

STABILITY CERTIFICATE

08.09.2025

The detailed engineering and structure design of the proposed building comprising of **Proposed Construction of Residential Building (Stilt+05 Floors)**, Public purpose plot, T.S.No:7/II, Old S.Nos: 276,277,278 & 279, Glass factory road, Thiruvottiyur, Chennai-600019, has been done by us based on the report of geotechnical investigation (Soil test) done by **Geo Mines Engineers Pvt. Ltd, Report No: GMEPL/HANSA ESTATE PVT. LTD./173/2024-25 dated 31st May 2024** 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/we have checked various parameters and found that the proposed building would be safe

3. I/We further certify that:

- (i) The minimum grade of concrete is **M-25**
- (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 IS Codes No.8.75 and design of earthquake resistant structure as per Is code No.1893-2002 & IS 456:2000

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

Encl.: Structural Design Calculation



Stamp and Signature

V.R. RAVINDRAN, M.E., M.I.E.,
Structural Consultant
CMDA Reg.No: SE/GR-I/19/04/105
Chennai Corpn. Reg.No: RSE 101812023
E-mail: vrpconsultants@gmail.com
Web: www.vrpconsultants.com



STABILITY CERTIFICATE

The Proposed Residential building **Proposed Construction of Residential Building (Stilt+05 Floors)**, Public purpose plot, T.S.No:7/II, Old S.Nos: 276,277,278 & 279, Glass factory road, Thiruvottiyur, Chennai-600019, 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 cantilever projections 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 Engineer
VRP CONSULTANTS

V.R. RAVINDRAN, M.E., M.I.E.,
Structural Consultant
CMDA Reg.No: SE/GR-I/19/04/105
Chennai Corpn. Reg.No: RSE 101812023
E-mail: vrpconsultants@gmail.com
Web: www.vrpconsultants.com

**VRP CONSULTANTS
CONSULTING ENGINEERS**

NO. 18, VATHIYAR THOTHAM MAIN ROAD
KODAMBAKKAM, CHENNAI - 600 024.

☎ : +91 44-24810096
✉ : vrpconsultants@gmail.com
📠 : +91 - 97910 20760

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 structures. 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 200 kN/m² and this has been considered in the design of foundation.



V.R. RAVINDRAN

Structural Engineer

VRP CONSULTANTS

V.R. RAVINDRAN, M.E., M.I.E.,
Structural Consultant

CMDA Reg.No: SE/GR-I/19/04/105
Chennai Corpn. Reg.No: RSE 101812023
E-mail: vrpconsultants@gmail.com
Web: www.vrpconsultants.com

STABILITY CERTIFICATE

It is certified that Residential building, at **Proposed Construction of Residential Building (Stilt+05 Floors), Public purpose plot, T.S.No:7/II, Old S.Nos: 276,277,278 & 279, Glass factory road, Thiruvottiyur, Chennai- 600019**, 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 300 mm.
2. The grade of concrete is M-25.
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.



V.R. RAVINPRAN, M.E., M.I.E.,
Structural Consultant
CMDA RQS.No: SE/GR-I/19/04/105
Chennai Corpn. Reg.No: RSE 101812023
E-mail: vrpconsultants@gmail.com
Web: www.vrpconsultants.com

DESIGN OF SLAB

Data:

Concrete	M25	fck	=	25	N/mm ²
Steel	Fe 500	fy	=	500	N/mm ²
Shorter Span		Lx	=	3.81	m
Longer Span		Ly	=	4.22	m
Assuming Depth of Slab		D	=	150	mm
Assuming Dia of reinf.			=	8	mm
Clear Cover			=	20	mm
Eff. Depth of Slab		d	=	126	mm
Eff. Shorter Span		lx	=	3.94	m
Eff. Longer Span		ly	=	4.35	m

1. Load Calculations:

Self weight of slab	0.15	x	25.00	=	3.75	kN/m ²
Floor Finish load	0.075	x	20.00	=	1.50	kN/m ²
Live load				=	2.00	kN/m ²
Total load				=	7.30	kN/m ²
Load Factor				=	1.50	
Factored Load	7			=	10.95	kN/m ²
Span Ratio			l_y/l_x	=	4.35 / 3.94	
				=	1.10	

2. Bending Moment Calculation:

Support Condition
From IS 456-2000 Table 26

7	Three edges Discontinuous (One long edge α
7	α_{Nx} = 0.064
	α_{Px} = 0.048
	α_{Ny} = 0.000
	α_{Py} = 0.043

Shorter Span:

Negative Moment (Support)

$$M_{Nx} = \alpha_{Nx} \times w_u \times l_x^2$$

$$= 0.064 \times 10.95 \times 3.94^2$$

$$= 10.91 \text{ kN.m}$$

Positive Moment (Mid span)

$$M_{Px} = \alpha_{Px} \times w_u \times l_x^2$$

$$= 0.048 \times 10.95 \times 3.94^2$$

$$= 8.18 \text{ kN.m}$$

Longer Span :

Negative Moment (Support)

$$M_{Ny} = \alpha_{Ny} \times w_u \times l_y^2$$

$$= 0.000 \times 10.95 \times 4.35^2$$

$$= 0.00 \text{ kN.m}$$

Positive Moment (Mid span)

$$\begin{aligned}
 M_{Py} &= \alpha_{py} \times W_u \times l_x^2 \\
 &= 0.043 \times 10.95 \times 3.94^2 \\
 &= 7.29 \text{ kN.m}
 \end{aligned}$$

Reinforcement:

Required in Shorter Span

Reinf Required

Reinf Provided

Support

8Ø @ 240mm c/c

- 8 dia @ 150 mm c/c

Mid span

8Ø @ 325mm c/c

- 8 dia @ 150 mm c/c

Required in Longer Span

Support

8Ø @ 330mm c/c

- 8 dia @ 150 mm c/c

Mid span

8Ø @ 330mm c/c

- 8 dia @ 150 mm c/c

3. Check for Shear:

As per BS:8110 Shear coefficients

Max Shear coeff. for continuous edge in short direction

$$\gamma_{cx} = 0.48$$

Shear coefficient for discontinuous edge in short direction

$$\gamma_{dcx} = 0.32$$

Shear coefficient for continuous edge in long direction

$$\gamma_{cy} = 0.00$$

Shear coefficient for discontinuous edge in long direction

$$\gamma_{dcy} = 0.29$$

S.F for continuous edge in short direction

$$V_{cx} = \gamma_{cx} \times l_x \times W$$

Maximum Shear Force

$$\begin{aligned}
 V_u &= 0.48 \times 3.936 \times 10.95 \\
 &= 20.74 \text{ kN}
 \end{aligned}$$

S.F for discontinuous edge in short direction

$$\begin{aligned}
 V_{dcx} &= \gamma_{dcx} \times l_x \times W \\
 &= 0.32 \times 3.936 \times 10.95 \\
 &= 13.828 \text{ kN}
 \end{aligned}$$

S.F for continuous edge in long direction

$$\begin{aligned}
 V_{cy} &= \gamma_{cy} \times l_x \times W \\
 &= 0.00 \times 3.936 \times 10.95 \\
 &= 0.000 \text{ kN}
 \end{aligned}$$

S.F for discontinuous edge in long direction

$$\begin{aligned}
 V_{dcy} &= \gamma_{dcy} \times l_x \times W \\
 &= 0.29 \times 3.936 \times 10.95 \\
 &= 12.499 \text{ kN}
 \end{aligned}$$

S.F for continuous edge in short direction

$$V_u = 20.741$$

Design Shear stress τ_v

$$\begin{aligned}
 V_u/bd &= 20741 / (1000 \times 126) \\
 &= 0.165 \text{ N/mm}^2
 \end{aligned}$$

Reinforcement provided in the slab is

= 8Ø @ 150 mm c/c

% of reinforcement provided

$$p_t = 0.266$$

IS:456 Table 19

Allowable shear stress

$$\tau_c = 0.37 \text{ N/mm}^2$$

As per IS:456 cl. 40.2.1.1 k value for slab

$$= 1.30$$

Design shear stress for concrete

$$\begin{aligned}
 k \times \tau_c &= 1.30 \times 0.375 \\
 &= 0.487 \text{ N/mm}^2
 \end{aligned}$$

Actual Shear Stress < Design Shear Stress

$$0.165 < 0.487$$

SAFE

4. Check for deflection

Allowable span / depth Ratio

% of Tension reinforcement

Corresponding Compression reinf.

% of Compression reinforcement

Modification factor for Tension reinf.

Modification factor for Comp. reinf.

Modified span/depth ratio

Actual span/depth ratio

Actual span/depth ratio < Modified span/depth ratio

$$\begin{aligned}l/d &= 26 \\pt &= 0.266 \\ \text{Bar dia} &= 0 \quad \text{mm} \\ \text{spacing} &= 150 \quad \text{mm} \\pc &= 0.000\end{aligned}$$

$$\begin{aligned}F1 &= 2.00 \quad (\text{From Fig 4 in IS 456 - 2000}) \\F2 &= 1.00 \quad (\text{From Fig 5 in IS 456 - 2000})\end{aligned}$$

$$\begin{aligned}&= l/d \times F1 \times F2 \\&= 26 \times 2.00 \times 1.00 \\&= 52.00\end{aligned}$$

$$\begin{aligned}&= 3936 / 126 \\&= 31.24\end{aligned}$$

$$31.24 < 52.00$$

SAFE

DESIGN OF BEAM

Data:

Effective span	=	4.91 m
	=	4910 mm
Breadth of beam	=	230 mm
Overall depth (assumed)	=	450 mm
Characteristic strength of steel		
	f_y	= 500 N/mm ²
	f_{ck}	= 25 N/mm ²
Cover	=	25 mm

Total load

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

$$\begin{aligned}\text{Effective depth} = d &= 450 - 25 - \frac{25}{2} \\ &= 412.5 \text{ mm}\end{aligned}$$

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

$$\begin{aligned}d' &= 25 + (25/2) \\ &= 37.5 \text{ mm}\end{aligned}$$

$$\begin{aligned}\frac{d'}{d} &= \frac{37.5}{412.5} \\ &= 0.1\end{aligned}$$

Minimum Reinforcement

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

$$\frac{A_s}{bd} = \frac{0.85}{f_y}$$

Where ,

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

f_y = Characteristic strength of reinforcement

$$\begin{aligned} A_s &= \frac{0.85 \times b \times d}{f_y} \\ &= \frac{0.85 \times 230 \times 412.5}{500} \\ &= 161.29 \text{ mm}^2 \end{aligned}$$

Referring 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

$$\begin{aligned} \text{Width of rib} &= \frac{2}{3} (\text{depth of rib}) = \frac{2}{3} (450 - 150) \\ &= 200 \text{ mm} \end{aligned}$$

Loading on the beam

$$\begin{aligned} \text{From the slab} &= \frac{7.75 \times 4.910}{3} \\ &= 13 \text{ kN/m} \\ \text{D.L of the rib} &= 0.23 \times 0.3 \times 25 \text{ kN/m} \\ &= 1.8 \text{ kN/m} \end{aligned}$$

$$\text{Total} = 14.8 \text{ kN/m}$$

Provide 20 mm dia bars at clear cover 25 mm

$$\begin{aligned} \text{Effective cover} &= 25 + 10 \\ &= 35 \text{ mm} \end{aligned}$$

$$\text{Effective depth } d = 415 \text{ mm}$$

$$\text{Center to Center bearing} = 4.91 \text{ m}$$

$$\text{Effective span} = 4.91 \text{ m}$$

$$\text{Max. BM} = \frac{14.8 \times 4.910 \times 4.910}{8}$$

$$\begin{aligned} &= 45 \text{ kN.m} \\ \text{Req. depth } d &= \left[\frac{1.5 \times 45 \times 10^6}{2.76 \times 230} \right]^{1/2} \\ &= 326 \text{ mm} \end{aligned}$$

$$\text{Provided depth, D} = 450 \text{ mm}$$

$$\frac{M_u}{bd^2} = \left[\frac{1.5 \times 45 \times 10^6}{230 \times 415 \times 415} \right]^{\frac{1}{2}}$$

$$p_t = \frac{f_{ck}}{2 \times f_y} \left[1 - \left(\text{SQRT} \left[1 - \frac{4 \times (M_u/b \times d^2)}{0.87 \times f_{ck}} \right] \right) \right] \times 100$$

$$= 0.32 \%$$

$$A_{st} = \left[\frac{0.32 \times 230 \times 415}{100} \right]$$

$$= 305 \text{ mm}^2$$

Provided 3 - Y16

Check for Shear

$$V = \frac{1.5 \times 14.8 \times 4.910}{2}$$

$$= 55 \text{ kN}$$

$$\tau_c = 0.54 \text{ N/mm}^2$$

$$V_{uc} = \frac{0.54 \times 230 \times 412.5}{1000}$$

$$= 51.2 \text{ kN}$$

$$V_{uc} > \text{Shear at support}$$

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	=	230 mm
		=	0.23 m
Depth of column	D	=	450 mm
		=	0.45 m
	fck	=	25 N/mm ²

Total axial load

Dead load & live load from one floor		=	300 kN
Total axial load all floors		=	6 x 300
		=	1800 kN
Column dimension		=	230 x 450 mm
Self weight of column		=	0.2 x 0.45 x 6 x 25 x 3.1
		=	47 kN
Total load		=	(1,800 + 47) x 1.5
	Pu	=	2770.5 kN

Area of Reinforcement

$$\begin{aligned}\frac{d'}{D} &= 0.1 \\ d' &= 45 \text{ mm} \\ \frac{P_u}{f_{ck}.b.D} &= \frac{2,771 \times 10^3}{25 \times 230 \times 450} \\ &= 1.07 \\ \frac{M_u}{f_{ck}.b.D^2} &= \frac{1.7 \times 1.5 \times 15.4 \times 10^6}{25 \times 230 \times 450 \times 450} \\ &= 0.03\end{aligned}$$

Referring to chart in SP:16 for values

$$\frac{P_u}{f_{ck}.b.D} = 1.07 \quad ; \quad \frac{M_u}{f_{ck}.b.D^2} = 0.03$$

$$\text{The value of } \frac{P}{f_{ck}} = 0.05$$

$$p = \frac{0.05 \times 25}{1.25}$$

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

$$= \frac{1.25 \times 230 \times 450}{100}$$

$$= 1294 \text{ mm}^2$$

Provide 8 - Y25 bars

Design of Lateral Ties

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

Hence 8 dia bar is adopted

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

- a. Least lateral dimension = 300 mm
- b. $16 \times \text{dia of main reinforcement} = 16 \times 25 = 400\text{mm}$
- 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	=	230 mm
	B	=	450 mm
Size of footing	L	=	2.4 m
	B	=	2.4 m
Safe Bearing capacity of soil	SBC	=	200 kN/m ²
Depth of footing below GL		=	2 m
Density of soil	g	=	18 kN/m ³
Characteristic strength of concrete	f _{ck}	=	25 N/mm ²
Characteristic strength of Steel	f _y	=	500 N/mm ²
Depth of footing provided	D	=	0.525 m
cover		=	50 mm

1. Loading on footing

Axial load on column	=	1847 kN
Self weight of footing (10%)	=	184.7 kN

Total load on footing	W	=	2031.7 kN
-----------------------	---	---	-----------

Adopt size of footing	=	2.40 x 2.40 m
	=	5.8 m ²

Soil pressure,	$\frac{P}{A}$	=	$\frac{2031.7}{5.8}$
----------------	---------------	---	----------------------

	=	203 kN/m ²
Gross safe bearing capacity	=	250 kN/m ²

Hence safe

2. Moment calculation

Face of the column	=	$\frac{2.40 - 0.23}{2}$
--------------------	---	-------------------------

=	1.09 m
=	154 kN/m ²

Moment	M	=	$\left[\frac{154 \times (1.09)^2}{2} \right]$
--------	---	---	--

		=	91 kN.m
Factored moment	Mu	=	136.5 kN.m

3. Area of Reinforcement

Effective depth	d	=	465 mm (or)	0.465 m
Dia of bar provided	Ø	=	20 mm	
Provided spacing		=	100 mm	

$$\frac{M_u}{b.d^2} = \frac{137 \times 10^6}{1000 \times 465 \times 465}$$

$$= 0.63$$

Percentage of tension reinforcement

$$p_t = \frac{f_{ck}}{2 \times f_y} \left[1 - \left(\text{SQRT} \left[1 - \frac{4 \times (M_u / b \times d^2)}{0.87 \times f_{ck}} \right] \right) \right] \times 100$$

$$= 0.15 \%$$

$$\begin{aligned} \text{Required, } A_{st} &= \frac{0.15 \times 1000 \times 465}{100} \\ &= 697.5 \text{ mm}^2 \end{aligned}$$

$$\text{Provided, } A_{st} = 3142 \text{ mm}^2$$

$$= 0.68 \%$$

Hence safe

4. Check for One way shear

$$\begin{aligned} V_u &= 1.5 \times 154.00 \times ((2.40 \times 0.5) - (0.23 \times 0.5)) - 0.47 \\ &= 143 \text{ kN} \end{aligned}$$

$$\text{Permissible shear stress,} = \frac{143 \times 1000}{1000 \times 465}$$

$$= 0.31 \text{ N/mm}^2$$

$$\text{Allowable shear stress,} = 0.55 \text{ N/mm}^2$$

Hence safe

5. Check for Punching shear

$$\begin{aligned} \text{Punching force } P_f &= \left[154 \times (5.8 - ((0.23 + 0.47) \times (0.45 + 0.47))) \right] \times 1.5 \\ &= 1193 \text{ kN} \end{aligned}$$

$$\text{Punching shear stress} = \frac{1,193 \times 1000}{465 \times 2 \times (230 + 450 + (2 \times 465))}$$

$$= 0.80 \text{ N/mm}^2$$

$$\text{Allowable shear stress} = 1.25 \text{ N/mm}^2$$

Hence safe

EARTH QUAKE ANALYSIS

1. Calculation of horizontal seismic Coefficient

As per IS 1893 - 2002

$$A_h = \frac{z \cdot I \cdot S_a}{2 \cdot R \cdot g}$$

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

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

Natural period,	T _a	=	0.075 h ^¾
(Clause.7.6)		=	0.075 x 18.3 ^¾
		=	0.66 sec

h = height of the building

A _h	=	$\frac{0.16 \times 1 \times 2.5}{2 \times 5}$
	=	0.04

2. Calculation of Base shear & seismic forces

Base shear	V	=	A _n ∑ W _i
		=	0.040 x 1,847
		=	73.9 kN

Total no of columns	=	44
Shear per column	=	$\frac{73.9}{44}$

	=	1.68
Seismic moment per column	=	$\frac{1.68 \times 3}{4}$
	=	1.3 T-m

Column Provided = 230 x 450 mm with 8 - Y25

Hence safe

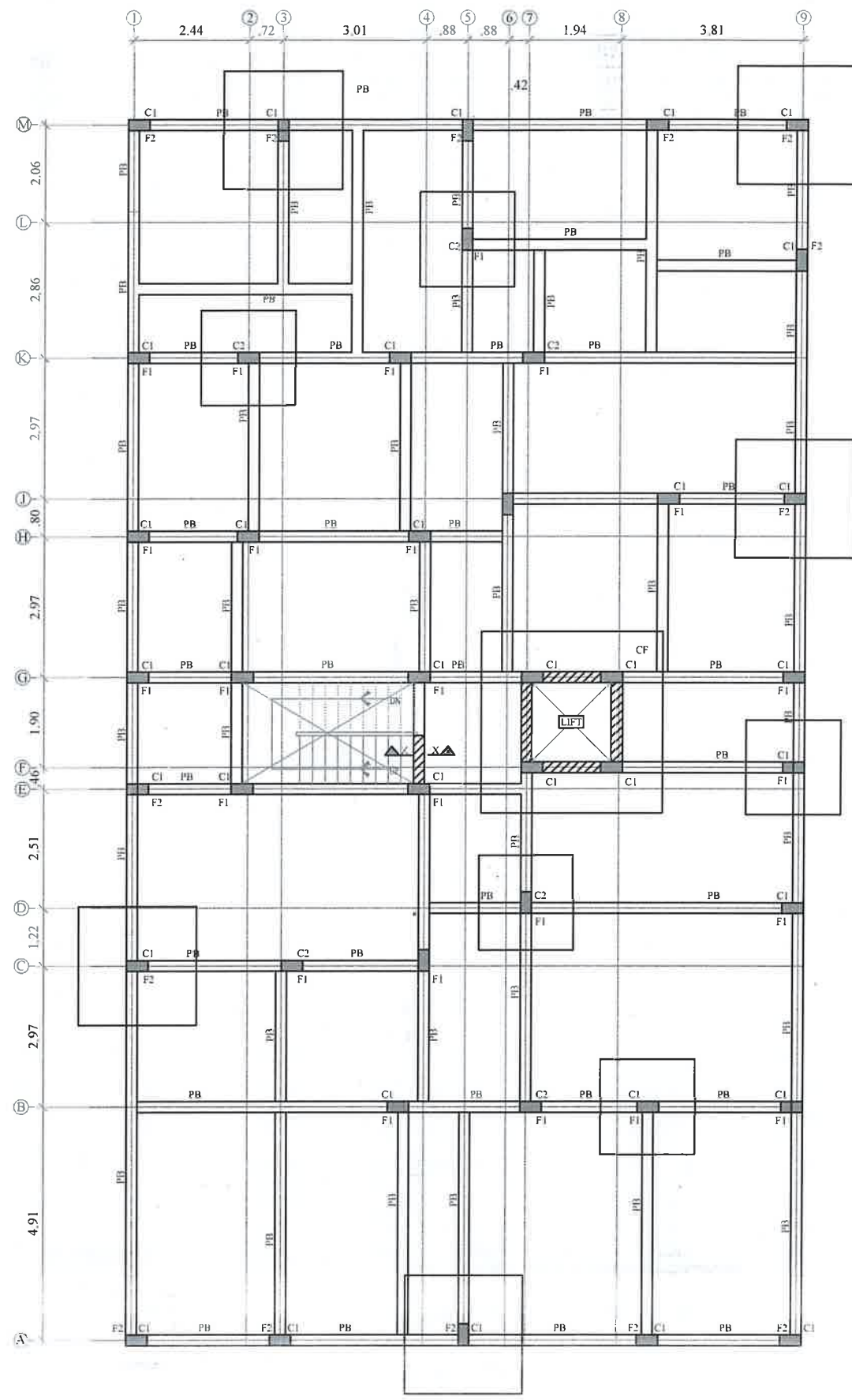
3. Checking for footing

SBC = 25 T/m²
Soil pressure = 20.317 T/m²

$$\begin{aligned} & \frac{p}{A} \pm \frac{1.30 \times 6}{12} \\ = & 20.317 \pm 0.65 \\ = & 20.967 \\ = & 19.667 \text{ T/m}^2 < 25 \text{ T/m}^2 \end{aligned}$$

Hence safe

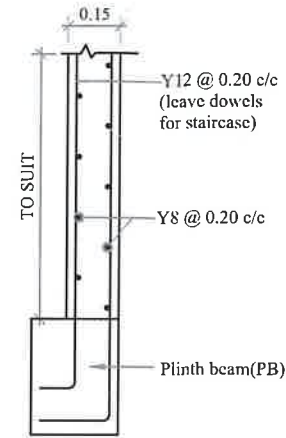

V.R. RAVINDRAN, M.E., M.I.E.,
Structural Consultant
CMDA Reg.No: SE/GR-I/19/04/105
Chennai Corpn. Reg.No: RSE 101812023
E-mail: vrpconsultants@gmail.com
Web: www.vrpconsultants.com



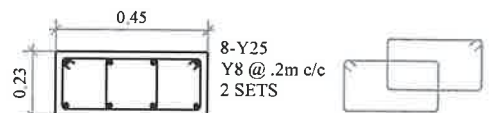
LAYOUT OF FOUNDATION, PLINTH BEAM AND COLUMN (BLOCK-1)

(ALL GRID DIMENSIONS SHALL BE CHECKED WITH ARCHITECTURAL DRG.)

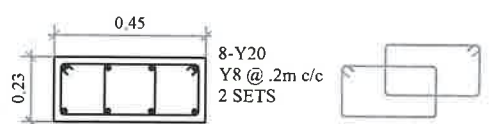
FOOTING SCHEDULE					
FOOTING MKD	FOOTING SIZE	EXCAVATION SIZE	D	REINFORCEMENT AT BOTTOM (BW)	REINFORCEMENT AT TOP (BW)
F1	2.00 x 2.00	2.15 x 2.15	0.45	Y12 @ 0.1 C/C	----
F2	3.00 x 3.00	3.15 x 3.15	0.525	Y16 @ 0.15 C/C	----
CF	4.00 x 4.00	4.15 x 4.15	0.60	Y16 @ 0.1 C/C	Y12 @ 0.1 C/C



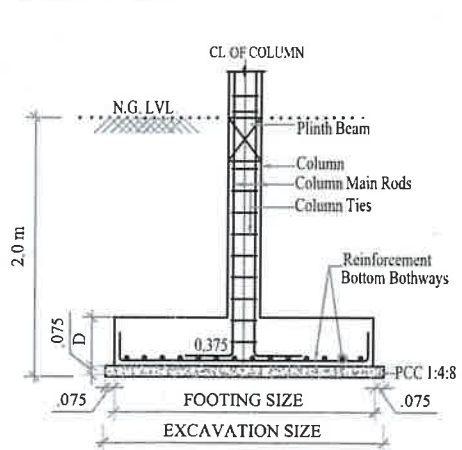
SECTION X-X



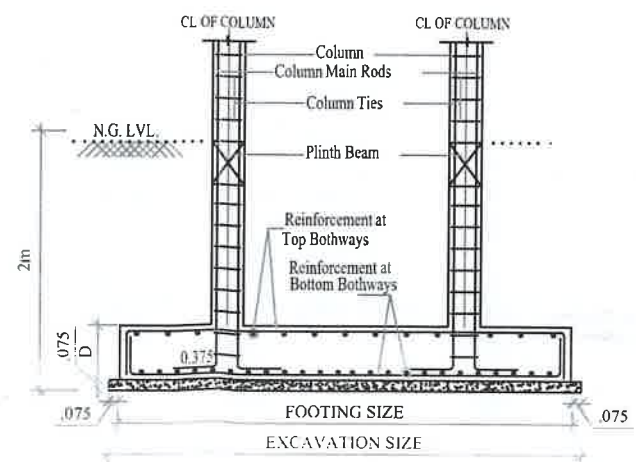
DETAIL OF COLUMN-C1



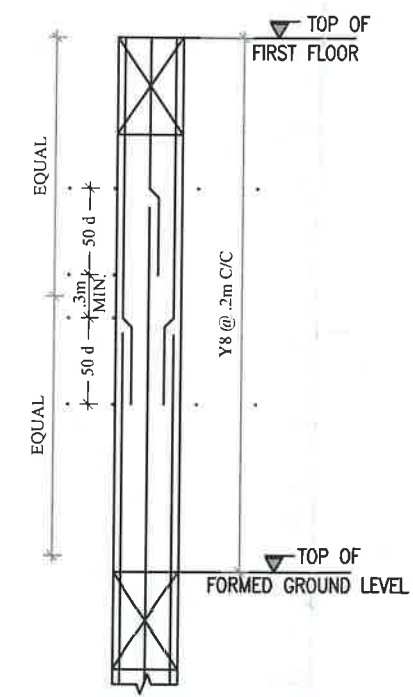
DETAIL OF COLUMN-C2



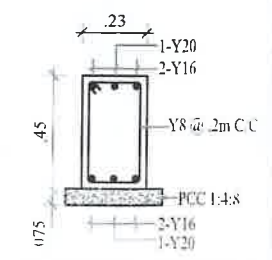
DETAIL OF FOOTING - F1 & F2



DETAIL OF FOOTING - CF



TYPICAL DETAIL OF COLUMN FOR LAPPING OF COLUMN BARS



C.S OF PLINTH BEAM-PB

LEGENDS:	
LVL	: LEVEL
T&B	: TOP & BOTTOM
B/W	: BOTHWAYS
----	: TOP BAR
----	: BOTTOM BAR

- GENERAL NOTES :**
- Grade of Concrete and steel : M-25 & Fe-550-D.
 - Mix of Concrete shall be designed as per IS 456 - 2000.
 - Cement shall be generally be of 53 Grade - unless otherwise specified.
 - Clear cover to reinforcement shall be as follows:
Slab - 20 mm (3/4")
Beam - 25 mm (1")
Column - 40 mm (1 1/2")
 - Lapping shall be 50 times diameter of smaller bar
 - Lapping shall be staggered.
 - For columns, if lapping is required, it shall be provided at midway between two floors.
 - For beams, lapping of bars shall be avoided at bottom at center of beam (Le)at span.
 - For beams, lapping of bars shall be avoided at top of beam at Column - Beam joint (Le) at support.
 - All dimensions are in "metres"
 - SBC is considered as 200 kN/sq.m at 2.0 m depth as per Soil report.

V.R. RAVINDRAN, M.E., M.I.E.,
Structural Consultant
CMAA Reg.No: SE/GR-1/19/04/105
Chennai Corp. Reg.No: RSE 101812023
E-mail: vrpconsultants@gmail.com
Web: www.vrpconsultants.com

REV	DESCRIPTION	DATE	BY	CHKD.	DATE
0	RELEASED FOR CONSTRUCTION	15.10.24	RAHMAN	PRIYA	
1	DESCRIPTION				

NOTES:

- This drawing should be read along with Architectural drawing.
- Foundation has been designed for STILL + FIVE FLOORS ONLY

Structural Consultant:
V.R.P. CONSULTANTS PH : 044-4861 0086
CONSULTING ENGINEERS MOB: +91-97910 20760
#18, Vathiyar Thotham Main Road, Kodambakkam, Chennai - 24
E-MAIL : vrpconsultants@gmail.com
Website : www.vrpconsultants.com

Client:
HANSA ESTATES,
CHENNAI

Project Title:
PROPOSED RESIDENTIAL BUILDING, BLOCK-1
AT THIRUVOTTIYUR, CHENNAI.

Drawing Title:
LAYOUT & DETAILS OF FOUNDATION, COLUMN
AND PLINTH BEAM

DATE : 15.10.2024
DESIGN : PRIYA **DWG NO :** 01
FILE: VR-4/VRPC2022/800 Series/Diamond - Gems Park

LEGENDS:

LVL : LEVEL
T&B : TOP & BOTTOM
B/W : BOTHWAYS
---- : TOP BAR
---- : BOTTOM BAR

GENERAL NOTES :

- Grade of Concrete and steel : M-25 & Fe-550-D.
- Mix of Concrete shall be designed as per IS 456 - 2000.
- Cement shall be generally be of 53 Grade - unless otherwise specified.
- Clear cover to reinforcement shall be as follows:
Slab - 20 mm (3/4")
Beam - 25 mm (1")
Column - 40 mm (1 1/2")
- Lapping shall be 50 times diameter of smaller bar
- Lapping shall be staggered.
- For columns, if lapping is required, it shall be provided at midway between two floors.
- For beams, lapping of bars shall be avoided at bottom at center of beam (Le) at span.
- For beams, lapping of bars shall be avoided at top of beam at Column - Beam joint (Le) at support.
- All dimensions are in "metres"
- SBC is considered as 200 kN/sq.m at 2.0 m depth as per Soil report.

V.R. RAVINDRAN, M.E., M.I.E.,
Structural Consultant
CMDA Reg.No: SE/GR-179/04/105
Chennai Corp. Reg.No: RSE 101812023
E-mail: vrpconsultants@gmail.com
Web: www.vrpconsultants.com

REV	DESCRIPTION	DATE
0	RELEASED FOR CONSTRUCTION	15.10.24

- NOTES:
- This drawing should be read along with Architectural drawing.
 - Foundation has been designed for SILT-FIVE FLOORS ONLY

Structural Consultant:
V.R.P. CONSULTANTS
CONSULTING ENGINEERS
PH : 044-4661 0066
MOB: +91-97910 20760
#18, Vathiyar Thotham Main Road, Kodambakkam, Chennai - 24
E-MAIL : vrpconsultants@gmail.com
Website : www.vrpconsultants.com

Client:
HANSA ESTATES,
CHENNAI

Project Title:
PROPOSED RESIDENTIAL BUILDING, BLOCK-2
AT THIRUVOTTIYUR, CHENNAI.

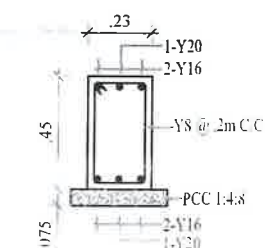
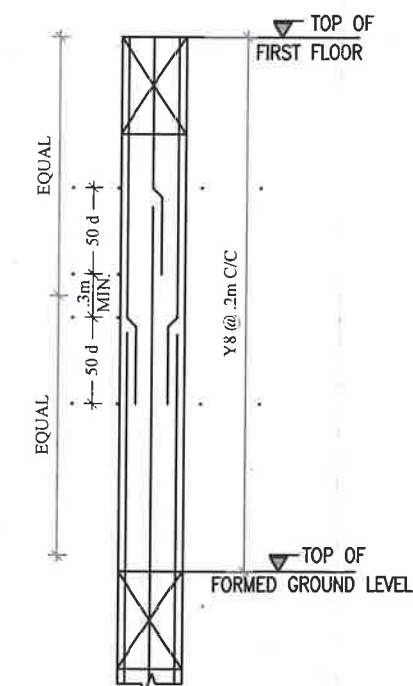
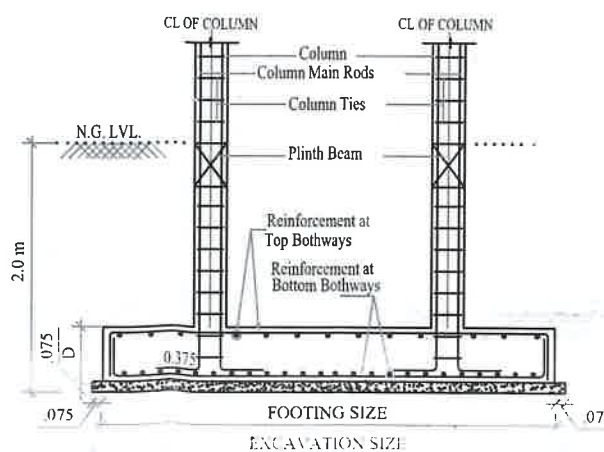
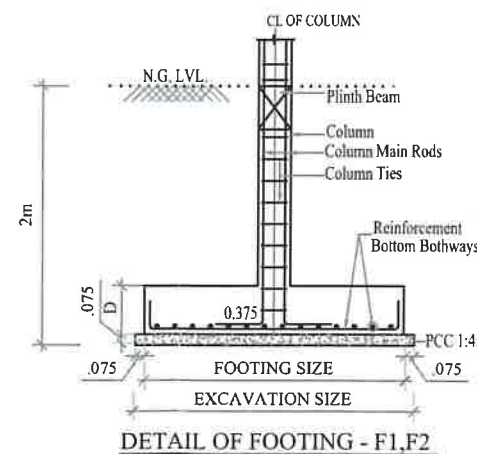
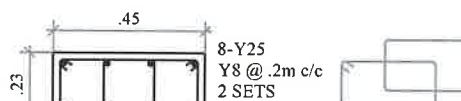
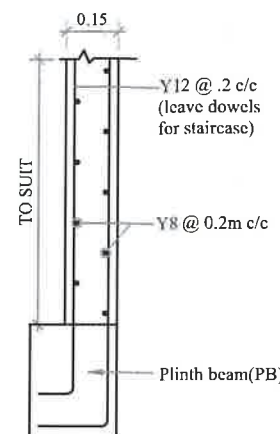
Drawing Title:
LAYOUT & DETAILS OF FOUNDATION, COLUMN
AND PLINTH BEAM

DATE : 15.10.24

FILE: VR-4//VRPC2022/600 Series/Diamond - Gems Park

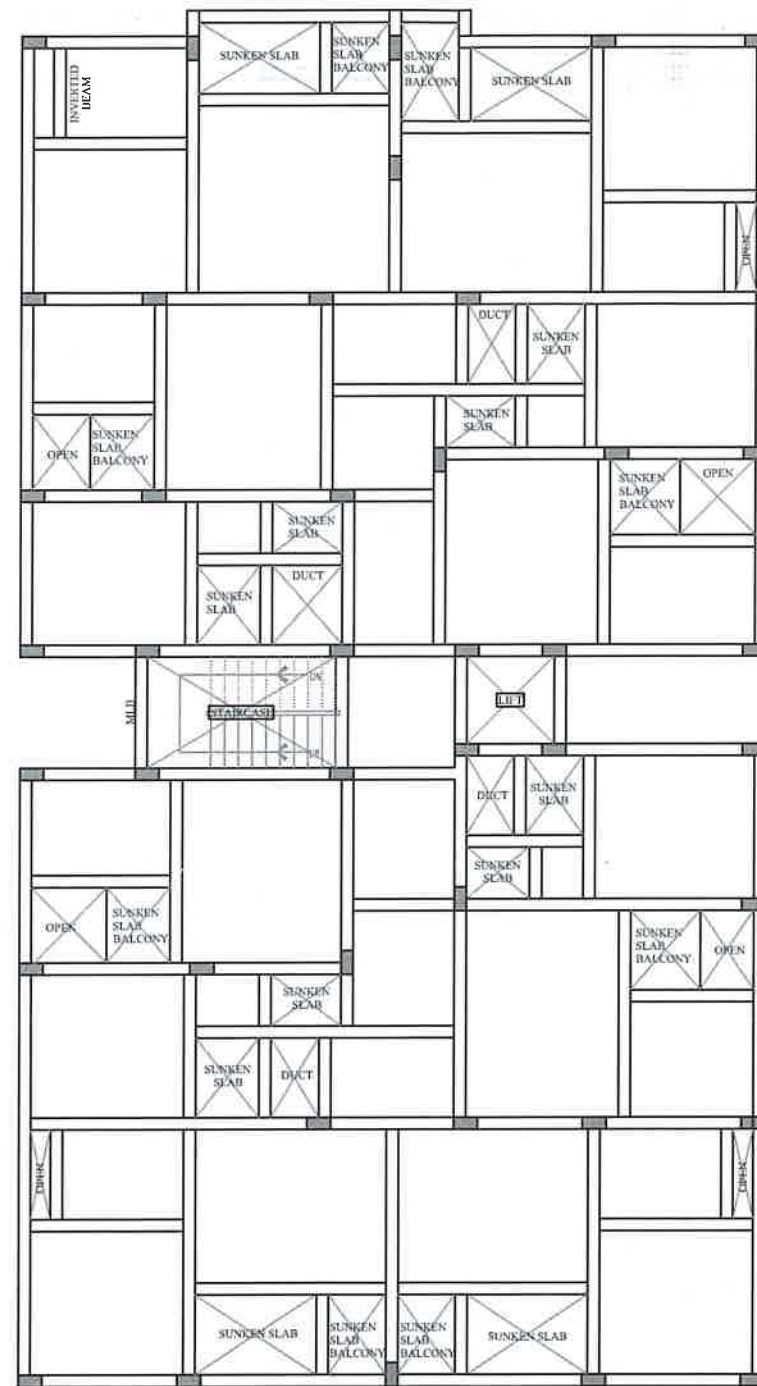
FOOTING SCHEDULE

FOOTING MKD	FOOTING SIZE	EXCAVATION SIZE	D	REINFORCEMENT AT BOTTOM (BW)	REINFORCEMENT AT TOP (BW)
F1	2.00 x 2.00	2.15 x 2.15	.450	Y16 @ 0.15 C/C	----
F2	3.00 x 3.00	3.15 x 3.15	.525	Y12 @ 0.1 C/C	----
CF	4.00 x 3.00	4.15 x 3.15	.600	Y16 @ 0.1 C/C	Y12 @ 0.1 C/C



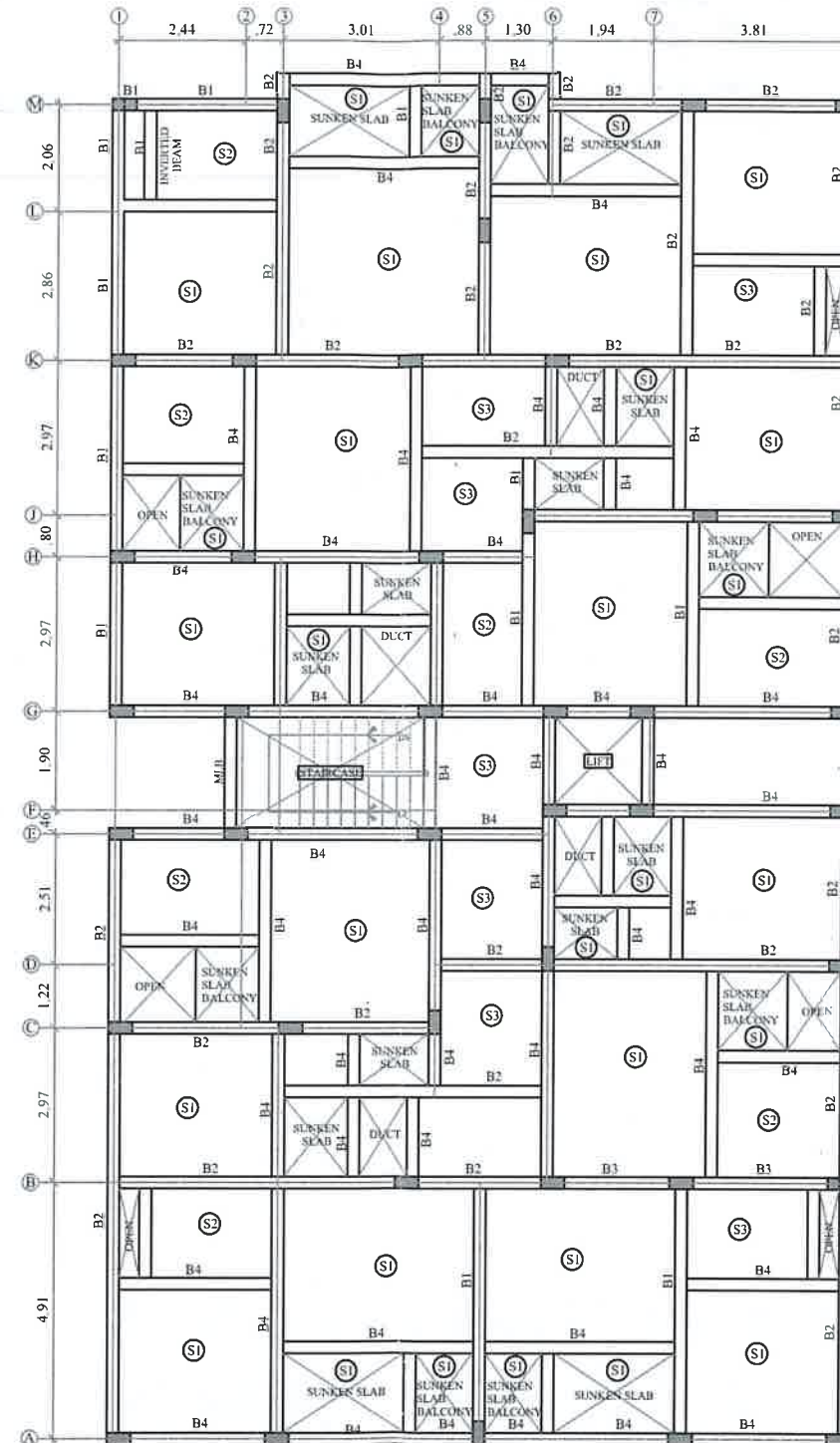
LAYOUT OF FOUNDATION, PLINTH BEAM AND COLUMN (SILT, I, II & III) BLOCK-2

(ALL GRID DIMENSIONS SHALL BE CHECKED WITH ARCHITECTURAL DRAWING)



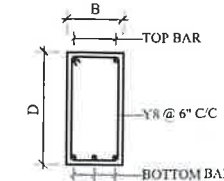
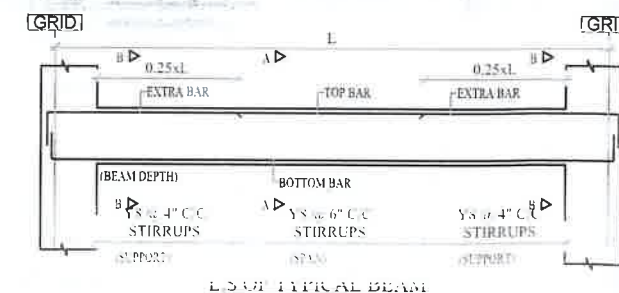
**LAYOUT OF ROOF BEAM AND SLAB OVER TYP
FLOORS (STILT, I, II & III) BLOCK-1**
(ALL GRID DIMENSIONS SHALL BE CHECKED WITH ARCHITECTURAL DRG.)

BEAM REINFORCEMENT DETAIL				
BEAM MKD	BEAM SIZE (B X D)	TOP BAR		BOTTOM BAR
		AT SUPPORT	AT SPAN	
B1	230 X 525	2-Y20+1-Y16	2-Y20	2-Y20+1-Y16
B2	230 X 600	2-Y20+1-Y25	2-Y20	2-Y20+1-Y25
B3	230 X 525	2-Y20+1-Y20	2-Y20	2-Y20+1-Y20
B4	230 X 450	2-Y16+1-Y16	2-Y16	2-Y16+1-Y20

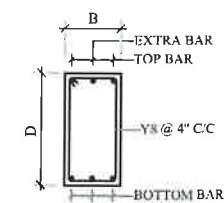


**LAYOUT OF ROOF BEAM AND SLAB OVER TYP
FLOORS (STILT, I, II & III) BLOCK-1**
(ALL GRID DIMENSIONS SHALL BE CHECKED WITH ARCHITECTURAL DRG.)

SLAB REINFORCEMENT DETAIL			
BEAM MKD	SLAB THK	SHORTER SPAN	LONGER SPAN
S1	15	Y8 @ .15 C/C	Y8 @ .15 C/C
S2	15	Y8 @ .2 C/C	Y8 @ .15 C/C
S3	15	Y8 @ .2" C/C	Y8 @ .2 C/C



**SECTION A-A
(AT SPAN)**



**SECTION B-B
(AT SUPPORT)**

LEGENDS:

- LVL : LEVEL
- T&B : TOP & BOTTOM
- B/W : BOTHWAYS
- : TOP BAR
- : BOTTOM BAR

GENERAL NOTES :

- Grade of Concrete and steel : M-25 & Fe-550-D.
- Mix of Concrete shall be designed as per IS 456 - 2000.
- Cement shall be generally be of 53 Grade - unless otherwise specified.
- Clear cover to reinforcement shall be as follows:
Slab - 20 mm (3/4")
Beam - 25 mm (1")
Column - 40 mm (1 1/2")
- Lapping shall be 50 times diameter of smaller bar
- Lapping shall be staggered.
- For columns, if lapping is required, it shall be provided at midway between two floors.
- For beams, lapping of bars shall be avoided at bottom at center of beam (i.e) at span.
- For beams, lapping of bars shall be avoided at top of beam at Column - Beam joint (i.e) at support.
- For slab, wherever bars are not shown, provide Y10 @ 0.25 C/C (Distribution Steel)
- For slab, chair rods shall be provided to keep top reinforcement in place
- All dimensions are in "metres"

V.R. RAVINDRAN M.E., M.I.E.,
Structural Consultant
CMAA Reg. No: SE/GR-1/19/04/105
Chennai Corp. Reg. No: RSE 101812023
E-mail: vrpconsultants@gmail.com
Web: www.vrpconsultants.com

REV	DESCRIPTION	DATE
-----	-------------	------

NOTES:
This drawing should be read along with Architectural drawing.

Structural Consultant:
V.R.P. CONSULTANTS PH: 044-4861 0096
CONSULTING ENGINEERS MOB: +91-97910 20760
#18, Vathiyar Thottam Main Road, Kodambakkam, Chennai - 24
E-MAIL : vrpconsultants@gmail.com
Website : www.vrpconsultants.com

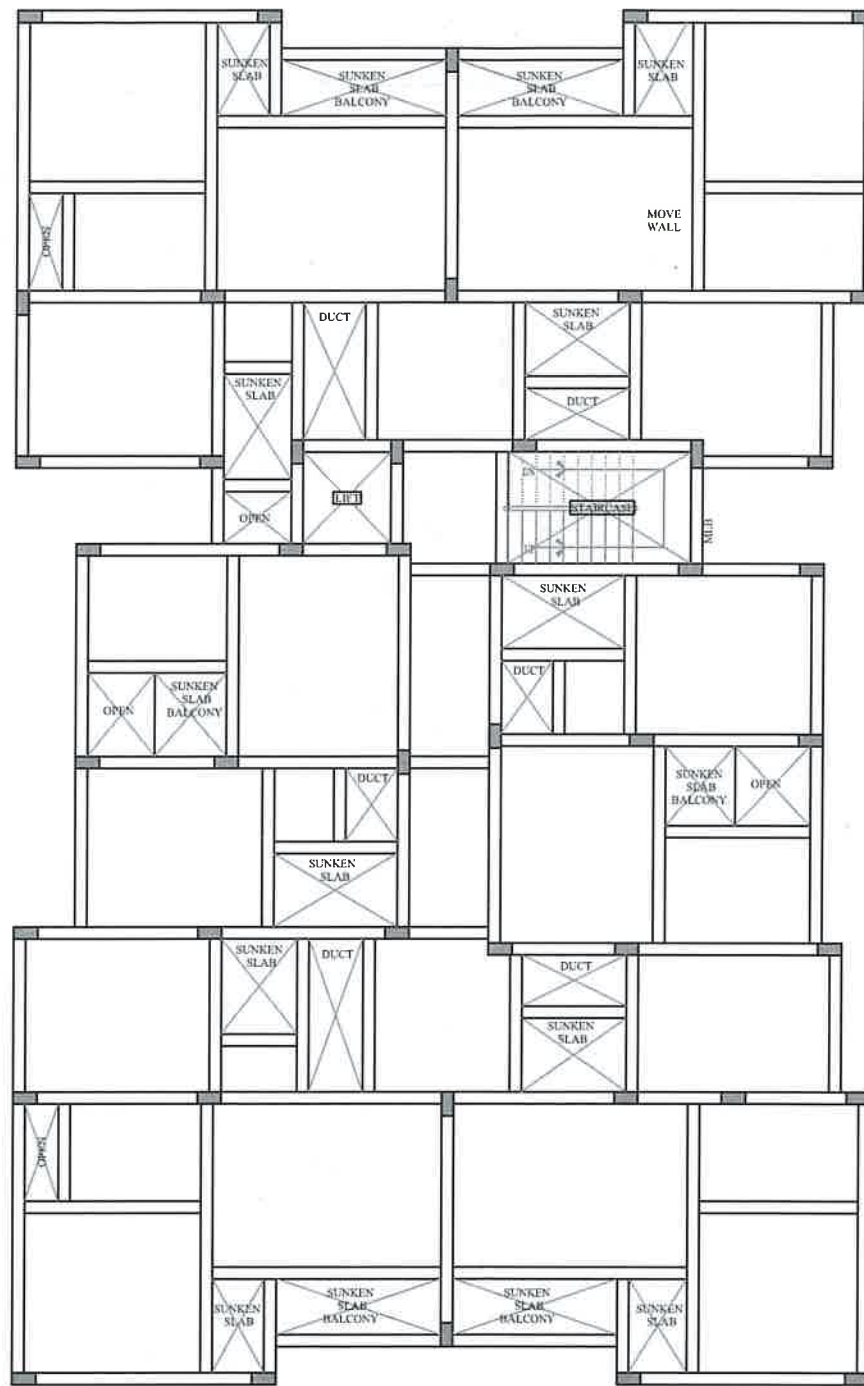
Client:
HANSA ESTATES,
CHENNAI

Project Title:
PROPOSED RESIDENTIAL BUILDING, BLOCK-1
AT THIRUVOTTIYUR, CHENNAI

Drawing Title:
LAYOUT & DETAILS OF ROOF SLAB & BEAMS
OVER TYPICAL FLOOR

DATE : 15.10.2024

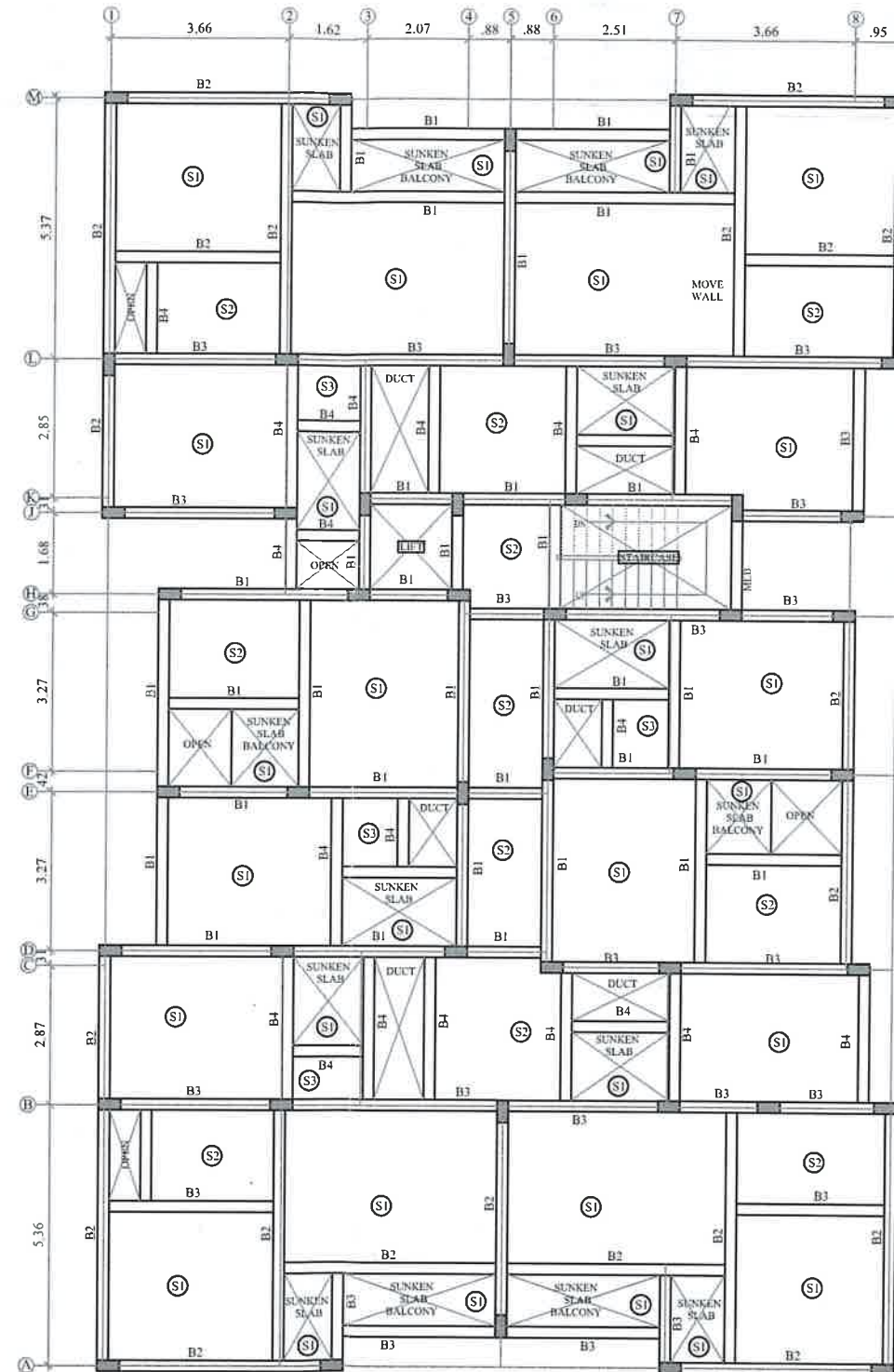
FILE: VR-4//VRPC2022/600 Series/Diamond - Gems Park



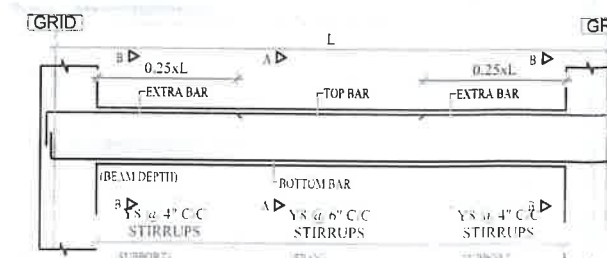
LAYOUT OF ROOF BEAM AND SLAB OVER TYP FLOORS (STILT, I, II & III) BLOCK-2
(ALL GRID DIMENSIONS SHALL BE CHECKED WITH ARCHITECTURAL DRG.)

BEAM REINFORCEMENT DETAIL				
BEAM MKD	BEAM SIZE (B X D)	TOP BAR		BOTTOM BAR
		AT SUPPORT	AT SPAN	
B1	230 X 525	2-Y20+1-Y16	2-Y20	2-Y20+1-Y16
B2	230 X 600	2-Y20+1-Y25	2-Y20	2-Y20+1-Y25
B3	230 X 525	2-Y20+1-Y20	2-Y20	2-Y20+1-Y20
B4	230 X 450	2-Y16+1-Y16	2-Y16	2-Y16+1-Y20

SLAB REINFORCEMENT DETAIL			
BEAM MKD	SLAB THK	SHORTER SPAN	LONGER SPAN
S1	15	Y8 @ .15 C/C	Y8 @ .15 C/C
S2	15	Y8 @ .2 C/C	Y8 @ .15 C/C
S3	15	Y8 @ .2" C/C	Y8 @ .2 C/C



LAYOUT OF ROOF BEAM AND SLAB OVER TYP FLOORS (STILT, I, II & III) BLOCK-2
(ALL GRID DIMENSIONS SHALL BE CHECKED WITH ARCHITECTURAL DRG.)



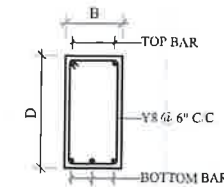
L.S OF TYPICAL BEAM

LEGENDS:

LVL : LEVEL
 T&B : TOP & BOTTOM
 B/W : BOTHWAYS
 - - - - : TOP BAR
 - - - - : BOTTOM BAR

GENERAL NOTES :

- Grade of Concrete and steel : M-25 & Fe-550-D.
- Mix of Concrete shall be designed as per IS 456 - 2000.
- Cement shall be generally be of 53 Grade - unless otherwise specified.
- Clear cover to reinforcement shall be as follows:
 Slab - 20 mm (3/4")
 Beam - 25 mm (1")
 Column - 40 mm (1 1/2")
- Lapping shall be 50 times diameter of smaller bar
- Lapping shall be staggered.
- For columns, if lapping is required, it shall be provided at midway between two floors.
- For beams, lapping of bars shall be avoided at bottom at center of beam (L_e) at span.
- For beams, lapping of bars shall be avoided at top of beam at Column - Beam joint (L_e) at support.
- For slab, wherever bars are not shown, provide Y10 @ 0.25 C/C (Distribution Steel)
- For slab, chair rods shall be provided to keep top reinforcement in place
- All dimensions are in "metres"



SECTION A-A
(AT SPAN)



SECTION B-B
(AT SUPPORT)

V.R. RAVINDRAN, M.E., M.I.E.,
 Structural Consultant
 CIMA Reg.No: SE/GR-I/19/04/105
 Chennai Corpn. Reg.No: RSE 101812023
 E-mail: vrpcconsultants@gmail.com
 Web: www.vrpcconsultants.com

REV	DESCRIPTION	DATE
-----	-------------	------

This drawing should be read along with Architectural drawing.

Structural Consultant:

V.R.P. CONSULTANTS PH : 044-4861 0086
 CONSULTING ENGINEERS MOB: +91-97910 20760
 #18, Vathiyar Thottam Main Road, Kodambakkam, Chennai - 24
 E-MAIL : vrpcconsultants@gmail.com
 Website : www.vrpcconsultants.com

Client:
HANSA ESTATES,
 CHENNAI

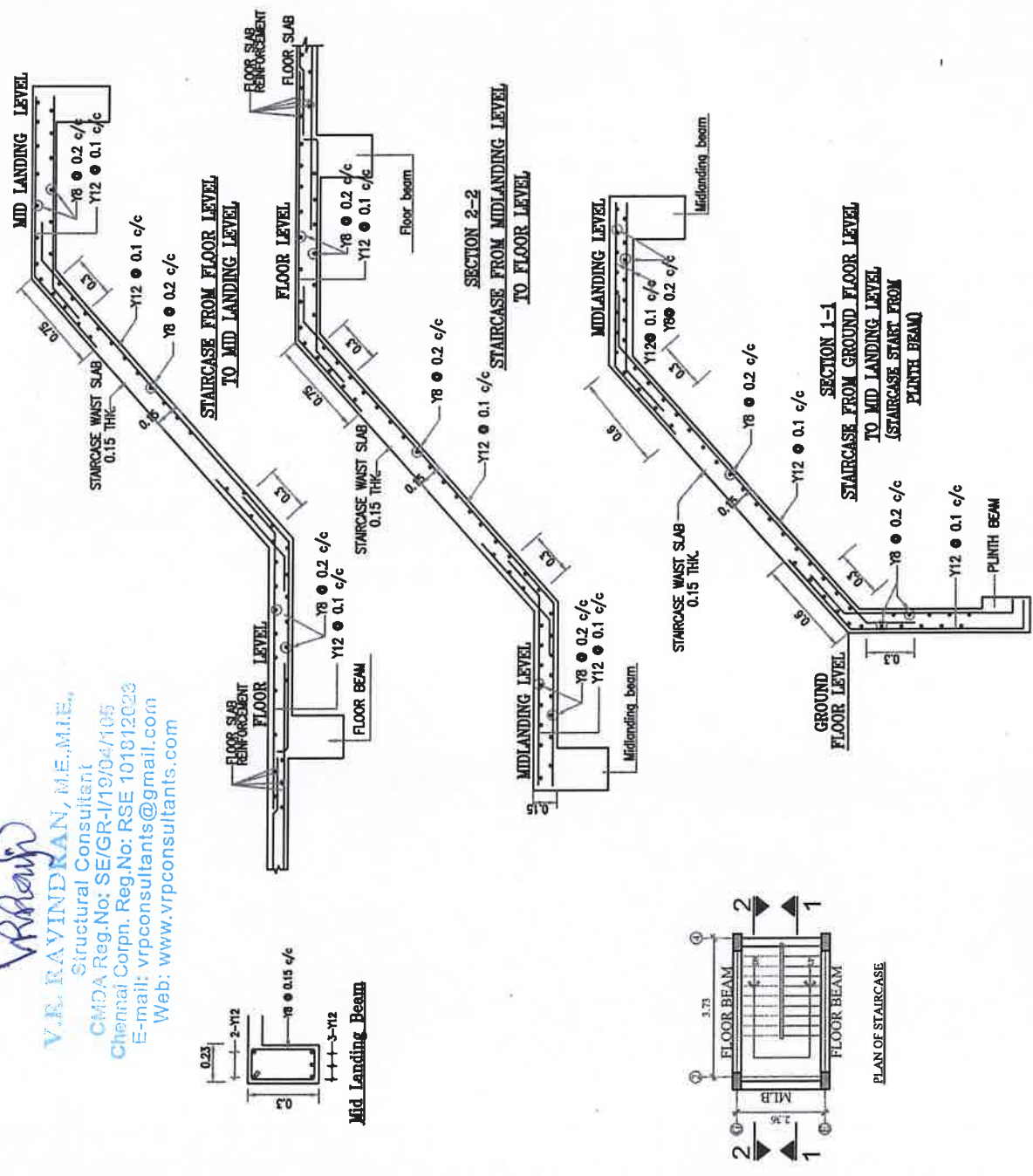
Project Title:
PROPOSED RESIDENTIAL BUILDING, BLOCK-2
AT THIRUVOTTYUR, CHENNAI

Drawing Title:
LAYOUT & DETAILS OF ROOF SLAB & BEAMS
OVER TYPICAL FLOOR

DATE : 15.10.2024

FILE:VR-4/VRPC2022/600 Series/Diamond - Gems Park

V.R. RAVINDRAN, M.E., M.I.E.,
Structural Consultant
CMDA Reg.No: SE/GR-1/19/04/105
Chennai Corpn. Reg.No: RSE 101812023
E-mail: vrpconsultants@gmail.com
Web: www.vrpconsultants.com



GENERAL NOTES :

1. Grade of Concrete and steel : M-25 & Fe-550-Q.
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 - 25
Slab - 20
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 of center of beam (L_a) at open.
8. For beams, lapping of bars shall be avoided at top of beam at Column - Beam joint (L_a) at support.
9. For Side-Chair rods shall be provided to keep Top reinforcement in place.
10. For Slab-Provide Y8 @ 0.2 c/c wherever bars are not shown.

STEEPING 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	7 days
a. Spanning upto 4.5m(15'-0")	14 days
b. Spanning over 4.5m(15'-0")	14 days
5. Props to Beams	14 days
a. Spanning upto 6m(20'-0")	21 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 14887.

NOTES

1. This drawing should be read along with Architectural drawing.

Structural Engineer :

VRP CONSULTANTS
CONSULTING ENGINEERS
5/3, FIRST STREET, AZH NAGAR, KODUMBUR, CHENNAI-24.
E-MAIL : vrpconsultants@gmail.com
Website : www.vrpconsultants.com
Ph: 044-2461 0066
Mob: +91-97910 20700

Project Title

**PROPOSED RESIDENTIAL BUILDING,
BLOCK-1 & 2 AT THIRUVOTTIYUR,
CHENNAI.**

LAYOUT & DETAILS OF STAIRCASE

DATE : 16.10.2024
DWG NO : 03

FILE : \VRPC_2022\Hamed\Diamond\Staircase