

Daylight and Sunlight Assessment, For Planning

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Document control sheet

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1 Background

This document outlines the required daylight and sunlight analysis for the development of Newport Knowledge Quarter located adjacent to existing residential properties on Emlyn Street in Newport. The assessment is required to support planning submission and demonstrate compliance with local amenity policies and best practice guidance (BRE 209).

2 Policy Context

The impact on the existing buildings has been assessed using the criteria set out in the following documents

- Building Research Establishment's (BRE) 'Site layout planning for daylight and sunlight - a guide to good practice' (BR 209) (Littlefair, 2011). Whilst the guide itself states that its guidelines are not mandatory, they are those predominately referenced for daylight and sunlight standards in the UK.
- The Local Development Plan (LDP) policies (e.g. GP2-type amenity policies) require protection of residential amenity.
- Newport SPG requires developments to avoid harm to neighbouring living conditions, including daylight and sunlight

3 Methodology

3.1 Required Analysis – Neighbouring Properties

The following assessments must be undertaken for existing neighbouring dwellings:

3.1.1 Vertical Sky Component (VSC)

The potential for daylight at a particular point may be quantified by assessing the proportion of the sky that is 'visible' from that point, i.e. not obscured by objects such as buildings. For points located on vertical surfaces such as walls, this proportion of visible sky is termed the 'vertical sky component' or VSC.

3.1.2 Daylight Distribution (No-Skyline / NSL)

The no skyline is used to assess daylight performance which is the point on the working plane at which no sky can be viewed. This is often expressed as the percentage of working plane from which the sky can be viewed such as 80% or 0.8.

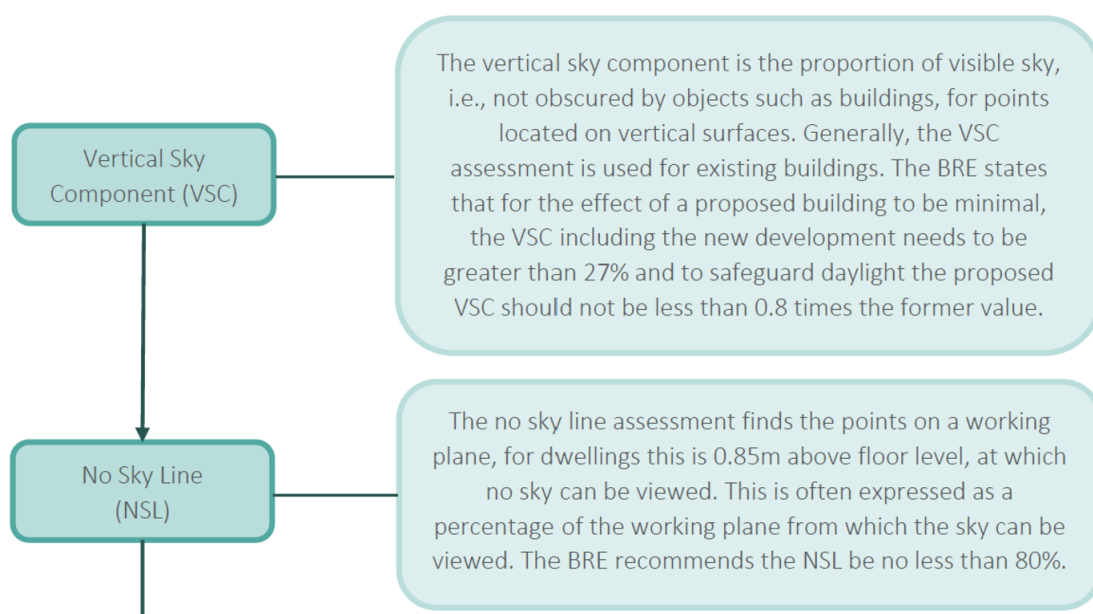


Table 1: BRE testing criteria for existing developments.

Criteria	Further Testing
25° rule	If angle from new development to existing is greater than 25 degrees additional testing of the VSC will be required.
43° rule	If angle from new development to proposed adjoining development is above 43 degrees, additional testing of VSC will be required.

Figure 1. VSC and NSL Criteria

3.1.3 Sunlight (Annual Probable Sunlight Hours – APSH)

APSH - ‘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. The sunlight reaching a window is quantified as a percentage of this unobstructed annual total.

Criteria:

- Annual APSH > 25% - If a room can receive more than one quarter of annual probable sunlight hours (APSH), including at least 5% of APSH in the winter months between 21 September and 21 March, then it should still receive enough sunlight.
- Alternative compliance (retained sunlight) is if the annual APSH is below 25%, the room may still be acceptable provided it retains at least 80% of its former APSH value.
- If the overall annual loss of APSH is 4% or less, the loss of sunlight is small.

3.1.4 Sunlight Analysis – Amenity Spaces

The sunlight analysis for the surrounding amenity spaces looks at the amount of sunlight the space receives on the 21st of March pre and post development.

The amenity space requires 50% of the space to meet 2 hours of sunlight to pass the assessment on the 21st of March.

3.2 Computer Simulation Details

3.2.1 Software

The calculations have been carried out using IES Virtual Environment 2025, an accredited Building Performance Modelling (BPM) tool in accordance with CIBSE Guide AM11 (CIBSE, 2015).

IES-VE uses a Radiance based calculation simulation for daylight. This predicts the transport of light in a virtual 3D scene using physically based models for the emission, transmission, reflection and scattering of light. The output, therefore, can inform on how the building might perform, for example, in terms of visual impression and predicted illuminance levels for particular sky conditions. Radiance can produce highly accurate predictions, within 10% of measured illuminance values.

3.2.2 Weather File

In accordance with BRE guidelines, the ADF has been assessed based on a uniform overcast sky in line with BS 8206 and CIE guidelines.

Solar calculations, for the purpose of sunlight availability, have been carried out based on the most suitable local weather file at the development.

Weather file: Cardiff.TRY

3.2.3 Model Properties

Glazing properties have been modelled in accordance with their building period.

- 1995 Glazing: 3.3 W/m²k
- 2010 Glazing: 2.2 W/m²k

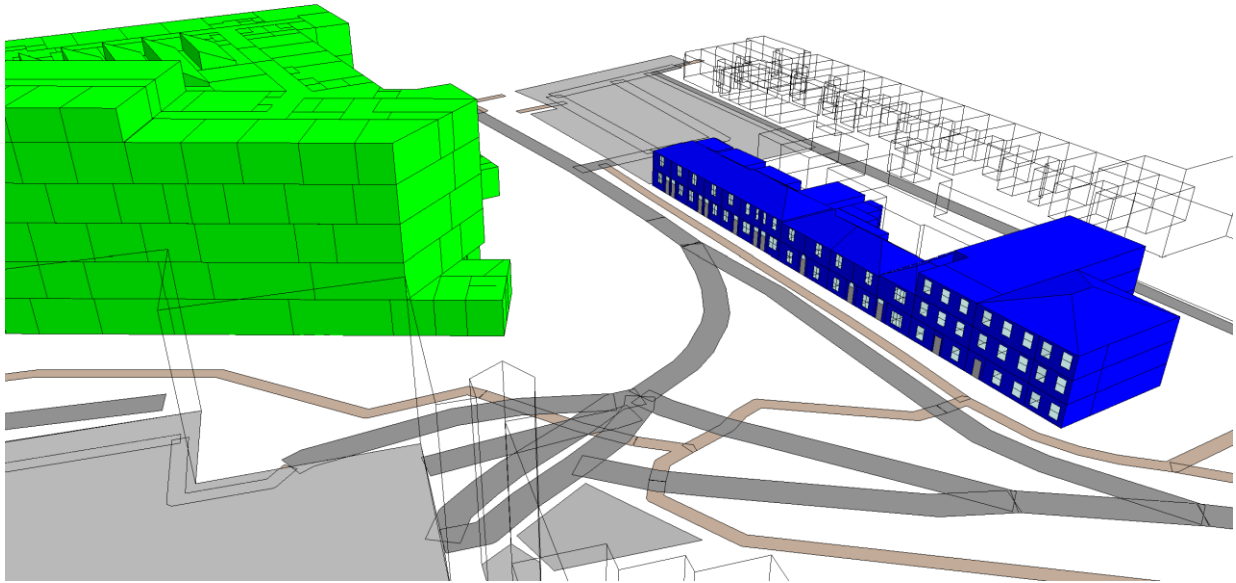


Figure 2. IES-VE Model

4 Results

The design team have carried out a daylight and sunlight assessment for the existing buildings surrounding the proposed development. The team have sought to safeguard daylight access and sunlight availability for the existing buildings in accordance with BRE good practice guidance whilst also considering other site requirements and objectives.

A summary of the overall performance of the existing buildings is shown below.

4.1 Vertical Sky Component Results

Table 1. Summary of daylight performance for existing buildings

Daylight Variable	BRE 209 Requirements	Percentage of Existing Buildings Achieving Guidelines	Pass/ Fail
VSC	27%	40%	Pass

4.2 No Skyline/ NSL

Table 2. No Skyline/ NSL Results

Dwelling	Sky View	Pass/ Fail
32/33 Emlyn St.	1.0	Pass
34 Emlyn St.	1.0	Pass
35 Emlyn St.	1.0	Pass
36 Emlyn St.	1.0	Pass
37 Emlyn St.	1.0	Pass
38 Emlyn St.	1.0	Pass
39 Emlyn St.	1.0	Pass
40 Emlyn St.	1.0	Pass
41 Emlyn St.	1.0	Pass
42 Emlyn St.	1.0	Pass

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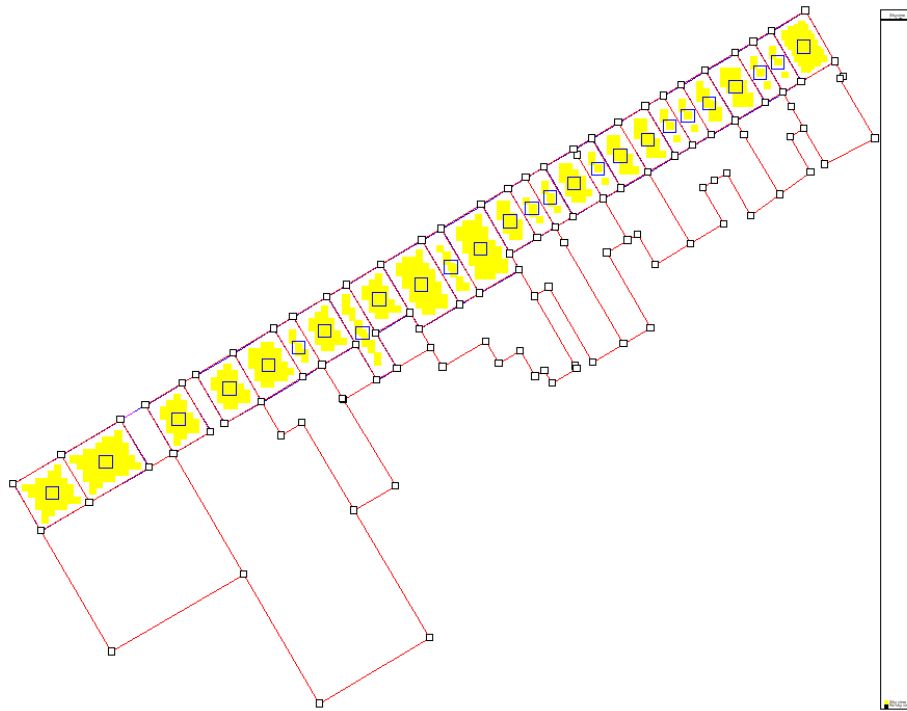


Figure 3. No Skyline Visual Results (Ground Floor)

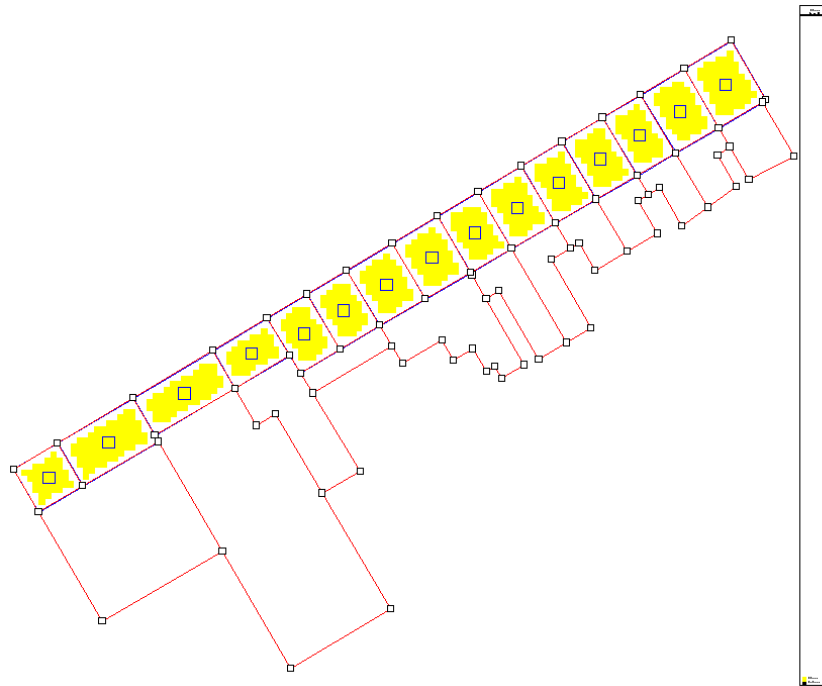


Figure 4. No Skyline Visual Results (First Floor)

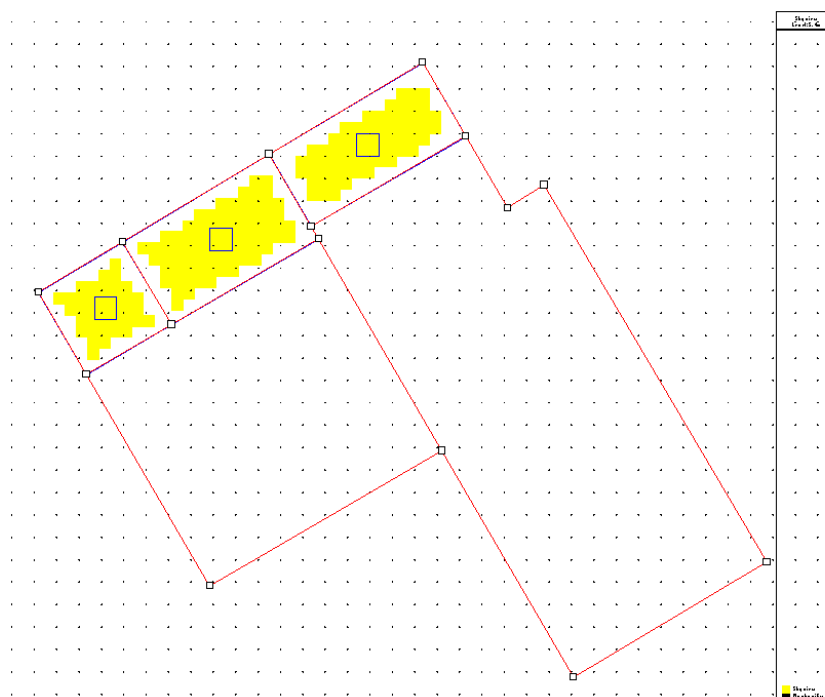


Figure 5. No Skyline Visual Results (Second Floor – 41/42 Emlyn St)

4.3 Annual Probable Sunlight Hours – APSH

All the buildings assessed on Emlyn St. pass as they do not experience a reduction factor of less than 80%. However, the existing dwellings ASPH and WPSH averages do not pass the specified criteria.

Table 3. Annual Probable Sunlight Hours – APSH Results

Criteria	Average	Reduction Factor	Pass/ Fail
APSH	9.41%	100%	Pass
WPSH	1.08%	100%	Pass

4.3.1 Sunlight Analysis – Amenity Spaces

The results are summarised in the table below. It can be seen that a majority of the surrounding amenity spaces do not meet the BRE guideline, with six spaces failing to receive at least two hours of sunlight across 50% of their area on 21 March. However, in accordance with BRE 209, these spaces may still be considered compliant where they retain at least 80% of their former area meeting the two-hour sunlight criterion.

Table 4. Sunlight Analysis – Amenity Spaces

Existing – Meets Criteria	Existing – Did Not Meet Criteria	Proposed – Meets Criteria	Proposed – Did Not Meet Criteria
4	6	4	6

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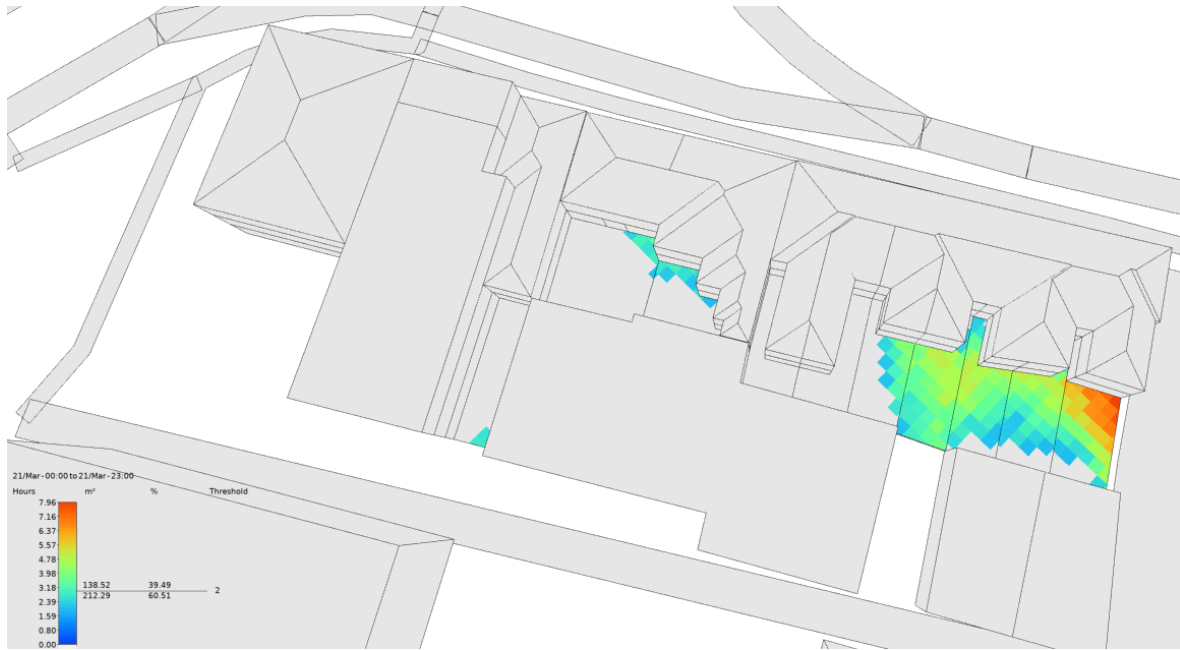


Figure 6. Before the development Sunlight Analysis – Amenity Spaces



Figure 7. After the development Sunlight Analysis – Amenity Spaces

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