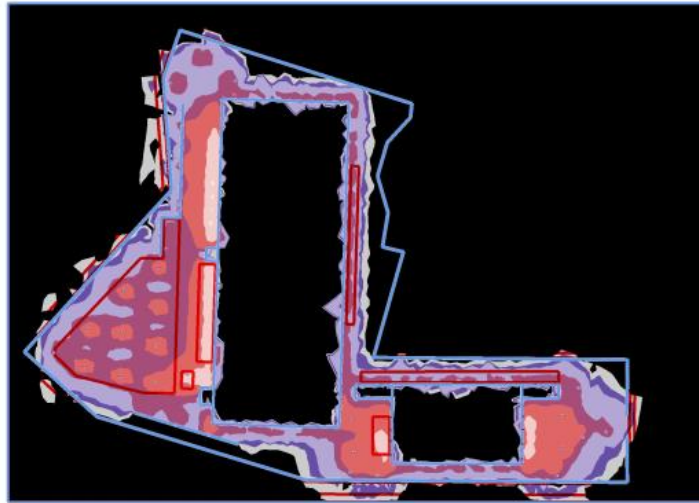


Proposed Redevelopment of the former DWP site, Heywood



External Lighting Report

Issue 5 – 13th March 2023

A Submission by



CONSULTANCY – M+E – BREEAM – BIM – STATS – ENERGY – SUSTAINABILITY



DOCUMENT ISSUE STATUS

Issue No	Issue Date	Description	Written By	Approved By
1	24-10-22	Preliminary Issue	R. Bromley	D.J. Sorbie
2	12-01-23	Revised to suit latest Architects plans Planning Issue	R. Bromley	D.J. Sorbie
3	28-02-23	Revised to suit latest Architects plans Revised Planning Issue	R. Bromley	D.J. Sorbie
4	03-03-23	BREEAM compliance clarifications added Revised to suit latest Architects plans Revised Planning Issue	R. Bromley	D.J. Sorbie
5	13-03-23	Revised to suit latest Architects plans Revised Planning Issue	R. Bromley	D.J. Sorbie

Index

1. Summary	4
2. Description of the Project	5
3. Proposed Lighting Scheme	7
4. Lighting Calculation Results	12
5. Notes & Images	14
(a) Lighting Simulation Images	
(b) Full calculated results	

1. Summary

This External Lighting Report describes the proposed lighting scheme and calculated results for the proposed redevelopment of the former DWP Heywood Stores site at Manchester Road, Heywood. The proposed development is described in Section 2 but in summary comprises the demolition of the 9No existing (former) DWP Store buildings , land reprofiling and the development of 3 no. Class B8 logistics units with associated access, parking, servicing and landscaping detail.

The parameters for the intended lighting levels and proposed lighting equipment are described in Section 3.

The results are given in Section 4 and show that the target lighting levels have been achieved, and the effect on the surrounding environment has been minimised. Overspill is minimised and there is zero direct upward light in compliance with 'Dark Skies' recommendations

The proposed scheme and results of the calculated lighting levels are shown on Synergy drawing LTG-001 Revision - and Section 5 C of this report

The results show that the target lighting levels have been achieved, and the effect on the surrounding environment has been minimised. Overspill is minimised and there is zero direct upward light.

The ecological impact has been carefully considered and measures included to reduce the effect on the natural environment, in line with the recommendations of the Bat Conservation Trust guidance "Artificial Lighting and Wildlife".

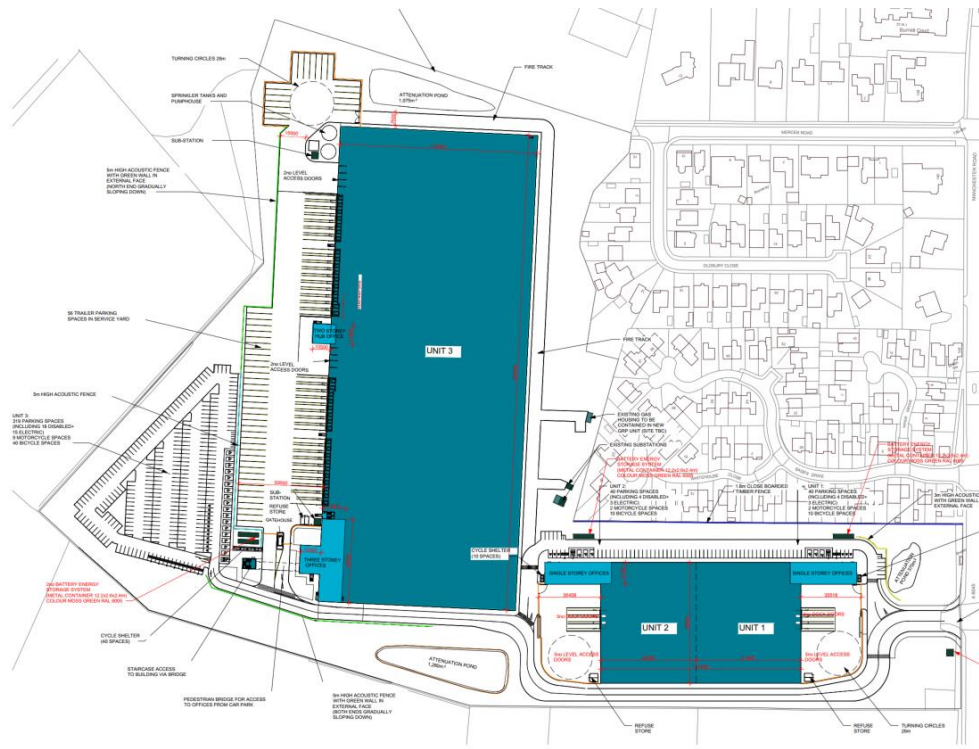
2. Description of the Project

The report informs a full planning application the proposed redevelopment of the former DWP Heywood Stores site at Manchester Road, Heywood and the construction of 3no. Class B8 logistics units with associated access, parking, servicing and landscaping detail. The proposed scheme would potentially operate on a 24/7 basis and therefore a new external lighting scheme is required to replace the existing site aging scheme.

The area of the development is shown in the satellite image below, and the architect's proposal for the site (refer to Ashton Smith Architects drawing, an image has also been included below)



Existing Site, satellite image



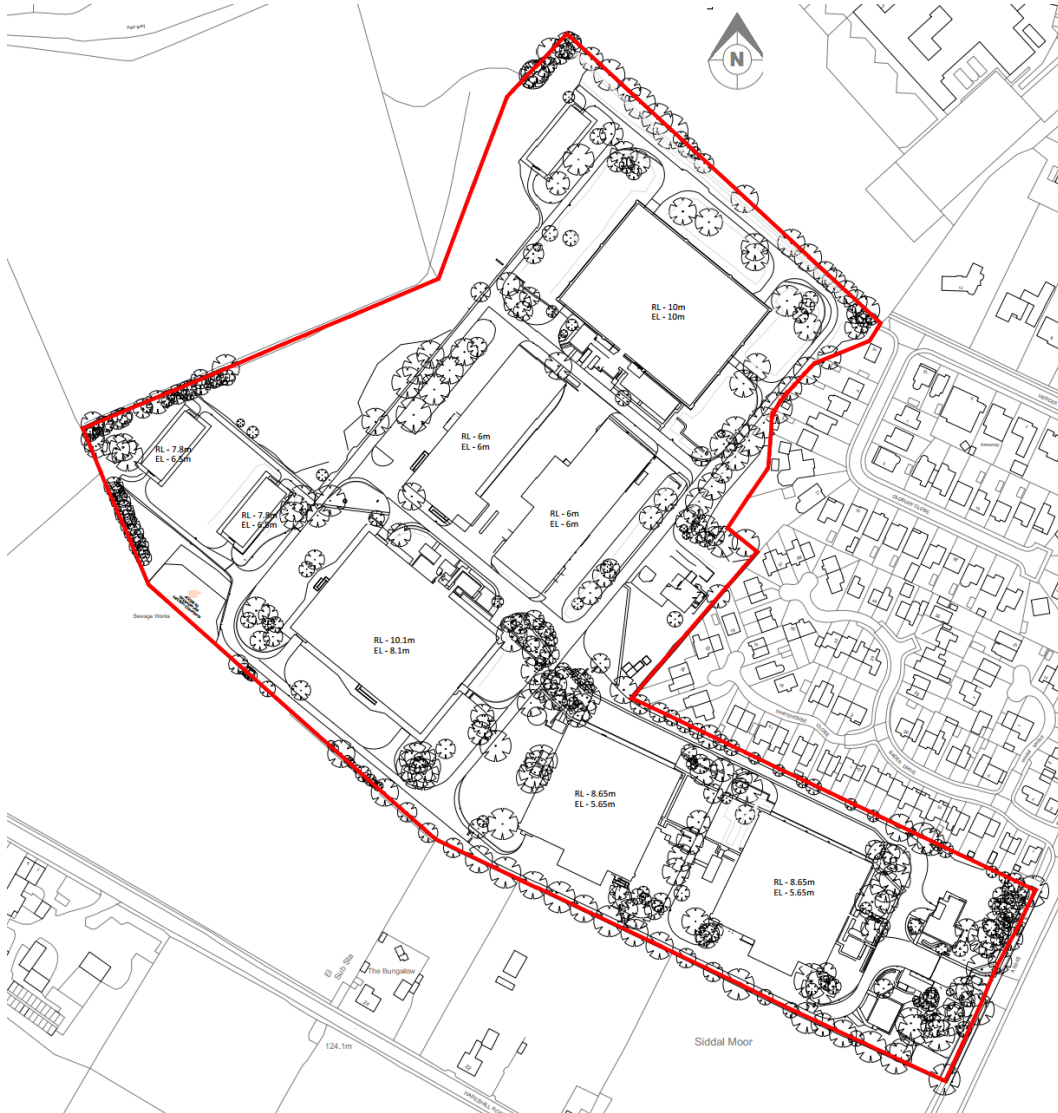
Proposed Site Plan
Refer to Architects plans for latest layouts

Proposed External Lighting

The lighting proposal only covers the external lighting to the new development, marked by the red boundary, but also shows the effect on the immediate surrounding areas.

The further surrounding areas are:

- Residential to the East
- The lit main traffic roadway A6045 Manchester Road Southeast
- Commercial Area under construction South – Southwest
- Agricultural land Northwest



3. Proposed Lighting Scheme

Lighting shall consist of the following:

- Column mounted single flat glass luminaires on the outer perimeter, mounted at 12m, aimed inwards away from the site boundary towards the service yard, roadway or parking areas
- Column mounted twin headed luminaires in the centre of the larger service yards, mounted at 12m, where perimeter lighting does not reach the centre
- Wall mounted luminaires at high level on the facades of the buildings 12m overlooking the service yard and loading docks, and 8m high on other building elevations.

The ecology considerations and effect on neighbours have been accommodated by specification of luminaires and light sources to minimise the effect on the surrounding environment.

Lighting levels to the car park and service yard have been selected to meet the requirements of British Standards and recommendations of professional bodies i.e. SLL & CIBSE (Society of Light & Lighting, Chartered Institute of Building Services Engineers), and the Client's requirement to provide a well-lit car park to promote safety of operatives and site security. Lighting has been designed in line with Table 2 (and its accompanying notes) of the Institution of Lighting Professionals (ILP) Guidance notes for the reduction of obtrusive light, 2011 and the following;

- **BSEN 12464 Part 2: 2014 – Light and Lighting – Lighting of Work Places, Part 2: Outdoor work Places**
- **Bat Conservation Trust guidance “Artificial Lighting and Wildlife”**

The external lighting has been designed for both safety and security and complies with the lower levels of lighting as recommended during the requisite hours in Table 2 of the ILP guidance notes. The scheme as proposed makes efficient use of the light source and has minimal overspill beyond site boundary and zero direct upward light.

Target Lighting Levels

The target lighting illumination levels are as follows:

- (i) **Car park and service yard: 10 lux average, 0.40 uniformity.** (BSEN 12464-2, table 5.1.2 for “Traffic areas for slowly moving vehicles”)
- (ii) **Service yard (loading bays): 50 lux average, 0.40 uniformity.** (BSEN 16464-2, table 5.1.4 for “Loading and unloading points”)
- (iii) **Pedestrian footpath: 5 lux average, 0.25 uniformity** or better.
(BSEN 12464-2, table 5.1.1)
- (iv) **Roadways**
In compliance with BS5489-1:2013 Code for the practice for the design of road lighting
- (v) **Environmental Zone** chosen from BSEN 12464-2 (Reduction of Obtrusive Light) is **E3: medium district brightness (industrial or residential suburbs)**. This limits the upward light (sky glow) to 15% of the total installed flux, and limits the overspill lighting on neighbouring properties to 10 lux (pre curfew) and 2 lux (post curfew).
In practice for this project it is proposed to choose luminaires with much better performance than E3 requirements.

Proposed Lighting Equipment

Luminaires have been chosen to conform to the following requirements:

High efficiency/low energy luminaires, considerably more efficient than the requirements of Part L Building Regulations, by use of LED light sources circa 110 lumens per watt.
The design of luminaires shall be chosen to provide good control of light (i.e. tight beam control) to create minimal stray light, and shall be aimed at the activity area only.
Luminaires shall be constructed with recessed LEDs, flat glass and aimed downwards, to achieve zero upward light (full horizontal cut off).
Location of luminaires shall further reduce the overspill: they shall be only used for, and carefully aimed at, the task area (car parks and service yard).
Good colour rendering, CRI Ra>70 for enhanced user safety and security
Colour temperature of 3000K, as recommended in the BCT guidance and MK LPA response (requiring lower than 4200K). The intention of the BCT advice is to limit UV and the blue component of light which may attract insects and affect the feeding pattern of bats. The use of LED light sources allows a slightly higher colour temperature whilst still complying with the BCT advice, because the LEDs are designed to have zero UV (100-400nm wavelength) and much reduced blue component (<550nm wavelength).
Baffles or shields shall be used where necessary to prevent overspill into environmentally sensitive areas.

Column height has been optimised to 12m to reduce the quantity of fixtures.

This is high enough to allow the luminaires to be aimed in a downwards direction, reducing sideways aiming which may cause overspill and glare (e.g. if shorter columns were used with luminaires trying to throw laterally across the yard).

It will be high enough above delivery lorries to reduce shadowing. (The maximum height of an articulated lorry was taken as 4.5m AFFL.)

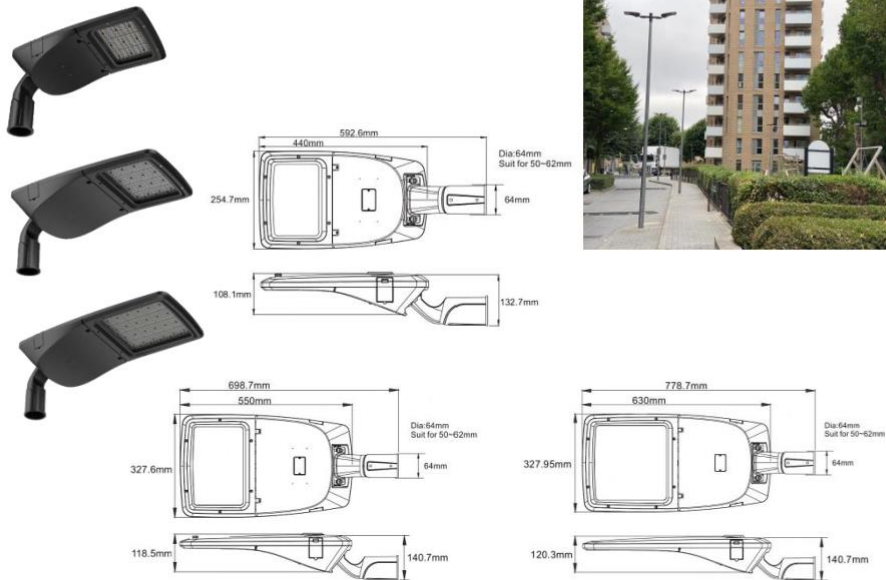
Building mounted lighting is at 12m above loading docks and generally 8m AFFL on building perimeters – this is subject to final positioning by the Architect to suit the design of the elevations. This height was chosen so that the luminaires would be a reasonable distance above any lorries which may be parked adjacent to the buildings.

8m is also a reasonable height for maintenance access.

Proposed luminaires:

EDGE LIGHTING

PRODUCT:
**PROFORM
AREA**



Description	IP66 LED Street light for column/arm mounting applications, with 60mm entry coupler
Materials	Manufactured from cast aluminium with PMMA lens
Body Colour	Black
Body Dimensions	MINI: 440mm x 255mm x 108mm MIDI: 550mm x 328mm x 119mm MAXI: 630mm x 328mm x 120mm
Weight	MINI: 5.0kg MIDI: 7.0kg MAXI: 8.5kg
Light Distribution	Asymmetric Forward (AF), Asymmetric Wide (AW) or Open Area (OA)
Luminous Flux	MINI: 8000L (60W) MIDI: 14000L (100W) MAXI: 28000L (200W)
LED Colour Temperature	3000K, 4000K or 6000K
Tilt Factor	-15°, -10°, -5°, 0 as standard, 5°, 10°, 15°
Accessories available	Photocell (PC)

Product Code

PRODUCT / BODY / INSTALLATION / DISTRIBUTION / FLUX / LED COLOUR / TILT FACTOR / ACCESSORIES

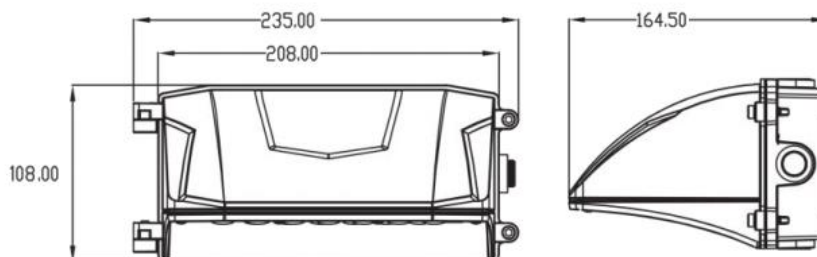
Example: **PFMAREA/MIDI/AF/14000L/3000K**

= PROFORM AREA MIDI, asymmetric forward throw, 14,000 lumens, 3000K

EDGE LIGHTING SERVICES LTD

Unit 1, Abbey Industrial Estate, 24 Willow Lane, Mitcham, Surrey CR4 4NA
020 8687 0190 sales@edgelighting.co.uk edgelighting.co.uk

(Rear baffle shield to be fitted to sensitive perimeters as required during site commissioning stage.)



Description	Surface mounted IP66 rated LED forward throw luminaire with Zero Upward Light
Materials	Manufactured from cast aluminium with moulded lens
Body Colour	Black
Body Dimensions	235mm x 108mm x 165mm
Luminous Flux	4200L (30W) or 7000L (50W)
LED Colour Temperature	3000K or 4000K
Accessories available	3 hour emergency (EM3) Photocell (PC) Microwave Detector (MW)

Product Code

PRODUCT / FLUX / LED COLOUR / ACCESSORIES

Example: **DARQNODE/4200L/3000K**

= DarqSky Node, 4200 lumens, 3000K

EDGE LIGHTING SERVICES LTD

Unit 1, Abbey Industrial Estate, 24 Willow Lane, Mitcham, Surrey CR4 4NA
020 8687 0190 sales@edgelighting.co.uk edgelighting.co.uk

Proposed Lighting Control

The lighting for each car park area shall be controlled from the three associated unit(s).

Lighting shall be switched using programmable timers to only switch on the lighting for pre-determined hours, and PIR Presence detection (fitted where appropriate), photocell sensors to only allow the lighting to operate during hours of darkness.

(The hours of operation are to be agreed with the client).

The luminaires are provided with DALI dimmable control gear which will allow areas to be dimmed when less busy.

The lighting will be capable of being individually controlled from each Units Building Management System BMS as and when installed as part of the building users fit out

The current calculated illumination levels show the luminaires at 100% output.

4. Lighting Calculation Results

Refer to the Synergy Proposed External Lighting Layout drawing, LTG-001 Revision -, showing the proposed lighting column and luminaire positions, and the calculated lighting levels achieved.

The drawing shows isolux contours for 0.2, 0.5, 1, 2, 5, 10 20 and 50 lux.

The calculations show that the predicted lighting levels in some sample areas are:

Unit 1 and unit 2, car park and service yard	13.9 lux average, 5.7 lux minimum, 0.41 uniformity (Target: 10 lux, 0.40 uniformity) (Achieved target lux level and uniformity – result accepted)
Unit 3, car park	16.1 lux average, 4.9 lux minimum, 0.31 uniformity (Target: 20 lux, 0.25 uniformity) (Achieved target lux level, uniformity close to target – higher illumination level compensates for slightly low uniformity result accepted)
Unit 1&2, loading area	58.8 lux average, 33.4 lux minimum, 0.57 uniformity (Target: 50 lux, 0.40 uniformity) (Achieved target lux level, better uniformity – result accepted)
Unit 3, loading area	56.5 lux average, 32.5 lux minimum, 0.57 uniformity (Target: 50 lux, 0.40 uniformity) (Achieved target lux level, better uniformity – result accepted)
2m strip outside boundary	0.25 lux average, 0 lux minimum, uniformity N/A (Target: 2.0 lux maximum) (Achieved 0.25lux Overspill minimised – result accepted).
Unit 1&2 Pedestrian footpath	11.1 lux average, 3.8 lux minimum, 0.34 uniformity (Target: 5 lux, 0.25 uniformity) (Achieved target lux level and uniformity – result accepted, higher illumination level improves security).
Unit 3 Pedestrian footpath	11.2 lux average, 6.5 lux minimum, 0.58 uniformity (Target: 5 lux, 0.25 uniformity) (Achieved target lux level and uniformity – result accepted, higher illumination level improves security).

Comment:

The calculated lighting levels for the sample areas are very close to the target levels, without falling below the recommended safe levels given in BSEN 12464-2 thereby achieving a safe & efficient compliant scheme design.

The isolux contours on the lighting drawing show the general level of lighting and uniformity, which is very good thereby providing consistent illumination levels and no 'bright spots'.

Overspill is kept to a minimum by the optical control of the luminaires, and the aiming and positioning. The 1 lux, 0.5 lux and 0.2 lux isolux contours are shown.

This shows minimal intrusion into the surrounding areas, with only very low levels of light traveling a short distance over the boundary.

The residential properties within the residential estate are not adversely affected - the calculations show that they are well beyond the lowest 0.2 lux contour.

This value falls well below the requirements for the reduction of obtrusive light, as defined in BSEN 12464-2, which sets a maximum of 2 lux measured at the nearest residential buildings.

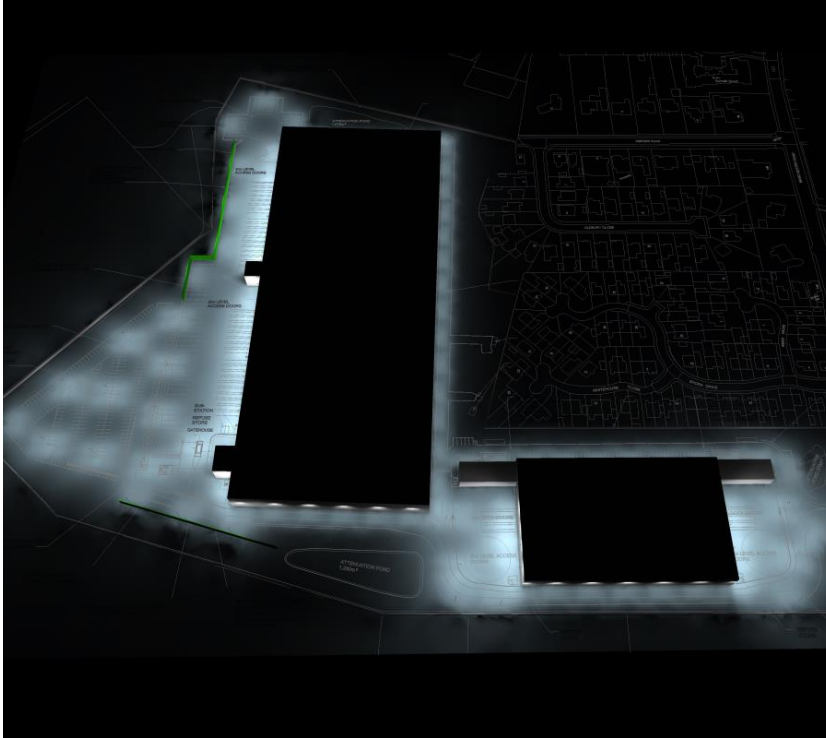
The polar charts for each luminaire show that there is zero light output at any angle higher than 75° (15° below the horizontal) for all proposed luminaires – there is no direct upward light.

1. The proposed lighting scheme is more efficient and provides significant improvement over the current 'DWP Heywood Stores' lighting installation. The existing lighting is provided by a mixture of wall mounted floodlights and column mounted 'traditional' luminaires with limited consideration of glare or light pollution. The existing lighting system will be completely replaced.
2. The lighting scheme is the minimum required for security and safe operational purposes.
Comment: calculated average illumination levels are within tolerance.
3. Glare and light spillage are minimised.
Comment: calculated isolux contours show absolute minimal spillage beyond the site boundary.
Luminaires specified have excellent control of light, flat glass and recessed LEDs to minimise glare. Any glare experienced post installation will be rectified via the installation of baffle shields during the commissioning stage if required
4. The amenity of residential areas is not adversely affected.
Comment: light spillage reduces to zero within a few metres of the site boundary, well before reaching the residential accommodation
5. There would be no unacceptable adverse impact on the character and beauty, openness, tranquility, dark landscapes or enjoyment of the night sky of the countryside.
Comment: the lighting scheme has minimal overspill and zero direct upward light in line with 'Dark Skies' recommendations
6. The visual character of historic buildings and conservation areas are not adversely affected.
Comment: not applicable
7. There would be no dazzling or distraction of drivers on nearby roads.
Comment: calculated isolux contours show absolute minimal spillage beyond the site boundary. Luminaires are specified with good control of light and recessed LEDs to minimise glare.
Any glare experienced post installation will be rectified via the installation of baffle shields during the commissioning stage if required
8. There would be no unacceptable adverse effects on species, habitats or the wider natural environment.
Comment: calculated isolux contours show minimal spillage beyond the site boundary, and average illumination of the wooded nature area is less than 1 lux 'moonlight'.
Requirements of the Bat Conservation Trust's guidance have been followed.

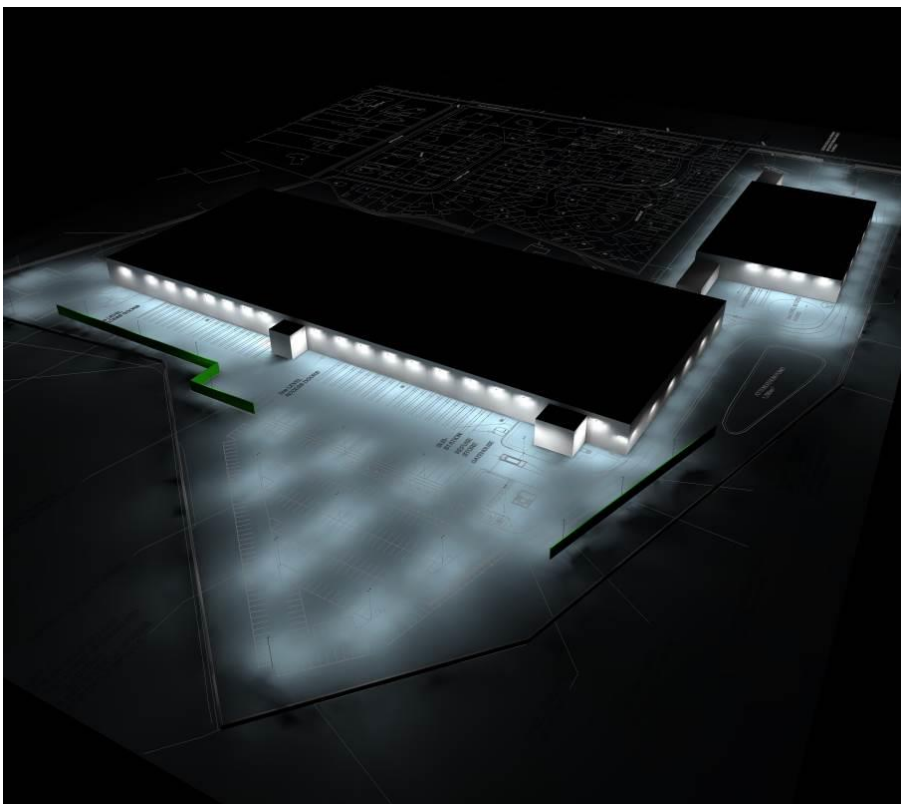
The External Lighting proposal therefore complies with the Development Plan requirements

5. Notes & Images

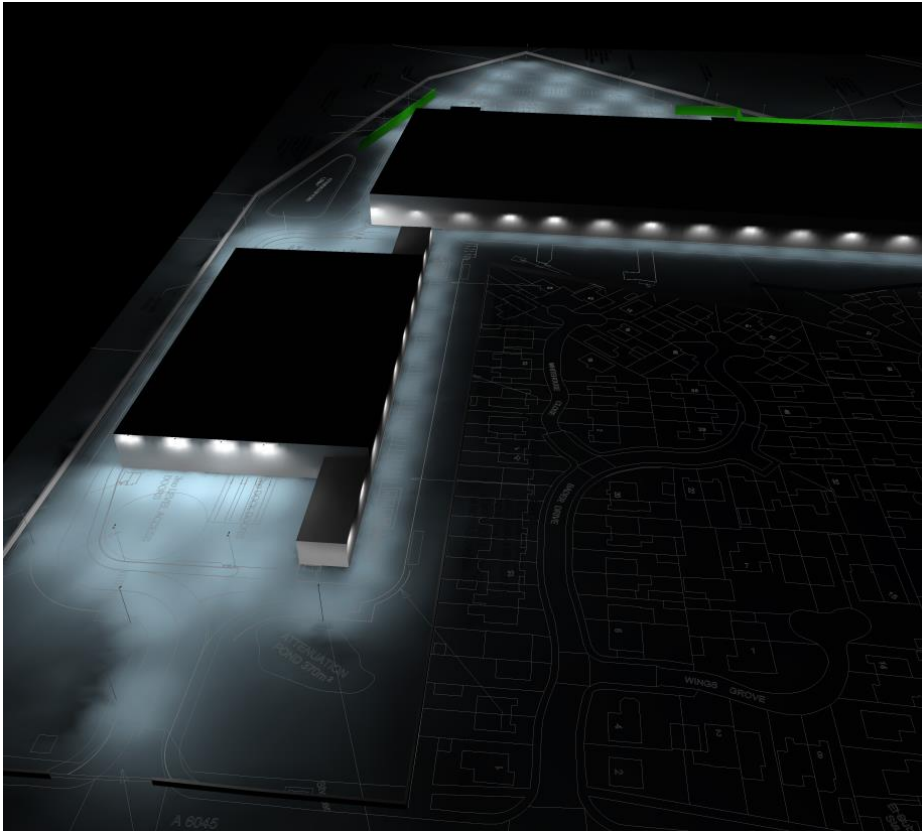
The following sample images are taken from the full calculated results.



South Plan view: showing good uniformity, with higher lighting levels only where required at loading docks.



View from West showing lower illumination levels in the car parking less onerous areas



View from East side

(a) Full Calculated Results

The following pages are the full output of the calculated illumination levels



TCC Manchester

Installation : Exterior Site Lighting

Project number :

Customer :

Processed by : Steve Willis

Date : 13.03.2023

Project description:

To drawing - 21157-ASA-00-ZZ.ZZ-D-A-0003

The following values are based on precise calculations performed on calibrated lamps and luminaires, and their configurations, whereby gradual, unavoidable deviations can occur in practice. All guarantee claims are excluded for the specified data.

This exclusion of liability applies irrespective of the legal grounds for both damages and consequential damages suffered by users and third parties.

Object : TCC Manchester
Installation : Exterior Site Lighting
Project number :
Date : 13.03.2023

EDGE
LIGHTING

1 Luminaire data

1.1 EDGE LIGHTING Ltd, PROFORM AREA 24000lm 3... (PROFORM AREA 24...)

1.1.1 Data sheet

Manufacturer: EDGE LIGHTING Ltd

PROFORM AREA 24000lm 3000K.Idt

PROFORM AREA 24000lm 3000K

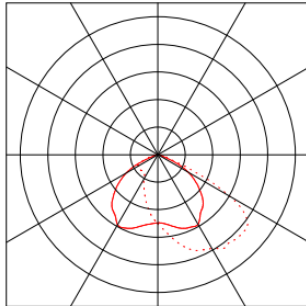
Luminaire data

Luminaire efficiency : 100%
Luminaire efficacy : 133.33 lm/W
Classification : A40 ↓100.0% ↑0.0%
CIE Flux Codes : 43 80 99 100 100
UGR 4H 8H : 36.1 / 31.2
Power : 180 W
Luminous flux : 24000 lm

Equipped with

Quantity : 1
Designation :
Colour :
Luminous flux : 24000 lm

Dimensions : 440 mm x 255 mm x 109 mm



Object : TCC Manchester
Installation : Exterior Site Lighting
Project number :
Date : 13.03.2023

EDGE
LIGHTING

1 Luminaire data

1.2 EDGE Lighting Ltd, DARQSKY NODE 30W (DARQSKY NODE 30W)

1.2.1 Data sheet

Manufacturer: EDGE Lighting Ltd

DARQSKY NODE 30W

DARQSKY NODE 30W

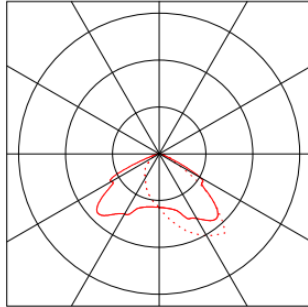
Luminaire data

Luminaire efficiency : 100%
Luminaire efficacy : 137.96 lm/W
Classification : A40 ↓100.0% ↑0.0%
CIE Flux Codes : 44 86 98 100 100
UGR 4H 8H : 30.6 / 20.2
Power : 30 W
Luminous flux : 4138.7 lm

Equipped with

Quantity : 1
Designation :
Colour :
Luminous flux : 4138.7 lm

Dimensions : 162 mm x 200 mm x 108 mm



Object : TCC Manchester
Installation : Exterior Site Lighting
Project number :
Date : 13.03.2023

EDGE
LIGHTING

1 Luminaire data

1.3 EDGE LIGHTING Ltd, PROFORM AREA 10600lm 3... (!PROFORM AREA 1...)

1.3.1 Data sheet

Manufacturer: EDGE LIGHTING Ltd

!PROFORM AREA 10600lm 3000K.Idt

PROFORM AREA 10600lm 3000K

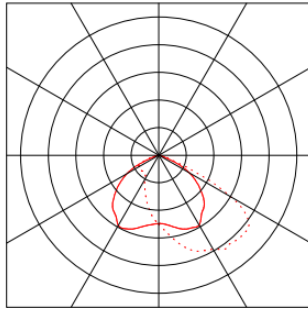
Luminaire data

Luminaire efficiency : 100%
Luminaire efficacy : 132.5 lm/W
Classification : A40 ↓100.0% ↑0.0%
CIE Flux Codes : 43 80 99 100 100
UGR 4H 8H : 33.3 / 28.3
Power : 80 W
Luminous flux : 10600 lm

Equipped with

Quantity : 1
Designation :
Colour :
Luminous flux : 10600 lm

Dimensions : 440 mm x 255 mm x 109 mm



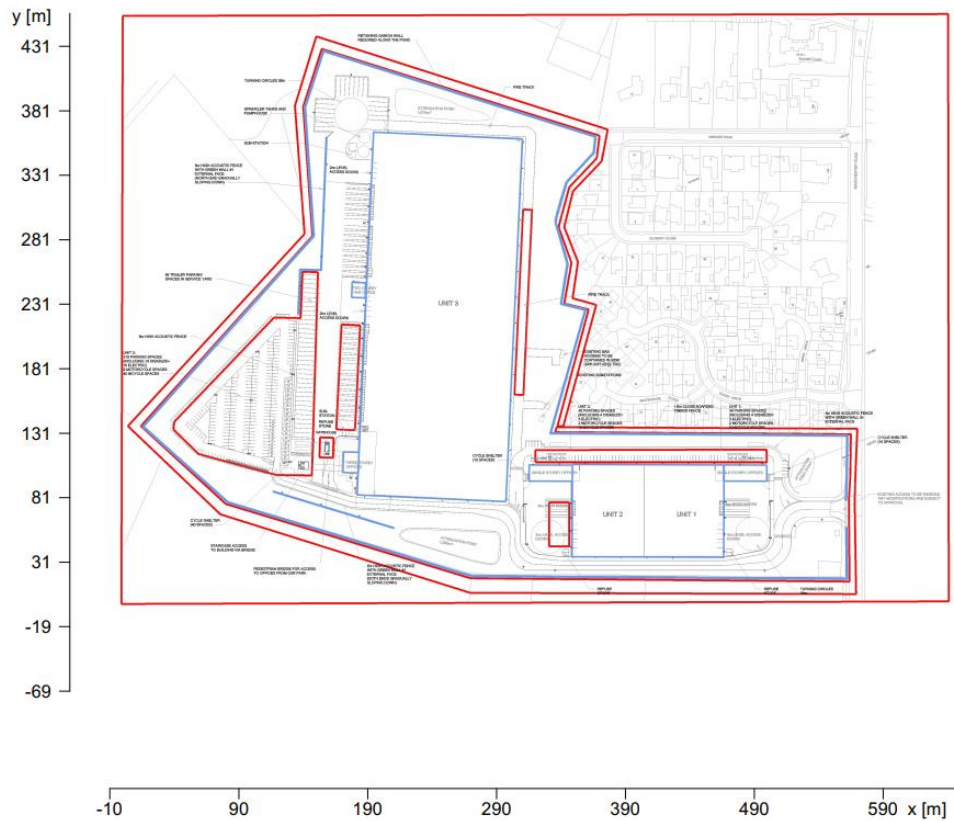
Object : TCC Manchester
Installation : Exterior Site Lighting
Project number :
Date : 13.03.2023

EDGE
LIGHTING

2 Areas For Lighting Report

2.1 Description, Areas For Lighting Report

2.1.1 Floor plan



Object : TCC Manchester
Installation : Exterior Site Lighting
Project number :
Date : 13.03.2023

EDGE
LIGHTING

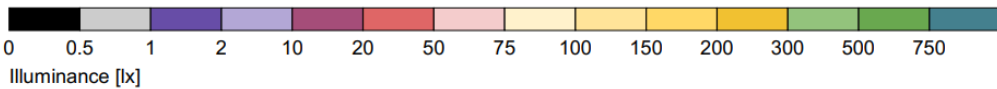
2 Areas For Lighting Report

2.2 Summary, Areas For Lighting Report

2.2.1 Result overview, Evaluation area 1



-10 90 190 290 390 490 590 x [m]



General

Calculation algorithm used
Maintenance factor

Average indirect fraction
0.85

Total luminous flux
Total power
Total power per area (291473.38 m²)

1332441.00 lm
9970.0 W
0.03 W/m² (1.03 W/m²/100lx)

Evaluation area 1

Reference plane 1.1

Horizontal
Em 3.31 lx
Emin 0 lx
Emin/Em (Uo) ---
Emin/Emax (Ud) ---
Position 0.00 m

Type No.\Make

		EDGE LIGHTING Ltd	
1	27 x	Order No.	: PROFORM AREA 24000lm 3000K.Idt
		Luminaire name	: PROFORM AREA 24000lm 3000K
		Equipment	: 1 x 180 W / 24000 lm
3	47 x	Order No.	: !PROFORM AREA 10600lm 3000K.Idt
		Luminaire name	: PROFORM AREA 10600lm 3000K
		Equipment	: 1 x 80 W / 10600 lm

Object : TCC Manchester
Installation : Exterior Site Lighting
Project number :
Date : 13.03.2023



2 Areas For Lighting Report

2.2 Summary, Areas For Lighting Report

2.2.1 Result overview, Evaluation area 1

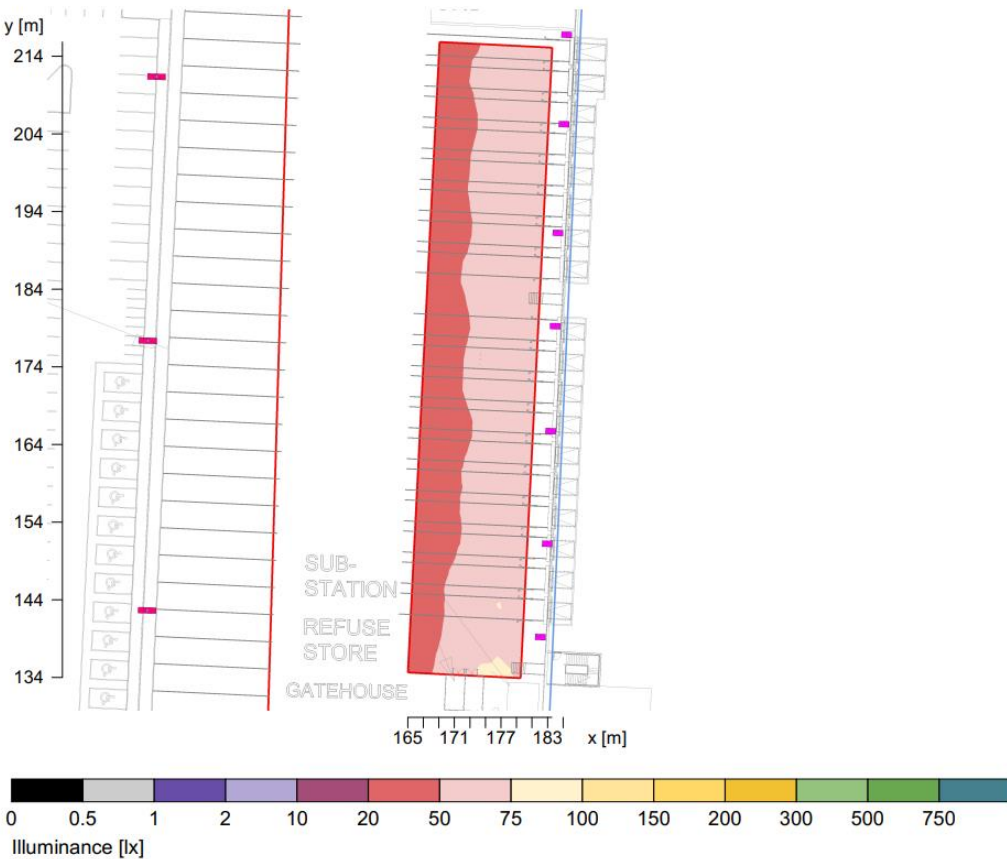
2	45 x	EDGE Lighting Ltd	Order No.	: DARQSKY NODE 30W
			Luminaire name	: DARQSKY NODE 30W
			Equipment	: 1 x 30 W / 4138.7 lm

Object : TCC Manchester
Installation : Exterior Site Lighting
Project number :
Date : 13.03.2023

2 Areas For Lighting Report

2.3 Calculation results, Areas For Lighting Report

2.3.2 Pseudo colours, UNIT 3 LOADING AREA (E)

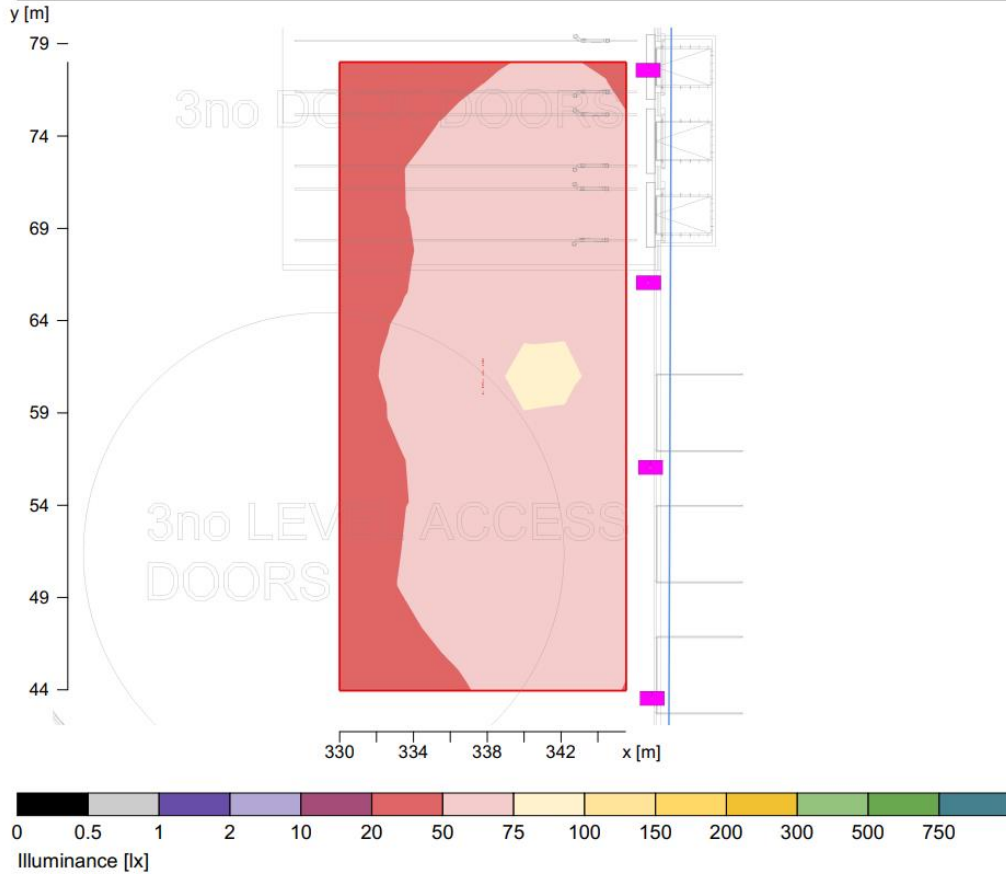


Object : TCC Manchester
Installation : Exterior Site Lighting
Project number :
Date : 13.03.2023

EDGE
LIGHTING

2.3 Calculation results, Areas For Lighting Report

2.3.3 Pseudo colours, UNIT 1/2 LOADING AREA (E)



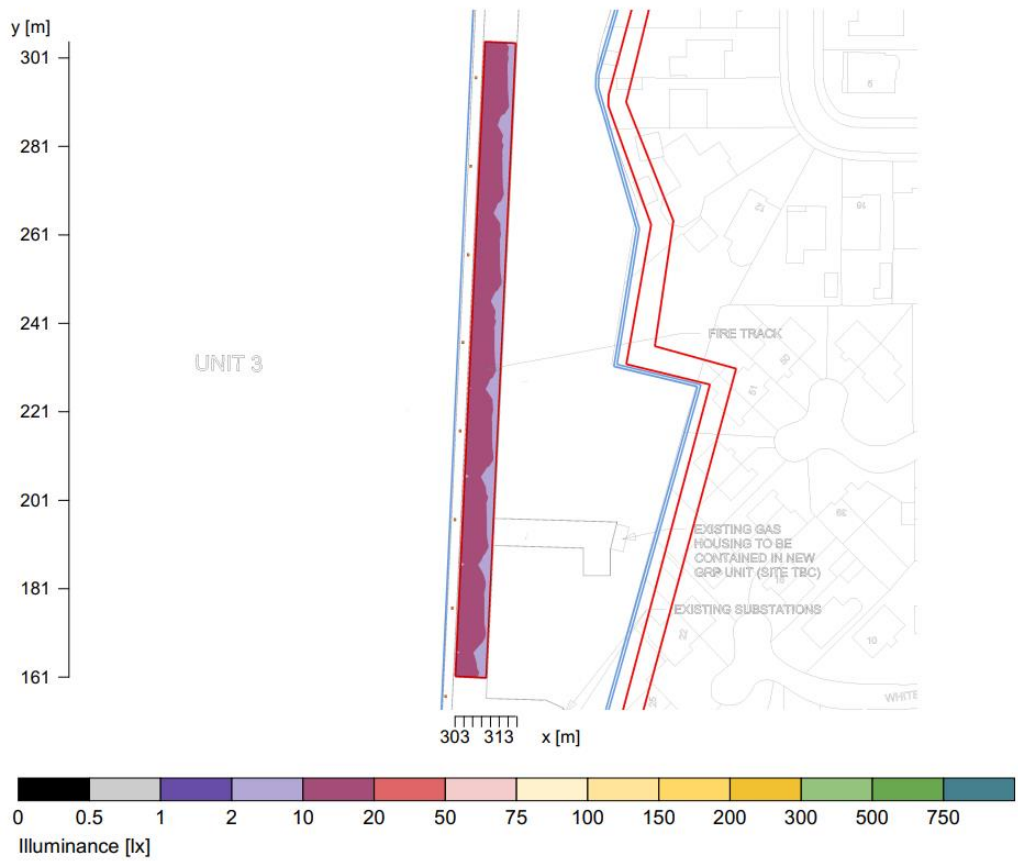
Height reference plane
Average illuminance
Minimum illuminance
Maximum illuminance
Uniformity U_0
Diversity U_d

: 0.00 m
Em : 58.5 lx
Emin : 32.8 lx
Emax : 76.9 lx
Emin/Em : 1 : 1.78 (0.56)
Emin/Emax : 1 : 2.34 (0.43)

Object : TCC Manchester
Installation : Exterior Site Lighting
Project number :
Date : 13.03.2023

2.3 Calculation results, Areas For Lighting Report

2.3.4 Pseudo colours, UNIT 1/2 LOADING AREA (E)



Height reference plane	: 0.00 m
Average illuminance	Em : 12.3 lx
Minimum illuminance	Emin : 8.2 lx
Maximum illuminance	Emax : 17.9 lx
Uniformity Uo	Emin/Em : 1 : 1.50 (0.66)
Diversity Ud	Emin/Emax : 1 : 2.18 (0.46)

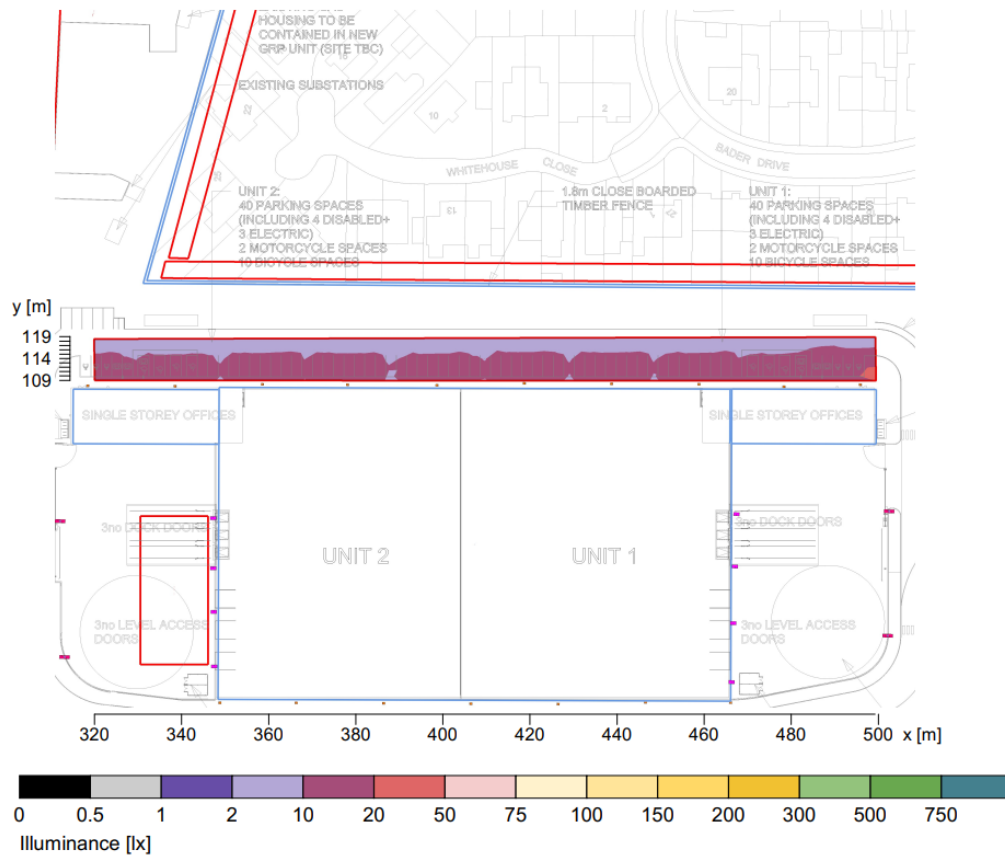
Object : TCC Manchester
 Installation : Exterior Site Lighting
 Project number :
 Date : 13.03.2023

EDGE

L I G H T I N G

2.3 Calculation results, Areas For Lighting Report

2.3.5 Pseudo colours, UNIT 1/2 Rear Parking (E)



Average illuminance
 Minimum illuminance
 Maximum illuminance
 Uniformity U_0
 Diversity U_d

E_m : 11.3 lx
 E_{min} : 4 lx
 E_{max} : 20.8 lx
 E_{min}/E_m : 1 : 2.85 (0.35)
 E_{min}/E_{max} : 1 : 5.25 (0.19)

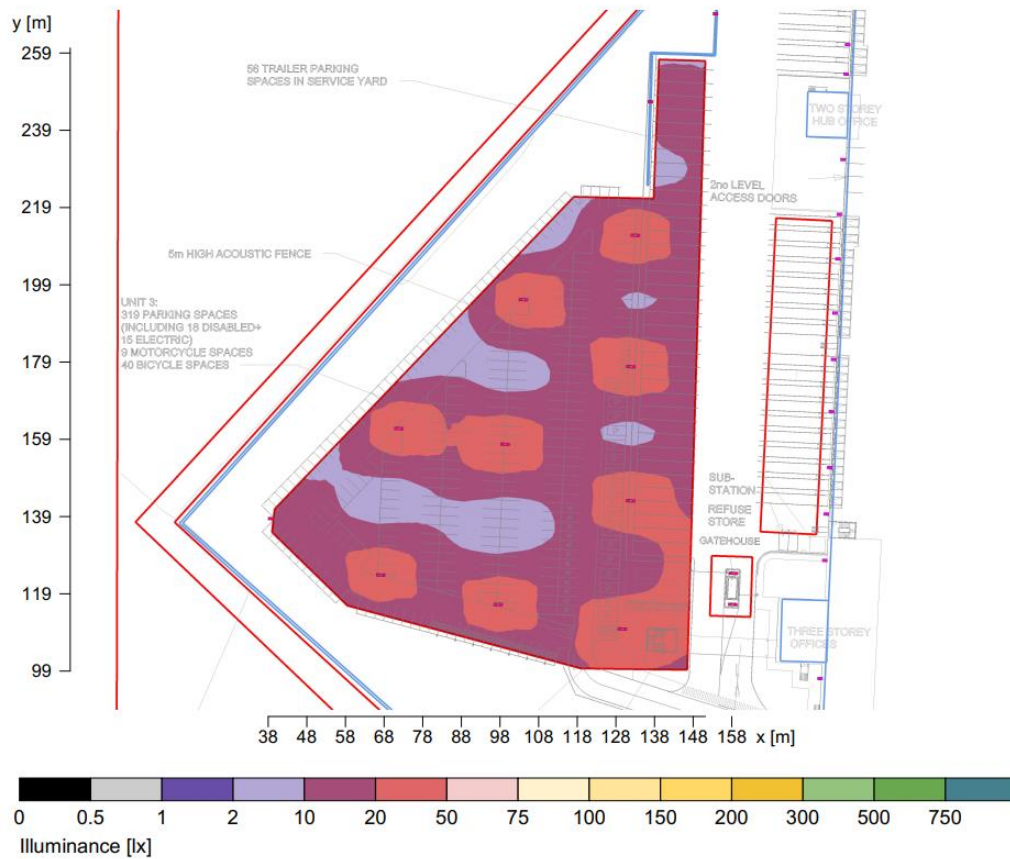
Object : TCC Manchester
 Installation : Exterior Site Lighting
 Project number :
 Date : 13.03.2023

EDGE

L I G H T I N G

2.3 Calculation results, Areas For Lighting Report

2.3.6 Pseudo colours, LORRY and CAR PARKING (E)



Height reference plane
 Average illuminance
 Minimum illuminance
 Maximum illuminance
 Uniformity U_0
 Diversity U_d

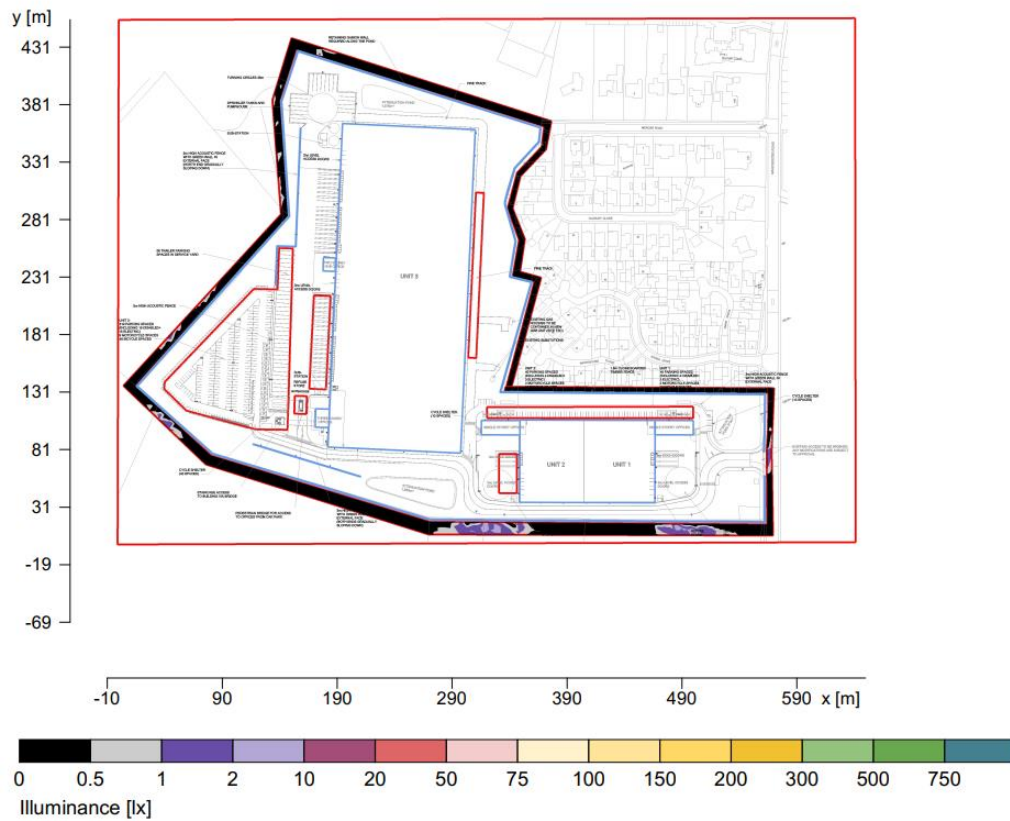
: 0.00 m
 E_m : 16.4 lx
 E_{min} : 5.4 lx
 E_{max} : 32.9 lx
 E_{min}/E_m : 1 : 3.04 (0.33)
 E_{min}/E_{max} : 1 : 6.09 (0.16)

Object : TCC Manchester
Installation : Exterior Site Lighting
Project number :
Date : 13.03.2023

EDGE
LIGHTING

2.3 Calculation results, Areas For Lighting Report

2.3.7 Pseudo colours, 5m PERIMETER ZONE (E)



Height reference plane
Average illuminance
Minimum illuminance
Maximum illuminance
Uniformity U_0
Diversity U_d

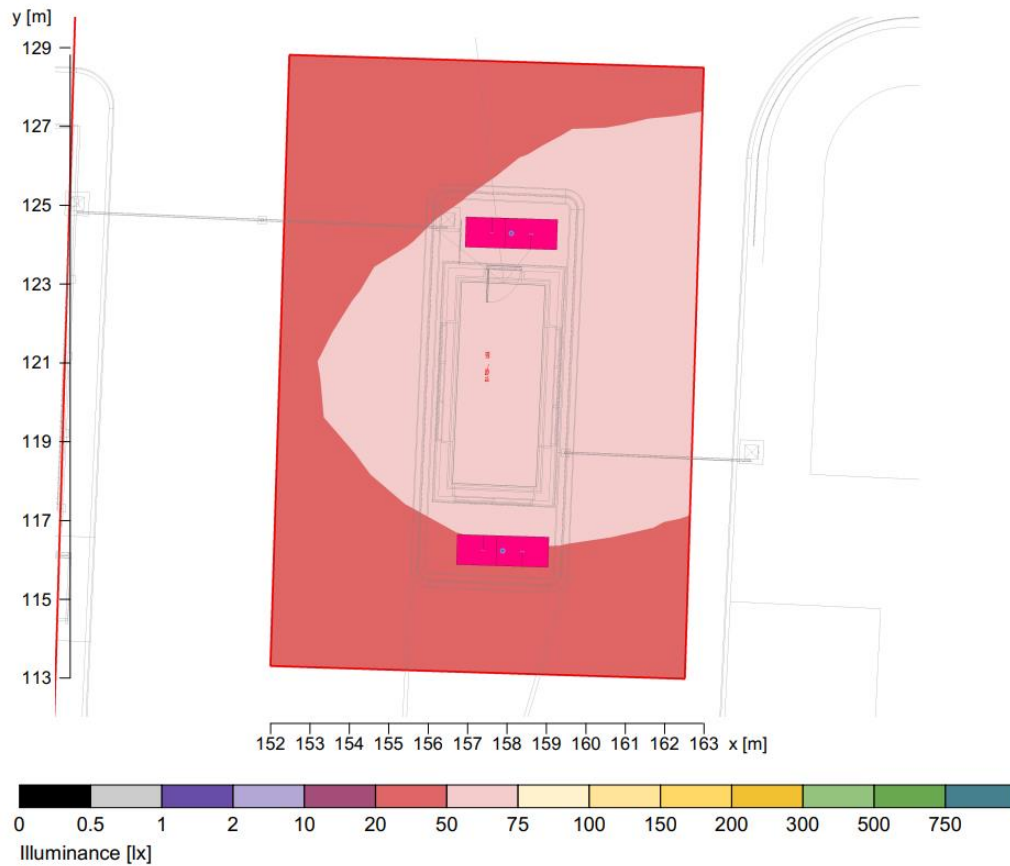
	: 0.00 m
Em	: 0.29 lx
Emin	: 0 lx
Emax	: 3.02 lx
Emin/Em	: ---
Emin/Emax	: ---

Object : TCC Manchester
Installation : Exterior Site Lighting
Project number :
Date : 13.03.2023

EDGE
LIGHTING

2.3 Calculation results, Areas For Lighting Report

2.3.8 Pseudo colours, GATEHOUSE (E)



Height reference plane
Average illuminance
Minimum illuminance
Maximum illuminance
Uniformity U_0
Diversity U_d

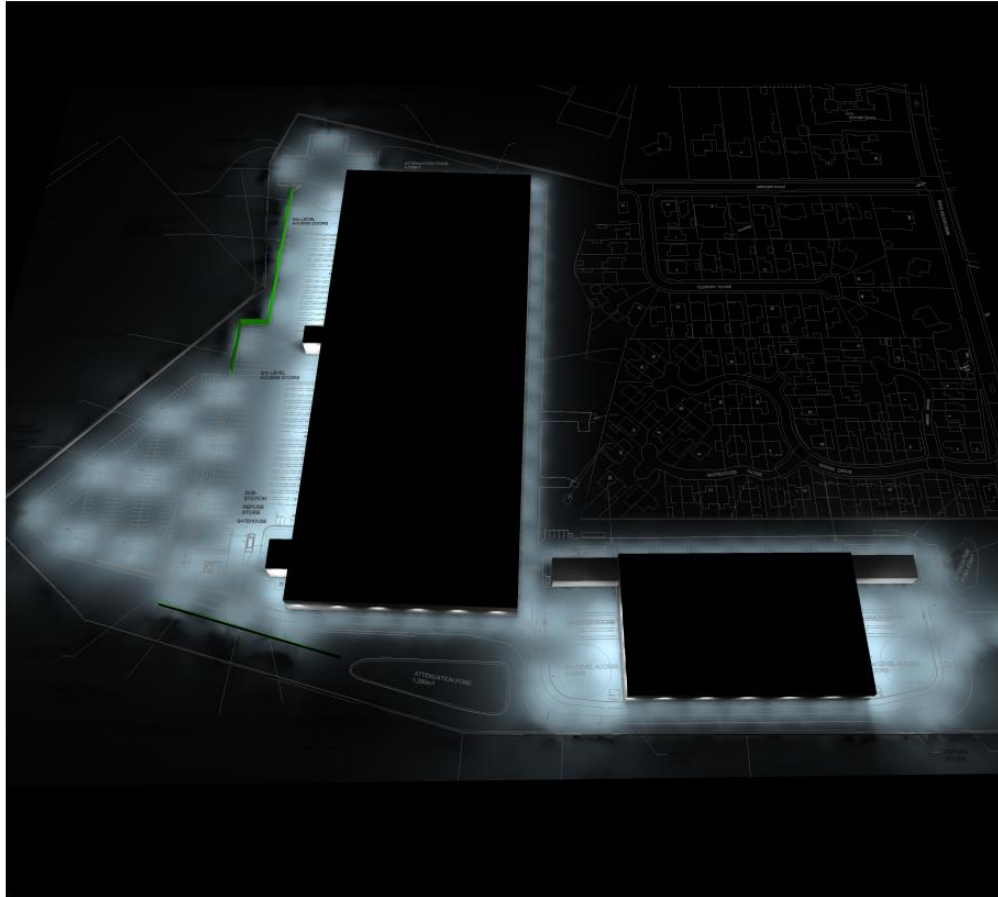
: 0.00 m
Em : 50 lx
Emin : 38.9 lx
Emax : 59.3 lx
Emin/Em : 1 : 1.28 (0.78)
Emin/Emax : 1 : 1.52 (0.66)

Object : TCC Manchester
Installation : Exterior Site Lighting
Project number :
Date : 13.03.2023

EDGE
LIGHTING

2.3 Calculation results, Areas For Lighting Report

2.3.9 3D luminance, View 1

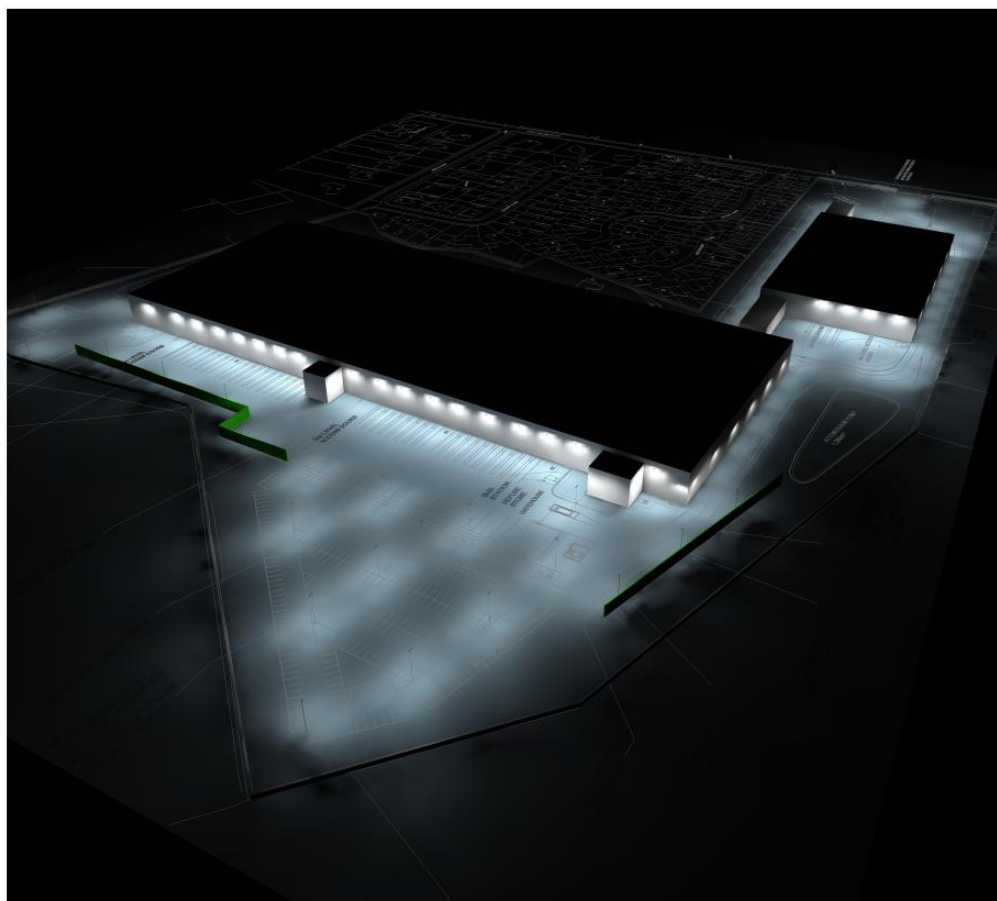


Object : TCC Manchester
Installation : Exterior Site Lighting
Project number :
Date : 13.03.2023

EDGE
LIGHTING

2.3 Calculation results, Areas For Lighting Report

2.3.10 3D luminance, View 2

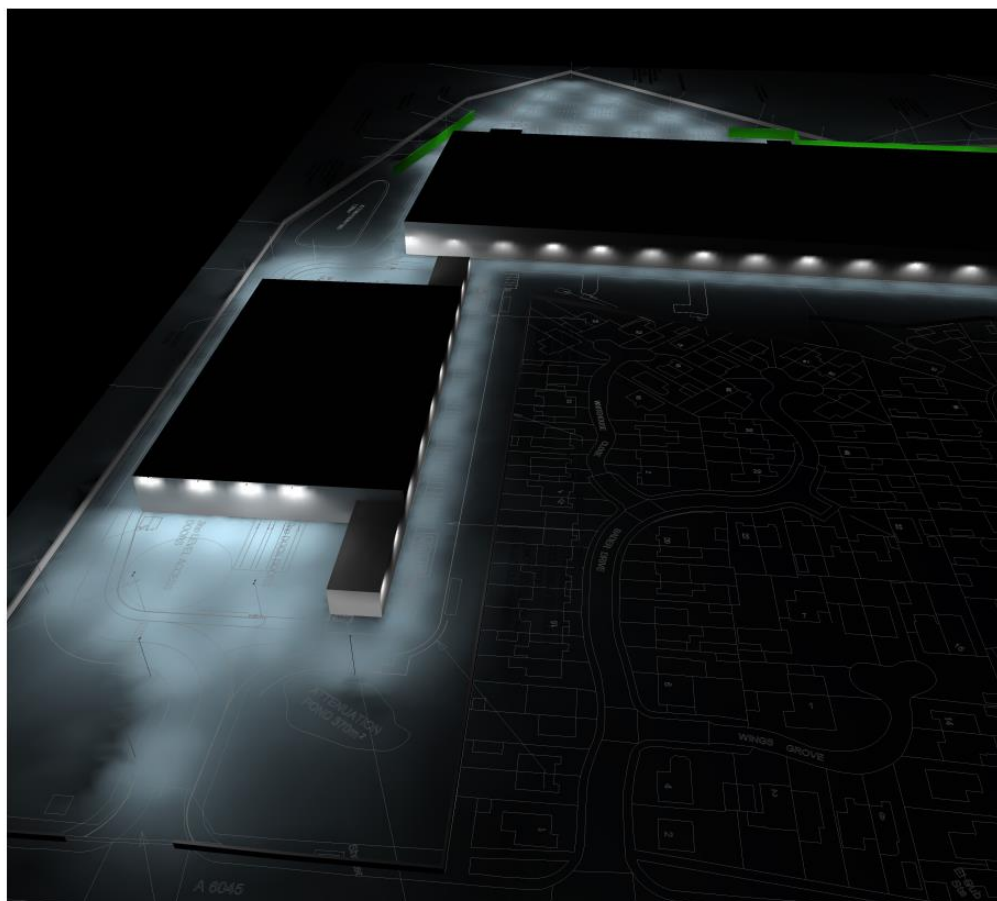


Object : TCC Manchester
Installation : Exterior Site Lighting
Project number :
Date : 13.03.2023

EDGE
LIGHTING

2.3 Calculation results, Areas For Lighting Report

2.3.11 3D luminance, View 3

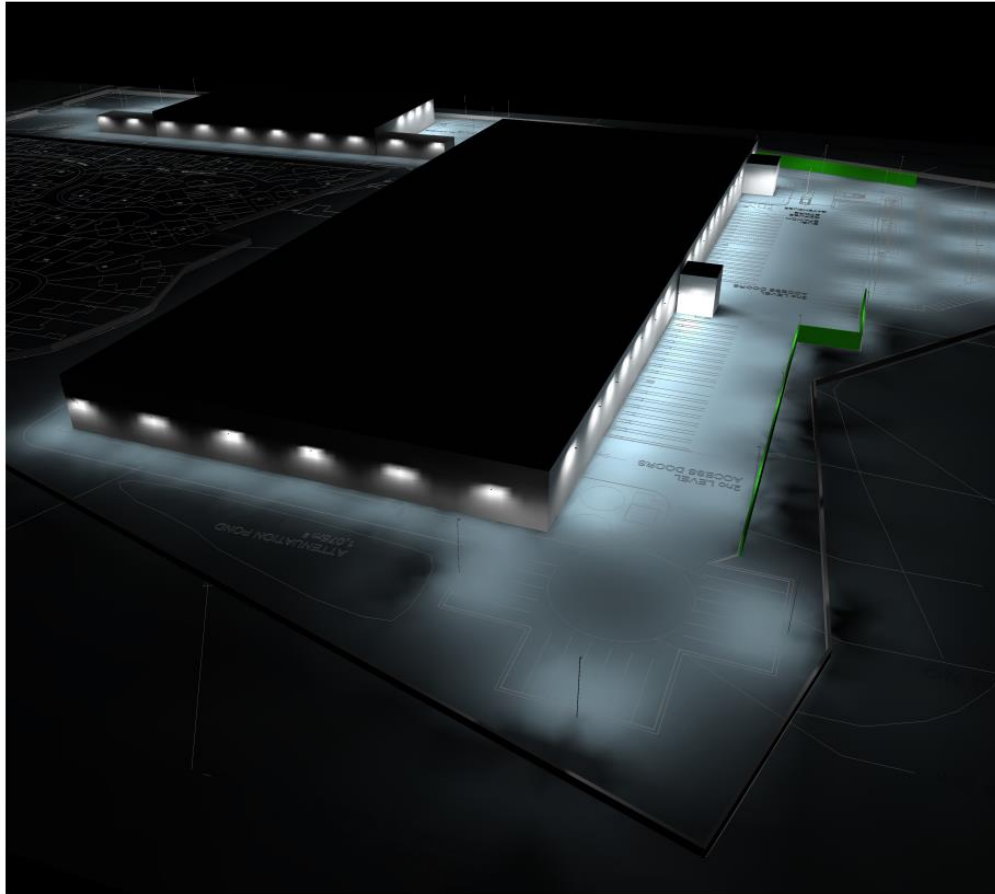


Object : TCC Manchester
Installation : Exterior Site Lighting
Project number :
Date : 13.03.2023

EDGE
LIGHTING

2.3 Calculation results, Areas For Lighting Report

2.3.12 3D luminance, View 4



[illegible]