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Convention Center

Warangal, Telangana, India

Dec, 2025

Convention Center

Warangal, Telangana, India

BACHELOR OF ARCHITECTURE

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DEPARTMENT OF ARCHITECTURE AND PLANNING

MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY, BHOPAL

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ARC 511 – Thesis Project

Convention Center

Warangal, Telangana, India

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DEPARTMENT OF ARCHITECTURE AND PLANNING

MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY, BHOPAL

CANDIDATE DECLARATION

The Thesis Project in the subject ARC 511, entitled "**Convention Center, Warangal, Telangana, India"**, is being submitted in partial fulfilment of the requirement for the award of degree of Bachelor of Architecture by the undersigned for evaluation.
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 Dec, 2025 **Anjali Swain**

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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 subject ARC-511, Thesis Project.

Date: 1st Dec, 2025 **Dr. Vicky Lalramsangi**
Thesis Guide

CERTIFICATION OF EXAMINATION

The Bachelor of Architecture Thesis Viva-Voce examination of Ms Anjali Swain Scholar No.211110008, was held on 1/12/2025 to 2/12/25.

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ABSTRACT

This thesis is about designing a Convention Centre in Warangal, near the Textile Park. The aim of this project is to create a place where people can come together for events, exhibitions, conferences, and cultural programs. I wanted the design to feel welcoming, comfortable, and meaningful for the people who use it.

Warangal has a strong history of textiles and crafts, and this inspired the overall concept. The design tries to reflect the spirit of the city- its culture, identity, and energy. The Convention Centre is imagined not just as a building but as a community space where learning, business, and celebrations can happen in an open and friendly environment.

The project focuses on simple but effective ideas like bringing in natural light, keeping the spaces cool through shading and ventilation, and adding green areas that make the site calm and refreshing. The planning is kept flexible so that different types of events can be held easily without confusion in movement or function.

Overall, this thesis tries to show how architecture can support people, bring communities together, and create a space that feels both modern and connected to its roots.

ACKNOWLEDGMENT

I would like to express my sincere gratitude to everyone who supported me throughout this thesis journey. First, I am thankful to my guide Dr. Vicky Lalramsangi, who encouraged me, corrected me, and helped me understand my own ideas more clearly. Her guidance made this work possible.

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TABLE OF CONTENTS

.....i

CANDIDATE DECLARATION iii

ABSTRACT.....iv

ACKNOWLEDGMENT v

CHAPTER 1 1

1. INTRODUCTION.....1

1.1. Introduction 1

1.2. Aim.....1

1.3. Objective 1

1.4. Scope 2

1.5. Limitations 2

1.6. Need for Design 2

CHAPTER 2 3

2. DESIGN BRIEF 3

2.1. Project Brief 3

2.2. Proposing Agency 3

2.3. Details of Spaces 4

2.4. Site Details 4

2.5. Location.....5

2.6. Proximity.....5

2.7. Site Surrounding.....5

2.8. Landmark 7

2.9. Proposed land use Zone.....7

2.10. Development Parameters 7

2.11. Parking details 8

2.12. Project Cost Estimate.....8

2.13. Site Layout.....9

2.14. Tender Document 10

CHAPTER 3 ..... **11**
3. LITERATURE REVIEW **11**
3.1. Convention Centre 11
3.1.1. Key Features of a Convention Centre 11
3.2. Convention Centre hotel 11
3.3. Types of Convention Centres 11
3.4. Importance of Convention Centre 12
3.5. Evolution and history of convention Centre 13
3.6. Guidelines for Approval of Convention Centres by Government of India 14
3.7. Norms and byelaws 16
3.7.1. Socio-cultural Facilities 16
3.7.2. Staircase/Exit Requirements 16
3.7.2.1. Capacity for Exits 17
3.7.2.2. Minimum Width Provisions for Passageway Corridors 17
3.7.3. Ramps 18
3.7.3.1. Ramps with Gradients 18
3.7.4. Ventilation Shaft 18
3.7.4.1. Interior Open Space for Light and Ventilation 19
3.7.4.2. Joint Open-Air Space 19
3.7.5. Projection into Open Spaces 19
3.7.6. Sanitation requirements for assembly buildings 20
3.7.7. Norms for differently abled within segregated toilets 21
3.7.8. Water requirement and facilities 21
3.7.8.1. General guidance for water supply arrangements 21
3.7.9. Provisions for Differently-Abled, Elderly and Children 22
3.7.10. Site development 22
3.7.10.1. Access Path/Walk Way 22
3.7.10.2. Parking 23
3.7.10.3. Building requirements 23
3.7.10.4. Approach to plinth level 23

3.7.10.5. Corridor connecting the entrance/ exit for the differently abled 24
3.7.10.6. Stairways 24
3.7.10.7. Lifts.....24
3.7.10.8. Desirable Lift size.....24
3.7.10.9. Toilets 25
3.7.11. Harvesting provisions in various Building categories: 25
3.7.11.1. Rain Water Harvesting Provisions for Open spaces in cities 25
3.7.12. Green Buildings and Sustainability Provisions.....26
3.7.12.1. Provisions and Applicability 26
3.7.12.2. Water Conservation and Management.....26
3.7.12.3. Solar Energy Utilization 26
3.7.12.4. Energy Efficiency (Concept of passive solar design of buildings).....26
3.7.12.5. Waste Management 27
3.7.12.6. Roof Top Solar Energy Installations 27
3.7.12.7. Installation of Solar Assisted Water Heating System in Buildings 27
3.7.12.8. Installation of Solar Water Heating System.....28
3.7.12.9. Capacity 28
3.7.12.10. Specifications 28
3.7.12.11. Auxiliary System: 28
3.7.12.12. Sustainable Waste Management.....28
3.7.12.13. Sustainability of Building Materials.....29
3.7.12.14. Fire Escapes or External Stairs.....29
3.7.12.15. Spiral Stairs 30
3.7.12.16. Staircase Enclosures 30
3.7.13. Ramps.....30
3.7.14. Service ducts/refuge chute.....30
3.7.14.1. Electrical services.....31
3.7.14.2. Air-conditioning 31
3.7.14.3. Air-Conditioning should conform to the following:.....32
3.7.14.4. Fire Dampers 32

3.7.14.5. Static water storage tank 32
3.7.14.6. Automatic sprinklers 33
3.7.15. Exhibition Galleries 33
3.7.15.1. Space Standards 34
3.7.16. Means of escape 35
3.7.16.1. Travel distance: 35
3.7.16.2. Exits: 35
3.7.16.3. Stairs: 35
3.7.16.4. Ramps: 35
3.7.17. Fire Safety 35
3.7.17.1. General Exit Requirements 35
3.7.17.2. Capacity of exits 35
3.7.17.3. Doorways 36
3.7.17.4. Stairways and ramps 36
3.7.17.5. Horizontal exits 36
3.7.18. Vertical circulation 36
3.7.18.1. Escalators 36
3.7.19. Elevators 37
3.7.19.1. Location: 37
3.7.19.2. Planning a passenger lift: 37
3.7.20. Ramps 38
3.7.21. Internal staircase 39
3.7.22. Parking 39
CHAPTER 4 42
4. SITE INVENTORY 42
4.1. Site Details 42
4.1.1. Site 42
4.1.2. Views from Site 43
4.1.3. Proximity 43
4.1.4. Utilities & Infrastructure 44

4.1.4.1. Electricity 44
4.1.4.2. Drainage 44
4.1.4.3. Water Supply 45
4.1.5. Noise 45
4.1.6. Street view 46
4.1.7. Typography 46
4.1.8. Soil Type 48
4.1.8.1. Type of Foundation can be Used: 48
4.2. Climate 48
4.2.1. Data 49
4.2.1.1. Average Temperature in Warangal 49
4.2.1.2. Average Hourly Temperature in Warangal 50
4.2.1.3. Cloud 50
4.2.1.4. Rainfall 51
4.2.1.5. Humidity 51
4.2.1.6. Wind 52
4.2.1.7. Wind Direction in Warangal 53
4.2.1.8. Solar analysis 53
4.3. Vegetation 54
CHAPTER 5 56
5. CASE STUDY 56
5.1. LIVE CASE STUDY 1: Science City Convention Centre, Kolkata 56
1. Project Overview 56
2. Urban Context & Site Planning 56
3. Spatial Organization 57
4. Architectural Observation 57
5. Structural Systems 58
6. Climate Response 58
7. Building Services 58
8. Landscape Design 59

9. Sustainability Features 59
10. Inferences 59
5.2. LIVE CASE STUDY 2: Biswa Bangla Convention Centre (BBCC), New Town, Kolkata 59
1. Project Overview 59
2. Urban Context & Site Planning 60
3. Spatial Organization 61
4. Design Philosophy 62
5. Architectural Observation 62
6. Structural & Material System 62
7. Circulation Design 63
8. Acoustics & AV Systems 63
9. Climate Response & Sustainability 64
10. Building Services 64
11. Landscape & Open Space 64
12. Strengths & Design Takeaways 64
13. Inference 65
5.3. DESK APPRAISAL 1: Hyderabad International Convention Centre (HICC), Hyderabad, Telangana 65
1. Project Overview 65
2. Urban Context & Site Planning 66
3. Spatial Organization 66
4. Design Philosophy 67
5. Architectural Observations 68
6. Structural & Material System 68
7. Circulation 68
8. Acoustics & AV Integration 68
9. Climate Response & Sustainability 69
10. Building Services 69
11. Strengths & Performance 69
12. Inference 69

5.4. DESK APPRAISAL 2: Queen Sirikit National Convention Centre (QSNCC), Bangkok, Thailand 70
1. Project Overview 70
2. Urban Context & Site Planning 70
3. Spatial Organization 71
4. Design Philosophy 72
5. Architectural Observations 72
6. Structural & Material System 72
7. Circulation & User Experience 73
8. Acoustics & Tech Integration 73
9. Climate Response & Sustainability 73
10. Building Services 74
11. Strengths & Performance 74
12. Inference 74
5.5. Comparison Table 75
REFERENCES 78

Table of Figures

Fig 1: Project Location 5
Fig 2: Project Site 6
Fig 4: Warangal Land Zoning 7
Fig 5: Project Site Layout 9
Fig 6: Site Google Earth 9
Fig 7: Tender- Letter of Invitation 10
Fig 8: Escalator Norms 37
Fig 9: Escalator Norms 37
Fig 10: Elevator Norms 38
Fig 11: Marked Official Site 42
Fig 12: Proximity 43
Fig 13: Site Views 43
Fig 14: Low Tension Line 44
Fig 15: Drainage 44

Fig 16: Daramsagar Canal 45
Fig 17: Noise 45
Fig 18: Carriage Way 46
Fig 19: Street View 46
Fig 20: Typography 46
Fig 21: Site Section 47
Fig 22: Contour Analysis 47
Fig 23: Sandy Loam Soil 48
Fig 24: Temperature Graph 49
Fig 25: Average Hourly Temperature Graph 50
Fig 26: Cloud Graph 50
Fig 27: Rainfall Graph 51
Fig 28: Humidity Graph 52
Fig 29: Wind Graph 52
Fig 30: Wind Direction Graph 53
Fig 31: Sun Path 53
Fig 32: Asian Palmyra Palm 54
Fig 33: Neem Tree 55
Fig 34: Science City Convention Centre 56
Fig 35: Seminar Hall Plan 57
Fig 36: Auditorium plan 57
Fig 37: Biswa Bangla Convention Centre 60
Fig 38: BBCC Site Plan 61
Fig 39: Auditorium Hall BBCC 62
Fig 40: Interior BBCC 63
Fig 41: Hyderabad International Convention Centre 66
Fig 42: HICC Floor Plans 67
Fig 43: Queen Sirikit National Convention Centre 70
Fig 44: QSNCC Planning 71
Fig 45: QSNCC Level 1 planning 71
Fig 46: QSNCC Interiors 72

Table of Tables

Table 1: Space Requirement According to Tender 4
Table 2: Site Details 4
Table 3: Site Proximity according to Tender 5
Table 4: Site MOS according to GO423 7
Table 5: Parking Details according to GO168 8

Table 6: Cost Estimation according to Tender 8
Table 7: NBC FAR norms 16
Table 8: Staircase Norms 17
Table 9: NBC Exit Norms 17
Table 10: NBC Ramps 18
Table 11: NBC Shaft Norms 18
Table 12: NBC Sanitary Norms for Assembly Building 20
Table 13: NBC Rainwater Harvesting Norms 26
Table 14: Exhibition Gallery Norms 34
Table 15: Fire Safety Norms 35
Table 16: Vertical Circulation Norms 36
Table 17: Elevator Norms 38
Table 18: GO 168 PArking Norms 40
Table 19: Monthly Temperature Table 49
Table 20: Cloud Data Table 51
Table 21: Monthly Rainfall Table 51
Table 22: Monthly Humidity Table 52
Table 23: Wind Table 53
Table 24: SSCC Space Detail Data 57
Table 25: BBCC Space Detail Data 62
Table 26: Design Inference 65
Table 27: HICC Space Detail Data 66
Table 28: Design Inference 69
Table 29: QSNCC Space Detail Data 71
Table 30: Design Inference 74
Table 31: Comparison Table 77

CHAPTER 1

1. INTRODUCTION

1.1.INTRODUCTION

The Telangana State Industrial Infrastructure Corporation (TSIIC), under its objective of providing integrated industrial infrastructure development, envisages the need to undertake the development of the Warangal International Convention Centre (WICC) cum 3-Star Hotel at IT Park Madikonda, Warangal, Telangana on Public Private Partnership (PPP) mode under IALA Warangal. The project is proposed on approximately 10 acres (40,468 sq.m.) of land and includes a convention Centre, a business hotel, entertainment and F&B facilities, and surface parking. The total built-up area is approximately 250,000 sq. ft. The project aims to provide comprehensive facilities for conventions, exhibitions, meetings, and hospitality in an integrated manner.

1.2.AIM

To design a comprehensive, inclusive, and culturally responsive convention Centre and business hotel complex in Warangal that caters to diverse professional, cultural, and social needs, while harmonizing contemporary architecture with regional identity.

1.3.OBJECTIVE

- **To analyze the spatial and functional requirements** of a modern convention Centre integrated with hospitality, including convention halls, breakout spaces, business hubs, and supporting infrastructure.
- **To design a flexible and sustainable built environment** that facilitates large-scale gatherings, exhibitions, and conferences without compromising user comfort, accessibility, or environmental responsiveness.
- **To establish a meaningful architectural language** that draws inspiration from Warangal's cultural and historic context, especially the Kakatiya heritage, while addressing present and future urban dynamics.
- **To explore efficient circulation, security, and service strategies** within the complex to ensure a smooth user experience for varied stakeholder groups—organizers, delegates, staff, and the public.
- **To assess and apply smart urban infrastructure models**, energy-efficient design strategies, and environmentally responsive technologies suited for Telangana's climatic and urban context.
- **To respond to the PPP framework of development** by proposing a design that is not only architecturally significant but also financially viable and adaptable for phased implementation.

1.4.SCOPE

- The project will explore spatial planning for large-scale events, including auditoriums, exhibition halls, banquet areas, breakout spaces, lobbies, and support services.
- Emphasis will be placed on architectural expression, climate responsiveness, material use, and urban integration.
- The design will address crowd management, vehicular and pedestrian movement, security, and emergency planning.
- The scope includes landscape design, facade articulation, vertical circulation, and incorporation of smart building features.
- The project will also explore adaptability of spaces for multiple functions and long-term resilience.

1.5.LIMITATIONS

- **High Initial Capital Investment:** Building a large-scale convention Centre involves significant upfront costs in terms of land development, construction, infrastructure, and finishing, often requiring public-private partnerships or government funding.
- **Operational and Maintenance Challenges:** Convention centres demand constant maintenance due to heavy footfall, wear and tear, HVAC operations, and technological upkeep. This includes managing acoustics, lighting systems, and AV infrastructure regularly.
- **Seasonal Utilization:** Many convention centres suffer from under-utilization during off-seasons or when not programmed well, leading to economic inefficiency and high idle maintenance costs.
- **Energy Consumption:** Large halls with air-conditioning, lighting systems, and event setups are energy-intensive. Without proper passive strategies and efficient systems, the environmental footprint can be significant.
- **Security and Crowd Control**: Hosting high-profile or large-capacity events brings challenges in terms of safety, surveillance, crowd management, and emergency evacuation-demanding a robust operational strategy beyond just architectural design.

1.6.NEED FOR DESIGN

Warangal is poised to become a major regional Centre in Telangana's urban development strategy. However, its infrastructural growth has largely been industrial, with insufficient attention to civic and cultural spaces that serve wider communities. A convention Centre not only fulfils this infrastructural need but also acts as a cultural and economic catalyst—boosting tourism, providing employment opportunities, and encouraging global-local interaction. With increasing demand for decentralized venues that can host significant events

outside metropolitan cities, this project envisions an iconic, responsive, and inclusive space that can place Warangal on the national map of event destinations.

CHAPTER 2

2. DESIGN BRIEF

2.1.PROJECT BRIEF

The proposed thesis project envisions the design of a state-of-the-art Convention Centre in Warangal, Telangana, near the emerging Textile Park area. With Warangal poised for industrial and cultural growth, the project aims to create a multifunctional space that caters to business events, exhibitions, conferences, and cultural programs.

The design focuses on creating a flexible, sustainable, and user-centric environment that responds to site conditions, local climate, and urban context. Emphasis is placed on passive design strategies, seamless circulation, integration of indoor and outdoor spaces, and provisions for large gatherings. The convention Centre aspires to become an architectural landmark—a civic hub that reflects Warangal's aspirations while addressing the practical challenges of operation, maintenance, and adaptability.

2.2.PROPOSING AGENCY

The Telangana State Industrial Infrastructure Corporation Limited, envisages the need to undertake development of Warangal International Convention Centre (WICC) cum 3-Star Hotel @ IT Park Madikonda, Warangal, Telangana on Public Private Partnership (PPP) Mode Under IALA Warangal.

2.3.DETAILS OF SPACES

The Minimum Development Obligations (Build-Up) for the Project:

Sl. No.	Description	Area In sq.ft	
A	**Convention Centre cum Exhibition Centre (2,500 Pax)**	**50,000**	sq. ft.
I	Convention Centre	30,000	sq. ft.
II	Small Meeting rooms	2,000	sq. ft.
III	Large Meeting rooms	5,000	sq. ft.
IV	Business Centre	5,000	sq. ft.
V	Pre-function and Circulation Spaces	8,000	sq. ft.
B	**Business Hotel (150 Keys)**	**150,000**	sq.ft
C	**Entertainment and F&B**	**50,000**	sq. ft.
	Total	**250,000**	sq. ft.
D	**Parking**	As per GO 168	Surface Parking

Table 1: Space Requirement According to Tender

2.4.SITE DETAILS

Project Site Attributes	
Location	Sy. No. 1791/ 1 of Madikonda (V) Warangal (U) District
Site Area	~ 10 acres (40,468 sq. m.)
Primary Access	NH 163
Visibility & Frontage	Excellent Visibility and Frontage along abutting roads ; contiguous site
Shape, Terrain	Regular and mostly flat
Project Site Boundary	
North	Vacant land
South	Vacant land
East	NH 163 Access road
West	Dharmasagar Canal

Table 2: Site Details

2.5.LOCATION

The Project Site is located in Sy. No. 1791/ 1 of Madikonda (V) in Warangal, Telangana, India. The site is located opposite to the Textile Park. Following map shows the location of the Project Site with respect to Warangal.

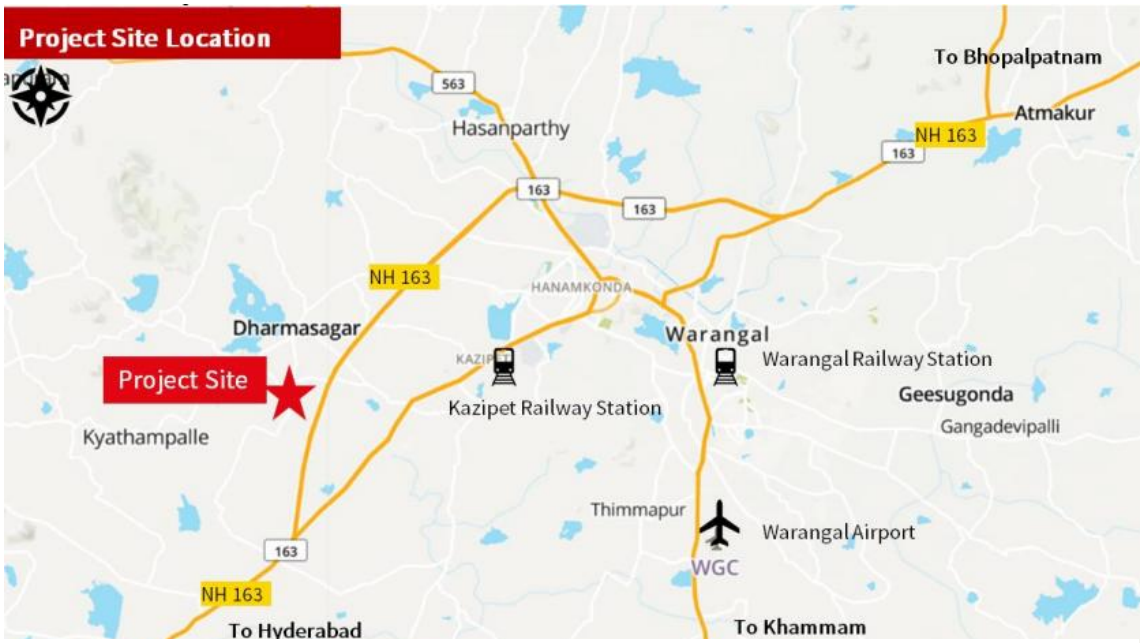


Fig 1: Project Location

2.6.PROXIMITY

The table below provides distance of the Project Site with respect to few key landmarks.

Details of Landmark Distances from project Site.

Location / Landmark	Approximate Distance from the Project Site
Textile Park	Opposite (Immediate Neighborhood)
V City Madikonda	~3.7 Km
Kazipet Junction	~9 Km
Warangal Railway Station	~20 Km
Hyderabad City	~140 Km
Hyderabad International Airport	~ 161 Km

Table 3: Site Proximity according to Tender

2.7.SITE SURROUNDING

The East side of the site is with large area of Textile Park and having NH 163 Infront of site for access toward site.

The West side and South side of the site is vacant land.

The North side of the site is allocated for IT park development.



Fig 2: Project Site



2.8.LANDMARK

Infront of Site there is TSIIC (Telangana State Industrial Infrastructure Corporation Limited) Flatted factory complex.

2.9.PROPOSED LAND USE ZONE

Land is zoned to the category of Industrial Zone (I)

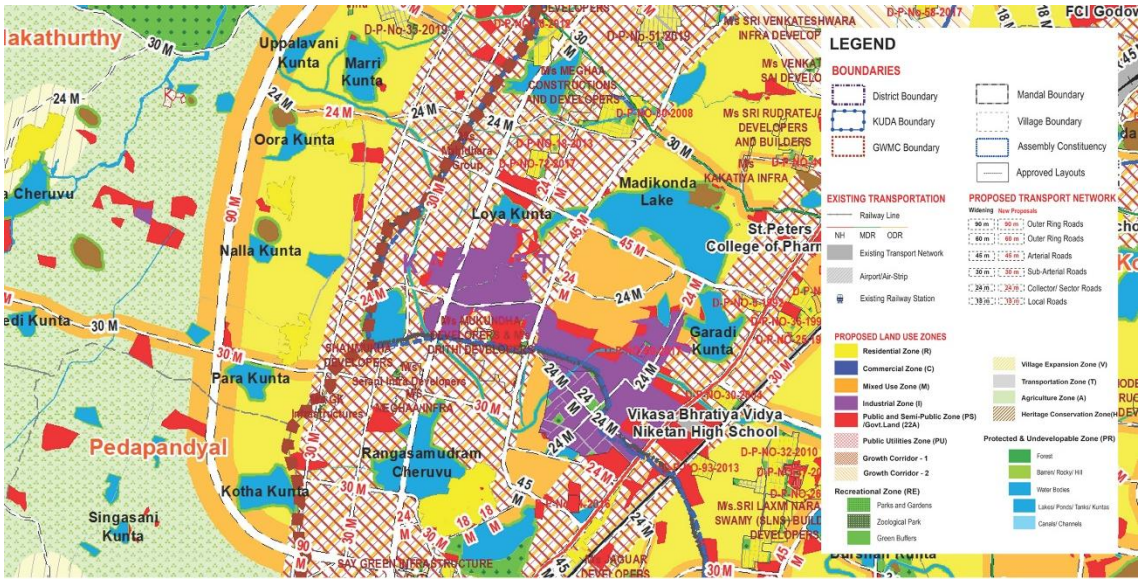


Fig 4: Warangal Land Zoning

2.10. DEVELOPMENT PARAMETERS

According to G.O. Ms. No. 423 (Government of Andhra Pradesh)

Site Area	10 acres (40,468 sq.m.)
Total Build up Area	250,000 sq. ft
F.A. R	2
Ground Coverage	40%
Front Setback	9 m
Side Setback	6m
Rear Setback	6 m
Minimum Frontage	9 m

Table 4: Site MOS according to GO423

2.11. PARKING DETAILS

Category	Build up Area	ECS Per 100 Sq.m	Total ECS Required
Convention Center	50,000 Sq. ft	2.0 ECS/100 sq.m	46
Hotel	150,000 Sq. ft	3.0 ECS/100 sq.m	139
Entertainment and F&B	50,000 Sq. ft	2.0 ECS/100 sq.m	46
Total	250,000 Sq. ft		**231**

Table 5: Parking Details according to GO168

2.12. PROJECT COST ESTIMATE

The project cost (excluding upfront development premium and annual rent during construction payable to TSIIC) is estimated to be ~ Rs. 175 Crores. The table below provides indicative break-up of the estimated Project Cost:

Estimated Project Cost

Particulars	Unit Cost (Rs. per sq. ft.)	Total Project Cost (Rs. Crores)
MICE (International Standard Convention Centre)	~ 6,430	~ 32.15
Business Hotel (150 Keys)	~ 6,607	~ 99.10
Entertainment and F&B	~ 4,620	~ 23.10
Total Development Cost		**~ 154.35**
Interest Cost		~ 20.65
Total Project Cost		**~175.00**

Table 6: Cost Estimation according to Tender

2.13. SITE LAYOUT

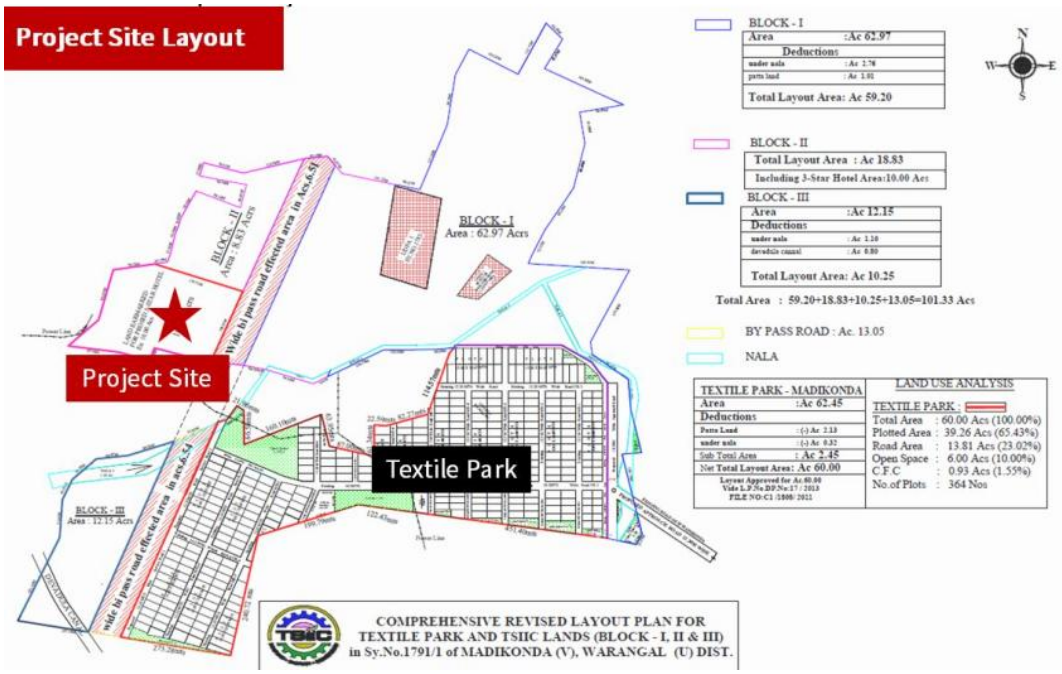


Fig 5: Project Site Layout



Fig 6: Site Google Earth

2.14. TENDER DOCUMENT

LETTER OF INVITATION

To:

<Name and Address of the Purchaser of the Request for Proposal Document>

Subject: **Invitation for Submission of Bid for 'Warangal International Convention Centre (WICC) cum 3-Star Hotel @ IT Park Madikonda, Warangal, Telangana on Public Private Partnership (PPP) Mode Under IALA Warangal'.**

Dear Madam / Sir,

We, the Telangana State Industrial Infrastructure Corporation Limited under our core objective of providing integrated infrastructure development for the state of Telangana, envisage the need to undertake development of Warangal International Convention Centre (WICC) on approximately 10 acres (40,468 sq. m.) of land located at Madikonda, Warangal, Telangana, India, on PPP Mode.

The Project is envisaged to be a Warangal International Convention Centre (WICC) cum 3-Star Hotel @ IT Park Madikonda, which is proposed to be developed at Madikonda, Warangal, Telangana, involving private developers.

We have earmarked about 10 acres (40,468 sq. m.)of land for the Project, which is envisaged to be an Warangal International Convention Centre (WICC) cum 3-Star Hotel @ IT Park Madikonda along with other support facilities. This Request for Proposal (the "RFP") document is for the Project, which is being proposed on approximately 10 acres (40,468 sq. m.) of land with about 200,000 sq. ft. of built-up area and corresponding car parking area.

We are pleased to invite you to participate in the bidding process and partner with the Government of Telangana in developing the proposed Warangal International Convention Centre (WICC) cum 3-Star Hotel @ IT Park Madikonda, Warangal, Telangana on Public Private Partnership (PPP) Mode Under IALA Warangal and contribute to the growth of the State of Telangana. This RFP document comprises of three volumes:

1. Volume 1: Instruction to the Bidders
2. Volume 2: Development Agreement
3. Volume 3: Project Information Memorandum

Please feel free to contact us if you need any clarifications and/or additional information.

Yours faithfully,
for Telangana State Industrial Infrastructure Corporation Limited

Fig 7: Tender- Letter of Invitation

CHAPTER 3

3. LITERATURE REVIEW

3.1.CONVENTION CENTRE

A convention Centre (also known as a conference Centre or exhibition hall) is a large public building or complex specifically designed to host events, such as: Conferences, Conventions, Seminars, Exhibitions, Trade shows, Cultural programs, Business meetings.

3.1.1. Key Features of a Convention Centre

1. **Large Halls or Auditoriums** – For keynote speeches, performances, or big gatherings.
2. **Breakout Rooms/Meeting Rooms** – Smaller spaces for workshops or group discussions.
3. **Exhibition Areas** – Open or partitioned spaces for displaying products or stalls.
4. **Pre-function Areas** – For registration, refreshments, networking, etc.
5. **Back-of-House Facilities** – Service corridors, green rooms, kitchens, storage.
6. **Resorts or Hotels** – for accommodation for attendees.
7. **Technical Infrastructure** – Audio-visual systems, internet, lighting, air-conditioning.
8. **Parking and Accessibility** – Ample vehicle parking and easy access for attendees.

3.2.CONVENTION CENTRE HOTEL

Convention Hotel means a hotel with 50 rooms or greater that provides facilities and services designed to host meetings or gatherings within or upon the same premises of the hotel or within a facility (for example: convention centres, auditoriums, outdoor venues, etc.) that is in close proximity of the hotel.

3.3.TYPES OF CONVENTION CENTRES

1. Convention Centres (without lodging): These are dedicated large buildings primarily designed for conventions, trade shows, exhibitions, and conferences. They typically offer extensive floor areas, often accommodating thousands of attendees. They usually contain:

- **Exhibit Halls:** Large open spaces for trade shows and exhibitions.
- **Auditoriums/Plenary Halls:** For large keynote speeches, presentations, or performances.
- **Meeting Rooms & Conference Rooms:** Smaller, flexible spaces for breakout sessions, workshops, and business meetings.
- **Support Facilities:** Registration areas, food and beverage services, business centres, press lounges, VIP lounges, and parking. These centres are often located adjacent to or near hotels to provide accommodation for attendees.

2. Convention Hotels (with lodging): These are hotels that integrate significant convention and meeting spaces within their own facilities, in addition to providing accommodation and other hotel amenities (restaurants, fitness centres, etc.). They offer the convenience of having

everything under one roof, making them popular for events where attendees also need lodging.

3. Conference Centres: Similar to convention centres, but often smaller in scale and with a stronger focus on meetings and educational programs rather than large-scale exhibitions. They tend to offer higher levels of service and specialized amenities for focused discussions and learning.

4. Exhibition Halls/Trade Show Venues: While often part of larger convention centres, some venues are primarily designed as standalone exhibition halls, focusing specifically on hosting trade shows and large product displays.

5. Venues with Convention Capabilities: Other types of venues can host conventions or events with similar characteristics, though they may not be purpose-built convention centres:

6. Business Centres: Offer amenities like cutting-edge technology, multimedia facilities, and specialized rooms for business meetings and smaller conferences.

7. Unique and Special Venues:

1. **Museums and Art Galleries:** Provide a distinct and often culturally rich backdrop for events.
2. **Historical Buildings:** Offer a unique ambiance and charm.
3. **Educational Venues:**
4. **Universities and Colleges:** Often have lecture halls, auditoriums, classrooms, and sometimes even residential halls that can be rented for corporate gatherings, academic conferences, and workshops, often at a lower cost.
5. **Sports Venues (Stadiums/Arenas):** Can accommodate very large numbers of people for major events, concerts, or large-scale product launches.
6. **Banquet Halls:** Primarily used for formal events like weddings and proms, but can also host smaller conferences or corporate dinners.
7. **Community Centres:** Offer low-cost multi-purpose rooms for various gatherings.
8. **Theatres and Auditoriums:** Ideal for events requiring a stage and audience setup, such as presentations, performances, or large lectures.

3.4.IMPORTANCE OF CONVENTION CENTRE

Convention centres are crucial for economic development and city branding. They attract business travelers who spend on hotels, restaurants, and local services, creating jobs and generating tax revenue. Beyond direct economic impact, they foster knowledge exchange, promote innovation, and enhance a city's international reputation by hosting major events. They also serve as important community gathering places for local events, enriching social and cultural life.

3.5.EVOLUTION AND HISTORY OF CONVENTION CENTRE

The evolution of convention centres reflects a fascinating journey from rudimentary gathering spaces to the sophisticated, technologically advanced, and often sustainable hubs we see today.

- **Early Forms of Gathering Spaces:**
  - **Ancient Times:** The concept of large gatherings for trade, political discourse, or religious ceremonies dates back to ancient marketplaces (like Greek Agora and Roman Forums), castles, and palaces. Halls in castles, for instance, were designed to accommodate large groups for important meetings with the king, serving as early "convention halls." A notable historical example is the "Tennis Court Oath" during the French Revolution in 1789, where a makeshift meeting in an indoor tennis court became a pivotal moment in history.
  - **Medieval Fairs:** In the Middle Ages, fairs were common across Europe, primarily for promoting agricultural products, arts, crafts, and other handmade goods. These can be seen as precursors to modern trade shows.
- **The Birth of Purpose-Built Exhibition Halls (19th Century):**
  - **Industrial Revolution:** The Industrial Revolution, with its mass production and advancements in transportation and communication, spurred the need for dedicated spaces to showcase new technologies and products.
  - **The Crystal Palace (1851, London):** This iconic structure, built specifically for the Great Exhibition, is often cited as a landmark in the history of exhibition halls. It provided an unprecedented amount of exhibition space and showcased the world's industrial and cultural achievements.
  - **Bingley Hall (1850, Birmingham, England):** Considered one of the first purpose-built exhibition halls in Great Britain, it was constructed from surplus materials and hosted a variety of public gatherings.
  - **Other 19th-Century Halls:** Throughout the latter half of the 19th century, many cities around the world began building dedicated halls for large meetings and exhibitions, such as Memorial Hall in Philadelphia (1876) and Exhibition Place in Toronto (1878).
- **20th Century: Modern Convention Centres Emerge:**
  - **Post-WWI Growth:** As industries and trades grew and sought more suitable venues, cities began investing in modern facilities to attract business, development, and tourism. These often took the form of new municipal halls that could host both professional conventions and popular entertainment.
  - **Increased Size and Scope:** The late 1920s saw the appearance of modern, multipurpose convention centres that grew in size and scope. Examples include Atlantic City's Boardwalk Hall (1929), known for its massive clear-span space.
  - **Post-WWII Boom and Specialization:** The mid-20th century witnessed a significant boom in convention center construction, especially in the U.S. Places like McCormick Place in Chicago (1955) and the Las Vegas Convention Center (1959) emphasized abundant exhibition space,

becoming anchors for local economies. These facilities began to offer more than just exhibition space, incorporating auditoriums, concert halls, lecture halls, and meeting rooms.
    - **Rise of the MICE Industry:** The growth of the Meetings, Incentives, Conferences, and Exhibitions (MICE) industry further fueled the development of dedicated convention centres, recognizing the economic significance of business tourism.
- **21st Century: Technology, Flexibility, and Sustainability:**
    - **Multifaceted and Technology-Driven:** Today's convention centres are far from simple utilitarian halls. They are multifaceted, technology-driven spaces designed to accommodate a diverse array of events, blurring the lines between physical and virtual interaction.
    - **Hybrid Events:** The rise of hybrid events (combining in-person and digital attendees) has redefined the role of convention centres, leading to increased focus on robust Wi-Fi, seamless streaming capabilities, and interactive setups.
    - **Flexible and Adaptive Spaces:** Modern designs prioritize flexibility and adaptability, with modular layouts, airwall configurations, and customizable spaces to suit various event sizes and themes.
    - **Enhanced Networking:** Convention centres are incorporating dedicated networking zones, often with technology to facilitate connections and digital information exchange.
    - **Sustainability:** Environmental consciousness is a major driver, with venues adopting green building materials, renewable energy sources, waste reduction programs, and eco-friendly event setups.
    - **Experiential Design:** There's a growing emphasis on creating dynamic and engaging experiences for attendees, moving beyond mere content delivery to foster human connection and a sense of place. This includes incorporating natural light, outdoor meeting spaces (like rooftop gardens), and integration with the surrounding urban environment.
    - **Economic Drivers:** Convention centres continue to be crucial for attracting business, driving tourism, and spearheading urban revitalization projects.

3.6.GUIDELINES FOR APPROVAL OF CONVENTION CENTRES BY GOVERNMENT OF INDIA

General Features:

It is very essential that the proposed convention Centre should contain at least one convention hall, two mini convention halls, one exhibition hall, one restaurant and parking facilities as per details given below: -

1. Convention Hall-Convention Hall as the name suggests should have audio Visual conferencing equipment, facility for high fidelity recording, video projection/ video graphs etc. and skilled manpower at various levels.

The seating capacity in the hall may be in a classroom style in the following category: - Above 1500pax or 1200-1500 pax or 800-1200 pax or 300-800 pax

2. Mini Convention Halls: Mini Convention halls are equally important in Convention Centres as these halls are required for various seminars, committees, meetings etc. the seating capacity therefore, may be in a theatrical or classroom style to seat as follows: -. 200-300 pax or 100-200 pax or 50-100 pax or 20-50 pax

3. Exhibition Hall: Exhibition Hall is another important feature in convention Centre. Delegates to the convention as well as trade relative promoters take part in trade shows to promote their products during conventions. As such, it is essential that such exhibition hall should have a capacity to accommodate at least 20 booths of 3 mts by 3 mts in size excluding passages in between the booths.

4. Restaurants: Restaurants in the convention centres should confirm to the existing guidelines of HRACC laid down by the Ministry.

5. Parking: Parking facility for not less than 50 cars and five coaches.

6. Residential Accommodation for Delegates/ Participants: applicable only if, promoters, desire to have residential accommodation in the convention complex and the guidelines laid down by the Ministry in respect of star category hotels will apply.

7. Infrastructural Facilities: -

1. Landscaped forefront
2. Exhibition Management Centre
3. Administrative facilities for corporate office including IITTM/ Internet etc.
4. Trade Show/ Fair Facilities such as Tourist Office, Bank and Money Changing facilities, Travel Desk, STD/ISD, Press Lounge, VIP Lounges etc.
5. Technical facilities such as plant room, electric substation, stores, electric power back-up-system, fire hydrant etc.
6. Gate complex for stipulating entry and exit.
7. Information booths.
8. Public Convenience.
9. Stationary Shops and Kiosks.
10. Public Address System.
11. First aid with doctor on call facilities.
12. Security office and booths for security arrangements.
13. Storage complex for custom storage and handling etc.
14. Fire safety arrangements.
15. Locker facilities.
16. Handicraft shops, souvenir shop.
17. Facility for the physically disabled person.
18. Other facility for enhancing customer satisfaction.

3.7.NORMS AND BYELAWS

3.7.1. Socio-cultural Facilities

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

Notes:

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

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

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

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

Table 7: NBC FAR norms

3.7.2. Staircase/Exit Requirements

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

The minimum width of staircase shall be as follows:

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

Table 8: Staircase Norms

3.7.2.1. Capacity for Exits

The capacity of exits (staircase, ramps and doorways) indicating the number of persons could be safety evacuated through a unit exit width of 50 cm shall be as given below:

Sl. No.	Group of Occupancy	Number of Occupants		
		Stairways	Ramps	Doors
1	Residential	25	50	75
2	Educational	25	50	75
3	Institutional	25	50	75
4	Assembly	40	50	60
5	Business	50	60	75
6	Mercantile	50	60	75
7	Industrial	50	60	75
8	Storage	50	60	75
9	Hazardous	25	30	40

Table 9: NBC Exit Norms

3.7.2.2. Minimum Width Provisions for Passageway Corridors

The following minimum width provisions shall be made way corridor for each passage.

a	Residential buildings, dwelling unit type.	1.00 m.
b	Residential buildings, e.g., hostels, etc.	1.25 m.
c	Assembly buildings like auditorium theatres and cinemas.	2.00 m.
d.	All other buildings including hotels e) Hospital. Nursing Homes, etc.	1.50 m.

3.7.3. Ramps

3.7.3.1. Ramps with Gradients

1. Where ramps with gradients are necessary or desired, they shall conform to the following requirements.
2. A ramp when provided should not have a slope greater than 1 in 20 or maximum of 1 in 12 for a short distance up to 9000mm.
3. A ramp shall have handrails on at least one side, and preferably two sides, that are 900 mm high, measured from the surface of the ramp, that are smooth, and that extend 300 mm beyond the top and bottom of the ramp. Where major traffic is predominantly children, the handrails should be placed 760 mm high.

Sl. No.	Height of the Building (m.)	Exterior open spaces to be left on all sides in m. (front rear and sides in each plot) As per prescribed set backs
1	10	3
2	15	5
3	18	6
4	21	7
5	24	8
6	27	9
7	30	10
8	35	11
9	40	12
10	45	13
11	50	14
12	55 and above	16

Table 10: NBC Ramps

3.7.4. Ventilation Shaft

For ventilating the spaces for water closets and bathrooms, if not opening on the front side, rear and interior open spaces, shall open on the ventilation shaft, the size, of which shall not be less than the values given below:

Height of Building (m)	Size of ventilation shaft (sq m)	Minimum size of shaft (m)
Upto 10.0	1.2	0.9
Upto 12.0	2.8	1.2
Upto 18.0	4.0	1.5
Upto 24.0	5.4	1.8
Upto 30.0	8.0	2.4
Above 30.0	9.0	3.0

Table 11: NBC Shaft Norms

For buildings above 30.0 m. height, mechanical ventilation system shall be hustled besides the provision of minimum ventilation shaft

For fully air-conditioned residential buildings for lodging purposes, the ventilation shaft need not be insisted upon, provided the air-conditioning system works in an uninterrupted manner also, provided there is an alternative source of power supply. However, it is not mandatory in case of buildings where ventilation is mechanized.

3.7.4.1. Interior Open Space for Light and Ventilation

i. The whole or part of one side of one or more rooms intended for human habitation and not abutting on either the front, rear or side open spaces shall abut on an interior open space whose minimum width in all directions shall be 3.0 m in case of buildings not more than 15 m 17.5 m (with stilts) in height, and in case of buildings above 15 m/ 17.5 m (with stilts) it shall have mandatory mechanical ventilation in addition.
ii. Sunken Courtyard: Sunken courtyard up to 3mt in depth from the ground level as 'light well within building envelop shall be permitted for light and ventilation for basement area.
iii. Skylight: Skylight in interior open space (courtyard) shall be permitted subject to the fact that it may not act as a covered space on the ground floor and does not violate the maximum minimum ground coverage rules.

3.7.4.2. Joint Open-Air Space

i. Every interior or exterior or air space, unless the latter is a street, shall be maintained for the benefit of such building exclusively and shall be entirely within the owner's own premises.
ii. If such interior or exterior open-air space is intended to be used for the benefit of more than one building belonging to the same owner, then the width of such open-air space shall be the one specified for the tallest building as specified in clause 4.10.3 and 4.10.4 abutting on such open- a i r space.
iii. Provision of Podium for parking and landscaping in case the buildings are to be constructed with stilt floor on individual plot for providing parking space and where basement could not be approached for parking, in such cases a podium may be constructed on ground floor in continuation of the stilt floor having access from the front for the parking after leaving minimum 3m setback from the plot line. The terrace of podium may be used for plantation & landscaping. For low rise development, the maximum height permitted is 15mnts. However, where the stilt floor is to be constructed for parking the height may be increased to 17.5 mt

3.7.5. Projection into Open Spaces

i. Every interior or exterior open space shall be kept, free from any erection thereon and shall be open to the sky. Nothing except comice, chajja or weather shade (not more than 0.75 m. wide) shall overhang or project over the said open spaces so as to reduce the width to less than the minimum required.
ii. Note: Such projections shall not be allowed at a height less than 20 m from the corresponding shed floor level

iii. A canopy or canopies each not exceeding 4.50 m. in length and 2.40 m in width in the form of cantilever or cantilevers, over the main entrance entrances, providing a minimum clear height of 2.2 m. below the canopy in single storeyed residential building, only one such canopy shall be permitted for each individual detached block. In more than one storeyed residential building, two canopies shall be permitted over ground floor higher floor entrances. In buildings of other occupancies, the permissibility of canopy, canopies shall be as decided by the Authority on its merits.

iv. In case of residential building only, a balcony or balconies at roof level of a width of 120 m overhanging in set-backs within one's own land and courtyards provided the minimum area required shall not be reduced by more than 30% of such open space

v. The projections (cantilever) of cupboards and shelves shall be permitted and are exempted from covered area calculations in case of residential buildings only

Such projection shall be up to 0.75 m. depth provided.

i. That no cupboard shall project in the side set back on the ground floor

ii. That outer length of cupboard overhanging in the set-backs shall not exceed 2.0 m. per habitable room. In addition to this, cupboard under the above and windows can be provided.

iii. Only one pergola on each floor shall be permitted in a residential building if constructed in the exterior open spaces or terrace. Such pergola shall not exceed 3.50 sq. m in area on which 40% shall be void and shall have a cleat height 2.20 m

3.7.6. **Sanitation requirements for assembly buildings**

Sl. No.	Sanitary Unit	For Public		For Staff	
		Male	Female	Male	Female
1	Water Closet (W.C.)	One for 200 persons upto 400 persons. For over 400 persons, add at the rate of 1 per 250 persons or part thereof	Four for 100 persons upto 200 persons. For over 200 persons, add at the rate of 1 per 50 persons or part thereof	One for 1-15 persons. Two for 16-35 persons.	Two for 1-12 persons. Four for 13-25 persons, add at the rate of 1 per 6 persons.
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 for 50 persons or part thereof	--	Nil upto 6 persons One for 7-20 persons Two for 21-45 persons	--
4	Wash Basins	One for every 200 persons or part thereof. For over 400 persons, add at the rate of 1 per 250 persons or part thereof.	One for every 200 persons or part thereof. For over 200 persons, add at the rate of 1 per 150 persons or part thereof	One for 1-15 persons Two for 16-35	One for 1-12 persons Two for 13-25 persons
5	Cleaner's Sink	One per floor, minimum			
6	Drinking Water Fountain	One per 100 persons or part thereof			
7	Shower/Bath	As per trade requirements			

Table 12: NBC Sanitary Norms for Assembly Building

Sl. No.	Sanitary Unit	For Public		For Staff	
		Male	Female	Male	Female
1.	Water Closet (W.C.)	One per 50 seats upto 200 seats. For over 200 seats, add at the rate of 1 per 100 seats or part thereof	One per 25 seats upto 200 seats. For over 200 seats, add at the rate of 1 per 50 seats or part thereof	1 for 15 persons. 2 for 16-35 persons. 3 for 36-65 persons. 4 for 66-100 persons.	2 per 1-12 persons. 4 for 13-25 persons. 6 for 26-40 persons. 8 for 41-57 persons. 10 for 58-77 persons. 12 for 78-100 persons.
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 for 50 persons or part thereof	--	Nil upto 6 persons. 1 for 7-20 persons. 2 for 21-45 persons. 3 for 46-70 persons. 4 for 71-100 persons.	--
4.	Wash Basins	One for every water closet			
5.	Kitchen Sinks & Dish Washer	One per each Kitchen			
6.	Service Sink	One in the restaurant			

3.7.7. Norms for differently abled within segregated toilets

i. One special W.C. in a set of toilets shall be provided for the use of differently abled persons, with essential provision of wash basin near the entrance.
ii. Minimum clear opening of the door shall be 900 mm and the door shall swing out
iii. Suitable arrangement of vertical/horizontal handrails with 50 mm clearance from wall shall be made in the toilet.
iv. The W.C. seat shall be 500 mm from the floor.

3.7.8. Water requirement and facilities

Water requirement for the facility may be worked out and enough storage for ½ day operation is to be kept in storage. If municipal water supply is reliable, the toilet blocks may have underground sump that can store half a day's requirement and overhead tanks for another half. If municipal water supply is not available, toilet block may have its own bore well and pump with no underground sump. Alternatively, a hand tube well can be used for storing water in an elevated (not overhead) tank. To minimize the wastage of water, self-closing water taps should be used.

The pans must be of Pour Flush (PF) design i.e. with a steep slope. Traps should be of a 20 mm water seal. (Use of 50 mm water seal traps will require more water for flushing.) If toilet is to be linked to city sewer, a master trap has to be provided at the sewer connection. Urinals may not be fitted with urinal pots as their replacement is expensive.

3.7.8.1. General guidance for water supply arrangements

1. For new construction: Provision shall be made for underground tank for the storage of water, having capacity at 200 one. Per person with adequate pumping arrangements to supply water to upper floors. Filtered water connection will be allowed only for use of drinking and bathing needs. For other purposes i.e. flushing

and gardening etc., the individual shall be required to have own arrangements of tube well water within the premises. While according sanction to Layout Plan, the Authority shall make a special mention that provision for space shall be kept for the construction of underground reservoir of adequate capacity along with booster pumping station.

2. Arrangements as given in I above shall also be provided in Group Housing Societies.
3. The plumbing arrangement in case of new constructions shall be made in a way that the potable water shall be used for drinking, cooking & bathing only and for rest of the uses, provision for ground water can be made with dual piping system.
4. Low-capacity system should preferably be provided instead of normal 12.5 L capacity.
5. Provisions for sustainable methods of Water and Wastewater management and Water harvesting may be referred from section 9.2 in the Byelaws.

3.7.9. **Provisions for Differently-Abled, Elderly and Children**

Types of buildings to adopt barrier-free guidelines as notified by the State Government

1. Buildings to be designed for Ambulant Disabled People
2. Higher Secondary School. Conference Hall, Dance Halls, Youth Centres. Youth Clubs. Sports Centres. Sports Pavilions, Boat Club Houses, Ice Rinks, Bowling Centres. Swimming Pools, Police Stations. Law Courts. Courts Houses. Sports Stadiums, Theatres, Concert Halls, Cinemas, Auditoria, Small Offices (the maximum plinth area 1400 sq. Mt) Snack Bars, Cafes, and banqueting rooms (for capacity above 50 dinners).

   Note:

   a. In sports stadiums, provisions shall be made for non-ambulant spectators (small wheelchair)
   b. @1:1000 up to 10,000 spectators and @ 1:2000 for spectators above 10,000.
   c. In Theatres, Concert Halls, Cinemas and Auditoria provisions shall be made for non- ambulant spectators (Small Wheel Chairs) @ 1/250 up to 1000 spectators and 1/500 for spectators above 1000.

3.7.10. **Site development**

Level of the roads, access paths and parking areas shall be described in the plan along with specification of the materials.

3.7.10.1. Access Path/Walk Way

Access path from plot entry and surface parking to building entrance shall be minimum of 1800 mm wide having even surface without any steps. Slope, if any, shall not have gradient greater than 5%. Selection of floor material shall be made suitably to attract or to guide visually impaired persons (limited to colored floor material whose color and brightness is conspicuously different from that of the surrounding floor material or the material that emits different sound to guide visually impaired persons:

hereinafter referred "o as "guiding floor material". Finishes shall have a non-slip surface with a texture traversable by a wheel chair. Krebs wherever provided should blend to a common level.

3.7.10.2. Parking

1. For parking of vehicles of differently-abled people, the following provisions shall apply:
2. Surface parking for two car spaces shall be provided near entrance for the physically differently-abled persons with maximum travel distance of 30.0 m. from building entrance.
3. The width of parking bay shall be minimum 3.6 meter.
4. The information stating that the space is reserved for wheel chair users shall be conspicuously displayed.
5. Guiding floor materials shall be provided or a device, which guides visually impaired persons with audible signals, or other devices, which serves the same purpose, shall be provided.

3.7.10.3. Building requirements

The specified facilities in buildings for differently abled persons shall be as follows:

3.7.10.4. Approach to plinth level

Every building should have at least one entrance accessible to the differently abled and shall be indicated by proper signage. This entrance shall be approached through a ramp together with the stepped entry.

a. Ramped Approach: Ramp shall be finished with non-slip material to enter the building. Minimum width of ramp shall be 1800mm with maximum gradient 1:12. Length of ramp shall not exceed 9.0 meter having 800mm high hand rail on both sides extending 300mm beyond top and bottom of the ramp. Minimum gap from the adjacent wall to the hand rail shall be 50mm
b. Stepped Approach: For stepped approach size of tread shall not be less than 300mm and maximum riser shall be 150mm. Provision of 800mm high hand rail on both sides of the stepped approach similar to the ramped approach.
c. Exit/Entrance Door: Minimum & clear opening of the entrance door shall be 900mm and it shall not be provided with a step that obstructs the passage of a wheel chair user. Threshold shall not be raised more than 12mm
d. Entrance Landing: Entrance landing shall be provided adjacent to ramp with the minimum dimension 1800mm x 2000mm. The entrance landing that adjoins the top end of a slope shall be provided with floor materials to attract the attention of visually impaired person's (limited to colored floor material whose color and brightness is conspicuously different from that of the surrounding floor material or the material that emits different sound to guide visually impaired persons. Finishes shall have a non-slip surface with a texture traversable by a wheel chair. Krebs wherever provided should blend to a common level.

3.7.10.5. Corridor connecting the entrance/ exit for the differently abled

The corridor connecting the entrance/exit for differently abled leading directly outdoors to a place where information concerning the overall use of the specified building can be provided to visually impaired persons either by a person or by signs, shall be provided as follows:

a) Guiding floor materials shall be provided or device that emits sound to guide visually impaired persons.
b) The minimum width shall be 1500mm.
c) In case there is a difference of level, slope ways shall be provided with a slope of 1:12.
d) Handrails shall be provided for ramps/slope ways.

3.7.10.6. Stairways

a) One of the stair-ways near the entrance/exit for the differently abled shall have the following provisions:
b) The minimum width shall be 1350 mm.
c) Height of the riser shall not be more than 150 mm and width of the tread 300mum. The steps shall not have abrupt (square) nosing.
d) Maximum number of risers on a flight shall be limited to 12.
e) Handrails shall be provided on both sides and shall extend 300 mm on the top and bottom of each flight of steps.

3.7.10.7. Lifts

Wherever lift is required as per bye-laws. Provision of at least one lift shall be made for the wheel chair user with the following cage dimensions of lift recommended for passenger lift of 13 person's capacity of NBC 2005. BIS. Section 4.9.3 Table no.

3.7.10.8. Desirable Lift size

i. Clear internal width 1100 mm
ii. Clear internal depth 2000 mm
iii. Entrance door width 900 mm

a) A hand rail not less than 600mm long at 1000mm above floor level shall be fixed adjacent to the control panel.

b) The lift lobby shall be of an inside measurement of 1800 mm x 2000 mm or more.

c) The time of an automatically closing door should be minimum 5 seconds and the closing speed should not exceed 0.25 m/ sec.

d) The interior of the cage shall be provided with a device that audibly indicates the floor, the cage has reached indicates that the door of the cage of entrance/exit is either open or closed.

e) Graphic Braille signage, as per the Harmonized Guidelines, shall be provided in the lift

lobby.

3.7.10.9. Toilets

One special W.C. in a set of toilets shall be provided for the use of differently abled with essential provision of washbasin near the entrance for the differently abled.

a) The minimum size shall be 1500 mm x 1750 mm.

b) Minimum clear opening of the door shall be 900mm and the door shall swing out.

c) Suitable arrangement of vertical horizontal handrails with 50mm clearance from wall shall be made in the toilet.

d) The W.C. seat shall be 500mm from the floor.

3.7.11. **Harvesting provisions in various Building categories:**

3.7.11.1. Rain Water Harvesting Provisions for Open spaces in cities

The open spaces for recreational land use generally constitute regional parks, district parks, playgrounds, and stadiums, sports complex, monument zones, public parking. Plaza and other public open spaces. This may be as high as 30% to 50% of the city's geographic area. All such public open spaces above the size of 500 sq.m shall have arrangements for complete utilization and capture of storm water with scientific rainwater harvesting arrangements.

The following ideas may also be included:

i. Well cum Channel cum Percolation pits.
ii. Use of al abandoned bore wells for recharging of groundwater

iii. Artificial or natural Storage of storm water runoff from larger sites.

Category / Use	Area of Plot (sq.m.)	Provisions to be made	Other conditions
Residential Plotted Houses			
New Proposals	100 and above	Construction of Rain Water Harvesting Structure.	Shall have emphasis on both storage and reuse.
Group Housing			
New Proposals	All plot sizes	i. Construction of Rain Water Harvesting Structure. ii. Concrete paving to be avoided and permeable materials are to be used for all open parking spaces.	Should indicate the system of Strom Water Drainage, Rain Water Harvesting Structure and Recharging Well
Public and semi public buildings			
All Proposals	All plot sizes	i. Shall have Rain Water Harvesting Structure and storage ii. Shall have Recharge pits	Shall have emphasis on both storage and reuse.
Commercial / Mixed use			
All Proposals	All plot sizes	i. Construction of Rain Water Harvesting Structure. ii. Soft landscape provisions and open spaces with Percolation pits. iii. Common treatment plant to be made part of the integrated development, funded by sale of commercial space.	Should indicate the system of Strom Water Drainage, Rain Water Harvesting Structure and Recharging Well Shall have emphasis on both storage and reuse.
Industrial			
All proposals	All plot sizes	i. Construction of Rain Water Harvesting Structure. ii. Soft landscape provisions and open spaces with Percolation pits. iii. Use of abandoned bore wells for recharging of ground water. iv. Common treatment plant to be made part of the integrated development funded by sale of commercial space.	Should indicate the system of Strom Water Drainage, Rain Water Harvesting Structure and Recharging Well. Provision should be made not to inject contaminated water into recharge structures in industrial areas and care is to be taken to keep such structures away from sewer lines, septic tanks, soak pits, landfill and other sources of contamination.
Other proposals	All plot sizes	Similar as above	Similar as above

Table 13: NBC Rainwater Harvesting Norms

3.7.12. Green Buildings and Sustainability Provisions

3.7.12.1. Provisions and Applicability

The green building provisions on various plot sizes are indicated in the table below: Provisions for Sanction

3.7.12.2. Water Conservation and Management

- Rain Water Harvesting
- Low Water Consumption Plumbing Fixtures
- Waste Water Recycle and Reuse
- Reduction of Hardscape

3.7.12.3. Solar Energy Utilization

- Installation of Solar Photovoltaic Panels (detailed at section 10.2.3 below)
- Installation of Solar Assisted Water Heating Systems

3.7.12.4. Energy Efficiency (Concept of passive solar design of buildings)

- Low Energy Consumption Lighting Fixtures (Electrical Appliances - BEE Star and Energy Efficient Appliances)
- Energy Efficiency in HVAC systems.

- Lighting of Common areas by solar energy LED devices.

3.7.12.5. Waste Management

- Segregation of Waste
- Organic Waste Management

In case owners of properties desire to procure green building ratings from one or more rating bodies, they may suitably incorporate any other provisions if required and additional incentive FAR as per Master Plan may be availed.

3.7.12.6. Roof Top Solar Energy Installations

Rooftop photovoltaic power station or rooftop PV system, is a photovoltaic system that has its electricity-generating solar panels mounted on the rooftop of residential or commercial buildings. The various components of such a system include photovoltaic modules, mounting systems, cables, solar inverters and other

3.7.12.7. Installation of Solar Assisted Water Heating System in Buildings

I. No new building in the following categories in which there is a system of installation for supplying hot water shall be built unless the system of the installation is also having an auxiliary solar-assisted water heating system

a) Hospitals and Nursing homes.
b) Hotels, Lodges, Guest Houses, and Group Housing with a plot area of 4000 sq m.
c) Hostels of Schools, Colleges, and Training Centres with more than 100 Students.
d) Barracks of armed forces, paramilitary forces, and police.
e) Individual residential buildings having more than 150 sq m. plinth area.
f) Functional Buildings of Railway Stations and Air Ports like waiting rooms retiring rooms, restrooms, inspection bungalows, and catering units.
g) Community Centres. Banquet Halls. Barat Ghars. Mangal Karyalayas and buildings for similar use.

i)	"Solar Assisted Water Heating System"	A device to heat water using solar energy as heat source.
ii)	"Auxiliary back-up"	Electricity operated or fuel fired boilers/systems to heat water coming out from solar water heating system to meet continuous requirement of hot water.
iii)	"New Building"	Such buildings of above said categories for which construction plans have been submitted to the Authority for clearance.
iv)	"Existing building"	Such buildings, which are licensed to perform their respective business.

3.7.12.8. **Installation of Solar Water Heating System**

a) New Buildings: Clearance of plan for the construction of new buildings of the aforesaid categories shall only be given if they have a provision in the building design itself for an insulated pipeline from the rooftop in the building to various distribution points where hot water is required. The building must have a provision for continuous water supply to the solar water heating system. The building should also have open space on the rooftop. which receives direct sunlight. The load bearing capacity of the roof should at least be 50 kg. per sq m. All new buildings of above said categories must complete installation of solar water heating systems before obtaining necessary license to commence their business.
b) Existing Buildings: Installation of Solar Assisted Water Heating Systems in the existing building shall be made mandatory at the time of change of use to above said category provided there is a system or installation for supplying hot water.

3.7.12.9. **Capacity**

The capacity of solar water heating system to be installed on the building of different categories shall be decided in consultation with the local bodies. The recommended minimum capacity shall not be less than 25 liters per day for each bathroom and kitchen subject to the condition that maximum of 50% of the total roof area is provided with the system

3.7.12.10. **Specifications**

Installation of Solar Assisted Water Heating Systems shall conform to BIS specification IS 12933. The solar collectors used in the system shall have the BIS certification mark

3.7.12.11. **Auxiliary System:**

Wherever either hot water requirement is continuous, auxiliary heating arrangement with electric elements or oil of adequate capacity can be provided.'

3.7.12.12. **Sustainable Waste Management**

Zero Waste is a concept of waste management and planning approaches that emphasize waste prevention as opposed to end waste management. This means restructuring production and distribution systems, designing and managing products and processes to systematically follow the 3R rule of Reduce. Re-use and Re-cycle the volume of waste, to conserve and recover all used resources, and therefore eliminating all discharges to landfills, and prevent air, water and land pollution.

Zero Waste/ land-fill can be achieved by adopting systematic approach of segregation at source by planning, by collection facilitation and most importantly by creating public awareness.

The green waste can be converted into fuel cakes, and kitchen waste into manure construction & demolition waste into bricks, plastic waste into oil paper glass and steel back into the same and all residual inert materials can also be converted into bricks. Achieving zero land-fill is more conveniently

possible if

i. The collection is made from house to house and some segregation is done at the household level and
ii. Separate wet and dry bins must be provided at the ground level.
iii. The recycling is done at decentralized, say, ward or even lower levels.

3.7.12.13. **Sustainability of Building Materials**

Sustainability of natural resources for building materials shall be ensured through conservation of available natural resources and use of supplementary materials such as industrial agricultural by- products, renewable resources, factory made building components and recycled construction and demolition waste.

Supplementary building materials (derived or processed waste) shall be suitably used in combination with conventional resources offers dual advantages in purview of health & environmental benefits.

a) Use of Factory made pre-fab/pre-cast and recycled components with green benefits:
b) Panels, hollow slabs, hollow blocks, etc. conservation of materials, less water requirement.
c) Fly Ash bricks, Portland Pozzolana cement, Fly ash concrete, phosphor-gypsum-based walling
& Roofing panels, particle wood recycled use of industrial/ agricultural by-products. (Ref. Table 14)
d) Fly ash/ AAC (Autoclaved aerated light weight concrete) panels/ CLC (Cellular lightweight concrete) panels- ensures thermal comfort (significant reduction in air conditioning requirement)
e) Use of bamboo & rapidly growing plantation timbers- environmental benefits.
f) Local materials are generally suitable for prevailing geo-climatic conditions & have the advantage of low transportation cost & time. Sustainable use of building materials shall be encouraged which may combine certain mandatory provisions and incentives.

3.7.12.14. **Fire Escapes or External Stairs**

a) Fire escape shall not be taken into account while calculating the number of staircases for a building.
b) All fire escapes shall be directly connected to the ground.
c) Entrance to the fire escape shall be separate and remote from internal staircase.
d) The route to fire escape shall be free of obstructions at all times except the doorway leading to the fire escape which shall have the required fire resistance.
e) Fire escape shall be constructed of non-combustible materials.
f) Fire escape stairs shall have straight flight not less than 125 cm wide with 25 cm treads and risers not more than 19 cm.
g) Handrails shall be at a height not less than 100 cm.
h) Fire escape staircase in the mercantile, business, assembly, hotel buildings above 24 m. height shall be a fire tower and in such a case width of the same shall not be less than the width of the main staircase. No combustible material shall be allowed in the

fire tower.

3.7.12.15. **Spiral Stairs**

i. The use of spiral staircase shall be limited to low occupant load and to a building height 9 m.
ii. A spiral stair shall not be less than 150 cm in diameter and shall be designed to give the adequate headroom

3.7.12.16. **Staircase Enclosures**

i. The external enclosing walls of the staircase shall be of the brick or the R.C.C. construction having fire resistance of not less than two hours. All enclosed staircases shall have access through self-closing door of one-hour fire resistance. These shall be single swing doors opening in the direction of the escape. The door shall be fitted with the check action door closers.
ii. The staircase enclosures on the external wall of the building shall be ventilated to the atmosphere at each landing
iii. Permanent vent at the top equal to the 5% of the cross-sectional area of the enclosure and openable sashes at each floor level with area equal to 1 to 15% of the cross-sectional area of the enclosure on external shall be provided. The roof of the shaft shall be at least I m. above the surrounding roof. There shall be no glazing the glass bricks in any internal closing wall of staircase. If the staircase is in the core of the building and cannot be ventilated at each landing, a positive of 5-mm. e.g. by electrically operated blower/blowers shall be maintained.
iv. The mechanism for pressurizing the staircase shaft shall be so installed that the same shall operate automatically on fire alarm system/sprinkler system and be provided with manual operation facilities.

3.7.13. **Ramps**

i. Ramps of slope of not more than 1 in 10 may be substituted for and shall comply with all the applicable requirements of all required stairways as to enclosure capacity and limiting dimensions. Larger slopes shall be provided for special uses but in no case greater than 1 in 8. For all slopes exceeding 1 in 10 and where the use is such as to involve danger of slipping, the ramp shall be surfaced with approved non-slipping material
ii. The minimum width of the ramps in the Hospitals shall be 2.4 m. and, in the basement, using car parking shall be 6.0 m
iii. Handrails shall be provided on both sides of the ramp.
iv. Ramp shall lead directly to outside open space at ground level or courtyards of safe place.
v. For building above 24.0 m in height, access to ramps from any floor of the building shall be through smoke fire check door.
vi. In case of nursing homes, hospitals, etc. area exceeding 300 sq m at each floor one of the exit facilities shall be a ramp of not less than 2.4 m. in width.

3.7.14. **Service ducts/refuge chute**

Service duct shall be enclosed by walls and door, if any, of 2 hours fire rating. If ducts are larger than 10 sq m. the floor should seal them, but provide suitable opening for the pipes to pass through, with the gaps sealed.

A vent opening at the top of the service shaft shall be provided between one-fourth and one-half of the area of the shaft. Refuge chutes shall have an outlet at least of wall of non-combustible material with fire resistance of not less than two hours. They shall not be located within the staircase enclosure or service shafts or air- conditioning shafts. Inspection panel and door shall be tight fitting with 1 hour fire resistance; the chutes should be as far away as possible form exits.

Refuge chutes shall not be provided in staircase walls and A/C shafts etc.

3.7.14.1. Electrical services

Electrical Services shall conform to the following:

a) The electric distribution cables/wiring shall be laid in a separate duct shall be sealed at every floor with non-combustible material having the same fire resistance as that of the duct. Low and medium voltage wiring running in shaft and in false ceiling shall run in separate conduits.
b) Water mains, telephone wires, inter-com lines, gas pipes or any other service lines shall not be laid in ducts for electric cables.
c) Separate conduits for water pumps, lifts, staircases and corridor lighting and blowers for pressuring system shall be directly from the main switch panel and these circuits shall be laid in separate conduit pipes, so that fire in one circuit will not affect the others. Master switches controlling essential service circuits shall be clearly labeled.
d) The inspection panel doors and any other opening in the shaft shall be provided with airtight fire doors having fire resistance of not less than 1 hour.
e) Medium and low voltage wiring running in shafts, and within false ceiling shall run in metal conduits. Any 230-voltage wiring for lighting or other services, above false ceiling should have 660V grade insulation. The false ceiling including all fixtures used for its suspension shall be of non-combustible material.
An independent and well-ventilated service room shall be provided on the ground floor with direct access from outside or from the corridor for the purpose of termination of electrical supply from the licenses service and alternative supply cables. The doors provided for the service room shall have fire resistance of not less than I hour.
f) Miniature circuit breakers (MCB) and Earth leakage circuit breaker (ELCB) shall be provided for electrical circuit.

3.7.14.2. **Air-conditioning**

a. Air-conditioning system should be installed and maintained so as to minimize the danger of spread of fire, smoke or fumes thereby from one floor of fire area to another or from outside into any occupied building or structure
b. Air Conditioning systems circulating air to more than one floor area should be provided with dampers designed to close automatically in case of fire and thereby prevent spread of fire or smoke. Such a system should also be provided with automatic controls to stop fans in case of fire, unless arranged to remove smoke from

a fire, in which case these should be designed to remain in operation.

c. Air- conditioning system serving large places of assembly (over one thousand persons), large departmental stores, or hostels with over 100 rooms in a single block should be provided with effective means for preventing circulation of smoke through the system in the case of fire in air filters or from other sources drawn into the system even though there is insufficient heat to actuate heat smoke sensitive devices controlling fans or dampers. Such means shall consist of approved effective smoke sensitive controls.

3.7.14.3. **Air-Conditioning should conform to the following:**

i. Escape routes like staircase, common corridors, lift lobbies: etc. should not be used as return air passage.
ii. The ducting should be constructed of metal in accordance with BIS 655:196
iii. Wherever the ducts pass through fire walls or floor, the opening around the ducts should be sealed with fire resisting material of same rating as of walls/floors.
iv. Metallic ducts should be used even for the return air instead of space above the false ceiling.
v. The material used for insulating the duct system (inside outside) should be of flame resistant (IS 4355: 1977) and non-conductor of heat.
vi. Area more than 750 sq m. on individual floor should be segregated by a firewall and automatic fire dampers for isolation should be provided.

3.7.14.4. **Fire Dampers**

These shall be located in air ducts and retum air ducts passages at the following points:

i. At the fire separation wall
ii. Where ducts/passages enter the central vertical shaft
iii. Where the ducts pass through floors
iv. At the inlet of supply air duct and the return air duct of each compartment on every floor.

The dampers shall operate automatically and shall simultaneously switch off the air- handling fans. Manual operation facilities shall also be provided.

Note: For blowers, where extraction system and dust accumulators are used, dampers shall be provided

a) Fire smoke dampers (for smoke extraction shafts) for building more than 24 m in height.
b) For apartment houses in non-ventilated lobbies corridor operated by detection system and manual control sprinkler system
c) For other buildings on operation of smoke heat detection system and manual control sprinkler system.
d) Automatic fire dampers shall be so arranged so as to close by gravity in the direction of air movement and to remain tightly closed on operation of a fusible link.

3.7.14.5. **Static water storage tank**

a) A satisfactory supply of water exclusively for the purpose of firefighting shall always be available in the form of underground static storage tank with capacity

specified in Annexure- A' with arrangements of replenishment b town's main or alternative source of supply@ 1000 liters per minute. The static storage water supply required for the above-mentioned purpose should entirely be accessible to the fire tenders of the local fire service Provision of suitable number of manholes shall be made available for inspection repairs and insertion of suction hose etc. The covering slab shall be able to withstand the vehicular load of 45 tons in case of high rise and 22 tons in case of low-rise buildings. A draw off connection shall be provided. The slab need not strengthened if the static tank is not located in mandatory seat- back area.

b) To prevent stagnation of water in the static water tank the suction tank of the domestic water supply shall be fed only through an over flow arrangement to maintain the level therein at the minimum specified capacity.
c) The static water storage tank shall be provided with a fire brigade collecting branching with 4 Nos. 63mm Dia instantaneous male inlets arranged in a valve box with a suitable fixed pipe not less than 15 cm Dia to discharge water into the tank. This arrangement is not required where down comer is provided.

3.7.14.6. **Automatic sprinklers**

An automatic sprinkler system shall be installed in the following buildings

a) All buildings of 24 m. and above in height, except group housing and 45 m and above in case of apartment group housing society building.
b) Hotels below 15 m. in height and above 1000 sq m. built up area at each floor and or if basement is existing.
c) All hotels, mercantile, and institutional buildings of 15 m. and above.
d) Mercantile buildings having basements more than one floor but below 15 m (floor area not exceeding 750 sq m.)
e) Underground Shopping Complex.
f) Underground car/scooter parking /enclosed car parking.
g) Basement area 200 sq m. and above.

3.7.15. **Exhibition Galleries**

An Exhibition is an organized presentation and display of a selection of items. In practice, exhibitions usually occur within museums, galleries and exhibition halls, and World's Fairs. Exhibitions can include many things such as art in both major museums and smaller galleries, interpretive exhibitions, natural history museums and history museums, and also varieties such as more commercially focused exhibitions and trade fairs.

Table 4 Art Galleries, Libraries and Museums
(*Clause* 4.2.5.1)

Sl No.	Fixtures	Public		Staff	
		Males	Females	Males	Females
(1)	(2)	(3)	(4)	(5)	(6)
i)	Water closets	1 per 200 up to 400 Over 400 add at 1 per 250 or part thereof	1 per 100 up to 200 Over 200 add at 1 per 150 or part thereof	1 for up to 15 2 for 16 to 35	1 for up to 12 2 for 13 to 25
ii)	Ablution tap	One in each water closet	One in each water closet	One in each water closet	One in each water closet
		1 water tap with draining arrangements shall be provided for every 50 persons or part thereof in the vicinity of water closets and urinals			
iii)	Urinals	1 per 50	—	Nil up to 6 1 per 7 to 20 2 per 21 to 45	—
iv)	Wash basins	1 for every 200 or part thereof. For over 400, add at 1 per 250 persons or part thereof	1 for every 200 or part thereof. For over 200, add at 1 per 150 persons or part thereof	1 for up to 15 2 for 16 to 35	1 for up to 12 2 for 13 to 25
v)	Drinking water fountain	← 1 per 100 persons or part thereof →			
vi)	Cleaner's sink	← 1 per floor (Minimum) →			
vii)	Showers/bathing rooms	← As per requirements →			

NOTES
1 Some WCs may be Indian style, if desired.
2 Male population may be assumed as two-third and female population as one-third.

Table 14: Exhibition Gallery Norms

3.7.15.1. Space Standards

a. Aisles:

Must be a minimum width of 3 meters. Must equal total width of existing exits. Must have 2 exits. Must have no dead ends.

b. Fire exits/Clearways:

Designated fire exits and clear ways cannot be encroached upon under any circumstance.

Storage of materials or equipment in these areas is not permitted. It is the responsibility of the event organizer to ensure that stand holders comply with this requirement.

3.7.16. **Means of escape**

3.7.16.1. Travel distance:

The maximum travel distance from seat to exit within the auditorium is determined by the need to evacuate from each level of the auditorium within 2 minutes. For traditional seating the maximum travel distance is 18 m measured from the gateway, for continental seating 15 m from any seat.

3.7.16.2. **Exits:**

From each level of the auditorium two separate exits must be provided for the first 500 seats with an additional exit for each further 250 seats.

3.7.16.3. **Stairs:**

Staircase fights should have at past two risers and not more than 16. Al treads should be 275 mm and risers 180 mm.

3.7.16.4. **Ramps:**

Wheelchair users should be provided with flat or ramped escape routes which may be separate from other routes. Ramps should not be longer than 4.5 m or steeper than 8.5%

Number of people	Minimum total exit widths (m)
upto 200	2.2
201-300	2.4
301-400	2.8
401-500	3.2
751-1000	6.4
1001-2000	14.4

Table 15: Fire Safety Norms

3.7.17. **Fire Safety**

Every building shall be so constructed, equipped, maintained and operated as to avoid undue danger to the life and safety of the occupants from fire, smoke, fumes, or panic during the time period necessary for escape.

3.7.17.1. General Exit Requirements

An exit may be a doorway; to an internal staircase, or external staircase, or terrace(s), which have access to the street, or to the roof of a building or a refuge area.

All exits shall provide continuous means of egress to the exterior of a building or to an exterior open space leading to a street.

Exits shall be so arranged that they may be reached without passing through another occupied unit.

3.7.17.2. **Capacity of exits**

The unit of exit width, used to measure the capacity of any exit, shall be 500

mm. A clear width of 250 mm shall be counted as an additional half unit. Clear widths less than 250 mm shall not be counted for exit width.

In an assembly building (convention center), the capacity per storey per unit width of exit of stairways, ramps and doors is 40,50 and 60 respectively.

The travel distance to an exit from the dead end of a corridor shall not exceed 30m in case of assembly buildings.

3.7.17.3. **Doorways**

No exit doorway shall be less than 1000 mm in width except assembly buildings where door width shall be not less than 2000 mm. Doorways shall be not less than 2000 mm in height.

3.7.17.4. **Stairways and ramps**

The minimum width of tread shall be 300 mm and the maximum height of riser shall be 150 mm for assembly buildings.

The minimum width for a staircase shall be 2m.

The minimum headroom in a passage under the landing of a staircase and under the staircase shall be 2.2m.

The slope of a ramp shall not exceed 1 in 10. In certain cases, steeper slopes maybe permitted but in no case greater than 1 in 8.

3.7.17.5. **Horizontal exits**

For buildings more than 24 m in height, refuge area of 15 m² or an area equivalent to 0.3 m² per person to accommodate the occupants of two consecutive floors.

3.7.18. **Vertical circulation**

3.7.18.1. Escalators

Escalators are required for continuous mass transportation of people. The standard dimensions for various depths of an escalator are prescribed in the adjoining table.

Step width	600	800	1000
A	605-620	805-820	1005-1020
B	1170-1220	1320-1420	1570-1620
C	1280	1480	1680
Transportation capacity/hr	5000-6000	7000-8000	8000-10000

Table 16: Vertical Circulation Norms

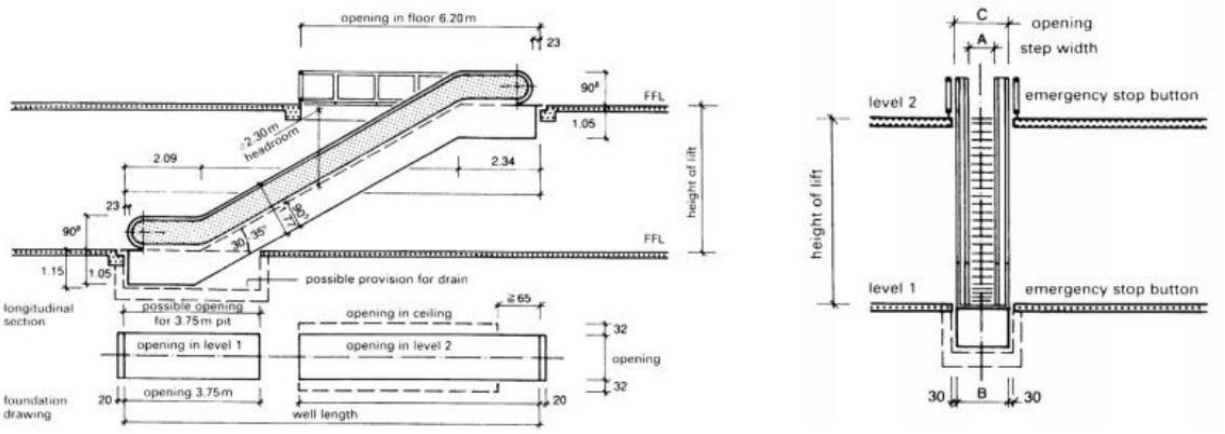


Fig 8: Escalator Norms

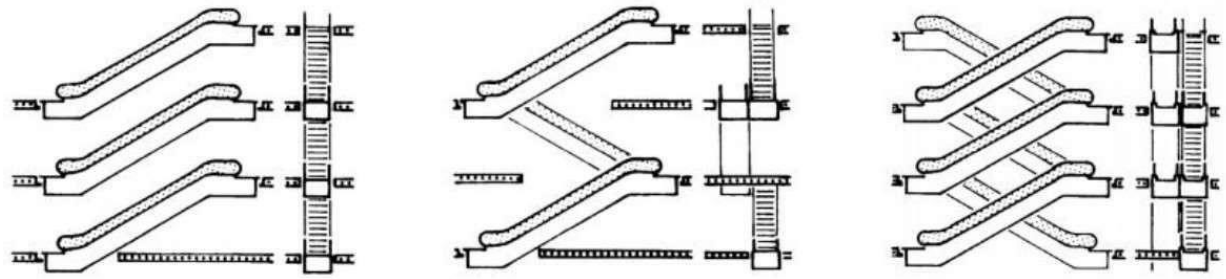


Fig 9: Escalator Norms

i. Angle of inclination of an escalator from the horizontal shall not exceed 30°. but for rises not exceeding 6 m the angle of inclination is permitted to be increased up to 35

ii. In accordance with a worldwide standard, the width of the step to be used is 60cm (for one person), 80cm (for one-to-two people width) and 100cm (for two people width). A 100cm step provides ample space for camuing goods.

iii. Calculation of length in plan for an escalator:
   a) with 30deg, escalator 1.732 storey height
   b) with 35deg, escalator = 1.428 storey height

iv. The landing area of escalators shall have a surface that provides a secure foot hold for a minimum distance of 0.85 m measured from the root of the comb teeth.

3.7.19. **Elevators**

3.7.19.1. Location:

Passenger lifts should be within a reasonable walking distance from the furthest part of the floor areas served (say, 70 m maximum) and, where they are the only or main lifts near an entrance. The location of goods and service lifts will depend on their function, but they should not open into passenger lift lobbies or public areas.

3.7.19.2. **Planning a passenger lift:**

Cul-de-sac or recessed lobbies, are essential to get the maximum performance

from lift groups. Clearly, having called for lift service the waiting passengers should not have to walk further than necessary to the responding lift car, and should not be obstructed by passers-by.

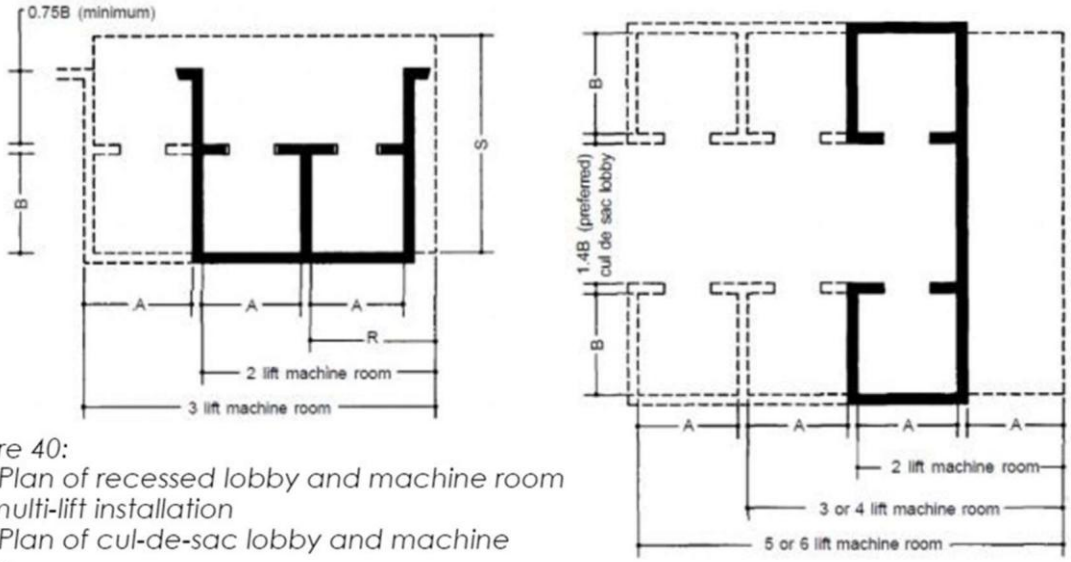


Figure 40:
(a.) Plan of recessed lobby and machine room for multi-lift installation
(b.) Plan of cul-de-sac lobby and machine room

- **Selecting the size of an elevator:**

Type	Capacity/ load	Shaft size	Car size	Door	Pit
	persons/kg	mm	mm	mm	mm
General purpose passenger traffic (speed : 1m/s)	13/1000	2400*2300	1600*1400	1100	1800
	16/1250	2600*2300	1950*1400	1100	1900
	21/1600	2600*2600	1950*1750	1100	1900
Intensive passenger electric traction (speed : 2.5 m/s)	13/1000	2400*2300	1600*1400	1100	2800
	16/1250	2600*2300	1950*1400	1100	2800
	21/1600	2600*2600	1950*1750	1100	2800
General-purpose goods lifts, electric traction (speed : 0.5/0.63/1 m/s)	13/1000	2100*2100	1400*1800	1400	1500
Heavy-duty goods, electric traction	26/2000	2600*2900	1700*2000	1700	1500-1800
	26/2000	2900*2500	2000*2100	1800	1500-1800

Table 17: Elevator Norms

3.7.20. **Ramps**

These are used to allow wheeled vehicles such as trolleys, wheelchairs and buggies to change levels.

Fig 10: Elevator Norms

a) A ramp when provided should not have a slope greater than 1 in 20 or maximum af I in 12 for short distance up to 9000 mm.
b) Each ramp shall have at least 1800 mm of straight clearance at the bottom
c) At least one entrance usable by individuals in wheelchairs shall be on a level that would make the elevators accessible.
d) Width of a ramp: It is determined according to type and intensity of use. One-way travel requires a minimum width of 900 mm clear, whereas two-way travel needs 1500 mm. Where turns occur at landings adequate space for maneuvering wheel chairs must be provided.

3.7.21. **Internal staircase**

All assembly buildings having area more than 500 m on each floor shall have a minimum of two staircases.

a) The minimum width for a staircase in an assembly building shall be 1500mm. The formula for most staircases of twice the rise plus the going lies between 600 and 630mm will give a suitable relationship.
b) The rise should not exceed 190 mm, and the going should not be less than 250 mm.
c) The top of the handrail should be between 900 and 1000 mm above the pitch line.
d) The minimum headroom in a passage under the landing of a staircase and under the staircase shall be 2.2 m.

Maximum Pitch	Rise		Going		Maximum risers per flight
32.7degrees	Minimum	135	Minimum	280	16 risers
	Maximum	180	Maximum	340	

3.7.22. **Parking**

According to GO 168

6. INSTITUTIONAL (medical), ASSEMBLY PUBLIC BUILDINGS AND PUBLIC OFFICE COMPLEXES:

1. Maximum permissible FAR : Refer relevant statement.
2. Building Requirements and setbacks upto 10 mtrs. building height.

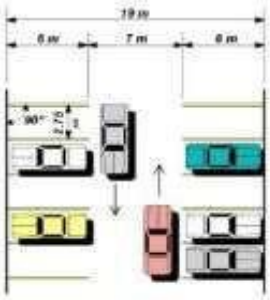
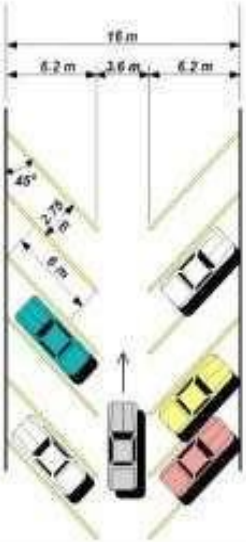
Plot area (Sq.mts.)	Max. Cov	Setbacks for Office buildings		Setbacks for Other buildings	
		Front	Remaining sides	Front	Remaining sides
a) Below 500	As per min.building setbacks	6.00	4.50	9.00	6.00
b) 500 – 2000	50%	6.00	4.50	9.00	6.00
c) 2000 & above	1000 sq.mts. or 40% whichever is higher	6.00	4.50	9.00	6.00

(3) for above category of buildings above 10 mtrs. height:
In addition to the setbacks prescribed above there shall be an increase of 1.0 mtrs. on all sides for every increase of 3.0 mtrs. height of building above 10 mtrs.

4. PARKING:

Type of Building	One vehicular parking space of 20 sq.mts. area for every
a) Institutional (Medical)	20 beds
b) Government or semi-public buildings	100 sq.mts. builtup area or fraction thereof

Table 18: GO 168 PArking Norms

Type	Description	Layout	Advantage/Disadvantages
Perpendicular	• Effective in low turnover rate or long term parking areas. • Most efficient and economical since it accommodates the most vehicles per linear meter.		**Advantages:** • Works well with either one- or two-way aisles • Handles the most vehicles per square meter of pavement **Disadvantages:** • Requires widest area • Two-way traffic can create visibility problems
Angled - 60 degree	• This parking area configuration is ideal for a fast turnover rate or predominantly short term use. • This is often offset by difficulties of inefficient circulation patterns and one-way aisles.		**Advantages:** • Easy maneuvering in and out of parking spaces • Good visibility • Lends itself to either one-or two-way aisles **Disadvantages:** • Requires more pavement per vehicle than perpendicular configuration
Angled - 45 degree	• The 45 degree angled parking configuration displays similar benefits and limitations as the 60 degree.		**Advantages:** • Reduced width requirements for layout. • Easy maneuvering in and out of parking spaces. • Good visibility to the rear **Disadvantages:** • Doesn't work well with two-way aisles • Requires more pavement per vehicle than perpendicular parking configuration.

CHAPTER 4

4. SITE INVENTORY

4.1. SITE DETAILS

4.1.1. Site

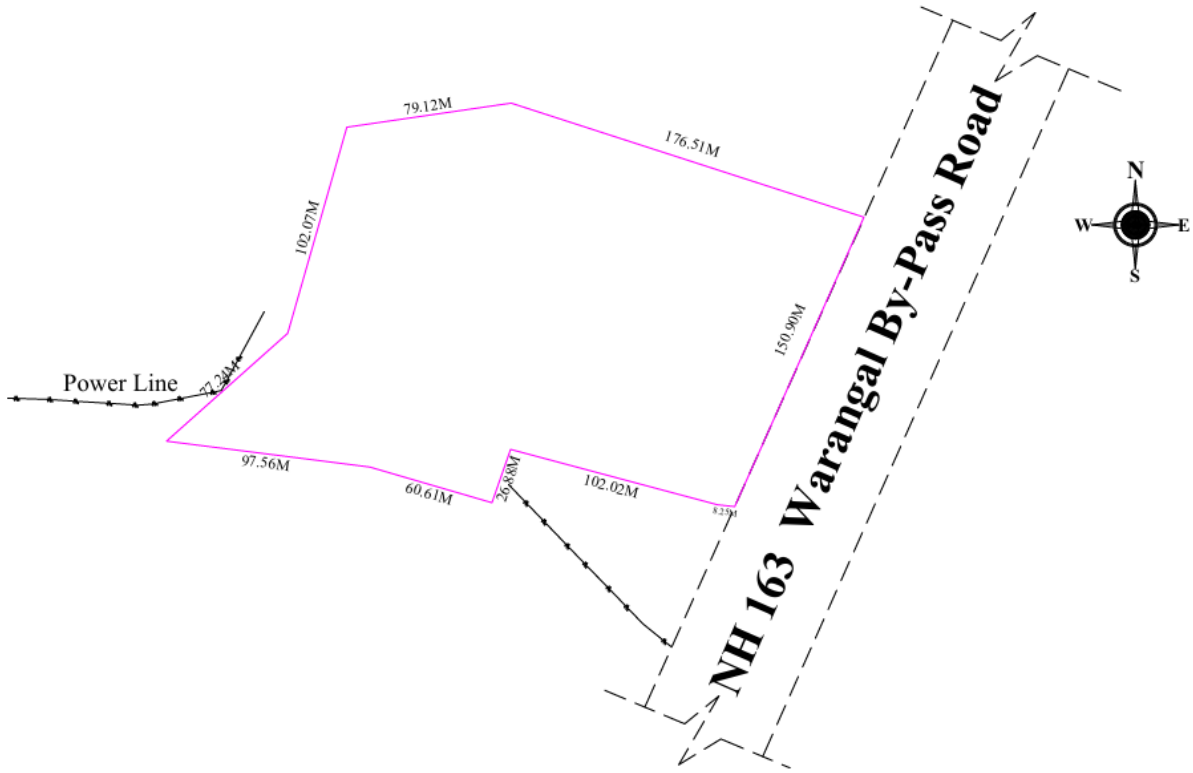


Fig 11: Marked Official Site

4.1.2. Views from Site

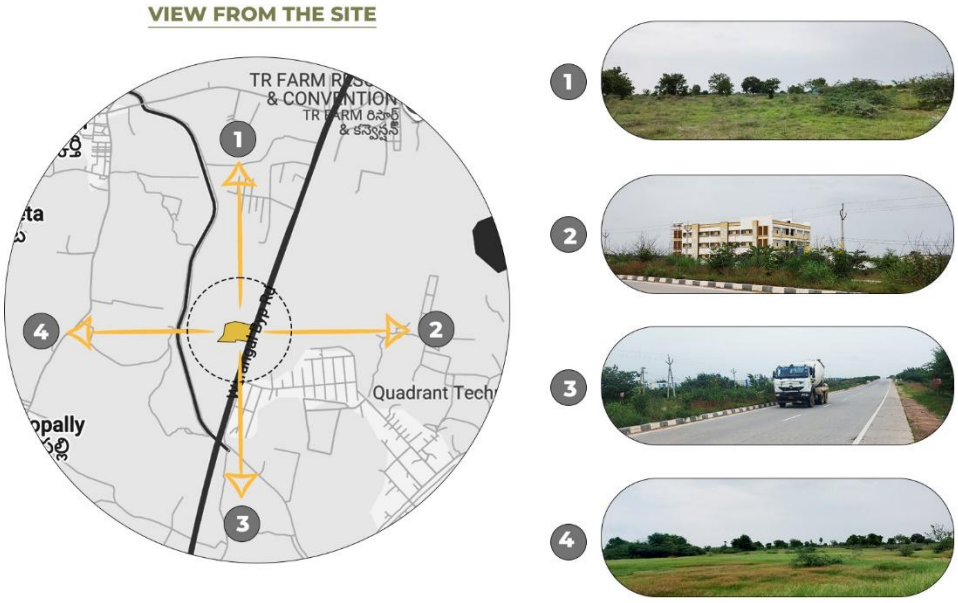


Fig 13: Site Views

4.1.3. Proximity

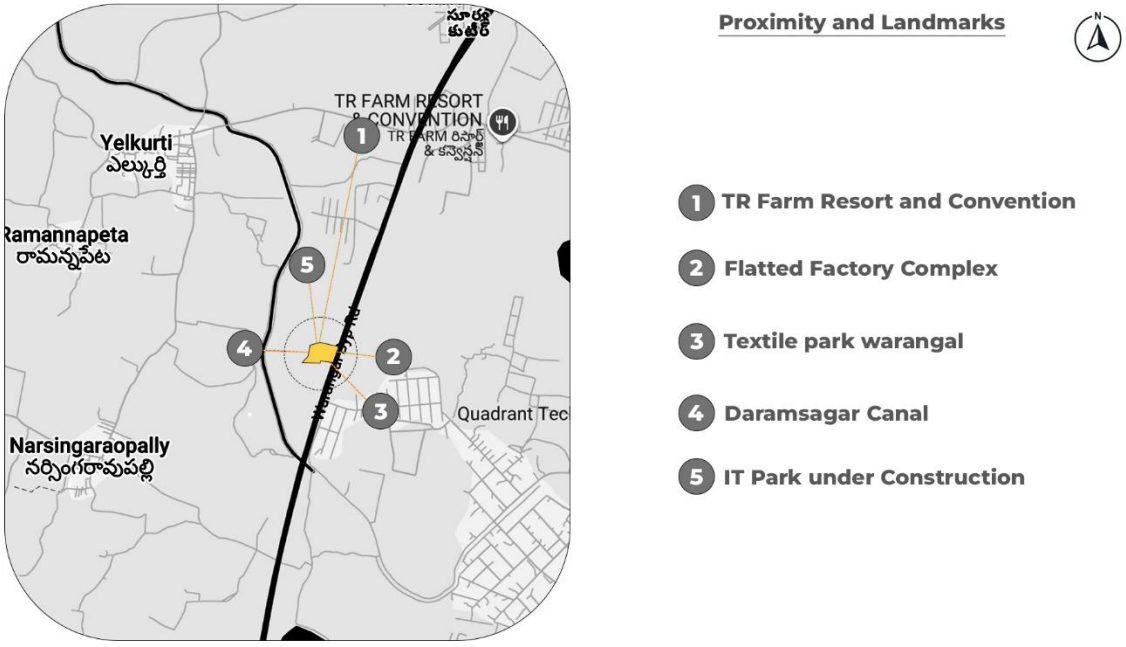


Fig 12: Proximity

The neighborhood Proximity been shown at the above figure

4.1.4. Utilities & Infrastructure

4.1.4.1. Electricity

The site has a low-tension electric line passing at west and south corner of the site which help



Fig 14: Low Tension Line

to take electricity to the site.

4.1.4.2. Drainage

The site has a drainage pathway in front of the site near to NH. and beneficially the site has slope towards the east which means towards the entrance of the site where drainage pathway



Fig 15: Drainage

is located.

4.1.4.3. Water Supply



Fig 16: Daramsagar Canal

The site has a canal named Daramsagar canal which come from Darsmsagar lake which is 14 km away from the site passing through the back side of the site at distance of 150m which can be utilized for water supply to the site.

4.1.5. Noise

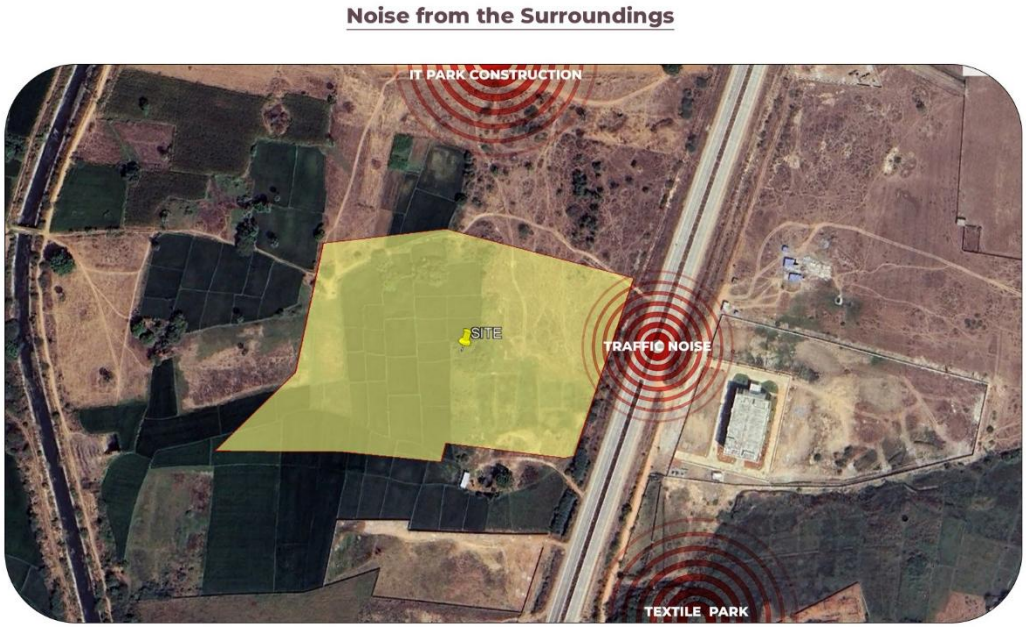


Fig 17: Noise

4.1.6. Street view



Fig 19: Street View

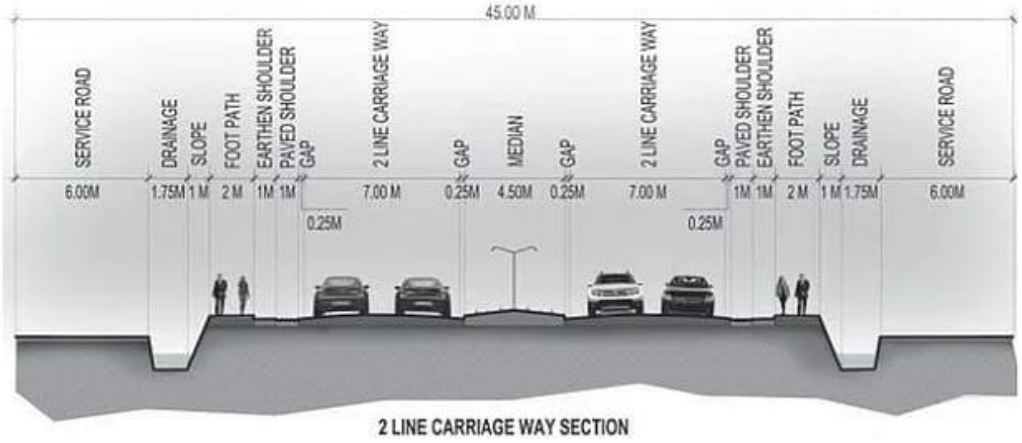


Fig 18: Carriage Way

4.1.7. Typography



Fig 20: Typography

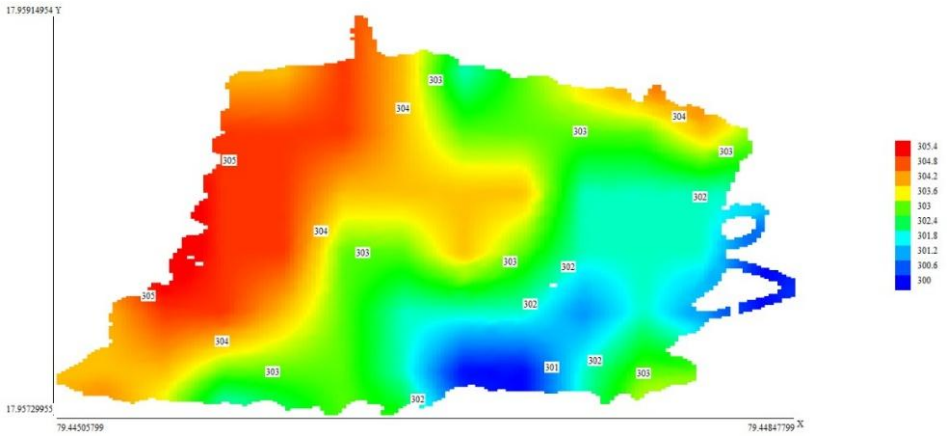


Fig 22: Contour Analysis

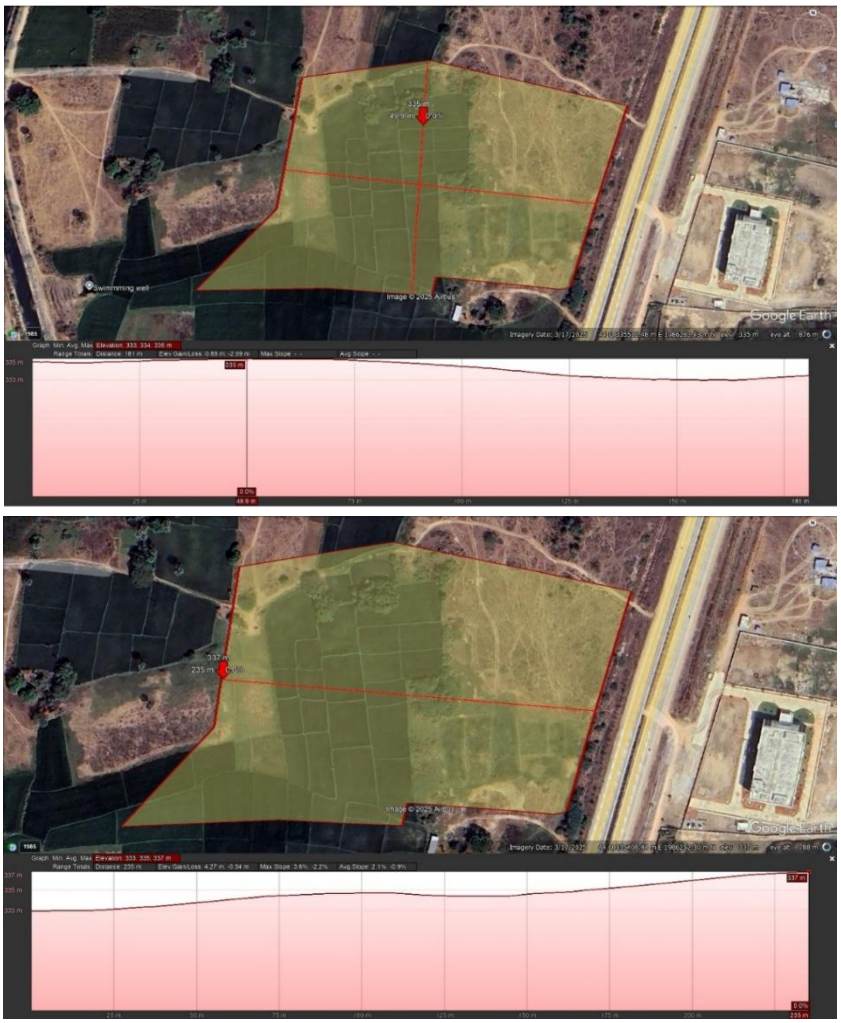


Fig 21: Site Section

Mostly flat land and Slopes towards east side of the site

4.1.8. Soil Type

The Soil Condition of the Site is Sandy Loam Soil. **Sandy loam soil,** the most suitable **type of foundation** depends on several factors like the **load of the structure, water table level,** and **depth of the stable strata.** Sandy loam soils are **moderately stable** and **drain well.**



Fig 23: Sandy Loam Soil

4.1.8.1. Type of Foundation can be Used:

Pile Foundation

When used: If the sandy loam is shallow and underlain by weak strata or high-water table.

Why: Transfers the load to deeper, stable soil layers.

Type: Driven or bored piles (depending on equipment and depth).

Considerations for Foundation in Sandy Loam:

Compaction is essential to reduce settlement. Water table must be checked — high water can weaken soil strength. Proper drainage around the foundation is crucial to avoid erosion

4.2. CLIMATE

Warangal, located in the state of Telangana, India, experiences a tropical climate characterized by hot summers, moderate monsoons, and mild winters. The city falls under the semi-arid climatic zone according to the Koppen climate classification. Climatic data plays a crucial role in urban planning, architecture, agriculture, and infrastructure development in Warangal, as it helps design systems and structures that are environmentally responsive and sustainable.

Warangal experiences a tropical climate with distinct seasonal variations in temperature, rainfall, humidity, and wind patterns. Summers are extremely hot, with temperatures often exceeding 40°C, particularly in April and May. In contrast, winters are relatively mild, with average minimum temperatures ranging between 15°C and 20°C during December and January. The region receives the majority of its annual rainfall during the southwest monsoon season, from June to September, with an average annual precipitation of about 900 to 1,100 mm. Humidity levels are generally high during the monsoon months, while the summer and winter seasons remain relatively dry. The wind direction varies seasonally, and moderate breezes are commonly experienced during both the summer and monsoon periods.

4.2.1. Data

4.2.1.1. Average Temperature in Warangal

The hot season lasts for 2.1 months, from April 2 to June 5, with an average daily high temperature above 101°F. The hottest month of the year in Warangal is May, with an average high of 105°F and low of 84°F.

The cool season lasts for 3.4 months, from October 18 to February 1, with an average daily high temperature below 88°F. The coldest month of the year in Warangal is December, with

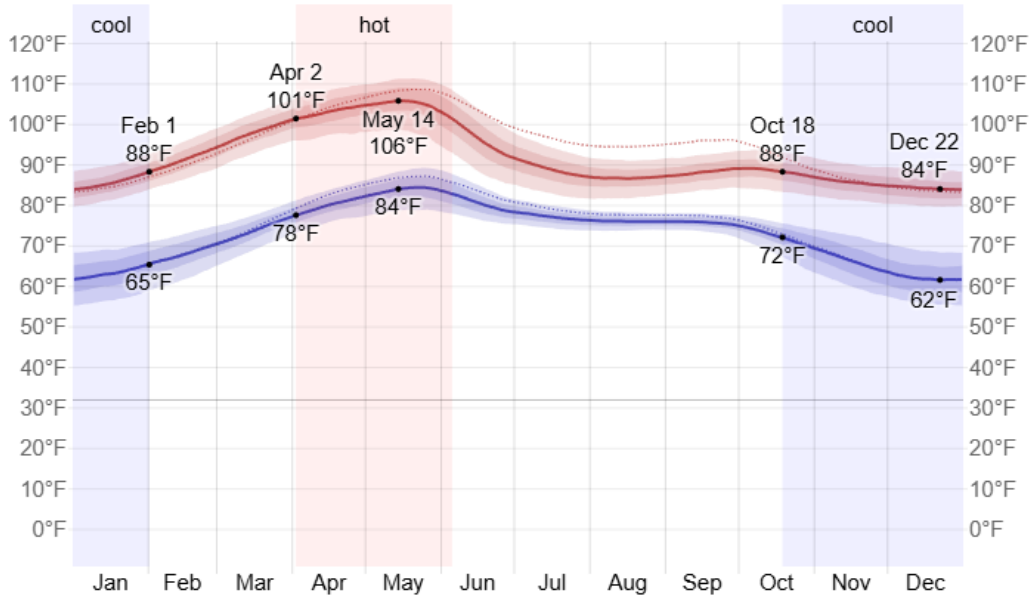


Fig 24: Temperature Graph

an average low of 62°F and high of 84°F.

Average	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
High	86°F	91°F	98°F	103°F	105°F	97°F	89°F	87°F	88°F	88°F	86°F	84°F
Temp.	75°F	80°F	87°F	92°F	95°F	88°F	83°F	81°F	82°F	81°F	77°F	74°F
Low	63°F	68°F	74°F	80°F	84°F	81°F	77°F	76°F	76°F	72°F	66°F	62°F

Table 19: Monthly Temperature Table

4.2.1.2. Average Hourly Temperature in Warangal

The figure below shows you a compact characterization of the entire year of hourly average temperatures. The horizontal axis is the day of the year, the vertical axis is the hour of the day, and the color is the average temperature for that hour and day.

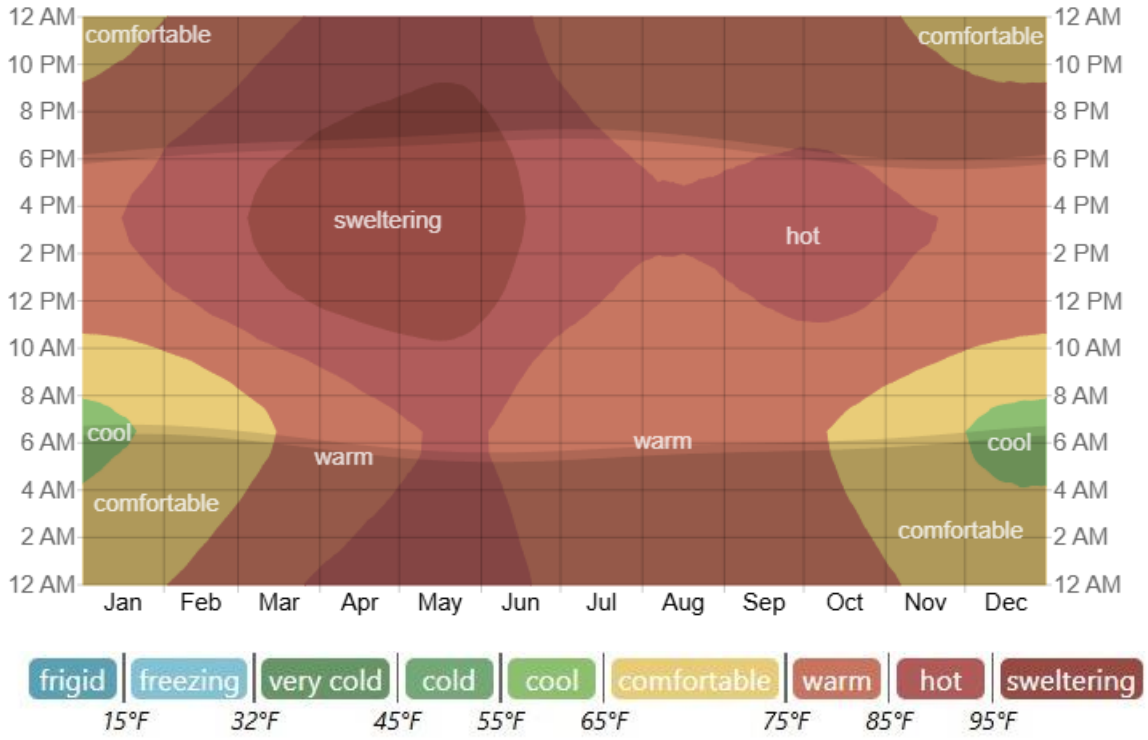


Fig 25: Average Hourly Temperature Graph

4.2.1.3. Cloud

The clearer part of the year in Warangal begins around October 11 and lasts for 7.1 months, ending around May 15. The clearest month of the year in Warangal is February, during which on average the sky is clear, mostly clear, or partly cloudy 78% of the time. The cloudier part of the year begins around May 15 and lasts for 4.9 months, ending around October 11. The

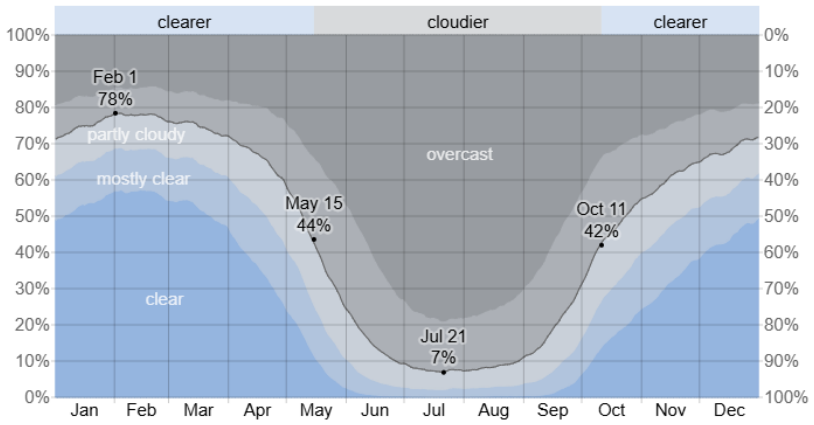


Fig 26: Cloud Graph

cloudiest month of the year in Warangal is July, during which on average the sky is overcast or mostly cloudy 92% of the time.

Fraction	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Cloudier	25%	22%	26%	34%	60%	85%	92%	91%	80%	54%	39%	31%
Clearer	75%	78%	74%	66%	40%	15%	8%	9%	20%	46%	61%	69%

Table 20: Cloud Data Table

4.2.1.4. Rainfall

The rainy period of the year lasts for 7.4 months, from April 9 to November 21, with a sliding 31-day rainfall of at least 0.5 inches. The month with the most rain in Warangal is July, with an average rainfall of 7.4 inches.

The rainless period of the year lasts for 4.6 months, from November 21 to April 9. The month with the least rain in Warangal is December, with an average rainfall of 0.1 inches.

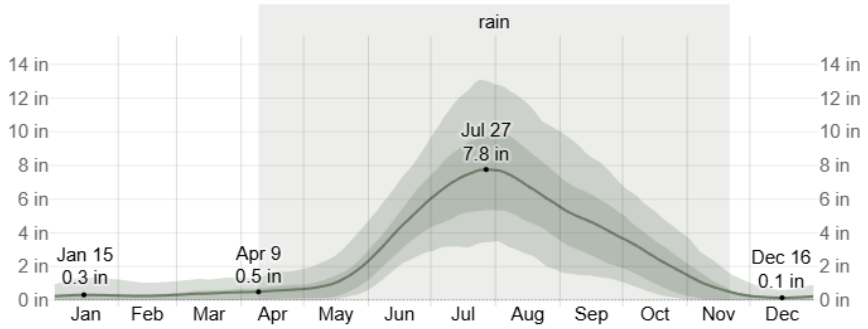


Fig 27: Rainfall Graph

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rainfall	0.3″	0.3″	0.4″	0.6″	1.1″	4.2″	7.4″	6.8″	4.7″	2.6″	0.7″	0.1″

Table 21: Monthly Rainfall Table

4.2.1.5. Humidity

Warangal experiences extreme seasonal variation in the perceived humidity. The muggier period of the year lasts for 7.8 months, from March 25 to November 17, during which time the comfort level is muggy, oppressive, or miserable at least 34% of the time. The month with the muggiest days in Warangal is August, with 30.8 days that are muggy or worse. The month with the fewest muggy days in Warangal is December, with 4.2 days that are muggy or worse.

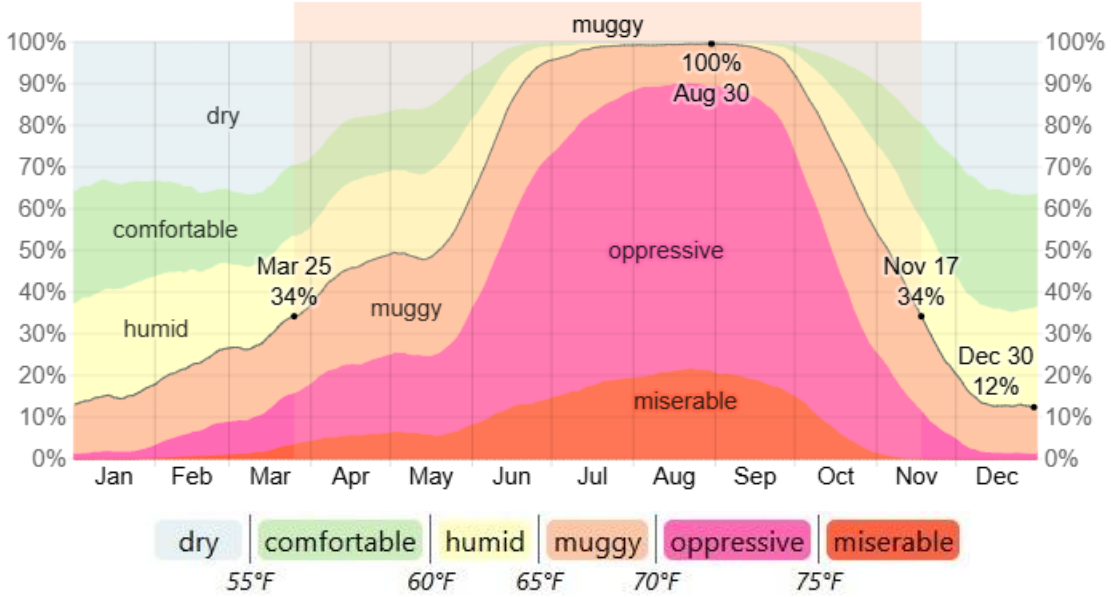


Fig 28: Humidity Graph

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Muggy days	4.7 d	6.3 d	9.5 d	13.6 d	16.1 d	25.3 d	30.4 d	30.8 d	29.3 d	22.5 d	10.7 d	4.2 d

Table 22: Monthly Humidity Table

4.2.1.6. Wind

The windier part of the year lasts for 4.4 months, from April 19 to August 31, with average wind speeds of more than 8.0 miles per hour. The windiest month of the year in Warangal is June, with an average hourly wind speed of 10.4 miles per hour. The calmer time of year lasts for 7.6 months, from August 31 to April 19. The calmest month of the year in Warangal is December, with an average hourly wind speed of 5.3 miles per hour.

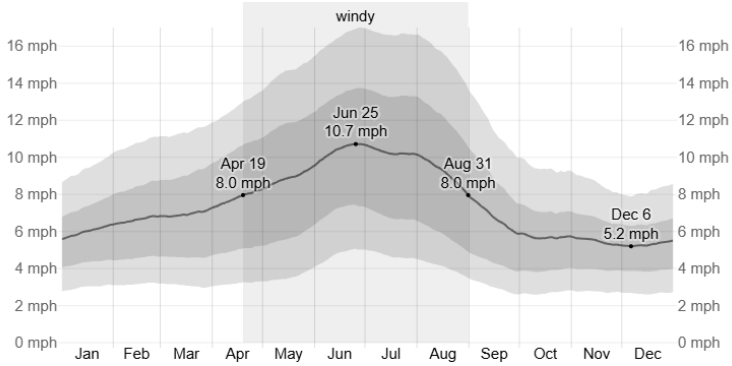


Fig 29: Wind Graph

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Windspeed (mph)	6.0	6.6	7.0	7.8	8.9	10.4	10.3	9.1	6.7	5.7	5.5	5.3

Table 23: Wind Table

4.2.1.7. Wind Direction in Warangal

The wind is most often from the west for 4.0 months, from May 25 to September 26, with a peak percentage of 86% on August 1. The wind is most often from the east for 1.8 months, from November 2 to December 28, with a peak percentage of 48% on November 21. The wind is most often from the south for 4.9 months, from December 28 to May 25, with a peak

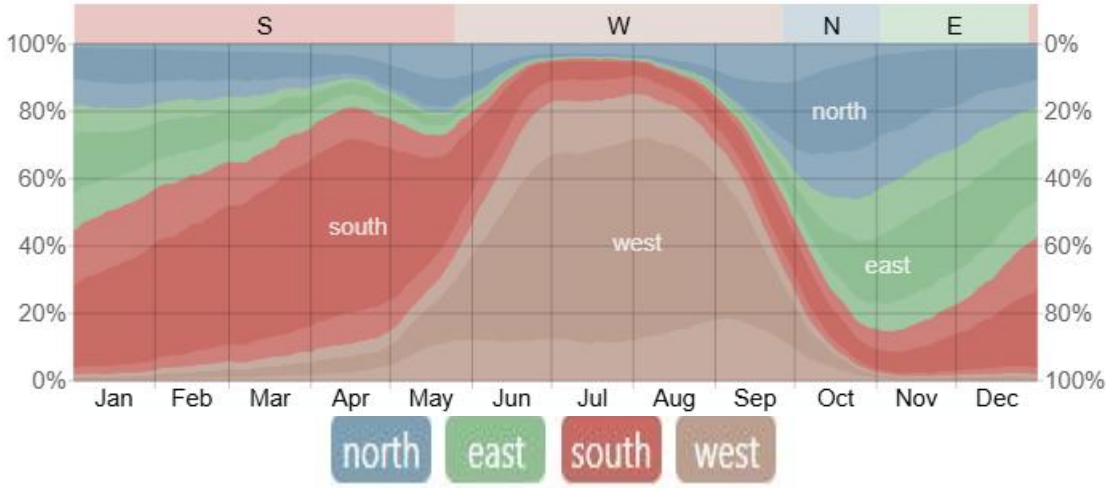


Fig 30: Wind Direction Graph

percentage of 43% on January 1.

4.2.1.8. Solar analysis

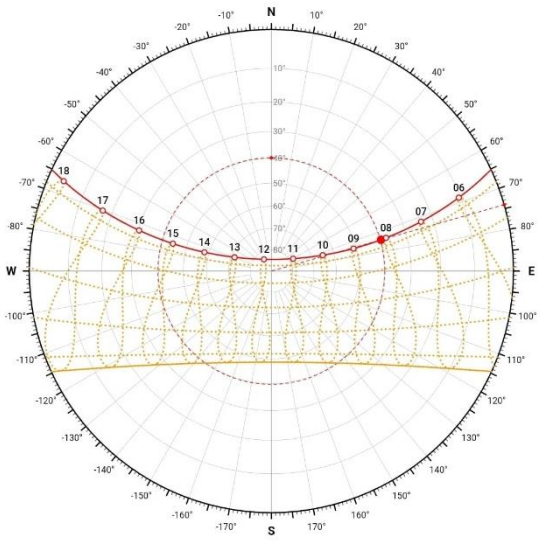


Fig 31: Sun Path

4.3. VEGETATION

Asian Palmyra Palm



Fig 32: Asian Palmyra Palm

- **Common Name:** Asian Palmyra Palm / Toddy Palm / Ice Apple Tree
- **Scientific Name:** *Borassus flabellifer*
- **Average Trunk Radius:**
    - **Radius:** ~30–50 cm (0.3–0.5 m)
    - **Diameter:** ~60–100 cm (can vary based on age and soil)
- **Average Height:**
    - **Typical Range:** 20–30 meters
    - **Mature Height:** Up to 30 meters in ideal conditions
- **Foliage Type:**
    - **Type:** Evergreen
    - **Leaf Shape:** Fan-shaped
    - **Leaf Size:** Each leaf can be 1.5–2 meters long, forming a dense crown
    - **Crown Spread:** Roughly 6–10 meters wide at maturity

Neem Tree



Fig 33: Neem Tree

Common Name: Neem Tree

- **Scientific Name:** *Azadirachta indica*
- **Region:** Common and native to **Warangal** and across the Indian subcontinent
- **Trunk Radius**: ~30 to 45 cm (diameter ~60–90 cm)
- **Height**: Around 15–20 m in mature local specimens
- **Foliage**: Evergreen compound leaves, occasionally shedding in severe drought
- **Crown Spread**: Dense, rounded canopy 10–15 m wide under open growth

CHAPTER 5

5. CASE STUDY

5.1. LIVE CASE STUDY 1: SCIENCE CITY CONVENTION CENTRE, KOLKATA

1. Project Overview

- **Project Name:** Science City Convention Centre
- **Location:** EM Bypass, Kolkata, West Bengal
- **Architects:** HCP Design, Planning and Management Pvt. Ltd.
- **Client:** National Council of Science Museums
- **Inaugurated:** December 1996
- **Plot Area:** 6 acres
- **Built-up Area:** Approx. 23,000 sq.m
- **Typology:** National-level convention facility
- **Purpose:** Seminars, exhibitions, public lectures, cultural and scientific events



Fig 34: Science City Convention Centre

2. Urban Context & Site Planning

- Located adjacent to Science City, a public science museum and one of Kolkata's key attractions.
- The site is bounded by urban roads and benefits from high visibility and accessibility.

- Vehicular and pedestrian movement is managed through landscaped forecourts and a wide central access.
- The zoning respects movement hierarchy: public → semi-public → private → service.

3. Spatial Organization

- **Main Axis:** Entry plaza → pre-function foyer → main auditorium → backstage
- **Secondary Wings:** Seminar rooms and breakout halls branch laterally
- **Support Services:** Loading docks, green rooms, kitchen, mechanical rooms placed at rear/service cores
- **Vertical Movement:** Lifts and wide staircases located centrally and at flanks

Space Type	Details
Main Auditorium	2,232 seats, divisible, raked seating, acoustically treated
Mini Auditorium	392 seats, flat floor, retractable seating
Seminar Rooms	Three halls of 100–150 capacity
Pre-function	15m wide, column-free lobby space with natural light
Service Areas	Green rooms, storage, utility cores
Ancillary	Admin offices, control rooms, pantry

Table 24: SSCC Space Detail Data

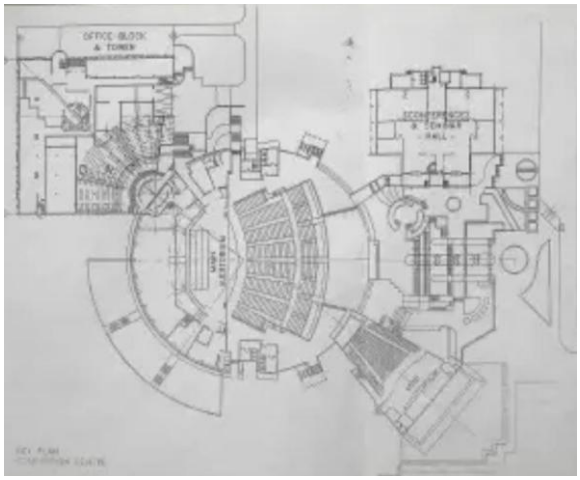


Fig 36: Auditorium plan

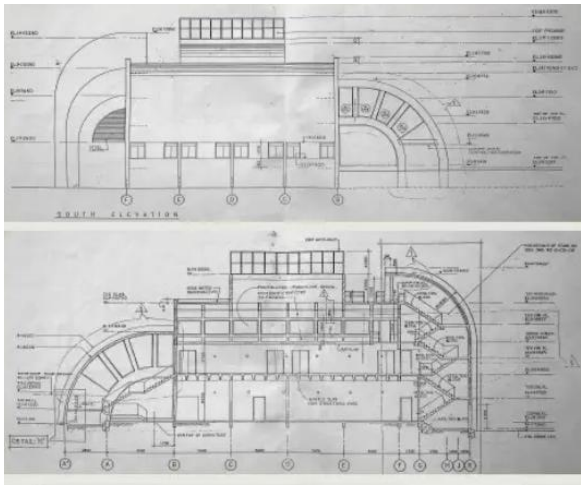


Fig 35: Seminar Hall Plan

4. Architectural Observation

- **Form Language:** Curvilinear roofscape inspired by waveforms; dynamic shell-structure gives identity

- **Facade Treatment:**
    - Glazing with fritted glass for solar control
    - Louvred panels at entry edges for wind deflection
    - Roof overhangs to shade glazed façades
- **Color Palette:** Neutral greys, blues and Aluminium cladding for an institutional-modern feel

5. Structural Systems

- **Auditorium Roof:** Long-span steel trusses with shell covering
- **Foundation:** Deep pile foundation due to Kolkata's alluvial soil
- **Framing:** RCC columns and beams; PT slabs in public areas
- **Acoustic Enclosures:** Box-in-box structure with vibration isolation in the auditorium

6. Climate Response

- **Kolkata's Climate:** Hot-humid, with heavy monsoons and high RH
- **Design Solutions:**
    - Glazing minimized on east/west sides
    - Double glazing with low-E coating
    - Roof and wall insulation for thermal comfort
    - Water bodies and landscape buffers on entry side
- **Passive Features:**
    - Orientation N–S to minimize solar gain
    - Cross ventilation in lobbies and waiting areas
    - Skylights placed to avoid direct solar entry

7. Building Services

- **HVAC:** Centrally air-conditioned zones with VAV system
- **Fire Safety:** Automated sprinkler and smoke extraction system
- **Lighting:** LED-based with dimming and daylight sensors
- **ICT/AV:** Advanced AV integration with video conferencing and translation booths

8. Landscape Design

- Formal landscape at the entrance plaza
- Stepped water features and seating steps create social interaction zones but not open anymore
- Native plant species for reduced water usage
- Paving with porous materials for stormwater infiltration

9. Sustainability Features

- **Rainwater Harvesting:** Collected from the large roof surface
- **STP & Grey Water Reuse:** For landscape irrigation and flushing
- **Solar Panels:** Installed on rooftop canopy
- **Energy Efficiency:** BMS-controlled lighting and HVAC zoning

10. Inferences

- Shell-like iconic form builds architectural identity.
- Entry sequencing is crucial: open plaza → controlled entry → dramatic volume inside.
- Program zoning should minimize functional overlaps (like seminar sound leaking into exhibition).
- Auditorium design must consider flexibility through partitions, tiering, and AV.

5.2. LIVE CASE STUDY 2: BISWA BANGLA CONVENTION CENTRE (BBCC), NEW TOWN, KOLKATA

1. Project Overview

- **Name:** Biswa Bangla Convention Centre
- **Location:** Action Area I, New Town, Kolkata, West Bengal
- **Client:** WBHIDCO (West Bengal Housing Infrastructure Development Corporation)
- **Architect:** Dulal Mukherjee & Associates
- **Built-up Area:** 56,932 sq.m
- **Site Area:** 10 acres (approx.)
- **Completed:** 2017
- **Typology:** International Convention Centre with mixed-use components

- **Project Cost:** ₹450 Crores (approx.)



Fig 37: Biswa Bangla Convention Centre

2. Urban Context & Site Planning

- Located on the **Major Arterial Road** near iconic **Kolkata Gate**.
- Surrounded by institutional hubs, upcoming 5-star hotels, and business districts of New Town.
- Designed to act as an **anchor for international MICE tourism** in East India.
- Entry forecourt designed as a symbolic civic space with water bodies, sculpture elements, and lighting.

3. Spatial Organization

The facility is divided into **functional zones** based on user type and activity:



Fig 38: BBCC Site Plan

Zone	Function
Main Auditorium Core	3,200-seat raked hall with divisible capacity, retractable walls
Exhibition Wing	Flexible open hall spaces 5,000+ sq.m for expos & fairs
Banquet Wing	4 halls of varying sizes for cultural, social & corporate events
Seminar/Breakout Rooms	Small to medium capacity (100–300 pax), modular partitions
VIP & Admin Core	Green rooms, control rooms, boardroom, and VIP lounge
Hospitality Block	100-room 4-star hotel tower (planned as PPP)

Rooftop Spaces	Banquet lawns, cafe, observation deck

Table 25: BBCC Space Detail Data

4. Design Philosophy

- **Form Development:** Inspired by Bengal's traditional weaving & crafts, the design creates a layered visual experience- where massing shifts, folds, and overlaps.
- **Cultural Integration:** The entrance murals, interior art pieces, and even wayfinding symbols subtly reflect Bengali motifs (e.g. Alpana, terracotta).

5. Architectural Observation

- **Form Language:** Bold cuboidal and angular blocks stacked to emphasize hierarchy of function
- **Materials:**
    - ACP cladding with bronze and steel tones
    - High-performance DGU (Double-glazed units)
    - U-channels and fins for shading
- **Lighting:** LED linear lighting along parapets; façade projection mapping ready
- **Roof Treatment:** Flat RCC slab in lower blocks, green roof and pergola pavilions on banquet lawn level



Fig 39: Auditorium Hall BBCC

6. Structural & Material System

- **Structure:** RCC flat slab system with post-tensioned spans in large halls
- **Auditorium Roof:** Steel space-frame with acoustic insulation panels
- **Hotel Tower:** RCC shear wall core and beam-slab construction

- **Flooring:** Vitrified tiles, granite at entries, wood-finish vinyl in halls

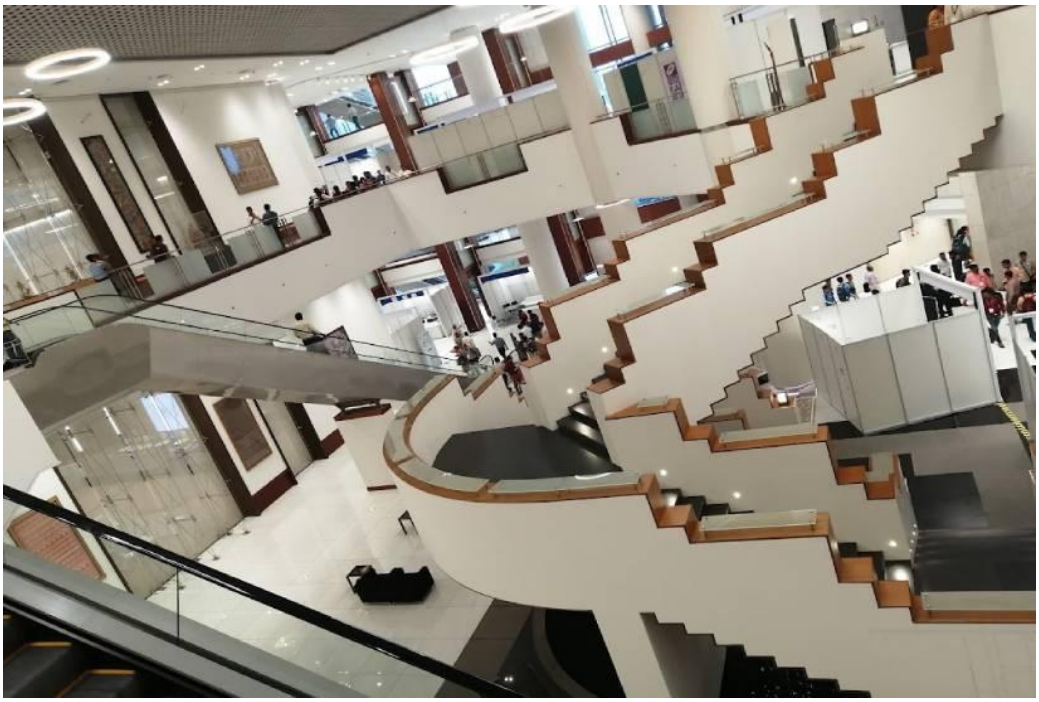


Fig 40: Interior BBCC

7. Circulation Design

- **Public Entry:** Grand ramp leading to lobby with high headroom (double-height)
- **Vertical Movement:** Escalators more than 8 lifts; separate cores for hotel, public, and VIP
- **Service Movement:** Rear entry and basement access for kitchens, logistics, and performers
- **Zoning Logic:** Public → Semi-public → Restricted (clearly delineated)
- **Universal Accessibility:** Ramps, tactile indicators, Braille signage

8. Acoustics & AV Systems

- **Auditorium:**
    - Reverberation time carefully controlled (1.3–1.5s)
    - Sound-reflective walls & absorbent ceiling
    - Advanced AV system: 4K projection, translation booths, wireless mic networks
- **Banquet/Conference:** Modular acoustics, movable partitions with acoustic seals

9. Climate Response & Sustainability

- **Kolkata Climate:** Hot-humid + high rainfall (monsoon heavy)
- **Design Measures:**
    - **Orientation:** Major fenestrations placed away from west sun
    - **Facade Fins:** Reduce glare and direct solar gain
    - **Rainwater Harvesting:** Large collection tanks under basement
    - **Solar Power:** Rooftop PV panels supplement energy
    - **STP Plant:** Greywater reused in flushing & landscape irrigation
    - **Green Roof:** At banquet terrace level to reduce urban heat island effect

10. Building Services

- **HVAC:** VRV system with zonal control and fresh air modules
- **Fire Fighting:** Multi-zonal addressable fire alarm system; pressure zones in staircases
- **Lighting:** Centralized BMS control for lighting scenes, DALI-compatible
- **Basement Parking:** 3 levels with 822 car capacity, separate exit ramps for emergency

11. Landscape & Open Space

- Landscape architects created a formal and festive interface:
    - Entry plaza with reflective pools and sculptures
    - Rooftop banquet garden (1,000+ pax capacity)
    - Peripheral trees to buffer sound and heat
    - Bio-swales integrated for stormwater management

12. Strengths & Design Takeaways

Aspect	**Observation**
Functionality	Segregated user access improves flow in high-footfall events
Flexibility	Halls can be partitioned or merged- allows multiple event types simultaneously
Sustainability	Green roof, PVs, STP, HVAC zoning- efficient performance in Kolkata's climate

Landmark Quality	Iconic design with cultural subtlety- adds identity to New Town skyline
Integration	Hotel + Rooftop banquet + exhibition: all-in-one MICE solution

Table 26: Design Inference

13. Inference

- **Stacking & Zoning:** Can solve tight site conditions- hotel above, exhibition below.
- **Landscape & Roof Use:** Open spaces like rooftop banquets enhance program flexibility.
- **User Circulation:** VIP, public, and service zones must not intersect.
- **Multi-purpose Use:** Your convention design should allow partitions + modular flexibility.
- **Acoustics First:** Plan for reverb time, soundproofing, AV from the start.

5.3. DESK APPRAISAL 1: HYDERABAD INTERNATIONAL CONVENTION CENTRE (HICC), HYDERABAD, TELANGANA

1. Project Overview

- **Project Name:** Hyderabad International Convention Centre (HICC)
- **Location:** Near HITEC City, Hyderabad, Telangana
- **Client/Developer:** Emaar-MGF (Private) in collaboration with the Government of Andhra Pradesh (at the time)
- **Operator:** Accor Hotels (Novotel Convention Centre)
- **Architect:** RMJM (UK) + Genesis Design Studio (India)
- **Built-up Area:** 32,000 sq.m
- **Year of Completion:** 2006
- **Typology:** International Convention & Exhibition Centre

- **Project Cost:** ₹250–300 Crores approx.



Fig 41: Hyderabad International Convention Centre

2. Urban Context & Site Planning

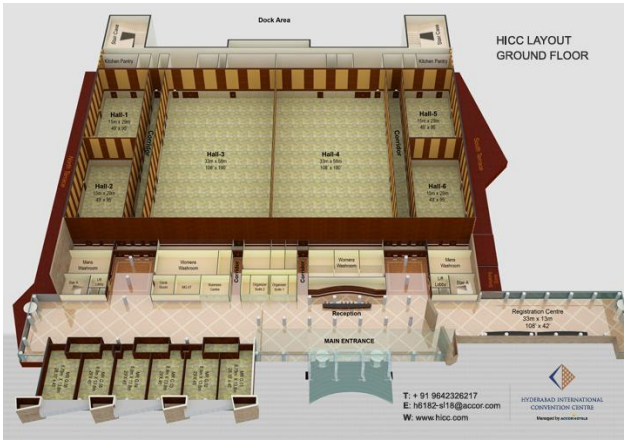
- Located adjacent to the Novotel Hotel, forming a combined hospitality-convention complex.
- Sited in the heart of HITEC City — Hyderabad's IT and business district.
- Accessible via the Outer Ring Road and well-connected to the airport.
- Planned as a central node for international business, summits, tech expos, and medical congresses.

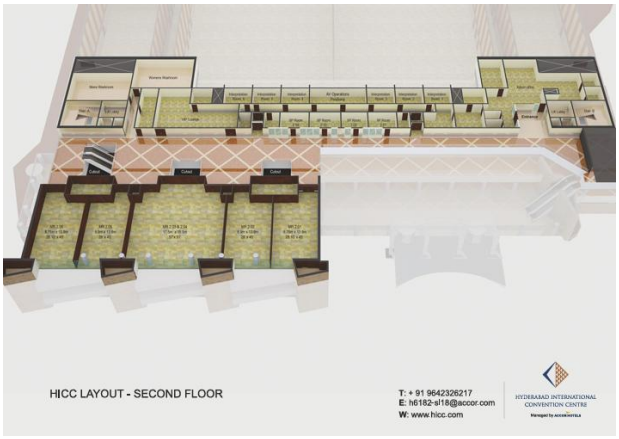
3. Spatial Organization

The building is designed for **maximum flexibility** in function and **seamless user circulation**.

Space Type	Details
Main Hall	6,500 pax (theatre-style), divisible into 6 smaller halls
Pre-function Lobby	6,480 sq.m — 3-sided daylight-filled foyer
Meeting Rooms	40+ breakout rooms and business lounges
Back-of-House	Dedicated service corridors, green rooms, pantry
VIP Areas	Private lounges, secure access
Hotel Integration	Novotel Hotel with 287 rooms directly connected to HICC

Table 27: HICC Space Detail Data





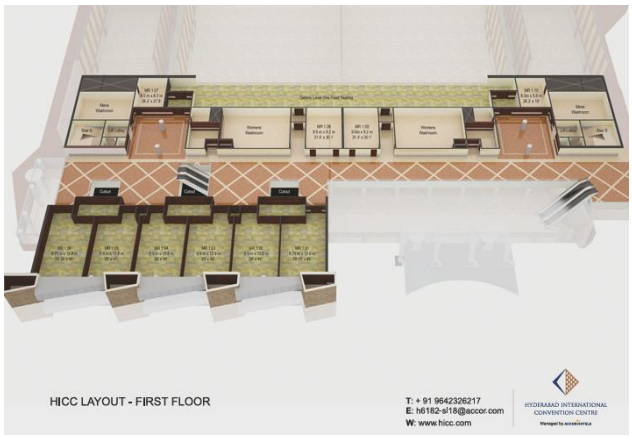


Fig 42: HICC Floor Plans

4. Design Philosophy

- **Purpose-built flexibility:** Movable acoustic partitions, column-free spans, retractable seating.
- **Global standards:** Follows ICCA and UFI guidelines for international MICE (Meetings, Incentives, Conferences, Exhibitions) facilities.
- **Cultural neutrality:** Simple, adaptable interiors suitable for global corporate, cultural, and diplomatic events.

5. Architectural Observations

- **Form:** Rectilinear volume with a dynamic roof profile and light steel structure
- **Facade:**
    - Double-glazed curtain wall system
    - Deep roof overhangs
    - Aluminium louvres for shading
- **Material Palette:**
    - Grey cladding
    - Stone flooring
    - Wood-finish paneling inside halls for acoustic treatment

6. Structural & Material System

- **Structure Type:** RCC substructure with long-span steel trusses
- **Main Hall Span:** 60m column-free using steel box trusses
- **Flooring:** High-load capacity slab for exhibition booths & vehicular access
- **Partitions:** Operable walls with STC 50+ acoustic ratings

7. Circulation

- **Public Entry:** Wide stepped plaza with canopied entry
- **VIP Access:** Side entries with security screening
- **Service Access:** At-grade rear access + basement logistics
- **Internal Movement:** Clearly zoned lobbies, escalators, elevators, and wide corridors
- **Accessibility:** Fully wheelchair accessible

8. Acoustics & AV Integration

- **Main Hall:** Designed for variable reverb time with acoustic curtains & modular panels
- **AV Systems:** Simultaneous interpretation booths, large-format LED screens, drop-down projectors
- **Lighting:** Programmable scene control, LED grid lighting for exhibitions

9. Climate Response & Sustainability

- **Hyderabad Climate:** Hot semi-arid; extreme summers
- **Envelope Design:**
    - Low solar gain DGU glazing
    - Roof insulation and deep overhangs
- **HVAC:** Centralized chiller system zoned per hall
- **Sustainable Features:**
    - Rainwater harvesting
    - STP for greywater
    - Energy-efficient equipment
    - Low-flow water fixtures

10. Building Services

- **Power Backup:** 100% generator backup for 24x7 operation
- **Fire Safety:** Sprinkler system, fire stair cores, smoke extraction zones
- **BMS:** Building Management System for HVAC, lighting, safety
- **Connectivity:** High-speed fiber-optic infrastructure

11. Strengths & Performance

Aspect	Highlight
Flexibility	Main hall can hold car expos, trade shows, concerts, or tech conferences
Integration	Seamless hotel connectivity ensures comfort for international guests
Acoustics	Tunable environment for speeches, music, or performance
Efficiency	Fast turnaround time between events due to smart zoning & service corridors
Global Recognition	Hosted events like UN summits, G20, World IT Congress

Table 28: Design Inference

12. Inference

- Modular design with operable partitions: efficient space management.

- Hotel integration boosts convention viability & comfort.
- A neutral form helps make the space universally usable across cultures.
- Technical detailing like AV, HVAC zoning, and acoustic control is vital at planning stage.
- Accommodate high-load flooring if vehicle-based exhibitions or trade expos are likely.

5.4. DESK APPRAISAL 2: QUEEN SIRIKIT NATIONAL CONVENTION CENTRE (QSNCC), BANGKOK, THAILAND

1. Project Overview

- **Project Name:** Queen Sirikit National Convention Centre (QSNCC)
- **Location:** Ratchadaphisek Road, Khlong Toei, Bangkok, Thailand
- **Client/Developer:** N.C.C. Management & Development Co., Ltd.
- **Architects:** Design 103 International (Thailand)
- **Renovated & Reopened:** 2022
- **Total Built-up Area:** 300,000 sq.m
- **Typology:** National & International Convention Centre
- **Project Cost:** US $500 million (approx.)



Fig 43: Queen Sirikit National Convention Centre

2. Urban Context & Site Planning

- Strategically located in the heart of Bangkok, adjacent to **Benjakitti Park**, and directly linked to **public metro (MRT)** via Queen Sirikit Station.

- Integrated with a **mixed-use urban precinct** that includes retail, hospitality, food courts, and outdoor recreation.
- Connected to Bangkok's green lung — giving a natural edge to a tech-savvy facility.

3. Spatial Organization

Space Type	Details
Total Function Area	78,500 sq.m (Exhibition + Convention)
Main Plenary Hall	6,000 pax capacity
Exhibition Halls	2 large halls, 45,000+ sq.m total
Breakout Rooms	50+ modular meeting rooms
Public Lobbies	Double-height, light-filled with park views
Retail Integration	Cafes, bookshops, food zones at public level
Outdoor Zones	Open plaza with water features & sculptures

Table 29: QSNCC Space Detail Data

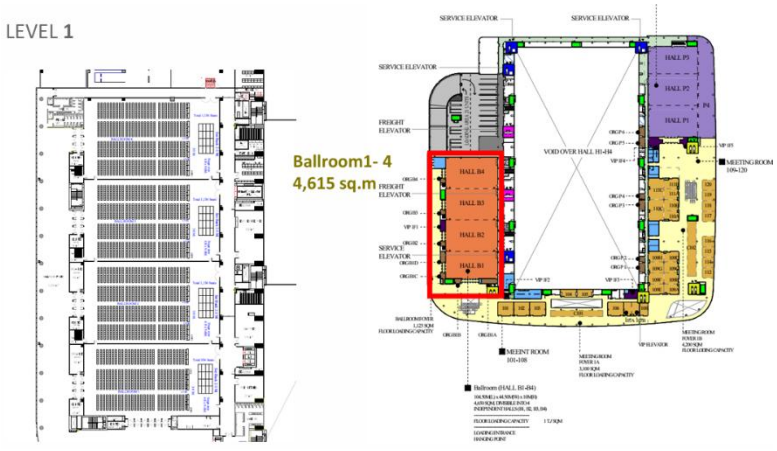


Fig 45: QSNCC Level 1 planning



Fig 44: QSNCC Planning

4. Design Philosophy

- **"Roots & Wings" Concept:** Inspired by Thai heritage (roots) and global ambition (wings).
- A blend of contemporary architecture with subtle traditional motifs in detailing and interiors.
- Focused on human-scaled public engagement, not just large-scale event hosting.

5. Architectural Observations

- **Form:** Clean rectilinear mass with floating roofline; central atrium dynamism.
- **Facade:**
    - Custom Aluminium fins with Thai floral motifs
    - High-performance glass for daylight + solar control
- **Material Palette:**
    - Natural stone
    - Warm-toned wood accents
    - Matte metal finishes
    - Traditional patterns integrated subtly in ceiling and wall details



Fig 46: QSNCC Interiors

6. Structural & Material System

- **Structure Type:** Steel-reinforced concrete core with steel trusses for long-span halls
- **Main Hall Span:** 60–70m column-free exhibition spaces
- **Roof:** Composite steel deck with suspended acoustic clouds

- **Interior Finishes:** Bamboo-laminated panels, acoustic textiles, Thai-inspired chandeliers

7. Circulation & User Experience

- **Public Access:** Grand stepped entry plaza + Metro-level entry
- **Private/VIP Access:** Separate secure entrances for dignitaries
- **Vertical Movement:** 50+ escalators, 40 elevators, wide stairwells
- **Wayfinding:** Digital signage, interactive maps, multilingual support
- **Universal Design:** Wheelchair-friendly access, inclusive washrooms

8. Acoustics & Tech Integration

- **Acoustics:** Tuned reverb with suspended baffle systems and noise-isolating partitions
- **AV Systems:**
    - 4K LED walls
    - VR/AR projection mapping zones
    - Advanced control rooms with live translation booths
- **Lighting:** Human-centric lighting with daylight-linked sensors
- **ICT:** High-speed fiber backbone and 5G ready infrastructure

9. Climate Response & Sustainability

- **Bangkok Climate:** Tropical humid - warm & wet
- **Passive Design Features:**
    - North-south orientation
    - Shaded glazing systems
    - Deep roof eaves
- **Active Systems:**
    - Smart HVAC zoning
    - Occupancy-linked lighting and cooling
- **Green Building Certification:** LEED Gold
- **Sustainability Features:**
    - 30% energy reduction via envelope and systems
    - Rainwater harvesting + greywater reuse

- Green roof with solar panels
- Native landscaping

10. Building Services

- **Power:** Grid + solar + backup generators
- **Security:** AI-enabled crowd control, RFID access
- **Fire Safety:** Water mist sprinklers, evacuation lifts, fire-retardant materials
- **BMS:** Centralized control with energy analytics dashboard

11. Strengths & Performance

Aspect	Highlight
Cultural Identity	Integrates traditional Thai patterns and metaphors in a subtle global form
Connectivity	MRT station direct link and pedestrian bridge from park
Flexibility	Modular halls with plug-and-play infrastructure for any event type
Sustainability	Green-certified, low-energy footprint + landscape integration
Inclusivity	Designed to welcome diverse users: youth, elderly, disabled, tourists

Table 30: Design Inference

12. Inference

- Cultural expression doesn't require literal forms — subtle detailing goes a long way.
- Transit integration (like metro access) makes a convention center more inclusive and accessible.
- Park adjacency gives breathing room to an otherwise intense facility.
- Embrace multi-use integration — cafes, retail, exhibition, business — in a single venue.
- Tech-readiness (AV, 5G, smart lighting) is a growing requirement in global venues.

5.5. COMPARISON TABLE

Criteria	Science City	Biswa Bangla	HICC	QSNCC
1. Location	Kolkata	Kolkata	Hyderabad	Bangkok, Thailand
2. Year of Completion	1996	2017	2006	2022 (renovated)
3. Architect	HCP Design, Planning and Management Pvt. Ltd.	WBHIDCO	RMJM	Design 103 International
4. Built-up Area	24,000 sq.m.	53,000 sq.m.	29,000 sq.m.	300,000+ sq.m.
5. Plot Area	10 acres	20 acres	15 acres	55 acres
6. Seating Capacity (Main Hall)	2,000	3,000	6,500	6,000+
7. Number of Auditoriums	2	1 main, multiple breakout	1 divisible hall	2 main halls
8. Exhibition Space	Yes	Yes	Yes	Yes
9. Breakout Rooms	Yes	Yes	Yes	Yes
10. Banquet Facilities	Moderate	High	High	High
11. Pre-function Areas	Medium	Large	Large	Extensive
12. Parking Capacity	300 cars	500+	700+	2,700+ vehicles
13. Height (Main Block)	G+3	G+4	G+2	Up to 5 levels
14. Floor-to-Floor Height	4.5m approx.	5.5m	6m	Variable (4–6m)
15. HVAC System	Centralized	Centralized (energy efficient)	Centralized with zoning	Intelligent zoning

16. Fire Safety	Yes (modern standards)	Yes + evacuation mapping	NFPA standards	International code compliant
17. Sustainability	Passive techniques	LEED Gold Certified	Energy-efficient lighting	Rainwater harvesting, solar
18. Daylighting Use	Moderate	High	Low	Extensive
19. Vertical Circulation	Lifts + Stairs	Escalators, lifts, stairs	Multiple lift cores	Escalators, lifts, ramps
20. Acoustics	Treated interiors	Acoustic wall panels	Retractable sound baffles	Multi-material absorption
21. Structural System	RCC Frame	RCC + steel	Steel truss + RCC	Steel composite
22. Connectivity	Near metro & city hub	Close to airport	Linked to tech hub	Direct MRT station access
23. Landscape Integration	Minimal	Integrated forecourts	Linked to hotel greens	Urban forest & plaza
24. Back-of-House (BOH)	Functional	Separated services	Extensive	Zoned & hidden
25. Emergency Exits	Adequate	Marked & planned	Zoned per code	Zoned with signage
26. Material Palette	Glass, concrete	Steel, glass, stone	RCC, acoustic fabric panels	Wood, glass, bronze metal
27. Façade Type	Contemporary glazing	Curtain wall system	Composite panels + glazing	Dynamic double skin façade
28. Cultural Reference	Subtle	Bengal art theme	Neutral	Thai motifs + symbolism
29. Flexibility of Spaces	Moderate	Moderate to high	High (modular halls)	High (divisible halls)
30. Integration with Adjacent Zones	Part of Science City	Near Mela grounds	Linked to Novotel Hotel	Mixed-use, urban node

31. Special Features	Modern Structure	Iconic cylindrical hall	Pillarless span 6,500 pax	Fully barrier-free design
32. Public Access/Entry Points	2	3	3	4+
33. Ancillary Services	Pantry, cloakroom	Green rooms, kitchen zones	VIP lounges, media zones	Press rooms, translation pods
34. Security Provisions	CCTV + guards	Metal detectors	RFID access + cameras	AI surveillance system
35. Technological Infrastructure	Basic	AV integrated	Full conference tech	Smart conference tech

Table 31: Comparison Table

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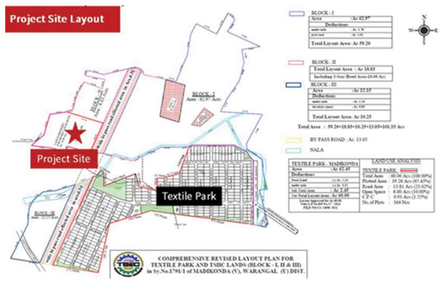
WARANGAL INTERNATIONAL CONVENTION CENTRE

INTRODUCTION

PROJECT OVERVIEW

The proposed Warangal International Convention Centre (WICC) cum 3-star hotel tender proposed by TSIIC is a multifunctional civic and business hub proposed at Madikonda, Warangal (Sy. No. 1791/1). Located opposite the Textile Park and adjacent to NH-163, the complex will host convention halls, exhibition spaces, seminar rooms, support services and hotel accommodation to position Warangal as a regional MICE (Meetings, Incentives, Conferences, Exhibitions) destination. The design strategy balances flexible programming, climate-responsive planning, and a material palette inspired by the local Kakatiya heritage.





AIM & OBJECTIVE

Aim:
Deliver an inclusive, financially viable convention complex that responds to Warangal's climate and urban context.

Objectives:
• Provide flexible, multi-scale event spaces (plenary, exhibition, seminar, and breakout rooms).
• Integrate a 150-key 3-star hotel and F&B to support events and generate revenue.
• Adopt passive and active sustainability measures (shading, daylighting, water harvesting, efficient HVAC).
• Ensure universal accessibility, clear service circulation, and operational efficiency.

NEED FOR DESIGN

Warangal's rapid industrial and IT-park development has created a gap in high-quality event infrastructure. The WICC will catalyse local employment, support the regional textile and industrial economy, and attract business tourism—bringing conferences, trade fairs, and cultural programs to the city.

Strategically sited opposite the Textile Park and with direct access from NH-163, the project leverages regional connectivity to serve both local stakeholders and inter-city delegations.

SCOPE

-Convention halls (main plenary for ~2,500 pax + divisible halls).

-Exhibition halls and flexible event floors.

-Seminar & breakout rooms, AV-enabled meeting spaces.

-Integrated 150-key 3-star hotel & F&B.

-Surface parking, landscaped courtyards, and public plaza.

Project Site Attributes	
Location	Sy. No. 1791/ 1 of Madikonda (V) Warangal (U) District
Site Area	~ 10 acres (40,468 sq. m.)
Primary Access	NH 163
Visibility & Frontage	Excellent Visibility and Frontage along abutting roads ; contiguous site
Shape, Terrain	Regular and mostly flat
Project Site Boundary	
North	Vacant land
South	Vacant land
East	NH 163 Access road
West	Dharmasagar Canal

As per Tender Document

Sl. No.	Description	Area In sq.ft	
A	**Convention Centre cum Exhibition Centre (2,500 Pax)**	**50,000**	sq. ft.
I	Convention Centre	30,000	sq. ft.
II	Small Meeting rooms	2,000	sq. ft.
III	Large Meeting rooms	5,000	sq. ft.
IV	Business Centre	5,000	sq. ft.
V	Pre-function and Circulation Spaces	8,000	sq. ft.
B	**Business Hotel (150 Keys)**	**150,000**	sq.ft
C	**Entertainment and F&B**	**50,000**	sq. ft.
	Total	**250,000**	sq. ft.
D	**Parking**	As per GO 168	Surface Parking

As per Tender Document

Statement	Plot Size Sq.mts	Proposed Road Width as per Notified Master Plan Plan/Zonal Development Plan			
		Below 12 mts.	12 to 18 mts.	18 mts. and above	Max.height in mts.
For Hyd,VSP Mpl.Corp. & Gaddiannaram G.P.	Below 200	1.00	1.25	1.25	10 (no stilt)
	200 to below 1000	1.00	1.25	1.33	15 *
	1000 to below 2000	1.25	1.33	1.50	**
	2000 & above	1.25	1.50	1.75	**
Statement	**Plot Size Sq.mts**	**Proposed Road Width as per Notified Master Plan Plan/Zonal Development Plan**			
		Below 12 mts.	**12 to 18 mts.**	**18 mts. and above**	**Max.height in mts.**
(B) For other Mpl.Corp.	Below 200	1.00	1.25	1.30	10 (no stilt)
	200 to below 1000	1.10	1.30	1.40	15 *
	1000 to below 2000	1.25	1.40	1.60	**
	2000 & above	1.25	1.50	1.75	**
	Below 200	1.00	1.25	1.33	10 (no stilt)
For Municipalities within UDA areas of HUDA, TUDA,KUDA,VUDA, VGTUDA, SSUDA	200 to below 1000	1.25	1.33	1.50	15 *
	1000 to below 2000	1.33	1.40	1.60	**
	2000 & above	1.40	1.50	1.75	**
For Gram Panchayats falling within UDA areas of HUDA, TUDA,KUDA,VUDA, VGTUDA, SSSUDA	Below 200	1.25	1.25	1.33	10 (no stilt)
	200 to below 1000	1.40	1.50	1.60	15 *
	1000 to below 2000	1.50	1.60	1.70	**
	2000 & above	1.75	1.85	2.00	**

As per GO 423

6. INSTITUTIONAL (medical), ASSEMBLY PUBLIC BUILDINGS AND PUBLIC OFFICE COMPLEXES:

1. Maximum permissible FAR : Refer relevant statement.
2. Building Requirements and setbacks upto 10 mtrs. building height.

Plot area (Sq.mts.)	Max. Cov	Setbacks for Office buildings		Setbacks for Other buildings	
		Front	Remaining sides	Front	Remaining sides
a) Below 500	As per min.building setbacks	6.00	4.50	9.00	6.00
b) 500 – 2000	50%	6.00	4.50	9.00	6.00
c) 2000 & above	1000 sq.mts. or 40% whichever is higher	6.00	4.50	9.00	6.00

(3) for above category of buildings above 10 mtrs. height:
In addition to the setbacks prescribed above there shall be an increase of 1.0 mtrs. on all sides for every increase of 3.0 mtrs. height of building above 10 mtrs.

As per GO 423

LIMITATIONS

-High initial capital costs and phased PPP delivery constraints.

-Seasonal monsoon and high summer temperatures demand robust climatic design.

-Site frontage on NH requires careful traffic and arrival planning

DESIGN APPROACH

Functional Zoning: Public → semi-public → restricted → service cores for clear flows.

Passive-First: Deep overhangs, recessed glazing, shaded courtyards, and high-thermal-mass plinths.

Flexibility: Operable walls, modular halls, adaptable MEP distribution for varied event scales.

Vernacular Integration: Use of local materials (granite, laterite, terracotta screens) to root architecture in Kakatiya tradition while meeting contemporary performance.

Landscape & Microclimate: Courtyards, water features and vegetation to cool approach and public spaces.

NOTES :

1.) THIS DRAWING IS TO BE READ IN CONJUCTION WITH DRAWING NO. : AR002, AR003 , AR004

2.) ALL DIMENSIONS ARE IN MM AND ALL LEVELS ARE IN MTS.

3.) ALL DIMENSIONS ARE STRUCTURAL DIMENSIONS UNLESS MENTIONED OTHERWISE.

4.) THE DRAWING IS TO BE READ AND NOT BE SCALED.

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1.)				
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PROJECT:
WARANGAL INTERNATIONAL CONVENTION CENTRE

GUIDE:
AR. VICKY LALRANSANGI MA'AM

DRAWING:
INTRODUCTION

NORTH:

SCALE:

PURPOSE:
FOR CONSTRUCTION

DEALT BY:
ANJALI SWAIN
211110008

CHECKED BY:
ANJALI SWAIN
211110008

REVISIONS:
A | B | C | D | E

DRG. NO.:
AR 01

SITE ANALYSIS

LOCATION



INTRODUCTION

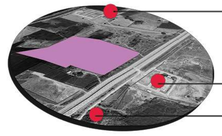
The proposed thesis project is a Convention Centre located in Warangal, Telangana, near the Textile Park area. Warangal, being a rapidly developing tier-2 city with rich cultural heritage and growing industrial importance, has been identified as a strategic location for such a facility. The project falls under the Telangana State Industrial Infrastructure Corporation (TSIIC) and the Government of Telangana's initiative to boost trade, tourism, and cultural exchange in the region. The scope of the project is to design a state-of-the-art, multi-purpose convention centre equipped to host national and international conferences, exhibitions, trade fairs, and cultural programs, while simultaneously enhancing the city's infrastructure and economic growth.

LOCATION- Sy. No. 1791/ 1 of Madikonda (V) in Warangal, Telangana, India
LATITUDE- 17.9452456
LONGITUDE- 79.4701607
SITE AREA- 40,468 Sq. M
ELEVATION- 266 M
CLIMATE DIVISION- Tropical Climate

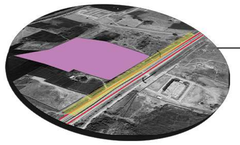
Location / Landmark	Approximate Distance from the Project Site
Textile Park	Opposite (Immediate Neighborhood)
V City Madikonda	~3.7 Km
Kazipet Junction	~9 Km
Warangal Railway Station	~20 Km
Hyderabad City	~140 Km
Hyderabad International Airport	~ 161 Km

Proximity as per Tender

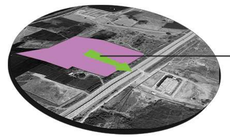
SITE CONTEXT



NEIGHBORHOOD CONTEXT
Upcoming IT Park
Flatted Factory Complex
Textile Park, Warangal



CONNECTIVITY
Road Accesibility



TYPOGRAPHY
Slope towards the Road
Sandy Loamy Soil

SITE SECTION

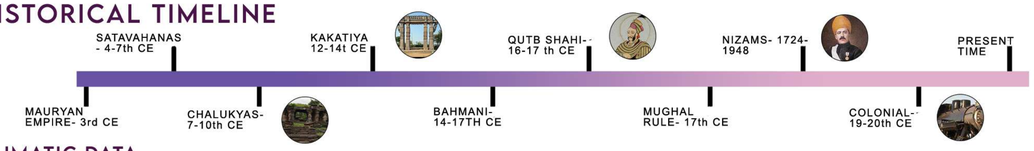


SITE SECTION X-X

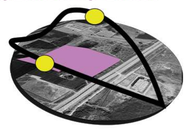


SITE SECTION Y-Y

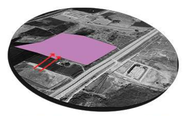
HISTORICAL TIMELINE



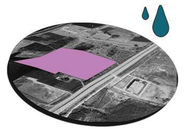
CLIMATIC DATA



Sun Path- The sun glare affecting North too



Primary Wind Flow from South



Total Rainfall is 744.8 mm

SITE PHOTOS

Site Views







Views from Site



North



East

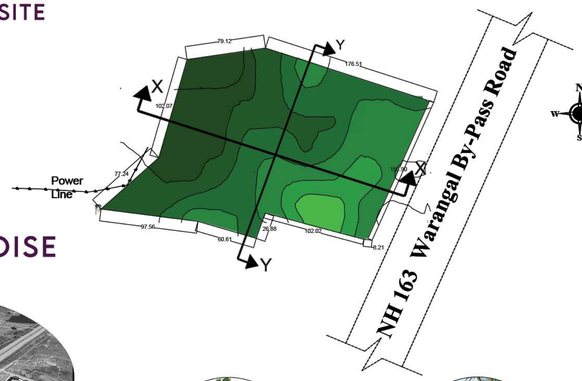


South

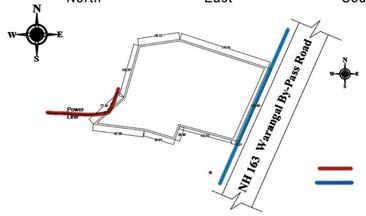


West

SITE

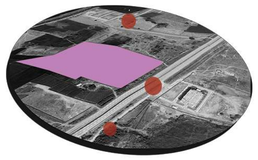


SITE UTILITIES



Low Tension Power Line
Drainage

NOISE



Noise Source

VEGETATION ON SITE



Neem Tree



Palm Tree

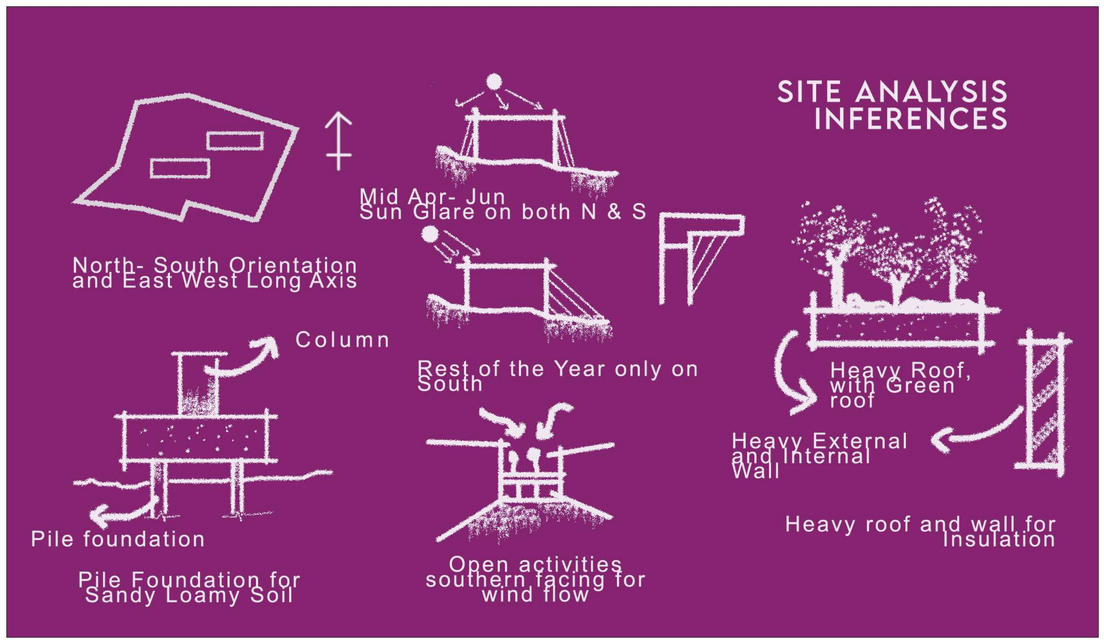


Babool Tree



Bermuda Grass

SITE ANALYSIS INFERENCES



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PROJECT:
WARANGAL INTERNATIONAL CONVENTION CENTRE

GUIDE:
AR. VICKY LALRANSANGI MA'AM

DRAWING:
SITE ANALYSIS

NORTH:

SCALE:

PURPOSE:
FOR CONSTRUCTION

DEALT BY:
ANJALI SWAIN
211110008

CHECKED BY:
ANJALI SWAIN
211110008

REVISIONS:

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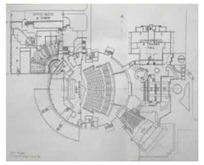
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AR 02

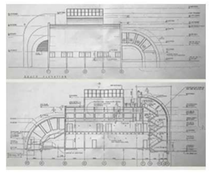
CASE STUDIES

SCIENCE CITY CONVENTION CENTRE, KOLKATA

- **Project Name:** Science City Convention Centre
- **Location:** EM Bypass, Kolkata, West Bengal
- **Architects:** HCP Design, Planning and Management Pvt. Ltd.
- **Client:** National Council of Science Museums
- **Inaugurated:** December 1996
- **Plot Area:** 6 acres
- **Built-up Area:** Approx. 23,000 sq.m
- **Typology:** National-level convention facility
- **Purpose:** Seminars, exhibitions, public lectures, cultural and scientific events







Design Features

-Located in Kolakata's Science City campus, integrated with an exhibition centre and hotel.

-Main auditorium with flexible seating, divisible into smaller halls.

-Equipped with advanced AV systems, acoustic treatment, and stage rigging.

-Landscaped forecourt with water features for passive cooling.

-Integration with public plaza to encourage community engagement.

Space Type Details

Main Auditorium 2,232 seats, divisible, raked seating, acoustically treated

Mini Auditorium 392 seats, flat floor, retractable seating

Seminar Rooms Three halls of 100–150 capacity

Pre-function 15m wide, column-free lobby space with natural light

Service Areas Green rooms, storage, utility cores

Ancillary Admin offices, control rooms, pantry





QUEEN SIRIKIT NATIONAL CONVENTION CENTRE, BANGKOK

- **Project Name:** Queen Sirikit National Convention Centre
- **Location:** Ratchadaphisek Road, Khlong Toei, Bangkok, Thailand
- **Architects:** Design 103 International
- **Client:** N.C.C. Management & Development Co., Ltd.
- **Inaugurated:** 2022 (Renovated)
- **Built-up Area:** 300,000 sq.m
- **Typology:** National & International Convention Centre



Design Features

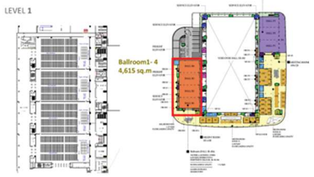
Inspired by Thai cultural motifs and royal symbolism in its interiors.

Large, flexible halls for exhibitions, trade shows, and international conferences.

Renovation introduced high-performance glass and upgraded HVAC systems.

Connected to Bangkok's MRT for public accessibility.

Incorporates landscaped gardens and water bodies for aesthetics and microclimate improvement.



Space Type Details

Total Function Area 78,500 sq.m (Exhibition + Convention)

Main Plenary Hall 6,000 pax capacity

Exhibition Halls 2 large halls, 45,000+ sq.m total

Breakout Rooms 50+ modular meeting rooms

Public Lobbies Double-height, light-filled with park views

Retail Integration Cafes, bookshops, food zones at public level

Outdoor Zones Open plaza with water features & sculptures

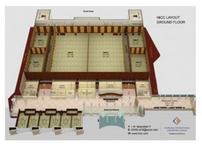
HYDERABAD INTERNATIONAL CONVENTION CENTRE

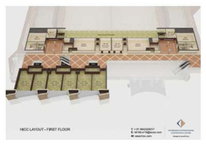
- **Project Name:** Hyderabad International Convention Centre
- **Location:** Near HITEC City, Hyderabad, Telangana
- **Architects:** RMJM (UK) + Genesis Design Studio (India)
- **Client:** Emaar-MGF (Private) in collaboration with the Government of Andhra Pradesh (at the time)
- **Inaugurated:** 2006
- **Built-up Area:** Approx. 32,000 sq.m
- **Typology:** International Convention & Exhibition Centre





Sl. No.	Criterion	Science City (Kolkata)	Biswa Bangla (New Town, Kolkata)	HICC (Hyderabad)	QSNCC (Bangkok)
1	Location / Year	Kolkata — 1996	New Town, Kolkata — 2017	Hyderabad — 2006	Bangkok — 2022
2	Client / Architect	NCSM / HCP Design	WBHIDCO / Dulal Mukherjee	Emaar-MGF / RMJM + Genesis	N.C.C. Mgmt / 103 International
3	Plot area	6 acres	10 acres	15 acres	55 acres
4	Built-up area	23,000 sq.m	56,932 sq.m	32,000 sq.m	300,000+ sq.m
5	Main hall capacity	2,232 seats	3,200 seats	6,500 seats	6,000+ seats
6	Number/divisibility of auditoria	Main + mini (392); main divisible	Main + breakouts; divisible	1 large hall, divisible into 6	2 main halls + 50+ breakouts
7	Exhibition capability	Column-free spans for multiple use	5,000+ sq.m wing	Large, flexible halls	45,000+ sq.m exhibition area
8	Seminar Rooms	Several seminar rooms (100–150 pax)	Multiple modular rooms	40+ meeting rooms	50+ meeting rooms
9	Hotel integration	No hotel	Planned 100-room hotel	Linked Novotel (287 rooms)	Integrated with mixed-use precinct
10	Parking capacity	Integrated Surface Parking with Park	3-level basement	Not quantified (ample)	2,700+ vehicles
11	Pre-function / banquet	Column-free lobby (15m wide)	Large lobbies + rooftop banquet	Large foyer (6,480 sq.m)	Extensive lobbies, rooftop banquet
12	Circulation & connectivity	Plaza entry; lifts & stairs	Forecourt plaza, escalators & lifts	Multiple lift cores; linked hotel	Direct MRT link, pedestrian bridge
13	Structural system	Steel trusses; shell roof	Space-frame & PT slabs	RCC + steel trusses, 60m span	Steel trusses, 60–70m span
14	HVAC / MEP	Centralized VAV; BMS	Centralized; BMS	Chiller system; NFPA fire systems	Zoned BMS, ICT backbone
15	Sustainability	Rainwater harvesting, STP, PVs	Green roofs, STP, energy efficient	STP, energy-efficient lighting & HVAC	LEED Gold, PVs, green roofs
16	Key design takeaway	Iconic shell, passive climate response	Cultural layering + banquet/expo stacking	Global MICE standard + hotel integration	Transit/park integration, tech-ready









Space Type Details

Main Hall 6,500 pax (theatre-style), divisible into 6 smaller halls

Pre-function Lobby 6,480 sq.m — 3-sided daylight-filled foyer

Meeting Rooms 40+ breakout rooms and business lounges

Back-of-House Dedicated service corridors, green rooms, pantry

VIP Areas Private lounges, secure access

Hotel Integration Novotel Hotel with 287 rooms directly connected to HICC

Design Features

-Pillar-free hall of 6,480 sq.m, divisible into six smaller halls via operable walls.

-Advanced teleconferencing and simultaneous translation systems.

-Direct connectivity to Novotel Hyderabad Convention Centre hotel.

-Landscaped green buffers to reduce noise and provide visual relief.

-Multiple service bays and backstage loading docks for large-scale events.







BISWA BANGLA CONVENTION CENTRE, KOLKATA

- **Project Name:** Biswa Bangla Convention Centre
- **Location:** Action Area I, New Town, Kolkata, West Bengal
- **Architects:** Dulal Mukherjee & AssociatesLtd.
- **Client:** WBHIDCO (West Bengal Housing Infrastructure Development Corporation)
- **Inaugurated:** 2017
- **Plot Area:** 10 acres
- **Built-up Area:** 56,932 sq.m
- **Typology:** International Convention Centre with mixed-use components

Space Type Details

Main Auditorium Core 3,200-seat raked hall with divisible capacity, retractable walls

Exhibition Wing Flexible open hall spaces 5,000+ sq.m for expos & fairs

Banquet Wing 4 halls of varying sizes for cultural, social & corporate events

Seminar/Breakout Rooms Small to medium capacity (100–300 pax), modular partitions

VIP & Admin Core Green rooms, control rooms, boardroom, and VIP lounge

Hospitality Block 100-room 4-star hotel tower (planned as PPP)

Rooftop Spaces Banquet lawns, cafe, observation deck

Design Features

Distinctive oval-shaped main auditorium, iconic to the New Town skyline.

Flexible interior spaces — divisible halls, banquet areas, breakout rooms.

Use of local stone and glass curtain wall for façade expression.

Large entrance forecourt doubles as an event spillover space.

Rainwater harvesting and energy-efficient lighting systems integrated.

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PROJECT:
WARANGAL INTERNATIONAL CONVENTION CENTRE

GUIDE:
AR. VICKY LALRANSANGI MA'AM

DRAWING:
CASE STUDIES

NORTH:

SCALE:

PURPOSE:
FOR CONSTRUCTION

DEALT BY:
ANJALI SWAIN
211110008

CHECKED BY:
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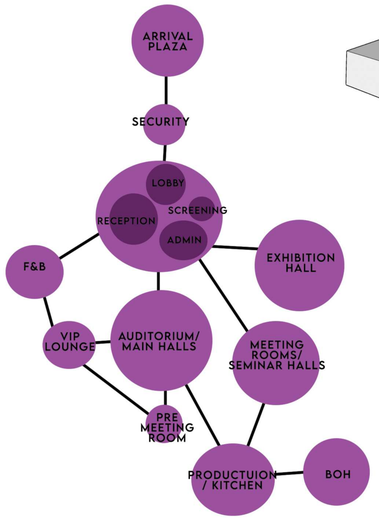
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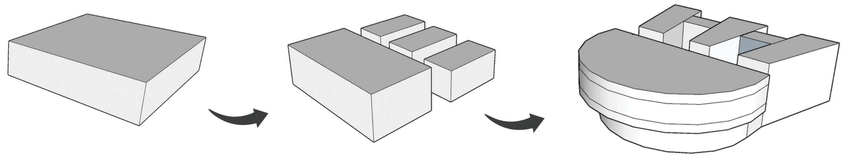
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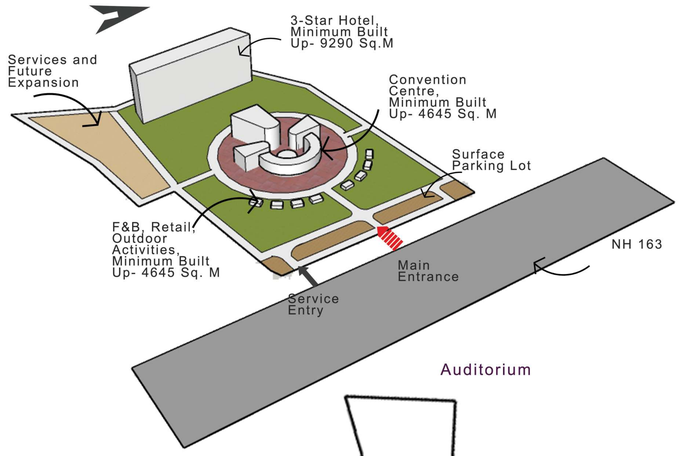
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CONCEPTUAL

INTERNAL BUBBLE DIAGRAM







VEGETATION



Palmyrus Palm tree | Neem Tree | Bermuda Grass | Babool Tree



Additional ProposedVegetation (Native)

Palash Tree | Teak

DESIGN ELEMENTS

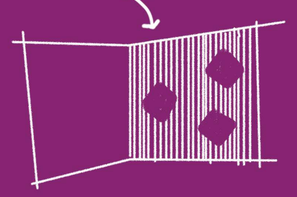


Used as decorative abacus on the coulmns of the convention centre



Motifs like Elephant and Peacock seen on wall carvings and torana of the temple architecture of warangal

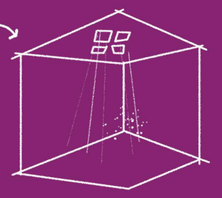
Textile like weaving design





Cheriyal Traditional Art Cladding used on facade with red laterite or sandstone to credit the culture

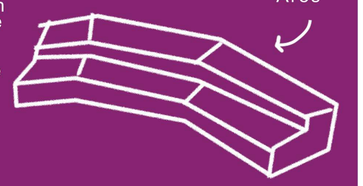
Skylight will provide an user interactive space as it will provide play of light and shadow



Pochampally Fabric geometry carved or designed on the wall and sylights in that design

Basalt is ideal for thermal insulation on Warangal Climatic Ares

Basalt stone which is common as a material in all the temple architecture, can be used as cladding on walls or the flooring for outdoor areas like the Open Air Theater



CULTURAL ELEMEMTS



Ramappa Temple



1000 Pillar Temple



Pochampally Fabric



Cheriyal Art



Warangal Fort

VERNACULAR MATERIALS



Warangal Granite



Red Laterite Stone



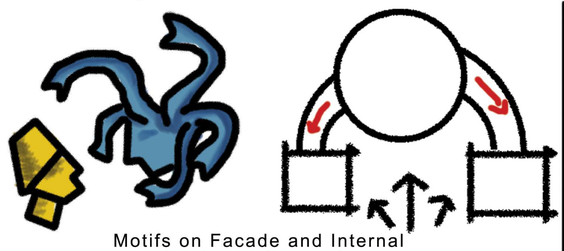
local Terracotta



Basalt Stone

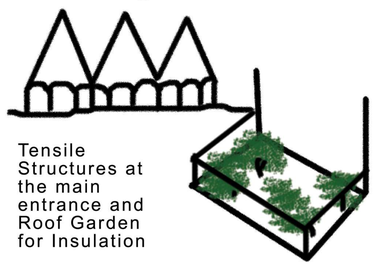
CASE STUDY ELEMENTS

Science City Convention Centre



Motifs on Facade and Internal and External Connections

Biswa Bangla Convention Centre



Tensile Structures at the main entrance and Roof Garden for Insulation

Queen Sirikit Convention Centre



Skylights at main seminar areas for daylight utilisation

Hyderabad International Convention Centre



Large column free spaces for halls and large gathering areas

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PROJECT:
WARANGAL INTERNATIONAL CONVENTION CENTRE

GUIDE:
AR. VICKY LALRANSANGI MA'AM

DRAWING:
CONCEPT

NORTH:

SCALE:

PURPOSE:
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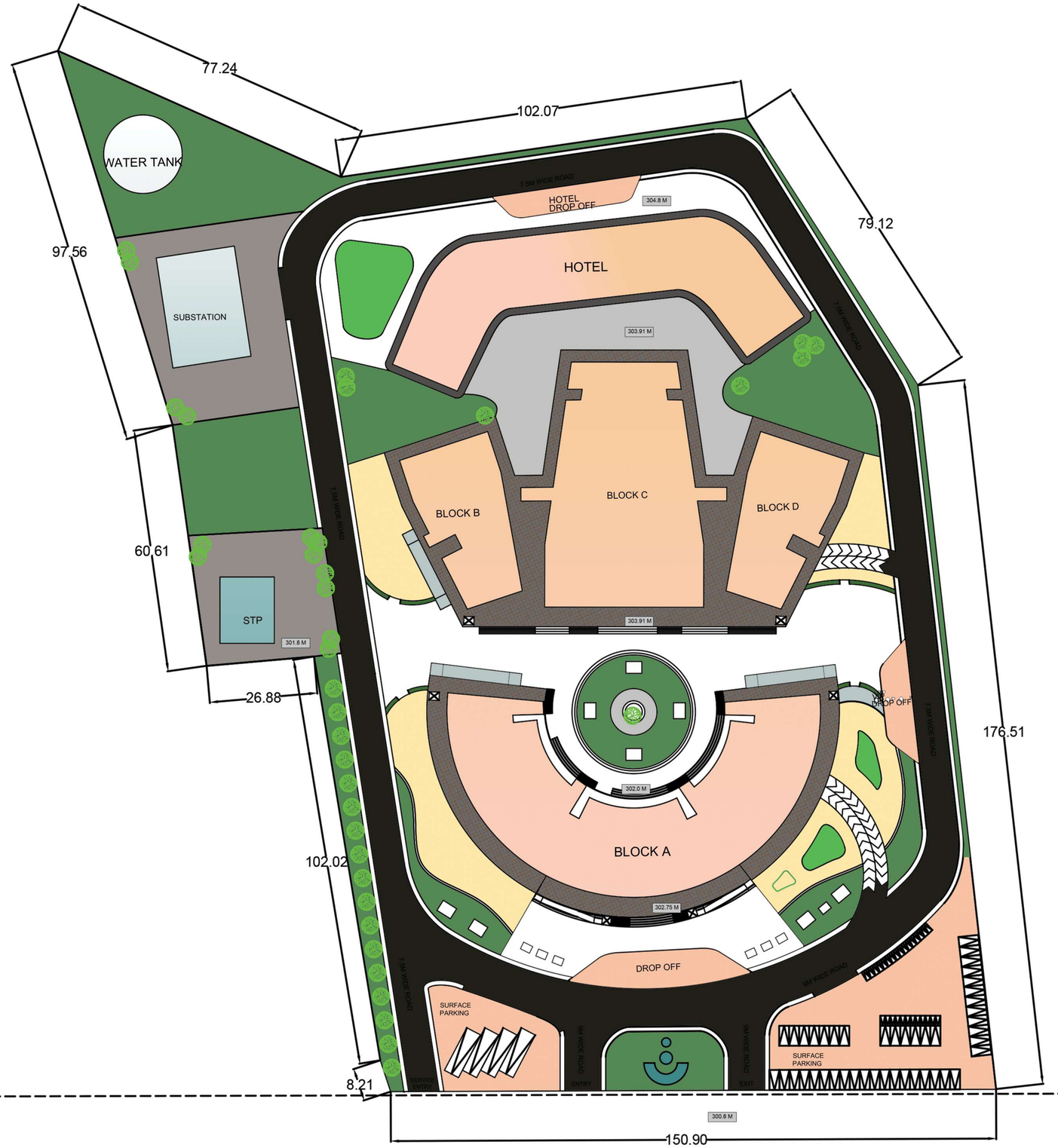
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PROJECT:
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GUIDE:
AR. VICKY LALRANSANGI MA'AM

DRAWING:
SITE PLAN

NORTH:

SCALE:
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PURPOSE:
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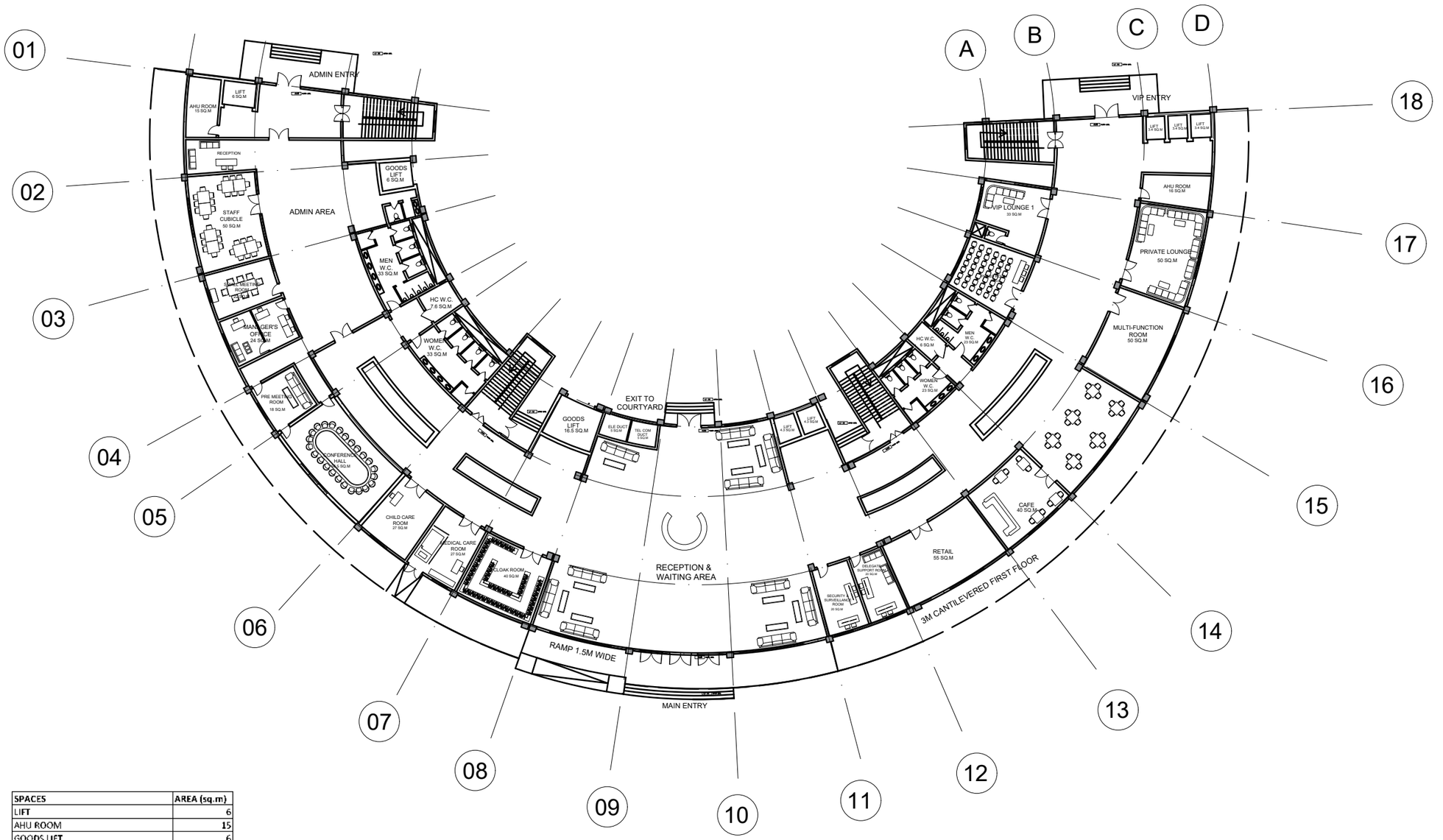
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DRG. NO.:
AR 05



SPACES	AREA (sq.m)
LIFT	6
AHU ROOM	15
GOODS LIFT	6
STAFF CUBICLE	50
SMALL MEETING ROOM	22
MEN W.C	33
MANAGER'S OFFICE	24
HC W.C	7.6
PRE MEETING	18
WOMEN W.C	33
CONFERENCE HALL	56.5
CHILD CARE ROOM	27
GOODS LIFT	16.6
MEDICAL CARE ROOM	27
CLOAK ROOM	40
ELEC DUCT	5
TELE COM DUCT	5
LIFT	4.3
LIFT	4.3
SECURITY SURVEILLANCE ROOM	20
DELEGATE SUPPORT ROOM	20
RETAIL	55
CAFÉ	40

WOMEN W.C	23
HC W.C	8
MEN W.C	23
MULTI-FUNCTON ROOM	50
PRESS ROOM	33
PRIVATE LOUNGE	50
VIP LOUNGE 1	33
AHU ROOM	16
LIFT	3.4
LIFT	3.4
LIFT	3.4

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PROJECT:
WARANGAL INTERNATIONAL CONVENTION CENTRE

GUIDE:
AR. VICKY LALRANSANGI MA'AM

DRAWING:
BLOCK A- GROUND FLOOR

NORTH:

SCALE:
1:200

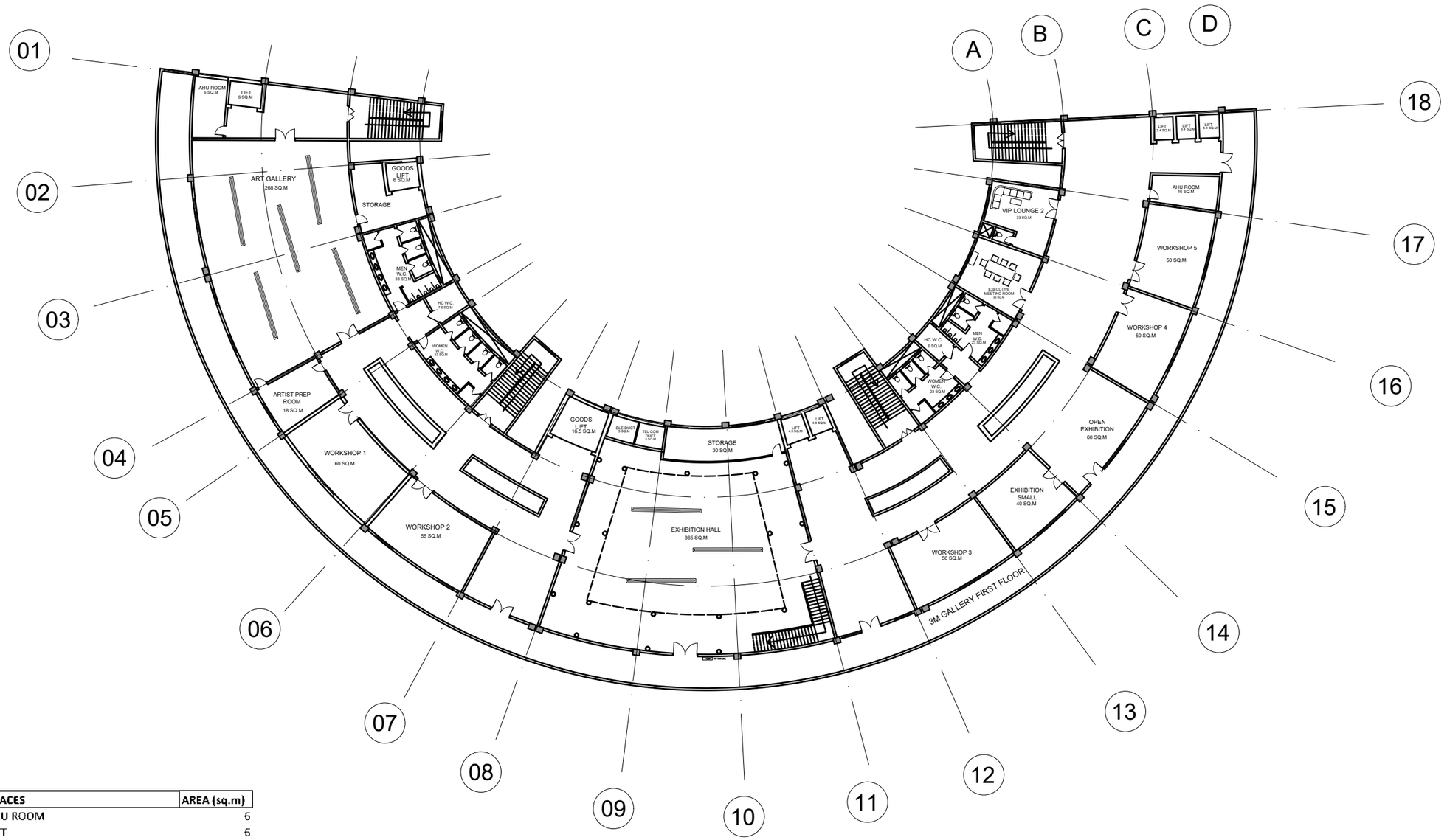
PURPOSE:
FOR CONSTRUCTION

DEALT BY:
ANJALI SWAIN
211110008

CHECKED BY:
ANJALI SWAIN
211110008

REVISIONS:
A B C D E

DRG. NO.:
AR 06



SPACES	AREA (sq.m)
AHU ROOM	6
LIFT	6
ART GALLERY	268
STORAGE	30
GOODS LIFT	6
MEN W.C	33
HC W.C	7.6
WOMEN W.C	33
ARTIST PREP ROOM	18
WORKSHOP 1	60
WORKSHOP 2	56
GOODS LIFT	16.5
ELEC DUCT	5
TELE COM DUCT	5
STORAGE	30
EXHIBITION HALL	365
LIFT	4.3
LIFT	4.3
WORKSHOP 3	56
WOMEN W.C	23
HC W.C	6
MEN W.C	23
EXHIBITION HALL	40
OPEN EXHIBITION	60
EXECUTIVE MEETING ROOM	33
WORKSHOP 4	50
WORKSHOP 5	50
VIP LOUNGE 2	33
AHU ROOM	16
LIFT	3.4
LIFT	3.4
LIFT	3.4

NOTES :

1.) THIS DRAWING IS TO BE READ IN CONJUCTION WITH DRAWING NO. : AR002, AR003 , AR004

2.) ALL DIMENSIONS ARE IN MM AND ALL LEVELS ARE IN MTS.

3.) ALL DIMENSIONS ARE STRUCTURAL DIMENSIONS UNLESS MENTIONED OTHERWISE.

4.) THE DRAWING IS TO BE READ AND NOT BE SCALED.

5.) FOR STRUCTURAL DETAILS, REFER DRAWING NO.

6.) FOR GENERAL NOTES REFER DRAWING NO.

7.) IN CASE OF ANY DISCREPANCY IT SHOULD BE BROUGHT TO THE NOTICE OF THE ARCHITECT PRIOR TO CONSTRUCTION AT THE SITE.

8.) THIS DRAWING HAS NOT BEEN PUBLISHED AND IS THE SOLE PROPERTY OF VITH SEM ARCHITECTURE AND IS ISSUED TO THE PARTY FOR THE SPECIFIC PURPOSE AS STATED IN THE AGREEMENT AND IT SHALL NOT BE REPRODUCED, COPIED, LENT OR OTHERWISE DISPOSED OFF DIRECTLY OR INDIRECTLY NOT USED FOR ANY OTHER PURPOSE OTHER THAN FOR WHICH IT IS FURNISHED.

PRINTS :

PRINTS ISSUED TO:	NO. OF PRINTS:	DATE:	REMARKS:

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PROJECT:
WARANGAL INTERNATIONAL CONVENTION CENTRE

GUIDE:
AR. VICKY LALRANSANGI MA'AM

DRAWING:
BLOCK A- FIRST FLOOR

NORTH:

SCALE:
1:200

PURPOSE:
FOR CONSTRUCTION

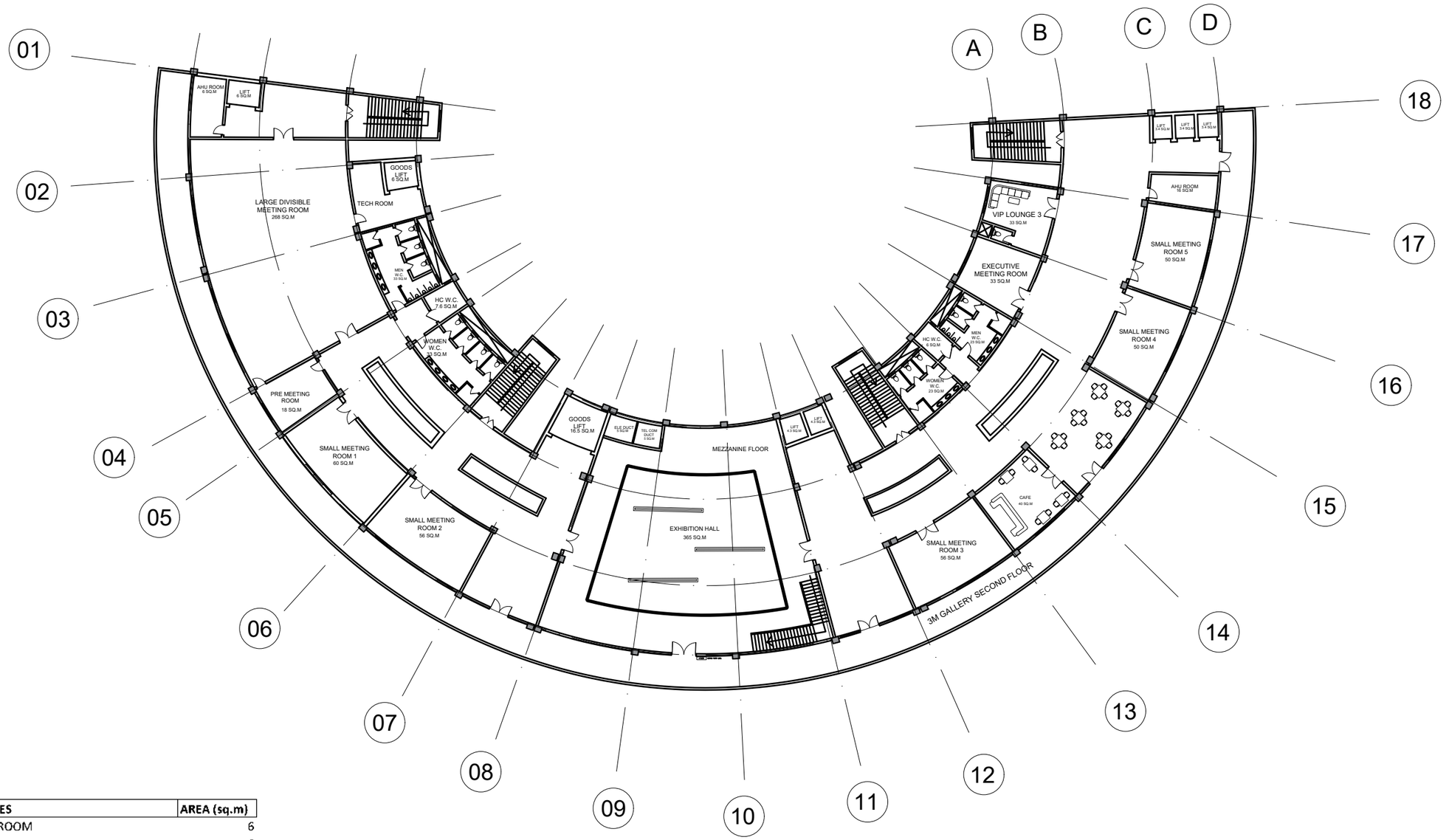
DEALT BY:
ANJALI SWAIN
211110008

CHECKED BY:
ANJALI SWAIN
211110008

REVISIONS:

A	B	C	D	E

DRG. NO.:
AR 06A



SPACES	AREA (sq.m)
AHU ROOM	6
LIFT	6
LARGE DIVISIBLE MEETING ROOM	268
GOODS LIFT	6
TECH ROOM	25
MEN W.C	33
HC W.C	7.6
WOMEN W.C	33
PRE MEETING ROOM	18
SMALL MEETING ROOM 1	60
SMALL MEETING ROOM 2	56
GOODS LIFT	16.5
ELEC DUCT	5
TELE COM DUCT	5
EXHIBITION HALL	365
LIFT	4.3
LIFT	4.3
SMALL MEETING ROOM 3	56
WOMEN W.C	23
HC W.C	6
MEN W.C	23

CAFÉ	40
EXECUTIVE MEETING ROOM	33
SMALL MEETING ROOM 4	50
SMALL MEETING ROOM 5	50
VIP LOUNGE 3	33
AHU ROOM	16
LIFT	3.4
LIFT	3.4
LIFT	3.4

NOTES :

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REVISION:

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PROJECT:
WARANGAL INTERNATIONAL CONVENTION CENTRE

GUIDE:
AR. VICKY LALRANSANGI MA'AM

DRAWING:
BLOCK A- SECOND FLOOR

NORTH:

SCALE:
1:200

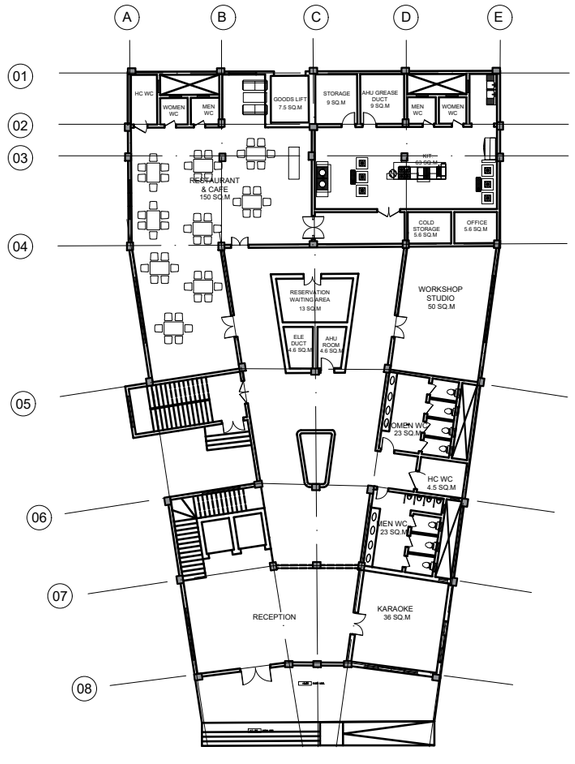
PURPOSE:
FOR CONSTRUCTION

DEALT BY:
ANJALI SWAIN
211110008

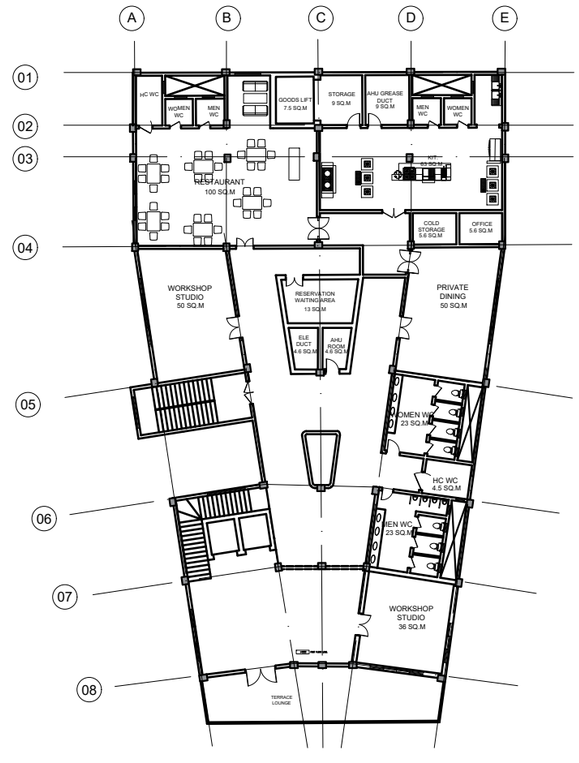
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ANJALI SWAIN
211110008

REVISIONS:
A | B | C | D | E

DRG. NO.:
AR 06B



GROUND FLOOR



FIRST FLOOR

SPACES	AREA (sq.m)
RECEPTION	72
KARAOKE	36
MEN WC	23
HC WC	4.5
WOMEN WC	23
ELEC DUCT	4.6
AHU ROOM	4.6
RESERVATION WAITING AREA	13
WORKSHOP STUDIO	50
COLD STORAGE	5.6
OFFICE	5.6
KITCHEN	63
RESTAURANT & CAFÉ	150
GOODS LIFT	7.5
STORAGE	9
AHU GREASE DUCT	9
HC WC RESTUARANT	4.6
WOMEN WC RESTAURANT	3
MEN WC RESTAURANT	3
MEN WC KITCHEN	3
WOMEN WC KITCHEN	3

SPACES	AREA (sq.m)
TERRACE LOUNGE	50
WORKSHOP STUDIO	36
MEN WC	23
HC WC	4.5
WOMEN WC	23
ELEC DUCT	4.6
AHU ROOM	4.6
RESERVATION WAITING AREA	13
WORKSHOP STUDIO	50
PRIVATE DINING	50
COLD STORAGE	5.6
OFFICE	5.6
RESTAURANT	100
KITCHEN	63
AHU GREASE DUCT	9
STORAGE	9
GOOD LIFT	7.5
HC WC RESTUARANT	4.6
WOMEN WC RESTAURANT	3
MEN WC RESTAURANT	3
MEN WC KITCHEN	3
WOMEN WC KITCHEN	3

NOTES :

1.) THIS DRAWING IS TO BE READ IN CONJUCTION WITH DRAWING NO. : AR002, AR003 , AR004

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PROJECT:
WARANGAL INTERNATIONAL CONVENTION CENTRE

GUIDE:
AR. VICKY LALRANSANGI MA'AM

DRAWING:
BLOCK B- FLOOR PLANS

NORTH:

SCALE:
1:200

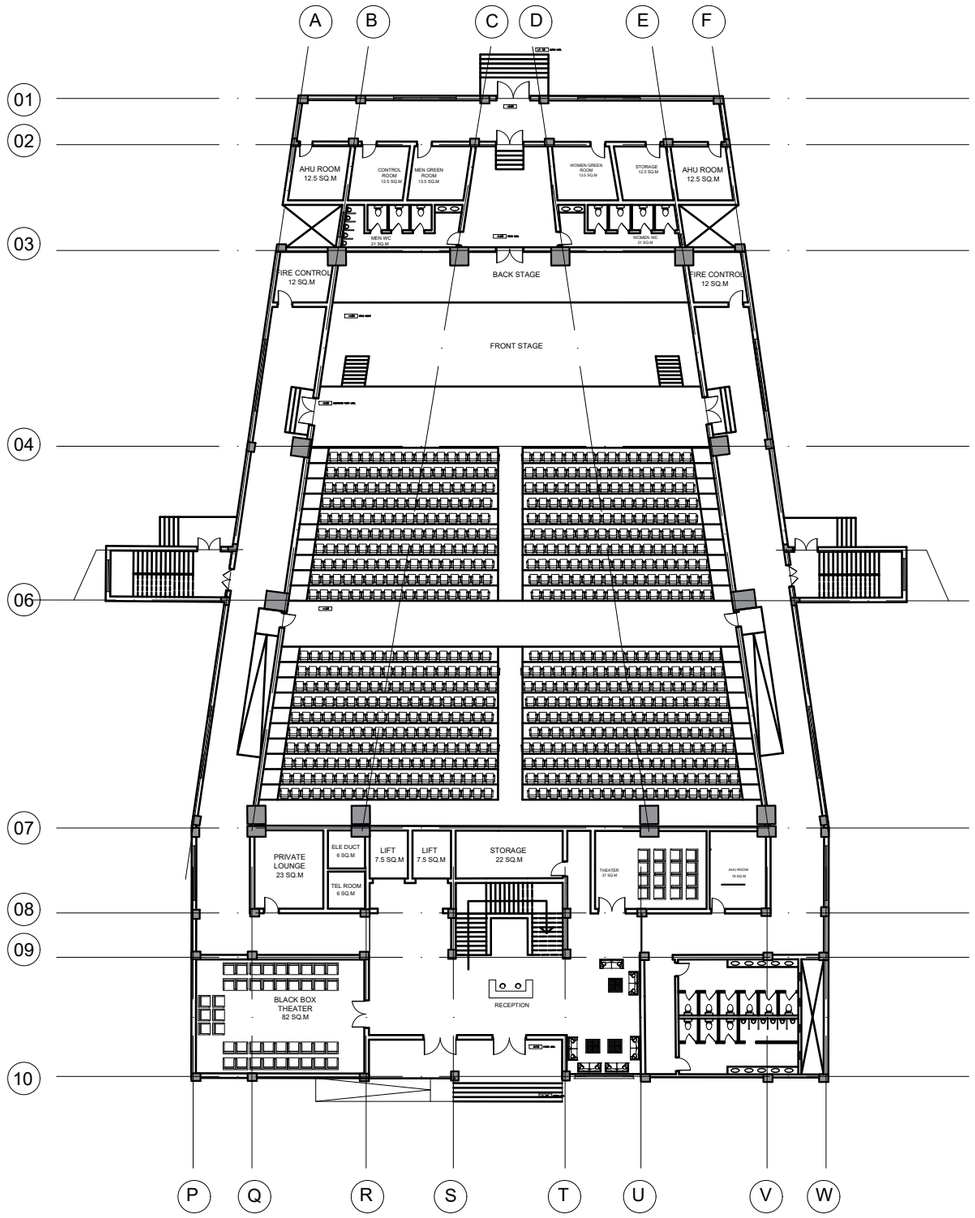
PURPOSE:
FOR CONSTRUCTION

DEALT BY:
ANJALI SWAIN
211110008

CHECKED BY:
ANJALI SWAIN
211110008

REVISIONS:
A | B | C | D | E

DRG. NO.:
AR 07



SPACES	AREA (sq.m)
RECEPTION	144
BLACK BOX THEATER	82
THEATER	37
AHU ROOM	18
STORAGE	22
LIFT	7.5
LIFT	7.5
ELEC DUCT	6
TELE ROOM	6
PRIVATE LOUNGE	23
AUDITORIUM	970
FIRE CONTROL	12
FIRE CONTROL	12
MEN WC	21
WOMEN WC	21
AHU ROOM	12.5
CONTROL ROOM	12.5
MEN GREEN ROOM	13.5
WOMEN GREEN ROOM	13.5
STORAGE	12.5
AHU ROOM	12.5

NOTES :

1.) THIS DRAWING IS TO BE READ IN CONJUCTION WITH DRAWING NO. : AR002, AR003 , AR004

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PROJECT:

WARANGAL INTERNATIONAL CONVENTION CENTRE

GUIDE:

AR. VICKY LALRANSANGI MA'AM

DRAWING:

BLOCK C- GROUND FLOOR PLANS

NORTH:

SCALE:

1:200

PURPOSE:

FOR CONSTRUCTION

DEALT BY:

ANJALI SWAIN
211110008

CHECKED BY:

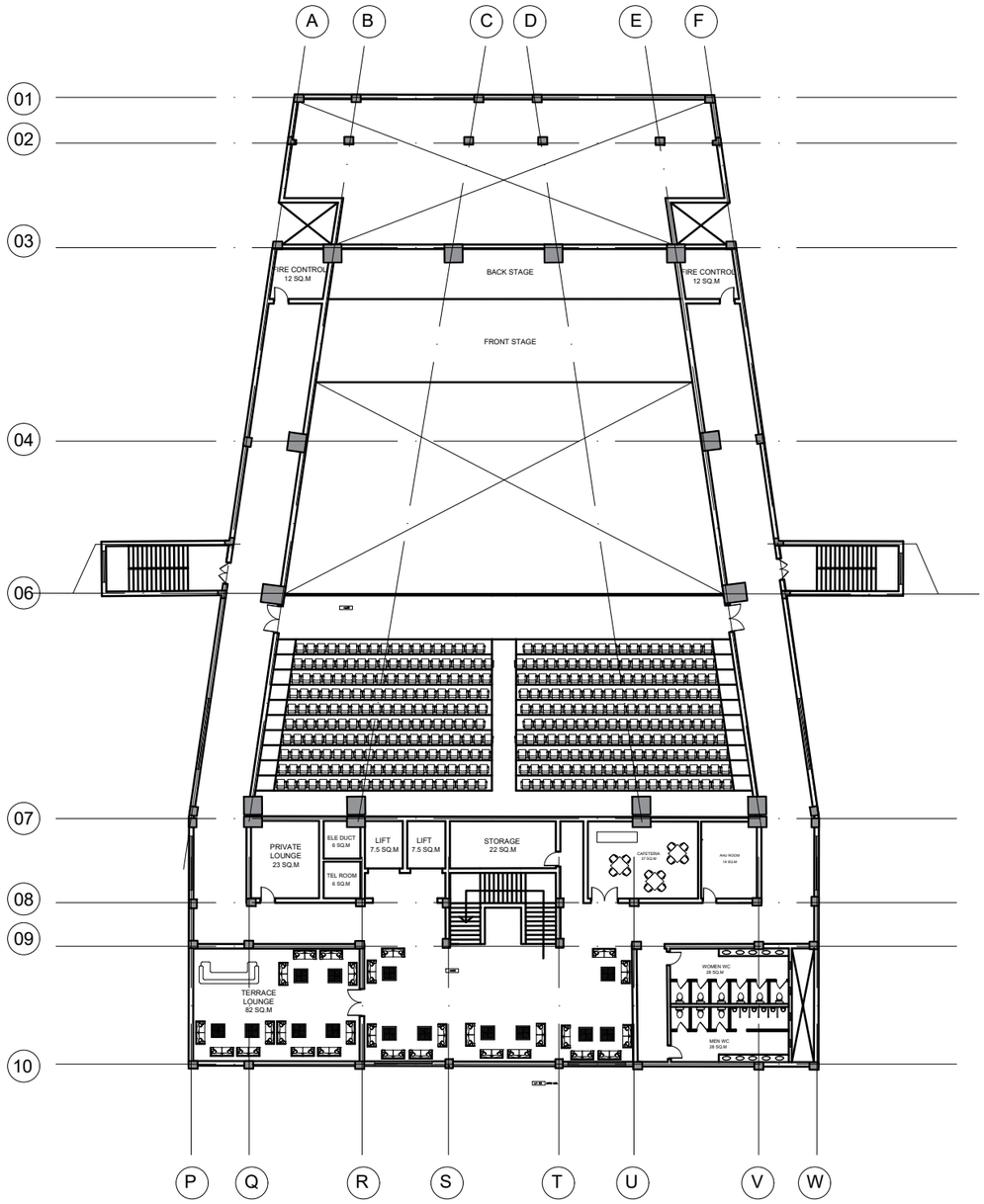
ANJALI SWAIN
211110008

REVISIONS:

A	B	C	D	E

DRG. NO.:

AR 08



SPACES	AREA (sq.m)
TERRACE LOUNGE	82
MEN WC	28
WOMEN WC	28
AHU ROOM	18
CAFETERIA	37
STORAGE	22
LIFT	7.5
LIFT	7.5
ELEC DUCT	6
TELE ROOM	6
PRIVATE LOUNGE	23
AUDITORIUM	456
FIRE CONTROL	12
FIRE CONTROL	12

NOTES :

1.) THIS DRAWING IS TO BE READ IN CONJUCTION WITH DRAWING NO. : AR002, AR003 , AR004

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PROJECT:
WARANGAL INTERNATIONAL CONVENTION CENTRE

GUIDE:
AR. VICKY LALRANSANGI MA'AM

DRAWING:
BLOCK C- FIRST FLOOR PLANS

NORTH:

SCALE:
1:200

PURPOSE:
FOR CONSTRUCTION

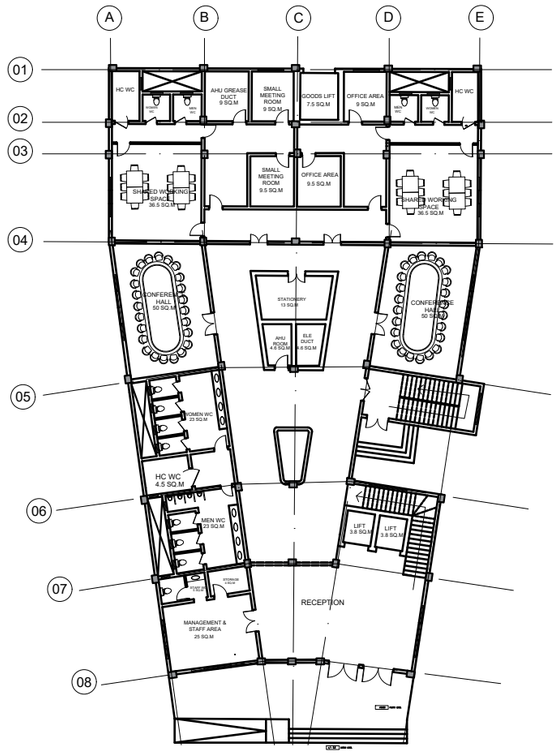
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ANJALI SWAIN
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ANJALI SWAIN
211110008

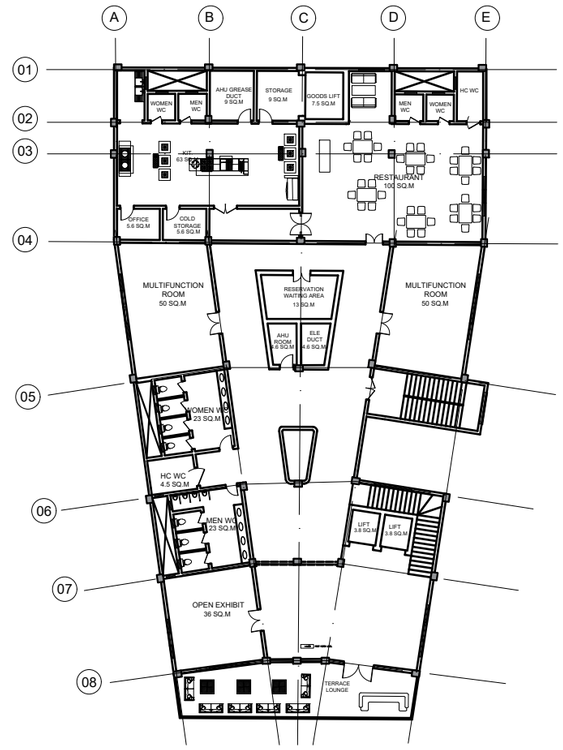
REVISIONS:

A	B	C	D	E

DRG. NO.:
AR 08A



GROUND FLOOR



FIRST FLOOR

SPACES	AREA (sq.m)
RECEPTION	72
MANAGEMENT & STAFF AREA	25
STAFF WC	5
STORAGE	4
MEN WC	23
HC WC	4.5
WOMEN WC	23
LIFT	3.8
LIFT	3.8
AHU ROOM	4.6
ELEC DUCT	4.6
STATIONERY	13
CONFERENCE HALL	50
CONFERENCE HALL	50
SHARED WORKING SPACE	36.5
SHARED WORKING SPACE	36.5
SMALL MEETING ROOM	9.5
OFFICE AREA	9.5
HC WC OFFICE	4.6
WOMEN WC OFFICE	3
MEN WC OFFICE	3
AHU GREASE DUCT	9
SMALL MEETING ROOM	9
GOODS LIFT	7.5
OFFICE AREA	9
MEN WC OFFICE	3
WOMEN WC OFFICE	3
HC WC OFFICE	4.6

SPACES	AREA (sq.m)
TERRACE LOUNGE	50
OPEN EXHIBIT	36
LIFT	3.8
LIFT	3.8
MEN WC	23
HC WC	4.5
WOMEN WC	23
AHU ROOM	4.6
ELEC DUCT	4.6
RESERVATION WAITING AREA	13
MULTIFUCTION ROOM	50
MULTIFUCTION ROOM	50
KITCHEN	63
COLD STORAGE	5.6
OFFICE	5.6
RESTAURANT	100
AHU GREASE DUCT	9
STORAGE	9
GOODS LIFT	7.5
MEN WC RESTAURANT	3
WOMEN WC RESTAURANT	3
HC WC RESTAURANT	4.6
MEN WC KITCHEN	3
WOMEN WC KITCHEN	3

NOTES :

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PROJECT:

WARANGAL INTERNATIONAL CONVENTION CENTRE

GUIDE:

AR. VICKY LALRANSANGI MA'AM

DRAWING:

BLOCK D- FLOOR PLANS

NORTH:

SCALE:

1:200

PURPOSE:

FOR CONSTRUCTION

DEALT BY:

ANJALI SWAIN
211110008

CHECKED BY:

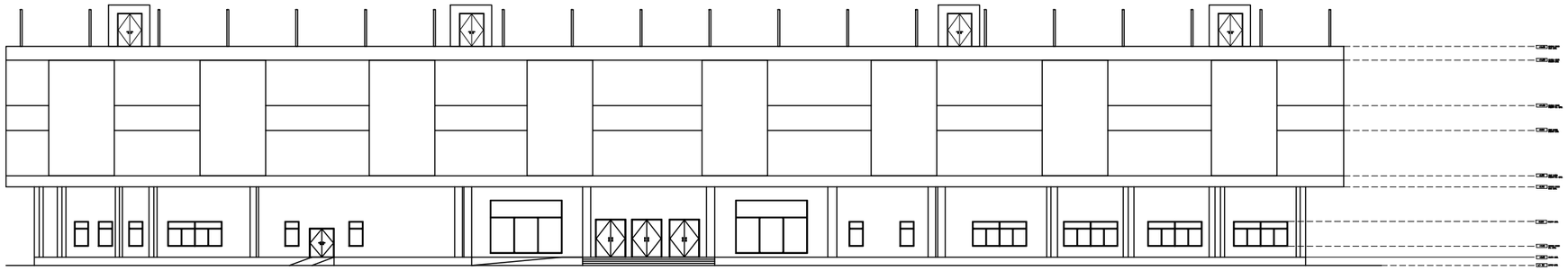
ANJALI SWAIN
211110008

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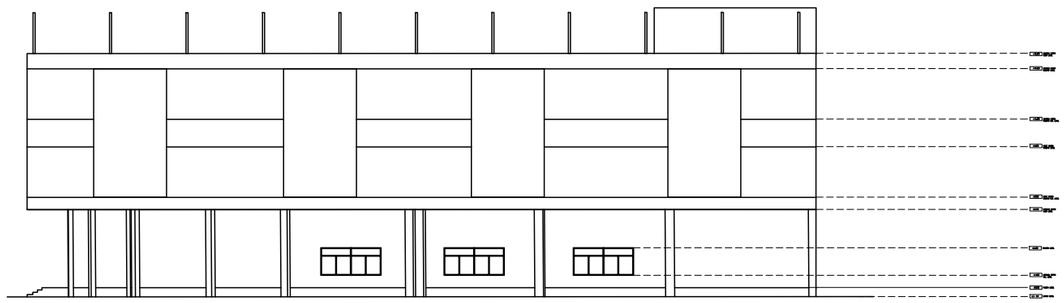
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DRG. NO.:

AR 09



FRONT ELEVATION



SIDE ELEVATION

NOTES :

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PROJECT:

WARANGAL INTERNATIONAL CONVENTION CENTRE

GUIDE:

AR. VICKY LALRANSANGI MA'AM

DRAWING:

BLOCK A- ELEVATION

NORTH:

SCALE:

1:200

PURPOSE:

FOR CONSTRUCTION

DEALT BY:

ANJALI SWAIN
211110008

CHECKED BY:

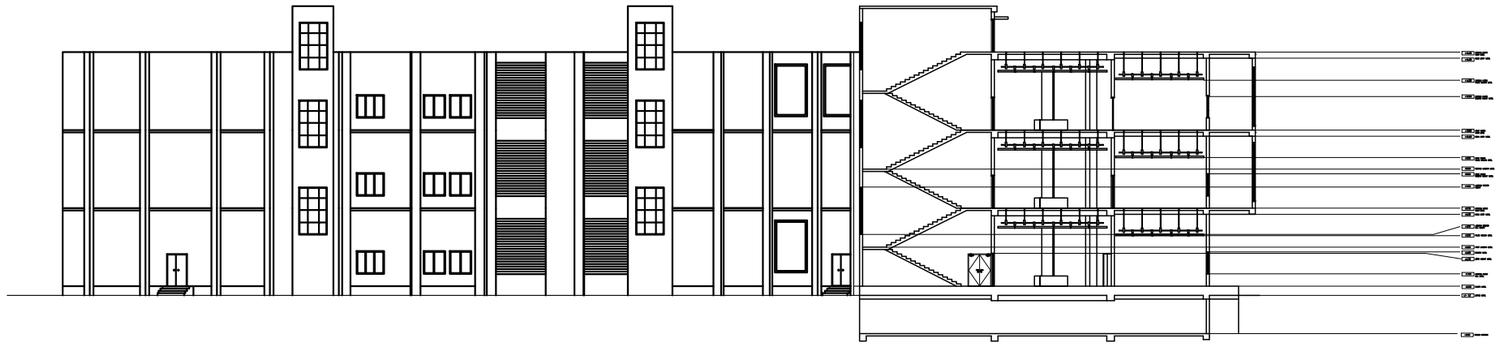
ANJALI SWAIN
211110008

REVISIONS:

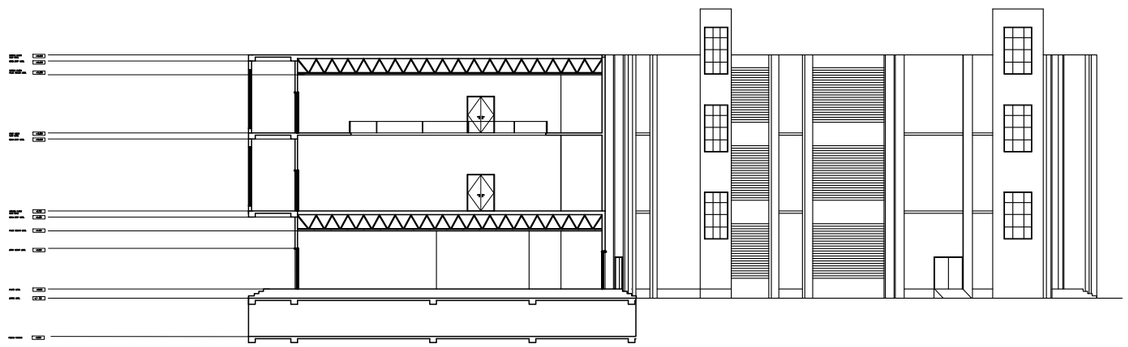
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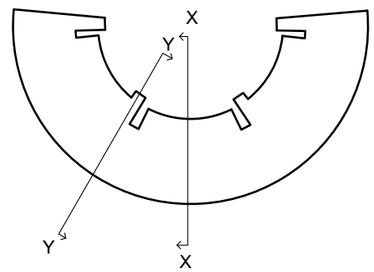
AR 10



SECTION Y-Y'



SECTION X-X'



KEY PLAN

NOTES :

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PROJECT:
WARANGAL INTERNATIONAL CONVENTION CENTRE

GUIDE:
AR. VICKY LALRANSANGI MA'AM

DRAWING:
BLOCK A- SECTION

NORTH:

SCALE:
1:200

PURPOSE:
FOR CONSTRUCTION

DEALT BY:
ANJALI SWAIN
211110008

CHECKED BY:
ANJALI SWAIN
211110008

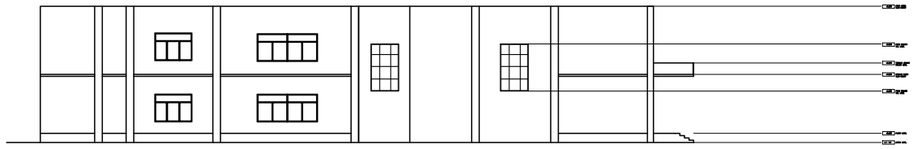
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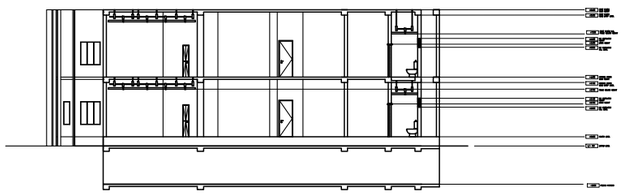
DRG. NO.:
AR 11



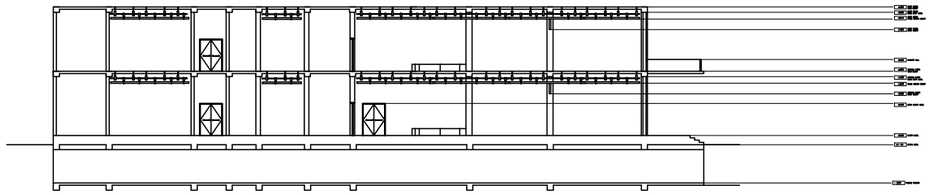
FRONT ELEVATION



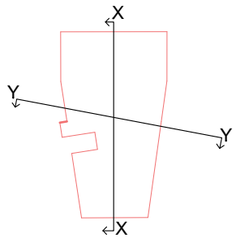
SIDE ELEVATION



SECTION Y-Y'



SECTION X-X'



KEY PLAN

NOTES :

1.) THIS DRAWING IS TO BE READ IN CONJUCTION WITH DRAWING NO. : AR002, AR003 , AR004

2.) ALL DIMENSIONS ARE IN MM AND ALL LEVELS ARE IN MTS.

3.) ALL DIMENSIONS ARE STRUCTURAL DIMENSIONS UNLESS MENTIONED OTHERWISE.

4.) THE DRAWING IS TO BE READ AND NOT BE SCALED.

5.) FOR STRUCTURAL DETAILS, REFER DRAWING NO.

6.) FOR GENERAL NOTES REFER DRAWING NO.

7.) IN CASE OF ANY DISCREPANCY IT SHOULD BE BROUGHT TO THE NOTICE OF THE ARCHITECT PRIOR TO CONSTRUCTION AT THE SITE.

8.) THIS DRAWING HAS NOT BEEN PUBLISHED AND IS THE SOLE PROPERTY OF VITH SEM ARCHITECTURE AND IS ISSUED TO THE PARTY FOR THE SPECIFIC PURPOSE AS STATED IN THE AGREEMENT AND IT SHALL NOT BE REPRODUCED, COPIED, LENT OR OTHERWISE DISPOSED OFF DIRECTLY OR INDIRECTLY NOT USED FOR ANY OTHER PURPOSE OTHER THAN FOR WHICH IT IS FURNISHED.

PRINTS :

PRINTS ISSUED TO:	NO. OF PRINTS:	DATE:	REMARKS:

REVISION:

NO.:	DETAILS:	DATE:	CHECKED:	APPROVED:
1.)				
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5.)				

PROJECT:
WARANGAL INTERNATIONAL CONVENTION CENTRE

GUIDE:
AR. VICKY LALRANSANGI MA'AM

DRAWING:
BLOCK B- SECTION ELEVATION

NORTH:

SCALE:
1:200

PURPOSE:
FOR CONSTRUCTION

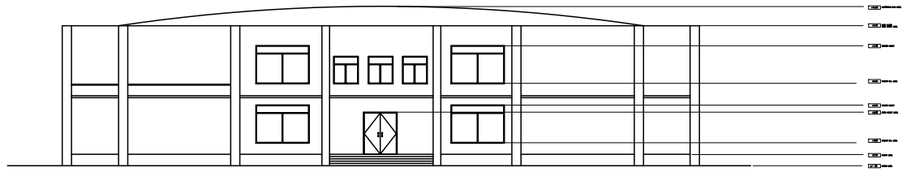
DEALT BY:
ANJALI SWAIN
211110008

CHECKED BY:
ANJALI SWAIN
211110008

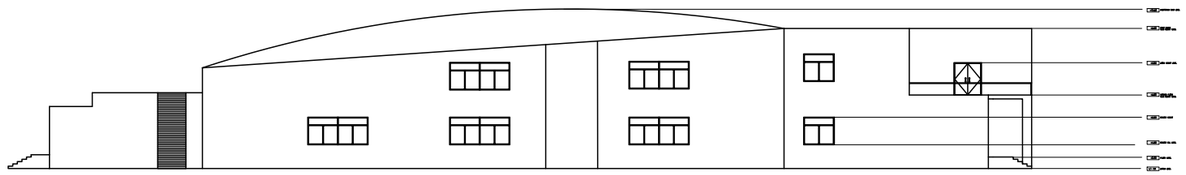
REVISIONS:

A	B	C	D	E

DRG. NO.:
AR 12



FRONT ELEVATION



SIDE ELEVATION

NOTES :

1.) THIS DRAWING IS TO BE READ IN CONJUCTION WITH DRAWING NO. : AR002, AR003 , AR004

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PROJECT:

WARANGAL INTERNATIONAL CONVENTION CENTRE

GUIDE:

AR. VICKY LALRANSANGI MA'AM

DRAWING:

BLOCK C- ELEVATION

NORTH:

SCALE:

1:200

PURPOSE:

FOR CONSTRUCTION

DEALT BY:

ANJALI SWAIN
211110008

CHECKED BY:

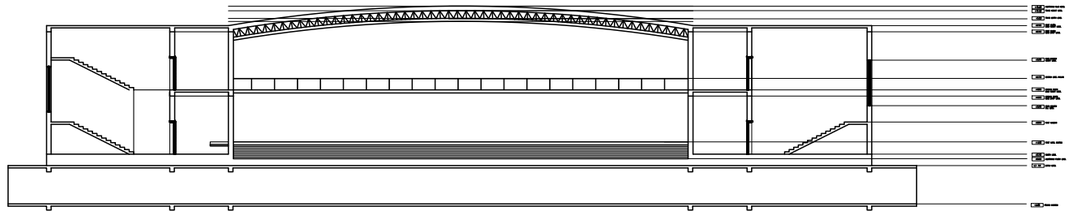
ANJALI SWAIN
211110008

REVISIONS:

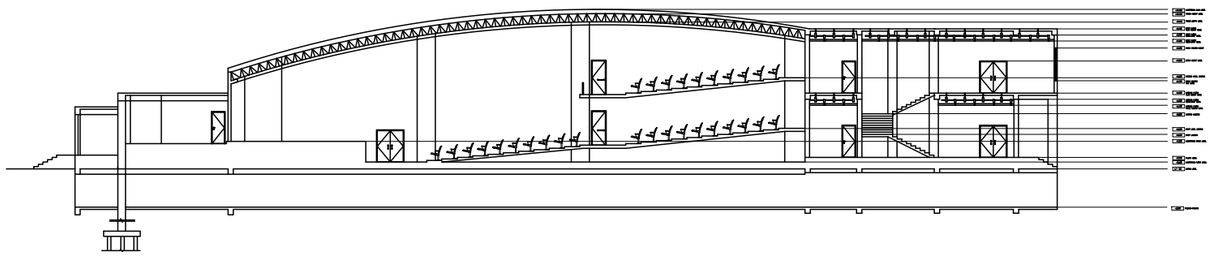
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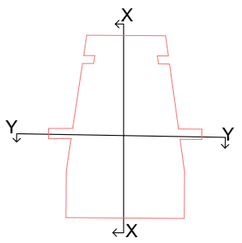
AR 13



SECTION Y-Y'



SECTION X-X'



KEY PLAN

NOTES :

1.) THIS DRAWING IS TO BE READ IN CONJUCTION WITH DRAWING NO. : AR002, AR003 , AR004

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PROJECT:

WARANGAL INTERNATIONAL CONVENTION CENTRE

GUIDE:

AR. VICKY LALRANSANGI MA'AM

DRAWING:

BLOCK C- SECTION

NORTH:

SCALE:

1:200

PURPOSE:

FOR CONSTRUCTION

DEALT BY:

ANJALI SWAIN
211110008

CHECKED BY:

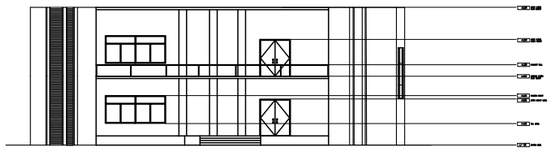
ANJALI SWAIN
211110008

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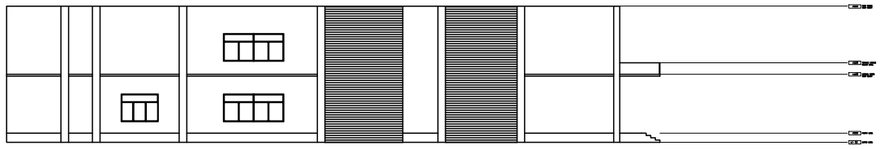
A	B	C	D	E

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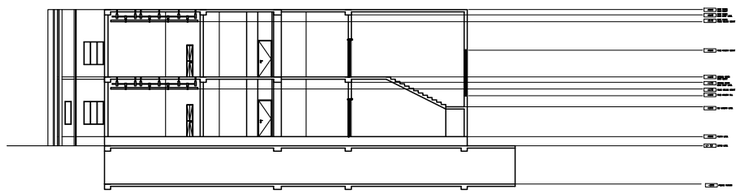
AR 14



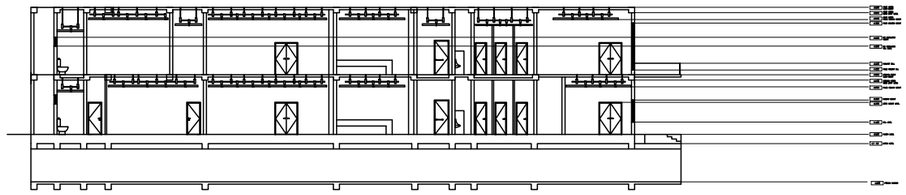
FRONT ELEVATION



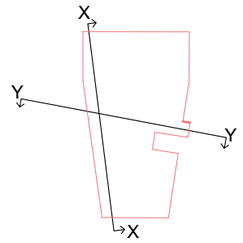
SIDE ELEVATION



SECTION Y-Y'



SECTION X-X'



KEY PLAN

NOTES :

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PROJECT:

WARANGAL INTERNATIONAL CONVENTION CENTRE

GUIDE:

AR. VICKY LALRANSANGI MA'AM

DRAWING:

BLOCK D- SECTION ELEVATION

NORTH:

SCALE:

1:200

PURPOSE:

FOR CONSTRUCTION

DEALT BY:

ANJALI SWAIN
211110008

CHECKED BY:

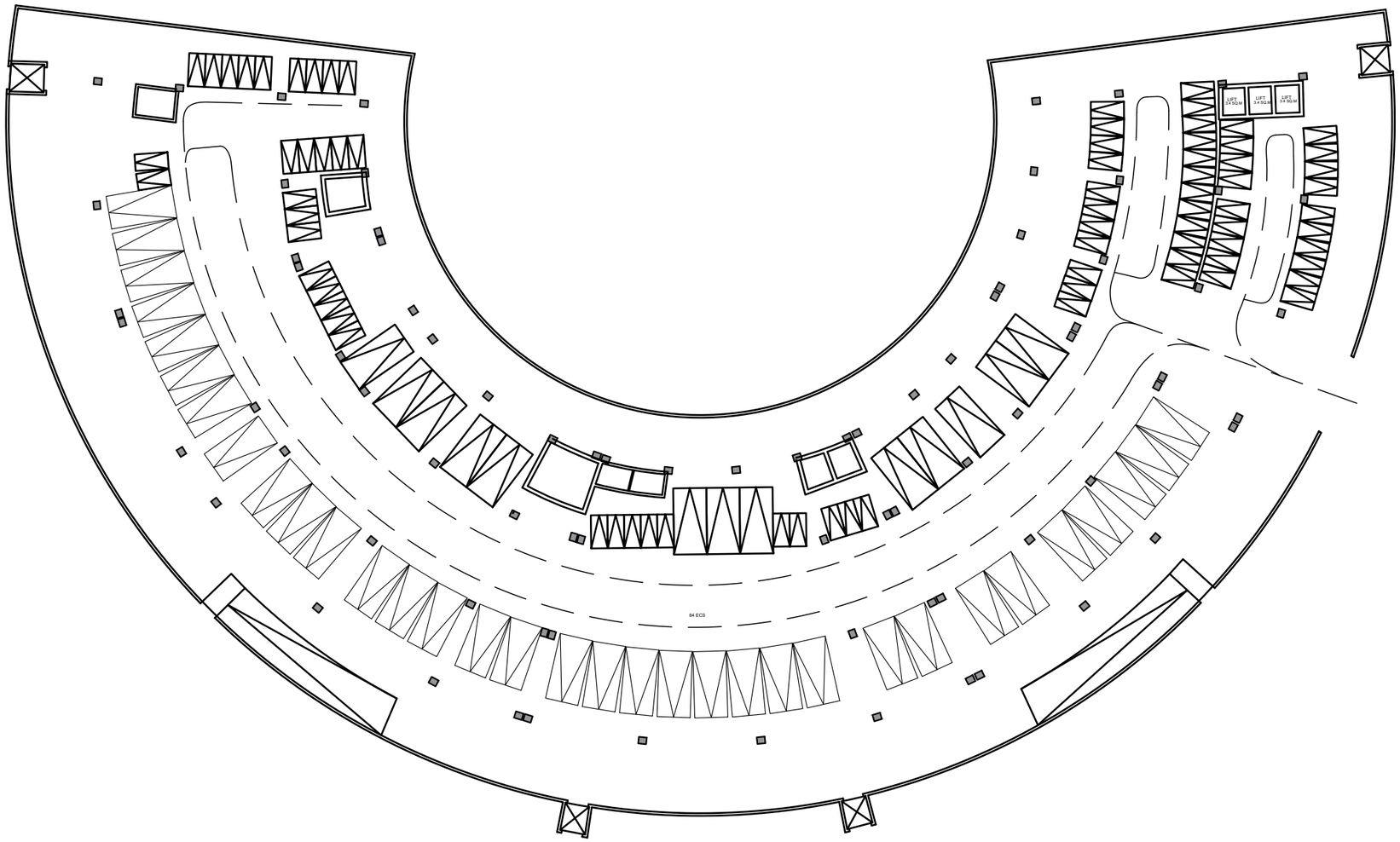
ANJALI SWAIN
211110008

REVISIONS:

A	B	C	D	E

DRG. NO.:

AR 15



NOTES :

1.) THIS DRAWING IS TO BE READ IN CONJUCTION WITH DRAWING NO. : AR002, AR003 , AR004

2.) ALL DIMENSIONS ARE IN MM AND ALL LEVELS ARE IN MTS.

3.) ALL DIMENSIONS ARE STRUCTURAL DIMENSIONS UNLESS MENTIONED OTHERWISE.

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PROJECT:

WARANGAL INTERNATIONAL CONVENTION CENTRE

GUIDE:

AR. VICKY LALRANSANGI MA'AM

DRAWING:

PARKING 1

NORTH:

SCALE:

1:250

PURPOSE:

FOR CONSTRUCTION

DEALT BY:

ANJALI SWAIN
211110008

CHECKED BY:

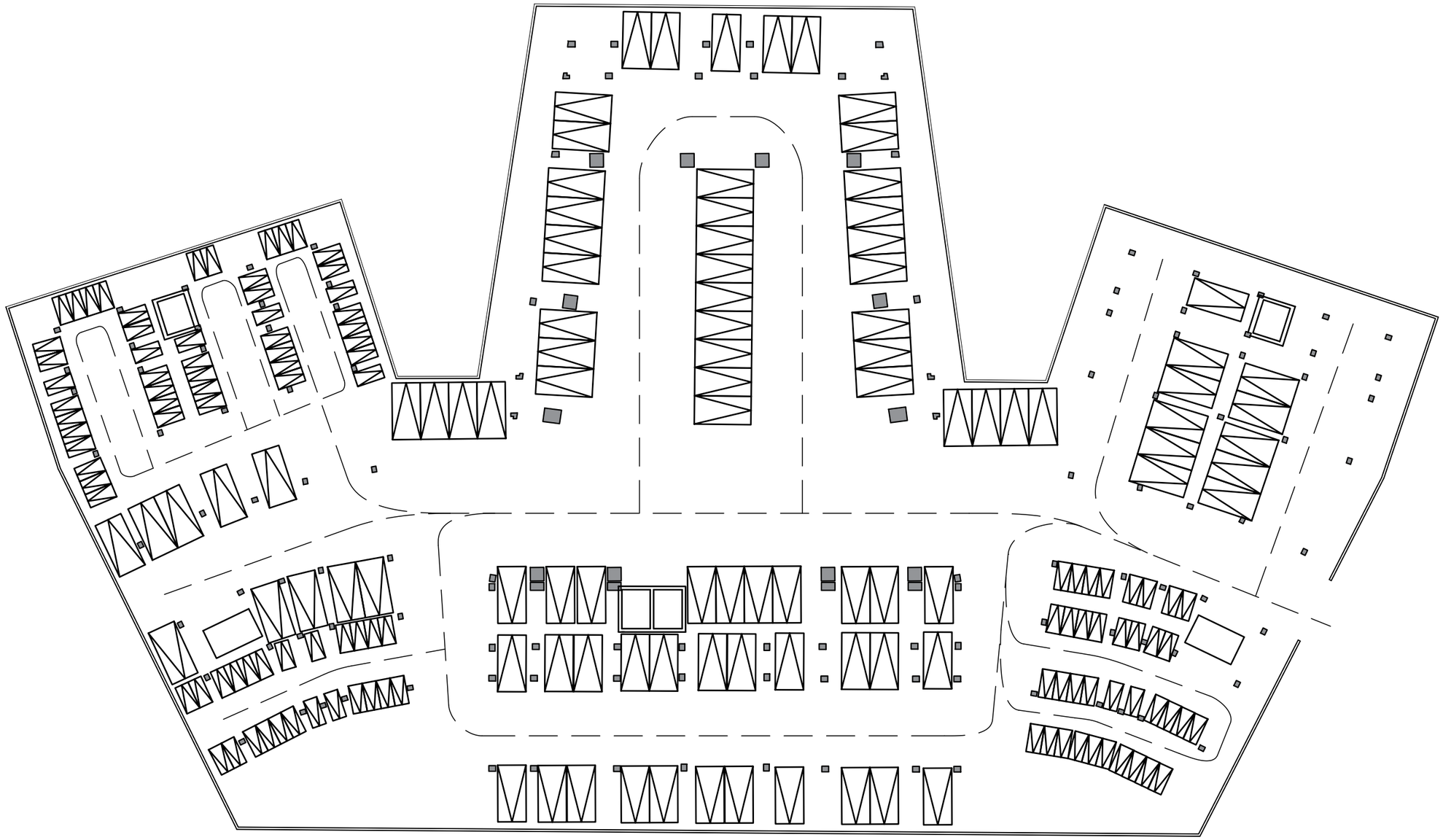
ANJALI SWAIN
211110008

REVISIONS:

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AR 16



NOTES :

1.) THIS DRAWING IS TO BE READ IN CONJUCTION WITH DRAWING NO. : AR002, AR003 , AR004

2.) ALL DIMENSIONS ARE IN MM AND ALL LEVELS ARE IN MTS.

3.) ALL DIMENSIONS ARE STRUCTURAL DIMENSIONS UNLESS MENTIONED OTHERWISE.

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PROJECT:
WARANGAL INTERNATIONAL CONVENTION CENTRE

GUIDE:
AR. VICKY LALRANSANGI MA'AM

DRAWING:
PARKING 2

NORTH:

SCALE:
1:250

PURPOSE:
FOR CONSTRUCTION

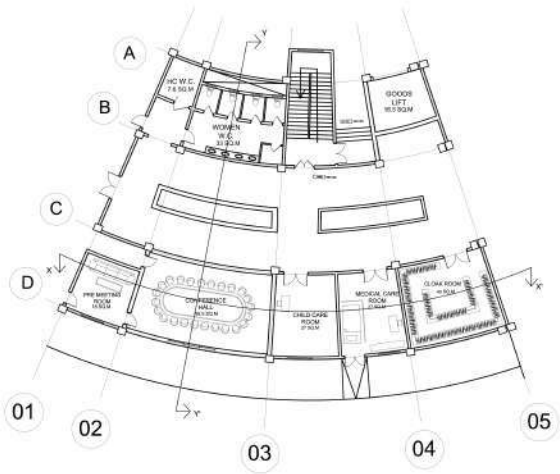
DEALT BY:
ANJALI SWAIN
211110008

CHECKED BY:
ANJALI SWAIN
211110008

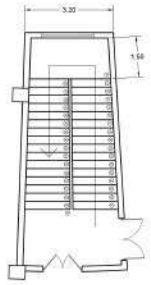
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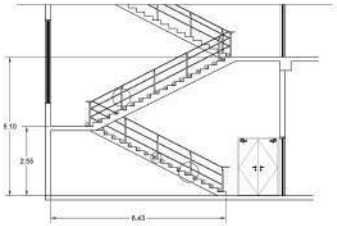
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AR 17



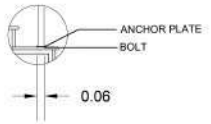
PLAN 1:200



STAIRCASE PLAN 1:100



SECTION 1:100



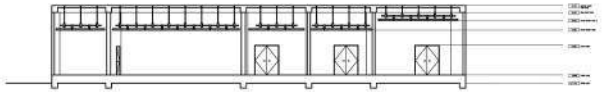
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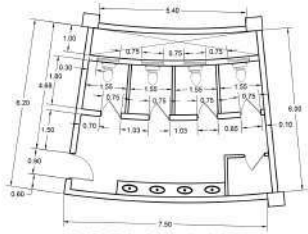
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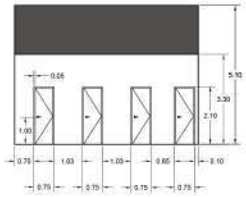
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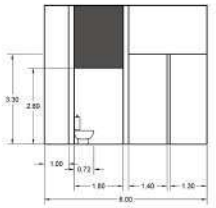
SECTION X-X' 1:200



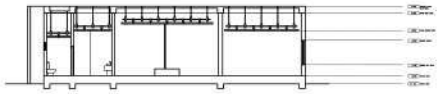
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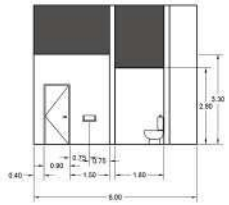
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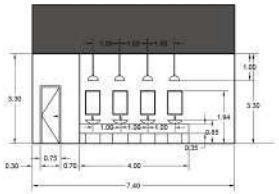
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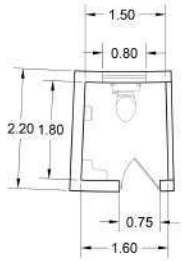
SECTION Y-Y' 1:200



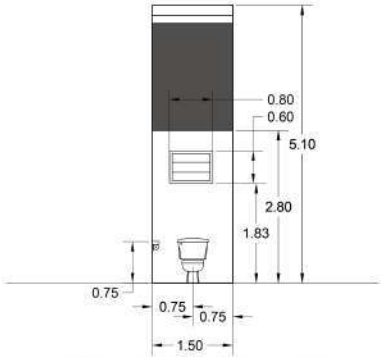
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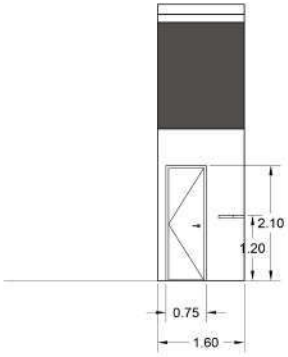
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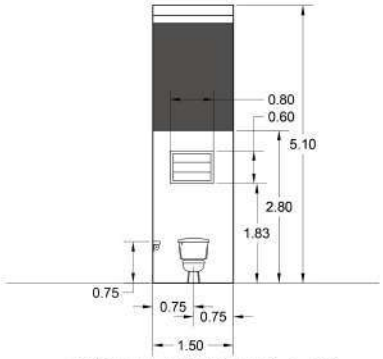
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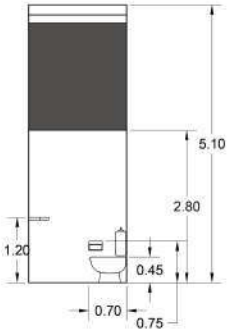
WC ELEVATION 1 1:50



WC ELEVATION 2 1:50



WC ELEVATION 3 1:50



WC ELEVATION 4 1:50

NOTES :

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PROJECT:

WARANGAL INTERNATIONAL CONVENTION CENTRE

GUIDE:

AR. VICKY LALRANSANGI MA'AM

DRAWING:

WORKING DRAWING

NORTH:

SCALE:

PURPOSE:

FOR CONSTRUCTION

DEALT BY:

ANJALI SWAIN
211110008

CHECKED BY:

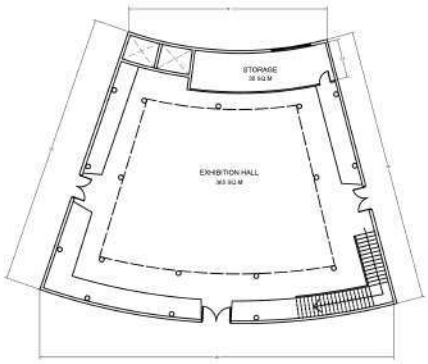
ANJALI SWAIN
211110008

REVISIONS:

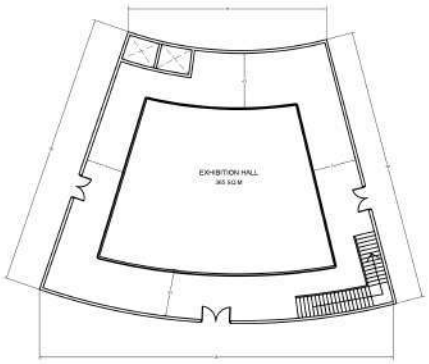
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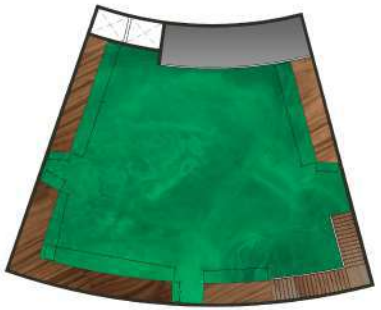
AR 18



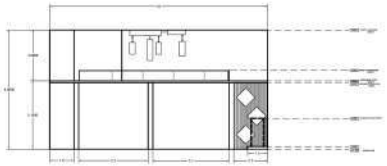
FIRST FLOOR



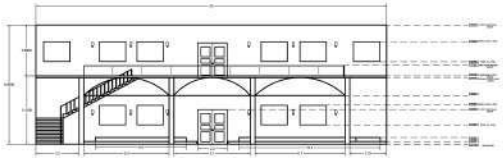
SECOND FLOOR



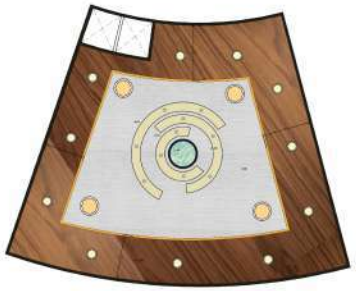
FLOORING PLAN



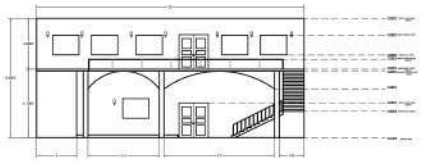
ELEVATION 1



ELEVATION 2



CEILING PLAN



ELEVATION 3



ELEVATION 4

MATERIAL BOARD



WHITE GYPSUM | GREEN OSIDE | WOOD | GREY OXIDE | WOODEN GYPSUM









NOTES :

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5.)				

PROJECT:

WARANGAL INTERNATIONAL CONVENTION CENTRE

GUIDE:

AR. VICKY LALRANSANGI MA'AM

DRAWING:

ELECTIVE-INTERIORS

NORTH:

SCALE:

1:200

PURPOSE:

FOR CONSTRUCTION

DEALT BY:

ANJALI SWAIN
211110008

CHECKED BY:

ANJALI SWAIN
211110008

REVISIONS:

A | B | C | D | E

DRG. NO.:

AR19

VEGETATION TABLE

NATIVE TREES

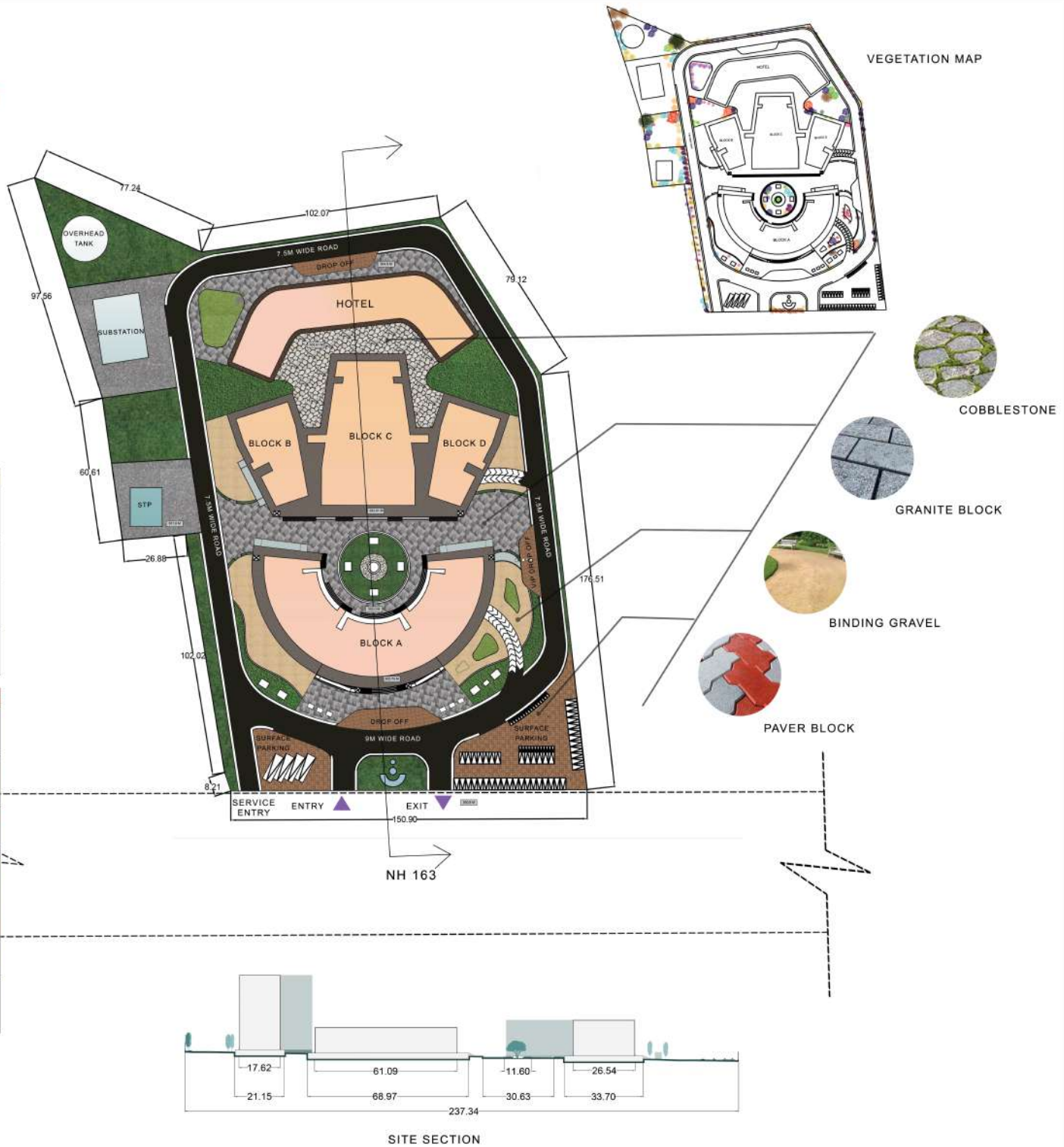
S. No	Local name	Botanical name	Description	Ht & Spread (m)	Legend	Image
1	Neem	*Azadirachta indica*	Extremely drought-tolerant, low maintenance. Excellent avenue & shade tree.	H: 12–20, S: 8–12		
2	Asian Palmyra	*Borassus flabellifer*	Iconic vertical element. Very drought hardy, good for entrance framing.	H: 15–25, S: 5–8		
3	Palash	*Butea monosperma*	Native, bright seasonal flowers (Mar–Apr). Deciduous, low water needs.	H: 8–12, S: 6–10		
4	Tamarind	*Tamarindus indica*	Deep-rooted, tolerant of semi-arid climate. Good large canopy for plazas.	H: 10–20, S: 8–15		
5	Jamun	*Syzygium cumini*	Fruit tree that attracts birds. Tolerates Deccan conditions and good for biodiversity.	H: 10–18, S: 8–12		
6	Pongamia / Karanja	*Pongamia pinnata*	Nitrogen-fixer, drought hardy, good for roadside/parking shade.	H: 10–15, S: 6–10		

FLOWERING TREES

S. No	Local name	Botanical name	Description	Ht & Spread (m)	Legend	Image
1	Amaltas	*Cassia fistula*	Bold yellow racemes in late spring. Drought tolerant once established.	H: 10–15, S: 6–10		
2	Jarul	*Lagerstroemia speciosa*	Long flowering season (summer). Good for plazas and avenue mixing.	H: 6–12, S: 5–8		
3	Gulmohar	*Delonix regia*	Spectacular summer bloom. Performs well in Deccan if soil moderately deep.	H: 8–12, S: 10–15		
4	Parijat / Harsingar	*Alyxiantheer achorrantir*	Small scented flowering tree. Good near seating for fragrance.	H: 3–4, S: 2–4		

SHRUBS

S. No	Local name	Botanical name	Description	Height & Spread (m)	Legend	Image
1	Kamini	*Murraya paniculata*	Fragrant white flowers. Excellent formal hedge or low screen.	H: 1.5–3, S: 1–2		
2	Ixora (Jungle geranium)	*Ixora coccinea*	Mass flowering shrub for beds & colour. Needs less water once established.	H: 0.5–1.5, S: 0.5–1		
3	Chandni	*Tabernaemontana divaricata*	Evergreen, fragrant, good formal hedges and foundation planting.	H: 0.5–1.2, S: 0.5–1		
4	Tanner's cassia	*Cassia auriculata*	Drought-tolerant flowering shrub. Good for low-maintenance beds.	H: 1–3, S: 1–2		
5	Adhatoda / Vasaka	*Adhatoda vasica*	Dense evergreen medicinal shrub. Good screening and edge planting.	H: 1–2, S: 1–1.5		
6	Clerodendrum spp.	*Clerodendrum inerme / C. splendens*	Attractive for pollinators. Colorful flowerz can be used as specimen or mixed beds.	H: 1–3, S: 1–2		



VEGETATION MAP

COBBLESTONE

GRANITE BLOCK

BINDING GRAVEL

PAVER BLOCK

SITE SECTION

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