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CONSULTING LIMITED

Client: Holly Walk Developments Limited

Assessment of Daylight and Sunlight Provision to the Proposed Development at No. 16 Frognal Gardens, London, NW3 6UX

May 2018

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Client: Holly Walk Developments Limited

Assessment of Daylight and Sunlight Provision – No. 16 Frognal Gardens, London, NW3 6UX

Contents Amendment Record

This report has been issued and amended as follows:

Issue	Revision	Description	Date	Written by	Checked by
1	0	Draft Issue	22nd May 2018	GI	SPH
2	1	Final Issue	22nd May 2018	GI	SPH

Contents

1 Background and Scope of Appraisal

Herrington Consulting has been commissioned by Holly Walk Developments Limited to analyse and quantify the provision of natural daylight and sunlight to the habitable rooms within the proposed development at No. 16 Frognal Gardens, London NW3 6UX.

2 The Site and Development Proposals

2.1 Site Location

The site is located within the London Borough of Camden. The location of the site is shown in Figure 2.1 and the site plan included in Appendix A.1 of this report.

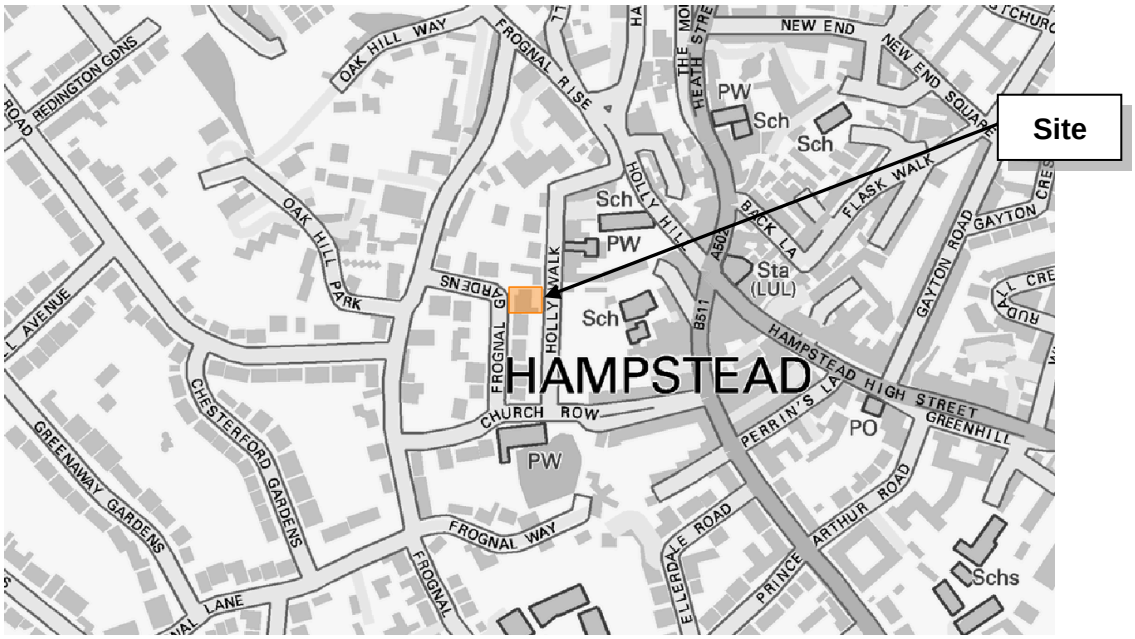


Figure 2.1 – Location map (Contains Ordnance Survey data © Crown copyright and database right 2011)

2.2 The Development

The proposal for development is to demolish the existing garage and erect a three-bedroom dwelling. Drawings of the proposed scheme, along with the site location, are included in Appendix A.1 of this report.

3 Policy and Guidance

3.1 National Planning Policy

National Planning Policy Framework (2012)

The National Planning Policy Framework adopted on the 27th March 2012, replacing the Planning Policy Statements and Planning Policy Guidance, stipulates that *"…planning po*licies and decisions should always seek to secure a good standard of amenity for existing and future *occupants of land and buildings."*

National Planning Practice Guidance (2014)

The National Planning Practice Guidance was launched in 2014, creating an online resource for planning practitioners. The guidance does not provide any further detail in terms of amenity beyond that stated above.

3.2 Regional Planning Policy

The London Plan – Spatial Development Strategy for London (2016)

Policy 7.6: 'Architecture' of the adopted London Plan, includes the following statements: *"Buildings and structures should… not cause unacceptable harm to the amenity of surrounding* land and buildings, particularly residential buildings*, in relation to… overshadowing". "New* development*…* should not have a negative impact on the character or amenity of neighbouring *sensitive land uses".*

The London Plan – Supplementary Planning Guidance on Housing (2016)

Policy 7.6Bd on 'Standards for privacy, daylight and sunlight' states that 'An appropriate degree of *flexibility needs to be applied when using BRE guidelines to assess the daylight and sunlight …* within new developments. Guidelines should be applied sensitively to higher density development, especially in opportunity areas, town centres, large sites and accessible locations, where BRE advice suggests considering the use of alternative targets*'*

In the 'Standards for privacy, daylight and sunlight', Paragraph 1.3.46 states that 'the daylight targets within a proposed scheme should be assessed drawing on broadly comparable residential typologies within the area and of a similar nature across London*'.*

Standard 32 on 'Daylight and Sunlight' states that 'All homes should provide for direct sunlight to enter at least one habitable room for part of the day. Living areas and kitchen dining spaces *should preferably receive direct sunlight'*.

3.3 Local Planning Policy

Camden Local Plan (2017)

Policy A1 'Managing the impact of development' states that *'The Council will seek to protect the* quality of life of occupiers and neighbours. We will grant permission for development unless this causes unacceptable harm to amenity. *The factors we will consider include: … f. sunlight, daylight and overshadowing'.* Section 6.5 states that: *'Loss of daylight a*nd sunlight can be caused if spaces are overshadowed by development. To assess whether acceptable levels of daylight and sunlight are available to habitable, outdoor amenity and open spaces, the Council will take into account the most recent guidance published by the Building Research Establishment (currently *the Building Research Establishment's Site Layout Planning for Daylight and Sunlight* – A Guide *to Good Practice 2011)'.*

3.4 Best Practice Guidance

In the absence of official national planning guidance / legislation on daylight and sunlight, the most recognised guidance document is published by the Building Research Establishment and entitled 'Site Layout Planning for Daylight and Sunlight – A Guide to Good Practice', Second Edition, 2011; herein referred to as the 'BRE Guidelines'.

The BRE Guidelines are not mandatory and themselves state that they should not be used as an instrument of planning policy, however in practice they are heavily relied upon as they provide a good guide to approach, methodology and evaluation of daylight and sunlight impacts.

In conjunction with the BRE Guidelines further guidance is given within the British Standard (BS) 8206-2:2008: 'Lighting for buildings - Part 2: Code of practice for daylighting'.

In this assessment, the BRE Guidelines have been used to establish the extent to which the Proposed Development meets current best practice guidelines. In cases where the Development is likely to reduce light to key windows the study has compared results against the BRE criteria.

Whilst the BRE Guidelines provide numerical guidance for daylight, sunlight and overshadowing, these criteria should not be seen as absolute targets since, as the document states, the intention of the guide is to help rather than constrain the designer. The Guide is not an instrument of planning policy, therefore whilst the methods given are technically robust, it is acknowledged that some level of flexibility should be applied where appropriate.

4 Assessment Techniques

4.1 Background

Natural light refers to both daylight and sunlight. However, a distinction between these two concepts is required for the purpose of analysis and quantification of natural light in buildings. In this assessment, the term 'Daylight' is used for natural light where the source is the sky in overcast conditions, whilst 'Sunlight' refers specifically to the light coming directly from the sun.

4.2 Average Daylight Factor

The Average Daylight Factor (ADF) method calculates the average illuminance within a room as a proportion of the illuminance available to an unobstructed point outdoors under a sky of known luminance and luminance distribution. This is the most detailed of the daylight calculations and considers the physical nature of the room behind the window, including; window transmittance, and surface reflectivity.

This method of quantifying the availability of daylight within a room does, however, require the internal layout to be known and is generally only used for establishing daylight provision in new rooms. The BRE Guide sets out the following guidelines for the assessment of the ADF:

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. In dwellings, the following minimum average daylight factors should be achieved: 1% in bedrooms, 1.5% in living rooms and 2% in kitchens.

4.3 No Sky Line

The No Sky Line (NSL), or sometimes referred to as No Sky View or Daylight Distribution method, describes the distribution of daylight within rooms by calculating the area of the 'working plane', which will have a direct and unobstructed view of the sky. The working plane height is generally set at 850mm above floor level within a residential property and 700mm within a commercial property.

If a significant area of the working plane lies beyond the NSL, i.e. this area of the room has no view of the sky at the working plane height, there is likely to be a poor distribution of daylight within the room. However, this test is relatively simplistic and base purely on geometric parameters. Consequently, no account is taken of the reflectance of light within the room.

The BRE Guidelines do recommend that the NSL test is applied alongside the ADF test, and this is primarily to provide an indication of how well the daylight within the room is distributed. The determination of the level of adequacy of natural daylighting is, however, still predominantly driven by the ADF target values. Notwithstanding this, the NSL test does provide useful information on the way that the daylight is distributed within a room and this is often useful to the designer. The NSL test has therefore been undertaken alongside the ADF analysis and the

graphical and numerical outputs are included within the appendix to this report. These results are, however, only used in a qualitative and informative way, rather than a quantitative pass/fail manner.

4.4 Room Depth Criteria

The BRE Guidelines do include advice for determining recommended room depths to proposed new rooms under specific circumstances using the Room Depth Criteria (RDC). This is more of a rule-of-thumb test that can be used to plan building layouts etc at an early conceptual stage, rather than providing quantitative outputs at the more detailed stage of a development.

This test has numerous limitations when being applied to anything but a simplistic room layout and does not take into account external obstructions. It is therefore not considered to provide any meaningful data on the level or distribution of daylight that is not already provided by the ADF and NSL tests. Consequently, it is only applied in very particular situations.

4.5 Annual Probable Sunlight Hours

It is also possible to quantify the amount of sunlight available to a new development and the recognised methodology for undertaking this analysis is the Annual Probable Sunlight Hours (APSH) method. The meaning of 'probable sun hours' is the total number of hours that the sun is expected to shine on unobstructed ground, allowing for average levels of cloudiness.

For a typical development to be considered as having very good levels of direct sunlight, s test the centre point of the window will would ideally need to receive more than 25% of APSH for the year, including at least 5% in the winter months between 21st September and the 21st March. The BRE Guidelines also recommend having at least one main window of the proposed development facing within 90 degrees of due south, with priority ideally given for to living rooms and a preference to sunlight, especially in the afternoon. Bedrooms and kitchens are generally viewed as less important during this time of day, where occupants normally prefer sunlight in the mornings in these rooms.

For new development and especially where existing buildings are being re-developed, it is important to acknowledge that these are aspirational targets intended to aid and not constrain the designer.

5 Assessment Methodology

5.1 Method of Baseline Data Collation

The following data and information has been used to inform this study:

- OS Mastermap mapping
- Measured survey data (Peter Bernamont Architects, Kent – May 2018)
- Scheme drawings (Peter Bernamont Architects, Kent – May 2018)
- Photographs provided by the client (March 2018)
- Aerial photography (Google Maps and Bing)

5.2 Numerical Modelling

The numerical analysis used in this assessment has been undertaken using the Waldrum Tools (Version 4.0.0.3) software package.

5.3 Calculation Assumptions

The following assumptions have been made when undertaking the analysis:

- When assessing the ADF for internal rooms and in the absence of specific information, the following parameters are assumed:
  - Glazing type is assumed to be double glazing (Pilkington K Glass 4/16/4 Argon filled) with a light transmittance value of 0.78 (value for double glazed unit not per pane).
  - Correction factor for frames and glazing bars = 0.8
  - Where information from the designer is not available, the following values are used to derive the Maintenance Factor applied to the transmittance values.

Location / setting	**Building type (**Residential – good maintenance)	**Exposure (normal)**	**Special exposure**	**Maintenance Factor**
Urban	8%	x 1.0	x 1.0	0.92
Rural / suburban	4%	x 1.0	x 1.0	0.96

Table 5.1 – Parameters used for deriving Maintenance Factor (refer to BS 8206-2:2008 Tables A3, A4 and A5

The reflectance values used in the ADF analysis of the proposed new buildings are shown in table 5.2 below and are used unless specified otherwise by the designer:

Surface	Value
Internal walls (painted pale cream)	81%
Internal ceiling (painted white)	85%
Internal flooring	30%
External walls (unpainted brick)	20%
External walls (painted white)	70%

Table 5.2 – Reflectance values used in ADF analysis

6 Daylight Provision to Proposed New Rooms

6.1 Overview

As discussed in Section 4, the primary test for daylight is the Average Daylight Factor (ADF) test and this is discussed in detail in the following section. The No Sky Line (NSL) analysis has also been carried out to provide supporting information on the distribution of daylight within each of the habitable rooms. The NSL results are processed by the computational model in both graphical and numerical formats and these are included in the appendix to this report.

It is the intension of the BRE Guidelines to aid, rather than constrain the designer and as such a range of qualitative and quantitative tests are outlined, which vary in complexity. During the early stages of design, it is often appropriate to use the more simplistic rule-of-thumb tests. However, when assessing a final design at the planning application stage for example, it is more appropriate to rely upon the more detailed and quantitative analysis techniques. These allow window size and position, glazing type, room layout and dimensions etc to be taken into consideration. Consequently, the assessment of natural daylight provision has been based primarily on the results of the ADF test, although reference to the NSL results is made when deemed necessary.

6.2 Average Daylight Factor (ADF)

Using the analytical techniques discussed in Sections 4 and 5, the daylighting tests have been applied for the habitable rooms within the proposed development.

In accordance with the guidance set out in both the BRE Guidelines and the BS 8206-2:2008 document, rooms that have a dual use, i.e. an open plan kitchen and lounge, are assessed as a single room and assessed against the room use with the highest daylighting requirement. For example, where a room includes both living and kitchen spaces, then the higher daylighting requirement of the kitchen is adopted as the threshold target.

The results are summarised in Table 6.1 below.

Floor	Room Use	ADF	Minimum Recommended ADF	Meets BRE Guidelines?
Ground	R1 - Bedroom	1.4%	1.00%	Yes
	R2 - Bedroom	1.9%	1.00%	Yes
	R3 - Bedroom	1.3%	1.00%	Yes
First	R1 - Study	10.9%	1.50%	Yes
	R2 – Kitchen/Dining	2.0%	2.00%	Yes
	R3 – Living Room	7.8%	1.00%	Yes

Table 6.1 – Calculated ADF values

From the results in Table 6.1 it can be seen that all rooms within the proposed development exceed the minimum required ADF target values prescribed by the BRE Guidelines and will therefore enjoy good levels of daylight.

7 Sunlight Provision to Proposed Development

7.1 Annual Probable Sunlight Hours Assessment (APSH)

The BRE Guidelines provide guidance in respect of sunlight quality for new developments stating: *"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 assessment criteria set out within the BRE document are discussed in Section 4.3 of this report, but in general terms the overall objective sought by the guidelines is 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 the centre of at least one window to a main living room can receive 25% of annual probable sunlight hours, including at least 5% of annual probable sunlight hours in the winter months between 21st September and 21st March.

It is also worth noting that in paragraph 3.1.11 of the BRE guidance it is suggested that if a room faces significantly north of due east or west it is unlikely to meet the recommended levels of sunlight. From this it can be deduced that only windows facing within 90 degrees of due south can be assessed using this methodology.

A further observation from paragraph 5.3 of the BS 8206-2 is that with regards to sunlight duration, the degree of satisfaction is related to the expectation of sunlight. Therefore, if a room is north facing or if the building is in a densely-built urban area, the absence of sunlight is more acceptable than when its exclusion seems arbitrary.

It should be noted that where rooms have more than one window, it is acceptable to sum the non-coincident sunlight hours to achieve a 'room total'. This approach is acknowledged by the BRE Guidelines and facilitates a greater understanding of the sunlight received within a room by taking into account the fact that some windows will receive sunlight at different times during the day.

The results of this analysis are summarised in Table 7.1.

Floor	Room Use	Percentage APSH (Room Total)	
		All year	Winter
Ground	R1 - Bedroom	*North Facing*	*North Facing*
	R2 - Bedroom	10	0
	R3 - Bedroom	48	5
First	R1 - Study	70	17
	R2 – Kitchen/Dining	44	12
	R3 – Living Room	84	27

Table 7.1 – Results of APSH analysis

The results above show that the majority of rooms achieve or exceed the aspirational values provided by the BRE Guidelines. Furthermore, both of the main habitable rooms within the unit significantly exceed the aspirational target value of 25 annual probable sunlight hours and 5 winter sunlight hours. Consequently, it has been possible to conclude that the main habitable spaces within the proposed development will be well lit throughout the year by direct sunlight.

7.2 Direct Sunlighting to Amenity Spaces

The BRE Guidelines acknowledge that good site layout planning for daylight and sunlight should not limit itself to providing good natural light inside buildings. Sunlight in the space between buildings has an important effect on the overall appearance and ambiance of a development. The worst situation is to have significant areas on which the sun does not shine for a large part of the year. These areas would, in general, be damp, chilly and uninviting.

The BRE Guidelines set out the following principle benefits of sunlight in the spaces between buildings:

- 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)

The assessment criteria set out within the BRE Guidelines is based on the recommendation that for an amenity space to appear adequately sunlit throughout the year, at least half of this area should receive at least two hours of sunlight on 21st March.

Inspection of the scheme drawings indicate that the amenity areas for the proposed development are provided in the form of two balconies which serve the kitchen/dining room and the living room. As the BRE assessment for amenity areas is derived for open spaces such as rear gardens and parks, the test is not applicable to the amenities in question and therefore the sun on ground test has not been undertaken.

8 Conclusions

The detailed analysis undertaken as part of this assessment has examined the provision of natural daylight and sunlight to the habitable rooms for the proposed development at No. 16 Frognal Gardens, London. Using detailed numerical modelling applications, the Average Daylight Factor (ADF) and Annual Probable Sunlight Hours (APSH) have been quantified for each room. In line with the assessment criteria prescribed by the BRE Guidelines, it has been shown that for all rooms, the provision of natural daylight will meet or exceed the minimum required threshold set out in both the BRE Guidelines and the British Standard (BS) 8206-2:2008: 'Lighting for buildings - Part 2: Code of practice for daylighting'.

A Appendices

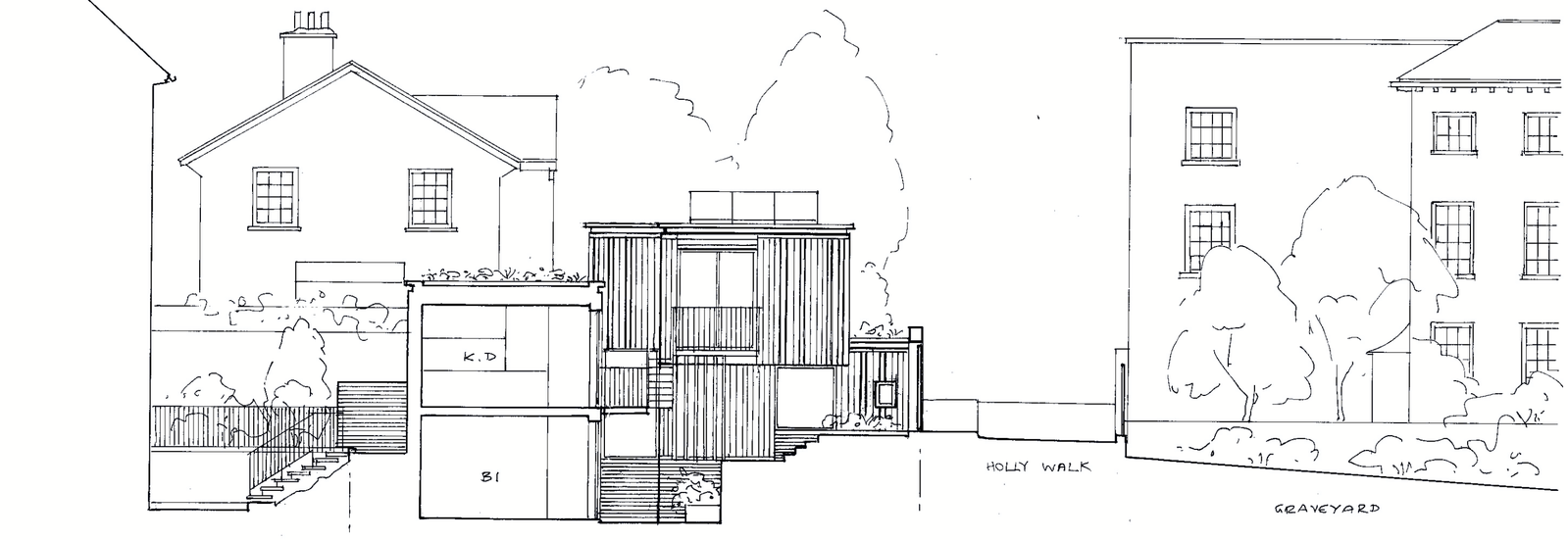
A.1 Appendix A.1 – Scheme Drawings

A.2 Appendix A.2 – Graphical Model Outputs

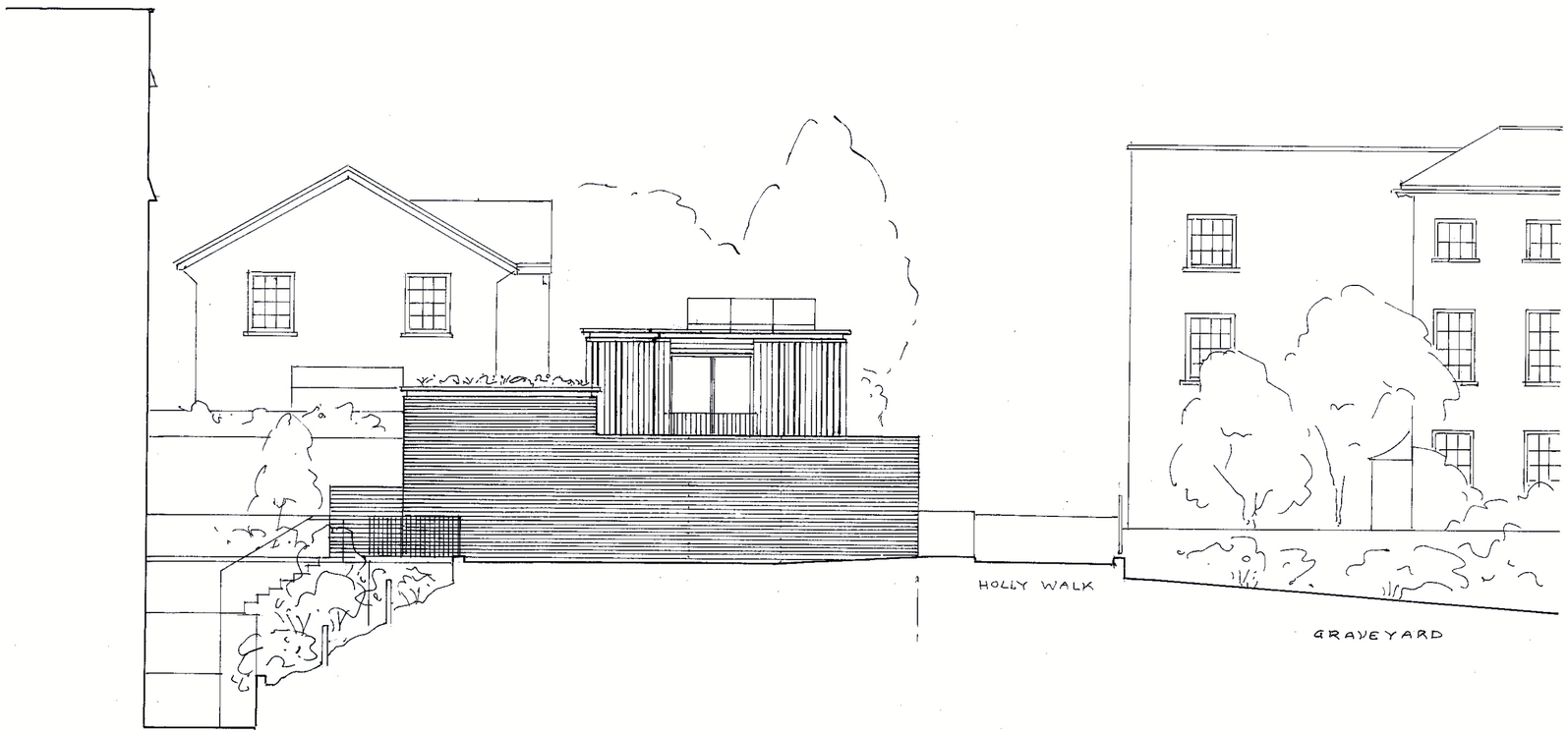
A.3 Appendix A.3 – Average Daylight Factor Calculations

A.4 Appendix A.4 – APSH Calculations

Appendix A.1 – Scheme Drawings



SOUTH SECTION W-W - PROPOSED



SOUTH ELEVATION - PROPOSED

ELEVATION AT COURTYARD IN DIRECTION OF 18 HOLLY WALK

0 1 2 3 4 5 10m

SCALE 1:100 @ A2

MATERIALS KEY:

UNTREATED TIMBER CLADDING

BRICKWORK WALLS

PAINTED METAL GUARDING

PPC METAL FRAME WINDOWS

REV DATE REVISION

Project: 16 FROGNAL GARDENS, NW3

Drwg Title: PROPOSED NEW HOUSE
EAST ELEVATION + SECTION W-W

Drwg No: FGH/6/05

Rev:

Scale: 1:100 @ A2

Date: MAY 2018

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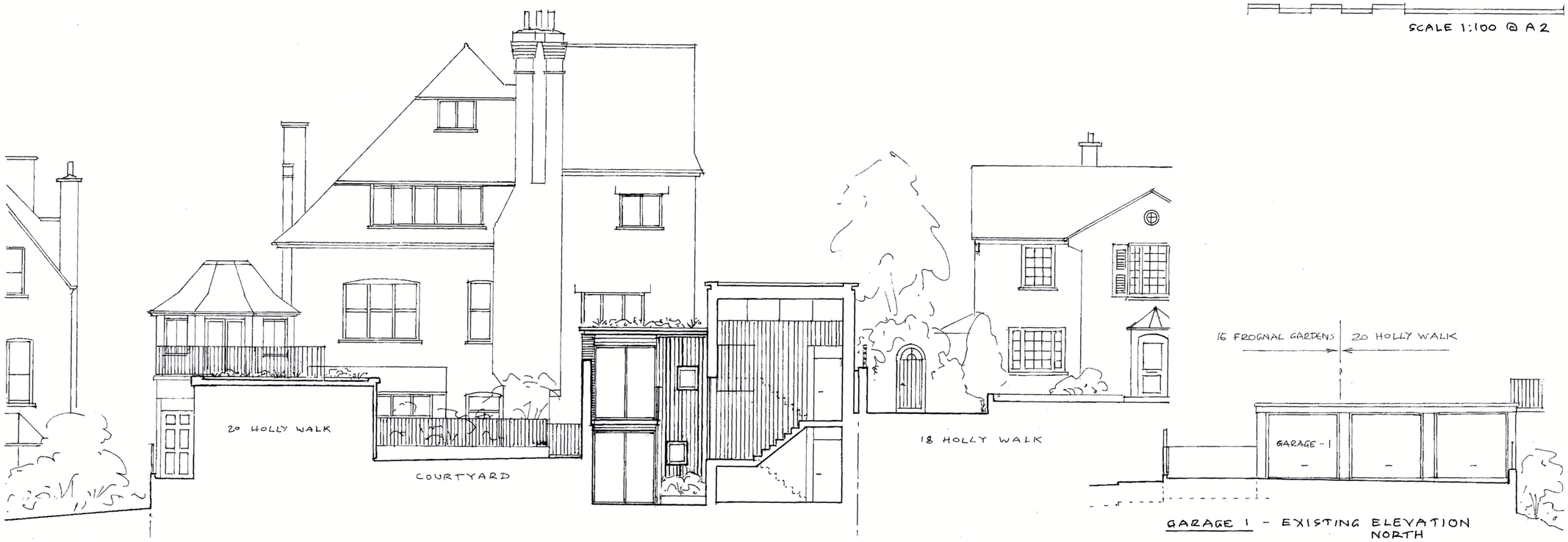
0 1 2 3 4 5 10 m

SCALE 1:100 @ A2



EAST SECTION X-X - PROPOSED

GARAGE 1 - EXISTING ELEVATION NORTH

GARAGE 1 - PROPOSED ELEVATION NORTH

SECTION V-V

EAST ELEVATION - PROPOSED

ELEVATION ALONG HOLLY WALK

MATERIALS KEY

REFER DRAWING FGH/6/05

REV	DATE	REVISION

Project: 16 FROGNAL GARDENS, NW3

Drwg Title: PROPOSED NEW HOUSE
EAST ELEVATION + SECTION X-X

Drwg No: FGH/6/04

Rev:

Scale: 1:100 @ A2

Date: MAY 2018

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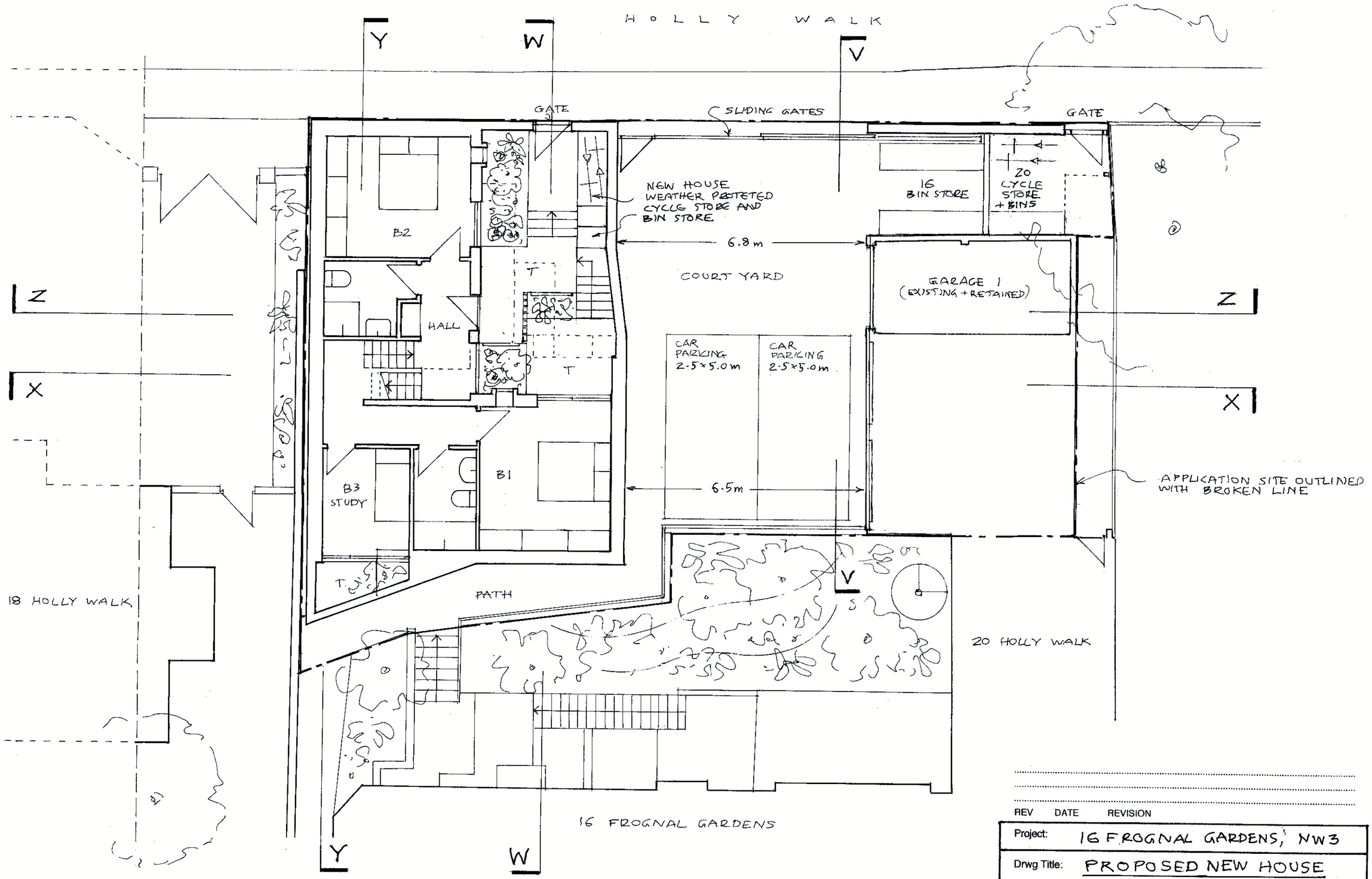

GROUND + LOWER GROUND FLOOR PLANS

N

0 1 2 3 4 5m

SCALE 1:100 @ A3

REV DATE REVISION

Project:	16 FROGNAL GARDENS, NW3
Drwg Title:	PROPOSED NEW HOUSE GROUND + LOWER GROUND PLANS
Drwg No:	FGH/6/01
Rev:	
Scale:	1:100 @ A3
Date:	MAY 2018

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HOLLY WALK

Y W V Z X

CANOPY ROOF

L T ST K D

18 HOLLY WALK

20 HOLLY WALK

16 FROGNAL GARDENS

UPPER + LOWER FIRST FLOOR PLANS

N

0 1 2 3 4 5m

SCALE 1:100 @ A3

REV DATE REVISION

Project:	16 FROGNAL GARDENS, NW3
Drwg Title:	PROPOSED NEW HOUSE UPPER FLOORS PLANS
Drwg No:	FGH/6/02
Rev:	
Scale:	1:100 @ A3
Date:	MAY 2018

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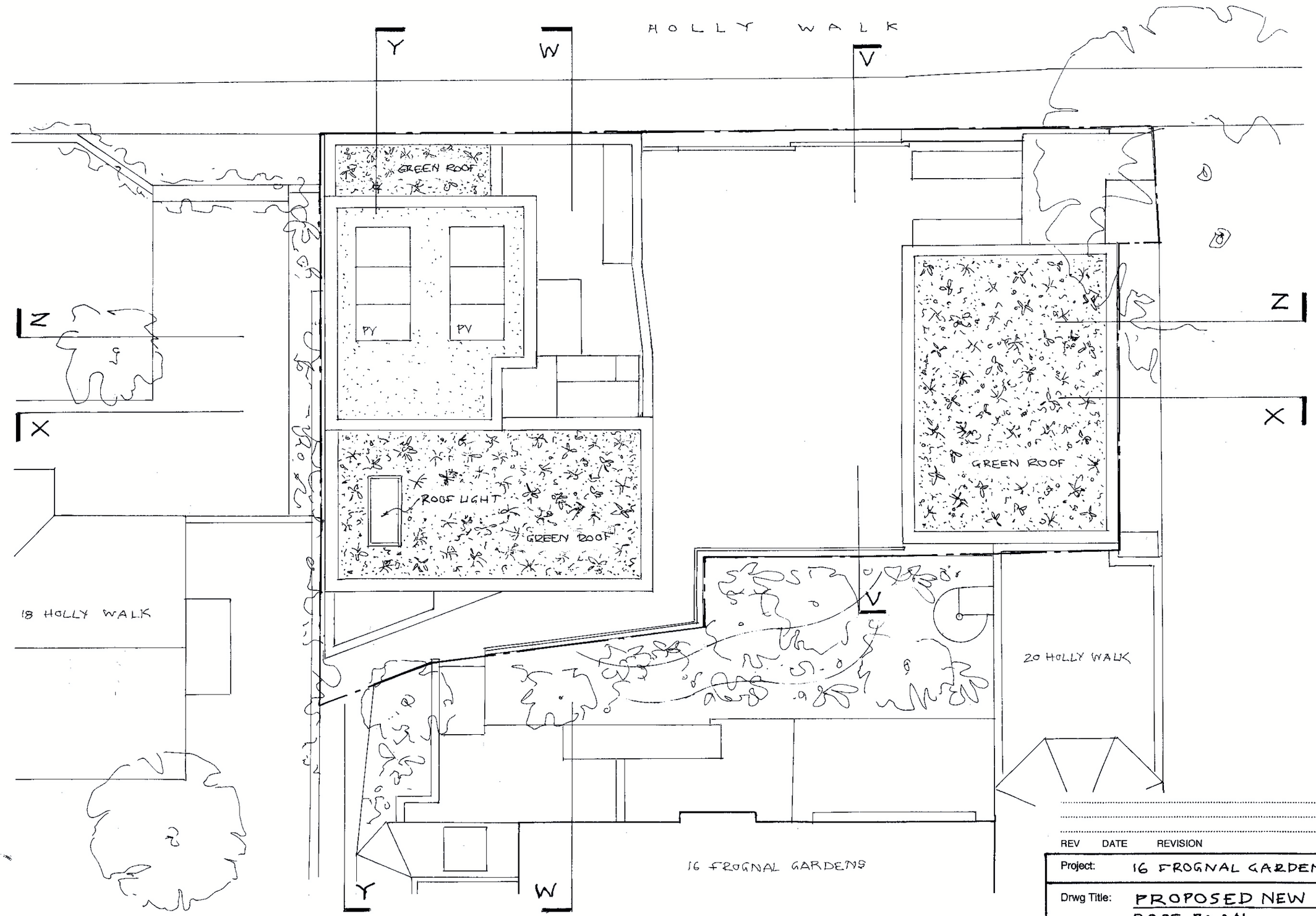

ROOF PLAN - PROPOSED

REV	DATE	REVISION

Project: 16 FROGNAL GARDENS, NW3

Drwg Title: PROPOSED NEW HOUSE
ROOF PLAN

Drwg No: FGH/6/03

Rev:

Scale: 1:100 @ A3

Date: MAY 2018

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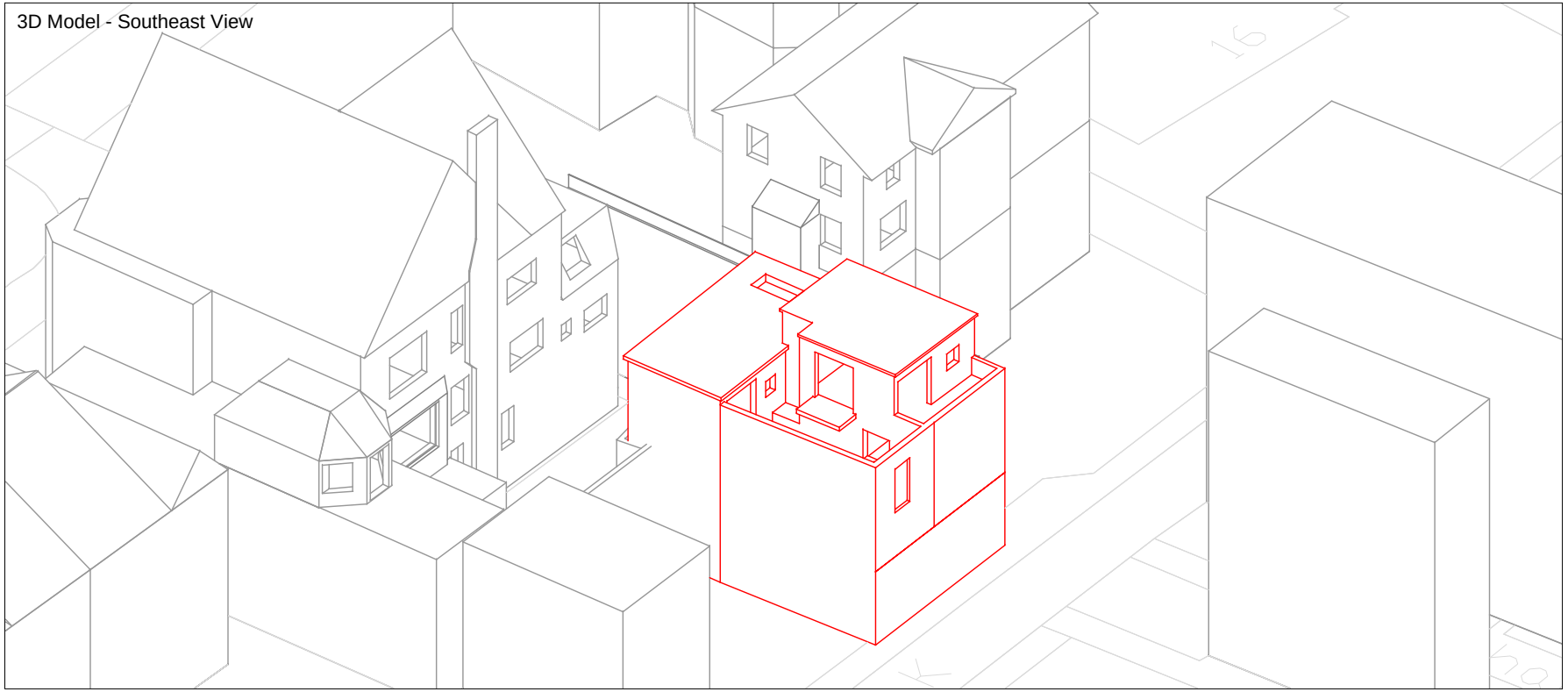
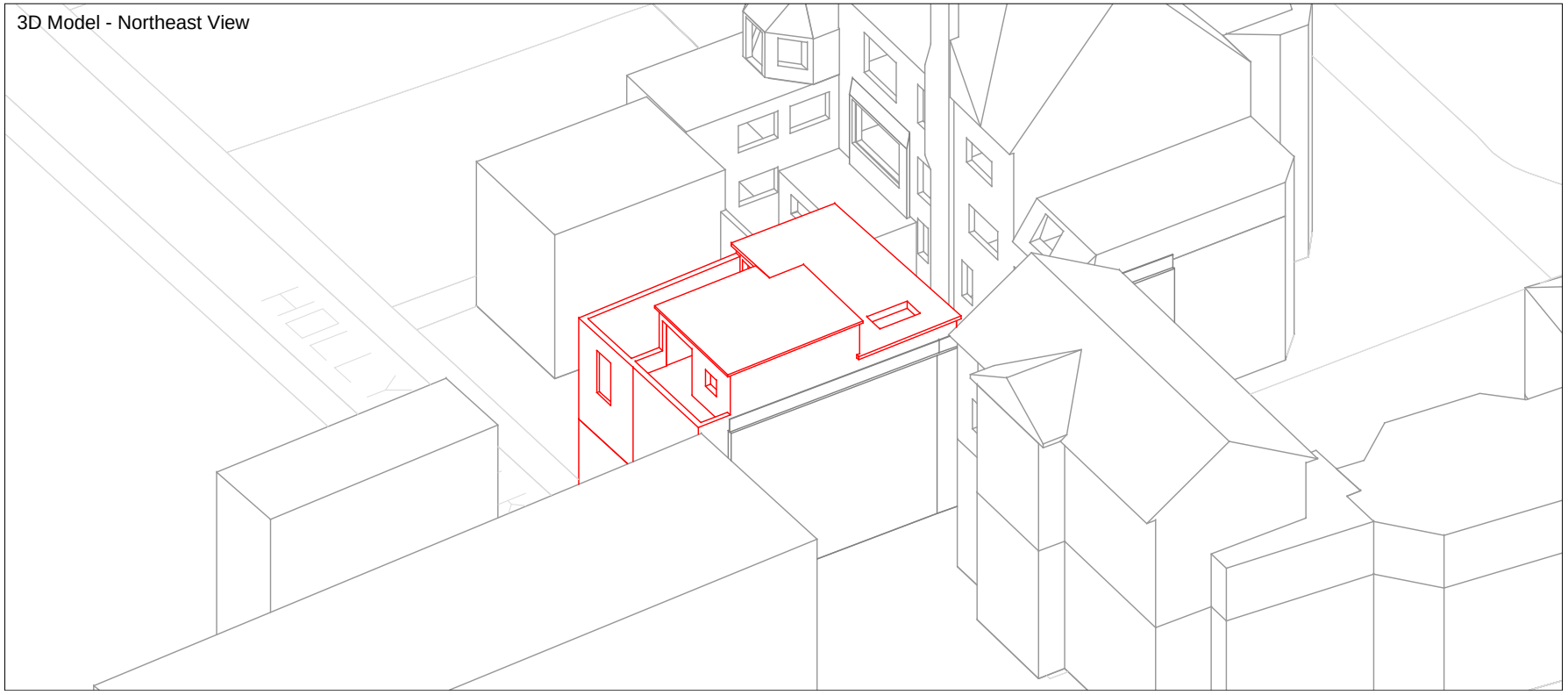
Appendix A.2 – Graphical Model Outputs





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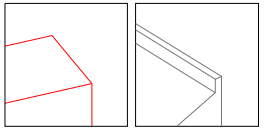
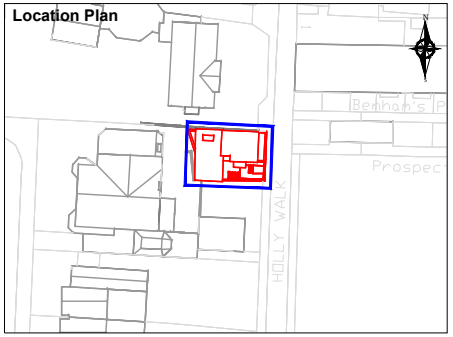
Legend



Proposed Buildings | Surrounding Buildings

Location Plan



Rev	Description	Date
00	First issue	22/05/2018

CLIENT
Holly Walk Developments Limited

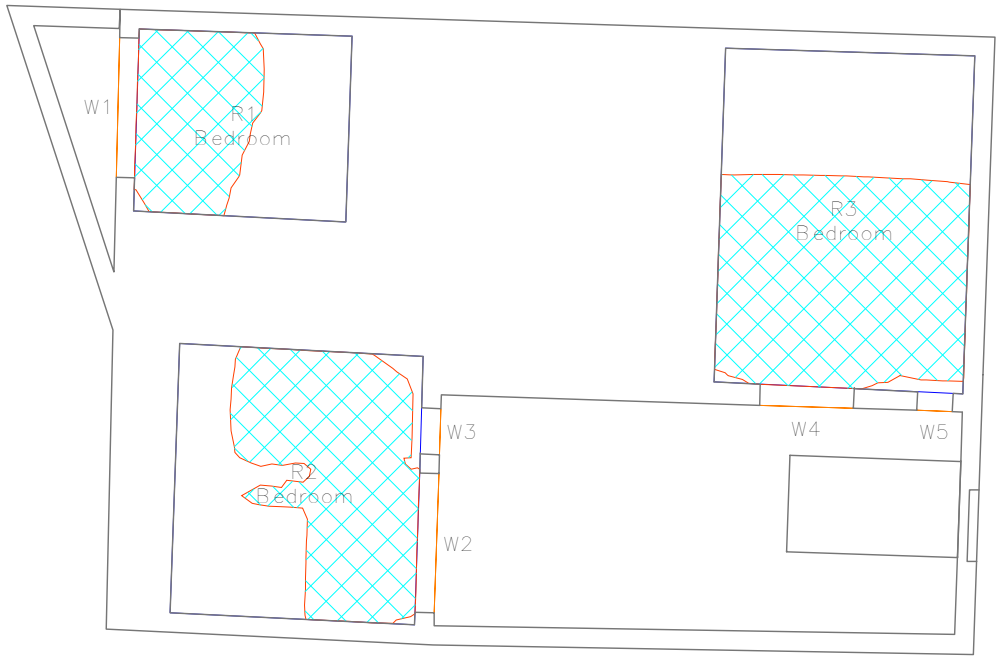
PROJECT
Frognal Gardens, London

SCALE	PROJ REF	ANALYST	DRAWN BY
Not to scale	2032	GI	GI

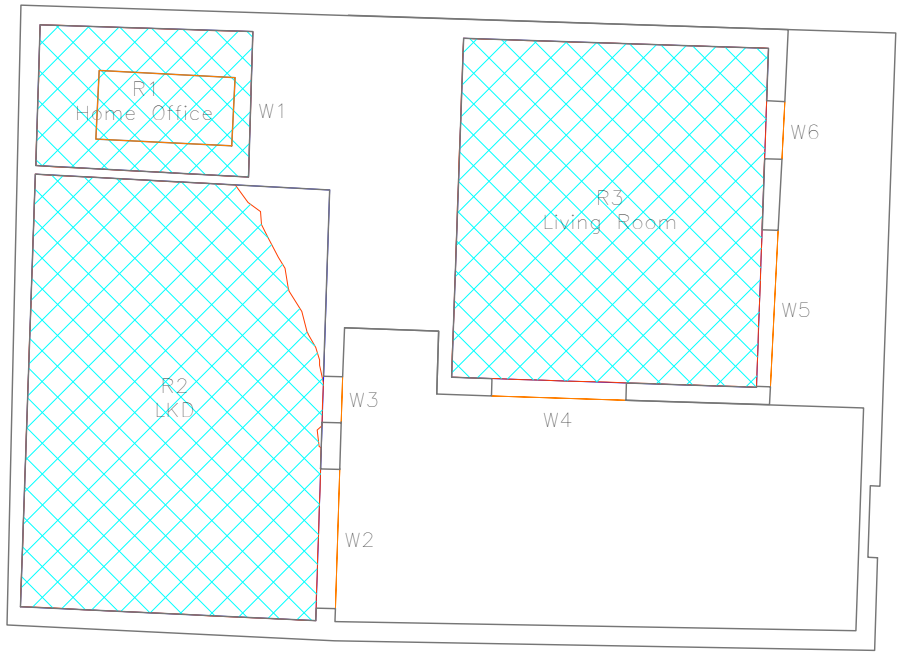
DWG REF.
3D Model - Proposed Site Scenario.

DWG No.
2032_01

NSL Contours - Ground Floor



NSL Contours - First Floor



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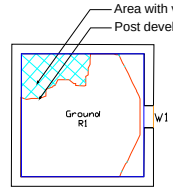
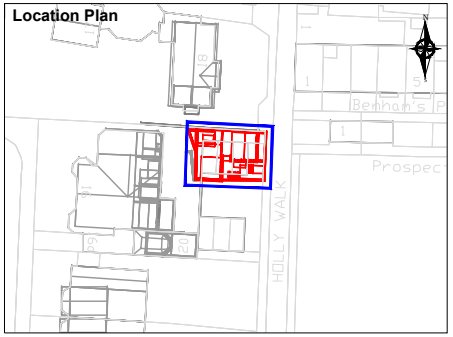
Legend



Location Plan



00	First issue	22/05/2018
Rev	**Description**	**Date**

CLIENT
Holly Walk Developments Limited

PROJECT
Frognal Gardens, London

SCALE	PROJ REF	ANALYST	DRAWN BY
Not to scale	2032	GI	GI

DWG REF.
No sky line contours.

DWG No.
2032_02

Appendix A.3 – Average Daylight Factor Calculations

Project Name: Frognal Gardens
Project No.: 2032
Report Title: Average Daylight Factor Analysis to Proposed New Rooms
Date of Analysis: 21/05/2018

Floor Ref.	Room Ref.	Room Use.	Room Area (m2)	Lit Area Proposed	ADF Proposed	ADF Req.	Meets BRE Criteria
16 Frognal Gardens							
Ground	R1	Bedroom	7.66	40.49%	1.40%	1.00%	Yes
	R2	Bedroom	13.38	77.39%	1.87%	1.00%	Yes
	R3	Bedroom	16.40	31.72%	1.31%	1.00%	Yes
First	R1	Home Office	5.96	100.00%	10.85%	1.50%	Yes
	R2	LKD	24.91	25.09%	1.97%	2.00%	Yes
	R3	Living Room	20.23	100.00%	7.77%	1.50%	Yes

Appendix A.4 – APSH Calculations

Project Name: Frognal Gardens
Project No.: 2032
Report Title: APSH (Sunlight) Analysis to Proposed New Rooms
Date of Analysis: 21/05/2018

Floor Ref.	Room Ref.	Property Type	Room Use.	Window Ref.	Window Orientation	Annual	Meets BRE Criteria	Winter	Meets BRE Criteria	Total Suns per Room Annual	Meets BRE Criteria	Total Suns per Room Winter	Meets BRE Criteria
16 Frognal Gardens													
Ground	R1	Residential	Bedroom	W1	271°	3	NO	0	NO				
										3	NO	0	NO
	R2	Residential	Bedroom	W2	92°	4	NO	0	NO				
				W3	92°	8	NO	0	NO				
										10	NO	0	NO
	R3	Residential	Bedroom	W4	182°	39	YES	5	YES				
				W5	182°	30	YES	3	NO				
										48	YES	5	YES
First	R1	Residential	Home Office	W1	90° Hz	70	YES	17	YES				
										70	YES	17	YES
	R2	Residential	LKD	W2	92°	29	YES	0	NO				
				W3	92°	40	YES	12	YES				
										44	YES	12	YES
	R3	Residential	Living Room	W4	182°	82	YES	27	YES				
				W5	93°	45	YES	15	YES				
				W6	93°	44	YES	15	YES				
										84	YES	27	YES