



Hampton Waterworks

External Lighting Assessment

For Waterfall Hampton Investment Ltd

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Hampton Waterworks

1. INTRODUCTION

1.1 Purpose of Report

Hydrock Consultants has been appointed by Waterfall Planning Ltd to provide planning stage advisory services in relation to the design and refurbishment of the proposed Hampton Waterworks development in Hampton. This document forms part of the Detailed Planning Application and will inform the London Borough of Richmond Upon Thames Council Planning Department of the external lighting strategy of the site.

1.2 Site and Location

The development site is located within the authority boundary of the London Borough of Richmond Upon Thames and is bounded by Upper and Lower Sunbury Roads to the north and east. To the West lies existing residential development as well as the Water Treatment works reservoirs and buildings which are also found to the South of the site.

The site currently houses Grade II Listed former waterworks buildings comprising former engine houses with a single storey between.

The existing site location and red line boundary is shown in Figure 1.

1.3 Development Details

The development proposes to refurbish four existing buildings into a mixed-use development consisting of 36 residential units along with commercial spaces. The key elements of the scheme are as follow:

- 16no. of 1-bedroom apartments;
- 11no. of 2-bedroom apartments;
- 9no. of 3+ bedroom apartments;
- Flexible commercial area; and
- 39no. car parking spaces.

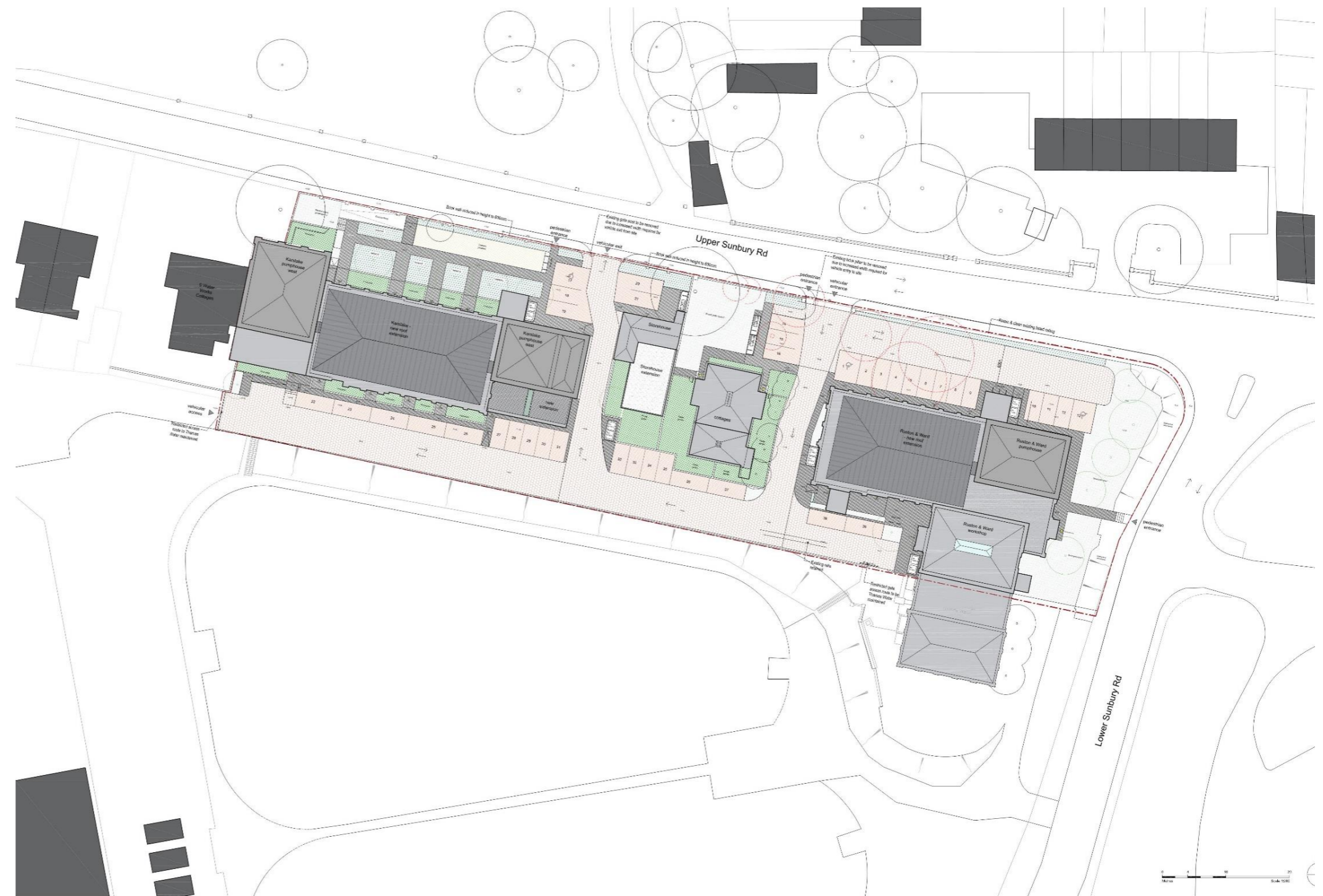


Figure 1: Site masterplan.

2. LEGISLATION, POLICY AND GUIDANCE

2.1 National Legislation

National Legislation is given in the following documents:

- Wildlife and Countryside Act 1981;
- Environmental Protection Act 1990;
- Clean Neighbourhood and Environment Act 2005; and
- The Conservation of Habitats and Species Regulations 2017.

The statutory regime within these documents has been amended to include the light spill glare from lighting installations within different premises: 'artificial light emitted from premises so as to be prejudicial to health and nuisance'.

Under Section 79 of the Environmental Protection Act 1990, local authorities have a duty to take notice and act accordingly to investigate any complaint regarding artificial lighting of statutory nuisance. Once statutory nuisance may occur, local authorities must issue an abatement notice requiring that the nuisance cease or be abated within a set timescale.

2.2 National Planning Policy

The National Planning Policy Framework (NPPF) 2019 states that:

- 180: Planning policies and decisions should also ensure that new development is appropriate for its location taking in account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development.

- In doing so they should:
 - » Limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.

The Planning Policy Guidance (PPG) states that: "Artificial light provides valuable benefits to society, including through extending opportunities for sport and recreation, and can be essential to a new development. Equally, artificial light is not always necessary, has the potential to become what is termed 'light pollution' or 'obtrusive light' and not all modern lighting is suitable in all locations. It can be a source of annoyance to people, harmful to wildlife, undermine enjoyment of the countryside or detract from enjoyment of the night sky. For maximum benefit, the best use of artificial light is about getting the right light, in the right place and providing light at the right time.

2.3 Local Planning Policy

2.3.1 *London Borough of Richmond Local Plan Policy LP10*

The Council will seek to ensure that artificial lighting in new developments does not lead to unacceptable impacts by requiring the following, where necessary:

1. An assessment of any new lighting and its impact upon any receptors;
2. Mitigation measures, including the type and positioning of light sources; and
3. Promotion of good lighting design and use of new technologies.

2.4 Legislation & Guidance for Lighting Effects on Bats

In the United Kingdom, all bats are protected by law. The following documents form the legislative framework for the protection of bats:

- The Wildlife and Countryside Act 1981;
- The Conservation of Habitats and Species Regulations (2010).

According to the above-mentioned documents, it is illegal to:

- Intentionally or recklessly disturb a bat while it is occupying a structure or place of shelter or protection;
- Intentionally or recklessly obstruct access to a structure or place used by a bat for protection or shelter.

The Bat Conservation Trust has published documents that offer guidance on artificial lighting for new or existing developments around bat sensitive areas. Landscape and Urban Design for Bats & Biodiversity make the following recommendations:

- No bat roost should be directly illuminated;
- The type of lamp specified does not have an adverse impact on bats foraging and commuting patterns;
- The height of the lighting columns should be as low as possible;
- The light should be as low as guidelines permit;
- The lighting operational times should provide switch off intervals;
- Road and trackways in areas important for bat foraging and commuting areas should provide stretches left unlit to avoid isolations of bat colonies.

The Bat Conservation Trust and the Institute of Lighting Professionals (ILP) have produced Guidance Note 8: Bats and Artificial Lighting in the UK. It summarises the impact of artificial

lighting on bats and provides guidance on mitigation methods to reduce the impact on bats. This note shall be referred to throughout the report.

2.5 Ecology Assessment

An ecological assessment of the site has been undertaken by RPS Group.

Ecological surveys have been undertaken on the site to identify areas of the site which are of importance to bats (shown in blue in Figure 2). The river and associated riparian habitat adjacent to the south of the site will undoubtedly be of importance to commuting/foraging bats in the local area.

Upper Sunbury Road has also been identified as a possible suitable area for foraging and commuting bats, though to a lesser extent due to the existing column luminaires and road traffic illumination.

The external lighting will be designed in conjunction with the ecology strategy and so there is no negative affect to fauna on or near to the site.



Figure 2: Bat sensitive areas.

3. EXTERNAL LIGHTING STRATEGY

A desktop survey of the existing lighting environment has been undertaken. The assessment consists of a desk top survey of the site identifying and commenting on the existing lighting profile. This is completed through:

- An assessment of the site, adjacent areas and sensitive receptors;
- Establishing the site and surrounding area Environmental Zone ratings as per current Institute of Lighting Professionals (ILP) and Bat Conservation Trust guidance.

The survey and report aim to clarify the known light pollution issues and will enable a review of the results against the criteria identified by the various lighting and environmental bodies, national and local policy and standards.

3.1 Existing Site Conditions

Guidance Notes for the Reduction of Obstructive Light GN01:2011 classifies environmental zones into five categories, shown in Table 1. The lighting limitations for each environmental zones are described in Table 2, extracted from the same document. Limits are set in terms of:

- Permissible maximum upward light %;
- Illuminance into windows;
- Source intensity; and
- 'building luminance', which sets upper values for decorative lighting of any structure, statue etc.

These limits should then be applied to any new lighting in the area.

Following the desk study, the site has been classified as Environmental Zone E3.

Where possible, any new lighting proposed by the development should conform to the limitations provided in Table 1.

3.2 Sensitive Receptors

The sensitive receptors of the site have been identified as the following:

- Residential dwellings along Upper Sunbury Road;
- Proposed dwellings on site;
- Areas identified that may be of ecological benefit.

3.3 Relevant Standards and Guides

The following documents should be consulted and adhered to when designing the external lighting strategy for the scheme:

- ILP Guidance Notes for the Reduction of Obtrusive Light GN01:2011;
- CIBSE Lighting Guide 6 (LG6) – Outdoor Environment;
- CEN/TR 13201-1: Road Lighting - Part 2;
- CIE – Guidelines for Minimising Sky Glow;
- Royal Commission on Environmental Pollution – Artificial Light in the Environment.
- CIBSE Lighting Guide 5: Lighting for Education, and DfEE Building Bulletins;
- BS 5489-1:2013 Code of Practice for the Design of Road Lighting;
- The Institute of Lighting Professionals (ILP) Guidance Note 08/18 - Bats and Artificial Lighting in the UK.

The ILP Guide for the Reduction of Obtrusive Lights is the primary document used by most local councils and planning departments to categorise the provision of external lighting. Where possible, the external lighting should be compliant to Dark Sky requirements and to Lighting Environmental Zone E3.

Zone	Sky Glow ULR (Max %)	Light Intrusion (into windows) E _v (Lux)		Luminaire intensity I (candelas)		Building Luminance L (Pre-curfew)
		Pre-curfew	Post-curfew	Pre-curfew	Post-curfew	Average L (cd/m ²)
E0	0	0	0	0	0	0
E1	0	2	0(1*)	2500	0	0
E2	2.5	5	1	7500	500	5
E3	5	10	2	10000	1000	10
E4	15	25	5	25000	2500	25

Table 1: Obtrusive Light Limitations for Exterior Lighting Installations - General Observers. (ULR = Upward Light Ratio of the installation; E_v = Vertical illuminance in lux; I = Light intensity in candelas; L = Luminance in candelas per square meter. *permitted only from public road lighting installations.)

3.4 Proposed External Lighting Strategy

3.4.1 Roadways

The roadways throughout the site have been lit with 5m tall LED column luminaires with a CCT of 3000°K with a tilt of 0°. These areas have been lit to BS EN 12464 traffic area standards as shown in Table 3.

3.4.2 Car Parking

Car parking areas have been lit with 4m tall LED column luminaires with a CCT of 3000°K and a tilt of 0°. These areas have been lit to BS EN light traffic standards as shown in Table 3.

3.4.3 Walkways

Walkways on site have been lit with 1m tall LED bollard luminaires with a CCT of 3000°K. These areas have been lit to BS EN 12464 pedestrian walkway standards as shown in Table 3.

3.5 Impact on Sensitive Receptors

To ensure that the site complies with the requirements in Guidance Notes for the Reduction of Obtrusive Light GN01:2011, the windows can have a maximum illuminance of 10 lux (pre-curfew) and 2 lux (post curfew).

The maximum light intrusion into the residential windows has been calculated at 1.49 lux.

Light spill into bat sensitive areas has been reduced as far as possible, maintaining illuminance below 0.5 lux or estimated current

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

Table 2: Environmental Lighting Categories

Ref. no.	Type of area, task or activity	E _m [lx]	U _o	R _{GL}	R _a
5.9.1	Light traffic, e.g. parking areas of shops, terraced and apartment houses, cycle parks	5	0.25	55	20
5.1.1	Walkways exclusively for pedestrians	5	0.25	50	20
5.1.2	Traffic areas for slowly moving vehicles	10	0.4	50	20

Table 3: BS EN 12464-2:2014 lighting standards.

light levels. All site boundaries have an illuminance of 1 lux or lower. Please see Appendix B for the lux contour drawing of the predicted light spill.

To ensure internal lighting from the proposed buildings does not adversely affect these areas, sliding panels have been introduced in the areas of the façade which contain floor to ceiling glazing. This will minimise internal light spill from the development.

3.6 Lighting Control

The external lighting controls as a minimum will consist of photocell and time clock arrangements. Security lighting will be controlled via a passive infrared (PIR) system.

3.7 Conclusion

The above methods of lighting and control are proven methods for reducing light spill over the site boundary onto neighbouring areas and reducing sky glow from upward light distribution. The purpose of the lighting scheme is ultimately to provide a safe and secure environment for the site users and to minimise or eliminate any negative impact on the existing environment and residential properties ensuring that the new development blends into the surrounding environment.

3.7.1 Additional Measures to Reduce Light Spill

The following measures are recommended for adoption for the proposed development:

- The use of directional, LED lamps is recommended to both save energy and ensure that light is only directed to the required areas;
- Cowls, shields or hoods could be fitted to luminaires to limit light spill into unwanted areas; and
- Proposed luminaires should, where possible, have a 0° tilt and be designed to have an upward light ratio (ULR) of 0%.

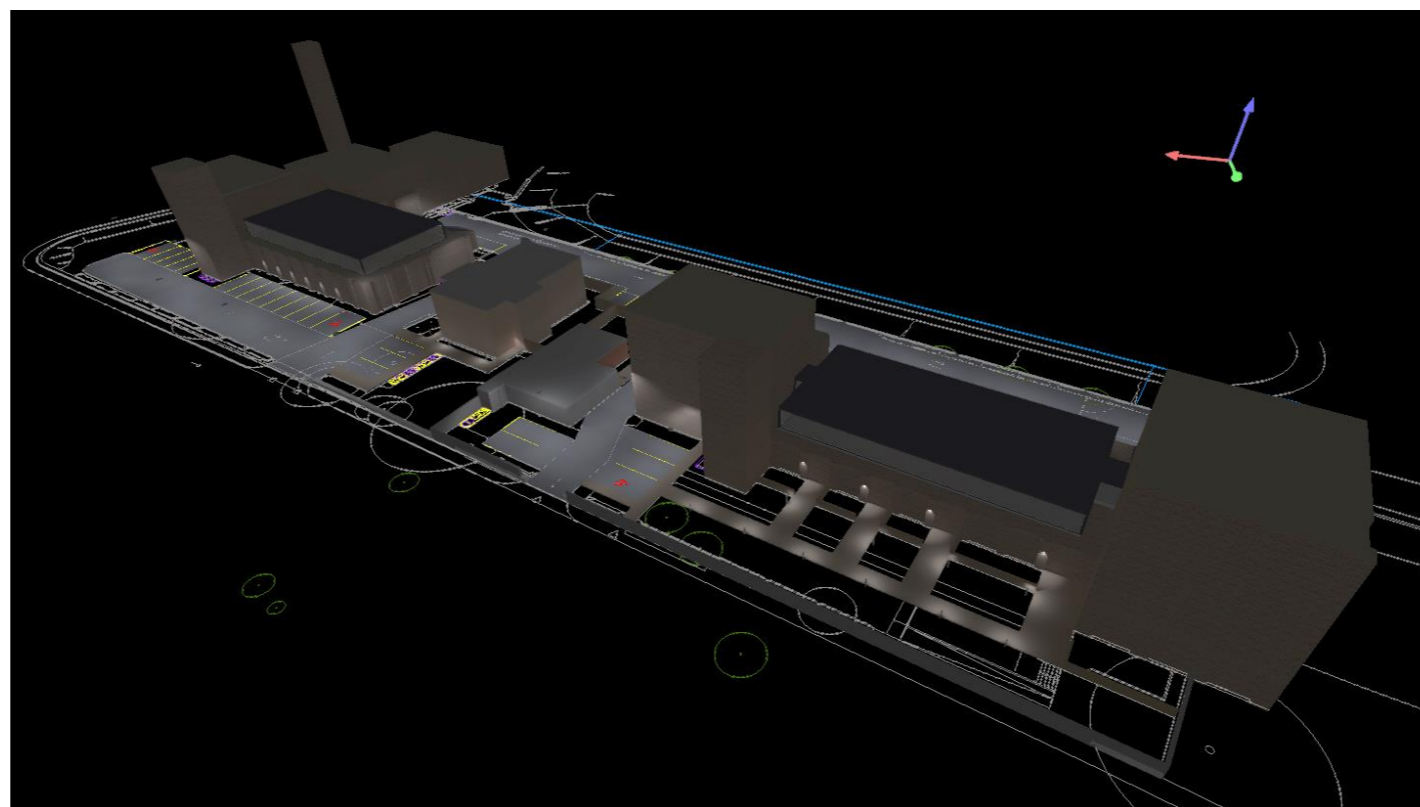


Figure 3: DIALux model of site.

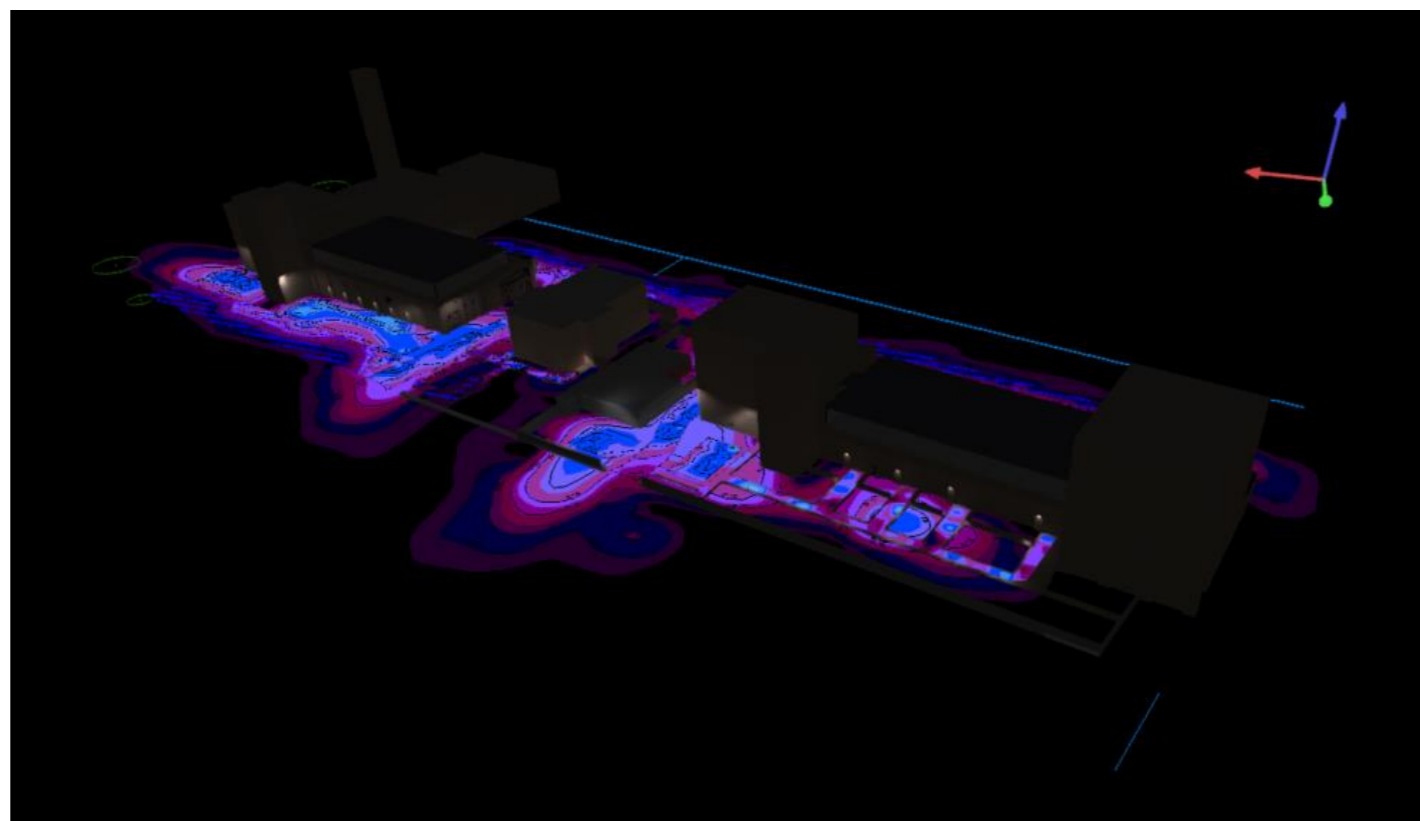


Figure 4: DIALux model of site - light spill.

Appendix A Glossary of Terms

Atmospheric Conditions

The amount of particle pollution and presence of moisture and other gases in the atmosphere. Light is scattered by the particles and that coming back to an observer below causes the veiling impact of Sky Glow.

Aura

Localised halo of light above a lit area, caused by direct upward light or reflections from the ground and other surfaces. More obvious where light units are grouped relatively close together and / or of high power.

Ballast

Ballast is located internally within a luminaire and forms part of the lighting control gear. The ballast regulates the light output of the luminaire.

Curfew

The time after which stricter requirements (for the control of obtrusive light) will apply. Often a condition of use of lighting applied by the local planning authority.

Colour Rendering Index (CRI)

Ability of a light source to match colours in comparison with a full spectrum light source such as daylight or a tungsten lamp. On a scale of 0 – no colour matching, to 100 – full colour matching.

Environmental Zone (E0 – E4)

A classification method developed by the ILP to match appropriate lighting controls to the local environment:

- An E0 Zone is UNESCO Starlight Reserve, IDA Dark Sky Parks etc.;
- E1 Zone is an intrinsically dark landscape;
- E2 Zone as low district brightness;
- E3 Zone is medium district brightness; and
- E4 Zone is a City Centre location.

LED

Light emitting diode.

Lighting Illuminance

The illuminance or light level is the amount of light energy reaching a given point on a defined surface area, namely the luminous flux (i.e. lumens) per square meter. Illuminance is measured in lux.

Lux

The lux is the unit of illuminance and luminous emittance, measuring luminous flux per unit area. It is equal to one lumen per square meter. In photometry, this is used as a measure of the intensity, as perceived by the human eye, of light that hits or passes through a surface.

Sky Glow

Wide area of night sky scattering direct and indirect upward light back to an observer. Depends on atmospheric conditions and the amount of upward light. Very typical above urban areas.

SON

High-pressure sodium discharge lamp. Typically golden orange light or whiter light, but more modern versions available in a 'whiter' output. Very poor CRI of approximately 25.

SOX

Low pressure sodium discharge lamp. Orange light, essentially monochromatic, identifying only yellow colour with all others rendered as shades of grey. CRI 0.

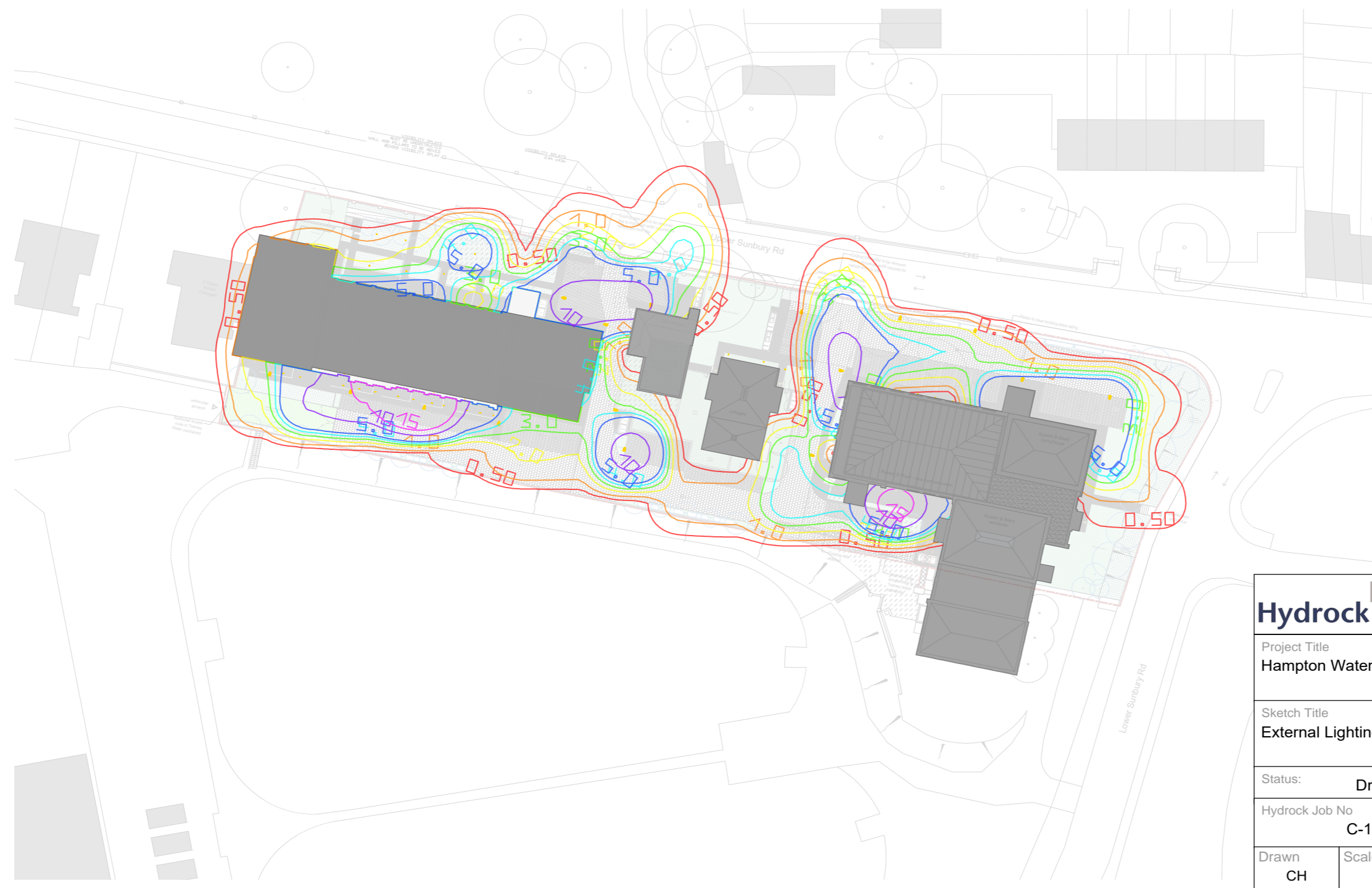
ULOR

Upward light ratio output.

Uniformity (U0)

The uniformity of illumination is the lowest calculated illuminance and the average illuminance of the working plane. Uniformity is calculated to ensure the lighting design provides a uniform illuminance in line with the required standards.

Appendix B Lux Contour Drawing



USE OF DRAWINGS
 These drawings are prepared for the use of the client and are not to be used for any other purpose without the written consent of the client. The client is responsible for ensuring that the drawings are used in accordance with the intended purpose and for any errors or omissions. The client is also responsible for ensuring that the drawings are used in accordance with the relevant legislation and standards.

REVISIONS

REV. NO.	DESCRIPTION	DATE
1	ISSUE FOR PERMIT	13/01/2023
2	ISSUE FOR PERMIT	13/01/2023
3	ISSUE FOR PERMIT	13/01/2023
4	ISSUE FOR PERMIT	13/01/2023
5	ISSUE FOR PERMIT	13/01/2023
6	ISSUE FOR PERMIT	13/01/2023
7	ISSUE FOR PERMIT	13/01/2023

NOTE
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Key

- Asphalt
- Shared surface paving
- Paved surface paving
- Car parking base
- Private amenity space
- Shared soft landscaping
- Children's play area
- Shared access surface
- Grass planting
- Tree
- Existing & retained
- Proposed
- New
- Existing columns to be retained
- Existing columns to be removed
- New location of retained columns

SCALE: 1:200
Proposed Site Plan

Project Title Hampton Waterworks		
Sketch Title External Lighting Strategy		
Status:		Drawing
Hydrock Job No		C-12193-C
Drawn	Scale	Date
CH		13/01/2023
Sketch Number		Revision
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