

Bevington Bush

Daylight and Sunlight Desktop Assessment

035131

17 February 2016

Revision 01

Revision	Description	Issued by	Date	Checked
00	Issue for comment	DRK	16/02/2016	MC
01	Issue for planning	DRK	17/02/2016	MC

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Glossary

Term	Definition
Annual Probable Sunlight Hours (APSH)	The long-term average of the total number of hours during a year in which direct sunlight reaches the unobstructed ground (when clouds are taken into account)
Daylight	The visible part of global solar radiation (includes sun and sky light)
Obstruction	Anything outside a building which prevents a direct view of the sky from a given reference point
Skylight	That part of the light from the sun that reaches the earth's surface as a result of scattering in the atmosphere
Sunlight	That part of the light from the sun that reaches the earth's surface as parallel rays after selective attenuation by the atmosphere
Vertical Sky Component (VSC)	Ratio, expressed as a percentage, of that part of illuminance, at a point on a given vertical plane, that is received directly from a standard overcast sky, to illuminance on a horizontal plane due to an unobstructed hemisphere of this sky
Winter Probable Sunlight Hours (WPSH)	The probable sunlight hours between 21 September and 21 March

1 Executive summary

This report sets out the results of a desktop assessment of daylight and sunlight availability surrounding the proposed Bevington Bush development in Liverpool. The methodology adopted for the assessment is in accordance with BRE Report BR209, Site layout planning for daylight and sunlight: A guide to good practice, second edition, 2011.

BR209 sets out design guidance with the aim to provide sufficient access to light from the sky and sunlight in appropriate rooms of new and existing buildings and amenity spaces.

The design criteria described in BR209 are meant to provide guidance for designers rather than a regulatory requirement. Designers are encouraged to apply the guidance so that it is sensitive to the development being assessed. The proposed development is in a high density, urban environment and as such, numerical targets should be interpreted flexibly, as advised in BR209. Dense urban areas and city centre developments may often experience greater site constraints when compared to low-rise suburban areas, and thus a high degree of obstruction which leads to non-compliance with BRE guidance (as is the case for some receptors as outlined in this report) is often unavoidable.

In the following assessment, daylight and sunlight access to existing windows and open spaces surrounding the development Site and proposed development windows and open spaces have been qualitatively assessed against the criteria described in BR209.



Figure 1—1 Key Plan – Surrounding buildings and open space locations assessed

The findings of the assessment are summarised as follows based on the criteria identified in section 3.8:

1.1 Existing buildings and surroundings

Light from the sky – Existing buildings

Four out of six of the adjacent buildings were estimated to not be impacted by the proposed development. Of the two existing buildings that may be adversely impacted by the development the impact may be limited to the ground to second floors of the dwellings facing East. Details of the BR209 rule can be found in section 3.1.

Table 1—1 Impact of the proposed development on existing buildings skylight

Building	Observations	BR209 25° rule achieved	Estimated BR209 Impact of Proposed Development on Existing Buildings
C2	Ground, first, and second floors	NO	Major Adverse
	Third floor	YES for 7-9 storey Block C No for 15 storey Block B	Minor Adverse
C3	Ground, first, and second floors	NO	Major Adverse
	Third floor	YES for 7 storey Block A No for 15 storey Block B	Minor Adverse

Direct sunlight – Existing buildings

Moderate to Major Adverse impacts are likely to be limited to two (buildings C2 and C3) out of six existing buildings.

Direct sunlight – Existing open spaces

None of the existing open spaces were estimated to be impacted by the proposed development.

1.2 Proposed development

Light from the sky – Propose development

All of the proposed elevations facing the courtyard are expected to have adverse impacts on skylight. The extent of which was as a result of the constraints on building heights and separation. The larger than average windows could to some extent mitigate this impact.

Direct sunlight – Proposed open spaces

Of the two proposed open spaces only the courtyard was identified as having limited access to direct sunlight.

Table 1—2 Impact of development on proposed open spaces

Open space	Observation	Estimated area receiving BR209 sunlight hours	Estimated BR209 impact
4 The Courtyard	Significantly overshadowed by blocks B and C. Only expected to receive a small amount of direct sunlight	0%	Major Adverse

	through the gaps between the blocks		
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1.3 Adjoining development

Light from the sky – Adjoining development

The impact of reduction in light from the sky on the adjoining development land from the proposed development was limited to the South and South Southwest boundary of the development site.

Table 1—3 Light from sky assessment on the adjoining development

Adjoining Development	Observations	BR209 43° rule achieved	Estimated BR209 Impact of Proposed Development on Future Development
D	South and South Southwest boundary of the adjacent development site	NO	Moderate Adverse

2 Introduction

2.1 Background

This report has been prepared to support the planning application for the proposed Bevington Bush development in Liverpool.

The proposed development consists of mainly residential accommodation (C3) with ground floor communal space, an A1/A3 unit, associated access, servicing, parking, and landscaping.

The aim of the report is to present results of a qualitative desktop assessment of:

- The impact the proposed development has on daylight and sunlight access to existing adjacent buildings;
- Sunlight access to proposed and existing open spaces; and
- The impact the proposed development has on daylight access of adjoining development land.

2.2 Site

Figure 2—1 illustrates the proposed development Site boundary and immediate surrounding context.



Figure 2—1 Proposed development site location

3 Assessment Methodology

BR209 sets out sensible design guidance with the aim to provide sufficient daylight and sunlight access in appropriate rooms of new and existing buildings and open spaces.

The impact of the proposed development on daylight and sunlight access to existing windows, daylight access to adjoining development land and sunlight access on and proposed and existing open spaces were assessed in the context of BR209 guidance to estimate:

- Access to light from the sky to existing buildings and adjoining development land;
- Access to direct sunlight to existing buildings; and
- Access to direct sunlight in proposed and existing open spaces.

The proposed massing used for this assessment was the Architect's Sketchup model, which illustrates the height and footprint of the proposed development. Window locations on existing buildings were determined from photographs of the Site, however room uses could not necessarily be determined. All existing windows affected by the proposed development were qualitatively assessed against BR209 guidance. It should be noted that rooms normally considered to have a need for light from the sky are residential kitchens, living rooms and bedrooms and only residential living rooms and conservatories are considered to have a need for direct sunlight.

3.1 Light from the sky – Existing buildings

The excerpt from BR209 below summarises the methodology for assessing access to sky light for existing buildings.

"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 daylight of the existing building may be adversely affected. This will be the case if either:

- *The VSC measured at the centre of an existing window is less than 27, and less than 0.8 times its former value*
- *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."*

3.2 Light from the sky – New buildings

The excerpt from BR209 below summarises the methodology for assessing access to light from the sky for new buildings.

"Obstructions can limit access to light from the sky. This can be checked by measuring or calculating the angle of visible sky Θ , angle of obstruction or vertical sky component (VSC) at the centre of the lowest window where daylight is required. If VSC is:

- *at least 27% (Θ is greater than 65°, obstruction angle less than 25°) conventional window design will usually give reasonable results.*
- *between 15% and 27% (Θ is between 45° and 65°, obstruction angle between 25° and 45°) special measures (larger windows, changes to room layout) are usually needed to provide adequate daylight.*

- *between 5% and 15% (Θ is between 25° and 45°, obstruction angle between 45° and 65°) it is very difficult to provide adequate daylight unless very large windows are used.*
- *less than 5% (Θ less than 25°, obstruction angle more than 65°) it is often impossible to achieve reasonable daylight, even if the whole window wall is glazed."*

3.3 Direct sunlight – Existing Buildings

The excerpt from BR209 below summarises the methodology for assessing access to direct sunlight for existing buildings.

"If a living room of an existing dwelling has a main window facing within 90° of due south, and any part of a new development subtends an angle of more than 25° to the horizontal measured from the centre of the window in a vertical section perpendicular to the window in a vertical section perpendicular to the window, then the sunlighting of the existing window may be adversely affected. This will be the case if the centre of the window:

- *receives less than 25% of annual probable sunlight hours, or less than 5% of annual probable sunlight hours between 21 September and 21 March and*
- *receives less than 0.8 times its former sunlight hours during either period and*
- *has a reduction in sunlight received over the whole year greater than 4% of annual probable sunlight hours."*

3.4 Direct sunlight – New Buildings

The excerpt from BR209 below summarises the methodology for assessing access to direct sunlight for new buildings.

"In general a dwelling, or non-domestic building which has a particular requirement for sunlight, will appear reasonably sunlit provided:

- *at least one main window wall faces within 90° of due south and*
- *the centre of at least one window to a main living room can receive 25% of annual probable sunlight hours, including at least 5% of annual probable sunlight hours in the winter months between 21 September and 21 March.*

Where groups of dwellings are planned, site layout design should aim to maximise the number of dwellings with a main living room that meets the above recommendations."

3.5 Direct sunlight – Open spaces

The excerpt from BR209 below summarises the methodology for assessing access to direct sunlight for gardens and open spaces.

"It is recommended that for it to appear adequately sunlit throughout the year, at least half of a garden or amenity area should receive at least two hours of sunlight on 21 March. If as a result of a new development an existing garden or amenity area does not meet the above, and the area which can receive two hours of sun on 21 March is less than 0.8 times its former value, then the loss of sunlight is likely to be noticeable. If a detailed calculation cannot be carried out, it is recommended that the centre of the area should receive at least two hours of sunlight on 21 March."

3.6 Light from the sky – Adjoining development land

The excerpt from BR209 below summarises the methodology for assessing access to sky light on adjacent development land.

“In broad general terms, a development site next to a proposed new building will retain the potential for good diffuse daylighting provided that on each common boundary:

- *(a) No new building, measured in a vertical section perpendicular to the boundary, from a point 1.6m above ground level, subtends an angle of more than 43° to the horizontal or*
- *(b) If (a) is not satisfied, then all points 1.6m above the boundary line are within 4m (measured along the boundary) of a point which has a VSC (looking towards the new building(s) of 17% or more.”*

3.7 Identification of assessment locations

This desktop study completes an initial assessment of daylight and sunlight access to existing buildings by identifying facade locations which were deemed to meet the guidance of BR209 by having an obstruction angle less than 25° (see Figure 3—1 for an illustration of this principle). Only façade locations on existing buildings having an obstruction angle greater than 25° will need to be assessed in detail as part of a quantitative study should it be necessary to determine their Vertical Sky Component. Of these locations only those facing within 90° of south will need to be assessed in detail as part of a quantitative study should it be necessary to determine the Annual Probable Sunlight Hours (APSH) and Winter Probable Sunlight Hours (WPSH).

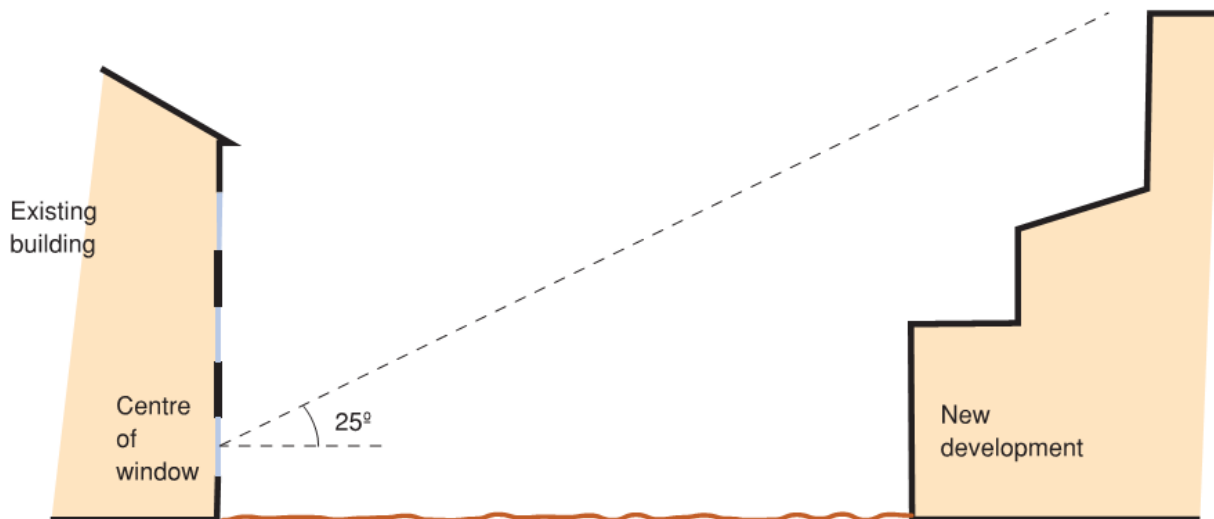


Figure 3—1 BR209 obstruction angle corresponding to a VSC of 27% at adjacent windows

This desktop study also completes an initial assessment of daylight access to adjoining development land by checking the obstruction angle at the north boundary of the Site, as described in section 3.6 (see Figure 3—2 for an illustration of this principle). Where the obstruction angle produced by the proposed development exceeds 43°, an assessment of the VSC at the boundary will need to be carried out as part of a quantitative study should it be necessary.

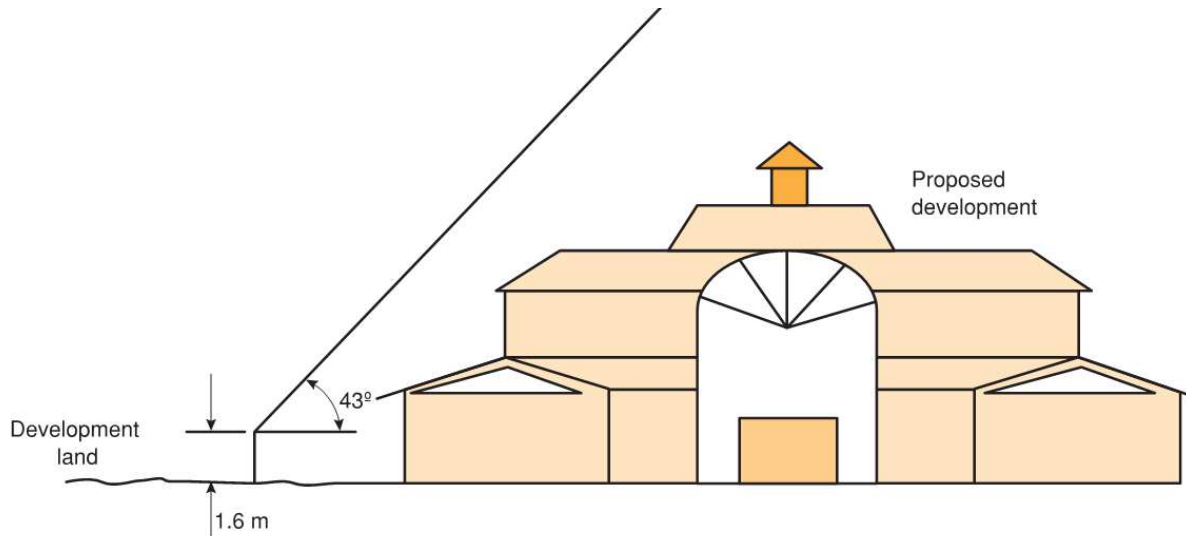


Figure 3—2 BR209 obstruction angle corresponding to a VSC of 17% at a Site boundary

3.8 Impact assessment of the proposed development on its surroundings

BR209 Appendix I describes the impact of a development on its surroundings as 'Beneficial', 'Negligible' or 'Adverse' in terms of the change in the amount of skylight and sunlight reaching an existing building where it is required, or the amount of sunlight reaching an open space. It also states that, 'The assessment of impact will depend on a combination of factors, and there is no simple rule of thumb that can be applied', however guidance is provided on quantifying the significance of relative adverse changes as minor, moderate or major, as follows:

3.8.1 Impact 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.

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".

The impact is considered to be negligible if the guidance of BR209 is met. The further categories include major, moderate and minor impact significance as defined in Table 3—1.

An element of professional judgement is required to establish threshold values for the level of impact. Based on relevant numerical values provided in BR209 and industry-accepted typical values, the significance criteria adopted for this assessment are detailed in Table 3—1. Where an impact is identified as 'Beneficial', the same significance criteria are adopted as recommended in BR209 Appendix I.

Table 3—1 Impact assessment significance criteria

Significance	Criterion: change in Vertical Sky Component or Probable Sunlight Hours
Negligible	$\leq 20\%$
Minor	$> 20\%$ and $\leq 30\%$
Moderate	$> 30\%$ and $\leq 40\%$
Major	$> 40\%$

4 Desktop assessment

4.1 Existing surroundings

Assessment results are presented below for daylight and sunlight availability surrounding the proposed development. The keyplan in Figure 4—1 identifies the following surrounding buildings.

- The existing St Johns ambulance station (building A)
- The Reach Tower (building B) an 8 storey residential building
- Atlantic Point Village (buildings C1 to C4) consisting of a number of 4 storey residential buildings
- A substation (building E) – not assessed

Existing and proposed open spaces assessed for sunlight access were also identified.

- Existing open space (location 1)
- Existing open space (location 2)



Figure 4—1 Key Plan – Surrounding buildings and open space locations assessed

4.1.1 Light from the sky – Existing buildings

The impact of reduction in light from the sky on the surrounding buildings from the proposed development was estimated by identifying which buildings were partially obstructed by the proposed development based on the BR209 25° rule.

Table 4—1 below summarised the expected impact of the proposed development on the existing buildings. All windows of buildings C2 and C3 were shown as likely to not meet the BR209 criteria. If deemed important a quantitative study to calculate the VSCs for the pre and post development condition would be required to fine tune the impact.

Table 4—1 Impact of the proposed development on existing buildings skylight

Building	Observations	BR209 25° rule achieved	Estimated BR209 Impact of Proposed Development on Existing Buildings
A	Building has a low requirement for skylight as it is not residential	NO	Negligible
B	Building has other access to skylight	YES	Negligible
C1	No windows on Gable end facing the development	YES	Negligible
C2	Ground, first, and second floors	NO	Major Adverse
	Third floor	YES for 7-9 storey Block C No for 15 storey Block B	Minor Adverse
C3	Ground, first, and second floors	NO	Major Adverse
	Third floor	YES for 7 storey Block A No for 15 storey Block B	Minor Adverse
C4	Buildings glazed elevation does not face the proposed development	YES	Negligible
E	Building has no requirement for skylight	YES	Negligible

4.1.2 Direct sunlight – Existing buildings

Moderate to Major Adverse impacts are likely to be limited to buildings C2 and C3 as they are to the West of the proposed development.

4.1.3 Direct sunlight – Existing open spaces

Sunlight access has been estimated for existing open spaces (areas 1 and 2 shown in Figure 4—1) adjacent to the proposed development that would become part of a linear park along Scotland Road.

To meet BR209 guidance on sunlight access to existing open spaces, at least half of an open space should receive at least two hours of sunlight on 21 March and should not be reduced to less than 0.8 times its former value with the proposed development in place.

As the open spaces are to the South and East of the proposed development it is expected that the current good access to sunlight will not be reduced significantly and is expected to meet the BR209 guidance. The impact of the proposed development on these existing open spaces has been deemed negligible.

4.2 Proposed development

Assessment results are presented below for daylight and sunlight availability within the proposed development. The keyplan in Figure 4—2 identifies the following surrounding buildings.

- Block A
- Block B
- Block C

Proposed open spaces assessed for sunlight access were also identified.

- Proposed external seating area (location 3)
- Residents only recreation area (location 4)

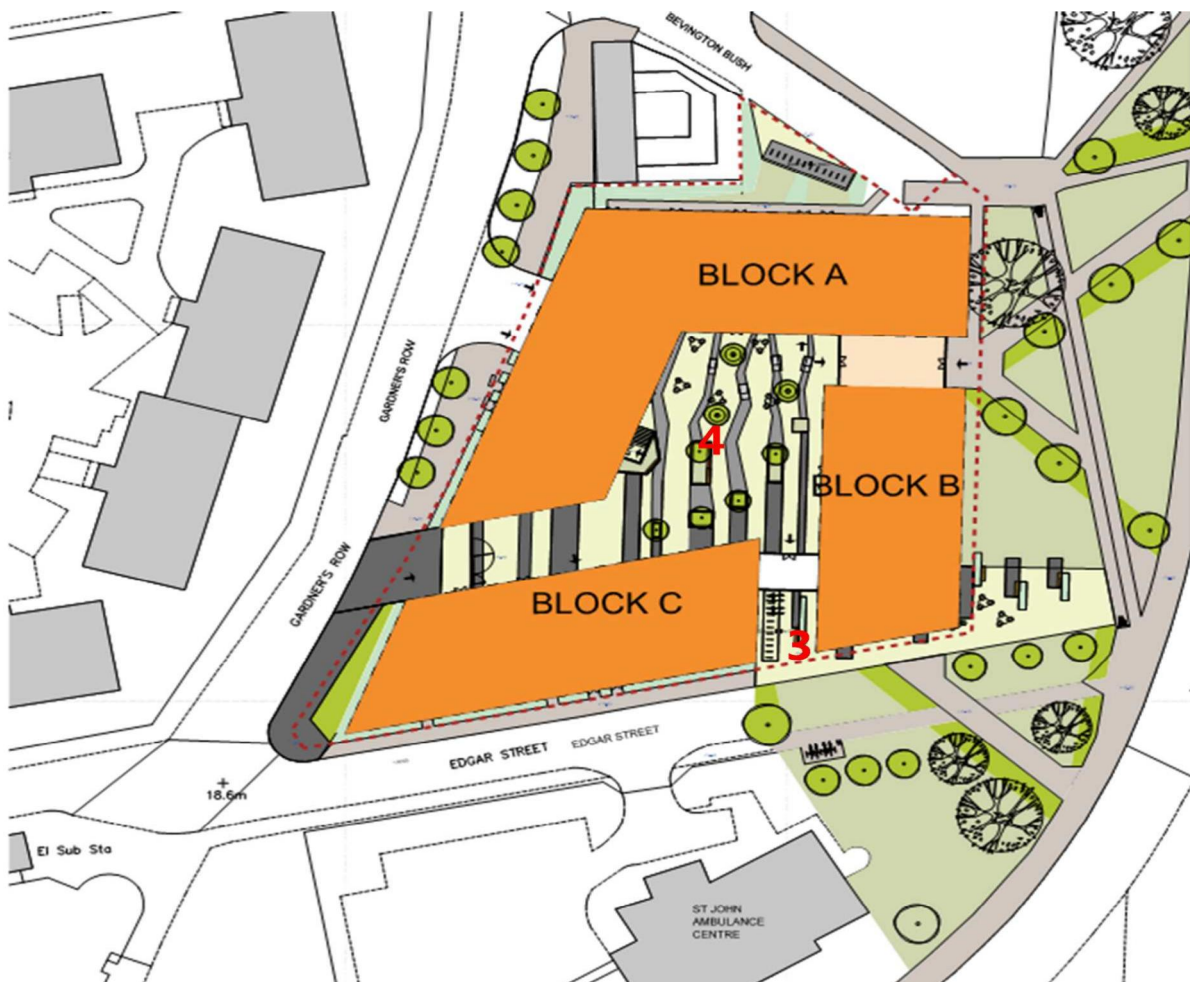


Figure 4—2 Proposed development keyplan

4.2.1 Light from the sky – Propose development

The impact of reduction in light from the sky on the proposed development from self shading was estimated by identifying which buildings were partially obstructed by the proposed development based on the obstruction angles.

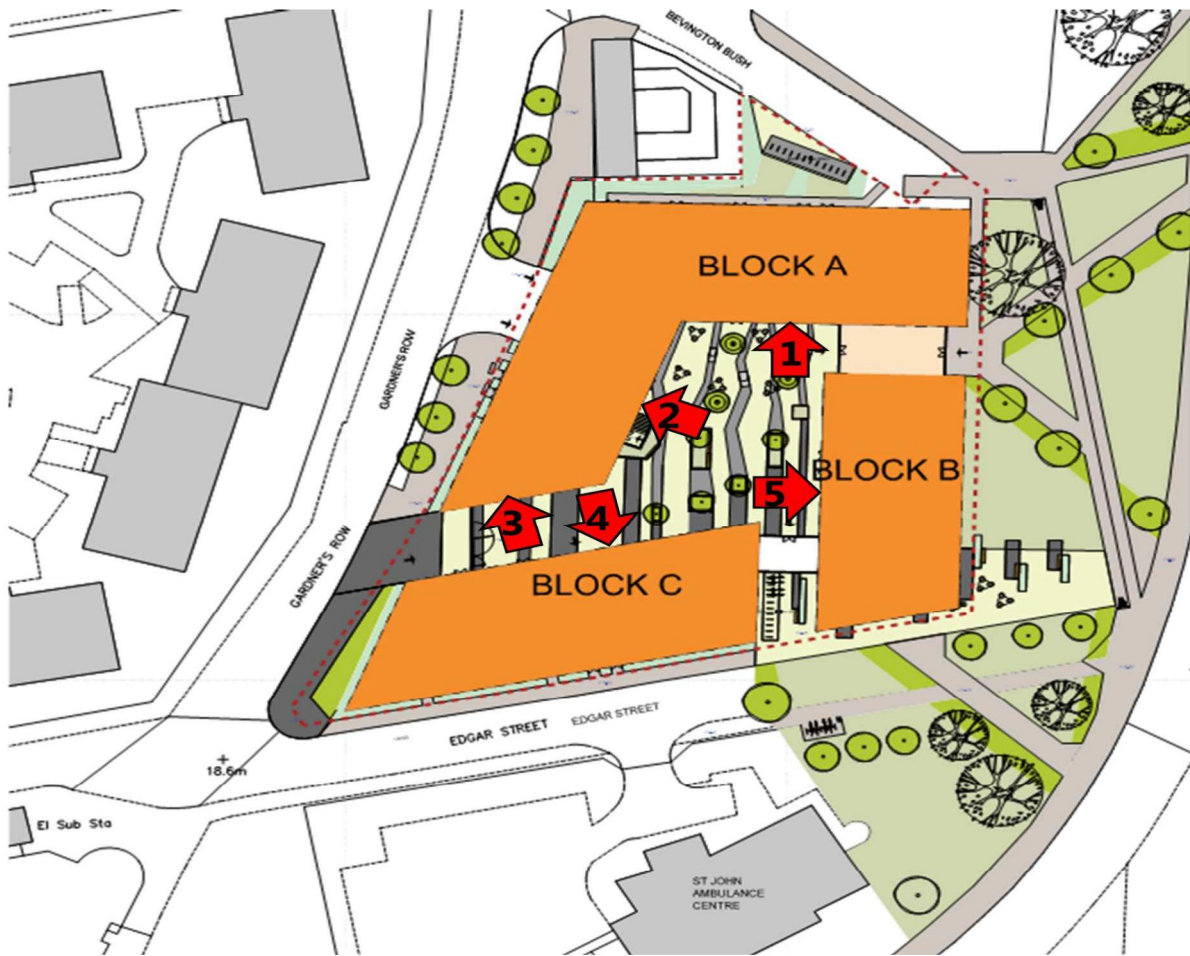


Figure 4—3 Proposed development self shading elevations keyplan

The following Figure 4—4 to Figure 4—8 illustrate the impact of self shading from the development. Areas highlighted in red indicate significant reduction in skylight. The areas highlighted yellow indicate areas where larger windows could result in a VSD that achieves the BR209 criteria and reduce the extent adverse impact.



Figure 4—4 Elevation 1 Block A facing South



Figure 4—5 Elevation 2 Block A facing East



Figure 4—6 Elevation 3 Block A facing South



Figure 4—7 Elevation 4 Block C facing North



Figure 4—8 Elevation 5 Block B facing West

Table 4—2 below summarises the expected impact of the proposed development on itself. If deemed important a quantitative study to calculate the VSCs for development condition would be required to fine tune the impact.

Table 4—2 Impact of skylight on the proposed development

Building	Location	Observations	Estimated BR209 Impact of Proposed Development on Existing Buildings
A	Elevation 1	Most living spaces obstructed by the taller Block C. Larger than average windows could reduce the impact	Moderate to Major Adverse
	Elevation 2	All living spaces obstructed by the taller block B	Major Adverse
	Elevation 3	Some living spaces obstructed by the taller Block C. Dual aspect lounges reduce the extent of impact.	Moderate Adverse
B	Elevation 5	Only lower floors obstructed by Block A. Larger than average windows could reduce the impact	Minor Adverse to Negligible
C	Elevation 4	Only lower floors obstructed by Block A. Larger than average windows could reduce the impact	Minor to Moderate Adverse

4.2.2 Direct sunlight – Proposed open spaces

Sunlight access has been estimated for public realm amenity areas within the proposed development, (area 3 and 4 shown in Figure 4—2). The courtyard (area 4) will be substantially shaded by the proposed development and Figure 4—9 estimates the extent of exposure to sunlight.



Figure 4—9 Estimated sunlight access to the courtyard

Table 4—3 summarises the impact of the development on the proposed open spaces.

Table 4—3 Impact of development on proposed open spaces

Open space	Observation	Estimated area receiving BR209 sunlight hours	Estimated BR209 impact
3 Communal breakout	Unshaded south facing aspect	100%	Negligible
4 The Courtyard	Significantly overshadowed by blocks B and C. Only expected to receive a small amount of direct sunlight through the gaps between the blocks	0%	Major Adverse

4.3 Adjoining development land

The adjoining development land is located to the North of the proposed site (development site D).



Figure 4—10 Keyplan showing adjacent development land

4.3.1 Light from the sky

Light from the sky – Adjoining development

The impact of reduction in light from the sky on the adjoining development land from the proposed development was limited to the South and South Southwest boundary of the development site.

Table 4—4 Light from sky assessment on the adjoining development

Adjoining Development	Observations	BR209 43° rule achieved	Estimated BR209 Impact of Proposed Development on Future Development
D	South and South Southwest boundary of the adjacent development site	NO	Moderate Adverse
	Southeast and Southwest to West boundary of the adjacent development site	YES	Negligible

5 Conclusions

5.1 Existing buildings and surroundings

Light from the sky – Existing buildings

Four out of six of the adjacent buildings were estimated to not be impacted by the proposed development. Of the two existing buildings that may be adversely impacted by the development the impact may be limited to the ground to second floors of the dwellings facing East.

Table 5—1 Impact of the proposed development on existing buildings skylight

Building	Observations	BR209 25° rule achieved	Estimated BR209 Impact of Proposed Development on Existing Buildings
C2	Ground, first, and second floors	NO	Major Adverse
	Third floor	YES for 7-9 storey Block C No for 15 storey Block B	Minor Adverse
C3	Ground, first, and second floors	NO	Major Adverse
	Third floor	YES for 7 storey Block A No for 15 storey Block B	Minor Adverse

Direct sunlight – Existing buildings

Moderate to Major Adverse impacts are likely to be limited to two out of six existing buildings.

Direct sunlight – Existing open spaces

None of the existing open spaces were estimated to be impacted by the proposed development.

5.2 Proposed development

Light from the sky – Propose development

All of the proposed elevations facing the courtyard are expected to have adverse impacts on skylight. The extent of which was as a result of the constraints on building heights and separation. The larger than average windows could to some extent mitigate this impact.

Direct sunlight – Proposed open spaces

Of the two proposed open spaces only the courtyard was identified as having limited access to direct sunlight.

Table 5—2 direct sunlight impact on the proposed open spaces

Open space	Observation	Estimated area receiving BR209 sunlight hours	Estimated BR209 impact
4 The Courtyard	Significantly overshadowed by blocks B and C. Only expected to receive a small amount of direct sunlight through the gaps between the blocks	0%	Major Adverse

5.3 Adjoining development

Light from the sky – Adjoining development

The impact of reduction in light from the sky on the adjoining development land from the proposed development was limited to the South and South Southwest boundary of the development site.

Table 5—3 Light from sky assessment on the adjoining development

Adjoining Development	Observations	BR209 43° rule achieved	Estimated BR209 Impact of Proposed Development on Future Development
D	South and South Southwest boundary of the adjacent development site	NO	Moderate Adverse

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