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JAYAM CONSULTANTS PRIVATE LIMITED

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STABILITY CERTIFICATE

It is certified that the plan showing the proposed Ground floor, commercial building in New T.S.No. 33/14, T.S.No. 33/15, T.S.No. 33/16, T.S.No. 33/17, T.S.No. 33/18, T.S.No. 33/19 and T.S.No. 33/20, situated at Ward No. C, Block No. 35 of Madhavaram Village, MadhavaramTaluk, previously Ambattur taluk, Thiruvallur district & is designed to resist for earthquake. Check has been made and found safe and I hereby certify that:

The minimum grade of concrete is M25

The Minimum column size if 400 mm

The design analysis using the code of practice for loading standards as per BIS-875 and seismic forces as per the latest code BIS- 1893 &BIS- 456.

I.S.456	-	2000 (Code of practice for PCC & RCC)
I.S.875	-	2015 (Code of practice for design loads for buildings & structures)
S.P.16 & S.P.34-		2002 (Code of practice for design and detailing)
I.S.13920	-	2016 (Code of practice for design and detailing for earthquake)
I.S.1893	-	2002 (Criteria for earthquake resistant building)
I.S.4236	-	1993 (Code of practice for design earthquake resistant building)
NBC	-	2005.

Signature of Structural Engineer,

J.S PADMANABHAN

S. PADMANABHAN
Registered Structural Engineer
Grade - I (SE)
Regn. No. SE/GR-I/19/05/123

PLAN SHOWING THE PROPOSED GROUND FLOOR, COMMERCIAL BUILDING IN NEW T.S.NO. 33/14, T.S.NO. 33/15, T.S.NO. 33/16, T.S.NO. 33/17, T.S.NO. 33/18, T.S.NO. 33/19 AND T.S.NO. 33/20, SITUATED AT WARD NO. C, BLOCK NO. 35 OF MADHAVARAM VILLAGE, MADHAVARAMTALUK, PREVIOUSLY AMBATTURTALUK, THIRUVALLUR DISTRICT,

TYPICAL STRUCTURAL DESIGN CALCULATION

01. General

Proposed Building of Ground floor for commercial purpose.

02. Design Basis :

Latest Design codes of BIS-456, 875 AND 1893 are followed with SP-16. Design Aid book. A Typical Frame was taken for analysis to arrive at the bending moment for column design, since the building is only Ground floor, wind force is taken in to account. Live Load reduction factor is applied in design. Pile foundation is proposed as per soil report. Fe-500 steel is used as main steel and 8 mm bars for distributors.

03. Earthquake consideration.

For better stability during earthquake, 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 Minimum size is taken as 400 mm (16")

04. WIND LOAD

Vz = Vb x K1 x K2 X K3 X K4
Vb = 50m/sec in chennai
K1 = Probability Factor = 1
K2 = Terrain, Height Factor = 1
K3 = Topography Factor = 1
K4 = Cyclonic Factor = 1.15

P = 0.6 x Vz x Vz
= 0.6 x 50 x 50
= 1500 N / Sq.m

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FLOOR LOADS :

DEAD LOADS

Assuming 5''thk slab dead load	=	313 kg/sqm
Weight of floor finish, partitions etc.,	=	131 kg/sqm
Total dead load	=	444 kg/sqm

LIVE LOADS

Live load on typical floor	=	200 kg/sqm
Total load on typical floor	=	644 kg/sqm

ROOF LOADS

Assuming 5''thk slab dead load	=	313 kg/sqm
Weight of weathering course	=	273 kg/sqm
Total dead load	=	586 kg/sqm
Live load on roof with success assumed	=	150 kg/sqm
Total roof load	=	736 kg/sqm
Staircase loading liable to overcrowding	=	500 kg/sqm
Wind load considering height of building	=	200 kg/sqm

BRICK LOADS

Weight of brick per sqm	=	1890 kg/cum
Assuming beam size of 9''x24''	=	335 kg/rm
R.C.C Mix to be adopted	=	M25

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LOAD ON TYPICAL COLUMN

Roof load		=	10.31ton
Beam load		=	12.57ton
Brick work load		=	37.50ton
Self weight of column assuming (16''x16'')		=	5.07ton
Total load on column		=	65.45ton
	Say	=	66ton

Provide 12-Y16

Safe capacity of above section = 160ton

Hence safe

TYPICAL FOUNDATION

SBC of soil = 14ton/sqm
As per soil report @3m depth

Area of footing required = 4.72 sqm

Area of footing provided = 6.76 sqm

Hence safe

TYPICAL SLAB Ly/Lx = 4.0/3.5 =1.14

Hence two way slab

Provide 5''thk slab

Provide Y8 @ 4'' C/C (shorter direction)

Provide Y8 @ 7'' C/C (longer direction)

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TYPICAL BEAM

Span	=	5.965m
Slab load	=	1805kg/m
Self weight	=	350 kg/m
Total load	=	2155kg/m
Bending moment	=	8028.01kg-m
B.M due to conc 1	=	6545.3kg-m
B.M due to conc 2	=	3145.00kg-m
Total bending moment	=	17718.31kg-m

EARTHQUAKE ANALYSIS

Calculation of horizontal seismic coefficient
As per code I.S.1893/2016 Ah = ZI/2R x Sa/g

Zone factor (Chennai zone)	z =	0.16
Importance factor	I =	1.2
Response reduction factor	R =	5.0

Natural period

Ta	=	0.075h
	=	0.075x4.5
	=	0.34secs
	H =	(Ht of buildg)
Sa/g	=	1.67/t

Sa/g = 1.67/0.34 = 4.91

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Sa/g = $\frac{0.16 \times 1.2}{2 \times 5.0} \times 4.91$

= 0.094

CALCULATION OF BASE SHEAR/SEISMIC FORCES

Floor	Wi	Hi	Wi x Hi^2	Qi
Terrace	87.108	4.5	1763.94	11.825
Plinth	14.691	0.6	5.288	1.04×10^{-3}
EWI	101.8		E 1769.23	

Base shear V = Ah EWI

= 0.094 x1763.3 = 1.65ton

Seismic force per column = 1.65/4 =0.414

Seismic moment per column = 0.414x3/2 =0.62

Column provided is safe against the additional seismic moment of 0.62mt.

CHECK FOR PILE

P/a+M/z

$\frac{66}{6.76} \pm \frac{0.62}{2.93}$

9.77 +- 0.212

=9.982 ton/sqm.

=1.25 x 14

=17.5 ton/sqm

Hence safe

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Vastu & Property Management Tools

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