

MIT | Arts, Commerce & Science College

**Maharashtra Academy of Engineering and Educational
Research's**

**MIT Arts, Commerce and Science College, Alandi (D) –
412 105.**

7.1.6 Quality audit on environment and energy -

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7.1.6

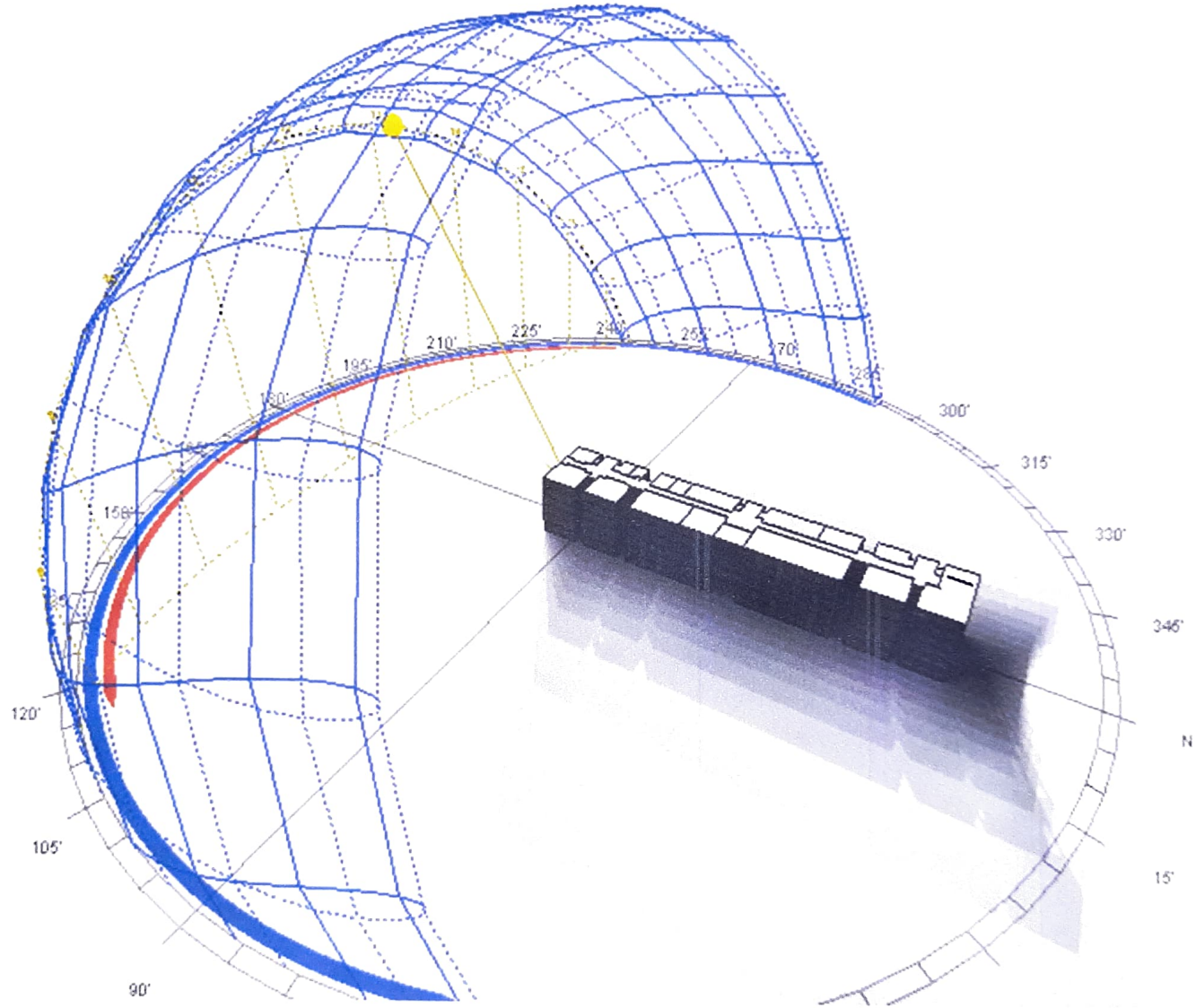
Environmental Consciousness and Sustainability

Green Audit

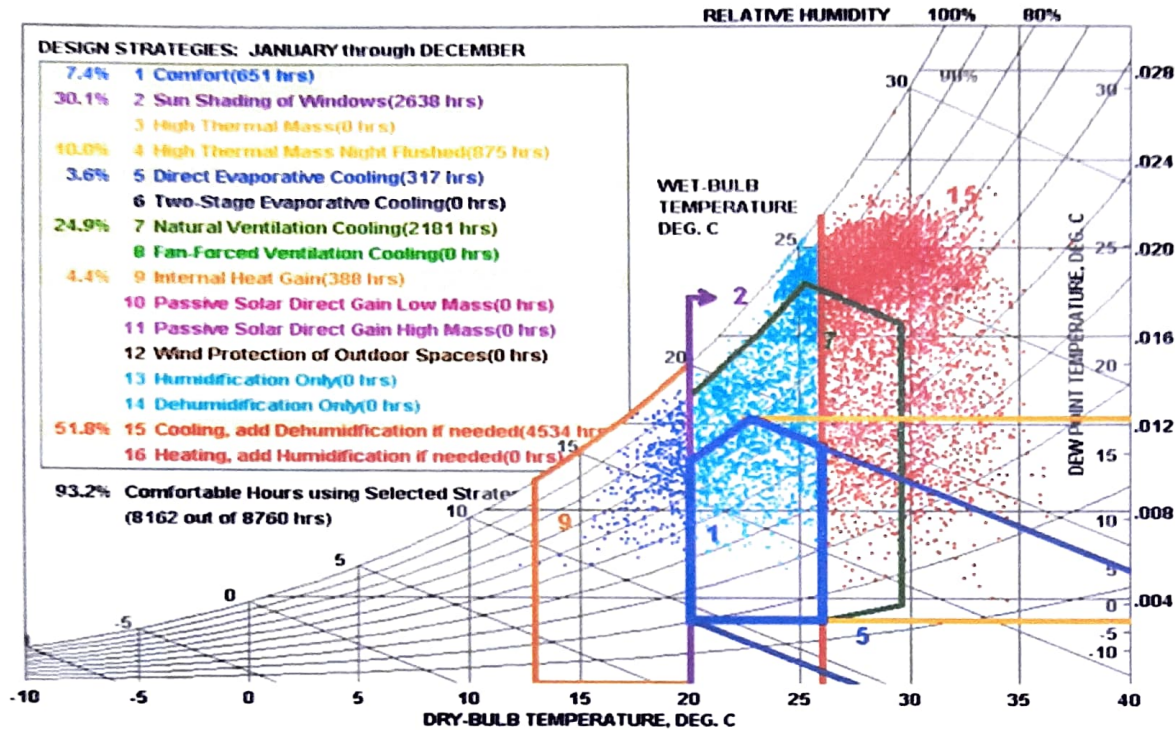
Energy Audit

Environment Audit

Indoor Environmental Quality and Building Simulation



Climate Analysis



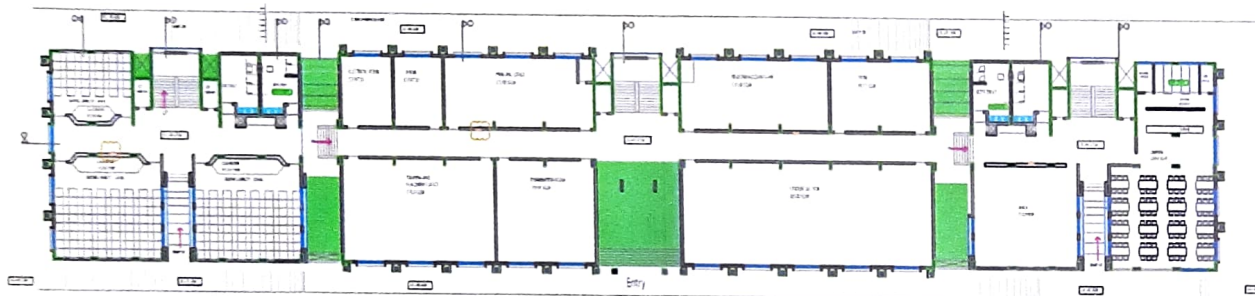
Psychrometric Chart above explains that, no other strategy is effective for passive comfort except Solar Shading & Natural Ventilation.

- Strategies like direct evaporative cooling, internal heat gain and High thermal mass are also effective, but for a lesser period.
- Around 30% of total comfort hours can be achieved by Sun Shading.
- Around 27% of total comfort hours can be achieved by Natural Ventilation.
- From all the above strategies around 50 % of total comfort hours can be achieved by Sun Shading and Natural Ventilation & for the rest 50% of the time air conditioning may be required. For this analysis, the Comfort Criterion was set at 22 to 26 degree C for dry bulb temperature & relative humidity to 70%.

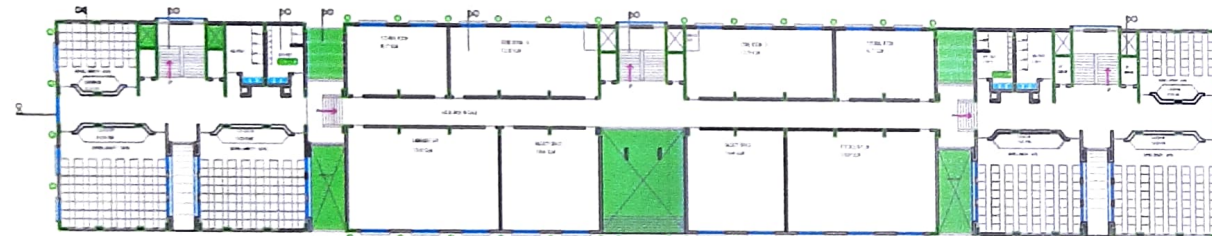
The Psychrometric Chart above confirms that the four effective strategies are Shading, Ventilation, Internal heat gain and Evaporative cooling. The graph plot on next page shows the degree difference between the Dry Bulb Temperature & Relative Humidity. As per the legend, at least 30% of the total hours are in comfort range with an effective wind speed of 3 to 5 m/s. Fan forced ventilation is also an effective strategy during monsoon period.

Three courtyards in building are providing sufficient day-light and ventilation to adjacent corridors and class rooms.

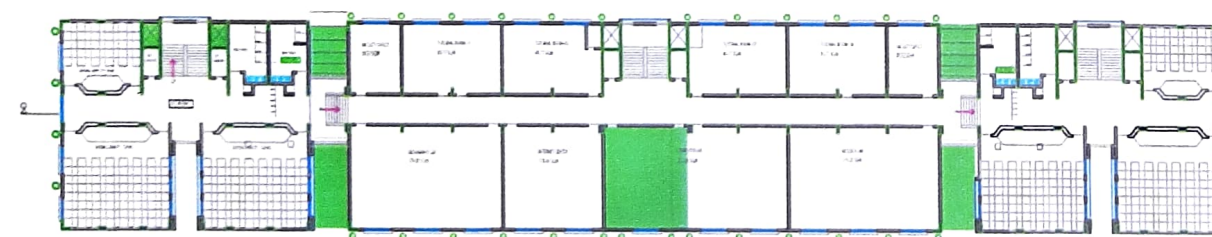
It enforces stack effect through out building, which provides sufficient amount of air changes per hour from every room, And helps to maintain comfort zone.



GROUND FLOOR PLAN

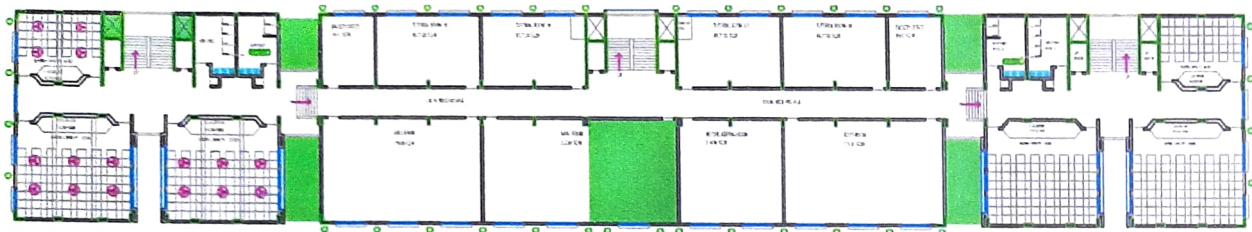


FIRST FLOOR PLAN

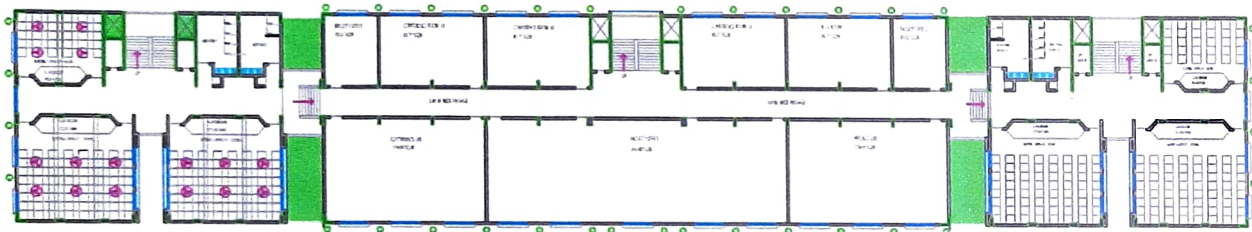


SECOND FLOOR PLAN

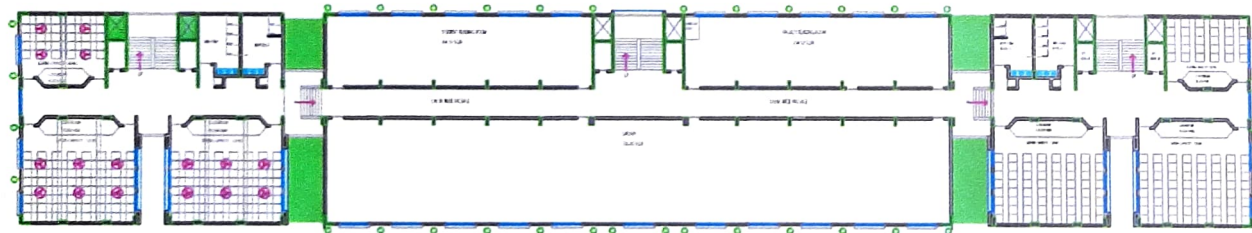




THIRD FLOOR PLAN



FOURTH FLOOR PLAN

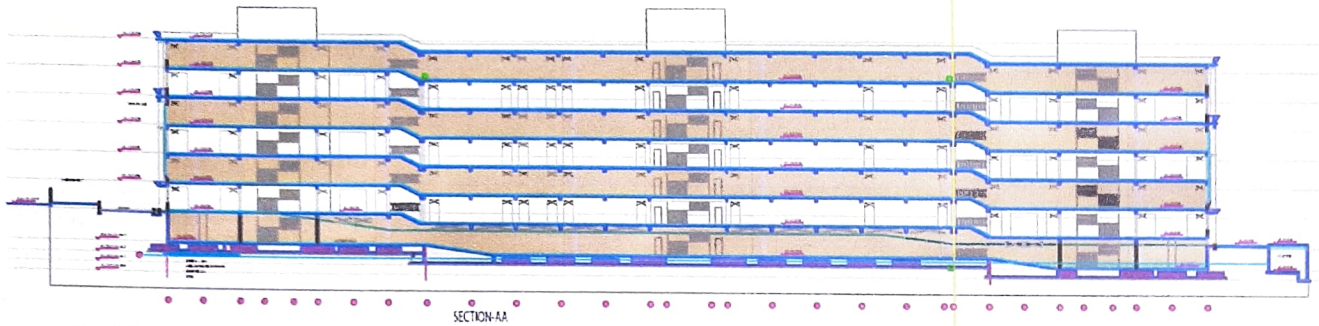


FIFTH FLOOR PLAN

Three courtyards in building are providing sufficient day-light and ventilation to adjacent corridors and class rooms.



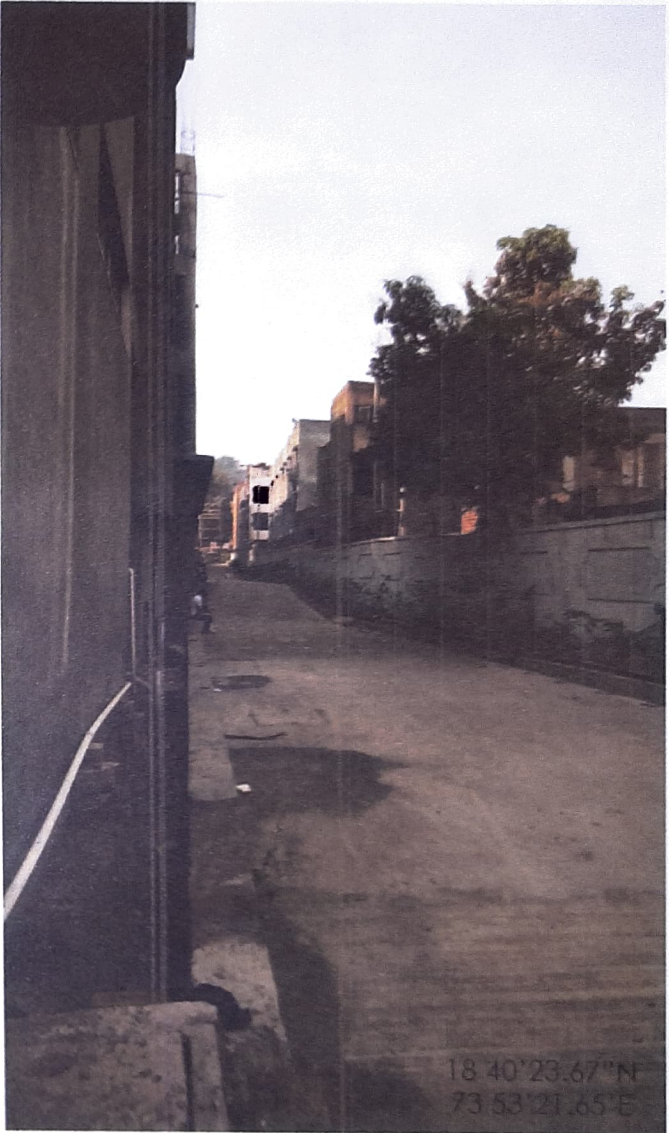
Sufficient day light penetration in corridor reduce artificial lighting-effectively reduction in use of electricity







Site Section – Building design and Site Development is w.r.t. land profile reduces unnecessary cutting filling of land.





Basement Parking with daylight penetration and natural ventilators to exhaust smoke.



Sr. No.	Points	Requirements as per standards and Facts on location	Remark/ Required
A Site Planning			
1	Soil Erosion Control	<ul style="list-style-type: none"> To control soil erosion concrete paving blocs are used. Pavers blocks are also endorse ground water seepage. Plantation is needs to be done along compound wall 	
2	Landscape	<ul style="list-style-type: none"> 3 courtyards are formed in between building, and are planted with various species . 1 tree for every 80 SQ M open area are required to plant on site. 185 trees need be plant through out site 	<ul style="list-style-type: none"> Prescribed number of trees are available on site. 

4	Parking Facilities	<ul style="list-style-type: none"> Underground parking is provided as per Requirements and prescribed in bylaws. 	
6	Design for Differently Able	<ul style="list-style-type: none"> Lift is provided from stilt parking to every floor. Wheelchair accessibility is maintain through ramps and lifts are provided on every floor. 	

D	Indoor Environmental Quality			
Sr. No.	Points	Standards	current	
	Daylighting levels (LUX)			
1	Class rooms	200-300	400 (South side Class rooms) 268 (East side Class rooms) 171 (North side Class rooms)	

3	Computer Lab	300-500		
			Average value of day light is 200	
4	Library	200-300		
			Average value of day light is 200	

5	Laboratories	300-500	400	Average Value as per standards
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WWR- Wall to window area ratio

Optimum WWR as per ECBC norms - averagely which is under 30%. It helps to reduce heat gain.

As per Building orientation Limited WWR additionally with appropriate fenestration design is done on East -West direction to avoid direct light and also reduce heat gain.

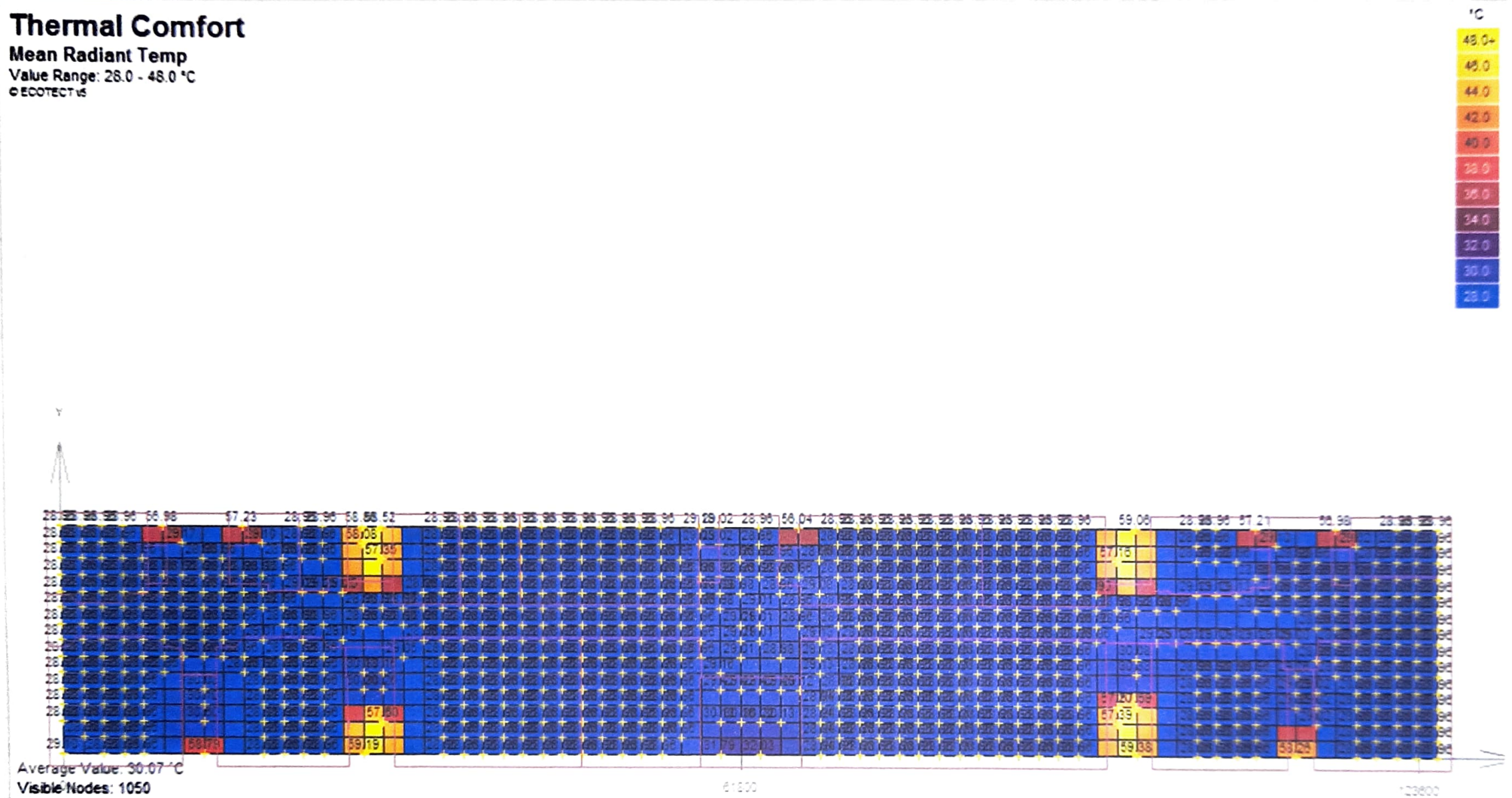
Building	Vertical Fenestration Type window Nomenclature)	No of Window	LENGTH	HEIGHT	Window Area	Total Window Area	Sum of Window Area	Wall Area	WWR
			M	M	SQ M	SQ M	SQ M	SQ M	%
EAST/ WEST	W1	30	2.40	2.40	5.76	172.80	208.80	1434.07	15%
	W	12	1.25	2.40	3.00	36.00			
NORTH/ SOUTH	W1	12	3.00	2.40	7.20	86.40	86.40	269.03	32%



E. Thermal Analysis

Thermal Comfort

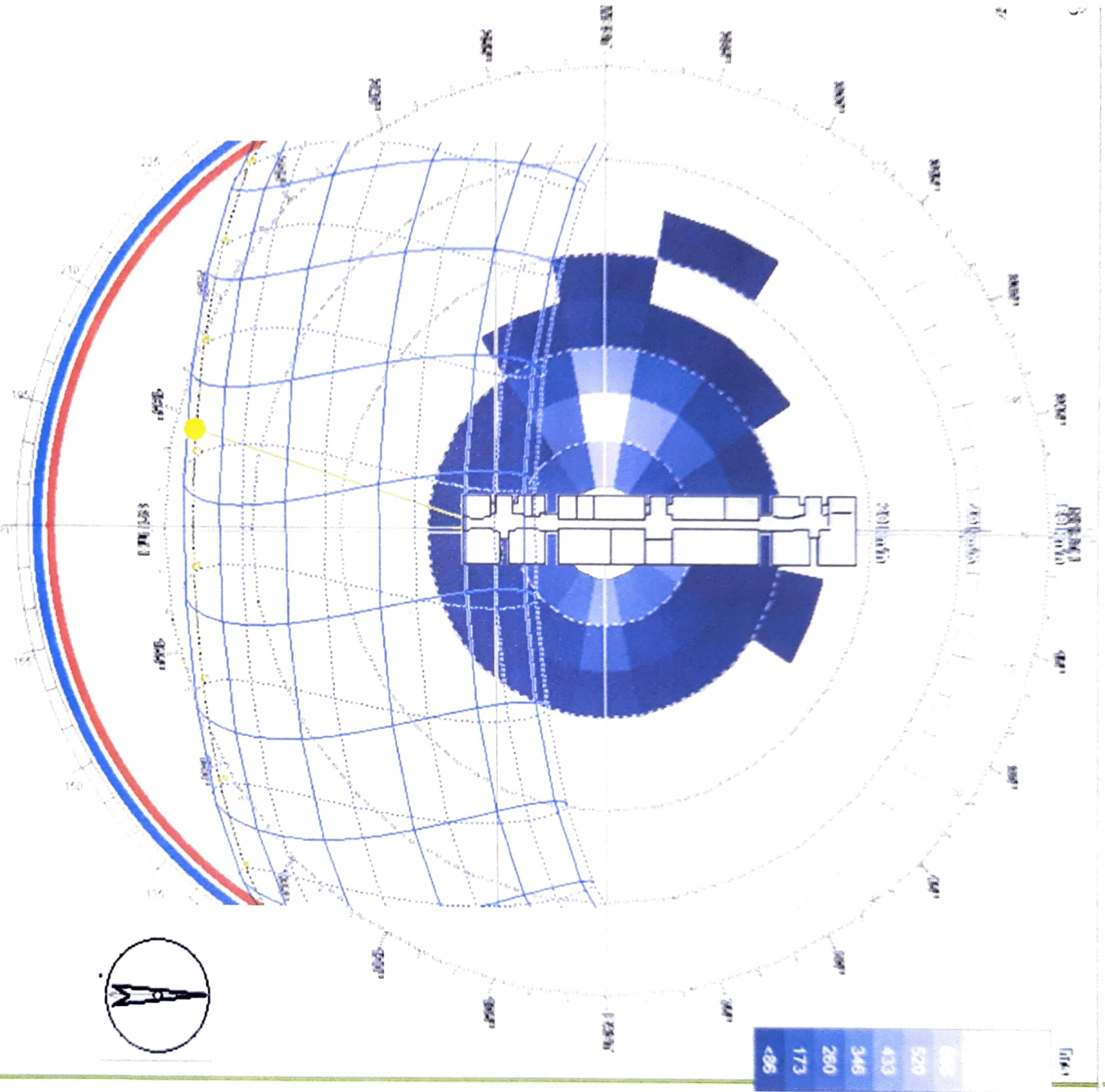
Mean Radiant Temp
Value Range: 28.0 - 48.0 °C
© ECOTECT 15



Maximum areas from the building are comes under comfort zone. Average value of comfort zone is 24 to 27 c .
Average value of comfort zone of Dhruv building is 26.63 c.




Exterior Wind Analysis

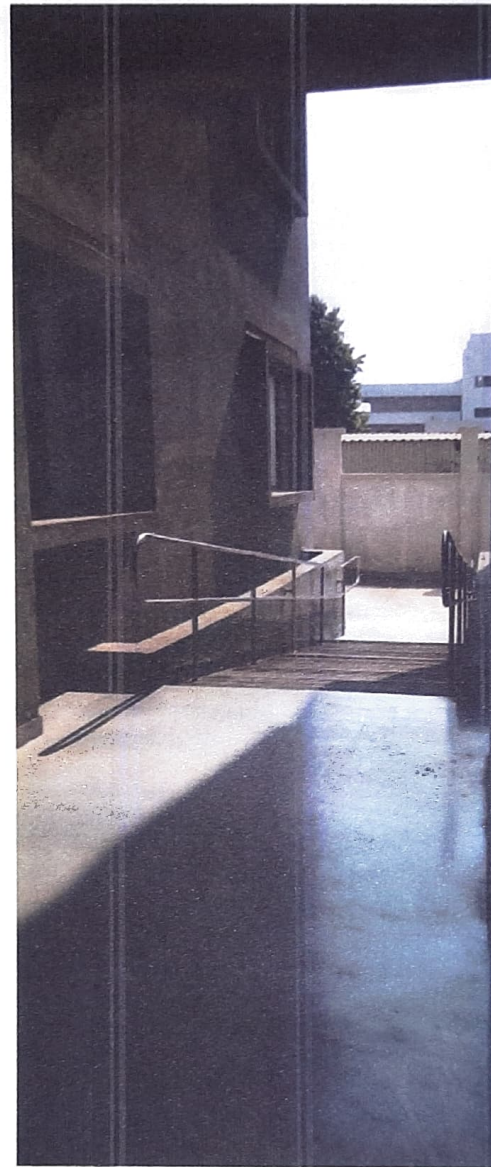
The Wind analysis shows that the building layout corresponds to the prevailing wind direction. The prevailing wind direction is west. The average wind speed is 20kmph. The layout is such that it allows the wind flow to all the floor plats of the building. The windows, in-between pockets and placement of staircase is on waste side which enhance the airflow in the building.



Natural Ventilation

Regularly Occupies Spaces	Floor Area	Area of Windows	Percentage of Window Openings	Openable window area	Percentage of Openable area	Recommended percent
	SQ M	SQ M	%	SQ M		
Class room Type 1	121.81	25.92	75	19.44	16%	10%
Lab	182.10	28.80	75	21.60	12%	10%
Faculty office	118.46	19.20	75	14.40	12%	10%

F		Energy Efficiency	
Sr. No.	Points	current	
1	Minimum Energy Performance	Because of sufficient amount of day light is available and maximum areas are come under comfort zone at maximum time of year there is hardly need to use artificial light and mechanical ventilation system.	
2	Daylight	Sufficient amount of defused daylight is penetrated in class rooms, no need to use light fixtures during daytime	
3	Energy saving Measures in other Appliances and Equipments	All lighting fixtures are LED. Purchase order is attached.	



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