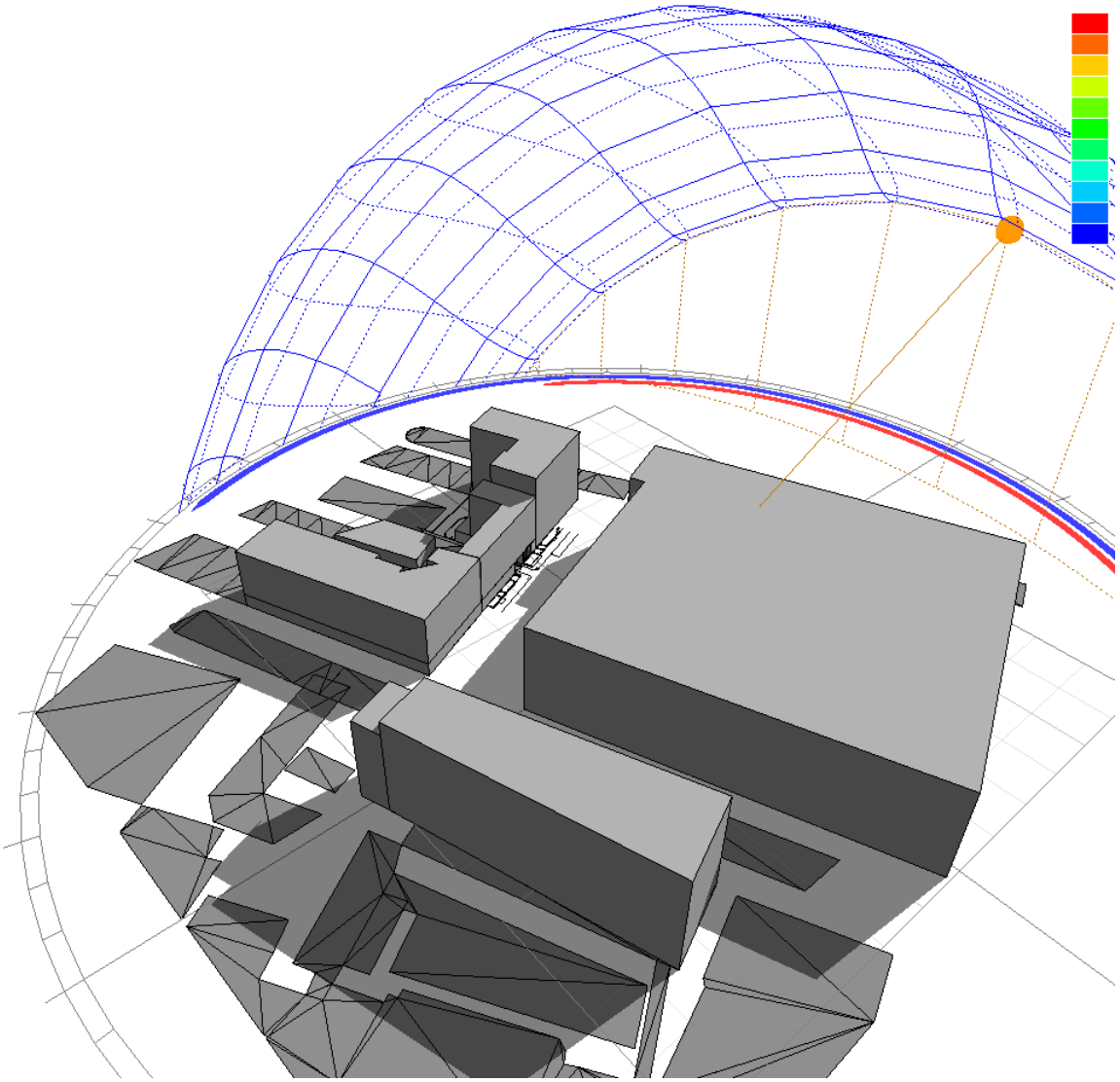
DAYLIGHT STUDY FOR THE PROPOSED CONVERSION ON 11-12 GRENVILLE STREET, WC1N1LZ, LONDON

FOR

11-12 Grenville Street Limited

Date: 14/10/2021

PREPARED BY: ECODESIGN LTD



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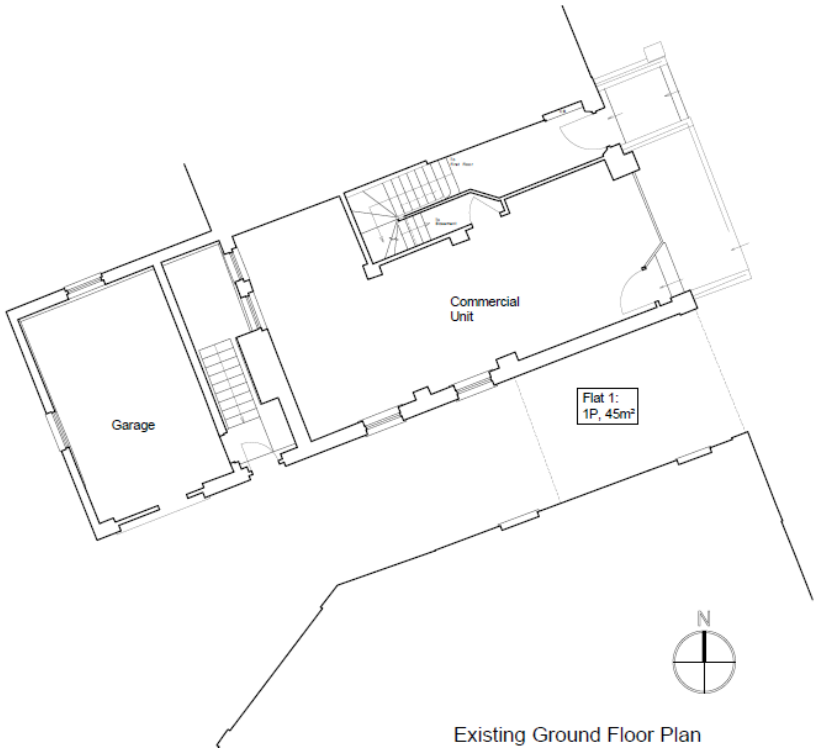
1. INTRODUCTION

The purpose of this study is to evaluate the daylight performance of the proposed conversion on ground floor level on 11-12 Grenville Road, London, WC1N1LZ. This proposed habitable unit is part of a conversion proposal, therefore this report will examine the daylight availability of this unit.

The building that already exists there (see Figure 1) is composed of five storeys (basement, ground, first, second, third) and the proposed conversion that this report is examining is concerned only with the ground floor. In the proposed conversion on the ground floor, one new flat is proposed: Unit 1, which is a one bedroom flat partly facing Grenville Street and the other part facing the small side street, as shown in Figure 2.

As the external geometry of the building will not expand and the volume will be the same (changes will only occur internally), there is going to be no difference in the overshadowing on the site and hence neighbouring and existing windows on the same building and neighbouring buildings will not experience any additional overshadowing. As such, there is no need to conduct an overshadowing study and this study will therefore focus on the daylight performance of the proposed habitable rooms.



Existing Ground Floor Plan

Existing Front (East) Elevation

Figure 1: *Plan of the existing ground floor on 11-12 Grenville Street and elevation of the front facade*

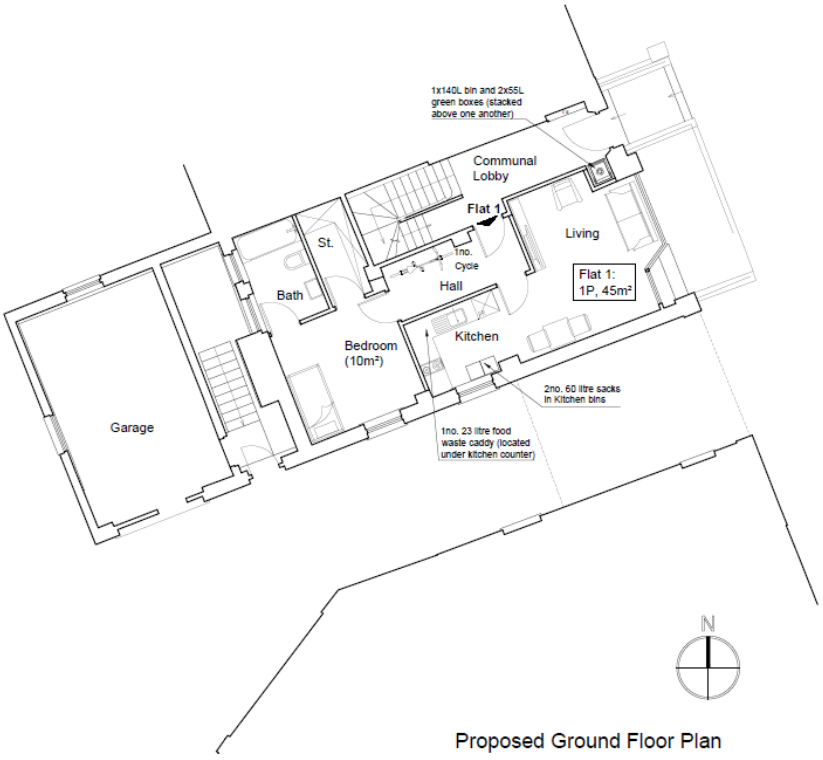


Figure 2: *Proposed ground floor plan and front elevation*

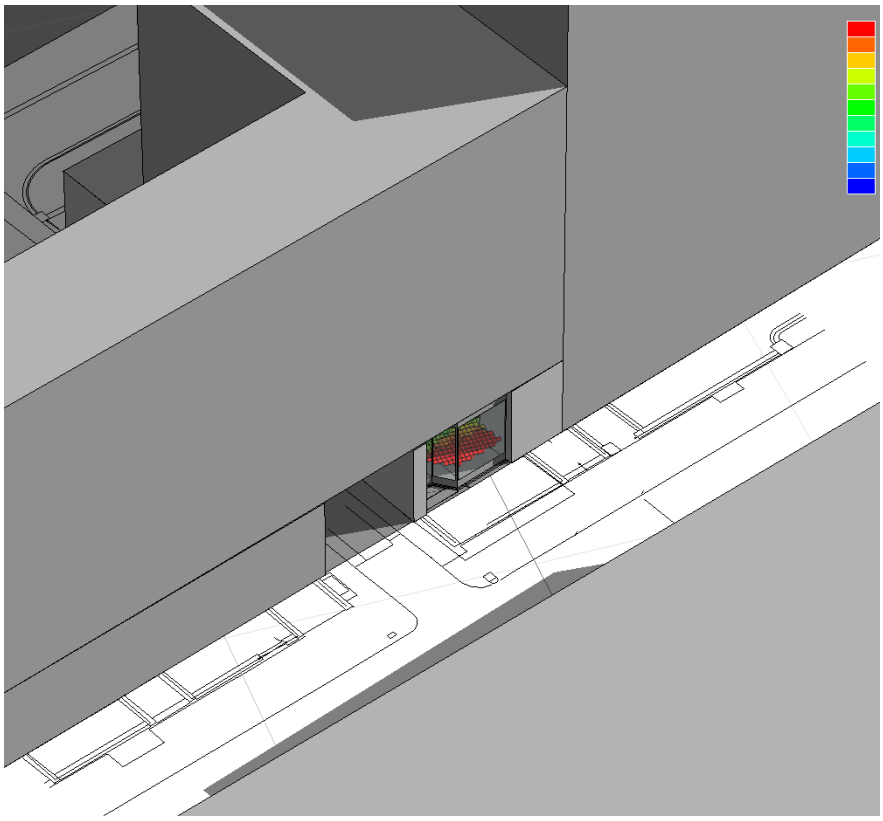


Figure 3: *Model of the site*

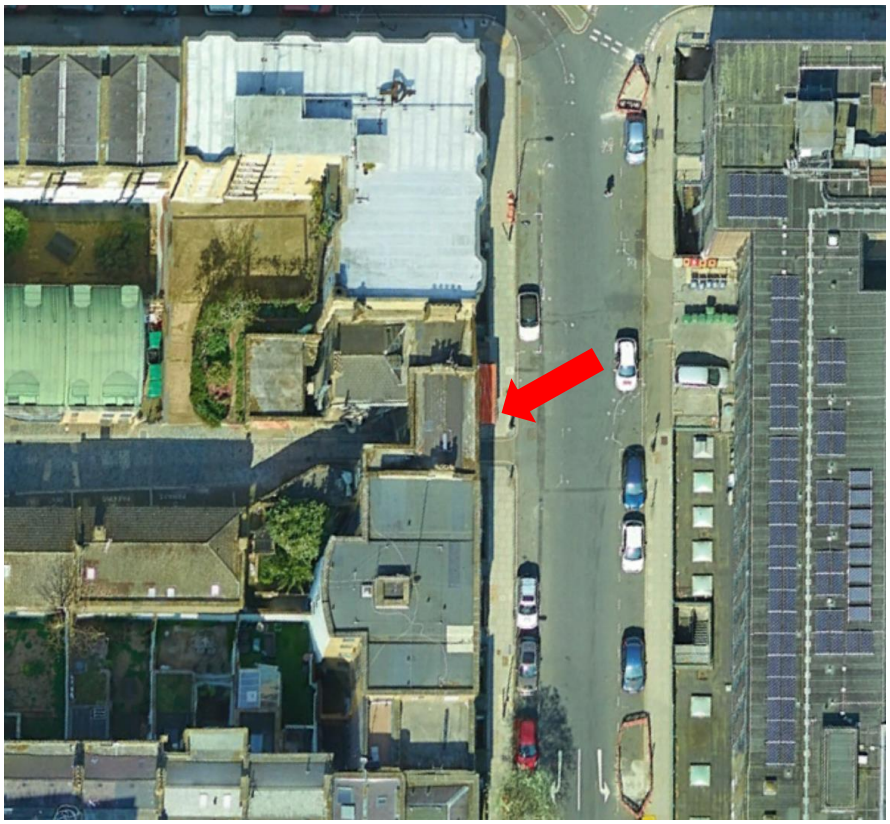


Figure 4: *Satellite view of the site*

2. APPROACH

The front façade of the building facing Grenville Street is facing East and the side façade on the small side street is facing South. There are nearby buildings on all sides of the proposed conversion (as can be seen from Figures 3 and 4).

In order to perform the necessary calculations, building performance modelling was used, in the form of building simulation software, specialising in lighting simulation. In this case AUTODESK ECOTECT Analysis was used to setup the required 3D models.

Drawings, in order to construct 3D models, were provided by the client and their architect: Tal Arc Architects. Additional drawings were also provided with site surveys, which were also used to construct mass models of surrounding buildings.

The 3D models constructed for simulations were optimised for a daylight impact study analysis, thus the models were constructed in such a way so that the massing of buildings was captured, with window details on the surrounding properties to be investigated. Geometric detail that would not impact on the analysis was not included.

In terms of daylight performance of the proposed new development, all the habitable rooms (bedroom, kitchen/living space) were calculated and more specifically the daylight factors over a grid of points was calculated for all such rooms.

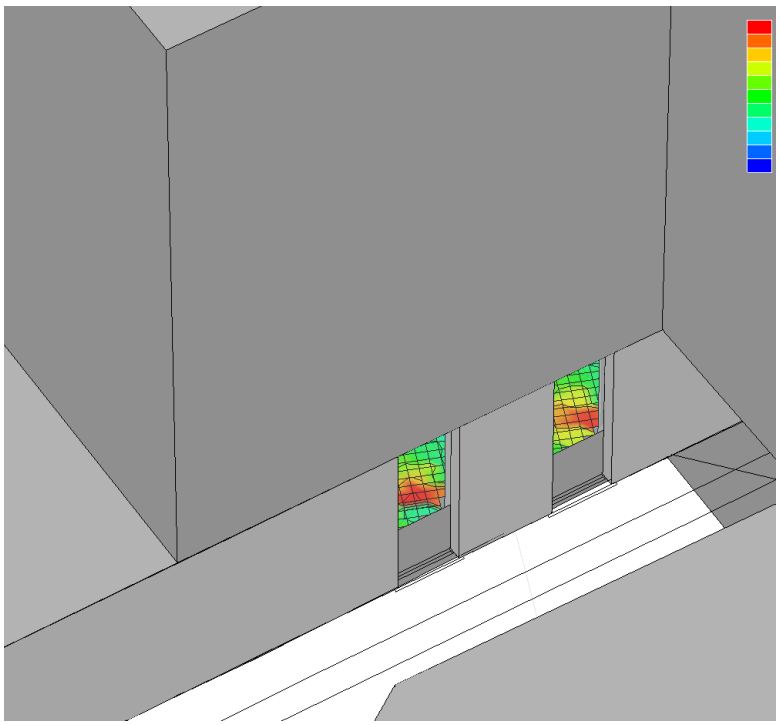
The reflection of surfaces is very important for daylight performance. The intention of the architects is to specify white colours for walls and ceilings on all proposed new rooms. The reflectance values on surfaces as proposed by CIBSE Guide A: Environmental Design Guide are: Floors: 0.3, Walls: 0.5, Ceilings: 0.7. The reflection levels could potentially represent a fairly dark carpet, a coloured wall and a white ceiling. As the architects intend to use white colour on ceiling and walls, the daylight

predicted later on the report will be slightly higher in real life. As instructed by the architect a double glazing system with clear glass was simulated as part of the model for all windows.

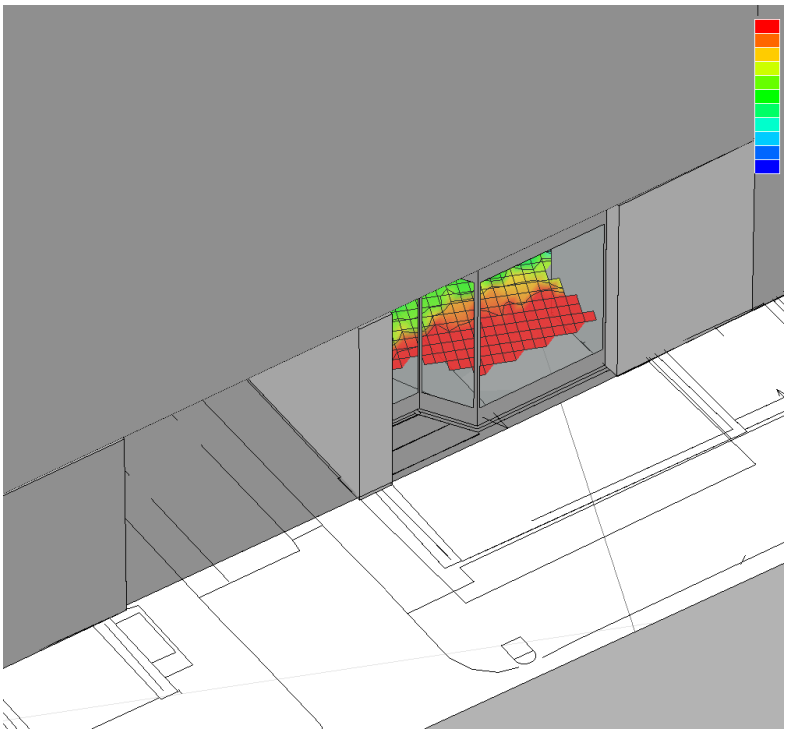
The targets set in terms of daylight performance were provided by a range of guides that exist in the UK. More specifically, the guidance for daylight factors was the British Standard 8206 and the Building Research Establishment (BRE) was considered, that suggest minimum average daylight levels for bedrooms and living rooms for new developments, as can be seen in the following table.

Summary of requirements
BS 8206 and BRE Guidance Recommendations, that the average daylight factor to exceed the following values: -For kitchens: **2%** -For living rooms and dining rooms: **1.5 %** -For bedrooms: **1%**

The above table lists the main targets to be met by the proposed rooms, as minimum requirements. On this basis, a series of calculations and simulations were performed in order to determine the daylight performance of the proposed rooms. The simulations, included a calculation of daylight factors over a grid of points (set at 800mm above floor level – desk level), from which the average daylight factor of each room can be derived.



Figures 5: *Model used for Daylight Factor calculations for the proposed ground floor flat (windows facing on the side street)*



Figures 6: *Model used for Daylight Factor calculations for the proposed ground floor flat (windows facing on Grenville Street)*

3. RESULTS AND DISCUSSION

3.1 Daylight Factors of proposed habitable Flat 1 (ground floor)

The minimum requirements as set by the guides and shown in the previous section are: Bedrooms: 1 %, Living Rooms: 1.5%, Kitchens: 2%. As the rooms proposed for Flat 1 combine more than one function (i.e. Kitchen, living), the approach in this report is to use the highest requirement. Therefore in the case of a combined Kitchen/Living room, to use 2% as the minimum average daylight factor target.

The results of the daylight factor simulations revealed that the proposed new habitable rooms receive more than the minimum recommended level of average daylight factor, as can be seen in Table 1.

Table 1. *Average Daylight Factors achieved for the Unit A proposed conversion*

Floor	Flat	ROOM	Minimum Recommended Average DF(%)	Achieved Av.DF (%)
Ground	Flat 1	Kitchen-Living	2%	5.23%
Ground	Flat 1	Sleeping	1%	3.21%

In order to provide a more qualitative view of the results, a graphs of the DF results over the entire proposed new Flat can be seen in Figure 7, where the distribution of daylight over a working plane can be seen in plan view. The average DF of the proposed unit is more than the minimum requirement and actually significantly higher. The DF levels are highest close to the windows (as expected), dropping towards the back of the room, but still maintaining 1-2% DF at the back.

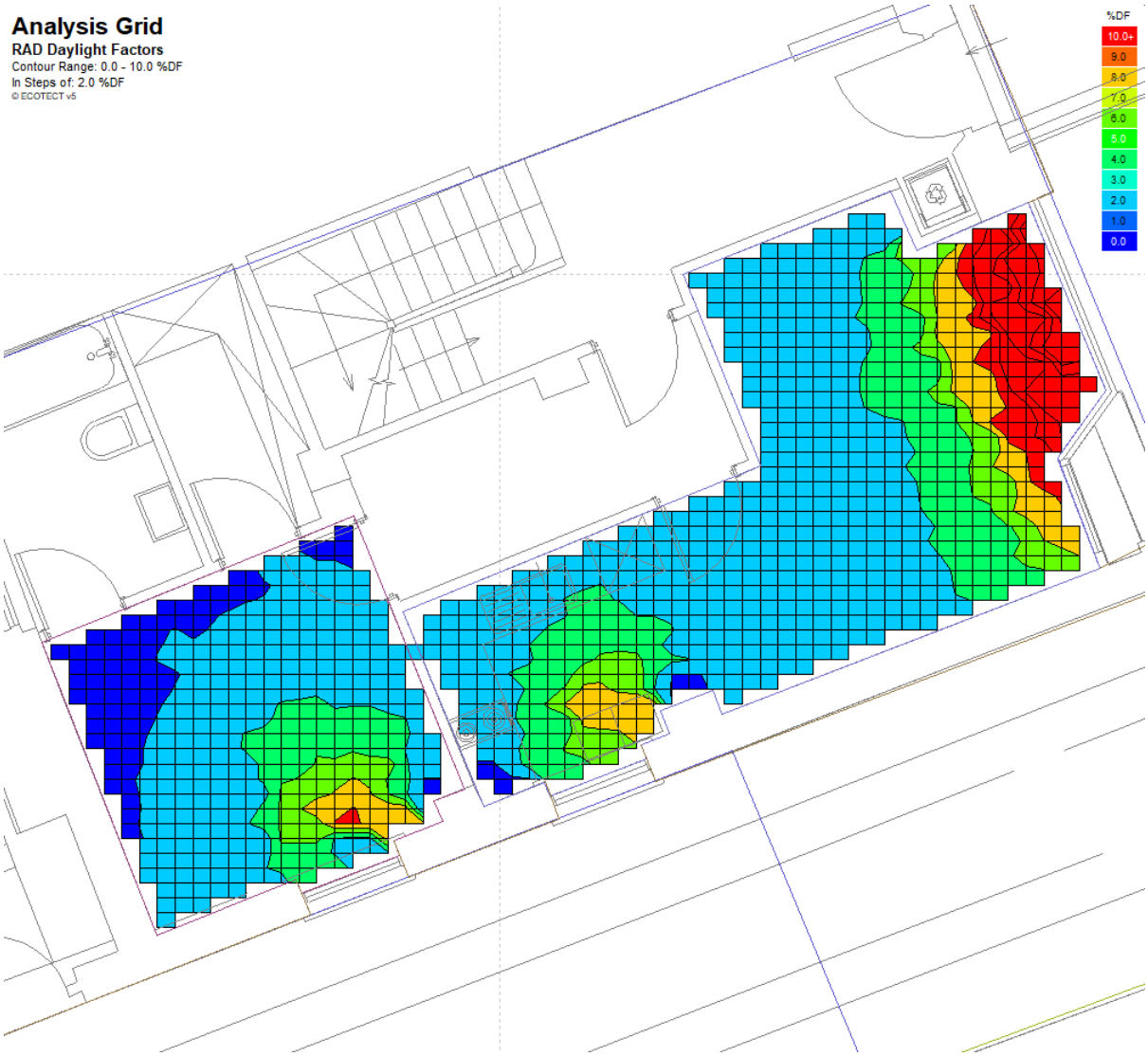


Figure 7: *DF distribution inside the proposed Flat 1 on the Ground floor*

4. CONCLUSIONS

This study looked into the effect that a proposed conversion on 11-12 Grenville Street on the daylight availability of the proposed new Flat 1 on the ground floor. The proposed conversion retains the external volume of the building and hence no additional external shading will be present and hence there was no need for a sunlight study for existing windows.

Regarding the daylight performance of the proposed unit A, there is plenty of natural light arriving in the proposed unit and the average daylight factor for both the bedroom and the living-kitchen room were found to be higher than the required minimum.