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RE REGULATORY RECORD

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DIGITALLY VERIFIED RECORD

STRUCTURAL ANALYSIS AND DESIGN AS PER INDIAN STANDARDS

FOR THE PROPOSED RESDENTIAL FLATS AT BLOCK M54/1 To 12, M55/1 To 12 & M56/1 To 12, STATION ROAD,(STATION TO NORTH TOWNSHIP SCHOOL), TNHB, KORATTUR, CHEENAI – 600080. COMPRISED IN SURVEY NO.1020/1A PART,T.S.NO:201 PART,IN BLOCK NO.43, OF KORATTUR VILLAGE, GREATER CHENNAI CORPORATION DIVISION – ZONE- 7.

The construction will be carried out by M/S RAJUS FLAT PROMOTERS PRIVATE LTD.

Er. P. ANAND RAJU
Registered Structural Engineer Grade - I (SE)
CMDA No: SE/GR-I/2024/02/004
Flat No:2, First Floor, S-133, S-Block
6th Main Road, Anna Nagar, Chennai -600 040
Ph/Fax: 044 42643214, Cell: 9840488820,
E-Mail: aanandassociate@gamil .com

Anand Associates

Er. P. ANAND RAJU
M.E. (STRUCT), M.Sc. (REV), M.Sc (P&M), M.B.A., Ph.D., LLB, FIV, M.I.E.,
M.I.C.I, M.I.C.E, F.A.C.C.E, M.I.S.T.E, M.I.S.S.E, M.C.E, M.I.A.S.E, D.M.M.T.L.M.

Class-1A Panel of Private Practicing Engineer, Chennai Dist. (Structural Engineer)
Registered Valuer : Under Companies Act | Approved Valuer | Income Tax Valuer | Chartered Engineer | Licensed Surveyor

STABILITY CERTIFICATE

(To be furnished while filing application for registration of building)

The detailed engineering and structure design of the proposed building comprising of Stilt + 5 floors at M54/1 To 12, M55/1 To 12 & M56/1 To 12, Station Road,(Station To North Township School), TNHB, Korattur, Cheenai – 600080 S.No No.1020/1A Part,T.S.No:201 Part, has been done by me/us based on the report of geotechnical investigation (soil test) done by T.J.Engineers Report No. TJE/003621/2025 Dated 01.02.2025 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 M25.

(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 IS 456 : 2000 and design of earthquake resistant structure as per IS Code No IS 875 Series (part 1-5)and IS 1893 :2016

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

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DESIGN OF SLAB

Consider a critical bay of slab with safe end conditions for typical slab design.

Slab thickness		=	130 cm
Longer span		=	6.86 m
Shorter span		=	3.43 m
Grade of concrete		=	20 N/mm²
Grade of steel		=	415 N/mm²
Clear cover		=	15 mm
Load factor		=	1.5
Boundary condition		=	Two long edges continuously
EFFECTIVE SPAN		=	
Longer span	ly	=	6.86 m
Shorter span	lx	=	3.43 m
Span ratio	ly/ lx	=	2

Hence, the slab may be designed as a Two-way slab.

EFFECTIVE DEPTH

Longer span	=	110 mm
Shorter span	=	105 mm

LOAD CALCULATION

Self-weight of slab	=	[130 x 25] / 1000	= 3.25 kN/m²
Live load			= 2.00kN/m²
Floor finish and partition			= 1.75kN/m²
Total load (W)			= 7.00 kN/m²

MOMENT CALCULATION

Factored bending moment-

Shorter span:	-ve moment coefficient	= 0.069
	Negative Bending Moment	= 1.5 x 7.0 x 0.069 x 3.43² = 8.52 kN-m
	+ve moment coefficient	= 0.052
	Positive Bending Moment	= 1.5 x 7.0 x 0.052 x 3.43² = 6.42 kN-m

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Longer span: -ve moment coefficient = 0.000

Negative Bending Moment = 1.5 x 7.0 x 0.000 x 3.43^2 = 0.000 kN-m

-ve moment coefficient = 0.035

DEPTH CHECK

1) W.r.t to moment:

Mu = fck bd2

8.5220 x 100 x d2

d = sqrt of 8.52x10°/ (20 x 110) = 62.23mm Proposed d = 110mm

D = 130mm

2) W.r.t to deflection:

Pt% = 2.51/130 = 19.31%

Span /effective depth = 34 (Chart-22, Design Aids for Reinforced Concrete)
Effective depth = 3280/34 = 96.5 mm

Proposed Effective depth = 110 m

REINFORCEMENT DETAILS:

	Mu/bd^2	Pt Reqd	Ast Reqd (%)	Ast Provided (mm^2)
Shorter span-				
-ve Moment at support	0.70	0.203	223	8 Tor @ 20cm c/c (251mm^2)
+ve Moment at midspan	0.53	0.152	167	8 Tor @ 20cm c/c (251mm^2)
Long span-				
-ve Moment at support	0.00	0.000	000	8 Tor @ 20cm c/c (251mm^2)
+ve Moment at midspan	0.36	0.102	1.12	8 Tor @ 20cm c/c (251mm^2)

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DESIGN OF BEAM

A model calculation of beam is given below.

GENERAL DATA

Breath of beam	b	= 230 mm
Depth of beam	D	= 750 mm
Clear cover of Reinforcement		= 25 mm
Diameter of main bars	Y	= 25 mm
Diameter of stirrups	Y1	= 8 mm
Effective depth of beam	d	= 710 mm
Dist from beam edge to center of main steel	d'	= 40 mm
d'/d Ratio	40/710	= 0.07
Characteristic compressive strength of concrete	fck	= 20 N/mm^2
Characteristic yield strength of steel	fy	= 415 N/mm^2

RESULTS FROM STAAD ANALYSIS

The following are the results taken from the STAAD Analysis. Critical values due to the combination of loads by Earthquake and Wind are considered for calculation.

Maximum positive moment at mid span	= 340 kN-m
Maximum Negative moment at support	= 286 kN-m
Maximum shear force	= 297 kN

DESIGN FOR POSITIVE MOMENT

Mu/bd^2		340000x1.5/230 x 710 x 710 = 4.40 N/mm^2
Percentage of reinforcement	Pt	=1.434 (Table no. 50 of Design aids for RCC)
	Pc	= 0.498 (Table no. 50 of Design aids for RCC)
Area of tensile steel required	Ast	= 1.434 x 230 x 710 = 234172mm^2

Provide 5 nos. 25mm dia Tor steel (245400mm^2)

Area of compression reinforcement Asc = 0.498 x 230 x 710 = 81323mm^2

Provide 3 nos. 25 mm dia Tor steel (147200mm^2)

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DESIGN FOR NEGATIVE MOMENT

Mu/bd^2 286000/ 230 x 710 x 710 = 2.47 N/mm^2

Percentage of reinforcement Pt = 0.827 (Table no 2 of Design aids for RCC)

Area of tensile steel required Ast= 0.827 x 230 x 710 = 135049mm^2

Provide 3 nos25 mm Dia tor steel (147200mm^2

DESIGN FOR SHEAR

Ultimate shear Vu = 297x1.5 kN

Shear stress tv = Vu/d=445500/230 x 710 = 2.73 N/mm^2

From table J for M20, tc = 2.8 N/mm^2

tv is less than tc.

Pt=100 Ast/bd 245400/230 x 710=1.50

From Table 61, for Pt=1 50, tc=0.72 N/mm^2

Shear capacity of concrete section tc bd = 0.72 x 230 x 710/1000 = 118 kN

Shear to be carried by stirrups = 273-118 155 KN

Vus/d = 155/71 = 2.18 kN/cm

Referring to table 62 for steel fy=415 N/mm^2

8mm diameter two legged vertical stirrups at 16 cm spacing is required.

Proposed 8mm diameter two legged vertical stirrups at 10cm spacing.

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DESIGN OF COLUMNS

Grade of concrete M25	f ck	= 25 N/mm^2
Grade of steel 415	fy	=415 N/mm^2
Column size	B	= 300 mm
	D	= 600 mm
Unsupported length	L	= 2.2
5 m		
Clear cover		= 40 mm
Dia of the bar		= 25 mm
Axial load on column	P	= 2550 KN
Bending moment	Mx	= 60 kN-m

Pu / fck x b x d = 2550 x 1-5x 1000/25 x 300 x 600 = 0.85

Mux / fck x b x d^2 = 60 x1.5x 1000000 / 25 x 300 x 600 x 600 = 0.035

Refer Chart 46, fy = 415 N mm^2 d'/D = 0. 10

P / fck = 0.15

Ast required = 0.15 x 25 x 300 x 600/ 100 = 6750 mm^2

Proposed 10 nos. of 32 mm dia Tor steel (8942 mm^2)

Spacing of lateral ties is the minimum of the following,

1. Least lateral dimension = 300 mm
2. 16 times smallest dia of longitudinal reinforcement 16 x 12 = 192 mm
3. 48 times the dia of transverse reinforcement 48 x 8=384 mm

Proposed Y-8 lateral ties at 150mm C/C.

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DESIGN OF PILE FOUNDATION

Column size	a = 300 mm b = 450 mm
SBC of soil	w= 79.44 kN/m^2
Axial load	p = 2550 kN
Weight of footing 10 %	= 255 kN
Total load	Pu= 2800 kN
Area required 2800/90	a = 31.11 m^2
Size of footing required	= 5.58 m x 5.58 m (Since footing size is very big, design for pile foundation)

Load carrying capacity of 600 mm dia pile = 142 x 9.807 KN (As per soil report)

Number of piles required = 2550 /142 x 9.807 =1.83 say 2 piles

Ast required for 600mm Dia pile = 0.4x22x600x600/4x7x100 =1131 mm^2

Provide 10 numbers 12 Tor and 8mm dia rings at 150 mm center to center.

Depth of pile = 30 meters (As per soil report)

PILE CAP DESIGN -MOMENT CALCULATION

Center to center of piles = 2.5 to 3 times dia of the pile

Breath of pile cap = 600+150+150=900 mm

Length of pile cap =2.5x 600+150+150 =1800 mm

Depth of pile cap =1400 mm

Moment at critical section for pile cap

Mu =WL/4= 2550 X1.5X1.80/4=1721 kN-m

Mu/bd^2 = 1721/0.9x1.34x1.34x1000=1.06

Pt for singly reinforced sections = 0.314 (Table no 3)

Ast=0.314x90x134/100 =37.87 cm^2 = 12 nos 25 dia Tor steel

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Shear force = 2550 /2 =1275 KN

Vus/d=1275 x 1.5/134 =13.27

Pt=5890/900x1340 = 0.49%

Shear strength of concrete = 0.48 N/mm^2

Vertical stirrups = 13.27-0.49x134/10 = 6.61 N/mm^2

Assuming diameter of bar = 12 mm,

Spacing of bars using 12 mm = 120 mm

Hence, proposed 12mm rods @ 100mm C/C

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CHENNAI METROPOLITAN DEVELOPMENT AUTHORITY
'ThalamuthuNatarajan Building', No.1, Gandhi Irwin Road,
Egmore, Chennai-600 008.

PROFESSIONAL REGISTRATION CERTIFICATE

This is to certify that the **Thiru P. ANAND RAJU** has enrolled as **Registered Structural Engineer Grade-I (SE)** with Chennai Metropolitan Development Authority (CMDA) who has the qualification of **M.E.,(Civil Engg.)** and experience in the relevant field for **19years**.

He has been given the Registration No.**SE/GR-I/2024/02/004** on **13.02.2024.** He shall be required to comply with the duties and responsibilities prescribed by the Government of Tamil Nadu in Part-V, "Registration of Professionals", Tamil Nadu Combined Development and Building Rules, 2019 approved vide G.O.(Ms) No.18 MAWS (MA1) Dept. dated 04.02.2019.

This Registration is valid upto **12.02.2029**.



METROPOLITAN DEVELOPMENT AUTHORITY
CHENNAI-600 008.

13/2/2024

(A. MEGANATHAN)
Superintendent

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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

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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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OMR Thoraipakkam,
Chennai 600 097, India
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+91 9996 12 9996

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