Environmental Technology II - Daylighting & Electric Lighting

Submission Date	23 April 2025
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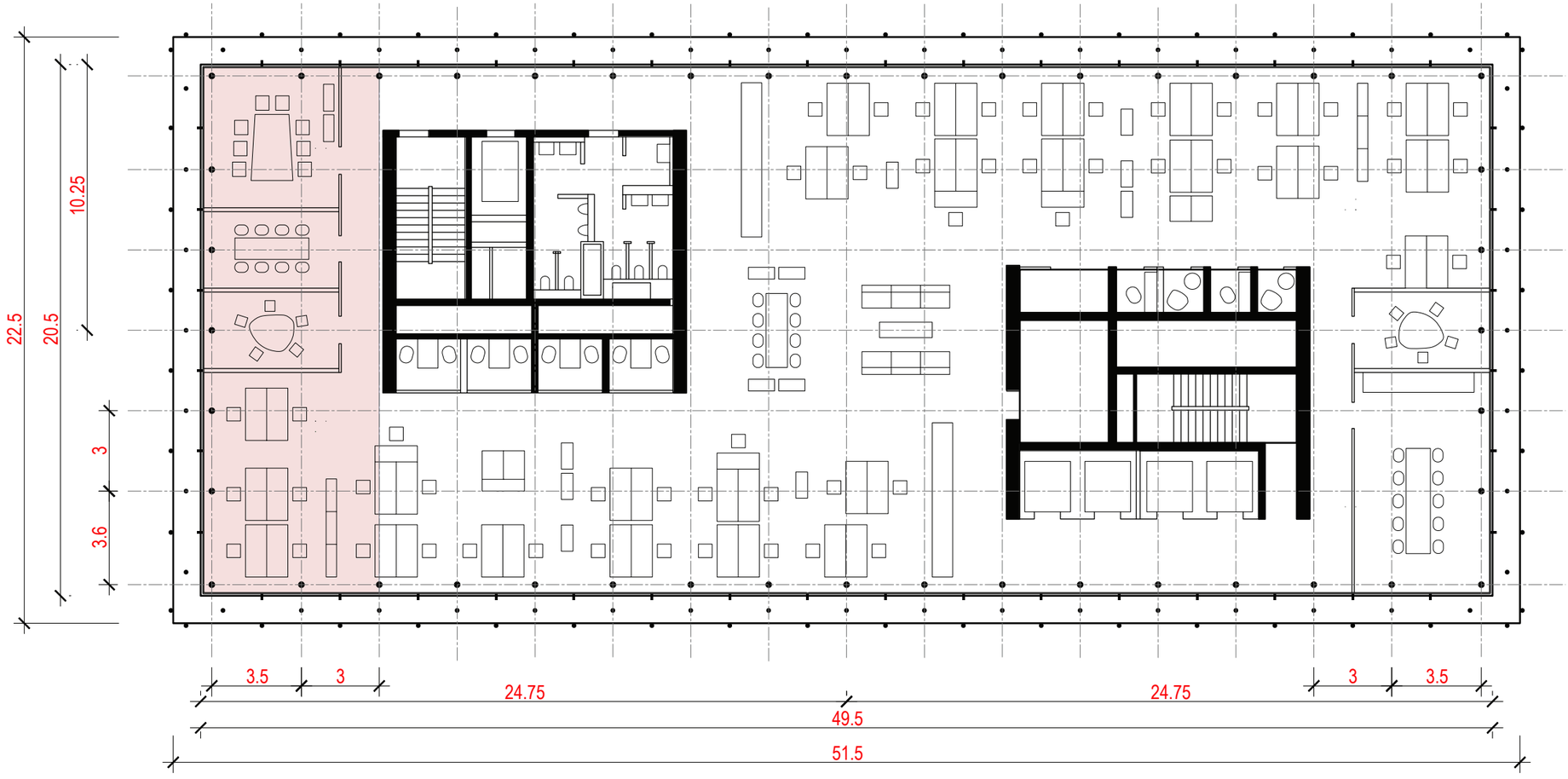
SILOM ROAD’S ORIENTATION

EXISTING DAYLIGHTING

ZONE SELECTION



The selected area near the building's north glass wall was chosen for its high natural light exposure. Comparing current and proposed conditions shows a clear increase in the space receiving 300–3000 lux, indicating better daylight distribution, improved visual comfort, and reduced need for artificial lighting.

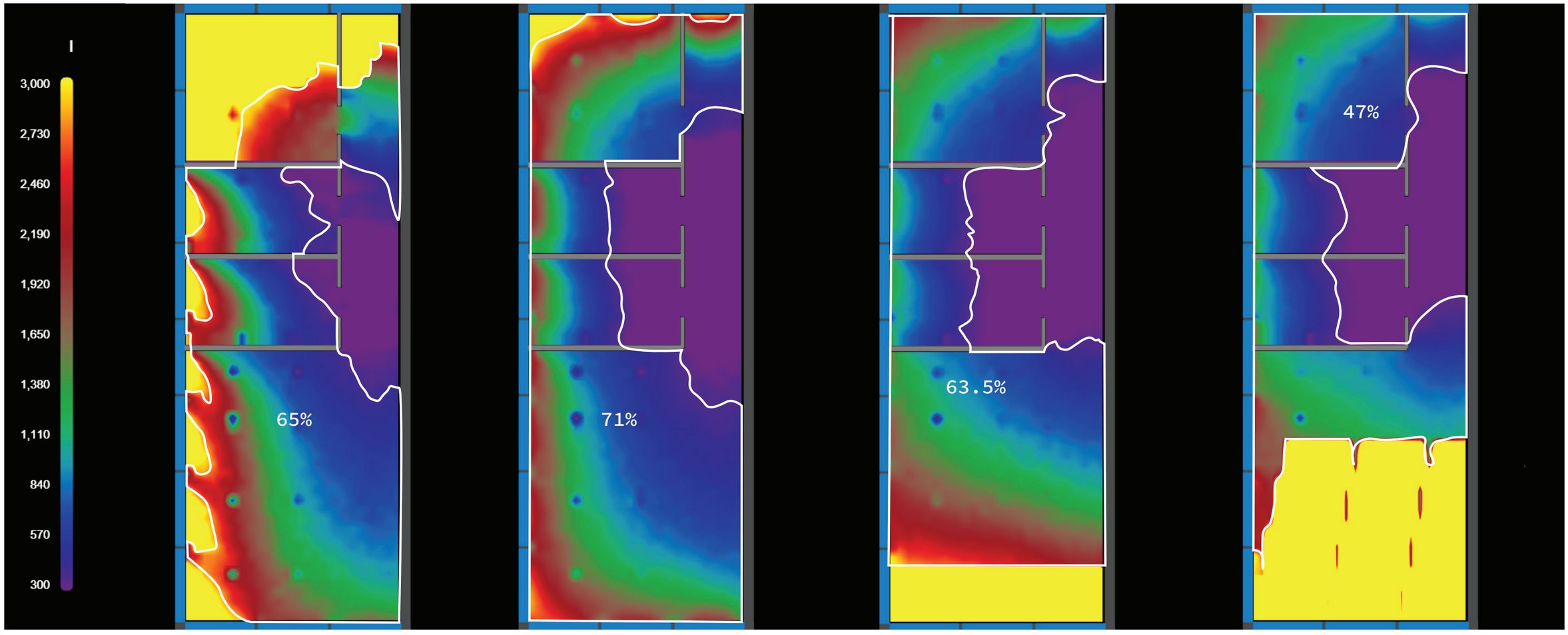
N

PLAN
SCALE 1:200

0 5 10 20 40 m

EXISTING DAYLIGHTING

DATE : 21 MARCH
SKY CONDITION : SUNNY



09.00 12.00 15.00 17.00

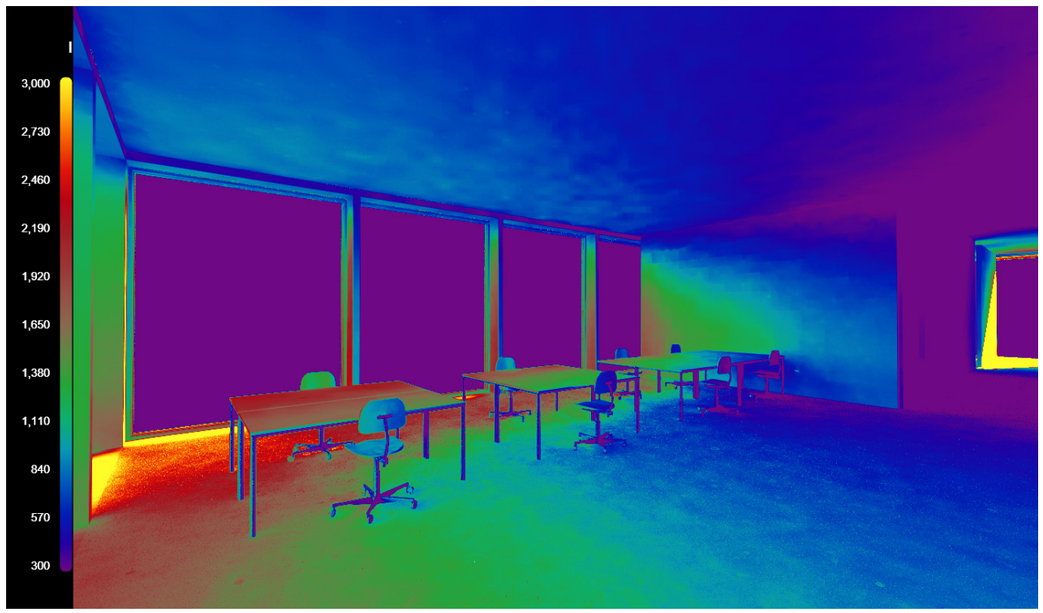
WINDOW SIZE

NORTH	EAST AND WEST
W : 2400 MM	W : 2250 MM
H : 3200 MM	H : 3200 MM

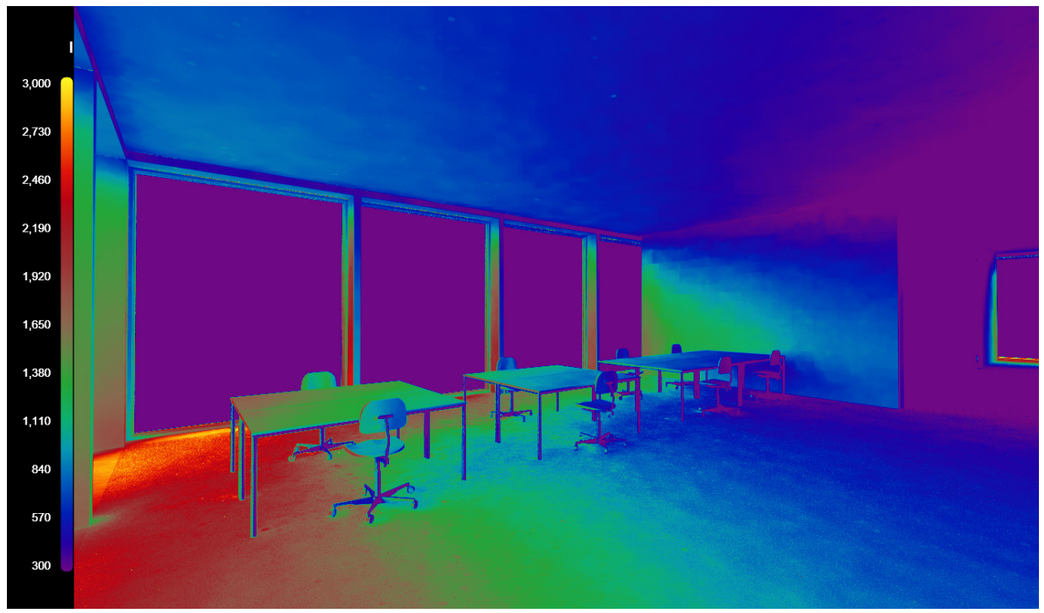
WINDOW'S LENGHT : 33.16 M WINDOW GLAZING TO WALL 96%
HEIGHT FLOOR : 3.3 M

N

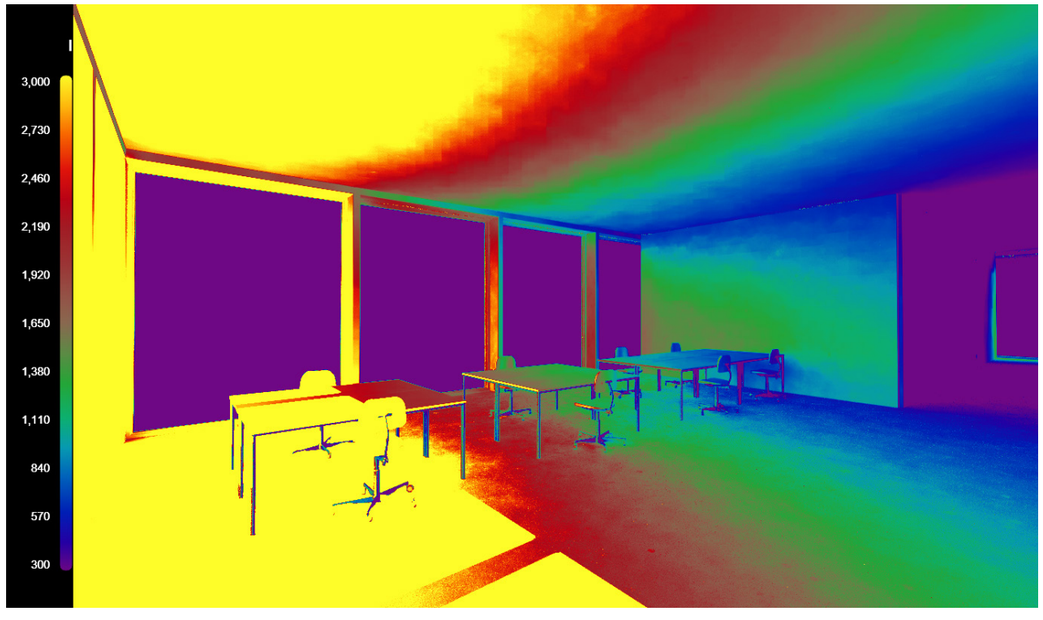
EXISTING DAYLIGHTING



09.00



12.00



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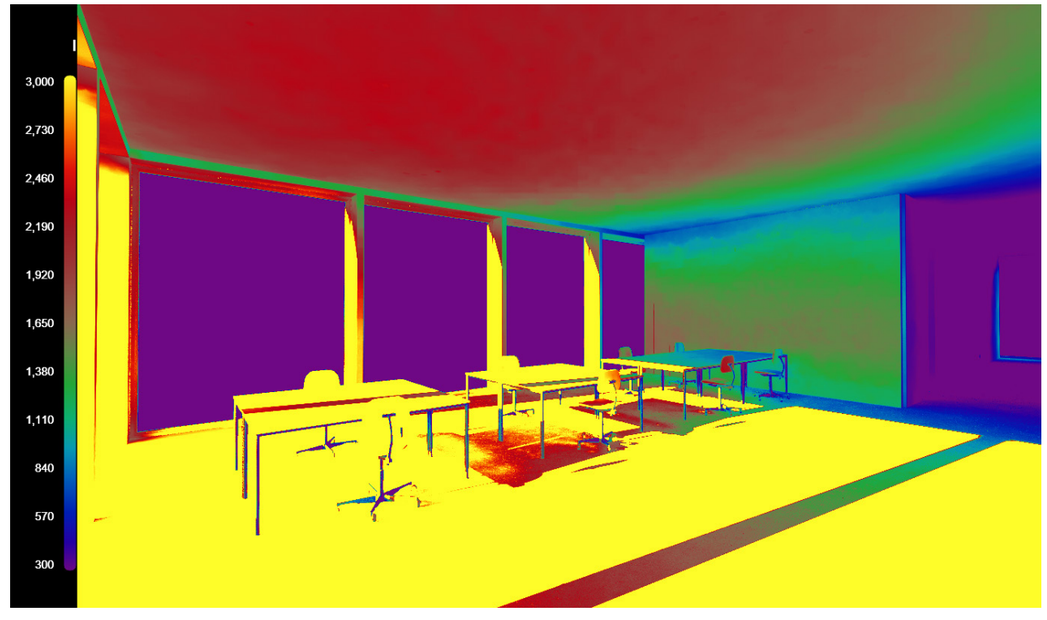
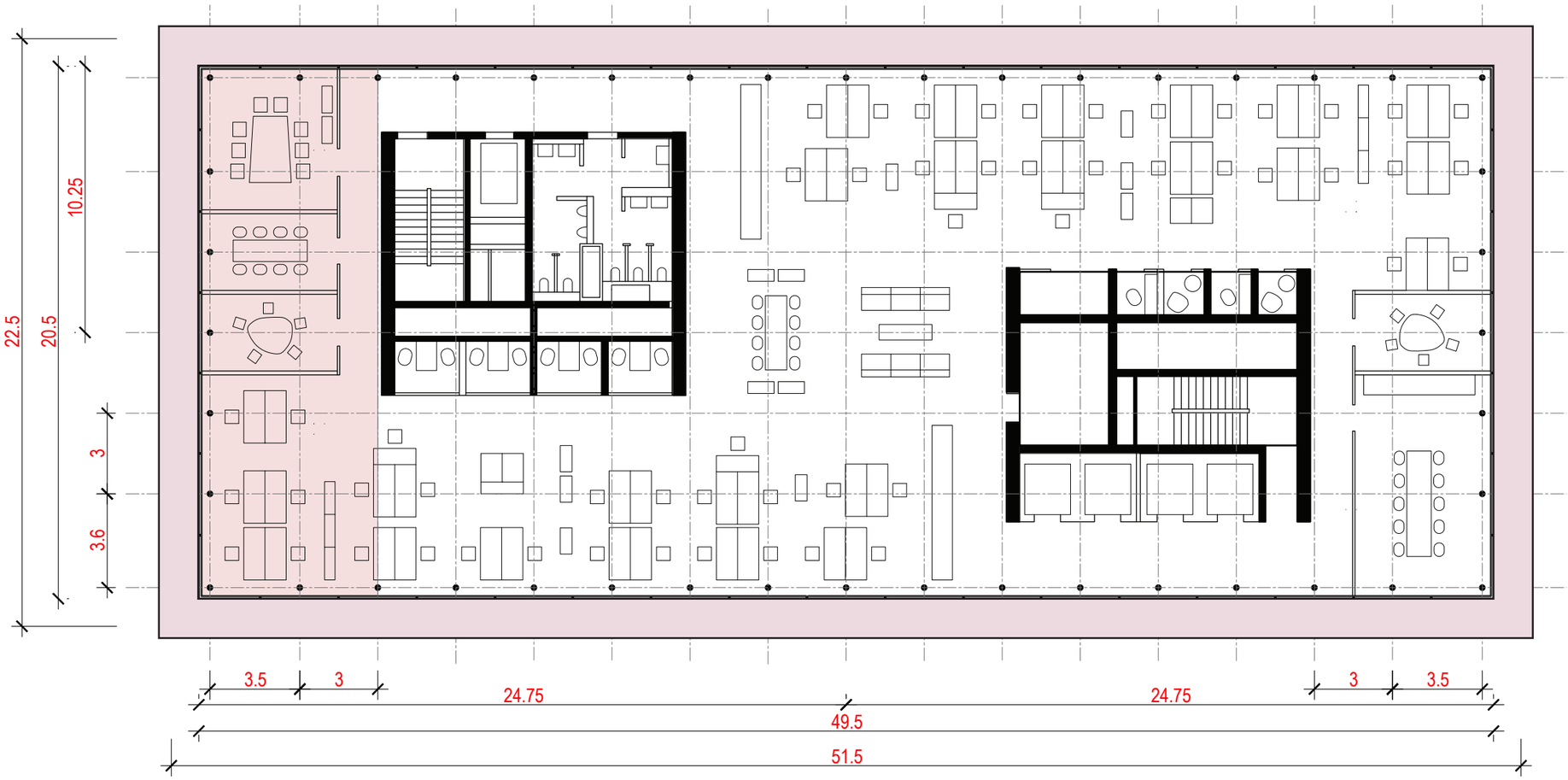


17.00

According to the daylighting analysis, a significant presence of yellow and purple areas was observed. To address this, the proposed strategies include adding overhangs modifying the surface reflectance of materials.

PROPOSING STRATIGY TO CONTROL DAYLIGHTING

ZONE SELECTION



The first strategy involves adding a 1.5 meter overhang to reduce direct sunlight penetration and glare, especially in areas exposed to strong daylight. In addition, the reflectance of individual components—including the walls, ceiling, and floor—is adjusted to optimize the distribution of natural light within the space. By increasing the reflectivity of interior surfaces, the strategy aims to enhance overall brightness and achieve a more even and comfortable lighting environment throughout the day.Moreover, resizing the window size on the west side to 2 meters in width

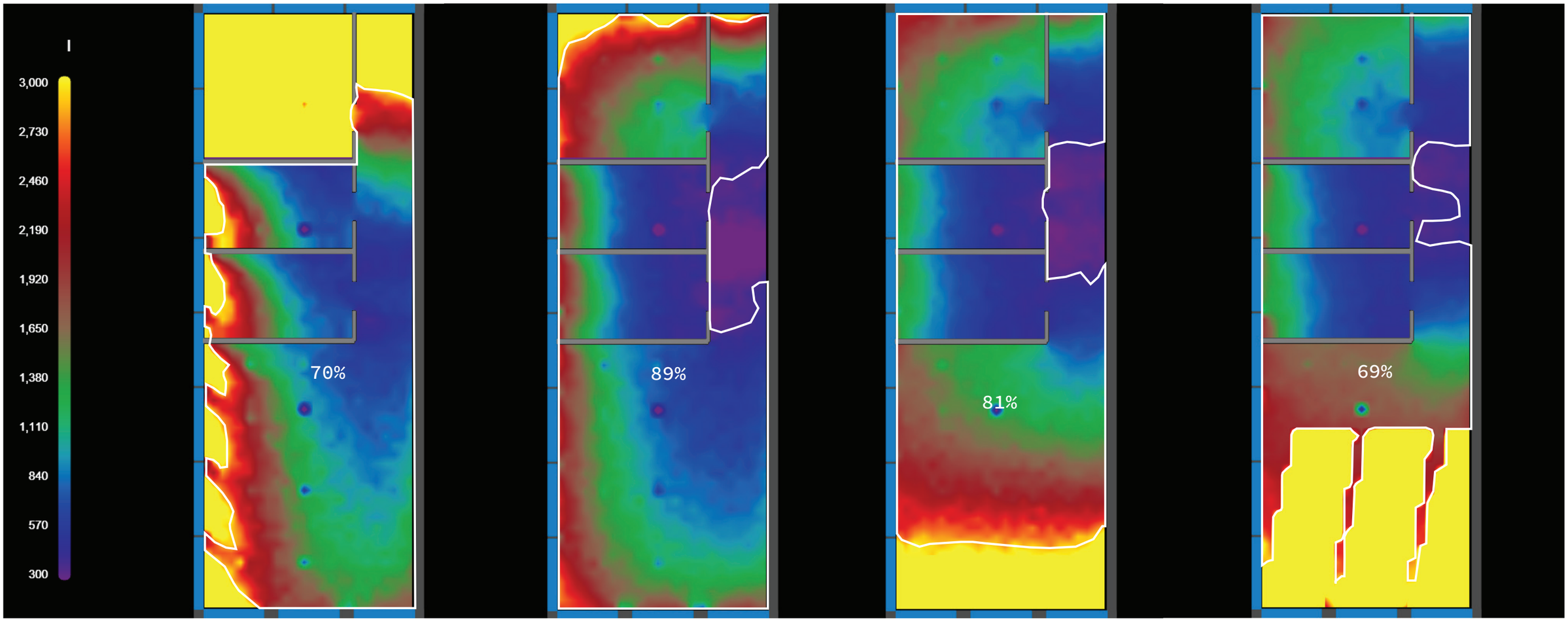
N

PLAN
SCALE 1:200

0 5 10 20 40 m

PROPOSING STRATIGY TO CONTROL DAYLIGHTING

DATE : 21 MARCH
SKY CONDITION : SUNNY



09.00 12.00 15.00 17.00

WINDOW SIZE

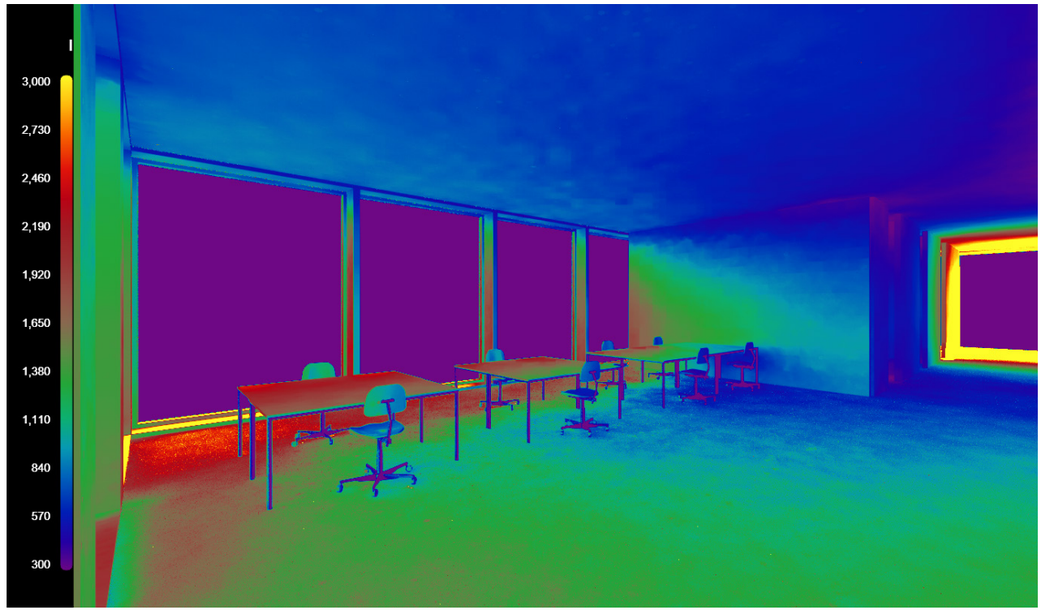
NORTH	EAST	WEST
W : 2400 MM	W : 2250 MM	W : 2000 MM
H : 3200 MM	H : 3200 MM	H : 3200 MM

WINDOW'S LENGHT : 33.16 M
HEIGHT FLOOR : 3.3 M
OVERHANG : 1.5 M

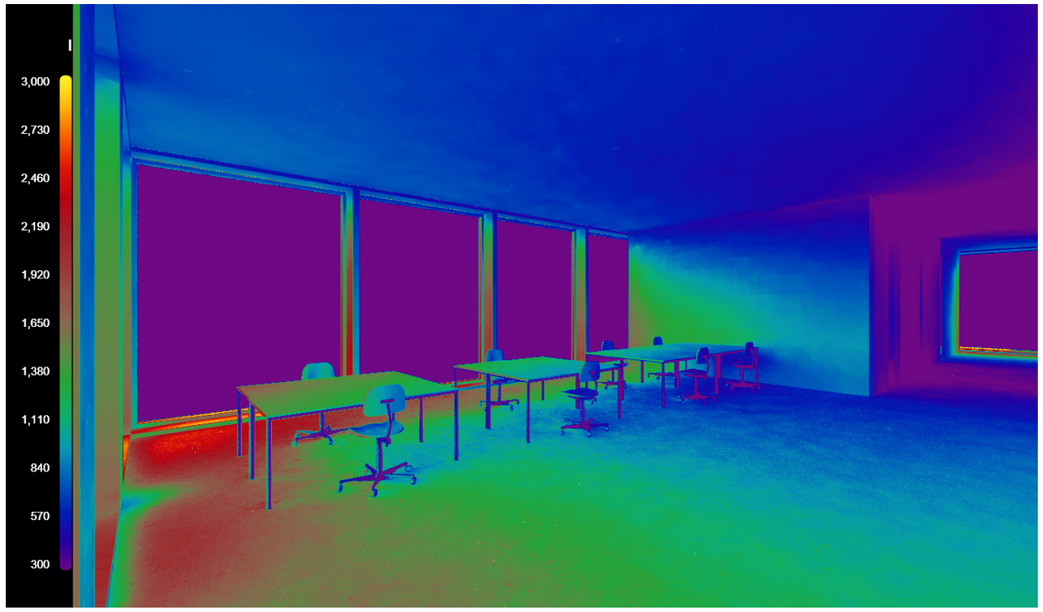
WINDOW GLAZING TO WALL 93%

N

PROPOSING STRATIGY TO CONTROL DAYLIGHTING



09.00



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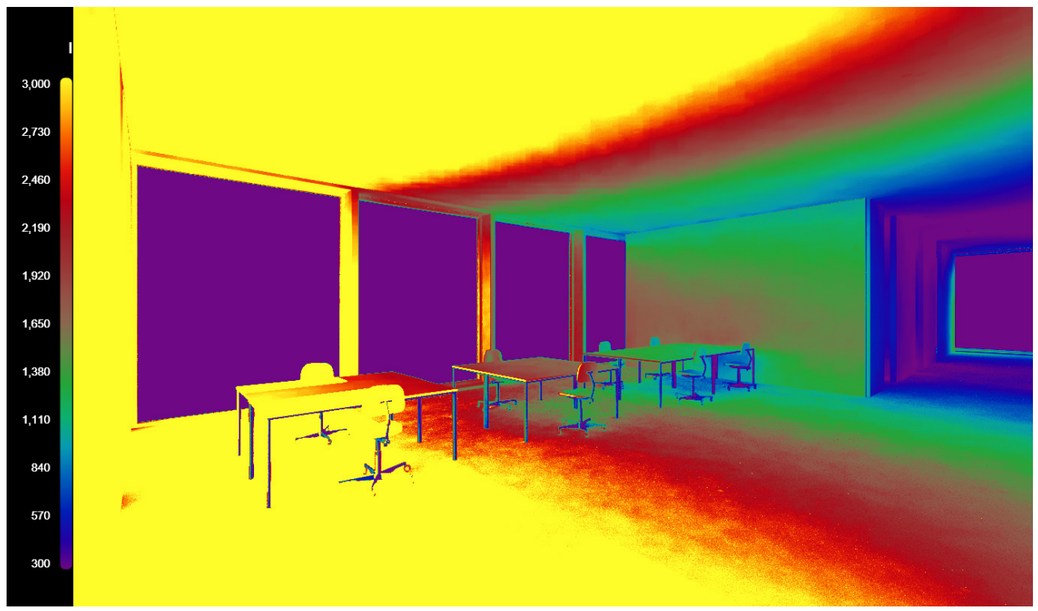

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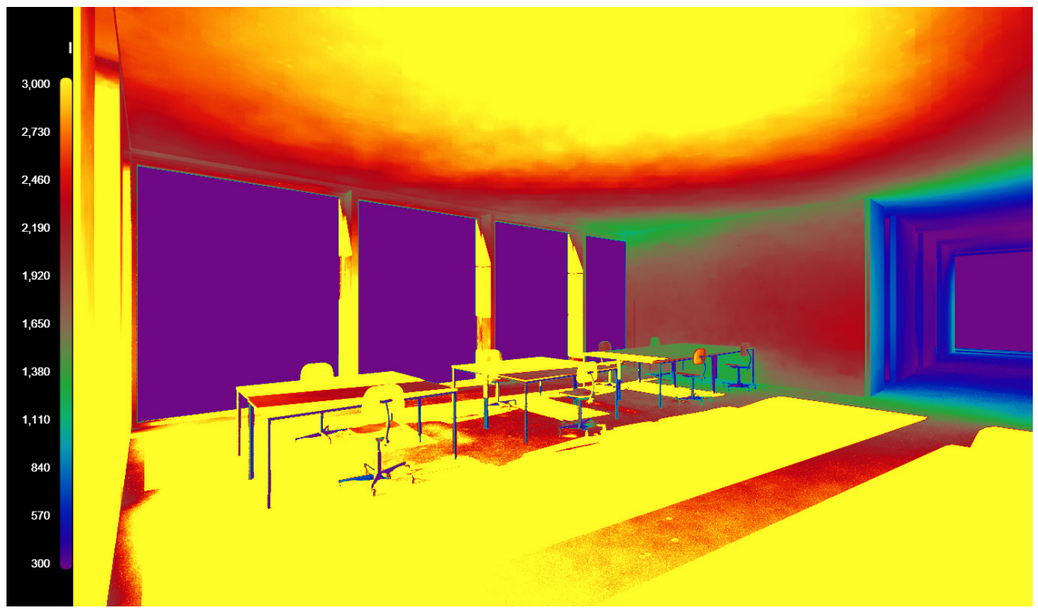


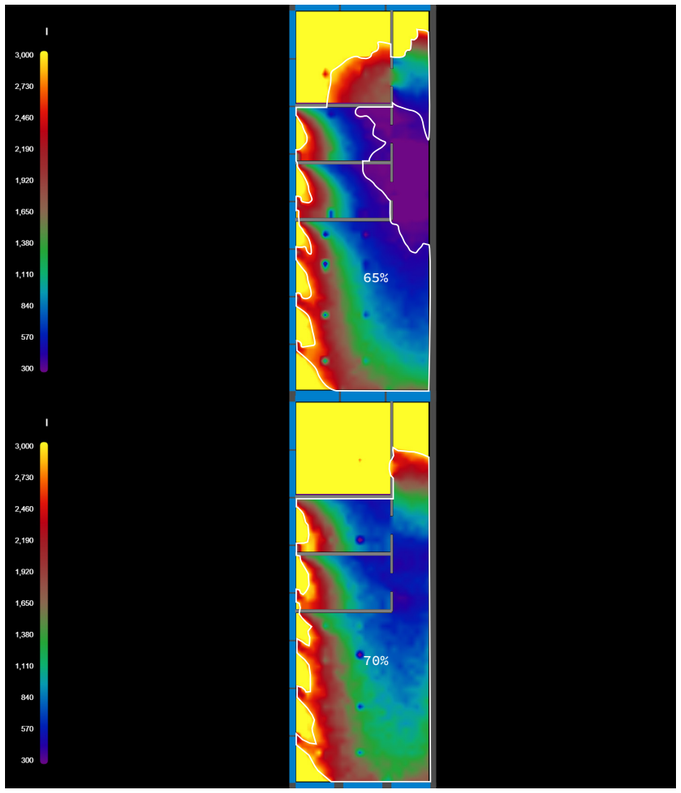
17.00

COMPARISON

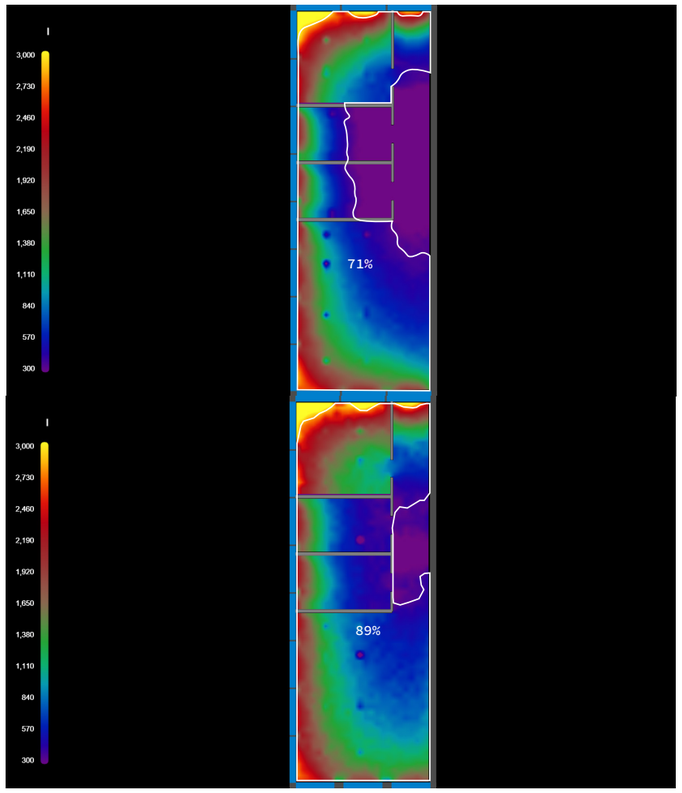
EXISTING DAYLIGHTING

PROPOSING STRATIGY

09.00



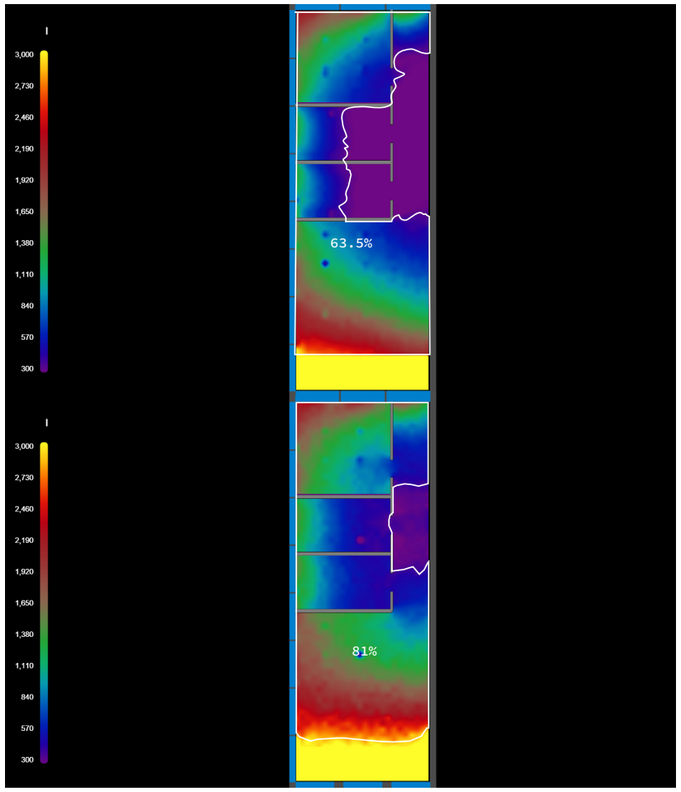
12.00



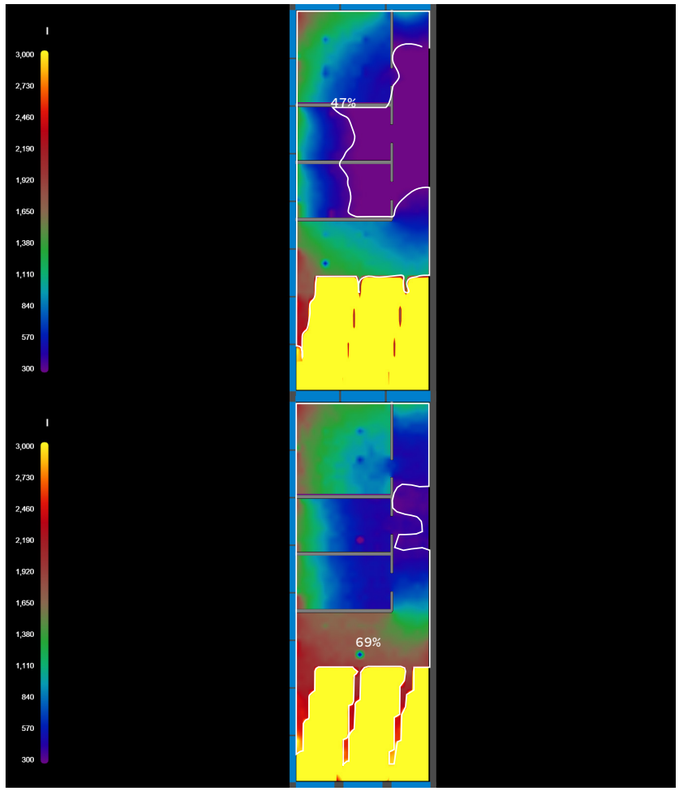
EXISTING DAYLIGHTING

PROPOSING STRATIGY

15.00



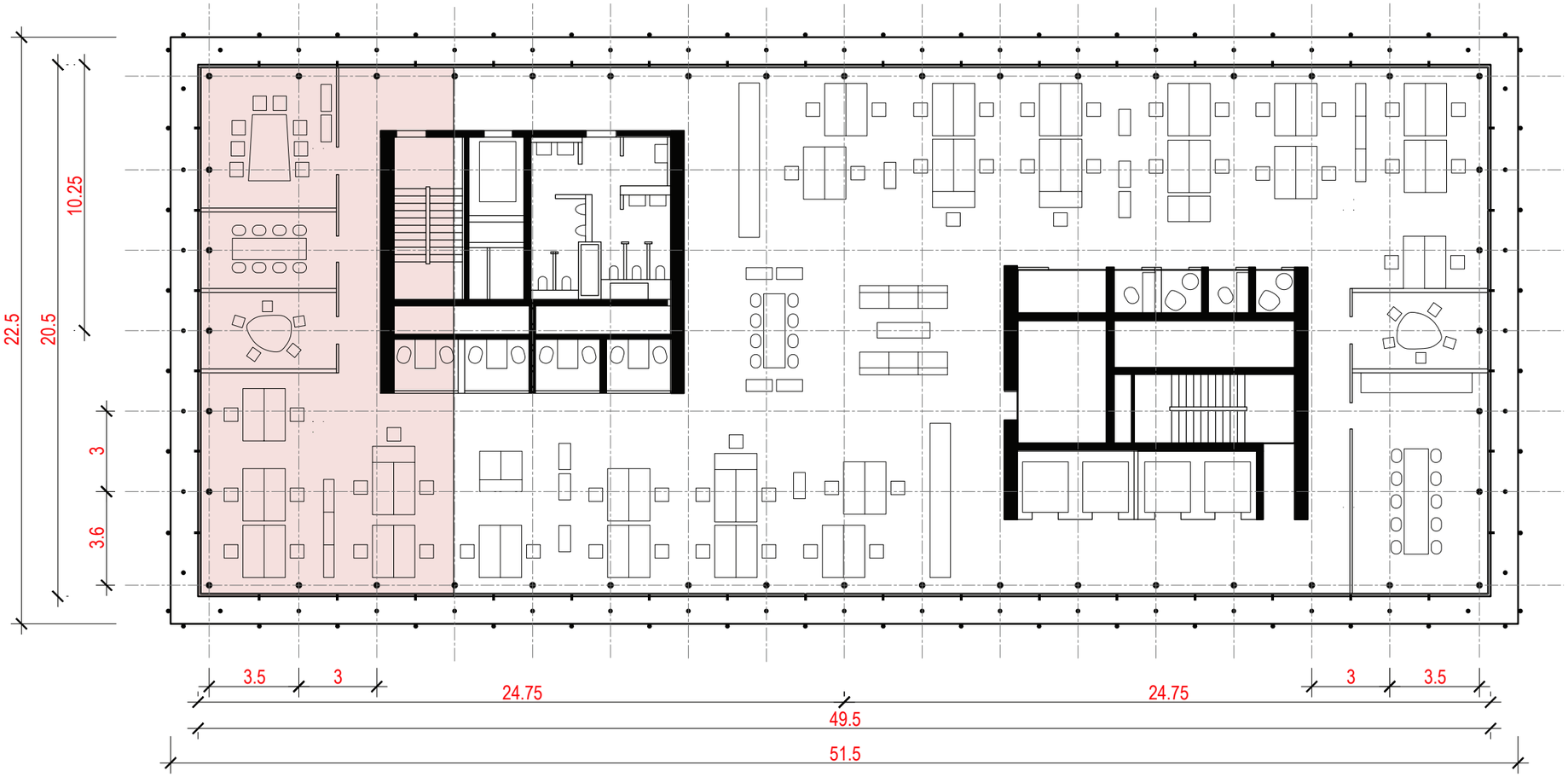
17.00



When comparing the existing condition with the proposed daylighting strategy, it becomes evident that the area receiving an optimal illuminance level of 300-3000 lux has significantly increased. This improvement is clearly reflected in the higher percentage of adequately lit spaces in the proposed design. The increase in well-lit areas indicates a more balanced and effective daylight distribution, contributing to better visual comfort and reduced dependence on artificial lighting during the day.

ELECTRIC LIGHTING ZONING

ZONE SELECTION



This specific zone has been selected for conducting an analysis of electric fixture performance, focusing on how it is influenced by the level of daylight access. By evaluating the natural light entering this area, the study aims to understand how daylight contributes to overall lighting needs and how it can reduce dependency on artificial fixtures during daytime hours. This helps in optimizing fixture placement, improving energy efficiency, and enhancing user comfort.

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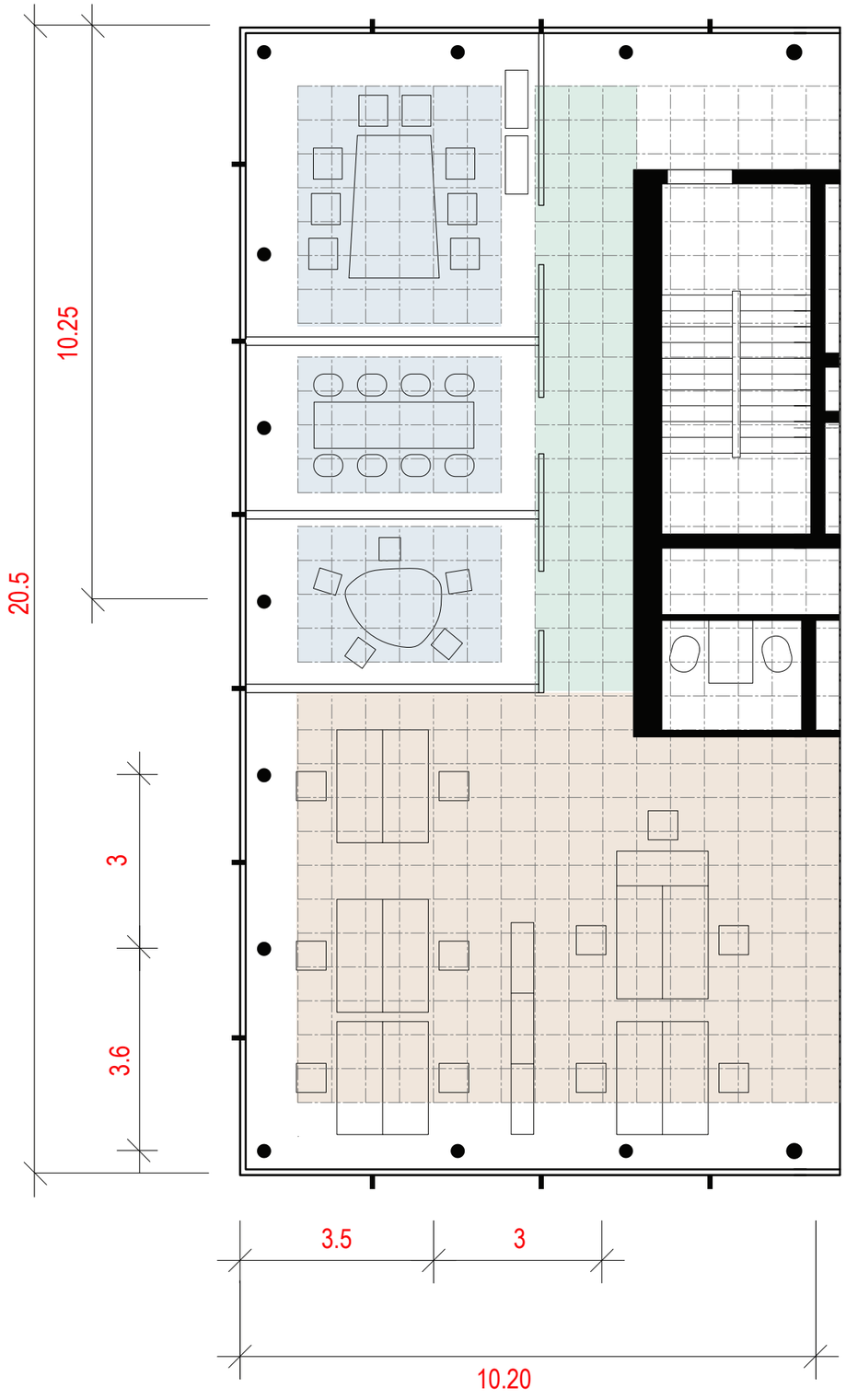
PLAN
SCALE 1:200

0 5 10 20 40 m

ZONE DISTRIBUTION



= Cellular

= Circulation

= Open plan

N

PLAN
SCALE 1:100

0 2.5 5 10 20 m

CELLULAR ROOM 1 – DOWNLIGHT

Settings

Units: Meters - Lux

Room Dimensions

Length [X]	3.6	m
Width [Y]	4.2	m
Height [Z]	3.3	m
Workplane	2.5	m
Ceiling Type	Open	

Room Reflectances

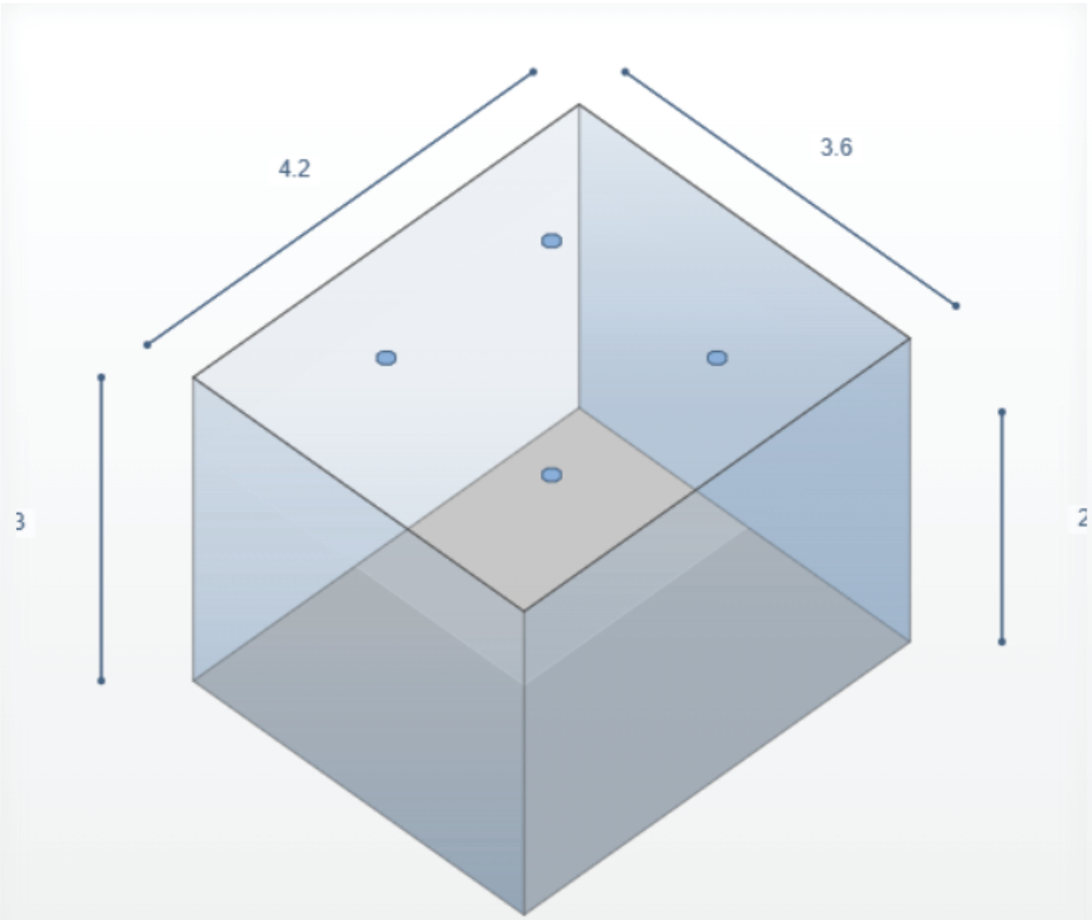
Ceiling	60	%
Walls	80	%
Floor	60	%

Criteria

Illuminance	300	lux
Power Density		W/m²
Quantity		

Constraints

Spacing X [SC=1]	1.8	m
Spacing Y [SC=1]	1.8	m
Rows	2	
Columns	2	



Calculation Results [A]

Illuminance	306 lux
Power Density	3.33 W/m²
Quantity	4

Spacing Results [A]

Spacing	1.8 x 1.8 m
Arrangement	2 x 2
Outside Spacing X	0.83 m
Outside Spacing Y	1.13 m

Display

Dimensions Room ☑ Layout ☐

Show Zonal Cavity Info [+]

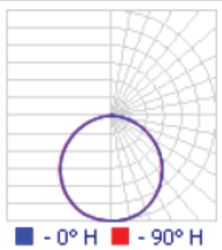
Project Information

A

Juno Lighting

[A] - JSBC 6IN SWW2 90CRI WL MW M6 -50K

Light Loss Factor	1	Symbol Shape	Circular	Lamp Quantity	1
Suspension Length	0	Symbol Length	.15	Lumens Per Lamp	1024
Orientation	0	Symbol Width		Wattage	12.6



CELLULAR ROOM 2&3 – DOWNLIGHT

Settings

Units: Meters - Lux

Room Dimensions

Length [X]	3.6	m
Width [Y]	2.4	m
Height [Z]	3.3	m
Workplane	2.5	m
Ceiling Type	Open	

Room Reflectances

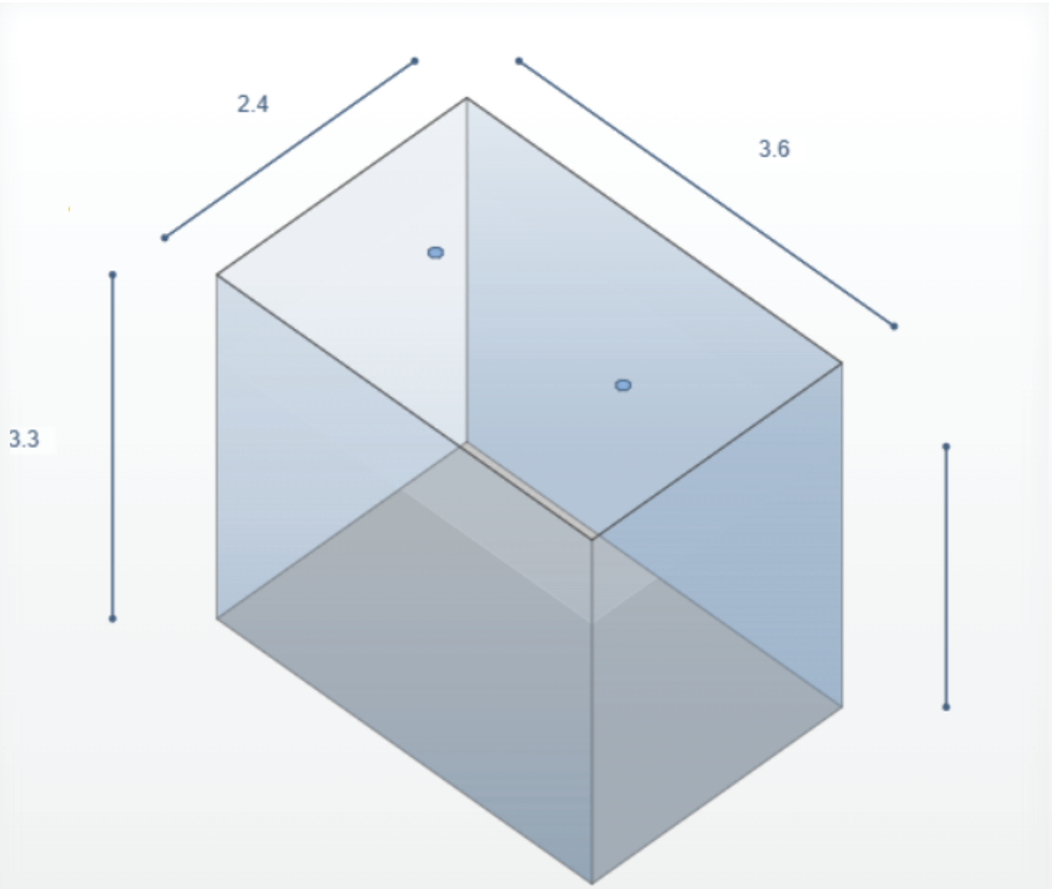
Ceiling	60	%
Walls	80	%
Floor	60	%

Criteria

Illuminance	300	lux
Power Density		W/m²
Quantity		

Constraints

Spacing X [SC=1.1]	1.8	m
Spacing Y [SC=1.1]	1.8	m
Rows	1	
Columns	2	



Calculation Results [E]

Illuminance	305 lux
Power Density	4.49 W/m²
Quantity	2

Spacing Results [E]

Spacing	1.8 x 1.8 m
Arrangement	2 x 1
Outside Spacing X	0.85 m
Outside Spacing Y	1.15 m

Display

Dimensions Room ☑ Layout ☐

Show Zonal Cavity Info [+]

Project Information

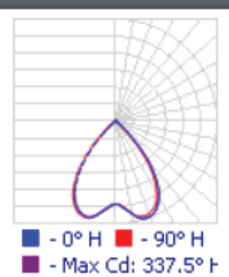
E

VRDL4 1500LM WD 27K 90CRI CAL

Luminaire LED

[E] - VRDL4 1500LM WD 27K 90CRI CAL

Light Loss Factor	1	Symbol Shape	Circular	Lamp Quantity	1
Suspension Length	0	Symbol Length	.1	Lumens Per Lamp	1156
Orientation	0	Symbol Width		Wattage	19.4



CICULATION – DOWNLIGHT

Settings

Units: Meters - Lux

Room Dimensions

Length [X]	10.8	m
Width [Y]	1.8	m
Height [Z]	3.3	m
Workplane	2.5	m
Ceiling Type	Open	

Room Reflectances

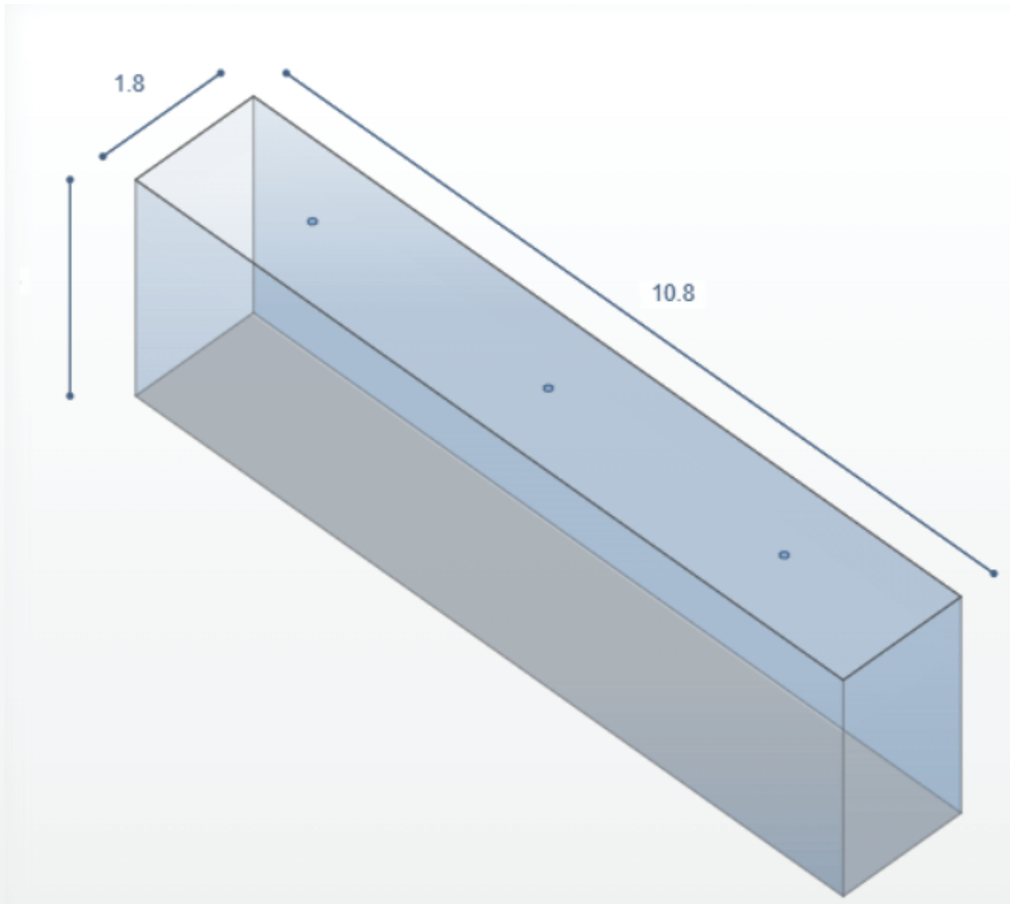
Ceiling	60	%
Walls	80	%
Floor	60	%

Criteria

Illuminance	300	lux
Power Density		W/m²
Quantity		

Constraints

Spacing X [SC=0.8]	3.6	m
Spacing Y [SC=0.9]	0.9	m
Rows	1	
Columns	3	



Calculation Results [C]

Illuminance	355 lux
Power Density	4.24 W/m²
Quantity	3

Spacing Results [C]

Spacing	3.6 x 0.9 m
Arrangement	3 x 1
Outside Spacing X	1.75 m
Outside Spacing Y	0.85 m

Display

Dimensions Room ☑ Layout ☐

Show Zonal Cavity Info [+]

Project Information

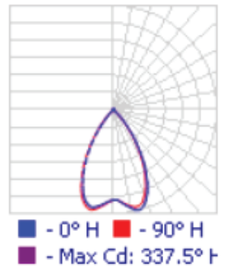
C

VRDL4 2000LM MD 27K 80CRI CAL

Luminaire LED

[C] - VRDL4 2000LM MD 27K 80CRI CAL

Light Loss Factor	1	Symbol Shape	Circular	Lamp Quantity	1
Suspension Length	0	Symbol Length	.1	Lumens Per Lamp	1957
Orientation	0	Symbol Width		Wattage	27.5



OPEN PLAN – LUMINANCE LINEAR LIGHT

Settings

Units: Meters - Lux

Room Dimensions

Length [X]	7	m
Width [Y]	20	m
Height [Z]	3.3	m
Workplane	2.5	m
Ceiling Type	Open	

Room Reflectances

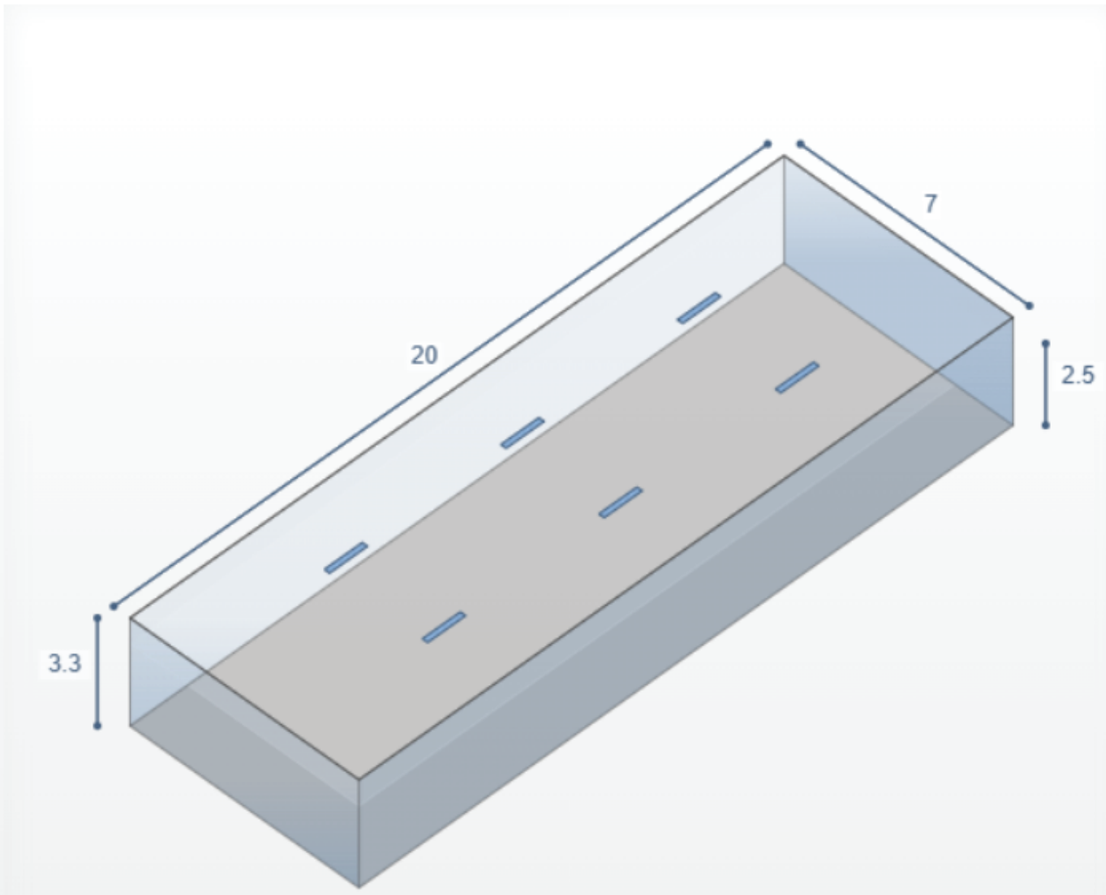
Ceiling	60	%
Walls	80	%
Floor	60	%

Criteria

Illuminance	300	lux
Power Density		W/m²
Quantity		

Constraints

Spacing X [SC=1.1]	3	m
Spacing Y [SC=1]	5.4	m
Rows	3	
Columns	2	



Calculation Results [A]

Illuminance	306 lux
Power Density	2.31 W/m²
Quantity	6

Spacing Results [A]

Spacing	3 x 5.4 m
Arrangement	2 x 3
Outside Spacing X	1.92 m
Outside Spacing Y	4.02 m

Comparison

Luminaire	LUX	W/M²	Count
A	306	2.31	6
B	88	0.63	6
C	59	0.54	6

Display

Dimensions Room ☑ Layout ☐

Show Zonal Cavity Info [+]

Project Information

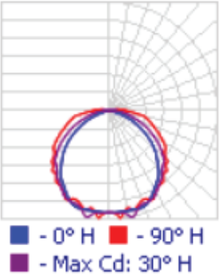
A | B | C

CLF7L 4FT 50W 40K CLP

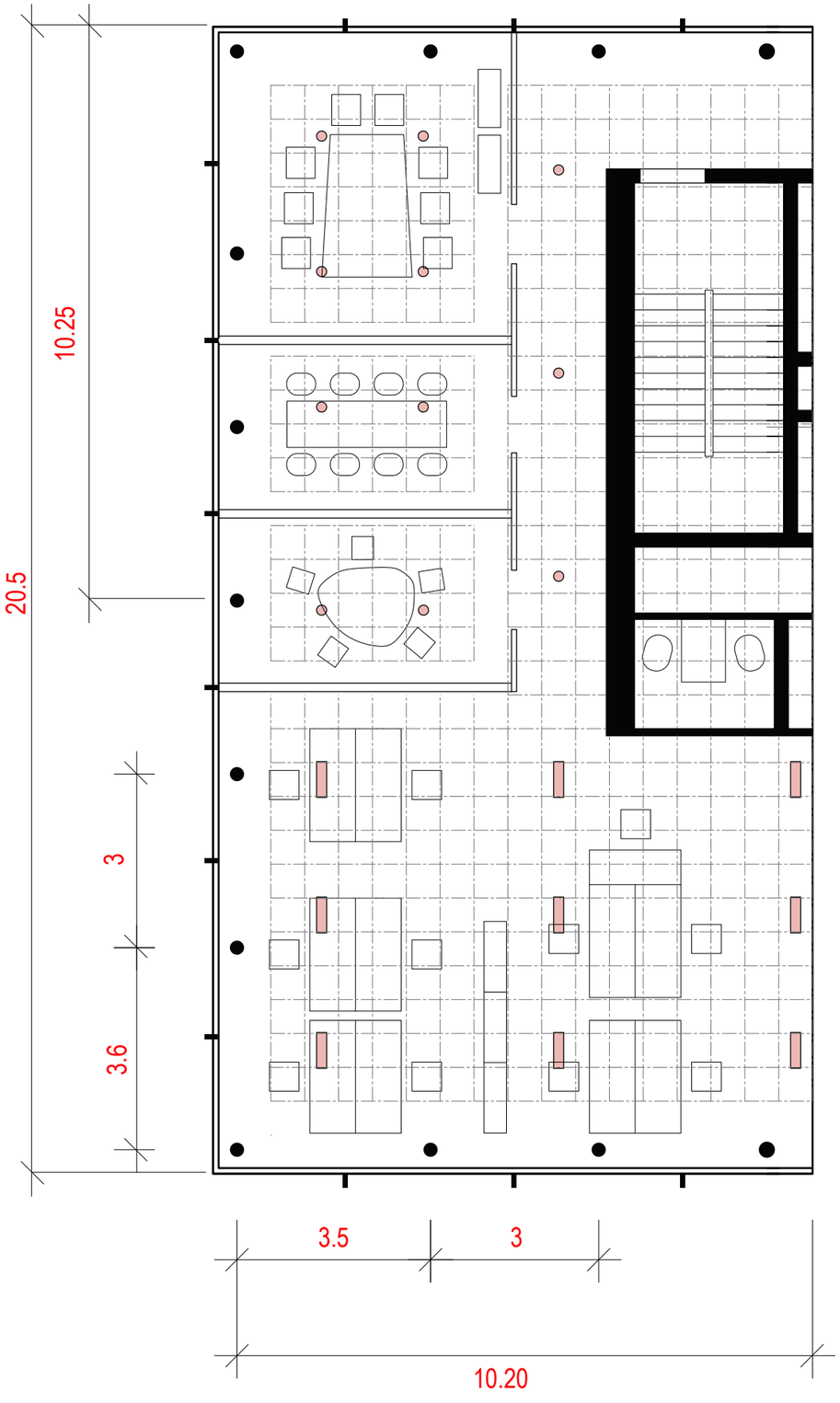
Luminaire LED

[A] - CLF7L 4FT 50W 40K CLP

Light Loss Factor	1	Symbol Shape	Rectangular	Lamp Quantity	336
Suspension Length	0	Symbol Length	.16	Lumens Per Lamp	16
Orientation	0	Symbol Width	1.16	Wattage	54



CONCEPT LIGHTING DESIGN



This lighting design concept utilizes dim lighting in circulation areas and meeting rooms to create a calm, focused atmosphere while conserving energy. In contrast, linear lighting is applied in the open office space to ensure consistent, evenly distributed illumination that supports productivity and visual comfort for daily work activities.

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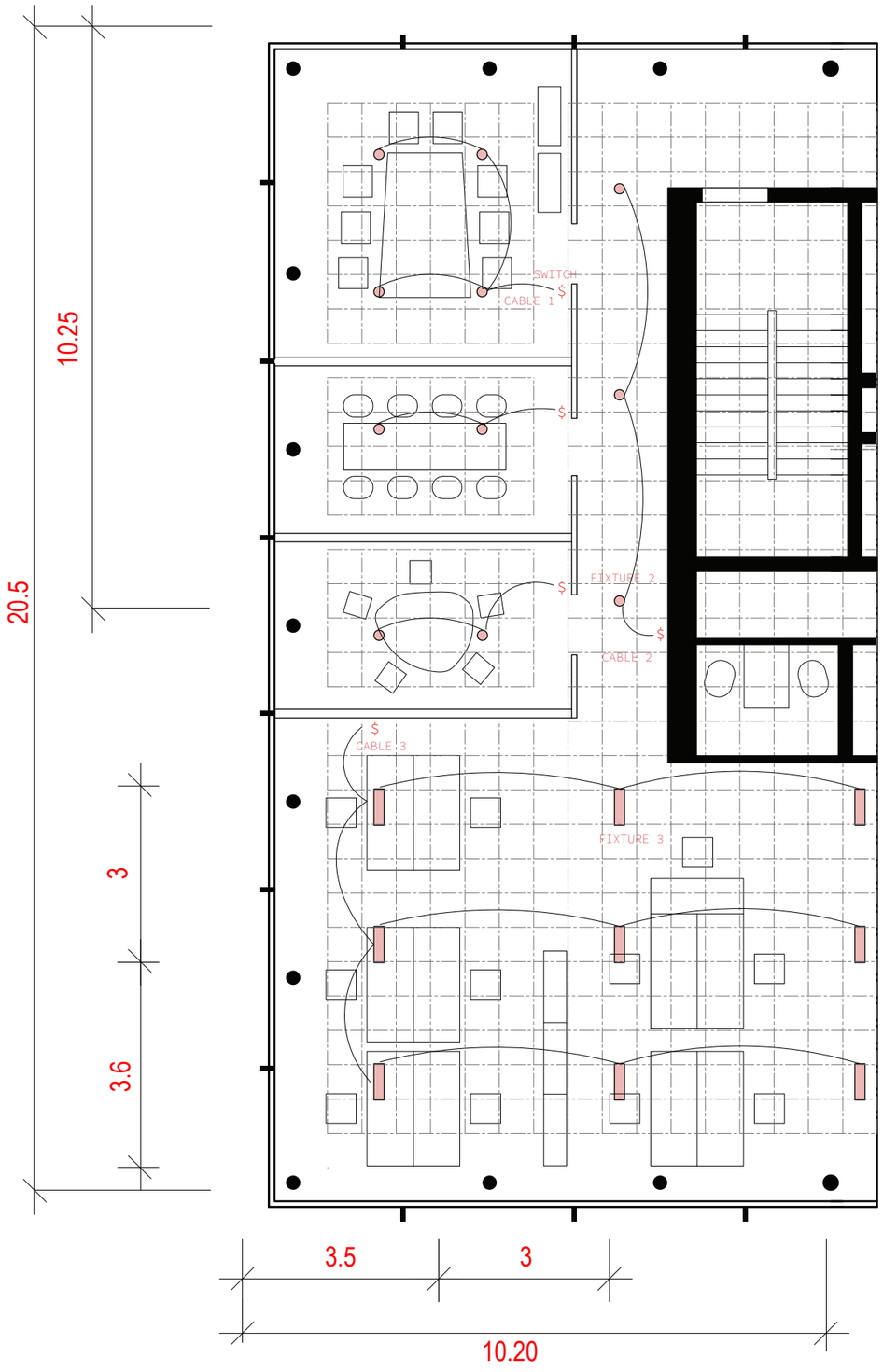
PLAN
SCALE 1:100

0 2.5 5 10 20 m

LIGHTING PLAN WITH CABLES AND SWITCHES



At the end of the design, a detailed lighting plan is provided, showing the layout of cables and switches assigned to each zone. Each zone is equipped with three lighting fixtures connected through three corresponding cables, ensuring efficient control and distribution of power tailored to the lighting needs of each area.

N

PLAN
SCALE 1:100

0 2.5 5 10 20 m

PERSPECTIVE VIEW OF ELECTRIC LIGHTING DESIGN