REPORT

149 Heath Road
Twickenham TW1

DAYLIGHT & SUNLIGHT

Neighbouring Residential Properties

and Proposed Accommodation

August 2016

BVP
BROOKE VINCENT + PARTNERS

RICS

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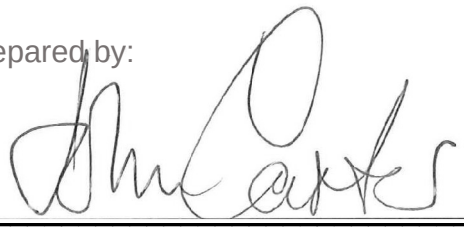
Prepared by:



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25 August 2016

149 Heath Road, Twickenham, TW1

Daylight & Sunlight

We are instructed to report upon the impact of daylight and sunlight aspects of this planning application in relation to neighbouring residential properties and proposed residential accommodation.

Our report is based upon the scheme drawings prepared by Chassay Studio Ltd, survey information and photographs, plus daylight and sunlight studies.

1.0 SUMMARY

1.1 This report has been drafted by reference to the Building Research Establishment (BRE) publication (2011), *"Site Layout Planning for Daylight and Sunlight. A Guide to Good Practice"* and local planning policy.

1.2 Our studies have confirmed that the daylight and sunlight to neighbouring properties would be compliant with BRE Guidelines.

1.3 Similarly, levels of daylight within the proposed accommodation would satisfy BRE criteria. Sunlight availability would vary in response to aspect but the architect has ensured the layouts satisfy the combination of BRE and London Plan recommendations.

1.4 In summary, BRE's recommendations and criteria have been satisfied together with the relevant London Plan and local policies.

2.0 PLANNING POLICY

London Borough of Richmond-Upon-Thames Development Management Plan (adopted November 2011)

2.1 The Local Planning Authority sets out the priorities for the development of the Borough and for writing local planning policies and guidance. The Local Plan sets out the priorities for the development of the borough and is used for making decisions on planning applications. It consists of a number of planning documents and guidance, of which the most relevant is the Development Management Plan.

Policy DM DC 5:

Neighbourliness, Sunlighting and Daylighting

"In considering proposals for development, the council will seek to protect adjoining properties from unreasonable loss of privacy, pollution, visual intrusion, noise and disturbance. To protect privacy for residential development there should normally be minimum distance of 20m between main facing windows of habitable rooms. The council would generally seek to ensure that the design and layout of buildings enables efficient sunlight and daylight to penetrate into and between buildings, and that adjoining land or properties are protected from overshadowing in accordance with established standards.

In the explanatory notes that follow this policy, the following is included.

6.1.31 – "with respect to light, the council will be guided in general terms by the standards set out in site layout, planning for sunlight and daylight, and in sun on ground indicators (BRE 1991); or any standards replacing them, to ensure this". (This report refers to the up to date version of this guidance as noted later).

Policy DM DC 6:

Balconies and other floor terraces

Purpose built, well designed and positions balconies or terraces are encouraged where new residential units are on upper floors. They should be:

- *Preferably receive direct sunlight.*
- *(Other items within this policy are not relevant to the terms of this report)*

The London Plan 2016 (Including Housing Standards minor alterations - March 2016)

2.3 The London Plan forms part of Richmond-upon-Thames' Development Plan. The Housing Supplementary Planning Guidance (HSPG) 2016, defines in greater detail the London Plan's approach to Housing requirements and standards. Those aspects of the HSPG that are relevant to this report are mostly relevant to the London Plan **Policy 3.5 – Quality and Design of Housing Development**, and as detailed below.

Housing Supplementary Planning Guidance – March 2016

2.4 **Daylight and Sunlight**

Standard 32 – *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.*

The explanatory notes that follow Standard 32 include the following comments:

2.3.45 "… In *addition to the above standards, BRE good practice guidelines and methodology can be used to assess the levels of daylight and sunlight achieved within new developments, taking into account guidance below and in Section 1.3*".

Section 1.3 is entitled *'Optimising Housing Potential'* and confirms that "*… 'optimisation' can be defined as 'developing land to the fullest amount consistent with all relevant planning objectives'...".*

2.3.46 "*Where direct sunlight cannot be achieved in line with Standard 32, developers should demonstrate how the daylight standards proposed within a scheme and individual units would achieve good amenity for residents*…".

2.3.47 "*BRE guidelines on assessing daylight and sunlight should be applied sensitively to higher density development in London, particularly in central and urban settings, recognising the London Plan strategic approach to optimising housing output (Policy 3.4) and the need to accommodate additional housing supply in locations with good accessibility suitable for higher density development (Policy 3.3). Quantitative standards on daylight and sunlight should not be applied rigidly without carefully considering the location and context and standards experienced in broadly comparable housing typologies in London*".

2.4 Dual Aspect

Standard 29 – *Developments should minimise the number of single aspect dwellings. Single aspect dwellings that are north facing, or exposed to noise levels above which significant adverse effects on health and quality of life occur, or which contain three or more bedrooms should be avoided.*

The explanatory notes that follow Standard 29 include the following comments:

2.3.37 *"Dual aspect dwellings with opening windows on at least two sides have many inherent benefits. These include better daylight, a greater chance of direct sunlight for longer periods…".*

2.3.39 *"… The design of single aspect flats will need to demonstrate that all habitable rooms and the kitchen are provided with adequate ventilation, privacy and daylight and the orientation enhances amenity, including views. North facing single aspect dwellings should be avoided wherever possible. However, in applying this standard consideration should also be given to other planning and design objectives for a site, for example the aim to maximise active frontages and minimise inactive frontages".*

2.3.41 *"In single aspect dwellings with more than two bedrooms it is difficult to achieve adequate natural ventilation and daylight to all rooms in an efficient plan layout which avoids long internal corridors. Single aspect dwellings containing three or more bedrooms should therefore be avoided. The design of single aspect ground floor dwellings will require particular consideration to maintain privacy and adequate levels of daylight".*

2.6 The London Plan and HSPG do not provide numerical values for daylight or sunlight. Those given in this report are based upon the BRE guidance referred to, in explanatory note 2.3.47 above, and more fully detailed in the item that follows this.

3. METHOD OF CALCULATION

Building Research Establishment

3.1 The calculations and considerations within this report are based upon the Building Research Establishment (BRE) publication 2011 ''Site Layout Planning to Daylight and Sunlight. A Guide To Good Practice''. BRE confirm that the Guide does not contain mandatory requirements and in the **Introduction** provides a full explanation of its purpose:-

"The Guide is intended for building designers and their clients, consultants and planning officials."

"The advice given here is not mandatory and this document should not be seen as an instrument of planning policy."

"It aims to help rather than constrain the designer."
"Although it gives numerical guidelines these should be interpreted flexibly since natural lighting is only one of many factors in site layout design."

"In special circumstances the developer or planning authority may wish to use different target levels. For example, in an historic city centre, or in an area with high rise buildings, a higher degree of obstruction may be unavoidable if new developments are to match the height and proportions of existing buildings."

3.2 Modelling and Results

3.2.1 Our analysis and subsequent results are produced by the application of our specialist software on our three-dimensional model, images of which are included in **Appendix 1**. This is based upon survey information, supplemented by photographs, plus the architect's planning drawings also included in **Appendix 3**.

3.2.2 In this model, the neighbouring buildings are defined in green, the existing site building in blue and the proposed building in magenta. This is further clarified by the architect's layout plans in **Appendix 3**, which includes room references that can again be cross-referenced to the body of our report and the results sheets.

3.3 Daylight

3.3.1 Daylight is not specific to a particular direction, as it is received from the dome of the sky.

3.3.2 Reference is made in the BRE report to various methods of assessing the effect a development will have on diffused daylight.

3.3.3 The simplest methods are not appropriate in an urban environment, where the built form is invariably complex. Vertical Sky Component (VSC) is the calculation most readily adopted, as the principles of calculation can be established by relating the location of any particular window to the existing and proposed, built environment.

3.3.4 The BRE Guide states *"If any part of a new building or extension, measured in a vertical section perpendicular to a main window wall of an existing building, from the centre of the lowest window, subtends an angle of more than 25^{o} to the horizontal, then the diffused daylighting of the existing building may be adversely affected.*

This will be the case if the Vertical Sky Component measured at the centre of an existing main window is less than 27% and less than 0.8 times its former value".

3.3.5 Where the VSC calculation has been used, BRE also seeks to consider daylight distribution within neighbouring rooms, once again defining an adverse effect as a result that is less than 0.8 the former value. Access is rarely available and we have therefore taken a reasoned approach.

3.3.6 The method of calculation for proposed accommodation is known as Average Daylight Factor (ADF). This is the most comprehensive of daylight calculations defined by BRE and is appropriate to proposed accommodation, because all relevant information is available.

3.3.7 The initial calculation is Vertical Sky Component which measures the value of daylight received at the centre of the window face. The area of glazing through which the light is transmitted and the transmission value of the glazing is then considered. Within the room the total surface area is calculated and a degree of reflection applied. The outcome is then compared to the values recommended by BRE. Assuming that the rooms are used in conjunction with artificial lighting the minimum recommended ADF levels are:-

2%	Kitchen or combined kitchen and living space
1.5%	Living room and study
1%	Bedroom

Where kitchens have been sited at the rear of the room these are to be served by task lighting in the modern mode.

3.3.8 Where a room is served by more than one window, ADF calculations are made in relation to each window and the individual results added together to provide the true ADF for that room.

3.3.9 With regard to the ADF calculations for proposed accommodation daylight, the following assumptions have been made with regard to the various elements that together are computed to produce the ADF value;

- Glazing transmittance – 0.68 for the double glazing (BRE default reading)
- Net glazed area of the window – 0.8 (BRE default reading)
- Interior surface reflectance – Living/kitchen/dining Room 0.5 (BRE default reading)
  – Bedroom 0.5 (BRE default reading)
- Reflectance beneath reference plane – Living/kitchen/dining room 0.15 (BRE default reading)
  – Bedroom 0.15 (BRE default reading)

3.4 Sunlight

3.4.1 The BRE *Guide to Good Practice* confirms:

(i) Sunlight is only relevant to neighbouring residential windows which have a view of the proposed development and face within 90^{o} of south, i.e. south of the east-west axis.

(ii) If any part of a new development subtends an angle of more than 25^{o} to the horizontal measured from the centre of the main living room window, a vertical section perpendicular to the window, then the sunlighting in the existing dwelling may be adversely affected.

(iii) Similarly, the sunlight availability to an existing dwelling may be adversely affected if the APSH, when measured at the centre of the window is reduced by more than 4%.

(iv) Should the loss be greater than 4%, then sunlight availability may be adversely affected if the centre of the window receives less than 25% of the annual probable sunlight hours, of which 5% of the annual total should be received between 21 September and 21 March (winter) and less than 0.8 times its former sunlight hours during either period.

(v) Kitchens and bedrooms are less important, although care should be taken not to block too much sun.

3.4.2 Proposed accommodation "*will appear reasonably sunlit provided*":-

- *at least one main window wall faces within 90° of due south; and*
- *the centre of at least one window to a main living room can receive 25% of annual probably sunlight hours, including at least 5% of annual probable sunlight hours in the winter months between 21 September and 21 March.*
- *In housing, the main requirement for the sunlight is living rooms… It is viewed as less important in bedrooms and in kitchens.*

3.4.3 BRE acknowledges that a simple layout strategy can be an issue for flats:-
"Sensitive layout design of flats will attempt to ensure that each individual dwelling has at least one main living room which can receive a reasonable amount of sunlight. In both flats and houses, a sensible approach is to try to match internal room layout with window/wall orientation. Where possible, living rooms should face the southern or western parts of the sky and kitchens towards the north or east.

The overall sunlighting potential of a large residential development may be initially assessed by counting how many dwellings have a window to a main living room facing south, east or west. The aim should be to minimise the number of dwellings whose living rooms face solely north, north east or north west, unless there is some compensating factor such as an appealing view to the north."

3.4.4 BRE then provides an example of "*careful layout design*" in which *"four out of the five flats shown have a south-facing living room".* This example is provided without having to consider the site constraints that impact upon most urban locations.

4.0 DAYLIGHT RESULTS

4.1 Neighbouring Buildings

4.1.1 For the purposes of this report we have analysed the residential windows closest to the development site. The results are detailed in **Appendix 2**.

North

Heath Road

4.1.2 On the opposite side of Heath Road is a three-storey terrace with retail at ground floor and residential on the two upper floors. The first sheet of Appendix 2 confirms that an angle rising from the centre of the lowest residential window (first floor) and directly opposite the proposed development, subtends the proposed development of 21º. We have already reiterated BRE Guidance in item 3.34 of this report which confirms that an adverse effect to daylighting is only likely to occur if the development were to subtend an angle of 25º from this window. In short, there would be no adverse effect.

East and West

Heath Road

4.1.3 To the east and on the opposite side of Saville Road is a commercial building, of which only the flank windows have a view of the proposed development. In any case, the commercial buildings are not relevant to the terms of this report and require no further consideration.

4.1.4 To the west, stands a terrace of properties with retail at ground level and residential above. The single window in the flank elevation that has a view of the proposed development serves a landing to the residential parts. However, BRE is explicit in stating that non-habitable spaces, such as hallways and landings, are excluded from the guidance and there is no daylighting criteria to satisfy.

South

2 Saville Road

4.1.5 To the south of the site is a residential property, the flank wall of which faces the site. This flank wall was originally imperforate but in 2002 planning approval was gained for extending the building to the rear and refurbishing other parts of the building. The flank wall of the rearward extension remains imperforate. A chimney breast was removed from what was the original rear bedroom, with rearward facing window now blocked in, and the chimney breast now replaced by a window. All of this information is included on a copy of the approved plans in Appendix 2. The daylight results follow on the next sheet. These confirm that VSC (Vertical Sky Component and daylight received at the centre of the window), would be reduced to below 27% of VSC and below 80% of the existing reading. Similarly, the daylight distribution within the room would be reduced.

4.1.6 BRE gives specific advice in these circumstances as reiterated below.

2.2.3 – "Note that numerical values given here are purely advisory. Different criteria may be used based on the requirements for daylighting in an area viewed against other site layout constraints. Another important issue is whether the existing building is itself a good neighbour, standing a reasonable distance from the boundary, and taking no more than its fair share of light. Appendix F gives further guidance."

Appendix F then goes on to confirm ".....an example, where side windows on the existing building are close to the boundary. To ensure the new development matches the height and proportions of existing buildings, the VSC and APSH (sunlight availability) targets for these windows could be set to those for a "mirror image" building the same height and size an equal distance away on the other side of the boundary."

4.1.7 If a mirror image were to be modelled then it would be sited along the line of boundary and obliterate any light to this recent window. The degree to which the development stands back from the boundary confirms that, in daylighting terms, it is being far more considerate than the BRE Guidelines recommend.

4.2 Proposed Accommodation

4.2.1 We have modelled the proposed accommodation and it's fenestration and the daylight results are included in Appendix 3.

4.2.2 These results confirm that every room, without exception, would not only receive daylight in accordance with BRE recommendations but substantially in excess of the recommended values.

4.3 Daylight Summary

4.3.1 The results for neighbouring residential buildings confirm that BRE criterion has been satisfied.

4.3.2 Within the proposed accommodation, the combination of layout and fenestration has ensured that all rooms would receive the benefit of daylight, that would be substantially above the minimum values recommended by BRE.

5.0 SUNLIGHT RESULTS

5.1 Neighbouring Residential Buildings

5.1.1 Sunlight availability is only relevant to the habitable rooms sited on the north side of Heath Road. This report has already confirmed that an angle of 25º rising from the lowest residential window does not subtend the proposed development and this confirms, like daylight, that good sunlight availability would be retained. There would be no adverse effect.

5.1.2 The only other building requiring consideration is 2 Saville Road on the south side of the development. Items 3.4.1(v) confirms the BRE Guideline that kitchen and bedrooms are less important, although care should be taken not to block too much sun. The only window within sight of this development is, as previously detailed, a bedroom window sited on the boundary. However, it is north facing and a north facing window in an urban environment would not receive sunlight. BRE only requires windows that face with 90º of south to be tested. There would be no adverse effect.

5.2 Proposed Accommodation

5.2.1 BRE recognises that accommodating sunlight in blocks of flats can be difficult and promotes a layout whereby living rooms should have a window facing south, east or west. They then go on to provide a reasoned example, where 4 out of 5 living rooms meet this criteria, the equivalent of 8 out of 10. This example is produced with no site constraints, which are inevitable throughout the urban environment, including this site. Heath Road demands that any development at this site reflects the urban grain. Despite this, 7 out of 10 living rooms would face south, east or west, through at least one window.

5.2.2 *We have previously outlined the daylight and sunlight requirements incorporated into the London Plan HSPG 2016. Standard 32 recommends that "All homes should provide for direct sunlight to enter at least one habitable room for part of the day. Living areas and kitchens/dining spaces should preferably receive direct sunlight."*

5.2.3 We have confirmed that 7 out of 10 living rooms would receive direct sunlight, in living rooms. Importantly all flats would provide for direct sunlight to enter at least 1 (typically many more) habitable rooms for part of the day. This is wholly in accordance with the London Plan.

5.2.4 In the explanatory notes to Standard 32, the London Plan confirms that *"where direct sunlight cannot be achieved in line with Standard 32, developers should demonstrate how the light standards proposed within a scheme and individual units will achieve good amenity for residents." This report has already shown that daylight availability throughout this development would be significantly above the minimum values recommended by BRE and therefore, the London Plan is satisfied.*

5.3 Sunlight Summary

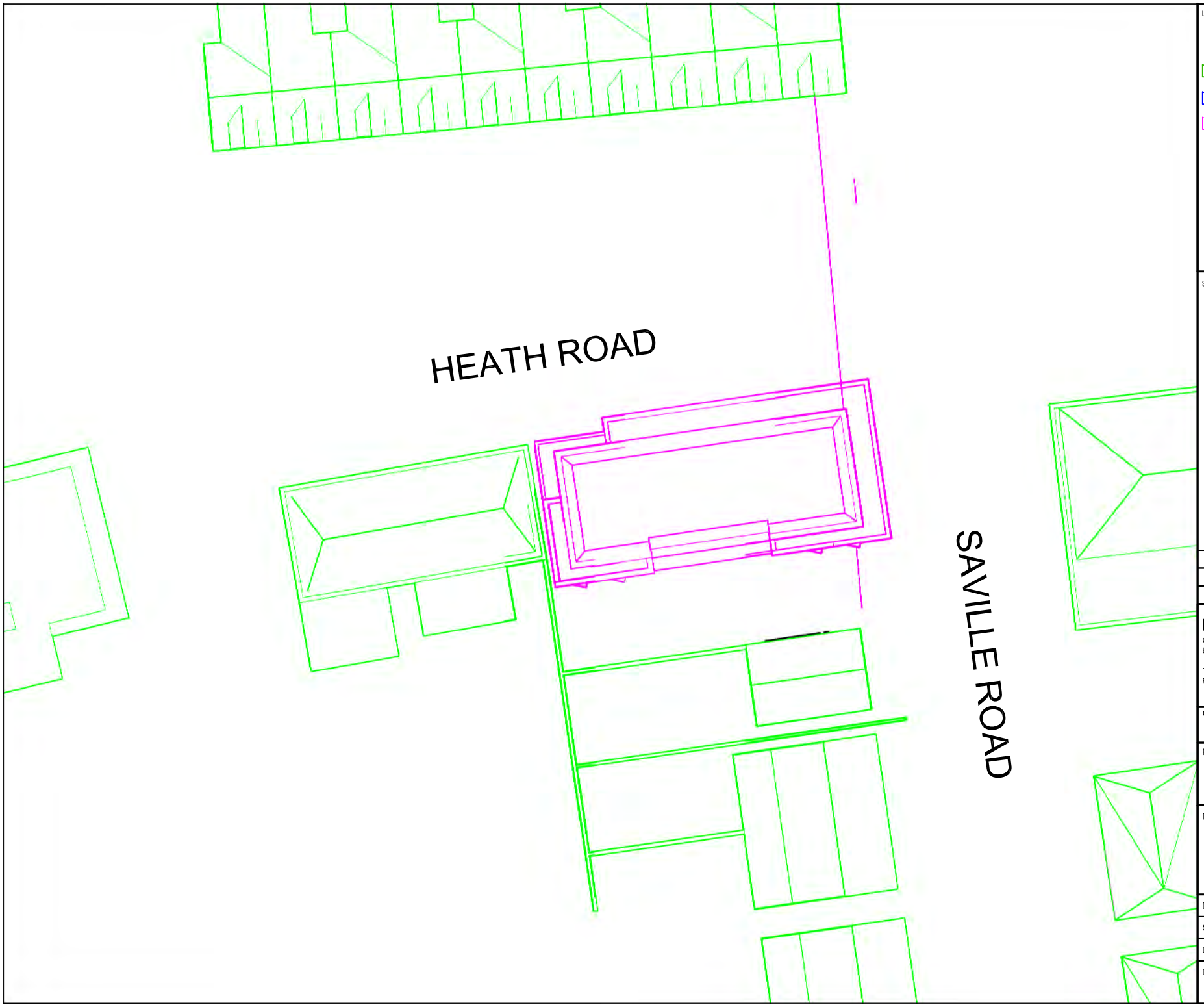
5.3.1 Sunlight availability to neighbouring residential buildings would satisfy BRE criterion.

5.3.2 The proposed accommodation has a layout which has been well considered in relation to site constraints and satisfies the combined recommendations of BRE and London Plan.

5.3.3 Unusually for Local Planning Authorities, Richmond has a specific policy relating to balconies and upper floor terraces. This confirms that they should preferably receive direct sunlight.

5.3.4 The communal terraces at first and second floor levels face south and would receive direct sunlight. At top floor level, the balconies will include areas on the east and west of the building and would be in receipt of direct sunlight.

Appendix 1
Location Plan, CAD Model



LEGEND

N

Existing surrounding buildings

Proposed Building

SOURCES OF DATA

Rev.	Date	Description

Brooke Vincent & Partners
Chartered Building Surveyors
Enterprise House The Crest London NW4 2HW

Tel: 020 8202 1013 Fax: 020 8202 9488
E-mail: info@brooke-vincent.co.uk

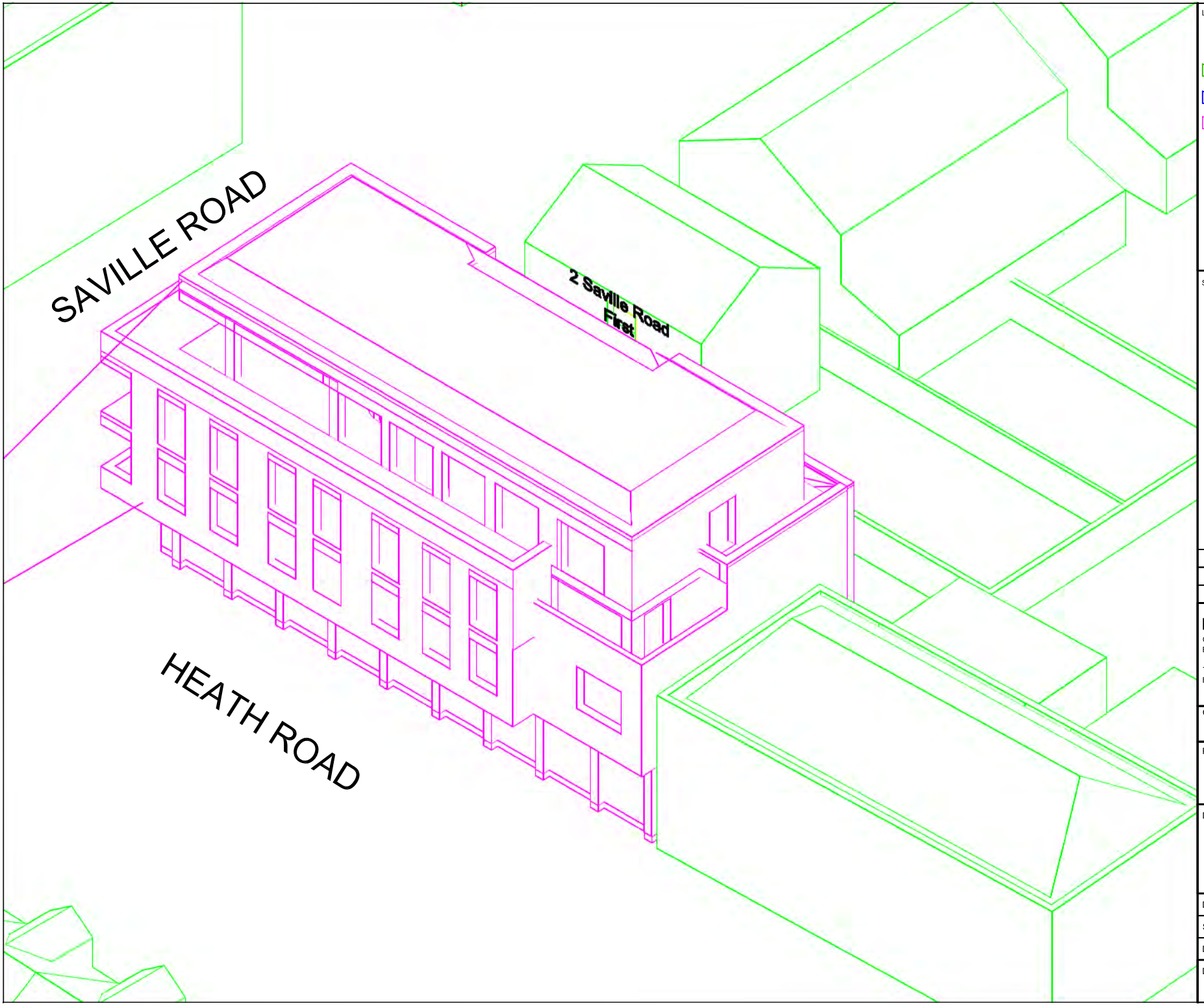
CLIENT / ARCHITECT:
Chassay Studio Limited

PROJECT:
149 Heath Road
TW1 4BN

DRAWING:
Plan View-Existing

DRAWN: AP	PROJECT NO: 10921
SCALE: NTS	
DATE: 02.08.2016	

DRAWING NO:	REV:
10921-01	



LEGEND

N

Existing surrounding buildings

Proposed Building

SOURCES OF DATA

Rev.	Date	Description

Brooke Vincent & Partners
Chartered Building Surveyors
Enterprise House The Crest London NW4 2HW

Tel: 020 8202 1013 Fax: 020 8202 9488
E-mail: info@brooke-vincent.co.uk

CLIENT / ARCHITECT:
Chassay Studio Limited

PROJECT:
149 Heath Road
TW1 4BN

DRAWING:
Perspective View- Proposed_01
Perspective 1

DRAWN: AP	PROJECT NO: 10921
SCALE: NTS	
DATE: 11.02.2016	

DRAWING NO:	REV:
10921-02	

LEGEND

N

Existing surrounding buildings

Proposed Building

SOURCES OF DATA

Rev.	Date	Description

Brooke Vincent & Partners
Chartered Building Surveyors
Enterprise House The Crest London NW4 2HW

Tel: 020 8202 1013 Fax: 020 8202 9488
E-mail: info@brooke-vincent.co.uk

CLIENT / ARCHITECT:
Chassay Studio Limited

PROJECT:
149 Heath Road
TW1 4BN

DRAWING:
Perspective View - Proposed_02

DRAWN: AP	PROJECT NO: 10921
SCALE: NTS	
DATE: 02.08.2016	

DRAWING NO:	REV:
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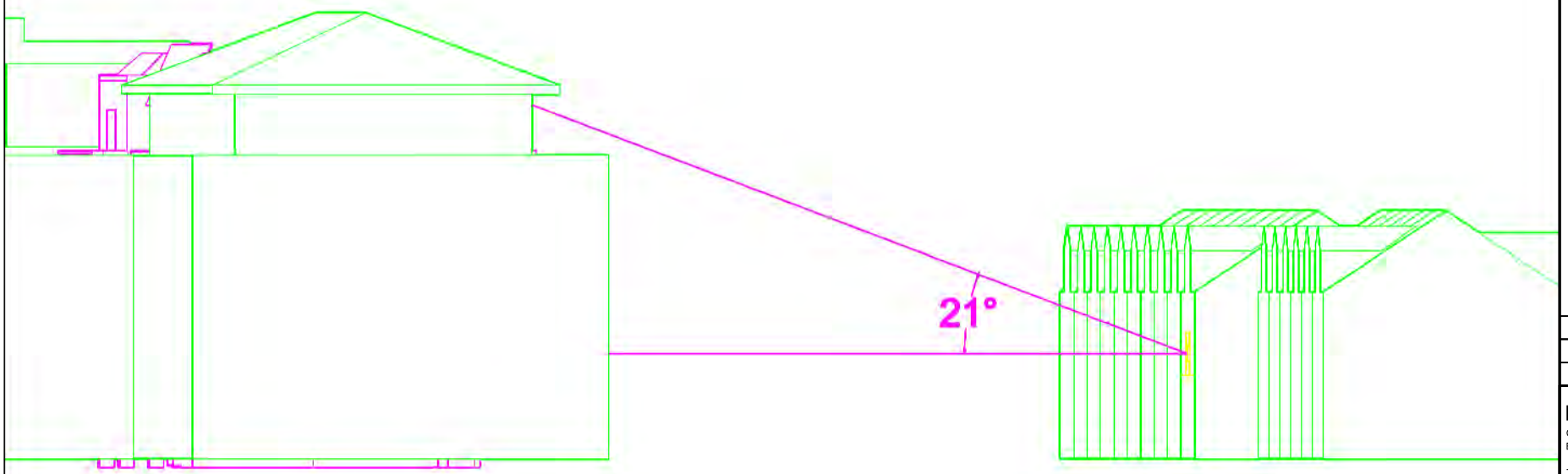


LEGEND

N

Existing surrounding buildings

Proposed Building

SOURCES OF DATA

Rev.	Date	Description

Brooke Vincent & Partners
Chartered Building Surveyors
Enterprise House The Crest London NW4 2HW

Tel: 020 8202 1013 Fax: 020 8202 9488
E-mail: info@brooke-vincent.co.uk

CLIENT / ARCHITECT:
Chassay Studio Limited

PROJECT:
149 Heath Road
TW1 4BN

DRAWING:
Perspective View-Proposed_04

DRAWN: AP	PROJECT NO: 10921
SCALE: NTS	
DATE: 02.08.2016	

DRAWING NO:	REV:
10921-05	

Appendix 2

Daylight and Sunlight Results

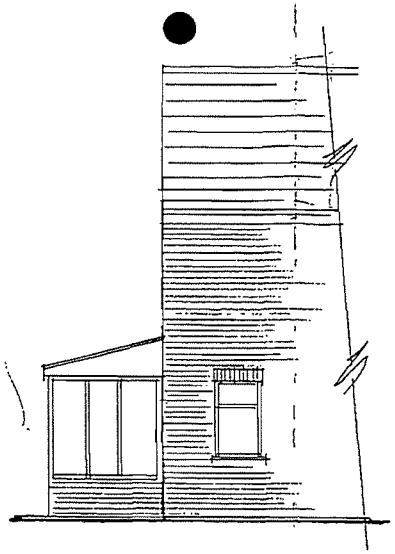
Neighbouring Properties

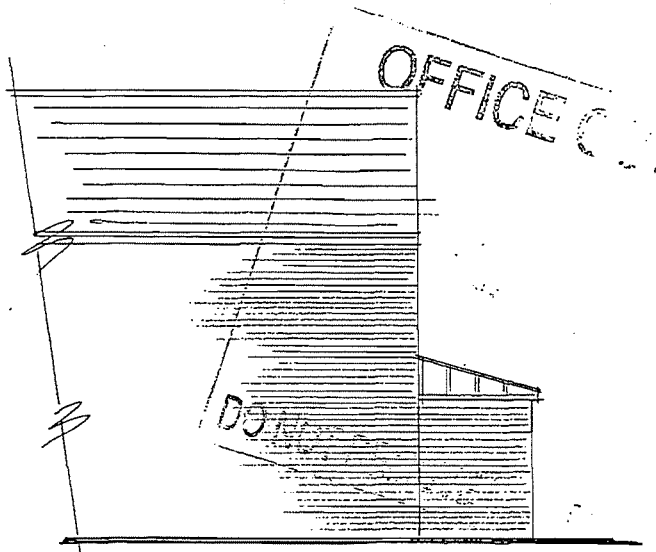
Project Name: 25.08.16
Project No: 10921
Date of Analysis: 25/08/2016
Key drawings: DD Results

Floor Ref.	Room Ref.	Room Use.		Room Area	Lit Area Existing	Lit Area Proposed	Difference	Pass / Fail
2 Saville Road								
First	R1	Bedroom	Area m2	15.36	15.01	6.18	41.17%	FAIL
			% of room		97.72%	40.23%		

Project Name: 25.08.16
Project No: 10921
Date of Analysis: 25/08/2016
Key drawings: VSC APSH Results

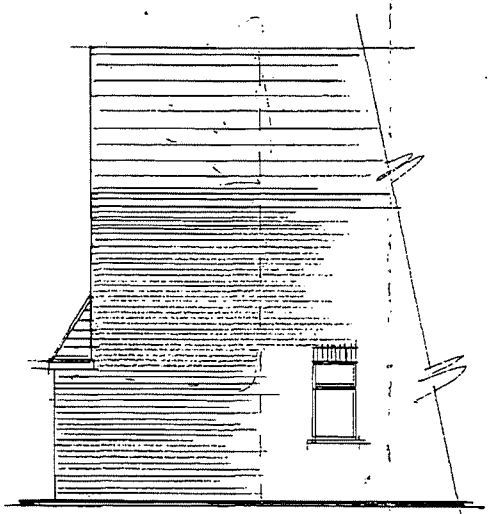
Floor Ref.	Room Ref.	Room	Use.	Window Ref.	Scenario	VSC	VSC Sunlight Loc	Difference	Pass / Fail	Available Sunlight Hours					
										Annual %	Diff	Pass / Fail	Winter %	Diff	Pass / Fail
2 Saville Road															
First	R1	Bedroom		W1	Existing	37.46	0	47.46%	FAIL	*North Facing					
					Proposed	17.78	0								

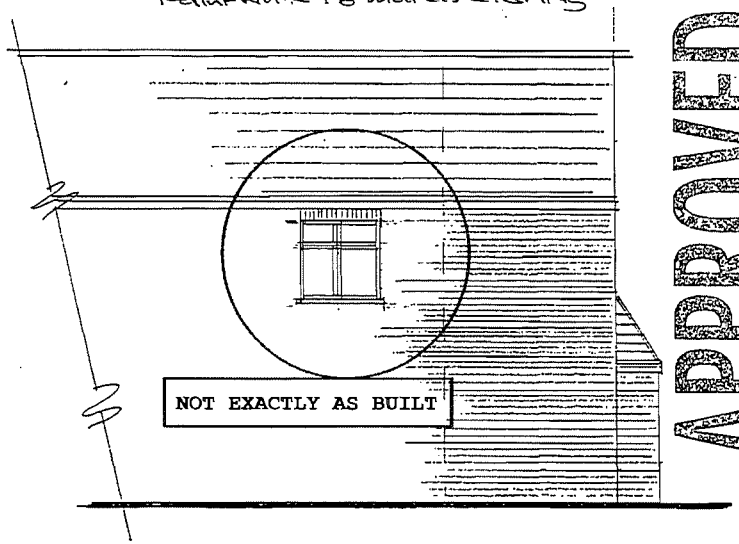




Existing Rear & Flank Elevations

Finishes
Brickwork to match existing
Roof tiles to match existing
Windows to match existing
Paintwork to match existing



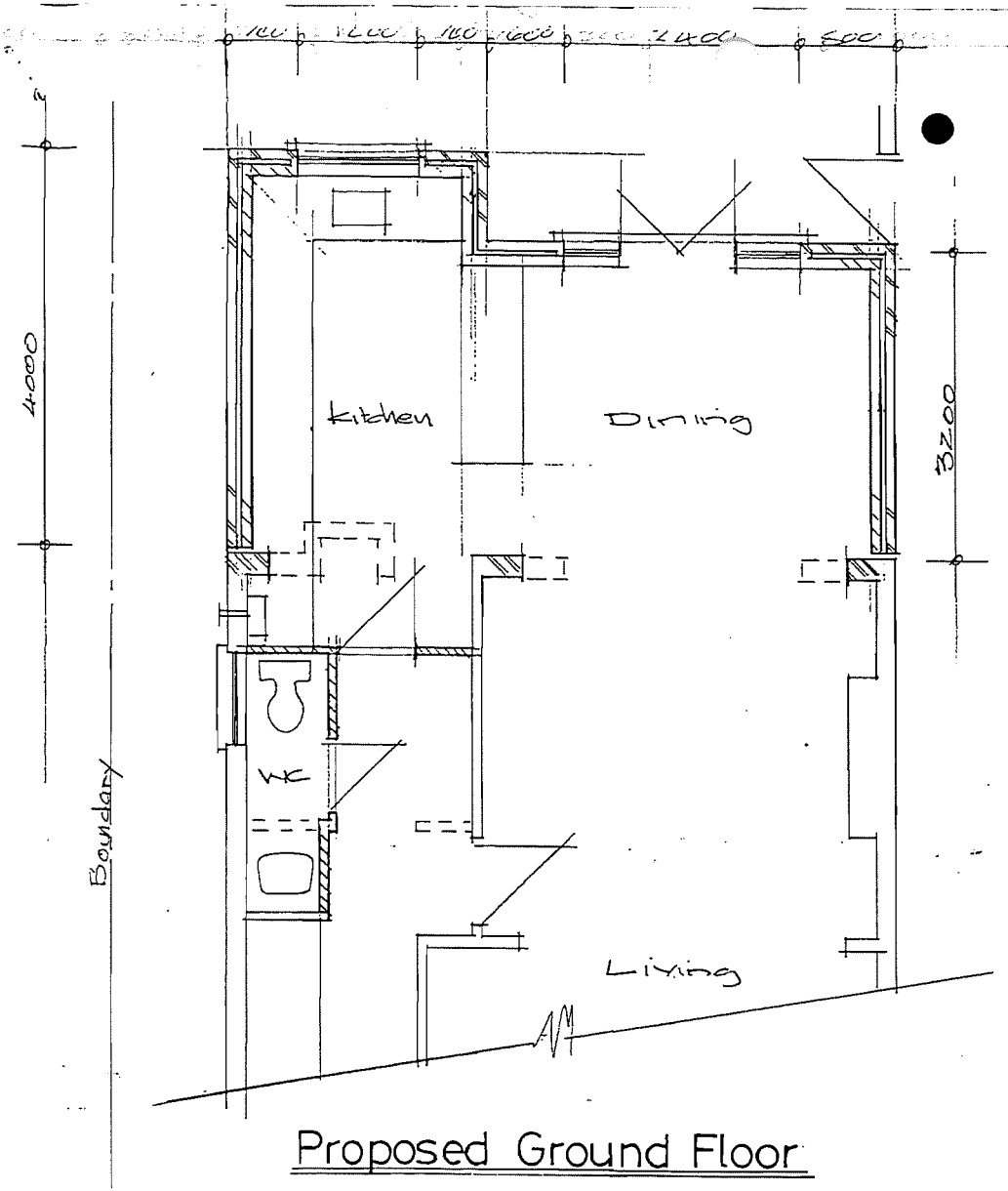


APPROVED

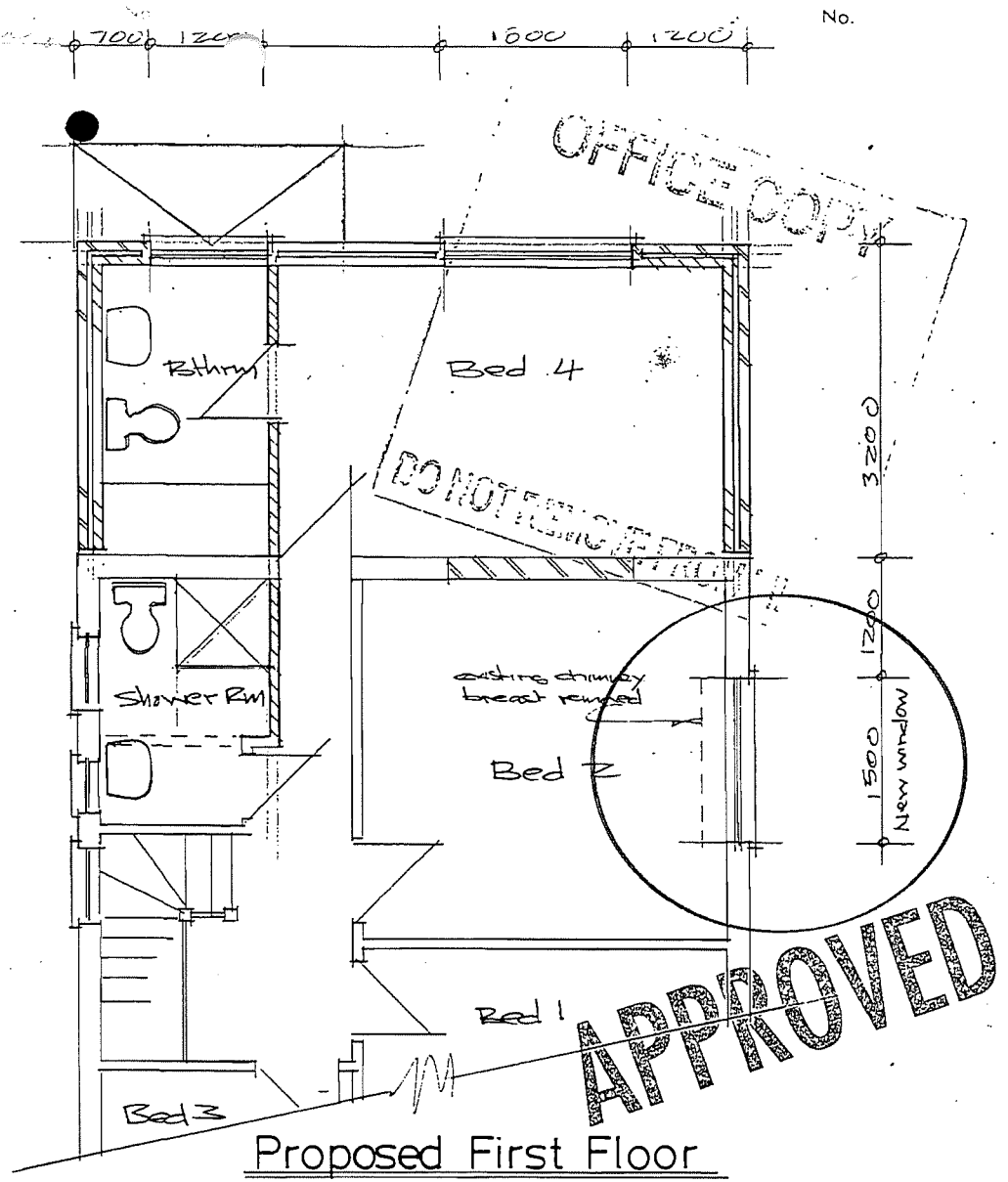
Proposed Rear & Flank Elevations

Mr. & Mrs. Sawkins
2 Saville Road, Twickenham, TW11 4BA
PROPOSED TWO & SINGLE STOREY REAR EXTENSION
EXISTING & PROPOSED REAR & FLANK ELEVATIONS
Scale 1:100 Drg. No. 002A/003 Rev. Jan 2002

鹿島建設株式会社 年 月 日



Proposed Ground Floor



Proposed First Floor

SAVILLE ROAD

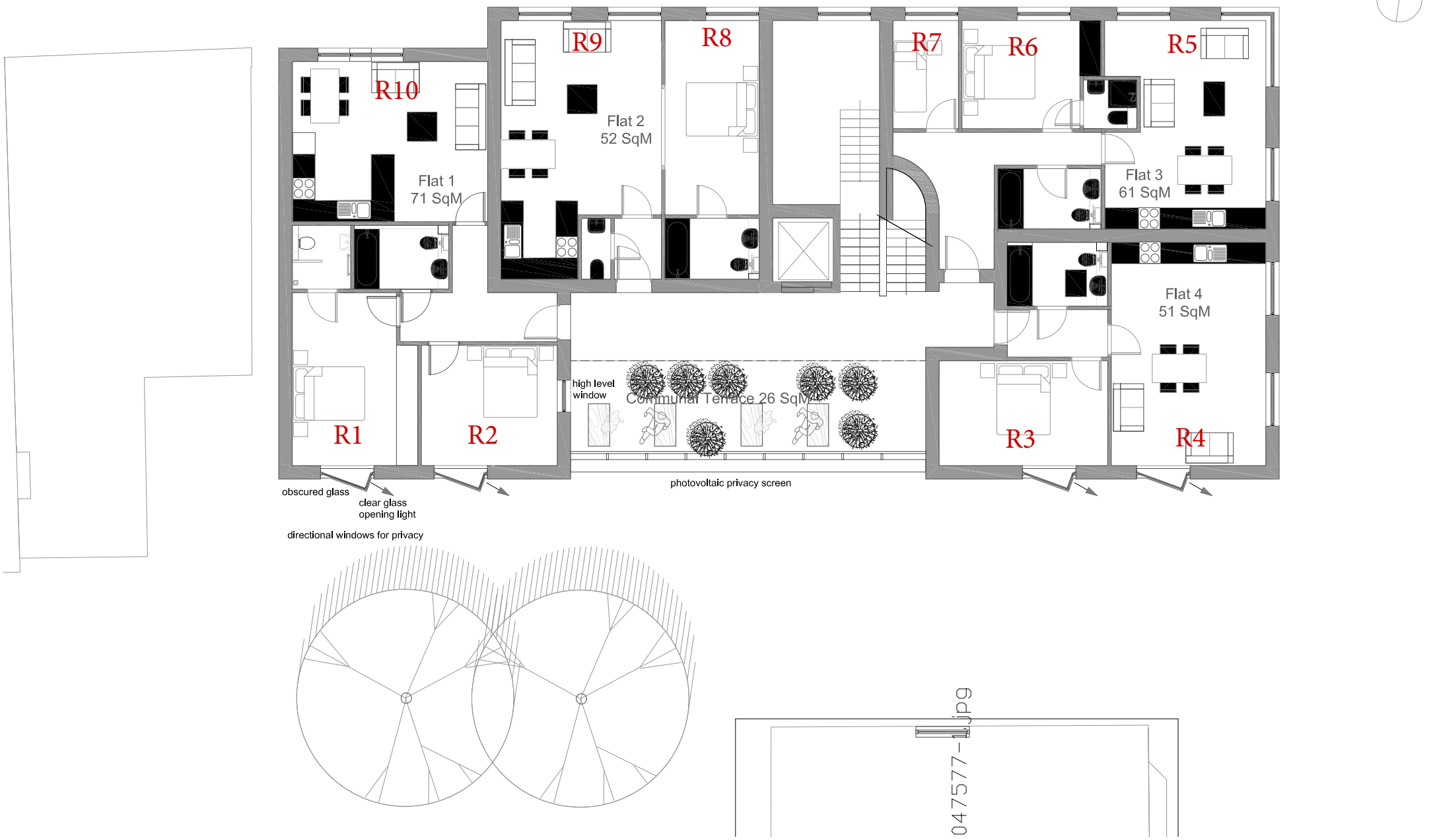
Mr. & Mrs. Sawkins
2 Saville Road, Twickenham, TW11 4BA
PROPOSED TWO & SINGLE STOREY REAR EXTNSION
PROPOSED GROUND & FIRST FLOOR PLANS
Scale 1:50 Drg. No. 002A/002 Rev. Jan 2002

鹿島建設株式会社 年 月 日

Appendix 3

Daylight Results

Proposed Accommodation



0 2 4 6 8 M

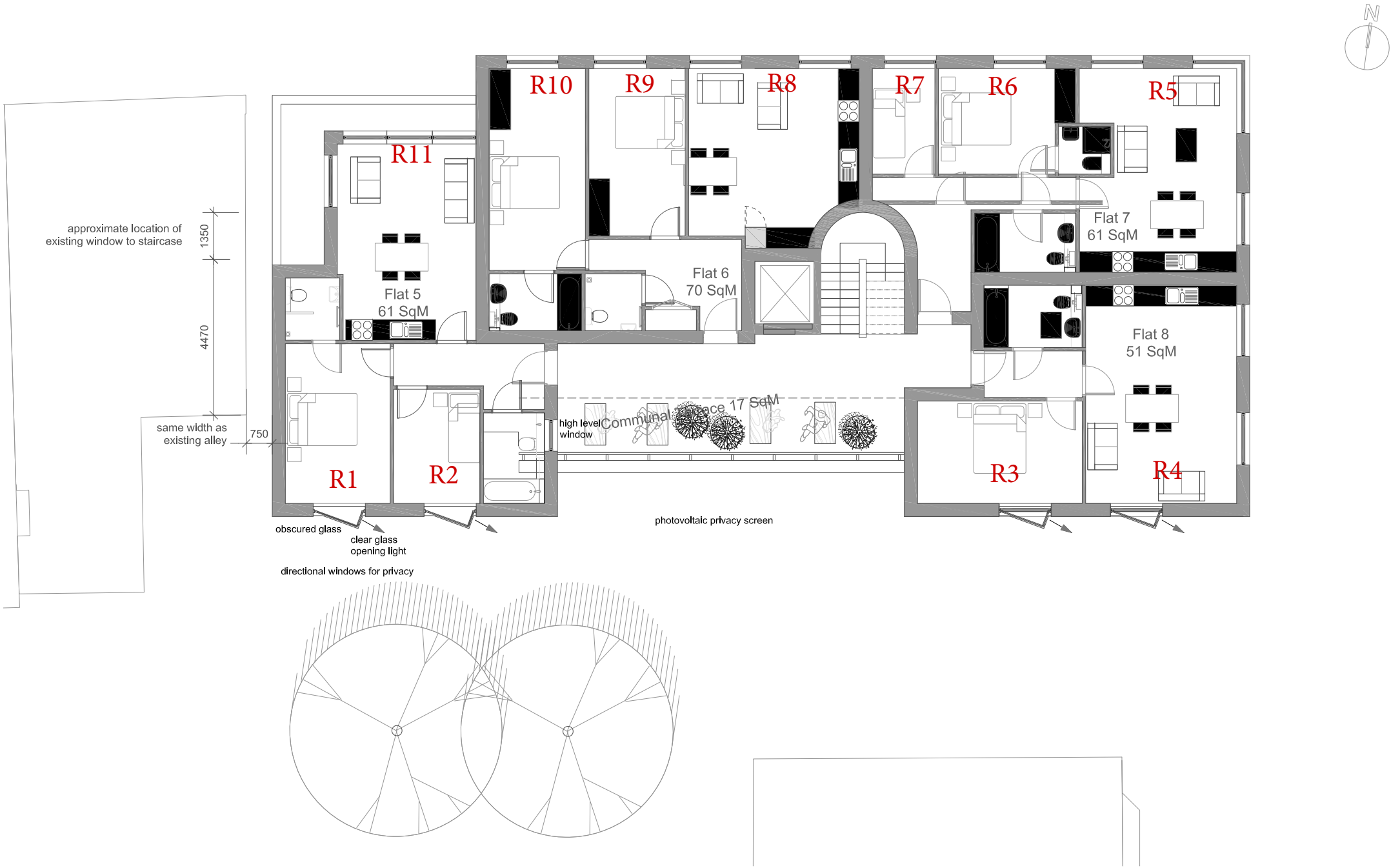
149 – 151 Heath Road Twickenham TW1 4BN
no.1517

Project FIRST FLOOR PLAN

SCALE 1:100

drwg no. 23
1517–

version 10



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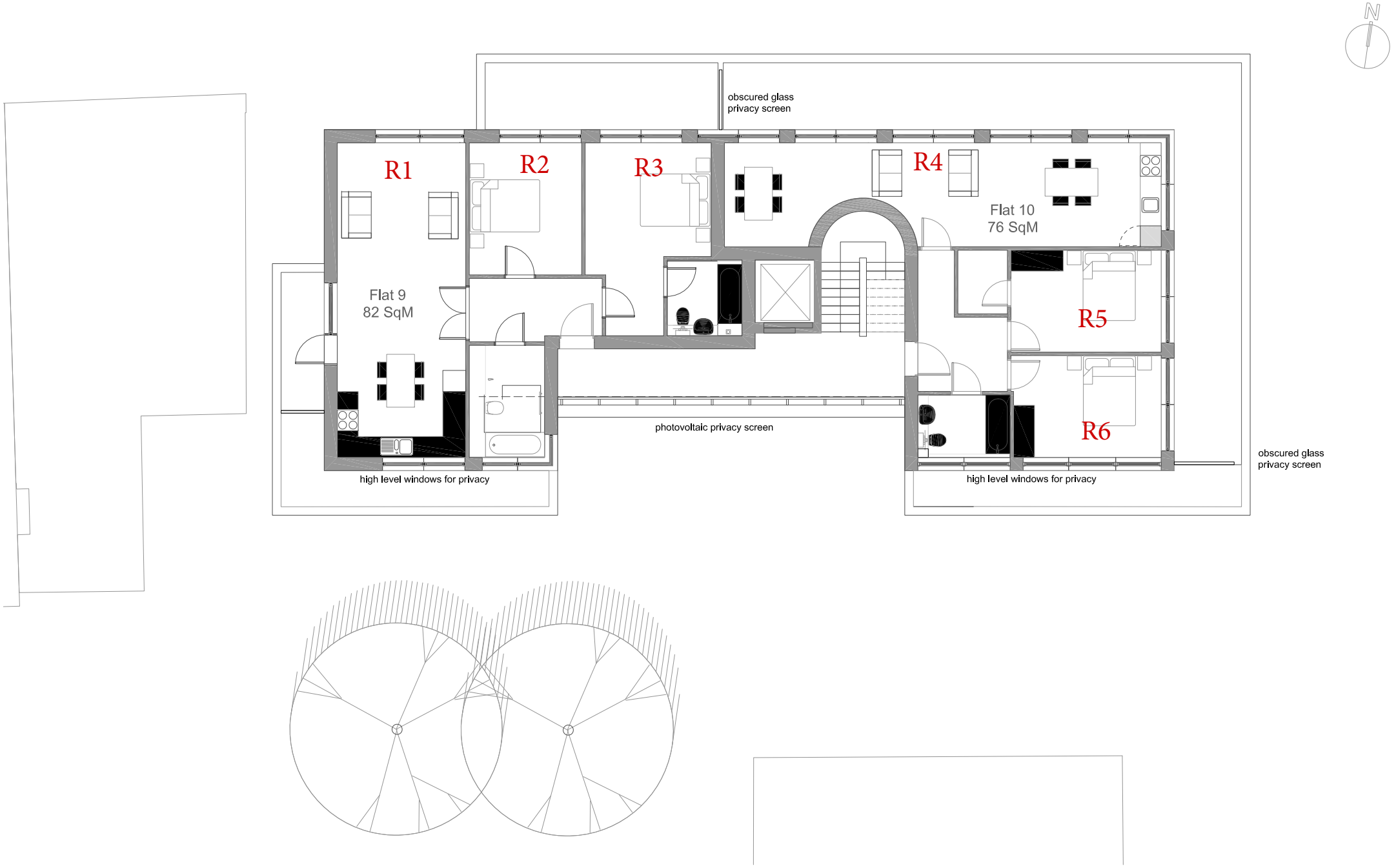
149 – 151 Heath Road Twickenham TW1 4BN
no.1517

Project SECOND FLOOR PLAN

SCALE 1:100

drwg no. 24
1517–

version 10



149 – 151 Heath Road Twickenham TW1 4BN
no.1517

Project THIRD FLOOR PLAN

SCALE 1:100

drwg no. 25
1517–

version 10

Project Name: Heath Road
Project No: 10921
Date of Analysis: 02/08/2016
Key drawings: ADF Results

PROPOSED

Floor Ref.	Room Ref.	Room Use.	Window Ref.	Glass Transmittance	Glazed Area	Clear Sky Angle Proposed	Room Surface Area	Average Surface Reflectance	Below Working Plane Factor	ADF Proposed	Req'd Value	Pass/Fail
First	R1	Bedroom	W1	0.68	1.49	80.71	75.29	0.50	1.00	1.44		
			W3	0.68	0.54	59.11	75.29	0.50	1.00	0.39		
										1.83	1	PASS
First	R2	Bedroom	W2	0.68	1.49	81.14	62.49	0.50	1.00	1.75		
			W4	0.68	0.54	59.87	62.49	0.50	1.00	0.47		
										2.22	1	PASS
First	R3	Bedroom	W5	0.68	1.49	75.60	67.07	0.50	1.00	1.52		
			W7	0.68	0.54	57.03	67.07	0.50	1.00	0.42		
										1.94	1	PASS
First	R4	LKD	W10	0.68	1.89	70.78	108.46	0.50	1.00	1.12		
			W6	0.68	1.49	76.97	108.46	0.50	1.00	0.96		
			W8	0.68	0.54	57.63	108.46	0.50	1.00	0.26		
			W9	0.68	1.89	69.40	108.46	0.50	1.00	1.10		
										3.43	2	PASS
First	R5	LKD	W11	0.68	1.89	57.90	107.73	0.50	1.00	0.92		
			W12	0.68	2.82	75.84	107.73	0.50	1.00	1.80		
			W13	0.68	2.06	83.64	107.73	0.50	1.00	1.45		
			W14	0.68	1.89	82.37	107.73	0.50	1.00	1.31		
										5.48	2	PASS
First	R6	Bedroom	W15	0.68	1.89	82.09	52.40	0.50	1.00	2.68		
										2.68	1	PASS
First	R7	Bedroom	W16	0.68	1.89	81.83	36.04	0.50	1.00	3.89		
										3.89	1	PASS
First	R8	Bedroom	W18	0.68	1.89	81.51	70.17	0.50	1.00	1.99		
										1.99	1	PASS
First	R9	LKD	W19	0.68	1.89	81.44	116.92	0.50	1.00	1.19		
			W20	0.68	1.89	81.40	116.92	0.50	1.00	1.19		
										2.39	2	PASS
First	R10	LKD	W21	0.68	3.02	81.24	100.34	0.50	1.00	2.21		
										2.21	2	PASS
Second	R1	Bedroom	W1	0.68	1.80	84.24	66.44	0.50	1.00	2.06		
										2.06	1	PASS
Second	R2	Bedroom	W2	0.68	1.80	84.05	45.61	0.50	1.00	3.00		
										3.00	1	PASS
Second	R3	Bedroom	W5	0.68	1.80	84.25	67.07	0.50	1.00	2.04		
										2.04	1	PASS
Second	R4	LKD	W10	0.68	2.20	77.37	108.46	0.50	1.00	1.43		
			W6	0.68	1.80	84.25	108.46	0.50	1.00	1.26		
			W9	0.68	2.20	76.63	108.46	0.50	1.00	1.41		
										4.10	2	PASS
Second	R5	LKD	W11	0.68	2.20	78.73	107.76	0.50	1.00	1.46		
			W12	0.68	3.29	81.01	107.76	0.50	1.00	2.24		
			W13	0.68	2.41	87.51	107.76	0.50	1.00	1.77		
			W14	0.68	2.21	86.39	107.76	0.50	1.00	1.60		
										7.08	2	PASS
Second	R6	Bedroom	W15	0.68	2.20	86.34	52.83	0.50	1.00	3.27		
										3.27	1	PASS
Second	R7	Bedroom	W16	0.68	2.20	86.30	35.60	0.50	1.00	4.85		
										4.85	1	PASS
Second	R8	LKD	W17	0.68	2.20	86.26	85.09	0.50	1.00	2.03		
			W18	0.68	2.20	86.23	85.09	0.50	1.00	2.03		
										4.05	2	PASS
Second	R9	Bedroom	W19	0.68	2.20	86.22	65.26	0.50	1.00	2.64		
										2.64	1	PASS
Second	R10	Bedroom	W20	0.68	2.20	86.21	75.77	0.50	1.00	2.27		
										2.27	1	PASS
Second	R11	LKD	W21	0.68	5.61	55.21	93.43	0.50	1.00	3.01		
			W22	0.68	2.21	65.58	93.43	0.50	1.00	1.40		
										4.41	2	PASS
Third	R1	LKD	W1	0.68	3.48	87.88	131.71	0.50	1.00	2.10		
			W12	0.68	3.45	87.94	131.71	0.50	1.00	2.09		
			W13	0.68	2.21	7.44	131.71	0.50	1.00	0.11		
										4.31	2	PASS
Third	R2	Bedroom	W11	0.68	3.45	87.91	60.33	0.50	1.00	4.56		
										4.56	1	PASS
Third	R3	Bedroom	W10	0.68	3.45	87.91	78.66	0.50	1.00	3.50		
										3.50	1	PASS
Third	R4	LKD	W5	0.68	4.26	85.28	154.20	0.50	1.00	2.13		
			W6	0.68	3.66	88.47	154.20	0.50	1.00	1.90		
			W7	0.68	7.57	88.38	154.20	0.50	1.00	3.93		

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			W8	0.68	3.45	87.91	154.20	0.50	1.00	1.79		
			W9	0.68	3.45	87.91	154.20	0.50	1.00	1.79		
										11.54	2	PASS
Third	R5	Bedroom	W4	0.68	3.92	84.75	62.20	0.50	1.00	4.84		
										4.84	1	PASS
Third	R6	Bedroom	W2	0.68	5.83	88.18	61.79	0.50	1.00	7.54		
			W3	0.68	3.92	84.54	61.79	0.50	1.00	4.86		
										12.40	1	PASS