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DIGITALLY VERIFIED RECORD

PLAN SHOWING THE PROPOSED CONSTRUCTION OF STILT FLOOR (PARKING) + 5 FLOORS (NON HIGH RISE BUILDING -18.25 M HT) AVAILING PREMIUM FSI RESIDENTIAL BUILDING WITH 45 DWELLING UNITSAT MANAPAKKAM MAIN ROAD, KOLAPAKKAM, CHENNAI. COMPRISED IN OLD S.NO. 24 / 1 (PART) ,NEW S.NO. 24 / 1B2 , KOLAPAKKAM VILLAGE, KUNDRATHUR TALUK , KANCHIPURAM DISTRICT, KUNDRATHUR PANCHAYATH UNION .

TYPICAL STRUCTURAL DESIGN CALCULATION

1 **General:**

Proposed buildings are **S+5** floors. Stilt floor is used for car parking. Upper floors are for residential purpose.

2 **Design Basis:**

Latest Design codes of BIS-456, 875 and 1893 are followed with SP-16 Design Aid book. A typical 2-D Frame was taken for analysis to arrive at the bending moment for column design. Since the building is 6 stories, wind force is taken into account. Also a live load reduction factor of 0.4 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

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")

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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 = 1.0

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

= 0.09x18/ sqrt 23.7

= 0.33

= $0.075\ h^{0.75}$ for office building

W = seismic weight of building

= 100% D.L + 25% L.L for residential <=300

= 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

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5 **Design Loads:**

Slab 150mm thk	=	3.75	KN/sq.m
Live load	=	2.00	KN/sq.m
Finishes	=	1.50	KN/sq.m
		7.25	KN/sq.m

Say 7KN/sq.m/floor for slab and beam design

Applying live load reduction of = 0.4 ,

For column and foundation design, 6.05 Kn/sqm is taken.

This value is also taken for frame analysis

AAC Blocks 200 thick for exterior walls

0.2 x 2.4 x 7 = 3 KN/m/floor

AAC Blocks 100 thick for interior walls

0.100 X 2.4 x 7 = 1.68 KN/m/floor

Beam 0.2 x 0.60 x 25 .= 3.00 KN/m/floor

Columns 0.3 x 0.60 x 3.00 x 25 .= 13.5 KN/floor

for 6 upper 6 X 13.5 KN/floo .= 81 KN

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

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6 **SLAB DESIGN:** Refer sheet-1 SLAB - S1

Thickness	=	150	mm	Fck	= M	25	N/sq.mm
Cover	=	25	mm	Fy	=Fe	500	N/sq.mm
Eff.Depth	=	120	mm				

Panel (3.6 X 8.6) m

Twoway slab Ly / Lx = 8.6 / 3.6 .= 2.39
Support condition - One Way Slab

short span= α x = - (- BM at continuous edge) Table:26
= - (+ BM at midspan) in IS-456-2000
short span= α y = 0.100 (+ BM at midspan)
= - (- BM at continuous edge)
Designed for 0.100 co.efficient

Mu .= 0.100 x 7.5 1.5 x 3.6 x 3.6 = 14.58 KNm/m

$$\text{Mu / b.d.d} = \frac{14.58 \times 1000 \times 1000}{1000 \times 120 \times 120} = 1.01 \text{ N/sq.mm}$$

From Table-2 of SP-16, Pt 0.250 %
Minimum Pt = 0.12 % as per code, for Fe-500

At = 0.250 x 1000 120 ./ 100 = **300** sq.mm/m

Provide 8 dia @ 125 = **402** sq.mm/m Short span

Provide 8 dia @ 230 = **219** sq.mm/m Long span

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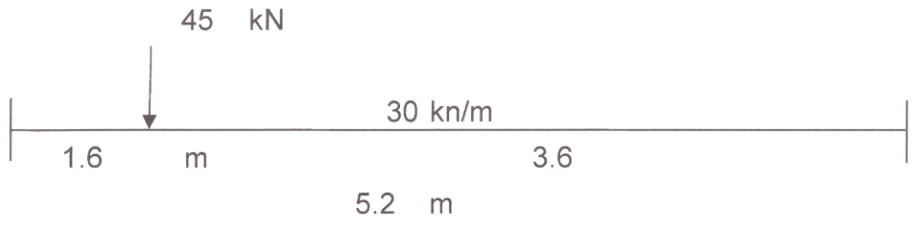
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7 **Beam design:** Beam-1 (Refer sheet -01)

span = 5.2 m Beam size 200 x 450

d = 410 mm

Fck = M 25



Bending moment for UDL load = 115.00 Kn.m

Max. B.M = 115.0 Knm (top of support)

This is taken for design

Mu = 115.0 x 1.5 x 10-e6

172.5 x **10-e6** Nmm

$$Mu/b.d.d = \frac{172.5 \times 10\text{-}e6}{200 \times 410 \times 410} = 5.13 \text{ N/sq.mm}$$

From table-2 SP-16 for d'/d = 40 / 450 = 0.09

Pt = **1.400** % Pc = **0.250** %

At = 1.400 x 200 x 410 / 100 = **1148** sq.mm (Bot)

Ac = 0.250 x 200 x 410 / 100 = **205** sq.mm (Top)

provided 2 No 16 = **402** sq.mm +

3 No 20 = **942**

1345 sq.mm

No of bars at top of support = **2 Nos** **16** dia + **3 Nos** **20** dia

%age of steel at top of support = 1.6 %

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8 **COLUMN DESIGN:** **COL-C1** **COL SIZE** **600 X 300**

Maximum load is with wind force P = 150 t

Pu = 1.5 x 150 x10 = 2250 KN

Max.Bending Moment = 2 t.m Mu = 1.5 x 2.0 x10= 30 Kn.m

Cover = 40 mm

d'/d = 0.07

Fck = **M35** = 35 N/sq.mm

Provide bars equaly all sides

Refer chart 44 of SP-16

$$\frac{Pu}{Fck\ b\ d} = \frac{2250 \times 1000}{35 \times 600 \times 260} = 0.36$$

$$\frac{Mu}{Fck\ b\ d^2} = \frac{30 \times 10^6}{35 \times 600 \times 260} = 0.02$$

$$\frac{p}{Fck} = 0.02 \qquad p\% = 0.02 \times 35 \times 260 = 0.7\ \%$$

Minimum %age of steel is 0.8 %

$$As = \frac{0.8 \times 600 \times 300}{100} = 1440 \text{ sq.mm}$$

Provided	10	Nos	20 dia	+	=	3142 sq.mr +
	0	Nos	0 dia		=	0 sq.mm
		TOTAL PROVIDED			=	3142 sq.mm

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

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9 Pile cap and pile

As per soil report, 20 m bored cast-in-situ pile can be adopted.

600 dia pile safe capacity	=	96	t
Col-A carries maximum load of (P)	=	150	t
So No of piles provided	=	2	Nos

Pile cap size = 1800 x 900 X 750 mm

M-30 grade = 30 N/sq.mm

Pile to pile distance(L) = 1.5 m

Bending Moment = $\frac{W \times L}{6}$ = 375 kN-m

Mu/bD^2 = 1.45 D = 0.75 m

Ast = 2155 sq.mm d = 0.69 m

Provide = 6-25 Bottom

6-16 Top

Shear Design:

Shear force 750 KN

Factored shear force = 1.5 x 750 = 1125 KN

for 0.45 % steel Shear resisted by concrete section

from table-61 0.5 x 900 x 750 / 1000 = 338 KN

Balance shear (Vus) = 1125 - 338 = 788 KN

Vus/d = 788 / 68.5 = 11.50 KN/cm

from table 62 of SP-16

Required 6 legged 10 stirrups @ 140 mm c/c

Provided 6 legged **12** stirrups @ **150** mm c/c

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Shear Design:

Shear force 110 KN

Factored shear force = 1.5 x 110 = 165 KN

for 1.64 % steel Shear resisted by concrete section

from table-61 0.76 x 200 x 410 / 1000 = 62 KN

Balance shear (Vus) = 165 - 62 = 103 KN

Vus/d = 103 / 41 = 2.50 KN/cm

from table 62 of SP-16

Required 2 legged	8 stirrups	@	140 mm	c/c
Provided 2 legged	**8** stirrups	@	**100** mm	c/c

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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

Verified RealEstate™

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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Prepared from the registers named on the page each finding sits on. Where a register could not be read, this document says so in its place rather than leaving the gap to be read as a clean result.