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DIGITALLY VERIFIED RECORD

Design Report & Stability Certificate

Site Address

The Proposed Construction of Stilt Floor Parking + 5 Floors Residential Building (Height - 18.0m) With 25 Dwelling Units at Door No : 2(1), 4(2), Silambu Street, Padmanaba Nagar, Arumbakkam, Chennai 600094.Comprised in T.S.No : 79 / 17 & 79/18 (Old T.S. No : 79 Part) , Block No : 1, Puliyur Village With in the limit Greater Chennai Corporation.

S.Subramaniam, MS.(Struc).PDQS.DRTM.
Registered Structural Engineer Grade – 1
CMDA : (SE/GR-I/19/02/008)
Corporation: RSE100122019

Kannimar Consultants

Industrial Building Consultants
Structural Design

New No. 14, Old No.17A, Kannimar Villa, Ganga Nagar, Jafferkhanpet, Ashok Nagar, Chennai – 83.
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KC-6300

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S. Subramaniam, M.S. (Struc). PDQS. DRTM.
Chartered Engineer
Registered Structural Engineer Grade - I
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Stability Certificate

It is certified that The Proposed Construction of Stilt Floor Parking + 5 Floors Residential Building (Height - 18.0m) With 25 Dwelling Units at Door No : 2(1), 4(2), Silambu Street, Padmanaba Nagar, Arumbakkam, Chennai 600094.Comprised in T.S.No : 79 / 17 & 79/18 (Old T.S. No : 79 Part) , Block No : 1, Puliyur Village With in the limit Greater Chennai Corporation is Designed to resist for earthquake, check has been made and found safe and sound

and I hereby certify that

- The Minimum grade of concrete is M25.
- The design analysis using the code of practice for loading standards as per IS-875 part and seismic force as per the IS 1893 & IS456-2000
- The above said building is designed for earthquake forces of Zone III. The relevant BIS codes were used for its design. Hence it is certified that the above said building is safe in its life circle against the forces like Service loads as well as seismic forces as per specifications given in Zone III of BIS 1893
- Minimum size of the column is 300 mm

S. Subramaniam, M.S.(Struc)., PDQS, DRTM.
Registered Structural Engineer Grade-I.
(SE / GR-I / 2024 / 02 / 008).
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COLUMN DESIGN

Column load as per load calculation		=	200	Mt			
Long Column design as per IS456-2000, Page 71							
Factored Load	P_u	=	$C_r(0.4\ f_{ck}.\ A_c + 0.67\ f_y.\ A_{sc})$				
Working load	P	=	$P_u/1.5$				
	C_r	=	1.25 - [(l_e/D)/48]				
PROCEDURE:							
	F_{ck}	=	25	N/mm²			
	F_y	=	415	N/mm²			
Length of column	L	=	3.6	m			
	l_e	=	3.06	m	0.85* L		
	C_r	=	0.97				
Modulus of elasticity of concrete	E_c	=	25000.00	N/mm²			
Ref IS 456-2000 Cl 6.2.3.1							
Flexural strength of concrete	f_{cr}	=	3.50	N/mm²			
Ref IS 456-2000 Cl 6.2.2							
Maximum shear stress in concrete for limit state method of design							
Ref IS 456-2000 Table 20 Cl 40.2.3	$t_{c\,max}$	=	3.1	N/mm²			
Permissible bearing stress		=	0.45*Fck				
		=	0.45	x	25		
Permissible bearing stress		=	11.25	N/mm²			
Column size		=	230	750	mm		
Minimum Eccentricity,e		=	L/500 + Lateral dimension/30				
One direction		=	14.87	mm			
Another Direction		=	32.20	mm			
Minimum eccentricity		=	20	mm			
Consider Minimum Eccentricity		=	32.20	mm			
0.05*b		=	11.50		<	32.20	
Area of column		=	172500	mm²			
Number of rod		=					
		=	6	25	2944.88	mm²	
		=	6	25	2944.88	mm²	
Area of Steel(A_{sc})		=	5889.75	mm²			
Area of Concrete(A_c)		=	166610.25	mm²			
	P_u	=	3213971.741	N			
	P	=	2142647.827	N			
	Say	=	**214.26**	**Tonne**			
% of Reinforcement	**0.8**	<	**3.41**	<	**4**	%	
		SAFE		**SAFE**			
Column Load	214.26	>	200.00	**Mt**			
		SAFE					

Lateral Ties:

As per IS 456-2000: Clause 26.5.3.2.c-Page 49

Diameter shall not be less than		=	25 / 4				
		=	6.25	mm dia			
Provide		=	8	mm dia			
Spacing							
Shall not be more than following							
Least dimension of column		=	230	mm			
16x Smallest dia of column rod		=	400	mm			
Not more than		=	300	mm			
Minimum of above		=	**230**	mm			
Provide	8	@	150	mm C/c			

Development length in compression

	Ld	=	Ø *σs / 4*T_{bd}				
	Ø	=	Dia of bar	=	25.00	mm	
(Fy/1.15)	σs	=	Stress in bar	=	360.87	N/mm²	(0.87*Fy)
Page 43,26.2.1.1	T_{bd}	=	Bond stress	=	2.8	N/mm²	
	Ld	=	25 / 4	360.8696 / 2.8			
	Ld	=	805.512	mm			

SUMMARY

Column size		=	230	x	750		
Rebar		=	6	25			
			6	25			
Lateral tie	8	@	**150**	mm C/c			

Bond stress for **Compression** 43,IS 456-2000

Grade of concrete	Type	M20	M25	M30	M35	M40 & above
Design Bond Stress,N/mm²	Plain	1.5	1.75	1.875	2.125	2.375
	Deformed	2.4	2.8	3	3.4	3.8

Pile Design

Pile capacity as per soil report

Dia"mm"	Safe Load in "Mt"
550	60
600	70

Pile depth			18 M
Actual Load from the column		=	2000 kN
Add pile cap weight-5%		=	100 kN
Total weight on pile		=	2100 kN
Dia of pile adopted		=	600 mm
Capacity of pile as per soil report		=	70 T
Number of pile to be provided		=	2100
		=	700
No. of pile		=	3.00 No
Say		=	3 Nos
Rebar Calculation		=	
Provide minimum rebar		=	0.6 %
Area of rebar		=	1696.25 mm^2
Provide	8	20	
	0	16	
"A_{st}" Provided	2512.96	>	1696.25 mm^2
		Safe	
%age of steel provided			**0.89 %**

Lateral Ties:

As per IS 456-2000; Clause 26.5.3.2.c-Page 49

Diameter shall not be less than		=	20
			4
		=	5 mm dia
Provide		=	8 mm dia

Spacing

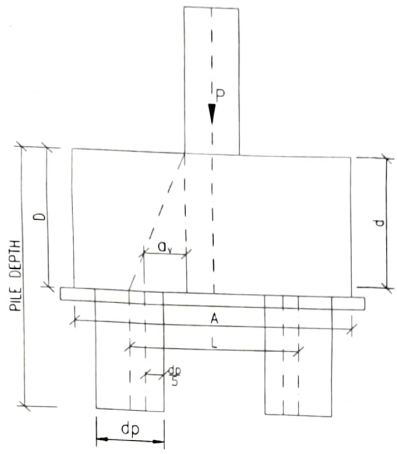
Shall not be more than following			
Least dimension of column		=	600 mm
16x Smallest dia of column rod		=	320 mm
Not more than		=	300 mm
Minimum of above		=	300 mm
Provide	8	@	150 mm C/c

Summary

Pile size		=	600 mm
No. Of pile		=	3 No
Rebar	8	NOS	Y 20
Lateral tie	8	@	**150** mm C/c

PILE CAP DESIGN : 3 Pile

Ref: Limit state design of Reinforced Concrete-P.C.Vargheese
P-483



Load on Column	P	=	**200** Mt		
Factored load		=	3000 kN		
Column size	a,b	=	300	750 mm	
No of pile		=	3 No		
Load per pile		=	1000 kN		
Pile diameter	d_p	=	600 mm		
Distance between pile	L	=	1800 mm	1800	
Pilecap size		=	2700 mm	2700	
		=	2450 mm	2458.8	
Depth of pile cap		=	1200 mm	1300	
Effective cover		=	68 mm		
Effective depth	d	=	1132 mm	d	
	f_y	=	415 N/mm^2		
	f_{ck}	=	25 N/mm^2		

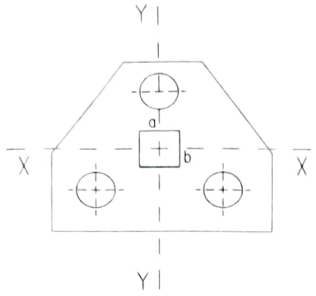
Check for Compression :

Area of pile cape	=	5.23	m^2		
Wt.of pile cape	=	5.23	1.2	25	
	=	156.9			
Pile cap Load taken by one pile	=	52.30 kN			
Column load taken by one pile	=	200	=	66.67 kN	
	=	3			
Load Taken by pile inc . Colum +cap	=	66.67	+	5.23	
	=	71.90			
Pile capacity as per load test/soil report	=	75	>	71.90 Mt	
			Safe		
	a_v	=	345		
	a_v/d	=	0.30	<	2

Adopt Truss theory

Tensile forces along X-X axis = 541997.9 N

Tensile forces along Y-Y axis = 484025.3 N



T parallel to xx = $\frac{p}{36Ld}\left[4L^2 + b^2 - 3a^2\right]$

T parallel to yy = $\frac{p}{18Ld}\left[2L^2 - b^2\right]$

Area of steel-XX axis = 1501.17 mm^2

Area of steel-YY axis = 1340.60 mm^2

Area of steel = 1501.17 mm^2

Minimum area of steel = 4160.1 mm^2 0.15%

Area of reinforcement atBottom = 4160.10 mm^2

Provide

12	25
0	16

Area of steel provided 5889.75 > 4160.1 mm^2

Design is **Safe**

Check for Shear

%ge of steel = 0.21 %

Asper clause 40.5.1 of IS456-2000 page-74

Enhanced shear stress T_c'

T_c' = T_c x 2d/ a_v

% of steel	**T_c**
0.15	0.29
0.25	0.36

As per clause 40.2 (P73) of IS 456-2000

For 0.21 0.33

T_c = 0.33 N/mm^2

T_c' = $\frac{Tc \times 2 \times d}{a_v}$

T_c' = $\frac{0.33 \times 2 \times \mathbf{1132}}{345}$

= 2.19 N/mm^2

T_c' 2.19 < 3.05 N/mm^2

Safe

Shear stress 1.08 < **2.19** N/mm^2

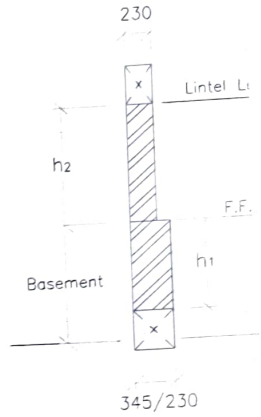
Safe

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PLINTH BEAM

Span	=	6.32	m
Wall thickness-Below basement	=	0.23	m
Wall height	=	0.75	m
Wall thick-above basement	=	0.25	m
Wall height	=	0	m
Beam Size b	=	230	mm
D	=	450	mm
d'	=	46	mm
d	=	404	mm
F_y	=	415	N/mm²
F_{ck}	=	25	N/mm²

l/16 = **395** mm
d'/d = 0.114



LOAD CALCULATIONS:

Self wt = b x D x 1 x 25	=	2.59	kN/m
Brick masonry weight below basement	=	3.45	kN/m
Brick masonry weight above basement	=	0	
Max Udl	w =	6.04	kN/m
Max B.M at Mid span	=	$(wl^2/20)$	

6.04	6.32	6.32
	20	

BM = 12.06 kN.M

SF = wl/3 (0.5 x w x l)

6.04	x	6.32
	3	

SF = 12.72 kN

M_u/bd^2 =

1.5	12.06	1000000
230.00	404	404

= **0.48** N/mm²

Refer SP 16 ,Page 86.Pt = **0.137** % P_c = 0.1

A_{st} =

0.137	230	404
	100	

Ast = 127 mm² = 93 mm²

Provide

2	16
1	16
0	16

"A_{st}" Provided 603.11 > 126.94 **SAFE**

2	16
1	16
0	12

603.1104 > 92.92 **SAFE**

Min.Reint = $(0.87 \times b \times d / F_y)$ mm²

0.870	230	404
	415	

Min.Reint = 194.796 mm²

"A_{st}" Provided 603.1 > 194.8 mm² **SAFE**

CHECK FOR SHEAR STRENGTH

T_c Max = $0.62 * sqrt(F_{ck})$

0.62	5

= 3.10 N/mm²

As per clause 40.2 (P73) of IS 456-2000

Percentage of steel P_t = **0.65** %

Shear strength = kT_c

k = 1

% of steel	T_c
0.5	0.49
0.75	0.57

For 0.65 0.54

kT_c = 1.00 X 0.54 < 3.10 N/mm²

kT_c = 0.54 N/mm² **SAFE**

Now T_v = $V_u/b.d$ X 12.72

Nominal Shear stress V_u = 1.5 19.079 kN

T_v = $V_u/b.d$

T_v =

19.08	1000
230.00	404

0.21 < 3.10 N/mm²

T_v = **SAFE**

0.54 N/mm²

0.21 < kT_c

T_v < **SAFE**

Total shear strength V_u = 19078.50 N

Shear contribution by concrete $T_c b.d$ =

0.54	230	404

49963.1328

Shear contribution by stps V_{us} = V_u - T_c b.d

19078.50 - 49963.13

-30884.63 N

-475 mm C/C

Provide Y 8 =

Area or 2 legged stps a = 101 mm²

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Spacing of stirrups = $\frac{0.87 * Fy * a * d}{V_{us}}$

0.87	415	101	404
	-30884.63		

= -475 mm C/C

Provide shear Rebar without considering conc. shear — Y 8 — 769 mm C/C

Area of 2 legged stps — a = 101 mm²

$= \frac{0.87 * Fy * a * d}{V_s}$

0.87	415	101	404
	19078.50		

= **769 mm C/C**

V_{us}/d = $\frac{-30884.63}{404.00}$ | 10 | 1000

= -0.764 kN/cm

Minimum Stirrups Reinforcement — Y 8

A_{sv} = 100.52 mm²

S_v = 0.87*Fy*Asv/0.4*b

$= \frac{0.87 \quad 415 \quad 101}{0.4 \quad 230.00}$

$= \frac{36292.16832}{92}$

= **394 mm C/C**

Maximum Spacing of Stirrups = 0.75 *d

= 303 mm

= 300 mm

Least of above 300 mm

			Y	8		
				@		
Provide	394	>	200	<	300	
		SAFE		**SAFE**		
	531	>	200	<	769	
		SAFE		**SAFE**		

Development length in Tension

Ld = $\frac{\emptyset * \sigma s}{4 * T_{bd}}$

Ø = Dia of bar = 16 mm

(0.87*Fy) σs = Stress in bar(Fy/1.15) = 360.87 N/mm²

Page 43,26.2.1.1 T_{bd} = Bond stress = 2.24 N/mm²

Ld = $\frac{16 \quad 360.8695652}{4 \quad 2.24}$

Ld = 644.4 mm

Bond stress for **tension** P 43,IS 456-2000

Grade of concrete	Type	M20	M25	M30	M35	M40 & above
Design Bond Stress,N/mm²	Plain	1.2	1.4	1.5	1.7	1.9
	Deformed	1.92	2.24	2.4	2.72	3.04

Centre Beam-Continues

Span	=	6.32 m			
Lateral span	=	4.21 m			
Wall height	=	2.45 m			
Wall thickness	=	0.25 m			
b	=	230 mm			
D	=	600 mm	l/12.5	**506**	mm
d'	=	50 mm	d'/d =	0.091	
d	=	550 mm			
f_y	=	415 N/mm²			
f_{ck}	=	25 N/mm²			

Slab Load:

Self wt	=	3.125	kN/m²	slab thk 0.125 m
Live Load	=	2	kN/m²	
Floor Finish	=	1.5	kN/m²	
Mish. Load	=	1	kN/m²	
		7.625	kN/m²	

Load Calculations:

Brick work/ AAC Block	=	**20**	kN/m³
Self wt = b x D x 1 x 25	=	3.45	kN/m
Brick work:	=	10.4125	kN/m
Udl for slab	=	21.41	kN/m
Max Udl	w =	35.27	kN/m

M_u Limit = $0.138\ f_{ck}\ bd^2$

0.138	25	230	302500

= 240033750.00 Nmm

240.03 > 192.11

M_u limit > M_u

Singly Reinforced

"d" - reqd = 492.05 < 550 mm

Safe

Max B.M at Mid span = $(wl^2/13)$

35.27	6.32	6.32
	13	

BM = 108.37 kN.M

M_u Midspan = **162.56 kN.M**

Max B.M at Support = $(wl^2/11)$

35.27	6.32	6.32
	11	

BM = 128.08 kN.M

M_u Support = **192.11 kN.M**

SF = wl/2 (0.5 x w x l)

35.27	x	6.32
	2	

SF **111.46 kN**

M_u/bd^2 @Mid span =

1.5	108.37	1000000
230.00	550	550

= **2.34** N/mm²

M_u/bd^2 @Support =

1.5	128.08	1000000
230.00	550	550

= **2.76 N/mm²**

Rebar @ Mid span

	P_t	P_c	
Refer SP 16 ,Page 86,Pt =	0.738	0.37	**0.738** %

A_{st} =

0.738	230	550
	100	

	Ast	=	933	mm^2			=	467	mm^2
Provide		3	20				3	20	
		2	16				0	16	
		0	16				0	16	
"A_{st}" Provided		1344.43	>	933.34	mm^2		942.36	>	466.67
		1.06	**Safe**				**0.74**	**Safe**	

Rebar @ Support

		P_t	P_c	
Refer SP 16 ,Page 86,Pt	=	0.899	0.450	0.899 %

A_{st}	=	0.899	230	550
			100	

	Ast	=	1138	mm^2		=	569	mm^2
Provide		3	20			3	16	
		2	16			0	16	
		0	16			0	16	
"A_{st}" Provided		1344.43	>	1137.83	mm^2	603.1104	>	568.91
		1.06	**Safe**			**0.48**	**Safe**	

Min.Reinf = 0.87 x b x d / F_y mm^2

=	0.870	230	550
		415	

Min.Reinf = 265.193 mm^2

"A_{st}" Provided 1344.4336 > 265.193 mm^2

Safe

Min. % of steel required

As per Cl.26.5.1.1 IS456:2000 = 0.205 %

As per Cl.6.2.1 IS13920:1993 = 0.290 % (0.24 √ fck) /fy)

$p_{t\,min}$ = **0.290** % < 1.06 %

Safe

Max. % of steel to be used =

As per Cl.26.5.1.1 IS456:2000 = 4.000 %

As per Cl.6.2.1 IS13920:1993 = 2.500 %

$p_{t\,max}$ = **2.500** % > 1.06 %

Safe

CHECK FOR SHEAR STRENGTH

As per clause 40.2 (P73) Tc Max = 0.62 *sqrt(Fck)

of IS 456-2000 = 0.62 | 5

= 3.10 N/mm^2

Percentage of steel P_t = **1.06** %

Permissible shear stress in concrete (kt_c) for solid slabs in limit state design method

Ref IS 456:2000 Cl 40.2.1.1, Table 19

f_{ck} N/mm^2	p_t %	D of slab	k	$k\,t_c$ N/mm^2
25	1.06	600	1.00	0.66

Now kT_c = 0.66 N/mm^2 < 3.10 N/mm^2

Nominal Shear stress T_v = $V_u/b.d$ **Safe**

V_u = 1.5 X 111.46

167.188

T_v = $V_u/b.d$

= 167.19 | 1000

230.00 | 550

= 1.32 < 3.10 N/mm^2

Safe

1.32 > 0.66 N/mm^2

T_v > kT_c

Provide shear Bar

Total shear strength V_u =

Shear contribution by concrete $T_c b.d$ = 167188.33 N

0.66	230	550

Shear contribution by stps V_{us} = 83490

V_u - T_c b.d

167188.33 - 83490

Minimum shear resistance 0.4bd = 83698.33 N

= 50600.00 N

Provide = 83698.33 N

Y 10 373 mm C/C

Area or 2 legged stps a = 157 mm^2

Spacing of stirrups = $\frac{0.87 * Fy * a * d}{V_{us}}$

0.87	415	157	550
	83698.33		

= **373** mm C/C

Provide shear Rebar without considering conc. shear

Y 10 **187** mm C/C

a = 157 mm^2

= $\frac{0.87 * Fy * a * d}{V_u}$

0.87	415	157	550
	167188.33		

= **187 mm C/C**

Minimum Stirrups Reinforcement

Y 10

A_{sv} = 157.06 mm^2

S_v = 0.87*Fy*Asv/0.4*b

0.87	415	157
0.4	230.00	

$\frac{56706.513}{92}$

= **616 mm C/C**

Maximum Spacing of Stirrups = 0.75 *d

= 412.5 mm

= 300 mm

Least of above 300 mm

Y 10 @ 150

Provide 616 > **Safe** < 300 **Safe**

SLAB DESIGN

Location: **ONE WAY SLAB**

L_x	=	3.28	m		
L_y	=	6.73	m		
f_{ck}	=	25	N/mm²		
f_y	=	415	N/mm²		
L_y/L_x	=	2.05	>	2	

One Way Slab

Span	=	3.28	m	
Slab thickness	=	125	mm	102.50 Span/32
Cover	=	20	mm	
Effective depth	=	105	mm	
Concrete wt	=	25	kN/m³	
Live Load on Slab	=	2	kN/m²	
Floor finish	=	1.5	kN/m²	

Design Load:

slab weight	=	3.13	kN/m²	
Live + Floor finish Load	=	3.5	kN/m²	
Total Load		6.63	kN/m²	
Max. BM	=	7.13	kNM	
M_u	=	10691160	Nmm	
M_u limit	=	38036250	Nmm	$(0.138 f_{ck}\, bd^2)$

M_u < M_u limit

Singly reinforced

"d" - reqd under compression = 55.67 < 105 mm

Hence OK

$M_u/b.d^2$ = **0.97** N/mm²

SP16, Table 2,Page 48,

$$Pt = 50\left(1 - \sqrt{1 - \frac{4.6\,\frac{Mu}{bd^2}}{\frac{fy}{fck}}}\right)$$

P_t	=	**0.282**	%
Area of steel	=	296.01	mm²
Minimum area of steel-0.12%	=	126	mm²
Hence area of steel	=	296.01	mm²

Adopt

Y 10 @ 125 **mm C/C**

628.24 > 296.01 mm²

Safe

Distribution Steel

Minimum area of steel-0.12% = 126 mm²

Adopt

Y 10 @ 150 **mm C/C**

523.53 > 126 mm²

Safe

Check for Shear strength

As per clause 40.2 (P72)
of IS 456-2000

Percentage of steel P_t = **0.598**

Shear strength = kT_c

Permissible shear stress in concrete (kt_c) for solid slabs in limit state design method

Ref IS 456:2000 Cl 40.2.1.1, Table 19

f_{ck} N/mm²	p_t %	D of slab	k	$k\,t_c$ N/mm²
25	0.60	125	1.30	0.69

Nominal Shear stress $T_v = V_u/b.d$

$V_u = 16.30$ kN

$T_v = 0.16$ N/mm²

$0.16 < 0.69$ N/mm²

$T_v < kT_c$

SAFE

Check for Defflection

Live Load $2 < 3.01$ kN/m²

Defflection calculation is Not Necessary

A_{st} required = 296.01 mm²

A_{st} Provided = 628.24 mm²

Steel stress for service Load $F_s = 0.58 \times F_y \times \frac{A_{st}\ \text{required}}{A_{st}\ \text{Provided}}$

As per Fig-4,IS 456-2000,Page38

0.58	415	296.01
	628.24	

F_s = **113.41 N/mm²**

Percentage of steel provided = **0.60 %**

Modification factor-Fig-4

Asper IS 456-2000-Page 38

f_y N/mm²	f_s N/mm²	$p_{t\,req.}$ %	$p_{t\,prov.}$ %	MF_t IS 456 Fig 4
415	113.41	**0.282**	**0.60**	2.00

Effective depth ratio

For,Simply supported = 20

Continues = 26

Cantilever = 7

(Lx/d) Max = 26 x 2.000 = 52.00

(Lx/d)Provided = $\frac{3280}{105}$ = 31.24

(Lx/d) Max $52 >$ 31.24 (Lx/d)Provided

Safe

Maximum diameter of bars for slabs

Ref IS 456-2000 Cl 26.5.2.2

D of slab mm	dia of bar mm	Result Cl 26.5.2.2
125	**10**	Ok

overall depth of slab in mm	300 or more	275	250	225	200	175	150or less
k	1	1.05	1.1	1.15	1.2	1.25	1.3

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STAIRECASE -DOG LEGGED MODEL

Location:

L_x	=	5.41	m		
F_{ck}	=	25	N/mm^2		
F_y	=	415	N/mm^2		
Step weight		20	kN/m^3		
Landing width	=	1.2			
Slope length	=	3.01			
Step tread	=	0.25	m		
Step riser	=	0.165	m		
Slope length for one step	=	0.300	m		
Number of tread	=	3.01			
	=	0.25			
	=	12.04	No		
Say	=	11	No		
Aditional slope length per flight	=	11	x	0.050	
	=	0.54			
Effective length	=	5.95	m		
Concrete wt	=	25	kN/m^3		
Waist slab thickness	=	0.140	m	(Assumed)	
Loads:					
Dead load of Waist slab	=	3.5	kN/m^2		
Ceiling finish	=	0.25	kN/m^2		
Sub total	=	3.75	kN/m^2		
Dead Load on plan area	=	3.75	x	0.300	
				0.25	
	=	4.49	kN/m^2		
Brick load	=	0.165	x	20	
				2	
		1.65	kN/m^2		
Live load	=	3	kN/m^2		
Floor finish	=	1.5	kN/m^2		
Total load on staire	=	10.64	kN/m^2		
Maximum BM($w \times l^2/12$)	=	10.64	x	5.95 ^{2}	
	=			12	
	=	31.45	kN.M		
M_u	=	1.5 x	31451734		
		47177600.97	Nmm		

47177600.97		
0.138	25	1000

13674.67

sqrt	=	116.94	mm
Cover	=	20.00	mm
Total	=	136.94	mm
Provide	=	140.00	mm
d		117.00	

47177600.97		
1000.00	117.00	117.00

3.45

As per SP16, Table 2,Page 48,

P_t	=	**1.190**	%			
Area of steel	=	1.190158197	x	1000	x	117.00

100

= 1392.49 mm^2

Adopt

Y 16 @ 140 **mm C/C**

1436 > 1392 mm^2

Safe

Distributer:

Provide minimum steel = 0.12%

0.12	1000	117.00
	100	

= **140.4** mm^2

Adopt

Y 10 @ 150 **mm C/C**

524 > 140 mm^2

Safe

Check for Shear strength

As per clause 40.2 (P72)
of IS 456-2000

Percentage of steel P_t = $\frac{1435.98 \times 100}{1000 \times 117.00}$

P_t = **1.23 %**

Shear strength = kT_c

k = 1.2

IS456-2000,Page73,table19

% of steel	**T_c**
1	0.64
1.25	0.7

For **1.23** 0.69 N/mm^2

kT_c = 1.200 x 0.695

0.833

Nominal Shear stress T_v = $V_u/b.d$

V_u

1.5	5.95	10.64
	2	

V_u = 47.5345 kN

T_v $\frac{47.5345 \times 1000}{1000 \times 117.00}$

T_v = 0.4063 < 0.8335

T_v < kT_c

SAFE

SUMMARY

Waist slab thick = **140.00 mm**

Main Rebar = **Y 16** @ 140 **mm C/C**

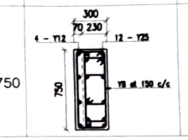
Distributer = Y 10 @ 150 **mm C/C**

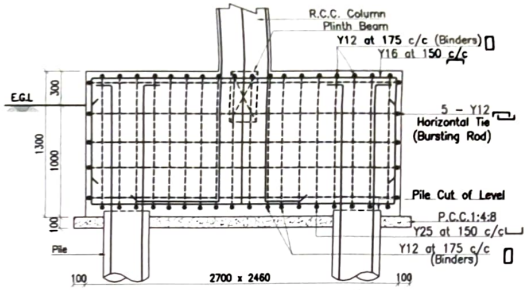
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SUNSHADE DESIGN

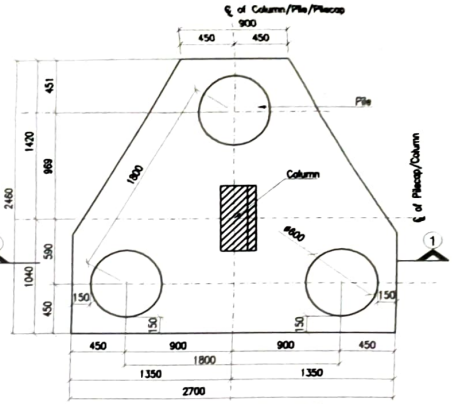
1	Grade of concrete		F_{ck}	=	**25**	N/mm^2	
2	grade of steel		Fy	=	**415**	N/mm^2	
3	Width of sunshade			=	**0.6**	m	
4	Sunshade thickness -	t_{max}		=	0.075	m	**75** mm
		t_{min}		=	0.1	m	**100** mm
		average		=	0.0875		87.5
		cover		=	0.014		**15**
		effective depth d		=	0.061	m	61 mm
5	Self weight of sunshade			=	2.19	kN/m^2	
	Finishes			=	1	kN/m^2	
	Live load			=	0.75	kN/m^2	
			Total		3.94	kN/m^2	
6	Maximum BM	$W L^2/2$		=	0.71	kN.M	
		"d" req		=	16.02	<	61 mm
					SAFE		
7	M_u/ bd^2			=	**0.29**	N/mm^2	
		P_t		=	**0.085**		
	Area of steel			=	51.85	mm^2	
	Adopt						
		Y 10			**140**	**mm C/C**	
		560.93		>	51.85	mm^2	
				Safe			

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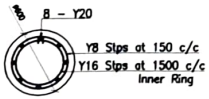
Marked As	Column Schedule	Tie Arrangement
C1 300 x 750		



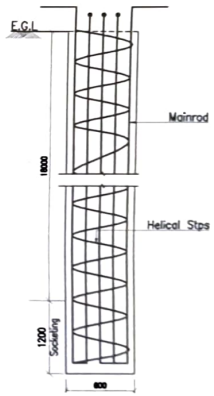
C.S. of Pile Cap PC1
Size 2700 x 2460 x1300
Section "1 - 1"



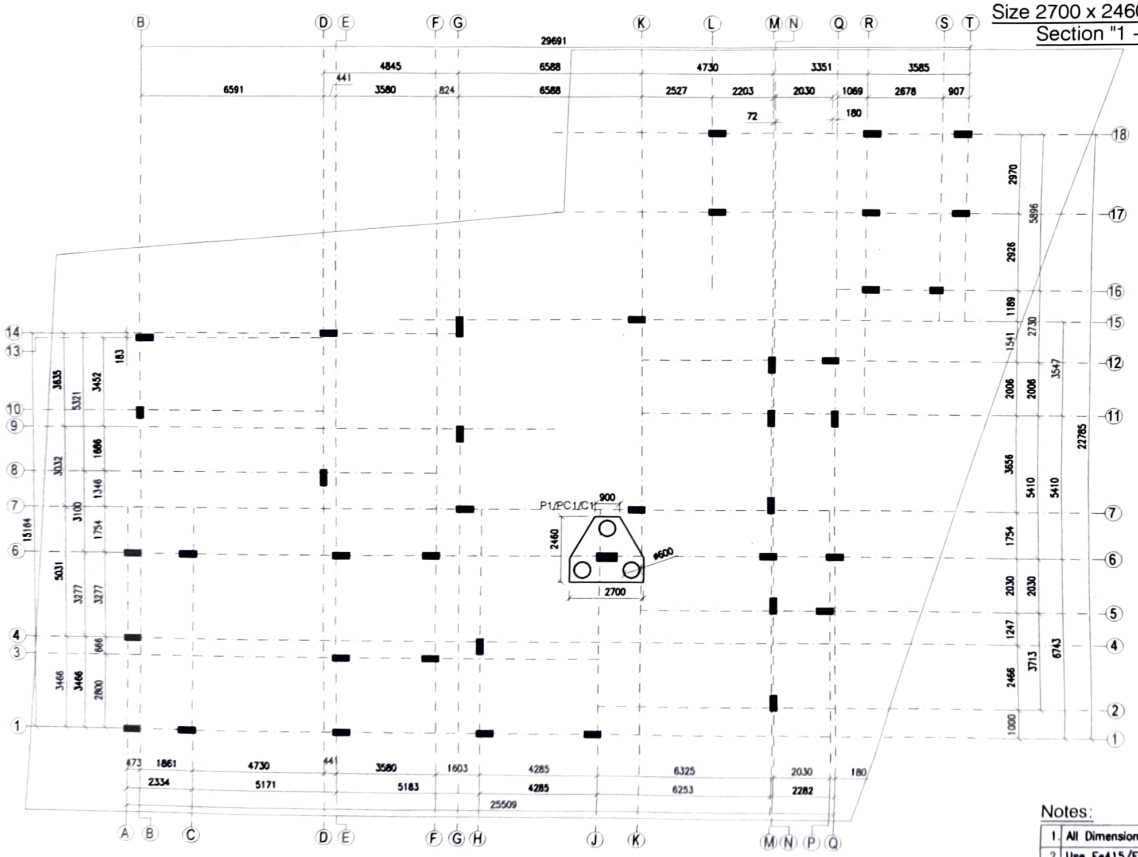
Plan of Pile Cap PC1
Size 2700 x 2460



C.S. of Pile P1
Size 600 Ø



L.S. of Pile P1
Size 600 Ø



Pile , Pilecap & Column Layout
(For Stilt +5 Floors)

Notes:

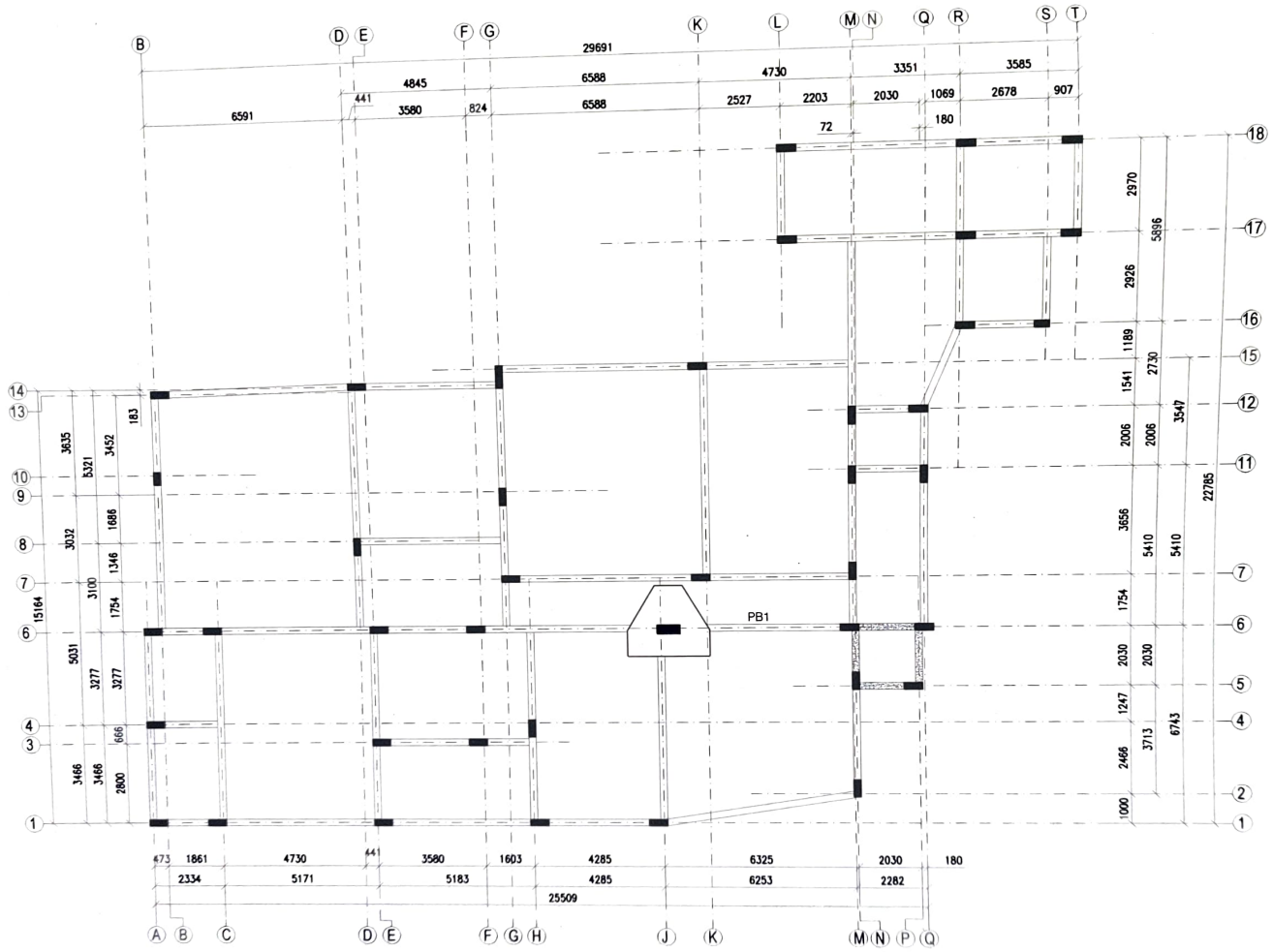
1.	All Dimensions Are In MM.
2.	Use Fe415/Fe500 Grade Steel.
3.	Use Mix M30 For Pile.
4.	Clear Cover To The Reinforcement For Footing:50mm Column:40mm,Beam:30mm,Slab:20mm,Rcc Wall:20mm.

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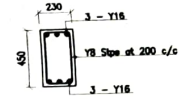
Site Address:-

The Proposed Construction of Stilt Floor Parking + 5 Floors Residential Building (Height - 18.0m) With 25 Dwelling Units at Door No : 2(1),4(2) Silambu Street, Padmanaba Nagar, Arumbakkam, Chennai 600094.Comprised in T.S.No : 79 / 17&79/18 (Old T.S. No : 79 Part) , Block No : 1, Puliyur Village With in the limit Greater Chennai Corporation.

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Plinth Beam Layout



C.S. of Plinth Beam PB1
Size 230 x 450

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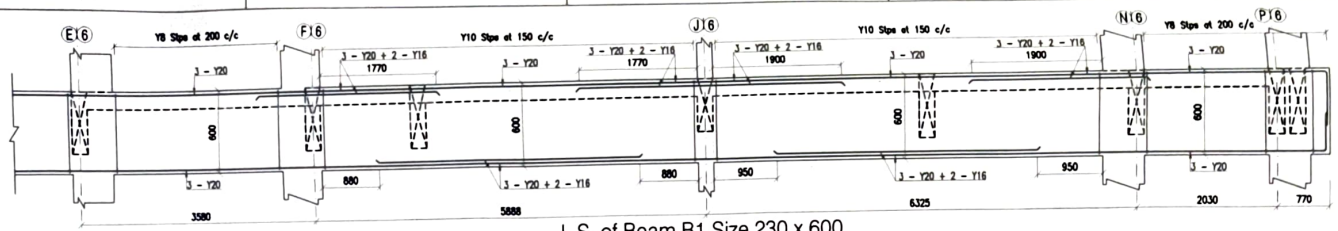
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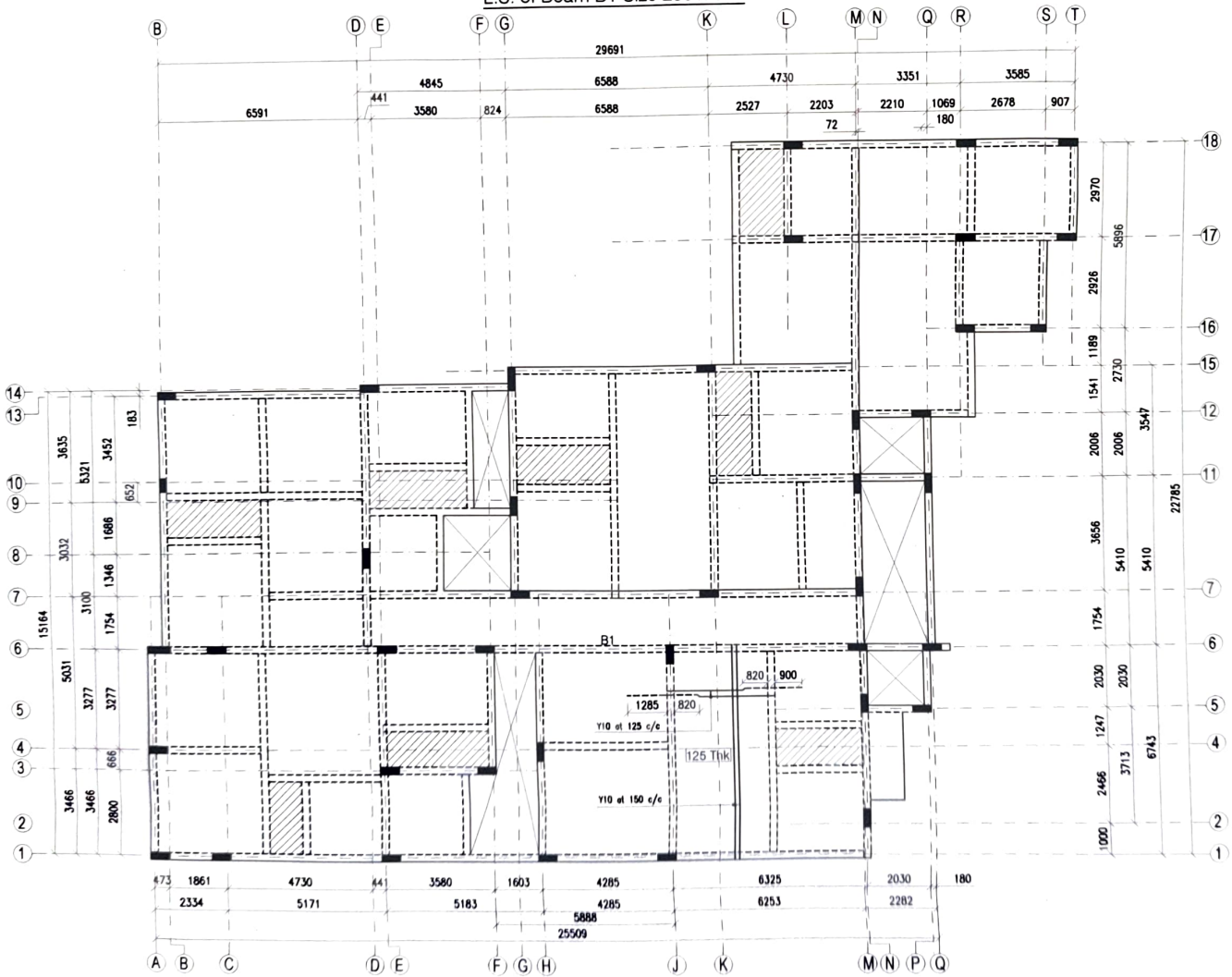
Notes:

1. All Dimensions Are In MM.
2. Use Fe415/Fe500 Grade Steel.
3. Use Mix M30 For Pile.
4. Clear Cover To The Reinforcement For Footing:50mm Column:40mm,Beam:30mm,Slab:20mm,Rcc Wall:20mm.

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L.S. of Beam B1 Size 230 x 600



Roof Beam & Slab Layout

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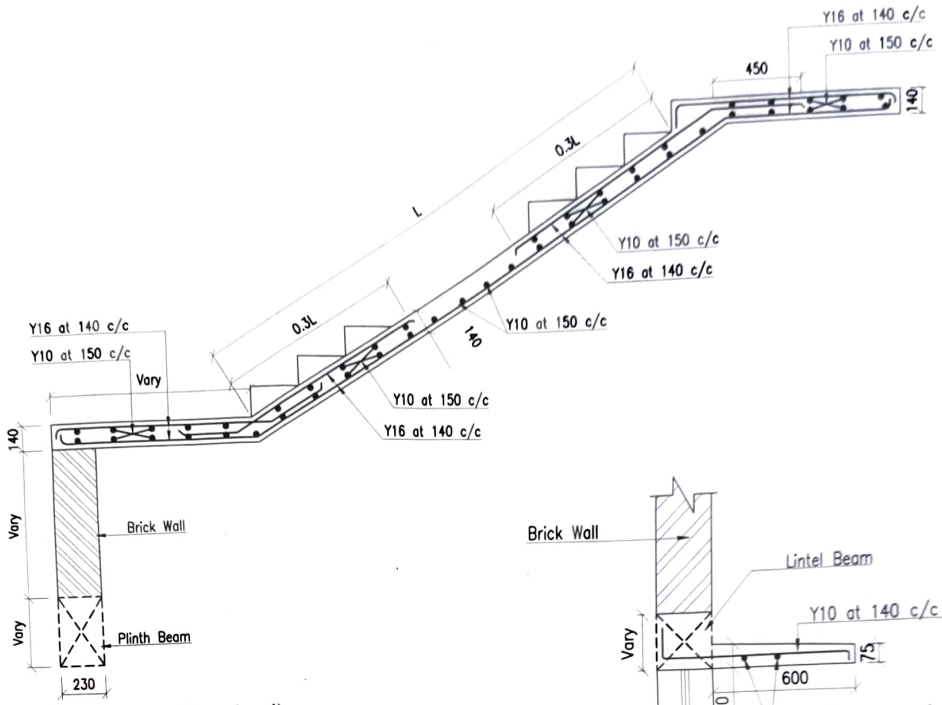
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Notes:

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3. Use Mix M30 For Pile.
4. Clear Cover To The Reinforcement For Footing:50mm Column:40mm,Beam:30mm,Slab:20mm,Rcc Wall:20mm.

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Detail of Staircase (Typical)

Sunshade Detail (Typ)

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Notes:

1.	All Dimensions Are In MM.
2.	Use Fe415/Fe500 Grade Steel.
3.	Use Mix M25 For all Works
4.	Clear Cover To The Reinforcement For Footing:50mm Column:40mm,Beam:30mm,Slab:20mm,Rcc Wall:20mm.

Site Address:-

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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.