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DIGITALLY VERIFIED RECORD

STABILITY CALCULATIONS FOR AVITTAM THIRUNAVUKKARASAR FOR THE PROPOSED CONSTRUCTION OF STILT+5 FLOORS(HEIGHT 18.3M) RESIDENTIAL BUILDING WITH 65 DWELLING FOR AFFORDABLE HOUSING ATDARKAST ROAD(KISHKINDA MAIN ROAD),KANNADAPALAYAM BAJANAI KOIL STREET,WEST TAMBARAM,CHENNAI-600045 COMPRISED IN OLD S.NOS268/2,268/3&268/4&TS NOS.106/2,107/4,107/5,108/4,&108/5 BLOCK NO.21,WARD NO.C OF TAMBARAM VILLAGE,TAMBARAM TALUK WITH IN THE LIMITS OF TAMBARAM MUNICIPALCORPORATION

Design Data Report :

Footing Data:

Soil Parameters :

SBC of soil	=250.00 kN/m²
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 safty	= 1.400
Depth From Ground	= 2500 mm

Material Properties :

fck	= 25.00 N/mm²
fy	= 500.00 N/mm²

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
Minimum Footing Depth	= 150 mm
Top Offset	= 50 mm
Bottom PCCOffset	= 150 mm
Bottom PCCDepth	= 150 mm
Pedestal Offset	= 150 mm
Pedestal Depth	= 150 mm
Size RoundingFactor	= 25 mm
Depth RoundingFactor	= 25 mm
Number of Steps	= 1
Minimum Step Depth	= 150 mm

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Column Data:

Material Properties :

fck	= 25.00 N/mm²
fy	= 500.00 N/mm²
fy - Stirrups	= 500.00 N/mm²

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

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.

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Reinforcement Details :

Steel Ratio(AstX/AstY)	= 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.

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Material Properties :

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

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 Trapizoidal Slab	= Average of two parellel sides
Maximum Dimension to be used for General Slab	= Maximum of two parellel sides

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Beam Data:

Shear Design Data :

Minimun 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
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 calcultaed at c/c distance of the beam span for design

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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

Part1	**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/-I2024/4/0037**	
6	Use of the building	**RESIDENTIAL**	
7	Number of stories above ground level (including storeys to be added later, if any)	**STILT+5FLOORS**	
8	Number of basements below ground level	**NIL**	
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 250KN/SQ.M**	IS:1893 C1.6.3.5.2 IS: 1904 IS: 1892 IS: 2131 IS: 2720

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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 Floor loads Roof loads	**4KN/SQM** **1.5KN/SQM**	IS: 875 Part 2

13	Cyclone/Wind • Speed • Design pressure intensity	**N/A**	IS: 875 Part 3
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 Bldg.	II	III	IV	V
Ordinary	B	C	D	E
Important	C	D	E	E

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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**			
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 $(b_1+b_2+b_3)/l_1$ or $(b_6+b_7)/l_2$ • Minimum pier width between consequent opening (b_4) • Vertical distance (h_3) • 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 openings **N/A**	⟩ ⟩	⟩ ⟩	⟩ ⟩	IS: 4326 C1 8.4.8. IS: 4326 C1 8.4.9
9	Integration of prefab roofing/flooring elements through reinforced concrete screed. **N/A**	⟩	⟩	⟩	IS:4326 C1 9.1.4

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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**
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**	

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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

	• 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 if 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 SESIMIC 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
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

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

Foundation

i. In case raft foundation has been adopted, indicate K value used for analysis ofthe raft.

ii. Incase pile foundations have been used, give full particulars of the piles, type, dia, length, capacity

iii. 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

i. 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

ii. Indicate the idealization of frames and shear walls adopted in the analysis with the help of sketches.

iii. Submit framing plans of each floor

iv. In case of basements, indicate the system used to contain earth pressures.

Part 4	**Buildings in structural steel**		
1	Adopted method of design	o Simple o Semi-rigid o 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
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

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12	Minimum Fire rating proposed, with method	o Rating..... hours o Method proposed. -In tumescent painting -Spraying -Quilting -Fire retardant boarding	IS: 1641, 1642, 1643

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SCADDS/RC-Footing Designer 2022 [Release: 4.01.3010]

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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 given Reinforced Concrete Footing Design problem.

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

1. Footing Input
2. Flexural Design Output for Footing
3. Flexural Design Output for Pedestal, if provided
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 Flexure and Bond, only checks for stresses are made for Shear.

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.

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STABILITY CALCULATIONS FOR AVITTAM THIRUNAVUKKARASAR FOR THE PROPOSED CONSTRUCTION OF STILT+5 FLOORS(HEIGHT 18.3M) RESIDENTIAL BUILDING WITH 65 DWELLING FOR AFFORDABLE HOUSING ATDARKAST ROAD(KISHKINDA MAIN ROAD),KANNADAPALAYAM BAJANAI KOIL STREET,WEST TAMBARAM,CHENNAI-600045 COMPRISED IN OLD S.NOS268/2,268/3&268/4&TS NOS.106/2,107/4,107/5,108/4,&108/5 BLOCK NO.21,WARD NO.C OF TAMBARAM VILLAGE,TAMBARAM TALUK WITH IN THE LIMITS OF TAMBARAM MUNICIPALCORPORATION

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			
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. : 9)

The footing is to be designed as an Isolated Footing.

Width of Column	=	230	mm.
Length of Column	=	450	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 Bending.

Working Axial Load	=	452.228	KN.
Working Moment about ZZ-axis	=	0.283	KN m.
Working Moment about XX-axis	=	0.639	KN m.
Safe Bearing Capacity of Soil	=	250	KN/sq.m.
Factor of Safety for Safe Bearing Capacity	=	1.5	

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F01 : Flexure Output (LC No. : 9)

Working Axial Load on Footing	=	452.228	KN.
Factored Axial Load on Footing	=	452.228	KN.
Percentage Factor for Self Weight of Footing	=	10	%
Factored Self Weight of Footing	=	45.223	KN.
Total Factored Axial Load on Footing	=	497.451	KN.
Working Moment about ZZ-axis	=	0.283	KN m.
Factored Moment about ZZ-axis	=	0.283	KN m.

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Working Moment about XX-axis	=	0.639	KN m.
Factored Moment about XX-axis	=	0.639	KN m.
Ultimate Bearing Capacity of Soil	=	375	KN/sq.m.
From Vertical Load and Bending considerations, Area of Footing Required	=	1.34	sq.m.
Equal Projections were intially assumed from the Column Faces to arrive at the Footing Size.			
Width of Footing Required	=	1.053	m.
Length of Footing Required	=	1.273	m.
Width of Footing Provided	=	1.075	m.
Length of Footing Provided	=	1.275	m.
Actual Bearing Area Provided	=	1.371	sq.m.
Max. Bearing Pressure at the Base	=	366.509	KN/sq.m.
Min. Bearing Pressure at the Base	=	359.366	KN/sq.m.

Bending about ZZ-axis:-

Load Eccentricity lies within the limit causing total Compression.
Hence, the Footing Base about ZZ-axis will be in touch with the Soil.

Net Bearing Pressure at the Base - Right End	=	333.514	KN/sq.m.
Net Bearing Pressure at the Base - Left End	=	331.574	KN/sq.m.
Net Bearing Pressure at the Column Face	=	332.887	KN/sq.m.
Net Bearing Pressure - 'd' from Face	=	333.334	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	=	412.5	mm.
Design Bending Moment	=	30.484	KN m.
Modified Depth of Footing at the Face of Wall	=	350	mm.
Modified Depth of Footing at the End	=	200	mm.
Effective Depth Required	=	155.914	mm.
Effective Depth Provided	=	294	mm.

Hence SAFE.

Percentage of Steel Required	=	0.077	%

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

Percentage of Main Steel Provided	=	0.12	%
Area of Steel Provided	=	379.26	sq.mm.
Dia. of Rod-1 in Central Band	=	10	mm.
Required Spacing of Rods	=	222.619	mm.
Max. Spacing allowed (Rounded off)	=	225	mm.
Dia. of Rod-2 in Central Band	=	12	mm.
Required Spacing of Rods	=	320.571	mm.
Max. Spacing allowed (Rounded off)	=	250	mm.

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Bending about XX-axis:-

Load Eccentricity lies within the limit causing total Compression.
Hence, the Footing Base about XX-axis will be in touch with the Soil.

Net Bearing Pressure at the Base - Right End	=	333.514	KN/sq.m.
Net Bearing Pressure at the Base - Left End	=	328.312	KN/sq.m.
Net Bearing Pressure at the Column Face	=	331.47	KN/sq.m.
Net Bearing Pressure - 'd' from Face	=	332.893	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	=	422.5	mm.
Design Bending Moment	=	37.876	KN m.
Modified Depth of Footing at the Face of Wall	=	350	mm.
Modified Depth of Footing at the End	=	200	mm.
Effective Depth Required	=	138.517	mm.
Effective Depth Provided	=	282	mm.

Hence SAFE.

Percentage of Steel Required	=	0.087	%

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

Percentage of Main Steel Provided	=	0.12	%
Area of Steel Provided	=	431.46	sq.mm.
Dia. of Rod-1 in Central Band	=	10	mm.
Required Spacing of Rods	=	232.092	mm.
Max. Spacing allowed (Rounded off)	=	225	mm.
Dia. of Rod-2 in Central Band	=	12	mm.
Required Spacing of Rods	=	334.212	mm.
Max. Spacing allowed (Rounded off)	=	250	mm.

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

Note (2):- The required minimum area of reinforcement will be also as per IS:456-2000, Clause 34.5.2, if the Footing Thickness exceeds 1000 mm. This minimum area is 360.0 sq.mm. for each side or face.

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

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

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F01 : Dowel Bars Output (LC No. : 9)

Factored Axial Load on Column	=	452.228	KN.
Char. Comp. Strength of Concrete	=	25	N/sq.mm.
Yield Stress of Pedestal Steel	=	500	N/sq.mm.

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Width of Column Section	=	230	mm.
Depth of Column Section	=	450	mm.
Area of Column Section	=	103500	sq.mm.
Width of Footing	=	1.075	m.
Length of Footing	=	1.275	m.
Area of Footing	=	1.371	sq.m.
As Per IS:456-2000, Clause 34.4, Basic Permissible Bearing Stress	=	11.25	N/sq.mm.
Max. Bearing Stress based on Area Ratio	=	22.5	N/sq.mm.
Actual Bearing Stress	=	4.369	N/sq.mm.

As Per IS:456-2000, Clause 34.4.3,
Reinforcement is NOT required. However, Minimum Steel is Provided.

Percentage of Steel Required	=	0.5	%
Area of Steel Provided	=	517.5	sq.mm.
Dowel Rod Size-1	=	12	mm.
No. of Rods to be Provided	=	5	Nos.
Corresponding Steel Area	=	565.487	sq.mm.
Dowel Rod Size-2	=	16	mm.
No. of Rods to be Provided	=	3	Nos.
Corresponding Steel Area	=	603.186	sq.mm.

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

F01 : One Way Shear Output (LC No. : 9)

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

Design Shear Force about Length	=	42.474	KN.
Modified Depth of Footing at the Face of Wall	=	350	mm.
Modified Depth of Footing at the End	=	200	mm.
Depth of Footing at Critical Section	=	187.091	mm.
Projection of Footing from Critical Section	=	118.5	mm.
As Per IS:456-2000, Clause 40.1, Actual Shear Stress	=	0.211	N/sq.mm.
As Per IS:456-2000, Table 19, Design Shear Strength of Concrete	=	0.262	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	=	54.591	KN.
Depth of Footing at Critical Section	=	177.621	mm.
Projection of Footing from Critical Section	=	128.5	mm.
As Per IS:456-2000, Clause 40.1, Actual Shear Stress	=	0.241	N/sq.mm.
As Per IS:456-2000, Table 19, Design Shear Strength of Concrete	=	0.267	N/sq.mm.

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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. : 9)

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

Length of Footing at Critical Section	=	0.732	m.
Width of Footing at Critical Section	=	0.512	m.
Ratio of Width to Length at Critical Section	=	0.699	
Modified Depth of Footing at the Face of Wall	=	350	mm.
Modified Depth of Footing at the End	=	200	mm.
Depth of Footing at Critical Section	=	234.545	mm.
Design Shear Force	=	323.598	KN.
As Per IS:456-2000, Clause 31.6.2.1, Actual Shear Stress	=	0.555	N/sq.mm.
As Per IS:456-2000, Clause 31.6.3.1, Coefficient, ks	=	1	
Max. Permissible Shear Stress	=	1.25	N/sq.mm.

The section is SAFE in Shear.

F01 : Global Input Data (LC No. : 10)

The footing is to be designed as an Isolated Footing.

Width of Column	=	230	mm.
Length of Column	=	450	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	=	137.976	KN.
Working Moment about ZZ-axis	=	40.028	KN m.
Working Moment about XX-axis	=	0.298	KN m.
Safe Bearing Capacity of Soil	=	250	KN/sq.m
Factor of Safety for Safe Bearing Capacity	=	1.5	

F01 : Flexure Output (LC No. : 10)

Working Axial Load on Footing	=	137.976	KN.
Factored Axial Load on Footing	=	137.976	KN.
Percentage Factor for Self Weight of Footing	=	10	%
Factored Self Weight of Footing	=	13.798	KN.

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Total Factored Axial Load on Footing	=	151.774	KN.
Working Moment about ZZ-axis	=	40.028	KN m.
Factored Moment about ZZ-axis	=	40.028	KN m.
Working Moment about XX-axis	=	0.298	KN m.
Factored Moment about XX-axis	=	0.298	KN m.
Ultimate Bearing Capacity of Soil	=	375	KN/sq.m
From Vertical Load and Bending considerations, Area of Footing Required	=	0.987	sq.m.
Equal Projections were intially assumed from the to arrive at the Footing			
Width of Footing Required	=	0.89	m.
Length of Footing Required	=	1.11	m.
Width of Footing Provided	=	1.2	m.
Length of Footing Provided	=	1.425	m.
Actual Bearing Area Provided	=	1.71	sq.m.
Max. Bearing Pressure at the Base	=	188.19	KN/sq.m
Min. Bearing Pressure at the Base	=	-10.676	KN/sq.m
Bending about			
Load Eccentricity exceeds the limit causing Hence, a portion of the Base will not be in touch			
The Size of Footing has been probably modified to this condition so that the Net Bearing Capacity at will remain within the Ultimate Bearing Capacity.			
Portion of Footing in contact with Soil	=	1267.172	mm.
Net Bearing Pressure at the Base - Right End	=	183.219	KN/sq.m
Net Bearing Pressure at the Column Face	=	112.732	KN/sq.m
Net Bearing Pressure - 'd' from Face	=	158.856	KN/sq.m
As Per IS:456-2000, Clause the critical section for Bending Moment is at the of the			
Projection of Footing from Critical Section	=	487.5	mm.

Design Bending Moment	=	22.776	KN m.
Modified Depth of Footing at the Face of Wall	=	375	mm.
Modified Depth of Footing at the End	=	225	mm.
Effective Depth Required	=	131.04	mm.
Effective Depth Provided	=	319	mm.
Hence			
Percentage of Steel Required	=	0.043	%
As Per IS:456-2000, Clause 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	=	459.36	sq.mm.
Dia. of Rod-1 in Central Band	=	10	mm.
Required Spacing of Rods	=	205.172	mm.

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Max. Spacing allowed (Rounded off)	=	200	mm.
Dia. of Rod-2 in Central Band	=	12	mm.
Required Spacing of Rods	=	295.448	mm.
Max. Spacing allowed (Rounded off)	=	250	mm.

Bending about

Load Eccentricity exceeds the limit causing
Hence, a portion of the Base will not be in touch

The Size of Footing has been probably modified to this condition so that the Net Bearing Capacity at will remain within the Ultimate Bearing Capacity.

Net Bearing Pressure at the Base - Right End	=	315.892	KN/sq.m
Net Bearing Pressure at the Column Face	=	230.469	KN/sq.m
Net Bearing Pressure - 'd' from Face	=	286.655	KN/sq.m

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

Projection of Footing from Critical Section	=	485	mm.
Design Bending Moment	=	48.171	KN m.

Modified Depth of Footing at the Face of Wall	=	375	mm.
Modified Depth of Footing at the End	=	225	mm.
Effective Depth Required	=	152.886	mm.
Effective Depth Provided	=	307	mm.

Hence

Percentage of Steel Required	=	0.084	%

As Per IS:456-2000, Clause
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	=	524.97	sq.mm.
Dia. of Rod-1 in Central Band	=	10	mm.
Required Spacing of Rods	=	213.192	mm.
Max. Spacing allowed (Rounded off)	=	200	mm.
Dia. of Rod-2 in Central Band	=	12	mm.
Required Spacing of Rods	=	306.996	mm.
Max. Spacing allowed (Rounded off)	=	250	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

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 consideratio

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

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F01 : Dowel Bars Output (LC No. : 10)			
Factored Axial Load on Column	=	137.976	KN.
Char. Comp. Strength of Concrete	=	25	N/sq.m
Yield Stress of Pedestal Steel	=	500	N/sq.m
Width of Column Section	=	230	mm.
Depth of Column Section	=	450	mm.
Area of Column Section	=	103500	sq.mm.
Width of Footing	=	1.2	m.
Length of Footing	=	1.425	m.
Area of Footing	=	1.71	sq.m.
As Per IS:456-2000, Clause Basic Permissible Bearing Stress	=	11.25	N/sq.m
Max. Bearing Stress based on Area Ratio	=	22.5	N/sq.m
Actual Bearing Stress	=	1.333	N/sq.m
As Per IS:456-2000, Clause Reinforcement is NOT required. However,			
Percentage of Steel Required	=	0.5	%
Area of Steel Provided	=	517.5	sq.mm.
Dowel Rod Size-1	=	12	mm.
No. of Rods to be Provided	=	5	Nos.
Corresponding Steel Area	=	565.487	sq.mm.
Dowel Rod Size-2	=	16	mm.
No. of Rods to be Provided	=	3	Nos.
Corresponding Steel Area	=	603.186	sq.mm.
Note :- Calculation for Dowel Rods is only However, Dowel Rods may not be required in			

F01 : One Way Shear Output (LC No. : 10)			
As Per IS:456-2000, Clause the critical section for Shear Force is at a the Effective Depth of the Footing, from the			
Design Shear Force about Length	=	34.584	KN.
Modified Depth of Footing at the Face of	=	375	mm.
Modified Depth of Footing at the End	=	225	mm.
Depth of Footing at Critical Section	=	220.846	mm.
Projection of Footing from Critical	=	168.5	mm.
As Per IS:456-2000, Clause Actual Shear Stress	=	0.13	N/sq.m
As Per IS:456-2000,			
Design Shear Strength of Concrete	=	0.266	N/sq.m
As Per IS:456-2000, Max. Permissible Shear Stress	=	3.124	N/sq.m

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STABILITY CALCULATIONS FOR AVITTAM THIRUNAVUKKARASAR FOR THE PROPOSED CONSTRUCTION OF STILT+5 FLOORS(HEIGHT 18.3M) RESIDENTIAL BUILDING WITH 65 DWELLING FOR AFFORDABLE HOUSING ATDARKAST ROAD(KISHKINDA MAIN ROAD),KANNADAPALAYAM BAJANAI KOIL STREET,WEST TAMBARAM,CHENNAI-600045 COMPRISED IN OLD S.NOS268/2,268/3&268/4&TS NOS.106/2,107/4,107/5,108/4,&108/5 BLOCK NO.21,WARD NO.C OF TAMBARAM VILLAGE,TAMBARAM TALUK WITH IN THE LIMITS OF TAMBARAM MUNICIPALCORPORATION

The section is SAFE in Shear, about			
Design Shear Force about Width	=	71.266	KN.
Depth of Footing at Critical Section	=	208.34	mm.
Projection of Footing from Critical	=	166	mm.
As Per IS:456-2000, Clause Actual Shear Stress	=	0.24	N/sq.m
As Per IS:456-2000, Design Shear Strength of Concrete	=	0.271	N/sq.m
As Per IS:456-2000, Max. Permissible Shear Stress	=	3.124	N/sq.m
The section is SAFE in Shear, about			

F01 : Punching Shear Output (LC No. : 10)

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			
Length of Footing at Critical Section	=	0.757	m.
Width of Footing at Critical Section	=	0.537	m.
Ratio of Width to Length at Critical Section	=	0.709	
Modified Depth of Footing at the Face of	=	375	mm.
Modified Depth of Footing at the End	=	225	mm.
Depth of Footing at Critical Section	=	263.923	mm.
Design Shear Force	=	103.911	KN.
As Per IS:456-2000, Clause Actual Shear Stress	=	0.152	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			

F01 : Global Input Data (LC No. : 11)

The footing is to be designed as an Isolated			
Width of Column	=	230	mm.
Length of Column	=	450	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	=	585.589	KN.
Working Moment about ZZ-axis	=	40.48	KN m.
Working Moment about XX-axis	=	0.724	KN m.
Safe Bearing Capacity of Soil	=	250	KN/sq.m.
Factor of Safety for Safe Bearing Capacity	=	1.5	

F01 : Flexure Output (LC No. : 11)

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Working Axial Load on Footing	=	585.589	KN.
Factored Axial Load on Footing	=	585.589	KN.
Percentage Factor for Self Weight of	=	10	%
Factored Self Weight of Footing	=	58.559	KN.
Total Factored Axial Load on Footing	=	644.148	KN.
Working Moment about ZZ-axis	=	40.48	KN m.
Factored Moment about ZZ-axis	=	40.48	KN m.
Working Moment about XX-axis	=	0.724	KN m.
Factored Moment about XX-axis	=	0.724	KN m.
Ultimate Bearing Capacity of Soil	=	375	KN/sq.m.
From Vertical Load and Bending Area of Footing Required	=	2.137	sq.m.
Equal Projections were intially assumed from the to arrive at the Footing			
Width of Footing Required	=	1.356	m.
Length of Footing Required	=	1.576	m.
Width of Footing Provided	=	1.375	m.

Length of Footing Provided	=	1.6	m.
Actual Bearing Area Provided	=	2.2	sq.m.
Max. Bearing Pressure at the Base	=	363.231	KN/sq.m.
Min. Bearing Pressure at the Base	=	222.359	KN/sq.m.
Bending about			
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	=	336.613	KN/sq.m.
Net Bearing Pressure at the Base - Left	=	198.612	KN/sq.m.
Net Bearing Pressure at the Column Face	=	287.019	KN/sq.m.
Net Bearing Pressure - 'd' from Face	=	318.845	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	=	575	mm.
Design Bending Moment	=	72.756	KN m.
Modified Depth of Footing at the Face of	=	425	mm.
Modified Depth of Footing at the End	=	275	mm.
Effective Depth Required	=	225.747	mm.
Effective Depth Provided	=	369	mm.
Hence			
Percentage of Steel Required	=	0.091	%
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	=	608.85	sq.mm.
Dia. of Rod-1 in Central Band	=	10	mm.

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Required Spacing of Rods	=	177.371	mm.
Max. Spacing allowed (Rounded off)	=	175	mm.
Dia. of Rod-2 in Central Band	=	12	mm.
Required Spacing of Rods	=	255.414	mm.
Max. Spacing allowed (Rounded off)	=	250	mm.

Bending about

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

Net Bearing Pressure at the Base -	=	336.613	KN/sq.m.
Net Bearing Pressure at the Base - Left	=	333.742	KN/sq.m.
Net Bearing Pressure at the Column	=	335.417	KN/sq.m.
Net Bearing Pressure - 'd' from Face	=	336.188	KN/sq.m.

As Per IS:456-2000, Clause
the critical section for Bending Moment is of the

Projection of Footing from Critical	=	572.5	mm.
Design Bending Moment	=	88.157	KN m.
Modified Depth of Footing at the Face	=	425	mm.
Modified Depth of Footing at the End	=	275	mm.
Effective Depth Required	=	201.922	mm.
Effective Depth Provided	=	357	mm.

Hence

Percentage of Steel Required	=	0.101	%

As Per IS:456-2000, Clause
the required percentage of Steel is less to be provided. Hence, Minimum Steel is

Percentage of Main Steel Provided	=	0.12	%
Area of Steel Provided	=	685.44	sq.mm.
Dia. of Rod-1 in Central Band	=	10	mm.
Required Spacing of Rods	=	183.333	mm.
Max. Spacing allowed (Rounded off)	=	175	mm.
Dia. of Rod-2 in Central Band	=	12	mm.
Required Spacing of Rods	=	263.999	mm.
Max. Spacing allowed (Rounded off)	=	250	mm.

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

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

Note (3):- The assumed Depth of Footing so that a SAFE design is arrived at from consideratio

STABILITY CALCULATIONS FOR AVITTAM THIRUNAVUKKARASAR FOR THE PROPOSED CONSTRUCTION OF STILT+5 FLOORS(HEIGHT 18.3M) RESIDENTIAL BUILDING WITH 65 DWELLING FOR AFFORDABLE HOUSING ATDARKAST ROAD(KISHKINDA MAIN ROAD),KANNADAPALAYAM BAJANAI KOIL STREET,WEST TAMBARAM,CHENNAI-600045 COMPRISED IN OLD S.NOS268/2,268/3&268/4&TS NOS.106/2,107/4,107/5,108/4,&108/5 BLOCK NO.21,WARD NO.C OF TAMBARAM VILLAGE,TAMBARAM TALUK WITH IN THE LIMITS OF TAMBARAM MUNICIPALCORPORATION

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

F01 : Dowel Bars Output (LC No. : 11)

Factored Axial Load on Column	=	585.589	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	=	450	mm.
Area of Column Section	=	103500	sq.mm.
Width of Footing	=	1.375	m.
Length of Footing	=	1.6	m.
Area of Footing	=	2.2	sq.m.
As Per IS:456-2000, Clause			
Basic Permissible Bearing Stress	=	11.25	N/sq.mm.
Max. Bearing Stress based on Area	=	22.5	N/sq.mm.
Actual Bearing Stress	=	5.658	N/sq.mm.
As Per IS:456-2000, Clause			
Reinforcement is NOT required. However,			
Percentage of Steel Required	=	0.5	%
Area of Steel Provided	=	517.5	sq.mm.
Dowel Rod Size-1	=	12	mm.
No. of Rods to be Provided	=	5	Nos.
Corresponding Steel Area	=	565.487	sq.mm.
Dowel Rod Size-2	=	16	mm.
No. of Rods to be Provided	=	3	Nos.
Corresponding Steel Area	=	603.186	sq.mm.

Note :- Calculation for Dowel Rods is only

However, Dowel Rods may not be

F01 : One Way Shear Output (LC No. : 11)

As Per IS:456-2000, Clause			
the critical section for Shear Force is at a			
the Effective Depth of the Footing, from			
Design Shear Force about Length	=	92.829	KN.
Modified Depth of Footing at the Face	=	425	mm.
Modified Depth of Footing at the End	=	275	mm.
Depth of Footing at Critical Section	=	272.739	mm.
Projection of Footing from Critical	=	206	mm.
As Per IS:456-2000, Clause			
Actual Shear Stress	=	0.248	N/sq.mm.
As Per IS:456-2000,			
Design Shear Strength of Concrete	=	0.265	N/sq.mm.
As Per IS:456-2000,			
Max. Permissible Shear Stress	=	3.124	N/sq.mm.

The section is SAFE in Shear, about

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Design Shear Force about Width	=	109.532	KN.
Depth of Footing at Critical Section	=	260.319	mm.
Projection of Footing from Critical	=	203.5	mm.
As Per IS:456-2000, Clause Actual Shear Stress	=	0.263	N/sq.mm.
As Per IS:456-2000, Design Shear Strength of Concrete	=	0.269	N/sq.mm.
As Per IS:456-2000, Max. Permissible Shear Stress	=	3.124	N/sq.mm.
The section is SAFE in Shear, about			

F01 : Punching Shear Output (LC No. : 11)

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

Length of Footing at Critical	=	0.807	m.
Width of Footing at Critical Section	=	0.587	m.
Ratio of Width to Length at Critical	=	0.727	
Modified Depth of Footing at the Face	=	425	mm.
Modified Depth of Footing at the End	=	275	mm.
Depth of Footing at Critical Section	=	314.87	mm.
Design Shear Force	=	455.008	KN.
As Per IS:456-2000, Clause Actual Shear Stress	=	0.518	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			

F01 : Global Input Data (LC No. : 12)

The footing is to be designed as an

Width of Column	=	230	mm.
Length of Column	=	450	mm.
Footing Shape	=	Rectangular	
Initial Depth at the Face of	=	300	mm.
Initial Depth at the End	=	150	mm.

The footing is subjected to Axial Load &

Working Axial Load	=	543.103	KN.
Working Moment about ZZ-axis	=	1.248	KN m.
Working Moment about XX-axis	=	28.204	KN m.
Safe Bearing Capacity of Soil	=	250	KN/sq.m
Factor of Safety for Safe Bearing	=	1.5	

F01 : Flexure Output (LC No. : 12)

Working Axial Load on Footing	=	543.103	KN.
Factored Axial Load on Footing	=	543.103	KN.

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Percentage Factor for Self Weight of	=	10	%
Factored Self Weight of Footing	=	54.31	KN.

Total Factored Axial Load on Footing	=	597.413	KN.
Working Moment about ZZ-axis	=	1.248	KN m.
Factored Moment about ZZ-axis	=	1.248	KN m.
Working Moment about XX-axis	=	28.204	KN m.
Factored Moment about XX-axis	=	28.204	KN m.
Ultimate Bearing Capacity of Soil	=	375	KN/sq.m
From Vertical Load and Bending			
Area of Footing Required	=	1.955	sq.m.
Equal Projections were intially assumed from to arrive at the Footing			
Width of Footing Required	=	1.293	m.
Length of Footing Required	=	1.513	m.
Width of Footing Provided	=	1.3	m.
Length of Footing Provided	=	1.525	m.
Actual Bearing Area Provided	=	1.982	sq.m.
Max. Bearing Pressure at the Base	=	369.48	KN/sq.m
Min. Bearing Pressure at the Base	=	233.207	KN/sq.m
Bending about			
Load Eccentricity lies within the limit causing Hence, the Footing Base about ZZ-axis will			
Net Bearing Pressure at the Base - Right	=	342.085	KN/sq.m
Net Bearing Pressure at the Base - Left	=	337.132	KN/sq.m
Net Bearing Pressure at the Column Face	=	340.339	KN/sq.m
Net Bearing Pressure - 'd' from Face	=	341.538	KN/sq.m
As Per IS:456-2000, Clause the critical section for Bending Moment is at of the			
Projection of Footing from Critical	=	537.5	mm.
Design Bending Moment	=	64.131	KN m.
Modified Depth of Footing at the Face of	=	425	mm.
Modified Depth of Footing at the End	=	275	mm.
Effective Depth Required	=	215.241	mm.

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Effective Depth Provided	=	369	mm.
Hence			
Percentage of Steel Required	=	0.085	%
As Per IS:456-2000, Clause the required percentage of Steel is less than to be provided. Hence, Minimum Steel is			
Percentage of Main Steel Provided	=	0.12	%

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Area of Steel Provided	=	575.64	sq.mm.
Dia. of Rod-1 in Central Band	=	10	mm.
Required Spacing of Rods	=	177.371	mm.
Max. Spacing allowed (Rounded off)	=	175	mm.
Dia. of Rod-2 in Central Band	=	12	mm.
Required Spacing of Rods	=	255.414	mm.
Max. Spacing allowed (Rounded off)	=	250	mm.

Bending about

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

Net Bearing Pressure at the Base - Right	=	342.085	KN/sq.m
Net Bearing Pressure at the Base - Left	=	210.765	KN/sq.m
Net Bearing Pressure at the Column Face	=	288.042	KN/sq.m
Net Bearing Pressure - 'd' from Face	=	325.316	KN/sq.m

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

Projection of Footing from Critical	=	535	mm.
Design Bending Moment	=	70.727	KN m.
Modified Depth of Footing at the Face of	=	425	mm.
Modified Depth of Footing at the End	=	275	mm.
Effective Depth Required	=	182.706	mm.
Effective Depth Provided	=	357	mm.

Hence

Percentage of Steel Required	=	0.085	%

As Per IS:456-2000, Clause
the required percentage of Steel is less than to be provided. Hence, Minimum Steel is

Percentage of Main Steel Provided	=	0.12	%
Area of Steel Provided	=	653.31	sq.mm.
Dia. of Rod-1 in Central Band	=	10	mm.
Required Spacing of Rods	=	183.333	mm.
Max. Spacing allowed (Rounded off)	=	175	mm.
Dia. of Rod-2 in Central Band	=	12	mm.
Required Spacing of Rods	=	263.999	mm.
Max. Spacing allowed (Rounded off)	=	250	mm.

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

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

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

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

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Value, User-defined Minimum and Maximum

F01 : Dowel Bars Output (LC No. : 12)

Factored Axial Load on Column	=	543.103	KN.
Char. Comp. Strength of Concrete	=	25	N/sq.m
Yield Stress of Pedestal Steel	=	500	N/sq.m
Width of Column Section	=	230	mm.
Depth of Column Section	=	450	mm.
Area of Column Section	=	103500	sq.mm.
Width of Footing	=	1.3	m.
Length of Footing	=	1.525	m.
Area of Footing	=	1.982	sq.m.
As Per IS:456-2000, Clause Basic Permissible Bearing Stress	=	11.25	N/sq.m
Max. Bearing Stress based on Area	=	22.5	N/sq.m
Actual Bearing Stress	=	5.247	N/sq.m
As Per IS:456-2000, Clause Reinforcement is NOT required. However,			
Percentage of Steel Required	=	0.5	%
Area of Steel Provided	=	517.5	sq.mm.
Dowel Rod Size-1	=	12	mm.
No. of Rods to be Provided	=	5	Nos.
Corresponding Steel Area	=	565.487	sq.mm.
Dowel Rod Size-2	=	16	mm.
No. of Rods to be Provided	=	3	Nos.
Corresponding Steel Area	=	603.186	sq.mm.

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

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F01 : One Way Shear Output (LC No. : 12)

As Per IS:456-2000, Clause the critical section for Shear Force is at a the Effective Depth of the Footing, from			
Design Shear Force about Length	=	74.874	KN.
Modified Depth of Footing at the Face	=	425	mm.
Modified Depth of Footing at the End	=	275	mm.
Depth of Footing at Critical Section	=	266.023	mm.
Projection of Footing from Critical	=	168.5	mm.
As Per IS:456-2000, Clause Actual Shear Stress	=	0.217	N/sq.mm.
As Per IS:456-2000, Design Shear Strength of Concrete	=	0.265	N/sq.mm.
As Per IS:456-2000, Max. Permissible Shear Stress	=	3.124	N/sq.mm.

The section is SAFE in Shear, about

Design Shear Force about Width	=	84.476	KN.
Depth of Footing at Critical Section	=	253.542	mm.

Projection of Footing from Critical	=	166	mm.
As Per IS:456-2000, Clause Actual Shear Stress	=	0.218	N/sq.mm.
As Per IS:456-2000, Design Shear Strength of Concrete	=	0.269	N/sq.mm.
As Per IS:456-2000, Max. Permissible Shear Stress	=	3.124	N/sq.mm.

The section is SAFE in Shear, about

F01 : Punching Shear Output (LC No. : 12)

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

Length of Footing at Critical	=	0.807	m.
Width of Footing at Critical Section	=	0.587	m.
Ratio of Width to Length at Critical	=	0.727	
Modified Depth of Footing at the Face	=	425	mm.
Modified Depth of Footing at the End	=	275	mm.
Depth of Footing at Critical Section	=	311.512	mm.
Design Shear Force	=	408.709	KN.
As Per IS:456-2000, Clause Actual Shear Stress	=	0.471	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

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

The footing is to be designed as an

Width of Column	=	230	mm.
Length of Column	=	450	mm.
Footing Shape	=	Rectangular	

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Initial Depth at the Face of	=	300	mm.
Initial Depth at the End	=	150	mm.

The footing is subjected to Axial Load &

Working Axial Load	=	180.463	KN.
Working Moment about ZZ-axis	=	1.7	KN m.
Working Moment about XX-axis	=	27.182	KN m.

STABILITY CALCULATIONS FOR AVITTAM THIRUNAVUKKARASAR FOR THE PROPOSED CONSTRUCTION OF STILT+5 FLOORS(HEIGHT 18.3M) RESIDENTIAL BUILDING WITH 65 DWELLING FOR AFFORDABLE HOUSING ATDARKAST ROAD(KISHKINDA MAIN ROAD),KANNADAPALAYAM BAJANAI KOIL STREET,WEST TAMBARAM,CHENNAI-600045 COMPRISED IN OLD S.NOS268/2,268/3&268/4&TS NOS.106/2,107/4,107/5,108/4,&108/5 BLOCK NO.21,WARD NO.C OF TAMBARAM VILLAGE,TAMBARAM TALUK WITH IN THE LIMITS OF TAMBARAM MUNICIPALCORPORATION

Safe Bearing Capacity of Soil	=	250	KN/sq.m.
Factor of Safety for Safe Bearing	=	1.5	

F01 : Flexure Output (LC No. : 13)

Working Axial Load on Footing	=	180.463	KN.
Factored Axial Load on Footing	=	180.463	KN.
Percentage Factor for Self Weight of	=	10	%
Factored Self Weight of Footing	=	18.046	KN.
Total Factored Axial Load on Footing	=	198.509	KN.
Working Moment about ZZ-axis	=	1.7	KN m.
Factored Moment about ZZ-axis	=	1.7	KN m.
Working Moment about XX-axis	=	27.182	KN m.
Factored Moment about XX-axis	=	27.182	KN m.
Ultimate Bearing Capacity of Soil	=	375	KN/sq.m.
From Vertical Load and Bending Area of Footing Required	=	1.031	sq.m.

Equal Projections were intially assumed to arrive at the Footing

Width of Footing Required	=	0.911	m.
Length of Footing Required	=	1.131	m.
Width of Footing Provided	=	0.95	m.
Length of Footing Provided	=	1.175	m.
Actual Bearing Area Provided	=	1.116	sq.m.
Max. Bearing Pressure at the Base	=	339.407	KN/sq.m.
Min. Bearing Pressure at the Base	=	16.264	KN/sq.m.

Bending about

Load Eccentricity lies within the limit

Hence, the Footing Base about ZZ-axis

Net Bearing Pressure at the Base -	=	323.24	KN/sq.m.
Net Bearing Pressure at the Base - Left	=	307.687	KN/sq.m.
Net Bearing Pressure at the Column	=	318.442	KN/sq.m.
Net Bearing Pressure - 'd' from Face	=	321.671	KN/sq.m.

As Per IS:456-2000, Clause
the critical section for Bending Moment is of the

Projection of Footing from Critical	=	362.5	mm.
Design Bending Moment	=	20.076	KN m.
Modified Depth of Footing at the Face	=	300	mm.
Modified Depth of Footing at the End	=	150	mm.
Effective Depth Required	=	130.346	mm.
Effective Depth Provided	=	244	mm.

Hence

Percentage of Steel Required	=	0.083	%

As Per IS:456-2000, Clause
the required percentage of Steel is less to be provided. Hence, Minimum Steel is

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Percentage of Main Steel Provided	=	0.12	%
Area of Steel Provided	=	278.16	sq.mm.
Dia. of Rod-1 in Central Band	=	10	mm.
Required Spacing of Rods	=	268.237	mm.
Max. Spacing allowed (Rounded off)	=	250	mm.
Dia. of Rod-2 in Central Band	=	12	mm.
Required Spacing of Rods	=	386.261	mm.
Max. Spacing allowed (Rounded off)	=	250	mm.

Bending about

Load Eccentricity lies within the limit
Hence, the Footing Base about XX-axis

Net Bearing Pressure at the Base -	=	323.24	KN/sq.m.
Net Bearing Pressure at the Base - Left	=	15.651	KN/sq.m.
Net Bearing Pressure at the Column	=	206.68	KN/sq.m.

Net Bearing Pressure - 'd' from Face	=	285.682	KN/sq.m.

As Per IS:456-2000, Clause
the critical section for Bending Moment is of the

Projection of Footing from Critical	=	360	mm.
Design Bending Moment	=	21.653	KN m.
Modified Depth of Footing at the Face	=	300	mm.
Modified Depth of Footing at the End	=	150	mm.
Effective Depth Required	=	106.303	mm.
Effective Depth Provided	=	232	mm.

Hence

Percentage of Steel Required	=	0.08	%

As Per IS:456-2000, Clause
the required percentage of Steel is less to be provided. Hence, Minimum Steel is

Percentage of Main Steel Provided	=	0.12	%
Area of Steel Provided	=	327.12	sq.mm.
Dia. of Rod-1 in Central Band	=	10	mm.
Required Spacing of Rods	=	282.111	mm.
Max. Spacing allowed (Rounded off)	=	250	mm.
Dia. of Rod-2 in Central Band	=	12	mm.
Required Spacing of Rods	=	406.24	mm.
Max. Spacing allowed (Rounded off)	=	250	mm.

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

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

Note (3):- The assumed Depth of Footing so that a SAFE design is arrived at from consideratio

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Note (4):- Spacing of Rods are also

Value, User-defined Minimum and

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

Factored Axial Load on Column	=	180.463	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	=	450	mm.
Area of Column Section	=	103500	sq.mm.
Width of Footing	=	0.95	m.
Length of Footing	=	1.175	m.
Area of Footing	=	1.116	sq.m.
As Per IS:456-2000, Clause Basic Permissible Bearing Stress	=	11.25	N/sq.mm.
Max. Bearing Stress based on Area	=	22.5	N/sq.mm.
Actual Bearing Stress	=	1.744	N/sq.mm.
As Per IS:456-2000, Clause Reinforcement is NOT required. However,			
Percentage of Steel Required	=	0.5	%
Area of Steel Provided	=	517.5	sq.mm.
Dowel Rod Size-1	=	12	mm.
No. of Rods to be Provided	=	5	Nos.
Corresponding Steel Area	=	565.487	sq.mm.
Dowel Rod Size-2	=	16	mm.
No. of Rods to be Provided	=	3	Nos.
Corresponding Steel Area	=	603.186	sq.mm.

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

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

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

Design Shear Force about Length	=	36.3	KN.
Modified Depth of Footing at the Face	=	300	mm.
Modified Depth of Footing at the End	=	150	mm.
Depth of Footing at Critical Section	=	143.034	mm.
Projection of Footing from Critical	=	118.5	mm.
As Per IS:456-2000, Clause Actual Shear Stress	=	0.267	N/sq.mm.
As Per IS:456-2000, Design Shear Strength of Concrete	=	0.272	N/sq.mm.

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As Per IS:456-2000, Max. Permissible Shear Stress	=	3.124	N/sq.mm.
The section is SAFE in Shear, about			
Design Shear Force about Width	=	41.498	KN.
Depth of Footing at Critical Section	=	130.333	mm.
Projection of Footing from Critical	=	116	mm.
As Per IS:456-2000, Clause Actual Shear Stress	=	0.271	N/sq.mm.
As Per IS:456-2000, Design Shear Strength of Concrete	=	0.278	N/sq.mm.
As Per IS:456-2000, Max. Permissible Shear Stress	=	3.124	N/sq.mm.
The section is SAFE in Shear, about			

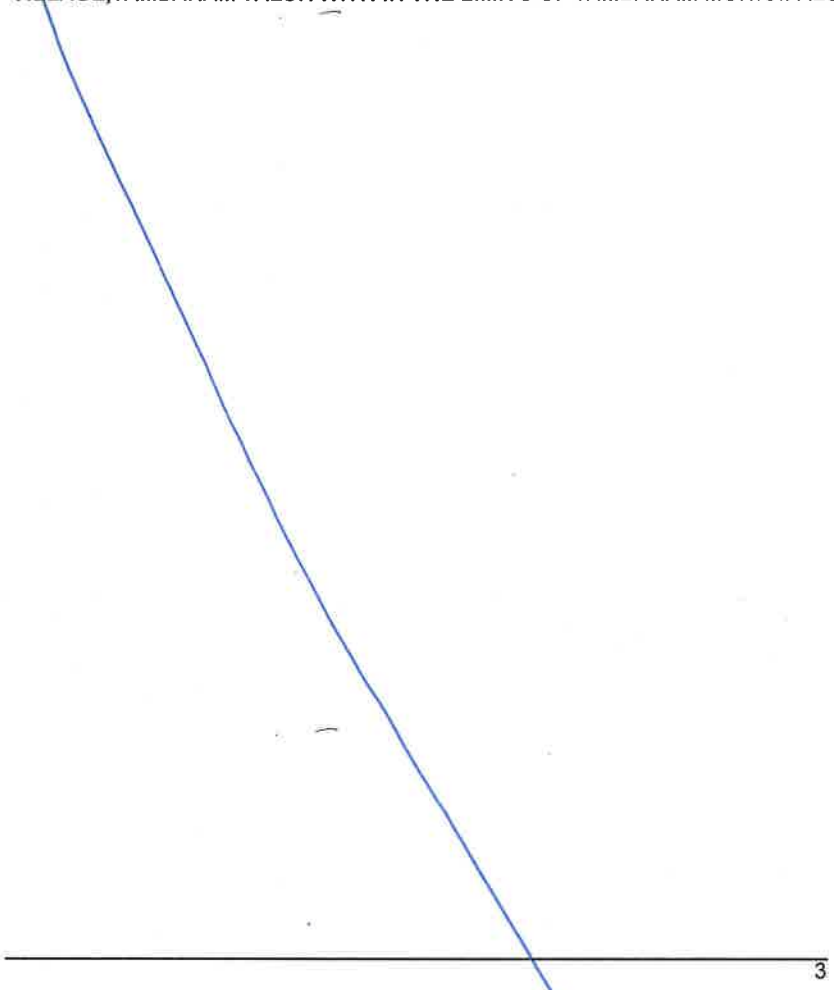
F01 : Punching Shear Output (LC No. : 13)

As Per IS:456-2000, Clause the critical section for Shear Force is at a the Half the Effective Depth of the Footing, the			
Length of Footing at Critical	=	0.682	m.
Width of Footing at Critical Section	=	0.462	m.
Ratio of Width to Length at Critical	=	0.677	
Modified Depth of Footing at the Face	=	300	mm.
Modified Depth of Footing at the End	=	150	mm.
Depth of Footing at Critical Section	=	187.517	mm.

Design Shear Force	=	127.281	KN.
As Per IS:456-2000, Clause Actual Shear Stress	=	0.297	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			

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SCADDS/RC-Slab Designer 2022 [Release: 4.01.3010]

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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 Design,
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

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.

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Factor of Safety for Load	=	1.5	
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	=	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.

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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.
Rods in Tension			
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.

S01 - PANEL INPUT

Slab Number	=	S01	
Slab Shape	=	Rectangular	
Centre to Centre Short Span	=	1.21	m.
Centre to Centre Long Span	=	3.25	m.
Effective Short Span	=	0.98	m.
Support Type : Continuous Supports			
It is a One way Slab.			
Initial Thickness of Slab	=	125	mm.
Type of Building is "Residential Building"			
Type of Floor is "All Rooms and Kitchens"			
Live Load	=	2	KN/sq.m.
Floor Finish Load	=	1	KN/sq.m.
Partition Load	=	0.5	KN/sq.m.
Miscellaneous Load	=	NIL	

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S01 - FLEXURE OUTPUT

Slab Identification Number	=	**S01**	
Effective Short Span	=	0.98	m.
Effective Long Span	=	3.095	m.
Long Span to Short Span Ratio	=	3.158	
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.**
Loads on the Slab Panel			
Live Load	=	2	KN/sq.m.
Floor Finish Load	=	1	KN/sq.m.
Partition Load	=	0.5	KN/sq.m.
Miscellaneous Load	=	NIL	
Total Dead Load on Slab Panel	=	**4.319**	**KN/sq.m.**

STABILITY CALCULATIONS FOR AVITTAM THIRUNAVUKKARASAR FOR THE PROPOSED CONSTRUCTION OF STILT+5 FLOORS(HEIGHT 18.3M) RESIDENTIAL BUILDING WITH 65 DWELLING FOR AFFORDABLE HOUSING ATDARKAST ROAD(KISHKINDA MAIN ROAD),KANNADAPALAYAM BAJANAI KOIL STREET,WEST TAMBARAM,CHENNAI-600045 COMPRISED IN OLD S.NOS268/2,268/3&268/4&TS NOS.106/2,107/4,107/5,108/4,&108/5 BLOCK NO.21,WARD NO.C OF TAMBARAM VILLAGE,TAMBARAM TALUK WITH IN THE LIMITS OF TAMBARAM MUNICIPALCORPORATION

Total Load on Slab Panel	=	**6.319**	**KN/sq.m.**
Safety Factor for Load	=	1.5	
Total Factored Load on Slab Panel	=	**9.479**	**KN/sq.m.**
Effective Depth Required	=	17.239	mm.
Effective Depth Provided	=	90	mm.
Hence SAFE.			

Short Span Reinforcement over Centre Portion

Short Span Positive Moment	=	0.807	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.
Max. Spacing allowed (Rounded off) (+)	=	**275**	**mm.**

Short Span Reinforcement over Support

Short Span Negative Moment	=	0.942	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 practical considerations, those values will be used and implemented in the Drawings and Quantity

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S01 - SHEAR CHECK

Effective Short Span	=	0.98	m.
Effective Long Span	=	3.095	m.
Total Factored Load per Unit Length	=	**9.479**	**KN/m.**
Shear Coeff. for Continuous Edge-X	=	0.6	
Corresponding Design Shear	=	5.574	KN.

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Shear Coeff. for Discontinuous Edge-X	=	0	
Corresponding Design Shear	=	0	KN.
Shear Coeff. for Continuous Edge-Y	=	0.6	
Corresponding Design Shear	=	5.574	KN.
Shear Coeff. for Discontinuous Edge-Y	=	0	
Corresponding Design Shear	=	0	KN.
Maximum Design Shear	=	**5.574**	**KN.**
As Per IS:456-2000, Clause			
Actual Shear Stress	=	0.062	N/sq.mm.
As Per IS:456-2000, Clause 40.2.1.1 & Table 19,			
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 0.062 < 0.342 and 0.062 <
The Slab Panel is SAFE in Shear.

S01 - DEFLECTION CHECK

Effective Short Span	=	0.98	m.
Effective Depth of Slab	=	90	mm.
Actual Span to Depth Ratio	=	**10.889**	
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**	**> 10.889**

Deflection Requirements are O.K.

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STABILITY CALCULATIONS FOR AVITTAM THIRUNAVUKKARASAR FOR THE PROPOSED CONSTRUCTION OF STILT+5 FLOORS(HEIGHT 18.3M) RESIDENTIAL BUILDING WITH 65 DWELLING FOR AFFORDABLE HOUSING ATDARKAST ROAD(KISHKINDA MAIN ROAD),KANNADAPALAYAM BAJANAI KOIL STREET,WEST TAMBARAM,CHENNAI-600045 COMPRISED IN OLD S.NOS268/2,268/3&268/4&TS NOS.106/2,107/4,107/5,108/4, &108/5 BLOCK NO.21,WARD NO.C OF TAMBARAM VILLAGE,TAMBARAM TALUK WITH IN THE LIMITS OF TAMBARAM MUNICIPALCORPORATION.

SCADDS/RC-Beam Desianer 2022 [Release: 4.01.3010]

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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)

Introduction:-

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

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Global Material Data			
Concrete Clear Cover	=	25	mm.
Char. Comp. Strength of Concrete	=	20	N/sq.mm.

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Yield Strength of Main Steel	=	500	N/sq.mm.
Main Rod Size-1	=	12	mm.
Main Rod Size-2	=	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	=	22360.68	N/sq.mm.
Young's Modulus of Steel	=	200000	N/sq.mm.

Bond / Development Length Output

Char. Comp. Strength of Concrete	=	20	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	=	1.92	N/sq.mm.
Rods in Tension:-			
Main Rod Diameter-1	=	12	mm.
Corresponding Development Length	=	679.688	mm.
Main Rod Diameter-2	=	16	mm.
Corresponding Development Length	=	906.25	mm.
Rods in Compression:-			
Main Rod Diameter-1	=	12	mm.
Corresponding Development Length	=	543.75	mm.

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Main Rod Diameter-2	=	16	mm.
Corresponding Development Length	=	725	mm.

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B19 : Global Input Data

Effective Span	=	2.81	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	=	56.472	KN m.
Min. Bending Moment at End-1	=	-49.335	KN m.
Max. Bending Moment at End-2	=	49.172	KN m.
Min. Bending Moment at End-2	=	-48.998	KN m.
Max. Bending Moment at Middle	=	25.996	KN m.
Min. Bending Moment at Middle	=	-25.418	KN m.
Max. Shear Force at Left	=	41.812	KN.
Max. Shear Force at Right	=	39.334	KN.
Max. Torsional Moment	=	0	KN m.
Torsion, as per Analysis Results, is partially			
Ignore Torsion Limit	=	10	%

STABILITY CALCULATIONS FOR AVITTAM THIRUNAVUKKARASAR FOR THE PROPOSED CONSTRUCTION OF STILT+5 FLOORS(HEIGHT 18.3M) RESIDENTIAL BUILDING WITH 65 DWELLING FOR AFFORDABLE HOUSING ATDARKAST ROAD(KISHKINDA MAIN ROAD),KANNADAPALAYAM BAJANAI KOIL STREET,WEST TAMBARAM,CHENNAI-600045 COMPRISED IN OLD S.NOS268/2,268/3&268/4&TS NOS.106/2,107/4,107/5,108/4, &108/5 BLOCK NO.21,WARD NO.C OF TAMBARAM VILLAGE,TAMBARAM TALUK WITH IN THE LIMITS OF TAMBARAM MUNICIPALCORPORATION.

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

B19 : End-1 Max - Flexure Output

Bending Moment	=	56.472	KN m.
Factored Moment	=	56.472	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	=	95.485	KN m.

Total Design Moment	=	56.472	KN m.
Depth of Neutral Axis	=	96.043	mm.
Tensile Reinforcement Required	=	0.402	%
Compression Reinforcement is NOT Necessary.			
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	%
Area of Tensile Reinforcement	=	365.625	sq.mm.
Main Rod Size-1	=	12	mm.
No. of Rods Required	=	3.233	Nos.
No. of Rods Provided	=	4	Nos.

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Corresponding Steel Area	=	452.389	sq.mm.
Main Rod Size-2	=	16	mm.
No. of Rods Required	=	1.818	Nos.
No. of Rods Provided	=	2	Nos.
Corresponding Steel Area	=	402.124	sq.mm.
Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding			
Main Rod Size-1	=	12	mm.
No. of Rods Provided	=	2	Nos.
Corresponding Steel Area	=	226.195	sq.mm.
Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding			
Main Rod Size-2	=	16	mm.
No. of Rods Provided	=	2	Nos.
Corresponding Steel Area	=	402.124	sq.mm.
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.			

B19 : End-1 Max - Shear Output

Shear Force	=	41.812	KN.
Factored Shear	=	41.812	KN.
As Per IS:456-2000, Clause 40.1,			
Actual Shear Stress	=	0.46	N/sq.mm.
As Per IS:456-2000, Table 19,			
Design Shear Strength of Concrete	=	0.478	N/sq.mm.
As Per IS:456-2000, Table 20,			

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Max. Permissible Shear Stress	=	2.794	N/sq.mm.
Minimum Shear Reinforcement is provided.			
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.			

B19 : End-1 Min - Flexure Output

Bending Moment	=	49.335	KN m.
Factored Moment	=	49.335	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	=	95.485	KN m.
Total Design Moment	=	49.335	KN m.
Depth of Neutral Axis	=	82.604	mm.
Tensile Reinforcement Required	=	0.346	%
Compression Reinforcement is NOT Necessary.			
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,			

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Max. Reinforcement Percentage	=	4	%
Area of Tensile Reinforcement	=	314.465	sq.mm.
Main Rod Size-1	=	12	mm.

No. of Rods Required	=	2.78	Nos.
No. of Rods Provided	=	3	Nos.
Corresponding Steel Area	=	339.292	sq.mm.
Main Rod Size-2	=	16	mm.
No. of Rods Required	=	1.564	Nos.
No. of Rods Provided	=	2	Nos.
Corresponding Steel Area	=	402.124	sq.mm.

Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding

Main Rod Size-1	=	12	mm.
No. of Rods Provided	=	2	Nos.
Corresponding Steel Area	=	226.195	sq.mm.

Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding

Main Rod Size-2	=	16	mm.
No. of Rods Provided	=	2	Nos.
Corresponding Steel Area	=	402.124	sq.mm.

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.

B19 : End-1 Min - Shear Output

Shear Force	=	41.812	KN.
Factored Shear	=	41.812	KN.

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As Per IS:456-2000, Clause 40.1,			
Actual Shear Stress	=	0.46	N/sq.mm.
As Per IS:456-2000, Table 19,			
Design Shear Strength of Concrete	=	0.425	N/sq.mm.
As Per IS:456-2000, Table 20,			
Max. Permissible Shear Stress	=	2.794	N/sq.mm.
Stirrups have to be Designed for Shear.			
Shear for which Stirrups are Provided	=	3.19	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.

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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.

B19 : End-2 Max - Flexure Output

Bending Moment	=	49.172	KN m.
Factored Moment	=	49.172	KN m.
Overall Depth of Section	=	450	mm.
Bottom Effective Cover	=	55	mm.
Effective Depth	=	395	mm.
Maximum N.A. Ratio	=	0.456	

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Total Limiting Moment	=	95.485	KN m.
Total Design Moment	=	49.172	KN m.
Depth of Neutral Axis	=	82.302	mm.
Tensile Reinforcement Required	=	0.345	%
Compression Reinforcement is NOT Necessary.			
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	%
Area of Tensile Reinforcement	=	313.314	sq.mm.
Main Rod Size-1	=	12	mm.
No. of Rods Required	=	2.77	Nos.
No. of Rods Provided	=	3	Nos.
Corresponding Steel Area	=	339.292	sq.mm.
Main Rod Size-2	=	16	mm.
No. of Rods Required	=	1.558	Nos.
No. of Rods Provided	=	2	Nos.
Corresponding Steel Area	=	402.124	sq.mm.
Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding			
Main Rod Size-1	=	12	mm.
No. of Rods Provided	=	2	Nos.
Corresponding Steel Area	=	226.195	sq.mm.

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Compression Steel is NOT required. However, 2

are provided, irrespective of the size, for holding

Main Rod Size-2	=	16	mm.
No. of Rods Provided	=	2	Nos.
Corresponding Steel Area	=	402.124	sq.mm.

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.

B19 : End-2 Max - Shear Output

Shear Force	=	39.334	KN.
Factored Shear	=	39.334	KN.
As Per IS:456-2000, Clause 40.1,			
Actual Shear Stress	=	0.433	N/sq.mm.
As Per IS:456-2000, Table 19,			
Design Shear Strength of Concrete	=	0.425	N/sq.mm.
As Per IS:456-2000, Table 20,			
Max. Permissible Shear Stress	=	2.794	N/sq.mm.
Stirrups have to be Designed for Shear.			
Shear for which Stirrups are Provided	=	0.712	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.

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B19 : End-2 Min - Flexure Output

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Bending Moment	=	48.998	KN m.
Factored Moment	=	48.998	KN m.
Overall Depth of Section	=	450	mm.
Bottom Effective Cover	=	55	mm.
Effective Depth	=	395	mm.

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Maximum N.A. Ratio	=	0.456	
Total Limiting Moment	=	95.485	KN m.
Total Design Moment	=	48.998	KN m.
Depth of Neutral Axis	=	81.981	mm.
Tensile Reinforcement Required	=	0.344	%
Compression Reinforcement is NOT Necessary.			
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	%
Area of Tensile Reinforcement	=	312.092	sq.mm.
Main Rod Size-1	=	12	mm.
No. of Rods Required	=	2.759	Nos.
No. of Rods Provided	=	3	Nos.
Corresponding Steel Area	=	339.292	sq.mm.
Main Rod Size-2	=	16	mm.
No. of Rods Required	=	1.552	Nos.
No. of Rods Provided	=	2	Nos.
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	=	12	mm.
No. of Rods Provided	=	2	Nos.
Corresponding Steel Area	=	226.195	sq.mm.
Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding			
Main Rod Size-2	=	16	mm.
No. of Rods Provided	=	2	Nos.
Corresponding Steel Area	=	402.124	sq.mm.
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.			

B19 : End-2 Min - Shear Output

Shear Force	=	39.334	KN.

Factored Shear	=	39.334	KN.
As Per IS:456-2000, Clause 40.1, Actual Shear Stress	=	0.433	N/sq.mm.
As Per IS:456-2000, Table 19, Design Shear Strength of Concrete	=	0.425	N/sq.mm.
As Per IS:456-2000, Table 20, Max. Permissible Shear Stress	=	2.794	N/sq.mm.
Stirrups have to be Designed for Shear.			
Shear for which Stirrups are Provided	=	0.712	KN.

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STABILITY CALCULATIONS FOR AVITTAM THIRUNAVUKKARASAR FOR THE PROPOSED CONSTRUCTION OF STILT+5 FLOORS(HEIGHT 18.3M) RESIDENTIAL BUILDING WITH 65 DWELLING FOR AFFORDABLE HOUSING ATDARKAST ROAD(KISHKINDA MAIN ROAD),KANNADAPALAYAM BAJANAI KOIL STREET,WEST TAMBARAM,CHENNAI-600045 COMPRISED IN OLD S.NOS268/2,268/3&268/4&TS NOS.106/2,107/4,107/5,108/4, &108/5 BLOCK NO.21,WARD NO.C OF TAMBARAM VILLAGE,TAMBARAM TALUK WITH IN THE LIMITS OF TAMBARAM MUNICIPALCORPORATION.

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.

B19 : Mid. Max - Flexure Output

Bending Moment	=	25.996	KN m.
Factored Moment	=	25.996	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	=	95.485	KN m.
Total Design Moment	=	25.996	KN m.
Depth of Neutral Axis	=	41.559	mm.
Tensile Reinforcement Required	=	0.174	%

Compression Reinforcement is NOT Necessary.

As Per IS:456-2000, Clause 26.5.1.1.a,

Min. Tensile Reinforcement Percentage	=	0.17	%

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As Per IS:456-2000, Clause 26.5.1.1.b,			
Max. Reinforcement Percentage	=	4	%
Area of Tensile Reinforcement	=	158.211	sq.mm.
Main Rod Size-1	=	12	mm.
No. of Rods Required	=	1.399	Nos.
No. of Rods Provided	=	2	Nos.
Corresponding Steel Area	=	226.195	sq.mm.
Main Rod Size-2	=	16	mm.
No. of Rods Required	=	0.787	Nos.
No. of Rods Provided	=	1	Nos.
Corresponding Steel Area	=	201.062	sq.mm.
Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding			
Main Rod Size-1	=	12	mm.
No. of Rods Provided	=	2	Nos.
Corresponding Steel Area	=	226.195	sq.mm.
Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding			
Main Rod Size-2	=	16	mm.
No. of Rods Provided	=	2	Nos.
Corresponding Steel Area	=	402.124	sq.mm.
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.			

B19 : Mid. Max - Shear Output

Shear Force	=	39.53	KN.
Factored Shear	=	39.53	KN.
As Per IS:456-2000, Clause 40.1,			
Actual Shear Stress	=	0.435	N/sq.mm.
As Per IS:456-2000, Table 19,			

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Design Shear Strength of Concrete	=	0.359	N/sq.mm.
As Per IS:456-2000, Table 20, Max. Permissible Shear Stress	=	2.794	N/sq.mm.
Stirrups have to be Designed for Shear.			
Shear for which Stirrups are Provided	=	6.954	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.

B19 : Mid. Min - Flexure Output

Bending Moment	=	25.418	KN m.
Factored Moment	=	25.418	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	=	95.485	KN m.
Total Design Moment	=	25.418	KN m.

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Depth of Neutral Axis	=	40.591	mm.
Tensile Reinforcement Required	=	0.17	%
Compression Reinforcement is NOT Necessary.			
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	%
Area of Tensile Reinforcement	=	154.526	sq.mm.
Main Rod Size-1	=	12	mm.
No. of Rods Required	=	1.366	Nos.
No. of Rods Provided	=	2	Nos.
Corresponding Steel Area	=	226.195	sq.mm.
Main Rod Size-2	=	16	mm.
No. of Rods Required	=	0.769	Nos.
No. of Rods Provided	=	1	Nos.
Corresponding Steel Area	=	201.062	sq.mm.

Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding

Main Rod Size-1	=	12	mm.
No. of Rods Provided	=	2	Nos.
Corresponding Steel Area	=	226.195	sq.mm.

Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding

Main Rod Size-2	=	16	mm.
No. of Rods Provided	=	2	Nos.

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Corresponding Steel Area	=	402.124	sq.mm.

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.

B19 : Mid. Min - Shear Output

Shear Force	=	39.53	KN.
Factored Shear	=	39.53	KN.
As Per IS:456-2000, Clause 40.1,			
Actual Shear Stress	=	0.435	N/sq.mm.
As Per IS:456-2000, Table 19,			
Design Shear Strength of Concrete	=	0.359	N/sq.mm.
As Per IS:456-2000, Table 20,			
Max. Permissible Shear Stress	=	2.794	N/sq.mm.
Stirrups have to be Designed for Shear.			
Shear for which Stirrups are Provided	=	6.954	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.

B19 : Side Face Steel Output

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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.

B19 : Deflection Check Output

Type of Beam	=	Ends	Fixed or Continuous
Effective Span of Beam	=	2.81	m.
Effective Depth of Beam	=	395	mm.
Actual Span to Depth Ratio	=	7.114	
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	=	1.28	
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	=	33.274	

Deflection Requirements are O.K.

B19 : Deep Beam Check Output

Effective Span of Beam	=	2.81	m.
Overall Depth	=	450	mm.
Effective Span to Depth Ratio	=	6.244	

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Minimum Value for the above	=	2.5

As Per IS:456-2000, Clause 29.1,
this Beam is NOT a Deep Beam.

B19 : Slender Beam Check Output

Clear Distance between Lateral Restraints	=	2.81	m.
Allowable Value for the above	=	13.8	m.

As Per IS:456-2000, Clause 23.3,
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 clear

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B20 : Global Input Data

Effective Span	=	5.43	m.
Section Type	=	Rectangular	
Width of Web	=	230	mm.
Overall Depth	=	450	mm.
Effective Cover at Top	=	55	mm.

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Effective Cover at Bottom	=	55	mm.
Number of Stirrup Legs	=	2	Nos.
Max. Bending Moment at End-1	=	32.633	KN m.
Min. Bending Moment at End-1	=	-22.939	KN m.
Max. Bending Moment at End-2	=	35.021	KN m.
Min. Bending Moment at End-2	=	-21.719	KN m.
Max. Bending Moment at Middle	=	11.03	KN m.
Min. Bending Moment at Middle	=	-15.881	KN m.
Max. Shear Force at Left	=	17.427	KN.
Max. Shear Force at Right	=	18.845	KN.
Max. Torsional Moment	=	0	KN m.
Torsion, as per Analysis Results, is partially			
Ignore Torsion Limit	=	10	%
If Torsion is less than the above % of the Max. it will be ignored. Otherwise, the Beam is			

B20 : End-1 Max - Flexure Output

Bending Moment	=	32.633	KN m.
Factored Moment	=	32.633	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	=	95.485	KN m.

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Total Design Moment	=	32.633	KN m.
Depth of Neutral Axis	=	52.824	mm.
Tensile Reinforcement Required	=	0.221	%
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	=	201.097	sq.mm.
Main Rod Size-1	=	12	mm.
No. of Rods Required	=	1.778	Nos.
No. of Rods Provided	=	2	Nos.
Corresponding Steel Area	=	226.195	sq.mm.
Main Rod Size-2	=	16	mm.
No. of Rods Required	=	1	Nos.
No. of Rods Provided	=	1	Nos.
Corresponding Steel Area	=	201.062	sq.mm.
Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding			
Main Rod Size-1	=	12	mm.
No. of Rods Provided	=	2	Nos.
Corresponding Steel Area	=	226.195	sq.mm.
Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding			
Main Rod Size-2	=	16	mm.

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No. of Rods Provided	=	2	Nos.
Corresponding Steel Area	=	402.124	sq.mm.

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.

B20 : End-1 Max - Shear Output

Shear Force	=	17.427	KN.
Factored Shear	=	17.427	KN.
As Per IS:456-2000, Clause 40.1,			
Actual Shear Stress	=	0.192	N/sq.mm.
As Per IS:456-2000, Table 19,			
Design Shear Strength of Concrete	=	0.359	N/sq.mm.
As Per IS:456-2000, Table 20,			
Max. Permissible Shear Stress	=	2.794	N/sq.mm.

Minimum Shear Reinforcement is provided.

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.

B20 : End-1 Min - Flexure Output

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Bending Moment	=	22.939	KN m.
Factored Moment	=	22.939	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	=	95.485	KN m.
Total Design Moment	=	22.939	KN m.
Depth of Neutral Axis	=	36.467	mm.
Tensile Reinforcement Required	=	0.17	%
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	=	154.445	sq.mm.
Main Rod Size-1	=	12	mm.

No. of Rods Required	=	1.366	Nos.
No. of Rods Provided	=	2	Nos.
Corresponding Steel Area	=	226.195	sq.mm.
Main Rod Size-2	=	16	mm.
No. of Rods Required	=	0.768	Nos.
No. of Rods Provided	=	1	Nos.

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Corresponding Steel Area	=	201.062	sq.mm.
Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding			
Main Rod Size-1	=	12	mm.
No. of Rods Provided	=	2	Nos.
Corresponding Steel Area	=	226.195	sq.mm.
Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding			
Main Rod Size-2	=	16	mm.
No. of Rods Provided	=	2	Nos.
Corresponding Steel Area	=	402.124	sq.mm.
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.			

B20 : End-1 Min - Shear Output

Shear Force	=	17.427	KN.
Factored Shear	=	17.427	KN.
As Per IS:456-2000, Clause 40.1,			
Actual Shear Stress	=	0.192	N/sq.mm.
As Per IS:456-2000, Table 19,			
Design Shear Strength of Concrete	=	0.359	N/sq.mm.
As Per IS:456-2000, Table 20,			
Max. Permissible Shear Stress	=	2.794	N/sq.mm.
Minimum Shear Reinforcement is provided.			
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.

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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.

B20 : End-2 Max - Flexure Output

Bending Moment	=	35.021	KN m.
Factored Moment	=	35.021	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	=	95.485	KN m.
Total Design Moment	=	35.021	KN m.
Depth of Neutral Axis	=	56.952	mm.
Tensile Reinforcement Required	=	0.239	%
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	=	216.81	sq.mm.
Main Rod Size-1	=	12	mm.

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STABILITY CALCULATIONS FOR AVITTAM THIRUNAVUKKARASAR FOR THE PROPOSED CONSTRUCTION OF STILT+5 FLOORS(HEIGHT 18.3M) RESIDENTIAL BUILDING WITH 65 DWELLING FOR AFFORDABLE HOUSING ATDARKAST ROAD(KISHKINDA MAIN ROAD),KANNADAPALAYAM BAJANAI KOIL STREET,WEST TAMBARAM,CHENNAI-600045 COMPRISED IN OLD S.NOS268/2,268/3&268/4&TS NOS.106/2,107/4,107/5,108/4, &108/5 BLOCK NO.21,WARD NO.C OF TAMBARAM VILLAGE,TAMBARAM TALUK WITH IN THE LIMITS OF TAMBARAM MUNICIPALCORPORATION.

No. of Rods Required	=	1.917	Nos.
No. of Rods Provided	=	2	Nos.
Corresponding Steel Area	=	226.195	sq.mm.
Main Rod Size-2	=	16	mm.
No. of Rods Required	=	1.078	Nos.
No. of Rods Provided	=	1	Nos.
Corresponding Steel Area	=	201.062	sq.mm.
Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding			
Main Rod Size-1	=	12	mm.
No. of Rods Provided	=	2	Nos.
Corresponding Steel Area	=	226.195	sq.mm.
Compression Steel is NOT required. However, 2			

are provided, irrespective of the size, for holding

Main Rod Size-2	=	16	mm.
No. of Rods Provided	=	2	Nos.
Corresponding Steel Area	=	402.124	sq.mm.

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.

B20 : End-2 Max - Shear Output

Shear Force	=	18.845	KN.
Factored Shear	=	18.845	KN.
As Per IS:456-2000, Clause 40.1,			
Actual Shear Stress	=	0.207	N/sq.mm.
As Per IS:456-2000, Table 19,			
Design Shear Strength of Concrete	=	0.359	N/sq.mm.

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As Per IS:456-2000, Table 20,			
Max. Permissible Shear Stress	=	2.794	N/sq.mm.
Minimum Shear Reinforcement is provided.			
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.			

B20 : End-2 Min - Flexure Output

Bending Moment	=	21.719	KN m.
Factored Moment	=	21.719	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	=	95.485	KN m.
Total Design Moment	=	21.719	KN m.
Depth of Neutral Axis	=	34.452	mm.
Tensile Reinforcement Required	=	0.17	%

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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	=	154.445	sq.mm.
Main Rod Size-1	=	12	mm.
No. of Rods Required	=	1.366	Nos.
No. of Rods Provided	=	2	Nos.
Corresponding Steel Area	=	226.195	sq.mm.
Main Rod Size-2	=	16	mm.
No. of Rods Required	=	0.768	Nos.
No. of Rods Provided	=	1	Nos.
Corresponding Steel Area	=	201.062	sq.mm.
Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding			
Main Rod Size-1	=	12	mm.
No. of Rods Provided	=	2	Nos.
Corresponding Steel Area	=	226.195	sq.mm.
Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding			
Main Rod Size-2	=	16	mm.
No. of Rods Provided	=	2	Nos.
Corresponding Steel Area	=	402.124	sq.mm.
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.			

B20 : End-2 Min - Shear Output

Shear Force	=	18.845	KN.
Factored Shear	=	18.845	KN.

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As Per IS:456-2000, Clause 40.1,			
Actual Shear Stress	=	0.207	N/sq.mm.

As Per IS:456-2000, Table 19,			
Design Shear Strength of Concrete	=	0.359	N/sq.mm.
As Per IS:456-2000, Table 20,			
Max. Permissible Shear Stress	=	2.794	N/sq.mm.
Minimum Shear Reinforcement is provided.			
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.

B20 : Mid. Max - Flexure Output

Bending Moment	=	15.881	KN m.
Factored Moment	=	15.881	KN m.
Overall Depth of Section	=	450	mm.
Bottom Effective Cover	=	55	mm.
Effective Depth	=	395	mm.
Maximum N.A. Ratio	=	0.456	

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Total Limiting Moment	=	95.485	KN m.
Total Design Moment	=	15.881	KN m.
Depth of Neutral Axis	=	24.932	mm.
Tensile Reinforcement Required	=	0.17	%
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	=	154.445	sq.mm.

Main Rod Size-1	=	12	mm.
No. of Rods Required	=	1.366	Nos.
No. of Rods Provided	=	2	Nos.
Corresponding Steel Area	=	226.195	sq.mm.
Main Rod Size-2	=	16	mm.
No. of Rods Required	=	0.768	Nos.
No. of Rods Provided	=	1	Nos.
Corresponding Steel Area	=	201.062	sq.mm.
Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding			
Main Rod Size-1	=	12	mm.
No. of Rods Provided	=	2	Nos.
Corresponding Steel Area	=	226.195	sq.mm.
Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding			

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Main Rod Size-2	=	16	mm.
No. of Rods Provided	=	2	Nos.
Corresponding Steel Area	=	402.124	sq.mm.

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.

B20 : Mid. Max - Shear Output

Shear Force	=	14.436	KN.
Factored Shear	=	14.436	KN.
As Per IS:456-2000, Clause 40.1,			
Actual Shear Stress	=	0.159	N/sq.mm.
As Per IS:456-2000, Table 19,			
Design Shear Strength of Concrete	=	0.359	N/sq.mm.
As Per IS:456-2000, Table 20,			
Max. Permissible Shear Stress	=	2.794	N/sq.mm.
Minimum Shear Reinforcement is provided.			
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.

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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.

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B20 : Mid. Min - Flexure Output

Bending Moment	=	11.03	KN m.
Factored Moment	=	11.03	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	=	95.485	KN m.
Total Design Moment	=	11.03	KN m.
Depth of Neutral Axis	=	17.172	mm.
Tensile Reinforcement Required	=	0.17	%
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	=	154.445	sq.mm.
Main Rod Size-1	=	12	mm.
No. of Rods Required	=	1.366	Nos.
No. of Rods Provided	=	2	Nos.
Corresponding Steel Area	=	226.195	sq.mm.
Main Rod Size-2	=	16	mm.
No. of Rods Required	=	0.768	Nos.
No. of Rods Provided	=	1	Nos.
Corresponding Steel Area	=	201.062	sq.mm.

Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding

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Main Rod Size-1	=	12	mm.
No. of Rods Provided	=	2	Nos.
Corresponding Steel Area	=	226.195	sq.mm.

Compression Steel is NOT required. However, 2 are provided, irrespective of the size, for holding

Main Rod Size-2	=	16	mm.
No. of Rods Provided	=	2	Nos.
Corresponding Steel Area	=	402.124	sq.mm.

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.

B20 : Mid. Min - Shear Output

Shear Force	=	14.436	KN.
Factored Shear	=	14.436	KN.
As Per IS:456-2000, Clause 40.1,			
Actual Shear Stress	=	0.159	N/sq.mm.
As Per IS:456-2000, Table 19,			
Design Shear Strength of Concrete	=	0.359	N/sq.mm.
As Per IS:456-2000, Table 20,			
Max. Permissible Shear Stress	=	2.794	N/sq.mm.

Minimum Shear Reinforcement is provided.

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.

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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.

B20 : Side Face Steel Output

Overall Depth of Section	=	450	mm.

As Per IS:456-2000, Clauses 26.5.1.3,
Side Face Reinforcement is NOT Required.

B20 : Deflection Check Output

Type of Beam	=	Ends	Fixed or Continuous
Effective Span of Beam	=	5.43	m.
Effective Depth of Beam	=	395	mm.
Actual Span to Depth Ratio	=	13.747	

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 = 1.28

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

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Allowable Span to Depth Ratio	=	33.274	

Deflection Requirements are O.K.

B20 : Deep Beam Check Output

Effective Span of Beam	=	5.43	m.
Overall Depth	=	450	mm.
Effective Span to Depth Ratio	=	12.067	
Minimum Value for the above	=	2.5	

As Per IS:456-2000, Clause 29.1,
this Beam is NOT a Deep Beam.

B20 : Slender Beam Check Output

Clear Distance between Lateral Restraints	=	5.43	m.
Allowable Value for the above	=	13.8	m.

As Per IS:456-2000, Clause 23.3,
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

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SCADDS/RC-Slab Designer 2022 [Release: 4.01.3010]

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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 Design, 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.

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GLOBAL MATERIAL DATA

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.

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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	
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.

Rods in Tension

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STABILITY CALCULATIONS FOR AVITTAM THIRUNAVUKKARASAR FOR THE PROPOSED CONSTRUCTION OF STILT+5 FLOORS(HEIGHT 18.3M) RESIDENTIAL BUILDING WITH 65 DWELLING FOR AFFORDABLE HOUSING ATDARKAST ROAD(KISHKINDA MAIN ROAD),KANNADAPALAYAM BAJANAI KOIL STREET,WEST TAMBARAM,CHENNAI-600045 COMPRISED IN OLD S.NOS268/2,268/3&268/4&TS NOS.106/2,107/4,107/5,108/4,&108/5BLOCK NO.21,WARD NO.COF TAMBARAM VILLAGE,TAMBARAM TALUK WITH IN THE LIMITS OF TAMBARAM MUNICIPALCORPORATION

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.

S01 - PANEL INPUT

Slab Number	=	S01	
Slab Shape	=	Rectangular	
Centre to Centre Short Span	=	1.21	m.
Centre to Centre Long Span	=	3.25	m.

Effective Short Span	=	0.98	m.

Support Type : Continuous Supports
It is a One way Slab.

Initial Thickness of Slab	=	125	mm.

Type of Building is "Residential Building"
Type of Floor is "All Rooms and Kitchens"

Live Load	=	2	KN/sq.m.

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Floor Finish Load	=	1	KN/sq.m.
Partition Load	=	0.5	KN/sq.m.
Miscellaneous Load	=	NIL	

S01 - FLEXURE OUTPUT

Slab Identification Number	=	**S01**	
Effective Short Span	=	0.98	m.
Effective Long Span	=	3.095	m.
Long Span to Short Span Ratio	=	3.158	
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.**
Loads on the Slab Panel			
Live Load	=	2	KN/sq.m.
Floor Finish Load	=	1	KN/sq.m.
Partition Load	=	0.5	KN/sq.m.
Miscellaneous Load	=	NIL	
Total Dead Load on Slab Panel	=	**4.319**	**KN/sq.m.**
Total Load on Slab Panel	=	**6.319**	**KN/sq.m.**
Safety Factor for Load	=	1.5	
Total Factored Load on Slab Panel	=	**9.479**	**KN/sq.m.**
Effective Depth Required	=	17.239	mm.
Effective Depth Provided	=	90	mm.
Hence SAFE.			

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Short Span Reinforcement over Centre Portion

Short Span Positive Moment	=	0.807	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.
Max. Spacing allowed (Rounded off) (+)	=	**275**	**mm.**

Short Span Reinforcement over Support Portion

Short Span Negative Moment	=	0.942	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.**

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Note:- The required Spacing of Main Rods will be compared with 300 mm. (11.811") or 3d whichever is less. If the required spacing this limit, the least value will be automatically provided.
This is done in accordance with IS:456-2000 Clause 26.3.3.

Similarly, the required Spacing of Dist. Rods will be compared with 300 mm. (11.811") or 5d whichever is less. If the required spacing this limit, the least value will be automatically provided.
This is done in accordance with IS:456-2000 Clause 26.3.3.

If the User has fixed Minimum and Maximum Spacing values from practical considerations, those values will be used as appropriate and implemented in the Drawings and Quantity Calculations.

S01 - SHEAR CHECK

Effective Short Span	=	0.98	m.
Effective Long Span	=	3.095	m.
Total Factored Load per Unit Length	**=**	**9.479**	**KN/m.**
Shear Coeff. for Continuous Edge-X	=	0.6	
Corresponding Design Shear	=	5.574	KN.
Shear Coeff. for Discontinuous Edge-X	=	0	
Corresponding Design Shear	=	0	KN.
Shear Coeff. for Continuous Edge-Y	=	0.6	
Corresponding Design Shear	=	5.574	KN.
Shear Coeff. for Discontinuous Edge-Y	=	0	
Corresponding Design Shear	=	0	KN.
Maximum Design Shear	=	5.574	KN.
As Per IS:456-2000, Clause 40.1, Actual Shear Stress		0.062	N/sq.mm.

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As Per IS:456-2000, Clause 40.2.1.1 & Table 19,			
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 0.062 < 0.342 and 0.062 < 3.124.
The Slab Panel is SAFE in Shear.

S01 - DEFLECTION CHECK

Effective Short Span	=	0.98	m.
Effective Depth of Slab	=	90	mm.
Actual Span to Depth Ratio	=	**10.889**	
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	=	1.478	
Allowable Span to Depth Ratio	=	**38.424**	**> 10.889**

Deflection Requirements are O.K.

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THE LANDLENS SUITE

Eight ways to know a piece of land before you pay for it.

This report covers one part of the picture. These cover the rest, drawn from the same government records, for any property in Tamil Nadu.

LandLens One
Ask anything about a property and get an answer grounded in live government records, with the sources shown.
/landlens/one

Verify My Land
Every record check run on one property and returned as a single report.
/landlens/verify-my-land

Legal Opinion
An advocate's written opinion on the title, built on the records we pull for it.
/landlens

One Map
Every layer on one map: the parcel, its boundary, zoning, water bodies and what sits around it.
/landlens/one/map

PriceMap
What land actually changed hands for around this plot, taken from the registered deeds.
/landlens/pricemap

Build Scope
What you are allowed to build here: floor space, height, coverage and setbacks.
/landlens/build-scope

Property Tracker
Watch a property and hear about it when something new is registered against it.
/landlens/property-tracker

Deal Room
Run the transaction in one place: documents, stamping, signatures and the parties.
/landlens/deal-room

FREE TOOLS · NO ACCOUNT NEEDED

Twenty-four checks you can run yourself, at no cost.

Records and verification

The registers themselves, read for you.

- Encumbrance Certificate
- Patta and Chitta
- Field Measurement Sketch
- EC Analyzer
- Bank charge check
- Court case search
- Seller background check
- Approval check by survey

Value and duty

What it is worth and what it costs to register.

- Guideline value by street
- Guideline value by survey
- Stamp duty and registration fees
- Capital gains
- Floor space index
- Area unit converter

Zoning and land use

What the plan says can happen on this land.

- Land use zone finder
- CMDA land use check
- Coastal regulation zone
- Master plan check
- Water bodies finder
- Airport height clearance

Registers and directories

Who holds it, and which office keeps the record.

- Find your registering office
- Temple property check
- Waqf property check
- RERA register

Every free tool
/tools

Services we run for you
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The LandLens suite
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- Legal opinions, due diligence and title verification
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Prepared from the registers named on the page each finding sits on. Where a register could not be read, this document says so in its place rather than leaving the gap to be read as a clean result.