The Daylight Lab

DAYLIGHT & SUNLIGHT ASSESSMENT
MAY 2022, REF: 2214/LIGHT

CLIENT:
Diocese of Westminster

SITE ADDRESS:
238 Haverstock Hill
London NW3 2AE

CONTENTS:

AUTHOR:
William Pottinger

Introduction

This report has been commissioned by the Diocese of Westminster and prepared by The Daylight Lab to assess the levels of daylight and sunlight within the proposed new flats at No.238 Haverstock Hill.

The approach is based on the BRE's "Site Layout Planning for Daylight and Sunlight, a Guide to Good Practice", Second Edition, PJ Littlefair 2011, which is generally accepted as good practice by Local Planning Authorities.

Site & Project Description

The application site comprises a 3 storey property (lower ground to first) previously used as a nunnery. The street elevation of the property faces approximately south-west.

Attached to the north-west is a commercial premises at No.240 Haverstock Hill.

Separated by a gap of approximately 2-3m to the south-east is a 5 storey school building (part of Rosary Primary School).

It is proposed to extend and convert the existing building to form 5x 1 bedroom flats over lower-ground, ground and first floors.

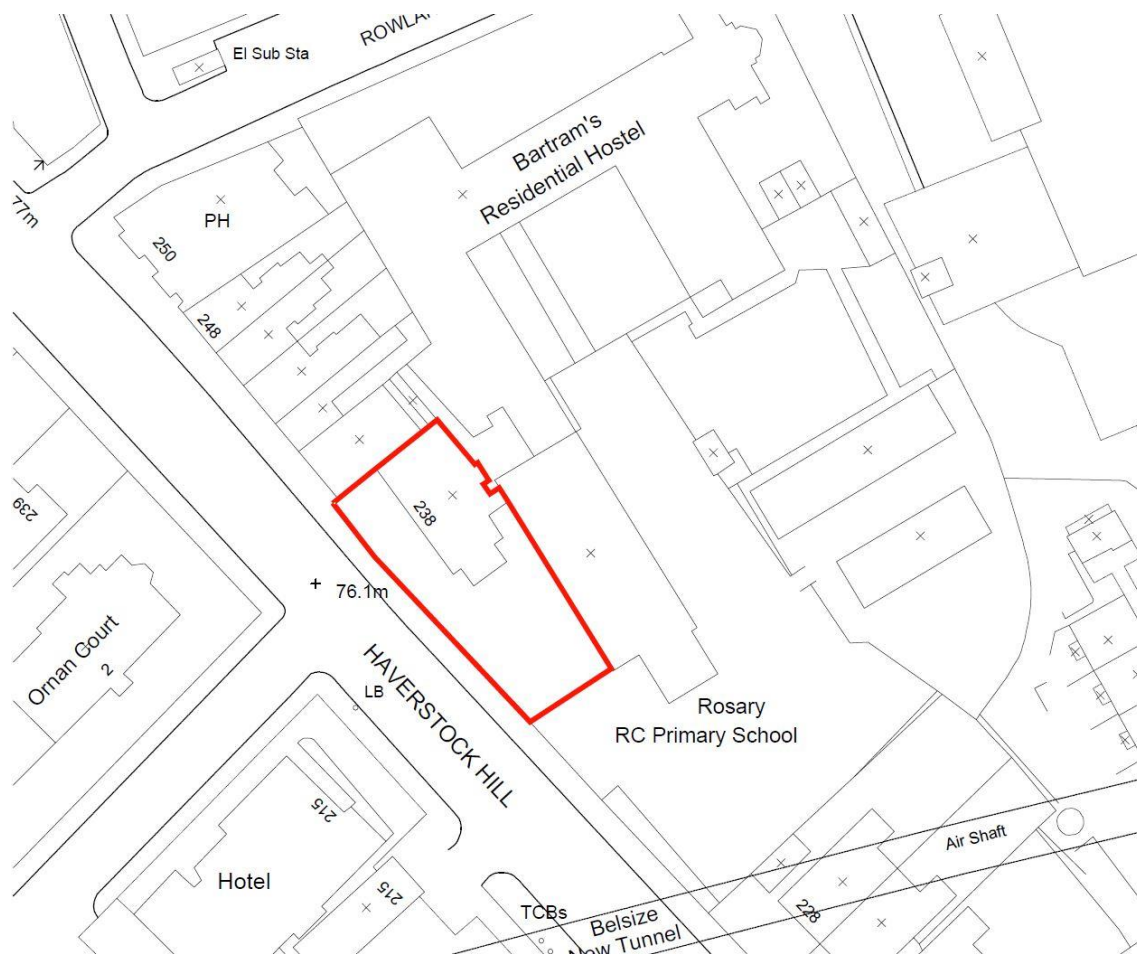Proposed plans and elevations can be found in Appendix 1.

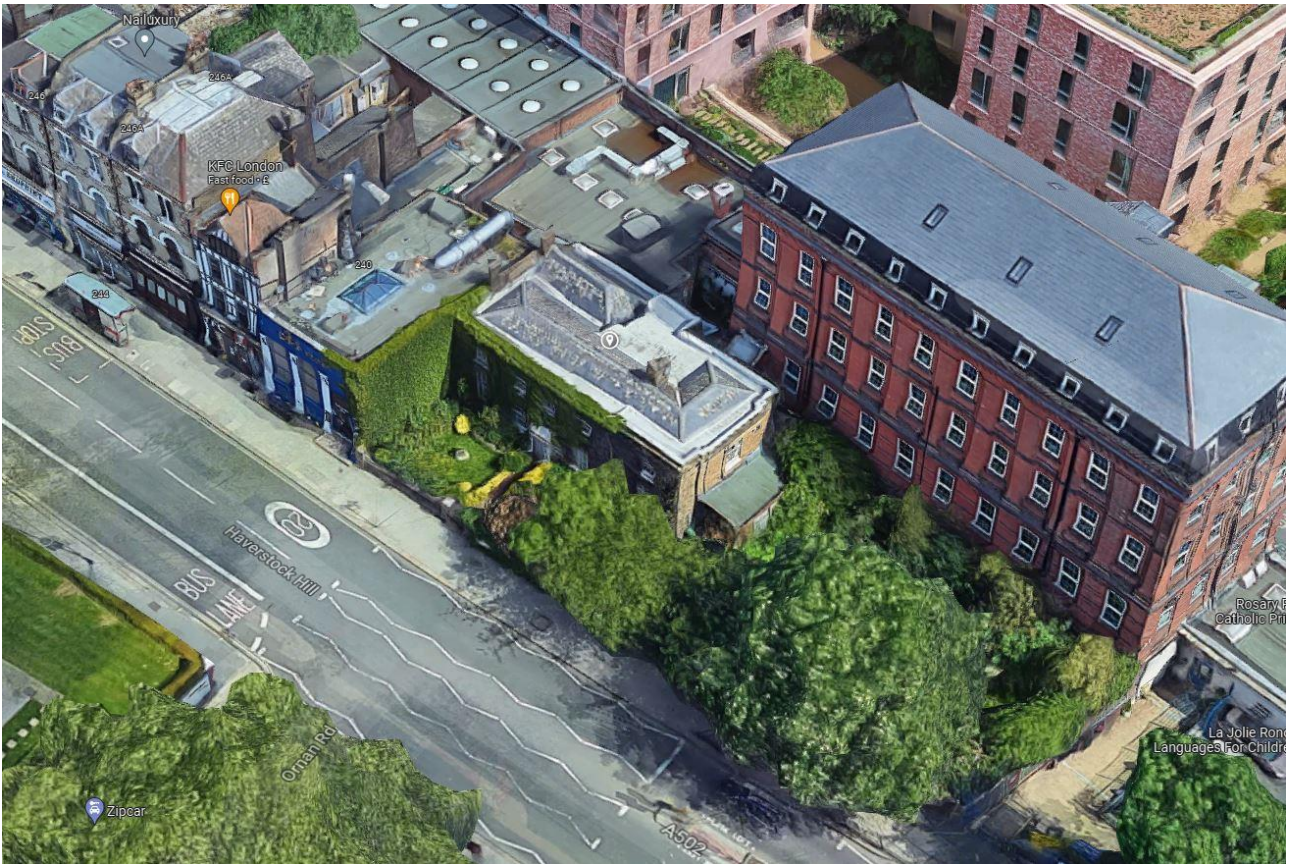*Fig 1. Location Plan. North to top. Do not scale.*

Fig 2. Aerial view of site from south.

Methodology

An as proposed 3D model of the site and surrounding properties was prepared by The Daylight Lab to a level of detail suitable for testing using drawings, a topographical survey and photographs provided by Wilby & Burnett Architects.

Materials were set to provide accurate reflectance values with white painted walls and ceilings and light coloured wooden floors within the proposed flats and red/yellow stock brick, white render, roof slates, tiles, grass, tarmac and concrete elsewhere.

Preliminary tests were carried out based on draft plans with results showing shortfalls in daylight to the lower-ground floor Flat 1. Meetings were then held between The Daylight Lab and the architect and minor adjustments were agreed in order to bring the scheme up to a "pass".

Full tests were then carried out based on the revised plans, using the following methods of measurement and specialist analysis software (MBS Daylight & Daylight Visualiser), in full accordance with the BRE guidelines:

Daylight - Average Daylight Factor (ADF)

Daylight provision in proposed rooms may be checked using the Average Daylight Factor (ADF). The ADF is a measure of the overall amount of daylight in a space and may be defined as the ratio of daylight flux indecent on the working plane (850mm above floor level for residential accommodation) to the area of the working plane, expressed as a percentage of the outdoor illuminance on a horizontal plane due to an unobstructed CIE standard overcast sky. Thus a 1%

ADF would mean that the average indoor illuminance would be one hundredth of the outdoor unobstructed illuminance. BS 8206-2 *Code of practice for daylighting* recommends an ADF of 5% for a well day-lit space and 2% for a partly day-lit space with acceptable minimum values of 2% for kitchens, 1.5% for living rooms and combined living/kitchen/diners, and 1% for bedrooms.

Daylight - Room Depth

If a proposed habitable room has windows in only one wall the depth of the room should ideally not exceed the limiting value given by $(L/W) + (L/H) < (2/(1-Rb))$, where L is the room length, W the room width, H the window head height above floor level and Rb the average reflectance of the surface in the rear half of the room. If L exceeds this value supplementary electric lighting will be required towards the end of the room furthest from the window.

Sunlight - Annual Probable Sunlight Hours (APSH)

A dwelling or any non-domestic building where there is a particular requirement for sunlight will appear reasonably sunlit provided that at least one main window to a living room (or a commercial space which is deemed to have a special requirement for sunlight) faces within 90° of due South and receives at least 25% of the annual probable sunlight hours (APSH), including at least 5% during the winter (WPSH), between the 21st of September and 21st of March.

The following figures 3-6 show the proposed model as tested.

Figure 7 then provides reference numbers for the proposed living room windows tested for APSH and WPSH.

Fig 3. 3D model viewed from south. Shadows set to 12pm, 21st March (the equinox).

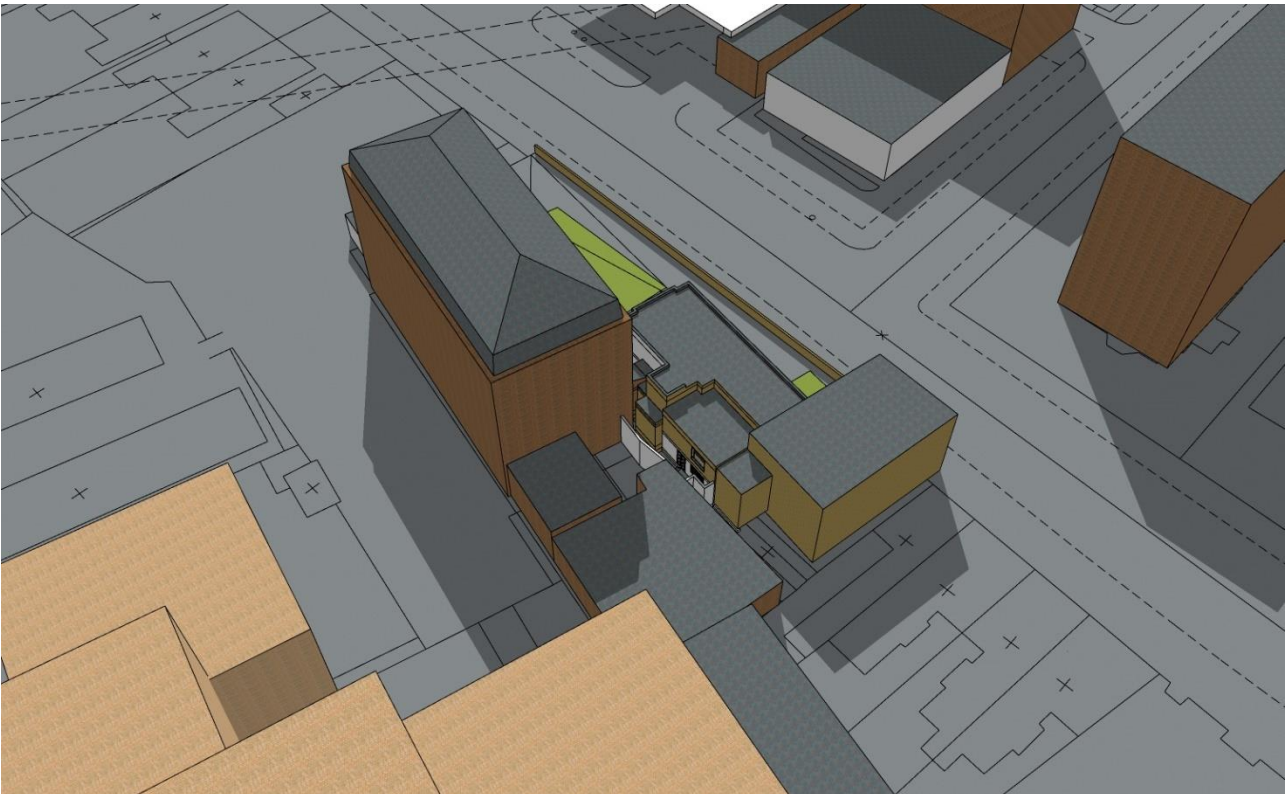*Fig 4. 3D model viewed from west. Shadows set to 12pm, 21st March (the equinox).*

Fig 5. 3D model viewed from north. Shadows set to 12pm, 21st March (the equinox).
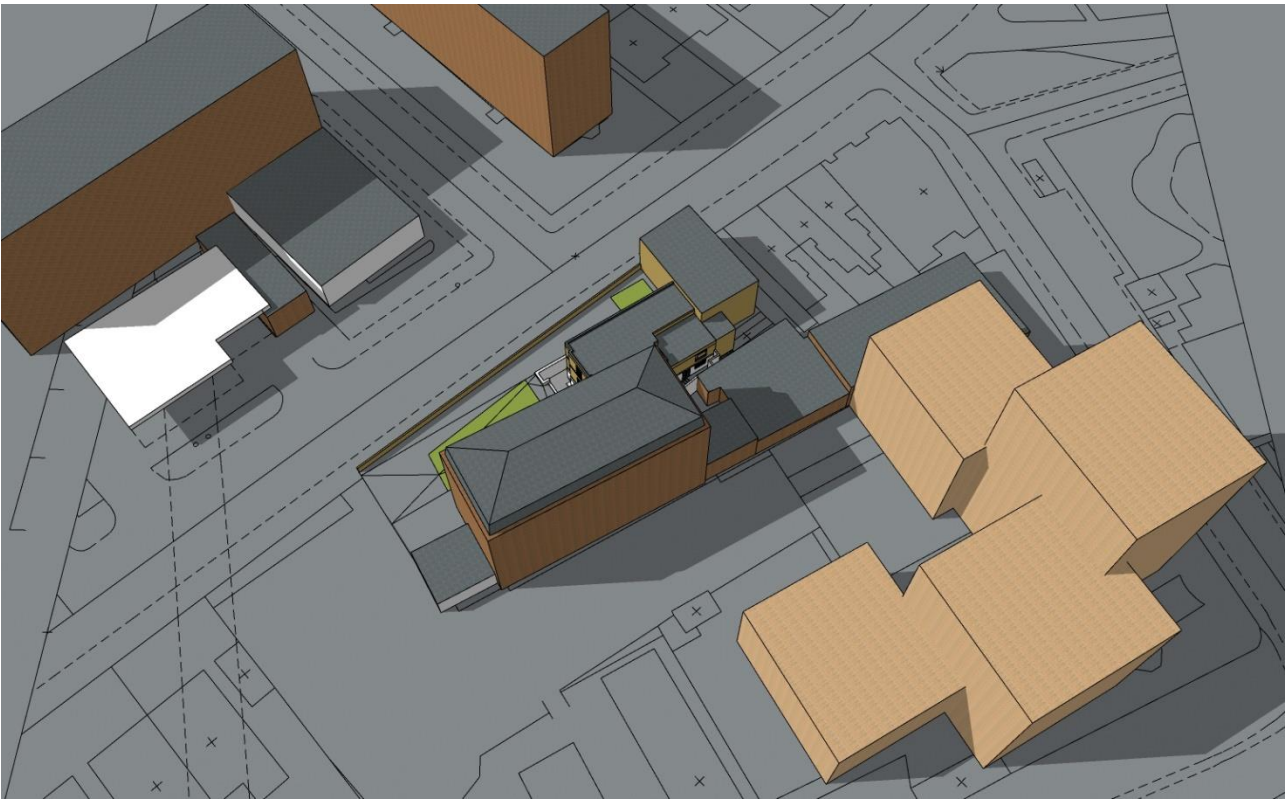
Fig 6. 3D model viewed from east. Shadows set to 12pm, 21st March (the equinox).

Fig 7. Front and side elevation of proposed with living room window references indicated.

Data

Daylight - Average Daylight Factor (ADF)

The following table compares ADF results for the proposed habitable rooms with BRE recommendations. Gradient maps indicating the daylight distribution can be found in Appendix 2.

Table 1. Average Daylight factor results.

Flat	Room	ADF (%)	Minimum Accepted (%)	Meets BRE?
1	Bedroom	1.14	1	YES
1	Living/kitchen/dining	1.53	1.5	YES
2	Bedroom	1.31	1	YES
2	Living/kitchen/dining	2.25	1.5	YES
3	Bedroom	2.09	1	YES
3	Living/kitchen/dining	1.71	1.5	YES
4	Bedroom	2.98	1	YES
4	Living/kitchen/dining	1.92	1.5	YES
5	Bedroom	1.55	1	YES
5	Living/kitchen/dining	2.30	1.5	YES

Daylight - Room Depth

The following table provides results for room depth calculations for all proposed single aspect habitable rooms.

Table 2. Room depth results.

Flat	Room	Length (L)	Width (W)	Window Head (H)	Average Room Reflectance (Rb)	(L/W)+ (L/H)	(2/(1-Rb))	Meets BRE?
1	Bedroom	4.3	3.3	2.1	0.45	3.35	3.64	YES
2	Bedroom	3.8	3.9	2.1	0.45	2.78	3.64	YES
2	Living/kitchen/dining	4.3	5.9	2.25	0.45	2.64	3.64	YES
3	Bedroom	4	3.25	2.25	0.45	3.01	3.64	YES
4	Bedroom	3.65	3.8	2.25	0.45	2.58	3.64	YES
4	Living/kitchen/dining	4.6	7.2	2	0.45	2.94	3.64	YES
5	Bedroom	4.6	3.5	2	0.45	3.61	3.64	YES

Sunlight - Annual Probable Sunlight Hours (APSH/WPSH)

The following table provides proposed APSH and WPSH for the proposed living room windows that face within 90° of due south.

Table 3. Annual and winter probable sunlight hours results.

Flat	Window Id	Window Orientation	Prop APSH (%)	Minimum accepted (%)	Meets BRE?	Prop WPSH (%)	Minimum accepted (%)	Meets BRE?
1	1	145°	53	25	YES	18	5	YES
2	2	235°	55	25	YES	20	5	YES
3	3	145°	56	25	YES	21	5	YES
4	4	235°	60	25	YES	21	5	YES
5	5	145°	60	25	YES	24	5	YES

Conclusion

Daylight - Average Daylight Factor (ADF)

All proposed habitable rooms were found to exceed relevant minimum accepted figures for Average Daylight Factor (ADF) in new dwellings.

Daylight – Room Depth

All single aspect rooms meet desired figures for maximum room depth in new dwellings.

Sunlight - Annual Probable Sunlight Hours (APSH/WPSH)

All proposed living rooms enjoy a window that faces within 90°of due south and receives in excess of minimum accepted figures for Annual and Winter Probable Sunlight Hours (APSH and WPSH) in new dwellings.

Closing Statement

The proposed scheme was found to enjoy acceptable levels of daylight and sunlight, passing all applicable BRE tests for new dwellings.

The scheme therefore satisfies BRE and local policy requirements for daylight and sunlight.
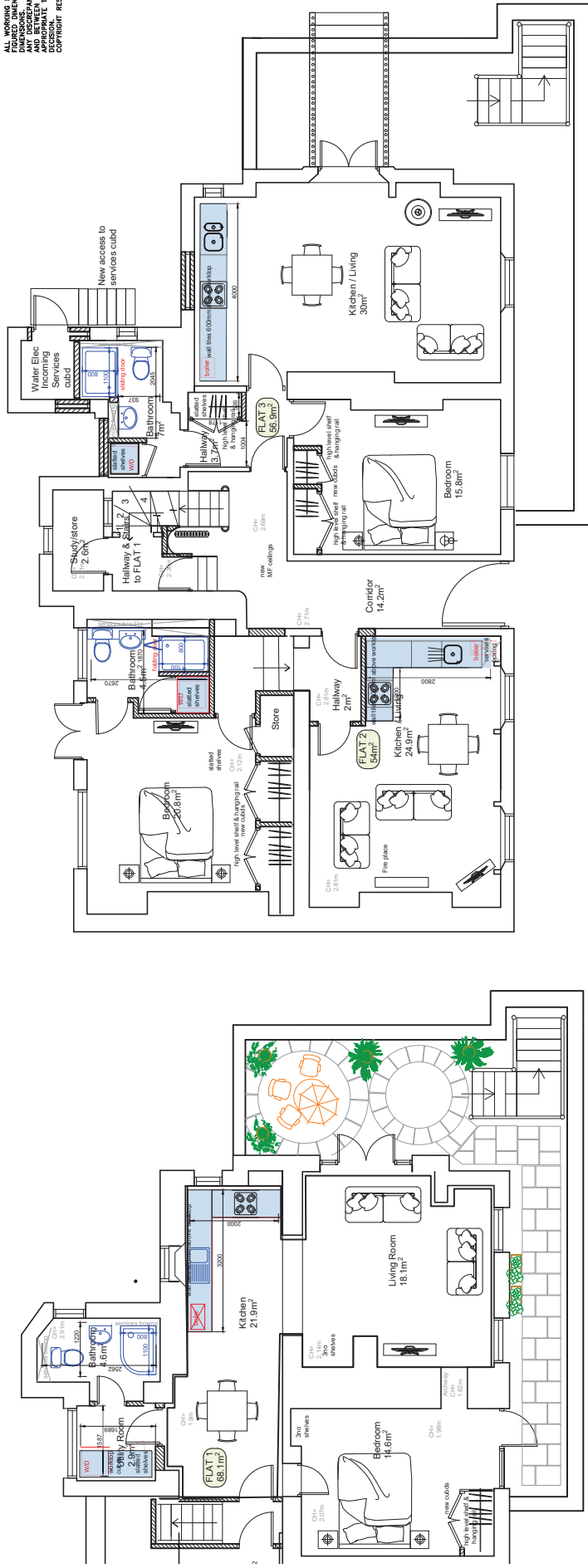
William Pottinger, The Daylight Lab, May 2022.

APPENDIX 1
Proposed Plans & Elevations
(not to scale).

A W33 window increase in size

238 HAVERSTOCK HILL
BELSIZE PARK
LONDON
NW3 2AE

DIOCESE OF WESTMINSTER

PLANS
AS PROPOSED FITTINGS

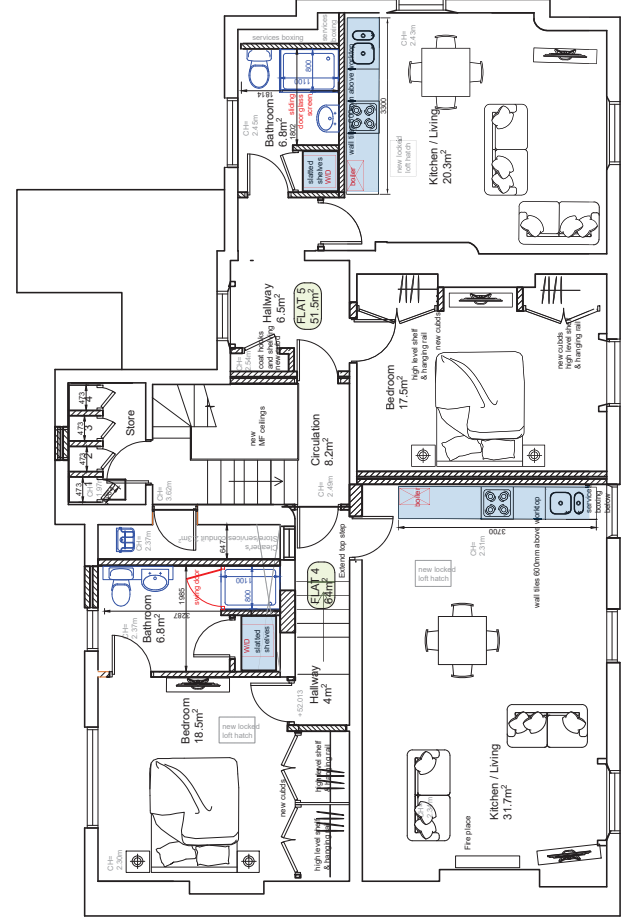RIBA Chartered Practice
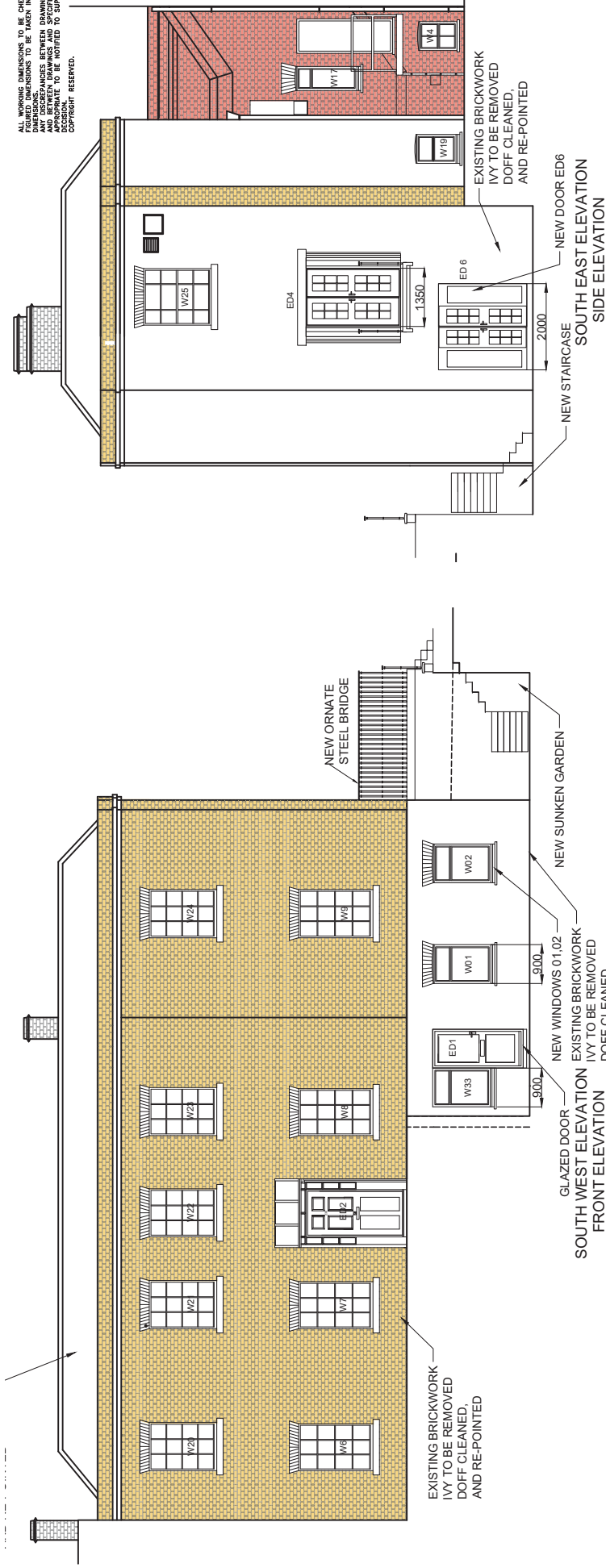RICS

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Flat 1
FLAT 1 88.1m²
Kitchen 21.9m²
Living Room 18.1m²
Bedroom 14.6m²
Bathroom 4.6m²
Utility Room 2.9m²

Flat 2
FLAT 2 54m²
Kitchen / Living 24.9m²
Bedroom 20.8m²
Bathroom 4.6m²
Hallway 2m²
Store
Corridor 14.2m²

Flat 3
FLAT 3 56.9m²
Kitchen / Living 30m²
Bedroom 15.8m²
Bathroom 7m²
Hallway 3.7m²
Study/store 2.6m²
Hallway & stairs to FLAT 1
New access to services cubd
Water Elec Incoming Services cubd

Flat 4
FLAT 4 63m²
Kitchen / Living 31.7m²
Bedroom 18.5m²
Bathroom 6.8m²
Hallway 4m²
Store

Flat 5
FLAT 5 51.5m²
Kitchen / Living 20.3m²
Bedroom 17.5m²
Bathroom 6.8m²
Hallway 6.5m²
Circulation 8.2m²

ALL WORKING DIMENSIONS TO BE CHECKED ON SITE.
FIGURED DIMENSIONS TO BE TAKEN IN PREFERENCE TO SCALED DIMENSIONS.
ANY DISCREPANCIES BETWEEN DRAWINGS OF DIFFERING SCALES AND BETWEEN DRAWINGS AND SPECIFICATION WHERE APPROPRIATE TO BE NOTIFIED TO SUPERVISING OFFICER FOR DECISION.
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SOUTH EAST ELEVATION
SIDE ELEVATION

W4
W17
W19
W25
ED4
ED 6
1350
2000

NEW DOOR ED6

NEW STAIRCASE

EXISTING BRICKWORK IVY TO BE REMOVED DOFF CLEANED, AND RE-POINTED

SOUTH WEST ELEVATION
FRONT ELEVATION

W24
W9
W23
W8
W22
W7
W2
W6
W20
ED2
ED1
W33
W01
W02
900
900

NEW ORNATE STEEL BRIDGE

NEW SUNKEN GARDEN

NEW WINDOWS 01,02

EXISTING BRICKWORK IVY TO BE REMOVED DOFF CLEANED, AND RE-POINTED

GLAZED DOOR

EXISTING BRICKWORK IVY TO BE REMOVED DOFF CLEANED, AND RE-POINTED

NORTH WEST ELEVATION
SIDE ELEVATION

ATTACHED TO ADJACENT BUILDING

NORTH EAST ELEVATION
REAR ELEVATION

W30
W10
W29
ED3
W11
W31
W2
W28
W12
W27
W14
W3
W18
W4a
W2b
800

ATTACHED TO ADJACENT BUILDING

NEW ORNATE STEEL BRIDGE
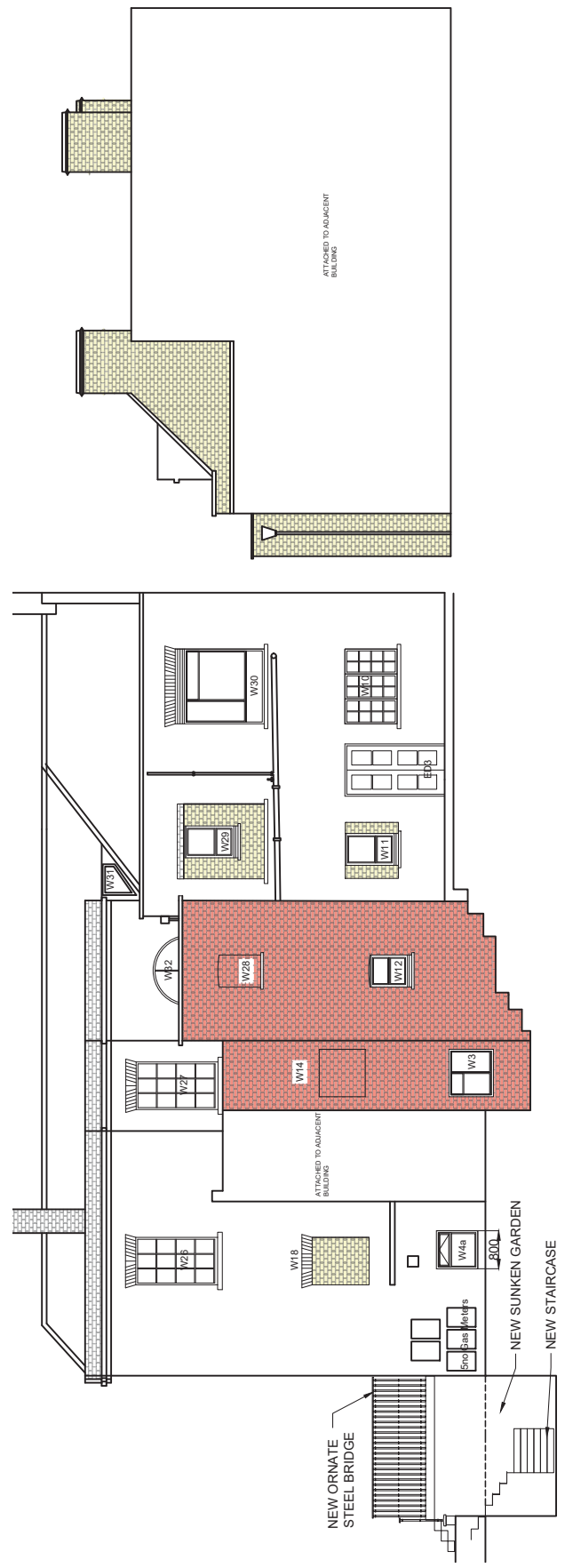
NEW SUNKEN GARDEN

NEW STAIRCASE

Sho Gas Meters

B: Revised to show new window 4a, and enlarged windows W01,W02 W33 and doors ED4 and ED6

238 HAVERSTOCK HILL
BELSIZE PARK
LONDON
NW3 2AE

DIOCESE OF WESTMINSTER

ELEVATIONS AS PROPOSED

RIBA Chartered Practice

RICS Regulated by RICS

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APPENDIX 2
Average Daylight Factor (ADF) gradient maps.

w_flat 1 bed
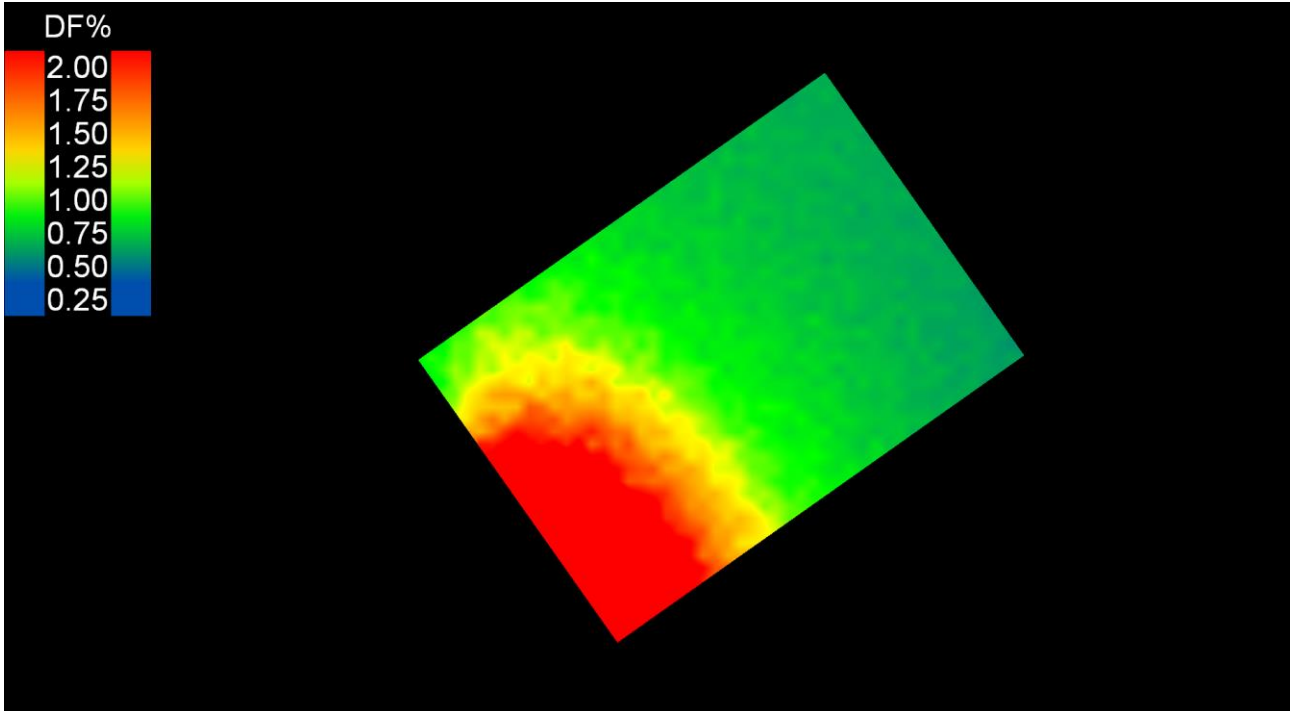
Default

Average	$D_{average}$	1.14 DF[%]
Median	D_{median}	0.76 DF[%]
Minimum	D_{min}	0.46 DF[%]
Maximum	D_{max}	5.95 DF[%]
Uniformity 1	$D_{min}/D_{average}$	0.4043
Uniformity 2	D_{min}/D_{max}	0.0771

w_flat 1 living/kitchen/dining
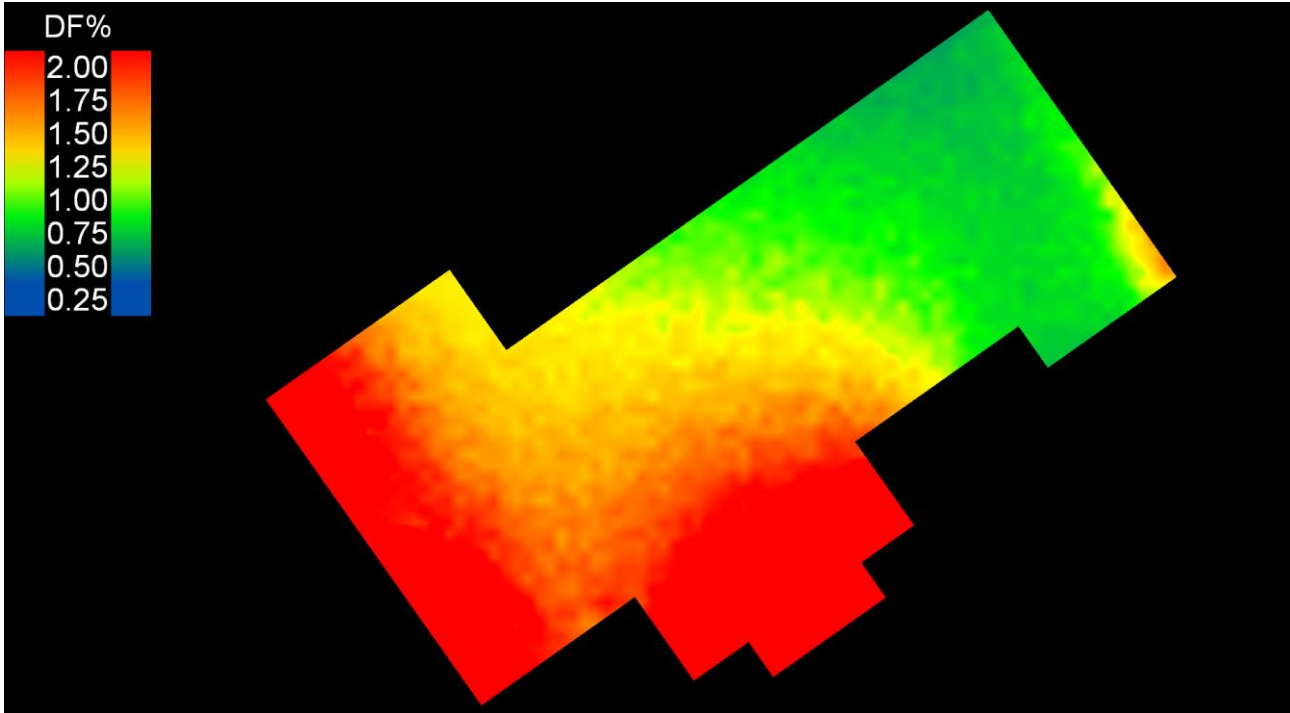
Default

Average	$D_{average}$	1.53 DF[%]
Median	D_{median}	1.31 DF[%]
Minimum	D_{min}	0.51 DF[%]
Maximum	D_{max}	6.87 DF[%]
Uniformity 1	$D_{min}/D_{average}$	0.3360
Uniformity 2	D_{min}/D_{max}	0.0749

w_flat 2 bed
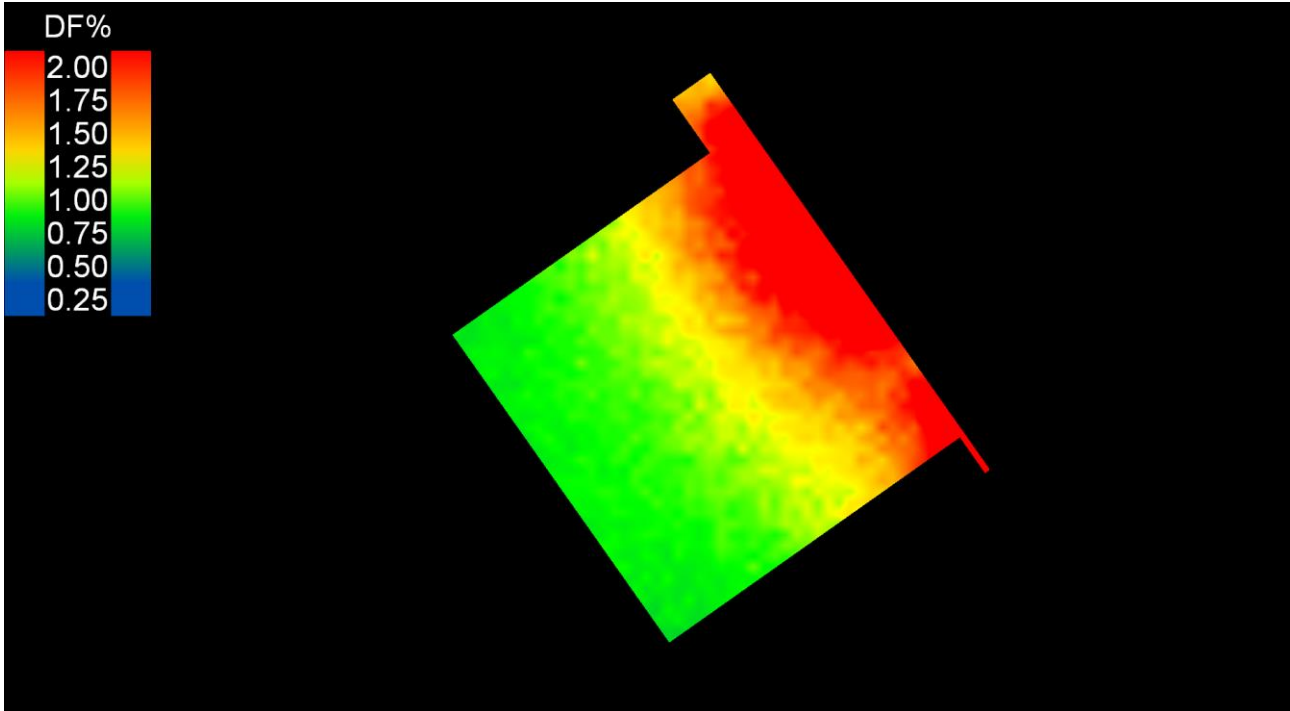
Default

Average	$D_{average}$	1.31 DF[%]
Median	D_{median}	1.04 DF[%]
Minimum	D_{min}	0.67 DF[%]
Maximum	D_{max}	3.90 DF[%]
Uniformity 1	$D_{min}/D_{average}$	0.5120
Uniformity 2	D_{min}/D_{max}	0.1719

w_flat 2 living/kitchen/dining
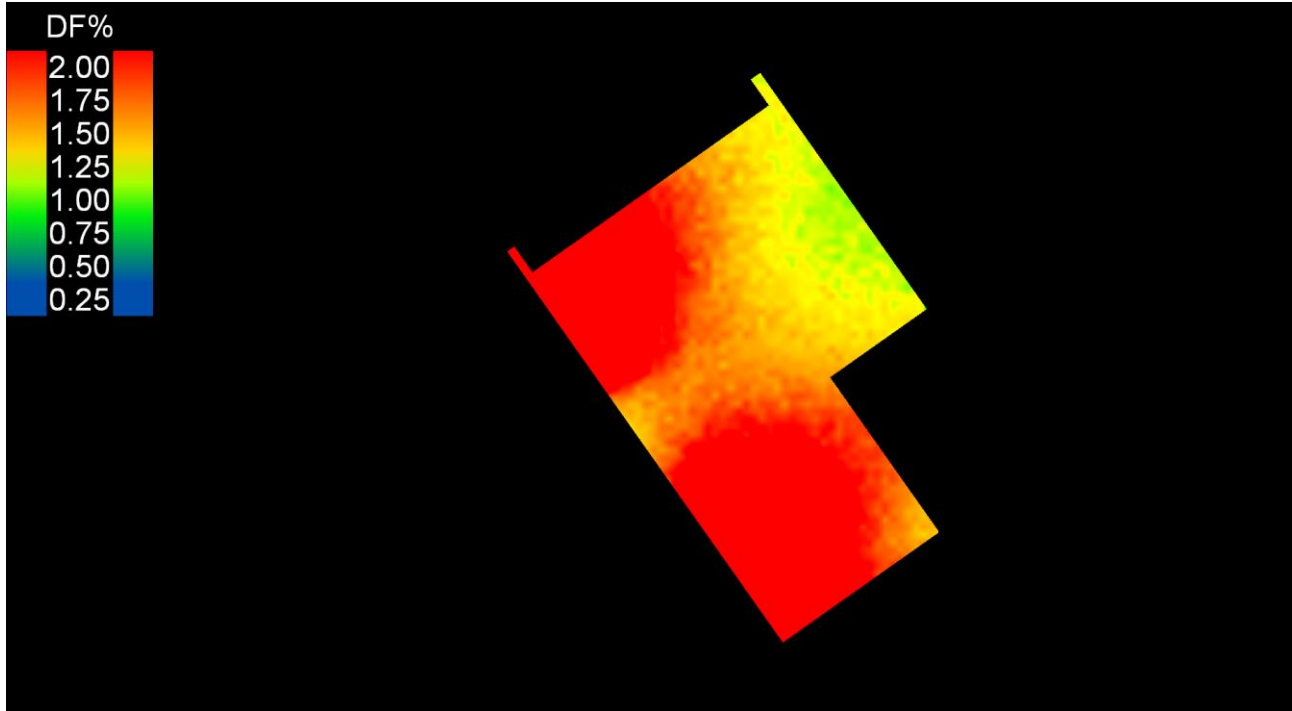
Default

Average	$D_{average}$	2.25 DF[%]
Median	D_{median}	1.72 DF[%]
Minimum	D_{min}	0.91 DF[%]
Maximum	D_{max}	8.75 DF[%]
Uniformity 1	$D_{min}/D_{average}$	0.4054
Uniformity 2	D_{min}/D_{max}	0.1045

w_flat 3 bed
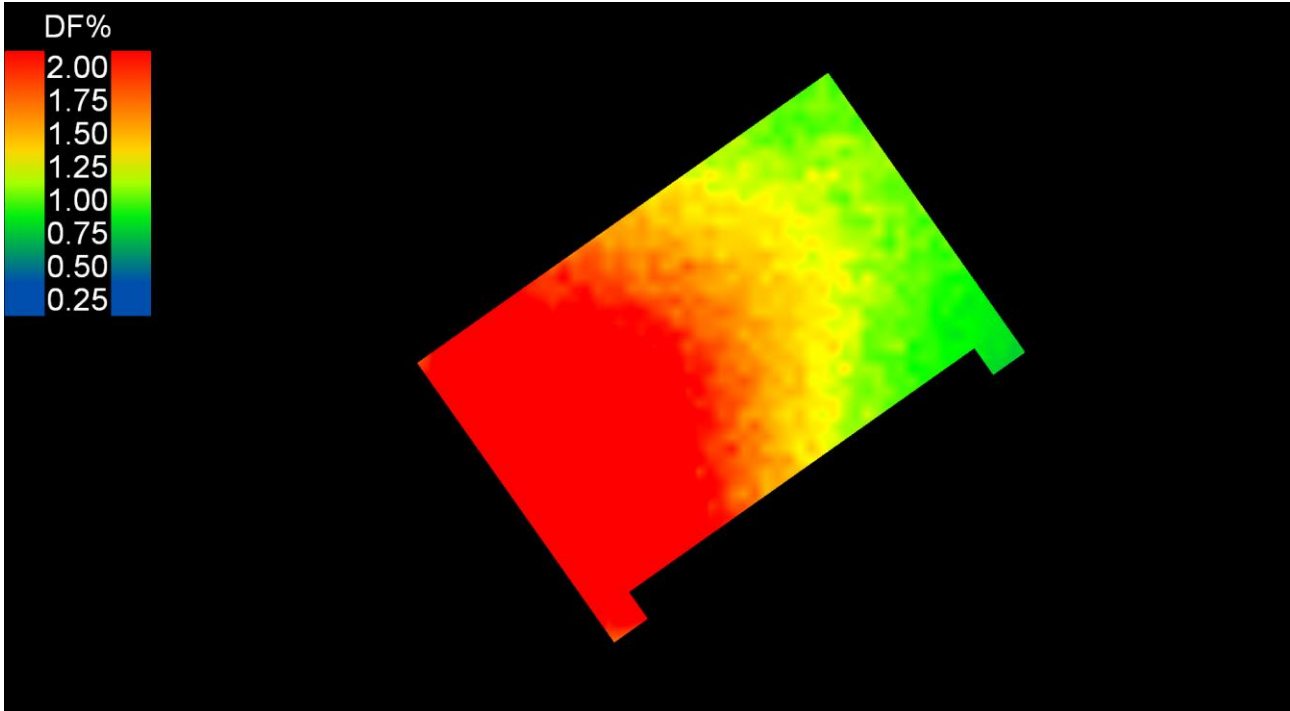
Default

Average	$D_{average}$	2.09 DF[%]
Median	D_{median}	1.52 DF[%]
Minimum	D_{min}	0.65 DF[%]
Maximum	D_{max}	9.17 DF[%]
Uniformity 1	$D_{min}/D_{average}$	0.3129
Uniformity 2	D_{min}/D_{max}	0.0714

w_flat 3 living/kitchen/dining
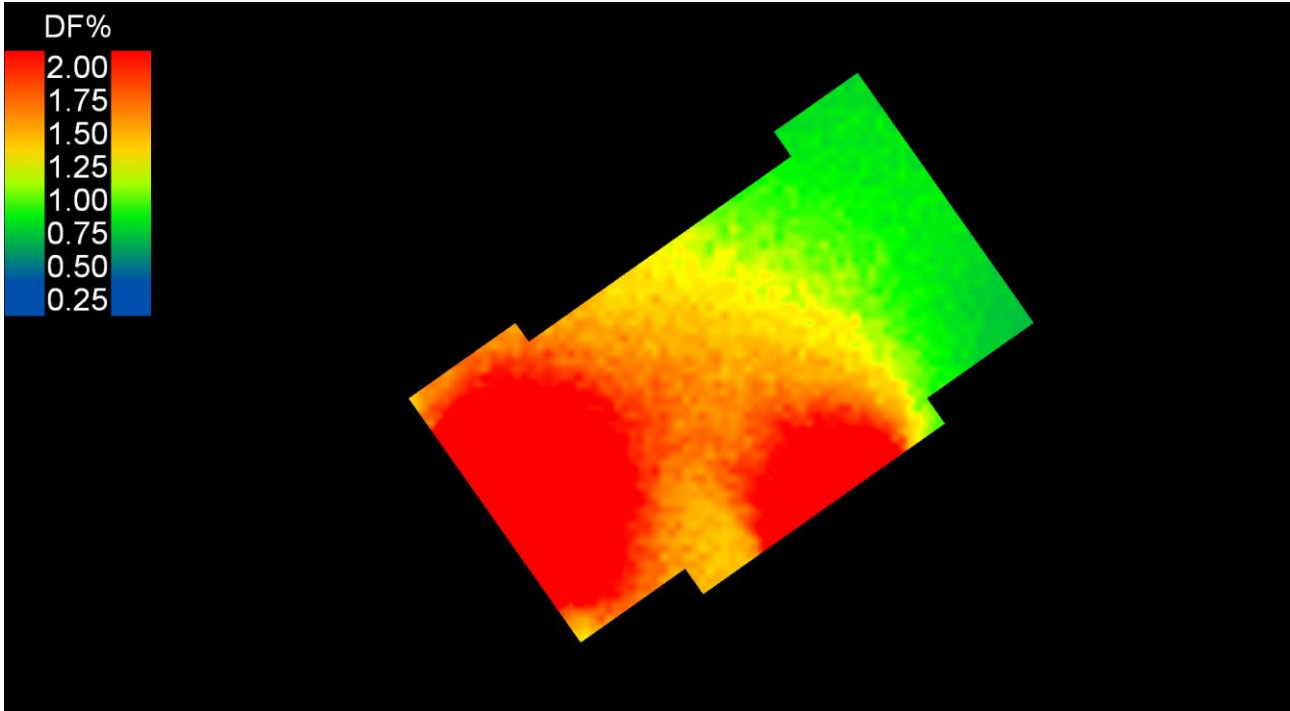
Default

Average	$D_{average}$	1.71 DF[%]
Median	D_{median}	1.43 DF[%]
Minimum	D_{min}	0.58 DF[%]
Maximum	D_{max}	8.97 DF[%]
Uniformity 1	$D_{min}/D_{average}$	0.3368
Uniformity 2	D_{min}/D_{max}	0.0643

w_flat 4 bed

DF%
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
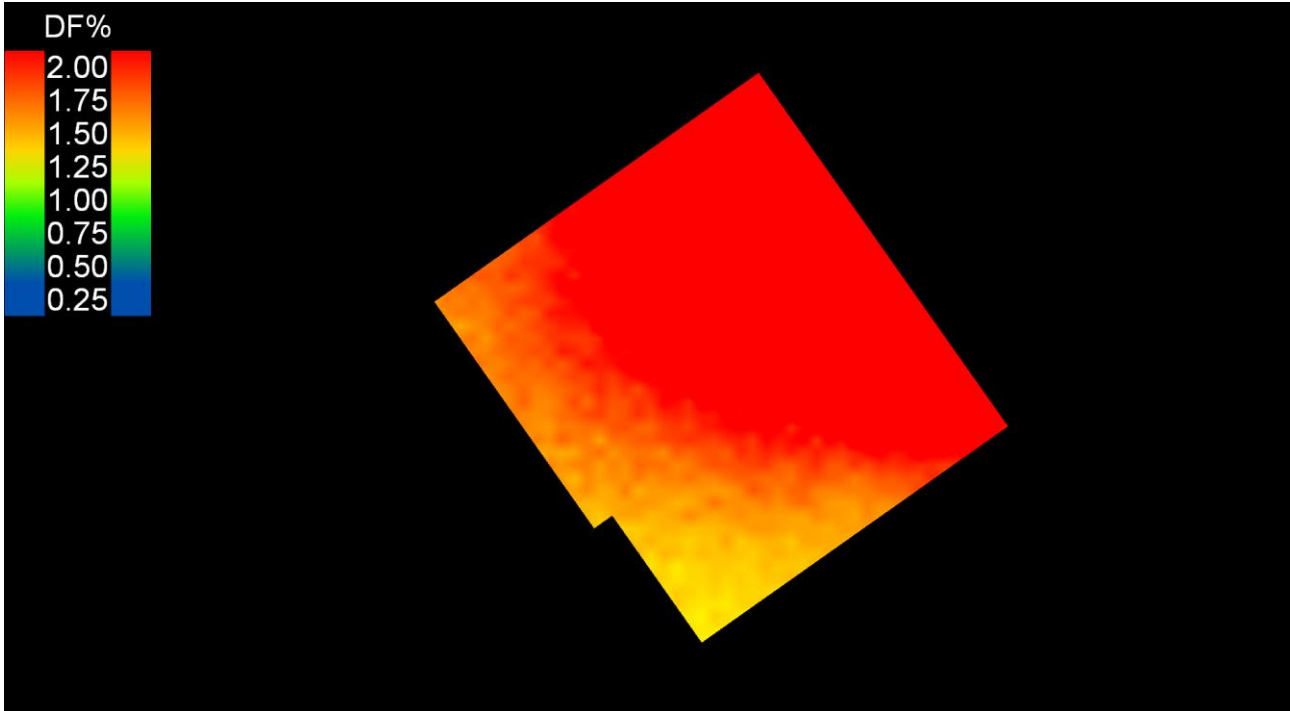
Default

Average	$D_{average}$	2.98 DF[%]
Median	D_{median}	2.18 DF[%]
Minimum	D_{min}	1.12 DF[%]
Maximum	D_{max}	10.97 DF[%]
Uniformity 1	$D_{min}/D_{average}$	0.3766
Uniformity 2	D_{min}/D_{max}	0.1024

w_flat 4 living/kitchen/dining
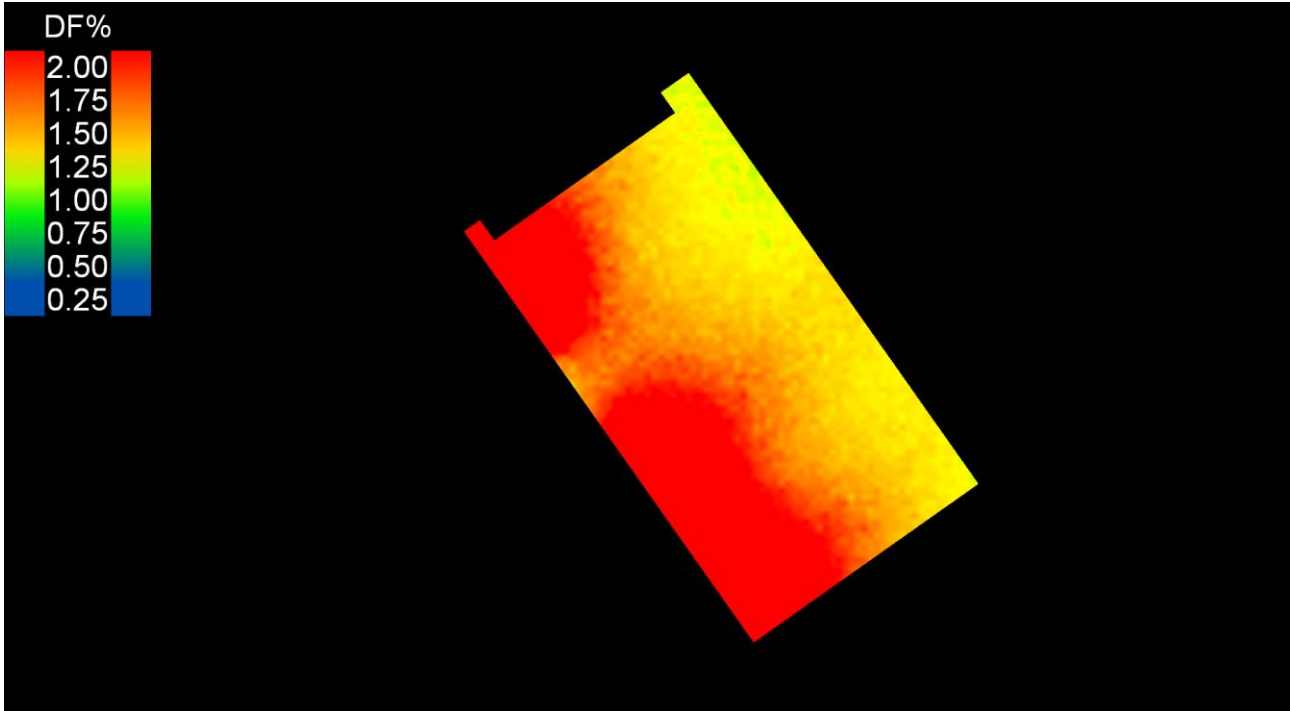
Default

Average	$D_{average}$	1.92 DF[%]
Median	D_{median}	1.48 DF[%]
Minimum	D_{min}	1.00 DF[%]
Maximum	D_{max}	8.43 DF[%]
Uniformity 1	$D_{min}/D_{average}$	0.5246
Uniformity 2	D_{min}/D_{max}	0.1192

w_flat 5 bed
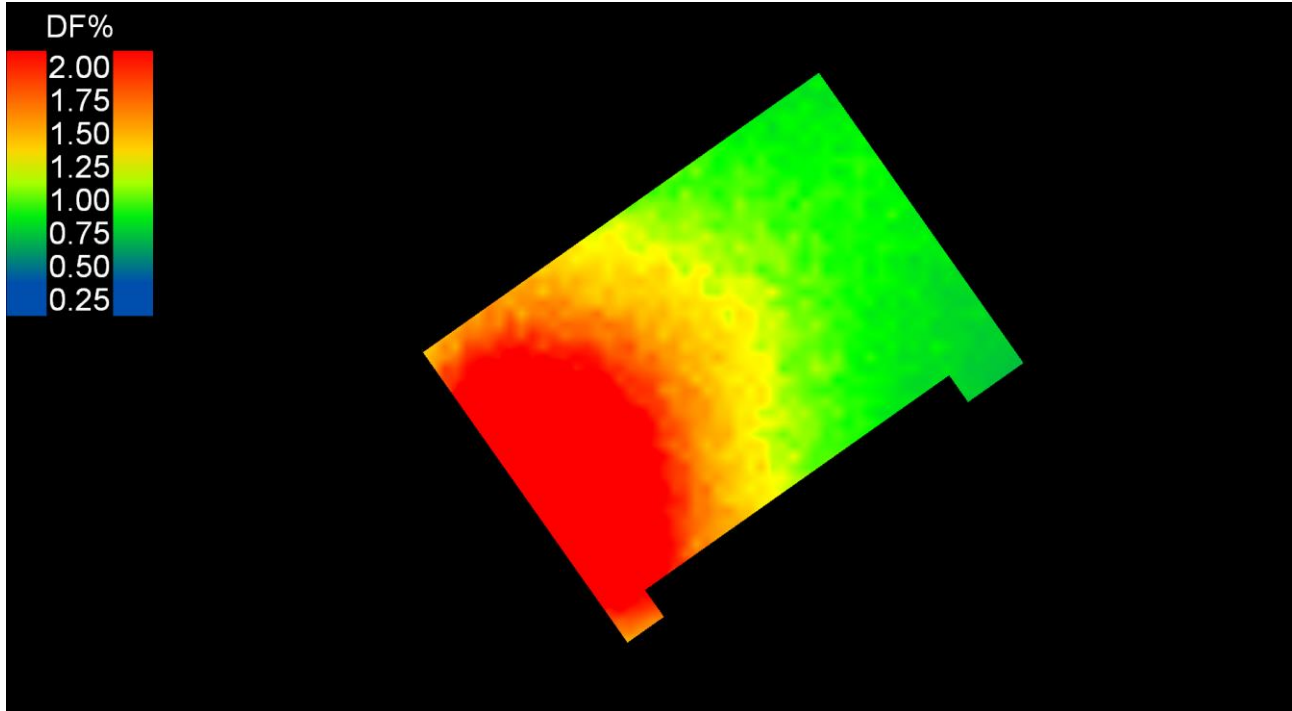
Default

Average	$D_{average}$	1.55 DF[%]
Median	D_{median}	1.12 DF[%]
Minimum	D_{min}	0.61 DF[%]
Maximum	D_{max}	8.07 DF[%]
Uniformity 1	$D_{min}/D_{average}$	0.3912
Uniformity 2	D_{min}/D_{max}	0.0753

w_flat 5 living/kitchen/dining
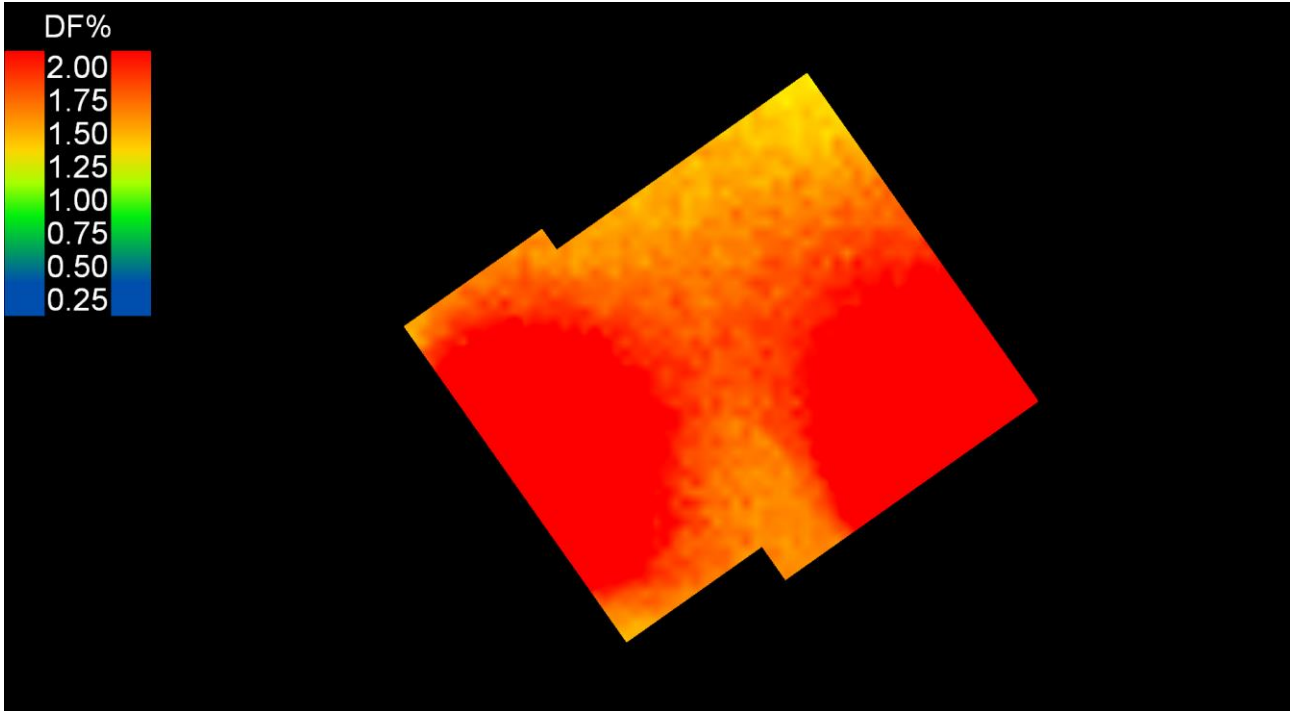
Default

Average	$D_{average}$	2.30 DF[%]
Median	D_{median}	1.82 DF[%]
Minimum	D_{min}	1.14 DF[%]
Maximum	D_{max}	8.25 DF[%]
Uniformity 1	$D_{min}/D_{average}$	0.4937
Uniformity 2	D_{min}/D_{max}	0.1379