gia
CHARTERED SURVEYORS

DAYLIGHT & SUNLIGHT

DAYLIGHT POTENTIAL AND OVERSHADOWING ASSESSMENT

Murphy's Yard, Camden

28 May 2021

GIA No: **17352**

PROJECT DATA:

Client	**Folgate Estates**
Architect	**Studio Egret West**
Project Title	**Murphy's Yard, Camden**
Project Number	**17352**

REPORT DATA:

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GIA Department	**Daylight & Sunlight**
Dated	**28 May 2021**

Prepared by	**MM**
Checked by	**PCA**
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3D models	**VERTEX**
OS Data	**FIND Maps**

Map data

CONTENTS

1 EXECUTIVE SUMMARY

The purpose of this report is to ascertain the daylight potential for the proposed residential buildings within the Murphy's Yard illustrative masterplan and the sunlight potential for the proposed open spaces.

Daylight assessments for Vertical Sky Component (VSC) have been undertaken on all façades where residential accommodation is proposed. An overshadowing analysis has also been undertaken for the proposed open spaces within the scheme.

Overall, the results of the daylight assessments show that the proposed residential blocks have very good daylight potential across the masterplan. Daylight levels are generally higher where the proposed blocks face the railway and low-rise existing buildings, where there are sufficiently spaced apart and typically on upper floors. Mid-range VSC levels (12-18%) are typically seen in the inner facades of the proposed urban blocks and where buildings are closer to each other. Low daylight levels are seen in very few limited areas, typically on the lowest floors and in inset portions of the façades which would be best suited for non-habitable rooms. Further details can be found in section 5.1.

The above will be considered throughout the detailed design stage, and any Reserved Matters Application will be accompanied by a report discussing this work and the levels of light within each room in detail.

The overshadowing analysis shows that all proposed public open spaces within the masterplan meet or exceeds the recommendations by BRE of at least two hours of sunlight on 21st March, and will also be well sunlit throughout the year. Similarly, all proposed communal open spaces will far exceed BRE's recommendations and will be sunlit throughout the year. The indicative private open spaces in block P would not meet BRE's recommendation on 21st March, however these will be well sunlit from April to August and minor massing adjustments in the future detailed design could improve the levels of sunlight in March significantly. Further details can be found in section 5.2.

Overall, the proposed masterplan has the potential to provide excellent daylight and sunlight amenity to future residents and users. Future Reserved Matters Applications will be accompanied by detailed daylight and sunlight reports discussing the work undertaken throughout the detailed design stage and the corresponding final levels of daylight and sunlight within each relevant habitable room.

2 INTRODUCTION

GIA have been instructed to provide a report upon the daylight and sunlight potential of the proposed accommodation and open space within the Murphy's Yard masterplan prepared by Studio Egret West.

GIA were specifically instructed to carry out the following:

- To prepare a 3D computer model of the masterplan's surrounding context, including consented schemes within the area;
- To prepare the architects' 3D computer model for technical assessments;
- Carry out a daylight assessment for the proposed residential blocks using the methodology set out in the BRE guidance for Vertical Sky Component;
- Carry out overshadowing assessments for the proposed open spaces using the methodology set out in the BRE guidance for sunlight on ground; and
- Prepare a report setting out the results of the assessments.

3 BRE GUIDELINES

The Building Research Establishment (BRE) have set out in their handbook 'Site Layout Planning for Daylight and Sunlight a Guide to Good Practice (2011)', guidelines and methodology for the measurement and assessment of daylight and sunlight within proposed buildings.

This document states that it is also intended to be used in conjunction with the interior daylight recommendations found within the British Standard BS8206-2:2008 and The Applications Manual on Window Design of the Chartered Institution of Building Services Engineers (CIBSE).

The guide also provides advice on site layout planning to determine the quality of daylight and sunlight within open spaces between buildings.

It is important to note, however, that this document is a guide and states that its aim *"is to help rather than constrain the designer"*.

The document provides advice, but also clearly states that it *"is not mandatory and this document should not be seen as an instrument of planning policy."* The report also acknowledges in its introduction that *"in special circumstances the developer or planning authority may wish to use different target values. For example, in a historic city centre a higher degree of obstruction may be unavoidable if new developments are to match the height and proportions of existing buildings."*

It is an inevitable consequence of the built up urban environment that daylight and sunlight will be more limited in these areas. It is well acknowledged that in such situations there may be many other conflicting and potentially more important planning and urban design matters to consider other than just the provision of ideal levels of daylight and sunlight.

3.1 DAYLIGHT

The BRE set out various methods for assessing the daylight within a proposed building within section 2.1 and Appendix C of the handbook. These are summarised below.

Vertical Sky Component (VSC)

This method of assessment can be undertaken using a skylight indicator or a Waldram diagram. It measures from a single point, at the centre of the window (if known at the early design stage), the quantum of sky visible taking into account all external obstructions. Whilst these obstructions can be either other buildings or the general landscape, trees are usually ignored unless they form a continuous or dense belt of obstruction.

The VSC method is a useful 'rule of thumb' but has some significant limitations in determining the true quality of daylight within a proposed building. It does not take into account the size of the window, any reflected light off external obstructions, any reflected light within the room, or the use to which that room is put. Appendix C of the guide goes into more detail on these matters and sets forward alternative methods for assessment to overcome these limitations.

Appendix C of the BRE guide: Interior Daylighting Recommendations, states:

"The British Standard for daylighting, and the CIBSE Applications manual: window design, contain advice and guidance on interior daylighting. This guide to good practice is intended to be used in conjunction with them, and its guidance is intended to fit in with their recommendations.

For skylight, the British Standard and the CIBSE manual put forward three main criteria, based on the average daylight factor, room depth, and the position of the no skyline."

These assessments are set out below.

Average Daylight Factor (ADF)

"If a predominantly daylit appearance is required, then DF 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 last are minimum values of Average Daylight Factor, and should be attained even if a predominantly daylit appearance is not required."

This method of assessment takes into account the total glazed area to the room, the transmittance quality 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 Vertical Sky Component and the quantum of reflected light off external surfaces.

This is, therefore, a significantly more detailed method of assessment than the Vertical Sky Component method set out above.

Room Depth Criterion (RDC)

Where it has access to daylight from windows in one wall only, the depth of a room can become a factor in determining the quantity of light within it. The BRE guidance provides a simple method for examining the ratio of room depth to window area. However, whilst it does take into account internal surface reflections, this method also has significant limitations in that it does not take into account any obstructions outside the window and therefore draws no input from the quantity of light entering the room.

No Sky Line (NSL)

This third method of assessment is a simple test to establish where within the proposed room the sky will be visible through the windows, taking into account external obstructions. The assessment is undertaken at working plane height (850mm above floor level) and the method of calculation is set out in Appendix D of the BRE handbook.

Appendix C of the BRE handbook states *"if a significant area of the working plane lies beyond the no skyline (i.e., it receives no direct skylight), then the distribution of daylight in the room will look poor and supplementary electric lighting will be required."* To guarantee a satisfactory daylight uniformity, the area which does not receive direct skylight should not exceed 20% of the floor area, as quantified in the BS 8206 Part2 2008.

Summary

The Average Daylight Factor 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.

However, the conclusion of Appendix C of the BRE guide states:

"All three of the criteria need to be satisfied if the whole of the room is to look adequately daylit. Even if the amount of daylight in a room (given by the Average Daylight Factor) is sufficient, the overall daylight appearance will be impaired if its distribution is poor."

In most urban areas it is important to recognise that the distribution of daylight within a room may be difficult to achieve, given the built up nature of the environment. Consequently, most local authorities seek to ensure that there is sufficient daylight within the room as determined by the Average Daylight Factor calculation. However, the additional recommendations of the BRE and British Standard for residential accommodation, set out above, ought not to be overlooked.

3.2 OVERSHADOWING

The BRE guidance in respect of overshadowing of amenity spaces is set out in section 3.3 of the handbook. Here it states as follows:

"Sunlight in the spaces between buildings has an important impact on the overall appearance and ambiance of a development. It is valuable for a number of reasons:

- *To provide attractive sunlit views (all year)*
- *To make outdoor activities, like sitting out and children's play more pleasant (mainly during the warmer months)*
- *To encourage plant growth (mainly in spring and summer)*
- *To dry out the ground, reducing moss and slime (mainly during the colder months)*
- *To melt frost, ice and snow (in winter)*
- *To dry clothes (all year)"*

Again, it must be acknowledged that in urban areas the availability of sunlight on the ground is a factor which is significantly controlled by the existing urban fabric around the site in question and so may have very little to do with the form of the development itself. Likewise there may be many other urban design, planning and site constraints which determine and run contrary to the best form, siting and location of a proposed development in terms of availability of sun on the ground.

The summary of section 3.3 of the guide states as follows:

"3. 3 .17 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 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.

3.3 FURTHER RELEVANT INFORMATION

Further information can be found in The Daylight in Urban Areas Design Guide (Energy Saving Trust CE257, 2007) which provides the following recommendation with regards to VSC levels in urban areas:

"If 'theta' (Visible sky angle) is greater than 65° (obstruction angle less than 25° or VSC at least 27 percent) conventional window design will usually give reasonable results.

If 'theta' is between 45° and 65° (obstruction angle between 25° and 45°, VSC between 15 and 27 percent), special measures such as larger windows and changes to room layout are usually needed to provide adequate daylight.

If 'theta' is between 25° and 45° (obstruction angle between 45° and 65°, VSC from 5 to 15 percent), it is very difficult to provide adequate daylight unless very large windows are used.

If 'theta' is less than 25° (obstruction angle more than 65°, VSC less than 5 percent) it is often impossible to achieve reasonable daylight, even if the whole window wall is glazed."

4 METHODOLOGY

In order to undertake the daylight and overshadowing assessments set out in the later pages, we have prepared a three dimensional computer model and used specialist lighting simulation software.

This report accompanies the outline planning application for the residential blocks within the proposed masterplan, for which detail design will be developed and submitted as part of future Reserved Matters Applications.

The assessments included in this report are based on the Illustrative masterplan provided by Studio Egret West, which represents a more realistic scenario for internal amenity than the parameter schemes. Whilst the detailed design may vary from the illustrative masterplan, this would be later covered within the relevant reserved matters application when full detailed daylight assessments would be undertaken

The three-dimensional representation of the proposed scheme has been placed in the context of its surrounding buildings which have been modelled from survey information, photogrammetry, OS and site photographs. This allows for a precise model, which in turn ensures that analysis accurately represents the amount of daylight and sunlight available to the building facades and external spaces, considering all of the surrounding obstructions and orientation.

The façades of each residential building have been panelled with 1m-wide panels, the centre point of each has then been technically assessed. This allows to ascertain the levels of light across every façade at all possible floor levels and to highlight pinch-points within the massing where care ought to be taken in future detailed design.

Daylight

Daylight tests are carried out under an overcast consition, meaning that the orientation of the blocks is not relevant.

Vertical Sky Component (VSC) measures the quantum of daylight reaching the façade as a result of external obstructions: the lesser the obstructions, the higher the VSC and the potential for good daylight within the proposed accommodation.

The results for the portions of the façades serving residential accommodation, are presented in false-colour diagrams in shades of:

- Blue, representing low daylight potential, i.e. VSC values between 0% and 5%;
- Red, representing lower-medium daylight potential, i.e. VSC values between 5% and 15%;
- Orange, representing upper-medium daylight potential, i.e. VSC values between 15% and 27%;
- Yellow, representing high daylight potential, i.e. VSC values above 27%.

Cores, circulation areas and utility spaces have been excluded from the calculations where known.

Overshadowing

The overshadowing test has been undertaken for the proposed open space at the equinox (21st March) as recommended by the BRE, and in all summer months, when outdoor spaces are most likely to be enjoyed. The results are presented on a two-colour diagram showing the compliance rate on 21st March, and on a false colour scale depicting the sunlight exposure on these dates.

5 CONCLUSIONS

5.1 CONCLUSIONS ON DAYLIGHT

The results of the assessments show that 67% of all the façades will see VSC levels of 27% and above, whilst a further 26% of all the tested panels seeing VSC levels between 15% and 27%. The remaining 7% of the facade will see VSC levels lower than 15%, of which only 0.5% are below 5% VSC.

Daylight levels are generally higher where the proposed blocks face the railway and low-rise existing buildings, where there are sufficiently spaced apart and typically on upper floors. Mid-range VSC levels (12-18%) are typically seen in the inner facades of the proposed urban blocks and where buildings are closer to each other. Low daylight levels are seen in very few limited areas, typically on the lowest floors and in inset portions of the façades which would be best suited for non-habitable rooms.

Overall, the great majority of the scheme will benefit from good daylight potential on the façades, providing good freedom of design for the internal layouts and façades in future Reserved Matters Applications.

5.2 CONCLUSIONS ON OVERSHADOWING

The BRE guidance advises that for an open space to appear adequately sunlit throughout the year, at least half of its area should receive two or more hours of sunlight on 21st March.

The overshadowing assessments are presented on pages 26 to 30 of this report.

The overshadowing analysis shows that all proposed public open spaces within the masterplan meet or exceeds the recommendations by BRE of at least two hours of sunlight on 21st March, and will also be well sunlit throughout the year. Similarly, all proposed communal open spaces will far exceed BRE's recommendations and will be sunlit throughout the year.

The indicative private open spaces in block P would not meet BRE's recommendation on 21st March, however these will be well sunlit from April to August and minor massing adjustments in the future detailed design could improve the levels of sunlight in March significantly.

In conclusion, the scheme offers excellent sunlight amenity overall.

6 SITE OVERVIEW

Illustrative residential buildings

Outline commercial buildings

Fig. 01: Top view

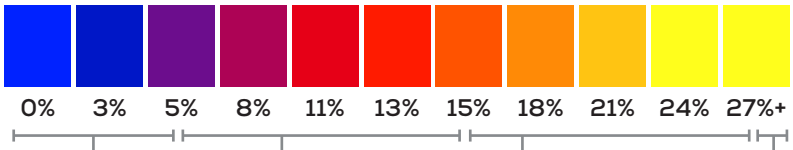
Fig. 02: Perspective view

7 DAYLIGHT POTENTIAL ASSESSMENTS

Fig. 03: Daylight Potential on Site

DAYLIGHTING
VERTICAL SKY COMPONENT (VSC)

DAYLIGHTING
VERTICAL SKY COMPONENT (VSC)



Blues (levels of VSC at 0%-5%)

It is mostly impossible to get acceptable levels of daylight behind these areas of the façade.

It is in these areas where the massing ought to be revisited so as to allow for greater sky visibility. Otherwise, it is in these areas that cores or retail/ commercial elements ought to be located.

If this is not possible, no living rooms ought to be positioned in these areas and only bedrooms with maximised glass could receive adequate daylight.

No rooms behind recessed balconies or below pop-out balconies will see any meaningful daylight.

Yellow (levels of VSC at 27% or above)

Greater design freedom but low levels of daylight ingress can still be seen.

In particular, care ought to be taken when designing recessed balconies. A deep living/kitchen/dining room behind a recessed balcony is unlikely to work in any situation.

Bolt-on balconies in these areas can normally allow the windows below to receive adequate daylight but matters can be improved through staggering the balconies up the building.

Reds (levels of VSC at 5%-15%)

It is very difficult to get good levels of daylight within these areas of the scheme. It is possible but requires very large windows and no further obstruction of the sky (such as that caused by balconies). Room depths also need to be minimised.

No rooms behind recessed balconies or below pop-out balconies are likely to see good levels of daylight.

Oranges (levels of VSC at 15%-27%)

Design with care in order to achieve good levels of daylight.

Balconies will need to be situated so as not to further reduce the levels of daylight seen by the windows below. Windows will need to be generally larger than normal and room depths ought to be minimised where possible.

Behind recessed balconies and below pop-out balconies, only bedrooms with maximised windows are likely to achieve the recommended levels of daylight.

We would generally discourage the use of recessed balconies in these areas.

Blocks M & O - DAYLIGHT POTENTIAL

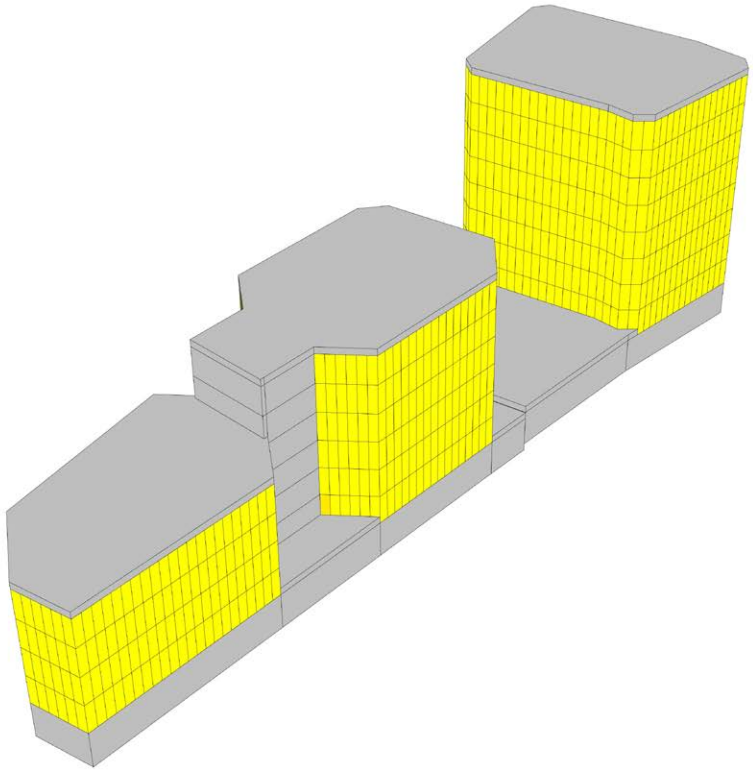


Fig. 04: VSC Diagram

DAYLIGHTING
VERTICAL SKY COMPONENT (VSC)

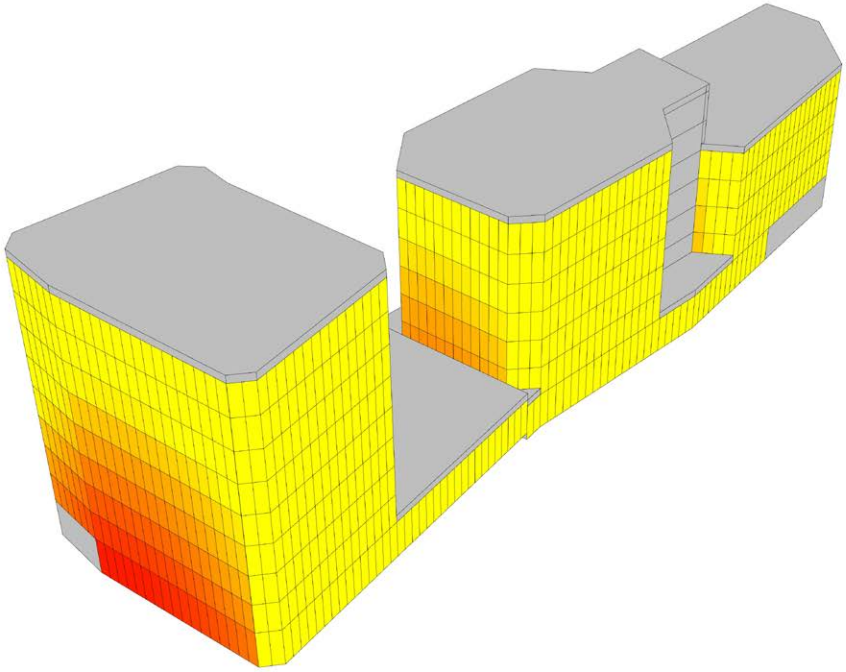
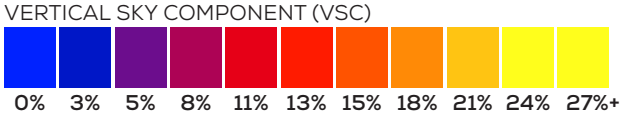


Fig. 05: VSC Diagram

DAYLIGHTING
VERTICAL SKY COMPONENT (VSC)



Block L - DAYLIGHT POTENTIAL

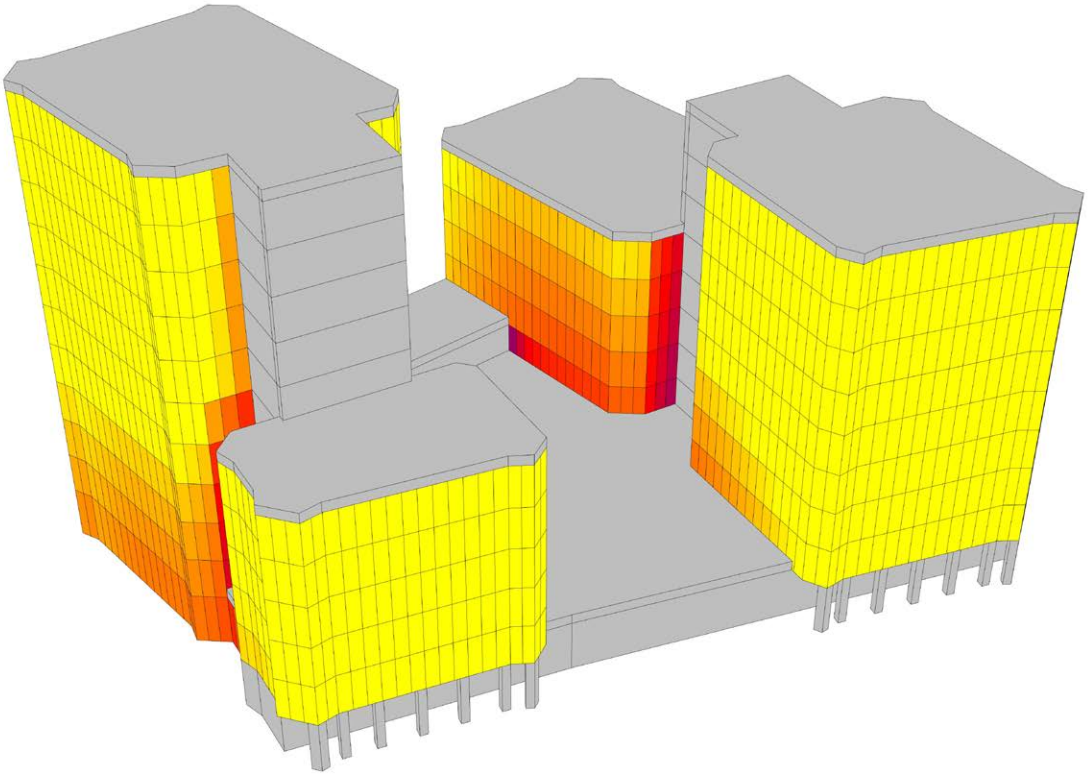


Fig. 06: VSC Diagram

DAYLIGHTING
VERTICAL SKY COMPONENT (VSC)

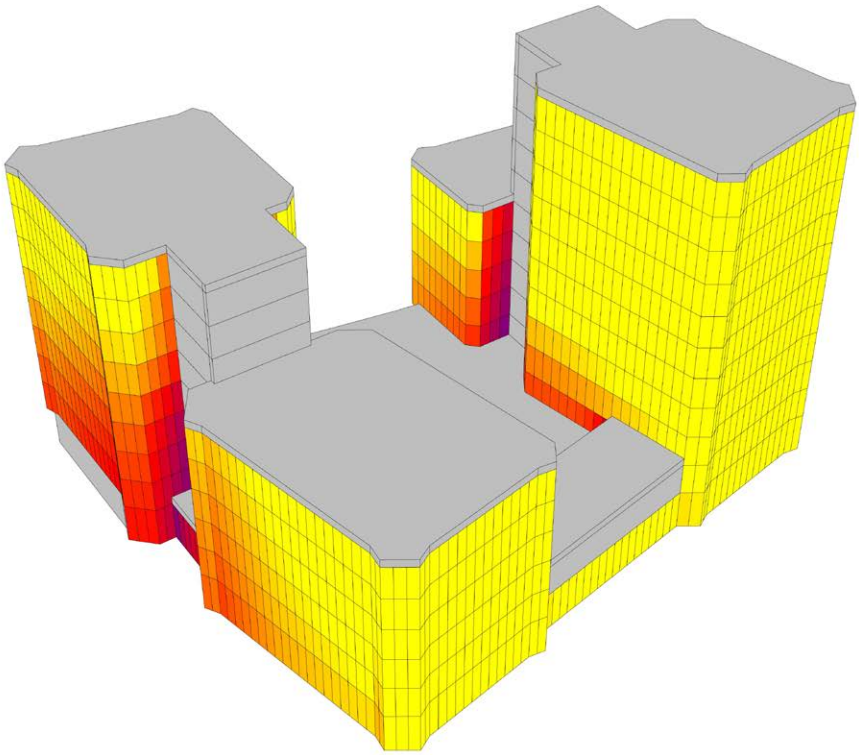


Fig. 07: VSC Diagram

DAYLIGHTING
VERTICAL SKY COMPONENT (VSC)

0% 3% 5% 8% 11% 13% 15% 18% 21% 24% 27%+

Blocks P - DAYLIGHT POTENTIAL

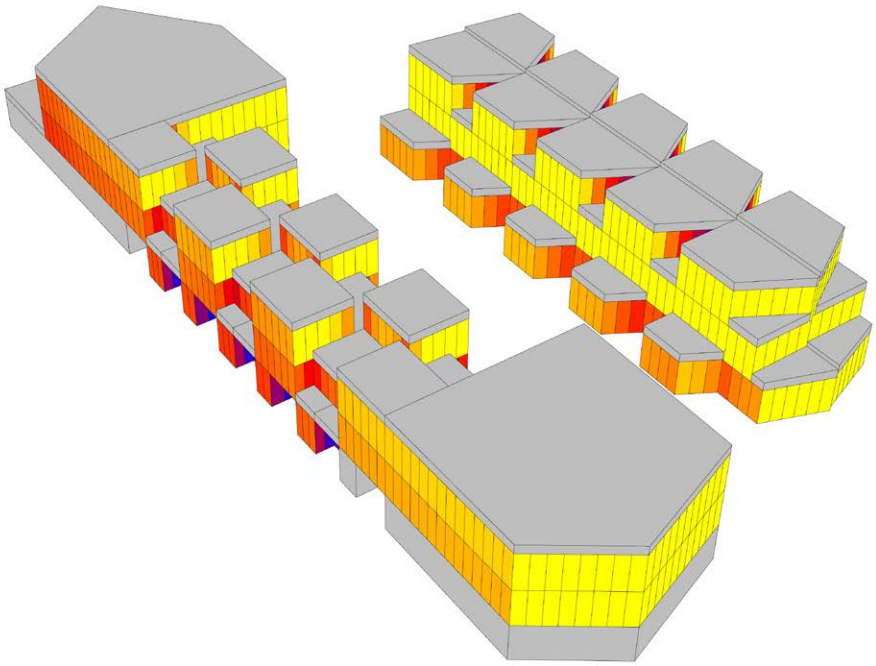
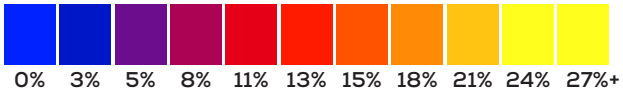


Fig. 08: VSC Diagram

DAYLIGHTING
VERTICAL SKY COMPONENT (VSC)



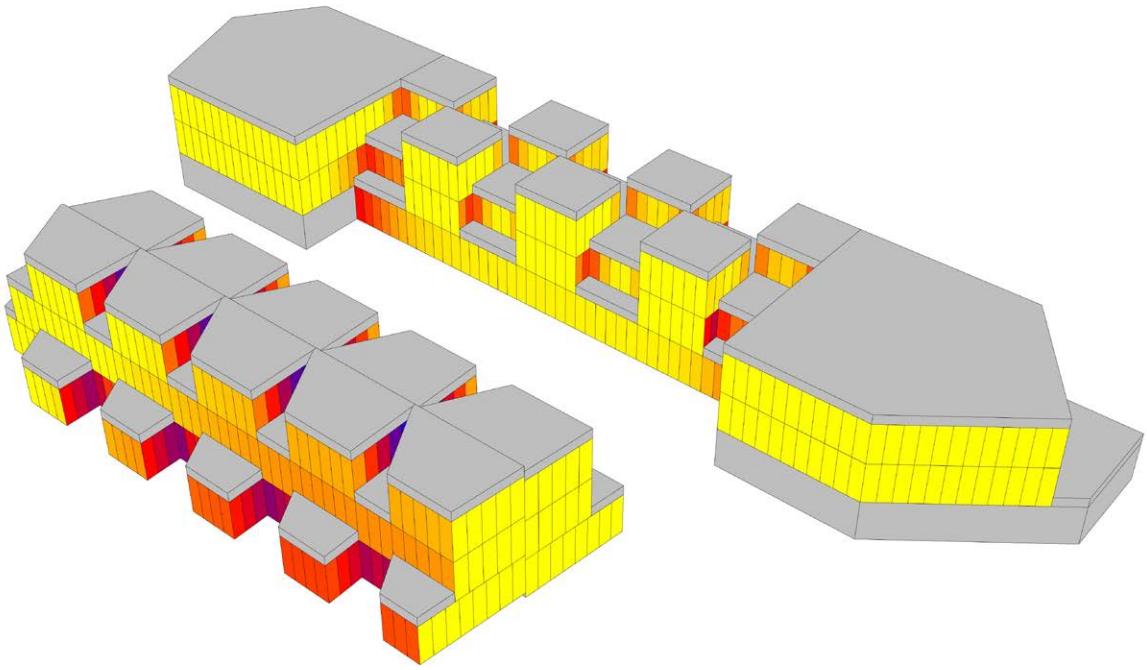
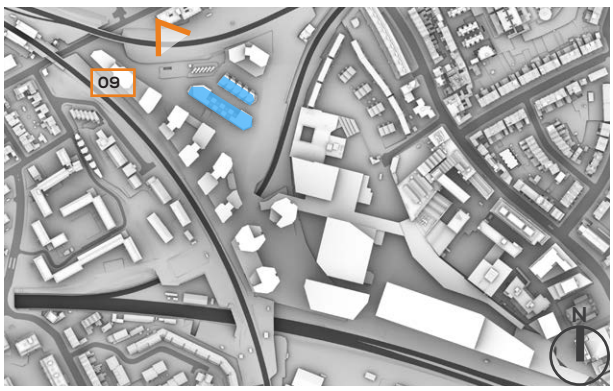


Fig. 09: VSC Diagram



DAYLIGHTING
VERTICAL SKY COMPONENT (VSC)

0% 3% 5% 8% 11% 13% 15% 18% 21% 24% 27%+

Block Q - DAYLIGHT POTENTIAL

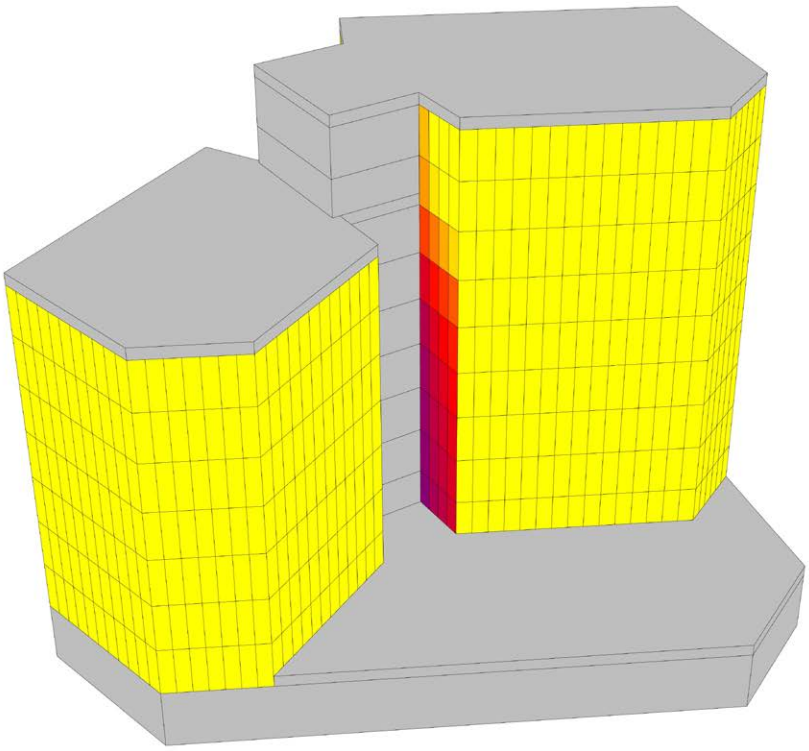
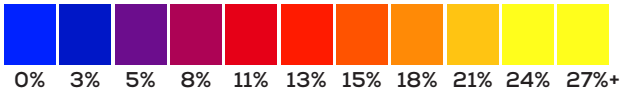


Fig. 10: VSC Diagram

DAYLIGHTING
VERTICAL SKY COMPONENT (VSC)



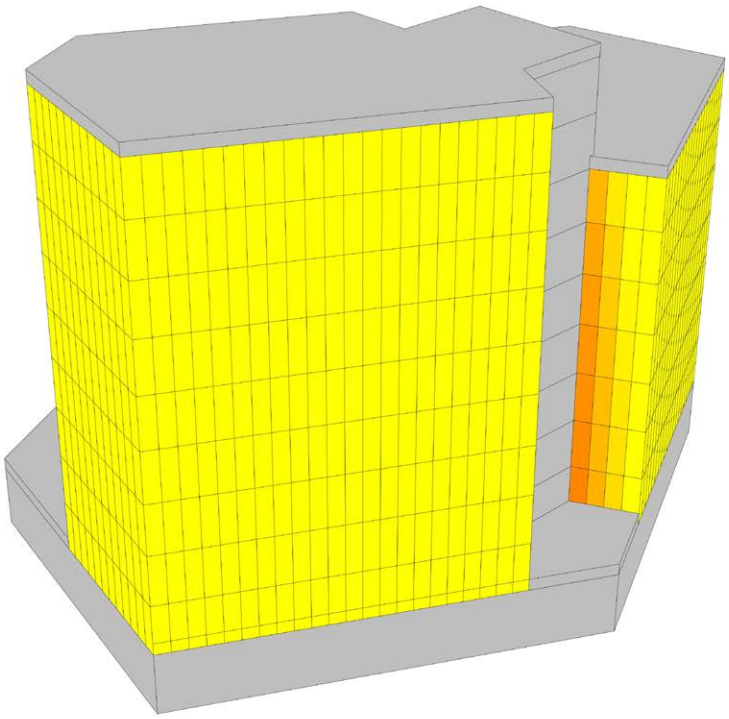
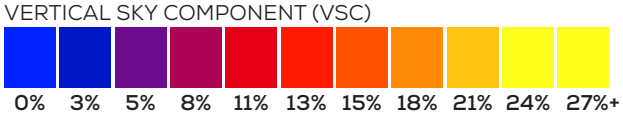


Fig. 11: VSC Diagram



Block K - DAYLIGHT POTENTIAL

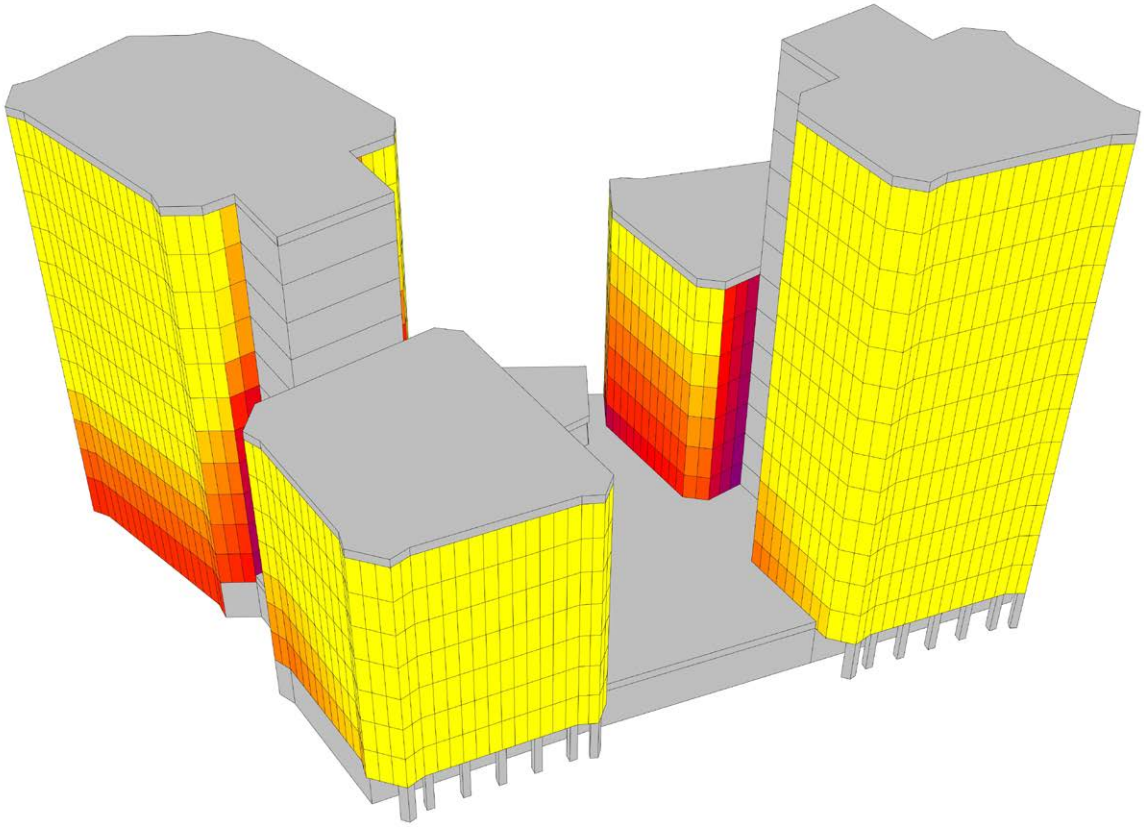
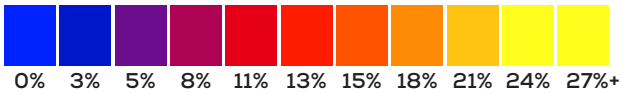


Fig. 12: VSC Diagram

DAYLIGHTING
VERTICAL SKY COMPONENT (VSC)



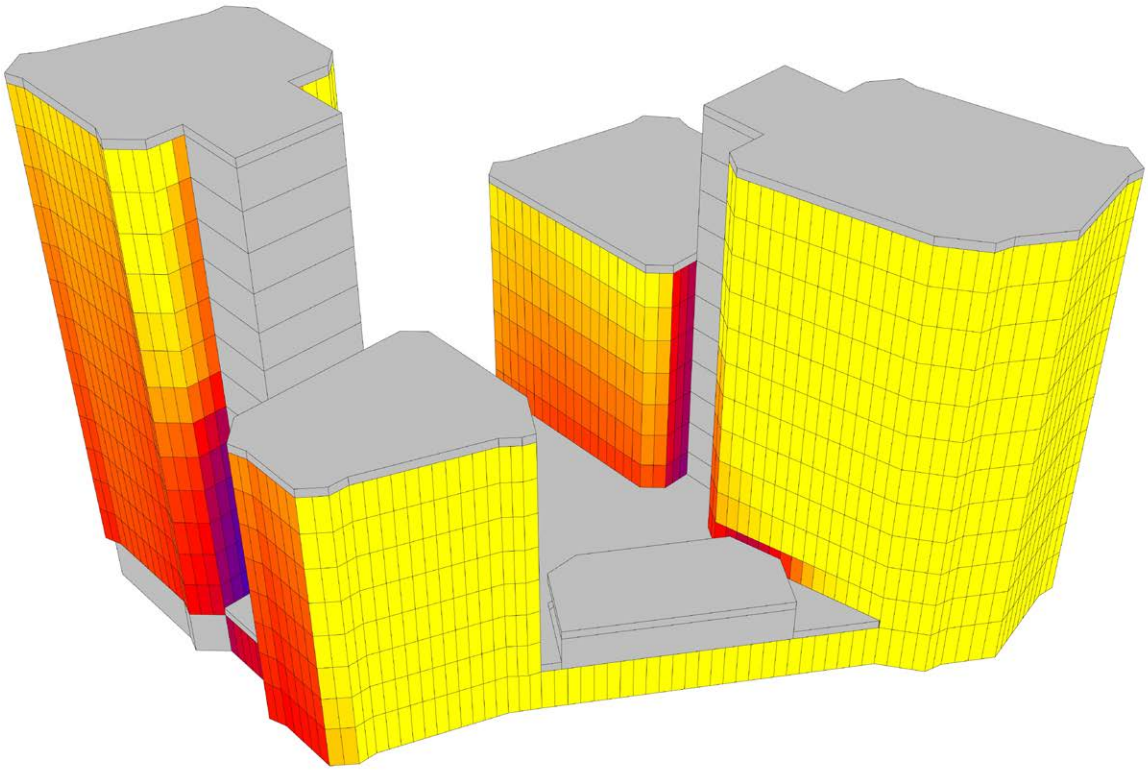
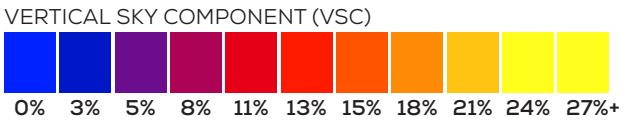


Fig. 13: VSC Diagram



Blocks J & S - DAYLIGHT POTENTIAL

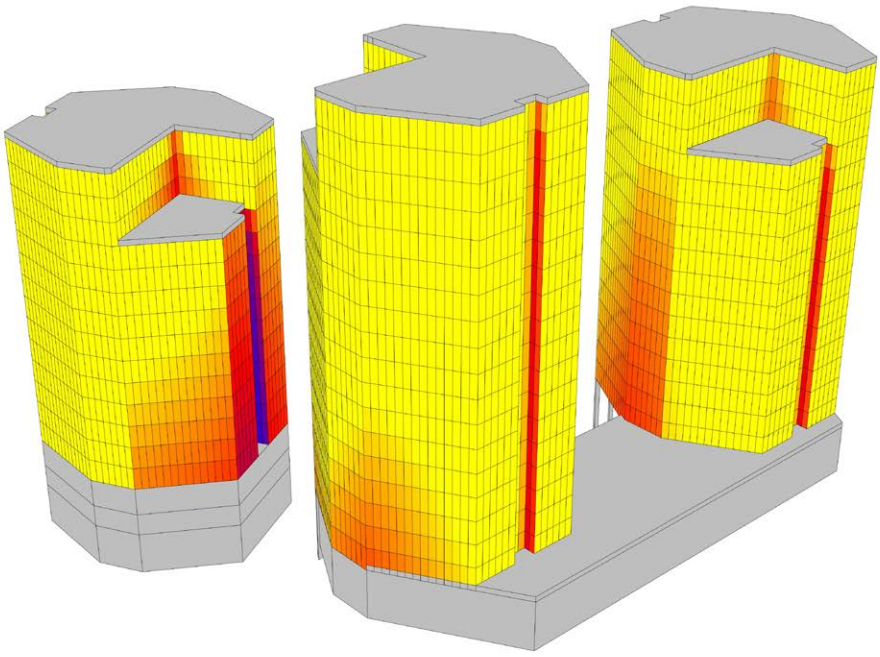
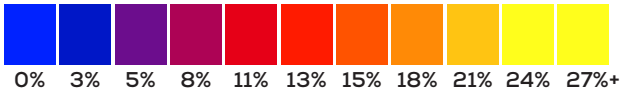


Fig. 14: VSC Diagram

DAYLIGHTING
VERTICAL SKY COMPONENT (VSC)



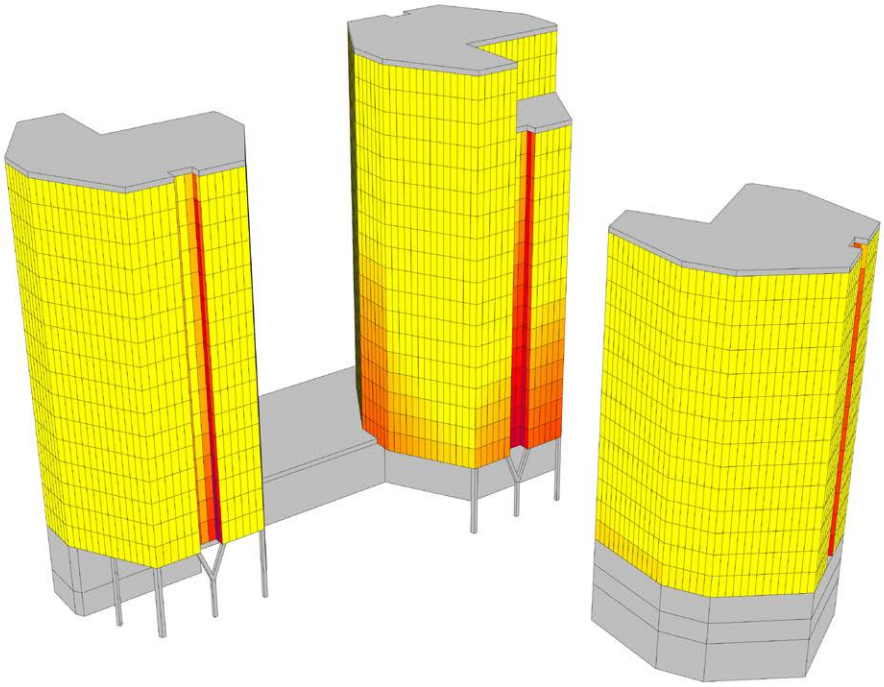
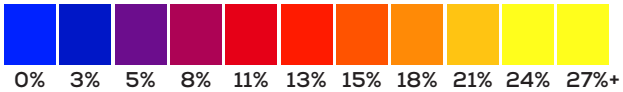


Fig. 15: VSC Diagram

DAYLIGHTING

VERTICAL SKY COMPONENT (VSC)



Block C - DAYLIGHT POTENTIAL

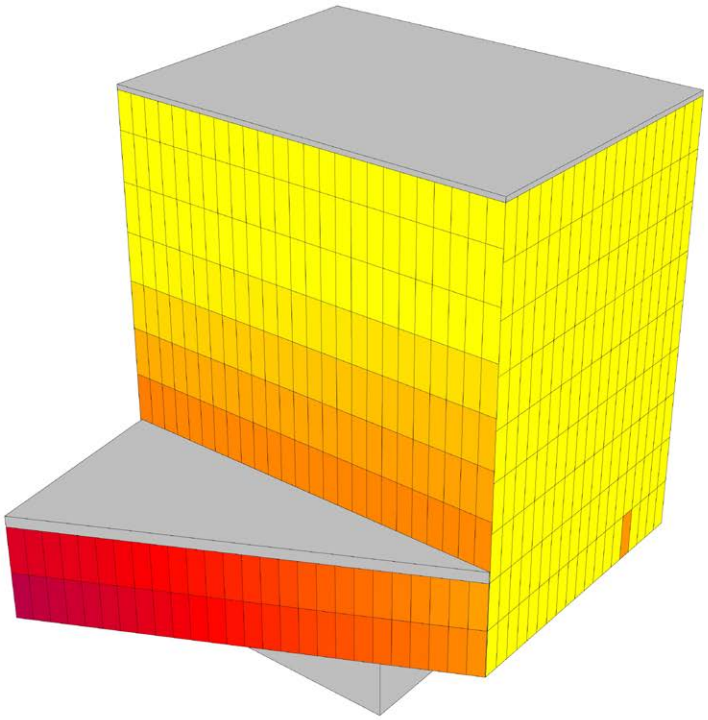
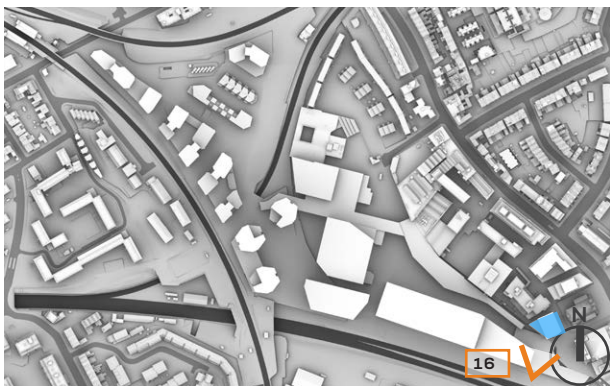
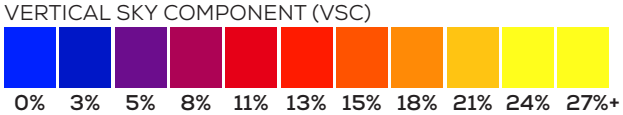


Fig. 16: VSC Diagram



DAYLIGHTING
VERTICAL SKY COMPONENT (VSC)



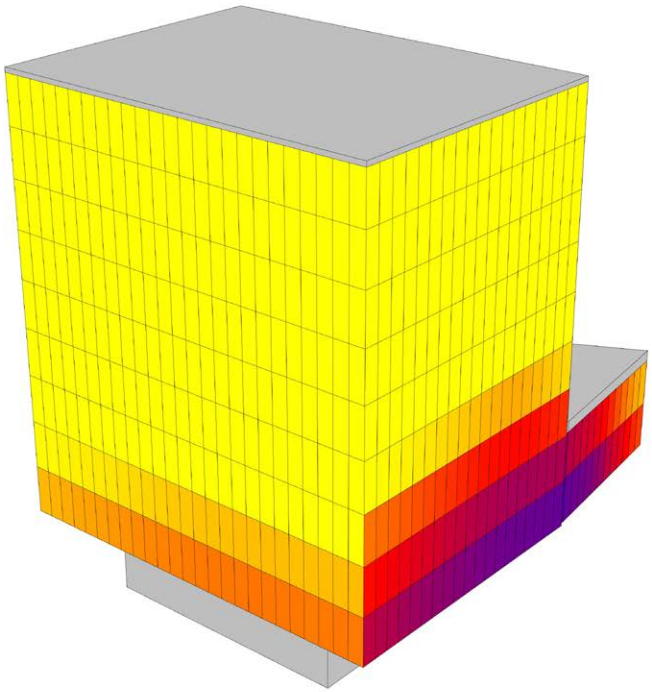
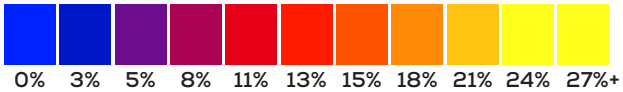
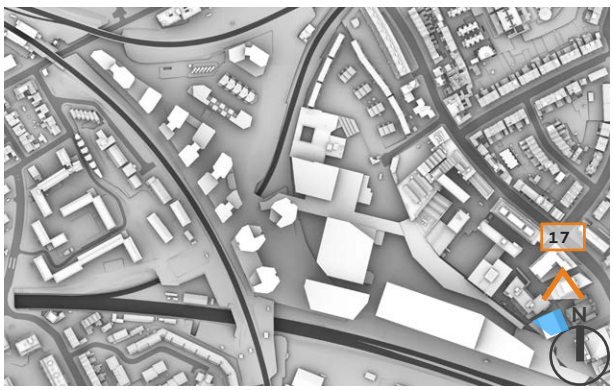


Fig. 17: VSC Diagram

DAYLIGHTING

VERTICAL SKY COMPONENT (VSC)



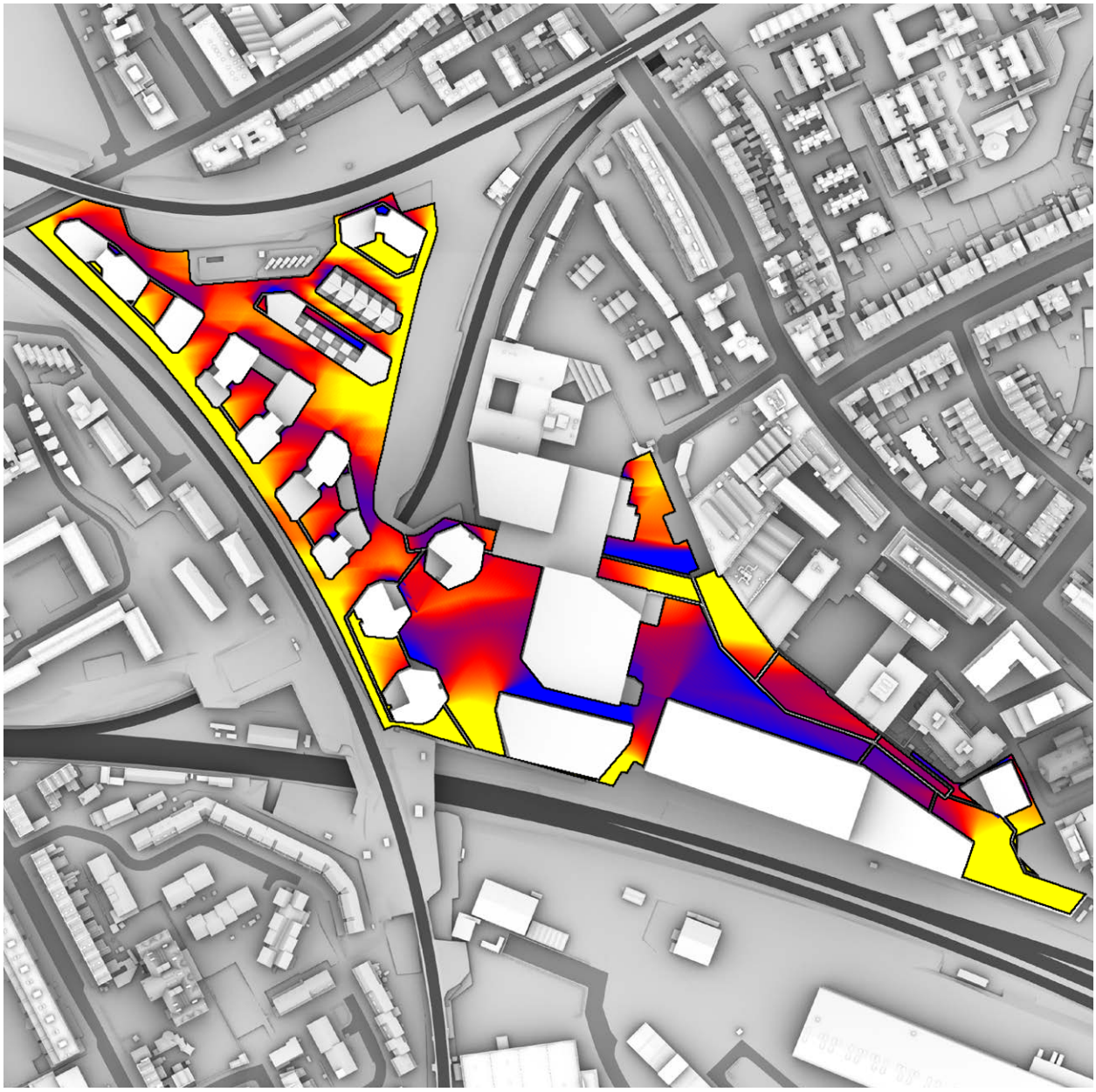


8 OVERSHADOWING ASSESSMENTS

OVERSHADOWING ASSESSMENT - PROPOSED SCENARIO - OPEN SPACE
SUN HOURS ON GROUND - BRE TEST

SUN HOURS ON GROUND
BRE TEST - 21ST MARCH

OVERSHADOWING ASSESSMENT - PROPOSED SCENARIO - OPEN SPACE
SUN EXPOSURE ON GROUND - 21ST MARCH (21ST SEPTEMBER)



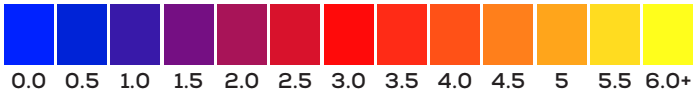
21st MARCH
(SPRING EQUINOX)

LONDON

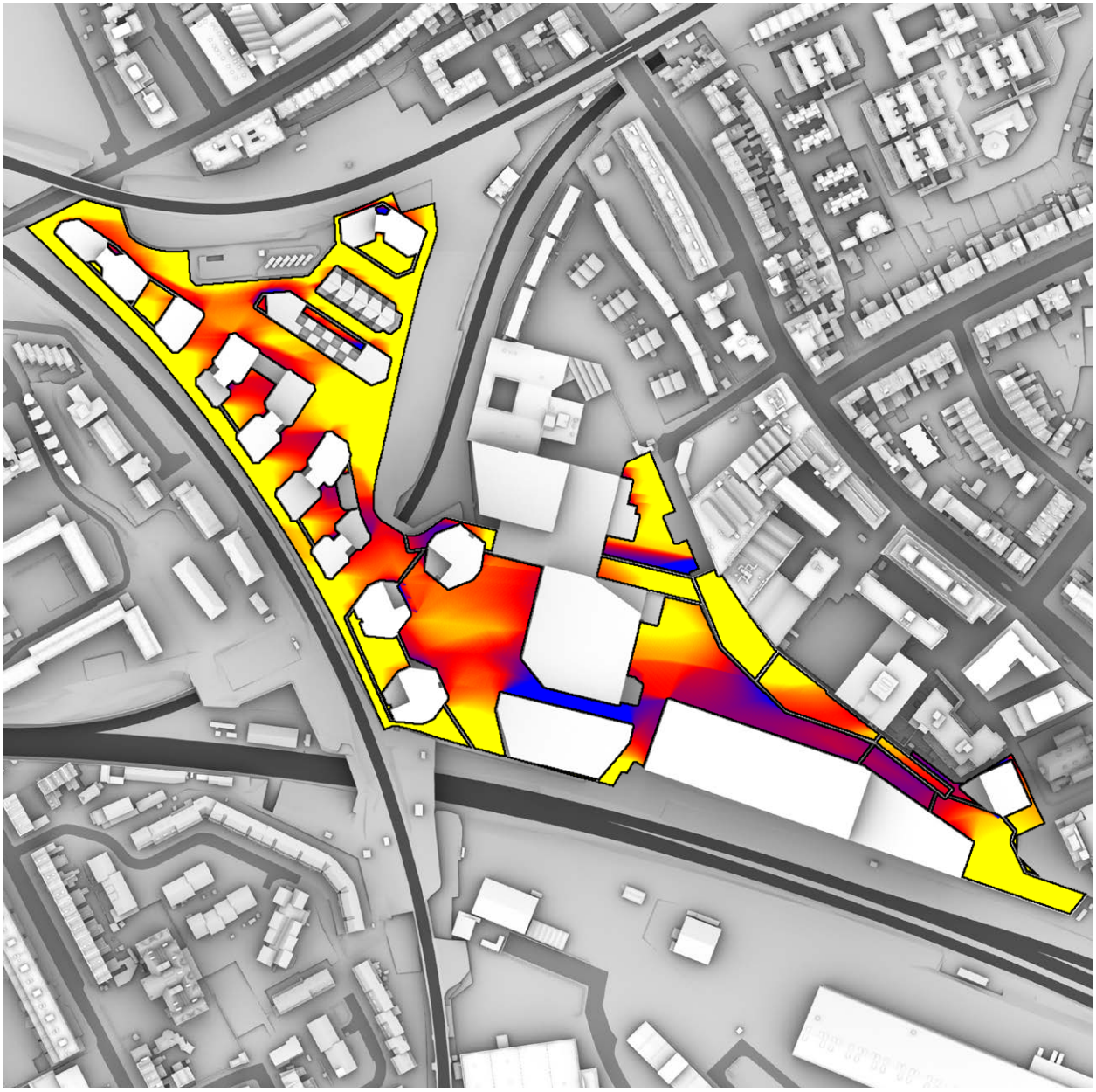
Latitude:	51.4
Longitude:	0.0
Sunrise:	06:02 GMT
Sunset:	18:14 GMT

Total Available Sunlight:
12hrs 12mins

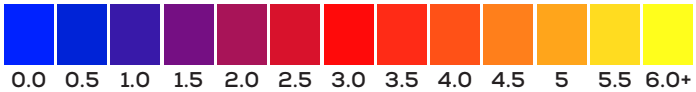
SUN EXPOSURE
TOTAL HOURS



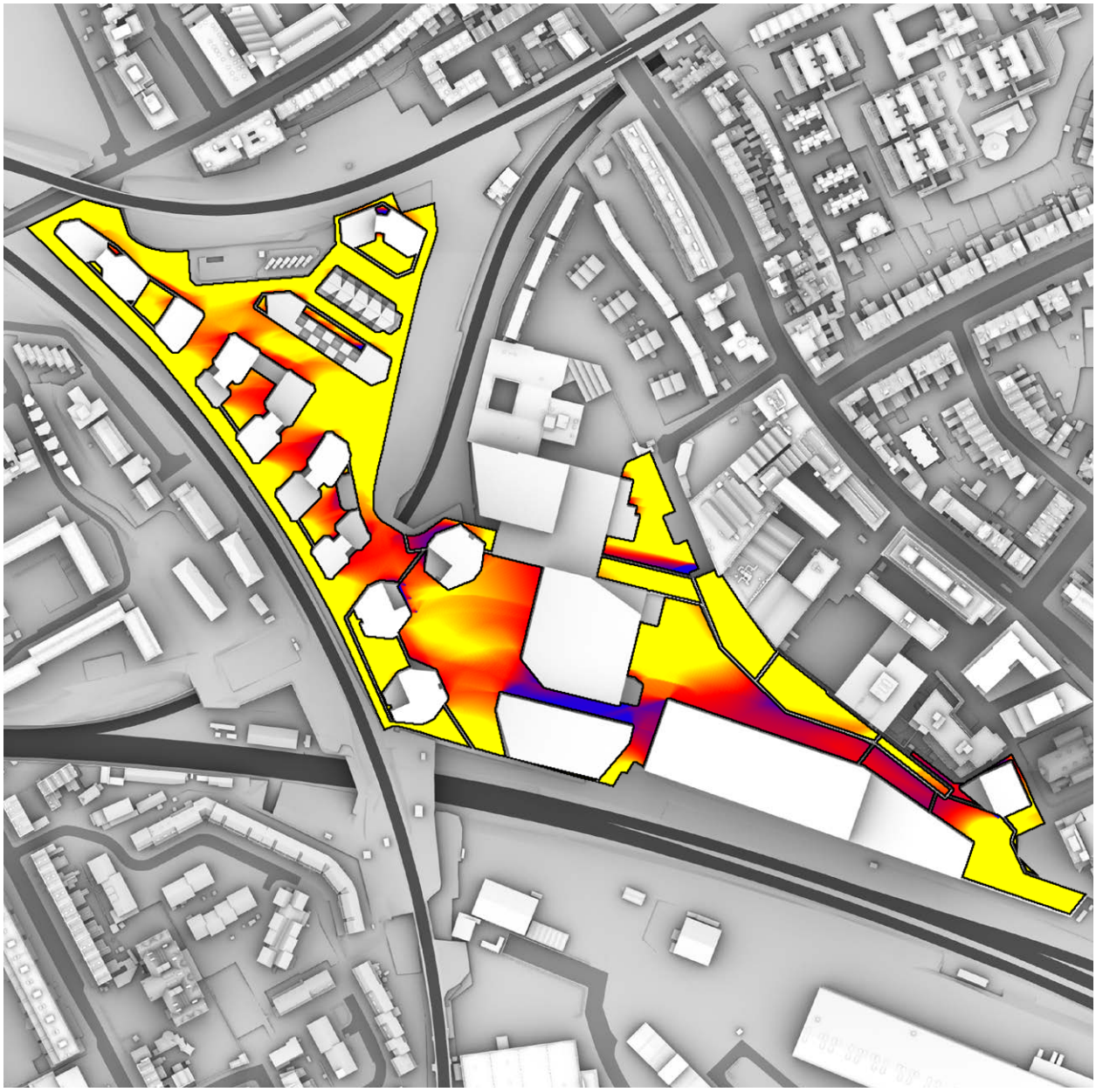
OVERSHADOWING ASSESSMENT - PROPOSED SCENARIO - OPEN SPACE
SUN HOURS ON GROUND - 21ST APRIL (21ST AUGUST)



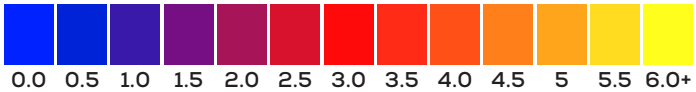
SUN EXPOSURE
TOTAL HOURS



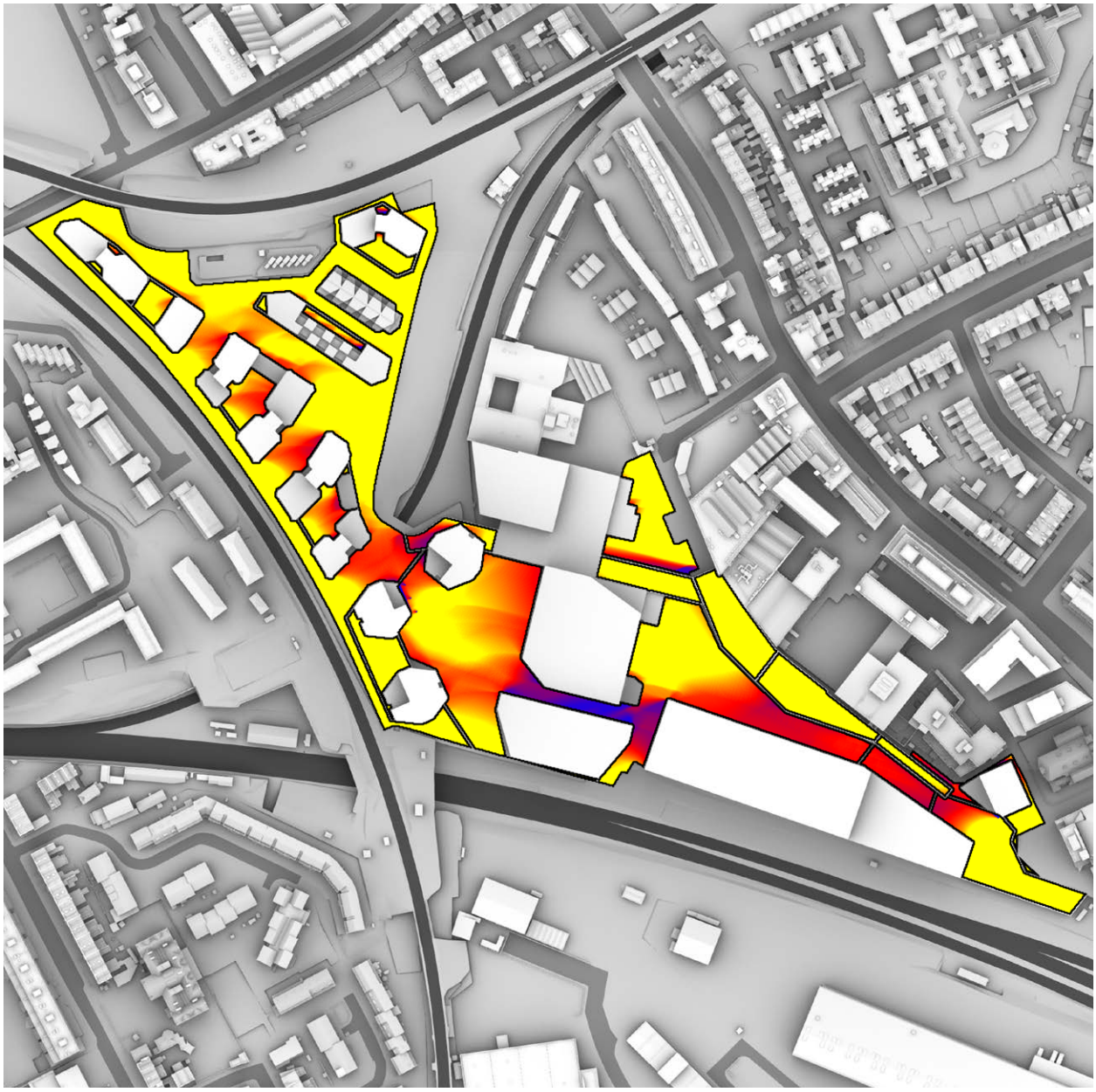
OVERSHADOWING ASSESSMENT - PROPOSED SCENARIO - OPEN SPACE
SUN EXPOSURE ON GROUND - 21ST MAY (21ST JULY)



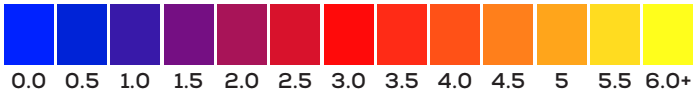
SUN EXPOSURE
TOTAL HOURS



OVERSHADOWING ASSESSMENT - PROPOSED SCENARIO - OPEN SPACE
SUN EXPOSURE ON GROUND - 21ST JUNE



SUN EXPOSURE
TOTAL HOURS



21st JUNE
(SUMMER SOLSTICE)

LONDON

Latitude:	51.4
Longitude:	0.0
Sunrise:	04:43 GMT
Sunset:	21:21 GMT

Total Available Sunlight:
16hrs 38mins

gia
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