

School of Planning and Architecture
New Delhi

Divisional Presentation

Presentation link -
<https://www.youtube.com/watch?v=vXhIHFejuvk>




Solar™
Decathlon
India



The ARCHONS

The Team





Can educating children help in the
battle against climate change?

Introduction

Site Area- 15256 sq. m.

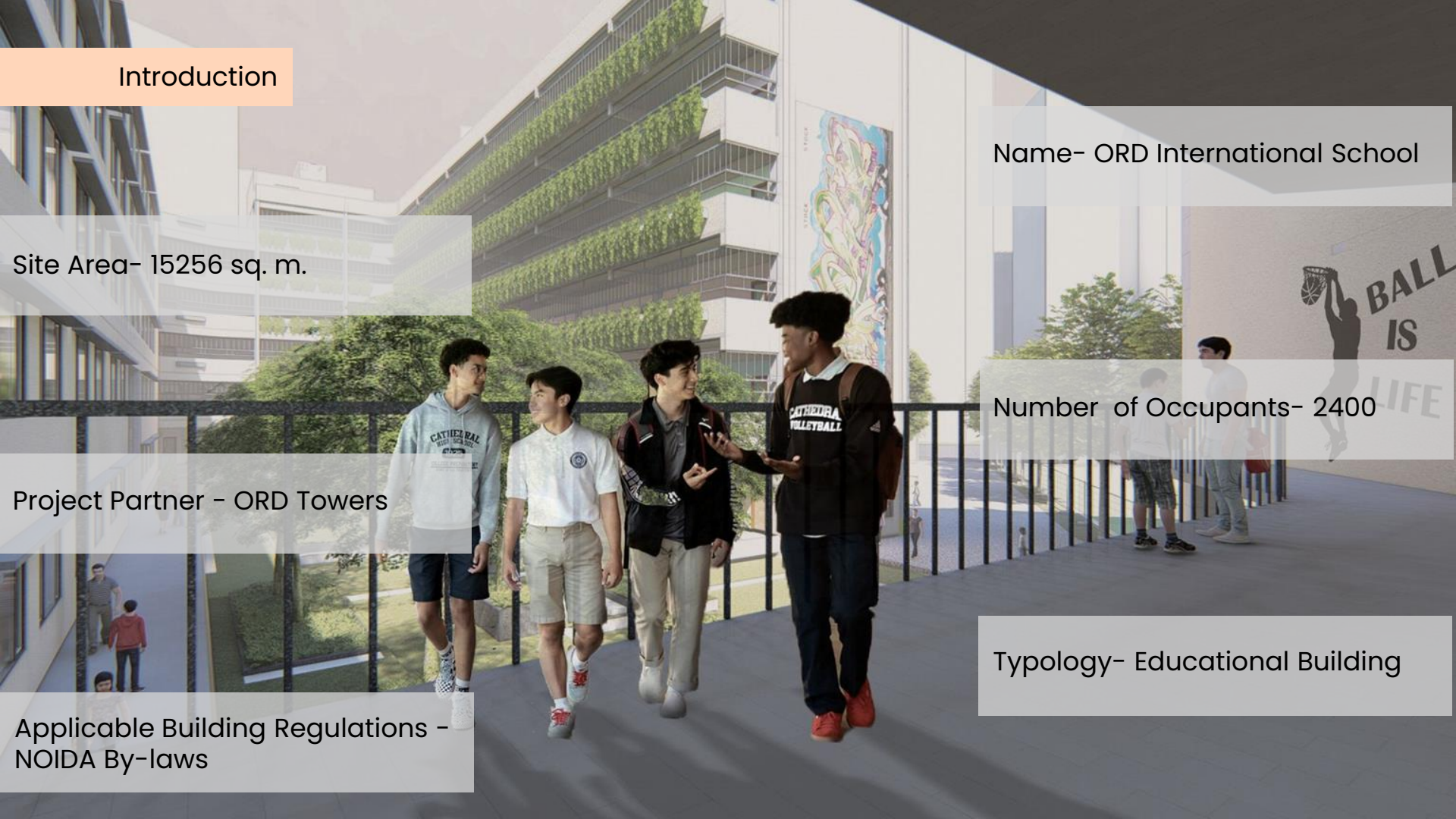
Project Partner - ORD Towers

Applicable Building Regulations -
NOIDA By-laws

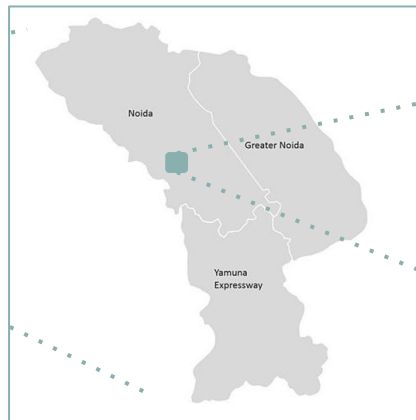
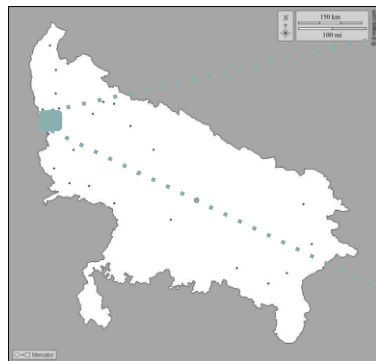
Name- ORD International School

Number of Occupants- 2400

Typology- Educational Building

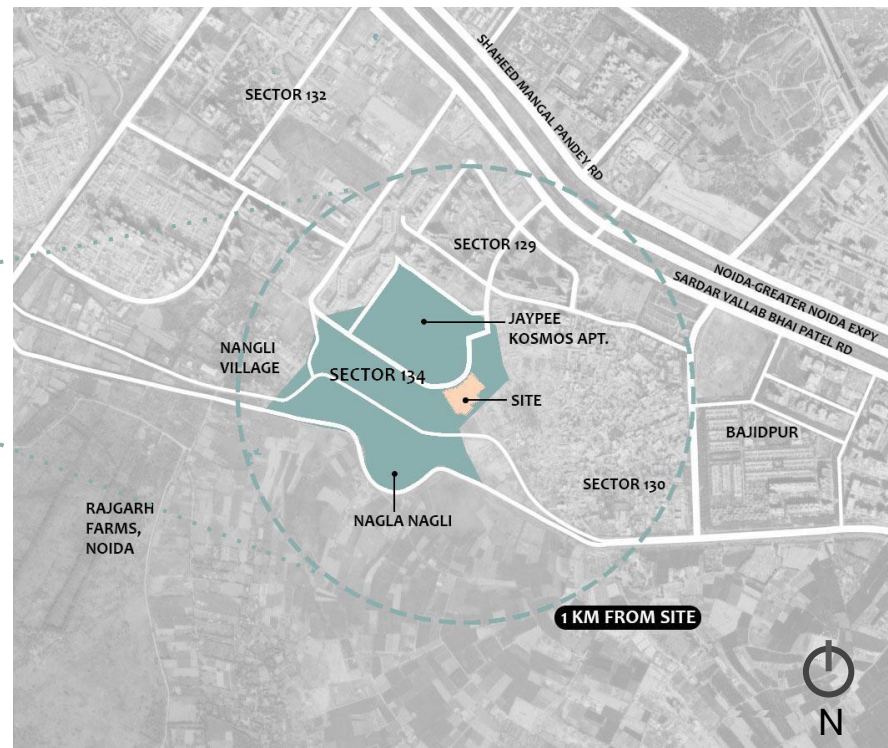


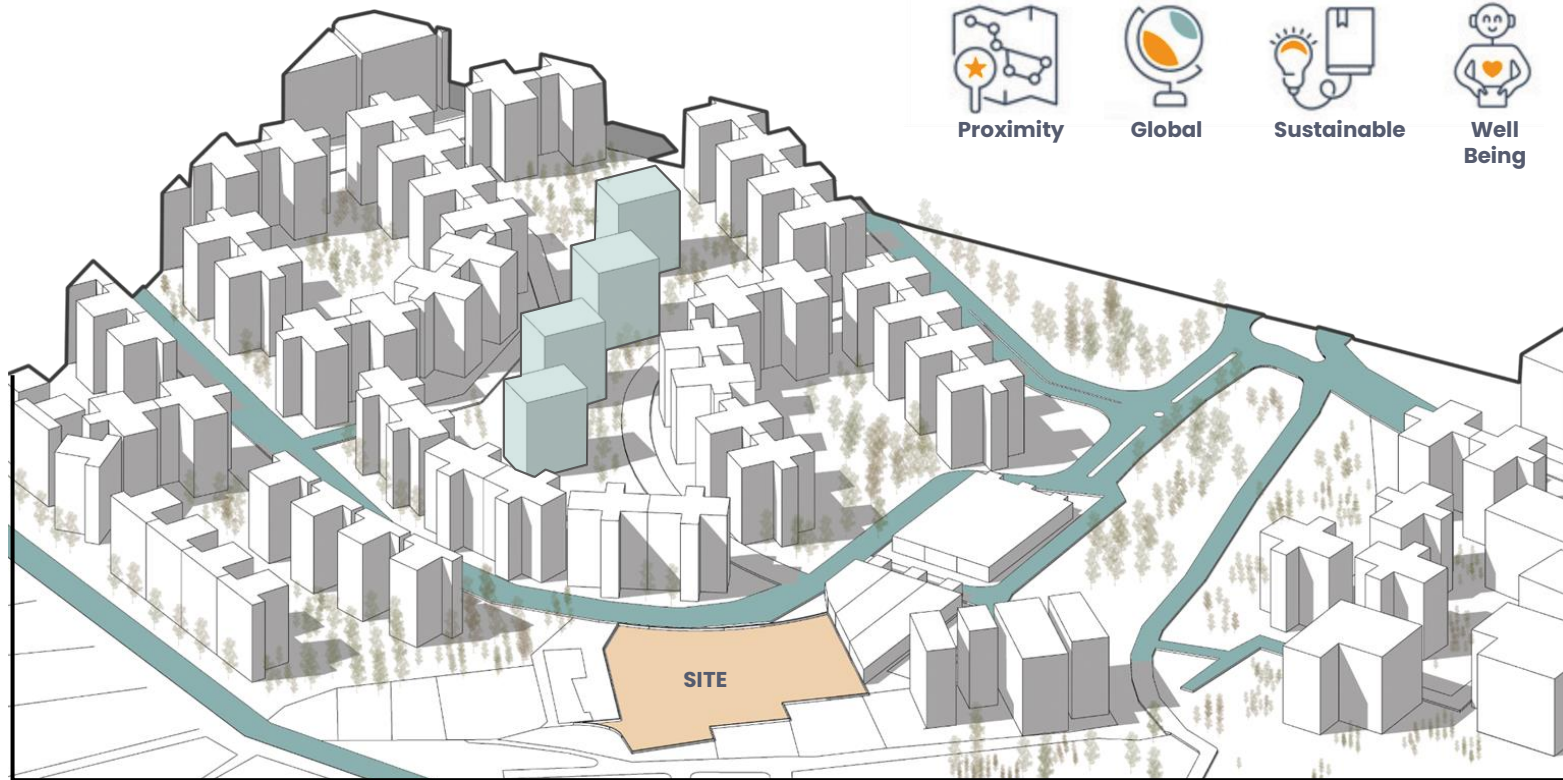
Site & Context



Noida, UP

Latitude: **28.50 N**
Longitude: **77.38 E**





Proximity



Global



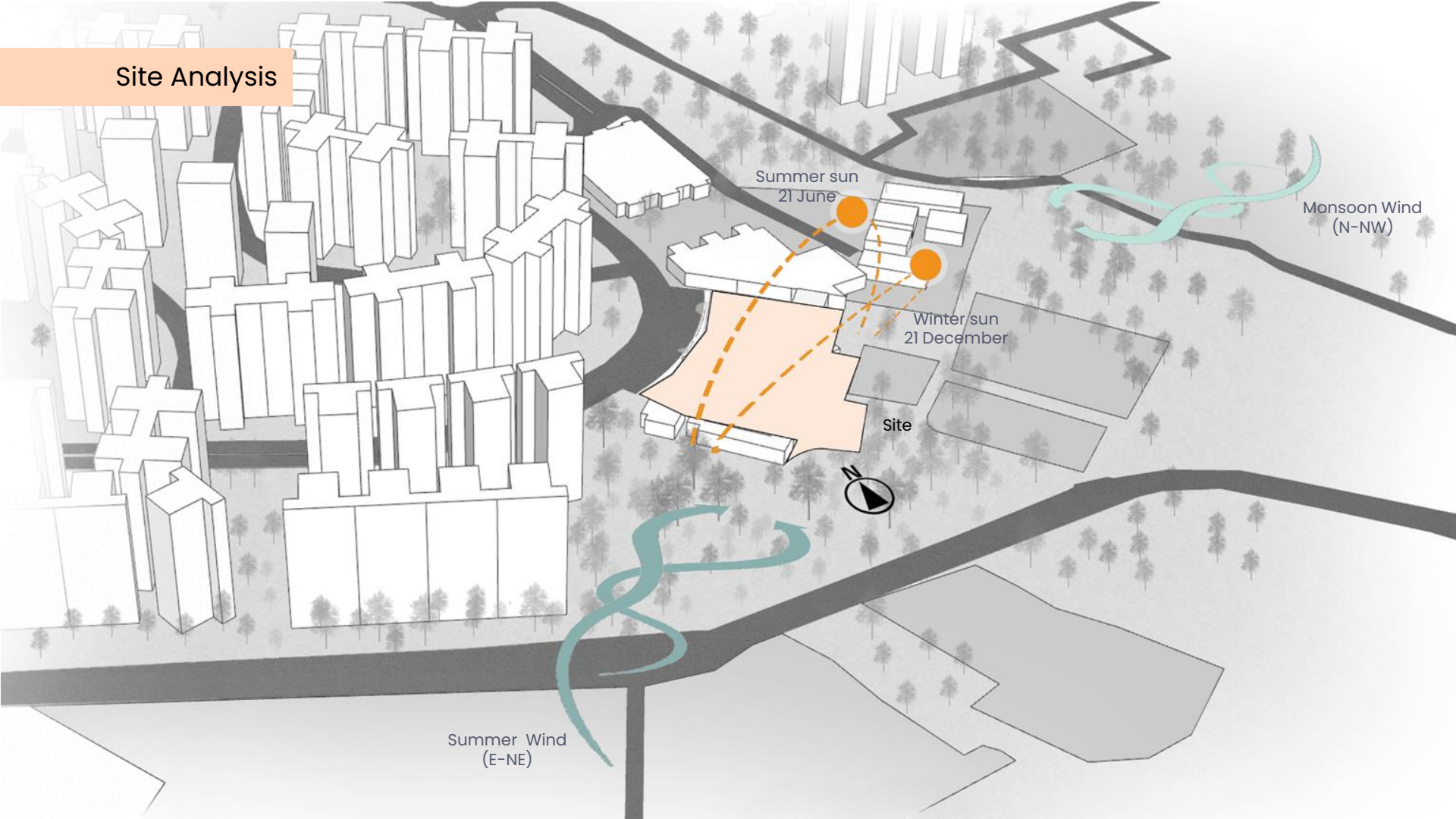
Sustainable

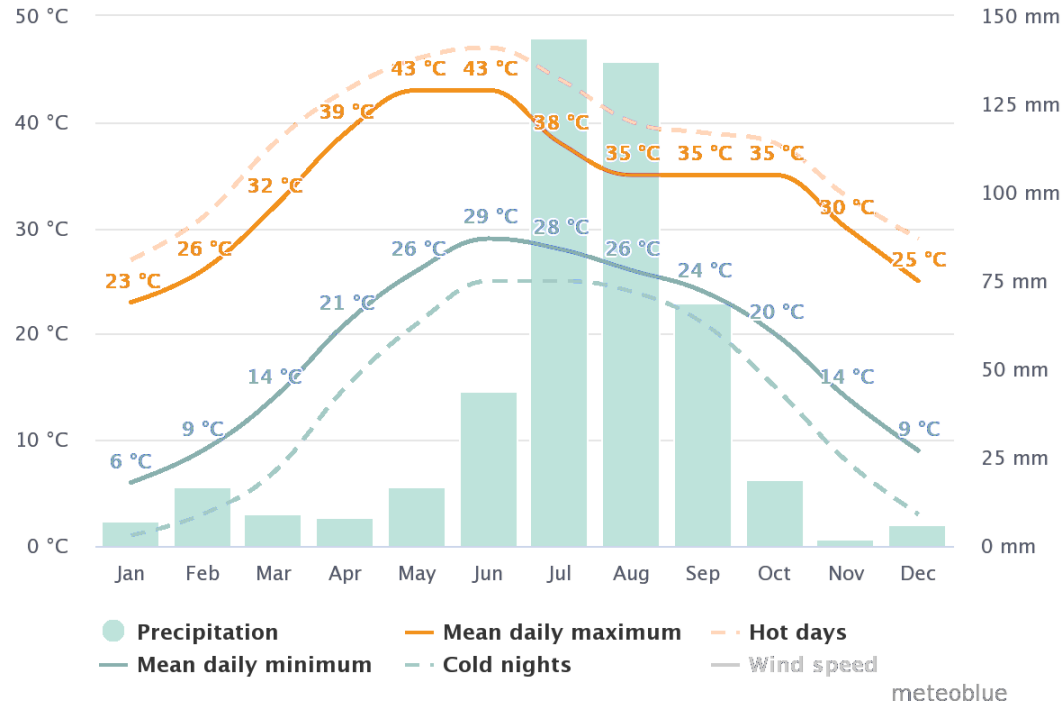


Well
Being



Site Analysis





Architecture

Design Principles

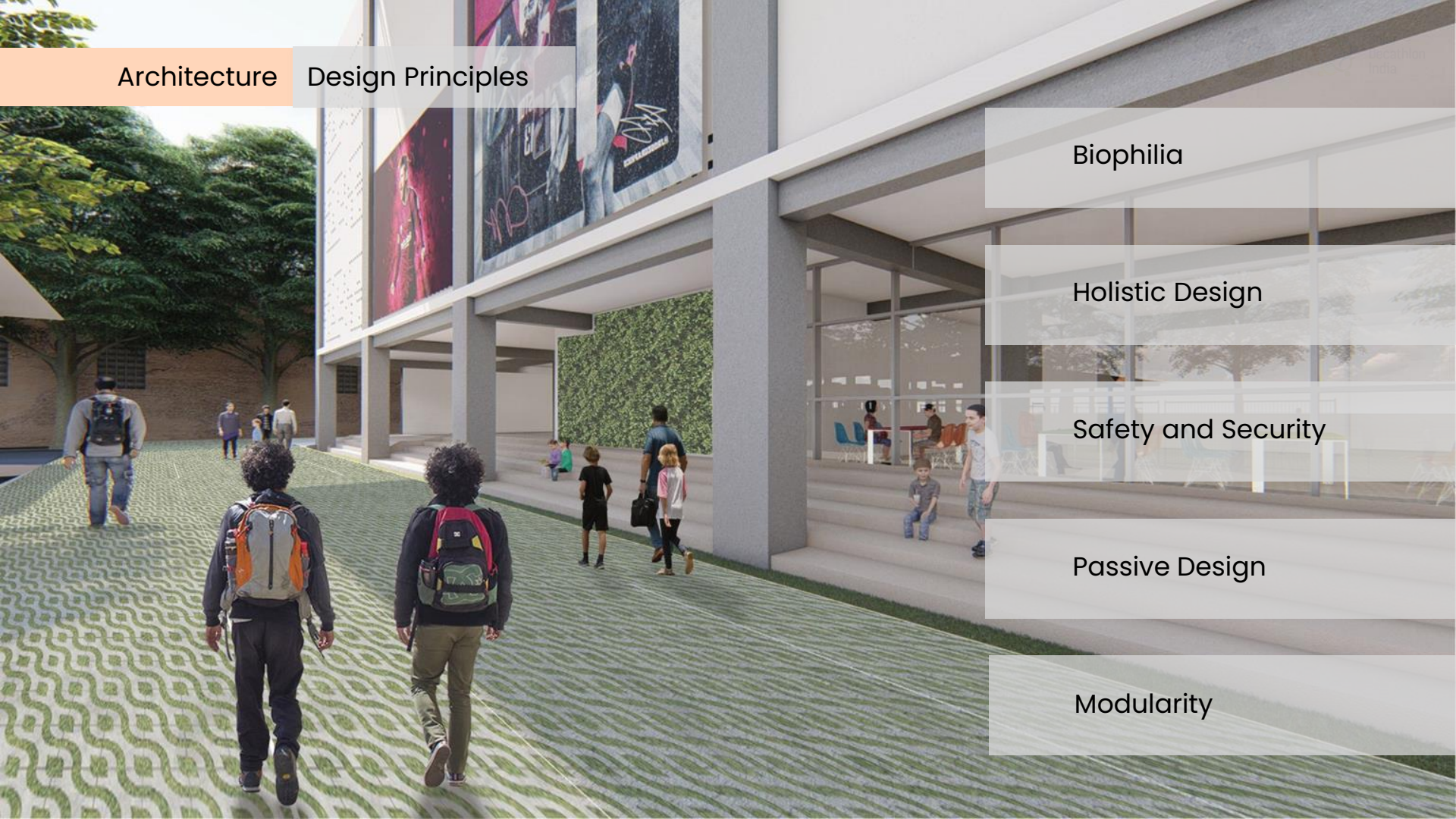
Biophilia

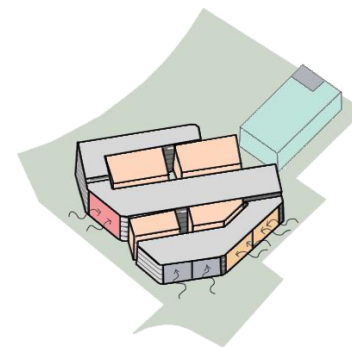
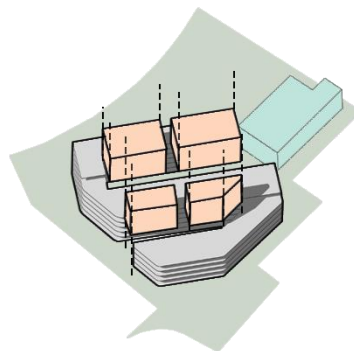
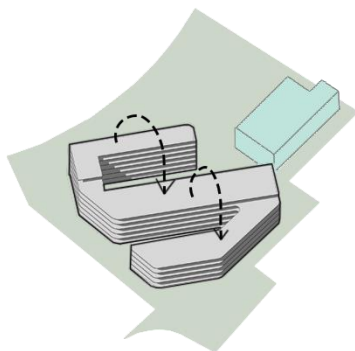
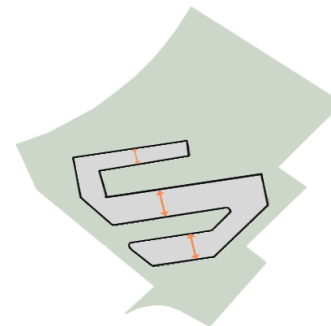
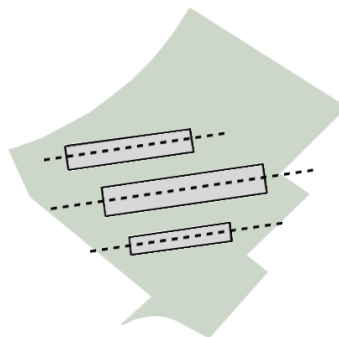
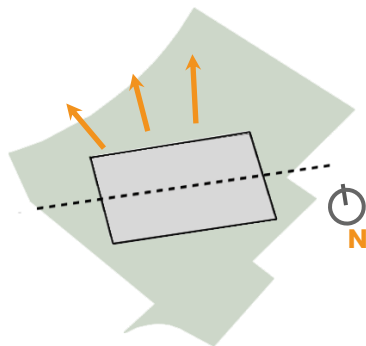
Holistic Design

Safety and Security

Passive Design

Modularity



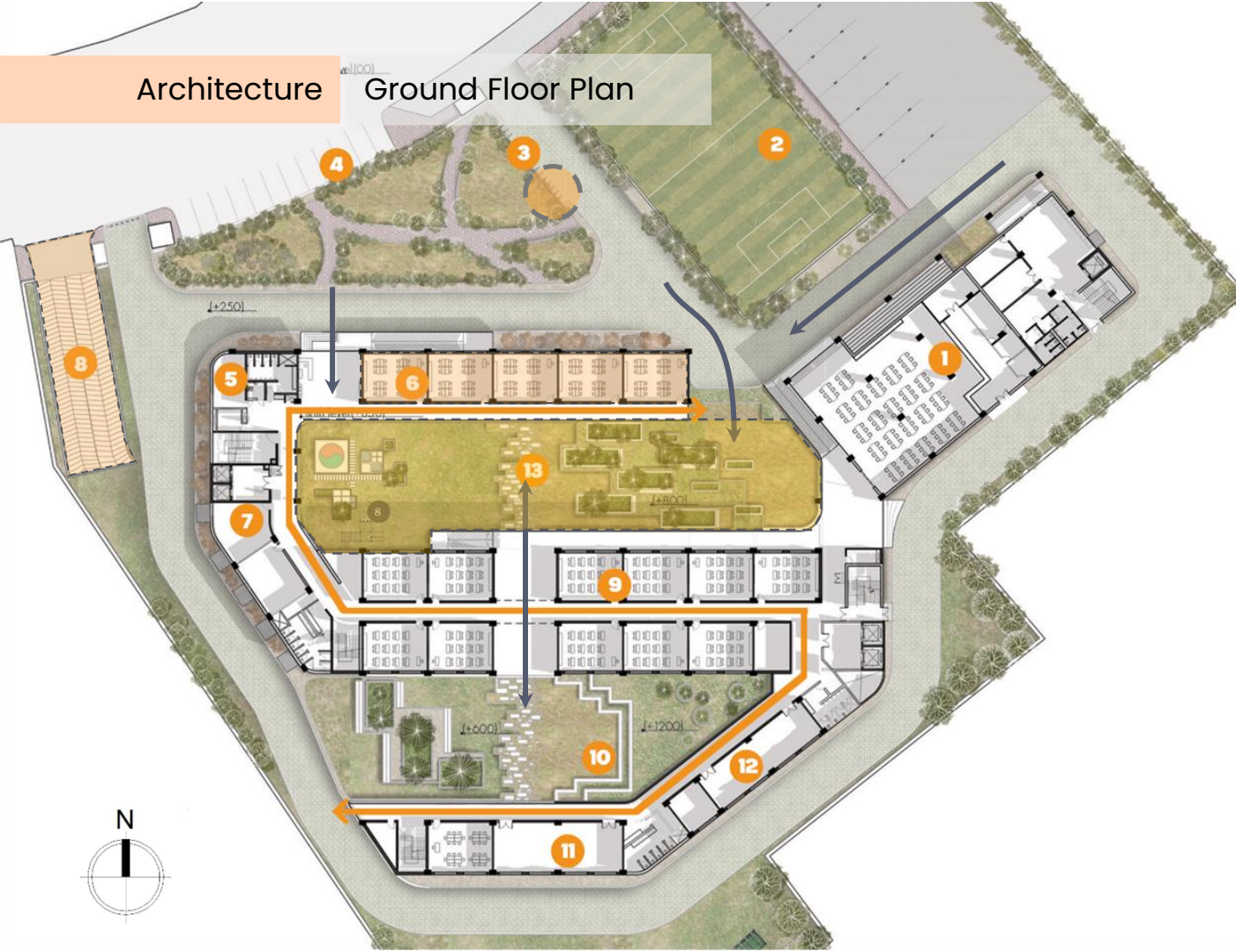


Architecture Site Plan



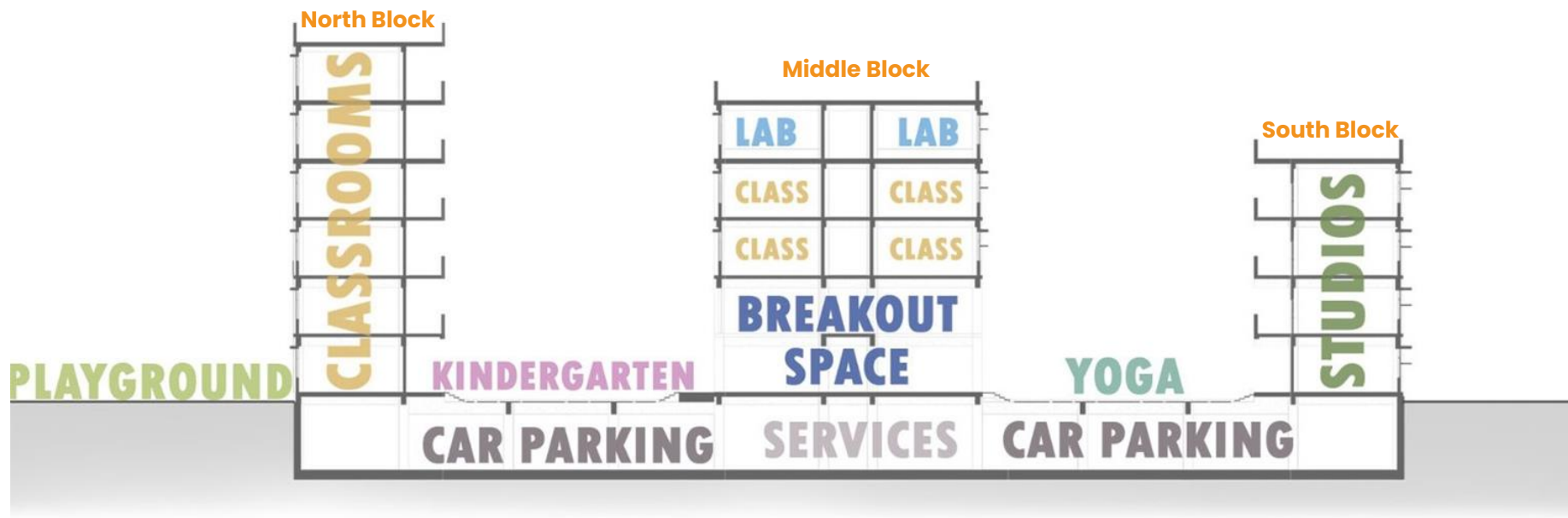
Architecture

Ground Floor Plan

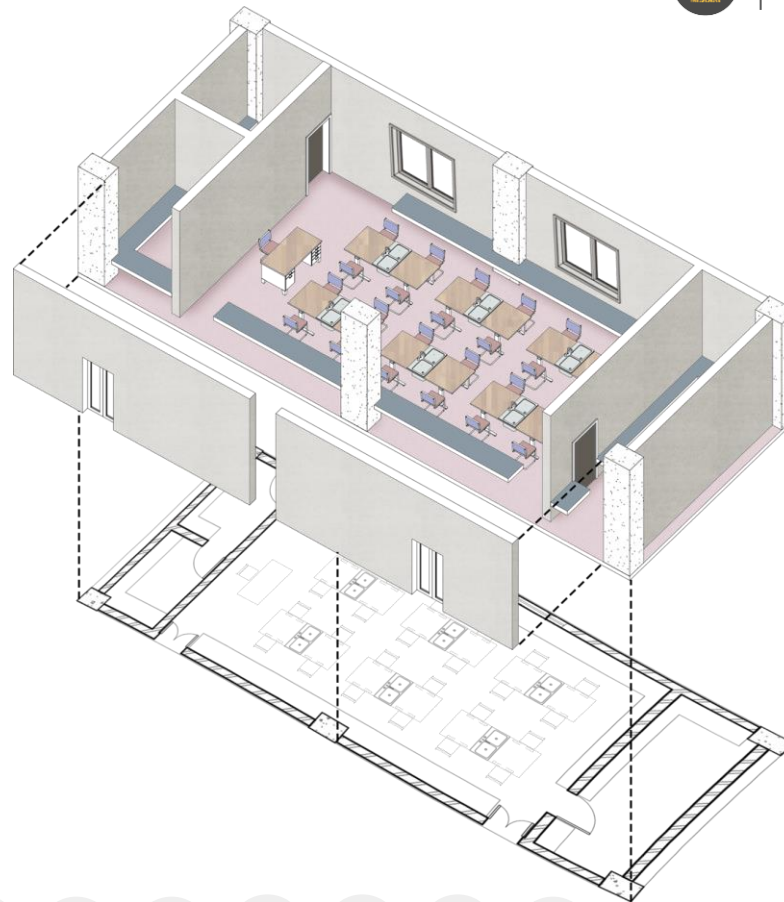
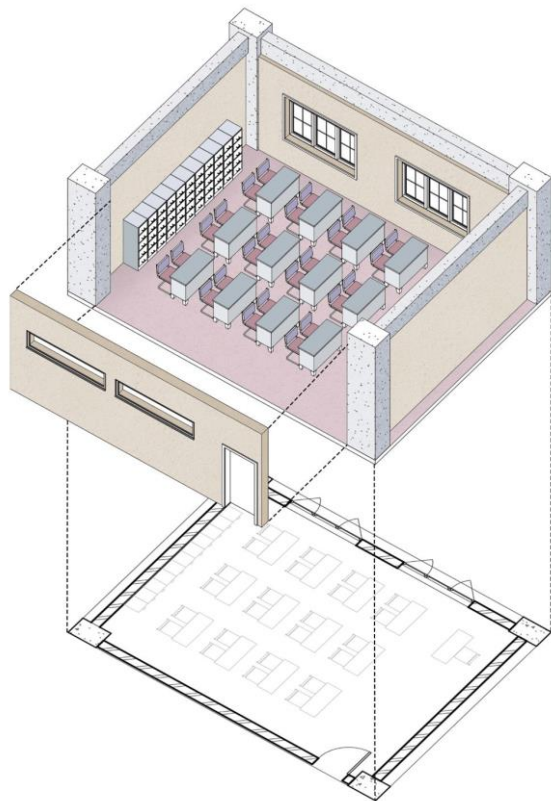


GROUND FLOOR PLAN

1. Canteen
2. Futsal ground
3. Cycle stand
4. Car parking
5. Air handling unit room
6. Pre-Primary classroom
7. Administration office
8. Ramp
9. Primary classroom
10. South courtyard
11. Dance & music room
12. Studio
13. North courtyard



Architecture Classroom Layouts





Berger Bison Acrylic Emulsion

Armstrong Fiber Ceiling Panel

Products tested by ARAI
NRC value: Up to 0.9 NRC
Up to 50 CAC

Techno Acoustic Wall Panel

NRC value: upto 0.85-0.9



Mild steel Locker

Armstrong Vinyl Tiles

NRC value: up to 0.15-0.2
(Junior Classroom)

Wooden Bench

NRC value: up to 0.2 - 0.3
Reduce 20%-30% of
airborne sound

Terrazzo Flooring
(Senior Classroom)



125 mm Thk. Partition Wall

Interactive punctures

Cardboard Pipe

Cardboard Furniture



An architectural rendering of a modern school building with a large, open courtyard. In the foreground, a woman with a yellow backpack and two young girls are walking away from the viewer. To the left, two children are sitting on a low concrete bench. The courtyard is landscaped with green grass, small trees, and low concrete walls. The building in the background is a multi-story structure with many windows. A semi-transparent dark grey rectangle is overlaid in the center of the image, containing white text.

What are the challenges involved in
designing a net-positive school in Noida?





Wind Tower

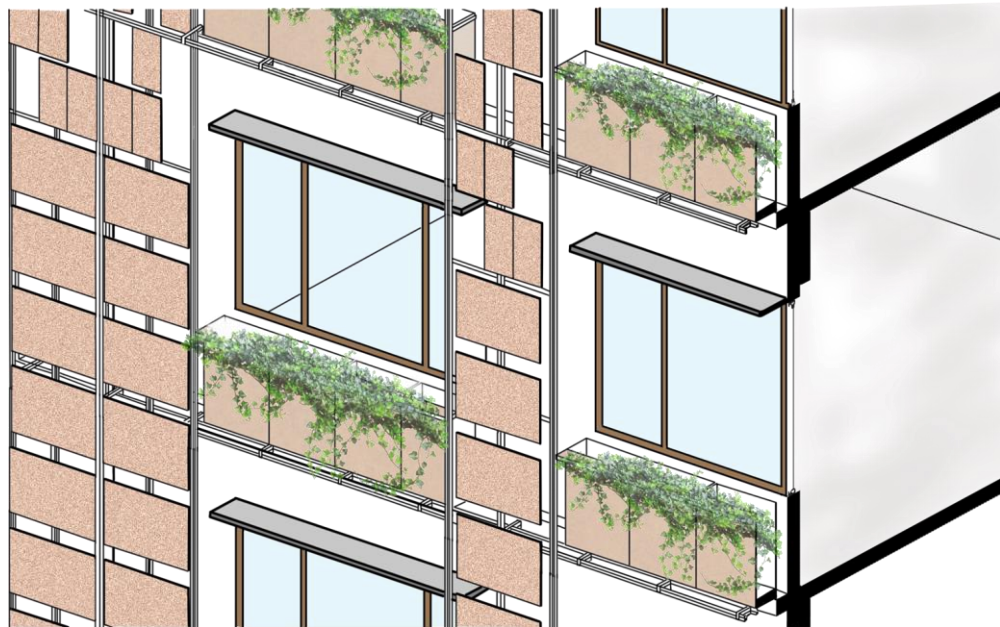


Insulation

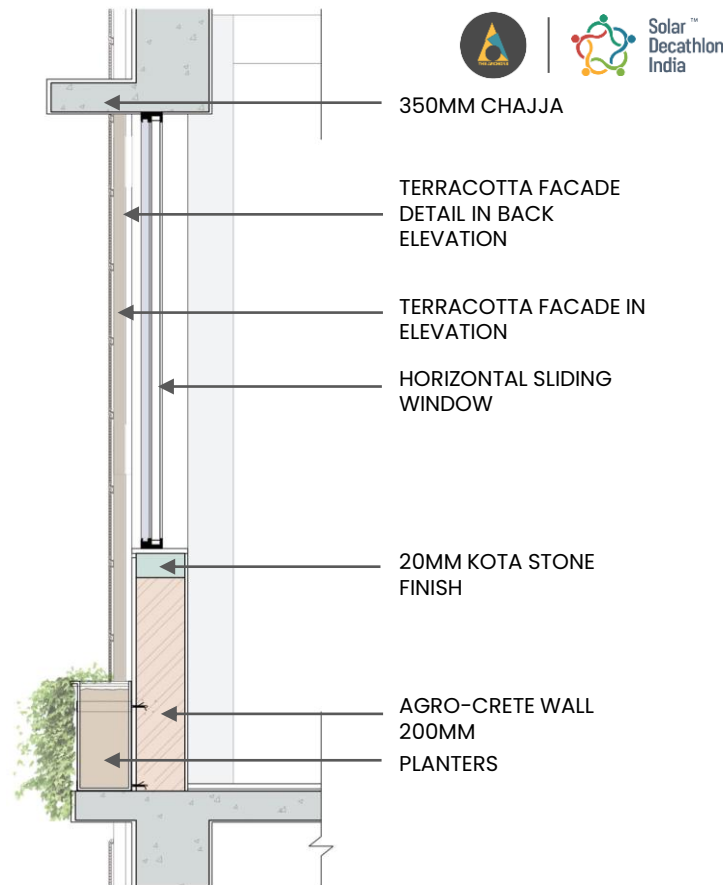


Optimum
Shading

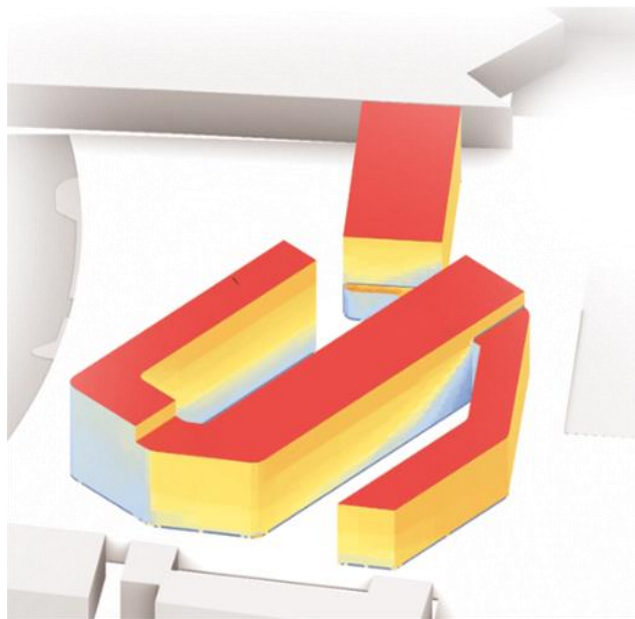




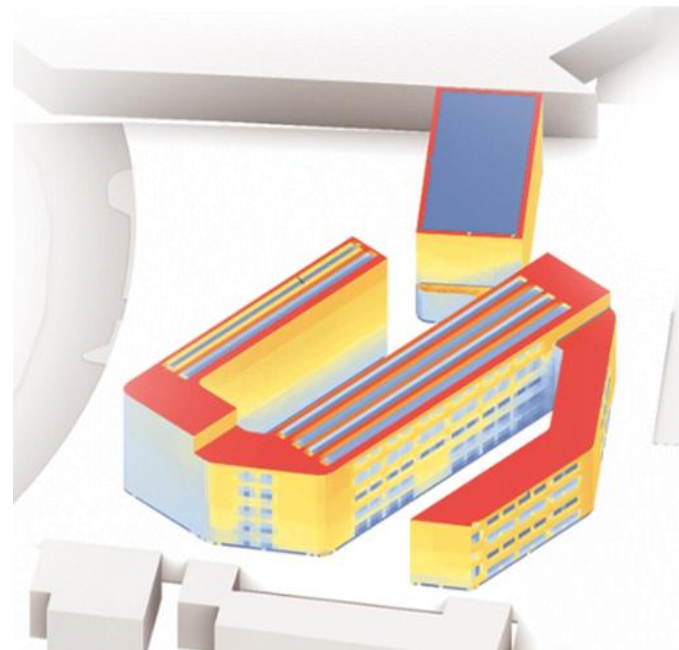
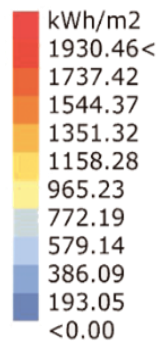
North Face



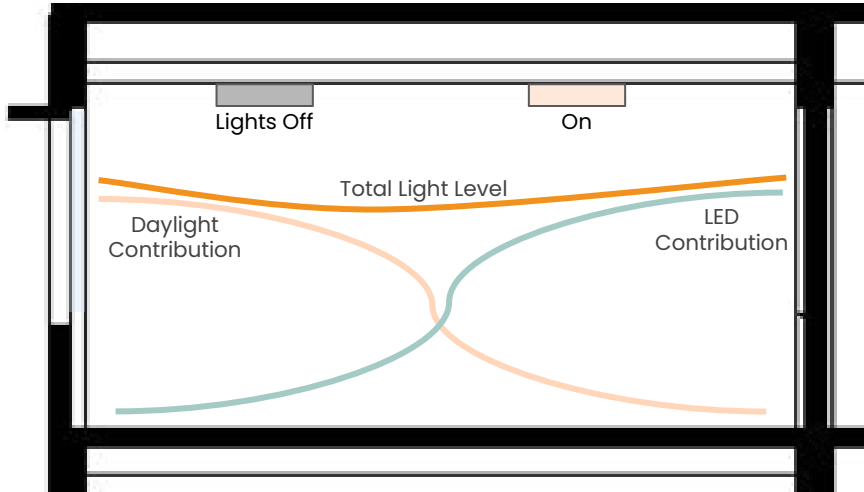
EXTERNAL WALL SECTION



Baseline

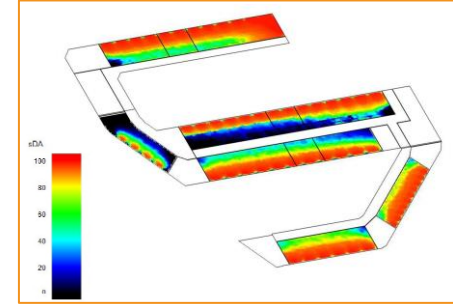


Proposed

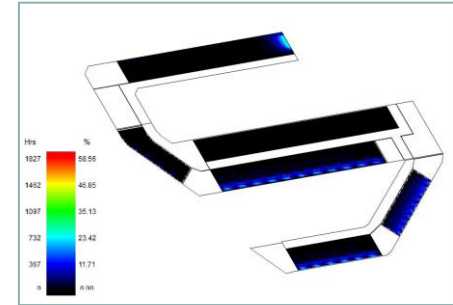


3 STEPPED Lighting Sensors

	Total Floor Area	Area in Range (m2)	Area in Range (%)
sDA	7285.9	4890.6	67.12
ASE	7285.9	6632.2	91.03

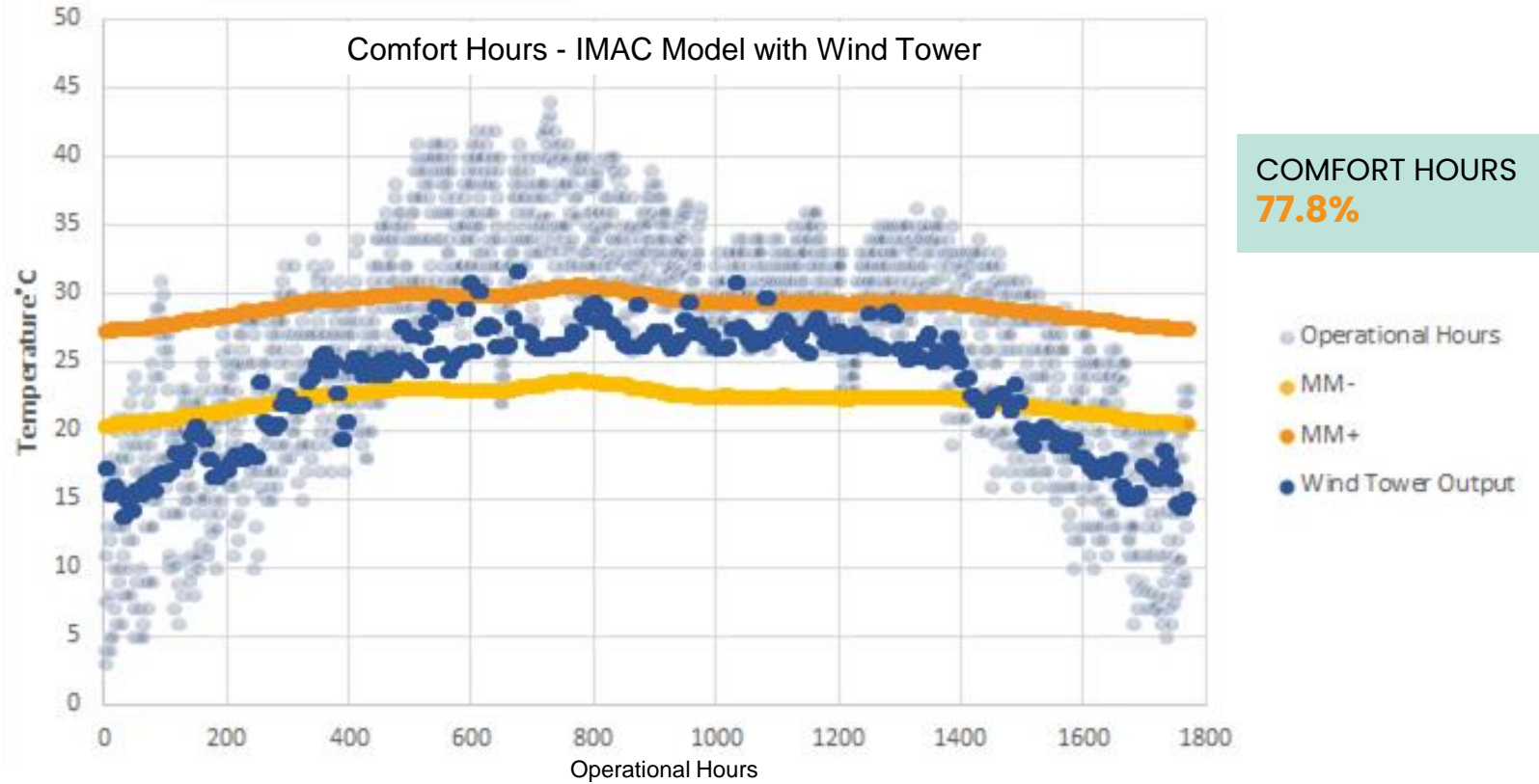


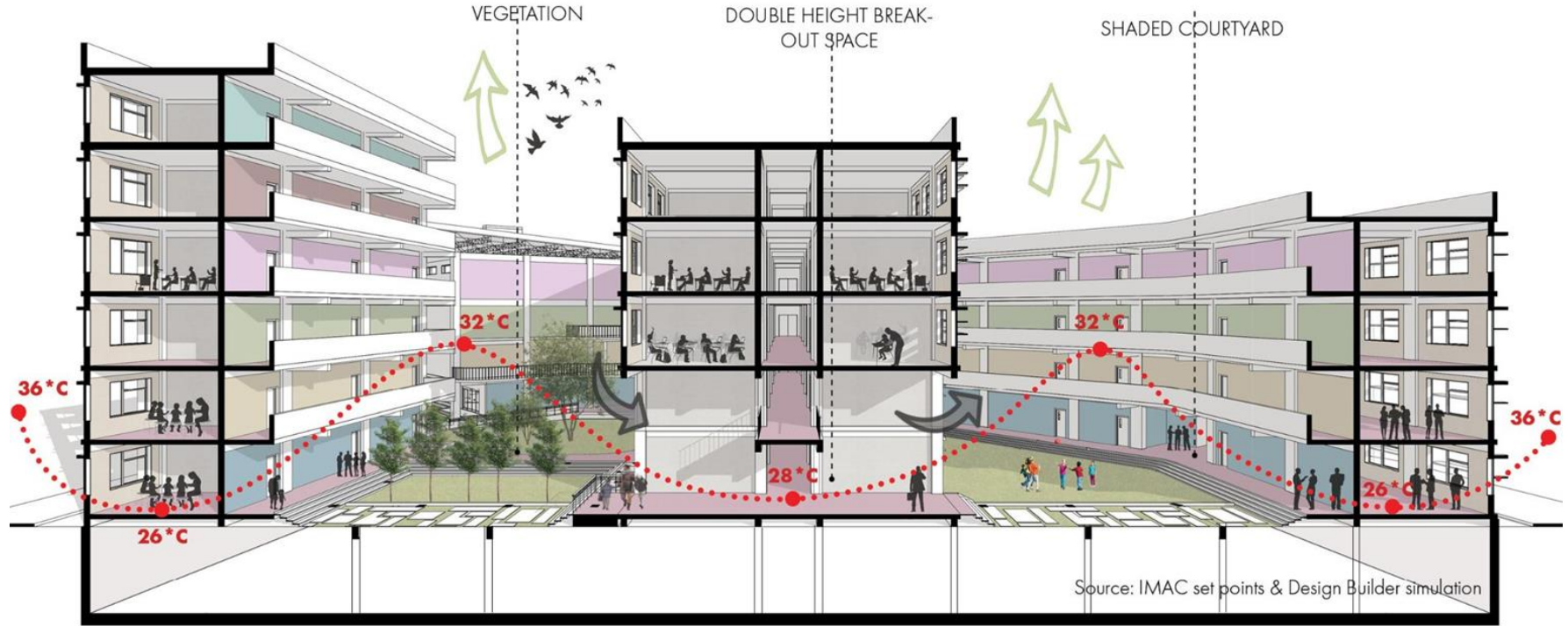
Daylight Autonomy



Annual Sunlight Exposure

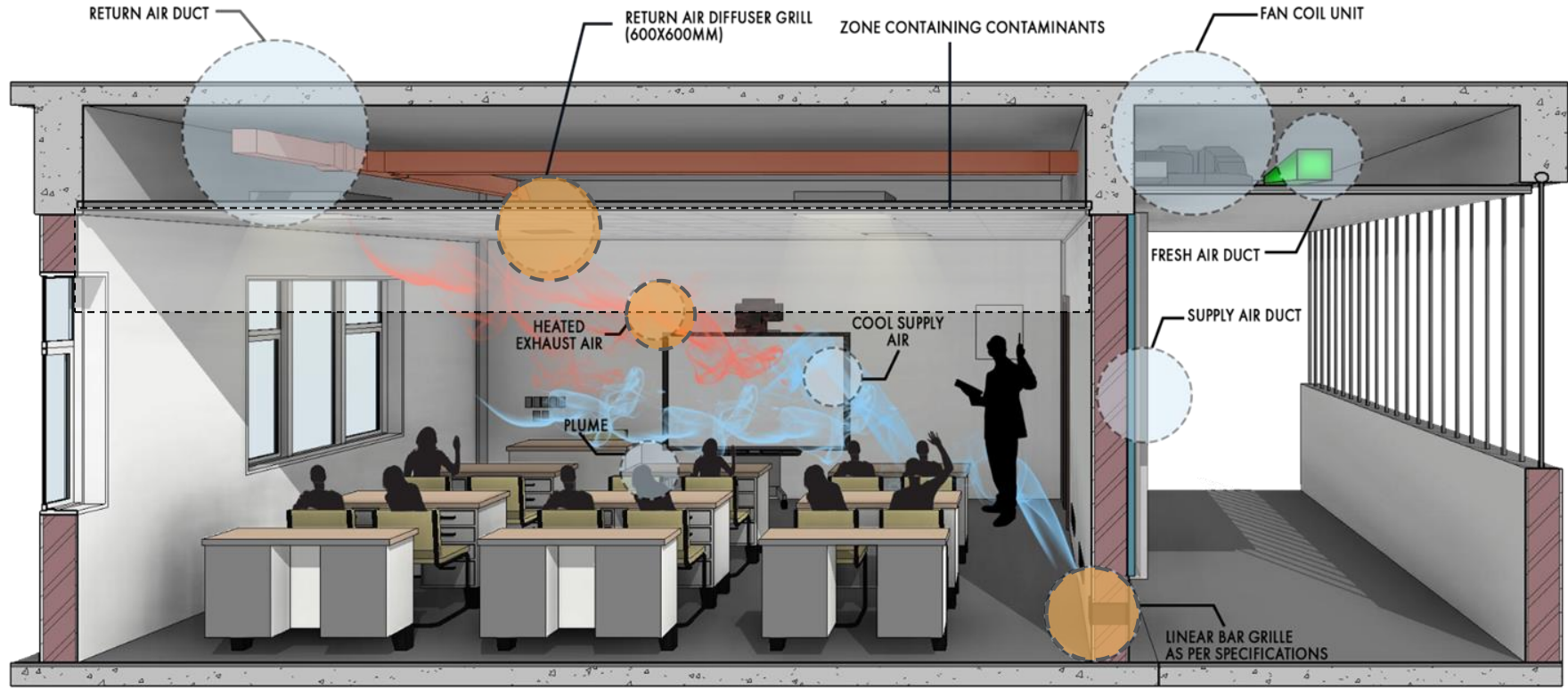
Comfort Comfort Hours

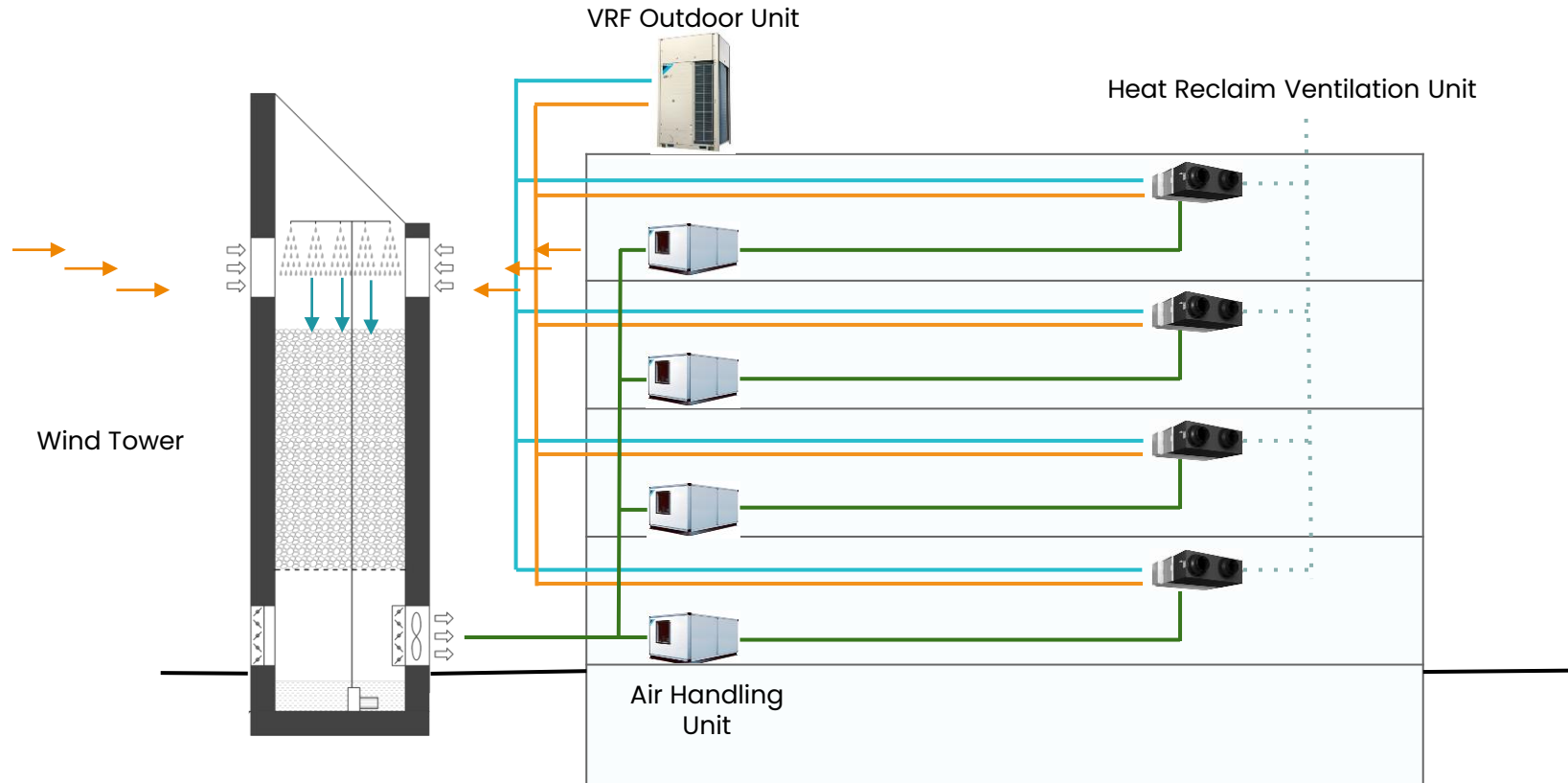




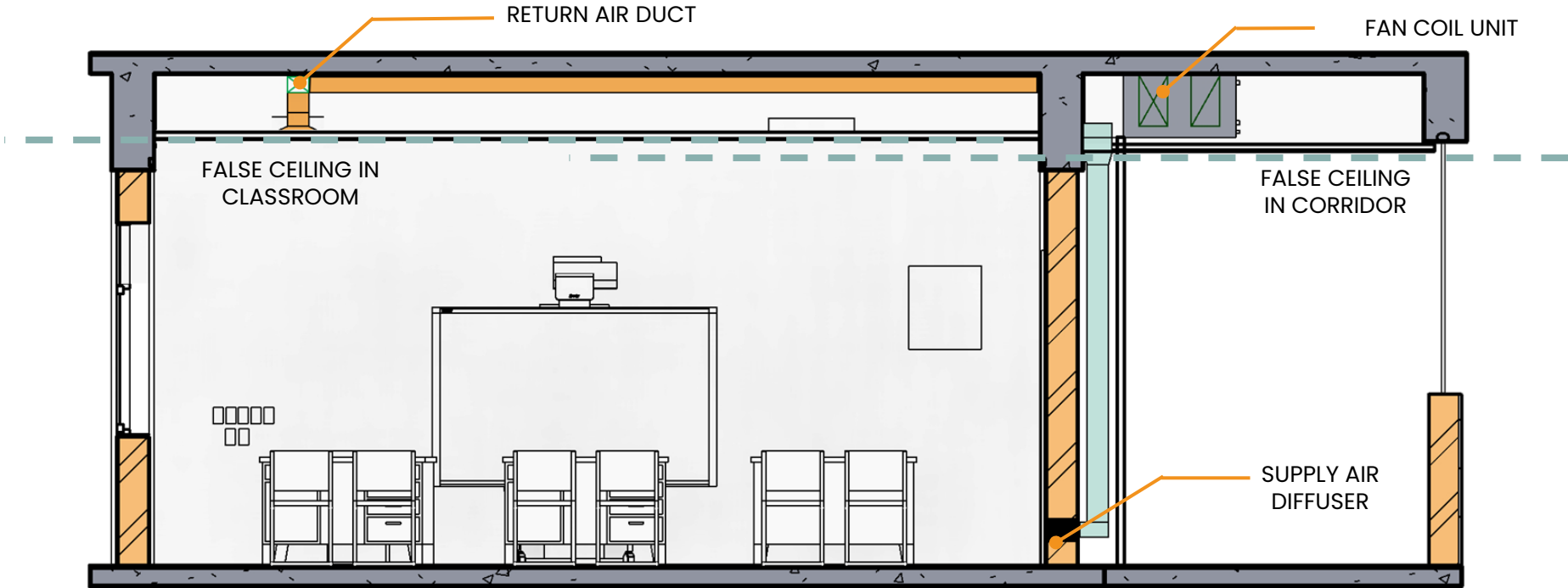


Comfort Displacement Ventilation

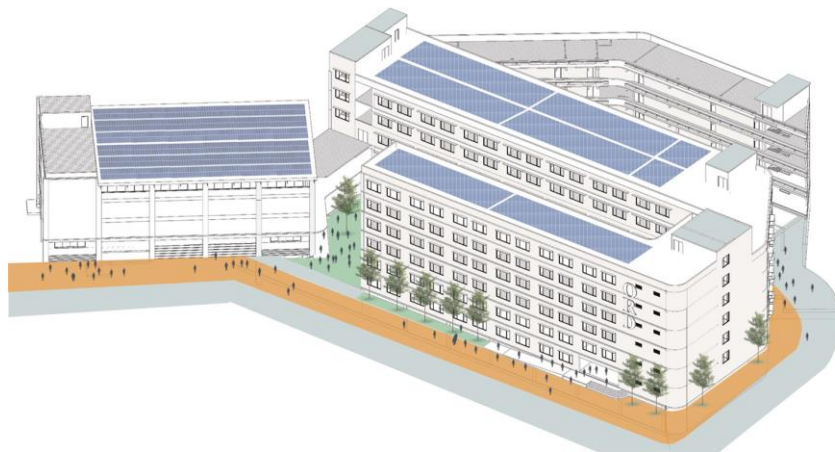




Operations HVAC

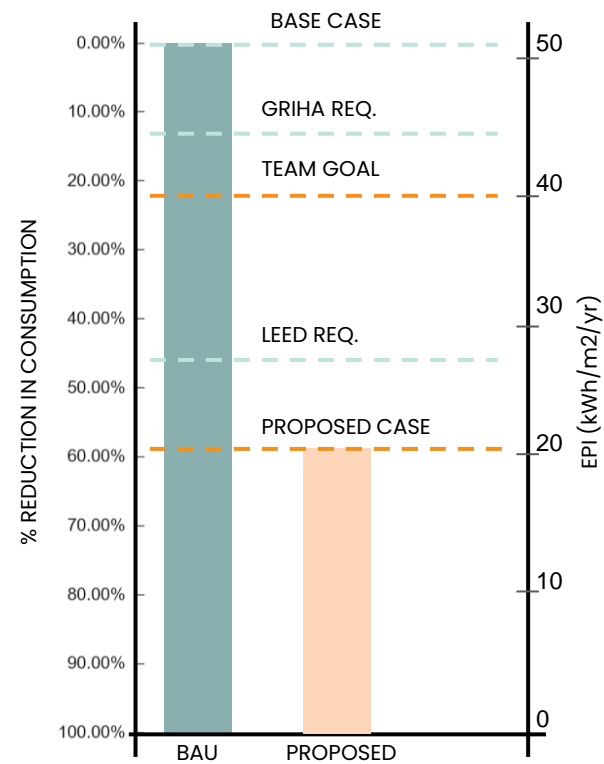


Energy Overview

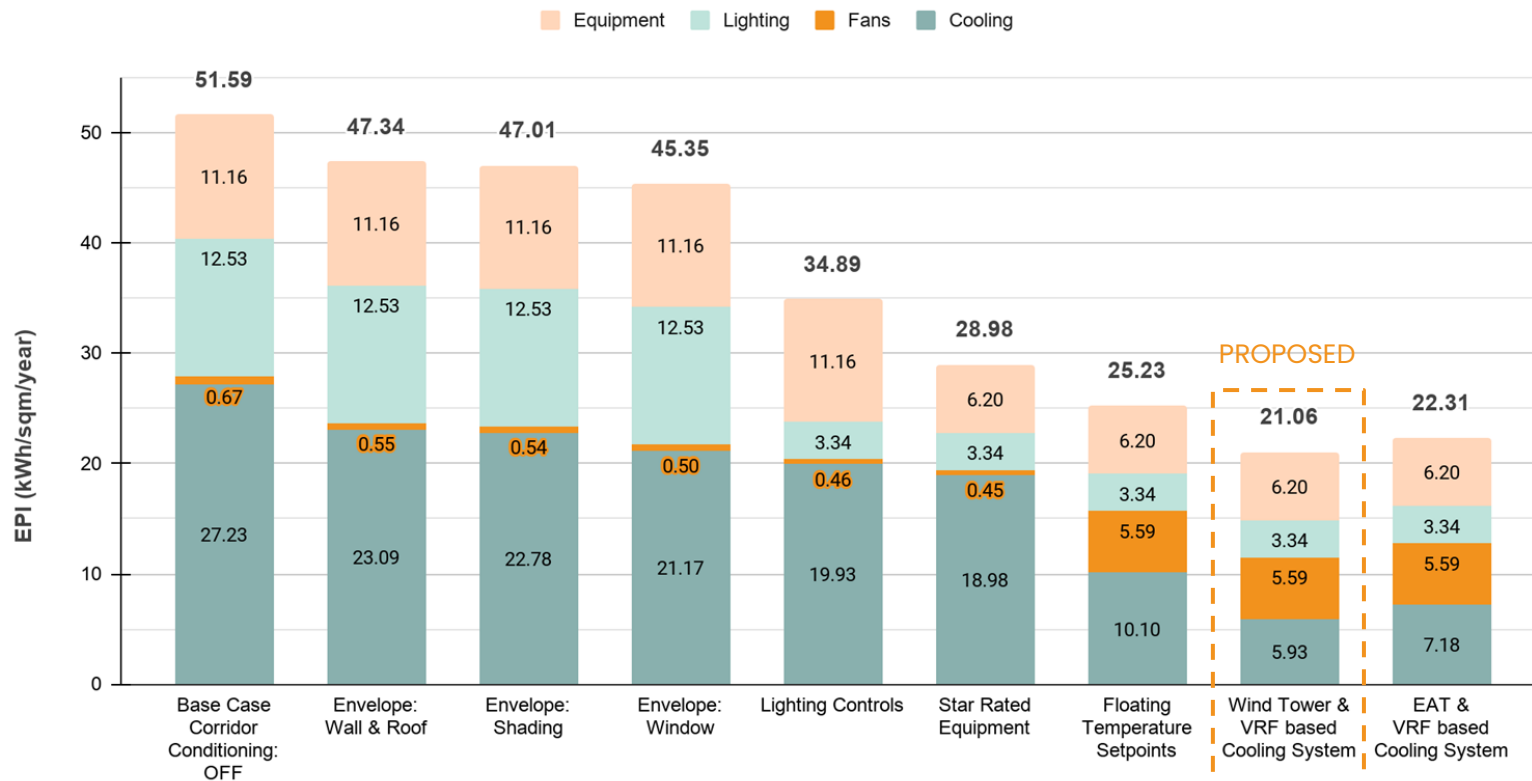


Baseline EPI (kWh/m ² /yr)	Target (kWh/m ² /yr)	Proposed EPI (kWh/m ² /yr)
51.59	40.00	21.06

59.17% Reduction



Energy ECMs



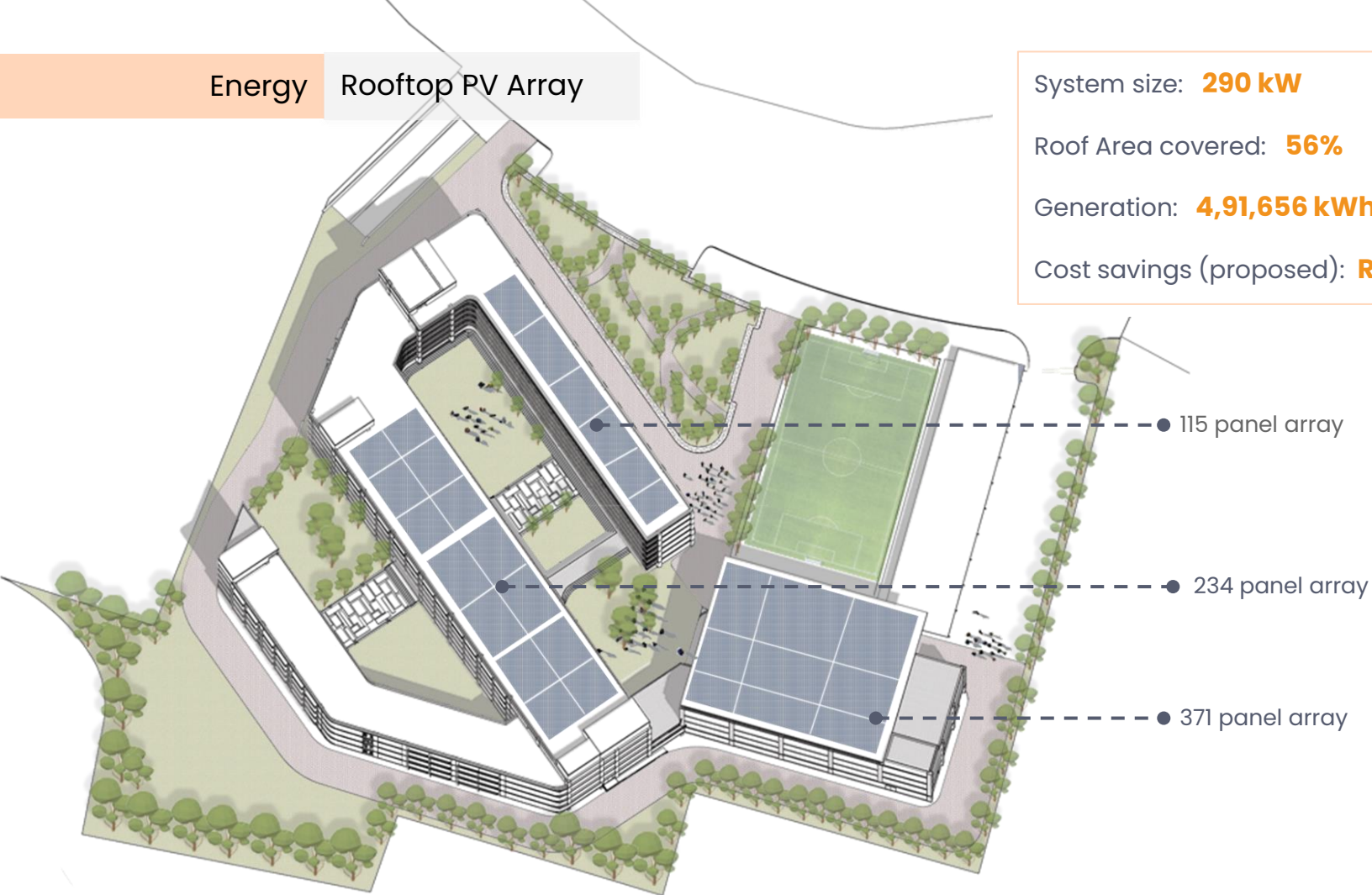
Energy Rooftop PV Array

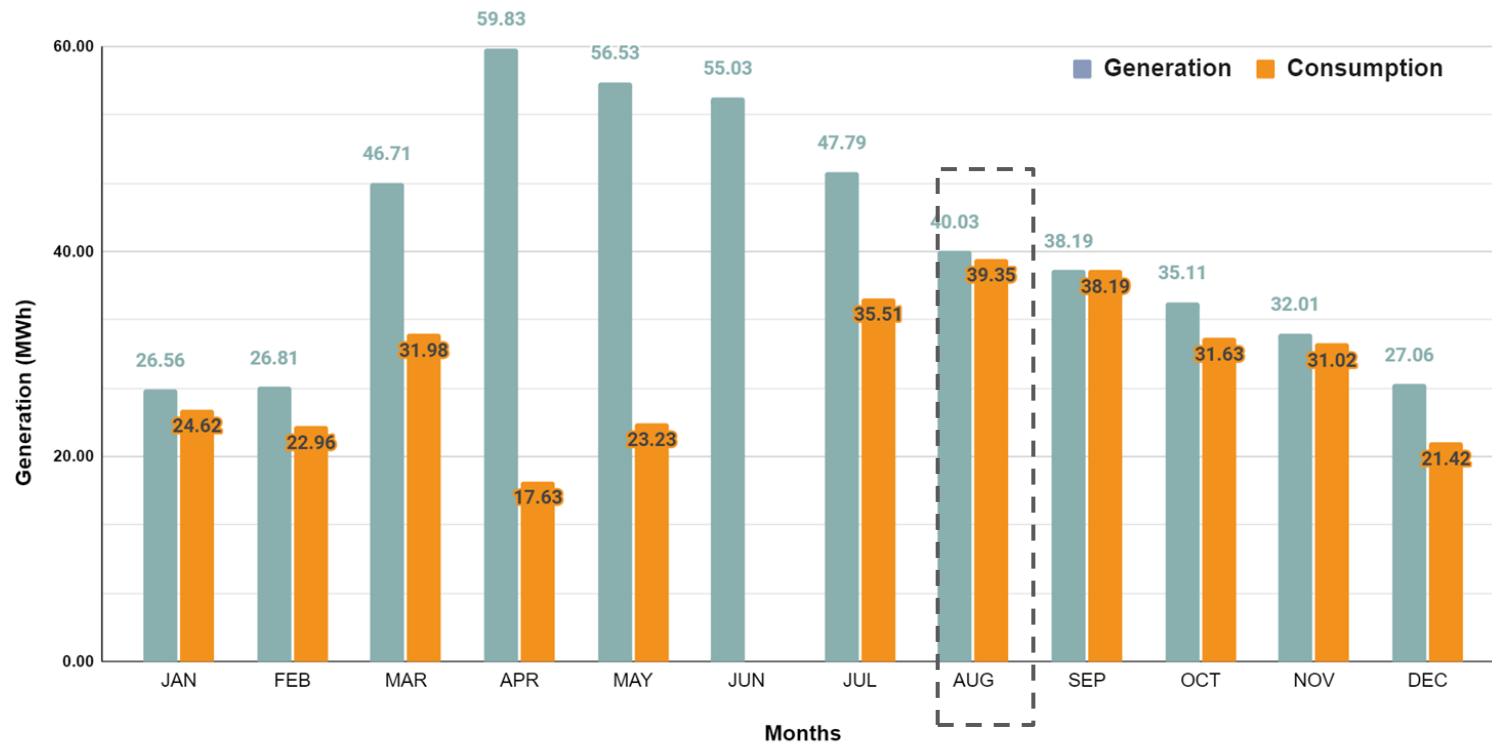
System size: **290 kW**

Roof Area covered: **56%**

Generation: **4,91,656 kWh**

Cost savings (proposed): **Rs 34,40,348**



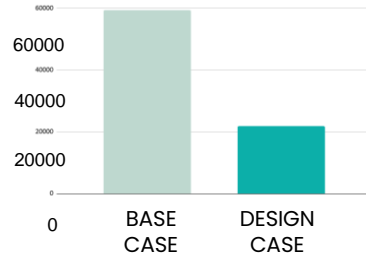




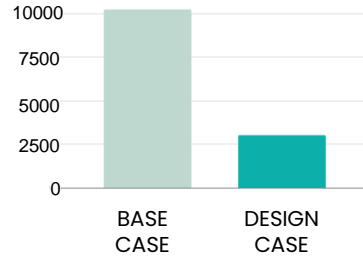
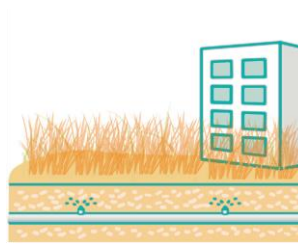
	Generation (kWh)	Total Generation (kWh)	Consumption (kWh)	Net Site Energy (kWh)
Multipurpose Hall	268,436.86	491,656.48	321,291.26	-170,365.12
School Block	223,219.62			
	EPI (kWh/sqm.)	32.21	21.06	-11.16

~~NET-ZERO~~ → **NET-POSITIVE**



BUILDING WATER
DEMAND

63% reduction

LANDSCAPE WATER
DEMAND

70.52% reduction

Total annual
Water Demand 23640 kLWater used from
**Alternate
Sources** 20129 kLAverage rainwater
**Recharged to
Ground** 4462 kL

**FRESH
WATER
SOURCE**



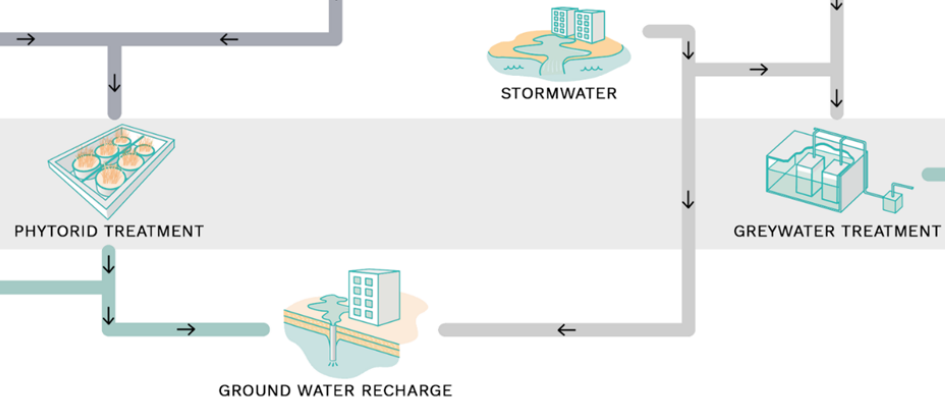
USES

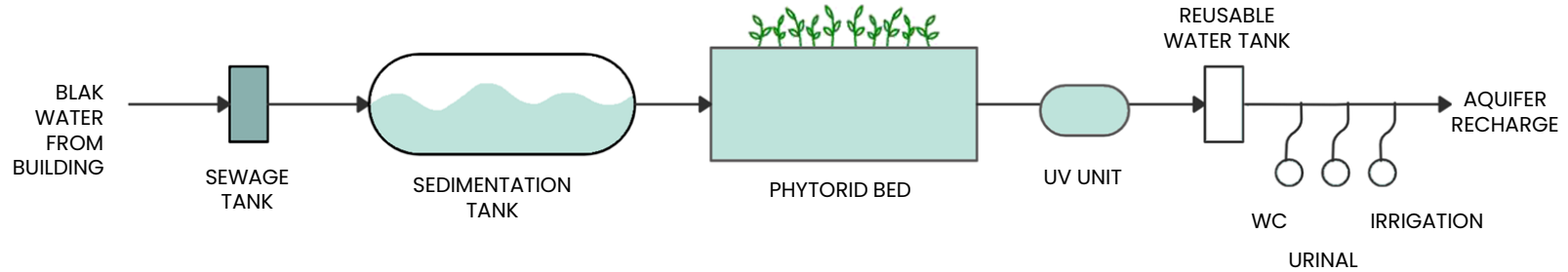


SOURCE

TREATMENT

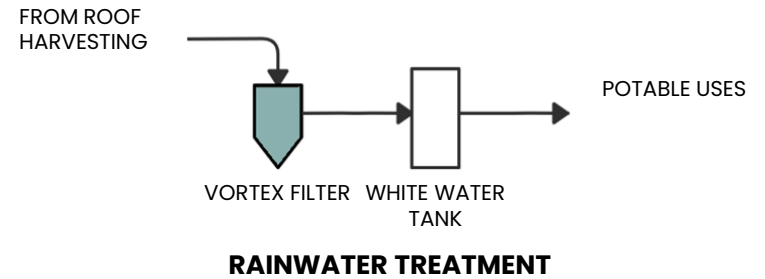
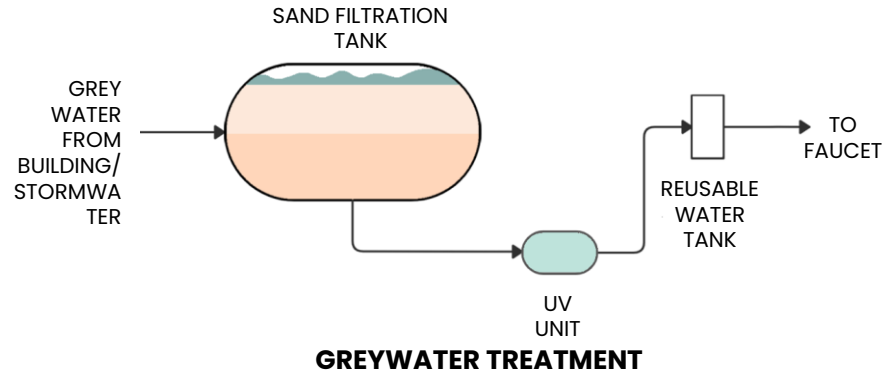
OUTFLOW





BLACKWATER TREATMENT







28% PLANT COVER
WITH NATIVE PLANTS AND
XERISCAPING



41% RAINWATER COLLECTED
AND REUSED



EFFICIENT PLUMBING FIXTURES
WITH LOW FLOW RATES



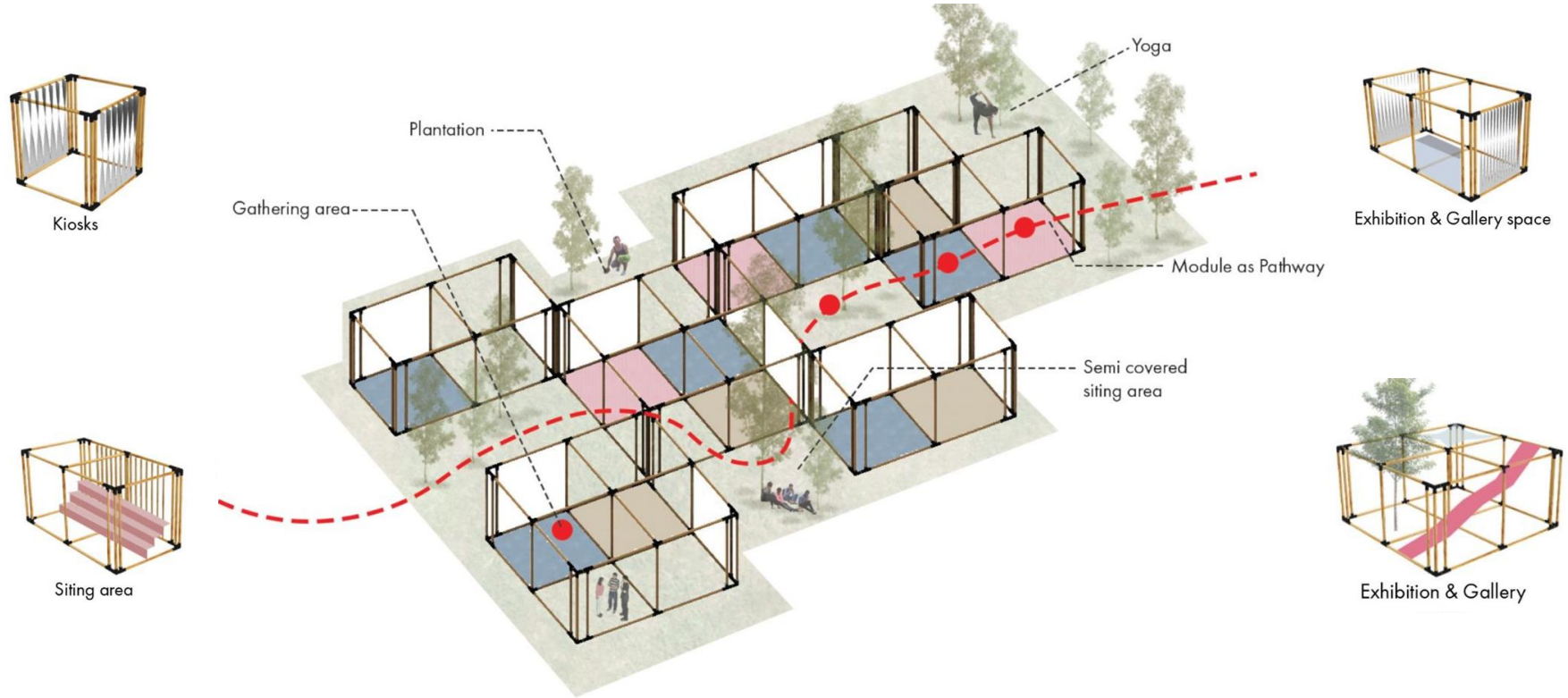
PERMEABLE PAVERS
FOR GROUND WATER RECHARGE



INTERACTIVE DASHBOARD
TO CREATE AWARENESS



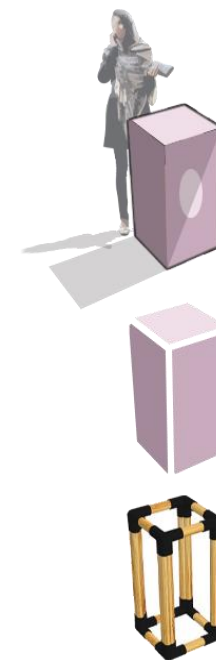
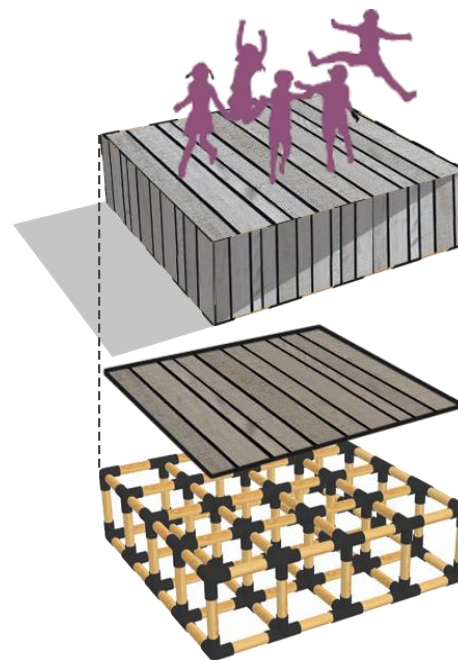
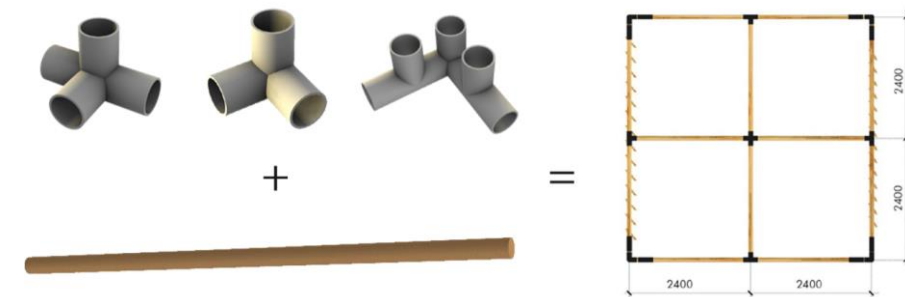
Innovation Modular PODS

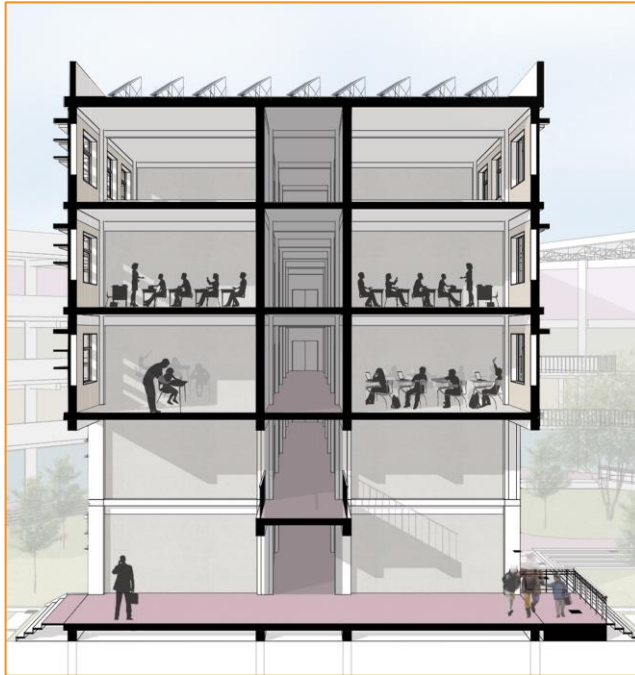


Modular Pods Adaptive Uses

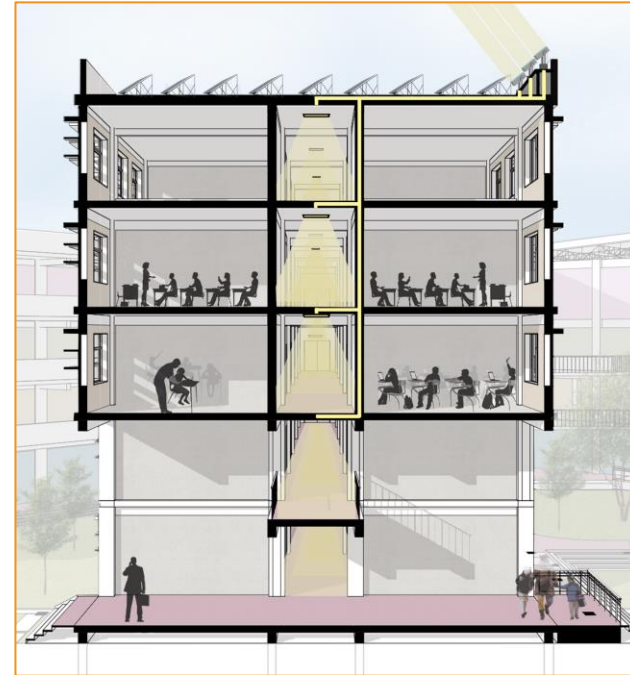


Modular Pods Scalability



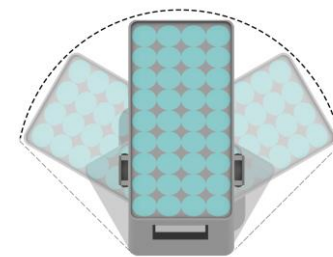
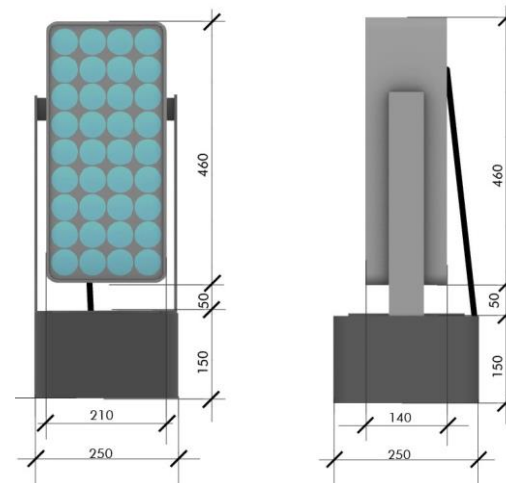
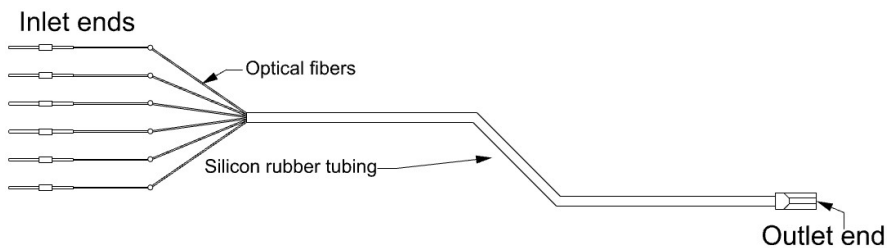
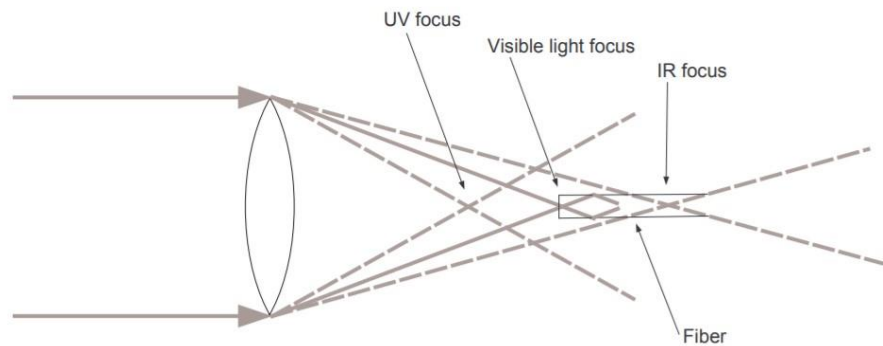


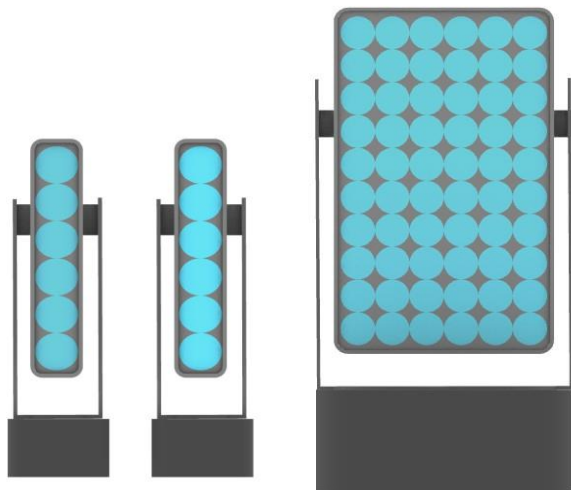
Without Lamps



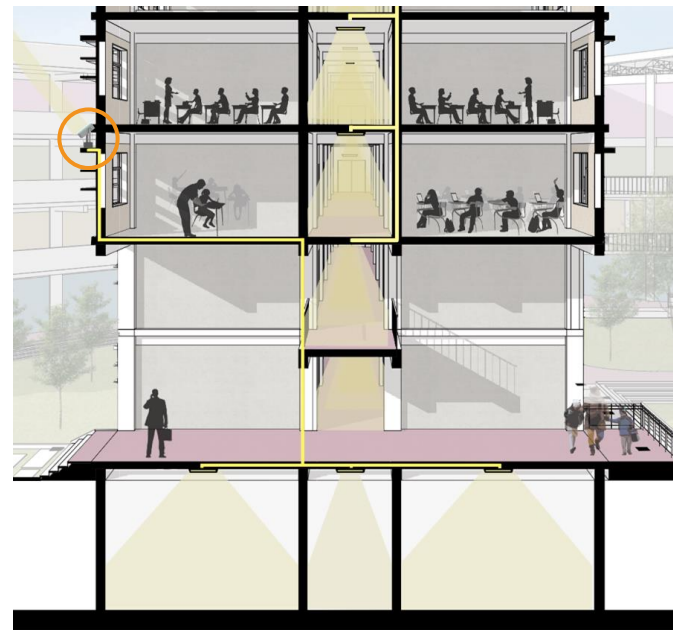
With Lamps

Optical Lamp Concept

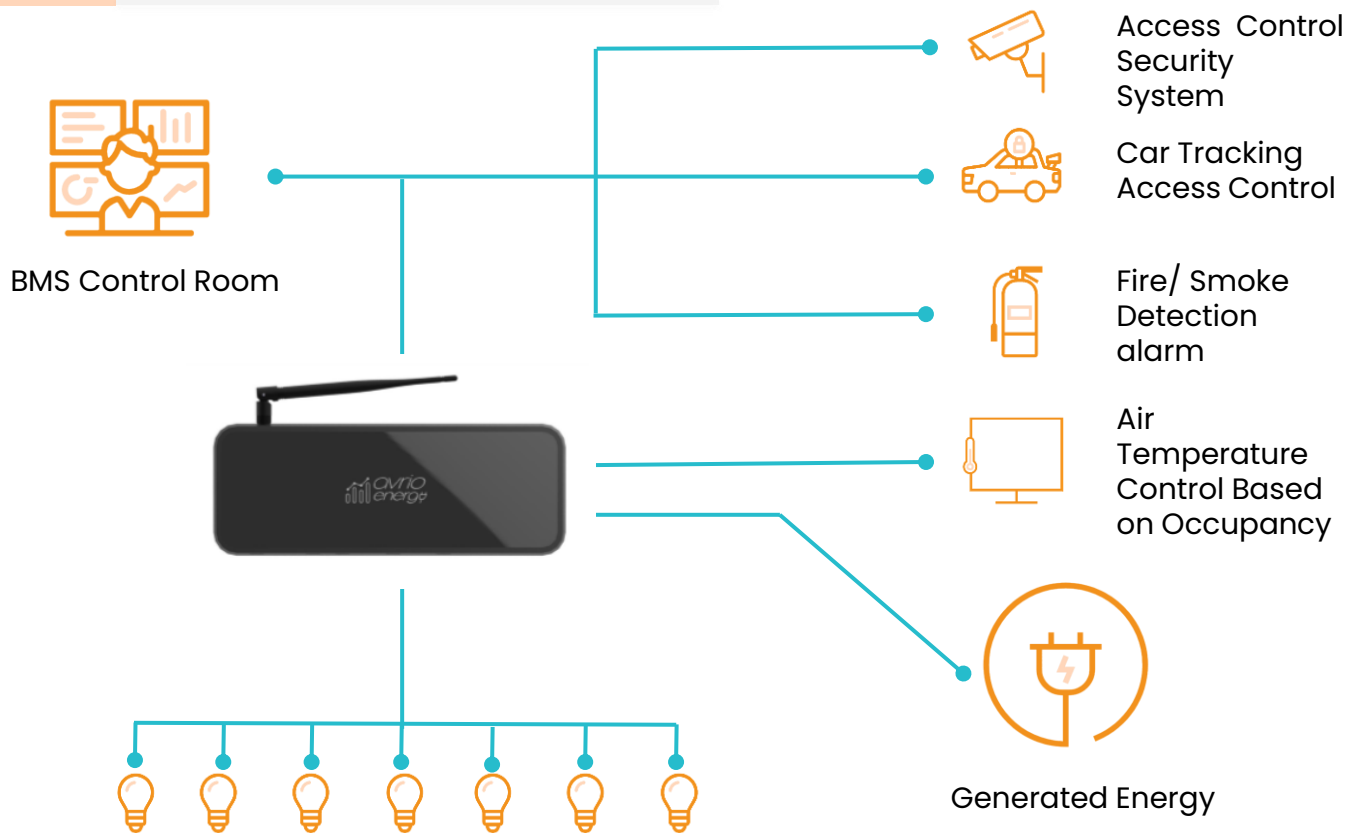




Different Modules

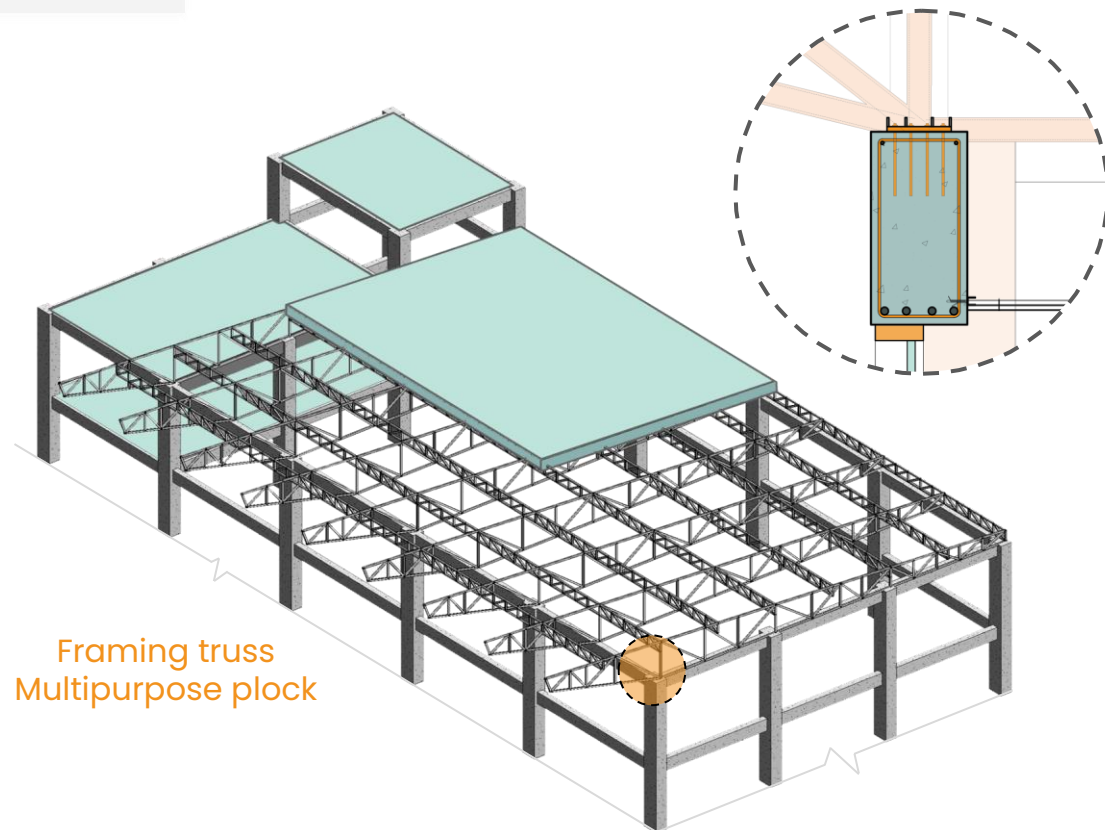
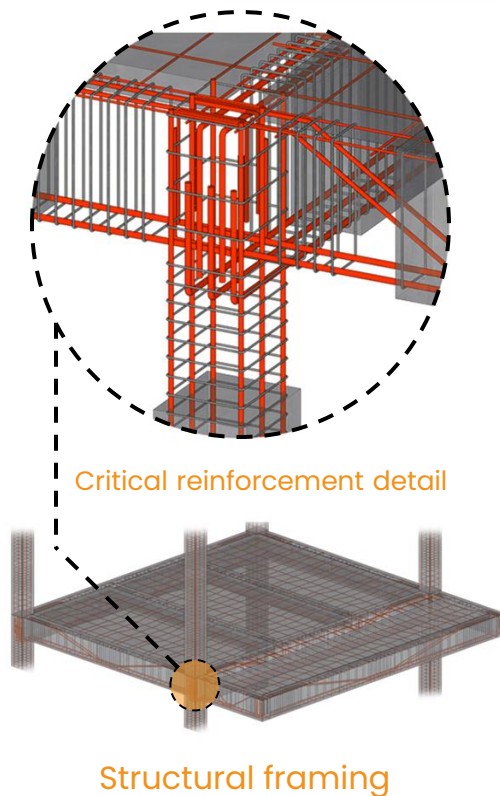


Basement Installation

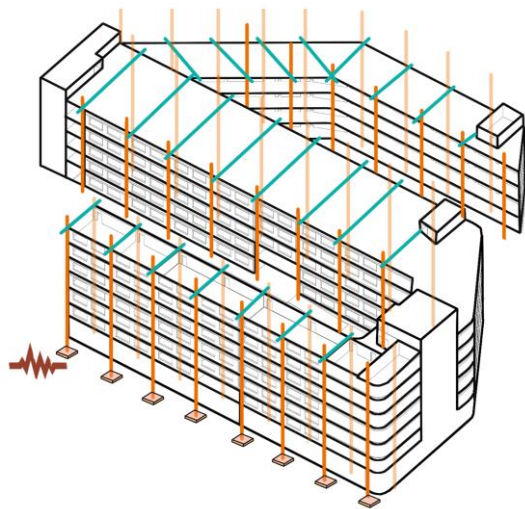


Interactive Visual Displays

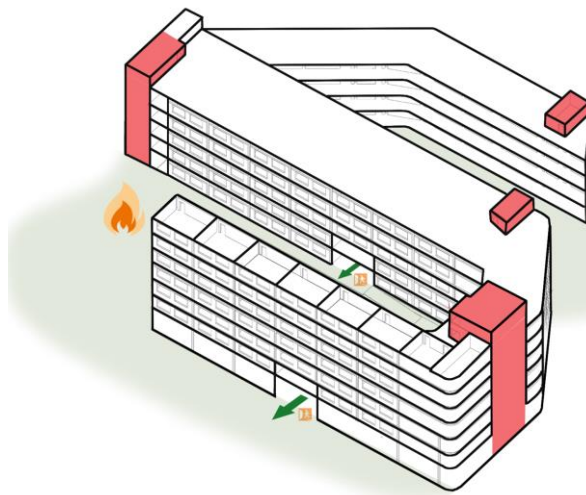




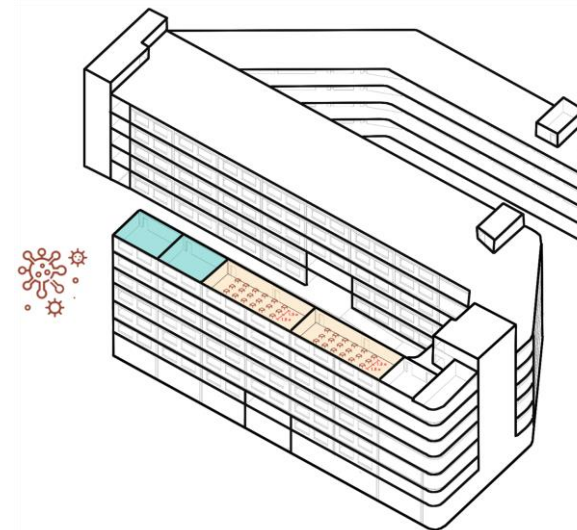
Resilience



Structural Stability



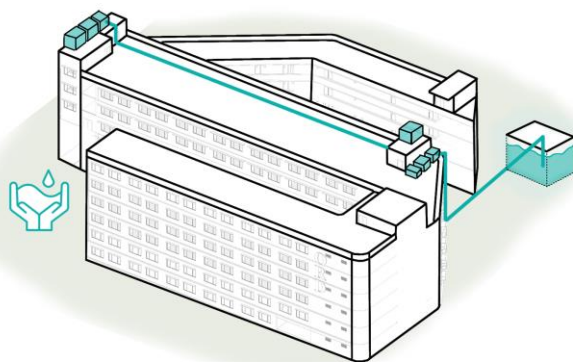
Fire Resilient



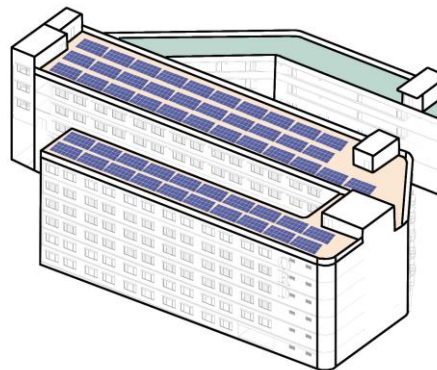
Pandemic



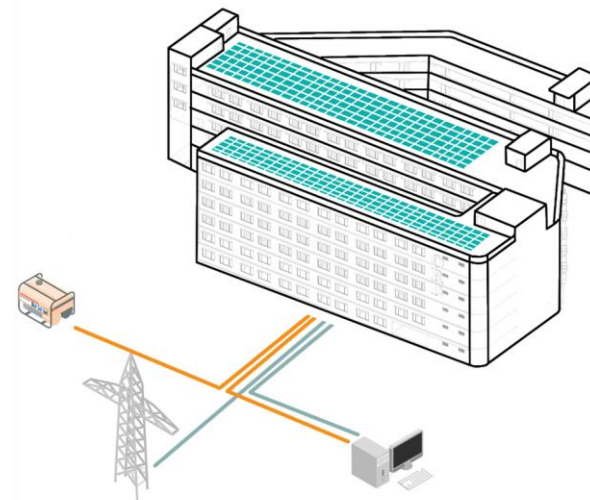
Resilience



Water Failure



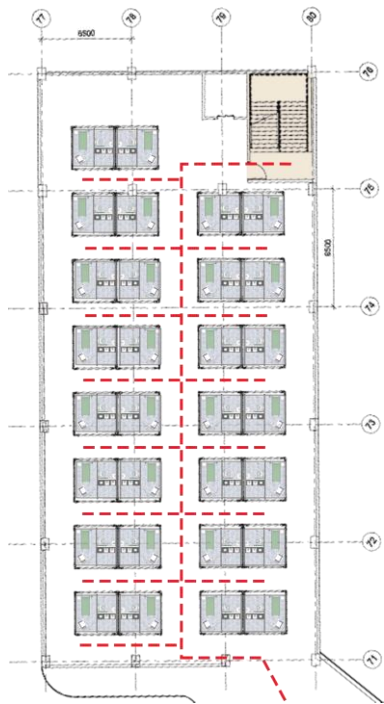
Future Extension



Renewable



Resilience



Resilience



Shaded open courtyard

Utilizing Break out spaces

Adjusting partition wall

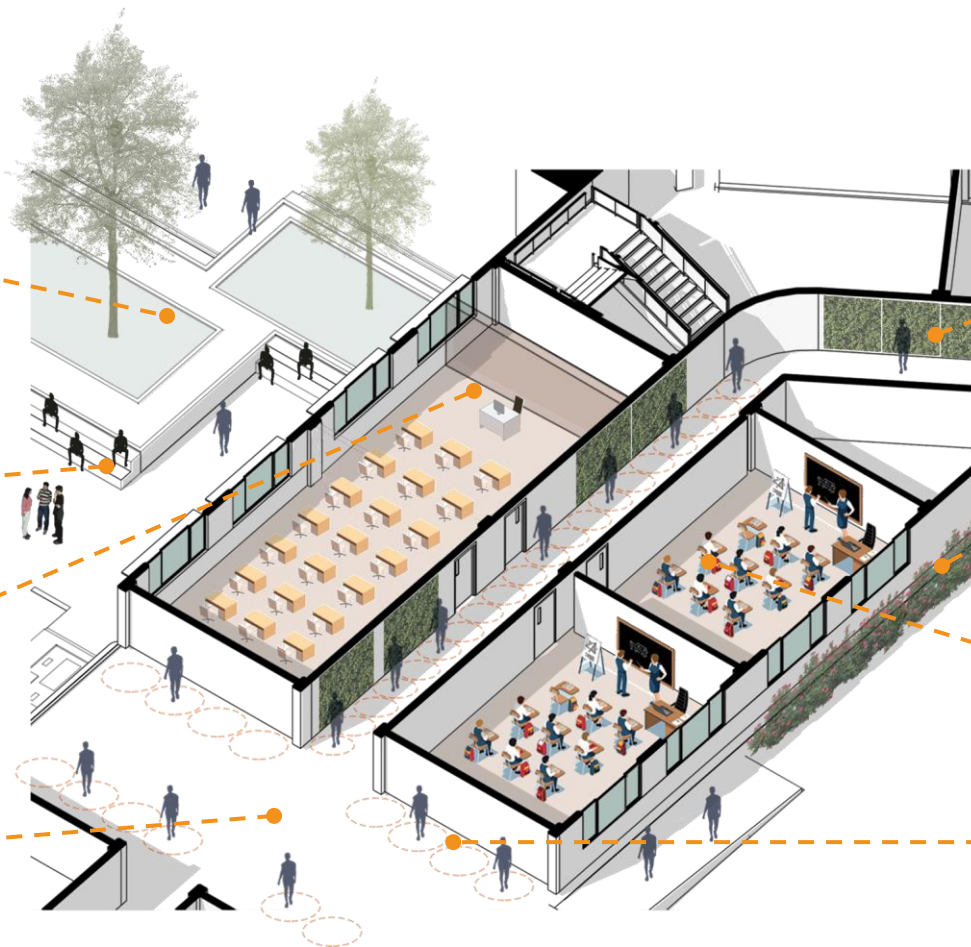
Multiple entries and exit

Adding Living wall (increase mental well Being)

Planting Herbal Plants in courtyard

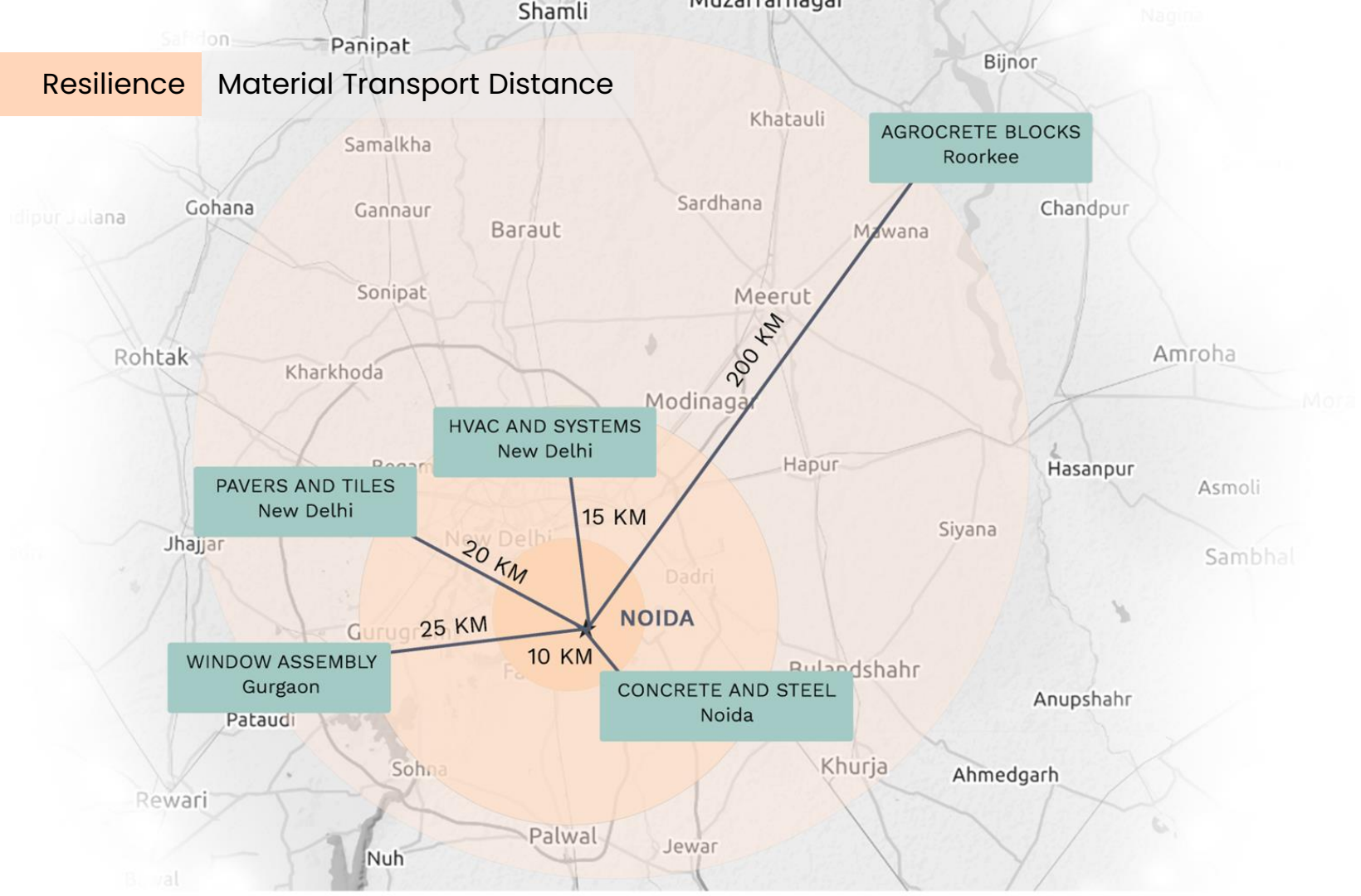
Reduce Indoor occupancy

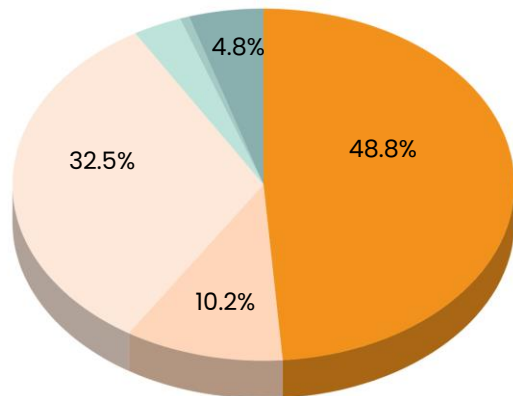
Grid of circle painted (2m radius)



Resilience

Material Transport Distance





- Contingency
- Landscape and site development
- Equipments & Furnishing
- MEP Services
- Internal Works
- Civil Works

Total Construction Cost:

INR 45.53 Crores

Incremental Cost:

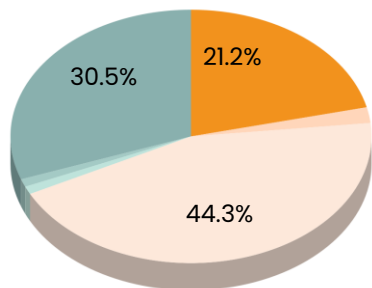
INR 4.75 Crores

2800 Rs/sq.ft.

7% less than budget

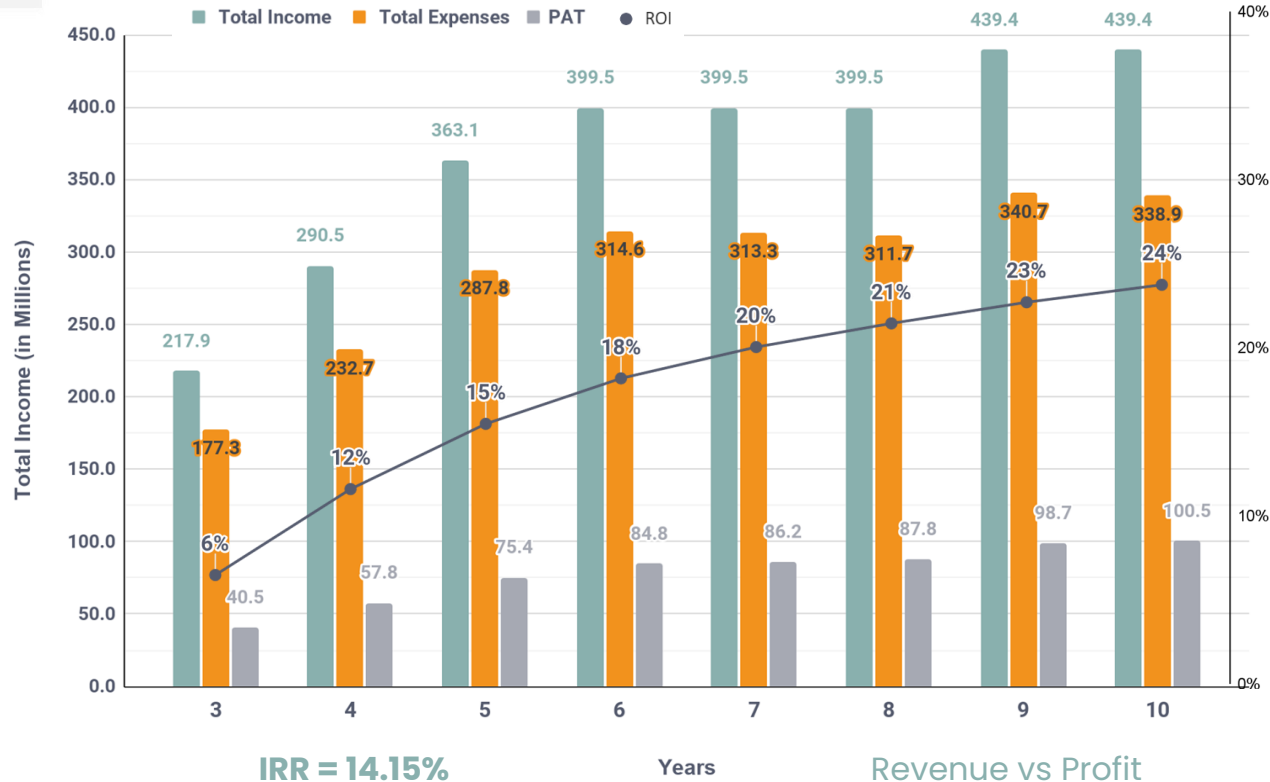
	Cost/Year	Remarks
Total Operational Cost	₹ 223,725,720	Refer Business Model
Expected Minimum Profit	₹ 68,000,000	school + client (30% margin)
Income Required	₹ 291,628,292	opex + profit
Min. Student fee required/term	₹ 132,560	2200 students





Expenses

- Profit
- Marketing
- Insurance
- Administration
- General Expenses
- Direct Maintenance

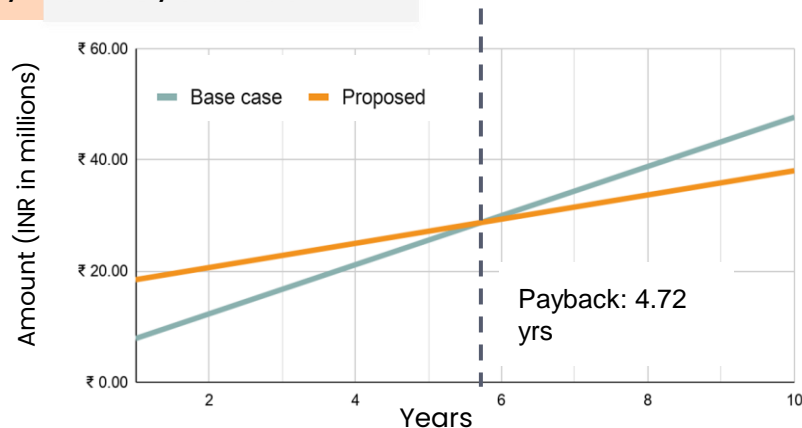




Affordability

Life Cycle Cost

HVAC System



Lifetime Savings (10 yrs):

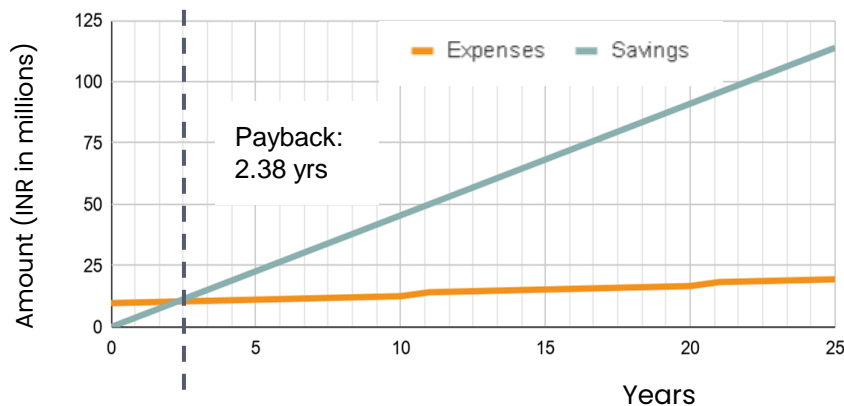
INR 22,433,021

181% savings

Cost of new system:

INR 12,389,872

PV System



Lifetime Savings (25 yrs):

INR 95,330,140

1000% savings

Cost of new System:

INR 9,489,510



YES: 81

LIKELY: 4

LESS CERTAIN: 9

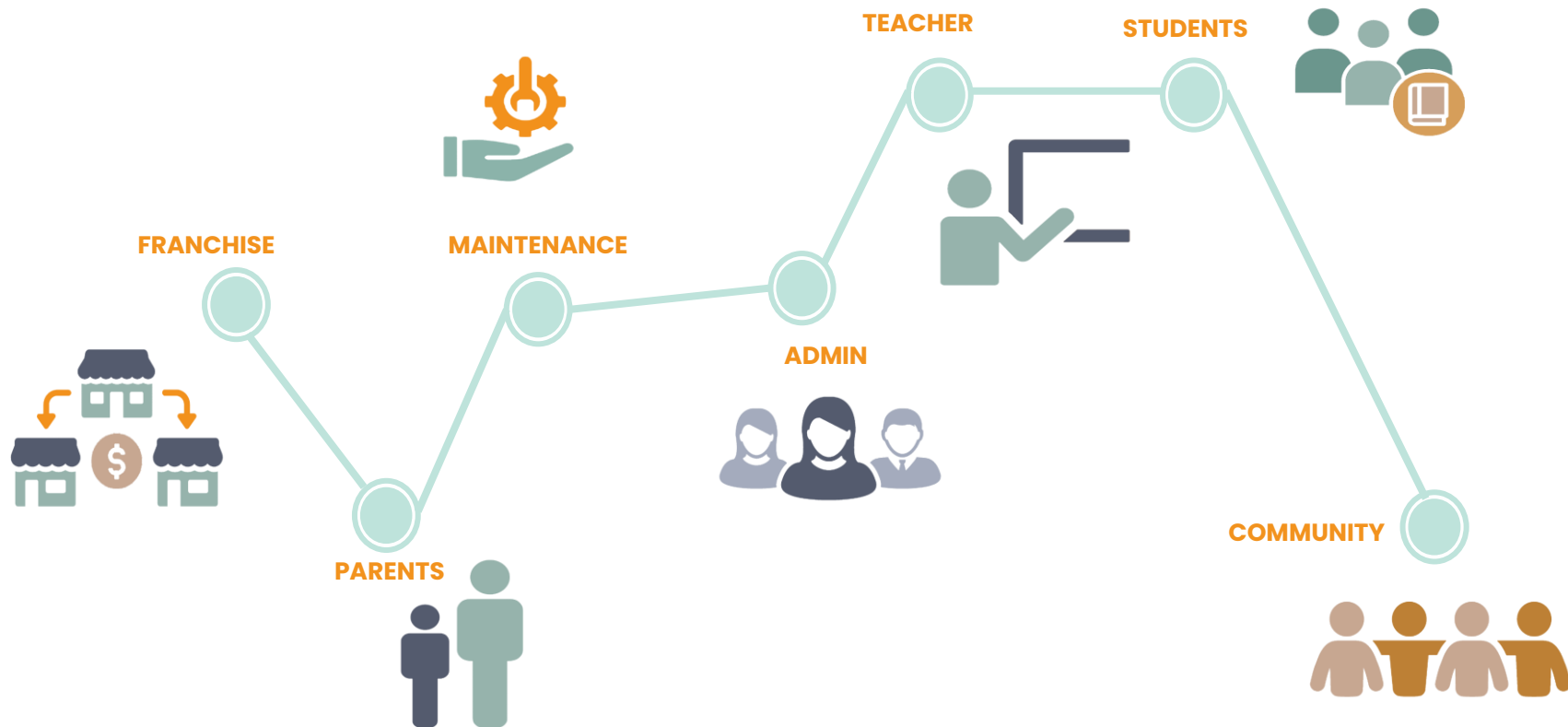
UNLIKELY: 16



SCORECARD TOTAL: 85 LIKELY OR BETTER

LEED PLATINUM





An architectural rendering of a modern school building featuring a central courtyard. The courtyard is filled with greenery, including large trees and low-lying plants. A wide, light-colored concrete path winds through the space, with several children walking and sitting on a long, low concrete bench. The building has a clean, minimalist design with large windows and a flat roof. The overall atmosphere is bright and airy, suggesting a healthy and active learning environment.

Re-defining the School Building

Project Partner



Mr. Deepanshu Gupta
CEO

Industry Partners





Thank You