





SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

Accredited "A" Grade by NAAC | 12B Status by UGC | Approved by AICTE

www.sathyabama.ac.in

**SCHOOL OF BUILDING AND ENVIRONMENT
DEPARTMENT OF ARCHITECTURE
M. Arch (Sustainable Architecture)**

**PROFESSIONAL TRAINING (S89APT)
JUL 2022 - AUG 2022**

Name of the Student : Rohitram Sundar

Reg No. : 41890014

Semester : III

Batch : 2021-2023



SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

Accredited "A" Grade by NAAC | 12B Status by UGC | Approved by AICTE

www.sathyabama.ac.in

SCHOOL OF BUILDING AND ENVIRONMENT

DEPARTMENT OF ARCHITECTURE

M. Arch (Sustainable Architecture)

VIVA-VOCE EXAMINATION

This is to certify that the Professional Training Report (S89APT) is the work of **Rohitram Sundar** who had undergone training in **Arch-e-studio** and has been monitored by the continuous assessment during Jul 2022 to Aug 2022.

Dr. Devyani Gangopadhyay
(HOD AND DEAN)

Submitted for Viva voce Examination held on **20.12.2022**

Internal Examiner

External Examiner



SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

Accredited "A" Grade by NAAC | 12B Status by UGC | Approved by AICTE

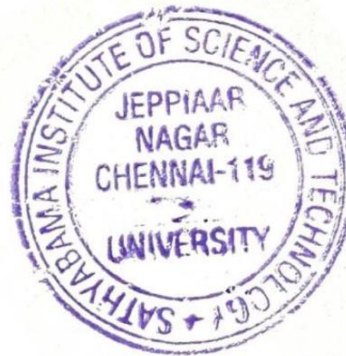
www.sathyabama.ac.in

DECLARATION

I **Rohitram Sundar** hereby declare that this Professional Training Report for one month done by me under the guidance of **Ar. Vennila T** is submitted in partial fulfillment of the requirements for the completion of the practical training session.

DATE : 20.12.2022

PLACE : Chennai, Tamilnadu



Rohitram Sundar

SIGNATURE OF CANDIDATE

ACKNOWLEDGEMENT

I am pleased to acknowledge my sincere thanks to Board of Management of **SATHYABAMA INSTITUTE OF SCIENCE & TECHNOLOGY** for their kind encouragement in doing this project and for completing it successfully. I am grateful to them.

I convey my thanks to **Dr. Devyani Gangopadhyay, Dean, School of building and Environment** for providing me necessary support and details at the right time during the progressive reviews.

I would like to express my sincere and deep sense of gratitude to **Ar.Vennila T** for her valuable guidance, suggestions and constant encouragement paved way for the successful completion of my Training.

I would also like to express my sincere thanks to Ar. Catherine Selvaraj (Internal Co-Ordinator) for her valuable guidance, during the entire Professional Training period.

I wish to express my thanks to all Teaching and Non-teaching staff members of the Department of Architecture who were helpful in many ways for the completion of the project.

ARCHESTUDIO CHENNAI PVT. LTD

Chennai -600078

Phone no: 044-48522969

email:archestudio@gmail.com

ARCHESTUDIO CHENNAI PVT. LTD

Chennai -600078

Phone no: 044-42151405

email:archestudio@gmail.com

Letter : Appoint.It/ JA/ AES2021-22/4.

Chennai-78

11.07.22

To

Rohitram Sundar srohitram@gmail.com

Mob:9840112013

Sub: Appointment as intern- internship period from 11.07.22 till 16.08.22

We are pleased to offer you, a position as an Intern at Archestudio Chennai Pvt Ltd., based on the interview on 30.06.22 . We confirm your joining date as 11.07.22,, with the following conditions and terms,

1. Your internship period would be one month (11.07.22 till 16.08.22)
2. During the internship period you would be working on drawings of various projects and also doing site visits of ongoing projects
3. Office hours (hybrid mode) will be 8 Am till 4 pm, Monday- Friday.

Please confirm acknowledgement of this letter by email.

Welcome to Archestudio team. Let's look forward to a mutually rewarding collaboration.



Vennila T for ARCHESTUDIO CHENNAI
PVT LIMITED

COMPLETION CERTIFICATE FOR INTERNSHIP TRAINING

Chennai 78

17.08.2022

To

The HOD,

Department of Architecture

Sathyabhama Institute of Science and Technology,

Chennai – 600 119

Respected Sir,

Sub: M.Arch internship completion (11.07.22- 16.08.22)

This is to certify that Mr. Rohitram Sundar has joined our office on 11.07.2022 for his M.Arch internship program.

He has successfully completed his internship and is relieved from this office on 16.08.22.

Mr. Rohitram Sundar participated in design development and working drawing preparation of interior, residential and office projects.

He was a welcome addition to our office and his conduct has been **Excellent**.

Thanks for your time



Sincerely

Vennila T



SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

Accredited "A" Grade by NAAC | 12B Status by UGC | Approved by AICTE

www.sathyabama.ac.in

DEPARTMENT OF ARCHITECTURE

PROFESSIONAL PRACTICAL TRAINING REPORT 2022

(Continuous progress report of the trainee architect for the period of One month in the office to submitted to HOD by the Trainee in Charge of the Organization)

1. Name of the office / organization : Arche - studio
2. Address & Contact Number : _____
3. Name of the student : ROHITRAM SUNDAR
4. Duration : From 11.7.2022 To 27.7.2022
5. Total No. of days : 15

6. Evaluation of Performance criteria shall be on

* Note: Kindly grade the student as per his/her overall performance in the office during the assessment month which will be converted to the allotted 90 marks by the department.

Description of works	Excellent	Good	Fair	Poor	NA
Understanding of office culture		✓			
Participation in the office					✓
Reading of drawings		✓			
Presentation Techniques		✓			
Model making works					✓
Understanding of construction details					✓
Drafting Skills (Manual / Computer)		✓			
Site Supervision / Discussion with clients	✓				
Adherence to Time schedule		✓			
Other computer skills	✓				
File and Office Maintenance					✓
Coordination with other consultants					✓
Overall Grading*	B				

(A - 9.0, B - 8.0, C - 7.0, D - 6.0, E - 5.0)

7. Any other Remarks : _____

8. Signature of the:
Head of the Office
/ Organization
(With Seal)

hairs



SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

Accredited "A" Grade by NAAC | 12B Status by UGC | Approved by AICTE

www.sathyabama.ac.in

DEPARTMENT OF ARCHITECTURE

PROFESSIONAL PRACTICAL TRAINING REPORT 2022

(Continuous progress report of the trainee architect for the period of One month in the office to submitted to HOD by the Trainee in Charge of the Organization)

1. Name of the office / organization : Arche studio
2. Address & Contact Number : _____
3. Name of the student : ROHITRAM SUNDAR
4. Duration : From 29.7.2022 To 16.8.2022
5. Total No. of days : 15

6. Evaluation of Performance criteria shall be on

* Note: Kindly grade the student as per his/her overall performance in the office during the assessment month which will be converted to the allotted 90 marks by the department.

Description of works	Excellent	Good	Fair	Poor	NA
Understanding of office culture		✓			
Participation in the office					✓
Reading of drawings		✓			
Presentation Techniques		✓			
Model making works					✓
Understanding of construction details	✓				✓
Drafting Skills (Manual / Computer)		✓			
Site Supervision / Discussion with clients	✓	✓			
Adherence to Time schedule		✓			
Other computer skills	✓				
File and Office Maintenance					✓
Coordination with other consultants					✓
Overall Grading*	B				

(A - 9.0, B - 8.0, C - 7.0, D - 6.0, E - 5.0)

7. Any other Remarks : _____

8. Signature of the:
Head of the Office
/ Organization
(With Seal)

hairs



Work Diary

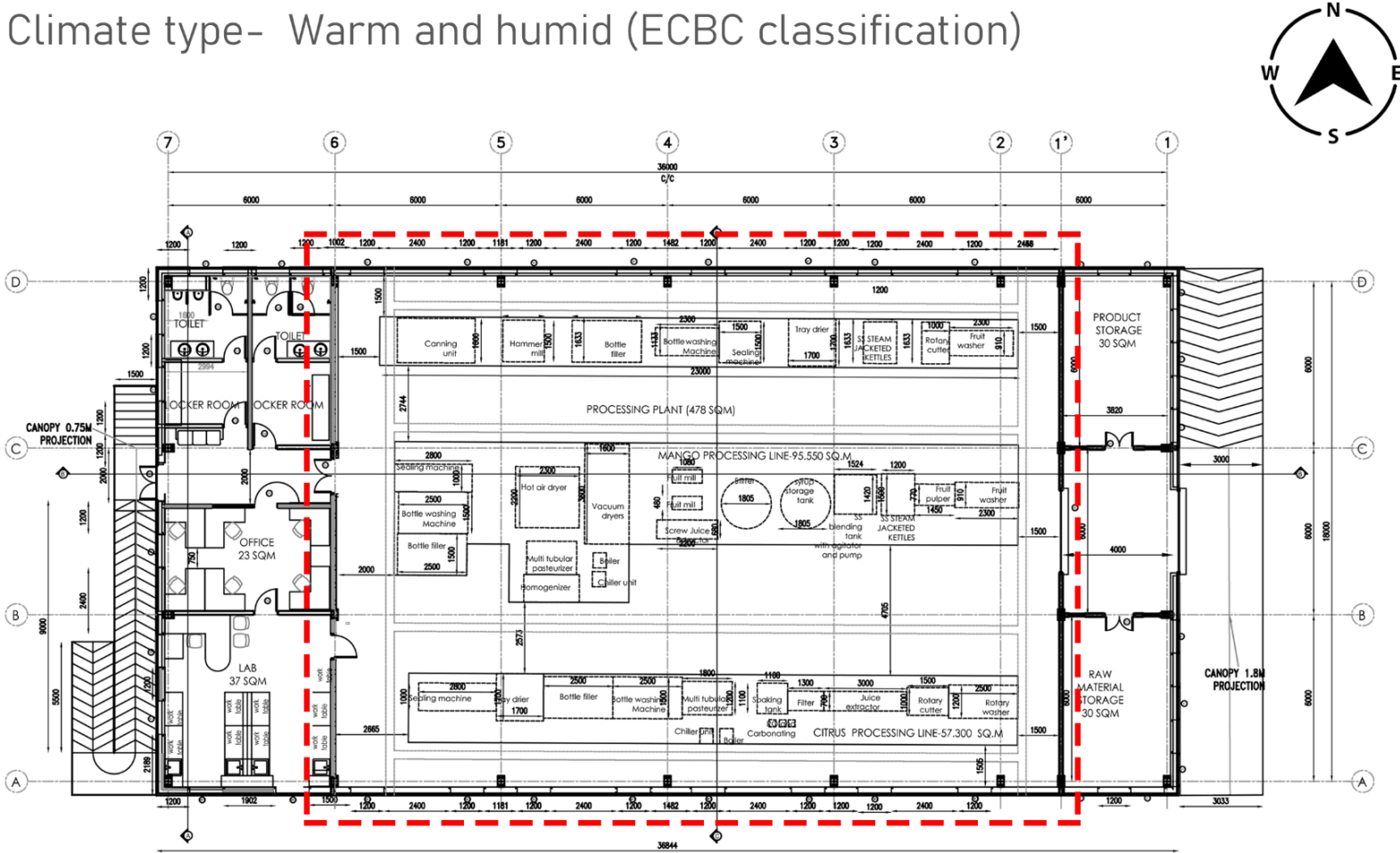
DATE	PROJECT	WORK DONE
(11/7/2022)	Industry @ IIT,Tirupati	Daylighting Simulation, Velux
(12/7/2022)	Industry @ IIT,Tirupati	Daylighting analysis, Velux
(13/7/2022)	Industry @ IIT,Tirupati	Artificial lighting modelling, Dialux
(14/7/2022)	Industry @ IIT,Tirupati	Artificial lighting analysis, Dialux
(15/7/2022)	Industry @ IIT,Tirupati	Artificial lighting design option based on analysis, Dialux
(16/7/2022)	Retrofitting office interior @ Guindy,Chennai	3D model corrections
(17/7/2022)	Review on Water management video presented by Thali talks	Review of Water management video presented by Thali talks
(18/7/2022)	Recording studio @ Royapettah,Chennai	Site visit, as built dwg measurements and lux lvl calculation
(19/7/2022)	Recording studio @ Royapettah,Chennai	CAD dwg drafting proposal dwg Rev.1
(20/7/2022)	Recording studio @ Royapettah,Chennai	CAD dwg drafting proposal dwg Rev.2
(21/7/2022)	Life cycle cost assessment	Presentation on LCA and eco-friendly interior materials
(22/7/2022)	Retrofitting office interior @ Guindy,Chennai	Daylighting Simulation and analysis, Velux
(23/7/2022)	Rules and regulations	Sustainability related standards from NBC book
(25/7/2022)	Residence @ Velachery	3D Modelling from CAD file
(26/7/2022)	Residence @ Velachery	Shading device calculation and designing
(27/7/2022)	Residence @ Velachery	Elevation design conceptual options
(28/7/2022)	Rules and regulations	Sustainability related standards from ECBC and IS.SP.41
(29/7/2022)	Residence @ Adyar	3D Modelling from CAD file
(01/8/2022)	Residence @ Adyar	Site Context modelling from G-earth
(02/8/2022)	Residence @ Adyar	Daylighting simulation and analysis, Velux
(03/8/2022)	Recording studio @ Royapettah,Chennai	CAD dwg drafting proposal dwg Rev.3 and working dwg
(04/8/2022)	Residence @ Velachery	Finalised elevation design and rendering
(05/8/2022)	Residence @ Adyar	CFD simulation and analysis, Autodesk Flow
(06/8/2022)	Tutorial on software	Conducted a session on how to use Velux daylighting software
(08/8/2022)	Residence @ Adyar	Eco Niwas Samhita calculation

TABLE OF CONTENTS

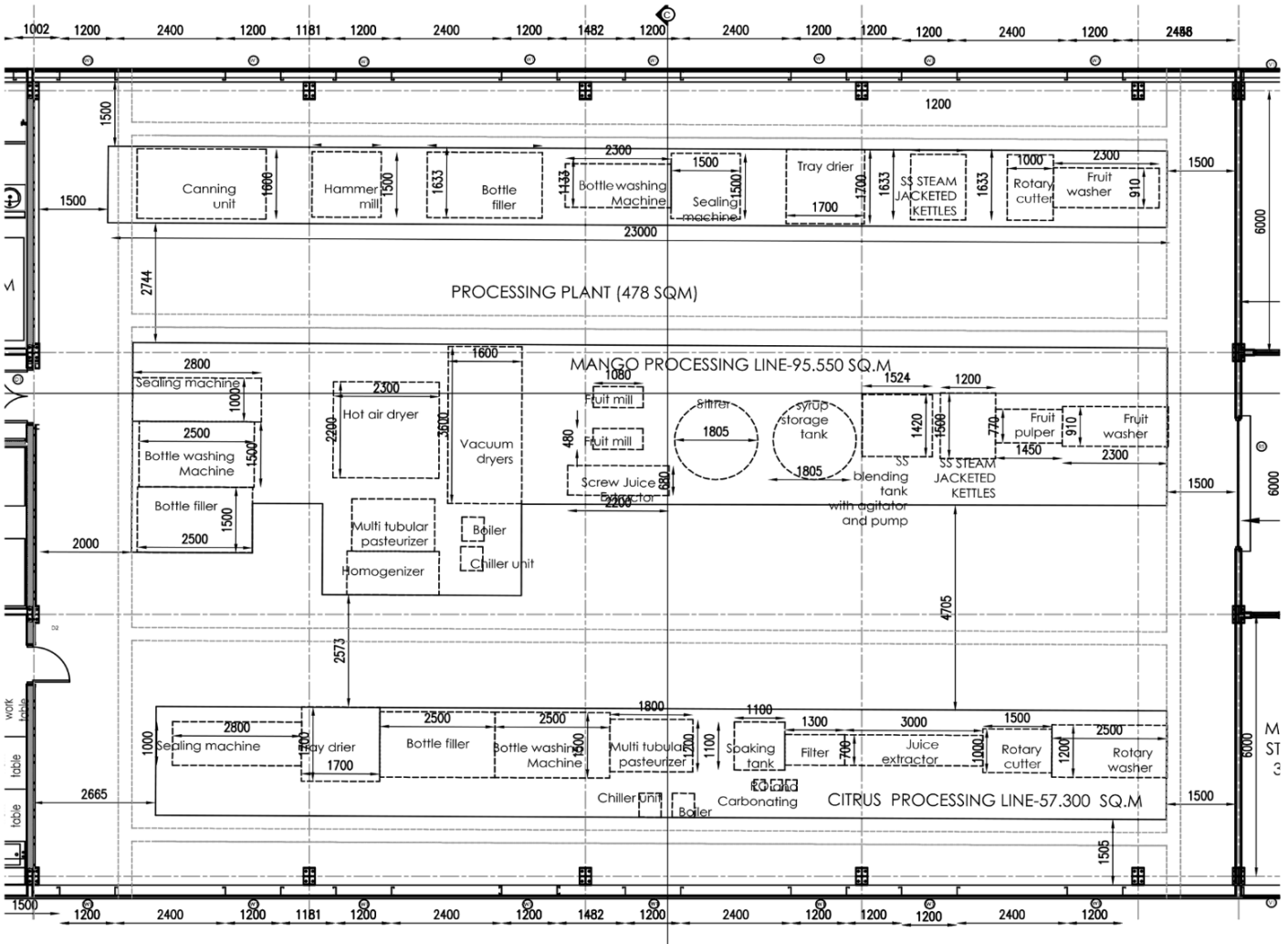
CHAPTER NO.	TITLE	PAGE NO.
1	Industrial plant @ IIT, Tirupati	1
2	Residence @ Velachery	8
3	Retrofitting of Office space @ IIT, Guindy	11
4	Retrofitting Recording studio @ Royapettah	13
5	Residence @ Adyar	15
6	Thali talks on Ancient water management of Tamilnadu	18

Industrial plant @ IIT, Tirupati

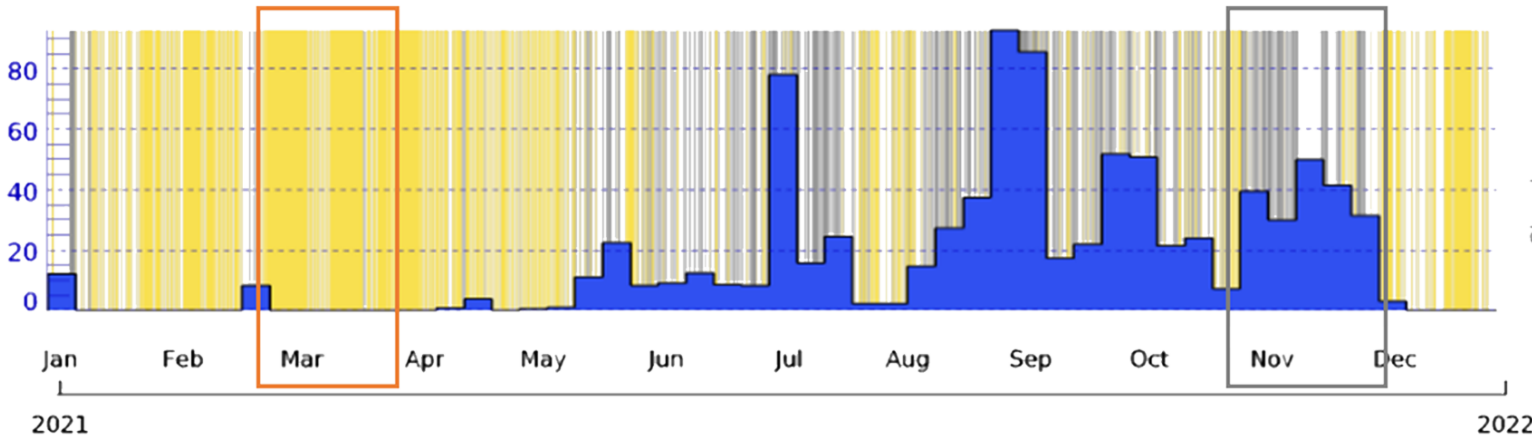
Typology- Industry building
Location- IIT, Tirupati
Coordinates -13.62N , 79.41 E
Climate type- Warm and humid (ECBC classification)



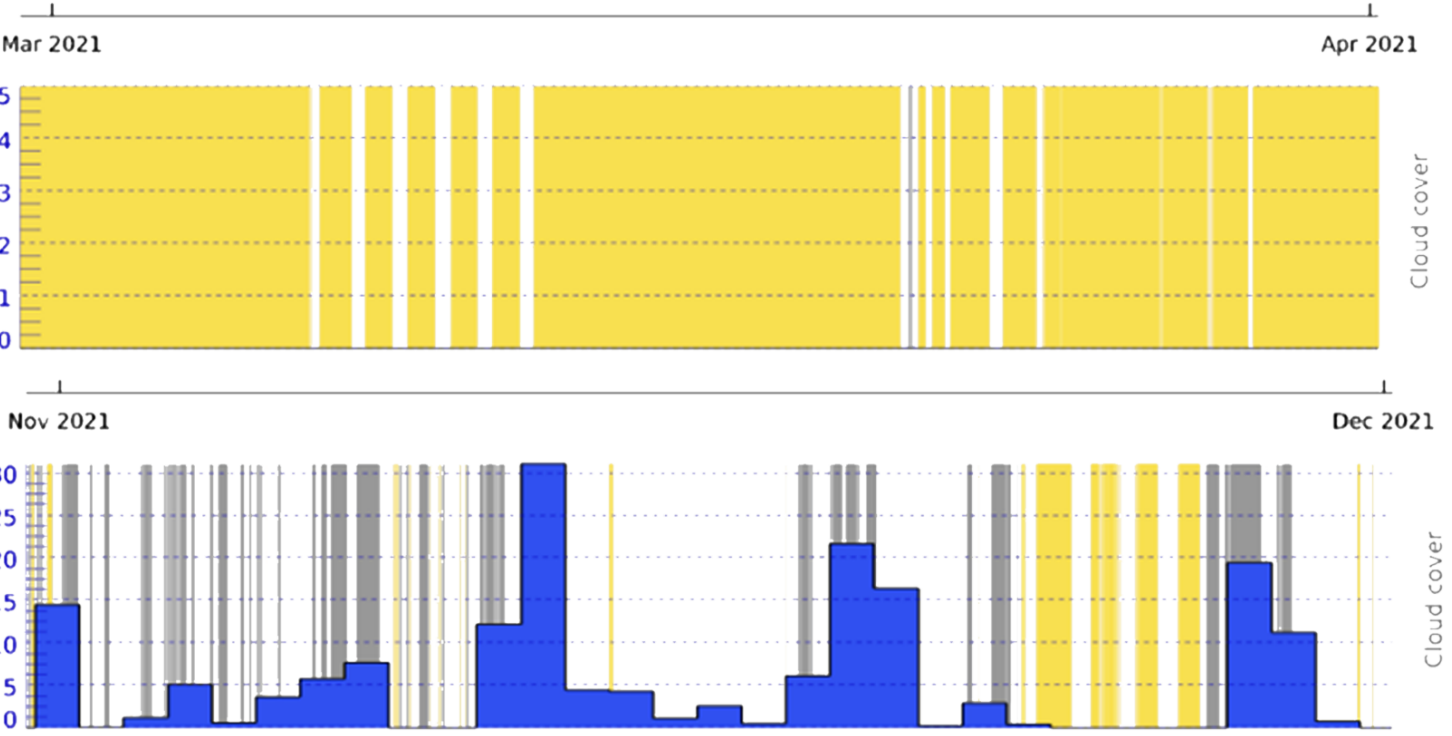
Scope of work - Daylighting and artificial lighting analysis
Simulation tools used - VELUX and DIALUX

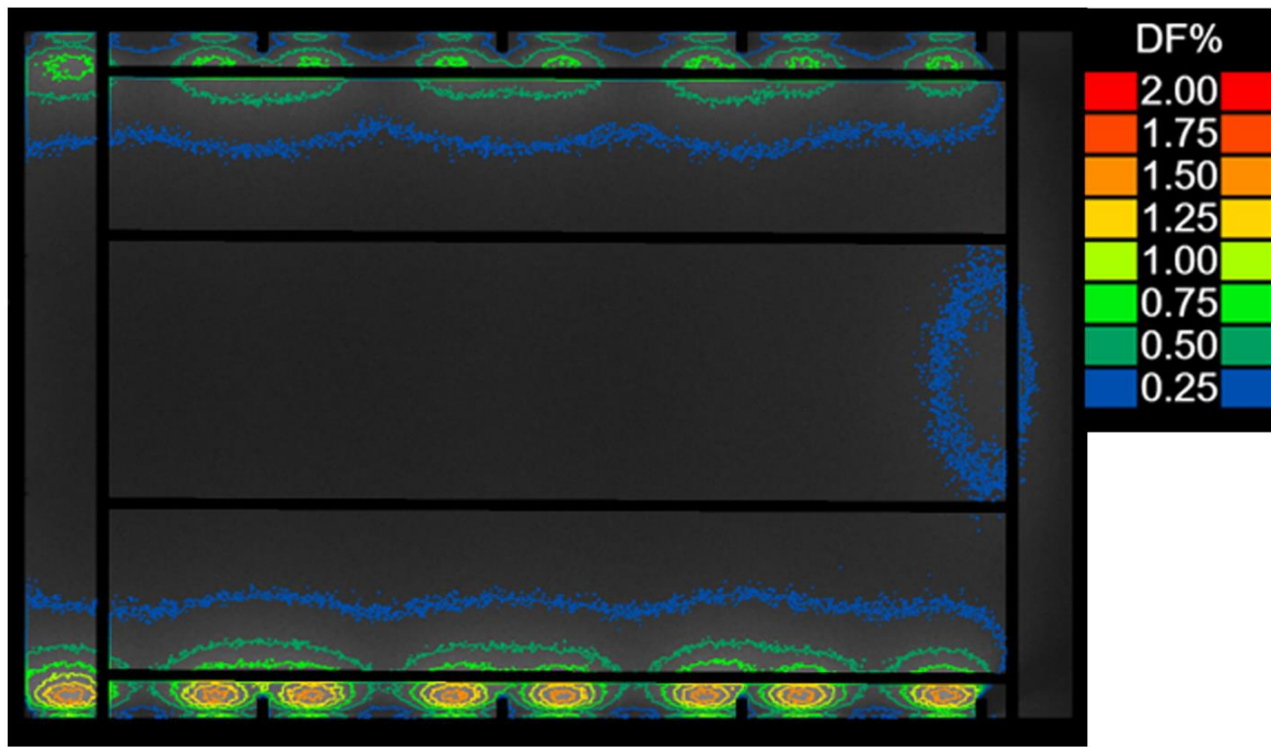


Cloud cover data for illuminance analysis



Cloud cover during the Month of March . It is the least during this month with more sunny days.
Cloud cover during the Month of November . It is the most during this month with more amounts precipitation and lesser sunny days.



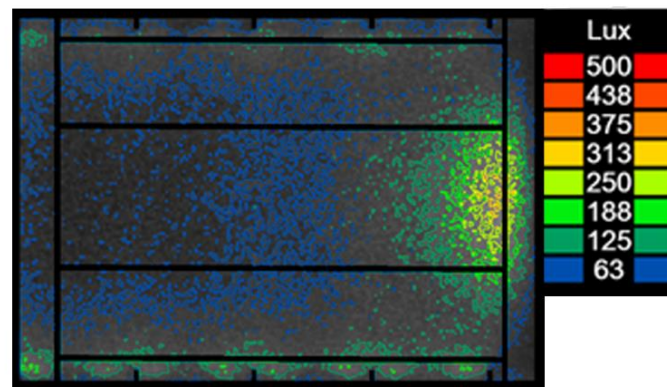


Daylight factor analysis done for overcast sky condition @ 12 noon
 About 1.75 % of DF is observed near to the windows and in the interior of the spaces it reduces to almost Zero.

2% of DF provides decent lighting to the interior space. In this scenario this is seen nearby the fenestrations.

Work plane set @ 850mm from FFL

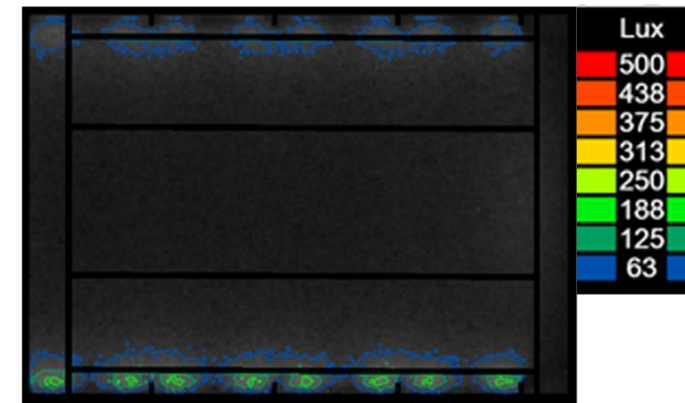
Average	$D_{average}$	0.25 DF [%]
Median	D_{median}	0.18 DF [%]
Minimum	D_{min}	0.00 DF [%]
Maximum	D_{max}	1.79 DF [%]



March 21st
 Illuminance data

Average	$I_{average}$	84.12 lux
Median	I_{median}	74.52 lux
Minimum	I_{min}	6.89 lux
Maximum	I_{max}	380.65 lux

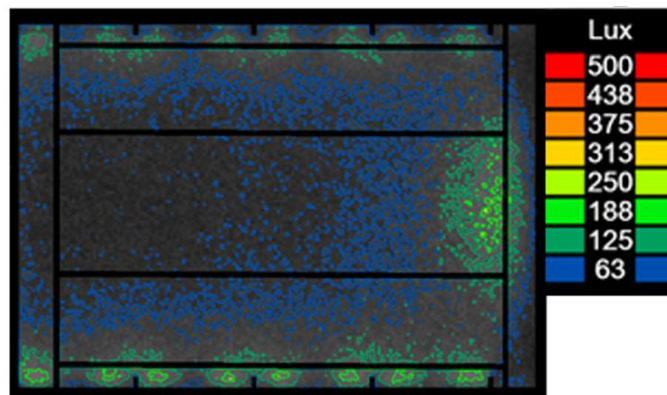
9am



November 21st
 Illuminance data

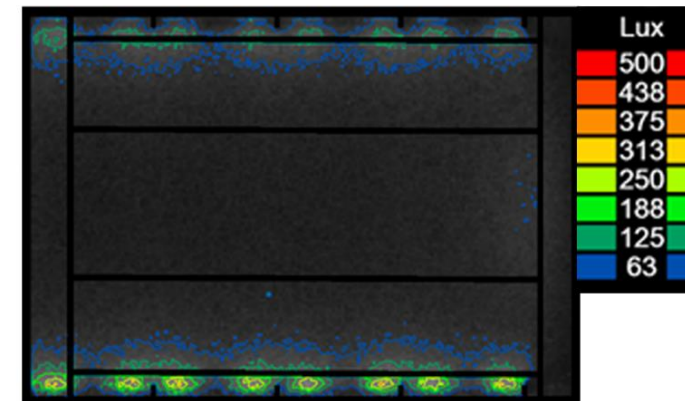
Average	$I_{average}$	30.64 lux
Median	I_{median}	21.47 lux
Minimum	I_{min}	2.25 lux
Maximum	I_{max}	252.69 lux

9am



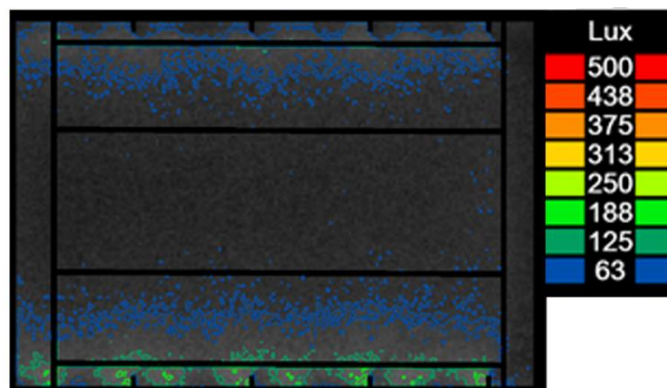
12noon

Average	$I_{average}$	72.48 lux
Median	I_{median}	64.60 lux
Minimum	I_{min}	6.60 lux
Maximum	I_{max}	289.14 lux



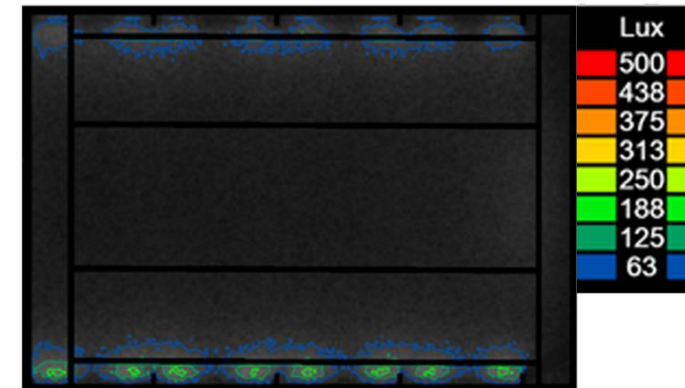
12noon

Average	$I_{average}$	44.39 lux
Median	I_{median}	31.09 lux
Minimum	I_{min}	3.47 lux
Maximum	I_{max}	366.19 lux



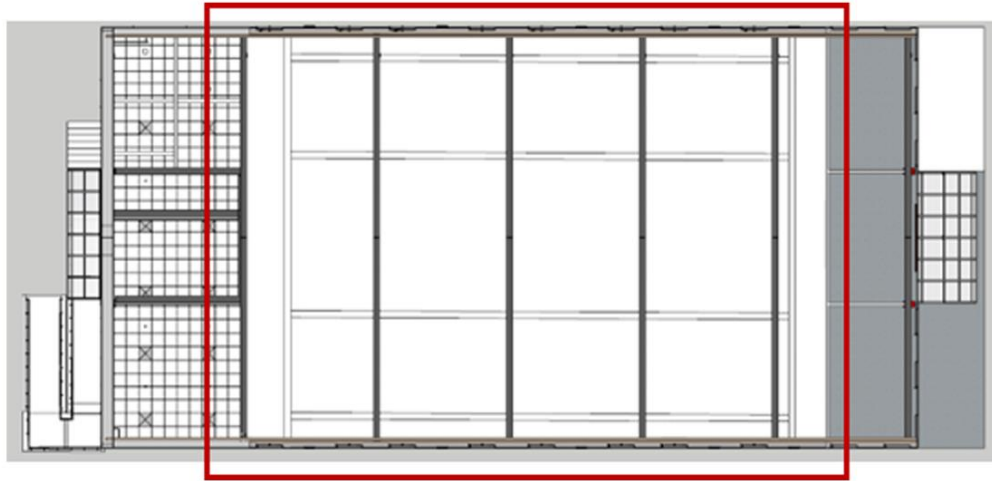
3pm

Average	$I_{average}$	54.09 lux
Median	I_{median}	45.56 lux
Minimum	I_{min}	6.56 lux
Maximum	I_{max}	249.59 lux



3pm

Average	$I_{average}$	30.61 lux
Median	I_{median}	21.51 lux
Minimum	I_{min}	2.11 lux
Maximum	I_{max}	252.19 lux



PRODUCTION LINE Luminaire list

Φ_{total} 289792 lm	P_{total} 6400.0 W	Luminous efficacy 45.3 lm/W
-----------------------------	-------------------------	--------------------------------

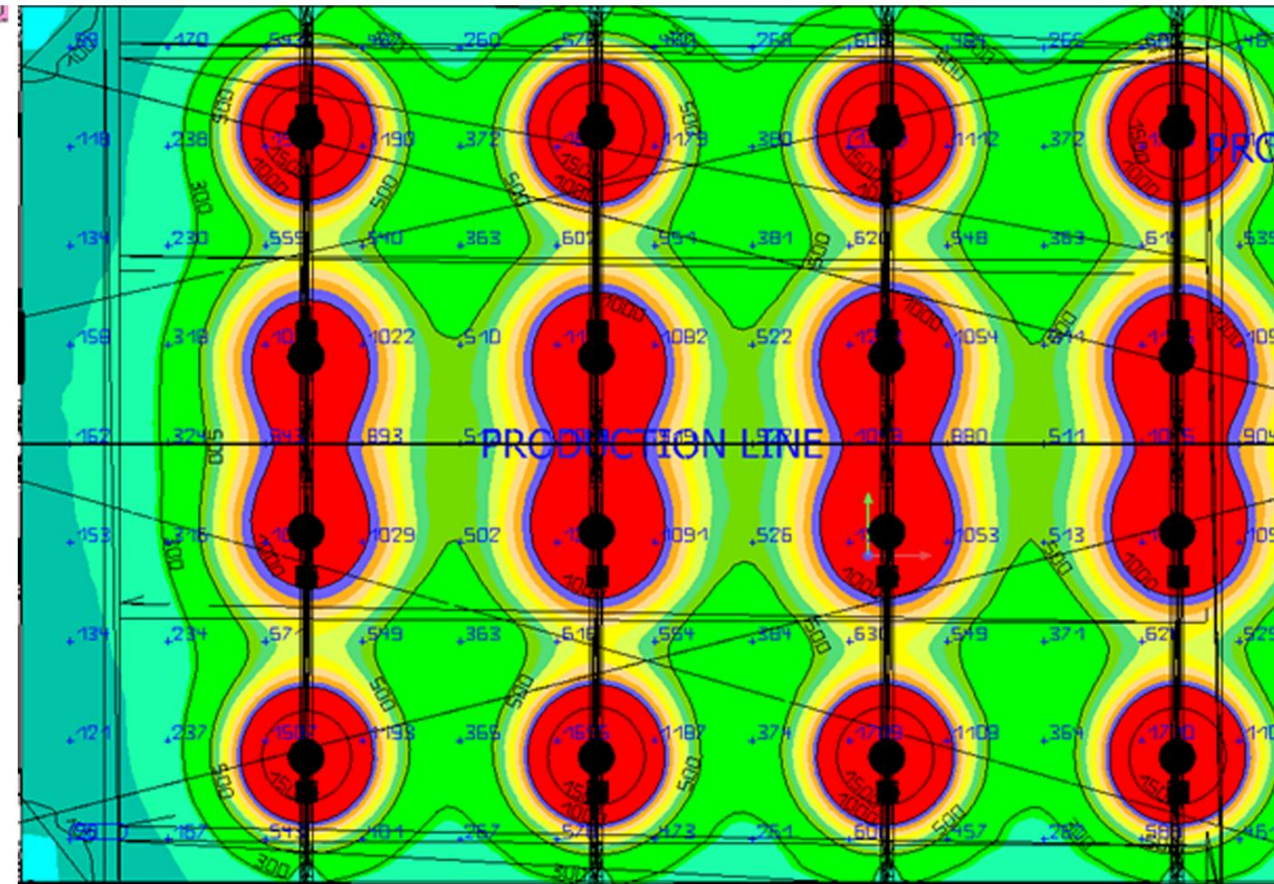
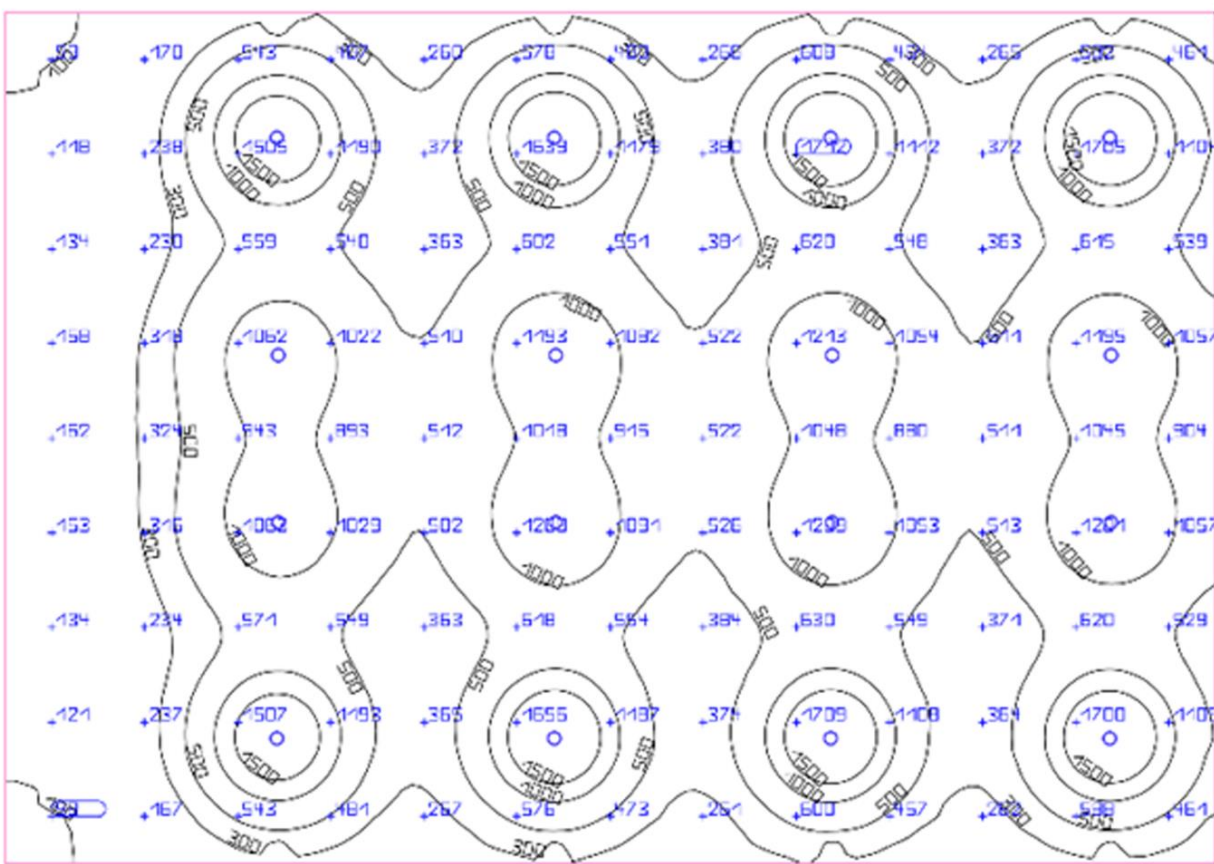
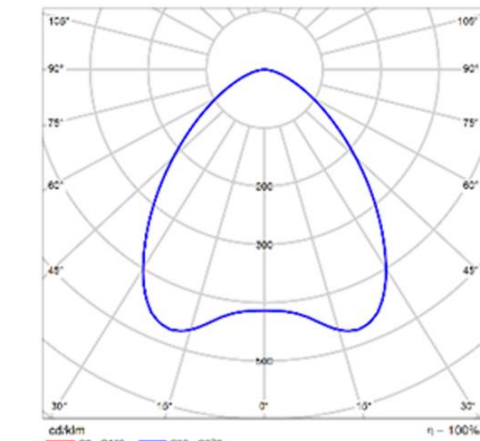
pcs.	Manufacturer	Article No.	Article name	P	Φ	Luminous efficacy
16	Lighting Technologies		HBA 400H EL IP65 SET P1	400.0 W	18112 lm	45.3 lm/W

Space - Production line

Philips - BY101P LED210S/840 WB PS



P	154.0 W
Φ_{Lamp}	20500 lm
$\Phi_{Luminaire}$	20500 lm
η	100.00 %
Luminous efficacy	133.1 lm/W
CCT	4000 K
CRI	80

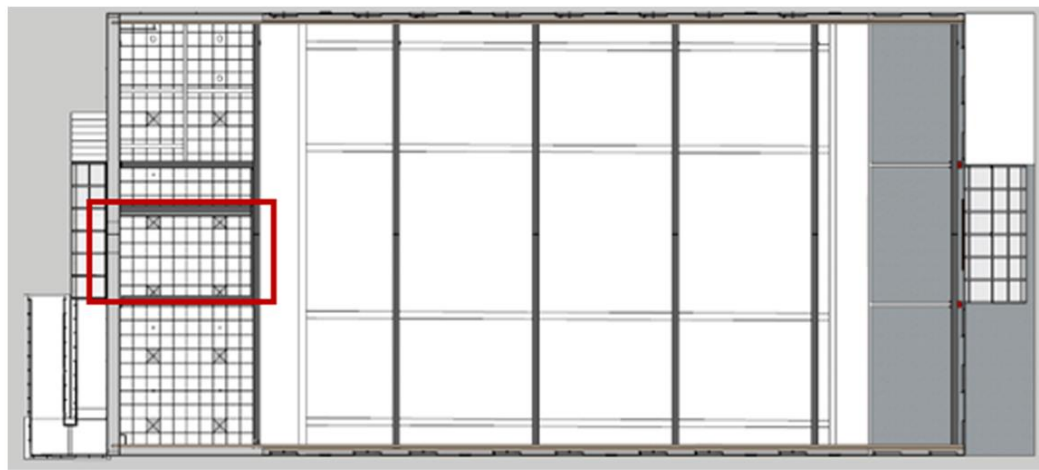


	Symbol	Calculated	Target	Check	Index
Working plane	$\bar{E}_{perpendicular}$	670 lx	≥ 500 lx	✓	WP1
	g_1	0.13	-	-	WP1
Consumption values	Consumption	3450 kWh/a	max. 16850 kWh/a	✓	
Room	Lighting power density	5.12 W/m ²	-	-	
		0.76 W/m ² /100 lx	-	-	

Mounting height changed from 5.4m to 5m from dwg.
The luminaire fitting was obstructing the light source

More spread of light compared to previous option.
Overall illuminance E – 670lx greater than 500lx.
Which is within the 500-1000lx standard requirement.

Work plane @ 800mm.



Luminaire list

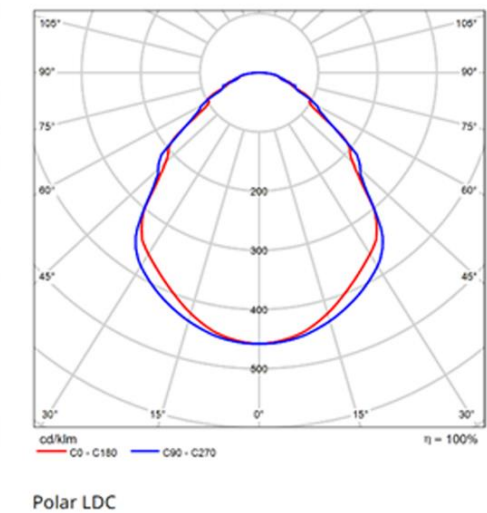
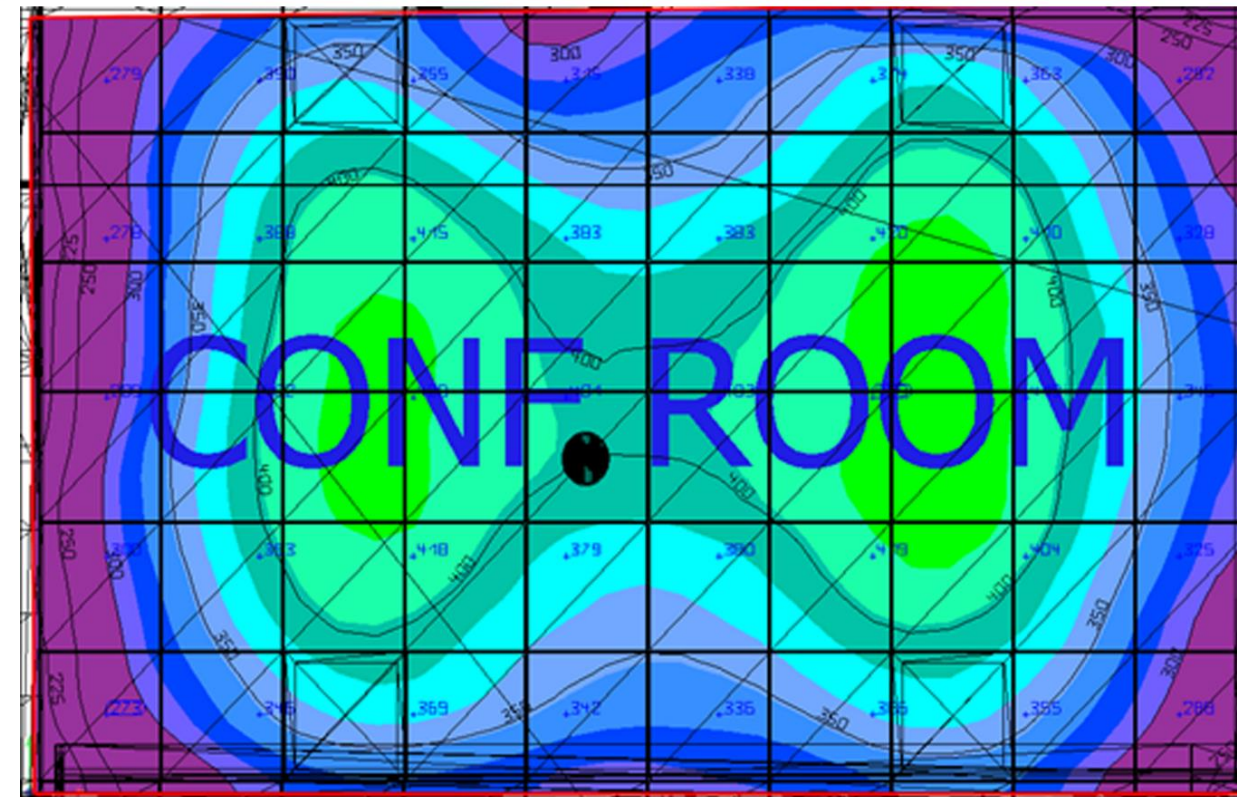
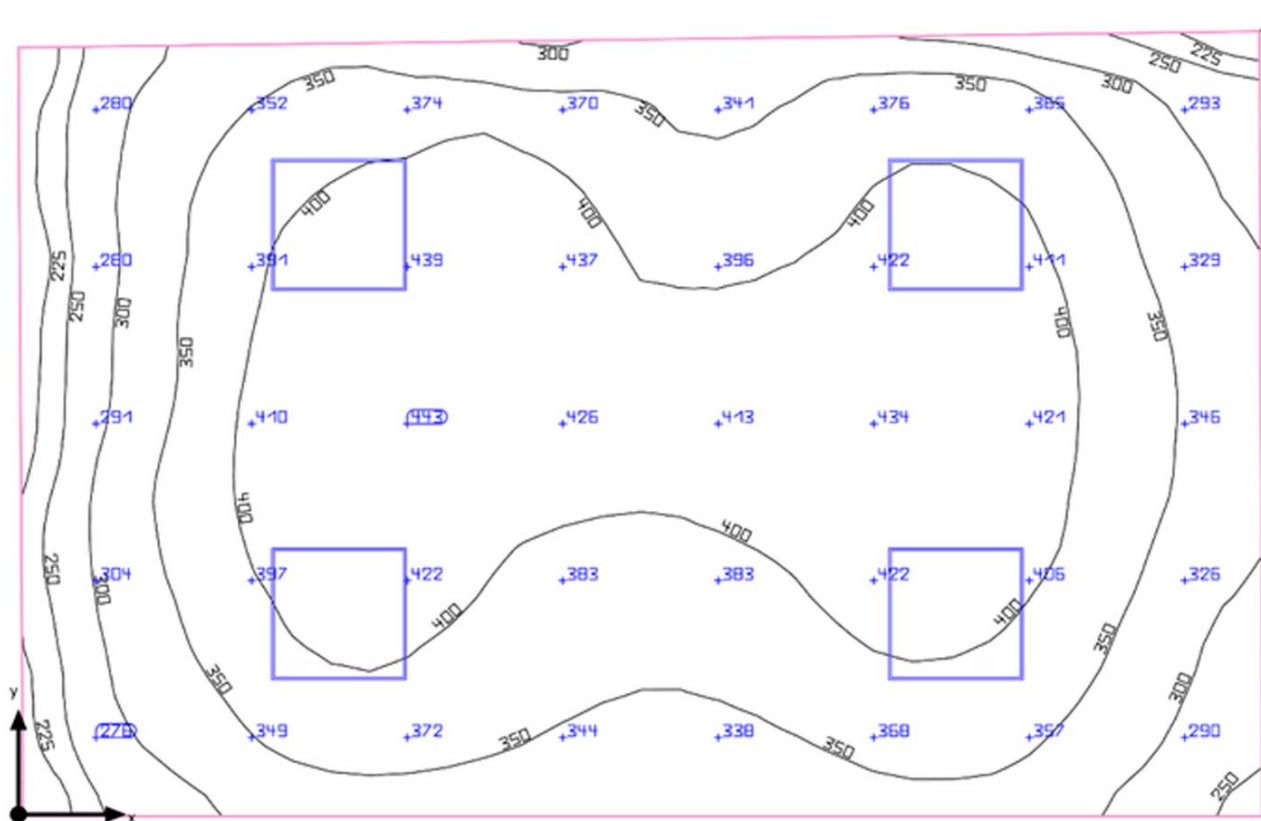
Φ_{total}	P_{total}	Luminous efficacy
11196 lm	92.0 W	121.7 lm/W

pcs.	Manufacturer	Article No.	Article name	P	Φ	Luminous efficacy
4	Philips		RC402B LED28S/840 OC PSD W62L62	23.0 W	2799 lm	121.7 lm/W

Philips - RC402B LED28S/840 OC PSD W62L62



P	23.0 W
Φ_{Lamp}	2800 lm
$\Phi_{Luminaire}$	2799 lm
η	99.96 %
Luminous efficacy	121.7 lm/W
CCT	4000 K



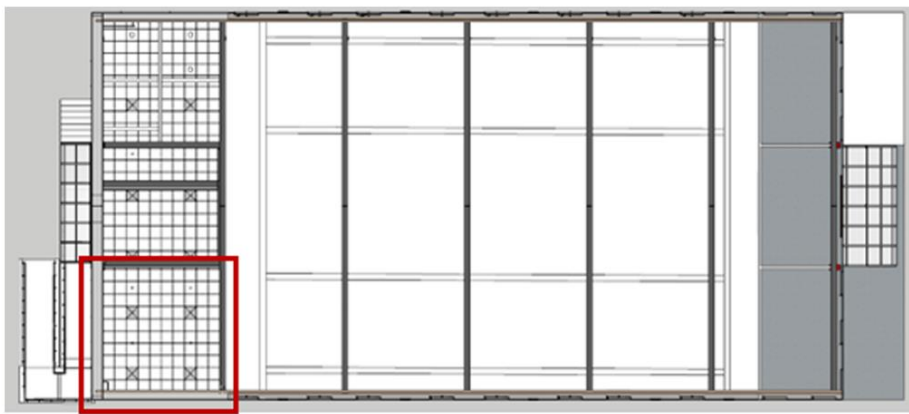
Results

	Symbol	Calculated	Target	Check	Index
Working plane	$E_{perpendicular}$	365 lx	≥ 300 lx	✓	WP3
	g_1	0.56	-	-	WP3
Consumption values	Consumption	55 kWh/a	max. 750 kWh/a	✓	
Room	Lighting power density	4.34 W/m ²	-	-	
		1.19 W/m ² /100 lx	-	-	

The luminaires are placed almost evenly spread out it does the work of spreading out the light. At center avg of 400 lux is obtained.

The East and west periphery of the room receive less light compared to the center.

Overall of illuminance of work plane E- 365 lux within the required standard of 300-600 lux
Workplane @ 800mm



Luminaire list

Φ_{total} 25188 lm	P_{total} 240.0 W	Luminous efficacy 105.0 lm/W
----------------------------	------------------------	---------------------------------

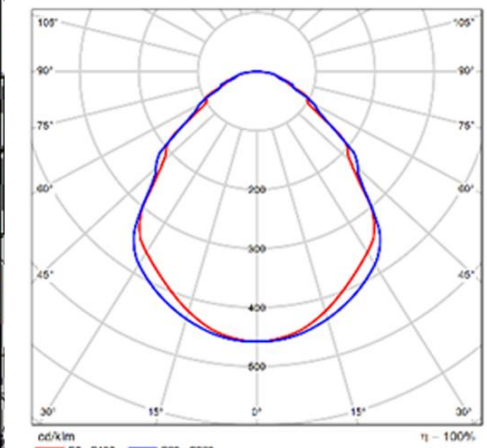
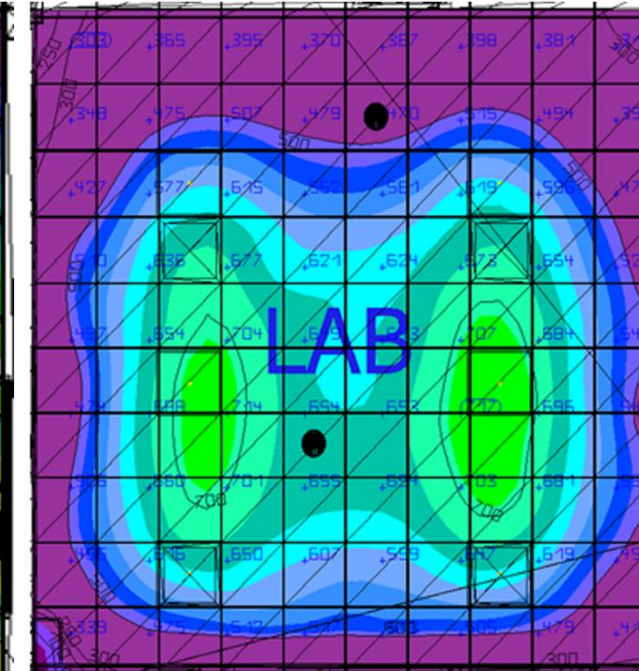
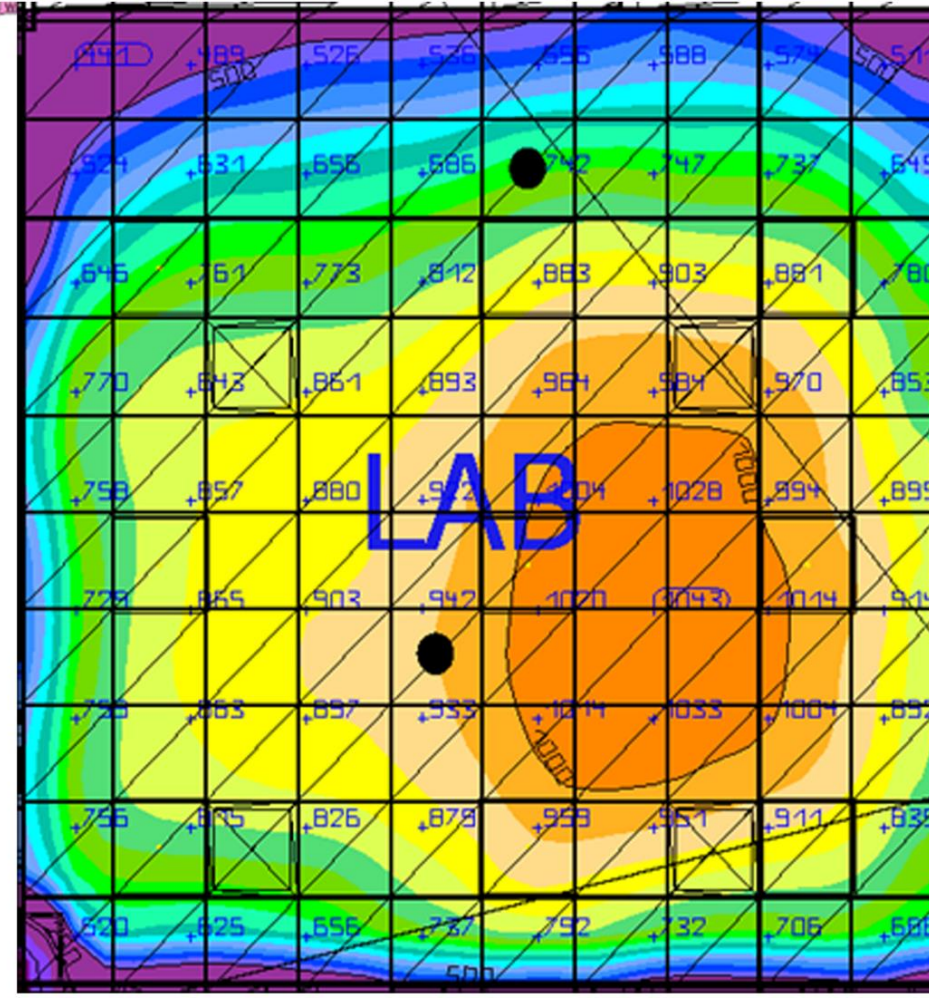
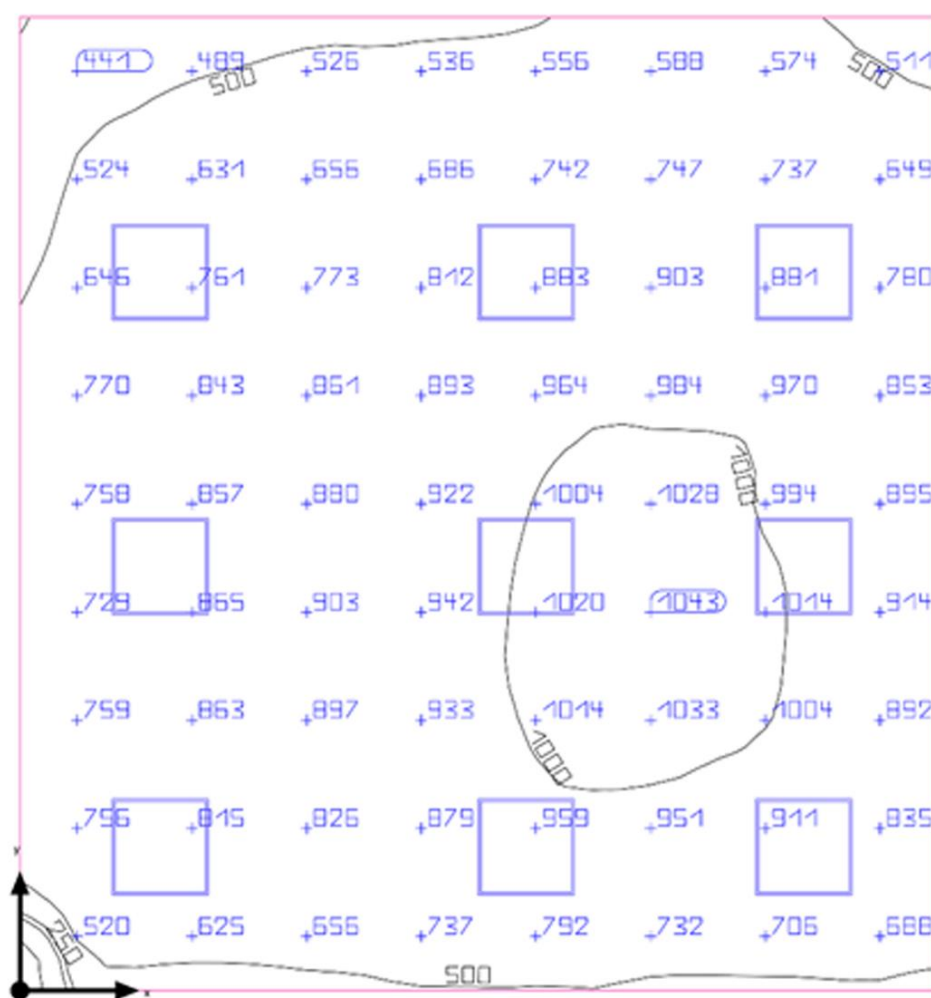
pcs.	Manufacturer	Article No.	Article name	P	Φ	Luminous efficacy
9	Philips		RC400B LED42S/830 OC POE W60L60	40.0 W	4198 lm	105.0 lm/W

Space -Laboratory

Philips - RC400B LED42S/830 OC POE W60L60



P	40.0 W
Φ_{Lamp}	4200 lm
$\Phi_{Luminaire}$	4198 lm
η	99.96 %
Luminous efficacy	105.0 lm/W
CCT	3000 K
CRI	80



Polar LDC

Previous option as per dwg

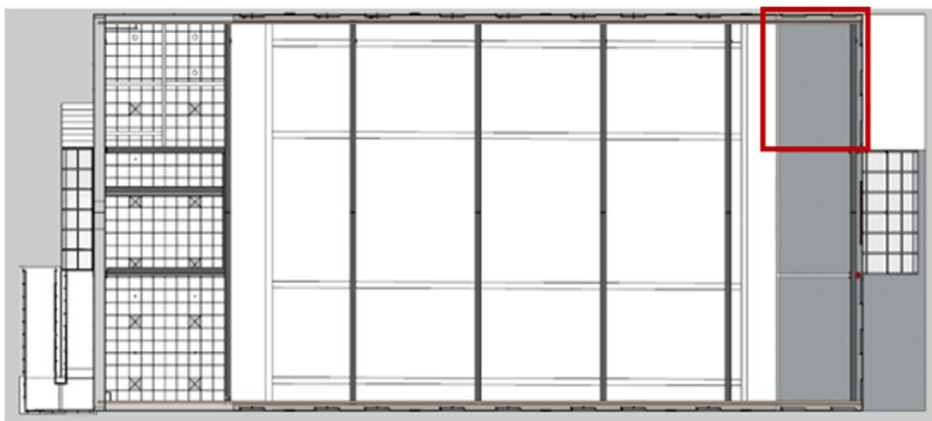
The number of lighting in the first case was only 6nos. which did not light up the space for re-quired lux lvl.

The number of luminaires inside the space has been increased from 6nos to 9nos. This provides ample lighting on the Work plane as compared to the previous option.

792lx > 600lx of required lvl.

Same lighting fixture has been used.

	Symbol	Calculated	Target	Check	Index
Working plane	$E_{perpendicular}$	792 lx	≥ 600 lx	✓	WP2
	g_1	0.071	-	-	WP2
Consumption values	Consumption	500 kWh/a	max. 1250 kWh/a	✓	
Room	Lighting power density	10.32 W/m ²	-	-	
		1.30 W/m ² /100 lx	-	-	



Luminaire list

Φ_{total}
20000 lm

P_{total}
144.0 W

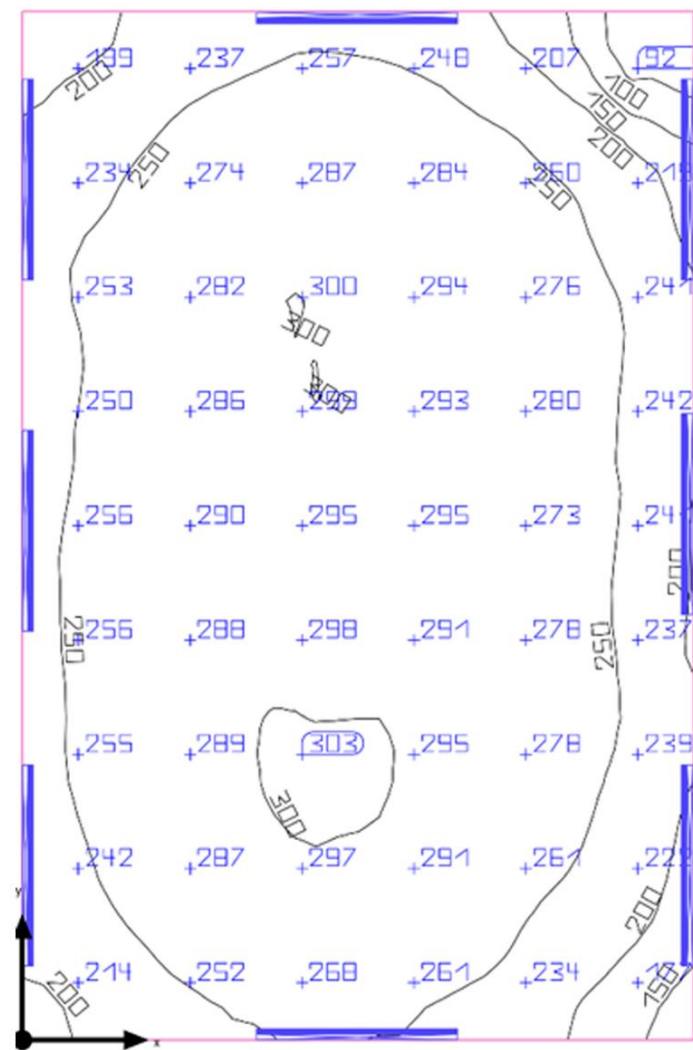
Luminous efficacy
138.9 lm/W

pcs.	Manufacturer	Article No.	Article name	P	Φ	Luminous efficacy
8	Philips		BN126C L1200 1 xLED25S/840	18.0 W	2500 lm	138.9 lm/W

PHILIPS



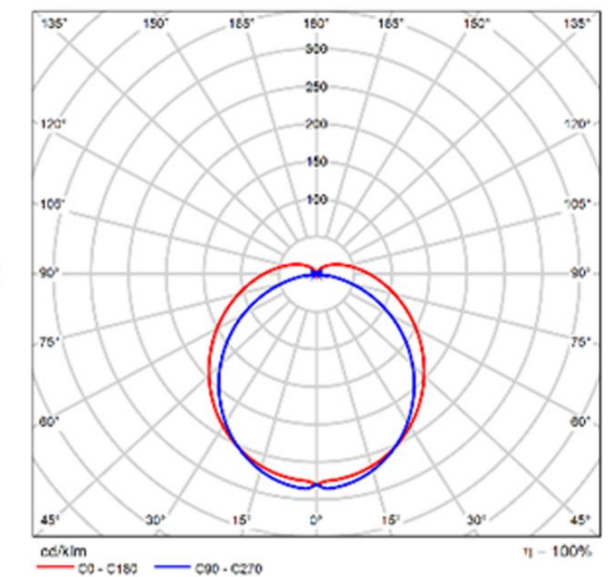
P	18.0 W
Φ_{Lamp}	2500 lm
$\Phi_{Luminaire}$	2500 lm
η	100.00 %
Luminous efficacy	138.9 lm/W
CCT	4000 K
CRI	80



The product storage room has tubelights placed on the walls @ mounting height of 2400mm from FFL.

The luminaires that are placed almost evenly spread out it does the work of spreading out the light.
The luminaires are placed on walls.as shown in the luminaire layout.

Overall of illuminance of work plane E- 259 lux within the required standard of minimum

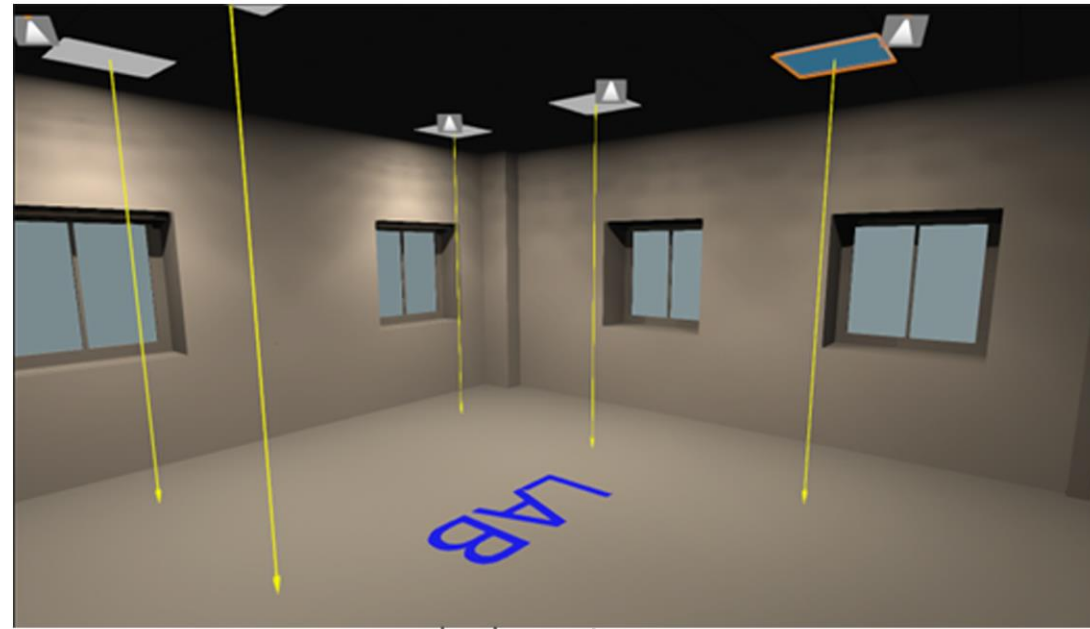


Polar LDC

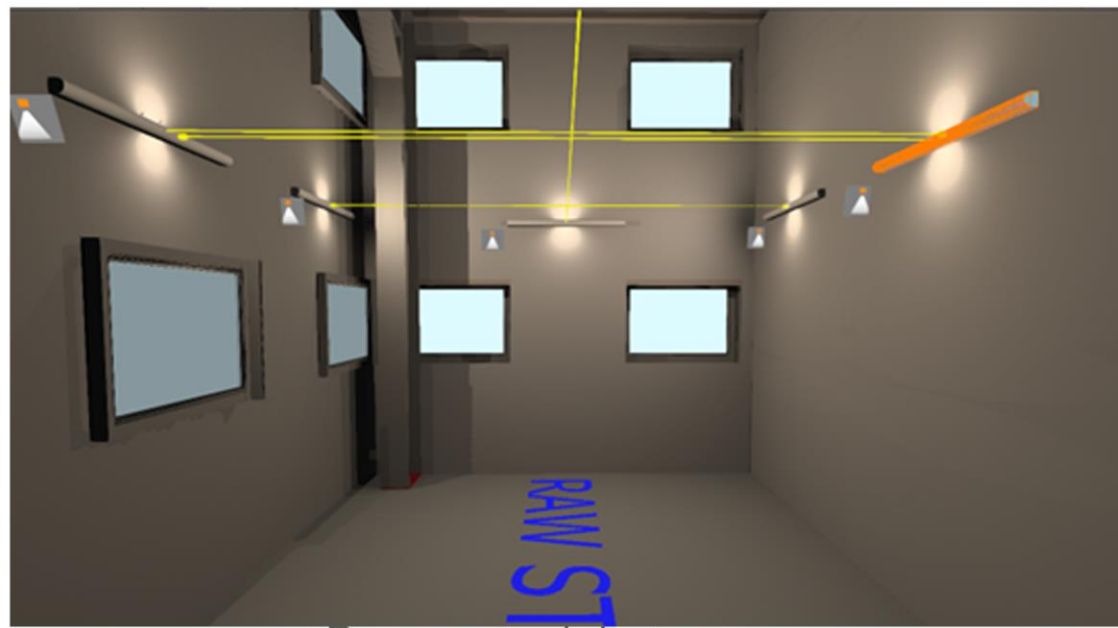
	Symbol	Calculated	Target	Check	Index
Working plane	$\bar{E}_{perpendicular}$	259 lx	≥ 100 lx	✓	WP7
	g_1	0.24	-	-	WP7
Consumption values	Consumption	200 kWh/a	max. 900 kWh/a	✓	
Room	Lighting power density	5.84 W/m ²	-	-	
		2.25 W/m ² /100 lx	-	-	



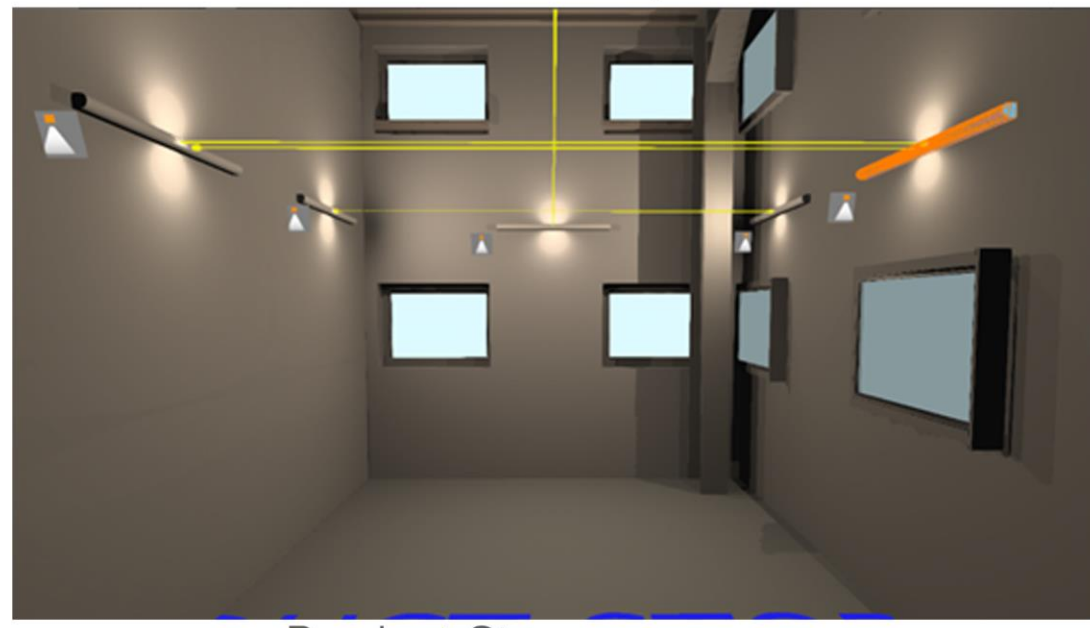
Production line



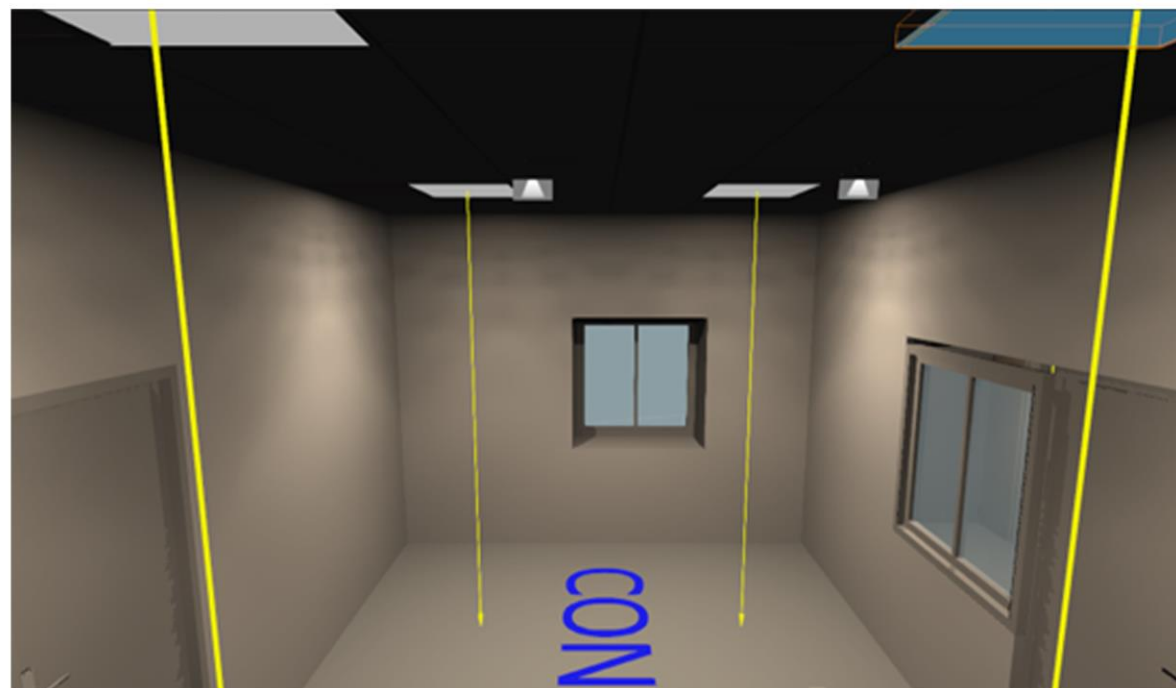
Laboratory



Raw material storage area



Product Storage area



Conference Room

Residence @ Velachery

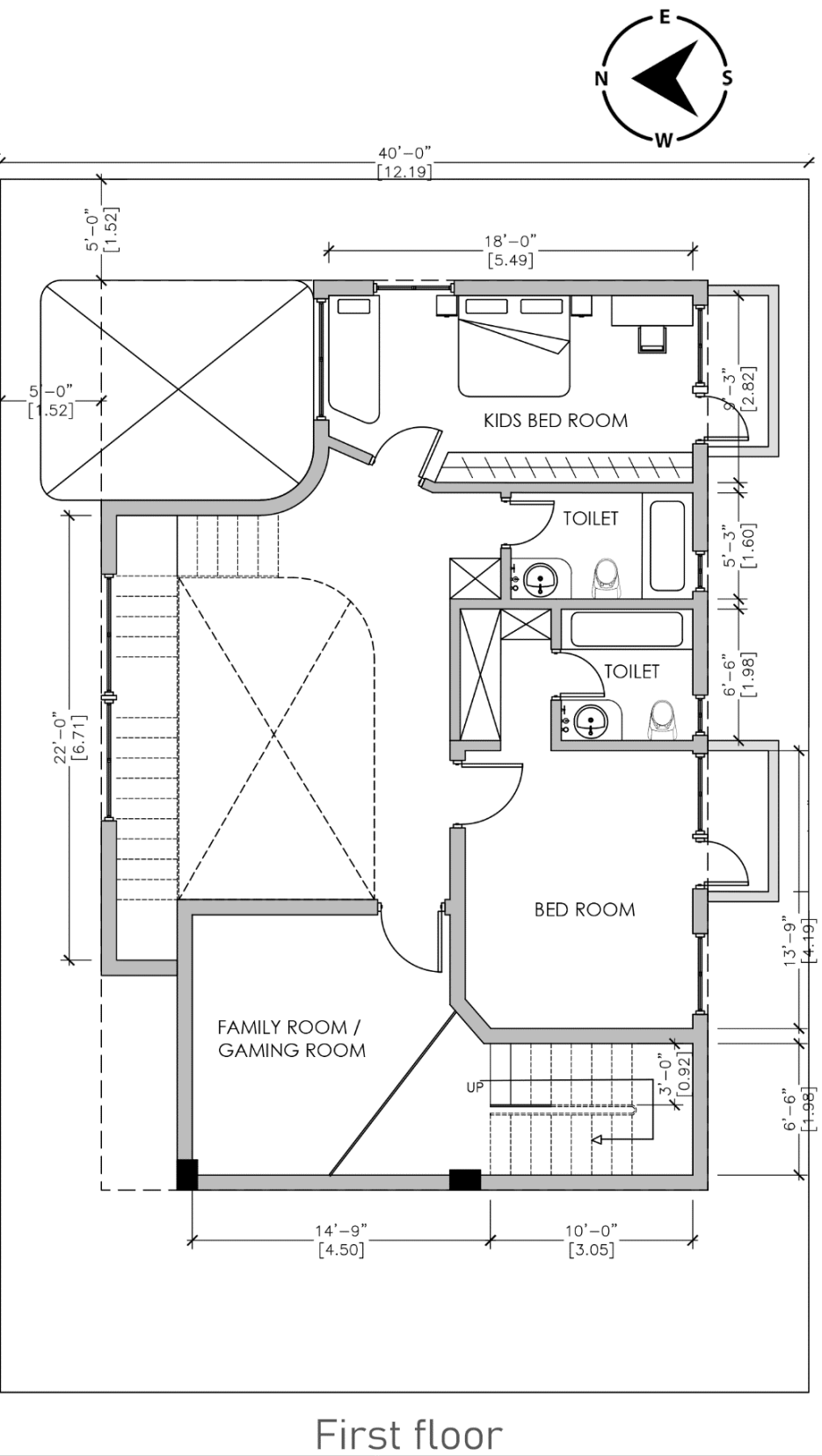
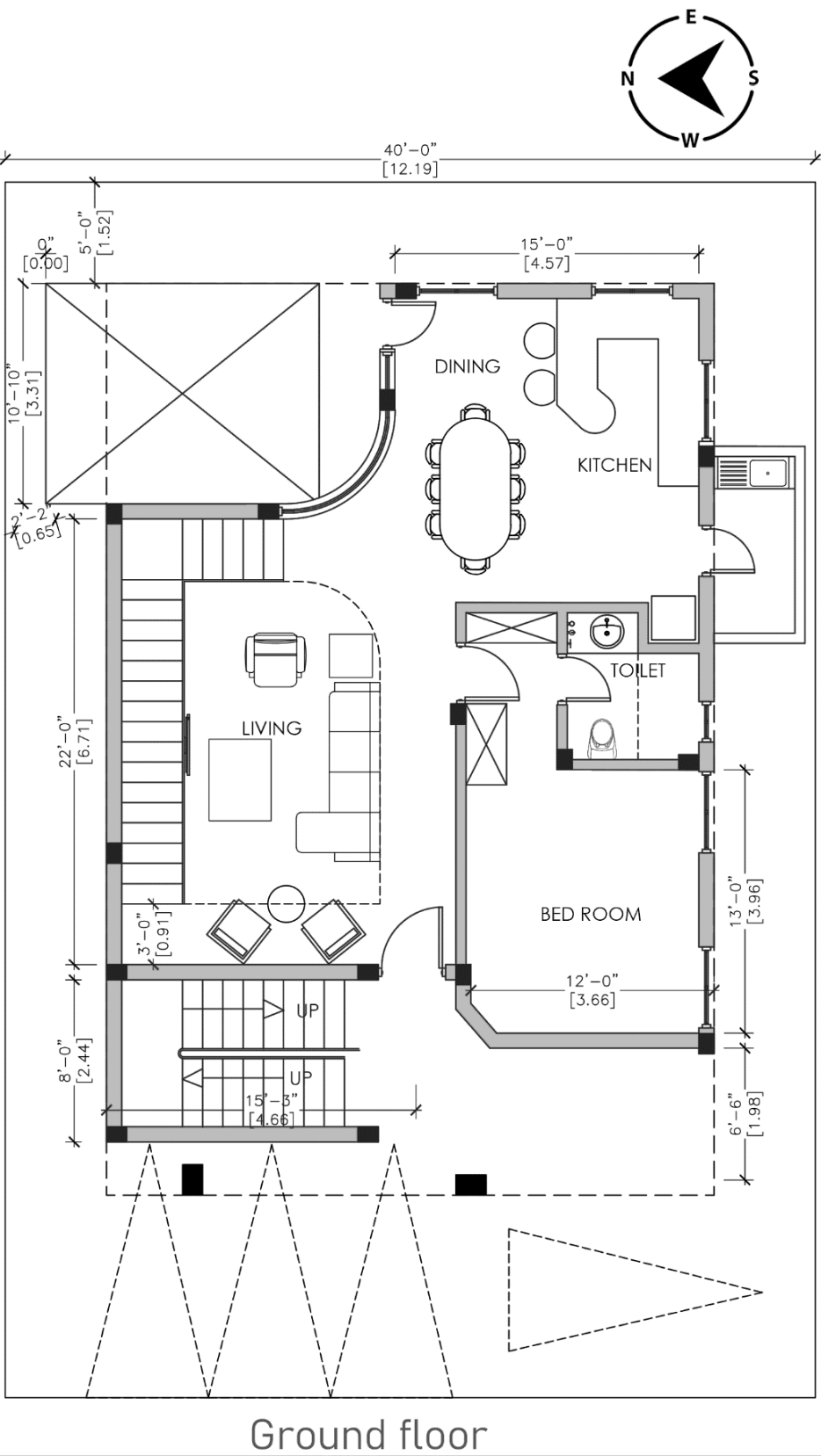
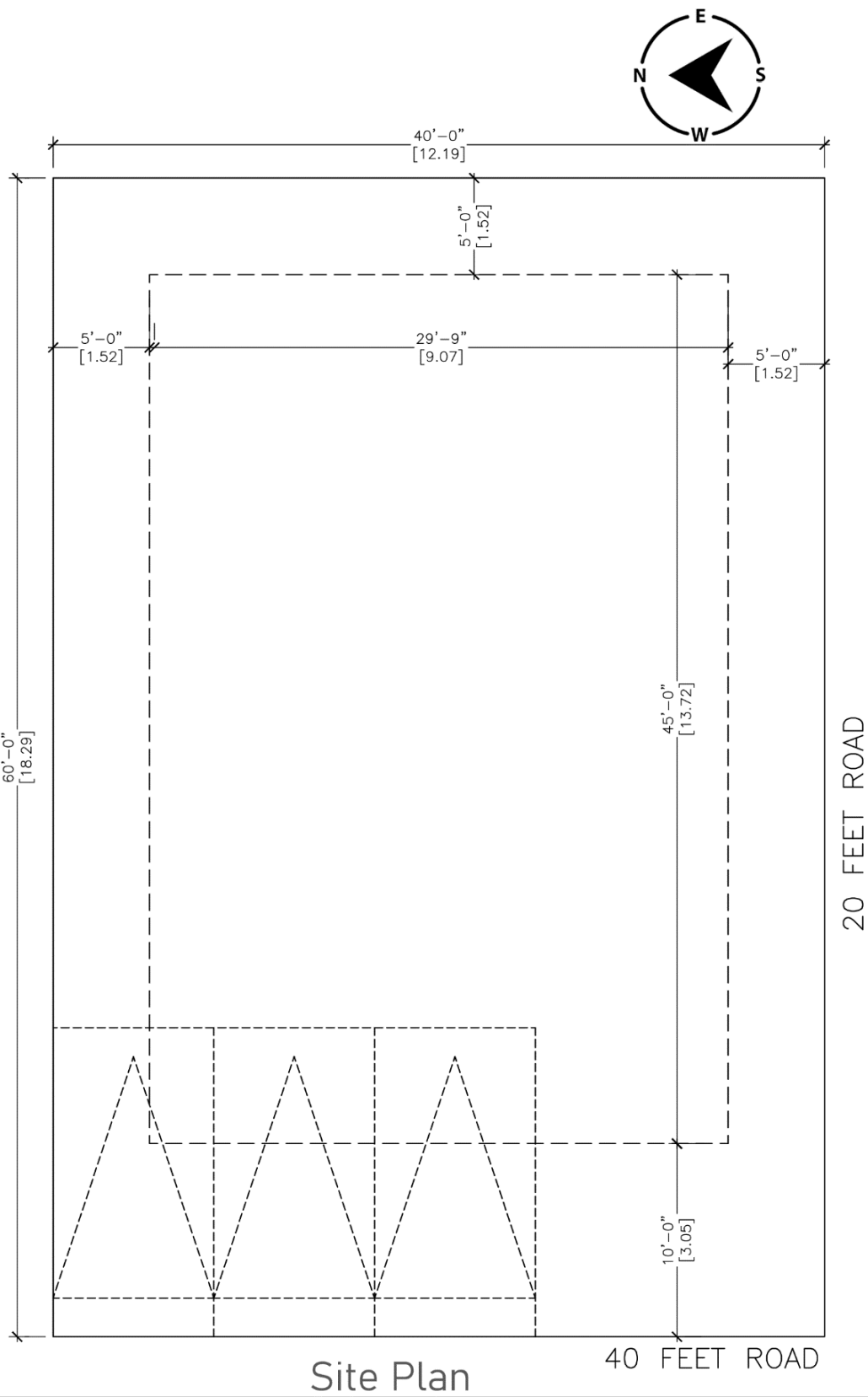
Typology- Residence

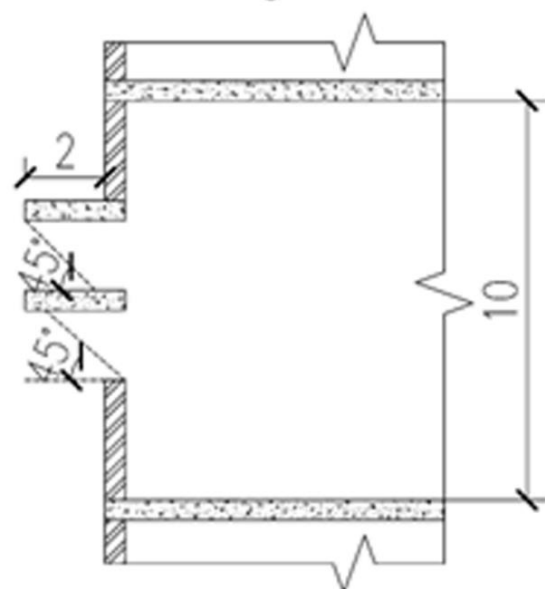
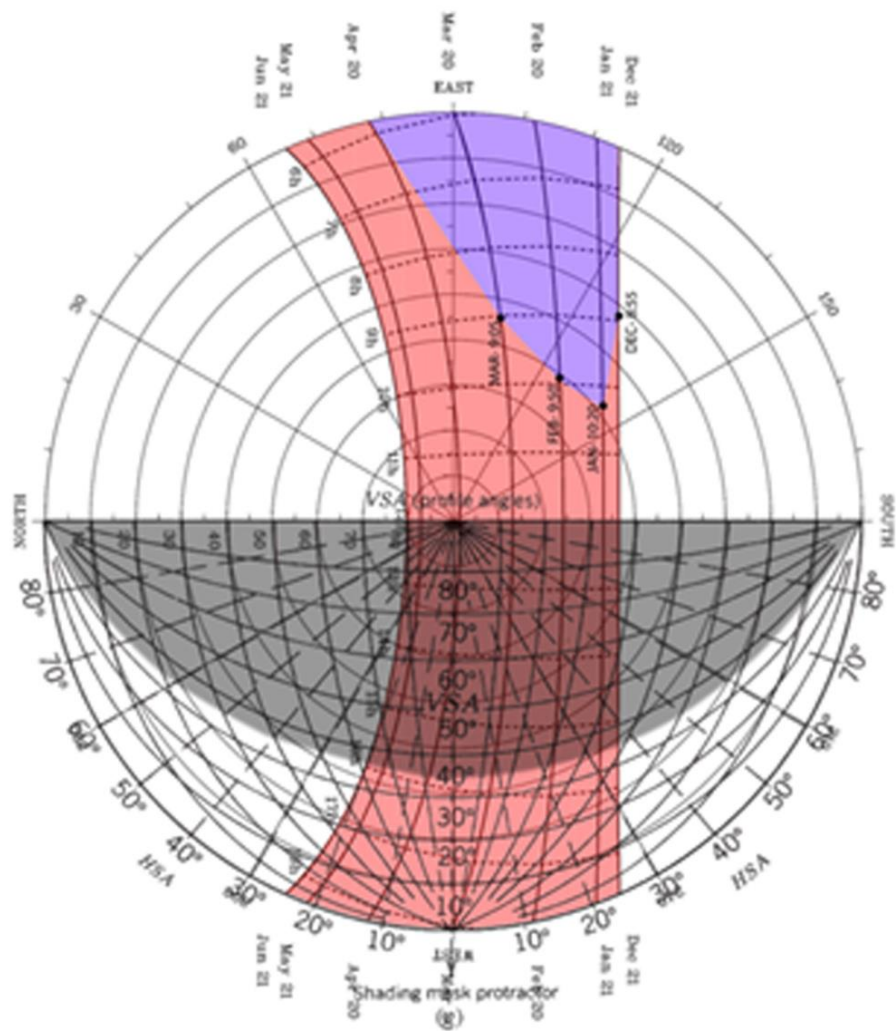
Location- Velachery, Chennai

Coordinates -12.9815° N, 80.2180° E

Climate type- Warm and humid (ECBC classification)

Scope of work - 3D modelling from CAD, Shading device design and elevation option.

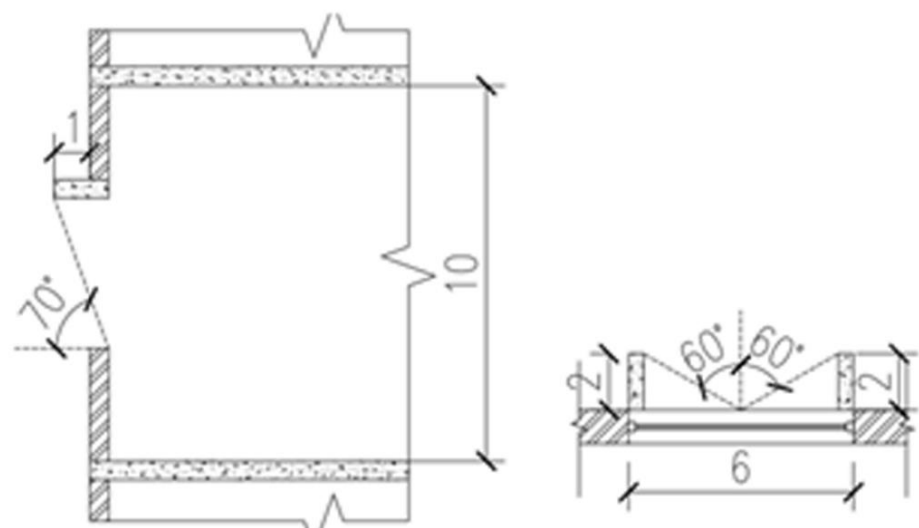
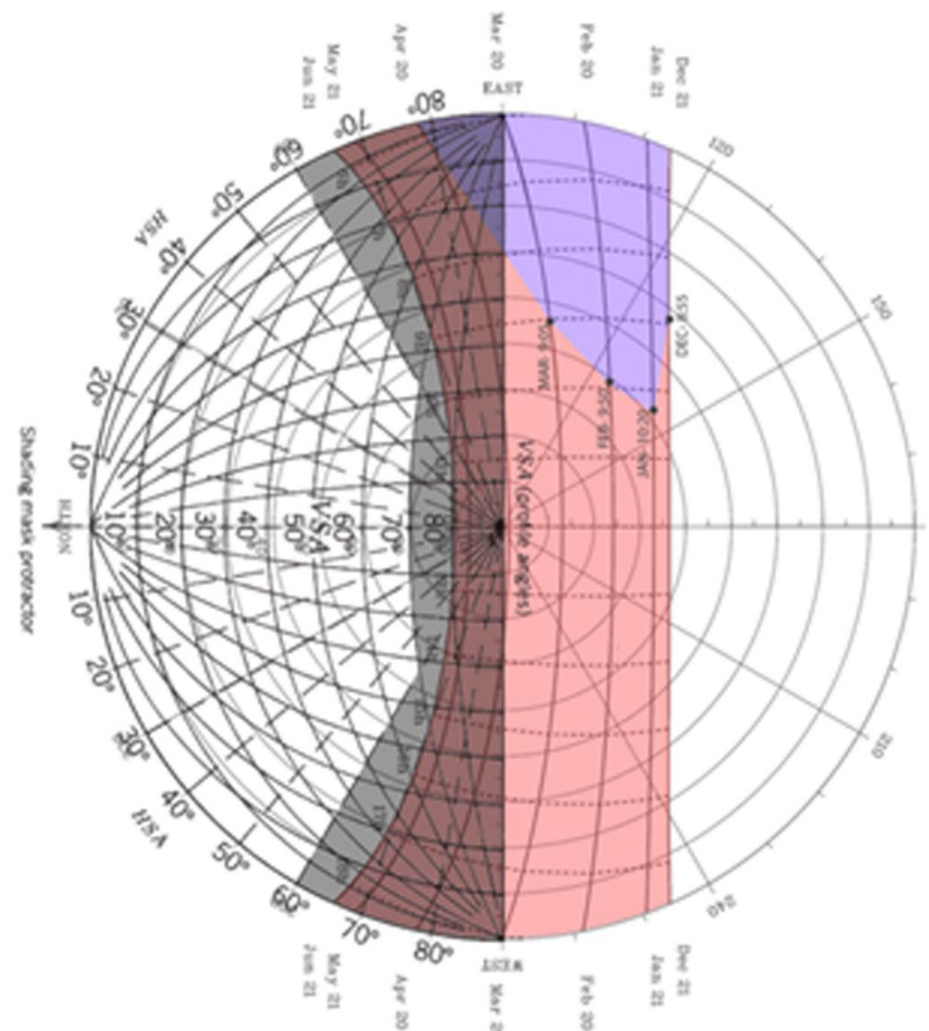




WEST SIDE HORIZONTAL SHADING DEVICE

WEST

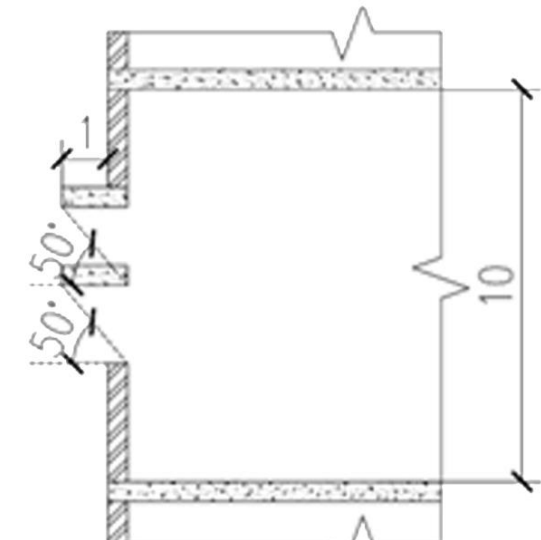
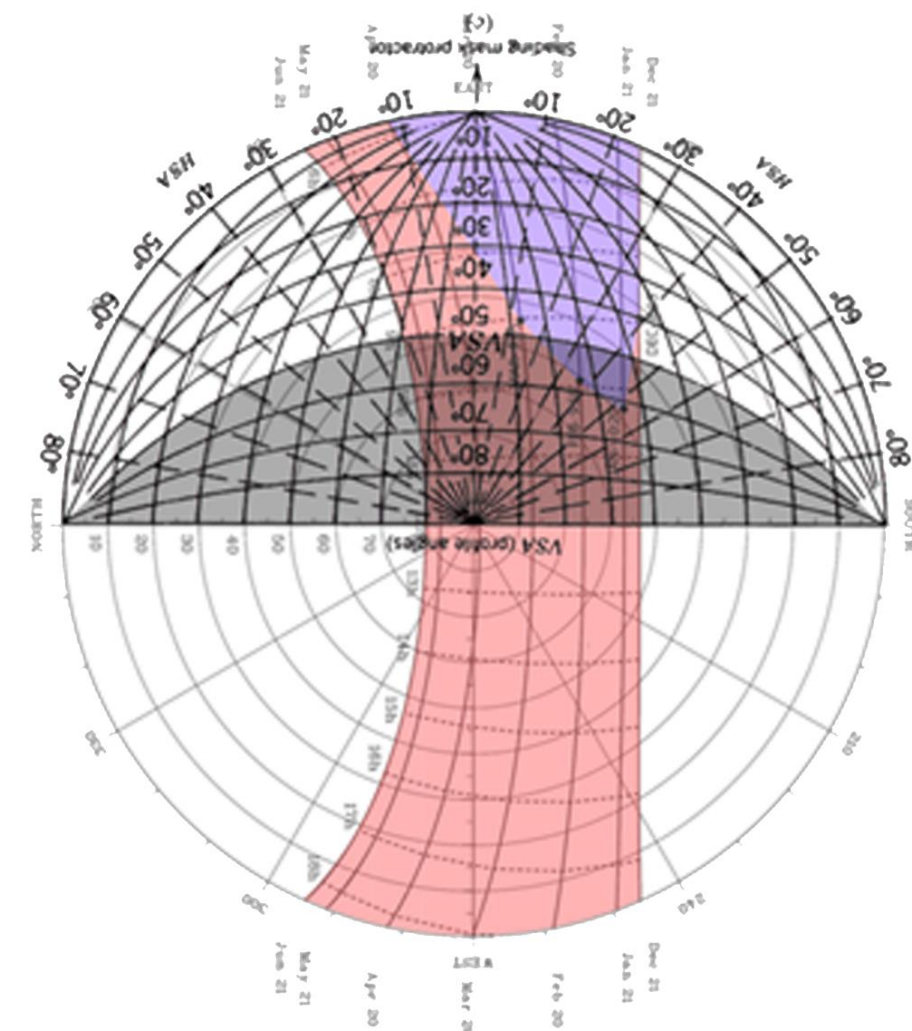
VSA – 45deg. Cuts off the direct sun radiation till 15:30pm (i.e.) till 3:30 after which the radiation enters into the space. To reduce the length of over hang its split into 2 each spanning 2ft .



NORTH SIDE HORIZONTAL SHADING DEVICE NORTH SIDE VERTICAL SHADING DEVICE

NORTH

VSA – 70deg. Not much of radiation enters into space due to altitude difference but azimuth difference @ different months creates direct radiation so egg crate design with HSA- 60deg.



EAST SIDE HORIZONTAL SHADING DEVICE

EAST

VSA – 50deg. This cuts off the radiation entering into the space after 9am (i.e.) till 9am there is penetration of solar radiation into the space. To reduce the length its divided into 2 each of 1ft span.

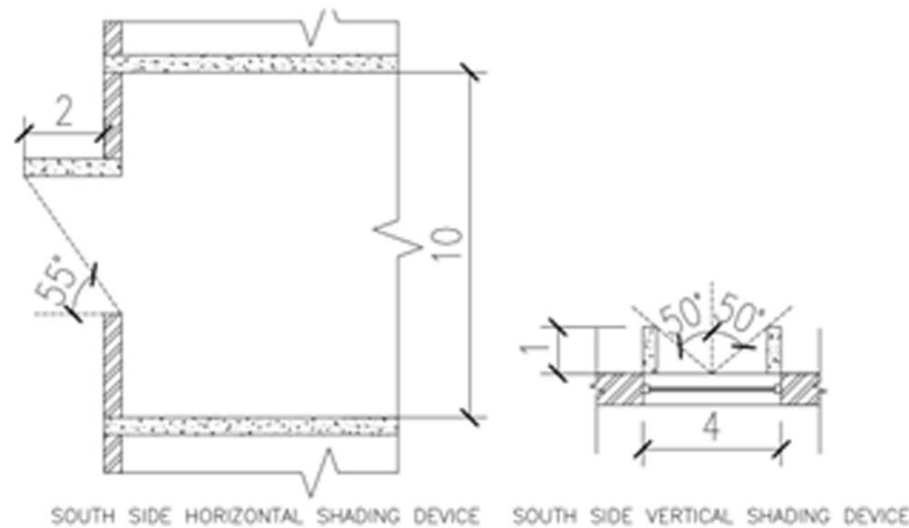
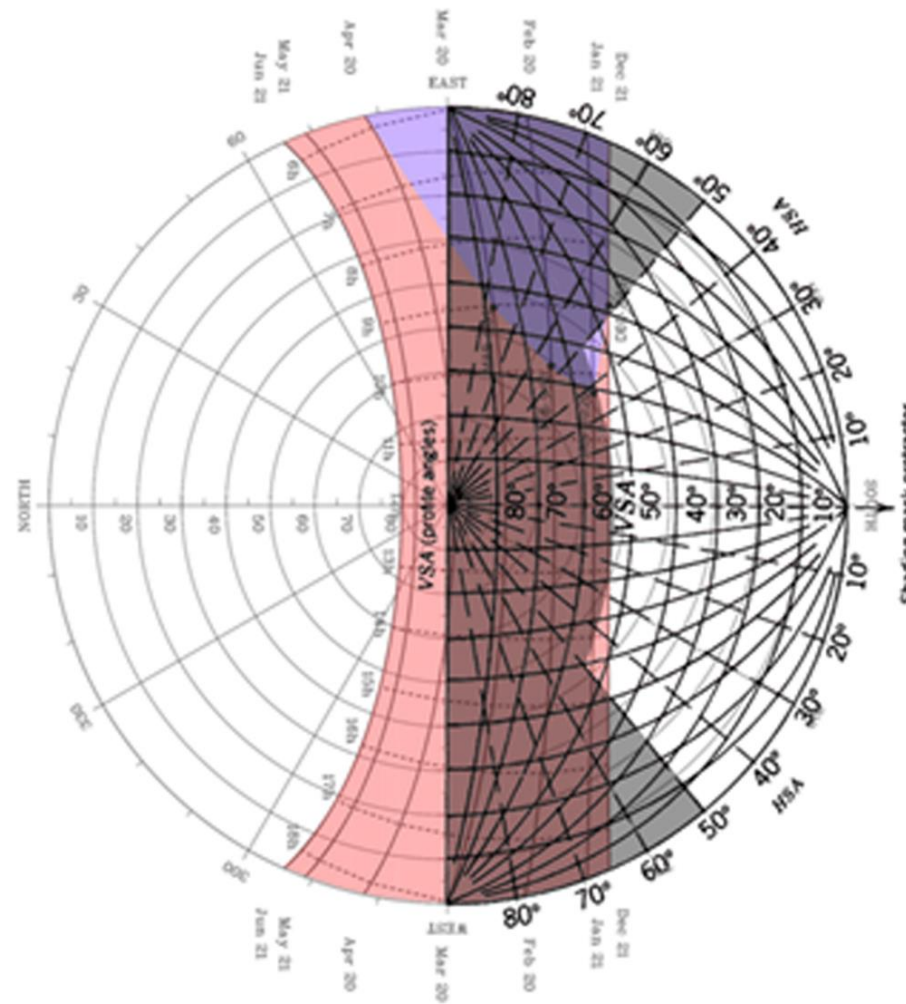
THE RIB

Fusion of modern and traditional material on the facade - Concrete and mud plaster finish. Combination of subtle grey texture with soft orange plaster finish.

The shading device (horizontal elements) as facade elements tends to create an illusion that the house is wider rather than focusing on the verticality (which is not mostly seen in individual residential buildings).

Jalli works on the facade complement the colour scheme and material finish in the elevation and also provide interesting shadow patterns after 4pm in the interiors.

Horizontal grooves creates a sense of continuity on the concrete finish and does not make it look different and stand out instead combines it as a whole.



SOUTH

VSA – 55deg. and HSA 50deg.
Covers most of the direct solar radiation that enters into the building .
Reduces glare and heat gain.

Retrofitting of office @ IIT, Chennai

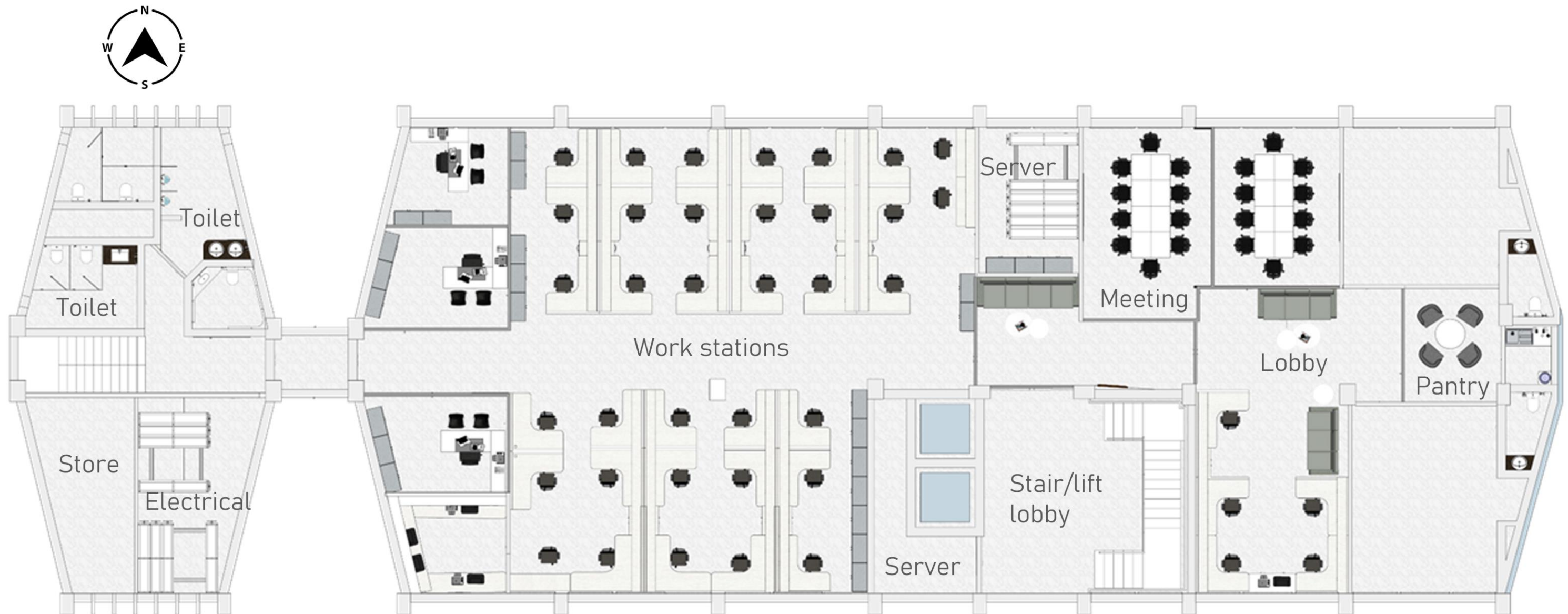
Typology- Office Space

Location- IIT Guindy campus, Chennai

Coordinates -13.006° N, 80.23° E

Climate type- Warm and humid (ECBC classification)

Scope of work -Daylighting analysis using VELUX daylight visualizer for 2 instances. One with sun breaker fins on the external facade and one without the sun breakres and analysis is donr. This office space is located in 4th floor of the building,



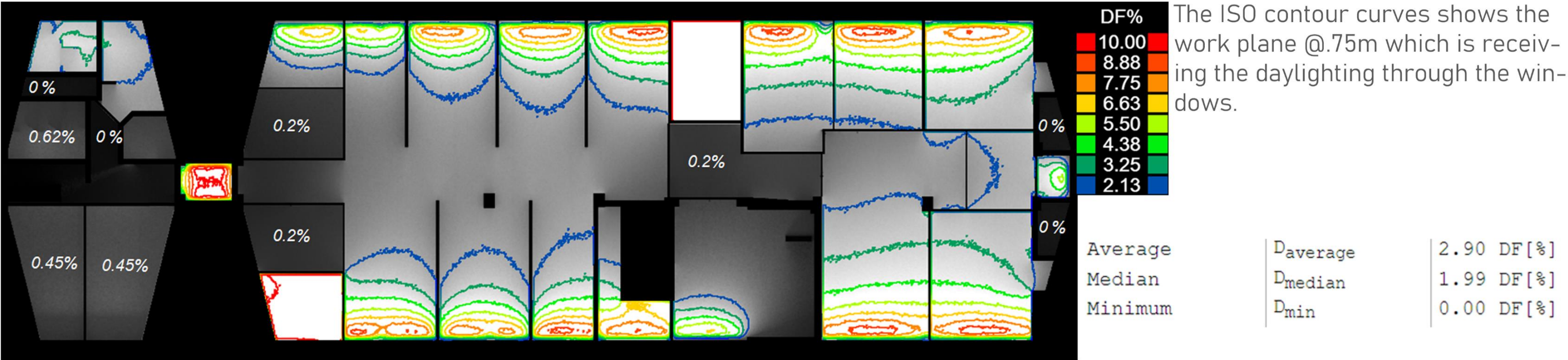
Translucent Properties-

Window glazing - Clear glass - 76% VLT

Interior partition- Frosted glass - 45% VLT

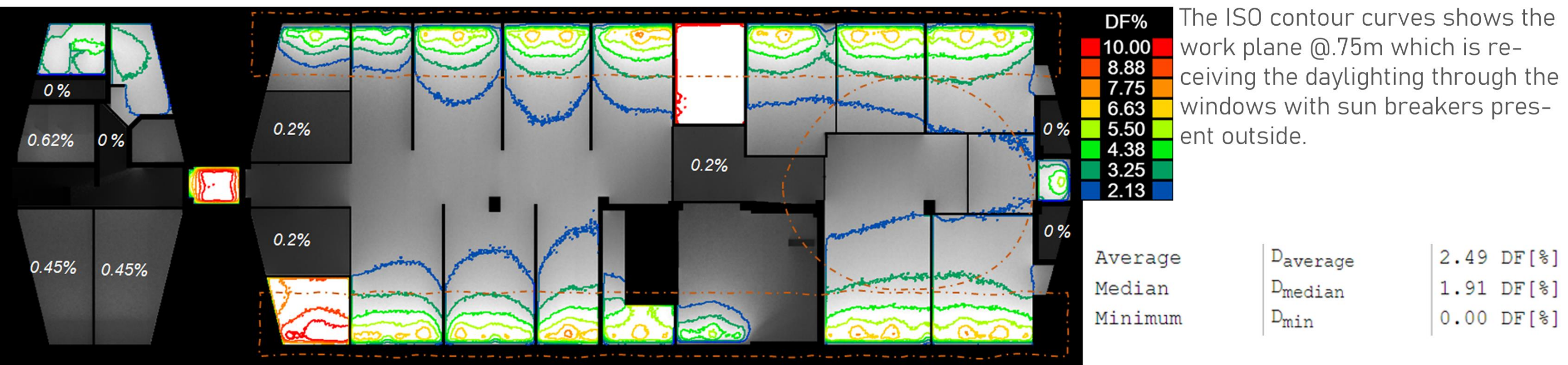
Ventilator glazing - Clear glass- 76% VLT

Simulation without the sun breaker fins on the facade



The office space is located in the 4th floor which proves to be advantageous when coming to the usage of daylighting. On an average 2.90% of DF is available for the given space. DF value of 2% is sufficient for good ambient lighting of a space. Majority of the habitable spaces like the cabins workstations receive good daylighting. The spaces like the lounge, storeroom ,AHU and some areas of toilets receive less daylight.

Simulation with the sun breaker fins on the facade



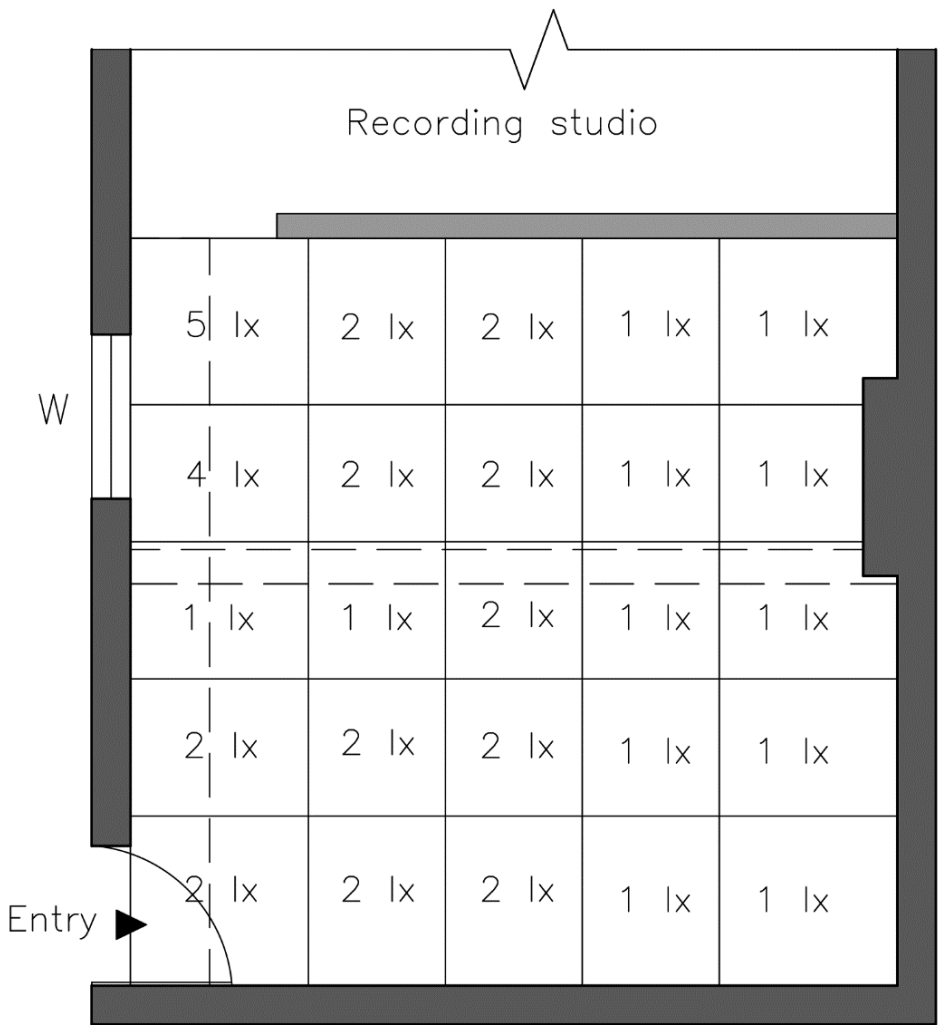
There are sun breakers provided as skin element for the building. This reduces the avg DF to 2.49% of DF for the given space. DF value of 2% is sufficient for good ambient lighting of a space. The spaces like the lounge, storeroom ,AHU and some areas of toilets receive less daylight. Compared to the previous scenario there is less direct sun light at the window periphery entering the space which means lesser chances of glares. Penetration depth of light is also reduced in east side spaces.

Recording Studio @ Royapettah,Chennai

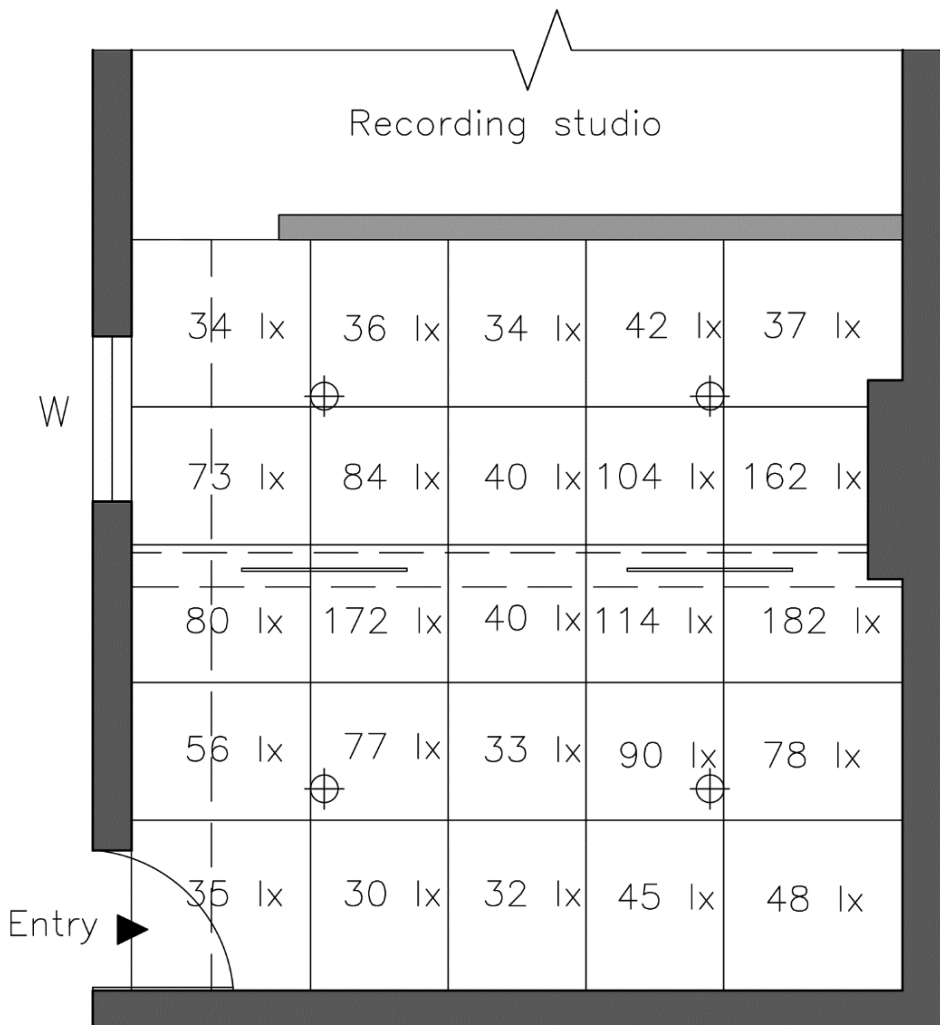
Typology- Office and recording Studio
Location- Royapettah, Chennai
Coordinates -13.05° N, 80.26° E
Climate type- Warm and humid (ECBC classification)

Scope of work -On site measurements were taken and the lux levels were taken as shown in the dwg in 1x1m grid values and a new interior proposal for reception and office area was given.

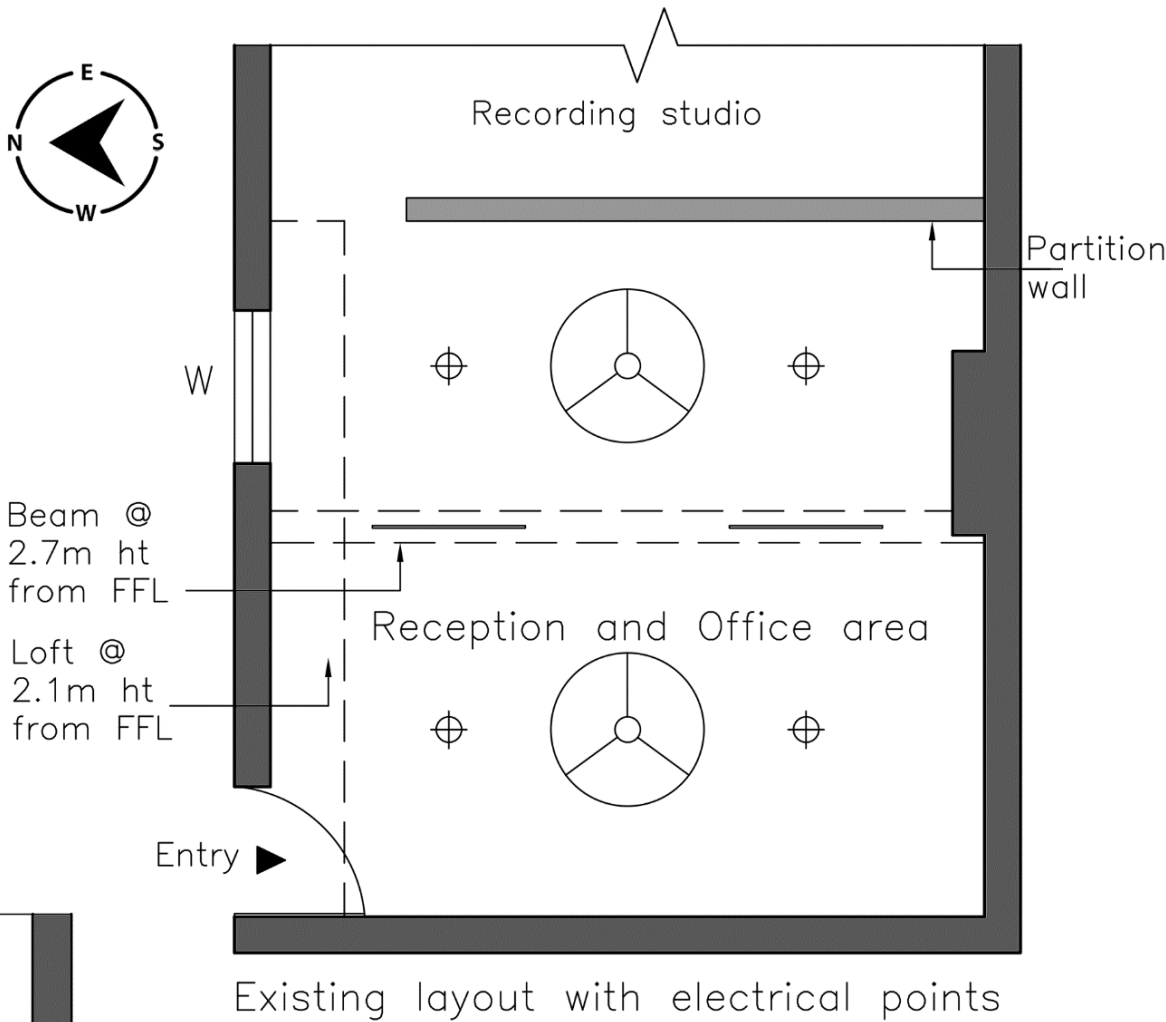
There was an existing office nearby that was to be shifted to this place. So most of the lighting fixtures, furnitures and interior materials were taken up ,upscaled and reused in the new proposal given.



Lux levels @ sill level plane,
(only daylight)



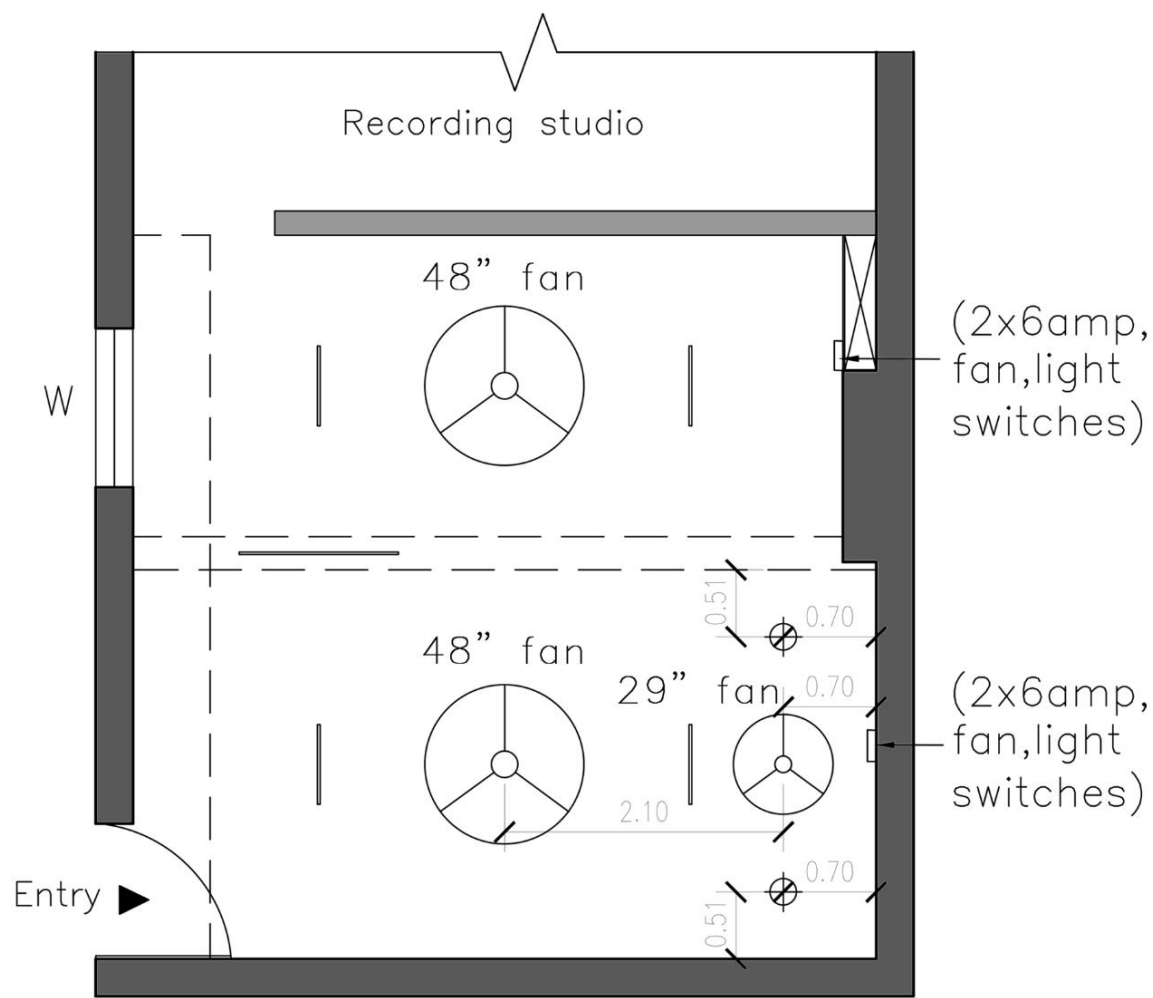
Lux levels @ sill level plane
(Artificial lighting)



The lux values were taken on site @ 2pm on mobile phones.
App used - Lux light meter for android platform.

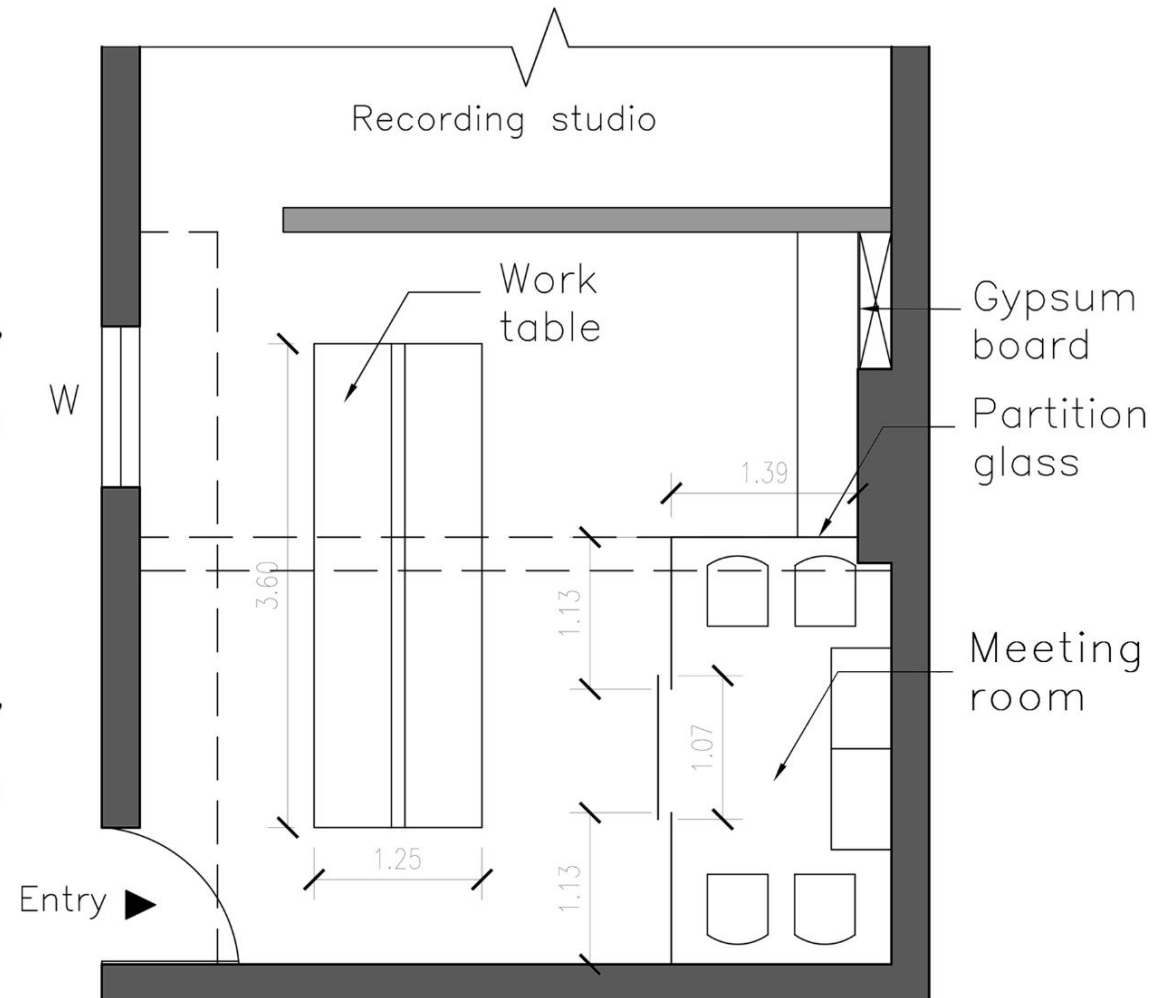
Values of the daylighting as well as artificial lighting was taken.

Sill level .75m was taken as reference for work plane for taking the values.



Proposed additions and changes to Electrical Drawing

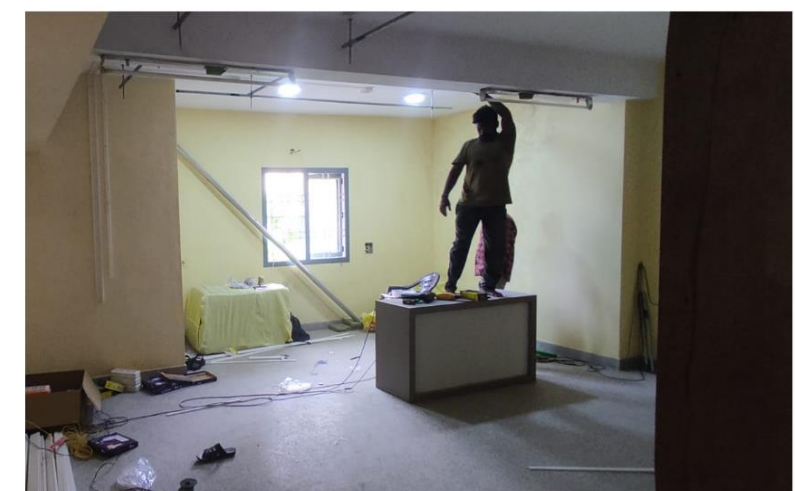
1. Both existing fan points retained
2. Tiny ceiling fan added inside meeting room.
3. 2 ft tubes removed from old office and added here. Existing spot lights changed to tubelights.
4. Power supply added to work station seating.
5. Switch boxes added in places.



Proposed Partition and Furniture layout

1. Partition glass from next door office is removed and refixed along with sliding door for access.
2. Light weight partition with appropriate finish to be added above the partition glass to support the glass.

There was an existing office nearby that was to be shifted to this place. So most of the lighting fixtures, furnitures and interior materials were taken up, upscaled and reused in the new proposal given.



Residence @ Adyar

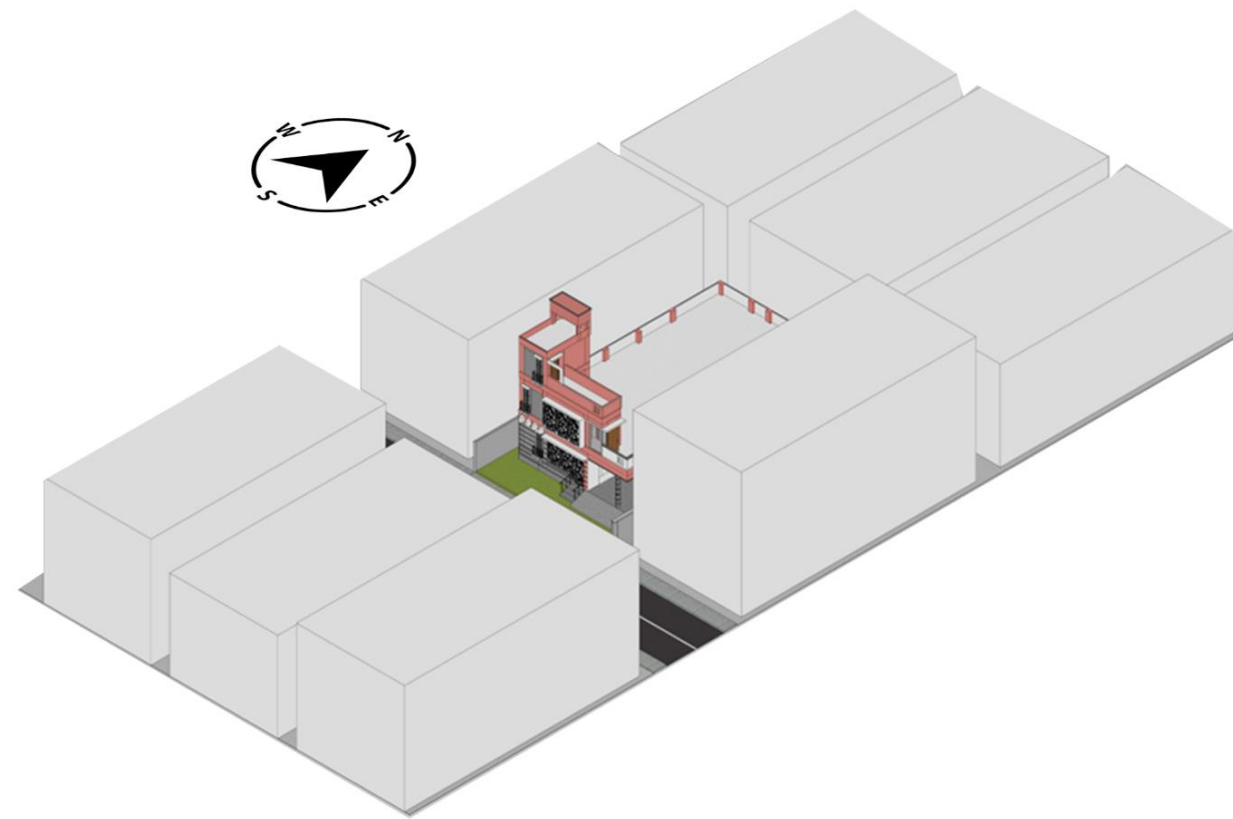
Typology- Residence

Location- Indira nagar, Adyar, Chennai

Coordinates -13.00° N, 80.25° E

Climate type- Warm and humid (ECBC classification)

Scope of work -Corrections in sketchup model added site context, daylighting analysis, Eco-Niwas calculation and flow analysis.

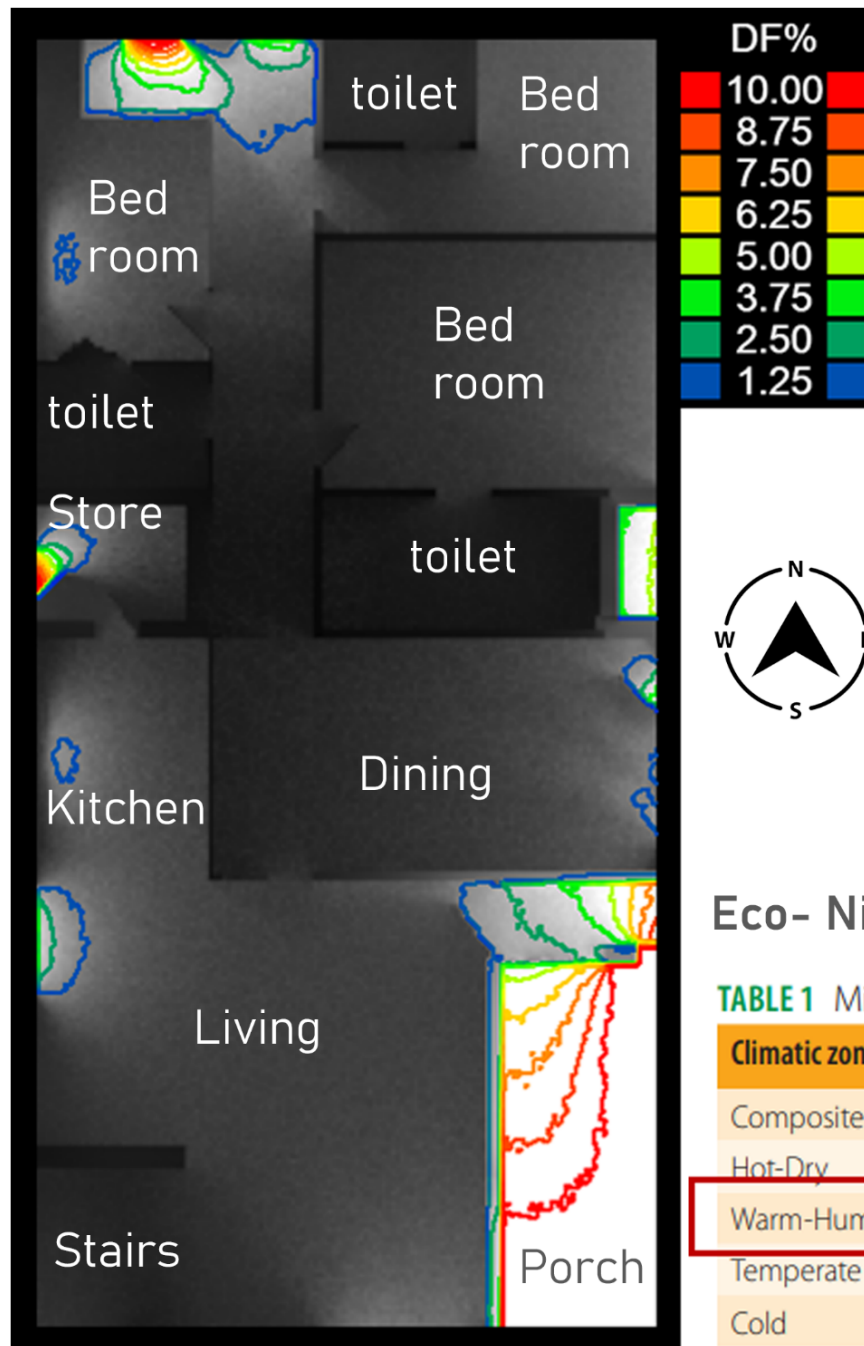


Site surrounding

Site located @ residential neighbourhood in adyar.

The surrounding buildings are residential spaces mostly individual houses and one mid rise apartment.





- 1.The periphery areas with windows in the spaces in the residence receive daylighting as seen in the simulation .
- 2.The interior areas in the middle like the walkway , restroom spaces do not receive any direct or diffused day lighting and requires artificial lighting dependance during day time.
- 3.Maximum of 17% is seen in the exterior porch area of the residence.
- 4.The other spaces seen in the simulation receive diffused lighting through the windows present in the peripheral areas of the respective spaces.
- 5.The residential spaces around the building also contribute to the available daylight present .

Average	$D_{average}$	1.22 DF [%]
Median	D_{median}	0.30 DF [%]
Minimum	D_{min}	0.00 DF [%]
Maximum	D_{max}	17.12 DF [%]

Eco- Niwas Samhitha Calculation-

TABLE 1 Minimum requirement of window-to-floor area ratio (WFR_{op})

Climatic zone	Minimum WFR_{op} (%)
Composite	12.50
Hot-Dry	10.00
Warm-Humid	16.66
Temperate	12.50
Cold	8.33

$$WFR_{op} = \frac{A_{openable}}{A_{carpet}}$$

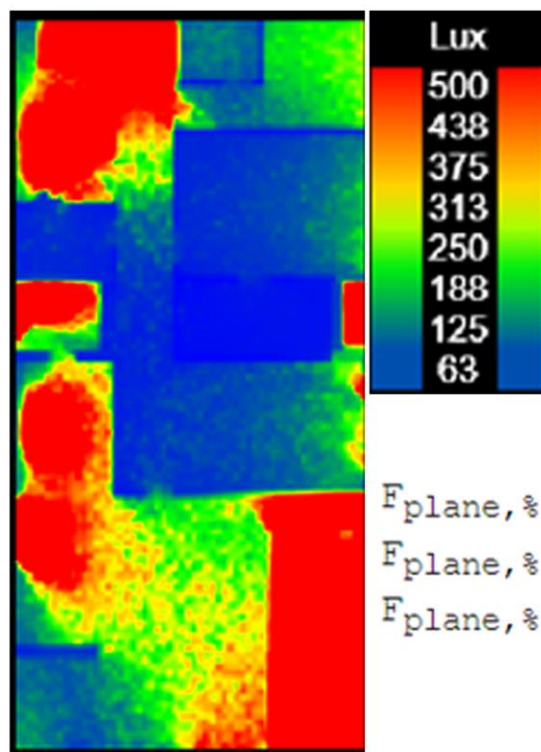
Total openable area – 250sqft approx.
 Total carpet area – 1445 sqft. from Sketchup layer
 WFR- 17.3% approx.
 > 16.66 % of minimum WFR for Warm and humid climatic zone

TABLE 2 Minimum visible light transmittance (VLT) requirement¹⁵

Window-to-wall ratio (WWR) ¹⁶	Minimum VLT ¹⁷
0-0.30	0.27
0.31-0.40	0.20
0.41-0.50	0.16
0.51-0.60	0.13
0.61-0.70	0.11

$$WWR = \frac{A_{non-opaque}}{A_{envelope}}$$

Total non opaque area – 122 sqft approx.
 Total envelope area – 2800 sqft. . from Sketchup layer
 WWR- 0.04
 0.04 lies between 0-0.30 which requires minimum VLT of 0.27 but the VLT of glass used in 0.7 > 0.27



Illuminance analysis- May month

9am

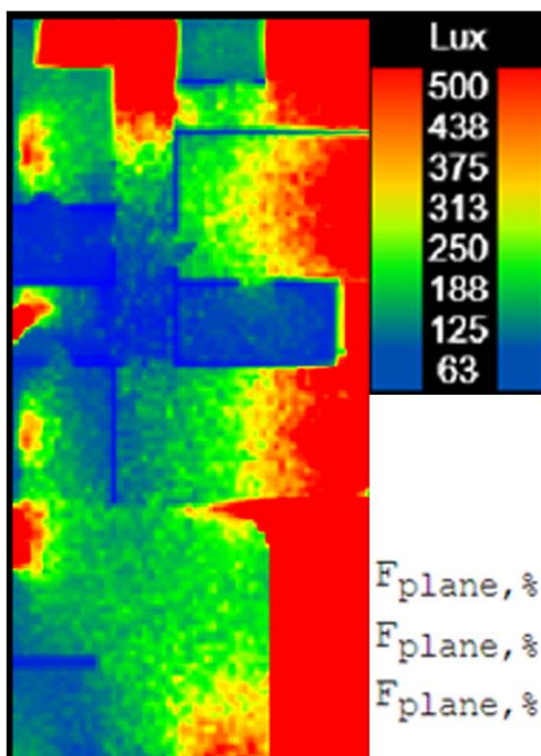
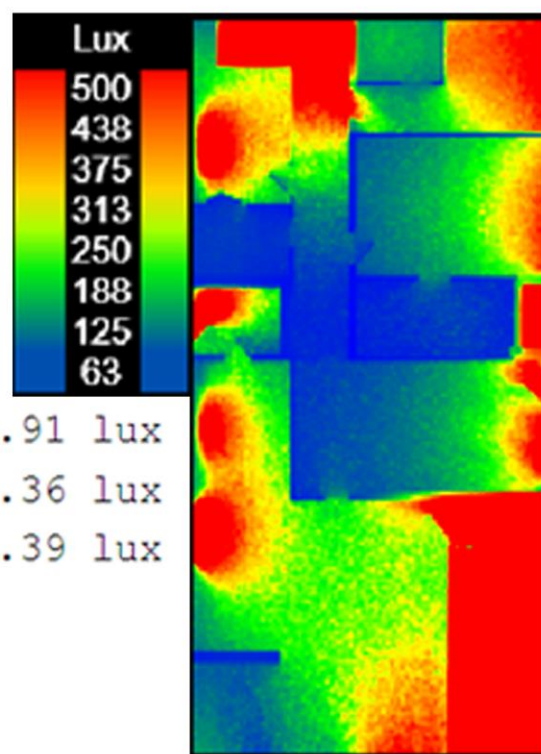
The spaces on the east direction are shaded by nearby buildings hence the lesser daylight availability. On an average there is lesser illuminance levels in the Interior spaces.

$F_{plane, \%} \geq 50\%$	172.31 lux
$F_{plane, \%} \geq 60\%$	103.22 lux
$F_{plane, \%} \geq 70\%$	69.61 lux

At 12noon there is highest fplane >50% illuminance of 213lux compared to other timings. This is mainly because of the surrounding buildings tend to block the radiation falling on the residence

$F_{plane, \%} \geq 50\%$	213.91 lux
$F_{plane, \%} \geq 60\%$	164.36 lux
$F_{plane, \%} \geq 70\%$	119.39 lux

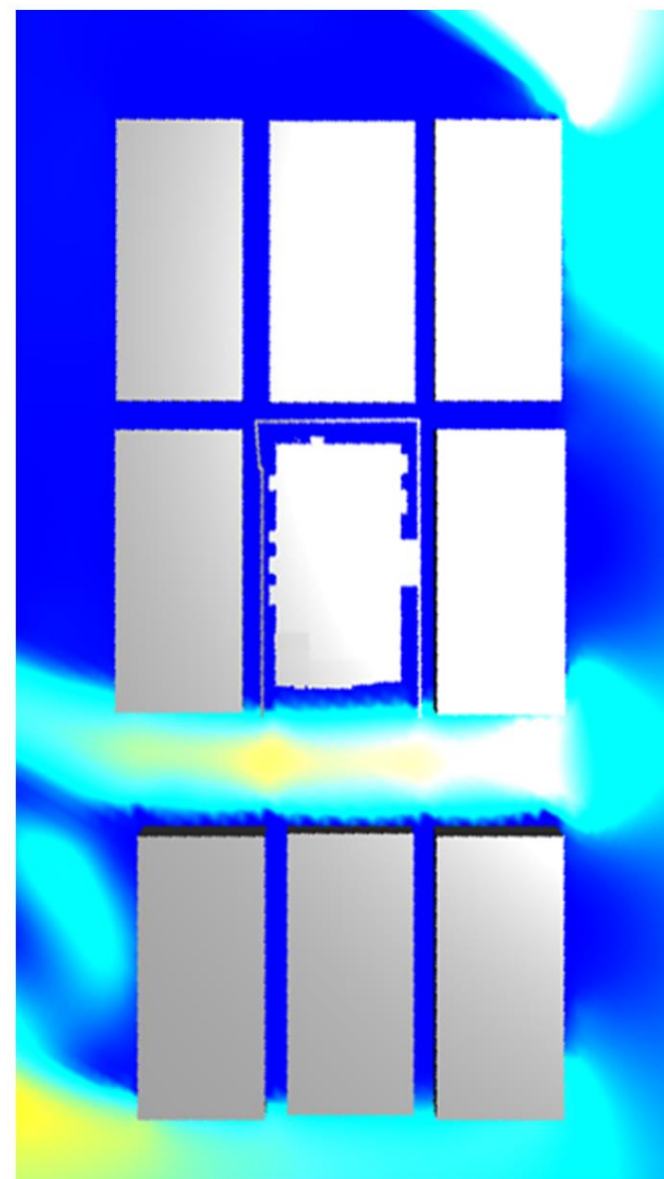
12 noon



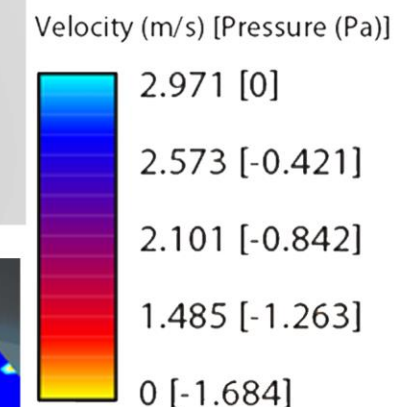
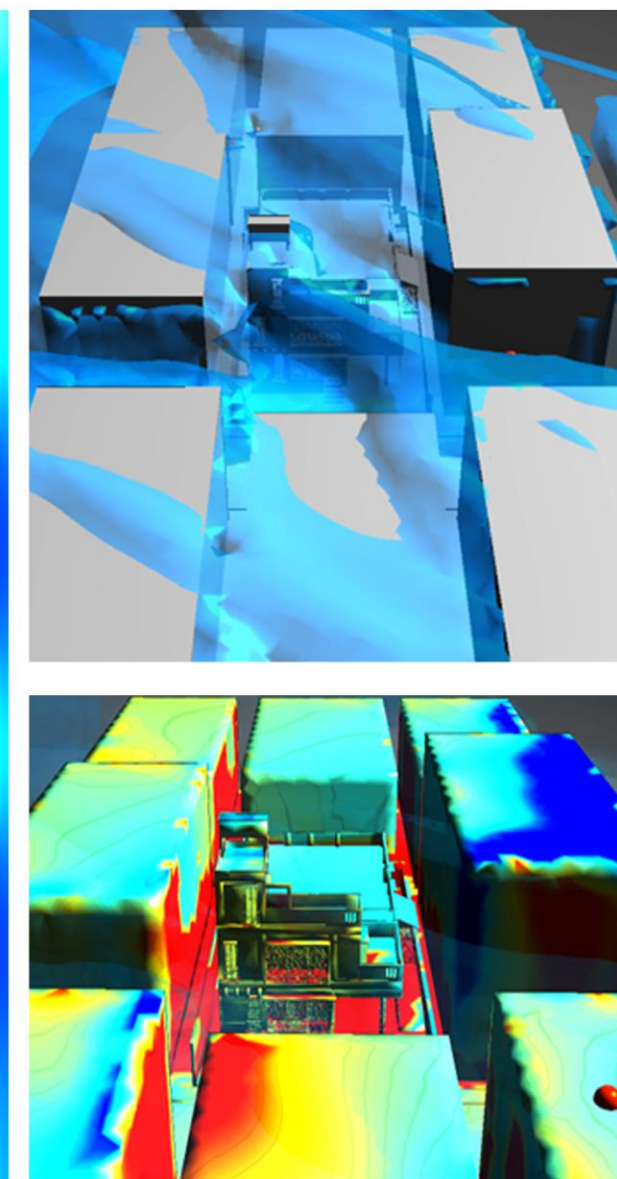
3 pm

The west direction spaces are shaded by the buildings on the west side hence the lesser illuminance contour. The inner spaces away from periphery receives some lighting compared to other two timings.

$F_{plane, \%} \geq 50\%$	187.68 lux
$F_{plane, \%} \geq 60\%$	152.91 lux
$F_{plane, \%} \geq 70\%$	120.54 lux



Flow analysis



Max wind speed set to 3m/s

Wind from SE and E direction

The wind plane is set @ window sill level the neighboring buildings reduce the amount of incident wind on the residence.

The Iso-plane surface shows the change in velocity of wind w.r.t to the surroundings .

Its seen more on the streets which has less to no obstructions. Here it reaches up to 2.5m/s speed.

Nearby the residence its down to almost 1m/s speed. The iso contour shows flow of wind over the residence .

The points marked as red are areas of +ve pressure (ie) places where there is incident wind other areas marked have -ve pressure which causes the flow of wind towards that areas.

Thali Talks – Ancient water management of Tamilnadu By Prof. R.H. Rukkumany

Part- 1 <https://youtu.be/vCN24XPx9nY>

The professor talks about the ancient water management system in Tamilnadu that is the Eri and Kulams.

- Reason to build – Less rainfall all over, to store and use water during the days of need, mostly man made because of less contour's variation (i.e., less variations in hills and depressions).
- Natural or manmade depressions around which walls were built to stagnate water and store it & to be used for irrigation and human usage.
- Eri's often found outside of villages for irrigation purposes, Kulam found inside the villages for human usage activities.
- Can be traced back to 8th and 10th Cen. Could be as old as 1st Cen. Inscriptions on rock (kal vettugal) are the sources of proof. Veeranam eri is as old as Chola period.
- Eris were linked (chain link of eris) the flow from upstream to downstream through different villages. Check dams built at different levels to facilitate flow of water.
- The lowest point gets filled up first and the subsequent levels fill up. The top most of the gradient fills the last. Mud and coconut barks used to build the retaining walls of the check dams to control water flow. Flooding is common but it can be easily re-built.
- The sand from the foreshore of the Eri kulams after the first shower (Vandal Mann) taken up and used as fertilizer due to rich organic content (dried leaves, animal droppings etc.)
- Similarly, the mud from the eri kulams were taken up to make pottery for festivals during the month of aadi (on setting of monsoon) natural desilting of the streamway.
- Eri and kulam karai (the banks at village passing)- spots of socialization and places to gather on evenings.

Part- 2 <https://youtu.be/WqBoRISxV4c>

The professor talks about the water management and wastelands.

- Ground water is depleting in many areas and this water is taken up and stored in tanks and used by us. The source can be changed to eri kulams but they are very polluted.
- High waste content like untreated sewage water, chemicals solid waste like plastics etc. in eri kulam banks and waterbody.
- Proper waste water management system is urgent and important need now. The waste water sent to waste lands and ditches percolate down the ground and affects the ground water table thus rendering it waste to use.
- Ground water depletion and water scarcity is a thing in many villages and this can be countered by using water from eri kulams but they are polluted and unuseful.
- NGOs are on this track to help villages but in long runs proves to be in vain. The change should come within inside the community- social preservation is needed -the scale of work is huge constant policing by NGO is difficult- all social problems are need to be addressed and resolved -only the people in the community is capable of doing it – awareness and education among them is important.
- Valarpuram village example- they have decent water levels compared to nearby villages, reasons –
 1. Same community people-more social bonding
 2. Underground water level very bad so there was important requirement to maintain eri kulam for drinking water. Proper waste mgmt., security and constant policing by villagers to protect the waterbody.
 3. More loyalty and attachment the village & community maintenance and participation.