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DIGITALLY VERIFIED RECORD

GK STRUCTURALS

G.Karthikeyan M.E. M.B.A., RSE 100872019,

Consulting Structural / Civil Engr. SE/GR-1/19/04/089

Ref.:Stru/SC/2025 Date: 04-07-2025

Structural Stability Certificate

It is certified that the Proposed Residential Building comprising **Stilt Floor + 5 floors with 19 Dwelling Units** to be set up at **Plot Nos. 29A, 29B & 30, Subramanian Colony, Velachery, Chennai – 600 042, Comprised in S. No. 317/1C (Document), T.S. Nos. 37/1, 37/2, 37/3, 37/4, 38/1, 38/2, 38/3 & 38/4, Block No. – 188 (Patta) of Velachery Village within the limits of Greater Chennai Corporation, Zone – 13, Division - 177, Tamil Nadu State,** have been designed as a RCC structure to withstand the Dead Load, Imposed Load and Wind Load / Earthquake loads ensuring Structural Safety and service ability as per the norms and guidelines prescribed in the following codes of Bureau of Indian Standards.

1. The minimum grade of concrete is M20
2. IS: 456-2000 Code of Practice for Plain and Reinforced concrete.
3. IS: 875-1987 Code of Practice for Design loads for Buildings and Structures.
4. IS: 1893-2002 Criteria for Earthquake resistant design of Structures Part-1 general Provisions and Buildings.
5. IS: 4236-1993 Code of Practice for Earthquake resistant design & Construction of Buildings.
6. IS: 13920-1993 Code of Practice for Ductile detailing of concrete structures subjected to seismic forces and
7. National Building code of India – 2005 are carried out.

It is further certified that the above structures will be constructed from foundation to roof as per structural designs and detailing of reinforcements furnished in our drawings.

Hence, I hereby certify that the building will be **structurally safe and sound** when used for the purpose for which it is designated.

Signature with Seal

G.KARTHIKEYA, M.E.,
Structural Engr Grade-I
CMDA: SE/ GR-I / 19/ 04/ 089
DTCP: T.VLR/ RSE / C-I / 2019 / 12 / 006
3H, Vantage Plaza, #1, L.B. & M.G. Road,
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Enclosure: Structural Design Calculations

STRUCTURAL DESIGN CALCULATIONS

(LOAD CALCULATIONS)

STRUCTURE:

The proposed Building has been envisaged as R.C Framed Structure with Ground + FIVE Upper floors. The Ground Floor is intended for Car Parking Utility. The upper Floors from 1st to 5TH are intended for Residential Utility.

ANALYSIS & DESIGN:

The Structure has been idealized as 3D Frame, with R.C Slab & Beam. All Beams are interconnecting with Columns. The design of all R.C components is done using Limit State Method.

The following codes of the Indian Standards are adopted in the Structural Design:

IS: 456-2000	-	Plain and Reinforced Concrete-code of Practice (Fourth Revision)
IS: 875-1987	-	Code of Practice for Design loads (other than Earthquake) for Buildings and Structures. Part (1) - Dead Loads-Unit Weights of Building Materials and Stored Materials (second revision) Part (2) - Impact Loads (second revision) Part (3) - Wind Loads (second revision) Part (4) - Snow Loads (second revision) Part (5) - Special Loads and Load Combinations.
IS: 1893-2002	-	Criteria for Earthquake Resistant Design of Structures (Fifth Revision).

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IS: 13920-1993	-	Ductile Detailing of Reinforced Concrete Structures Subjected to Seismic Forces- Code of Practice.
SP7:1983	-	National Building Code of India 1983.
SP: 34(S&T)-1987	-	Hand Book on Concrete Reinforcement and Detailing.
SP: 23(S&T)-1982	-	Hand Book on Concrete Mixes.
SP: 16(S&T)-1980	-	Design Aids for Reinforced Concrete to IS: 456-1978.

The concrete grade assumed for all R.C Column is M 25 and others M 25. The Steel grade considered in the design is Fe 500.

FOUNDATION:

The columns are supported on PILE CAPS sitting on PILES at 9.5.m below NGL as per soil report, the pile load carrying capacity of 500 dia pile is 70 T.

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TYPICAL FLOOR LOADS:

Self Wt. Of the slab	= 0.125m x 25 KN/m^3	=	3.125 KN/m^2
Floor Finish		=	1.0 KN/m^2
Ceiling Plastering		=	0.5 KN/m^2
Live Load		=	2.0 KN/m^2
			6.625 KN/m^2

Say 6.75 KN/ m^2 (DL-4.75 KN/m^2+ LL-2 KN/m^2)

TERRACE SLAB:

Self Wt. Of the slab	= 0.125m x 25 KN/m^3	=	3.125 KN/m^2
Weathering Course	= 0.1m x 20 KN/m^3	=	2.00 KN/m^2
Ceiling Plastering		=	0.5 KN/m^2
Live Load		=	1.50 KN/m^2
			7.125 KN/m^2

Say 7.25 KN/ m^2 (DL-5.75 KN/m^2+ LL-1.5 KN/m^2)

TOILET SLAB:

Self Wt. Of the slab	= 0.125m x 25 KN/m^3	=	3.125 KN/m^2
Filling load	= 0.25m x 20 KN/m^3	=	5.0 KN/m^2
Ceiling Plastering		=	0.5 KN/m^2
Live Load		=	1.50 KN/m^2
			10.125 KN/m^2

Say 10.5 KN/ m^2 (DL-9 KN/m^2+ LL-1.5 KN/m^2)

STRUCTURAL MATERIALS:

Concrete Grade	M25 (1:1:2)
Steel Grade	Fe500.

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DESIGN OF CRITICAL COLUMN:

Maximum axial load on column P =750 kN
M_X =30 kN-m
M_Z =10 kN-m

Factored loads P_U =1125 kN
M_{UX} =45 kN-m
M_{UY} =15 kN-m

Assume column size as 300mm x 525mm

fck – 25N/mm^2
fy-500N/mm^2

$$d'/D = \frac{48mm}{525mm} = 0.092$$

$$d'/D = \frac{48mm}{300mm} = 0.16$$

$$\frac{P_U}{fckbD} = \frac{1125\ kN \times 1000}{25N/mm^2 \times 300mm \times 525mm} = 0.28$$

assume Pt = 2%

Pt/fck = 2/25 = 0.1

We shall refer chart 44, SP 16

$$\frac{M_U}{fckbD^2} = 0.105$$

$$M_{UX1} = \frac{0.105 \times 25N/mm^2 \times 300mm \times (525mm)^2}{1 \times 10^6}$$

= 217.1 kN-m

from chart 46, SP16

$$\frac{M_U}{fckbD^2} = 0.085$$

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$$M_{UY1} = \frac{0.085 \times 25N/mm^2 \times 525mm \times (300mm)^2}{1 \times 10^6}$$

$= 100.4$ kN-m

from chart 63, P_{UZ}

$P_{UZ}/Ag = 15N/mm^2$

$$P_{UZ} = \frac{15N/mm^2 \times 300mm \times 525mm}{1000}$$

$= 2362.5$kN

$$\frac{P_U}{P_{UZ}} = \frac{1125 \text{ kN}}{2362.5\text{kN}} = 0.689$$

$$\frac{M_{UX}}{M_{UX1}} = \frac{45 \text{ kN-m}}{217.1 \text{ kN-m}} = 0.21$$

$$\frac{M_{UY}}{M_{UY1}} = \frac{15 \text{ kN-m}}{100.4 \text{ kN-m}} = 0.15$$

From char 64, SP 16

Allowable $\frac{M_{UX}}{M_{UX1}} = 0.93$

$\frac{M_{UY}}{M_{UY1}} = 0.91217.1$

Hence 0.k & safe

So, for critical column, we shall adopt the following

Size -300mm x 525mm
M25, Fe 500

Reinf. verticals – 4 - 25 Y + +8-20 Y + 4-12Y

Ties – 10y@ 175mm c/c (4 LEGGED)

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CRITICAL COLUMN FOOTING DESIGN:

Maximum Axial Load on column	=	700 KN
SBC of soil	=	220 KN/ m2
Area of Footing spread	=	700 x 1.05
		----------
		220 KN/ m2
	=	3.35 m2

We shall adopt footing size of 2400 x 2400

Provided area	=	5.76 m2

Hence for critical Column Footing

We shall adopt size	=	2400 mm x 2400 mm
Edge Depth	=	200 mm
Overall Depth	=	715 mm

Flat projection beyond column footing 100mm alround

Reinforcement

Bottom	=	12 Y @ 125 c/c B/w

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DESIGN OF SLAB:

Self-Wt. Of the slab	= 0.115m x 25 KN/m3	=	2.875 KN/m2
Floor Finish		=	1.0 KN/m2
Partition Load		=	1.0 KN/m2
Ceiling Plastering		=	0.5 KN/m2
Live Load		=	2.0 KN/m2
	Total	=	7.375 KN/m2

Say 7.5 KN/ m2

Negative Moment for the Shorter Span = 0.0751 x 11.75 x 3.5 x 3.5 x 1.5

= 16.214 kNm

MUx

------ short = 16.214 x 10^6 /(1000 x 105^2) = 1.47

bD2 Table 2 of SP 16 Pt

MUy

------ long = 10.2 x 10^6 /(1000 x 105^2) = 0.92

bD2 Table 2 of SP 16 Pt

Ast = Along Shorter direction – 0.714 x 1000 x 105/100

= 751 mm2

Reinf. Provided - 10Y@ 125mm c/c (Shorter Direction)

Distributor – 10Y@ 135mm c/c (Longer Direction)

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DESIGN OF BEAM

Clear span = 6.1 m

Effective span = 6.33 m

Load from slab = 850 x (6.33 / 2)

= 2690 Kg/m

Load from 5.5cm partition wall = 0.055 x 2.70 x 6.1 x 1920

= 1739 Kg/m

Total = 4440 Kg/m

Maximum bending moment = (4440 x (6.33)²) / 10

= 17791Kgm

M ultimate = 1.5 x 17791

= 26686 Kg/m

= 277.3 KNm

Size of beam = 23cm x 60.0 cm (effective depth 57cm)

Mu/bd^2 = (277.3 x 1000) / (23 x57 x 57)

= 3.71 N/mm^2

From table 50;

d' / d = 0.1

pt = 1.3 pc = 1.1

Ast = (1.3 / 100) x 23 x 57 = 17.0 sq.cm

Asc = (1.1 x 23 x 57) / 100

= 14.42 Sq cm

Area of steel provided:

Bottom 3nos of 20mm +3nos of 20mm

area provided 18.84Sq cm which is more than 17.0 Sq cm.

Top 3nos of 20mm +3nos of 20mm.

Hence safe.

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CHECK FOR SHEAR

Maximum shear force (V) = (4440 x 6.1) / 2

= 13542 kg

141.0 KN

V ultimate = (141 X 1.50)

= 211.5 KN

(τv) = Vu / bd

=211.5 x 10 /(23 x57)

= 1.61 N/mm²

Which is less than (τc) max 2.80 N/mm² for M25 concrete.

Hence safe

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THE LANDLENS SUITE

Eight ways to know a piece of land before you pay for it.

This report covers one part of the picture. These cover the rest, drawn from the same government records, for any property in Tamil Nadu.

LandLens One
Ask anything about a property and get an answer grounded in live government records, with the sources shown.
/landlens/one

Verify My Land
Every record check run on one property and returned as a single report.
/landlens/verify-my-land

Legal Opinion
An advocate's written opinion on the title, built on the records we pull for it.
/landlens

One Map
Every layer on one map: the parcel, its boundary, zoning, water bodies and what sits around it.
/landlens/one/map

PriceMap
What land actually changed hands for around this plot, taken from the registered deeds.
/landlens/pricemap

Build Scope
What you are allowed to build here: floor space, height, coverage and setbacks.
/landlens/build-scope

Property Tracker
Watch a property and hear about it when something new is registered against it.
/landlens/property-tracker

Deal Room
Run the transaction in one place: documents, stamping, signatures and the parties.
/landlens/deal-room

FREE TOOLS · NO ACCOUNT NEEDED

Twenty-four checks you can run yourself, at no cost.

Records and verification

The registers themselves, read for you.

- Encumbrance Certificate
- Patta and Chitta
- Field Measurement Sketch
- EC Analyzer
- Bank charge check
- Court case search
- Seller background check
- Approval check by survey

Value and duty

What it is worth and what it costs to register.

- Guideline value by street
- Guideline value by survey
- Stamp duty and registration fees
- Capital gains
- Floor space index
- Area unit converter

Zoning and land use

What the plan says can happen on this land.

- Land use zone finder
- CMDA land use check
- Coastal regulation zone
- Master plan check
- Water bodies finder
- Airport height clearance

Registers and directories

Who holds it, and which office keeps the record.

- Find your registering office
- Temple property check
- Waqf property check
- RERA register

Every free tool
/tools

Services we run for you
/services

The LandLens suite
/landlens/one

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Every claim in this document traces back to a government record.

- Legal opinions, due diligence and title verification
- Building plan, layout and sub-division approvals
- Completion and occupancy certificates, regularisation
- Escrow, negotiation and NRI property management
- Land survey, soil testing, architecture and construction

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