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Rohini, Delhi, India

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BACHELOR OF ARCHITECTURE

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DEPARTMENT OF ARCHITECTURE AND PLANNING

MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY, BHOPAL

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CAMPUS OF AMBEDKAR UNIVERSITY

Rohini, Delhi, India.

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9th Semester, 5th Year

UNDER THE GUIDANCE OF

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DEPARTMENT OF ARCHITECTURE AND PLANNING

MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY, BHOPAL

CANDIDATE DECLARATION

The Thesis Project in the subject ARC 511, entitled "Campus of Ambedkar University, Rohini, Delhi", is being submitted in partial fulfilment of the requirement for the award of the degree of Bachelor of Architecture by the undersigned for evaluation.

The matter embodied in this project is a record of my work. If, in future, it is found that the above statement is false, then I have no objection to the withdrawal of the Bachelor of Architecture Degree awarded to me by the Institute.

Date: 2nd Dec, 2025

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RECOMMENDATION

Based on the above declaration of the student, the undersigned recommends that the work submitted by the candidate may be considered for the end term examination of the subject ARC-511, Thesis Project.

Date: 2nd Dec, 2025

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CERTIFICATION OF EXAMINATION

The Bachelor of Architecture Thesis Viva-Voce examination of Ms. N S Chithraja Scholar No.211110012, was held on 1/12/2025 to 2/12/25.

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ABSTRACT

This thesis explores the design of **an Institute of Science & Technology in Rohini, Delhi**, a vibrant urban location with **strategic proximity to the metro and key urban infrastructure**. The institute aims to foster a dynamic learning environment for technological innovation and interdisciplinary research.

The proposed design encompasses a centrally placed Administrative Block that serves as the operational core of the campus, a comprehensive Library and IT Complex functioning as the academic knowledge hub, and multiple Academic Clusters designed for interdisciplinary learning. These academic clusters integrate classrooms, seminar rooms, computer labs, research studios, workshops, and faculty spaces that cater to the diverse schools including Undergraduate Studies, Liberal Studies, Development Studies, Law and Governance, Business and Public Policy, Education Studies, Human Studies, and Culture & Creative Expressions. Each block is equipped with specialized labs, flexible learning environments, and collaborative research facilities to support seamless teaching, learning, and innovation across disciplines.

Recognizing the importance of holistic student and faculty life, the project includes **hostel accommodation** for students and **group housing for 50% of faculty members**. This integrated campus layout fosters interaction, community building, and academic collaboration, contributing to an enriching living-learning environment.

Anticipating future growth and academic expansion, the master plan envisions **Phase 2** development, which will include an additional academic block, a state-of-the-art **auditorium** for conferences and cultural events, and expanded **student hostel facilities** to accommodate an increasing student population.

The overall master plan will priorities pedestrian-friendly pathways, green spaces, and flexible learning environments to create a thriving and adaptable academic ecosystem. This project will serve as a model for futuristic educational campuses in urban India, balancing functionality, sustainability, and architectural expression.

ACKNOWLEDGMENT

The completion of this thesis report has been one of the most significant parts of our thesis study. We would like to acknowledge everyone who has helped us throughout in the completion of this Thesis Report, directly or indirectly.

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CHAPTER 1

1. DESIGN BRIEF

1.1 OVERVIEW

- **Project Name:** Dr. B.R. Ambedkar University Delhi – Rohini Campus
- **Proposing agency:** PUBLIC WORKS DEPARTMENT (Government of N.C.T. of Delhi)

1.2 ABOUT THE PROJECT

The upcoming Rohini Campus of Dr. B. R. Ambedkar University Delhi (AUD) is strategically located in Sector 3, Rohini, and spans across 18 acres. Designed to accommodate up to 3,500 full-time students, the campus will include hostel facilities for 900 students as well as 132 residential units for faculty and staff.

This integrated campus aims to foster a vibrant academic and cultural environment, equipped with a range of world-class infrastructure including:

- Auditorium, convention centre, seminar, and conference halls
- Library and student centre
- Indoor and outdoor sports facilities
- Health centre, guest house, and cafeterias
- Display and performance spaces
- Convenience/utility centre and creche

The academic framework of the campus will house seven interdisciplinary schools:

- School of Undergraduate Studies
- School of Liberal Studies
- School of Development Studies
- School of Law, Governance & Citizenship
- School of Business, Public Policy & Social Entrepreneurship
- School of Education Studies
- School of Human Studies and Culture & Creative Expressions

In addition to the schools, the campus will host several specialized research and innovation centres, including:

- Centre for Research Methods
- Centre for Community Knowledge
- Centre for Future Studies
- Centre for South Asian Studies
- Centre for Psycho-Clinical Research

- Centre for Early Childhood Education & Development
- Centre for Development Practice
- Centre for Publishing
- Centre for Women's Studies
- University Centre for Innovation & Incubation of Entrepreneurship

1.3 DETAILED LIST OF SPACES

Institutional and Administrative Facilities are proposed to be built in the campus in three categories i.e. Central facilities at Campus level, Cluster level facilities, and School level facilities.

1.3.1 Central Facilities

The Central Facilities are shared spaces designed for the entire campus community and include the Library & IT Complex, Auditorium/Convention Centre, Media Labs, Exhibition Centre, Student Centre, Cafeteria, Sports Centre, and the Administrative Block. These facilities will be used by all Schools and Centres of the university and are expected to function 24 hours a day, 7 days a week. Due to their significance and continuous usage, their placement within the campus must be carefully planned to ensure accessibility and convenience for all users.

Sl. No.	Infrastructure	Facilities	Proposed Area (sq.m.)
i)	Administrative Block	To house offices of the VC, PVC, Registrar, CoF, Deans of Functional Divisions (Academic Services, Student Services, AES, Planning, Research, International Partnerships) and other related offices – 50% of the total staff strength (50% of 230)	3500
ii)	Library and IT Complex	Will provide book-storage facilities, reading spaces with computer terminals and offices for library services and staff – 2 lakh books	10500
iii)	Auditorium Complex	To house an auditorium (500 persons), Committee / meeting / Seminar rooms of 50 (2 nos.)/150 (2 nos.) persons capacity	4000
iv)	Student Centre	To provide space for student related activities, reading rooms, Placement office, recreation rooms, indoor sports and lockers etc. (350 students)	1000
v)	Exhibition Centre	For exhibitions	500
vi)	Cafeteria	Canteen facilities for 350 Students/ Staff/ Visitors	2000
vii)	Convenience/ Utility Centre	Shopping Centre, Food Courts, Bank, ATM, Post Office, Book & Stationery stores, etc.	750
viii)	Faculty Centre/Club	Meeting halls for informal gatherings, dining rooms, indoor sports facilities, etc. – 100 persons capacity	500
ix)	Health Centre	With OPD facilities and 6 beds for emergencies	250
x)	Covered Parking Block	Near the entrance with sitting space for drivers	100

xi)	University Crèche	Capacity for 50 children	250
xii)	Maintenance Office	For day-to-day maintenance of the entire campus. Will house electric sub-station; AC plant, lifts, civil, electrical, horticulture, plumbing, water supply, firefighting and other services.	2000
xiii)	Sports Centre	The Sports Centre will have Indoor/Outdoor sports facilities	1000
xiv)	Basement Parking and Service Area	Parking and service area	31680

Table 1: Central Facilities at Campus Level

1.3.2 Cluster level facilities

The Schools and Centres of the university serve as the core spaces for teaching, learning, and research activities. To promote academic synergy and optimize spatial efficiency, schools with epistemic (knowledge-based) congruity will be grouped into functional clusters.

Shared Infrastructure: Schools and Centres within a cluster will share common facilities, such as seminar halls, lounges, meeting rooms, and labs.

Non-Exclusive Instructional Spaces: Classrooms and instructional spaces will be centrally managed and not assigned exclusively to any individual school, promoting flexibility and efficient use.

Cross-School Interactions: Clustering encourages academic intermixing between students and faculty across disciplines, fostering a multidisciplinary learning environment.

Optimized Space Utilization: The cluster strategy ensures maximum use of shared resources, reducing redundancy and increasing sustainability.

Sl. No.	Infrastructure	Facilities	Total Proposed Area (sq.m.) for 2 clusters
i)	Classrooms	Standard sizes of 30/60/120 students capacity (60% of the student's strength)	10000
ii)	Computer Labs. / IT / Research Rooms	To house Project staff, Research Fellows, PhD students, Classrooms, etc. 20% capacity of total students strength in modules of 50 persons each	5500
iii)	Committee Rooms	2 rooms of 75 capacity each with audio-visual and other conference facilities in each cluster	800
iv)	Faculty Rooms	Similar facilities in all faculty rooms i) 100% rooms for Regular & Visiting Faculty ii) 10% extra capacity for transit faculty from other AUD campus and from local institutes	5000

v)	Faculty / Staff Lounge	Sitting and retiring spaces, changing rooms and pantry, etc. for 50 persons in each cluster	500
vi)	Staff Rooms	Servicing common facilities in the cluster – 25% of total staff strength	800
vii)	Utility Rooms	Photocopying/printing/scanning/pantry services for faculty and staff	800
viii)	Student Common	Reading rooms with computer terminals; recreation room	800
ix)	Security Office, Maintenance, Staff Offices	For round the clock security and maintenance	800
xii)	Workshops/ Studios and Laboratories	Workshops, Studios and Laboratories (Some of these spaces might require specialized consultants with respect to design and operational needs of these studios)	22500
		TOTAL AREA	47550

Table 2:Facilities at Cluster Level

Faculty: Student Ratio (1:15)

- Admin Staff is 1/2 of total faculty strength
- Project staff is 8 per centre + 1/4th per faculty

Clusters	Schools and Centres	Number of Students	Number of Faculty	Admin Staff	Project Staff
R1.1	School of Undergraduate Studies (SUS)	1000	65	32	30
R1.2	School of Liberal Studies (SLS)	660	44	22	8
R1.3	Centre for Law and Governance	140	9	4	8
R1.4	Community Outreach Programme (COP)		3	2	8
R1.5	Centre for Publishing		3	2	8
Subtotal R1	Sub-total	1800	124	62	54
R2.1	School of Business Public Policy and Social Entrepreneurship (SBPPSE)	565	38	19	32
R2.2	School of Educational Studies (SES)	510	34	17	
R2.3	School of Human Studies (SHS)	580	39	19	

R2.4	School of Culture and Creative Expressions (SCCE)	20	2	1	
R2.5	ACIIE		3	2	8
R2.6	CPCR		3	2	8
R2.7	CECED		3	2	8
R2.8	Centre for Women Studies		3	2	8
Subtotal R2	Sub-total	1675	125	56	36
Total (R1+R2)	Total	3475	249	126	122

Table 3: Cluster-wise Staff & Student Allocation

1.3.3 School/ Centre level facilities

Every School will have a Dean/Director's complex, Documentation Centre and Stores etc.

Sl. No.	Infrastructure	Facilities	Proposed Area (sq.m.)
i)	Dean/Director Office Complex	Dean's / Director's office, Visitors' lounge, Office for Dean's / Director's staff, Meeting room for 10 persons, Common facilities like pantry, bathrooms, etc	550
ii)	Documentation Centre	Photocopying, Project work	300
iii)	Store	Supplies and Stationery	150

Table 4:Dean/Director Office and Support Facilities

1.4 RESIDENTIAL ZONING

The "Residential Zone" of the Rohini Campus will cover approximately "25% of the total plot area". It has been carefully planned to accommodate:

- Student Hostels (for both girls and boys, with a mix of single and double occupancy),
- Faculty Hostels, and
- Residential units for faculty and staff.

The housing layout is envisioned to promote a non-hierarchical and inclusive community, encouraging intermixing of faculty and staff residences with shared community resources.

1.4.1 Common Facilities Proposed within the Residential Zone:

- Community Centre
- Guest House
- Faculty Transit Accommodation
- Convenience Centre

- Maintenance Office
- Electrical Substation

1.4.2 Breakdown of Residential Typologies:

- Faculty Housing – 50% of the total residential capacity
- Staff Housing – 30% of the total residential capacity
- Student Hostels – 25% of the total residential capacity

Gender Ratio: Girls: Boys = 2: 1
Programme Ratio: Postgraduate (PG): Undergraduate (UG) = 1: 1
PG Students – Single occupancy rooms
UG Students – Double occupancy rooms

Refer Table 5 and 6 for detailed area allocation and housing layouts.

Sl. No.	**Faculty & Staff**	**Students Hostel – 600 Rooms**			
	Houses (2/3/4/5/6 Type)	**UG (D) Girls**	**PG (S) Girls**	**UG (D) Boys**	**PG (S) Boys**
Rohini	35/35/30/10/2	200	200	100	100
Total	112	200	200	100	100

Table 5: Facilities at Residential Colony and Hostels

Sl. No.	Infrastructure	Facilities
i)	Community Centre	With a multi-purpose Hall, indoor games, and kitchen facilities, etc. (1500 sqm)
ii)	Guest House	A 10-room Guest House (750 sqm)
iii)	Faculty Transit Accommodation	A 20-room facility for Faculty with double room sets, attached to the Guest House using common facilities (1500 sqm)
iv)	Convenience Centre	Shops, Bank, ATMs, Post Office, etc. (500 sqm)

Table 6: Common Facilities

1.5 REGULATIONS AND DEVELOPMENT CONTROLS

The total area of the Rohini plot of AUD is 7.3 hectares (73,000 sqm)
According to the prevalent by-laws in Delhi, the plot area is earmarked as:

- Area reserved for Institutional use 70%
- Area reserved for Residential use 30%

Current FAR: 2.25

Total built up area permissible at the Rohini plot: 1, 60,875 sqm

Almost 85% of the permissible built-up area will be broadly utilized as under:

- Institutional Areas 90,000 sqm
- Residential Areas 46,000 sqm
- Basement, Parking, and service area 31,680 sqm (built-up area not included in FAR)

Total Area (Phase I) 1,67,680 sqm

Total built-up area for which Comprehensive Planning must be done by the consultant is

1,67,680 Sqm.

1.6 SITE DETAILS

1.6.1 Introduction - Standards specified by RPF of the Tender Document

Based on the provided RFP document for the New Campus of Ambedkar University Delhi (AUD) at Sector-3, Rohini, Delhi-110085, here are the details regarding area and calculations, along with standardized provisions:

- **Name of Work:** Comprehensive Consultancy Services for Planning, Designing and Development of New Campus of Ambedkar University Delhi (Phase-I works) at Sector-3, Rohini, Delhi-110085.
- **Project Location:** Sector-3, Rohini, Delhi-110085.
- **Total Plot Area:** 7.3 hectares (73,000 sqm).
- **Encumbrances:** The site is free from all encumbrances, including overhead power lines.
- **Site Division:** The 7.3-hectare plot is divided by a 13.5-meter-wide public road almost in the center. The new campus will be developed taking this road into account, considering it will remain a public road accessible to the neighboring population and maintenance agencies.

1.6.2 Features of the Site

(i) Location and Connectivity

The site is in the western part of Delhi, within an already developed urban neighborhood.
It is well connected through:

- Outer Ring Road (approx. 1 km away)
- Delhi Metro (Red Line)– Nearby stations:
- Madhuban Chowk
- Rohini East

(ii) Infrastructure

- External roads, sewerage, and stormwater drainage are already in place in Rohini.
- All internal services of the AUD campus will be connected to existing DDA-laid infrastructure.

- This road will remain public and accessible to the neighboring population and maintenance agent

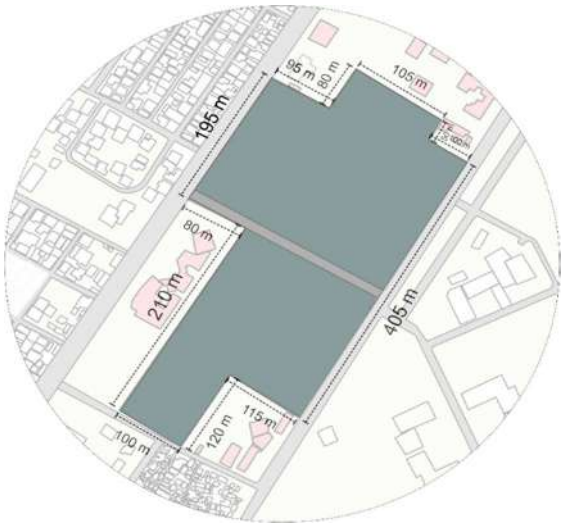


Figure 1: Site Dimensions



Figure 2: Road Connectivity

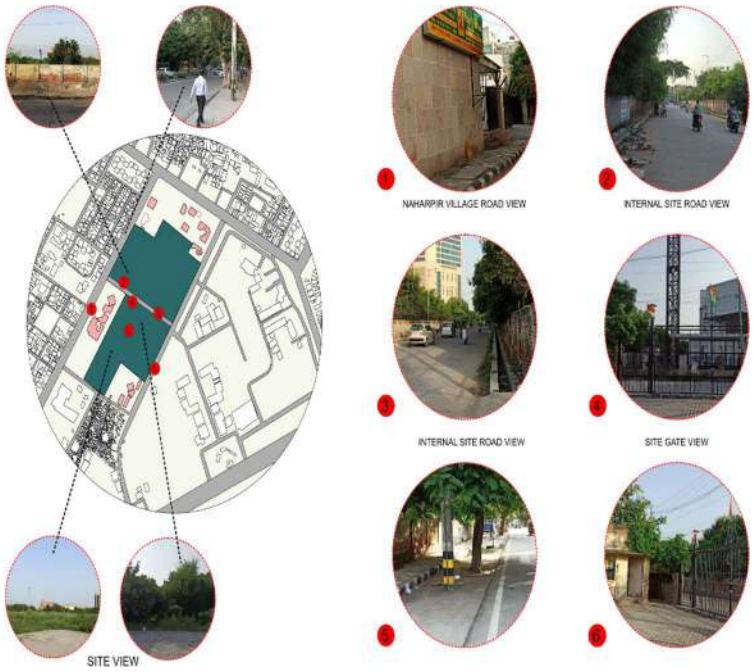


Figure 3: Site Context & edges

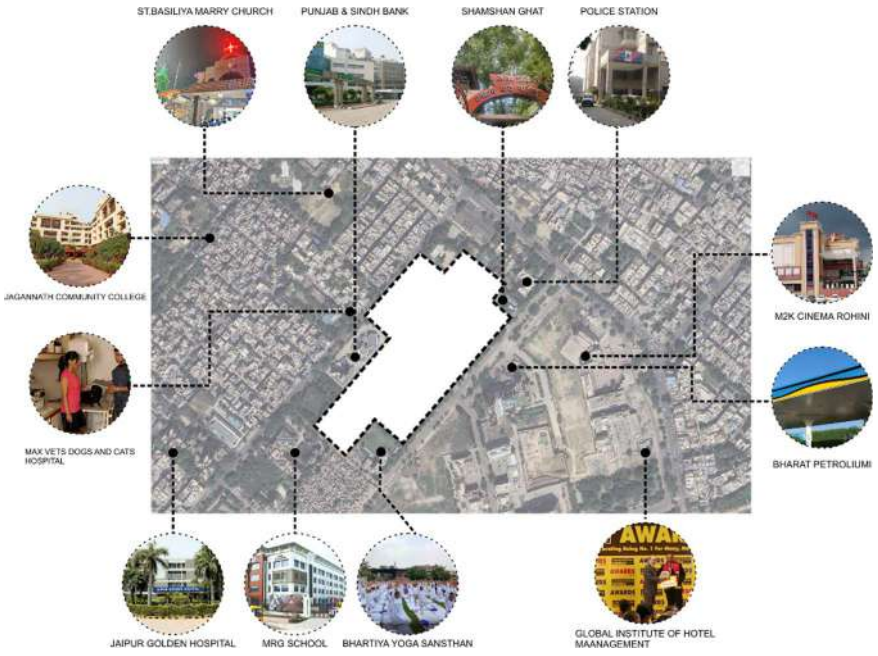


Figure 4 Context Plan

1.7 ZONING REGULATION

- The site has been earmarked as "**Institutional Land**" under MPD-2021.



Figure 4: Zonal Development Plan of Zone-H

- The project must comply with all relevant building bye-laws, height restrictions, ground coverage, floor area ratio (FAR), and setback regulations applicable to Rohini developments.

- Any construction on the site must comply with applicable institutional development norms and standards, including those set by statutory and planning authorities such as the **Delhi Development Authority (DDA)** and **Public Works Department (PWD)**, and must align with environmental and sustainability benchmarks like **GRIHA or LEED certifications**.

1.8 SETBACK REGULATION

As per the guidelines outlined in the **Master Plan for Delhi 2021 (MPD-2021)** and applicable building bye-laws for institutional developments, the following setback norms apply to large institutional plots within Delhi, including the proposed **Ambedkar University Delhi campus** at **Sector-3, Rohini**:

The total site area of the campus is approximately **73,000 square meters**, placing it in the category of **plots larger than 10,000 sqm**. Therefore, the mandatory minimum setbacks are:

- **Front Setback:** 15 meters
- **Rear Setback:** 12 meters
- **Side Setbacks (each side):** 12 meters

CHAPTER 2

2 LITERATURE REVIEW

The proposed new campus for Ambedkar University Delhi (AUD) in Rohini, outlined in the Request for Proposal (RFP) from the Public Works Department (PWD) of Delhi, provides a clear plan for campus design that combines teaching goals, space use, and environmental care. This document is an important reference for understanding the challenges of planning and designing a higher education institution in a modern Indian city.

Ambedkar University aims to be a multi-campus institution based on the principles of equity, social justice, and interdisciplinary learning. The academic approach focuses on inclusiveness, open access to knowledge, and strong involvement in the humanities and social sciences. The campus is not just a place for education; it is designed to encourage open discussion, community involvement, and meaningful experiences for students, faculty, and society.

The site for the proposed development is in Sector-3, Rohini. It covers 7.3 hectares. Zoning rules set aside 70% of the land for institutional use and 30% for residential use. The design must follow the development control rules of the Master Plan of Delhi 2021. The total allowable built-up area is around 167,680 square meters. The proposal highlights the need to get approvals from several urban agencies, including DUAC, Delhi Jal Board, Delhi Fire Services, and the Central Pollution Control Board. The goal is to create a campus that meets local planning rules while also following global best practices in architecture and sustainability.

The program layout is organized into central, cluster-level, and school-specific zones. Central facilities include the library, IT complex, student center, auditorium, and administration block. These spaces will serve as 24/7 communal hubs for all campus users. Cluster-level planning is suggested for schools that focus on related themes, promoting collaboration and making the best use of resources. Each school will have its own identity with dedicated deans' offices, resource centers, and meeting spaces. The residential area, which takes up nearly one-fourth of the site, aims to encourage a communal way of living. It will combine faculty and student housing with shared amenities, like a community center, guest house, convenience stores, and play areas.

2.1 MODEL BUILDING BYELAWS (Delhi)

A university campus is a dynamic and multifunctional environment conceived not only as a space for academic instruction, but as a collective framework for intellectual engagement, social integration, and cultural evolution. It is planned and designed to foster critical dialogue, interdisciplinary collaboration, and inclusive participation among diverse user groups, with the overarching goal of nurturing knowledge, innovation, and societal contribution.

2.1.1 Regulatory Standards for Public and Semi-public

3.10.1 General

Maximum ground coverage	30%
In hills	25%
Maximum floor area ratio	2.00
In hills	1.00
Maximum height	26 m.
In hills	15 m.

3.10.2 Government offices integrated office complex

Maximum ground coverage	30%
Maximum floor area ratio	2.00
In hills	1.00
Maximum height	37 m.
In hills	15 m.

Other Control:

i) The integrated office complex shall include Central Government Office, Local Government Office, Public Undertaking Offices and Courts.

ii) Basements up to the building envelope line to the maximum extent of plot area shall be allowed and if used for parking and services should not be counted in FAR.

Figure 5: Model Building Bye-laws, 2016, pg 42

2.1.2 Regulatory Standards for Colleges

Maximum ground coverage	35%
In hills	25%
Maximum floor area ratio	1.50
In hills	0.75
Maximum height	15 m.

Note:

1. In case of the above premises the total area of the plot shall be divided in
- *i) School/college building area*
- *ii) Play field area*
- *iii) Parking area*
- *iv) Residential and hostel area*

2. The maximum ground coverage and FAR shall be calculated only on the areas meant for building.

Table 3.9 Development Controls for Other Education Facilities

Sl. No	Category	Maximum		
		Ground Coverage	FAR	Height
1.	Play School, Coaching Centre, Computer Training Institute, Physical Education Centre etc.	N.A.	N.A.	N.A.
2	School for Mentally Challenged.	50%	1.20	18 mt.
3	School for*differently abled persons.	50 %	1.20	18 mt

Notes:

Pre-Primary Schools/Nursery Schools/Montessori Schools/Creche, Play Schools, may be permissible in residential use premises as per Mixed use policy.

Other Controls:

1. *In case of new schools, the front boundary wall shall be recessed by 6 mt. to accommodate visitors parking within setback area.*
2. *Playground shall be developed on pool basis in different areas at neighborhood level.*
3. *Practice of providing dedicated Nursery School plots in the layout plan discontinued as same is permissible in Mixed use.*
4. *In case of schools for mentally / *differently abled persons, 20% of the maximum Far can be utilized for residential use of essential staff and student accommodation.*

Figure 6: Model Building Bye-laws, 2016, pg 42

2.1.3 Regulatory Standards for Large Educational Campuses (Above 8 Hectares)

3.11.5 Education and Research Centre (large campus i.e. above 8 Ha.)

Large campuses of universities, medical and engineering colleges and other education and research institutes shall be covered under these regulations. The campus will be divided into three parts and the regulations shall apply, as given below:

i) Academic, including administration (45% of the total land area)

Maximum ground coverage	30%
In hills	20%
Maximum floor area ratio	1.20
In hills	0.80
Maximum height	37 m.
In hills	15 m.

Basement below the ground floor and to the maximum extent of ground coverage shall be allowed and if used for parking and services should not be counted in FAR.

ii) Residential (25% of total land area)

This will be developed at a density of 400 PPHa gross. The land shall be reserved for residential facilities @ 9.2 sqmt. per person. Sub-division regulations as given for group housing shall apply.

iii) Sports and Cultural Activities (15% of the total area)

Maximum ground coverage	10%
Maximum FAR	15

iv) *Parks and landscape* (15% of the total land area): Suitable landscape plan to be prepared for this area.

Figure 7: Model Building Bye-laws 2016, pg 45

2.1.4 Socio-Cultural Facilities

Sl.No	Category	Maximum			Other Controls
		Ground Coverage	FAR	Height	
1.	a. Multipurpose Community Hall. b. Banquet hall	30% 30%	1.20 1.20	26m 26m	1. Parking standard @3.0ECS/100sq m of floor area. 2. Other controls related to basements etc. are given at end of this chapter.
2.	a. Community Recreational Club. b. Recreational Club	30% 25%	1.20	26m	Parking standard @2ECS/100sq.m of floor area.
3.	Socio- cultural activities such as auditorium, music, dance & drama centre/mediation & spiritual centre etc.	35%	1.20	26m	1. Parking standard @ 2ECS/100sq.m of floor area. 2. A proper scheme for visitors parking and parking adequacy statement shall be prepared taking into consideration large number of visitors.
4.	Exhibition cum Fair Ground	20%	0.20	26m	Subject to statutory clearances.
5.	Science centre	30%	1.20	NR,	Parking standard @2ECS.
6.	International Convention Centre	30%	1.20	Subject to approval of AAI, Fire Department and other statutory bodies	Parking standard @2ECS.

Notes:

i. In case of community recreational clubs, 0.50 FAR shall be admissible on the area beyond 2000 sqm.

ii. In the open area apart from outdoor games/sport facilities, swimming pool would be permissible upto an area of 300sqm. Free from ground coverage.

iii. Basement within the ground envelope shall be allowed for parking, stilt floor for parking is permissible.

iv. 30% of basement area for services, storage shall not be counted in FAR.

Figure 8: Model Building Bye-laws 2016, pg 48

2.1.5 Creche/Day Care Facilities

As per factories Act, 1948 a Creche/Day care facility has to be provided for any organization/establishment employing more than 15 women for their kids upto the age of 5.

a) The height of the rooms shall be not less than 3.6 metres from the floor to soffit and there shall not be less than 1.86 sqm of floor area / child to be accommodated and maintaining adequate ventilation by the circulation of fresh air.
b) There is a minimum of one toilet and one wash hand basin for every 10 children over the age of two years.
c) The minimum staffing ratios for care shall be 1:4 children.
d) Monitoring - There is a necessity of minimum two supervisor on continuous duty.

2.1.6 General Building Requirements and Services

Understanding Occupant Load Standards for Different Building Types

This part sets out the standard space requirements of various parts of a building (for all types of buildings – low/ high rise).

Table 4.1 Occupant Load

Sl.No.	Type of Occupancy	Occupant Load per 100 sq m. of Plinth or Covered Area
1	Residential	8.0
2	Educational	25.0
3	Institutional	6.60
4	Assembly with fixed or loose seats and dance floor without seating facilities including dining rooms	 166.6 66.6
5	Mercantile street floor and sales basement upper sale floor	 33.3 16.6
6	Business and industrial	10.0
7	Storage	3.3
8	Hazardous	10.0

* *The occupant load in dormitory portions of homes for the aged, orphanages or mental hospitals etc. where sleeping accommodation is provided shall be calculated at not less than 13.3 persons per 100 sq.m.*

** *The plinth or covered area shall include, in addition to the main assembly room or space, any occupied connecting room or space in the same storey or in the storeys above or below where entrance is common to such rooms and space and the area available for use by the occupants of the assembly place. No deduction shall be made in the plinth/covered area for corridors, closets and other sub-divisions; that area shall include all space serving the particular assembly occupancy.*

Figure 9: Model Building Bye-laws 2016, pg 51

2.1.7 2.1.7 Ramps

a) The ramp to basement and parking floors shall not be less than 7.2m wide for two-way traffic and 4 m wide for one way traffic, provided with Gradient of 1:10 for cars and 1:15 for heavy vehicles. At curved portions of the ramp or for circular ramps the slope should not be more than 1:12.

b) Ramps may also be provided in the setbacks which can be sloped considering unhindered movement of fire engine and in no case the gradient shall be less than 1:10.

2.1.8 2.1.8 Provision of Podium for parking and landscaping

In case the buildings are to be constructed with stilt floor on individual plot for providing parking space and where basement could not be approached for parking, in such cases a podium may be constructed on ground floor in continuation of the stilt floor having access from the front for the parking after leaving minimum 3m setback from the plot line. The terrace of podium may be used for plantation & landscaping. For low rise development, the maximum height permitted is 15mts. However, where the stilt floor is to be constructed for parking the height may be increased to 17.5 mtr.

2.1.9 Water requirement and facilities

Sl. No.	Type of Occupancy	Consumption per head per day (in lt.)
1.	Residential	
	a) In living units	135
	b) Hostels	135
	c) Hotels with lodging accommodation (per bed)	180
	d) Hotels (5 star and above)	340
2.	Educational	
	a) Day schools	45
	b) Boarding Schools	135
3.	Institutional (Medical Hospitals)	
	a) No. of beds not exceeding 100	340
	b) No. of beds exceeding 100	450
	c) Medical quarters and hostels	135
4.	Assembly- Cinema theatres, auditoria, etc. (per seat accommodation)	15
5.	Government or Semi public business	45
6.	Segregated toilet facilities for Visitors in Public Buildings	
	a) Each use of toilet (including washing hands and floors)	7
	b) Flushing urinals	0.20
7.	Mercantile (Commercial)	
	a) Restaurants (per seat)	70
	b) Other business building	45
8.	Industrial	
	a) Factories where bath-rooms are to be provided	45
	b) Factories where bath-rooms are not to be provided	30
9.	Storage (including Warehouses)	30
10.	Hazardous	30
11.	Intermediate Stations (excluding mail and express stops).	45 (25)*
12.	Junction Station	70 (45)*
13.	Terminal Stations	45
14.	International and Domestic Airports	70

* The values in parenthesis are for such stations, where bathing facilities are not provided.

Note: *The number of persons for Sl. No. 11 to 14 shall be determined by the average number of passenger handled by the station daily with due consideration given to the staff and workers likely to use the facilities.*

Figure 10: Per Capita water requirement for various Occupancies/Uses (Model Building Bye-laws 2016, pg 70)

Table 4.7 Flushing Storage Capacities

Sl. No.	Classification of Building	Storage Capacity
1.	For tenements having common convenience	900 lt. net per w.c. seat
2.	For residential premises other than tenement having common conveniences	270 lt. net for one w.c. seat each and 180 lt. for each additional seat in the same flat.
3.	For factories and workshops	900 lt. per w.c. seat and 180 lt. per urinal.
4.	For cinemas, public assembly hall, etc.	900 lt. per w.c. seat and 350 lt. per urinal.

Table 4.8 Domestic Storage Capacities

Sl. No.	No. of Floors	Storage Capacity	Remarks
For premise occupied tenements with common conveniences:			
1.	Ground floor	Nil	Provided down take fittings are installed
2.	Floors 2, 3,4, 5 and upper floors	500 litre per tenement	
For premises occupied as flats or blocks			
1.	Ground floor	Nil	Provided down take fittings are installed
2.	Floors 2, 3, 4, 5 and upper floors	500 litre per tenement	

Note: *1. If the premises are situated at a place higher than the road level in front of the premises, storage at ground level shall be provided on the same lines as on floors.*

2. The above storage may be permitted to be installed provided that the total domestic storage calculated on the above basis is not less than the storage calculated on the number of down take fittings according to scale given below:

Down take taps	*70 l. each*
Showers	*135 l. each*
Bathtubs	*200 l. each*

Figure 11: Model Building Bye-laws 2016, pg 71

Table 4.11 Sanitation Requirements for Educational Occupancy

Sl. No.	Sanitary Unit	Boarding Institution		Other Educational Institution	
		For Boys	For Girls	For Boys	For Girls
1.	Water Closet (W.C.)	One for 8 boys or part thereof	One for 6 girls or part thereof	One for 40 boys or part thereof	One for 25 girls or part thereof
2.	Ablution Taps	One in each W.C.	One in each W.C.	One in each W.C.	One in each W.C.
3.	Urinals	One per every 25 pupils or part thereof	--	One per every 20 pupils or part thereof	--
4.	Wash Basins	One for every 8 pupils or part thereof	One for every 6 pupils or part thereof	One for every 60 pupils or part thereof	One for every 40 pupils or part thereof
5.	Baths	One for every 8 pupils or part thereof	One for every 6 pupils or part thereof	--	--
6.	Drinking Water Fountains	One for every 50 pupils or part thereof	One for every 50 pupils or part thereof	One for every 50 pupils or part thereof	One for every 50 pupils or part thereof
7.	Cleaner's Sink	One per Floor minimum	One per Floor minimum	One per Floor minimum	One per Floor minimum

Note:

1. *One water tap with draining arrangements shall be provided for every 50 persons or part thereof, in the vicinity of water closets and urinal.*
2. *For teaching staff, the schedule of sanitary units to be provided shall be the same as in case of office buildings (Table 5.10).*

Figure 12: Model Building Bye-laws 2016, pg 73

2.1.10 Minimum room size and height requirement for educational buildings

Height

The height of all rooms for human habitation shall not be less than 2.75 m measured from the surface of the floor to the lowest point of the ceiling (bottom of slab) provided that the minimum clear headway under any beam shall not be less than 2.4 m. In the case of pitched roof, the average height of rooms shall not be less than 2.75 m. The minimum clear head room under a beam, folded plates or eaves shall be 2.4 m. In the case of air-conditioned rooms, a height of not less than 2.4 m measured from the surface of the floor to the lowest point of air-conditioning duct or the false ceiling shall be provided.

Size

The area of habitable room shall not be less than 9.5 m2, where there is only one room with a minimum width of 2.4 m. Where there are two rooms, one of these shall not be less than 9.5 m2 and the other not less than 7.5 m2, with a minimum width of 2.1 m.

2.1.11 Bathroom and Water – Closets

Height

The height of a bathroom or water-closet measured from the surface of the floor to the lowest point in the ceiling (bottom of slab) shall not be less than 2.1 m.

Size

The area of a bathroom shall not be less than 1.8 m2 with a minimum width of 1.2 m. The floor area of water-closet shall be 1.1 m2 with a minimum width of 0.9 m. If bath and water-closet are combined, its floor area shall not be less than 2.8 m2 with a minimum width of 1.2 m.

Other Requirements

Every bathroom or water-closet shall:

a) be so situated that at least one of its walls shall open to external air;

b) not be directly over or under any room other than another water-closet, washing place, bath or terrace, unless it has a water-tight floor;

c) have the platform or seat made of water-tight non-absorbent material;

d) be enclosed by walls or partitions and the surface of every such wall or partition shall be finished with a smooth impervious material to a height of not less than 1 m above the floor of such a room;

e) be provided with an impervious floor covering, sloping towards the drain with a suitable grade and not towards VERANDAH or any other room; and

f) have a window or ventilator, opening to a shaft or open space, of area not less than 0.3 m2 with side not less than 0.3 m.

2.1.12 Basement Usage and Design Regulations

The following regulations govern the design, use, and construction of basements in accordance with the applicable Development Control Rules:

- Basements shall strictly not be used for residential purposes under any circumstances.
- Construction of basements shall be permitted only by the Competent Authority, subject to compliance with the designated **land use** and all relevant provisions specified in the Development Control Rules.
- Basements constructed **within the building envelope** and adhering to **maximum ground floor coverage norms** may be used for the following purposes only:
    a. **Storage** of household or other goods composed of ordinarily **non-combustible** materials.
    b. Use as **strong rooms, bank cellars**, and similar secure facilities.
    c. Installation of **air-conditioning equipment** and other mechanical systems or utilities that serve the building.
    d. Provision of **vehicular parking spaces**.
- All basements must meet the following structural and safety requirements:
    a. A **minimum height of 2.4 meters** shall be maintained from the basement floor to the underside of the roof slab or ceiling.
    b. **Adequate ventilation** must be provided in accordance with the occupancy type. If natural ventilation is insufficient, **mechanical ventilation systems** such as exhaust fans or blowers must be installed.
    c. The **ceiling height** above the average surrounding ground level shall be **not less than 0.9 meters and not more than 1.2 meters**.
    d. Proper **surface drainage systems** shall be installed to prevent rainwater or surface runoff from entering the basement.
    e. The **walls and floors** of the basement shall be **watertight** and designed to withstand soil pressure and moisture. Adequate **damp-proofing treatments** shall be incorporated.
    f. **Access to the basement** must be separate from the main and alternative staircases that serve the upper floors.
    g. Where staircases are continuous across multiple floors, they must be of the **enclosed type, effectively serving as a fire separation** between the basement and upper floors. Open ramps for basement access may be permitted within the building line, subject to drainage provisions mentioned in (d).
    h. **Exit provisions** from the basement must comply with **Part 4 – Fire and Life Safety** of the building code.

2.1.13 Septic Tanks

Design, Location, and Construction Standards

In accordance with the Model Building Bye-Laws, 2016 (TCPO) and NBC 2005 (Part 9: Plumbing Services), the construction and placement of septic tanks for sewage disposal must adhere strictly to the following guidelines to ensure public health, hygiene, and structural safety.

Location of Septic Tanks and Subsurface Absorption Systems

- Septic tanks must not be located closer than 18 meters from any source of drinking water (e.g., wells), ensuring protection from bacterial contamination of groundwater.
- The tank must be at least 6 meters away from the nearest habitable structure, or as far as possible within economic constraints, to prevent damage and odor nuisance (Model Bye-Laws, 2016, Clause 4.15.1).

Dimensional and Material Requirements

Minimum internal dimensions:

- Width: 750 mm
- Depth below water level: 1 meter
- Liquid holding capacity: 1 cubic meter
- The length of the septic tank should be 2 to 4 times its width.
- Tanks can be constructed from brickwork, stone masonry, concrete, or other approved materials (Clause 4.15.2a & b).

Effluent Disposal Regulations

- Effluent must not be discharged into open drains or water bodies without adequate treatment to avoid environmental pollution (Clause 4.15.2c).
- The minimum pipe diameter for outlets must be 100 mm, and the direction of flow in junctions should not exceed an angle of 45° from the main flow line (Clause 4.15.2d).

Drainage Gradient and Ventilation

- Gradient of dispersion trenches and under-drainage should lie between 1:300 and 1:400 (Clause 4.15.2e).
- Every septic tank must include a ventilation pipe (minimum diameter 50 mm) with a **mosquito-proof wire mesh cover.
- The pipe should extend:
- 2 m above ground level if tank is 15 m or more from any building.
- 2 m above the building roofline if tank is closer than 15 m (Clause 4.15.2f).

Seepage Pit Design (if used for Effluent Disposal)

Pits should have:

- Minimum cross-sectional dimension of 0.90 m
- Minimum depth of 1.00 m below inlet pipe
- Lining materials: Stone, brick, or concrete blocks with **dry joints, backed with **75 mm gravel.
- For large pits, top portion may be narrowed to minimize RCC slab size.
- Near trees or where unlined pits are used, pit should be filled with loose stones.

- Masonry ring to prevent surface flooding and anti-mosquito inlet pipe drop of 0.90 m should be provided (Clause 4.15.2g).

Dispersion Trench Alternative
Trench dimensions:

- Depth: 0.50 m – 1.00 m
- Width: 0.30 m – 1.00 m
- Length: Not more than 30 m
- Spacing between trenches: Minimum 1.8 m
- Trenches should be laid on a gentle gradient, lined with 150 mm to 250 mm of washed gravel, and contain open-jointed earthenware or concrete pipes (diameter 75 mm to 100 mm) (Clause 4.15.2h).

2.1.14 Staircase/ Exit Requirements

4.17 Staircase/Exit Requirements

4.17.1 The minimum clear width, minimum tread width and maximum riser of staircases for buildings shall be as given as below (*see also* Part 4 'Fire and Life Safety of NBC 2005).

4.17.2 Minimum width

The minimum width of staircase shall be as follows:

A	Residential buildings (dwellings) NOTE — For row housing with 2 storeys, the min. width of shall be 0.75	1.0 m
B	Residential hotel buildings	1.5 m
C	Assembly buildings like auditoria, theatres and cinemas	2.0 m
D	Educational building	1.5 m
E	Institutional buildings	2.0 m
F	All other buildings	1.5 m

4.17.3 Minimum tread

The minimum width of tread without nosing shall be 250 mm for residential buildings. The minimum width of tread for other buildings shall be 300 mm.

4.17.4 Maximum riser

4.17.4.1 The maximum height of riser shall be 190 mm for residential buildings and 150 mm for other buildings and these shall be limited to 12 per flight.

4.17.4.2 The minimum head-room in a passage under the landing of a staircase shall be 2.2 m. The minimum clear head-room in any staircase shall be 2.2 m.

4.17.5 Exit Requirements

All aspects of exit requirements for corridors, doors, stair cases, ramps, etc in respect of widths, travel distance shall be as per Part 4 'Fire and Life Safety' of NBC,2005.

Figure 13: Model Building Bye-laws 2016, pg 57

2.1.15 Types of Exits

a) Permissible Exit Types:

Exits may be of horizontal or vertical type, and include:

- Doorways
- Corridors and passages
- Internal staircases
- External staircases
- Ramps to verandas
- Terraces with access to a street

Horizontal exits connecting to adjoining buildings on the same level

b) Not Considered as Exits:

These do not qualify as exit routes for fire safety purposes.

- Lifts,
- Escalators, and
- Revolving doors

2.1.16 Wheelchair Accessibility

At least one primary entrance to every building shall be accessible to individuals using wheelchairs and clearly marked with signage. That entrance should be located on a level that also provides elevator access for unhindered vertical movement.

2.1.17 Arrangement of Exits

When designing university or institutional campuses (like AUD Rohini), the arrangement of exits must follow these guidelines to ensure efficient and safe evacuation during emergencies:

a) Exit Placement and Travel Distance:

For all academic buildings, hostels, libraries, and auditoriums: The maximum walking distance from any point on a floor to the nearest exit must not exceed:

- 22.5 meters for residential (e.g., hostels) and educational/institutional buildings (e.g., classrooms, admin blocks).
- 30.0 meters for assembly spaces (e.g., auditoriums), office zones, cafeterias, or storage areas.
- Where more than one exit is required (e.g., in larger blocks or floors):
- Exits must be spaced as far apart as possible, creating multiple safe escape paths.
- Every part of the floor should have clear and direct access to at least one exit.

b) Distance from Remote Points:

For campus buildings with larger floor plates (like libraries or lecture halls):

- The distance from the most remote corner to an exit should not exceed half of the permitted maximums.
- For educational/institutional use: 11.25 meters
- For assembly/business/office use: 15.0 meters

- Exception: For buildings housing vulnerable populations (e.g., medical, or special needs blocks), the maximum travel distance from remote points must not exceed 6.0 meters.

2.1.18 Roof Drainage and Rainwater Management

(As per Model Building Bye-Laws, 2016, TCPO – Section 4.18)

The roof of a building must be designed and constructed to effectively drain rainwater using appropriately sized and adequately placed rainwater pipes. These pipes should be arranged, jointed, and fixed in a manner that ensures water is carried away from the building without causing dampness to any part of the walls, roof, or foundations—either of the building itself or adjacent structures.

2.1.19 Connection Requirements:

Rainwater pipes may be mandated by the Authority to connect to a drain, sewer, or a covered channel formed beneath the public footpath to lead water directly to the road gutter or any other approved outlet system.

2.1.20 Pipe Placement:

Rainwater pipes must be fixed to the exterior of the building's walls, either exposed or recessed within grooves formed in the walls. Any alternative method must be pre-approved by the Authority.

2.1.21 Rainwater Harvesting Recommendation:

It is recommended to conserve rainwater using appropriate Rain Water Harvesting (RWH) techniques, including roof water collection systems. Reference should be made to Part 9, Plumbing Services, Section 1 of the National Building Code (NBC) 2005, for further technical guidelines.

2.2 Master Plan Delhi 2021

Sl. No.	Category	Maximum			Other Controls
		Ground Coverage	FAR	Height	
1	Vocational Training Centre (ITI/Polytechnic / Vocational/ Training Institute/ Management Institute/ Teacher Training Institutes etc.) / Research and Development centre.	35%	[1][225]	37 m	1. [2][Upto 30% of max. permissible FAR can be used for hostel accommodation for the students.] 2. Parking standard @ 1.33 ECS / 100 sq m of floor area. The areas earmarked for parking if misused liable to be municipalized / taken over by the authority. 3. Other controls related to basements etc. are given in the Development Code chapter.
2	General College				
3	Professional College (Technical)				

Sl. No.	Category	Maximum			Other Controls
		Ground Coverage	FAR	Height	
4	University Campus including International Education Centre (IEC) – Large campus (10 ha and above) will be divided into following four parts: a) Academic including Administration (45% of total land area)	30%	[1][225]	37 m	1. Parking standard @ 1.33 ECS / 100 sq m of floor area. 2. Other controls related to basements etc. are given in the Development Code chapter. 3. Landscape plan to be prepared.
	b) Residential (25% of total land area)	1. Regulations for group housing shall apply. 2. The land shall be reserved for facilities as per residential norms.			
	c) Sports and Cultural activities (15%)	10%	15	26 m	
	d) Parks and Landscape (15%)	N. A.			

2.3 Delhi Development Authority

2.3.1 Environmental Conditions For Buildings And Constructions

(Category '3': 50000 to 150000 m2)

MEDIUM	S.N.	ENVIRONMENTAL CONDITIONS
Topography and Natural Drainage	1	The natural drain system should be maintained for ensuring unrestricted flow of water. No construction shall be allowed to obstruct the natural drainage through the site. No construction is allowed on wetland and water bodies. Check dams, bio- swales, landscape, and other sustainable urban drainage systems (SUDS) are allowed for maintaining the drainage pattern and to harvest rain water. Buildings shall be designed to follow the natural topography as much as possible. Minimum cutting and filling should be done.
Water conservation - Rain Water Harvesting, and Ground Water Recharge	2	A complete plan for rain water harvesting, water efficiency and conservation should be prepared. The local bye-law provisions on rain water harvesting should be followed. If local bye-law provisions are not available, adequate provision for storage and recharge should be followed as per the Ministry of Urban Development Model Building Bye- laws, 2016. A rain water harvesting plan needs to be designed where the recharge bores of minimum one recharge bore per 5,000 square meters of built up area and storage capacity of minimum one day of total fresh water requirement shall be provided. In areas where ground water recharge is not feasible, the rain water should be harvested and stored for reuse. The ground water shall not be withdrawn without approval from the Competent Authority. All recharge should be limited to shallow aquifer.
	2(a)	At least 20% of the open spaces as required by the local building bye-laws shall be pervious. Use of Grass pavers, paver blocks with at least 50% opening, landscape etc. would be considered as pervious surface.
	2(b)	Use of water efficient appliances should be promoted. Low flow fixtures or sensors be used to promote water conservation.
	2(c)	Separation of grey and black water should be done by the use of dual plumbing system. In case of single stack system separate recirculation lines for flushing by giving dual plumbing system be done.
Solid Waste Management	3	Solid waste: Separate wet and dry bins must be provided in each unit and at the ground level for facilitating segregation of waste. The provisions of the Solid Waste (Management) Rules 2016 and the e-waste (Management) Rules 2016, and the Plastics Waste (Management) Rules 2016 shall be followed.

	3(a)	All non-biodegradable waste shall be handed over to authorized recyclers for which a written tie up must be done with the authorized recyclers.
	3(b)	Organic waste composter/Vermiculture pit with a minimum capacity of 0.3 kg/person/day must be installed.
Sewage Treatment Plant	4	Onsite sewage treatment of capacity of treating 100% waste water to be installed. Treated waste water shall be reused on site for landscape, flushing, cooling tower, and other end-uses. Excess treated water shall be discharged as per CPCB norms. Natural treatment systems shall be promoted. Sludge from the onsite sewage treatment, including septic tanks, shall be collected, conveyed and disposed as per the Ministry of Urban Development, Central Public Health and Environmental Engineering Organisation (CPHEEO) Manual on Sewerage and Sewage Treatment Systems, 2013.
Energy	5	Compliance with the Energy Conservation Building Code (ECBC) of Bureau of Energy Efficiency shall be ensured. Buildings in the States which have notified their own ECBC, shall comply with the State ECBC. Outdoor and common area lighting shall be LED. Concept of passive solar design that minimize energy consumption in buildings by using design elements, such as building orientation, landscaping, efficient building envelope, appropriate fenestration, increased day lighting design and thermal mass etc. shall be incorporated in the building design. Wall, window, and roof u-values shall be as per ECBC specifications.
	5(a)	Solar, wind or other Renewable Energy shall be installed to meet electricity generation equivalent to 1% of the demand load or as per the state level/ local building bye-laws requirement, whichever is higher.

	5(b)	Solar water heating shall be provided to meet 20% of the hot water demand of the commercial and institutional building or as per the requirement of the local building bye-laws, whichever is higher. Residential buildings are also recommended to meet its hot water demand from solar water heaters, as far as possible.
	5(c)	Use of environment friendly materials in bricks, blocks and other construction materials, shall be required for at least 20% of the construction material quantity. These include flyash bricks, hollow bricks, AACs, Fly Ash Lime Gypsum blocks, Compressed earth blocks, and other environment friendly materials. Fly ash should be used as building material in the construction as per the provisions of the Fly Ash Notification of September, 1999 as amended from time to time.
Air Quality and Noise	6	Dust, smoke & other air pollution prevention measures shall be provided for the building as well as the site. These measures shall include screens for the building under construction, continuous dust/ wind breaking walls all around the site (at least 3meter height). Plastic/tarpaulin sheet covers shall be provided for vehicles bringing in sand, cement, murram and other construction materials prone to causing dust pollution at the site as well as taking out debris from the site. Wheel washing for the vehicles used be done. Sand, murram, loose soil, cement, stored on site shall be covered adequately so as to prevent dust pollution. Wet jet shall be provided for grinding and stone cutting. Unpaved surfaces and loose soil shall be adequately sprinkled with water to suppress dust. All construction and demolition debris shall be stored at the site (and not dumped on the roads or open spaces outside) before they are properly disposed. All demolition and construction waste shall be managed as per the provisions of the Construction and Demolition Waste Rules 2016. All workers working at the construction site and involved in loading, unloading, carriage of construction material and construction debris or working in any area with dust pollution shall be provided with dust mask. For indoor air quality the ventilation provisions as per National Building Code of India.

	6(a)	The location of the DG set and exhaust pipe height shall be as per the provisions of the CPCB norms.
Green Cover	7	A minimum of 1 tree for every 80 sq.mt. of land should be planted and maintained. The existing trees will be counted for this purpose. Preference should be given to planting native species.
	7(a)	Where the trees need to be cut, compensatory plantation in the ratio of 1:3 (i.e. planting of 3 trees for every 1 tree that is cut) shall be done and maintained.
Top Soil Preservation and Reuse	8	Topsoil should be stripped to a depth of 20 cm from the areas proposed for buildings, roads, paved areas, and external services. It should be stockpiled appropriately in designated areas and reapplied during plantation of the proposed vegetation on site.
Transport	9	A comprehensive mobility plan, as per MoUD best practices guidelines (URDPFI), shall be prepared to include motorized, non-motorized, public, and private networks. Road should be designed with due consideration for environment, and safety of users. The road system can be designed with the basic criteria. 1. Hierarchy of roads with proper segregation of vehicular and pedestrian traffic. 2. Traffic calming measures. 3. Proper design of entry and exit points. 4. Parking norms as per local regulation.
Environment Management Plan	10	An environmental management plan (EMP) shall be prepared and implemented to ensure compliance with the environmental conditions specified in item number 1 to 9 above. A dedicated Environment Monitoring Cell with defined functions and responsibility shall be put in place to implement the EMP. The environmental cell shall ensure that the environment infrastructure like Sewage Treatment Plant, Landscaping, Rain Water Harvesting, Energy efficiency and conservation, water efficiency and conservation, solid waste management, renewable energy etc. are kept operational and meet the required standards. The environmental cell shall also keep the record of environment monitoring and those related to the environment infrastructure.

viii) A maximum of 50% of interior exit stairways are permitted to egress through an atrium on the level of exit discharge.

ix) Since the design of each atrium varies in many aspects, hence drawings for use of kiosks in Atrium shall be referred to Delhi Fire Service for approval.

x) The atrium usage shall not be more than 25% of the atrium floor and subject to above mentioned conditions.

2.3.2 Sanitation Requirements

Educational Occupancy

Table 9.6: Sanitation Requirements for Educational Occupancy

S.No	Sanitary Unit	Boarding Institution		Other Educational Institution	
		For Boys	For Girls	For Boys	For Girls
1.	Water Closet (W.C.)	One for every 8 pupils or part thereof	One for every 6 pupils or part thereof	One for every 25 pupils or part thereof	One for every 15 pupils or part thereof
2.	Ablution Taps	One in each W.C.	One in each W.C.	One in each W.C.	One in each W.C.
3.	Urinals	One per every 25 pupils or part thereof	--	One per every 20 pupils or part thereof	--
4.	Wash Basins	One for every 8 pupils or part thereof	One for every 6 pupils or part thereof	One for every 40 pupils or part thereof	One for every40 pupils or part thereof
5.	Baths	One for every 8 pupils or part thereof	One for every 6 pupils or part thereof	--	--
6.	Drinking Water Fountains	One for every 50 pupils or part thereof	One for every 50 pupils or part thereof	One for every 50 pupils or part thereof	One for every 50 pupils or part thereof
7.	Cleaner's Sink	One per Floor minimum	One per Floor minimum	One per Floor minimum	One per Floor minimum

Notes:

i. *One water tap with draining arrangements shall be provided for every 50 persons or part thereof, in the vicinity of water closets and urinal.*

ii. *For teaching staff, the schedule of sanitary units to be provided shall be the same as in case of office buildings (Table 9.9).*

2.3.3 Administrative Building

Table 9.7 (contd.): Administrative Buildings

S.No	Sanitary Unit	For Males	For Females
1	Water Closet (W.C.)	One for every 25 persons or part thereof	One for every 15 persons or part thereof
2	Ablution Taps	One in each W.C.	One in each W.C.
3	Wash Basins	One for every 25 persons or part thereof	One for every 25 persons or part thereof
4	Baths with Shower	One on each floor	One on each floor
5	Bed pan washing sink	--	--
6	Cleaner's Sink	One per floor minimum	One per floor minimum
7	Kitchen sinks & dish Washers (where Kitchen is provided)	One for each floor	One for each floor
8	Urinals	Nil up to 6 persons 1 for 7-20 persons 2 for 21-45 persons 3 for 46-70 persons 4 for 71-100 persons From 101 to 200 persons add at the rate of 3%; for over 200 persons add at the rate of 2.5%	--

S.No	Type of occupancy	Consumption (in lt.)
1.	Residential i. EWS/LIG dwelling units(LPCD/ dwelling unit) ii. . MIG and above category flats/houses/floors (LPCD/ dwelling unit) iii. Hotels with lodging accommodation (per bed)	 135 225 180
2.	Educational a) Day schools(per head per day) b) Boarding schools(per head per day)	 45 135
3	Institutional(medical hospitals) a)no. of beds not exceeding 100 b)no. of beds exceeding 100 c) medical quarters and hotels	 340 450 135
4	Assembly – cinema theatres, auditoria, etc. (per seat accommodation)	15
5.	Government or semi-public business	45
6	Mercantile(commercial) a) Restaurants(per seat) b) Other business building	 70 45
7	Industrial a. Factories where bath- rooms are to be provided. b. Factories where bath-rooms are not to be provided	 45 30
8.	Storage(including warehouses)	30
9.	Hazardous	30
10.	Intermediate stations (excluding mail and express stops.	45(25)*
11.	Junction stations	70(45)*
12.	Terminal stations	45
13.	International and domestic Airports	70

*The values in parenthesis are for such stations, where bathing facilities are not provided.

2.3.4 Residential building

Table 9.10: Sanitation requirements for residencs

S.No.	Sanitary Unit	Dwelling with individual conveniences	Dwelling without individual conveniences.
1	Bath Room	One provided with water tap	One for every two tenement
2	Water Closet (WC)	One	One for every two tenement
3	Sink (or Nahani) in the Floor	One	-------
	Water Tap	One	One with drainage arrangement in each tenement. One in common bath rooms and common water closet.

Note:

Where only one water closet is provided in a dwelling, the bath and water closet shall be separately accommodated.

2.4 PROVISIONS FOR GREEN BUILDINGS

2.4.1 Provisions and applicability for various plot sizes

Category of Plot Sizes (sq.m.)	Category of Plot Sizes (sq.m.)	Provisions for Green Building (as per Clause 10.2)
I	up to105	Optional usage of 2 (a), 2(b).
II	105 to 500	1(a), 2(a),2(b), 4(a)
	500 to 1,000	1(a), 1(c), 2(a),2(b), 4(a)
	1,000 to 3,000	1(a), 1(c), 1(d), 2(a),2(b), 3(b), 4(a)
III	Above 3,000	1(a), 1(b), 1(c), 1(d), 2(a), 2(b), 3(a), 3(b), 4(a), 4(b)

Notes:

**The schemes/ projects formulated on the basis of provisions given in Master plan/ Zonal Development Plan will require approval as indicated:*

{Chapter 3 of these Bye-Laws, NBC (latest), ECBC 2007 or latest, BEE Star rating/ IGBC/ GRIHA Certification}

***EIA**- Environmental Impact Assessment Study Report, **ECC**- Environmental Clearance Certificate, **MoEF** – Ministry of Environment and Forest,**NBC** – National Building Code, **ECBC** – Energy Conservation Building Code, **BEE** – Bureau of Energy Efficiency, **LEED**– Leadership in Energy and Environment Design, **IGBC** – Indian Green Building Council, **GRIHA**– Green Rating for Integrated Habitat Assessment, **TERI** – The Energy and Resources Institute.*

The prevailing provisions of the above shall be applicable. However if there are any modification in the same, the modified provisions shall become automatically applicable.

10.2 **Provisions for Sanction:**

(As per Annexure – X)

1. Water Conservation and Management

a. Rain Water Harvesting (by Recharge)

b. Low Water Consumption Plumbing Fixtures

c. Waste Water Recycle and Reuse

d. Reduction of hardscape

2. Solar Energy Utilization

a. Installation of Solar Photovoltaic Panels

b. Installation of Solar Assisted Water Heating Systems

3. Energy Efficiency

a. Low Energy Consumption Lighting Fixtures (Electrical Appliances – BEE Star and Energy Efficient Appliances)

b. Energy Efficiency in HVAC systems

4. Waste Management

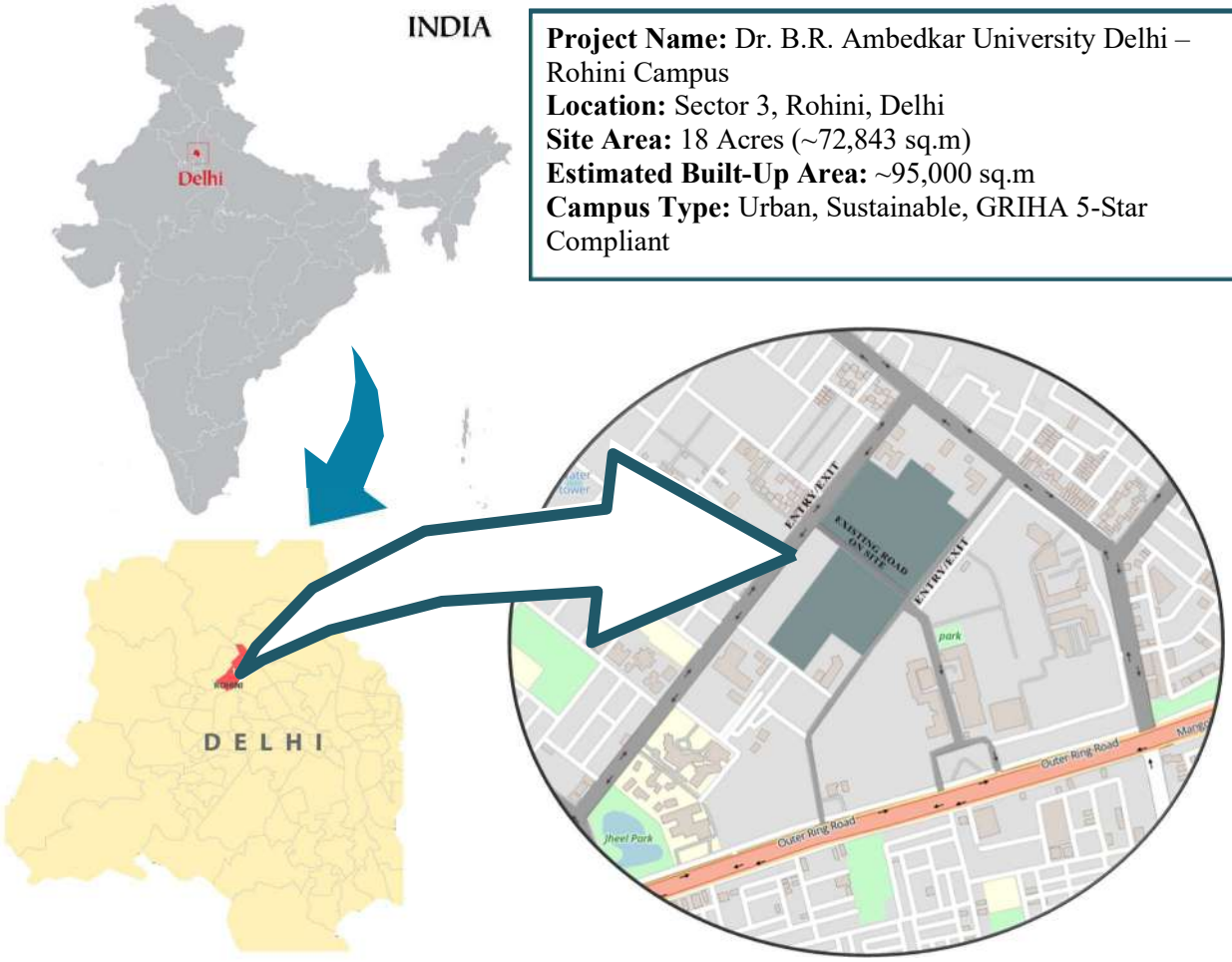
a. Segregation of Waste

b. Organic Waste Management

CHAPTER 3

3 SITE INVENTARY

3.1 LOCATION:



Project Name: Dr. B.R. Ambedkar University Delhi – Rohini Campus
Location: Sector 3, Rohini, Delhi
Site Area: 18 Acres (~72,843 sq.m)
Estimated Built-Up Area: ~95,000 sq.m
Campus Type: Urban, Sustainable, GRIHA 5-Star Compliant

Figure 14: Location

3.2 PROXIMITY

The site is well connected to - Outer Ring Road – 0.6 km

- Metro station – Rohini East - 2.4 km, Rohini West - 3.1 km, Pitampura - 3.1 km

- IGI International Airport - 19.6km
- Bus stands nearby are Pushpanjali Enclave Bus Stand, Kali Mandir Bus Stand,
- Naharpur Village Bus Stand, Rohini Sector -7 Bus Stand.
- New Delhi Railway Station – 15 km

3.3 CLIMATE ANALYSIS

- Latitude: 28.7061° N
- Longitude: 77.1029° E
- Elevation above sea level: 216.0 m
- Koppen–Geiger climate zone: Humid subtropical, dry winter.
- Average yearly temperature: 24.5 °C
- Hottest yearly temperature: 40.0 °C
- Coldest yearly temperature: 7.4 °C
- Annual cumulative horizontal solar radiation: 1959.4 kWh/m2
- Percentage of diffuse horizontal solar radiation: 34.4 %

Weather Conditions:

• A monsoon influenced humid subtropical with high variation between summer and winter temperatures and precipitation.

3.4 SUN PATH ANALYSIS

Seasons	Solar Time	Azimuth (°)	Altitude (°)	Hour Angle (°)	Declination (°)	Rise Time	Set Time	Daylight Duration
Spring	10:01	129.82	49.82	29.71	0.21	06:25	18:33	12:09
Summer	10:13	106.32	63.51	26.86	18.61	05:31	19:04	13:33
Autum	10:16	133.72	52.61	26.04	0.72	06:09	18:20	12:11
Winter	10:11	150.4	31.69	27.28	-23.43	07:10	17:29	10:19

Table 7: Sun path analysis

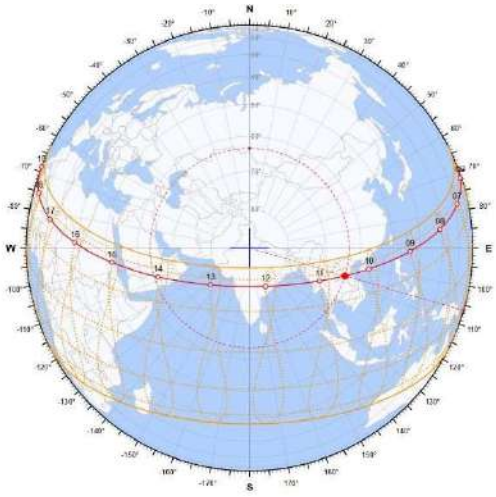


Figure 15: Sun Path

Sun Altitude Variation

The highest solar altitude occurs around noon on June 21st (Summer Solstice), when the sun reaches approximately 83° above the horizon.
The lowest solar altitude is on December 21st (Winter Solstice), with the sun rising and setting at shallow angles, peaking around 37° at solar noon.

Solar Orientation

During summer months, the sun follows a high arc, nearly overhead at noon, especially in May and June. In winter, the sun path shifts towards the south, with shorter days and longer shadows.

Day Length

Longest days occur in June (around 14 hours), providing maximum solar exposure.
Shortest days fall in December (around 10 hours), reducing solar availability.

East-West Solar Movement

The sun rises north of east and sets north of west in summer. In winter, it rises south of east and sets south of west.

3.4.1 Site Planning & Orientation according to sun path

- Academic blocks, classrooms, and libraries should be oriented along the east–west axis, with longer façades facing north and south, to optimize daylight and minimize heat gain.
- South-facing façades can be designed to maximize winter solar exposure, while easily shaded during summer using horizontal shading devices.

Building Placement & Massing

- Use **staggered massing** to allow **mutual shading** between blocks during peak summer months.
- **Avoid deep building footprints** to maximize daylight penetration into internal spaces and reduce dependence on artificial lighting.

Landscape & Outdoor Spaces

- **Courtyards and open learning areas** should be placed to **receive morning sun** (east or southeast orientation) and **remain shaded in the hot afternoon** using trees or tensile structures.
- **Vegetation buffers and tree canopies** should be planted along **west and southwest boundaries** to block harsh evening sun and reduce heat island effects.

Facade & Shading Design

- **North-facing façades**: Use larger glazed openings to bring in **diffused daylight** with minimal solar gain.
- **South-facing façades**: Integrate **horizontal overhangs, balconies, or pergolas** to block high-angle summer sun but allow winter sunlight.
- **East and West façades**: Limit openings or use **vertical louvers, jaali walls, or shading trees** to control low-angle morning and evening sun.

Thermal Comfort & Ventilation

- Locate **gathering areas**, **canteens**, and **recreational zones** to take advantage of **early morning sun and prevailing northwest breezes**, promoting both daylight comfort and passive ventilation.
- Incorporate **verandas, shaded corridors, and transitional spaces** to reduce heat gain and act as thermal buffers between indoor and outdoor zones.

Energy Efficiency

- Proper solar orientation and shading can significantly reduce the need for **mechanical cooling and artificial lighting**, supporting **net-zero energy goals** and improving **operational efficiency** across campus.

3.5 WIND DIRECTION HARNESSING AND MITIGATION:

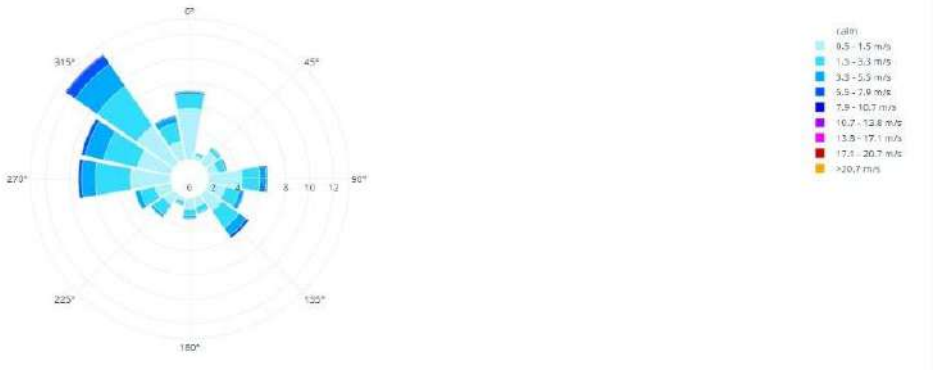


Figure 16: Annual Wind Rose

Aspect	Observation
Dominant Wind Direction	Northwest (270°–330°)
Frequent Wind Speeds	0.5 – 5.5 m/s (Light to moderate)
Calm Periods Present	wind often drops below 0.5 m/s
Strong Wind Events	Rare, occasional winds above 5.5 m/s
Design Relevance	Optimize for northwest ventilation; shading

Table 8: Wind Analysis

3.5.1 Implications for Architectural Design in Delhi

Building Orientation

- Openings and ventilation systems should Favor northwest wind entry for natural cooling and cross-ventilation.
- Avoid large glazed surfaces on the northwest during summer to prevent hot winds and glare.

Shading & Landscaping

- Planting wind-break trees on the northwest edge can help diffuse harsh summer winds.
- Courtyard and veranda designs can be optimized to channel or block wind based on seasonality.

Urban Heat Island Consideration

- With frequent calm conditions and low wind speeds, air stagnation can worsen heat buildup in dense urban areas.
- Incorporate urban ventilation corridors or wind tunnels in planning.

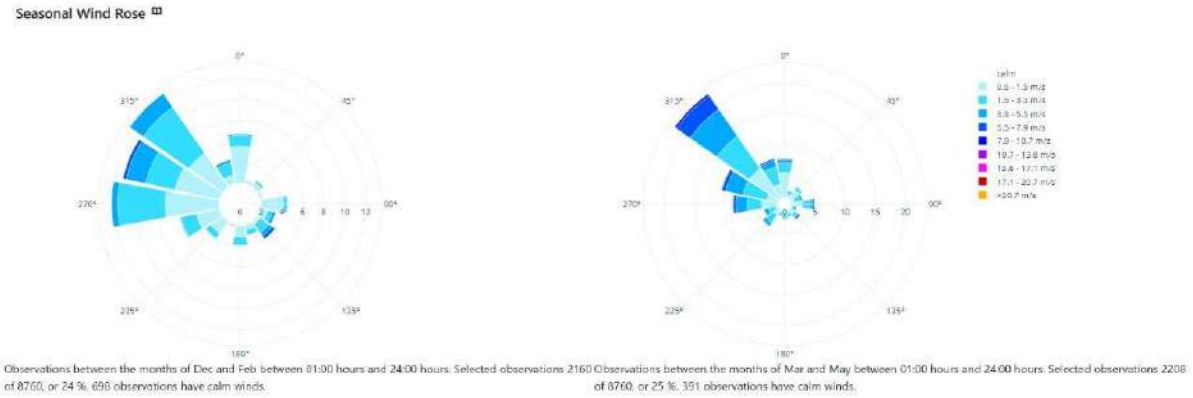


Figure 17: Seasonal Wind Rose – 1

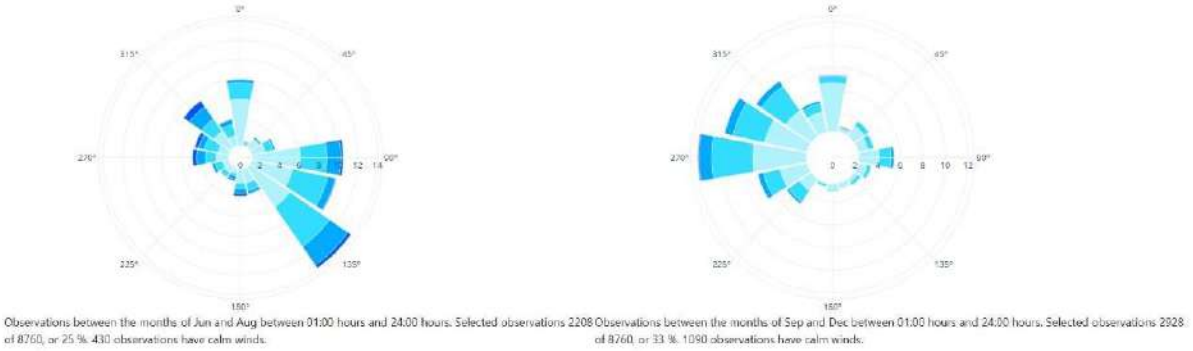


Figure 18: Seasonal wind Rose – 2

- Orient building openings and courtyards toward NW and NE to harness prevailing cool breezes.
- Enable cross-ventilation through operable windows placed on opposing facades. Incorporate wind towers, scoops, or Jaali-walls in building design to draw in and direct breezes.
- Encourage stack effect in multistoried buildings through roof vents and internal atriums.
- Dense trees, green belts, hedges, and berms act as natural shields.
- Reduce exposure on west facades:
- Use smaller windows with shading.
- Create shaded microclimates with native trees and water features (ponds, shaded fountains).
- Maximize permeable surfaces in open areas to reduce runoff and encourage groundwater recharge.

3.6 CLIMATE-RESPONSIVE DESIGN (HOT SEMI-ARID)

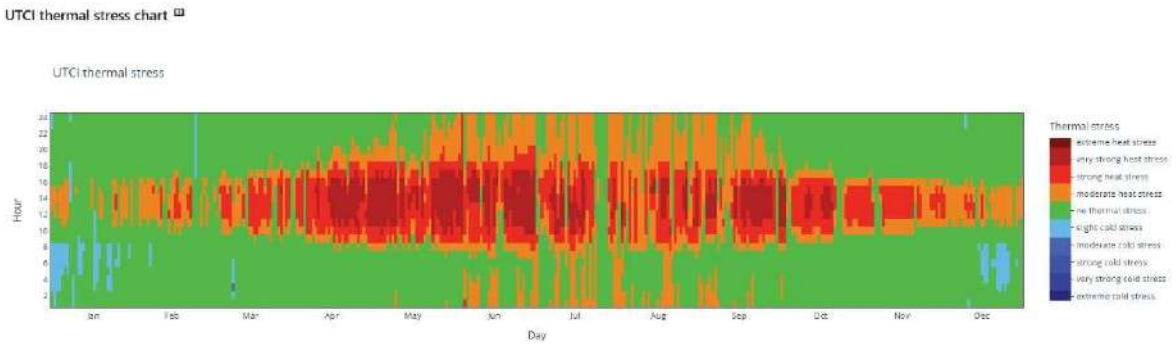


Figure 19: UTCI Thermal Stress Chart

Thermal Stress Category	Time of Occurrence	Months Impacted
Extreme Heat Stress	10 AM – 6 PM	April – September
Strong/Very Strong Heat	9 AM – 7 PM	March – October
Comfortable (No Stress)	Most of Day/Night	Dec – Feb, early Mar
Slight to Moderate Cold	Early morning (2 AM – 9 AM)	Late Dec – Feb

Table 9: Thermal Stress

Design Implications

- Reducing heat gain during hot months through strategic shading, use of light-coloured reflective materials, and minimizing exposed surfaces.
- Optimizing the building envelope by integrating high thermal mass materials that stabilize internal temperatures and insulating roofs and walls to limit both summer heat ingress and winter heat loss.
- Enhancing passive cooling, especially through night-time ventilation and well-designed fenestration to facilitate air movement.
- Preparing for short but notable winter stress by allowing for passive solar gain and preventing unnecessary heat loss through appropriate insulation and material selection.

These strategies form the foundation of a climate-responsive architectural design, ensuring energy efficiency, occupant comfort, and sustainability throughout the year.

3.7 PASSIVE COOLING STRATEGIES:

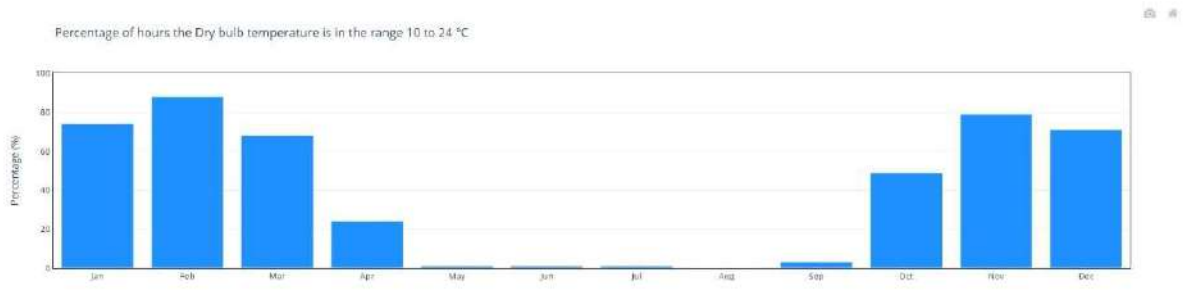


Figure 20: Natural Ventilation

- **Natural Ventilation:** As mentioned above, design for maximum cross-ventilation, stack ventilation, and wind-driven ventilation.
- **Evaporative Cooling:** Consider evaporative cooling systems, especially during the dry summer months, to lower ambient air temperature. This can be integrated into air handling units or through landscape features.
- **Night Purging:** Design systems to allow for night purging, flushing out accumulated heat from the building interior by opening windows during cooler night hours.
- **Day lighting:** Maximize the use of natural daylight to reduce reliance on artificial lighting. Design appropriate window sizes, orientations, and light shelves/louvers to bring in diffused light without excessive glare or heat gain.
- Utilize atrium spaces and skylights with appropriate shading for deeper penetration of daylight.

3.8 TEMPERATURE CHART

Descriptive statistics

Apply month and hour filter

Month Range 1 12 Invert

Hour Range 0 24 Invert

month	mean (°C)	std (°C)	min (°C)	1% (°C)	25% (°C)	50% (°C)	75% (°C)	99% (°C)	max (°C)
Jan	13.09	4.13	4.2	5.1	9.88	12.6	16.4	21.86	23.2
Feb	16.71	4.55	7	8.24	13.3	16	20.42	26.06	27.2
Mar	21.36	5.38	10.4	11.4	17.4	21.15	25.02	33.06	35.2
Apr	28.41	5.69	14.6	16.84	24.28	28.1	32.4	39.96	41.2
May	32.36	4.84	22.6	24	28.4	32	36.3	42.16	43.6
Jun	33.19	4	23	25.32	30.28	33	36.12	41.48	41.6
Jul	30.26	3.28	23.6	24.3	27.5	30.1	32.8	36.76	37.6
Aug	29.7	2.56	24	24.99	27.7	29.5	31.6	35	36
Sep	29.16	3.13	18.8	22.92	26.9	28.6	31.3	36.06	37
Oct	24.97	4.56	14.6	16.34	21.38	24.25	29	34.16	35.4
Nov	19.42	4.72	9.4	11.32	15.4	19	23.2	28.92	31.4
Dec	14.55	5.43	5	5.89	9.9	13.4	19.7	25.4	27
Year	24.46	8.16	4.2	7.4	18.2	26	30.5	40	43.6

Figure 21: Descriptive Statistics of Temperature

3.9 SWOT ANALYSIS

Strengths

Well-Established Infrastructure:
The site benefits from essential urban infrastructure already in place—including access roads, defined entry and exit points, sewage systems, manholes, and electrical poles. This pre-existing network reduces the need for heavy investment in basic services and accelerates the development process. Additionally, the internal road serves as a natural circulation spine, aiding in efficient site planning, movement, and zoning.

Mature Vegetation and Native Trees: (Neem, Bamboo, Peepal, Banyan, Baare, Grape)
The presence of established trees offers an immediate ecological advantage, creating natural shade, enhancing biodiversity, and contributing to a healthier microclimate. These trees, particularly Neem, Peepal, and Banyan being native and hardy can be thoughtfully incorporated into the landscape design to preserve the site's natural character and environmental value.

Weaknesses

High Surrounding Density:

The site is nestled within a heavily built-up context, bordered by residential and institutional establishments. While this promotes connectivity with the larger community, it introduces several challenges:

- Potential for noise intrusion into academic or quiet zones
- Visually cluttered surroundings with limited natural or landscaped buffers
- Elevated foot and vehicular traffic near access points, demanding stronger entry regulation and crowd management strategies

Access and Security Challenges:

Due to its integration with the urban fabric and the presence of an internal road cutting through the site, multiple access points are possible. While this improves movement flexibility, it also complicates campus security. A robust approach involving surveillance systems, perimeter definition, and real-time monitoring will be necessary to ensure safety and asset protection.

Adverse Impact from Outer Ring Road:

The site's southern edge flanks the Outer Ring Road, offering strong transport links but also exposing the site to continuous noise and air pollution. To counter this, careful attention must be given to the orientation of buildings, incorporation of acoustic buffers, green belts, and the use of noise-reducing materials especially along southern facades to create a healthier, more comfortable environment.

Opportunities

Strong Connectivity to Public Services and Transport Hubs:

The site is strategically located near metro stations such as Rohini West, Rohini East, and Rithala, as well as essential facilities like Ambedkar Hospital and other civic utilities. This proximity offers several advantages:

- Enhanced emergency preparedness and rapid access to medical care
- Opportunities to integrate the campus with Delhi's public transit and last-mile connectivity systems
- Convenient approach for students, faculty, and visitors traveling from different areas across the city

Multiple Access Frontages for Strategic Planning:

With more than one road adjoining the site—including a bisecting road—it becomes possible to design tailored access routes. This provides:

- Dedicated entry zones for pedestrians, vehicular traffic, and service movement
- Greater flexibility in construction scheduling and future development phases through zonal segregation
- Potential to organize the campus into distinct functional zones such as academic, residential, and administrative areas, each with its own controlled access and identity

Threats

Urban Noise and Activity Overload:
Located within the densely populated neighbourhood of Rohini Sector 3, the site is constantly exposed to high levels of vehicular and pedestrian movement. This urban hustle can result in:

- Elevated noise pollution, especially along road-facing edges
- Disruption to quite academic or residential zones if not acoustically buffered

Constraints on Parking and Traffic Flow:
Given its urban setting, the site may face restrictions in allocating space for surface parking or smooth internal circulation. Additionally, traffic congestion on surrounding roads especially during peak hours can:

- Hinder easy ingress and egress
- Impact delivery schedules, visitor access, and daily campus operations

Vulnerability Due to Open Access:
The presence of multiple potential access points, especially where the internal road cuts through the site, raises security concerns. To address these, the campus will require:

- Thoughtful design of access control systems
- Surveillance infrastructure and continuous monitoring
- Defined perimeters without compromising openness and accessibility

CHAPTER 4

4 CASE STUDY & DESK APPRAISAL

4.1 NIFT DELHI

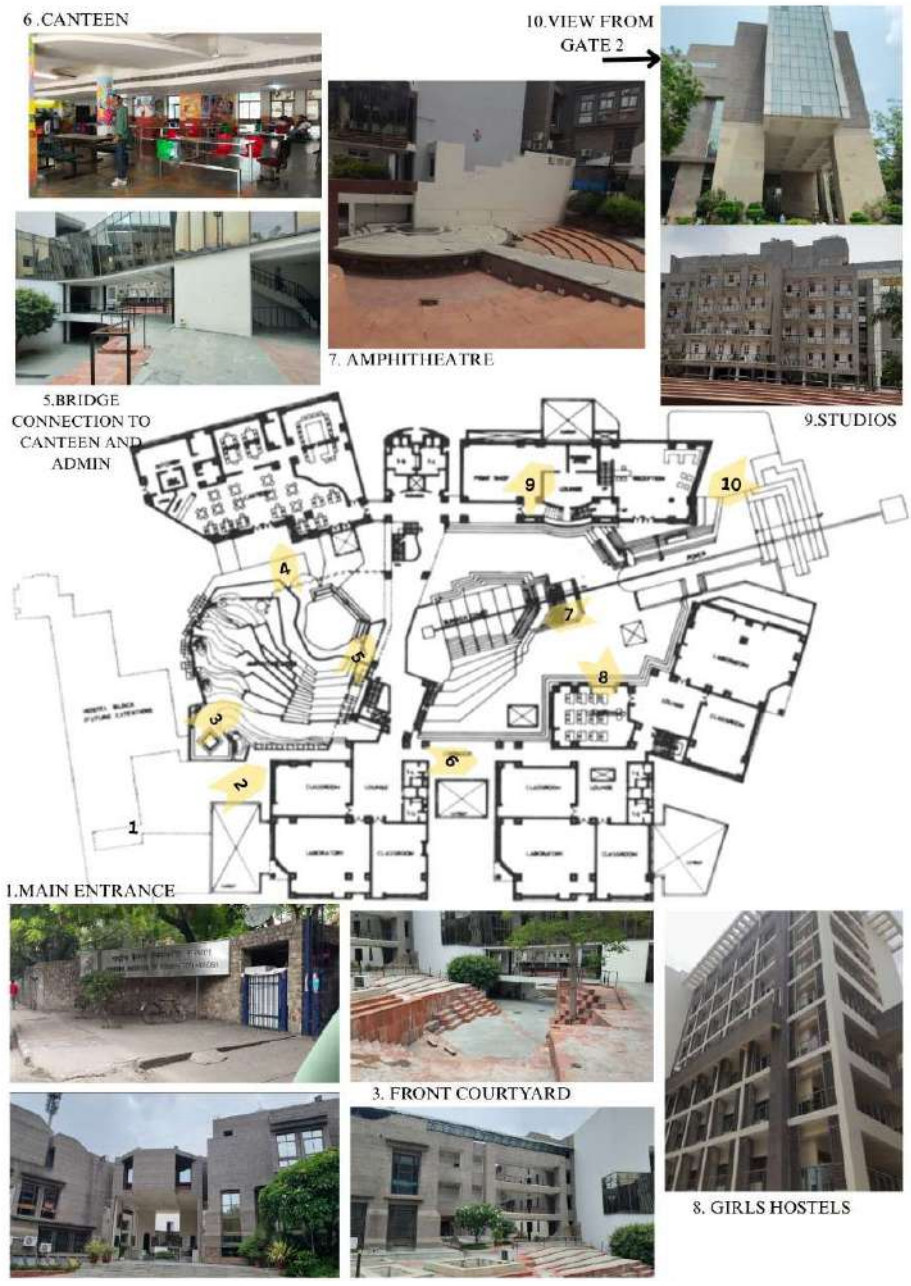


Figure 22: Visual site analysis board

4.1.1 Project Overview

- **Project Name:** National Institute of Fashion Technology (NIFT), Delhi
- **Location:** Hauz Khas, New Delhi, India
- **Client:** Ministry of Textiles, Government of India
- **Architect:** B.V. Doshi in collaboration with the NIFT Design Team
- **Project Type:** Educational and Design Campus
- **Built-up Area:** Approx. 28,000–32,000 sqm (estimated)

NIFT Delhi is a premier design education campus that merges academic, administrative, and recreational spaces in a compact, urban setting. Its spatial design focuses on interaction, creative flexibility, and functional clarity.

4.1.2 Site Planning & Orientation

- **NW-SE Axis:** Buildings are aligned to the NW-SE axis, optimizing exposure to sunlight and prevailing winds.
- **Response to Site Geometry:** Blocks are organized along side lines, making maximum use of the plot's constraints.
- **Pedestrian Spine:** The campus is organized around a central axis that simplifies navigation and connects major zones.
- **Window Orientation Issue:** NW- and SE-facing windows create glare and heat gain, especially in academic blocks.
- **Amphitheatre Misalignment:** Originally designed with a water-body-facing stage, the actual built orientation ignores sun paths, leading to discomfort.

4.1.3 Circulation & Connectivity

- **Multilevel Network:** Circulation occurs across three levels using corridors, staircases, ramps, and bridges.
- **Bridges as Functional Elements:** Bridges connect academic and administrative areas while acting as performance ramps and observation points.
- **Dual-Purpose Corridors:** Corridors are wide and designed for both movement and display, serving as student interaction and exhibit zones.
- **Accessibility:** Five staircases and two lifts ensure smooth movement and universal access across the campus.
- **Integration with Outdoor Spaces:** Circulation links to terraces, courtyards, and semi-open bays that enhance usability.

4.1.4 Structural System

- **Frame Structure:** The entire complex follows a square module (7.88m grid).
- **Waffle Slab Roofing:** Waffle slabs (1.7m x 1.7m) provide structural efficiency and column-free areas up to 6.85 sqm.
- **Column Ducts:** Square hollow columns function as service ducts for HVAC and future retrofits.

- **Wall Thickness:** 990 mm external wall thickness offers insulation and sun protection.

4.1.5 Materials & Finishes

- **Structure:** RCC frame with brick infill.
- **Cladding:** Use of random rubble stone at plinths, non-reflective float glass, and vibrant interiors.
- **Façade:** Grey grit-finished exterior with interior contrasts of white, grey, and green reflected in glass surfaces.
- **Windows:** Mix of traditional jharokhas designs and modern glazing systems.
- **Floor Finishes:**
    - Reception: Black granite and white marble check
    - Corridors: Kota green and Jaisalmer yellow stone
    - Labs/Classrooms: Cement finish
    - Exhibition Hall: Chip flooring
    - Outdoor: Kutni stone

4.1.6 Climate Responsiveness

- **Orientation Benefit:** NW-SE layout helps with cross-ventilation and winter daylight.
- **Thermal Massing:** Thick walls and concrete slabs regulate interior temperatures.
- **Waffle Slabs:** Reduce heat retention and allow wider spans for flexible space usage.
- **Shading Devices:** Limited use of shading on SE facades leads to excess solar heat gain.
- **Lack of Green Buffers:** Minimal planting limits microclimate regulation and reduces passive cooling.



Figure 23: Back courtyard

4.1.7 Landscaping

- **Amphitheatre Landscaping:** Combines high/low platforms and mixed material paving.
- **Limited Green Zones:** Green space is restricted to edges and cut-outs with no major shaded court.
- **Boundary Trees:** Evergreen and deciduous trees line the periphery but don't influence core thermal conditions.
- **Functional Landscaping:** Earth mounds and flowerbeds enhance visual appeal but provide little environmental impact.



Figure 24: Landscaping

4.1.8 User Experience

- **Amphitheatre Discomfort:** Poor orientation causes overheating and underutilization for large events.
- **Creative Space Use:** Students adapt corridors, steps, and terraces for events, displays, and installations.
- **Thermal Issues:** Some classrooms and studios experience glare and heat due to SE-facing glass.
- **Movement Efficiency:** Circulation system ensures clear wayfinding and encourages social interaction.
- **Material Durability:** External grit finish and cement interiors provide resilience and ease of maintenance.



Figure 25: Group site visit

4.1.9 Design Inferences

- Orient academic blocks to benefit from passive ventilation, but avoid harsh sun exposure through shading or façade design.
- Incorporate a primary pedestrian axis that ties together key zones (academic, admin, residential), encouraging walkability and interaction.
- Consider elevated pathways, bridges, and ramps as functional and experiential connectors—doubling as exhibition or observation spaces.
- Widen and design internal corridors to serve multiple functions—movement, pause points, and student expression areas.
- Use modular planning with efficient slab systems (like flat slabs or waffle slabs) for flexibility and future adaptability of spaces.
- Embed vertical service ducts within structural elements for streamlined maintenance and long-term upgrades.
- Leverage thermal mass with wall and slab thickness while balancing with insulation to reduce energy loads.
- Integrate vegetative buffers, courtyards, and shaded semi-open spaces within the core layout for thermal regulation and user comfort.
- Place **green spaces at the core** of your layout (not just edges) to enhance thermal comfort and social interaction.
- Use material textures and colours not only for aesthetics but also to define functional zones and enhance durability.
- Choose context-appropriate, low-maintenance materials especially for high-footfall and outdoor areas.
- Design multipurpose spaces (e.g., steps, platforms, terraces) to encourage informal learning, events, and exhibitions.
- Ensure legible circulation and spatial transitions that invite interaction without compromising movement flow.

4.2 CEPT UNIVERSITY, AHMEDABAD

4.2.1 Project Overview

Name: CEPT University (Centre for Environmental Planning and Technology)
Location: Navrangpura, Ahmedabad, Gujarat, India
Architect: B.V. Doshi
Client: CEPT Trust / Government of Gujarat
Type: Educational Campus for Architecture, Planning, Design, and Management
Site Area: Approx. 12.5 acres
Built Character: A low-rise, decentralized, open-ended academic campus that emphasizes spatial porosity, human scale, and strong indoor-outdoor relationships. The built form and open spaces coexist harmoniously to foster a learning environment rooted in informality and spatial exploration.

4.2.2 Course They Offer

Bachelors in Architecture (5 years) (80 seats)
Masters in Architectural Design
Masters in Conservation and Regeneration
Masters in Architectural History and Research
Masters in Landscape Architecture (2 years) (24 seats)
PhD in Architecture
Bachelors in Urban Design
Masters in Urban Planning
Masters in Urban Transport Systems
Masters in Urban Infrastructure
Masters in Urban Housing
Masters in Urban Design
PhD in Planning

4.2.3 Design Brief & Objectives

The campus was envisioned as a democratic, evolving academic environment with spaces that support interaction, creativity, and interdisciplinary learning.
A key aim was to merge architectural, planning, and design faculties within a shared ecosystem rather than isolated zones.
The design encourages both programmed and unprogrammed use of space, fostering spontaneity and student-led adaptation.
Climatic conditions of Ahmedabad prompted the integration of passive design strategies to ensure thermal comfort and minimal energy consumption.

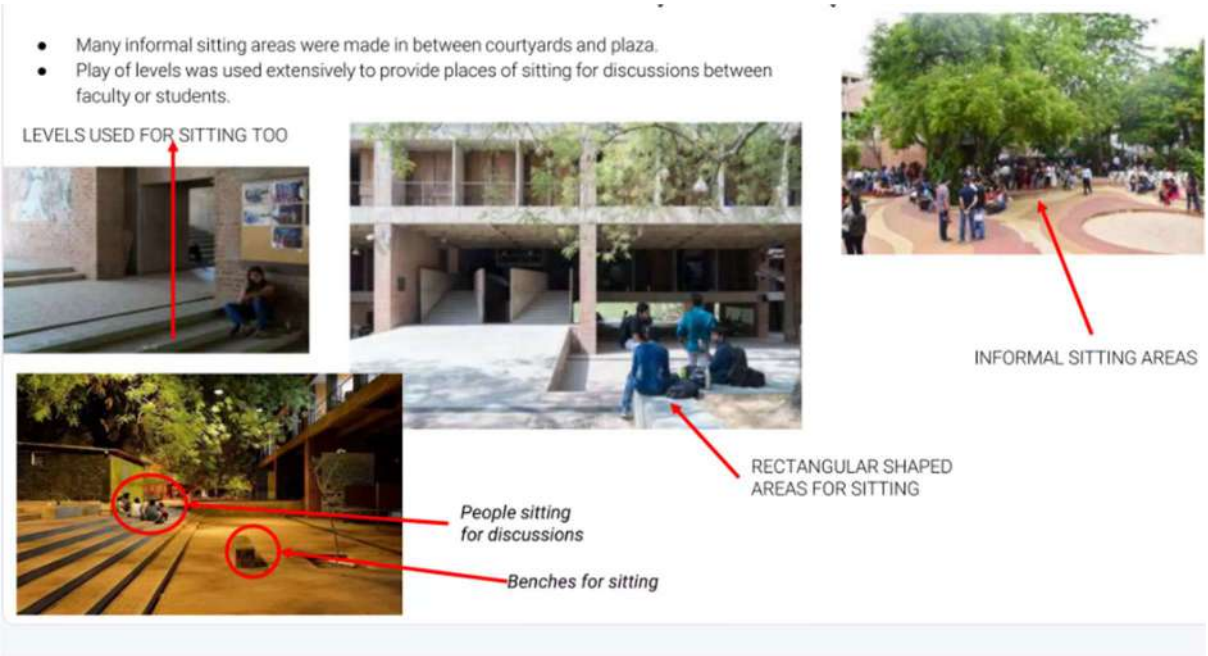


Figure 26: Informal gatherings

4.2.4 Site Planning & Layout

The site layout follows a loosely structured spatial arrangement with buildings organized as a cluster of pavilions.
These blocks are connected by shaded pedestrian paths, informal gathering spaces, and semi-open courtyards.
No strict zoning or axial planning is followed, promoting permeability and cross-departmental interaction.
The design accommodates future growth, allowing the campus to expand organically without compromising spatial continuity.

4.2.5 Architectural Concept

CEPT's architecture avoids rigid definitions of space, allowing for open-ended interpretations and flexible usage.
Terraces, steps, platforms, and voids become active spatial elements, repurposed by users as informal classrooms or exhibition zones.
Boundaries between built and unbuilt spaces are softened, resulting in an immersive campus experience.
The perceived incompleteness in form and finish encourages user engagement and fosters a sense of ownership among students and faculty.

4.2.6 Orientation & Climate Response

Most structures are aligned along a north-south orientation to reduce solar heat gain and enhance daylight penetration.
Trees are strategically planted to align with prevailing wind directions, contributing to cross-

ventilation and outdoor comfort.
Overhangs, shaded walkways, and vegetation buffer the built mass, creating shaded thermal zones across the site.

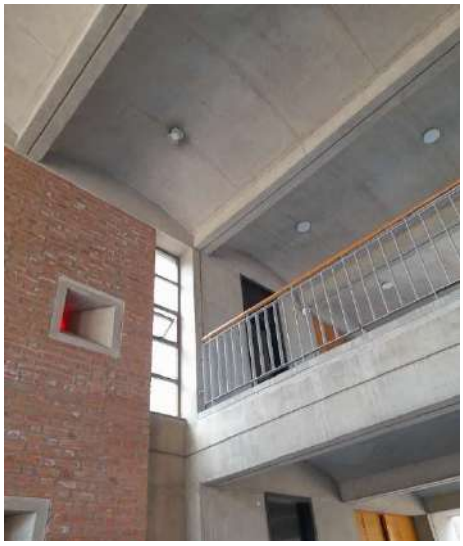


Figure 28(a): Sky light



Figure 27(b): Shaded sitting

4.2.7 Circulation

The movement system within the campus is designed to be organic and non-linear, deviating from conventional corridor-based planning.
Circulation paths meander through semi-covered walkways, staircases, and landscape features, blurring the distinction between transit and pause.



Figure 29: Rectangular sitting



Figure 30: Site visit picture

4.2.8 Structure & Construction

Buildings employ a modular RCC (Reinforced Cement Concrete) frame system, providing flexibility in interior spatial arrangements.
Structural elements such as beams, columns, and slabs are left exposed to express architectural honesty and material authenticity.
The use of modular construction not only supports structural clarity but also simplifies future modifications or extensions.

4.2.9 Materials

The material palette includes exposed RCC, locally sourced brick infill walls, and natural stone like kota for flooring.
Finishes are purposefully minimal, allowing surfaces to age and develop character over time through user engagement and environmental exposure.
Material selection emphasizes durability, sensory tactility, and cost-effectiveness while aligning with the regional construction practices.

4.2.10 Landscape Design

Landscape is an integral part of the spatial system, not just as visual relief but as a functional environmental moderator.
Open courts, tree-shaded pockets, and vegetated buffers regulate microclimate and enhance user comfort.
Step-down courts and terraced platforms foster interaction while aiding surface water drainage.
Indigenous plant species are used to ensure ecological resilience and reduce maintenance.



Figure 32: Shaded study areas



Figure 31: open corridors

4.2.11 Climate Responsiveness

Thermal mass in masonry walls, shaded outdoor spaces, and deep overhangs reduce reliance on active cooling systems.
Buildings are designed for cross ventilation, aided by operable windows, open corridors, and interconnected courtyards.
Microclimatic regulation is achieved by combining shaded walkways, tree canopies, and permeable

ground surfaces.

Challenges:

Recent extensions show limited application of earlier passive strategies.

Paved areas without vegetation increase surface temperature during peak summer.

4.2.12 User Experience & Adaptability

Students actively repurpose terraces, steps, and informal niches for collaborative work, events, and exhibitions.

Spaces are not programmatically fixed, offering multiple use scenarios throughout the day and across semesters.

Adaptability is enhanced by visual openness, absence of rigid barriers, and modular infrastructure that welcomes transformation.

The design's open-endedness nurtures creativity and improvisation, reflecting evolving user needs.



Figure 34: Stairs



Figure 33: Sitting/ gathering area

4.2.13 Design Inferences

- Avoid rigid zoning design flexible, unprogrammed spaces that foster interdisciplinary learning, spontaneous interaction, and student-led occupation.
- Let surfaces age naturally and avoid over-finishing. This engages users emotionally and encourages a participatory campus culture.
- Break the campus into smaller, interconnected blocks (pavilions), rather than one large volume. This keeps a human scale and increases porosity.
- A free-flowing site layout allows natural movement, reduces monotony, and supports layered experiences.
- Corridors and walkways are not just connectors they are spaces to exhibit, sit, pause, and observe.

- Transition spaces (e.g., shaded edges, verandas, semi-open bays) blur boundaries and provide comfort and engagement.
- Orientation (N-S), overhangs, tree-shading, thermal mass, and courtyards reduce energy needs and improve livability.
- Planting native trees within and between built forms cools the environment and filters light.
- A modular grid system simplifies space planning, structure, and future adaptation.
- Visible beams, slabs, and columns create architectural character and teach by revealing structure.
- Use local materials (brick, stone, concrete) to ground the campus in its region and culture.
- Open courts, green buffers, and terraced earth forms support drainage, thermal comfort, and student activity.

4.2.14 Applications

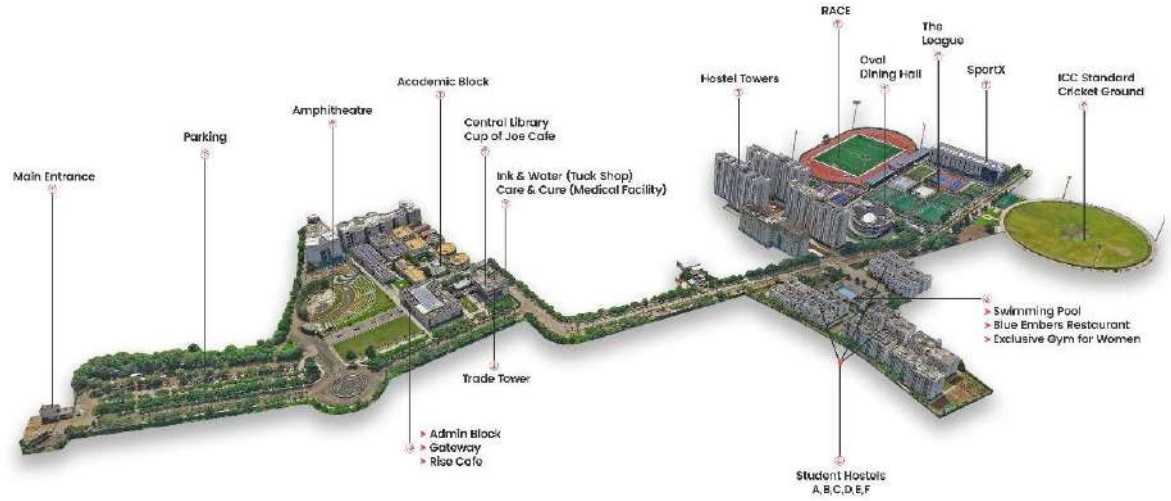
- Use terraces, platforms, steps, and in-between spaces as dynamic zones for informal learning, exhibitions, and co-creation.
- Allow students and faculty to personalize or reinterpret spaces over time.
- Organize departments or functions around shared courtyards or social nodes to encourage cross-pollination of disciplines.
- Plan with **organic circulation** and multiple paths between zones rather than rigid grids or singular spines.
- Design **multi-purpose circulation paths** staircases, semi-covered walkways, and courtyards that invite lingering and gathering.
- Layer indoor and outdoor thresholds using pergolas, tree lines, and shaded arcades.
- Prioritize **climate-responsive design** early: orient buildings to catch wind, shade harsh sun, and encourage passive cooling through courtyard systems.
- Use **landscape design as passive infrastructure** not decoration to create shaded learning and activity zones.
- Use modularity to allow reconfigurable studios, labs, or learning spaces that can evolve with changing academic needs.
- Leave selected elements exposed beams, brick infill, or natural stone to create an educational and tactile environment.
- Celebrate material authenticity through **texture, weathering, and simplicity**—let materials age and tell stories.
- Integrate **step-down courts, bioswales, and shaded gardens** that collect water, cool spaces, and allow relaxation or learning.

DESK APPRAISAL

4.3 WOXSEN UNIVERSITY, HYDRABAD

4.3.1 Project Overview

- **Name:** Woxsen University
- **Location:** Kamkole Village, Sadasivpet, Sangareddy District, Telangana – 502345, India
- **Established:** Founded in 2014 as Woxsen School of Business; became a university in 2020
- **Architect:** Rajeev Kumar Sharma, Gourav Das, Arvind Kumar
- **Architectural Firm:** Designhaaus Solutions Pvt. Ltd.
- **Client:** Woxsen University, promoted by Founder & Chancellor Mr. Praveen K. Pula
- **Type:** Private, fully residential, multidisciplinary university campus
- **Site Area:** Approx. 200 acres



4.3.2 Courses offered

Schools
- Business
- Arts & Design
- Technology
- Architecture & Planning
- Liberal Arts & Humanities
- Law
- Sciences

Faculty
- Faculty Directory

UG Programs
- B.Tech
- BBA / BBA (Hons.)
- B. Arch
- B.Des (Hons.)
- BA (Hons.)
- BA LLB (Hons.)
- BBA LLB (Hons.)
- B.Sc (Hons.)
- BCA

Woxsen Summer Program
- WSP Explorer
- WSP Tech Wizards
- WSP Leadership Incubator
- WSP Creative Visionaries

PG Programs
- MBA (General)
- MBA (Financial Services)
- MBA (Business Analytics)
- MBA For Experienced Professionals

Doctoral
- Ph.D.

Executive Education

Certification Courses
- Short-Term Courses

4.3.3 Student Amenities

Facilities

- The Central Library
- Classrooms
- Housing
- Eateries
- Health & Wellness
- Sports Arena
- Fitness Centre
- Tuck Shop

Lab & Studios

- AI & Robotics Studio
- Analytics & Behavioural Lab
- Bloomberg Finance Lab
- Digital Design Lab
- Labs, Studios & Workshops
- Trade Tower
- Moot Court

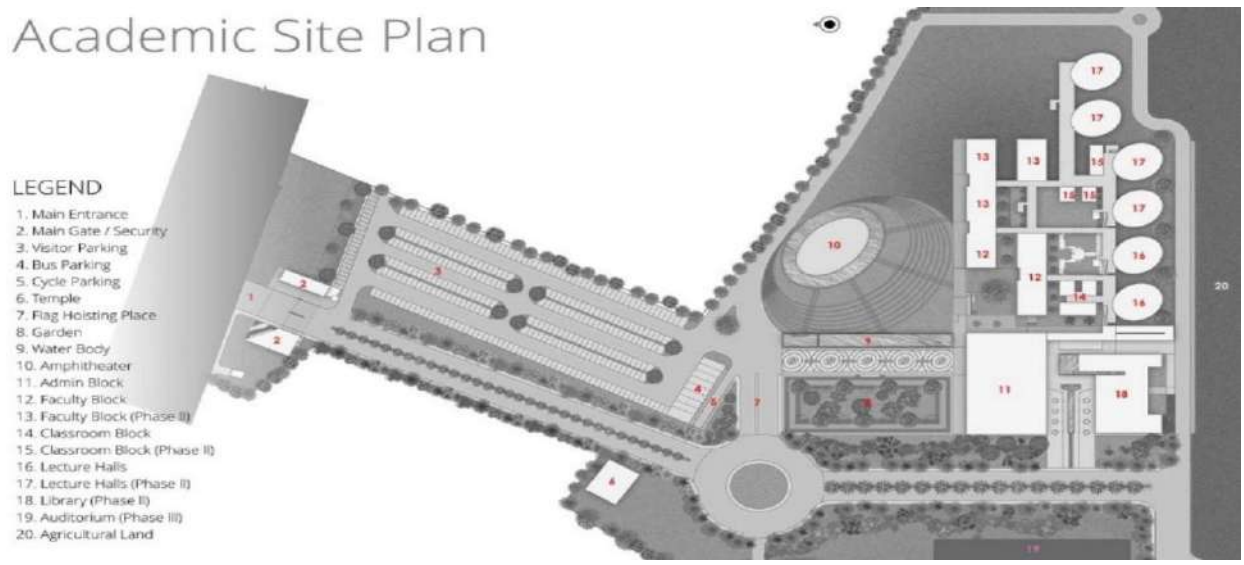
4.3.4 Proximity

Category	Place/Feature	Distance (Approx.)	Remarks / Relevance
Urban Settlements	Sadasivpet Town	8 km	Nearest town; includes markets, banks, medical, and bus stops
	Sangareddy City	30 km	District headquarters with full urban services
	Zaheerabad Town	20 km	Industrial & logistics support town
Educational Institutions	IIT Hyderabad	15 km	Premier tech institute; possible academic collaboration
	Gitam University (Hyderabad)	12 km	Engineering, pharmacy & business programs
	Sri Chaitanya & Narayana Colleges (multiple)	10–15 km	Coaching hubs for higher education prep
	Gaudium School, Rockwell Intl. School	10–15 km	High-end international schools
Industrial Hubs	Mahindra Tractor Plant	10 km	Major employer and part of regional economy
	PepsiCo Bottling Plant	15 km	FMCG manufacturing unit

	NIMZ (National Investment & Manufacturing Zone)	12–15 km	India's first planned industrial manufacturing zone
Transportation Nodes	Sadasivpet Railway Station	5 km	Nearest rail access point
	NH-65 (Hyderabad–Mumbai Highway)	Touches campus vicinity	Ensures national-level road connectivity
	Patancheru ORR Exit	30 km	Entry point to Hyderabad Outer Ring Road (connects city suburbs)
Public Amenities	Sadasivpet Govt Hospital	8 km	Emergency healthcare access
	SBI, HDFC, Axis Banks	8–10 km	Banking and ATM services
	Petrol Bunks (HPCL, IOCL)	5–8 km	Fuel stations for campus/residential mobility
	Local Groceries & Markets	8–10 km	Day-to-day supplies, kirana shops, convenience stores
Environmental Features	Agricultural Lands & Hillocks	Surrounding	Supports eco-friendly, contextual design strategy
	Seasonal Water Channels & Ponds	Surrounding	Water-sensitive site planning opportunity
	Dry Deciduous Green Cover	Surrounding	Natural buffer against heat; potential for passive cooling integration

Table 10: Proximity Chart

4.3.5 Academic Site Plan



Woxsen University is more than just classrooms and studios. Its patiently designed elements combine to form a robust appeal while maintaining the required scale and purpose of the project.

As spaces are necessary for gatherings and social interactions to urban life, architecture plays as a catalyst to encourage understanding and curiosity, a place where ideas are celebrated - a Library. The exact philosophy was followed by the architects to create a library spread across 50,000 sq. ft with world class amenities and interiors.



To strengthen the existing infrastructure, the volume was kept open to provide transparency. Due to its volume and dynamic identity, the building fits naturally along with its composite structure use of steel and concrete. Structure wise, a leap in design was taken in the form of coffered slab which we could use to incorporate a larger span cantilever.

The expansive skylight adds to the grandeur of the space with the low-e glasses maintaining high solar performance.





The design process involved creating double height spaces to create an illusion of every space being on one level. This was achieved by constructing slabs in a way which creates voids in 4 floors giving an optical illusion, also making sure the visibility is maintained throughout. This, in turn, allows more light and ventilation inside the building and strengthens the building's role in being sustainable. 80%

of the facade is double glazed to allow penetration of sunlight. This also reduces energy consumption as use of artificial lighting is brought down.

It stands out with a triple height atrium space, which acts as a gathering space for any kind of formal/informal events.

It had to act as the focal point for all activities and create the aspirational identity for the visitor.

The campus ensures a 100% barrier free environment. Breakout green zones provide natural outdoors for socializing and act as comfort zones between buildings congruous with sunlight and ventilation.

4.3.6 Lecture Halls

The student's accommodation has been planned at a comfortable distance from the main building. Students are encouraged to walk or cycle.

The lecture theatre is unique in being oval shaped in plan with appropriate raked seating arrangement, which ensures complete focus and attention of students and teachers alike. The monolithic exposed concrete look is continued as a unifying element.





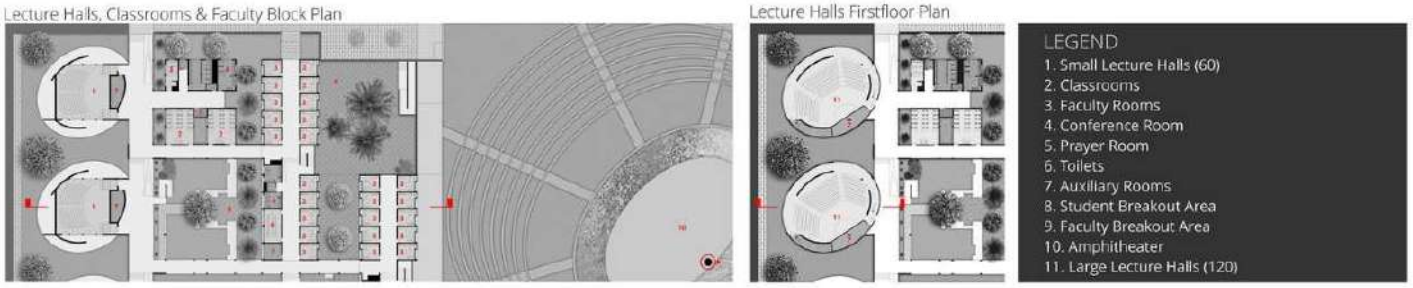


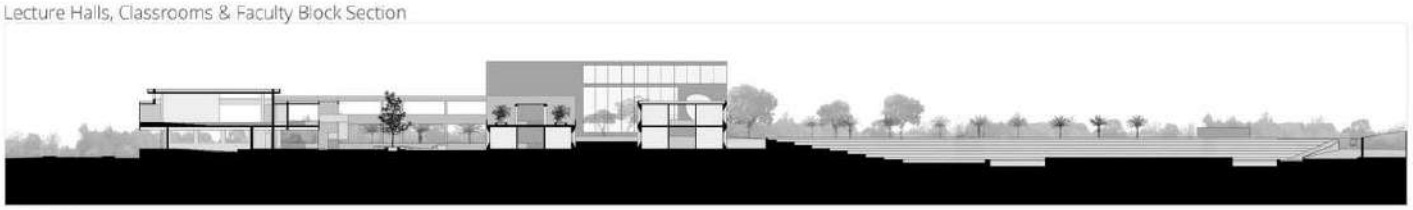

The program extends on the east with the faculty rooms and lecture theatre blocks juxtaposed with structural grid system of interconnected spaces such as verandahs, open corridors, terraces, and courts at various levels establishing a link with the outdoors.

The bright furniture makes the internal spaces playful yet sublime. The exposed HVAC ducts extend the design intent of being honest and truthful with the structure and services.











4.3.7 Design Inferences

Campus Planning & Zoning

- **Decentralized and Inclusive Layout:** Academic blocks, student housing, and recreational zones are clearly segregated yet connected through walkable green corridors.
- **Clustered Academic Schools:** Each school (Business, Technology, Architecture, etc.) functions as an independent cluster with shared facilities (library, labs, sports).

- **Central Node:** Facilities like the Central Library, Sports Arena, and Food Courts act as social and academic anchors.
- **Balanced Built-Open Ratio:** Large open spaces and courtyards are interspersed with low-rise academic blocks to create a sense of openness.

Spatial Hierarchy & Connectivity

- **Strong Pedestrian Network:** Wide shaded walkways and courtyards encourage student interaction and ease of movement.
- **Visual Connectivity:** Axis-based planning creates sightlines to key buildings and open spaces, making orientation easy.
- **Functional Adjacencies:**
- Labs and studios close to academic departments for quick access.
- Housing near eateries and wellness facilities.
- Central Library at a junction accessible to all schools.

Architectural Character

- **Contemporary yet Contextual Design:** Use of earthy materials (brick, stone, concrete) blended with glass and steel to reflect a modern academic ethos.
- **Large Shaded Facades:** Deep overhangs, pergolas, and recessed windows reduce glare and heat gain, suitable for Hyderabad's hot climate.
- **Courtyard Typology:** Many blocks use inward-facing courtyards for natural ventilation and social gathering.
- **Signature Landmarks:** Structures like the Trade Tower or Moot Court add iconic elements to the skyline.

Sustainability & Climate Response

- **Passive Design Strategies:** Orientation to minimize east-west sun, shaded circulation paths, and water bodies for microclimate control.
- **Green Spaces:** Lawns, tree-lined boulevards, and sports fields enhance thermal comfort and student well-being.
- **Material Palette:** Locally available stone and brick for thermal mass and durability.

Student-Centric Amenities

- **Integrated Wellness:** Sports arena, fitness center, and health facilities close to student housing.
- **Diverse Food & Retail Spaces:** Eateries and tuck shops distributed across campus reduce travel distance.
- **Innovation Hubs:** Specialized labs (AI Studio, Bloomberg Finance Lab, Digital Design Lab) act as flexible multi-use learning spaces.

Lessons for Thesis Design

- **Create a cohesive identity:** A strong architectural vocabulary unifies various schools and facilities.
- **Plan for adaptability:** Studios and labs designed with modular layouts to accommodate changing technologies.
- **Community Building:** Encourage informal interaction through shaded courtyards, open-air amphitheatres, and central plazas.
- **Sustainability as core:** Integrate renewable energy sources, water harvesting, and bio-diversity corridors.

4.4 IIM, AHMEDABAD

4.4.1 Project Overview

- Name: Indian Institute of Management Ahmedabad (IIM-A)
- Location: Vastrapur, Ahmedabad, Gujarat – 380015, India
- Established: 1961

Architect:

- Heritage Campus: Louis I. Kahn
- On-Site Architect: Anant Raje
- Restoration: Somaya & Kalappa Consultants
- New Campus: HCP Design, Planning and Management Pvt. Ltd. (led by Bimal Patel)

Architectural Firm:

- Heritage: Designed by Louis Kahn (independent architect, with Anant Raje)
- New Campus: HCP Design, Planning and Management Pvt. Ltd.
- Restoration: SNK Consultants
- Client: Government of India, with support from business leaders like Vikram Sarabhai and Kasturbhai Lalbhai
- Type: Public, autonomous, fully residential business school campus

Site Area:

- Heritage Campus: 102 acres
- New Campus: 39 acres
- Total Area: 141 acres (combined)
- Built-up Area:
- Heritage: Multiple blocks including classrooms, dormitories, library, and auditorium
- New Campus: Lecture halls, hostels, academic blocks, incubation centers, etc.

Year of Completion:

- Heritage Campus: 1964–1974
- New Campus: Completed in phases starting from early 2000s
- Restoration Works: 2016–2020

Campus Typology:

- Educational, modernist institutional campus
- Segregated academic and residential zones
- Internal courtyards and plazas used as active public realms

Built Character:

- Exposed red brick (Heritage) and exposed concrete (New Campus)
- Use of geometric forms, circular openings, arches
- Vaulted corridors, deep-set fenestrations, inward-looking planning
- Minimal ornamentation reflecting Modernist architecture

- Soil Type: Semi-arid with firm ground, typical of western India, suitable for RCC and masonry structures

Climate Consideration:

- Hot and dry climate (semi-arid)
- Heritage buildings designed with deep shading, natural ventilation, and thermal mass
- Orientation and open-to-sky courts for passive cooling

4.4.2 Introduction

IIM, Ahmedabad is the top management school of India and is amongst top business schools of Asia. Also, the intuitive design and careful planning by architect of world fame: Louis I. Kahn further offers scope for the following.

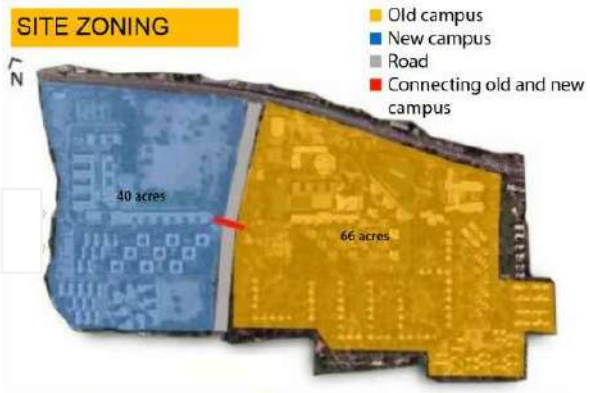
Analysis of the functional relationship and the circulation between the academic, administrative, and residential areas in a management institute.

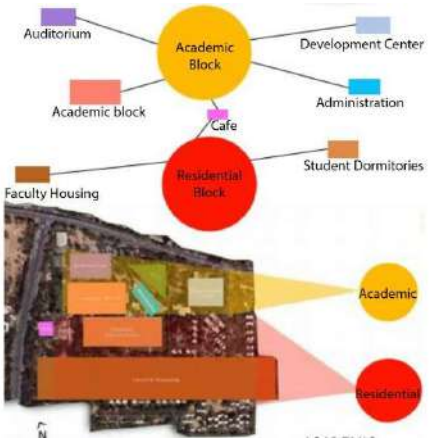
Analysis of the spatial requirements for academic areas like lecture halls, seminar halls, conference rooms, library, computer centre etc.

Role played by landscape elements in integrating the built-up environment.



4.4.3 Site Zoning





4.4.4 Road Network



Proximity:

- Parimal Garden (5.3 km): Urban green park; popular for morning walks and community recreation.
- Ahmedabad University (3–4 km): Academic campus with modern ecological design and multidisciplinary programs.
- Nirma University (5–6 km): Major private university known for its Centre of Excellence and research culture.
- C.G. Road (Chimanlal Girdharlal Road) (3–4 km): Prominent commercial and retail corridor of the city.
- Ahmedabad One Mall (Vastrapur) (1–2 km): Key shopping, entertainment, and dining destination close to IIMA campus.
- Vastrapur Lake & Nehru Park (1–2 km): Lakeside recreational and leisure space; jogging and event spot for locals.
- Sabarmati Riverfront (8.9 km): Iconic civic promenade offering public space and scenic views.
- Atal Pedestrian Bridge (8.9 km): Architecturally distinct pedestrian bridge inspired by kite design.
- Sabarmati Ashram (9.2 km): Historic home of Mahatma Gandhi; museum and spiritual centre.
- Kankaria Lake (9.8 km): Cultural and entertainment zone; includes gardens, zoo, and boating.
- Teen Darwaza & Jama Masjid (Old City) (8.4–8.7 km): Prominent heritage monuments reflecting Indo-Islamic architecture.

4.4.5 Activity

The day time activity is concentrated in aca-demic and administration zones.
More use of interaction and transition area like, corridors, galleries and courts and foyers throughout the campus.

Activities tend to flow between classrooms, library, computer, centre, canteens, and students dormitories.

Night time activity shifts to library and hostel blocks and to the courtyards and foyers. Seasonal activities of large social gathering happen in Louis Kahn Plaza.

4.4.6 Vertical Circulation

"For easy access, new elevators have been installed including at the un-derpass that connects the new campus with the old.

Elevators will be shortly installed for reaching classrooms. Two ramps per classroom have been built that take students directly into the class.



4.4.7 Site Plan



4.4.8 Campus Layout

- Separate entries for institutional and residential complex.
- Separate service entry.
- Academic and social activities have been integrated with students and staff living.
- Institutional building has been taken as the focal building.
- Auditorium is located near the main entrance for easy access for visitors.
- Residential areas have been planned in hierarchical pattern.
- The scale and massing give unmonumental feeling of space.
- Canteen and auditorium do not integrate well due to being a later addition.
- School building is planned around a court
- School building and student's dorm have been placed diagonally to take advantage of winds from south-west

4.4.9 Administrative Buildings

The IIMA's Administrative Blocks are designed to provide efficient, high tech and comfortable working environments.

The administrative blocks at IIMA house the core operations of the institute, including academic coordination, admissions, finance, HR, director's office, and student affairs. These buildings act as the institutional backbone, ensuring seamless functioning of the campus.



4.4.10 Academic Block

Academic Blocks, located on both the main and west campus, house spaces for classes, seminars, faculty offices and administrative department offices



Programmes they Offer

- Two year post graduate program in management.
- Fellow program in management at doctorate level.
- Programs for practitioners from industry and dustry and government
- Management development programs
- Research and publications

4.4.11 Classrooms and Seminar rooms

Consists of 6 classrooms and 5 seminar rooms linked by a wide passage with semi-open spaces in the old campus. The semi-open spaces act as transition point between double height corridor and classroom. The corridors also have a sense of belonging, act as an extension of classrooms by allowing discussion and interaction.

Kahn's concept of 'served and servant spaces'- segregation of toilet and stairs from classroom block. Floors raked in 'C' shape layout enhances formal interaction thus resulting in a better learning environment and providing strong position to the teacher.

- Total students in classroom: 60
- Carpet area: 132.2 sq.mts
- Area/Student: 2.2 sq.mts
- Built up area: 267 sq.mts
- No of floors: 3
- Total built up area: 8691 sq.mts
- No of rooms per floor: 6





4.4.12 IMDC

The International Management Development Centre is a self-contained facility that combines the functions of a guest house and a venue for courses and conferences.





4.4.13 Library

The library is the most prominent building of the whole campus. It is approached by a broad, imposing flight of steps from the parking lot. It is so designed as to become the centre of faculty student interaction.
Entrance to the library is from the first floor. The library building is a five storyed structure with a rectangular plan.





GROUND FLOOR

- Has library administrative areas and stores.

FIRST FLOOR

- Accommodates issuing counter, reference books, catalogues, book stacks and carrels.

SECOND FLOOR

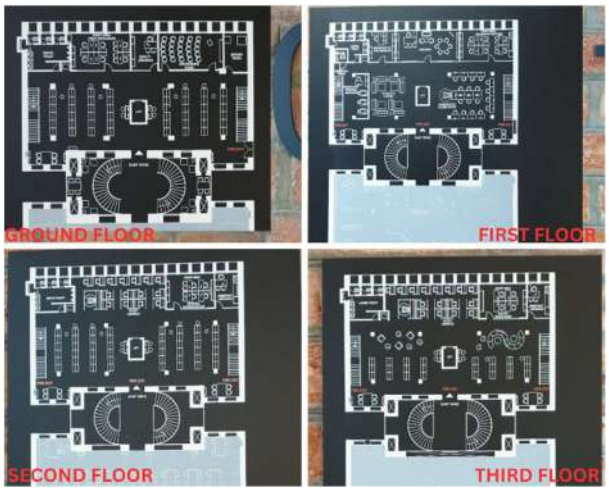
- accommodates triple height reading hall and conference halls.

THIRD FLOOR

- accommodates bound volumes of journals

FOURTH FLOOR

- has bound volumes of old books and journals.





4.4.14 Auditoriums

From the iconic RJ Matthai Auditorium named after our first full time Director to the new state of the art auditoriums in the JSW-SPP building, the institute has spaces to host large events of national and international scale



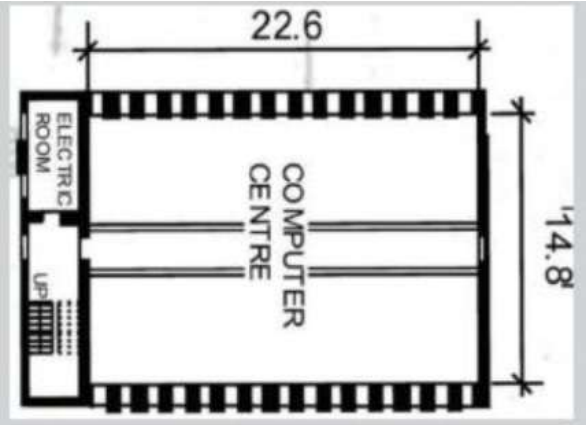




The acoustics of the auditorium are taken care of with the design of an asymmetric folded plate roof which helps in carrying the sound to the back rows without the need of any false ceiling and plaster moulds.
The Auditorium accommodated in a combination of stepped and flat floors, which is to be mainly used for simulated conferences by participating students, lectures as well as periodic entertainment.

4.4.15 Computer Lab

The computer centre is located far from the dormitories as compares to rest of the educational areas. Designed as an addition to the existing blocks.



- No of terminals - 150
- working hours - 24hrs/day
- Ground coverage - 465 m2
- No of floors - 2
- total built up area - 930 m2
- carpet area (single floor) - 335 m2
- area/student - 1.8 m2

4.4.16 Architectural Features

Blend of vernacular traditions and modern architecture

In much of the same ways that he approached the design of the National Assembly Building in Bangladesh, he implemented the same techniques in the Indian IIM such that he incorporated local materials (brick and concrete) and large geometrical façade extractions as homage to Indian vernacular architecture. It was Kahn's method of blending modern architecture and Indian tradition into an architecture that could only be applied for the IIM.

STYLE: Modernist with contextual Indian adaptation
MATERIALS: Exposed red brick, concrete, teak wood
DESIGN ELEMENTS:

- Bold geometric forms (arches, circles, voids)
- Massive walls with minimal ornamentation
- Strong symmetry and axial planning

CLIMATE RESPONSIVENESS:

- Deep-set windows, thick walls for thermal comfort
- Natural cross-ventilation and courtyards
- Light wells for diffused daylight

CAMPUS LAYOUT:

- Zoned into academic, residential, and administrative areas
- Louis Kahn Plaza as the central gathering space
- Colonnaded walkways for seamless connectivity

KEY BUILDINGS:

- Iconic library with circular openings
- Dormitories promoting community living
- Classrooms designed for natural acoustics and light




CIRCULAR WINDOWS, ARCHED CORRIDORS AND EXPOSED BRICKWORK




EXPOSED CONCRETE AND DIAGONAL WALLS

4.5 YASHOBHOOMI INDIA INTERNATIONAL EXPO CONVENTION CENTRE (IICC DWARKA)

Location	Dwarka, New Delhi
Architect	B. V. Doshi.
Area	12 acres



4.5.1 INTRODUCTION

Yashobhoomi Convention Centre, officially known as the India International Convention & Expo Centre (IICC), is a landmark development located in Dwarka, New Delhi. As one of India's most ambitious infrastructure projects, it is envisioned to establish the country as a premier destination for global conferences, exhibitions, and business events. This world-class facility not only accommodates large-scale gatherings but also stands as a symbol of India's emerging leadership in the global MICE (Meetings, Incentives, Conferences, and Exhibitions) industry.

4.5.2 Concept and Approach

The design and development of Yashobhoomi Convention Centre were driven by a holistic vision to blend modern architectural practices with India's cultural heritage. The concept focuses on creating a world-class convention and exhibition space that is both functional and symbolic of India's economic growth and cultural diversity. The architectural approach is characterized by its emphasis on sustainability, flexibility, and technological integration. The design incorporates green building principles, aiming for a LEED Platinum certification. This is achieved through energy-efficient systems, water conservation strategies, and the use of locally sourced materials.

A critical aspect of the conceptual design is the centre's ability to host a wide variety of events, ranging from international conferences to large-scale exhibitions, concerts, and cultural events. The architecture is flexible, with spaces that can be easily adapted to different configurations and event types.

4.5.3 Proximities



Area		Size
Exhibition Hall	Hall 3	57,007sqm (Leasable Area)
	Hall 4	42,041sqm (Leasable Area)
	Hall 5	81,556 sqm (Leasable Area)

- 11 Kms from Indra Gandhi International Airport
- 23 Kms from Connaught Place
- 26 Kms from New Delhi Railways Station
- 16 Kms from Gurugram

Serviced by Public Transports (Buses, Cabs, Metros)

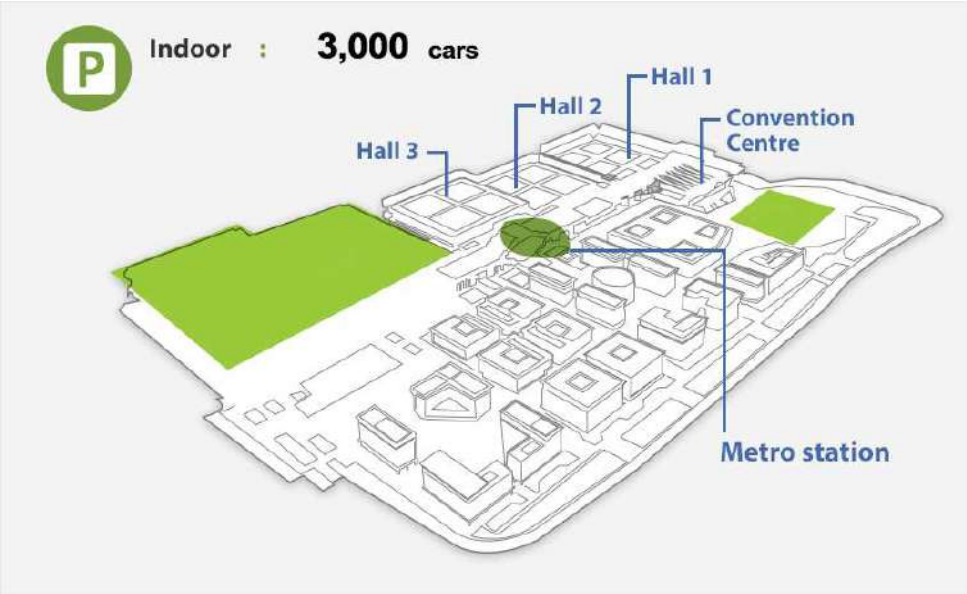
4.5.4 Accessibility

- Adjacent to Dwarka Express for easy road access
- Connected via NH-8 and Urban Extension Road-II (UER-II)



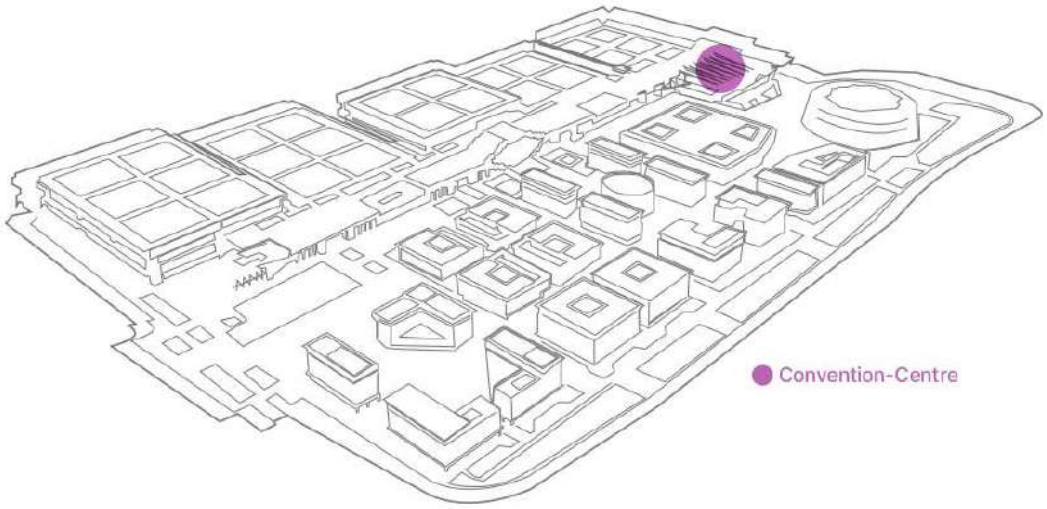
4.5.5 Spatial Planning:

The Master Plan structures the project in two differential sectors. It leaves the fairgrounds and Convention area to the West and the development of mixed use (Hotels, Offices, Retail Areas) to the East.

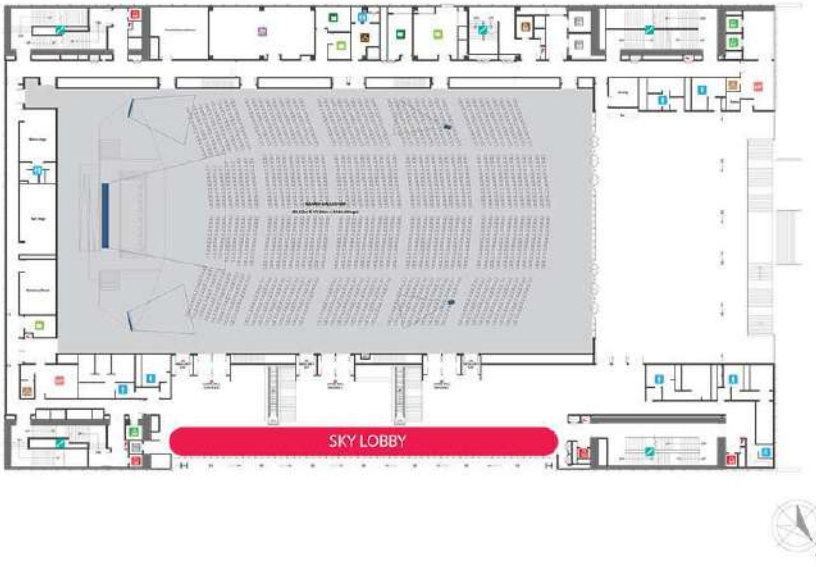


4.5.6 Convention Hall

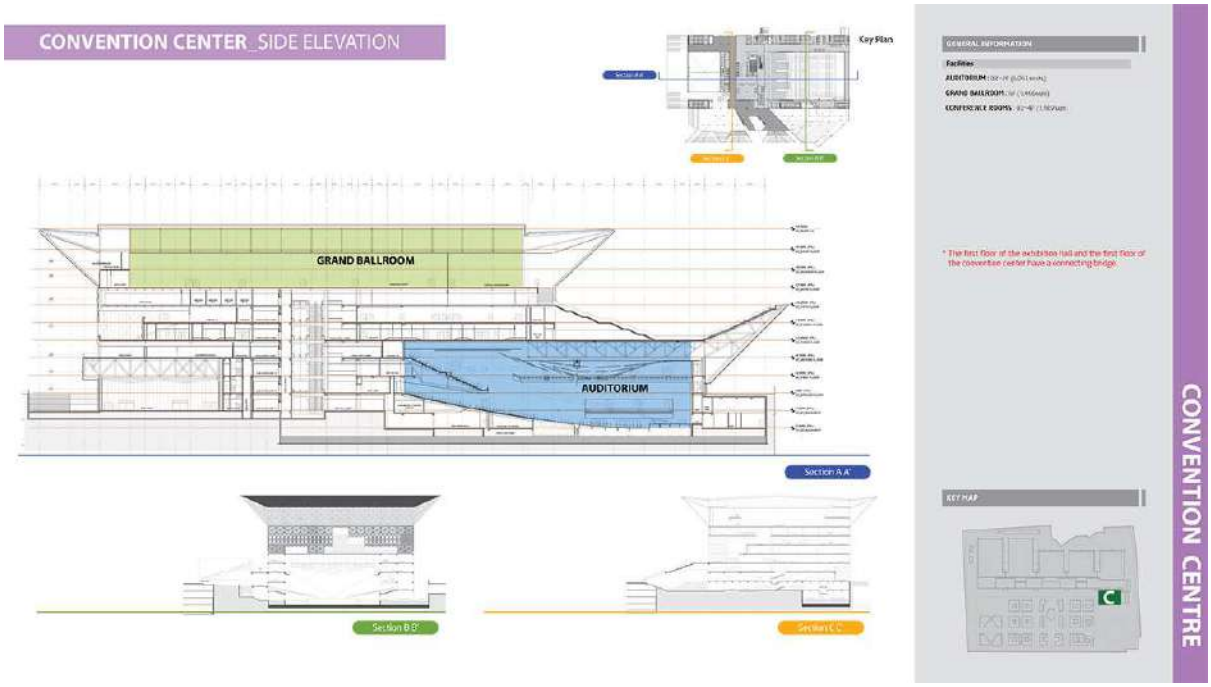
Area	73000 sqm
No. of Floors	8
No. of Convention rooms	15
Capacity of Main Auditorium	6000 pax
Capacity of Grand Ballroom	25000 pax
No. of Meeting rooms	13
Total Capacity	11000



CONVENTION CENTRE_6F







4.5.7 Auditorium

It is the core of the complex and it's equipped with a seating capacity of around 6000 people. Other Features:

i. LED Media Façade on both interior and exterior sides
ii. Decoration inspired by Indian Culture
iii. Terrazzo floors, metal sound absorbers, lit-up patterned walls
iv. Innovative automated seating system (flat floor or tiered seating)



Figure 35 Auditorium

4.5.8 Exhibition Halls

There are 3 Exhibition Halls constructed among a total of 5 Exhibition Halls 5 exhibition halls provide over 240000 sqm of built-up space with additional open exhibition area. Roof is decorated colourful panels and vibrant pattern which defines its character façade opens itself in an arch-like structure welcoming visitor. Each hall is equipped with flexibility to be converted into 4 small halls.

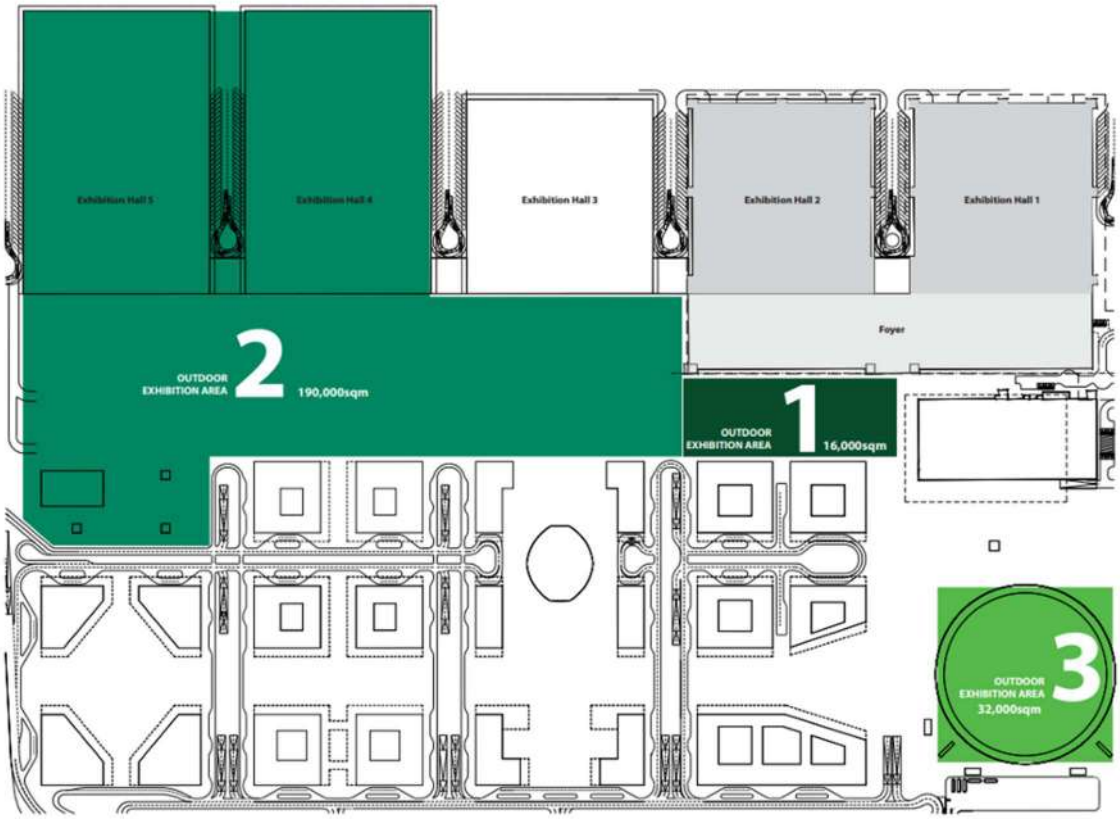


Figure 36 Placement of the rooms



Figure 37 Grand Ballroom (Palash Hall)



Figure 38 B101(Amaltas Hall)

4.5.9 Parking

Car Spaces Distribution

Parking is distributed across four basement levels, with a total of 6,294 ECS (Equivalent Car Spaces). These are spread across different facilities including hotels, offices, and retail areas.

A total of 168 preferred car spaces is designated across the four basements, providing convenient parking for specific categories, such as VIP or priority guests.

Various facilities such as retail, hotels, offices, and convention centres have dedicated parking spaces, with retail receiving the largest share, having 1,555 ECS in total.

4.5.10 Inferences

The Yashobhoomi Convention Centre is a landmark in modern Indian architecture, embodying a blend of cutting-edge technology, sustainability, and cultural representation.

Its design and concept underscore the importance of flexible, multi-functional spaces in meeting the demands of a global MICE industry.

The centre not only enhances India's infrastructure capabilities but also serves as a testament to the country's commitment to becoming a major player in the global conference and exhibition landscape.

5 REFERENCES

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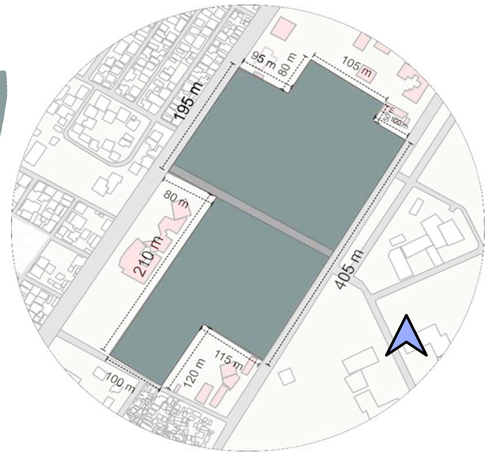
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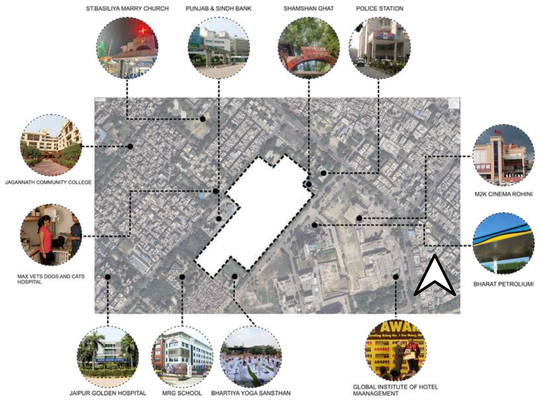


LOCATION

SECTOR-3, ROHINI, DELHI-110085
COORDINATES: 28.7077° N, 77.1076° E

PROXIMITY

- THE SITE IS WELL CONNECTED TO - OUTER RING ROAD – 0.6 KM
- METRO STATION – ROHINI EAST - 2.4 KM,
- ROHINI WEST - 3.1 KM, PITAMPURA - 3.1 KM
- IGI INTERNATIONAL AIRPORT - 19.6KM
- BUS STANDS NEARBY ARE PUSHPANJALI ENCLAVE BUS STAND, KALI MANDIR BUS STAND,
- NAHARPUR VILLAGE BUS STAND, ROHINI SECTOR -7 BUS STAND.
- NEW DELHI RAILWAY STATION – 15 KM



SITE CONTEXT



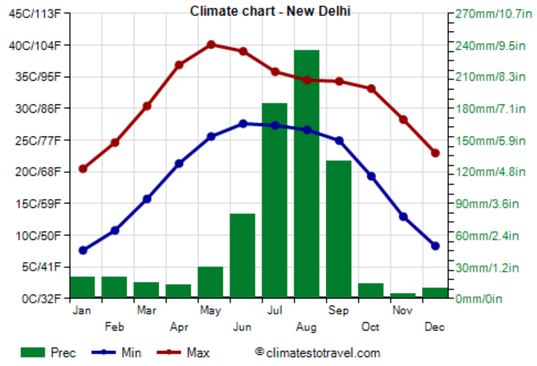
ROAD CONNECTIVITY

SITE

CLIMATE:

- ORIENT BUILDING FACADES MAINLY TOWARDS NORTH AND SOUTH TO ENJOY DAYLIGHT AND REDUCE HARSH SUN.
- USE HORIZONTAL SHADING (OVERHANGS/PERGOLAS) ON SOUTH FACADES TO BLOCK SUMMER SUN, ALLOW WINTER SUN.
- ADD VERTICAL FINS OR DENSE TREES TO EAST AND WEST SIDES FOR MORNING AND AFTERNOON SUN PROTECTION.
- PLACE MAJOR OUTDOOR SPACES LIKE COURTYARDS ON SOUTH, SOUTHEAST, OR SOUTHWEST FOR WINTER SUN AND SUMMER SHADE.
- MAXIMIZE WINDOW AREA ON NORTH AND WELL-SHADED SOUTH FACES; KEEP EAST/WEST WINDOWS SMALLER AND SHADED.
- PROVIDE SHADED ROOFS OR GREEN COVERS ON TERRACES EXPOSED TO MIDDAY AND AFTERNOON SUN.
- USE TREES AND LANDSCAPING TO SHIELD OPEN AREAS FROM INTENSE SUMMER SUNLIGHT, ESPECIALLY ON WEST AND SOUTHWEST.
- SMART ORIENTATION AND SHADING HELP REDUCE ENERGY NEEDS AND KEEP CAMPUS COMFORTABLE YEAR-ROUND.

PRECIPITATION



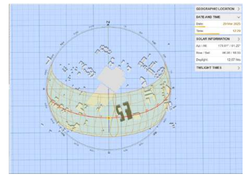


WINDROSE B/W JUNE&AUG AND SEP&DEC

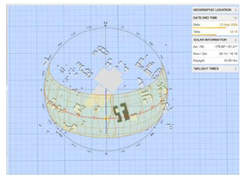


WINDROSE B/W DEC&FEB AND MAR&MAY

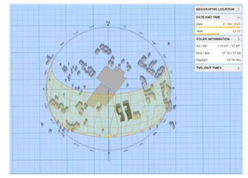
SUNPATH:



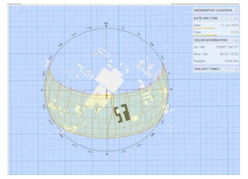
SPRING EQUINOX



AUTUM EQUINOX

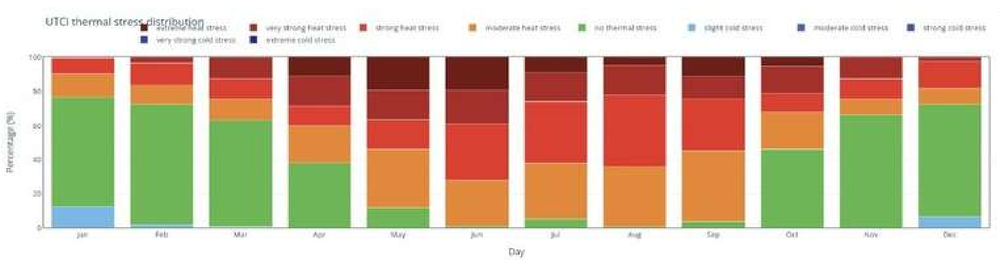


WINTER SOLSTIC

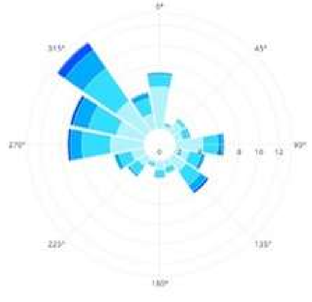


SUMMER SOLSTIC

- Dry season from October to May with very low rainfall.
- Monsoon season: heavy rainfall from June to September, peaking in July and August.
- Minimum temperatures lowest in January (~7°C/45°F), highest around June (~30°C/86°F).
- Maximum temperatures peak in May–June (~40°C/104°F), slightly cooler during monsoon.
- Distinct hot summer before monsoon onset followed by warm, wet monsoon months.
- Climate shows strong seasonality with hot summers, intense monsoon rains, and dry winters.



THERMAL STRESS DISTRIBUTION



ANNUAL WINDROSE

- ORIENT MAIN BUILDINGS TO CATCH BREEZES FROM THE WEST AND NORTHWEST FOR BETTER VENTILATION.
- PLACE BLOCKS AND COURTYARDS TO CREATE COOL, BREEZY OUTDOOR SPACES, BUT USE TREES OR SCREENS TO CUT DOWN ON ANY HARSH WINDS ON EXPOSED SPOTS.
- PUT SERVICE AREAS OR LESS-USED SPACES ON THE EAST/SOUTH, WHICH ARE LESS WINDY.
- FACADES FACING THE WIND SHOULD HAVE WINDOWS THAT CAN OPEN AND USE SHADING TO BALANCE SUN AND AIRFLOW.
- AVOID CREATING WIND TUNNELS BY STAGGERING BUILDINGS.

- EMPHASIZE COOLING AND SHADE.
- PLAN CAMPUS EVENTS AND GATHERINGS FOR COOLER MONTHS.
- USE GREEN BUFFERS, WATER FEATURES, AND VENTILATED DESIGNS FOR COMFORT.

SITE DETAILS

- **NAME OF WORK:** COMPREHENSIVE CONSULTANCY SERVICES FOR PLANNING, DESIGNING AND DEVELOPMENT OF NEW CAMPUS OF AMBEDKAR UNIVERSITY DELHI (PHASE-I WORKS) AT SECTOR-3, ROHINI, DELHI-110085.
- **PROJECT LOCATION:** SECTOR-3, ROHINI, DELHI-110085.
- **ENCUMBRANCES:** THE SITE IS FREE FROM ALL ENCUMBRANCES, INCLUDING OVERHEAD POWER LINES.
- **SOIL TYPE:** ALLUVIUM SOIL WITH LOAMY TEXTURE
- **TOTAL PLOT AREA:** 7.3 HECTARES (73,000 SQM).
- **FAR :** 2.25
- **TOTAL PERMISIBLE BUILT UP :** 1,60,875 SQM
- **INSTITUTIONAL:** 90,000 SQM
- **RESIDENTIAL:** 46,000 SQM
- **TOTAL BUILT UP:** 76844 SQM
- **INSTITUTIONAL :** 54800 SQM
- **RESIDENTIAL :** 22044 SQM
- **BASEMENT, PARKING & SERVICE AREAS:** 31,680 SQM
- **TOTAL GROUND COVERAGE:** 18,980 SQM (26 % 73000)
- **GROUND COVERAGE FOR INSTITUTIONAL:** 13,286 SQM (70 % 18,980)
- **GROUND COVERAGE FOR RECIDENTIAL :** 5694 SQM (30 % 18,980)

01

SITE ANALYSIS

DONE BY:
N S Chithraja (211110012)
GUIDED BY:
Prof. Dr. Jagdish Singh

INSPIRATION

THE DESIGN TAKES INSPIRATION FROM CELEBRATED INDIAN CAMPUSES LIKE IIT BOMBAY AND IIM BANGALORE, WHERE SHADED WALKWAYS, LUSH COURTYARDS, AND RHYTHMIC OPEN SPACES CREATE A UNIQUE JOURNEY THAT BALANCES COMFORT, CONNECTIVITY, AND DELIGHT. DRAWING ON LOCAL PASSIVE DESIGN TRADITIONS, THE PROJECT PRIORITIZES MICROCLIMATES WITH DEEP VERANDAHS, PERGOLAS, PLANTED COURTS, AND CONTINUOUS CIRCULATION CHAMPIONING BOTH COOL RESPITE IN HARSH SUMMERS AND VISUAL VIBRANCY THROUGHOUT THE YEAR.

CORE DESIGN PHILOSOPHY

THE CAMPUS UNFOLDS AS A "JOURNEY OF SPACES" A SEAMLESS, CLIMATE RESPONSIVE NETWORK WHERE MOVEMENT FLOWS NATURALLY THROUGH SHADED CORRIDORS, LAYERED COURTYARDS, AND INTENTIONAL PAUSES. THIS SLOW, RHYTHMIC PROGRESSION CREATES POCKETS OF MICROCLIMATIC COMFORT THAT ENCOURAGE EXPLORATION, SOCIAL INTERACTION, AND REFLECTION. EACH DESIGN ELEMENT FROM SHADED NODES TO FRAMED VIEWS WORKS TOGETHER TO ENHANCE WAYFINDING, FOSTER A SENSE OF COMMUNITY, AND RESPOND THOUGHTFULLY TO DELHI'S CHALLENGING CLIMATE CONDITIONS.

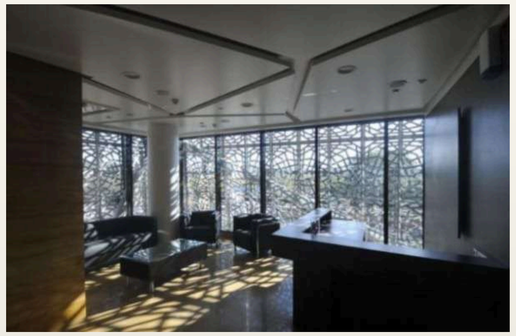
ELEMENTS THAT ARE TAKEN FROM THE INFERENCECES FROM THE SITE ANALYSIS & CASE STUDIES



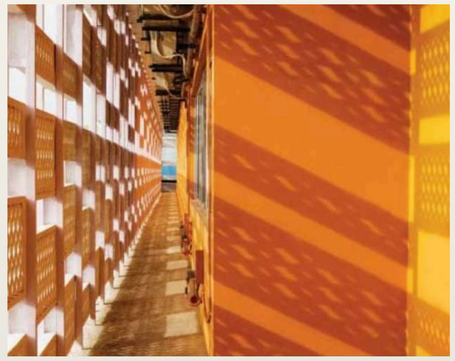
SHADED WALK WAYS

CONTINUOUS SHADED WALKWAYS CONNECT DIFFERENT ZONES, PROTECTING USERS FROM HARSH SUN, SUPPORTING COMFORTABLE MOVEMENT, AND BRINGING RELIEF DURING HOT WEATHER.

DOUBLE LAYER WALLS

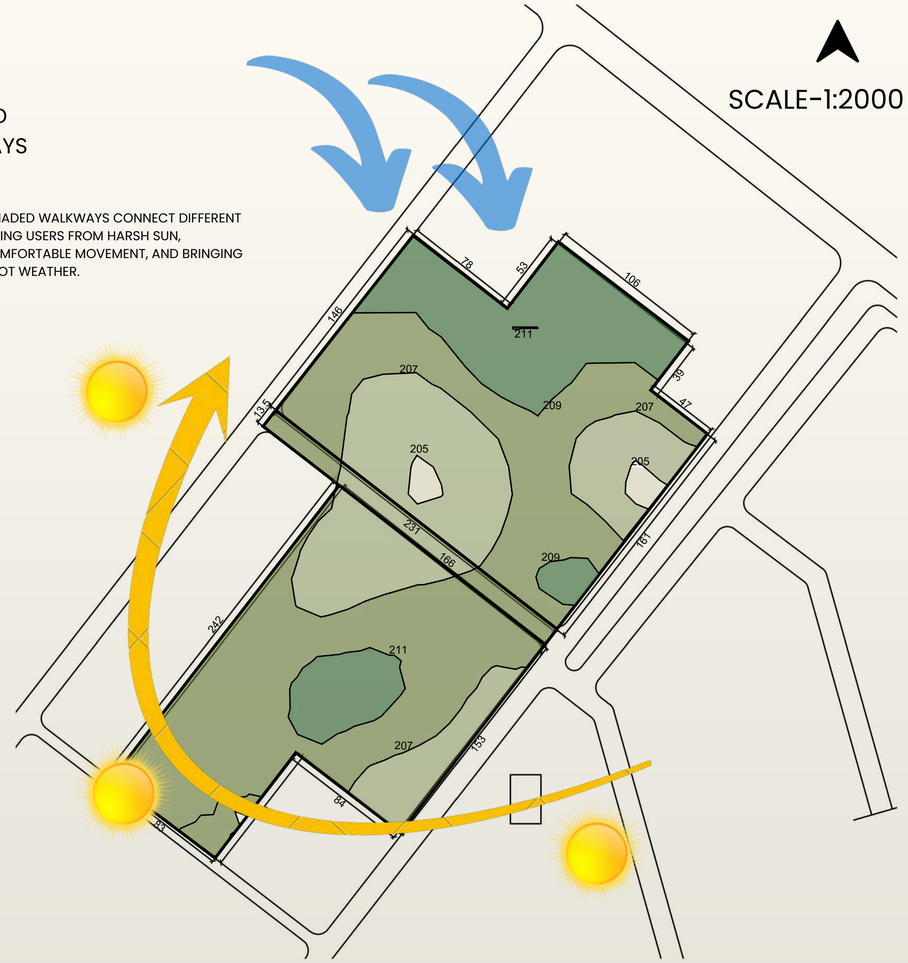


DOUBLE-SKIN FACADES USE VENTILATED OUTER SCREENS TO FILTER SUNLIGHT, PRE COOL INCOMING AIR, AND DIFFUSE HARSH HEAT, MAKING INTERIORS MORE COMFORTABLE AND ENERGY EFFICIENT.



BROAD SITE ZONING

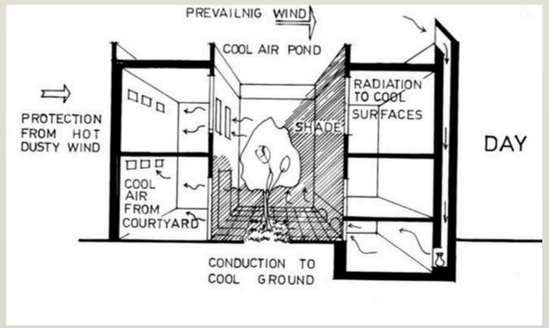


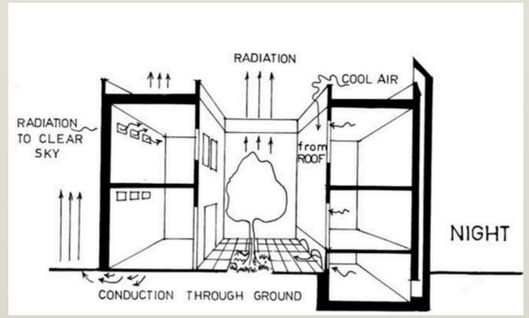


SITE CONTOURS

COURTYARD

OPEN COURTYARDS ARE CENTRAL TO THE DESIGN, CREATING COOL, SHADED SPACES THAT ENCOURAGE INFORMAL GATHERINGS AND NATURAL VENTILATION WHILE BREAKING UP THE HEAT OF THE SURROUNDINGS.





02 CONCEPT

DONE BY:
N S Chithraja (211110012)
GUIDED BY:
Prof. Dr. Jagdish Singh

New Campus of Ambedkar University Delhi (Phase-I works) at Sector-3, Rohini, Delhi-110085.

Total Plot Area: 7.3 hectares (73,000 sqm).
FAR : 2.25
Total Permissible built-up : 1,60,875 sqm
Institutional: 90,000 sqm
Residential: 46,000 sqm
total built up: 76844 sqm
institutional : 54800 sqm
residential : 22044 sqm
Basement, parking & service areas: 31,680 sqm
Total ground coverage: 25550 sqm (35 % 73000)

Ground Coverage for Institutional:
17885 sqm (70 % 18,980)
Achieved Ground coverage :50%17885
8025 SQM{Excluding future exansion}
Ground Coverage for Residential :
7665 sqm(30 % 18,980)
Achieved Ground coverage :85 %17885
5583 SQM{Excluding future exansion}

Cluster: 1200 x 2 = 2400sqm
Admin 2000 sqm
Auditorium:3000sqm
Library:1500sqm
Future Cluster expansion:2000

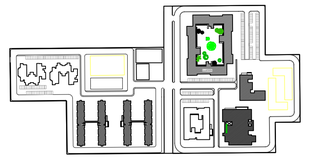
Hostels: 1605 x 2 = 3210 sqm
Faculty/Staff housing: 2048 sqm
Community Centre :200sqm
Future Cluster expansion:3000



NOTE:

1. THE DRAWINGS ARE TO BE READ IN CONJUCTION WITH DRAWINGS NO.
2. ALL DIMENSIONS ARE IN MM AND ALL LEVELS ARE IN MTS.
3. ALL DIMENSIONS ARE STRUCTURAL DIMENSIONS UNLESS MENTIONED OTHERWISE.
4. THE DRAWING IS TO BE READ AND NOT TO BE SCALED.
5. FOR STRU2CTURAL DETAILS, REFER DRAWING NO.
6. FOR GENERAL NOTES REFER DRAWING NO.
7. IN CASE OF ANY DISCREPANCY IT SHOULD BE BROUGHT TO THE NOTICE OF THE ARCHITECT PRIOR TO CONSTRUCTION AT THE SITE.
8. THE DRAWING HAS NOT BEEN PUBLISHED AND IS THE SOLE PROPERTY OF VITH SEMESTER ARCHITECTURE AND IS ISSUED TO THE PARTY FOR THE SPECIFIC PURPOSE AS STATED IN THE AGREEMENT AND IT SHALL NOT BE REPRODUCED, COPIED, LENT OR OTHERWISE DISPOSED OFF DIRECTLY OR INDIRECTLY NOT USED FOR ANY OTHER PURPOSE OTHER THAN FOR WHICH IT IS FURNISHED.

KEY PLAN:



PROJECT:
AMBEDKAR UNIVERSITY, DELHI

PROPOSING AGENCY:
PWD, DELHI

DRAWING:
SITE PLAN

SCALE:
1:800

NORTH:



DESIGNED BY:
N S CHITHRAJA
211110012

GUIDED BY:
DR. JAGDISH SINGH

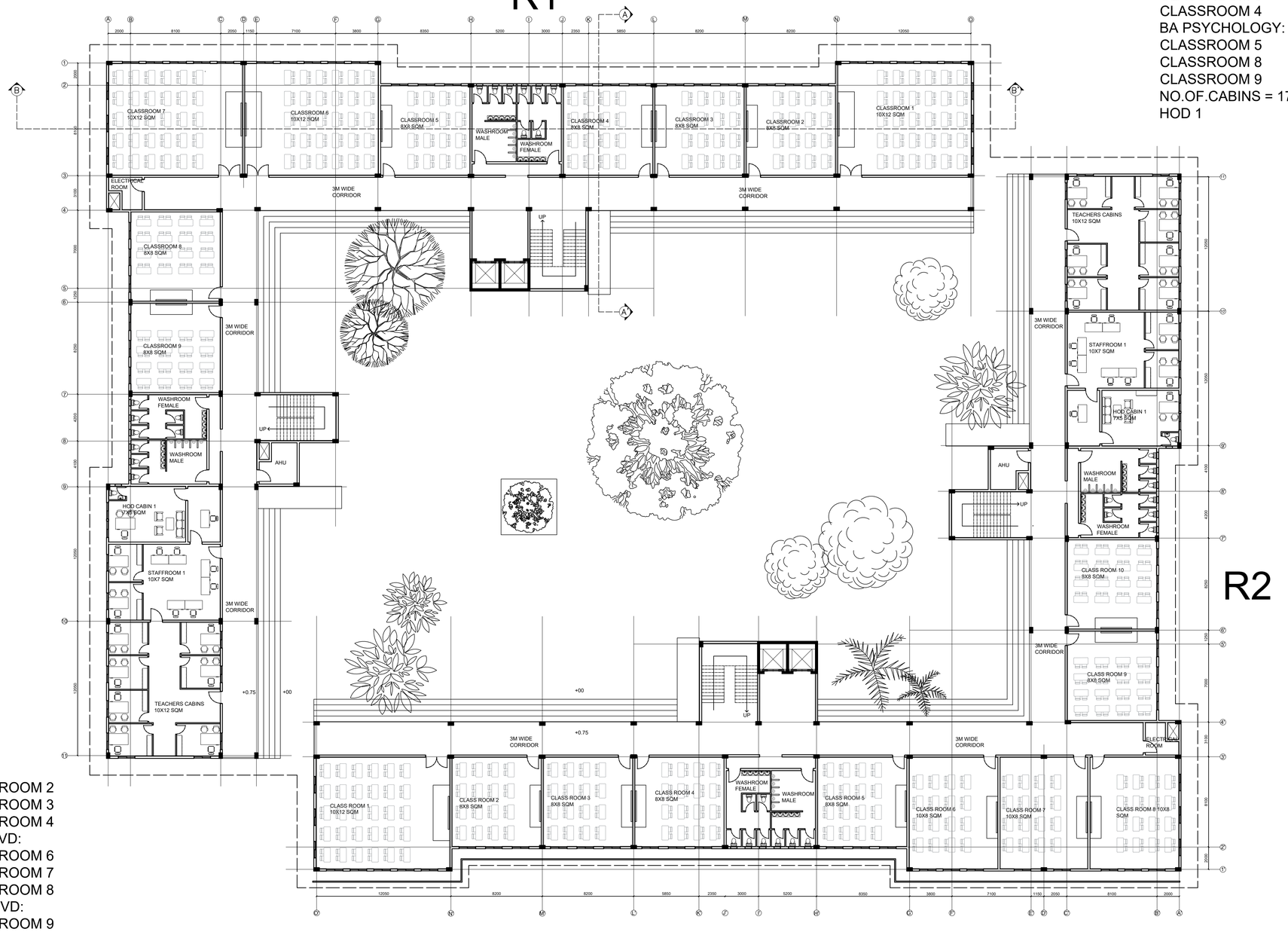
REVISIONS:

A	B	C	D	E	

SHEET NO:

ARC001

R1



R2

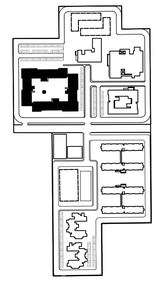
R1
BA ECONOMICS:
CLASSROOM 1
CLASSROOM 6
CLASSROOM 7
BA HISTORY:
CLASSROOM 2
CLASSROOM 3
CLASSROOM 4
BA PSYCHOLOGY:
CLASSROOM 5
CLASSROOM 8
CLASSROOM 9
NO.OF.CABINS = 17
HOD 1

R2
BBA:
CLASSROOM 2
CLASSROOM 3
CLASSROOM 4
BBA-IEVD:
CLASSROOM 6
CLASSROOM 7
CLASSROOM 8
MBA-IEVD:
CLASSROOM 9
CLASSROOM 10
MA EDUCATION:
CLASSROOM 5
MBA:
CLASSROOM 1
NO.OF.CABINS = 17
HOD 1

NOTE:

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KEY PLAN:



PROJECT:
AMBEDKAR UNIVERSITY, DELHI.

PROPOSING AGENCY:
PWD, DELHI.

DRAWING:
CLUSTER (GROUND FLOOR PLAN)

SCALE:
1:200

NORTH:



DESIGNED BY:
N S CHITHRAJA
211110012

GUIDED BY:
DR. JAGDISH SINGH

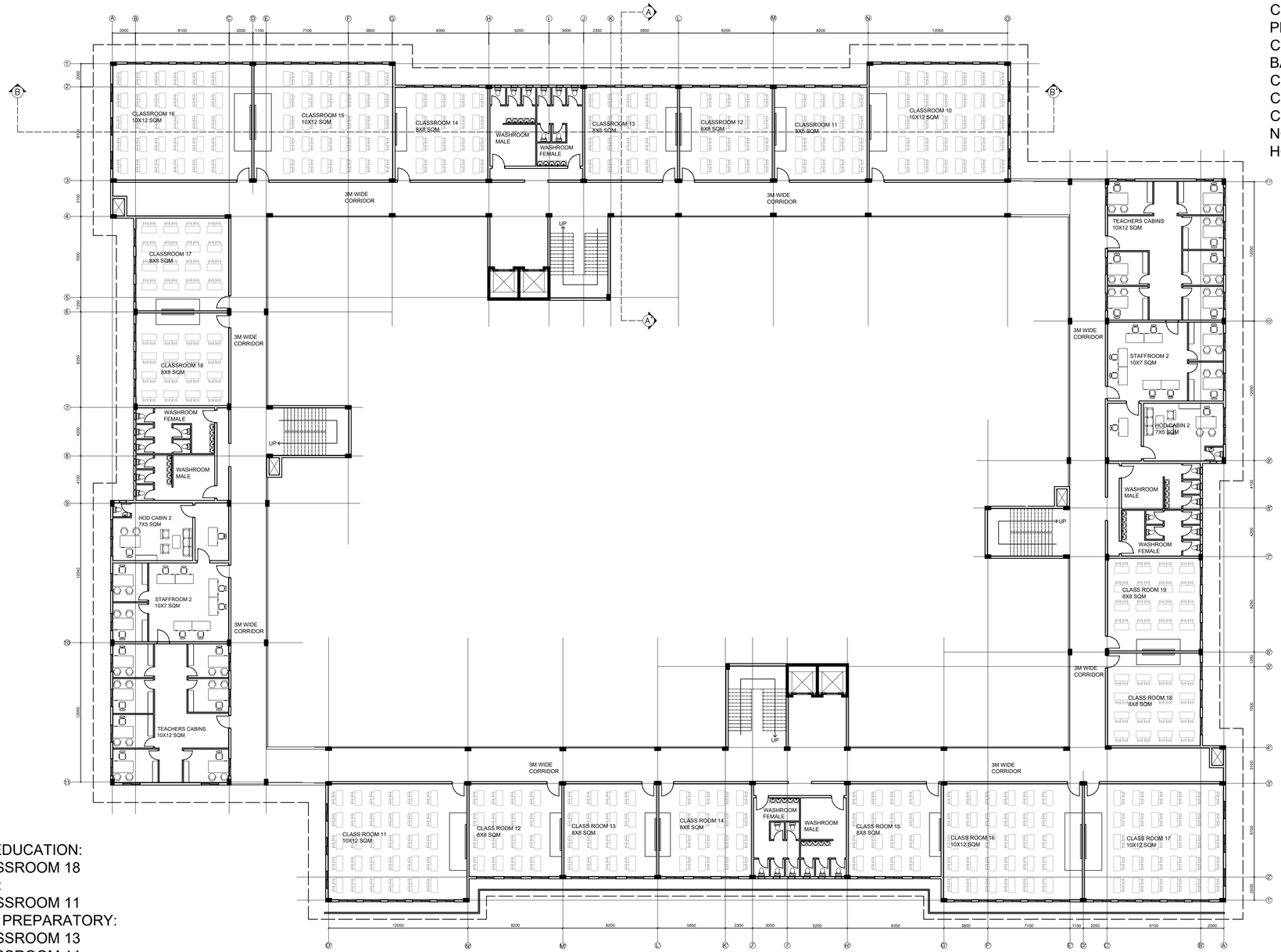
REVISIONS:

A	B	C	D	E	

SHEET NO:

ARC002

R1



R1
BA SS&HUMANITIES:
CLASSROOM 11
CLASSROOM 12
CLASSROOM 13
MA HISTORY:
CLASSROOM 17
CLASSROOM 18
Phd HISTORY:
CLASSROOM 14
BA MATHS:
CLASSROOM 10
CLASSROOM 15
CLASSROOM 16
NO.OF.CABINS = 17
HOD 1

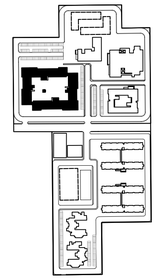
R2

R2
MA EDUCATION:
CLASSROOM 18
MBA:
CLASSROOM 11
ITEP PREPARATORY:
CLASSROOM 13
CLASSROOM 14
CLASSROOM 15
CLASSROOM 12
ITEP SECONDARY:
CLASSROOM 19
MA GENDER STUDIES:
CLASSROOM 16
CLASSROOM 17
NO.OF.CABINS = 17
HOD 1

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KEY PLAN:



PROJECT:
AMBEDKAR UNIVERSITY, DELHI.

PROPOSING AGENCY:
PWD, DELHI.

DRAWING:
CLUSTER FIRST FLOOR PLAN

SCALE:
1:200

NORTH:

DESIGNED BY:
N S CHITHRAJA
211110012

GUIDED BY:
DR. JAGDISH SINGH

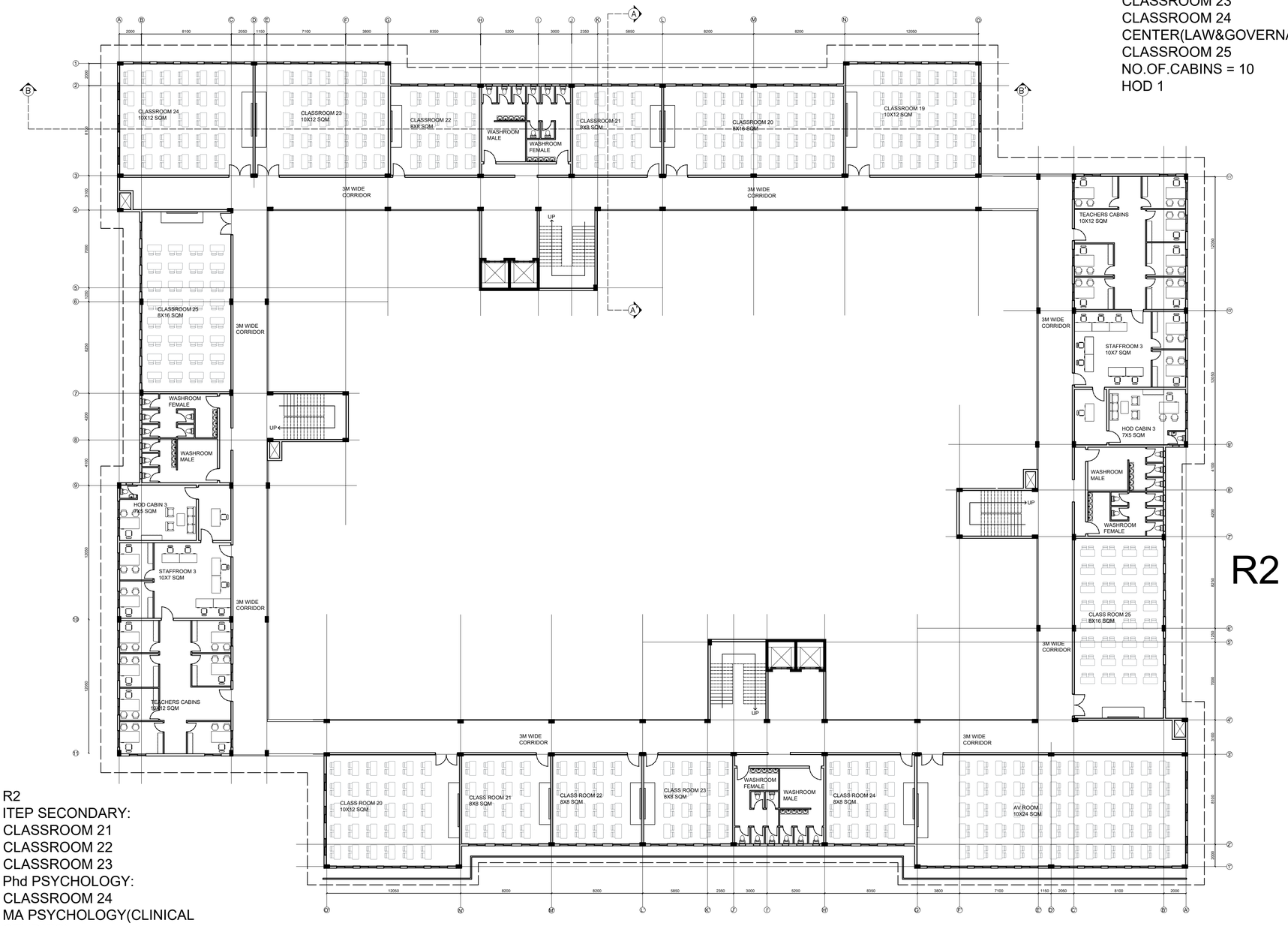
REVISIONS:

A	B	C	D	E	

SHEET NO:

ARC003

R1



R1
Phd ECONOMICS:
CLASSROOM 21
Phd MATHEMATICS
MA ECONOMICS:
CLASSROOM 19
CLASSROOM 20
MA MATHEMATICS:
CLASSROOM 23
CLASSROOM 24
CENTER(LAW&GOVERNANCE) :
CLASSROOM 25
NO.OF.CABINS = 10
HOD 1

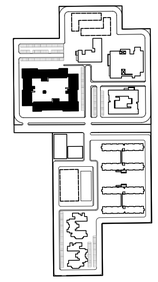
R2

R2
ITEP SECONDARY:
CLASSROOM 21
CLASSROOM 22
CLASSROOM 23
Phd PSYCHOLOGY:
CLASSROOM 24
MA PSYCHOLOGY(CLINICAL STUDIES):
CLASSROOM 20
CLASSROOM 25
AV ROOM
NO.OF.CABINS = 17
HOD 1

NOTE:

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KEY PLAN:



PROJECT:
AMBEDKAR UNIVERSITY, DELHI.

PROPOSING AGENCY:
PWD, DELHI.

DRAWING:
CLUSTER SECOND FLOOR PLAN

SCALE:
1:200

NORTH:

DESIGNED BY:
N S CHITHRAJA
211110012

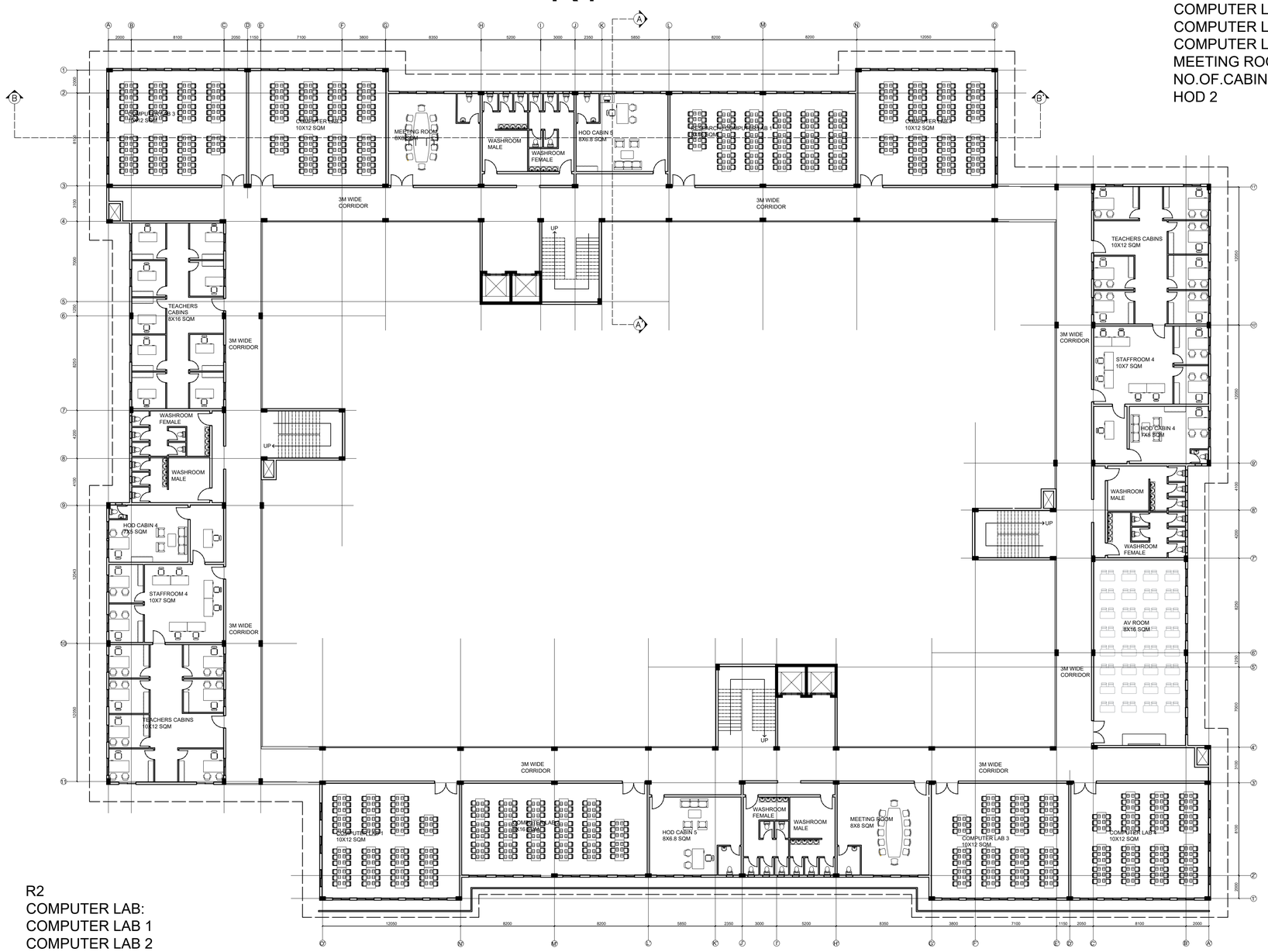
GUIDED BY:
DR. JAGDISH SINGH

REVISIONS:

A	B	C	D	E	

SHEET NO:

ARC004



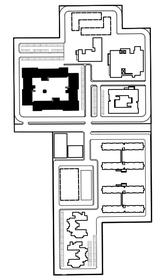
R1
COMPUTER LAB:
COMPUTER LAB 1
COMPUTER LAB 2
COMPUTER LAB 3
COMPUTER LAB 4
MEETING ROOM
NO.OF.CABINS = 26
HOD 2

R2
COMPUTER LAB:
COMPUTER LAB 1
COMPUTER LAB 2
COMPUTER LAB 3
COMPUTER LAB 4
MEETING ROOM
AV ROOM
NO.OF.CABINS = 17
HOD 2

NOTE:

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KEY PLAN:



PROJECT:
AMBEDKAR UNIVERSITY, DELHI.

PROPOSING AGENCY:
PWD, DELHI.

DRAWING:
CLUSTER THIRD & FOURTH FLOOR PLAN

SCALE:
1:200

NORTH:



DESIGNED BY:
N S CHITHRAJA
211110012

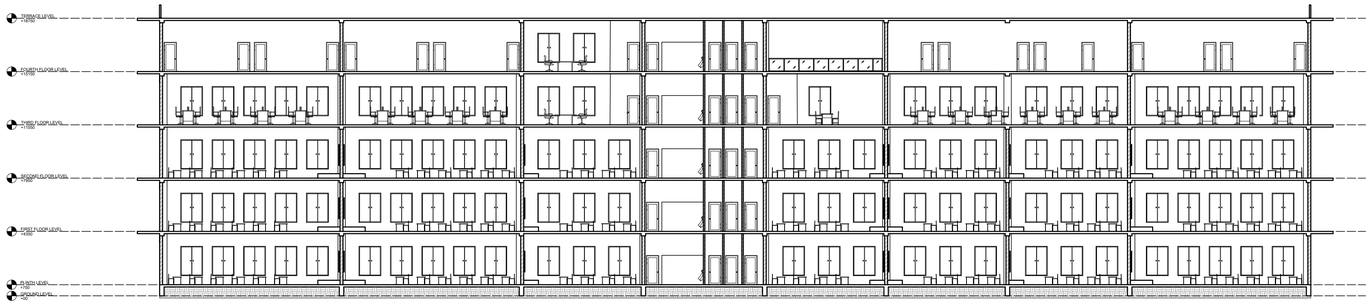
GUIDED BY:
DR. JAGDISH SINGH

REVISIONS:

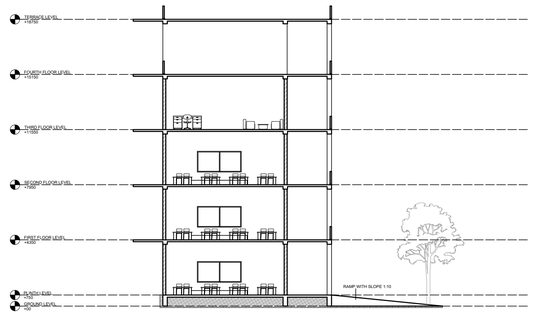
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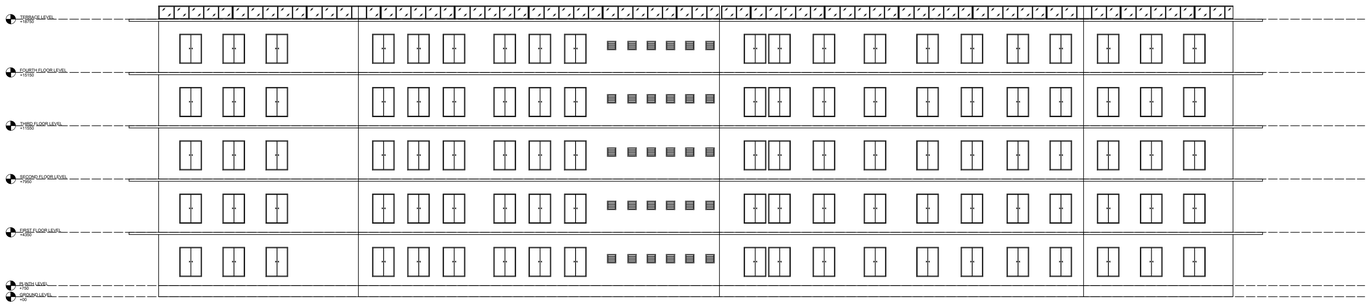
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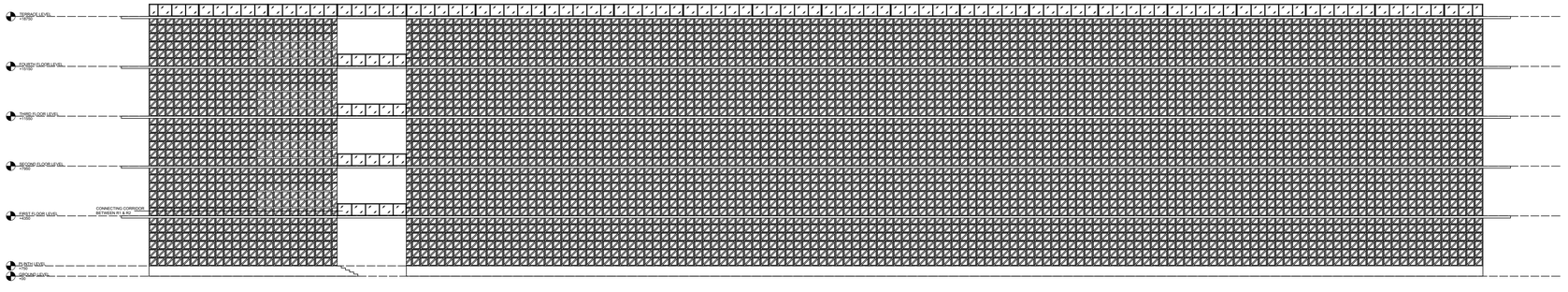
SECTION BB'



SECTION AA'



SOUTH WEST ELEVATION

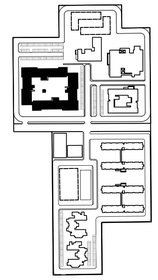


SOUTH EAST ELEVATION

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KEY PLAN:



PROJECT:
AMBEDKAR UNIVERSITY, DELHI.

PROPOSING AGENCY:
PWD, DELHI.

DRAWING:
CLUSTER SECTIONS & ELEVATIONS

SCALE:
1:200

NORTH:



DESIGNED BY:
N S CHITHRAJA
211110012

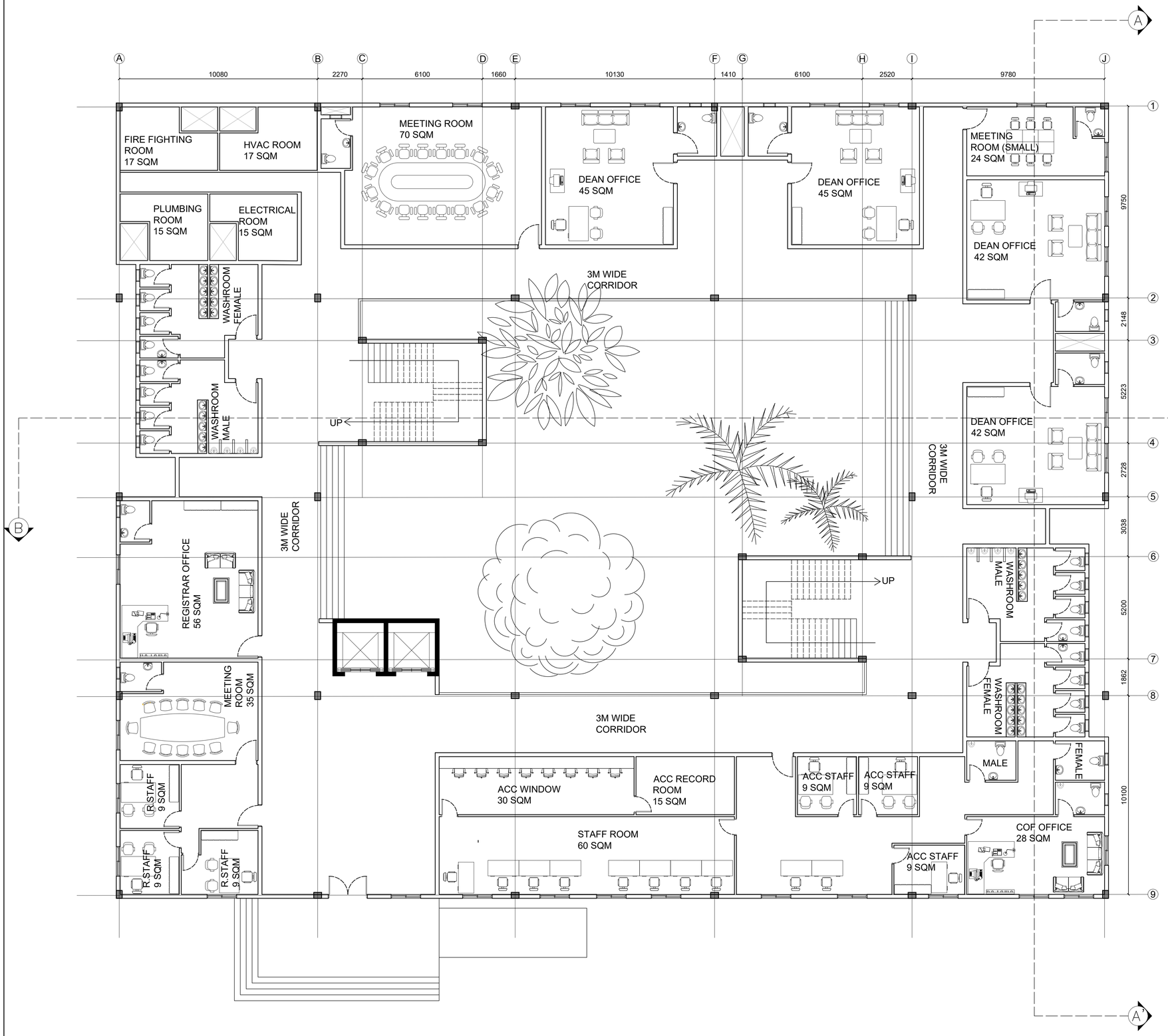
GUIDED BY:
DR. JAGDISH SINGH

REVISIONS:

A	B	C	D	E	

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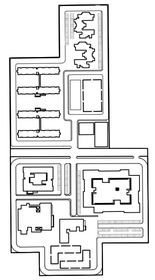
ARC006



NOTE:

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KEY PLAN:



PROJECT:
AMBEDKAR UNIVERSITY, DELHI.

PROPOSING AGENCY:
PWD, DELHI.

DRAWING:
ADMIN GROUND FLOOR PLAN

SCALE:
1:100

NORTH:

DESIGNED BY:
N S CHITHRAJA
211110012

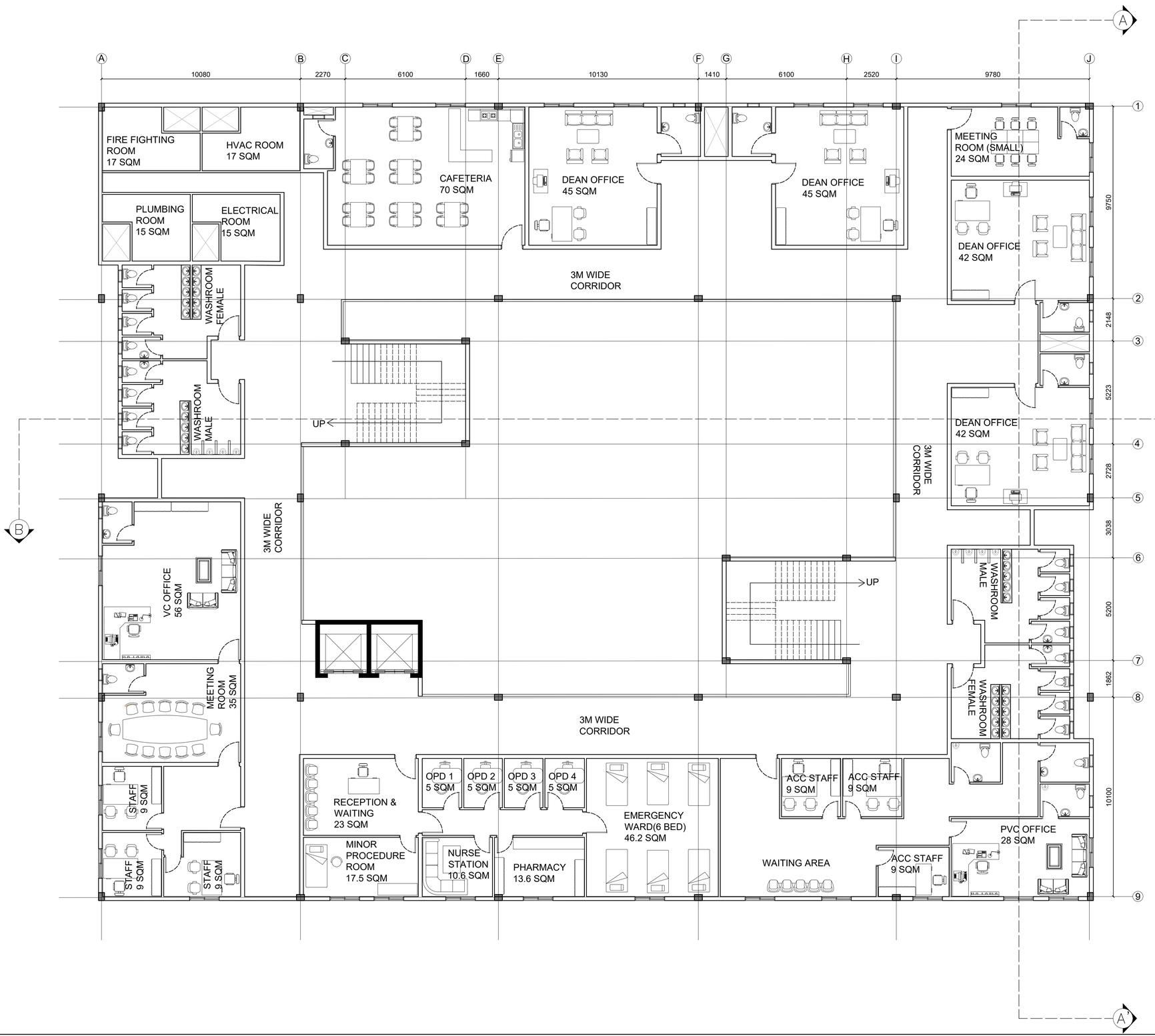
GUIDED BY:
DR. JAGDISH SINGH

REVISIONS:

A	B	C	D	E	

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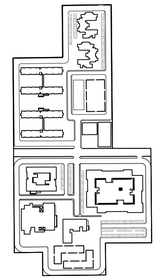
ARC007



NOTE:

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KEY PLAN:



PROJECT:
AMBEDKAR UNIVERSITY, DELHI.

PROPOSING AGENCY:
PWD, DELHI.

DRAWING:
ADMIN FIRST FLOOR PLAN

SCALE:
1:100

NORTH:

DESIGNED BY:
N S CHITHRAJA
211110012

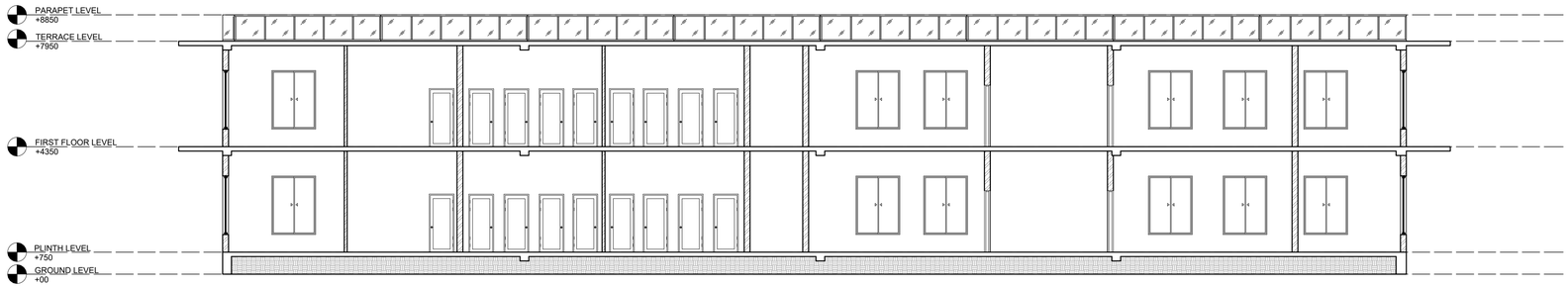
GUIDED BY:
DR. JAGDISH SINGH

REVISIONS:

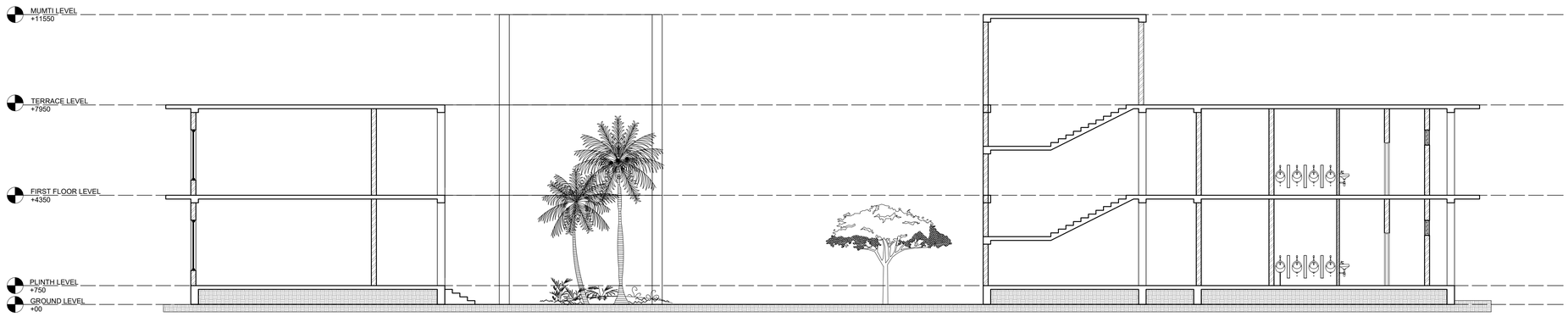
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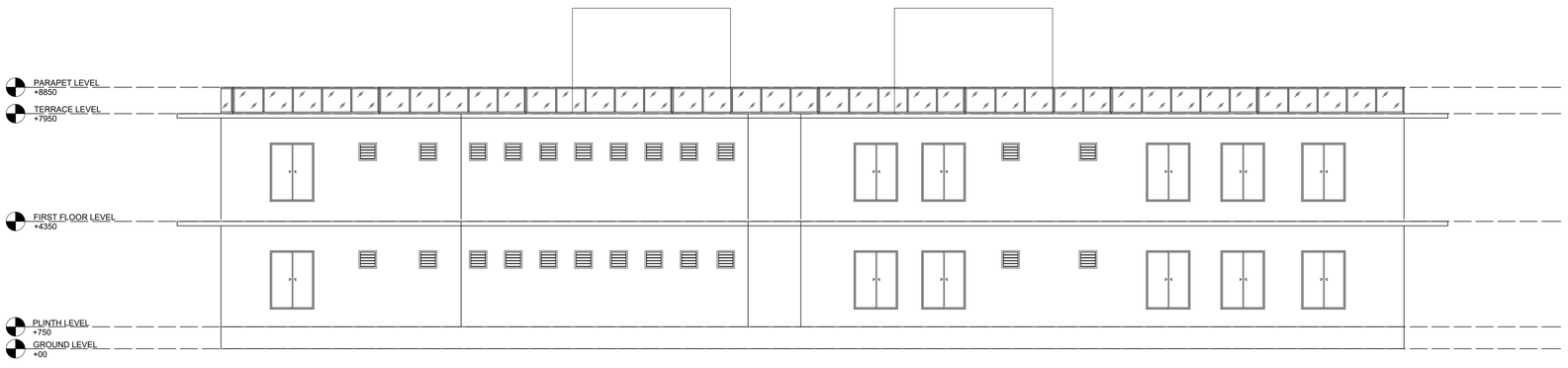
ARC008



SECTION AA'



SECTION BB'

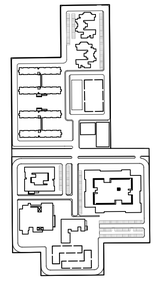


SIDE ELEVATION

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KEY PLAN:



PROJECT:
AMBEDKAR UNIVERSITY, DELHI.

PROPOSING AGENCY:
PWD, DELHI.

DRAWING:
ADMIN SECTIONS & ELEVATIONS

SCALE:
1:100

NORTH:



DESIGNED BY:
N S CHITHRAJA
211110012

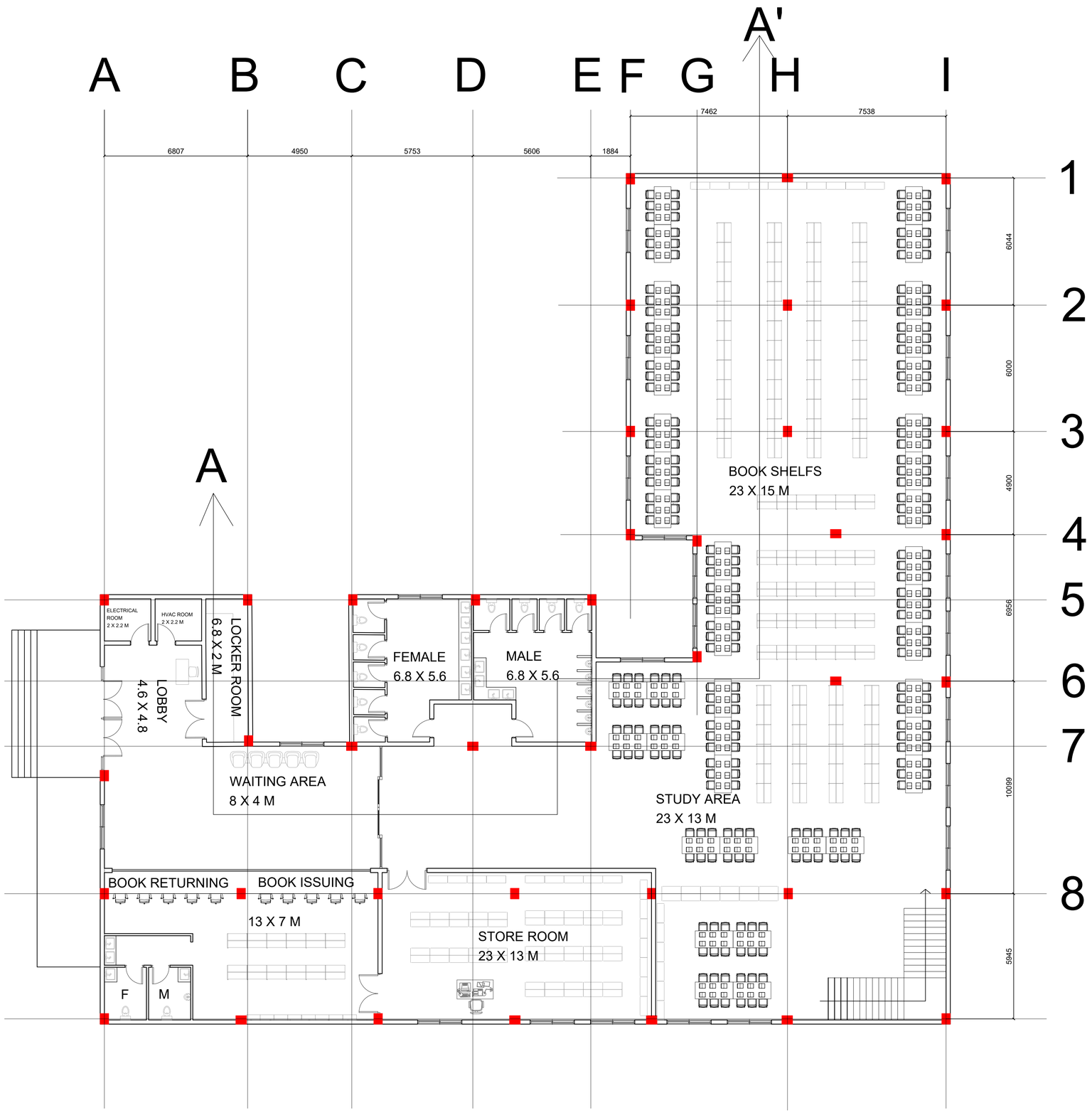
GUIDED BY:
DR. JAGDISH SINGH

REVISIONS:

A	B	C	D	E	

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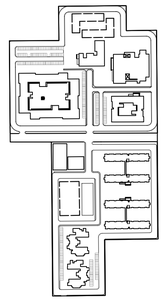
ARC009



NOTE:

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KEY PLAN:



PROJECT:
AMBEDKAR UNIVERSITY, DELHI

PROPOSING AGENCY:
PWD, DELHI

DRAWING:
LIBRARY GROUND FLOOR PLAN

SCALE:
1:100

NORTH:

DESIGNED BY:
N S CHITHRAJA
211110012

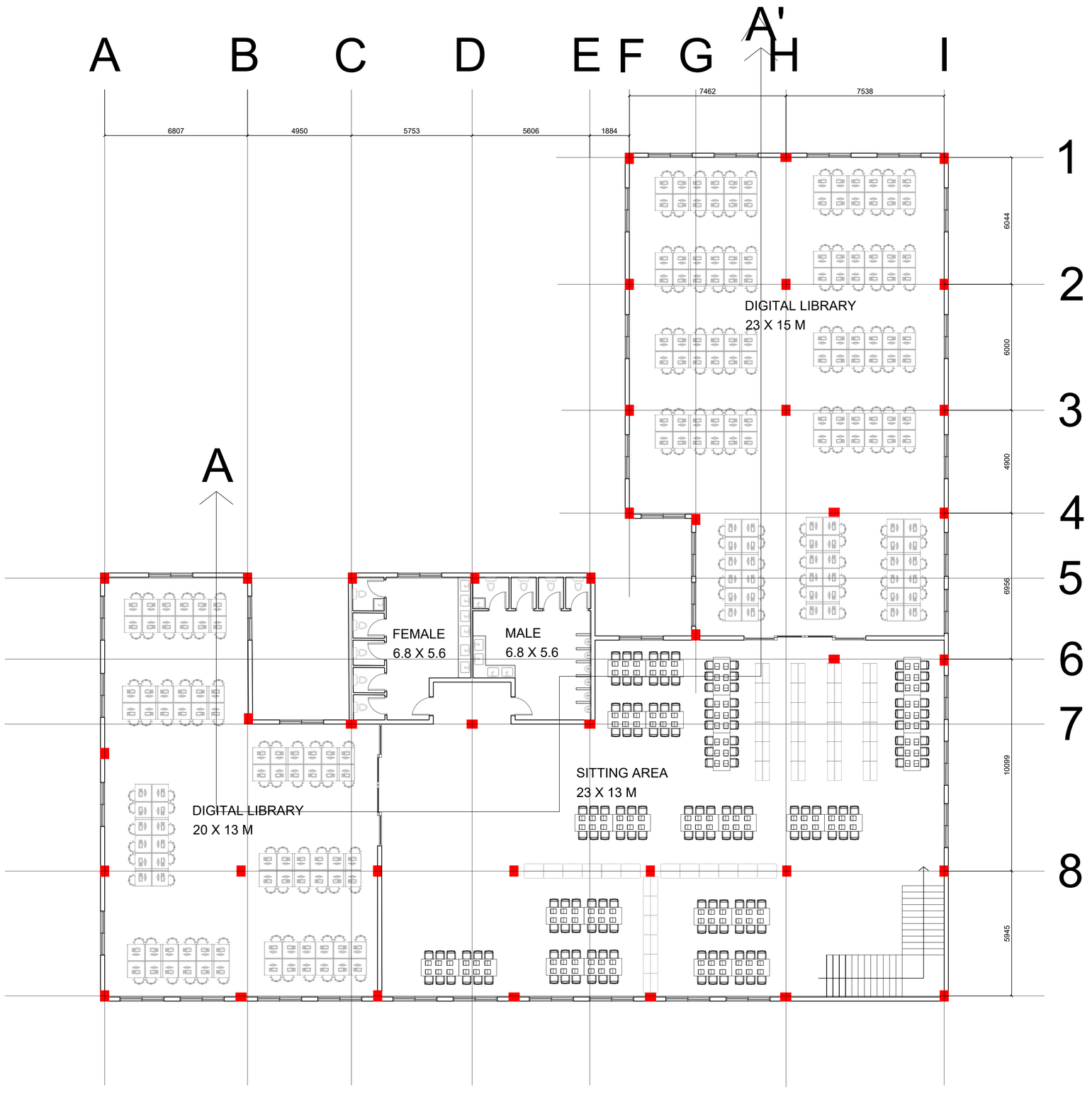
GUIDED BY:
DR. JAGDISH SINGH

REVISIONS:

A	B	C	D	E	

SHEET NO:

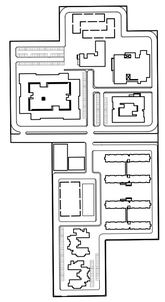
ARC0010



NOTE:

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KEY PLAN:



PROJECT:
AMBEDKAR UNIVERSITY, DELHI

PROPOSING AGENCY:
PWD, DELHI

DRAWING:
LIBRARY FIRST FLOOR PLAN

SCALE:
1:100

NORTH:

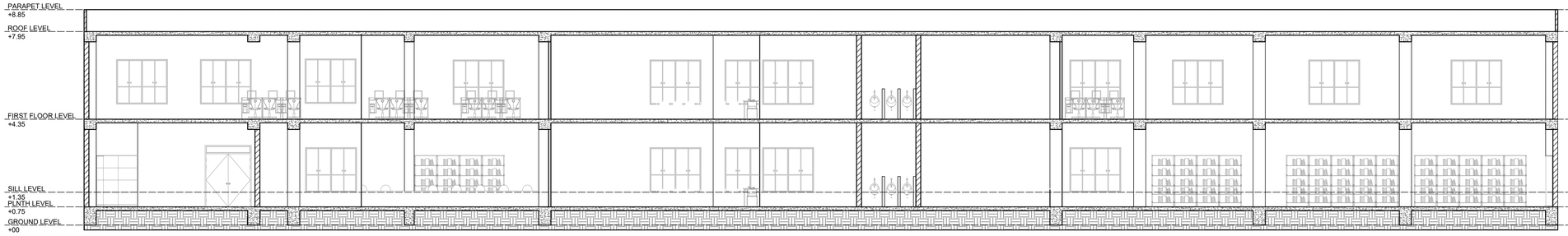
DESIGNED BY:
N S CHITHRAJA
211110012

GUIDED BY:
DR. JAGDISH SINGH

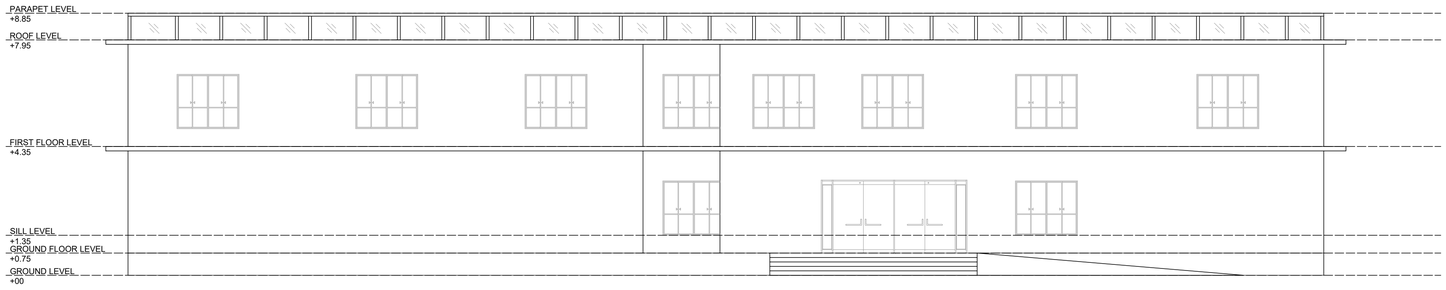
REVISIONS:

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SHEET NO:
ARC0011



SECTION AA'

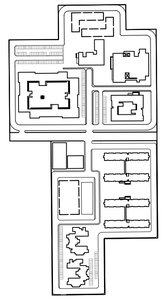


FRONT ELEVATION

NOTE:

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KEY PLAN:



PROJECT:
AMBEDKAR UNIVERSITY, DELHI

PROPOSING AGENCY:
PWD, DELHI

DRAWING:
LIBRARY SECTIONS &ELEVATIONS

SCALE:
1:100

NORTH:



DESIGNED BY:
N S CHITHRAJA
211110012

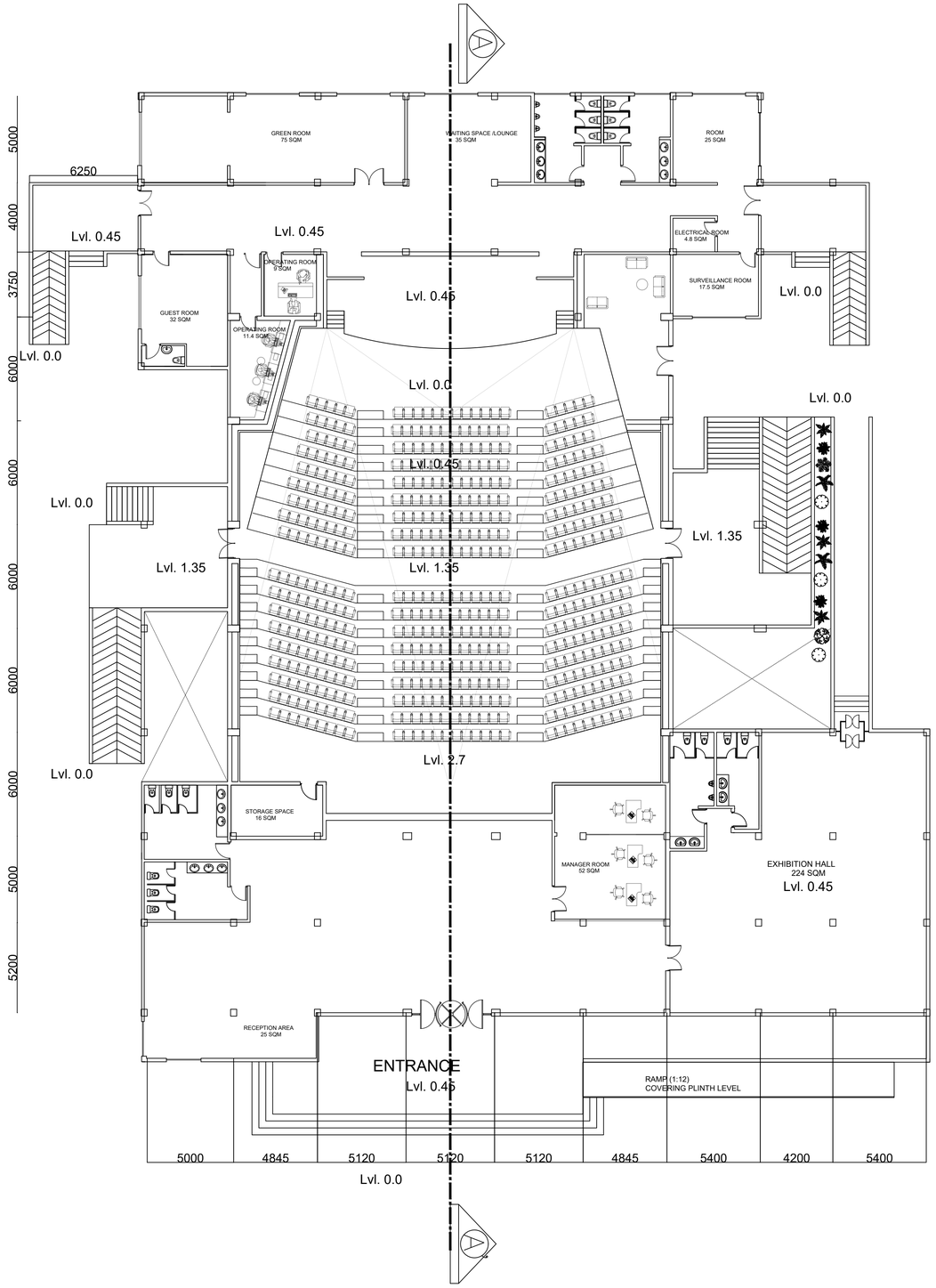
GUIDED BY:
DR. JAGDISH SINGH

REVISIONS:

A	B	C	D	E	

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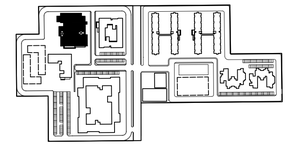
ARC0012



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KEY PLAN:



PROJECT:
AMBEDKAR UNIVERSITY, DELHI.

PROPOSING AGENCY:
PWD, DELHI.

DRAWING:
CLUSTER SECTIONS & ELEVATIONS

SCALE:
1:100

NORTH:

DESIGNED BY:
N S CHITHRAJA
211110012

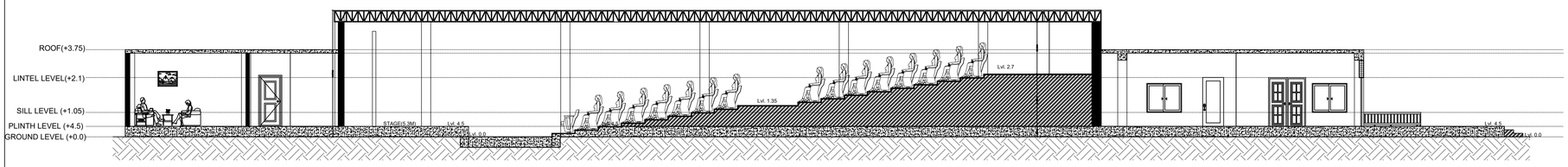
GUIDED BY:
DR. JAGDISH SINGH

REVISIONS:

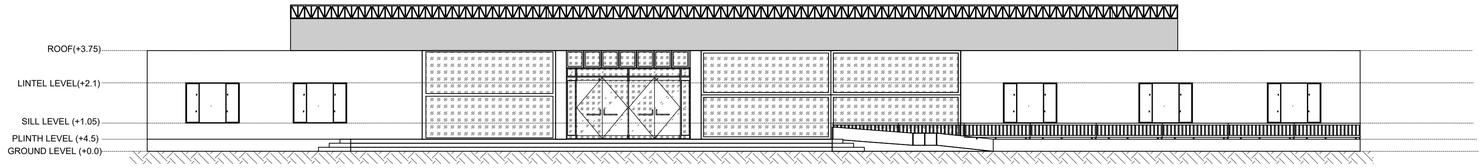
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SHEET NO:

ARC013



SECTION AA'

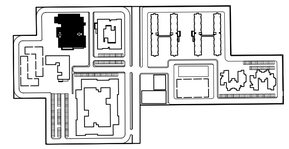


ELEVATION

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KEY PLAN:



PROJECT:
AMBEDKAR UNIVERSITY, DELHI.

PROPOSING AGENCY:
PWD, DELHI.

DRAWING:
CLUSTER SECTIONS & ELEVATIONS

SCALE:
1:75

NORTH:



DESIGNED BY:
N S CHITHRAJA
211110012

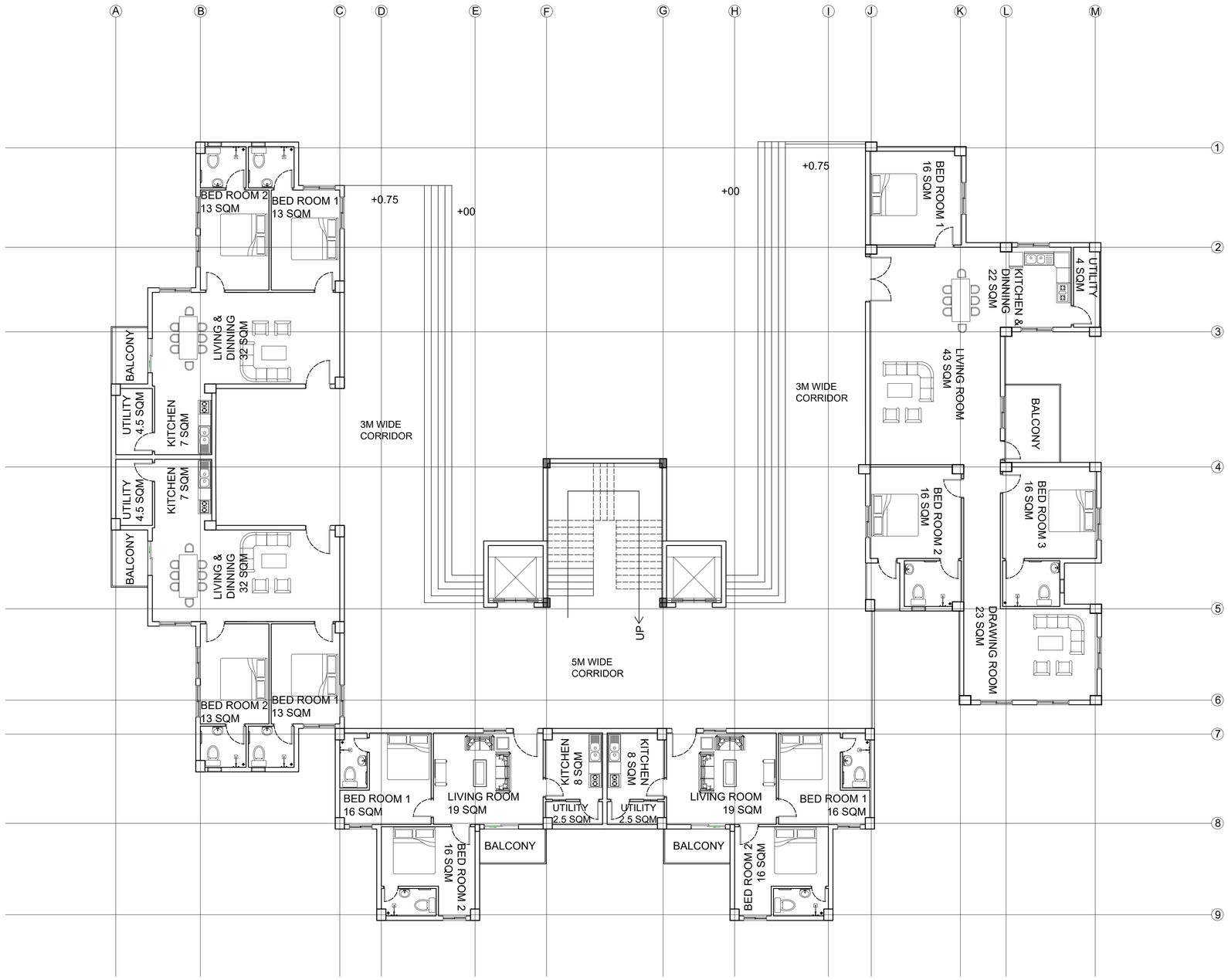
GUIDED BY:
DR. JAGDISH SINGH

REVISIONS:

A	B	C	D	E	

SHEET NO:

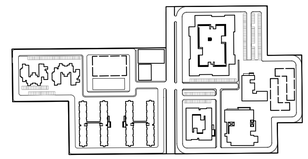
ARC014



NOTE:

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KEY PLAN:



PROJECT:
AMBEDKAR UNIVERSITY, DELHI

PROPOSING AGENCY:
PWD, DELHI

DRAWING:
FACULTY HOUSING G+6 FLOORS

SCALE:
1:100

NORTH:



DESIGNED BY:
N S CHITHRAJA
211110012

GUIDED BY:
DR. JAGDISH SINGH

REVISIONS:

A	B	C	D	E	

SHEET NO:

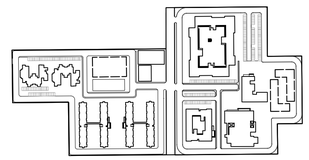
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NOTE:

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KEY PLAN:



PROJECT:
AMBEDKAR UNIVERSITY, DELHI

PROPOSING AGENCY:
PWD, DELHI

DRAWING:
FACULTY HOUSING 7TH FLOOR PLAN

SCALE:
1:100

NORTH:



DESIGNED BY:
N S CHITHRAJA
211110012

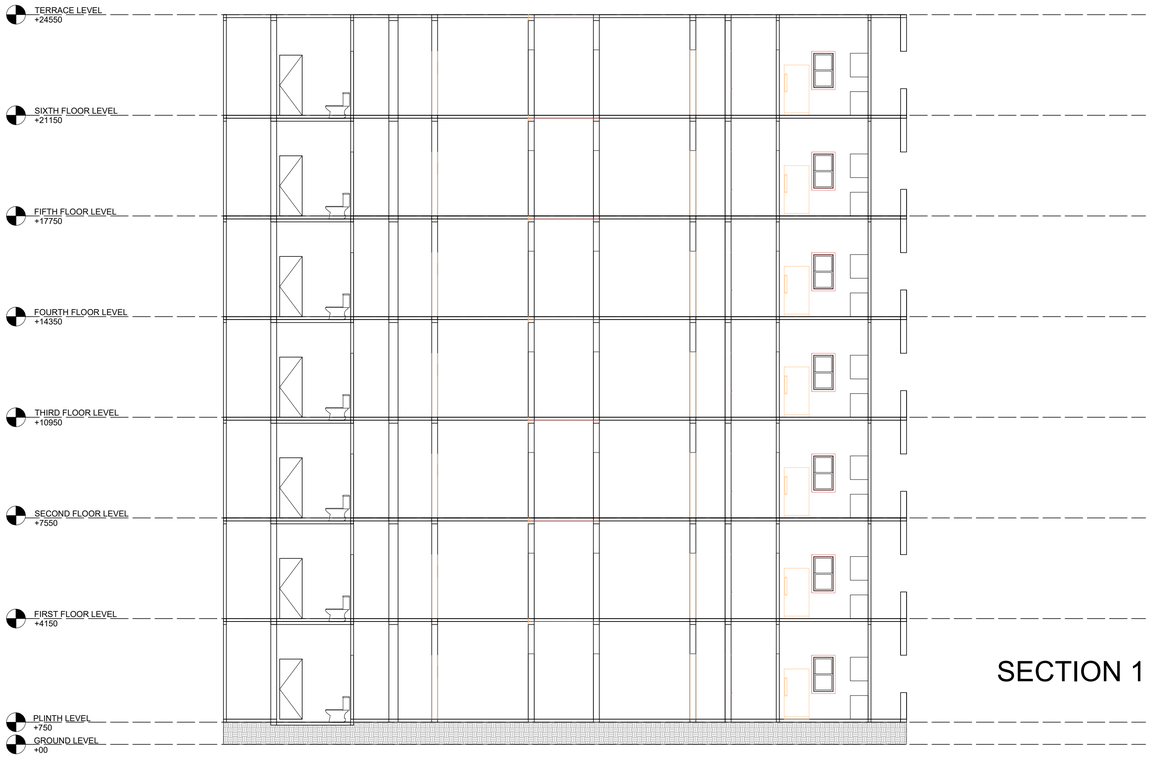
GUIDED BY:
DR. JAGDISH SINGH

REVISIONS:

A	B	C	D	E	

SHEET NO:

ARC0016



SECTION 1

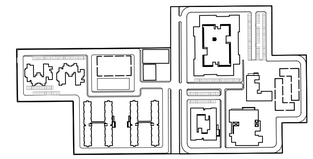


SECTION 2

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KEY PLAN:



PROJECT:
AMBEDKAR UNIVERSITY, DELHI

PROPOSING AGENCY:
PWD, DELHI

DRAWING:
FACULTY HOUSING SECTIONS

SCALE:
1:100

NORTH:



DESIGNED BY:
N S CHITHRAJA
211110012

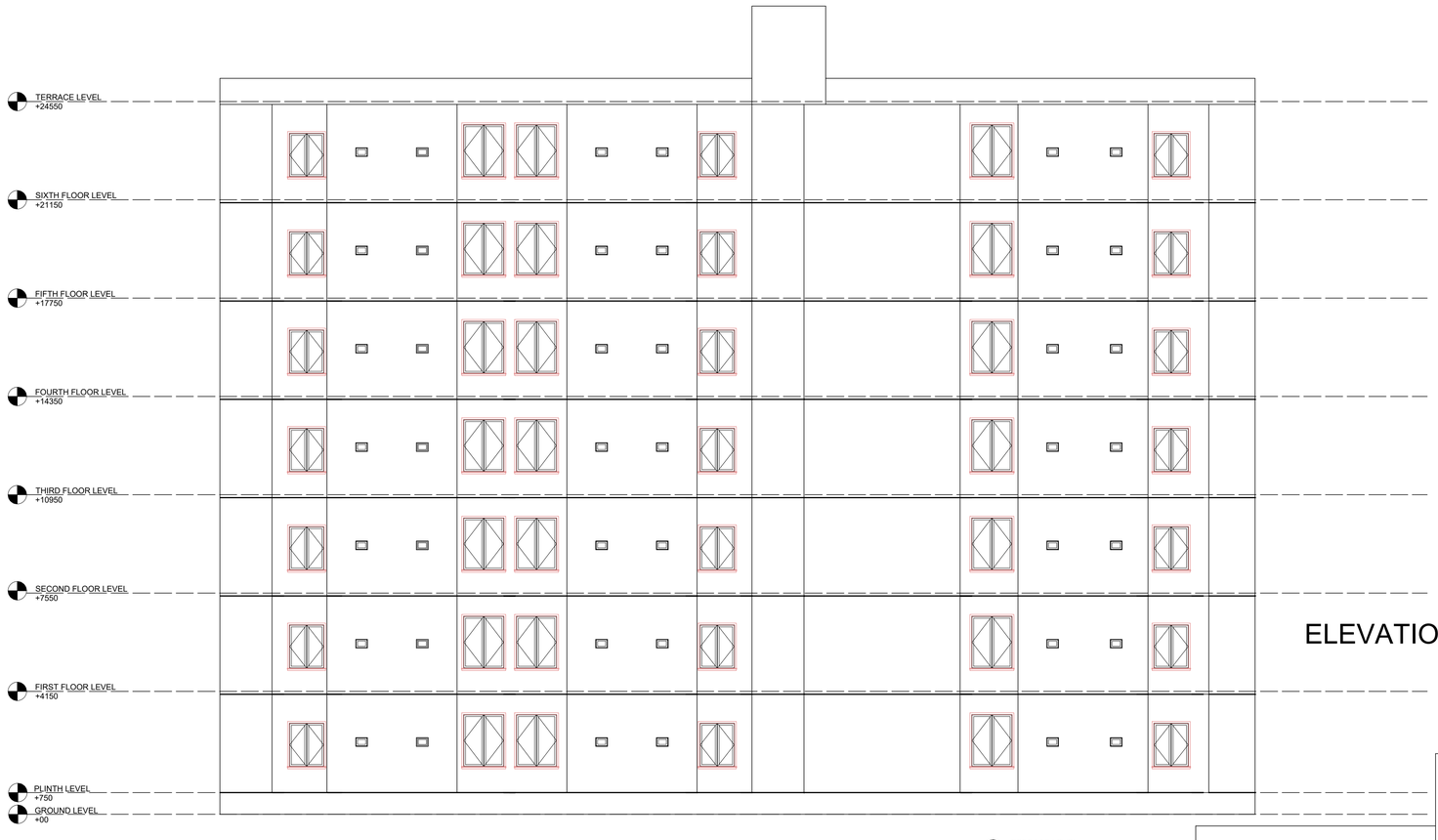
GUIDED BY:
DR. JAGDISH SINGH

REVISIONS:

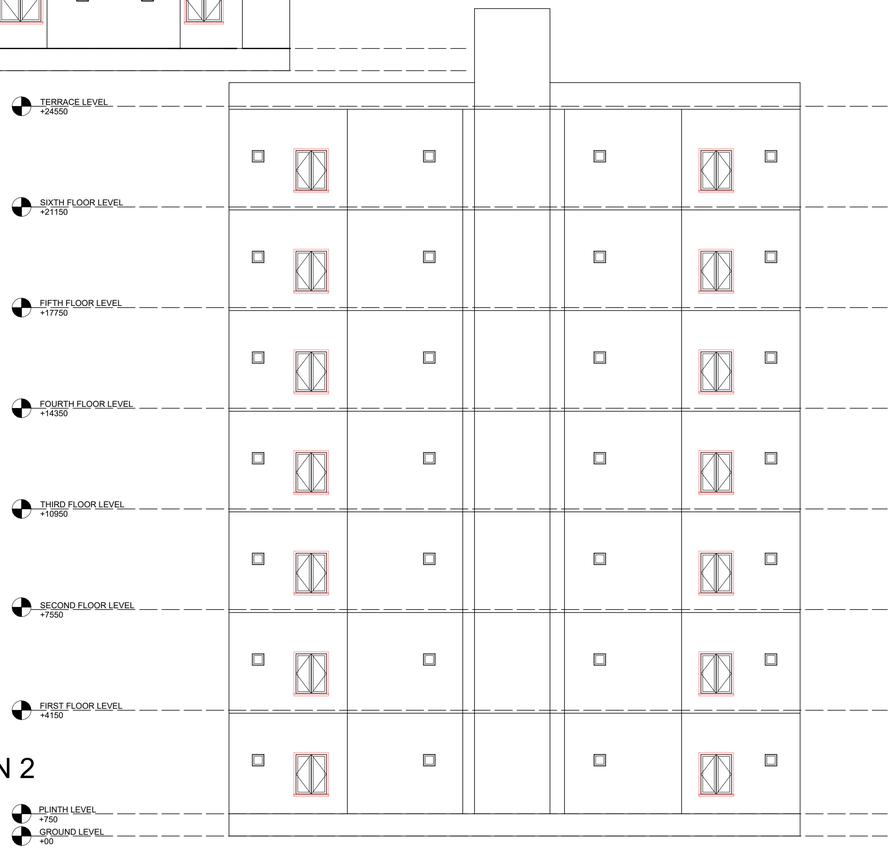
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SHEET NO:

ARC0017



ELEVATION 1

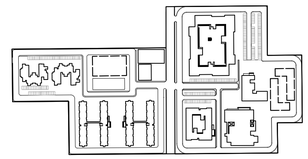


ELEVATION 2

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KEY PLAN:



PROJECT:
AMBEDKAR UNIVERSITY, DELHI

PROPOSING AGENCY:
PWD, DELHI

DRAWING:
FACULTY HOUSING SECTIONS

SCALE:
1:100

NORTH:



DESIGNED BY:
N S CHITHRAJA
211110012

GUIDED BY:
DR. JAGDISH SINGH
ASSOCIATE PROFESSOR,
ARCH & PLANNING DEPARTMENT
MANIT, BHOPAL

REVISIONS:

A	B	C	D	E	

SHEET NO:

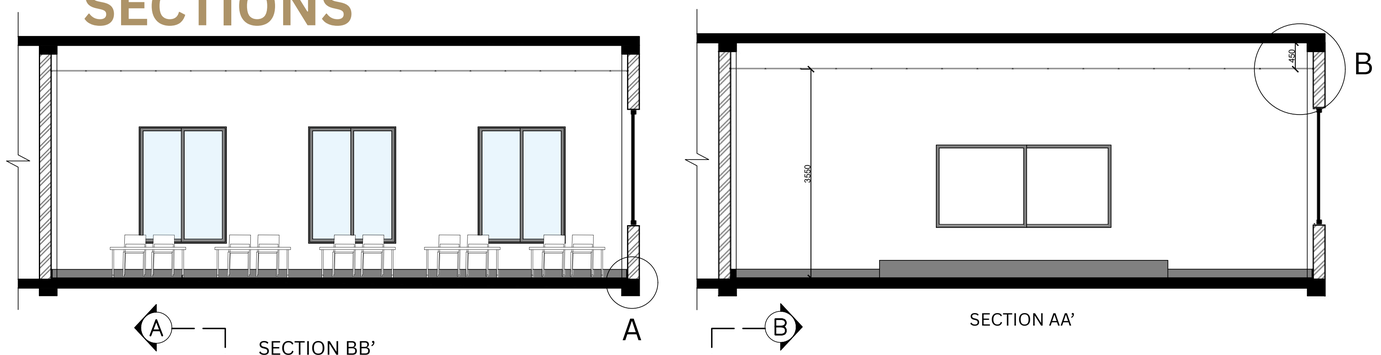
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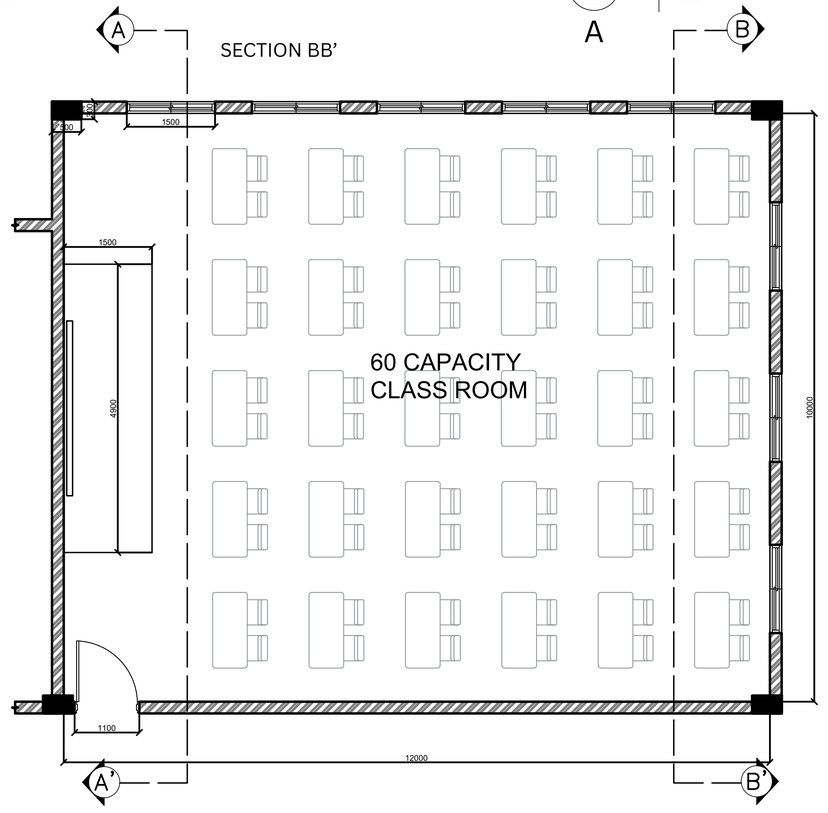
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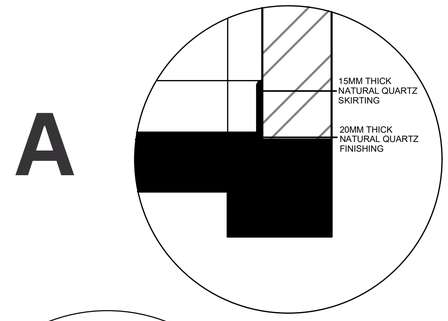
MATERIALS

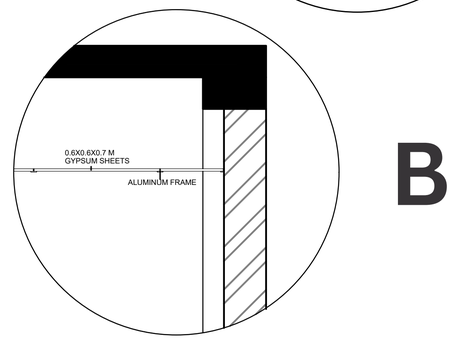


SECTIONS

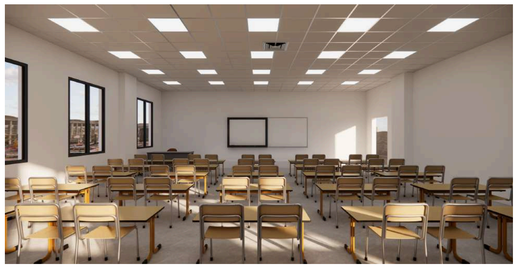


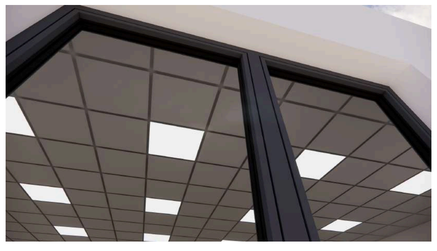


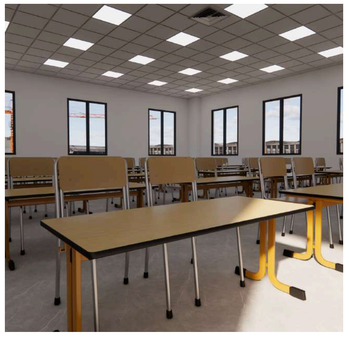


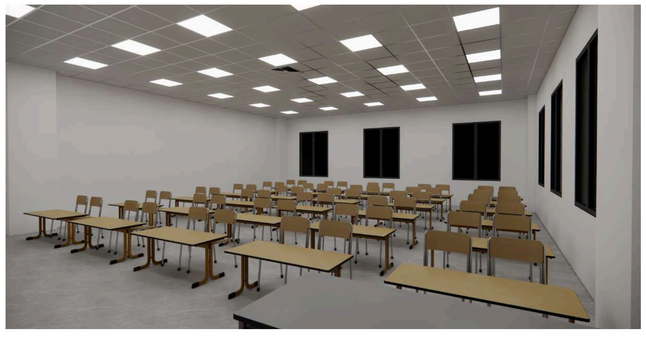


RENDERS

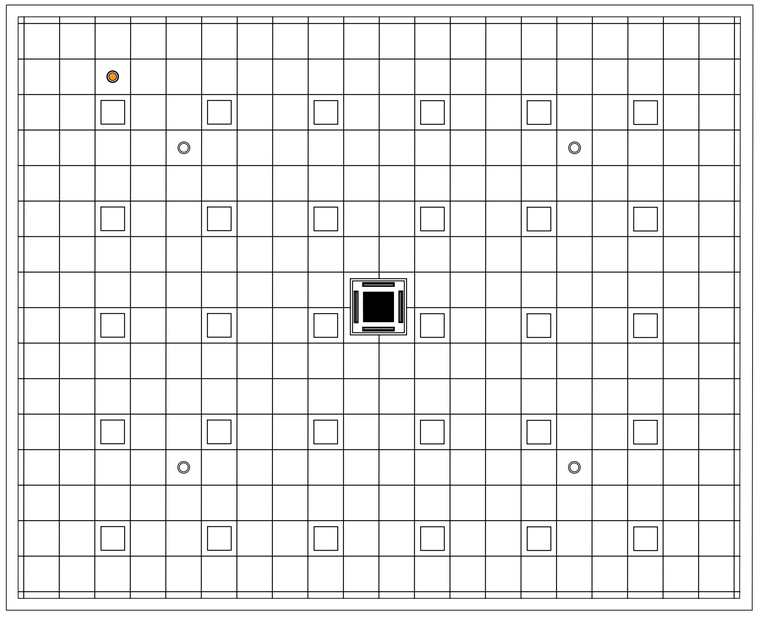








Material	Used in	Company
Natural Qquartz	Flooring and Skirting	Relay Quartz
Oak wood	Benches and Chairs	Siddhi Creators
Gypsum Panels	Ceiling	Gyproc
Aluminium Frames	Ceiling Frames and Window Frames	Fenesta
Flush Lights	Ceiling	Jainsons Lights
Air Diffuser	Ceiling	Daikin



DONE BY: N S CHITHRAJA 211110012
GUIDED BY: Dr. JAGDISH SINGH

ACOUSTICS

EFFECTIVE RT CALCULATION:

Surface	Area (m²)
Ceiling	768
Floor	768
Walls	896
Total	2432 m²

TOTAL ABSORPTION(A):

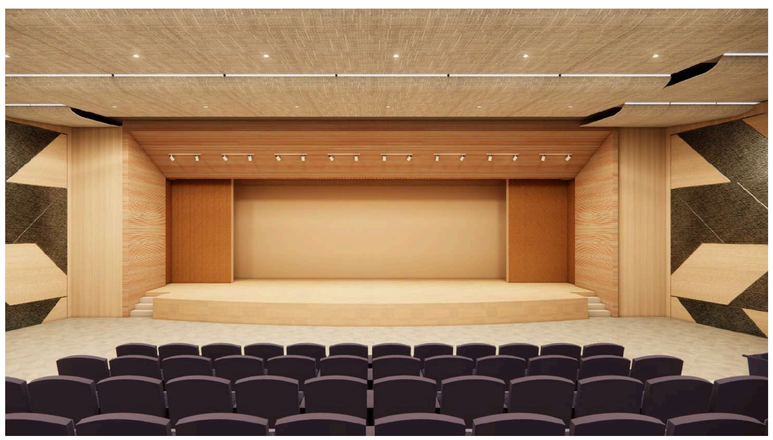
Surface	Material	Coverage	α (500 Hz)	Absorption A = Sxα (m² Sabine)
Ceiling	25% acoustic panels (above audience)	192 m²	0.75	144
	75% reflective wood/gypsum panels	576 m²	0.05	28.8
Floor	35% carpet (aisles & front)	269 m²	0.25	67.3
	65% polished concrete	499 m²	0.02	10
Walls	35% perforated wood/fabric panels	314 m²	0.6	188
	65% wood veneer/plaster	582 m²	0.1	58
Seating (500 people)	Upholstered seats (occupied)			400 x 0.4 = 160
TOTAL ABSORPTION (A)				656 m² Sabine

ADJUSTED EFFECTIVE ABSORPTION:

Occupancy	Audience Absorption (m²)	Total A (m² Sabine)	RT (s)
Empty	0	496	1.00 s
Half-full (250 people)	80	576	0.86 s
Full (500 people)	160	656	0.75 s

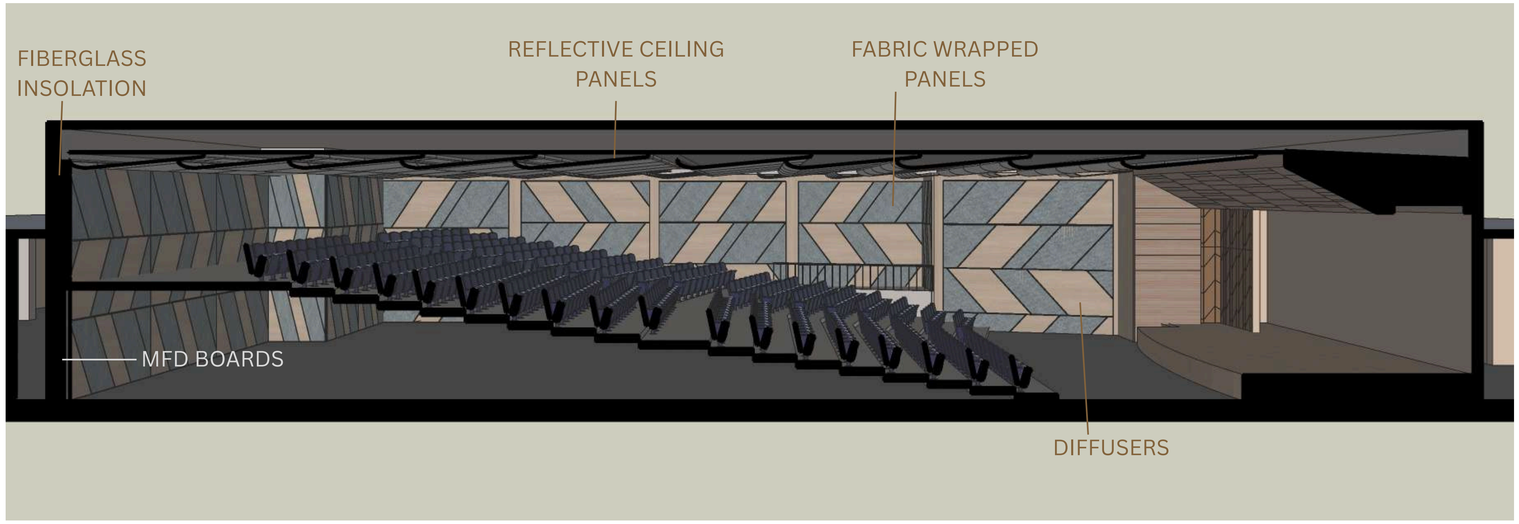
- When low-frequency reflections are considered, effective RT rises roughly x 1.3 - 1.5 times
- Effective RT = 1.0 – 1.2 s occupied

MATERIAL / FINISHES DISTRIBUTION:

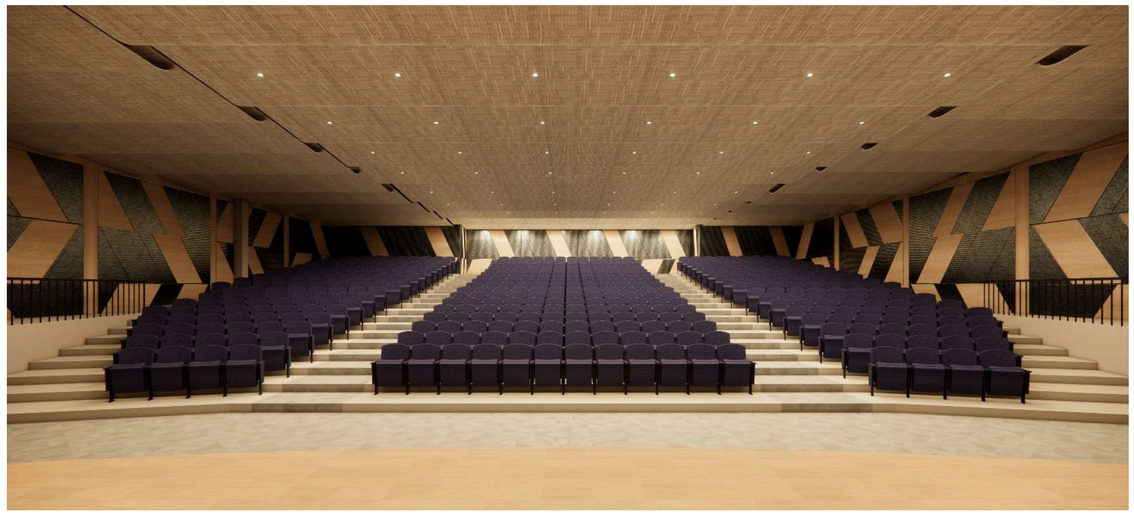


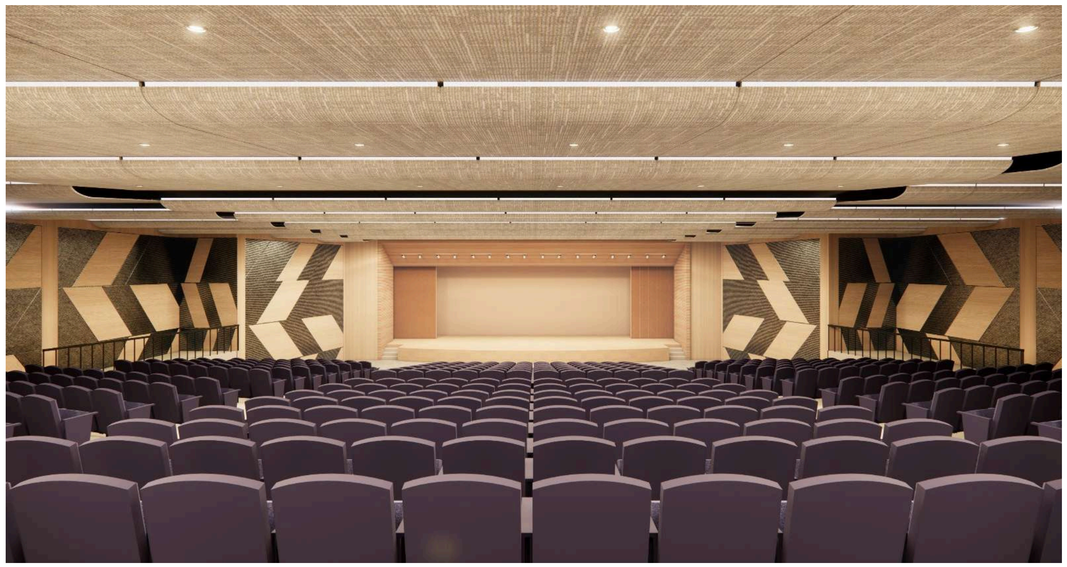
Element	Treatment	Function
Ceiling	25% acoustic panels in center, 75% reflective wood	Controls flutter echoes, maintains brightness
Walls	35% absorptive panels on side/rear, rest reflective	Smooths reverberation, prevents slap echo
Floor	Carpet limited to aisles	Reduces footfall noise, avoids over-absorption
Seats	Upholstered	Major variable absorber
Rear wall	Diffusers	Distribute late reflections evenly
Doors & glazing	Sealed	Prevent external noise ingress

SECTION ACOUSTIC DETALS



VIEWS





DONE BY: N S CHITHRAJA 211110012

GUIDED BY: Dr. JAGDISH SINGH

DIGITAL MODEL

















PHYSICAL MODEL



