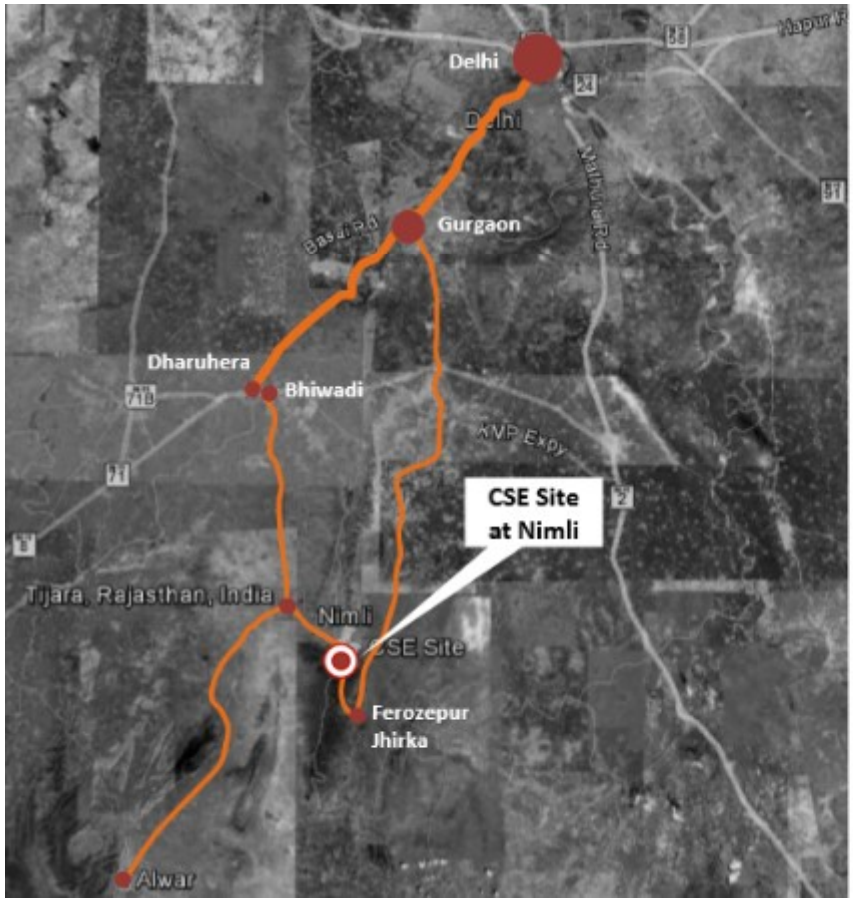
Anil Agarwal Environment Training Institute: Case Study

AAETI

AAETI – NIMLI TIJARA - CASE STUDY

AAETI

Location



Location
Nimli Village, Tehsil Tijara, Alwar, Rajasthan

Key Distances

Delhi (via Bhiwadi)	21km
IGI Airport (via Bhiwadi)	111km
Gurgaon (via Bhiwadi)	86km
Gurgaon (via Ferozepur Jhirka)	108km
Bhiwadi	46km
Alwar	62km
Tijara	15km
Ferozepur Jhirka	11km

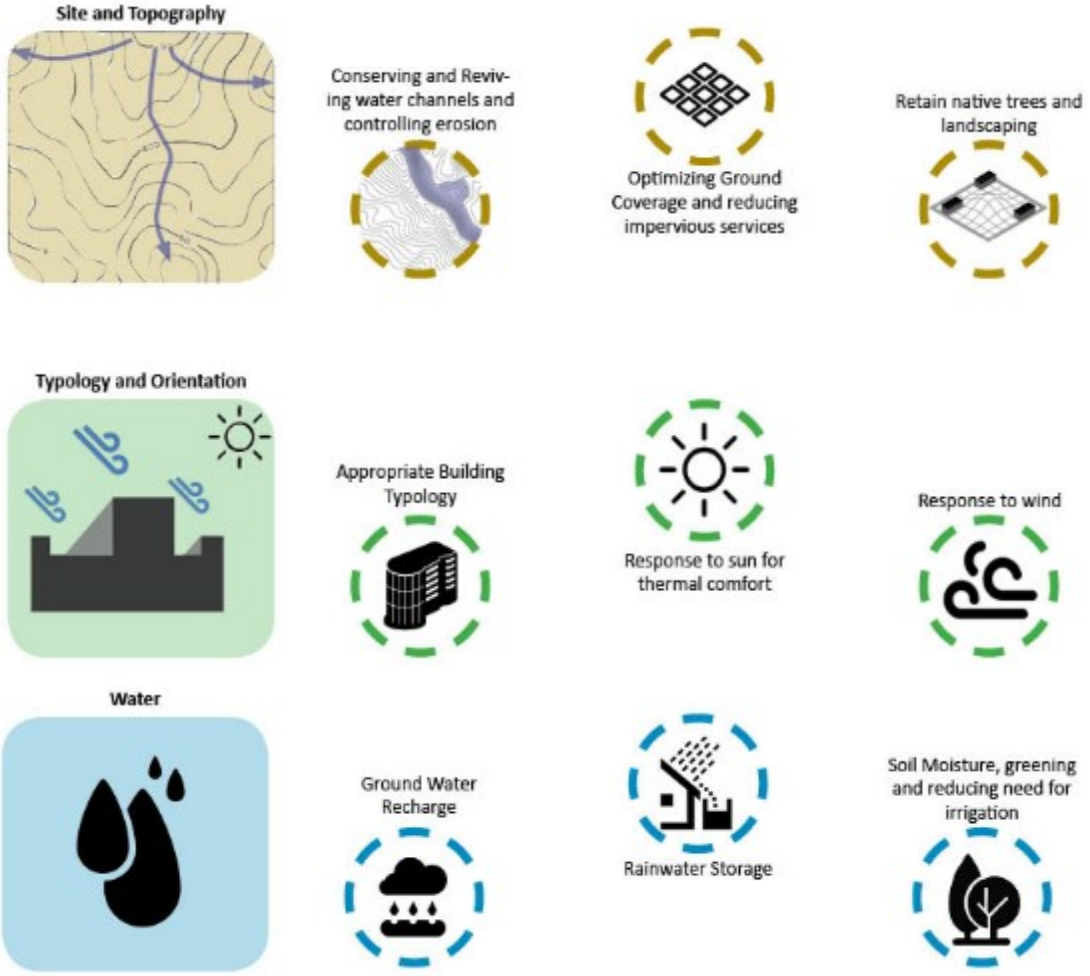
AAETI

CSE

NATURAL SETTING

AAETI

9 Aspects of sustainability



CSE

AAETI

9 Aspects of sustainability

CSE

AAETI

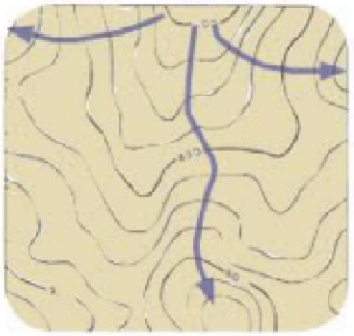
9 Aspects of sustainability

CSE

AAETI

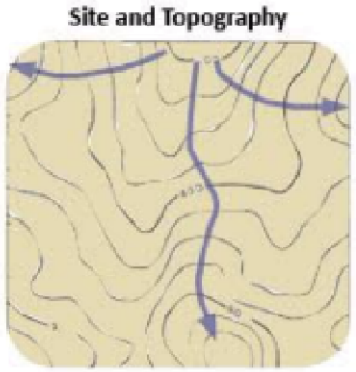
CSE

Site and Topography



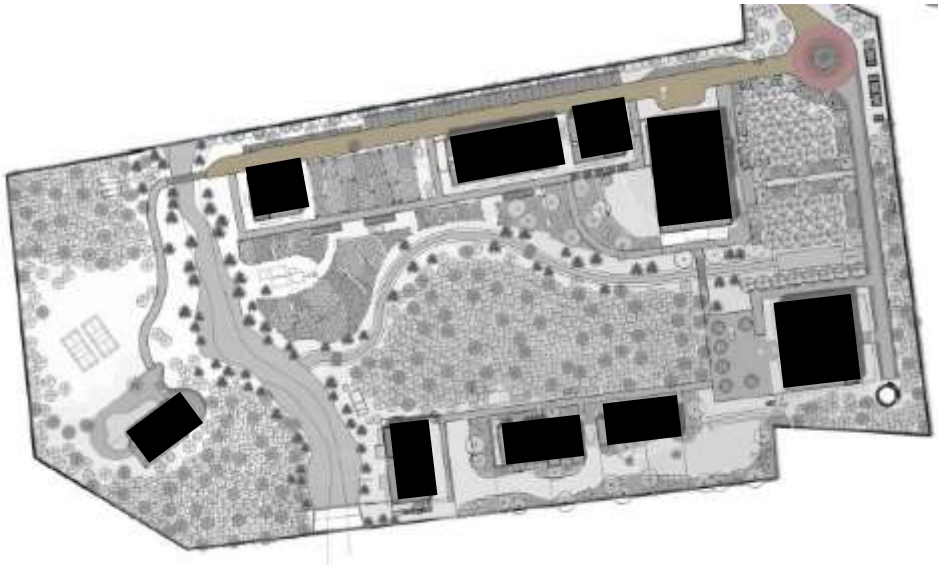
Conserving and Reviving water channels and controlling erosion

AAETI



Site and Topography

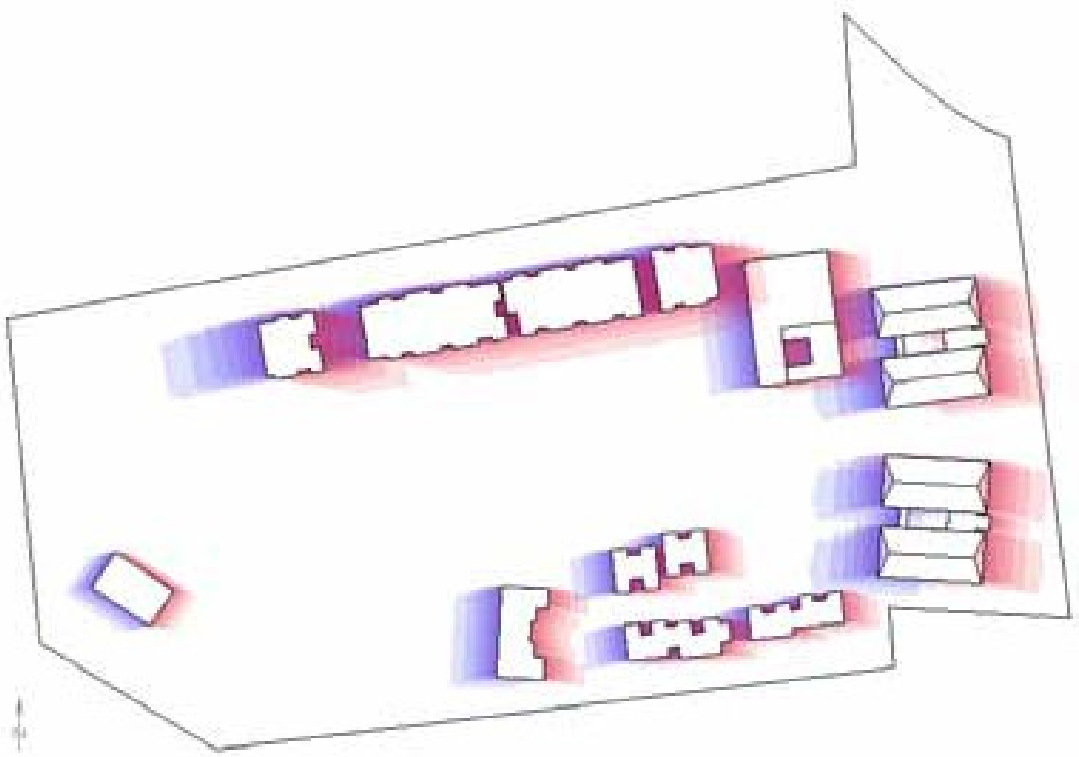
- Minimum disturbance to land/site topography
- No cutting (felling) of trees due to planning and construction of building(s) avoiding cutting of trees
- Minimization of roads and hard area



CSE

AAETI

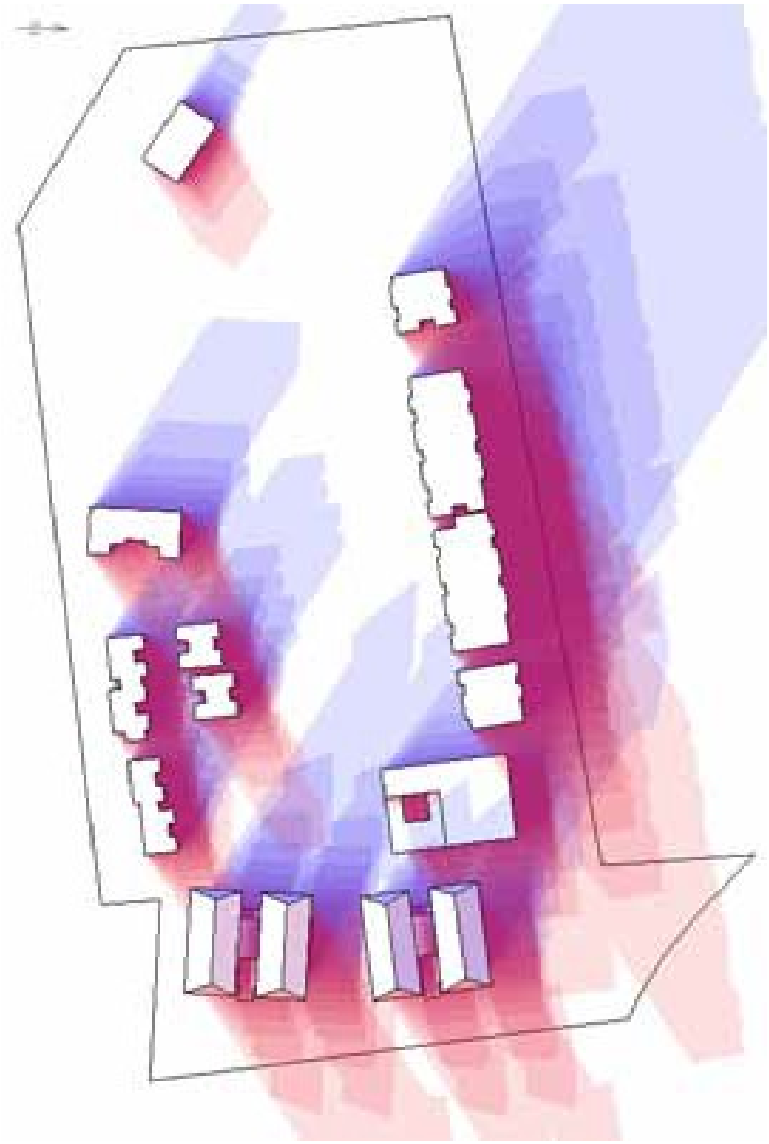
Shadow Analysis 22nd June



CSE

CSE

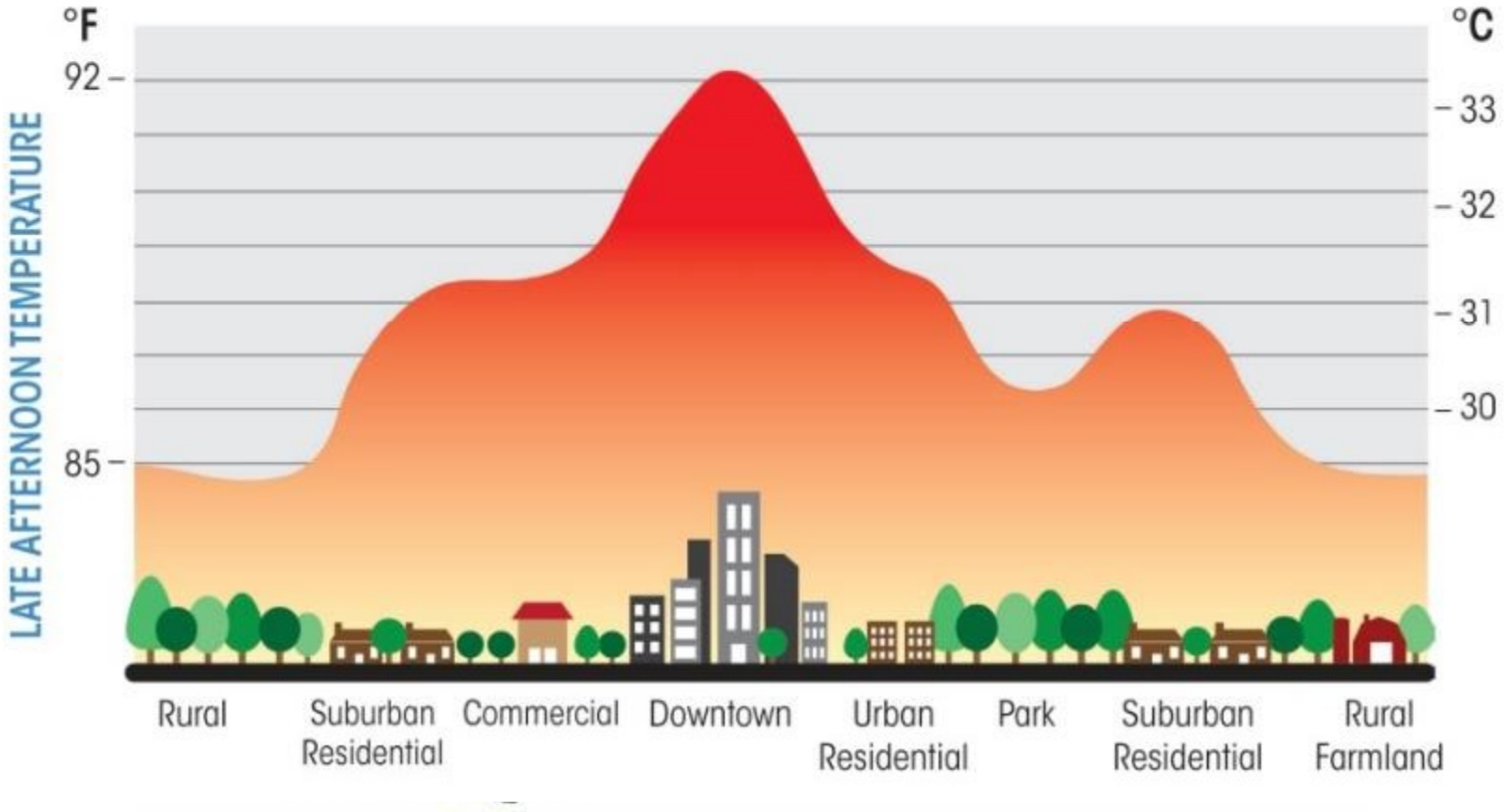
AAETI



CSE

AAETI

AAETI


°F
92
85
°C
33
32
31
30
LATE AFTERNOON TEMPERATURE
Rural
Suburban Residential
Commercial
Downtown
Urban Residential
Park
Suburban Residential
Rural Farmland

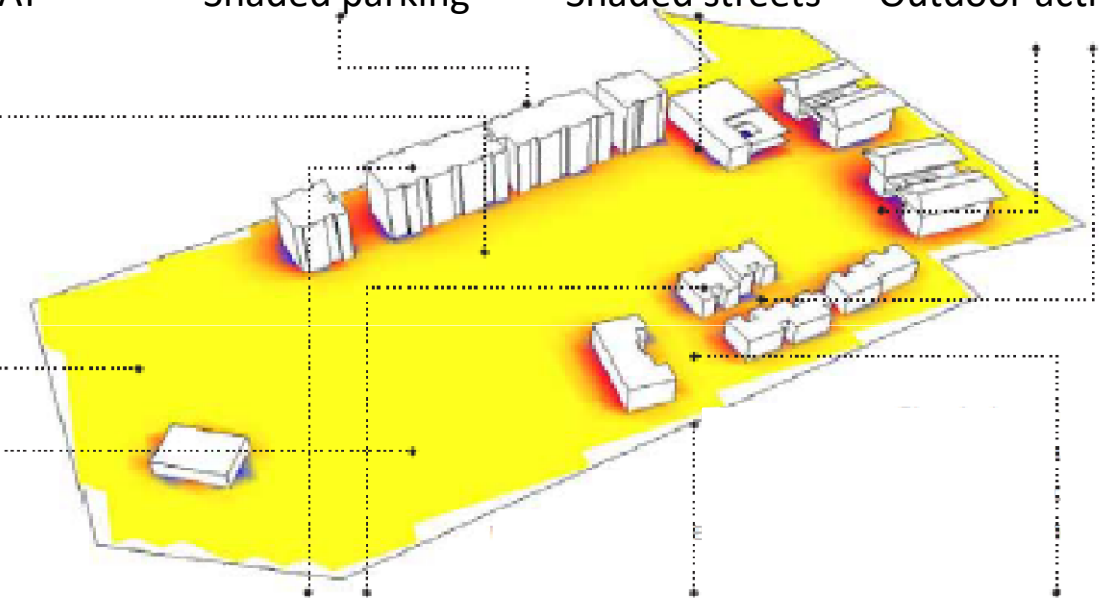
AAETI

Shaded OAT

Shaded parking

Shaded streets

Outdoor activities



On-ground PV

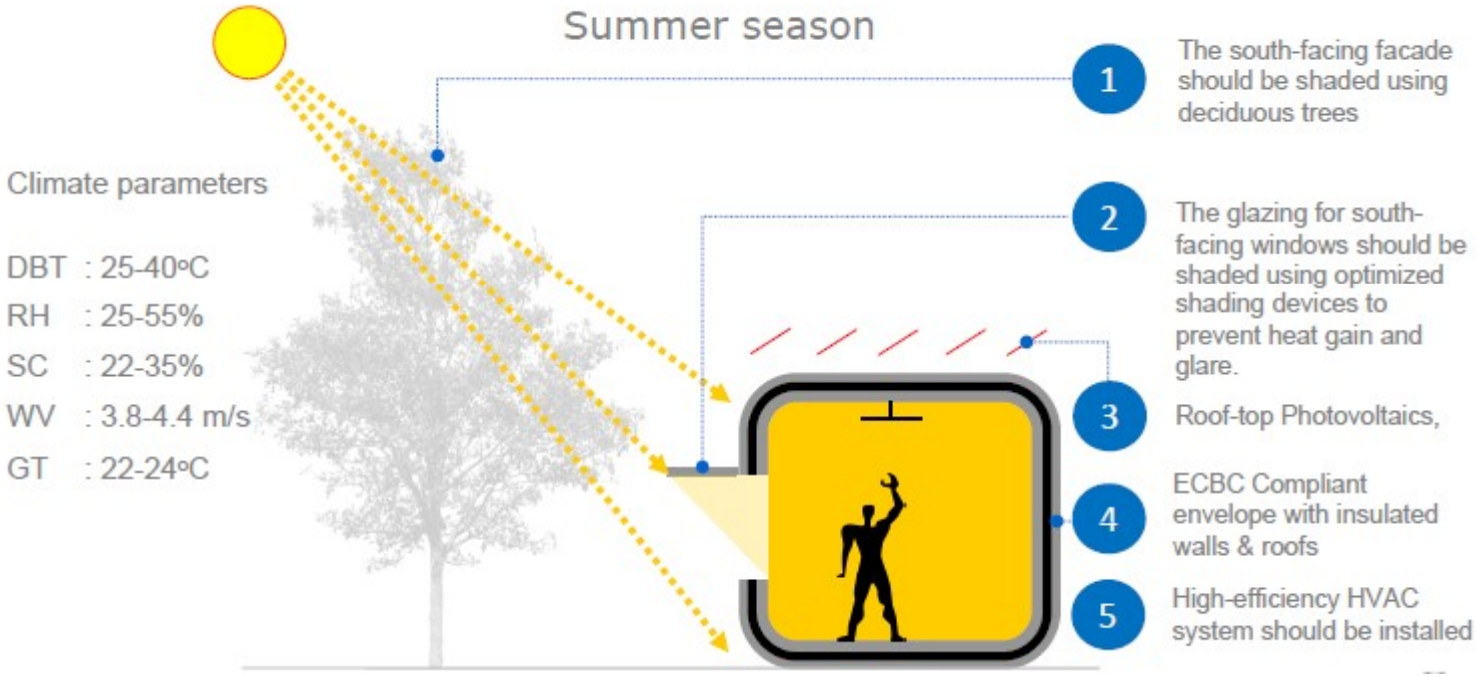
Roof-top PV

Peripheral tree buffer

Minimize hard-paved areas

AAETI

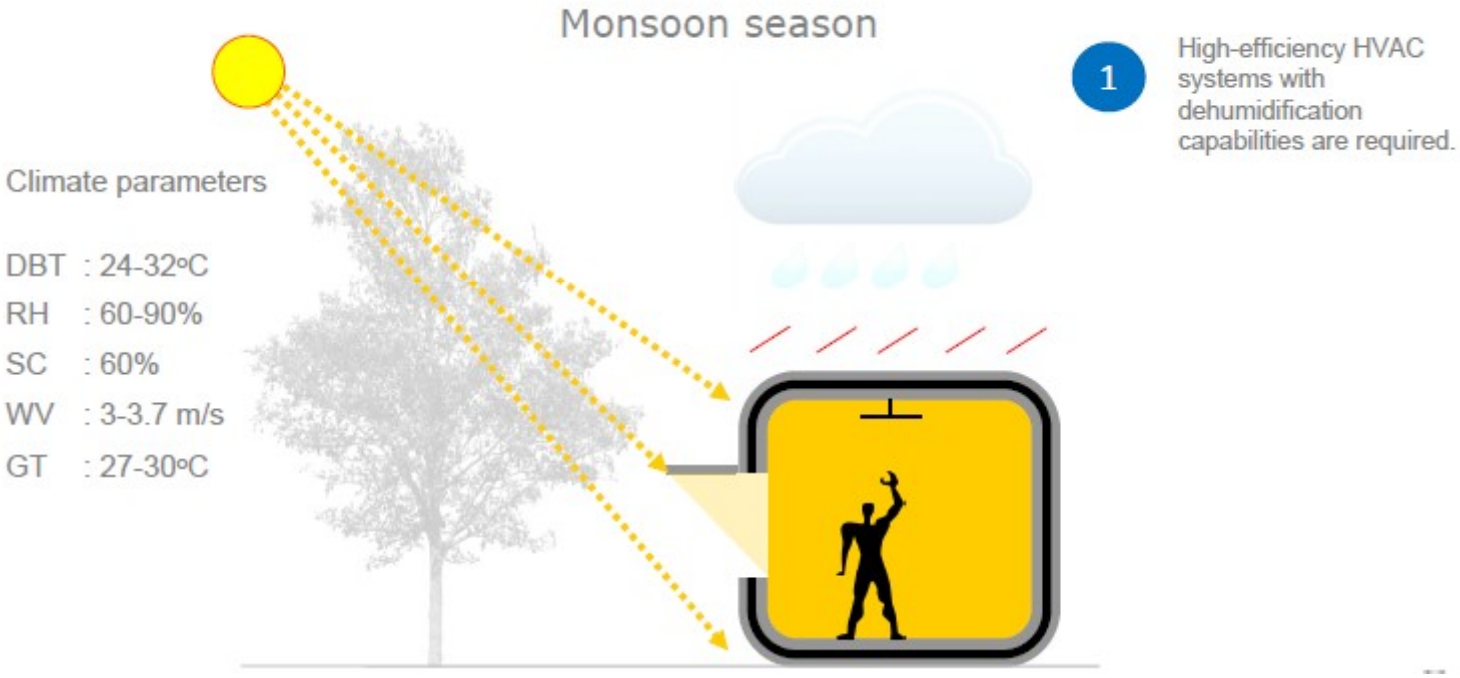
Envelope shading, Window shading, Highly efficient envelope & HVAC



CSE

AAETI

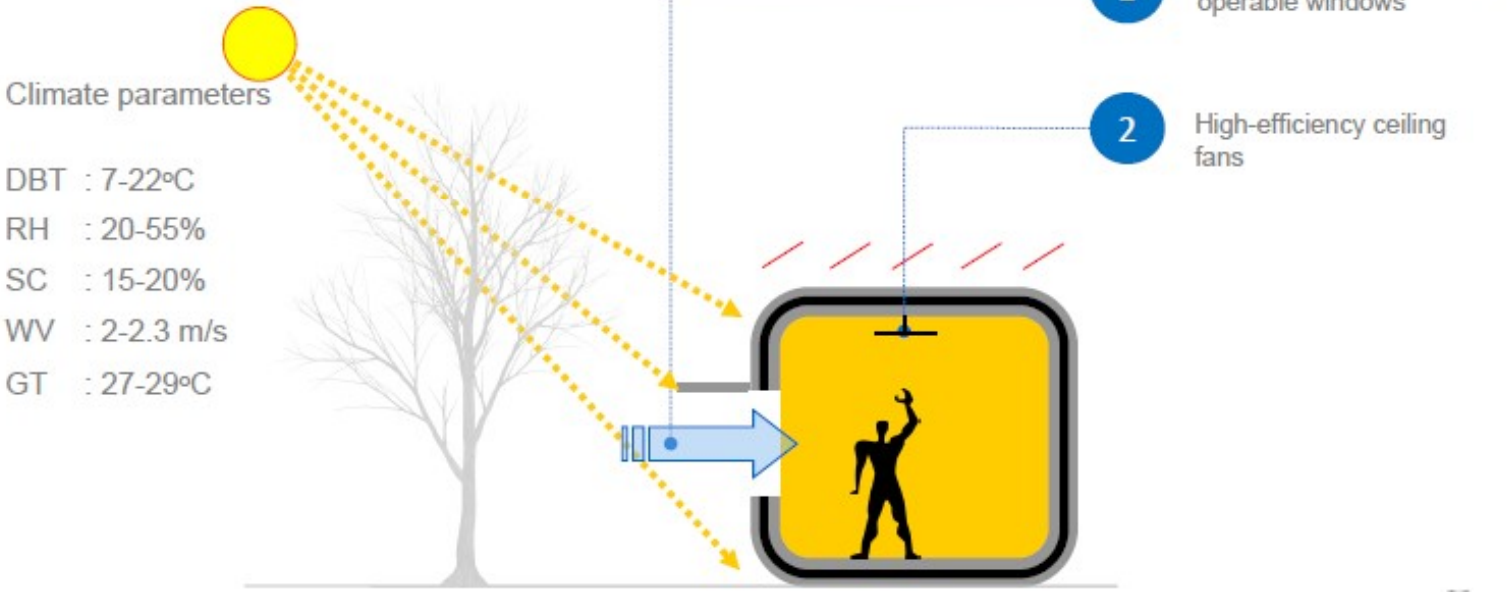
High-efficiency HVAC with Dehumidification



AAETI

Natural ventilation and Indoor Air Movement

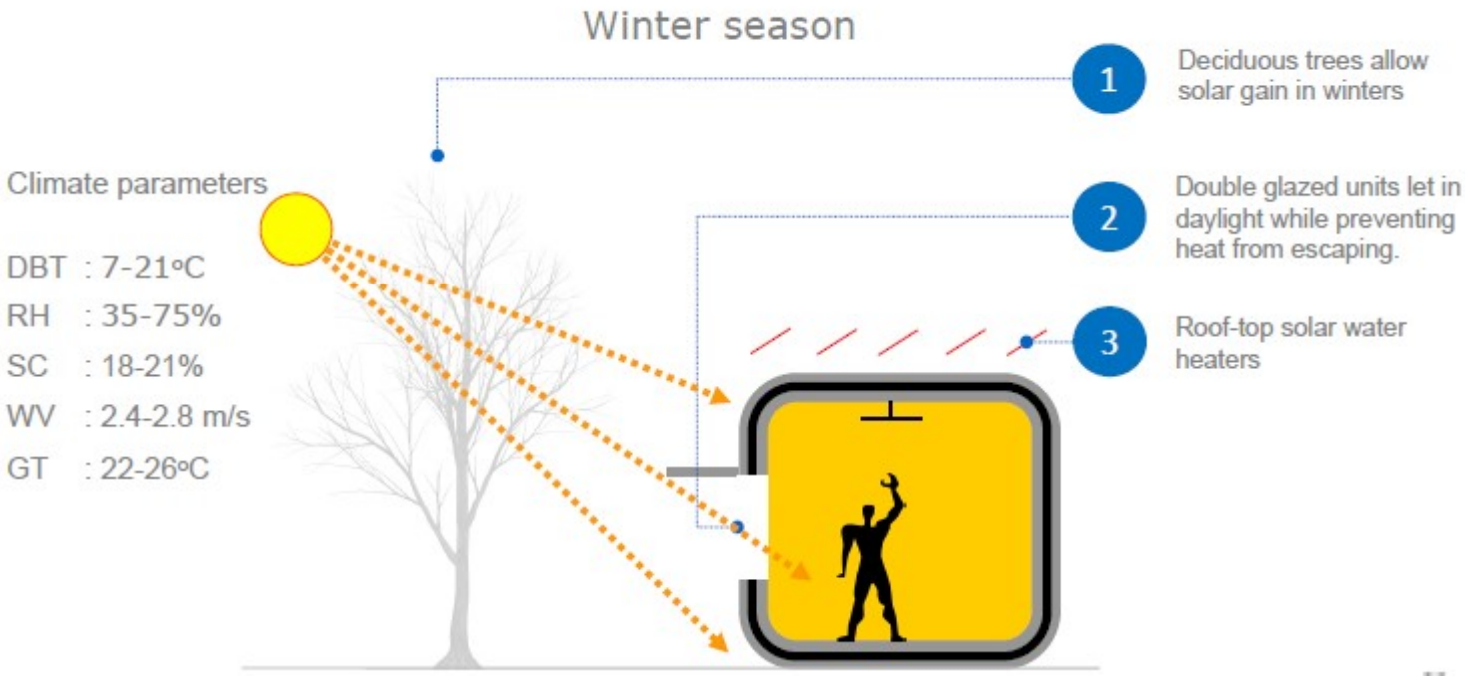
Spring & Autumn season



CSE

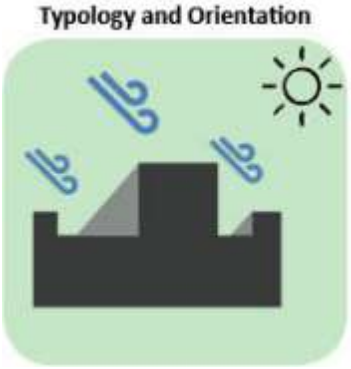
AAETI

Passive solar gains, High thermal mass & Glare prevention with shading devices



CSE

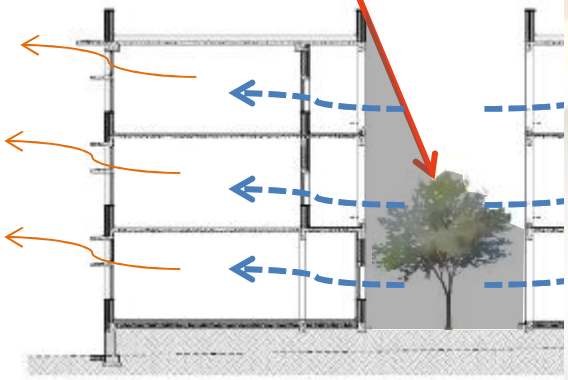
AAETI



Typology and Orientation

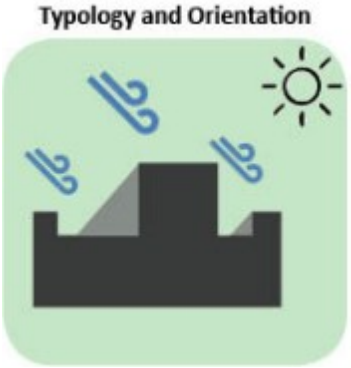
Appropriate Building Typology

Narrow Courtyard Typology

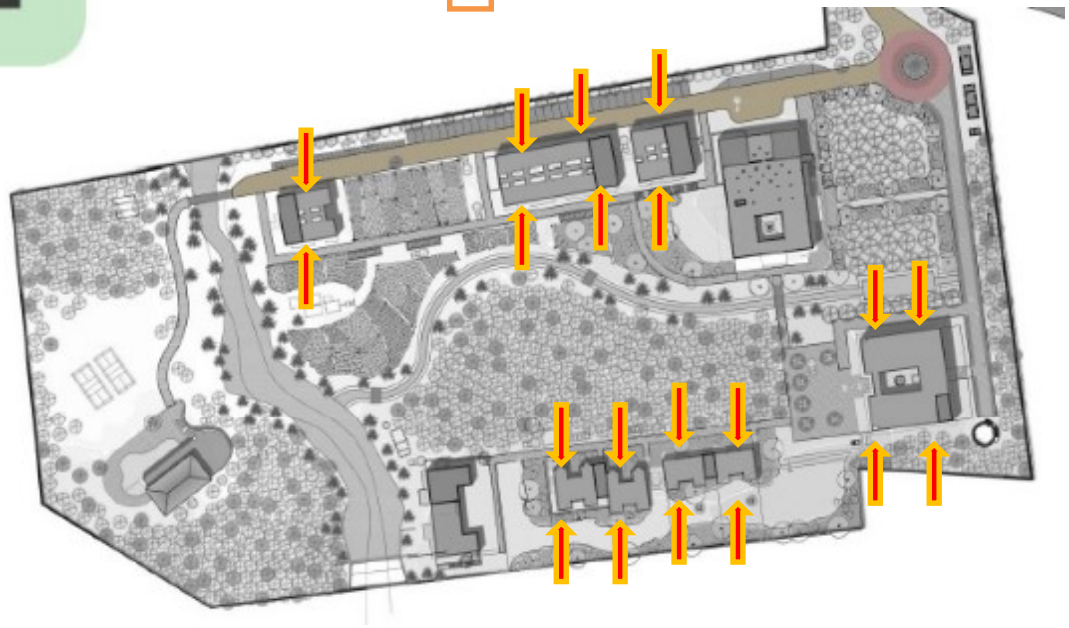


Any other climate responsiv architecture design strategy

AAETI



N



S

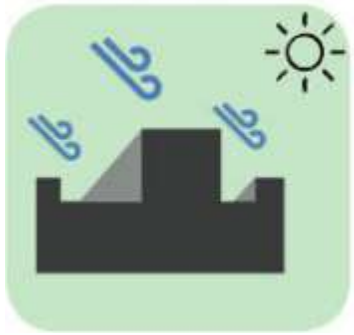
Response to wind

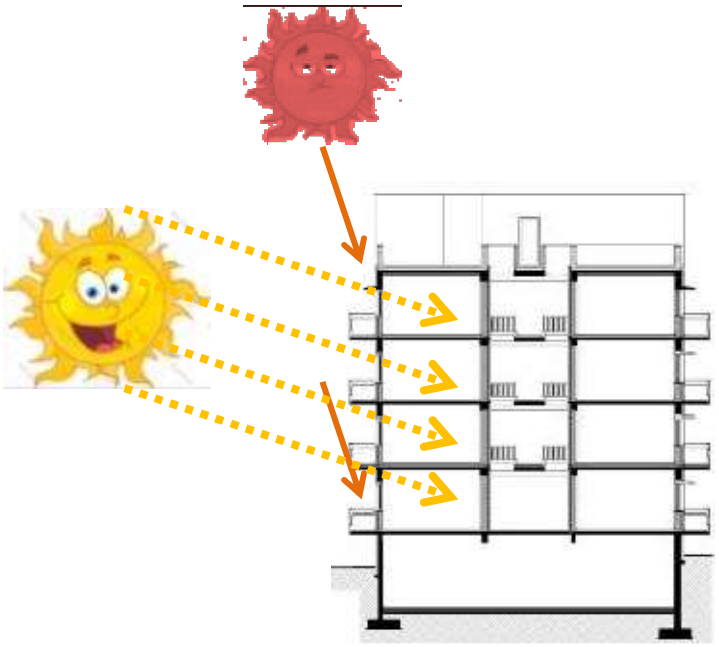
Response to sun for thermal comfort

Orientation of building and window to wall ratio (WWR) including design of openings / fenestration

AAETI

Typology and Orientation





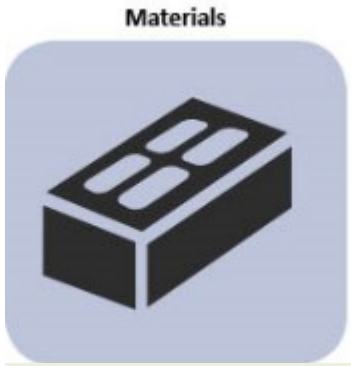
Response to wind

Shading on the south facing windows

Response to sun for thermal comfort

For all climatic zones, the window Wall Ratio (WWR) should be in the range of 20 to 40 %.

AAETI



Materials

Use of Recycled Waste Products in Masonry Work
Use of local material/items (Available within 100 kms) to the extent of minimum 5% or more of the cost of construction

Stones from the site are utilized in boundary wall construction

Recycled iron bars from construction are used for this gate, railings and similar elements

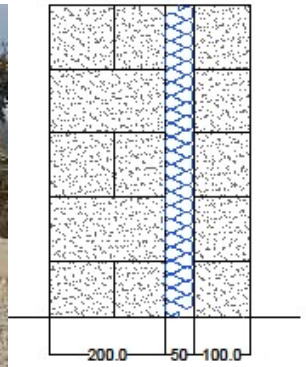
Temporary structures made up of rammed earth from the site.

CSE

AAETI

Heat, Lux and Air

Heat Gain Reduction



AAC Blocks + XPS

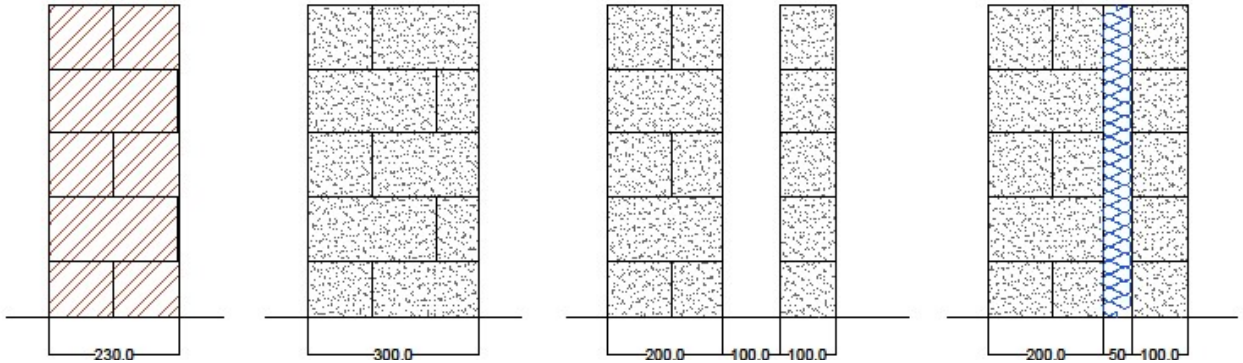
Highly reflective surfaces bounce off radiation.

Good insulation protects the outside heat to enter inside.

CSE

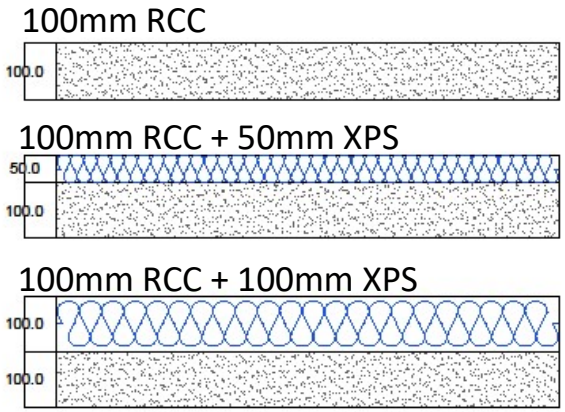
AAETI

Walls

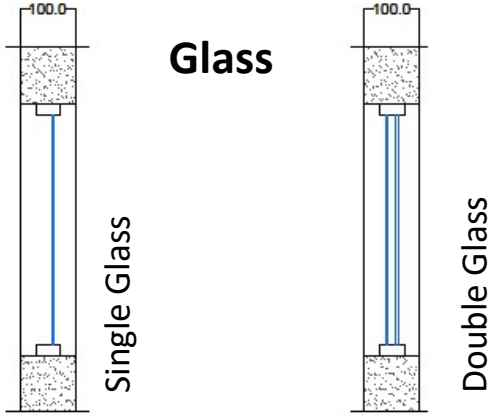


Brick wall | AAC Blocks | AAC Blocks + Air Gap | AAC Blocks + XPS

Roof



Glass



Energy Efficient Building Envelope

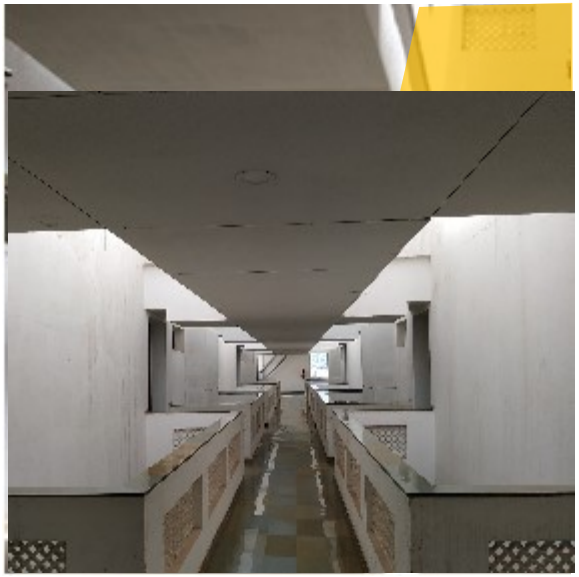
AAETI

Building Envelope Energy Saving

25%

CSE

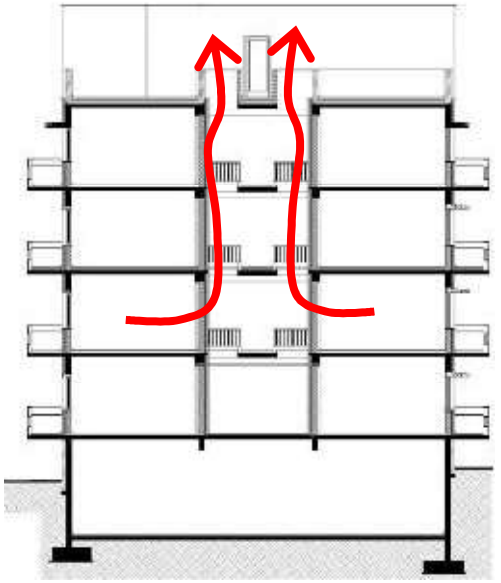
AAETI



Maximum Daylight Utilization

Light shelves in corridors allow natural light to filter in

The light shelves also allow the hot air to escape



Encouraging cross ventilation

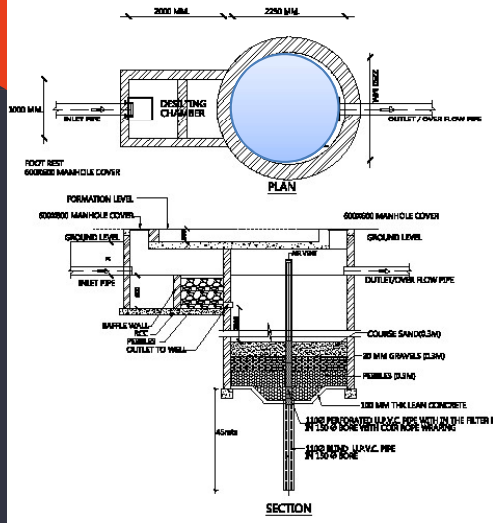
CSE

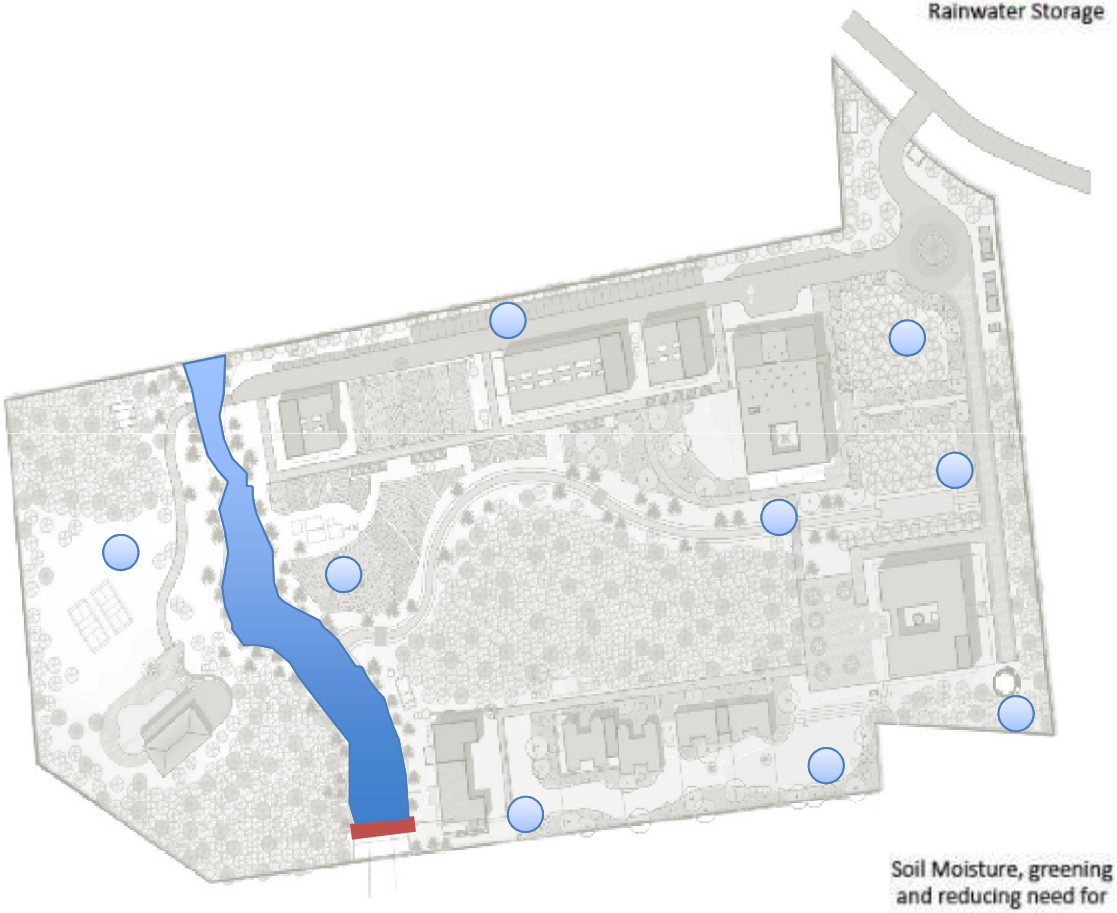
AAETI

Water

Water

Rainwater Storage





Ground Water Recharge

Soil Moisture, greening and reducing need for irrigation

9 Rain Water Recharge Wells were added on the site

2 Storage tanks with a combined capacity of 912KL

AAETI

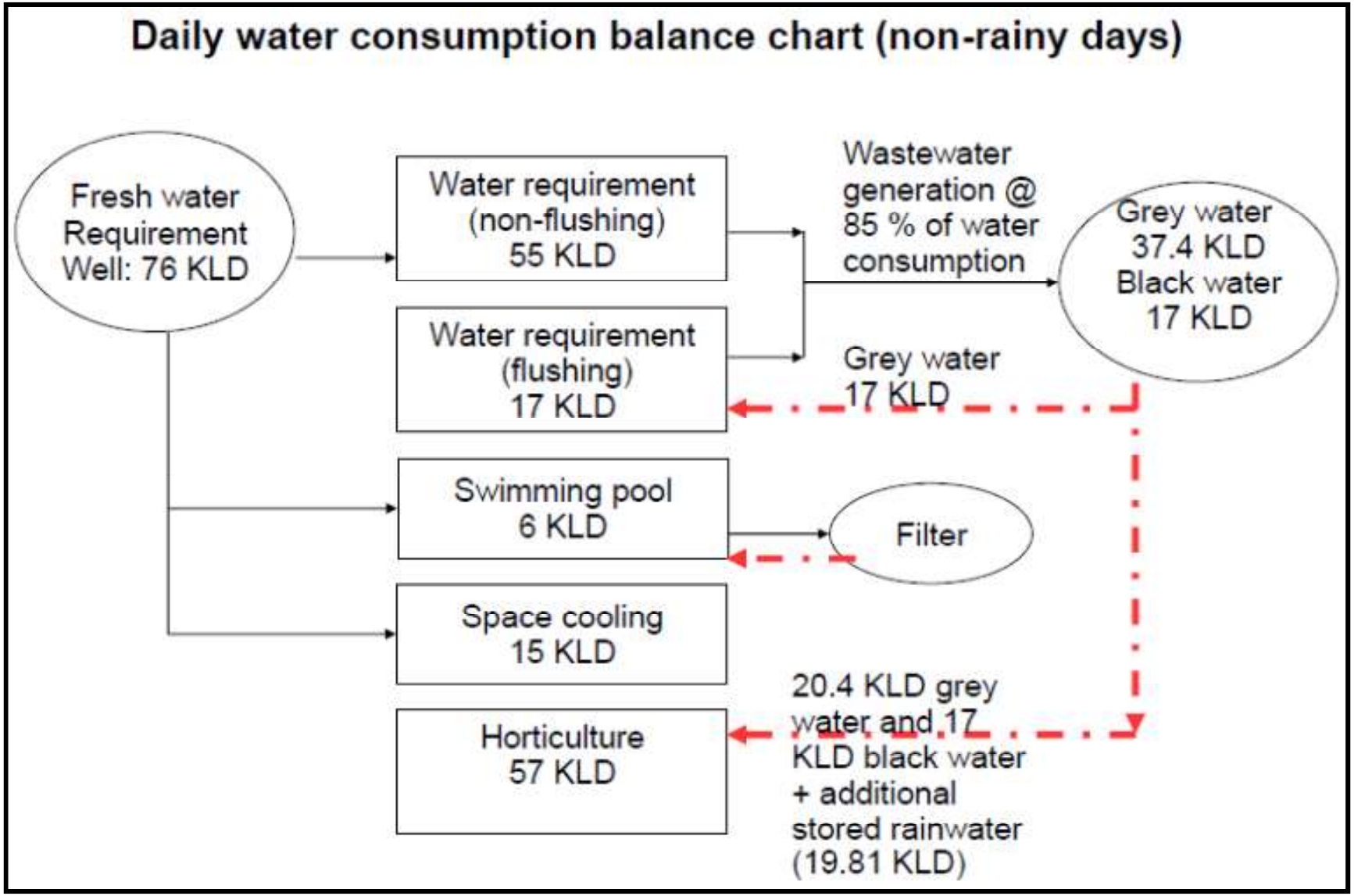
Water

Storage Tank - Number - 2; Capacity - 100 KL (each); Reuse = Potable purposes

Recharge Well - Number - 8; Groundwater recharge

CSE

Use of rain water harvesting to the extent of 50-100% of the rainfall on the rooftop of the building (s) OR 100% GROUND WATER RECHARGING



Recycling to the extent of 80% water or above

Recycling to the extent of 80% water or above

AAETI

Waste Management

The campus will have multi point waste segregation and will recycle 100% of its organic waste onsite.

Providing segregation facilities for C&D waste, wet waste and dry waste

AAETI

Water -Energy Nexus

Water-Energy Nexus

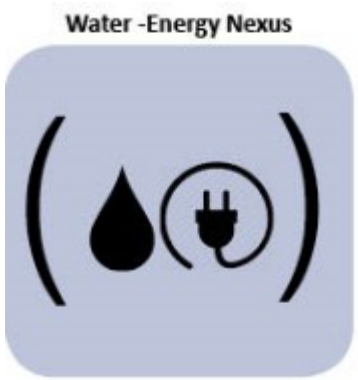
% of Energy from Solar

The campus is proposed to produce 100KWp of power from solar in phase 1 which offsets 30-40% of the total energy demand

Generation of Renewable Energy

CSE

AAETI



Water-Energy Nexus

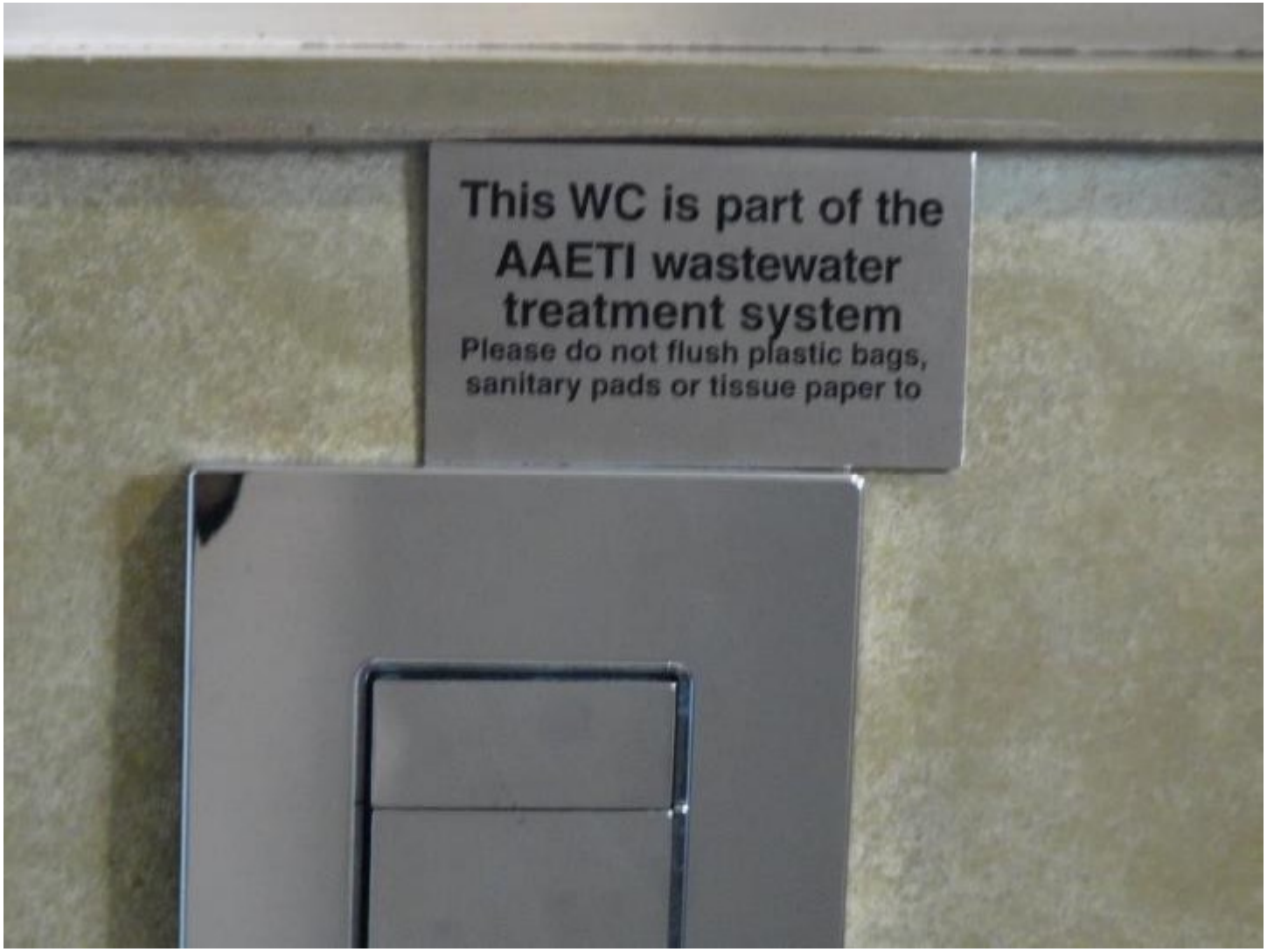
Energy Efficient LED bulbs have been used in the building.

Occupancy sensors in bathrooms switch off automatically when uninhabited

Self closing taps help in reduction of water usage

Heat pump is used to utilize the heat produced during air conditioning for water heating purposes

- Energy Efficient Lighting, Fans, Air conditioners with Controls
- Integration of controls with IBMS and sensors for lighting fixtures


This WC is part of the
AAETI wastewater
treatment system
Please do not flush plastic bags,
sanitary pads or tissue paper to

- Use of low flow water supply fixtures
- Use of low flow/waterless flushing fixtures/urinals

AAETI

Heat Pump → Hot Water

Heat Pump transfers excess heat to places here heat is needed

CSE

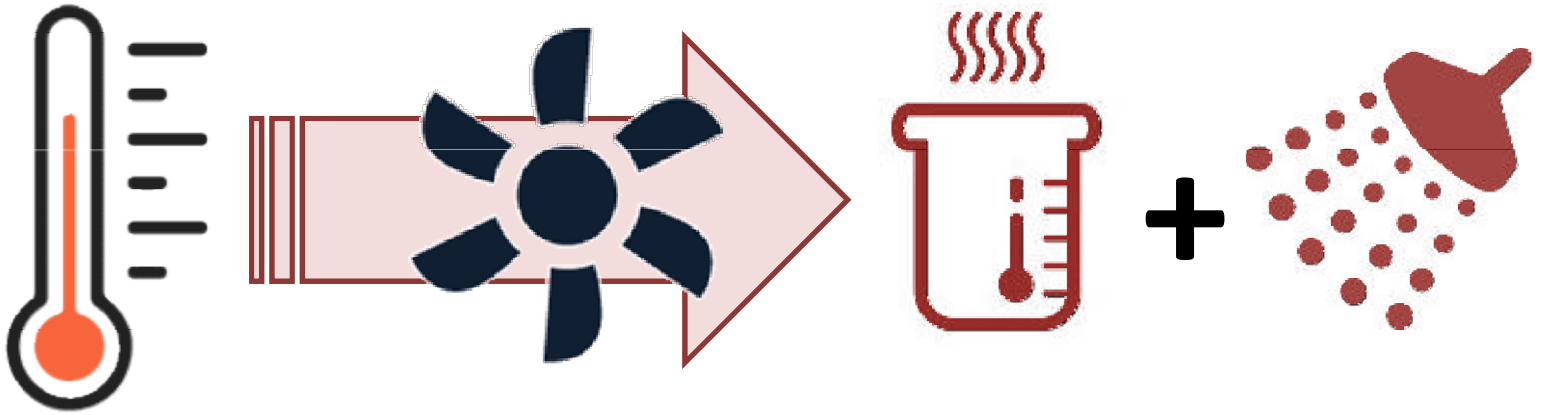
AAETI

Water -Energy Nexus

Water-Energy Nexus

Efficient Techniques and equipments

Heat Pump transfers excess heat to places here heat is needed



CSE

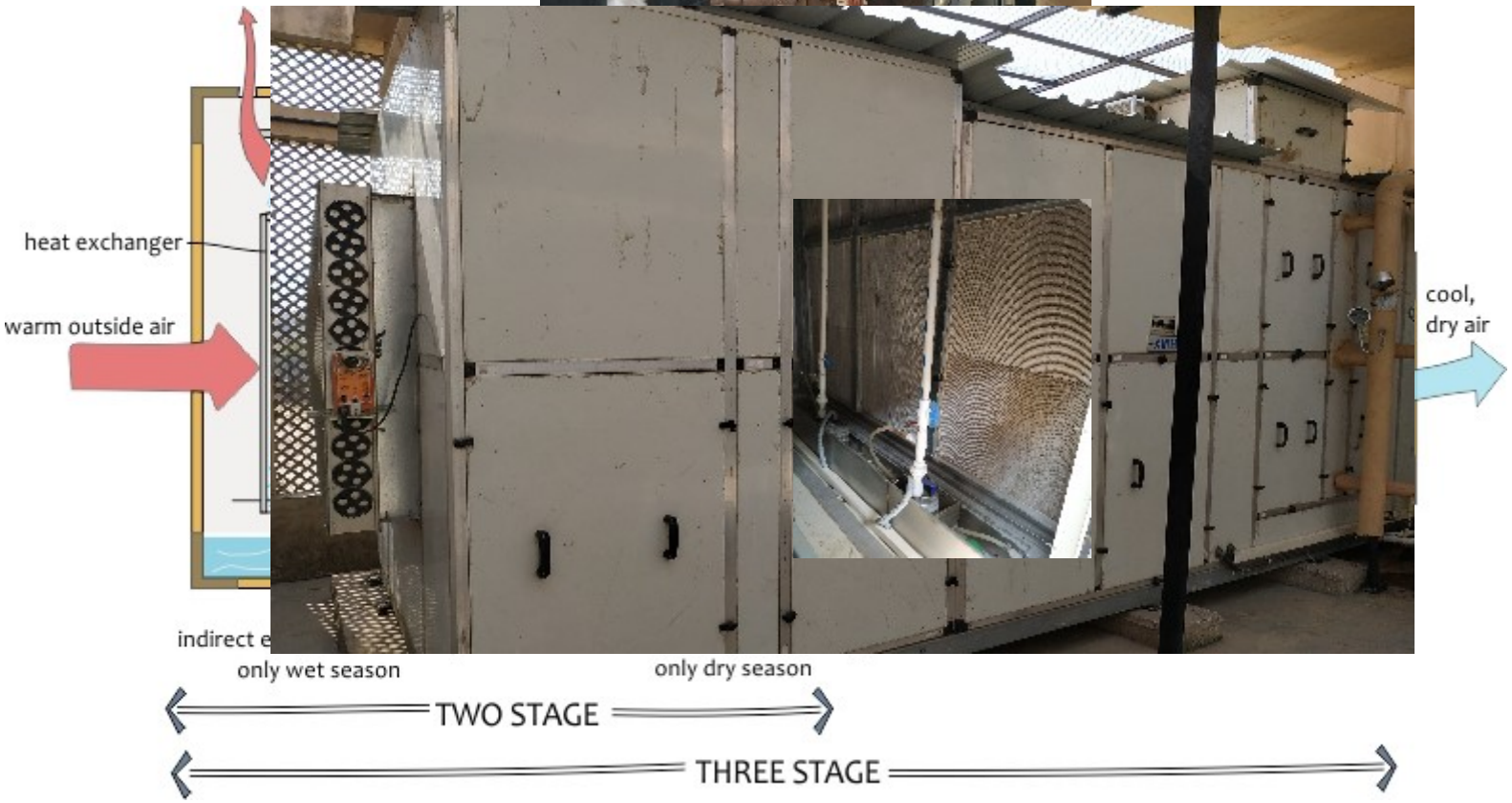
AAETI

Water -Energy Nexus

Water-Energy Interface

Active Cooling Techniques

3 Stage Cooling



CSE

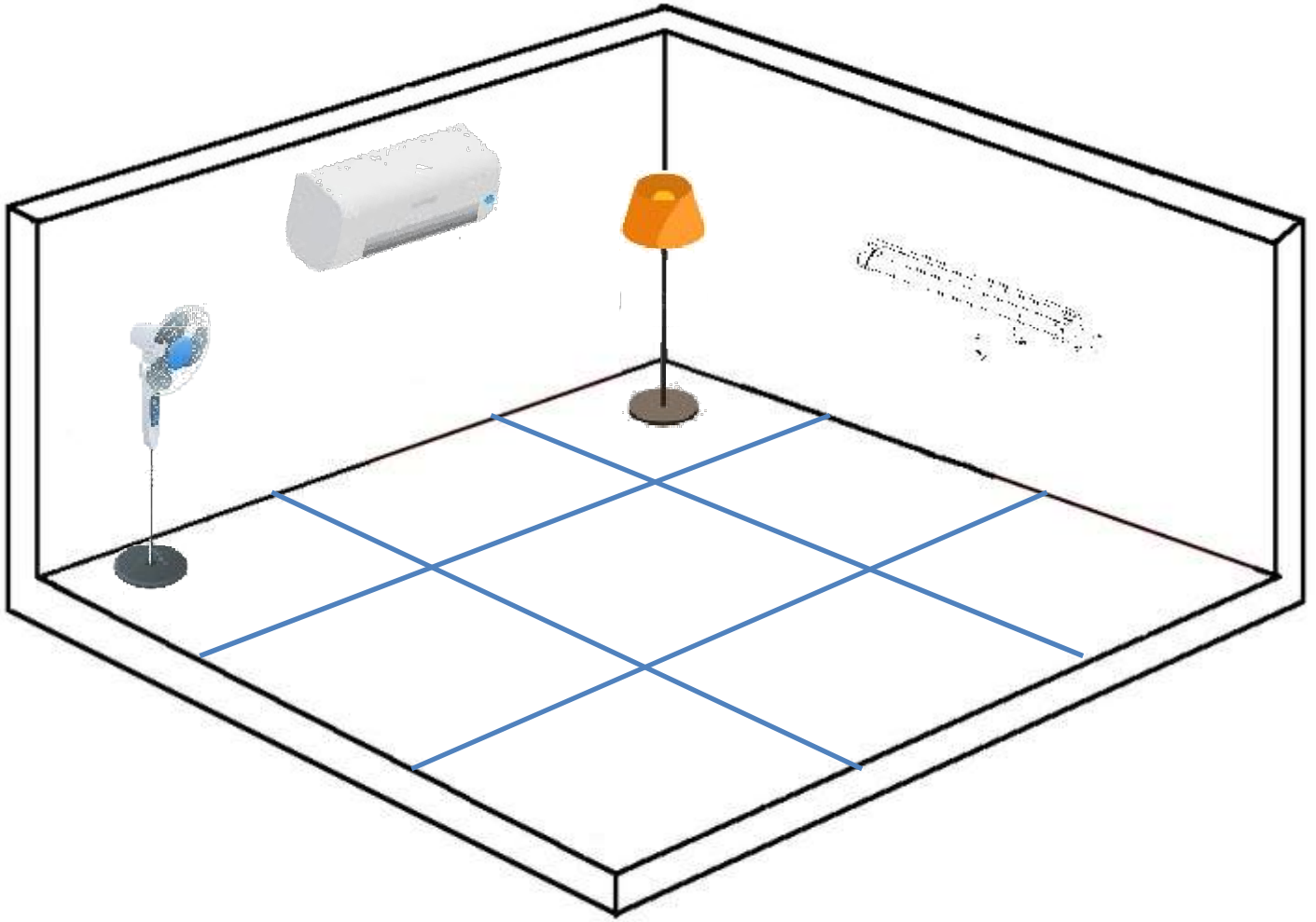
AAETI

Air Conditioning Tonnage saving

71 TR

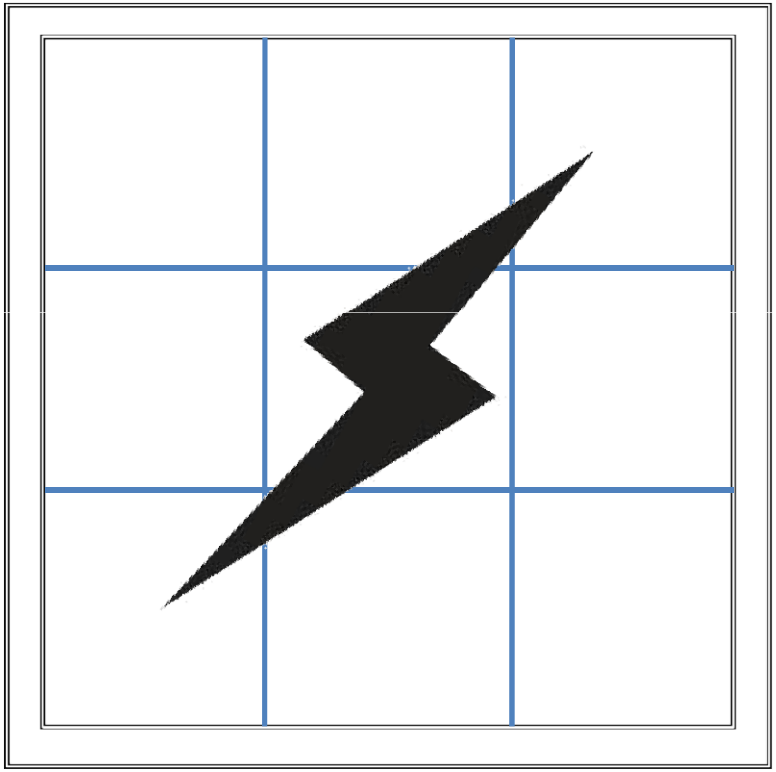
AAETI

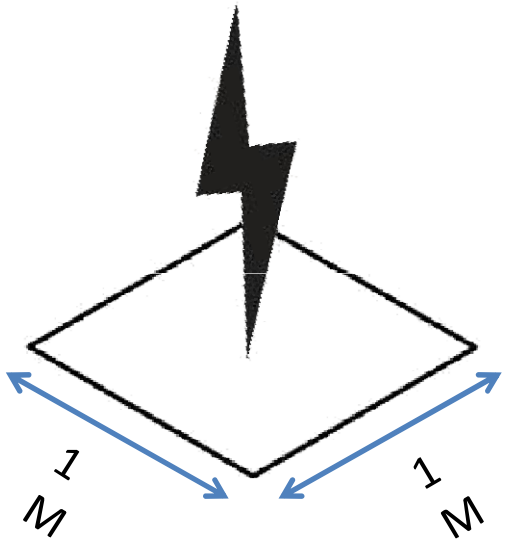
EPI – Energy



AAETI

EPI – Energy



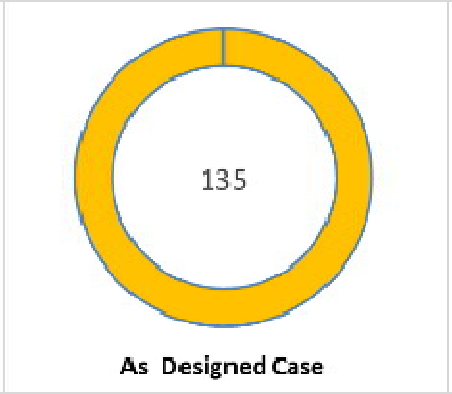


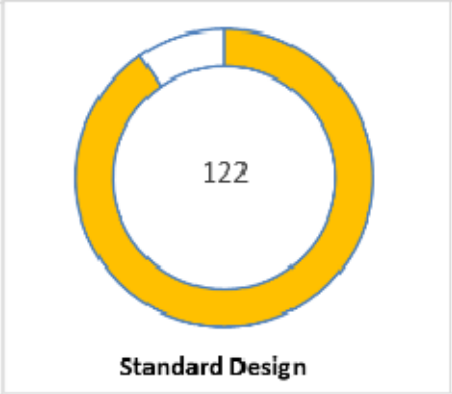
Energy
Performance = **I**ndex

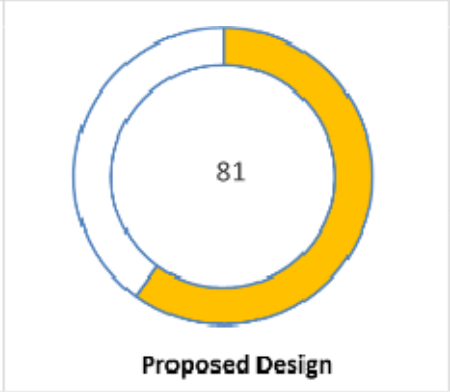
$$\frac{\text{Total Energy Consumed}}{\text{Built Up Area (sq.m.)}}$$

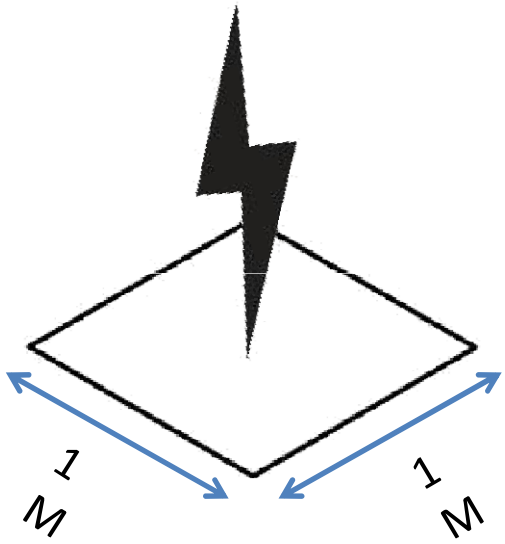
AAETI

EPI – Energy









CSE

AAETI

Energy Savings

40% Less than as Designed Case

34% Less than Standard Design Case

356,573 KWh Energy Saved Annually

CSE

AAETI

Carbon Emissions Savings

292t CO_2 averted annually

10,44,882 Km.

50 Homes for an Year

13,000 Trees

1,31,461 Kg. of Coal Burned

CSE

AAETI

Operations and Monitoring

Optimization and Monitoring

Optimization

Document and Dissemination

Piezometer

Smart Meter

Water Meters

Performance Benchmarking

S.No	Test Parameter	Unit	Permissible limit		
			Acceptable Limit	Permissible Limit in the Absence of Alternate Sources	May 2015
					Site 2: Borewell
1	pH	-	6.5 to 8.5	No relaxation	7.70
2	Total Solids	mg/L	-	500	-
3	Total Soluble Solid	mg/L	-	-	-
4	Total Dissolved Solid	mg/L	500	2000	420.0
5	Total Hardness (as $CaCo_3$)	mg/L	200	600	232.0
6	Chlorides (as Cl)	mg/L	250	1000	46.08
7	Sulphate (as SO_4)	mg/L	200	400	21.11
8	Nitrate (as NO_3)	mg/L	45	No relaxation	0.22
9	Total Iron (as Fe)	mg/L	0.3	No relaxation	0.08
10	Total Chromium (as Cr)	mg/L	0.05	No relaxation	<0.01

AAETI

Health, Wellbeing and Universal Design

Health, Wellbeing and Universal Design

Clean air, water and Fuel mix

- Segregation of pedestrian and vehicular traffic

User Wellbeing

Food Gardens and native trees

Ramps and special toilets for physically challenged

Universal Design

CSE

Efficient irrigation system like micro, drip or sprinkler irrigation

AAETI

AAETI – NIMLI TIJARA - CASE STUDY