

Appendix F7: Light Pollution Assessment



DAYLIGHT & SUNLIGHT
LIGHT POLLUTION ASSESSMENT

One Medlock Street, Manchester

03 October 2022

GIA No: **19146**

PROJECT DATA:

Client **Premier Inn Hotels & Dominvs Group**
Architect **Jon Matthews Architects**
Project Title **One Medlock Street, Manchester**
Project Number **19146**

REPORT DATA:

Report Title **Light Pollution Assessment**
GIA Department **Daylight & Sunlight**
Dated **03 October 2022**

Prepared by **LG**
Checked by **KST**
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SOURCES OF INFORMATION:

Information Received **IR-02-04-19146**
Release Number **Rel_01_19146_DSD**
Issue Number **02**
Site Photos **GIA**
3D models **VERTEX**
OS Data **FIND Maps**



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1 SITE OVERVIEWS

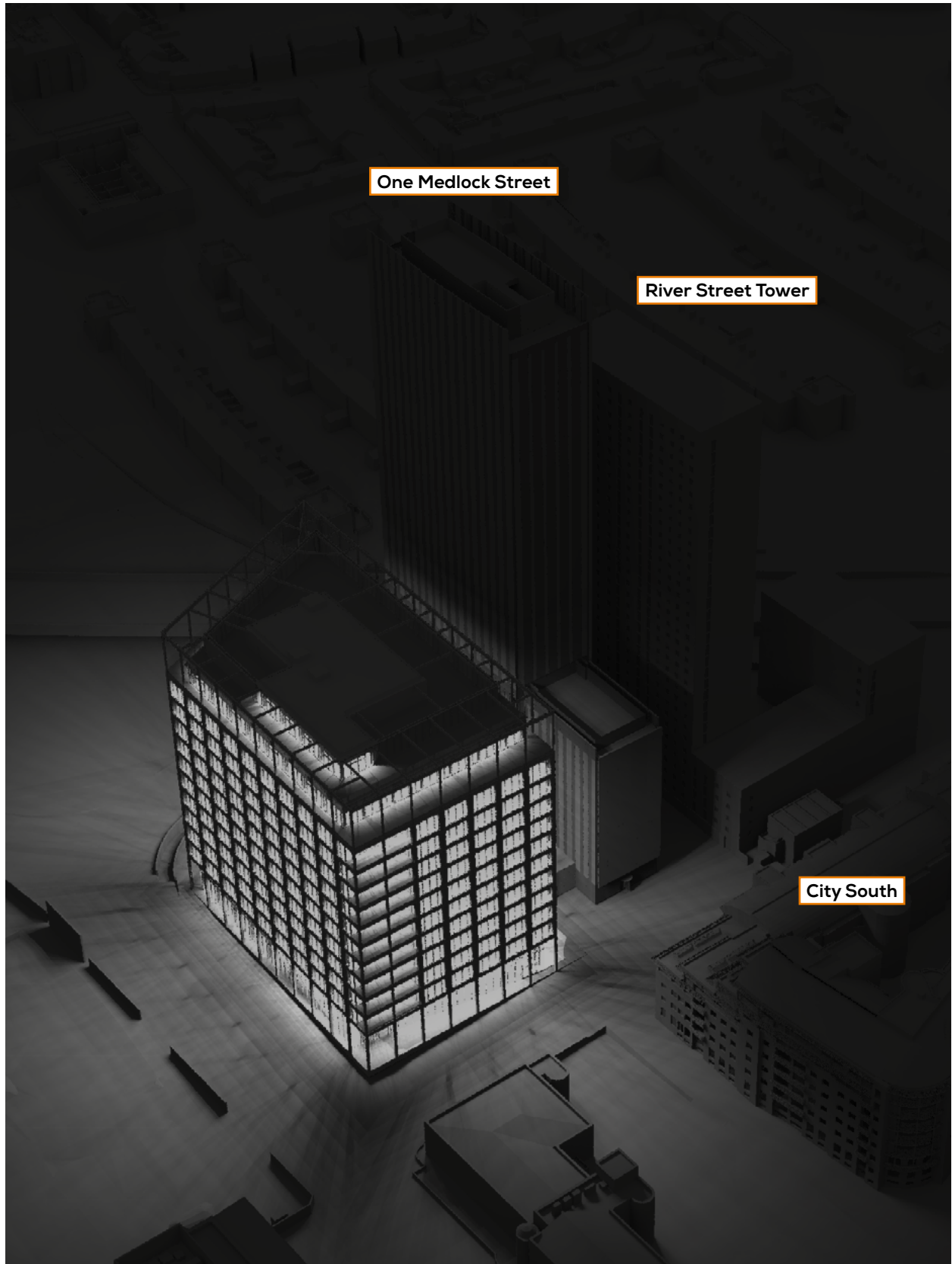


Fig. 01: Site Overview Perspective

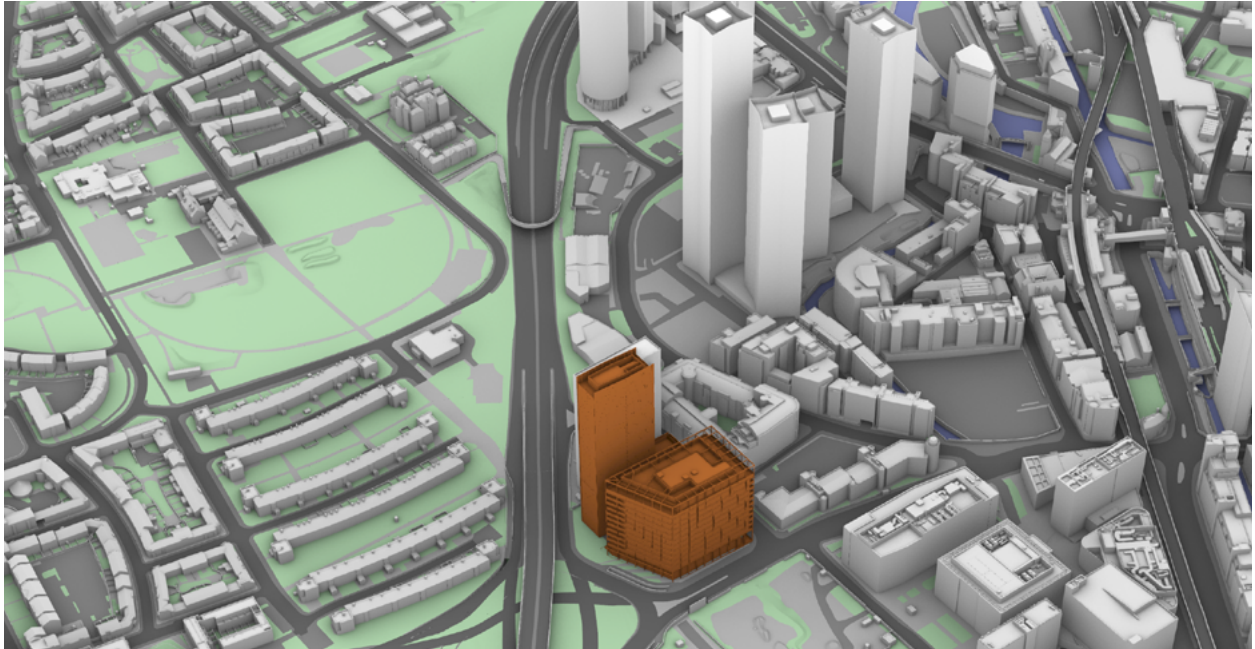


Fig. 03: Site Perspective

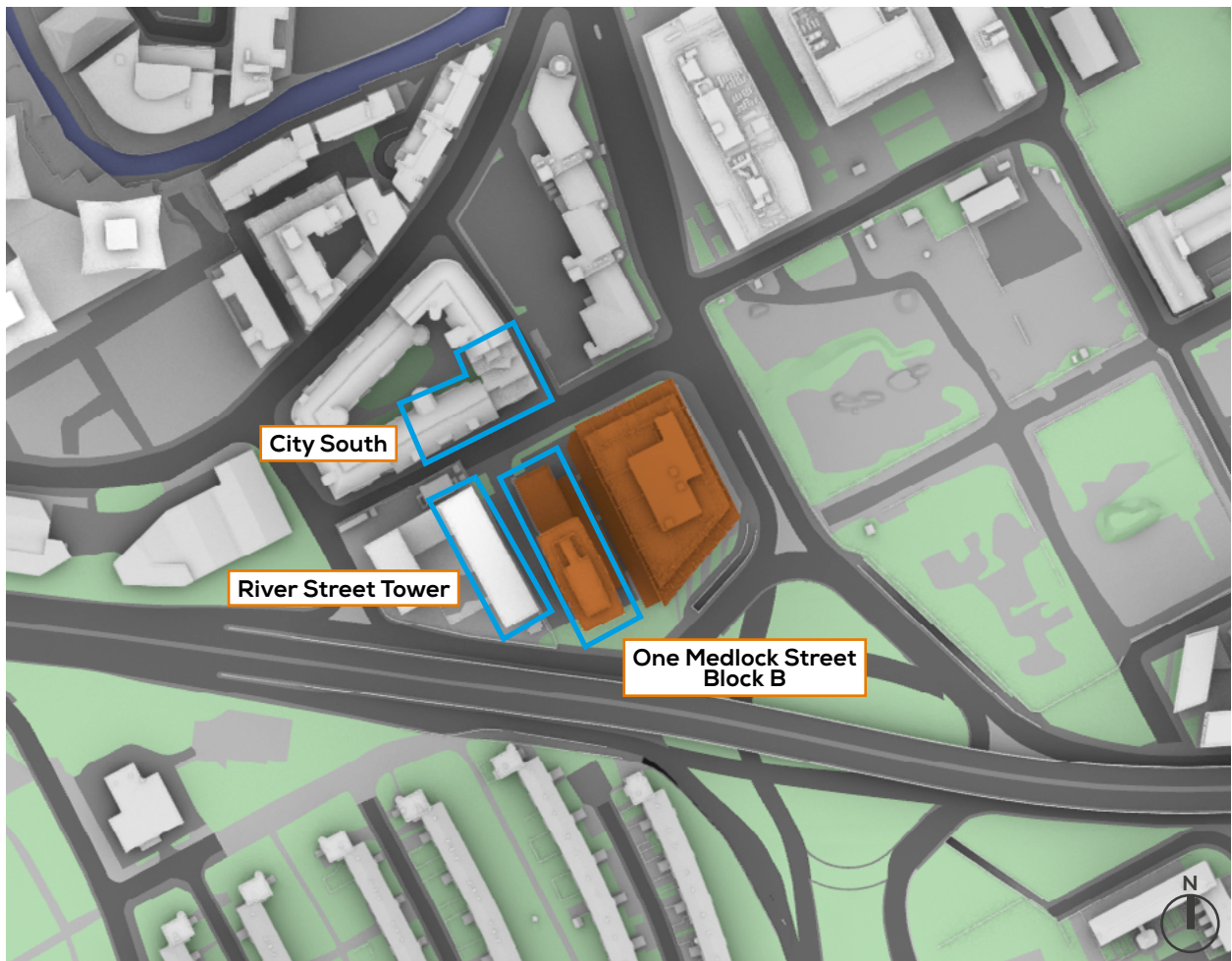


Fig. 02: Site Plan

2 METHODOLOGY

In order to undertake the light pollution assessments set out above, and in accordance with your instructions, we have prepared a 3D computer model and used specialist lighting simulation software.

The 3D representation of the proposed development is based on models and drawings provided by Jon Matthews Architects. This has been placed in the context of its surrounding buildings which have been modelled from measured survey. This allows for a precise model, which in turn ensures that analysis accurately represents the levels of light spillage.

2.1 SIMULATION ASSUMPTIONS

Where no values for reflectance, transmittance and maintenance factor were specified by the designer the following values from BS 8206-2:2008, Annex A, tables A.1-A.6 were used for the calculation of Light Pollution. These values are shown in the table below.

Light Sources

The light fittings specified by the lighting designer have been incorporated within the 3D model in .ies format so as to achieve an initial average illuminance of 500 lux across the working plane.

2.2 SKY GLOW

Luminance distribution data provided by the fitting's manufacturer is used to calculate the proportion of light which is emitted directly into the sky for each fitting type. This information is then used to calculate the total sky glow (ULR).

2.3 LIGHT TRESPASS

In this case the sensitive receptors are specified as the windows of residential properties in close proximity to the site and the proposed façades of Buildings 3, 6 and 7.

In the proposed scenario virtual sensors are placed on the outside walls of residential buildings surrounding the new development. The sensors calculate the incident illuminance to this point.

2.4 GLARE

A virtual camera is positioned at the assessed point facing the site. A false colour luminance picture is produced showing the brightness levels of the light sources that are visible within the proposed development.

2.5 BUILDING LUMINANCE

A false colour luminance picture is produced showing the luminance (cd/m^2) of the façades of the proposed building. This data is averaged to assess compliance.

Table 01: Typical reflectance, transmittance and maintenance factors

REFLECTANCE VALUES:		MAINTENANCE FACTORS: GLAZING TYPE		TV (Normal)	A.3	A.4	A.5	A.6	TV (Total)
Surrounding	0.2	Triple Low-E (frames modelled)	0.63	8	1	1	1	1	0.58
Pavement	0.2	Triple Low-E (frames not modelled)	0.63	8	1	1	0.8	0.46	
Grass	0.1	Triple Low-E (inclined, frames modelled)	0.63	8	2	1	1	0.53	
Water	0.1	Triple Low-E (inclined, frames not modelled)	0.63	8	2	1	0.8	0.42	
Yellow brick	0.3	Triple Low-E (horizontal, frames modelled)	0.63	8	3	1	1	0.48	
Red brick	0.2	Triple Low-E (horizontal, frames not modelled)	0.63	8	3	1	0.8	0.38	
Portland Stone	0.6								
Concrete	0.4								
Internal walls (light grey)	0.68	Double Low-E (frames modelled)	0.75	8	1	1	1	0.69	
Internal ceiling (white paint)	0.85	Double Low-E (frames not modelled)	0.75	8	1	1	0.8	0.55	
Internal floor (medium veneer)	0.3	Double Low-E (inclined, frames modelled)	0.75	8	2	1	1	0.63	
Internal floor (light veneer)	0.4	Double Low-E (inclined, frames not modelled)	0.75	8	2	1	0.8	0.50	
		Double Low-E (horizontal, frames modelled)	0.75	8	3	1	1	0.57	
		Double Low-E (horizontal, frames not modelled)	0.75	8	3	1	0.8	0.46	
		Single (frames modelled)	0.9	8	1	1	1	0.83	
		Single (frames not modelled)	0.9	8	1	1	0.8	0.66	
		Single (inclined, frames modelled)	0.9	8	2	1	1	0.76	
		Single (inclined, frames not modelled)	0.9	8	2	1	0.8	0.60	
		Single (horizontal, frames modelled)	0.9	8	3	1	1	0.68	
		Single (horizontal, frames not modelled)	0.9	8	3	1	0.8	0.55	
		Double Translucent Low-E (frames modelled)	0.74	8	1	1	1	0.68	
		Double Translucent Low-E (frames not modelled)	0.74	8	1	1	0.8	0.54	
		Double Translucent Low-E (inclined, frames modelled)	0.74	8	2	1	1	0.62	
		Double Translucent Low-E (inclined, frames not modelled)	0.74	8	2	1	0.8	0.50	
		Double Translucent Low-E (horizontal, frames modelled)	0.74	8	3	1	1	0.56	
		Double Translucent Low-E (horizontal, frames not modelled)	0.74	8	3	1	0.8	0.45	

TRANSMITTANCE VALUES	TV
Triple glazing (Low-E): Pilkington K Glass 4/12/4/12/4 Argon filled 90%	0.63
Double glazing (Low-E): Pilkington K Glass 4/16/4 Argon filled 90%	0.75
Single glazing: Pilkington Optifloat Clear 4mm Annealed	0.90
Translucent glazing (Low-E): Pilkington Optifloat Opal - 4mm K / 16/4mm Opal	0.74

3 LIGHT POLLUTION ASSESSMENTS

LIGHT TRESPASS ASSESSMENT CITY SOUTH - SOUTH-EAST FACADE

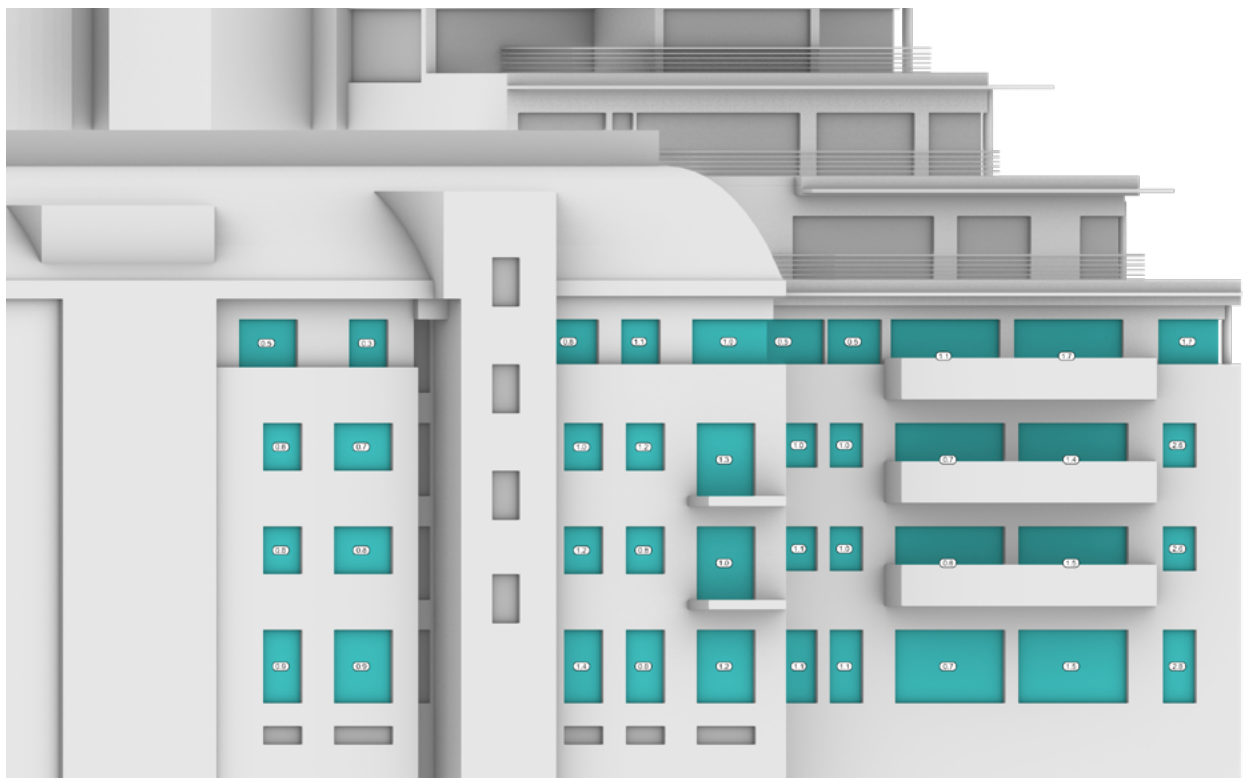


Fig. 04: Illuminance Levels



SOUTH-EAST FACADE: PRE CURFEW



Fig. 05: Light Trespass Assessment - Pre Curfew

SOUTH-EAST FACADE: POST CURFEW

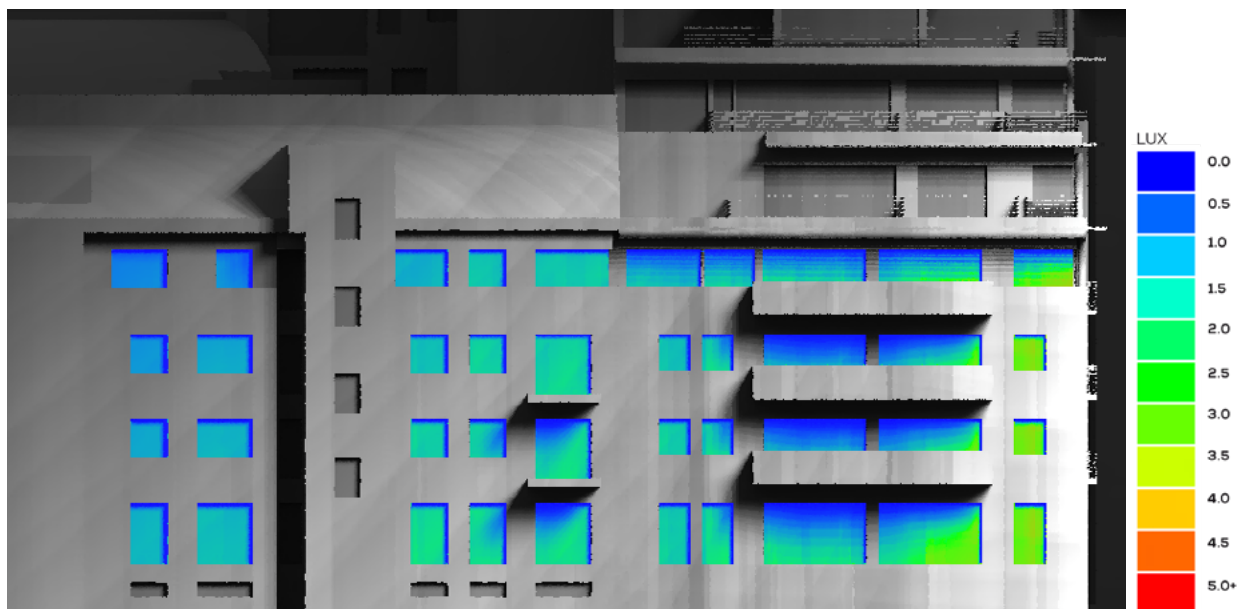


Fig. 06: Light Trespass Assessment - Post Curfew

LIGHT TRESPASS ASSESSMENT
RIVER STREET TOWER - NORTH-EAST FACADE

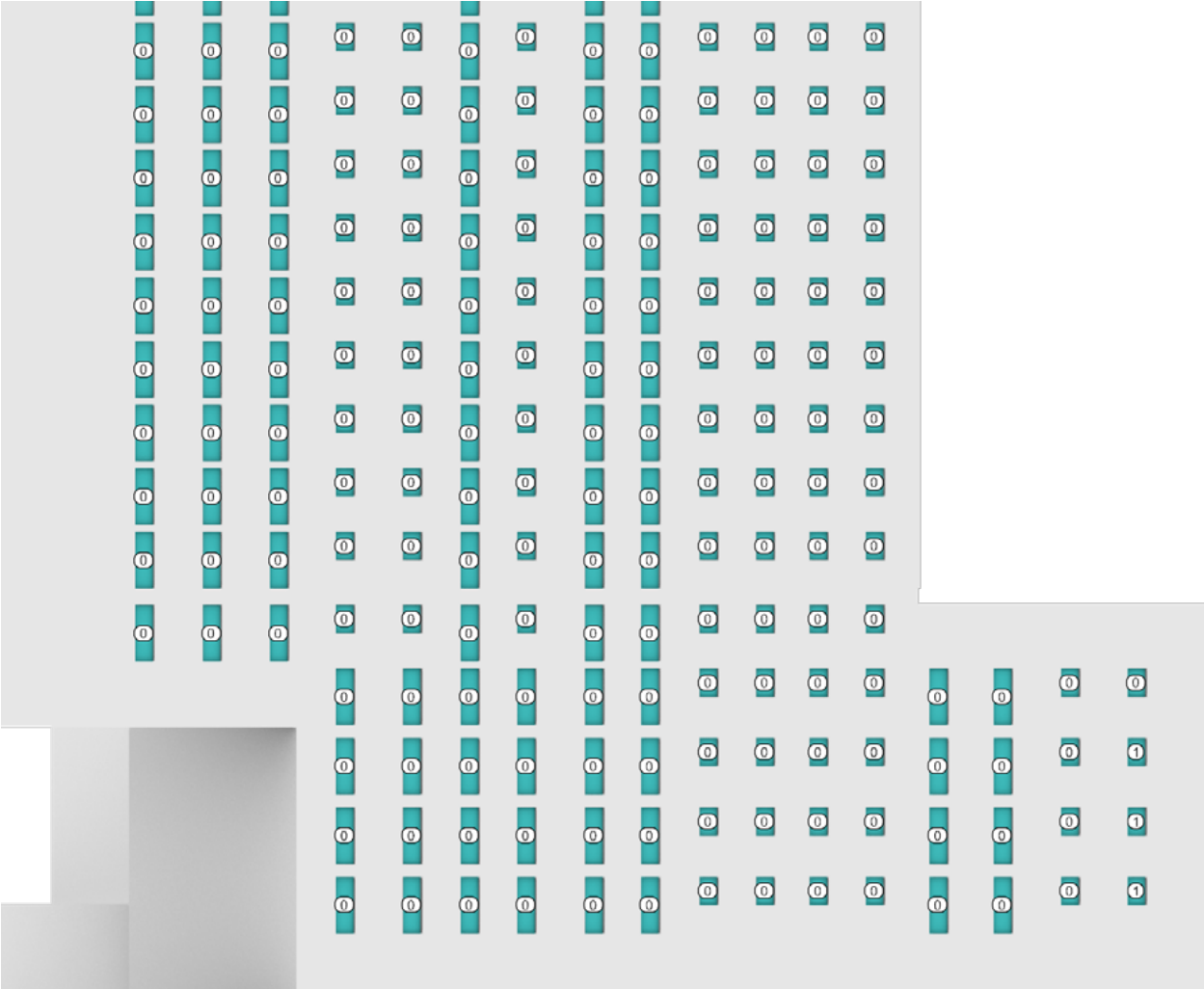
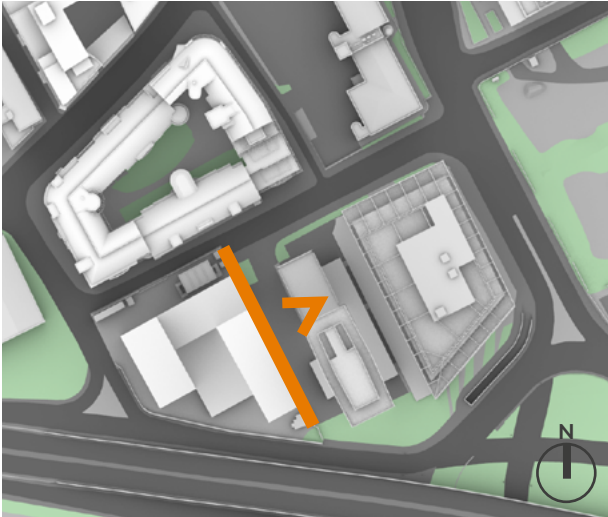


Fig. 07: Illuminance Levels



NORTH-EAST FACADE: PRE CURFEW

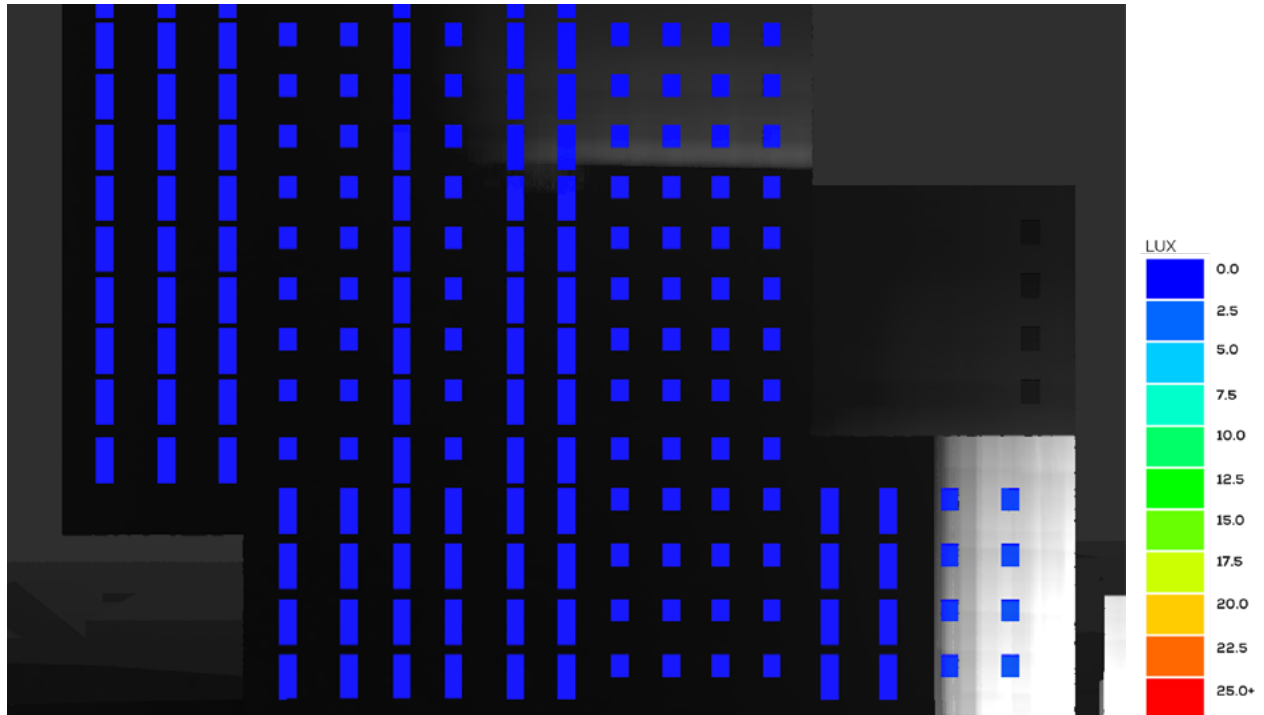


Fig. 08: Light Trespass Assessment - Pre Curfew

NORTH-EAST FACADE: POST CURFEW

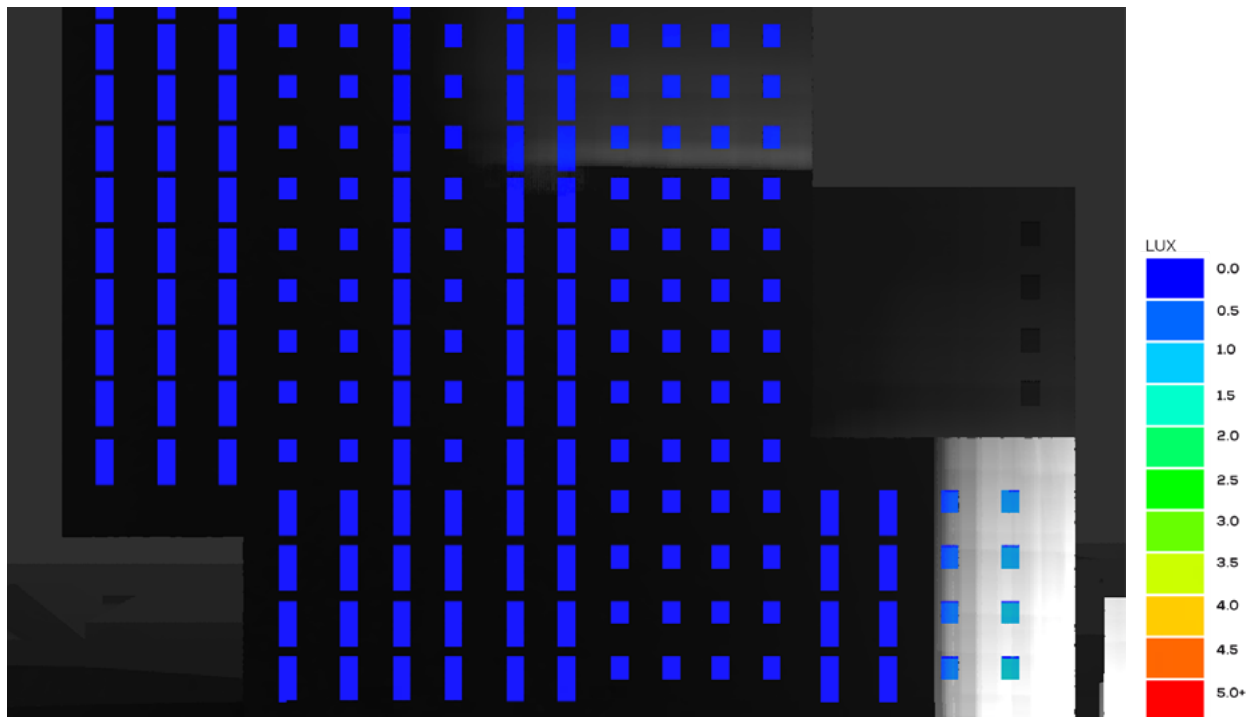


Fig. 09: Light Trespass Assessment - Post Curfew

LIGHT TRESPASS ASSESSMENT
ONE MEDLOCK STREET (APARTMENT BUILDING) - NORTH-EAST FACADE

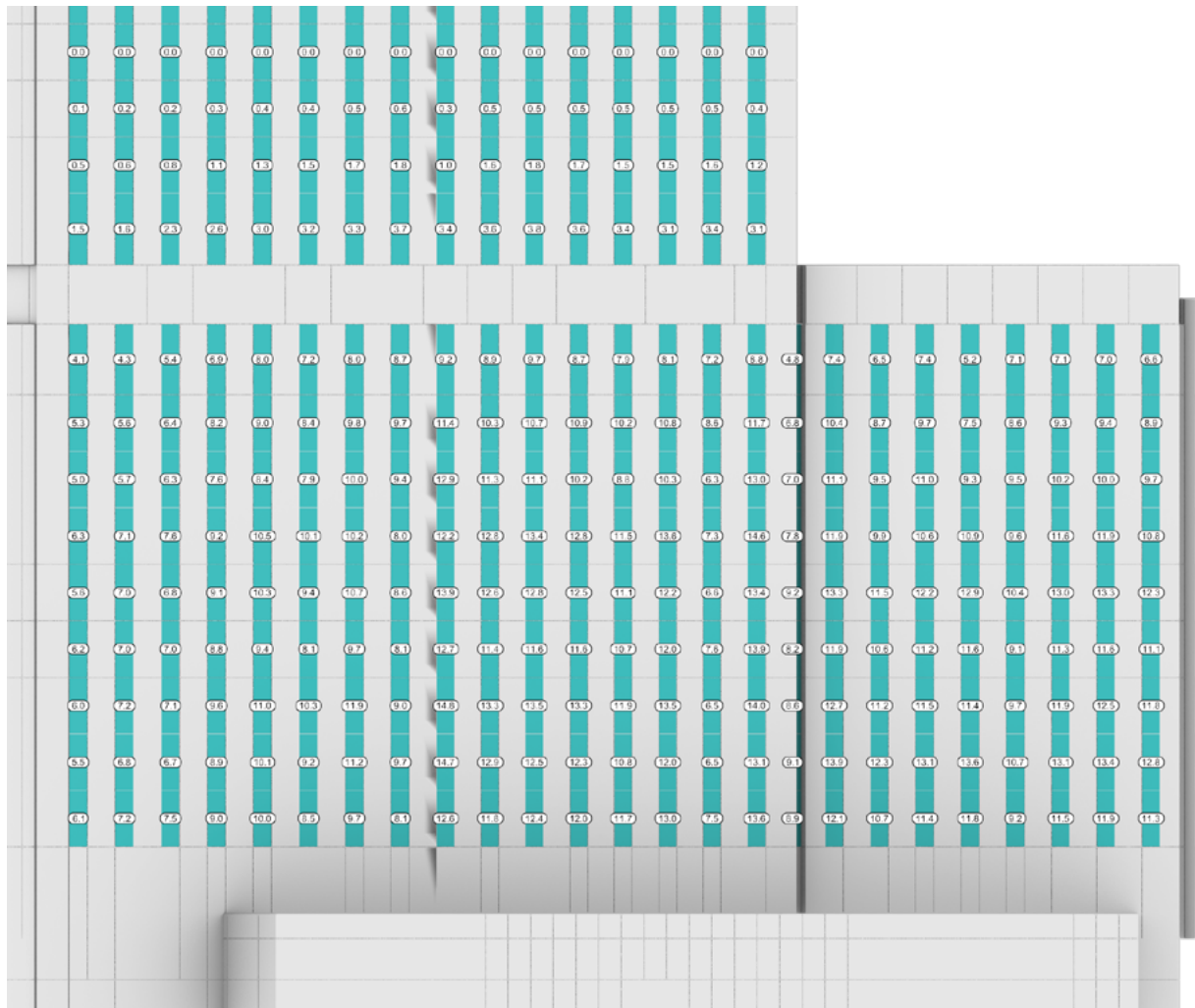
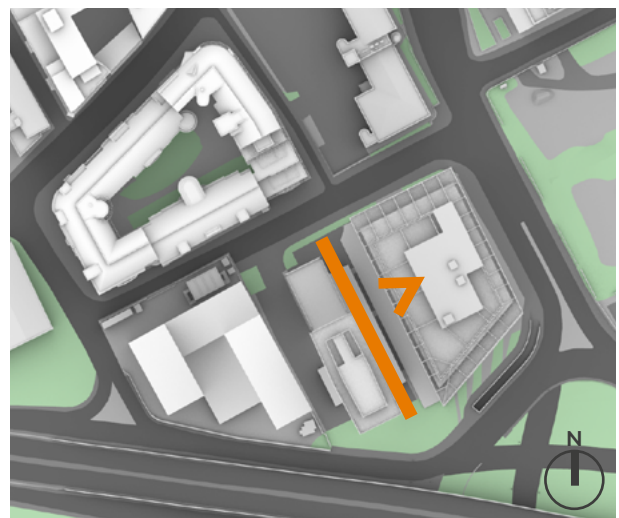


Fig. 10: Illuminance Levels



NORTH-EAST FACADE: PRE CURFEW

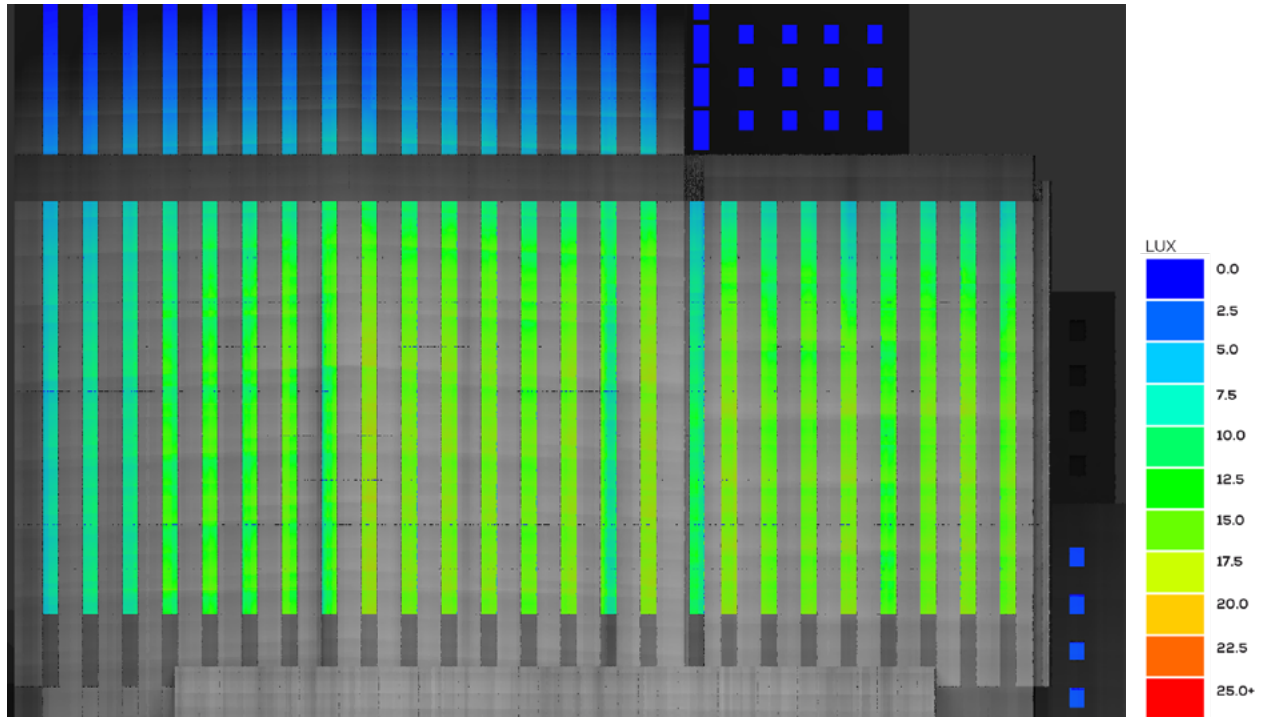


Fig. 11: Light Trespass Assessment - Pre Curfew

NORTH-EAST FACADE: POST CURFEW

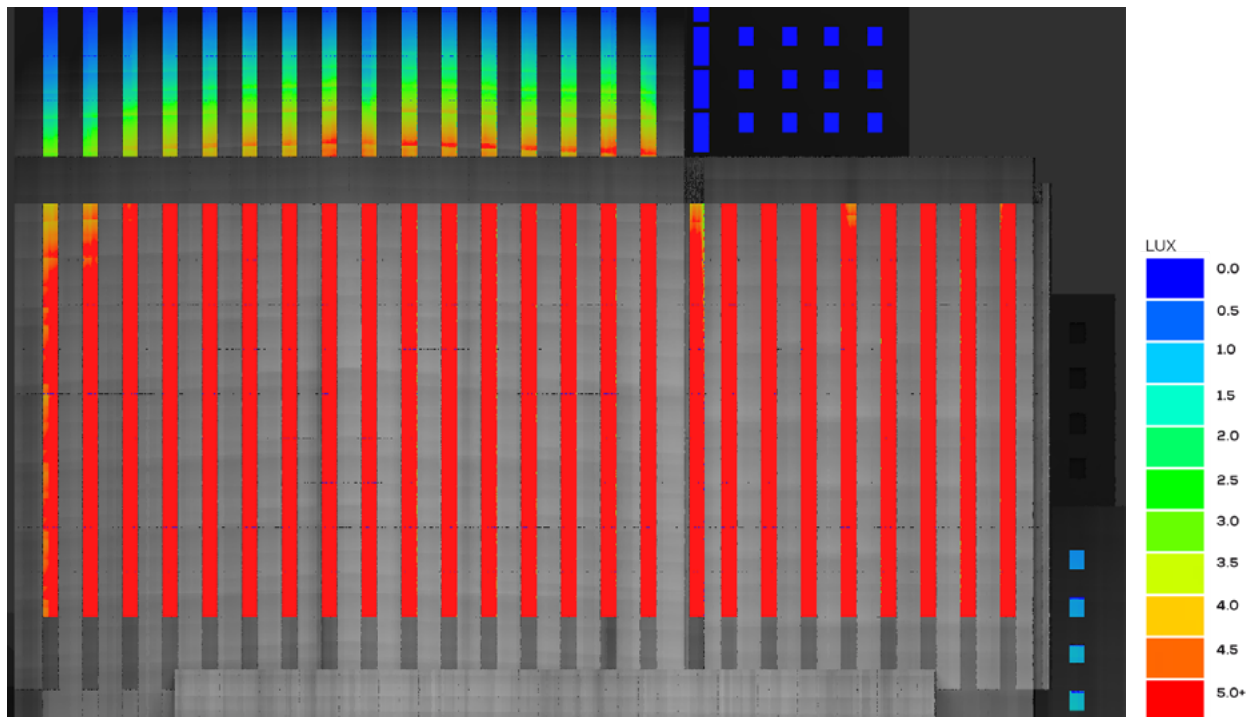


Fig. 12: Light Trespass Assessment - Post Curfew



For further details please contact us on:

LONDON

T 020 7202 1400

E mail@gia.uk.com

The Whitehouse
Belvedere Road
London SE1 8GA

MANCHESTER

T 0161 672 5100

E manchester@gia.uk.com

2 Commercial Street
Manchester
M15 4RQ

BELFAST

T 02892 449 674

E belfast@gia.uk.com

River House
48-60 High Street
Belfast BT1 2BE

BRISTOL

T 0117 374 1504

E bristol@gia.uk.com

33 Bristol
Colston Avenue
Bristol BS1 4UA

DUBLIN

T 020 7202 1400

E hello@giasurveyors.ie

77 Lower Camden Street
Dublin Ireland
D02 XE80