Harefield Grove,

Rickmansworth Road, Harefield

Internal Daylight Assessment

Job No: 6386

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Contents

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1.0 Introduction

1.1 This internal daylight assessment and shadow study has been prepared to support a planning application for the proposed development at Harefield Grove, Rickmansworth Road, Harefield, UB9.

1.2 The report assesses the proposals in respect of daylight matters within habitable rooms in the proposed dwellings at ground, first and second floor level, having regard to industry standard guidance.

1.3 The report concludes that the proposal is acceptable and in accordance with planning policy requirements in relation to daylight for those rooms assessed.

1.4 There is no existing specific National Planning Policy relating to the prospective impacts of developments on daylight and sunlight on their surrounding environment.

1.5 However, the BRE Report 'Site Layout Planning for Daylight and Sunlight: A Guide to Good Practice' (3rd edition, 2022) is the established National guidance to aid the developer to prevent and/or minimise the impact of a new development on the availability of daylight within new proposals. It has been developed in conjunction with daylight and sunlight recommendations in BS EN 17037: 2018+A1:2021 (with UK Annexe): 'Daylight in Buildings'

1.6 This reference document is accepted as the authoritative work in the field on daylight, sunlight and overshadowing and is specifically referred to in many Local Authorities' planning policy guidance for daylighting. The methodology therein has been used in numerous lighting analyses and the standards of permissible reduction in light are accepted as the industry standards.

2.0 Project Summary

2.1 The proposal site is at Harefield Grove, Rickmansworth Road, Harefield UB9.

2.2 The proposal is for a three storey block of flats consisting of 28 residential units, the internal refurbishment of the existing house on the site to create 6 new residential units and the construction and extension of other existing buildings on site to create 4 additional homes.

2.3 Following comments from LBH conservation and Design Officers during the application's determination, changes have been made to the new stable block. This has resulted in the internal layout being reconfigured this is to ensure the new locations of the habitable rooms receive sufficient daylight.

2.4 It is understood that the position, place and design of the 4 additional homes means there will be no issue with daylight access.

2.5 No changes to the internal layout of the Main House have been made and therefore the results previously supplied in T16 Design's original report are unchanged (Ref: Job No. 4600)

2.6 2D CAD drawings have been provided to us by the design team. These have been used to construct a 3D analysis model in order to assess the internal daylight levels within each room.

2.7 Computer simulation modelling has been used to produce the results, presented below

Site Location

3.0 Methodology

3.1 This BRE and BS EN 17037 guidance allows for two alternative methods to assess daylight within new dwellings. This report uses the following method:

- Target Daylight Factor (DF_T)

3.2 The DF_T method is a complex and representative calculation to determine natural internal luminance.

3.3 It takes into account such factors as window size, number of windows available to the room, room size and layout, room surface reflectance, and the angle of visible sky reaching the window.

3.4 Due to the complexity of the daylight entering the proposed rooms, the Target Daylight Factor approach is the most suitable calculation to give a realistic indication of the internal illuminance that will be experienced.

3.5 The calculations have assumed a white ceiling, cream walls and mid-grey carpet or wooden floor using reflectance values taken from the BS EN 170437 Guidance.

3.6 The benchmark values for all habitable rooms which are recommended by the BRE guidance and BS:EN 17037:2018 are:

Table C2 – Target daylight factors (D) for London		
Level of recommendation	Target daylight factor D for half of assessment grid	Target daylight factor D for 95% of assessment grid
Minimum	2.1%	0.7%
Medium	3.5%	2.1%
High	5.3%	3.5%

3.7 It is deemed by the guidance that if the minimum DF criteria are met, then the occupiers of the dwelling will have sufficient daylight. As can be seen from the results below that all assessed habitable rooms meet and exceed the minimum levels of internal daylight.

3.0 Methodology

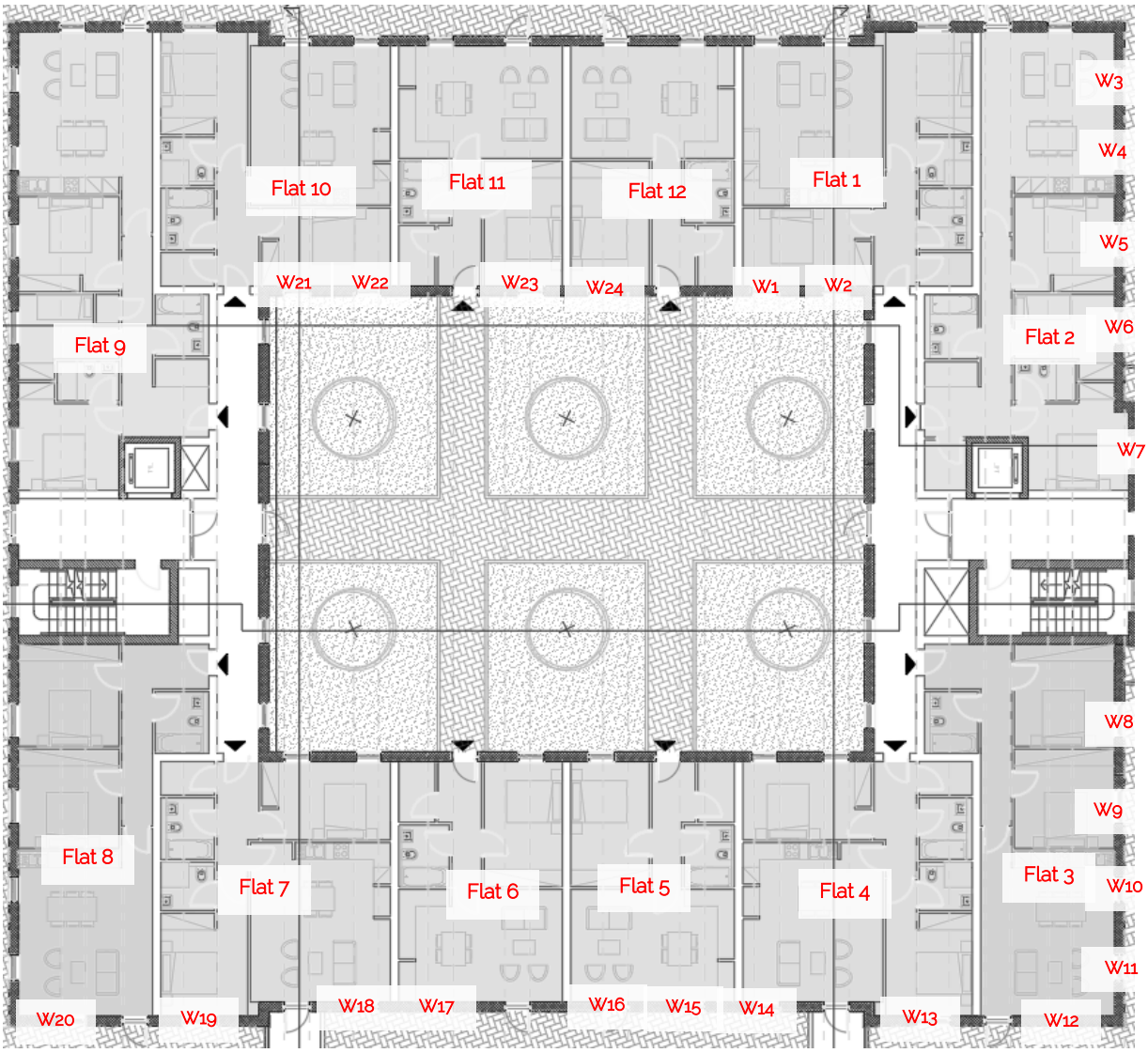
3.8 The minimum DF_T values for various UK locations and room types for conversions are provided below. The targets for London have been used for this site.

Table C3 – Target daylight factors (D_T) to achieve over at least 50% of the assessment grid in UK domestic habitable rooms with vertical and/or inclined daylight apertures			
Location	**D_T for 100 lx (Bedroom)**	**D_T for 150 lx (Living room)**	**D_T for 200 lx (Kitchen)**
St Peter (Jersey)	0.6%	0.9%	1.2%
London (Gatwick Airport)	0.7%	1.1%	1.4%
Birmingham	0.6%	0.9%	1.2%
Hemsby (Norfolk)	0.6%	0.9%	1.3%
Finningley (Yorkshire)	0.7%	1.0%	1.3%
Aughton (Lancashire)	0.7%	1.1%	1.4%
Belfast	0.7%	1.0%	1.4%
Leuchars (Fife)	0.7%	1.1%	1.4%
Oban	0.8%	1.1%	1.5%
Aberdeen	0.7%	1.1%	1.4%

3.9 As can be seen from the results below that all assessed habitable rooms meet and exceed the minimum levels of internal daylight.

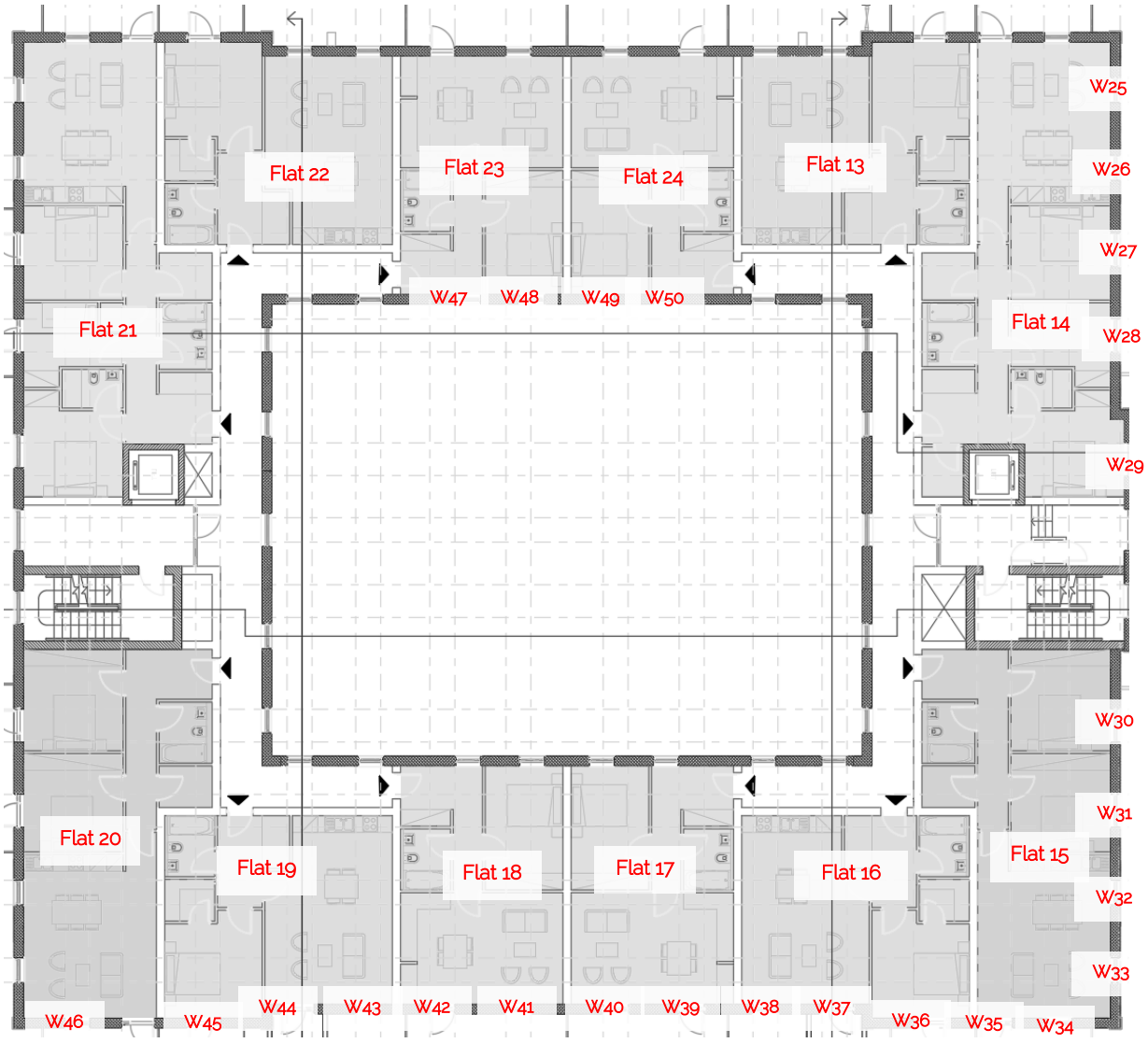
3.10 In addition to the numerical BRE tests, a sunlight exposure test and a shadow study has been produced. This is given in Section 6 and 7 respectively.

4.0 Room Schedules



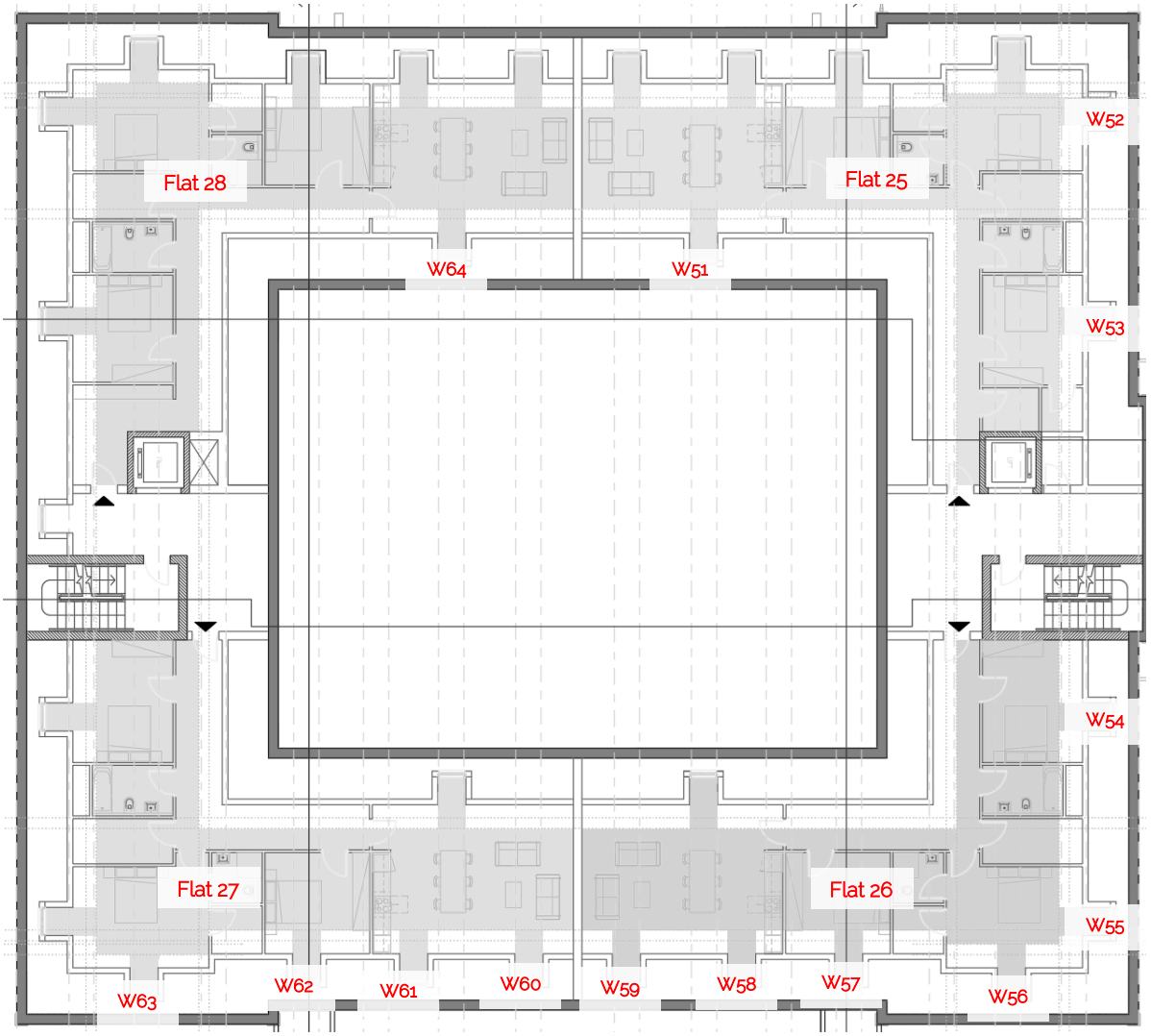
Stable Block - Ground Floor

4.0 Room Schedules



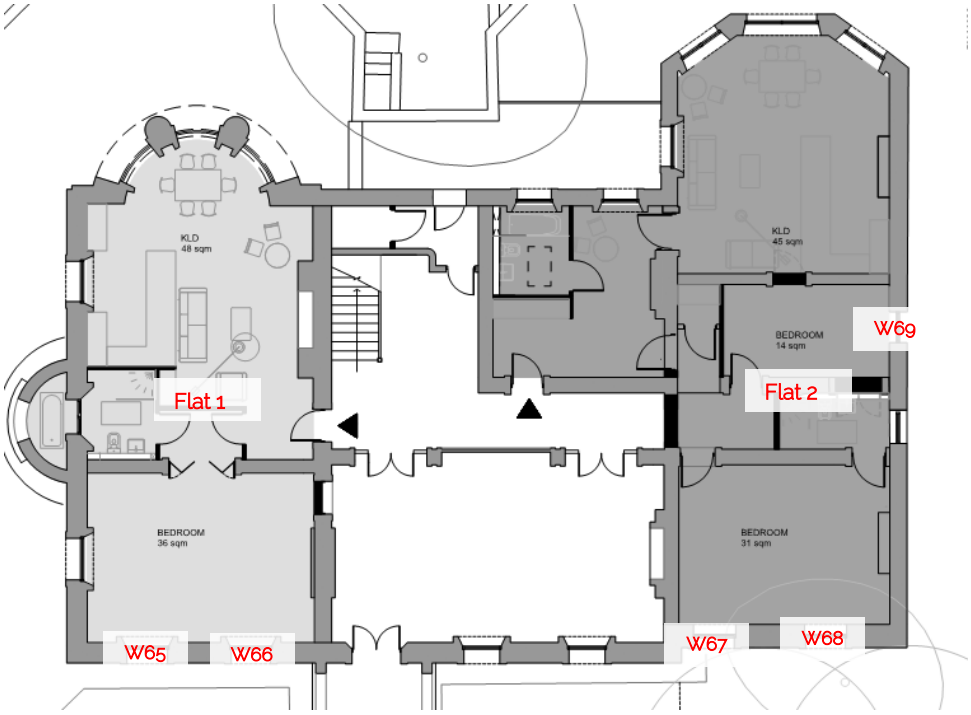
Stable Block - First Floor

4.0 Room Schedules

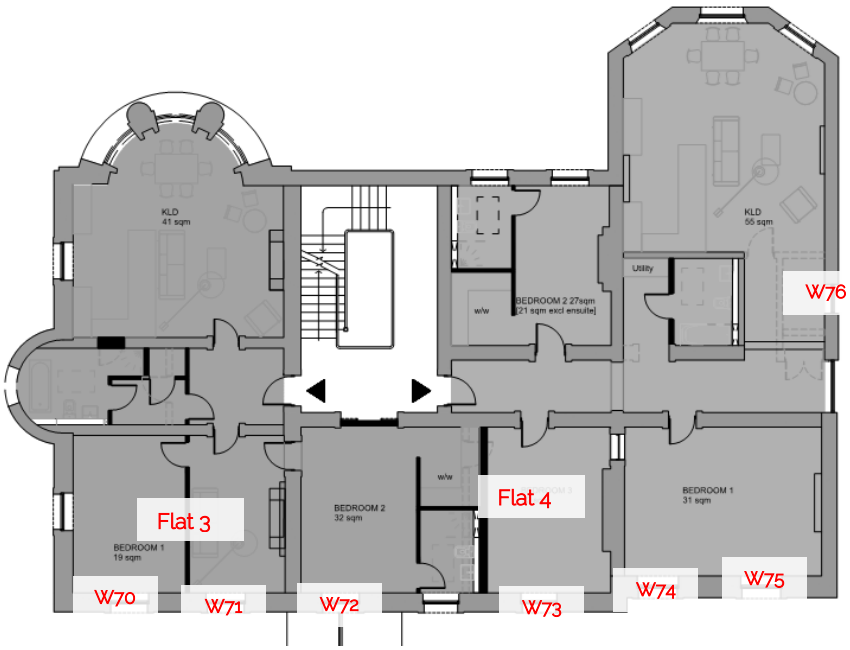


Stable Block - Second Floor

4.0 Room Schedules

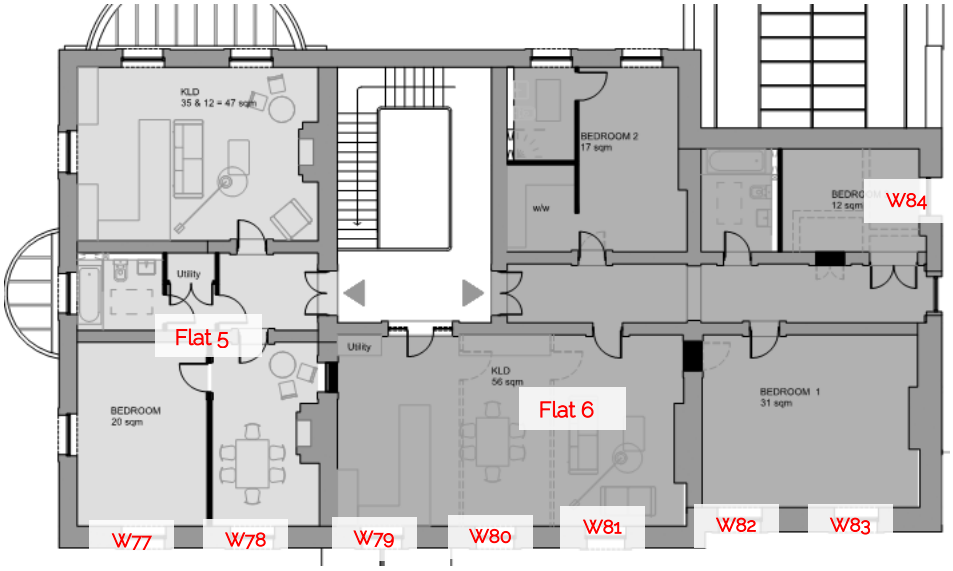


Main House - Ground Floor



Main House – First Floor

4.0 Room Schedules



Main House – Second Floor

5.0 Daylight Results

Minimum Target Daylight Factor – Ground Floor						
Flat	Room	0.7% DF Target Area	Area Receiving 0.7% DF	2.1% DF Target Area	Area Receiving 2.1% DF	Meets Standards?
Flat 1	LKD	95%	98.90%	50%	87.40%	Yes
Flat 1	Bedroom 1	95%	99.30%	50%	92.00%	Yes
Flat 1	Bedroom 2	95%	98.20%	50%	82.50%	Yes
Flat 2	LKD	95%	99.70%	50%	98.30%	Yes
Flat 2	Bedroom 1	95%	100.00%	50%	99.60%	Yes
Flat 2	Bedroom 2	95%	99.40%	50%	94.10%	Yes
Flat 2	Bedroom 3	95%	99.80%	50%	99.10%	Yes
Flat 3	LKD	95%	99.80%	50%	98.50%	Yes
Flat 3	Bedroom 1	95%	99.20%	50%	94.90%	Yes
Flat 3	Bedroom 2	95%	99.30%	50%	95.10%	Yes
Flat 4	LKD	95%	98.80%	50%	87.30%	Yes
Flat 4	Bedroom 1	95%	99.20%	50%	91.90%	Yes
Flat 4	Bedroom 2	95%	98.30%	50%	82.70%	Yes
Flat 5	LKD	95%	97.40%	50%	73.20%	Yes
Flat 5	Bedroom 1	95%	97.20%	50%	67.80%	Yes
Flat 6	LKD	95%	97.40%	50%	73.10%	Yes
Flat 6	Bedroom 1	95%	97.10%	50%	67.70%	Yes
Flat 7	LKD	95%	98.90%	50%	87.40%	Yes
Flat 7	Bedroom 1	95%	99.10%	50%	91.80%	Yes
Flat 7	Bedroom 2	95%	98.20%	50%	82.80%	Yes
Flat 8	LKD	95%	99.70%	50%	98.40%	Yes
Flat 8	Bedroom 1	95%	99.10%	50%	94.70%	Yes
Flat 8	Bedroom 2	95%	99.40%	50%	95.30%	Yes
Flat 9	LKD	95%	99.60%	50%	98.20%	Yes
Flat 9	Bedroom 1	95%	100.00%	50%	99.40%	Yes
Flat 9	Bedroom 2	95%	99.30%	50%	94.00%	Yes
Flat 9	Bedroom 3	95%	99.80%	50%	99.10%	Yes
Flat 10	LKD	95%	98.90%	50%	87.40%	Yes
Flat 10	Bedroom 1	95%	99.10%	50%	91.80%	Yes
Flat 10	Bedroom 2	95%	98.20%	50%	82.80%	Yes
Flat 11	LKD	95%	78.40%	50%	73.20%	Yes
Flat 11	Bedroom 1	95%	97.20%	50%	67.80%	Yes
Flat 12	LKD	95%	78.40%	50%	73.10%	Yes
Flat 12	Bedroom 1	95%	97.10%	50%	67.70%	Yes

5.0 Daylight Results

Minimum Target Daylight Factor – First Floor						
Flat	Room	0.7% DF Target Area	Area Receiving 0.7% DF	2.1% DF Target Area	Area Receiving 2.1% DF	Meets Standards?
Flat 13	LKD	95%	99.10%	50%	90.30%	Yes
Flat 13	Bedroom 1	95%	99.50%	50%	92.70%	Yes
Flat 13	Bedroom 2	95%	98.70%	50%	83.40%	Yes
Flat 14	LKD	95%	99.80%	50%	99.50%	Yes
Flat 14	Bedroom 1	95%	100.00%	50%	100.0%	Yes
Flat 14	Bedroom 2	95%	99.70%	50%	95.60%	Yes
Flat 14	Bedroom 3	95%	100.00%	50%	99.60%	Yes
Flat 15	LKD	95%	100.00%	50%	99.50%	Yes
Flat 15	Bedroom 1	95%	99.70%	50%	96.80%	Yes
Flat 15	Bedroom 2	95%	99.90%	50%	99.10%	Yes
Flat 16	LKD	95%	99.20%	50%	90.50%	Yes
Flat 16	Bedroom 1	95%	99.70%	50%	94.40%	Yes
Flat 16	Bedroom 2	95%	99.00%	50%	86.80%	Yes
Flat 17	LKD	95%	97.60%	50%	77.50%	Yes
Flat 17	Bedroom 1	95%	97.50%	50%	75.40%	Yes
Flat 18	LKD	95%	97.80%	50%	75.50%	Yes
Flat 18	Bedroom 1	95%	98.00%	50%	76.20%	Yes
Flat 19	LKD	95%	99.20%	50%	88.50%	Yes
Flat 19	Bedroom 1	95%	99.30%	50%	92.20%	Yes
Flat 19	Bedroom 2	95%	98.60%	50%	87.50%	Yes
Flat 20	LKD	95%	100.0%	50%	99.80%	Yes
Flat 20	Bedroom 1	95%	99.80%	50%	96.40%	Yes
Flat 20	Bedroom 2	95%	99.90%	50%	97.70%	Yes
Flat 21	LKD	95%	100.0%	50%	99.90%	Yes
Flat 21	Bedroom 1	95%	100.00%	50%	100.00%	Yes
Flat 21	Bedroom 2	95%	100.00%	50%	98.20%	Yes
Flat 21	Bedroom 3	95%	100.00%	50%	99.90%	Yes
Flat 22	LKD	95%	99.20%	50%	93.10%	Yes
Flat 22	Bedroom 1	95%	99.90%	50%	97.40%	Yes
Flat 22	Bedroom 2	95%	99.50%	50%	89.40%	Yes
Flat 23	LKD	95%	97.60%	50%	77.40%	Yes
Flat 23	Bedroom 1	95%	97.70%	50%	75.90%	Yes
Flat 24	LKD	95%	97.90%	50%	76.00%	Yes
Flat 24	Bedroom 1	95%	98.10%	50%	76.50%	Yes

5.0 Daylight Results

Minimum Target Daylight Factor – Second Floor						
Flat	Room	0.7% DF Target Area	Area Receiving 0.7% DF	2.1% DF Target Area	Area Receiving 2.1% DF	Meets Standards?
Flat 25	LKD	95%	97.20%	50%	75.10%	Yes
Flat 25	Bedroom 1	95%	98.10%	50%	79.40%	Yes
Flat 25	Bedroom 2	95%	97.50%	50%	77.30%	Yes
Flat 25	Bedroom 3	95%	96.90%	50%	73.00%	Yes
Flat 26	LKD	95%	97.30%	50%	75.20%	Yes
Flat 26	Bedroom 1	95%	98.20%	50%	79.60%	Yes
Flat 26	Bedroom 2	95%	97.60%	50%	77.40%	Yes
Flat 26	Bedroom 3	95%	97.00%	50%	73.10%	Yes
Flat 27	LKD	95%	97.00%	50%	74.90%	Yes
Flat 27	Bedroom 1	95%	97.90%	50%	79.10%	Yes
Flat 27	Bedroom 2	95%	97.20%	50%	77.10%	Yes
Flat 27	Bedroom 3	95%	96.70%	50%	72.60%	Yes
Flat 28	LKD	95%	96.90%	50%	74.70%	Yes
Flat 28	Bedroom 1	95%	97.80%	50%	79.00%	Yes
Flat 28	Bedroom 2	95%	97.10%	50%	77.00%	Yes
Flat 28	Bedroom 3	95%	96.60%	50%	72.50%	Yes

5.0 Daylight Results

Minimum Target Daylight Factor – Main House				
Unit	Room	Required DF_T Over 50% of Room Area	Area Of Room Receiving Required DF_T	Meets Standards?
1	Kitchen/Living/Dining	1.4%	98.7%	Yes
1	Bedroom	0.7%	100.0%	Yes
2	Kitchen/Living/Dining	1.4%	95.4%	Yes
2	Bedroom 1	0.7%	100.0%	Yes
2	Bedroom 2	0.7%	98.4%	Yes
3	Kitchen/Living/Dining	1.4%	98.9%	Yes
3	Living	1.1%	94.1%	Yes
3	Bedroom 1	0.7%	100.0%	Yes
3	Bedroom 2	0.7%	93.2%	Yes
4	Kitchen/Living/Dining	1.4%	98.5%	Yes
4	Bedroom 1	0.7%	100.0%	Yes
4	Bedroom 2	0.7%	94.6%	Yes
4	Bedroom 3	0.7%	92.5%	Yes
5	Kitchen/Living	1.4%	93.4%	Yes
5	Dining	1.1%	90.4%	Yes
5	Bedroom	0.7%	100.0%	Yes
6	Kitchen/Living/Dining	1.4%	100.0%	Yes
6	Bedroom 1	0.7%	95.2%	Yes
6	Bedroom 2	0.7%	95.0%	Yes
6	Bedroom 3	0.7%	96.1%	Yes

6.0 Sunlight Exposure Test

6.1 Assessing sunlight within new dwellings is defined by the methodology contained in the BRE guidance and BS17037:2018

6.2 The SE_T is a detailed calculation that can help determine the amount of sunlight available to dwellings.

6.3 The Target Sunlight Exposure states that relevant habitable rooms should receive at least 1.5 hours of sunlight on March 21st.

6.4 Only rooms which are served by windows which face within 90° of south need to be assessed.

6.5 The BRE guidance also states that living rooms (and conservatories) are the rooms where sunlight is most valued, and of lesser importance in bedrooms and kitchens.

6.6 As such, only the sunlight levels to windows serving living rooms or combined kitchen/living/dining rooms have been assessed.

6.7 The windows which meet these criteria are noted in the schedule below.

6.8 It is deemed by the guidance that if the minimum criteria are met, then the occupiers of the dwelling will have sufficient sunlight.

6.9 As can be seen from the results below that all assessed windows meet the BRE guidance values for sunlight on March 21st

6.0 Sunlight Exposure Test

Sunlight Exposure – March 21st			
Window	Target Sunlight Exposure	Actual Sunlight Exposure	Meets Standards?
1	1.5 hours	3.9	Yes
2	1.5 hours	2.5	Yes
3	1.5 hours	6.6	Yes
4	1.5 hours	6.6	Yes
5	1.5 hours	6.6	Yes
6	1.5 hours	6.6	Yes
7	1.5 hours	6.6	Yes
8	1.5 hours	6.6	Yes
9	1.5 hours	6.6	Yes
10	1.5 hours	6.6	Yes
11	1.5 hours	6.6	Yes
12	1.5 hours	8	Yes
13	1.5 hours	8	Yes
14	1.5 hours	7.5	Yes
15	1.5 hours	7.7	Yes
16	1.5 hours	8	Yes
17	1.5 hours	8	Yes
18	1.5 hours	8	Yes
19	1.5 hours	8	Yes
20	1.5 hours	5.6	Yes
21	1.5 hours	6.3	Yes
22	1.5 hours	6.4	Yes
23	1.5 hours	5.9	Yes
24	1.5 hours	6.6	Yes
25	1.5 hours	6.6	Yes
26	1.5 hours	6.6	Yes
27	1.5 hours	6.6	Yes
28	1.5 hours	6.6	Yes

6.0 Sunlight Exposure Test

Sunlight Exposure – March 21st			
Window	Target Sunlight Exposure	Actual Sunlight Exposure	Meets Standards?
29	1.5 hours	6.6	Yes
30	1.5 hours	6.6	Yes
31	1.5 hours	6.6	Yes
32	1.5 hours	6.6	Yes
33	1.5 hours	8	Yes
34	1.5 hours	8	Yes
35	1.5 hours	8	Yes
36	1.5 hours	6.3	Yes
37	1.5 hours	7.6	Yes
38	1.5 hours	6.6	Yes
39	1.5 hours	6.6	Yes
40	1.5 hours	8	Yes
41	1.5 hours	8	Yes
42	1.5 hours	8	Yes
43	1.5 hours	8	Yes
44	1.5 hours	8	Yes
45	1.5 hours	8	Yes
46	1.5 hours	8	Yes
47	1.5 hours	7.5	Yes
48	1.5 hours	7.7	Yes
49	1.5 hours	7.9	Yes
50	1.5 hours	7.5	Yes
51	1.5 hours	8	Yes
52	1.5 hours	6.6	Yes
53	1.5 hours	6.6	Yes
54	1.5 hours	6.6	Yes
55	1.5 hours	6.6	Yes
56	1.5 hours	8	Yes

6.0 Sunlight Exposure Test

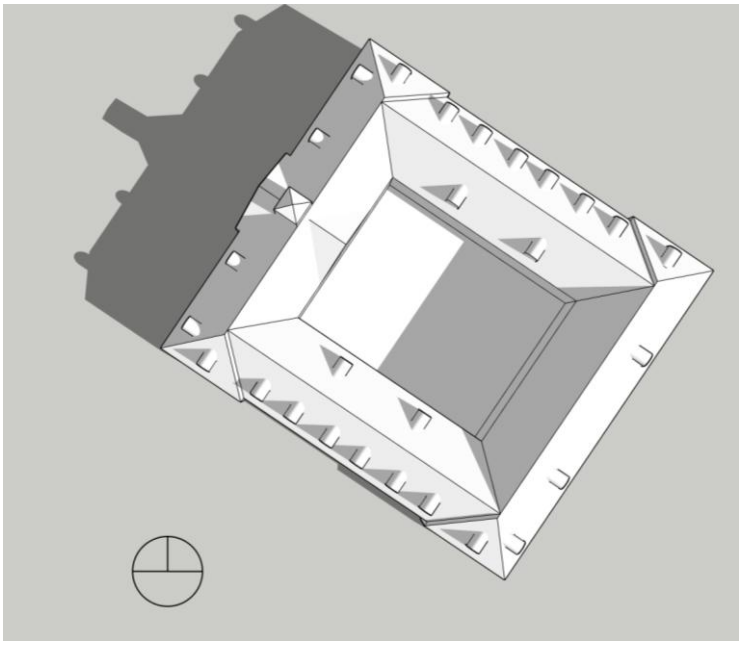
Sunlight Exposure – March 21st			
Window	Target Sunlight Exposure	Actual Sunlight Exposure	Meets Standards?
57	1.5 hours	8	Yes
58	1.5 hours	8	Yes
59	1.5 hours	8	Yes
60	1.5 hours	8	Yes
61	1.5 hours	8	Yes
62	1.5 hours	8	Yes
63	1.5 hours	8	Yes
64	1.5 hours	7.9	Yes
65	1.5 hours	6.7	Yes
66	1.5 hours	6.7	Yes
67	1.5 hours	6.7	Yes
68	1.5 hours	6.7	Yes
69	1.5 hours	5.9	Yes
70	1.5 hours	6.9	Yes
71	1.5 hours	6.9	Yes
72	1.5 hours	6.9	Yes
73	1.5 hours	6.9	Yes
74	1.5 hours	6.9	Yes
75	1.5 hours	6.9	Yes
76	1.5 hours	6.4	Yes
77	1.5 hours	7.7	Yes
78	1.5 hours	7.7	Yes
79	1.5 hours	7.7	Yes
80	1.5 hours	7.7	Yes
81	1.5 hours	7.7	Yes
82	1.5 hours	7.7	Yes
83	1.5 hours	7.7	Yes
84	1.5 hours	7.3	Yes

7.0 Visual Shadow Study

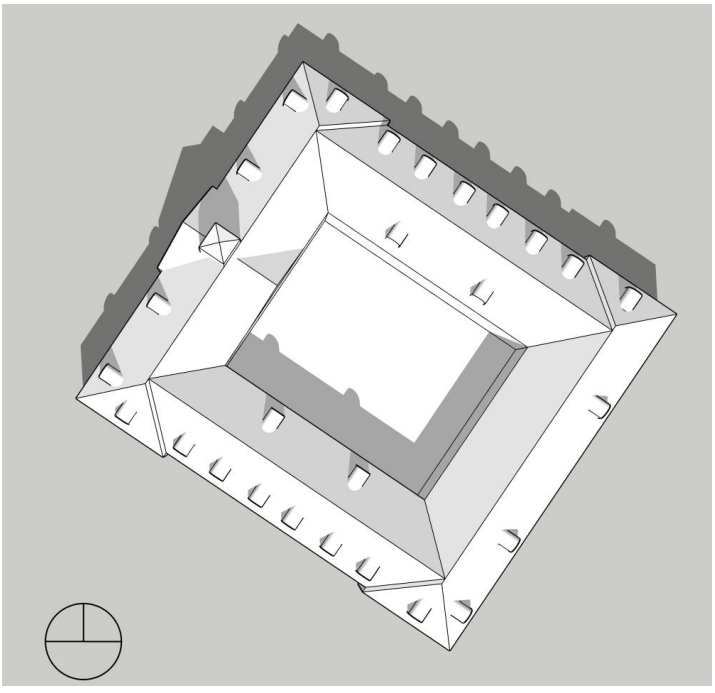
7.1 The shadow analysis provided below is intended to demonstrate that there will be no increased overshadowing to the neighbouring polytunnels to the north of the site.

7.2 The study has been undertaken on the 21st of March, 21st of June, 21st of September and 21st of December at 09.00, 12.00, 15.00.

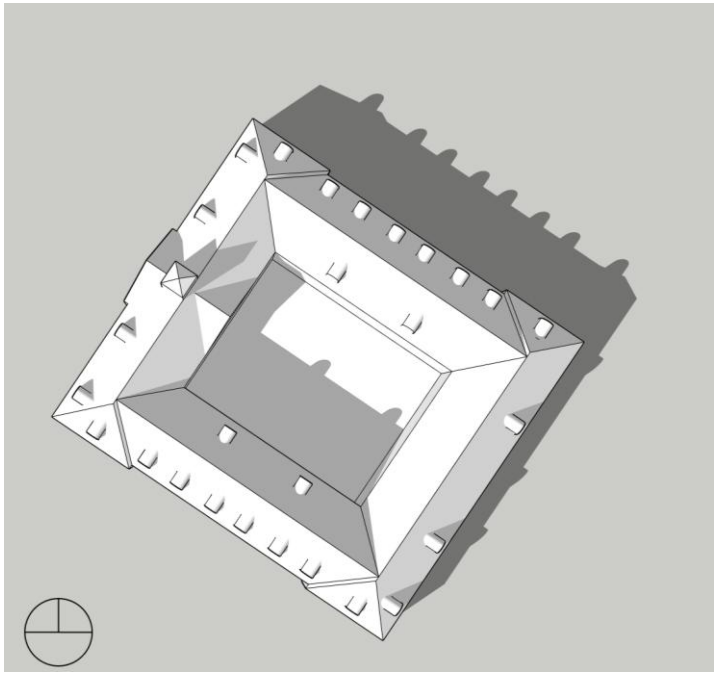
7.3 The images from this analysis are shown below. There is no specific guidance on how these images are to be interpreted, but they are presented to give a visual guide to the level of overshadowing that the proposal will create.



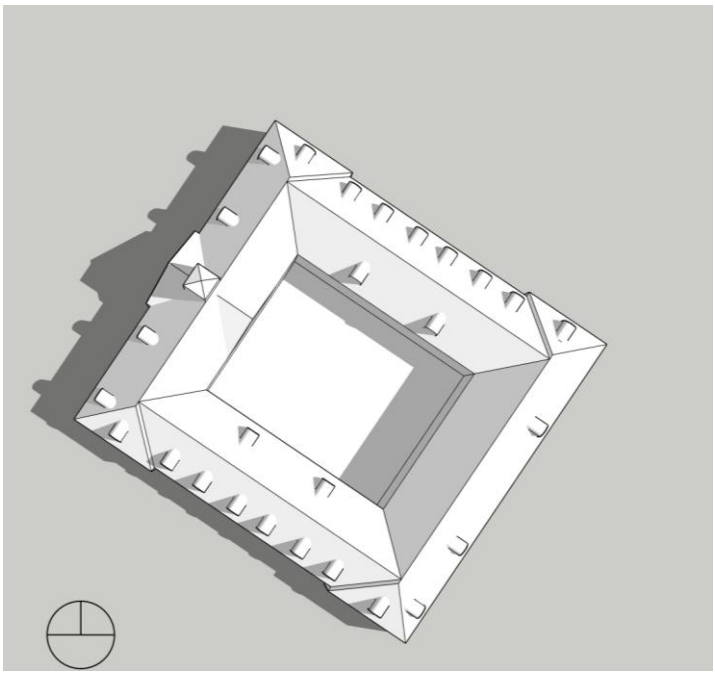
March 21st - 09.00



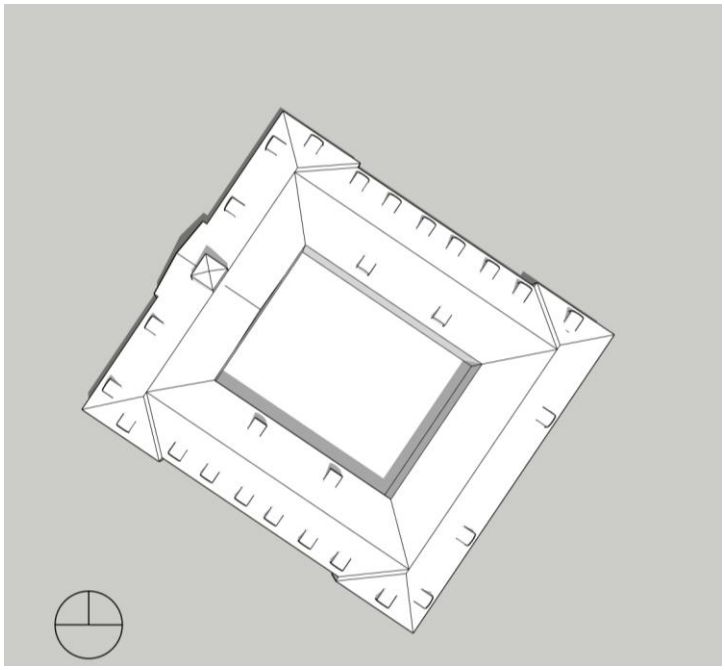
March 21st - 12.00



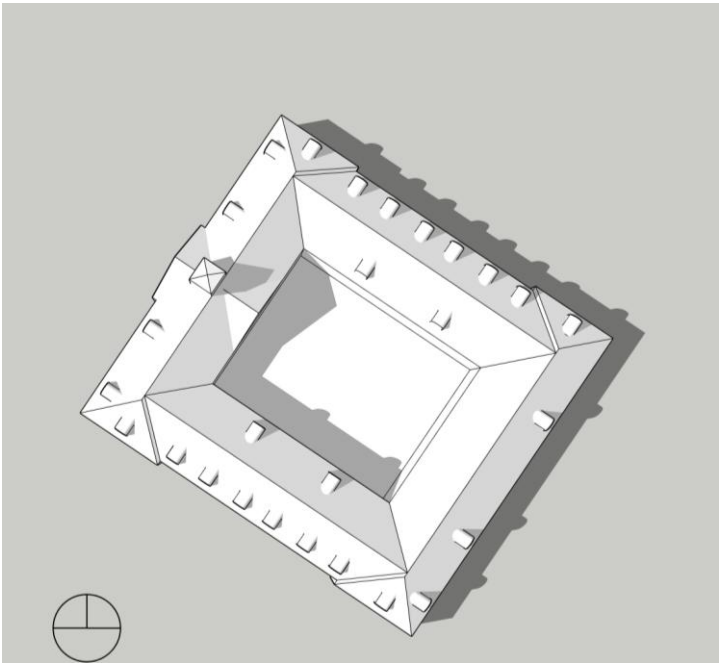
March 21st - 15.00



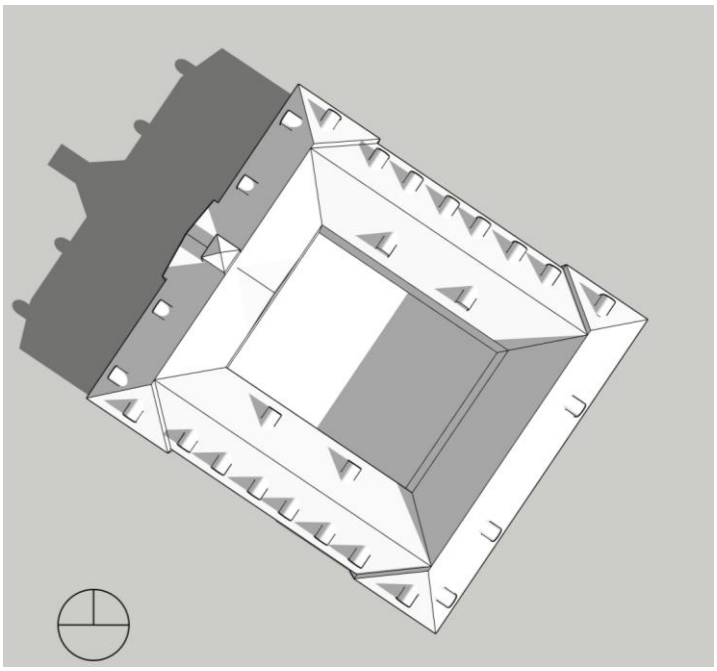
June 21st - 09.00



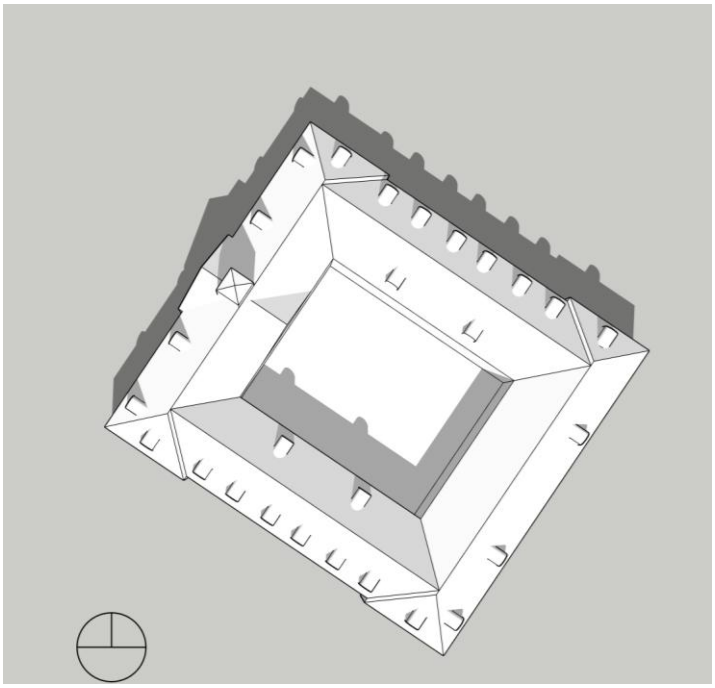
June 21st - 12.00



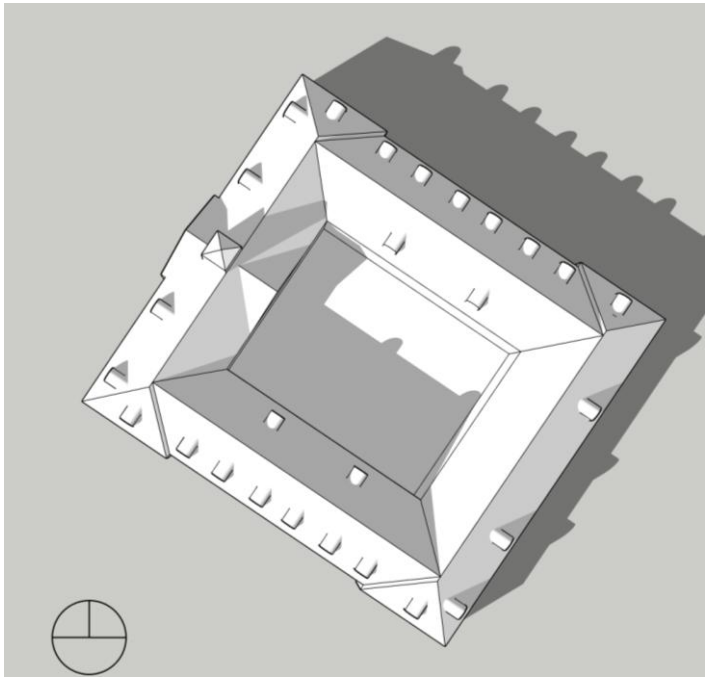
June 21st - 15.00



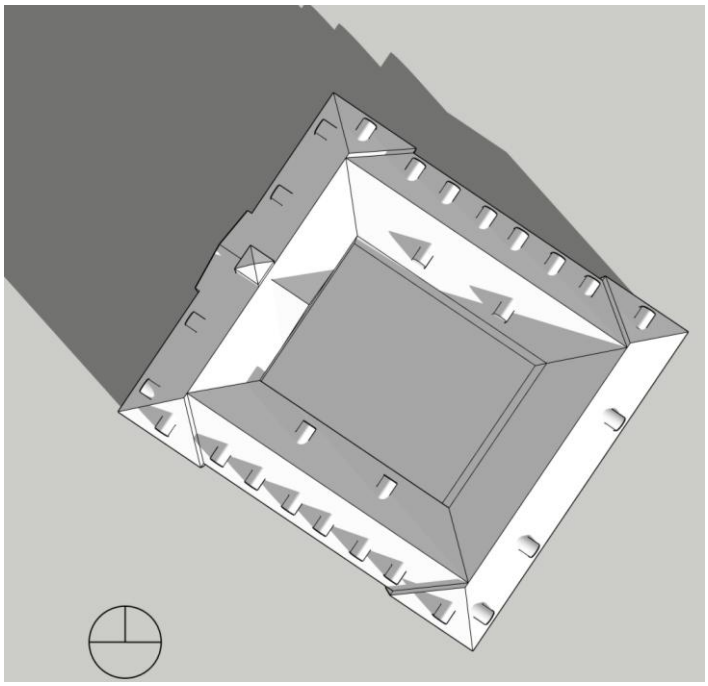
September 21st - 09.00



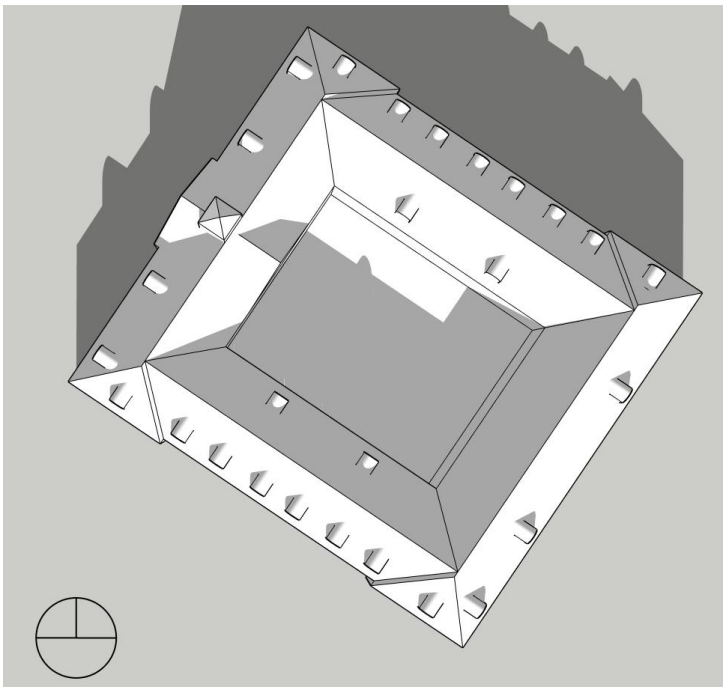
September 21st - 12.00



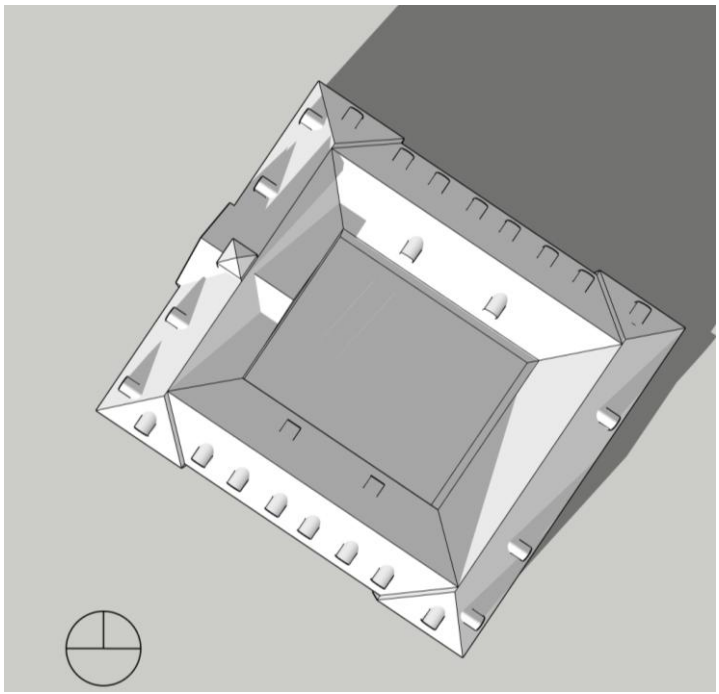
September 21st - 15.00



December 21st - 09.00



December 21st - 12.00



December 21st - 15.00

8.0 Conclusions

8.1 The proposed development at Harefield Grove, Rickmansworth Road, Harefield has been assessed for internal daylight levels using the Target Daylight Factor (DF_T) test as prescribed by the BRE guidance and BS EN 17037:2018.

8.2 The design team has endeavoured to ensure that the proposed habitable rooms have levels of natural light in excess of the minimum standards prescribed by the standards.

8.3 This has been successfully achieved, as demonstrated by the positive results presented within this report.

8.4 The assessed room meets the recommendations using the DF_T test.

8.5 Where relevant the assessed windows receive an acceptable level of sunlight exposure in accordance with the BRE guidance.

8.6 This means the future occupants will enjoy a well-lit environment, with reduced reliance on artificial lighting.

8.7 It is therefore the conclusion of this report that the proposals meet the guidance levels for daylight and sunlight and are therefore acceptable in planning terms.