



University Partnerships Programme

University of Reading

St Patrick's Hall

Redevelopment

Outline Daylight Level Analysis

November 2017

Rev D

Hulley & Kirkwood Consulting Engineers Ltd

2nd Floor, Studio 5 – 11

5 Millbay Road

Plymouth

Devon

PL1 3LF

(t): 01752 255 575

(e): hk.plymouth@hulley.co.uk

(w): www.hulley.co.uk

Prepared By: EK
Authorised By: DC
Revision: Revised Planning Submission (Rev D)
Project No: P0263
Date: November 2017

University Partnerships Programme

University of Reading

St Patrick's Hall

Redevelopment

Outline Daylight Level Analysis

November 2017

Rev D

REV	DESCRIPTION	PREPARED BY	DATE
-	Planning Submission	EK	December 2015
A	Revised Planning Submission	EK	March 2016
B	Revised Planning Submission (minor amendments to the introduction)	EK	May 2016
C	Revised Planning Submission (Windows updated)	EK	October 2017
D	Summary of Changes	EK	November 2017

CONTENTS

EXECUTIVE SUMMARY 6

1.0 Introduction..... 7

2.0 Average Daylight Level Analysis Methodology and Inputs 7

3.0 Results..... 8

This Outline Daylight Level Analysis has been prepared in relation to a revised application for the redevelopment of St Patrick's Hall to provide student accommodation and associated ancillary uses. A previous application (Council Planning Ref: 161182) for the redevelopment of the site was withdrawn following the local listing of Pearson's Court within the site. This revised application retains Pearson's Court and redevelops the remainder of the site.

The changes proposed as part of this revised scheme are summarised as follows:

- There is a net reduction in student bed numbers in comparison with the previous submission. The withdrawn application proposed 1024 new student bedspaces and 6 no. three bedroom flats for families, resulting in a net increase of 726 bedspaces. The revised application provides 884 new bedspaces and would retain 116 existing bedspaces within Pearson's Court. This results in a net increase of 702 bedspaces at the site.
- The demolition of the original Pearson's Court building no longer forms part of the plans for redevelopment.
- The Sets building to the south of the Pearson's courtyard will be removed and replaced with new, high-quality accommodation; this element of the scheme has been redesigned to complement the retained courtyard.
- The proposed new courtyard to the north of the site, has increased in massing to accommodate the need for student accommodation while retaining the locally listed Pearson's Court.
- The two low-rise buildings previously proposed in the southern part of the site have been removed in response to concerns raised regarding the proximity of the buildings to the nearby house.
- New low rise accommodation is proposed set further back from the southern boundary and deeper into the site to mitigate proximity to the neighbours.
- New accommodation is now proposed above the catering Hub building and to the centre of the site.
- The Social facilities including the bar, café and dining facilities will be located in the centre of the site away from the southern boundary.
- The Combined Heat and Power (CHP) energy centre has been relocated to the centre of the site away from the southern boundary.
- Warden accommodation will be provided within the existing accommodation on the southern boundary and an updated Student Management Plan have been introduced as part of the revised application.

EXECUTIVE SUMMARY

This initial study indicates that the assessed bedrooms achieve good average daylight factor and uniformity ratio, with values also being in line with the BREEAM 2014 New Construction Hea 01 Daylighting criteria requirements.

Regarding the assessed kitchen/living/dining areas, even though they achieve good practice average daylight factors, the uniformity ratio is not satisfactory due to the deep room plans. However, they comply with the BREEAM 2014 New Construction Hea 01 Daylighting minimum and average daylight illuminance requirements.

It should be noted that the results of this initial study have been produced for checking that the current proposals achieve good daylighting for residents in occupied spaces. They do not prove compliance with Hea 01 criteria requirements until the design development has been finalised and the entire site is assessed.

1.0 Introduction

Hulley & Kirkwood Consulting Engineers Ltd have completed an initial average daylight level analysis for four bedrooms and two typical kitchens, including living/dining areas, proposed for the St Patrick's Hall redevelopment, to assist in determining the resulting daylighting levels that can be expected in these areas.

The average daylight level analysis has been calculated for what is considered to be the three 'worst case' bedrooms all north facing and looking into courtyards and two 'worst case' kitchen/living/dining areas (typical townhouse and block).

The conclusions of this outline analysis have been provided in Section 4.0.

2.0 Average Daylight Level Analysis Methodology and Inputs

The measurement of the average daylight factor is based on an overcast sky of uniform luminance and is not dependant on seasonal variations or direct sunlight.

This study measures the average daylight factor on a working plane height of 0.75m above floor level and is based on an empty room (i.e. without furniture or occupants), which is an industry standard calculation principal.

Incorporated surface reflectance values are;

Floors= 30% (Karndean American Oak)
Walls = 80% (white matt painted walls)
Ceilings = 80% (white matt painted ceilings)
Glazing Light Transmittance = 70%

The Integrated Environmental Solutions (IES) software, which is a complete Building Performance Modelling / Analysis tool, has been used to analyse the daylighting performance. It is used for thermal modelling, energy (EPC) modelling, Part L compliance modelling, artificial lighting and daylighting analysis (FlucsDL module). All of which are based on the same model to ensure continuity and design co-ordination.

The results from this analysis tool form the basis to this report.

Additional IES input settings include for the following:

Margin used at walls and obstructions for working planes and task areas: 0m
Calculation quality: Low
Grid size of working planes and inner room surfaces: 0.125m
Grid size of outer room surfaces: 1m.
Calculation method: Average inter-reflections

Finally, the IES models are based on the Planning Architectural drawings provided by Willmore Iles Architects (received 25/11/15 and updated where relevant). Further update included for the amended site plan dated 21/09/17 and proposed agreed windows.

3.0 Results

The average daylight level analysis has been calculated for four 'worst case' bedrooms all north facing and looking into courtyards (bedrooms A2.1.01, B1.G.08, B2.G.01 and H1.1.04). The study also includes for two 'worst case' typical kitchens/living/dining areas (H1.G.K and E1.G.K)

Complete models of those blocks have been created and analysed. These are accurate representation of the Architectural design and glazing properties both internal and externally.

The table below summarises the IES results for daylight modelling, providing the room name (as identified on the architectural layouts), average daylight factor (%), uniformity value and minimum and average daylight illuminance.

Room Reference	Average Daylight Factor (%)	Uniformity	Minimum Daylight Illuminance (lux)	Average Daylight Illuminance (lux)	Area (m ²)
A2.1.01	4.4	0.34	182.69	533.71	10
B1.G.08	4.6	0.42	238.25	563.45	10
B2.G.01	3.4	0.42	172.96	415.17	16
H1.1.04	5.3	0.42	275.55	652.33	10
H1.G.K (Living/Dining)	2.9	0.19	66.68	356.52	30
H1.G.K (Kitchen)	5.0	0.14	82.63	605.22	14.5
E1.G.K (Living/Dining)	7.4	0.27	243.36	898.65	30
E1.G.K (Kitchen)	3.1	0.27	102.42	378.55	11

The following figures show the visual representation of the daylight factor with contour levels for the assessed rooms as listed above.

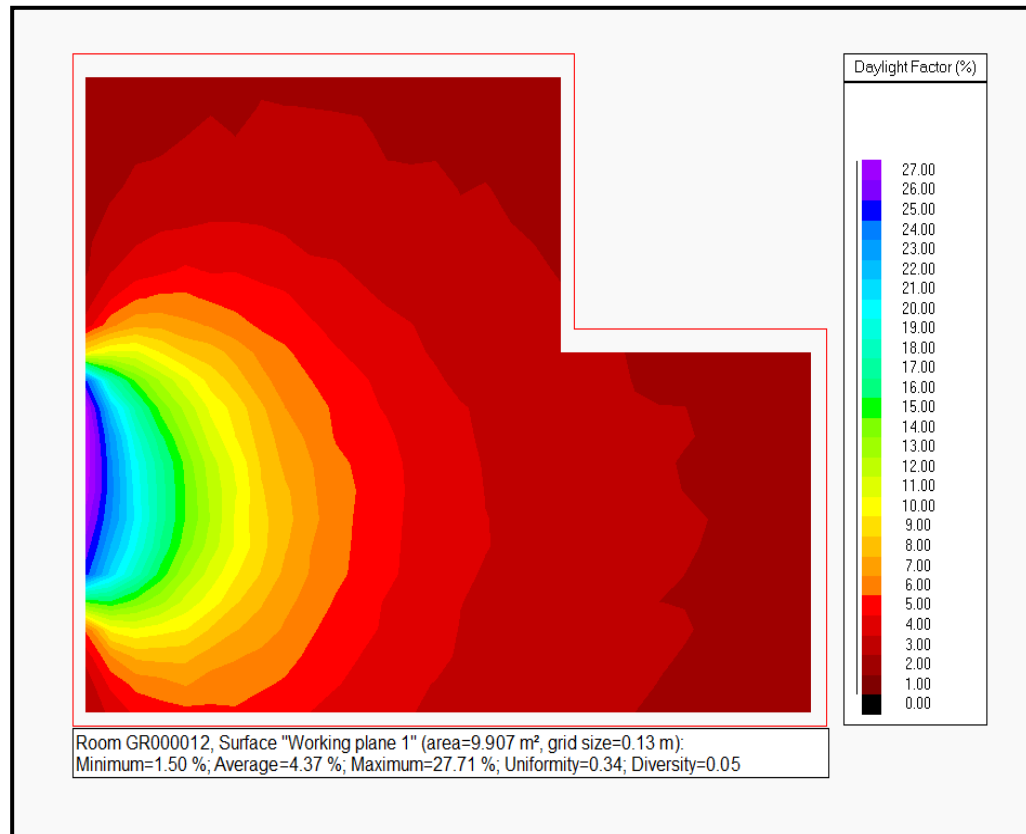


Figure 1: IES FlucsDL Daylight Factor for Bedroom A2.1.01

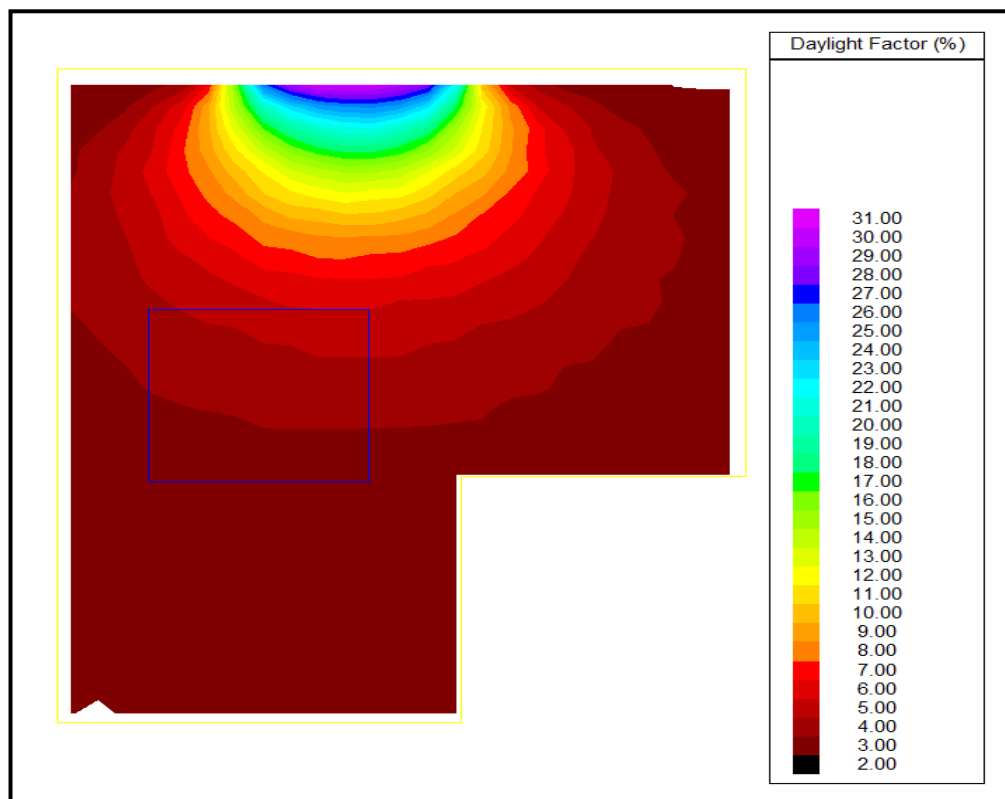


Figure 2: IES FlucsDL Daylight Factor for Bedroom B1.G.08

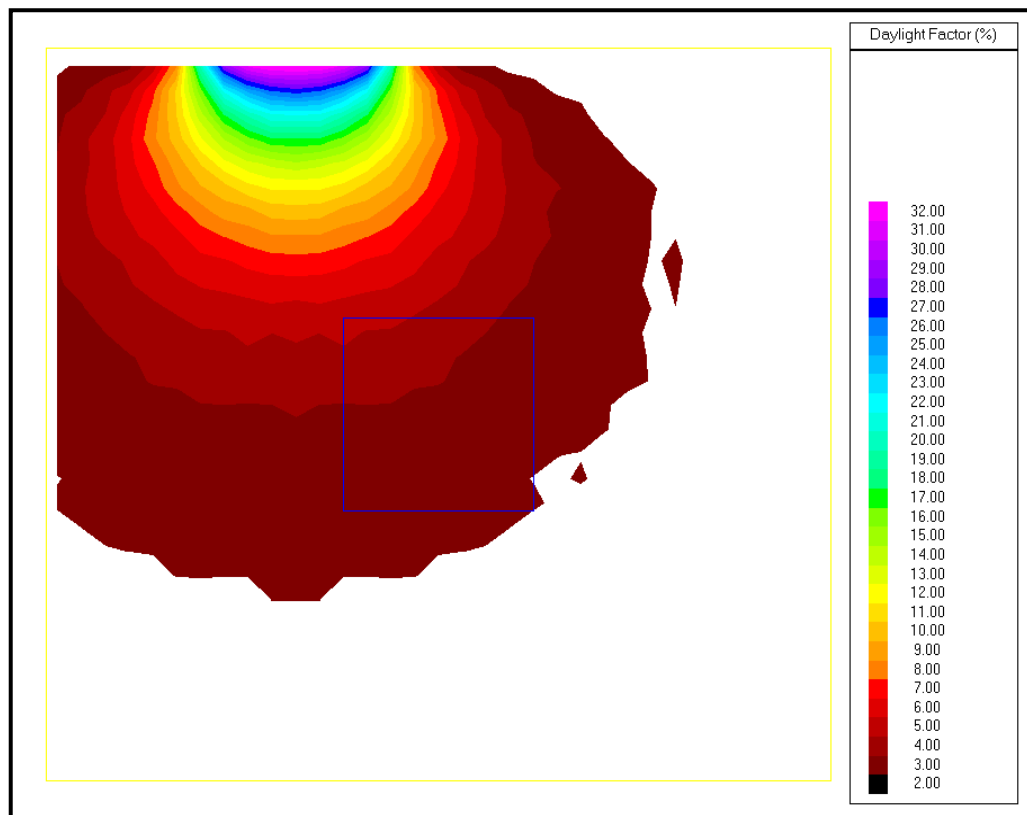


Figure 3: IES FlucsDL Daylight Factor for Bedroom B2.G.01

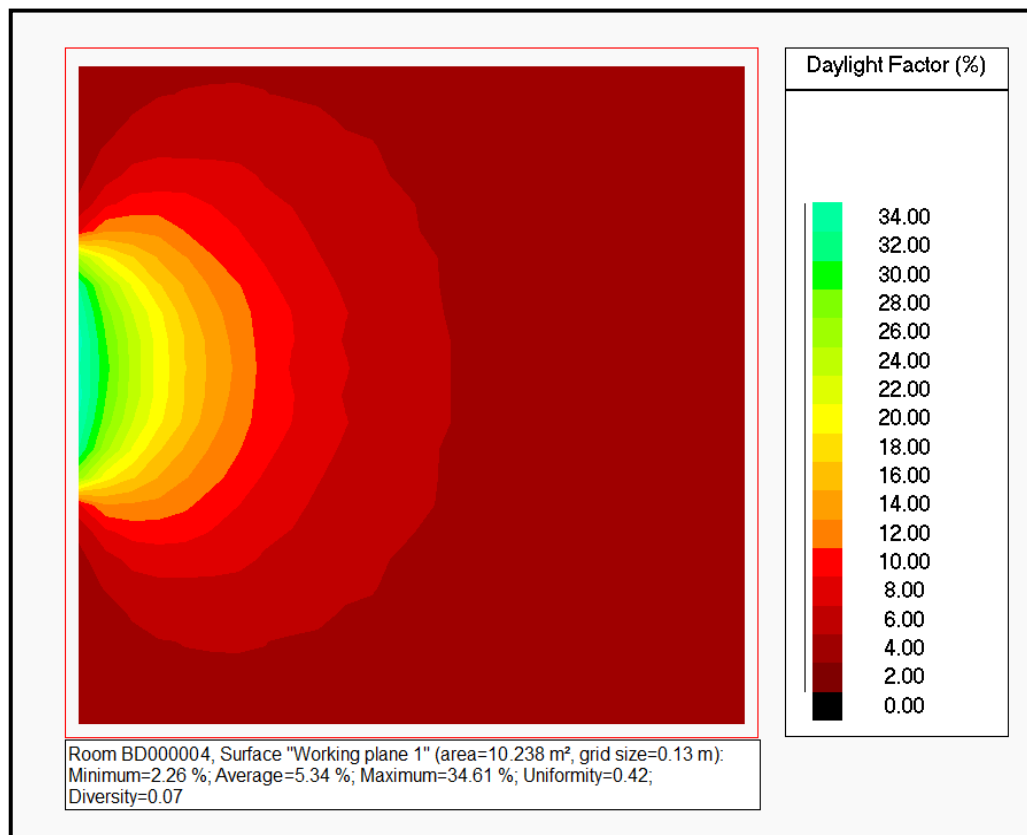


Figure 4: IES FlucsDL Daylight Factor for Bedroom H1.1.04

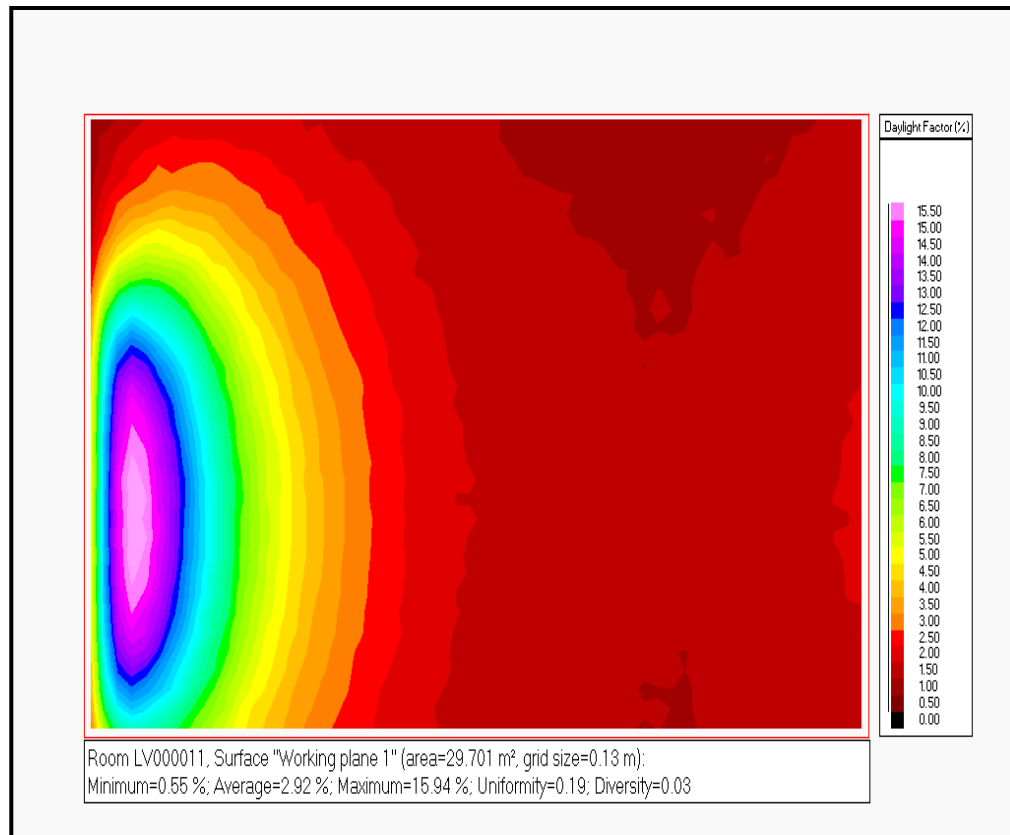


Figure 5: IES FlucsDL Daylight Factor for Room H1.G.K (Living/Dining)

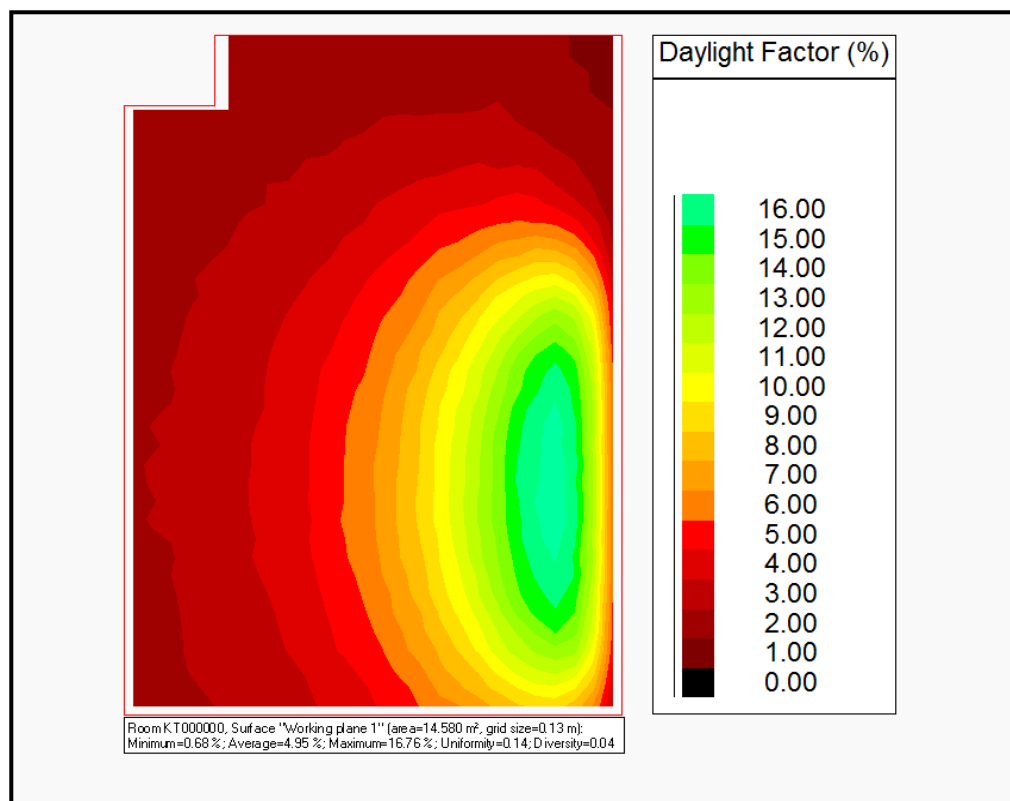


Figure 6: IES FlucsDL Daylight Factor for Room H1.G.K (Kitchen)

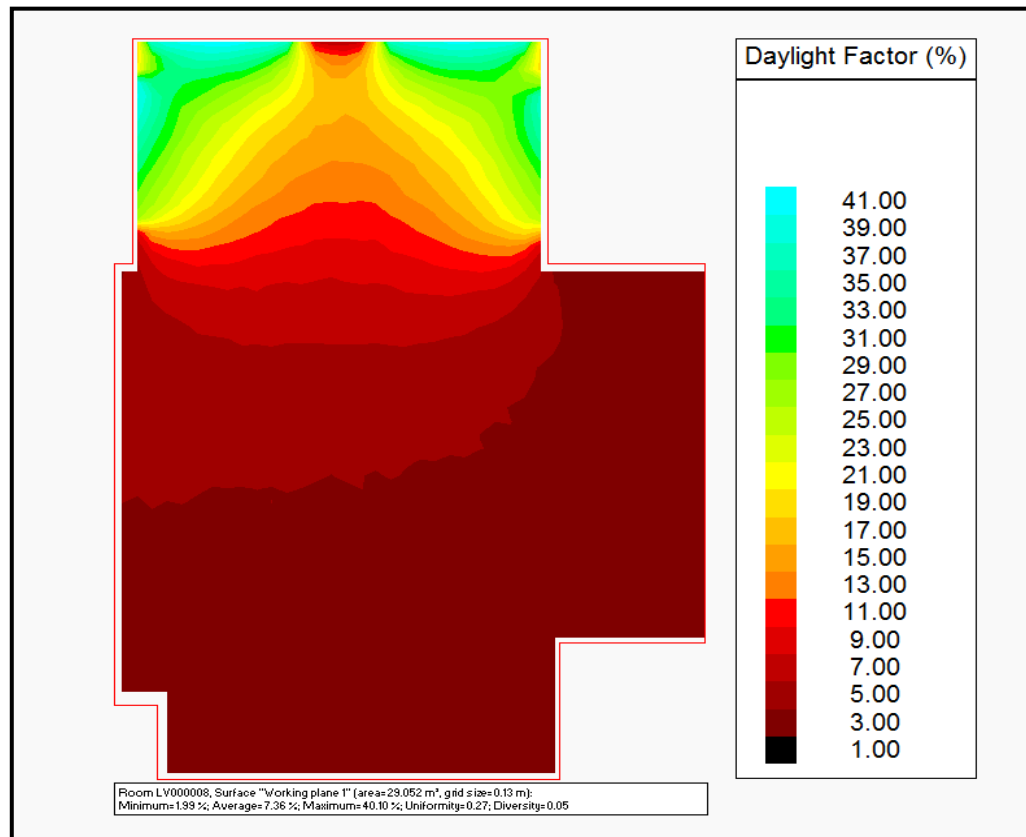


Figure 7: IES FlucsDL Daylight Factor for Room E1.G.K (Living/Dining)

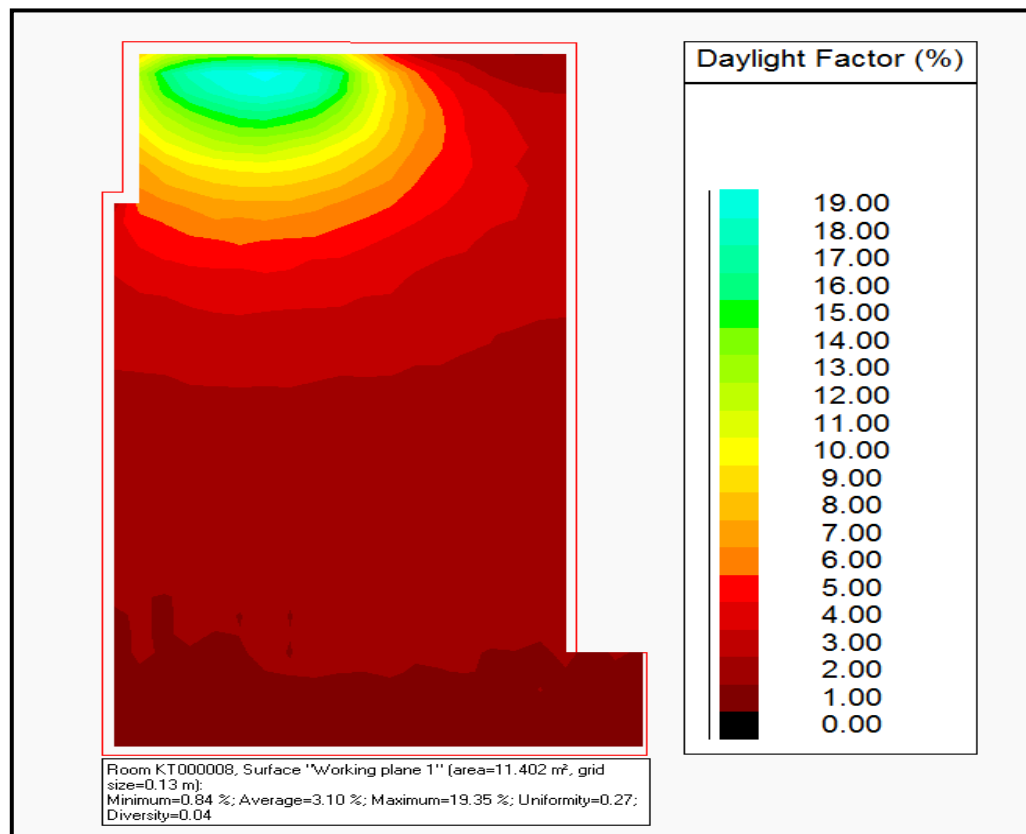


Figure 8: IES FlucsDL Daylight Factor for Room E1.G.K (Kitchen)