

CHAPTER SEVENTEEN MICROCLIMATE – DAYLIGHT, SUNLIGHT & SHADOW ANALYSIS

17.1 INTRODUCTION

This chapter summarises the analyses of the daylight and sunlight impact to the existing surrounding dwellings arising from the proposed development located in Limerick. Integrated Environmental Solutions Limited have been appointed to assess this impact and have undertaken the analysis.

The focus of the study considers the following items:

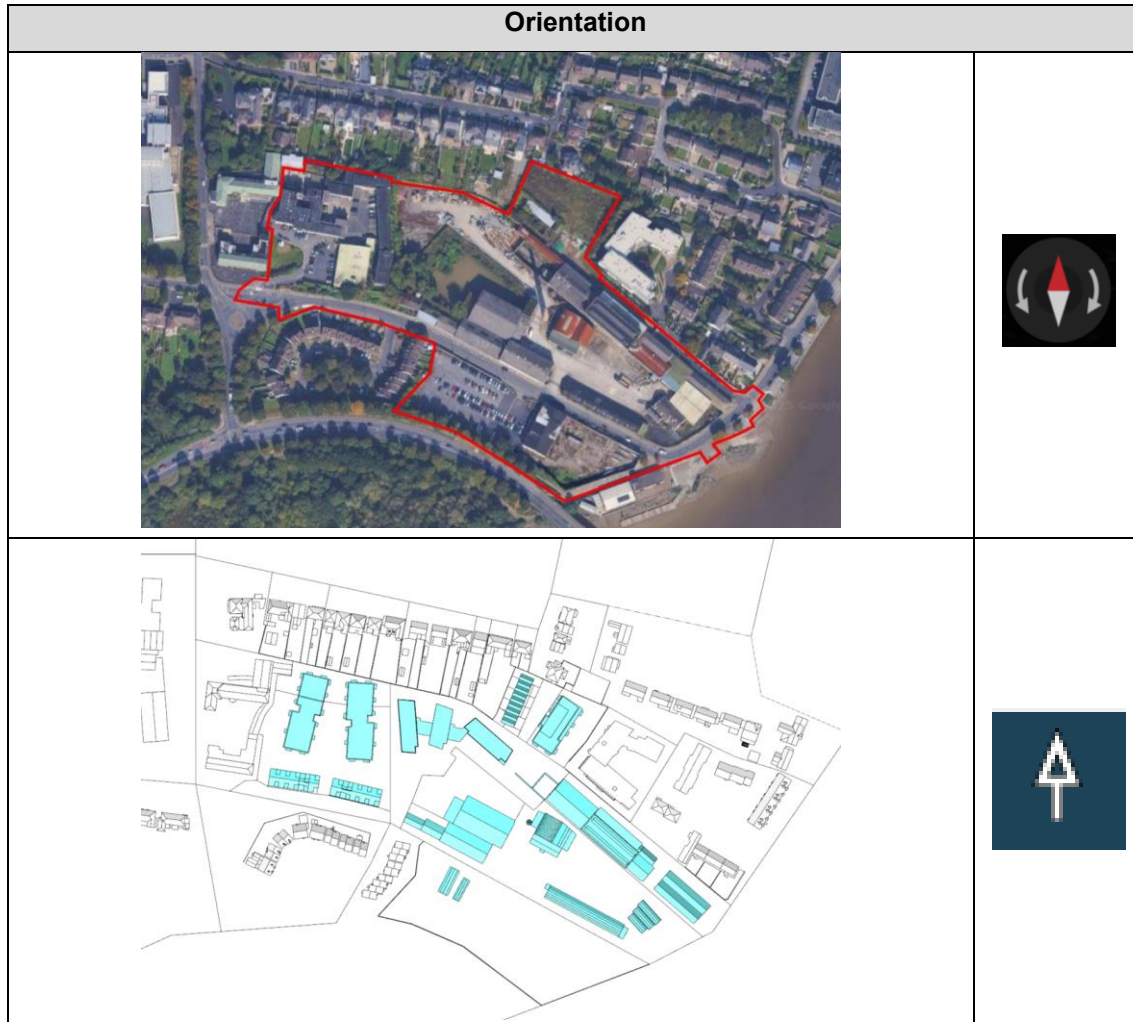
- **Shadow Analysis**
Assessed using shadow images cast at key times throughout the year, i.e. March 21st, June 21st and December 21st to determine if any overshadowing impact occurs and to what extent to any existing neighbouring dwellings in accordance with the BRE Guide (3rd Edition).
- **Sunlight to Amenity Spaces**
Assessed using annual Solar Exposure calculations to determine any impact to existing amenities and the sunlight received and also to assess the proposed developments amenity spaces to derive how much sunlight they can expect to receive in accordance with the BRE Guide (3rd Edition).
- **Sunlight to Existing Buildings**
Assessed using the Annual Probable Sunlight Hours (APSH) method in accordance with the Guide (3rd Edition) - to determine any impact to sunlight received to the existing neighbouring building main living areas.
- **Daylight to Existing Buildings**
Assessed using the Vertical Sky Component (VSC) method in accordance with the BRE Guide (3rd Edition) – to determine any impact to existing daylight received to the existing building neighbouring the site.

17.2 ASSESSMENT METHODOLOGY

The proposed application site (Phase II) is part of a phased development proposal for a significant city centre, regeneration area or Masterplan Site (MS). This MS is divided into four different phases of delivery as detailed in Section 1.6.3 in Chapter 1.0 Introduction. The overall MS layout which illustrates the indicative layout of the subject site and adjoining lands in the ownership of the applicant is displayed in Chapter 1.0, Figure 1.4 and full details of the proposed development phases are provided in Chapter 2.0, Section 2.2.4. In addition to an in-depth assessment of the Proposed Development, this assessment takes a holistic approach and examines the wider MS area, taking into account the proposed future phases of development based on the available information.

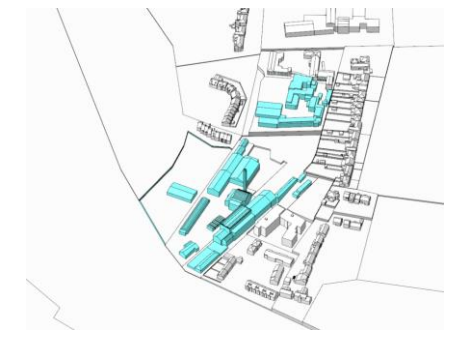
17.2.1 Orientation

The model orientation has been taken from drawings provided by the Architect with the resulting angle shown below used in the analysis.



17.2.2 Proposed Model

The following images illustrate the models created from the architectural information provided and the use of Google/Bing maps where information was absent.

	Existing Scheme	Proposed Scheme
View looking from North of Site		
View looking from East of Site		
View looking from South of Site		
View looking from West of Site		

17.2.3 Planning Authority Guidelines

Where daylight is concerned, the Planning Design Standards for Apartments 2025 refers to the Sustainable Residential Development and Compact Settlements Guidelines 2024 Section 5.3.7(b) Daylight, which states the following:

“(b) In cases where a technical assessment of daylight performance is considered by the planning authority to be necessary, regard should be had to quantitative performance approaches to daylight provision outlined in guides like A New European Standard for Daylighting in Buildings IS EN17037:2018, UK National Annex BS EN17037:2019 and the associated BRE Guide 209 2022 Edition (June 2022), or any relevant future standards or guidance specific to the Irish context.”

The guidelines go on further to note the following:

“In drawing conclusions in relation to daylight performance, planning authorities must weigh up the overall quality of the design and layout of the scheme and the measures proposed to maximise daylight provision, against the location of the site and the general presumption in favour of increased scales of urban residential development. Poor performance may arise due to design constraints associated with the site or location and there is a need to balance that assessment against the desirability of achieving wider planning objectives. Such objectives might include securing comprehensive urban regeneration and or an effective urban design and streetscape solution.”

As such the following section details out the standards adhered to within this report that align with the planning authority guidelines as outlined above.

17.2.4 Reference Standards & Summary of Assessments Undertaken

With regards to daylighting, all methodologies have been employed for completeness to ensure appropriate and reasonable regard has been taken to address all assessments under all of the different standards. For clarity these standards are listed below followed by a summary of each assessment type and which standard is applicable to each:

Standards:

- BRE Guide –3rd Edition of BR 209 BRE Site Layout Planning for Daylight and Sunlight
- BS EN 17037-2018+A1-2021 – Daylight in Buildings
This is the UK implementation of the European EN 17037-2018+A1-2021 standard. It supersedes BS 8206-2:2008 which is withdrawn in the UK. The BS EN standard includes a National Annex which addresses daylight requirements specific to dwellings which is notable as Ireland's climate matches closely with the UK.
- IS EN 17037-2018+A1-2021 – Daylight in Buildings
This is the Irish implementation of the European EN 17037-2018+A1-2021 standard – This has been included for completeness but does not have requirements specific to dwellings.

Assessment Type:

- **Shadow Analysis**

Assessed using shadow images cast at key times throughout the year, i.e. March 21st, June 21st and December 21st to determine if any overshadowing impact occurs and to what extent to any existing neighbouring dwellings in accordance with the BRE Guide (3rd Edition).

- **Sunlight to Amenity Spaces**

Assessed using Solar Exposure calculations to determine any impact to existing amenities and the sunlight received and also to assess the proposed developments amenity spaces to derive how much sunlight they can expect to receive in accordance with the BRE Guide (3rd Edition).

- **Sunlight to Existing Buildings**

Assessed using the Annual Probable Sunlight Hours (APSH) method in accordance with the BRE Guide (3rd Edition) - to determine any impact to sunlight received to the existing neighbouring building main living areas.

- **Daylight to Existing Buildings**

Assessed using the Vertical Sky Component (VSC) method in accordance with the BRE Guide (3rd Edition) - to determine any impact to existing daylight received to the existing building neighbouring the site.

With regards to the detailed methodology for each assessment type please refer to the specific study within section 17.5.3 Operational Effects. With regards to the proposed development performance please refer to the full Daylight, Sunlight and Shadow analysis.

17.2.5 BRE – Site Layout Planning for Daylight and Sunlight (3rd Edition) – Impact Classification

Access to daylight and sunlight is a vital part of a healthy environment. Sensitive design should provide sufficient daylight and sunlight to new residential developments while not obstructing light to existing homes nearby.

The 3rd Edition of the BR 209 BRE Site Layout Planning for Daylight and Sunlight, advises on planning developments for good access to daylight and sunlight and is widely used by local authorities to help determine the performance of new developments.

BRE guidance in Appendix H (BRE Guide 3rd Edition) – Environmental Impact Assessment suggests impact classifications as minor, moderate and major adverse. It provides further classifications of these impacts with respect to criteria summarised in the table below.

Where the loss of skylight or sunlight fully meets the guidelines in the BRE guide (3rd Edition), the impact is assessed as negligible or minor adverse. Where the loss of skylight or sunlight does not meet the BRE guidelines, the impact is assessed as minor, moderate or major adverse.

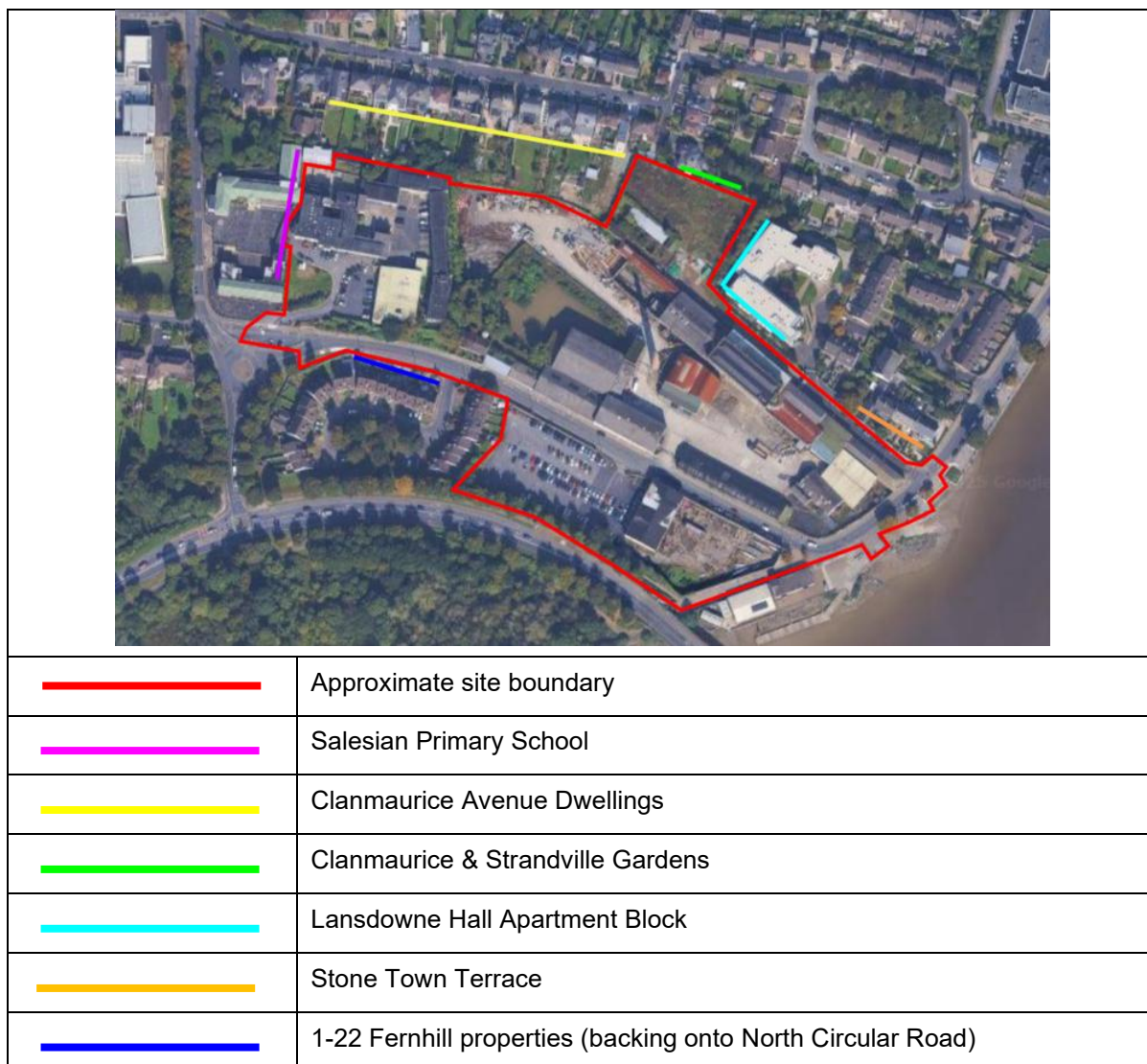
As the BRE Guidance has specific terminology relating to daylight and sunlight impact classification and represents the best practice guidance, this terminology will be adhered to within this report.

Impact	Description
<i>Negligible adverse impact</i>	• <i>Loss of light well within guidelines, or</i> • <i>only a small number of windows losing light (within the guidelines) or limited area of open space losing light (within the guidelines)</i>
<i>Minor adverse impact (a)</i>	• <i>Loss of light only just within guidelines and</i> ◦ <i>a larger number of windows are affected or</i> ◦ <i>larger area of open space is affected (within the guidelines)</i>
<i>Minor adverse impact (b)</i>	• <i>only a small number of windows or limited open space areas are affected</i> • <i>the loss of light is only marginally outside the guidelines</i> • <i>an affected room has other sources of skylight or sunlight</i> • <i>the affected building or open space only has a low-level requirement for skylight or sunlight</i> • <i>there are particular reasons why an alternative, less stringent, guideline should be applied</i>
<i>Major adverse impact</i>	• <i>large number of windows or large open space areas are affected</i> • <i>the loss of light is substantially outside the guidelines</i> • <i>all the windows in a particular property are affected</i> • <i>the affected indoor or outdoor spaces have a particularly strong requirement for skylight or sunlight (living rooms / playground)</i>

17.3 EXISTING RECEIVING ENVIRONMENT

To help understand the potential impact to surrounding buildings, potential sensitive receptors were identified as illustrated below. These receptors were selected as they are the properties that are directly neighbouring the proposed development site that could potentially be impacted by the development of the proposed site. To the north are detached and semidetached dwellings on Clanmaurice Avenue and Strandville Gardens. Situated to the east of the development site are the Lansdowne Hall apartments and the terraced housing on Stone Town Terrace. To the south are dwellings at Fernhill and to the west the Salesian Primary School.

To note, the 4 terraced dwellings, Rosehill 21-24 have not been assessed as there are no changes to massing that would directly impact these properties and the neighbouring garages and shed likewise as noted in the BRE Guide section 2.2.2, "windows to bathrooms, toilets, storerooms, circulation areas and garages need not be analysed".



17.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The proposed development seeks

A. Demolition of a number of structures to facilitate development and B. Construction and phased delivery of (i) buildings within the site ranging in height from 3 – 7 stories (with screened plant at roof level) including (a) 234 no. residential units; (b) 270 no. student bedspaces (PBSA) with ancillary resident services at ground floor level; (c) 299sqm of commercial floorspace; and (d) a creche; (ii) extensive public realm works, riverside canopy and heritage interpretative panels (iv) 3 no. dedicated bat houses; (v) Mobility Hub with canopy; (vi) pedestrian / cycle connectivity from North Circular Road to Condell Road; and (vii) all ancillary site development works including (a) water services, foul and surface water drainage and associated connections across the site and serving each development zone; (b) attenuation measures; (c) raising the level of North Circular Road; (d) car and bicycle parking; (e) public lighting; (f) telecommunications antennae; and (g) all landscaping works. Consent is also sought for use of the PBSA accommodation, outside of student term time, for short-term letting purposes.

A detailed Performance assessment of the daylight provision targets within the development proposal has been undertaken by IES and is included in the Daylight Sunlight and Overshadowing Assessment Report accompanying the development proposal under separate cover. Across the proposed development, 94% of the tested rooms within the proposed development are achieving the daylight provision targets in accordance with Table NA.1 of BS EN 17037-2018+A1-2021.

Design features have been incorporated into the development where rooms do not achieve the daylight provision targets in accordance with the standards they were assessed against. These design features help to balance off and compensate the lower levels of daylight measured in the applicable spaces and are summarised as follows:

- Percentage of apartments, triplexes or townhouses that are dual aspect (or greater) is 54.7% (128 out of 234)
- The amount of Communal Amenity Space provided for the residential plots is 1,689sqm, some 8.5% more than the recommended minimum of 1,556sqm for the residential plots.
- Some 7,817sqm of public open space / public realm is to be provided in the proposals.
- Some 78.2% of the residential homes are provided in excess of the minimum apartment sizes recommended in the Guidelines (183 out of 234).

17.5 LIKELIHOOD OF SIGNIFICANT EFFECTS

17.5.1 Construction Effects

The analysis summarises both the daylight and sunlight access to the proposed development and the impact to existing adjacent properties as a result of the proposed development. It is considered that during the construction phase there will be no impacts experienced in relation to daylight and sunlight to the proposed development, and the impact to the existing adjacent properties will be imperceptible.

17.5.2 Operational Effects

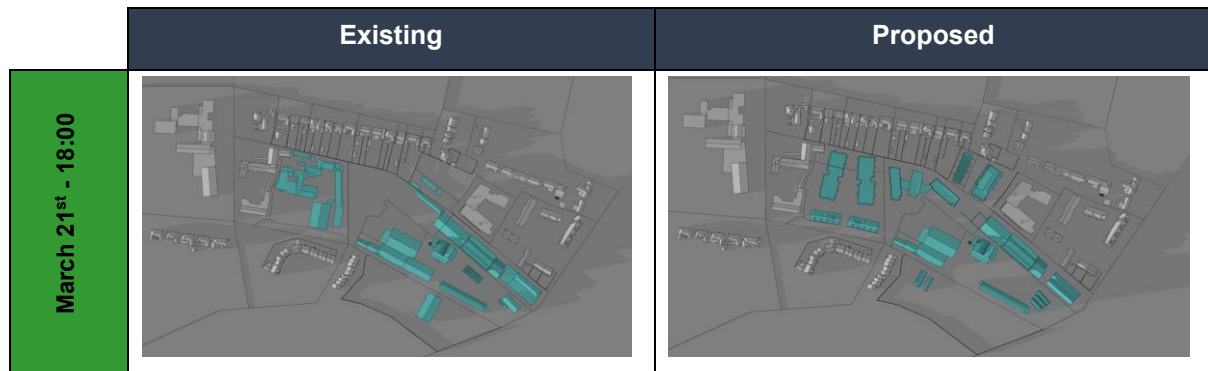
In order to understand the impact the proposed development will have during the operational phase, the following sections summarise the following studies that were undertaken:

- Overshadowing analysis.
- Daylight analysis of existing buildings (VSC).
- Sunlight access to the existing buildings (APSH).
- Sunlight access to the existing amenity spaces (Solar Exposure).

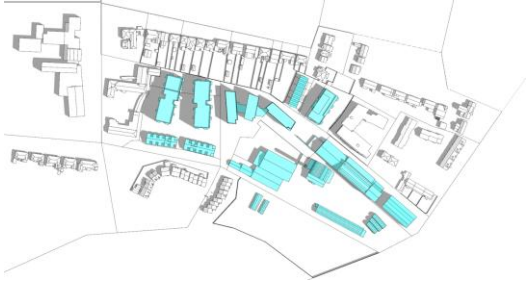
17.5.2.1 Overshadowing Analysis

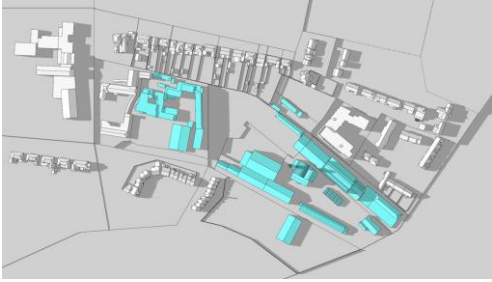
Plan View – March 21st

	Existing	Proposed
March 21 st - 8:00		
March 21 st - 10:00		
March 21 st - 12:00		
March 21 st - 14:00		
March 21 st - 16:00		



Plain View – June 21st

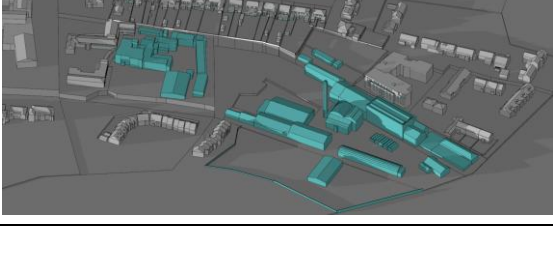
	Existing	Proposed
June 21 st - 8:00		
June 21 st - 10:00		
June 21 st - 12:00		
June 21 st - 14:00		
June 21 st - 16:00		

	Existing	Proposed
June 21 st - 18:00		
June 21 st - 20:00		

Plain View December 21st

	Existing	Proposed
December 21 st - 8:00		
December 21 st - 10:00		
December 21 st - 12:00		
December 21 st - 14:00		
December 21 st - 16:00		

3D View – March 21st

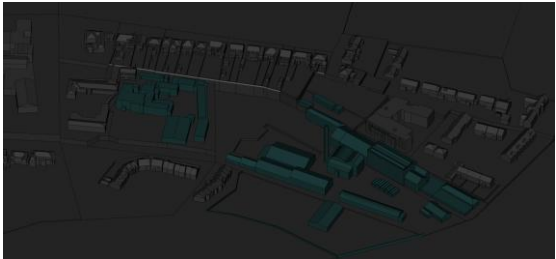
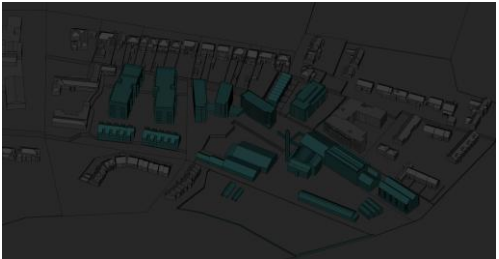
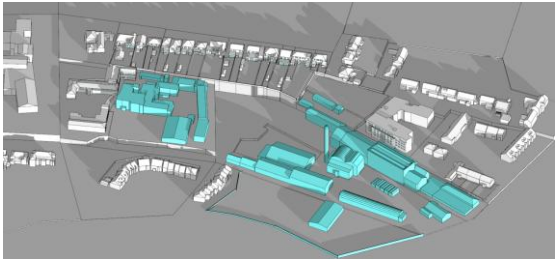
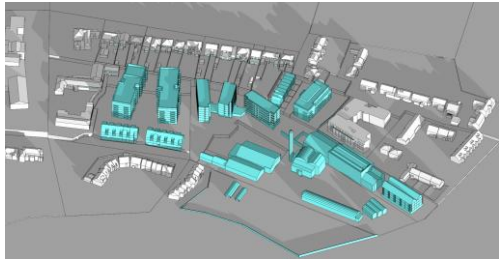
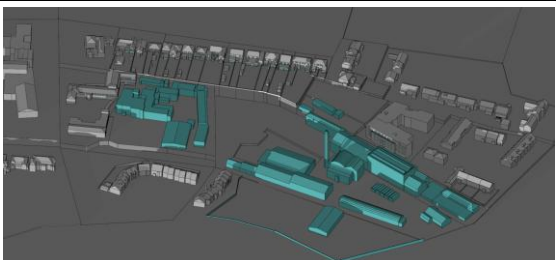
	Existing	Proposed
March 21 st - 8:00		
March 21 st - 10:00		
March 21 st - 12:00		
March 21 st - 14:00		
March 21 st - 16:00		
March 21 st - 18:00		

3D View – June 21st

	Existing	Proposed
June 21 st - 8:00		
June 21 st - 10:00		
June 21 st - 12:00		
June 21 st - 14:00		
June 21 st - 16:00		
June 21 st - 18:00		



3D View – December 21st

	Existing	Proposed
December 21 st - 8:00		
December 21 st - 10:00		
December 21 st - 12:00		
December 21 st - 14:00		
December 21 st - 16:00		

Discussion

The shadow analysis illustrates different shadows being cast at key times of the year (March 21st, June 21st and December 21st) for the Existing Situation and the Proposed Scheme. The results from the study are summarised as follows:

- **Salesian Primary School**
Minimal additional shading visible from the proposed development on these buildings during March 0800-1200, June 1200 and December* 1000-1200. No additional shading is observed from the proposed development on these neighbouring properties at any other period of the test days as specified in the BRE Guide.
- **Clanmaurice Avenue Dwellings**
Minimal additional shading visible from the proposed development on these buildings during December* 1200-1400. No additional shading is observed from the proposed development on these neighbouring properties at any other period of the test days as specified in the BRE Guide.
- **Clanmaurice & Strandville Gardens**
Minimal additional shading visible from the proposed development on these buildings during March 1200-1600 and December* 1000-1600. No additional shading is observed from the proposed development on these neighbouring properties at any other period of the test days as specified in the BRE Guide.
- **Lansdowne Hall Apartment Block**
Additional shading visible from the proposed development on these buildings during March 1800 and June 1800-2000. No additional shading is observed from the proposed development on these neighbouring properties at any other period of the test days as specified in the BRE Guide.
- **Stone Town Terrace**
Additional shading visible from the proposed development on these buildings during March 1400-1800, June 1800 and December 1200-1600. No additional shading is observed from the proposed development on these neighbouring properties at any other period of the test days as specified in the BRE Guide.
- **1-22 Fernhill Properties (backing onto North Circular Road)**
No additional shading is observed from the proposed development on these neighbouring properties throughout the year.

* Overshadowing can be expected in December when the sun is lower in the sky and shadows cast are much longer. Although this is the case, overshadowing is least noticeable during the winter months as there is a lot less sunlight available at this time of year and so the overall impact is vastly reduced. The potential shading impact is quantified via the “Sunlight to Amenity Spaces” and “Daylight to Existing Buildings” sections of this report as these tests will provide a quantitative set of results in line with the BRE Guidance.

17.5.2.2 Daylight Analysis of Existing Building

Guidance Requirements - BRE Guide (3rd Edition) / IS/BS EN 17037-2018+A1-2021

When designing a new development, it is important to safeguard the daylight to nearby buildings. The BRE Guide provides numerical values that are purely advisory. Different criteria may be used based on the requirements for daylighting in an area viewed against other site layout constraints. Another issue is whether the existing building is itself a good neighbour, standing a reasonable distance from the boundary and taking no more than its fair share of light. Any reduction in the total amount of skylight can be calculated by determining the vertical sky component at the centre of key reference points. The vertical sky component definition from the BRE Guide (3rd Edition) is described below: -

Vertical sky component (VSC)	This is a measure of the amount of light reaching a window. It is the ratio of that part of illuminance, at a point on a given vertical plane, that is received directly from a CIE standard overcast sky, to illuminance on a horizontal plane due to an unobstructed hemisphere of this sky. Usually the 'given vertical plane' is the outside of a window wall. The VSC does not include reflected light, either from the ground or from other buildings.
-------------------------------------	--

The maximum possible VSC value for an opening in a vertical wall, assuming no obstructions, is 40%. This VSC at any given point can be tested in RadianceIES, a module of IES VE.

For typical residential schemes the BRE Guide (3rd Edition) states the following in Section 2.2.7:

2.2.7 If this VSC 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 VSC, with the new development in place, is both less than 27% and less than 0.8 times its former value, 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.
--

As such this study will compare the Existing scheme and Proposed scheme and consider if the values on the existing buildings are above 27% or not less than 0.8 times their former value (that of the Existing scheme).

It is also important to note that Section 2.1.6 of the BRE Guide states that if the VSC is between 15% and 27%, special measures such as larger windows can provide adequate daylight (refer to extract below).

2.1.6 The amount of daylight a room needs depends on what it is being used for. But roughly speaking, if θ is:

- greater than 65° (obstruction angle less than 25° or VSC at least 27%) conventional window design will usually give reasonable results.
- between 45° and 65° (obstruction angle between 25° and 45°, VSC between 15% and 27%) special measures (larger windows, changes to room layout) are usually needed to provide adequate daylight.
- between 25° and 45° (obstruction angle between 45° and 65°, VSC between 5% and 15%) it is very difficult to provide adequate daylight unless very large windows are used.
- less than 25° (obstruction angle greater than 65°, VSC less than 5%) it is often impossible to achieve reasonable daylight, even if the whole window wall is glazed.

Assessment

Based on the above criteria, the locations in the following sections have been modelled and analysed with the results also included.

Please note, the “Comment” symbol in each of the tables represents the following:

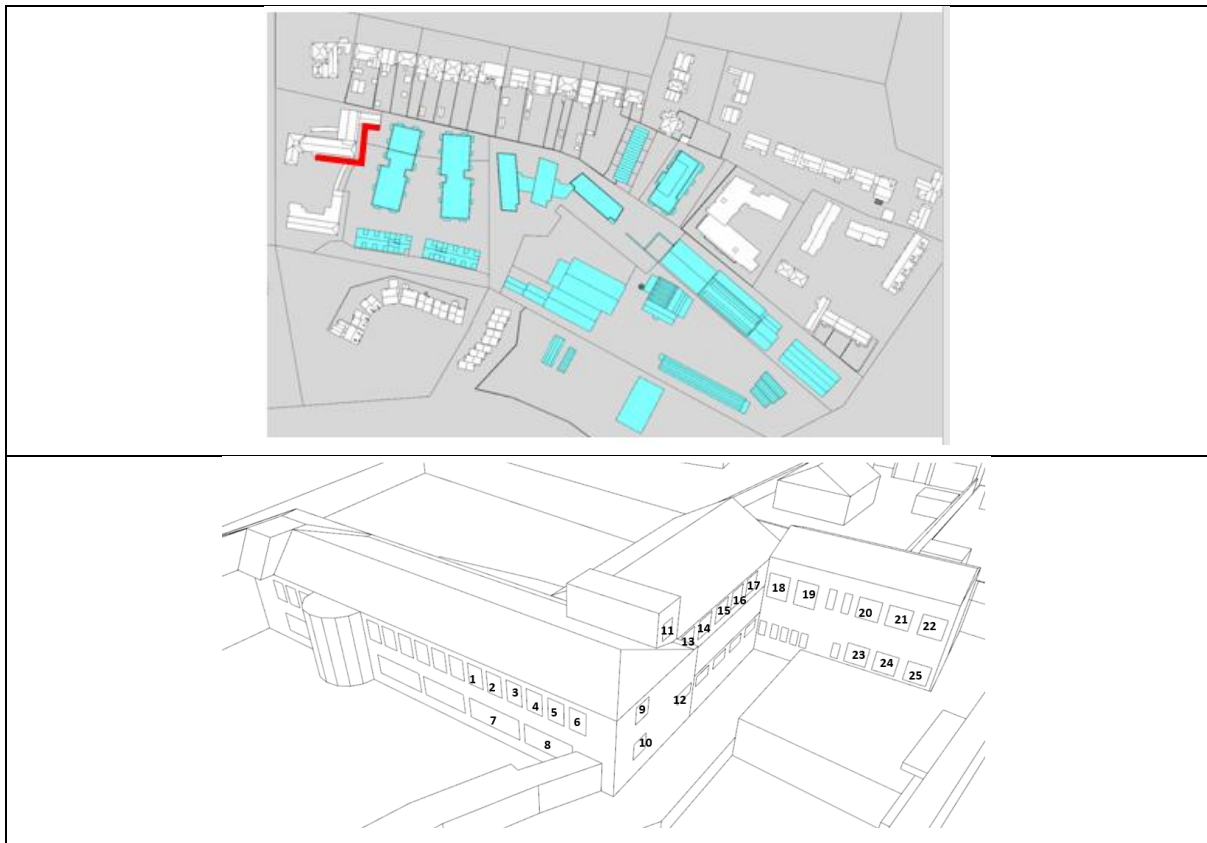
- ✓ For these locations, the Proposed Scheme VSC value is greater than 27% or 0.8 times their former value (that of the Existing Situation/Permitted Scheme).
- ✓¹ For these locations, the Proposed Scheme VSC value is less than 0.8 times its former value (that of the Existing). However, the Proposed Scheme VSC values are between 15% and 27% and hence adequate daylight should still be expected (as per Section 2.1.6 of the BRE Guide) given the presence of larger than conventional windows.
- x For these locations, the Proposed Scheme VSC value is less than 15% and less than 0.8 times its former value (that of the Existing Situation), therefore, it does not achieve the BRE recommendations.

View 1: Salesian Primary School



Points	Existing Situation VSC	Proposed Scheme VSC	Proposed VSC as a % of Existing Situation	Comment
1	37.77	31.77	84%	✓
2	36.63	27.49	75%	✓
3	37.6	31.16	83%	✓
4	36.34	26.87	74%	✓ ¹
5	37.05	30.89	83%	✓
6	35.45	28	79%	✓
7	37.02	30.97	84%	✓
8	35.62	28.17	79%	✓
9	36.46	30.03	82%	✓
10	34.71	27.69	80%	✓
11	35.72	28.97	81%	✓
12	33.6	26.78	80%	✓
13	34.85	27.79	80%	✓
14	32.16	25.53	80%	✓
15	35.87	28.51	80%	✓
16	33.02	26.54	80%	✓
17	30.12	24.13	80%	✓

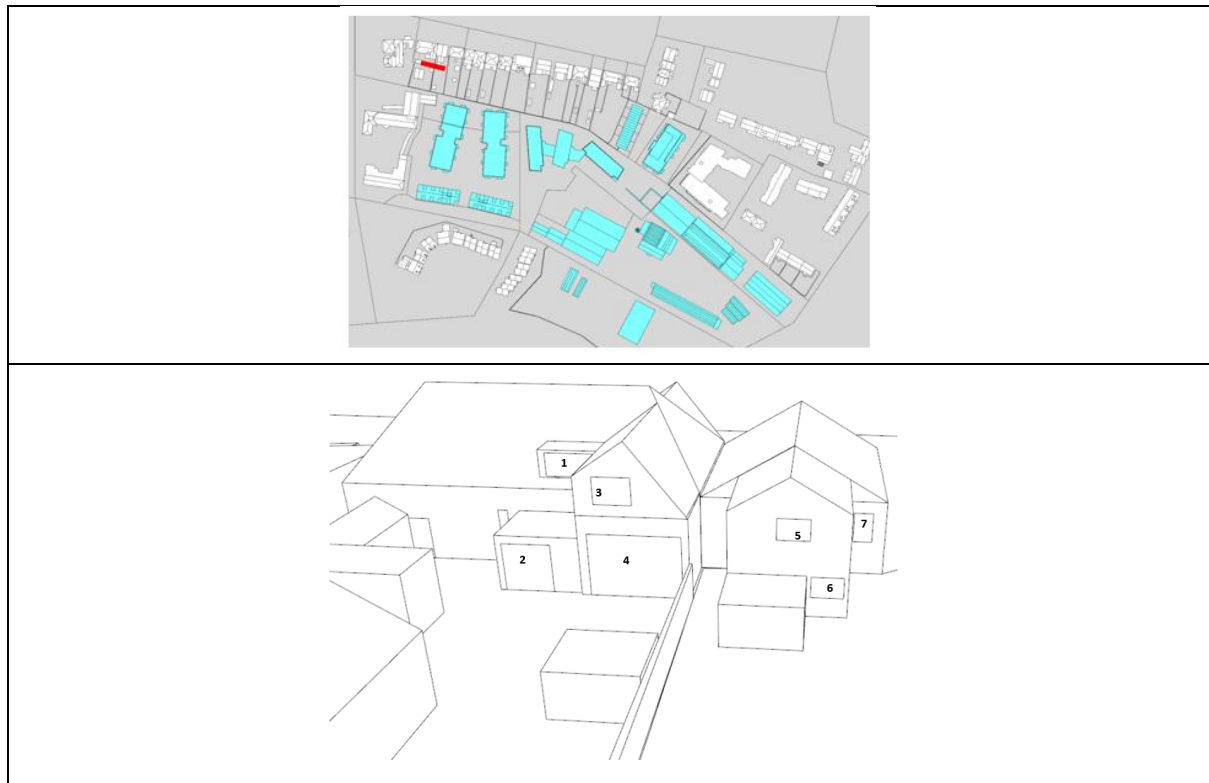
View 2: Salesian Primary School



Ref.	Existing Situation	Proposed Scheme VSC	Proposed VSC as a % of Existing Situation	Comment
1	35.42	34.78	98%	✓
2	35.2	34.36	98%	✓
3	34.15	34.21	100%	✓
4	33.13	33.82	102%	✓
5	32.08	33.2	103%	✓
6	30.56	32.81	107%	✓
7	32.05	32.36	101%	✓
8	28.6	30.51	107%	✓
9	18.05	21.21	118%	✓
10	11.43	18.19	159%	✓
11	34.64	26.67	77%	✓ ¹
12	23.29	19.79	85%	✓
13	31.38	23.31	74%	✓ ¹
14	32.27	23.84	74%	✓ ¹
15	30.47	22.26	73%	✓ ¹
16	25.52	17.63	69%	✓ ¹

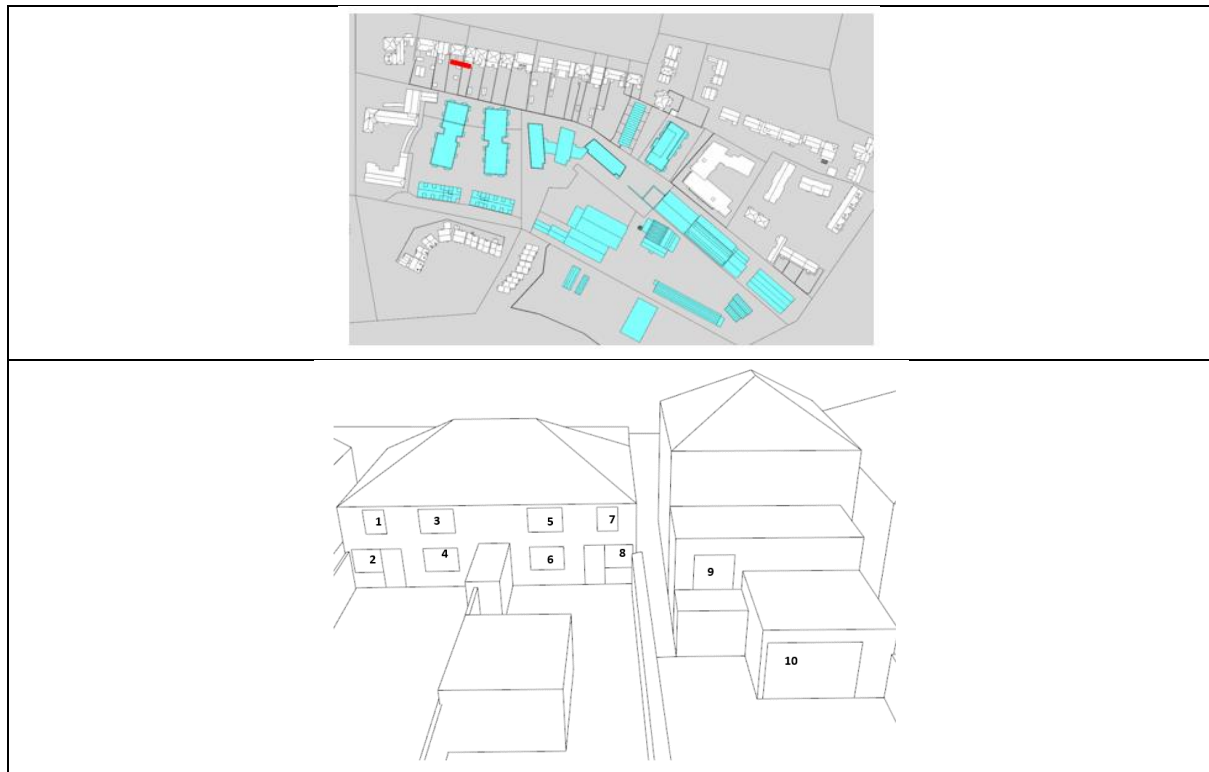
Ref.	Existing Situation	Proposed Scheme VSC	Proposed VSC as a % of Existing Situation	Comment
17	8.3	7.41	89%	✓
18	32.79	29.91	91%	✓
19	33.6	29.94	89%	✓
20	34.25	29.33	86%	✓
21	27.72	24.47	88%	✓
22	34.25	28.05	82%	✓
23	27.87	24.1	86%	✓
24	34.24	26.52	77%	✓ ¹
25	27.86	23.08	83%	✓

View 3: Clanmaurice Avenue Dwellings



Points	Existing Situation VSC	Proposed Scheme VSC	Proposed VSC as a % of Existing Situation	Comment
1	34.38	34.09	99%	✓
2	32.84	30.76	94%	✓
3	38.66	36.61	95%	✓
4	35.55	33.05	93%	✓
5	38.46	35.78	93%	✓
6	33.47	30.49	91%	✓
7	24.13	21.55	89%	✓

View 4: Clanmaurice Avenue Dwellings



Points	Existing Situation VSC	Proposed Scheme VSC	Proposed VSC as a % of Existing Situation	Comment
1	36.6	33.59	92%	✓
2	31.6	28.93	92%	✓
3	37.31	34.4	92%	✓
4	33.1	31.87	96%	✓
5	37.88	34.71	92%	✓
6	33.03	30.3	92%	✓
7	37.2	34.49	93%	✓
8	29.69	28.27	95%	✓
9	37.82	33.88	90%	✓
10	35.41	30.65	87%	✓

View 5: Clanmaurice Avenue Dwellings



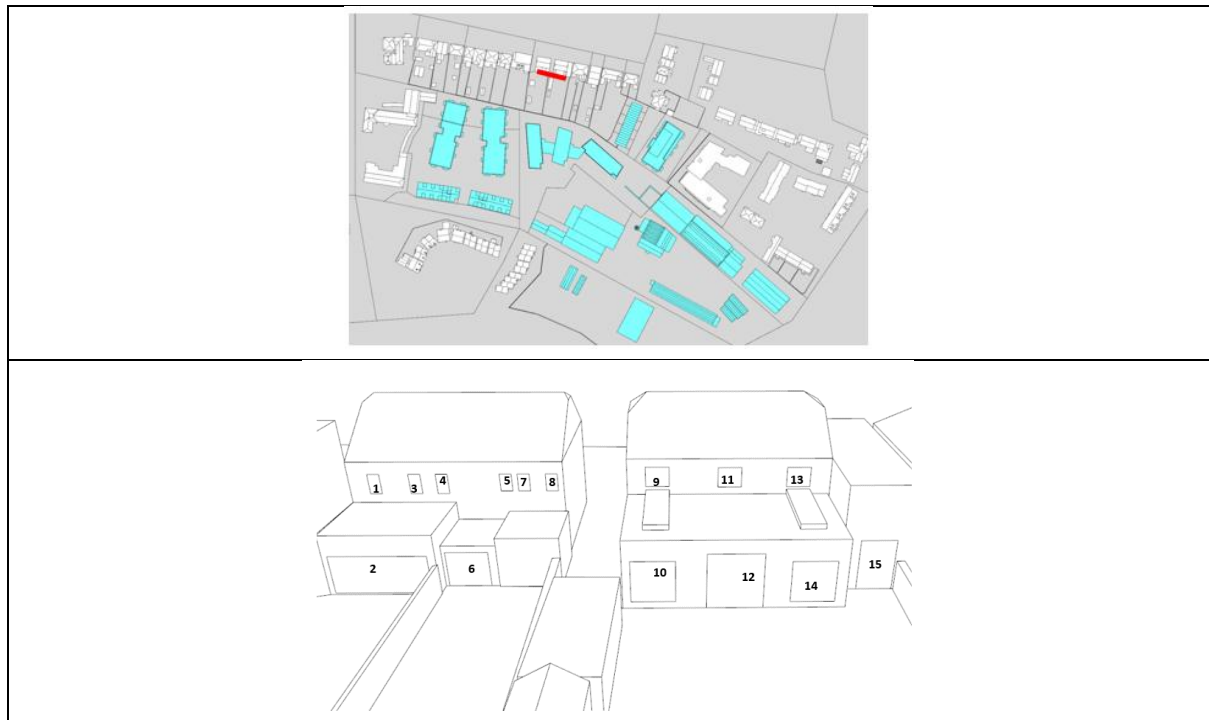
Points	Existing Situation VSC	Proposed Scheme VSC	Proposed VSC as a % of Existing Situation	Comment
1	38.74	34.51	89%	✓
2	37.65	31.82	85%	✓
3	34.96	32.25	92%	✓
4	37.84	33.7	89%	✓
5	38.46	34.5	90%	✓
6	37.45	32.03	86%	✓
7	38.84	34.53	89%	✓
8	38.79	34.58	89%	✓
9	37.3	31.45	84%	✓

View 6: Clanmaurice Avenue Dwellings



Points	Existing Situation VSC	Proposed Scheme VSC	Proposed VSC as a % of Existing Situation	Comment
1	34.63	29.81	86%	✓
2	38.59	34.27	89%	✓
3	36.81	31.43	85%	✓
4	36.81	32.81	89%	✓
5	37.84	32.47	86%	✓
6	38.86	34.82	90%	✓
7	35.07	34.56	99%	✓
8	38.95	30.61	79%	✓
9	31.37	29.26	93%	✓
10	37.41	32.39	87%	✓
11	32.02	29.78	93%	✓
12	38.85	34.77	89%	✓

View 7: Clanmaurice Avenue Dwellings



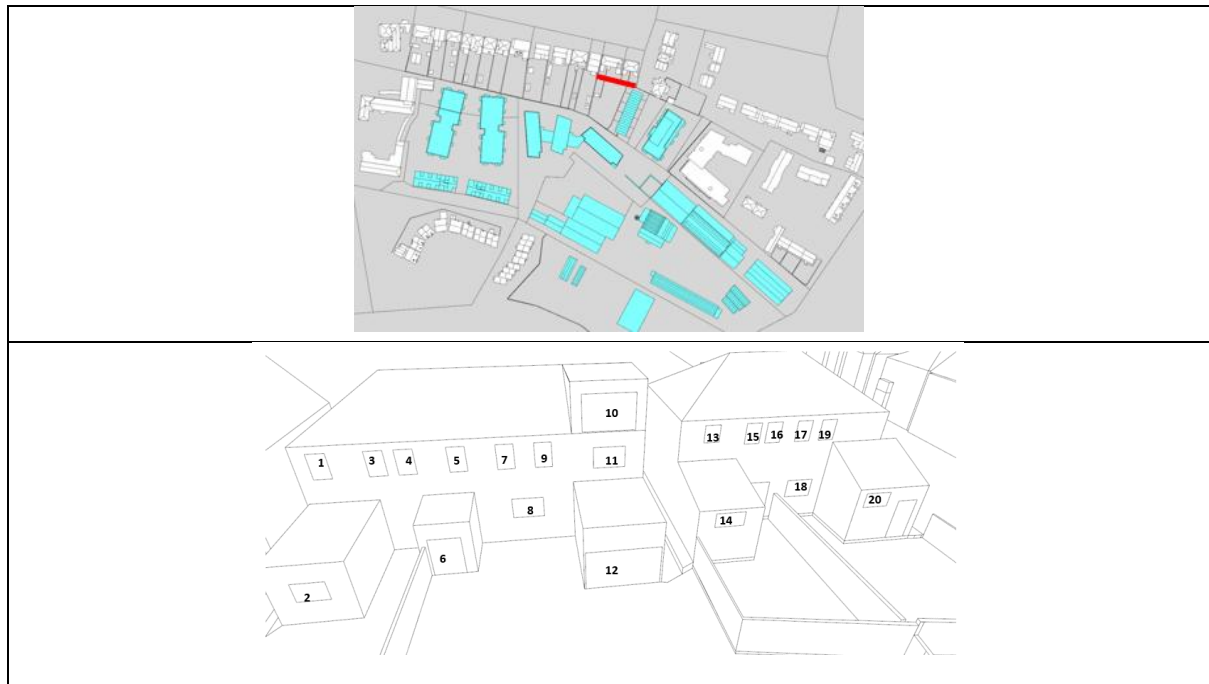
Points	Existing Situation VSC	Proposed Scheme VSC	Proposed VSC as a % of Existing Situation	Comment
1	37.49	34.32	92%	✓
2	35.97	32.69	91%	✓
3	38.18	34.77	91%	✓
4	38.52	34.98	91%	✓
5	38.74	35.27	91%	✓
6	31.02	29.22	94%	✓
7	38.75	35.31	91%	✓
8	38.76	35.38	91%	✓
9	38.76	35.76	92%	✓
10	34.29	32.04	93%	✓
11	38.43	35.76	93%	✓
12	37.42	33.71	90%	✓
13	34.93	32.36	93%	✓
14	37.72	33.8	90%	✓
15	32.8	29.89	91%	✓

View 8: Clanmaurice Avenue Dwellings



Points	Existing Situation VSC	Proposed Scheme VSC	Proposed VSC as a % of Existing Situation	Comment
1	34.33	32.82	96%	✓
2	35.69	33.06	93%	✓
3	37.01	34.35	93%	✓
4	25.25	23.72	94%	✓
5	33.6	31.15	93%	✓
6	38.89	35.97	92%	✓
7	38.09	34.34	90%	✓
8	37.62	34.7	92%	✓
9	37.46	34.11	91%	✓
10	38.69	35.7	92%	✓
11	38.79	36.05	93%	✓
12	37.86	34.18	90%	✓

View 9: Clanmaurice Avenue Dwellings



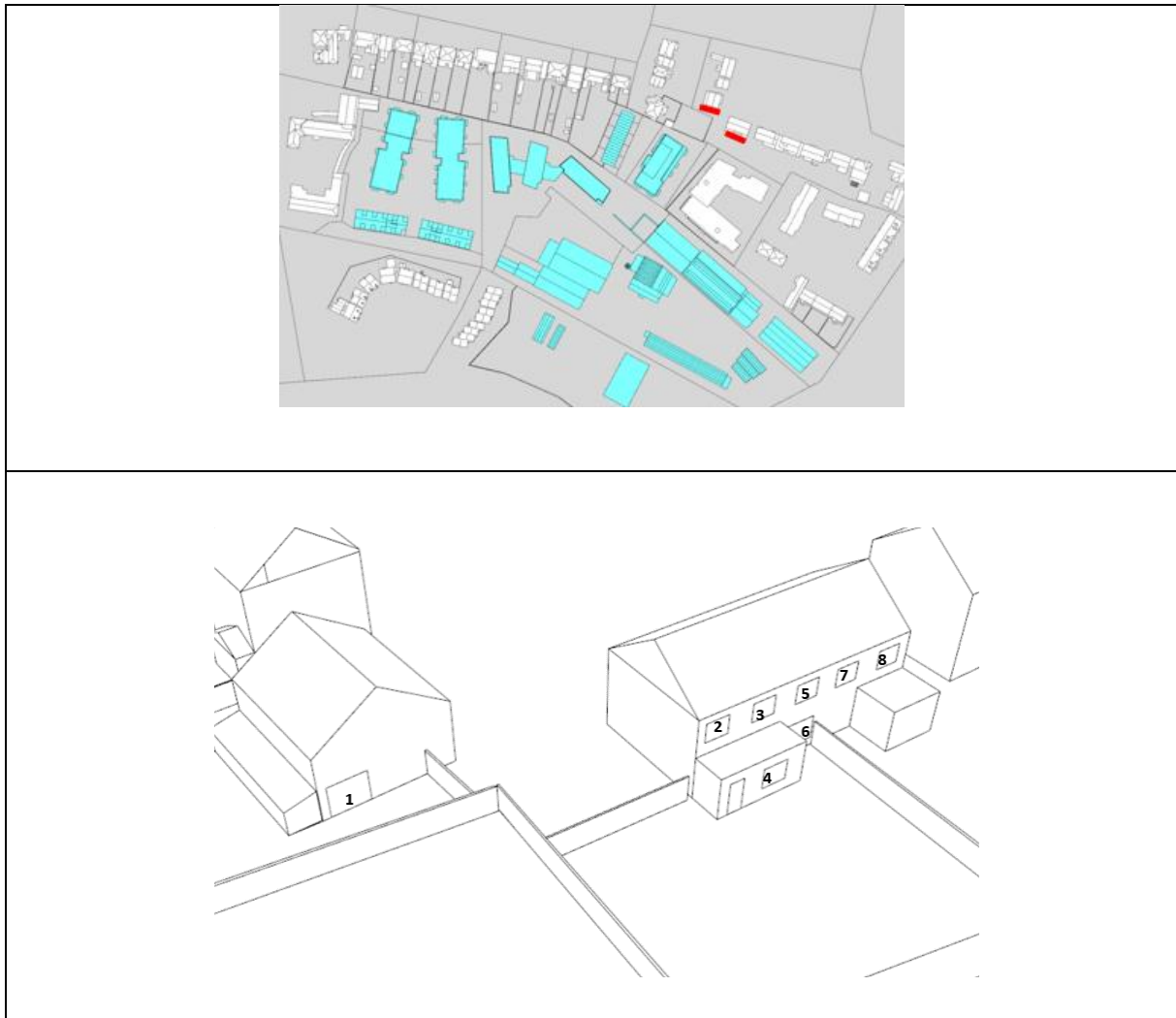
Points	Existing Situation VSC	Proposed Scheme VSC	Proposed VSC as a % of Existing Situation	Comment
1	34.8	32.99	95%	✓
2	36.64	32.87	90%	✓
3	38.52	35.93	93%	✓
4	38.63	36.11	93%	✓
5	38.72	36.32	94%	✓
6	33.17	30.68	92%	✓
7	38.86	36.39	94%	✓
8	34.09	31.58	93%	✓
9	38.72	36.3	94%	✓
10	38.99	37.1	95%	✓
11	38.88	36.01	93%	✓
12	37.04	33.49	90%	✓
13	38.88	36.72	94%	✓
14	38.3	34.39	90%	✓
15	38.87	36.47	94%	✓
16	38.88	36.43	94%	✓
17	38.8	36.31	94%	✓
18	29.27	26.37	90%	✓
19	38.89	36.54	94%	✓
20	38.39	33.17	86%	✓

View 10: Clanmaurice Avenue Dwellings



Points	Existing Situation VSC	Proposed Scheme VSC	Proposed VSC as a % of Existing Situation	Comment
1	37.26	36.02	96.7	✓
2	34	31.62	93.0	✓
3	38.92	34.95	89.8	✓
4	33.97	28.87	85.0	✓

View 11 Strandville Gardens



Ref.	Existing Situation	Proposed Scheme VSC	Proposed VSC as a % of Existing Situation	Comment
1	28.12	28.11	100%	✓
2	36.56	34.72	95%	✓
3	36.3	34.97	96%	✓
4	33.12	31.85	96%	✓
5	36.34	35.26	97%	✓
6	28.37	28.52	101%	✓
7	36.1	35.11	97%	✓
8	36.16	35.05	97%	✓

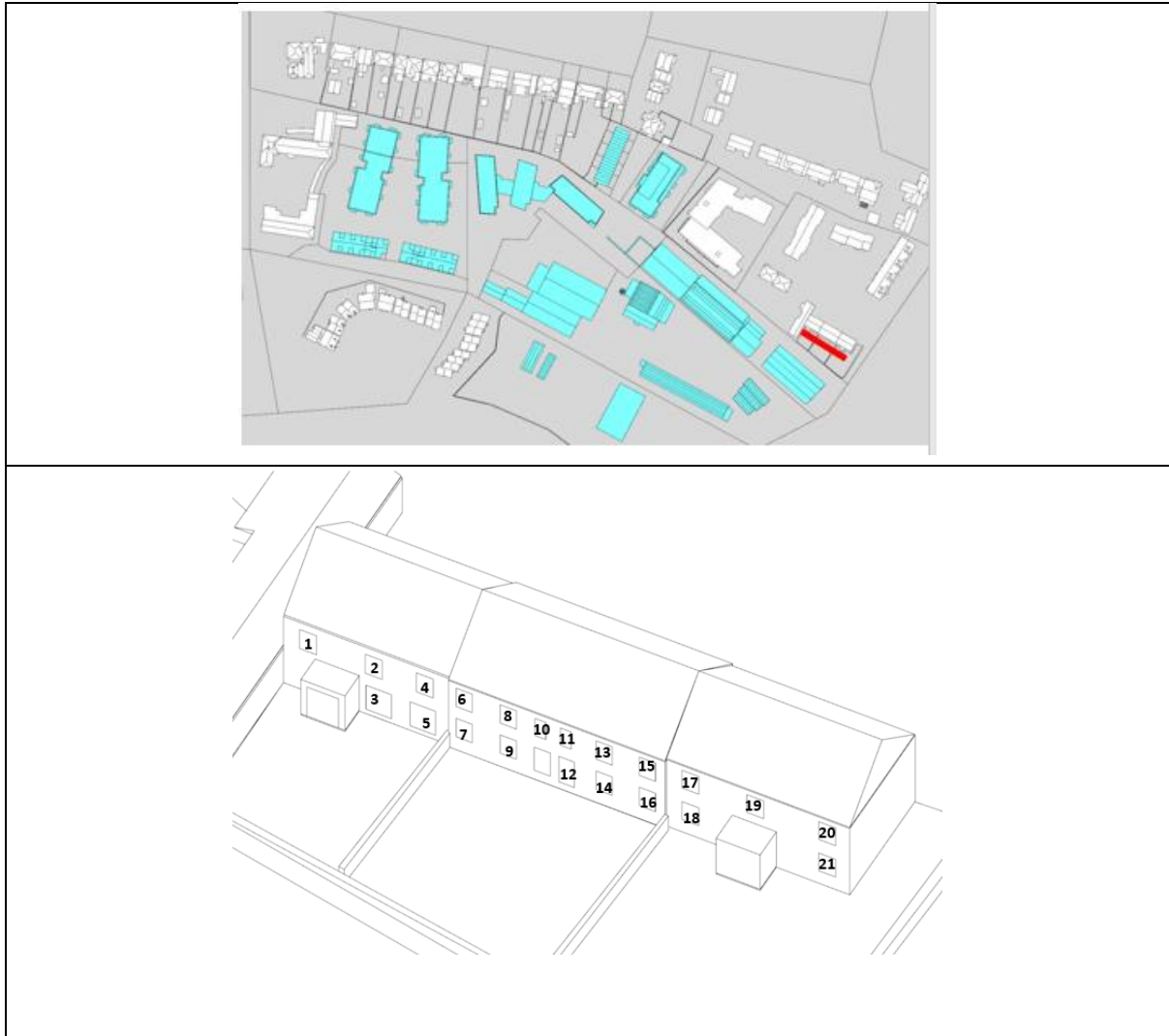
View 12: Lansdowne Hall Apartments



Points	Existing Situation VSC	Proposed Scheme VSC	Proposed VSC as a % of Existing Situation	Comment
1	38.10	35.43	93%	✓
2	37.02	33.02	89%	✓
3	35.03	30.90	88%	✓
4	38.16	34.46	90%	✓
5	29.92	24.97	83%	✓
6	27.69	22.51	81%	✓
7	38.04	33.83	89%	✓
8	29.89	24.23	81%	✓
9	27.69	21.52	78%	✓ ¹
10	38.16	33.37	87%	✓
11	37.14	30.67	83%	✓
12	35.94	27.97	78%	✓

13	38.16	32.81	86%	✓
14	37.47	30.27	81%	✓
15	36.08	27.66	77%	✓
16	38.19	32.10	84%	✓
17	37.56	29.43	78%	✓
18	35.61	27.04	76%	✓
19	38.24	31.70	83%	✓
20	36.74	28.51	78%	✓
21	35.46	25.71	73%	✓ ¹
22	37.99	31.14	82%	✓
23	29.82	20.83	70%	✓ ¹
24	28.26	17.90	63%	✓ ¹
25	38.61	34.60	90%	✓
26	37.39	31.29	84%	✓
27	36.21	28.19	78%	✓
28	34.59	25.08	73%	✓ ¹
29	38.67	34.89	90%	✓
30	37.96	32.89	87%	✓
31	37.27	29.06	78%	✓
32	35.68	27.13	76%	✓
33	38.74	35.20	91%	✓
34	38.06	32.36	85%	✓
35	37.14	29.85	80%	✓
36	35.41	27.39	77%	✓

View 13: Stone Town Terrace



Points	Existing Situation VSC	Proposed Scheme VSC	Proposed VSC as a % of Existing Situation	Comment
1	36.3	27.58	76%	✓
2	36.26	27.88	77%	✓
3	26.68	19.77	74%	✓ ¹
4	36.56	28.03	77%	✓
5	33.8	25.43	75%	✓ ¹
6	36.88	28.44	77%	✓
7	34.54	26.58	77%	✓
8	37.17	28.67	77%	✓
9	34.75	26.74	77%	✓
10	37.25	29.32	79%	✓
11	37.27	29.69	80%	✓

12	34.72	27.2	78%	✓
13	37.46	30.15	80%	✓
14	35.06	28.63	82%	✓
15	37.43	30.65	82%	✓
16	35.21	29.12	83%	✓
17	37.54	31.77	85%	✓
18	34.27	28.66	84%	✓
19	37.98	32.84	86%	✓
20	38.12	34.26	90%	✓
21	38.12	34.26	90%	✓

View 14: Fernhill (North Circular Road)



Points	Existing Situation VSC	Proposed Scheme VSC	Proposed VSC as a % of Existing Situation	Comment
1	35.55	31.8	89%	✓
2	32.15	29.37	91%	✓
3	35.2	31.48	89%	✓
4	35.76	32.12	90%	✓
5	31.13	28.74	92%	✓
6	35.54	31.9	90%	✓
7	34.9	31.59	91%	✓
8	31.86	28.92	91%	✓
9	34.27	30.78	90%	✓
10	34.91	30.89	88%	✓
11	33.97	30.29	89%	✓
12	28.53	26.11	92%	✓
13	30.21	30.39	101%	✓
14	33.74	27.73	82%	✓
15	33.79	29.97	89%	✓

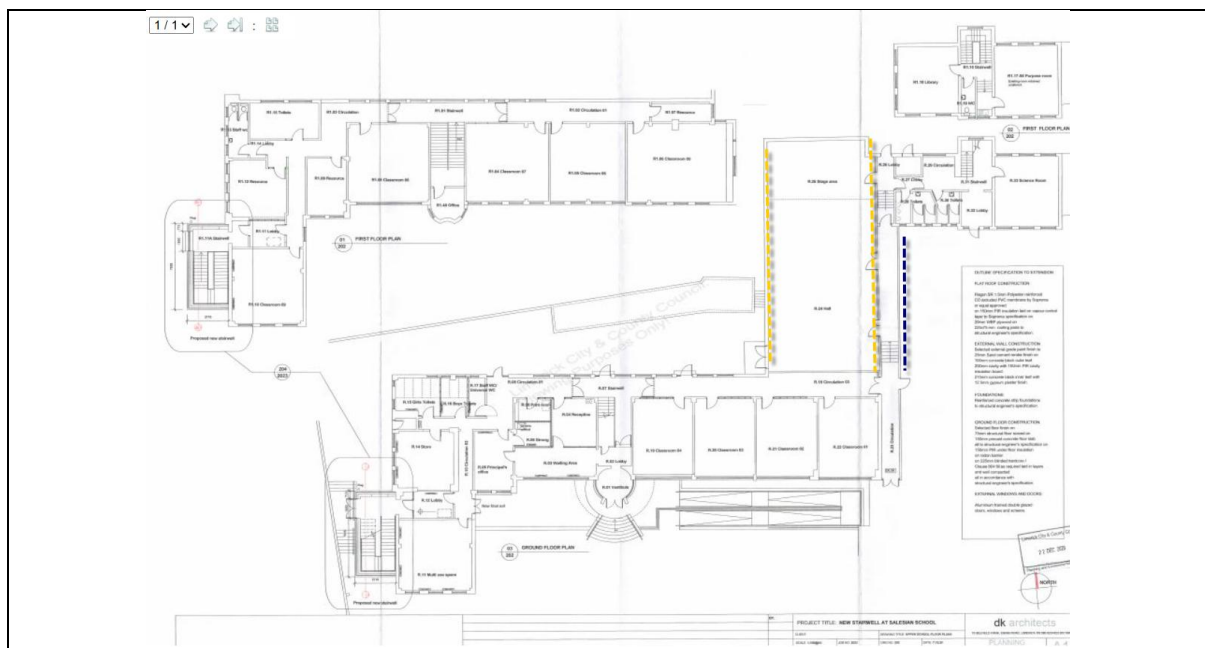
16	33.99	30.42	89%	✓
17	33.69	29.98	89%	✓
18	28.58	25.63	90%	✓
19	33.74	31.05	92%	✓
20	33.53	30.56	91%	✓
21	29.55	27.5	93%	✓
22	34.06	30.55	90%	✓
23	32.81	27.59	84%	✓
24	30.74	29.4	96%	✓
25	34.85	30.77	88%	✓
26	32.05	26.24	82%	✓
27	35.07	30.9	88%	✓
28	32.78	26.47	81%	✓
29	35.22	31.05	88%	✓
30	34.75	31	89%	✓

Discussion

This study considers the Proposed Scheme and tests if the VSC results are greater than 27% or not less than 0.8 times the value of the Existing Scheme.

When compared to the Existing Scheme, of the 226 no. points tested, 94% (212 points) have a Proposed VSC value greater than 27% or not less than 0.8 times their former value compared to the Existing Scheme, thus complying with the BRE Guidelines. It should be noted that none of the windows neighbouring the development fall into category three and have a VSC value of less than 15% and less than 0.8 times its former value. All results are positive.

7 windows below recommendation are located on the Salesians Primary School. 3 of these windows are above 26% and only marginally outside the recommended value of 27% (View 1 window 4 & View 2. Windows 11 & 24) and therefore adequate daylight should still be received. The remaining 4 are windows to the same hall space within the School (orange dotted line highlighted in the image below) that is also lit from an array of windows on the other side (images of hall space windows below) of the hall and therefore there will be a negligible impact to the school hall space overall. To note the windows at ground level (blue dotted line marked on the floor plan below) have been omitted as these are to a circulation space and are not required to be assessed as noted in the BRE Guide section 2.2.2, "windows to bathrooms, toilets, storerooms, circulation areas and garages need not be analysed".



Floor Plan of Salesians Primary School



Salesians Primary School Hall West	Salesians Primary School Hall East
------------------------------------	------------------------------------

5 windows below recommendation are located on the Lansdowne Hall apartments. 2 of the windows are to bedrooms and are above 25% and marginally outside recommendations and therefore there will be a minor adverse impact to these windows. The remaining 3 windows below recommendations have values between 18% and 21% and are located on living spaces with large floor to ceiling glass onto an outdoor balcony area. As noted in the BRE guide (as per Section 2.1.6), adequate daylight should still be expected given the presence of larger than conventional windows. Therefore, there will be a negligible effect to these windows and to the building as a whole.

Finally, the remaining 2 windows below recommendations are located on properties on Stone Town Terrace. Both windows have percentages of between 18% and 25% and are marginally outside the recommended of 80% of the existing value. In addition to this both windows are larger than a conventional window and have floor to ceiling glass in place. As noted in the BRE guide (as per Section 2.1.6), adequate daylight should still be expected given the presence of larger than conventional windows. Therefore, there will be a negligible impact to these windows and these neighbouring dwellings as a whole as results of the redevelopment of the proposed site.

The redevelopment of the proposed site will therefore overall have a negligible impact to daylight to exiting neighbouring receptors.

17.5.2.3 Sunlight Analysis of Existing Buildings

Guidance – BRE Guide (3rd Edition)

The BRE Guide (3rd Edition) states that interiors where the occupants expect sunlight should receive at least one quarter (25%) of annual probable sunlight hours, including at least 5% of annual probable sunlight hours during the winter months, between 21st September and 21st March.

Here '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. If a window reference point can receive more than 25% of annual probable sunlight hours, including at least 5% of annual probable sunlight hours during the winter months between 21st September and 21st 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 (21st September to 21st March) and reduction in sunlight across the year has a greater reduction than 4%, then the occupants of the existing building will notice the loss of sunlight.

Summary

3.2.13 If a living room of an existing dwelling has a main window facing within 90° of due south, and any part of a new development subtends an angle of more than 25° to the horizontal measured from the centre of the window in a vertical section perpendicular to the window, then the sunlighting of the existing dwelling may be adversely affected. This will be the case if the centre of the window:

- receives less than 25% of annual probable sunlight hours and less than 0.80 times its former annual value; or less than 5% of annual probable sunlight hours between 21 September and 21 March and less than 0.80 times its former value during that period;
- and also has a reduction in sunlight received over the whole year greater than 4% of annual probable sunlight hours.

BRE 3rd Edition guidance document Site Layout Planning for Daylight and Sunlight

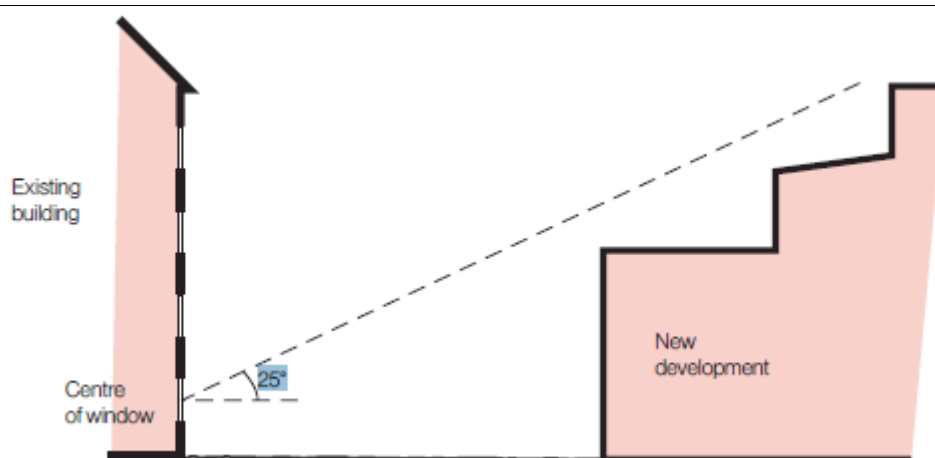
As such this study will compare the Existing Scheme and Proposed Schemes and consider if the values on the existing buildings meet the requirements outlined above when compared to their former value (that of the Existing scheme).

APSH Exclusions

The BRE recommendations note that if a new development sits within 90° of due south of any main living room window of an existing dwelling, then these should be assessed for APSH. However, there are several exceptional cases in which APSH is not required to be calculated, as indicated below:

3.2.9 It is not always necessary to do a full calculation to check sunlight potential. The guideline above is met provided either of the following is true:

- If the distance of each part of the new development from the existing window is three or more times its height above the centre of the existing window (note: obstructions within 90° of due north of the existing window need not count here).
- The window wall faces within 90° of due south and no obstruction, measured in the section perpendicular to the window wall, subtends an angle of more than 25° to the horizontal (Figure 14 in section 2.2). Again, obstructions within 90° of due north of the existing window need not be counted.
- The window wall faces within 20° of due south and the reference point has a VSC (section 2.1) of 27% or more.



BRE 3rd Edition guidance document Site Layout Planning for Daylight and Sunlight

Consequently, APSH will only be calculated for adjacent windows which meet the following conditions:

1. The height distance rule is not met and the existing building has living room with a main window which faces within 90 degrees of due south with the 25° rule not being met either.
2. Existing building is located to the North, East, or West of the Proposed Development.
3. The existing main living room window lies within 20 degrees of due south and has a VSC of less than 27%.

Assessment

Based on the above criteria, the locations in the following sections have been modelled and analysed with the results also included.

Please note, the "Comment" symbol in each of the tables represents the following:

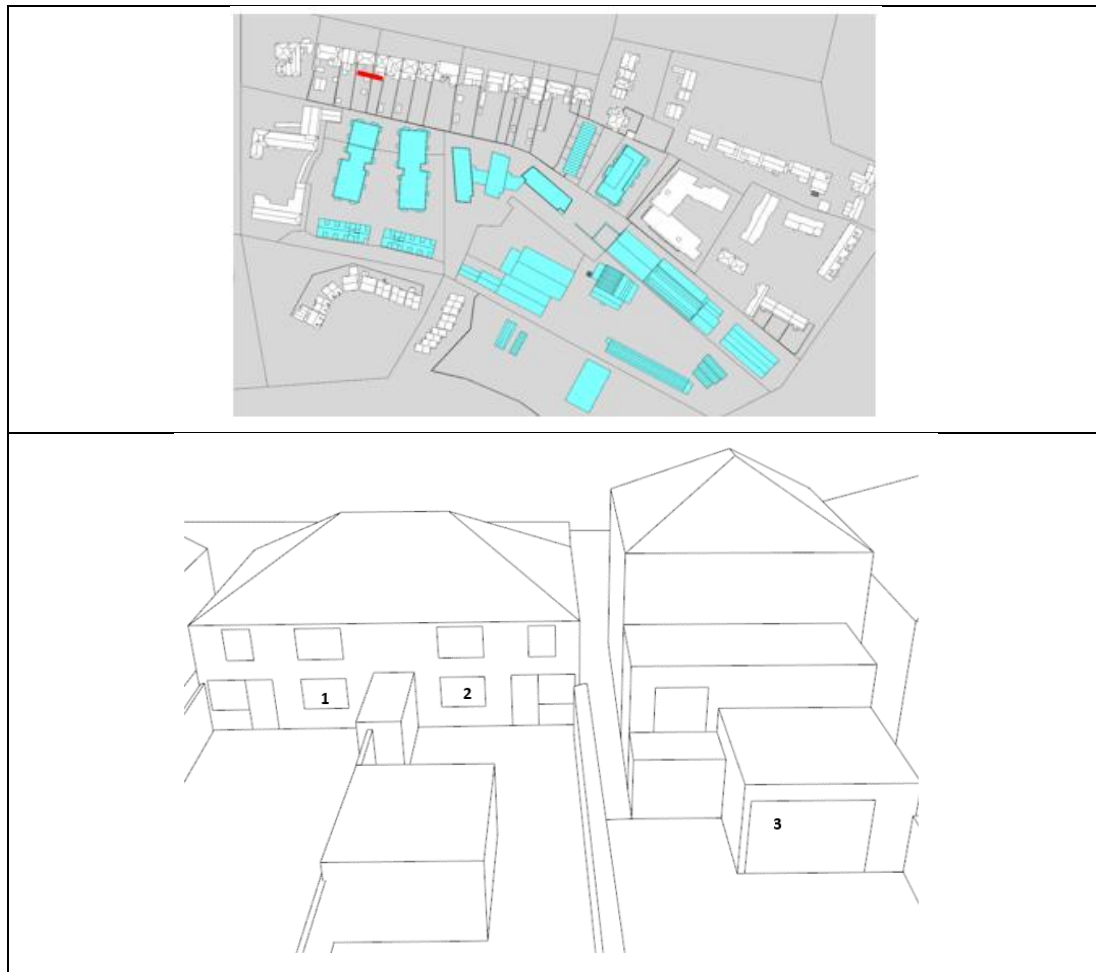
- ✓/✓ For these locations, both the Proposed Scheme annual and winter APSH results are greater than 25% and 5% respectively, or are greater than 0.8 times their former value with the Proposed Development in place.
- ✓/x For these locations, the annual APSH results are greater than 25% or are greater than 0.8 times their former value with the Proposed Development in place, however, the winter results are below the guidelines.
- x/✓ For these locations, the annual APSH results are less than the recommended values, however, the winter APSH results are greater than 5% or greater than 0.8 times their former value with the Proposed Development in place.
- x/x For these locations, both the annual and winter APSH results are less than 25% and 5% respectively, and less than 0.8 times their former value with the Proposed Development in place.

View 1: Clanmaurice Avenue Dwellings



Points	Existing Situation APSH		Proposed Scheme APSH		Proposed APSH as a % of Existing Situation		Comment
	Annual	Winter	Annual	Winter	Annual	Winter	
1	35.95	11.92	34.01	9.97	95%	84%	✓/ ✓
2	32.87	11.81	31.83	10.09	97%	85%	✓/ ✓

View 2: Clanmaurice Avenue Dwellings



Points	Existing Situation APSH		Proposed Scheme APSH		Proposed APSH as a % of Existing Situation		Comment
	Annual	Winter	Annual	Winter	Annual	Winter	
1	33.49	10.13	32.51	9.15	97%	90%	✓/ ✓
2	34.96	11.16	33.02	9.22	94%	83%	✓/ ✓
3	37.91	11.61	34.49	8.96	91%	77%	✓/ ✓

View 3: Clanmaurice Avenue Dwellings



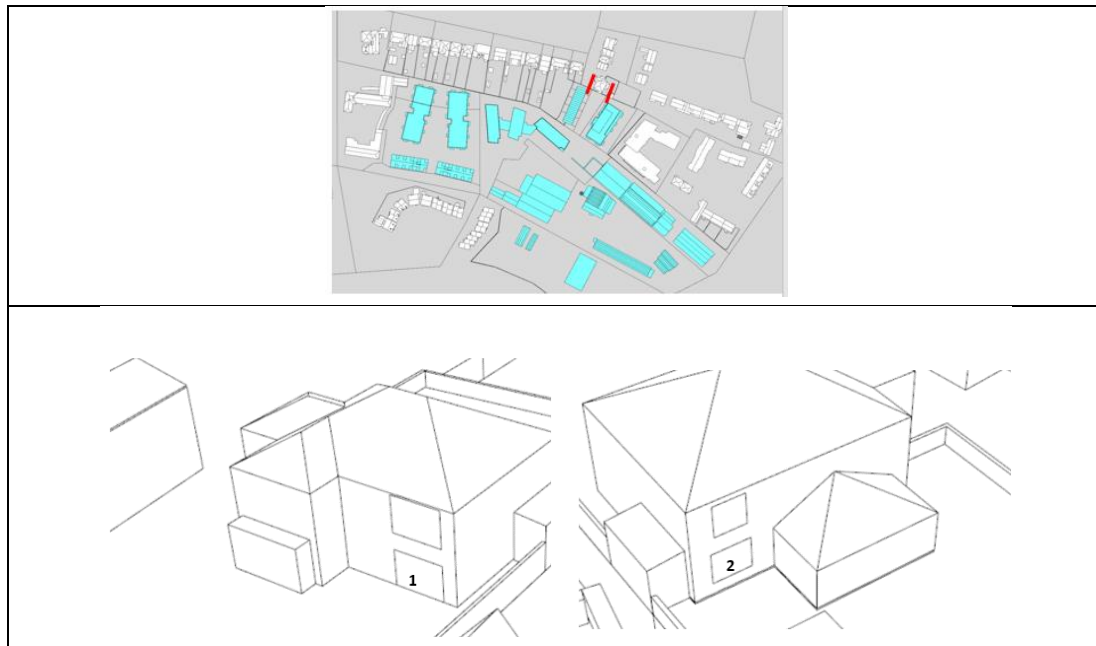
Points	Existing Situation APSH		Proposed Scheme APSH		Proposed APSH as a % of Existing Situation		Comment
	Annual	Winter	Annual	Winter	Annual	Winter	
1	39.68	13.64	37.54	11.5	95%	84%	✓/ ✓
2	39.46	14.79	36.92	12.25	94%	83%	✓/ ✓
3	38.35	12.37	36.45	10.48	95%	85%	✓/ ✓

View 4: Clanmaurice Avenue Dwellings



Points	Existing Situation APSH		Proposed Scheme APSH		Proposed APSH as a % of Existing Situation		Comment
	Annual	Winter	Annual	Winter	Annual	Winter	
1	35.47	11.8	35.37	11.71	100%	99%	✓/ ✓
2	29.3	10.56	29.22	10.58	100%	100%	✓/ ✓
3	41.17	14.42	41.15	14.41	100%	100%	✓/ ✓

View 5: Clanmaurice Avenue Dwellings



Points	Existing Situation APSH		Proposed Scheme APSH		Proposed APSH as a % of Existing Situation		Comment
	Annual	Winter	Annual	Winter	Annual	Winter	
1	16.02	2.64	15.88	2.51	99%	95%	✓/ ✓
2	29.53	9.57	25.09	5.13	85%	54%	✓/ ✓

View 6: Clanmaurice Avenue Dwellings

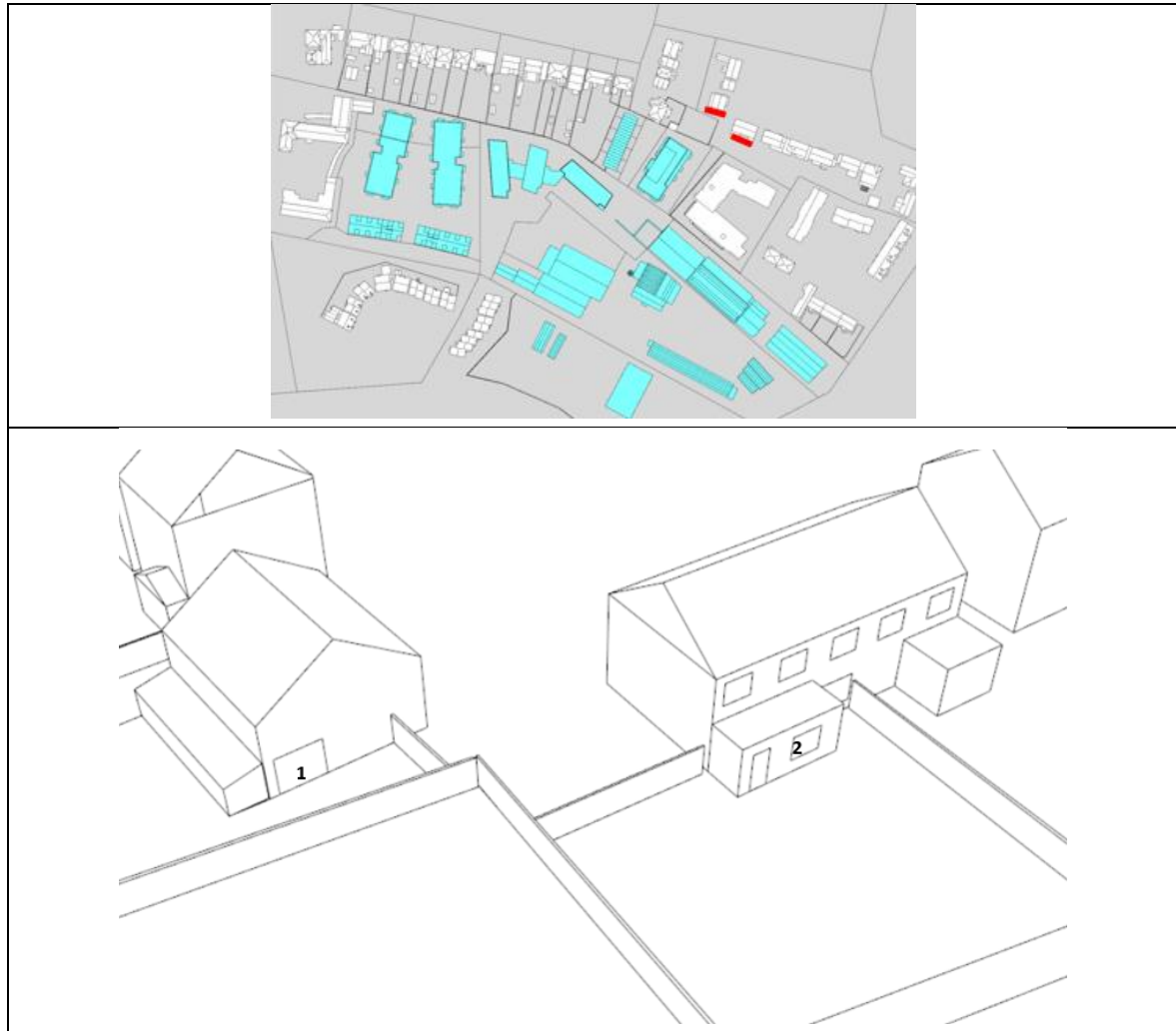


Points	Existing Situation APSH		Proposed Scheme APSH		Proposed APSH as a % of Existing Situation		Comment
	Annual	Winter	Annual	Winter	Annual	Winter	
1	36.2	11.45	36.1	11.34	100%	99%	✓/✓
2	36.76	12	36.29	11.54	99%	96%	✓/✓
3	40.67	14.8	39.14	13.3	96%	90%	✓/✓

View 7: Clanmaurice Avenue Dwellings



Points	Existing Situation APSH		Proposed Scheme APSH		Proposed APSH as a % of Existing Situation		Comment
	Annual	Winter	Annual	Winter	Annual	Winter	
1	36.89	14.75	34.81	12.67	94%	86%	✓/ ✓
2	37.88	11.89	36.83	10.84	97%	91%	✓/ ✓
3	41.3	15.24	39.06	13.01	95%	85%	✓/ ✓



Ref.	Existing Situation APSH		Proposed Scheme APSH		Proposed APSH as a % of Existing Situation		Comment
	Annual	Winter	Annual	Winter	Annual	Winter	
1	53.95	14.65	53.46	14.15	99%	97%	✓/✓
2	62.64	22.13	60.26	21.44	96%	97%	✓/✓

View 8: Stone Town Terrace



Points	Existing Situation APSH		Proposed Scheme APSH		Proposed APSH as a % of Existing Situation		Comment
	Annual	Winter	Annual	Winter	Annual	Winter	
1	33.3	11.58	28.19	6.76	85%	58%	✓/✓
2	37.02	13.78	32.78	9.54	89%	69%	✓/✓
3	32.51	9.31	29.68	6.48	91%	70%	✓/✓

Discussion

This study considers existing dwellings sunlight and tests if the Annual Probable Sunlight Hours (APSH) results for the living room windows (existing properties) are greater than 25% annual and 5% winter sunlight or are greater than 0.8 times their former value with the proposed development in place or the reduction in sunlight across the year is less than 4% with the proposed development in place.

When compared to the Existing Scheme, 100% of the tested points (22no.) meet the BRE recommended values. These results highlight that the proposed development will have minimal impact to the sunlight received to these existing neighbouring properties. Overall the impact to the existing adjacent properties sunlight will be negligible.

17.5.2.4 Sunlight to the Existing Amenity Spaces

Guidance Requirements

The impact of the proposed development on the sunlight availability to the amenity spaces will be considered to determine how the amenity spaces perform when assessed against the BRE Guide (3rd Edition) which states the following in Section 3.3.17:

Summary

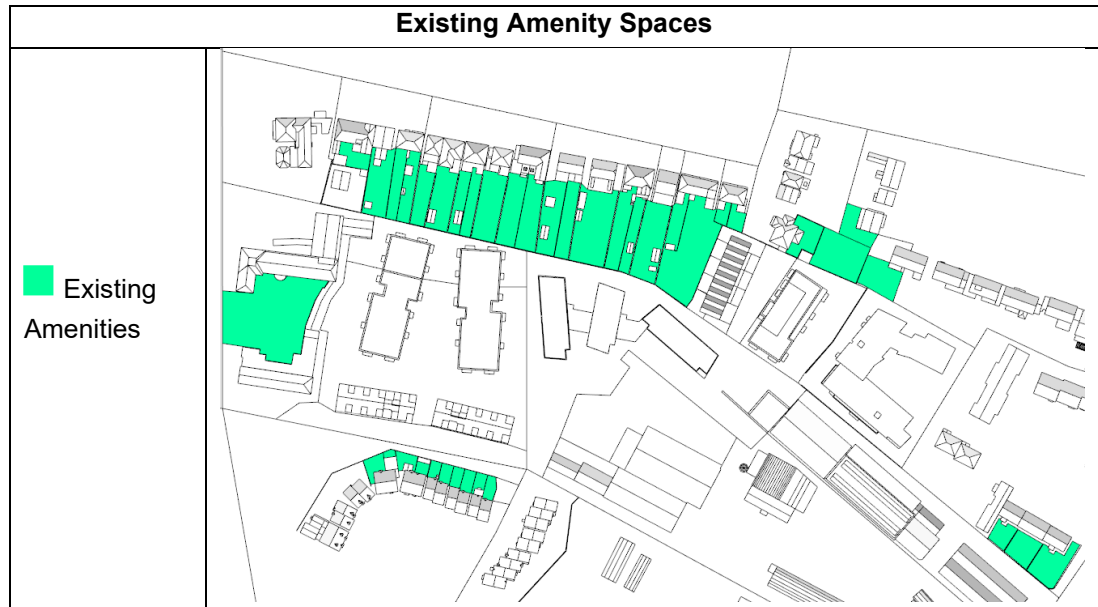
3.3.17 It is recommended that for it to appear adequately sunlit throughout the year, at least half of a garden or amenity area should receive at least two hours of sunlight on 21 March. If as a result of new development an existing garden or amenity area does not meet the above, and the area that can receive two hours of sun on 21 March is less than 0.80 times its former value, then the loss of sunlight is likely to be noticeable. If a detailed calculation cannot be carried out, it is recommended that the centre of the area should receive at least two hours of sunlight on 21 March.

The BRE Guide (3rd Edition) states that for a space to appear adequately sunlit throughout the year, at least half of a garden or amenity space should receive at least 2 hours of sunlight on March 21st. In the case of existing amenity spaces, if they are already below the 50% threshold then the BRE recommends the results kept to within 80% of the existing situation.

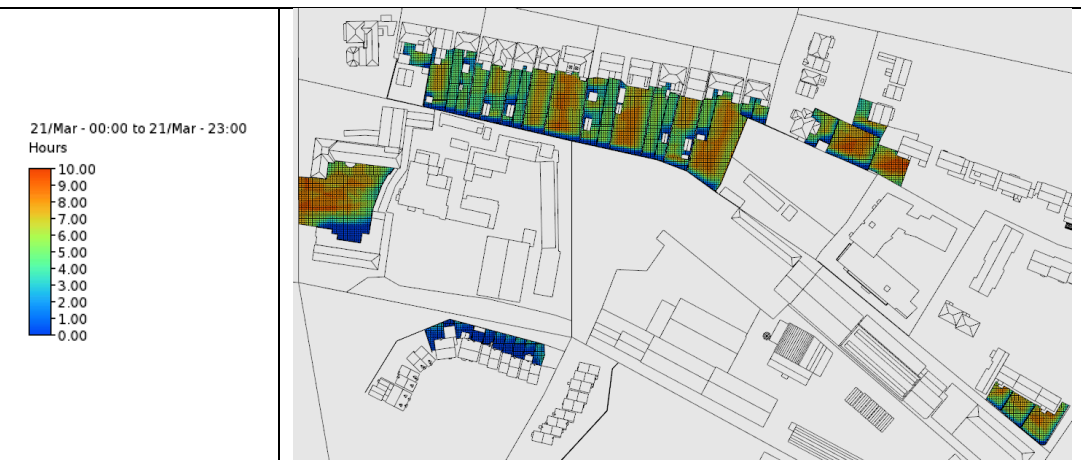
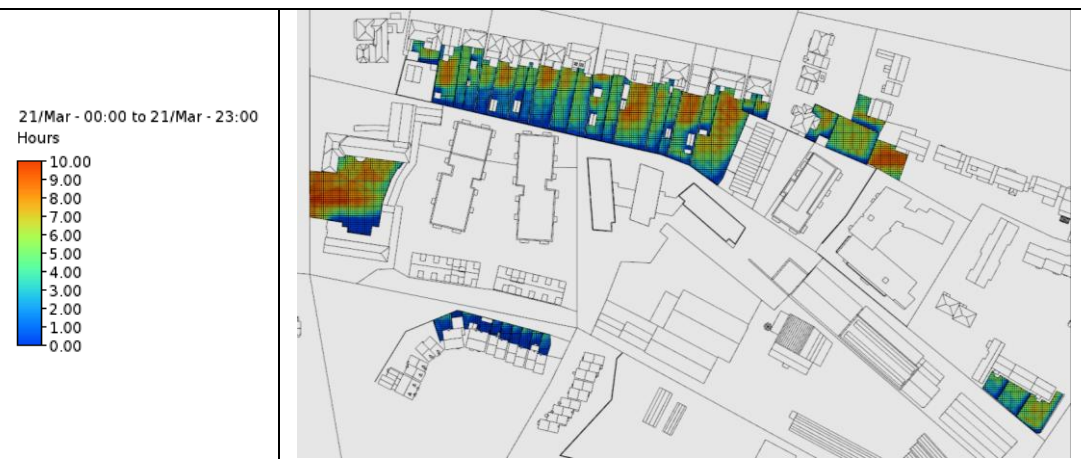
Assessment

Existing Amenity Spaces

This analysis will be performed on the amenity spaces illustrated in the image below.



Existing Amenity Spaces Results

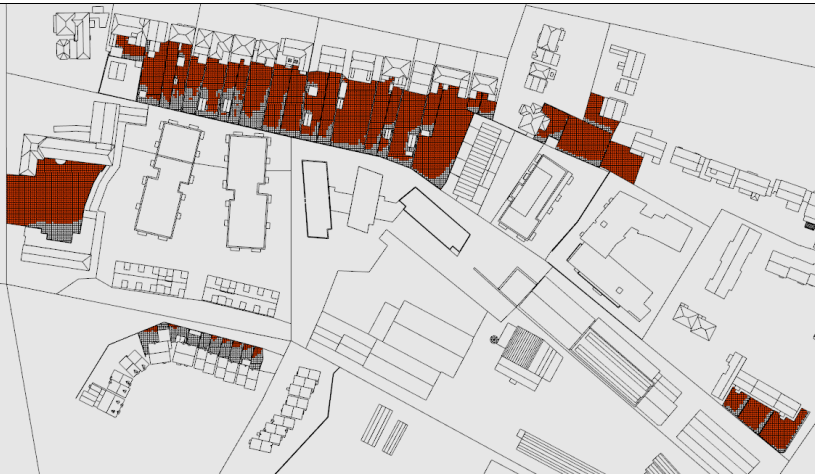
Prior to Development in place: Absolute Scale Showing all Hours of Sunlight Received**Proposed Development in place: Absolute Scale Showing all Hours of Sunlight Received**

Prior to Development in place: Hours of Sunlight > 2 Illustrated in Red

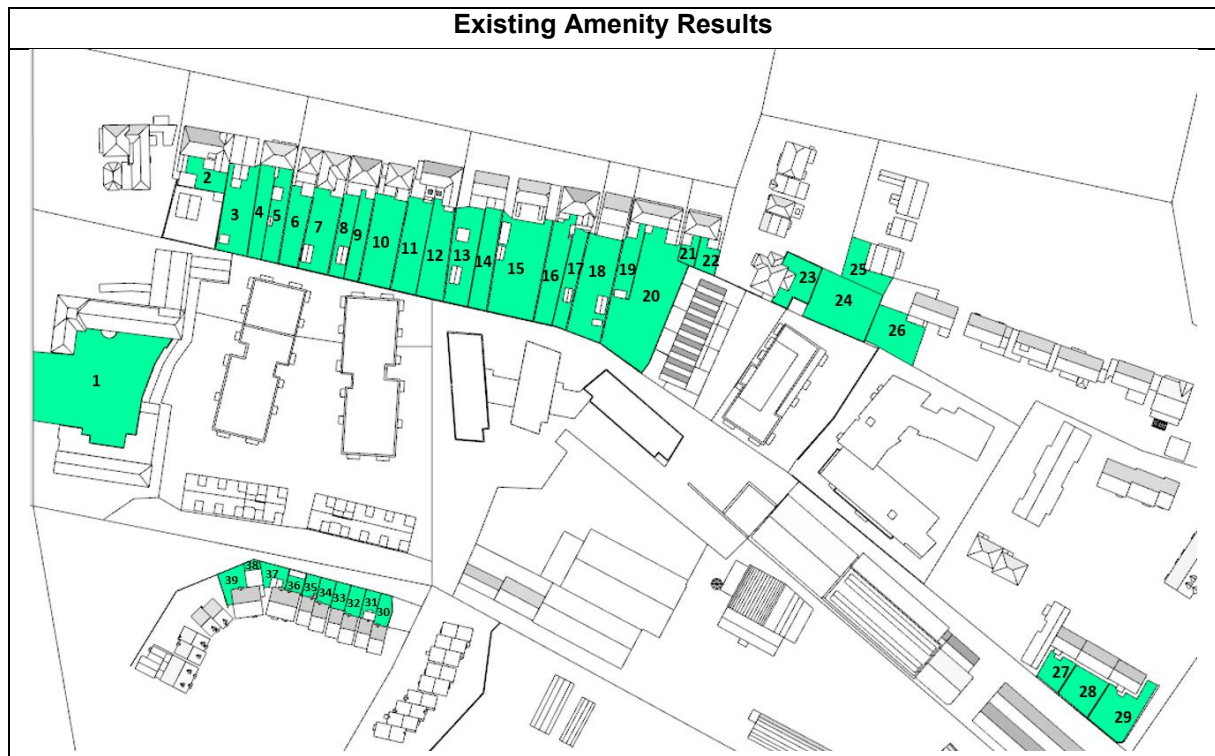
- Receives more than 2 hours of sunlight
- Receives less than 2 hours of sunlight

**Proposed Development in place: Hours of Sunlight > 2 Illustrated in Red**

- Receives more than 2 hours of sunlight
- Receives less than 2 hours of sunlight



Existing Amenity Results



Ref	Area (m ²)	Existing Area >2 hrs		Existing Area with Proposed Development in Place >2 hrs		Proposed vs Existing (%)	Comment
		(m ²)	(%)	(m ²)	(%)		
1	1489	1323	89%	1323	89%	100%	✓
2	122	115	94%	93	76%	81%	✓
3	346	307	89%	289	84%	94%	✓
4	194	178	92%	170	88%	96%	✓
5	230	209	91%	173	75%	83%	✓
6	226	211	93%	140	62%	66%	✓
7	339	312	92%	275	81%	88%	✓
8	191	152	80%	132	69%	87%	✓
9	172	160	93%	102	59%	64%	✓
10	414	391	94%	306	74%	78%	✓
11	345	331	96%	296	86%	89%	✓
12	337	316	94%	299	89%	95%	✓
13	369	322	87%	297	80%	92%	✓
14	263	246	94%	225	86%	91%	✓
15	668	631	94%	621	93%	98%	✓

Ref	Area (m ²)	Existing Area >2 hrs		Existing Area with Proposed Development in Place >2 hrs		Proposed vs Existing (%)	Comment
		(m ²)	(%)	(m ²)	(%)		
16	300	280	93%	261	87%	93%	✓
17	212	185	87%	171	81%	92%	✓
18	496	463	93%	435	88%	94%	✓
19	178	155	87%	153	86%	99%	✓
20	894	875	98%	834	93%	95%	✓
21	57	42	74%	41	72%	98%	✓
22	83	65	78%	62	75%	95%	✓
23	197	173	88%	165	84%	95%	✓
24	473	441	93%	436	92%	99%	✓
25	185	156	84%	156	84%	100%	✓
26	288	265	92%	265	92%	100%	✓
27	124	114	92%	92	74%	81%	✓
28	200	191	96%	171	86%	90%	✓
29	303	293	97%	287	95%	98%	✓
30	61	19	30%	19	30%	100%	✓
31	48	9	19%	9	19%	100%	✓
32	63	10	16%	10	16%	100%	✓
33	54	7	13%	7	13%	100%	✓
34	54	5	9%	5	9%	100%	✓
35	43	0	0%	0	0%	100%	✓
36	51	0	0%	0	0%	100%	✓
37	66	7	10%	8	10%	100%	✓
38	20	0	0%	0	0%	100%	✓
39	89	13	15%	13	15%	100%	✓

Discussion

As outlined in Section 3.3.17 of the BRE Guide (3rd Edition), for a space to appear adequately sunlit throughout the year, at least half of the garden or amenity area should receive at least 2 hours of sunlight on March 21st. In the case of existing amenity spaces, if they are already below the 50% threshold then the BRE recommends the results kept to within 80% of the existing situation.

On March 21st the majority of existing amenity spaces will receive similar levels of sunlight with the proposed development in place when compared to the existing scenario. In all cases the results comply with the recommendations in the BRE Guide outlined above. Overall the impact to the existing adjacent properties will be negligible.

17.5.3 Do Nothing Scenario

In a “Do-Nothing” scenario no new buildings will be constructed, therefore, the existing level of daylight and sunlight access will remain unchanged.

17.6 CUMULATIVE DEVELOPMENT & IMPACTS

Regarding the Masterplan Site, as a whole it is expected that the sympathetic sculpting proposed with the massing tapering down towards the Proposed Development and the distance of the TUS (Phase 3) and Shipyard (Phase 4) from the Proposed Development (Phase 2) will have a Not Significant impact to the Proposed Phase 2 Development and also the existing receiving environment. There are no other noted permitted developments proposed in close proximity to the development application site that should be considered within this report where daylight and sunlight are concerned.



Masterplan Site - Including conceptual massing Phase 3 (TUS Campus-6) & Phase 4 (Shipyard-7)

17.7 REMEDIAL & MITIGATION MEASURES

17.7.1 Incorporated Design Mitigation

Where daylight is concerned, The Planning Design Standards for Apartments 2025 refers to the Sustainable Residential Development and Compact Settlements Guidelines 2024 Section 5.3.7(b) Daylight, which states the following:

“(b) In cases where a technical assessment of daylight performance is considered by the planning authority to be necessary, regard should be had to quantitative performance approaches to daylight provision outlined in guides like A New European Standard for Daylighting in Buildings IS EN17037:2018, UK National Annex BS EN17037:2019 and the associated BRE Guide 209 2022 Edition (June 2022), or any relevant future standards or guidance specific to the Irish context.”

Furthermore, Section 3.2 of the Urban Development and Building Heights: Guidelines for Planning Authorities December 2018, states the following: -

“Where a proposal may not be able to fully meet all the requirements of the daylight provisions above, this must be clearly identified and a rationale for any alternative, compensatory design solutions must be set out, in respect of which the planning authority or An Bord Pleanála should apply their discretion, having regard to local factors including specific site constraints and the balancing of that assessment against the desirability of achieving wider planning objectives. Such objectives might include securing comprehensive urban regeneration and or an effective urban design and streetscape solution.”

Having regard to the statements above, it should be noted that throughout the design process the design team worked hard to optimise the whole development to maximise the daylight within the proposed scheme. The following design optimisation solutions were tested in an attempt to improve daylight to the proposed apartments which included the following:

- Alterations to layouts.
- Increase Opening

With regards to the existing neighbouring properties and in particular the Lansdowne Hall apartments, mitigation measures were taken with regards to the proposed design of the Stonetown Terrace apartment block to protect these existing neighbouring apartments daylight. An extensive design development was conducted considering multiple different massing options after the original design was noted to have a major impact to these dwellings. The mitigation measures included a sculpting of the massing on the upper floors, a reduction to the base floor levels from 11m to 9.5m to bring the overall building height down as well as moving the building away from the existing Lansdowne Hall building by half a meter. These design alterations combined changed the impact from a major adverse impact to a minor adverse impact.

When taking into consideration the results from all the tests conducted, sunlight to amenities, sunlight to buildings and daylight to buildings, the Proposed Development has a negligible impact to neighbouring daylight and sunlight. Please refer to Chapter 5 Consideration of Alternatives Section 5.6.3.

17.7.2 Operation Phase Mitigation

Negligible impact is expected in relation to daylight and sunlight access experienced by the future inhabitants of the Proposed Development and to the existing inhabitants of the adjacent buildings. Sufficient mitigation measures have been incorporated into the design of the proposed development where required and therefore, no additional remedial or mitigation measures are considered to be required.

17.8 RESIDUAL IMPACTS

Negligible impact is expected in relation to daylight and sunlight access experienced by the future inhabitants of the proposed development and to the existing inhabitants of the adjacent neighbouring buildings. No remedial or mitigation measures are proposed. The residual impacts during the operational phase are considered to be in line with the Predicted Impacts when considering daylight and sunlight to existing and proposed properties.

17.9 MONITORING

No ongoing monitoring of daylight and sunlight is required during the Construction or Operational Phases. The analysis outlined in this chapter is carried out based on the completion of the Proposed Development.

7.11 REFERENCES

- BRE Guide –3rd Edition of BR 209 BRE Site Layout Planning for Daylight and Sunlight
- BS EN 17037-2018+A1-2021 – Daylight in Buildings
- IS EN 17037-2018+A1-2021 – Daylight in Buildings
- EPA 2022 Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports
- Sustainable Urban Housing: Design Standards for New Apartments Guidelines for Planning Authorities