

# **Institute of Design Environment and Architecture - Architecture Department**

## **Course Content Semester 9**

### **Design Project Module 9**

#### **Course Objective and Syllabus**

Students will begin to think of architectural design in the larger context of global trends and social reality. They will make working prototypes with details in drawings and models.


#### **Course Outcomes**

Understand the site and program in a larger context of its place in the city and global and ecological dimensions. Students will redefine the nature of architectural program in order to future-proof their recommendations. They will design for a scaled down version of a quickly transforming reality.


This studio is '**Sustainable Studio**'. The studio program is based in six different cities of India and each student has a different program, but the central focus of the studio is to approach each project and site in a sustainable manner.

Students will research on various sustainability issues like climate responsive architecture, sustainable building materials, Water efficiency, site preservation, heat island reduction, energy efficiency etc. and this research will further inform their design decisions.

# Students' work



Context Plan






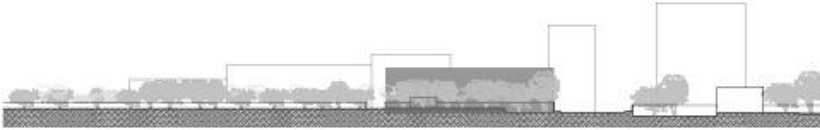
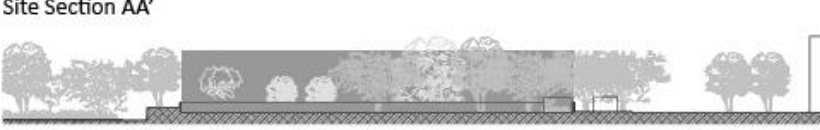

Site Plan  
Site area: 3210 Sq mt.

## Ahmedabad, Gujarat 23.03'N 72.58'E

- The site is Located in the old city of Ahmedabad.
- The site plot is lined with trees on two sides.
- The Site has ample green cover with Lal Darwaja garden on one side and children's park on the other side.
- The site has a public garden,an underground market and commercial center in the vicinity.
- Located within the close proximity of Public transport
- There is constant vehicular flow and commercial activites around the site.
- Located adajcent to the historical monument of Sidi Saiyyed
- Located in the commercial zone of the context.
- The site has a block of an office which is now closed.

Site Photographs

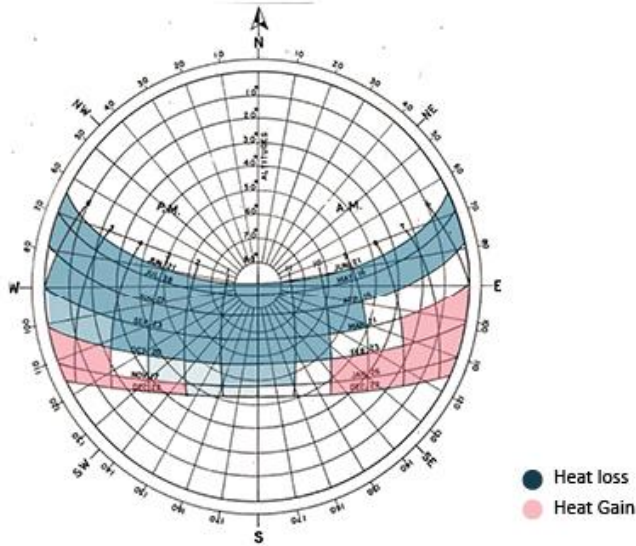




Sustainability studio	City - Ahmedabad	Name - Honey Bhutoria	Sources - Google map, Google earth,	Keywords - Heritage Landscape, Historic sites
Semester 9	Project - Heritage and Tourist Information Center, Lal Darwaja	IU No - 164300007		

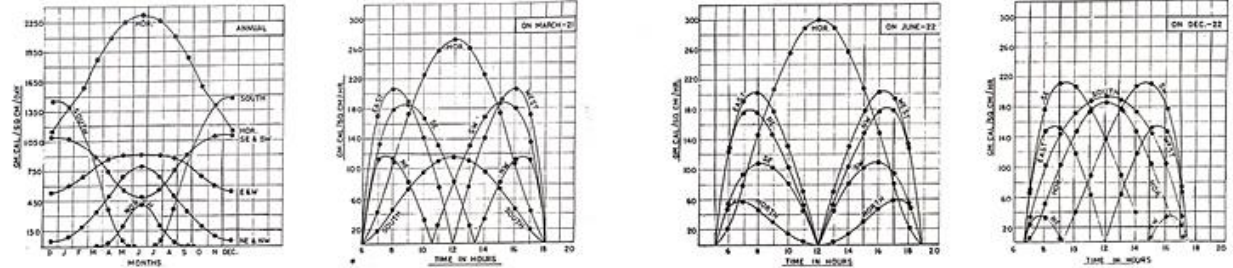


# Students' work

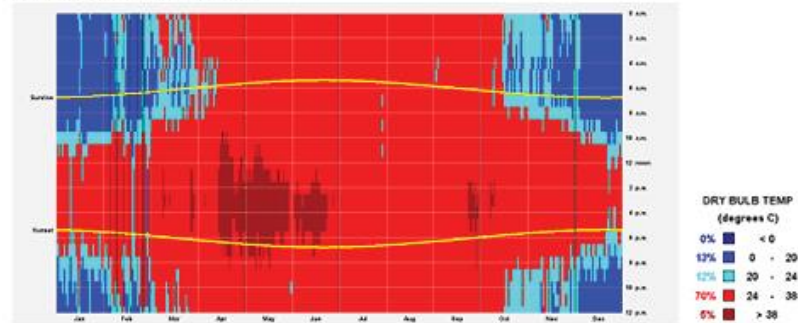
**Ahmedabad, Gujarat** 23.0225° N, 72.5714° E  
**Climate Data**  
**Solar Chart**



Direct solar radiation on clear days



Dry bulb temperature



## INFERENCES

### Direct Solar Radiation Incident on Clear Days

- The Horizontal surfaces (Terraces and open plinths), receives **max heat gain** from **April to Sept**.
- The **south, south east and south west** facades receives **max heat gain** from **Oct to Jan**.
- The **North** facade will receive **nearly no heat gain** from **Nov to Feb**
- In the month of March, the **horizontal surfaces** receive **max heat gain** from **9am - 3 pm**.
- South, south east and south west** receives **heat gain** in during **morning and evening** time with and **North facade** does not

### Direct Solar Radiation Incident on Clear Days

- In the month of **June**, the horizontal surfaces receives **max heat gain** from **9am - 4 pm**.
- East and west** facade receives **heat gain** in during **morning and evening** time with and **north facade** receives **less heat gains** in **mornings and evenings** and **south facade** receives **less heat gain** during **afternoon**.
- In the month of Dec, the **South east and South west** receives **max heat gain** from **morning and evening**.
- North facade** receives **no heat** during this month and relative **less heat gains** in **North west and North South**.

## Conclusions

- Mostly in **March, april, may, June and October** there is a need to **apply heat loss techniques** and also the sky cover is ranging from 10%-40%.
- Monsoon months **June, July and August** need **maximum ventilation** and Heat Loss.
- **North-east** and **North-west** facades will be relatively be comfortable throughout the year.

Sustainability studio

City - Ahmedabad

Name - Honey Bhutoria

Sources - www.weather-and-climate.com

Keywords - Direct Solar radiation on clear days, solar chart, Dry bulb Temp

Semester 9

Project - Heritage and Tourist Information Center, Lal Darwaja

IU No - IU1643000007

Climate Consultant

# Students' work

## Sustainability Concern

### Building envelope

The Entire building envelope has Applied the strategies of:  
 Cross ventilation  
 Stack ventilation  
 Water ponds and exterior surface colour  
 to deal with the Hot- dry climate of Ahmedabad.

**Double Height spaces**  
- In order to diffuse light and provide cool light.

**Openings**  
- East- west Openings are kept small in order to admit partial sun.

**Courtyards**  
Small scale courtyards are used in order to prevent heating in South Facade.

**Unshaded Walls**  
- The South wall is made Thick and well insulated.

**Clear glass**  
Made to admit more cool daylight and are fixed windows.

**250 mm thick brick walls**  
- In order to store adequate cold

**Red oxide**  
- No lead  
- Can Resist heat upto large temperatures  
- Anti-corrosive, long life

**South- west Opening**  
- In order to allow the flow of the wind and block the maximum of South Sun.

**Play of Openings**  
- In order to maximise Natural ventilation in circulation spaces.

**Diffused Light**  
- Keeping away the maximum harsh light and hence provide cooler light.

**Skylights**  
To light the space within through natural light, Hence reducing effect on the mechanical appliances

**Courtyard Effect**  
Presence of Low Level Openings on the ground floor and high wall openings on the top.

**Landscaping**  
Using soft materials to mitigating heat collection

**Granite flooring**  
-No other resources or materials are necessary to create granite countertops.  
-There are no harmful toxins or chemicals used to quarry and finish granite, an important component of sustainability.

**Water Body**  
Creating a micro- climate in order to maintain cool temperatures and cool the hot winds as well.

Considered the Hot- Arid Situational strategies:  
Interwoven buildings and Water and Green Edges of Vegetation

Sustainability studio

Semester 9

Name - Honey Bhutoria

IU No - IU1643000007

Case study- 079 Stories, Ahmedabad

Keywords - Thermal Mass, exterior surface colour, ventilation



# Students' work

## Indore, Madhya Pradesh 22.71'N 75.85'E



Context plan



Site Plan

Site Area - 150 -200 sq.m



- Location is in mainly near the market place and main water tank.
- Mostly it opens up on the secondary street.
- The site is located in the centre of the of the whole aranya in the busy commercial area.
- The site is located in such a way which forms the junction for the nearby sector of housing.

- The site is open having temporary market structure.
- Also there is an existing public toilet in the nearby vicinity.
- Also proposing different scales of toilets in the whole Aranya according to the density of the pepole and need.
- There many commercial shops and public school and its play ground in the nearby area.

### Site Photographs



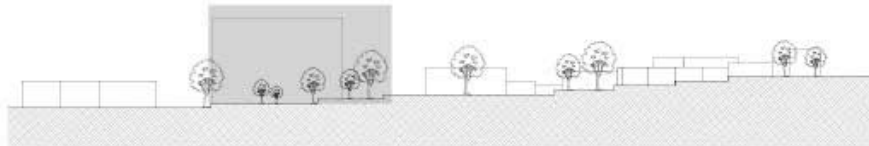
Site looking towards water tank



Site looking towards market place



Site looking towards road near market



Site Section



Site looking towards market area

Sustainability studio

City - Indore

Name - Kashish Mehta

Sources - Google Earth  
Google Maps  
AranyaNagar Booklet by Idea  
(Indus University)

Keywords - Busy market space, commercial area, Junction for the three sector, Public Toilets

Semester 9

Project - Public Toilet

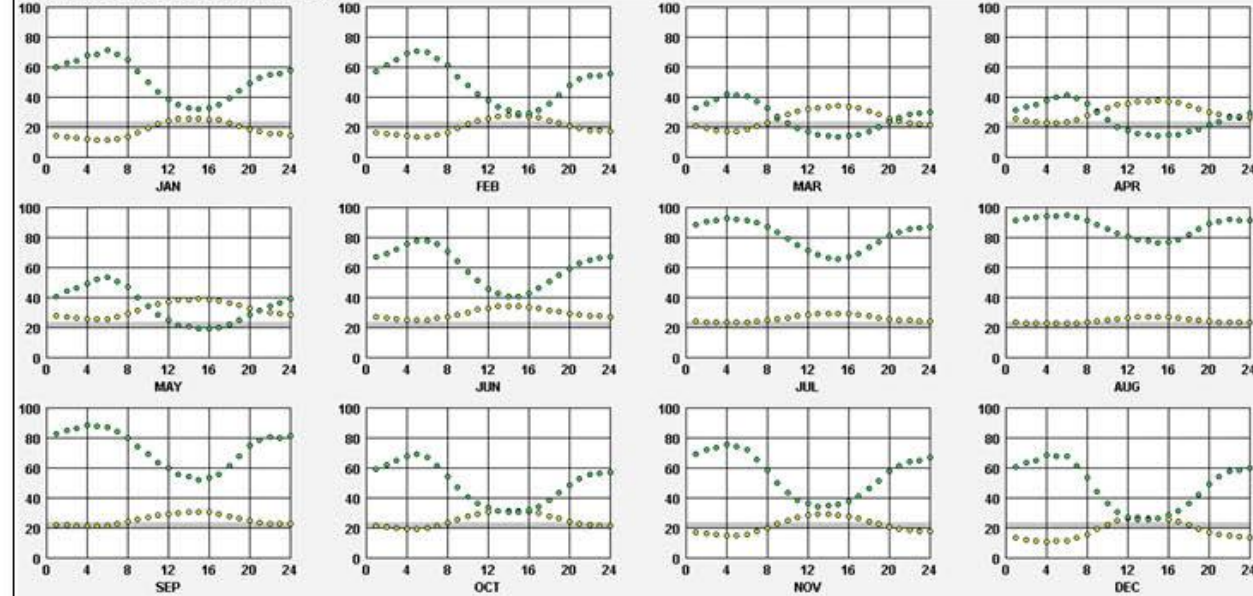
IU No - 1643000012

# Students' work

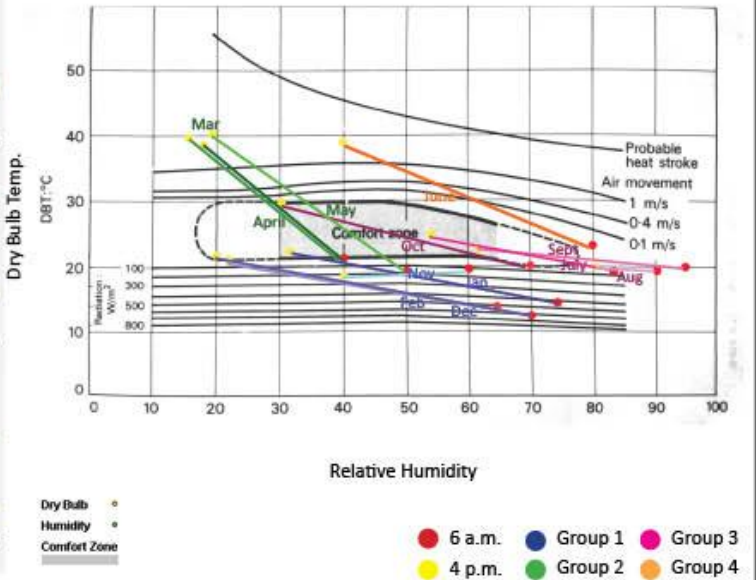
**Indore, Madhya Pradesh 22.71'N 75.85'E**

Climate Data.

Dry bulb x Relative humidity



Thermal Comfort Chart



## INFERENCES

MONTHS	DAY		NIGHT		wind Speed	Direction
	Temperature	Humidity	Temperature	Humidity		
Group 1 January, February, Nov, Dec	↑	Optimum	↑	Optimum	Minimum- 3m/s Maximum- 7m/s	North east
Group 2 March, April, May	↓	↑	Optimum	Optimum	Minimum- 1m/s Maximum- 11m/s	South west
Group 3 July, August, September	Optimum	Optimum	Optimum	↓	Minimum- 2m/s Maximum- 11m/s	West

## Thermal Comfort Zone

-The months which falls in comfort zones are **March, April, May, Oct, Sep and July.**

-The months **Jan, Feb, Nov, Dec, June and August** falls in uncomfortable zones.

Sustainability studio

City - Indore

Name - Kashish Mehta

Sources - [www.weather-and-climate.com](http://www.weather-and-climate.com)

Keywords - Dry bulb, Relative Humidity, thermal comfort.

Semester 9

Project - Public Toilet

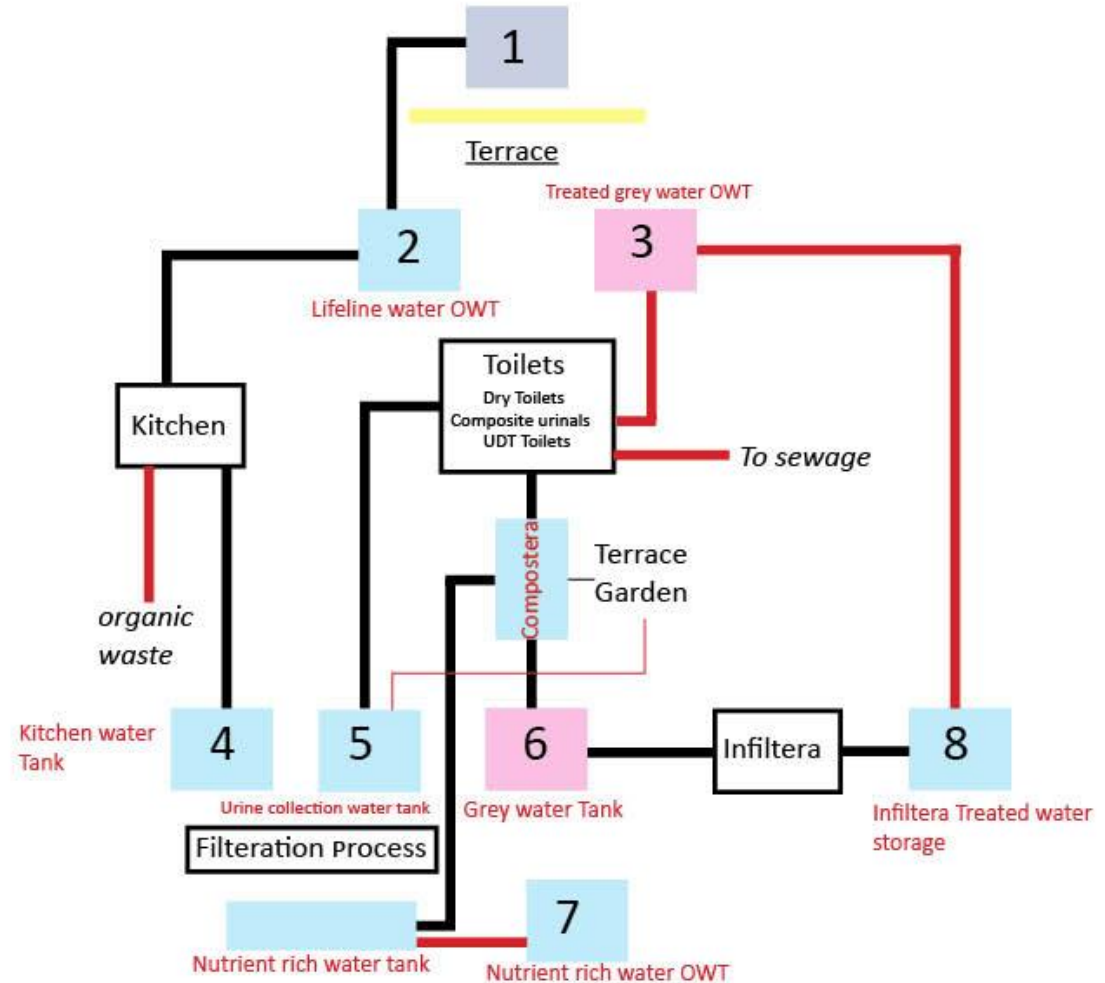
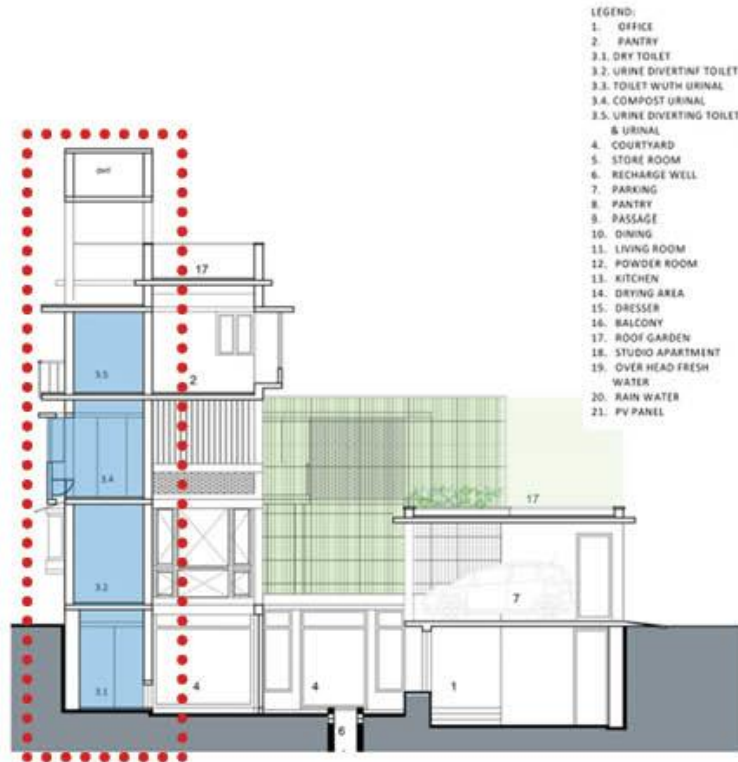
IU No - IU1643000012

Climate Consultant

# Students' work

## CaseStudies

### ECO House



Sustainability studio

City - Indore

Name - Kashish Mehta

sources - Biome Environment

Keywords - Casestudies

Semester 9

Project - Public Toilets

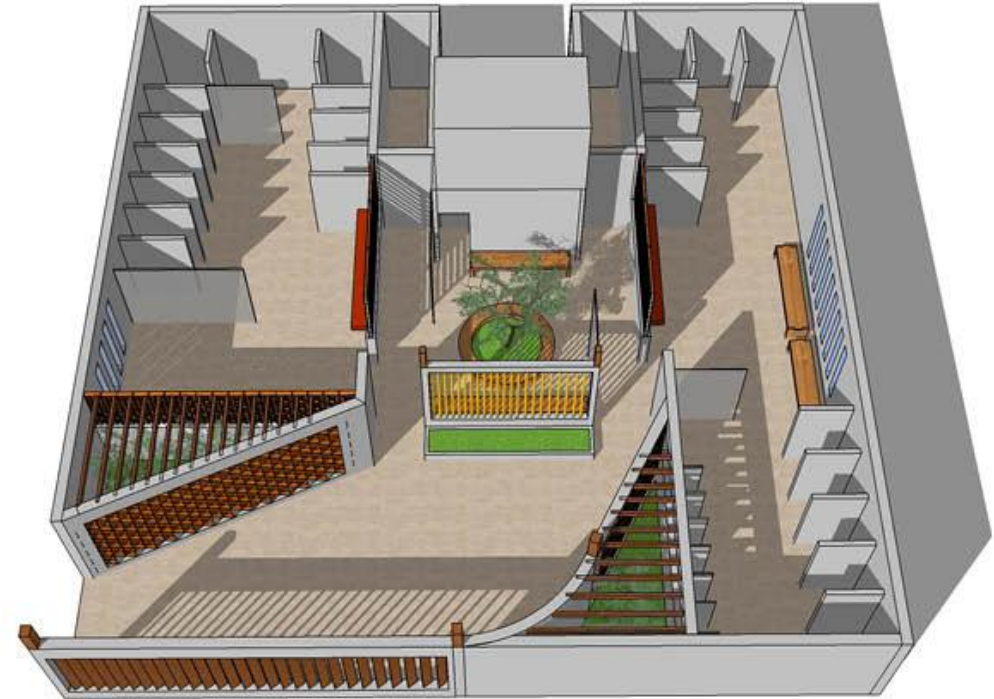
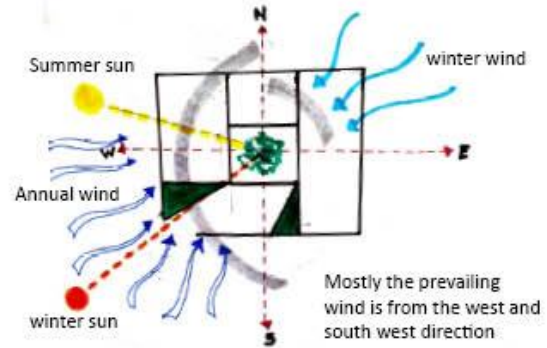
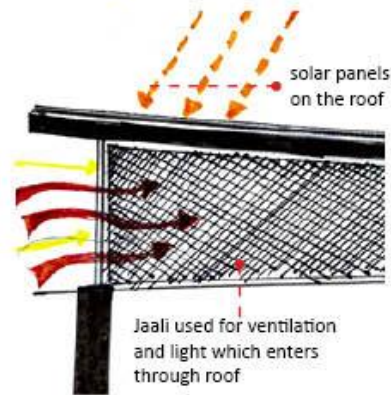
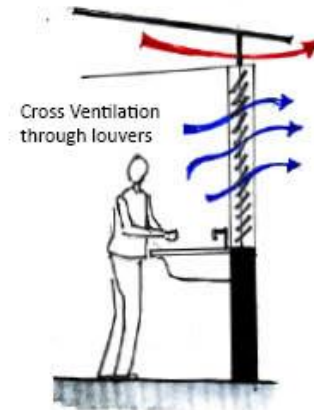
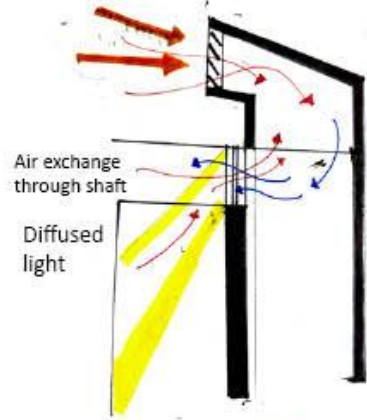
IU No - 1643000012



# Students' work

## Indore, Madhya Pradesh Public Toilets

Detail for the wind catcher shaft



Sustainability studio

City - Indore

Name - Kashish Mehta

Semester 9

Project - Public Toilets

IU No - 1643000012