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Proposed Construction Residential Building at
PLOT NO – 23, 1ST CROSS STREET, CLASSIC RETREAT,
SHOLLINGANALLUR, CHENNAI – 600119, S.No.585/1A8,
Sholinganallur Village, Sholinganallur Taluk,
Greater Chennai Corporation, Division-198, Zone-15.

DESIGN BASIS REPORT – STRUCTURAL

REV	DATE	DESCRIPTION	PREPARED BY
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INDEX

S. No.	DESCRIPTION	PAGE NO.
1.0	**General**	
1.1	Project Brief	2
1.2	Soil Data	2
1.3	Building Brief Descriptions	2
1.3.1	Salient features of castellated beams	2
1.3.2	Area	3
2.0	**Design Brief**	
2.1	Important Notes for Design & Construction	
2.1.1	Concrete & Reinforcement Strength	4
2.1.2	Structural Steel Material Specification	5
2.2	Loadings	5
2.2.1	General	5
2.2.2	Dead Load	5
2.2.3	Live Load	6
2.2.4	Collateral Load	6
2.2.5	Wind Load	6
2.2.6	Earthquake Load	6
2.2.7	Combination of Loading for Steel	6
2.2.8	Combination of Loading for RCC	7
3.0	**Analysis**	8
4.0	**Code & References**	9

1. PROJECT BRIEF:

Construction of proposed Residential building at Plot 23, 1ST Cross Street, Classic Retreat, Sholinganallur, Chennai – 600119, S.NO. 585/1A8, Sholinganallur Village, Sholinganallur Taluk, Greater Chennai Corporation, Division-198, Zone-15. This Building comprises of Stilt + 5 Floors with Two Wheelers parking & Car Parking . This specification covers the general requirements for structural design and analysis of proposed residential development project.

2. STRUCTURAL SYSTEM

The structural system adopted is as below, based on preliminary analysis and design, which have been elaborated later in this report:

- The building is basically a RC framed structure. The analysis and design are done using STAAD/SAFE/RCDC software.
- Conventional RC beam-slab system is adopted for substation areas respectively.
- For obtained bearing capacity of soil, Pile foundation system is recommended by the soil consultant.

3. DESIGN STANDARDS:

Sl.No.	Code	Title
1	IS-875(Part 1)-1987 (Reaffirm 2013)	Code of Practice for Design Loads (Other than Earthquake) for Buildings and Structures - Unit Weights of Buildings Materials and Stored Material
2	IS-875(Part 2)-1987 (Reaffirm 2013)	Code of Practice for Design Loads (Other than Earthquake) for Buildings and Structures - Imposed Loads
3	IS-875(Part 3)-1987(Reaffirm 2013)	Code of Practice for Design Loads (Other than Earthquake) for Buildings and Structures - Wind Loads
4	IS-875(Part 5)-1987(Reaffirm 2013)	Code of Practice for Design Loads (Other than Earthquake) for Buildings and Structures - Special Loads and Load Combinations
5	IS:456-2000	Code of Practice for Plain and Reinforced Concrete
6	IS:432(Part 2)-1982	Specification for Mild Steel and Medium Tensile Steel Bars and Hard Drawn Steel Wire for Concrete Reinforcement – Hard Drawn Steel Wire
7	IS: 1893:2002	Criteria for Earthquake Resistant Design of Structures Part - 1 General Provisions and Buildings

8	IS: 800-2007	General construction of steel- code of practice.
9	IS 1080 :1985	Code of practice for design & construction of shallow foundations in soil
10	IS 1904 :1986	Code of practice for design & construction of foundations in soil general requirements
11	IS 2950, Part 1:1981	Code of practice for design & construction of raft Foundations, Part I - Design
12	IS 2911 Pt. 1 Section- I 1979	Code of Practice for Design and Construction of Pile Foundation.- Driven Cast in situ concrete pile
13	IS 2911 Pt. 1 Section- II - 1979	Code of Practice for Design and Construction of Pile Foundation. – Bored cast in situ piles
14	IS 2911 Pt. IV 1985	Code of Practice for Design and Construction of Pile Foundation – Load test on piles
15	IS 6403:1981	Code of Practice for determination of bearing capacity of shallow foundations
16	IS 13920 : 1993 (Reaffirmed 1998) Edition 1.2 (2002-03)	Ductile Detailing Of Reinforced Concrete Structures Subjected to Seismic Forces – Code of Practice

4. SOIL DATA:

With reference to "Geotechnical Report" submitted by GEO ENGINEERING CONSULTANTS & SERVICES, # 12B, 2ndFloor, Anbu Nagar, 3rd Street, Alwarthirunagar, Chennai-600 087 have recommended foundation system shall be Pile foundation.

As per the soil test report the Pile foundation of 25ft deep from existing ground level, Where the Highly weathered rock has been met – 500 dia pile vertical load carrying capacity shall be 60 t.

5. LOADING DATA

a. Dead load

Self-weight of the materials shall be calculated on the basis of unit weights given in(IS: 875 -1987(PART- I).

- ✓ Unit weight of concrete - 25.0 kN /m^3
- ✓ Unit weight of AAC block - 6.0 kN /m^3
- ✓ Unit weight of solid block - 20.0 kN /m^3
- ✓ Unit weight of steel - 78.5 kN /m^3
- ✓ Unit weight of floor finishes - 20.0 kN /m^3
- ✓ Unit weight of water - 9.807 kN /m^3
- ✓ Partitions, ducts, False ceiling - 1.50 kN /m^2

b. Wall load

The load from wall shall be calculated separately and assigned in the analysis.

c. Floor load

TERRACE FLOOR SLAB:

Weathering Coarse - 4.00 kN/m^2 (screed is 200mm)

FIRST – SECOND , THIRD, FOURTH AND FIFTH FLOOR SLAB:

Toilet - 7.00 kN/m^2 (Sunken is 350mm)

Floor finishes - 2.00 kN/m^2 (Finishes of 100mm)

d. Live load:

On the basis of intended occupancy and use, the loading shall be based on IS: 875 -1987(PART-II).

All Room & Kitchen	- 2.00 kN/m^2
Toilet & bath room	- 2.00 kN/m^2
Corridors, passages, staircases including tire escapes and store	- 3.00 kN/m^2
Balconies	- 3.00 kN/m^2
Terrace floor with access	- 1.50 kN/m^2

Live load reduction:

Live load reduction is considered for foundation and column design as per IS 875 – 1987 (Part-2).

e. Wind load:

Wind loads design of structures shall be based on the following parameters to arrive design wind speeds. (IS: 875 -1987(PART- III).

Basic wind speed (Vb)	- 33 m/sec
Risk Coefficient, K1	- 1.0
Terrain, Height, structure size factor, K2	- Ter.category-3& class B
Topography factor, K3	- 1.0
Design wind speed (Vz)	- Vb x K1 x K2 x K3
Design wind pressure (Pz)	- 0.6 Vz^2

f. Seismic load:

Seismic loads design of structures shall be considered as per IS 1893-2002.

Zone	- III
Zone factor (Z)	- 0.16
Importance factor (I)	- 1.0 - Table 6of IS 1893-2002
Response reduction factor (R)	- 3.0 (OMRF) Table 7of IS 1893-2002

Avg. response acceleration coefficients (Sa/g) for soil conditions as per Fig 2 of IS 1893-2002

Design Horizontal seismic coefficient (A_h) = 0.01667 x (Sa/g)

Time period - moment-resisting frame building without brick infill panels ($0.075\ h^{0.75}$)

The building is designed for static analysis.

6. DESIGN LOAD COMBINATIONS:

The building is designed using the limit state method with appropriate load factors as per IS: 456-2000.

TABLE: PARTIAL SAFETY FACTORS FOR LOADS, γf, FOR LIMIT STATES

LoadCombination	Limit State of Collapse			Limit State of Serviceability		
	DL	LL	WL/EL	DL	LL	WL/EL
DL + LL	1.5	1.5	--	1	1	--
DL + LL ±WL	1.2	1.2	1.2	1	0.8	0.8
DL + LL ±EL	1.2	1.2	1.2	1	0.8	0.8
DL ± WL	1.5 or 0.9$	--	1.5	1	--	1
DL ± EL	1.5 or 0.9$	--	1.5	1	--	1

Where,DL - Dead Load, LL - Live Load, WLX, WLZ - Wind load in X and Z direction,

ELX, ELZ - Seismic load in X and Z direction

7. DESIGN PARAMETERS

Material specifications

Concrete and reinforcement strengths:

a) Grade of concrete - M25

b) Grade of reinforcement - Fe 500

Exposure conditions and cover for RCC members

Nominal cover for all structural members shall be based on "MILD" exposure condition and 2 hours Fire rating whichever is governing.

Structural element	Cover to reinforcement
Floor slab	- 25 mm
Beam/walls	- 30 mm
Column	- 40 mm
Foundations	- 50 mm

8. ANALYSIS

1. The structure is idealized as 3D frame and analyzed using software package both vertical and lateral loads.
2. The lateral loads include wind loads and earthquake loads.
3. Seismic load intensity of Zone - III is considered Seismic analysis and design purpose.
4. Forces and moments from the three dimensional analysis output the worst combination are used the design of the structure. The foundation is designed critical un-factored load combinations.
5. The support conditions of all the columns are assumed to be fixed.

9. DESIGN AND DETAILING:

The designs of the RCC elements are made using the limit state method with appropriate load factors as per IS: 456 – 2000 in consonance with SP 34-1987 for detailing.

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Property Documentation & Workflow Tools

Forms & Templates, Document Generator, Document Translation, Dictionary

Vastu & Property Management Tools

Home Vastu Shastra, Plot Vastu Shastra, Property Management

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