

Cherry Hinton, Newbury Hill

Overshadowing Study

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1. Introduction

- 1.1 This report presents an analysis of the skylight and sunlight* overshadowing impact of the proposed residential development at Cherry Hinton, Newbury Hill, Hampstead Norreys, Berkshire, RG18 0TR.
- 1.2 Calculations have been conducted to measure the potential for good daylight at window locations in the adjacent residential dwellings at 1 and 2 Church Street and Flint House.
- 1.3 Refer to Appendix A for more detail on which windows have been analysed.
- 1.4 The calculation results allow comparison between the potential for good daylight at neighbouring windows before and after the construction of the proposed development.
- 1.5 The calculations have been run on a CAD model built with reference to:
 - Existing and Proposed drawings provided by Countryside Designs (no.s 237-01 (Feb. 2019) and 239-01 (May 2019)),
 - Block Plan drawing no. 239-02 dated May 2019
 - A site visit on 28.11.2019 during which photographs and measurements were taken.
- 1.6 The calculation process is in accordance with guidance in BRE report 209: 'Site Layout Planning for Daylight and Sunlight: a guide to good practice (2nd Edition).' This document is referred to as the 'BRE guidelines' in this report.



Image 1.1. Block plan excerpt showing the proposed development site and adjacent buildings subject to overshadowing assessment.

* Skylight and sunlight are the constituents of daylight

2. Executive Summary

- 2.1 The proposed development at Cherry Hinton has been assessed for its impact on the skylight and sunlight received by three neighbouring dwellings.
- 2.2 Calculations relating to 13 windows in Flint House and 1 and 2 Church Street have shown that no windows will experience a noticeable reduction in skylight due to the construction of the proposed development.
- 2.3 Of the 13 windows analysed for skylight access, nine are relevant for sunlight availability assessment because they face less than 90° from due south.
- 2.4 None of the nine windows assessed for sunlight access will experience a noticeable reduction in sunlight, during the winter months or throughout the whole year.
- 2.5 Sunlight to the rear amenity area of 1 Church Street is unaffected by the proposed development and in excess of the BRE recommendation that 50% of the area should receive two hours of sunlight on March 21st.

3. Methodology - VSC and APSH calculations

- 3.1 To assess the overshadowing impact of the proposed development on neighbouring buildings, it is necessary to calculate vertical sky component (VSC) and annual probable sunlight hours (APSH) at a reference point at the centre of windows to living spaces.
- 3.2 For VSC calculations the reference point is in the external plane of the window wall. For APSH calculations the reference point is in the same place (when analysing sunlight to existing buildings).
- 3.3 Windows to bathrooms, toilets, storerooms and circulation areas need not be analysed (in accordance with the BRE guidelines).
- 3.4 Images in section 4 show the overshadowing conditions subject to assessment.
- 3.5 VSC is a metric for light from the sky (referred to as skylight). It is the amount of skylight falling on a vertical wall or window.
- 3.6 APSH is a metric for quantifying access to direct sunlight. 'Probable sunlight hours' means the total number of hours in the year that the sun is expected to shine on unobstructed ground, allowing for average levels of cloudiness for the location in question.
- 3.7 The following statement, from section 2.2.7 of the BRE guidelines, describes what VSC values mean for skylight conditions inside a room:
- 3.8 'If this vertical sky component is greater than 27% then enough skylight should still be reaching the window of the existing building. Any reduction below this level should be kept to a minimum. If the vertical sky component, with the new development in place, is both less than 27% and less than 0.8 times its former value, then occupants of the existing building will notice the reduction in the amount of skylight. The area lit by the window is likely to appear more gloomy, and electric lighting will be needed more of the time.'
- 3.9 The theoretical maximum VSC is 39.6%, not 100%.
- 3.10 The following statement, from section 3.2 of the BRE guidelines, describes what APSH means for sunlight conditions inside a room:
- 3.11 'If [the] window reference point can receive more than one quarter of annual probable sunlight hours, including at least 5% of annual probable sunlight hours during the winter months between 21 September and 21 March, then the room should still receive enough sunlight... Any reduction in sunlight access below this level should be kept to a minimum. If the available sunlight hours are both less than the amount given and less than 0.8 times their former value, either over the whole year or just during the winter months (21 September to 21 March), then the occupants of the existing building will notice the loss of sunlight; if the overall annual loss is greater than 4% of APSH, the room may appear colder and less cheerful and pleasant.'
- 3.12 APSH need not be calculated for any window which faces more than 90 degrees from due South.
- 3.13 To calculate VSC and APSH at the centre of relevant windows, a CAD model must be built which contains accurate geometry of all affected windows and any obstruction which comes between the window reference point and the sky (from the horizon upwards). Such obstructions include:
- balconies
 - eaves
 - other buildings
- 3.14 As a check BRE recommends that at least half of the amenity area, gardens in this case, should receive at least two hours of sunlight on 21st March.
- 3.15 It should be noted that the BRE guidelines are not mandatory. They are guidance for architects, developers and planners - to assist in the understanding of factors affecting daylight in buildings.

4. Overshadowing Conditions - Existing

4.1 The existing overshadowing condition is pictured below.

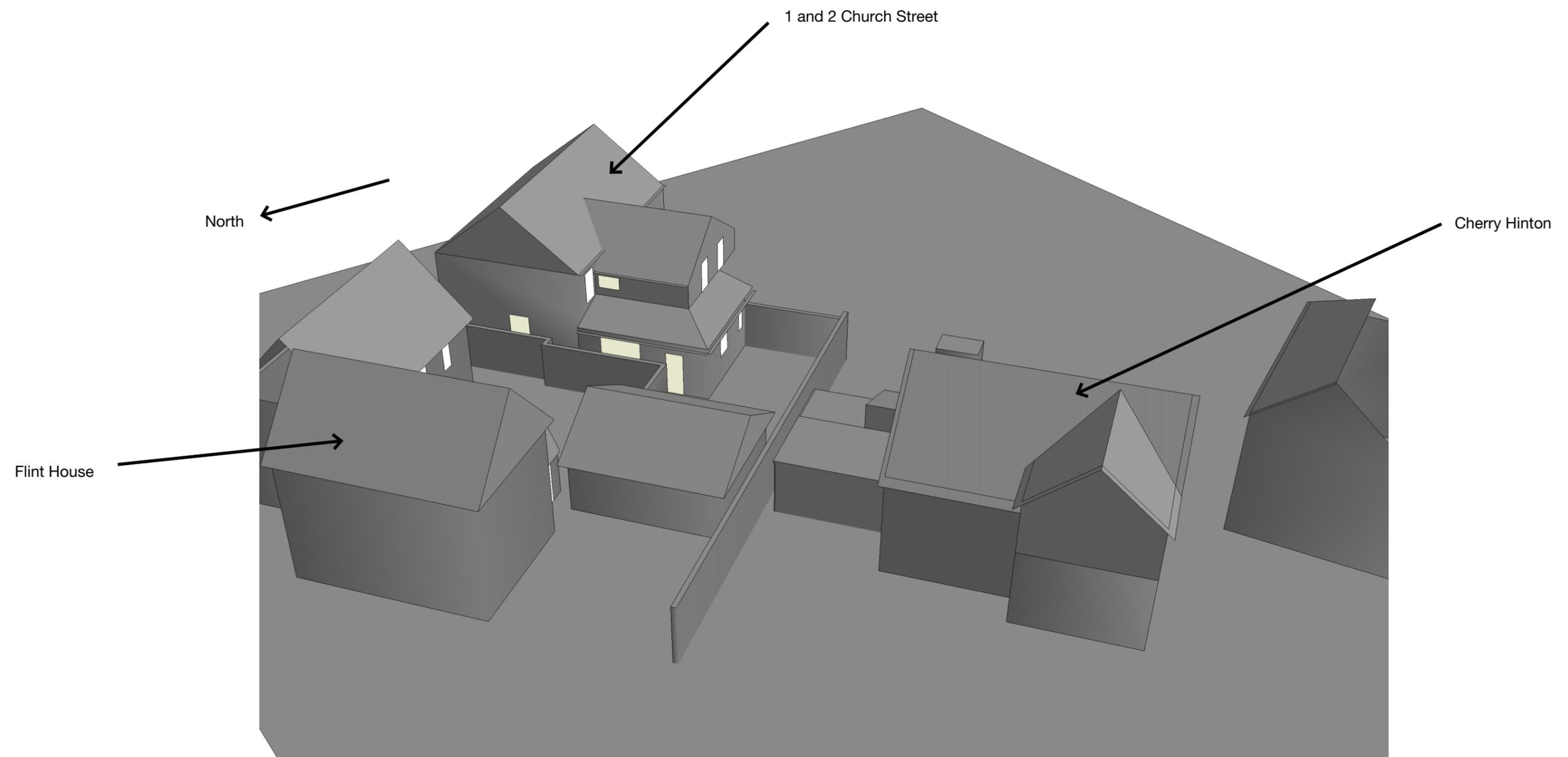


Image 4.1. Existing condition

4. Overshadowing Conditions - Proposed

4.2 The proposed overshadowing condition is pictured below.

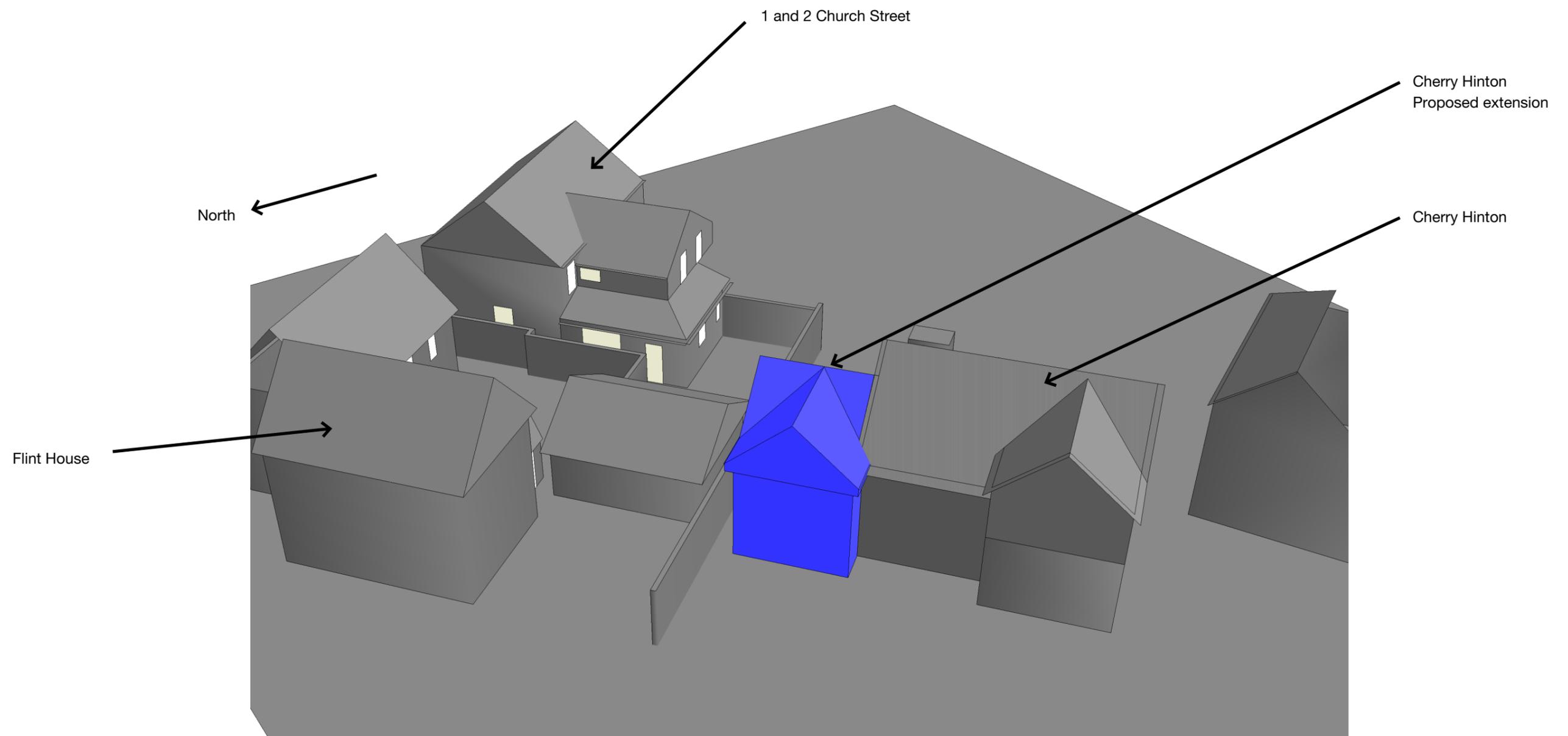


Image 4.2. Proposed condition

5. VSC Results

- 5.1 VSC results are presented in table 5.1 below.
- 5.2 None of the 13 windows analysed will experience a noticeable reduction in skylight.
- 5.3 The fraction of proposed to existing for all windows is 0.97 or higher. Any change to daylight levels inside the rooms behind the windows, due to the construction of the proposed development, will be negligible.

Window Id	Vsc Existing	Vsc Proposed	Pr/Ex	Meets BRE Criteria
1	28.348961	27.714809	0.98	YES
2	31.565842	30.680428	0.97	YES
3	19.384781	18.709075	0.97	YES
4	24.76753	24.442135	0.99	YES
5	24.040596	23.875383	0.99	YES
6	37.947912	37.622595	0.99	YES
7	37.777128	37.332641	0.99	YES
8	24.279476	23.896432	0.98	YES
9	31.331217	30.874659	0.99	YES
10	25.498024	25.43573	1	YES
11	14.986033	14.472753	0.97	YES
12	33.153815	32.931881	0.99	YES
13	30.582307	30.440619	1	YES

Table. 5.1. VSC results.

Notes on the results.

If a window does not experience a reduction in VSC to less than 27% and 0.8 times its former value then it is classed as meeting the BRE criteria.

6. APSH Results

6.1 APSH results are presented in table 6.1 below.

6.2 None of the 13 windows analysed will experience a noticeable reduction in sunlight.

Window Id	Annual APSH				Winter APSH			
	Existing	Proposed	Pr/Ex	Meets BRE Criteria	Existing	Proposed	Pr/Ex	Meets BRE Criteria
1	46	44	0.96	YES	10	10	1	YES
2	57	54	0.95	YES	21	21	1	YES
3	North	North	North	North	North	North	North	North
4	North	North	North	North	North	North	North	North
5	North	North	North	North	North	North	North	North
6	66	66	1	YES	23	23	1	YES
7	67	67	1	YES	24	24	1	YES
8	North	North	North	North	North	North	North	North
9	49	49	1	YES	8	8	1	YES
10	53	52	0.98	YES	17	16	0.94	YES
11	19	19	1	YES	2	2	1	YES
12	54	54	1	YES	22	22	1	YES
13	53	53	1	YES	21	21	1	YES

Table. 6.1. APSH results.

Notes on the results.

For APSH, the results are classed as meeting the BRE criteria if either:

1. A window does not experience a reduction in APSH to less than 25% for the whole year and/or less than 5% in the winter, and either reduction is less than 0.8 times the former value,
2. The overall annual loss is less than 4% of APSH

Windows with result 'North' are not relevant for APSH assessment because they face more than 90° from due south.

7. Amenity Results

7.1 Amenity calculation results are presented in figures 7.1 and 7.2 below.

7.2 A sunlight amenity calculation has shown that the outdoor space of no. 1 Church St. receives at least 120 minutes of direct sunlight on 21st March over 66.70% of its total area of 44.98m².

This is in excess of the recommended minimum of 50%.

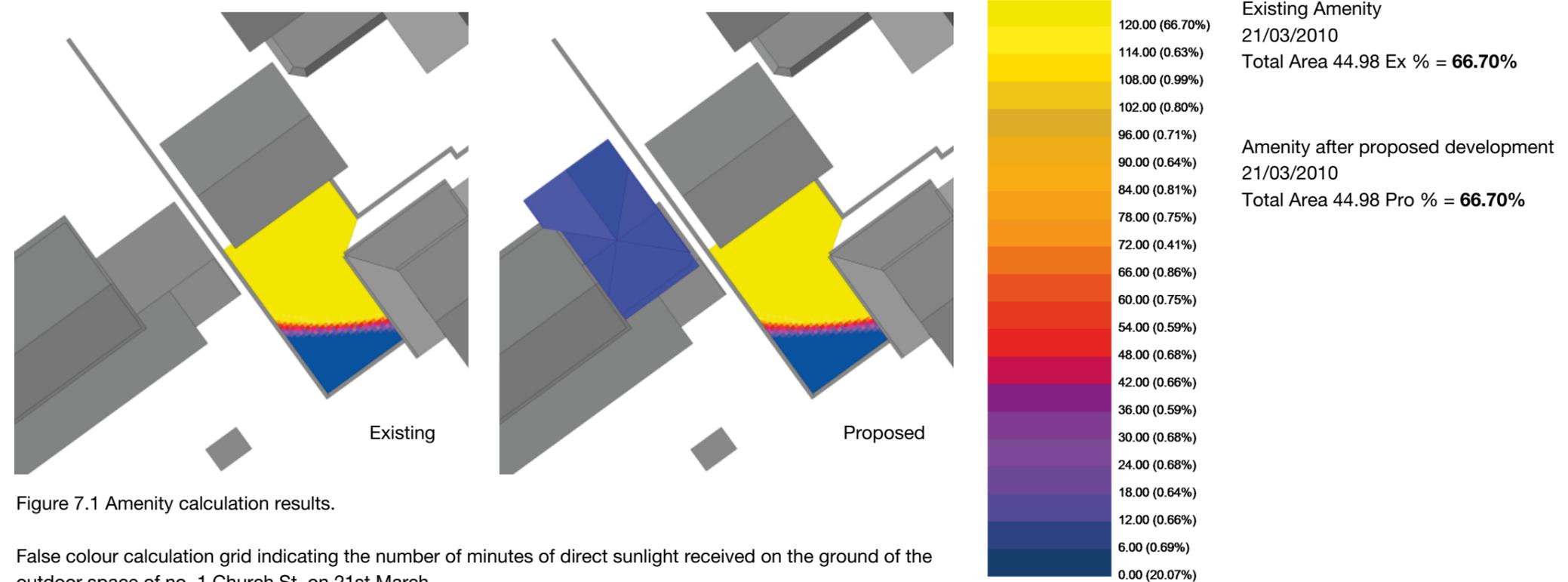


Figure 7.1 Amenity calculation results.

False colour calculation grid indicating the number of minutes of direct sunlight received on the ground of the outdoor space of no. 1 Church St. on 21st March.

Each colour represents a certain quantity of minutes (as listed on the legend to the right). The legend also displays the percentage of the calculation plane area that receives each sunlight duration.

Appendix A

Detail of buildings and windows subject to VSC and APSH assessment

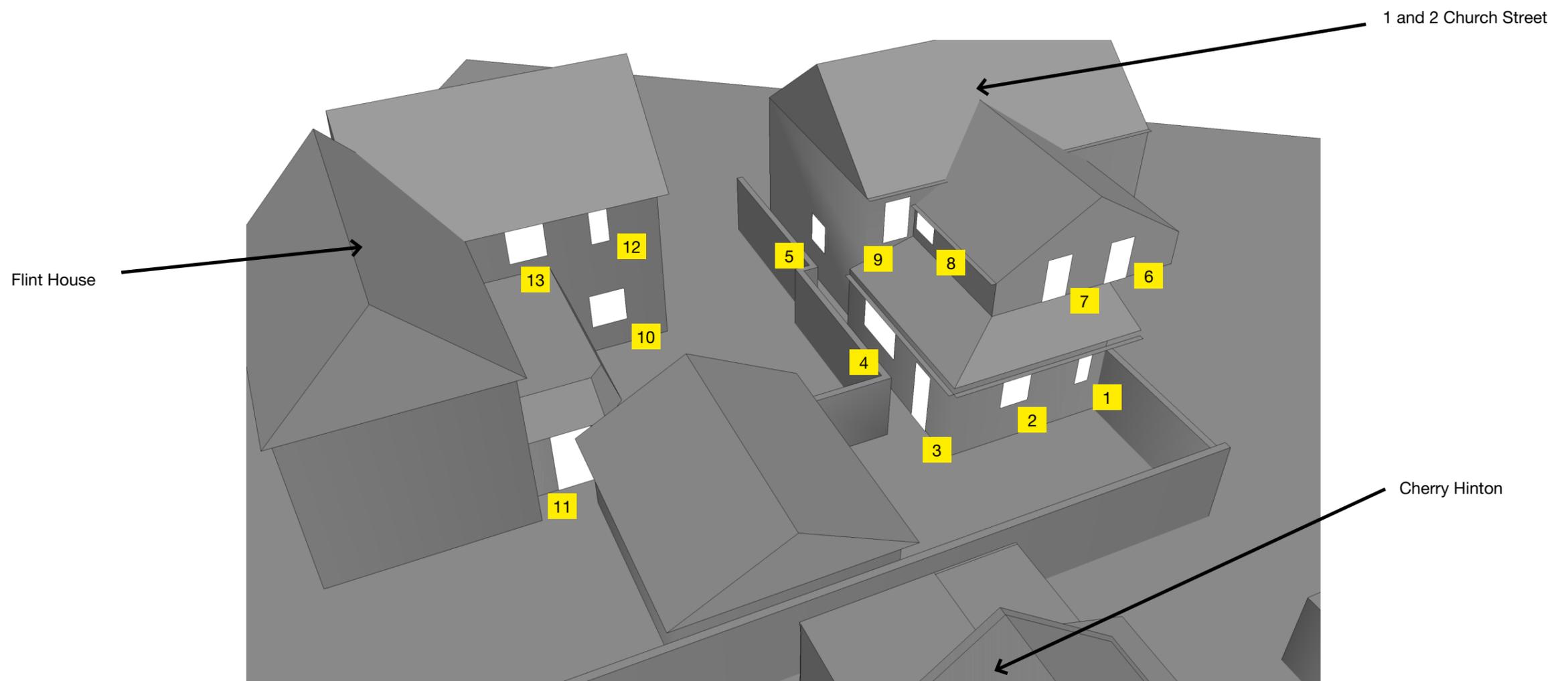


Fig. A1. Windows assessed for VSC and APSH.
Windows are shown in white.
Window reference numbers correspond to the results tables.

Note.
A first floor window on the side wall of no. 1 Church St. is omitted because it serves a bathroom, which is not relevant for assessment.
Two small rooflights to the rear kitchen of no. 1 Church St. are omitted because VSC is not an applicable metric for non-vertical windows and the VSC change to nearby windows makes it evident that overshadowing to these rooflights from the proposed development will be miniscule and negligible.

Appendix B

Calculation Parameters

Site Parameters

Location:	Cherry Hinton, Newbury Hill, Hampstead Norreys, Berkshire, RG18 0TR.
Latitude:	51.483000N
Longitude:	1.240000W
Time Zone:	GMT

Calculation Software

MBS Daylight plugin for Sketchup 2019. Made and validated by MBS
Survey Software Ltd.

References

Building Research Establishment, 2011, Site Layout Planning for Daylight
and Sunlight: a guide to good practice. Second Edition.
P. Littlefair.