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DIGITALLY VERIFIED RECORD

2628

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23-05-2025

STRUCTURAL STABILITY CERTIFICATE

The detailed engineering and structure design of The proposed construction of high rise building (HRB) consisting of extended double basement floor + stilt floor part (double height parking) / ground floor part (banquet hall, home theatre, reception and meter room) + 20 floors + 21st floor part - 30 dwelling units with 72.0m height of residential building and open swimming pool at 21st floor at door no.11, c.p.ramaswamy road, alwarpet, chennai - 600 028 comprised in r.s.no.1646/12 & 1646/47 block no.34 of mylapore village within the limit of grater chennai corporation.zone -ix, division – 123 has been done by me based on the report of geotechnical investigation (soil test) done by Geo marine consultants Pvt. Ltd and report No. GT-2270 Dated 28/09/2021 and considering the functional requirement of the building.

2. It is certified that among other factors, the proposed building has been designed to resist earthquake. I have checked various parameters and found that the proposed building would be safe.

3. I further certify that:

(i) The minimum grade of concrete is M25

(ii) The design and analysis has been done using the code of practice for plain and reinforced concrete as per IS 456, design loads as per IS875 and design of earthquake resistant structure as per IS 1893

4. The building will be safe and sound when used for the purpose for which it is designed.

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ENCL: Structural Design Calculations

PLAN SHOWING THE PROPOSED CONSTRICTION OF HIGH RISE BUILDING (HRB) CONSISTING OF EXTENDED DOUBLE BASEMENT FLOOR + STILT FLOOR PART (DOUBLE HEIGHT PARKING) / GROUND FLOOR PART (BANQUET HALL, HOME THEATER, RECEPTION AND METER ROOM) + 20 FLOORS + 21st FLOOR PART - 30 DWELLING UNITS WITH 72.0M HEIGHT OF RESIDENTIAL BUILDING AND OPEN SWIMMING POOL AT 21st FLOOR AT DOOR NO.11, C.P.RAMASWAMY ROAD, ALWARPET, CHENNAI - 600 028 COMPRISED IN R.S.No.1646/12 & 1646/47 BLOCK No.34 OF MYLAPORE VILLAGE WITHIN THE LIMIT OF GRATER CHENNAI CORPORATION.ZONE -IX, DIVISION - 123.

TYPICAL STRUCTURAL DESIGN CALCULATION

1 **General:**

Proposed building is for residential use. Basement and Stilt floor is used for car park . And upper floors are used for residential use.

2 **Design Basis:**

Latest Design codes of BIS-456, 875 and 1893 are followed with SP-16 Design Aid book. Since the building is 22 stories, wind force is not taken into account. Also a live load reduction factor of as pr IS 800 is taken for foundation and column design.

Pile foundation is proposed as per as per soil report.

Fe- 500 steel is used as main steel and minimum M25 concrete is provided

3 **Earthquake consideration:**

For better stability during earhquake, the columns are braced in both direction with beams. Continuous lintels are specified for outer walls and column ties are closely spaced for better ductility. For building on stilt, minimum size is taken as 300 mm(12")

EARTHQUAKE LOAD

Design horizontal Seismic coeff. Ag = $\frac{Z}{2} \times \frac{I}{R} \times \frac{Sa}{g}$

Z	=	Zone Factor = 0.16 for Chennai
I	=	Importance Factor = 1.2
R	=	Response reduction Factor = 5
$\frac{Sa}{g}$	=	Avg. response acc.coeff. Depends on Ta
Ta	=	Fundamental natural period
	=	$\frac{0.09\ h}{\sqrt{d}}$ for infill walls
		h = height of the building
		d = Width of the building
	=	0.075 h for office building
W	=	seismic weight of building
	=	100% D.L + 25% L.L for residential <=300

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= 100% D.L + 50% L.L for residential >300

Base Seismic Shear Vb = Ag x W

4 **WIND LOAD**

Vz = Vb x K1 x K2 x k3

Vb = 50 m/sec in Chennai

K1 = Probability Factor = 1

K2 = Terrain, Height Factor = 1

K3 = Topography Factor = 1

p = 0.6 x Vz x Vz

= 0.6 x 50 x 50

= 1500 N/Sq.m

150 Kg/Sq.m

N. Chandru.

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5 **Design Loads:**

Slab	150 mm thk	=	36.0 KN/sq.m
Live load avg		=	4.00 KN/sq.m
Finishes		=	2.00 KN/sq.m
			42.00 KN/sq.m

Applying live load reduction of = 0.1 ,

For column and foundation design, 38.4 Kn/sqm is taken.

This value is also taken for frame analysis

b.w. 230 thick for exterior walls

0.2 x 2.55 x 8 = 4 KN/m/floor

B.W. 100 thk for interior panels

0.115 X 2.55 x 8 = 2.35 KN/m/floor

Beams 0.3 x 0.60 x 25 .= 4.5 KN/m/floor

Columns 0.30 x 1.00 x 3.20 x 25 .= 24.0 KN/floor

These are taken for analysis with WL+LL+DL combination.

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6 **SLAB DESIGN:** Refer drawing sheet

Thickness	=	200 mm		Fck	= M 30	N/sq.mm
Cover	=	20 mm		Fy	=Fe 500	N/sq.mm
Eff.Depth	=	175 mm				

Effective slab (4.5 x 7.5) m

Twoway slab Ly / Lx = 7.5 / 4.5 .= 1.7

Support condition - Two way slab, one long side continuous

short span= α x = 0.070 (- BM at continuous edge) Table:26

= 0.060 (+ BM at midspan) in IS-456-2000

long span= α y = 0.037 (- BM at support)

Designed for 0.070 co.efficient

Mu .= 0.070 x 9.0 1.5 x 4.5 x 4.5 = 19.1 KNm/m

$$\text{Mu / b.d.d} = \frac{19.14 \times 1000 \times 1000}{1000 \times 175 \times 175} = 0.62 \text{ N/sq.mm}$$

From Table-3of SP-16, Pt 0.330 %

Minimum Pt = 0.12 % as per code,

At = 0.330 x 1000 175 ./ 100 = **578** sq.mm/m

Provide 10 dia @ 100 = **785.4** sq.mm/m Short span

Provide 10 dia @ 125 = **628.3** sq.mm/m Long span

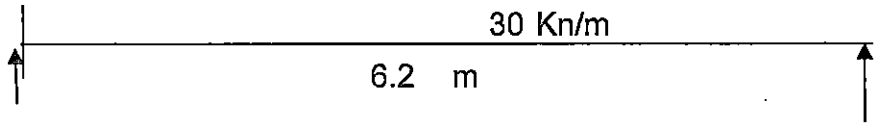
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7 **Beam design:** Beam-1

span = 8 m Beam size 300 x 600

d = 560 mm

Fck = M 30



Bending moment for UDL load = W x l x l / 12 = 96.10 Kn.m

Max. B.M = 96.1 Knm (top of support)

This is taken for design

Mu = 96 x 1.5 x 10-e6

144 x **10-e6** Nmm

Mu/b.d.d = $\frac{144 \times 10\text{-e}6}{300 \times 560 \times 560}$ = 1.53 N/sq.mm

From table-3 SP-16 for d'/d = 40 / 600 = 0.07

Pt = **0.700** % Pc = **0.00** %

At = 0.700 x 300 x 560 / 100 = **1176** sq.mm (top)

Ac = 0.000 x 300 x 560 / 100 = **0** sq.mm (bot)

provided 3 No 20 = **942** sq.mm +

3 No 20 = **942**

1885 sq.mm at support top

Shear Design:

Shear force wl/2 = 93

Factored shear force = 1.5 x 93 = 140 KN

for 0.70 % steel . Shear resisted by concrete section

from table-61 0.65 x 300 x 560 / 1000 = 109 KN

Balance shear (Vus) = 140 - 109 = 30 KN

Vus/d = 30 / 56 = 0.54 KN/cm

from table 62 of SP-16

Required 2 legged 8 stirrups @ 100 mm c/c

Provided 2 legged **10** stirrups @ **125** mm c/c

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8 **COLUMN DESIGN:** **COL-A** **COL SIZE** 300 X 1200

Maximum load is with wind force P = 798 t

Pu = 1.5 x 798 x10 = 11970 KN

Max.Bending Moment = 25 t.m Mu = 1.5 x 25.0 x10= 375 Kn.m

Cover = 30 mm

d'/d = 0.03

Fck = 50 N/sq.mm

Provide bars equaly all sides

Refer chart 47 of SP-16

$$\frac{Pu}{Fck\ b\ d} = \frac{1E+04 \times 1000}{50 \times 300 \times 1200} = 0.67$$

$$\frac{Mu}{Fck\ b\ d^2} = \frac{375 \times 10^6}{50 \times 300 \times 1200} = 0.017$$

$$\frac{p}{Fck} = \frac{0.045}{1200}$$

p% = 0.05 x 50 2.3 %

Minimum %age of steel is 0.8 %

$$As = \frac{2.25 \times 300 \times 1200}{100} = 8100 \text{ sq.mm}$$

Provided 22 Nos 25 dia = **10799** sq.mm

Ties 8 @ 100 c/c & 175mm c/c

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9 **Pile cap and pile**

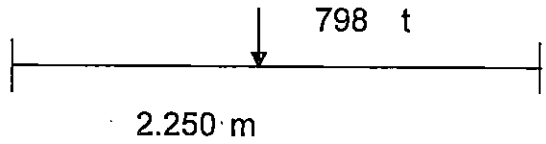
As per soil report, 25 m bored cast-in-situ pile can be adopted.

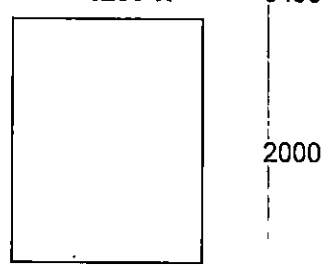
M3 0 concrete

900 dia pile safe capacity	=	450	t
Col-A carries maximum load of	=	798	t
So No of piles provided	=	2	Nos

Pile cap size = 2975 x 4880

M-30 grade = 30 N/sq.mm





Section of pile cap

Pile to pile distance = 2.25 m

axial force = 798 x 2.25 / 4 x 1.92

= 234 tonnes

At reqd = 233.8 /2.5 = 94 sqcm

Provided bttom bothways = **20 nos** 25

= 98.2 sqcm

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10 RAFT SLAB DESIGN:

Thickness	=	650 mm	Fck	= M	30	N/sq.mm
Cover	=	50 mm	Fy	=Fe	500	N/sq.mm
Eff.Depth	=	595 mm				

Upward thrust on raft= 65 kn/sqm

Since the upward thrust is nominal, and downaward load of raft is high, nominal rebars have been provided.

Provided 12 @ 100mm c/c top and bottom , bothways

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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
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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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