2.1.24 Result overview, Batching Plant Perimeter 5




Illuminance [lx]

**General**

| | |
|---|---|
| Calculation algorithm used | Average indirect fraction |
| Height of evaluation surface | 0.00 m |
| Maintenance factor | 0.84 |
| Total luminous flux of all lamps | 226584 lm |
| Total power | 1954 W |
| Total power per area (617040.00 m²) | 0.00 W/m² |
| Upward light ratio (ULR) | 0.01 |

**Illuminance**

| | | |
|---|---|---|
| Average illuminance | Em | 38.2 lx |
| Minimum illuminance | Emin | 15.2 lx |
| Maximum illuminance | Emax | 56 lx |
| Uniformity Uo | Emin/Em | 1:2.52 (0.4) |
| Diversity Ud | Emin/Emax | 1:3.7 (0.27) |

**Type No.\Make**

**AEC ILLUMINAZIONE SRL**

1 2

Order No. : 44w (3 module) 525mA Italo 1 with S05 Optic
Luminaire name : ITALO 1 0F2H1 S05 4.5-3M
Equipment : 1 x L-IT1-0F2H1-4000-525-3M-70-25 44 W / 5530 lm

3 4

Order No. : 39w (2 module) 525mA Italo 1 with STE-M Optic
Luminaire name : ITALO 1 0F3 STE-M 4.5-2M
Equipment : 1 x L-IT1-0F3-4000-525-2M-70-25 39 W / 5160 lm

The ULR value has been calculated without obstruction by other objects.

## 2.1 Summary, Exterior 1

### 2.1.24 Result overview, Batching Plant Perimeter 5

**not a Relux Member**

2 14

Order No. : *9DFBD*
Luminaire name : Product
Equipment : 1 x 7.5w LED 8 W / 806 lm

**Thorlux**

4 34

Order No. : STF17571
Luminaire name : Starflood LED
Equipment : 1 x 42W LED 47 W / 5400 lm

# Appendix E

## Luminaire Data Sheets and Manufacturers Data

Kingfisher Lighting

# Datasheet

## Italo

### Product Description

One product, three sizes. The Italo series offers high performance functionality, versatility and a wide variety of optics. A versatile solution suitable for any street application.

### Specification Text

The luminaire shall be manufactured from high-pressure die-cast aluminium. It shall have an LED efficacy of up to 126 lm/W and will be capable of producing up to 35,170 luminaire lumens at 4000K with a CRI >70. It shall have an asymmetric forward throw optic and is rated at IP66 and IK09.

### Specification

| | |
|---|---|
| Weight: | 7.0-19.0kg |
| Windage: | Italo 1: 0.06 - 0.18m² |
| | Italo 2: 0.06 - 0.25m² |
| | Italo 3: 0.1 - 0.4m² |
| Material: | Die-cast Aluminium |
| Paint finish: | Semi-Gloss Satin Grey |

### Key Features

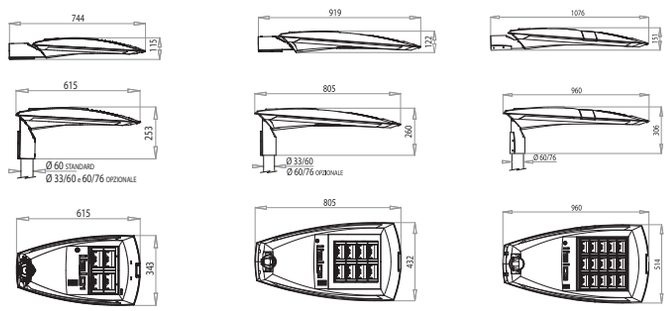
- 21.5W - 286.0W
- 2,360 - 35,170 Luminaire Lumens
- Efficacy up to 126 lm/W
- 4000K, CRI >70
- Lifetime >100,000hr, L90
- Toolless Entry

AEC ILLUMINAZIONE

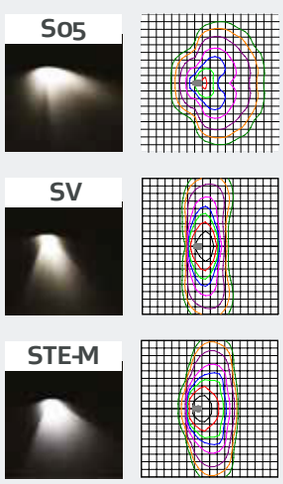
light life

LED | IP66 | IK09 | DIM | Control Compatible

### Dimensions




### Optics



| Code | Power | Luminaire Lumens | No. Modules | Drive Current | Optic | CCT(K) | IP | IK | Weight kg | Paint Finish | Driver Included | Driver Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IT1-SO5-4.7-1M1F | 21.5 | 2,420 | 1 | 700 | Asymmetrical Suburban Street Optic (SO5) | 4000 | IP66 | IK09 | 7.0 | Semi-Gloss Satin Grey | Driver inc | DALI |
| IT1-SO5-4.7-2M1F | 40.0 | 4,720 | 2 | 700 | | 4000 | IP66 | IK09 | 7.0 | Semi-Gloss Satin Grey | Driver inc | DALI |
| IT1-SO5-4.7-4M1F | 76.0 | 8,990 | 4 | 700 | | 4000 | IP66 | IK09 | 7.0 | Semi-Gloss Satin Grey | Driver inc | DALI |
| IT1-SO5-4.8-4M1F | 93.0 | 10,380 | 4 | 850 | | 4000 | IP66 | IK09 | 7.0 | Semi-Gloss Satin Grey | Driver inc | DALI |
| IT1-SO5-4.100-4M1F | 146.0 | 15,130 | 4 | 1000 | | 4000 | IP66 | IK09 | 7.0 | Semi-Gloss Satin Grey | Driver inc | DALI |
| IT3-SO5-4.7-10M1F | 191.0 | 23,730 | 10 | 700 | | 4000 | IP66 | IK09 | 19.0 | Semi-Gloss Satin Grey | Driver inc | DALI |
| IT3-SO5-4.7-11M1F | 210.0 | 26,070 | 11 | 700 | | 4000 | IP66 | IK09 | 19.0 | Semi-Gloss Satin Grey | Driver inc | DALI |
| IT3-SO5-4.7-15M1F | 286.0 | 35,170 | 15 | 700 | | 4000 | IP66 | IK09 | 19.0 | Semi-Gloss Satin Grey | Driver inc | DALI |
| IT1-SV-4.7-1M1F | 21.5 | 2,420 | 1 | 700 | Asymmetrical Urban Street Optic (SV) | 4000 | IP66 | IK09 | 7.0 | Semi-Gloss Satin Grey | Driver inc | DALI |
| IT1-SV-4.7-2M1F | 40.0 | 4,720 | 2 | 700 | | 4000 | IP66 | IK09 | 7.0 | Semi-Gloss Satin Grey | Driver inc | DALI |
| IT1-STE-M-4.7-2M1F | 52.0 | 6,530 | 2 | 700 | Asymmetrical Suburban Street Optic (STE-M) | 4000 | IP66 | IK09 | 7.0 | Semi-Gloss Satin Grey | Driver inc | DALI |
| IT1-STE-M-4.7-4M1F | 102.0 | 12,550 | 4 | 700 | | 4000 | IP66 | IK09 | 7.0 | Semi-Gloss Satin Grey | Driver inc | DALI |
| ITP-SO5-4.7-1M1F | 21.5 | 2,360 | 1 | 700 | Asymmetrical Suburban Street Optic (SO5) | 4000 | IP66 | IK09 | 12.0 | Semi-Gloss Satin Grey | Driver inc | DALI |
| ITP-SO5-4.7-2M1F | 40.0 | 4,600 | 2 | 700 | | 4000 | IP66 | IK09 | 12.0 | Semi-Gloss Satin Grey | Driver inc | DALI |
| ITP-SO5-4.7-4M1F | 76.0 | 8,770 | 4 | 700 | | 4000 | IP66 | IK09 | 12.0 | Semi-Gloss Satin Grey | Driver inc | DALI |
| ITP-SV-4.7-1M1F | 21.5 | 2,360 | 1 | 700 | Narrow Street Optic (SV) | 4000 | IP66 | IK09 | 12.0 | Semi-Gloss Satin Grey | Driver inc | DALI |
| ITP-SV-4.7-2M1F | 40.0 | 4,600 | 2 | 700 | | 4000 | IP66 | IK09 | 12.0 | Semi-Gloss Satin Grey | Driver inc | DALI |
| ITP-STE-M-4.7-2M1F | 52.0 | 6,370 | 2 | 700 | Asymmetrical Suburban Street Optic (STE-M) | 4000 | IP66 | IK09 | 12.0 | Semi-Gloss Satin Grey | Driver inc | DALI |
| ITP-STE-M-4.7-4M1F | 102.0 | 12,240 | 4 | 700 | | 4000 | IP66 | IK09 | 12.0 | Semi-Gloss Satin Grey | Driver inc | DALI |

# Accessories & Options

## Mounting Options

- Post Top 60-76mm, 76mm recmd Side Entry Fixing
  Contact for details

## Dimming Options

- Constant light output
- Programmable
- Part night dimming
- Step dimming
- Wireless dimming
  Contact for details

## Other Options

- Colour temperature options
- Photocell options
- Emergency options
- Paint finish options
  Contact for details

Kingfisher Lighting

# Datasheet

# Quarto 2.0

## Product Description

A stylish, modern bulkhead available with LED emergency and photocell. Quarto 2.0 is suited to building and perimeter lighting.

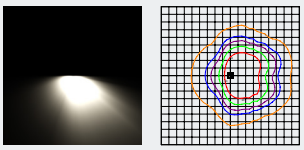
## Specification Text

The luminaire shall be manufactured from high-pressure die-cast aluminium. It shall have an LED efficacy of up to 114.0 lm/W and will be capable of producing up to 1,453 luminaire lumens at 4000K with a CRI >70. It shall have an asymmetric forward throw optic and is rated at IP65 and IK10.

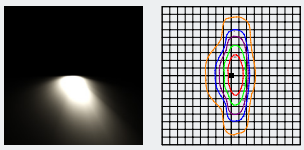
## Specification

Weight: 4.0kg
Material: Die-cast Aluminium
Paint finish: RAL7016 Anthracite
Grey Marine Grade Finish

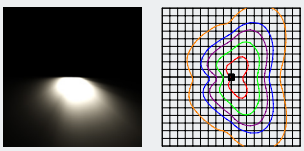
## Optics



Flood Optic



Path Optic



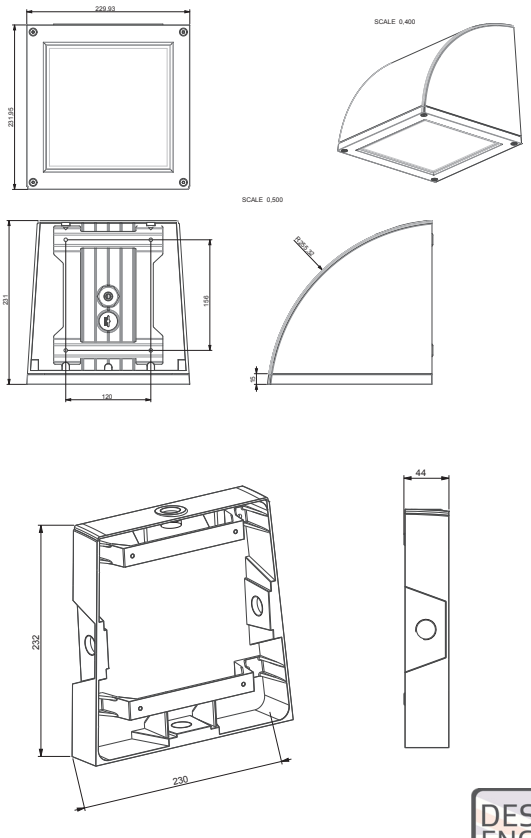
Street Optic

## Key Features

- 7.5 - 14.2W
- 806 - 1,453 Luminaire Lumens
- Efficacy up to 114.0 lm/W
- 4000K, CRI >70
- Lifetime >100,000hr, L80

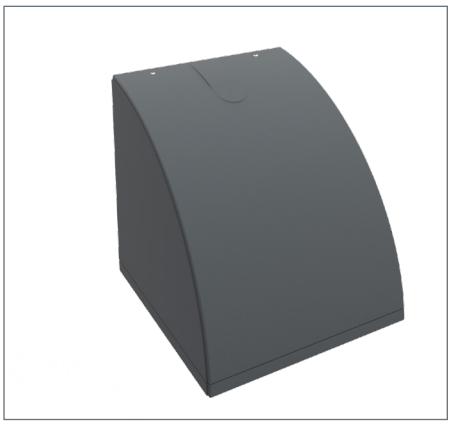
LED | IP65 | IK10 | DIM | Control Compatible

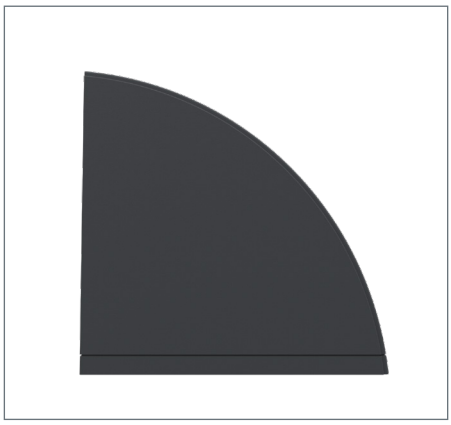
## Dimensions

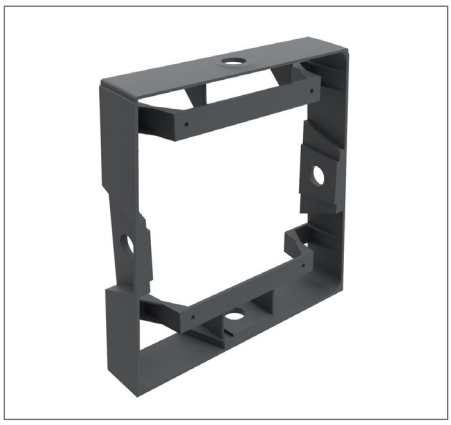



DESIGNED & ENGINEERED IN THE UK

| Code | Power | Luminaire Lumens | Drive Current | Optic | CCT(K) | IP | IK | Weight kg | Paint Finish | Driver Included |
|---|---|---|---|---|---|---|---|---|---|---|
| QUAFL08D | 7.5 | 857 | 250 | Asymmetrical Flood Optic FL | 4000 | IP65 | IK10 | 4.0 | RAL7016 Anthracite Grey Marine Grade Finish | Driver inc |
| QUAFL15D | 14.2 | 1,542 | 500 | | 4000 | IP65 | IK10 | 4.0 | RAL7016 Anthracite Grey Marine Grade Finish | Driver inc |
| QUAOC08D | 7.5 | 825 | 250 | Asymmetrical Path optic OC | 4000 | IP65 | IK10 | 4.0 | RAL7016 Anthracite Grey Marine Grade Finish | Driver inc |
| QUAOC15D | 14.2 | 1,485 | 500 | | 4000 | IP65 | IK10 | 4.0 | RAL7016 Anthracite Grey Marine Grade Finish | Driver inc |
| QUAST08D | 7.5 | 806 | 250 | Asymmetrical Street Optic ST | 4000 | IP65 | IK10 | 4.0 | RAL7016 Anthracite Grey Marine Grade Finish | Driver inc |
| QUAST15D | 14.2 | 1,453 | 500 | | 4000 | IP65 | IK10 | 4.0 | RAL7016 Anthracite Grey Marine Grade Finish | Driver inc |







## Accessories & Options

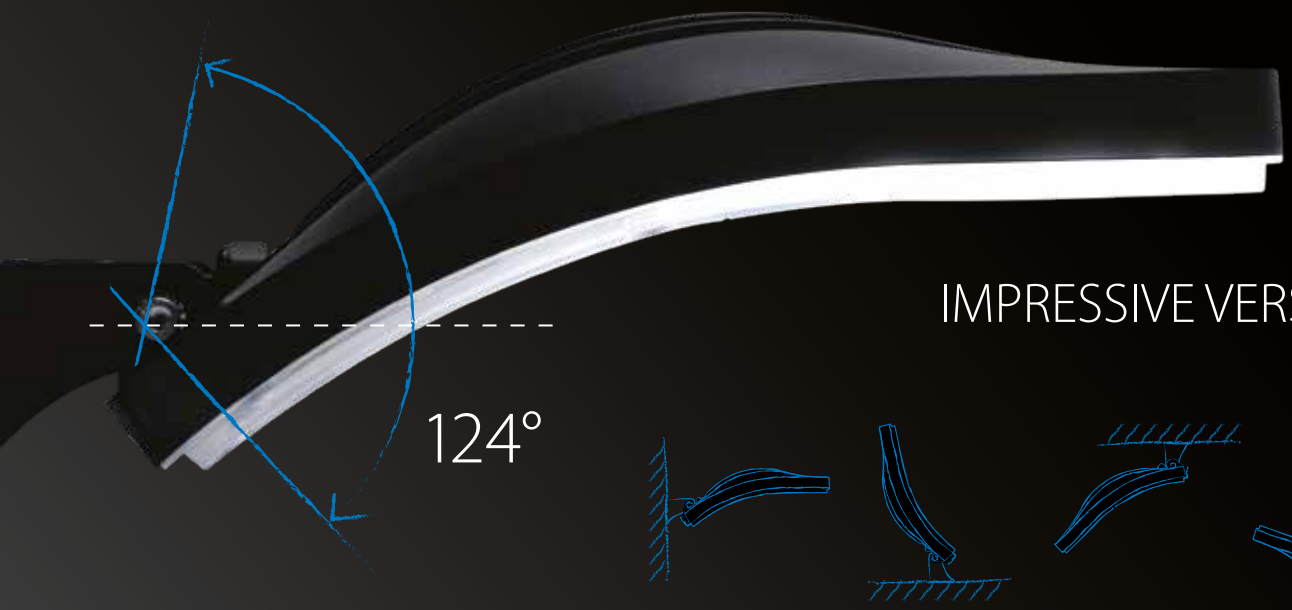
### Mounting Options

- Stirrup Mount
  Contact for details

### Other Options

- Colour Temperature Options
- Photocell Option
- Emergency Option
  Contact for details

# STARFLOOD

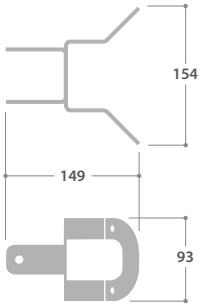



## IMPRESSIVE VERSATILITY

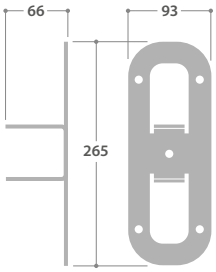


## MOUNTING OPTIONS

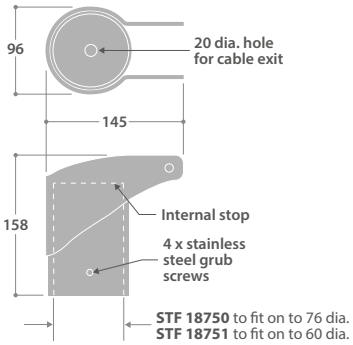
**Corner mounting bracket**




**Wide mounting bracket**

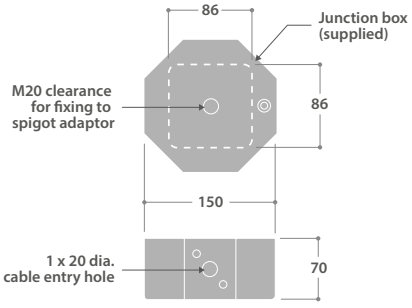



**Single luminaire pole top mount**

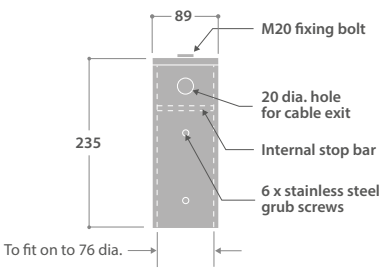



*Single luminaire pole top mount*

**Pole top mounting kit**




**Spigot adaptor**




| DESCRIPTION | CAT. No | APPROX. kg |
|---|---|---|
| Single luminaire pole top mount finished silver (76mm dia.) | **STF 18750SV3** | 1.2 |
| Single luminaire pole top mount finished graphite (76mm dia.) | **STF 18750G2** | 1.2 |
| Single luminaire pole top mount finished silver (60mm dia.) | **STF 18751SV3** | 1.5 |
| Single luminaire pole top mount finished graphite (60mm dia.) | **STF 18751G2** | 1.5 |
| Pole top mounting kit finished silver ■ | **STF 17330SV3** | 1.4 |
| Pole top mounting kit finished graphite ■ | **STF 17330G2** | 1.4 |
| Galvanised spigot adaptor for 76 dia. shaft | **POT-89** | 2.9 |
| Corner mounting bracket finished graphite | **STF 17329G2** | 0.5 |
| Wide mounting bracket finished graphite | **STF 17328G2** | 0.5 |

■ For use with spigot adaptor **POT-89**, can accomodate up to 4 Starfloods

# STARFLOOD

## HIGH PERFORMANCE MINI LED FLOODLIGHTS

IP66 IK10 UKCA CE LED

WINDAGE - 0.06m²

### SPECIFICATION

- Graphite full polyester powder finish. Silver option RAL9006
- Strong die-cast LM6M aluminium body
- Highly impact resistant polycarbonate cover and acrylic high efficiency LED lenses
- Photocell option
- Smart External versions with intelligent lighting control for use up to 6 metres mounting height
- SmartScan wireless technology removes the need for control cabling. Ideal for retro-fit
- Fitted with 4000K LEDs

### LED CHARACTERISTICS

| | |
|---|---|
| CRI | **70+** |
| COLOUR TEMPERATURE | **4000K** |
| RATED LIFE (HOURS) | **100K - L90/B10** |
| PROTECTION | **LED PROTECT** |
| DRIVER EFFICIENCY | **>85%** |
| REPLACEABLE | **YES** |
| POWER FACTOR | **>0.95** |
| LL/CW | **118.1** |

For LED characteristics explanation see **www.thorlux.com/led-guide**

### SmartScan Configurations

Find out more at **www.thorlux.com/smartscan**

### COLOUR OPTIONS

Graphite

Silver

### RANGE

| | LED | CAT. No. | APPROX. kg |
|---|---|---|---|
| SMART EXTERNAL | 20W | **STF 17567SS** | 2.3 |
| | 34W | **STF 17568SS** | 2.3 |
| STANDARD | 20W | **STF 17569L** | 2.2 |
| | 34W | **STF 17570L** | 2.2 |
| | 42W | **STF 17571L** | 2.2 |

CIRCUIT TYPE -
SMART EXTERNAL **SS - SmartScan**
STANDARD **L - non-dimming (LED)**

**SILVER OPTION** - add suffix **SV3** e.g. **STF 17567SSSV3** etc.
**NOTE** - Smart version not suitable for uplighting applications

### OPTIONS

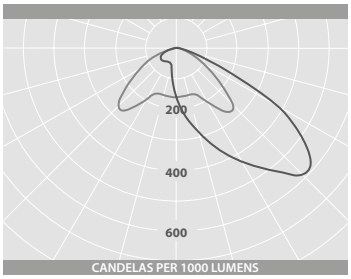
| DESCRIPTION | SUFFIX | EXAMPLE |
|---|---|---|
| Photocell | **PC** | **STF 17569LPC** |

## < 2% Upward Light

Help reduce light pollution and protect the night sky by selecting < 2% upward light luminaires

# STARFLOOD

## PHOTOMETRIC GUIDE




Luminaire Lumen Output:
20W = 2835lm
34W = 4575lm
42W = 5400lm

## PERFORMANCE GUIDE

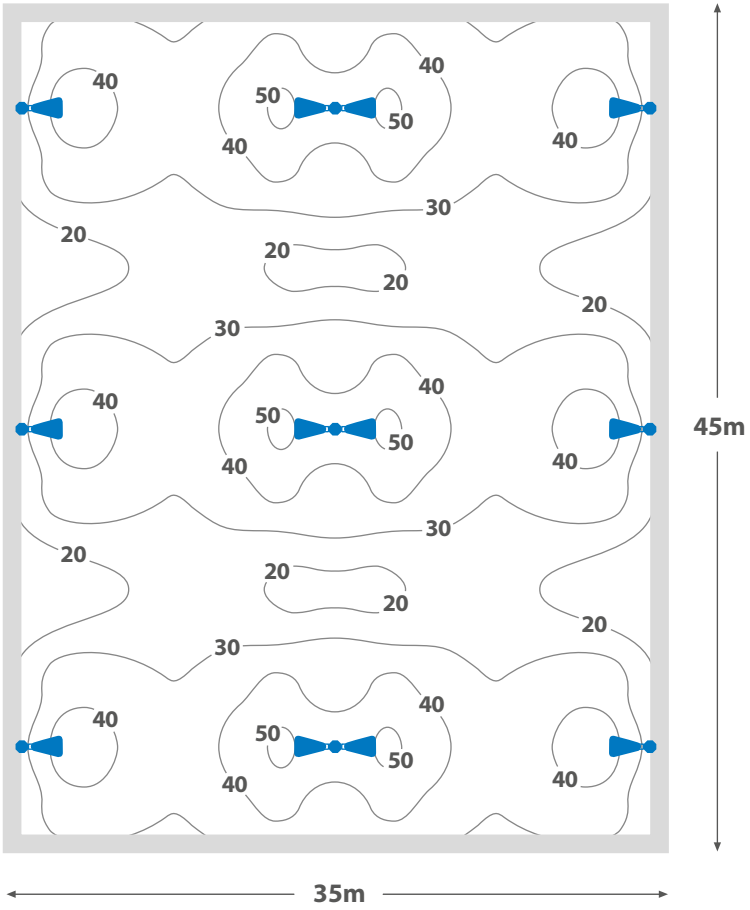
**20W LED**

| SPACING | AVERAGE ILLUMINANCE | UNIFORMITY (min/av) |
|---|---|---|
| **4m mounting height** - 6m forward throw | | |
| 8m ctrs | 40 lux | 0.44 |
| 10m ctrs | 30 lux | 0.47 |
| 12m ctrs | 23 lux | 0.29 |
| 14m ctrs | 17 lux | 0.20 |
| **5m mounting height** - 8m forward throw | | |
| 8m ctrs | 24 lux | 0.34 |
| 10m ctrs | 19 lux | 0.36 |
| 12m ctrs | 16 lux | 0.39 |
| 14m ctrs | 14 lux | 0.33 |
| **6m mounting height** - 10m forward throw | | |
| 8m ctrs | 20 lux | 0.33 |
| 10m ctrs | 16 lux | 0.34 |
| 12m ctrs | 13 lux | 0.37 |
| 14m ctrs | 11 lux | 0.39 |

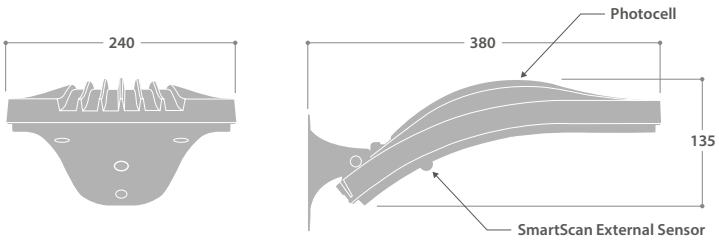
**FIGURES ARE BASED ON INITIAL LUMENS**

## TYPICAL SPACING GUIDE

**42W LED / 6m mounting height / 17.5 x 17.5m spacing -**
Average illuminance = 32 lux / Uniformity = 0.31




## DIMENSIONS



Engineering
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