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SB CONSULTANTS

11, Theradi Street, Pallikaranai, Chennai- 600 100
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structuralshankar@gmail.com

Date: 19.4.2025

Er. M.SHANKAR, M.Tech(Struct), MIE, MISSE, FMACCE (I) .

Chartered/ Structural engineer Grade-I (SE-I)

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 PLOT NO. 31 & 32, OLD DOOR NO. 02, NEW DOOR NO. 03, 18TH MAIN ROAD AND 3RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI 600061 AND COMPRISED IN OLD S.NO. 21/3A (Part), AS PER PATTA NEW T.S. NO. 70 & 71, BLOCK NO. 22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR TALUKS has been done by me/us based on the report of geotechnical investigation (soil test) done By T.J. ENGINEERS 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.

3.1/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-875 and

design of earthquake resistant structure as per IS Code No 1893-2002

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

Stamp and Signature

Encl.: Structural Design Calculation

Er.M. SHANKAR, M.Tech(Struct), MIE, MISSE, FMACCE
CMDA Regd. Structural Engineer GR-I (SE-I)
Reg No. SE/2024/4/0037
SB CONSULTANTS

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Email: structshankar97@yahoo.com



CHENNAI METROPOLITAN DEVELOPMENT AUTHORITY

Thalamuthu Natarajan Building, No.1, Gandhi Irwin Road, Egmore,

Chennai - 600 008

Phone : 28414855 Fax: 91-044-28548416

E-mail: mscmda@tn.gov.in

Web site: www.cmdachennai.gov.in.

PROFESSIONAL REGISTRATION CERTIFICATE

This is to certify that the Thiru / Tmt. / M/s. **M.SHANKAR** has enrolled as **Registered Structural Engineer Grade-I(SE)** with Chennai Metropolitan Development Authority (CMDA) who has the qualification of **M.E Structures** and experience in the relevant field for 7 years.

He/She has been given the Registration No. **SE/I/2024/4/0037** on **12-Apr-2024** He/She 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 **11-Apr-2029**.

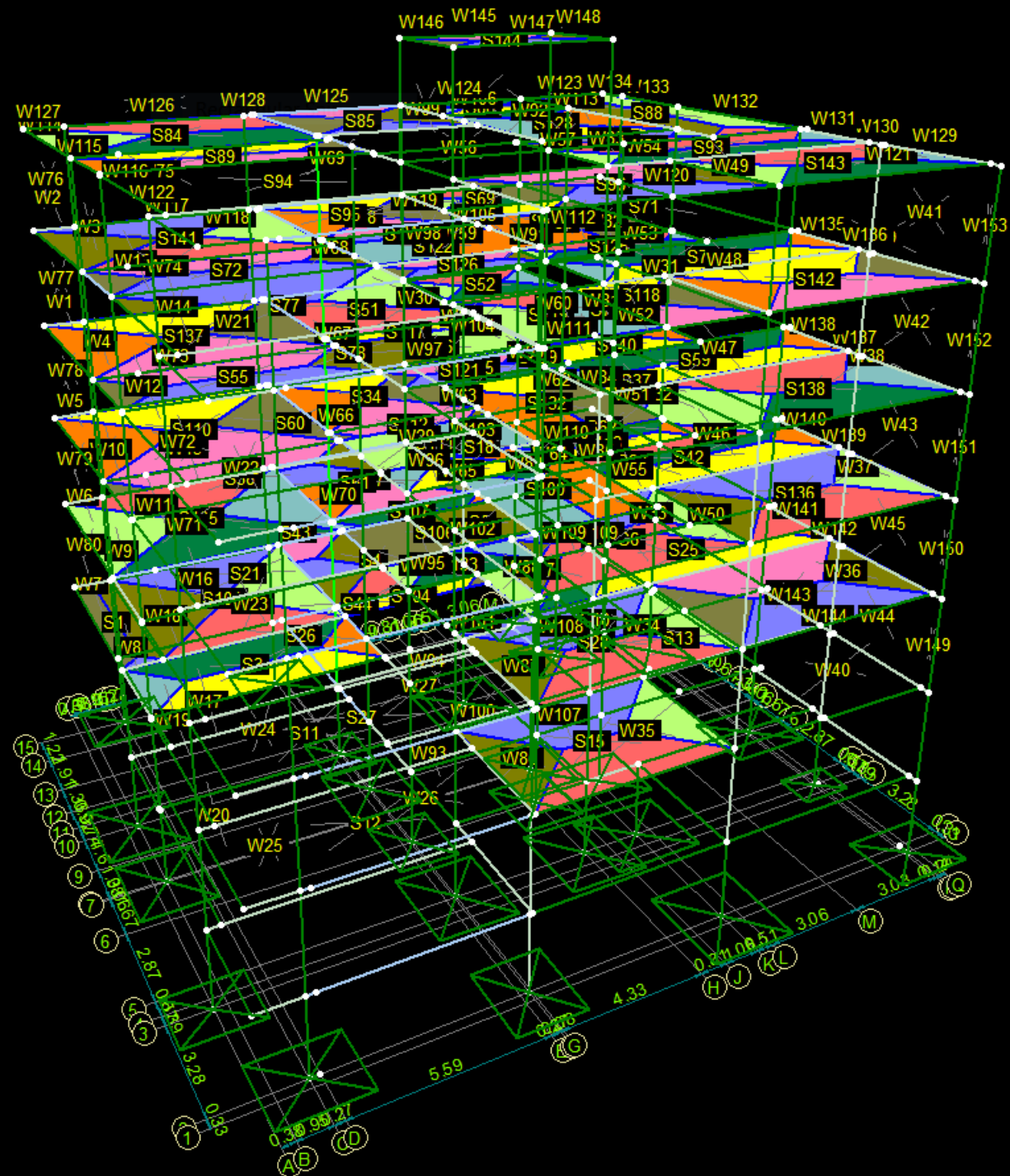


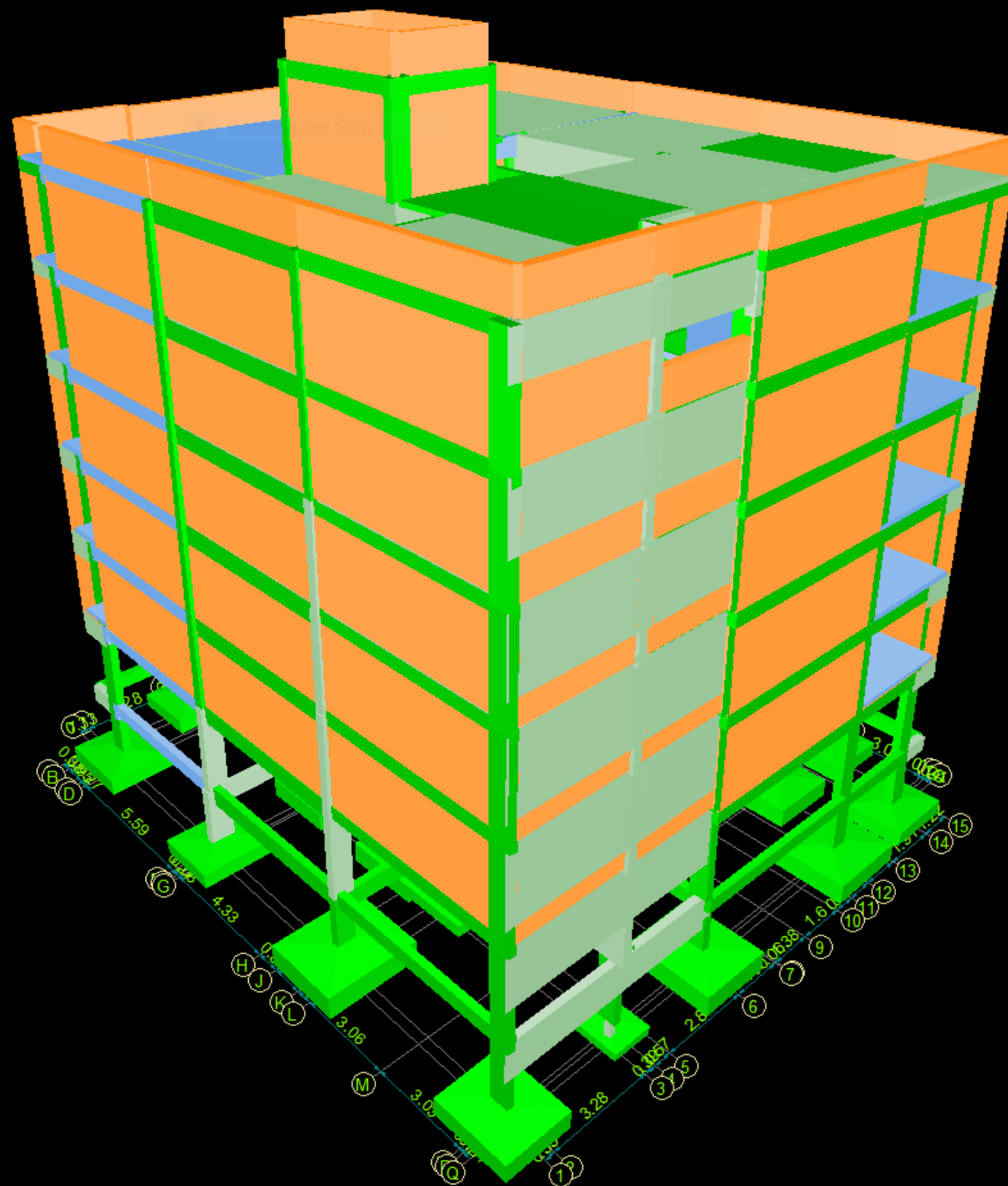
Signature valid

Name : A. Meganathan
Designation : Superintendent
Date : 04/12/2024 3:58:02 PM

A Meganathan

Superintendent





STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS (WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND COMPRISED IN OLD S.NO.21/3A,(PART), AS PER PATTA NEW T.S NO.70&71 BLOCK NO.22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION.

Design Data Report :

Footing Data:

Soil Parameters :

SBC of soil	= 300.00 kN/m ²
SBC Increment Factor for Seismic Load	= 1.500
SBC Increment Factor for Wind Load	= 1.500
Angle of friction, (phi)	= 30.00 degrees
Cohesion	= 60.00
Permissible factor of safety	= 1.400
Depth From Ground	= 2500 mm

Material Properties :

f _{ck}	= 25.00 N/mm ²
f _y	= 500.00 N/mm ²

Footing Parameters :

Minimum steel Percentage	= 0.12
Minimum spacing between bars	= 100 mm
Maximum spacing between bars	= 200 mm
Diameters of selected bars	= 10 mm , 12 mm .
Bottom Cover	= 50 mm
End Cover	= 50 mm

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Minimum Footing Depth	= 150 mm
Top Offset	= 50 mm
Bottom PCC Offset	= 150 mm
Bottom PCC Depth	= 150 mm
Pedestal Offset	= 150 mm
Pedestal Depth	= 150 mm
Size Rounding Factor	= 25 mm
Depth Rounding Factor	= 25 mm
Number of Steps	= 1
Minimum Step Depth	= 150 mm

Column Data:

Material Properties :

f_{ck}	= 25.00 N/mm ²
f_y	= 500.00 N/mm ²
f_y - Stirrups	= 500.00 N/mm ²

Column Parameters :

Effective Length Factor (X - Axis)	= 1.00
Effective Length Factor (Y - Axis)	= 1.00
Minimum Eccentricity @ X-Axis	= 20 mm
Minimum Eccentricity @ Y-Axis	= 20 mm
Clear Cover	= 40 mm

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Design Considerations :

Design is done as per IS 456.

Detailing is done as per IS 13920.

Confinement reinforcement is provided.

Live Load reduction is considered.

Minimum steel percentage is based on provided section.

Reinforcement Details :

Steel Ratio(A_{stX}/A_{stY})	= 1.00
Reinforcement Placing (on two sides or on four sides)	= 2
Minimum steel Percentage	= 0.80
Maximum steel Percentage	= 4.00
Minimum spacing between main bars	= 25 mm
Maximum spacing between main bars	= 300 mm
Minimum spacing between Stirrups	= 150 mm
Diameters of selected bars	= 12 mm , 16 mm , 20 mm , 25 mm , 32 mm .

Slab Data: Use Bent-up bars for steel detailing.

Material Properties :

RCC Grade	= M20
Main Steel Grade	= Fe415
Distribution Steel Grade	= Fe415

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Slab Parameters :

Effective Cover	= 25 mm
Minimum spacing between Main bars	= 75 mm
Maximum spacing between Main bars	= 200 mm
Minimum spacing between Dist.bars	= 75 mm
Maximum spacing between Dist.bars	= 300 mm
Maximum Main/Dist. bar Diameter	= 32 mm
Minimum Main bar Diameter	= 8 mm
Minimum Dist.bar Diameter	= 8 mm
Maximum Dimension to be used for Trapezoidal Slab	= Average of two parallel sides
Maximum Dimension to be used for General Slab	= Maximum of two parallel sides

Beam Data:

Shear Design Data :

Minimum Stirrup Dia	= 8 mm
Stirrup Legs	= 2
Minimum Stirrups Spacing	= 100 mm
Stirrups Steel Grade Name	= Fe500
Effect of Concrete in shear considered	

Beam Covers :

Tension Cover	= 33 mm
Compression Cover	= 33 mm

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Side Cover = 25 mm

Beam sections are designed as Doubly Reinforced Section

Main Bars Detailing Straight + Curtailed

Detailing provision As per IS 13920 is followed

End Moments are calculated at c/c distance of the beam span for design

Torsion Moments are considered in beam design

Anchor bar Dia = 8 mm

Main Steel Grade = Fe500

No. of division of the beam = 10

Max. Aggregate size = 20

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Annexure – XIV

[See rule 51 (3)]

Form 1

Structural Design Basis Report

(1) This report to accompany the application for Building Developments

Part 1	General Data		
S.No.	Description	Information	Notes
1.	Site Address		
2	Name of Owner		
3	Name of Registered Developer along with the Registration Number		
4	Name of Registered Architect/Engineer along with the Registration Number		
5	Name of Registered Structural engineer along with the Registration Number	SE/- I2024/4/003 7	
6	Use of the building	RESIDENTIAL	
7	Number of stories above ground level (including storeys to be added later, if any)	STILT+5 FLO ORS	
8	Number of basements below ground level	NIL	

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9	Type of structure Load bearing walls R.C.C. frame R.C.C. frame and Shear Walls Steel frame	RC FRAME	
10	Soil data Type of soil Design safe bearing capacity	INDIVIDUAL ISOLATED FOOTING WITH SBC 330KN/SQ.M	IS:1893 C1.6.3.5.2 IS: 1904 IS: 1892 IS: 2131 IS: 2720
11	Dead loads (unit weight adopted) • Earth: 18KN/CUM • Water: 10KN/CUM • Brick masonry:19.2KN/CUM • Plain cement concrete 24KN/CUM • Reinforced cement concrete:25 KN/CUM • Floor finish 50KG/SQM • Other fill materials		IS: 875 Part 1
12	Imposed (live) loads	4KN/SQM	IS: 875 Part 2
	Floor loads Roof loads	1.5KN/SQM	
13	Cyclone / Wind • Speed • Design pressure intensity	N/A	IS: 875 Part 3

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS (WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTA NEW T.S NO.70&71 BLOCK NO.22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION

14	Seismic zone	III	IS: 1893 (2002)
15	Importance factor	1	IS:1893(2002) Table 6
16	Seismic zone factor (Z)	0.16	IS:1893 Table 2
17	Response reduction factor		IS:1893 Table 7
18	Fundamental natural period – approx.	0.29SEC	IS:1893 C1.7.6
19	Design horizontal acceleration spectrum value (A_h)		IS: 1893 C1.6.4.2
20	♥ Expansion / Separation Joints	N/A	
21	Building is regular / irregular	REGULAR	IS 1893

♥ Enclose detailed drawings drawn to scale for each floor

♦ In case terrace garden is provided, indicate additional fill load and live load along with the detailed drawings drawn to scale

Part 2		Load bearing masonry buildings					
Sl.No.	Description	Information	Notes				
1	Building category	N/A	IS: 4326 C1.7 Read with IS:1893				
			Zone	II	III	IV	V
			Bldg.				
			Ordinary	B	C	D	E
			Important	C	D	E	E
2	Basement Provided	N/A					
3	Number of floors including Ground Floor (all floors including stepped floors in hill slopes)	N/A					
4	Type of wall masonry	N/A					

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5	Type and mix of Mortar	N/A	IS: 4326 C1.8.1.2
6	Re: size and position of openings (See note No.[i]) - Minimum distance (b₅) - Ratio (b₁+b₂+b₃)/ 1₁ or (b₆+b₇)/ 1₂ - Minimum pier width between consequent opening (b₄) - Vertical distance (h₃) - Ratio of wall height to thickness 4 - Ratio of wall length between cross wall to thickness	N/A	IS: 4326 Table 4, Fig.7
7	Horizontal seismic band - at plinth level N/A - at window sill level N/A - at lintel level N/A - at ceiling level N/A	P IP NA } } } } } } } } } } } }	(see note No.2) IS:4326 C1 8.4.6 IS: 4326 C1 8.3 IS: 4326 C1 8.4.2 IS: 4326 C1 8.4.3 IS: 4326 C1 8.4.3
	- at eave level of sloping roof N/A - at top of gable walls N/A - at top of ridge walls N/A	} } } } } } } } }	IS: 4326 C1 8.4.3 IS: 4326 C1 8.4.4
8	Vertical reinforcing bar N/A at corners and T junction of walls at jambs of doors and window	} } } } } }	IS: 4326 C1 8.4.8. IS: 4326 C1 8.4.9

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	openings N/A		
9	Integration of prefab roofing/flooring elements through reinforced concrete screed. N/A	} }	IS:4326 C1 9.1.4
10	Horizontal bracings in pitched truss in horizontal plane at the level of ties in the slopes of pitched roofs N/A	} }	

Notes: (i) Information in Item 6 should be given on separate A4 sheets for all walls with large number of openings

(ii) IP indicated "Information Provided"

IP indicates "Information to be

provided" NA indicates "Not

Applicable"

Tick mark one box

Part 3	Reinforced concrete framed buildings		
Sl. No.	Description	Information	Notes

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1	Type of building • Regular frames • Regular frames with Shear Walls • Irregular frames • Irregular frames with Shear Walls • Soft storey	REGULAR FRAMES	IS: 1893 C1 7.1
2	Number of basements	NIL	
3	Number of floors including ground floor	S+5	
4	Horizontal floor system • Beams and slabs • Waffles • Ribbed floor • Flat slab with drops • Flat plate without drops	BEAM AND SLAB	
5	Soil data • Type of soil • Recommended type of foundation -Independent footings -Raft -Piles • Recommended bearing capacity of soil	MEDIUM SOIL WITH ISOLATED FOOTING	IS: 1498

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	- Recommended type, length, diameter and load capacity of piles - Depth of water table - Chemical analysis of ground water - Chemical analysis of soil		
6	Foundations Depth below ground level Type Independent Interconnected Raft Piles	INDIVIDUAL ISOLATED FOOTING	
7	System of interconnecting foundations Plinth beams Foundation beams	PLINTH BEAM	IS: 1893 C1 7.12.1
8	Grades of concrete used in different parts of building	M25 FOR COLUMNS & M20 FOR REST	
9	Method of analysis used	FEM	
10	Computer software used	SCADDS NUCLEUS 2022 VERSION	
11	Torsion included	INCLUDED	IS: 1893 C1 7.9

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12	Base shear a. Based on approximate fundamental period b. Based on dynamic analysis c. Ratio of a/b	BASED ON APPROXIMATE FUNDAMENTAL PERIOD	IS: 1893 Cl. 7.5.3
13	Distribution of seismic forces along the height of the building.	REFER SEISMIC JUSTIFICATION	IS:1893 Cl.7.7 (Provide sketch)
14	The Column of soft ground storey specially designed.	YES	IS: 1893 Cl.7.10
15	Clear minimum cover provided in • Footing 50MM • Column 40MM • Beams 25MM • Slabs 20MM • Walls		IS: 456 Cl. 26.4

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16	Ductile detailing of RC frame - Type of reinforcement used Fe 500D - Minimum dimension of beams 230MM - Minimum dimension of columns 230MM - Minimum percentage of reinforcement of beams at any cross section 0.20% - Maximum percentage of reinforcement at any section of beam 4% - Spacing of transverse reinforcement in 2-d length of beams near the ends 100MM - Ratio of capacity of beams in shear to capacity of beams in flexure <1 - Maximum percentage of reinforcement in column 4%		IS: 456 Cl. 5.6 IS: 13920 Cl.6.1 IS: 13920 Cl.7.1.2 IS: 456 Cl.26.5.1(a) IS: 13920 Cl.6.2.1 IS: 456 Cl.26.5.1.1(b) IS: 13920 Cl.6.2.2 IS: 13920 Cl.6.3.5 IS: 456 Cl.26.5.3.1 IS: 13920 Cl. 7.4
	- Confining stirrups near ends of columns and in beam-column joints Diameter 8mm Spacing 100MM - Ratio of shear capacity of columns to maximum seismic shear in the storey. <1		

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS (WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTA NEW T.S NO.70&71 BLOCK NO.22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION

17	Does the features require clearance by SDRP Example: High rise building Prefab building Building in hazard prone areas	N/A	
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Foundation

- In case raft foundation has been adopted, indicate K value used for analysis of the raft.
- In case pile foundations have been used, give full particulars of the piles, type, dia, length, capacity
- In case of high water table, indicate system of countering water pressure, and indicate the existing water table, and that assumed to design foundations.

Idealization for Earthquake analysis

- In case of composite system of shear walls and rigid frames, give distribution of base shear in the two systems on the basis of analysis, and that used for design of each system
- Indicate the idealization of frames and shear walls adopted in the analysis with the help of sketches.
- Submit framing plans of each floor
- In case of basements, indicate the system used to contain earth pressures.

Part 4	Buildings in structural steel		
1	Adopted method of design	☐ Simple ☐ Semi-rigid ☐ Rigid	IS:800 Cl 3.4.4 IS:800 Cl.3.4.5 IS:800 Cl.3.5.6

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2	Design based on	- o Elastic analysis - o Plastic analysis	IS: 800 Section-9 SP;6 (6)
3	Floor construction	- o Composite - o Non composite - o Boarded	
4	Roof construction	- o Composite - o Non composite - o Metal - o Any other	
5	Horizontal force resisting system adopted	- Frames - Braced frames - Frames & shear walls	Note: Seismic force As per IS:1893 Would depend on system
6	Slenderness ratios maintained	Members defined in Table 3.1, IS:800	IS 800; Cl.3.7
7	Member deflection	Beams, Rafters	IS:800 Cl.3.13

	limited to	Crane Girders, Purlins Top of columns	
8	Structural members	- o Encased in concrete - Not encased	IS: 800 Section-10
9	Proposed material	- o General weld-able - o High strength - o Cold formed - o Tubular	IS: 2062 IS: 8500 IS: 801, 811 IS: 806
10.	Minimum metal thickness Specified for corrosion protection	- o Hot rolled sections - o Cold formed sections - o Tubes	IS: 800, Cl.3.8 Cl.3.8.1 to Cl.3.8.4 Cl.3.8.5

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
 STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING
 UNITS (WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH
 TOD BENEFIT AT PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR
 NO.03, 18TH MAIN ROAD AND 3 RD MAIN ROAD, NCBS
 COLONY, NANGANALLUR, CHENNAI-600061 AND COMPRISED IN OLD
 S.NO.21/3A, (PART), AS PER PATTA NEW T.S NO.70&71 BLOCK
 NO.22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR TALUK AND
 WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION

11	Structural connections	- o Rivets - o CT Bolts - o S H F G Bolts - o Black Bolts - o Welding field Shop (Specify welding type proposed) Composite	IS: 800, Section-8 IS: 1929, 2155, 1149 IS 6639, 1367 IS 3757, 4000 IS: 1363, 1367 IS: 816, 814, 1395, 7280, 3613, 6419, 6560, 813, 9595
12	Minimum Fire rating proposed, with method	- o Rating..... hour s - o Method proposed. -In tumescent painting -Spraying -Quilting -Fire retardant boarding	IS: 1641, 1642, 1643

STRUCTURAL ENGINEER

**SCADDS/Nucleus 2022: RC-Footing Designer
Limit State Design of Wall Footings for
Axial Load & Uniaxial Bending,
Isolated Flat/Sloped Rectangular/Circular Footings
with or without Pedestals
for Axial Load, Uniaxial & Biaxial Bending,
Combined Rectangular/Trapezoidal Footings
with or without Pedestals
for Axial Load & Uniaxial Bending
in accordance with IS:456-2000 and IS:6403-1981**

Introduction:-

This Report contains the detailed solution for the Reinforced Concrete Footing Design problem.

The given Footing is considered for flexural the output contains the following portions:

1. Footing Input Data
2. Flexural Design Output for Footing
3. Flexural Design Output for Pedestal, if
4. One Way Shear Check Output
5. Two Way Shear Check Output
6. Development Length / Bond Design Output

While detailed design will be carried out for and Bond, only checks for stresses are made for

Global Material Data			
Concrete Clear Cover	=	50	mm.
Char. Comp. Strength of Concrete	=	25	N/sq.mm.
Yield Strength of Main Steel	=	500	N/sq.mm.
Main Rod Size-1	=	10	mm.
Main Rod Size-2	=	12	mm.
Yield Strength of Distribution Steel	=	500	N/sq.mm.
Distbn. Rod Size-1	=	10	mm.
Distbn. Rod Size-2	=	12	mm.
Yield Strength of Dowel/Pedestal Steel	=	500	N/sq.mm.
Dowel/Pedestal Rod Size-1	=	12	mm.
Dowel/Pedestal Rod Size-2	=	16	mm.
Factor of Safety for Load	=	1	
Partial Safety Factor for Concrete	=	1.5	
Partial Safety Factor for Steel	=	1.15	
Max. Strain in Concrete	=	0.0035	mm./mm.
Max. Strain in Steel	=	0.0055	mm./mm.
Young's Modulus of Concrete	=	25000	N/sq.mm.
Young's Modulus of Steel	=	200000	N/sq.mm.

Bond / Development Length Output

Char. Comp. Strength of Concrete	=	25	N/sq.mm.
Yield Stress of Main Steel	=	500	N/sq.mm.
Yield Stress of Secondary Steel	=	500	N/sq.mm.
Yield Stress of Dowel/Pedestal Steel	=	500	N/sq.mm.

As Per IS:456-2000, Clause 26.2.1.1,

Design Bond Stress for Main Rods	=	2.24	N/sq.mm.
Design Bond Stress for Secondary Rods	=	2.24	N/sq.mm.
Design Bond Stress for Dowel/Pedestal Rods	=	2.24	N/sq.mm.

Rods in Tension:-

Main Rod Diameter-1	=	10	mm.
Corresponding Development Length	=	485.491	mm.

Main Rod Diameter-2	=	12	mm.
Corresponding Development Length	=	582.589	mm.

Secondary Rod Diameter-1	=	10	mm.
Corresponding Development Length	=	485.491	mm.

Secondary Rod Diameter-2	=	12	mm.
Corresponding Development Length	=	582.589	mm.

Rods in Compression:-

Dowel/Pedestal Rod Diameter-1	=	12	mm.
Corresponding Development Length	=	582.589	mm.

Dowel/Pedestal Rod Diameter-2	=	16	mm.
Corresponding Development Length	=	776.786	mm.

F01 : Global Input Data (LC No. : 13)

The footing is to be designed as an Isolated Footing.

Width of Column	=	230	mm.
Length of Column	=	600	mm.

Footing Shape	=	Rectangular
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Initial Depth at the Face of Wall/Column	=	300	mm.
Initial Depth at the End	=	150	mm.

The footing is subjected to Axial Load & Biaxial

Working Axial Load	=	1409.585	KN.
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Working Moment about ZZ-axis	=	33.279	KN m.
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Working Moment about XX-axis	=	10.145	KN m.
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Safe Bearing Capacity of Soil	=	300	KN/sq.m.
Factor of Safety for Safe Bearing Capacity	=	1.5	

F01 : Flexure Output (LC No. : 13)

Working Axial Load on Footing	=	1409.585	KN.
Factored Axial Load on Footing	=	1409.585	KN.

Percentage Factor for Self Weight of Footing	=	10	%
Factored Self Weight of Footing	=	140.958	KN.

Total Factored Axial Load on Footing	=	1550.543	KN.
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Working Moment about ZZ-axis	=	33.279	KN m.
Factored Moment about ZZ-axis	=	33.279	KN m.

Working Moment about XX-axis	=	10.145	KN m.
Factored Moment about XX-axis	=	10.145	KN m.

Ultimate Bearing Capacity of Soil	=	450	KN/sq.m.
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From Vertical Load and Bending considerations, Area of Footing Required	=	3.732	sq.m.
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Equal Projections were initially assumed from the
to arrive at the Footing Size.

Width of Footing Required	=	1.756	m.
Length of Footing Required	=	2.126	m.

Width of Footing Provided	=	1.775	m.
Length of Footing Provided	=	2.15	m.

Actual Bearing Area Provided	=	3.816	sq.m.
Max. Bearing Pressure at the Base	=	439.622	KN/sq.m.
Min. Bearing Pressure at the Base	=	372.978	KN/sq.m.

Bending about ZZ-axis:-

Load Eccentricity lies within the limit causing total
Hence, the Footing Base about ZZ-axis will be in

Net Bearing Pressure at the Base - Right End	=	402.686	KN/sq.m.
Net Bearing Pressure at the Base - Left End	=	354.014	KN/sq.m.
Net Bearing Pressure at the Column Face	=	385.141	KN/sq.m.
Net Bearing Pressure - 'd' from Face	=	396.89	KN/sq.m.

As Per IS:456-2000, Clause

the critical section for Bending Moment is at the
of the Column.

Projection of Footing from Critical Section	=	775	mm.
Design Bending Moment	=	211.536	KN m.
Modified Depth of Footing at the Face of Wall	=	575	mm.
Modified Depth of Footing at the End	=	425	mm.
Effective Depth Required	=	357.061	mm.
Effective Depth Provided	=	519	mm.

Hence SAFE.

Percentage of Steel Required	=	0.104	%
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As Per IS:456-2000, Clause

the required percentage of Steel is less than the
to be provided. Hence, Minimum Steel is

Percentage of Main Steel Provided	=	0.12	%
Area of Steel Provided	=	1105.47	sq.mm.
Dia. of Rod-1 in Central Band	=	10	mm.
Required Spacing of Rods	=	126.108	mm.
Max. Spacing allowed (Rounded off)	=	125	mm.
Dia. of Rod-2 in Central Band	=	12	mm.
Required Spacing of Rods	=	181.595	mm.
Max. Spacing allowed (Rounded off)	=	175	mm.

Bending about XX-axis:-

Load Eccentricity lies within the limit causing total
Hence, the Footing Base about XX-axis will be in

Net Bearing Pressure at the Base - Right End	=	402.686	KN/sq.m.
Net Bearing Pressure at the Base - Left End	=	384.713	KN/sq.m.
Net Bearing Pressure at the Column Face	=	394.864	KN/sq.m.
Net Bearing Pressure - 'd' from Face	=	400.119	KN/sq.m.

As Per IS:456-2000, Clause

the critical section for Bending Moment is at the of the Column.

Projection of Footing from Critical Section	=	772.5	mm.
Design Bending Moment	=	256.655	KN m.
Modified Depth of Footing at the Face of Wall	=	575	mm.
Modified Depth of Footing at the End	=	425	mm.
Effective Depth Required	=	297.877	mm.
Effective Depth Provided	=	507	mm.

Hence SAFE.

Percentage of Steel Required	=	0.109	%
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As Per IS:456-2000, Clause

the required percentage of Steel is less than the to be provided. Hence, Minimum Steel is

Percentage of Main Steel Provided	=	0.12	%
Area of Steel Provided	=	1308.06	sq.mm.
Dia. of Rod-1 in Central Band	=	10	mm.
Required Spacing of Rods	=	129.092	mm.
Max. Spacing allowed (Rounded off)	=	125	mm.
Dia. of Rod-2 in Central Band	=	12	mm.
Required Spacing of Rods	=	185.893	mm.
Max. Spacing allowed (Rounded off)	=	175	mm.

*Note (1):- The required Spacing of Main Rods will 300 mm. or 3d (300 mm. or 5d for Dist. Rods)
If the required spacing exceeds this limit, the least will be automatically provided. This is done in IS:456-2000 Clause 26.3.3.*

Note (2):- The required minimum area of as per IS:456-2000, Clause 34.5.2, if the Footing 1000 mm. This minimum area is 360.0 sq.mm. for

Note (3):- The assumed Depth of Footing will be so that a SAFE design is arrived at from both considerations.

Note (4):- Spacing of Rods are also controlled by

Value, User-defined Minimum and Maximum

F01 : Dowel Bars Output (LC No. : 13)

Factored Axial Load on Column	=	1409.585	KN.
Char. Comp. Strength of Concrete	=	25	N/sq.mm.
Yield Stress of Pedestal Steel	=	500	N/sq.mm.
Width of Column Section	=	230	mm.
Depth of Column Section	=	600	mm.
Area of Column Section	=	138000	sq.mm.
Width of Footing	=	1.775	m.
Length of Footing	=	2.15	m.
Area of Footing	=	3.816	sq.m.
As Per IS:456-2000, Clause			
Basic Permissible Bearing Stress	=	11.25	N/sq.mm.
Max. Bearing Stress based on Area Ratio	=	22.5	N/sq.mm.
Actual Bearing Stress	=	10.214	N/sq.mm.
As Per IS:456-2000, Clause 34.4.3, Reinforcement is NOT required. However,			
Percentage of Steel Required	=	0.5	%
Area of Steel Provided	=	690	sq.mm.
Dowel Rod Size-1	=	12	mm.
No. of Rods to be Provided	=	6	Nos.
Corresponding Steel Area	=	678.584	sq.mm.
Dowel Rod Size-2	=	16	mm.
No. of Rods to be Provided	=	4	Nos.
Corresponding Steel Area	=	804.248	sq.mm.

*Note :- Calculation for Dowel Rods is only
However, Dowel Rods may not be required in all*

F01 : One Way Shear Output (LC No. : 13)

As Per IS:456-2000, Clause 34.2.4,
the critical section for Shear Force is at a
the Effective Depth of the Footing, from the Face

Design Shear Force about Length	=	181.664	KN.
Modified Depth of Footing at the Face of Wall	=	575	mm.
Modified Depth of Footing at the End	=	425	mm.
Depth of Footing at Critical Section	=	418.548	mm.

Projection of Footing from Critical Section	=	256	mm.
As Per IS:456-2000, Clause Actual Shear Stress	=	0.245	N/sq.mm.
As Per IS:456-2000, Table 19, Design Shear Strength of Concrete	=	0.264	N/sq.mm.
As Per IS:456-2000, Table 20, Max. Permissible Shear Stress	=	3.124	N/sq.mm.
The section is SAFE in Shear, about ZZ-axis.			
Design Shear Force about Width	=	218.774	KN.
Depth of Footing at Critical Section	=	406.223	mm.
Projection of Footing from Critical Section	=	253.5	mm.
As Per IS:456-2000, Clause Actual Shear Stress	=	0.25	N/sq.mm.
As Per IS:456-2000, Table 19, Design Shear Strength of Concrete	=	0.267	N/sq.mm.
As Per IS:456-2000, Table 20, Max. Permissible Shear Stress	=	3.124	N/sq.mm.
The section is SAFE in Shear, about XX-axis.			

F01 : Punching Shear Output (LC No. : 13)

As Per IS:456-2000, Clause the critical section for Shear Force is at a the Half the Effective Depth of the Footing, from the Column.			
Length of Footing at Critical Section	=	1.107	m.
Width of Footing at Critical Section	=	0.737	m.
Ratio of Width to Length at Critical Section	=	0.666	
Modified Depth of Footing at the Face of Wall	=	575	mm.
Modified Depth of Footing at the End	=	425	mm.
Depth of Footing at Critical Section	=	462.774	mm.
Design Shear Force	=	1100.009	KN.
As Per IS:456-2000, Clause Actual Shear Stress	=	0.645	N/sq.mm.
As Per IS:456-2000, Clause Coefficient, ks	=	1	

Max. Permissible Shear Stress = 1.25 N/sq.mm.

The section is SAFE in Shear.

F01 : Global Input Data (LC No. : 14)

The footing is to be designed as an Isolated Footing.

Width of Column = 230 mm.

Length of Column = 600 mm.

Footing Shape = Rectangular

Initial Depth at the Face of Wall/Column = 300 mm.

Initial Depth at the End = 150 mm.

The footing is subjected to Axial Load & Biaxial

Working Axial Load = 1249.667 KN.

Working Moment about ZZ-axis = 27.102 KN m.

Working Moment about XX-axis = 9.897 KN m.

Safe Bearing Capacity of Soil = 300 KN/sq.m.

Factor of Safety for Safe Bearing Capacity = 1.5

F01 : Flexure Output (LC No. : 14)

Working Axial Load on Footing = 1249.667 KN.

Factored Axial Load on Footing = 1249.667 KN.

Percentage Factor for Self Weight of Footing = 10 %

Factored Self Weight of Footing = 124.967 KN.

Total Factored Axial Load on Footing = 1374.634 KN.

Working Moment about ZZ-axis = 27.102 KN m.

Factored Moment about ZZ-axis = 27.102 KN m.

Working Moment about XX-axis = 9.897 KN m.

Factored Moment about XX-axis = 9.897 KN m.

Ultimate Bearing Capacity of Soil = 450 KN/sq.m.

From Vertical Load and Bending considerations,
Area of Footing Required = 3.315 sq.m.

Equal Projections were initially assumed from the
to arrive at the Footing Size.

Width of Footing Required = 1.645 m.

Length of Footing Required = 2.015 m.

Width of Footing Provided = 1.65 m.

Length of Footing Provided = 2.025 m.

Actual Bearing Area Provided	=	3.341	sq.m.
Max. Bearing Pressure at the Base	=	446.218	KN/sq.m.
Min. Bearing Pressure at the Base	=	376.609	KN/sq.m.

Bending about ZZ-axis:-

Load Eccentricity lies within the limit causing total
Hence, the Footing Base about ZZ-axis will be in

Net Bearing Pressure at the Base - Right End	=	408.817	KN/sq.m.
Net Bearing Pressure at the Base - Left End	=	360.75	KN/sq.m.
Net Bearing Pressure at the Column Face	=	391.904	KN/sq.m.
Net Bearing Pressure - 'd' from Face	=	403.037	KN/sq.m.

As Per IS:456-2000, Clause

the critical section for Bending Moment is at the
of the Column.

Projection of Footing from Critical Section	=	712.5	mm.
Design Bending Moment	=	168.858	KN m.
Modified Depth of Footing at the Face of Wall	=	525	mm.
Modified Depth of Footing at the End	=	375	mm.
Effective Depth Required	=	326.207	mm.
Effective Depth Provided	=	469	mm.

Hence SAFE.

Percentage of Steel Required	=	0.109	%
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As Per IS:456-2000, Clause

the required percentage of Steel is less than the
to be provided. Hence, Minimum Steel is

Percentage of Main Steel Provided	=	0.12	%
Area of Steel Provided	=	928.62	sq.mm.
Dia. of Rod-1 in Central Band	=	10	mm.
Required Spacing of Rods	=	139.552	mm.
Max. Spacing allowed (Rounded off)	=	125	mm.
Dia. of Rod-2 in Central Band	=	12	mm.
Required Spacing of Rods	=	200.955	mm.
Max. Spacing allowed (Rounded off)	=	200	mm.

Bending about XX-axis:-

Load Eccentricity lies within the limit causing total
Hence, the Footing Base about XX-axis will be in

Net Bearing Pressure at the Base - Right End	=	408.817	KN/sq.m.
Net Bearing Pressure at the Base - Left End	=	387.274	KN/sq.m.
Net Bearing Pressure at the Column Face	=	399.547	KN/sq.m.
Net Bearing Pressure - 'd' from Face	=	405.67	KN/sq.m.

As Per IS:456-2000, Clause

the critical section for Bending Moment is at the of the Column.

Projection of Footing from Critical Section	=	710	mm.
Design Bending Moment	=	207.083	KN m.
Modified Depth of Footing at the Face of Wall	=	525	mm.
Modified Depth of Footing at the End	=	375	mm.
Effective Depth Required	=	270.978	mm.
Effective Depth Provided	=	457	mm.

Hence SAFE.

Percentage of Steel Required	=	0.115	%
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As Per IS:456-2000, Clause

the required percentage of Steel is less than the to be provided. Hence, Minimum Steel is

Percentage of Main Steel Provided	=	0.12	%
Area of Steel Provided	=	1110.51	sq.mm.
Dia. of Rod-1 in Central Band	=	10	mm.
Required Spacing of Rods	=	143.216	mm.
Max. Spacing allowed (Rounded off)	=	125	mm.
Dia. of Rod-2 in Central Band	=	12	mm.
Required Spacing of Rods	=	206.231	mm.
Max. Spacing allowed (Rounded off)	=	200	mm.

*Note (1):- The required Spacing of Main Rods will 300 mm. or 3d (300 mm. or 5d for Dist. Rods)
If the required spacing exceeds this limit, the least will be automatically provided. This is done in IS:456-2000 Clause 26.3.3.*

Note (2):- The required minimum area of as per IS:456-2000, Clause 34.5.2, if the Footing 1000 mm. This minimum area is 360.0 sq.mm. for

Note (3):- The assumed Depth of Footing will be so that a SAFE design is arrived at from both considerations.

Note (4):- Spacing of Rods are also controlled by Value, User-defined Minimum and Maximum

F01 : Dowel Bars Output (LC No. : 14)

Factored Axial Load on Column	=	1249.667	KN.
Char. Comp. Strength of Concrete	=	25	N/sq.mm.
Yield Stress of Pedestal Steel	=	500	N/sq.mm.
Width of Column Section	=	230	mm.
Depth of Column Section	=	600	mm.
Area of Column Section	=	138000	sq.mm.
Width of Footing	=	1.65	m.
Length of Footing	=	2.025	m.
Area of Footing	=	3.341	sq.m.
As Per IS:456-2000, Clause			
Basic Permissible Bearing Stress	=	11.25	N/sq.mm.
Max. Bearing Stress based on Area Ratio	=	22.5	N/sq.mm.
Actual Bearing Stress	=	9.056	N/sq.mm.
As Per IS:456-2000, Clause 34.4.3,			
Reinforcement is NOT required. However,			
Percentage of Steel Required	=	0.5	%
Area of Steel Provided	=	690	sq.mm.
Dowel Rod Size-1	=	12	mm.
No. of Rods to be Provided	=	6	Nos.
Corresponding Steel Area	=	678.584	sq.mm.
Dowel Rod Size-2	=	16	mm.
No. of Rods to be Provided	=	4	Nos.
Corresponding Steel Area	=	804.248	sq.mm.

Note :- Calculation for Dowel Rods is only
However, Dowel Rods may not be required in all

F01 : One Way Shear Output (LC No. : 14)

As Per IS:456-2000, Clause 34.2.4,
the critical section for Shear Force is at a
the Effective Depth of the Footing, from the Face

Design Shear Force about Length	=	163.091	KN.
Modified Depth of Footing at the Face of Wall	=	525	mm.
Modified Depth of Footing at the End	=	375	mm.

Depth of Footing at Critical Section	=	370.263	mm.
Projection of Footing from Critical Section	=	243.5	mm.
As Per IS:456-2000, Clause Actual Shear Stress	=	0.267	N/sq.mm.
As Per IS:456-2000, Table 19, Design Shear Strength of Concrete	=	0.277	N/sq.mm.
As Per IS:456-2000, Table 20, Max. Permissible Shear Stress	=	3.124	N/sq.mm.
The section is SAFE in Shear, about ZZ-axis.			
Design Shear Force about Width	=	198.745	KN.
Depth of Footing at Critical Section	=	357.915	mm.
Projection of Footing from Critical Section	=	241	mm.
As Per IS:456-2000, Clause Actual Shear Stress	=	0.274	N/sq.mm.
As Per IS:456-2000, Table 19, Design Shear Strength of Concrete	=	0.28	N/sq.mm.
As Per IS:456-2000, Table 20, Max. Permissible Shear Stress	=	3.124	N/sq.mm.
The section is SAFE in Shear, about XX-axis.			
F01 : Punching Shear Output (LC No. : 14)			
As Per IS:456-2000, Clause the critical section for Shear Force is at a the Half the Effective Depth of the Footing, from the Column.			
Length of Footing at Critical Section	=	1.057	m.
Width of Footing at Critical Section	=	0.687	m.
Ratio of Width to Length at Critical Section	=	0.65	
Modified Depth of Footing at the Face of Wall	=	525	mm.
Modified Depth of Footing at the End	=	375	mm.
Depth of Footing at Critical Section	=	413.632	mm.
Design Shear Force	=	970.194	KN.
As Per IS:456-2000, Clause Actual Shear Stress	=	0.672	N/sq.mm.
As Per IS:456-2000, Clause Coefficient, ks	=	1	

Max. Permissible Shear Stress = 1.25 N/sq.mm.

The section is SAFE in Shear.

F01 : Global Input Data (LC No. : 19)

The footing is to be designed as an Isolated

Width of Column = 230 mm.

Length of Column = 600 mm.

Footing Shape = Rectangular

Initial Depth at the Face of Wall/Column = 300 mm.

Initial Depth at the End = 150 mm.

The footing is subjected to Axial Load & Biaxial

Working Axial Load = 1357.047 KN.

Working Moment about ZZ-axis = 45.276 KN m.

Working Moment about XX-axis = 25.867 KN m.

Safe Bearing Capacity of Soil = 300 KN/sq.m.

Factor of Safety for Safe Bearing Capacity = 1.5

F01 : Flexure Output (LC No. : 19)

Working Axial Load on Footing = 1357.047 KN.

Factored Axial Load on Footing = 1357.047 KN.

Percentage Factor for Self Weight of Footing = 10 %

Factored Self Weight of Footing = 135.705 KN.

Total Factored Axial Load on Footing = 1492.751 KN.

Working Moment about ZZ-axis = 45.276 KN m.

Factored Moment about ZZ-axis = 45.276 KN m.

Working Moment about XX-axis = 25.867 KN m.

Factored Moment about XX-axis = 25.867 KN m.

Ultimate Bearing Capacity of Soil = 450 KN/sq.m.

From Vertical Load and Bending considerations,
Area of Footing Required = 3.794 sq.m.

Equal Projections were initially assumed from the
to arrive at the Footing Size.

Width of Footing Required = 1.772 m.

Length of Footing Required = 2.142 m.

Width of Footing Provided = 1.775 m.

Length of Footing Provided	=	2.15	m.
Actual Bearing Area Provided	=	3.816	sq.m.
Max. Bearing Pressure at the Base	=	447.177	KN/sq.m.
Min. Bearing Pressure at the Base	=	335.136	KN/sq.m.

Bending about ZZ-axis:-

Load Eccentricity lies within the limit causing total
Hence, the Footing Base about ZZ-axis will be in

Net Bearing Pressure at the Base - Right End	=	411.618	KN/sq.m.
Net Bearing Pressure at the Base - Left End	=	345.4	KN/sq.m.
Net Bearing Pressure at the Column Face	=	387.749	KN/sq.m.
Net Bearing Pressure - 'd' from Face	=	403.733	KN/sq.m.

As Per IS:456-2000, Clause 34.2.3,
the critical section for Bending Moment is at the Face
of the Column.

Projection of Footing from Critical Section	=	775	mm.
Design Bending Moment	=	215.174	KN m.
Modified Depth of Footing at the Face of Wall	=	575	mm.
Modified Depth of Footing at the End	=	425	mm.
Effective Depth Required	=	360.118	mm.
Effective Depth Provided	=	519	mm.

Hence SAFE.

Percentage of Steel Required	=	0.106	%
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As Per IS:456-2000, Clause 26.5.2.1,
the required percentage of Steel is less than the
to be provided. Hence, Minimum Steel is provided.

Percentage of Main Steel Provided	=	0.12	%
Area of Steel Provided	=	1105.47	sq.mm.
Dia. of Rod-1 in Central Band	=	10	mm.
Required Spacing of Rods	=	126.108	mm.
Max. Spacing allowed (Rounded off)	=	125	mm.
Dia. of Rod-2 in Central Band	=	12	mm.
Required Spacing of Rods	=	181.595	mm.
Max. Spacing allowed (Rounded off)	=	175	mm.

Bending about XX-axis:-

Load Eccentricity lies within the limit causing total

Hence, the Footing Base about XX-axis will be in

Net Bearing Pressure at the Base - Right End	=	411.618	KN/sq.m.
Net Bearing Pressure at the Base - Left End	=	365.793	KN/sq.m.
Net Bearing Pressure at the Column Face	=	391.674	KN/sq.m.
Net Bearing Pressure - 'd' from Face	=	405.073	KN/sq.m.

As Per IS:456-2000, Clause

the critical section for Bending Moment is at the of the Column.

Projection of Footing from Critical Section	=	772.5	mm.
Design Bending Moment	=	259.793	KN m.
Modified Depth of Footing at the Face of Wall	=	575	mm.
Modified Depth of Footing at the End	=	425	mm.
Effective Depth Required	=	299.692	mm.
Effective Depth Provided	=	507	mm.

Hence SAFE.

Percentage of Steel Required	=	0.111	%
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As Per IS:456-2000, Clause

the required percentage of Steel is less than the to be provided. Hence, Minimum Steel is

Percentage of Main Steel Provided	=	0.12	%
Area of Steel Provided	=	1308.06	sq.mm.
Dia. of Rod-1 in Central Band	=	10	mm.
Required Spacing of Rods	=	129.092	mm.
Max. Spacing allowed (Rounded off)	=	125	mm.
Dia. of Rod-2 in Central Band	=	12	mm.
Required Spacing of Rods	=	185.893	mm.
Max. Spacing allowed (Rounded off)	=	175	mm.

*Note (1):- The required Spacing of Main Rods will 300 mm. or 3d (300 mm. or 5d for Dist. Rods)
If the required spacing exceeds this limit, the least will be automatically provided. This is done in IS:456-2000 Clause 26.3.3.*

Note (2):- The required minimum area of as per IS:456-2000, Clause 34.5.2, if the Footing 1000 mm. This minimum area is 360.0 sq.mm. for

Note (3):- The assumed Depth of Footing will be so that a SAFE design is arrived at from both considerations.

Note (4):- Spacing of Rods are also controlled by Value, User-defined Minimum and Maximum

F01 : Dowel Bars Output (LC No. : 19)

Factored Axial Load on Column	=	1357.047	KN.
Char. Comp. Strength of Concrete	=	25	N/sq.mm.
Yield Stress of Pedestal Steel	=	500	N/sq.mm.
Width of Column Section	=	230	mm.
Depth of Column Section	=	600	mm.
Area of Column Section	=	138000	sq.mm.
Width of Footing	=	1.775	m.
Length of Footing	=	2.15	m.
Area of Footing	=	3.816	sq.m.
As Per IS:456-2000, Clause			
Basic Permissible Bearing Stress	=	11.25	N/sq.mm.
Max. Bearing Stress based on Area Ratio	=	22.5	N/sq.mm.
Actual Bearing Stress	=	9.834	N/sq.mm.
As Per IS:456-2000, Clause 34.4.3,			
Reinforcement is NOT required. However,			
Percentage of Steel Required	=	0.5	%
Area of Steel Provided	=	690	sq.mm.
Dowel Rod Size-1	=	12	mm.
No. of Rods to be Provided	=	6	Nos.
Corresponding Steel Area	=	678.584	sq.mm.
Dowel Rod Size-2	=	16	mm.
No. of Rods to be Provided	=	4	Nos.
Corresponding Steel Area	=	804.248	sq.mm.

Note :- Calculation for Dowel Rods is only
However, Dowel Rods may not be required in all

F01 : One Way Shear Output (LC No. : 19)

As Per IS:456-2000, Clause 34.2.4,
the critical section for Shear Force is at a
the Effective Depth of the Footing, from the Face

Design Shear Force about Length	=	185.248	KN.
Modified Depth of Footing at the Face of Wall	=	575	mm.
Modified Depth of Footing at the End	=	425	mm.

Depth of Footing at Critical Section	=	418.548	mm.
Projection of Footing from Critical Section	=	256	mm.
As Per IS:456-2000, Clause			
Actual Shear Stress	=	0.249	N/sq.mm.
As Per IS:456-2000, Table 19,			
Design Shear Strength of Concrete	=	0.264	N/sq.mm.
As Per IS:456-2000, Table 20,			
Max. Permissible Shear Stress	=	3.124	N/sq.mm.
The section is SAFE in Shear, about ZZ-axis.			
Design Shear Force about Width	=	222.558	KN.
Depth of Footing at Critical Section	=	406.223	mm.
Projection of Footing from Critical Section	=	253.5	mm.
As Per IS:456-2000, Clause			
Actual Shear Stress	=	0.255	N/sq.mm.
As Per IS:456-2000, Table 19,			
Design Shear Strength of Concrete	=	0.267	N/sq.mm.
As Per IS:456-2000, Table 20,			
Max. Permissible Shear Stress	=	3.124	N/sq.mm.
The section is SAFE in Shear, about XX-axis.			

F01 : Punching Shear Output (LC No. : 19)

As Per IS:456-2000, Clause			
the critical section for Shear Force is at a the Half the Effective Depth of the Footing, from the Column.			
Length of Footing at Critical Section	=	1.107	m.
Width of Footing at Critical Section	=	0.737	m.
Ratio of Width to Length at Critical Section	=	0.666	
Modified Depth of Footing at the Face of Wall	=	575	mm.
Modified Depth of Footing at the End	=	425	mm.
Depth of Footing at Critical Section	=	462.774	mm.
Design Shear Force	=	1059.01	KN.
As Per IS:456-2000, Clause			
Actual Shear Stress	=	0.62	N/sq.mm.
As Per IS:456-2000, Clause			

Coefficient, ks	=	1	
Max. Permissible Shear Stress	=	1.25	N/sq.mm.
The section is SAFE in Shear.			
F01 : Global Input Data (LC No. : 20)			
The footing is to be designed as an Isolated			
Width of Column	=	230	mm.
Length of Column	=	600	mm.
Footing Shape	=	Rectangular	
Initial Depth at the Face of Wall/Column	=	300	mm.
Initial Depth at the End	=	150	mm.
The footing is subjected to Axial Load & Biaxial			
Working Axial Load	=	1186.838	KN.
Working Moment about ZZ-axis	=	21.831	KN m.
Working Moment about XX-axis	=	32.543	KN m.
Safe Bearing Capacity of Soil	=	300	KN/sq.m.
Factor of Safety for Safe Bearing Capacity	=	1.5	
F01 : Flexure Output (LC No. : 20)			
Working Axial Load on Footing	=	1186.838	KN.
Factored Axial Load on Footing	=	1186.838	KN.
Percentage Factor for Self Weight of Footing	=	10	%
Factored Self Weight of Footing	=	118.684	KN.
Total Factored Axial Load on Footing	=	1305.522	KN.
Working Moment about ZZ-axis	=	21.831	KN m.
Factored Moment about ZZ-axis	=	21.831	KN m.
Working Moment about XX-axis	=	32.543	KN m.
Factored Moment about XX-axis	=	32.543	KN m.
Ultimate Bearing Capacity of Soil	=	450	KN/sq.m.
From Vertical Load and Bending considerations, Area of Footing Required	=	3.31	sq.m.
Equal Projections were initially assumed from the to arrive at the Footing Size.			
Width of Footing Required	=	1.644	m.
Length of Footing Required	=	2.014	m.

Width of Footing Provided	=	1.65	m.
Length of Footing Provided	=	2.025	m.
Actual Bearing Area Provided	=	3.341	sq.m.
Max. Bearing Pressure at the Base	=	445.505	KN/sq.m.
Min. Bearing Pressure at the Base	=	335.952	KN/sq.m.

Bending about ZZ-axis:-

Load Eccentricity lies within the limit causing total
Hence, the Footing Base about ZZ-axis will be in

Net Bearing Pressure at the Base - Right End	=	409.984	KN/sq.m.
Net Bearing Pressure at the Base - Left End	=	371.266	KN/sq.m.
Net Bearing Pressure at the Column Face	=	396.361	KN/sq.m.
Net Bearing Pressure - 'd' from Face	=	405.328	KN/sq.m.

As Per IS:456-2000, Clause 34.2.3,
the critical section for Bending Moment is at the Face
of the Column.

Projection of Footing from Critical Section	=	712.5	mm.
Design Bending Moment	=	169.806	KN m.
Modified Depth of Footing at the Face of Wall	=	525	mm.
Modified Depth of Footing at the End	=	375	mm.
Effective Depth Required	=	327.122	mm.
Effective Depth Provided	=	469	mm.

Hence SAFE.

Percentage of Steel Required	=	0.11	%
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As Per IS:456-2000, Clause 26.5.2.1,
the required percentage of Steel is less than the
to be provided. Hence, Minimum Steel is provided.

Percentage of Main Steel Provided	=	0.12	%
Area of Steel Provided	=	928.62	sq.mm.
Dia. of Rod-1 in Central Band	=	10	mm.
Required Spacing of Rods	=	139.552	mm.
Max. Spacing allowed (Rounded off)	=	125	mm.
Dia. of Rod-2 in Central Band	=	12	mm.
Required Spacing of Rods	=	200.955	mm.
Max. Spacing allowed (Rounded off)	=	200	mm.

Bending about XX-axis:-

Load Eccentricity lies within the limit causing total
Hence, the Footing Base about XX-axis will be in

Net Bearing Pressure at the Base - Right End	=	409.984	KN/sq.m.
Net Bearing Pressure at the Base - Left End	=	339.15	KN/sq.m.
Net Bearing Pressure at the Column Face	=	379.504	KN/sq.m.
Net Bearing Pressure - 'd' from Face	=	399.638	KN/sq.m.

As Per IS:456-2000, Clause

the critical section for Bending Moment is at the
of the Column.

Projection of Footing from Critical Section	=	710	mm.
Design Bending Moment	=	204.071	KN m.
Modified Depth of Footing at the Face of Wall	=	525	mm.
Modified Depth of Footing at the End	=	375	mm.
Effective Depth Required	=	269	mm.
Effective Depth Provided	=	457	mm.

Hence SAFE.

Percentage of Steel Required	=	0.114	%
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As Per IS:456-2000, Clause

the required percentage of Steel is less than the
to be provided. Hence, Minimum Steel is

Percentage of Main Steel Provided	=	0.12	%
Area of Steel Provided	=	1110.51	sq.mm.
Dia. of Rod-1 in Central Band	=	10	mm.
Required Spacing of Rods	=	143.216	mm.
Max. Spacing allowed (Rounded off)	=	125	mm.
Dia. of Rod-2 in Central Band	=	12	mm.
Required Spacing of Rods	=	206.231	mm.
Max. Spacing allowed (Rounded off)	=	200	mm.

*Note (1):- The required Spacing of Main Rods will
300 mm. or 3d (300 mm. or 5d for Dist. Rods)
If the required spacing exceeds this limit, the least
will be automatically provided. This is done in
IS:456-2000 Clause 26.3.3.*

*Note (2):- The required minimum area of
as per IS:456-2000, Clause 34.5.2, if the Footing
1000 mm. This minimum area is 360.0 sq.mm. for*

Note (3):- The assumed Depth of Footing will be

so that a SAFE design is arrived at from both considerations.

Note (4):- Spacing of Rods are also controlled by Value, User-defined Minimum and Maximum

F01 : Dowel Bars Output (LC No. : 20)

Factored Axial Load on Column	=	1186.838	KN.
Char. Comp. Strength of Concrete	=	25	N/sq.mm.
Yield Stress of Pedestal Steel	=	500	N/sq.mm.
Width of Column Section	=	230	mm.
Depth of Column Section	=	600	mm.
Area of Column Section	=	138000	sq.mm.
Width of Footing	=	1.65	m.
Length of Footing	=	2.025	m.
Area of Footing	=	3.341	sq.m.
As Per IS:456-2000, Clause			
Basic Permissible Bearing Stress	=	11.25	N/sq.mm.
Max. Bearing Stress based on Area Ratio	=	22.5	N/sq.mm.
Actual Bearing Stress	=	8.6	N/sq.mm.
As Per IS:456-2000, Clause 34.4.3,			
Reinforcement is NOT required. However,			
Percentage of Steel Required	=	0.5	%
Area of Steel Provided	=	690	sq.mm.
Dowel Rod Size-1	=	12	mm.
No. of Rods to be Provided	=	6	Nos.
Corresponding Steel Area	=	678.584	sq.mm.
Dowel Rod Size-2	=	16	mm.
No. of Rods to be Provided	=	4	Nos.
Corresponding Steel Area	=	804.248	sq.mm.

Note :- Calculation for Dowel Rods is only
However, Dowel Rods may not be required in all

F01 : One Way Shear Output (LC No. : 20)

As Per IS:456-2000, Clause 34.2.4,
the critical section for Shear Force is at a
the Effective Depth of the Footing, from the Face

Design Shear Force about Length	=	163.786	KN.
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Modified Depth of Footing at the Face of Wall	=	525	mm.
Modified Depth of Footing at the End	=	375	mm.
Depth of Footing at Critical Section	=	370.263	mm.
Projection of Footing from Critical Section	=	243.5	mm.
As Per IS:456-2000, Clause			
Actual Shear Stress	=	0.268	N/sq.mm.
As Per IS:456-2000, Table 19,			
Design Shear Strength of Concrete	=	0.277	N/sq.mm.
As Per IS:456-2000, Table 20,			
Max. Permissible Shear Stress	=	3.124	N/sq.mm.
The section is SAFE in Shear, about ZZ-axis.			
Design Shear Force about Width	=	197.558	KN.
Depth of Footing at Critical Section	=	357.915	mm.
Projection of Footing from Critical Section	=	241	mm.
As Per IS:456-2000, Clause			
Actual Shear Stress	=	0.273	N/sq.mm.
As Per IS:456-2000, Table 19,			
Design Shear Strength of Concrete	=	0.28	N/sq.mm.
As Per IS:456-2000, Table 20,			
Max. Permissible Shear Stress	=	3.124	N/sq.mm.
The section is SAFE in Shear, about XX-axis.			
F01 : Punching Shear Output (LC No. : 20)			
As Per IS:456-2000, Clause			
the critical section for Shear Force is at a			
the Half the Effective Depth of the Footing, from			
the Column.			
Length of Footing at Critical Section	=	1.057	m.
Width of Footing at Critical Section	=	0.687	m.
Ratio of Width to Length at Critical Section	=	0.65	
Modified Depth of Footing at the Face of Wall	=	525	mm.
Modified Depth of Footing at the End	=	375	mm.
Depth of Footing at Critical Section	=	413.632	mm.
Design Shear Force	=	921.416	KN.
As Per IS:456-2000, Clause			
Actual Shear Stress	=	0.639	N/sq.mm.

As Per IS:456-2000, ClauseCoefficient, k_s = 1

Max. Permissible Shear Stress = 1.25 N/sq.mm.

The section is SAFE in Shear.**F01 : Global Input Data (LC No. : 21)**

The footing is to be designed as an Isolated

Width of Column = 230 mm.

Length of Column = 600 mm.

Footing Shape = Rectangular

Initial Depth at the Face of Wall/Column = 300 mm.

Initial Depth at the End = 150 mm.

The footing is subjected to Axial Load & Biaxial

Working Axial Load = 1472.509 KN.

Working Moment about ZZ-axis = 336.707 KN m.

Working Moment about XX-axis = 17.634 KN m.

Safe Bearing Capacity of Soil = 300 KN/sq.m.

Factor of Safety for Safe Bearing Capacity = 1.5

F01 : Flexure Output (LC No. : 21)

Working Axial Load on Footing = 1472.509 KN.

Factored Axial Load on Footing = 1472.509 KN.

Percentage Factor for Self Weight of Footing = 10 %

Factored Self Weight of Footing = 147.251 KN.

Total Factored Axial Load on Footing = 1619.76 KN.

Working Moment about ZZ-axis = 336.707 KN m.

Factored Moment about ZZ-axis = 336.707 KN m.

Working Moment about XX-axis = 17.634 KN m.

Factored Moment about XX-axis = 17.634 KN m.

Ultimate Bearing Capacity of Soil = 450 KN/sq.m.

From Vertical Load and Bending considerations,
Area of Footing Required = 5.48 sq.m.Equal Projections were initially assumed from the
to arrive at the Footing Size.

Width of Footing Required = 2.163 m.

Length of Footing Required	=	2.533	m.
Width of Footing Provided	=	2.175	m.
Length of Footing Provided	=	2.55	m.
Actual Bearing Area Provided	=	5.546	sq.m.
Max. Bearing Pressure at the Base	=	443.661	KN/sq.m.
Min. Bearing Pressure at the Base	=	140.431	KN/sq.m.

Bending about ZZ-axis:-

Load Eccentricity lies within the limit causing total
Hence, the Footing Base about ZZ-axis will be in

Net Bearing Pressure at the Base - Right End	=	417.112	KN/sq.m.
Net Bearing Pressure at the Base - Left End	=	131.422	KN/sq.m.
Net Bearing Pressure at the Column Face	=	307.878	KN/sq.m.
Net Bearing Pressure - 'd' from Face	=	380.028	KN/sq.m.

As Per IS:456-2000, Clause 34.2.3,
the critical section for Bending Moment is at the Face
of the Column.

Projection of Footing from Critical Section	=	975	mm.
Design Bending Moment	=	393.57	KN m.
Modified Depth of Footing at the Face of Wall	=	700	mm.
Modified Depth of Footing at the End	=	550	mm.
Effective Depth Required	=	456.241	mm.
Effective Depth Provided	=	644	mm.

Hence SAFE.

Percentage of Steel Required	=	0.102	%
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As Per IS:456-2000, Clause 26.5.2.1,
the required percentage of Steel is less than the
to be provided. Hence, Minimum Steel is provided.

Percentage of Main Steel Provided	=	0.12	%
Area of Steel Provided	=	1680.84	sq.mm.
Dia. of Rod-1 in Central Band	=	10	mm.
Required Spacing of Rods	=	101.63	mm.
Max. Spacing allowed (Rounded off)	=	100	mm.
Dia. of Rod-2 in Central Band	=	12	mm.
Required Spacing of Rods	=	146.347	mm.
Max. Spacing allowed (Rounded off)	=	150	mm.

Bending about XX-axis:-

Load Eccentricity lies within the limit causing total
Hence, the Footing Base about XX-axis will be in

Net Bearing Pressure at the Base - Right End	=	417.112	KN/sq.m.
Net Bearing Pressure at the Base - Left End	=	399.57	KN/sq.m.
Net Bearing Pressure at the Column Face	=	409.269	KN/sq.m.
Net Bearing Pressure - 'd' from Face	=	414.462	KN/sq.m.

As Per IS:456-2000, Clause

the critical section for Bending Moment is at the
of the Column.

Projection of Footing from Critical Section	=	972.5	mm.
Design Bending Moment	=	499.817	KN m.
Modified Depth of Footing at the Face of Wall	=	700	mm.
Modified Depth of Footing at the End	=	550	mm.
Effective Depth Required	=	399.986	mm.
Effective Depth Provided	=	632	mm.

Hence SAFE.

Percentage of Steel Required	=	0.116	%
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As Per IS:456-2000, Clause

the required percentage of Steel is less than the
to be provided. Hence, Minimum Steel is

Percentage of Main Steel Provided	=	0.12	%
Area of Steel Provided	=	1933.92	sq.mm.
Dia. of Rod-1 in Central Band	=	10	mm.
Required Spacing of Rods	=	103.56	mm.
Max. Spacing allowed (Rounded off)	=	100	mm.
Dia. of Rod-2 in Central Band	=	12	mm.
Required Spacing of Rods	=	149.126	mm.
Max. Spacing allowed (Rounded off)	=	150	mm.

*Note (1):- The required Spacing of Main Rods will
300 mm. or 3d (300 mm. or 5d for Dist. Rods)
If the required spacing exceeds this limit, the least
will be automatically provided. This is done in
IS:456-2000 Clause 26.3.3.*

*Note (2):- The required minimum area of
as per IS:456-2000, Clause 34.5.2, if the Footing
1000 mm. This minimum area is 360.0 sq.mm. for*

Note (3):- The assumed Depth of Footing will be so that a SAFE design is arrived at from both considerations.

Note (4):- Spacing of Rods are also controlled by Value, User-defined Minimum and Maximum

F01 : Dowel Bars Output (LC No. : 21)

Factored Axial Load on Column	=	1472.509	KN.
Char. Comp. Strength of Concrete	=	25	N/sq.mm.
Yield Stress of Pedestal Steel	=	500	N/sq.mm.
Width of Column Section	=	230	mm.
Depth of Column Section	=	600	mm.
Area of Column Section	=	138000	sq.mm.
Width of Footing	=	2.175	m.
Length of Footing	=	2.55	m.
Area of Footing	=	5.546	sq.m.
As Per IS:456-2000, Clause			
Basic Permissible Bearing Stress	=	11.25	N/sq.mm.
Max. Bearing Stress based on Area Ratio	=	22.5	N/sq.mm.
Actual Bearing Stress	=	10.67	N/sq.mm.
As Per IS:456-2000, Clause 34.4.3,			
Reinforcement is NOT required. However,			
Percentage of Steel Required	=	0.5	%
Area of Steel Provided	=	690	sq.mm.
Dowel Rod Size-1	=	12	mm.
No. of Rods to be Provided	=	6	Nos.
Corresponding Steel Area	=	678.584	sq.mm.
Dowel Rod Size-2	=	16	mm.
No. of Rods to be Provided	=	4	Nos.
Corresponding Steel Area	=	804.248	sq.mm.

Note :- Calculation for Dowel Rods is only
However, Dowel Rods may not be required in all

F01 : One Way Shear Output (LC No. : 21)

As Per IS:456-2000, Clause 34.2.4,
the critical section for Shear Force is at a
the Effective Depth of the Footing, from the Face

Design Shear Force about Length	=	286.94	KN.
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Modified Depth of Footing at the Face of Wall	=	700	mm.
Modified Depth of Footing at the End	=	550	mm.
Depth of Footing at Critical Section	=	544.923	mm.
Projection of Footing from Critical Section	=	331	mm.
As Per IS:456-2000, Clause			
Actual Shear Stress	=	0.242	N/sq.mm.
As Per IS:456-2000, Table 19,			
Design Shear Strength of Concrete	=	0.265	N/sq.mm.
As Per IS:456-2000, Table 20,			
Max. Permissible Shear Stress	=	3.124	N/sq.mm.
The section is SAFE in Shear, about ZZ-axis.			
Design Shear Force about Width	=	348.294	KN.
Depth of Footing at Critical Section	=	532.668	mm.
Projection of Footing from Critical Section	=	328.5	mm.
As Per IS:456-2000, Clause			
Actual Shear Stress	=	0.256	N/sq.mm.
As Per IS:456-2000, Table 19,			
Design Shear Strength of Concrete	=	0.267	N/sq.mm.
As Per IS:456-2000, Table 20,			
Max. Permissible Shear Stress	=	3.124	N/sq.mm.
The section is SAFE in Shear, about XX-axis.			

F01 : Punching Shear Output (LC No. : 21)

As Per IS:456-2000, Clause
the critical section for Shear Force is at a
the Half the Effective Depth of the Footing, from
the Column.

Length of Footing at Critical Section	=	1.232	m.
Width of Footing at Critical Section	=	0.862	m.
Ratio of Width to Length at Critical Section	=	0.7	
Modified Depth of Footing at the Face of Wall	=	700	mm.
Modified Depth of Footing at the End	=	550	mm.
Depth of Footing at Critical Section	=	588.462	mm.
Design Shear Force	=	1183.847	KN.

As Per IS:456-2000, Clause

Actual Shear Stress	=	0.48	N/sq.mm.
As Per IS:456-2000, Clause			
Coefficient, k_s	=	1	
Max. Permissible Shear Stress	=	1.25	N/sq.mm.
The section is SAFE in Shear.			
F01 : Global Input Data (LC No. : 22)			
The footing is to be designed as an Isolated			
Width of Column	=	230	mm.
Length of Column	=	600	mm.
Footing Shape	=	Rectangular	
Initial Depth at the Face of Wall/Column	=	300	mm.
Initial Depth at the End	=	150	mm.
The footing is subjected to Axial Load & Biaxial			
Working Axial Load	=	1031.289	KN.
Working Moment about ZZ-axis	=	282.283	KN m.
Working Moment about XX-axis	=	0.998	KN m.
Safe Bearing Capacity of Soil	=	300	KN/sq.m.
Factor of Safety for Safe Bearing Capacity	=	1.5	
F01 : Flexure Output (LC No. : 22)			
Working Axial Load on Footing	=	1031.289	KN.
Factored Axial Load on Footing	=	1031.289	KN.
Percentage Factor for Self Weight of Footing	=	10	%
Factored Self Weight of Footing	=	103.129	KN.
Total Factored Axial Load on Footing	=	1134.418	KN.
Working Moment about ZZ-axis	=	282.283	KN m.
Factored Moment about ZZ-axis	=	282.283	KN m.
Working Moment about XX-axis	=	0.998	KN m.
Factored Moment about XX-axis	=	0.998	KN m.
Ultimate Bearing Capacity of Soil	=	450	KN/sq.m.
From Vertical Load and Bending considerations, Area of Footing Required	=	4.205	sq.m.
Equal Projections were initially assumed from the to arrive at the Footing Size.			

Width of Footing Required	=	1.874	m.
Length of Footing Required	=	2.244	m.
Width of Footing Provided	=	1.875	m.
Length of Footing Provided	=	2.25	m.
Actual Bearing Area Provided	=	4.219	sq.m.
Max. Bearing Pressure at the Base	=	448.087	KN/sq.m.
Min. Bearing Pressure at the Base	=	89.712	KN/sq.m.

Bending about ZZ-axis:-

Load Eccentricity lies within the limit causing total
Hence, the Footing Base about ZZ-axis will be in

Net Bearing Pressure at the Base - Right End	=	423.641	KN/sq.m.
Net Bearing Pressure at the Base - Left End	=	66.78	KN/sq.m.
Net Bearing Pressure at the Column Face	=	292.792	KN/sq.m.
Net Bearing Pressure - 'd' from Face	=	383.039	KN/sq.m.

As Per IS:456-2000, Clause 34.2.3,
the critical section for Bending Moment is at the Face
of the Column.

Projection of Footing from Critical Section	=	825	mm.
Design Bending Moment	=	242.489	KN m.
Modified Depth of Footing at the Face of Wall	=	625	mm.
Modified Depth of Footing at the End	=	475	mm.
Effective Depth Required	=	375.793	mm.
Effective Depth Provided	=	569	mm.

Hence SAFE.

Percentage of Steel Required	=	0.094	%
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As Per IS:456-2000, Clause 26.5.2.1,
the required percentage of Steel is less than the
to be provided. Hence, Minimum Steel is provided.

Percentage of Main Steel Provided	=	0.12	%
Area of Steel Provided	=	1280.25	sq.mm.
Dia. of Rod-1 in Central Band	=	10	mm.
Required Spacing of Rods	=	115.026	mm.
Max. Spacing allowed (Rounded off)	=	100	mm.
Dia. of Rod-2 in Central Band	=	12	mm.
Required Spacing of Rods	=	165.638	mm.
Max. Spacing allowed (Rounded off)	=	150	mm.

Bending about XX-axis:-

Load Eccentricity lies within the limit causing total
Hence, the Footing Base about XX-axis will be in

Net Bearing Pressure at the Base - Right End	=	423.641	KN/sq.m.
Net Bearing Pressure at the Base - Left End	=	422.128	KN/sq.m.
Net Bearing Pressure at the Column Face	=	422.977	KN/sq.m.
Net Bearing Pressure - 'd' from Face	=	423.437	KN/sq.m.

As Per IS:456-2000, Clause

the critical section for Bending Moment is at the
of the Column.

Projection of Footing from Critical Section	=	822.5	mm.
Design Bending Moment	=	322.252	KN m.
Modified Depth of Footing at the Face of Wall	=	625	mm.
Modified Depth of Footing at the End	=	475	mm.
Effective Depth Required	=	330.488	mm.
Effective Depth Provided	=	557	mm.

Hence SAFE.

Percentage of Steel Required	=	0.109	%
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As Per IS:456-2000, Clause

the required percentage of Steel is less than the
to be provided. Hence, Minimum Steel is

Percentage of Main Steel Provided	=	0.12	%
Area of Steel Provided	=	1503.9	sq.mm.
Dia. of Rod-1 in Central Band	=	10	mm.
Required Spacing of Rods	=	117.504	mm.
Max. Spacing allowed (Rounded off)	=	100	mm.
Dia. of Rod-2 in Central Band	=	12	mm.
Required Spacing of Rods	=	169.206	mm.
Max. Spacing allowed (Rounded off)	=	150	mm.

*Note (1):- The required Spacing of Main Rods will
300 mm. or 3d (300 mm. or 5d for Dist. Rods)
If the required spacing exceeds this limit, the least
will be automatically provided. This is done in
IS:456-2000 Clause 26.3.3.*

*Note (2):- The required minimum area of
as per IS:456-2000, Clause 34.5.2, if the Footing
1000 mm. This minimum area is 360.0 sq.mm. for*

Note (3):- The assumed Depth of Footing will be so that a SAFE design is arrived at from both considerations.

Note (4):- Spacing of Rods are also controlled by Value, User-defined Minimum and Maximum

F01 : Dowel Bars Output (LC No. : 22)

Factored Axial Load on Column	=	1031.289	KN.
Char. Comp. Strength of Concrete	=	25	N/sq.mm.
Yield Stress of Pedestal Steel	=	500	N/sq.mm.
Width of Column Section	=	230	mm.
Depth of Column Section	=	600	mm.
Area of Column Section	=	138000	sq.mm.
Width of Footing	=	1.875	m.
Length of Footing	=	2.25	m.
Area of Footing	=	4.219	sq.m.
As Per IS:456-2000, Clause			
Basic Permissible Bearing Stress	=	11.25	N/sq.mm.
Max. Bearing Stress based on Area Ratio	=	22.5	N/sq.mm.
Actual Bearing Stress	=	7.473	N/sq.mm.
As Per IS:456-2000, Clause 34.4.3,			
Reinforcement is NOT required. However,			
Percentage of Steel Required	=	0.5	%
Area of Steel Provided	=	690	sq.mm.
Dowel Rod Size-1	=	12	mm.
No. of Rods to be Provided	=	6	Nos.
Corresponding Steel Area	=	678.584	sq.mm.
Dowel Rod Size-2	=	16	mm.
No. of Rods to be Provided	=	4	Nos.
Corresponding Steel Area	=	804.248	sq.mm.

*Note :- Calculation for Dowel Rods is only
However, Dowel Rods may not be required in all*

F01 : One Way Shear Output (LC No. : 22)

As Per IS:456-2000, Clause 34.2.4,
the critical section for Shear Force is at a
the Effective Depth of the Footing, from the Face

Design Shear Force about Length	=	193.603	KN.
Modified Depth of Footing at the Face of Wall	=	625	mm.
Modified Depth of Footing at the End	=	475	mm.
Depth of Footing at Critical Section	=	465.545	mm.
Projection of Footing from Critical Section	=	256	mm.
As Per IS:456-2000, Clause			
Actual Shear Stress	=	0.222	N/sq.mm.
As Per IS:456-2000, Table 19,			
Design Shear Strength of Concrete	=	0.28	N/sq.mm.
As Per IS:456-2000, Table 20,			
Max. Permissible Shear Stress	=	3.124	N/sq.mm.
The section is SAFE in Shear, about ZZ-axis.			
Design Shear Force about Width	=	241.576	KN.
Depth of Footing at Critical Section	=	453.231	mm.
Projection of Footing from Critical Section	=	253.5	mm.
As Per IS:456-2000, Clause			
Actual Shear Stress	=	0.237	N/sq.mm.
As Per IS:456-2000, Table 19,			
Design Shear Strength of Concrete	=	0.283	N/sq.mm.
As Per IS:456-2000, Table 20,			
Max. Permissible Shear Stress	=	3.124	N/sq.mm.
The section is SAFE in Shear, about XX-axis.			
F01 : Punching Shear Output (LC No. : 22)			
As Per IS:456-2000, Clause			
the critical section for Shear Force is at a			
the Half the Effective Depth of the Footing, from			
the Column.			
Length of Footing at Critical Section	=	1.157	m.
Width of Footing at Critical Section	=	0.787	m.
Ratio of Width to Length at Critical Section	=	0.68	
Modified Depth of Footing at the Face of Wall	=	625	mm.
Modified Depth of Footing at the End	=	475	mm.
Depth of Footing at Critical Section	=	511.273	mm.
Design Shear Force	=	802.962	KN.

As Per IS:456-2000, Clause

Actual Shear Stress	=	0.404	N/sq.mm.
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As Per IS:456-2000, Clause

Coefficient, k_s	=	1	
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Max. Permissible Shear Stress	=	1.25	N/sq.mm.
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The section is SAFE in Shear.

F01 : Global Input Data (LC No. : 23)

The footing is to be designed as an Isolated

Width of Column	=	230	mm.
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Length of Column	=	600	mm.
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Footing Shape	=	Rectangular	
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Initial Depth at the Face of Wall/Column	=	300	mm.
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Initial Depth at the End	=	150	mm.
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The footing is subjected to Axial Load & Biaxial

Working Axial Load	=	1406.412	KN.
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Working Moment about ZZ-axis	=	26.606	KN m.
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Working Moment about XX-axis	=	35.058	KN m.
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Safe Bearing Capacity of Soil	=	300	KN/sq.m.
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Factor of Safety for Safe Bearing Capacity	=	1.5	
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F01 : Flexure Output (LC No. : 23)

Working Axial Load on Footing	=	1406.412	KN.
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Factored Axial Load on Footing	=	1406.412	KN.
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Percentage Factor for Self Weight of Footing	=	10	%
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Factored Self Weight of Footing	=	140.641	KN.
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Total Factored Axial Load on Footing	=	1547.053	KN.
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Working Moment about ZZ-axis	=	26.606	KN m.
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Factored Moment about ZZ-axis	=	26.606	KN m.
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Working Moment about XX-axis	=	35.058	KN m.
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Factored Moment about XX-axis	=	35.058	KN m.
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Ultimate Bearing Capacity of Soil	=	450	KN/sq.m.
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From Vertical Load and Bending considerations, Area of Footing Required	=	3.864	sq.m.
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Equal Projections were initially assumed from the
to arrive at the Footing Size.

Width of Footing Required	=	1.789	m.
Length of Footing Required	=	2.159	m.
Width of Footing Provided	=	1.8	m.
Length of Footing Provided	=	2.175	m.
Actual Bearing Area Provided	=	3.915	sq.m.
Max. Bearing Pressure at the Base	=	443.757	KN/sq.m.
Min. Bearing Pressure at the Base	=	346.564	KN/sq.m.

Bending about ZZ-axis:-

Load Eccentricity lies within the limit causing total
Hence, the Footing Base about ZZ-axis will be in

Net Bearing Pressure at the Base - Right End	=	407.833	KN/sq.m.
Net Bearing Pressure at the Base - Left End	=	370.339	KN/sq.m.
Net Bearing Pressure at the Column Face	=	394.258	KN/sq.m.
Net Bearing Pressure - 'd' from Face	=	403.205	KN/sq.m.

As Per IS:456-2000, Clause 34.2.3,
the critical section for Bending Moment is at the Face
of the Column.

Projection of Footing from Critical Section	=	787.5	mm.
Design Bending Moment	=	225.103	KN m.
Modified Depth of Footing at the Face of Wall	=	575	mm.
Modified Depth of Footing at the End	=	425	mm.
Effective Depth Required	=	366.737	mm.
Effective Depth Provided	=	519	mm.

Hence SAFE.

Percentage of Steel Required	=	0.109	%
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As Per IS:456-2000, Clause 26.5.2.1,
the required percentage of Steel is less than the
to be provided. Hence, Minimum Steel is provided.

Percentage of Main Steel Provided	=	0.12	%
Area of Steel Provided	=	1121.04	sq.mm.
Dia. of Rod-1 in Central Band	=	10	mm.
Required Spacing of Rods	=	126.108	mm.
Max. Spacing allowed (Rounded off)	=	125	mm.
Dia. of Rod-2 in Central Band	=	12	mm.
Required Spacing of Rods	=	181.595	mm.

Max. Spacing allowed (Rounded off)	=	175	mm.
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Bending about XX-axis:-

Load Eccentricity lies within the limit causing total
Hence, the Footing Base about XX-axis will be in

Net Bearing Pressure at the Base - Right End	=	407.833	KN/sq.m.
Net Bearing Pressure at the Base - Left End	=	348.135	KN/sq.m.
Net Bearing Pressure at the Column Face	=	381.798	KN/sq.m.
Net Bearing Pressure - 'd' from Face	=	399.011	KN/sq.m.

As Per IS:456-2000, Clause

the critical section for Bending Moment is at the
of the Column.

Projection of Footing from Critical Section	=	785	mm.
Design Bending Moment	=	267.492	KN m.
Modified Depth of Footing at the Face of Wall	=	575	mm.
Modified Depth of Footing at the End	=	425	mm.
Effective Depth Required	=	303.342	mm.
Effective Depth Provided	=	507	mm.

Hence SAFE.

Percentage of Steel Required	=	0.113	%
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As Per IS:456-2000, Clause

the required percentage of Steel is less than the
to be provided. Hence, Minimum Steel is

Percentage of Main Steel Provided	=	0.12	%
Area of Steel Provided	=	1323.27	sq.mm.
Dia. of Rod-1 in Central Band	=	10	mm.
Required Spacing of Rods	=	129.092	mm.
Max. Spacing allowed (Rounded off)	=	125	mm.
Dia. of Rod-2 in Central Band	=	12	mm.
Required Spacing of Rods	=	185.893	mm.
Max. Spacing allowed (Rounded off)	=	175	mm.

*Note (1):- The required Spacing of Main Rods will
300 mm. or 3d (300 mm. or 5d for Dist. Rods)
If the required spacing exceeds this limit, the least
will be automatically provided. This is done in
IS:456-2000 Clause 26.3.3.*

*Note (2):- The required minimum area of
as per IS:456-2000, Clause 34.5.2, if the Footing*

1000 mm. This minimum area is 360.0 sq.mm. for

Note (3):- The assumed Depth of Footing will be so that a SAFE design is arrived at from both considerations.

Note (4):- Spacing of Rods are also controlled by Value, User-defined Minimum and Maximum

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
 STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS
 (WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT
 PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD
 AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND
 COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTANAM NO.70&71
 BLOCK NO.22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR
 TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION.

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SCADDS/Nucleus 2022: RC-Beam Designer Limit State Design of Singly/Doubly Reinforced Rectangular/Tee/Ell Beam Sections subjected to Moment/Torsion/Shear as per IS:456-2000 upto Amendment 5 (Reaffirmed 2021)	
<u>Introduction:-</u> This Report contains the detailed solution for the Reinforced Concrete Beam Design problem. The given Beam Section is considered for flexural design and the output contains the following 1. Global Input Data 2. Development Length Output 3. Flexural Design Output 4. Shear Design Output 5. Side Face Steel Output 6. Deflection Check Output 7. Slender Beam Check Output 8. Deep Beam Check Output While detailed design will be carried out for and Side Face Steel, only checks are made for	

Global Material Data	
Concrete Clear Cover	= 25 mm.

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS (WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTA NEW T.S NO.70&71 BLOCK NO.22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION.

Char. Comp. Strength of Concrete	=	25	N/sq.mm.
Yield Strength of Main Steel	=	500	N/sq.mm.
Main Rod Size-1	=	16	mm.
Yield Strength of Tie Steel	=	500	N/sq.mm.
Stirrup Rod Size-1	=	8	mm.
Stirrup Rod Size-2	=	10	mm.
Factor of Safety for Load	=	1	
Partial Safety Factor for Concrete	=	1.5	
Partial Safety Factor for Steel	=	1.15	
Max. Strain in Concrete	=	0.0035	mm./mm.
Max. Strain in Steel	=	0.0055	mm./mm.
Young's Modulus of Concrete	=	25000	N/sq.mm.
Young's Modulus of Steel	=	200000	N/sq.mm.

Bond / Development Length Output			
Char. Comp. Strength of Concrete	=	25	N/sq.mm.
Yield Stress of Main Steel	=	500	N/sq.mm.
As Per IS:456-2000, Clause 26.2.1.1,			
Design Bond Stress for Main Rods	=	2.24	N/sq.mm.
<u>Rods in Tension:-</u>			
Main Rod Diameter-1	=	16	mm.
Corresponding Development Length	=	776.786	mm.
<u>Rods in Compression:-</u>			
Main Rod Diameter-1	=	16	mm.

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS
(WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT
PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD
AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND
COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTA NEW T.S
NO.70&71 BLOCK NO.22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR
TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION.

Corresponding Development Length	=	621.429 mm.
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B117 : Global Input Data

Effective Span	=	4.33 m.
Section Type	=	Rectangular
Width of Web	=	230 mm.
Overall Depth	=	450 mm.
Effective Cover at Top	=	55 mm.
Effective Cover at Bottom	=	55 mm.
Number of Stirrup Legs	=	2 Nos.
Max. Bending Moment at End-1	=	142.061 KN m.
Min. Bending Moment at End-1	=	-89.69 KN m.
Max. Bending Moment at End-2	=	110.409 KN m.
Min. Bending Moment at End-2	=	-55.08 KN m.
Max. Bending Moment at Middle	=	51.613 KN m.
Min. Bending Moment at Middle	=	-74.273 KN m.
Max. Shear Force at Left	=	90.282 KN.
Max. Shear Force at Right	=	91.022 KN.
Max. Torsional Moment	=	0 KN m.
Torsion, as per Analysis Results, is partially		
Ignore Torsion Limit	=	10 %

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS (WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTA NEW T.S NO.70&71 BLOCK NO.22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION.

If Torsion is less than the above % of the Max.
it will be ignored. Otherwise, the Beam is

B117 : End-1 Max - Flexure Output

Bending Moment	=	142.061	KN m.
Factored Moment	=	142.061	KN m.
Overall Depth of Section	=	450	mm.
Bottom Effective Cover	=	55	mm.
Effective Depth	=	395	mm.
Maximum N.A. Ratio	=	0.456	
Total Limiting Moment	=	119.356	KN m.
Total Design Moment	=	142.061	KN m.
Moment for Compression Steel	=	22.706	KN m.

Depth of Neutral Axis	=	180.14	mm.
Tensile Reinforcement Required	=	1.113	%
Compression Reinforcement Required.	=	0.19	%
As Per IS:456-2000, Clause 26.5.1.1.a, Min. Tensile Reinforcement Percentage	=	0.17	%
As Per IS:456-2000, Clause 26.5.1.1.b, Max. Reinforcement Percentage	=	4	%

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS (WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTANAM NO.70&71 BLOCK NO.22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION.

Area of Tensile Reinforcement	=	1010.814	sq.mm.
Main Rod Size-1	=	16	mm.
No. of Rods Required	=	5.027	Nos.
No. of Rods Provided	=	5	Nos.
Corresponding Steel Area	=	1005.31	sq.mm.
Area of Compression Reinforcement	=	172.364	sq.mm.
Main Rod Size-1	=	16	mm.
No. of Rods Required	=	0.857	Nos.
No. of Rods Provided	=	1	Nos.
Corresponding Steel Area	=	201.062	sq.mm.
<i>Note:- Please note that the minimum number of should be always TWO, even if the number of ONE or less. This is to be done during detailing.</i>			
B117 : End-1 Max - Shear Output			
Shear Force	=	90.282	KN.
Factored Shear	=	90.282	KN.
As Per IS:456-2000, Clause 40.1, Actual Shear Stress	=	0.994	N/sq.mm.
As Per IS:456-2000, Table 19, Design Shear Strength of Concrete	=	0.666	N/sq.mm.
As Per IS:456-2000, Table 20, Max. Permissible Shear Stress	=	3.124	N/sq.mm.
Stirrups have to be Designed for Shear.			
Shear for which Stirrups are Provided	=	29.785	KN.
Stirrup Steel Yield Strength	=	500	N/sq.mm.
No. of Stirrup Legs	=	2	Nos.
Stirrup Rod Diameter-1	=	8	mm.
Spacing of Stirrups Required	=	300	mm.

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS (WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTA NEW T.S NO.70&71 BLOCK NO.22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION.

Stirrup Rod Diameter-2	=	10	mm.
Spacing of Stirrups Required	=	300	mm.

As per IS:456-2000 Clause 26.5.1.5, if the stirrup exceeds 0.75d or 300 mm., whichever is less, the value will be provided as the Spacing of Stirrups.

B117 : End-1 Min - Flexure Output

Bending Moment	=	89.69	KN m.
Factored Moment	=	89.69	KN m.
Overall Depth of Section	=	450	mm.
Bottom Effective Cover	=	55	mm.
Effective Depth	=	395	mm.
Maximum N.A. Ratio	=	0.456	
Total Limiting Moment	=	119.356	KN m.
Total Design Moment	=	89.69	KN m.
Depth of Neutral Axis	=	126.552	mm.
Tensile Reinforcement Required	=	0.663	%
Compression Reinforcement is NOT Necessary.			
As Per IS:456-2000, Clause			
Min. Tensile Reinforcement Percentage	=	0.17	%
As Per IS:456-2000, Clause			
Max. Reinforcement Percentage	=	4	%

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS (WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTA NEW T.S NO.70&71 BLOCK NO.22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION.

Area of Tensile Reinforcement	=	602.214	sq.mm.
Main Rod Size-1	=	16	mm.
No. of Rods Required	=	2.995	Nos.
No. of Rods Provided	=	3	Nos.
Corresponding Steel Area	=	603.186	sq.mm.
Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding			
Main Rod Size-1	=	16	mm.
No. of Rods Provided	=	2	Nos.
Corresponding Steel Area	=	402.124	sq.mm.
<i>Note:- Please note that the minimum number of should be always TWO, even if the number of ONE or less. This is to be done during detailing.</i>			
B117 : End-1 Min - Shear Output			
Shear Force	=	90.282	KN.
Factored Shear	=	90.282	KN.

As Per IS:456-2000, Clause 40.1, Actual Shear Stress	=	0.994	N/sq.mm.
As Per IS:456-2000, Table 19, Design Shear Strength of Concrete	=	0.548	N/sq.mm.
As Per IS:456-2000, Table 20, Max. Permissible Shear Stress	=	3.124	N/sq.mm.
Stirrups have to be Designed for Shear.			

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS (WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTA NEW T.S NO.70&71 BLOCK NO.22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION.

Shear for which Stirrups are Provided	=	40.502	KN.
Stirrup Steel Yield Strength	=	500	N/sq.mm.
No. of Stirrup Legs	=	2	Nos.
Stirrup Rod Diameter-1	=	8	mm.
Spacing of Stirrups Required	=	300	mm.
Stirrup Rod Diameter-2	=	10	mm.
Spacing of Stirrups Required	=	300	mm.
<i>As per IS:456-2000 Clause 26.5.1.5, if the stirrup exceeds 0.75d or 300 mm., whichever is less, the value will be provided as the Spacing of Stirrups.</i>			
B117 : End-2 Max - Flexure Output			
Bending Moment	=	110.409	KN m.
Factored Moment	=	110.409	KN m.
Overall Depth of Section	=	450	mm.
Bottom Effective Cover	=	55	mm.
Effective Depth	=	395	mm.
Maximum N.A. Ratio	=	0.456	
Total Limiting Moment	=	119.356	KN m.
Total Design Moment	=	110.409	KN m.
Depth of Neutral Axis	=	163.007	mm.
Tensile Reinforcement Required	=	0.854	%
Compression Reinforcement is NOT Necessary.			
As Per IS:456-2000, Clause			
Min. Tensile Reinforcement Percentage	=	0.17	%
As Per IS:456-2000, Clause			

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS (WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTANAM NO.70&71 BLOCK NO.22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION.

Max. Reinforcement Percentage	=	4	%
Area of Tensile Reinforcement	=	775.69	sq.mm.

Main Rod Size-1	=	16	mm.
No. of Rods Required	=	3.858	Nos.
No. of Rods Provided	=	4	Nos.
Corresponding Steel Area	=	804.248	sq.mm.
Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding			
Main Rod Size-1	=	16	mm.
No. of Rods Provided	=	2	Nos.
Corresponding Steel Area	=	402.124	sq.mm.
<i>Note:- Please note that the minimum number of should be always TWO, even if the number of ONE or less. This is to be done during detailing.</i>			

B117 : End-2 Max - Shear Output

Shear Force	=	91.022	KN.
Factored Shear	=	91.022	KN.
As Per IS:456-2000, Clause 40.1, Actual Shear Stress	=	1.002	N/sq.mm.
As Per IS:456-2000, Table 19, Design Shear Strength of Concrete	=	0.613	N/sq.mm.
As Per IS:456-2000, Table 20, Max. Permissible Shear Stress	=	3.124	N/sq.mm.
Stirrups have to be Designed for Shear.			

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS (WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTA NEW T.S NO.70&71 BLOCK NO.22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION.

Shear for which Stirrups are Provided	=	35.365	KN.
Stirrup Steel Yield Strength	=	500	N/sq.mm.
No. of Stirrup Legs	=	2	Nos.
Stirrup Rod Diameter-1	=	8	mm.
Spacing of Stirrups Required	=	300	mm.
Stirrup Rod Diameter-2	=	10	mm.
Spacing of Stirrups Required	=	300	mm.
<i>As per IS:456-2000 Clause 26.5.1.5, if the stirrup exceeds 0.75d or 300 mm., whichever is less, the value will be provided as the Spacing of Stirrups.</i>			
B117 : End-2 Min - Flexure Output			
Bending Moment	=	55.08	KN m.
Factored Moment	=	55.08	KN m.
Overall Depth of Section	=	450	mm.
Bottom Effective Cover	=	55	mm.
Effective Depth	=	395	mm.

Maximum N.A. Ratio	=	0.456	
Total Limiting Moment	=	119.356	KN m.
Total Design Moment	=	55.08	KN m.
Depth of Neutral Axis	=	72.968	mm.
Tensile Reinforcement Required	=	0.382	%

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS (WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTANAM NO.70&71 BLOCK NO.22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION.

Compression Reinforcement is NOT Necessary.

As Per IS:456-2000, Clause

Min. Tensile Reinforcement Percentage	=	0.17	%
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As Per IS:456-2000, Clause

Max. Reinforcement Percentage	=	4	%
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Area of Tensile Reinforcement	=	347.228	sq.mm.
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Main Rod Size-1	=	16	mm.
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No. of Rods Required	=	1.727	Nos.
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No. of Rods Provided	=	2	Nos.
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Corresponding Steel Area	=	402.124	sq.mm.
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Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding

Main Rod Size-1	=	16	mm.
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No. of Rods Provided	=	2	Nos.
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Corresponding Steel Area	=	402.124	sq.mm.
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Note:- Please note that the minimum number of should be always TWO, even if the number of ONE or less. This is to be done during detailing.

B117 : End-2 Min - Shear Output

Shear Force	=	91.022	KN.
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Factored Shear	=	91.022	KN.
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As Per IS:456-2000, Clause 40.1,

Actual Shear Stress	=	1.002	N/sq.mm.
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As Per IS:456-2000, Table 19,

Design Shear Strength of Concrete	=	0.465	N/sq.mm.
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As Per IS:456-2000, Table 20,

Max. Permissible Shear Stress	=	3.124	N/sq.mm.
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STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS (WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTA NEW T.S NO.70&71 BLOCK NO.22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION.

Stirrups have to be Designed for Shear.

Shear for which Stirrups are Provided	=	48.78	KN.
Stirrup Steel Yield Strength	=	500	N/sq.mm.

No. of Stirrup Legs	=	2	Nos.
Stirrup Rod Diameter-1	=	8	mm.
Spacing of Stirrups Required	=	300	mm.
Stirrup Rod Diameter-2	=	10	mm.
Spacing of Stirrups Required	=	300	mm.

As per IS:456-2000 Clause 26.5.1.5, if the stirrup exceeds 0.75d or 300 mm., whichever is less, the value will be provided as the Spacing of Stirrups.

B117 : Mid. Max - Flexure Output

Bending Moment	=	74.273	KN m.
Factored Moment	=	74.273	KN m.
Overall Depth of Section	=	450	mm.
Bottom Effective Cover	=	55	mm.
Effective Depth	=	395	mm.
Maximum N.A. Ratio	=	0.456	
Total Limiting Moment	=	119.356	KN m.
Total Design Moment	=	74.273	KN m.
Depth of Neutral Axis	=	101.732	mm.

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS (WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTA NEW T.S NO.70&71 BLOCK NO.22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION.

Tensile Reinforcement Required	=	0.533	%
Compression Reinforcement is NOT Necessary.			
As Per IS:456-2000, Clause			
Min. Tensile Reinforcement Percentage	=	0.17	%
As Per IS:456-2000, Clause			
Max. Reinforcement Percentage	=	4	%
Area of Tensile Reinforcement	=	484.102	sq.mm.
Main Rod Size-1	=	16	mm.
No. of Rods Required	=	2.408	Nos.
No. of Rods Provided	=	3	Nos.
Corresponding Steel Area	=	603.186	sq.mm.
Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding			
Main Rod Size-1	=	16	mm.
No. of Rods Provided	=	2	Nos.
Corresponding Steel Area	=	402.124	sq.mm.
<i>Note:- Please note that the minimum number of should be always TWO, even if the number of</i>			

<i>ONE or less. This is to be done during detailing.</i>			
B117 : Mid. Max - Shear Output			
Shear Force	=	67.123	KN.
Factored Shear	=	67.123	KN.
As Per IS:456-2000, Clause 40.1,			
Actual Shear Stress	=	0.739	N/sq.mm.

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS (WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTA NEW T.S NO.70&71 BLOCK NO.22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION.

As Per IS:456-2000, Table 19, Design Shear Strength of Concrete	=	0.548	N/sq.mm.
As Per IS:456-2000, Table 20, Max. Permissible Shear Stress	=	3.124	N/sq.mm.
Stirrups have to be Designed for Shear.			
Shear for which Stirrups are Provided	=	17.343	KN.
Stirrup Steel Yield Strength	=	500	N/sq.mm.
No. of Stirrup Legs	=	2	Nos.
Stirrup Rod Diameter-1	=	8	mm.
Spacing of Stirrups Required	=	300	mm.
Stirrup Rod Diameter-2	=	10	mm.
Spacing of Stirrups Required	=	300	mm.
<i>As per IS:456-2000 Clause 26.5.1.5, if the stirrup exceeds 0.75d or 300 mm., whichever is less, the value will be provided as the Spacing of Stirrups.</i>			
B117 : Mid. Min - Flexure Output			
Bending Moment	=	51.613	KN m.
Factored Moment	=	51.613	KN m.
Overall Depth of Section	=	450	mm.
Bottom Effective Cover	=	55	mm.
Effective Depth	=	395	mm.
Maximum N.A. Ratio	=	0.456	
Total Limiting Moment	=	119.356	KN m.
Total Design Moment	=	51.613	KN m.
Depth of Neutral Axis	=	67.989	mm.

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS (WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTA NEW T.S NO.70&71 BLOCK NO.22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION.

Tensile Reinforcement Required	=	0.356	%
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Compression Reinforcement is NOT Necessary.

As Per IS:456-2000, Clause

Min. Tensile Reinforcement Percentage	=	0.17	%
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As Per IS:456-2000, Clause

Max. Reinforcement Percentage	=	4	%
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Area of Tensile Reinforcement	=	323.534	sq.mm.
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Main Rod Size-1	=	16	mm.
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No. of Rods Required	=	1.609	Nos.
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No. of Rods Provided	=	2	Nos.
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Corresponding Steel Area	=	402.124	sq.mm.
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Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding

Main Rod Size-1	=	16	mm.
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No. of Rods Provided	=	2	Nos.
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Corresponding Steel Area	=	402.124	sq.mm.
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Note:- Please note that the minimum number of should be always TWO, even if the number of ONE or less. This is to be done during detailing.

B117 : Mid. Min - Shear Output

Shear Force	=	67.123	KN.
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Factored Shear	=	67.123	KN.
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As Per IS:456-2000, Clause 40.1,

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS (WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTANAM NO.70&71 BLOCK NO.22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION.

Actual Shear Stress	=	0.739	N/sq.mm.
As Per IS:456-2000, Table 19, Design Shear Strength of Concrete	=	0.465	N/sq.mm.
As Per IS:456-2000, Table 20, Max. Permissible Shear Stress	=	3.124	N/sq.mm.
Stirrups have to be Designed for Shear.			
Shear for which Stirrups are Provided	=	24.882	KN.
Stirrup Steel Yield Strength	=	500	N/sq.mm.
No. of Stirrup Legs	=	2	Nos.
Stirrup Rod Diameter-1	=	8	mm.
Spacing of Stirrups Required	=	300	mm.
Stirrup Rod Diameter-2	=	10	mm.
Spacing of Stirrups Required	=	300	mm.
<i>As per IS:456-2000 Clause 26.5.1.5, if the stirrup exceeds 0.75d or 300 mm., whichever is less, the value will be provided as the Spacing of Stirrups.</i>			
B117 : Side Face Steel Output			

Overall Depth of Section	=	450	mm.
As Per IS:456-2000, Clauses 26.5.1.3, 26.5.1.7, Side Face Reinforcement is NOT Required.			
B117 : Deflection Check Output			
Type of Beam	=	Ends	Fixed or Continuous

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS (WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTA NEW T.S NO.70&71 BLOCK NO.22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION.

Effective Span of Beam	=	4.33	m.
Effective Depth of Beam	=	395	mm.
Actual Span to Depth Ratio	=	10.962	
As Per IS:456-2000, Clause 23.2.1.a, Factor Alpha	=	26	
As Per IS:456-2000, Clause 23.2.1.b, Factor Zigma	=	1	
As Per IS:456-2000, Clause 23.2.1.c, Factor Gamma	=	1.067	
As Per IS:456-2000, Clause 23.2.1.d, Factor Delta	=	1	
As Per IS:456-2000, Clause 23.2.1.e, Factor Lamda	=	1	
Allowable Span to Depth Ratio	=	27.731	
Deflection Requirements are O.K.			
B117 : Deep Beam Check Output			
Effective Span of Beam	=	4.33	m.
Overall Depth	=	450	mm.
Effective Span to Depth Ratio	=	9.622	
Minimum Value for the above	=	2.5	
As Per IS:456-2000, Clause 29.1, this Beam is NOT a Deep Beam.			
B117 : Slender Beam Check Output			
Clear Distance between Lateral Restraints	=	4.33	m.
Allowable Value for the above	=	13.8	m.
As Per IS:456-2000, Clause 23.3,			

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
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this Beam is NOT a Slender Beam.

Note :-

*Actually, the clear distance between lateral
taken as against the effective span. But, the
taken for simplifying the calculations. In fact, it's
to consider the effective span rather than the*

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
 STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS
 (WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT
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 AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND
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SCADDS/Nucleus 2022: RC-Column Designer Limit State Design of Braced/Unbraced Short/Long Rectangular/Circular Cracked/Uncracked Column Sections Subjected to Axial Load/Uni-axial & Bi-axial Bending as per IS:456-2000 upto Amendment 5 (Reaffirmed 2021)		
<u>Introduction:-</u> This Report contains the detailed solution for the Reinforced Concrete Column Design problem. The given Column Section is considered for Design and the output contains the following 1. Global Input Data 2. Development Length Output 3. Slenderness & Eccentricity Output 4. Flexural Design Output 5. Tie Design Output While detailed design will be carried out for design for Axial Tension and Shear is not		

Global Material Data		
Concrete Clear Cover	=	40 mm.
Char. Comp. Strength of Concrete	=	30 N/sq.mm.

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS
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Yield Strength of Main Steel	=	500	N/sq.mm.
Main Rod Size-1	=	16	mm.
Main Rod Size-2	=	20	mm.
Yield Strength of Tie Steel	=	500	N/sq.mm.
Tie Rod Size-1	=	8	mm.
Tie Rod Size-2	=	10	mm.
Factor of Safety for Load	=	1	
Partial Safety Factor for Concrete	=	1.5	
Partial Safety Factor for Steel	=	1.15	
Max. Strain in Concrete	=	0.0035	mm./mm.
Max. Strain in Steel	=	0.0055	mm./mm.
Young's Modulus of Concrete	=	27386.128	N/sq.mm.
Young's Modulus of Steel	=	200000	N/sq.mm.

Bond / Development Length Output			
Char. Comp. Strength of Concrete	=	30	N/sq.mm.
Yield Stress of Main Steel	=	500	N/sq.mm.
As Per IS:456-2000, Clause			
Design Bond Stress for Main Rods	=	3	N/sq.mm.
<u>Rods in Compression:-</u>			
Main Rod Diameter-1	=	16	mm.
Corresponding Development Length	=	580	mm.
Main Rod Diameter-2	=	20	mm.
Corresponding Development Length	=	725	mm.

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
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C1 : Global Input Data (LC No. : 13)			
Column Section	=	Rectangular	
Width of Column	=	230	mm.
Depth of Column	=	600	mm.
The Effective Lengths about ZZ and YY axes based on actual framing conditions from the 3D			
Effective Length Coeff. about ZZ axis	=	0.696	
Effective Length Coeff. about YY axis	=	0.817	
Unsupported Length-ZZ of Column	=	2.05	m.
Unsupported Length-YY of Column	=	2.5	m.
Effective Length-ZZ of Column	=	1.427	m.
Effective Length-YY of Column	=	2.041	m.
Working Axial Load on Column	=	1408.329	KN.
Working Moment about ZZ-axis at Top	=	33.279	KN m.
Working Moment about YY-axis at Top	=	-9.938	KN m.
Working Moment about ZZ-axis at Bottom	=	25.269	KN m.
Working Moment about YY-axis at Bottom	=	-15.582	KN m.
C1 : Slenderness & Eccentricity Output (LC No. : 13)			
Effective Length-ZZ of Column	=	1.427	m.
Effective Length-YY of Column	=	2.041	m.
Slenderness Ratio about ZZ-axis	=	8.875	
The Column is Short about the ZZ-axis.			

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
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Slenderness Ratio about YY-axis	=	2.378	
The Column is Short about the YY-axis.			
As Per IS:456-2000, 25.4,			
Minimum Eccentricity	=	20	mm.
$L_0/500 + b/30$	=	12.667	mm.
$L_0/500 + D/30$	=	24.1	mm.
Actual Minimum Eccentricity about ZZ	=	24.1	mm.
Actual Minimum Eccentricity about YY	=	20	mm.
As Per IS:456-2000, 39.3,			
0.05 times D (Limiting Value about ZZ)	=	30	mm.
0.05 times b (Limiting Value about YY)	=	11.5	mm.
Actual Eccentricity about ZZ due to Moment-ZZ	=	23.63	mm.
Actual Eccentricity about YY due to Moment-YY	=	11.064	mm.
Design Eccentricity about ZZ due to Moment-ZZ	=	24.1	mm.
Design Eccentricity about YY due to Moment-YY	=	20	mm.
As Per IS:456-2000, 39.3,			
Design Eccentricity about ZZ is not more than the			
Hence, the Column carries only Axial Load about			
<i>Design Eccentricity about YY is more than the</i>			
<i>Hence, the Column has Axial Load & Bending</i>			
Revised Design Bending Moment about YY	=	28.167	KN m.
C1 : Flexural Design Output (LC No. : 13)			
Axial Load on Column	=	1408.329	KN.

**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS
(WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT
PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD
AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND
COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTANAM NO. T.S
NO.70&71 BLOCK NO.22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR
TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION**

Factored Axial Load	=	1408.329	KN.
Revised Design Moment about YY axis	=	28.167	KN m.
The Column is subjected to Axial Load & Uni-axial			
Main Reinforcement is provided along all the			
Characteristic Comp. Strength of Concrete	=	30	N/sq.mm.
Yield Stress of Main Steel	=	500	N/sq.mm.
Min. Percentage of Reinforcement Required	=	0.8	%
Max. Percentage of Reinforcement Allowed	=	6	%
Depth of Neutral Axis	=	6	mm.
Width of Column	=	230	mm.
Depth of Column	=	600	mm.
Gross Sectional Area	=	138000	sq.mm.
Percentage of Reinforcement to be Provided	=	0.8	%
Area of Longitudinal Reinforcement Required	=	1104	sq.mm.
Main Rod Size-1	=	16	mm.
No. of Rods Required	=	5.491	Nos.
No. of Rods Provided	=	6	Nos.
Corresponding Steel Area	=	1206.372	sq.mm.
Main Rod Size-2	=	20	mm.
No. of Rods Required	=	3.514	Nos.
No. of Rods Provided	=	4	Nos.
Corresponding Steel Area	=	1256.637	sq.mm.
<i>Note:- Please note that the minimum number of will be always FOUR for Rectangular Columns Columns, as per IS:456-2000 Clause 26.5.3.1.(c)</i>			
C1 : Tie Pitch Output (LC No. : 13)			

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS
(WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT
PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD
AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND
COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTANAM NO. T.S
NO.70&71 BLOCK NO.22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR
TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION

Tie Rod Size-1	=	8	mm.
Tie Rod Size-2	=	10	mm.

Main Rod Size-1	=	16	mm.
As Per IS:456-2000,			
Least Lateral Dimension	=	230	mm.
16 times dia. of Main Rod	=	256	mm.
Maximum allowable value as per Code	=	300	mm.
Minimum of the above values for 16# Rods	=	225	mm.
Main Rod Size-2	=	20	mm.
As Per IS:456-2000,			
Least Lateral Dimension	=	230	mm.
16 times dia. of Main Rod	=	320	mm.
Maximum allowable value as per Code	=	300	mm.
Minimum of the above values for 20# Rods	=	225	mm.
<i>Spacing of Rods are also controlled by User-Value, User-defined Minimum and Maximum</i>			

C1 : Global Input Data (LC No. : 14)			
Column Section	=	Rectangular	
Width of Column	=	230	mm.
Depth of Column	=	600	mm.
The Effective Lengths about ZZ and YY axes were based on actual framing conditions from the 3D			
Effective Length Coeff. about ZZ axis	=	0.696	

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS
(WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT
PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD
AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND
COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTANAM NO. T.S
NO.70&71 BLOCK NO.22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR
TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION

Effective Length Coeff. about YY axis	=	0.817	
Unsupported Length-ZZ of Column	=	2.05	m.
Unsupported Length-YY of Column	=	2.5	m.
Effective Length-ZZ of Column	=	1.427	m.
Effective Length-YY of Column	=	2.041	m.
Working Axial Load on Column	=	1248.411	KN.
Working Moment about ZZ-axis at Top	=	27.102	KN m.
Working Moment about YY-axis at Top	=	-9.69	KN m.
Working Moment about ZZ-axis at Bottom	=	22.19	KN m.
Working Moment about YY-axis at Bottom	=	-14.607	KN m.
C1 : Slenderness & Eccentricity Output (LC No. : 14)			
Effective Length-ZZ of Column	=	1.427	m.
Effective Length-YY of Column	=	2.041	m.
Slenderness Ratio about ZZ-axis	=	8.875	
The Column is Short about the ZZ-axis.			
Slenderness Ratio about YY-axis	=	2.378	

The Column is Short about the YY-axis.			
As Per IS:456-2000, 25.4,			
Minimum Eccentricity	=	20	mm.
$L_o/500 + b/30$	=	12.667	mm.
$L_o/500 + D/30$	=	24.1	mm.
Actual Minimum Eccentricity about ZZ	=	24.1	mm.
Actual Minimum Eccentricity about YY	=	20	mm.
As Per IS:456-2000, 39.3,			
0.05 times D (Limiting Value about ZZ)	=	30	mm.

**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS
(WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT
PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD
AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND
COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTANAM NO. T.S
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TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION**

0.05 times b (Limiting Value about YY)	=	11.5	mm.
Actual Eccentricity about ZZ due to Moment-ZZ	=	21.709	mm.
Actual Eccentricity about YY due to Moment-YY	=	11.701	mm.
Design Eccentricity about ZZ due to Moment-ZZ	=	24.1	mm.
Design Eccentricity about YY due to Moment-YY	=	20	mm.
As Per IS:456-2000, 39.3, Design Eccentricity about ZZ is not more than the Hence, the Column carries only Axial Load about			
<i>Design Eccentricity about YY is more than the</i> <i>Hence, the Column has Axial Load & Bending</i>			
Revised Design Bending Moment about YY	=	24.968	KN m.
C1 : Flexural Design Output (LC No. : 14)			
Axial Load on Column	=	1248.411	KN.
Factored Axial Load	=	1248.411	KN.
Revised Design Moment about YY axis	=	24.968	KN m.
The Column is subjected to Axial Load & Uni-axial			
Main Reinforcement is provided along all the			
Characteristic Comp. Strength of Concrete	=	30	N/sq.mm.
Yield Stress of Main Steel	=	500	N/sq.mm.
Min. Percentage of Reinforcement Required	=	0.8	%
Max. Percentage of Reinforcement Allowed	=	6	%
Depth of Neutral Axis	=	6	mm.
Width of Column	=	230	mm.
Depth of Column	=	600	mm.
Gross Sectional Area	=	138000	sq.mm.

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS
(WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT
PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD
AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND
COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTANAM NO.70&71
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Percentage of Reinforcement to be Provided	=	0.8	%
Area of Longitudinal Reinforcement Required	=	1104	sq.mm.

Main Rod Size-1	=	16	mm.
No. of Rods Required	=	5.491	Nos.
No. of Rods Provided	=	6	Nos.
Corresponding Steel Area	=	1206.372	sq.mm.
Main Rod Size-2	=	20	mm.
No. of Rods Required	=	3.514	Nos.
No. of Rods Provided	=	4	Nos.
Corresponding Steel Area	=	1256.637	sq.mm.
<i>Note:- Please note that the minimum number of will be always FOUR for Rectangular Columns Columns, as per IS:456-2000 Clause 26.5.3.1.(c)</i>			

C1 : Tie Pitch Output (LC No. : 14)

Tie Rod Size-1	=	8	mm.
Tie Rod Size-2	=	10	mm.
Main Rod Size-1	=	16	mm.
As Per IS:456-2000,			
Least Lateral Dimension	=	230	mm.
16 times dia. of Main Rod	=	256	mm.
Maximum allowable value as per Code	=	300	mm.
Minimum of the above values for 16# Rods	=	225	mm.
Main Rod Size-2	=	20	mm.
As Per IS:456-2000,			

**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS
(WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT
PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD
AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND
COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTANAM NO. T.S
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TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION**

Least Lateral Dimension	=	230	mm.
16 times dia. of Main Rod	=	320	mm.
Maximum allowable value as per Code	=	300	mm.
Minimum of the above values for 20# Rods	=	225	mm.
<i>Spacing of Rods are also controlled by User-Value, User-defined Minimum and Maximum</i>			
C1 : Global Input Data (LC No. : 19)			
Column Section	=	Rectangular	
Width of Column	=	230	mm.
Depth of Column	=	600	mm.
The Effective Lengths about ZZ and YY axes were based on actual framing conditions from the 3D			
Effective Length Coeff. about ZZ axis	=	0.696	
Effective Length Coeff. about YY axis	=	0.817	
Unsupported Length-ZZ of Column	=	2.05	m.
Unsupported Length-YY of Column	=	2.5	m.
Effective Length-ZZ of Column	=	1.427	m.
Effective Length-YY of Column	=	2.041	m.
Working Axial Load on Column	=	1355.791	KN.
Working Moment about ZZ-axis at Top	=	45.276	KN m.
Working Moment about YY-axis at Top	=	26.074	KN m.
Working Moment about ZZ-axis at Bottom	=	20.073	KN m.
Working Moment about YY-axis at Bottom	=	9.03	KN m.
C1 : Slenderness & Eccentricity Output (LC No. : 19)			

**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS
(WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT
PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD
AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND
COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTANAM NO. T.S
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Effective Length-ZZ of Column	=	1.427	m.
Effective Length-YY of Column	=	2.041	m.
Slenderness Ratio about ZZ-axis	=	8.875	
The Column is Short about the ZZ-axis.			
Slenderness Ratio about YY-axis	=	2.378	
The Column is Short about the YY-axis.			
As Per IS:456-2000, 25.4,			
Minimum Eccentricity	=	20	mm.
$L_o/500 + b/30$	=	12.667	mm.
$L_o/500 + D/30$	=	24.1	mm.
Actual Minimum Eccentricity about ZZ	=	24.1	mm.
Actual Minimum Eccentricity about YY	=	20	mm.
As Per IS:456-2000, 39.3,			
0.05 times D (Limiting Value about ZZ)	=	30	mm.
0.05 times b (Limiting Value about YY)	=	11.5	mm.
Actual Eccentricity about ZZ due to Moment-ZZ	=	33.394	mm.
Actual Eccentricity about YY due to Moment-YY	=	19.232	mm.
Design Eccentricity about ZZ due to Moment-ZZ	=	33.394	mm.
Design Eccentricity about YY due to Moment-YY	=	20	mm.
As Per IS:456-2000, 39.3,			
Design Eccentricity about ZZ is more than the			
Hence, the Column has Axial Load & Bending			
Revised Design Bending Moment about ZZ	=	45.276	KN m.
<i>Design Eccentricity about YY is more than the</i>			
<i>Hence, the Column has Axial Load & Bending</i>			
Revised Design Bending Moment about YY	=	27.116	KN m.
C1 : Flexural Design Output (LC No. : 19)			

**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS
(WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT
PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD
AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND
COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTANAM NO.70&71
BLOCK NO.22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR
TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION**

Axial Load on Column	=	1355.791	KN.
Factored Axial Load	=	1355.791	KN.
Revised Design Moment about ZZ axis	=	45.276	KN m.
Revised Design Moment about YY axis	=	27.116	KN m.
The Column is subjected to Axial Load & Bi-axial			
Main Reinforcement is provided along all the			
Characteristic Comp. Strength of Concrete	=	30	N/sq.mm.
Yield Stress of Main Steel	=	500	N/sq.mm.
Min. Percentage of Reinforcement Required	=	0.8	%
Max. Percentage of Reinforcement Allowed	=	6	%
Percentage of Reinforcement Required	=	0.001	%
As Per IS:456-2000,			
the required percentage of Reinforcement is less than the Minimum value to be provided. Therefore, Reinforcement will be provided.			
Depth of Neutral Axis about ZZ-axis	=	545.4	mm.
Depth of Neutral Axis about YY-axis	=	545.4	mm.
Ultimate Axial Load, P _{uz}	=	1863.499	KN.
Ratio of P _u /P _{uz}	=	0.728	
Value of Coefficient, Alpha-n	=	1.879	
Ultimate Moment Capacity about ZZ-axis	=	99.102	KN m.
Ultimate Moment Capacity about YY-axis	=	37.982	KN m.
Ratio of Actual to Ultimate Moment, M _{ux} /M _{ux1}	=	0.457	

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS
(WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT
PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD
AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND
COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTANAM NO. T.S
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Ratio of Actual to Ultimate Moment, M_{uy}/M_{uy1}	=	0.714	
Sum of above Ratios, applied with Alpha-n	=	0.76	
Width of Column	=	230	mm.
Depth of Column	=	600	mm.
Gross Sectional Area	=	138000	sq.mm.
Percentage of Reinforcement to be Provided	=	0.8	%
Area of Longitudinal Reinforcement Required	=	1104	sq.mm.
Main Rod Size-1	=	16	mm.
No. of Rods Required	=	5.491	Nos.
No. of Rods Provided	=	6	Nos.
Corresponding Steel Area	=	1206.372	sq.mm.
Main Rod Size-2	=	20	mm.
No. of Rods Required	=	3.514	Nos.
No. of Rods Provided	=	4	Nos.
Corresponding Steel Area	=	1256.637	sq.mm.
<i>Note:- Please note that the minimum number of will be always FOUR for Rectangular Columns</i>			

<i>Columns, as per IS:456-2000 Clause 26.5.3.1.(c)</i>			
C1 : Tie Pitch Output (LC No. : 19)			
Tie Rod Size-1	=	8	mm.
Tie Rod Size-2	=	10	mm.
Main Rod Size-1	=	16	mm.
As Per IS:456-2000,			

**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS
(WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT
PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD
AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND
COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTANAM NO. T.S
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Least Lateral Dimension	=	230	mm.
16 times dia. of Main Rod	=	256	mm.
Maximum allowable value as per Code	=	300	mm.
Minimum of the above values for 16# Rods	=	225	mm.
Main Rod Size-2	=	20	mm.
As Per IS:456-2000,			
Least Lateral Dimension	=	230	mm.
16 times dia. of Main Rod	=	320	mm.
Maximum allowable value as per Code	=	300	mm.
Minimum of the above values for 20# Rods	=	225	mm.
<i>Spacing of Rods are also controlled by User-Value, User-defined Minimum and Maximum</i>			
C1 : Global Input Data (LC No. : 20)			
Column Section	=	Rectangular	
Width of Column	=	230	mm.
Depth of Column	=	600	mm.
The Effective Lengths about ZZ and YY axes were based on actual framing conditions from the 3D			
Effective Length Coeff. about ZZ axis	=	0.696	
Effective Length Coeff. about YY axis	=	0.817	
Unsupported Length-ZZ of Column	=	2.05	m.
Unsupported Length-YY of Column	=	2.5	m.
Effective Length-ZZ of Column	=	1.427	m.
Effective Length-YY of Column	=	2.041	m.
Working Axial Load on Column	=	1185.582	KN.
Working Moment about ZZ-axis at Top	=	21.831	KN m.
Working Moment about YY-axis at Top	=	-32.336	KN m.
Working Moment about ZZ-axis at Bottom	=	20.13	KN m.

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS
(WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT
PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD
AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND
COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTANAM NO. T.S
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Working Moment about YY-axis at Bottom	=	-23.027	KN m.
C1 : Slenderness & Eccentricity Output (LC No. : 20)			
Effective Length-ZZ of Column	=	1.427	m.
Effective Length-YY of Column	=	2.041	m.
Slenderness Ratio about ZZ-axis The Column is Short about the ZZ-axis.	=	8.875	
Slenderness Ratio about YY-axis The Column is Short about the YY-axis.	=	2.378	
As Per IS:456-2000, 25.4,			
Minimum Eccentricity	=	20	mm.
$L_0/500 + b/30$	=	12.667	mm.
$L_0/500 + D/30$	=	24.1	mm.
Actual Minimum Eccentricity about ZZ	=	24.1	mm.
Actual Minimum Eccentricity about YY	=	20	mm.
As Per IS:456-2000, 39.3,			
0.05 times D (Limiting Value about ZZ)	=	30	mm.
0.05 times b (Limiting Value about YY)	=	11.5	mm.
Actual Eccentricity about ZZ due to Moment-ZZ	=	18.414	mm.
Actual Eccentricity about YY due to Moment-YY	=	27.274	mm.
Design Eccentricity about ZZ due to Moment-ZZ	=	24.1	mm.
Design Eccentricity about YY due to Moment-YY	=	27.274	mm.
As Per IS:456-2000, 39.3,			
Design Eccentricity about ZZ is not more than the			
Hence, the Column carries only Axial Load about			

**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS
(WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT
PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD
AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND
COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTANAM NO. T.S
NO.70&71 BLOCK NO.22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR
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*Design Eccentricity about YY is more than the
Hence, the Column has Axial Load & Bending*

Revised Design Bending Moment about YY = 32.336 KN m.

C1 : Flexural Design Output (LC No. : 20)

Axial Load on Column = 1185.582 KN.

Factored Axial Load = 1185.582 KN.

Revised Design Moment about YY axis = 32.336 KN m.

The Column is subjected to Axial Load & Uni-axial

Main Reinforcement is provided along all the

Characteristic Comp. Strength of Concrete = 30 N/sq.mm.

Yield Stress of Main Steel = 500 N/sq.mm.

Min. Percentage of Reinforcement Required = 0.8 %

Max. Percentage of Reinforcement Allowed = 6 %

Depth of Neutral Axis = 6 mm.

Width of Column = 230 mm.

Depth of Column = 600 mm.

Gross Sectional Area = 138000 sq.mm.

Percentage of Reinforcement to be Provided = 0.8 %

Area of Longitudinal Reinforcement Required = 1104 sq.mm.

Main Rod Size-1 = 16 mm.

No. of Rods Required = 5.491 Nos.

**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS
(WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT
PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD
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NO.70&71 BLOCK NO.22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR
TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION**

No. of Rods Provided	=	6	Nos.
Corresponding Steel Area	=	1206.372	sq.mm.
Main Rod Size-2	=	20	mm.
No. of Rods Required	=	3.514	Nos.
No. of Rods Provided	=	4	Nos.
Corresponding Steel Area	=	1256.637	sq.mm.
<i>Note:- Please note that the minimum number of will be always FOUR for Rectangular Columns Columns, as per IS:456-2000 Clause 26.5.3.1.(c)</i>			
C1 : Tie Pitch Output (LC No. : 20)			
Tie Rod Size-1	=	8	mm.
Tie Rod Size-2	=	10	mm.
Main Rod Size-1	=	16	mm.
As Per IS:456-2000,			
Least Lateral Dimension	=	230	mm.
16 times dia. of Main Rod	=	256	mm.
Maximum allowable value as per Code	=	300	mm.
Minimum of the above values for 16# Rods	=	225	mm.
Main Rod Size-2	=	20	mm.
As Per IS:456-2000,			
Least Lateral Dimension	=	230	mm.
16 times dia. of Main Rod	=	320	mm.
Maximum allowable value as per Code	=	300	mm.
Minimum of the above values for 20# Rods	=	225	mm.
<i>Spacing of Rods are also controlled by User- Value, User-defined Minimum and Maximum</i>			
C1 : Global Input Data (LC No. : 21)			
Column Section	=	Rectangular	

**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS
(WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT
PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD
AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND
COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTANAM NO. T.S
NO.70&71 BLOCK NO.22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR
TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION**

Width of Column	=	230	mm.
Depth of Column	=	600	mm.

The Effective Lengths about ZZ and YY axes were based on actual framing conditions from the 3D

Effective Length Coeff. about ZZ axis	=	0.696	
Effective Length Coeff. about YY axis	=	0.817	
Unsupported Length-ZZ of Column	=	2.05	m.
Unsupported Length-YY of Column	=	2.5	m.
Effective Length-ZZ of Column	=	1.427	m.
Effective Length-YY of Column	=	2.041	m.
Working Axial Load on Column	=	1471.253	KN.
Working Moment about ZZ-axis at Top	=	336.707	KN m.
Working Moment about YY-axis at Top	=	-17.426	KN m.
Working Moment about ZZ-axis at Bottom	=	-70.189	KN m.
Working Moment about YY-axis at Bottom	=	-17.477	KN m.

C1 : Slenderness & Eccentricity Output (LC No. : 21)

Effective Length-ZZ of Column	=	1.427	m.
Effective Length-YY of Column	=	2.041	m.
Slenderness Ratio about ZZ-axis The Column is Short about the ZZ-axis.	=	8.875	
Slenderness Ratio about YY-axis The Column is Short about the YY-axis.	=	2.378	
As Per IS:456-2000, 25.4, Minimum Eccentricity	=	20	mm.

**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS
(WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT
PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD
AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND
COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTA NEW T.S
NO.70&71 BLOCK NO.22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR
TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION**

Lo/500 + b/30	=	12.667	mm.
Lo/500 + D/30	=	24.1	mm.
Actual Minimum Eccentricity about ZZ	=	24.1	mm.
Actual Minimum Eccentricity about YY	=	20	mm.
As Per IS:456-2000, 39.3,			
0.05 times D (Limiting Value about ZZ)	=	30	mm.
0.05 times b (Limiting Value about YY)	=	11.5	mm.
Actual Eccentricity about ZZ due to Moment-ZZ	=	228.857	mm.
Actual Eccentricity about YY due to Moment-YY	=	11.879	mm.
Design Eccentricity about ZZ due to Moment-ZZ	=	228.857	mm.
Design Eccentricity about YY due to Moment-YY	=	20	mm.
As Per IS:456-2000, 39.3,			
Design Eccentricity about ZZ is more than the Hence, the Column has Axial Load & Bending			
Revised Design Bending Moment about ZZ	=	336.707	KN m.
<i>Design Eccentricity about YY is more than the Hence, the Column has Axial Load & Bending</i>			
Revised Design Bending Moment about YY	=	29.425	KN m.

C1 : Flexural Design Output (LC No. : 21)			
Axial Load on Column	=	1471.253	KN.
Factored Axial Load	=	1471.253	KN.
Revised Design Moment about ZZ axis	=	336.707	KN m.
Revised Design Moment about YY axis	=	29.425	KN m.

**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS
(WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT
PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD
AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND
COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTANAM NO. T.S
NO.70&71 BLOCK NO.22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR
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The Column is subjected to Axial Load & Bi-axial

Main Reinforcement is provided along all the

Characteristic Comp. Strength of Concrete	=	30	N/sq.mm.
Yield Stress of Main Steel	=	500	N/sq.mm.
Min. Percentage of Reinforcement Required	=	0.8	%
Max. Percentage of Reinforcement Allowed	=	6	%
Depth of Neutral Axis about ZZ-axis	=	402	mm.
Depth of Neutral Axis about YY-axis	=	380.4	mm.
Ultimate Axial Load, P _{uz}	=	3439.928	KN.
Ratio of P _u /P _{uz}	=	0.428	
Value of Coefficient, Alpha-n	=	1.379	
Ultimate Moment Capacity about ZZ-axis	=	385.811	KN m.
Ultimate Moment Capacity about YY-axis	=	105.797	KN m.
Ratio of Actual to Ultimate Moment, M _{ux} /M _{ux1}	=	0.873	
Ratio of Actual to Ultimate Moment, M _{uy} /M _{uy1}	=	0.278	
Sum of above Ratios, applied with Alpha-n	=	1	
Width of Column	=	230	mm.
Depth of Column	=	600	mm.
Gross Sectional Area	=	138000	sq.mm.
Percentage of Reinforcement to be Provided	=	3.161	%
Area of Longitudinal Reinforcement Required	=	4362.18	sq.mm.
Main Rod Size-1	=	16	mm.
No. of Rods Required	=	21.696	Nos.
No. of Rods Provided	=	22	Nos.
Corresponding Steel Area	=	4423.362	sq.mm.
Main Rod Size-2	=	20	mm.

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS
(WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT
PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD
AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND
COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTANAM NO. T.S
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No. of Rods Required	=	13.885	Nos.
No. of Rods Provided	=	14	Nos.
Corresponding Steel Area	=	4398.23	sq.mm.

*Note:- Please note that the minimum number of
will be always FOUR for Rectangular Columns*

Columns, as per IS:456-2000 Clause 26.5.3.1.(c)

C1 : Tie Pitch Output (LC No. : 21)

Tie Rod Size-1	=	8	mm.
Tie Rod Size-2	=	10	mm.
Main Rod Size-1	=	16	mm.

As Per IS:456-2000,

Least Lateral Dimension	=	230	mm.
16 times dia. of Main Rod	=	256	mm.
Maximum allowable value as per Code	=	300	mm.

Minimum of the above values for 16# Rods = 225 mm.

Main Rod Size-2 = 20 mm.

As Per IS:456-2000,

Least Lateral Dimension	=	230	mm.
16 times dia. of Main Rod	=	320	mm.
Maximum allowable value as per Code	=	300	mm.

Minimum of the above values for 20# Rods = 225 mm.

*Spacing of Rods are also controlled by User-
Value, User-defined Minimum and Maximum*

**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS
(WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT
PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD
AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND
COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTANAM NO. T.S
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C1 : Global Input Data (LC No. : 22)			
Column Section	=	Rectangular	
Width of Column	=	230	mm.
Depth of Column	=	600	mm.
The Effective Lengths about ZZ and YY axes were based on actual framing conditions from the 3D			
Effective Length Coeff. about ZZ axis	=	0.696	
Effective Length Coeff. about YY axis	=	0.817	
Unsupported Length-ZZ of Column	=	2.05	m.
Unsupported Length-YY of Column	=	2.5	m.
Effective Length-ZZ of Column	=	1.427	m.
Effective Length-YY of Column	=	2.041	m.
Working Axial Load on Column	=	1030.033	KN.
Working Moment about ZZ-axis at Top	=	-282.283	KN m.
Working Moment about YY-axis at Top	=	-0.791	KN m.
Working Moment about ZZ-axis at Bottom	=	114.421	KN m.
Working Moment about YY-axis at Bottom	=	-11.267	KN m.
C1 : Slenderness & Eccentricity Output (LC No. : 22)			
Effective Length-ZZ of Column	=	1.427	m.
Effective Length-YY of Column	=	2.041	m.
Slenderness Ratio about ZZ-axis	=	8.875	
The Column is Short about the ZZ-axis.			
Slenderness Ratio about YY-axis	=	2.378	

**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS
(WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT
PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD
AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND
COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTANAM NO. T.S
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The Column is Short about the YY-axis.

As Per IS:456-2000, 25.4,

Minimum Eccentricity	=	20	mm.
$L_0/500 + b/30$	=	12.667	mm.
$L_0/500 + D/30$	=	24.1	mm.

Actual Minimum Eccentricity about ZZ	=	24.1	mm.
Actual Minimum Eccentricity about YY	=	20	mm.

As Per IS:456-2000, 39.3,

0.05 times D (Limiting Value about ZZ)	=	30	mm.
0.05 times b (Limiting Value about YY)	=	11.5	mm.

Actual Eccentricity about ZZ due to Moment-ZZ	=	274.052	mm.
Actual Eccentricity about YY due to Moment-YY	=	10.939	mm.

Design Eccentricity about ZZ due to Moment-ZZ	=	274.052	mm.
Design Eccentricity about YY due to Moment-YY	=	20	mm.

As Per IS:456-2000, 39.3,

Design Eccentricity about ZZ is more than the
Hence, the Column has Axial Load & Bending

Revised Design Bending Moment about ZZ	=	282.283	KN m.
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*Design Eccentricity about YY is more than the
Hence, the Column has Axial Load & Bending*

Revised Design Bending Moment about YY	=	20.601	KN m.
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C1 : Flexural Design Output (LC No. : 22)

Axial Load on Column	=	1030.033	KN.
Factored Axial Load	=	1030.033	KN.
Revised Design Moment about ZZ axis	=	282.283	KN m.
Revised Design Moment about YY axis	=	20.601	KN m.

The Column is subjected to Axial Load & Bi-axial

**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS
(WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT
PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD
AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND
COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTANAM NO. T.S
NO.70&71 BLOCK NO.22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR
TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION**

Main Reinforcement is provided along all the

Characteristic Comp. Strength of Concrete	=	30	N/sq.mm.
Yield Stress of Main Steel	=	500	N/sq.mm.
Min. Percentage of Reinforcement Required	=	0.8	%
Max. Percentage of Reinforcement Allowed	=	6	%
Depth of Neutral Axis about ZZ-axis	=	356.4	mm.

Depth of Neutral Axis about YY-axis	=	342	mm.
Ultimate Axial Load, P _{uz}	=	2871.216	KN.
Ratio of P _u /P _{uz}	=	0.359	
Value of Coefficient, Alpha-n	=	1.265	
Ultimate Moment Capacity about ZZ-axis	=	322.205	KN m.
Ultimate Moment Capacity about YY-axis	=	91.676	KN m.
Ratio of Actual to Ultimate Moment, M _{ux} /M _{ux1}	=	0.876	
Ratio of Actual to Ultimate Moment, M _{uy} /M _{uy1}	=	0.225	
Sum of above Ratios, applied with Alpha-n	=	0.997	
Width of Column	=	230	mm.
Depth of Column	=	600	mm.
Gross Sectional Area	=	138000	sq.mm.
Percentage of Reinforcement to be Provided	=	2.021	%
Area of Longitudinal Reinforcement Required	=	2788.98	sq.mm.
Main Rod Size-1	=	16	mm.
No. of Rods Required	=	13.871	Nos.

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS
(WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT
PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD
AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND
COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTANAM NO. T.S
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No. of Rods Provided	=	14	Nos.
Corresponding Steel Area	=	2814.867	sq.mm.
Main Rod Size-2	=	20	mm.
No. of Rods Required	=	8.878	Nos.
No. of Rods Provided	=	9	Nos.
Corresponding Steel Area	=	2827.433	sq.mm.
<i>Note:- Please note that the minimum number of will be always FOUR for Rectangular Columns Columns, as per IS:456-2000 Clause 26.5.3.1.(c)</i>			
C1 : Tie Pitch Output (LC No. : 22)			
Tie Rod Size-1	=	8	mm.
Tie Rod Size-2	=	10	mm.
Main Rod Size-1	=	16	mm.
As Per IS:456-2000,			
Least Lateral Dimension	=	230	mm.
16 times dia. of Main Rod	=	256	mm.
Maximum allowable value as per Code	=	300	mm.
Minimum of the above values for 16# Rods	=	225	mm.
Main Rod Size-2	=	20	mm.
As Per IS:456-2000,			
Least Lateral Dimension	=	230	mm.
16 times dia. of Main Rod	=	320	mm.
Maximum allowable value as per Code	=	300	mm.
Minimum of the above values for 20# Rods	=	225	mm.

**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS
(WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT
PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD
AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND
COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTANAM NO. T.S
NO.70&71 BLOCK NO.22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR
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Spacing of Rods are also controlled by User-Value, User-defined Minimum and Maximum

C1 : Global Input Data (LC No. : 23)

Column Section	=	Rectangular	
Width of Column	=	230	mm.
Depth of Column	=	600	mm.
The Effective Lengths about ZZ and YY axes were based on actual framing conditions from the 3D			
Effective Length Coeff. about ZZ axis	=	0.696	
Effective Length Coeff. about YY axis	=	0.817	
Unsupported Length-ZZ of Column	=	2.05	m.
Unsupported Length-YY of Column	=	2.5	m.
Effective Length-ZZ of Column	=	1.427	m.
Effective Length-YY of Column	=	2.041	m.
Working Axial Load on Column	=	1405.156	KN.
Working Moment about ZZ-axis at Top	=	26.606	KN m.
Working Moment about YY-axis at Top	=	35.265	KN m.
Working Moment about ZZ-axis at Bottom	=	28.147	KN m.
Working Moment about YY-axis at Bottom	=	7.856	KN m.

C1 : Slenderness & Eccentricity Output (LC No. : 23)

Effective Length-ZZ of Column	=	1.427	m.
Effective Length-YY of Column	=	2.041	m.
Slenderness Ratio about ZZ-axis	=	8.875	
The Column is Short about the ZZ-axis.			
Slenderness Ratio about YY-axis	=	2.378	
The Column is Short about the YY-axis.			
As Per IS:456-2000, 25.4,			
Minimum Eccentricity	=	20	mm.

**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS
(WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT
PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD
AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND
COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTA NEW T.S
NO.70&71 BLOCK NO.22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR
TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION**

Lo/500 + b/30	=	12.667	mm.
Lo/500 + D/30	=	24.1	mm.
Actual Minimum Eccentricity about ZZ	=	24.1	mm.
Actual Minimum Eccentricity about YY	=	20	mm.
As Per IS:456-2000, 39.3,			
0.05 times D (Limiting Value about ZZ)	=	30	mm.
0.05 times b (Limiting Value about YY)	=	11.5	mm.

Actual Eccentricity about ZZ due to Moment-ZZ	=	20.031	mm.
Actual Eccentricity about YY due to Moment-YY	=	25.097	mm.
Design Eccentricity about ZZ due to Moment-ZZ	=	24.1	mm.
Design Eccentricity about YY due to Moment-YY	=	25.097	mm.
As Per IS:456-2000, 39.3,			
Design Eccentricity about ZZ is not more than the			
Hence, the Column carries only Axial Load about			
<i>Design Eccentricity about YY is more than the</i>			
<i>Hence, the Column has Axial Load & Bending</i>			
Revised Design Bending Moment about YY	=	35.265	KN m.

C1 : Flexural Design Output (LC No. : 23)

Axial Load on Column	=	1405.156	KN.
Factored Axial Load	=	1405.156	KN.
Revised Design Moment about YY axis	=	35.265	KN m.
The Column is subjected to Axial Load & Uni-axial			
Main Reinforcement is provided along all the			

**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS
(WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT
PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD
AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND
COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTANAM NO. T.S
NO.70&71 BLOCK NO.22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR
TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION**

Characteristic Comp. Strength of Concrete	=	30	N/sq.mm.
Yield Stress of Main Steel	=	500	N/sq.mm.
Min. Percentage of Reinforcement Required	=	0.8	%
Max. Percentage of Reinforcement Allowed	=	6	%
Depth of Neutral Axis	=	6	mm.
Width of Column	=	230	mm.
Depth of Column	=	600	mm.
Gross Sectional Area	=	138000	sq.mm.
Percentage of Reinforcement to be Provided	=	0.8	%
Area of Longitudinal Reinforcement Required	=	1104	sq.mm.
Main Rod Size-1	=	16	mm.
No. of Rods Required	=	5.491	Nos.
No. of Rods Provided	=	6	Nos.
Corresponding Steel Area	=	1206.372	sq.mm.
Main Rod Size-2	=	20	mm.
No. of Rods Required	=	3.514	Nos.
No. of Rods Provided	=	4	Nos.
Corresponding Steel Area	=	1256.637	sq.mm.
<i>Note:- Please note that the minimum number of will be always FOUR for Rectangular Columns Columns, as per IS:456-2000 Clause 26.5.3.1.(c)</i>			

C1 : Tie Pitch Output (LC No. : 23)			
Tie Rod Size-1	=	8	mm.

**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS
(WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT
PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD
AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND
COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTANAM NO. T.S
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Tie Rod Size-2	=	10	mm.
Main Rod Size-1	=	16	mm.
As Per IS:456-2000,			
Least Lateral Dimension	=	230	mm.
16 times dia. of Main Rod	=	256	mm.
Maximum allowable value as per Code	=	300	mm.
Minimum of the above values for 16# Rods	=	225	mm.
Main Rod Size-2	=	20	mm.
As Per IS:456-2000,			
Least Lateral Dimension	=	230	mm.
16 times dia. of Main Rod	=	320	mm.
Maximum allowable value as per Code	=	300	mm.
Minimum of the above values for 20# Rods	=	225	mm.
<i>Spacing of Rods are also controlled by User-Value, User-defined Minimum and Maximum</i>			
C1 : Global Input Data (LC No. : 24)			
Column Section	=	Rectangular	
Width of Column	=	230	mm.
Depth of Column	=	600	mm.
The Effective Lengths about ZZ and YY axes were based on actual framing conditions from the 3D			
Effective Length Coeff. about ZZ axis	=	0.696	
Effective Length Coeff. about YY axis	=	0.817	
Unsupported Length-ZZ of Column	=	2.05	m.
Unsupported Length-YY of Column	=	2.5	m.
Effective Length-ZZ of Column	=	1.427	m.
Effective Length-YY of Column	=	2.041	m.

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS
(WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT
PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD
AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND
COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTANAM NO. T.S
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TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION

Working Axial Load on Column	=	1096.131	KN.
Working Moment about ZZ-axis at Top	=	27.818	KN m.
Working Moment about YY-axis at Top	=	-53.482	KN m.
Working Moment about ZZ-axis at Bottom	=	16.086	KN m.
Working Moment about YY-axis at Bottom	=	-36.6	KN m.
C1 : Slenderness & Eccentricity Output (LC No. : 24)			
Effective Length-ZZ of Column	=	1.427	m.
Effective Length-YY of Column	=	2.041	m.

Slenderness Ratio about ZZ-axis	=	8.875	
The Column is Short about the ZZ-axis.			
Slenderness Ratio about YY-axis	=	2.378	
The Column is Short about the YY-axis.			
As Per IS:456-2000, 25.4,			
Minimum Eccentricity	=	20	mm.
$L_o/500 + b/30$	=	12.667	mm.
$L_o/500 + D/30$	=	24.1	mm.
Actual Minimum Eccentricity about ZZ	=	24.1	mm.
Actual Minimum Eccentricity about YY	=	20	mm.
As Per IS:456-2000, 39.3,			
0.05 times D (Limiting Value about ZZ)	=	30	mm.
0.05 times b (Limiting Value about YY)	=	11.5	mm.
Actual Eccentricity about ZZ due to Moment-ZZ	=	25.379	mm.
Actual Eccentricity about YY due to Moment-YY	=	48.792	mm.
Design Eccentricity about ZZ due to Moment-ZZ	=	25.379	mm.
Design Eccentricity about YY due to Moment-YY	=	48.792	mm.

**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS
(WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT
PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD
AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND
COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTANAM NO. T.S
NO.70&71 BLOCK NO.22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR
TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION**

As Per IS:456-2000, 39.3,

Design Eccentricity about ZZ is not more than the
Hence, the Column carries only Axial Load about

*Design Eccentricity about YY is more than the
Hence, the Column has Axial Load & Bending*

Revised Design Bending Moment about YY = 53.482 KN m.

C1 : Flexural Design Output (LC No. : 24)

Axial Load on Column = 1096.131 KN.

Factored Axial Load = 1096.131 KN.

Revised Design Moment about YY axis = 53.482 KN m.

The Column is subjected to Axial Load & Uni-axial

Main Reinforcement is provided along all the

Characteristic Comp. Strength of Concrete = 30 N/sq.mm.

Yield Stress of Main Steel = 500 N/sq.mm.

Min. Percentage of Reinforcement Required = 0.8 %

Max. Percentage of Reinforcement Allowed = 6 %

Depth of Neutral Axis = 6 mm.

Width of Column = 230 mm.

Depth of Column = 600 mm.

Gross Sectional Area = 138000 sq.mm.

Percentage of Reinforcement to be Provided = 0.8 %

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
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Area of Longitudinal Reinforcement Required	=	1104	sq.mm.
Main Rod Size-1	=	16	mm.
No. of Rods Required	=	5.491	Nos.
No. of Rods Provided	=	6	Nos.
Corresponding Steel Area	=	1206.372	sq.mm.
Main Rod Size-2	=	20	mm.
No. of Rods Required	=	3.514	Nos.
No. of Rods Provided	=	4	Nos.
Corresponding Steel Area	=	1256.637	sq.mm.

*Note:- Please note that the minimum number of
 will be always FOUR for Rectangular Columns
 Columns, as per IS:456-2000 Clause 26.5.3.1.(c)*

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
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SCADDS/RC-Slab Designer 2022 [Release: 4.01 2018.1]
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SCADDS/Nucleus 2022: RC-Slab Designer
Limit State Design of R.C.C. One Way/Two Way
Rectangular/Square Slabs & Trapezoidal/Triangular Slabs
and Circular/Hexagonal/Octagonal Slabs
with Simple/Fixed/Continuous/Cantilever Supports
as per IS:456-2000 upto Amendment 5 (Reaffirmed 2021)
and IS:875-1987(Part-2)

INTRODUCTION

This Report contains detailed design solutions for

The R.C.C. Slabs are considered for Flexural
the output contains the following portions:

1. Global Input Data
2. Flexural Design Output
3. Shear Check Output
4. Deflection Check Output
5. Development Length / Bond Design Output

While detailed design is carried out for Flexure,
only checks are made for items 3 and 4.

GLOBAL MATERIAL DATA

**STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS
(WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT
PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD
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Concrete Clear Cover	=	20	mm.
Char. Comp. Strength of Concrete	=	25	N/sq.mm.
Density of Concrete	=	24.517	KN/cu.m.
Yield Strength of Main Steel	=	550	N/sq.mm.
Main Rod Size-0	=	8	mm.
Main Rod Size-1	=	10	mm.
Yield Strength of Secondary Steel	=	550	N/sq.mm.
Secondary Rod Size-0	=	8	mm.
Secondary Rod Size-1	=	10	mm.
Yield Strength of Torsion Steel	=	550	N/sq.mm.
Torsion Rod Size-0	=	8	mm.
Torsion Rod Size-1	=	10	mm.
Factor of Safety for Load	=	1.5	
Partial Safety Factor for Concrete	=	1.5	

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS (WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTANAM NO.70&71 BLOCK NO.22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION

Partial Safety Factor for Steel	=	1.15	
Max. Strain in Concrete	=	0.0035	mm./mm.
Max. Strain in Steel	=	0.0055	mm./mm.
Young's Modulus of Concrete	=	22360.68	N/sq.mm.
Young's Modulus of Steel	=	200000	N/sq.mm.
Total Number of Slab Panels	=	1	

BOND / DEVELOPMENT LENGTH OUTPUT			
Char. Comp. Strength of Concrete	=	25	N/sq.mm.
Yield Stress of Main Steel	=	550	N/sq.mm.
Yield Stress of Secondary Steel	=	550	N/sq.mm.
As Per IS:456-2000, Clause 26.2.1.1,			
Design Bond Stress for Main Rods	=	2.24	N/sq.mm.
Design Bond Stress for Secondary Rods	=	2.24	N/sq.mm.
<u>Rods in Tension</u>			
Main Rod Diameter-1	=	8	mm.
Corresponding Development Length	=	427.232	mm.
Main Rod Diameter-2	=	10	mm.
Corresponding Development Length	=	534.04	mm.
Secondary Rod Diameter-1	=	8	mm.
Corresponding Development Length	=	427.232	mm.
Secondary Rod Diameter-2	=	10	mm.
Corresponding Development Length	=	534.04	mm.

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
 STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS
 (WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT
 PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD
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S001 - PANEL INPUT			
Slab Number	=	S001	
Slab Shape	=	Rectangular	
Centre to Centre Short Span	=	1.22	m.
Centre to Centre Long Span	=	6.15	m.
Effective Short Span	=	0.99	m.
Support Type : Continuous Supports It is a One way Slab.			
Initial Thickness of Slab	=	125	mm.
Type of Building is "Residential Building"			

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS (WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTANAM NO.70&71 BLOCK NO.22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION

Type of Floor is "All Rooms and Kitchens"			
Live Load	=	2	KN/sq.m.
Floor Finish Load	=	1	KN/sq.m.
Partition Load	=	1	KN/sq.m.
Miscellaneous Load	=	NIL	
S001 - FLEXURE OUTPUT			
Slab Identification Number	=	S001	
Effective Short Span	=	0.99	m.
Effective Long Span	=	5.995	m.
Long Span to Short Span Ratio	=	6.056	
It is a One way Slab.			
Thickness of Slab Provided	=	125	mm.
Concrete Clear Cover	=	20	mm.
Density of Reinforced Concrete	=	24.517	KN/cu.m.
Dead Weight of Slab	=	2.819	KN/sq.m.
<u>Loads on the Slab Panel</u>			
Live Load	=	2	KN/sq.m.
Floor Finish Load	=	1	KN/sq.m.
Partition Load	=	1	KN/sq.m.
Miscellaneous Load	=	NIL	
Total Dead Load on Slab Panel	=	4.819	KN/sq.m.
Total Load on Slab Panel	=	6.819	KN/sq.m.

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS (WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTA NEW T.S NO.70&71 BLOCK NO.22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION

Safety Factor for Load	=	1.5	
Total Factored Load on Slab Panel	=	10.229	KN/sq.m.
Effective Depth Required	=	18.068	mm.
Effective Depth Provided	=	90	mm.
Hence SAFE.			
<u>Short Span Reinforcement over Centre</u>			
Short Span Positive Moment	=	0.884	KN m.
Short Span Positive Steel	=	108	sq.mm.
Dia. of Rod-1 along Short Span	=	8	mm.
Required Spacing along Short Span (+)	=	465.421	mm.
Max. Spacing allowed (Rounded off) (+)	=	275	mm.
Dia. of Rod-2 along Short Span	=	10	mm.
Required Spacing along Short Span (+)	=	727.221	mm.

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS
(WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT
PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD
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TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION

Max. Spacing allowed (Rounded off) (+)	=	275	mm.
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Short Span Reinforcement over Support

Short Span Negative Moment	=	1.035	KN m.
Short Span Negative Steel	=	108	sq.mm.
Dia. of Rod-1 along Short Span	=	8	mm.
Required Spacing along Short Span (-)	=	465.421	mm.
Max. Spacing allowed (Rounded off) (-)	=	275	mm.
Dia. of Rod-2 along Short Span	=	10	mm.
Required Spacing along Short Span (-)	=	727.221	mm.
Max. Spacing allowed (Rounded off) (-)	=	275	mm.

Distribution Reinforcement

Distribution Steel Percentage	=	0.12	%
Long Span Distribution Steel	=	138	sq.mm.
Spacing of Rod-1 along Long Span (+)	=	364.243	mm.
Max. Spacing allowed (Rounded off) (+)	=	300	mm.
Spacing of Rod-2 along Long Span (+)	=	569.129	mm.
Max. Spacing allowed (Rounded off) (+)	=	300	mm.

Note:- The required Spacing of Main Rods will be 300 mm. (11.811") or 3d whichever is less. If the this limit, the least value will be automatically This is done in accordance with IS:456-2000

Similarly, the required Spacing of Dist. Rods will 300 mm. (11.811") or 5d whichever is less. If the this limit, the least value will be automatically This is done in accordance with IS:456-2000

If the User has fixed Minimum and Maximum

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
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 NO.70&71 BLOCK NO.22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR
 TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION

*practical considerations, those values will be
 and implemented in the Drawings and Quantity*

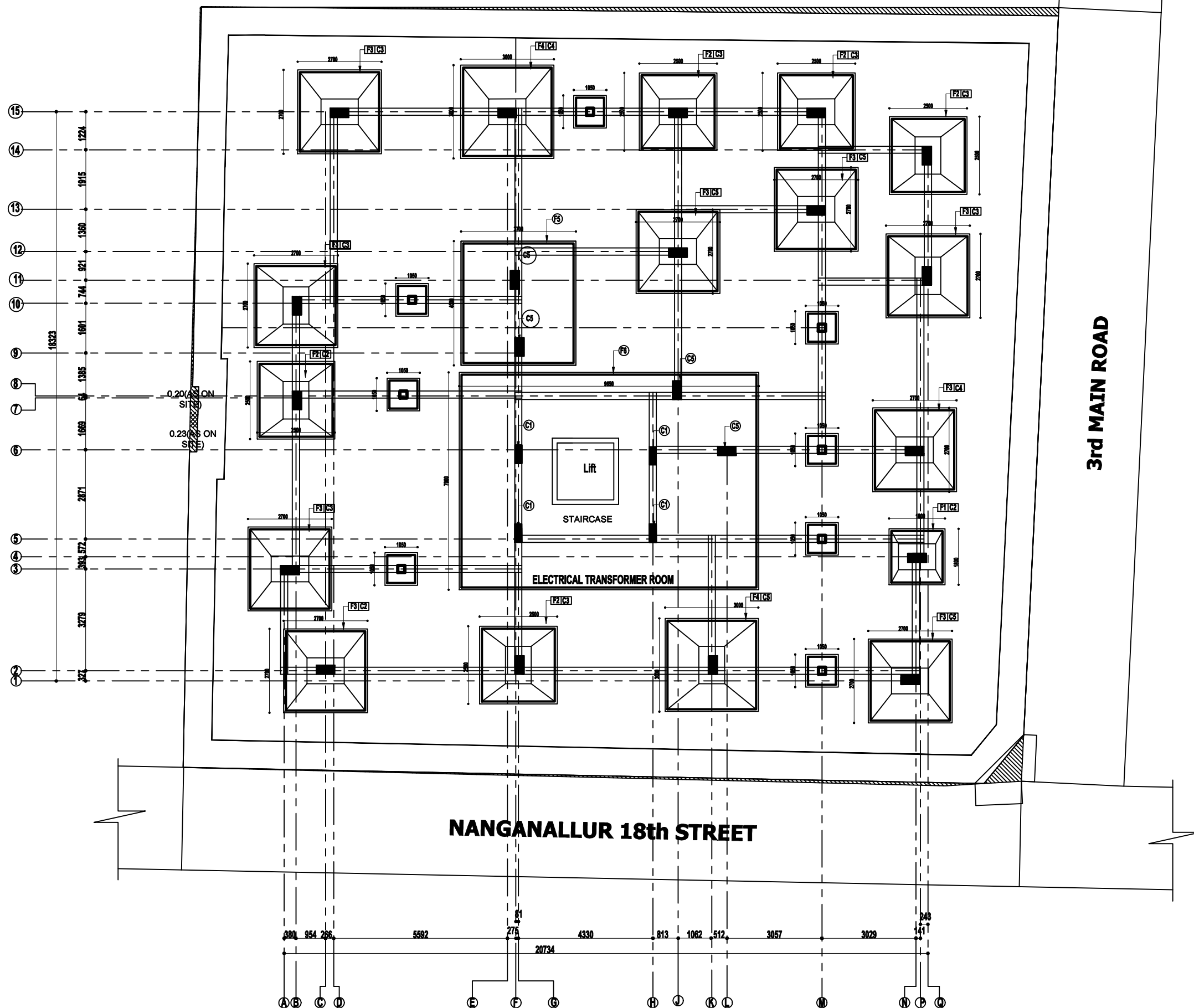
S001 - SHEAR CHECK

Effective Short Span	=	0.99	m.
Effective Long Span	=	5.995	m.
Total Factored Load per Unit Length	=	10.229	KN/m.
Shear Coeff. for Continuous Edge-X	=	0.6	
Corresponding Design Shear	=	6.076	KN.
Shear Coeff. for Discontinuous Edge-X	=	0	
Corresponding Design Shear	=	0	KN.
Shear Coeff. for Continuous Edge-Y	=	0.6	
Corresponding Design Shear	=	6.076	KN.

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS (WITH HEIGHT 18.3M) AVAILING PREMIUM FSI WITH TOD BENEFIT AT PLOT NO.31&32, OLD DOOR NO.02, NEW DOOR NO.03, 18TH MAIN ROAD AND 3 RD MAIN ROAD, NCBS COLONY, NANGANALLUR, CHENNAI-600061 AND COMPRISED IN OLD S.NO.21/3A, (PART), AS PER PATTANAM NO.70&71 BLOCK NO.22, WARD-B OF NANGANALLUR VILLAGE, ALANDUR TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION

Shear Coeff. for Discontinuous Edge-Y	=	0	
Corresponding Design Shear	=	0	KN.
Maximum Design Shear	=	6.076	KN.
As Per IS:456-2000, Clause			
Actual Shear Stress	=	0.068	N/sq.mm.
As Per IS:456-2000, Clause 40.2.1.1 & Table			
Design Shear Strength of Concrete	=	0.342	N/sq.mm.
As Per IS:456-2000, Table 20,			
Max. Permissible Shear Stress	=	3.124	N/sq.mm.
It can be seen that $0.068 < 0.342$ and $0.068 <$			
The Slab Panel is SAFE in Shear.			
S001 - DEFLECTION CHECK			
Effective Short Span	=	0.99	m.
Effective Depth of Slab	=	90	mm.
Actual Span to Depth Ratio	=	11	
As Per IS:456-2000, Clause			
Factor Alpha	=	26	
As Per IS:456-2000, Clause 23.2.1.b,			
Factor Zigma	=	1	
As Per IS:456-2000, Clause			
Factor Gamma	=	1.478	
Allowable Span to Depth Ratio	=	38.424	> 11
Deflection Requirements are O.K.			

STABILITY CALCULATIONS FOR THE PROPOSED CONSTRUCTION OF
STILT +5 FLOORS RESIDENTIAL BUILDING WITH 16 DWELLING UNITS
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TALUK AND WITHIN THE LIMITS OF GREATER CHENNAI CORPORATION



FOUNDATION LAYOUT.

PROJECT:
PLAN SHOWING THE PROPOSED CONSTRUCTION OF STILT FLOOR + 5 FLOORS
RESIDENTIAL BUILDING WITH 16 DWELLING UNITS (WITH HEIGHT 18.30M)
AVAILING PREMIUM FSI WITH TOD BENEFIT AT PLOT NO. 31 & 32, OLD DOOR
NO. 02, NEW DOOR NO. 03, 18TH MAIN ROAD AND 3RD MAIN ROAD, NCBS COLONY,
NANGANALLUR, CHENNAI 600061 AND COMPRISED IN OLD S.NO. 21/3A (Part),
AS PER PATTI NEW T.S. NO. 70 & 71, BLOCK NO. 22, WARD-8 OF NANGANALLUR
VILLAGE, ALANDUR TALUK AND WITHIN THE LIMITS OF
GREATER CHENNAI CORPORATION.

- NOTES:**
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS
OTHER WISE SPECIFIED
 2. M30 GRADE OF CONCRETE FOR COLUMNS AND FE 500 GRADE WITH MCC 320KG/ CUM BY DESIGN MIX
CONFORMING TO IS 456-2000 & IS 10262-1982 UNLESS OTHER WISE SPECIFIED.
 3. CLEAR COVER TO MAIN STEEL SHALL BE
25MM FOR BEAMS
40MM FOR COLUMNS
50MM FOR FOOTINGS
15MM FOR SLABS/SUNSHADES
 4. FOUNDATION IS DESIGNED FOR STILT+5 FLOOR ONLY.
 5. SBC CONSIDERED AT 2.5M BELOW EXG. GL IS 300KNSQ.M AS PER SOIL REPORT
 6. BUILDING IS DESIGNED FOR SEISMIC WIND LOAD ONLY.
 7. 'Y' DENOTES TOR 40 STEEL CONFORMING TO IS 1786-1985.
 8. 'R' DENOTES MILD STEEL CONFORMING TO IS 432-1982.
 9. FORM WORK TO BE REMOVED FOR SPANS
UPTO 0M - 3M 7 DAYS
3M - 4.5M 14 DAYS
4.5M - 6M 21 DAYS
 10. AVOID CLAY SOIL FILLING IN BASEMENT.
 11. USE 1:1:2 MIX FOR STARTERS
 12. USE OPC FOR ALL CONCRETE WORKS.
 13. LAP LENGTH SHALL BE 47 TIMES THE DIA OF BAR.
 14. ALL COLUMN RODS TO BE STAGGERED
 15. NO DIMENSION SHOULD BE SCALED OFF FROM THE DRG.
ONLY WRITTEN DIMENSION SHOULD BE FOLLOWED.
 16. USE CHAIR RODS FOR TOP REINFORCEMENT
 17. CANTILEVER PROPS SHOULD NOT BE RELEASED UNTIL
ROOF IS CONCRETED.
 18. ALL FOOTING RODS BENT 6" UP.
 19. ALL BEAM TOP RODS SHALL BE PROPERLY
IN COLUMNS

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R.NO.	REVISION	DATE	SIGN
1.			
2.			
3.			

PROJECT NO:	
DRG TITLE:	FOUNDATION LAYOUT
STRUCTURAL DRAWING	
DRG.NO : SD-01 ONLY.	
SCALE : 1"=4'-0" & 1"=2'-0"	
DATE : 13.4.2025	
SHEET SIZE : A1	1/1
DRAWN BY : K.Uma	

CAD FILE: EISHANKAR/2025/ANIRUDH FOUNDATION/RIKS/FDN
GOOD FOR CONSTRUCTION



**AANIRUDH
FOUNDATION PVT LTD**

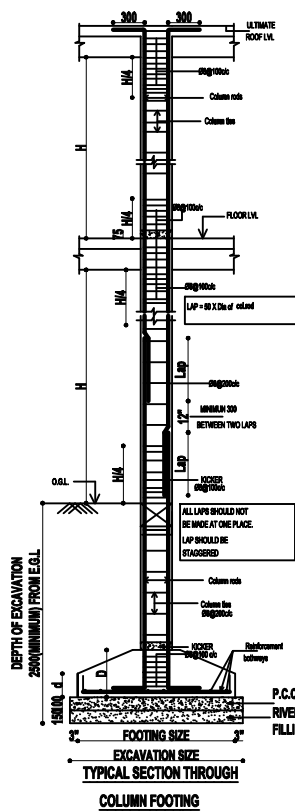
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E-mail : engg@aanirudhflatpromoters.in
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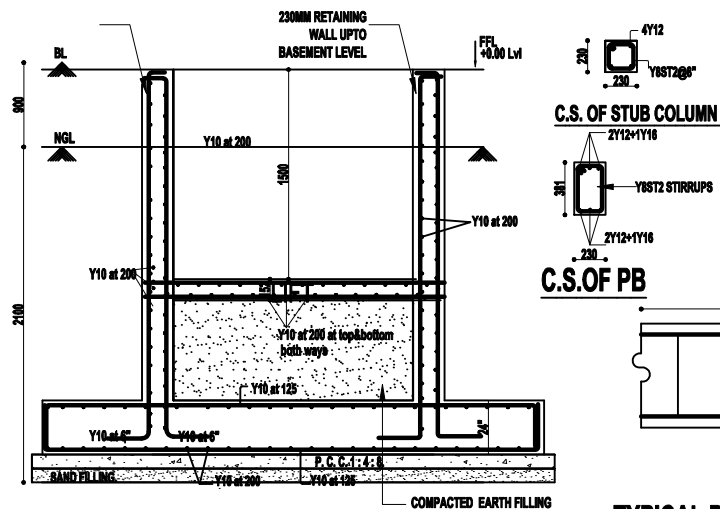
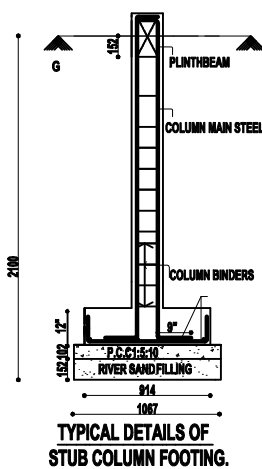
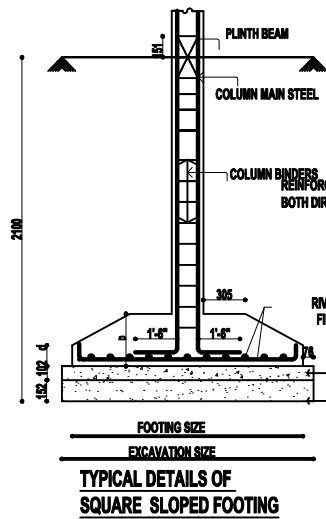
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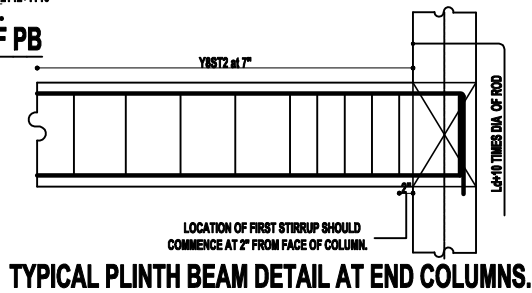
SNO	COLUMN REFERENCE	SIZE	COLUMN SHAPE	MAINSTEEL	BINDERS	BINDERS	TIE DETAILS
01.	C1	230X610		10Y20	-REFER - -SECTION-	M ₃₀	
02.	C2	300X610		10Y20	-REFER - -SECTION-	M ₃₀	
03.	C3	300X610		10Y25	-REFER - -SECTION-	M ₃₀	
04.	C4	300X610		10Y25	-REFER - -SECTION-	M ₃₀	
05.	C5	300X610		12Y25	-REFER - -SECTION-	M ₃₀	



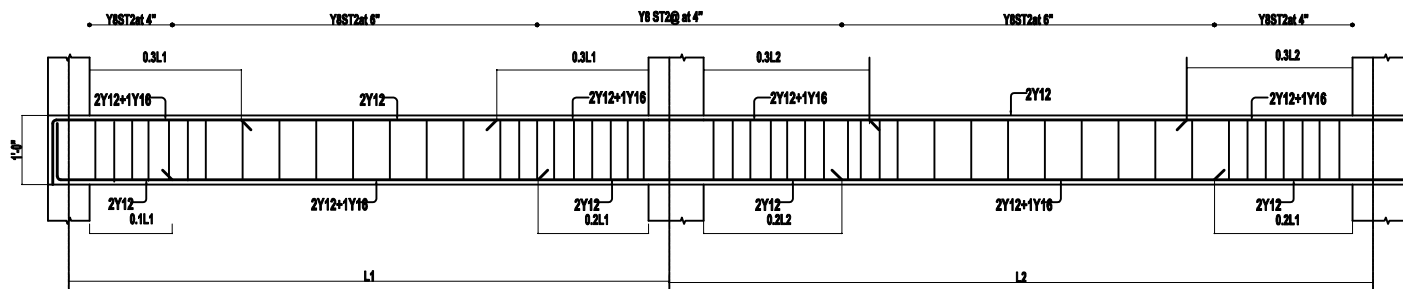
SLNO	FOOT.REF	EX.SIZE	FOOTING SIZE	DEPTH		REINFT		MIX
				d	D	SH.DR	LO.DR	
1	F1	1800X1800	1650X1650	200	600	Y12 at 150	Y12 at 150	M 25
2	F2	2500X2500	2350X2350	200	650	Y12 at 150	Y12 at 150	M 25
3	F3	2700X2700	2550X2550	200	700	Y12 at 150	Y12 at 150	M 25
4	F4	3000X3000	2850X2850	200	750	Y12 at 150	Y12 at 150	M 25
5	F5	3700X4000	3550X3850	—	750	Y12 at 150	Y12 at 150	M 25
6	F6	9650X7000	9550X6850	—	850	Y12 at 150 AT TOP&BOT	Y12 at 150 AT TOP&BOT	M 25



TYPICAL LIFT PIT/SHEAR WALL DETAILS. '
(WATER PROOFING TO BE DONE ON BOTH POSITIVE AND NEGATIVE SIDES.)



TYPICAL PLINTH BEAM DETAIL AT END COLUMNS.



TYP.DETAIL OF CONTINUOUS PLINTH BEAM PB

**PLAN SHOWING THE PROPOSED CONSTRUCTION OF STILT FLOOR + 5 FLOORS
RESIDENTIAL BUILDING WITH 16 DWELLING UNITS (WITH HEIGHT 18.30M)
AVAILING PREMIUM FSI WITH TOD BENEFIT AT PLOT NO. 31 & 32, OLD DOOR
NO. 02, NEW DOOR NO. 03, 18TH MAIN ROAD AND 3RD MAIN ROAD, NCBS COLONY,
NANGANALLUR, CHENNAI 600061 AND COMPRISED IN OLD S.NO. 21/3A (Part),
AS PER PATTA NEW T.S. NO. 70 & 71, BLOCK NO. 22, WARD-B OF NANGANALLUR
VILLAGE, ALANDUR TALUK AND WITHIN THE LIMITS OF
GREATER CHENNAI CORPORATION.**

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED
2. M30 GRADE OF CONCRETE FOR COLUMNS AND FE 500 GRADE WITH MCC 320/KG/ CU.M BY DESIGN MIX CONFIRMING TO IS 456-2000 & IS 10262-1982 UNLESS OTHERWISE SPECIFIED.
3. CLEAR COVER TO MAIN STEEL SHALL BE
25MM FOR BEAMS
40MM FOR COLUMNS.
50MM FOR FOOTINGS,
15MM FOR SLABS & SUNSHADES
4. FOUNDATION IS DESIGNED FOR STILT+5 FLOOR ONLY.
5. SBC CONSIDERED AT 2.50M BELOW EXG. GL IS 300KN/SQ.M AS PER SOIL REPORT
6. BUILDING IS DESIGNED FOR SEISMIC+WIND LOAD ONLY.
7. Y DENOTES TOR 40 STEEL CONFIRMING TO IS 1786-1985.
8. 'R' DENOTES MILD STEEL CONFIRMING TO IS 432-1982.
9. FORM WORK TO BE REMOVED FOR SPANS
UP TO 0M—3M 7DAYS
3M—4.5M 14DAYS
4.5M—6M 21DAYS
10. AVOID CLAY SOIL FILLING IN BASEMENT.
11. USE 1;1;2 MIX FOR STARTERS
12. USE OPC FOR ALL CONCRETE WORKS.
13. LAP LENGTH SHALL BE 47 TIMES DIA OF BAR.
14. ALL COLUMN RODS TO BE STAGGERED
15. NO DIMENSION SHOULD BE SCALED OFF FROM THE DRG.
ONLY WRITTEN DIMENSION SHOULD BE FOLLOWED.
16. USE CHAIR RODS FOR TOP REINFORCEMENT
17. CANTILEVER PROPS SHOULD NOT BE RELEASED UNTIL ROOF IS COMPLETED.
18. ALL FOOTING RODS BENT 6° UP.
19. ALL BEAM TOP RODS SHALL BE PROPERLY IN COLUMNS

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ELEVATION LEVELS ARE FINISHED FLOOR LEVEL.

STRUCTURAL ENGINEER RESPONSIBILITY IS LIMITED TO DESIGN & ISSUAL OF STRUCTURAL DRAWING ONLY

ONUS OF CONSTRUCTION LIES WITH CONTRACTOR/OWNER

R.NO.	REVISION	DATE	SIGN
1.			
2.			
3.			

DRG TITLE:

COLUMN&FOOTING DETAILS

STRUCTURAL DRAWING

DRG.NO : SD-01 ONLY.

SCALE : 1"=4'-0" & 1"=2'-0"

DATE : 13.4.2025

SHEET SIZE : A₁

DRAWN BY : K.Uma

CAD FILE: E:\SHANKAR\2025ANIRUDH FOUNDATION\RKS\FDN

GOOD FOR CONSTRUCTION



**AANIRUDH
FOUNDATION PVT LTD**

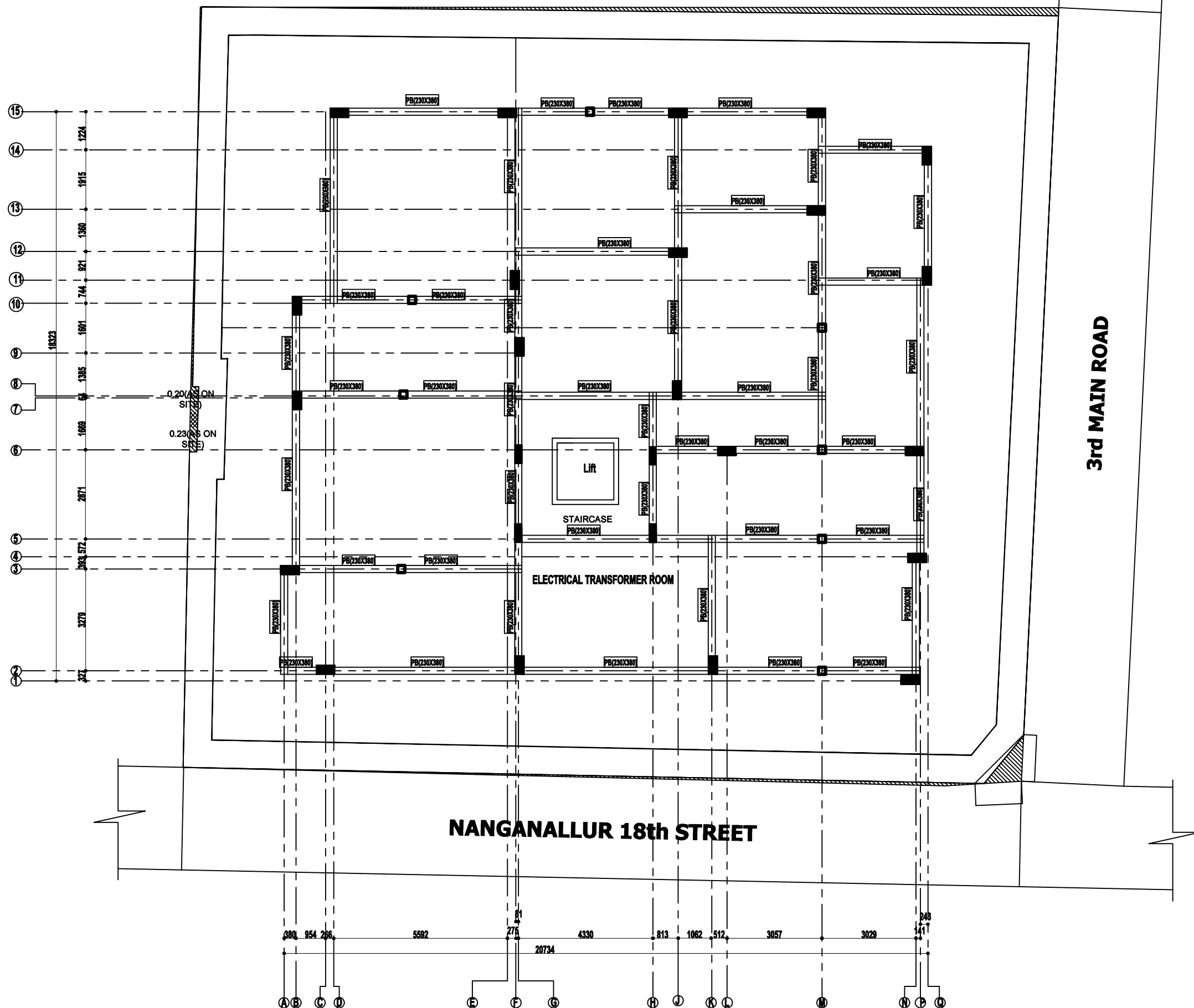
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PLINTH BEAM LAYOUT.

PROJECT:
PLAN SHOWING THE PROPOSED CONSTRUCTION OF STILT FLOOR + 5 FLOORS
RESIDENTIAL BUILDING WITH 16 DWELLING UNITS (WITH HEIGHT 18.30M)
AVAILING PREMIUM FSI WITH TOD BENEFIT AT PLOT NO. 31 & 32, OLD DOOR
NO. 02, NEW DOOR NO. 03, 18TH MAIN ROAD AND 3RD MAIN ROAD, NCBS COLONY,
NANGANALLUR, CHENNAI 600061 AND COMPRISED IN OLD S.NO. 21/3A (Part),
AS PER PATTI NEW T.S. NO. 70 & 71, BLOCK NO. 22, WARD-8 OF NANGANALLUR
VILLAGE, ALANDUR TALUK AND WITHIN THE LIMITS OF
GREATER CHENNAI CORPORATION.

- NOTES:**
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS
OTHER WISE SPECIFIED
 2. M30 GRADE OF CONCRETE FOR COLUMNS AND FE 500 GRADE WITH MCC 320KG/ CUM BY DESIGN MIX
CONFORMING TO IS 456-2000 & IS 10262-1982 UNLESS OTHER WISE SPECIFIED.
 3. CLEAR COVER TO MAIN STEEL SHALL BE
25MM FOR BEAMS
40MM FOR COLUMNS
50MM FOR FOOTINGS,
15MM FOR SLABS/SUNSHADES
 4. FOUNDATION IS DESIGNED FOR STILT+5 FLOOR ONLY.
 5. SBC CONSIDERED AT 2.5M BELOW EX. GL IS 300KN/SQ.M AS PER SOIL REPORT
 6. BUILDING IS DESIGNED FOR SEISMIC WIND LOAD ONLY.
 7. Y DENOTES TOR 40 STEEL CONFORMING TO IS 1786-1985.
 8. 'R' DENOTES MILD STEEL CONFORMING TO IS 432-1982.
 9. FORM WORK TO BE REMOVED FOR SPANS
UPTO 0M - 3M 7 DAYS
3M - 4.5M 14 DAYS
4.5M - 8M 21 DAYS
 10. AVOID CLAY SOIL FILLING IN BASEMENT.
 11. USE 1:1:2 MIX FOR STARTERS
 12. USE OPC FOR ALL CONCRETE WORKS.
 13. LAP LENGTH SHALL BE 47 TIMES THE DIA OF BAR.
 14. ALL COLUMN RODS TO BE STAGGERED
 15. NO DIMENSION SHOULD BE SCALED OFF FROM THE DRG.
ONLY WRITTEN DIMENSION SHOULD BE FOLLOWED.
 16. USE CHAIR RODS FOR TOP REINFORCEMENT
 17. CANTILEVER PROPS SHOULD NOT BE RELEASED UNTIL
ROOF IS CONCRETED.
 18. ALL FOOTING RODS BENT 6"UP.
 19. ALL BEAM TOP RODS SHALL BE PROPERLY
IN COLUMNS

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OF STRUCTURAL DRAWING ONLY
- ONUS OF CONSTRUCTION LIES WITH CONTRACTOR/OWNER

R.NO.	REVISION	DATE	SIGN
1.			
2.			
3.			

PROJECT NO:	
DRG TITLE:	PLINTH BEAM LAYOUT
STRUCTURAL DRAWING	
DRG.NO : SD-01 ONLY.	
SCALE : 1"=4'-0" & 1"=2'-0"	
DATE : 13.4.2025	
SHEET SIZE : A1	1/1
DRAWN BY : K.Uma	

CAD FILE: EISHANKAR/2025/ANIRUDH FOUNDATION/RIKS/FDM
GOOD FOR CONSTRUCTION



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