Figure 9: Detailed Proposals (Phase A) with Existing Surrounding Buildings (Configuration 2, Board 2) – View in the Wind Tunnel (from the south)

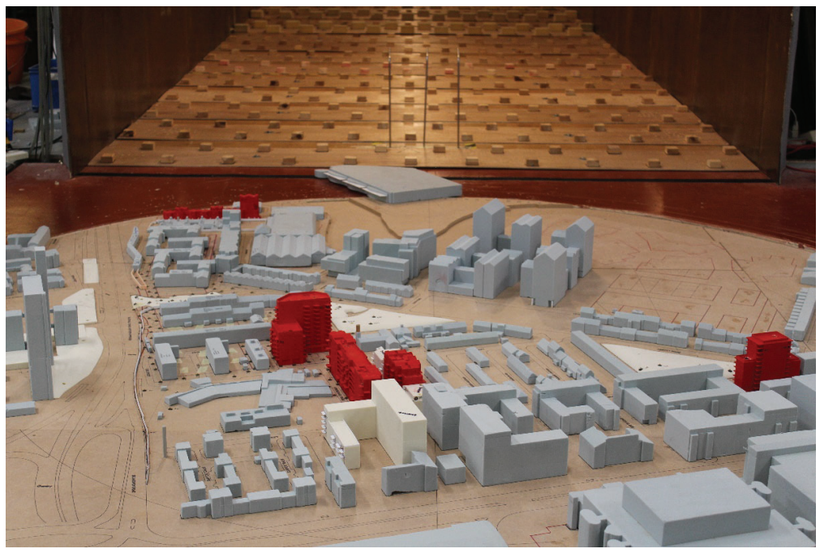

Figure 10: Detailed Proposals (Phase A) with Existing Surrounding Buildings (Configuration 2, Board 2) – View in the Wind Tunnel (from the south)

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Figure 11: Proposed Development (Outline Proposals plus Detailed Proposals) with Existing Surrounding Buildings (Configuration 3, Board 1) – View in the Wind Tunnel (from the south)

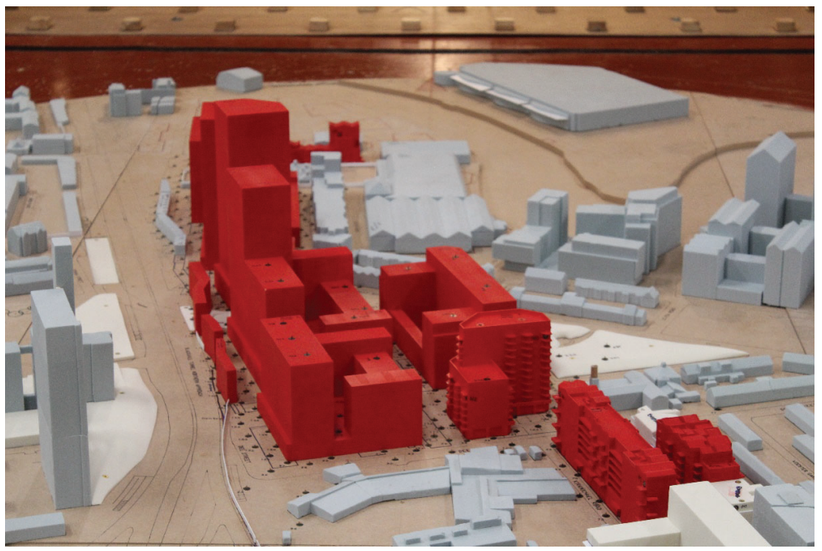

Figure 12: Proposed Development (Outline Proposals plus Detailed Proposals) with Existing Surrounding Buildings (Configuration 3, Board 1) – View in the Wind Tunnel (from the south)

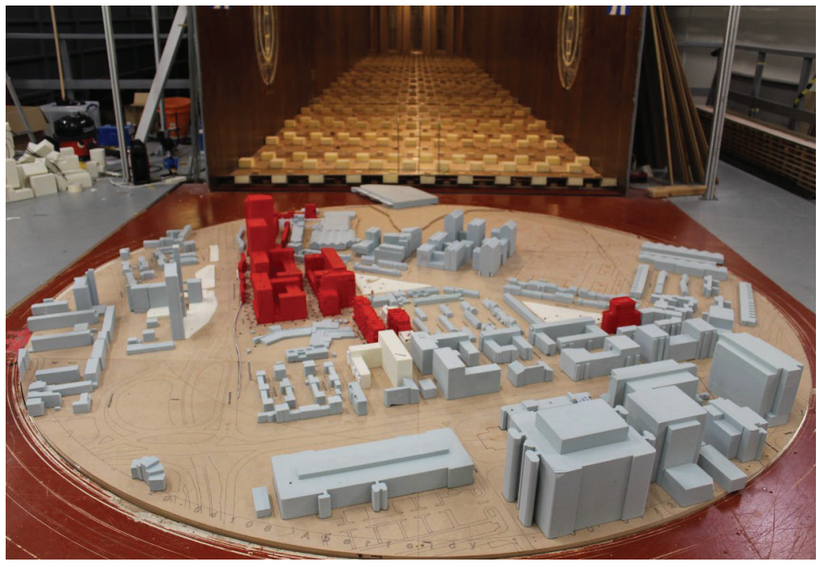

Figure 13: Proposed Development (Outline Proposals plus Detailed Proposals) with Existing Surrounding Buildings (Configuration 3, Board 2) – View in the Wind Tunnel (from the south)

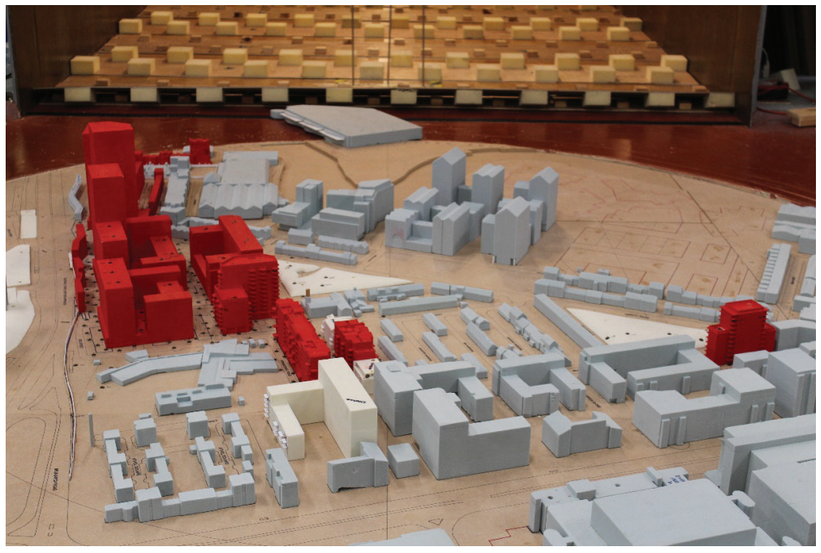

Figure 14: Proposed Development (Outline Proposals plus Detailed Proposals) with Existing Surrounding Buildings (Configuration 3, Board 2) – View in the Wind Tunnel (from the south)

Figure 15: Proposed Development (Illustrative Scheme) and Phase A with Existing Surrounding Buildings (Configuration 4, Board 1) – View in the Wind Tunnel (from the north)

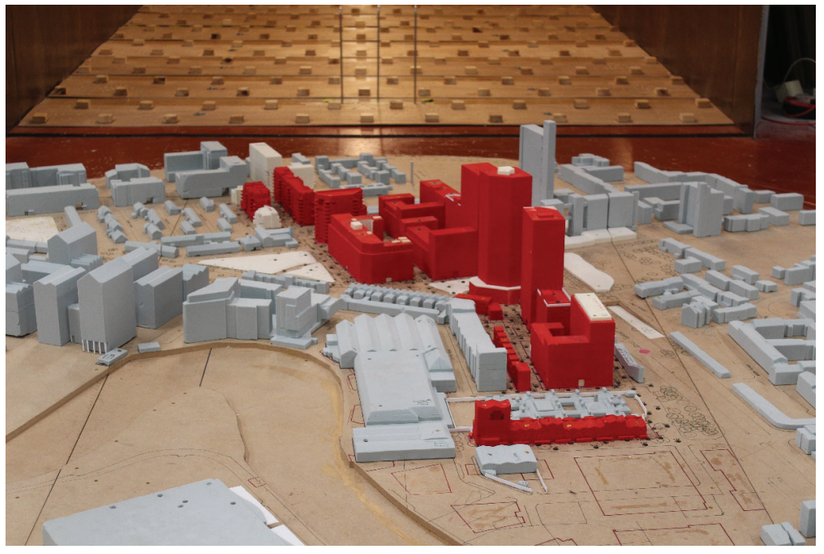

Figure 16: Proposed Development (Illustrative Scheme) and Phase A with Existing Surrounding Buildings (Configuration 4, Board 1) – View in the Wind Tunnel (from the north)

Figure 17: Proposed Development (Illustrative Scheme) and Phase A with Existing Surrounding Buildings, Proposed Landscaping and Wind Mitigation Measures (Configuration 5, Board 1) – View in the Wind Tunnel (from the north)

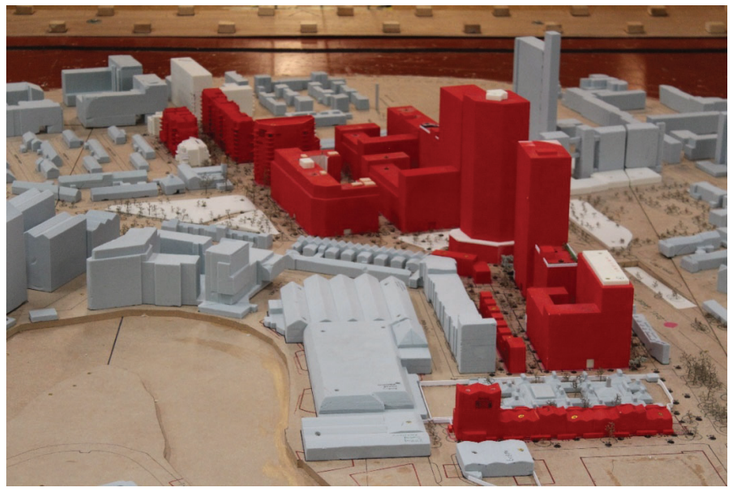

Figure 18: Proposed Development (Illustrative Scheme) and Phase A with Existing Surrounding Buildings, Proposed Landscaping and Wind Mitigation Measures (Configuration 5, Board 1) – View in the Wind Tunnel (from the north)

Figure 19: Existing Site with Cumulative Surrounding Buildings (Configuration 6, Board 1) – View in the Wind Tunnel (from the south)

Figure 20: Existing Site with Cumulative Surrounding Buildings (Configuration 6, Board 1) – View in the Wind Tunnel (from the south)

Figure 21: Existing Site with Cumulative Surrounding Buildings (Configuration 6, Board 2) – View in the Wind Tunnel (from the south)

Figure 22: Existing Site with Cumulative Surrounding Buildings (Configuration 6, Board 2) – View in the Wind Tunnel (from the south)

Figure 23: Detailed Proposals (Phase A) with Cumulative Surrounding Buildings (Configuration 7, Board 1) – View in the Wind Tunnel (from the south)

Figure 24: Detailed Proposals (Phase A) with Cumulative Surrounding Buildings (Configuration 7, Board 1) – View in the Wind Tunnel (from the south)

Figure 25: Detailed Proposals (Phase A) with Cumulative Surrounding Buildings (Configuration 7, Board 2) – View in the Wind Tunnel (from the south)

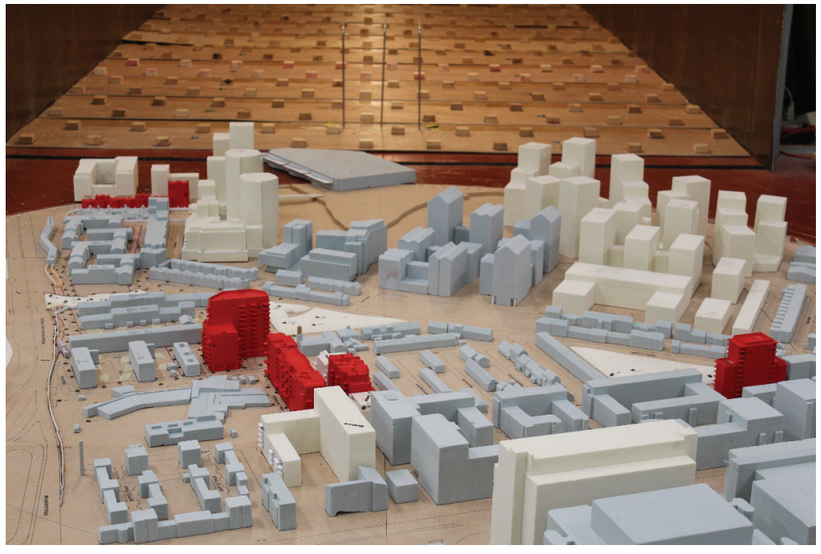

Figure 26: Detailed Proposals (Phase A) with Cumulative Surrounding Buildings (Configuration 7, Board 2) – View in the Wind Tunnel (from the south)

Figure 27: Proposed Development (Outline Proposals plus Detailed Proposals) with Cumulative Surrounding Buildings (Configuration 8, Board 1) – View in the Wind Tunnel (from the south)

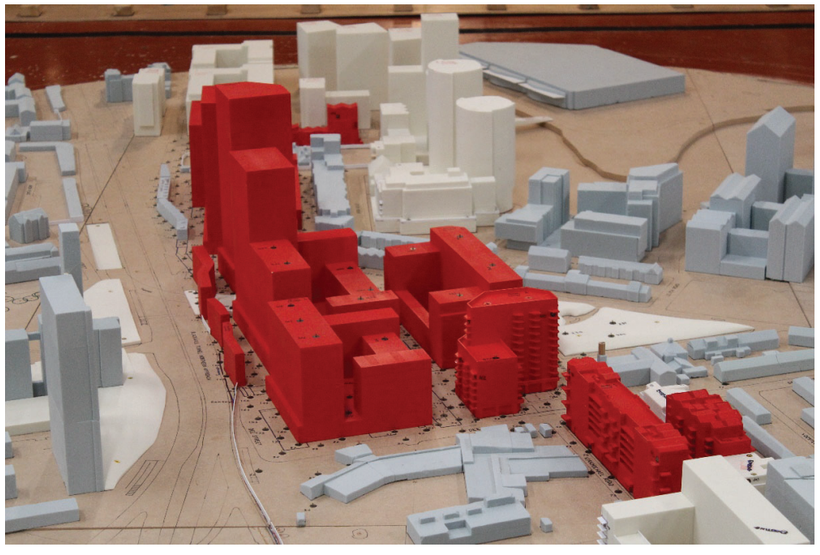

Figure 28: Proposed Development (Outline Proposals plus Detailed Proposals) with Cumulative Surrounding Buildings (Configuration 8, Board 1) – View in the Wind Tunnel (from the south)

Figure 29: Proposed Development (Outline Proposals plus Detailed Proposals) with Cumulative Surrounding Buildings (Configuration 8, Board 2) – View in the Wind Tunnel (from the south)

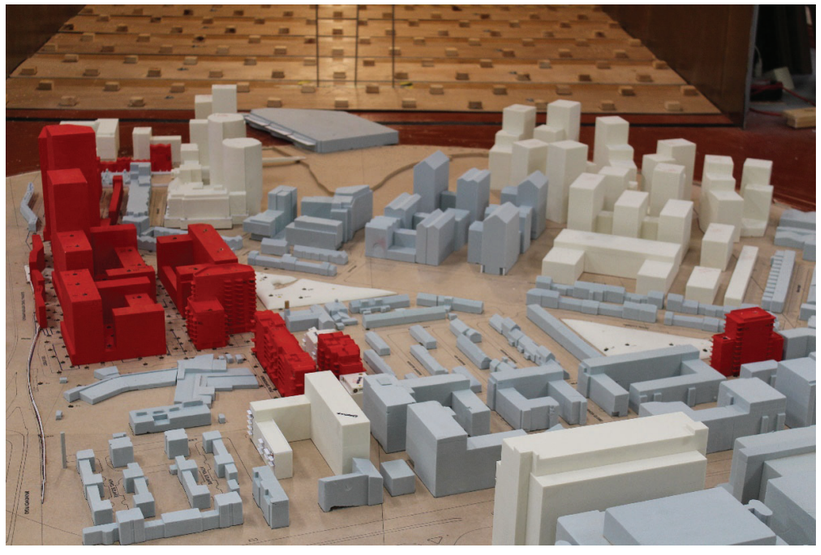

Figure 30: Proposed Development (Outline Proposals plus Detailed Proposals) with Cumulative Surrounding Buildings (Configuration 8, Board 2) – View in the Wind Tunnel (from the south)

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Figure 31: Proposed Development (Illustrative Scheme) and Phase A with Cumulative Surrounding Buildings (Configuration 9, Board 1) – View in the Wind Tunnel (from the north)

Figure 32: Proposed Development (Illustrative Scheme) and Phase A with Cumulative Surrounding Buildings (Configuration 9, Board 1) – View in the Wind Tunnel (from the north)

Figure 33: Proposed Development (Illustrative Scheme) and Phase A with Cumulative Surrounding Buildings, Proposed Landscaping and Wind Mitigation Measures (Configuration 10, Board 1) – View in the Wind Tunnel (from the south)

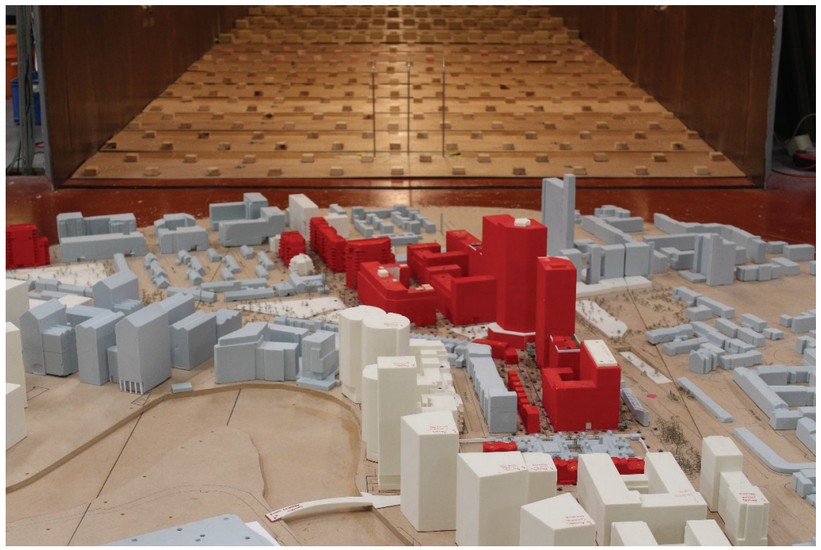

Figure 34: Proposed Development (Illustrative Scheme) and Phase A with Cumulative Surrounding Buildings, Proposed Landscaping and Wind Mitigation Measures (Configuration 10, Board 1) – View in the Wind Tunnel (from the south)

APPENDIX B

APPENDIX B: LANDSCAPING SCHEME

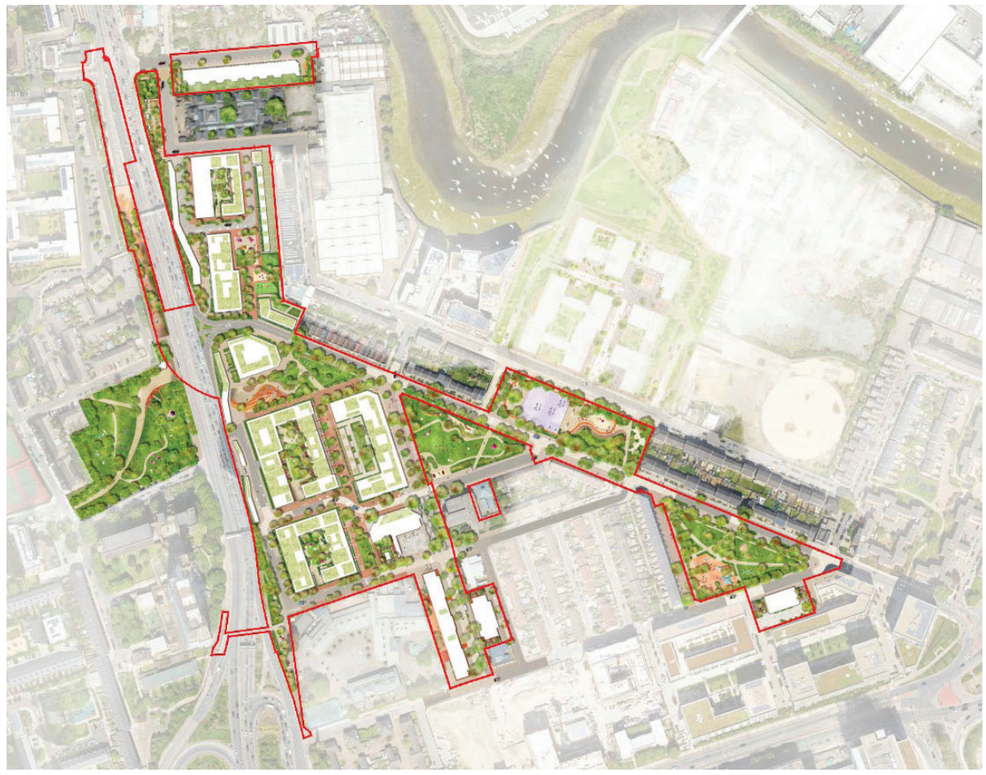

Figure 35: Proposed Landscaping Scheme (Ref. AVL-LDA-SBX-XX-XX-DR-L-0004.pdf received on 05/10/2021)

APPENDIX C

APPENDIX C: WIND MITIGATION MARK-UP

Figure 36: **Wind Mitigation Mark-up**

Appendix: Daylight, Sunlight, Overshadowing, Light Pollution and Solar Glare

Appendix: Daylight, Sunlight, Overshadowing, Light Pollution and Solar Glare

Annex 1

Planning Policy

Legislation and Planning Policy Context

1.1 The following sections of this ES Chapter annex provide a review of relevant legislation, guidance and national, regional and local planning policy in terms of daylight, sunlight and overshadowing.

National Legislation

1.2 There is no relevant legislation for daylight, sunlight and overshadowing.

National Planning Policy

National Planning Policy Framework (2021)

1.3 The National Planning Policy Framework[1], updated in July 2021, stipulates that:

> *"… planning policies and decisions should ensure that developments … create places that are safe, inclusive and accessible and which promote health and well-being, with a high standard of amenity for existing and future users."*

1.4 Paragraph 123, part C stipulates that:

> *"…local planning authorities should refuse applications which they consider fail to make efficient use of land, taking into account the policies in this Framework. In this context, when considering applications for housing, authorities should take a flexible approach in applying policies or guidance relating to daylight and sunlight, where they would otherwise inhibit making efficient use of a site (as long as the resulting scheme would provide acceptable living standards)."*

National Planning Practice Guidance (MHCLG) November 2016 (Last updated July 2021)

1.5 The National Planning Practice Guidance (NPPG) was last updated in July 2019. This document states that the form and scale of tall buildings should be designed with respect to daylight and sunlight patterns and whether the development would have an unreasonable impact on the daylight and sunlight levels enjoyed by neighbouring occupiers.

Regional Planning Policy

The New London Plan (March 2021)[2]

1.7 Policy D6 Housing Quality and Standards states that:

- 'The design of development should provide sufficient daylight and sunlight to new and surrounding housing that is appropriate for its context, whilst avoiding overheating, minimising overshadowing and maximising the usability of outside amenity space.'

1.8 Policy D9 Tall buildings states that:

- '...development proposals should address the following impacts: ...buildings should not cause adverse reflected glare [and] ...buildings should be designed to minimise light pollution from internal and external lighting." It continues that "wind, daylight, sunlight penetration and temperature conditions around the building(s) and neighbourhood must be carefully considered and not compromise comfort and the enjoyment of open spaces, including water spaces, around the building.'

[1] Department for Communities and Local Government (DCLG), National Planning Policy Framework, 2012.
[2] Greater London Authority (GLA), 2021; The New London Plan, 2021.

The Mayor's Housing Supplementary Planning Guidance (SPG) (March 2016)

1.9 The SPG[3] draws on the London Plan, primarily policy 7.6Bd, and provides further guidance on standards to daylight, and overshadowing. The guidance states that:

> *"…an appropriate degree of flexibility needs to be applied when using BRE guidelines to assess the daylight and sunlight impacts of new development on surrounding properties, as well as within new developments themselves… Guidelines should be applied sensitively to higher density development…where BRE advice suggests considering the use of alternative targets' taking in to account the 'local circumstances; the need to optimise housing capacity; and scope for character and form of an area to change over time."*

1.10 Standard 32 states that:

> *"All homes should provide for direct sunlight to enter at least one habitable room for part of the day. Living areas and kitchen dining spaces should preferably receive direct sunlight."*

1.11 It is also states that:

> *"Natural light is also vital to a sense of wellbeing in the home, and this may be restricted in densely developed parts of the city". The Mayor seeks to encourage housing that provides comfortable and enjoyable places of retreat and privacy" and factors to be considered include daylight and sunlight."*

Local Planning Policy

London Borough Of Tower Hamlets Local Plan 2031: Managing Growth and Sharing Benefits (January 2020)

1.12 The recently adopted local plan provides spatial policies, development management policies and site allocations to guide and manage development in the borough. The policy document states that *"a sunlight and daylight assessment must accompany all major planning applications and/or smaller schemes where adverse effects on daylight and sunlight levels are anticipated."*

1.13 Policy S.DH1 notes *that "development is required to meet the highest standards of design, layout and construction which respects and positively responds to its context, townscape, landscape and public realm at different spatial scales".* In order to achieve this, developments must:

> *"use design and construction techniques to ensure that the development does not result in unacceptably harmful impacts arising from overheating, wind, air pollution, light pollution and noise pollution and the loss of sunlight and daylight."*

1.14 Additionally, Policy D.DH8 states that development is required to protect and where possible enhance amenity in order to:

> *"ensure adequate levels of daylight and sunlight for new residential developments, including amenity spaces within the development.*
>
> *not result in an unacceptable material deterioration of the sunlight and daylight conditions of surrounding development and not resulting in an unacceptable level of overshadowing to surrounding open space and private outdoor space, and*
>
> *not create unacceptable levels of artificial light, odour, noise, fume or dust pollution during the construction and life of the development."*

[3] GLA, 2016, Housing Supplementary Guidance, 2016.

London Borough Of Tower Hamlets Tall Buildings Study Draft Report (July 2017)

Tall Building Design

1.15 As with any other development, the London Plan and the borough's design policies apply in guiding an appropriate and high quality design response. However, tall building developments should bring forward an exceptionally well considered urban design response and due to its wider visibility and prominence the architectural quality of a tall building needs specific attention. This must consider in particular:

> *"The design to minimise impacts on microclimate including wind, overshadowing and daylighting, solar glare and light pollution."*

Impact On The Local Environment Impact On Microclimate

1.16 Tall buildings, due to their size and their significant extension above the typical height in an area, will have significantly greater impacts on the local microclimate than other ordinary building types. The following micro-climatic impacts will need particular attention:

- *"Overshadowing and Day Lighting*
- *Solar Glare and Light Pollution"*

Other Relevant Policy, Standards and Guidance

Historic England Guidance on Tall Buildings – Historic England Advice Note 4 (2015)

1.17 Paragraph 4.10 of the Historic England Advice Note 4 recommends that the following should be addressed in relation to tall buildings:

> *"consideration of the impact on the local environment, including microclimate, overshadowing, night-time appearance, vehicle movements and the environment and amenity of those in the vicinity of the building".*

Building Research Establishment (BRE) Guidelines: Site Layout Planning for Daylight and Sunlight 2011, A Guide to Good Practice, Second Edition (2011)

1.18 The Building Research Establishment (BRE) Guidelines '*Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice 2011, 2nd edition'* (released October 2011)[5] ('BRE Guidelines') provides advice on site layout planning to achieve good sunlighting and daylighting within buildings, and in the open spaces between them. The BRE Guidelines are intended for use by building designers, developers, consultants and Local Planning Authorities (LPAs). The advice presented in the BRE Guidelines is not mandatory and should not be used as an instrument of planning policy, the Guidelines state:

> *"This guide is a comprehensive revision of the 1991 edition of Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice. It is purely advisory and the numerical target values within it may be varied to meet the needs of the development and its location."*

1.19 The BRE Guidelines also state:

> *"The advice given here is not mandatory and the guide should not be seen as an instrument of planning policy; its aim is to help rather than constrain the designer. In special circumstances the developer or planning authority may wish to use different target values… in an area with modern high-rise buildings, a higher degree of obstruction maybe unavoidable if new developments are to match the height and proportions of existing building" (para.1.6).*

1.20 In addition, the BRE Guidelines state:

> *"it is intended to be read in conjunction with the interior daylighting recommendations in the British Standard 8206-2 Code of practice for daylighting, and in the CIBSE publication Lighting guide: daylighting and window design" (para. 1.3).*

[4] Building Research Establishment (BRE) Guidelines: Site Layout Planning for Daylight and Sunlight 2011, A Guide to Good Practice, Second Edition, 2011

“Daylighting gives to a building a unique variety and interest. An interior which looks gloomy, or which does not have a view to the outside when this could reasonably be expected, will be considered unsatisfactory by its users.”

1.21 *The CIE 146:2002 Collection on glare[5] states:*

"Disability glare is glare that impairs vision (CIE, 1987). It is caused by scattering of light inside the eye [...]. The veiling luminance of scattered light will have a significant effect on visibility when intense light sources are present in the peripheral visual field and the contrast of objects to be seen is low."

"Disability glare is most often of importance at night when contrast sensitivity is low and there may well be one or more bright light sources near to the line of sight, such as car headlights, streetlights or floodlights. But even in daylight conditions disability glare may be of practical significance: think of traffic lights when the sun is close to them, or the difficulty viewing paintings hanging next to windows."

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[5] *International Commission on Illumination (CIE) CIE Collection on Glare (CIE 146:2002)*

Appendix: Daylight, Sunlight, Overshadowing, Light Pollution and Solar Glare

Annex 2

Methodology and Baseline

Methodology

Approach for Daylight, Sunlight, Overshadowing and Light Pollution Assessments

The technical analyses carried out to inform the assessments have been undertaken by creating a digital three dimensional (3D) model of the existing site and Proposed Development, based on measured survey data.

Daylight

Vertical Sky Component

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".*

The 3D model uses Waldram Diagrams 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 the existing and proposed buildings, and thus calculate the sun hours on ground in each scenario.

Only those surrounding properties which have windows facing towards the application site were included in the assessment. If a nearby property has no windows facing the application site, these properties would not be affected by the Proposed Development in terms of light.

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.

The maximum VSC value is almost 40% 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*
> - *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."*

No Sky Line

The BRE Guidelines state that where room layouts are known, the effect on the daylight distribution can be calculated by plotting the NSL. In terms of the surrounding receptors, it has not been possible to obtain room layouts for all of the properties and therefore layouts have been assumed where information is not available.

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.

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.

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 will 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.

In relation to deep rooms lit by windows on one side, the BRE Guidelines state (para. 2.2.10):

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

Average Daylight Factor

The BRE Guidelines state the following in Appendix C:

"If a predominantly day lit appearance is required, then ADF should be 5% or more if there is no supplementary electric lighting, or 2% or more if supplementary electric lighting is provided. There are additional recommendations for dwellings of 2% for kitchens, 1.5% for living rooms and 1% for bedrooms. These additional recommendations are minimum values of Average Daylight Factor, and should be attained even if a predominantly day lit appearance is not achievable."

This method of assessment takes into account the total glazed area to the room, the visible light transmittance of the glazing proposed, the total area of the room surfaces including ceilings and floors, and the internal average reflectance for the room being assessed. The method also takes into account the VSC and the quantum of reflected light.

This is, therefore, a significantly more detailed method of assessment than the VSC method.

The BRE Guidelines state that this method of assessment for daylight should be applied to new developments rather than existing neighbouring buildings, unless the internal subdivision of the properties is known; whereby the ADF may be used to inform the light potential.

The ADF gives a more detailed assessment of the daylight within a room and takes into account the highest number of factors in establishing a quantitative output.

Sunlight

Annual Probable Sunlight Hours

APSH is measured using a sun indicator containing 100 spots, each representing 1% of APSH. Therefore, where no obstruction exists the total annual probable sunlight hours would amount to 1486 hours and therefore each spot equates to 14.86 hours of the total annual sunlight hours.

The number of spots is calculated for the baseline and Proposed Development 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 window assessed.

The BRE Guidelines note 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."; and

"…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".

In relation to existing surrounding receptors, the BRE Guidelines state 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 (21st September to 21st 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%.

It is often not possible to determine the room uses within each of the neighbouring properties, nor is it clear which windows should be considered as the 'main windows'. Therefore, regardless of use, all the rooms with windows facing the site and within 90° of due south have been considered in the assessment.

Summary of Criteria for Daylight and Sunlight

The following table provides a summary of the criteria set out within the BRE Guidelines for daylight and sunlight.

Table 9.1 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 is former value.
NSL	A room may be adversely affected if the daylight distribution (NSL) is reduced beyond 0.8 times its existing area.
ADF	Bedroom 1%, Living room 1.5% and kitchen 2%.
APSH	A window may be adversely affected if a point at the centre of the window received for the whole year, less than 25% of the APSH including at least 5% of the APSH during the winter months (21st September to 21st March) and 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%.

Transient Overshadowing

Where a Proposed Development includes tall buildings, these may affect the sunlight availability to gardens or open spaces in close proximity to the site. Owing to the southerly location of the sun path, only amenity areas located within 90° of due north of the Proposed Development have the potential to be affected by overshadowing from tall buildings and therefore taken into consideration in this assessment.

The 2011 BRE guidelines suggest plotting a series of shadow plans illustrating the location of shadows cast from those buildings at different times of the day and period of the year to assess the potential overshadowing effects. To this end, the overshadowing plots are mapped for the three key dates listed below:

- 21st March (Spring Equinox);
- 21 st June (Summer Solstice); and
- 21 st December (Winter Solstice).

The 21st September (Autumn Equinox) is not assessed owing to the identical solar altitude and therefore equivalent outcomes of overshadowing to those presented for 21 st March.

For each of these dates, the overshadowing is calculated at hourly intervals throughout daylight hours from sunrise to sunset. On 21st December, the sun is at its lowest altitude consequently creating long shadows to be cast and represents the worst-case scenario in terms of overshadowing.

The analysis described above varies according to different latitudes. The Site is located within London, which is at a latitude of 51.5° north.