Verified RealEstate™

Your trusted partner for buying, selling, and managing property, ensuring hassle-free service with 100% transparency.

3/350/2 Mettukuppam,
OMR Thoraipakkam,
Chennai, India

hello@verified.realestate
+91 9996 12 9996

Official Property Record

Digitally Verified Record - Powered by Verified RealEstate™

PROPOSED CONSTRUCTION OF RESIDENTIAL GROUP DEVELOPMENT COMPRISING 4 BLOCKS AND COMBINED BASEMENT; BLOCK 1: BASEMENT FLOOR + GROUND FLOOR + 5 FLOORS (18.15M HEIGHT) RESIDENTIAL BUILDING WITH 95 DWELLING UNITS, BLOCK 2: BASEMENT FLOOR + GROUND FLOOR + 4 FLOORS + 5TH FLOOR PART (18.15M HEIGHT) RESIDENTIAL BUILDING WITH 54 DWELLING UNITS AND SWIMMING POOL, INDOOR GAMES ROOM, ASSOCIATION ROOM, VIDEO GAMES ROOM & KIDS PLAY ROOM; BLOCK 3: BASEMENT FLOOR + GROUND FLOOR + 5 FLOORS (18.15M HEIGHT) RESIDENTIAL BUILDING WITH 36 DWELLING UNITS; BLOCK 4: BASEMENT FLOOR + GROUND FLOOR + 5 FLOORS (18.15M HEIGHT) RESIDENTIAL BUILDING WITH 24 DWELLING UNITS; TOTALLY 209 DWELLING UNITS AVAILING PREMIUM FSI IN S.NOS. 10/1, 10/5, 10/6, 10/7, 10/8, 10/11A, 11/7A, 11/8A1A, 11/8B, 11/8C1A, 11/8C1B, 11/8C2, 11/8C3, 11/8C4, 11/9A, 11/10B1B, 11/10B2, 12/1A, AND 12/1B OF NEELANKARAI VILLAGE AND S.NO.23/24 OF SEEVARAM VILLAGE WITHIN THE LIMIT OF GREATER CHENNAI CORPORATION.

TYPICAL STRUCTURAL DESIGN CALCULATION

1 **General:**

All residential buildings are Basement + Ground + 5 upper floors. Basement floor is used as car parking purpose. Upper floors are for Residential use. One typical block design is given

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 0.2 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 basement and stilt, minimum size is taken as 300 mm(12")

S. NAGESH, B.E. (CIVIL), M.A.Sc., F.I.E.
STRUCTURAL ENGINEER
CMDA REG. No: SE/GR-I/2020/08/276
GCC REG No : RSE 101202020
New No. 15, 3rd Cross Street,
Karpagam Gardens, Adyar, Chennai - 600 020.
Email : nagesh.somadev@gmail.com
Mobile : 98402 31666

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

= 0.075 h 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

S. NAGESH, B.E. (CIVIL), M.A.Sc., F.I.E.
STRUCTURAL ENGINEER
CMDA REG. No: SE/GR-I/2020/08/276
GCC REG No : RSE 101202020
New No. 15, 3rd Cross Street,
Karpagam Gardens, Adyar, Chennai - 600 020.
Email : nagesh.somadev@gmail.com
Mobile : 98402 31666

5 **Design Loads:**

Slab130 mm thk avg	=	3.3 KN/sq.m
Live load	=	2.0 KN/sq.m
Finishes	=	1.7 KN/sq.m
		7.0 KN/sq.m

Say 7.0 KN/sq.m/floor for slab and beam design

Applying live load reduction of = 0.2 ,

For column and foundation design, 5.6 Kn/sqm is taken.

This value is also taken for frame analysis

200 thick AAC blocks for exterior walls

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

B.W. 100 thk for interior panels

0.100 X 2.55 x 8 = 2.04 KN/m/floor

Beams 0.2 x 0.35 x 25 .= 1.75 KN/m/floor

Columns 0.3 x 0.45 x 3.00 x 25 .= 10.1 KN/floor

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

S. NAGESH, B.E. (CIVIL), M.A.Sc., F.I.E.
STRUCTURAL ENGINEER
CMDA REG. No: SE/GR-I/2020/08/276
GCC REG No : RSE 101202020
New No. 15, 3rd Cross Street,
Karpagam Gardens, Adyar, Chennai - 600 020.
Email : nagesh.somadev@gmail.com
Mobile : 98402 31666

6 **SLAB DESIGN:**

Thickness	=	130 mm	Fck	= M 30	N/sq.mm
Cover	=	20 mm	Fy	=Fe 415	N/sq.mm
Eff.Depth	=	105 mm			

Panel (3.4 x 4.9) m

Twoway slab Ly / Lx = 4.9 / 3.4 .= 1.4

Support condition - 1 sides discontinuous

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

= 0.049 (+ BM at midspan) in IS-456-2000

Long span α y = 0.055 (- BM at support)

0.042 +BM AT MIDSPAN

Designed for 0.070 co.efficient

Mu .= 0.070 x 7.0 1.5 x 3.4 x 3.4 = 8.50 KNm/m

$$\text{Mu / b.d.d} = \frac{8.50 \times 1000 \times \mathbf{1000}}{1000 \times 105 \times 105} = 0.77 \text{ N/sq.mm}$$

From Table-3of SP-16, Pt 0.200 %

Minimum Pt = 0.12 % as per code, for Fe-415

At = 0.200 x 1000 105 ./ 100 = **210** sq.mm/m

Provide 10 dia @ 175 = **448.8** sq.mm/m Short span

Provide 8 dia @ 175 = **287.2** sq.mm/m Long span

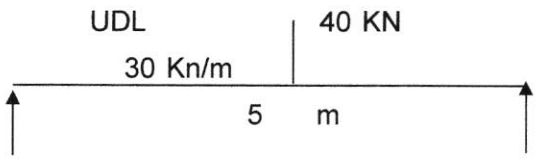
S. NAGESH, B.E. (CIVIL), M.A.Sc., F.I.E.
STRUCTURAL ENGINEER
CMDA REG. No: SE/GR-I/2020/08/276
GCC REG No : RSE 101202020
New No. 15, 3rd Cross Street,
Karpagam Gardens, Adyar, Chennai - 600 020.
Email : nagesh.somadev@gmail.com
Mobile : 98402 31666

8 **Beam design:** Beam-1

span = 5 m Beam size 200 x 450

d = 410 mm

Fck = M 30



Bending moment for UDL 98.00 Kn.m

Max. B.M = 98.00 (top of support) This is taken for design

Mu = 98 x 1.5 x 10-e6 = **147.0** x **10-e6 =** Nmm

$$Mu/b.d.d = \frac{147.0 \times 10\text{-}e6}{200 \times 410 \times 410} = 4.37 \text{ N/sq.mm}$$

From table-53 SP-16 for d'/d = 40 / 450 = 0.00

Pt = **1.000** % Pc = **0.30** %

At = 1.000 x 200 x 410 / 100 = **820** sq.mm (top)

Ac = 0.300 x 200 x 410 / 100 = **246** sq.mm (bot)

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

2 No 12 = **226**

1169 sq.mm at support top

Shear Design:

Shear force p/2 = 95 KN

Factored shear force = 1.5 x 95 = 143 KN

for 1.00 % steel Shear resisted by concrete section

from table-61 0.65 x 200 x 410 / 1000 = 53 KN

Balance shear (Vus) = 143 - 53 = 89 KN

Vus/d = 89 / 41 = 2.18 KN/cm

from table 62 of SP-16

Required 2 legged 8 stirrups @ 150 mm c/c

Provided 2 legged **8** stirrups @ **110** mm c/c

S. NAGESH, B.E. (CIVIL), M.A.Sc., F.I.E.
STRUCTURAL ENGINEER
CMDA REG. No: SE/GR-I/2020/08/276
GCC REG No : RSE 101202020
New No. 15, 3rd Cross Street,
Karpagam Gardens, Adyar, Chennai - 600 020.
Email : nagesh.somadev@gmail.com
Mobile : 98402 31666

9 **COLUMN DESIGN:** **COL-A** **COL SIZE** **300 X 600**

Maximum load is with wind force P = 160 t

Pu = 1.5 x 160 x10 = **2400** KN

Max.Bending Moment = 3 t.m Mu = 1.5 x 3.0 x10= 45 Kn.m

Cover = 40 mm

d'/d = 0.07

Fck = 35 N/sq.mm

Provide bars equaly all sides

Refer chart 44 of SP-16

$$\frac{Pu}{Fck\ b\ d} = \frac{2400 \times 1000}{35 \times 300 \times 600} = 0.38$$

$$\frac{Mu}{Fck\ b\ d^2} = \frac{45 \times 10^6}{35 \times 300 \times 600} = 0.01$$

$$\frac{p}{Fck} = \frac{0.04}{p\% = 0.05 \times 35} \quad 1.75\ \%$$

Minimum %age of steel is 0.8 %

$$As = \frac{1.75 \times 300 \times 600}{100} = 3150 \text{ sq.mm}$$

Provided 6 Nos 20 dia = **1885** sq.mm

\+ 4 Nos 25 dia = **1964** sq.mm

3848 SQ MM

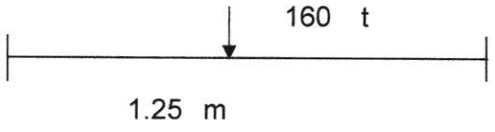
Ties 8 @ 125 & 175c/c

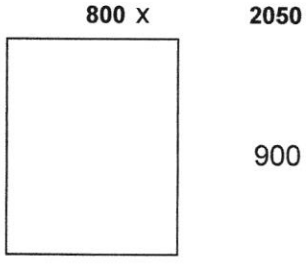
S. NAGESH, B.E. (CIVIL), M.A.Sc., F.I.E.
STRUCTURAL ENGINEER
CMDA REG. No: SE/GR-I/2020/08/276
GCC REG No : RSE 101202020
New No. 15, 3rd Cross Street,
Karpagam Gardens, Adyar, Chennai - 600 020.
Email : nagesh.somadev@gmail.com
Mobile : 98402 31666

10 **Pile cap and pile**

As per soil report, 15.5 m bored cast-in-situ pile can be adopted.

500 dia pile safe capacity	=	100	t	
Col-A carries maximum load of	=	160	t	
So No of piles provided	=	2	Nos	
Pile cap size	=	800 x 2050 X	800	MM
M-30 grade	=	25	N/sq.mm	





Section of pile cap

Pile to pile distance = 1.25 m

axial force = 160 x 1.25 / / 0.82

= 61 tonnes

At reqd = 60.98 /2 '= 30 sqcm

Provided bttom bothways = **11 nos** 20

= 34.6 sqcm

S. NAGESH, B.E. (CIVIL), M.A.Sc., F.I.E.
STRUCTURAL ENGINEER
CMDA REG. No: SE/GR-I/2020/08/276
GCC REG No : RSE 101202020
New No. 15, 3rd Cross Street,
Karpagam Gardens, Adyar, Chennai - 600 020.
Email : nagesh.somadev@gmail.com
Mobile : 98402 31666

our services doesn't just end there

Buying & Selling Services

Property Buying Assistance, Property Selling Support, Market Price Analysis, Owner Outreach and Negotiation.

Legal & Documentation Services

Certified EC, Patta, legal opinions, property verification, due diligence, litigation solutions, and legal heir certificates.

Property Development & Approvals

Building plan approvals, construction, layout and sub-division approvals, zone conversion, and occupancy certification.

NRI & Investment Services

Escrow Services, Rentals, Litigation Solutions, Property Valuation and Property Management

Compliance & Special Services

Demolition, Vaasthu checks, regularization of unauthorized buildings, and office space solutions.

empowering your real estate decisions with smart tools

Property Valuation & Cost Estimation

Guideline Value, Apartment Composite Value, Stamp Duty & Registration Fees Calculator, Building Value Calculator, Capital Gains Calculator, Area Unit Converter, Length Unit Converter

Ownership, Compliance & Legal Verification

Encumbrance Certificate (EC) Search, Find Your SRO, Temple Property Check, WAQF Property Check, View Patta/Chitta, View FMB, Patta Analyzer, EC Analyzer

Zoning & Land Use Analysis

Land Use Zone Finder, CRZ Zone Check, Aquifer Zone Check, CBA Check, EWS Check, Road Width Check, Proposed Road Widening Check, FSI Calculator

Property Documentation & Workflow Tools

Forms & Templates, Document Generator, Document Translation, Dictionary

Vastu & Property Management Tools

Home Vastu Shastra, Plot Vastu Shastra, Property Management

Verified RealEstate™

We're honored to be part of your real estate journey

3/350/2 Mettukuppam,
OMR Thoraipakkam,
Chennai, India

hello@verified.realestate
+91 9996 12 9996
www.verified.realestate