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15.02.2024

To
Tamil Nadu Real Estate Regulatory Authority (TNRERA),
1st Floor, Tower – II,
CMDA,
No.1A, Gandhi Irwin Bridge Road,
Egmore, Chennai – 600 008

STABILITY CERTIFICATE

The proposed Residential building **Stilt + 5 Floors at Plot No. D&E, Comprised in Old Survey No.687/2, as per Patta No.761, New Survey No.687/2A Part of Periya Kuppam Village, Thiruvallur Taluk, Thiruvallur District** has been designed as per IS Codal regulations and the construction will be carried out as per Standard Engineering Practice and hence the building is certified to be structurally stable.

The entire structure shall be designed with all safety precautions as per IS Codal regulation to support the slab and walls at every floor level.

V.R.RAVINDRAN
Structural Consultant
V R P CONSULTANTS

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Design of Structure

The structure has been modeled in software "ETABS". The columns and beams have been modeled as per plan. The slab has been given as plate model and loadings are applied as per IS Codal regulations. The wall load has been applied on beams as per plan.

The structure has been analysed as three dimensional structure. The earthquake forces are applied as per IS 1893-2002. The ductile detailing has been followed as per IS 13920-1993.

The loads on columns are taken and foundation is designed as per IS Code. Beams and columns are designed by ETABS. The floor slab is designed manually using IS Codal regulations.

Soil bearing capacity as per soil report is 220 kN/m^2 and this has been considered in the design of foundation.

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STABILITY CERTIFICATE

It is certified that Residential building at **Stilt + 5 Floors at Plot No. D&E, Comprised in Old Survey No.687/2, as per Patta No.761, New Survey No.687/2A Part of Periya Kuppam Village, Thiruvallur Taluk, Thiruvallur District** has been designed to resist earthquake, check has been made and found safe and I hereby certify that

1. The least dimension of the column is 230 mm.
2. The grade of concrete is **M-20**.
3. The design and analysis is done using the codes of practice for loading standards as per IS: 875 Parts and Seismic force as per the code IS 1893-2002 & IS 456:2000

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DESIGN OF SLAB

Data:

Concrete	M25		fck	=	25	N/mm²
Steel	Fe 500		fy	=	500	N/mm²
Shorter Span			Lx	=	3.35	m
Longer Span			Ly	=	4.31	m
Assuming Depth of Slab			D	=	150	mm
Assuming Dia of reinf.				=	10	mm
Clear Cover				=	20	mm
Eff. Depth of Slab			d	=	125	mm
Eff.Shorter Span			l_x	=	3.48	m
Eff. Longer Span			l_y	=	4.43	m

1. Load Calculations:

Self weight of slab	0.15	x	25.00	=	3.75	kN/m²
Floor Finish load	0.075	x	20.00	=	1.50	kN/m²
Live load				=	2.00	kN/m²
Total load				=	7.30	kN/m²
Load Factor				=	1.50	
Factored Load	3			=	10.95	kN/m²
Span Ratio			ℓ_y/ℓ_x	=	4.43 / 3.48	
				=	1.27	

2. Bending Moment Calculation:

Support Condition	**3**	One Long Edge Discontinuous			
From IS 456-2000 Table 26	3	α_{Nx}	=	0.056	
		α_{Px}	=	0.043	
		α_{Ny}	=	0.037	
		α_{Py}	=	0.028	

Shorter Span:

Negative Moment (Support)	M_{Nx}	=	$\alpha_{Nx} \times w_u \times l_x^2$	
		=	0.056 x 10.95 x 3.48²	
		=	7.37	kN.m
Positive Moment (Mid span)	M_{Px}	=	$\alpha_{Px} \times w_u \times l_x^2$	
		=	0.043 x 10.95 x 3.48²	
		=	5.65	kN.m

Longer Span :

Negative Moment (Support)	M_{Ny}	=	$\alpha_{Ny} \times w_u \times l_x^2$	
		=	0.037 x 10.95 x 3.48²	
		=	4.89	kN.m

Positive Moment (Mid span)	M_{Py}	=	$\alpha_{Py} \times w_u \times l_x^2$
		=	0.028 x 10.95 x 3.48^2
		=	3.70 kN.m

Reinforcement:

	Reinf Required		Reinf Provided
Required in Shorter Span			
Support	10Ø @ 375mm c/c	-	10 dia @ 150 mm c/c
Mid span	10Ø @ 375mm c/c	-	10 dia @ 150 mm c/c
Required in Longer Span			
Support	10Ø @ 375mm c/c	-	10 dia @ 150 mm c/c
Mid span	10Ø @ 375mm c/c	-	10 dia @ 150 mm c/c

3. Check for Shear:

As per BS:8110 Shear coefficients

Max Shear coeff. for continuous edge in short direction	γcx =	0.46
Shear coefficient for discontinuous edge in short direction	γdcx =	0.30
Shear coefficient for continuous edge in long direction	γcy =	0.36
Shear coefficient for discontinuous edge in long direction	γdcx =	0.00

S.F for continuous edge in short direction	Vcx	=	$\gamma cx * \ell x * W$
Maximum Shear Force	Vu	=	0.46 x 3.475 x 10.95
		=	17.60 kN
S.F for discontinuous edge in short direction	Vdcx	=	$\gamma dcx * \ell x * W$
		=	0.30 x 3.475 x 10.95
		=	11.604kN
S.F for continuous edge in long direction	Vcy	=	$\gamma cy * \ell x * W$
		=	0.36 x 3.475 x 10.95
		=	13.698kN
S.F for discontinuous edge in long direction	Vdcy	=	$\gamma dcy * \ell x * W$
		=	0.00 x 3.475 x 10.95
		=	0.000kN

S.F for continuous edge in short direction	Vu	=	17.597
Design Shear stress τv	Vu/bd	=	17597 / (1000 x 125)
		=	0.141 N/mm²

Reinforcement provided in the slab is		=	10Ø @ 150 mm c/c
% of reinforcement provided	pt	=	0.419
IS:456 Table 19			
Allowable shear stress	τc	=	0.45 N/mm²
As per IS:456 cl. 40.2.1.1 k value for slab		=	1.30
Design shear stress for concrete	k x τc	=	1.30 x 0.454
		=	0.591 N/mm²

Actual Shear Stress < Design Shear Stress 0.141 < 0.591

SAFE

4. Check for deflection

Allowable span / depth Ratio		l/d	=	26	
% of Tension reinforcement		pt	=	0.419	
Corresponding Compression reinf.		Bar dia	=	0	mm
		spacing	=	150	mm
% of Compression reinforcement		pc	=	0.000	
Modification factor for Tension reinf.	F1	=	2.00	(From Fig 4 in IS 456 - 2000)	
Modification factor for Comp. reinf.	F2	=	1.00	(From Fig 5 in IS 456 - 2000)	

Modified span/depth ratio = l/d x F1 x F2
= 26 x 2.00 x 1.00
= **52.00**

Actual span/depth ratio = 3475 / 125
= **27.80**

Actual span/depth ratio < Modified span/depth ratio 27.80 < 52.00

SAFE

DESIGN OF BEAM

Data:

Effective span		=	4.53 m
		=	4530 mm
Breadth of beam		=	230 mm
Overall depth (assumed)		=	450 mm
Characterstic strength of steel			
	fy	=	500 N/mm²
	fck	=	25 N/mm²
Cover		=	25 mm

Total load

Dead load from slab		=	3.75 kN/m²
Floor finish		=	1 kN/m²
Partition		=	1 kN/m²
Total dead load		=	5.75 kN/m²
Live load		=	2 kN/m²
	Total load	=	7.75 kN/m²

Effective depth = **d** = $450 - 25 - \frac{25}{2}$

= 412.5 mm

Distance of centroid of Compression reinforcement from the extreme compression fibre =

d' = 25 + (25/2)

= 37.5 mm

$\frac{d'}{d} = \frac{37.5}{412.5}$

= 0.1

Minimum Reinforcement

The min. area of tension reinforcement shall not be less than the given,

$$\frac{As}{bd} = \frac{0.85}{fy}$$

Where ,

As	=	Min. area of tension reinforcement
b	=	Breadth of the beam or breadth of web of T-beam
d	=	Effective depth

fy = Characterstic strength of reinforcement

$$As = \frac{0.85 \times b \times d}{fy}$$

$$= \frac{0.85 \times 230 \times 412.5}{500}$$

$$= 161.29 \text{ mm}^2$$

Refering Design Aids **IS:456**, The reinforcement as shown in the sketch

Overall depth of beam = $\frac{1}{12}$ to $\frac{1}{20}$ of the span

Provide over all depth = 450 mm

Width of rib = $\frac{2}{3}$ (depth of rib) = $\frac{2}{3}$ (450 - 150)

= 200 mm

Loading on the beam

From the slab = $\frac{7.75 \times 4.530}{3}$

= 12 kN/m

D.L of the rib = 0.23 x 0.3 x 25 kN/m

= 1.8 kN/m

Total = 13.8 kN/m

Provide 20 mm dia bars at clear cover 25 mm

Effective cover = 25 + 10

= 35 mm

Effective depth d = 415 mm

Center to Center bearing = 4.53 m

Effective span = 4.53 m

Max. BM = $\frac{13.8 \times 4.530 \times 4.530}{8}$

= 35 kN.m

Req.depth **d** = $\left[\frac{1.5 \times 35 \times 10 \wedge 6}{2.76 \times 230}\right]^{1/2}$

= 288 mm

Provided depth, D = 450 mm

$$\frac{Mu}{bd^2} = \left[\frac{1.5 \times 35 \times 10 \wedge 6}{230 \times 415 \times 415}\right]^{1/2}$$

$$= 1.2$$

$$pt = \frac{fck}{2 \times fy}\left[1 - \left(SQRT\left[1 - \frac{4 \times (Mu/b \times d^2)}{0.87 \times fck}\right]\right)\right] \times 100$$

$$= 0.29\ \%$$

$$Ast = \left[\frac{0.29 \times 230 \times 415}{100}\right]$$

$$= 277\ mm^2$$

Provided 3 - Y16

Check for Shear

$$V = \frac{1.5 \times 13.8 \times 4.530}{2}$$

$$= 47\ kN$$

$$\tau_c = 0.54\ N/mm^2$$

$$Vuc = \frac{0.54 \times 230 \times 412.5}{1000}$$

$$= 51.2\ kN$$

Vuc > Shear at support

Provide Y8 @ 150 c / c (stirrups)

DESIGN OF COLUMN

Data :

Total No. of floors		=	5
Total No. of Roof		=	6
Storey height		=	3.05 m
Breadth of column	b	=	300 mm
		=	0.3 m
Depth of column	D	=	450 mm
			0.45 m
	fck	=	25 N/mm²

Total axial load

Dead load & live load from one floor		=	200 kN
Total axial load all floors		=	6 x 200
		=	1200 kN
Column dimension		=	300 x 450 mm
Self weight of column		=	0.3 x 0.45 x 6 x 25 x 3.1
		=	62 kN
Total load		=	(1,200 + 62) x 1.5
	Pu	=	1893 kN

Area of Reinforcement

	$\frac{d'}{D}$	=	0.1
	d'	=	45 mm
	$\frac{Pu}{fck.b.D}$	=	$\frac{1,893 \times 10^{3}}{25 \times 300 \times 450}$
		=	0.56
	$\frac{Mu}{fck.b.D^2}$	=	$\frac{1.7 \times 1.5 \times 15.4 \times 10^{6}}{25 \times 300 \times 450 \times 450}$
		=	0.03

Refering to chart in SP:16 for values

$\frac{Pu}{fck.b.D}$ = 0.56 ; $\frac{Mu}{fck.b.D^2}$ = 0.03

The value of $\frac{P}{fck}$ = 0.08

$$p = \frac{0.08 \times 25}{2}$$

$$As = \frac{p \times b \times D}{100}$$

$$= \frac{2.00 \times 300 \times 450}{100}$$

$$= 2700 \text{ mm}^2$$

Provide 8 - Y25 bars

Design of Lateral Ties

Dia of lateral ties = $\frac{1}{4} \times 25 = 6$ mm

Hence 8 dia bar is adopted

Pitch is min. of the following - (as per IS:456)

a. Least lateral dimension = 300 mm
b. 16 x dia of main reinforcement = 16 x 25 = 400mm
c. 300mm

Hence provide Y8 @ 200 c/c
Similarly other columns are calculated.

DESIGN OF FOUNDATION

Design of Isolated footing for intermediate column

Data :

Column size	L	=	300	mm
	B	=	450	mm
Size of footing	L	=	2.1	m
	B	=	2.1	m
Safe Bearing capacity of soil	SBC	=	220	kN/m²
Depth of footing below GL		=	1.6	m
Density of soil	g	=	18	kN/m³
Characterstic strength of concrete	fck	=	25	N/mm²
Characterstic strength of Steel	fy	=	500	N/mm²
Depth of footing provided	D	=	0.68	m
cover		=	50	mm

1. Loading on footing

Axial load on column		=	1262 kN
Self weight of footing (10%)		=	126.2 kN
Total load on footing	W	=	1388.2 kN
Adpot size of footing		=	2.10 x 2.10 m
		=	4.4 m²
Soil pressure,	P / A	=	1388.2 / 4.4
		=	182 kN/m²
Gross safe bearing capacity		=	275 kN/m²

Hence safe

2. Moment calculation

Face of the column		=	(2.10 - 0.30) / 2
		=	0.9 m
Design pressure		=	136 kN/m²
Moment	M	=	[136 x (0.90)^2 / 2]
		=	55 kN.m
Factored moment	Mu	=	82.5 kN.m

3. Area of Reinforcement

Effective depth d = 620 mm (or) 0.62 m

Dia of bar provided Ø = 20 mm

Provided spacing = 100 mm

$$\frac{Mu}{b.d^2} = \frac{83 \times 10^{6}}{1000 \times 620 \times 620}$$

$$= 0.21$$

Percentage of tension reinforcement

$$pt = \frac{fck}{2 \times fy}\left[1 - \left(SQRT\left[1 - \frac{4 \times (Mu/b \times d^2)}{0.87 \times fck}\right]\right)\right] \times 100$$

$$= 0.05\ \%$$

Required, Ast $= \frac{0.05 \times 1000 \times 620}{100}$

$= 310\ mm^2$

Provided, Ast = 3142 mm^2

= 0.51 %

Hence safe

4. Check for One way shear

Vu = 1.5 x 136.00 x(((2.10 x 0.5) - (0.30 x 0.5)) - 0.62)

= 57 kN

Permissible shear stress, $= \frac{57 \times 1000}{1000 \times 620}$

= 0.09 N/mm^2

Allowable shear stress, = 0.49 N/mm^2

Hence safe

5. Check for Punching shear

Punching force Pf = [136 x (4.4 -((0.30 + 0.62) x (0.45 + 0.62)))] x 1.5

= 697 kN

Punching shear stress $= \frac{697 \times 1000}{620 \times 2 \times (300 + 450 + (2 \times 620))}$

= 0.28 N/mm^2

Allowable shear stress = 1.25 N/mm^2

Hence safe

EARTH QUAKE ANALYSIS

1. Calculation of horizontal seismic Coefficient

As per IS 1893 - 2002

$$Ah = \frac{z \cdot I \quad Sa}{2 \cdot R \quad g}$$

Zone factor,	Z	=	0.16	(As per table 7)
Importance factor,	I	=	1	
Response reduction factor,	R	=	5	

$$\frac{sa}{g} = 2.5$$

Natural period, Ta = 0.075 h ¾

(Clause.7.6) = 0.075 x 18.3 ^0.75

= 0.66 sec

h = height of the building

$$Ah = \frac{0.16 \times 1 \times 2.5}{2 \times 5}$$

= 0.04

2. Calculation of Base shear & seismic forces

Base shear V = An ∑ Wi

= 0.040 x 1,262

= 50.5 kN

Total no of columns = 28

Shear per column = 50.5 / 28

= 1.8

Seismic moment per column = 1.80 x 3 / 4

= 1.4 T-m

Column Provided = 300 x 450 mm with 8 - Y25

Hence safe

3. Checking for footing

SBC = 27.5 T/m²

Soil pressure = 18.2 T/m²

$$= \frac{p}{A} \pm \frac{1.40 \times 6}{12}$$

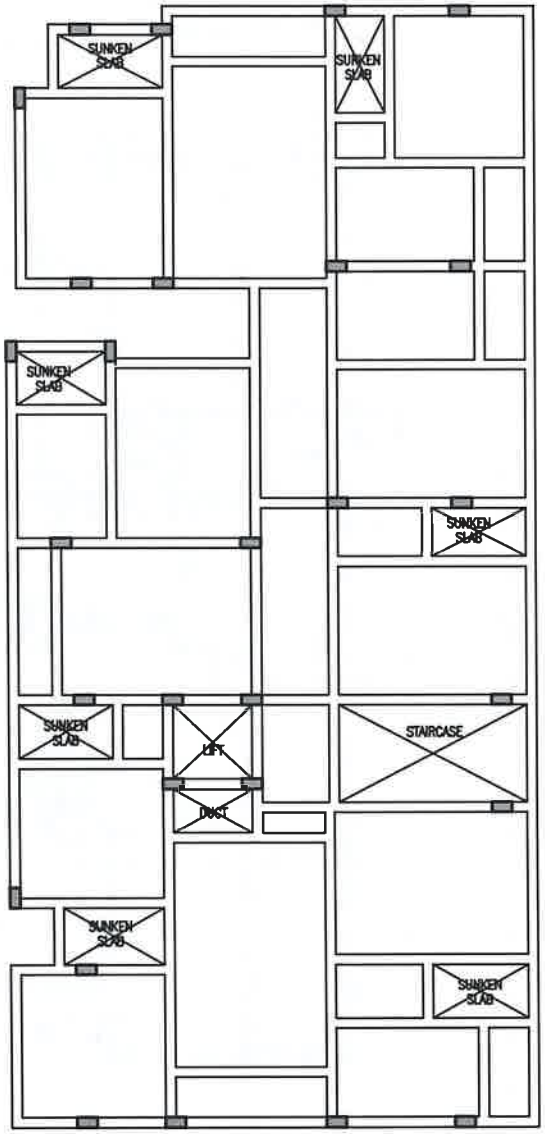
$$= 18.2 \pm 0.7$$

$$= 18.9$$

$$= 17.5 \text{ T/m}^2 < 27.5 \text{ T/m}^2$$

Hence safe

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N

LAYOUT OF TYPICAL ROOF SLAB & BEAMS

GENERAL NOTES :

1. Grade of Concrete and steel : M-20 & Fe-500.
2. Mix of Concrete shall be designed as per IS 456 - 2000.
3. Cement shall be generally be of 43 Grade - unless otherwise specified.
4. Clear cover to reinforcement shall be as follows:
   - Floor beam - 1"
   - Floor slab - 3/4"
5. Lapping shall be 50 times diameter of smaller bar
6. Lapping shall be staggered.
7. For beams, lapping of bars shall be avoided at bottom at center of beam (Le) at span.
8. For beams, lapping of bars shall be avoided at top of beam at Column - Beam joint (Le) at support.
9. For Slabs-Chair rods shall be provided to keep Top reinforcement in place.
10. For Slabs-Provide Y8 @ 8" C/C wherever bars are not shown.

STRIPPING TIME FOR FORMWORK

	Time duration
1. Vertical Formwork to Columns, Walls and Beams	1 day
2. Soffit Formwork to Slabs	3 days
3. Soffit Formwork to Beams	7 days
4. Props to Slabs	
a. Spanning upto 4.5m(15'-0")	7 days
b. Spanning over 4.5m(15'-0")	14 days
5. Props to Beams	
a. Spanning upto 6m(20'-0")	14 days
b. Spanning over 6m(20'-0")	21 days

Props to be refixed immediately after removal of formwork at soffit of slabs and beams.

SPECIFICATION FOR SHUTTERING :

Shuttering of adequate strength with necessary props, bracing and struts shall be provided as per IS 456:2000 & IS 14687.

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NOTES

1. This drawing should be read along with Architectural drawing.
2. All dimensions are in feet & inches.

Structural Consultant :

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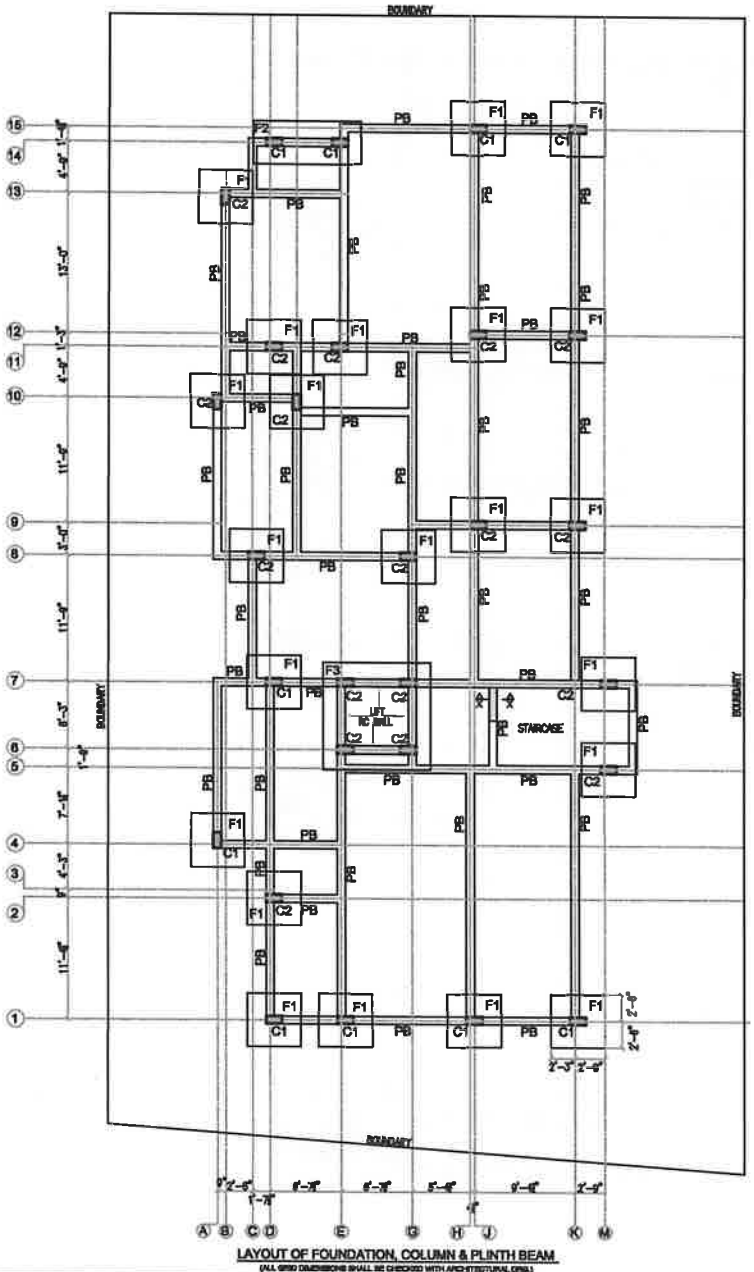
PROPOSED RESIDENTIAL BUILDING AT PLOT-D
THIRUMALAI STREET, RAJAJIPURAM II,
THIRUVALLUR.

LAYOUT OF ROOF SLAB & BEAMS
OVER TYPICAL FLOOR

DATE : 05.07.2023

DWG NO : 02

FILE :D/HANSA ESTATE/GF Roof



LAYOUT OF FOUNDATION, COLUMN & PLINTH BEAM

(ALL SITE DIMENSIONS SHALL BE CHECKED WITH ARCHITECTURAL DRGS.)

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FOOTING SCHEDULE

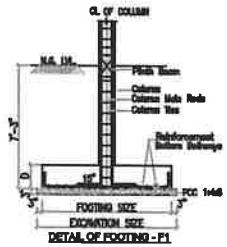
FOOTING MARK	FOOTING SIZE	EXCAVATION SIZE	D	REINFORCEMENT AT BOTTOM (LONGITUDINAL)	REINFORCEMENT AT TOP (LONGITUDINAL)
F1	5'-0" X 5'-0"	6'-6" X 6'-6"	21"	Y16 @ 6" C/C	- - - -
F2	10'-0" X 6'-0"	10'-6" X 6'-6"	21"	Y16 @ 6" C/C	Y12 @ 6" C/C
F3	10'-0" X 10'-0"	10'-6" X 10'-6"	21"	Y16 @ 6" C/C	Y12 @ 6" C/C



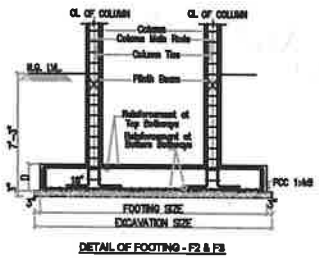
DETAIL OF COLUMN-C1



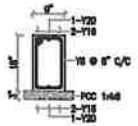
DETAIL OF COLUMN-C2



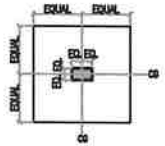
DETAIL OF FOOTING - F1



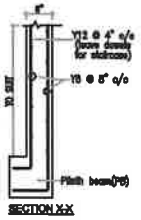
DETAIL OF FOOTING - F2 & F3



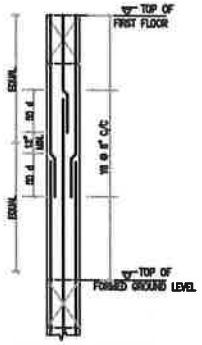
C/S OF PLINTH BEAM-PB



CENTER LINE PLAN OF FOOTING & COLUMN



SECTION X-X



TYPICAL DETAIL OF COLUMN FOR LAPPING OF COLUMN BARS

GENERAL NOTES :

1. Grade of Concrete and steel : M-20 & Fe-500.
2. Mix of Concrete shall be designed as per IS 456 - 2000.
3. Cement shall be generally be of 43 Grade - unless otherwise specified.
4. Clear cover to reinforcement shall be as follows:
   - Footing - 2"
   - Column - 1½"
   - Plinth beam - 1"
5. Lapping shall be 50 times diameter of smaller bar
6. Lapping shall be staggered.
7. For columns, if lapping is required, it shall be provided at midway between two floors.
8. For beams, lapping of bars shall be avoided at bottom at center of beam (i.e)at span.
9. For beams, lapping of bars shall be avoided at top of beam at Column - Beam joint (i.e) at support.
10. SBC is considered as 220 kN/sq.m at 2.20m depth as per soil test report.

NOTES:

1. This drawing should be read along with Architectural drawing.
2. Foundation has been designed for STILT+FIVE FLOORS ONLY
3. All dimensions are in feet & inches.

Structural Consultant :
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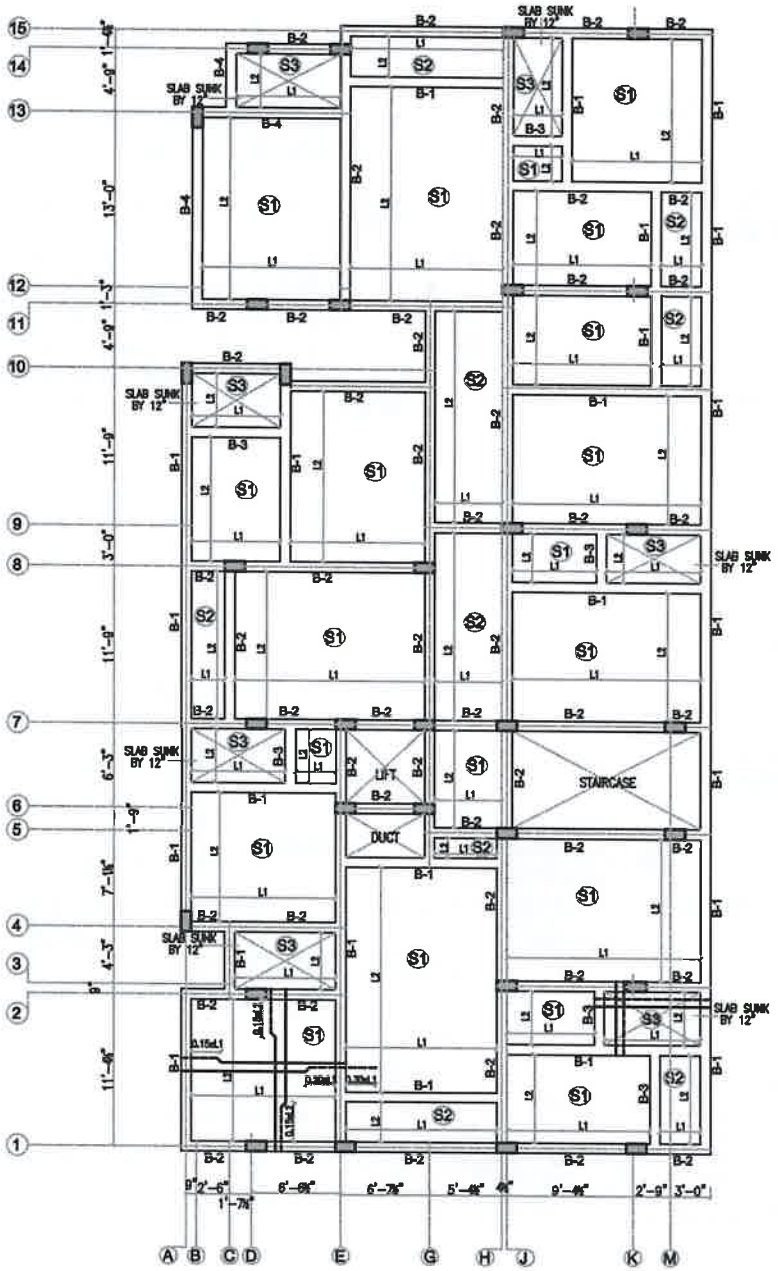
PROPOSED RESIDENTIAL BUILDING AT PLOT-D THIRUMALAI STREET, RAJAJIPURAM II, THIRUVALLUR.

LAYOUT & DETAILS OF FOUNDATION,COLUMN AND PLINTH BEAM

DATE : 05.07.2023

DWG NO : 01

FILE :D/HANSA ESTATE/Fdn



LAYOUT OF TYPICAL ROOF SLAB & BEAMS

(ALL GRID DIMENSIONS SHALL BE CHECKED WITH ARCHITECTURAL DRG.)
(ALL SLABS ARE OF 6" THK (U.N.O.))

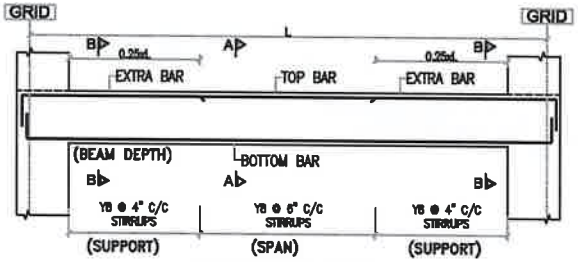
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BEAM REINFORCEMENT DETAIL

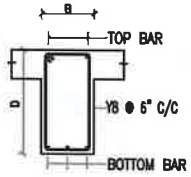
BEAM MKD	BEAM SIZE (B X D)	TOP BAR		BOTTOM BAR
		AT SUPPORT	AT SPAN	
B1	9" X 18"	2-Y16+1-Y20	2-Y16	2-Y16+1-Y20
B2	9" X 21"	2-Y20+1-Y20	2-Y20	2-Y20+1-Y25
B3	9" X 18"	2-Y16+1-Y16	2-Y16	2-Y16+1-Y12
B4	9" X 21"	2-Y20+1-Y16	2-Y20	2-Y20+1-Y16

SLAB REINFORCEMENT DETAIL

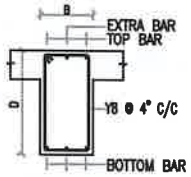
SLAB MKD	SLAB THK.	SHORTER SPAN	LONGER SPAN
S1	6"	Y8 @ 6" C/C	Y8 @ 6" C/C
S2	6"	Y8 @ 6" C/C	Y8 @ 8" C/C
S3	6"	Y8 @ 4" C/C	Y8 @ 6" C/C
S4	6"	Y8 @ 4" C/C	Y8 @ 4" C/C



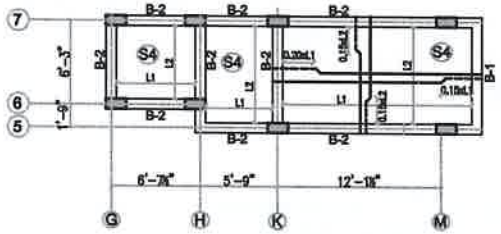
L.S. OF TYPICAL BEAM



SECTION A-A
(AT SPAN)



SECTION B-B
(AT SUPPORT)



LAYOUT OF ROOF SLAB & BEAMS OVER STAIRCASE & LIFT HEADROOM

(ALL SLABS ARE OF 6" THK (U.N.O.))

GENERAL NOTES :

1. Grade of Concrete and steel : M-20 & Fe-500.
2. Mix of Concrete shall be designed as per IS 456 - 2000.
3. Cement shall be generally be of 43 Grade - unless otherwise specified.
4. Clear cover to reinforcement shall be as follows:
   Floor beam - 1"
   Floor slab - 3/4"
5. Lapping shall be 50 times diameter of smaller bar
6. Lapping shall be staggered.
7. For beams, lapping of bars shall be avoided at bottom at center of beam (Le) of span.
8. For beams, lapping of bars shall be avoided at top of beam at Columns - Beam joint (Le) at support.
9. For Slabs-Chair rods shall be provided to keep Top reinforcement in place.
10. For Slabs-Provide Y8 @ 6" C/C wherever bars are not shown.

STRIPPING TIME FOR FORMWORK

	Time duration
1. Vertical Formwork to Columns, Walls and Beams	1 day
2. Soffit Formwork to Slabs	3 days
3. Soffit Formwork to Beams	7 days
4. Props to Slabs	
a. Spanning upto 4.5m(15'-0")	7 days
b. Spanning over 4.5m(15'-0")	14 days
5. Props to Beams	
a. Spanning upto 6m(20'-0")	14 days
b. Spanning over 6m(20'-0")	21 days

Props to be refixed immediately after removal of formwork of soffit of slabs and beams.

SPECIFICATION FOR SHUTTERING :

Shuttering of adequate strength with necessary props, bracing and struts shall be provided as per IS 456:2000 & IS 14687.

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NOTES:

1. This drawing should be read along with Architectural drawing.
2. All dimensions are in feet & inches.

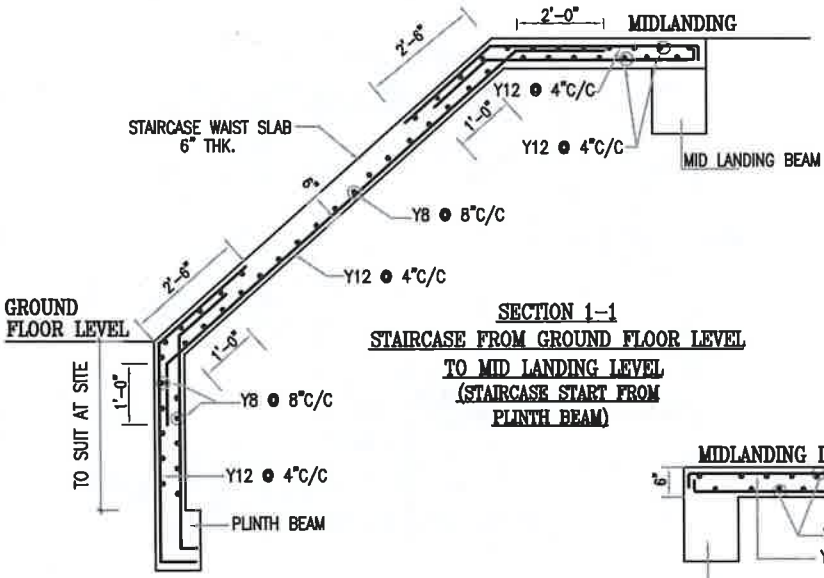
Structural Consultant :
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PROPOSED RESIDENTIAL BUILDING AT PLOT-D THIRUMALAI STREET, RAJAJIPURAM II, THIRUVALLUR.

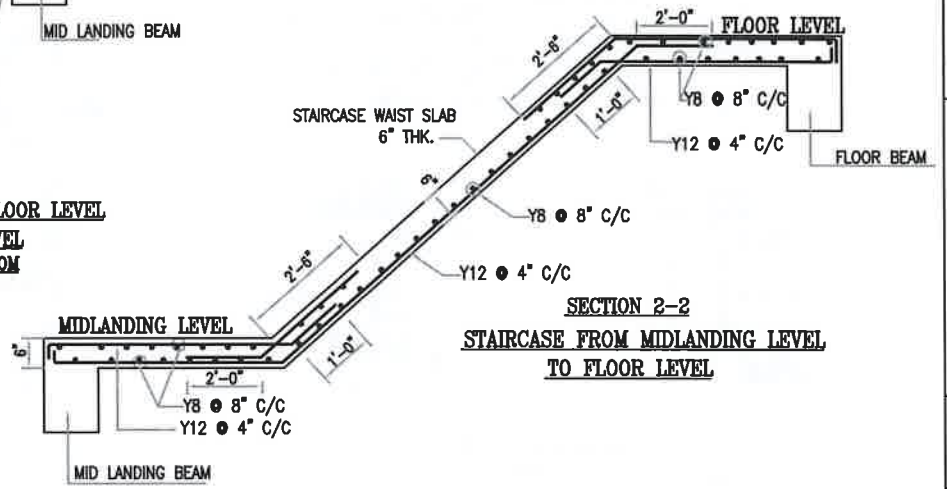
LAYOUT OF ROOF SLAB & BEAMS OVER TYPICAL FLOOR & SHR

DATE : 05.07.2023
DWG NO : 03
FILE : D/HANSA ESTATE/GF Roof

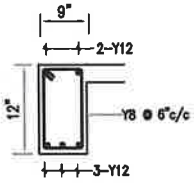
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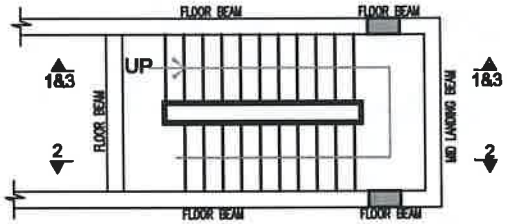
SECTION 1-1
STAIRCASE FROM GROUND FLOOR LEVEL
TO MID LANDING LEVEL
(STAIRCASE START FROM
PLINTH BEAM)



SECTION 2-2
STAIRCASE FROM MIDLANDING LEVEL
TO FLOOR LEVEL



Mid Landing Beam



PLAN OF STAIRCASE
(This drawing should be read along with Architectural drg.)

SECTION 3-3
STAIRCASE FROM FLOOR LEVEL
TO MID LANDING LEVEL

GENERAL NOTES :

1. Grade of Concrete and steel : M-20 & Fe-500.
2. Mix of Concrete shall be designed as per IS 456 - 2000.
3. Cement shall be generally be of 43 Grade - unless otherwise specified.
4. Clear cover to reinforcement shall be as follows:
   Beam - 1"
   Waist slab - 3/4"
5. Lapping shall be 50 times diameter of smaller bar
6. Lapping shall be staggered.
7. For beams, lapping of bars shall be avoided at bottom at center of beam (Le) at span.
8. For beams, lapping of bars shall be avoided at top of beam at Column - Beam joint (Le) at support.
9. For Slabs-Chair rods shall be provided to keep Top reinforcement in place.
10. For Slabs-Provide Y8 @ 8" C/C wherever bars are not shown.

STRIPPING TIME FOR FORMWORK

	Time duration
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a. Spanning upto 6m(20'-0")	14 days
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NOTES:

1. This drawing should be read along with Architectural drawing.
2. All dimensions are in feet & inches.

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PROPOSED RESIDENTIAL BUILDING AT PLOT-D
THIRUMALAI STREET, RAJAJIPURAM II,
THIRUVALLUR.

LAYOUT & DETAILS OF STAIRCASE

DATE : 05.07.2023

DWG NO : 04

FILE :D/HANSA ESTATE/STAIRCASE



our services doesn't just end there

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Vastu & Property Management Tools

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