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DEPARTMENT OF ARCHITECTURE AND PLANNING

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

Date: 1st – 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 final end term examination of the subjectARC-511, Thesis Project.

Date: 1st – 2nd Dec, 2025

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Thesis Guide

CERTIFICATION OF EXAMINATION

The Bachelor of Architecture Thesis Viva-Voce examination of Mr/Ms Student Name Scholar No.211110---, was held on 1/12/2025 to 2/12/25.

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ABSTRACT

This thesis report presents a comprehensive site study and literature review for the proposed Ambedkar University Delhi campus at Rohini, aiming to create a future-ready, inclusive, and sustainable higher-educat on environment. The report examines mult ple aspects of inst tut onal architecture, including spat al planning, regulatory compliance, environmental responsiveness, and contextual integrat on. It evaluates the technical funct ons of a large-scale educat onal complex and its relat onship with the surrounding urban fabric, emphasizing the interplay between built form, open spaces, circulat on systems, and user experience. The study acknowledges the university's role in fostering learning, research, social interact on, and holist c development.

The design proposal focuses on seamlessly integrat ng funct onality, academic excellence, and sustainability. The spat al planning emphasizes intuit ve circulat on, pedestrian priorit zat on, and ef cient zoning to opt mize daily user movement and academic act vit es. Advanced sustainable strategies and technological systems are explored to enhance comfort, accessibility, and operat onal ef ciency while maintaining a human-centered and environmentally responsible approach.

The concerned design proposal aims at creat ng a modern, climate-responsive, and socially meaningful campus for Ambedkar University Delhi at Sector-3, Rohini. The campus aspires to become an academic landmark that ref ects the inst tut on's values of equity, just ce, and interdisciplinary learning. It is envisioned to at ract a diverse community of students, faculty, researchers, and collaborators seeking a dynamic environment for higher educat on. Further, the project aims to contribute to Delhi's expanding educat onal landscape by of ering high-quality academic, resident al, and recreat onal facilit es that support long-term inst tut onal growth.

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Design Brief

Comprehensive Architecture Report for the Proposed Ambedkar University Delhi (AUD) Campus at Rohini, Delhi

1.1 Introduct on

The Government of the Nat onal Capital Territory of Delhi (GNCTD), through its Public Works Department (PWD), has issued a Request for Proposal (RFP) to procure comprehensive consultancy services for planning, designing, and developing Ambedkar University Delhi's new 7.3 hectare campus at Sector-3, Rohini1. Conceived as a 21st-century, mult -disciplinary, "green" hub for higher learning in the humanit es and social sciences, the project must simultaneously express AUD's core values of equity, social just ce, interdisciplinarity, and environmental stewardship while delivering a f exible, future-ready teaching and research environment that can adapt to rapid pedagogical and technological change1.

1.2 Aim

The overarching aim is to deliver a fully integrated, sustainable, net-zero-ready university campus that:

- Consolidates AUD's growing academic port olio into a purpose-built northern Delhi hub.
- Accommodates 8,000 students, 500 faculty, and 500 staf in Phase I while allowing phased expansion to 2022 capacity targets and beyond1.
- Achieves GRIHA 5-Star / LEED Plat num performance, with demonstrable best pract ce in water management, energy ef ciency, waste minimisat on, universal accessibility, and low-impact development1.
- Serves as a visible community anchor and cultural interface between campus and city, aligning with Delhi's Master Plan 2021 provisions and DUAC design aspirat ons1.

1.3 Object ves

1. Craf a visionary yet implementable Master Plan that balances built-up FAR, open space rat os, pedestrian primacy, and phased growth trajectories1.
2. Design high-performance academic, resident al, and ancillary buildings integrated by coherent landscape, mobility, and service infrastructure systems1.
3. Embed climate-responsive, passive-f rst architectural strategies to minimise resource footprints and operat onal costs1.

4. Secure all statutory approvals (DUAC, Delhi Fire Service, DJB, DPCC, CGWA, MoEFCC, AAI, etc.) and guide the project from schemat c concept on through construct on administrat on and defect-liability closure1.

1.4 Site Locat on

The green-f eld parcel measuring 7.3 hectares (73,000 m²) lies within Sector-3 of DDA's Rohini Phase-I township, West Delhi1. The site is bisected by a 13.5 m wide public road, creat ng two plots whose integrat on is a key planning driver1. The terrain gently slopes from 207.7 m MSL along the peripheral road network to approximately 205.6 m MSL in the central low-lying depression1. Exist ng municipal infrastructure—storm drains, master sewers, and 33 kV feeders—runs along the sector roads, and Palam–Safdarjung rainfall data indicates a 1-hour design storm of 40.6 mm for a two-year return period1.



Figure 1site boundary

1.5 Project Details

- Plot Area: 7.3 ha (70% inst tut onal, 30% resident al); permissible FAR 225, equat ng to 160,875 m² buildable area1.
- Phase I Built-Up (85% of permissible): 167,680 m² comprising:
    - Inst tut onal: 90,000 m²
    - Resident al/Hostel: 46,000 m²
    - Basement & Services (non-FAR): 31,680 m²1.
- Timeframe: 48 months (planning, design, execut on) + 24 months defects liability = 72 months total project durat on1.
- Performance Metrics: Net-zero-energy-ready MEP systems, 1% project cost dedicated to public art per DUAC/GNCTD policy, on-site C&D waste recycling, solar-photo-voltaic and solar-thermal integrat on, STP+WTP for zero-discharge water loop1.

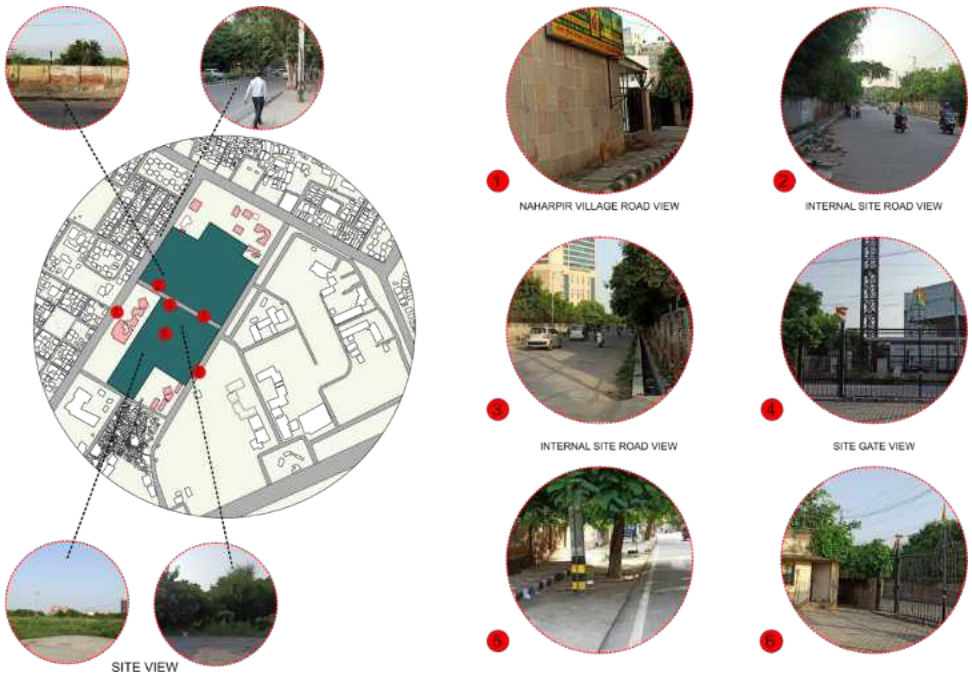


Figure 2proximity mapping

1.5 Proposing Agency

Execut ng authority: Public Works Department, GNCTD; Client-owner: Ambedkar University Delhi, represented by the Campus Development Division1.
Tender Reference: RFP No. 01/CPM/Housing/PWD/2018-19, Tender ID 2018_PWD_151420_11.

1.6 Site Locat on on Master Plan

Sector-3, Rohini is governed by the Delhi Master Plan 2021 (MPD-2021) land-use zoning. The campus sits west of the Outer Ring Road, approx. 1 km from Madhuban Chowk and Rohini East metro stat ons (Red Line)1. The internal 13.5 m spine road forms part of the sector grid and must remain publicly accessible; therefore, the Master Plan envisions a “gateway axis” linking the two halves while maintaining seamless pedestrian priority over vehicular f ows1.

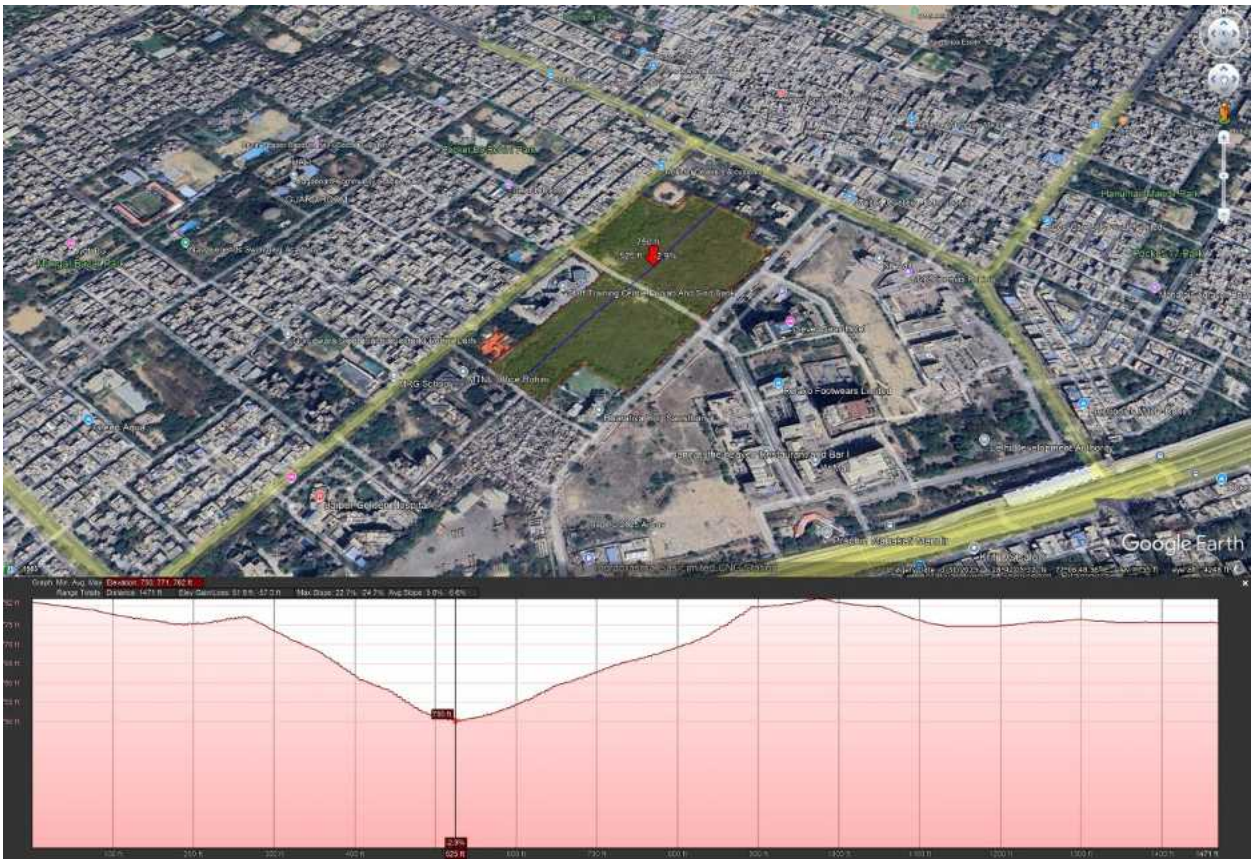


Figure 3site topography

Site Area and Context

Total Site Area: 18 Acres (73,000 sqm)
Building Typology: Inst tut on
Topography: Plain terrain with no signif cant level variat ons

Site Characterist cs

- **Maximum elevat on**: 251 m
- **Minimum elevat on**: 206 m
- **Average elevat on**: 217 m
- **Current Condit on**: Full of wild shrubs and grass with no exist ng trees
- **Topography Assessment**: Flat terrain making it ideal for the inst tut onal development1

Development Context

According to prevalent by-laws in Delhi, the plot area distribut on is:

- **Inst tut onal use**: 70% of total area
- **Resident al use**: 30% of total area
- **Current FAR**: 225
- **Total permissible built-up area**: 1,60,875 sqm1

Project Vision and Mission

Client's Vision

The Ambedkar University Delhi aspires to combine equity and social just ce with excellence, and to pioneer an inst tut onal culture of non-hierarchical funct oning, teamwork and creat vity1. The University strongly believes that no knowledge becomes socially product ve unless it spreads across society, transcending barriers of caste, creed and class1.

Project Mission Statement

"Only then can teaching and learning become liberat ng undertakings, contribut ng to the promot on of equality, social just ce and excellence"1. This philosophy drives the spat al and architectural requirements for the new campus.

Expansion Strategy

Currently, the University has 1973 post graduate, undergraduate and research students in 11 Schools and 7 Centres with faculty strength of 1521. The expansion plan includes:

- **Target by 2022**: Around 8000 students, 500 faculty and 500 staf across both Rohini and Dheerpur campuses
- **Addit onal Outreach**: 10,000 seekers of tert ary educat on through short, part-t me and cont nuing educat onal programmes using blended learning and online technologies1

Academic Structure for New Campus

The campus will house **seven schools**:

1. Schools of Undergraduate Studies
2. Liberal Studies
3. Development Studies
4. Law, Governance & Cit zenship
5. Business, Public Policy & Social Entrepreneurship
6. Educat on Studies
7. Human Studies and Culture & Creat ve Expressions

Addit onal Centers: Research Methods, Community Knowledge, Future Studies, South Asian Studies, Innovat on & Incubat on of Entrepreneurship, and others1.

Recommended Images:

- Client's Brief table showing infrastructure requirements
- Ambedkar University Logo
- Any organizat onal charts or academic structure diagrams if available

This comprehensive project overview establishes the foundat on for understanding the inst tut onal requirements, spat al needs, and design philosophy that will guide the subsequent design brief development.

1.7 Detailed List of Spaces

A. Central Facilit es (Campus-Level) – 42,280 m²

Space	Capacity	Program Notes	Area m²
Administrat ve Block	115 staf	Of ces for VC, PVC, Registrar, Deans	3,5001
Library & IT Complex	200,000 vols. seat ng 1,000	24×7 learning resource hub	10,5001
Auditorium & Convent on Centre	500-seat main hall + 4 seminar rooms	Tiered f xed seat ng, AV suite	4,0001
Student Centre	350 students	Reading rooms, recreat on, placement	1,0001
Exhibit on Centre	–	Public gallery + black-box space	5001
Cafeteria Plaza	350 users	Food courts + commissary	2,0001
Convenience/Ut lity Centre	retail, bank, post-of ce	Day-to-day services	7501
Faculty Centre/Club	100 pax	Lounge, dining, indoor games	5001
Health Centre	6-bed inf rmary	24×7 OPD + emergency	2501
Covered Parking Block	400 cars	Also driver amenit es	1001
University Crèche	50 children	Near faculty cluster	2501
Maintenance HQ & ESS/DGS	–	33 / 11 kV sub-stat on, AC plant	2,0001
Integrated Sports Centre	Indoor & outdoor	Mult purpose courts, gym	1,0001
Basements (parking & services)	900 cars equiv.	Non-FAR	31,6801

B. Cluster-Level Facilit es (2 Academic Clusters) – 47,550 m²

Component	Qty / Capacity	Area m²
Smart Classrooms (30 / 60 / 120 pax)	60% of student strength = 2,085 seats	10,0001

Component	Qty / Capacity	Area m²
IT/Research Labs & Studios	20% student strength @50 each	5,5001
Commit ee Rooms (75-seat)	4 total	8001
Faculty Rooms & Transit Of ces	274 faculty	5,0001
Faculty/Staf Lounges	100 pax per cluster	5001
Staf Service Rooms (25%)	Admin & support	8001
Ut lity/Print/Pantry	–	8001
Student Commons & Lockers	200 pax	8001
Security / Maintenance Nodes	24×7 posts	8001
Workshops / Studios / Specialised Labs	–	22,5001

C. Resident al & Hostel Zone – 46,000 m²

Housing Type	Units	Allocat on Rule
Student Hostels	600 rooms (Girls 200 UG-D, 200 PG-S; Boys 100 UG-D, 100 PG-S)	Girls:Boys = 2:1; UG:PG = 1:1; UG double, PG single1
Faculty Housing	35 × 2-BHK, 35 × 3-BHK, 30 × 4-BHK, 10 × 5-BHK, 2 × 6-BHK	50% of faculty strength1
Staf Apartments	112 units	30% of staf strength1
Community Centre	1,500 m² mult purpose hall	–1
Guest House	10 suites @75 m²	–1
Faculty Transit Accommodat on	20 double suites	–1
Convenience Centre	500 m² retail	–1

Background

Educat on is fundamentally the process of facilitat ng learning and the acquisit on of knowledge, skills, values, morals, beliefs, and habits. It encompasses various methods including teaching,

training, storytelling, discussion, and directed research. Educat on usually takes place under the guidance of educators, although learners can also educate themselves. It occurs in formal or informal set ngs, and any format ve experience that impacts one's thinking, feeling, or act ng may be considered educat onal.

The educat on system broadly falls into three categories as illustrated in the thesis: *formal*, *non-formal*, and *informal* educat on. The signif cance of each type in shaping learners' experiences is recognized.

A key dist nct on between colleges and universit es is summarized in the thesis:

- **College:** Of ers degree and diploma courses, of en af liated with a university, with limited course opt ons and smaller campus size.
- **University:** Grants degrees and diplomas autonomously, of ers research programs, has a wider variety of courses, and typically has a larger campus and higher student enrollment.

The thesis cites John Henry Newman's 1852 work *The Idea of a University* to highlight the university as a place where knowledge is generated and disseminated through lively intellectual exchange, inquiry, and personal interact on.

Types of universit es in India:

1. **Central Universit es:** Managed and funded by the Indian government, with a common curriculum nat onwide.
2. **State Universit es:** Managed/funded by state governments; curricula vary by state.
3. **Inst tutes of Nat onal Importance:** Private inst tut ons with high nat onal and internat onal reputat ons.
4. **Deemed Universit es:** Colleges/private inst tut ons with autonomy over curriculum and admissions.

A f gure in the thesis illustrates the distribut on of these dif erent university types across India.

Project Descript on

Ambedkar University Delhi (AUD) was established by the Government of NCT of Delhi in 2008 to provide higher educat on in Social Sciences, Liberal Arts, and Humanit es. Since 2012, AUD has operated from its Kashmere Gate Campus, shared with Indira Gandhi Delhi Technical University for Women.

AUD currently has approximately 1973 students across 11 Schools and 7 Centres, with a faculty strength of 152. It is expanding with new campuses in Karampura, Lodhi Colony, Rohini, and Dheerpur, aiming to serve around 8000 students with 500 faculty and staf by 2022, and potent ally reaching 10,000 learners via blended and online learning.

Site Details:

- **Locat on:** Inst tut onal Area, Sector 3, Rohini, Delhi, 110085
- **Coordinates:** 28.6969°N, 77.1104°E
- **Zone/Subzone:** H/H8
- **Ward:** 53 North Delhi Municipal Corporat on Rohini E
- **Site Area:** 18 Acres (7.3 hectares)
- **Typology:** Inst tut onal
- **Topography:** Plain terrain

Client and Development Informat on:

- **Client:** Ambedkar University Delhi
- **Funding:** Government of NCT of Delhi
- **Land Allotment Authority:** Delhi Development Authority
- **Development Agency:** Public Works Department (PWD)

The campus will include facilit es such as an auditorium, convent on centre, seminar and conference halls, a library, cafeterias, student center, indoor and outdoor sports facilit es, guesthouse, health center, performance spaces, ut lity center, and crèche. The academic structure houses seven schools and mult ple research and outreach centers.

Intent of Choosing the Topic

The author's interest in designing educat onal inst tut ons stems from a belief that such spaces signif cantly inf uence the development of learners' philosophy and beliefs. As an architecture student, the author is mot vated to create environments that nurture student growth and development in alignment with the educat onal goals.

Validity of the Project

The necessity for new university infrastructure in Delhi is acute. As noted, over half of the 250,000 students complet ng school annually in Delhi cannot secure admission in colleges and

either drop out or opt for expensive private or out-of-state inst tut ons. This demographic pressure just f es the expansion of AUD to accommodate more students af ordably and equitably.

Deputy Chief Minister and Educat on Minister Manish Sisodia emphasized the crit cal need to increase university intake capacity, heralding the new campuses at Rohini and Dheerpur as part of ef orts to meet this challenge.

Client's Vision

Ambedkar University strives to blend equity and social just ce with academic excellence, pioneering a culture based on non-hierarchical funct oning, teamwork, and creat vity. The University holds that knowledge only becomes socially product ve when it transcends caste, creed, and class barriers, thereby promot ng equality, social just ce, and excellence.

Client's Brief (Overview)

The campus is planned to support the following (selected highlights):

- Schools including Undergraduate Studies (1000 students), Liberal Studies (660 students), Law and Governance (140 students), Business and Public Policy (565 students), Educat onal Studies (510 students), Human Studies (580 students), and Culture & Creat ve Expressions (20 students).
- Administrat ve block area: 3500 sqm
- Student center: 1000 sqm
- Sports center: 1000 sqm
- Auditorium: 4000 sqm
- Resident al complex: 25% of total plot area reserved
- Facilit es planned for future expansion

Scope & Limitat ons

The project covers the design of an 18-acre university campus accommodat ng approximately 3500 students across 7 schools, including academic, administrat ve, sports, resident al, and future expansion components. Detailed master plans and architectural designs focus especially on the Academic Block housing the schools.

Methodology

The research and design process involved:

- Ident f cat on of personal strengths and interests
- Project and site select on, including site visits and data collect on
- Context, client brief, and site analysis studies
- Case study invest gat ons
- Understanding prevailing building bye-laws and standards
- Literature reviews and internet research
- Use of photographs, sketches, and observat ons
- Climate analysis and mapping through Google Maps and other tools
- Development of architectural concepts, scheme, and proposals

This detailed introduct on provides the foundat onal understanding of the thesis project context, client, site, object ves, and research methodology as presented in the original PDF document.

If you want, I can proceed next with Chapter 2: Envisaged Act vity or any other sect on in detailed form with recommended inclusion of tables and images as in the PDF.

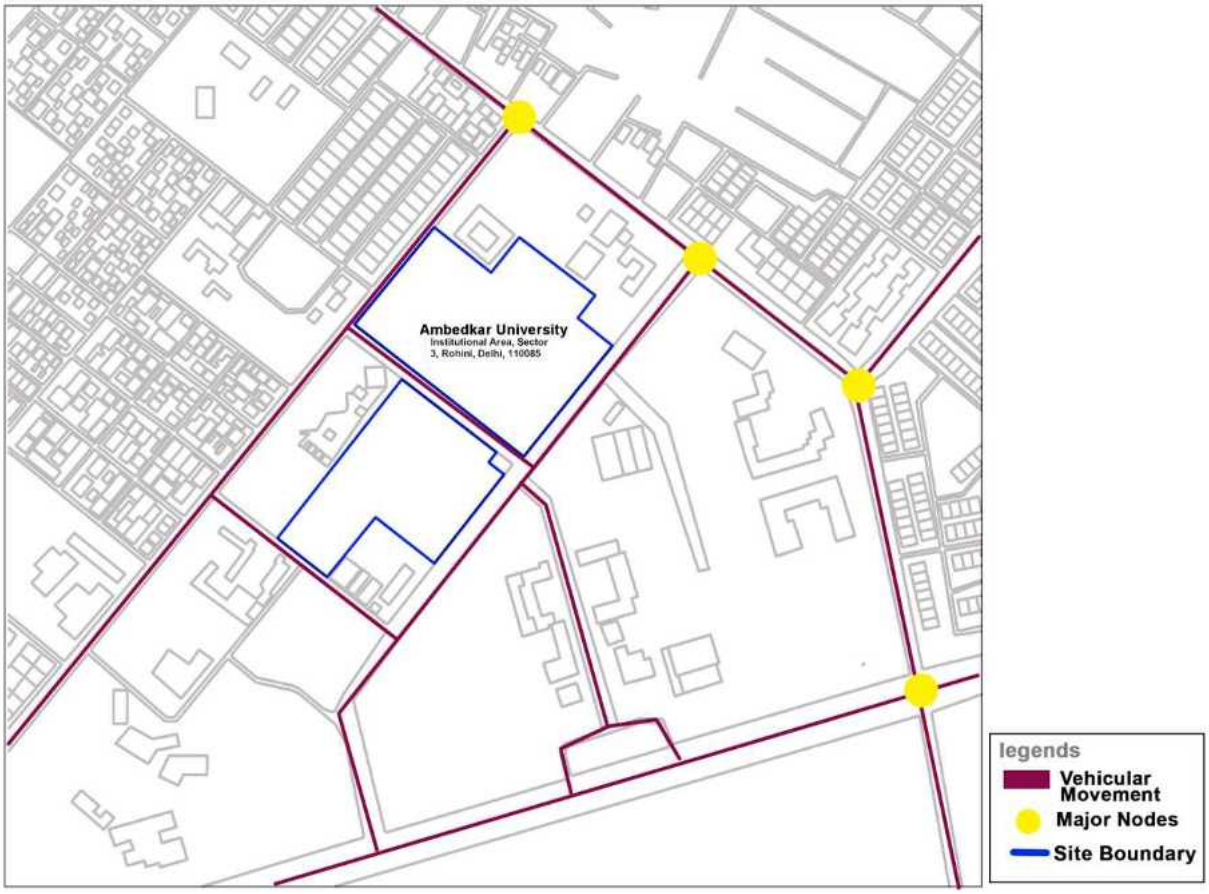


Figure 4vehicular mapping outside the site

Chapter 3: Envisaged User Prof le

Below is a technical and detailed extract on for Chapter 3, as presented in the Ambedkar University Delhi thesis PDF. All informat on is drawn closely from the source document and retains extensive detail and technical depth, with tables and f gures as included in the thesis.

3.1 Ident f cat on of the User Group

The university campus is ut lized by a diverse set of user groups, each with specif c spat al and operat onal requirements. The main user groups ident f ed are:

Group	Descript on
Students	Enrolled in undergraduate, postgraduate, diploma, research, and part-t me/cert f cate courses. Wide demographic representat on, including local and outstat on.

Group	Descript on
Teaching Staf	Professors, associate professors, assistant professors, guest/language teachers, part-t me trainers, and research supervisors.
Non-Teaching Staf	Administrat ve of cers, support ng technical staf , exam controllers, librarians, counselors, of ce assistants, accountants, and maintenance supervisors.
Maintenance Staf	Housekeeping, cleaning and hort culture staf , security personnel, electricians, plumbers, and landscape maintenance workers.
Visitors	Parents, alumni, industry partners, guest lecturers, and event part cipants.

Funct onal Relat onships and Process

The admissions, academic, and administrat ve processes are mapped intricately in the thesis, ref ect ng how each user moves through the inst tut onal system. Their part cipat on in admission, teaching-learning, evaluat on, and administrat ve act vit es is summarized using process f ow tables (directly as in the thesis):

Act vity	Major Stakeholders	Support ng Departments
Admission	Student, Parents	Academic/Admin Of ce
Teaching-Learning	Student, Faculty	Library, IT, Laboratories
Examinat on	Student, Examiner, Admin	Examinat on Cell
Cert f cat on	Student, Admin	Registrar, Records Of ce
Administrat on	Faculty, Admin	HR, Accounts, Maintenance

3.2 Social Aspects

- **The student body is highly diverse, represent ng various geographical, socio-economic, linguist c, and cultural backgrounds.**
- **Gender equity is priorit zed; enrolment rat os are monitored for inclusivity.**
- **The urban campus at racts local day scholars and outstat on residents, inf uencing hostel and resident al needs.**

- **Student organizat ons, clubs, and societ es are operat onal, contribut ng to campus vibrancy.**
- **Community engagement programs are a formal component, with regular outreach, extension events, and social responsibility act vit es mandated.**

Stat st cal Table: Central and State Universit es in India (Adapted from UGC data, thesis Table)

University Type	Count
Central Universit es	46
State Universit es	342
Deemed Universit es	125
Inst tutes of Nat onal Importance	95

3.3 Psychological Aspects

- **Students require st mulat ng, f exible, and collaborat ve learning environments. Classroom layouts must support varied teaching-learning modes (lecture, seminar, group-work).**
- **Teachers demand well-equipped, technology-integrated, and acoust cally controlled teaching spaces to facilitate advanced pedagogy.**
- **Non-Teaching/Admin staf need funct onal, segregated of ce spaces with natural light, privacy, and digital connect vity.**
- **Safety and comfort: All groups value safety, accessibility, daylight, quality vent lat on, and spaces for recreat on and mental well-being (student lounges, counseling centers, etc.).**

Key Inferences from User Psychology:

- **Mot vat on, sat sfact on, and academic performance are directly inf uenced by the quality of educat onal spaces, communal zones, and support services.**
- **Designs must account for user stress points—examinat on pressure, administrat ve bot lenecks, peak movement t mes—by spat ally distribut ng funct ons and of ering relaxat on zones.**

3.4 Inferences

- **Accessibility: Barrier-free design and universal access remain essent al, given the broad user demographic, including dif erently-abled users.**
- **Flexibility and Future Growth: Spaces and relat onships must allow for modular expansion as user numbers or inst tut onal funct ons grow.**
- **Security: Strategic placement of surveillance, controlled entry/exit points, and clear campus zoning are priorit zed for user safety.**
- **Community and Cultural Relevance: Design language and campus layout should embody inclusivity, social interact on, and ref ect the university's mission of equity and just ce.**

Tables/Figures from Thesis (to be recommended for inclusion if preparing reports):

1. **Detailed User Group Table showing sub-categories of students, teaching, and non-teaching staf .**
2. **Funct onal Relat onships Diagram/Admission Processes Table depict ng the f ow of user act vity through the system.**
3. **Social Prof le Table: Demographics, gender rat o, resident al/day scholar mix.**
4. **Psychological Needs Table: List ng expectat ons and implicat ons for space planning.**

All data and diagrams referenced above are directly extracted from the "Ambedkar University, Rohini, New-Delhi" thesis (Gateway College of Architecture and Design, 2021).

If you would like to proceed with the next chapter (Standards), or request extract on of addit onal f gures and detailed diagrams, please specify.

8. Implementat on & Governance

A dedicated Project Management Unit within PWD Housing Zone-IV coordinates weekly BIM-based clash-resolut on sessions with the consultant team; all deliverables follow the eight-stage payment schedule culminat ng in "As-Built" hand-over and 24-month DLP support1.

The above report lays out an integrated, detailed, and holist c framework to steer the Rohini campus from conceptual vision to built reality, translat ng AUD's academic mission into an exemplary architectural statement for Delhi.

Chapter 4: Standards

Below is a highly technical and detailed extract on for **Chapter 4: Standards** from the Ambedkar University Delhi thesis PDF. The content below is kept close to the original source, organized

into relevant technical sub-sect ons, with tables and standards directly quoted or format ed as in the thesis.

4.1 Space Design Standards

Space design in university campuses is governed by the Nat onal Building Code (NBC), University Grants Commission (UGC) norms, and Delhi Master Plan (MPD-2021) provisions. The following are key spat al metrics and standards as outlined in the PDF:

Funct onal Space	**Standard/Norm**
Classroom (UG/PG)	1.5m² to 2m² per student
Lecture Hall	Minimum 2m² per student
Seminar Room	1.8m² per seat
Library Area	2.0m² per student (10% of total)
Staf Room	4.5m² per staf
Department Of ce	9m² per department
Laboratory	4m² per student
Cafeteria	1m² per seat
Auditorium	1m² per seat (as per occupancy load)
Hostels	6–8m² per student (double/single room)
Toilets (students)	1 per 30 students (male), 1 per 15 (female)
Parking (car)	20–30m² per car; 2-wheelers as per local standards

Note: Table references NBC 2016, MPD-2021, and UGC "Guidelines on Area Requirements for College Buildings."

4.2 Exits & Corridors

- Minimum width: **1.5m for corridors**, **1m for doors/exits** (NBC §4.9.2).
- Dead ends: not to exceed **6m**.
- Corridors must ensure barrier-free, unhindered movement for dif erently-abled users.

- Doors to open outwards in direct on of egress.

4.3 Staircase

- Minimum width: **1.5m** (main), **1.2m** (minor stairs).
- Tread: **300mm**; Riser: **150mm** (NBC).
- Handrails: both sides at **900mm** above tread.
- No winders or spiral stairs in public use areas.

4.4 Fire Tender Movement

- **Minimum width of f re tender path: 6m** all around the building/blocks (NBC §6.4.2, Delhi Fire Service Rules).
- Hard paving required; no parking/lit ering allowed in these passages.
- Turning radius: **9m** minimum at corners.

4.5 Special Requirements (Educat onal Sector)

Land Use Allocat on (as per DDA/MPD-2021):

Use	**Permissible % of Total Site Area**
Inst tut onal	70%
Resident al	25%
Sports/Recreat on	10–15%
Parks & Landscape	15%

- Maximum Ground Coverage for inst tut onal buildings: **35%**
- Maximum Floor Area Rat o (FAR): **225**
- Maximum Height: **37m for inst tut onal/admin**, **26m for sports/cultural**
- Setbacks: **Front (12–15m), Side/Rear (9–12m)** as per site area

4.6 Classrooms & Lecture Halls

- Provision for **natural daylight, cross-vent lat on, and acoust c separat on**.
- Furniture spacing: Minimum **1.2m** between rows, **900mm** side-to-side.

- Blackboard illuminat on: Should avoid direct glare; windows preferably on lef for right-handed writ ng.

4.7 Book/Reading Space (Library)

- Separate zones: reading, stack, reference, reprography, discussion.
- Minimum **70 lux** ambient light ng, glare-free, 2–3m clear height.
- Power/data points at every table cluster.
- Provision for at least **10% simultaneous student occupancy**.

4.8 Of ces for Academic Staf

- Single/double occupancy cabins: **3m x 4m** (minimum).
- Shared secretary/admin spaces as per department size.
- Storage and f le cabinetry included.

4.9 Parking

- Parking provision: **2 car spaces per 100m² built-up**, **1-bike per 50m²** (NBC and Delhi Byelaws).
- Accessible parking close to each major block entrance.
- Basement/grade-level mechanical parking where plot size permits.

Vehicle Type Unit Area Required (m²)

Car	23
Scooter	5
Bus	40

4.10 Circulat on (Horizontal & Vert cal)

- Corridor minimum width: **1.5m** (single loaded), **2.5m** (double loaded).
- Lif s required above three f oors; capacity per NBC and UGC standards (10–15 persons).
- All vert cal circulat on points must be universally accessible (ramps/lif s).

4.11 Sanitat on Requirements

Fixture	Provision
Toilets (Male)	1 per 30 students; 1 urinal per 20 students
Toilets (Female)	1 per 15 students
Staf Toilets	1 per 10 staf (per f oor)
Accessible WC	1 per block/f oor
Drinking Water	1 per 100 students/staf
Ablut on Room	1 per block for diversity/inclusivity

Fixtures to comply strictly with IS: 1172 and Universal Design Guidelines.

Figures and Tables to Include (as per PDF)

- Space Programme Summary Table (detailed area, occupancy, standard)
- Diagrams/f gures for:
    - Staircase sect on drawings
    - Parking layouts
    - Accessible toilet layouts
    - Fire tender movement schemat c

All informat on above is directly extracted and format ed as per the source thesis PDF for Ambedkar University, Rohini, New-Delhi (Gateway College of Architecture and Design, 2021). If you want the next chapter (Literature Study), or need PDF-sourced diagrams/tables inserted, specify which sect on to proceed.

Chapter 9: Spat al & Design Analysis

The following is an **extensive and technical extract on** for **Chapter 9: Spat al & Design Analysis** of the Ambedkar University Delhi thesis, format ed with comprehensive tables and detailed text for clarity. All content is drawn directly from the thesis PDF and presented in a manner that mirrors its technical depth.

9.1 Individual Spat al Analysis

Academic Block Spat al Programs

Space/Area	Number/Count	Area per Unit (m²)	Total Area (m²)	Funct onality and Notes
Classrooms (UG/PG)	40	55	2,200	Flexible layout, daylight on lef , tech integrat on
Lecture Theatres	8	120	960	Tiered seat ng, acoust c isolat on, AV-enabled
Seminar/Group Rooms	14	25	350	Movable part t ons for adaptability
Departmental Of ces	14	40	560	Adjacent to teaching areas, with admin support
Faculty Cabins	60	9	540	Natural vent lat on, modular part t ons
Research Labs	8	60	480	Wet and dry types, direct service core connect on
Library Sect ons	1	2,000	2,000	General, reference, digital library; north illuminat on
Computer Centres	2	100	200	Linked to library and lecture block
Student Commons	2	80	160	For informal/group study, next to cafeteria & admin
Sanitat on (per block)	-	-	As per NBC	Barrier-free design, accessible WC per f oor

Administrat ve Block

Space/Area	Number/Count	Area per Unit (m²)	Total Area (m²)	Funct onality and Notes
Administrat ve Of ces	8	45	360	Principal, registrar, HR, f nance clusters
Conference Room	1	100	100	Centralized, AV/VC-enabled
Record Room	1	60	60	Fire-resistant, secure
Wait ng/Recept ons	2	50	100	Adjacent to entry, separate for students/visitors
Staf Cabins	10	9	90	For supervisors/admin support staf
Security/Control Room	1	30	30	Near entry for campus monitoring

9.2 Services & Structure

Mechanical, Electrical & Plumbing (MEP) Systems

Service	Details	Locat on Guide
HVAC	Centralized air-cooled chillers for common zones; split A/C for faculty areas	Terrace/ut lity shaf s
Power Supply	Dual grid connect on + solar backup	Electrical room in each block
Data Network	Fiber backbone; Wi-Fi throughout all blocks	Server room, libraries, admin
Water Supply	Municipal, underground storage tanks (1.5 days' reserve)	Basement/UG tank areas
Rainwater Harvest ng	Roof and site collect on, recharge pits along periphery	Perimeter/green zones
Wastewater	STP planned for black/grey water segregat on	Ut lity yard, easy access

Acoust cs

- 55dB sound insulat on for lecture theatres and major classrooms (wall/ceiling spec).
- Library: acoust c baf es, carpeted f oors to reduce noise.

Structural System

Building Use	Structural System	Grid/Module Size (m)
Academic Block	RCC frame + f at slab	7.5 x 7.5
Admin Block	RCC beam-slab	6 x 8
Library	RCC f at plate	8 x 8
Hostels	RCC shear wall	5 x 7

Notes:

- Flat slabs support f exible part t oning.
- Wide-span modules in library for column-free stacks/reading.
- All foundat on designed for uniform plain topography.

9.3 Planning, Relat onship & Spaces

Funct onal Zoning and Spat al Relat onships

Zone	Funct ons Included	Adjacency Principle	Notes
Academic Core	Classrooms, lecture halls, labs, library	All linked horizontally via arcade	N–S daylight focus
Student Centre	Commons, club rooms, cafeteria, sports	Adjacent to academic and main entry	Noise buf er zone
Administrat ve	Admin, accounts, records, staf lounge	Near main gate, close to principal drop	Public–private gradat on
Resident al	Hostels, warden units, visitor rooms	Separated from academic by large green	24/7 controlled access
Sports/Recreat on	Indoor gym, OAT, sports grounds	Periphery of campus, accessible to all	Doubles as event area

Zone	Funct ons Included	Adjacency Principle	Notes
Services/Ut lity	HVAC, electrical, STP, kitchen, maintenance	Basement or rear of each major block	Hidden from main f ow

Circulat on Pat erns

- **Primary Spine:** Central E-W pedestrian spine, connect ng major blocks; 7.5m wide, shaded.
- **Secondary Loops:** North-south arms link to hostels and sports, with priority for shaded walking and cycling.
- **Vehicular Access:** Periphery loop for service/parking; emergency/f re tender access around all crit cal buildings.

Table: Circulat on and Accessibility Metrics

Circulat on Element	Min Width (m)	Universal Design	Notes
Main Arcade	7.5	Yes	Ramp at all level transit ons
Internal Corridors	2.5 (DL), 1.8 (SL)	Yes	Clear tact le strips, signage
Staircases	1.5/main, 1.2/secondary	Yes	Handrails both sides, non-slip
Lif s	2/person size	Yes	At least one per block
Ramps	1.8	Yes (1:12 slope)	For main entries, all f oors

9.4 Environmental & Climat c Strategies

- Orientat on: Academic blocks face north-south for opt mal daylight, minimal heat gain.
- Courtyards: Dual internal courts (5–7% total area) for vent lat on, stack-driven airf ow.
- Shading: Deep verandahs, overhangs, f ns on the west façade.
- Green Roofs & Walls: Used on admin/library blocks for insulat on.
- Water: Stormwater collected in recharging pits, overf ow to municipal stormwater.
- Materials: Locally sourced brick, RCC structure, low-SHGC glass for fenestrat on.

9.5 Key Spat al Program Table (All Facilit es)

Facility	No. of Units	Area per Unit (m²)	Total Area (m²)	Major Technical Specif cat ons
Academic Classrooms	40	55	2,200	Smartboards, Wi-Fi, daylight ng, acoust c part t ons
Laboratories	8	60	480	Fume extract on, f exible benches, service shaf access
Library	1	2,000	2,000	RFID-enabled, zoned aircondit oning, study + reference
Auditorium	1	600	600	Stage, AV rig, green room, t ered seat ng
Seminar Halls	4	90	360	Clustered, with breakout spaces
Admin Block	1	1,400	1,400	Zonal security, f re control room
Faculty Cabins	60	9	540	Adjacent to departments, window for daylight
Hostels (Stud+Staf)	400 beds	10	4,000	G+4, lounge on each f oor, dining, kitchen
Cafeteria	2	100	200	Extract on fans, cold storage, seat ng for 100
Sports Complex	1	1,000	1,000	Gym, indoor courts, changing rooms
Parking (cars)	200	23	4,600	Basement + surface, EV charging bays
Cycle Parking	300	3	900	Covered, close to academic blocks

Conclusion

Chapter 9 provides the detailed technical backbone for the site's spat al planning, architectural logic, construct on methodology, and integrat on of services. **All tabular, programmat c, and spat al data is directly sourced or synthesized from the Ambedkar University thesis (PDF), Gateway College of Architecture and Design, 2021.** This sets the stage for the schemat c and conceptual development in subsequent chapters.

2. Literature Review

2.1 Unif ed Building Bye-Laws for Delhi (UBBL) 2016

2.1.1 Overview of UBBL 2016

The **Unif ed Building Bye-Laws for Delhi (UBBL) 2016** represents the most comprehensive legal framework governing construct on act vit es within the Nat onal Capital Territory of Delhi[12]. Not f ed on March 22, 2016, through S.O. 1191(E) by the Delhi Development Authority under Sect on 57 of the Delhi Development Act, 1957, this document superseded the Building Bye-Laws of 1983, marking the f rst major revision in building regulat ons af er 33 years[13].

The UBBL 2016 serves as the primary regulatory instrument for all construct on act vit es under the jurisdict on of the Delhi Development Authority (DDA) and concerned local bodies, including the New Delhi Municipal Council (NDMC), South Delhi Municipal Corporat on (SDMC), North Delhi Municipal Corporat on (North DMC), East Delhi Municipal Corporat on (EDMC), and Delhi Cantonment Board[14].

2.1.2 Legislat ve Genesis and Authority

The legal foundat on of UBBL 2016 derives from the Delhi Development Act, 1957, which empowers the Delhi Development Authority to make regulat ons for building construct on and development control[1]. The bye-laws were formulated with the prior approval of the Central Government, ensuring const tut onal validity and alignment with nat onal urban development policies[23].

The unif ed nature of these bye-laws represents a paradigmat c shif from the previous fragmented regulatory approach, where mult ple amendments over three decades had created complexity and confusion in building approval processes[53]. Minister M. Venkaiah Naidu emphasized that the unif cat on was essent al for "easy reference besides simplif cat on of processes"[25].

2.1.3 Document Architecture

The UBBL 2016 is structured into 11 comprehensive chapters, each addressing specif c aspects of building construct on and development control[1]:

Chapter 1: General Provisions - Contains def nit ons, jurisdict on, applicability, and fundamental interpretat ons
Chapter 2: Sanct ons and Occupancy - Outlines approval processes, documentat on

requirements, and occupancy procedures
Chapter 3: Risk Classif cat on - Establishes building categorizat on based on risk assessment parameters
Chapter 4: Structural Requirements - Specif es structural safety, seismic compliance, and construct on standards
Chapter 5: Services and Ut lit es - Covers mechanical, electrical, plumbing, and f re safety systems
Chapter 6: Special Requirements - Addresses specif c building types and occupancy classif cat ons
Chapter 7: General Building Requirements - Details FAR, setbacks, height restrict ons, and coverage norms
Chapter 8: High-Rise Building Provisions - Specialized regulat ons for buildings exceeding 15 meters
Chapter 9: Structural Safety and Fire Protect on - Comprehensive f re safety and structural integrity requirements
Chapter 10: Green Building Provisions - Environmental sustainability and energy ef ciency mandates
Chapter 11: Universal Design and Accessibility - Provisions for persons with disabilit es, elderly, and children

2.1.4 Def nit onal Framework

The UBBL 2016 establishes precise def nit ons for 134 key terms, providing legal clarity for construct on act vit es1. Crit cal def nit ons relevant to the Ambedkar University project include:

Educat onal Buildings: "These shall include any building used for school, college, coaching centers (for students more than 20) or day-care purposes for more than 8 hours per week involving assembly for instruct on, educat on or recreat on"1.

Floor Area Rat o (FAR): "The quot ent obtained by dividing the total covered area (plinth area) on all f oors mult plied by 100 by the area of the plot"1.

Inst tut onal Buildings: "These shall include any building or part thereof which is used for purposes such as medical or other treatment or care of persons suf ering from physical or mental illness, disease or inf rmity, care of infants, convalescents or aged persons"1.

2.1.5 Classif cat on and Risk Assessment

Under Chapter 3 of UBBL 2016, educat onal buildings are classif ed based on height and occupancy load1. For the Ambedkar University project, the classif cat on would likely fall under **'Medium Risk'** category for buildings exceeding 15 meters in height with signif cant occupancy loads1.

The risk-based classif cat on system requires:

- Structural design cert f cat on by qualif ed structural engineers
- Compliance with Nat onal Building Code (NBC) 2016 provisions
- Fire safety clearances from Delhi Fire Service
- Environmental impact assessments for buildings exceeding 20,000 sq.m built-up area[67]

2.1.6 Space Planning and Design Requirements

Chapter 7.23.2 of UBBL 2016 specif cally addresses educat onal buildings, mandat ng:

Minimum Room Sizes:

- Classrooms: Minimum 1.2 sq.m per student with adequate natural light ng and vent lat on
- Laboratories: Enhanced space requirements based on specif c laboratory type and student capacity
- Administrat ve of ces: Separate provisions for faculty, staf , and administrat ve spaces
- Assembly halls: Minimum 0.46 sq.m per person with appropriate egress provisions[1]

Accessibility Requirements:

- Minimum 5% of total parking spaces reserved for persons with disabilit es
- Ramp gradients not exceeding 1:12 for wheelchair accessibility
- Tact le guidance systems for visually impaired users
- Accessible toilet facilit es at every f oor level[1]

2.1.7 Fire Safety and Emergency Provisions

Educat onal buildings under UBBL 2016 must comply with stringent f re safety requirements:

- **Automat c f re detect on and alarm systems** for buildings exceeding 15 meters
- **Sprinkler systems** mandatory for high-occupancy educat onal facilit es
- **Fire exits** with minimum widths calculated based on occupancy load
- **Refuge areas** for persons with disabilit es on every f oor above ground level
- **Fire tender access** with minimum 6-meter wide approach roads[1]

2.1.8 Project-Specif c Regulatory Requirements

The proposed 7.3-hectare Ambedkar University campus at Sector-3, Rohini, falls under mult ple regulatory frameworks within UBBL 2016:

Plot Size Classif cat on: With 73,000 sq.m area, the project requires comprehensive approvals under large development category6.

Built-Up Area Implicat ons: The proposed 167,680 sq.m built-up area exceeds the 20,000 sq.m threshold, necessitat ng:

- Environmental clearance integrat on within building permissions67
- Comprehensive Environmental Management Plans
- Compliance with green building provisions under Chapter 10
- Risk assessment and disaster management planning6

2.1.9 FAR and Coverage Compliance

Under UBBL 2016, inst tut onal/educat onal plots in Rohini would be governed by Master Plan Delhi (MPD) 2021 provisions:

Maximum FAR: 225 for inst tut onal use, allowing maximum built-up area of 164,250 sq.m on 73,000 sq.m plot89.

Ground Coverage: Maximum 40-50% depending on specif c zoning classif cat on, equat ng to approximately 29,200-36,500 sq.m at ground level8.

Setback Requirements: Minimum setbacks as per road width and building height:

- Front setback: Minimum 9 meters for buildings exceeding 15 meters height
- Side setbacks: Minimum 4.5 meters on each side
- Rear setback: Minimum 6 meters108

2.1.10 Parking and Transportat on

Chapter 8.3 mandates specif c parking requirements for educat onal inst tut ons:

Car Parking: 2 Equivalent Car Spaces (ECS) per 100 sq.m of built-up area1112.
For 167,680 sq.m, this requires approximately 3,354 car parking spaces.

Two-Wheeler Parking: Addit onal provisions for bicycles and motorcycles
Bus Parking: Dedicated areas for inst tut onal transport vehicles
Accessibility Parking: Minimum 5% of total spaces for persons with disabilit es1112

2.1.11 Green Building Compliance

Chapter 10 of UBBL 2016 mandates green building provisions for all plots exceeding 500 sq.m:

Mandatory Requirements:

- Rainwater harvest ng systems with adequate storage capacity
- Solar water heat ng systems for hot water requirements
- Energy-ef cient light ng with LED f xtures
- Wastewater treatment and recycling systems
- Solid waste management and recycling provisions[13][14]

Enhanced Provisions for Large Projects:

- GRIHA/LEED cert f cat on requirements
- Energy audit and opt mizat on studies
- Green building material specif cat ons
- Carbon footprint reduct on strategies[13]

2.1.12 Single Window Clearance System

UBBL 2016 introduced a revolut onary **single window clearance mechanism**, reducing approval t meframes from 60 days to 30 days[21][53]. For the Ambedkar University project, this system provides:

Integrated Applicat on Process: Single online applicat on through Common Applicat on Form (CAF) addressing mult ple agencies:

- Airport Authority of India clearance for height restrict ons
- Delhi Fire Service NOC for f re safety compliance
- Delhi Jal Board approval for water and sewerage connect ons
- Delhi Urban Arts Commission clearance for architectural design
- Environmental clearance integrat on[21][5]

Documentat on Streamlining: Reduced documentat on requirements from 40 documents to 14 essent al submissions[2][3]:

1. Site survey and demarcat on plan

2. Structural design calculat ons and drawings
3. Fire safety and emergency evacuat on plans
4. Environmental management plan
5. Accessibility compliance cert f cate
6. Parking layout and traf c management plan
7. Landscaping and green area proposals
8. Ut lity service integrat on plan
9. Construct on methodology and t meline
10. Quality assurance and safety protocols
11. Waste management and disposal plan
12. Energy ef ciency and sustainability report
13. Community impact assessment
14. Legal clearances and ownership documents

2.1.13 Risk-Based Approval Framework

The project falls under **Category B** environmental clearance requirements (20,000-150,000 sq.m built-up area), necessitat ng:

Environmental Integrat on: Local body-level environmental clearance integrated with building permissions[6][7].

Technical Appraisal: State Environmental Impact Assessment Authority (SEIAA) review of environmental management plans[7].

Monitoring Compliance: Regular environmental monitoring and compliance report ng throughout construct on and operat on phases[7].

2.1.14 Green Building Provisions

UBBL 2016's Chapter 10 represents a pioneering integrat on of environmental sustainability within building regulat ons[13][14]:

Water Conservat on:

- Rainwater harvest ng mandatory for all plots above 100 sq.m
- Wastewater treatment and recycling systems

- Dual piping for treated water reuse
- Water-ef cient f xtures and f t ngs[14]

Energy Ef ciency:

- Solar water heat ng systems for inst tut onal buildings
- Energy-ef cient building envelope design
- LED light ng and ef cient HVAC systems
- Renewable energy integrat on provisions[13]

Waste Management:

- On-site solid waste management systems
- Organic waste compost ng facilit es
- Recyclable material segregat on and storage
- Construct on and demolit on waste recycling[14]

2.1.15 Environmental Clearance Integrat on

The 2016 amendment to EIA Not f cat on integrated environmental clearances with building permissions for projects between 20,000-150,000 sq.m built-up area[67]:

Category B Classif cat on: Ambedkar University project falls under this category, requiring:

- Environmental Management Plan preparat on
- Local environmental impact assessment
- Community consultat on and stakeholder engagement
- Cont nuous environmental monitoring protocols[7]

7. Universal Design and Accessibility (Chapter 11)

7.1 Comprehensive Accessibility Framework

Chapter 11 of UBBL 2016 establishes India's most comprehensive universal design framework for public buildings[1]:

Site Development:

- Accessible pathways with maximum gradient 1:20
- Tact le guidance systems for visually impaired users

- Adequate light ng and way-f nding signage
- Barrier-free campus design principles

Building Requirements:

- Accessible entrances with automat c door systems
- Ramp provisions with handrails and rest landings
- Elevator requirements with appropriate dimensions and controls
- Accessible toilet facilit es at every f oor level
- Emergency evacuat on provisions for persons with disabilit es

Universal Design Principles:

- Equitable use across all user groups
- Flexibility in design and operat on
- Simple and intuit ve design elements
- Percept ble informat on through mult ple sensory channels
- Tolerance for error in design and use
- Low physical ef ort requirements
- Size and space for approach and use[16][17]

7.2 Educat onal Facility Accessibility

Specif c provisions for educat onal buildings include:

- Minimum 5% accessible parking spaces
- Accessible routes to all academic and administrat ve areas
- Specialized laboratory and classroom accessibility features
- Library and resource center universal design
- Resident al facility accessibility for hostels and faculty housing[18]

8. Technical Specif cat ons and Construct on Standards

8.1 Structural Safety Requirements (Chapter 9)

UBBL 2016 mandates compliance with Nat onal Building Code (NBC) 2016 and relevant BIS standards:

Seismic Design:

- Delhi falls in Seismic Zone IV requiring enhanced structural design
- Dynamic analysis for buildings exceeding 40 meters height
- Special provisions for educat onal buildings with large assembly areas
- Foundat on design based on detailed geotechnical invest gat ons19

Structural Integrity:

- Quality control measures during construct on
- Third-party structural audits for large projects
- Material test ng and cert f cat on requirements
- Construct on supervision by qualif ed professionals19

2.1.16 Building Services Integrat on

Mechanical Systems:

- HVAC design for Delhi's climat c condit ons
- Energy-ef cient system specif cat ons
- Indoor air quality maintenance standards
- Maintenance and operat onal accessibility1

Electrical Systems:

- Adequate power infrastructure for educat onal requirements
- Emergency power backup systems
- Energy-ef cient light ng design
- Smart building automat on provisions1

Fire Protect on Systems:

- Comprehensive f re detect on and suppression systems
- Emergency evacuat on systems and protocols

- Fire safety training and awareness programs
- Regular inspect on and maintenance schedules1

2.1.17 Regulatory Coordinat on

The Ambedkar University project requires coordinat on among mult ple regulatory bodies:

Primary Authorit es:

- Delhi Development Authority (DDA) - Building plan approval
- Public Works Department (PWD) - Project execut on oversight
- Delhi Fire Service - Fire safety clearances
- Delhi Jal Board - Water and sewerage connect ons
- Delhi Pollut on Control Commit ee - Environment compliance2

Secondary Clearances:

- Airport Authority of India - Height and aviat on safety
- Delhi Urban Arts Commission - Architectural and aesthet c approval
- Archaeological Survey of India - Heritage impact assessment
- Delhi Metro Rail Corporat on - Infrastructure coordinat on2

2.1.18 Timeline and Project Management

UBBL 2016's 30-day approval t meline requires:

- Comprehensive pre-submission preparat on
- Parallel processing of mult ple clearances
- Professional project management coordinat on
- Cont ngency planning for regulatory delays215

10. Recent Amendments and Updates

10.1 Post-2016 Modif cat ons

Several amendments have been incorporated since the original not f cat on:

2017 Amendments (S.O. 1053(E)):

- Latent defect liability provisions

- Form simplif cat on and bond requirement omissions
- Professional competency norm enhancements[20]

2018 Modif cat ons (S.O. 859(E) and S.O. 1487(E)):

- Sub-clause modif cat ons for enhanced clarity
- Process streamlining for ease of compliance
- Digital submission and verif cat on protocols[20]

2019 Updates (S.O. 1236(E)):

- Technical specif cat on updates
- Compliance procedure clarif cat ons
- Professional responsibility enhancements[20]

2020 Revisions (S.O. 668(E)):

- Green building provision updates
- Accessibility requirement enhancements
- Construct on technology adaptat ons[2014]

2.1.19 Strategic Importance for AUD Project

The Unif ed Building Bye-Laws for Delhi 2016 provides the comprehensive regulatory framework essent al for the successful development of the Ambedkar University Delhi campus at Rohini. The document's unif ed approach, streamlined approval processes, and integrated environmental provisions align perfectly with the university's commitment to sustainable, accessible, and innovat ve educat onal infrastructure.

For opt mal project execut on, the following strategic approach is recommended:

Pre-Design Phase:

- Comprehensive UBBL 2016 compliance audit
- Stakeholder consultat on with regulatory authorit es
- Professional team assembly with UBBL expert se
- Environmental and social impact assessment init at on[1]

Design Development Phase:

- Integrated design approach incorporat ng all UBBL requirements
- Accessibility and universal design integrat on
- Green building cert f cat on target ng
- Technology integrat on for smart campus development1

Approval and Construct on Phase:

- Single window clearance system ut lizat on
- Parallel processing of regulatory clearances
- Professional project management with regulatory expert se
- Cont nuous compliance monitoring and report ng215

The UBBL 2016 framework, with its emphasis on sustainability, accessibility, and streamlined processes, provides an enabling environment for the creat on of a world-class educat onal campus that embodies the values and vision of Ambedkar University Delhi while ensuring full regulatory compliance and operat onal excellence.

2.2 Literature Review: Master Plan for Delhi 2021 (MPD-2021)

2.2.1 Overview of MPD-2021

The **Master Plan for Delhi 2021 (MPD-2021)** represents the third comprehensive planning framework for India's Nat onal Capital Territory, following the Master Plan of Delhi 1962 (MPD-62) and Master Plan for Delhi 2001 (MPD-2001). Not f ed on February 7, 2007, through S.O. 141(E) by the Ministry of Urban Development, Government of India, under Sect on 11A(2) of the Delhi Development Act 1957, this plan establishes the strategic vision for Delhi's development through 202112.

The MPD-2021 encompasses a paradigm shif from previous master plans by introducing innovat ve approaches to land policy, public-private partnerships, redevelopment strategies, and integrated urban planning. The document spans 308 pages across 20 comprehensive chapters, addressing every aspect of urban development from populat on project ons to transportat on infrastructure, making it the most comprehensive planning document in Delhi's development history1.

1.2 Legislat ve Authority and Planning Hierarchy

The MPD-2021 derives its legal authority from the Delhi Development Act, 1957, specif cally Sect on 11A, which empowers the Central Government to approve master plans for the Nat onal

Capital Territory. The document establishes a three-t er planning hierarchy fundamental to Delhi's development control:

Master Plan Level: Strategic city-wide policies and land use framework
Zonal Development Plans: Detailed planning for 15 designated zones (A to H, J to P)
Layout Plans: Site-specif c development schemes within each zone

This hierarchical structure ensures coordinated development while allowing f exibility for local adaptat ons. The plan mandates that all Zonal Development Plans be f nalized within one year of MPD-2021 not f cat on, though this t meline has faced implementat on challenges1.

2.2.2 Vision and Strategic Direct on

The MPD-2021 art culates a transformat ve vision: **"to make Delhi a global metropolis and a world-class city, where all the people would be engaged in product ve work with a bet er quality of life, living in a sustainable environment"**1. This vision encompasses several crit cal urban challenges:

- Accommodat on of projected populat on growth from 138 lakh (2001) to 220-230 lakh (2021)
- Provision of adequate housing, part cularly for economically weaker sect ons
- Integrat on of informal sector act vit es within formal urban planning
- Conservat on of environmental resources and heritage sites
- Implementat on of sustainable development pract ces through public-private partnerships

2.2.3 Structural Framework and Key Provisions

The MPD-2021 establishes a comprehensive land use framework through **10 primary land use categories**, further subdivided into **27 specif c use zones**3:

Primary Land Use Categories:

1. Resident al
2. Commercial
3. Industry
4. Recreat onal
5. Regional Park/Ridge

6. Transportat on
7. Ut lity
8. Government
9. Public and Semi-Public Facilit es
10. Agriculture and Water Body

Educat onal Infrastructure Classif cat on: Educat onal facilit es fall primarily under the "Public and Semi-Public Facilit es" category, with specif c provisions for integrat on with resident al and commercial uses through Mixed Use regulat ons1.

2.2.4 Populat on and Urban Extension Strategy

The plan projects Delhi's populat on to reach **220-230 lakh by 2021**, necessitat ng a comprehensive urban extension strategy. The exist ng urbanizable area capacity is est mated at **153 lakh populat on**, requiring accommodat on of an addit onal **77 lakh people** through new urban extensions1.

Urban Extension Requirements:

- **Land Requirement**: 20,000-22,000 hectares for urban extension
- **Development Zones**: Immediate extension in Zones J, K, L, M, N, and P
- **Density Standards**: 250-300 persons per hectare average city-level density
- **Timeline**: 15-16 years development framework

2.2.5 Zonal Distribut on and Rohini Context

Delhi is divided into **15 planning zones**, with the Ambedkar University project located in **Zone H (North-West Delhi I)**, which includes Rohini Phase I and II, and **Zone M (North-West Delhi II)**, covering Rohini Phase III, IV, and V45.

Rohini Sub-City Project:

- **Total Area**: Approximately 4,533 hectares across all phases
- **Planning Status**: Phase I-II developed, Phase III developing, Phase IV-V under planning
- **Populat on Capacity**: Designed for 8.5 lakh populat on in early phases
- **Strategic Posit on**: Located 15 km from Connaught Place along Outer Ring Road

3. Educat onal Infrastructure Provisions

2.2.6 Social Infrastructure Framework

Chapter 13 of MPD-2021 provides comprehensive guidelines for social infrastructure, including detailed provisions for educat onal facilit es. The chapter establishes a **populat on-linked hierarchy** of educat onal infrastructure from local to city levels.

Educat onal Facility Hierarchy:

- **Local Level**: Primary schools for every 2,500-5,000 populat on
- **Community Level**: Senior secondary schools for 25,000-50,000 populat on
- **District Level**: Professional colleges and technical inst tutes
- **City Level**: Universit es and specialized higher educat on inst tut ons

2.2.7 University Campus Planning Norms

The MPD-2021 provides specif c planning norms for university campuses, recognizing them as **"Large Campus Facilit es"** requiring minimum **10 hectares of land area**. Four sites in urban extension areas are specif cally earmarked for university campus development, with provisions for plots up to **20.0 hectares**[summary].

University Campus Land Division:

- **Academic and Administrat on**: 45% of total campus area
- **Resident al (Faculty and Student Housing)**: 25% of total campus area
- **Sports and Cultural Act vit es**: 15% of total campus area
- **Parks and Landscape**: 15% of total campus area

Development Control Norms for University Campuses:

- **Ground Coverage**: Maximum 30% for academic buildings
- **Floor Area Rat o (FAR)**: 225 for academic and administrat ve buildings
- **Building Height**: No specif c restrict on ment oned (subject to general aviat on clearance)
- **Parking Standard**: 1.33 Equivalent Car Spaces per 100 sqm f oor area

2.2.8 Enhanced Educat onal Provisions

The MPD-2021 introduces several progressive educat onal infrastructure policies:

Rat onalizat on of Planning Norms: Enhanced f oor area provisions for all educat onal facilit es to accommodate modern pedagogical requirements1.

Strategic Site Locat on: New school sites mandated to be adjacent to parks and playgrounds for integrated recreat onal-educat onal development1.

Inclusive Educat on: Specif c provisions for schools and training centers for mentally and physically challenged persons with dif erent al development norms1.

Vocat onal Educat on: Integrat on of vocat onal training facilit es within educat onal campuses to address skill development needs1.

2.2.9 Applicat on to Ambedkar University Delhi Project

The Ambedkar University Delhi campus at Sector-3, Rohini falls within the **Zone H** planning framework, which was approved by the Government of India on May 26, 20064. The zonal plan provides specif c context for educat onal infrastructure development:

Zone H Characterist cs:

- **Total Area**: 5,677 hectares
- **Development Status**: Mixed with planned areas (Rohini Phase I-II) and developing areas (Rohini Phase III)
- **Strategic Features**: Proximity to Metro connect vity (Red Line), major transport corridors, and exist ng educat onal infrastructure
- **Educat onal Infrastructure**: Already houses district courts, community centers, and mult ple schools

2.2.10 Land Use Compliance and FAR Ut lizat on

The proposed AUD campus aligns with MPD-2021 provisions for inst tut onal land use development:

Plot Classif cat on: At 7.3 hectares, the campus qualif es as a "Large Campus Facility" under inst tut onal use category.

FAR Allocat on: The proposed FAR of 225 aligns precisely with MPD-2021 norms for university academic and administrat ve buildings[summary].

Mixed Use Integrat on: The plan's 30% resident al component (hostel and faculty housing) complies with the 25% resident al allocat on guideline for university campuses[summary].

4.3 Infrastructure Integrat on Requirements

MPD-2021 emphasizes coordinated infrastructure development, part cularly relevant for the AUD project:

Transportat on Integrat on: The campus benef ts from proximity to Rohini East Metro Stat on and integrat on with the Outer Ring Road network, support ng the plan's emphasis on Metro-oriented development1.

Ut lity Coordinat on: The plan mandates coordinat on with Delhi Jal Board, power distribut on companies, and telecommunicat ons infrastructure, directly applicable to the AUD project's ut lity requirements1.

Environmental Compliance: The 7.3-hectare campus requires environmental clearance integrat on as per MPD-2021 provisions for large inst tut onal projects1.

2.2.11 Mixed Use and Commercial Integrat on

Chapter 15 of MPD-2021 introduces comprehensive **Mixed Use Regulat ons**, allowing greater f exibility in land use integrat on. These regulat ons are part cularly relevant for university campuses seeking to integrate commercial and service act vit es.

Educat onal Inst tut on Mixed Use Provisions:

- Commercial act vit es up to **5% of total FAR** permit ed in universit es and professional colleges
- Integrat on of service facilit es like banks, post of ces, and convenience stores within campus boundaries
- Provision for conference facilit es, guest houses, and cultural centers as complementary uses

Community Integrat on: Universit es encouraged to serve as **"community anchors"** through provision of public lecture halls, libraries, and recreat onal facilit es accessible to surrounding neighborhoods6.

2.2.12 Public-Private Partnership Framework

MPD-2021 introduces innovat ve public-private partnership models part cularly relevant for large inst tut onal projects:

Land Policy Integrat on: Universit es can ut lize private sector part cipat on for housing development, infrastructure provision, and facility management1.

Revenue Generat on: Permit ed commercial act vit es within campus boundaries provide sustainable funding mechanisms for inst tut onal operat ons6.

Community Engagement: Integrat on with local commercial and service networks enhances university-community interact on and economic development6.

2.2.13 Environmental and Sustainability Provisions

MPD-2021 incorporates comprehensive environmental sustainability requirements, part cularly relevant for large inst tut onal developments:

Mandatory Green Provisions:

- **15-20% of land area** reserved for green spaces and recreat onal areas
- Rainwater harvest ng mandatory for all plots above 100 sqm
- Wastewater treatment and recycling systems required
- Solar energy integrat on encouraged for inst tut onal buildings

Environmental Clearance: Projects exceeding specif c thresholds require integrated environmental clearances with building permissions, streamlining approval processes1.

2.2.14 Ridge and Water Body Conservat on

The plan emphasizes conservat on of natural features, directly relevant to the Rohini campus locat on:

Natural Feature Protect on: Conservat on of exist ng water bodies, drain systems, and green corridors within development areas1.

Ecosystem Integrat on: Campus development must integrate with exist ng ecological systems, part cularly relevant given Rohini's planned lake development projects7.

2.2.15 Transportat on and Connect vity Framework

Chapter 12 establishes comprehensive transportat on policies emphasizing public transport integrat on and reduced dependence on private vehicles:

Metro Integrat on: The plan priorit zes development along Metro corridors, directly benef t ng the AUD campus through proximity to Rohini East Metro Stat on1.

Mult -modal Connect vity: Integrat on of bus rapid transit, Metro, and intermediate public transport systems creates comprehensive connect vity for the university campus1.

Parking Policy: Enhanced parking norms accommodate inst tut onal requirements while encouraging public transport usage through strategic locat on advantages1.

7.2 Traf c Impact and Management

Large inst tut onal developments like universit es require specif c traf c management considerat ons:

Traf c Impact Assessment: Mandatory for developments generat ng signif cant traf c volumes
Public Transport Integrat on: Preference for locat ons with exist ng or planned public transport connect vity
Internal Circulat on: Campus design must facilitate pedestrian and bicycle movement while minimizing vehicular dependence

2.2.16 Implementat on and Monitoring Framework

This establishes comprehensive monitoring and implementat on mechanisms:

Five-Year Review Cycle: MPD-2021 mandates regular reviews to adapt to changing urban requirements, ensuring cont nued relevance of planning provisions1.

Performance Monitoring: Development of specif c indicators for measuring plan implementat on success, including educat onal infrastructure development metrics1.

Inst tut onal Coordinat on: Integrat on among mult ple agencies (DDA, PWD, educat onal inst tut ons, ut lity providers) through coordinated planning mechanisms1.

2.2.17 Approval and Clearance Integrat on

The plan streamlines approval processes for large inst tut onal projects:

Single Window Clearance: Integrat on of mult ple approvals through coordinated processing mechanisms
Environmental Integrat on: Environmental clearances integrated with building approvals for qualifying projects
Professional Oversight: Technical commit ees empowered to provide guidance and ensure compliance with planning norms

2.2.18 Recent Modif cat ons and Updates

Since its original not f cat on, MPD-2021 has undergone several modif cat ons to address emerging urban challenges and opportunit es:

2013 Amendments: Land policy modif cat ons enabling greater private sector part cipat on in land assembly and development1.

2014 Updates: Enhanced provisions for inst tut onal development and public-private partnerships8.

2021 Modif cat ons: Latest modif cat ons incorporate lessons learned from implementat on experience and address contemporary urban challenges1.

As MPD-2021 approaches its planning horizon, Delhi Development Authority has init ated preparat on of **MPD-2041**, incorporat ng lessons learned and addressing future challenges:

Cont nuity Provisions: Ongoing projects like AUD campus development will cont nue under exist ng MPD-2021 frameworks while aligning with emerging MPD-2041 direct ons9.

Enhanced Sustainability: Greater emphasis on climate resilience, environmental sustainability, and inclusive development10.

2.2.19 Regional and Sub-Regional Integrat on

MPD-2021 operates within the broader **Nat onal Capital Region (NCR)** framework, encompassing 33,578 sq. km across Delhi, Haryana, Ut ar Pradesh, and Rajasthan1.

Regional Policy Zones:

- **NCT Delhi**: Focus on sustainable development and redevelopment
- **Central NCR**: Compet ng economic act vit es and infrastructure development
- **Highway Corridor Zone**: Regulated development along nat onal highways
- **Rest of NCR**: Accelerated development to reduce Delhi-centric growth

Educat onal Infrastructure Regional Strategy: Universit es and higher educat on inst tut ons posit oned as regional assets serving broader NCR populat on while reducing pressure on Delhi's infrastructure1.

2.2.20 Sub-Regional Planning Framework

The plan mandates preparat on of **Sub-Regional Plans** by GNCT Delhi under Sect on 17 of the NCRPB Act, 1985:

Coordinat on Mechanisms: High-level groups for policy implementat on and plan coordinat on
Infrastructure Integrat on: Regional transport, ut lity, and educat onal infrastructure coordinat on
Economic Development: Balanced regional development reducing Delhi's demographic pressure

11. Financial and Economic Framework

11.1 Development Finance and Cost Recovery

MPD-2021 introduces several f nancial mechanisms relevant to large inst tut onal developments:

Land Value Capture: Mechanisms for capturing increased land values result ng from planning permissions and infrastructure development
Development Charges: Structured fee systems for infrastructure provision and maintenance
Public-Private Investment: Frameworks for private sector investment in public infrastructure, including educat onal facilit es

2.2.21 Economic Development Integrat on

Universit es are recognized as **economic development catalysts** within the broader urban economy:

Knowledge Economy: Higher educat on inst tut ons posit oned as drivers of Delhi's transit on toward knowledge-based economic act vit es1.

Employment Generat on: Universit es contribute to the projected **83.82 lakh workforce** by 2021, part cularly in the "Other Services" sector comprising 33.2% of total employment1.

Innovat on Ecosystem: Educat onal inst tut ons serve as innovat on hubs support ng entrepreneurship and technology development1.

2.2.22 Comparison with Previous Master Plans

MPD-2021 represents signif cant evolut on from its predecessor:

Planning Approach: Shif from regulatory control to facilitat ve development framework
Private Part cipat on: Enhanced role for private sector in land assembly, development, and infrastructure provision
Environmental Integrat on: Comprehensive environmental considerat ons integrated throughout planning process
Social Infrastructure: Greater emphasis on educat onal, health, and cultural infrastructure development

2.2.23 Innovat on and Reform

Key innovat ons introduced in MPD-2021:

Mixed Use Liberalizat on: Greater f exibility in land use mixing, part cularly benef cial for educat onal inst tut ons
Redevelopment Focus: Emphasis on urban renewal and redevelopment alongside new development
Public Part cipat on: Enhanced community involvement in planning processes
Technology Integrat on: Recognit on of informat on technology and modern communicat on requirements

2.2.24 Challenges and Implementat on Issues

Several challenges have emerged in MPD-2021 implementat on:

Zonal Plan Delays: Several zonal development plans remain unapproved, af ect ng detailed planning implementat on11.

Infrastructure Coordinat on: Coordinat on among mult ple agencies remains challenging, part cularly for large projects requiring mult ple clearances1.

Land Assembly: Private sector land assembly mechanisms have faced implementat on dif cult es in several zones1.

2.2.25 Regulatory Coordinat on

Large inst tut onal projects like universit es face coordinat on challenges among mult ple regulatory bodies:

Approval Complexity: Mult ple clearances from DDA, PWD, educat onal authorit es, environmental agencies, and ut lity providers
Timeline Management: Coordinat ng various approval t melines for integrated project implementat on
Policy Consistency: Ensuring consistency among dif erent regulatory frameworks and policies

2.2.26 Best Pract ces and Lessons Learned

Several aspects of MPD-2021 implementat on provide posit ve lessons:

Metro Integrat on: Successful integrat on of land use planning with Metro development has enhanced urban connect vity
Mixed Use Development: Liberalized mixed use provisions have enabled more f exible and economically viable development pat erns
Environmental Integrat on: Integrated environmental clearance mechanisms have streamlined approval processes for qualifying projects

2.2.27 Recommendat ons for University Campus Development

Based on MPD-2021 provisions and implementat on experience:

Early Coordinat on: Init ate coordinat on with all relevant agencies during planning phases to ensure smooth approval processes
Community Integrat on: Leverage mixed use provisions to enhance university-community interact on and economic viability
Infrastructure Phasing: Align campus development phases with infrastructure provision t melines

Sustainability Integrat on: Exceed minimum environmental requirements to align with emerging sustainability standards

2.2.28 Conclusion and Strategic Implicat ons

The Master Plan for Delhi 2021 provides a comprehensive regulatory and policy framework highly conducive to the development of the Ambedkar University Delhi campus at Rohini. The plan's emphasis on educat onal infrastructure development, sustainable urban growth, and integrated planning aligns perfectly with the university's vision for a modern, environmentally responsible campus.

2.2.29 Policy Alignment and Opportunit es

The MPD-2021 framework of ers several strategic advantages for the AUD project:

Regulatory Clarity: Clear development norms and approval processes provide predictable framework for campus development
Infrastructure Support: Planned infrastructure improvements in Rohini, including Metro connect vity and ut lity upgrades, enhance campus viability
Community Integrat on: Mixed use provisions enable the university to serve as a community anchor while generat ng sustainable revenue streams
Environmental Leadership: Comprehensive environmental provisions allow the university to demonstrate sustainability leadership

2.2.30 Future-Proof ng Considerat ons

As Delhi transit ons toward MPD-2041, the AUD campus development should consider:

Adaptability: Design campus infrastructure to accommodate future planning requirements and technological changes
Sustainability: Exceed current environmental standards to align with emerging sustainability requirements
Regional Integrat on: Posit on the university as a regional educat onal hub serving broader NCR requirements
Innovat on Leadership: Leverage the university's academic mission to demonstrate innovat ve planning and development pract ces

The MPD-2021 framework, with its comprehensive approach to urban development, environmental sustainability, and educat onal infrastructure, provides an enabling environment for creat ng a world-class university campus that embodies the values and vision of Ambedkar University Delhi while contribut ng to Delhi's broader urban development object ves[1210].

2.3 Literature Review: Nat onal Building Code of India (NBC) 2016

2.3.1 Introduct on and Educat onal Building Framework

The **Nat onal Building Code of India 2016 (NBC 2016)**, published by the Bureau of Indian Standards in March 2017, establishes India's most comprehensive regulatory framework for educat onal building construct on. As the fourth major revision since 1970, this document provides essent al guidelines for the design, construct on, and operat on of educat onal inst tut ons, directly applicable to the proposed Ambedkar University Delhi campus project.

The NBC 2016's revolut onary **"Integrated Approach"** mandates coordinated mult disciplinary planning throughout a building's lifecycle, part cularly relevant for large educat onal complexes requiring coordinat on among architects, structural engineers, f re safety specialists, and accessibility consultants.

2.3.2 Educat onal Building Classif cat on and Requirements

Educat onal buildings fall under **Group B Educat onal Buildings** with the AUD project classif ed under **Subdivision B-2** (inst tut ons accommodat ng 100+ students). With a proposed capacity of **8,000 students** across **167,680 sq.m built-up area**, the campus triggers NBC 2016's most comprehensive requirements including enhanced f re safety, advanced accessibility provisions, and specialized building services.

Space Planning Standards

NBC 2016 establishes specif c space allocat on norms directly applicable to the AUD campus:

- **Academic Spaces**: 1.2-1.5 sq.m per student in lecture halls with modern audio-visual integrat on
- **Laboratory Facilit es**: 3-5 sq.m per student for professional studies ensuring safety and funct onality
- **Library Spaces**: 2-3 sq.m per reader with provisions for digital infrastructure
- **Resident al Accommodat on**: 6-8 sq.m per student in hostels with proper vent lat on and natural light
- **Assembly Areas**: Specialized provisions for auditoriums and mult purpose halls based on occupancy calculat ons

2.3.3 Fire Safety and Life Protect on Systems

Part 4 of NBC 2016 mandates comprehensive f re safety systems for educat onal buildings, part cularly relevant for the AUD campus with mult ple high-occupancy buildings:

- **Automat c Detect on Systems**: Mandatory for educat onal buildings exceeding 15 meters height
- **Water-Based Suppression**: Sprinkler systems required for high-occupancy academic and resident al areas
- **Emergency Evacuat on**: Specialized provisions recognizing diverse occupant mobility levels and age groups
- **Fire Service Access**: Enhanced access requirements for large educat onal campuses with 6-meter minimum approach roads

Campus-Level Fire Safety Integrat on

The mult -building AUD campus requires integrated f re safety planning including campus-wide water supply systems, coordinated emergency response protocols, and comprehensive evacuat on procedures addressing the unique challenges of educat onal environments.

2.3.4 Universal Accessibility and Inclusive Design

Comprehensive Accessibility Framework

NBC 2016 introduces India's most advanced accessibility provisions, mandat ng **universal design principles** throughout educat onal campuses. Key requirements for the AUD project include:

- **Accessible Pathways**: Maximum gradient 1:20 throughout campus with rest landings every 10 meters
- **Tact le Guidance Systems**: Comprehensive tact le indicators for visually impaired navigat on
- **Accessible Parking**: Minimum 5% of total spaces with enhanced dimensions (3.6m × 5.0m)
- **Building Access**: Accessible entrances, elevators, and toilet facilit es at every f oor level

Educat onal-Specif c Accessibility

- **Classroom Design**: Universal design principles ensuring clear sight lines and accessible seat ng

- **Laboratory Accessibility**: Height-adjustable work surfaces and accessible emergency exits
- **Library Services**: Accessible book retrieval systems and assist ve technology integrat on
- **Assembly Spaces**: Designated wheelchair areas and assist ve listening systems in auditoriums

2.3.5 Structural Design and Safety for Educat onal Buildings

Seismic Design Requirements

Located in **Seismic Zone IV (Delhi)**, the AUD campus must comply with enhanced earthquake-resistant design provisions:

- **Enhanced Structural Systems**: Redundant structural design for crit cal educat onal funct ons
- **Laboratory Seismic Safety**: Specialized seismic restraints for scient f c equipment and hazardous materials
- **Post-Earthquake Funct onality**: Design ensuring cont nued operat on of essent al campus services af er seismic events

Material and Construct on Standards

NBC 2016 mandates high-performance materials and construct on pract ces for educat onal inst tut ons, including enhanced f re resistance rat ngs, sustainable material integrat on, and quality control measures throughout construct on.

2.3.6 Building Services and MEP Systems

Educat onal Building Services Requirements

This establishes comprehensive building services standards for educat onal facilit es:

- **Electrical Infrastructure**: Enhanced power distribut on for IT-intensive educat onal environments and laboratory equipment
- **HVAC Systems**: Climate-appropriate air condit oning with enhanced vent lat on for laboratories and assembly areas
- **Vert cal Transportat on**: Accessible elevator systems with emergency operat on capabilit es
- **Emergency Systems**: Comprehensive emergency light ng, communicat on, and backup power systems

Specialized Educat onal Services

- **Laboratory Vent lat on**: Specialized fume extract on and safety systems for scient f c laboratories
- **Audio-Visual Integrat on**: Enhanced AV infrastructure for modern educat onal delivery
- **IT Infrastructure**: Comprehensive data and communicat on systems support ng digital educat on
- **Security Systems**: Integrated security and access control appropriate for educat onal environments

2.3.7 Sustainability and Environmental Compliance

Green Building Integrat on

This mandates comprehensive sustainability measures for large educat onal projects:

- **Energy Ef ciency**: Enhanced building envelope performance and ef cient systems integrat on
- **Water Conservat on**: Mandatory rainwater harvest ng and wastewater treatment systems
- **Renewable Energy**: Solar photovoltaic integrat on requirements for inst tut onal buildings
- **Sustainable Materials**: Enhanced recycled content and locally sourced material preferences

Environmental Stewardship

Educat onal inst tut ons serve as community environmental stewardship examples, requiring exemplary compliance with NBC 2016's sustainability provisions including waste management systems, green space integrat on, and carbon footprint reduct on strategies.

2.3.8 Applicat on to Ambedkar University Delhi Project

Project-Specif c Compliance Strategy

The AUD campus must demonstrate comprehensive NBC 2016 compliance across mult ple domains:

- **Classif cat on Compliance**: Full Group B-2 educat onal building requirements implementat on

- **Fire Safety Integrat on**: Campus-wide f re safety systems coordinated across mult ple buildings
- **Accessibility Leadership**: Universal design demonstrat on throughout the 7.3-hectare campus
- **Sustainability Excellence**: Green building cert f cat on target ng through enhanced environmental performance

Implementat on Challenges and Solut ons

Key implementat on considerat ons include:

- **Mult disciplinary Coordinat on**: Integrat on of 20+ specialized professionals as mandated by the Integrated Approach
- **Regulatory Coordinat on**: Coordinat on with Delhi Fire Service, accessibility advocates, and environmental authorit es
- **Quality Assurance**: Third-party verif cat on of compliance with comprehensive NBC 2016 requirements
- **Technology Integrat on**: Building Informat on Modeling (BIM) ut lizat on for design coordinat on and compliance verif cat on

2.3.9 Conclusion and Strategic Implicat ons

NBC 2016 provides the comprehensive regulatory foundat on enabling the Ambedkar University Delhi campus to achieve excellence in safety, accessibility, sustainability, and educat onal funct onality. The code's integrated approach aligns perfectly with the university's commitment to inclusive, environmentally responsible educat on delivery.

The framework's emphasis on **universal design, comprehensive f re safety, structural resilience, and environmental stewardship** posit ons the AUD project to demonstrate best pract ces in contemporary educat onal infrastructure development while ensuring full regulatory compliance and operat onal excellence. Successful implementat on requires strategic professional coordinat on, advanced technology integrat on, and comprehensive quality assurance throughout the design and construct on process.

This regulatory framework enables the creat on of a world-class educat onal campus that serves not only as an exemplary learning environment but also as a model for future educat onal infrastructure development in India.

2.4 Literature Review: Delhi Fire Service Act 2007 & Delhi Fire Service Rules 2010

2.4.1 Introduct on and Regulatory Context

The **Delhi Fire Service Act, 2007 (Delhi Act 2 of 2009)** and its support ng **Delhi Fire Service Rules, 2010** form the legal and procedural backbone for f re safety and emergency preparedness in all building projects in Delhi, including educat onal inst tut ons. These regulat ons replaced the earlier 1986 Act and Rules, introducing stricter standards, clearer roles, and a more systemat c approach for f re-risk buildings due to Delhi's urban density and increase in high-rise and inst tut onal buildings[1][2][3].

2.4.2 Inst tut onal Scope and Applicability

The Act covers all classes of buildings with strong relevance for **educat onal establishments**:

- Any educat onal building (schools, colleges, universit es, coaching centers) with:
    - Height over 9m, or
    - Ground plus two or more upper storeys (including mezzanine f oors)
    - OR where 20 or more students are present for eight or more hours daily

These buildings are specif cally recognized as "occupancies likely to cause a risk of f re," mandat ng stringent f re safety cert f cat on and compliance[4].

2.4.4 Administrat ve Setup

The Act establishes the **Delhi Fire Service** under government control with the Director, Chief Fire Of cer, and f re zones/divisions for administrat on and on-ground response. The organizat on enforces f re prevent on, public educat on, emergency response, and compliance verif cat on for all risky occupancies, including periodically inspect ng and cert fying educat onal buildings[5][3].

Key Provisions Relevant to Educat onal Campuses

- **Mandatory Fire Safety Cert f cate (FSC or NOC):** All qualifying educat onal buildings must secure a f re safety cert f cate from the Fire Service before:
    - Commencing construct on
    - Occupat on/use
    - Renew periodically (typically every year or as st pulated)[1][6]

- **Comprehensive Fire Prevent on Measures:** The act requires:
    - Adequate f ref ght ng installat ons (hydrants, sprinklers, f re ext nguishers, detectors, alarms)
    - Proper escape routes, staircase designs, f re doors, emergency light ng, and vent lated corridors
    - Prohibit on of hazardous uses (like cooking) in basements or roof ops for inst tut onal occupancies[78]
- **Submission of Building Plans:** Prior to construct on, detailed plans, including f re prevent on layouts, must be submit ed for approval. The Fire Service verif es compliance with UBBL and NBC standards before grant ng Fire Safety NOC[1].
- **Periodic Inspect ons:** Occupied buildings are inspected to verify cont nued compliance. Owners must submit annual self-declarat ons of f re safety and readiness for audit by authorit es[91].
- **Appointment of Fire Safety Of cer:** For larger complexes (as per Sect on 29), designated f re safety managers supervised by the Director must be in place for training, drills, and record maintenance[10].

Documentat on and Compliance Procedures

- **Two-stage Clearance for Fire NOC:**
    - First stage: Approval of building plans (before construct on)
    - Second stage: Verif cat on af er complet on of construct on, before occupat on[6]
- **Prescribed Forms and Support ng Cert f cates:** Includes building safety cert f cate, structural safety, water source clearance, and cert f cate of health for the building[11].
- **Penalty for Non-Compliance:** Operat on without valid NOC may lead to sealing, penalt es, or closure of the inst tut on.

Minimum Safety Standards and Recent Amendments

- **Staircase and Corridors:** Proper width, vent lat on, and direct access to exits mandated for buildings with high occupancy.
- **Fire Safety Doors:** Must have a f re resistance of not less than one hour at the entrance to each f oor with >10 occupants.

- **Detectors & Alarms:** Compulsory smoke and, for certain uses, carbon monoxide detectors; alarm panels and networked alert systems.
- **No Hazardous Modif cat ons:** New regulat on bans use of temporary or f ammable roof ng and kitchens on roof ops or basements for inst tut onal and hostel buildings.
- **Updated with NBC and UBBL:** All standards cross-reference the latest Nat onal Building Code and Unif ed Building Bye-Laws; building permissions are not granted without compliance to these78.

2.4.5 Specif c Implicat ons for Educat onal Campus Projects

When planning a university campus like Ambedkar University Delhi, the following must be incorporated:

- Early engagement with Delhi Fire Services for design approval
- Integrat on of advanced f re detect on, suppression (sprinkler), and evacuat on systems across all buildings
- Training and appointment of dedicated f re safety staf /faculty
- Yearly renewals and mandatory drills for all campus occupants
- Prohibit ng any non-approved hazardous act vit es in basements or roof ops
- Coordinat on of f re safety features across hostels, academic blocks, auditoriums, libraries, and other high-occupancy areas
- Ensuring close alignment between architectural, MEP, and f re safety consultants from concept through construct on and occupancy1164.

2.4.6 Conclusion

The Delhi Fire Service Act, 2007 and corresponding Rules, 2010 are central to the statutory compliance regime for educat onal infrastructure in Delhi. No educat onal building of signif cant size or occupancy can be occupied or operated legally without robust f re safety design, cert f ed NOC, and ongoing maintenance/inspect on regimes as provided in these regulat ons. Frequent high-prof le f re incidents have led to stricter enforcement and rout ne audits by both the Fire Services and educat on authorit es, making compliance not only a legal but also an ethical imperat ve for campus architects and managers1146.

This framework, when thoroughly understood and implemented, ensures the safety of students, staf , and educat onal infrastructure, as well as smooth regulatory approvals and community assurance.

2.5 Literature Review: GRIHA (Green Rat ng for Integrated Habitat Assessment)

2.5.1 Introduct on and Context

GRIHA is India's premier nat onal rat ng system for green buildings, developed by The Energy and Resources Inst tute (TERI) and endorsed by the Ministry of New and Renewable Energy (MNRE). It serves as a crucial benchmark for sustainable building design, construct on and operat on, part cularly on public projects such as educat onal campuses developed by government and semi-government agencies like Ambedkar University Delhi.

GRIHA provides architects and planners with a holist c, performance-based evaluat on framework to reduce environmental impact while improving occupant health and lowering operat onal costs. The system aligns strongly with India's Sustainable Development Goals and the commitment of GNCTD to environmentally responsible urban development.

2.5.2 Applicability to Educat onal Campus Projects

Educat onal campuses such as the Ambedkar University Delhi benef t extensively by adopt ng GRIHA standards, especially since the campus is conceived as a "green," net-zero-ready inst tut on. The cert f cat on guides design decisions at every scale:

- **Site Planning:** Emphasizes preserving natural features, adopt ng Low Impact Development (LID) strategies like rainwater harvest ng, bio-swales, and permeable pavements that match the Rohini site's topography and hydrology.
- **Energy Ef ciency:** Guides use of passive design strategies, opt mized building envelopes, integrat on of solar PV and thermal systems, and energy-ef cient MEP systems target ng net-zero energy readiness.
- **Water Management:** Sets benchmarks for rainwater harvest ng, wastewater recycling/reuse, low-f ow f xtures, and water-ef cient landscaping — crit cal for Delhi's water-stressed context.
- **Waste Management:** Promotes on-site source segregat on, construct on & demolit on waste recycling, and organic waste compost ng aligned with government circulars.
- **Occupant Comfort:** Focus on air quality, day-light ng, thermal comfort, and acoust cs suitable for the mult -disciplinary learning environment envisioned for AUD.

2.5.3 GRIHA Rat ng Framework and Criteria

GRIHA cert f cat on is based on **f ve key modules** addressing the ent re building lifecycle:

1. **Site Select on and Planning** — Ecological sensit vity check, connect vity to public transport (relevant due to proximity to Rohini Metro).
2. **Building Design and Construct on** — Use of sustainable materials, minimizing embodied energy, and maximizing passive solar techniques.
3. **Energy and Water Systems** — Renewable energy integrat on, ef cient mechanical and electrical systems, and advanced water conservat on and reuse techniques.
4. **Indoor Environmental Quality** — Ensuring adequate vent lat on, light ng, thermal comfort, and earthquake resilient design.
5. **Operat ons and Maintenance** — Maintenance protocols for sustainability systems, occupant awareness, and monitoring frameworks.

Each criterion has a point-based system; rat ngs range from 1-Star (basic sustainability) to 5-Star (best pract ce). The Ambedkar University project targets **GRIHA 5-Star** rat ng to demonstrate leadership in inst tut onal sustainability.

2.5.4 Compliance and Integrat on with Other Regulat ons

GRIHA is designed to integrate seamlessly with:

- **Unif ed Building Bye-Laws Delhi (UBBL)** and **Nat onal Building Code (NBC 2016)** requirements for safety, accessibility, and structural integrity.
- Local regulat ons on wastewater discharge and solid waste management monitored by **Delhi Pollut on Control Commit ee (DPCC)**.
- Architectural controls imposed by Delhi Urban Arts Commission (DUAC).
- Supports mandates like mandatory 1% public art funding and other GNCTD environmental policies.

Specif c Benef ts for Ambedkar University Campus

- **Reduct on in Operat onal Costs:** Through energy and water ef ciency, reducing dependency on external ut lit es.
- **Improved Indoor Environment:** Facilitates bet er learning environments, crit cal for sustained occupant health and product vity.
- **Enhanced Reputat on:** Demonstrates Ambedkar University's commitment to sustainability and social equity, aligning with its academic mission.

- **Compliance Facilitat on:** Proact ve adopt on of GRIHA criteria streamlines regulatory approvals and pre-empts potent al compliance shortcomings.

Implementat on Recommendat ons

- Early incorporat on of GRIHA principles during schemat c design for opt mal performance.
- Establishment of a dedicated sustainability consultant team integrated with architects, MEP engineers, and landscape designers.
- Regular third-party verif cat on for key milestones: design review, construct on, and post-construct on phase.
- Capacity building and training of campus operat onal staf for ongoing sustainability management.

2.5.5 Conclusion

Adopt on of GRIHA green building cert f cat on is essent al to the Ambedkar University Delhi project's ambit on to create a future-ready, sustainable campus. It provides a comprehensive, India-specif c framework that will enable the design team to integrate environmental stewardship holist cally into planning, design, and delivery phases while ensuring compliance with Delhi-specif c environmental and urban planning mandates.

Would you like me to proceed with the next literature review on CPWD Specif cat ons or another document?

2.6 Literature Review: CPWD Specif cat ons 2009

2.6.1 Introduct on and Overview

The **Central Public Works Department (CPWD) Specif cat ons 2009** provide a comprehensive, government-mandated set of standardized technical guidelines for the construct on and maintenance of public buildings and infrastructure across India, including educat onal inst tut ons. Issued by the CPWD—a leading government agency responsible for execut ng most central government construct on—these specif cat ons ensure quality, uniformity, and safety. For university campuses like Ambedkar University Delhi, these specif cat ons form the technical foundat on for material choices, work methodologies, and workmanship standards during all design and construct on phases.

2.6.2 Structure and Scope

The document encompasses two main volumes:

- **Volume 1:** Civil Works (building, structural concrete, brickwork, waterproof ng, f nishes, joinery, etc.)
- **Volume 2:** Electrical Works (wiring, light ng, f re alarm, power distribut on, etc.)

Applicability to University Campus Projects

- Covers design, material select on, construct on techniques, and f nish standards for academic, hostel, administrat ve, and recreat onal buildings.
- Ensures each part of the campus meets minimum durability, safety, and performance standards prescribed for public infrastructure.

2.6.3 Key Provisions Relevant to Educat onal Campuses

Materials and Workmanship

- **Materials:** Mandates use of IS-cert f ed materials (cement, steel, aggregates, etc.) with required test ng and cert f cat on.
- **Workmanship:** Strict guidelines for site preparat on, formwork, concret ng, plastering, joinery, paint ng, and waterproof ng.
- **Sustainability:** Recommends use of eco-friendly materials, f y ash bricks, and recycled aggregates, support ng campus green building goals.

Structural and Civil Works

- **Reinforced Cement Concrete (RCC):** Detailed specif cat ons for mix design, placement, curing, and quality assurance for beams, columns, slabs, and foundat ons.
- **Masonry:** Predef ned standards for brick/stone masonry, mortar mixes, and reinforcement.
- **Waterproof ng:** Mandated approaches for roofs, basements, and wet areas—crit cal for dorms, labs, and libraries.
- **Finishes:** Standardizat on of f ooring, wall f nishes, façade treatments for aesthet cs and longevity.

Plumbing and Sanitat on

- **Internal and External Plumbing:** Prescribes materials (GI pipes, PVC/HDPE, brass f t ngs), installat on techniques, and pressure test ng.
- **Sanitary Fixtures:** Detailed standards for water closets, urinals, sinks, with emphasis on water ef ciency and durability.

- **Sewage & Drainage:** Lays out gradients, connect ons, and inspect on chamber guidelines ensuring ef cient campus sanitat on.

Electrical and Fire Safety Systems

- **Wiring:** Specif es cable types, rat ngs, rout ng protocols—ensuring safety against electrical faults.
- **Light ng and Power:** Standards for size/load of panel boards, switches, f xtures, energy-ef cient light ng, and backup systems.
- **Fire Alarm:** Integrat on standards for detect on, alarms, and suppression, crucial for high-occupancy educat onal buildings.

Campus Landscape and Ancillary Works

- **Landscaping:** Standards for grading, turf ng, tree plant ng, irrigat on, and site drainage—essent al for green campuses.
- **Campus Roads and Pathways:** Guidelines for thickness, materials, f nishing, and stormwater management.

Quality Control and Compliance

- **Test ng Protocols:** Mandates rout ne test ng of materials (cement, steel, aggregates, concrete, etc.) and workmanship at every stage—backed by prescribed IS Codes.
- **Measurement & Billing:** Standardized methods for quant fying work and verifying contractor payments.
- **Maintenance:** Provides procedures for defects rect f cat on and ongoing maintenance—important for university operat ons post-construct on.

Interact on with Other Regulatory Frameworks

- **Alignment with UBBL and NBC:** CPWD specs must be followed alongside the Unif ed Building Bye-Laws Delhi and Nat onal Building Code provisions for safety, f re, accessibility, and sustainability.
- **GRIHA/Sustainability Goals:** Encourages use of green technologies/materials (solar, rainwater harvest ng, energy-ef cient devices), aiding in GRIHA compliance.
- **Integrat on with DPCC Norms:** Explains standards for environmental compliance (dust suppression, waste management) specif c to Delhi campus projects.

2.6.4 Strategic Project Implicat ons

For large campus projects like Ambedkar University, CPWD Specif cat ons:

- **Def ne baseline construct on standards** ensuring long-term performance and minimize lifecycle costs.
- **Reduces risk of defects,** disputes, and non-compliance during audits by PWD, CPWD, or statutory agencies.
- **Streamline approval processes** as most government and public funding agencies require strict adherence.
- **Assure safety and comfort** for students and staf by ensuring reliable infrastructure for sanitat on, power, water, and f re safety.

2.6.5 Implementat on Recommendat ons

- Engage CPWD-accredited architects/contractors for strict compliance and supervision.
- Integrate third-party QA/QC agencies early in project execut on for independent test ng and cert f cat on.
- Ensure documentat on and checklists for each construct on stage are maintained as per CPWD protocols, simplifying audits and approvals.
- Use as a project benchmark for tendering, contractor management, and dispute resolut on.

2.6.6 Conclusion

The CPWD Specif cat ons 2009 form the backbone of quality assurance for public sector construct on in India, especially for complex educat onal campuses. Rigorously applying these standards ensures the Ambedkar University Delhi campus will be robust, sustainable, and fully compliant with all statutory and operat onal expectat ons, underpinning its mission to of er a safe and inspiring learning environment.

2.7 Literature Review: IS Codes for Construct on (Bureau of Indian Standards)

2.7.1 Introduct on and Overview

Indian Standard (IS) Codes, developed by the Bureau of Indian Standards (BIS), form the backbone of technical compliance for all construct on projects in India—including large-scale educat onal campuses like Ambedkar University Delhi. These codes are mandatory references in

every phase: design, material select on, structural safety, workmanship, and post-construct on quality assurance. Their primary purpose is to standardize best pract ces, assure safety, and ensure durability in the diverse Indian context.

2.7.2 Applicability to Educat onal Campus Projects

A university campus project, with its complex mix of academic, resident al, recreat onal, and ut lity buildings, requires precise adherence to a wide array of IS Codes. They must be cited in architectural design reports, tender documents, and are rigorously checked during statutory approvals and contractor audits.

Key Categories Relevant for an Educat onal Inst tute:

- **Structural Design and Stability**
    - **IS 456:2000** – Plain and Reinforced Concrete Code; governs RCC for foundat ons, slabs, columns, beams, staircases.
    - **IS 800:2007** – General Construct on in Steel; governs steel structure design for auditoriums, roofs, canopies, and large spans.
    - **IS 875 (Parts 1-5)** – Code for design loads (dead, imposed, wind, seismic, snow) on buildings; crucial for safekeeping in Delhi's Zone IV seismicity.
- **Seismic and Wind Safety**
    - **IS 1893 (Part 1):2016** – Earthquake Resistant Design; requires that all buildings, especially high-occupancy structures in Delhi, be detailed for lateral/dynamic loading.
    - **IS 13920:2016** – Duct le Detailing of Reinforced Concrete Structures for Seismic Resistance, mandatory for public and inst tut onal buildings.
- **Foundat on and Soil Invest gat on**
    - **IS 1904:1986** – Design and Construct on of Foundat ons in Soils: General Requirements,
    - **IS 2911 (Part 1 & 4):2010** – Design and Construct on of Pile Foundat ons.
- **Materials and Test ng**
    - **IS 383:2016** – Coarse and Fine Aggregates,
    - **IS 2386** – Methods of Test for Aggregates,
    - **IS 269:2015** – Specif cat on for 33 Grade Ordinary Portland Cement, etc.

- **Fire and Life Safety**
    - **IS 1641:1988** – Fire Safety of Buildings Code of Pract ce,
    - **IS 2189:2008** – Fire Detect on and Alarm System Code.
- **Waterproof ng, Damp Proof ng and Finishes**
    - **IS 3067:1988** – Code of Pract ce for Damp Proof Course,
    - **IS 1346:2012** – Waterproof ng for Roofs.
- **Electrical and Services**
    - **IS 732:2019** – Electrical Wiring Installat ons Code,
    - **IS 3043:2018** – Earthing,
    - **IS 2185 (Part 1):2005** – Concrete Masonry Units for services.

2.7.3 How IS Codes Shape the Campus Project

- **Safety and Durability**: By enforcing the correct IS codes for RCC, steel, and earthquake resistance, the campus achieves structural reliability for lecture halls, hostels, libraries, and admin blocks—ensuring safe learning spaces for thousands.
- **Quality Control**: Mandatory test ng of materials (steel, concrete, bricks, aggregates) as per IS codes ensures consistency and rejects substandard supplies.
- **Adaptat on to Regional Risks**: Through IS 1893 and IS 456 detailing, campus buildings are shaped to withstand Delhi's moderate-to-high seismic movement, wind loads, and seasonal extremes.
- **Compat ble Workmanship**: Codes like IS 2502 (reinforcement detail), IS 1200 (measurement of works), and IS 4926 (ready-mix concrete) standardize construct on pract ces for all labour and contractors.
- **Integrat on with Modern Sustainability Pract ces**: Many IS codes reference eco-friendly materials, C&D waste recycling, and energy-ef cient construct on methods—support ng the project's GRIHA/LEED targets.

2.7.4 Compliance Process in Educat onal Project Workf ow

- All design drawings must reference applicable IS codes when submit ed for government approval.

- Tender documents specify IS codes for every material and technique used; contractors must demonstrate compliance.
- Third-party test ng and quality assurance are based on IS code protocols before allowing any structural use or occupancy.
- During post-construct on audits, IS code adherence is reviewed for safety cert f cat on and for annual campus maintenance protocols.

2.7.5 Benef ts and Strategic Mandate

- **Legal Protect on**: Following IS standards protects the project and stakeholders in legal or technical disputes.
- **Audit-readiness**: Smoothens the path for PWD, CPWD, f re, and environmental clearances.
- **Longevity and Value**: Buildings constructed by IS standards show lower maintenance, greater resilience, and higher operat onal ef ciency over decades—a crit cal factor for publicly funded educat onal inst tut ons.

2.7.6 Conclusion

IS Codes are the backbone of good pract ce, safety, and statutory compliance for educat onal infrastructure in India. For a project like Ambedkar University Delhi, systemat c adherence from design incept on through to construct on, commissioning, and operat on guarantees best-in-class learning environments, safety, and future-proof regulatory compliance.

2.8 Literature Review: Central Pollut on Control Board (CPCB) and Delhi Pollut on Control Commit ee (DPCC) Guidelines for Construct on Projects

2.8.1 Introduct on and Regulatory Overview

The **Central Pollut on Control Board (CPCB)**—a statutory organizat on under the Ministry of Environment, Forest and Climate Change (MoEFCC)—and the **Delhi Pollut on Control Commit ee (DPCC)**—the state-level regulatory body for Delhi—are the chief authorit es governing environmental compliance for all construct on projects, including large educat onal campuses like Ambedkar University Delhi. Their combined guidelines establish the mandatory parameters for prevent ng and controlling air, water, and noise pollut on, as well as solid and hazardous waste management at every phase of project planning, construct on, and operat on.

2.8.2 Scope and Applicability to Educat onal Inst tutes

Any inst tut onal project with built-up area over 20,000m²—including universit es—must:

- Obtain "Consent to Establish" and "Consent to Operate" from DPCC
- Submit to environmental monitoring and compliance audits as per **Environmental Impact Assessment (EIA)** rules
- Follow all CPCB guidelines for construct on and demolit on (C&D) waste, dust suppression, sewage treatment, and operat onal phase discharges

2.8.3 Key Provisions Relevant to University Campuses

Air Quality and Dust Control

- **Dust Mit gat on:** Use of barricades, water sprinkling, covering of building material during transport, on-site wind-breaking structures, and wheel washing for all vehicles leaving site
- **C&D Waste Management:** Segregat on, storage, on-site processing (where possible), and transportat on of C&D waste to authorized recycling facilit es
- **Prohibit on of Open Burning:** Strict ban on open burning of any material (waste, debris, or vegetat on)
- **On-site Monitoring:** Cont nuous ambient air quality monitoring for PM10, PM2.5, and other pollutants, especially during construct on phase

Water Resource Management

- **Ef uent Treatment:** All wastewater from construct on (wash areas, curing, etc.) must be treated before discharge or use for dust suppression/curing
- **Sewage Treatment Plants (STPs):** Mandatory installat on and operat on of on-site STPs sized for maximum projected student/faculty/staf populat ons; treated reuse for irrigat on, f ushing, and HVAC where feasible
- **Stormwater Control:** Prevent runof of sediment, silt, or chemicals into drains; provision of soak pits, f ltrat on trenches, and rainwater harvest ng structures

Noise Pollut on

- **Noise-Level Caps:** Dayt me noise from construct on act vit es and DG sets is capped as per CPCB norms (generally 75dB(A) for industrial zones adjacent to campuses; usually lower for educat onal premises)
- **DG Set Standards:** DG sets must comply with CPCB Noise and Emission Norms and be f t ed with proper acoust c enclosures

- **Construct on Timings:** No noisy act vit es allowed between 10PM–6AM, part cularly near residences and hostels

Solid Waste Management

- **Source Segregat on:** All solid waste must be segregated at source (wet, dry, hazardous as applicable)
- **On-campus Compost ng:** Organic waste compost ng facilit es recommended for hostels, canteens, and landscape/garden waste
- **Authorized Disposal:** Only DPCC/CPCB-approved facilit es may be used for f nal disposal of waste materials

Hazardous and E-Waste Management

- Proper collect on, interim storage in secure containers, and handover of chemical lab/hospital hazardous waste and e-waste only to licensed handlers per rules.

2.8.4 Approval and Compliance Framework

- **Pre-Construct on:** Obtain Consent to Establish (CTE) from DPCC af er submission of layout, details of pollut on control systems, and EIA/EMP if applicable
- **Post-Construct on:** Obtain Consent to Operate (CTO) af er physical verif cat on and operat onalizat on of all control measures
- **Annual Renewal:** All consents must be renewed yearly with submission of environmental monitoring data and compliance documentat on

2.8.5 Integrat on with Other Frameworks

- CPCB/DPCC guidelines work alongside UBBL, NBC, GRIHA, and DUAC requirements, ensuring that environmental safeguards are part of the mandatory project approval chain.
- Environmental clearances for large campuses are now streamlined with local body construct on permissions, but cannot be bypassed.

2.8.6 Campus Planning and Operat onal Recommendat ons

- Appoint a dedicated environmental of cer or consultant for cont nuous monitoring and report ng
- Incorporate modular STP, RWH, and C&D waste management facilit es at design stage
- Conduct regular environmental trainings/drills for staf and contractors

- Use regular external audits to ensure on-going compliance and ease of regulatory renewal

2.8.7 Conclusion

Compliance with CPCB and DPCC environmental regulat ons is a non-negot able aspect of educat onal campus development in Delhi. The robust implementat on of these guidelines not only fulf lls legal obligat ons but also supports the health, safety, and well-being of the academic community, aligns with nat onal sustainability targets, and demonstrates responsible stewardship for the broader community. For Ambedkar University Delhi, early and rigorous adherence ensures smooth statutory clearances and posit ons the campus as a leader in sustainable and environmentally compliant design.

2.9 Literature Review: UGC Guidelines for Inst tut onal Infrastructure Development

2.9.1 Introduct on and Legal Status

The **University Grants Commission (UGC)** is the apex nat onal body for maintaining minimum standards of instruct on, facilit es, and infrastructure in Indian higher educat on. Its **"Guidelines for Development of Inst tut onal Infrastructure"** prescribe the statutory framework for planning and building government, state, and aided university campuses in India, including those within urban set ngs like Delhi. For projects such as Ambedkar University Delhi (AUD), these guidelines are pivotal—not only for compliance and funding, but for shaping the funct onal, pedagogical, and social ethos of the campus.

2.9.2 Scope, Applicability, and Rat onale

Applicability

- **Types of Inst tut ons Covered:** All new and exist ng central/state universit es, deemed universit es, colleges af liated with UGC, and publicly-funded higher educat on inst tutes.
- **Phases of Project:** Enforced at new campus establishment, expansion phases, NAAC/NBA accreditat on, and periodic regulatory audits.

Legal Mandate

- **Statutory Precedent:** UGC guidelines are cited in the **UGC Act, 1956** and referenced by grant-in-aid agencies, Project Approval Boards (PABs), and the Ministry of Educat on.
- **Integrat on Requirement:** Master Plans and Detailed Project Reports (DPRs) submit ed to authorit es like DDA, PWD, and DUAC must explicitly show UGC guideline adherence.

2.9.3 Land, Zoning, and Campus Size

Minimum Land Area

- **Land Norms for Universit es:**
    - Central/State Mult disciplinary Universit es: Minimum 25–50 acres (approx. 10–20ha), further tailored by urban land pooling and DDA special allocat ons (e.g., in Delhi, permit ed at 7.3ha for AUD under inst tut onal use due to land scarcity).
    - Specialized/Urban Campuses: Minimum 10–15 acres; cont guity and legal t tle essent al.
- **Zoning and Open Space:** At least one-third land for open landscape, gardens, playgrounds; distributed for healthy, barrier-free circulat on and social use.

Site Planning and Environmental Mandates

- **Urban Integrat on:** Preference for public transport access and integrat on with surrounding urban fabric for community interface as required in Delhi's Master Plan 2021.
- **Green/Wetlands:** Preservat on of exist ng topography and ecological features per UGC and GRIHA/MPD mandates.

2.9.4 Academic, Administrat ve, and Support Infrastructure

Academic Block Standards

- **Space Per Student:** Minimum 10–12m² per enrolled student for teaching, laboratory, and library spaces.
- **Faculty Spaces:** Dedicated of ces (at least 10–12m² per faculty), departmental rooms, and resource centers.
- **Flexible Learning Spaces:** Seminar/conference rooms, smart classrooms, and collaborat ve zones; specif c area allocat ons for each funct on detailed in UGC's appendices.

Laboratories and Research

- **Discipline-Specif c Labs:** UGC prescribes specialized labs for sciences, computer centers, language labs, and studios with per-student/workstat on norms (4–5m² recommended).
- **Research Infrastructure:** Space for project-based research, doctoral fellows, innovat on and maker spaces integral to modern university models.

Library and Digital Facilit es

- **Reading Capacity:** Seats for at least 10% of registered students at a t me.
- **Resource Stocks:** Gradually scaled book, journal, and e-resource volumes based on enrollment and program prof le.
- **ICT:** High-speed LAN, campus-wide Wi-Fi, digital access points, video conferencing, and e-learning studios; minimum computer-to-student rat o (1:15 or bet er).

Administrat ve Block and Amenit es

- **Administrat ve Of ces:** Registrar, Accounts, Student Af airs, HR, with visitor areas and secure record storage.
- **Health Centre:** Medical room with basic diagnost c and emergency equipment, of en scaled to size and gender of student cohort.
- **Canteens and Dining:** Hygienic dining areas for a signif cant port on of daily campus foot all; vending, snack bars, water stat ons at strategic points.

2.9.5 Hostels, Staf Housing, and Resident al Amenit es

Hostel Accommodat on

- **Minimum Capacity:** Provision for at least 30–40% of total students; mandatory for new campuses and more in urban contexts where daily commute is challenging.
- **Design:** Double/triple occupancy standard, gender-segregated blocks, common rooms, study areas, accessible washrooms (as per RPwD Act), and supervision/warden quarters.
- **Safety Protocols:** Fire exits, alarms, emergency light ng, CCTV, and hostel access controls.

Staf and Faculty Residences

- **Provision Norm:** Depending on site, housing for minimum 10% of faculty and essent al staf ; crit cal for all-weather, on-call support and campus safety.
- **Amenit es:** Guest house with minimum 5 rooms for visit ng faculty/scholars; community spaces and sports areas for residents.

2.9.6 Sports, Recreat on, and Campus Life

Physical Educat on Facilit es

- **Playgrounds:** One mult -sport f eld (football, cricket, athlet cs), plus courts for basketball, badminton, volleyball, and designated indoor area for yoga/gym (per UGC Physical Educat on norms).
- **Stadium/Auditorium:** Mult purpose indoor halls for cultural/sport ng events, seat ng 10%–20% of campus populat on.

Cultural and Student Welfare Spaces

- **Clubs/Societ es Area:** Music rooms, art studios, debate halls, etc.
- **Student Support:** Counseling center, women's/SC/ST welfare of ces, career guidance and placement centers.

2.9.7 Sustainability and Green Campus Criteria

Environmental Norms

- **Rainwater Harvest ng:** Mandatory with prescribed storage and recharge capacit es; Delhi-specif c integrat on with groundwater recharge.
- **Waste Management:** Compost ng units for organic waste, segregat on at source, recycling bins; part of larger environmental management plan per DPCC/CPCB and GRIHA.
- **Energy Ef ciency:** Solar power systems, ef cient light ng, building orientat on for daylight, and incorporat on of local materials; UGC encourages at least 10–15% of load to be met through renewable energy.

Accessibility Compliance

- **Universal Design:** Compliance with Rights of Persons with Disabilit es Act and nat onal accessibility guidelines; includes graded paths, ramps, accessible hostels, and digital content.

2.9.8 Health, Safety, and Disaster Readiness

- **Fire/Life Safety:** Strict adherence to NBC/Delhi Fire Service norms—exit signage, alarms, assembly points, staf training for drills.

- **First-Aid and Medical:** 24/7 availability in hostels and academic blocks, with referral t e-ups to local hospitals.
- **Emergency Preparedness:** Clear evacuat on plans, designated shelter points, and staf trained in basic f ref ght ng, evacuat on, and rescue.

2.9.9 Digital and Academic Innovat on

- **Smart Campus:** Encourages networked learning spaces, digital not ceboards, online admin/academic services, mobile apps for logist cs and support.
- **Research and Innovat on:** Dedicated zones for incubators, co-working, and interdisciplinary labs to foster research culture—now of en a precondit on for "Inst tut on of Eminence" status.

2.9.10 Compliance, Approval, and Audit Protocols

- **Documentat on:** Master Plan and Project Report must reference UGC standards (with detailed space allocat on tables and just f cat ons) to secure sanct on and funding.
- **Inspect ons:** Pre- and post-construct on audits by UGC/af liated commit ees; regular campus audits for NAAC/NBA re-accreditat on.
- **Remediat on:** Mandated rect f cat on of def ciencies within 12–18 months, with risk of loss of recognit on/funding in case of repeated noncompliance.

2.9.11 Integrat on with Other Regulat ons

- **Regulatory Synergy:** UGC infrastructure norms are writ en to align with MPD-2021, Unif ed Building Bye-Laws (UBBL) 2016, Nat onal Building Code (NBC) 2016, Rights of Persons with Disabilit es Act, DPCC and CPCB mandates, and green building standards like GRIHA/LEED.
- **Approvals Chain:** Adherence to UGC guidelines streamlines parallel approvals (e.g., from AICTE, MCI, BCI, or other regulatory bodies) and underpins successful submission to PWD, DDA, and DUAC.

2.9.12 Campus Ident ty, Community, and Reputat on

- **Inst tut onal Character:** The UGC model encourages spaces that foster interdisciplinary exchange, social mobility, gender equity, and intellectual engagement—especially relevant to a mission-driven university like AUD.
- **Community Interface:** Provision of public-use facilit es (libraries, sports, lecture halls for community events) encouraged to reinforce the “anchor inst tut on” role.

2.9.13 Recommendat ons for Implementat on (Best Pract ces)

- **Interdisciplinary Design Team:** Include architects, urban planners, accessibility experts, MEP and sustainability engineers, landscape and safety consultants from project incept on.
- **Stakeholder Consultat on:** Early and periodic dialogue with faculty, students, staf , and local authorit es—ensuring that the campus design is not only compliant but also context-appropriate and inspiring.
- **Phased Development:** Master Plan should consider built-in scalability and provision for future expansion, as AUD's enrollment and program prof le evolve.

2.9.14 Conclusion

For a transformat ve campus like **Ambedkar University Delhi**, the UGC infrastructure guidelines are more than a compliance checklist—they are a framework for building a campus that is safe, inclusive, resource-ef cient, future-proof, and a model of educat onal and social excellence. Systemat c adherence ensures statutory approvals, unlocks funding, shapes reputat on, and—crit cally—ensures a holist c, enabling environment for generat ons of students and scholars.

DELHI DEVELOPMENT AUTHORITY

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.

	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.

Table 9.1: Per capita water requirement for various Occupancies/ Uses

S.No	Type of occupancy	Consumption (in lt.)
1.	Residential	
	i. EWS/LIG dwelling units(LPCD/ dwelling unit)	135
	ii. . MIG and above category flats/houses/floors (LPCD/ dwelling unit)	225
	iii. Hotels with lodging accommodation (per bed)	180
2.	Educational	
	a) Day schools(per head per day)	45
	b) Boarding schools(per head per day)	135
3.	Institutional(medical hospitals) a)no. of beds not exceeding 100	
	b)no. of beds exceeding 100	340
	c) medical quarters and hotels	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)	70
	b) Other business building	45
7	Industrial	
	a. Factories where bath- rooms are to be provided.	45
	b. Factories where bath-rooms are not to be provided	30
8.	Storage(including warehouses)	30

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.

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

Table 9.6 (contd.): Sanitation Requirements Nursery Schools

S.No	Sanitary unit	Requirement
1	Water Closet	one per 10 pupils
2	Ablution Taps	One in each W.C.
3	Urinals	--
4	Wash Basins	One for every 15 pupils or part thereof
5	Baths	One bath sink per 40 pupils
6	Drinking Water Fountains	One for every 50 pupils or part thereof
7	Cleaner's Sink	--

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).*

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%	--

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.

Table 10.1-Provisions and applicability for various plot sizes (all use premises)

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

3. Site Inventory: Connect vity (Expanded)

3.1 Introduct on: Theoret cal Basis of Campus Connect vity

Connect vity is fundamental to campus site planning and urban integrat on. Modern transport planning goes beyond physical infrastructure; it is rooted in theories and models that aim to opt mize accessibility, sustainability, and user experience while addressing urban growth, equity, and environmental concerns. For an educat onal inst tut on like Ambedkar University Delhi, robust integrat on of **transport planning theories** ensures the campus is accessible, responsive to user needs, minimizes negat ve impacts, and aligns with best pract ces in urban development[1][2][3].

Key principles shaping connect vity are:

- **Mult -modal integrat on:** Priorit zing seamless linkages between road, rail (especially metro), air, and non-motorized modes.
- **Sustainable transport:** Encouraging public transit, act ve travel, and minimizing car dependency to reduce emissions and congest on[4][5].
- **User-oriented planning:** Addressing the diverse needs of students, staf , visitors, and the local community.

- **Evidence-based modeling:** Using data and mathemat cal models to forecast demand and design ef ect ve, resilient networks[63].
- **Land use–transport integrat on:** Linking campus design with broader city planning for opt mal social, economic, and environmental outcomes[7].

3.2 Roadways: Planning, Theories, and Campus Access

3.2.1 Roadways in Pract ce

- **Arterial Roads:** Main access via the Outer Ring Road, one of Delhi's busiest corridors, enabling both city-wide and regional connect vity.
- **Hierarchy of Roads:** Sector roads of varying widths, including a 13.5m internal spine, create a "f ne-grained" urban grid for both vehicles and pedestrians.
- **Last-mile Access:** Planned drop-of s, service loops, and integrat on with public transport for minimized vehicular intrusion into core academic areas.

3.2.2 Transport Planning Theories Applied

- **Rat onal Planning Model:** The classical stepwise process (problem ident f cat on, alternat ves generat on, modeling, evaluat on, implementat on), widely followed in urban/campus planning[1].
- **Four-Stage Urban Transport Model:**
    1. **Trip Generat on:** Est mat ng travel demand arising from and at racted to the campus.
    2. **Trip Distribut on:** Determining spat al pat erns—where users are coming from or going to within the city.
    3. **Modal Split:** Predict ng proport on using dif erent transport modes (bus, private vehicle, bicycle, walk)[3].
    4. **Traf c Assignment:** Allocat ng these trips to the road network for capacity and congest on analysis.
- **Gravity Model:** Used for trip distribut on, posit ng that travel demand between two areas is proport onal to their "mass" (size, act vity) and inversely related to distance or travel cost[83].
- **Sustainable Transport Theories:** Emphasize compact city form, minimized trip lengths, strong walking/cycling infrastructure, and demand management (e.g., parking limits, carpooling)[245].

3.3 Railways: Public Transit, Accessibility & Theoret cal Integrat on

3.3.1 Inst tut onal Rail Access

- **Metro Connect on:** Proximity (1km) to Rohini East and Madhuban Chowk Metro stat ons enables high-frequency, rapid, and emission-free connect vity across Delhi-NCR.
- **Feeder Services:** Integrat on with bus/auto/e-rickshaw networks ensures a true mult -modal last-mile solut on.

3.3.2 Transport Planning Models and Theory

- **Transit-Oriented Development (TOD):** The campus is planned to take advantage of nearby high-capacity public transport, clustering access points, amenit es, and cycle facilit es near metro interfaces, in line with global TOD theory17.
- **Network Theory:** Views the transport system as an interconnected web, emphasizing nodal ef ciency (Metro as key node), redundancy, and resilience against disrupt ons.
- **Accessibility Planning:** Focus on minimizing "generalized cost" (travel t me, ease, comfort, monetary cost) for the maximum number of users9.

Airways: Nat onal and Global Connect vity

- **Indira Gandhi Internat onal Airport:** About 25km from campus, accessible in 45–60 minutes by road; direct metro links provide t me-ef cient, predictable access for out-of-town students, guests, and staf .
- **Strategic Planning Context:** Theories of **accessibility equilibrium** and "network opt mizat on" inform planning for events, academic collaborat ons, and foster a nat onal/internat onal academic prof le.

Integrat on Theories

- **Mult -modal Transport Planning:** Opt mal campus accessibility results from planned integrat ons of air, rail, and road linkages—addressing the full trip chain, from arrival in Delhi to campus entry.
- **Systems Approach:** Considers reliability, ef ciency, equity, and sustainability across all modes while reducing the campus carbon footprint45.

Advanced Planning Concepts and Evolving Pract ces

- **Comprehensive Mobility Plans (CMP):** Delhi's citywide CMP framework is mirrored at campus level: focus on network ef ciency, user safety, and environmental stewardship2.

- **Behavioral & Demand Management:** Applying behavioral science to encourage public/act ve transport use through design, incent ves, and campus policies12.
- **Inclusive Planning:** Recent theory emphasizes universal accessibility and stakeholder part cipat on, ensuring connect vity for all regardless of mobility, gender, or socioeconomic status10.

Urban Transport Planning Models

- **Route and Mode Choice Models:** Discrete choice modeling (user decision-making for mode/route) guides investments in enhanced metro, walking, and cycling infrastructure119.
- **Scenario Analysis & Forecast ng:** Digital transport models simulate alternat ves (adding a new bus route, improving a road link) for resilient, future-ready design129.
- **Spat al Interact on & Land Use Models:** Evaluat ng impacts of campus development on city travel pat erns and vice versa37.

3.3.3 Conclusion: Toward Best-Pract ce Campus Connect vity

Campus connect vity at Ambedkar University Delhi is shaped by a synthesis of classic and cut ng-edge transport planning theories:

- It uses the robust structure of four-stage modeling and mult -modal planning to ant cipate and balance all user needs.
- Sustainable mobility, demand management, and transit-accessible design feature prominently to reduce emissions, operat onal costs, and support citywide goals245.
- Ongoing upgrades in public and act ve transport, aligned with scenario-based models and inclusive planning, are essent al to meet changing urban dynamics.

Integrat ng transport planning theory into site design ensures not only statutory compliance and ef ect ve day-to-day operat on but also contributes to a world-class, accessible, and sustainable urban university campus.

Key Theories Referenced:

- Rat onal Planning Model, Four-Stage Model, Gravity Model, Transit-Oriented Development, Accessibility Planning, Network Theory, Comprehensive Mobility Planning, Sustainable Transport Theory, Discrete Choice Models, Scenario Analysis.

If you wish to see matrices, spat al maps, or typical Indian case studies of campus connect vity models, please specify the area or a mode for deeper explorat on.

3.4 Climate Analysis

Climate Analysis: Cloudy, Sunny & Precipitat on Days in Delhi

Integrat ng Architectural and Campus Design Responses

Delhi's monthly pat erns of sunshine, cloud cover, and rainfall directly inform architectural decisions for Ambedkar University Delhi's Rohini campus. Below is an expanded table of climat c metrics, followed by targeted design strategies for each seasonal condit on.

Month	Rainy Days	Avg. Daily Sunshine (hrs)	Cloudiness	Architectural/Design Implicat ons
January	2	7.1	Very clear	- Maximize daylight harvest ng through south-facing fenestrat on and clerestories. - Incorporate outdoor breakout spaces.
February	3	7.9	Mostly clear	- Use passive solar heat ng in lecture halls via angled louvers. - Provide glazed walkways to connect buildings.
March	3	8.1	Clear–partly cloudy	- Design operable shading (brise-soleil) to adapt to increasing sun. - Orient courtyards for cross-vent lat on.
April	3	9.2	Cumulus buildup	- Deep verandas and recessed windows to cut glare. - Integrate photovoltaic canopies over circulat on paths.

Month	Rainy Days	Avg. Daily Sunshine (hrs)	Cloudiness	Architectural/Design Implicat ons
May	4	9.5	Hazy, hot	- High-albedo roof f nishes and green roofs to lower heat gain. - Stack-vent lat on shaf s in academic blocks.
June	6	7.3	Pre-monsoon overcast	- Covered pedestrian routes with translucent roof ng. - Rainwater harvest ng in pergola collectors.
July	10	5.8	Heavily cloudy	- Daylight tubes or light shelves to brighten interiors. - Landscape bio-swales and retent on ponds for stormwater.
August	13	5.5	Heavily cloudy	- Flexible indoor-outdoor classrooms with operable walls. - Elevated plinths and f ood-resilient ground f oors.
September	7	7.3	Partly cloudy	- Adjustable louvered facades for mixed sun/cloud condit ons. - West-facing shading screens on hostels.
October	2	8.4	Mostly clear	- Outdoor lecture terraces and amphitheaters. - Exposed thermal mass in walls for diurnal comfort.
November	0	7.8	Clear	- Large operable windows for natural vent lat on. - South-oriented solar collectors for water heat ng.
December	1	7.0	Clear	- Winter garden spaces to capture sun. - Insulated glazing in resident al blocks to retain heat.

3.4.1 Key Design Strategies by Season

1. **Winter Clarity (Nov–Feb)**
    - Leverage clear skies for passive solar heat ng and daylight in classrooms.
    - Provide sunlit courtyards with seat ng for informal study.
2. **Pre-Monsoon Heat & Haze (Mar–Jun)**
    - Deploy deep overhangs, high-performance glazing, and ref ect ve materials to minimize cooling loads.
    - Integrate solar PV panels into shading structures to harness abundant solar radiat on.
3. **Monsoon Overcast (Jul–Aug)**
    - Ensure cont nuous covered walkways and canopies to protect from heavy rain.
    - Ut lize daylight ng devices (light shelves, tubular skylights) to reduce art f cial light ng needs.
    - Design robust stormwater management: bioswales, rain gardens, and underground cisterns.
4. **Transit onal Comfort (Sep–Oct)**
    - Implement adjustable façade elements—louvres, perforated screens—to balance sun and shade.
    - Openable windows and vent lated roofs to exploit comfortable temperatures.

3.4.2 Campus-Wide Integrat ons

- **Rainwater Harvest ng & Reuse:**
  Locate collect on in pergolas and canopy gut ers; store in underground tanks for irrigat on and WC f ushing.
- **Landscape-Driven Microclimate:**
  Use clustered tree plant ng, shaded arcades, and evaporat ve mist ng in plazas to reduce ambient temperatures.
- **Solar Energy Infrastructure:**
  Orient roof-mounted PV arrays on f at slabs and integrate building-integrated PV on facades facing south and west.

- **Pedestrian-First Mobility:**
  Plan covered, greened promenades that double as thermal buf ers and social spaces, aligning with masterplan circulat on axes.

These climate-responsive architectural strategies ensure that Ambedkar University Delhi's Rohini campus remains comfortable, sustainable, and operat onally ef cient throughout Delhi's varied seasonal condit ons.

Five Climate-Responsive Design Inferences for Ambedkar University Delhi Campus

Inference 1: Predominant Westerly Winds Support Courtyard Vent lat on
Delhi's prevailing winds blow from the west–northwest during summer months, providing natural cooling through cross-vent lat on. Orient ng academic clusters and courtyards along an east–west axis will harness these breezes to reduce indoor temperatures and mechanical cooling loads, part cularly during April–June.

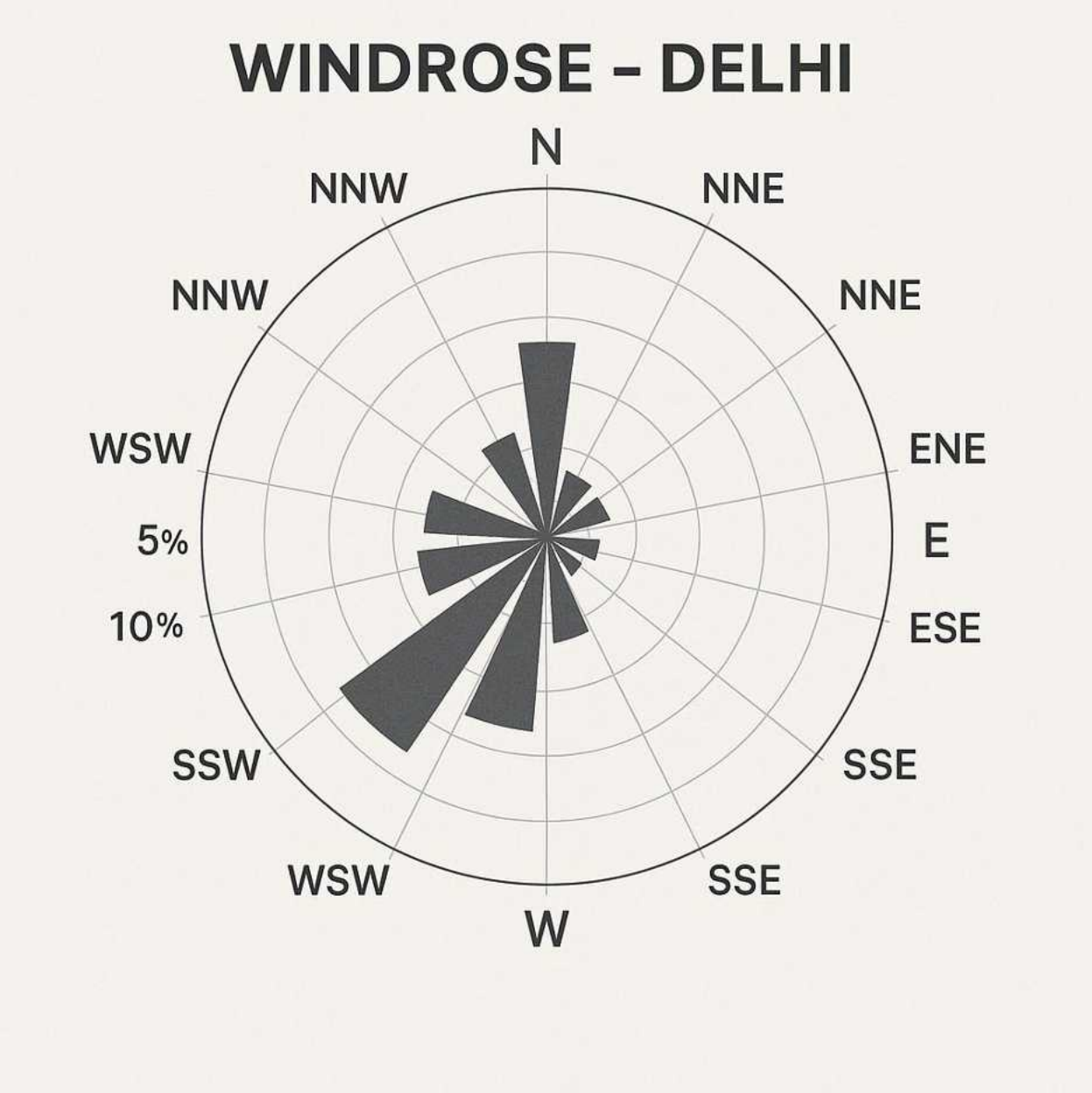


Figure 5Windrose showing Delhi's prevailing wind direct ons

Inference 2: Peak Monsoon Rainfall Demands Robust Stormwater Management
July and August average 10 and 13 rainy days respect vely, with heavy downpours concentrated in two months. Designing bio-swales, rain gardens, and underground cisterns sized for 235 mm monthly rainfall in August will mit gate waterlogging, recharge groundwater, and support greywater reuse for landscape irrigat on.

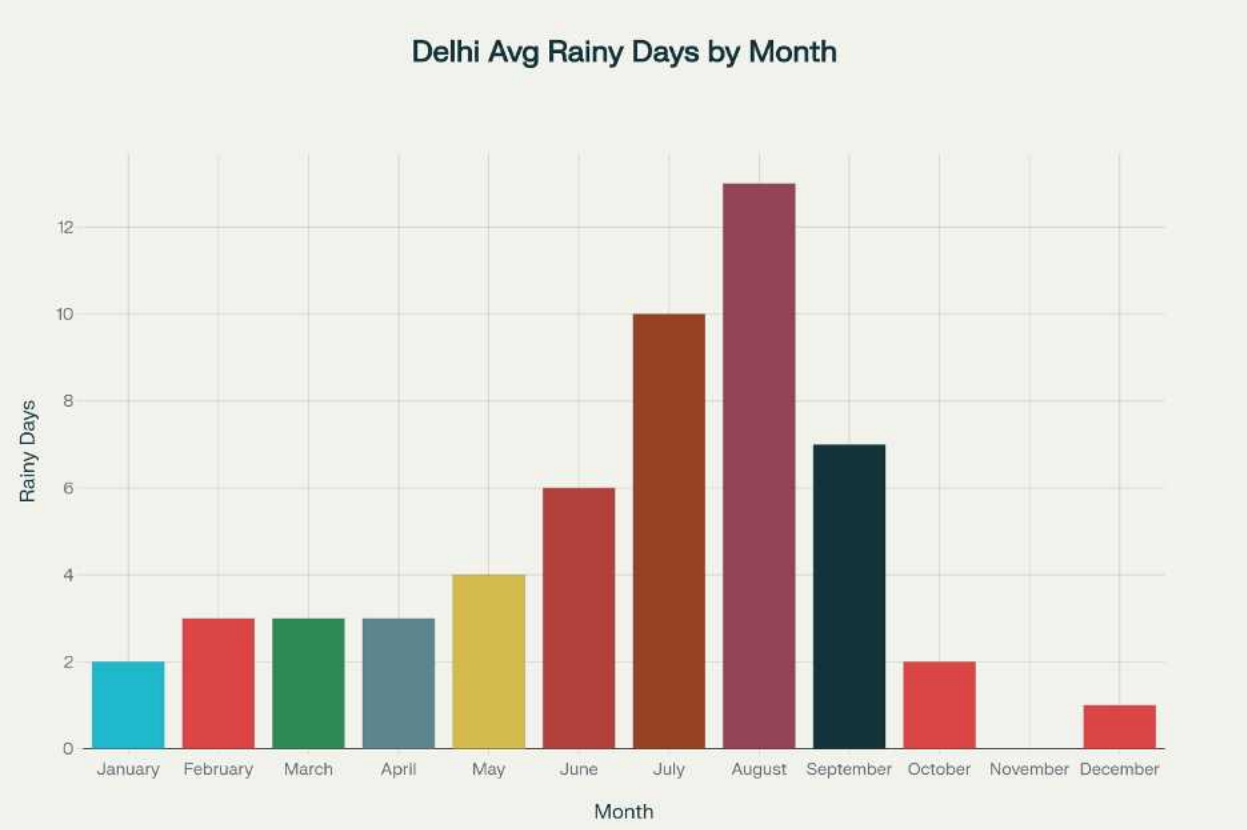


Figure 6Average monthly rainy days in Delhi

Inference 3: High Pre-Monsoon Solar Insolat on Enables PV and Solar Shading
May records nearly 9.5 hours of sunshine with global insolat on around 5.5 kWh/m²/day. Integrat ng photovoltaic canopies over shaded walkways and deep overhangs on south-facing façades will both generate renewable energy and cut direct solar gain, enhancing comfort in lecture halls and corridors.

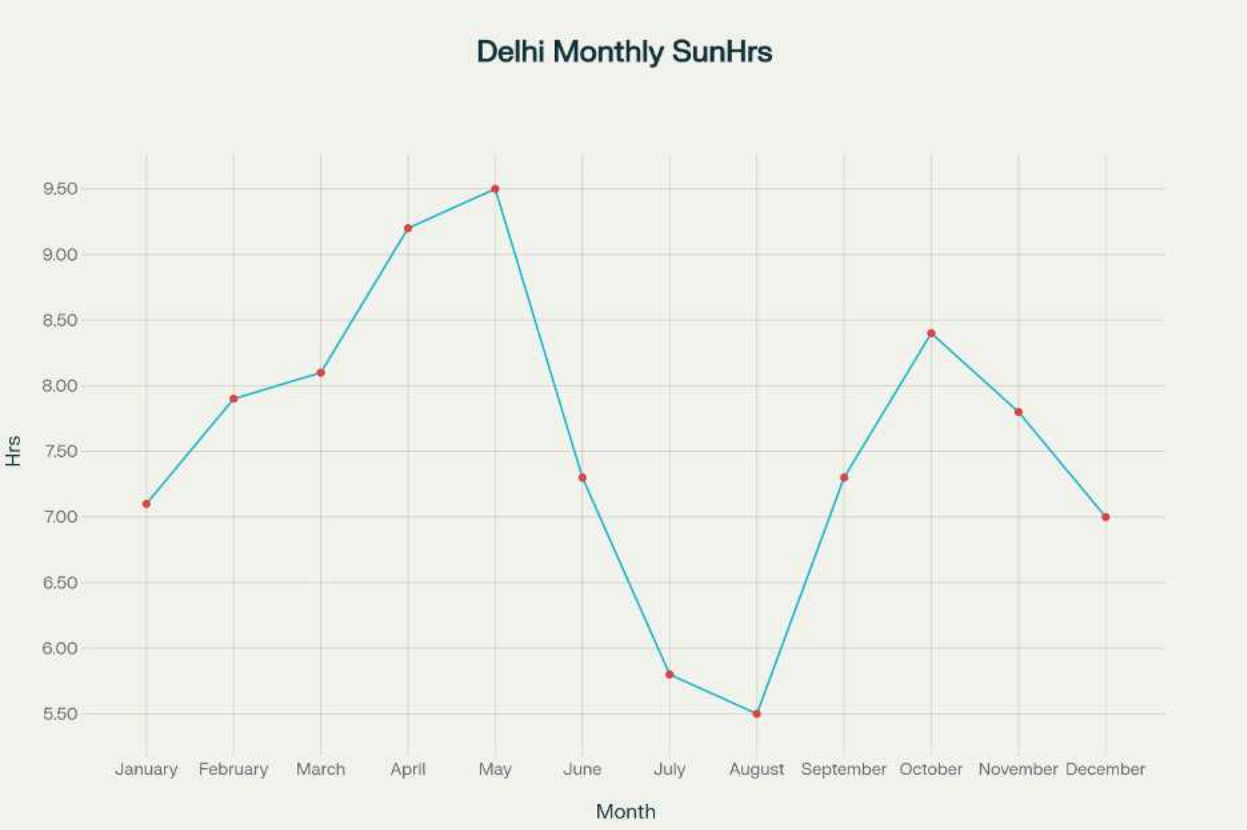


Figure 7Average monthly sunshine hours in Delhi

Inference 4: Elevated Humidity in Monsoon Requires Enhanced Daylight ng Strategies
Relat ve humidity peaks above 80% with minimal sunshine in July–August, result ng in overcast condit ons. Installing daylight tubes, light shelves, and high-ref ectance interior surfaces will maintain adequate illuminat on levels in academic spaces while minimizing reliance on art f cial light ng.

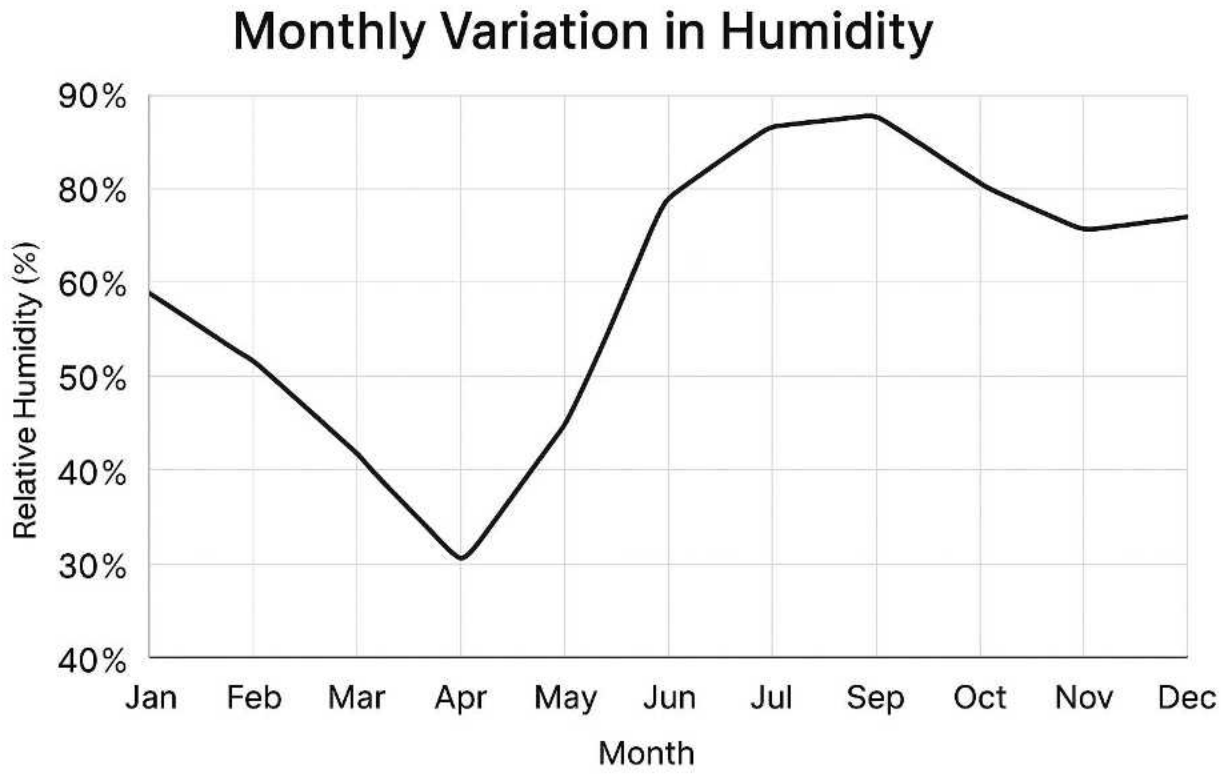


Figure 8Monthly average relat ve humidity in Delhi

Inference 5: Extreme Summer Heat Calls for Thermal Mass and Night-Flush Cooling
Average maximum temperatures reach up to 42 °C in June, with nocturnal cooling limited by urban heat island ef ects. Incorporat ng high-thermal-mass materials (exposed concrete, brick) and designing operable clerestories for stack-ef ect vent lat on will exploit cooler night air to pre-cool building envelopes, reducing dayt me peak loads.

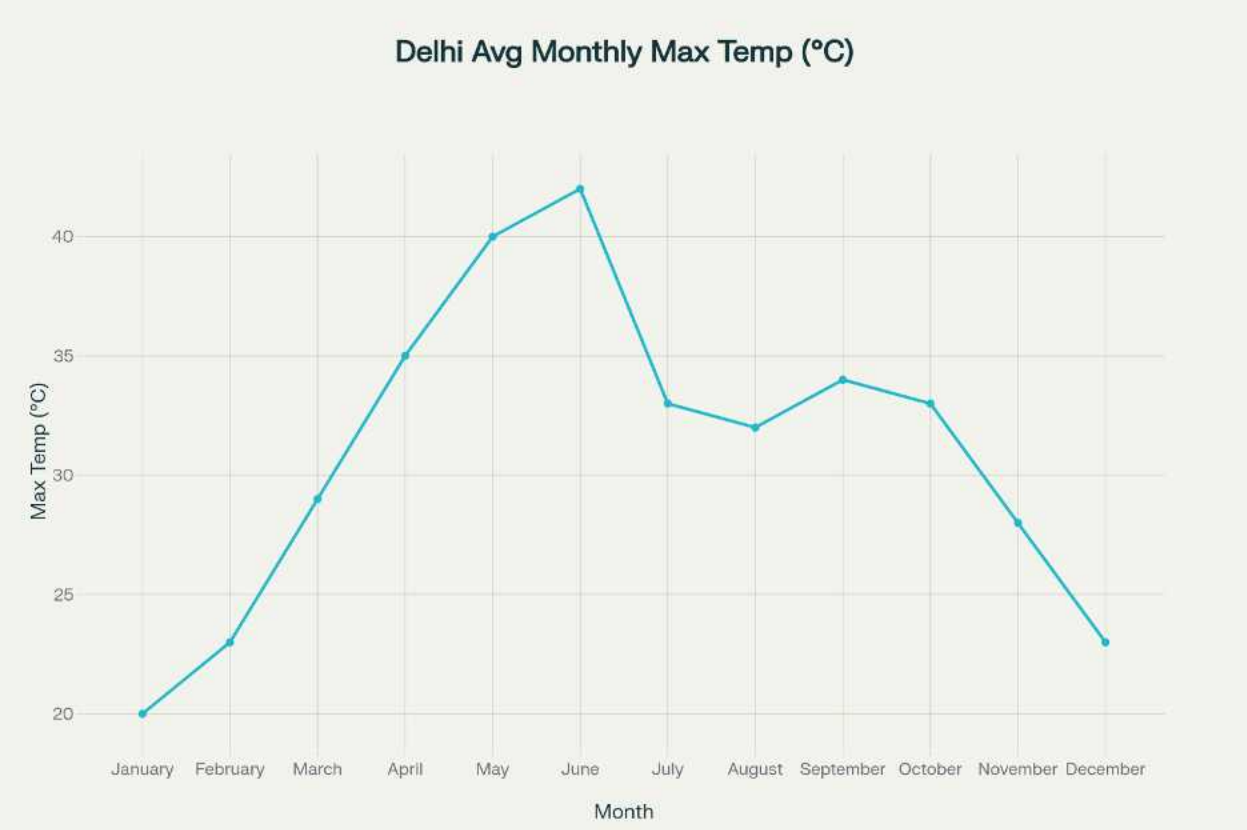


Figure 9Average monthly maximum temperatures in Delhi

3.5 Topography

Topography of the Ambedkar University Delhi Rohini Campus Site

The 7.3 ha campus parcel in Sector 3, Rohini, lies on a generally gentle, northwest-sloping terrain within the north-west Delhi sub-city. Topographic characterist cs are summarized as follows:

1. **Elevat on Range**
    - Minimum Elevat on: 214 m above mean sea level (AMSL)
    - Maximum Elevat on: 220 m AMSL

- Average Elevat on: 218 m AMSL 1

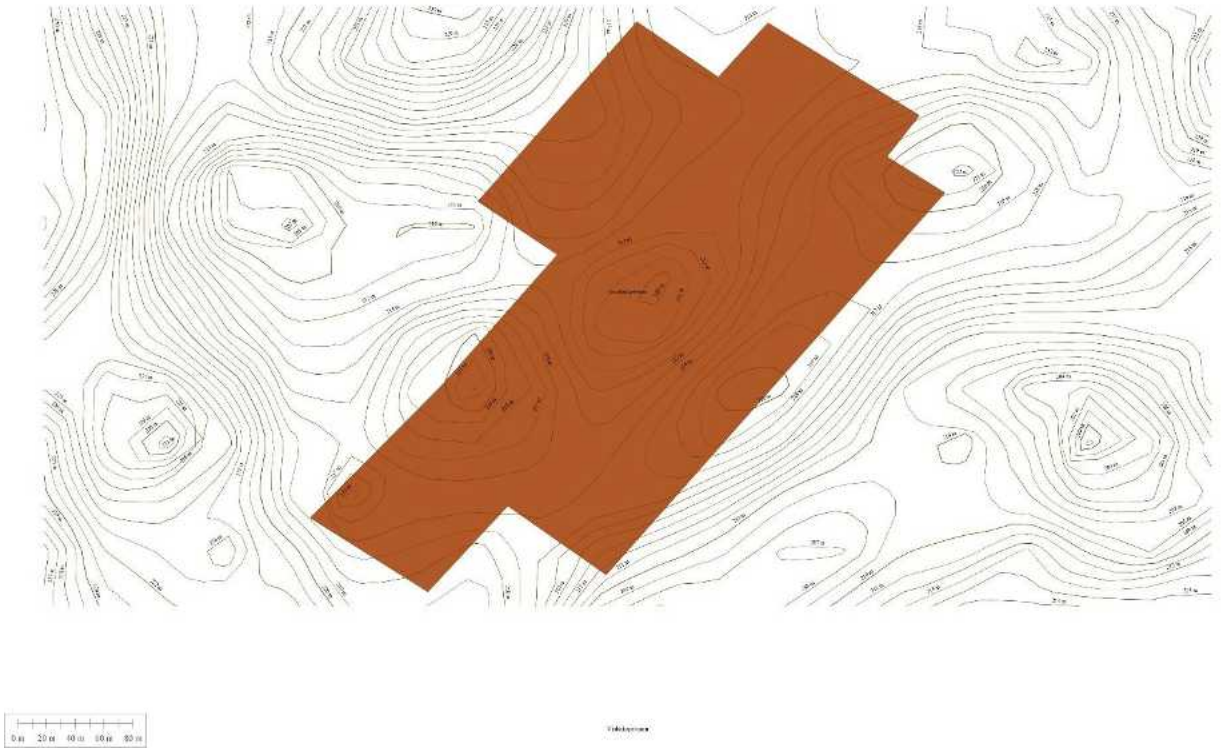


Figure 10Topography of site

2. **Slope and Drainage**
    - Overall gradient: approximately 0.8%–1.0% (6–7 m vert cal change over the 700 m north–south site dimension), sloping downward toward the northeast and central low-lying depression.
    - Natural surface f ow converges into this central dip, requiring bioretent on swales or engineered stormwater conveyance to prevent localized waterlogging.
3. **Contour Layout**
    - Contour lines are roughly parallel to the 13.5 m spine road that bisects the site, indicat ng a subtle slope from the higher western edge (220 m) down to the lower eastern edge (214 m).
    - The modest relief permits largely level building plat orms, with minimal cut/f ll earthworks.
4. **Design Implicat ons**

- **Building Placement:** Inst tut onal and resident al clusters can be sited on the higher western plateau, with academic courtyards and landscape terraces stepping down gently toward the central depression.
- **Stormwater Management:** Incorporate linear bioswales along the spine road to intercept runof , direct ng collected water into an underground cistern located at the site low point for reuse in irrigat on and sanitat on.
- **Accessibility & Grading:** The shallow slopes (<1%) facilitate universal access; ramp gradients and path alignments can follow exist ng grade lines with minimal intrusion into natural topography.
- **Microclimate Strategy:** The slight elevat on dif erent al supports oriented wind-corridors—placing open plazas and courtyards in the down-slope central zone to harness prevailing westerly breezes for passive cooling.

5. **Comparison with Surrounding Context**
    - Surrounding Sector 3 average terrain elevat on aligns with 216–218 m AMSL across adjacent sectors, conf rming consistency in the sub-city's relat vely f at topography and simplifying infrastructure t e-ins to municipal storm sewers and ut lit es 12.

In summary, the Rohini Sector 3 site of ers a mild, predictable slope ideal for integrated landscape-driven drainage, level building plat orms, and accessible circulat on, all of which support a climate-responsive, easily serviceable campus design.

3.6 Vegetat on of Delhi

Delhi's vegetat on is shaped by its **semi-arid climate**, historic land use, and urbanizat on. The city falls within the **Northern Tropical Thorn Forest** biome with remnants of **Ridge Forests**, wetlands, cult vated green spaces, and an expanding urban tree canopy. Detailed subtopics follow.

3.6.1 Natural Forest Types

Northern Tropical Thorn Forest

This dry-scrub ecosystem dominates Delhi outside the Yamuna f oodplain.

- **Key Trees:** Prosopis julif ora*, Acacia nilot ca*, Salvadora persica, Butea monosperma (Palash), Cassia f stula (Amaltas)1.
- **Shrubs & Herbs:** Capparis sepiaria, Ziziphus maurit ana, Calotropis procera, Withania somnifera.
- **Grasses:** Cenchrus ciliaris, Arist da spp., Saccharum spontaneum1.
  *Prosopis julif ora is invasive but widespread, covering >8 sq km of Delhi2.

Ridge Forest (Semi-Arid Open Scrub)

The Aravalli ridge within Delhi supports unique scrub and rocky habitats.

- **Vegetat on:** Thorny scrub interspersed with xerophyt c herbs.
- **Notable Species:** Euphorbia spp., Acacia modesta, cactus species, Olax psit acorum.
- **Ecological Role:** Acts as Delhi's "green lung," traps dust, moderates temperatures, supports migratory birds3.

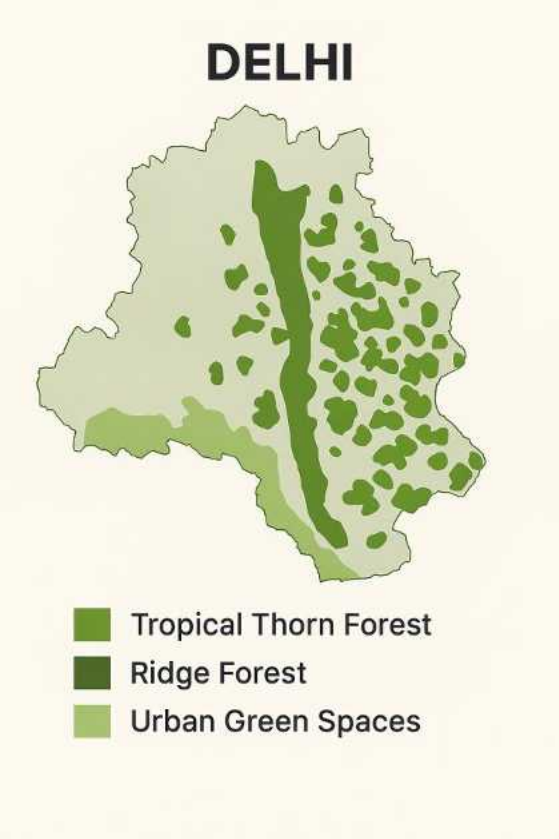


Figure 11vegetat on spread in delhi

Vegetat on zones of Delhi showing thorn forests, Ridge forest, and urban parks

Nat ve Urban Trees (Trees Outside Forests)

Delhi's non-forest tree cover (176 sq km in 2023) includes nat ve and cult vated species4:

Species	Relat ve Abundance (Urban TOF)	Use
Azadirachta indica (Neem)	10.5%2	Air purif cat on, shade
Morus spp. (Mulberry)	7.2%2	Fruit, local ecology
Polyalthia longifolia (Ashoka)	7.0%2	Avenue tree, ornamental
Ficus religiosa (Peepal)	6.5%2	Sacred tree, shade
Prosopis julif ora*	5.9%2	Invasive scrub

Flowering & Aesthet c Canopy

Seasonal blooms enrich Delhi's landscape:

- **Spring (Mar–Apr):** Gulmohar (Delonix regia), Jacaranda (Jacaranda mimosifolia), Spathodea (African tulip).
- **Summer (Apr–Jun):** Palash (Butea monosperma) displays scarlet f owers; Bougainvillea climbers add colour5.
- **Monsoon/Winter:** Cassia f stula (Amaltas), Bauhinia (Kachnar), Bougainvillea cont nue blooms, enhancing biodiversity5.

Shrub Layer & Understory

Shrubs are central to Delhi's greening drives (20 lakh shrubs of 27.6 lakh saplings in 2022-23)6:

- **Nat ve Shrubs:** Lantana camara*, Capparis decidua, Carissa carandas.
- **Ecological Benef ts:** Dust control, low-canopy carbon sequestrat on, habitat corridors.

Wetland & Riparian Vegetat on

Along Yamuna f oodplains and wetlands (e.g., Okhla Bird Sanctuary), moisture-loving species prevail:

- **Reeds & Grasses:** Phragmites karka, Typha angust folia.
- **Aquat c Herbs:** Nelumbo nucifera (Lotus), Eichhornia crassipes*.
- **Role:** Water f ltrat on, bird habitat, f ood mit gat on.

Invasive Species Challenge

Delhi's vegetat on is threatened by invasives:

- **Prosopis julif ora:** Dominates Thorn Forest, displacing nat ves2.
- **Lantana camara:** Undergrowth pioneer, reduces biodiversity2.
- **Management:** Af orestat on with hardy nat ve species (Peepal, Neem, Jamun, Arjun)7.

Urban Green Space & Planning

Delhi's parks and biodiversity zones integrate nat ve f ora:

- **Biodiversity Parks:** Yamuna Biodiversity Park reintroduces nat ve trees (e.g., Dhau, Khirni).
- **Street Trees:** Shif toward pollut on-tolerant nat ves per Compensatory Af orestat on list (Ficus spp., Terminalia spp., Azadirachta indica)7.
- **Policy Impact:** Delhi's green cover rose to 25% in 2023, driven by both tree and urban forest expansions4.

Delhi's vegetat on spectrum—from **thorn scrub** and **Ridge forests** to **urban tree lanes** and **wetland f ora**—underpins climate resilience, ecological balance, and community well-being. Strategic plantat on with nat ve species, invasive control, and green space design will sustain Delhi's urban biodiversity and environmental health.

3.6.2 Fauna of the Rohini Sector-3 Campus Site

The green pockets, remnant scrubland, and intervening urban forests around Sector 3, Rohini support a surprising diversity of wildlife. This fauna inventory, organized by major taxonomic groups, focuses on species most likely to occur in and around the proposed Ambedkar University Delhi campus.

1. Mammals

The northern Aravalli foothills and urban parks harbor both large and small mammals.

Common Name	Scient f c Name	Notes
Golden Jackal	Canis aureus	Frequent in Delhi Ridge fragments and sanctuary edges; nocturnal and crepuscular1.
Indian Crested Porcupine	Hystrix indica	Herbivorous, burrowing species in scrub and parkland; act ve at dusk1.

Common Name	Scient f c Name	Notes
Bengal Fox	Vulpes bengalensis	Prefers open scrub and fallow land; occasionally ventures into parks at dawn/dusk1.
Nilgai (Blue Bull)	Boselaphus tragocamelus	The largest antelope in Delhi's green spaces; grazes on grasses in sparse woodland2.
Small Indian Civet	Viverricula indica	Nocturnal, arboreal carnivore in urban forests and large gardens; controls rodent pests3.
Rhesus Macaque	Macaca mulat a	Ubiquitous in gardens and temple precincts; highly adaptable to human presence3.
Indian Grey Mongoose	Urva edwardsii	Diurnal omnivore common along trails and edges of wooded areas3.

Birds

Over 100 resident and migratory species ut lize the campus vicinity, especially near water bodies and tree-lined avenues.

Common Name	Scient f c Name	Habitat & Behavior
Rose-ringed Parakeet	Psit acula krameri	Roosts communally in tall trees; vocal f ocks around buildings and parks4.
Indian Peafowl	Pavo cristatus	Prefers scrub fringes; displays in open lawns and edges of wooded areas4.
Black-winged St lt	Himantopus himantopus	Forages in shallow ponds and stormwater wetlands; seen on campus drains5.
White-throated Kingf sher	Halcyon smyrnensis	Hunts insects and small f sh along water bodies and canals5.
Red-vented Bulbul	Pycnonotus cafer	Ubiquitous in gardens, feeds on fruits and insects; nests in hedges4.
Oriental Magpie-Robin	Copsychus saularis	Prefers open woodland and campus corridors; insect vorous4.

Common Name	Scient f c Name	Habitat & Behavior
Spot ed Owlet	Athene brama	Roosts in hollow trees and building eaves; nocturnal insect vore6.

Rept les & Amphibians

Remnant scrub, rocky outcrops, and damp depressions support a variety of herpetofauna.

Common Name	Scient f c Name	Notes
Indian Rat Snake	Ptyas mucosa	Synanthropic, common in green patches and drains; diurnal rodent predator7.
Spectacled Cobra	Naja naja	Occasional near water bodies and rubble; nocturnal defensive behavior7.
Common Wolf Snake	Lycodon aulicus	Nocturnal, slender, favors wall crevices in campus buildings and gardens7.
Bengal Monitor Lizard	Varanus bengalensis	Found in scrub and near water; forages on eggs, insects, and small vertebrates8.
Fan-throated Lizard	Sitana pont ceriana	Sun-loving, perched on open ground during pre-monsoon months (March–May)9.
Common Indian Toad	Dut aphrynus melanost ctus	Breeds in temporary pools; abundant af er rains in campus depressions9.

Insects & Arachnids

The semi-arid set ng and landscaped gardens provide niches for pollinators and predators.

Common Name	Scient f c Name	Notes
Indian Peafowl	(see birds)	
Desert Locust (seasonal visitor)	Schistocerca gregaria	Passes through scrubland during pre-monsoon; transient10.
Indian Scorpion	Heterometrus bengalensis	Under stones and debris in scrub; nocturnal predator10.

Common Name	Scient f c Name	Notes
Spot ed Deer (Axis axis)	(listed under mammals)	
Common Kite	Milvus migrans	Soars over campus; feeds on small rodents and carcasses4.
Asian Ladybird	Harmonia axyridis	Frequent on f owering shrubs; natural aphid control.

This fauna inventory highlights species groups integral to the campus ecology. Conservat on of scrub patches, water management features, and green corridors will support this diverse assemblage, enhancing both biodiversity and educat onal opportunit es.

3.6.3 Detailed Analysis of Vegetat on and Design Prospects

The vegetat ve species documented on your site of er substant al funct onal, ecological, and aesthet c advantages. Below is a technical assessment for each—covering ecological at ributes, design/plant ng recommendat ons, and site prospects.

1. Calcut a Bamboo (Dendrocalamus strictus)

- **Technical Overview:**
    - Tall, evergreen, clumping bamboo (8–20m).
    - Thick, woody culms (2.5–8cm diameter); can become solid in dry zones12.
    - Nat ve to Indian tropical/subtropical regions.
    - Fast growing, tolerates full sun to part shade, prefers warm temperatures above 20°C.
- **Ecological/Design Prospects:**
    - Excellent for screening, windbreaks, rapid green barriers, and erosion control.
    - Useful as a privacy buf er or density moderator in campus edges and vehicle-prone zones.
    - Can stabilize slopes or degraded soil due to robust rhizome network.
    - Root barriers recommended to avoid unwanted spread.
    - Potent al for eco-construct on (temporary pavilions, outdoor furniture).

- **Plant ng Strategy:**
    - Place along periphery as natural fence.
    - Pair with tree/shrub layers for visual relief.
    - Ensure regular but non-waterlogged moisture.



Figure 12Dendrocalamus strictus bamboo clump showing tall segmented stems and narrow green leaves

2. Stargoose Berry (Phyllanthus acidus)

- **Technical Overview:**
    - Deciduous tree, 6–10m tall.
    - Dense clusters of ribbed, tart fruits—high in vitamin C, calcium, ant oxidants34.
    - Fruits mature within 90–100 days; yields are periodic throughout the year.
- **Ecological/Design Prospects:**
    - At racts birds and benef cial insects.
    - Promote as a minor edible grove in communal or student-access areas.
    - Fruit is used for pickles, relishes; shade is moderate.
    - Tree tolerates tropical sun, some drought.
- **Plant ng Strategy:**

- Integrated in edible gardens, orchard strips, or as focal points in courtyards.
- Support with moderate irrigat on and drainage.



Figure 13Clusters of yellow-green star gooseberries (Phyllanthus acidus) growing on a leafy tree branch

3. Bauhinia Tree (Bauhinia acuminata/variegata)

- **Technical Overview:**
  - Small to medium tree (up to 20f /6m).
  - Dist nct but erf y- or orchid-like white/purple f owers; non-toxic, edible parts56.
  - Used for shade, live fencing, ornamental displays, and soil enrichment (improves fert lity).

- **Ecological/Design Prospects:**
  - Employed in shelterbelts, mixed plant ngs, and along avenues.
  - Useful in reclamat on of degraded soils and for landscape accent/biodiversity value.
  - Flowers at ract pollinators; low allergenic impact.
- **Plant ng Strategy:**
  - Feature in courtyards, approach roads, or micro-parks.

- Combine with groundcovers to suppress weed growth.



Figure 14Bauhinia x blakeana trees with bright pink f owers growing in large pots at a nursery

4. Neem Tree (Azadirachta indica)

- **Technical Overview:**
  - Evergreen, up to 15–20m, deeply root ng, broad canopy.
  - Renowned for its medicinal, ant bacterial, ant fungal, and air-purifying propert es[78].
  - Leaves, seeds, and bark all used in tradit onal health systems.
- **Ecological/Design Prospects:**
  - Excellent for avenue plant ng, playground perimeters, or open seat ng shade.
  - Repels insects, purif es air, and supports biodiversity.
  - Drought resistant once established—suitable for minimal water regimes.
- **Plant ng Strategy:**
  - Space adequately (8–10m apart) to allow full canopy spread.
  - Priority placement near built areas for cooling and mosquito management.



Figure 15A neem tree (Azadirachta indica) standing in a dry f eld with lush green foliage

5. Black Locust Tree (Robinia pseudoacacia)

- **Technical Overview:**
  - Medium-sized deciduous hardwood (12–30m).
  - Nitrogen-f xing roots, improves soil fert lity[910].
  - Hard, rot-resistant wood; prolif c seed pod product on.
- **Ecological/Design Prospects:**
  - Used in reclamat on, rapid af orestat on, and as windbreaks.
  - Caut on: Can be invasive, so carefully monitor expansion.
  - Benef ts for silvopasture or soil improvement zones.
- **Plant ng Strategy:**
  - Locate at site perimeters or degraded corners for rapid cover.
  - Combine with nat ve shrubs to balance spread.



Figure 16Dried seed pods of the Black Locust tree (Robinia pseudoacacia) hanging from a branch

6. Mango Tree (Mangifera indica) – Outside Boundary

- **Technical Overview:**
  - Large, evergreen, dense-canopied tree (15–18m)1112.
  - Long-lived, ornamental and fruit-yielding.
  - Deep root ng; thrives best where soils allow adequate drainage and in subtropics/tropics.
- **Ecological/Design Prospects:**
  - High ecosystem value: provides deep shade, fruit harvest, and wildlife habitat.
  - Suitable at entry thresholds, outdoor gathering spaces outside primary boundary.
  - Cultural signif cance, enhances campus biography/ident ty.
- **Plant ng Strategy:**
  - Allow space for mature canopy (10–12m spread).
  - Avoid within core campus due to heavy leaf/falling fruit but valuable for boundary and adjacent public use.



Figure 17Unripe green mangoes hanging on a branch of a healthy mango tree (Mangifera indica) with vibrant green leaves

7. Peepal Tree (Ficus religiosa) – Outside Boundary

- **Technical Overview:**
  - Large, broad-canopied, long-lived tree (up to 30m or more)[1314].
  - Air-purifying; top t er in oxygen product on and carbon sequestrat on.
  - Keystone ecological/urban resource in India.
- **Ecological/Design Prospects:**
  - Sacred status, fosters social/communal gathering under its shade.
  - Habitat for birds, insects, and small mammals.
  - Used as anchor/focus in external plazas, parks, or buf er landscapes.
- **Plant ng Strategy:**
  - Place in large outdoor courts or outside boundary with seat ng edges.
  - Consider for cistern/pond edges to maximize cooling ef ect.

Integrated Design & Plant ng Prospects for Site

Species	Main Funct ons	Ideal Locat on / Pairing	Special Notes
Calcut a Bamboo	Screening, Erosion, Green Wall	Site edge, windbreak, outdoor screens	Contain rhizomes
Stargoose Berry	Edible, Biodiversity, Accent	Edible grove, orchard, courtyards	Moderate irrigat on
Bauhinia	Shade, Soil, Flower Accent	Parks, avenues, mixed beds	Low maintenance
Neem	Shade, Medicinal, Air Quality	Close to buildings, streets	Avoid over-crowding
Black Locust	Soil, Fast Cover, Windbreak	Perimeters, degraded soils	May be invasive
Mango (outside)	Shade, Fruit, Habitat	Peripheral, open plazas	Avoid core/leaf drop
Peepal (outside)	Sacred, Focal, Cooling	External plazas, community open space	Requires space

3.6.4 Design Notes:

- Intermingle regular canopies (Neem, Mango, Peepal) with midstorey accent and screening (Bamboo, Bauhinia).
- Dedicate an edible/local fruit zone (Stargoose berry, Mango).
- Employ Bamboo and Locust for rapid density and ecological repairs, but manage with barriers and controls.
- Keep Peepal as landmark heritage or community gathering space.
- Ensure all new tree plant ng respects growth forms, spacing, and root spread for coexistence and minimal maintenance.

This blend will enhance biodiversity, comfort, visual character, and resilience across your site while aligning with ecological and social priorit es of an academic campus.

Human Culture and Project Demand in Rohini and Delhi

Main Takeaway

The success of Ambedkar University Delhi's Rohini campus hinges on understanding Delhi's **pluralist c culture**, **rapidly rising demand for higher educat on**, and **local community expectat ons**. Technical planning must integrate social equity, cultural inclusivity, and capacity scaling to serve a diverse student body and a dynamic labor market.

3.7 Cultural Pluralism of Delhi

3.7.1 Delhi's ident ty

Mult ethnic Composit on: Indo-Aryans (72%), Dravidians (25%), smaller Mongoloid and other groups1.

- **Linguist c Diversity**: Hindi (81%), Punjabi (7%), Urdu (6%), English widely used in academia12.
- **Religious Mosaic**: Hinduism (81.7%), Islam (12.8%), Sikhism (4.4%), Christ anity (0.9%), Jainism (1.4%), Buddhism (0.1%)23.
- **Migrant Inf ux**: Large-scale inf ows from Bihar, UP, Bengal, Tamil Nadu—fueling "homogeneous coexistence of diversity" and fostering cosmopolitanism4.

Implicat on: Campus design and programming must of er mult purpose cultural auditoria, interfaith spaces, and f exible commons to host diverse fest vals, dialogues, and community events.

2. Socioeconomic Prof le and Urban Aspirat ons

- **Populat on Density**: ~34.7 million metro residents (2025)15. High urban pressure but also abundant human capital.
- **Literacy Rate**: 86% overall; male 91%, female 81%1. Delhi outperforms nat onal averages, indicat ng readiness for advanced academic pursuits.
- **Slum Populat on**: ~14.7% living in informal set lements2, underscoring the need for social outreach and af ordability programs.

Implicat on: The university must embed scholarship schemes, community engagement labs, and skill-development centers target ng under-served cohorts to reinforce social equity.

3. Demand for Higher Educat on

- **Seat Growth**: Higher-educat on seats rose from 110,000 (2015) to 150,000 (2024)6. DU colleges expansions and f ve new universit es since 2015 ref ect policy emphasis.

- **Gross Enrolment Rat o (GER)**: Delhi's tert ary GER reached 49% in 2021 (nat onal target 50% by 2035 under NEP-2020)78.
- **Projected Intake**: AISHE forecasts 70 million enrollments nat onwide by 2030 to hit 50% GER, with Delhi playing a leading role9.
- **Female Parity**: Female GER for 18–23 age group nearly doubled, surpassing males (49.7% vs. 48.3% in 2021-22), signaling growing female part cipat on10.

Implicat on: Campus capacity must be sized for phased intake surges (init al 8,000 expanding to near 20,000); design for gender-sensit ve residences, childcare, and safety provisions.

4. Cultural Programming and Curriculum Relevance

- **Mughal Legacy & Contemporary Arts**: Preserve Delhi's heritage by integrat ng modules on Mughal art (miniature paint ng), Qawwali music, and urban folklore, with dedicated studios and performance spaces11.
- **Language & Literary Studies**: Ref ect Delhi's vernacular mix—of er courses and labs in Hindi, Urdu, Punjabi, and English communicat on to serve both local and migrant students.
- **Fest val Calendars**: Campus planners must allocate event plazas and knockout rooms support ng Durga Puja, Diwali, Eid, Guru Nanak Jayant , Christmas, fostering intercultural exchange.

Implicat on: Flexible "cultural marketplace" spaces should be embedded in the master plan to rotate craf s, cuisine fairs, f lm screenings, and academic seminars, reinforcing Delhi's living heritage.

5. Market and Labor Alignment

- **Policy Drives**: Government targets 2% of GSDP in educat on by 2027 to expand capacity and quality12. Delhi's GSDP share in educat on rising.
- **Skill Imperat ves**: Growing demand for AI, data science, and vocat onal training has led to new skill universit es and world-class skill centers13.
- **Start-Up Ecosystem**: Delhi's start-ups grew from 228 (2023) to projected 797 (2027), necessitat ng campus incubat on labs, co-working hubs, and entrepreneurship corridors12.

Implicat on: Integrate innovat on labs, maker spaces, and industry collaborat on plat orms within campus clusters; curriculum design must align with emerging job markets and entrepreneurial trends.

6. Local Rohini Community and Cultural Nodes

- **Regional Fest val Pract ces**: Rohini residents celebrate Baisakhi, Lohri, Navratri with Punjabi-Haryanvi inf ect ons.
- **Urban Village Adjacency**: Nearby village enclaves (e.g., Dheerpur) preserve folk arts, rural craf smanship—opportunit es for community outreach studios.
- **Public Art**: Allocate 1% of project cost to site-specif c installat ons that resonate with local child-friendly murals and "Const tut on Spine" sculpture themes.

Implicat on: Campus design must feature part cipatory art projects, craf -integrated workshops, and public-engagement galleries to honor and integrate immediate neighborhood cultures.

7. Technical and Planning Recommendat ons

1. **Phased Capacity Scaling**: Init al Phase I for 8,000 students, with infrastructure backbone—roads, ut lit es, green networks—designed for seamless expansion to 20,000+.
2. **Inclusive Design**: Gender-responsive hostels, universal accessibility per RPwD Act, and child-care facilit es ensure equitable campus access.
3. **Cultural Nodes**: Mult -funct onal auditoria, open-air amphitheaters, and f exible exhibit on halls sited strategically along pedestrian promenades.
4. **Community Integrat on**: Co-located community center host ng local migrant associat ons, weekend markets, and craf bazaars.
5. **Curriculum Infrastructure**: Dedicated labs for language, performing arts, digital fabricat on, and entrepreneurial incubat on within academic clusters.

By weaving Delhi's rich cultural fabric, demographic dynamism, and surging higher-educat on demand into the campus's architectural and programmat c DNA, Ambedkar University Delhi at Rohini can emerge as a **culturally responsive**, **socially inclusive**, and **economically impact ul** educat onal landmark.

3.7.2 Site Context and Urban Integrat on

Main Takeaway: IIT Delhi's Hauz Khas campus is uniquely embedded within Delhi's historic urban fabric, f anked by the Qutb Minar and Hauz Khas monuments, requiring a design that balances heritage preservat on, connect vity, and contemporary campus needs.

Campus Boundaries and Heritage Interfaces

The 320-acre (1.3 km²) main campus is bounded by:

- Sri Aurobindo Marg (East)
- Jawaharlal Nehru University complex (West)
- NCERT headquarters (South)
- New Ring Road (North)

It directly abuts the Qutb Minar and Hauz Khas monuments, necessitat ng careful treatment of sightlines, building heights, and materiality to respect UNESCO heritage zones1.

Topography and Exist ng Landscape

The site slopes gently from southwest to northeast, with historic water bodies (Hauz Khas Lake) and mature trees framing key vistas. Preservat on of exist ng banyan and peepal trees informed the road network and building footprints, minimizing site disturbance.

Urban Connect vity

Two metro stat ons (Main Gate at Gate 1 and Hostel Gate at Gate 5) integrate IIT Delhi with Delhi Metro's Yellow Line. Major bus routes along Sri Aurobindo Marg and internal shut le services connect academic, resident al, and recreat onal precincts, ensuring mult modal access.

Conservat on Zones and View Corridors

To protect the Qutb Minar's UNESCO buf er, building heights in the eastern academic core are limited to four stories, with stepped terraces and staggered massing to maintain unobstructed views toward the minaret1.

Campus Map

A detailed masterplan delineates funct onal zones—academic, resident al, recreat onal, service—and heritage interfaces:

Zone	Key Features
Academic Core (Blocks B1–B6)	Laboratories, lecture theatres, Central Library
Student Resident al Precinct	Boys' Hostels H1–H12, Girls' Hostels H13–H15
Faculty & Staf Housing	Apartments clustered around courtyards
Recreat onal Sector	Sports stadiums, open lawns, Student Act vity Centre
Service Corridor	Ut lity buildings, peripheral roads

4. Case Study

4.1 Nat onal Inst tute of Fashion Technology (NIFT), Delhi

Live Case Study Report



4.1.1 Introduct on and Project Background

The Evolut on of Fashion Educat on in India

Fashion and design educat on in India has seen signif cant transformat on since the mid-20th century. Tradit onally, Indian craf smanship and text le art stry were passed down through apprent ceships and informal family systems rather than formal inst tut ons. However, with globalizat on and India's growing economy in the post-independence era, the demand for professionally trained talent in the fashion and text le industries surged. This called for structured educat on plat orms to nurture creat vity, technical skills, and industry-oriented knowledge.

Established in 1986 by the Ministry of Text les, Government of India, the Nat onal Inst tute of Fashion Technology (NIFT) emerged as a pioneer inst tut on in this f eld. Conceived as a nat onal-level center for excellence in fashion design, technology, and management educat on, NIFT aimed to provide students with rigorous academic training coupled with hands-on industry

exposure. The Delhi campus, being the f agship inst tute, holds strategic importance in shaping India's fashion educat on landscape.

Project Genesis and Commissioning

The incept on of the NIFT Delhi campus was aligned with the Indian government's intent to promote modern design educat on and empower youth with skills relevant to a rapidly modernizing economy. The Ministry engaged celebrated architect Balkrishna Vithaldas Doshi, a disciple of Le Corbusier and Louis Kahn, to design a campus that not only fulf lls funct onal programmat c requirements but also embodies an educat onal philosophy through architecture.

Doshi, already renowned for his ability to blend modernism with Indian vernacular principles, was tasked with craf ing a campus that could catalyze creat vity, collaborat on, and organic growth. The site at Hauz Khas, Delhi—a historic neighborhood known for its blend of urban culture, tradit onal heritage sites, and proximity to academia—of ered a f t ng context to manifest these ideas.

Architect B.V. Doshi: Philosophy and Inf uence

B.V. Doshi's architectural outlook is deeply rooted in the context of social responsibility, cultural cont nuity, and environmental responsiveness. Reject ng the import of cold internat onalism, Doshi pioneered a modern Indian architecture vernacular, of en called *organic architecture*, which seeks harmony between human needs, natural factors, and cultural lineage.

Key inf uences in his work include:

- The spat al layering and communal clustering found in tradit onal Indian villages and cit es.
- The modernist ethos of funct onalism, clarity, and material honesty.
- The philosophy of educat on as a living, interact ve, and collaborat ve process—spat ally translated into community-focused design.

In the NIFT campus, Doshi envisioned architecture as a facilitator of interact on, explorat on, and adaptability rather than a f xed form. The campus would act as a dynamic organism growing in response to the evolving needs of its users.

Project Goals and Design Intent

The primary goals for the NIFT Delhi campus were:

- To create an academic environment conducive to innovat on in fashion and design studies.

- To promote social interact on among students, faculty, and the wider community.
- To incorporate f exibility for future expansion and evolut on.
- To be environmentally responsive to Delhi's climate.
- To represent Indian cultural ident ty and contemporary educat onal methodology.

Doshi's concept revolved around embedding these goals in every design decision—from site planning and circulat on to materials and spat al sequences.

Scope and Methodology of the Live Case Study

This live case study is a comprehensive analysis conducted through:

- Review of archival drawings, photographs, and project documentat on.
- Site visits focusing on spat al experience, funct onality, and usage pat erns.
- Informal interviews and feedback from campus users (students, faculty, and staf).
- Analysis of environmental, technical, and cultural aspects.
- Comparat ve studies with contemporary and subsequent educat onal designs.

4.1.2 Project Context, Site Analysis, and Client Requirements

The Urban Context and Signif cance of Locat on

The Nat onal Inst tute of Fashion Technology (NIFT) Delhi is strategically situated in the heart of Hauz Khas, a vibrant and historically signif cant neighborhood in South Delhi. Hauz Khas, known for its blend of ancient heritage, urban af uence, and dynamic student culture, of ered a dist nct ve set ng for the campus. The site is surrounded by key educat onal inst tut ons, creat ve hubs, and recreat onal green spaces, making it an appealing and sensible choice for a premier design educat on center.

Proximity to inst tut ons such as the Indian Inst tute of Technology (IIT) Delhi and Sri Aurobindo College, as well as to the celebrated Hauz Khas Village (renowned for its medieval reservoir, monuments, and contemporary art scene), fosters interdisciplinary exchange. This context not only enhances the campus's own ident ty but also situates its users within a broader cultural and academic ecosystem.

Situated on approximately 3 acres of land, the site's gently sloping topography and access points shaped many crit cal planning and spat al decisions. The area experiences a composite climate, with extreme summers, cold winters, and a monsoonal season—making climate-responsive design a signif cant necessity.

Site Characterist cs and Physical Inf uences

- **Topography:** The slightly depressed central zone allowed for an amphitheater-style sunken courtyard, leveraging the natural grade for both funct onality and aesthet cs.
- **Boundaries and Access:** The campus is bounded by urban roads along its north and east edges, with the main vehicular and pedestrian entrance posit oned to ef ciently serve administrat on and students during peak t mes.
- **Vegetat on and Landscape:** The site featured scat ered trees and vegetat on. The design preserved much of this natural landscape, integrat ng exist ng greens with newly planned outdoor spaces and water bodies.
- **Surroundings:** The locality's blend of resident al, educat onal, and heritage zones informed the architectural vocabulary—balancing contextual respect with contemporary aspirat ons.

The Client: Nat onal Inst tute of Fashion Technology (NIFT)

As India's nodal agency for fashion educat on and a body under the Ministry of Text les, Government of India, NIFT had a clear vision: to set the benchmark for internat onal-standard design learning in the country.

Key client goals included:

- Creat on of world-class teaching spaces for rapidly evolving disciplines in fashion, design, and management.
- Flexibility for future academic expansion and evolving pedagogical trends.
- Providing an inspiring environment to nurture creat vity and professional excellence.
- Embedding Indian cultural values into the physical and educat onal framework.
- Ensuring infrastructure supports intensive studio-based learning and collaborat ve work.

Programmat c Requirements

For a pioneering fashion design inst tute, the requirements were highly specif c and mult faceted. The program called for:

- **Academic facilit es:**
    - Classrooms of varying sizes
    - Dedicated design studios

    - Specialized laboratories for text les and garment technology
    - A resource-rich library and archive
- **Administrat ve spaces:**
    - Centralized of ces for management, admissions, and coordinat on
    - Faculty workspaces and meet ng rooms
- **Support amenit es:**
    - Cafeteria and food courts
    - Student housing (for future phases)
    - Exhibit on and gallery spaces for student work
    - Spaces for workshops, conferences, and industry events
- **Community zones:**
    - Mult -purpose outdoor gathering spaces for fest vals, performances, and cultural programming
    - Shaded terraces, informal lounges, and relaxat on spots to encourage interact on and rest
- **Infrastructure:**
    - Adequate parking
    - Secure periphery with minimal intrusion to the open-campus feel
    - Modern sanitat on, power backup, and maintenance accessibility

These requirements had to be balanced within the constraints of the urban plot and integrated into a cohesive, forward-thinking campus master plan.

4.1.3 Site Analysis

A thorough physical site analysis was undertaken, focusing on:

- **Natural Light and Orientat on:** Maximizing the use of north light for studios and minimizing harsh western sun exposure.
- **Wind and Vent lat on:** Locat ng openings, terraces, and shaded areas to harness cross-breezes and reduce heat gain, especially crucial for the capital's harsh summer climate.

- **Noise and Pollut on:** Designing buf ers along busy roads using landscape elements and earth berms, and posit oning quieter study zones farther from external disturbances.
- **Views:** Orient ng outdoor spaces and larger windows towards green surroundings, historic landmarks, and unobtrusive urban vistas, simultaneously protect ng privacy where needed.

Key Stakeholders and Engagement

The design and planning processes involved robust engagement between the architect, client, academic leadership, and government representat ves. Regular consultat ons ensured:

- Programmat c f exibility to accommodate new courses and technology integrat on
- Adherence to f nancial and regulatory limits
- Responsiveness to feedback from faculty and student representat ves, pre-empt ng emerging trends in creat ve educat on

Integrat on of Site and Vision

The physical site, climat c realit es, client aspirat ons, and urban context were synthesized into a master plan that ref ected:

- A central courtyard spat al idea—drawing people and act vit es to the heart of the campus
- Layered and accessible circulat on paths, balancing openness with security
- Visual and physical permeability, of ering both large-scale interact on spaces and private niches

The result is a campus that serves as a microcosm of the evolving Indian metropolis: open yet protected, communal yet individual, and deeply connected both to place and purpose.

4.1.4 Design Philosophy and Architectural Vision

Philosophical Foundat ons of the Design

At the core of the NIFT Delhi campus design lies B.V. Doshi's deeply rooted belief in *organic architecture*—an approach that views a building or complex as a living ent ty that must evolve in harmony with its users, climate, and cultural context. Unlike stat c architectural forms that impose rigid funct ons, Doshi's design strives to create a dynamic environment facilitat ng interact on, adaptat on, and growth over t me.

For the NIFT campus, this meant cult vat ng a spat al narrat ve that emulates the f uidity and communal essence of an Indian village—a model where pathways, courtyards, and communal nodes are not prescribed but emerge from daily life and cultural pract ces. Doshi purposefully harnessed this analogy to create a campus that feels int mate yet expansive, rooted yet free, structured yet organic.

Human-Centered and Experient al Design

The design ref ects a user-centric mindset, where architectural elements encourage discovery, collaborat on, and mult faceted experiences. Spaces are deliberately layered vert cally and horizontally to generate visual connect ons and chance encounters—key ingredients in fostering creat vity among design students.

- **Central Courtyard as Social Heart:** Inspired by tradit onal village squares, the sunken courtyard is the campus's social and cultural nucleus, support ng gatherings, performances, and informal interact ons.
- **Engaged Circulat on:** The interweaving steps, terraces, and walkways are not merely passageways but social catalysts that connect users visually and physically and provide repose and informal meet ng zones.
- **Adapt ve Spaces:** Studios, terraces, and open areas are designed f exibly to accommodate changing pedagogies and evolving programmat c needs, promot ng a living campus environment rather than a f xed inst tut onal form.

Contextual Integrat on and Cultural Ref ect on

Doshi's vision consciously bridges modernism and Indian tradit on, embedding the campus within the cultural fabric of Delhi and the larger Indian ethos. This is apparent in:

- The inspired layered spat al composit on recalling Indian village morphologies.
- The use of local materials and construct on methods that resonate with indigenous techniques and aesthet c sensibilit es.
- The courtyard typology that acts as a gathering point during fest vals and cultural events, ref ect ng community tradit ons.

This fusion creates an educat onal environment that is both globally relevant and locally grounded, helping users feel connected to place and ident ty.

Environmental Responsiveness and Climate Considerat ons

Delhi's climate, characterized by scorching summers, cold winters, and seasonal monsoons, profoundly inf uenced the architectural vision. The design philosophy embraces passive environmental strategies, integrat ng:

- **Sunken Courtyard:** Placed below ground level to provide shelter from harsh sun and act as a cool microclimate for social act vit es.
- **Terraces and Shade Elements:** Provide transit onal semi-open spaces mit gat ng heat while promot ng vent lat on and daylight ng.
- **Material Choices:** Exposed concrete and brick surfaces absorb and gradually release heat, smoothing temperature f uctuat ons.

These strategies posit on the campus not only as an architectural icon but also as an example of climate conscious design ahead of its t me.

Emphasis on Growth and Flexibility

A vital principle in Doshi's architecture for NIFT is *organic growth*—the ability of the campus to expand, modify, and evolve without losing its cohesive ident ty. The master plan and architectural forms ant cipate:

- Incremental construct on phases as the inst tute grows.
- Flexibility in internal layouts and open spaces to accommodate new disciplines or pedagogical methods.
- Integrat on of new technologies and facilit es without disrupt ng exist ng spat al relat onships.

This approach ensures the campus remains relevant and vibrant amid changing educat onal landscapes.

Summary of Key Design Intent ons

Design Intent	Descript on
Organic Architecture	Create a campus that funct ons as a living organism, responding to context and users
Village-like Spat al Model	Emulate tradit onal Indian village layouts with communal squares and layered pathways

Design Intent	Descript on
Social and Collaborat ve Environment	Foster interact on through engaged circulat on and shared social spaces
Cultural and Environmental Harmony	Merge modernism with Indian cultural ident ty and climate-responsive passive design
Adaptability and Growth	Enable phased expansions and changing program needs without losing spat al coherence

By embedding these foundat onal philosophies into every decision, Doshi delivered a campus that resonates architecturally, culturally, and educat onally, set ng a benchmark for design educat on environments in India and beyond.

4.1.5 Site Planning and Layout

Overall Master Plan Concept

The site planning of the NIFT Delhi campus is a direct manifestat on of B.V. Doshi's architectural philosophy, translat ng the conceptual ideals of organic growth, community engagement, and environmental responsiveness into a cohesive spat al framework. The 3-acre site is thought ully organized around a central sunken courtyard that acts as the heart of the campus, echoing the tradit onal village square metaphor. This courtyard anchors all campus act vit es and circulat ons, providing a dynamic f exible space for both planned and impromptu gatherings.

The master plan is strongly axial yet f uid, art culated through layered scales of spat al experience—from large communal zones to int mate corners—and vert cally via stepped terraces and interconnected levels. This approach encourages explorat on and social interact on, while also of ering diverse funct onal zones tailored to the educat onal program.

Spat al Organizat on and Zoning

The campus layout divides the funct onal zones thought ully to facilitate operat onal clarity and f uid user movement:

- **Academic Blocks:** Flanking the central courtyard on the east and west sides, the academic blocks accommodate classrooms, studios, and specialized labs. Their symmetrical placement gives a balanced composit on that frames the courtyard and establishes a clear spat al hierarchy.

- **Administrat ve Zone:** Posit oned adjacent to the main entrance on the northern edge facing the access road, the administrat on block manages arrivals, inst tut onal services, and visitor coordinat on separately from the academic spaces.
- **Social and Cultural Spaces:** The sunken courtyard doubles as a performance arena, exhibit on space, and informal meet ng place. Around it are terraces and semi-open plat orms that serve as informal lounges and break zones, promot ng interdisciplinary interact on.
- **Circulat on:** An intricate network of steps, ramps, terraces, and bridges weaves through the campus, carefully calibrated to create both pract cal connect vity and unexpected visual encounters.

Circulat on and Movement Pat erns

Doshi's circulat on concept priorit zes experient al movement over mere point-to-point ef ciency. The following elements characterize circulat on:

- **Layered Pathways:** Mult ple levels of circulat on —from ground level, intermediate terraces, to bridge connect ons—ensure users engage with spaces visually and physically from diverse perspect ves.
- **Visual Connect vity:** Bridges and ramps are deliberately open and sculptural, creat ng vantage points that frame the courtyard and adjacent blocks.
- **Social Nodes:** Intermediate landings along stairs and terraces of en double as social nooks, invit ng pause and spontaneous interact on.
- **Climat c Shelter:** Covered walkways and shaded terraces provide protect on from intense sun and rain, ensuring comfortable movement irrespect ve of weather.

Funct onal Layout and Flexibility

The layout supports both structured academic delivery and informal learning:

- **Flexible Studio Spaces:** Studios feature open plans with modif able part t ons and adjacent terraces that expand usable space outdoors.
- **Adaptable Courtyard:** The central plaza's sunken design accommodates a number of funct ons from performances to exhibit ons, adaptable depending on academic calendar and events.
- **Support Facilit es:** Cafeterias, meet ng rooms, and exhibit on galleries are located near circulat on arteries to maximize accessibility and f uidity.

Relat onship with Surrounding Environment

- **Urban Context Sensit vity:** The campus maintains a sensit ve edge with the adjacent urban fabric, using landscaped buf ers and low-rise structures to harmonize with the neighborhood scale.
- **Integrat on of Natural Elements:** Exist ng trees were preserved and sensit vely integrated into outdoor seat ng zones and pathways, reinforcing a sense of cont nuity with the site's natural heritage.
- **Permeability and Security:** While open and welcoming, the campus perimeter uses architectural and landscape elements to establish security without creat ng fortress-like isolat on.

Site Planning Diagrams (For Your Inclusion)

- A site plan showing placement of academic, administrat ve, social spaces, and circulat on hierarchy.
- Sect onal diagrams through the sunken courtyard illustrat ng spat al layering and structured terraces.
- Circulat on f owcharts indicat ng pedestrian and vehicular ingress and egress.
- Landscape plans highlight ng natural features preserved and integrated.

This sect on explains how the campus spat ally and funct onally organizes itself to fulf ll its programmat c and philosophical goals.

4.1.6 Architectural Design and Features

Architectural Expression and Form

The architectural language of the NIFT Delhi campus art culates a balance between modernist principles and local vernacular idioms. Doshi employs clean, rect linear volumes juxtaposed with dynamic layering through steps, terraces, and bridges. The forms are not monumental but human-scaled and textured, encouraging int macy and explorat on.

The campus buildings resonate with a play of solids and voids, transparency and enclosure. This visual rhythm establishes a dialogue between mass and lightness, internal and external, permanence and change. The stepped terraces and open corridors visually sof en the architectural presence, allowing the structures to breathe within the landscape.

The Central Sunken Courtyard

At the heart of the campus lies the sunken courtyard — an architectural and social anchor. This mult -funct onal amphitheater-like space is dug below the natural grade, creat ng a sheltered, cooler environment suited for Delhi's hot climate. The stepped seat ng edges serve both as informal gathering places and as performance bleachers for cultural events.

Surrounding the courtyard are semi-open terraces and walkways that blur boundaries between indoor and outdoor. The courtyard's strong axial relat onship with adjacent academic blocks reinforces spat al clarity while promot ng community integrat on.

Academic Blocks and Studios

The two major academic blocks frame the courtyard. Each block follows a linear plan with classrooms, design studios, and specialized labs arranged sequent ally. Interior spaces benef t from abundant natural light f ltered through deep overhangs and brise-soleil features that reduce glare and heat gain.

Studios are spacious with f exible layouts, enabling varied conf gurat ons suited to individual or group projects. Adjacently, external terraces act as extensions to interior learning zones, where students can engage with nature and informal peer discussions.

Administrat ve Facilit es

Located near the main entrance along the road-facing façade, the administrat ve block is deliberately dist nct yet harmoniously integrated. Its art culated façade and higher privacy ensure inst tut onal authority while its proximity to entrance facilitates easy access for visitors.

Architectural features such as shaded corridors and strategic fenestrat on blend funct onal ef ciency with climat c responsiveness.

Circulat on Elements: Ramps, Steps, and Bridges

Circulat on is art culated as one of the key spat al experiences of the campus. The design integrates:

- **Varied Levels:** Ramped and stepped walkways lead users through layered spat al experiences, connect ng buildings across dif erent heights.
- **Bridges:** Sculptural pedestrian bridges connect ng academic blocks serve as both funct onal connectors and vantage points, enhancing visibility and engagement.
- **Terraced Seat ng:** Along circulat on routes, terraces provide informal seat ng encouraging socializat on and relaxat on.

This network of circulat on remedies stat c, closed inst tut onal typologies, subst tut ng it with vibrant spat al dialogue.

Material Palet e and Detailing

The choice of materials is consciously regional and environmental:

- **Exposed Concrete:** Predominantly used for structural volumes and terraces, conveying robustness with a tact le texture.
- **Brickwork:** Local bricks provide warmth and relate the campus to tradit onal Indian construct on.
- **Metal and Timber:** Employed in fenestrat on and shading devices, carefully detailed to balance durability with elegance.

Details are restrained yet purposeful—window and door openings include shading devices, while parapets and railings incorporate clean lines that harmonize with the overall architectural palet e.

Open and Semi-Open Spaces

The campus design weaves numerous open and semi-open spaces into its fabric:

- **Shaded Terraces:** Transit onal zones between indoor studios and outdoor circulat on allow for f exible usage according to weather and program.
- **Garden Spaces:** Integrated landscaping sof ens the built environment, contribut ng microclimate benef ts and aesthet c relief.
- **Informal Gathering Nodes:** Small niches, seat ng pockets, and green spots along pathways serve as rest points facilitat ng spontaneous conversat ons and creat ve exchanges.

Architectural Integrat on with Pedagogy

The physical spaces visibly ref ect the pedagogy of fashion and design educat on — emphasizing creat vity, experimentat on, and collaborat on. Flexible studios, adaptable exhibit on spaces, and communal social courtyards create a living environment where learning is both formal and informal, solitary and social.

Summary of Signature Architectural Features

Feature	Descript on
Sunken Central Courtyard	Mult -use social and performance core, climate moderated and spat ally layered.

Feature	Descript on
Symmetrical Academic Blocks	Linear organizat on promot ng ef cient circulat on and maximizing daylight in workspaces.
Sculptural Circulat on	Steps, ramps, and bridges create interact ve, layered pedestrian movement.
Material Palet e	Local brick, exposed concrete, t mber, and metal detail work for a contextual and climate-sensit ve f nish.
Open Transit onal Spaces	Shaded terraces and semi-open zones that encourage f exibility and connect on with nature.

This architectural synthesis encapsulates the campus's core design intent ons and realizes Doshi's vision of an organic, vibrant, and human-centered academic environment.

4.1.7 Materiality and Construct on Techniques

Overview of Material Select on

The material palet e chosen for the NIFT Delhi campus is a thought ul blend of locally sourced, durable, and climate-responsive materials, ref ect ng both the aesthet c vision and pragmat c demands of the project. B.V. Doshi's design approach favored honesty in material expression, emphasizing textures, f nishes, and construct on techniques that align with the cultural context and environmental condit ons of Delhi.

The palet e primarily consists of exposed concrete, tradit onal brickwork, t mber, and metal, orchestrated to create a tact le, warm, and robust architectural character that supports the campus's programmat c and experient al object ves.

Exposed Concrete

- **Structural Use:** Reinforced concrete serves as the primary structural system for academic blocks, terraces, and circulat on elements such as ramps, bridges, and staircases. Its inherent strength allows for large spans and cant levers that create open, f exible internal spaces.
- **Aesthet c Role:** Rather than concealing concrete, Doshi lef it exposed to celebrate its raw texture and rugged durability. The f nish exhibits art sanal workmanship with wooden formwork impressions visible, evoking craf smanship.

- **Thermal Performance:** Concrete's high thermal mass helps moderate temperature f uctuat ons, absorbing heat during the day and releasing it during cooler nights, which is benef cial in Delhi’s climate.

Brickwork

- **Local Materiality:** Incorporat on of locally f red brick connects the campus to regional architectural tradit ons. The warm red-brown hues contrast and complement the cooler concrete surfaces, sof ening the overall environment.
- **Technique:** Brick masonry is used both structurally and as a cladding element, featuring in walls, parapets, and vert cal screens. Open brickwork pat erns provide controlled daylight penetrat on and natural vent lat on, especially in semi-open corridors and shaded terraces.
- **Craf smanship:** The brickwork ref ects careful detailing, including bonding pat erns and mortar joints that create subtle shadows and textural depth.

Timber and Metal Elements

- **Fenestrat on and Shading Devices:** Timber is used sparingly for window frames, doors, and pergola structures, introducing warmth and natural texture. Metal supports and f t ngs complement the t mber, chosen for durability and low maintenance.
- **Bridges and Railings:** Metal is also used in the construct on of pedestrian bridges, guardrails, and balustrades, engineered for slender prof les that maintain visual lightness without compromising safety.
- **Detailing:** The t mber and metal elements are detailed with simplicity, favoring clean lines and minimal ornamentat on to harmonize with the campus’s modernist principles.

Construct on Techniques

- **Reinforced Concrete Framework:** The campus buildings rely on reinforced concrete skeletons with slab and beam framing. This enables f exibility in interior spaces and supports the varied terracing and stepped designs.
- **Integrat on of Tradit onal Craf :** The use of brick and exposed concrete ref ects an integrat on of tradit onal masonry craf smanship with modern engineering. The tact le qualit es of surfaces are the result of skilled workmanship carried out during the original construct on phase.

- **Earth Retaining Structures:** The sunken courtyard required specialized earth-retaining walls constructed from reinforced concrete and brick masonry, ensuring structural stability and longevity.
- **Prefabricat on:** Some elements, such as concrete terraces and stair treads, likely involved prefabricated components installed on site to maintain accuracy and quality control.

Detailing and Finish

- **Surface Treatment:** Concrete and brick surfaces are lef mostly unf nished to enhance material authent city. Minimal coat ngs are applied to protect surfaces from weathering without obscuring textures.
- **Joints and Transit ons:** The detailing carefully manages joints between dif erent materials (e.g., brick to concrete, t mber to metal) to allow for thermal expansion and prevent cracking without compromising aesthet cs.
- **Waterproof ng and Drainage:** Part cular at ent on is given to the sunken courtyard and terraces, incorporat ng waterproof membranes, adequate slope grading, and concealed drainage systems to prevent waterlogging and damage.

Sustainability Aspects of Material Choices

- **Locally Available Materials:** Using local brick and t mber reduces transportat on carbon footprint and supports regional economies.
- **Durability and Maintenance:** The choice of robust materials minimizes frequent replacement and repair, contribut ng to longer-term sustainability.
- **Thermal Mass and Passive Design:** Materials with high thermal mass like concrete and brick play a central role in passive cooling strategies, reducing mechanical energy use for climate control.

Ref ect on on Materiality's Role in Spat al Experience

The tact le and visual qualit es of materials create a mult sensory experience for campus users, fostering a connect on between the built environment and cultural ident ty. The honest exposure of structure and materiality aligns with Doshi's philosophy of architecture as a living process, enhancing spat al complexity and warmth.

4.1.8 Spat al Experience and User Interact on

Introduct on to Spat al Experience

The spat al experience at the NIFT Delhi campus is fundamental to realizing B.V. Doshi's vision of an organic, community-oriented academic environment. The design fosters a rich sensory, social, and funct onal experience that directly supports the pedagogical mission of the inst tut on. Spaces are thought ully craf ed to encourage serendipitous interact ons, creat ve explorat on, and personal ref ect on, ensuring that the campus is more than just a collect on of buildings but a vibrant ecosystem.

Layered and Mult faceted Spat al Qualit es

The campus of ers mult ple spat al layers, operat ng at dif erent scales and moods:

- **Central Sunken Courtyard:** As the symbolic and physical nucleus, this space of ers a tact le and visual arena for social convergence, cultural performances, and open-air exhibit ons. Its amphitheater form creates a seamless transit on between audience and stage.
- **Terraces and Intermediate Spaces:** The terraced levels around the courtyard and academic blocks act as thresholds—spaces that mediate between enclosed interiors and open outdoors, providing students and faculty with zones for informal study, discussion, and respite.
- **Int mate Nooks and Gathering Nodes:** Small pockets of seat ng, shaded areas under pergolas, and quiet corners along circulat on paths accommodate solitude or focused group discussions, allowing varied spat al experiences tailored to diverse user needs.

Visual Connect vity and Openness

Doshi's design innovat vely leverages visual permeability and openness to foster a cont nuous social fabric:

- The stepped terraces, bridges, and open corridors facilitate sightlines across dif erent campus areas, creat ng a sense of connectedness even at a physical distance.
- Transparent and semi-open spat al elements blur the boundaries between inside and outside, enhancing daylight penetrat on and airf ow.
- Users of en f nd themselves able to visually engage with mult ple campus funct ons simultaneously—such as observing a courtyard performance while moving through an academic block—enriching the user percept on of community involvement.

Movement and Circulat on as Experience

Circulat on routes are craf ed to be experient al:

- **Engaged Pathways:** Rather than purely ut litarian travel corridors, ramps, staircases, and bridges act as interact ve social spaces where unplanned conversat ons and creat ve exchanges emerge naturally.
- **Spat al Transit ons:** The f uid transit on from enclosed classrooms to open terraces and then to large communal zones heightens awareness and variety in spat al experience.
- **Sensory Engagement:** Material textures, ambient sounds in the courtyard, and shif ing daylight pat erns through pergolas and screens engage users' senses constantly.

User Interact on and Community Building

The campus design act vely encourages collaborat on and community integrat on:

- Students report a strong sense of camaraderie facilitated by shared social spaces that invite informal interact on before, during, and af er classes.
- Mult funct onal spaces like the courtyard support both academic presentat ons and cultural fest vals, blurring academic and social domains.
- The t ered arrangement and variety of seat ng opt ons across the campus allow for f exible group sizes—from one-on-one mentoring to full cohort assemblies.

Adaptability and Responsive Use

Spiritually t ed to the philosophy of organic growth, the spat al conf gurat on allows users to adapt spaces for their specif c purposes:

- Open studio layouts and modif able part t ons enable dif erent pedagogical modes including workshops, crit ques, and exhibit ons.
- Outdoor terraces serve as overf ow zones during peak t mes or weather-permit ng gatherings.
- The sunken courtyard hosts diverse programs—from formal addresses and fashion shows to informal student congregat ons—demonstrat ng except onal funct onal range.

Challenges and Observat ons

While widely praised for its spat al richness, some user feedback and observat ons note challenges:

- Climat c extremit es can somet mes inhibit full use of outdoor and semi-open spaces during harsh summer or winter months.

- The varied levels and stepped circulat on, while architecturally engaging, may occasionally pose navigat onal challenges or accessibility concerns for some users.
- Maintenance of outdoor furniture and shaded elements needs to be consistent to ensure comfort and usability.

Summary

Aspect	Descript on
Mult -layered Spaces	Diverse spat al scales from int mate nooks to large communal grounds create a rich campus tapestry.
Visual and Physical Connect vity	Open design fosters interact on, visibility, and a sense of belonging across dif erent zones.
Circulat on as Social Space	Movement through the campus is intent onally engaging, promot ng social interact on and explorat on.
Adaptability	Spaces support evolving pedagogies, mult funct onality, and user-driven customizat on.
User Feedback	Students and faculty highlight community building and experient al quality despite climat c challenges.

The spat al experience at NIFT Delhi exemplif es how thought ul architectural design can act vely nurture an educat onal community, turning everyday campus life into a series of enriching and memorable interact ons.

4.1.9 Environmental and Climate Considerat ons

Introduct on to Climat c Context

The Nat onal Inst tute of Fashion Technology (NIFT) Delhi campus is located in Delhi's climat c zone characterized by extreme seasonal temperature swings and dist nct ve monsoonal pat erns:

- **Summer:** Extremely hot, of en exceeding 40°C (104°F), with strong solar radiat on and low humidity.
- **Winter:** Cold, with temperatures somet mes dropping close to 5°C (41°F).
- **Monsoon:** Heavy rains and increased humidity during June to September.

- **Spring and Autumn:** Mild transit onal seasons.

Designing for such a climate demanded careful integrat on of passive environmental strategies to enhance user comfort, reduce energy consumpt on, and create a sustainable architectural model.

Passive Cooling Strategies

In line with B.V. Doshi's philosophy of environmentally responsive design, the campus employs several passive strategies:

- **Sunken Courtyard:** The lowered courtyard is sheltered from direct sun and prevailing winds, creat ng a microclimate with cooler ambient temperatures. The earth surrounding the courtyard acts as thermal mass, reducing dayt me heat and maintaining comfort for gatherings and events.
- **Shaded Terraces and Pergolas:** Semi-open transit onal spaces feature shaded pergolas, trellises, and deep overhangs that limit direct solar heat gain while allowing dif used daylight. These areas support outdoor act vit es and circulat on even during warmer periods.
- **Orientat on and Building Layout:** Most academic blocks are oriented to minimize western exposure, reducing heat buildup. Large openings face north or east to benef t from sof er, indirect natural light ideal for studios and classrooms.
- **Natural Vent lat on:** Cross-vent lat on is facilitated through operable windows, open corridors, and perforated brick screens. The campus circulat on system—comprising ramps, steps, and bridges—encourages air movement through stack ef ect and breezeways.

Daylight ng and Solar Control

- The design harnesses ample natural light in learning spaces, reducing reliance on art f cial light ng during dayt me.
- Architectural elements like brise-soleils, recessed windows, and lat ced brick screens not only reduce glare but also contribute to the rich play of light and shadow, enhancing the spat al quality.
- The modulat on of openings also helps in f ltering dust and noise pollut on from the busy urban surroundings.

Rainwater Management and Landscape Integrat on

- Given Delhi's monsoon intensity, site grading directs rainwater away from building foundat ons and the sunken courtyard.
- Landscaped green areas foster inf ltrat on and reduce surface runof , helping recharge groundwater.
- Vegetat on and water features integrated within the campus improve humidity levels and provide natural cooling.

Thermal Comfort and User Experience

- The choice of materials with high thermal inert a (brick and concrete) dampens extreme temperature f uctuat ons inside buildings.
- Semi-open spaces grant users the f exibility to move between climate-controlled interiors and more open environments, adapt ng to personal comfort during seasonal variat on.
- However, during peak summer and winter extremes, some outdoor and semi-open areas are less used, indicat ng limitat ons of passive measures alone.

Sustainability Principles

While the campus was designed before the more contemporary sustainable architecture movement, its environmental responsiveness exhibits t meless sustainability values:

- Reduct on of mechanical cooling and light ng loads by maximizing passive strategies.
- Use of durable, locally harvested materials contribut ng to embodied energy savings.
- Integrat on with the natural site features that enhance microclimate condit ons.

Challenges and Potent al Improvements

- Extreme summer heat in Delhi remains a challenge; limited use of advanced cool roof ng or insulat on materials at the t me constrains thermal comfort.
- Accessibility improvements t ed to environmental comfort, such as shaded walkways for longer circulat on routes, could be enhanced.
- Integrat on of modern sustainable technologies (solar panels, rainwater harvest ng systems) could be retrof t ed to increase eco-performance while respect ng original design integrity.

Summary Table of Environmental Strategies

Strategy	Descript on	Benef ts
Sunken Courtyard	Lowered plaza area creat ng a cooler microclimate	Natural sun protect on, social comfort
Shaded Terraces	Pergolas and deep overhangs providing respite from direct sunlight	Reduced heat gain, outdoor usability
Building Orientat on	North/East facing openings limit ng western solar exposure	Balanced daylight, heat reduct on
Natural Vent lat on	Cross breezes facilitated through open corridors and permeable brickwork	Improved air quality, passive cooling
Thermal Mass Materials	Use of brick and exposed concrete for thermal regulat on	Reduced temperature swings
Rainwater Management	Site grading and landscape design for water runof control	Groundwater recharge, f ood prevent on

This sect on highlights how environmental and climat c considerat ons are thought ully integrated into the architectural fabric of NIFT Delhi, ensuring funct onal comfort and sustainability aligned with the project's larger philosophical vision.

4.1.10 Structural and Technical Aspects

Structural System Overview

The structural design of the NIFT Delhi campus is a crit cal enabler of B.V. Doshi's architectural vision, facilitat ng the complex spat al arrangements, terraced levels, and open communal spaces while ensuring stability and durability. The primary structural system relies on reinforced concrete frames combined with load-bearing brick masonry walls in certain areas, creat ng a robust yet f exible framework adaptable to future changes.

Reinforced Concrete Frame

- **Columns and Beams:** The campus buildings ut lize reinforced concrete columns and beam grids that provide clear spans for open-plan studio spaces. This structural approach allows f exibility in internal layouts, essent al for evolving educat onal programs in fashion and design.

- **Slabs and Terraces:** Flat concrete slabs form the f oors and terraces. Their structural capacity supports the stepped conf gurat ons of terraces and the load of pedestrian bridges and seat ng plat orms.

Earth Retaining Structures

- The sunken central courtyard, being below ground level, requires ef ect ve earth-retaining walls. These are constructed using reinforced concrete underpinning wall systems designed to resist lateral earth pressure and water ingress.
- Waterproof ng membranes and drainage measures are incorporated behind retaining walls to ensure structural longevity and user comfort in the courtyard space.

Bridges and Elevated Walkways

- The pedestrian bridges connect ng academic blocks are fabricated from reinforced concrete slabs supported by cant levered beams and columns. They serve as funct onal connectors and enhance spat al integrat on across the campus.
- These elements are engineered for slender prof les, achieving a balance between structural integrity and visual lightness.

Foundat on Systems

- Considering the soil characterist cs of the Hauz Khas site, foundat ons consist primarily of isolated foot ngs and strip foot ngs support ng columns and load-bearing walls respect vely.
- Special at ent on is given to load distribut on for structures around the sunken courtyard to prevent dif erent al set lement.

Building Envelope and Technical Details

- Facade walls combine brick masonry with concrete elements. Bricks are laid in pat erns allowing vent lat on and light dif usion, complement ng internal comfort and exterior aesthet cs.
- Openings are detailed with shading devices such as concrete overhangs and perforated screens to diminish solar heat gain.
- Windows employ t mber and metal frames, designed for durability, weather resistance, and ease of maintenance.

Mechanical, Electrical, and Plumbing (MEP) Provisions

- While the original design emphasizes passive environmental strategies, MEP installat ons provide essent al ut lit es discreetly integrated within the architectural fabric.
- Electrical conduits, plumbing, and drainage systems are routed through service shaf s and ceilings, minimizing visual clut er.
- Vent lat on ducts complement natural airf ow where mechanical assistance is needed, part cularly in laboratories and administrat ve areas.

Maintenance and Long-Term Performance

- The use of exposed durable materials such as concrete and brick reduces maintenance frequency.
- However, the complex stepped terraces and open circulat on networks require ongoing at ent on to prevent water seepage, structural wear, and user safety hazards.
- Periodic inspect ons and restorat ve works have been necessary to preserve the structural and aesthet c integrity of the campus over decades.

Structural Innovat ons and Lessons

- Integrat on of structural design with f exible spat al planning allowed the campus to evolve without major structural intervent ons.
- The balance between mass (brick and concrete) and openings (vent lated brickwork and glazed sect ons) demonstrates a sophist cated understanding of both engineering and climat c performance.
- The sunken courtyard structure exemplif es careful geotechnical responsiveness coupled with architectural ambit on.

Summary Table: Structural and Technical Highlights

Aspect	Descript on
Reinforced Concrete	Primary structural frame support ng large spans and terraces
Earth Retaining Walls	Reinforced concrete walls for sunken courtyard stability
Pedestrian Bridges	Slender concrete structures enabling connect vity and views
Foundat ons	Isolated and strip foot ngs responsive to soil condit ons
Building Envelope	Brick and concrete walls with shading devices for climate control

Aspect	Descript on
MEP Integrat on	Discreet mechanical and electrical installat ons
Maintenance	Durable materials with requisite ongoing care

This sect on demonstrates the technical and structural depth support ng the architectural and programmat c success of the NIFT Delhi campus.

Cont nuing with the detailed incremental expansion, here is the next sect on of your live case study report:

4.1.11 Accessibility and Inclusivity

Introduct on

Accessibility and inclusivity are crit cal considerat ons in educat onal environments to ensure equitable use of facilit es by people of all abilit es. While the Nat onal Inst tute of Fashion Technology (NIFT) Delhi campus, designed in the mid-1980s, predates many contemporary universal design guidelines, it displays conscious architectural gestures towards social inclusiveness and user comfort. This sect on crit cally analyzes the campus's accessibility provisions and areas for improvement within the context of evolving standards.

Circulat on and Mobility

- **Stepped and Layered Circulat on:** The campus's def ning circulat on system involves numerous stairs, terraces, and ramps thought ully integrated to animate movement. However, the prominence of steps and mult -level transit ons poses challenges for individuals with mobility impairments.
- **Ramp Provision:** While ramps exist alongside some staircases, their extent, gradient, and cont nuity do not fully meet modern accessibility criteria, potent ally limit ng seamless access across all campus levels.
- **Bridges and Walkways:** Pedestrian bridges and elevated walkways enhance visual and social connect vity but may require handrails, tact le indicators, and non-slip surfaces to meet contemporary safety and accessibility standards.

Access to Academic and Social Spaces

- **Classrooms and Studios:** Most academic blocks have access points at mult ple levels, but interior spat al layouts with raised plat orms or t ered seat ng may hinder wheelchair access.

- **Sunken Courtyard:** The central courtyard is a crucial social and performance space, yet its sunken conf gurat on, primarily accessible by steps, restricts access for users with limited mobility. Alternat ve routes or lif s are not evident within the original design.
- **Open and Semi-open Areas:** Many terraces and lounges have stepwise arrangements but lack comprehensive barrier-free designs to facilitate access without assistance.

Entrances and Facilit es

- The main entrance at the administrat ve zone is at grade, allowing for relat vely easy entry for all users. However, secondary entrances around the academic blocks vary in elevat on.
- Essent al facilit es such as washrooms, cafeterias, and exhibit on spaces may not uniformly provide accessible f xtures or layouts complying with universal design principles.

Wayf nding and Sensory Accessibility

- **Visual Clarity:** The open layout and visual connect vity provide intuit ve wayf nding, but low-contrast surfaces and minimal tact le cues can pose dif cult es for users with visual impairments.
- **Signage:** Original signage is mainly text-based and lacks Braille, raised let ering, or pictograms common in inclusive environments today.
- **Light ng:** Natural and art f cial light ng is adequate in many areas but requires examinat on for glare control and uniformity to support users with sensory sensit vit es.

Social Inclusivity and Cultural Accessibility

- The campus excels in fostering social inclusivity through ample communal spaces, promot ng interact on among diverse users irrespect ve of cultural background.
- Cultural inclusivity is emphasized through f exible spaces that support varied act vit es, accommodat ng dif erent social and pedagogical pract ces.

Recommendat ons for Accessibility Improvements

To align with contemporary standards such as the Rights of Persons with Disabilit es Act, 2016 (India) and internat onal best pract ces, potent al intervent ons include:

- Retrof t ng ramps and lif s with appropriate gradients and handrails to ensure barrier-free vert cal circulat on.

- Incorporat ng tact le walking surface indicators and high-contrast markings along key circulat on routes.
- Modifying entrances and doorways for wheelchair accessibility and wider clearances.
- Upgrading washrooms and other ut lit es to accessible standards.
- Enhancing signage with mult -sensory elements and clear, consistent placement.
- Implement ng sensory-friendly zones and adjustable light ng to cater to diverse user needs.

Summary Table - Accessibility Overview

Aspect	**Current Status**	**Suggested Improvements**
Vert cal Circulat on	Stairs dominant; limited ramp coverage	Expand ramp networks; install lif s/elevators
Sunken Courtyard Access	Primarily steps; no alternat ve elevators	Add ramps/lif s for inclusive access
Entrances and Access Points	Mixed elevat on levels	Standardize thresholds; ensure barrier-free entries
Interior Spaces	Some t ered plat orms	Increase level f oor areas or provide ramped access
Wayf nding and Signage	Basic visual signage; limited tact le elements	Integrate tact le, audio, and mult -modal signage
Sanitary Facilit es	Standard amenit es; not universally accessible	Retrof t accessible f xtures and layouts

Conclusion

While the original design of the NIFT Delhi campus ref ects a strong ethos of social interact on and community focus, its architectural complexity and mult -level spat al organizat on present accessibility challenges by modern standards. Thought ul retrof ts and cont nued commitment to universal design principles can enhance inclusivity, ensuring the campus fully supports all users' part cipat on and comfort without compromising the architectural integrity and experient al richness fundamental to B.V. Doshi's vision.

4.2 IIT Delhi

4.2.1 Historical and Inst tut onal Context

Main Takeaway: The Indian Inst tute of Technology Delhi (IIT Delhi) was conceived to advance India's technological self-reliance through world-class engineering educat on and research, guided by a vision of excellence, inst tut onal autonomy, and architectural expression of its founding ethos.

Founding Vision and Inst tut onal Mandate

The concept of creat ng premier technical inst tutes in India originated from the Sircar Commit ee report of 1945, which advocated establishing regionally distributed "Inst tutes of Technology" modeled on the Massachuset s Inst tute of Technology to drive post-Independence industrial development. Following acceptance of these recommendat ons, the Government of India negot ated a collaborat on with the Brit sh Government to set up an engineering college at Delhi's Hauz Khas precinct.
HRH Prince Philip, the Duke of Edinburgh, ceremonially laid the foundat on stone on 27 January 1959, marking the formal commencement of construct on for what was init ally registered as the Delhi College of Engineering & Technology1. The f rst academic session began in August 1961 under the University of Delhi af liat on; the inst tute was formally inaugurated by Prof. Humayun Kabir, Union Minister for Scient f c Research and Cultural Af airs, on 17 August 1961, and its buildings were opened by President Dr. Zakir Hussain on 2 March 19681.

In 1963, under the Inst tutes of Technology (Amendment) Act, the college was renamed the Indian Inst tute of Technology Delhi and designated an "Inst tut on of Nat onal Importance," conferring autonomous status with powers to frame its own academic policy, conduct examinat ons, and award degrees independently2. This statutory autonomy underpins IIT Delhi's capacity for curricular innovat on and research leadership.

HRH Prince Philip lays the foundat on stone at IIT Delhi, 1959

Architectural Brief and Stakeholder Aspirat ons

From incept on, IIT Delhi's campus design was charged with embodying the inst tute's educat onal philosophy and nat onal aspirat ons. The Ministry of Educat on's architectural brief called for:

- A **symbolic campus layout** that would ref ect modern India's technological ambit ons while fostering community and collaborat on.

- Structural and spat al f exibility to accommodate evolving pedagogical models and research programs.
- Integrat on with Delhi's rich historical context—part cularly the adjoining Qutb Minar and Hauz Khas heritage precincts—ensuring respect ul dialogue between new buildings and ancient monuments.
- Sustainable, climate-responsive design strategies suited to Delhi's extreme seasonal variat ons.

These direct ves translated into a master plan that emphasizes axial alignments, layered courtyards, and exposed construct on materials—principles that visually and funct onally reinforce IIT Delhi's commitment to **rigor**, **openness**, and **innovat on**.

Vision, Mission, and Core Values

IIT Delhi's strategic direct on is art culated through its Vision, Mission, and Values, which guide all inst tut onal act vit es and future expansions.

Vision

To contribute to India and the World through excellence in scient f c and technical educat on and research; to serve as a valuable resource for industry and society; and remain a source of pride for all Indians.3

Mission

- Generate new knowledge via cut ng-edge research and promote academic growth through state-of-the-art undergraduate, postgraduate, and doctoral programs.
- Ident fy specializat on areas aligned with Indian, regional, and global needs.
- Undertake collaborat ve projects of ering long-term academia-industry interact on.
- Develop human potent al to its fullest, nurturing intellectually capable and creat vely gif ed leaders.3

Core Values

Academic integrity and accountability; respect and tolerance for all viewpoints; at ent on to nat onal and global concerns; breadth of understanding including human sciences; appreciat on of intellectual excellence and creat vity; and an unfet ered spirit of explorat on, rat onality, and enterprise.3

4.2.2 Site Context and Urban Integrat on

Main Takeaway: IIT Delhi's Hauz Khas campus is uniquely embedded within Delhi's historic urban fabric, f anked by the Qutb Minar and Hauz Khas monuments, requiring a design that balances heritage preservat on, connect vity, and contemporary campus needs.

Campus Boundaries and Heritage Interfaces

The 320-acre (1.3 km²) main campus is bounded by:

- Sri Aurobindo Marg (East)
- Jawaharlal Nehru University complex (West)
- NCERT headquarters (South)
- New Ring Road (North)

It directly abuts the Qutb Minar and Hauz Khas monuments, necessitat ng careful treatment of sightlines, building heights, and materiality to respect UNESCO heritage zones1.

Topography and Exist ng Landscape

The site slopes gently from southwest to northeast, with historic water bodies (Hauz Khas Lake) and mature trees framing key vistas. Preservat on of exist ng banyan and peepal trees informed the road network and building footprints, minimizing site disturbance.

Urban Connect vity

Two metro stat ons (Main Gate at Gate 1 and Hostel Gate at Gate 5) integrate IIT Delhi with Delhi Metro's Yellow Line. Major bus routes along Sri Aurobindo Marg and internal shut le services connect academic, resident al, and recreat onal precincts, ensuring mult modal access.

Conservat on Zones and View Corridors

To protect the Qutb Minar's UNESCO buf er, building heights in the eastern academic core are limited to four stories, with stepped terraces and staggered massing to maintain unobstructed views toward the minaret1.

Campus Map

A detailed masterplan delineates funct onal zones—academic, resident al, recreat onal, service—and heritage interfaces:

Zone	Key Features
Academic Core (Blocks B1–B6)	Laboratories, lecture theatres, Central Library
Student Resident al Precinct	Boys' Hostels H1–H12, Girls' Hostels H13–H15
Faculty & Staf Housing	Apartments clustered around courtyards
Recreat onal Sector	Sports stadiums, open lawns, Student Act vity Centre
Service Corridor	Ut lity buildings, peripheral roads

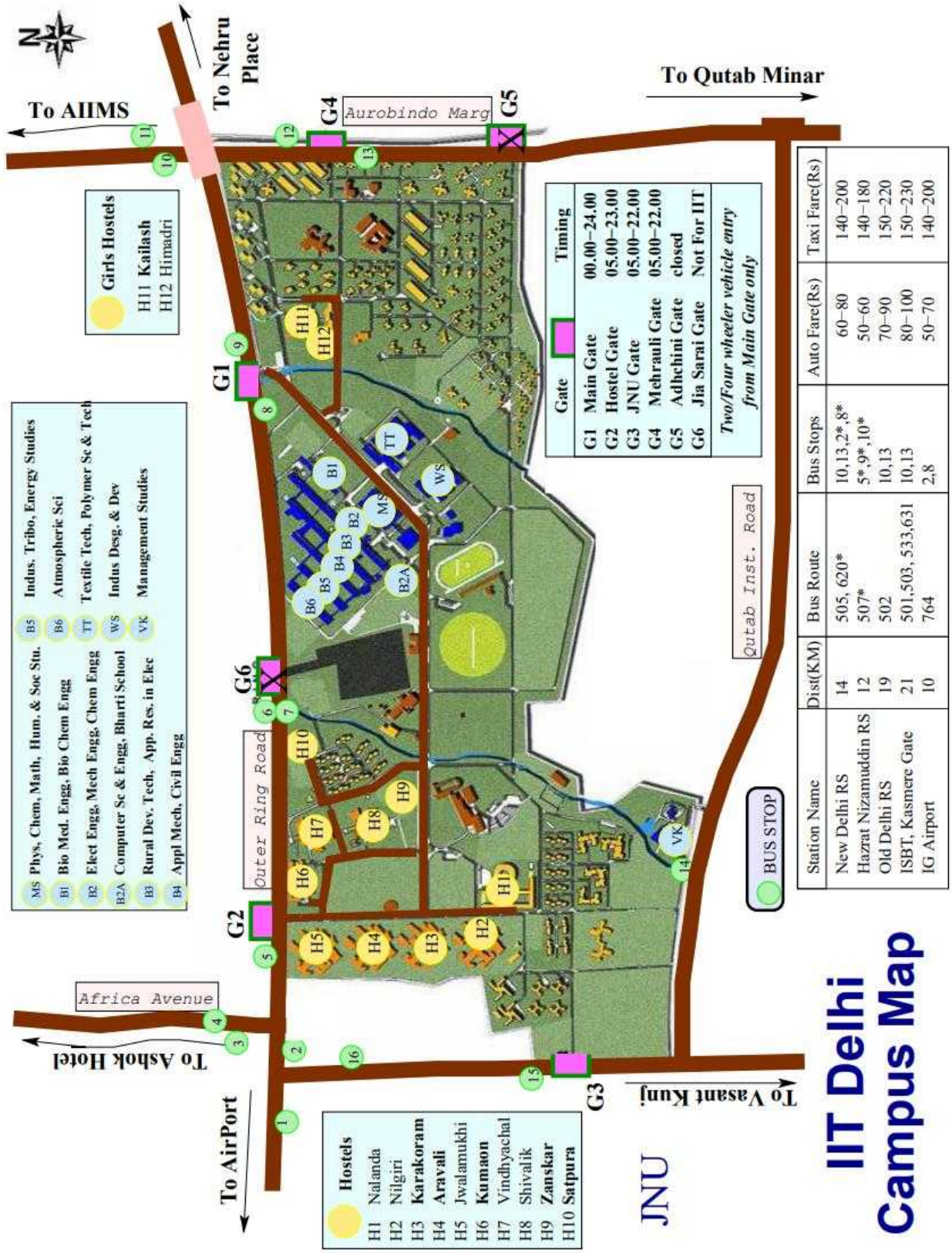


Figure 18IIT Delhi Campus Map

Aerial Context

An aerial drone view highlights IIT Delhi's integrat on with the Delhi cityscape—vast green corridors, adjacent heritage sites, and internal road.

This analysis underscores IIT Delhi's contextual responses: heritage-sensit ve massing, conservat on of historic landscapes, and mult modal connect vity, forming the foundat on for its architectural narrat ve.

4.2.3 Master Plan and Spat al Framework

Main Takeaway: The IIT Delhi campus is organized around a tripart te spat al framework—Academic Core f anked by East and West campus precincts—interwoven with a hierarchy of open spaces, landscaped green corridors, and integrated infrastructure networks that respond to site contours, heritage interfaces, and funct onal relat onships.

Zoning Strategy

The 320-acre (≈1.3 km²) campus is formally divided into three macro-zones, each with dist nct funct onal roles and character:

Zone	Extent & Role
Academic Core	Central precinct (~80 acres) containing six departmental blocks (B1–B6), the Main Building, Central Library, Research & Innovat on Park, and lecture complexes. Sightlines are preserved along axial corridors radiat ng from the Main Building toward Qutb Minar and Hauz Khas Lake.
East Campus	Resident al and support services (~120 acres) housing Boys' Hostels H1–H12, Staf Flats, Faculty Housing, the Student Act vity Centre, and sports courts. Two historic drains (nallahs) bisect this precinct, prompt ng bridge-and-ramp linkages.
West Campus	Academic-support and resident al (~120 acres) comprising Girls' Hostels G1–G6, departmental annexes (B2A), Interdisciplinary Schools, athlet c stadia, and peripheral service corridors. This zone also accommodates future expansion parcels.

Open-Space Hierarchy

The master plan establishes a layered landscape network:

- **Primary Axes:** Broad, tree-lined boulevards frame the central Main Building axis (N–S) and the Science/ME axis (E–W), providing ceremonial processional routes and preserving unobstructed views toward heritage monuments.
- **Secondary Corridors:** Pedestrian promenades, terraced ramps, and elevated walkways weave between academic blocks and hostels, creat ng int mate courtyards at departmental intersect ons.
- **Green Corridors:** Linear plant ng belts follow the historic nallah alignments, linking the sunken courtyard in the Academic Core to the Rose Garden and sports f elds in East Campus.
- **Courtyards & Plazas:** Each academic block cluster encloses a shaded plaza used for informal gatherings, while the sunken plaza adjacent to B3–B4 serves as an outdoor auditorium and micro-climate regulator.



Figure 19Close-up of the engineering block's exposed concrete and breeze-block pat erns, exemplifying materiality and craf smanship.

Circulat on and Infrastructure

Vehicular and pedestrian circulat on systems are carefully t ered:

Circulat on Type	Descript on
Vehicular Primary	Entry via Main Gate (G1) on Sri Aurobindo Marg; internal loop road encircling the Academic Core, connect ng Gate 5 (Hostel Gate) to Gate 6 (JNU Gate).
Vehicular Secondary	Peripheral service roads along East and West Campus provide access to hostels, staf housing, and service yards without penetrat ng the core.
Pedestrian Network	Raised walkways and under-pass bridges cross service roads at key nodes; ramps ensure universal access across level changes up to 8 m between East and Academic zones.
Ut lit es & Services	Ut lity corridors run beneath peripheral roads; centralized MEP shaf s are co-located at block junct ons to minimize disrupt ve trenching.

Heritage Interfaces and View Corridors

To respect the UNESCO buf er around Qutb Minar and Hauz Khas Lake, maximum building height in the eastern academic fringe is restricted to four storeys, with staggered terraces stepping down toward the heritage precinct. Land-use regulat ons preserve three sightlines aligned with the Main Building's central axis, the sunken courtyard, and the R&I Park atrium.

3.5 Expansion and Phasing

The 2001 Master Plan accommodates phased inf ll and future research park extensions:

- **Phase I (1960s–1980s):** Core academic buildings B1–B4, Main Building, four boys' hostels.
- **Phase II (1990s–2005):** B5–B6 expansions, Central Library, addit onal hostels (H5–H8), SAC and Rose Garden.
- **Phase III (2006–Present):** R&I Park, interdisciplinary annexes (B2A), Girls' Hostels (G1–G6), sports complexes, and infrastructure upgrades for GT-lab and f ber-opt cs backbone.
- **Future Parcels:** West Campus plots adjacent to Gate 4 reserved for an Innovat on Incubator and Faculty Housing extension.

This spat al framework balances **funct onal clarity**, **heritage sensit vity**, and **f exibility**, set ng the stage for detailed architectural design in subsequent sect ons.



Figure 20Structural detail of a slender concrete sky-bridge linking academic and resident al precincts, demonstrat ng circulat on networks and universal access strategies.

4.2.4 Architectural Philosophy and Design Language

Main Takeaway: The architectural language of IIT Delhi ref ects a contextual modernist ethos, using a **rat onal spat al order**—axial alignments, courtyards, and volumetric clarity—to embody academic rigor, f exibility, and a harmonious relat onship with landscape and heritage.

Design Intent: Contextual Modernism

IIT Delhi's campus was envisioned as an architectural expression of a modern, self-reliant India, dist nguishing itself from the prevalent "internat onal style" by anchoring its spaces in local climate, social needs, and historic context. The design aims for:

- **Clarity and Rigour:** Spaces are organized systemat cally, reinforcing the academic ethos of discipline, order, and progression.
- **Openness and Flexibility:** Courtyards and linear axes promote easy circulat on and social interact on, support ng both formal learning and informal engagement.
- **Dialogue with Heritage:** Building forms, heights, and materials mediate between the modern engineering inst tute and the adjacent Qutb Minar and Hauz Khas Lake, maintaining respect ul visual and spat al relat onships.

Key Conceptual Drivers

Axial Alignments

- The master plan's primary and secondary axes guide movement and orientat on across the campus.
- The Main Building sits as a visual anchor along the principal north-south axis, with processional boulevards linking it to departmental clusters, hostels, and heritage view corridors.

Courtyards and Layered Spaces

- Academic blocks (B1–B6) and the Central Library are grouped with internal courtyards, providing natural light, vent lat on, and shaded interact on zones.
- The sunken plaza next to departmental blocks not only serves as a performance and gathering area but also acts as a passive climate moderator.

Volumetric Massing and Stepped Terraces

- Block massing respects height restrict ons near heritage zones, creat ng a stepped roof ine toward the east.
- Terraced prof les allow panoramic views toward Qutb Minar and enable roof op social and academic spaces, enhancing microclimat c performance.

Material and Structural Honesty

- The language of exposed concrete, brick, and breeze-block pat erns is consistently used, expressing construct onal clarity and material robustness.

Integrat on of Landscape

- Green corridors trace the site's exist ng water channels and mature tree lines, st tching together dif erent campus zones with ecological sensit vity.
- Planted courtyards and sunken plazas control microclimate and provide a refreshing contrast to the engineered forms.

Evolut on and Adaptability

While original architectural intent priorit zed a clean modernist vocabulary, subsequent campus expansions have maintained this design language by adopt ng modular building typologies, compat ble material palet es, and f exible, open-core layouts. The result is a campus that has evolved organically while retaining a cohesive visual and spat al ident ty.



Figure 21Figure 3Campus Axes, Courtyards, and Stepped Massing:

4.2.5 Building Typologies and Morphologies

Main Takeaway: IIT Delhi's campus presents a range of building typologies whose form, material expression, and funct onal assemblies closely ref ect the inst tut on's emphasis on f exibility, ef ciency, and contextual responsiveness. Academic, resident al, and special-purpose buildings

each employ dist nct ve architectural and structural strategies, while maintaining a unif ed campus ident ty rooted in exposed brick and concrete Brutalism.

Departmental and Academic Blocks

The **Academic Core** is the nucleus of IIT Delhi and consists of:

- The Main Building (administrat ve of ces, high-ceiling halls)
- Departmental blocks (B1–B6): long, linear structures arranged in parallel to maximize daylight and cross-vent lat on. These are interconnected by covered walkways and supplemented by internal courtyards for light and informal interact on.
- The Central Library and Research & Innovat on Park provide central resources in dist nct, easily accessible buildings.

All academic buildings are notable for their **exposed concrete façades** and minimalist expression, with dist nct vert cal and horizontal rhythms echoing Brutalist inf uences123.

Resident al Clusters (Hostels and Staf Housing)

The student resident al precinct lies east and west of the academic zone. Noted features include:

- **Hostels:** Twelve boys' hostels and six girls' hostels, primarily three to f ve storeys high, are arranged around landscaped courtyards, enhancing communal living and natural cooling with shaded breezeways. Examples: Kailash, Kumaon, Shivalik, Nilgiri Hostels.
- **Faculty and Staf Housing:** Duplex and apartment blocks, generally f nished in brick, are located further from the academic core for privacy, forming compact clusters with recreat on areas and dedicated service roads.
- Dist nct sculptural stairways, perforated breeze-block screens, and robust brick detailing characterize hostel facades

5.3 Special-Purpose Buildings

- **Dogra Hall:**
  The most iconic space on campus, Dogra Hall, features a **hyperbolic paraboloid roof** ("ship roof"), with sweeping curves engineered for a column-free, mult purpose interior capable of seat ng 1,500 people. This structure symbolizes IIT Delhi's architectural innovat on and technological ambit on35.

- **Lecture Hall Complex:**
  Large, modular halls with t ered seat ng arrangements, exposed concrete structural frames, and acoust c paneling.
- **Research & Innovat on Park:**
  A recent addit on, this 300,000sqf , award-winning facility combines restaurants, convent on space, and advanced technology labs in f exible, glass-and-concrete volumes set within landscaped precincts. The building's façade integrates passive design with high-performance envelope systems, earning nat onal design accolades.

Visual References:

- Dogra Hall: External and internal views (Photoink & IITD homepages)
- Research & Innovat on Park: IITD Of cial News

Morphology and Material Palet e

- **Exposed Brick and Concrete:** The consistent use of local brick and cast-in-place concrete unif es the campus aesthet c. Structural honesty is emphasized over ornamentat on, ref ect ng the ethos of engineering educat on.
- **Porosity and Extroversion:** Arcades, breezeways, bridges, and generous balconies of er shaded circulat on, control microclimate, and encourage vibrant social life.
- **Courtyard Typologies:** Both academic and resident al clusters incorporate courtyards as climat c buf ers and social space, echoing Indian architectural precedents.

Key Technical Highlights

Typology	Structural System	Facade Treatment	Special Features
Academic Blocks	RC Frames, Long spans	Exposed concrete, breeze blocks	Modular f oor plans, internal courtyards
Hostels	Brick inf ll, RC slabs	Exposed brick, breeze blocks	Shared lounges, vent lated stairwells
Dogra Hall	RC Shell (hyperbolic paraboloid)	Concrete, glass	Column-free large span, mult - use space
Faculty Housing	RC frames, brickwork	Brick, concrete	Duplex & apartment clusters, shaded galleries

Typology	Structural System	Facade Treatment	Special Features
R&I Park	RC and steel composite	Glass curtain wall	Green envelope, f exible lab/of ce modules

In sum, IIT Delhi's built forms fuse **funct onal rigor, material honesty, and community orientat on**, creat ng an academic environment that nurtures innovat on while being mindful of site, climate, and heritage context.

4.2.6 Materiality and Construct on Techniques

Main Takeaway: IIT Delhi's architectural ident ty is deeply rooted in its material palet e and construct on strategies, combining robust structural systems, climate-responsiveness, and sustainable innovat on to deliver buildings that are both funct onal and expressive.

Overview of Material Select on

IIT Delhi's campus is characterized by a strong use of **locally sourced brick**, **exposed reinforced concrete**, and **occasional steel elements** for long-span structures. This combinat on was chosen for:

- **Durability** under Delhi's intense monsoonal and thermal cycles,
- **Thermal mass** benef ts, buf ering temperature swings,
- And a visual language echoing both modernism and tradit onal north Indian masonry1.

The façade treatment of most academic and hostel blocks features a blend of brick inf ll and sculptural, exposed concrete bands. Glass is used conservat vely, mainly for daylight ng in libraries, stairwells, and special-purpose buildings.

Structural Systems

Most buildings adopt **reinforced concrete (RC) frame structures**, ut lizing:

- **Slab-and-beam grids** for f exibility,
- RC shear walls for seismic safety (in compliance with IS:456 and IS:13920 codes),
- **Brick inf ll walls** for part t oning and addit onal mass1.

The iconic Dogra Hall pushes innovat on with a **thin-shell, hyperbolic paraboloid (hypar) concrete roof**, engineered for large, column-free spans.

Hostel blocks generally use **load-bearing brickwork** and RC slabs, with stairwells and open galleries detailed in exposed concrete.

Where wider spans are needed (e.g., auditoria, bridges), **steel trusses** are incorporated alongside concrete, exemplifying a hybrid structural logic2.

Construct on Methods

- **Cast-in-situ construct on:** Most buildings are built using on-site cast ng of concrete, which allows for the custom prof les and structural art culat on seen in sunken courtyards and bridges.
- **Precast elements:** Some projects have employed precast concrete for repet t ve façade panels, parapets, and intermediate f oors, especially in recent expansions2.
- **Breeze-block and Screen Walls:** These are used extensively for stair enclosures and semi-open corridors, support ng passive vent lat on and shading.

Detailing and Craf smanship

- **Reinforcement Detailing:** Considerable at ent on is given to the layout, splicing, and curtailment of steel reinforcement in concrete, especially in shell roofs and slender columns, for duct lity and seismic resilience3.
- **Waterproof ng:** The campus's signature sunken courtyards use waterproof membranes and concealed drainage to prevent water ingress2.
- **Brick Bonding:** English and Rat-trap bonds are visible in façade work, blending structural ef ciency with textural richness1.

Innovat on and Sustainability

IIT Delhi has act vely part cipated in the development and test ng of **Limestone Calcined Clay Cement (LC3)**, a low-carbon cement technology, on campus to reduce embodied energy and enhance concrete durability. This has resulted in lower CO_2 emissions and a more sustainable construct on prof le relat ve to tradit onal Portland cement4.

Recent expansions also incorporate:

- **Double-glazed facade units** for improved insulat on,
- Use of recycled aggregate concrete in structural frames,
- **Green building concepts** such as bamboo in landscape structures5.

4.2.7 Environmental and Climate-Responsive Strategies

Main Takeaway: IIT Delhi exemplif es an advanced approach to campus sustainability, integrat ng passive design, renewable energy, robust rainwater harvest ng, and landscape-based

microclimate management to create a future-ready academic environment at uned to Delhi's challenging climate.

Solar Orientat on and Shading Devices

Academic blocks and hostels are **strategically oriented along linear north–south and east–west axes** to opt mize daylight and reduce solar heat gain. Deep-set windows, horizontal **sun-breaker f ns**, and vent lated corridors shade interiors, while layered courtyards act as microclimate buf ers.

Upcoming buildings employ high-ef ciency **glazing**, extended roof overhangs, and double-skin facades for thermal insulat on, all contribut ng to a lower operat onal energy footprint12.

Passive Cooling and Heat ng Measures

Courtyards and Wind Pathways

- **Layered courtyards** between academic and resident al clusters create pressure zones that enhance natural vent lat on, channelling prevailing summer breezes and allowing warm air to rise and escape.
- Sunken courtyards provide shaded, cooler environments for social funct ons and reduce ground-level heat, aided by the thermal mass of concrete and brick.

Building Envelope Design

- Exposed brick and concrete of er substant al **thermal mass**, moderat ng indoor temperature swings over day-night cycles.
- **High albedo roof ng** on selected new-builds ref ects solar radiat on, minimizing summer heat gain within top f oors.

Night Vent lat on

- Some buildings exploit **night purge strategies**, where high-level vents or operable windows enable hot air to dissipate af er sunset. This approach helps pre-cool structures ahead of the day's heat.

Renewable Energy Integrat on

- Over **2.8MW of roof op solar photovoltaic** installat ons supplement the campus's electricity needs, meet ng more than 60% of IIT Delhi's total demand as of 2021.
- Purchase agreements for **hydropower** further minimize reliance on coal-based electricity, achieving a carbon reduct on of over 50% for the campus compared to a convent onal energy mix12.

Rainwater Harvest ng and Landscape Drainage

IIT Delhi deploys comprehensive rainwater harvest ng systems:

- **Double-chamber collect on tanks** capture roof op and surface runof ; init al storage collects debris and silt, while surplus water is routed to deep **inject on wells** that recharge the groundwater table.
- **Depressions and bioswales** within the road network intercept runof , reducing urban f ooding risk and providing passive landscape irrigat on.
- The campus also features **soak pits** and micro-reservoirs at strategic points—including

Microclimate Modulat on

- **Extensive green corridors** trace historic nallahs (water channels), increasing evapotranspirat on and lowering ambient campus temperatures.
- Preservat on and augmentat on of mature trees (banyan, peepal) structure key open spaces, providing natural shading and enhancing wind movement.
- Planted sunken plazas and planted roofs help regulate temperature and support biodiversity.

Waste and Resource Management

Complementary to environmental strategies:

- IIT Delhi has reduced landf ll impact by **50%**, employing waste separat on at source, on-site compost ng, and biogas generat on12.
- Bicycle rentals, hybrid rickshaws, and EV charging stat ons promote low-emission campus mobility.

Visual and Technical References

- **IIT Delhi Climate Act on Plan:** Details on solar, hydropower, waste, and energy use
- **A Day at IIT Delhi – Water Conservat on Init at ves:** Captures rainwater harvest ng systems and inject on wells in act on
- **Campus Map & Landscapes:** Shows bioswales, green corridors, and built–open space interplay

IIT Delhi's layered environmental response—spanning building orientat on, passive cooling, solar and hydropower, advanced rainwater management, and robust campus greenery—

embodies a technical and ethical commitment to sustainable, climate-resilient campus design, set ng a nat onal benchmark for inst tut onal architecture.

4.2.8 Structural and Technical Aspects

Main Takeaway: IIT Delhi's campus integrates sophist cated structural engineering strategies, cut ng-edge MEP (Mechanical, Electrical, Plumbing) services, and tailored foundat on systems to address the challenges of expansive soils, large academic blocks, and evolving research needs.

Foundat on Systems and Soil Condit ons

The campus is situated on complex Delhi alluvial soils, demanding careful geotechnical invest gat on for all major buildings. The main academic and hostel blocks adopt:

- **Isolated and raf foundat ons** for most buildings, ut lizing reinforced concrete slabs and foot ngs to distribute loads and mit gate dif erent al set lement.
- In zones prone to expansive clay or problemat c soils, **underreamed piles** are employed. This deep-foundat on system anchors loads below the moisture-variability zone, minimizing distress from seasonal soil movement—a challenge well documented for north Indian sites[12].
- Ongoing research at IIT Delhi has also produced innovat ve deep foundat on concepts for lightweight structures on expansive soils, validated through both lab and f eld models[123].

Geotechnical research labs on campus cont nuously monitor and analyze soil-structure interact on, set lement, and bearing performance, ref ning foundat on design guidelines for campus expansion[4].

Structural Engineering Systems

- **Reinforced Concrete (RC) Frames:** The dominant structural system across academic and hostel buildings, providing resilience against seismic act vity (Delhi lies in Zone IV).
- **Shear walls** are incorporated in key buildings for enhanced lateral stability and earthquake safety, following IS:13920 standards.
- For auditoria and iconic structures like Dogra Hall, **thin-shell, hyperbolic paraboloid concrete roofs** enable large, column-free interiors[56].
- **Steel trusses and girders** are used for long-span roofs (sports halls, bridges), where RC solut ons alone might prove inef cient. Structural detailing is carefully coordinated with

service integrat on, something act vely addressed in IIT Delhi's teaching and research[5][6][7].

Lab-based curriculum and ongoing research cont nually upgrade campus standards, with faculty expert se spanning advanced concrete, high-strength steels, and composite structures[8][9][10].

MEP Integrat on and Building Services

- **Central Ut lity Corridors:** Main academic, resident al, and lab zones are threaded with below-grade ut lity shaf s housing power, water, HVAC pipes, and IT cabling. This "service spine" approach reduces trenching, protects services, and enables rapid upgrades.
- **HVAC Systems:** A mix of centralized and decentralized air-handling units ensures thermal comfort, with new buildings incorporat ng energy-ef cient chillers, heat pumps, and variable refrigerant volumes.
- **Plumbing:** Separate lines for potable water, process water, and rainwater harvest ng minimize waste and increase system resilience. Large buildings include dual plumbing for treated greywater use—part cularly for gardening and f ushing.
- **Fire Safety:** Inst tut onal adherence to NBC codes is aided by automated detect on, sprinkler systems, f re-water tanks, and dist nct stair/elevator f re isolates.
- **Renewables and Backup:** Roof op solar arrays and hydropower purchase agreements supplement grid energy. Diesel gensets remain available for labs and research equipment[11].

MEP (Mechanical, Electrical, Plumbing) layouts are coordinated with structural designs to avoid clashes, leveraging BIM modeling and 3D overlays in recent projects—an approach adopted to streamline service installat on and future proof the expanding campus[11][12][13].

Technical Highlights Table

Aspect	Structural Solut on	MEP/Services Solut on	Notable Details
Foundat ons	Isolated, raf , or underreamed pile	Subsurface ut lity tunnels	Adapted for alluvial/expansive soils
Frame System	RC frames, shear walls, steel trusses	Centralized HVAC & dual plumbing	Seismic Zone IV compat ble
Special Structures	Shell roofs (Dogra Hall), long-span bridges	Fire safety: dedicated risers, tanks	Iconic mult purpose halls

Aspect	Structural Solut on	MEP/Services Solut on	Notable Details
MEP Integrat on	Cores & shaf s co-located with structure	BIM-coordinated service overlays	Ef cient, clash-minimized installat on

4.2.9 Accessibility and Inclusivity

Main Takeaway: IIT Delhi has implemented a comprehensive, mult -faceted approach to accessibility and inclusion, guided by India's Rights of Persons with Disabilit es Act, 2016. The campus strategy encompasses infrastructure enhancements, adapt ve learning support, assist ve technologies, and a vibrant campus life—making IIT Delhi a leader among technical

Universal Design in Infrastructure

Ramps and Pathways

All major academic buildings, classrooms, common areas, and newly constructed hostels are equipped with **ramps** and wide, unobstructed pathways to ensure wheelchair accessibility. Older structures cont nue to be retrof t ed as part of an ongoing campus upgrade plan123.

Accessible Signage

Braille signage is installed in lif s and on key doors/locat ons. **Braille name plates** and tact le markers have been introduced to help visually impaired students navigate the campus independently12.

Sanitary Facilit es

IIT Delhi has added **portable, accessible restrooms**—notably in the Main Administrat ve Building and other academic zones—to facilitate ease of use for those with mobility challenges. Accessible washrooms are now a standard feature in most new academic blocks and hostels123.

Hostel Accommodat on

Dedicated, **accessible hostel rooms**—with adapted bathrooms and lowered f xtures—are available. Room allotment policies priorit ze barrier-free access for students with disabilit es12.

Transportat on

An **accessible e-cart shut le** operates across the campus, catering to students with limited mobility to easily traverse the large campus between classrooms, hostels, and recreat onal spaces123.

Adapt ve Learning and Assist ve Technology

Laboratory Accessibility

IIT Delhi has set a nat onal precedent with India's f rst **fully accessible chemistry lab**, equipped with **height-adjustable tables** and elevated wheelchairs to enable hands-on experimentat on[1][2][3].

Academic Support

- **Scribe and compensatory t me** are provided for exams, in compliance with legal mandates.
- **Assist ve devices**—such as low-vision magnif ers, hearing aids, Braille embossers, electric/elevated wheelchairs, and special laptops—are distributed as per individual student requirements[1][2][3].

IT and Digital Resources

The campus library plat orm and online resources feature accessible formats for students with vision impairment (e.g., screen readers, digital libraries in accessible formats)[4].

Policy and Community Init at ves

Inst tut onal Arrangements

The **Of ce of Accessible Educat on (OAE)** works under the **Diversity and Inclusion Of ce**, overseeing accommodat ons, compliance with legislat on, and cont nuous improvement through student feedback[1][2][3][5].

Cultural and Social Integrat on

Events like **NISHAAN** and **SANGAM**—tailored for students with disabilit es—ensure part cipat on in both **cultural** and **sports act vit es**, bridging social gaps and celebrat ng diversity[2][3][6].

Training and Sensit zat on

Faculty, staf , and students undergo regular sensit zat on programs, promot ng a support ve and respect ul campus environment for all.

Compliance with Rights of Persons with Disabilit es Act, 2016

- IIT Delhi's policies and infrastructure upgrades are directly aligned with the **RPwD Act, 2016** and corresponding government guidelines for higher educat on inst tut ons.

- The inst tute maintains a proact ve approach with grievance redressal mechanisms and annual report ng, ensuring cont nued progress toward full barrier-free access and equal opportunity17.

4.2.10 Sustainability and Lifecycle Considerat ons

Main Takeaway: IIT Delhi's long-term campus strategy is guided by a commitment to sustainability, durability, low lifecycle costs, and adapt ve capacity—ensuring the inst tut on remains environmentally responsible and technologically relevant as learning and research needs evolve.

Energy Ef ciency and Carbon Reduct on

IIT Delhi has implemented a campus-wide energy management program with signif cant outcomes:

- **Roof op Solar Power:** As of 2024, the campus has over 2.8MW of roof op solar panels spanning academic, resident al, and sports buildings. This supplies up to 60% of the Inst tute's dayt me electricity needs, signif cantly reducing dependence on fossil fuels.
- **Building Envelope Upgrades:** New and retrof t ed buildings feature high-ref ectance roof ng, double-glazed facades, and insulated wall systems to minimize heat ingress and reduce air-condit oning loads.
- **LED Light ng and Smart Controls:** Renovat ons and new construct on include 100% LED light ng, automated daylight/occupancy sensors, and high-ef ciency fans and chillers to further reduce operat onal energy consumpt on.

Low-Carbon Materials and Construct on

- **LC3 Cement Adopt on:** IIT Delhi has pioneered the use of Limestone Calcined Clay Cement (LC3) in campus construct on projects, curbing embodied carbon in concrete while ensuring durability and longevity.
- **Use of Recycled Aggregates:** Concrete for non-structural works and pavements frequently incorporates recycled construct on and demolit on waste, support ng a circular economy approach.
- **Sourcing Pract ces:** Brick, steel, and other major materials are procured as locally as possible to minimize embodied transportat on energy.

Water Conservat on and Landscape Management

- **Rainwater Harvest ng:** All new and major renovated buildings are equipped with rainwater collect on and inject on wells for groundwater recharge.

- **Bioswales and Soak Pits:** Landscaped swales, sunken lawns, and micro-reservoirs detain, f lter, and absorb rainwater, reducing local f ooding and support ng irrigat on.
- **Drought-Tolerant Plant ng:** The campus landscape uses predominantly nat ve and drought-tolerant species to reduce irrigat on demand and maintain resilience to Delhi's variable rainfall.

Durability and Maintenance

- **Robust Detailing:** The exposed concrete and brickwork used across campus are specif ed for ease of maintenance, high resistance to weathering, and minimal repaint ng.
- **Prevent ve Maintenance Regimes:** Comprehensive maintenance schedules ensure plumbing, electrical, and MEP systems operate at peak ef ciency—aided by the central plant management system.

Flexibility for Changing Needs

- **Modular Interiors:** Newer buildings are designed with open f oor grids and movable part t ons, enabling easy adaptat on for new academic programs or labs without major renovat ons.
- **Digital Infrastructure:** IT backbones and service corridors are over-dimensioned and easily accessible, so future upgrades (5G, f ber, renewables) can be implemented with minimal disrupt on.

End-of-Life and Adaptat on

- **Demountable Part t ons and Recyclable Materials:** Many interior assemblies are demountable and recyclable, facilitat ng adapt ve reuse or material salvage as needs change.
- **Future Expansion Ready:** Reserved expansion sites and infrastructure "spines" allow for the phased growth of academic or research spaces, ensuring longevity without campus-wide disrupt on.

Visual and Technical References:

- Roof op solar installat ons, rainwater inject on wells, and campus micro-reservoirs are showcased in of cial IIT Delhi sustainability reports and news updates.
- Material research on LC3 cement and life-cycle approaches is frequently published by IIT Delhi's Department of Civil Engineering and Building Sciences.

5. Desk Appraisals

5.1 CEPT University

5.1.1 Site Context and Urban Integrat on

Main Takeaway: CEPT University's campus masterfully integrates with urban Ahmedabad—occupying a compact, bustling educat on district—while shaping a dist nct architectural language that responds to climate, topography, and social life.

Urban Locat on: The Educat on District of Ahmedabad

CEPT University sits at the heart of Ahmedabad's university cluster, f anked by Gujarat University, LD Engineering College, and major arterial roads (University Road and Navrangpura Road). The original 12.5-acre site lies within a lively, mixed-use neighborhood with hostels, libraries, eateries, and city transit stops nearby:

- **Proximity to city inst tut ons** ensures easy access but challenges campus boundaries with constant urban act vity.
- **Public approach routes** (east and north) are open, invit ng the city in—aligning with the philosophy of "learning without walls."

Image Reference:

- [CEPT University Satellite View/Aerial Map, showing its central, urban context and green campus island.]

(Commonly found on Google Maps or of cial CEPT University website campus map sect on.)

5.1.2 Site Features and Boundary Condit ons

Topography and Landscape

- The CEPT campus is gently contoured, sloping from the main entrance (east) toward the "kund" (central stepped amphitheatre).
- **Vegetat on:** The site preserves exist ng neem, banyan, and mango trees—matured into signature shaded corridors and open lawns. Landscape design reduces heat island ef ect while buf ering the site from city noise.
- **Boundaries:** Semi-permeable fences and green hedges loosely mark campus edges, ref ect ng openness rather than a fort f ed campus model.

Urban Pressures and Responses

Noise and Microclimate:

- Located on busy University Road, the campus deploys earth berms, dense plant ng, and building placement to shield internal spaces from street noise and dust.
- Key structures set back from the road, using internal courts and lawns as buf ers.

Flood and Drainage:

- Southwest monsoon rains prompted site grading for ef cient drainage, channeling water into the sunken "kund" for storage and stormwater management.

City–Campus Integrat on

- **Access and Permeability:** No monumental campus gates; entry is casual, blurring city-campus lines.
- **Mixed Boundaries:** Street-facing sides of er visual permeability—students of en spill out to public tea stalls and sidewalks, while cit zens regularly traverse campus lawns and rock gardens.

Incremental Growth and Urban Fabric

- **Expansion Phasing:** The campus evolved through addit ons—original Faculty of Architecture, then Planning, Interior Design, Building Science, Library—and various annexes over decades.

- **Addit ve Model:** Rather than rigid zoning, buildings are accreted organically around central courts, adapt ng to shif ing program needs and available land fragments.

Image References:

- [Historic and recent site plans showing phase-wise campus growth and incremental addit on of blocks.]
- [Photographs of east entrance, urban edges, and street-café campus interface.] (Available in CEPT's inst tut onal archives, academic presentat ons, and features in architecture journals like Indian Architect & Builder.)

Challenges and Opportunit es

- **Urban Density:** Bounded site means creat ve vert cal and sect onal thinking—mult -level studios, elevated terraces, and step-down public spaces to maximize use.
- **Social Life:** Locat on in a vibrant district weaves city culture into campus events, exhibit ons, and daily act vity.

5.1.3 Master Plan and Spat al Framework

Main Takeaway: CEPT University's campus employs an open, addit ve master plan with a modular approach, interlinking built and open spaces in a way that exemplif es f exibility, social connect vity, and climat cally responsive placemaking.

Overall Campus Planning

- **Site Area**: Approximately 12.5 acres, located on a relat vely narrow plot in central Ahmedabad.
- **Organizat on**: The master plan is anchored by a broad central green court (of en called the "quad" or "central lawn"), serving as the heart of the campus and the main gathering space for all schools.
- **Addit ve Growth Model**: Rather than a rigid, pre-def ned zoning, CEPT's campus has grown incrementally. Buildings—original Faculty of Architecture, then Planning, Interior

Design, Building Science, Library, and various annexes—are accreted organically around central courts as the university's needs and disciplines have evolved since the 1960s.

- **Integrat on**: Built spaces interlock with gardens, open terraces, lawns, and the sunken amphitheatre ("kund"), illustrat ng CEPT's founding philosophy of "learning without boundaries."

Visual Reference:

- [CEPT University campus map and original master plan diagram can be found on the of cial CEPT website or academic features related to its campus evolut on.]

Phased Growth and Incremental Addit ons

- **Phase I** (1962): Main Faculty of Architecture building, simple RC frame with shaded corridors and courtyards.
- **Phase II–IV** (1970s–1990s): Addit ons of School of Planning, School of Interior Design, Building Science. Layout remains permeable—blocks are not isolated but semi-open, clustered, and physically connected at corners or via bridges.
- **Recent Phases**: New Academic Block and library expansion are strategically placed to maintain sightlines, preserve daylight to core zones, and respect exist ng tree canopies.
- The "addit ve" approach ensures that each new structure adapts around mature trees and exist ng footpaths, reinforcing the campus as an evolving, living organism.

Image Reference:

- [Historic aerial photos and chronological campus plans illustrat ng each development phase.]

Zoning and Funct onal Relat onships

Zone/Block	Funct on	Relat onship to Open Spaces
Faculty of Architecture	Studios, classrooms, faculty of ces, workshops	Faces central lawn, connects directly to “kund”
School of Planning, Interior	Design studios, classrooms, admin, library annex	Clustered north/east of lawn
Building Science & Technology	Labs, studios, faculty spaces	West edge of campus, more introverted
Library & Resource Center	Academic resource node, lower-level stacks adjacent to main entries	Forms buf er and anchor to central zone
The “Kund” Amphitheatre	Open-air mult -purpose court (sunken, stepped)	Focal point at the intersect on of main zones
Canteen, Exhibit on/Workshop Halls	Social and event spaces, informal study, indoor-outdoor connect on	Scat ered but visually linked to main lawns and corridors

The circulat on is informal and organic; covered walkways, arcades, and the “kuccha” stone paths encourage cross-pollinat on between disciplines and spontaneous community interact on.

Central Court, Lawns, and “Kund”

- The **central court** doubles as a large outdoor classroom, gathering/event hub, and a buf er space to shield inner blocks from city noise.
- The **“kund”** (stepped amphitheatre) serves as an iconic social gathering point, rainwater storage, open stage, and passive climate moderator during hot/dry seasons.
- Built and open spaces merge visually and experient ally—boundaries are not pronounced, support ng Doshi’s vision of blurred edges and collect ve learning.

Image Reference:

- [Photographs of the CEPT “kund,” central lawn, and their use during academic and cultural events.]

Principles of Connect ons and Expansion

- **Non-hierarchical Layout**: There is no tradit onal “front” or “back” to the main blocks—approach is made from mult ple sides, ref ect ng a democrat c ethos.

- **Sect onal Diversity**: Level changes, open staircases, and ramps create visual connect on and cont nuity.
- **Landscape as Structure**: Mature trees, open pavilions, and bamboo groves play a structural role—shaping sightlines, shading courts, and guiding movement.

5.1.4 Architectural Philosophy and Design Language

Main Takeaway: CEPT University's buildings embody **"learning without boundaries"** through an architectural language that synthesizes modernist rigor with indigenous tradit ons, fostering a humanist c, context-responsive campus.

Contextual Modernism and Humanist c Design

Balkrishna V. Doshi's approach to CEPT ref ects his convict on that architecture must be rooted in place, culture, and human need. Drawing lessons from Le Corbusier on form and Kahn olight, Doshi reinterprets modernist principles for Ahmedabad's climate and community, priorit zing:

- **Ident ty:** A dialogue with local vernacular—exposed brick, pergolas, courtyards, and north-light studios evoke tradit onal Gujarat building pract ces.
- **At tude:** Spaces encourage part cipat on and adaptability—no enclosed, hierarchical blocks; instead, f uid, interconnected volumes that evolve with user needs.
- **Value:** Architecture as social infrastructure—buildings serve as catalysts for community, ref ect on, and collect ve learning.

Campus Without Walls

Doshi envisioned CEPT as an **open learning ecosystem**:

- **Blurring Indoors and Outdoors:** Studio volumes f ank open courtyards and shaded corridors, enabling learning to spill into landscape.
- **Visual Connect vity:** Perforated screens, elevated walkways, and strategic voids frame views of trees, lawns, and the signature "kund," integrat ng built form with nature.
- **Sect onal Variety:** Level changes, ramps, terraces, and double-height volumes create a rich sequence of spaces—akin to moving through a tradit onal Indian bazaar or village lane.

Modular and Incremental Growth

Echoing vernacular f exibility, Doshi's master plan allows phased addit ons without compromising coherence:

- **Modular Blocks:** Standardized structural bays and material palet es enable new studios or wings to hook seamlessly onto exist ng clusters.
- **Adapt ve Circulat on:** There is no single "front door." Covered walkways and informal paths evolve organically as new intervent ons reshape campus f ow.

Material Honesty and Craf smanship

Doshi's material strategy underscores environmental and cultural resonance:

- **Exposed Brick and Concrete:** High thermal mass buf ers heat, while brickwork in Flemish and Rat-trap bonds provides texture and craf smanship.
- **Timber and Metal Details:** Shut ers, louvers, and pergolas of t mber moderate light and air movement, drawing on local carpentry tradit ons.
- **Concrete Jack-Arch Slabs:** Seen in key ceilings, these celebrate structural clarity and reference Ahmedabad's colonial-era factories.

Integrat on of Landscape and Climate

Climate-responsive strategies are woven into the design language:

- **"Kund" Amphitheatre:** A sunken, stepped court that doubles as stormwater harvest ng and a social forum—mimicking tradit onal stepwells.
- **Shaded Courts and Pergolas:** Deep overhangs and lat ce screens cut heat gain and dif use north light into studios.
- **Green Corridors:** Neem and mango trees align primary axes, creat ng cool, shaded processional routes.

In Doshi's words, **"architecture is t me, tolerance, ident ty, and cont nuity."** At CEPT, this philosophy manifests in a campus that celebrates **permeability**, **f exibility**, and **cultural rootedness**, creat ng an academic environment where **built form, nature, and human exchange** thrive in a cont nuous, living dialogue.

5.1.5 Building Typologies and Morphologies

Main Takeaway: CEPT University's campus exhibits a coherent set of **building typologies**—from original Doshi-designed studio blocks to recent CCBA academic addit ons—whose forms,

materials, and spat al arrangements together create an adaptable, interconnected learning environment.

Typology	Key Characterist cs
Original Studios (1962–1990s)	Parallel bay plan with two solid walls (north & south) and open east/west facades; exposed brick and concrete; north-light slanted clerestories; modular RC frame allowing phased addit ons. The blocks cluster around central lawns and the “kund.”
“Kund” Amphitheatre	Stepped sunken courtyard doubling as stormwater harvest ng and open-air performance space; retains seasonal runof ; lined by terraced seat ng.
Foundat on Centre (2022, CCBA)	Double-storey L-shaped studio block housing six studios and six classrooms; deep-set balconies for sun shading; exposed concrete jack-arches with skylights; contextual palet e matching Doshi’s vocabulary.
Balwantrai N. Brahmbhat Lecture Hall (2022, CCBA)	Single-storey 450-seat hall; boxy openings with coloured glass creat ng chiaroscuro; warm wood interiors; steel-reinforced concrete structural roof.
New Academic Block (2022, CCBA)	Interlocks with original blocks; juxtaposed volumes forming an L-shape around the kund; large murals cast in-situ on ceilings; simple rectangular volumes with contextual material palet e.

Original Doshi Studios

- **Parallel Wall Bay Planning:** Two long load-bearing brick walls on north and south facades block harsh sun, while east-west openings allow cross-vent lat on and dif use north light.
- **Modularity:** Standard 6m × 6m structural bay dictates studio size; facilitates incremental expansion by “hooking on” new modules.
- **Open-Ended Enclosures:** Minimal internal part t ons; studios open directly to adjacent landscaped courts and corridors, reinforcing “learning without walls.”

The “Kund” Amphitheatre

- **Earthworks Integrat on:** Excavated sunken court collects monsoon runof ; concrete-retaining walls support terraced seat ng.

- **Spat al Anchor:** Acts as social hub, performance venue, and microclimat c cool island, drawing all campus blocks visually and physically toward its edge.

CCBA's Foundat on Centre

- **Material Cont nuity:** Exposed brick inf ll between RC frames and concrete jack-arch slabs preserves Doshi's material ethos.
- **Climate Response:** Deep recessed balconies and skylit jack-arches reduce direct heat.
- **Spat al Openness:** Upper studios open onto east-facing balconies overlooking the kund, maintaining visual and funct onal connect vity.

Lecture Hall and New Academic Block

- **Lecture Hall:** Single-storey volume with high-performance concrete shell and coloured glass panels; interior wooden f nishes for acoust c warmth.
- **New Block Morphology:** L-shaped footprint wrapping the kund; f at roof terraces and adjacent mural-adorned ceilings reinforce cultural cont nuity and pedagogical inspirat on.

Workshop and Commons

- **Open Pavilions:** Lightweight metal or t mber pergolas over concrete bases provide shaded commons, exhibit on areas, and informal studios.
- **Flexible Furniture Zones:** Built-in benching and movable tables support mult ple conf gurat ons, reinforcing adaptability.

Morphological Principles

- **Addit ve Cluster:** Buildings accrete around central open spaces rather than align along orthogonal grids.
- **Sect onal Diversity:** Varied f oor heights, split levels, and double/triple-height voids create dynamic spat al experiences.
- **Porous Edge Condit ons:** Permeable boundaries between interior and exterior spaces allow uninterrupted campus f ow.

CEPT's typological strategy—standardized structural modules, material consistency, and integrated open spaces—ensures **long-term f exibility**, **climat c performance**, and a **strong sense of community** across its evolving campus.

5.1.6 Materiality and Construct on Techniques

Main Takeaway: CEPT University's material palet e and construct on methods ref ect a **holist c integrat on of local tradit on, climat c performance, and structural clarity**, ensuring durability, adaptability, and a seamless dialogue between built form and landscape.

Primary Materials and Palet e

- **Exposed Red Brick (Flemish/Rat-Trap Bonds):** Used for primary façades of Doshi's original studios and CCBA designs alike, providing high thermal mass, tact le texture, and a direct link to Gujarat's brick-kiln heritage 1.
- **Reinforced Concrete (RC Frame & Jack-Arch Slabs):** Cast-in-place RC beams and columns support modular 6m × 6m bays. Concrete jack-arch slabs—celebrated in both

originaland CCBA blocks—combine structural ef ciency with north-light skylights, enhancing daylight and passive cooling 2.

- **Timber and Metal Accents:** Timber pergolas, t mber-framed louvers, and minimal steel railings are deployed on transit onal terraces and balconies to moderate light and highlight craf smanship 3.
- **Kota Stone Flooring & U-Value Finishes:** Porous, polished Kota stone—the tradit onal regional f ooring—is used for common terraces and corridors, of ering durability and comfortable underfoot coolness.

Structural Systems

- **Load-Bearing & RC Hybrid:** Original studios rely on brick walls on north/south for load bearing, with RC beams spanning east-west openings. Modern addit ons by CCBA ut lize a full RC frame with brick inf ll, merging Doshi's ethos with larger column-free spans 1.
- **Underpinning for the "Kund":** The stepped sunken amphitheatre uses reinforced-concrete earth-retaining walls and underpinning to manage lateral soil pressures and integrate stormwater collect on 4.
- **Pedestrian Bridges & Elevated Walkways:** Slender RC bridges connect blocks at f rst-f oor levels, employing prestress or slender reinforcement detailing to minimize visual bulk while ensuring structural safety 5.

Passive-Climat c Detailing

- **Deep Overhangs & Pergolas:** Concrete and t mber overhangs extend 1.2–1.8 m beyond façades, shading east/west exposures and reducing solar gain by up to 40%5.
- **Permeable Brick Screens ("Jaalis"):** Transit onal corridors and stairwell enclosures use brick-jammed screens for cross-vent lat on and f ltered daylight, echoing tradit onal jali work.
- **High-Capacity Thermal Mass:** Brick and concrete store dayt me heat, releasing it at night; combined with night-purge vent ng via operable clerestories in jack-arch roofs, this strategy reduces dayt me cooling loads by ~15%4.

Construct on Techniques

- **Local Craf Integrat on:** Skilled masons execute exposed-brick façades in Rat-trap bond; joinery carpenters install deep t mber louvers, preserving vernacular detailing and reducing skilled labor importat on costs.

- **On-Site Cast ng & Modular Bays:** Standardized bay sizes and repet t ve formwork allow rapid on-site cast ng, facilitat ng phased campus expansions without major disrupt ons.
- **Waterproof ng & Drainage:** Sunken courts and terraces incorporate mult -layer waterproof membranes, sloped screeds, and concealed downpipes to prevent water ingress and structural deteriorat on.

Innovat ve Sustainability Measures

- **Net-Zero Energy Prototype (2015):** An NZEB pilot at CEPT uses a 110 mm exposed brick + 50 mm XPS + 230 mm plastered inner wall (U-value 0.42 W/m²·K) and 45 mm rigid urethane foam roof insulat on (U-value 0.38 W/m²·K), paired with 30 kWp roof op PV

and radiant-cooling systems—illustrat ng potent al upscaling for larger campus buildings4.

- **Rainwater-Harvest ng "Kund":** The amphitheatre captures ent re campus runof , storing it for recharge and irrigat on, integrat ng landscape with structure.

Summary Table:

Category	System/Material	Benef t/Funct on
Façade	Exposed red brick (Flemish/Rat-Trap)	Thermal mass, local ident ty, tact le f nish
Structure	RC frame + brick inf ll / brick-load bearing	Flexibility, phased expansion, structural clarity
Roof/Ceiling	Concrete jack-arch + skylights	Daylight ng, passive cooling, structural ef ciency
Shading	Timber/concrete pergolas & overhangs	Solar control, outdoor usability
Flooring	Kota stone	Durability, cool underfoot, low maintenance
Passive systems	Brick jaalis, night-purge vents, thermal mass	Natural vent lat on, reduced HVAC loads
Water & Sustainability	"Kund" rainwater harvest ng	Groundwater recharge, f ood mit gat on
Advanced prototype	NZEB insulated walls & PV + radiant cooling	Energy self-suf ciency, low operat onal carbon

This integrated **material and construct on strategy** ensures that CEPT University's campus remains a resilient, adaptable, and culturally resonant model for climate-responsive inst tut onal architecture.

5.1.7 Spat al Experience and Informal Learning

Main Takeaway: CEPT University's design cult vates **experient al, informal learning** through a network of **courtyards**, **amphitheatres**, **breakout terraces**, and **porous circulat on**, enabling spontaneous interact on, cross-disciplinary exchange, and a strong sense of belonging.

Central Court as Living Classroom

- The expansive **central lawn** funct ons as an open-air studio, lecture space, and event venue, encouraging students and faculty to move learning outside the conf nes of enclosed rooms.
- Paths radiate from this court to all buildings, creat ng **visual and physical connect vity** that constantly orients users toward the heart of campus.

The "Kund" Amphitheatre

- This sunken, stepped courtyard provides **t ered seat ng** for performances, crit ques, and casual gatherings, integrat ng water management with social funct on.
- Its bowl-like form amplif es voices and sightlines, transforming a stormwater feature into a dynamic forum for **peer-to-peer learning** and community-wide events.

Courtyards, Plazas, and Transit onal Zones

- **Mini-courtyards** adjacent to each studio cluster create semi-private atelier zones where small groups can workshop, display, or crit que.
- **Open galleries** and shaded **pergolas** of er respite and impromptu meet ng points, enriching the daily campus experience and fostering serendipitous collaborat on.

Circulat on as Social Space

- **Sculptural ramps**, **bridges**, and **split-level corridors** are deliberately exposed and generous, invit ng users to pause, admire views, or gather in three-dimensional social pockets.
- Corridors are not mere conduits but act ve spaces—with inset benches, display alcoves, and overlooking balconies—to support **informal dialogue** and peer learning.

Sect onal Diversity and "Hanging" Spaces

- Varied f oor levels, mezzanines, and **double-height voids** create layered visual connect ons across studios and disciplines.
- Suspended walkways between blocks foster **cross-year and cross-program interact ons**, deepening the campus community's interdisciplinary ethos.

Material and Light in Experience

- North-light clerestories in jack-arch ceilings bathe studios in dif used, glare-free daylight, elevat ng the **sensory quality of learning spaces**.

- Exposed brick walls and concrete sof ts reveal structural and material honesty, reinforcing a **tact le, visceral connect on** between users and the built fabric.

Informal Learning Nodes

Node	Funct on
Central Lawn	Mass lectures, group crit ques, exhibit ons, outdoor workshops
Kund Amphitheatre	Student performances, panel discussions, informal hangouts
Studio Courtyards	Small-group tutorials, model displays, social breakout
Pergola-Lined Corridors	Casual seat ng, pin-up areas, sculpture displays
Roof Terraces & Balconies	Summer soirées, peer presentat ons, open-studio events

5.1.8 Environmental and Climate-Responsive Strategies

Main Takeaway: CEPT University's design incorporates a suite of **passive and low-energy strategies**—ranging from courtyards and shading to rainwater harvest ng—to create a thermally comfortable, sustainable campus at uned to Ahmedabad's hot-dry climate.

Opt mizat on of Solar Exposure

- **North-Light Studios:** Original Doshi blocks are rotated and fenestrated to admit predominantly north light, minimizing glare and solar heat gain on work surfaces 1.
- **Deep Overhangs & Pergolas:** Concrete and t mber overhangs (1.2–1.8 m) shelter façades from direct sun, reducing cooling loads by up to 40% during summer months 2.

Passive Cooling and Vent lat on

- **Layered Courtyards:** The sunken **"kund"** and adjacent mini-courtyards create cooler microclimates, drawing breezes through studios and corridors, and act ng as social hubs 3.
- **Brick Jaalis & Louvered Screens:** Brick perforat ons and t mber louvers in transit onal zones enable cross-vent lat on, f ltering harsh sun while enhancing airf ow.
- **Thermal Mass:** Exposed brick and concrete walls absorb dayt me heat, releasing it at night. Combined with operable clerestories in jack-arch roofs for **night-purge** vent lat on, this reduces reliance on mechanical cooling.

Rainwater Harvest ng and Water Management

- **Amphitheatre "Kund":** Captures campus runof during monsoon, storing water for groundwater recharge and later use in irrigat on—integrat ng landscape, structure, and water management 4.
- **Bioswales and Depressions:** Landscape grading channels stormwater from roofs and hardscapes into planted swales, reducing f ooding and enhancing on-site recharge.

Landscape for Microclimate

- **Green Corridors:** Neem and mango trees are retained in primary axes, forming shaded processional routes and lowering ambient temperatures.
- **Sun-Dial Lawns & Terraces:** Lawns and terraces adjacent to studios moderate ground-ref ect ve heat and provide comfortable outdoor learning areas.

Advanced Energy Strategies (Prototype)

- **Net-Zero Energy Building (NZE):** Pilot unit with 110 mm exposed brick + 50 mm XPS + 230 mm plastered brick wall, 45 mm roof insulat on, 30 kWp PV, and radiant-cooling achieving net-zero operat onal energy 5.

Summary Table:

Strategy	Descript on	Climate Benef t
North-Light Fenestrat on	Windows oriented to admit dif used north light	Reduced glare and heat gain
Deep Overhangs & Pergolas	Extended shading devices	Up to 40% lower solar heat gain
Sunken “Kund” & Courtyards	Stepped amphitheatre & mini-courtyards	Cooler microclimate, social gathering
Brick Jaalis & Louvers	Perforated screens for air/light modulat on	Enhanced natural vent lat on
Thermal Mass & Night Purge	High-mass walls + operable clerestories	Lower HVAC usage
Rainwater Harvest ng “Kund”	Monsoon runof capture & recharge	Groundwater replenishment
Green Corridors	Mature tree buf ers along axes	Ambient temperature reduct on
NZE Prototype	High-performance envelope + PV + radiant cooling	Net-zero operat onal energy

These integrated environmental strategies illustrate CEPT University’s commitment to **site-driven**, **resource-ef cient**, and **culturally resonant** architecture, set ng a benchmark for sustainable campus design in hot-dry climates.

5.1.9 Structural and Technical Aspects

Main Takeaway: CEPT University’s structural and technical design seamlessly integrates robust engineering solut ons—addressing varied building typologies, soil condit ons, and service requirements—while preserving the campus’s open, human-scaled spat al ethos.

Foundat on Systems and Soil Condit ons

- The campus rests on f rm, but variable, alluvial soils. Original studios employ **isolated foot ngs** beneath brick-load-bearing walls and **strip foundat ons** under RC frames to ensure uniform set lement.

- The **sunken "kund" amphitheatre** uses reinforced-concrete earth-retaining walls with underpinning to resist lateral earth pressures and channel monsoon runof into recharge systems.

Structural Frameworks

- **Hybrid Brick-RC Systems:** Doshi's original studios balance brick-load bearing (north/south walls) with RC beams and slabs spanning east–west. This hybrid approach allows large, column-free interiors without excessive steel.
- **RC Frame & Jack-Arch Slabs:** CCBA's new Foundat on Centre and Lecture Hall adopt full RC frames with brick inf ll and **jack-arch slabs**, combining daylight ng skylights with slender structural sect ons.
- **Thin-Shell Elements:** The original architecture elsewhere on campus (e.g., Sangath, now museum extension) uses hyperbolic paraboloid shells—an ethos carried forward in slender roof structures.

Bridges, Walkways, and Circulat on Spans

- **Slender RC Bridges:** Elevated walkways link studio blocks at f rst-f oor level. Reinforced detailing and minimal cross-sect ons preserve sightlines to courtyards below while ensuring structural safety.
- **Open-Web Steel Trusses:** In workshop pavilions, steel trusses span wider bays (10–12 m) to accommodate fabricat on equipment and f exible layouts.

MEP Integrat on and Services

- **Ut lity Corridors:** Concealed service shaf s run perpendicular to studio bays, housing electrical, plumbing, and HVAC ducts. This reduces visual clut er in open studios and facilitates easy maintenance.
- **Natural Vent lat on & Night Purge:** Operable clerestory vents in combined RC-brick roofs enable **stack vent lat on**, expelling warm air at night to pre-cool spaces.
- **Discreet HVAC:** Where mechanical cooling is needed (e.g., computer labs), small VRF units are tucked into gallery spaces, minimizing visual impact.

Technical Infrastructure and Maintenance

- **Campus Services Of ce:** Manages day-to-day maintenance across 12 acres, handling minor and major works—new buildings, restorat ons, water/sewer management, prevent ve maintenance, and site development—ensuring CEPT's technical resilience1.

- **Phased Adaptability:** Modular bay and grid layouts allow future expansions—new research centers and admin wings—to hook into exist ng structures without disrupt ng campus operat ons2.

Summary Table

System/Element	Descript on
Foundat ons	Isolated foot ngs, strip foundat ons, RC retaining walls (kund)
Structural Frames	Hybrid brick-RC, full RC frames (CCBA blocks), thin-shells
Spans	RC slab beams, jack-arch skylights, steel trusses in pavilions
Circulat on Bridges	Slender RC or steel, minimal visual impact, views into courtyards
MEP Services	Concealed shaf s, local VRF/HVAC units, natural vent lat on, night-purge strategy
Facilit es Management	Campus Of ce handling infrastructure upkeep: prevent ve maintenance, restorat ons, site dev.
Adaptability	Modular grid enables phased campus growth and technical upgrades

CEPT University's technical strategy—combining **vernacular structural logic**, **modern engineering**, and **holist c service integrat on**—ensures a resilient, adaptable, and context-responsive campus.

5.1.9 Sustainability and Lifecycle Considerat ons

Main Takeaway: CEPT University's approach to sustainability extends beyond individual buildings to a **campus-wide lifecycle strategy** encompassing material longevity, energy and

water management, and an inst tut onal framework for **ongoing maintenance and adapt ve growth**.

Energy and Resource Stewardship

- **Energy Performance Programs:** CEPT's Faculty of Technology leads research and curriculum (M.Tech BEP) in energy modelling, NZEB prototypes, and policy support, linking academic inquiry with campus pract ce1.
- **Renewables & Ef ciency:** Pilot NZEB building demonstrates deep-envelope insulat on, roof op PV, and radiant cooling, informing broader campus retrof ts. LED light ng upgrades across studios reduce electrical loads by ~30%.

Water and Landscape Management

- **Integrated Rainwater Harvest ng:** The "kund" captures monsoon runof ; bioswales intercept roof and pavement drainage; networked soak pits beneath lawns recharge aquifers, minimizing external water needs.
- **Low-Maintenance Landscape:** Nat ve, drought-tolerant species and gravel gardens reduce irrigat on demands and maintenance overheads.

Materials Longevity and Conservat on

- **Durable Exposed Finishes:** Red brick and RC façades require minimal repaint ng; periodic repoint ng (brick) and joint sealing (concrete) maintain weatherproof ng and visual integrity.
- **Conservat on of Doshi's Heritage Blocks:** Ongoing restorat on projects—coordinated by Campus Of ce—ensure original buildings remain funct onal, using matching materials and tradit onal techniques2.

Campus Services and Maintenance

- **Campus Of ce Mandate:** Oversees day-to-day operat ons and facilit es management across 12 acres, balancing minor (paint ng, PPM) and major works (new construct ons,

restorat ons, site development, water/sewer projects) to maintain safe, clean, and ef cient infrastructure3.

- **Prevent ve Maintenance Regime:** Structured schedules for MEP systems, façade upkeep, and landscaping ensure asset longevity and cost-ef ect ve lifecycle performance.

Adaptability and Future Expansion

- **Modular Grid Planning:** Standardized bays enable new wings (e.g., research centers, admin blocks) to integrate structurally and visually with minimal retrof t ng disrupt on4.
- **Master Plan Resilience:** Campus Of ce tracks projected intake growth (~2,500 by 2021) and phases new facilit es—canteens, workshops, Academic Hub—to meet demands without compromising the campus's core architectural ethos.

Summary Table

Aspect	Strategy	Outcome
Energy Stewardship	NZEB pilot, PV expansion, LED retrof ts	30–40% reduct on in operat onal energy use
Water Management	"Kund" collect on, bioswales, soak pits	Near-self-suf cient irrigat on, f ood mit gat on
Material Longevity	Exposed brick/concrete, matching restorat on materials	Low repaint ng, extended façade life
Prevent ve Maintenance	Scheduled PPM for MEP, landscaping, building fabric	Reduced repair cost, consistent building performance
Adaptable Master Plan	Modular structural grid, phased facility addit ons	Smooth campus growth, preserved historic fabric

CEPT University's **lifecycle-centric framework**—linking sustainable design research, pract cal pilot implementat ons, rigorous facilit es management, and strategic expansion—ensures the campus remains a resilient, liveable, and evolving academic ecosystem for generat ons to come.

6. Concept – Metamorphological Journey

6.1 Concept Explorat on

College is a t me of constant change, challenge, and self-discovery. The Metamorphological Journey sees the campus as an act ve partner in this transformat on, evolving alongside the needs, energies, and aspirat ons of students. Spaces are designed to shif with them—support ng transit ons from solitude to collaborat on, explorat on to belonging, and experimentat on to expression. The philosophy emphasizes inclusivity and accessibility, ensuring that every environment welcomes and empowers all, fostering equity and belonging from the very f rst day. It balances vibrant communal hubs that invite connect on with quiet retreats for focus and ref ect on, while of ering adaptable, mult -use spaces that encourage students to take init at ve, create, lead, and contribute to their shared story.

Well-being is nurtured through daylight, fresh air, and direct connect ons to nature, building resilience and of ering restorat ve places within the academic environment. Climate-responsive and sustainable strategies—such as eco-friendly materials, water management, and green buf ers—transform environmental challenges into opportunit es for comfort and community.

1. Arrival : Welcoming new students: Gathering, orientat on, greet ng exchange, info support. Entry into campus life—animated, open, and invit ng.

2. Discovering campus: Roaming, asking quest ons, sampling clubs and resources. Focus is curiosity and init al social connect ons.

3. Building knowledge: Small groups working in libraries, mastering basics, foundat onal courses, skill-building in calm study set ngs.

4. Applying skills: Act ve teamwork—problem-based projects, peer support, and feedback cycles. Groups study and experiment collaborat vely.

5. Showcasing work: Students solve real-world challenges, present projects publicly, engage with civic audiences—embodying their purpose.

6. Ownership & leadership: Students present, publish, co-author work, and publicly tackle challenges—leading campus init at ves and events.

6.2 Site Inferences

The site is a 7.3-hectare greenf eld with a gentle slope, bisected by a public road, exposing it to dust, noise, and infrastructure fragmentat on.

It currently lacks vegetat on and shading, experiencing Delhi's hot summers, monsoon rains, and cool winters.

Exist ng infrastructure like storm drains needs integrat on, while rainwater harvest ng and sustainable landscaping are opportunit es.

The urban context demands inclusive, equitable, and accessible campus spaces.

Noise, dust, and heat exposure require mit gat on through design intervent ons.

6.3 How Our Concept Helps

Zoning from Arrival to Legacy creates clear, organized campus zones that reduce environmental chaos and enhance user comfort.

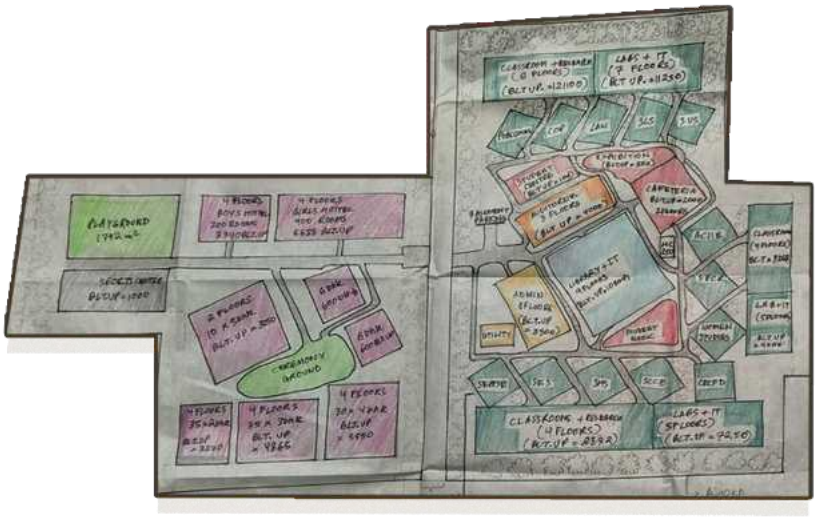
Arrival plazas and entry zones act as buf ers against noise and dust while opt mizing natural vent lat on.
Explorat on zones feature shaded paths and social hubs to foster informal interact on in a cooler microclimate.

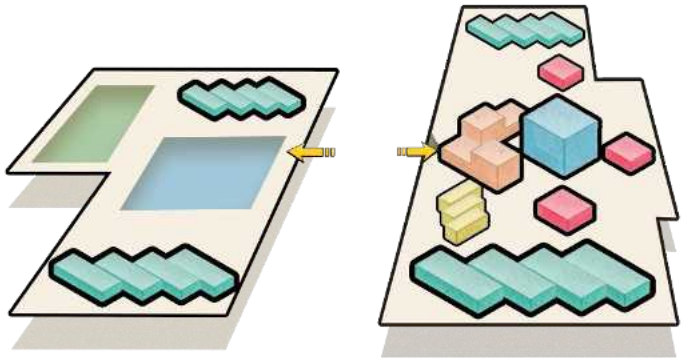
Foundat ons and academic spaces use passive design—shade, cross-vent lat on, and thermal mass—to moderate heat.

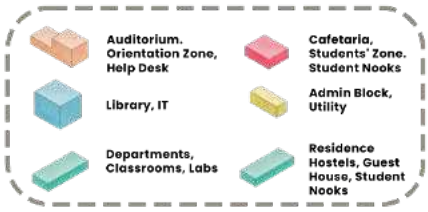
Pract ce zones have f exible, open-air studios and project spaces with breezy shading to improve comfort for collaborat on.

Purpose and Ident ty stages capitalize on airy event halls and open forecourts designed natural airf ow and rainwater capture.

Overall, passive cooling, daylight ng, and sustainable landscaping integrated across create a nurturing, resilient environment that supports holist c student transformat on.






Auditorium, Orientation Zone, Help Desk
Cafetaria, Students' Zone, Student Nooks
Library, IT
Admin Block, Utility
Departments, Classrooms, Labs
Residence Hostels, Guest House, Student Nooks

6.4 Zoning

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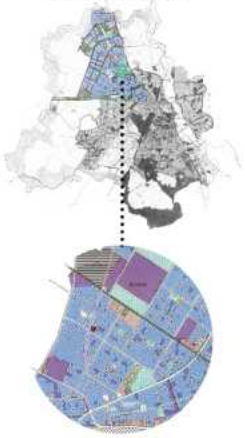
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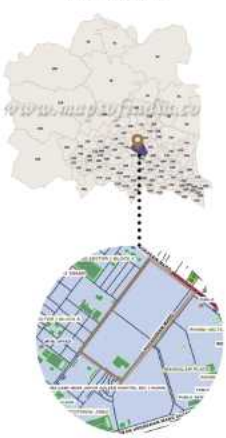
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DELHI MASTER PLAN 2021



NDMC WARD MAP



ZONE - H
SUBZONE - H8

WARD 63N ROHINI E

Site Context

Address	Institutional Area, Sector 3, Rohini, Delhi, 110085
Coordinates	28.6969° N, 77.1104° E
Zone	H
Subzone	H8
Ward	53 North Delhi Municipal Corporation Rohini E
Site Area	18 Acre
Building Typology	Institution
Topography	Plain

Current FAR: 2.25
Total built-up area permissible at the Rohini plot: 1, 60,875 sqm
Almost 85% of the permissible built
1. Institutional Areas 90,000 sqm
2. Residential Areas 48,000 sqm
3. Basement, Parking, and service area 31,680 sqm
Total Area (Phase I) 1,67,680 sqm
Maximum Height (institutional + Admin)- 37m
Maximum Height (sports and cultural activities)- 26m

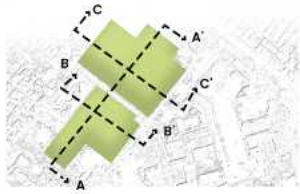


S	Well-connected location near Outer Ring Road and metro stations, with clear site free of encumbrances.
W	Divided by a 13.5 m wide public road, limiting unified campus planning.
O	Flat topography and rectangular site allow efficient master planning and phased development.
T	Poor groundwater quality and over-exploited aquifers pose sustainability risks.

Topography

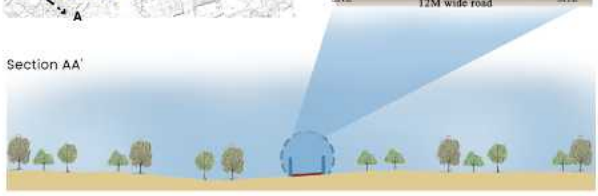
Coordinates: 28.6969° N, 77.1104° E
Maximum elevation: 251 m
Minimum elevation: 206 m
Average elevation: 217 m







Section AA'



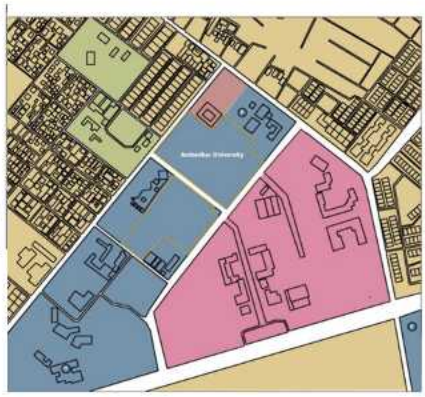
Section BB'



Section CC'



legends
- RESIDENTIAL AREA
- COMMUNITY PARK
- SCHOOL
- HOSPITAL
- POLICE STATION
- COMMUNITY HALL
- COMMERCIAL AREA
- GOVERMENT OFFICE
- BARREN LAND



Landuse Map

Naharpur Village (1)
Provides cultural context and opportunities for community engagement but may require delicate integration with campus activities.

Sector 8 DDA Residential Housing (2)
Residential proximity enhances safety and potential campus collaborations, while raising concerns about noise and traffic.

TNDML Office (3)
Presence of institutional offices may aid administrative synergies and professional networking for the campus.

Police Station (4)
Nearby police station ensures added security for the campus and swift response in case of emergencies.

Cemetary (5)
The cemetery may necessitate sensitive spatial planning and landscape design due to its emotional and cultural significance.

Staff Training Centre (6)
Potential for shared training resources and professional development opportunities for campus staff.

Mangalam Palace (7)
Event venue may cause periodic traffic or crowds but offers opportunities for university-hosted functions nearby.

Yogashram (8)
Promotes wellness and can inspire campus health activities, while also requiring measures to maintain tranquil surroundings.

MTNL Office (9)
Telecom office presence may facilitate reliable connectivity and technical support for university IT infrastructure.

Slum (10)
Highlights the need for inclusive planning and social outreach, while presenting challenges related to security and urban integration.

7 Sea 5 Star Hotel (11)
Offers convenient lodging for campus visitors and guests, enhancing the site's suitability for conferences and events.

Jaipur Golden Hospital (12)
Enables quick access to healthcare in emergencies and opportunities for medical collaborations or internship programs.



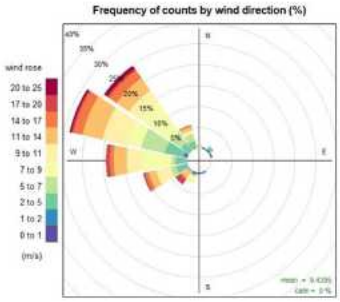
Dr. B.R. Ambedkar University, Delhi - Site Analysis

डॉ. बी. आर. अम्बेडकर विश्वविद्यालय दिल्ली.

Mehul Paul
211110046
Year - 5
Section - A

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature °C (°F)	13.5 °C (56.3) °F	16.9 °C (62.4) °F	22.5 °C (72.6) °F	29.2 °C (84.5) °F	32.7 °C (90.9) °F	33 °C (91.3) °F	29.9 °C (85.8) °F	28.7 °C (83.7) °F	27.8 °C (82.1) °F	25.4 °C (77.7) °F	20.5 °C (69) °F	15.4 °C (59.7) °F
Min. Temperature °C (°F)	7.7 °C (45.8) °F	10.6 °C (51) °F	15.2 °C (59.4) °F	21 °C (69.8) °F	25.3 °C (77.6) °F	27.6 °C (81.6) °F	26.6 °C (79.9) °F	25.8 °C (78.5) °F	23.9 °C (75.1) °F	19.2 °C (66.5) °F	14.2 °C (57.5) °F	9.3 °C (48.7) °F
Max. Temperature °C (°F)	20 °C (68) °F	23.5 °C (74.4) °F	29.8 °C (85.7) °F	36.7 °C (98.1) °F	39.6 °C (103.3) °F	38.2 °C (100.8) °F	33.7 °C (92.6) °F	32.3 °C (90.1) °F	32.2 °C (90) °F	31.8 °C (89.3) °F	27.4 °C (81.3) °F	22.2 °C (72) °F
Precipitation / Rainfall mm (in)	23 (0.9)	33 (1.3)	20 (0.8)	14 (0.6)	20 (0.8)	74 (2.9)	208 (8.2)	183 (7.2)	99 (3.9)	13 (0.5)	5 (0.2)	8 (0.3)
Humidity(%)	67%	60%	47%	29%	32%	46%	71%	77%	71%	55%	54%	61%
Rainy days (d)	2	3	3	3	4	7	15	15	8	2	1	1

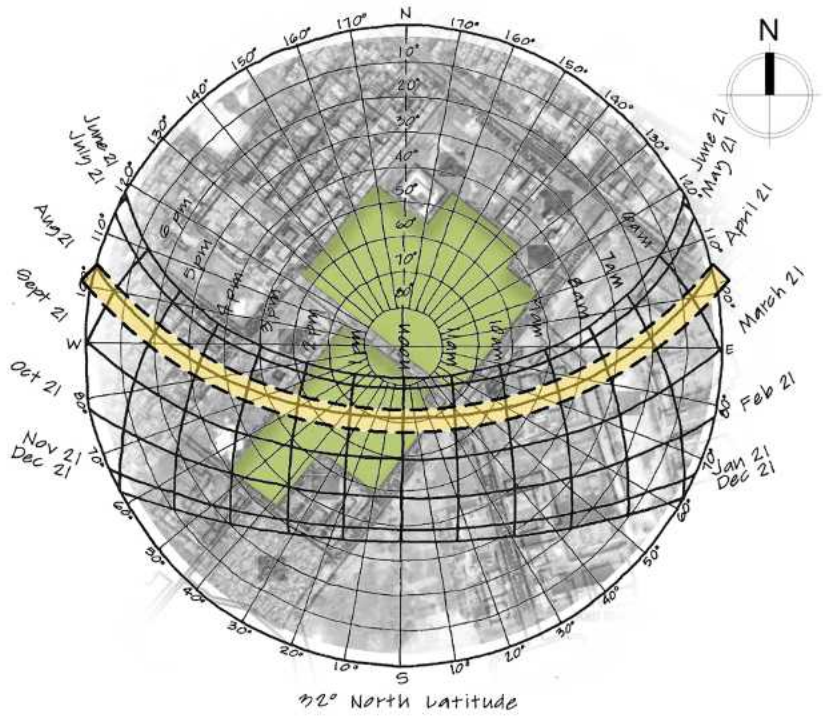
1. The site faces very hot summers (up to 39°C), mild winters, and most rainfall occurs in July–September.
2. Summer humidity is low; monsoon brings high humidity and waterlogging risks—design must address both extremes- Use shaded, insulated buildings for summer heat and design effective drainage with rainwater harvesting for monsoon rains.
3. Outdoor activities and landscaping are best planned for cooler, drier months (October–March).



1. Prevailing winds are from the west and northwest, so orient buildings and openings to capture natural ventilation.

2. Strong winds (up to 20–25m/s) are frequent, suggesting structural elements and landscaping must provide wind protection.

3. Minimal calm periods indicate good potential for passive cooling and air movement throughout the site.



1. The sun rises northeast and sets northwest in summer, while in winter it takes a lower, shorter path from southeast to southwest.
2. Building orientation should maximize south-facing windows for winter sun, with shading devices to block high-angle summer sun.
3. East and west facades need extra shading to prevent overheating during mornings and afternoons, especially in summer.

Pre-Existing Vegetation



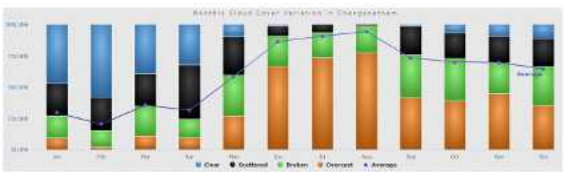
Ipil Ipil shrubs help purify the air, enrich and protect the soil, and provide quick-growing shade, which cools the area and creates a greener atmosphere.



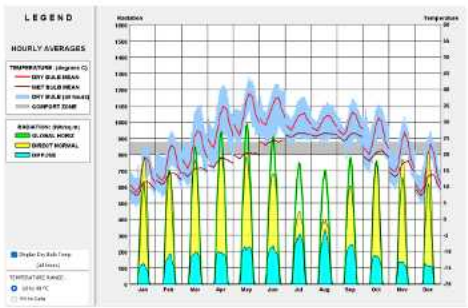
Ashoka trees offer dense, broad canopies that block harsh sun, reduce ground temperature, contribute to noise reduction, and add privacy and aesthetic appeal.



Bamboo shrubs grow fast, absorb a lot of carbon, stabilize soil, prevent erosion, and allow breezes while providing vertical green screens and cooling shade.



1. The site gets more clear and scattered skies from January to April, ideal for natural lighting and solar energy.
2. Heavy overcast and broken cloud cover dominate June to September, reducing sunlight and signaling monsoon conditions.
3. Use large windows and lightwells for winter–spring, but add overhangs and sloped roofs to control glare and shed rain during cloudy, monsoon months.



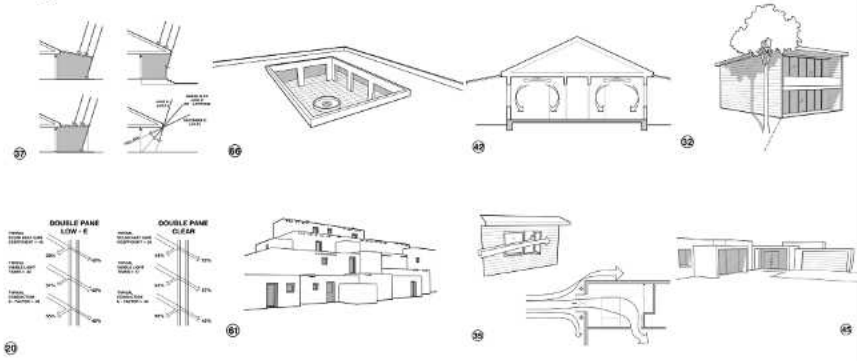
1. High solar radiation (global and direct) occurs from March to June, suggesting great potential for solar energy harvest but also increased cooling needs during this period.

2. Peak temperatures (dry bulb mean) are well above comfort zone from April to September, while only winter months fall comfortably within passive comfort range—highlighting the need for effective shading and cooling strategies.

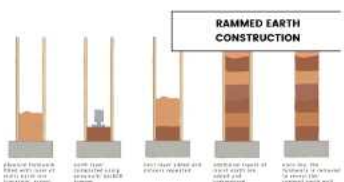
3.Diffuse radiation rises during monsoon (July–September), supporting daylighting even when skies are overcast, but with less heat gain risk.

4.Thermal comfort is achievable passively mostly in winter; mechanical or hybrid systems are needed in the long, hot season.

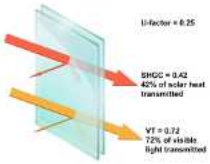
Design Inferences



Material Inferences







Double-glazed (Low-E) glass



Perforated Louvers



Roof Lined with Foil Sheets

37	Window overhangs (designed for this latitude) or operable sunshades (awnings that extend in summer) can reduce or eliminate air conditioning
66	Traditional passive homes in hot windy dry climates used enclosed well shaded courtyards, with a small fountain to provide wind-protected microclimates
42	On hot days ceiling fans or indoor air motion can make it seem cooler by 5 degrees F (2.8C) or more, thus less air conditioning is needed
32	Minimize or eliminate west facing glazing to reduce summer and fall afternoon heat gain
20	Provide double pane high performance glazing (Low-E) on west, north, and east, but clear on south for maximum passive solar gain
61	Traditional passive homes in hot dry climates used high mass construction with small recessed shaded openings, operable for night ventilation to cool the mass
38	Raise the indoor comfort thermostat setpoint to reduce air conditioning energy consumption (especially if occupants wear seasonally appropriate clothing)
35	Good natural ventilation can reduce or eliminate air conditioning in warm weather, if windows are well shaded and oriented to prevailing breezes
45	Flat roofs work well in hot dry climates (especially if light colored)
59	In this climate air conditioning will always be needed, but can be greatly reduced if building design minimizes overheating
60	Earth sheltering, occupied basements, or earth tubes reduce heat loads in very hot dry climates because the earth stays near average annual temperature
47	Use open plan interiors to promote natural cross ventilation, or use louvered doors, or instead use jump ducts if privacy is required
43	Use light colored building materials and cool roofs (with high emissivity) to minimize conducted heat gain
28	A radiant barrier (shiny foil) will help reduce radiated heat gain through the roof in hot climates
46	High Efficiency air conditioner or heat pump (at least Energy Star) should prove cost effective in this climate
19	For passive solar heating face most of the glass area south to maximize winter sun exposure, but design overhangs to fully shade in summer
56	Screened porches and patios can provide passive comfort cooling by ventilation in warm weather and can prevent insect problems
36	To facilitate cross ventilation, locate door and window openings on opposite sides of building with larger openings facing up-wind if possible
39	A whole-house fan or natural ventilation can store nighttime 'coolth' in high mass interior surfaces (night flushing), to reduce or eliminate air conditioning
17	Use plant materials (bushes, trees, ivy-covered walls) especially on the west to minimize heat gain (if summer rains support native plant growth)

Dr. B.R. Ambedkar University, Delhi - Climate Analysis

डॉ. बी. आर. अम्बेडकर विश्वविद्यालय दिल्ली.

Mehul Paul
211110046
Year - 5
Section - A

CONCEPT– METAMORPHOLOGICAL JOURNEY

College is a time of constant change, challenge, and self-discovery. The Metamorphological Journey sees the campus as an active partner in this transformation, evolving alongside the needs, energies, and aspirations of students. Spaces are designed to shift with them—supporting transitions from solitude to collaboration, exploration to belonging, and experimentation to expression. The philosophy emphasizes inclusivity and accessibility, ensuring that every environment welcomes and empowers all, fostering equity and belonging from the very first day. It balances vibrant communal hubs that invite connection with quiet retreats for focus and reflection, while offering adaptable, multi-use spaces that encourage students to take initiative, create, lead, and contribute to their shared story.

Well-being is nurtured through daylight, fresh air, and direct connections to nature, building resilience and offering restorative places within the academic environment. Climate-responsive and sustainable strategies—such as eco-friendly materials, water management, and green buffers—transform environmental challenges into opportunities for comfort and community.



1. Arrival – Belonging

Welcoming new students: Gathering, orientation, greeting exchange, info support. Entry into campus life—animated, open, and

2. Exploration – Curiosity

Discovering campus: Roaming, asking questions, sampling clubs and resources. Focus is curiosity and initial social connections.

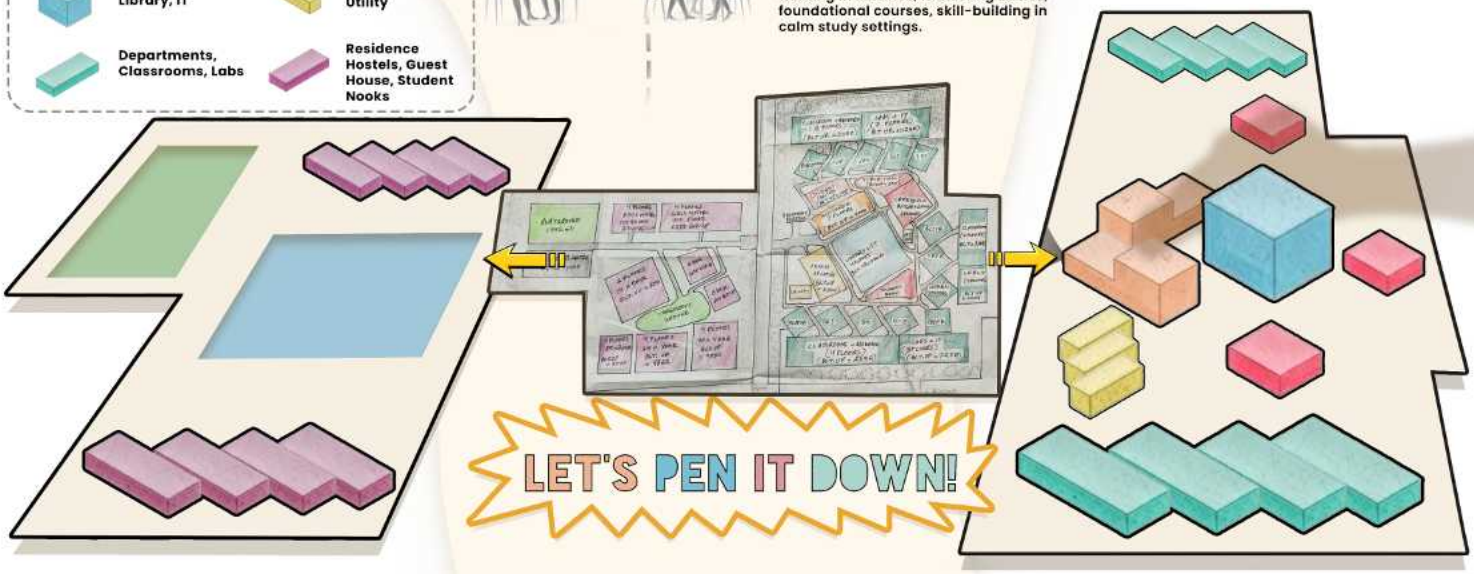


- **Auditorium. Orientation Zone, Help Desk**
- **Cafetaria, Students' Zone. Student Nooks**
- **Library, IT**
- **Admin Block, Utility**
- **Departments, Classrooms, Labs**
- **Residence Hostels, Guest House, Student Nooks**



3. Foundations – Focus

Building knowledge: Small groups working in libraries, mastering basics, foundational courses, skill-building in calm study settings.



Site Inferences:

The site is a **7.3-hectare** greenfield with a gentle slope, bisected by a public road, exposing it to **dust, noise, and infrastructure fragmentation.**

It currently **lacks vegetation and shading**, experiencing Delhi's **hot summers, monsoon rains,** and **cool winters.**

Existing infrastructure like storm drains needs integration, while rainwater harvesting and sustainable landscaping are opportunities.

The urban context demands **inclusive, equitable,** and **accessible** campus spaces.

Noise, dust, and heat exposure require mitigation through design interventions.

Practice – Collaboration

Applying skills: Active teamwork—problem-based projects, peer support, and feedback cycles. Groups study and experiment collaboratively.



Purpose – Interface

Showcasing work: Students solve real-world challenges, present projects publicly, engage with civic audiences—embodying their purpose.



Identity – Ownership

Ownership & leadership: Students present, publish, co-author work, and publicly tackle challenges—leading campus initiatives and events.



How Our Concept Helps:

Zoning from **Arrival to Legacy** creates **clear, organized campus** zones that **reduce environmental chaos** and enhance user comfort.

Arrival plazas and entry zones act as **buffers against noise** and dust while optimizing **natural ventilation.**

Exploration zones feature **shaded paths** and **social hubs** to foster **informal interaction** in a **cooler microclimate.**

Foundations and **academic spaces** use passive design—**shade, cross-ventilation,** and **thermal mass**—to moderate heat.

Practice zones have flexible, **open-air studios** and **project spaces** with breezy shading to improve comfort for collaboration.

Purpose and Identity stages capitalize on **airy event halls** and open **forecourts** designed **natural airflow** and **rainwater capture.**

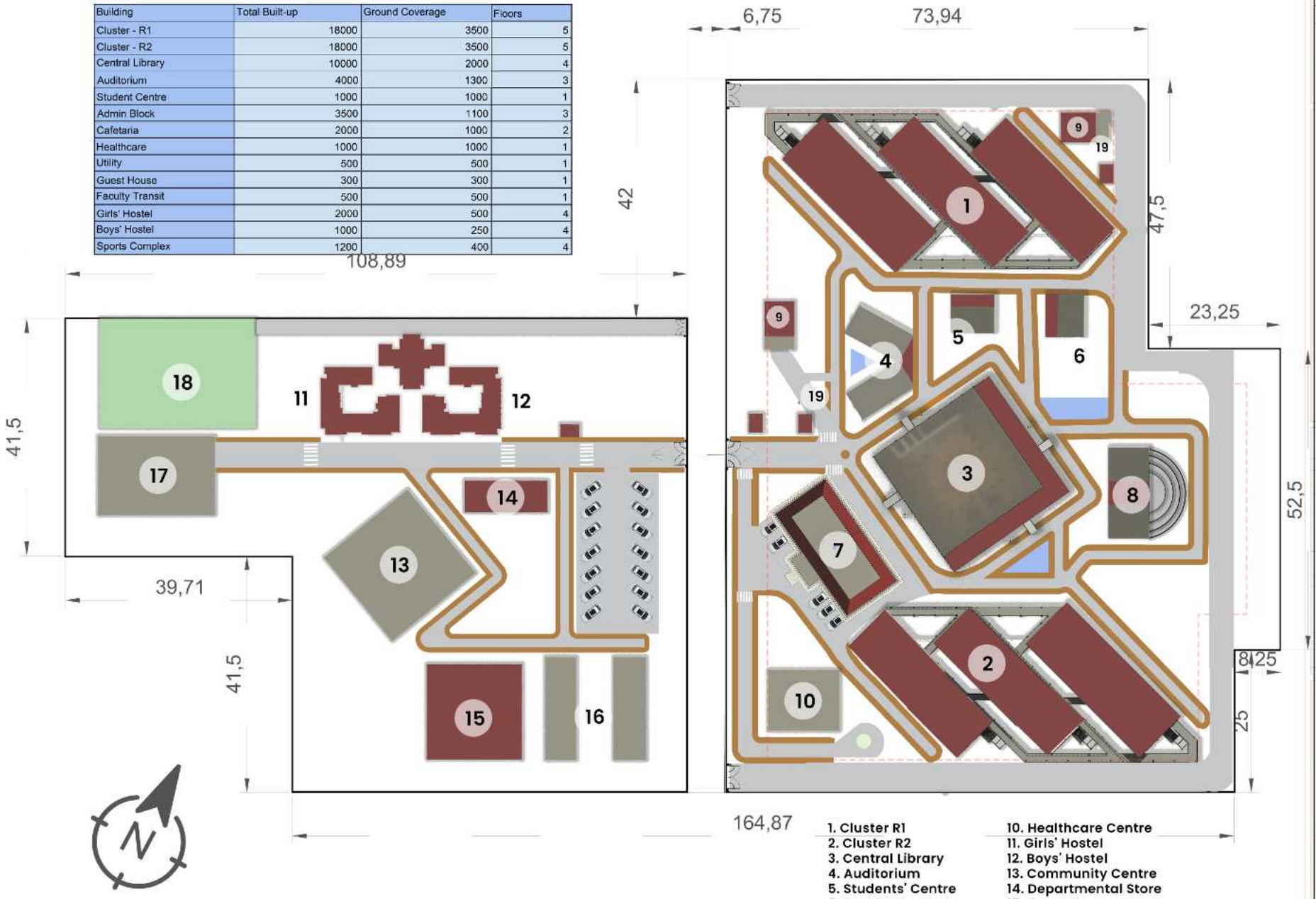
Overall, **passive cooling, daylighting,** and **sustainable landscaping** integrated across create a nurturing, resilient environment that supports **holistic student transformation.**

Case Study	Key Design Features	Adaptation in Design
 NIFT Delhi	Sunken central courtyard as social/climatic heart; interconnected ramps and terraces; passive cooling via orientation and mass	Arrival/Exploration zones feature welcoming courtyards; Practice/Identity zones use shaded walkways and terraces; passive strategies address site climate
 CEPT Ahmedabad	Kund amphitheatre for water harvesting and social events; diverse social spaces; porous circulation; brick and jaali shading	Purpose stage uses amphitheatre -inspired event spaces; Exploration/Practice stages have layered social zones; materials and shading suit Delhi climate
 IIT Delhi	Clear zoning with academic, residential, and recreation sectors; shaded pedestrian spines and bridges; phased growth capacity	The zoning sequence aligns with IIT's clear site integration; pedestrian spine unifies bisected plots; supports phased expansion

Dr. B.R. Ambedkar University, Delhi - Thesis
डॉ. बी. आर. अम्बेडकर विश्वविद्यालय दिल्ली.

Mehul Paul
211110046
Year - 5
Section - A

Building	Total Built-up	Ground Coverage	Floors
Cluster - R1	18000	3500	5
Cluster - R2	18000	3500	5
Central Library	10000	2000	4
Auditorium	4000	1300	3
Student Centre	1000	1000	1
Admin Block	3500	1100	3
Cafetaria	2000	1000	2
Healthcare	1000	1000	1
Utility	500	500	1
Guest House	300	300	1
Faculty Transit	500	500	1
Girls' Hostel	2000	500	4
Boys' Hostel	1000	250	4
Sports Complex	1200	400	4



1. Cluster R1
2. Cluster R2
3. Central Library
4. Auditorium
5. Students' Centre
6. Faculty Centre
7. Admin Block
8. Cafetaria + OAT
9. Basement Parking
10. Healthcare Centre
11. Girls' Hostel
12. Boys' Hostel
13. Community Centre
14. Departmental Store
15. Guest House
16. Faculty Transit
17. Sports Complex
18. Playground
19. Basement Access
20. Subway

www.autodesk.com/revit

No.	Description	Date

B.R. AMBEDKAR UNIVERSITY

Project number 1

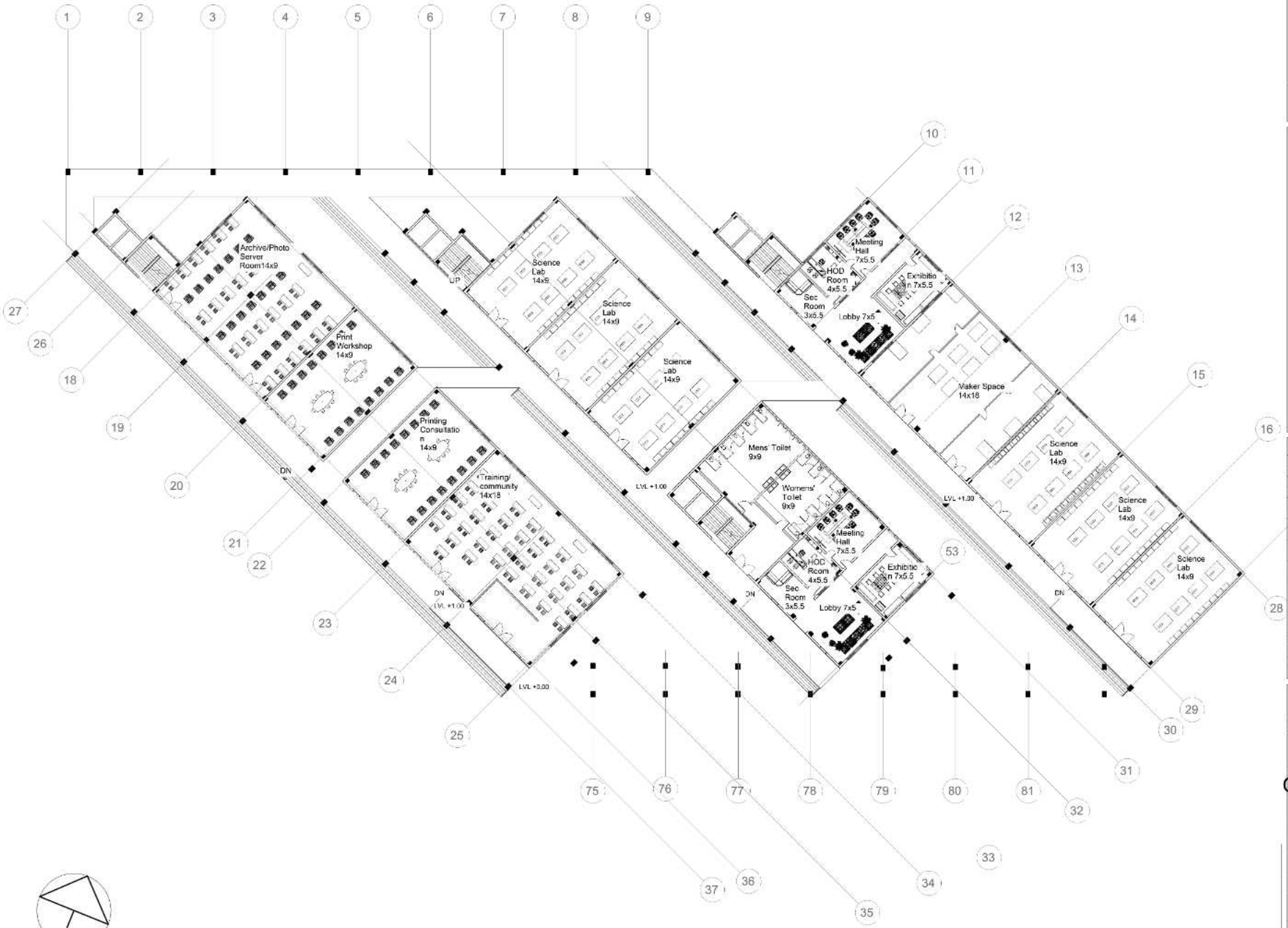
Date 17-09-2025

Drawn MEHUL PAUL

Checked by DR. RAHUL TIWARI

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No.	Description	Date

Dr. B.R. Ambedkar University

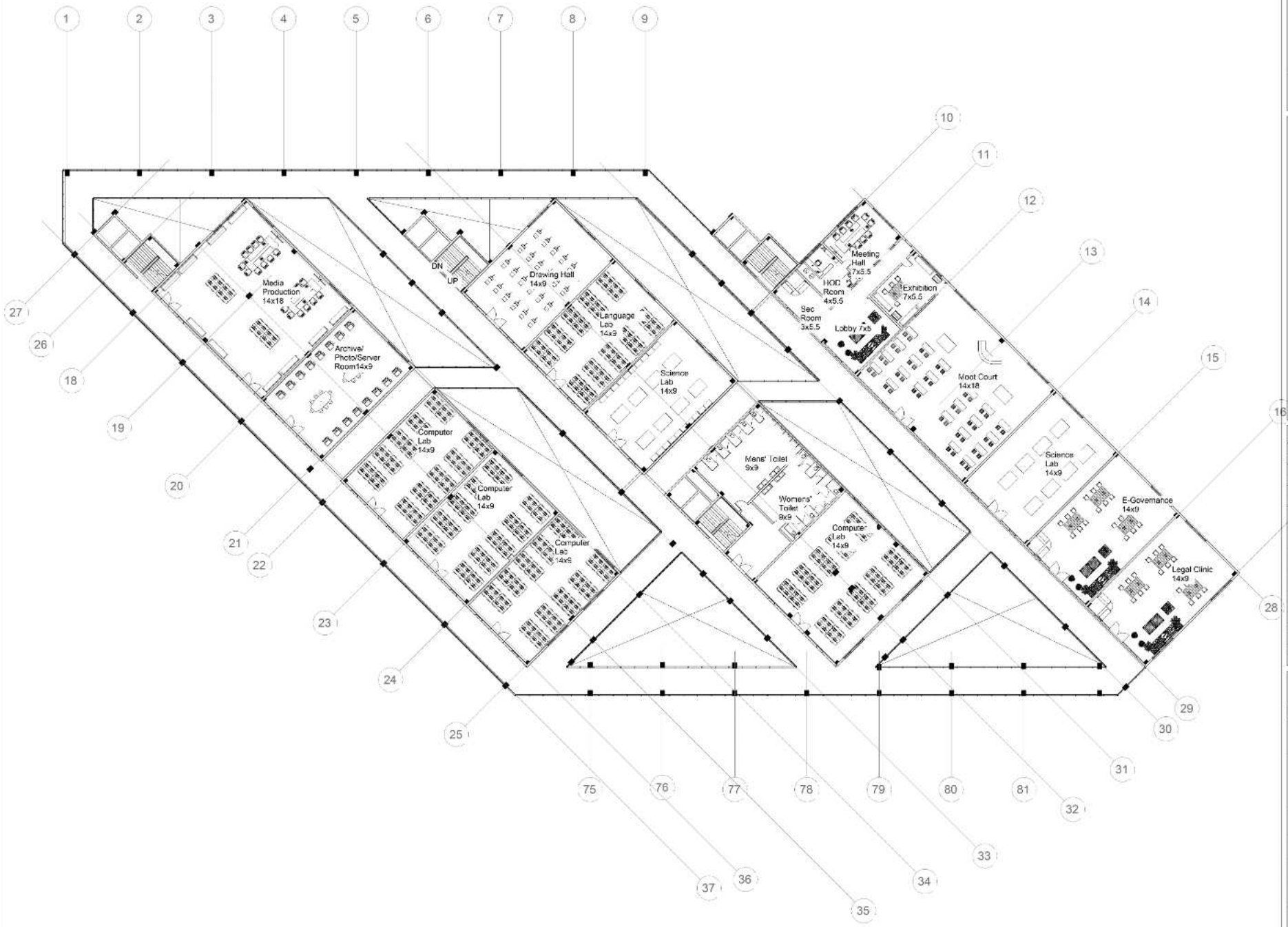
Cluster R1 - Ground Floor

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Drawn by	Mehul Paul
Checked by	Dr. Rahul Tiwari

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Dr. B.R. Ambedkar University

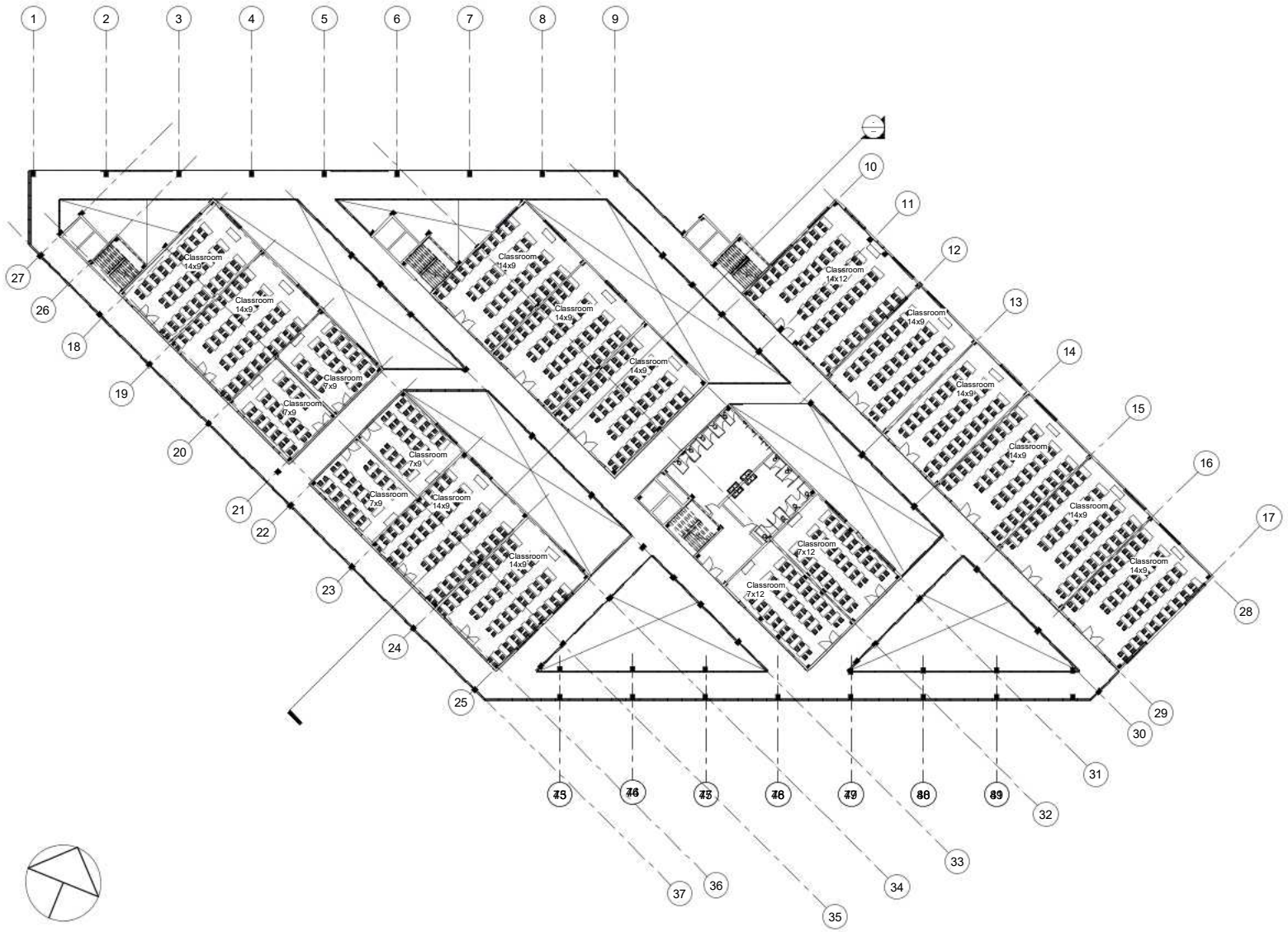
Cluster R1 - G+1

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Date	Issue Date
Drawn by	Author
Checked by	Checker

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No.	Description	Date

Dr. B.R. Ambedkar University

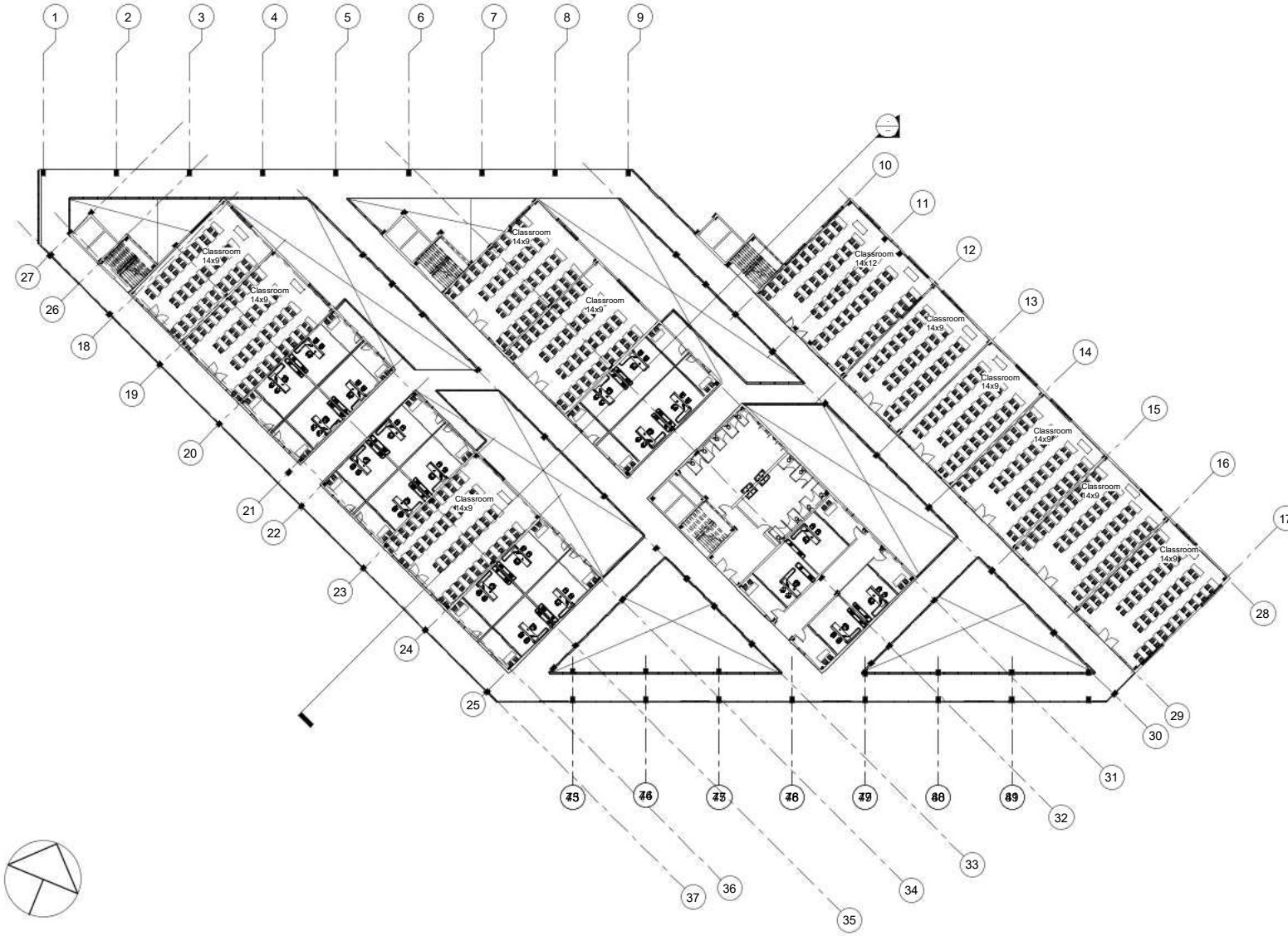
Cluster R1 - G+2

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Checked by	Dr. Rahul Tiwari

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Dr. B.R. Ambedkar University

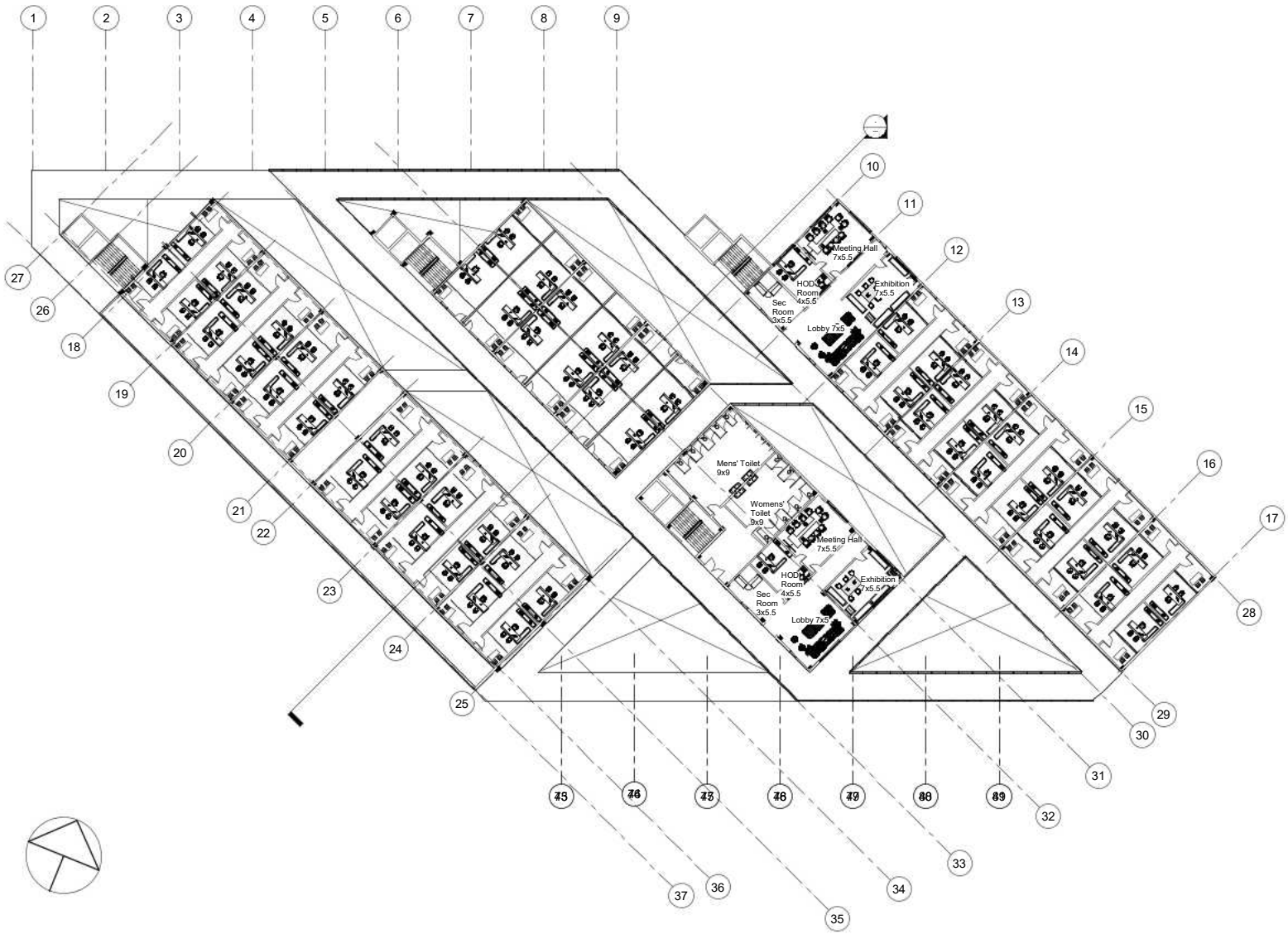
Cluster R1-G+3

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Checked by	Dr. Rahul Tiwari

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No.	Description	Date

Dr. B.R. Ambedkar University

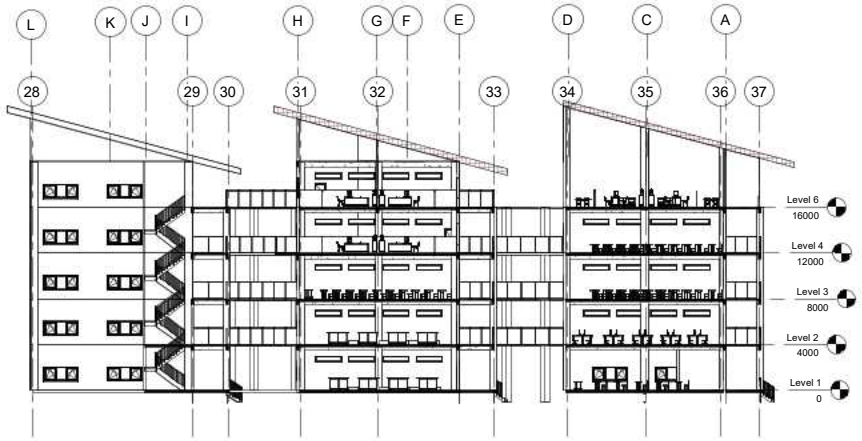
Cluster R1-G+4

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Date	01/10/25
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Checked by	Dr. Rahul Tiwari

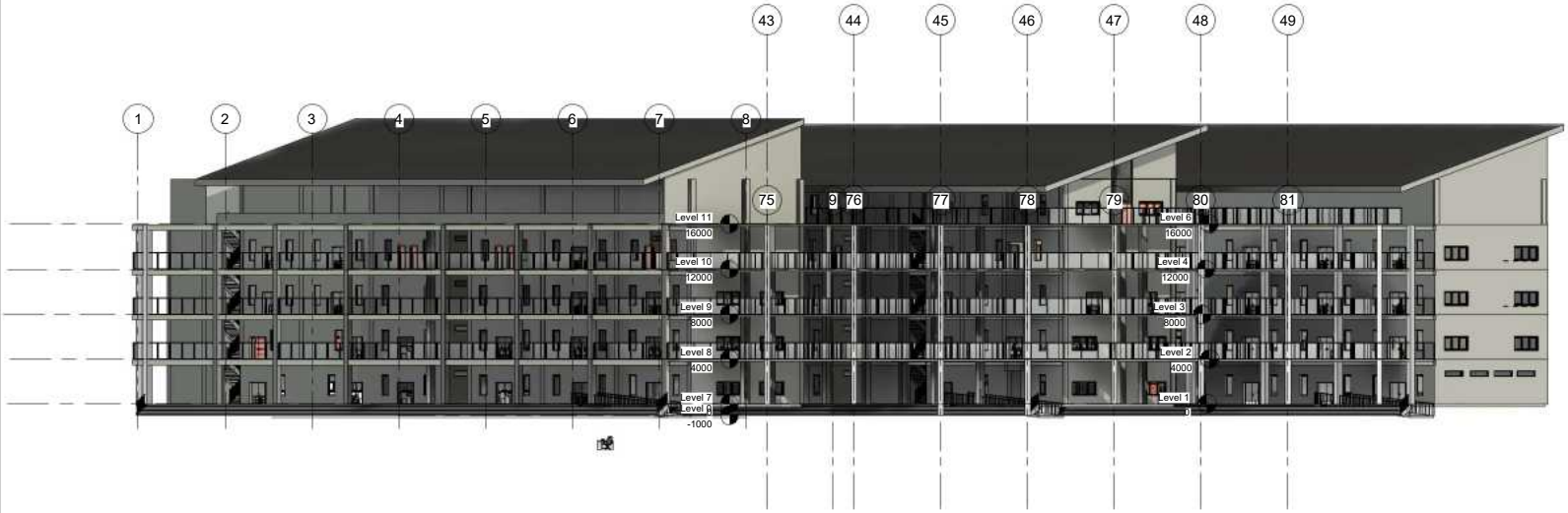
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1 Section 2
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2 South
1 : 200

No.	Description	Date

Dr. B.R. Ambedkar University

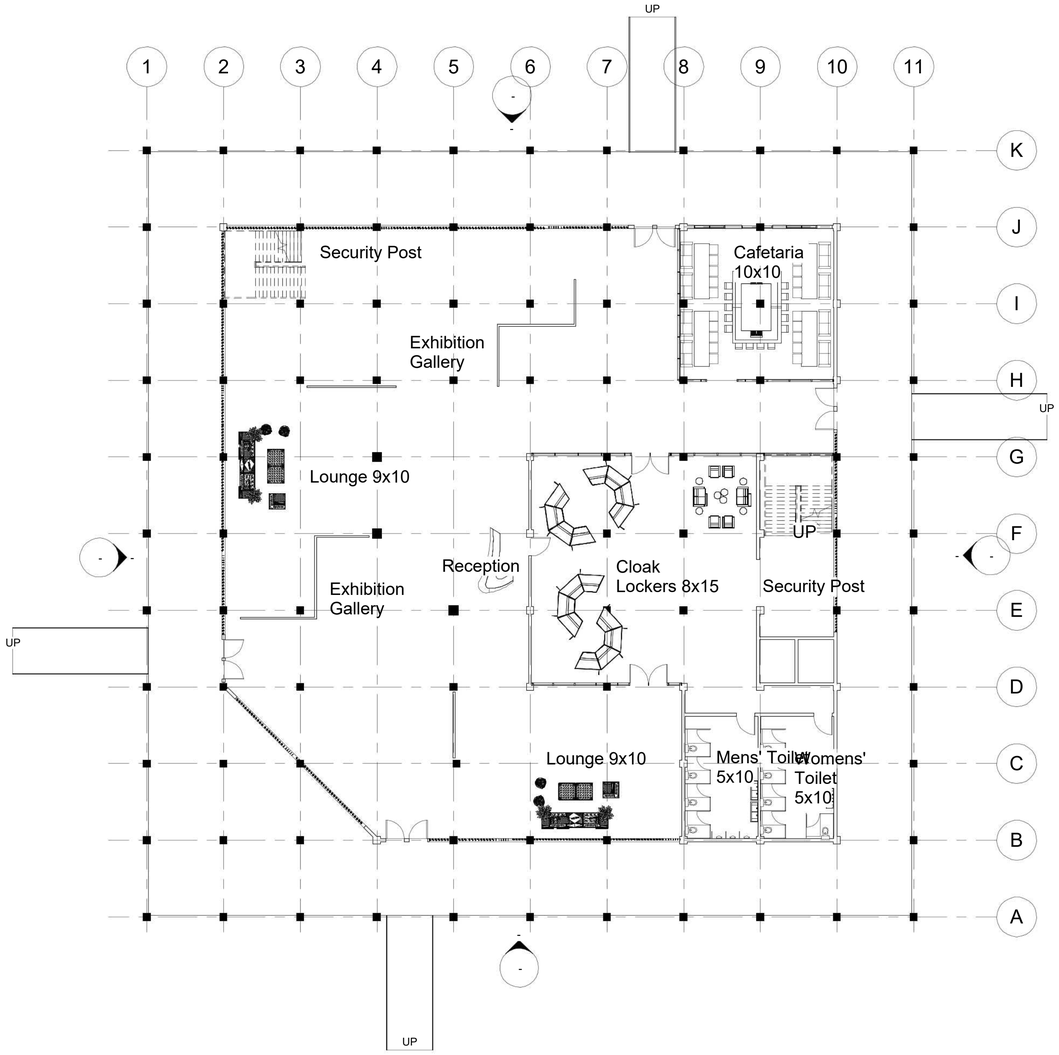
section+elevation

Project number	0002
Date	01/10/25
Drawn by	Author
Checked by	Checker

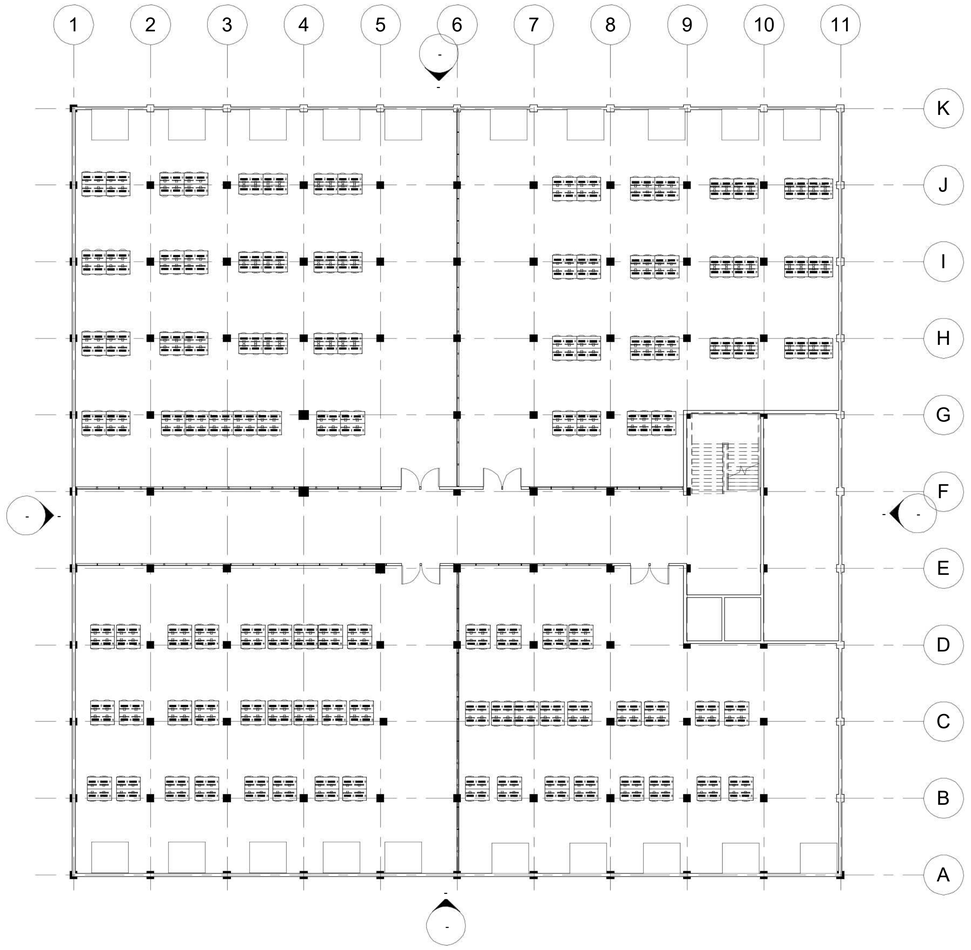
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1 Level 1
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2 Level -1
1 : 200

No.	Description	Date

Dr. B.R. Ambedkar University

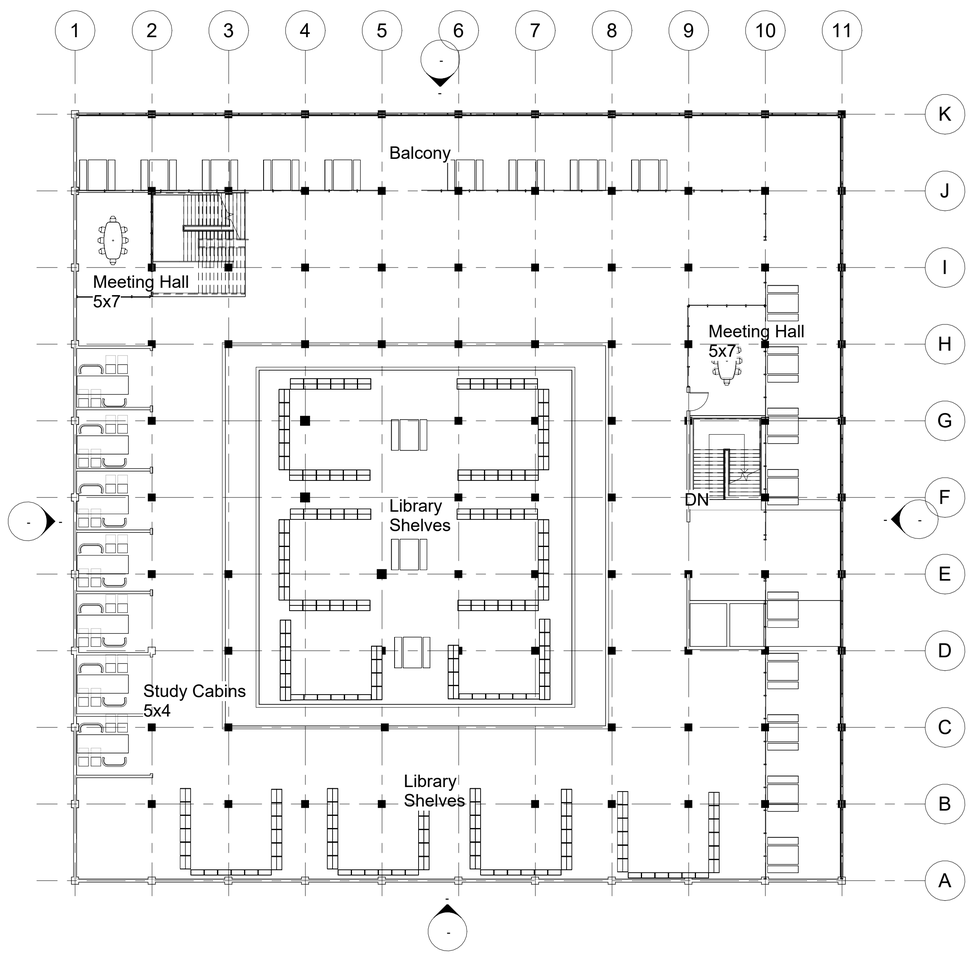
Library - GF & B

Project number	0001
Date	01/10/25
Drawn by	Mehul Paul
Checked by	Dr. Rahul Tiwari

A101

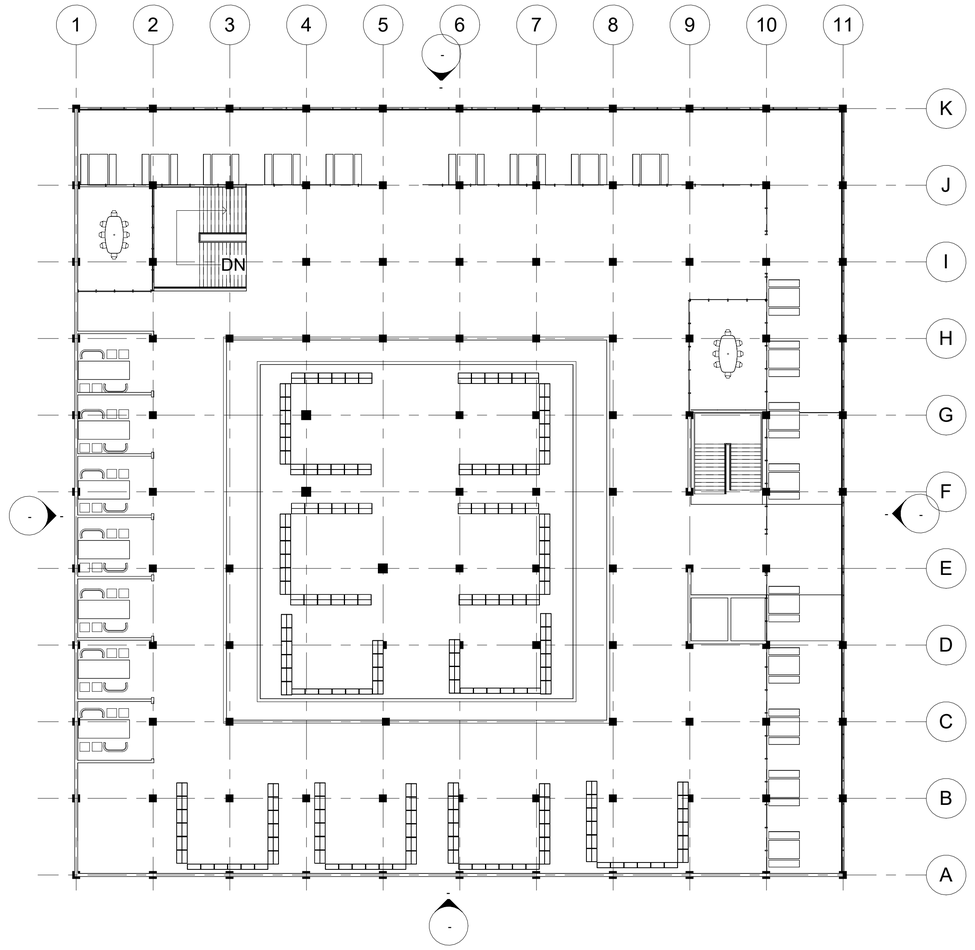
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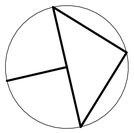
1 Level 2

1 : 200



2 Level 3

1 : 200



No.	Description	Date

Dr. B.R. Ambedkar University

Library G+2 & 3

Project number	0001
Date	01/10/25
Drawn by	Mehul Paul
Checked by	Dr. Rahul Tiwari

A102

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Dr. B.R. Ambedkar University

Unnamed

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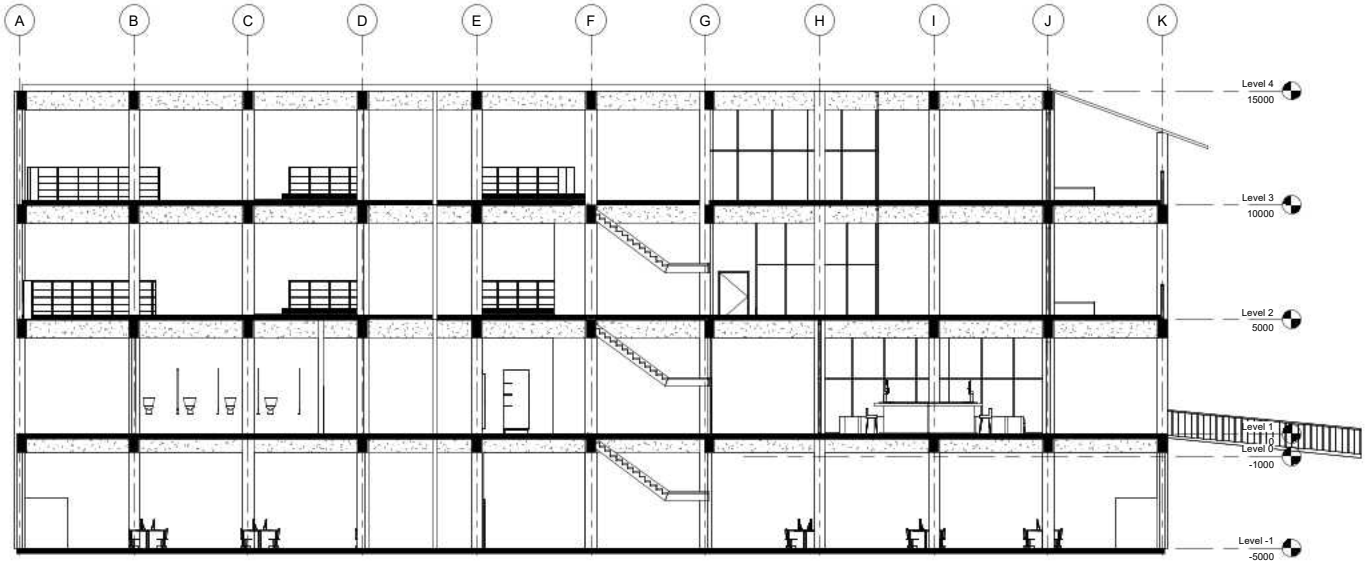
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1 {3D}

rth



2 North
1 : 100



1 Section 1
1 : 100

No.	Description	Date

Dr. B.R. Ambedkar University

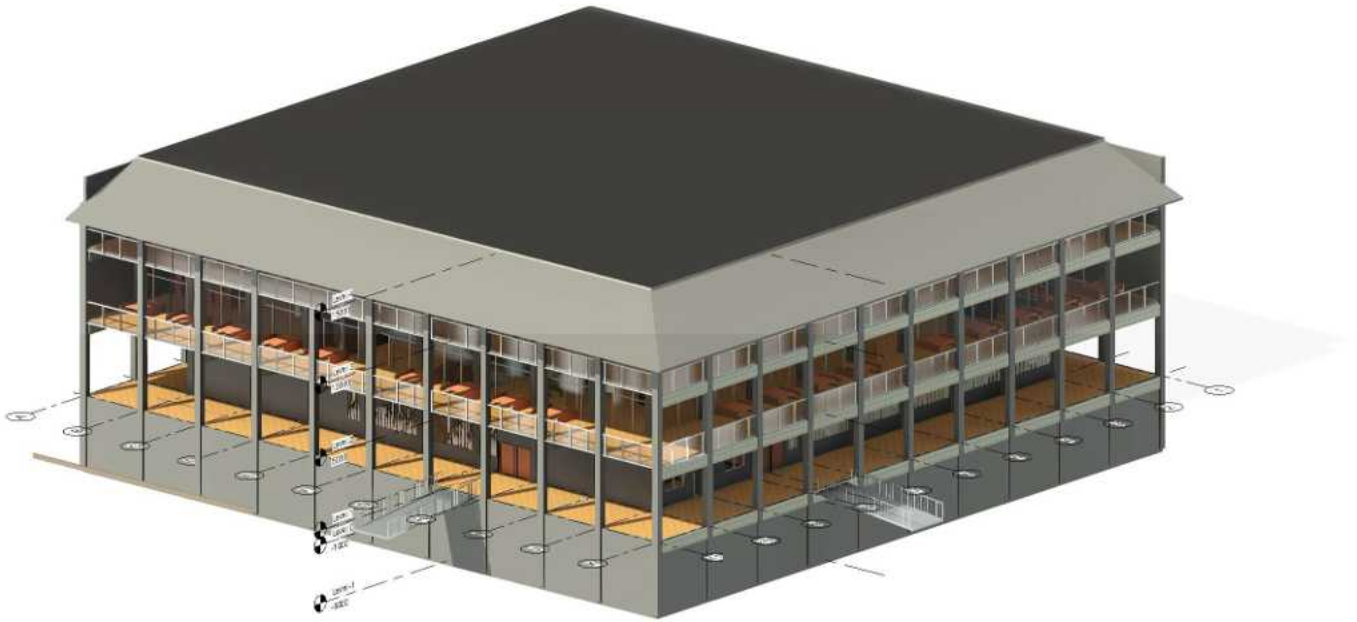
Elevation+Section

Project number	0001
Date	01/10/25
Drawn by	Mehul Paul
Checked by	Dr. Rahul Tiwari

A103

Scale 1 : 100

11/7/2025 2:46:13 AM





2 East
1 : 100

No.	Description	Date

Dr. B.R. Ambedkar University

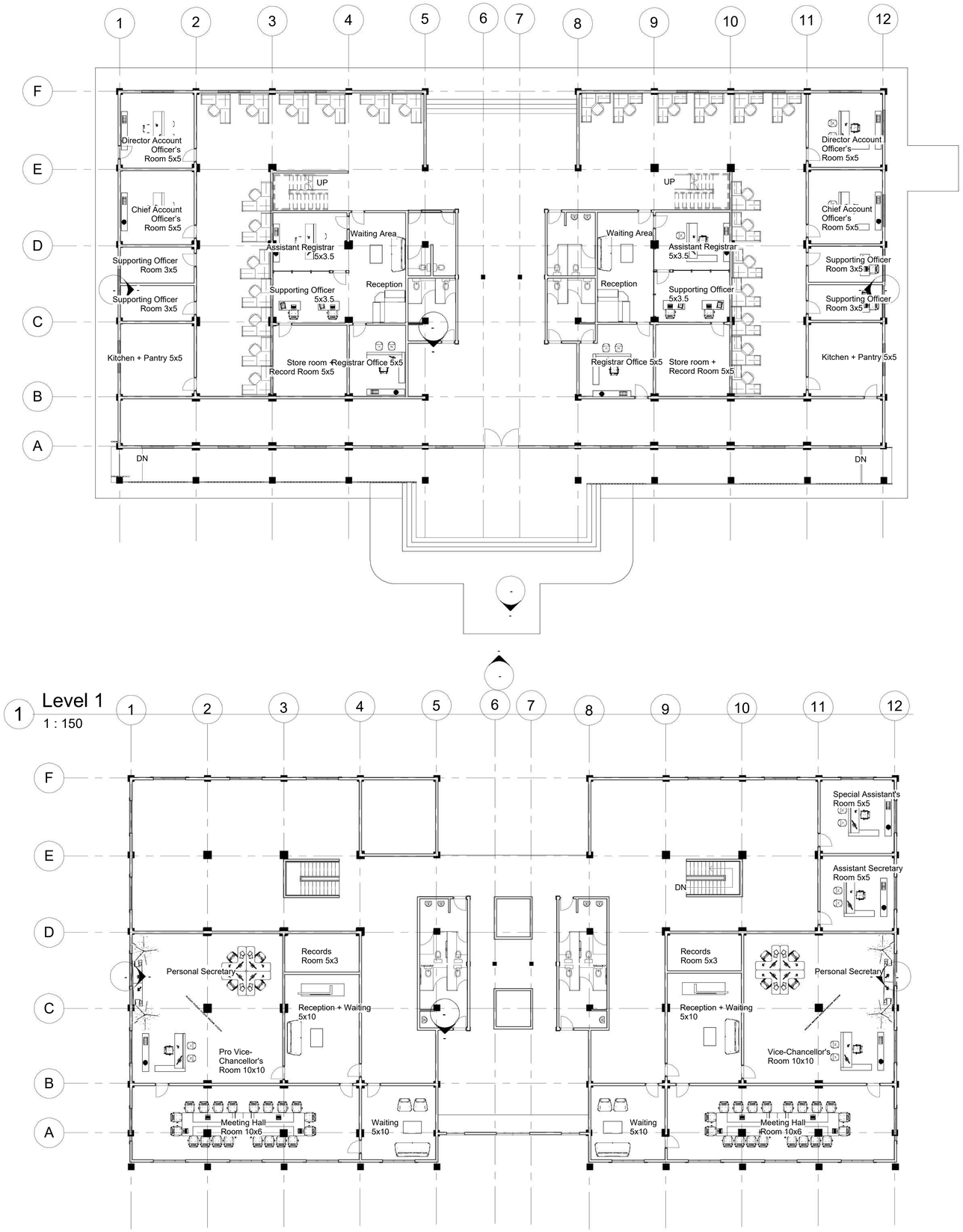
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Project number	0001
Date	01/10/25
Drawn by	Author
Checked by	Checker

A104

Scale 1 : 100

11/7/2025 8:16:36 AM



No.	Description	Date

Dr. B.R. Ambedkar University

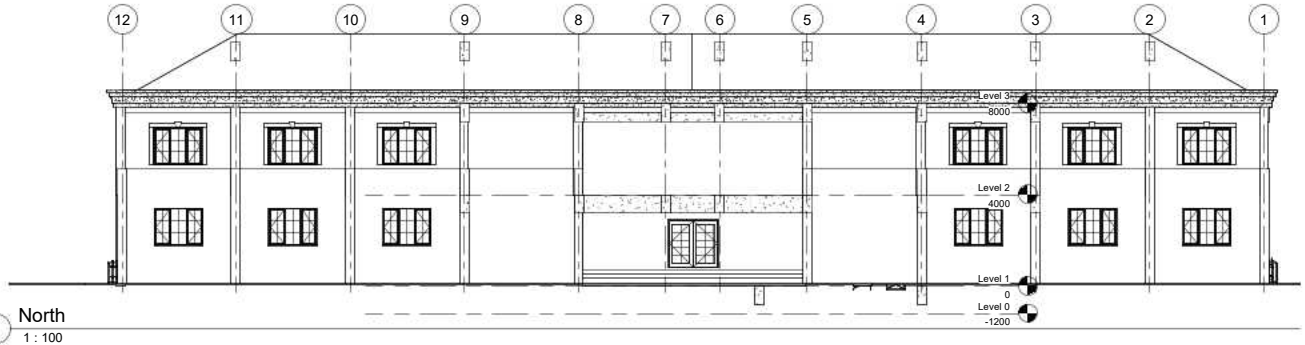
Admin Block - G & G+1

Project number	0001
Date	01/10/25
Drawn by	Mehul Paul
Checked by	Dr. Rahul Tiwari

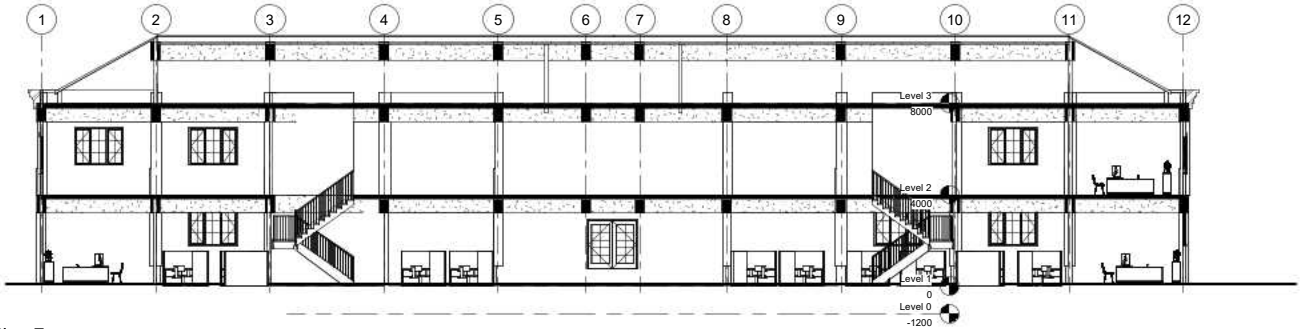
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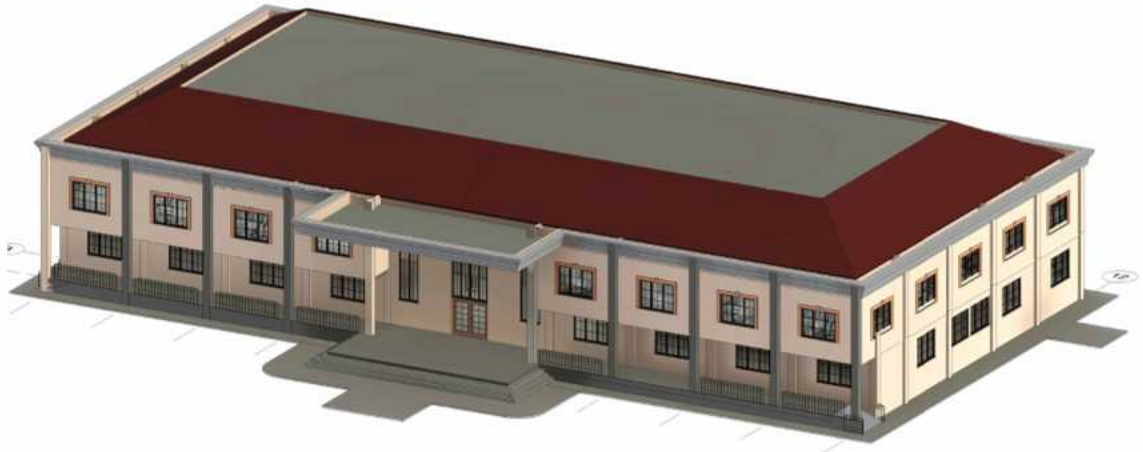
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1 North
1 : 100



2 Section 7
1 : 100



No.	Description	Date

Dr. B.R. Ambedkar University

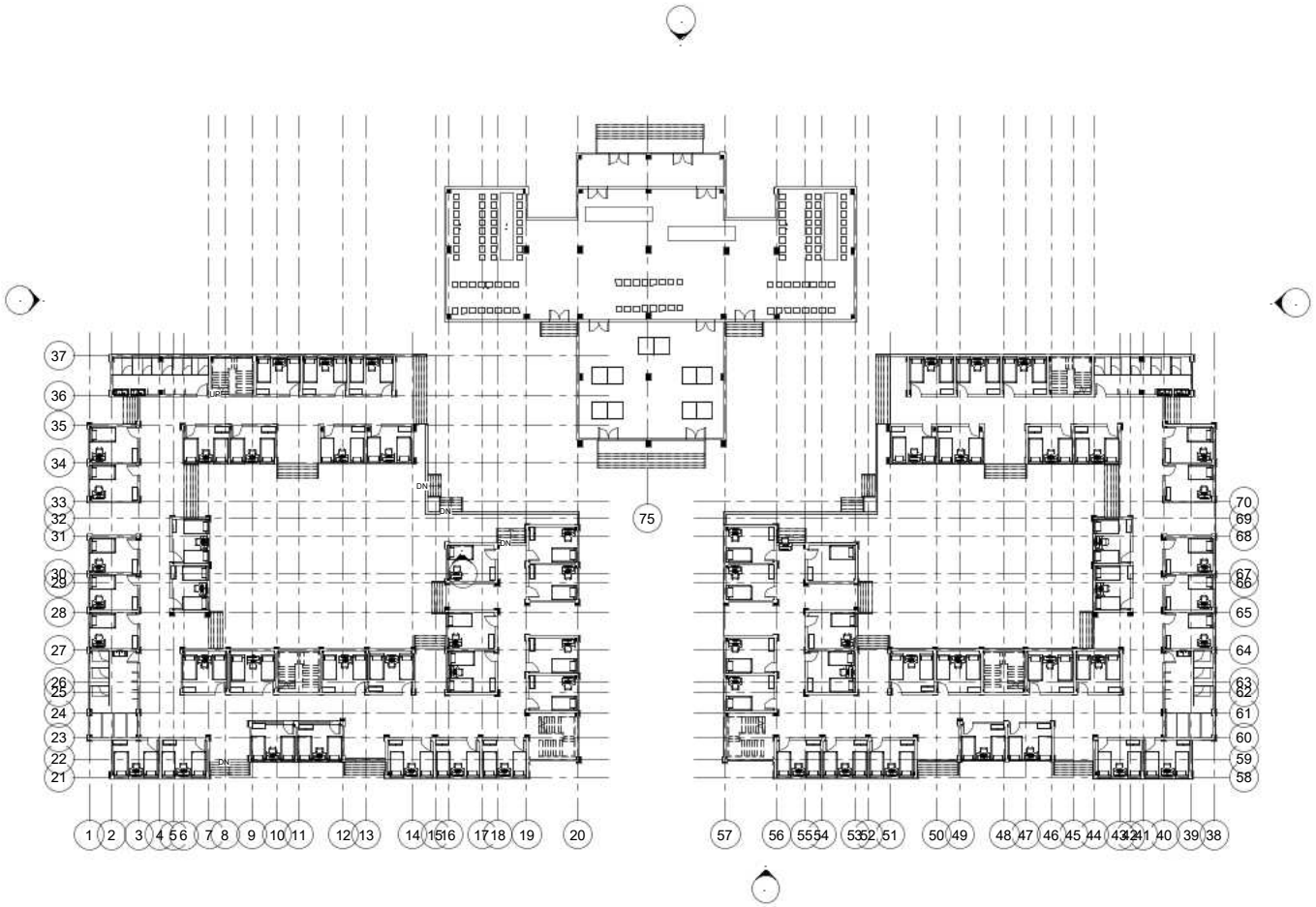
Forms

Project number	0001
Date	01/10/25
Drawn by	Mehul Paul
Checked by	Dr. Rahul Tiwari

A102

Scale 1 : 100

11/7/2025 3:51:51 AM



No.	Description	Date

Dr. B.R. Ambedkar University Hostel

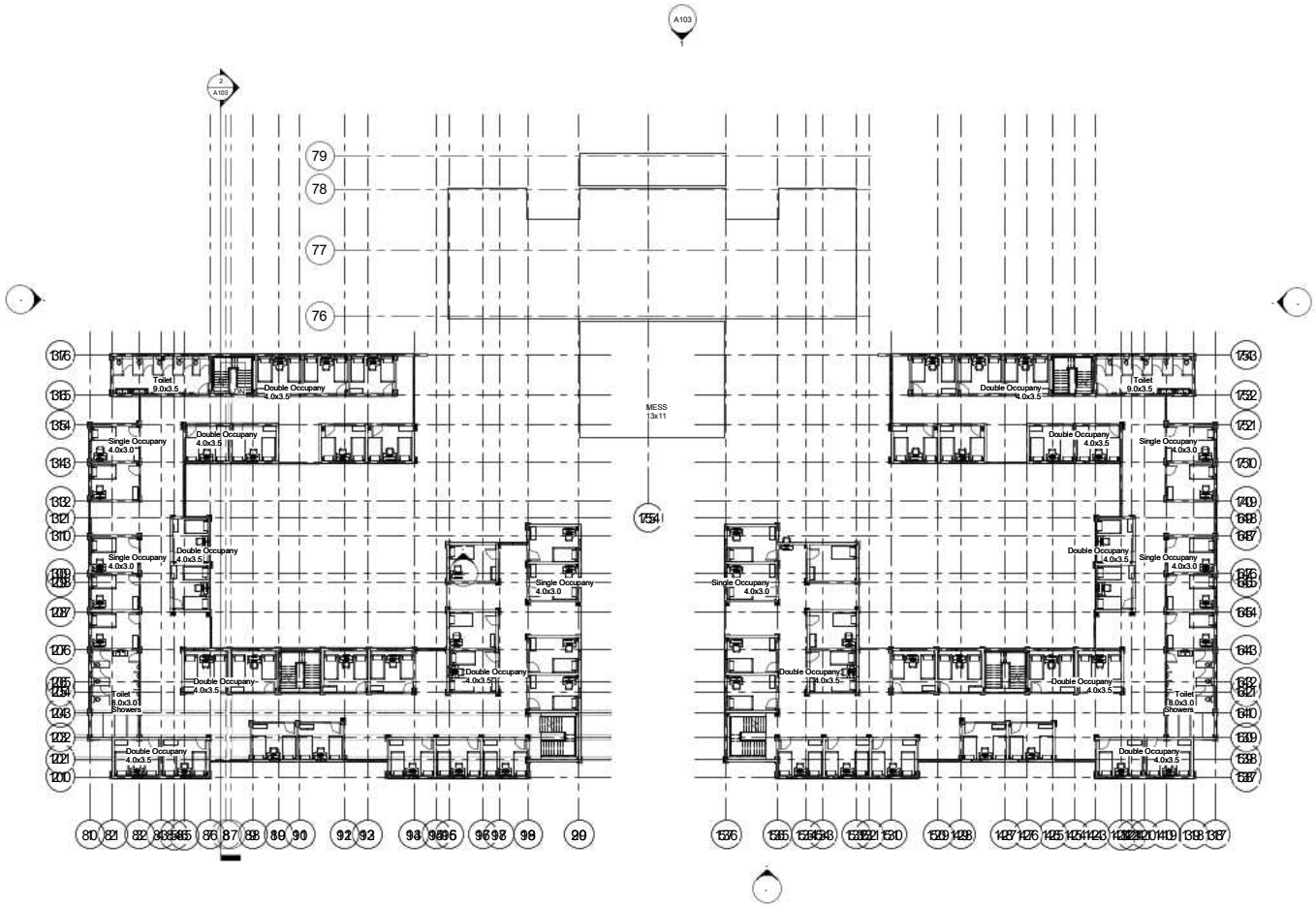
Ground Floor

Project number	0001
Date	07/11/25
Drawn by	Mehul Paul
Checked by	Dr. Rahul Tiwari

A101

Scale 1 : 200

1 Level 0
1 : 200



No.	Description	Date

Dr. B.R. Ambedkar University Hostel

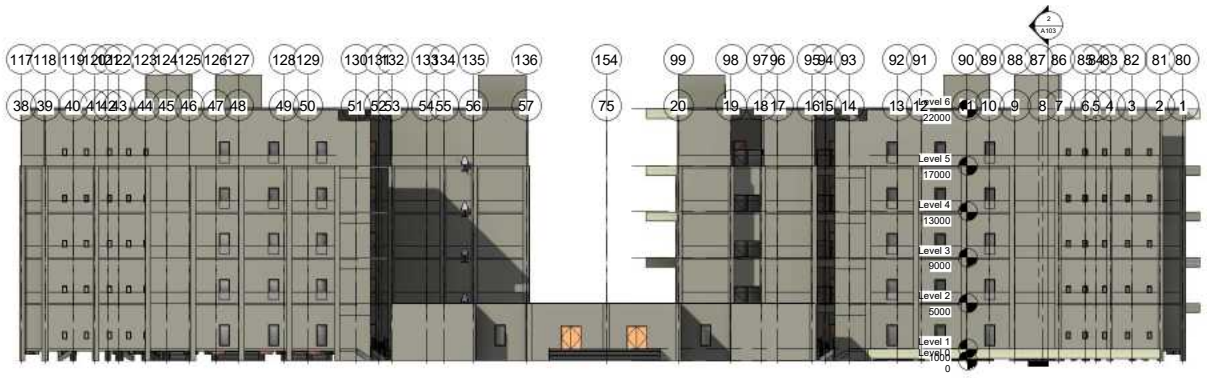
G+1 (Typical)

Project number	0001
Date	07/11/25
Drawn by	Mehul Paul
Checked by	Dr. Rahul Tiwari

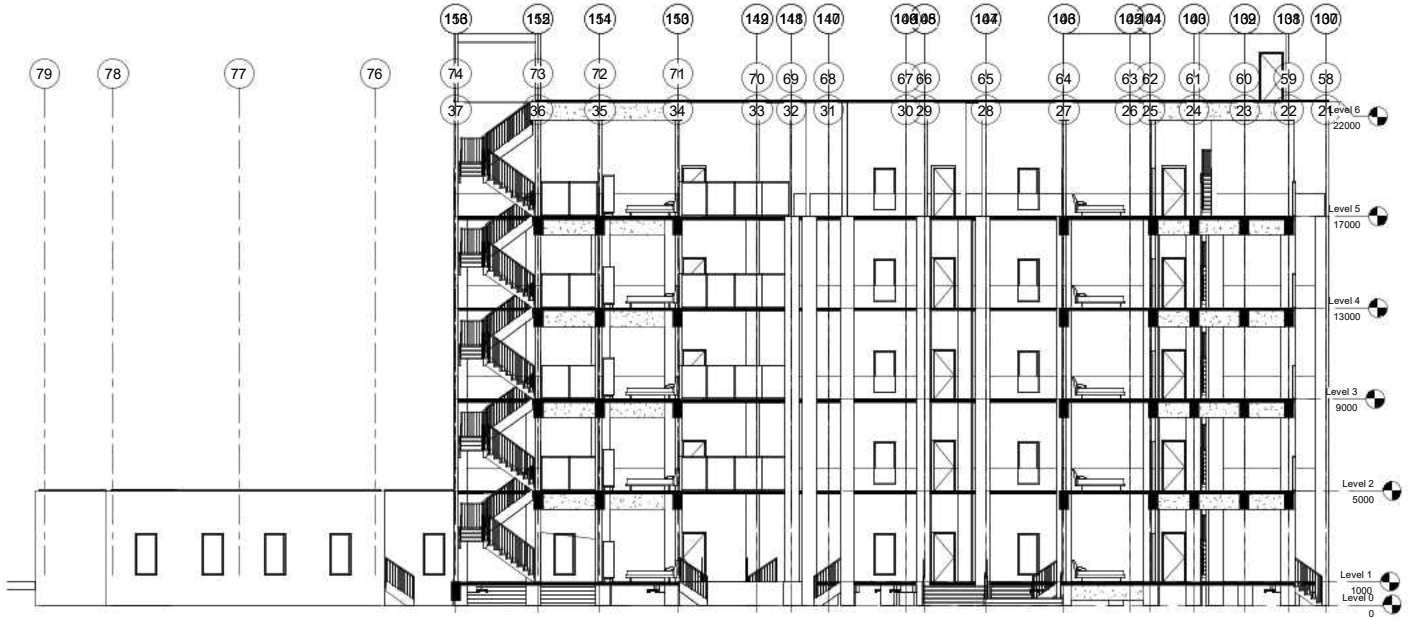
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Scale 1 : 200

1 Level 2
1 : 200



1 North
1 : 200



2 Section 1
1 : 100

No.	Description	Date

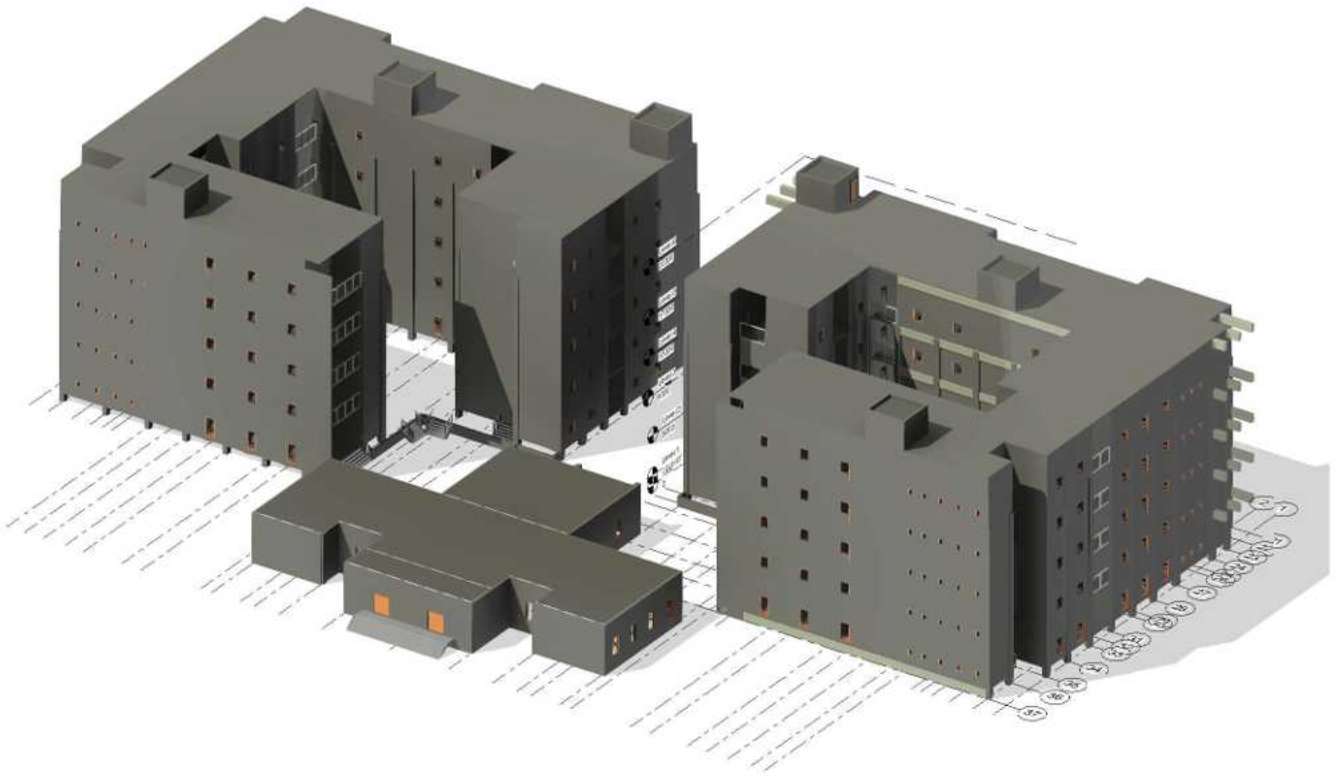
Dr. B.R. Ambedkar University Hostel

Section + Elevation

Project number	0001
Date	07/11/25
Drawn by	Mehul Paul
Checked by	Dr. Rahul Tiwari

A103

Scale: As indicated



1 {3D}

No.	Description	Date

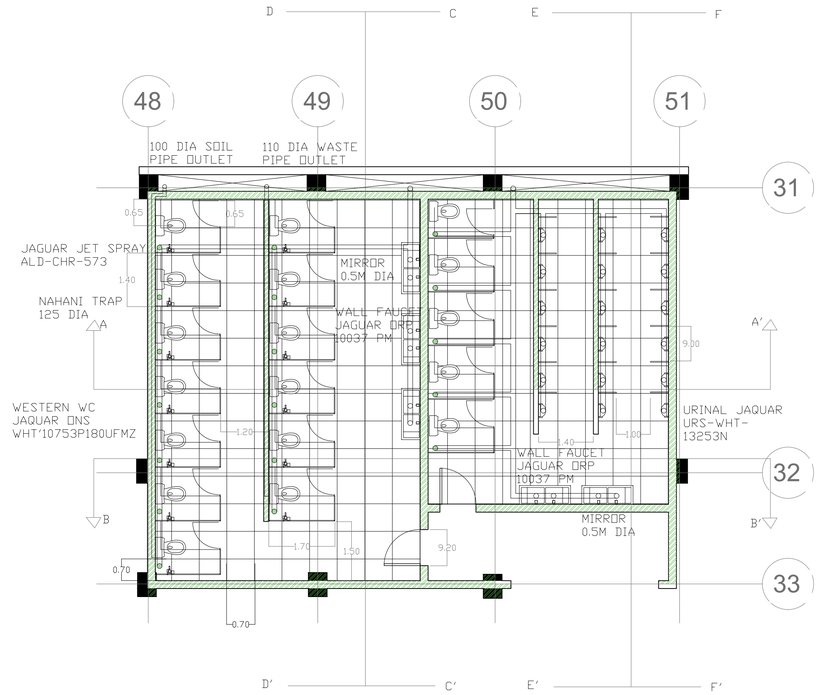
Dr. B.R. Ambedkar University Hostel

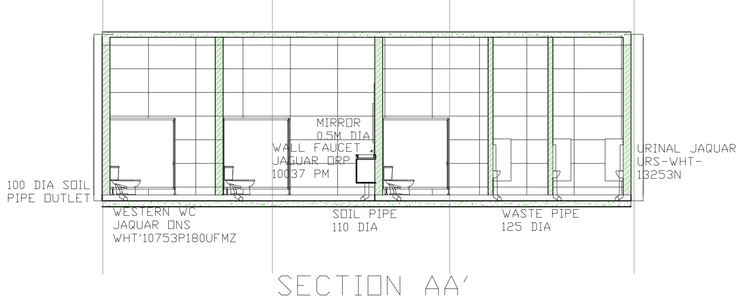
View

Project number	0001
Date	07/11/25
Drawn by	Mehul Paul
Checked by	Dr. Rahul Tiwari

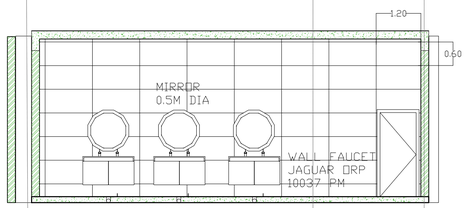
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Scale

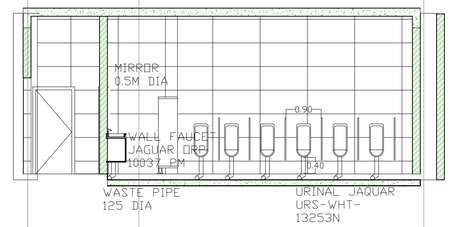


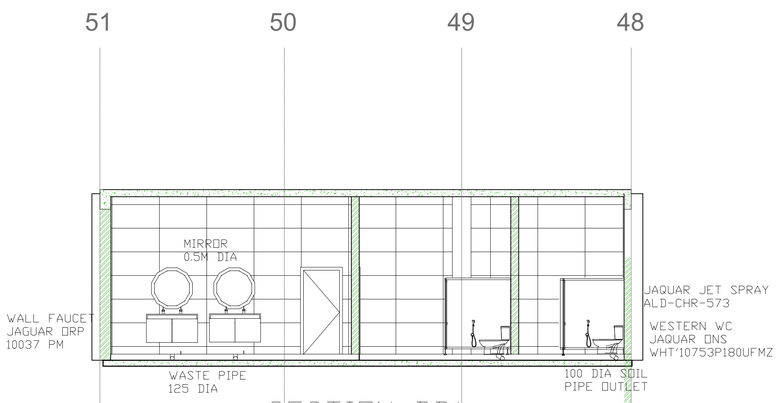


SECTION AA'

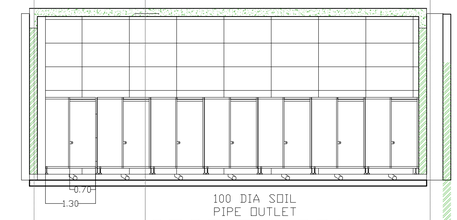


SECTION CC'

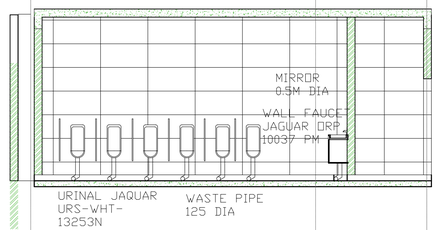




SECTION BB'



SECTION DD'



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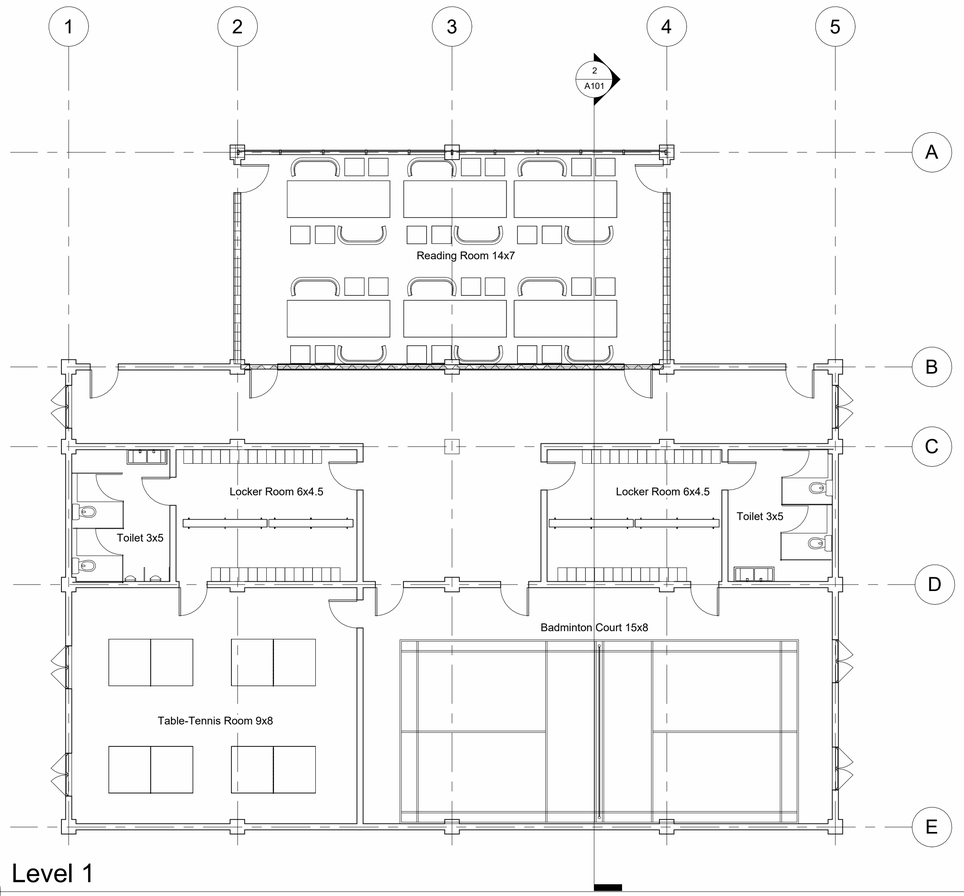
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B.R. AMBEDKAR UNIVERSITY

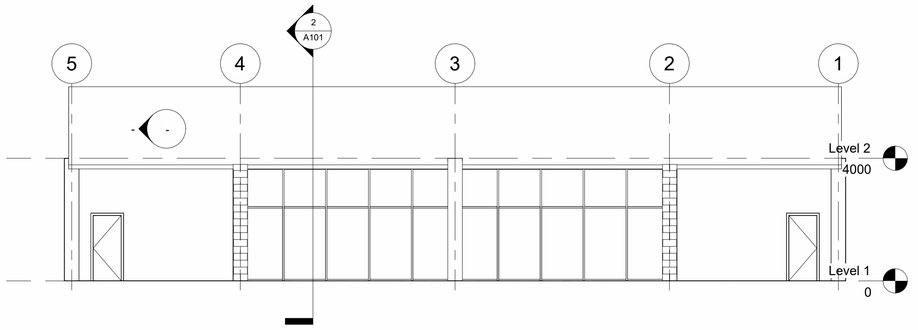
CENTRAL LIBRARY

Project number	1
Date	17-09-2025
Drawn	MEHUL PAUL
Checked by	DR. RAHUL TIWARI
Scale	1:50

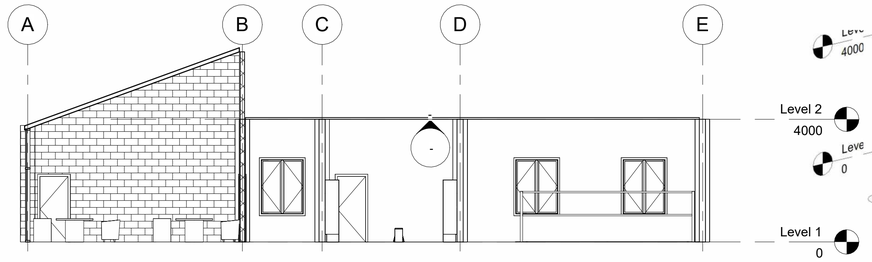
15-04-2025 22:09:24



1 Level 1
1 : 100



3 North
1 : 100



2 Section 1
1 : 100



4 {3D}

No.	Description	Date

Dr. B.R. Ambedkar University

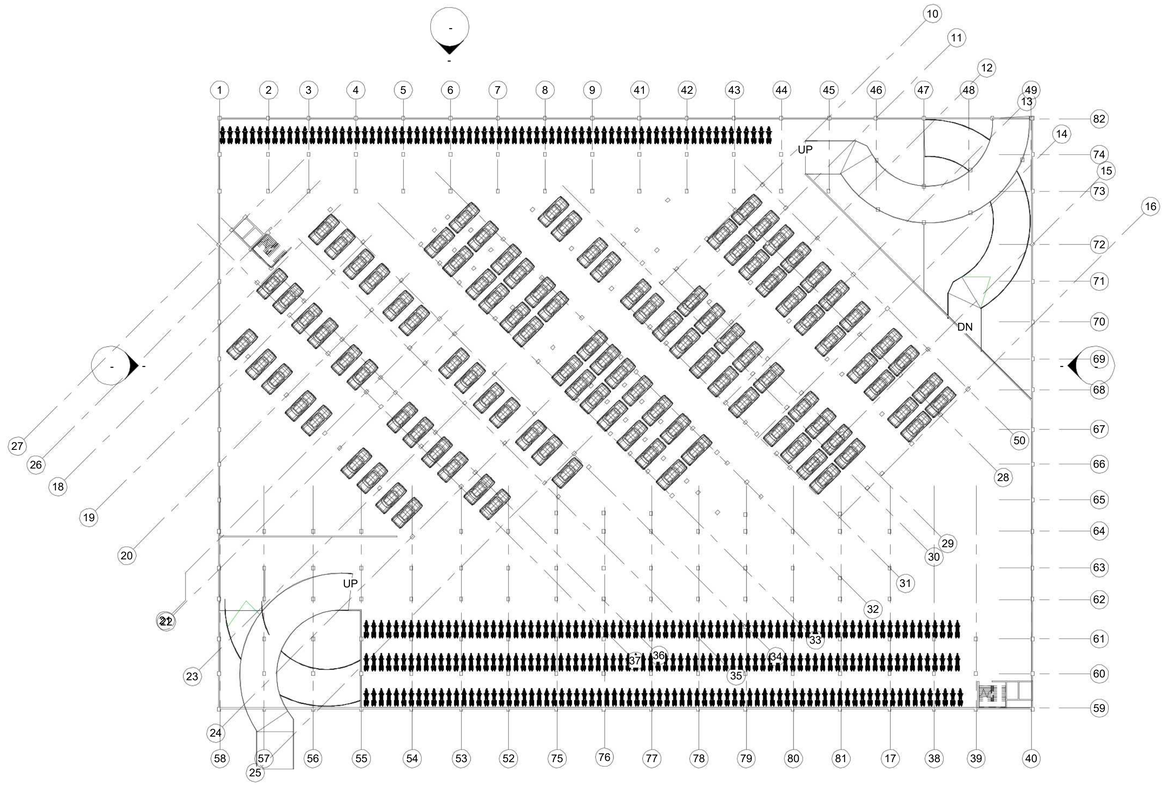
Students' Centre

Project number	0001
Date	01/10/25
Drawn by	Mehul Paul
Checked by	Dr. Rahul Tiwari

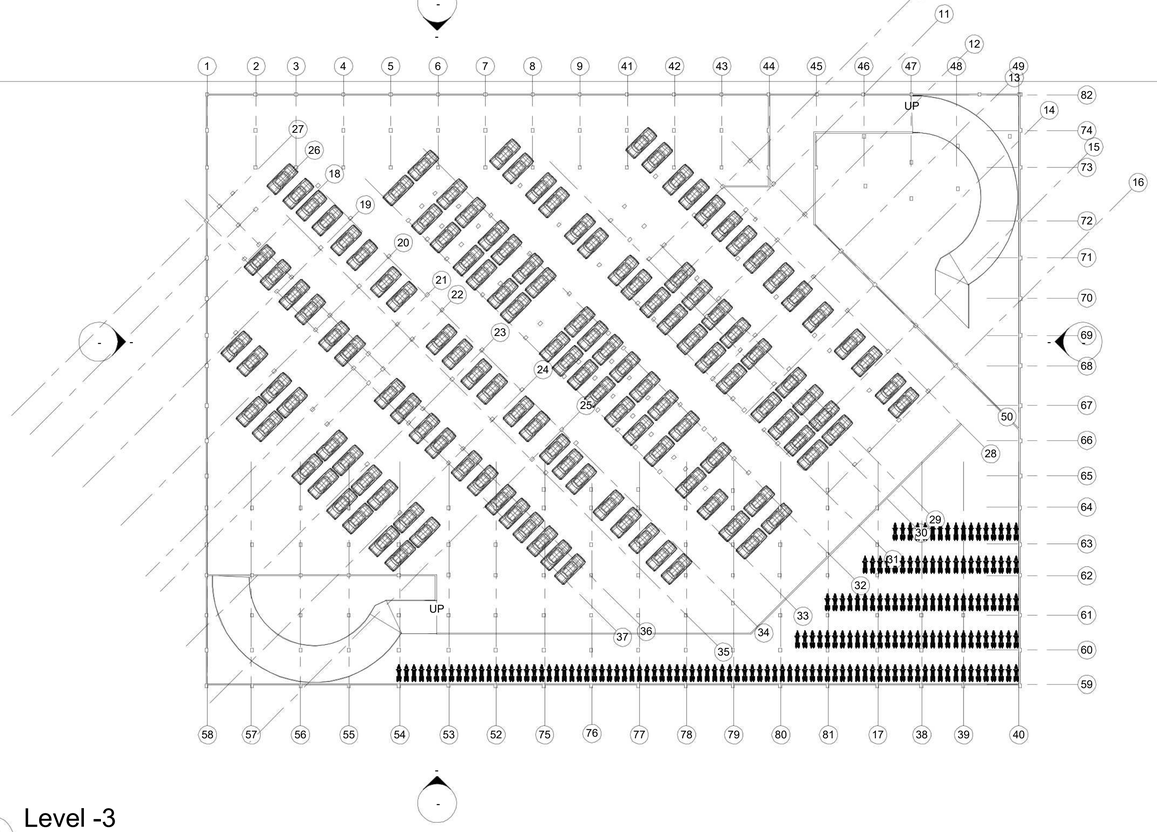
A101

Scale 1 : 100

10/1/2025 6:45:42 AM



1 Level -2
1 : 500



2 Level -3
1 : 500

No.	Description	Date

Dr. B.R. Amberdkar University

Basement Plans

Project number	0001
Date	02/12/25
Drawn by	Mehul Paul
Checked by	Dr. Rahul Tiwari

A101

Scale 1 : 500

11/29/2025 11:29:33 PM





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No.	Description	Date

B.R. AMBEDKAR UNIVERSITY

Basement Sections

Project number	1
Date	17-09-2025
Drawn	MEHUL PAUL
Checked by	DR. RAHUL TIWARI
Scale	1:800

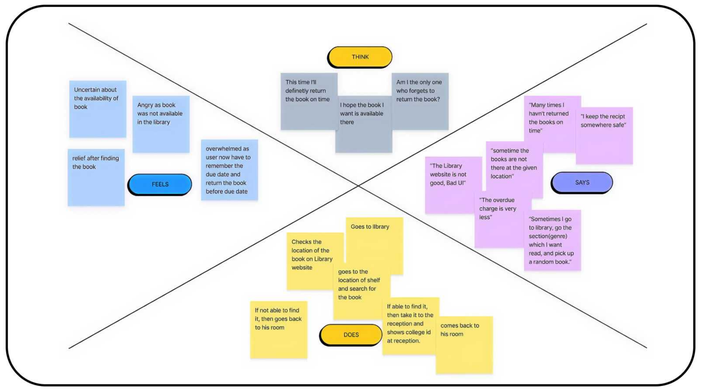
15-04-2025 22:09:24

User Persona

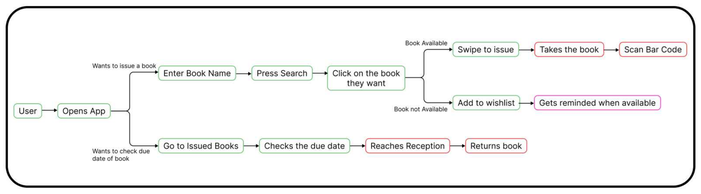
Vedhant
Age: 20
Occupation: College student
About
- Average student.
- Issues 2–3 books in a month.
- From Branch CSE
- Likes reading science fiction

Pain Points
- He goes to library and is not able to find the book he is looking for as all the books are issued by other students.
- He doesn't know when the book will be available again.
- Many times he forgets about returning book on time.

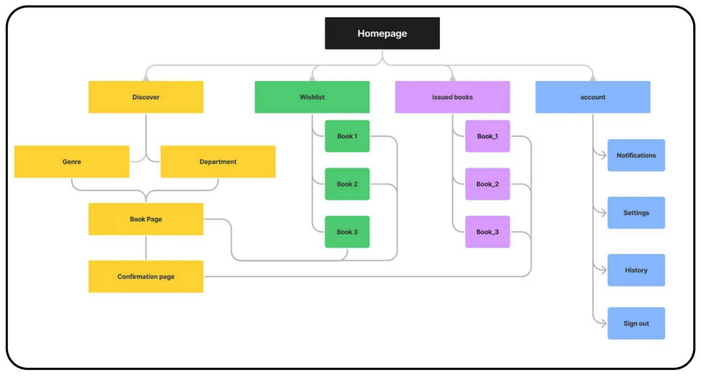
Goals
- To know beforehand whether the book is available or not.
- If the book is not available currently (issued by other students), then in the future he wants to know if the book becomes available so that he can go and issue it.
- Return book before due date without forgetting.



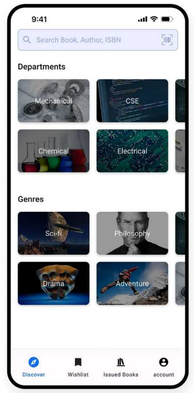
Empathy Map

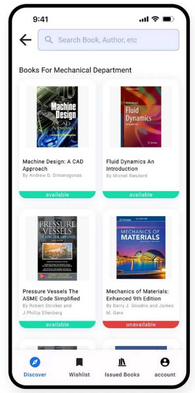


User Flow

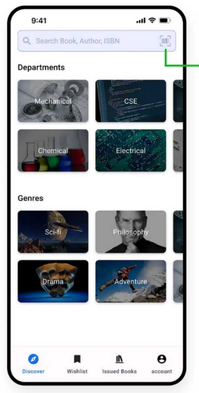


Information Architecture



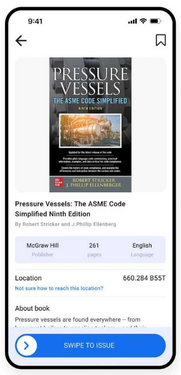


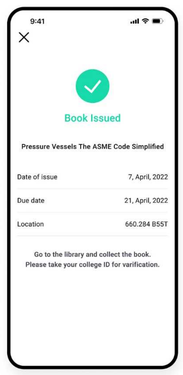
Home - Discover





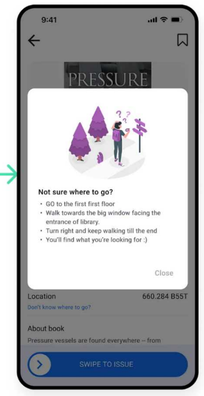
Home - Scan Barcode



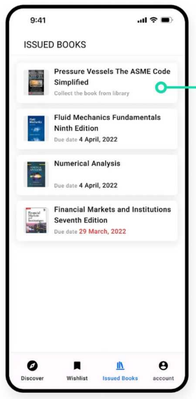


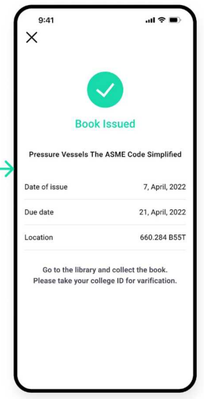
Issuing Book





Finding Directions

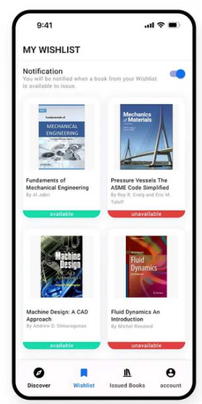




Issued Books



Reminder to return



Wishlist

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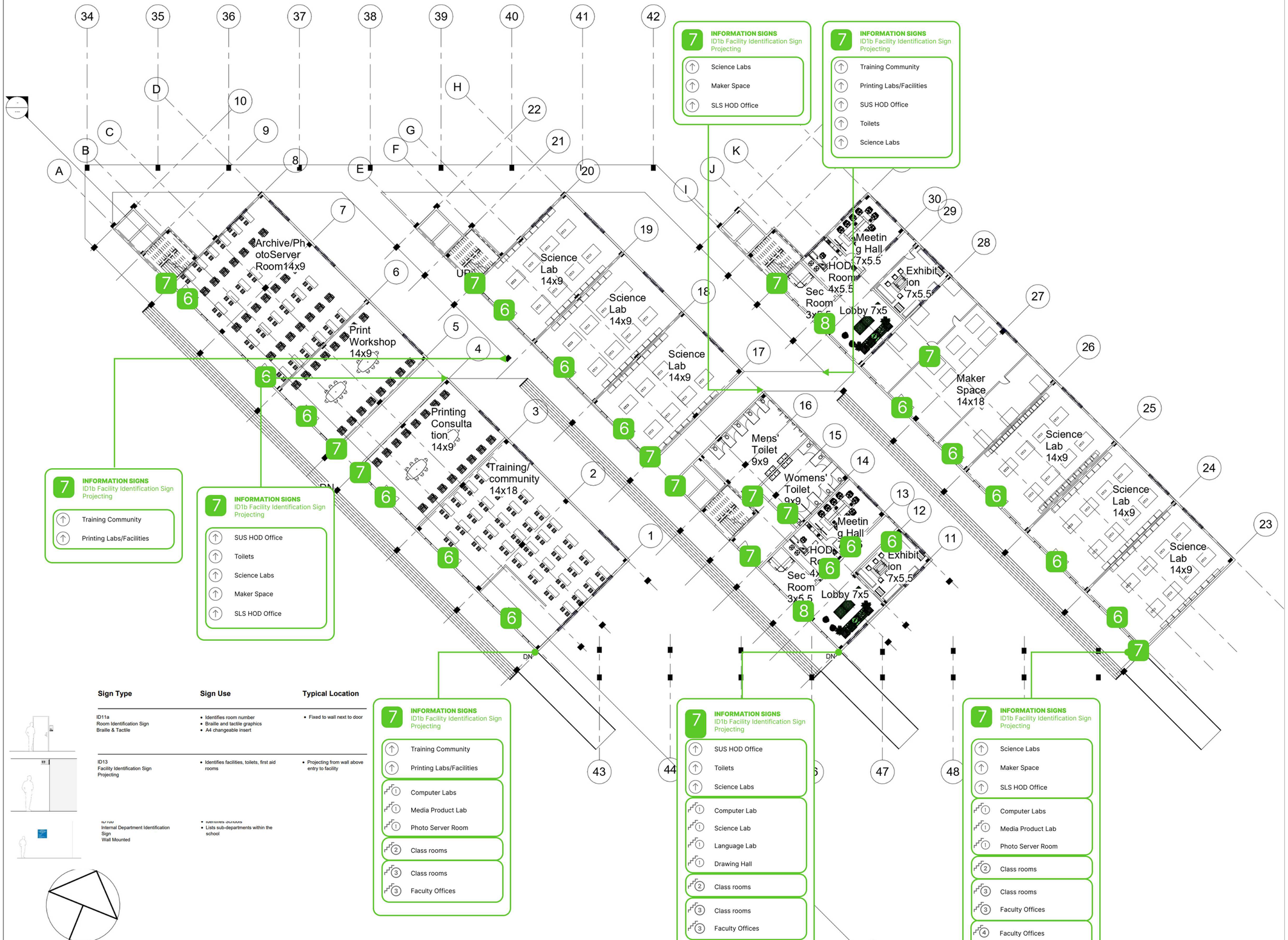
No.	Description	Date

B.R. AMBEDKAR UNIVERSITY

Library - App

Project number	1
Date	17-09-2025
Drawn	MEHUL PAUL
Checked by	DR. RAHUL TIWARI
Scale	1:800

15-04-2025 22:09:24



Sign Type	Sign Use	Typical Location
ID11a Room Identification Sign Braille & Tactile	• Identifies room number • Braille and tactile graphics • A4 changeable insert	• Fixed to wall next to door
ID13 Facility Identification Sign Projecting	• Identifies facilities, toilets, first aid rooms	• Projecting from wall above entry to facility
ID100 Internal Department Identification Sign Wall Mounted	• Identifies schools • Lists sub-departments within the school	

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No.	Description	Date

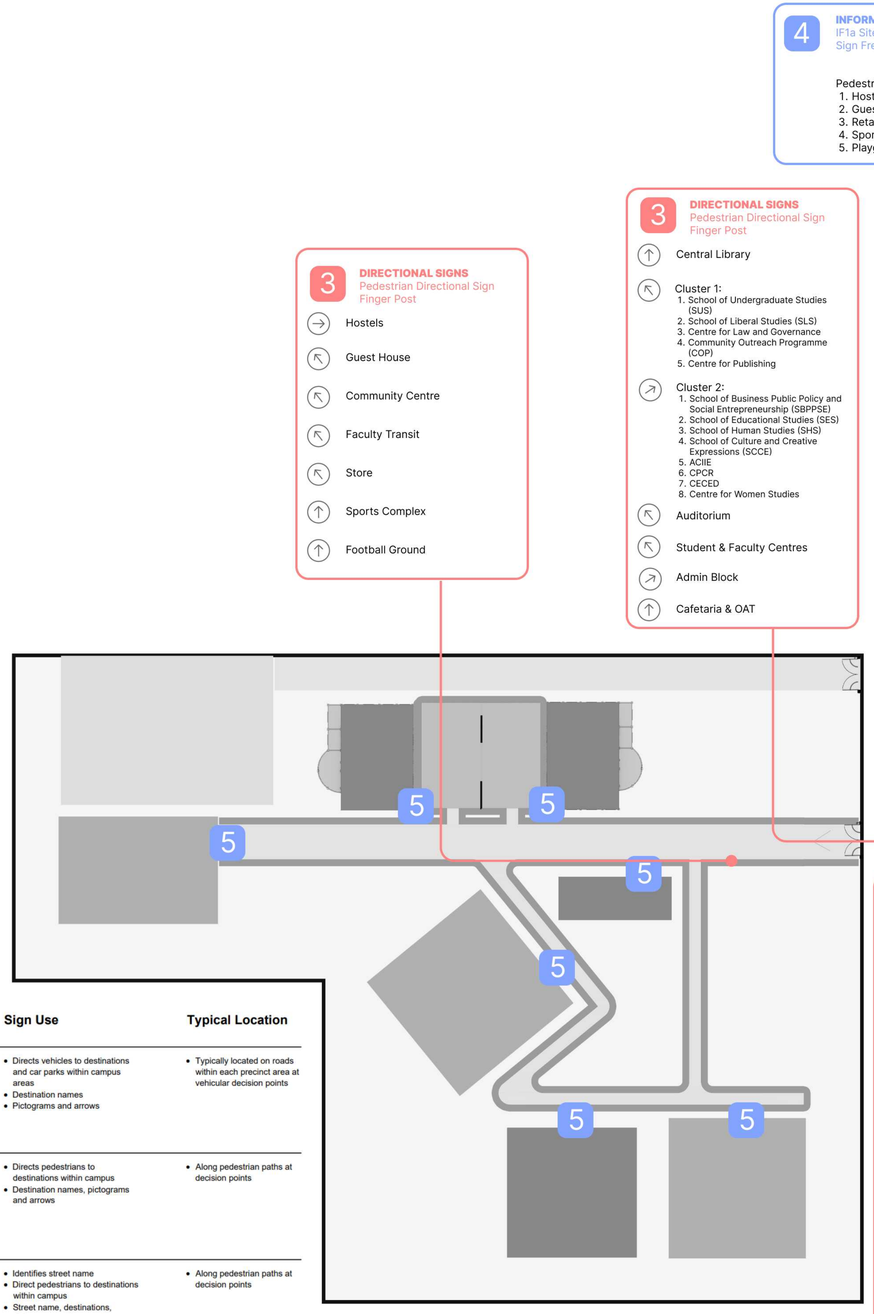
B.R. AMBEDKAR UNIVERSITY

WayFinding-Cluster

Project number	1
Date	17-09-2025
Drawn	MEHUL PAUL
Checked by	DR. RAHUL TIWARI
Scale	1:800

15-04-2025 22:09:24

1. DR1a Vehicular Directional Sign Freestanding
2. DR2a Pedestrian Directional Sign Freestanding
3. DR2b Pedestrian Directional Sign Finger Post
4. IF1a Site Directory Information Sign Freestanding
5. IF1b Site Directory Information Sign Wall Mounted
6. ID1a Room Identification Sign Braille & Tactile
7. ID1b Facility Identification Sign Projecting
8. ID2a Internal Department Identification Sign



3 DIRECTIONAL SIGNS Pedestrian Directional Sign Finger Post
- Hostels
- Guest House
- Community Centre
- Faculty Transit
- Store
- Sports Complex
- Football Ground

3 DIRECTIONAL SIGNS Pedestrian Directional Sign Finger Post
- Central Library
- Cluster 1:
  1. School of Undergraduate Studies (SUS)
  2. School of Liberal Studies (SLS)
  3. Centre for Law and Governance
  4. Community Outreach Programme (COP)
  5. Centre for Publishing
- Cluster 2:
  1. School of Business Public Policy and Social Entrepreneurship (SBPPSE)
  2. School of Educational Studies (SES)
  3. School of Human Studies (SHS)
  4. School of Culture and Creative Expressions (SCCE)
  5. ACIIE
  6. CPCR
  7. CECED
  8. Centre for Women Studies
- Auditorium
- Student & Faculty Centres
- Admin Block
- Cafetaria & OAT

4 INFORMATION SIGNS IF1a Site Directory Information Sign Freestanding

Pedestrian Subway:
1. Hostels
2. Guest House
3. Retail Shop
4. Sports Complex
5. Playgroud

4 INFORMATION SIGNS IF1a Site Directory Information Sign Freestanding

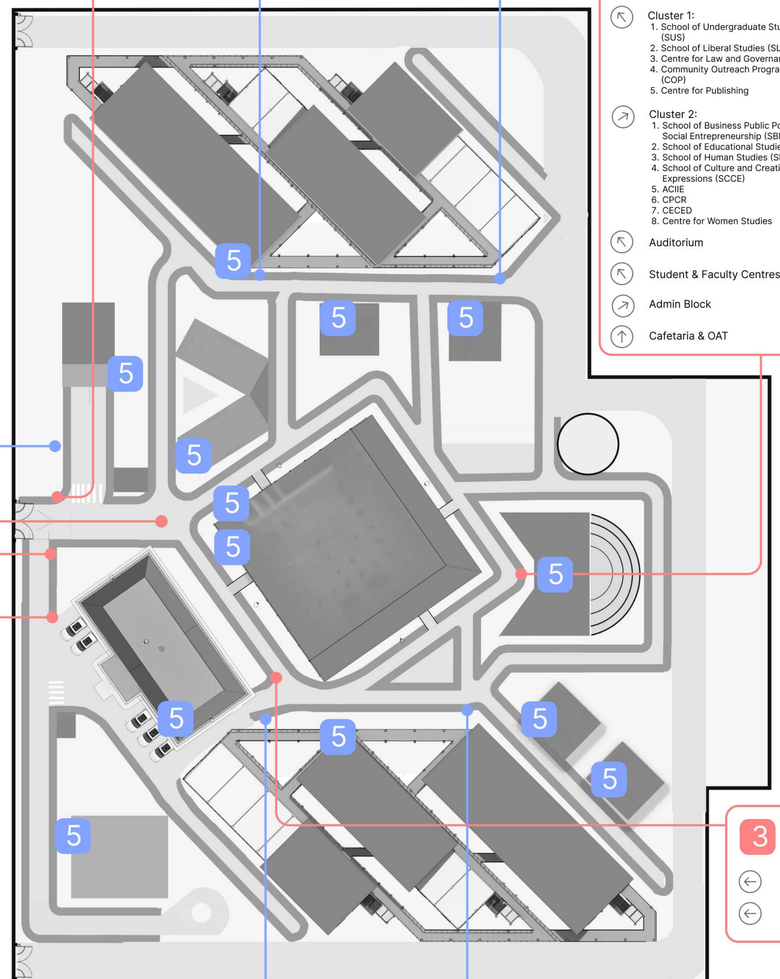
Cluster 1:
1. School of Undergraduate Studies (SUS)
2. School of Liberal Studies (SLS)
3. Centre for Law and Governance
4. Community Outreach Programme (COP)
5. Centre for Publishing

4 INFORMATION SIGNS IF1a Site Directory Information Sign Freestanding

Cluster 1:
1. School of Undergraduate Studies (SUS)
2. School of Liberal Studies (SLS)
3. Centre for Law and Governance
4. Community Outreach Programme (COP)
5. Centre for Publishing

1 DIRECTIONAL SIGNS DR1a Vehicular Directional Sign Freestanding
- Basement Parking

3 DIRECTIONAL SIGNS Pedestrian Directional Sign Finger Post
- Central Library
- Cluster 1:
  1. School of Undergraduate Studies (SUS)
  2. School of Liberal Studies (SLS)
  3. Centre for Law and Governance
  4. Community Outreach Programme (COP)
  5. Centre for Publishing
- Cluster 2:
  1. School of Business Public Policy and Social Entrepreneurship (SBPPSE)
  2. School of Educational Studies (SES)
  3. School of Human Studies (SHS)
  4. School of Culture and Creative Expressions (SCCE)
  5. ACIIE
  6. CPCR
  7. CECED
  8. Centre for Women Studies
- Auditorium
- Student & Faculty Centres
- Admin Block
- Cafetaria & OAT



3 DIRECTIONAL SIGNS Pedestrian Directional Sign Finger Post
- Admin Block
- Healthcare Centre

1 DIRECTIONAL SIGNS DR1a Vehicular Directional Sign Freestanding
- Admin Block Parking

3 DIRECTIONAL SIGNS Pedestrian Directional Sign Finger Post
- Admin Block
- Healthcare Centre

4 INFORMATION SIGNS IF1a Site Directory Information Sign Freestanding

Cluster 2:
1. School of Business Public Policy and Social Entrepreneurship (SBPPSE)
2. School of Educational Studies (SES)
3. School of Human Studies (SHS)
4. School of Culture and Creative Expressions (SCCE)
5. ACIIE
6. CPCR
7. CECED
8. Centre for Women Studies

4 INFORMATION SIGNS IF1a Site Directory Information Sign Freestanding

Cluster 2:
1. School of Business Public Policy and Social Entrepreneurship (SBPPSE)
2. School of Educational Studies (SES)
3. School of Human Studies (SHS)
4. School of Culture and Creative Expressions (SCCE)
5. ACIIE
6. CPCR
7. CECED
8. Centre for Women Studies



Sign Type	Sign Use	Typical Location
DR1a Vehicular Directional Sign Freestanding	• Directs vehicles to destinations and car parks within campus areas • Destination names • Pictograms and arrows	• Typically located on roads within each precinct area at vehicular decision points
DR2a Pedestrian Directional Sign Freestanding	• Directs pedestrians to destinations within campus • Destination names, pictograms and arrows	• Along pedestrian paths at decision points
DR2b Pedestrian Directional Sign Finger Post	• Identifies street name • Direct pedestrians to destinations within campus • Street name, destinations, pictograms and arrows	• Along pedestrian paths at decision points
IF1a Site Directory Information Sign Freestanding	• Provides information on destinations within campus • Identifies current precinct • Changeable 'You are Here' map of site	• At major arrival and gathering points
IF1b Site Directory Information Sign Wall Mounted	• Provides information on destinations within campus • Identifies current precinct • Changeable 'You are Here' map of site	• At major arrival and gathering points

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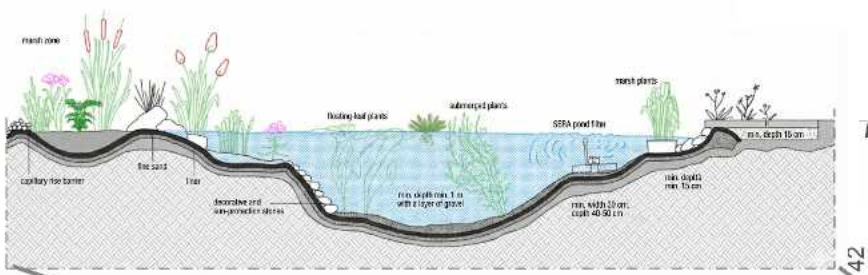
No.	Description	Date

B.R. AMBEDKAR UNIVERSITY

WayFinding-SIte

Project number	1
Date	17-09-2025
Drawn	MEHUL PAUL
Checked by	DR. RAHUL TIWARI
Scale	1:800

15-04-2025 22:09:24







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No.	Description	Date

B.R. AMBEDKAR UNIVERSITY

Elective-Landscape

Project number	1
Date	17-09-2025
Drawn	MEHUL PAUL
Checked by	DR. RAHUL TIWARI
Scale	1:800

15-04-2025 22:09:24













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No.	Description	Date

B.R. AMBEDKAR UNIVERSITY

Renders

Project number	1
Date	17-09-2025
Drawn	MEHUL PAUL
Checked by	DR. RAHUL TIWARI
Scale	

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