



DAYLIGHT & SUNLIGHT

INTERNAL DAYLIGHT AND
SUNLIGHT ASSESSMENT

Northgate House, Reading

AEW UK Core Plus Property Fund

17 June 2024

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Client **AEW UK Core Plus Property Fund**
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CONTENTS

1	BRE GUIDELINES	2
2	SIMULATION ASSUMPTIONS	5
3	SITE OVERVIEW	6
4	CONCLUSIONS	8
5	INTERNAL DAYLIGHT AND SUNLIGHT ASSESSMENTS	10

1 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 (BR 209 2022)', guidelines and methodology for the measurement and assessment of daylight and sunlight within proposed buildings.

1.1 INTRODUCTION

The BRE published the new edition of 'Site layout planning for daylight and sunlight: a guide to good practice' in June 2022 (BR 209). This is to be read in conjunction with BS EN 17037:2018 "Daylight in buildings", the UK National Annex of the British Standard and the CIBSE publication LG 10 'Daylighting – a guide for designers'.

BR 209 aims "to help rather than constrain the designer" as stated in Paragraph 1.5 of the new guidance.

The report provides advice, but also clearly states that it "is not mandatory and the guide should not be seen as an instrument of planning policy." The guidance also acknowledges in its introduction that "Although it gives numerical guidelines, these should be interpreted flexibly since natural lighting is only one of many factors in site layout design (see Section 5). In special circumstances the developer or planning authority may wish to use different target values. For example, in a historic city centre, or in an area with modern high-rise buildings, a higher degree of obstruction may be unavoidable if new developments are to match the height and proportions of existing buildings." (Paragraph 1.6)

1.2 BS EN 17037:2018 AND THE UK ANNEX

The British Standard BS8206-2:2008 was superseded by the new European Standard on daylight BS EN 17037:2018 "Daylight in buildings".

Following on from the review of the European Standard by a dedicated commission of UK experts, the British Standard Institution appended to BS EN 17037:2018 a UK National Annex which brings the recommended light levels in line with those of the former BS8206-2:2008.

The BS EN 17037 includes four criteria: daylighting, views, sunlight access and glare. However, daylighting and sunlight access are the only criteria considered relevant for residential buildings and therefore discussed within this report.

View out and Glare are mostly relevant in offices and schools, where occupants are more fixed to a certain location within a room. In residential habitable

rooms, occupants tend to move more freely and therefore view out and glare are not assessed within residential buildings.

In relation to sunlight access, the assessment considers the hours of sunlight reaching a window on the 21st March.

1.3 DAYLIGHT

The BRE set out the methods for assessing daylight within a proposed building within section 2.1 and Appendix C of the handbook. This is based on the methods detailed in the BS EN 17037.

BS EN 17037 suggests two possible methodologies for appraising daylight:

- Illuminance Method
- Daylight Factor Method

These methodologies are discussed in more detail below.

Whilst Vertical Sky Component (VSC) is no longer directly used to calculate the levels of daylight indoors, this is still referenced within the BRE guidance as a metric to appraise the level of obstruction faced by a building and the potential for good daylight indoors.

This method of assessment may also be used to appraise the daylight quality in the early stages of the design, when room layouts or window locations are still undecided.

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.

Illuminance method

Climate Based Daylight Modelling (CBDM) is used to predict daylight illuminance using sun and sky conditions derived from standard meteorological data (often referred to as climate or weather data). This analytical method allows the prediction of absolute daylight illuminance based on the location and building orientation, in addition to the building's daylight systems (shading systems, for example). Annex A within the BS EN 17037 proposes values of target illuminances and minimum target illuminances to exceed 50 % of daylight hours over 50% or more of the assessment area.

BS EN 17037 sets out minimum illuminance levels (300 lux) that should be exceeded over 50% of the space for more than half of the daylight hours in the year. It also includes recommendations for medium and high daylighting levels within a space (500 lux and 700 lux respectively). It should be noted here, however, that these targets are specified irrespective of a space's use or design.

The National Annex suggests that these targets can be challenging to achieve within residential settings, particularly in areas of higher density and so suggests lower targets can be considered in this situation. It should be noted here that the reduced targets suggested within the BS EN 17037:2018 National Annex are provided so as to be comparable with the previous BR209's recommendations for ADF. These targets are:

- 100 lux for bedrooms
- 150 lux for living rooms
- 200 lux for living/kitchen/diners, kitchens, and studios.

It is however stated in paragraph C17 of the BRE that: *"Where a room has a shared use, the highest target should apply. For example in a bed sitting room in student accommodation, the value for a living room should be used if students would often spend time in their rooms during the day. Local authorities could use discretion here. For example, the target for a living room could be used for a combined living/dining/kitchen area if the kitchens are not treated*

as habitable spaces, as it may avoid small separate kitchens in a design".

Daylight Factor method

This method involves calculating the median daylight factor on a reference plane (assessment grid).

"The daylight factor is the illuminance at a point on the reference plane in a space, divided by the illuminance on an unobstructed horizontal surface outdoors. The CIE standard overcast sky is used, and the ratio is usually expressed as a percentage."

This method of assessments considers an overcast sky, and therefore the orientation and location of buildings is not relevant. In order to account for different climatic conditions, Annex A within the BS EN 17037 sets equivalent daylight factor targets (D) for various locations in Europe.

The median daylight factor (MDF) should meet or exceed the target daylight factor relative to a given illuminance for more than half of daylight hours, over 50% of the reference plane.

1.4 SUNLIGHT

The BRE provide guidance in respect of sunlight quality for new developments within section 3.1 of the handbook. It is generally acknowledged that the presence of sunlight is more significant in residential accommodation than it is in commercial properties, and this is reflected in the BRE document.

It states, *"in housing, the main requirement for sunlight is in living rooms, where it is valued at any time of the day, but especially in the afternoon. Sunlight is also required in conservatories. It is viewed as less important in bedrooms and in kitchens where people prefer it in the morning rather than the afternoon."*

The BRE guide considers the critical aspects of orientation and overshadowing in determining the availability of sunlight at a proposed development site.

The guide proposes minimising the number of dwellings whose living room face solely north unless there is some compensating factor such as an appealing view to the north, and it suggests a number of techniques to do so. Furthermore, it discusses

massing solutions with a sensitive approach to overshadowing, so as to maximize access to sunlight.

At the same time, it acknowledges that the site's existing urban environment may impose orientation or overshadowing constraints which may not be possible to overcome.

To quantify sunlight access for interiors where sunlight is expected, it refers to the BS EN 17037 criterion that the minimum duration of sunlight exposure in at least one habitable room of a dwelling should be 1.5 h on March 21st. Table A.5 also establishes medium and high sunlight targets (3 and 4 hours).

This is to be checked at a reference point located centrally to the window's width and at the inner surface of the aperture (façade and/or roof). For multiple apertures in different façades it is possible to cumulate the time of sunlight availability if not occurring at the same time. The reference point is minimum 1.2 m above the floor and 0.3 m above the window sill if present.

The summary of section 3.1 of the guide states as follows:

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

- *At least one main window faces within 90 degrees of due south, and*
- *a habitable room, preferably a main living room, can receive a total of at least 1.5 hours of sunlight on 21 March. This is assessed at the inside centre of the window(s); sunlight received by different windows can be added provided they occur at different times and sunlight hours are not double counted.. "*

1.5 FURTHER RELEVANT INFORMATION

CIBSE LG 10 'Daylighting – a guide for designers'.

This guide details the process of designing for daylighting. It outlines considerations of form, orientation, and other aspects involved in designing the building envelope to optimise natural light.

The guidance in this document is written primarily for buildings located within the UK, and will be most applicable to projects in northern hemisphere. However, the principles are universal, and can be applied to other locations if the appropriate weather data is used and local standards and regulations are respected

2 SIMULATION ASSUMPTIONS

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

Calculation model

The three dimensional representation of the proposed development has been modelled using the drawings prepared by AWW, received by GIA in June 2024. These have been placed in the context of their 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 façades, internal and external spaces, considering all of the surrounding obstructions and orientation.

The weather file recorded at Gatwick Airport was considered the most relevant for this assessment.

Surfaces reflectance

In general, the reflectance value to be applied to surfaces in the computational modelling follows the BR 209 Annex C, unless specified by the design team. Assumptions applied are:

- Interior walls - 0.7
- Ceilings - 0.8
- Floors - 0.4
- Exterior ground and external obstructions - 0.2

Assessment Grids

For the daylight assessments, an analysis 'grid' is located within each room at working plane height (850 mm from FFL) and offset by 0.3m from the walls as recommended by BR 209.

Grid points are spaced by 0.2m .

Assessment Resolution

The climate-based daylight assessments have been undertaken on an hourly basis whilst the sunlight exposure assessment has been undertaken for every minute on the relevant days.

Glazing transmittance

A glazing visible light transmittance (VLT) of 70% has been used as in agreement with the wider design team. A framing factor has been taken from the elevations supplied. Maintenance factors have been applied as per BR209 with 0.92 for windows not beneath an overhang and 0.76 for windows beneath an overhang.

The final transmittance values are shown in the table below.

BS EN 17037:2018						
GLAZING TYPE	TV (Normal)	TABLE NA.2 (%)	TABLE NA.3 (%)	TABLE NA.4 (%)	FRAMING FACTOR (%)	TV (Total)
TYPE 01	0.70	Urban (8)	Vertical (1)	Sheltered (3)	0.90	0.48
TYPE 02	0.70	Urban (8)	Vertical (1)	Not Shelt. (1)	0.90	0.58

Table 01: Transmittance and maintenance factors

3 SITE OVERVIEW

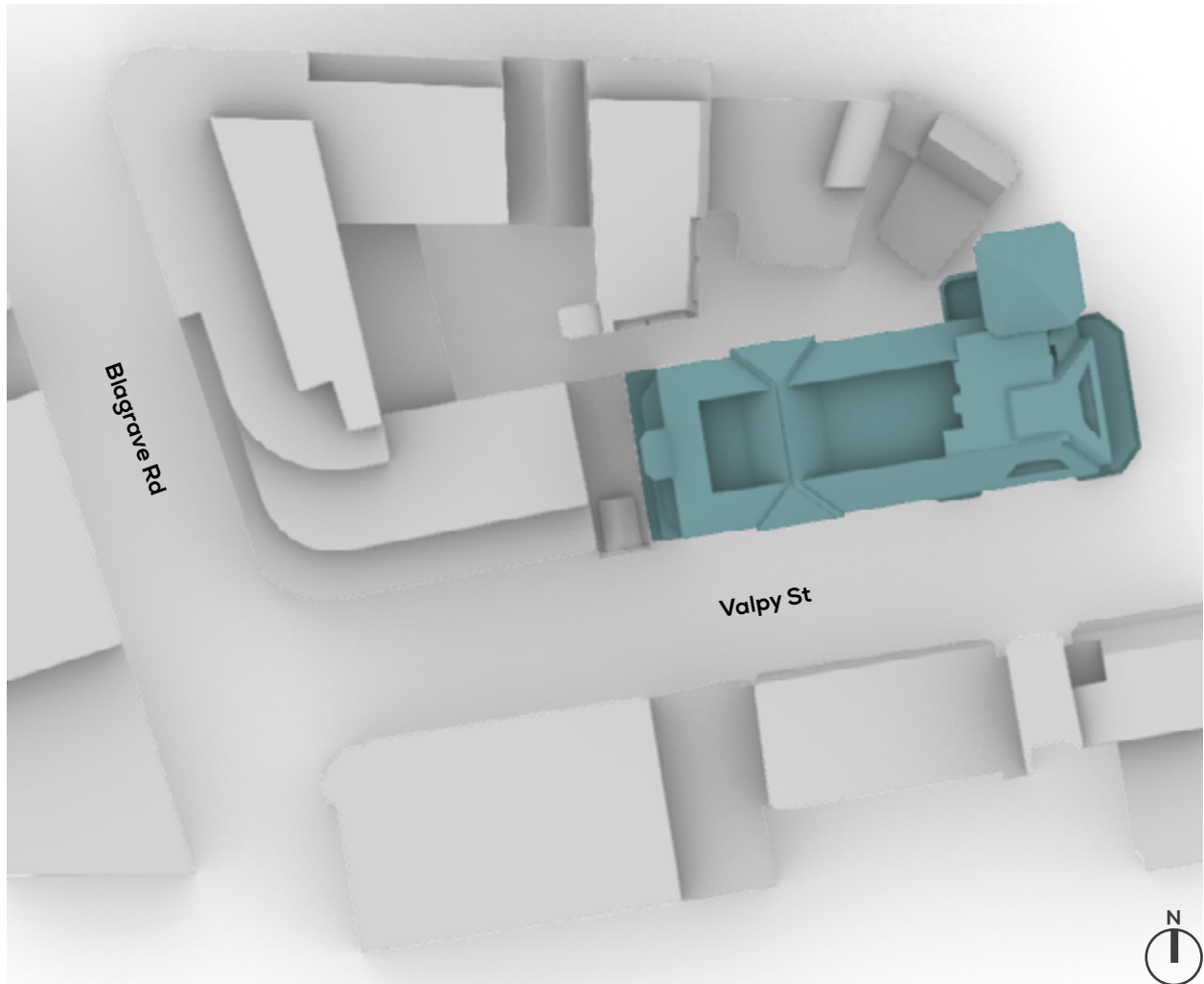


Fig. 01: Top view

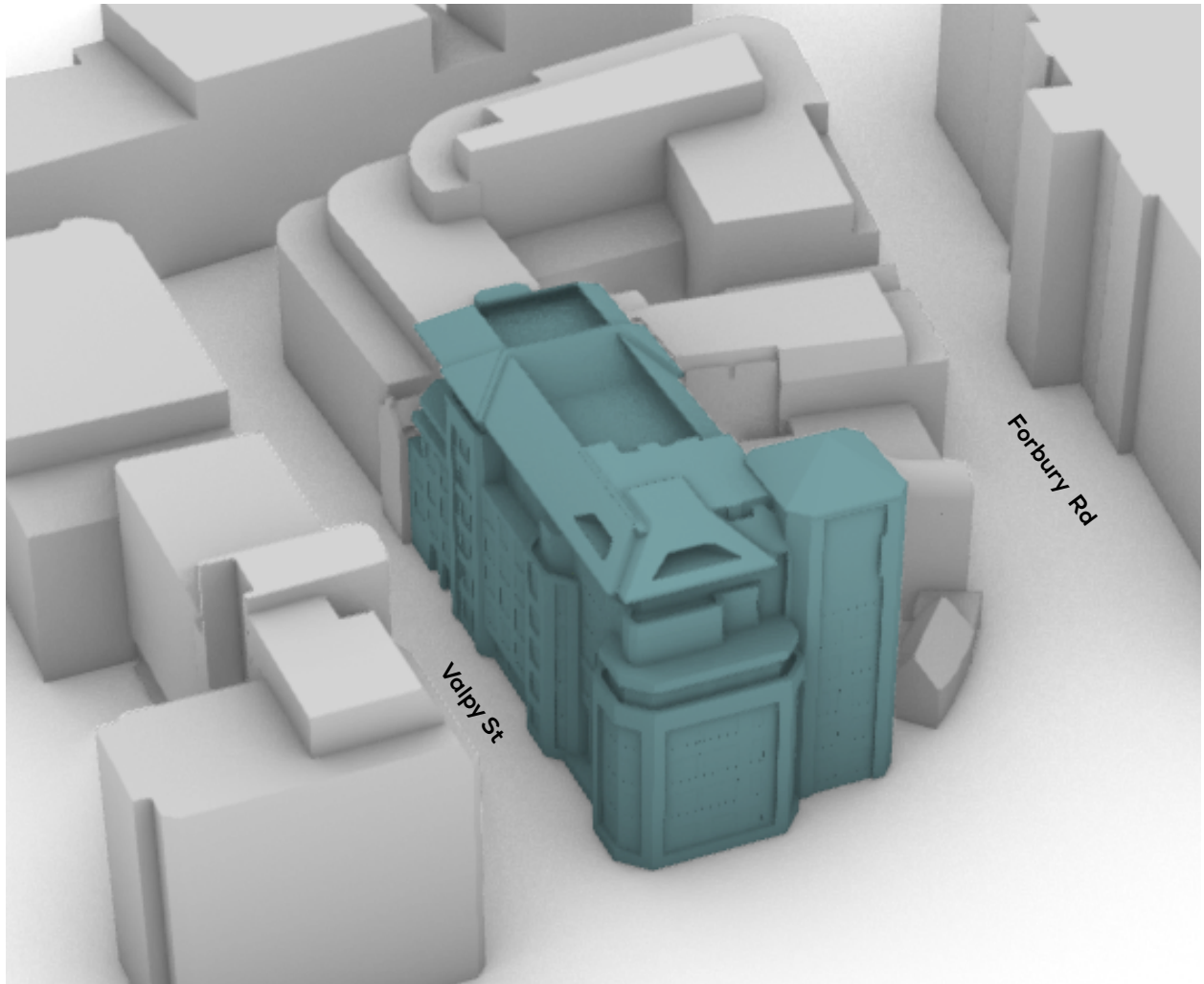


Fig. 02: Perspective view

4 CONCLUSIONS

The purpose of this report is to ascertain whether the proposed residential units at Northgate House, Reading will provide acceptable daylight and sunlight amenity for the enjoyment of future occupants.

The proposal, designed by AWW Architects, consists of a "change of use from Office (Use Class E) to provide 78 self-contained residential units (use Class C3)."

In terms of daylight and sunlight, the scheme is in close proximity to existing neighbouring properties to the south and north, which reduces its potential. The retained nature of the façades and the inherent depth of the floor plate bring additional constraints to the design. Section 3 of this report gives an overview of the scheme within its surrounding context.

In order to respond to the above constraints, GIA has worked alongside the design team to optimise the daylight and sunlight quality within the proposed residential units as much as possible. In particular, where possible, living rooms have been located in areas with higher daylight potential, and where needed, layouts have been reviewed and the depth of the rooms reduced where possible. Therefore, the results presented within this report illustrate a scheme optimised for daylight and sunlight as much as possible.

In addition to the above, it is important to bear in mind that the BRE Guidelines and the Housing SPG call for contextually appropriate daylight and sunlight targets, as opposed to measuring a development's performance based on nationally applicable numerical targets which are less suitable in denser urban environments. In this context, lower light levels are a natural consequence of balancing different design constraints and goals. This is acknowledged by BRE, which explains the advisory nature of the BRE Guidelines in section 1.6 of its handbook.

It should be noted that the results presented in this report are not intended to be viewed as a rigid pass/fail test based on a nationally applicable target. Instead, they should be understood in the context of the site's aspirations and the building's retained nature.

Further details on the appraised daylight and sunlight performance are provided below.

3.1 CONCLUSIONS ON DAYLIGHT AND SUNLIGHT

All habitable rooms have been technically assessed for their Median Daylight Illuminance (MDI) and sunlight exposure on 21st March, as recommended by BRE.

For daylight, rooms have been tested against the MDI targets set out within the UK National Annex (UKNA) on BS EN 17037:2018. For sunlight, BRE suggests that at least one room per unit, preferably a living room, should receive at least 1.5 hours of direct sunlight on the 21st March. Sections 1 and 2 provide further details on the applicable guidelines, adopted methodology and simulation assumptions.

The assessment results show that 156 out of the 195 tested rooms (80%) meet or exceed the minimum daylight illuminance levels.

The rooms achieving lower levels of daylight are 27 LKDs and 12 bedrooms.

The performance of the LKDs seeing lower levels of daylight is detailed below:

- 2 LKDs achieve at least the minimum recommendation for Living rooms (150 lux MDI) and therefore are considered well-lit living spaces;
- 7 LKDs see at least the minimum recommendation for bedrooms (100 lux MDI);
- The remaining 18 LKDs achieve between 35 and 98 lux MDI.

Most of the LKDs falling short of the recommendation are generously sized combined living kitchen and dining rooms, given the inherent depth of the floor plate, exceeding the minimum standards. In larger LKDs, natural light is typically concentrated at the front, with the rear (where kitchens are placed) relying more on supplementary artificial lighting. As MDI (Medium Daylight Illuminance) is calculated roughly at the centre of the room, this may lead to shortfalls even in rooms enjoying good light levels in their front part. Therefore, should only the living and dining areas at the front of those LKDs be assessed, most would likely report greater levels of MDI.

Of the 117 bedrooms assessed, only 12 see lower levels of daylight. Seven of them achieve at least 50 lux MDI, which is at least half of the minimum recommendation for bedrooms (100 lux MDI). The

remaining five bedrooms see levels of MDI ranging from 31 lux to 48 lux. Four of these rooms are on the lowest floor, facing north, where daylight expectation is lower.

In addition to the above, it is worth mentioning that 95% of the proposed units will have at least one room where daylight levels meet or exceed the minimum BRE guidance.

Regarding sunlight, 68% of the proposed units meet the minimum 1.5 hours of direct sunlight on the 21st of March for at least one room within a unit, as suggested by BRE. 70% of the proposed units have at least one room facing south. This performance is predominantly a function of the site's constraints and the fact that direct sunlight is intercepted by the existing context. Therefore, it can be considered acceptable overall, also taking into account the many other benefits such redevelopment brings.

It can be concluded that the scheme is making the most of the available natural light and future occupants will enjoy good daylight and sunlight levels on balance. Whilst lower light levels can be seen in some units, this is mainly a function of the site's constraints, and therefore, the appraised performance is considered acceptable overall.

5 INTERNAL DAYLIGHT AND SUNLIGHT ASSESSMENTS

Northgate House -Level 00

			DAYLIGHT		SUNLIGHT	
ROOM REF.	FLAT	ROOM USE	MEDIAN DAYLIGHT ILLUMINANCE (lux)	TARGET (lux)	BY ROOM	BY DWELLING
					21 MAR	WINDOW WITHIN 90° DUE SOUTH
NORTHGATE - LEVEL 00						
1	A	BEDROOM	31	100	00:00	NO
2	A	BEDROOM	46	100	00:00	
3	A	L/K/D	35	200	00:00	
4	B	BEDROOM	24	100	00:00	NO
5	B	BEDROOM	202	100	00:00	
6	B	L/K/D	70	200	00:00	
7	C	BEDROOM	202	100	00:00	NO
8	C	L/K/D	93	200	00:00	
9	D	STUDIO	324	200	00:00	YES
10	E	L/K/D	581	200	00:00	YES
11	E	BEDROOM	803	100	04:12	
12	E	BEDROOM	775	100	03:26	
13	F	BEDROOM	900	100	00:29	NO
14	F	BEDROOM	454	100	04:48	
15	F	L/K/D	394	200	04:43	
16	G	BEDROOM	914	100	04:35	YES
17	G	L/K/D	793	200	05:22	
18	H	L/K/D	50	200	02:14	YES
19	H	BEDROOM	124	100	01:00	
20	I	BEDROOM	144	100	01:09	YES
21	I	L/K/D	59	200	02:11	
22	J	L/K/D	53	200	01:25	YES
23	J	BEDROOM	58	100	01:02	
24	K	BEDROOM	132	100	01:24	YES
25	K	BEDROOM	48	100	00:58	
26	K	L/K/D	43	200	01:30	

Table 02: Assessment Data

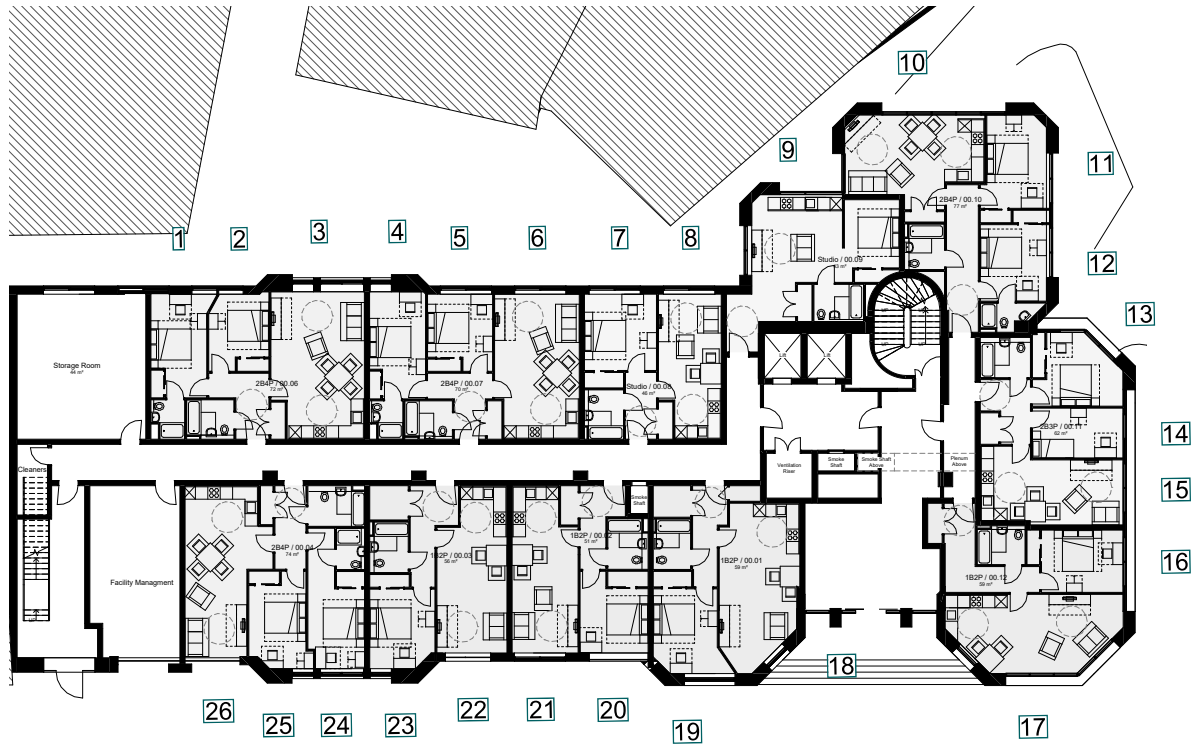
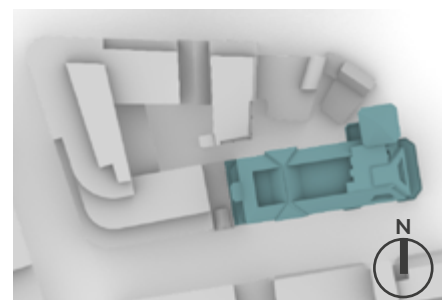


Fig. 03: Floor Plan



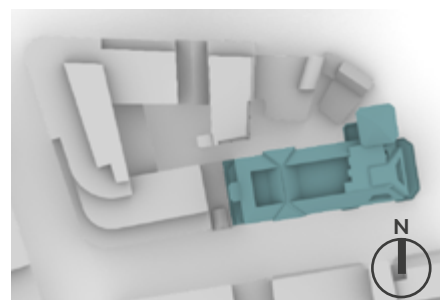
Northgate House -Level 01

			DAYLIGHT		SUNLIGHT	
ROOM REF.	FLAT	ROOM USE	MEDIAN DAYLIGHT ILLUMINANCE (lux)	TARGET (lux)	BY ROOM	BY DWELLING
					21 MAR	WINDOW WITHIN 90° DUE SOUTH
NORTHGATE - LEVEL 01						
27	L	BEDROOM	62	100	00:00	NO
28	L	BEDROOM	74	100	00:00	
29	L	L/K/D	51	200	00:00	
30	M	BEDROOM	37	100	00:00	NO
31	M	BEDROOM	345	100	00:00	
32	M	L/K/D	98	200	00:00	
33	N	BEDROOM	330	100	00:00	NO
34	N	L/K/D	143	200	00:00	
35	O	STUDIO	490	200	00:00	YES
36	P	L/K/D	778	200	00:00	YES
37	P	BEDROOM	967	100	04:12	
38	P	BEDROOM	872	100	03:26	
39	Q	BEDROOM	1018	100	00:29	NO
40	Q	BEDROOM	528	100	04:48	
41	Q	L/K/D	658	200	05:05	
42	R	L/K/D	1180	200	06:12	YES
43	R	BEDROOM	225	100	02:47	
44	R	BEDROOM	107	100	02:28	
45	S	BEDROOM	109	100	02:33	YES
46	S	BEDROOM	148	100	02:14	
47	S	L/K/D	46	200	01:21	
48	T	BEDROOM	193	100	02:16	YES
49	T	L/K/D	76	200	02:25	
50	U	L/K/D	75	200	02:36	YES
51	U	BEDROOM	72	100	01:02	
52	V	BEDROOM	169	100	02:31	YES
53	V	BEDROOM	62	100	00:58	
54	V	L/K/D	63	200	04:00	
55	W	L/K/D	127	200	04:33	YES
56	W	BEDROOM	311	100	04:48	

Table 03: Assessment Data



Fig. 04: Floor Plan



Northgate House -Level 02

NORTHGATE HOUSE - LEVEL 02			DAYLIGHT		SUNLIGHT	
ROOM REF.	FLAT	ROOM USE	MEDIAN DAYLIGHT ILLUMINANCE (lux)	TARGET (lux)	BY ROOM	BY DWELLING
					21 MAR	WINDOW WITHIN 90° DUE SOUTH
NORTHGATE - LEVEL 02						
57	X	BEDROOM	105	100	00:00	NO
58	X	BEDROOM	129	100	00:00	
59	X	L/K/D	120	200	00:00	
60	Y	BEDROOM	81	100	00:00	NO
61	Y	BEDROOM	563	100	00:00	
62	Y	L/K/D	181	200	00:00	
63	Z	BEDROOM	486	100	00:00	NO
64	Z	L/K/D	221	200	00:00	
65	AA	STUDIO	616	200	00:00	YES
66	AB	L/K/D	912	200	00:05	YES
67	AB	BEDROOM	1018	100	04:12	
68	AB	BEDROOM	923	100	03:26	
69	AC	BEDROOM	1066	100	00:29	NO
70	AC	BEDROOM	556	100	04:48	
71	AC	L/K/D	700	200	05:14	
72	AD	L/K/D	1272	200	07:26	YES
73	AD	BEDROOM	286	100	03:56	
74	AD	BEDROOM	308	100	04:16	
75	AE	BEDROOM	242	100	04:28	YES
76	AE	BEDROOM	182	100	02:17	
77	AE	L/K/D	56	200	04:29	
78	AF	BEDROOM	314	100	05:42	YES
79	AF	L/K/D	96	200	06:00	
80	AG	L/K/D	98	200	06:03	YES
81	AG	BEDROOM	102	100	03:57	
82	AH	BEDROOM	241	100	05:11	YES
83	AH	BEDROOM	84	100	03:21	
84	AH	L/K/D	94	200	05:56	
85	AI	L/K/D	203	200	05:58	YES
86	AI	BEDROOM	504	100	05:45	

Table 04: Assessment Data

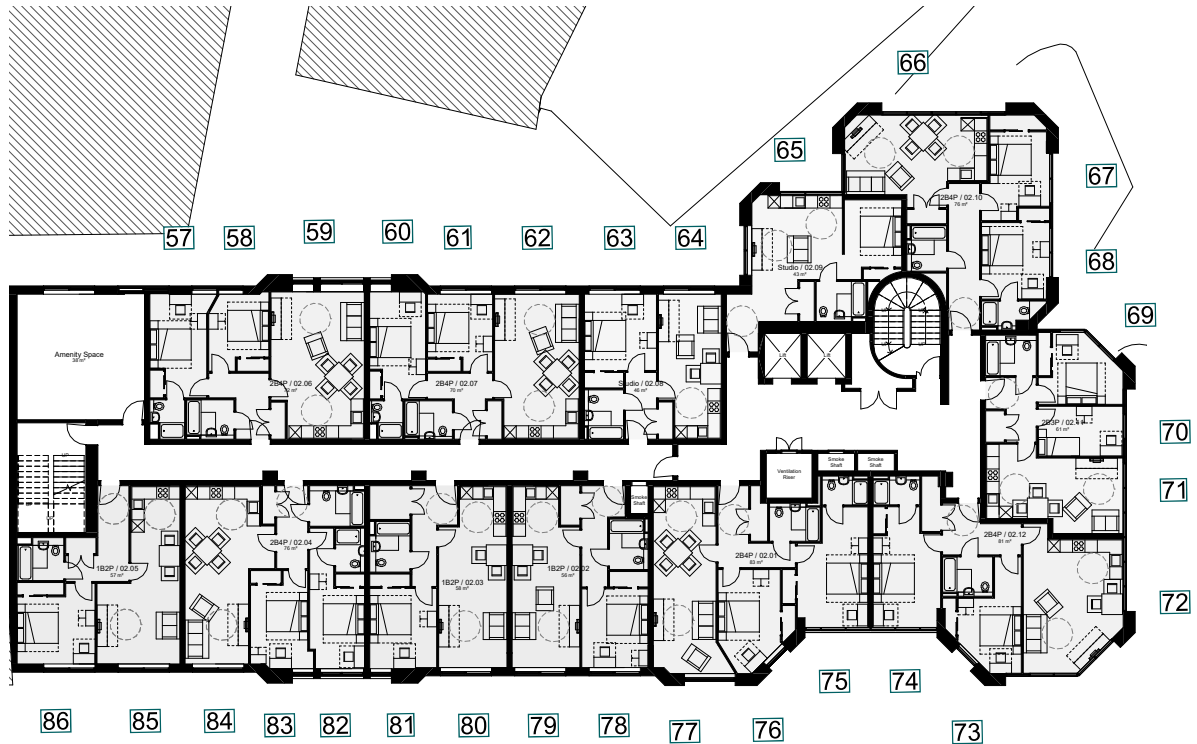
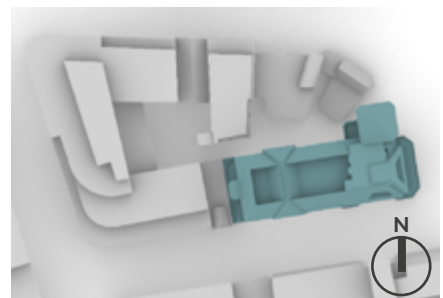


Fig. 05: Floor Plan



Northgate House -Level 03

			DAYLIGHT		SUNLIGHT	
ROOM REF.	FLAT	ROOM USE	MEDIAN DAYLIGHT ILLUMINANCE (lux)	TARGET (lux)	BY ROOM	BY DWELLING
					21 MAR	WINDOW WITHIN 90° DUE SOUTH
NORTHGATE - LEVEL 03						
87	AJ	BEDROOM	144	100	00:00	NO
88	AJ	BEDROOM	219	100	00:00	
89	AJ	L/K/D	188	200	00:00	
90	AK	BEDROOM	124	100	00:00	NO
91	AK	BEDROOM	694	100	00:00	
92	AK	L/K/D	238	200	00:00	
93	AL	BEDROOM	580	100	00:00	NO
94	AL	L/K/D	271	200	00:00	
95	AM	STUDIO	702	200	00:00	YES
96	AN	L/K/D	1003	200	00:17	YES
97	AN	BEDROOM	1041	100	04:44	
98	AN	BEDROOM	948	100	03:32	
99	AO	BEDROOM	911	100	00:29	NO
100	AO	BEDROOM	505	100	04:30	
101	AO	L/K/D	645	200	04:30	
102	AP	L/K/D	1163	200	09:24	YES
103	AP	BEDROOM	294	100	04:08	
104	AP	BEDROOM	476	100	06:23	
105	AQ	BEDROOM	365	100	06:31	YES
106	AQ	BEDROOM	237	100	03:31	
107	AQ	L/K/D	72	200	05:01	
108	AR	BEDROOM	496	100	06:06	YES
109	AR	L/K/D	131	200	06:19	
110	AS	L/K/D	131	200	06:26	YES
111	AS	BEDROOM	149	100	04:36	
112	AT	BEDROOM	429	100	06:06	YES
113	AT	BEDROOM	136	100	04:23	
114	AT	L/K/D	140	200	07:02	
115	AU	L/K/D	268	200	07:15	YES
116	AU	BEDROOM	658	100	03:11	

Table 05: Assessment Data

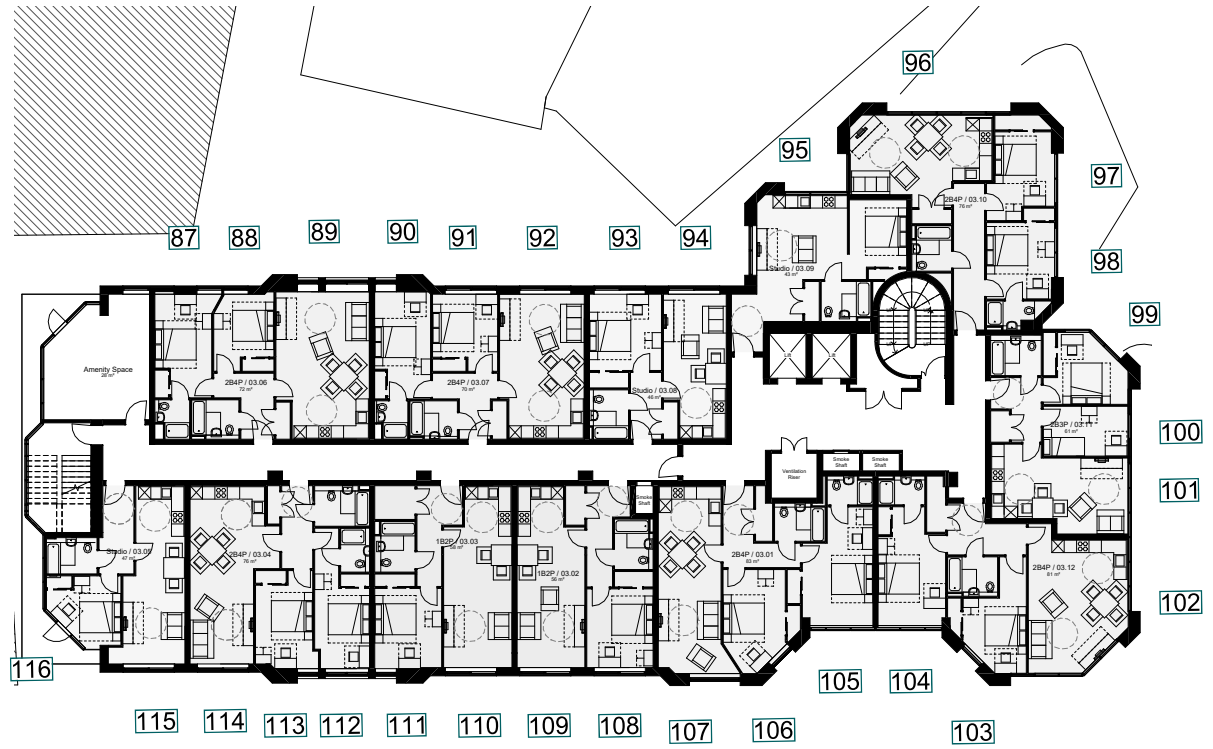
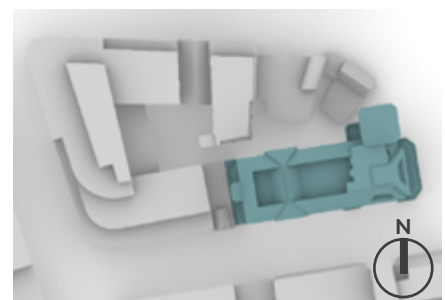


Fig. 06: Floor Plan



Northgate House -Level 04

			DAYLIGHT		SUNLIGHT	
ROOM REF.	FLAT	ROOM USE	MEDIAN DAYLIGHT ILLUMINANCE (lux)	TARGET (lux)	BY ROOM	BY DWELLING
					21 MAR	WINDOW WITHIN 90° DUE SOUTH
NORTHGATE - LEVEL 04						
117	AV	L/K/D	1365	200	02:24	YES
118	AV	BEDROOM	267	100	00:00	
119	AV	BEDROOM	466	100	00:00	
120	AW	BEDROOM	161	100	00:00	NO
121	AW	BEDROOM	803	100	00:00	
122	AW	L/K/D	288	200	00:00	
123	AX	BEDROOM	662	100	00:00	NO
124	AX	L/K/D	317	200	00:00	
125	AY	STUDIO	811	200	00:14	YES
126	AZ	L/K/D	1083	200	00:38	YES
127	AZ	BEDROOM	1079	100	04:48	
128	AZ	BEDROOM	979	100	04:08	
129	BA	BEDROOM	1429	100	04:17	NO
130	BA	L/K/D	421	200	04:17	
131	BB	L/K/D	1621	200	10:37	YES
132	BB	BEDROOM	575	100	09:55	
133	BB	BEDROOM	581	100	08:48	
134	BC	BEDROOM	532	100	08:16	YES
135	BC	BEDROOM	304	100	05:41	
136	BC	L/K/D	119	200	07:00	
137	BD	BEDROOM	713	100	07:59	YES
138	BD	L/K/D	224	200	08:09	
139	BE	L/K/D	230	200	08:10	YES
140	BE	BEDROOM	212	100	04:36	
141	BF	BEDROOM	573	100	06:54	YES
142	BF	BEDROOM	134	100	04:42	
143	BF	L/K/D	532	200	02:52	

Table 06: Assessment Data

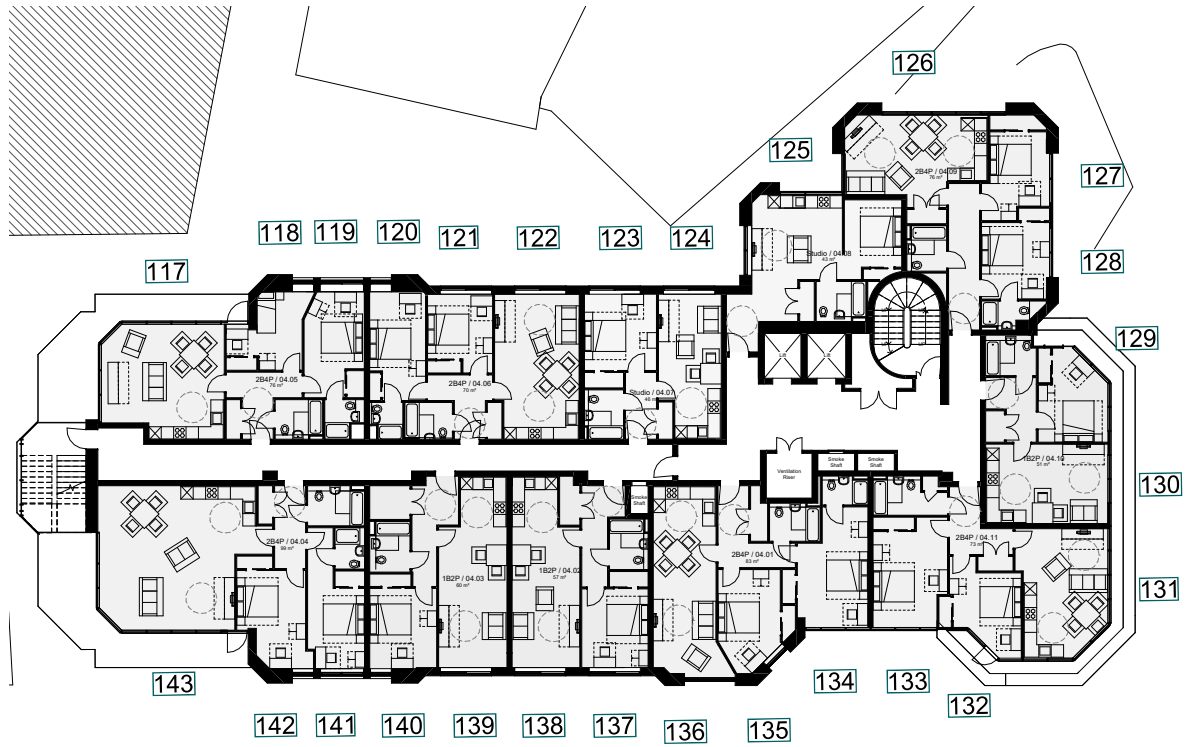
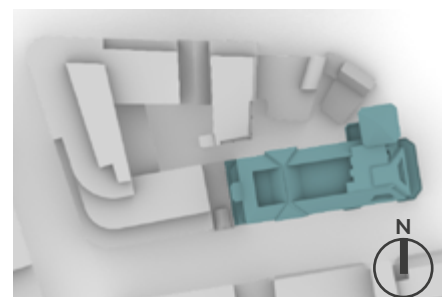


Fig. 07: Floor Plan



Northgate House -Level 05

			DAYLIGHT		SUNLIGHT	
ROOM REF.	FLAT	ROOM USE	MEDIAN DAYLIGHT ILLUMINANCE (lux)	TARGET (lux)	BY ROOM	BY DWELLING
					21 MAR	WINDOW WITHIN 90° DUE SOUTH
NORTHGATE - LEVEL 05						
144	BG	L/K/D	922	200	02:35	YES
145	BG	BEDROOM	179	100	00:00	
146	BG	BEDROOM	522	100	00:00	
147	BH	BEDROOM	142	100	00:00	NO
148	BH	BEDROOM	1194	100	00:00	
149	BH	L/K/D	455	200	00:00	
150	BI	BEDROOM	904	100	00:00	NO
151	BI	L/K/D	486	200	00:00	
152	BJ	STUDIO	796	200	00:37	YES
153	BK	L/K/D	1180	200	00:58	YES
154	BK	BEDROOM	1111	100	05:16	
155	BK	BEDROOM	1026	100	04:29	
156	BL	BEDROOM	1670	100	04:49	YES
157	BL	L/K/D	2371	200	10:49	
158	BL	BEDROOM	671	100	10:18	
159	BM	BEDROOM	565	100	09:52	YES
160	BM	BEDROOM	936	100	10:00	
161	BM	L/K/D	389	200	09:52	
162	BN	BEDROOM	1198	100	08:23	YES
163	BN	L/K/D	482	200	08:59	
164	BO	L/K/D	536	200	07:57	YES
165	BO	BEDROOM	274	100	04:35	
166	BP	BEDROOM	646	100	07:56	YES
167	BP	BEDROOM	101	100	04:41	
168	BP	L/K/D	1164	200	09:29	

Table 07: Assessment Data

Northgate House -Level 06

			DAYLIGHT		SUNLIGHT	
ROOM REF.	FLAT	ROOM USE	MEDIAN DAYLIGHT ILLUMINANCE (lux)	TARGET (lux)	BY ROOM	BY DWELLING
					21 MAR	WINDOW WITHIN 90° DUE SOUTH
NORTHGATE - LEVEL 06						
169	BQ	L/K/D	688	200	03:02	YES
170	BQ	BEDROOM	431	100	00:56	
171	BQ	BEDROOM	554	100	00:04	
172	BR	BEDROOM	543	100	00:00	NO
173	BR	BEDROOM	700	100	00:00	
174	BR	L/K/D	581	200	00:00	
175	BS	BEDROOM	692	100	00:09	NO
176	BS	L/K/D	473	200	00:22	
177	BT	L/K/D	1418	200	04:20	YES
178	BU	L/K/D	1064	200	05:04	NO
179	BU	BEDROOM	633	100	03:36	
180	BV	L/K/D	1313	200	03:58	YES
181	BV	BEDROOM	374	100	03:16	
182	BV	BEDROOM	486	100	03:42	
183	BW	BEDROOM	585	100	03:42	YES
184	BW	BEDROOM	253	100	03:16	
185	BX	BEDROOM	730	100	03:42	YES
186	BX	L/K/D	320	200	03:42	
187	BY	L/K/D	399	200	03:42	YES
188	BY	BEDROOM	743	100	10:11	
189	BZ	BEDROOM	426	100	09:40	YES
190	BZ	BEDROOM	463	100	10:59	
191	BZ	L/K/D	774	200	04:36	

Table 08: Assessment Data

Northgate House -Level 07

			DAYLIGHT		SUNLIGHT	
ROOM REF.	FLAT	ROOM USE	MEDIAN DAYLIGHT ILLUMINANCE (lux)	TARGET (lux)	BY ROOM	BY DWELLING
					21 MAR	WINDOW WITHIN 90° DUE SOUTH
NORTHGATE - LEVEL 07						
192	BT	BEDROOM	1267	100	05:20	
193	BT	BEDROOM	1038	100	05:20	
194	BT	BEDROOM	1114	100	04:44	
195	BW	L/K/D	249	200	00:11	

Table 09: Assessment Data

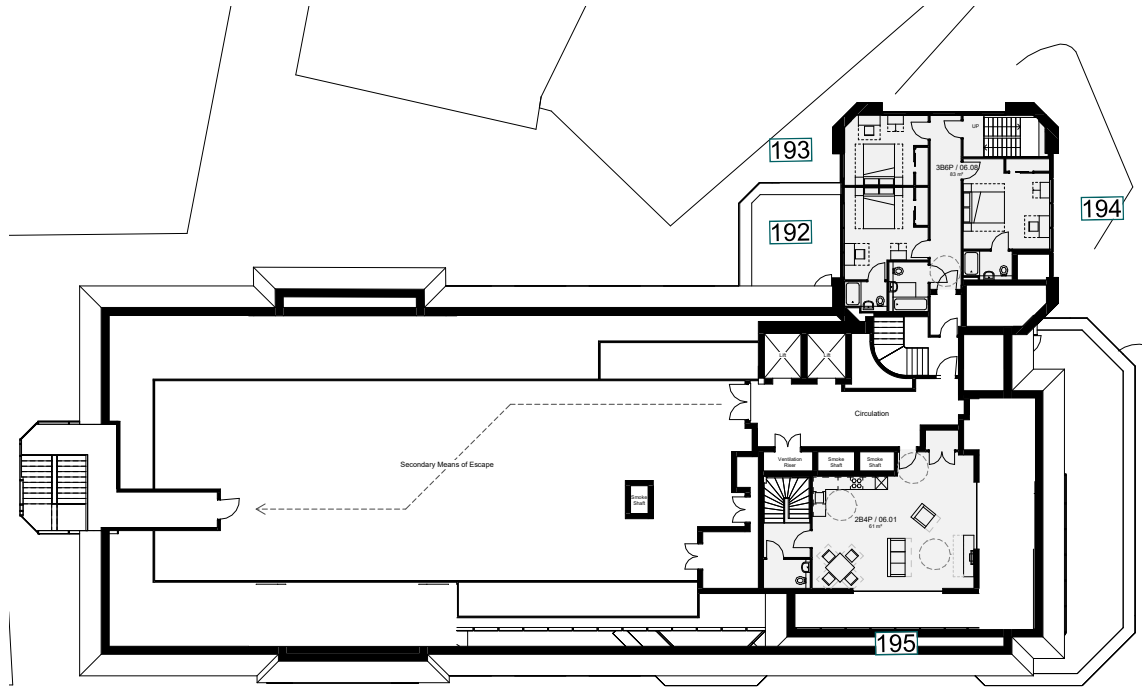
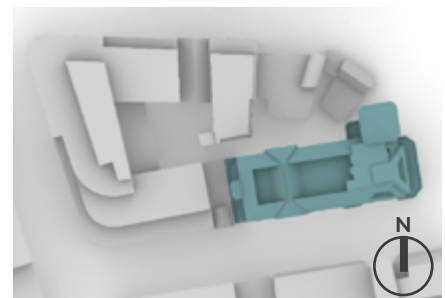


Fig. 10: Floor Plan





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