



Client: Mr Chris McManus

Assessment of Daylight and Sunlight
Provision at No. 24 Norwood Road,
Reading, Berkshire

October 2017

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Contents Amendment Record

This report has been issued and amended as follows:

Issue	Revision	Description	Date	Written by	Checked by
1	0	First Issue	31 st October 2017	NMM	SPH

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1

Background and Scope of Appraisal

Herrington Consulting has been commissioned by Mr Chris McManus to analyse and quantify the provision of natural daylight and sunlight to the habitable rooms within the proposed development at No. 24 Norwood Road, Reading, Berkshire, RG1 3LD.

2 The Site and Development Proposals

2.1 Site Location

The site is located within the town of Reading, in Berkshire. 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 proposals for development are to build a single storey extension, and to subdivide the existing terraced house, which is currently divided over three floors; into three flats. 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 policies 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*”.

3.3 Local Planning Policy

Reading Borough Local Development Framework Core Strategy (adopted 2008, altered 2015)

Paragraph 4.9 in the document states, “*The policy incorporates the use of EcoHomes and BREEAM standards. These standards cover a wide range of matters including building fabrics and materials, energy and water use, amenity areas and ecology, waste recycling, the location and accessibility of developments, daylighting, sound insulation etc. However, the current standards give high scores in urban areas to using previously developed land that is close to services, amenities and public transport routes. Developments in Reading will therefore naturally score relatively highly before any consideration of the impact of the development itself. Reading Borough Council believes that development should mitigate effects further by reducing greenhouse gas and other polluting emissions and providing higher energy conservation, hence the requirement for Eco-Homes and BREEAM ‘Very Good’ and ‘Excellent’ ratings. The government have consulted on a Draft Code for Sustainable Buildings that is partially based on the BREEAM Ecohomes standards for residential buildings. The Council will consider evidence based on these standards where it can be shown that they produce similar results to the relevant Ecohomes Standards.*”

Reading SPD Residential Conversions (adopted 2013)

Paragraph 2.5 of the document states, “*Policy DM4 highlights the need to ensure proposals do not have a detrimental impact to the living environment of existing or new residents taking into account issues such as privacy and overlooking, access to sunlight and daylight, visual dominance and overbearing effects of a development, noise and disturbance, crime and safety.*”

Paragraph 2.28 in the document states, “*A large proportion of Reading's existing housing stock, particularly within the town centre, is terraced. Those units that are, in principle, capable of being converted often contain a basement level. However, not all basements are suitable for conversion to a separate unit of living accommodation. In terms of daylight provision, outlook and headroom the basement level is often deficient. There are no adopted standards relating specifically to basements, but a planning judgement will be made as to the suitability of the accommodation proposed.*”

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 daylight 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 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.

To pass this test the centre point of the window will 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 Guideline also states that at least one main window of the proposed development should face 90 degrees of due south, with priority given for living rooms, 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.

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
- Scheme drawings in AutoCAD format (MCM Consultants – March 2017)
- Existing site photos provided by client (October 2017)
- 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 3.2.0.2) software package.

5.3 Calculation Assumptions

The following assumptions have been made when undertaking the analysis:

- When assessing the VSC the calculation is based on the centre point of the window position
- 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	0.94
Rural / suburban	4%	x 1.0	x 1.0	0.97

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%

Table 5.2 – Reflectance values used in ADF analysis

6 Daylight Provision to Proposed New Rooms

6.1 Average Daylight Factor (ADF)

Using the analytical techniques discussed in Sections 4 and 5, the Average Daylight Factor (ADF) has been calculated for the habitable rooms within the proposed development and proposed extension.

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.

However, where kitchens have a floor area that is less than 13m² then it is conventional to assume that this is not a habitable room and the daylight tests need not be applied. Notwithstanding this, where kitchens form an integral part of a room, such as in an LKD, they have been included but the interpretation of the daylighting results reflects the non-habitable status of the kitchen area.

The results are summarised in Table 6.1 below.

Floor	Room Use (Room Ref)	ADF	Minimum Recommended ADF	Meets BRE Guidelines?
Flat 1 Lower Ground	Living Room (R1)	1.5%	1.5%	Yes
	Bedroom (R2)	4.2%	1.0%	Yes
	Bedroom (R3)	4.8%	1.0%	Yes
Flat 2 Upper Ground	Living Room (R1)	2.5%	1.5%	Yes
	Bedroom (R2)	2.0%	1.0%	Yes
Flat 3 First Floor	LKD (R1)	3.5%	2.0%	Yes
	Bedroom (R2)	3.3%	1.0%	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 achieve or exceed the minimum required ADF target values prescribed by both the BRE Guidelines, and British standards. Consequently, it is possible to conclude that, in accordance with both the BRE Guidelines, all rooms assessed with receive adequate daylight and have reduced reliance on supplementary electric lighting.

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 windows on more than one elevation, 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	Room Ref	Percentage APSH (Room Total)		Meets BRE Guidelines?
			All year	Winter	
Flat 1 Lower Ground	Living Room	R1	44	13	Yes
	Bedroom	R2	10	0	n/a
	Bedroom	R3	10	0	n/a
Flat 2 Upper Ground	Living Room	R1	85	28	Yes
	Bedroom	R2	11	0	n/a
Flat 3 First Floor	LKD	R1	89	30	Yes
	Bedroom	R2	11	0	n/a

Table 7.1 – Results of APSH analysis

The results above show that all main living / LKD rooms assessed (which is one per flat) achieve or exceed the recommended target APSH values for both the whole year and winter months.

All bedroom's face within 90 degrees of due north and will therefore receive less direct sunlight. However, as stated above, the BRE Guidelines place less emphasis on bedrooms than on main living rooms. The detailed results in the appendix to this report and summarised in table 7.1 above, show that all flats will have one main living room exceeding the target values. Consequently, it has been possible to conclude that each of the proposed flats will be well sunlit 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 ambience 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 detailed numerical results and graphic outputs show that the amenity area serving the proposed flats will receive at least two hours of direct sunlight on 21st March to over 50% of its area. In exceeding this minimum target, this amenity space will deliver the principle benefits derived from direct sunlight and as a result will help deliver the amenity benefits provided by outdoor spaces.

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. 24 Norwood Road, Reading. Using detailed numerical modelling applications, the Average Daylight Factor (ADF) and Annual Probable Sunlight Hours (APSH) have been quantified for each of the rooms in the proposed flats.

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'.

When considering the amount of sunlight that would be available to these rooms, the detailed results show that each proposed flat will meet the criteria set by the BRE Guide, whereby at least one habitable room in the proposed dwelling should achieve the minimum 25% for whole year (APSH) and 5% for the winter months (or WPSH). In addition, the guidelines prioritise living areas over bedrooms, and suggest that they should face within 90 degrees of due south. This criterion met in all three of the proposed residential flats.

Therefore, it is possible to conclude that the proposed scheme can be expected to provide good levels of daylight and sunlight for its future occupants, in accordance with the BRE Guidelines.

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



Revision A:- Amendment to block plan 16-10-2017

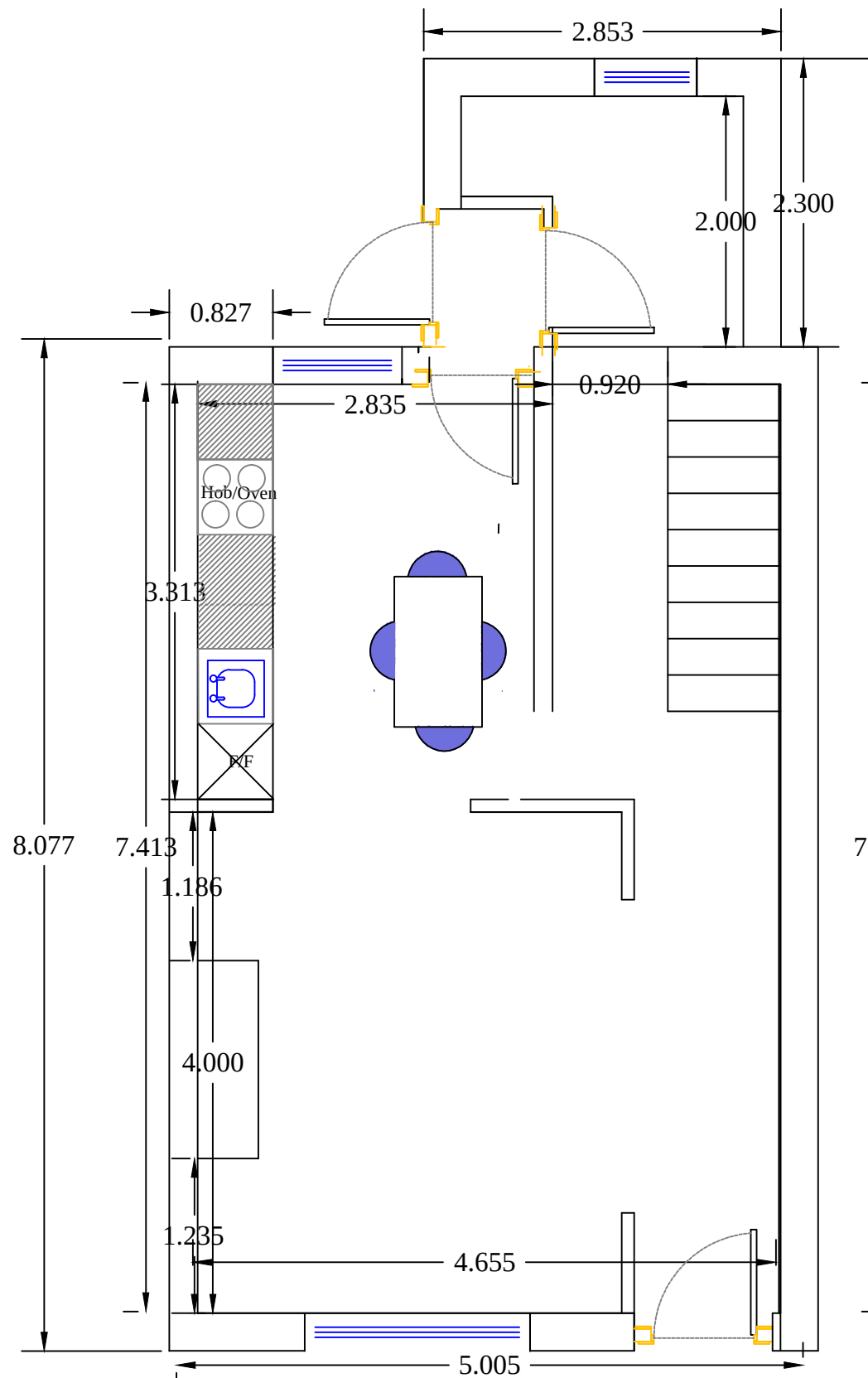
MCM Consultants

Mansewood Coach House, East End, Lochwinnoch PA12 4EP
Tel. 07795 835886
Email: mcm-consultants@btconnect.com

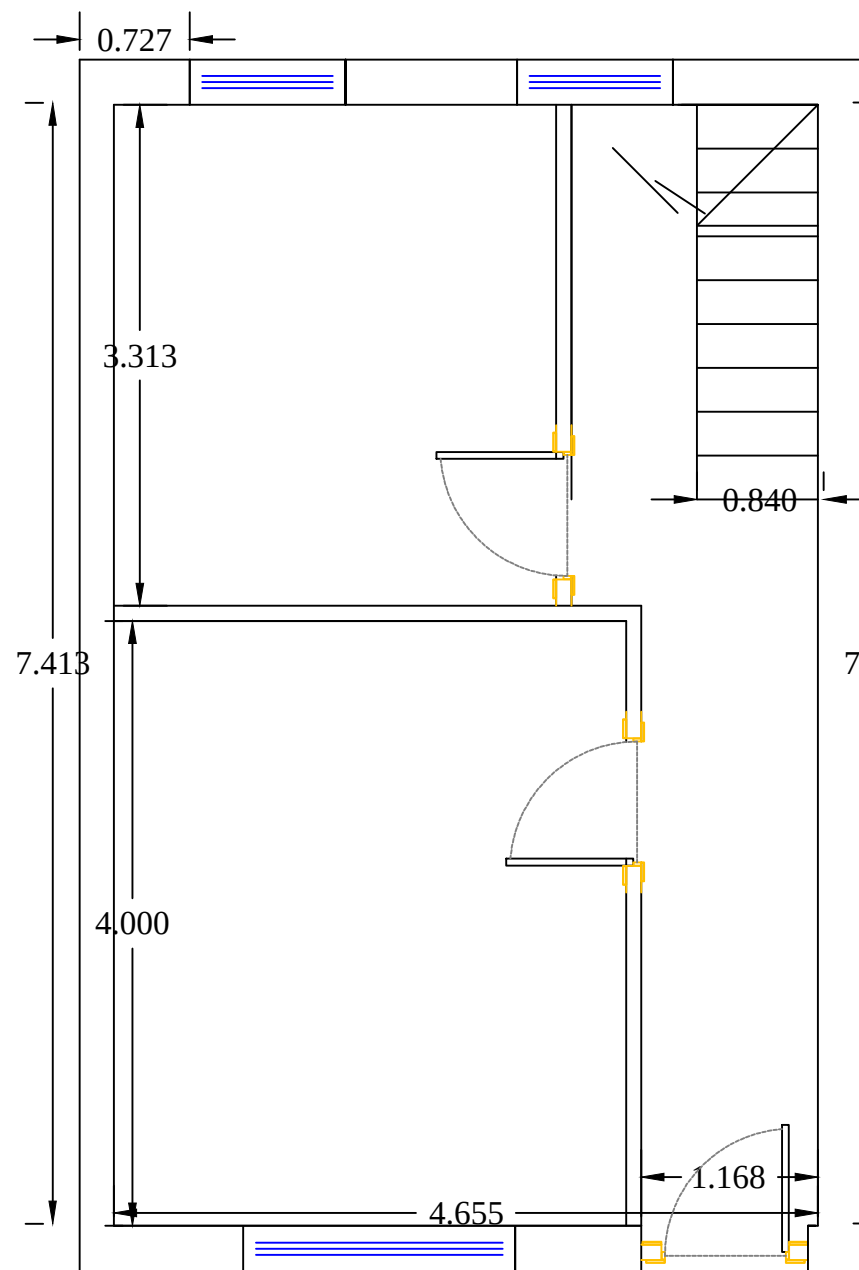
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Project:-	Proposed Alteration and Extension to Dwelling House 24 Norwood Road Reading

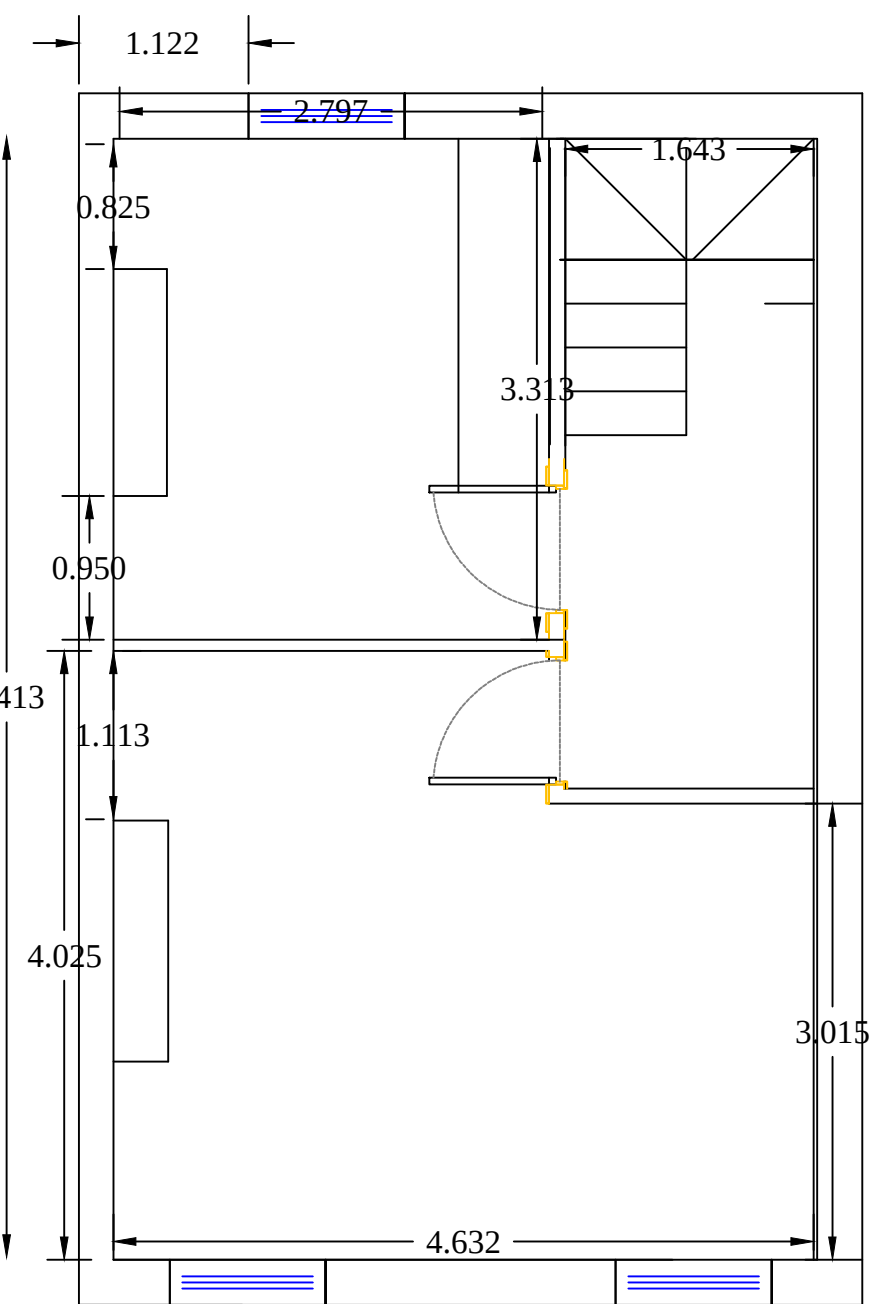
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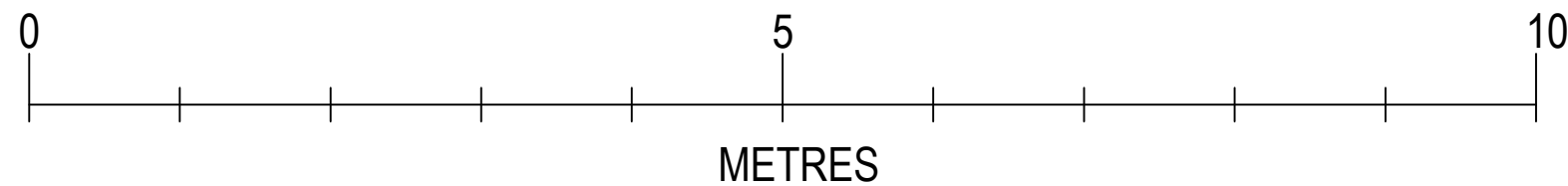
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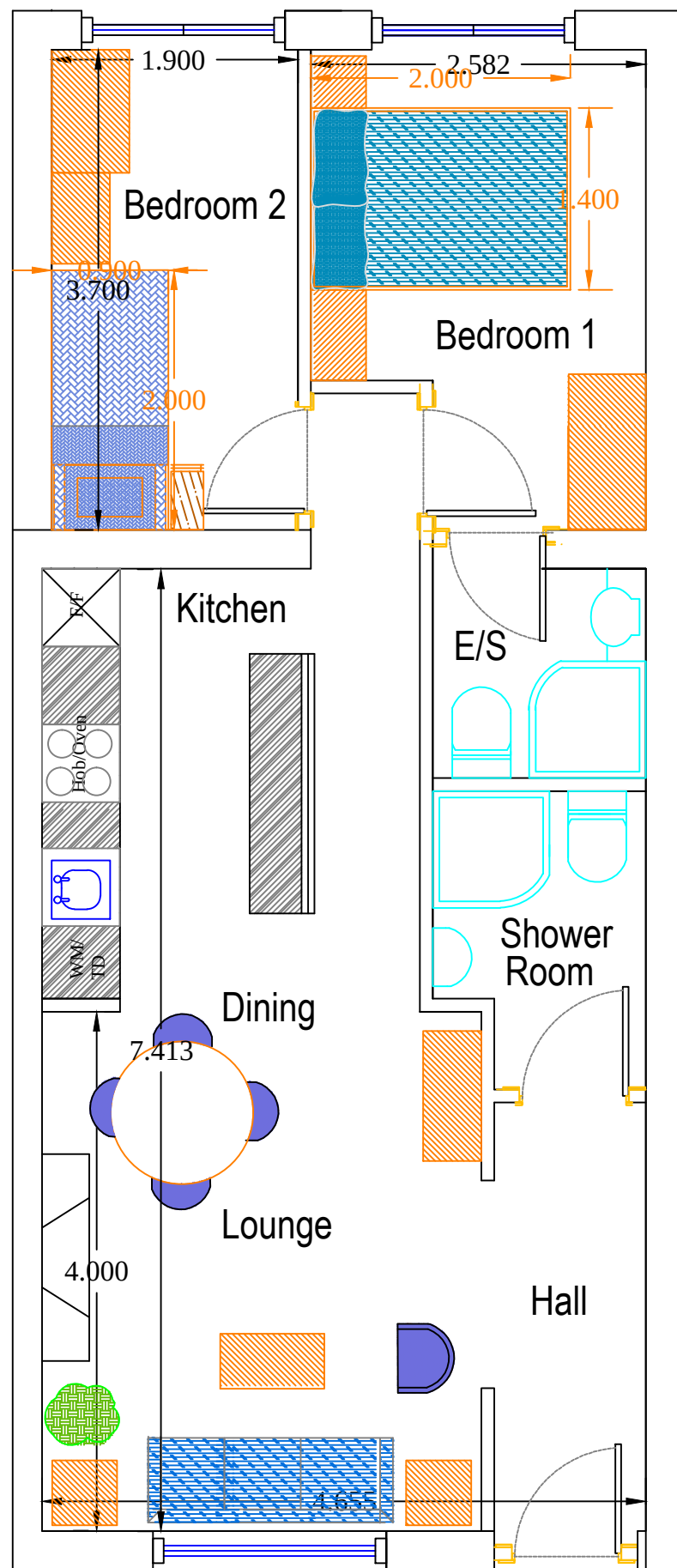
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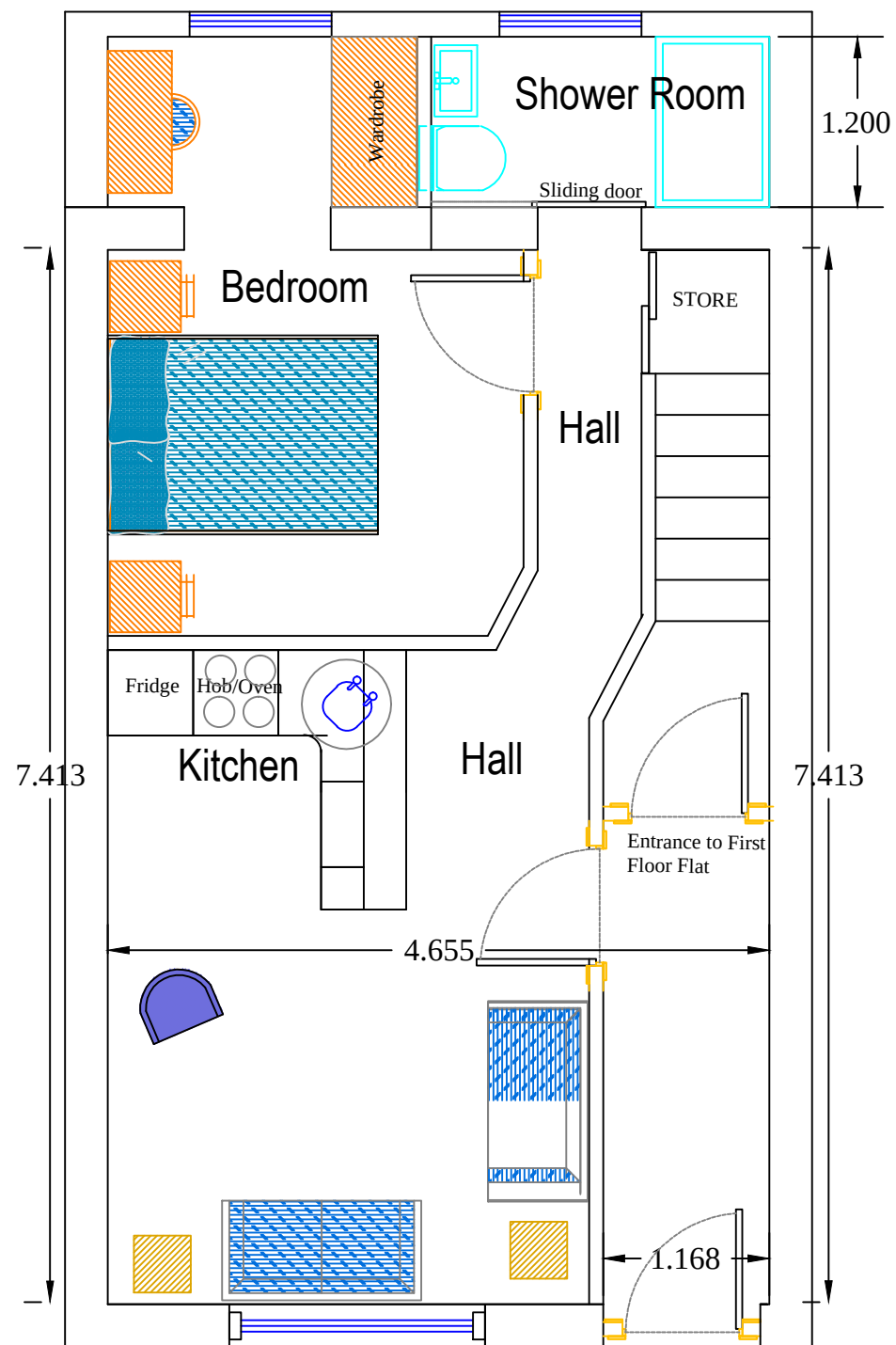
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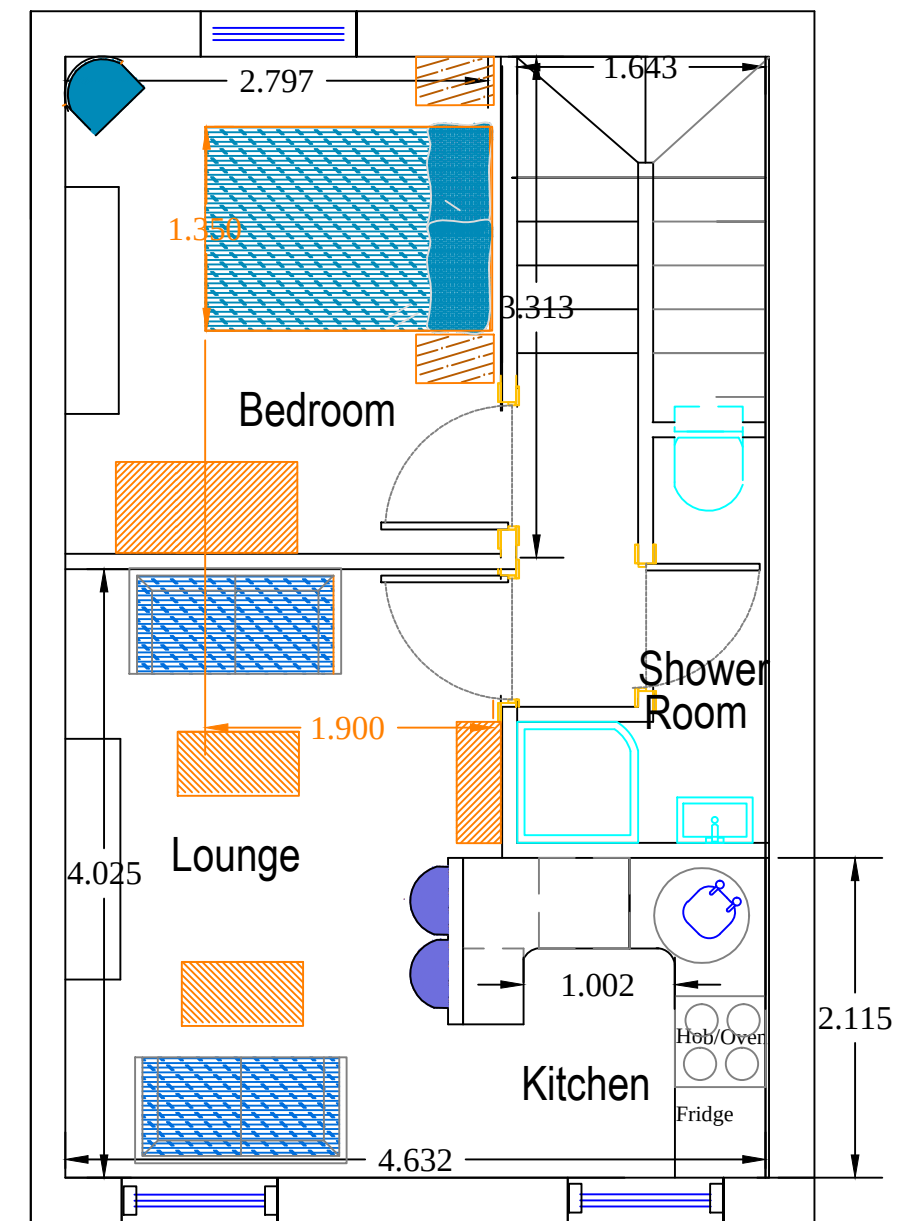
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		Project:-	Proposed Alteration and Extension to Dwelling House 24 Norwood Road Reading	
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Date:-	March 2017	Dwg. No:-	2017-01/03 PP	Scale:- 1/50



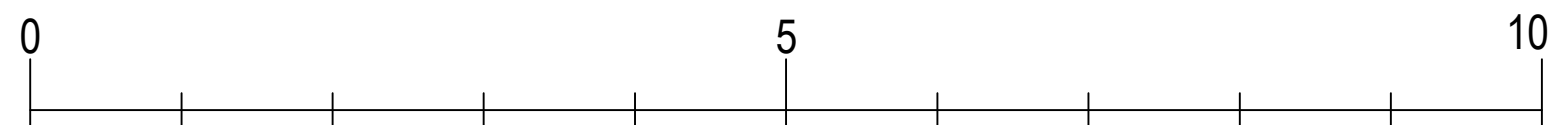
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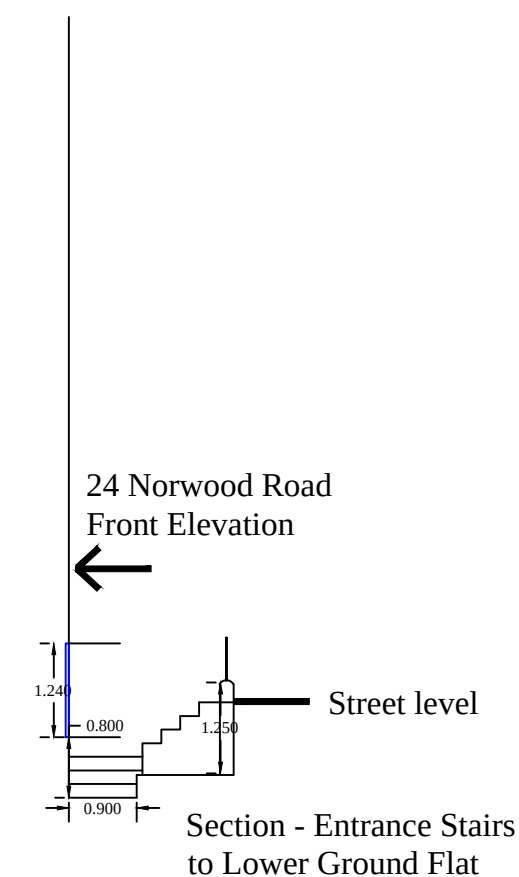
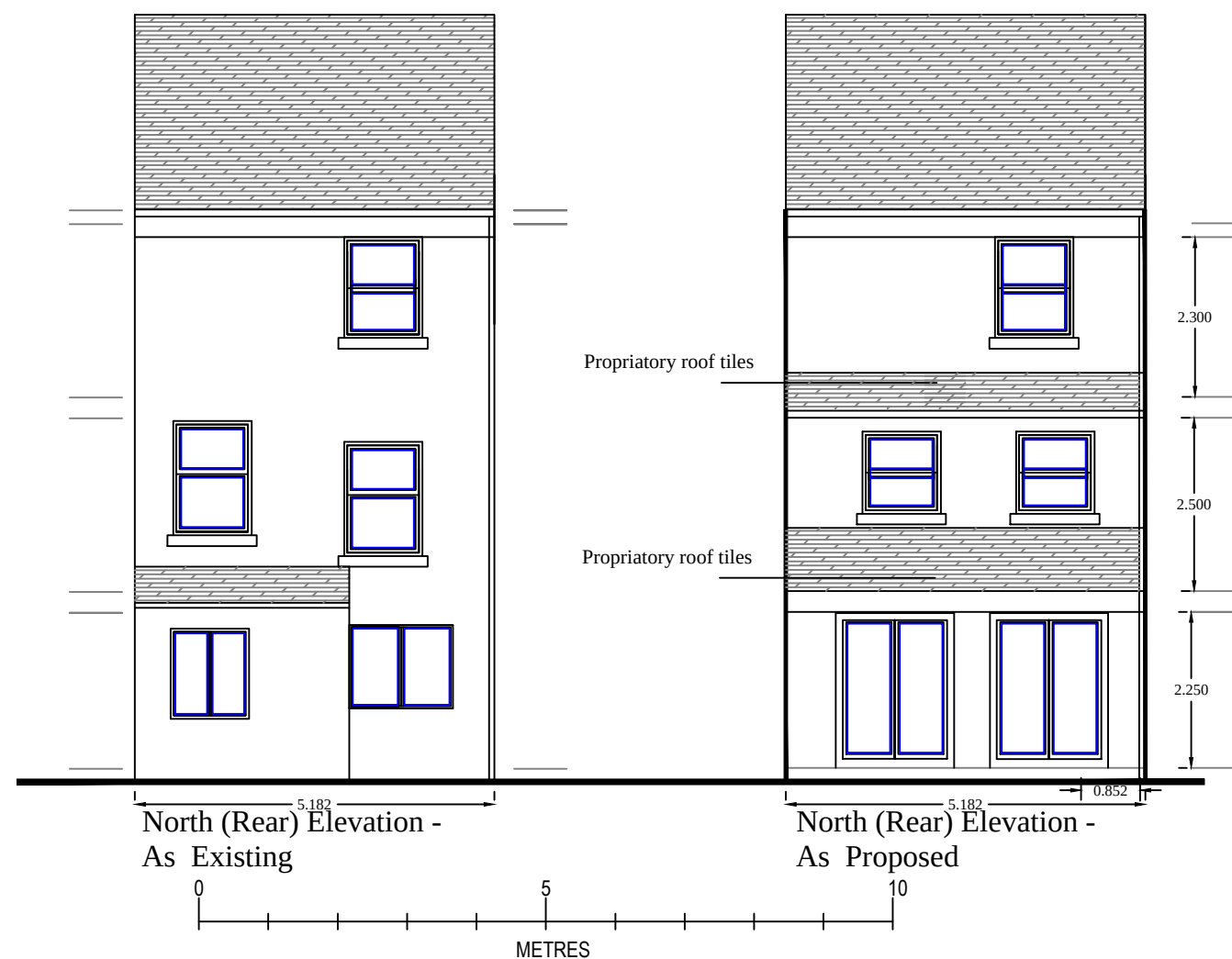
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FIRST FLOOR PLAN - AS PROPOSED

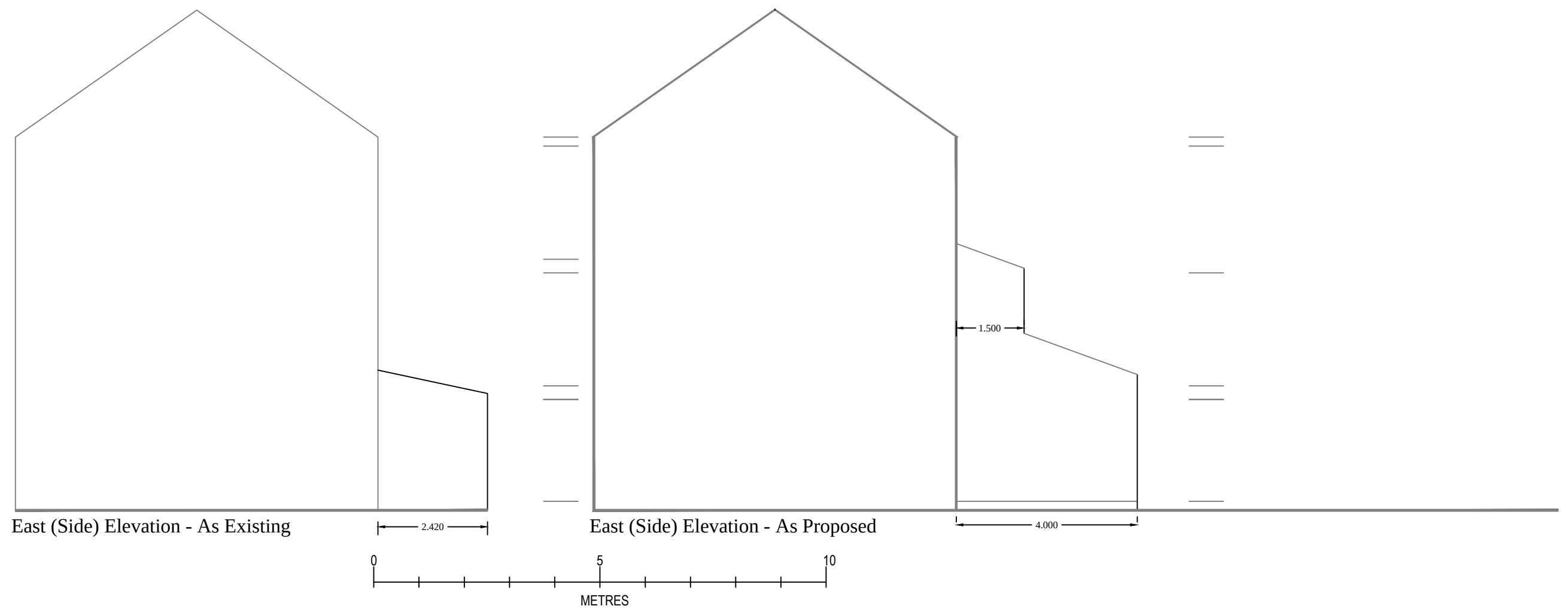


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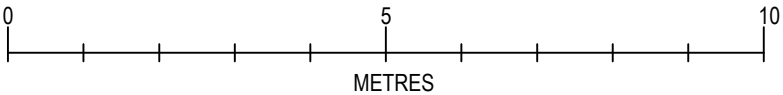
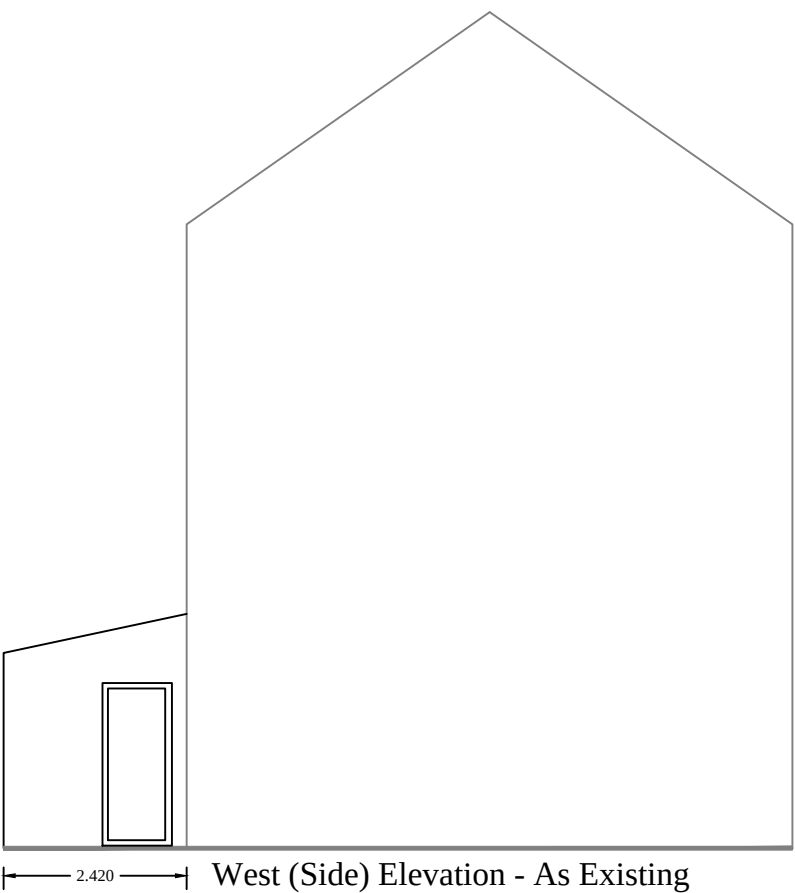
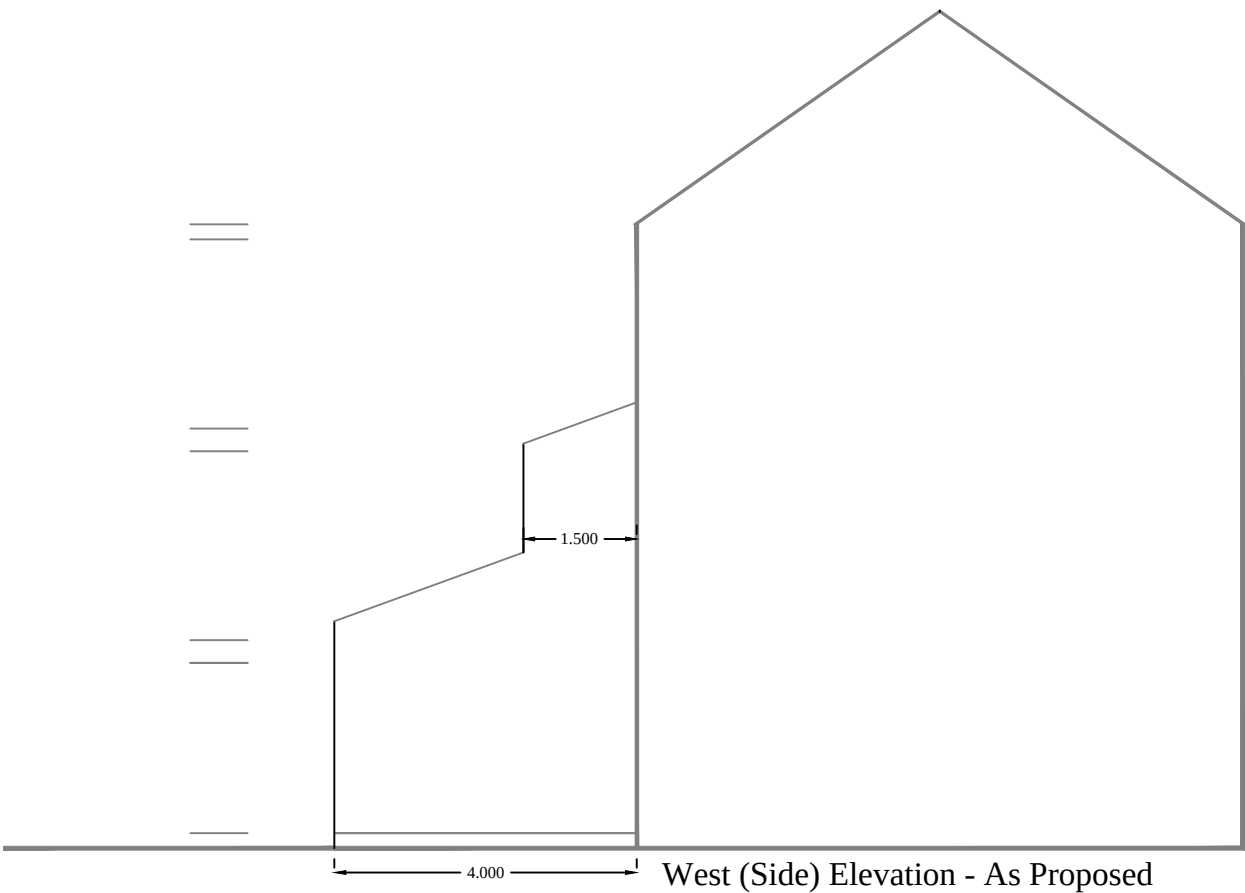
Revision A:- Reduction in upper floor extension to North (rear) Elevation 26/09/2017

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		Project:-	Proposed Alteration and Extension to Dwelling House 24 Norwood Road Reading RG1 3LD	
		Drawing:-	South (Front) and North (Rear) Elevations - As Existing & As Proposed	
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Revision A: Reduction in size of upper floor extension 26/09/2017

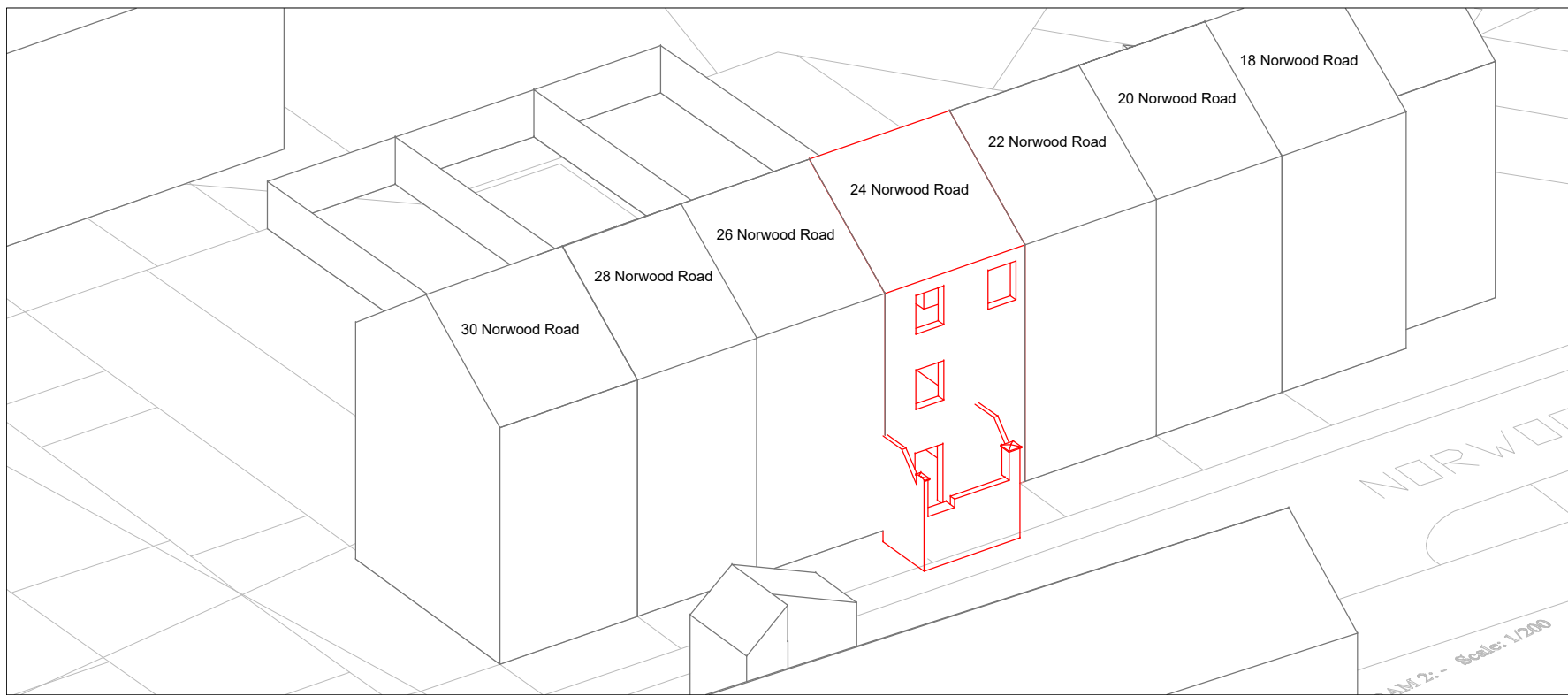
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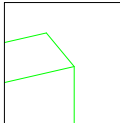
Revision A: Reduction in size of upper floor extension 26/09/2017

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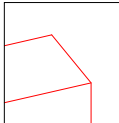
Appendix A.2 – Graphical Model Outputs



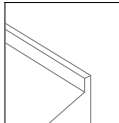
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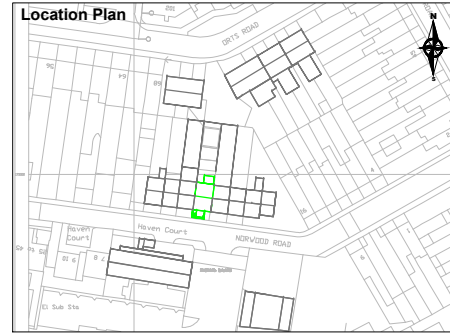
Existing Buildings



Proposed Buildings



Surrounding / Neighbouring Buildings



00	First issue	30/10/2017
Rev	Description	Date

CLIENT

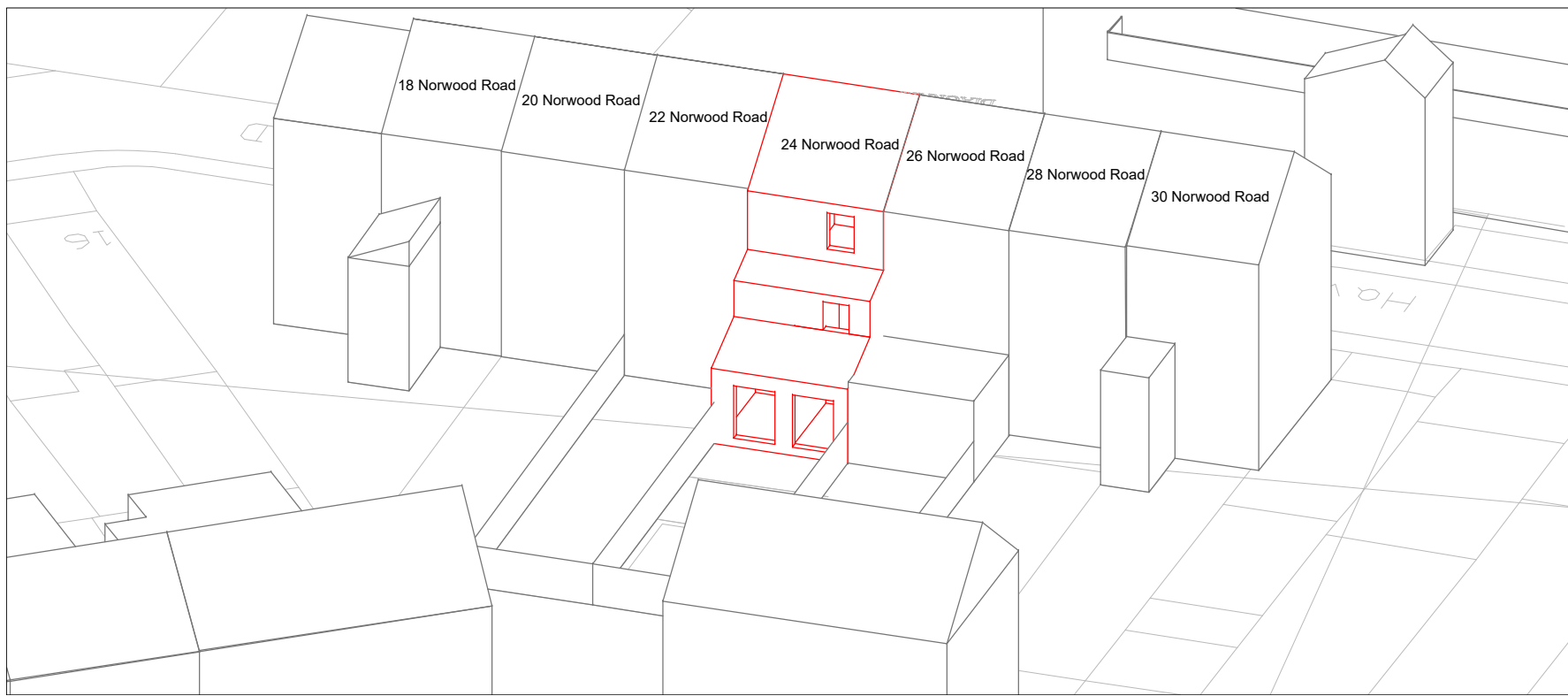
Chris McManus

PROJECT

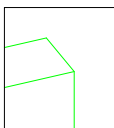
Norwood Road, Reading

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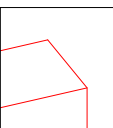
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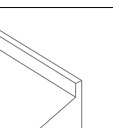
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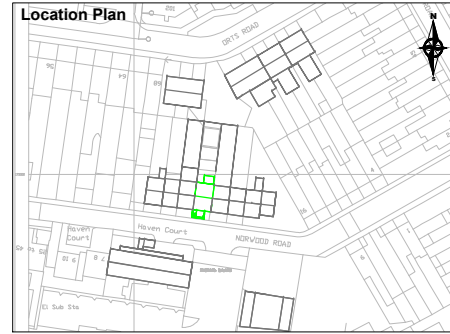
Existing Buildings



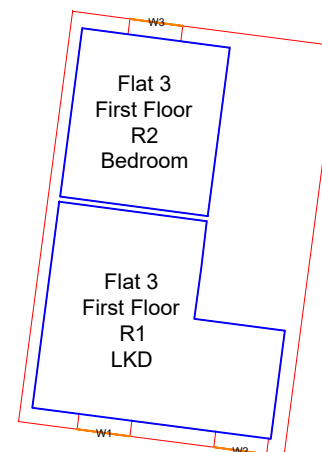
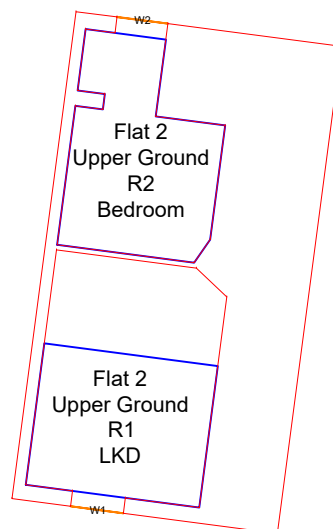
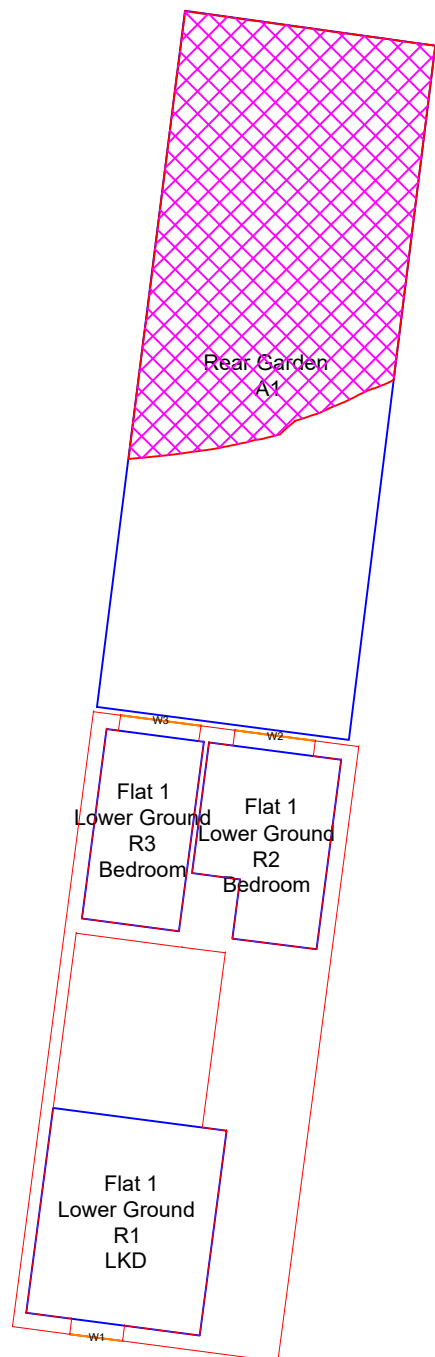
Proposed Buildings



Surrounding / Neighbouring Buildings



00	First issue	30/10/2017
Rev	Description	Date
CLIENT		
Chris McManus		
PROJECT		
Norwood Road, Reading		
SCALE	PROJ REF	ANALYST
Not to scale	1921	BB
DRAWN BY		
BL		
DWG REF.		DWG No.
3D Model - Existing & Proposed Site Scenarios		1921_02



1921_03

Appendix A.3 – Average Daylight Factor Calculations

Project Name: Norwood Road, Reading Project No.: 1921 Report Title: Average Daylight Factor Analysis to Proposed Rooms Date: 26/10/2017
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Floor Ref.	Room Ref.	Property Type	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	Meets BRE Criteria
Proposed Development - Flat 1													
Lower Ground	R1	Residential	Living Room	W1-L	0.78	0.70	46.29	60.34	0.65	0.15	0.11	1.50	YES
				W1-U	0.78	1.03	59.83	60.34	0.65	1.00	1.39		
Lower Ground	R2	Residential	Bedroom	W2-L	0.78	0.90	66.62	45.25	0.65	0.15	0.27	1.00	YES
				W2-U	0.78	1.73	75.03	45.25	0.65	1.00	3.91		
Lower Ground	R3	Residential	Bedroom	W3-L	0.78	0.90	66.12	39.27	0.65	0.15	0.31	1.00	YES
				W3-U	0.78	1.73	74.96	39.27	0.65	1.00	4.50		
Proposed Development - Flat 2													
Upper Ground	R1	Residential	Living Room	W1	0.78	1.14	77.05	47.02	0.65	1.00	2.54	1.50	YES
Upper Ground	R2	Residential	Bedroom	W2	0.78	0.91	N/A	55.00	0.65	1.00	2.01	1.00	YES
											2.01		
Proposed Development - Flat 3													
First Floor	R1	Residential	LKD	W1	0.78	1.11	81.39	70.63	0.65	1.00	1.75	2.00	YES
				W2	0.78	1.11	81.79	70.63	0.65	1.00	1.76		
First Floor	R2	Residential	Bedroom	W3	0.78	1.20	N/A	47.33	0.65	1.00	3.28	1.00	YES

Appendix A.4 – APSH Calculations

Project Name: Norwood Road, Reading Project No.: 1921 Report Title: APSH (Sunlight) Analysis to Proposed Rooms Date of Analysis: 26/10/2017													
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
Proposed Development - Flat 1													
Lower Ground	R1	Residential	Living Room	W1	187°	44	YES	13	YES				
										44	YES	13	YES
	R2	Residential	Bedroom	W2	7°	10		0		10		0	
	R3	Residential	Bedroom	W3	7°	10		0		10		0	
Proposed Development - Flat 2													
Upper Ground	R1	Residential	Living Room	W1	187°	85	YES	28	YES				
										85	YES	28	YES
	R2	Residential	Bedroom	W2	7°	11		0		11		0	
Proposed Development - Flat 3													
First Floor	R1	Residential	LKD	W1	187°	87	YES	30	YES				
				W2	187°	89	YES	30	YES				
										89	YES	30	YES
	R2	Residential	Bedroom	W3	7°	11		0		11		0	

Appendix A.5 – SOGCalculations

Project Name: Norwood Road, Reading
Project No.: 1921
Report Title: Two hours Sunlight to Amenity Analysis 21st March - Proposed Scheme
Date: 26/10/2017

Floor Ref.	Amenity Ref.	Amenity Area	Lit Area Proposed	Meets BRE Criteria
Proposed Development - Flat 1				
Lower Ground	A1	Area m2 Percentage	66.63 38.41 58%	YES