

New Mixed Use Development Museum Quarter, Museum Place, Cardiff

Planning Application
Daylighting Analysis



March 2026
for Museum Quarter



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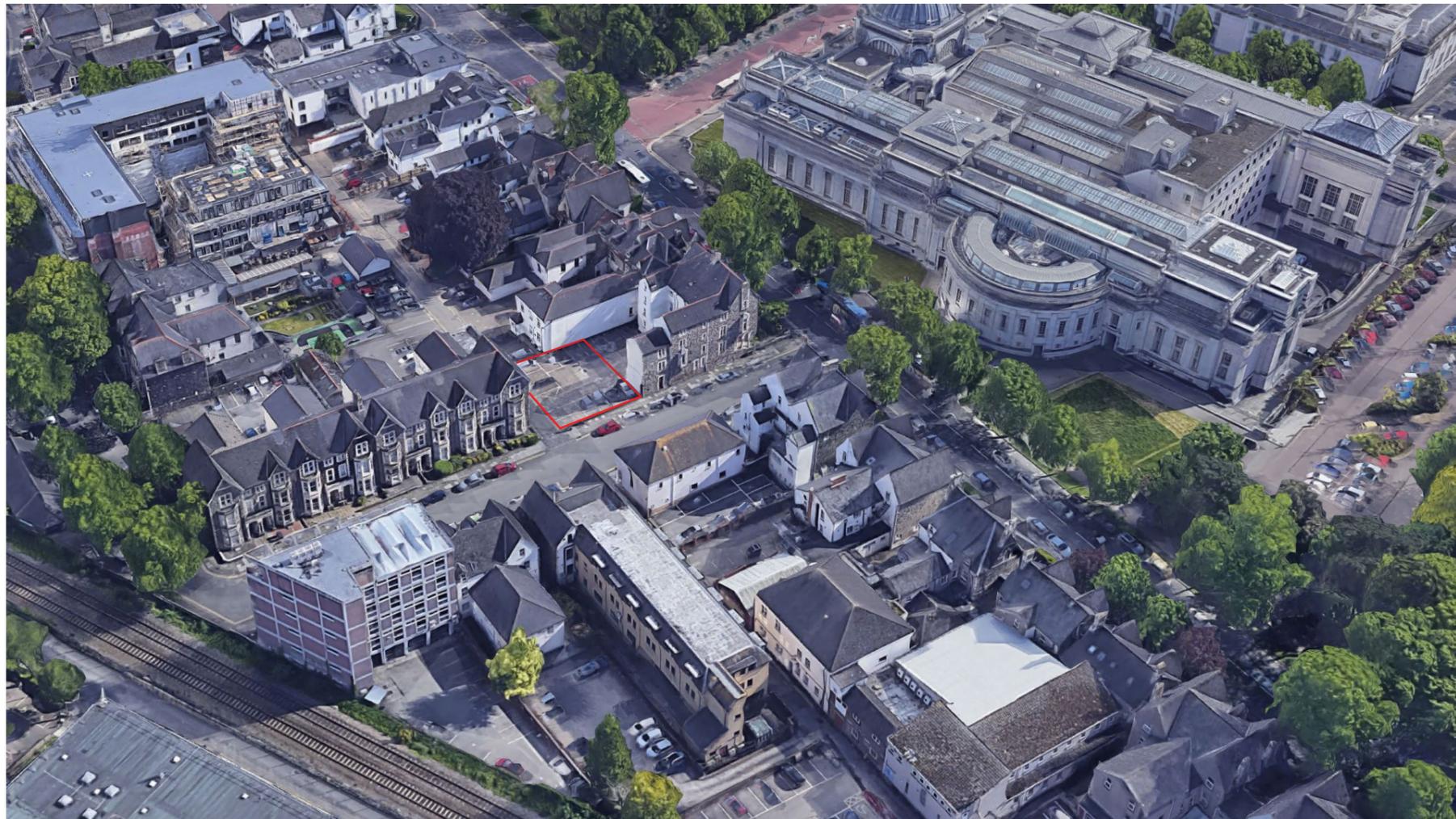
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Background



Existing Site viewed from the air.

The development is located on the corner of Museum Place and Park Lane, behind the Grade II listed 33-34 Park Place, within the Cathays Park Conservation Area. The site is currently a ground level car park and is therefore considered to be a brownfield site.

Our client's vision is to provide a contemporary six storey mixed use development with active frontage on the ground floor and five storeys of studio flats with a shared rooftop terrace. The design approach has been to use a traditional palette of materials in a respectful modern style with the top two storeys set well back from the front elevation on Museum Place.

Due to the constraints of the site, the proposed design does have a close proximity to the neighbouring buildings. However the design has carefully taken this into account in particular with regards to daylighting and outlook of the living spaces by the introduction of strategically placed glazed terraces.

In order to demonstrate that the daylighting of the proposed flats to all floors satisfies the current requirements despite the proximity to the neighbouring buildings, we have carried out a daylight analysis study using Autodesk Insight, an advanced simulation engine for building performance data analysis.

This report presents our method statement and the results of the performed daylight analysis, which we feel comprehensively supports the approval of the proposed development.



Site



Site Plan

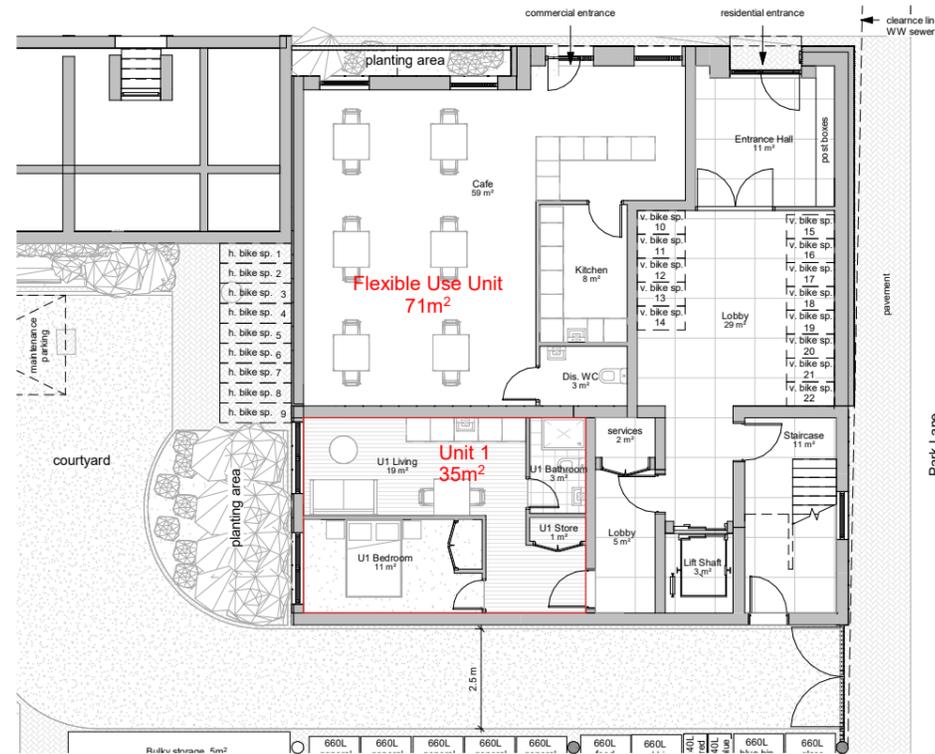
The site is built up on all sides, with the listed 33-34 Park Place to the west boundary comprising of 4 storeys of offices, the 2 storey Christadelphian hall to the north, the adjacent rear wing of the office building to the south, and a 3 storey row of Victorian terraced houses occupied by offices to the east.

The site has had planning permission for 2 separate applications in the last few years. Consent was granted for a new mixed use development, planning ref 21/01399/MJR on 16/11/2021. The consented scheme was for office accommodation over 4 storeys and a penthouse apartment on the top two floors.

Following the effects of the pandemic on office accommodation, a separate application for a residential building with A3 at ground level and 10 flats and a rooftop penthouse ref.22/00990/MJR was submitted and received planning consent on 18th May 2022.

The current proposed design seeks to create a residential building with studio apartments on upper levels and flexible use space at ground floor to create an active frontage, while preserving the design of the consented residential scheme with minor modifications to the external appearance. The only notable aspect of the design changes are the glazed terraces to the west elevation which serve to improve the daylighting to the proposed units facing the rear of 33-34 Park Place.

Section 2 - Privacy and Outlook



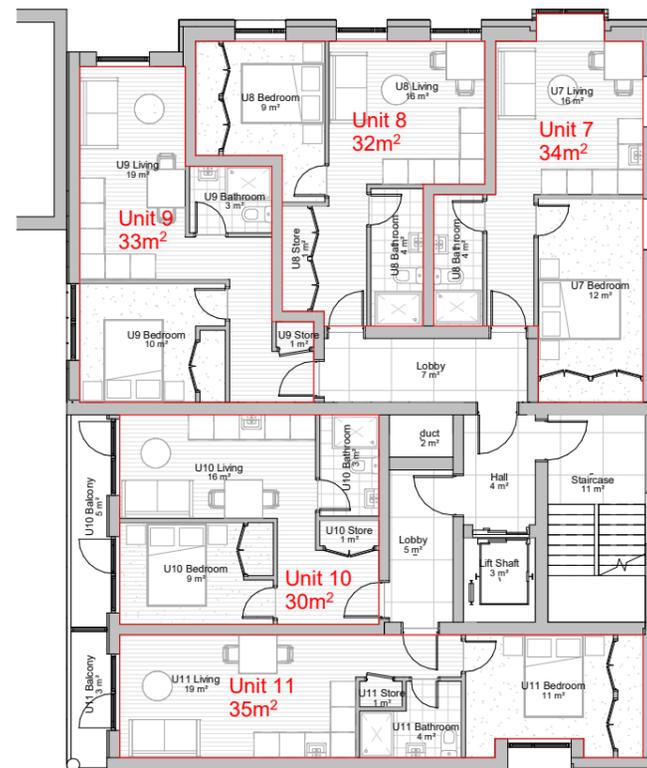
Ground floor plan

Design considerations

The courtyard layout has been designed to improve privacy and provide better outlook into a large planting area for the proposed ground floor unit.

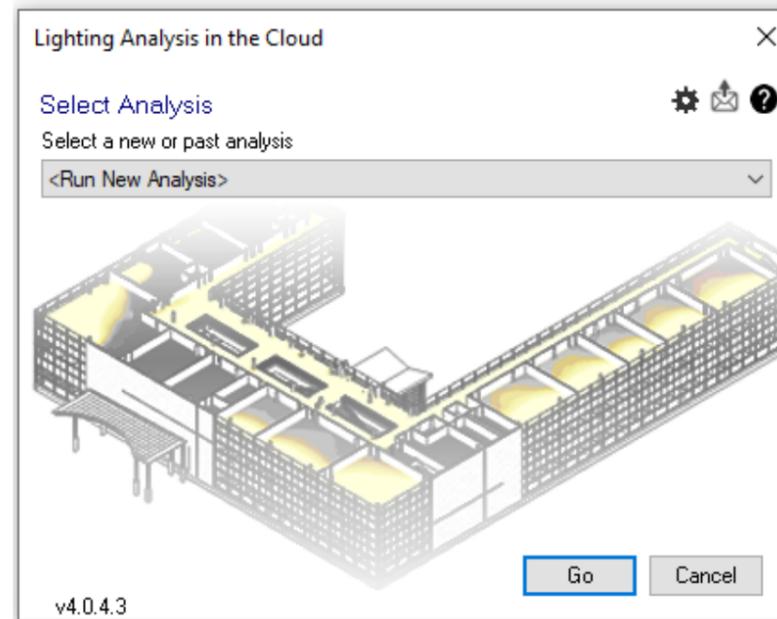
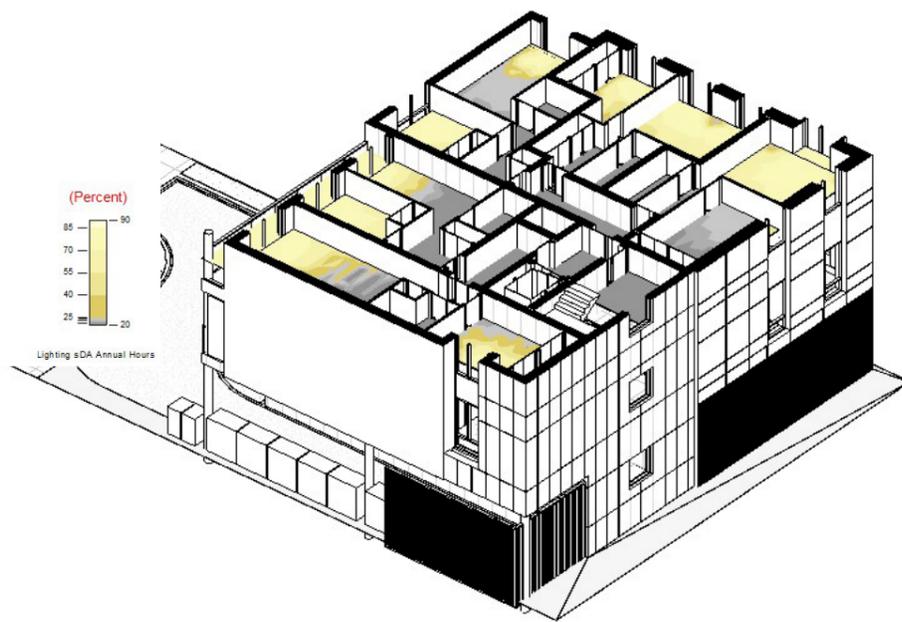
In addition, the upper floor terraces have been pushed back in line with the building to negate any overshadowing to the ground floor from the upper units.

In addition to the reduced depth of the terraces, the design also utilises obscured glass screens between the balconies. This feature, along with the proposed obscured glass balcony balustrade, improves the daylight into the units and addresses any concerns in regards to privacy that may arise.



First, Second, Third floor plan

Section 3 - Daylight analysis



Daylight analysis software

Methodology

We decided to primarily use the Spatial Daylight Autonomy (SDA) method using Autodesk Insight to analyse whether the development receives enough daylight. This is a more rigorous approach than the more traditional Daylight Factor because the latter is a static measurement, just a simple ratio of exterior and interior illuminance under an overcast sky on the 21st September at 12pm. SDA on the other hand is a dynamic measure that utilises location-based weather data over the course of an entire year. However, for completeness a Daylight Factor analysis is also included.

The SDA method, which is used by the LEED rating system, uses a sophisticated computer simulation technique to assess daylighting values. It divides the floor space into a 24" square grid and then measures the illuminance each grid square receives over the course of a typical year, using local weather data. It then calculates the percentage of daylight hours over the year that each square is illuminated over a threshold value of 300lux - the cross-over point where someone would be able to comfortably work without artificial lighting. This standard is more commonly used for workplaces and schools as it is arguably too onerous for residential properties.

We carried out a simulation run for the ground floor, second floor and fourth floor units as the best representative levels for the most overshadowed units, typical units and least overshadowed units by the neighbouring buildings. The simulation provides results for the proposed optimised design with improved plan layout.

Finally, we used the same service to carry out a Daylight Factor analysis indicating that the development meets the threshold suggested by CIBSE Lighting guide.



Spatial Daylight Autonomy

Areas of yellow show LEED 'passes', the lighter the yellow the better the daylighting, with grey showing LEED 'fails', the darker the grey the worse. However it should be noted that it is unrealistic and unnecessary to expect hallways, utilities and bedrooms to pass a LEED standard designed for workplaces and schools.



Second floor plan (typical layout for first, second and third floors)

Second floor daylight simulation

The second floor layout is a typical floor plan that is repeated for first, second and third floor level. It is considered as the best representative for the typical levels of overshadowing for the building.

The result shows good daylighting to all units which exceed the target Daylight Autonomy of 50% for most of the living spaces, meaning more than 50% of the time daylight levels are above the target illuminance required for the comfort of occupants.



Spatial Daylight Autonomy (cont.)

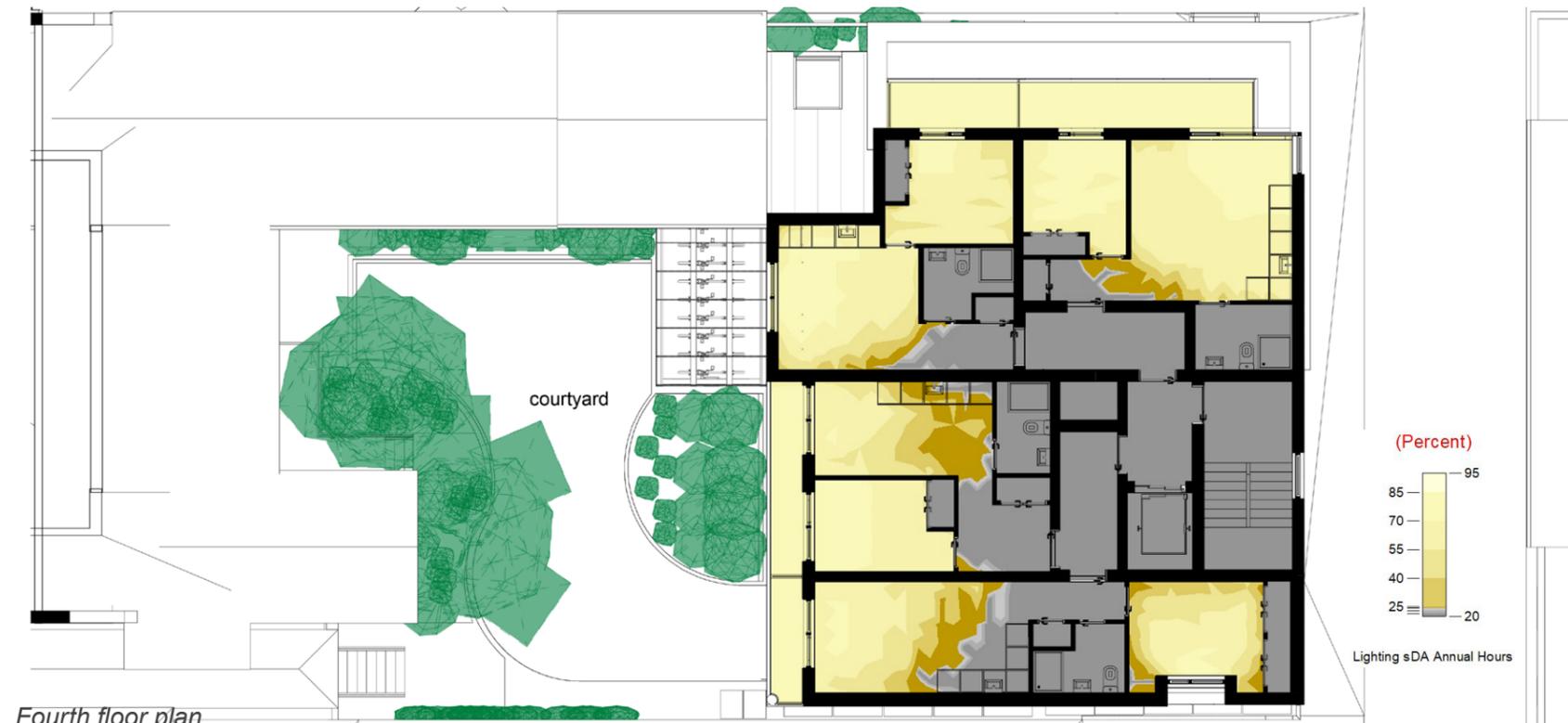


Ground floor plan

Ground floor daylight simulation

The ground floor layout is a representative for the most overshadowed spaces in the building.

However, similarly to the floors above, the result shows good daylighting to the commercial unit and the flat units which achieves the target illuminance required for the comfort of occupants.



Fourth floor plan

Fourth floor daylight simulation

The fourth floor is a representative for the least overshadowed units as at this point the floor level goes beyond the neighbouring buildings.

The result shows the daylighting to the units more than exceeding the target Daylight Autonomy of 50% and providing more than the required target illuminance for the comfort of occupants.



Lighting Analysis - Results Summary

Daylight Factor
For all Rooms Included in Daylighting

Standard Day - 61% Passing

Daylight Factor Sky
Building ADF: 4.6%

Daylight Factor

The requirement

According to section 4.12 of the Cardiff Infill Sites SPG, the BRE guidance should be followed for the assessment of sunlight and daylight. One of the methods of assessment provided in the BRE handbook relates to windows facing other buildings and falling beneath 25 degree angle taken from a point projecting from the centre of the window. In such a case, the measure of daylight should not fall below 27%.

In addition, the British Standard BS8206 Part II provides the following recommendations for the average daylight factor in dwellings.

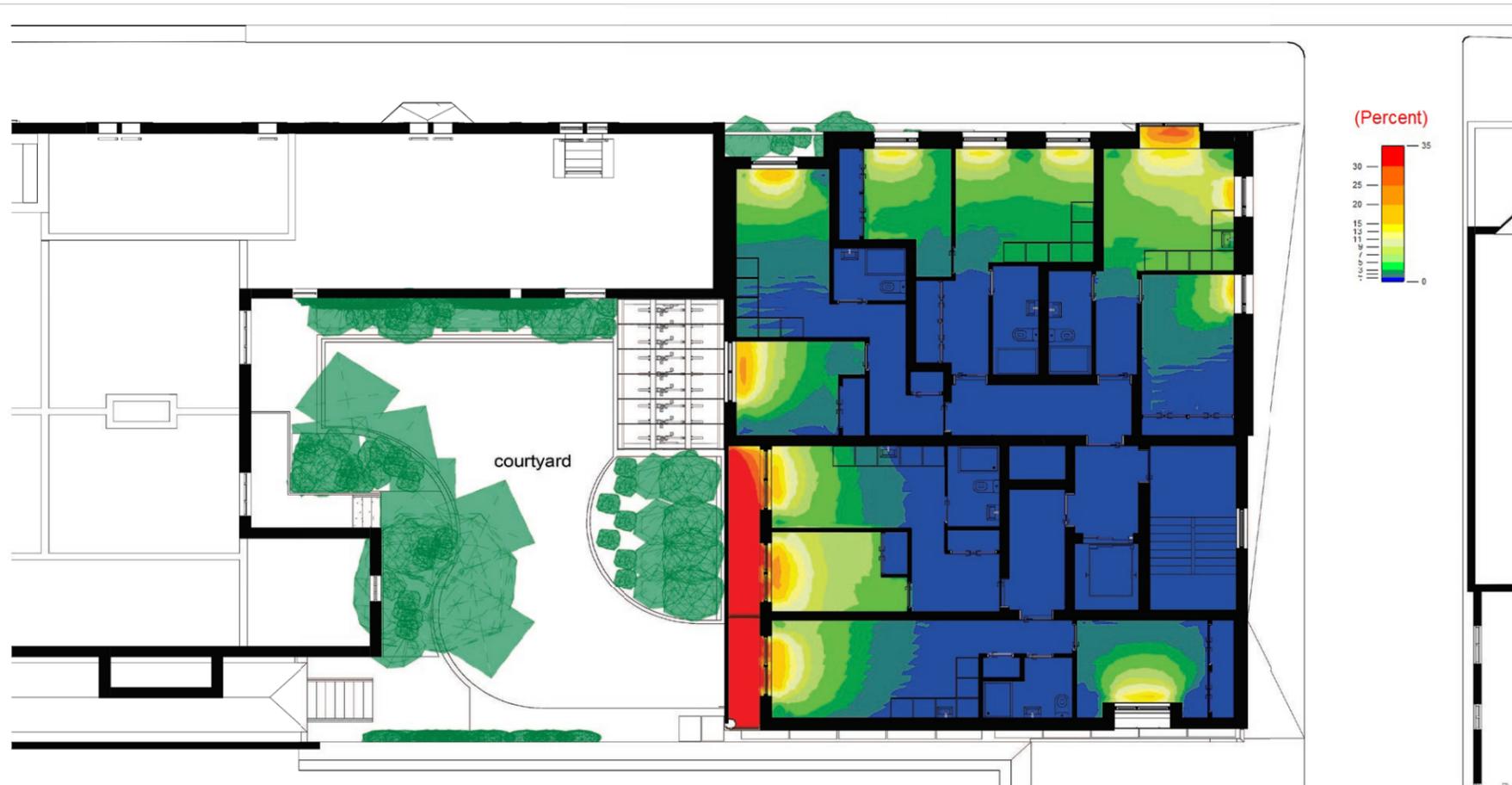
Room	Percentage
Kitchen	2%
Living Rooms	1.5%
Bedrooms	1%

The proposed design does not feature windows that fall within the 25 degree rule requirements. However, for the clarity of the results in this report, the design has been assessed against the measures suggested above,

The measure of daylight has been calculated by simulating the Average Daylight Factor using Adobe Insight.

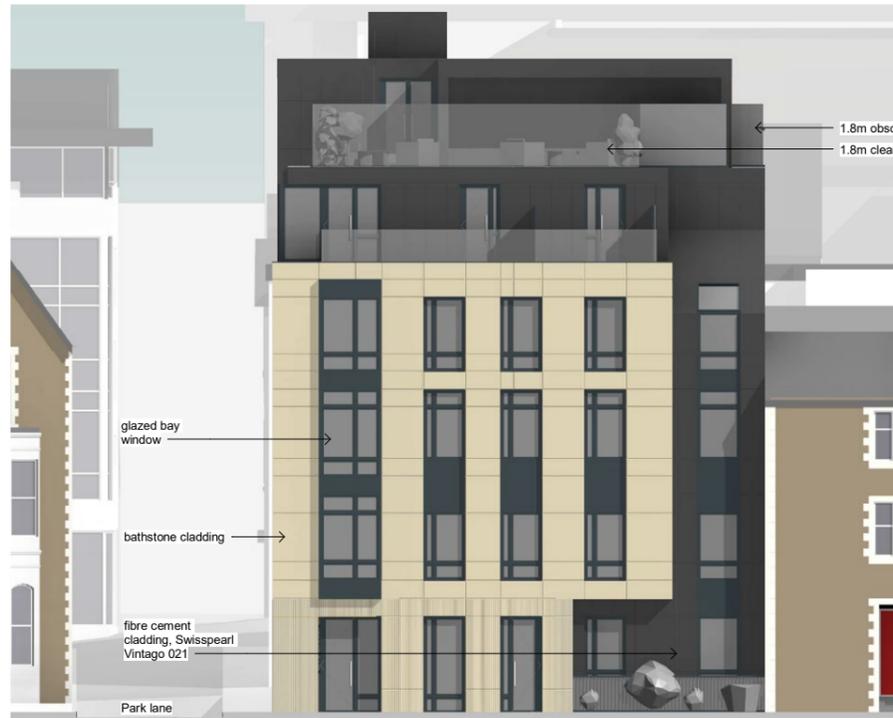
Analysis results

The analysis shows that the typical units have Daylight Factor much greater than 2%, the threshold below which the CIBSE Lighting guide describes as not adequately lit. In addition, for the entire second floor the daylight reaching a window passes the desired threshold with 61% and achieves an average daylight factor of 4.6% for the entire floor, including the lift, staircase, lobbies, corridors, and bathrooms.

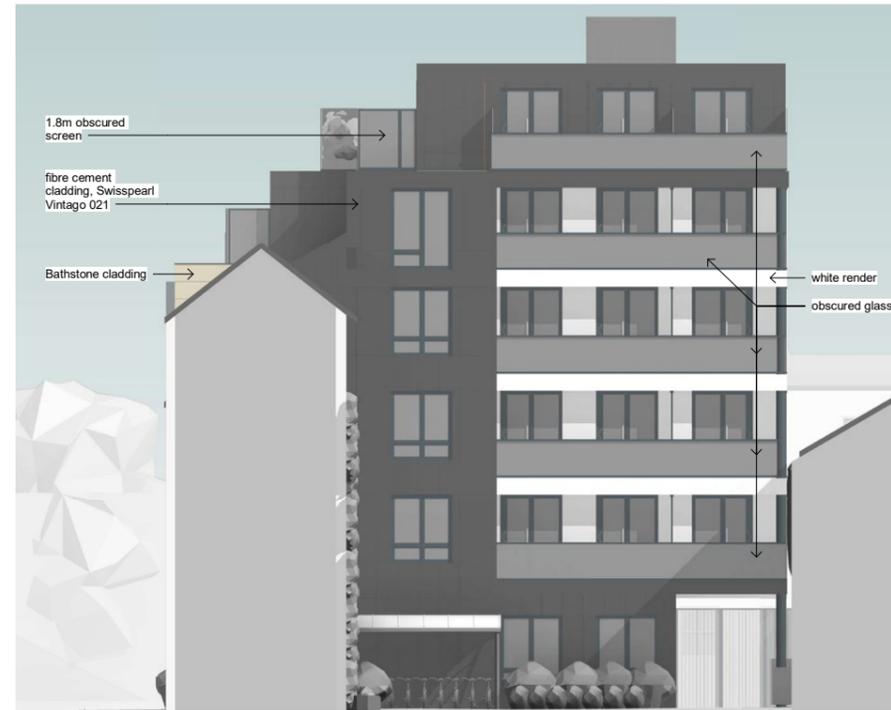


Second floor plan

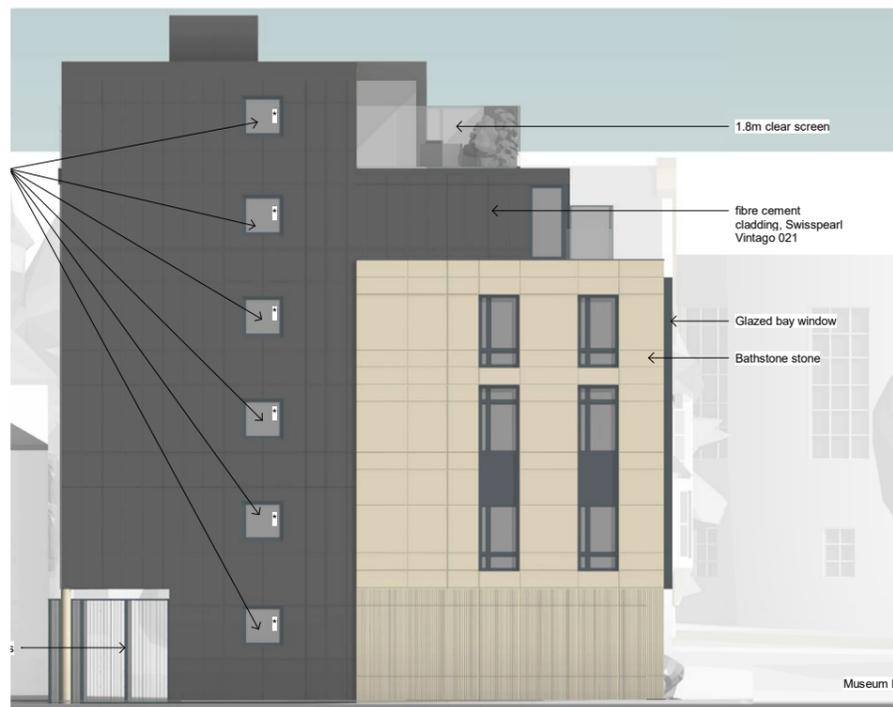
Section 4 - Conclusion



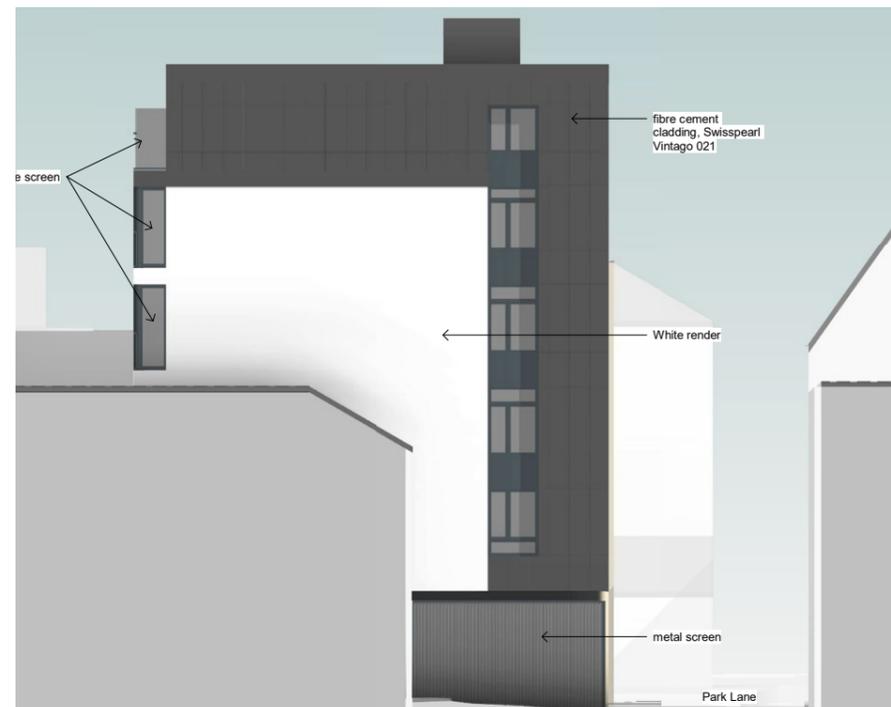
North Elevation



West Elevation



East Elevation



South Elevation

Outcome

The results of our analysis demonstrate that the proposed design that accompanies this report achieves the adequate daylighting, privacy and outlook requirements for a residential development despite the site constraints and close proximity to neighbouring properties.

The features of the design can be summarised as follows:

- obscured glass balconies: increase privacy without compromising daylight and provide outlook into the courtyard
- courtyard planting: improve privacy and outlook for ground floor units

The combination of obscured glass screens and balustrades, coupled with the careful design of the balconies to reduce overshadowing, results in a proposal that achieves the appropriate daylight, privacy and outlook. Therefore, we believe there is sufficient evidence to grant planning permission for this development.

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