

# Daylight and Sunlight Report

## Gas Holder Triplets

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King's Cross Central General Partner Ltd

October 2014

**King's Cross**



HOARE LEA LIGHTING

**Gas Holder Triplets, King's Cross Central**

**Daylight and Sunlight Report**

DOC-1602139-290914-AJ/DM-Triplets – Daylight Appraisal – P07

September 2014



# Daylight Appraisal

## Audit Sheet

Rev.	Description	Prepared and checked by	Reviewed by	Date by
P01	Preliminary issue	AJ	DDM	13 June 2014
P02	Final issue for Planning	DDM	DDM	09 July 2014
P03	Final issue for Planning – Update of GHI I of 1 bed units to Level 3	DDM	DDM	23 July 2014
P04	Final issue for Planning – Update Reflecting comments from NLPP	DDM	DDM	02 September 2014
P05	Final issue for Planning – Update Reflecting comments from NLPP	DDM	DDM	04 September 2014
P06	Final issue for Planning – Update Reflecting comments on Sunlight	DDM	DDM	26 September 2014
P07	Final issue for Planning – Update Reflecting comments on Sunlight	DDM	DDM	29 September 2014

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**1.0** Introduction

## I.0 Introduction

### Overview

This report presents the findings of a daylight and sunlight assessment of the proposed residential development within the relocated and re-erected gas holder guide frames at King's Cross Central, known as the 'Gas Holder Triplets'.

The report provides information to discharge Condition 43 of the Kings Cross Central Outline Planning Permission in respect to the Gas Holder Triplets. The condition states:

“Applications for the approval of Reserved Matters in relation to residential accommodation shall be accompanied by details of how the proposed design applies the standards recommended in the Building Research Establishments Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice 1991”.

The guide referred to in the condition, BR209, was published in 1991. Subsequently, a 2nd edition of the same document was published in 2011. Please see page 6 for more information on this document.

The guide frames for the Gas Holders 10, 11 and 12 (GH 10/11/12) are Grade II listed due to their unique intersecting and inter-locking structure. These three structures make up the Gas Holder Triplets.

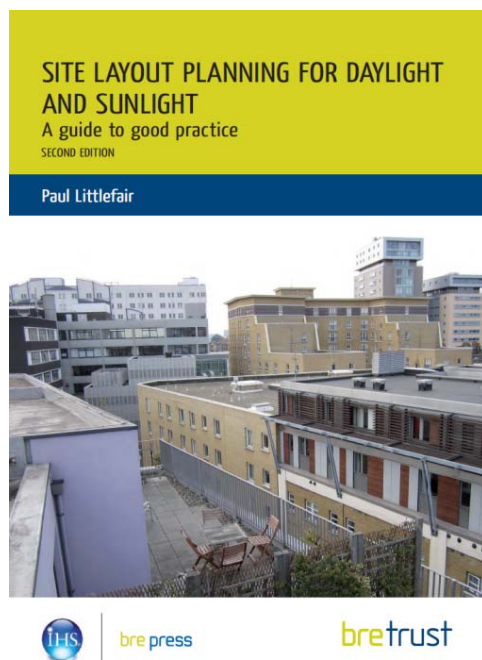
Three residential buildings, accommodating 144 residential units, are proposed to be located within the guide frames of the former gas holders and these are to be located in Development Zone N. A full description of the proposed development and site is provided in the Urban Design Report which accompanies the Reserved Matters submission for the Gas Holder Triplets.

BR209 does not deal with the issue of daylight and sunlight into buildings in terms of specific percentages of rooms which need to meet, or exceed, its recommended criteria. It is, however, a critical guide designed to encourage developments to take into consideration the issues surrounding daylight and sunlight penetration.

The guide, therefore, has been a key reference within the architectural design process of the Gas Holder Triplets which has culminated in **79%** of the residential units meeting/exceeding the BRE guidelines for the **daylight assessments** even once the constraints of the gas holder frames and geometries are taken into account.

In terms of sunlight ensuring that those apartments which do receive direct sunlight do not also suffer from excessive solar gain in the summer has been a key driver. As a result **37%** of residential units meet/exceed the BRE guidelines for **annual probable sunlight hours (this includes summer sunlight)** while **100%** of residential units meet/exceed the BRE guidelines for **winter probable sunlight hours**.

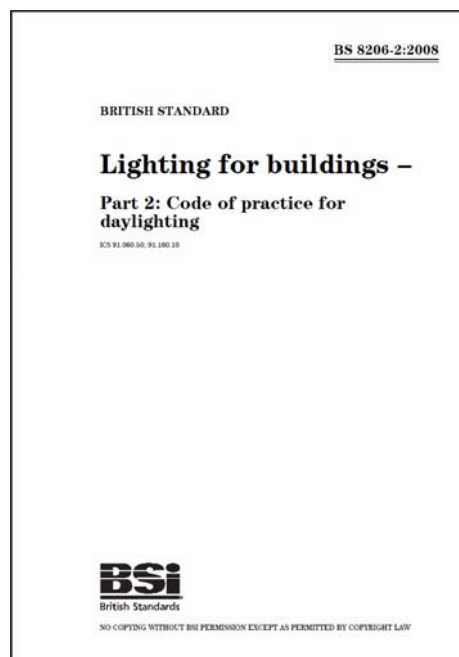
## I.0 Introduction



Front cover of BR209

Gas Holder Triplets – Daylight and Sunlight Report

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Front cover of BS 8206-2:2008

### BR209 and BS 8206-2

Guidance for good daylighting and sunlighting is given in Littlefair's *Site Layout Planning for Daylight and Sunlight*. The second edition of this guide was published in 2011. Often, the guide is referred to as 'BR209'.

Apart from Littlefair's BR209, guidance is also provided in British Standard BS 8206-2 *Lighting for buildings – Code of practice for daylighting*. The latest revision of the Standard is from 2008.

BR209 and BS8206-2 agree in their approaches to daylighting and sunlighting. They also recommend the same targets for daylight levels and sunlight availability in dwellings. Whilst the British Standard is rather concise, BR209 goes into more detail and gives guidance on how daylight and sunlight assessments should be carried out.

Obviously the amount of direct summer sunlight must be balanced against the risk of over heating.



## 1.0 Introduction

C4 If a predominantly daylit appearance is required, then the 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 ADF which should be attained even if a predominantly daylit appearance is not achievable.

2.1.14 Non-daylit internal kitchens should be avoided wherever possible, especially if the kitchen is used as a dining area too. If the layout means that a small internal galley-type kitchen is inevitable, it should be directly linked to a well daylit living room.

*BR209 on minimum daylight factors in dwellings (top), and on internal kitchens (bottom)*

### Minimum values of average daylight factor in dwellings

Even if a predominantly daylit appearance is not achievable in a dwelling, it is recommended that the average daylight factor should be at least the relevant value as given in Table 2.

#### Minimum average daylight factor

Room type	Minimum average daylight factor %
Bedrooms	1
Living rooms	1.5
Kitchens	2

Where one room serves more than one purpose, the minimum average daylight factor should be that for the room type with the highest value. For example, in a space which combines a living room and a kitchen the minimum average daylight factor should be 2%.

*Guidance on good daylighting in BS8206-2*

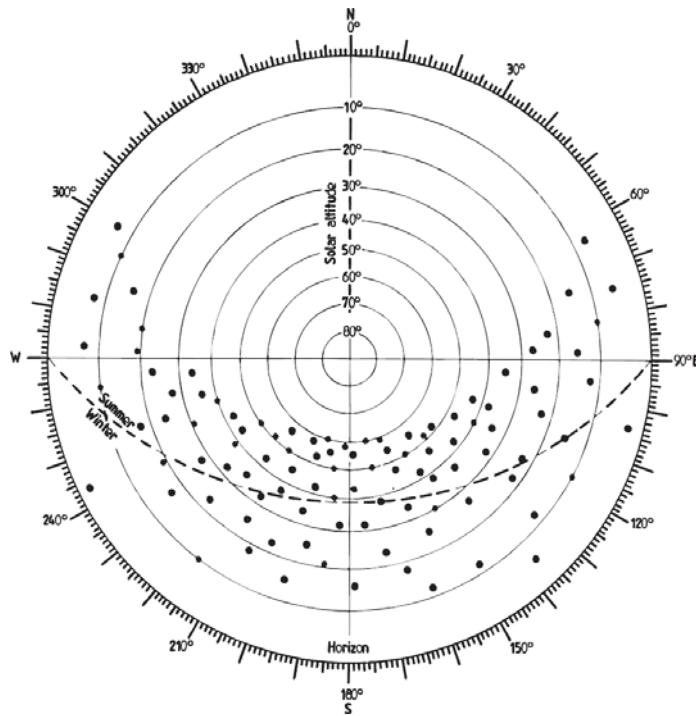
### Daylighting Guidance

Both BR209 and BS8206-2 recommend certain minimum average daylight factor values, ADFs, that lead to a pleasant and healthy indoor environment. The ADF is a metric that is used for quantifying the levels of natural light available in a daylit room.

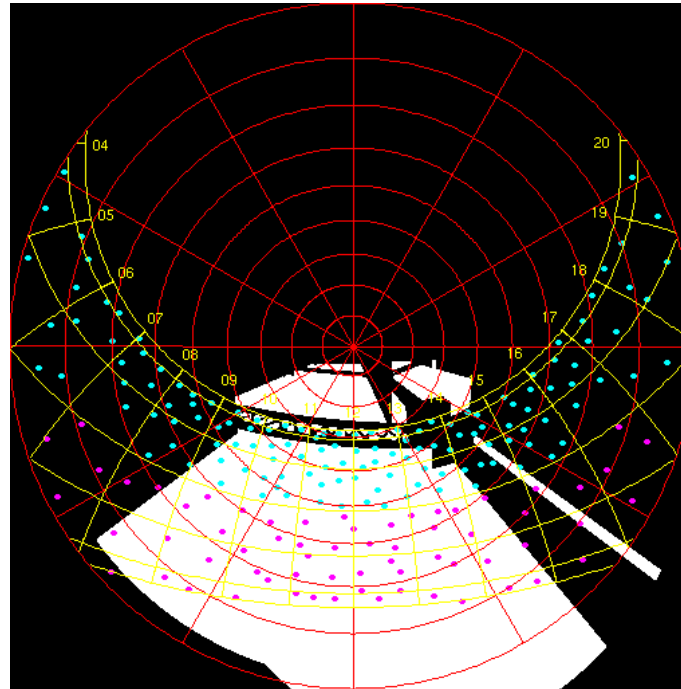
Both the Code and the Standard agree in their ADF targets, which depend upon the use of a room:

Space	Minimum ADF
Kitchens	2.0%
Living Rooms	1.5%
Bed Rooms	1.0%

## I.0 Introduction



BS 8206-2 diagram for probable sunlight hours



PSH diagram generated with Radiance

### Sunlighting Guidance

BR209 and BS8206-2 both suggest that 'probable sunlight hours', PSH, be used for quantifying the hours of sunlight that can be expected to reach the living room windows.

PSH are counted for the entire year (APSH), but are also looked at for the winter only (WPSH). Roughly one-third of the APSH occur during the winter months, between 21 Sep and 21 Mar.

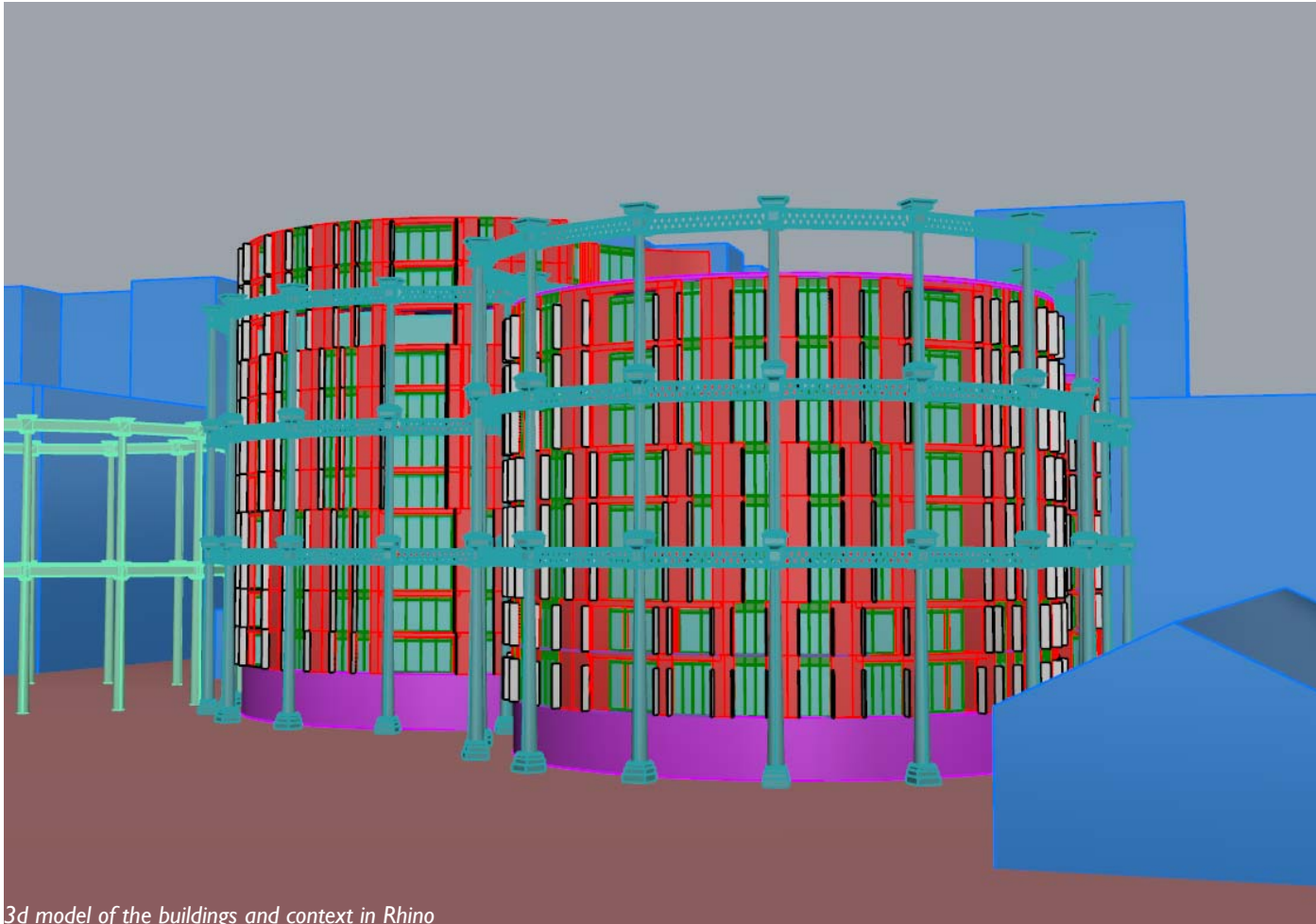
Target levels are identical between the BS and BR209:

Space	Annual PSH	Winter PSH
Living Rooms	25%	5%

BS8206-2 and BR209 both recommend the use of sunlight availability diagrams, although different types of diagrams are suggested. Used correctly, they should generate the same number of sunlight hours for a given window geometry and external obstructions.

Since the stereographic 'pepper plot' diagrams recommended in the BS are simpler to understand and to generate with computer software, they were chosen for this sunlight assessment. An example fisheye image with PSH overlay is shown on the left.

## 1.0 Introduction



3d model of the buildings and context in Rhino

### 3d Model

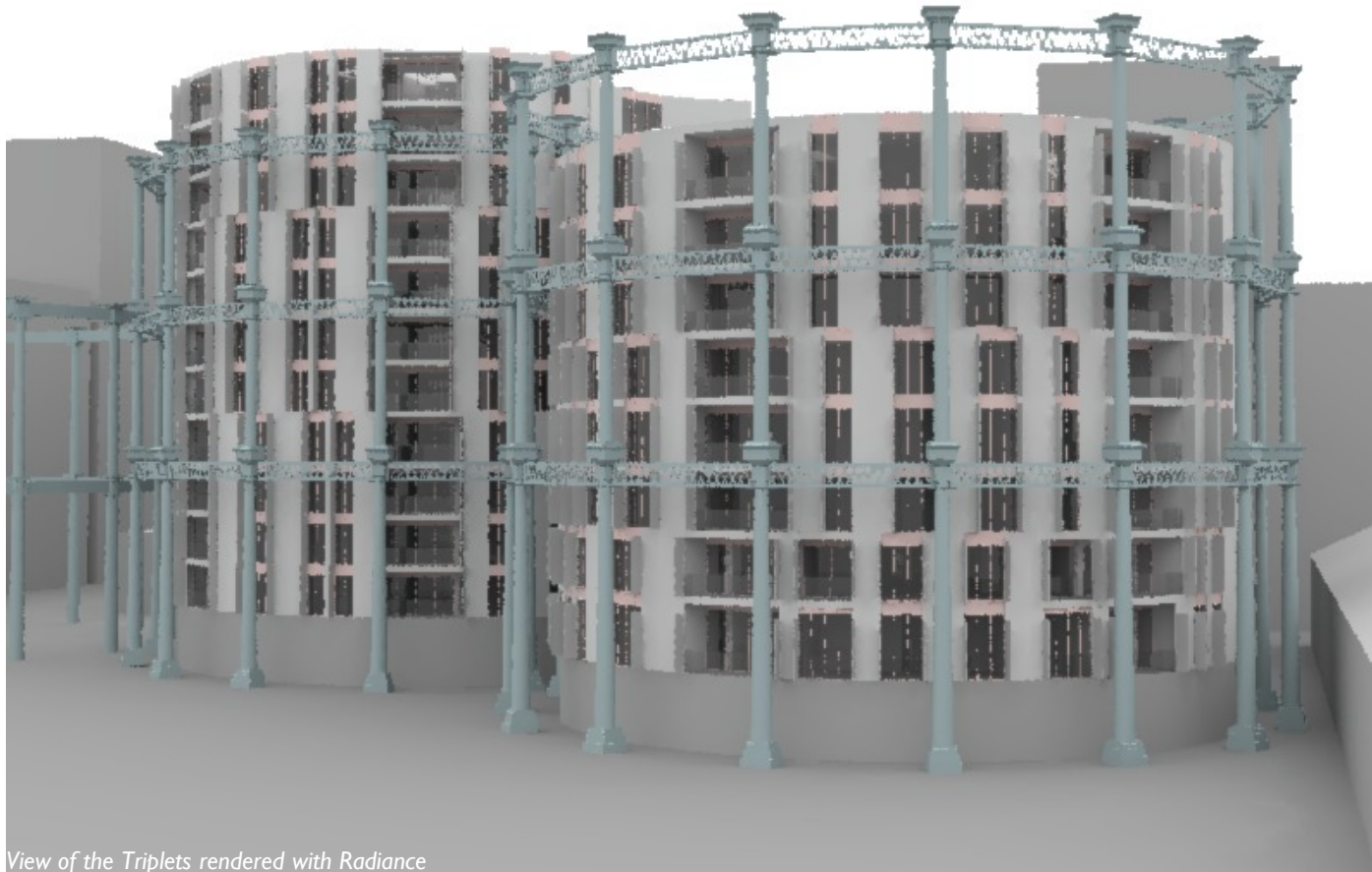
A detailed 3d computer model of the Gas Holder Triplets and context was constructed from recent scheme drawings supplied by Wilkinson Eyre Architects.

The massing of the surrounding buildings (proposed and existing), as well as 3d geometry of the gas holder guide frames of the Gas Holder Triplets and the neighbouring no. 8 GH were taken from an earlier 3d CAD model:

- Context:  
*00823\_Master Model\_230813.dwg*

Plot PI from that model was modified to reflect the latest massing approved by Camden Planning.

## 1.0 Introduction



*View of the Triplets rendered with Radiance*

### Assumptions

The following assumptions about material properties were made. The values chosen are typical for the building materials and surface finishes included in the scheme.

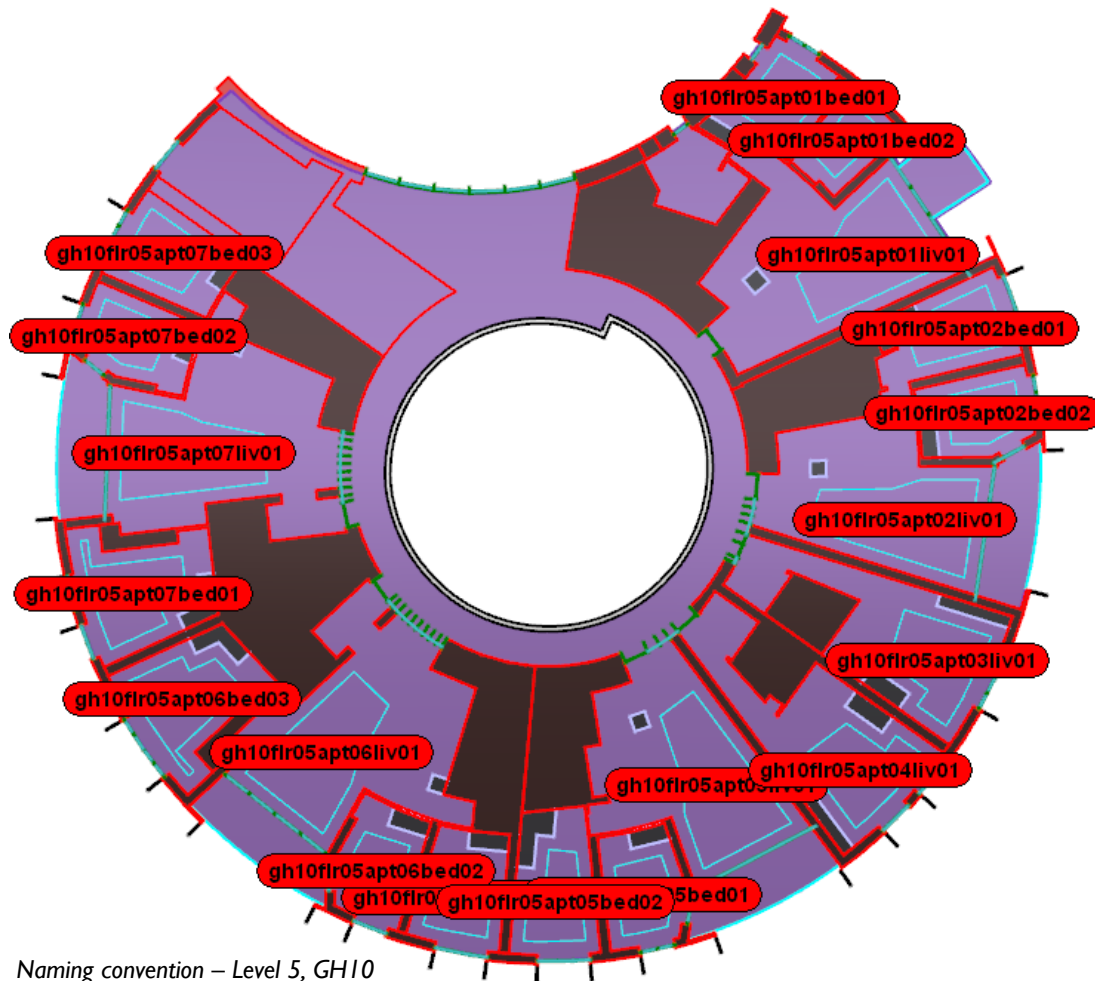
Light reflectance values:

- Floors: 30%
- Walls and partitions: 50%
- Ceilings: 70%
- Ground: 20%
- Obstructions: 30%

For the glazing, the ARUP Façade team specified a Pilkington Optifloat 4-16-4-16 unit with a visible light transmittance of 70%.

The gasholder frames are to be 'painted' in RAL 7040 which has a reflectance of about 31%.

## I.0 Introduction



Naming convention – Level 5, GH10

### Room Naming Convention

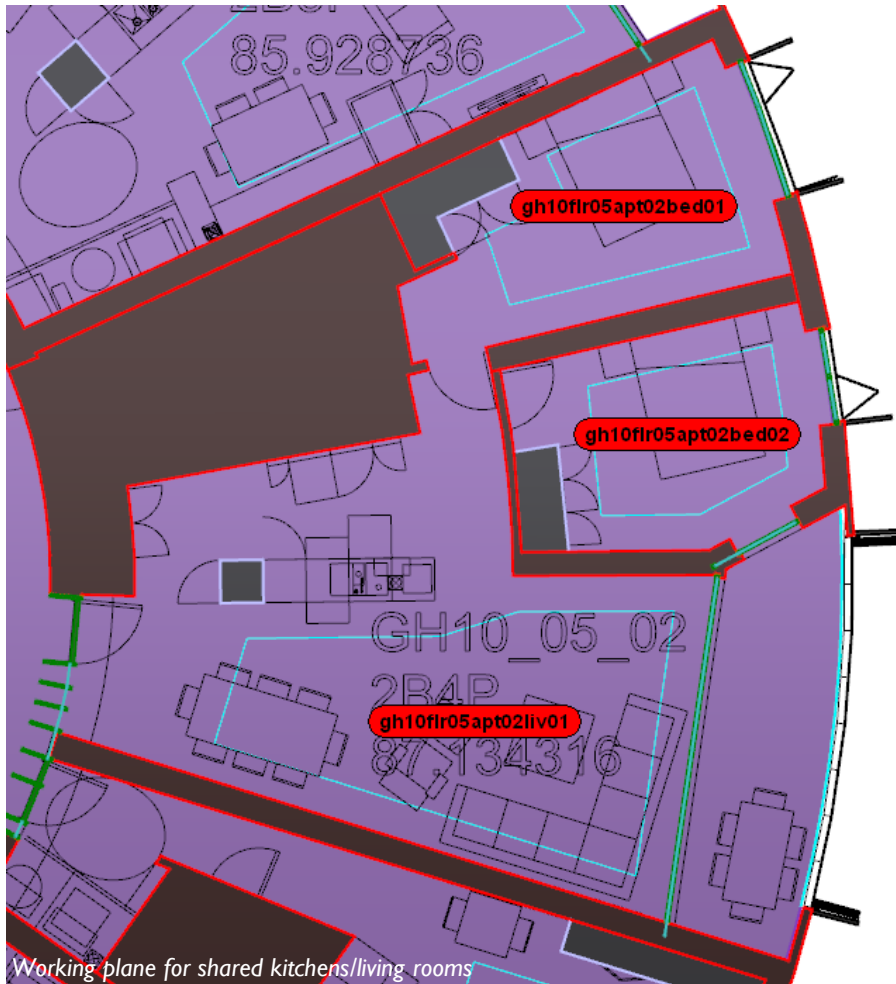
Our naming convention used throughout this assessment is set out as follows. Apartments numbers are incremented in a clockwise direction on each floor and for each of the residential buildings. Apartment '01' is always next to the courtyard.

Room types are indicated as:

- 'bed' ... bed room
- 'liv' ... living room
- 'kit' ... kitchen (penthouse level only)
- 'din' ... dining room (penthouse level only)

Where there are two or more bed rooms in one apartment, they are numbered 'bed01' and 'bed02' etc. Again, this is done in a clockwise direction around the gasholder's atrium.

## I.0 Introduction



### Working Plane Areas

The circular footprint constraints of the gas holder guide frames leads to relatively deep and narrow apartments when compared to more typical residential developments. In order to provide sufficient levels of natural light to the bed rooms and living spaces, it was necessary to move the kitchen areas away from the facades.

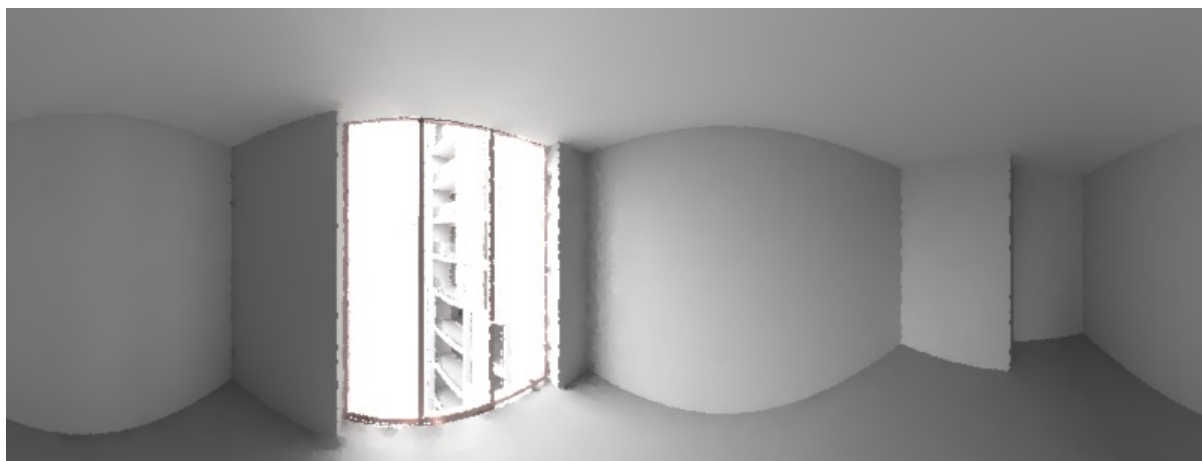
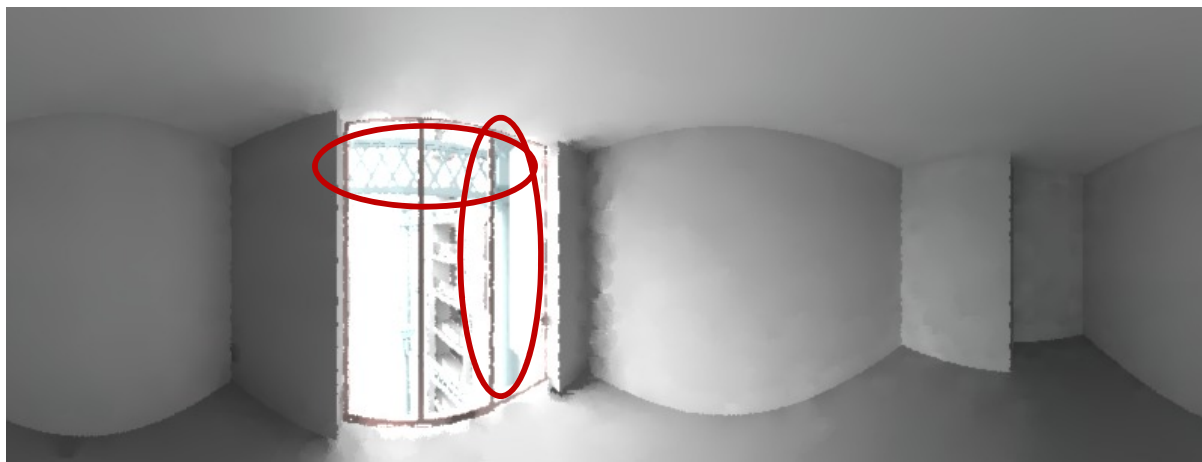
It is suggested in BR209 that -

***“Non-daylit internal kitchens should be avoided wherever possible, especially if the kitchen is used as a dining area too. If the layout means that a small internal galley-type kitchen is inevitable, it should be directly linked to a well daylit living room.”***

Due to the constraints of the building internal kitchens could not be avoided and were excluded from the areas across which average daylight factors were calculated following discussion and agreement in principle with LB Camden during pre-application discussions. To still provide the best possible daylight in the kitchens, they are directly connected to the living rooms in open-plan layouts which have large windows and balconies, without any separating partition walls as suggested in BR209.

In order to still provide a realistic assessment of the daylight quality, the calculation areas for ADFs do include the dining areas, so that the assessment follows the BR209 guidance in its suggestions, as well as in spirit.

## I.0 Introduction



*Panoramic view for a typical unit with (top) and without (bottom) the Triplets GH frames*

### **Gas Holder Guide Frames**

The Grade II Listed gas holder guide frames form part of the unique character of this residential scheme. The re-erection of the guide frames with residential development inside was part of the KXC outline planning permission, therefore, is a key constraint of the scheme.

One of the challenges that the design team had to address was the reduction in daylight caused by the gas holder guide frames themselves. This was a particular issue in the ‘pockets’ where the triplets are closest to each other.

In order to show how much the guide frames lead to a reduction in daylight levels, some of the calculations were run twice—with and without the gas holder guide frames.

The key reason for the two sets of calculation is that, traditionally, about 40% of daylight penetration coming in through a window is from the top third of that window. Therefore, as the image opposite shows, if certain apartment windows have the frame at the top of their window one can expect daylight levels in these apartments to fall although views out will be maintained.

Therefore the inclusion of the guide frames as part of the residential development are a significant constraint in terms of daylight penetration for the residential units.



**2.0**      **Appraisal**





**2.1 Daylight**

## 2.0 Appraisal

Level	Room Count / % which meet/exceed BRE Guildlines			
	GH 10	GH 11	GH 12	All GHs
Level 01	12/12 (100%)	10/20 (50%)	1/5 (20%)	23/37 (62%)
Level 02	14/16 (88%)	10/20 (50%)	9/13 (69%)	33/49 (67%)
Level 03	15/18 (83%)	9/20 (45%)	8/13 (62%)	32/51 (63%)
Level 04	17/19 (89%)	11/20 (55%)	9/13 (69%)	37/52 (71%)
Level 05	18/19 (95%)	15/20 (75%)	11/13 (85%)	44/52 (85%)
Level 06	18/19 (95%)	11/20 (55%)	10/13 (77%)	39/52 (75%)
Level 07	19/19 (100%)	19/20 (95%)	13/13 (100%)	51/52 (98%)
Level 08	14/14 (100%)	19/20 (95%)	-	33/34 (97%)
Level 09	-	17/20 (85%)	-	17/20 (85%)
Level 10	-	15/15 (100%)	-	15/15 (100%)
Level 11	-	18/18 (100%)	-	18/18 (100%)
<b>All Levels</b>	<b>127/136 (93%)</b>	<b>154/213 (72%)</b>	<b>61/83 (73%)</b>	<b>342/432 (79%)</b>

a) With GH frames

Level	GH 10	GH 11	GH 12	All GHs
Level 01	12/12 (100%)	12/20 (60%)	2/5 (40%)	26/37 (70%)
Level 02	15/16 (94%)	12/20 (60%)	9/13 (69%)	36/49 (73%)
Level 03	17/18 (94%)	14/20 (75%)	10/13 (77%)	41/51 (80%)
Level 04	18/19 (95%)	14/20 (70%)	10/13 (77%)	42/52 (81%)
Level 05	19/19 (100%)	18/20 (90%)	13/13 (100%)	50/52 (96%)
Level 06	19/19 (100%)	17/20 (85%)	13/13 (100%)	49/52 (94%)
Level 07	19/19 (100%)	20/20 (100%)	13/13 (100%)	52/52 (100%)
Level 08	14/14 (100%)	20/20 (100%)	-	34/34 (100%)
Level 09	-	20/20 (100%)	-	20/20 (100%)
Level 10	-	15/15 (100%)	-	15/15 (100%)
Level 11	-	18/18 (100%)	-	18/18 (100%)
<b>All Levels</b>	<b>133/136 (98%)</b>	<b>181/213 (85%)</b>	<b>70/83 (84%)</b>	<b>383/432 (89%)</b>

b) Without GH frames

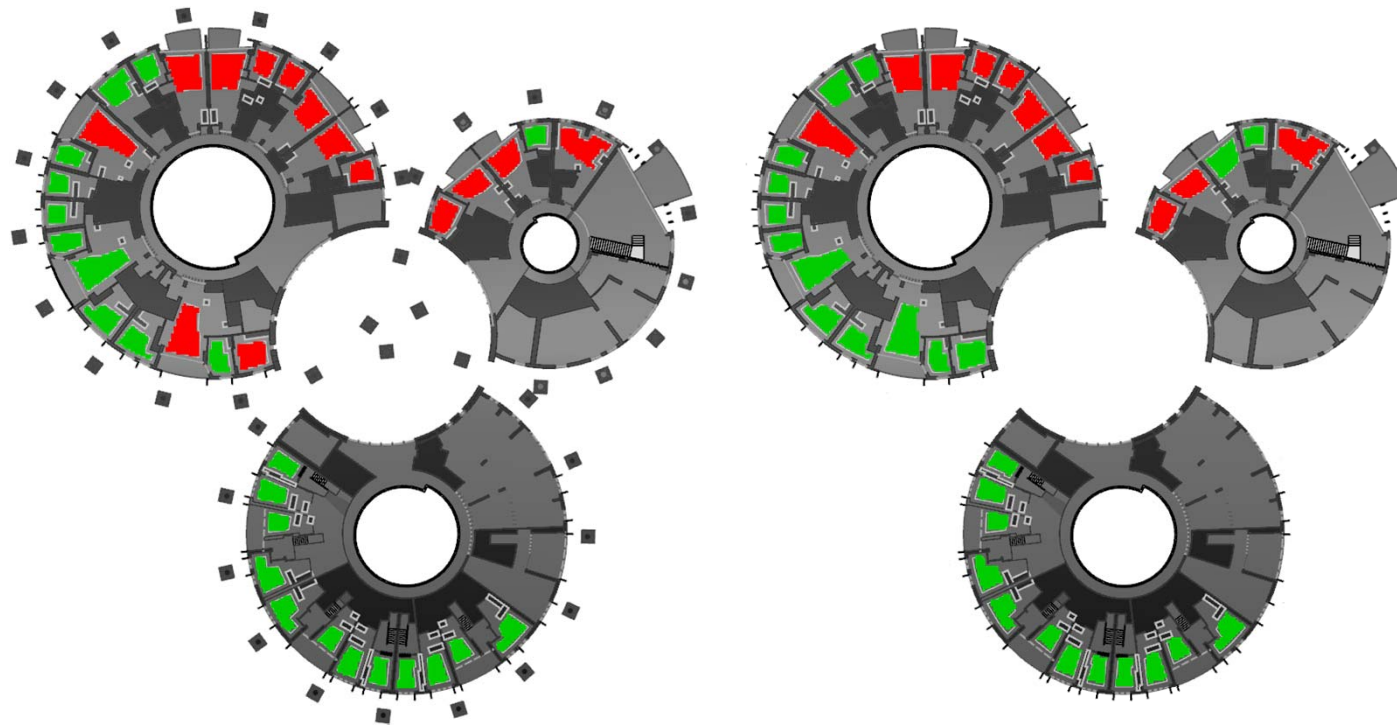
### Daylight Overview

The percentage of rooms that meet/exceed the BRE guidance are shown in the two tables on the left. The number that meet/exceed BRE guidance are given for each floor, and for each of the buildings (red, green, and blue background colours). The last column gives the overall percentage that meet/exceed BRE guidance **per-floor** while the last row of the tables shows the overall percentage of rooms, **per-block**, that meet/exceed BRE guidance across the three blocks. As discussed in the introduction to this document ADF calculations were carried out for two scenarios:

- As realistically as possible, with accurate room geometries, neighbouring buildings, and the Gas Holder Triplets guide frames included;
- As above, but with the Gas Holder Triplets guide frames excluded.

As shown in the overview tables on the left, in scenario a), 79% of units meet or exceed the BRE guidance. This includes all daylit spaces, i.e. all bed rooms and living rooms. On the penthouse levels, dining areas and kitchens are included as well. Scenario b), where the gas holder guide frames were removed, yields a higher percentage of 89%. Both results can be considered very good in an urban setting especially given the circular constraints of the buildings and their given adjacencies. They indicate that the design team have provided the recommended levels of natural light despite the site-imposed limitations in terms of the buildings being within the listed guide frames.

## 2.0 Appraisal



Level	GH 10	GH 11	GH 12	All GHs
Level 01	12/12 (100%)	10/20 (50%)	1/5 (20%)	23/37 (62%)

ADF targets: Level 1, with GH frames

Level	GH 10	GH 11	GH 12	All GHs
Level 01	12/12 (100%)	12/20 (60%)	2/5 (40%)	26/37 (70%)

ADF targets: Level 1, without GH frames

### Daylight Pass/Fail – Level 1

In the two diagrams on the left, rooms that achieve the BR209 recommended average daylight factors are marked in Green, while those who fall short are marked in Red.

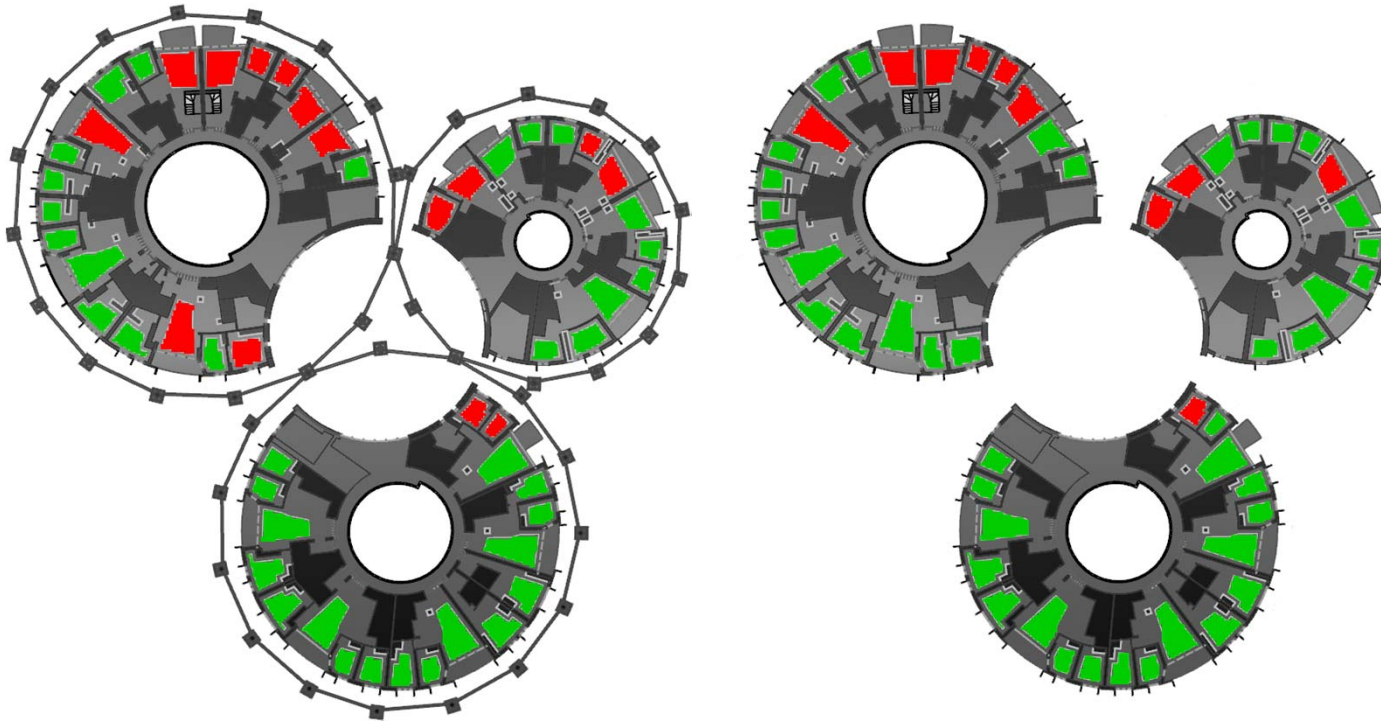
As discussed on the previous page, some of the apartments are obstructed by the development proposed in Plots P1 and P2, or by the other buildings in the Gas Holder Triplets and can therefore not quite achieve the BR209 recommended targets.

Space	Minimum ADF
Living Rooms	1.5%
Bed Rooms	1.0%

The effect of the GH frames on daylight levels can be seen when the image on the left is compared to the one on the right, where the calculations were done without the Triplets GH frames. Removal of the frames causes an additional three rooms (2 in GH 11 and 1 in GH12) to achieve the target ADF values.

The diagrams opposite show that daylight levels are a little lower in the rooms where the buildings are closest to one-another as well as some north-facing rooms. Due to the external constraints of the guide frames and their relationship to each other these factors are fixed as part of the Outline Planning Permission. The design team has developed the layouts specifically to respond to these constraints and provide more glazing with less linear balconies in order to maximise the daylight these units receive.

## 2.0 Appraisal



### Daylight Pass/Fail – Level 4

The neighbouring buildings have less of an impact on the provision with daylight for higher levels within the Triplets. The number of room that meet/exceed BRE guidance do, therefore, improve.

A further improvement can be observed if the Gas Holder Triplets guide frames are removed from the computer model: An extra 5 rooms achieve the BRE target levels if the calculations are done without the frames.

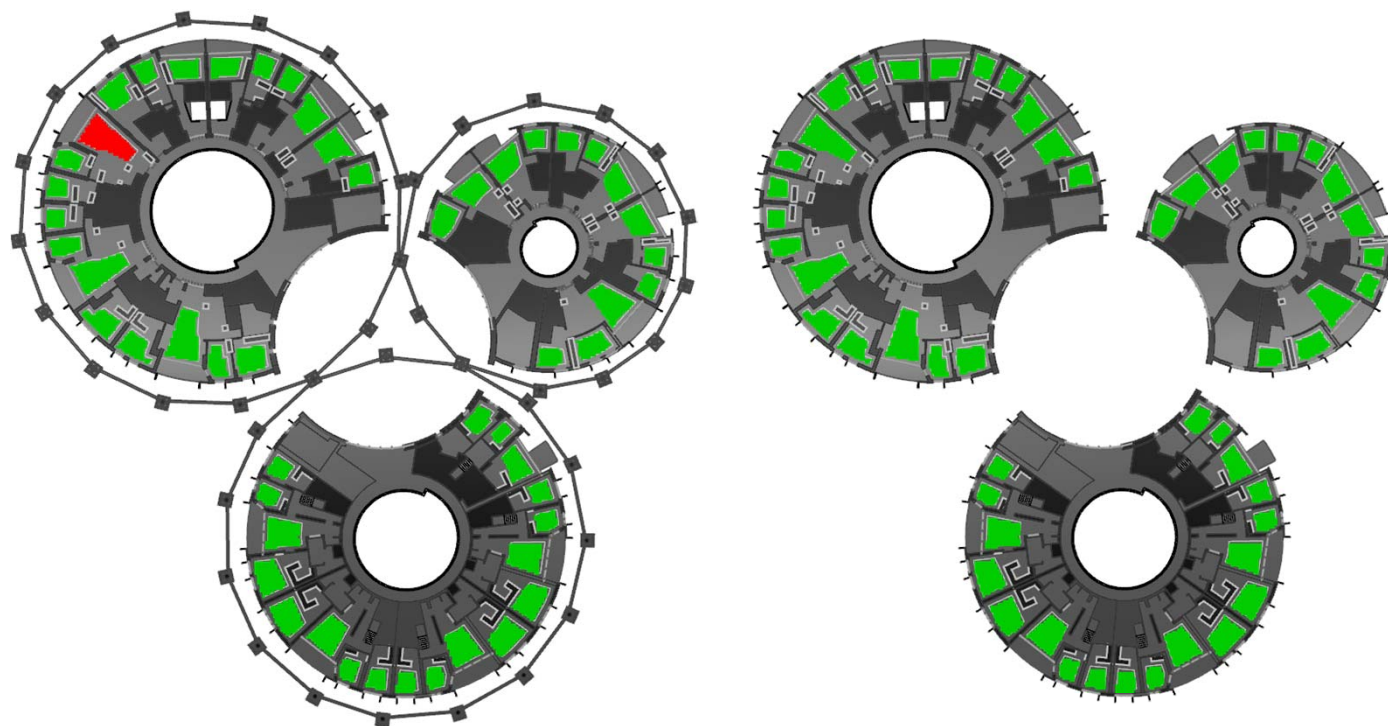
Level	GH 10	GH 11	GH 12	All GHs
Level 04	17/19 (89%)	11/20 (55%)	9/13 (69%)	37/52 (71%)

Level	GH 10	GH 11	GH 12	All GHs
Level 04	18/19 (95%)	14/20 (70%)	10/13 (77%)	42/52 (81%)

ADF targets: Level 4, with GH frames

ADF targets: Level 4, without GH frames

## 2.0 Appraisal



### Daylight Pass/Fail – Level 7

Only a single room does not achieve the BRE targets on level 7 if the calculations are done with the GH frames. This space is a relatively deep living room with a dining area at the back. It is one of those rooms that have a cast iron columns directly in front of the balcony window.

The pass rate for this floor is 100% if the frames are removed from the model.

Level	GH 10	GH 11	GH 12	All GHs
Level 07	19/19 (100%)	19/20 (95%)	13/13 (100%)	51/52 (98%)

Level	GH 10	GH 11	GH 12	All GHs
Level 07	19/19 (100%)	20/20 (100%)	13/13 (100%)	52/52 (100%)

ADF targets: Level 7, with GH frames

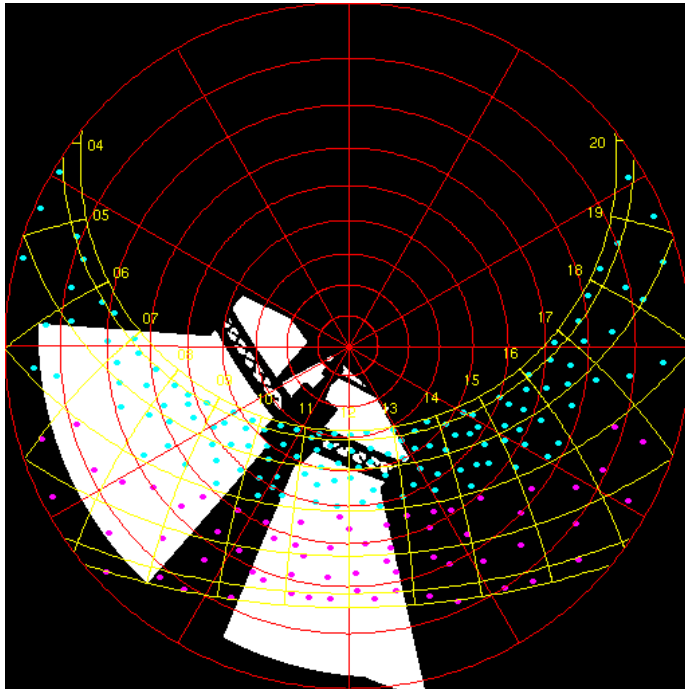
ADF targets: Level 7, without GH frames



**2.2**

**Sunlight**

## 2.0 Appraisal



### Sunlight Overview

Probable sunlight hours were counted by rendering fisheye images with a 180 degree view of the sky hemisphere. This was done for each window, with the camera being at the centre of the pane, at a height of 1.6 metres above FFL. This follows the guidance in BS 8206-2 and BR209.

A total of 200 dots representing the annual sunlight availability were overlayed onto the black and white images. Dots that are not obstructed are visible against a white background. Those dots were counted. Their numbers as a percentage of all dots, and as a percentage of the Winter dots (shown in magenta) form the annual and winter probable sunlight hours, respectively.

The example sun availability plot shown on the left is for *gh10flr02apt04liv01win3*. A total of 83 dots are unobstructed, of which 31 are magenta coloured winter dots. This equates to 15.5% winter PSH and 41.5% annual PSH, which is a 'pass'.

During the design process the design team developed the design to ensure maximum winter sunlight in the units whilst utilising balconies to reduce the amount of midday summer sun into south-facing units in order to prevent them over-heating due to excessive solar gain.

*Example sunlight availability diagram for gh10flr02apt04liv01win3*

## 2.0 Appraisal

Level	All GHs WPSH	All GHs APSH	All GHs Overall
Level 01	2/2 (100%)	0/2 (0%)	0/2 (0%)
Level 02	8/8 (100%)	5/8 (62%)	5/8 (62%)
Level 03	7/7 (100%)	2/7 (29%)	2/7 (29%)
Level 04	8/8 (100%)	2/8 (25%)	2/8 (25%)
Level 05	8/8 (100%)	2/8 (25%)	2/8 (25%)
Level 06	8/8 (100%)	2/8 (25%)	2/8 (25%)
Level 07	3/3 (100%)	1/3 (33%)	1/3 (33%)
Level 08	6/6 (100%)	4/6 (67%)	4/6 (67%)
Level 09	2/2 (100%)	0/2 (0%)	0/2 (0%)
Level 10	2/2 (100%)	2/2 (100%)	2/2 (100%)
<b>All Levels</b>	<b>54/54 (100%)</b>	<b>20/54 (37%)</b>	<b>20/54 (37%)</b>

Percentage 'pass' of all living rooms receiving Winter Probable Sunlight Hours

Percentage 'pass' of all living rooms receiving Summer Probable Sunlight Hours (lower due to solar gain issues)

Cumulative percentage 'pass' of all living rooms receiving Summer + Winter Probable Sunlight Hours

### Sunlight rooms that meet/exceed BRE guidance

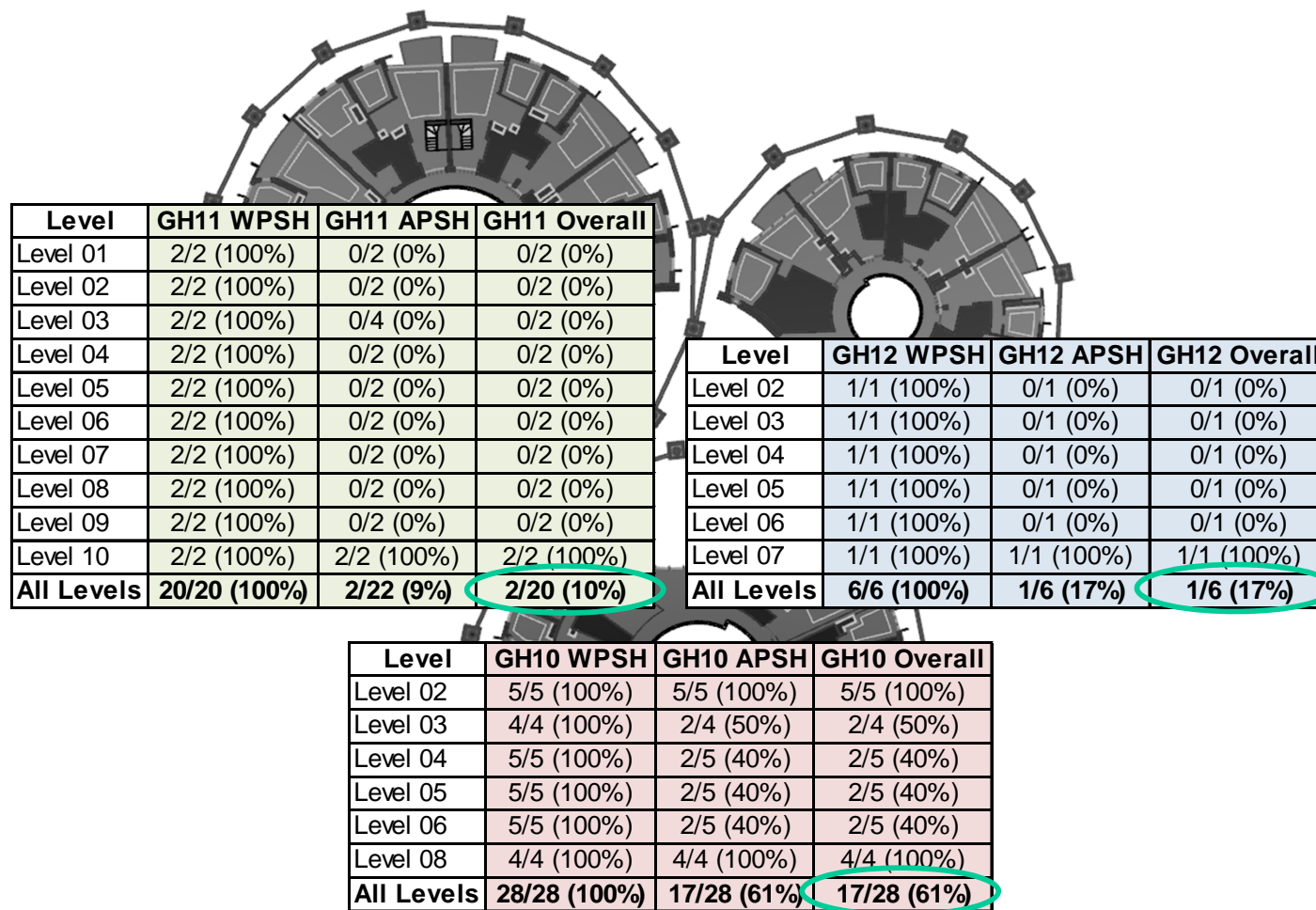
Following the procedure laid out on the previous page, sunlight hours were calculated for each window, and for all living rooms that face within +/-90 degrees of due South. North-facing apartments cannot receive sunlight for most of the year, which is why they are excluded from the assessment.

The overall and per-floor number of rooms that meet/exceed BRE guidance are summarised in the table on the left.

Rooms that meet/exceed BRE guidance for winter and annual PSH for each level



## 2.0 Appraisal



### Sunlight Pass/Fail – Overall

Shown in the tables on the left are the number of rooms, per-floor, that meet/exceed BRE guidance for each of the buildings. Gas holders 11 and 12 only have very few apartments with a south-facing living room. Since those are partially shaded by GH 10, only the penthouse suite can receive both the winter and annual numbers of sunlight hours that BR209 recommends. Hence the results reflect the small number of windows assessed when expressed as a percentage.

Most of the living rooms in gas holder 10 face within +/-90 degrees of due South. Since they are not obstructed by any neighbouring buildings, the overall number of rooms that meet/exceed BRE guidance is 60%, the balconies being purposely used to shade mid-summer sun. For low-angle winter sun, 100% of the apartments achieve or exceed the BR209-required 5% WPSH. Some of the high-angle summer sun is shaded by the balconies above.

Since the measurements are done at the window (as opposed to the balustrade), the overall pass rate for APSH is reduced to 61%. Summer sunlight is still received on the balcony. It is often also reaching the windows, but at a height of less than 1.6 m so is not counted in this assessment.

Solar shading during the summer months will lead to a reduction in overheating, and to lower energy bills since the air conditioning units are required for fewer hours. A lower number of rooms that meet/exceed BRE guidance during the summer is actually desirable in terms of building performance and energy consumption and the balcony external private amenity spaces provide the opportunity for plenty of sunlight.



**3.0** Conclusion

## 3.0 Conclusion

Level	Daylight
Level 01	23/37 (62%)
Level 02	33/49 (67%)
Level 03	33/51 (65%)
Level 04	37/52 (71%)
Level 05	44/52 (85%)
Level 06	39/52 (75%)
Level 07	51/52 (98%)
Level 08	33/34 (97%)
Level 09	17/20 (85%)
Level 10	15/15 (100%)
Level 11	18/18 (100%)
<b>All Levels</b>	<b>343/432 (79%)</b>



Percentage number of rooms that meet/exceed BRE guidance of all beds and living rooms

Level	All GHs WPSH	All GHs APSH	All GHs Overall
Level 01	2/2 (100%)	0/2 (0%)	0/2 (0%)
Level 02	8/8 (100%)	5/8 (62%)	5/8 (62%)
Level 03	7/7 (100%)	2/7 (29%)	2/7 (29%)
Level 04	8/8 (100%)	2/8 (25%)	2/8 (25%)
Level 05	8/8 (100%)	2/8 (25%)	2/8 (25%)
Level 06	8/8 (100%)	2/8 (25%)	2/8 (25%)
Level 07	3/3 (100%)	1/3 (33%)	1/3 (33%)
Level 08	6/6 (100%)	4/6 (67%)	4/6 (67%)
Level 09	2/2 (100%)	0/2 (0%)	0/2 (0%)
Level 10	2/2 (100%)	2/2 (100%)	2/2 (100%)
<b>All Levels</b>	<b>54/54 (100%)</b>	<b>20/54 (37%)</b>	<b>20/54 (37%)</b>



Percentage number of rooms that meet/exceed BRE guidance of all south-facing living rooms

### Conclusion

This report presented the results of a daylight and sunlight assessment of the Gas Holder Triplets.

The established setting within the Grade II listed linked guide frames of the former Gas Holders posed a number of interesting challenges to the design team. This is because the circular footprint of the buildings, as well as their proximity to each other makes a provision for good levels of natural light more difficult than it would be with a more conventional design.

The high density urban location and proximity to other ongoing and planned developments lead to overshadowing of the building.

However, 79% of all the habitable rooms achieve or exceed the BRE Criteria for daylighting and those rooms which fall below the BRE Guidelines are generally affected by self-shading from adjacent buildings.

37% of windows that are south facing windows, that have the potential to receive sunlight, achieve the criteria in BRE guidelines however, as described previously, 100% meet/exceed Winter Probable Sunlight Hours. This is typical of apartments where the need to control excessive solar gain, through the use of balconies, is a factor to reduce energy usage.

Therefore the daylight and sunlight in the Gas Holder Triplets is, in our opinion, acceptable by reference to the BRE Guidelines, which have been applied as required by Condition 43.



**4.0**

**Appendix**

## **4.1 Average Daylight Factors**

## 4.0 Appendix

Room	ADF	Target	Pass/Fail
gh10flr01apt01bed01	3.66	1.0	Pass
gh10flr01apt01bed02	3.61	1.0	Pass
gh10flr01apt02bed01	5.01	1.0	Pass
gh10flr01apt02bed02	4.80	1.0	Pass
gh10flr01apt03bed01	4.37	1.0	Pass
gh10flr01apt03bed02	5.65	1.0	Pass
gh10flr01apt04bed01	4.37	1.0	Pass
gh10flr01apt04bed02	5.16	1.0	Pass
gh10flr01apt05bed01	4.45	1.0	Pass
gh10flr01apt05bed02	4.29	1.0	Pass
gh10flr01apt06bed01	4.09	1.0	Pass
gh10flr01apt06bed02	2.66	1.0	Pass
gh10flr02apt01bed01	0.39	1.0	Fail
gh10flr02apt01bed02	0.99	1.0	Fail
gh10flr02apt01liv01	1.93	1.5	Pass
gh10flr02apt02bed01	3.07	1.0	Pass
gh10flr02apt02bed02	2.82	1.0	Pass
gh10flr02apt03bed01	2.73	1.0	Pass
gh10flr02apt03bed02	3.49	1.0	Pass
gh10flr02apt04bed02	3.20	1.0	Pass
gh10flr02apt04liv01	2.03	1.5	Pass
gh10flr02apt05liv01	3.20	1.5	Pass
gh10flr02apt06liv01	3.11	1.5	Pass
gh10flr02apt07bed01	3.28	1.0	Pass
gh10flr02apt07liv01	2.46	1.5	Pass
gh10flr02apt08bed01	3.18	1.0	Pass
gh10flr02apt08liv01	2.25	1.5	Pass
gh10flr02apt09liv01	2.11	1.5	Pass
gh10flr03apt01bed01	0.48	1.0	Fail
gh10flr03apt01bed02	0.55	1.0	Fail
gh10flr03apt01liv01	1.20	1.5	Fail
gh10flr03apt02liv01	2.08	1.5	Pass
gh10flr03apt03bed01	2.20	1.0	Pass
gh10flr03apt03liv01	1.74	1.5	Pass
gh10flr03apt04liv01	2.71	1.5	Pass
gh10flr03apt05bed01	2.63	1.0	Pass
gh10flr03apt05bed02	3.88	1.0	Pass
gh10flr03apt05liv01	1.69	1.5	Pass
gh10flr03apt06bed01	2.66	1.0	Pass
gh10flr03apt06bed02	3.30	1.0	Pass
gh10flr03apt06bed03	2.66	1.0	Pass
gh10flr03apt06liv01	1.59	1.5	Pass

Room	ADF	Target	Pass/Fail
gh10flr03apt07bed01	3.02	1.0	Pass
gh10flr03apt07bed02	2.69	1.0	Pass
gh10flr03apt07bed03	2.06	1.0	Pass
gh10flr03apt07liv01	1.62	1.5	Pass
gh10flr04apt01bed01	0.57	1.0	Fail
gh10flr04apt01bed02	0.76	1.0	Fail
gh10flr04apt01liv01	2.00	1.5	Pass
gh10flr04apt02bed01	3.21	1.0	Pass
gh10flr04apt02bed02	4.02	1.0	Pass
gh10flr04apt02liv01	2.01	1.5	Pass
gh10flr04apt03liv01	3.66	1.5	Pass
gh10flr04apt04liv01	3.90	1.5	Pass
gh10flr04apt05bed01	3.43	1.0	Pass
gh10flr04apt05bed02	4.07	1.0	Pass
gh10flr04apt05liv01	2.25	1.5	Pass
gh10flr04apt06bed01	3.47	1.0	Pass
gh10flr04apt06bed02	4.07	1.0	Pass
gh10flr04apt06bed03	3.42	1.0	Pass
gh10flr04apt06liv01	2.00	1.5	Pass
gh10flr04apt07bed01	3.80	1.0	Pass
gh10flr04apt07bed02	3.39	1.0	Pass
gh10flr04apt07bed03	2.55	1.0	Pass
gh10flr04apt07liv01	2.02	1.5	Pass
gh10flr05apt01bed01	0.75	1.0	Fail
gh10flr05apt01bed02	1.02	1.0	Pass
gh10flr05apt01liv01	1.77	1.5	Pass
gh10flr05apt02bed01	3.16	1.0	Pass
gh10flr05apt02bed02	3.97	1.0	Pass
gh10flr05apt02liv01	2.09	1.5	Pass
gh10flr05apt03liv01	3.65	1.5	Pass
gh10flr05apt04liv01	3.89	1.5	Pass
gh10flr05apt05bed01	3.45	1.0	Pass
gh10flr05apt05bed02	3.94	1.0	Pass
gh10flr05apt05liv01	2.34	1.5	Pass
gh10flr05apt06bed01	3.39	1.0	Pass
gh10flr05apt06bed02	4.01	1.0	Pass
gh10flr05apt06bed03	3.34	1.0	Pass
gh10flr05apt06liv01	2.11	1.5	Pass
gh10flr05apt07bed01	3.71	1.0	Pass
gh10flr05apt07bed02	3.33	1.0	Pass
gh10flr05apt07bed03	2.54	1.0	Pass
gh10flr05apt07liv01	2.07	1.5	Pass

Room	ADF	Target	Pass/Fail
gh10flr06apt01bed01	1.25	1.0	Pass
gh10flr06apt01bed02	1.44	1.0	Pass
gh10flr06apt01liv01	1.90	1.5	Pass
gh10flr06apt02bed01	2.92	1.0	Pass
gh10flr06apt02bed02	3.02	1.0	Pass
gh10flr06apt02liv01	1.63	1.5	Pass
gh10flr06apt03liv01	2.82	1.5	Pass
gh10flr06apt04liv01	2.57	1.5	Pass
gh10flr06apt05bed01	3.06	1.0	Pass
gh10flr06apt05bed02	3.26	1.0	Pass
gh10flr06apt05liv01	1.68	1.5	Pass
gh10flr06apt06bed01	3.16	1.0	Pass
gh10flr06apt06bed02	3.16	1.0	Pass
gh10flr06apt06bed03	3.21	1.0	Pass
gh10flr06apt06liv01	1.65	1.5	Pass
gh10flr06apt07bed01	2.56	1.0	Pass
gh10flr06apt07bed02	2.72	1.0	Pass
gh10flr06apt07bed03	2.02	1.0	Pass
gh10flr06apt07liv01	1.49	1.5	Fail
gh10flr07apt01bed01	2.36	1.0	Pass
gh10flr07apt01bed02	2.53	1.0	Pass
gh10flr07apt01bed03	3.32	1.0	Pass
gh10flr07apt02bed01	4.42	1.0	Pass
gh10flr07apt02bed02	4.07	1.0	Pass
gh10flr07apt02bed03	2.69	1.0	Pass
gh10flr07apt02bed04	3.52	1.0	Pass
gh10flr07apt03bed01	3.33	1.0	Pass
gh10flr07apt03bed02	2.69	1.0	Pass
gh10flr07apt03bed03	4.04	1.0	Pass
gh10flr07apt03bed04	4.87	1.0	Pass
gh10flr07apt04bed01	4.42	1.0	Pass
gh10flr07apt04bed02	4.06	1.0	Pass
gh10flr07apt04bed03	2.70	1.0	Pass
gh10flr07apt04bed04	3.60	1.0	Pass
gh10flr07apt05bed01	3.30	1.0	Pass
gh10flr07apt05bed02	2.43	1.0	Pass
gh10flr07apt05bed03	3.68	1.0	Pass
gh10flr07apt05bed04	2.99	1.0	Pass
gh10flr08apt01kit01	3.01	2.0	Pass
gh10flr08apt01liv01	5.01	1.5	Pass
gh10flr08apt02din01	7.12	1.5	Pass
gh10flr08apt02kit01	3.53	2.0	Pass

Room	ADF	Target	Pass/Fail
gh10flr08apt02liv01	4.26	1.5	Pass
gh10flr08apt03din01	7.18	1.5	Pass
gh10flr08apt03kit01	2.96	2.0	Pass
gh10flr08apt03liv01	4.47	1.5	Pass
gh10flr08apt04din01	7.12	1.5	Pass
gh10flr08apt04kit01	3.62	2.0	Pass
gh10flr08apt04liv01	4.23	1.5	Pass
gh10flr08apt05din01	6.97	1.5	Pass
gh10flr08apt05kit01	3.32	2.0	Pass
gh10flr08apt05liv01	3.72	1.5	Pass

## 4.0 Appendix

Room	ADF	Target	Pass/Fail
gh11flr01apt01bed01	0.71	1.0	Fail
gh11flr01apt01bed02	2.01	1.0	Pass
gh11flr01apt01bed03	4.03	1.0	Pass
gh11flr01apt01liv01	1.44	1.5	Fail
gh11flr01apt02bed01	4.23	1.0	Pass
gh11flr01apt02bed02	3.14	1.0	Pass
gh11flr01apt02bed03	3.71	1.0	Pass
gh11flr01apt02liv01	1.85	1.5	Pass
gh11flr01apt03bed01	3.29	1.0	Pass
gh11flr01apt03bed02	1.70	1.0	Pass
gh11flr01apt03liv01	0.82	1.5	Fail
gh11flr01apt04liv01	2.88	1.5	Pass
gh11flr01apt05bed01	1.99	1.0	Pass
gh11flr01apt05liv01	0.81	1.5	Fail
gh11flr01apt06bed01	0.49	1.0	Fail
gh11flr01apt06liv01	0.52	1.5	Fail
gh11flr01apt07bed01	0.62	1.0	Fail
gh11flr01apt07liv01	0.89	1.5	Fail
gh11flr01apt08bed01	0.78	1.0	Fail
gh11flr01apt08liv01	0.96	1.5	Fail
gh11flr02apt01bed01	0.63	1.0	Fail
gh11flr02apt01bed02	1.92	1.0	Pass
gh11flr02apt01bed03	3.60	1.0	Pass
gh11flr02apt01liv01	1.41	1.5	Fail
gh11flr02apt02bed01	3.82	1.0	Pass
gh11flr02apt02bed02	2.94	1.0	Pass
gh11flr02apt02bed03	3.57	1.0	Pass
gh11flr02apt02liv01	1.82	1.5	Pass
gh11flr02apt03bed01	3.28	1.0	Pass
gh11flr02apt03bed02	1.71	1.0	Pass
gh11flr02apt03liv01	0.80	1.5	Fail
gh11flr02apt04liv01	2.99	1.5	Pass
gh11flr02apt05bed01	1.96	1.0	Pass
gh11flr02apt05liv01	0.96	1.5	Fail
gh11flr02apt06bed01	0.49	1.0	Fail
gh11flr02apt06liv01	0.67	1.5	Fail
gh11flr02apt07bed01	0.60	1.0	Fail
gh11flr02apt07liv01	0.92	1.5	Fail
gh11flr02apt08bed01	0.74	1.0	Fail
gh11flr02apt08liv01	0.97	1.5	Fail
gh11flr03apt01bed01	0.95	1.0	Fail
gh11flr03apt01bed02	1.71	1.0	Pass

Room	ADF	Target	Pass/Fail
gh11flr03apt01bed03	3.30	1.0	Pass
gh11flr03apt01liv01	1.12	1.5	Fail
gh11flr03apt02bed01	3.44	1.0	Pass
gh11flr03apt02bed02	2.42	1.0	Pass
gh11flr03apt02bed03	2.91	1.0	Pass
gh11flr03apt02liv01	1.43	1.5	Fail
gh11flr03apt03bed01	2.83	1.0	Pass
gh11flr03apt03bed02	1.44	1.0	Pass
gh11flr03apt03liv01	0.70	1.5	Fail
gh11flr03apt04liv01	2.78	1.5	Pass
gh11flr03apt05bed01	1.95	1.0	Pass
gh11flr03apt05liv01	1.20	1.5	Fail
gh11flr03apt06bed01	0.71	1.0	Fail
gh11flr03apt06liv03	0.59	1.5	Fail
gh11flr03apt07bed01	0.70	1.0	Fail
gh11flr03apt07liv01	0.84	1.5	Fail
gh11flr03apt08bed01	0.79	1.0	Fail
gh11flr03apt08liv01	1.04	1.5	Fail
gh11flr04apt01bed01	0.96	1.0	Fail
gh11flr04apt01bed02	2.16	1.0	Pass
gh11flr04apt01bed03	3.99	1.0	Pass
gh11flr04apt01liv01	1.47	1.5	Fail
gh11flr04apt02bed01	4.26	1.0	Pass
gh11flr04apt02bed02	3.19	1.0	Pass
gh11flr04apt02bed03	3.99	1.0	Pass
gh11flr04apt02liv01	1.83	1.5	Pass
gh11flr04apt03bed01	3.69	1.0	Pass
gh11flr04apt03bed02	2.17	1.0	Pass
gh11flr04apt03liv01	1.04	1.5	Fail
gh11flr04apt04liv01	3.60	1.5	Pass
gh11flr04apt05bed01	2.52	1.0	Pass
gh11flr04apt05liv01	1.21	1.5	Fail
gh11flr04apt06bed01	0.74	1.0	Fail
gh11flr04apt06liv01	0.83	1.5	Fail
gh11flr04apt07bed01	0.88	1.0	Fail
gh11flr04apt07liv01	1.09	1.5	Fail
gh11flr04apt08bed01	1.03	1.0	Pass
gh11flr04apt08liv01	1.22	1.5	Fail
gh11flr05apt01bed01	1.04	1.0	Pass
gh11flr05apt01bed02	2.40	1.0	Pass
gh11flr05apt01bed03	3.88	1.0	Pass
gh11flr05apt01liv01	1.70	1.5	Pass

Room	ADF	Target	Pass/Fail
gh11flr05apt02bed01	4.32	1.0	Pass
gh11flr05apt02bed02	2.85	1.0	Pass
gh11flr05apt02bed03	3.66	1.0	Pass
gh11flr05apt02liv01	1.84	1.5	Pass
gh11flr05apt03bed01	3.08	1.0	Pass
gh11flr05apt03bed02	2.14	1.0	Pass
gh11flr05apt03liv01	1.09	1.5	Fail
gh11flr05apt04liv01	3.74	1.5	Pass
gh11flr05apt05bed02	2.27	1.0	Pass
gh11flr05apt05bed03	1.66	1.0	Pass
gh11flr05apt06bed02	1.25	1.0	Pass
gh11flr05apt06bed03	0.98	1.0	Fail
gh11flr05apt07bed01	1.08	1.0	Pass
gh11flr05apt07liv01	1.16	1.5	Fail
gh11flr05apt08bed01	0.73	1.0	Fail
gh11flr05apt08liv01	1.35	1.5	Fail
gh11flr06apt01bed01	1.32	1.0	Pass
gh11flr06apt01bed02	2.12	1.0	Pass
gh11flr06apt01bed03	3.35	1.0	Pass
gh11flr06apt01liv01	1.34	1.5	Fail
gh11flr06apt02bed01	3.71	1.0	Pass
gh11flr06apt02bed02	2.26	1.0	Pass
gh11flr06apt02bed03	3.15	1.0	Pass
gh11flr06apt02liv01	1.41	1.5	Fail
gh11flr06apt03bed01	2.67	1.0	Pass
gh11flr06apt03bed02	1.94	1.0	Pass
gh11flr06apt03liv01	0.77	1.5	Fail
gh11flr06apt04liv01	3.19	1.5	Pass
gh11flr06apt05bed01	1.94	1.0	Pass
gh11flr06apt05liv01	0.97	1.5	Fail
gh11flr06apt06bed01	0.98	1.0	Fail
gh11flr06apt06liv01	0.91	1.5	Fail
gh11flr06apt07bed01	0.99	1.0	Fail
gh11flr06apt07liv01	1.00	1.5	Fail
gh11flr06apt08bed01	0.87	1.0	Fail
gh11flr06apt08liv01	1.57	1.5	Pass
gh11flr07apt01bed01	1.78	1.0	Pass
gh11flr07apt01bed02	2.76	1.0	Pass
gh11flr07apt01bed03	4.10	1.0	Pass
gh11flr07apt01liv01	1.77	1.5	Pass
gh11flr07apt02bed01	4.50	1.0	Pass
gh11flr07apt02bed02	2.91	1.0	Pass

Room	ADF	Target	Pass/Fail
gh11flr07apt02bed03	4.17	1.0	Pass
gh11flr07apt02liv01	1.82	1.5	Pass
gh11flr07apt03bed01	3.80	1.0	Pass
gh11flr07apt03bed02	2.85	1.0	Pass
gh11flr07apt03liv01	1.35	1.5	Fail
gh11flr07apt04liv01	4.51	1.5	Pass
gh11flr07apt05bed01	2.72	1.0	Pass
gh11flr07apt05bed02	2.01	1.0	Pass
gh11flr07apt06bed01	1.61	1.0	Pass
gh11flr07apt06bed02	1.42	1.0	Pass
gh11flr07apt07bed01	1.57	1.0	Pass
gh11flr07apt07liv01	1.50	1.5	Pass
gh11flr07apt08bed01	1.44	1.0	Pass
gh11flr07apt08liv01	2.17	1.5	Pass
gh11flr08apt01bed01	1.98	1.0	Pass
gh11flr08apt01bed02	2.87	1.0	Pass
gh11flr08apt01bed03	4.07	1.0	Pass
gh11flr08apt01liv01	1.90	1.5	Pass
gh11flr08apt02bed01	4.44	1.0	Pass
gh11flr08apt02bed02	2.96	1.0	Pass
gh11flr08apt02bed03	4.21	1.0	Pass
gh11flr08apt02liv01	1.90	1.5	Pass
gh11flr08apt03bed01	3.84	1.0	Pass
gh11flr08apt03bed02	2.95	1.0	Pass
gh11flr08apt03liv01	1.48	1.5	Fail
gh11flr08apt04liv01	4.61	1.5	Pass
gh11flr08apt05bed01	2.73	1.0	Pass
gh11flr08apt05liv01	1.71	1.5	Pass
gh11flr08apt06bed01	1.51	1.0	Pass
gh11flr08apt06liv01	1.70	1.5	Pass
gh11flr08apt07bed01	1.72	1.0	Pass
gh11flr08apt07liv01	1.71	1.5	Pass
gh11flr08apt08bed01	1.55	1.0	Pass
gh11flr08apt08liv01	2.43	1.5	Pass
gh11flr09apt01bed01	2.22	1.0	Pass
gh11flr09apt01bed02	2.15	1.0	Pass
gh11flr09apt01bed03	3.24	1.0	Pass
gh11flr09apt01liv01	1.44	1.5	Fail
gh11flr09apt02bed01	3.44	1.0	Pass
gh11flr09apt02bed02	2.55	1.0	Pass
gh11flr09apt02bed03	3.21	1.0	Pass
gh11flr09apt02liv01	1.56	1.5	Pass

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Room	ADF	Target	Pass/Fail
gh11flr09apt03bed01	3.29	1.0	Pass
gh11flr09apt03bed02	2.08	1.0	Pass
gh11flr09apt03liv01	1.19	1.5	Fail
gh11flr09apt04liv01	3.56	1.5	Pass
gh11flr09apt05bed01	2.49	1.0	Pass
gh11flr09apt05bed02	2.18	1.0	Pass
gh11flr09apt06bed01	1.50	1.0	Pass
gh11flr09apt06bed02	1.15	1.0	Pass
gh11flr09apt07bed01	1.45	1.0	Pass
gh11flr09apt07liv01	1.44	1.5	Fail
gh11flr09apt08bed01	1.67	1.0	Pass
gh11flr09apt08liv01	1.94	1.5	Pass
gh11flr10apt01din01	3.67	1.5	Pass
gh11flr10apt01kit01	3.35	2.0	Pass
gh11flr10apt01liv01	3.08	1.5	Pass
gh11flr10apt02din01	3.89	1.5	Pass
gh11flr10apt02kit01	3.30	2.0	Pass
gh11flr10apt02liv01	3.08	1.5	Pass
gh11flr10apt03din01	3.01	1.5	Pass
gh11flr10apt03kit01	4.17	2.0	Pass
gh11flr10apt03liv01	2.90	1.5	Pass
gh11flr10apt04din01	2.82	1.5	Pass
gh11flr10apt04kit01	2.35	2.0	Pass
gh11flr10apt04liv01	2.93	1.5	Pass
gh11flr10apt05din01	3.09	1.5	Pass
gh11flr10apt05kit01	2.28	2.0	Pass
gh11flr10apt05liv01	2.63	1.5	Pass
gh11flr11apt01bed01	3.87	1.0	Pass
gh11flr11apt01bed02	4.35	1.0	Pass
gh11flr11apt01bed03	7.04	1.0	Pass
gh11flr11apt01bed04	4.82	1.0	Pass
gh11flr11apt02bed01	5.10	1.0	Pass
gh11flr11apt02bed02	7.38	1.0	Pass
gh11flr11apt02bed03	4.24	1.0	Pass
gh11flr11apt02bed04	4.84	1.0	Pass
gh11flr11apt03bed01	4.74	1.0	Pass
gh11flr11apt03bed02	4.03	1.0	Pass
gh11flr11apt03bed03	6.26	1.0	Pass
gh11flr11apt03bed04	6.06	1.0	Pass
gh11flr11apt04bed01	3.64	1.0	Pass
gh11flr11apt04bed02	5.18	1.0	Pass
gh11flr11apt04bed03	4.42	1.0	Pass

Room	ADF	Target	Pass/Fail
gh11flr11apt05bed01	4.37	1.0	Pass
gh11flr11apt05bed02	4.59	1.0	Pass
gh11flr11apt05bed03	3.04	1.0	Pass

Room	ADF	Target	Pass/Fail
gh12flr01apt01bed01	0.32	1.0	Fail
gh12flr01apt01liv01	0.85	1.5	Fail
gh12flr01apt02bed01	1.20	1.0	Pass
gh12flr01apt02liv01	1.30	1.5	Fail
gh12flr01apt03liv01	1.12	1.5	Fail
gh12flr02apt01bed01	0.32	1.0	Fail
gh12flr02apt01liv01	0.84	1.5	Fail
gh12flr02apt02bed01	2.18	1.0	Pass
gh12flr02apt02liv01	1.56	1.5	Pass
gh12flr02apt03bed01	1.52	1.0	Pass
gh12flr02apt03bed02	0.83	1.0	Fail
gh12flr02apt03liv01	1.02	1.5	Fail
gh12flr02apt04bed01	3.08	1.0	Pass
gh12flr02apt04bed02	2.94	1.0	Pass
gh12flr02apt04liv01	2.45	1.5	Pass
gh12flr02apt05bed01	2.48	1.0	Pass
gh12flr02apt05bed02	1.26	1.0	Pass
gh12flr02apt05liv01	1.91	1.5	Pass
gh12flr03apt01bed01	0.38	1.0	Fail
gh12flr03apt01liv01	0.91	1.5	Fail
gh12flr03apt02bed01	2.03	1.0	Pass
gh12flr03apt02liv01	1.59	1.5	Pass
gh12flr03apt03bed01	1.30	1.0	Pass
gh12flr03apt03bed02	0.75	1.0	Fail
gh12flr03apt03liv01	0.88	1.5	Fail
gh12flr03apt04bed01	2.40	1.0	Pass
gh12flr03apt04bed02	2.34	1.0	Pass
gh12flr03apt04liv01	2.13	1.5	Pass
gh12flr03apt05bed01	1.84	1.0	Pass
gh12flr03apt05bed02	1.28	1.0	Pass
gh12flr03apt05liv01	1.49	1.5	Fail
gh12flr04apt01bed01	0.50	1.0	Fail
gh12flr04apt01liv01	0.95	1.5	Fail
gh12flr04apt02bed01	2.75	1.0	Pass
gh12flr04apt02liv01	2.17	1.5	Pass
gh12flr04apt03bed01	1.75	1.0	Pass
gh12flr04apt03bed02	0.99	1.0	Fail
gh12flr04apt03liv01	1.25	1.5	Fail
gh12flr04apt04bed01	3.28	1.0	Pass
gh12flr04apt04bed02	3.28	1.0	Pass
gh12flr04apt04liv01	3.15	1.5	Pass
gh12flr04apt05bed01	2.99	1.0	Pass

Room	ADF	Target	Pass/Fail
gh12flr04apt05bed02	2.10	1.0	Pass
gh12flr04apt05liv01	2.15	1.5	Pass
gh12flr05apt01bed01	0.57	1.0	Fail
gh12flr05apt01liv01	1.09	1.5	Fail
gh12flr05apt02bed01	1.71	1.0	Pass
gh12flr05apt02liv01	1.92	1.5	Pass
gh12flr05apt03bed01	2.00	1.0	Pass
gh12flr05apt03bed02	1.84	1.0	Pass
gh12flr05apt03liv01	1.71	1.5	Pass
gh12flr05apt04bed01	3.14	1.0	Pass
gh12flr05apt04bed02	2.52	1.0	Pass
gh12flr05apt04liv01	2.40	1.5	Pass
gh12flr05apt05bed01	4.18	1.0	Pass
gh12flr05apt05bed02	2.19	1.0	Pass
gh12flr05apt05liv01	2.29	1.5	Pass
gh12flr06apt01bed01	0.75	1.0	Fail
gh12flr06apt01liv01	1.12	1.5	Fail
gh12flr06apt02bed01	1.52	1.0	Pass
gh12flr06apt02liv01	1.93	1.5	Pass
gh12flr06apt03bed01	1.67	1.0	Pass
gh12flr06apt03bed02	1.42	1.0	Pass
gh12flr06apt03liv01	1.42	1.5	Fail
gh12flr06apt04bed01	2.41	1.0	Pass
gh12flr06apt04bed02	1.69	1.0	Pass
gh12flr06apt04liv01	1.82	1.5	Pass
gh12flr06apt05bed01	3.01	1.0	Pass
gh12flr06apt05bed02	1.74	1.0	Pass
gh12flr06apt05liv01	1.65	1.5	Pass
gh12flr07apt01bed01	1.08	1.0	Pass
gh12flr07apt01liv01	2.05	1.5	Pass
gh12flr07apt02bed01	2.21	1.0	Pass
gh12flr07apt02liv01	2.77	1.5	Pass
gh12flr07apt03bed01	2.29	1.0	Pass
gh12flr07apt03bed02	2.13	1.0	Pass
gh12flr07apt03liv01	2.76	1.5	Pass
gh12flr07apt04bed01	3.34	1.0	Pass
gh12flr07apt04bed02	2.48	1.0	Pass
gh12flr07apt04liv01	3.57	1.5	Pass
gh12flr07apt05bed01	4.27	1.0	Pass
gh12flr07apt05bed02	2.54	1.0	Pass
gh12flr07apt05liv01	3.07	1.5	Pass



## 4.2 Probable Sunlight Hours

## 4.0 Appendix

Room	Winter PSH	Winter P/F	Annual PSH	Annual P/F	Overall P/F
gh10flr02apt04liv01	19.5%	Pass	57.5%	Pass	Pass
gh10flr02apt05liv01	30.0%	Pass	75.0%	Pass	Pass
gh10flr02apt06liv01	29.0%	Pass	71.5%	Pass	Pass
gh10flr02apt07liv01	20.5%	Pass	60.5%	Pass	Pass
gh10flr02apt08liv01	19.0%	Pass	55.0%	Pass	Pass
gh10flr03apt03liv01	19.0%	Pass	57.0%	Pass	Pass
gh10flr03apt04liv01	18.5%	Pass	56.5%	Pass	Pass
gh10flr03apt05liv01	20.5%	Pass	24.5%	Fail	Fail
gh10flr03apt06liv01	18.0%	Pass	23.5%	Fail	Fail
gh10flr04apt02liv01	7.0%	Pass	20.0%	Fail	Fail
gh10flr04apt03liv01	19.0%	Pass	57.0%	Pass	Pass
gh10flr04apt04liv01	18.5%	Pass	56.5%	Pass	Pass
gh10flr04apt05liv01	20.5%	Pass	24.5%	Fail	Fail
gh10flr04apt06liv01	18.0%	Pass	23.5%	Fail	Fail
gh10flr05apt02liv01	7.0%	Pass	20.0%	Fail	Fail
gh10flr05apt03liv01	19.5%	Pass	57.5%	Pass	Pass
gh10flr05apt04liv01	18.5%	Pass	57.5%	Pass	Pass
gh10flr05apt05liv01	20.5%	Pass	24.5%	Fail	Fail
gh10flr05apt06liv01	18.0%	Pass	23.5%	Fail	Fail
gh10flr06apt02liv01	8.0%	Pass	21.0%	Fail	Fail
gh10flr06apt03liv01	20.5%	Pass	59.0%	Pass	Pass
gh10flr06apt04liv01	19.5%	Pass	59.0%	Pass	Pass
gh10flr06apt05liv01	21.0%	Pass	23.0%	Fail	Fail
gh10flr06apt06liv01	17.0%	Pass	23.0%	Fail	Fail
gh10flr08apt02liv01	21.5%	Pass	62.0%	Pass	Pass
gh10flr08apt03liv01	31.5%	Pass	81.5%	Pass	Pass
gh10flr08apt04liv01	30.0%	Pass	84.5%	Pass	Pass
gh10flr08apt05liv01	19.0%	Pass	56.0%	Pass	Pass

Room	Winter PSH	Winter P/F	Annual PSH	Annual P/F	Overall P/F
gh11flr01apt01liv01	16.5%	Pass	16.5%	Fail	Fail
gh11flr01apt02liv01	10.5%	Pass	22.5%	Fail	Fail
gh11flr02apt01liv01	16.5%	Pass	16.5%	Fail	Fail
gh11flr02apt02liv01	10.5%	Pass	22.5%	Fail	Fail
gh11flr03apt01liv01	16.5%	Pass	16.5%	Fail	Fail
gh11flr03apt02liv01	10.5%	Pass	23.0%	Fail	Fail
gh11flr04apt01liv01	16.5%	Pass	16.5%	Fail	Fail
gh11flr04apt02liv01	10.5%	Pass	23.0%	Fail	Fail
gh11flr05apt01liv01	17.0%	Pass	17.0%	Fail	Fail
gh11flr05apt02liv01	10.0%	Pass	22.5%	Fail	Fail
gh11flr06apt01liv01	18.0%	Pass	18.0%	Fail	Fail
gh11flr06apt02liv01	10.0%	Pass	22.0%	Fail	Fail
gh11flr07apt01liv01	19.5%	Pass	19.5%	Fail	Fail
gh11flr07apt02liv01	10.0%	Pass	22.5%	Fail	Fail
gh11flr08apt01liv01	22.0%	Pass	22.0%	Fail	Fail
gh11flr08apt02liv01	10.0%	Pass	22.5%	Fail	Fail
gh11flr09apt01liv01	23.5%	Pass	23.5%	Fail	Fail
gh11flr09apt02liv01	10.5%	Pass	23.5%	Fail	Fail
gh11flr10apt01liv01	32.5%	Pass	85.0%	Pass	Pass
gh11flr10apt02liv01	23.0%	Pass	64.5%	Pass	Pass
gh12flr02apt05liv01	14.0%	Pass	21.5%	Fail	Fail
gh12flr03apt05liv01	15.5%	Pass	24.0%	Fail	Fail
gh12flr04apt05liv01	15.5%	Pass	24.0%	Fail	Fail
gh12flr05apt05liv01	14.0%	Pass	24.0%	Fail	Fail
gh12flr06apt05liv01	14.0%	Pass	24.0%	Fail	Fail
gh12flr07apt05liv01	18.5%	Pass	38.0%	Pass	Pass



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