GOSH CCC
Light Pollution Report

20/05/2022

GOSHCCC-document
number S2 P01

NHS
Great Ormond Street
Hospital for Children
NHS Foundation Trust

AVISON
YOUNG

Contents

Appendices

Report title: Great Ormond Street Hospital for Children NHS Foundation Trust
Prepared by: Emily Hearn, Senior Surveyor
Reviewed by: Mark Kidd, Principal
Status: Draft
Draft date: 19 May 2022

For and on behalf of Avison Young (UK) Limited

1. Executive Summary

1.1 This Light Pollution report has been prepared on behalf of the Applicant, Great Ormond Street Hospital for Children NHS Foundation Trust ("Applicant") in collaboration with the appointed design and build contractor John Sisk & Son (Holdings) Ltd ("Sisk") to support an application to the London Borough of Camden ("LBC") for full planning permission for the redevelopment of the Great Ormond Street Hospital ("GOSH") Frontage Building on Great Ormond Street WC1N 3JH X ("Site"), to provide a new Children's Cancer Centre ("CCC").

1.2 The assessment of light pollution considers the likely effect, or nuisance, that could be caused due to the artificial light emitting from the Proposed Development particularly during the night into spaces where it is unwanted such as into residential properties, particularly bedrooms, where this would cause nuisance to the occupants.

1.3 The sensitive receptors that are considered to be within close enough proximity to be potentially affected are the nearby residential properties which, in this instance, includes the properties at 19-49 Great Ormond Street. All other sensitive receptors are deemed to be of sufficient distance from the site such that any effect is likely to be negligible.

1.4 Primary consideration is given to the "post curfew" hours between 11pm and 6am, as this is when 'nuisance' is most likely to be noticed by the surrounding residents.

1.5 It is not possible to control the amount of light pollution that may occur from the other existing surrounding properties. Assessments have therefore only been undertaken considering the potential effects of the proposed development. It is understood that there are no proposed external lights on the elevations adjoining GOSHCCC and the potential light pollution sources are therefore the internal lights only.

1.6 The results of the assessments show that the light spillage is low even when assessed on a worst case assumption with the GOSHCCC operating through the night with all rooms electrically lit and without mitigation in place such as bedroom blinds pulled. The reality is that although the GOSHCCC will operate 24/7 the levels of activity during night time hours will be limited as follows:

- Some departments will be closed overnight and others will be quieter and have reduced occupancy.
- The inpatient wards will enter a night mode to encourage children and their resident parents to rest and sleep.
- Wards at night use dimmed lighting in bedrooms so that clinical staff can attend to patients but blinds will be closed against the windows.
- The day care area on level 5 will close each evening and reopen at around 7:30am each day. All lights in this floor will be turned off out of hours, save for occasions when regular security patrols are being undertaken.
- Other areas of the building will be largely unoccupied at night, such as the hospital school at Level 2 and the imaging department at level 1.

1.7 The resulting light levels are predominantly just above those recommended by the ILE for an E3-Medium district brightness (e.g. small-town centres or urban locations) at 3 Lux. When considered against an E4-High district brightness (e.g. town/city centres with high levels of night time activity – 5 Lux) the results are within the levels recommended. There is an isolated incidence where a higher lux

hits the elevation of 37-39 Great Ormond Street at 6 Lux dissipating out to each side. If these levels were actually experienced (in the scenario where the whole building was occupied throughout the night with all curtains/blind open), it would be considered a minor scale of effect which is not significant.

1.8 In addition, factors such as the use of curtains within the receptor residential buildings could also stop any light pollution causing a nuisance to the occupants. It is however recognised that the use of curtains within the neighbouring room cannot be argued to be a 'solution' to the potential light pollution given this is not in the control of the Applicant. However, it should be recognised that the use of curtains could stop the occupants experiencing a nuisance. Light pollution at the levels shown in the calculations are common in City locations such as this.

2. Introduction

2.1 This Light Pollution report has been prepared on behalf of the Applicant, Great Ormond Street Hospital for Children NHS Foundation Trust ("Applicant") in collaboration with the appointed design and build contractor John Sisk & Son (Holdings) Ltd ("Sisk") to support an application to the London Borough of Camden ("LBC") for full planning permission for the redevelopment of the Great Ormond Street Hospital ("GOSH") Frontage Building on Great Ormond Street WC1N 3JH X ("Site"), to provide a new Children's Cancer Centre ("CCC").

2.2 The purpose/scope of this report is to consider the potential light spillage from the proposed GOSHCCC upon any nearby residential properties.

2.3 The assessment has been undertaken with regard to the national and local planning policy as well as the guidance set out by the Institute of Lighting Practitioners (ILP): Guidance Note for the reduction of Obtrusive Light, 2020.

2.4 A Site Plan and 3D Views of the Scheme and image results depicting the likely light pollution are given at Appendices 1 to 2.

3. Sources of Information

3.1 In order to undertake the light pollution assessments, a 3D computer model of the existing Site, the proposed GOSHCCC, and the surrounding context has been used by Avison and Young (AY). This is based upon the following sources of information:

- Google Map and Bing Map aerial and street view imagery.
- Surveys and 2D topographical survey of the Site and immediate surrounds.
- AccuCities 3D photogrammetry model of the Site and surrounding context.
- Site visits and photography undertaken by AY in April 2022 and May 2022.
- SISK 3D model of the GOSHCCC.
- LBC online planning portal.
- Floor plans for several neighbouring properties obtained from Great Ormond Street Hospital for Children NHS Foundation Trust; and
- Floor plans for several neighbouring properties obtained from online/public records.

3.2 Detailed information on the proposed internal lighting regime for the proposed GOSHCCC has been provided and so this information has been incorporated into AY's computer simulations.

3.3 It should however be noted that the window transmittance values, wall, floor and ceiling finishes have been assumed as the following:

- Window Transmittance Value - 0.68
- White ceilings - 0.85
- Light Cream Partitions - 0.8
- Floor Finishes - 0.35
- All external facades - 0.2

3.4 The scope of neighbouring properties considered has been determined as a reasonable zone which considers both the scale of the GOSHCCC and the proximity of those properties which surround and face the Site.

4. Planning Policy

4.1 The following sections review the relevant legislation, national, regional and local planning policy and guidance requirements in terms of light pollution.

National Planning Policy

National Planning Policy Framework (NPPF), July 2021

4.2 There are no national planning policies directly relating to light pollution. However, Chapter 15 of the NPPF "Conserving and enhancing the natural environment" under the sub-heading "Ground Conditions and Pollution" states at paragraph 185:

> *Planning policies and decisions should also ensure that new development is appropriate for its location taking into 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: …*
>
> *… c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.*

National Planning Practice Guidance (NPPG), 2019

4.3 The NPPG is an online resource for planning practitioners. In respect to light pollution, the document titled 'Light Pollution' states at paragraph 003 (Reference ID 31-003-20191101):

> *Light intrusion occurs when the light 'spills' beyond the boundary of the area being lit. For example, light spill can impair sleeping, cause annoyance to people, compromise an existing dark landscape and/or affect natural systems (e.g. plants, animals, insects, aquatic life). It can usually be completely avoided with careful lamp design selection and positioning:*
>
> - *Lighting near or above the horizontal is usually to be avoided to reduce glare and sky glow (the brightening of the night sky).*
> - *Good design, correct installation and ongoing maintenance are essential to the optical effectiveness of lighting schemes such as fixed and/or regularly operated functional and decorative lighting elements.*
> - *In combination with optical good practice aimed at limiting light pollution, efficient lamp and luminaire selection are important considerations to minimise energy use and associated carbon emissions.*

Local Planning Policy

Camden Local Plan (Adopted July 2017)

4.4 The Council has adopted a number of planning documents that together form the development plan for Camden. The Camden Local Plan is the key strategic document in Camden's development plan. It sets out the vision for shaping the future of the Borough and contains policies for guiding planning decisions. The Local Plan was adopted by Council on 3 July 2017. It has replaced the Core Strategy and

Camden Development Policies documents. It is now the basis for planning decisions and future development in Camden.

4.5 In the document under Artificial lighting levels, paragraph 6.6 states:

> *Camden's dense character means that light pollution can be a bigger problem in the borough than in lower density areas where uses are not so close together. Artificial lighting should only illuminate the intended area and not affect or impact on the amenity of neighbours.*

Guidance

The Institution of Lighting Engineers (ILE) Guidance Notes for the Reduction of Light Pollution (2000)

4.6 The Institute of Lighting Engineers (ILE) document entitled "Guidance Notes for the Reduction of Light Pollution, 2000, provides qualitative advice for ways to reduce light pollution and suggests maximum acceptable levels of light pollution into windows pre and post-curfew and distinguishes these between rural and dense urban areas.

5. Light Pollution Calculation Methodology and Scope of Assessment

Scope of Assessment

5.1 The assessment of light pollution considers the likely effect, or nuisance, that could be caused due to the artificial light emitting from the Proposed Development into spaces where it is unwanted such as into residential properties, particularly bedrooms, where this would cause nuisance to the occupants, i.e., at night, the hospital lighting could spill out of the windows and potentially cause a nuisance to the occupants of nearby buildings.

5.2 All properties considered most sensitive to adverse instances of light intrusion are permanent residential properties. The properties which have been assessed in further detail are considered to be within sufficient proximity and have windows within with a direct or peripheral view of the site.

5.3 The sensitive receptors that are considered to be within close enough proximity to be potentially affected are the nearby residential properties which, in this instance, includes the properties at 19-49 Great Ormond Street. All other sensitive receptors are deemed to be of sufficient distance from the site such that any effect is likely to be negligible.

5.4 Primary consideration is given to the "post curfew" hours between 11pm and 6am, as this is when 'nuisance' is most likely to be noticed by the surrounding residents.

Light Pollution Calculation Methodology

5.5 Light pollution can be defined as any light emitting from the Site onto the neighbour's land/property where it is unwanted. For example, spillage of light from an office onto residential accommodation, may cause a nuisance. This is known also known as light intrusion.

5.6 Light Pollution assessments are not comparative. There are therefore no baseline light pollution conditions and the assessments have considered whether the conditions likely to be experienced with the completed Proposed Development are likely to be adverse using published guidance.

5.7 The Institute of Lighting Practitioners (ILP) report entitled: Guidance Note for the reduction of Obtrusive Light, 2020 provides measurable lighting level values to ascertain the acceptability of any light pollution onto nearby buildings. Quantitative light pollution assessments have therefore been undertaken in relation to these internal luminaires. This is assessed as vertical illuminance in lux (Ev), measured flat at the centre of the sensitive receptor.

5.8 The ILP provide limits for light intrusion based on a site's location and any breach of these limits is considered a nuisance. However, in the absence of any published scale considering what would be classed as a minor, moderate or major in scale, professional judgement has been applied in determining the scale of effect and whether it is significant. The degree to which the intrusion limit is breached, the use of the rooms being impacted and the proportion of the façade affected will determine the significance of the effect. To give an example, a breach of double the ILP limits to over half of a building's façade which serve bedrooms would be classified as a major effect.

5.9 Table 1 below sets out the ILP criteria based on the various environmental zones. The Site is located in a zone that could be defined as "E4" which is described in the guidance as High District Brightness.

Table 1: Light Pollution Criteria

Environmental Zone	Light Intrusion (into windows) Ev (Lux) (2)	
	Pre-Curfew	Post-Curfew
E0 – Dark areas (e.g. UNESCO Starlight Reserves, IDA Dark Sky Parks)	0	0
E1- Intrinsically dark areas (e.g. National Parks, areas of outstanding natural beauty)	2	0 (1*)
E2- Low district brightness (e.g. rural or small village locations)	5	1
E3- Medium district brightness (e.g. small-town centres or urban locations)	10	2
E4- High district brightness (e.g. town/city centres with high levels of night time activity)	25	5

Notes:

Ev = Vertical Illuminance in Lux and is measured flat on the glazing at the centre of the window.

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 planning authority. If not otherwise stated – 23.00 hrs is suggested.

* = From Public Road lighting installations only.

5.10 When carrying out our assessments primary consideration is given to the "post curfew" criterion of 2 – 5 lux.

5.11 To try and put the above illuminance levels into some perspective, it is understood that lighting on a main road is typically around 15 lux at ground level and a typical pedestrian footpath is lit to around 5 lux. In more rural areas, where the lighting is more spaced apart the levels are typically between 2 and 5 lux. 2 lux is also considered to be the minimum standard expected from a security perspective. i.e., the lighting outside a front door should be at least 2 lux to be able to safely enter.

5.12 Figure 1 below also provides some common light levels that are experienced depending on the time of day:

Condition	Illumination	
	(ftcd)	*(lux)*
Sunlight	10,000	107,527
Full Daylight	1,000	10,752
Overcast Day	100	1,075
Very Dark Day	10	107
Twilight	1	10.8
Deep Twilight	.1	1.08
Full Moon	.01	.108
Quarter Moon	.001	.0108
Starlight	.0001	.0011
Overcast Night	.00001	.0001

Figure 1 - Common light levels from Natural Sources (source: https://cdn.hackaday.io/files/1804277719388768/LightLevels_outdoor-indoor.pdf [Accessed 16.05.22])

5.13 It is not possible to control the amount of light pollution that may occur from the other existing surrounding properties, as it is not possible to regulate how the buildings are occupied or used. To some extent this is also the case for the proposed development itself, so it is therefore very difficult to predict the total potential amount of light pollution that may occur.

5.14 To be able to undertake some form of qualitative assessment, the calculations set out in this report have been undertaken considering the worst case potential effects of the proposed development alone i.e., ignoring any light pollution from the existing surrounding properties.

5.15 The proposed GOSHCCC space is likely to be able to be accessible 24 hours a day. Therefore, to understand whether there is the potential for light pollution to occur it is assumed that all spaces within the Proposed Development have the lights switched on and any blinds are fully open to understand the worst-case maximum effect. However, this is considered an unrealistic scenario as the level of activity within the GOSHCCC will drop significantly during the night and all hospital bedrooms will have blinds pulled.

5.16 We are not aware of any proposed external lights to the elevations of GOSHCCC. The only potential light pollution source is therefore the internal lights and when the light can spill out of the proposed windows.

5.17 Detailed information on the proposed internal lighting regime for the proposed GOSHCCC has been provided and so this information has been incorporated into computer simulations which have been run, using radiance, in order to estimate the potential light pollution levels that could occur based on the design of the development and proposed materials.

5.18 The results of the light pollution studies identify the light received on the elevations of the properties 19-49 Great Ormond Street. These have been depicted in images which are included at Appendix 2.

6. Existing Site and Proposed Development

Existing Site

6.1 The existing Site 1950's Frontage Building on Great Ormond Street currently houses the outdated cancer accommodation and co-dependent facilities. Referring to Figure 1 below and the AOD heights on the drawing, it will be noted that the existing Site building is generally much lower than the more modern buildings across the wider Great Ormond Street Hospital Estate. This presents an opportunity to redevelop the Site, so that the proposed GOSHCCC heights are more in keeping with the those across the wider estate, as identified in Figure 2 below, and indeed other taller buildings in the area.

6.2 A massing model of the existing Site is illustrated in red on Figure 2 below and drawings BRE 01-02, located in Appendix 1.

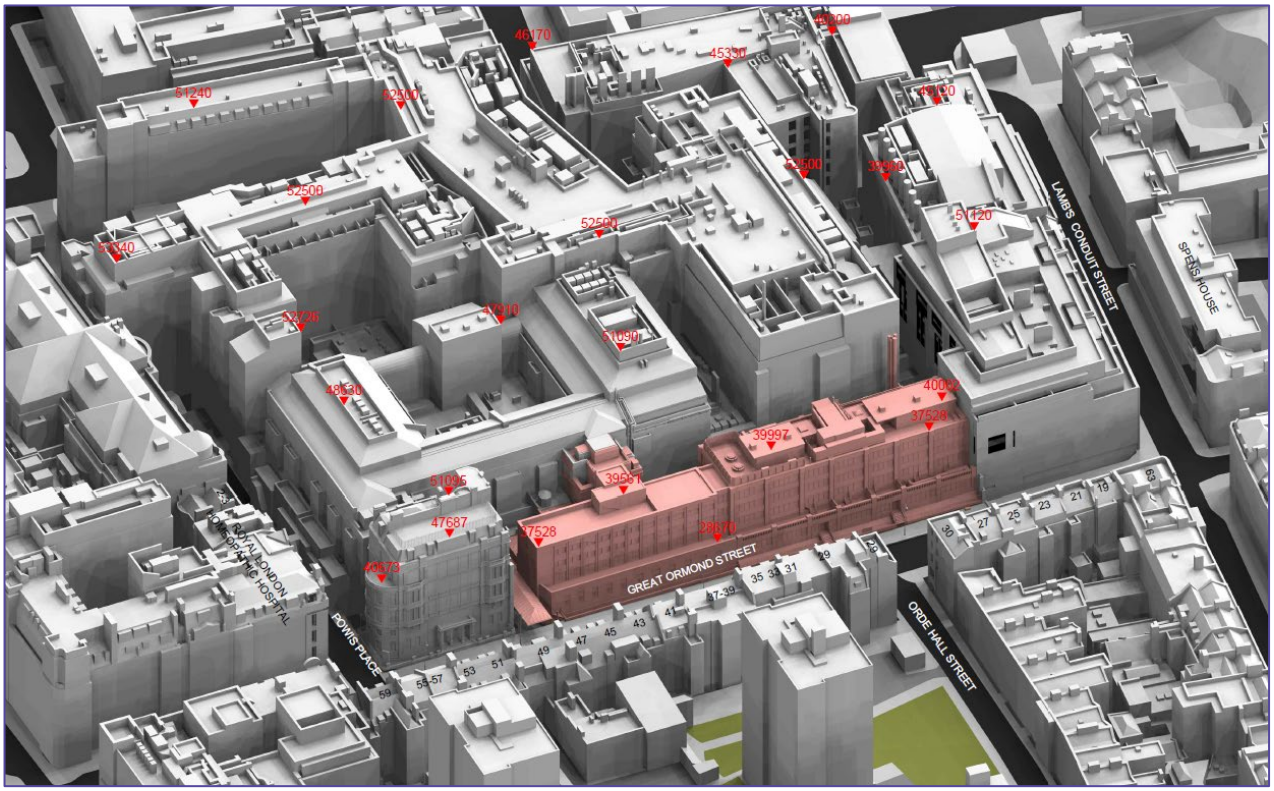

Figure 2 – View of the existing Site, illustrated indicatively in red

Proposed Development

6.3 The planning application relates to Phase 4 of the five-phase redevelopment programme for GOSH which aims to rebuild two thirds of the hospital over a 20-year period, to upgrade and better meet forecast future healthcare needs.

6.4 Improving outcomes for cancer is a major priority for the UK and paediatric cancer is assuming increasing importance. The proposed GOSHCCC will create a national resource for children with rare and difficult-to treat cancers. GOSH has a vision for the centre – to create facilities where our expert clinicians can improve outcomes for children through holistic, personalised and coordinated care across the child's entire cancer journey.

6.5 The GOSHCCC will be the physical embodiment of this aspiration and will provide inspiring and flexible spaces that can respond to the rapidly changing nature of cancer care and the research landscape, facilitating accelerated adoption of new innovations and models of care.

6.6 A massing model of the Proposed Development is illustrated in green on Figure 3 below and drawings BRE 03-04, located in Appendix 1.

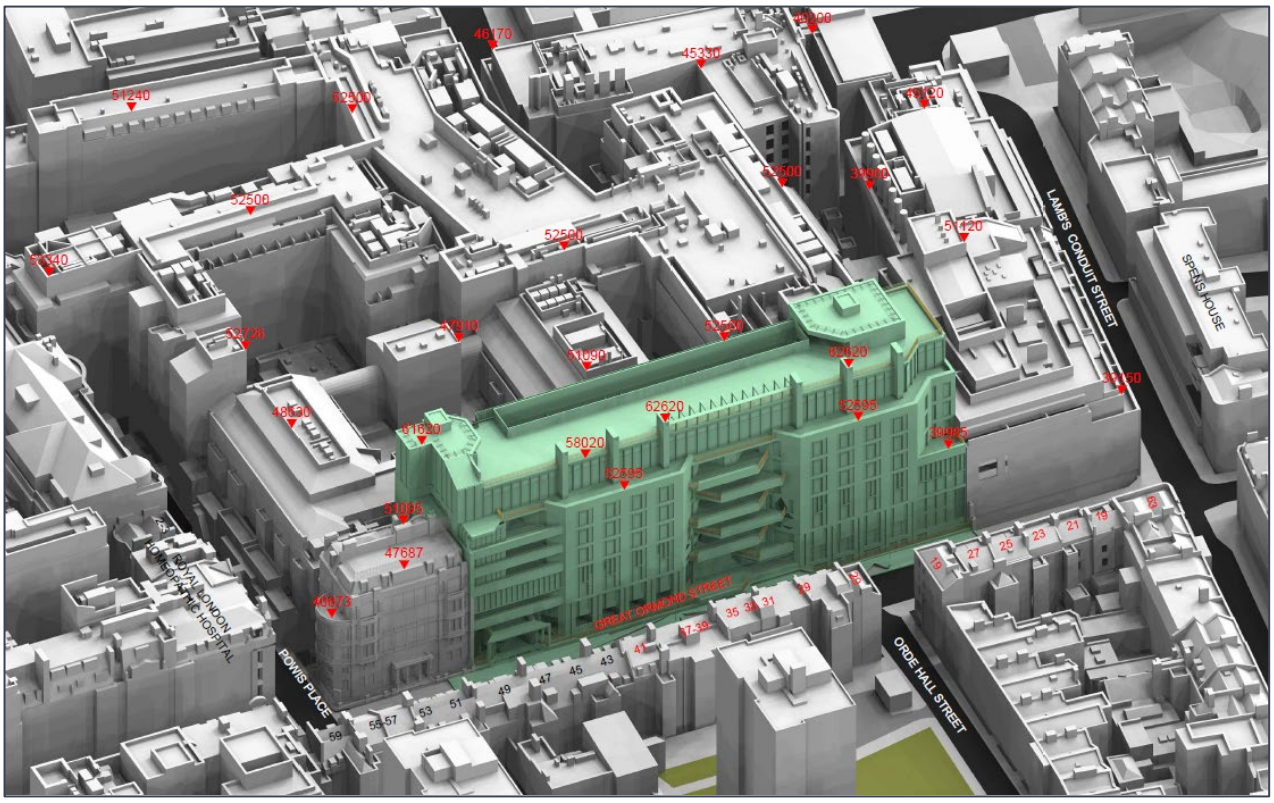

Figure 3 - View of the Proposed Development, illustrated in green

7. Assessment Results

7.1 The closest buildings to the Proposed Development that contain residential accommodation and that have the potential to be affected by light pollution are those at 19-49 Great Ormond Street.

7.2 As set out in the methodology, an assessment has been undertaken to consider the amount of light that may spill into the neighbouring elevations based on the assumption that all of the lights are on, all blinds/curtains are open, it is post curfew and with clear glass glazing. The visualization results of this assessment can be found within Appendix 2.

7.3 The results of the assessments show that the light spillage is low even when assessed on a worst case assumption with the GOSHCCC operating through the night with all rooms electrically lit and without mitigation in place such as bedroom blinds pulled. The reality is that although the GOSHCCC will operate 24/7 the levels of activity during night time hours will be limited as follows:

- Some departments will be closed overnight and others will be quieter and have reduced occupancy.
- The inpatient wards will enter a night mode to encourage children and their resident parents to rest and sleep.
- Wards at night use dimmed lighting in bedrooms so that clinical staff can attend to patients but blinds will be closed against the windows.
- The day care area on level 5 will close each evening and reopen at around 7:30am each day. All lights in this floor will be turned off out of hours, save for occasions when regular security patrols are being undertaken.
- Other areas of the building will be largely unoccupied at night, such as the hospital school at Level 2 and the imaging department at level 1.

7.4 The resulting worst case scenario light levels are predominantly just above those recommended by the ILE for an E3-Medium district brightness (e.g. small-town centres or urban locations) at 3 Lux. When considered against an E4-High district brightness (e.g. town/city centres with high levels of night time activity – 5 Lux) the results are within the levels Recommended. There is an isolated incidence where a higher lux hits the elevation of 37-39 Great Ormond Street at 6 Lux dissipating out to each side. If these levels were actually experienced (in the scenario where the whole building was occupied throughout the night with all curtains/blind open), it would be considered a minor scale of effect which is not significant.

7.5 In addition, factors such as the use of curtains within the neighbouring residential receptor buildings could also stop any light pollution causing a nuisance to the occupants. It is however recognised that the use of curtains within the neighbouring room cannot be argued to be a ‘solution’ to the potential light pollution given this is not in the control of the Applicant. However, it should be recognised that the use of curtains could stop the occupants experiencing a nuisance. Light pollution at the levels shown in the calculations are, after all, considered common in urban locations.

8. Conclusion

8.1 This Light Pollution report has been prepared on behalf of the Applicant, Great Ormond Street Hospital for Children NHS Foundation Trust ("Applicant") in collaboration with the appointed design and build contractor John Sisk & Son (Holdings) Ltd ("Sisk") to support an application to the London Borough of Camden ("LBC") for full planning permission for the redevelopment of the Great Ormond Street Hospital ("GOSH") Frontage Building on Great Ormond Street WC1N 3JH X ("Site"), to provide a new Children's Cancer Centre ("CCC").

8.2 The results of the assessments show that the light spillage is low with the vast majority of No.'s 19-49 Great Ormond Street façade experiencing a light level within what is recommended for an E4-High district brightness (e.g. town/city centres with high levels of night time activity – 5 Lux). There is a slight instance of a higher lux hitting the elevation of 37-39 Great Ormond Street at 6 Lux which then dissipates out to each side. If these levels were actually experienced (in the scenario where the whole building was occupied throughout the night with all curtains/blind open), it would be considered a minor scale of effect which is not significant. However, the reality is that although GOSHCCC will operate 24/7 the levels of activity during night-time hours will be limited.

8.3 In addition, factors such as the use of curtains within the neighbouring residential receptor buildings could also stop any light pollution causing a nuisance to the occupants. It is however recognised that the use of curtains within the neighbouring room cannot be argued to be a 'solution' to the potential light pollution given this is not in the control of the Applicant. However, it should be recognised that the use of curtains could stop the occupants experiencing a nuisance. Light pollution at the levels shown in the calculations are, after all, considered common in City centre locations.

Appendix 1

Existing Site Plan and 3D Views

Key:

- Existing
- Proposed
- Consented
- Surrounding Context

Sources of information

Existing building
Info 19 Feb 2018 BDP 3D Survey
01 GCD05_Gosh_Extension_WIP - 3D View

Surrounding buildings
Accucities

Info 19 Feb 2018 BDP 3D Survey
01 GCD05_Gosh_Extension_WIP - 3D View

Planning Portal Research and Photos

Proposed building
BDP fixed frozen 3D model received 19 April 2022
GOSH CCC Model.dwg further amended chimneys

Consented
N/A

Project Name	Drawn By	Scale @ A3
Great Ormond Street Hospital, London	AC	N/A
Drawing Title		
Plan View		
Existing Development		

Date	Project No.	Drawing No.	Revision
6-May-22	GR219_19	BRE_01	-

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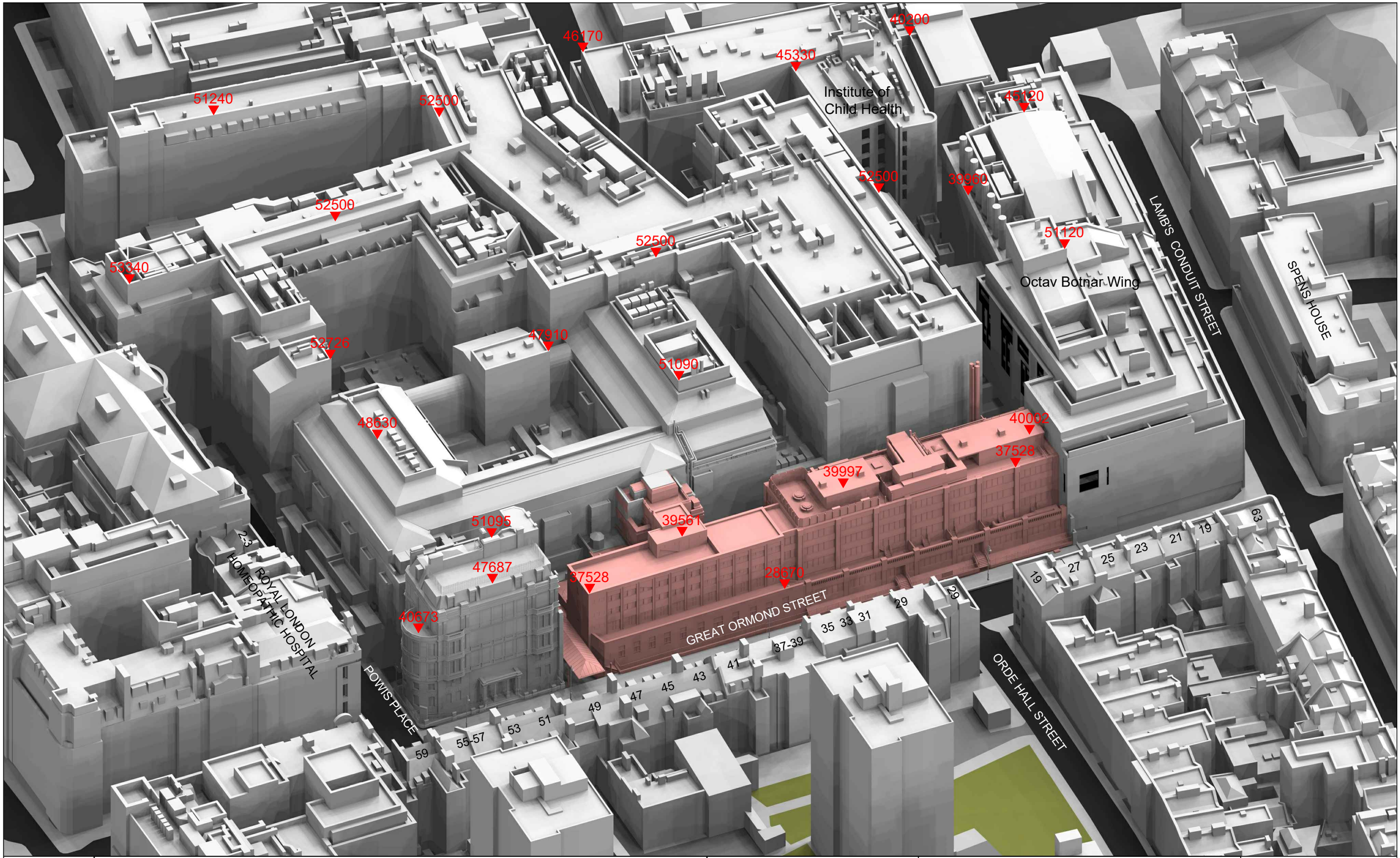
65 Gresham Street, London, EC2V 7NQ
08449 02 03 04 www.avisonyoung.co.uk



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Consented
N/A

Project Name		
Great Ormond Street Hospital, London		
Drawing Title		
3D View		
Existing Development		
Drawn By	**Scale @ A3**	**Date**
AC	N/A	6-May-22
Project No.	**Drawing No.**	**Revision**
GR219_19	BRE_02	-

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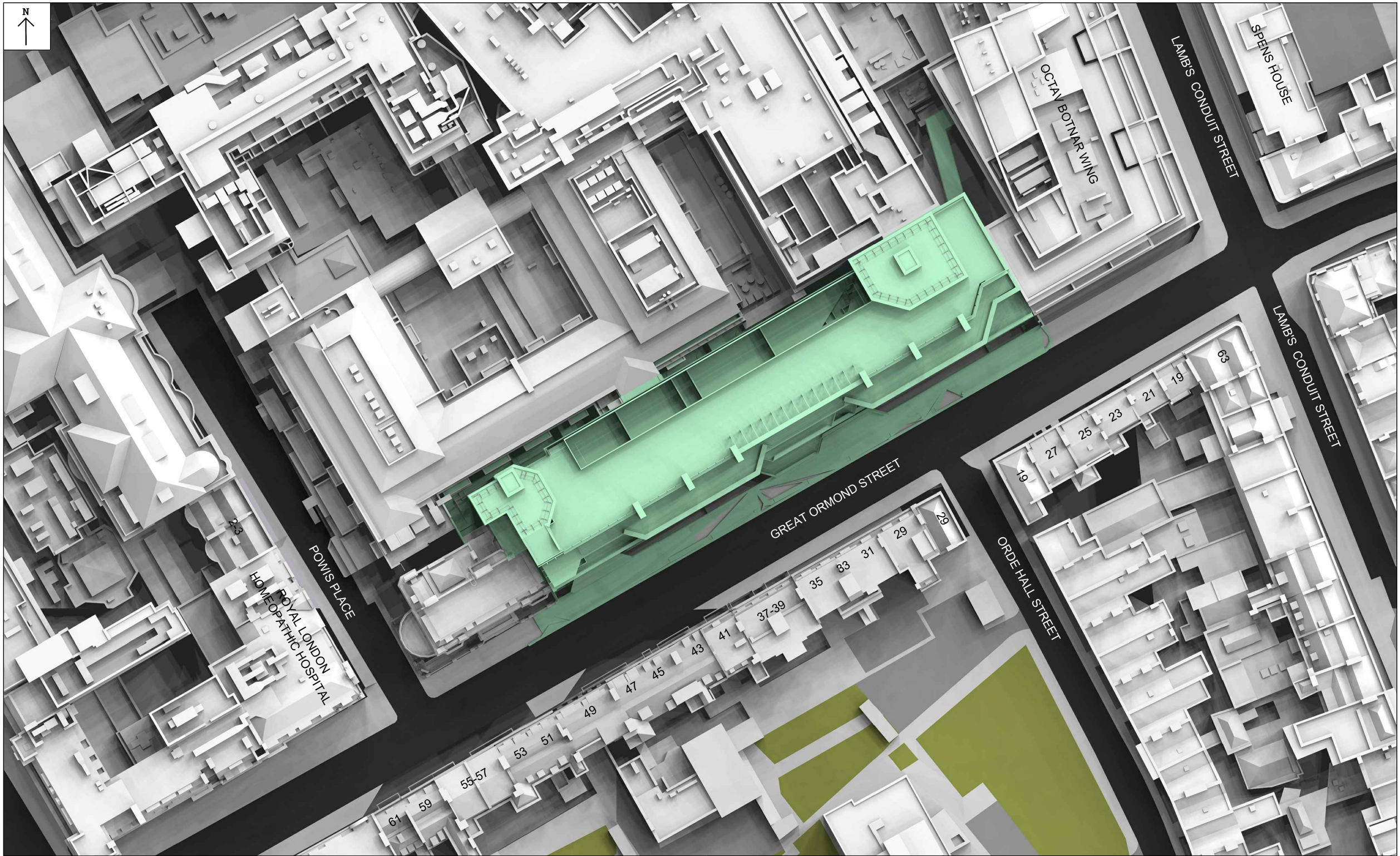
Proposed Site Plan and 3D Views



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- Consented
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01 GCD05_Gosh_Extension_WIP - 3D View

Surrounding buildings
Accucities

Info 19 Feb 2018 BDP 3D Survey
01 GCD05_Gosh_Extension_WIP - 3D View

Planning Portal Research and Photos

Proposed building
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received 19 April 2022
GOSH CCC Model.dwg
further amended chimneys

Consented
N/A

Project Name	Drawn By	Scale @ A3
Great Ormond Street Hospital, London	AC	N/A
Drawing Title		
Plan View		
Proposed Development		

Date	Project No.	Drawing No.	Revision
6-May-22	GR219_19	BRE_03	-

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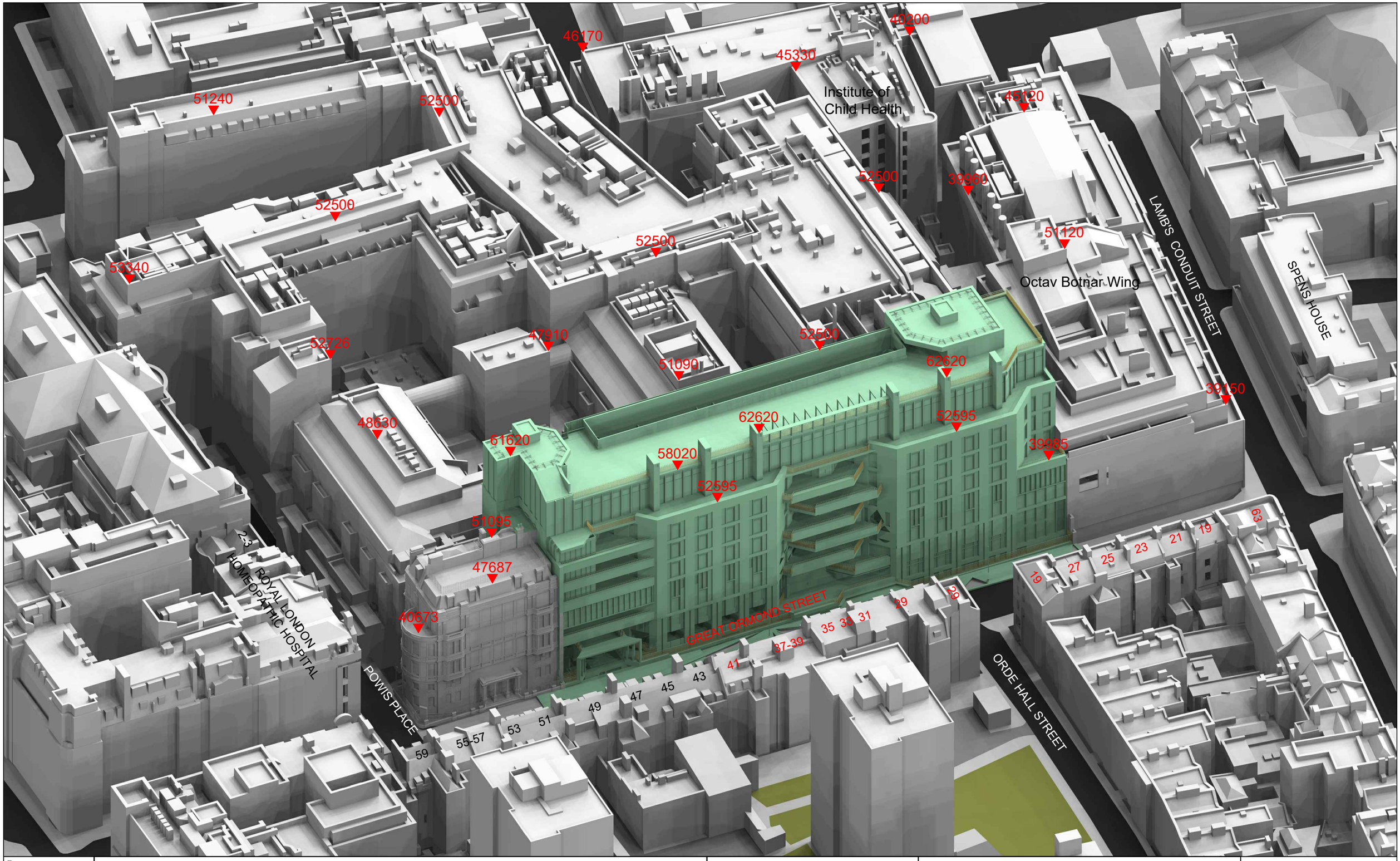

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Surrounding buildings
Accucities

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Consented
N/A

Project Name
Great Ormond Street Hospital, London

Drawing Title
3D View
Proposed Development

Drawn By	Scale @ A3	Date
AC	N/A	6-May-22

Project No.	Drawing No.	Revision
GR219_19	BRE_04	-

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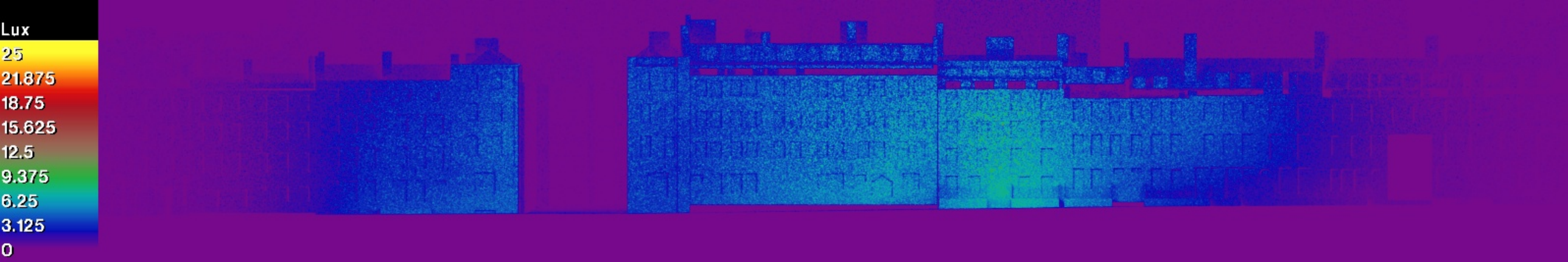
65 Gresham Street, London, EC2V 7NQ
08449 02 03 04 www.avisonyoung.co.uk

Appendix 2

Light Pollution Image Results


Lux
25
21.875
18.75
15.625
12.5
9.375
6.25
3.125
0

Contact details

Enquiries

Emily Hearn
(0)20 7911 2156
emily.hearn@avisonyoung.com

Visit us online
avisonyoung.com

Avison Young

65 Gresham Street, London EC2V 7NQ