

3 Daylight, Sunlight, Overshadowing, Solar Glare and Light Pollution

Introduction

- 13.1 This chapter, prepared by GIA, presents an assessment of the likely effects of the Development on the daylight and sunlight amenity to the occupiers of neighbouring sensitive properties and overshadowing to existing amenity areas in the vicinity of the Site.
- 13.2 A solar glare assessment has also been undertaken due to the Development's proximity to multiple road junctions and rail tracks to and from London Bridge mainline station. In addition, a light pollution assessment has been carried out to identify any potential effects to surrounding sensitive receptors.
- 13.3 This chapter contains a description of the methods used to assess the effects and a description of the relevant baseline conditions of the Site and its surrounding area. This is followed by an assessment of the likely significant effects of the Development during the demolition and construction works and once the Development is complete and operational. Mitigation measures are identified, where appropriate, to avoid, reduce or offset any adverse effects identified, and a description is provided of the nature and significance of likely residual effects.
- 13.4 This chapter is supplemented by the following documents:
- **Appendix 13.1:** Drawings of the existing Site and the Development;
 - **Appendix 13.2:** Daylight and Sunlight Results to surrounding sensitive receptors;
 - **Appendix 13.3:** Overshadowing Results;
 - **Appendix 13.4:** Solar Glare Results; and
 - **Appendix 13.5:** Light Pollution Results.
- 13.5 Please note that for the purposes of this ES chapter, the demolition, deconstruction, refurbishment and construction works will be referred to as 'the Works'.

Assessment Methodology and Significance Criteria

- 13.6 The non-mandatory Building Research Establishment (BRE) Guidelines¹ suggest that residential properties have the highest requirement for daylight and sunlight and state that "*the guidelines are intended for use for rooms in adjoining dwellings where light is required, including living rooms, kitchens and bedrooms*". Therefore, this chapter focuses on those residential buildings and other sensitive receptors such as hospitals surrounding the Site which would have the potential to be affected by the Development. The uses of nearby buildings, in terms of commercial and residential, were established using external observations and Valuation Office Agency (VOA) checks. The BRE Guidelines are the industry recognised standard for assessing all matters related to daylight, sunlight and overshadowing, and the primary reference within all national and local policy.
- 13.7 When determining whether changes in light condition are in line with policy and guidance, it is important to give consideration to other contextual matters, such as instances where the existing

light levels within neighbouring properties are already low, or where the proposed residual values are commensurate with that which one would expect to find in surrounding urban areas of similar density. Furthermore, daylight and sunlight impacts of a development should be balanced against the improvements and benefits which the scheme will bring to the area.

Baseline characterisation

- 13.8 Baseline characterisation was completed by firstly undertaking a review of the surrounding land uses using information and data sourced from the VOA website². This review was undertaken for all surrounding properties in close enough proximity to the Site to be affected by the Development, to identify any residential or other sensitive properties (such as hospital facilities) to be assessed as potential sensitive receptors.
- 13.9 It should be noted that buildings with transient use such as classrooms, hospitals and student accommodation have a lower requirement for daylight and sunlight, and are therefore given a lower sensitivity than permanent residential properties.
- 13.10 This review was followed by a Site visit during the month of submission to confirm the existing conditions around the Site remain accurate to those modelled. The conditions recorded are not considered to have changed from the day of the Site visit to the time of writing this ES chapter.
- 13.11 Based on the above, a three-dimensional (3D) AutoCAD model was developed for the existing surrounding properties and existing buildings on-Site using a full topographical survey, photogrammetric survey and site photographs.

Scenarios assessed

- 13.12 The following scenarios have been considered and are reported within this chapter of the ES:
- Baseline;
 - Demolition and Construction ('the Works'); and
 - Complete and Operational Development;

Baseline

- 13.13 This scenario has considered the current baseline condition (as at the time of writing) at identified sensitive receptors. It is depicted on drawings 8684-REL12-IS01-01-03 (**Appendix 13.1**).
- 13.14 As noted in paragraph 13.6, the BRE Guidelines state that residential properties have the highest requirement for daylight and sunlight. In addition, the BRE Guidelines state that other uses such as hospitals and schools may also have a requirement for daylight and sunlight.
- 13.15 Accordingly, existing residential and hospital receptors adjoining or in proximity to the Site have been considered within this assessment. In addition, classrooms associated with the London School of Commerce have been included.
- 13.16 Shard Place has been included in the baseline scenario as construction is well underway, and the superstructure is very likely to be completed before work starts on the proposed Development; the scheme is due to be completed in 2021.

- 13.17 With regard to Sun Hours on Ground, as sun exposure is predominantly within southern facing aspects of the Site due to the path of the sun, only the neighbouring amenity areas located to the north of the Site have been considered within this assessment. For transient overshadowing, all neighbouring amenity areas to the north of the Site in close enough proximity to experience overshadowing from the Development have been considered.

Complete and Operational Development

- 13.18 The complete and operational Development scenario consists of the detailed Development in the context of the surrounding existing environment. This scenario assesses the potential daylight, sunlight, overshadowing, solar glare and light pollution effects of the Development on the surrounding receptors and amenity spaces as well as sensitive road junctions and train lines.
- 13.19 This scenario is illustrated on drawing number 8684-REL12-IS01-04-06 within **Appendix 13.1**.

Sensitive Receptors

Daylight and Sunlight

- 13.20 As set out in the assessment methodology, existing residential, medical, religious and educational receptors are considered to be sensitive receptors that may be affected by the Development.
- 13.21 Hotels, student accommodation, hospitals and classrooms have been included in the assessment however these are considered to have a lower requirement for daylight owing to the transient occupancy.
- 13.22 In addition, future residential receptors within Shard Place have been included in the assessment as they are in very close proximity to the Site and construction of Shard Place is expected to be complete prior to the Works commencing on New City Court.

Table 13.1: Daylight and Sunlight Receptor Locations

Receptor Location
10-18 London Bridge Street
6 London Bridge Street
St Thomas Church
Guy's Hospital (Chapel)
Guy's Campus (Southwark Wing)
Guy's Campus (Tower Wing)
Iris Brook House Talbot Yard
Shepherds House – Talbot Yard
Chaucer House – White Hart Yard
Orchard Lisle House - Talbot Yard
63a Borough High Street

Receptor Location
Guy's Campus
The Old Kings Head Public house
3 Kings Head Yard
57 Borough High Street
53-55 Borough High Street
51 Borough High Street
2 St Thomas Street
8 Bedale Street
59-61 Borough High Street
22 Southwark Street
24 Southwark Street
Southwark Cathedral Annex
Southwark Cathedral
Shard Place
43 Borough High Street

Overshadowing

- 13.23 Owing to the southerly location of the sun path, only the amenity areas located to the north of the Site have the potential to have experience alteration is sunlight with the Proposed Development implemented. Therefore, only amenity areas located from northward of the Site from due east to due west have been considered. Due to the scale of the Development and the nature of the surrounding area, the amenity area in proximity to the Site that is considered sensitive in terms of overshadowing is shown on **Figure 13.2**.

Solar Glare

- 13.24 Solar glare is not a comparative assessment; the fact it may occur in the baseline does not necessarily justify its occurrence as a result of a Development. Therefore, the assessment considers the effect of the Development in absolute terms and not against the baseline.
- 13.25 Nearby railway lines and roads have also been assessed for solar glare, and the locations assessed can be seen in **Figure 13.5**.

Light Pollution

- 13.26 The following properties were considered sensitive in regard to light pollution due to their close proximity to the Site:
- 2 St Thomas Street;
 - 3 Kings Head Yard;

- 45 Borough High Street (The Old King's Head);
 - 43, 51, 53, 55, 57, 59, 63 and 63a Borough High Street;
 - Orchard Lisle House;
 - Shard Place; and
 - 9 St Thomas Street.
- 13.27 An assessment has been undertaken on the effects on these properties caused by the proposed Development.
- 13.28 All other sensitive receptors are considered too far from the Site to be affected by the Development in terms of light pollution.

Methodology for Determining Effects During the Works

- 13.29 Owing to the evolving and changing nature of the Works, the assessment of potential effects during demolition and construction of the Development on daylight, sunlight, overshadowing, solar glare and light pollution to surrounding receptors has not been modelled. Instead, a qualitative assessment has been undertaken using professional judgement and experience.
- 13.30 The potential daylight, sunlight, overshadowing, solar glare and light pollution effects relating to demolition and construction works would vary throughout the construction programme and gradually increase to the potential effects identified for the completed Development. It is considered that the completed Development represents the worst-case assessment in terms of likely effects on levels of daylight, sunlight, overshadowing, solar glare and light pollution received by sensitive receptors.

Methodology for Determining Complete and Operational Effects

- 13.31 The methodologies set out below have been used to determine the effects of the complete and operational Development.

Approach for Daylight, Sunlight, Overshadowing and Solar Glare Assessments

- 13.32 The technical analyses carried out to inform the assessments have been undertaken by creating a digital 3D model of the existing Site, and the complete and operational Development, based on measured survey data.

Daylight

- 13.33 The BRE Guidelines specify two primary methods for assessing daylight within an existing sensitive receptor:
- Vertical Sky Component (VSC); and
 - No Sky Line (NSL) Method.
- 13.34 These are presented in further detail as follows.

Vertical Sky Component (VSC) Method

- 13.35 The VSC method of assessment is defined in the BRE Guidelines as the:
- “ratio of that part of illuminance at a point on a given vertical plane that is received directly from a CIE standard overcast sky, to illuminate on a horizontal plane due to an unobstructed hemisphere of this sky”.*
- 13.36 The 3D model uses a Waldram Diagram to establish the VSC and 3D geometric calculations for daylight distribution. This model (which is orientated to north by the use of Ordnance Survey (OS) information) enables the path of the sun to be tracked throughout the year to establish the shadow cast by existing and proposed buildings, and thus calculate the sun hours on ground in each scenario and how the Development would affect the amount of daylight being received at surrounding sensitive receptors.
- 13.37 Only those surrounding properties which have windows facing towards the Site were included in the assessment. If a nearby property has no windows facing the Site, these properties would not be affected by the Development in terms of light.
- 13.38 The assessment is calculated from the centre of a window on the outward face and measures the amount of light available on a vertical wall or window following the introduction of visible barriers, such as buildings.
- 13.39 Regarding existing trees, these may be ignored unless they form dense continuous belts. As stated within the BRE Guidelines:
- 13.40 *“where the effect of a new building on existing building is being analysed, it is usual to ignore the effect of existing trees. This is because daylight is at its scarcest and most valuable in winter when most trees will not be in leaf.”* There are no “dense continuous belts” of trees within the Site, and as such, trees are excluded from the assessment as per the BRE Guidelines.
- 13.41 The maximum VSC value is 39.9% for a completely unobstructed vertical wall or window. In terms of assessment criteria, the BRE Guidelines state that:
- “If any part of a new building or extension, measured in a vertical section perpendicular to a main window wall of an existing building, from the centre of the lowest window, subtends an angle of more than 25° to the horizontal, then the diffuse daylighting of the existing building may be adversely affected. This will be the case if either:*
- *the VSC measured at the centre of an existing main window is less than 27%, and less than 0.8 times its former value; or*
 - *the area of the working plane in a room which can receive direct skylight is reduced to less than 0.8 times its former value.”*
- 13.42 It is acknowledged that the values in the BRE Guidelines are predicated against a 2-3 storey suburban model, therefore the application of its guidelines in inner urban environments should be treated flexibly. This form of assessment does not take account of context or detailed matters such as window size, room use, room size, window number or dual aspect rooms. This assessment also assumes that all obstructions to the sky are 100% non-reflective. It should be noted that the BRE Guidelines acknowledge this and state, in paragraph 2.2.3;

‘The numerical values given here are purely advisory. Different criteria may be used based on the requirements for daylighting in an area viewed against other site layout constraints.’

- 13.43 Clearly in more urban environments, if a development is to meet the scale and proportion of neighbouring buildings, large factor reductions are very difficult to avoid. GIAs experience in daylight and sunlight matters in dense urban environments suggest that weight should also be given to the retained values rather than just the percentage change. Our experience in the field would suggest that a more realistic VSC level in a dense urban environment would be considered to be around 15%.
- 13.44 GIA’s view on retained VSC levels is supported by the Greater London Authority’s hearing report for the Monmouth House and Featherstone Street development (application reference: P2015/3136/FUL) where it was considered in Para 120, Page 31:

‘For general guidance, whilst the BRE guidelines recommend a target value of 27% VSC when measured on an absolute scale, that value is derived from a low density suburban housing model. In an inner city urban environment, VSC values in excess of 20% should be considered as reasonably good, and VSC in the mid-teens should be acceptable.’

No Sky Line (NSL) Method

- 13.45 The NSL method is a measure of the distribution of daylight at the ‘working plane’ within a room. The ‘working plane’ is a horizontal plane 0.85m above finished floor level for residential properties. The NSL divides those areas of the working plane which can receive direct sky light from those which cannot. If a significant area of the working plane lies beyond the NSL (i.e. it receives no direct sky light), then the distribution of daylight in the room may be poor and supplementary electric lighting may be required.
- 13.46 Where actual room layouts were available, these have been considered in the modelling of the internal layouts within the surrounding properties. Obtaining these room layouts enables precise evaluation of the diffuse levels of daylight within each of the rooms via the NSL. Where layout information was not available assumptions have been made as to the use and internal configuration of the rooms (from external observations) behind the fenestration observed. In such cases a standard 4.2m (14 ft) room depth has been assumed, unless the building form dictated otherwise. This is common practice where access to buildings for surveying is unavailable.
- 13.47 The potential effects of daylighting distribution in an existing building can be found by plotting the NSL in each of the main rooms. For houses, this would include living rooms, dining rooms and kitchens. Bedrooms should also be analysed, although they are less important. The BRE Guidelines identify that if the area of a room that does receive direct sky light is reduced to less than 0.8 times its former value, then this would be noticeable to its occupants.
- 13.48 In relation to deep rooms lit by windows on one side, the BRE Guidelines state in paragraph 2.2.20:

“If an existing building contains rooms lit from one side only and greater than 5m deep, then a greater movement of the no sky line may be unavoidable.”

Sunlight

Annual Probable Sunlight Hours (APSH)

- 13.49 The APSH is a measure of sunlight that a given window may expect over the period of a year, and where there is no obstruction, equates to a maximum of 1,486 hours. Sunlight is measured using a sun indicator which contains 100 spots, each representing 1% of APSH (i.e. 14.86 hours of the total APSH).
- 13.50 The number of spots is calculated for all scenarios during the year and also during the winter period, and a comparison made between the two. This provides a percentage of APSH for each of the time periods for each window assessed.
- 13.51 The BRE Guidelines note on page 14 that:
- *“In housing, the main requirement for sunlight is in living rooms, where it is valued at any time of day, but especially in the afternoon.”*
 - *“all main living rooms of dwellings...should be checked if they have a window facing within 90° of due south. Kitchens and bedrooms are less important, although care should be taken not to block too much sun”.*
 - *“If the main living room to a dwelling has a main window facing within 90° of due north, but a secondary window facing within 90° of due south, sunlight to the secondary window should be checked.”*
 - *“...a south facing window will, in general, receive most sunlight, while a north facing one will receive it only on a handful of occasions. East and west facing windows will receive sunlight only at certain times of day”.*
- 13.52 In regard to existing surrounding receptors, the BRE Guidelines provide that a window may be adversely affected if a point at the centre of the window receives for the whole year, less than 25% of the APSH, including at least 5% of the APSH during the winter months (21 September to 21 March) and less than 0.8 times its former sunlight hours during either period, and if there is a reduction in total APSH which is greater than 4%.
- 13.53 Summary of Criteria for Daylight and Sunlight. **Table 13.2** provides a summary of the criteria set out within the BRE Guidelines for daylight and sunlight.

Table 13.2: Summary of Daylight and Sunlight Assessment Criteria

Method	BRE Criteria
VSC	A window may be adversely affected if its VSC measured at the centre of the window is less than 27% and less than 0.8 times its former value.
NSL	A room may be adversely affected if the daylight distribution (NSL) is reduced beyond 0.8 times its existing area.
APSH	A window may be adversely affected if a point at the centre of the window received for the whole year: <ul style="list-style-type: none"> – less than 25% of the APSH including at least 5% of the APSH during the winter months (21 September to 21 March); and

Method	BRE Criteria
	<ul style="list-style-type: none"> – less than 0.8 times its former sunlight hours during either period; and – for existing neighbouring buildings, if there is a reduction in total APSH which is greater than 4%.

Overshadowing

Transient overshadowing

- 13.54 The BRE Guidelines suggests that where large buildings are proposed that may affect a number of gardens or open spaces, it is useful to plot a shadow plan to illustrate the location of shadows at different times of the day and year. For the purpose of this assessment the hourly shadows were mapped for the following three key dates in the year:
- 21 March (Spring Equinox);
 - 21 June (Summer Solstice); and
 - 21 December (Winter Solstice).
- 13.55 21 September (Autumn Equinox) provides the same overshadowing images as 21 March (Spring Equinox) as the sun follows the same path at these corresponding times of year. Therefore, 21 March is used within the overshadowing assessment.
- 13.56 The transient overshadowing has been calculated at hourly intervals throughout the day from 08:00 to 19:00, and visual representations are provided in **Appendix 13.3**. Where there are gaps in timings in **Appendix 13.3**, this is because the sun would not be present during these times (for example, from approximately 16:00 onwards on 21 December) and thus no shadow can be cast. On December 21, the sun is at its lowest point causing long shadows to be cast and represents the worst-case scenario in terms of overshadowing.

Sun Hours on Ground

- 13.57 The BRE Guidelines suggest that Sun Hours on Ground assessments should be undertaken on the equinox (21 March or 21 September). Using specialist software, the path of the sun is tracked to determine where the sun would reach the ground and where it would not.
- 13.58 It is recommended that at least half of a garden or amenity area should receive at least two hours of sunlight on 21 March or the area which receives 2 hours of direct sunlight should not be reduced to less than 0.8 times its former value (i.e. there should be no more than a 20% reduction).

Solar Glare

- 13.59 Solar glare is particularly important at pedestrian crossings, road junctions and train lines, where glare can reduce visibility for drivers or pedestrians. Typically, elements considered to be reflective are either glazed apertures or metal cladding.
- 13.60 The BRE Guidelines includes the following statement in regard to the potential for reflected solar glare from a new development:

“Glare or solar dazzle can occur when sunlight is reflected from a glazed façade. This can affect road users outside and the occupants of adjoining buildings. The problem can occur either when there are large areas of reflective glass or cladding on the façade, or when there are areas of glass or cladding which slope back so that high altitude sunlight can be reflected along the ground. Thus solar dazzle is only a long term problem only for some heavily glazed (or mirror clad) buildings...”

- 13.61 Solar glare is not a comparative assessment; the fact it may occur in the baseline does not justify its occurrence as a result of a development. Therefore, the assessment presented in this chapter considers the effect of the Development in absolute terms, by reference to the relevant guidance levels.

Viewpoints for Road Users and Pedestrians

- 13.62 As indicated previously, the assessment considers potentially sensitive viewpoints for road users and pedestrians surrounding the Site. The viewpoints are generally located at the minimum stopping distance (see paragraph 13.65 of this chapter for further information) and at the driver's eye level. The focal point is a relevant traffic element, such as signals or incoming traffic.
- 13.63 Identifying the viewpoints based on the stopping distance is calculated as the combination of thinking and braking distances, using the following formula:

$$D_{total} = D_{thinking} + D_{braking} = V \cdot T + \frac{V^2}{2\mu \cdot g}$$

- 13.64 Where each component is:

- V = Relevant vehicle speed, typically the road speed limit;
- T = Thinking time (0.67 seconds);
- μ = Braking effort (considered 0.65 for cars and 0.5 for buses); and
- g = Gravity acceleration.

- 13.65 The height of the viewpoint is considered to be 1.5m for cars and 2.0m for buses. **Figure 13.3** identifies the typical stopping distance range for a car travelling at different speeds. Therefore, a viewpoint for a car driving at 20mph (32km/h) (i.e. speed limit for a dense urban location) would be placed at 12m from a traffic light and 1.5m above the ground.
- 13.66 The assessment also considers a driver's / pedestrian's field of vision which takes the angular extent seen at any given time, which for humans facing forwards is approximately 180 degrees.

Railway lines

- 13.67 In addition to road users, instances of solar reflection also have the potential to effect train drivers and their view of traffic signals. Due to the proximity of the Site to the railway line running to and from London Bridge Mainline Station, an assessment has been undertaken from these viewpoints.

Solar Glare Technical Assessment

- 13.68 The potential for reflected solar glare or dazzle from glazed or reflective façades from the Development has been assessed using specialist lighting software. The assessment shows the

path of the sun for the entire year around the Development. From this, two computer generated angular images have been produced for each selected viewpoint, indicating the area which sees the reflection of the sunpath at any point during the year. A modified diagram portraying a standardised extent of human vision is then overlaid onto the image.

- 13.69 The assessment has been undertaken on the basis that the fovea centralis (also generally known as the fovea) is a part of the eye, located in the centre of the macula region of the retina³. The fovea is responsible for sharp central vision (also called foveal vision), which is necessary in humans for reading, watching television, driving, and any activity where visual detail is of primary importance. The macula corresponds to the central 13° of the visual field⁴; the fovea to the central 3°.
- 13.70 **Figure 13.4** highlights the degrees of vision corresponding to the foveal view, with a red circle of 3° of angle in order to identify the area most sensitive to reflected solar glare. Another red circle represents the incidence of the 30° radius of our typical field of view in order to identify a secondary area of sensitivity to potential reflected glare instances.
- 13.71 The degrees of vision provide a reference from which significant effects can be identified. At 3°, the potential for the reflected glare to cause a hazard is high and mitigation would be required. Between 3° and 30°, there is the potential that there could be an issue and mitigation may be necessary.
- 13.72 As stated in the Commission Internationale de L'Eclairage guidance CIE 146:2002⁵, occurrences at angles beyond 30° would be of little significance in most situations, but may be relevant in exceptional circumstances. When seated in a driving seat of a typical car, for example, the limits of the windscreen would generally obstruct the driver's view at angles beyond 30° from the line of sight. Therefore, the risk of reflective solar glare causing a hazard is reduced and, as such, mitigation would make only a minor difference.
- 13.73 The methodology for solar glare is not aimed at addressing the intensity of an instance of reflected solar glare, but rather its occurrence, duration throughout the year and the location of this occurrence in respect of an individual's line of sight. It is also to be noted that the hours presented reflect solar time and therefore do not take Daylight Saving Hours into account.

Light Pollution

- 13.74 Light pollution is defined as any light emitting from artificial sources into spaces where it is unwanted, such as spillage of light from office or commercial buildings onto residential accommodation, where this would cause nuisance to the occupants. The ILP Guidance Notes⁶ provide suggested lighting level values to ascertain the acceptability of lighting levels of light pollution.
- 13.75 It should be noted that artificial light is not always perceived as being negative, particularly in areas of high crime where good street lighting and light into street environments is seen as a positive attribute. Adverse effects caused as a result of electric lighting include the intrusion of light into sensitive locations such as adjacent residential accommodation, areas of special night-time interest, or needless spillage into the night sky.
- 13.76 It should also be noted that the ILP Guidance relates and refers to external luminaires. However, commercial buildings with large areas of glazing and possible night-time usage can sometimes

cause light intrusion from their internal luminaires. For this reason, quantitative light pollution assessments can be undertaken in relation to these internal luminaires.

- 13.77 Potential light pollution effects of a new development are typically assessed in relation to four specific criteria:
- Sky Glow is the brightening of the night sky over our towns, cities and countryside. It can be quantified by measuring the Upward Light Ratio (ULR), which is the maximum permitted percentage (%) of luminaire flux for the total installation that goes directly into the sky;
 - Light Intrusion is the spilling of light beyond the boundary of a proposed development. It is assessed as vertical illuminance in lux (Ev) measured flat at the centre of the sensitive receptor;
 - Luminaire Intensity is the uncomfortable brightness of a light source when viewed against a dark background. It is applied to each source visible from a sensitive receptor and is measured as source intensity (I) (kcd); and
 - Building Luminance can cause an increase in the brightness of a general area and is measured in cd per metre squared (L) as an average over the building facade caused only by external lighting.

Light Intrusion Methodology

- 13.78 Light pollution is not a comparative assessment; the fact it may occur in the baseline does not necessarily justify its occurrence as a result of the Development. Therefore, the assessment considers the effect of the Development in absolute terms, by reference to the relevant guidance levels.
- 13.79 The assessment has been undertaken by preparing a computer generated 3D model of the Development and using specialist lighting simulation software. The light fittings used for this lighting simulation represent typical recessed office luminaires regularly spaced on the proposed office ceilings within the proposed commercial building in order to achieve an average illuminance of 500 lux across the working plane as a standard. It is understood that the lighting strategy proposes a lower lighting output which would seek to mitigate any potential risks identified in this chapter. The assessment within this chapter assumes that all luminaires are switched on at once and no blinds or shading devices are deployed for the purpose of the light pollution assessment. For this reason, it should be considered a worst-case scenario.
- 13.80 **Table 13.3** below sets out the environmental zones as per the ILP Guidance which have been applied in this assessment.

Table 13.3 ILP Light Pollution Criteria for Environmental Zones

Environmental Zone	Sky Glow ULR (Max %) (1)	Light Intrusion (into windows) Ev (Lux) (2)		Luminaire Intensity (candelas) (3)		Building Luminance Pre-curfew (4)
		Pre-curfew	Post-curfew	Pre-curfew	Post-curfew	Average L[cd/m ²]
E0 – Dark areas (e.g. UNESCO Starlight Reserves, IDA Dark Sky Parks)	0	0	0	0	0	0
E1- Intrinsically dark areas (e.g. National Parks, areas of outstanding natural beauty)	0	2	0 (1*)	2,500	0	0
E2- Low district brightness (e.g. rural or small village locations)	2.5	5	1	7,500	500	5
E3- Medium district brightness (e.g. small town centres or urban locations)	5.0	10	2	10,000	1,000	10
E4- High district brightness (e.g. town/city centres with high levels of night time activity)	15.0	25	5	25,000	2,500	25

Notes:

ULR = Upward Light Ratio of the Installation is the maximum permitted percentage of luminaire flux for the total installation that goes directly into the sky

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

I = Light Intensity in Cd

L = Luminance in Cd/m²

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.

13.81 With reference to criteria set out in

~~43.84~~**13.82** **Table 13.3**, as per ILP guidance, the Site is classified as environmental zone E4. This zone allows for a maximum pre-curfew light intrusion level of 25 lux and a maximum post-curfew light intrusion level of 5 lux.

Significance Criteria

Effect Significance Terminology Overview

~~43.82~~**13.83** In terms of sensitivity, surrounding properties are considered highly sensitive to daylight and sunlight levels, and specifically habitable rooms within the properties such as living rooms, kitchens and bedrooms, in accordance with the BRE Guidelines. All existing residential receptors, assessed within this chapter are considered highly sensitive due to the expectation of natural light and are given equal weighting, and therefore each individual receptor is not assigned a level of sensitivity as per the usual EIA methodology i.e. high, medium, low or very low. However, buildings with transient occupants such as student accommodation, educational facilities and hospitals are considered lower sensitivity as they are not permanent residences and are transient in nature.

~~43.83~~**13.84** For transient overshadowing, all public areas of open space such as parks, squares and private gardens in proximity to the Site are considered highly sensitive and are considered within the assessment.

~~43.84~~**13.85** The key terminology to be used to describe the magnitude of effects is as follows and is further described in the below sections of this chapter:

- Major;
- Moderate;
- Minor; and
- Negligible.

~~43.85~~**13.86** The nature of the effects may be either adverse (negative) or beneficial (positive).

~~43.86~~**13.87** Following the classification of an effect using this methodology, a clear statement is then made as to whether the effect is significant or not significant. As a general rule, in relation to sunlight, daylight, overshadowing and solar glare the following criteria is applied:

- 'Minor', 'Moderate' or 'Major' effects are deemed to be 'significant';
- 'Negligible' effects are considered to be 'not significant'.

Evaluating Effects and Significance – Daylight, Sunlight and Overshadowing

Daylight and Sunlight

~~43.87~~**13.88** For daylight and sunlight, the BRE Guidelines outline the approach within the accompanying Appendix I, in terms of assigning criteria to assess the effects:

- Section 3 of Appendix I states: "Adverse impacts occur when there is a significant decrease in the amount of skylight and sunlight reaching an existing building where it is required, or in the

amount of sunlight reaching an open space... The assessment of impact will depend on a combination of factors, and there is no simple rule of thumb that can be applied.”

- Paragraph 5 of Appendix I states: *“Where the loss of skylight or sunlight fully meets the guidelines, the impact is assessed as negligible or minor adverse. Where the loss of light is well within the guidelines, or only a small number of windows or limited area of open space lose light (within the guidelines), a classification of negligible impact is more appropriate. Where the loss of light is only just within the guidelines and a larger number of windows or open space are affected, a minor adverse impact would be more appropriate, especially if there is a particularly strong requirement for daylight and sunlight in the affected building or open space.”*
- Paragraph 6 of Appendix I states: *“Where the loss of skylight or sunlight does not meet the guidelines in this book, the impact is assessed as minor, moderate or long-term, local, adverse of major significance. Factors tending towards a minor adverse impact include:*
 - Only a small number of windows or limited area of open space are affected;
 - The loss of light is only marginally outside the guidelines;
 - An affected room has other sources of skylight or sunlight; and
 - The affected building or open space only has a low level of requirement for skylight or sunlight.”

~~43.88~~43.89 The classification of major adverse is documented within Paragraph 7 of the BRE Guidelines:

“Factors tending towards a major adverse impact include:

- *a large number of windows or large area of open space are affected;*
- *the loss of light is substantially outside the guidelines;*
- *all the windows in a particular property are affected; and*
- *the affected indoor or outdoor spaces have a particular strong requirement for skylight or sunlight, e.g. a living room in a dwelling or a children’s playground”.*

~~43.89~~43.90 Where the BRE Guidelines are met, the effects would be considered Negligible.

~~43.90~~43.91 With regard to the BRE Guidelines, professional judgement has been used to determine whether the potential effects would result in adverse or beneficial effects. The initial numerical criteria for determining the category of effect is based on percentage alterations, as follows:

- 0 – 19.9% alteration = Negligible;
- 20 - 29.9% alteration = Minor;
- 30 - 39.9% alteration = Moderate; and
- Greater than 40% alteration = Major.

~~43.94~~43.92 For instances where existing VSC, NSL and APSH levels within a property are low, any alteration may result in a disproportionate percentage change, whereby the actual change in daylight or sunlight within the property experienced by the occupant may not be as noticeable as the percentage change would suggest. This is one example of when professional judgement is taken into account.

~~43.92~~**13.93** Therefore, when assigning an overall significance per property, consideration has been given to the proportion of rooms / windows affected, as well as the percentage alterations, absolute changes, and any other relevant factors, including mitigating factors such as balconies, overhangs or design features which may also affect the determination of assigning the criteria.

~~43.93~~**13.94** Where room uses are unknown, all rooms assessed within the property or building are considered habitable to give the worst-case scenario for potential daylight and sunlight effects caused by the Development.

~~43.94~~**13.95** Where the scale of VSC levels and NSL levels within a property differ, professional judgement has also been used to determine an overall significance. In addition, if the scale of total APSH and Winter PSH differ greatly, professional judgement has also been used to determine the significance of the effect. This has been based on the factors stated in paragraph 13.92.

Overshadowing

Transient Overshadowing

~~43.95~~**13.96** The BRE Guidelines do not include criteria for the significance of transitory overshadowing other than to identify the different times of the day and year when shadow would be cast over a surrounding area.

~~43.96~~**13.97** The assessment of potential effects as a result of transient overshadowing is therefore based on professional judgement, taking into consideration the conditions of the existing Site and surrounding area, and comparing these conditions against the effect of the transient overshadowing arising from the Development.

Sun Hours on Ground

~~43.97~~**13.98** It is suggested in the BRE Guidelines that for an area to appear adequately sunlit throughout the year, at least half (50%) of any assessment area should see direct sunlight for at least two hours on the 21st March. If, as a result of new development, an existing assessment area will not meet BRE Guidelines and the area which can receive two hours of direct sunlight on the 21st March is reduced to less than 0.8 times its former area, then the loss of sunlight is likely to be noticeable.

~~43.98~~**13.99** Where the results show compliance with the BRE Guidelines criteria, the occupants are unlikely to experience any noticeable change to their sunlight amenity levels. For the purposes of this assessment, such an effect would be considered Negligible. Should the relevant criteria not be achieved, a judgment has to be made as to the significance of the effect based on the level of loss, retained sunlight levels and the relevant baseline scenario.

~~43.99~~**13.100** The table below sets out the numerical criteria adopted in relation to the sun on ground assessment.

Table 13.4 Sun on ground Significance Criteria

Significance	Numerical criteria on 21 st March
Negligible	Over 50% of the amenity area will receive 2 hours of sunlight or less than 20% alteration in area which receives 2 hours of direct sunlight.

Significance	Numerical criteria on 21 st March
Minor adverse	20-29.9% reduction in the area which receives 2 hours of direct sunlight (and below 50% retained area).
Moderate adverse	30-39.9% reduction in the area which receives 2 hours of direct sunlight (and below 50% retained area).
Major adverse	40%+ reduction in the area which receives 2 hours of direct sunlight (and below 50% retained area).

Solar Glare

~~43.100~~**13.101** There are no quantitative criteria within the BRE Guidelines or elsewhere regarding acceptable levels of solar glare. Generally, however, solar reflections at high altitudes are less likely to cause nuisance or distraction as one has to look upwards to see it.

~~43.101~~**13.102** Professional judgement has therefore been applied to assign the significance of solar glare arising from the proposed Development and to determine the criteria for assessing the significance of solar glare set out in **Table 13.5**.

~~43.102~~**13.103** Multiple viewpoints may be chosen for each of the traffic lanes, train line or signals affected. In terms of significance criteria however, professional judgement has been used to determine the effect at the location rather than the individual perspectives at a signal traffic junction. Factors that could influence the significance of effect may include:

- sunlight availability probability;
- area of façade off which reflections are visible;
- period of time reflections are visible;
- angle at which reflections are visible from line of sight;
- views of the development being obscured for example by trees; and
- the time of day at which the solar reflection will occur for example during peak traffic times.

~~43.103~~**13.104** Initially, the following guide will be used to ascertain the possible significance for each view and the factors listed above will then be taken into consideration to determine the overall significance for the designated viewpoint.

Table 13.5 Criteria Used for Determining the Effect of Solar Glare

Significance guidance	Possible factors
Negligible	No reflections are visible or if visible all occur at angles greater than 30° from the driver's line of sight and so, as stated by the CIE, will be of "little significance"
Minor	Solar reflections are visible within 30° to 10° or between 10° to 5° of the driver's line of sight for a short period of time
Moderate	Solar reflections are visible within 10° and 5° of the driver's line of sight occurring for a long period of time.

Significance guidance	Possible factors
Major	Solar reflections are visible within 5° of a driver's line of sight.
Note – mitigating factors such as alternative and unaffected signals/traffic lights and car visor angle may result in the assignment of significance which differs from the above.	

Light Pollution

~~43.104~~**13.105** The ILP Guidance Notes do not provide details on assigning of significance of effects for light pollution, therefore this is based on professional judgement considering the extent of the residential façade adversely affected as well as the extent to which the thresholds set out in the guidance are exceeded. **Table 13.6** highlights the criteria used to assign a specific significance.

Table 13.6 Criteria Used for Determining the Effect of Light Pollution

Significance	Description
Negligible	A small alteration from the existing scenario which is unlikely to be noticeable to the receptor. This may involve a small number of technical infringements of the numerical level suggested in the appropriate guidelines which should also be viewed in the context of the urban character of the area.
Minor	An alteration from the existing scenario which may be marginally noticeable to the sensitive receptor. This may include a number of marginal infringements of the numerical level suggested in the appropriate guidelines which should be viewed in the context of the urban character of the area.
Moderate	An alteration from the existing scenario which may cause a moderate noticeable change to the sensitive receptor. This may consist of a large proportion of marginal infringements of the numerical values suggested in the relevant guidelines and/or a small percentage of significant infringements.
Major	An alteration from the existing scenario which may cause a major noticeable change to the sensitive receptor. This may consist of a large proportion of significant infringements of the numerical values suggested within the relevant guidelines.

Assumptions and Limitations

~~43.105~~**13.106** Where actual room layouts were available, these have been considered when modelling the internal layouts of surrounding properties. Where layout information was not available assumptions have been made as to the use and internal configuration of the rooms (from external observations) behind the fenestration observed. In such cases a standard 4.2m (14ft) room depth has been assumed, unless the building form dictated otherwise. This is common practice where

access to buildings for surveying is unavailable. Obtaining these room layouts enables precise evaluation of the diffuse levels of daylight within each of the rooms via the NSL.

~~43.106~~**13.107** Floor levels have been assumed for surrounding properties where access has not been obtained. With the working plane located 850mm above the finished floor level, this has the potential to affect the assessment of NSL.

~~43.107~~**13.108** For solar glare, although great care is taken in identifying the most likely sensitive viewpoints, this does not guarantee that there are no additional sensitive locations where reflected solar glare could present a particular risk. This assessment is based on the assumption that in an urban environment moving traffic represents the biggest risk factor and so viewpoints and focus points are selected accordingly. For practical reasons the area of assessment is limited to the area surrounding the proposed Development as viewpoints within this area are the most sensitive in terms of Solar Glare. At greater distances, the view of the Development in a driver's line of sight would likely be partially obscured by surrounding schemes and only the upper portion of the building would be visible, which would typically be located above the driver's visor cut-off line. As such, the occurrence of reflected solar glare at greater distances is not the subject of this assessment

~~43.108~~**13.109** In addition, the methodology for solar glare is not aimed at addressing the intensity of an instance of reflected solar glare, but rather its occurrence, duration throughout the year, and the location of this occurrence in respect of an individual's line of sight. As previously mentioned, the hours presented reflect solar time and therefore do not take Daylight Saving Hours into account.

~~43.109~~**13.110** Owing to reasons of practicality in gaining access to surrounding residential properties, the light pollution assessments undertaken at neighbouring windows show the levels of lux emitted from the Development only. Light sources, such as streetlamps or spillage from other buildings are therefore not considered accounted for within the assessment. This is industry standard practice for proposals within high district brightness areas in central London where no external lighting is proposed, and effects can be mitigated by measures such as occupancy sensors.

Baseline Conditions

Existing Baseline

~~43.110~~**13.111** The study area comprises an urban area with buildings of multiple tenures and scales ranging from three storey buildings to the larger buildings of the News Building, The Shard and Guy's Hospital in close proximity to the Site to the north, north-east and east respectively.

~~43.111~~**13.112** The existing baseline is shown in Drawings 8684-REL12-IS01-04-06 in **Appendix 13.1**.

Existing Daylight and Sunlight to Surrounding Sensitive Receptors

~~43.112~~**13.113** The baseline daylight and sunlight conditions for the 26 identified surrounding sensitive receptors have been assessed, as summarised in **Table 13.7**.

Table 13.7 Summary of Baseline Daylight and Sunlight Levels

Address	Total No. Windows that meet VSC criteria (>27%)		Total No. of Rooms that receive NSL in excess of 80%		Total No. of Rooms that meet APSH criteria	
	Total Assessed	Total that meet criteria	Total Assessed	Total that meet criteria	Total Assessed	Total that meet criteria
10-18 London Bridge Street	102	58	86	76	82	71
6 London Bridge Street	12	0	12	3	12	3
St Thomas Church	8	4	4	4	4	4
Guy's Hospital (Chapel)	31	1	6	2	3	3
Guy's Campus (Southwark Wing)	103	24	29	20	5	5
Guy's Campus (Tower Wing)	1083	78	240	235	23	0
Iris Brook House Talbot Yard	61	11	54	36	18	6
Shepherds House - Talbot Yard	136	27	64	54	8	0
Chaucer House - White Hart Yard	82	44	20	20	-	-
Orchard Lisle House - Talbot Yard	107	38	97	64	-	-
63a Borough High Street	20	1	15	6	5	2
Guy's Campus	48	20	38	32	-	
The Old Kings Head Ph	23	0	8	3	2	1
3 Kings Head Yard	8	0	3	3	1	1
57 Borough High Street	3	0	3	3	3	2
53-55 Borough High Street	5	2	4	4	4	4
51 Borough High Street	2	1	2	2	2	2
2 St Thomas Street	3	3	3	0	3	3
8 Bedale St	10	10	5	4	5	5
59-61 Borough High Street	17	11	8	8	8	6
22 Southwark St	28	14	24	18	12	12
24 Southwark St	30	15	26	26	25	25
Southwark Cathedral Annex	246	21	19	14	13	4

Address	Total No. Windows that meet VSC criteria (>27%)		Total No. of Rooms that receive NSL in excess of 80%		Total No. of Rooms that meet APSH criteria	
	Total Assessed	Total that meet criteria	Total Assessed	Total that meet criteria	Total Assessed	Total that meet criteria
Southwark Cathedral	102	54	6	3	3	3
Shard Place	988	434	471	395	284	192
43 Borough High Street	9	3	8	7	8	7
Total	3267	874	1255	1042	533	361

13.114 Of the 26 properties considered as sensitive receptors, a total of 3,267 windows serving 1255 rooms were assessed for daylight and 533 rooms were assessed for sunlight.

13.115 For daylight in the baseline condition, 874 of the 3267 (27%) windows assessed for VSC and 1042 of the 1255 (83%) rooms assessed for NSL meet BRE criteria for daylight of 27% VSC and 80% NSL respectively. For sunlight, 361 of the 533 (68%) rooms assessed meet BRE criteria of 25% Total APSH and 5% Winter APSH.

13.116 Low existing daylight and sunlight levels can be attributed to the dense urban location and architectural features such as balconies, large roof overhangs and recessed windows. These reasons may reduce a property's daylight availability, resulting in low existing daylight and sunlight levels. Owing to these low existing levels, any development on the Site would lead to disproportionate adverse effects.

Existing Overshadowing to Sensitive Surrounding Amenity Areas

13.117 The existing Overshadowing assessments can be seen within **Appendix 13.4**.

13.118 Due to the relative low-rise building on the Site, the existing overshadowing is considered low. The relevant amenity areas are minimally affected in the baseline scenario.

Assessment of Likely Significant Effects

The Works

13.119 The likely effects in relation to the daylight and sunlight amenity, overshadowing, solar glare and light pollution for the surrounding properties and amenity areas would vary throughout the demolition and construction works, depending on the level of obstruction caused. The effects would almost certainly be less than that of the completed Development, given that the extent of permanent massing would increase throughout the construction stage, until the buildings are complete.

13.120 The effects to daylight, sunlight and overshadowing during demolition would be **beneficial** until the point of construction. As construction works progress, effects steadily increase in magnitude as the superstructure is built and then clad. Those effects that are perceptible (i.e. are beyond a

20% alteration as set out in BRE Guidelines), as the superstructure and cladding progress, would have similar effects to surrounding receptors to those once the Development is complete and operational, as presented below. It is therefore considered that the completed Development represents the worst-case assessment in terms of likely daylight, sunlight, overshadowing, solar glare and light pollution effects.

~~43.120~~13.121 During the Works, a number of tall cranes are likely to be present on-site, however their size and temporary presence would lead to generally imperceptible effects of a temporary nature. As such, the overall effect would range from being **negligible** at the start of the works to effects ranging from **negligible** to **long-term, permanent, adverse of major significance**, once the Development is complete, as set out in the assessment of the complete and operational Development below.

Completed and Operational Development

Daylight

~~43.124~~13.122 The full daylight assessment for the Development can be found within **Appendix 13.2** and is summarised in **Table 13.8**.

~~43.122~~13.123 In terms of daylight, measures including massing alterations were implemented during the design process to minimise the impacts on daylight to surrounding sensitive receptors as much as possible while still ensuring the provision of a viable scheme. These design interventions are included within the assessment and constitute iterative design as opposed to mitigation measures.

~~43.123~~13.124 Overall, of the ~~3267~~2797 windows assessed for VSC ~~2698~~2228 (~~79.683~~79.683%) would meet BRE criteria. Of the ~~4255~~1005 rooms assessed for NSL, ~~4031~~781 (~~77.782~~77.782%) would meet BRE criteria.

~~43.124~~13.125 The four buildings highlighted in grey in **Table 13.8** would experience no or little alteration in relation to VSC and NSL (below 20%), and the effect on daylight to these properties would therefore be **negligible**.

~~43.125~~13.126 The remaining affected 22 buildings are discussed in detail in the following paragraphs.

Table 13.8 Effects to VSC and NSL to Surrounding Sensitive Receptors

Address	<u>VSC</u>						<u>NSL</u>					
	Total No. Of Windows	No. Windows That Meet BRE Criteria	Below BRE Guidelines			Total	Total No. Of Rooms	No. Rooms That Meet The 0.8 Times Former Value Criteria	Below BRE Guidelines			Total
			20-29.9% Reduction	30-39.9% Reduction	>40% Reduction				20-29.9% Reduction	30-39.9% Reduction	>40% Reduction	
10-18 London Bridge Street	102	10	3	28	61	92	86 86	14 5	3 3	12 22	57 56	72 84
6 London Bridge Street	12	4	5	2	1	8	12 42	12 4	0 5	0 2	0 4	0 8
St Thomas Church	8	4	2	0	2	4	4 4	4 0	0 0	0 4	0 0	0 4
Guy's Hospital (Chapel)	31	16	0	0	15	15	6 6	3 4	0 0	0 0	3 5	3 5
Guy's Campus (Southwark Wing)	103	102	1	0	0	1	29 29	29 29	0 0	0 0	0 0	0 0
Guy's Campus (Tower Wing)	1083	1063	19	0	1	20	240 240	240 235	0 4	0 4	0 0	0 5
Iris Brook House Talbot Yard	61	18	6	29	8	43	54 54	20 48	7 4	5 24	22 8	34 36
Shepherds House - Talbot Yard	136	46	34	48	8	90	64 64	52 48	3 48	6 24	3 4	12 46
Chaucer House - White Hart Yard	82	23	12	10	37	59	20 20	15 5	5 3	0 3	0 9	5 45
Orchard Lisle House - Talbot Yard	107	2	15	13	77	105	97 97	26 4	0 42	2 43	69 74	71 96
63a Borough High Street	20	11	5	2	2	9	15 45	12 7	0 6	0 4	3 4	3 8

Address	VSC						NSL					
	Total No. Of Windows	No. Windows That Meet BRE Criteria	Below BRE Guidelines				Total No. Of Rooms	No. Rooms That Meet The 0.8 Times Former Value Criteria	Below BRE Guidelines			
			20-29.9% Reduction	30-39.9% Reduction	>40% Reduction	Total			20-29.9% Reduction	30-39.9% Reduction	>40% Reduction	Total
Guy's Campus	48	46	0	0	2	2	38 38	31 38	3 0	4 0	0 0	7 0
The Old Kings Head Ph	23	2	6	3	12	21	8 8	8 0	0 2	0 3	0 3	0 8
3 Kings Head Yard	8	4	4	0	0	4	3 3	3 4	0 2	0 0	0 0	0 2
57 Borough High Street	3	0	3	0	0	3	3 3	2 0	1 3	0 0	0 0	1 3
53-55 Borough High Street	5	1	4	0	0	4	4 4	3 4	1 3	0 0	0 0	1 3
51 Borough High Street	2	0	2	0	0	2	2 2	1 0	1 2	0 0	0 0	1 2
2 St Thomas Street	3	0	0	2	1	3	3 3	2 0	1 0	0 2	0 4	1 3
8 Bedale St	10	10	0	0	0	0	5 5	4 5	1 0	0 0	0 0	1 0
59-61 Borough High Street	17	17	0	0	0	0	8 8	8 8	0 0	0 0	0 0	0 0
22 Southwark St	28	28	0	0	0	0	24 24	23 24	1 0	0 0	0 0	1 0
24 Southwark St	30	30	0	0	0	0	26 26	26 26	0 0	0 0	0 0	0 0
Southwark Cathedral Annex	246	246	0	0	0	0	194 9	194 9	0 0	0 0	0 0	0 0

Address	VSC						NSL					
	Total No. Of Windows	No. Windows That Meet BRE Criteria	Below BRE Guidelines			Total	Total No. Of Rooms	No. Rooms That Meet The 0.8 Times Former Value Criteria	Below BRE Guidelines			Total
			20-29.9% Reduction	30-39.9% Reduction	>40% Reduction				20-29.9% Reduction	30-39.9% Reduction	>40% Reduction	
Southwark Cathedral	102	102	0	0	0	0	66	66	00	00	00	00
Shard Place	518988	942442	26	32	18	76	221474	213438	344	543	09	833
43 Borough High Street	9	1	0	8	0	8	88	54	30	07	00	37
Total	32672797	26982228	147	177	245	569	10054255	781890	3378	34149	157468	224365

10-18 London Bridge Street (Hotel)

~~43.126~~13.127 A total of 102 windows serving 86 rooms were assessed for daylight within this building. GIA were unable to obtain floor plans for this property and have, therefore, made reasonable assumptions as to their dimensions (as outlined in the Assumptions and Limitations section), which is relevant when considering the NSL methodology.

~~43.127~~13.128 For VSC, 10 of the 102 (10%) windows assessed would meet BRE Guideline criteria which would represent a negligible effect.

~~43.128~~13.129 Of the affected windows, three would experience an alteration in VSC levels of 20-29.9% which is considered a Minor Adverse effect and 28 windows would experience an alteration in VSC levels of 30-39.9% which is considered a Moderate Adverse effect. The remaining 61 windows would experience an alteration in VSC levels in excess of 40% which is considered a major adverse effect.

~~43.129~~13.130 For NSL, ~~five~~14 of the 86 rooms assessed would meet BRE Guideline criteria which would represent a negligible effect.

~~43.130~~13.131 Of the affected rooms, three would experience an alteration in NSL levels of 20-29.9% which is considered a Minor Adverse effect and ~~22~~12 rooms would experience an alteration in NSL levels of 30-39.9% which is considered a Moderate Adverse effect. The remaining ~~57~~6 rooms would experience an alteration in NSL levels in excess of 40% which is considered a Major adverse effect. It is important to note that the impacted hotel rooms are considered to be of transient use, generally occupied on a temporary basis and primarily used during night-time hours, these hotel rooms are therefore considered to be less sensitive to the effect of the Development on VSC and NSL levels respectively.

~~43.131~~13.132 Overall and based on professional judgement and due to the temporary nature and resulting lower sensitivity of hotel accommodation, the effect to daylight within this building would be **long term, local, adverse of moderate significance**.

6 London Bridge Street (Residential)

~~43.132~~13.133 A total of 12 windows serving 12 rooms were assessed for daylight within this building. GIA were unable to obtain floor plans for this property and have therefore made reasonable assumptions as to their dimensions, which is relevant when considering the NSL methodology.

~~43.133~~13.134 For VSC, 4 of the 12 (33%) windows assessed would meet BRE Guideline criteria which would represent a negligible effect.

~~43.134~~13.135 Of the affected windows, five would experience an alteration in VSC levels of 20-29.9 % which is considered a Minor Adverse effect. Two windows would experience an alteration in VSC between 30-39.9% which is considered a Moderate Adverse effect. The one remaining window (W1/F03) would experience an alteration in VSC of 40.5% which is considered a Major Adverse effect. This window has a low existing VSC value of 11.1% (against a BRE target value of 27%) meaning the percentage loss is disproportionate, with the absolute loss in VSC being 6.6%.

~~43.135~~13.136 For NSL, all 12 rooms comply with BRE Guideline criteria and are therefore considered to experience a negligible effect.

~~43.136~~13.137 Overall and based on professional judgement, the effect to daylight within this building would be **long-term, local, adverse of moderate significance**.

St Thomas Church (Religious)

~~43.137~~43.138 A total of eight windows serving four rooms were assessed for daylight within this building. GIA were unable to obtain floor plans for this property and have therefore made reasonable assumptions as to their dimensions, which is relevant when considering the NSL methodology.

~~43.138~~43.139 For VSC, four of the eight windows assessed (50%) would meet BRE criteria which would represent a negligible effect.

~~43.139~~43.140 Of the affected windows, two would experience an alteration in VSC levels of 20-29.9% which is considered a Minor Adverse effect. The remaining two windows would experience an alteration in VSC in excess of 40% which is considered a Major Adverse effect.

~~43.140~~43.141 For NSL, all four rooms comply with BRE Guideline criteria and are therefore considered to experience a negligible effect.

~~43.141~~43.142 Overall and based on professional judgement, the effect to daylight within this building would be **long-term, local, adverse of minor significance**.

Guy's Hospital – Chapel (Religious)

~~43.142~~43.143 A total of 31 windows serving six rooms were assessed for daylight within this building. GIA were unable to obtain floor plans for this property and have therefore made reasonable assumptions as to their dimensions, which is relevant when considering the NSL methodology.

~~43.143~~43.144 For VSC, 16 of the 31 (52%) windows assessed would meet BRE criteria which would represent a negligible effect.

~~43.144~~43.145 Of the affected windows, 15 windows would experience an alteration in VSC in excess of 40% which is considered a Major Adverse effect. It is important to note that four of the windows located on the ground floor (W8-W11/F00) experience VSC alterations between 65.5% and 70%, however, this is considered disproportionate to the actual impacts, as the windows have extremely low existing values between 2.9%-3% that are further reduced to between 0.9%-1% in the proposed scenario, with an absolute VSC change between 1.9%-2.1%.

~~43.145~~43.146 For NSL, three of the six (50%) rooms assessed would meet BRE criteria which would represent a negligible effect.

~~43.146~~43.147 Of the affected rooms, three would experience an alteration in NSL in excess of 40% which is considered a Major Adverse effect. It is important to note that the three rooms (R4-R6/F00) that experience NSL alterations above 70%, however, this is considered disproportionate to the actual impact, as the rooms have low existing NSL values of 5.8%, 6.1% and 7.4% which are reduced to 0.9%, 1.1% and 1.5% respectively in the proposed scenario. The absolute NSL loss to the identified rooms range between 0.9% and 1.5%.

~~43.147~~43.148 Overall and based on professional judgement and due to the temporary nature of the building, the effect to daylight within this building would be **long term, local, adverse of moderate significance**.

Guy's Campus – Southwark Wing (Hospital)

~~43.148~~43.149 A total of 103 windows serving 29 rooms were assessed for daylight within this hospital building. GIA were unable to obtain floor plans for this property and have, therefore, made reasonable assumptions as to their dimensions, which is relevant when considering the NSL methodology.

~~43.149~~43.150 For VSC, 102 of the 103 (99%) windows assessed would meet BRE Guideline criteria which would represent a negligible effect.

~~43.150~~13.151 The one affected window (W9/F04) experiences an alteration in VSC levels of 22.6% which is considered a Minor Adverse effect.

~~43.151~~13.152 For NSL, all 29 of the rooms fully comply with BRE Guideline criteria and are therefore considered to experience a negligible effect.

~~43.152~~13.153 Overall, based on professional judgement, and due to the temporary nature and resulting lower sensitivity of the healthcare facility, the effect to daylight within these buildings would be **negligible**.

Guy's Campus – Tower Wing (Hospital)

~~43.153~~13.154 A total of 1,083 windows serving 240 rooms were assessed for daylight within this hospital building. GIA were unable to obtain floor plans for this property and have therefore made reasonable assumptions as to their dimensions, which is relevant when considering the NSL methodology.

~~43.154~~13.155 For VSC, 1,063 of the 1,083 (98%) windows assessed would meet BRE Guideline criteria which would represent a negligible effect.

~~43.155~~13.156 Of the affected windows, 19 would experience an alteration in VSC levels of 20-29.9% which is considered a Minor Adverse effect. The remaining window (W8/F00) would experience a VSC alteration in excess of 40% which is considered a Major Adverse effect.

~~43.156~~13.157 It should be noted that the window experiencing a Major Adverse effect has an extremely low existing VSC value of 0.2%. Therefore, any alteration would result in a disproportionate percentage change, that in reality, is unlikely to be noticeable.

~~43.157~~13.158 For NSL, all 240 of the rooms comply with BRE Guideline criteria and are therefore considered to experience a negligible effect.

~~43.158~~13.159 Overall, based on professional judgement, and due to the temporary nature and resulting lower sensitive of a hospital, the effect to daylight within these buildings would be **negligible**.

Iris Brook House - Talbot Yard (Student Accommodation)

~~43.159~~13.160 A total of ~~65~~651 windows serving 49 rooms were assessed for daylight within this building. GIA were able to obtain floor plans for this property and have incorporated them within the 3D model to allow for more accurate results.

~~43.160~~13.161 For VSC, 18 of the ~~65~~651 (~~13.135~~13.135%) windows assessed would meet BRE criteria which would represent a negligible effect.

~~43.161~~13.162 Of the affected windows, ~~four-six~~four-six would experience an alteration in VSC levels of 20-29.9% which is considered a Minor Adverse effect and ~~294~~294 windows would experience an alteration in VSC levels of 30-39.9% which is considered a Moderate Adverse effect. The remaining eight windows would experience an alteration in VSC levels in excess of 40% which is considered a Major Adverse effect.

~~43.162~~13.163 For NSL, ~~2048~~2048 of the 49 (37%) rooms assessed would meet BRE criteria which would represent a negligible effect.

~~43.163~~13.164 Of the affected rooms, ~~four-seven~~four-seven would experience an alteration in NSL levels of 20-29.9% which is considered a Minor Adverse effect and five rooms would experience an alteration in NSL levels of 30-39.9% which is considered a Moderate Adverse effect. The remaining 22 rooms would experience an alteration in excess of 40% which is considered a Major Adverse effect.

~~43.164~~13.165 Overall, based on professional judgement and due to the temporary nature of student accommodation, the effect to daylight within this building would be **long-term, local, adverse of moderate significance**.

Shepherds House – Talbot Yard (Kings College - Educational)

~~43.165~~13.166 A total of 136 windows serving 64 rooms were assessed for daylight within this building. GIA were unable to obtain floor plans for this property and have therefore made reasonable assumptions as to their dimensions, which is relevant when considering the NSL methodology.

~~43.166~~13.167 For VSC, 46 of the 136 (34%) windows assessed would meet BRE criteria which would represent a negligible effect.

~~43.167~~13.168 Of the affected windows, 34 would experience an alteration in VSC levels of 20-29.9% which is considered a Minor Adverse effect and 48 windows would experience an alteration in VSC levels of 30-39.9% which is considered a Moderate Adverse effect. The remaining eight windows would experience an alteration in VSC levels in excess of 40% which is considered a Major Adverse effect.

~~43.168~~13.169 For NSL, 52 of the 64 (81%) room assessed would meet BRE criteria which would represent a negligible effect.

~~43.169~~13.170 Of the affected rooms, three would experience an alteration in NSL levels of 20-29.9% which is considered a Minor Adverse effect and six rooms would experience an alteration in NSL levels of 30-39.9% which is considered a Moderate Adverse effect. The remaining three rooms would experience an alteration in NSL levels in excess of 40% which is considered a Major Adverse effect.

~~43.170~~13.171 It is important to note Shepherds House forms part of the Guy's Campus (Kings College London) and that the windows and rooms within this building are not residential. The use of the rooms would be transient and likely to rely on artificial lighting as is the case with most educational buildings and would have a lower requirement for daylight. Therefore, due to the educational use, this building has a lower sensitivity to daylight.

~~43.171~~13.172 Overall, based on professional judgement and the lower sensitivity to daylight, the effect to daylight within these buildings would be **long-term, local, adverse of minor significance**.

Chaucer House (London School of Commerce - Educational)

~~43.172~~13.173 A total of 82 windows serving 20 rooms were assessed for daylight within this student accommodation building. GIA were unable to obtain floor plans for this property and have therefore made reasonable assumptions as to their dimensions, which is relevant when considering the NSL methodology.

~~43.173~~13.174 For VSC, 23 of the 82 (28%) windows assessed would meet BRE Guideline criteria which would represent a negligible effect.

~~43.174~~13.175 Of the affected windows, 12 would experience a VSC alteration between 20-29.9% which is considered a Minor Adverse effect and 10 would experience an alteration between 30-39.9% which is considered a Moderate Adverse effect. The remaining 37 windows would experience an alteration in excess of 40% which is considered a Major Adverse effect.

~~43.175~~13.176 For NSL, 15 of the 20 (75%) rooms assessed would meet BRE criteria which would represent a negligible effect.

~~43.176~~13.177 The five affected rooms would experience an alteration in NSL levels between 20-29.9% which is considered a Minor Adverse effect

~~43.177~~13.178 It is important to note that these are windows and rooms associated with the London School of Commerce and are not residential. The use of the rooms would be transient and likely to rely on artificial lighting as is the case with most educational buildings and would have a lower requirement for daylight. Therefore, due to the educational use, this building has a lower sensitivity to daylight.

~~43.178~~13.179 Overall, based on professional judgement and the lower sensitivity to daylight, the effect to daylight within these buildings would be **long-term, local, adverse of minor significance**.

Orchard Lisle House – Talbot Yard (Student Accommodation)

~~43.179~~13.180 A total of 107 windows serving 97 rooms were assessed for daylight within this student accommodation building. GIA were able to obtain floor plans for this property and have incorporated them within the 3D model to allow for more accurate results.

~~43.180~~13.181 For VSC, two of the 107 (2%) windows assessed would meet BRE criteria which would represent a negligible effect.

~~43.181~~13.182 Of the affected windows, 15 would experience an alteration in VSC levels of 20-29.9% which is considered a Minor Adverse effect and 13 would experience an alteration between 30-39.9% which is considered a Moderate Adverse effect. The remaining 77 windows would experience an alteration in excess of 40% which is considered a Major Adverse effect.

~~43.182~~13.183 For NSL, 26 of the 97 (27%) rooms assessed would meet BRE criteria which would represent a negligible effect.

~~43.183~~13.184 Of the affected rooms, two would experience an alteration in NSL between 30-39.9% which is considered a Moderate Adverse effect. The remaining 69 rooms would experience an alteration in excess of 40% which is considered a Major Adverse effect.

~~43.184~~13.185 It is important to note that Orchard Lisle House provides student accommodation which is deemed to be less sensitive in daylight terms (when compared to residential use) given the transient nature of its occupation. We therefore consider this building to have a lower sensitivity to daylight.

~~43.185~~13.186 Overall, based on professional judgement, and due to the temporary nature and resulting lower sensitivity of student accommodation, the effect of daylight within these buildings would be **long-term, local, adverse of moderate to major significance**.

63a Borough High Street (Residential)

~~43.186~~13.187 A total of 20 windows serving 15 rooms were assessed for daylight within this building. GIA were unable to obtain floor plans for this property and have therefore made reasonable assumptions as to their dimensions, which is relevant when considering the NSL methodology.

~~43.187~~13.188 For VSC, 11 of the 20 (55%) windows assessed would meet BRE criteria which would represent a negligible effect.

~~43.188~~13.189 Of the nine affected windows, five would experience an alteration in VSC levels of 20-29.9% which is considered a Minor Adverse effect and two windows would experience an alteration between 30-39.9% which is considered a Moderate Adverse effect. The two windows experiencing a Moderate Adverse effect (W1/F02 and W2/F02) have low existing VSC values of 12.8% and 6.9% which are further reduced to 7.8% and 4.2% respectively. The remaining two windows on the ground floor (W1/F01 and W2/F01) experience an alteration in VSC levels in

excess of 40% which is considered a Major Adverse effect. Both windows have low existing VSC levels of 10.8% and 5.4%, meaning the actual change has the ability to become exaggerated in percentage terms. The absolute VSC loss to the identified windows is 5% and 2.5% respectively.

~~43.189~~**13.190** For NSL, 12 of the 15 (80%) rooms comply with BRE Guideline criteria and are therefore considered to experience a negligible effect.

~~43.190~~**13.191** The three affected rooms experience an alteration in NSL in excess of 40% which is considered a Major Adverse effect. The rooms have low existing NSL values, therefore, the percentage change is disproportionate to the actual impact.

~~43.191~~**13.192** It should also be noted that this building is heavily obstructed by 59-61 Borough High Street, which largely results in low existing levels of light.

~~43.192~~**13.193** Overall and based on professional judgement, the effect to daylight within this building would be **long-term, local, adverse of moderate significance**.

Guy's Campus – Kings College London (Educational)

~~43.193~~**13.194** A total of 48 windows serving 38 rooms were assessed for daylight within this building. GIA were unable to obtain floor plans for this property and have therefore made reasonable assumptions as to their dimensions, which is relevant when considering the NSL methodology.

~~43.194~~**13.195** For VSC, 46 of the 48 (96%) windows assessed would be BRE criteria which would represent a negligible effect.

~~43.195~~**13.196** The two affected windows (W3/F01 and W4, F01) experience a VSC alteration of 66.7% and 40% respectively, which is considered a Major Adverse effect. It is important to note that the VSC alterations are considered disproportionate to the actual impact as the windows have extremely low existing VSC values of 1.2% and 1% which are further reduced to 0.4% and 0.8% respectively in the proposed scenario, with the absolute change in VSC being less than 1%.

~~43.196~~**13.197** For NSL, 31 for the 38 (82%) rooms assessed would meet BRE criteria which would represent a negligible effect.

~~43.197~~**13.198** Of the affected rooms, three would experience an alteration in NSL levels of 20-29.9% which is considered a Minor Adverse effect. The remaining four rooms would experience an alteration between 30-39.9% which is considered a Moderate Adverse effect. One room on the second floor (F02/R2) would retain a NSL value of 38.5%, whereas the remaining three rooms would retain NSL values in excess of 47%.

~~43.198~~**13.199** It is important to note that Guy's Campus building (Kings College London) has windows and rooms that are not residential. The use of the rooms would be transient and likely to rely on artificial lighting as is the case with most educational buildings and would have a lower requirement for daylight. Therefore, due to the educational use, this building has a lower sensitivity to daylight.

~~43.199~~**13.200** Overall, based on professional judgement and the lower sensitivity to daylight, the effect to daylight within these buildings would be **long-term, local, adverse of minor significance**.

The Old King's Head (Residential Element)

~~43.200~~**13.201** A total of 23 windows serving eight rooms were assessed for daylight within this building. GIA were unable to obtain floor plans for this property and have therefore made reasonable assumptions as to their dimensions, which is relevant when considering the NSL methodology. Whilst this is a mainly commercial building, it has not been possible to determine precisely where

the residential element is located, therefore, all windows/ rooms within the building, from first floor up, have been assessed.

~~43.201~~13.202 For VSC, two of the 23 (9%) windows assessed would meet BRE Guideline criteria which would represent a negligible effect.

~~43.202~~13.203 Of the affected windows, six would experience an alteration in VSC levels of 20-29.9% which is considered a Minor Adverse effect and three would experience an alteration in VSC levels of 30-39.9% which is considered a Moderate adverse effect. The remaining 12 windows experience an alteration in VSC levels in excess of 40% which is considered a Major Adverse effect.

~~43.203~~13.204 For NSL, all eight rooms comply with BRE Guideline criteria and are therefore considered to experience a negligible effect. It should be noted that three of the rooms experience an improvement in NSL values in the proposed scenario.

~~43.204~~13.205 Overall and based on professional judgement, the effect to daylight within this building would be **long-term, local, adverse of moderate significance**.

3 King's Head Yard (Residential Element)

~~43.205~~13.206 A total of eight windows serving three rooms were assessed for daylight within the 2nd and 3rd floor of this building. GIA were able to obtain floor plans for this property and have incorporated them within the 3D model to allow for more accurate results. The lower levels of the building serve commercial space and therefore have not been assessed.

~~43.206~~13.207 For VSC, four of the eight (50%) windows assessed would meet BRE Guideline criteria which would represent a negligible effect.

~~43.207~~13.208 The four affected windows would experience alteration in VSC levels between 20-29.9% which is considered a Minor Adverse effect.

~~43.208~~13.209 For NSL, all three rooms comply with BRE Guideline criteria and are therefore considered to experience a negligible effect.

~~43.209~~13.210 Overall and based on professional judgement, the effect to daylight within the residential element of this building would be **long-term, local, adverse of minor significance**.

57 Borough High Street (Residential)

~~43.210~~13.211 A total of three windows serving three rooms were assessed for daylight within this building. GIA were unable to obtain floor plans for this property and have therefore made reasonable assumptions as to their dimensions, which is relevant when considering the NSL methodology.

~~43.211~~13.212 For VSC, the three windows assessed would fall short of BRE Guideline criteria for VSC. The three windows would experience an alteration in VSC levels of 20-29.9% which is considered a Minor Adverse effect.

~~43.212~~13.213 For NSL, two of the three (67%) rooms comply with BRE Guideline criteria and are therefore considered to experience a negligible effect.

~~43.213~~13.214 The one affected room (F02/R1) would experience an alteration in NSL value of 24.7% which is considered a Minor Adverse effect.

~~43.214~~13.215 Overall and based on professional judgement, the effect to daylight within this residential building would be **long-term, local, adverse of minor significance**.

53-55 Borough High Street (Residential)

- ~~43.215~~13.216 A total of five windows serving four rooms were assessed for daylight within this building. GIA were unable to obtain floor plans for this property and have therefore made reasonable assumptions as to their dimensions, which is relevant when considering the NSL methodology.
- ~~43.216~~13.217 For VSC, one of the five windows assessed would meet BRE Guideline criteria which would represent a negligible effect.
- ~~43.217~~13.218 The four affected windows would experience an alteration in VSC levels of 20-29.9% which is considered a Minor Adverse effect.
- ~~43.218~~13.219 For NSL, three of the four (75%) rooms comply with BRE Guideline criteria and are therefore considered to experience a negligible effect.
- ~~43.219~~13.220 The one affected room (F02/R1) would experience an alteration in NSL of 25.1% which is considered a Minor Adverse effect.
- ~~43.220~~13.221 Overall and based on professional judgement, the effect to daylight within this residential building would be **long-term, local, adverse of minor significance**.

51 Borough High Street (Residential Element)

- ~~43.221~~13.222 A total of two windows serving two rooms were assessed for daylight within the 4th floor the building. GIA were unable to obtain floor plans for this property and have therefore made reasonable assumptions as to their dimensions, which is relevant when considering the NSL methodology.
- ~~43.222~~13.223 For VSC, the two windows assessed (W1/F04 and W2/F04) will fall short of BRE Guideline criteria for VSC. The two windows would experience an alteration in VSC levels of 27.3% and 26% respectively which is considered a Minor Adverse effect.
- ~~43.223~~13.224 For NSL, one of the two (50%) rooms comply with BRE Guideline criteria and is therefore considered to experience a negligible effect.
- ~~43.224~~13.225 The one affected room (F04/R1) would experience an alteration in NSL of 24.2% which is considered a Minor Adverse effect. The identified room will also retain a good NSL value of 61.4%.
- ~~43.225~~13.226 Overall and based on professional judgement, the effect to daylight within the residential element of this building would be **long-term, local, adverse of minor significance**.

2 St Thomas Street – Bunch of Grapes Pub (Residential Element)

- ~~43.226~~13.227 A total of three windows serving three rooms were assessed for daylight within the 3rd floor the building. GIA were unable to obtain floor plans for this property and have therefore made reasonable assumptions as to their dimensions, which is relevant when considering the NSL methodology.
- ~~43.227~~13.228 For VSC, the three windows assessed (W1-W3/F03) would fall short of BRE Guideline criteria. Two of the windows would experience an alteration in VSC levels of 30-39.9% which is considered a Moderate Adverse effect and the one remaining window would experience an alteration of 43% VSC which is considered a Major adverse effect. All three windows will retain VSC values above 15%, against a BRE target value of 27%.
- ~~43.228~~13.229 For NSL, one of the two (50%) rooms comply with BRE Guideline criteria and are therefore considered to experience a negligible effect.

~~43.229~~13.230 The one affected room (F03/R3) would experience an alteration in NSL of 23.4% which is considered a Minor Adverse effect.

~~43.230~~13.231 Overall and based on professional judgement, the effect to daylight within the residential element of this building would be **long-term, local, adverse of minor significance**.

8 Bedale Street (Residential)

~~43.231~~13.232 A total of 10 windows serving 10 rooms were assessed for daylight within these buildings. GIA were able to obtain floor plans for this property and have incorporated them within the 3D model to allow for more accurate results.

~~43.232~~13.233 For VSC, all 10 windows assessed would fully meet BRE Guideline criteria which would represent a negligible effect.

~~43.233~~13.234 For NSL, one of the two (50%) rooms comply with BRE Guideline criteria and are therefore considered to experience a negligible effect.

~~43.234~~13.235 The one affected room (F03/R3) would experience an alteration in NSL of 28.9% which is considered a Minor Adverse effect.

~~43.235~~13.236 Overall and based on professional judgement, the effect to daylight within these buildings would be **negligible**.

22 Southwark Street (Residential)

~~43.236~~13.237 A total of 28 windows serving 24 rooms were assessed for daylight within these buildings. GIA were unable to obtain floor plans for this property and have therefore made reasonable assumptions as to their dimensions, which is relevant when considering the NSL methodology.

~~43.237~~13.238 For VSC, all 28 windows assessed would fully meet BRE Guideline criteria which would represent a negligible effect.

~~43.238~~13.239 For NSL, 23 of the 24 (96%) rooms comply with BRE Guideline criteria and are therefore considered to experience a negligible effect.

~~43.239~~13.240 The one affected room (F01/R2) would experience an alteration in NSL of 25.4% which is considered a Minor Adverse effect.

~~43.240~~13.241 Overall and based on professional judgement, the effect to daylight within these buildings would be **negligible**.

Shard Place (Residential Element)

~~43.241~~13.242 A total of ~~988~~518 windows serving ~~474~~221 rooms were assessed for daylight within ~~this part retail~~this part-residential building. Given the recent consent for this building, the floor plans for this property have been obtained from the Southwark planning portal.

~~43.242~~13.243 For VSC, ~~942~~442 of ~~988~~518 (~~85.392~~85.392%) windows assessed would meet BRE Guideline criteria which would represent a negligible effect.

~~43.243~~13.244 Of the affected windows, 26 would experience an alteration between 20-29.9% which is considered a Minor Adverse effect and 32 would experience alterations between 30-39.9% which is considered a Moderate Adverse effect. The remaining 18 windows would experience an alteration in excess of 40% which is considered a Major Adverse effect.

~~43.244~~13.245 Of the 18 major adverse impacts recorded, nine will be localised to bedrooms, which are considered to be less sensitive by virtue of their use. The remaining nine major adverse impacts

will all be recorded within LKDs (living rooms, kitchens, and dining rooms) which pass the NSL methodology, due to the presence of multiple additional windows serving the same room.

~~43.245~~**13.246** For NSL, ~~463-213~~ of ~~471-221~~ (96.38%) rooms comply with BRE Guideline criteria and are therefore considered to experience a negligible effect.

~~43.246~~**13.247** Of the affected rooms, three would experience an alteration between 20-29.9% which is considered a Minor Adverse effect. The remaining five rooms would experience an alteration in NSL between 30-39.9% which is considered a Moderate Adverse effect. It is important to note that the eight affected rooms are bedrooms which are considered to be less sensitive.

~~43.247~~**13.248** Overall, based on professional judgement, the effect to daylight within these buildings would be **long-term, local, adverse of moderate significance**.

43 Borough High Street (Residential)

~~43.248~~**13.249** A total of nine windows serving eight rooms were assessed for daylight within this residential building. GIA were able to obtain floor plans for this property and have incorporated them within the 3D model to allow for more accurate results.

~~43.249~~**13.250** For VSC, one of the nine (11%) windows assessed would meet BRE Guideline criteria which would represent a negligible effect.

~~43.250~~**13.251** The eight affected windows would experience an alteration between 30-39.9% which is considered a Moderate Adverse effect. The affected windows will retain VSC values between 11% and 20%, against a BRE target value of 27%.

~~43.251~~**13.252** For NSL, five of the eight (63%) rooms fully comply with BRE Guideline criteria which would represent a negligible effect.

~~43.252~~**13.253** The three affected rooms would experience an alteration between 20-29.9% which is considered a Minor Adverse effect. Furthermore, all three rooms will retain good NSL values above 66% in the proposed scenario.

~~43.253~~**13.254** It is important to note that this property is recessed between two buildings on either side, creating flank walls which would limit the amount of daylight available from oblique angles. Therefore, these windows rely on daylight from directly across the Site.

~~43.254~~**13.255** Overall, based on professional judgement, the effect to daylight within these buildings would be **long-term, local, adverse of moderate significance**.

Sunlight

~~43.255~~**13.256** The full sunlight assessment can be found in Appendix 13.2 of this ES and the summary results are presented in **Table 13.9**.

~~43.256~~**13.257** Of the ~~533-393~~ rooms assessed for sunlight, ~~483-345~~ (90.687.7%) would meet the BRE criteria for both total Annual and Winter PSH and are therefore considered a Negligible effect.

~~43.257~~**13.258** A total of 23 buildings are assessed in relation to sunlight. Three buildings, Chaucer House - White Hart Yard, Orchard Lisle House - Talbot Yard and Guy's Campus are located south of the site would not be affected by the Development in relation to sunlight and are therefore not assessed.

~~43.258~~**13.259** The 19 buildings highlighted in grey in **Table 13.9** experience little or no change (below 20% alteration) in sunlight levels with the completed Development in place and are therefore considered a **negligible** effect.

~~13.259~~13.260 The remaining four affected properties are discussed in detail following **Table 13.9**.

Table 13.9 Effects to APSH to Surrounding Sensitive Receptors

Address	Total No. of Rooms	No. Rooms that meet BRE criteria	Total APSH			Winter APSH		
			Below BRE Guidelines			Below BRE Guidelines		
			20-29.9% Reduction	30-39.9% Reduction	>40% Reduction	20-29.9% Reduction	30-39.9% Reduction	>40% Reduction
10-18 London Bridge Street	82	64	0	2	13	0	1	7
6 London Bridge Street	12	4	2	0	2	0	1	4
St Thomas Church	4	4	0	0	0	0	0	0
Guy's Hospital (Chapel)	3	3	0	0	0	0	0	0
Guy's Campus (Southwark Wing)	5	5	0	0	0	0	0	0
Guy's Campus (Tower Wing)	23	23	0	0	0	0	0	0
Iris Brook House Talbot Yard	18	18	0	0	0	0	0	0
Shepherds House - Talbot Yard	8	8	0	0	0	0	0	0
Chaucer House - White Hart Yard	-	-	-	-	-	-	-	-
Orchard Lisle House - Talbot Yard	-	-	-	-	-	-	-	-
63a Borough High Street	5	5	0	0	0	0	0	0
Guy's Campus	-	-	-	-	-	-	-	-
The Old Kings Head Ph	2	2	0	0	0	0	0	0

Address	Total No. of Rooms	No. Rooms that meet BRE criteria	Total APSH			Winter APSH		
			Below BRE Guidelines			Below BRE Guidelines		
			20-29.9% Reduction	30-39.9% Reduction	>40% Reduction	20-29.9% Reduction	30-39.9% Reduction	>40% Reduction
3 Kings Head Yard	1	1	0	0	0	0	0	0
57 Borough High Street	3	3	0	0	0	0	0	0
53-55 Borough High Street	4	4	0	0	0	0	0	0
51 Borough High Street	2	2	0	0	0	0	0	0
2 St Thomas Street	3	2	0	0	0	0	0	1
8 Bedale St	5	5	0	0	0	0	0	0
59-61 Borough High Street	8	8	0	0	0	0	0	0
22 Southwark St	12	12	0	0	0	0	0	0
24 Southwark St	25	25	0	0	0	0	0	0
Southwark Cathedral Annex	13	13	0	0	0	0	0	0
Southwark Cathedral	3	3	0	0	0	0	0	0
Shard Place	144 284	264 123	32	8	11	0	10	12
43 Borough High Street	8	8	0	0	0	0	0	0
Total	393 533	483 345	54	40 10	26	0	122	24

10-18 London Bridge Street (Hotel)

~~43.260~~13.261 A total of 82 hotel rooms were assessed for sunlight within this building.

~~43.261~~13.262 64 (78%) of the 82 rooms assessed would meet BRE criteria for both total and winter PSH, which is therefore considered to equate to a Negligible effect.

~~43.262~~13.263 Of the affected rooms for winter PSH, one would experience alterations between 30-39.9% which is considered a Moderate Adverse effect and seven would experience an alteration in excess of 40% which is considered a Major Adverse effect.

~~43.263~~13.264 For total APSH, two rooms would experience alterations between 30-39.9% which is considered a Moderate Adverse effect, and 13 would experience an alteration in excess of 40% which is considered a Major Adverse effect.

~~43.264~~13.265 It is important to note that the impacted hotel rooms are considered to be of transient use as these are generally occupied on a temporary basis and primarily used during night-time hours, therefore, are considered to be less sensitive.

~~43.265~~13.266 Overall, based on professional judgement and due to the temporary nature and lower sensitivity of hotel accommodations, the effect to sunlight within this building is considered to be **long term, local, adverse of moderate significance**.

6 London Bridge Street (Residential)

~~43.266~~13.267 A total of 12 rooms were assessed for sunlight within this building.

~~43.267~~13.268 Four (33%) of the 12 rooms assessed would meet BRE criteria for both total and winter PSH, which is therefore considered to equate to a Negligible effect.

~~43.268~~13.269 Of the affected rooms for winter PSH, four would experience an alteration in excess of 40% which is considered a Major Adverse effect.

~~43.269~~13.270 For APSH, two rooms would experience alterations between 20-29.9% which is considered a Minor Adverse effect, and the other two would experience an alteration in excess of 40% which is considered a Major Adverse effect.

~~43.270~~13.271 Overall, based on professional judgment, the effect to these buildings is considered to be **long-term, local, adverse of moderate significance**.

2 St Thomas Street (Residential Element)

~~43.271~~13.272 A total of three rooms were assessed for sunlight within this building.

~~43.272~~13.273 Two of the three (67%) rooms assessed would meet BRE criteria for both annual and winter PSH.

~~43.273~~13.274 The one affected room for winter PSH would experience an alteration in excess of 40% which is considered a Major Adverse effect. However, the room (F03/R3) will retain a winter PSH value of 4%, against a BRE target value of 5%.

~~43.274~~13.275 Overall, based on professional judgment, the effect to these buildings is considered to be **long-term, local, adverse of minor significance**.

Shard Place (Residential Element)

~~43.275~~13.276 A total of ~~284~~144 rooms were assessed for sunlight within this building.

~~13.276~~13.277 ~~264-123~~ of the ~~284-144~~ (~~9285.4~~%) rooms assessed would meet BRE criteria for both annual and winter PSH.

~~13.277~~13.278 Of the affected rooms for winter PSH, ~~10 rooms would experience an alteration of 30-39.9% which is considered a Moderate Adverse effect and~~ 12 rooms would experience an alteration in excess of 40% which is considered a Major Adverse effect.

~~13.278~~13.279 For total APSH, ~~three-two~~ rooms would experience alterations between 20-29.9% which is considered a Minor Adverse effect and eight would experience an alteration between 30-39.9% which is considered a Moderate Adverse effect. The remaining 11 rooms would experience an alteration in excess of 40% which is considered a Major Adverse effect.

~~13.279~~13.280 Overall, based on professional judgment, the effect to these buildings is considered to be **long-term, local, adverse of moderate significance**.

Overshadowing

~~13.280~~13.281 Full details of the Transient Overshadowing assessment can be found within **Appendix 13.3** and the results are summarised below.

~~13.284~~13.282 The commentary below should be read in conjunction with the Transient Overshadowing and Sun Hours on Ground images presented within the full assessment provided in **Appendix 13.3**.

~~13.282~~13.283 The Transient Overshadowing assessment has been used to identify any area of public or private amenity space which may be significantly affected by the Development. The relevant areas identified are also assessed in more detail with the use of the Sun Hours on Ground methodology and are discussed below.

Transient Overshadowing to Existing Sensitive Receptors

21 March (equinox)

~~13.283~~13.284 On this day, shadow would be cast from 08:00 GMT in a north-westerly direction, which would move clockwise throughout the day. From this time, shadow is cast in the direction of the Borough Market, alongside shadow from existing structures. Throughout the morning the shadow from the proposed Development would move across the Southwark Cathedral late in the morning, clearing by 13:00 GMT. Throughout the afternoon shadow is cast eastward and reach The News Building, Shard Place, St Thomas Street, The News Building Plaza and the open space in front of London Bridge station.

21st June (summer solstice)

~~13.284~~13.285 On this day, shadow would be cast from 06:00 BST in a south-westerly direction, which would move clockwise throughout the day. For a short period in the morning the shadows will reach the Borough Market. From 13:00 BST and throughout the afternoon additional shadow would be cast upon St Thomas Street and Shard Place.

21 December (winter solstice)

~~13.285~~13.286 On this day, shadow would be cast from the proposed development from 09:00 GMT in a north-westerly direction, which would move clockwise throughout the day.

~~13.286~~13.287 Given the lower position of the sun in the sky, shadows would spread beyond the vicinity of the Site and reach the Thames River and London Bridge for short period of times. Additional shadow is cast upon the Borough Market from 9:00 GMT until 10:00 GMT. At this time until 14:00 GMT

shadow from the proposed development is cast over St Thomas Street. For the rest of the day the proposed Development does not affect any other relevant amenity areas.

Conclusion

~~43.287~~**13.288** Accordingly, based on professional judgement, the effects overshadowing would be **permanent, long-term** ranging from **negligible** to **moderate adverse (significant)**. Therefore, the relevant amenity areas are assessed quantitatively within the following sun hours on ground section.

Sun Hours on Ground

Southwark Cathedral

~~43.288~~**13.289** For Southwark Cathedral, the open area of amenity sees no alterations in sun hours on ground on the 21 March and are fully in line with BRE Guidelines. The effect of overshadowing is considered **negligible**.

Guy's Hospital Courtyard

~~43.289~~**13.290** The Guy's Hospital Courtyard experience no alterations in sun exposure on the 21 March as a result of the proposed development and are fully in line with BRE Guidelines. The effect of overshadowing is considered **negligible**.

London Bridge Station Public Plaza

~~43.290~~**13.291** The London Bridge Station Public Plaza amenity area would not experience any reduction in sun hours on ground on the 21 March and the effect is therefore considered **negligible**.

The News Building Public Plaza

~~43.291~~**13.292** The News Building Public Plaza would experience a reduction of from 25% to 13%4%. Owing to the baseline levels being below BRE Guidelines recommendations, the effect is considered negligible. The area by London Bridge Station would see a A total of 58% of the area still receives at no reduction in the area which sees least 2 hours of sunlight on 21 March-. Therefore, the effect of the Proposed Development is considered **negligible**.

Communal areas within Shard Place - Ground Floor, 16th Floor and Roof Level.

~~43.292~~**13.293** The communal areas associated with Shard Place are both not affected by the Proposed Development on the 21 March and therefore the overshadowing effects are considered **negligible**.

Front Open Spaces at 9 and 20 St Thomas Street

~~43.293~~**13.294** The area to the front of 9 Thomas Street experience a reduction in sunlight with the proposed Development in place. This effect is considered to be **long-term, local, adverse of moderate significance**.

~~43.294~~**13.295** It is worth noting that the area at the front of 9 St Thomas Street is not known to be currently used as an amenity space and therefore should be considered of lower sensitivity.

~~43.295~~**13.296** The area to the front of 20 Thomas Street would experience a reduction from 100% to 68% of the area receiving at least 2 hours of sunlight on 21 March-. Given that at least half of this area still meet the BRE guideline, the effect is considered acceptable and **negligible**.

Solar Glare

~~13.296~~13.297 The full solar glare assessment is provided at **Appendix 13.4**.

~~13.297~~13.298 The assessment has been undertaken from signalised road junctions, pedestrian crossings and railway tracks near to the Site which are considered sensitive in terms of solar glare (noted by the road name reference BH_1, ST_1, etc.). The receptor locations are shown in **Figure 13.5**. A total of 26 locations have been assessed in terms of solar glare.

~~13.298~~13.299 All solar glare assessments consider a worst-case scenario, assuming clear sky conditions.

~~13.299~~13.300 In accordance with the solar glare significance criteria presented in paragraphs 13.68 - 13.73, solar reflections occurring at angles greater than 30° from the driver's line of sight will not affect the driver's responsiveness and therefore can be considered Negligible. In addition, viewpoints where the portion of the façade of the Development visible is very small and the distance is greater than 15° of a driver's line of sight are also considered Negligible. The list of the locations from where this applies, and therefore the Development is considered to have an **Negligible** effect are the 12 listed below:

- BH_1;
- BH_2;
- BH_3;
- BH_4;
- BH_5;
- BH_6;
- US;
- ST_3;
- ST_4;
- CR;
- TLB_E_1; and
- TLB_E_2

~~13.300~~13.301 The number of locations to be considered further is therefore reduced to 14 locations.

~~13.301~~13.302 All remaining 14 locations are considered to have a **long term, local, adverse effect of minor significance**. This is because solar reflections occur within 30° to 10° or between 10° to 5° of the driver's line of sight for a short period of time. In addition, the minor adverse significance is due to mitigating factors such as reflections occurring from a small section of façade, potential reflections occurring over a limited period of time, unaffected traffic signals and being able to deploy a car visor which would shield the majority of reflections. The junctions considered Minor Adverse are listed below:

- SW_1;
- SW_2;
- SW_3;
- SS;
- LB_1;
- LB_2;
- LB_3;

- ST_1;
- TLB_N_1;
- TLB_N_2;
- TLB_N_3;
- TLB_W_1;
- TLB_W_2; and
- TLB_W_3.

Light Pollution

~~43.302~~13.303 The light pollution assessments can be found in **Appendix 13.5** and is discussed in detail below.

Light Intrusion

~~43.303~~13.304 The most sensitive receptors for light intrusion are considered to be residential buildings, highlighted in the map presented in **Figure 13.6**.

~~43.304~~13.305 The residential receptors assessed due to their close proximity to the proposed Development are as follows:

- 2 St Thomas Street (Bunch of Grapes Pub);
- 9 St Thomas Street (St Thomas Church);
- 3 Kings Head Yard;
- The Old King's Head Pub (Residential element);
- 43, 51, 53-55, 57, 59-61 and 63a Borough High Street;
- Orchard Lisle House; and
- Fielden House - Shard Place.

~~43.305~~13.306 The results of the assessment indicate that pre-curfew (before 11pm), the levels of light trespass would be very limited and well within the 25 lux level suggested by the ILP for a city centre location for the residential buildings assessed.

~~43.306~~13.307 The assessment also indicates that post-curfew (after 11pm), the levels of light trespass would be below the 5 lux level suggested by the ILP for the vast majority of the assessed properties. As such, the effect of light pollution for all but one of the sensitive receptors assessed (pre and post curfew) is considered **negligible**.

~~43.307~~13.308 The exception to the above is for 9 St Thomas Street (St Thomas Church), which meets the ILP Guidance pre-curfew, but breaches post-curfew. However, the assessment uses the worst-case scenario of 500 lux. This effect is therefore considered **long term, local, adverse effect of moderate significance**.

Mitigation Measures and Likely Residual Effects

~~43.308~~13.309 Overall, likely residual effects would remain as reported above with no mitigation, with the exception of light pollution where a lower lighting output is proposed for the Development, whereby measures such as occupancy sensors would be implemented thereby reducing the post-curfew illuminance lux levels and mitigate the light pollution effect to **negligible** (not significant).

~~43.309~~13.310 As part of the design process, the massing and façade details of the Development were informed by the potential daylight and sunlight effects. However, owing to the scale of the Development in

comparison to the existing buildings, its close proximity and low existing daylight and sunlight levels, changes in conditions would be unavoidable.

~~43.340~~**13.311** **Table 13.10** summarises the likely significant effects, mitigation measures and likely residual effects identified within this chapter.

Table 13.10 Summary of Likely Significant Effects, Mitigation Measures and Likely Residual Effects

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
The Works			
Daylight, sunlight and overshadowing effects during demolition.	Temporary, beneficial effects considered likely during demolition.	None proposed	Temporary, beneficial effects considered likely during demolition.
Solar glare effects during demolition.	Temporary, beneficial effects considered likely during demolition.	None proposed	Temporary, beneficial effects considered likely during demolition.
Daylight, sunlight and overshadowing during construction.	Effects would gradually change from beneficial to those expected once the Development is complete and operational.	None proposed	Effects would gradually change from beneficial to those expected once the Development is complete and operational.
Solar glare during construction.	Effects would gradually change from beneficial to those expected once the Development is complete and operational.	None proposed	Effects would gradually change from beneficial to those expected once the Development is complete and operational.
Light pollution during demolition.	Temporary, beneficial effects considered likely during demolition.	None proposed	Temporary, beneficial effects considered likely during demolition.
Completed and Operational Development			
Daylight	Long term, local, Negligible to 8 properties, minor adverse to 9 properties, moderate adverse to 8 properties and moderate to major adverse to 1 property.	None proposed	Long term, local, Negligible to 8 properties, minor adverse to 9 properties, moderate adverse to 8 properties and moderate to major adverse to 1 property.
Sunlight	Long term, local, Negligible to 19 properties, minor	None proposed	Long term, local, Negligible to 19 properties, minor adverse

Issue	Likely Significant Effect	Mitigation Measures	Likely Residual Effect
	adverse to 1 property, moderate adverse to 3 properties.		to 1 property, moderate adverse to 3 properties.
Overshadowing	Negligible to most amenity areas. Long term, local, moderate adverse to 1 property .	None proposed	Negligible to most amenity areas. Long term, local, moderate adverse to 1 property <u>area</u> .
Solar Glare	Long term, local, Negligible to 12 locations, minor adverse to the remaining 14 locations .	None proposed	Long term, local, Negligible to 12 locations, minor adverse to the remaining 14 locations
Light Pollution	Negligible to most properties. Long term, local, moderate adverse to 1 property.	Occupancy sensors and reduced level of internal illuminance during curfew hours	Negligible to all properties.

Monitoring

~~13.311~~ 13.312 No specific daylight, sunlight, overshadowing, solar glare and light pollution monitoring has been identified.

References

- ¹ Building Research Establishment (BRE) Guidelines, 2011. 'Site Layout Planning for Daylight and Sunlight 2011', A Guide to Good Practice, Second Edition (2011).
- ² Department for Communities and Local Government [Online]. Available at: <https://www.gov.uk/topic/local-government/council-tax>.
- ³ University of Utah: 'Simple Anatomy of the Retina'. Webvision., <http://webvision.med.utah.edu/book/part-i-foundations/simple-anatomy-of-the-retina/>.
- ⁴ Robert H. Spector (1990). 'Clinical Methods: The History, Physical, and Laboratory Examinations', 3rd edition, Chapter 3 - www.ncbi.nlm.nih.gov/books/NBK220/.
- ⁵ Commission Internationale de L'Eclairage (CIE), 2002, 146:2002 & CIE 147:2002 Collection on glare, 2002.
- ⁶ Institute of Lighting Practitioners (ILP), 2020: 'The Guidance Notes for the Reduction of Obtrusive Light'.