Waterman Moylan
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Daylight / Sunlight & Overshadowing Assessment

Strategic Housing Development at Kilnahue, Gorey, Co. Wexford

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Comments

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1. Introduction

Waterman Moylan have been appointed to complete the daylight and sunlight analysis as part of the documentation in support of the planning submission to Wexford County Council for Kilnahue, Gorey, Co. Wexford. The purpose of this analysis is to determine if the daylight factors and sunlight to amenity areas in the proposed development meet the recommendations of BRE document 'Site Layout Planning for Daylight and Sunlight: a Guide to Good Practice' Second Edition 2018.

The parameters assessed will include the following

- daylight factors within dwellings,
- sunlight to communal amenity areas and pocket parks within the proposed development,
- overshadowing caused by the proposed development within the subject site and existing adjacent properties,
- overshadowing caused by the proposed development on existing adjacent properties,
- vertical sky component to existing properties
- sunlight to existing property gardens

The proposed development has been analysed using a number of qualitative and quantitative methods to identify the areas of the development which were likely to receive the least daylight and to identify measures that could be taken to improve the daylight penetration. IES Virtual Environment simulation software was used to build a model of the proposed development to enable the necessary analysis to be completed.

This Daylight Analysis Report presents the requirements set out in the relevant guidance documents, describes the methodologies employed to complete the analysis and details the results that were achieved.

2. Site Overview and Nature of Proposed Development

2.1 Site Location

The subject site is located at the west of Gorey, Co. Wexford, with access to the site at the north from Gorey Hill/Kilnahue Lane and at the south-west from Carnew Road (R725). The site is bounded by agricultural lands to the west, by Carnew Road (R725), residential properties and agricultural lands to the south and east, and by Gorey Hill / Kilnahue Lane to the north. The site location is indicated in the Figure below:

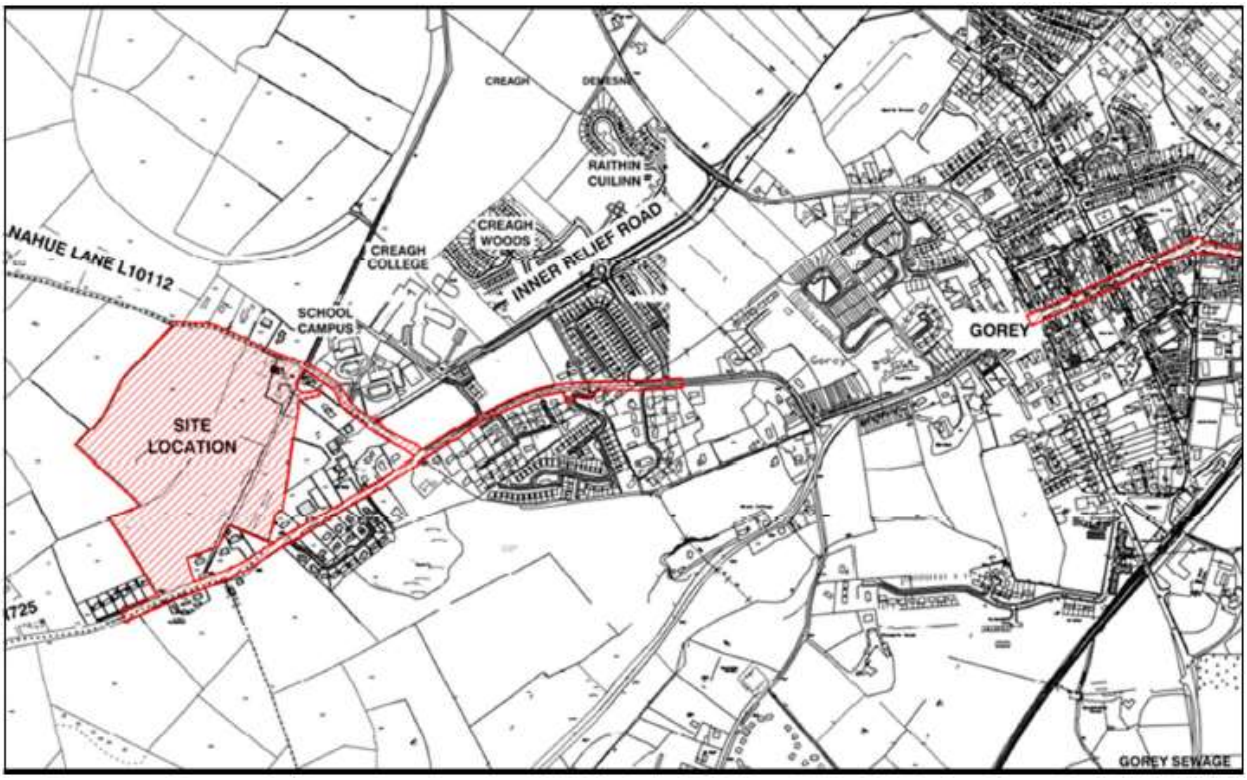

Figure 1: Site Location (Image Source: Google Maps)

2.2 Proposed Development – Schedule of Accommodation

The proposed development consists of a total of 421 residential units, comprising of 133 houses, 228 apartment units and 60 duplex units, a crèche, two retail units and community rooms. The schedule of accommodation is set out in the Table below:

Description	1-Bed	2-Bed	3-Bed	4-Bed	Total
Houses	-	-	115	18	133
Apartments	76	145	7	-	228
Duplexes	4	26	30	-	60
Crèche	565m²				-
Retail	210m²				-
Total	**80**	**171**	**152**	**18**	**421**

Table 1 | *Schedule of Accommodation*

Figure 2: Proposed Development Layout (Extract of drawing 18-008-Connolly Architects)

2.3 Design Development Process

The daylight modelling results presented in Section 4 of this report have been achieved following a design development process between the Architect, Connolly Architects and Waterman Moylan. Preliminary drawings were analysed for compliance and feedback was given to the Architect.

The initial daylight modelling focuses on accessing a ‘worst-case scenario’ apartment block and identifying areas showing non-compliance. The architect then updates non-compliant apartments, and these were retested, in some cases this is an iterative process which continues until all apartments can be shown to be compliant.

When this initial review of what are considered to be the worst performing apartments / duplex units is complete and the site plan, unit layouts and building elevations are nearing completion, a comprehensive modelling exercise is undertaken to assess the living areas and bedrooms in all apartments and duplexes on the site.

Once the full site model is built within the IES modelling software, the model is then used to assess the performance of the amenity space for access to sunlight, and the impact of the scheme on neighbouring properties is also assessed.

3. Relevant Standards and Assessment Approach

The Building Research Establishment (BRE) in the UK published a document entitled "***Site Layout Planning for Daylight and Sunlight. A Guide to Good Practice*** (Building Research Establishment Report, 2018) which is one of the primary sources of guidance on the subject of daylight and sunlight in residential developments.

The BRE Guide states as follows (at paragraph 2.1.8) in relation to daylight access within new development:

"2.1.8 Daylight provision in new rooms may be checked using the average daylight factor (ADF). The ADF is a measure of the overall amount of daylight in a space... BS 8206-2 Code of practice for daylighting, recommends an ADF of 5% for a well daylit space and 2% for a partly daylit space. Below 2% the room will look dull and electric lighting is likely to be turned on. In housing BS 8206-2 also gives minimum value of ADF of 2% for kitchens, 1.5% for living rooms and 1% for bedrooms."

Guidance on daylight levels in residential buildings is also provided in ***British Standard (BS) 8206: Part 2 – Code of Practice for Daylighting.*** The BRE document, BS 8206 and EN 17037:2018 describe similar approaches to assessing daylight levels in residential buildings and set the same minimum performance levels for daylighting. The BRE document refers to BS 8206 provides more practical advice and greater clarity around the assessment methodologies and will therefore form the basis for the assessment described in this report.

It is noted that BS 8206-2:2008: Lighting for buildings - Part 2: Code of practice for daylighting was replaced with BS EN 17037:2018 Daylight in Buildings. However, given that the Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities refer to the BS 8206-2:2008 and not to BS EN 17037:2018, BS 8206:2008 has been referenced in the preparation of this report.

3.1 Assessment Methodologies

The BRE report identifies a number of metrics that can be used to assess the levels of daylight that can be expected in a dwelling.

3.1.1 Angle of Visible Sky

The Angle of Visible Sky can be used to provide a qualitative assessment of the amount of daylight that can be expected based on the angle between the mid pane of the window a continuous obstruction opposite to it.

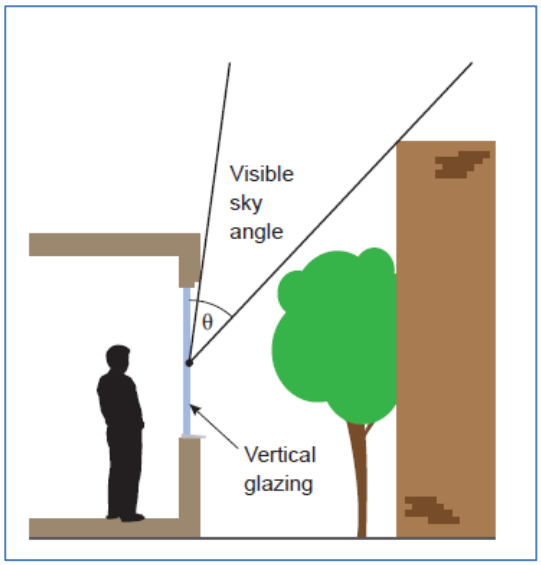

Figure 3: Angle of Visible Sky *(Θ)*

3.1.2 Vertical Sky Component (VSC)

The Vertical Sky Component (VSC) is the ratio of direct sky illuminance that falls on a vertical wall at a particular reference point to the simultaneous horizontal illuminance under an unobstructed sky. The maximum VSC is typically 40% for an unobstructed wall. The assessment of VSC assumes that the sky is completely overcast (CIE Overcast Sky), with no direct sunlight. As the sky model brightness is assumed unidirectional, there is therefore no difference in calculation for VSC for different orientations: i.e. Northerly aspect facades will receive identical natural light potential to Southerly, etc.

3.1.3 Average Daylight Factor (ADF)

The ADF is the ratio of illuminance at a point on a given plane due to light received from a sky of known or assumed luminance distribution, to illuminance on a horizontal plane due to an unobstructed hemisphere of this sky. Similar to the measurement of VSC, the assessment of ADF is also based on the CIE Overcast Sky.

The Angle of Visible Sky and the VSC are effectively different ways of representing the same information, both will allow an assessment to be made of the day light available at a point on a building façade, and by extension the likelihood of adequate daylight being available within the rooms of a building, however they do not provide a method for measuring the specific internal daylight levels.

The Average Daylight Factor does provide a method for making a quantitative assessment of the daylight that will be achieved internal. The ADF is assessed using numerical modelling which takes account of the external factors (such as shading from balconies or other buildings), the size and shape of the windows and the internal room layouts.

4. Daylight Assessment of Dwellings

As discussed in Section 3, a combination of methods was used to make an assessment of the daylight levels that will be achieved within the various apartments within the development. Initially, an assessment of the *Angle of Visible Sky* for Apartment Blocks LAB and Hybrid Duplex Blocks HYB was undertaken. This assessment identifies the apartments that will have the most restricted access to daylight based on BRE recommended Vertical Sky Angle obstruction angle of between 25° - 45°.

4.1 Angle of Visible Sky Assessment

In order to use the Angle of Visible Sky method to critically assess the scheme, a series of sections through the buildings were analysed to determine which apartments had the least advantageous “Angle of Visible Sky” as these are the apartments that are likely to perform the worst in terms of Average Daylight Factor.

Due to the low-rise nature of the scheme overall and the fact that the apartment blocks are generally well spaced out, the majority of apartments have a favourable Angle of Visible Sky. Similarly, the duplex blocks obstruction angle between each Hybrid Duplex block was greater than 25°.

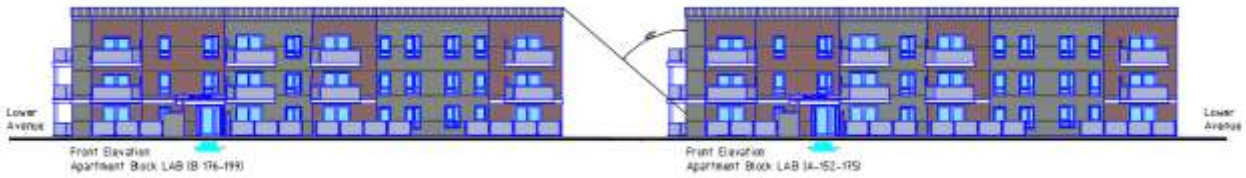

Figure 4: Block LAB (A) & (B) Front Elevation

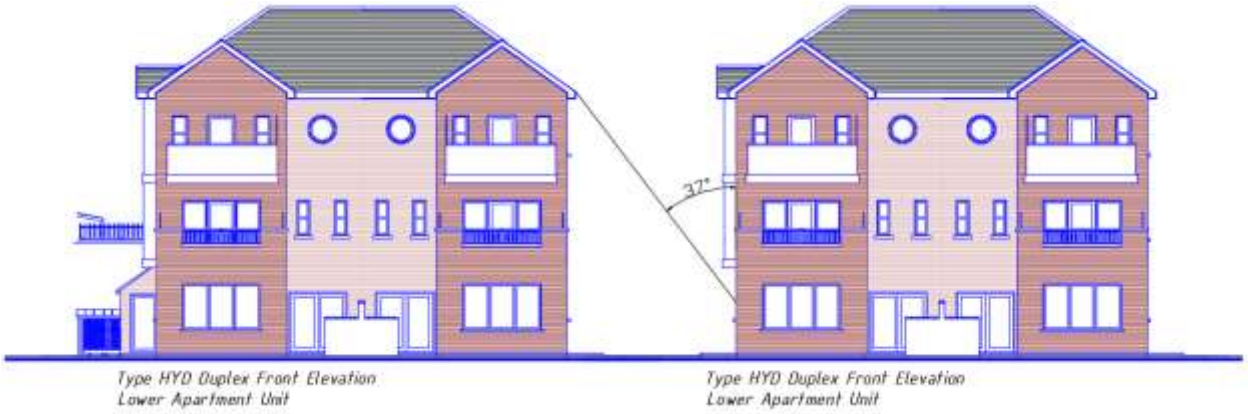

Figure 5: Block HYB (370-373) & (374-377) Front Elevation

4.2 Average Daylight Factor Assessment

Having analysed the development as described in Section 4.1, it is clear that the majority of spaces within the proposed development should perform well in terms of the access to daylight and would be expected to be in line with the BRE recommendations. Nonetheless, all units were assessed to determine the actual ADFs that would be achieved using computer modelling using IES Virtual Environment program Radiance. The results are shown in Table 4.1.

4.2.1 IES Model Data

The model was built in accordance with architectural Auto CAD layouts issued by Connolly Architects which included all blocks in the proposed development. Images of the model are presented below

The following assumptions were made when modelling the ADF in each of the apartments selected

- The CIE Overcast Sky was used in accordance with CIBSE and BRE Guidance
- The following material properties were assigned in the model:
    - Glazing Visible Light Transmittance - 0.70
    - Internal Wall Reflectance - 0.80
    - Ceiling Reflectance - 0.80
    - Internal Floor Reflectance - 0.68
    - Working Plane Height

The working plane height in the model was taken as 0.85m. This is a typical value for domestic applications based on guidance within the BRE Guide “Site Layout Planning for Daylight and Sunlight” Second Edition 2011.

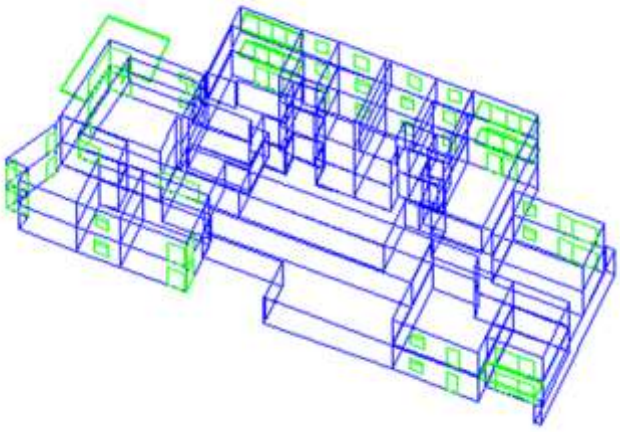

Figure 6: Image of IES Model Blocks EAB

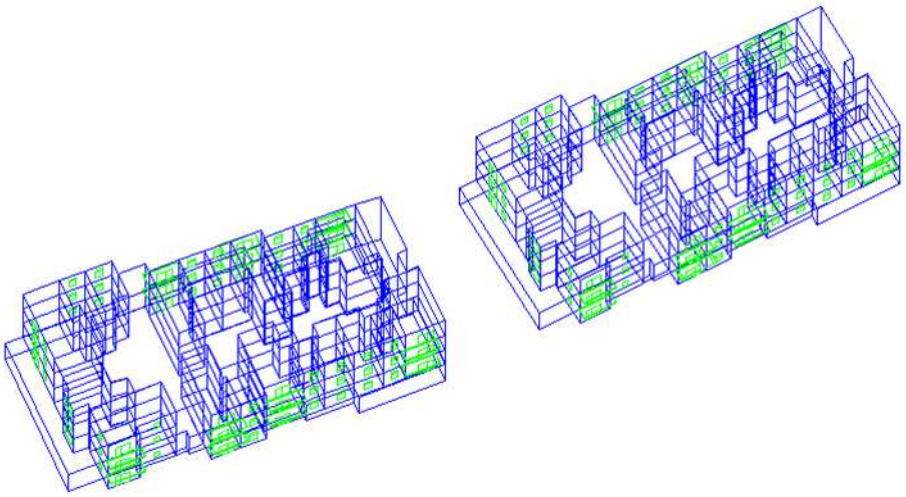

Figure 7: Image of IES Model Blocks LAB

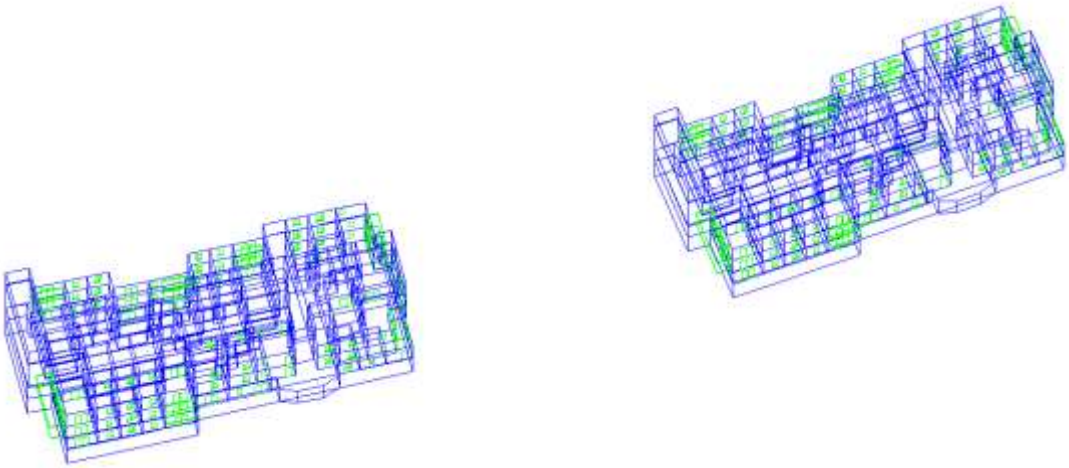

Figure 8: Image of IES Model Blocks MAB

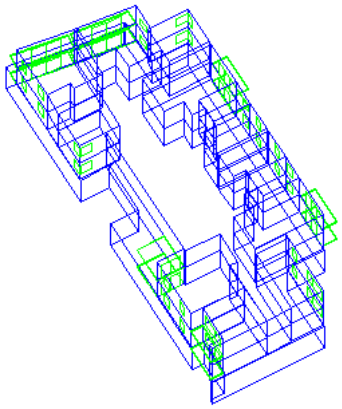

Figure 9: Image of IES Model Blocks XAB

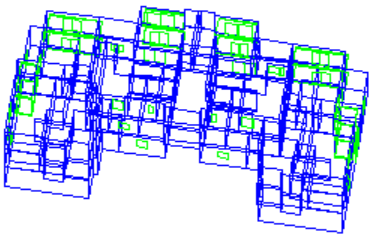

Figure 10: Image of IES Model Blocks DHB

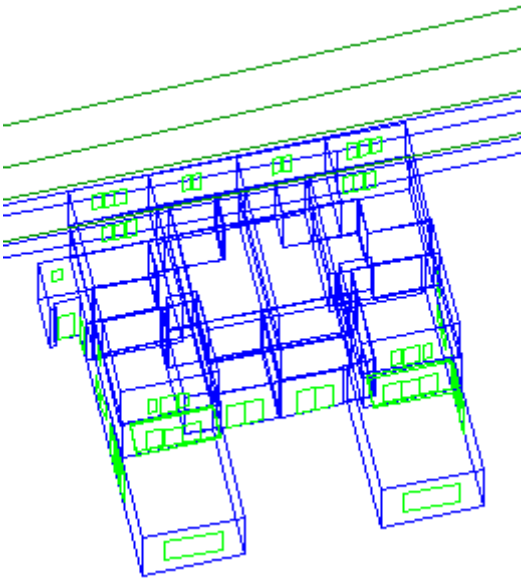

Figure 11: Image of IES Model Blocks HYD 372 - 411

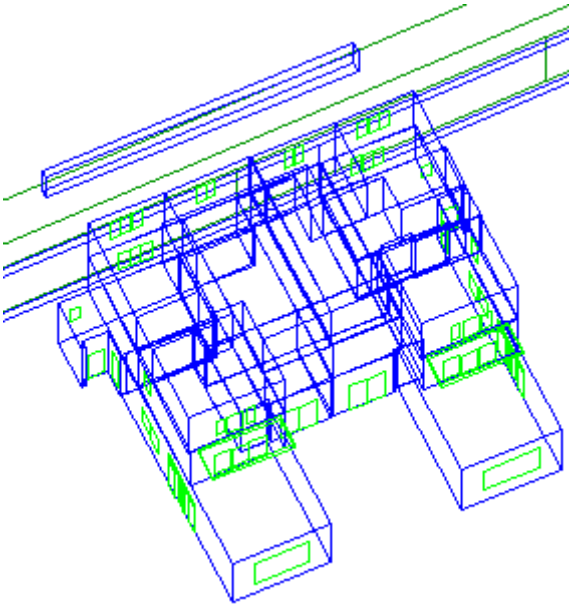

Figure 12: Image of IES Model Blocks HYD 412 - 423

4.2.2 ADF Results

The BRE report suggests a daylight level of 2% for kitchen/living/Dining areas, 1.5% Living areas and 1% for bedrooms is an adequate performance in terms of access to daylight. The table 4.1 below indicate rooms assessed achieved daylight levels in compliance with the minimum standards.

Table 4.1 identifies lower levels units across all blocks receive less daylight than units at first floor level and above.

In all cases adequate glazing areas have been designed into all units of the proposed development with dual aspect facades incorporated where possible.

Block	Unit	Type	ADF Required (%)	ADF Results (%)	BRE Compliance
MAB (E)	TY-1A.1-1	Kitchen/Living/Dining	2	2.04	Yes
MAB (E)		Bedroom 1	1	2.33	Yes
MAB (E)		Bedroom 2	1	1.67	Yes
MAB (E)	TY-3A.1-1	Kitchen/Living/Dining	2	2.67	Yes
MAB (E)		Bedroom 1	1	3.82	Yes
MAB (E)	TY-1A.2-1	Kitchen/Living/Dining	2	2.12	Yes
MAB (E)		Bedroom 1	1	2.32	Yes
MAB (E)		Bedroom 2	1	1.71	Yes
MAB (E)	TY-2A.1-1	Kitchen/Living/Dining	2	3.11	Yes
MAB (E)		Bedroom 1	1	1.93	Yes
MAB (E)		Bedroom 2	1	2.30	Yes
MAB (E)	TY-2A.2-1	Kitchen/Living/Dining	2	3.10	Yes
MAB (E)		Bedroom 1	1	1.88	Yes
MAB (E)		Bedroom 2	1	2.07	Yes
MAB (E)	TY-3-1	Kitchen/Living/Dining	2	3.01	Yes
MAB (E)		Bedroom 1	1	3.77	Yes
MAB (E)	TY-4A-1	Kitchen/Living/Dining	2	2.25	Yes
MAB (E)		Bedroom 1	1	1.60	Yes
MAB (E)	TY-1A.3-1	Kitchen/Living/Dining	2	4.27	Yes
MAB (E)		Bedroom 1	1	2.35	Yes
MAB (E)		Bedroom 2	1	1.75	Yes
MAB (E)	TY-1A.1-2	Kitchen/Living/Dining	2	2.19	Yes
MAB (E)		Bedroom 1	1	2.40	Yes
MAB (E)		Bedroom 2	1	1.90	Yes
MAB (E)	TY-3A.1-2	Kitchen/Living/Dining	2	2.95	Yes
MAB (E)		Bedroom 1	1	4.93	Yes

MAB (E)	TY-1A.2-2	Kitchen/Living/Dining	2	2.38	Yes
MAB (E)		Bedroom 1	1	2.41	Yes
MAB (E)		Bedroom 2	1	1.94	Yes
MAB (E)	TY-5A.1-2	Kitchen/Living/Dining	2	3.21	Yes
MAB (E)		Bedroom 1	1	2.06	Yes
MAB (E)		Bedroom 2	1	2.66	Yes
MAB (E)	TY-5A.1-3	Kitchen/Living/Dining	2	3.34	Yes
MAB (E)		Bedroom 1	1	2.00	Yes
MAB (E)		Bedroom 2	1	2.92	Yes
MAB (E)	TY-7-2	Kitchen/Living/Dining	2	2.02	Yes
MAB (E)		Bedroom 1	1	2.01	Yes
MAB (E)		Bedroom 2	1	2.54	Yes
MAB (E)	TY-4A-2	Kitchen/Living/Dining	2	2.81	Yes
MAB (E)		Bedroom 1	1	1.87	Yes
MAB (E)	TY-1A.3-2	Kitchen/Living/Dining	2	5.06	Yes
MAB (E)		Bedroom 1	1	2.44	Yes
MAB (E)		Bedroom 2	1	2.01	Yes
MAB (E)	TY-6A-3	Kitchen/Living/Dining	2	3.51	Yes
MAB (E)		Bedroom 1	1	4.90	Yes
MAB (E)		Bedroom 2	1	2.68	Yes
MAB (E)		Bedroom 3	1	2.37	Yes
MAB (E)	TY-7A-3	Kitchen/Living/Dining	2	2.11	Yes
MAB (E)		Bedroom 1	1	1.73	Yes
MAB (E)		Bedroom 2	1	2.15	Yes
MAB (E)	TY-8A-3	Kitchen/Living/Dining	2	3.40	Yes
MAB (E)		Bedroom 1	1	1.72	Yes
MAB (E)	TY-9A-3	Kitchen/Living/Dining	2	2.92	Yes
MAB (E)		Bedroom 1	1	2.27	Yes
MAB (E)		Bedroom 2	1	1.75	Yes
MAB (F)	TY-1A.1-1	Kitchen/Living/Dining	2	2.02	Yes
MAB (F)		Bedroom 1	1	2.33	Yes
MAB (F)		Bedroom 2	1	1.74	Yes
MAB (F)	TY-3A.1-1	Kitchen/Living/Dining	2	2.67	Yes
MAB (F)		Bedroom 1	1	3.82	Yes
MAB (F)	TY-1A.2-1	Kitchen/Living/Dining	2	2.12	Yes
MAB (F)		Bedroom 1	1	2.32	Yes
MAB (F)		Bedroom 2	1	1.71	Yes

MAB (F)	TY-2A.1-1	Kitchen/Living/Dining	2	3.05	Yes
MAB (F)		Bedroom 1	1	1.93	Yes
MAB (F)		Bedroom 2	1	2.30	Yes
MAB (F)	TY-2A.2-1	Kitchen/Living/Dining	2	3.02	Yes
MAB (F)		Bedroom 1	1	1.88	Yes
MAB (F)		Bedroom 2	1	2.07	Yes
MAB (F)	TY-3-1	Kitchen/Living/Dining	2	3.01	Yes
MAB (F)		Bedroom 1	1	3.77	Yes
MAB (F)	TY-4A-1	Kitchen/Living/Dining	2	2.25	Yes
MAB (F)		Bedroom 1	1	1.60	Yes
MAB (F)	TY-1A.3-1	Kitchen/Living/Dining	2	4.76	Yes
MAB (F)		Bedroom 1	1	2.75	Yes
MAB (F)		Bedroom 2	1	1.90	Yes
MAB (F)	TY-1A.1-2	Kitchen/Living/Dining	2	2.16	Yes
MAB (F)		Bedroom 1	1	2.40	Yes
MAB (F)		Bedroom 2	1	2.01	Yes
MAB (F)	TY-3A.1-2	Kitchen/Living/Dining	2	2.95	Yes
MAB (F)		Bedroom 1	1	4.93	Yes
MAB (F)	TY-1A.2-2	Kitchen/Living/Dining	2	2.38	Yes
MAB (F)		Bedroom 1	1	2.41	Yes
MAB (F)		Bedroom 2	1	1.94	Yes
MAB (F)	TY-5A.1-2	Kitchen/Living/Dining	2	3.28	Yes
MAB (F)		Bedroom 1	1	2.07	Yes
MAB (F)		Bedroom 2	1	2.92	Yes
MAB (F)	TY-5A.1-3	Kitchen/Living/Dining	2	3.24	Yes
MAB (F)		Bedroom 1	1	1.97	Yes
MAB (F)		Bedroom 2	1	2.67	Yes
MAB (F)	TY-7-2	Kitchen/Living/Dining	2	2.02	Yes
MAB (F)		Bedroom 1	1	2.01	Yes
MAB (F)		Bedroom 2	1	2.54	Yes
MAB (F)	TY-4A-2	Kitchen/Living/Dining	2	2.93	Yes
MAB (F)		Bedroom 1	1	1.87	Yes
MAB (F)	TY-1A.3-2	Kitchen/Living/Dining	2	4.97	Yes
MAB (F)		Bedroom 1	1	2.46	Yes
MAB (F)		Bedroom 2	1	2.01	Yes
MAB (F)	TY-6A-3	Kitchen/Living/Dining	2	3.53	Yes
MAB (F)		Bedroom 1	1	4.90	Yes
MAB (F)		Bedroom 2	1	2.68	Yes

MAB (F)		Bedroom 3	1	2.37	Yes
MAB (F)	TY-7A-3	Kitchen/Living/Dining	2	2.11	Yes
MAB (F)		Bedroom 1	1	1.73	Yes
MAB (F)		Bedroom 2	1	2.15	Yes
MAB (F)	TY-8A-3	Kitchen/Living/Dining	2	3.40	Yes
MAB (F)		Bedroom 1	1	1.72	Yes
MAB (F)	TY-9A-3	Kitchen/Living/Dining	2	2.98	Yes
MAB (F)		Bedroom 1	1	2.27	Yes
MAB (F)		Bedroom 2	1	1.75	Yes
MAB (G)	TY-1A.1-1	Kitchen/Living/Dining	2	2.02	Yes
MAB (G)		Bedroom 1	1	2.33	Yes
MAB (G)		Bedroom 2	1	1.74	Yes
MAB (G)	TY-3A.1-1	Kitchen/Living/Dining	2	2.67	Yes
MAB (G)		Bedroom 1	1	3.82	Yes
MAB (G)	TY-1A.2-1	Kitchen/Living/Dining	2	2.12	Yes
MAB (G)		Bedroom 1	1	2.32	Yes
MAB (G)		Bedroom 2	1	1.71	Yes
MAB (G)	TY-2A.1-1	Kitchen/Living/Dining	2	3.02	Yes
MAB (G)		Bedroom 1	1	1.93	Yes
MAB (G)		Bedroom 2	1	2.30	Yes
MAB (G)	TY-2A.2-1	Kitchen/Living/Dining	2	3.06	Yes
MAB (G)		Bedroom 1	1	1.88	Yes
MAB (G)		Bedroom 2	1	2.07	Yes
MAB (G)	TY-3-1	Kitchen/Living/Dining	2	3.01	Yes
MAB (G)		Bedroom 1	1	3.77	Yes
MAB (G)	TY-4A-1	Kitchen/Living/Dining	2	2.25	Yes
MAB (G)		Bedroom 1	1	1.60	Yes
MAB (G)	TY-1A.3-1	Kitchen/Living/Dining	2	4.76	Yes
MAB (G)		Bedroom 1	1	2.75	Yes
MAB (G)		Bedroom 2	1	1.90	Yes
MAB (G)	TY-1A.1-2	Kitchen/Living/Dining	2	2.16	Yes
MAB (G)		Bedroom 1	1	2.40	Yes
MAB (G)		Bedroom 2	1	2.01	Yes
MAB (G)	TY-3A.1-2	Kitchen/Living/Dining	2	2.95	Yes
MAB (G)		Bedroom 1	1	4.93	Yes
MAB (G)	TY-1A.2-2	Kitchen/Living/Dining	2	2.38	Yes
MAB (G)		Bedroom 1	1	2.41	Yes

MAB (G)		Bedroom 2	1	1.94	Yes
MAB (G)	TY-5A.1-2	Kitchen/Living/Dining	2	3.31	Yes
MAB (G)		Bedroom 1	1	2.07	Yes
MAB (G)		Bedroom 2	1	2.92	Yes
MAB (G)	TY-5A.1-3	Kitchen/Living/Dining	2	3.29	Yes
MAB (G)		Bedroom 1	1	1.97	Yes
MAB (G)		Bedroom 2	1	2.67	Yes
MAB (G)	TY-7-2	Kitchen/Living/Dining	2	2.02	Yes
MAB (G)		Bedroom 1	1	2.01	Yes
MAB (G)		Bedroom 2	1	2.54	Yes
MAB (G)	TY-4A-2	Kitchen/Living/Dining	2	2.68	Yes
MAB (G)		Bedroom 1	1	1.87	Yes
MAB (G)	TY-1A.3-2	Kitchen/Living/Dining	2	4.97	Yes
MAB (G)		Bedroom 1	1	2.46	Yes
MAB (G)		Bedroom 2	1	2.01	Yes
MAB (G)	TY-6A-3	Kitchen/Living/Dining	2	3.51	Yes
MAB (G)		Bedroom 1	1	4.90	Yes
MAB (G)		Bedroom 2	1	2.68	Yes
MAB (G)		Bedroom 3	1	2.37	Yes
MAB (G)	TY-7A-3	Kitchen/Living/Dining	2	2.11	Yes
MAB (G)		Bedroom 1	1	1.73	Yes
MAB (G)		Bedroom 2	1	2.15	Yes
MAB (G)	TY-8A-3	Kitchen/Living/Dining	2	3.40	Yes
MAB (G)		Bedroom 1	1	1.72	Yes
MAB (G)	TY-9A-3	Kitchen/Living/Dining	2	3.01	Yes
MAB (G)		Bedroom 1	1	2.27	Yes
MAB (G)		Bedroom 2	1	1.75	Yes
MAB (H)	TY-1A.1-1	Kitchen/Living/Dining	2	2.02	Yes
MAB (H)		Bedroom 1	1	2.33	Yes
MAB (H)		Bedroom 2	1	1.74	Yes
MAB (H)	TY-3A.1-1	Kitchen/Living/Dining	2	2.67	Yes
MAB (H)		Bedroom 1	1	3.82	Yes
MAB (H)	TY-1A.2-1	Kitchen/Living/Dining	2	2.12	Yes
MAB (H)		Bedroom 1	1	2.32	Yes
MAB (H)		Bedroom 2	1	1.71	Yes
MAB (H)	TY-2A.1-1	Kitchen/Living/Dining	2	3.11	Yes
MAB (H)		Bedroom 1	1	1.93	Yes

MAB (H)		Bedroom 2	1	2.30	Yes
MAB (H)	TY-2A.2-1	Kitchen/Living/Dining	2	3.09	Yes
MAB (H)		Bedroom 1	1	1.88	Yes
MAB (H)		Bedroom 2	1	2.07	Yes
MAB (H)	TY-3-1	Kitchen/Living/Dining	2	3.01	Yes
MAB (H)		Bedroom 1	1	3.77	Yes
MAB (H)	TY-4A-1	Kitchen/Living	2	2.25	Yes
MAB (H)		Bedroom 1	1	1.60	Yes
MAB (H)	TY-1A.3-1	Kitchen/Living/Dining	2	4.76	Yes
MAB (H)		Bedroom 1	1	2.75	Yes
MAB (H)		Bedroom 2	1	1.90	Yes
MAB (H)	TY-1A.1-2	Kitchen/Living/Dining	2	2.16	Yes
MAB (H)		Bedroom 1	1	2.40	Yes
MAB (H)		Bedroom 2	1	2.01	Yes
MAB (H)	TY-3A.1-2	Kitchen/Living/Dining	2	2.95	Yes
MAB (H)		Bedroom 1	1	4.93	Yes
MAB (H)	TY-1A.2-2	Kitchen/Living/Dining	2	2.38	Yes
MAB (H)		Bedroom 1	1	2.41	Yes
MAB (H)		Bedroom 2	1	1.94	Yes
MAB (H)	TY-5A.1-2	Kitchen/Living/Dining	2	3.35	Yes
MAB (H)		Bedroom 1	1	2.07	Yes
MAB (H)		Bedroom 2	1	2.92	Yes
MAB (H)	TY-5A.1-3	Kitchen/Living/Dining	2	3.32	Yes
MAB (H)		Bedroom 1	1	1.97	Yes
MAB (H)		Bedroom 2	1	2.67	Yes
MAB (H)	TY-7-2	Kitchen/Living/Dining	2	2.02	Yes
MAB (H)		Bedroom 1	1	2.01	Yes
MAB (H)		Bedroom 2	1	2.54	Yes
MAB (H)	TY-4A-2	Kitchen/Living/Dining	2	2.82	Yes
MAB (H)		Bedroom 1	1	1.87	Yes
MAB (H)	TY-1A.3-2	Kitchen/Living/Dining	2	4.97	Yes
MAB (H)		Bedroom 1	1	2.46	Yes
MAB (H)		Bedroom 2	1	2.01	Yes
MAB (H)	TY-6A-3	Kitchen/Living/Dining	2	3.56	Yes
MAB (H)		Bedroom 1	1	4.90	Yes
MAB (H)		Bedroom 2	1	2.68	Yes
MAB (H)		Bedroom 3	1	2.37	Yes
MAB (H)	TY-7A-3	Kitchen/Living/Dining	2	2.11	Yes

MAB (H)		Bedroom 1	1	1.73	Yes
MAB (H)		Bedroom 2	1	2.15	Yes
MAB (H)	TY-8A-3	Kitchen/Living/Dining	2	3.40	Yes
MAB (H)		Bedroom 1	1	1.72	Yes
MAB (H)	TY-9A-3	Kitchen/Living/Dining	2	3.13	Yes
MAB (H)		Bedroom 1	1	2.27	Yes
MAB (H)		Bedroom 2	1	1.75	Yes
LAB (A)	TY-11-1	Kitchen/Living/Dining	2	3.03	Yes
LAB (A)		Bedroom 1	1	3.34	Yes
LAB (A)	TY-12-1	Kitchen/Living/Dining	2	2.22	Yes
LAB (A)		Bedroom 1	1	2.29	Yes
LAB (A)	TY-13-1	Kitchen/Living/Dining	2	2.02	Yes
LAB (A)		Bedroom 1	1	2.46	Yes
LAB (A)		Bedroom 2	1	2.87	Yes
LAB (A)	TY-14-1	Kitchen/Living/Dining	2	2.12	Yes
LAB (A)		Bedroom 1	1	2.47	Yes
LAB (A)		Bedroom 2	1	2.81	Yes
LAB (A)	TY-15-1	Kitchen/Living/Dining	2	2.03	Yes
LAB (A)		Bedroom 1	1	2.33	Yes
LAB (A)		Bedroom 2	1	2.80	Yes
LAB (A)	TY-16-1	Kitchen/Living/Dining	2	2.06	Yes
LAB (A)		Bedroom 1	1	2.22	Yes
LAB (A)	TY-17-1	Kitchen/Living/Dining	2	2.06	Yes
LAB (A)		Bedroom 1	1	2.29	Yes
LAB (A)	TY-18-1	Kitchen/Living/Dining	2	2.90	Yes
LAB (A)		Bedroom 1	1	2.18	Yes
LAB (A)		Bedroom 2	1	2.87	Yes
LAB (A)	TY-19-2	Kitchen/Living/Dining	2	3.20	Yes
LAB (A)		Bedroom 1	1	3.37	Yes
LAB (A)		Bedroom 2	1	2.44	Yes
LAB (A)	TY-12-2	Kitchen/Living/Dining	2	2.43	Yes
LAB (A)		Bedroom 1	1	2.44	Yes
LAB (A)	TY-13-2	Kitchen/Living/Dining	2	2.13	Yes
LAB (A)		Bedroom 1	1	2.51	Yes
LAB (A)		Bedroom 2	1	2.94	Yes
LAB (A)	TY-14-2	Kitchen/Living/Dining	2	2.23	Yes
LAB (A)		Bedroom 1	1	2.48	Yes

LAB (A)		Bedroom 2	1	2.83	Yes
LAB (A)	TY-15-2	Kitchen/Living/Dining	2	2.14	Yes
LAB (A)		Bedroom 1	1	2.43	Yes
LAB (A)		Bedroom 2	1	2.87	Yes
LAB (A)	TY-16-2	Kitchen/Living/Dining	2	2.09	Yes
LAB (A)		Bedroom 1	1	2.29	Yes
LAB (A)	TY-17-2	Kitchen/Living/Dining	2	2.13	Yes
LAB (A)		Bedroom 1	1	2.37	Yes
LAB (A)	TY-18-2	Kitchen/Living	2	2.96	Yes
LAB (A)		Bedroom 1	1	2.19	Yes
LAB (A)		Bedroom 2	1	2.87	Yes
LAB (A)	TY-19-3	Kitchen/Living/Dining	2	3.57	Yes
LAB (A)		Bedroom 1	1	3.37	Yes
LAB (A)		Bedroom 2	1	2.51	Yes
LAB (A)	TY-12-3	Kitchen/Living/Dining	2	3.01	Yes
LAB (A)		Bedroom 1	1	2.50	Yes
LAB (A)	TY-13-3	Kitchen/Living/Dining	2	2.44	Yes
LAB (A)		Bedroom 1	1	2.50	Yes
LAB (A)		Bedroom 2	1	2.99	Yes
LAB (A)	TY-14-3	Kitchen/Living/Dining	2	2.59	Yes
LAB (A)		Bedroom 1	1	2.49	Yes
LAB (A)		Bedroom 2	1	2.98	Yes
LAB (A)	TY-15-3	Kitchen/Living/Dining	2	2.39	Yes
LAB (A)		Bedroom 1	1	2.56	Yes
LAB (A)		Bedroom 2	1	2.95	Yes
LAB (A)	TY-16-3	Kitchen/Living/Dining	2	2.76	Yes
LAB (A)		Bedroom 1	1	2.48	Yes
LAB (A)	TY-17-3	Kitchen/Living/Dining	2	2.69	Yes
LAB (A)		Bedroom 1	1	2.51	Yes
LAB (A)	TY-18-3	Kitchen/Living/Dining	2	2.97	Yes
LAB (A)		Bedroom 1	1	2.18	Yes
LAB (A)		Bedroom 2	1	2.87	Yes
LAB (B)	TY-11-1	Kitchen/Living/Dining	2	2.96	Yes
LAB (B)		Bedroom 1	1	2.75	Yes
LAB (B)	TY-12-1	Kitchen/Living/Dining	2	2.22	Yes
LAB (B)		Bedroom 1	1	2.29	Yes
LAB (B)	TY-13-1	Kitchen/Living/Dining	2	2.02	Yes

LAB (B)		Bedroom 1	1	2.46	Yes
LAB (B)		Bedroom 2	1	2.87	Yes
LAB (B)	TY-14-1	Kitchen/Living/Dining	2	2.10	Yes
LAB (B)		Bedroom 1	1	2.47	Yes
LAB (B)		Bedroom 2	1	2.81	Yes
LAB (B)	TY-15-1	Kitchen/Living/Dining	2	2.03	Yes
LAB (B)		Bedroom 1	1	2.33	Yes
LAB (B)		Bedroom 2	1	2.80	Yes
LAB (B)	TY-16-1	Kitchen/Living/Dining	2	2.06	Yes
LAB (B)		Bedroom 1	1	2.22	Yes
LAB (B)	TY-17-1	Kitchen/Living/Dining	2	2.06	Yes
LAB (B)		Bedroom 1	1	2.29	Yes
LAB (B)	TY-18-1	Kitchen/Living/Dining	2	2.43	Yes
LAB (B)		Bedroom 1	1	2.16	Yes
LAB (B)		Bedroom 2	1	2.85	Yes
LAB (B)	TY-19-2	Kitchen/Living/Dining	2	3.17	Yes
LAB (B)		Bedroom 1	1	3.04	Yes
LAB (B)		Bedroom 2	1	2.44	Yes
LAB (B)	TY-12-2	Kitchen/Living/Dining	2	2.45	Yes
LAB (B)		Bedroom 1	1	2.44	Yes
LAB (B)	TY-13-2	Kitchen/Living/Dining	2	2.13	Yes
LAB (B)		Bedroom 1	1	2.51	Yes
LAB (B)		Bedroom 2	1	2.94	Yes
LAB (B)	TY-14-2	Kitchen/Living/Dining	2	2.46	Yes
LAB (B)		Bedroom 1	1	2.48	Yes
LAB (B)		Bedroom 2	1	2.83	Yes
LAB (B)	TY-15-2	Kitchen/Living/Dining	2	2.14	Yes
LAB (B)		Bedroom 1	1	2.43	Yes
LAB (B)		Bedroom 2	1	2.87	Yes
LAB (B)	TY-16-2	Kitchen/Living/Dining	2	2.09	Yes
LAB (B)		Bedroom 1	1	2.29	Yes
LAB (B)	TY-17-2	Kitchen/Living/Dining	2	2.13	Yes
LAB (B)		Bedroom 1	1	2.37	Yes
LAB (B)	TY-18-2	Kitchen/Living/Dining	2	2.69	Yes
LAB (B)		Bedroom 1	1	2.16	Yes
LAB (B)		Bedroom 2	1	2.86	Yes
LAB (B)	TY-19-3	Kitchen/Living/Dining	2	3.56	Yes
LAB (B)		Bedroom 1	1	3.25	Yes

LAB (B)		Bedroom 2	1	2.51	Yes
LAB (B)	TY-12-3	Kitchen/Living/Dining	2	3.00	Yes
LAB (B)		Bedroom 1	1	2.50	Yes
LAB (B)	TY-13-3	Kitchen/Living/Dining	2	2.44	Yes
LAB (B)		Bedroom 1	1	2.51	Yes
LAB (B)		Bedroom 2	1	2.99	Yes
LAB (B)	TY-14-3	Kitchen/Living/Dining	2	2.61	Yes
LAB (B)		Bedroom 1	1	2.49	Yes
LAB (B)		Bedroom 2	1	2.98	Yes
LAB (B)	TY-15-3	Kitchen/Living/Dining	2	2.39	Yes
LAB (B)		Bedroom 1	1	2.56	Yes
LAB (B)		Bedroom 2	1	2.95	Yes
LAB (B)	TY-16-3	Kitchen/Living/Dining	2	2.76	Yes
LAB (B)		Bedroom 1	1	2.48	Yes
LAB (B)	TY-17-3	Kitchen/Living/Dining	2	2.69	Yes
LAB (B)		Bedroom 1	1	2.51	Yes
LAB (B)	TY-18-3	Kitchen/Living/Dining	2	2.85	Yes
LAB (B)		Bedroom 1	1	2.17	Yes
LAB (B)		Bedroom 2	1	2.86	Yes
LAB (C)	TY-11-1	Kitchen/Living/Dining	2	3.01	Yes
LAB (C)		Bedroom 1	1	3.21	Yes
LAB (C)	TY-12-1	Kitchen/Living/Dining	2	2.22	Yes
LAB (C)		Bedroom 1	1	2.29	Yes
LAB (C)	TY-13-1	Kitchen/Living/Dining	2	2.02	Yes
LAB (C)		Bedroom 1	1	2.46	Yes
LAB (C)		Bedroom 2	1	2.87	Yes
LAB (C)	TY-14-1	Kitchen/Living/Dining	2	2.12	Yes
LAB (C)		Bedroom 1	1	2.47	Yes
LAB (C)		Bedroom 2	1	2.81	Yes
LAB (C)	TY-15-1	Kitchen/Living/Dining	2	2.03	Yes
LAB (C)		Bedroom 1	1	2.33	Yes
LAB (C)		Bedroom 2	1	2.80	Yes
LAB (C)	TY-16-1	Kitchen/Living/Dining	2	2.06	Yes
LAB (C)		Bedroom 1	1	2.22	Yes
LAB (C)	TY-17-1	Kitchen/Living/Dining	2	2.06	Yes
LAB (C)		Bedroom 1	1	2.29	Yes
LAB (C)	TY-18-1	Kitchen/Living/Dining	2	2.78	Yes

LAB (C)		Bedroom 1	1	2.16	Yes
LAB (C)		Bedroom 2	1	2.84	Yes
LAB (C)	TY-19-2	Kitchen/Living/Dining	2	3.19	Yes
LAB (C)		Bedroom 1	1	3.30	Yes
LAB (C)		Bedroom 2	1	2.44	Yes
LAB (C)	TY-12-2	Kitchen/Living/Dining	2	2.41	Yes
LAB (C)		Bedroom 1	1	2.44	Yes
LAB (C)	TY-13-2	Kitchen/Living/Dining	2	2.13	Yes
LAB (C)		Bedroom 1	1	2.51	Yes
LAB (C)		Bedroom 2	1	2.94	Yes
LAB (C)	TY-14-2	Kitchen/Living/Dining	2	2.42	Yes
LAB (C)		Bedroom 1	1	2.48	Yes
LAB (C)		Bedroom 2	1	2.83	Yes
LAB (C)	TY-15-2	Kitchen/Living/Dining	2	2.14	Yes
LAB (C)		Bedroom 1	1	2.43	Yes
LAB (C)		Bedroom 2	1	2.87	Yes
LAB (C)	TY-16-2	Kitchen/Living/Dining	2	2.09	Yes
LAB (C)		Bedroom 1	1	2.29	Yes
LAB (C)	TY-17-2	Kitchen/Living/Dining	2	2.13	Yes
LAB (C)		Bedroom 1	1	2.37	Yes
LAB (C)	TY-18-2	Kitchen/Living/Dining	2	2.90	Yes
LAB (C)		Bedroom 1	1	2.16	Yes
LAB (C)		Bedroom 2	1	2.85	Yes
LAB (C)	TY-19-3	Kitchen/Living/Dining	2	3.57	Yes
LAB (C)		Bedroom 1	1	3.33	Yes
LAB (C)		Bedroom 2	1	2.51	Yes
LAB (C)	TY-12-3	Kitchen/Living/Dining	2	3.02	Yes
LAB (C)		Bedroom 1	1	2.50	Yes
LAB (C)	TY-13-3	Kitchen/Living/Dining	2	2.44	Yes
LAB (C)		Bedroom 1	1	2.50	Yes
LAB (C)		Bedroom 2	1	2.99	Yes
LAB (C)	TY-14-3	Kitchen/Living/Dining	2	2.48	Yes
LAB (C)		Bedroom 1	1	2.49	Yes
LAB (C)		Bedroom 2	1	2.98	Yes
LAB (C)	TY-15-3	Kitchen/Living/Dining	2	2.39	Yes
LAB (C)		Bedroom 1	1	2.56	Yes
LAB (C)		Bedroom 2	1	2.95	Yes
LAB (C)	TY-16-3	Kitchen/Living/Dining	2	2.76	Yes

LAB (C)		Bedroom 1	1	2.48	Yes
LAB (C)	TY-17-3	Kitchen/Living/Dining	2	2.69	Yes
LAB (C)		Bedroom 1	1	2.51	Yes
LAB (C)	TY-18-3	Kitchen/Living/Dining	2	2.94	Yes
LAB (C)		Bedroom 1	1	2.17	Yes
LAB (C)		Bedroom 2	1	2.86	Yes
LAB (D)	TY-11-1	Kitchen/Living/Dining	2	3.03	Yes
LAB (D)		Bedroom 1	1	2.69	Yes
LAB (D)	TY-12-1	Kitchen/Living/Dining	2	2.22	Yes
LAB (D)		Bedroom 1	1	2.29	Yes
LAB (D)	TY-13-1	Kitchen/Living/Dining	2	2.02	Yes
LAB (D)		Bedroom 1	1	2.46	Yes
LAB (D)		Bedroom 2	1	2.87	Yes
LAB (D)	TY-14-1	Kitchen/Living/Dining	2	2.14	Yes
LAB (D)		Bedroom 1	1	2.47	Yes
LAB (D)		Bedroom 2	1	2.81	Yes
LAB (D)	TY-15-1	Kitchen/Living/Dining	2	2.03	Yes
LAB (D)		Bedroom 1	1	2.33	Yes
LAB (D)		Bedroom 2	1	2.80	Yes
LAB (D)	TY-16-1	Kitchen/Living/Dining	2	2.06	Yes
LAB (D)		Bedroom 1	1	2.22	Yes
LAB (D)	TY-17-1	Kitchen/Living/Dining	2	2.06	Yes
LAB (D)		Bedroom 1	1	2.29	Yes
LAB (D)	TY-18-1	Kitchen/Living/Dining	2	2.35	Yes
LAB (D)		Bedroom 1	1	2.19	Yes
LAB (D)		Bedroom 2	1	2.58	Yes
LAB (D)	TY-19-2	Kitchen/Living/Dining	2	3.24	Yes
LAB (D)		Bedroom 1	1	2.99	Yes
LAB (D)		Bedroom 2	1	2.44	Yes
LAB (D)	TY-12-2	Kitchen/Living/Dining	2	2.41	Yes
LAB (D)		Bedroom 1	1	2.44	Yes
LAB (D)	TY-13-2	Kitchen/Living/Dining	2	2.13	Yes
LAB (D)		Bedroom 1	1	2.51	Yes
LAB (D)		Bedroom 2	1	2.94	Yes
LAB (D)	TY-14-2	Kitchen/Living/Dining	2	2.49	Yes
LAB (D)		Bedroom 1	1	2.48	Yes
LAB (D)		Bedroom 2	1	2.83	Yes

LAB (D)	TY-15-2	Kitchen/Living/Dining	2	2.14	Yes
LAB (D)		Bedroom 1	1	2.43	Yes
LAB (D)		Bedroom 2	1	2.87	Yes
LAB (D)	TY-16-2	Kitchen/Living/Dining	2	2.09	Yes
LAB (D)		Bedroom 1	1	2.29	Yes
LAB (D)	TY-17-2	Kitchen/Living/Dining	2	2.13	Yes
LAB (D)		Bedroom 1	1	2.37	Yes
LAB (D)	TY-18-2	Kitchen/Living/Dining	2	2.63	Yes
LAB (D)		Bedroom 1	1	2.19	Yes
LAB (D)		Bedroom 2	1	2.59	Yes
LAB (D)	TY-19-3	Kitchen/Living/Dining	2	3.67	Yes
LAB (D)		Bedroom 1	1	3.22	Yes
LAB (D)		Bedroom 2	1	2.51	Yes
LAB (D)	TY-12-3	Kitchen/Living/Dining	2	2.95	Yes
LAB (D)		Bedroom 1	1	2.50	Yes
LAB (D)	TY-13-3	Kitchen/Living/Dining	2	2.44	Yes
LAB (D)		Bedroom 1	1	2.50	Yes
LAB (D)		Bedroom 2	1	2.99	Yes
LAB (D)	TY-14-3	Kitchen/Living/Dining	2	2.51	Yes
LAB (D)		Bedroom 1	1	2.49	Yes
LAB (D)		Bedroom 2	1	2.98	Yes
LAB (D)	TY-15-3	Kitchen/Living/Dining	2	2.39	Yes
LAB (D)		Bedroom 1	1	2.56	Yes
LAB (D)		Bedroom 2	1	2.95	Yes
LAB (D)	TY-16-3	Kitchen/Living/Dining	2	2.76	Yes
LAB (D)		Bedroom 1	1	2.48	Yes
LAB (D)	TY-17-3	Kitchen/Living/Dining	2	2.69	Yes
LAB (D)		Bedroom 1	1	2.51	Yes
LAB (D)	TY-18-3	Kitchen/Living/Dining	2	2.81	Yes
LAB (D)		Bedroom 1	1	2.17	Yes
LAB (D)		Bedroom 2	1	2.86	Yes
EAB	TY-E1	Kitchen/Living/Dining	2	2.46	Yes
EAB		Bedroom 1	1	6.61	Yes
EAB		Bedroom 2	1	5.03	Yes
EAB	TY-E2	Kitchen/Living/Dining	2	2.49	Yes
EAB		Bedroom 1	1	2.40	Yes
EAB		Bedroom 2	1	3.09	Yes

EAB	TY-E3	Kitchen/Living/Dining	2	2.42	Yes
EAB		Bedroom 1	1	2.40	Yes
EAB		Bedroom 2	1	3.07	Yes
EAB	TY-E4	Kitchen/Living/Dining	2	3.50	Yes
EAB		Bedroom 1	1	3.84	Yes
EAB		Bedroom 2	1	5.06	Yes
EAB		Bedroom 3	1	3.27	Yes
EAB	TY-E1	Kitchen/Living/Dining	2	2.72	Yes
EAB		Bedroom 1	1	7.03	Yes
EAB		Bedroom 2	1	7.61	Yes
EAB	TY-E2	Kitchen/Living/Dining	2	2.99	Yes
EAB		Bedroom 1	1	2.53	Yes
EAB		Bedroom 2	1	3.41	Yes
EAB	TY-E2	Kitchen/Living/Dining	2	2.96	Yes
EAB		Bedroom 1	1	2.98	Yes
EAB		Bedroom 2	1	3.21	Yes
EAB	TY-E4	Kitchen/Living/Dining	2	5.90	Yes
EAB		Bedroom 1	1	4.21	Yes
EAB		Bedroom 2	1	5.60	Yes
EAB		Bedroom 3	1	3.42	Yes
EAB	TY-E5	Kitchen/Living/Dining	2	3.11	Yes
EAB		Bedroom 1	1	2.63	Yes
EAB		Bedroom 2	1	3.35	Yes
EAB	TY-E6	Kitchen/Living/Dining	2	5.80	Yes
EAB		Bedroom 1	1	4.46	Yes
EAB		Bedroom 2	1	3.35	Yes
EAB		Bedroom 3	1	2.66	Yes
XAB	TY-E1	Kitchen/Living/Dining	2	3.44	Yes
XAB		Bedroom 1	1	7.07	Yes
XAB		Bedroom 2	1	4.09	Yes
XAB	TY-E2	Kitchen/Living/Dining	2	2.39	Yes
XAB		Bedroom 1	1	2.52	Yes
XAB		Bedroom 2	1	3.13	Yes
XAB	TY-E3	Kitchen/Living/Dining	2	2.45	Yes
XAB		Bedroom 1	1	2.52	Yes
XAB		Bedroom 2	1	3.12	Yes
XAB	TY-E5	Kitchen/Living/Dining	2	5.07	Yes

XAB		Bedroom 1	1	4.62	Yes
XAB	TY-E6	Kitchen/Living/Dining	2	6.39	Yes
XAB		Bedroom 1	1	4.06	Yes
XAB	TY-E1-01	Kitchen/Living/Dining	2	5.07	Yes
XAB		Bedroom 1	1	7.40	Yes
XAB		Bedroom 2	1	6.27	Yes
XAB	TY-E2-01	Kitchen/Living/Dining	2	3.39	Yes
XAB		Bedroom 1	1	2.51	Yes
XAB		Bedroom 2	1	3.17	Yes
XAB	TY-E3-01	Kitchen/Living/Dining	2	3.46	Yes
XAB		Bedroom 1	1	2.53	Yes
XAB		Bedroom 2	1	3.14	Yes
XAB	TY-E5-01	Kitchen/Living/Dining	2	7.04	Yes
XAB		Bedroom 1	1	4.69	Yes
XAB	TY-E6-01	Kitchen/Living/Dining	2	8.17	Yes
XAB		Bedroom 1	1	4.33	Yes
DHB	TY-23	Kitchen/Living/Dining	2	3.26	Yes
DHB		Bedroom 1	1	2.40	Yes
DHB	TY-24	Kitchen/Living/Dining	2	2.09	Yes
DHB		Bedroom 1	1	1.58	Yes
DHB	TY-23H	Kitchen/Living/Dining	2	3.80	Yes
DHB		Bedroom 1	1	2.40	Yes
DHB	TY-24H	Kitchen/Living/Dining	2	2.09	Yes
DHB		Bedroom 1	1	1.68	Yes
DHB	TY-21	Kitchen/Living/Dining	2	3.38	Yes
DHB		Bedroom 1	1	2.30	Yes
DHB		Bedroom 2	1	4.57	Yes
DHB		Bedroom 3	1	7.70	Yes
DHB	TY-22	Kitchen/Living/Dining	2	3.30	Yes
DHB		Bedroom 1	1	5.20	Yes
DHB		Bedroom 2	1	2.24	Yes
DHB		Bedroom 3	1	1.39	Yes
DHB	TY-21H	Kitchen/Living/Dining	2	3.47	Yes
DHB		Bedroom 1	1	2.25	Yes
DHB		Bedroom 2	1	4.46	Yes
DHB		Bedroom 3	1	7.84	Yes
DHB	TY-22H	Kitchen/Living/Dining	2	2.79	Yes

DHB		Bedroom 1	1	5.51	Yes
DHB		Bedroom 2	1	2.30	Yes
DHB		Bedroom 3	1	1.27	Yes
HYB - 370	Lower GF	Kitchen/Living/Dining	2	6.60	Yes
HYB - 370	Lower GF	Bedroom 1	1	1.96	Yes
HYB - 370	Lower GF	Bedroom 2	1	3.15	Yes
HYB - 371	Upper GF	Kitchen/Dining	2	3.40	Yes
HYB - 371	Upper GF	Living Room	1.5	2.63	Yes
HYB - 371	First Floor	Bedroom 1	1	2.90	Yes
HYB - 371	First Floor	Bedroom 2	1	3.35	Yes
HYB - 371	First Floor	Bedroom 3	1	2.60	Yes
HYB - 372	Lower GF	Kitchen/Living/Dining	2	5.36	Yes
HYB - 372	Lower GF	Bedroom 1	1	1.75	Yes
HYB - 372	Lower GF	Bedroom 2	1	3.08	Yes
HYB - 373	Upper GF	Kitchen/Dining	2	3.16	Yes
HYB - 373	Upper GF	Living Room	1.5	2.62	Yes
HYB - 373	First Floor	Bedroom 1	1	2.93	Yes
HYB - 373	First Floor	Bedroom 2	1	3.33	Yes
HYB - 373	First Floor	Bedroom 3	1	2.62	Yes
HYB - 374	Lower GF	Kitchen/Living/Dining	2	5.43	Yes
HYB - 374	Lower GF	Bedroom 1	1	1.96	Yes
HYB - 374	Lower GF	Bedroom 2	1	3.15	Yes
HYB - 375	Upper GF	Kitchen/Dining	2	3.40	Yes
HYB - 375	Upper GF	Living Room	1.5	2.63	Yes
HYB - 375	First Floor	Bedroom 1	1	2.90	Yes
HYB - 375	First Floor	Bedroom 2	1	3.35	Yes
HYB - 375	First Floor	Bedroom 3	1	2.60	Yes
HYB - 376	Lower GF	Kitchen/Living/Dining	2	5.36	Yes
HYB - 376	Lower GF	Bedroom 1	1	1.72	Yes
HYB - 376	Lower GF	Bedroom 2	1	3.07	Yes
HYB - 377	Upper GF	Kitchen/Dining	2	3.16	Yes
HYB - 377	Upper GF	Living Room	1.5	2.62	Yes
HYB - 377	First Floor	Bedroom 1	1	2.93	Yes
HYB - 377	First Floor	Bedroom 2	1	3.33	Yes

HYB - 377	First Floor	Bedroom 3	1	2.62	Yes
HYB - 378	Lower GF	Kitchen/Living/Dining	2	5.43	Yes
HYB - 378	Lower GF	Bedroom 1	1	1.96	Yes
HYB - 378	Lower GF	Bedroom 2	1	3.15	Yes
HYB - 379	Upper GF	Kitchen/Dining	2	3.40	Yes
HYB - 379	Upper GF	Living Room	1.5	2.63	Yes
HYB - 379	First Floor	Bedroom 1	1	2.90	Yes
HYB - 379	First Floor	Bedroom 2	1	3.35	Yes
HYB - 379	First Floor	Bedroom 3	1	2.60	Yes
HYB - 380	Lower GF	Kitchen/Living/Dining	2	5.42	Yes
HYB - 380	Lower GF	Bedroom 1	1	1.75	Yes
HYB - 380	Lower GF	Bedroom 2	1	3.08	Yes
HYB - 381	Upper GF	Kitchen/Dining	2	3.16	Yes
HYB - 381	Upper GF	Living Room	1.5	2.62	Yes
HYB - 381	First Floor	Bedroom 1	1	2.93	Yes
HYB - 381	First Floor	Bedroom 2	1	3.33	Yes
HYB - 381	First Floor	Bedroom 3	1	2.62	Yes
HYB - 382	Lower GF	Kitchen/Living/Dining	2	5.44	Yes
HYB - 382	Lower GF	Bedroom 1	1	1.96	Yes
HYB - 382	Lower GF	Bedroom 2	1	3.15	Yes
HYB - 383	Upper GF	Kitchen/Dining	2	3.40	Yes
HYB - 383	Upper GF	Living Room	1.5	2.63	Yes
HYB - 383	First Floor	Bedroom 1	1	2.9	Yes
HYB - 383	First Floor	Bedroom 2	1	3.35	Yes
HYB - 383	First Floor	Bedroom 3	1	2.6	Yes
HYB - 384	Lower GF	Kitchen/Living/Dining	2	5.42	Yes
HYB - 384	Lower GF	Bedroom 1	1	1.75	Yes
HYB - 384	Lower GF	Bedroom 2	1	3.08	Yes
HYB - 385	Upper GF	Kitchen/Dining	2	3.16	Yes
HYB - 385	Upper GF	Living Room	1.5	2.62	Yes
HYB - 385	First Floor	Bedroom 1	1	2.93	Yes
HYB - 385	First Floor	Bedroom 2	1	3.33	Yes
HYB - 385	First Floor	Bedroom 3	1	2.62	Yes

HYB - 386	Lower GF	Kitchen/Living/Dining	2	5.44	Yes
HYB - 386	Lower GF	Bedroom 1	1	1.96	Yes
HYB - 386	Lower GF	Bedroom 2	1	3.15	Yes
HYB - 387	Upper GF	Kitchen/Dining	2	3.40	Yes
HYB - 387	Upper GF	Living Room	1.5	2.63	Yes
HYB - 387	First Floor	Bedroom 1	1	2.90	Yes
HYB - 387	First Floor	Bedroom 2	1	3.35	Yes
HYB - 387	First Floor	Bedroom 3	1	2.60	Yes
HYB - 388	Lower GF	Kitchen/Living/Dining	2	5.42	Yes
HYB - 388	Lower GF	Bedroom 1	1	1.75	Yes
HYB - 388	Lower GF	Bedroom 2	1	3.08	Yes
HYB - 389	Upper GF	Kitchen/Dining	2	3.16	Yes
HYB - 389	Upper GF	Living Room	1.5	2.62	Yes
HYB - 389	First Floor	Bedroom 1	1	2.93	Yes
HYB - 389	First Floor	Bedroom 2	1	3.33	Yes
HYB - 389	First Floor	Bedroom 3	1	2.62	Yes
HYB - 390	Lower GF	Kitchen/Living/Dining	2	5.30	Yes
HYB - 390	Lower GF	Bedroom 1	1	1.96	Yes
HYB - 390	Lower GF	Bedroom 2	1	3.15	Yes
HYB - 391	Upper GF	Kitchen/Dining	2	3.05	Yes
HYB - 391	Upper GF	Living Room	1.5	2.63	Yes
HYB - 391	First Floor	Bedroom 1	1	2.90	Yes
HYB - 391	First Floor	Bedroom 2	1	3.35	Yes
HYB - 391	First Floor	Bedroom 3	1	2.60	Yes
HYB - 392	Lower GF	Kitchen/Living/Dining	2	6.38	Yes
HYB - 392	Lower GF	Bedroom 1	1	1.75	Yes
HYB - 392	Lower GF	Bedroom 2	1	3.08	Yes
HYB - 393	Upper GF	Kitchen/Dining	2	3.25	Yes
HYB - 393	Upper GF	Living Room	1.5	2.62	Yes
HYB - 393	First Floor	Bedroom 1	1	2.93	Yes
HYB - 393	First Floor	Bedroom 2	1	3.33	Yes
HYB - 393	First Floor	Bedroom 3	1	2.62	Yes
HYB - 394	Lower GF	Kitchen/Living/Dining	2	6.32	Yes
HYB - 394	Lower GF	Bedroom 1	1	1.96	Yes

HYB - 394	Lower GF	Bedroom 2	1	3.15	Yes
HYB - 395	Upper GF	Kitchen/Dining	2	3.40	Yes
HYB - 395	Upper GF	Living Room	1.5	2.63	Yes
HYB - 395	First Floor	Bedroom 1	1	2.90	Yes
HYB - 395	First Floor	Bedroom 2	1	3.35	Yes
HYB - 395	First Floor	Bedroom 3	1	2.60	Yes
HYB - 396	Lower GF	Kitchen/Living/Dining	2	5.28	Yes
HYB - 396	Lower GF	Bedroom 1	1	1.75	Yes
HYB - 396	Lower GF	Bedroom 2	1	3.08	Yes
HYB - 397	Upper GF	Kitchen/Dining	2	3.26	Yes
HYB - 397	Upper GF	Living Room	1.5	2.62	Yes
HYB - 397	First Floor	Bedroom 1	1	2.93	Yes
HYB - 397	First Floor	Bedroom 2	1	3.33	Yes
HYB - 397	First Floor	Bedroom 3	1	2.62	Yes
HYB - 398	Lower GF	Kitchen/Living/Dining	2	5.37	Yes
HYB - 398	Lower GF	Bedroom 1	1	1.96	Yes
HYB - 398	Lower GF	Bedroom 2	1	3.15	Yes
HYB - 399	Upper GF	Kitchen/Dining	2	3.03	Yes
HYB - 399	Upper GF	Living Room	1.5	2.63	Yes
HYB - 399	First Floor	Bedroom 1	1	2.90	Yes
HYB - 399	First Floor	Bedroom 2	1	3.35	Yes
HYB - 399	First Floor	Bedroom 3	1	2.6	Yes
HYB - 400	Lower GF	Kitchen/Living/Dining	2	5.28	Yes
HYB - 400	Lower GF	Bedroom 1	1	1.75	Yes
HYB - 400	Lower GF	Bedroom 2	1	3.08	Yes
HYB - 401	Upper GF	Kitchen/Dining	2	3.01	Yes
HYB - 401	Upper GF	Living Room	1.5	2.62	Yes
HYB - 401	First Floor	Bedroom 1	1	2.93	Yes
HYB - 401	First Floor	Bedroom 2	1	3.33	Yes
HYB - 401	First Floor	Bedroom 3	1	2.62	Yes
HYB - 402	Lower GF	Kitchen/Living/Dining	2	5.09	Yes
HYB - 402	Lower GF	Bedroom 1	1	1.96	Yes
HYB - 402	Lower GF	Bedroom 2	1	3.15	Yes
HYB - 403	Upper GF	Kitchen/Dining	2	2.93	Yes

HYB - 403	Upper GF	Living Room	1.5	2.63	Yes
HYB - 403	First Floor	Bedroom 1	1	2.90	Yes
HYB - 403	First Floor	Bedroom 2	1	3.35	Yes
HYB - 403	First Floor	Bedroom 3	1	2.60	Yes
HYB - 404	Lower GF	Kitchen/Living/Dining	2	4.92	Yes
HYB - 404	Lower GF	Bedroom 1	1	1.75	Yes
HYB - 404	Lower GF	Bedroom 2	1	3.08	Yes
HYB - 405	Upper GF	Kitchen/Dining	2	2.88	Yes
HYB - 405	Upper GF	Living Room	1.5	2.62	Yes
HYB - 405	First Floor	Bedroom 1	1	2.93	Yes
HYB - 405	First Floor	Bedroom 2	1	3.33	Yes
HYB - 405	First Floor	Bedroom 3	1	2.62	Yes
HYB - 406	Lower GF	Kitchen/Living/Dining	2	4.88	Yes
HYB - 406	Lower GF	Bedroom 1	1	1.96	Yes
HYB - 406	Lower GF	Bedroom 2	1	3.15	Yes
HYB - 407	Upper GF	Kitchen/Dining	2	2.78	Yes
HYB - 407	Upper GF	Living Room	1.5	2.63	Yes
HYB - 407	First Floor	Bedroom 1	1	2.90	Yes
HYB - 407	First Floor	Bedroom 2	1	3.35	Yes
HYB - 407	First Floor	Bedroom 3	1	2.60	Yes
HYB - 408	Lower GF	Kitchen/Living/Dining	2	5.94	Yes
HYB - 408	Lower GF	Bedroom 1	1	1.75	Yes
HYB - 408	Lower GF	Bedroom 2	1	3.08	Yes
HYB - 409	Upper GF	Kitchen/Dining	2	2.79	Yes
HYB - 409	Upper GF	Living Room	1.5	2.62	Yes
HYB - 409	First Floor	Bedroom 1	1	2.93	Yes
HYB - 409	First Floor	Bedroom 2	1	3.33	Yes
HYB - 409	First Floor	Bedroom 3	1	2.62	Yes
HYB - 410	Lower GF	Kitchen/Living/Dining	2	6.06	Yes
HYB - 410	Lower GF	Bedroom 1	1	1.96	Yes
HYB - 410	Lower GF	Bedroom 2	1	3.15	Yes
HYB - 411	Upper GF	Kitchen/Dining	2	3.16	Yes
HYB - 411	Upper GF	Living Room	1.5	2.63	Yes
HYB - 411	First Floor	Bedroom 1	1	2.90	Yes

HYB - 411	First Floor	Bedroom 2	1	3.35	Yes
HYB - 411	First Floor	Bedroom 3	1	2.60	Yes
HYB - 412	Lower GF	Kitchen/Living/Dining	2	4.84	Yes
HYB - 412	Lower GF	Bedroom 1	1	1.75	Yes
HYB - 412	Lower GF	Bedroom 2	1	3.08	Yes
HYB - 413	Upper GF	Kitchen/Dining	2	2.85	Yes
HYB - 413	Upper GF	Living Room	1.5	2.62	Yes
HYB - 413	First Floor	Bedroom 1	1	2.93	Yes
HYB - 413	First Floor	Bedroom 2	1	3.33	Yes
HYB - 413	First Floor	Bedroom 3	1	2.62	Yes
HYB - 414	Lower GF	Kitchen/Living/Dining	2	4.91	Yes
HYB - 414	Lower GF	Bedroom 1	1	1.96	Yes
HYB - 414	Lower GF	Bedroom 2	1	3.15	Yes
HYB - 415	Upper GF	Kitchen/Dining	2	2.77	Yes
HYB - 415	Upper GF	Living Room	1.5	2.63	Yes
HYB - 415	First Floor	Bedroom 1	1	2.90	Yes
HYB - 415	First Floor	Bedroom 2	1	3.35	Yes
HYB - 415	First Floor	Bedroom 3	1	2.60	Yes
HYB - 416	Lower GF	Kitchen/Living/Dining	2	4.70	Yes
HYB - 416	Lower GF	Bedroom 1	1	1.75	Yes
HYB - 416	Lower GF	Bedroom 2	1	3.08	Yes
HYB - 417	Upper GF	Kitchen/Dining	2	2.67	Yes
HYB - 417	Upper GF	Living Room	1.5	2.62	Yes
HYB - 417	First Floor	Bedroom 1	1	2.93	Yes
HYB - 417	First Floor	Bedroom 2	1	3.33	Yes
HYB - 417	First Floor	Bedroom 3	1	2.62	Yes
HYB - 418	Lower GF	Kitchen/Living/Dining	2	4.74	Yes
HYB - 418	Lower GF	Bedroom 1	1	1.70	Yes
HYB - 418	Lower GF	Bedroom 2	1	2.81	Yes
HYB - 419	Upper GF	Kitchen/Dining	2	2.79	Yes
HYB - 419	Upper GF	Living Room	1.5	2.44	Yes
HYB - 419	First Floor	Bedroom 1	1	2.57	Yes
HYB - 419	First Floor	Bedroom 2	1	3.33	Yes
HYB - 419	First Floor	Bedroom 3	1	2.60	Yes

HYB - 420	Lower GF	Kitchen/Living/Dining	2	6.12	Yes
HYB - 420	Lower GF	Bedroom 1	1	2.33	Yes
HYB - 420	Lower GF	Bedroom 2	1	2.69	Yes
HYB - 421	Upper GF	Kitchen/Dining	2	3.07	Yes
HYB - 421	Upper GF	Living Room	1.5	2.45	Yes
HYB - 421	First Floor	Bedroom 1	1	2.68	Yes
HYB - 421	First Floor	Bedroom 2	1	3.56	Yes
HYB - 421	First Floor	Bedroom 3	1	2.65	Yes

Table 2: Blocks EAB, XAB, LAB & MAB, DHB, HYB – ADF Results

5. Sunlight on Proposed Development and Existing Properties

BRE Guidelines (2011) recommend that for external amenity spaces to appear adequately sunlit throughout the year, at least half of the garden or amenity space should receive a minimum two hours of sunlight on March 21st.

In order to show that sunlight levels for existing adjacent dwellings have not been negatively impacted by the proposed development insofar as to reduce the levels of sunlight to an unsatisfactory level as well as the impact within the proposed development, a sunlight study has been carried out using IES VE SunCast.

5.1 Sunlight on Amenity Areas – Proposed Development & Existing Properties

Figure 13: Overview of Amenity Spaces within the Proposed Development

The BRE report provides guidance on the accumulation of the hourly sunshine that will reach these amenity areas on the 21st of March (spring equinox). The threshold identified by BRE is that at least 50% of an amenity area will receive at least 2 hours of direct sunlight on the 21st of March. It is evident from Figures 14 that at least 50% of each amenity space and garden to existing properties receive 2 hours or more of sunlight on March 21st, therefore complies with BRE recommendations.

Figure 14: Overview of Sunlight Hours to Amenity Spaces & Existing Rear Gardens on March 21st (Source IES VE SunCast)

Note: Refer to Figure 33 to 40 of the Appendix for additional Sunlight Hour illustrations. <More than 50% greats than 2 hours.

6. Impact on Adjacent Existing Properties

The BRE guidance report suggests that analyses of the impact of new developments on existing adjacent properties should be considered. In order to assess the potential impacts of a new structure the report identifies a number of conditions that can be assessed, to determine if further detailed numerical daylight analysis is required.

The guidance suggests that if either of the following criteria are met that the development can be deemed to have no discernible impact on the daylight levels of the existing building.

- If the distance of each part of the new development is three or more times greater than its height above the midpoint of the of a window in the existing property or
- If the angle from the horizontal between the mid pane of a window of the existing dwelling and the highest point of the new structure is less than 25 degrees

All the apartment buildings on the site are a considerable distance from the site boundary and the from the neighbouring properties. This would give confidence that the proposed development will have a negligible impact on the neighbouring properties, however, a modelling exercise has still been undertaken to confirm this.

Each of the properties, labelled A to K on the map below have been assessed to determine the impacts of the proposed development. The following metrics were used

- Visible Sky Component
- Annual Probable Sunlight Hours
- Access to Sunlight in Existing Gardens
- Shadow Analysis

Figure 15: Overview of Existing Properties adjacent to the Proposed Development

Note: Label X is an existing Service Station & Garage

6.1 Daylight/Sunlight Impact on Surrounding Properties

Due to the low-rise nature of the development the impact on the surrounding existing dwellings is expected to be minimal.

However, on review of the local topography, a significant variation in levels was identified and it was decided that further analysis was warranted. Since it was not possible to gather accurate information on the internal layouts of the neighbouring properties or on the extent of glazing on the relevant elevations of these properties, glazing was added to the model of these buildings based on reasonable assumptions. This glazing is then used as a "receptor" within the model to measure the amount of daylight and/or sunlight that is incident on the elevation of the existing dwelling in both the "before" and "after" scenario

6.1.1 Vertical Sky Component (VSC) > 80% of its former value

When comparing the VSC of the permitted or the proposed scenarios to the existing site, a daylight impact to the existing properties and proposed development is identified. When comparing the current VSC for each dwelling and the impact of the proposed development, all selected windows show compliance with the VSC method by achieving ≥80% of its former value, therefore no further impact will be perceived over the permitted development.

Note: Glazing geometry to the rear of the existing dwelling were assumed for the purpose generating the results indicated below.

Property	IES Receptor Reference	VSC of Receptor		Impact of Proposed development on baseline VSC (Target <20%)	Meets BRE Guidelines
		Baseline	Proposed		
Existing Dwelling A	1	39.51	38.50	2.62	Yes
	2	37.11	36.33	2.15	Yes
	3	35.71	34.76	2.73	Yes
	4	39.76	39.07	1.77	Yes
Existing Dwelling B	5	39.91	38.51	3.64	Yes
	6	40.00	39.12	2.25	Yes
	7	37.36	36.69	1.83	Yes
	8	27.98	26.84	4.25	Yes
Existing Dwelling C	9	39.42	37.30	5.68	Yes
	10	39.61	37.19	6.51	Yes
	11	39.81	38.19	4.24	Yes
	12	39.52	38.27	3.27	Yes
	13	39.70	38.24	3.82	Yes
Existing Dwelling D	14	30.42	29.29	3.86	Yes
	15	39.72	38.87	2.19	Yes
	16	39.78	39.17	1.56	Yes
	17	38.50	38.31	0.50	Yes

	18	38.88	38.74	0.36	Yes
	19	39.35	37.75	4.24	Yes
	20	39.49	38.18	3.43	Yes
	21	39.98	38.20	4.66	Yes
	22	35.32	34.90	1.20	Yes
	23	38.84	38.35	1.28	Yes
	24	38.41	37.88	1.40	Yes
	25	38.91	38.06	2.23	Yes
	26	38.37	38.20	0.44	Yes
	27	38.86	38.11	1.97	Yes
	28	38.62	38.09	1.39	Yes
	29	38.73	38.11	1.63	Yes
Existing Dwelling E	30	37.97	37.11	2.32	Yes
	31	36.94	36.78	0.44	Yes
	32	39.38	37.59	4.76	Yes
	33	39.33	38.10	3.23	Yes
	34	36.14	31.12	16.13	Yes
	35	39.50	34.13	15.73	Yes
	36	39.61	34.91	13.46	Yes
	37	39.63	35.42	11.89	Yes
	38	32.78	31.73	3.31	Yes
	39	39.05	36.31	7.55	Yes
Existing Dwelling F	40	39.62	39.03	1.51	Yes
	41	39.72	39.15	1.46	Yes
	42	39.82	39.54	0.71	Yes
	43	39.96	39.66	0.75	Yes
	44	39.58	37.26	6.23	Yes
	45	39.50	37.42	5.56	Yes
	46	39.17	37.54	4.34	Yes
Existing Dwelling G	47	39.58	39.37	0.53	Yes
	48	39.91	39.81	0.25	Yes
	49	39.39	39.22	0.43	Yes
	50	39.76	38.41	3.51	Yes
	51	39.41	38.70	1.83	Yes
	52	38.96	38.10	2.26	Yes
	53	40.05	38.91	2.93	Yes
	54	39.93	39.03	2.31	Yes
	55	39.96	38.75	3.12	Yes
	56	39.97	39.18	2.02	Yes
	57	39.97	39.26	1.81	Yes
Existing Dwelling H	58	39.10	38.26	2.20	Yes
	59	39.25	38.71	1.39	Yes
	60	39.62	38.55	2.78	Yes

	61	38.56	38.48	0.21	Yes
Existing Dwelling I	62	33.60	32.55	3.23	Yes
	63	29.45	28.58	3.04	Yes
	64	39.96	37.00	8.00	Yes
	65	39.97	37.53	6.50	Yes
	66	29.21	27.54	6.06	Yes
	67	35.25	33.69	4.63	Yes
Existing Dwelling J	68	39.36	37.20	5.81	Yes
	69	39.05	37.54	4.02	Yes
Existing Dwelling K	70	39.52	39.23	0.74	Yes
	71	39.71	38.17	4.03	Yes
	72	39.40	38.34	2.76	Yes
	73	35.14	33.65	4.43	Yes

Table 3: Existing Property VSC Results

Note: Refer to Appendix Figures 41 to 51 for Receptor ID.

6.1.2 Annual Probable Sunlight Hours

Annual probable sunlight hours (APSH) is a measure of sunlight a given window may expect over the period of a one year. The BRE guidance recognises that sunlight is heavily influenced by orientation with north facing windows receiving significantly less sunlight than south facing windows throughout the year with eastwards or westwards windows receiving sunlight at certain points of each day.

The existing adjacent dwellings have a mixture of northerly and southerly glazing. The table below identifies each existing dwellings APSH prior to the development and the subsequent impact of the development.

If the assessment point of a window can receive more than 25% of APSH, including at least 5% of APSH in the winter months, then the room should receive enough sunlight.

When measuring the effect a proposed development will have on the APSH of an existing window, if the APSH value drops below the annual (25%) or winter (5%) guidelines. If the available sunlight the available sunlight hours are both less than the annual and winter BRE guidelines and less than 0.8 times their former value then the occupants of the existing dwelling will notice a loss of sunlight or if the overall annual loss is greater than 4% of ASPH, the room may appear colder and less pleasant.

Note: Glazing geometry of the existing dwellings were assumed for the purpose generating the results indicated below.

Property	Receptor Orientation	APSH of Receptor				Impact of Proposed extension on existing ASPH (Target <20%)		Impact of Proposed Development meet BRE Guidelines
		Annual APSH (Target >25%)		Winter APSH (Target <5%)				
		Baseline	Proposed	Baseline	Propose	Annual	Winter	
Existing Dwelling A	NW	14.88	14.88	0.69	0.69	0%	0%	No
	NE	12.50	11.21	0.78	0.71	11.50	9.85%	No
Existing Dwelling B	NW	19.43	19.43	2.07	2.07	0%	0%	No
	NE	21.39	21.39	1.93	1.93	0%	0%	Yes
Existing Dwelling C	NE	11.17	11.17	0.31	0.31	0%	0%	No
	NW	10.68	10.68	0.16	0.16	0%	0%	No
	SW	44.35	41.60	17.90	17.25	6.61%	3.76%	Yes
Existing Dwelling D	NW	17.64	17.64	2.07	2.07	0%	0%	No
Existing Dwelling E	NE	16.12	15.56	1.07	0.98	3.59%	9.18%	No
	NW	10.26	10.26	2.45	2.45	0%	0%	No
Existing Dwelling F	NW	18.86	17.54	2.18	2.01	5.81%	8.45%	No
Existing Dwelling G	SW	60.63	59.94	25.46	25.46	1.15%	0%	Yes
Existing Dwelling H	SW	49.12	46.90	17.67	17.67	4.73%	0%	Yes
Existing Dwelling I	SW	42.80	41.40	16.68	16.24	3.38%	2.71%	Yes
Existing Dwelling J	SW	73.26	70.50	34.84	32.08	3.91%	8.60%	Yes
Existing Dwelling K	SW	67.33	66.78	34.94	34.40	0.82%	1.57%	Yes

Table 4: Existing Property APSH Results

7. Overshadowing on the Proposed Development & Existing Dwellings

The overshadowing impact within the proposed development and to existing dwellings has been analysed. The impacts caused by overshadowing are generally most noticeable during the summer months and least noticeable during the winter months.

7.1 Proposed Development & Existing Dwellings

The overshadowing images illustrate the impact on the proposed development and adjacent existing dwellings during the Spring Equinox - March 21st, Summer Solstice – June 21st, Autumn Equinox - September 21st and Winter Solstice - December 21st at 7am, 10am, 2pm and 6pm.

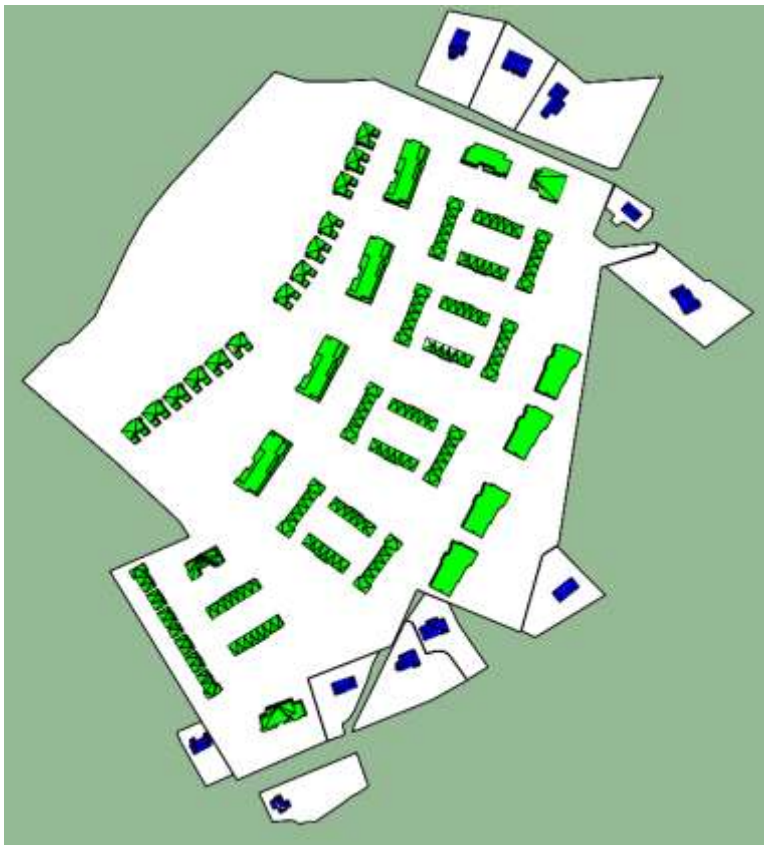

Figure 16: Proposed Development & Existing Dwellings Overview (Source IES VE model)

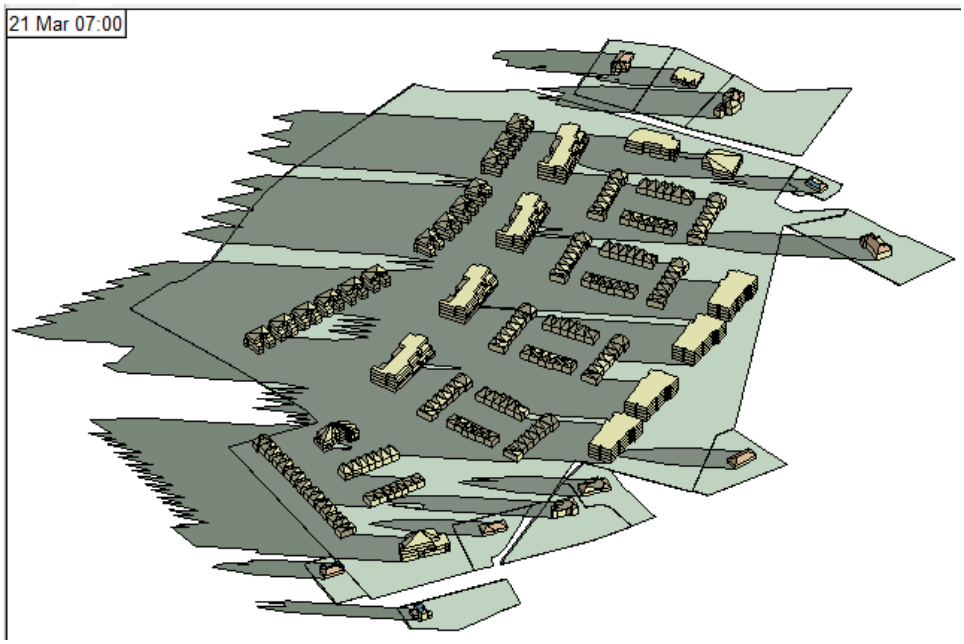

Figure 17: Overshadowing image on March 21st at 7am (Source IES VE model)

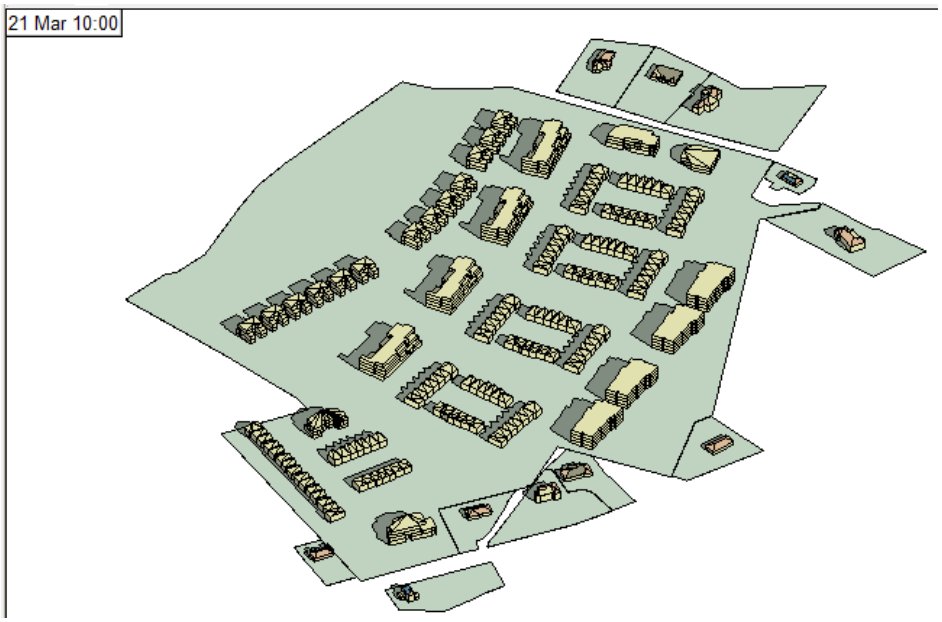

Figure 18: Overshadowing image on March 21st at 10am (Source IES VE model)

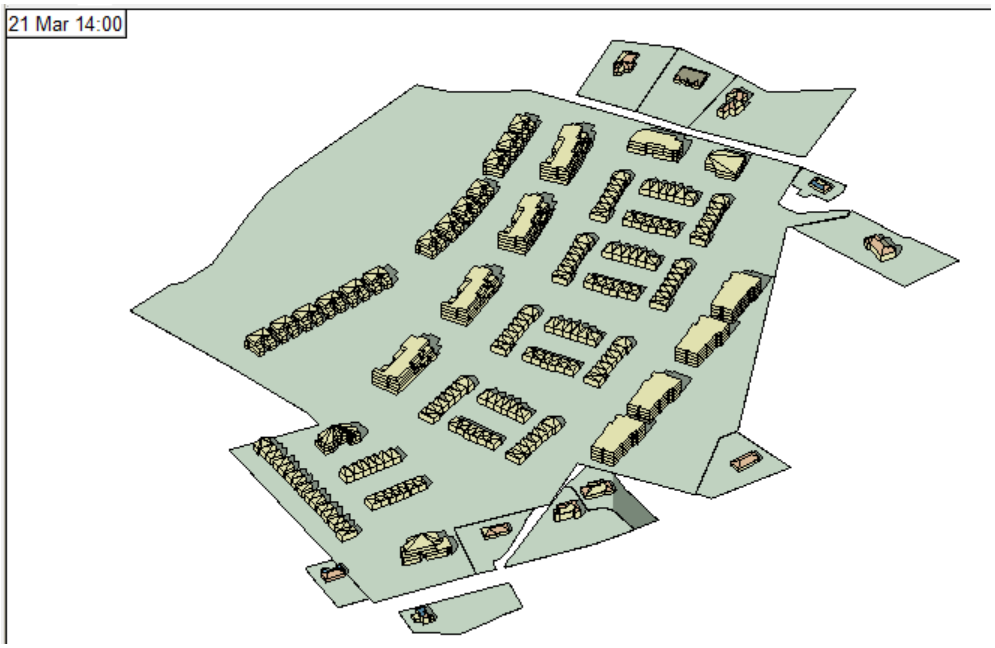

Figure 19: Overshadowing image on March 21st at 2pm (Source IES VE model)

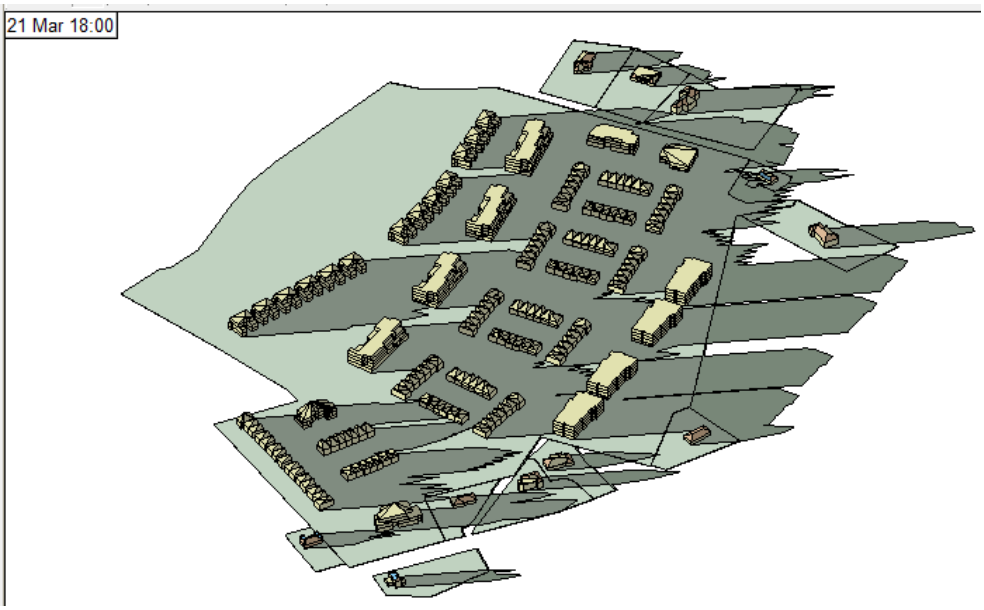

Figure 20: Overshadowing image on March 21st at 6pm (Source IES VE model)

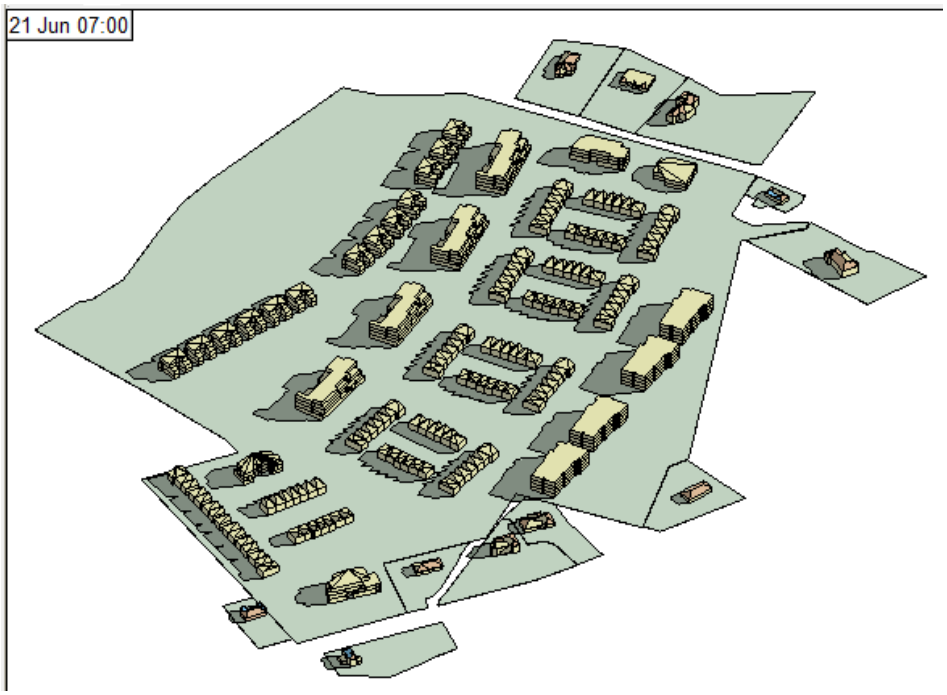

Figure 21: Overshadowing image on June 21st at7am (Source IES VE model)

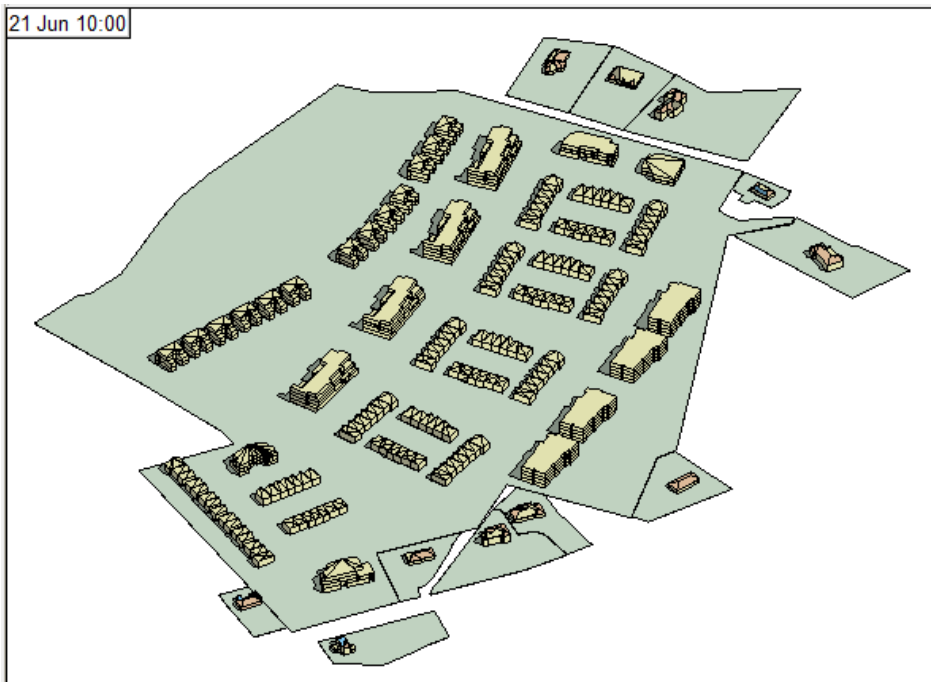

Figure 22: Overshadowing image on June 21st at 10am (Source IES VE model)

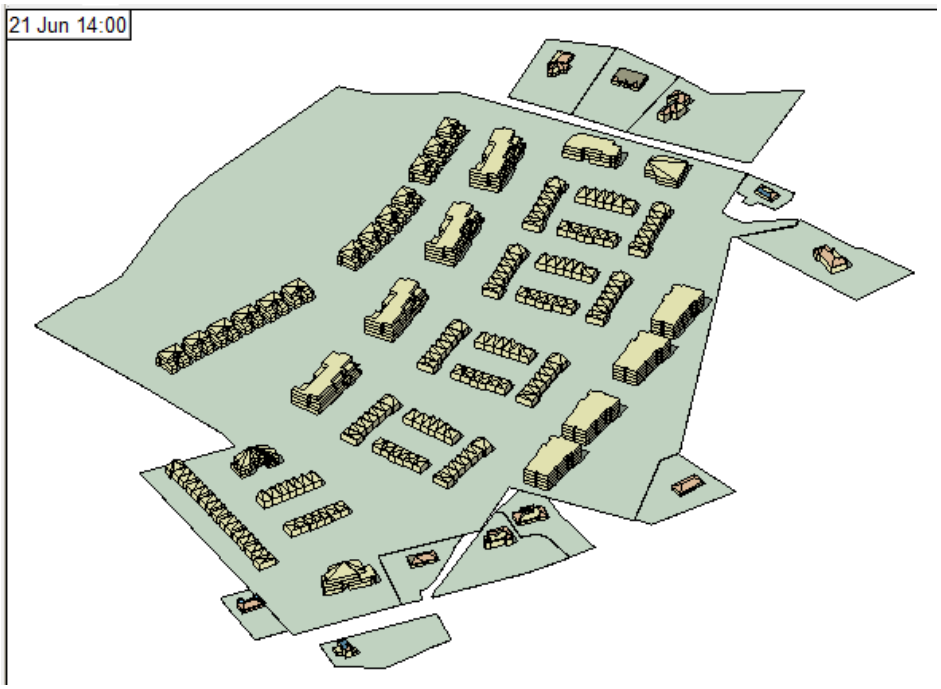

Figure 23: Overshadowing image on June 21st at 2pm (Source IES VE model)

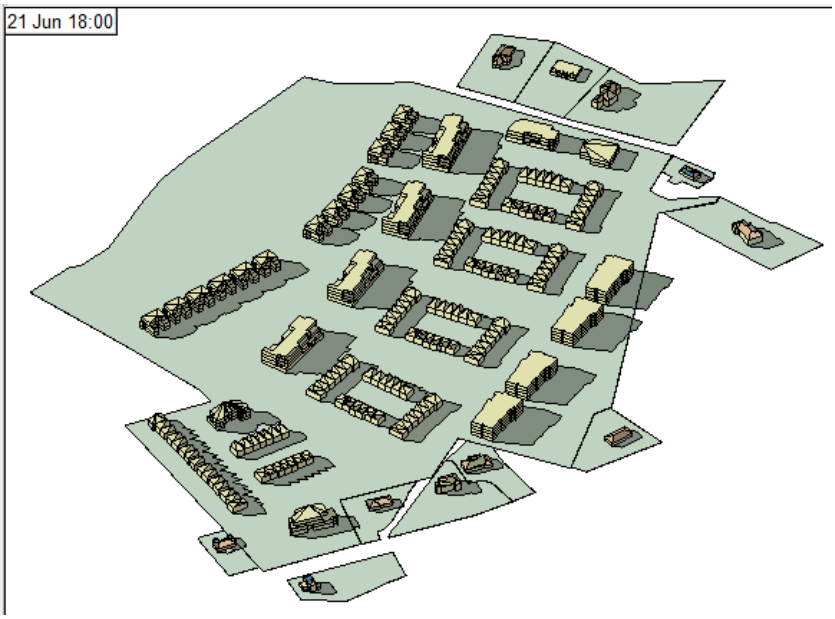

Figure 24: Overshadowing image on June 21st at 6pm (Source IES VE model)

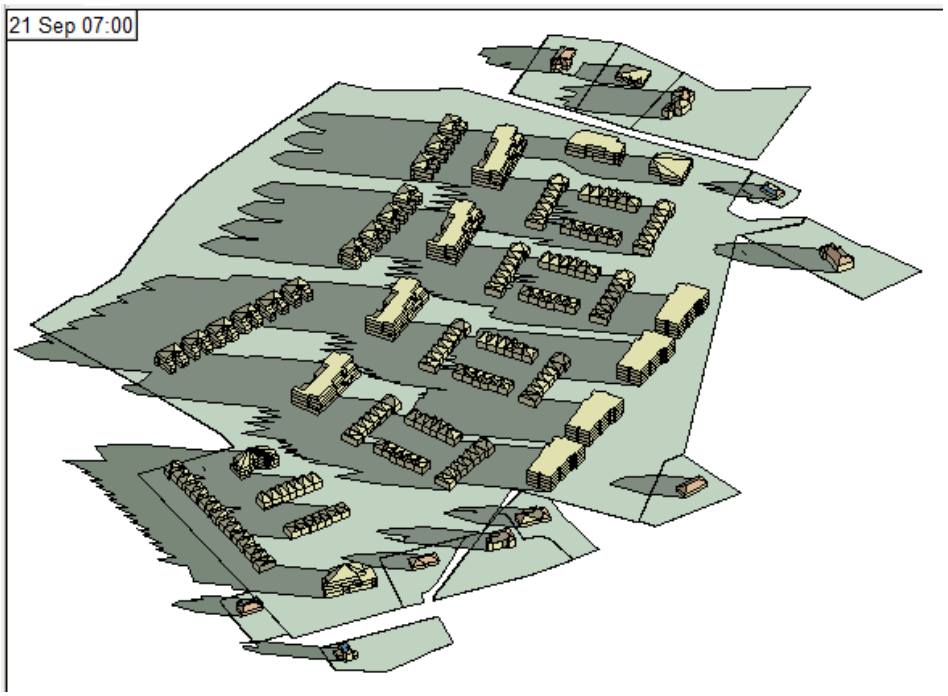

Figure 25: Overshadowing image on September 21st at 7am (Source IES VE model)

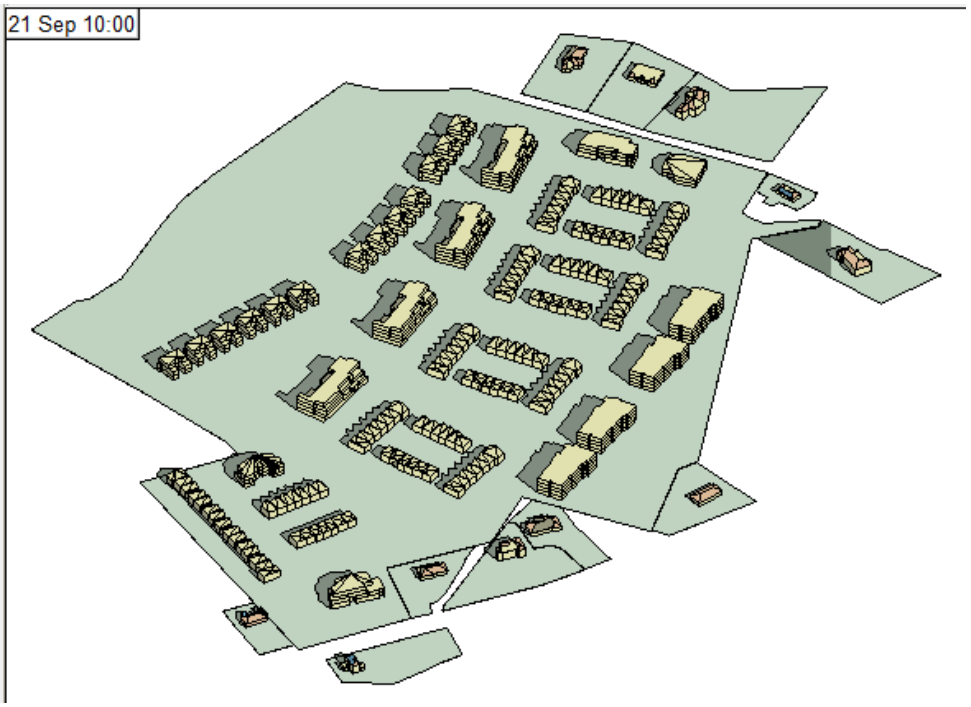

Figure 26: Overshadowing image on September 21st at 10am (Source IES VE model)

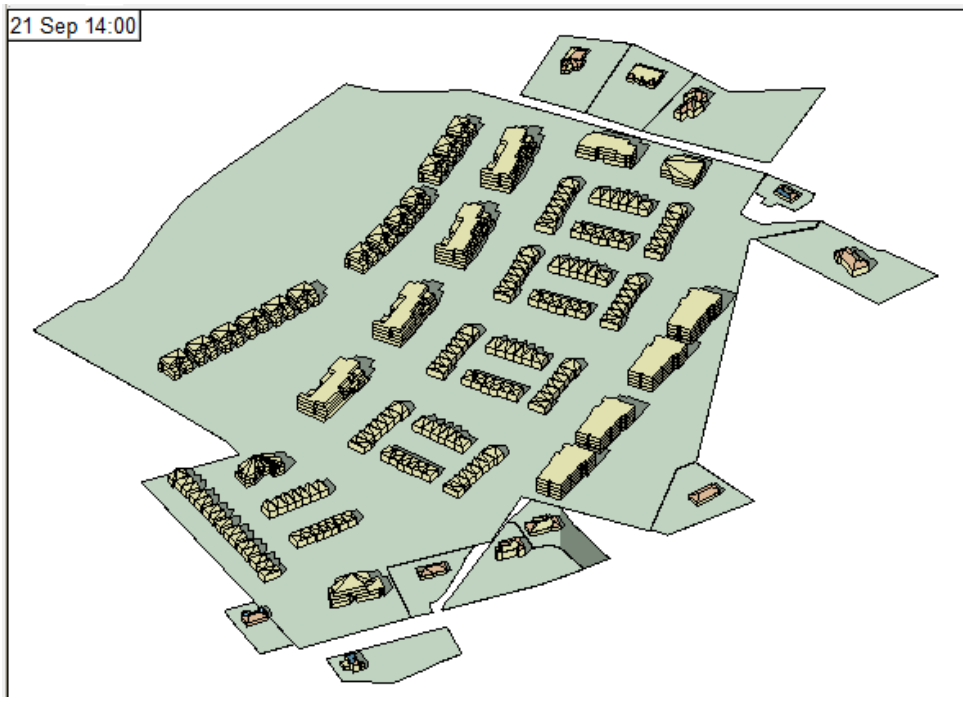

Figure 27: Overshadowing image on September 21st at 2pm (Source IES VE model)

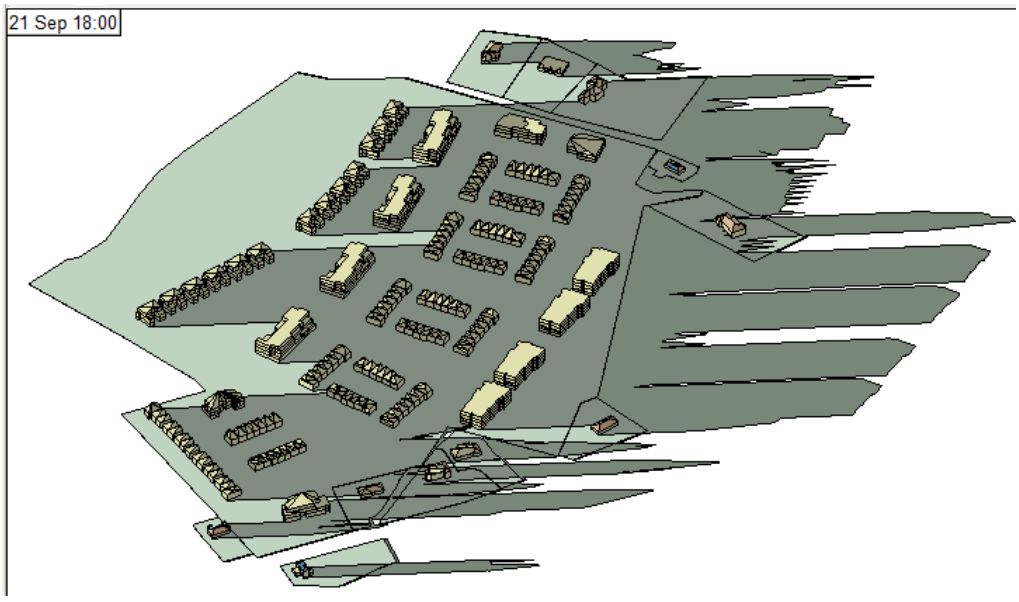

Figure 28: Overshadowing image on September 21st at 6pm (Source IES VE model)

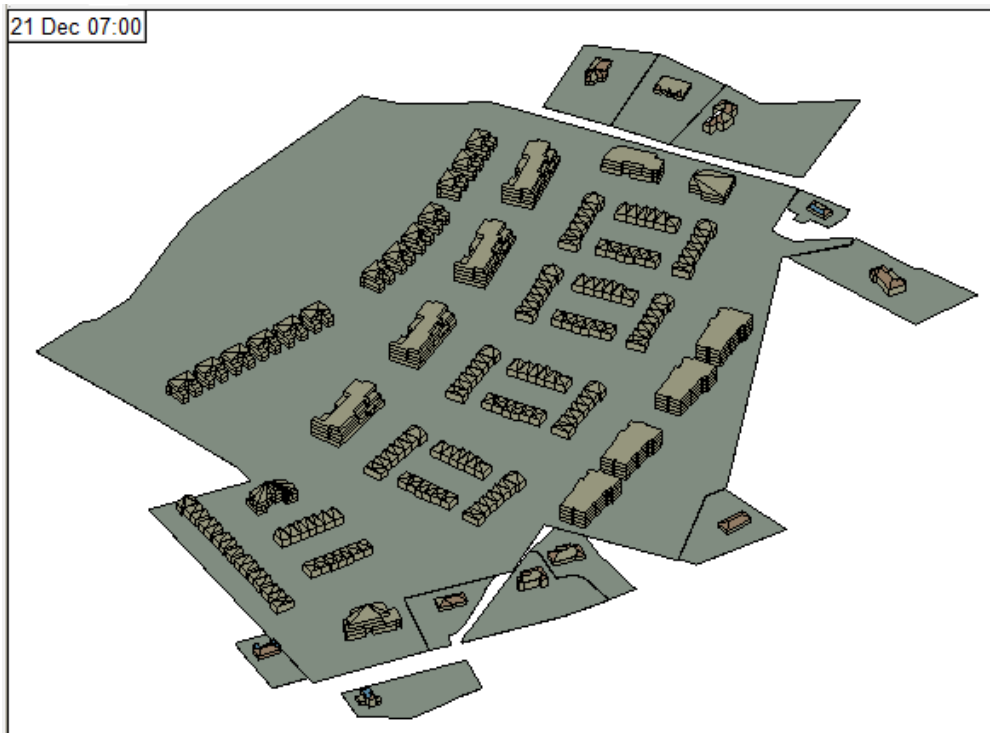

Figure 29: Overshadowing image on December 21st at 7am (Source IES VE model)

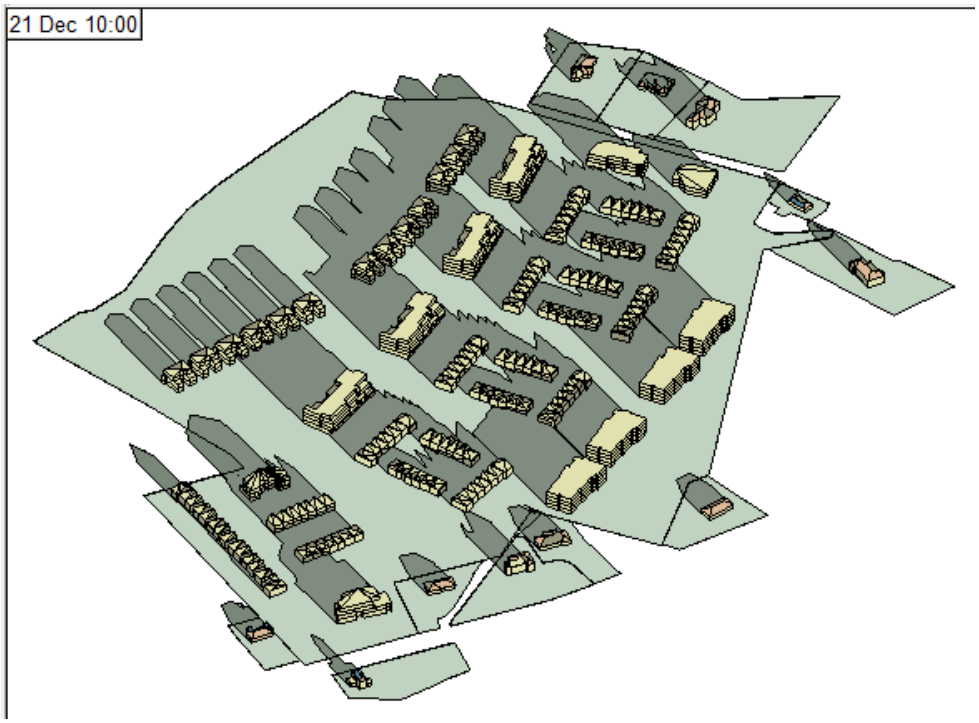

Figure 30: Overshadowing image on December 21st at 10am (Source IES VE model)

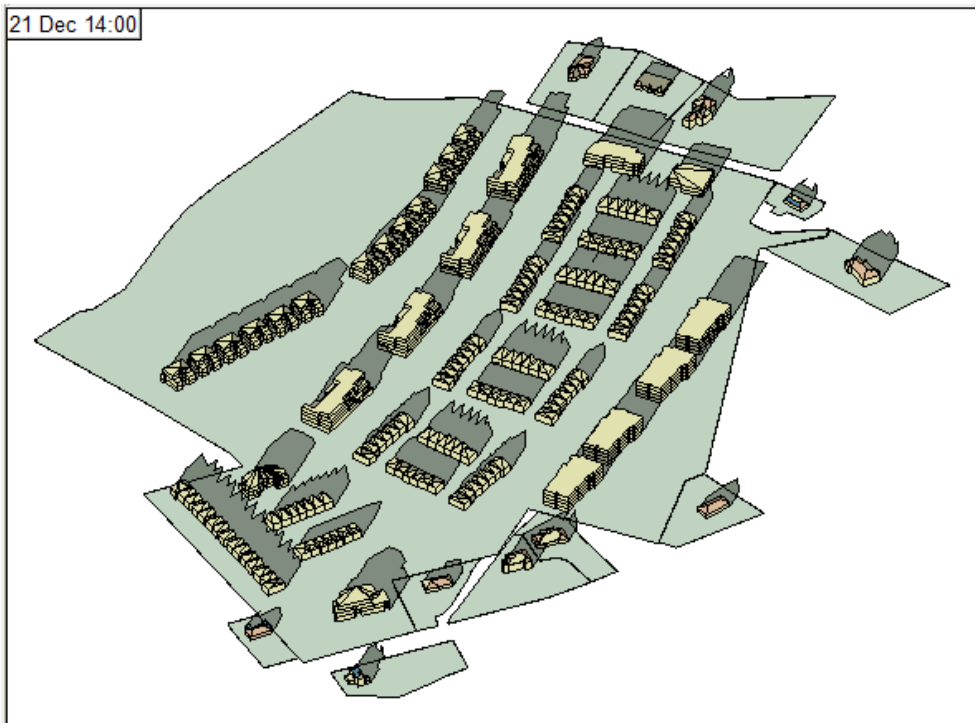

Figure 31: Overshadowing image on December 21st at 2pm (Source IES VE model)

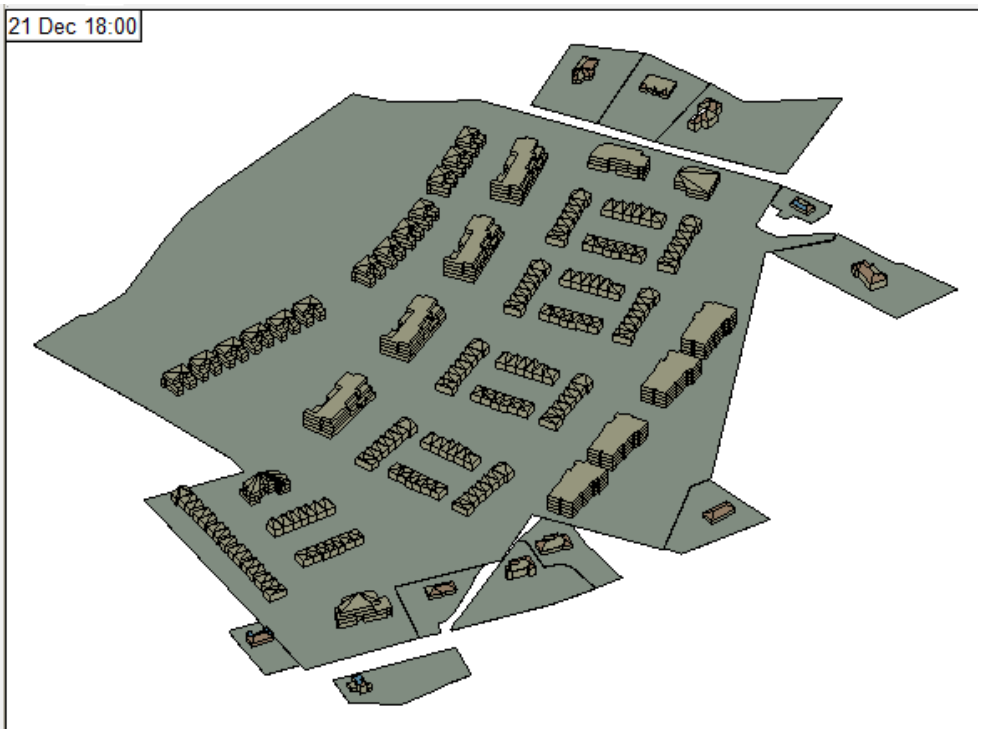

Figure 32: Overshadowing image on December 21st at 6pm (Source IES VE model)

8. Conclusion

The proposed development at Kilnahue, Gorey, Co. Wexford has been analysed in order to determine the following:

- The daylight levels within the living, kitchen/dining and bedroom areas for each apartment and duplex block, to give an indication of the expected daylight levels throughout the proposed development.
- The quality of the amenity spaces, being provided as part of the development, in relation to sunlight.
- The potential overshadowing within the proposed development.
- The impact to the existing dwellings surrounding the proposed development in relation to the impact on sunlight and potential overshadowing.

Internal Daylight

The analysis in section 4.2.2 confirms that the Average Daylight Factor in all kitchens, living, dining and bedrooms areas modelled across the entire development show levels of compliance with the BRE recommendations.

- The living/kitchen/dining areas across the scheme demonstrate levels of average daylight above the BRE recommended 2% average daylight factor with 100% of the kitchen/living/dining spaces achieving compliance.
- The bedrooms across the entire scheme demonstrate levels of average daylight above the BRE recommended 1% average daylight factor with 100% of the bedrooms achieving compliance.
- Overall, across the proposed scheme, 100% of the spaces analysed in the Apartment Blocks and Duplex Blocks demonstrate compliance with the BRE recommendations for average daylighting levels.

Sunlight on Proposed Development

In relation to the amenity areas within the proposed development the Sunlight analysis has shown that at least 2 hours of sunlight is achieved on March 21st on at least 50% of the amenity areas therefore complying with BRE Guidelines.

Impact on surrounding properties

The VSC analysis demonstrates that the proposed development has no significant daylight impact to existing adjacent dwellings,

Annual Probable Sunlight Hours

The annual probable sunlight hour assessment of neighbouring properties achieved the minimum BRE recommended values prior to the proposed development will still meet the BRE recommended values once the development is built.

Sunlight on Existing Properties

In relation to the neighbouring properties the Sunlight analysis has shown that at least 2 hours of sunlight is achieved on March 21st on at least 50% of the garden areas therefore complying with BRE Guidelines.

Overshadowing

The Overshadowing analysis identifies shadows being cast on the existing properties and proposed development during the Spring Equinox - March 21st, Summer Solstice – June 21st, Autumn Equinox - September 21st and Winter Solstice - December 21st at 7am, 10am, 2pm and 6pm. Due to the proximity of the proposed apartment blocks within the development to the existing properties the overshadowing impact from the development onto the existing properties is minimal.

9. Appendix

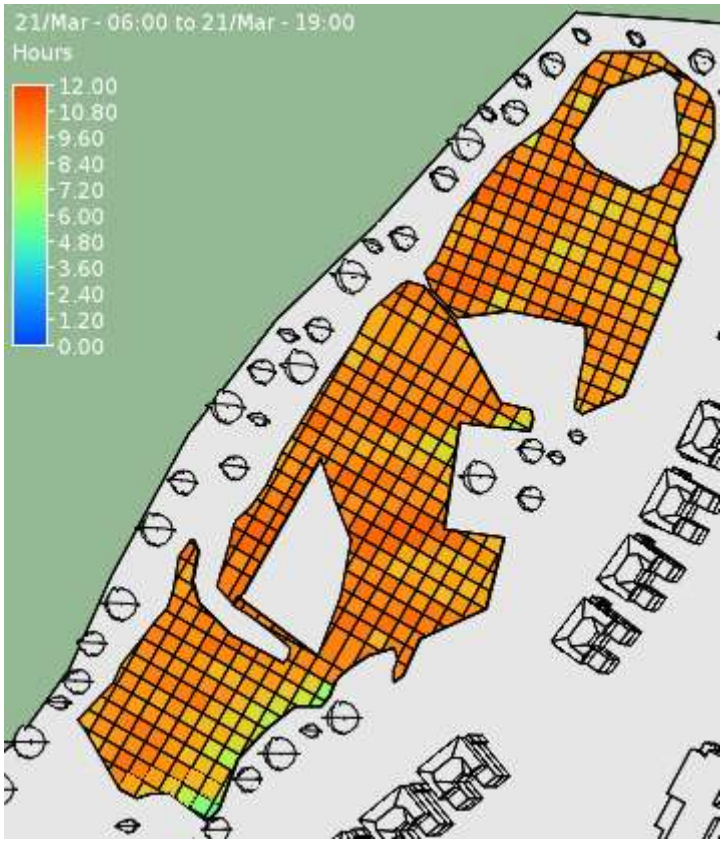

Figure 33: Sunlight hours to Amenity Space F, G & H on March 21st more than 50% > 2 hours (Source IES VE SunCast)

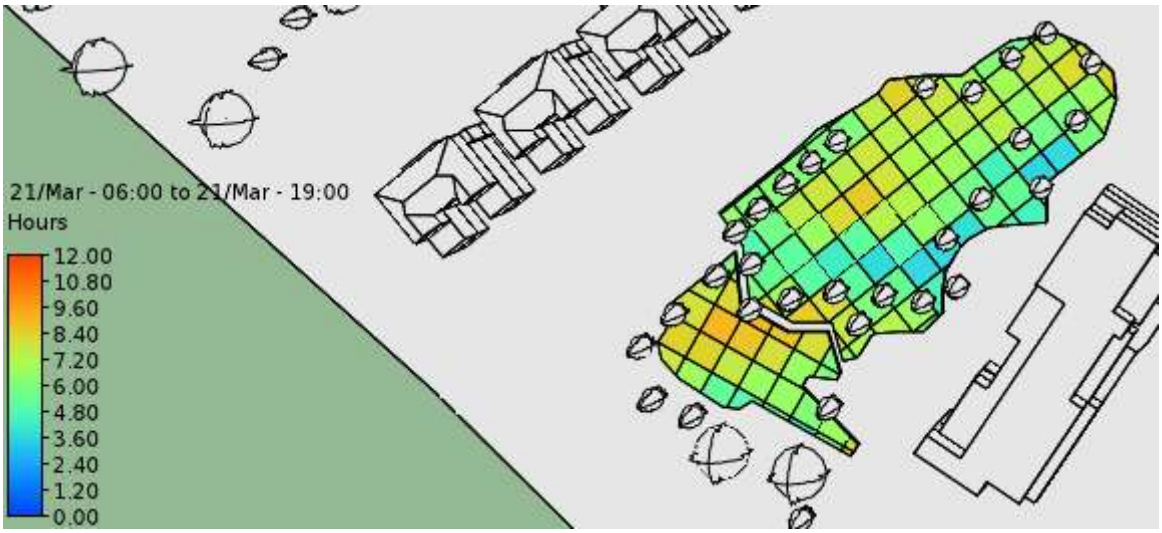

Figure 34: Sunlight hours to Amenity Space A & B on March 21st more than 50% > 2 hours (Source IES VE SunCast)

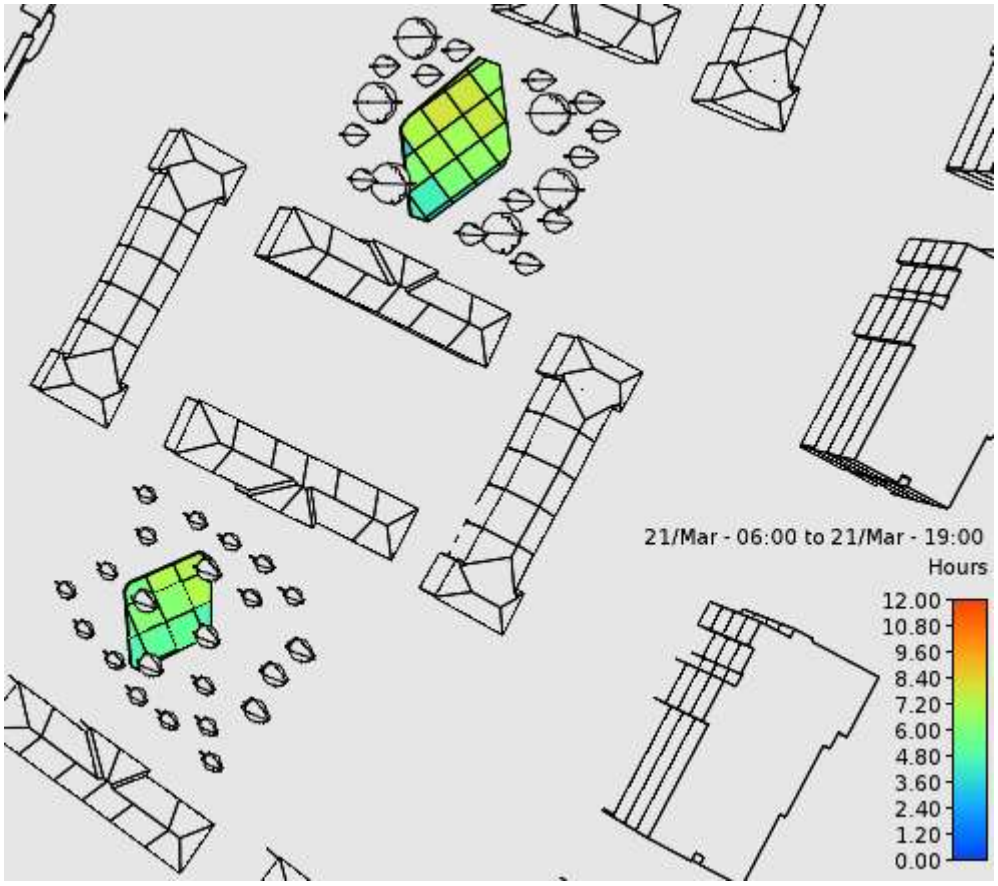

Figure 35: Sunlight hours to Amenity Space D & E on March 21st more than 50% > 2 hours (Source IES VE SunCast)

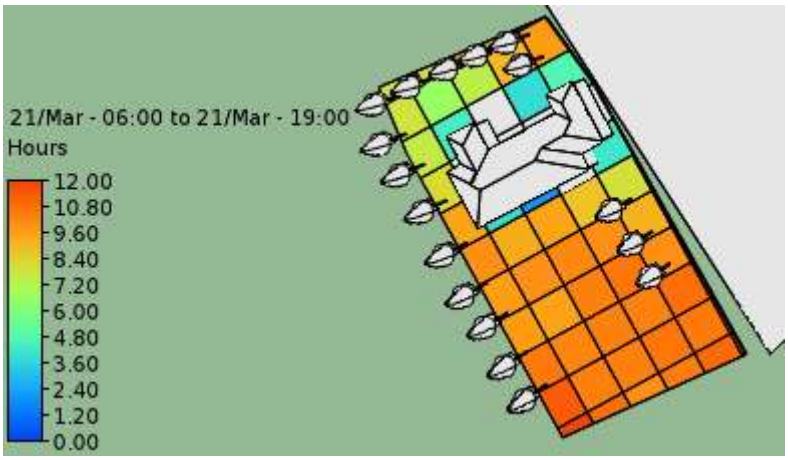

Figure 36: Sunlight hours to Existing Dwelling A on March 21st more than 50% > 2 hours (Source IES VE SunCast)

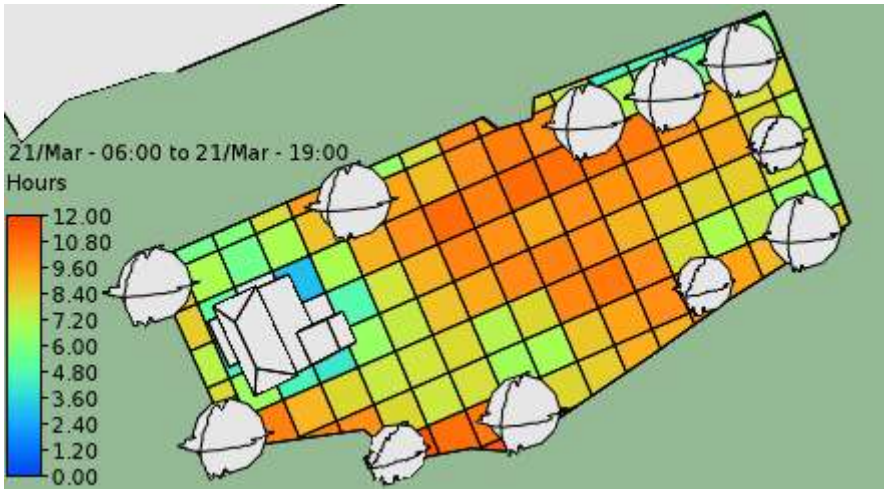

Figure 37: Sunlight hours to Existing Dwelling B on March 21st more than 50% > 2 hours (Source IES VE SunCast)

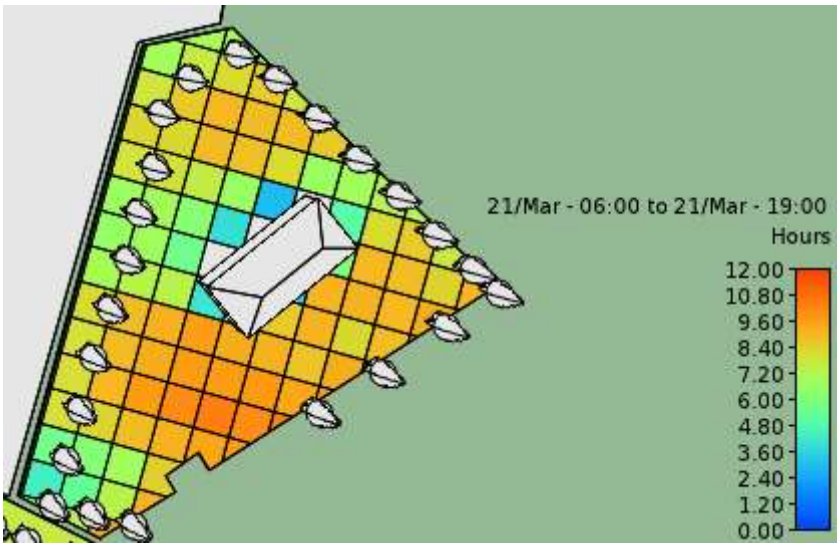

Figure 38: Sunlight hours to Existing Dwelling F on March 21st more than 50% > 2 hours (Source IES VE SunCast)

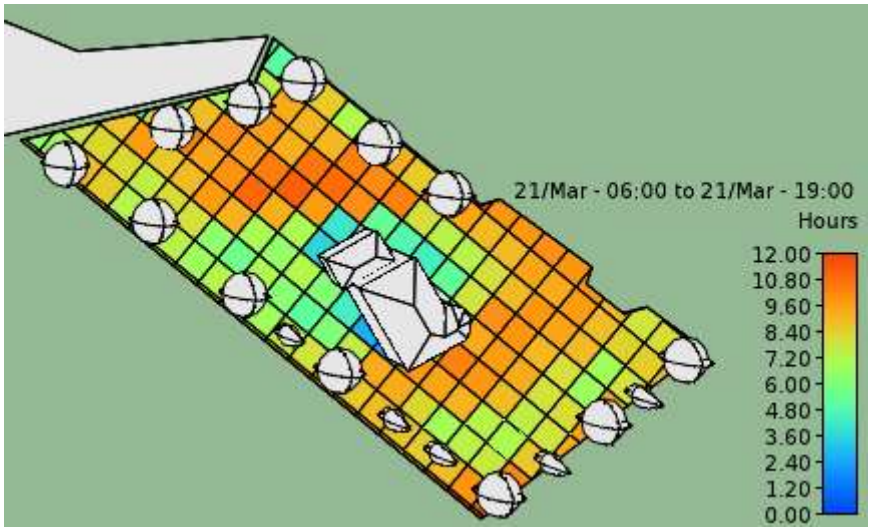

Figure 39: Sunlight hours to Existing Dwelling G on March 21st more than 50% > 2 hours (Source IES VE SunCast)

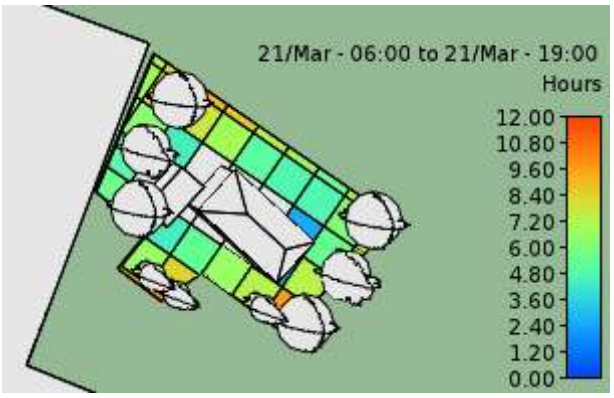

Figure 40: Sunlight hours to Existing Dwelling H on March 21st more than 50% > 2 hours (Source IES VE SunCast)

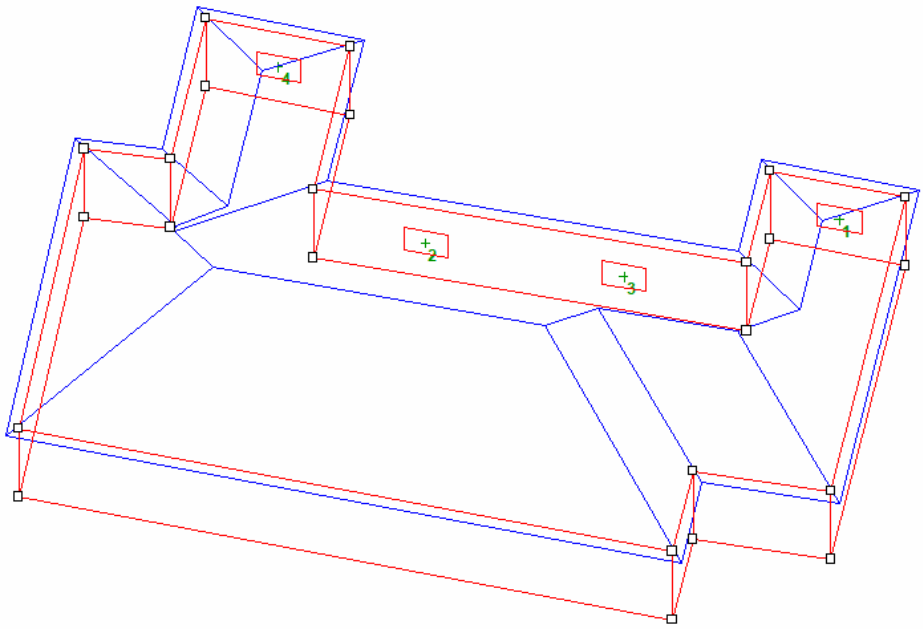

Figure 41: Existing Dwelling A - VSC Receptor Reference (Source IES VE SunCast)

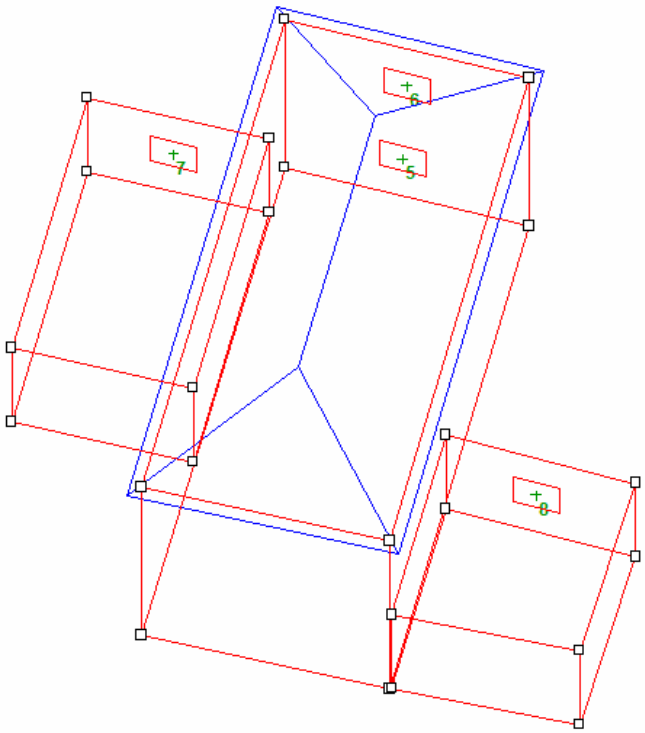

Figure 42: Existing Dwelling B - VSC Receptor Reference (Source IES VE SunCast)

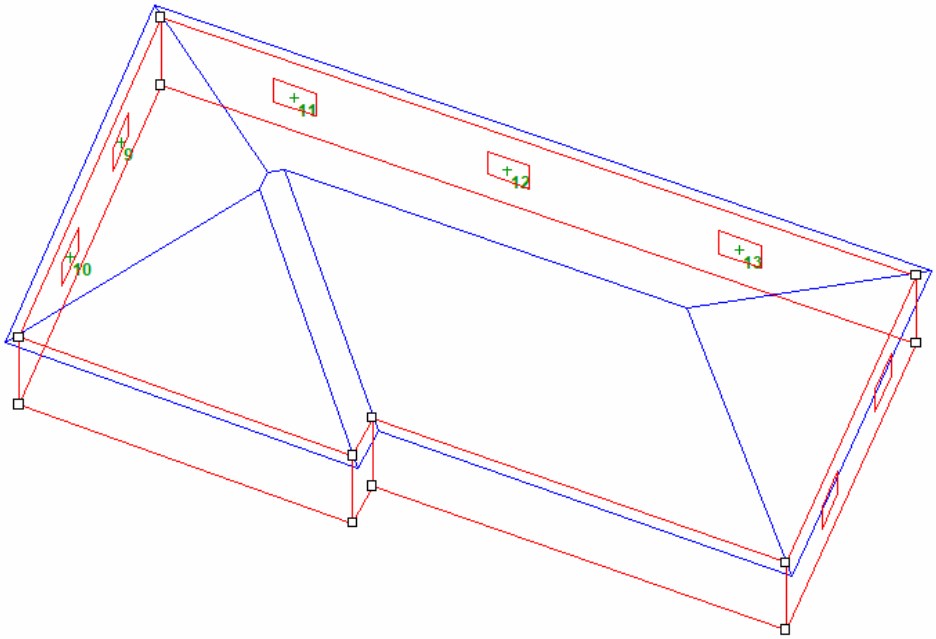

Figure 43: Existing Dwelling C - VSC Receptor Reference (Source IES VE SunCast)

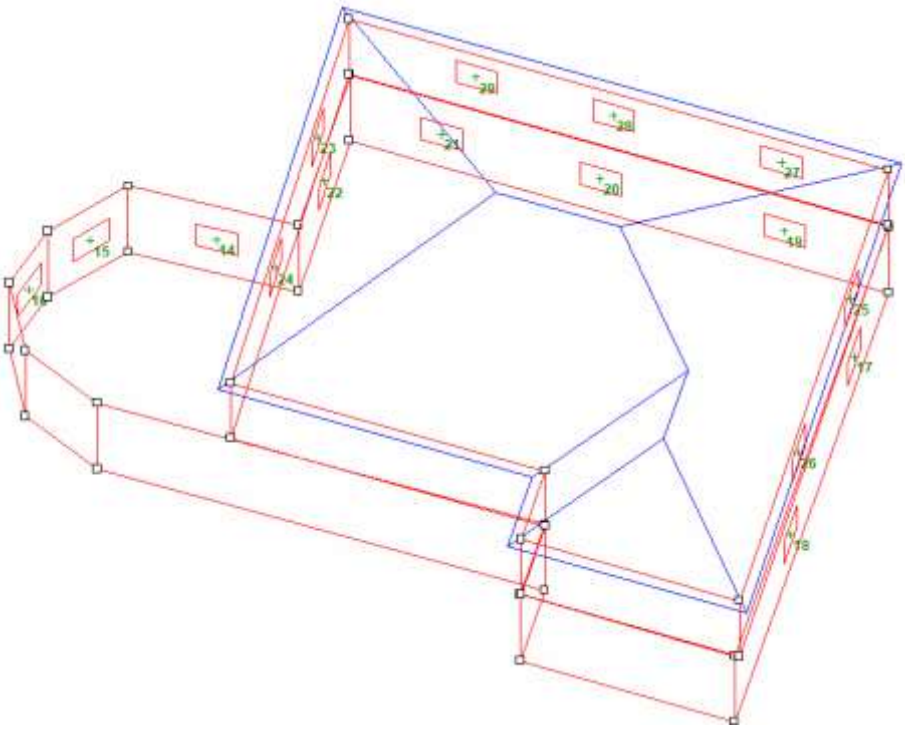

Figure 44: Existing Dwelling D - VSC Receptor Reference (Source IES VE SunCast)

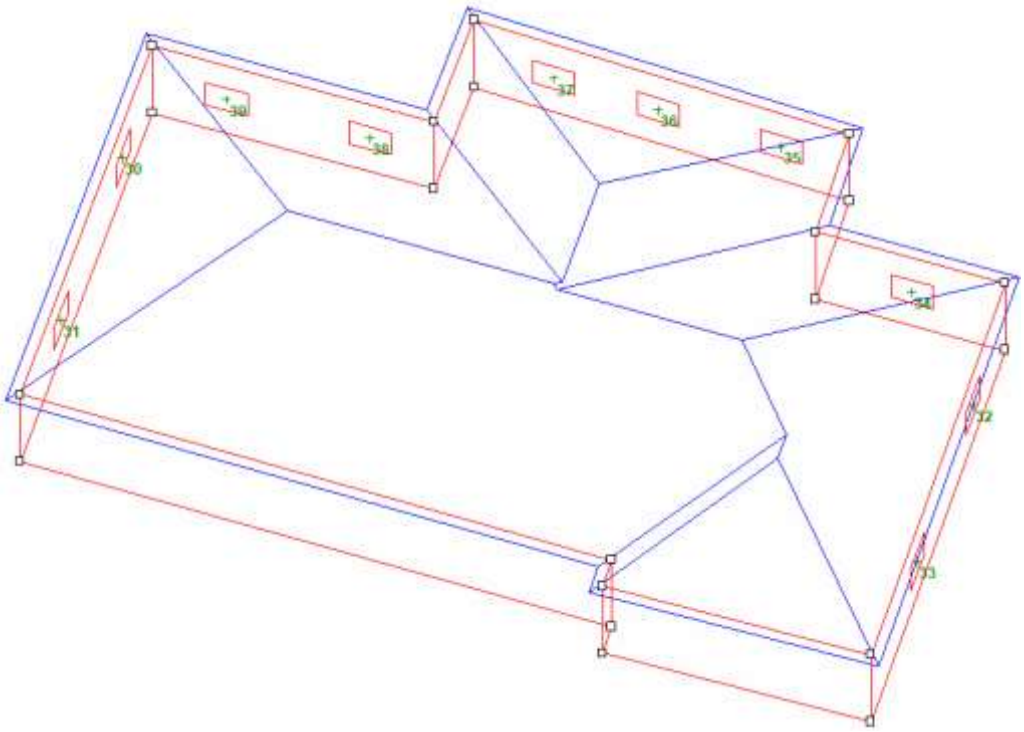

Figure 45: Existing Dwelling E - VSC Receptor Reference (Source IES VE SunCast)

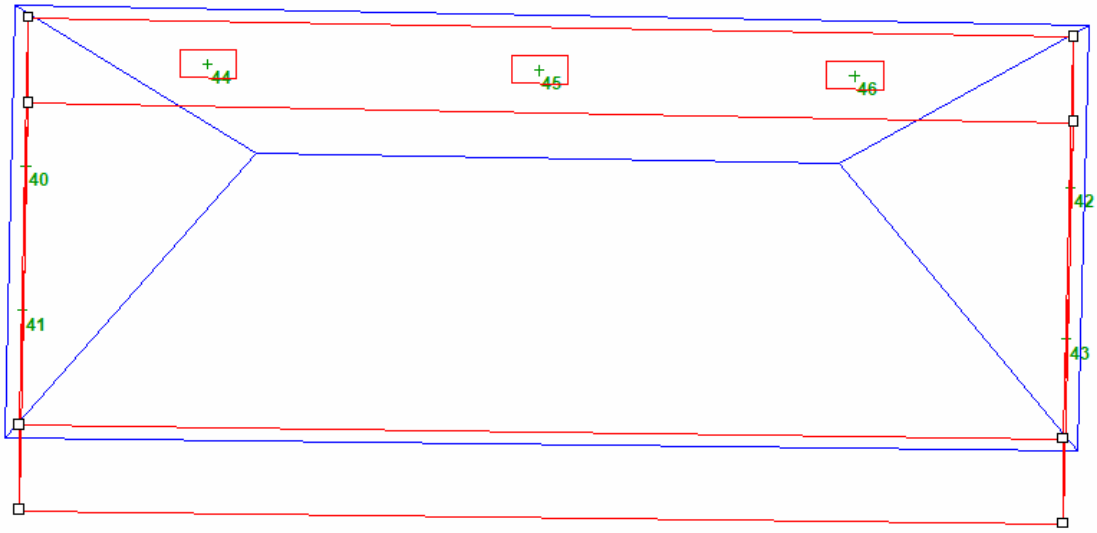

Figure 46: Existing Dwelling F - VSC Receptor Reference (Source IES VE SunCast)

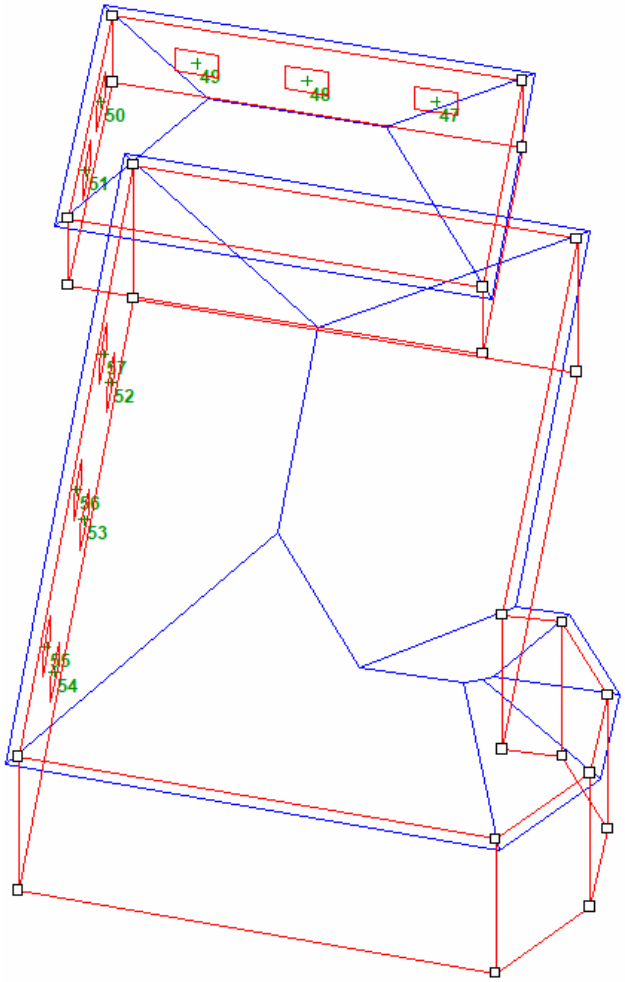

Figure 47: Existing Dwelling G - VSC Receptor Reference (Source IES VE SunCast)

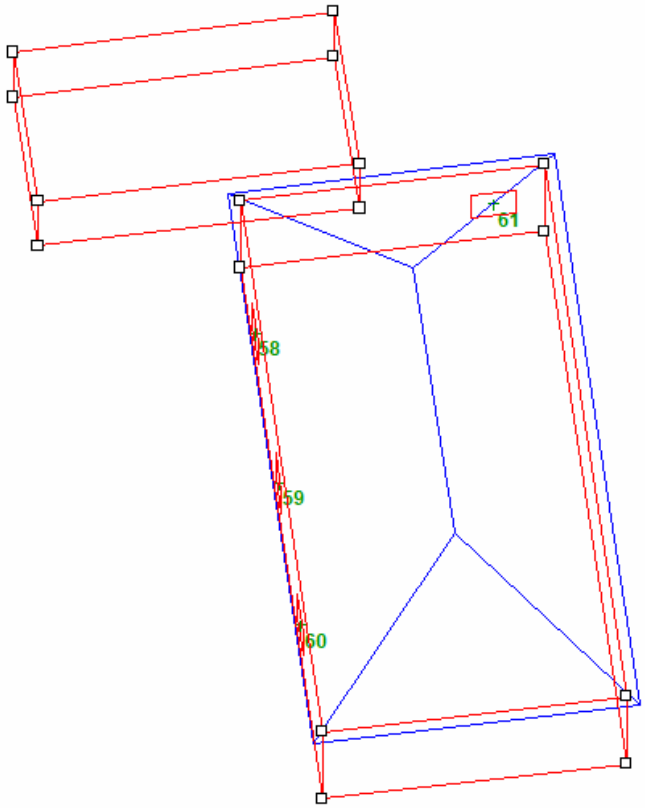

Figure 48: Existing Dwelling H - VSC Receptor Reference (Source IES VE SunCast)

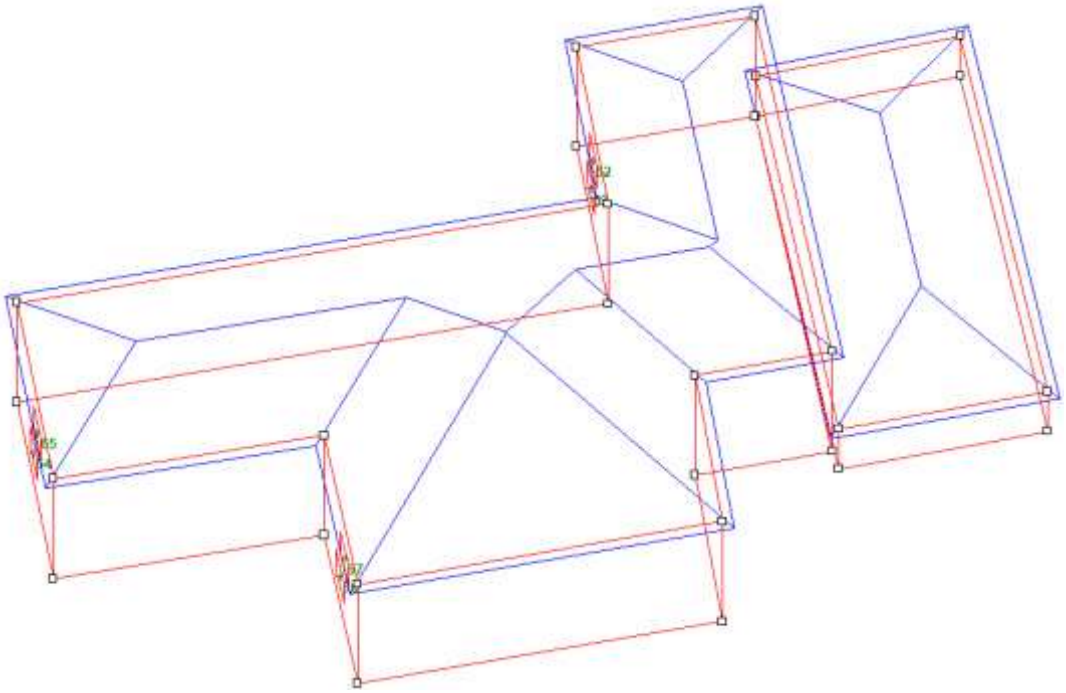

Figure 49: Existing Dwelling I - VSC Receptor Reference (Source IES VE SunCast)

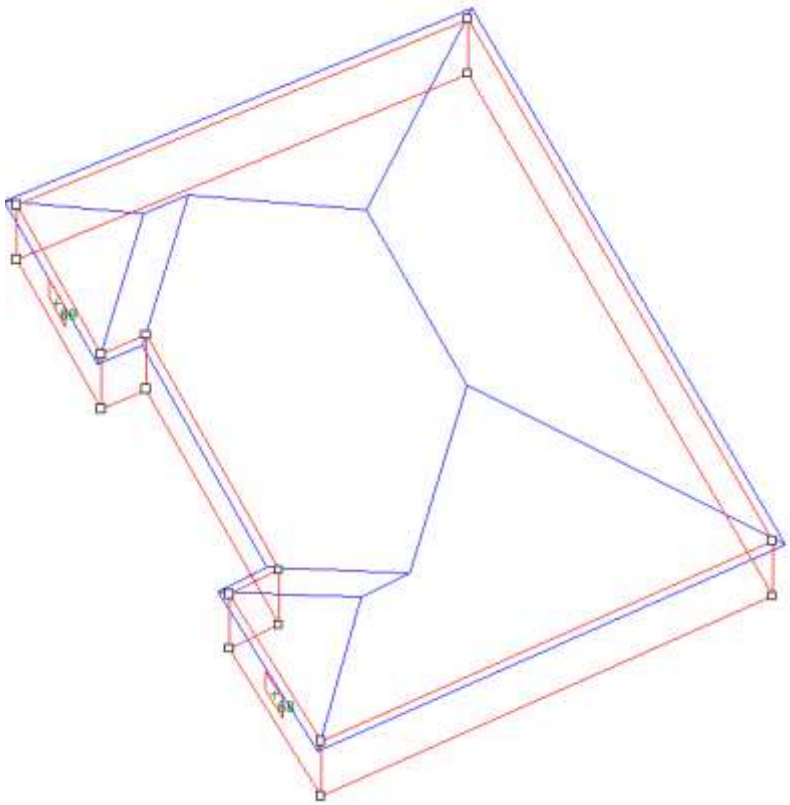

Figure 50: Existing Dwelling J - VSC Receptor Reference (Source IES VE SunCast)

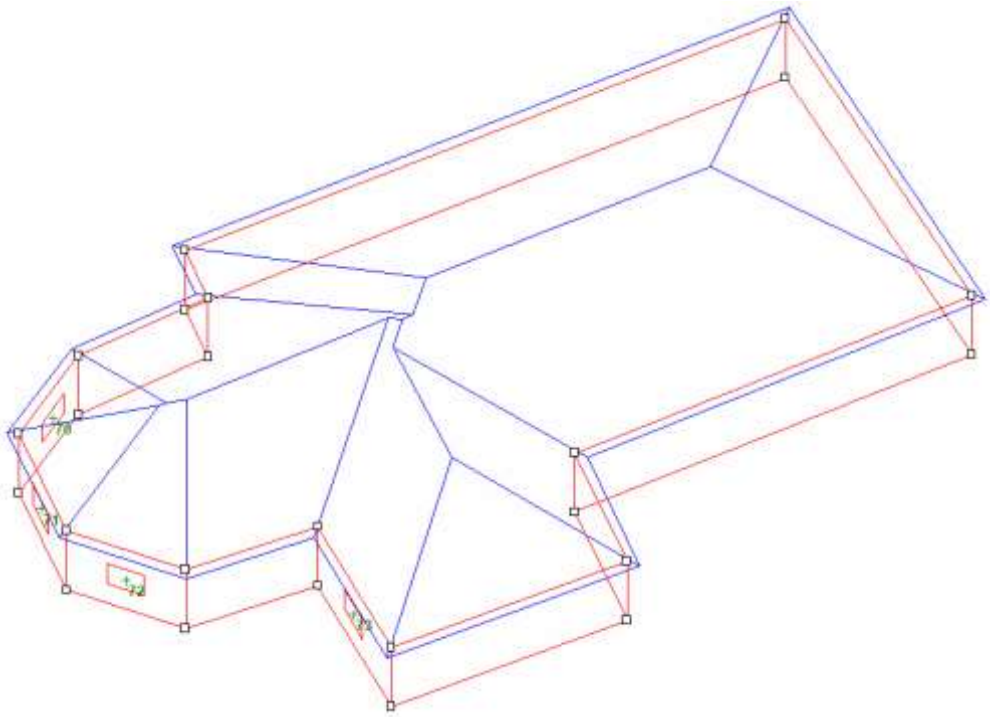

Figure 51: Existing Dwelling K - VSC Receptor Reference (Source IES VE SunCast)

UK and Ireland Office Locations