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Date - 30.08.2024

STRUCTURAL STABILITY CERTIFICATE

This is to certify that the Proposed Construction of group housing development consisting of 2 Blocks ; Block 1 – stilt floor + 5 floors (height 18.30 m) residential building with 10 dwelling units; Block 2 – stilt floor + 5 floors (height 18.30 m) residential building with 20 dwelling units; totally 30 dwelling units availing premium fsi with tod benefit at door no. 9, Plot No. 133, 134, 135, 136 & 137, Rajaji street, Ramakrishna nagar, Valasaravakkam, Chennai, comprised in Old S.No. 116/2, New S. No. 116/672, 116/673, 116/756, 116/757 & 116/758 of Valasaravakkam village within the limits of greater chennai corporation. is designed to resist all possible Gravity, Seismic loads, Wind loads and other Combination of loads as per the relevant IS Codes and other Codes in vogue which the structure is intended to with stand.

Check has been made the structucre is safe and sound and here by certify that,

1. Foundation & its vertical elements RC Column is designed for Stilt+5 Storey +Roof as Residential Apartment with LMR, OHT, and Head room as per Architectural plans considering relevant Residential Building loadings.

2. The minimum grade of concrete used in the structural design is M25.

3. The Analysis and design carried out for the intended Residential Building loading as per the code of practice IS 875 Part 1 to 2, wind forces as per IS 875 – 2015 (Part3) and seismic forces as per the seismic code of practice IS 1893-2016.

4. Design of Structural elements carried out as per the stipulations made in latest code of practice IS 456-2000 & IS 13920-2016.

5. Bored Pile foundation is designed considering the sub soil condition reported & the recommendation laid down in the Soil Investigation Report No.GECS-JC-GT-1112-2023-2024 dated 26-08-2023 carried out by GEO Engineering Consultant service, Chennai.



STRUCTURAL DESIGN BASIS REPORT

PROPOSED CONSTRUCTION OF RESIDENTIAL BUILDING AT VALASARAVAKKAM, CHENNAI

CLIENT:	**M/s. NARAIN PROMOTERS.,** **AYYA TOWER,** **TARAMANI LINK ROAD VELACHERY,** CHENNAI - 600 042.
ARCHITECT:	**EMAARA DESIGNS**
STRUCTURAL CONLTANT:	**RP ENGINEERS,** Chennai

M. PURUSOTHAMAN, M.E., (Struct.)
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R0	13-07-2024	Design Basis Report	OKAY	RAJEE	PURU	PURU
REV NO.	DATE	DESCRIPTION	STATUS	PREPARED BY	REVIEWED BY	APPRVD. BY

Index

- Design Information and Criteria
- Analysis summary report
- Design of Column
- Design of RCC Beam
- Design of RCC Slab
- Design of pile cap.

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Appendix (Refer drawings)

- Structural Framing Plans
- Pile and pile cap Reinforcement Details
- Column Layout & Column Schedule
- Beam Schedule & Details
- Slab Reinforcement Details

DESIGN INFORMATION AND CRITERIA

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1.0 INTRODUCTION

The Proposed Construction of Residential Building Consisting of Stilt +5 upper Floors at Valasaravakkam, Chennai.

1.1 Scope of the Report

This report provides the information on Codes of Practice, Design loads, Materials considered for the Design and Analysis of the building. In addition, this report summarizes the main design criteria, Structural system, Foundation system, Parameters & Methodology to be adopted in the design.

1.2 Project Overview

The proposed two Residential building consists of Stilt + 5 upper Floors.Block-1 is 29.5m long(X-dir) and 14m(Y-dir) wide, and block-2 is 17m long(X-dir)/14m wide (Y-dir). Typical dwelling floor height is 3m and the Stilt parking floor height is 3.1m. Overall height of block is approximately 19m measured from Stilt level.

1.3 Proposed Structures and its Usage.

1.3.1 Structural Type

The buildings structures are mainly cast in situ reinforced concrete structure. The structural system comprises of columns as vertical supporting structural elements with RC conventional Beam-slab system, Tie beams which are spanning between piles caps are cast in situ concrete structure.

1.3.2 Foundation Type

The foundation system for structure will be cast in situ bored piles. Pile diameter, its capacity and pile length will be decided based on subsoil conditions. Number of piles shall be determined for each vertical member based on forces to be supported by each member. The Foundation will be designed for the recommended in the Soil Investigation report No. GECS-JC-GT-1112-2023-2024 carried out by GEO Engineering Consultants Services.

Table: Structural Configuration and Floor heights:

Building Floor Height Details	**Stilt + 5 Storey+Roof**
Stilt Floor Height	3 m
1st floor height	3m
2^{nd} Floor height	3m
3^{rd} Floor to 5^{th} Floor	3m
Head Room	2.7m
LMR Roof	2.7m measuring from Roof

1.4 Concrete

Characteristic concrete strength (concrete grade) for the project shall be based on exposure condition and forces to be supported by specified structural elements. The minimum cement content and maximum water–cement ratio shall be as per IS code 456:2000. The minimum 28-day compressive strength of concrete for specified structural elements shall be as follows

Table 1.4.1 Grade of Concrete for Individual Structural elements of Tower/Non-Tower areas

Sl.No.	Structural Elements	Grade of Concrete
1.	Pile (Cement 400 kg/m^3)	M30
2.	Pile Cap	M30
3.	Tie Beam	M35
5.	RC Columns	M35
8.	RC Beams	M35
9.	RC Slabs	M35
10.	UG STP	M30
11.	UG Sump	M30
12.	Structural members in external services	M25



Table 1.4.2 Concrete Properties

Young's Modulus of Elasticity of Concrete	$5000\sqrt{fck}$
Poisson Ratio's Ratio ν =	0.2
Coefficient of Thermal expansion	5.5x10-6

1.4.3 Reinforcement

The characteristic tensile properties of steel used in design shall be as follows.

Reinforcement Characteristic yield strength f_{yk} (N/mm^2)	500 N/mm^2
Welded Steel Fabric yield strength $f_{0.2k}$ (N/mm^2)	485 N/mm^2
Young's Modulus E (kN/mm^2)	200 kN/mm^2
Poisson's ratio	0.3
Coefficient of Thermal expansion, α ($°C^{-1}$)	$12x10^{-6}$

1.4.4 Structural steel

All structural steel shall conform to Indian standard IS: 2062-2011.

Structural steel	Grade E=250	Grade E-350
Tensile strength	410 N/mm^2	490 N/mm^2
Yield stress t<20mm	250 N/mm^2	350 N/mm^2
Yield stress t = 20mm to 40mm	240 N/mm^2	330 N/mm^2
Yield stress t> 40mm	230 N/mm^2	320 N/mm^2
Young's Modulus (E)	200,000 N/mm^2	200,000 N/mm^2
Density	78.5 kN/m^3	78.5 kN/m^3

1.5 SUB-SOIL CONDITION

Soil Investigation is carried out by GEO Engineering Consultant service having a registered office in Chennai. Refer report No.GECS-JC-GT-1112-2023-2024 dated 26-08-2023 for sub-soil condition and foundation recommendation given by the consultant. Based on the soil report there are two (2) boreholes have been carried out to ascertain subsoil condition at the proposed site. From the sandy silty clay to silty sand layer, representative undisturbed samples were collected. These samples were used primarily to establish the compressibility parameters and to estimate the Settlements of shallow foundation system if it is applicable.

The sub-soil condition is uniform among the bore holes. Broadly, the sub-soil condition is summarized are as follows, the top 1m has sandy silty clay with “N” value of 5 and dipping down to 13. Below 1m and up to 5m, it is a silty clay layer which has “N” value in the range of 5. From 5m to 14m it is a Clayey silty sand exists with “N” in the range of 10 to 19. From 14m to 29m, it is a poorly graded sand to silty clay which has “N” value in the range of 4 to 10. Below it is a dense layer of silty sand which has “N” value more than 64 exists up to 31m. At 31m highly to shale rock encountered with “N” value more than 100 with CR 0 to 15%.

For the kind of proposed construction and the sub soil condition, Bored Cast in situ piles are recommended as the suitable foundation system. No open foundation is feasible due to shear and settlement failure consideration.

Refer the soil report for profile of boreholes and the sub soil conditions.

2.0 DESIGN CRITERIA

2.1 Design Life

The design life of the building is assumed as 50 years. This requirement is applicable only for concrete works and not applicable to replaceable finishing materials, water proofing and thermal insulations, facades etc. Hence periodic maintenance/refurbishment is required for all replaceable materials.

2.2 CODES, STANDARDS & REFERENCES

All design of structures shall comply with the requirements specified in the following.

a. Relevant Indian Standard Codes of Practice
b. National Building Code.
c. Local Building regulations.
d. Other relevant International codes where required.

All applicable latest editions of codes and standards will be referred and adopted in the analysis of structures and the design and detailing of structural members. All structural elements design shall be carried out primarily based on Indian Standards and Codes with latest revision, with amendments if any, as on date. In addition, other international codes and standards shall also be referred when required and relevant.
In the analysis, design and detailing of the building, the following Indian Standard codes of latest amendment will be used.

Table 2.2.1 Codes and Standards for Design Loads (Other Than Earthquake loads)

IS Code	Description
IS 875 (Part 1): 1987	Dead Loads (Unit Weight of Building Material and Stored Material)
IS 875 (Part 2): 1987	Imposed Load
IS 875 (Part 3): 2015	Wind Load
IS 875 (Part 5): 1987	Special Loads and Combinations

Table 2.2.2 Codes and Standards for Design of Earthquake Resistance structures

IS Code	Description
IS 1893(Part-1) :2016	Criteria for Earthquake Resistance design of structures.
IS 4326: 1993	Earthquake Resistant Design and Construction of Buildings – Code of Practice
IS 13920: 2016	Ductile Detailing of Reinforced Concrete Structures subject to Seismic Forces - Code of Practice.

T**able 2.2.3 Codes and Standards for Design of Concrete Structures**

IS Code	Description
IS 456: 2000	Plain and Reinforced Concrete - Code of practice
IS 6403 -1981	Code of practice for determination of bearing capacities of shallow foundations.
IS 8009-1976 (Part I):	Code of practice for calculation of settlement of foundations – Shallow foundation
IS 1904-1986(RA-2015)	Indian Standard Code of practice for design & construction foundations in Soil: General Requirements
IS 2950-1981(RA-2018)	Code of practice for design and construction of raft foundations : Part 1 Design (second revision).
IS 2974-Part-4	Design and Construction of Pile Foundation - Code of practice -Load Tests on Pile
IS 2974	Code of practice for design & construction of machine foundation
IS 1343-2012	Pre-stressed Concrete code of Practice
SP 16	Structural use of concrete, Design charts for singly reinforced beams, doubly reinforced beams and columns.
SP 34	Hand book on Concrete Reinforcement & Detailing
SP 7(Part IV)	National Building code of India
IS 1786-2008(RA-2018)	Specification for high strength deformed bars and wires for concrete Reinforcement.
IS 432 (Part 2) 1982	Specification for Mild Steel and Medium Tensile Steel Bars and Hard Drawn Steel Wire for concrete reinforcement – Hard Drawn Steel Wire
IS 3370 (part I)-2009	Code of practice for concrete structure for the storage of liquids

Table 2.2.4 Design of Steel Structural Elements

IS Code	Description
IS 800: 2007(RA-2017)	Code of Practice for General Construction in Steel
IS 2062: 2011(RA-2016)	Steel for General structural purposes

Table 2.2.5 Design of Concrete Elements - International codes

IS Code	Description
BS 8110: 1997	Structural use of concrete. Code of Practice for design and construction
ACI 318	Building Code requirements for Structural Concrete

The building is a RCC structure designed with Structural Column System. The slabs of all floor is used as diaphragms in redistribution of lateral forces.

Materials specified will conform to the latest edition of the relevant Indian Standard or other accepted standard. Specifications for materials will include sampling and testing as stipulated in the design standards. Detailed material specifications will be included in the Technical Specification.

2.3 LOADS

Table A: Unit Weight of Materials:

Material	Density
Reinforced Cement Concrete	25.00 kN/m^3
Plain Cement Concrete	24.00 kN/m^3
Screed Concrete	24.00 kN/m^3
Cement Mortar	20.00 kN/m^3
Solid concrete Block	20.00 kN/m^3
Structural Steel	78.50 kN/m^3
Cinder Concrete (Filling material)	08.00 kN/m^3
Dry soil	18.00 kN/m^3
Wet Soil	22.00 kN/m^3
Landscape soil	16.00 kN/m^3
Glass	28.00 kN/m^3
water	10.00 kN/m^3

2.3.1 Superimposed Dead Loads and Live Loads

The following are the imposed loads such as SDL and LL to be considered for the design of floor system depending usage floor. In addition to these loads, self-weight of structural elements will be considered depending on member sizes shown in the floor plans.

First Floor to 5th floor		
	SDL (kN/Sq.mt.)	**LL (kN/Sq.mt.)**
Finishes	1.25	0.0
Services load (ceiling)	0.0	0.0
Live Load	0.0	2.0
Partition/Filling Load	0.0	0.0
Total	**1.25**	**2.0**
Toilet (Filling load for 100mm for sunken depth)		
	SDL (kN/Sq.mt.)	**LL (kN/Sq.mt.)**
Finishes	1.25	0.0
Services load (ceiling)	0.0	0.0
Live Load	0.0	2.0
Partition/Filling Load	1	0.0
Total	**2.25**	**2.0**

Lobby /Corridor		
	SDL (kN/Sq.mt.)	LL (kN/Sq.mt.)
Finishes	1.25	0.0
Live Load	0.0	3.0
Partition Load	0.0	0.0
Total	**1.25**	**3.0**
Terrace		
	SDL (kN/Sq.mt.)	LL (kN/Sq.mt.)
Finishes	3.0	0.0
Live Load	0.0	3.0
Partition Load	0.0	0.0
Total	**3.0**	**3.0**
LMR		
	SDL (kN/Sq.mt.)	LL (kN/Sq.mt.)
Finishes	0.0	0.0
Live Load	0.0	3.0
Lift load	15.0	0.0
Total	**12.0**	**3.0**
OHT loads		
	SDL (kN/Sq.mt.)	LL (kN/Sq.mt.)
Finishes	0.0	0.0
Services load (ceiling)	0.0	0.0
Live Load	0.0	2.0
Water load	15.0	0.0
Total	**12.0**	**2.0**
*&**-shall be provided with pedestal or it will be supported by raised columns above terrace.		

In the analysis and design reduction to imposed load (Live load) shall be considered as per IS 875 Part (2), clause.3.2 where it is applicable.

2.5 TEMPERATURE EFFECTS

Temperature changes can cause additional stresses to the structure and has potential to increase in loads will be considered in the design of structural elements. Temperature effects will be considered for an ambient temperature variation from temperature during construction.

The maximum and minimum temperature for city of Chennai as recorded by Indian Metrological Department is as follows.

Maximum mean Temperature	45°C
Minimum mean Temperature	15°C
Average ambient Temperature during construction	30°C

The structural system will be designed for the effect of temperature variation. A temperature variation of **±15° C** will be considered in the structural analysis for consideration of thermal effect on structural elements.

Expansion Joints

Expansion joints have been avoided considering the extensive building maintenance failing which causing corrosion of reinforcement thereby spalling of concrete. However the exposed area shall be applied with temperature variation as highlighted above.

2.6 WIND LOAD

Design wind load for the buildings shall be estimated as per IS 875 (Part 3): 2015. Design wind speed (Vz) is based on such as location, basic wind speed, terrain, cyclone condition and topography.

Location of the building	Chennai
Basic Wind speed - Vb m/sec	50 m/sec
Risk Coefficient (Probability factor) -k1	1.0
Terrain factor (Terrain-2) – k2	1.0
Topography factor – k3	1.0
Importance factor (Cyclonic region) – k4	1.0

Design wind speed (Vz) = Vb*k1*k2*k3*k4 =50x1x1x1.0x1.0 = 50m/sec

Wind pressure (Pz) = 0.6 Vz^2 = 0.6x 50^2 =1500 N/m^2

For design of building wind pressure 1.5 kN/m^2 is considered.

Design wind pressure (P_d) = (K_d*K_a*K_c*P_z) > 0.7 Pz

Where K_d - Wind Directionality factor = 0.9

Ka – Area averaging factor = 0.8

Kc – Combination factor = 0.9

Design Wind pressure = 0.7x1.5 = 1.02 kN/m^2

2.6.1 Dynamic wind analysis

As per IS 875 (Part 3) - 2015, clause 9.1 Dynamic wind analysis has to be carried out if the buildings meet the following criteria.

a). Buildings and closed structures with a height to minimum lateral dimension ratio (H/Wmin) is more than 5. (or)

b). Building and structures whose natural frequency in the first mode is less than 1.0 Hz.

Block-1

Fundamental period of the building = Tax = 0.09H/(D)^0.5 = (0.09 x 19.5)/ $(30)^{0.5}$=0.3

Fundamental period of the building = Tay = 0.09H/(D)^0.5 = (0.09 x 19.5)/ $(14)^{0.5}$=0.42

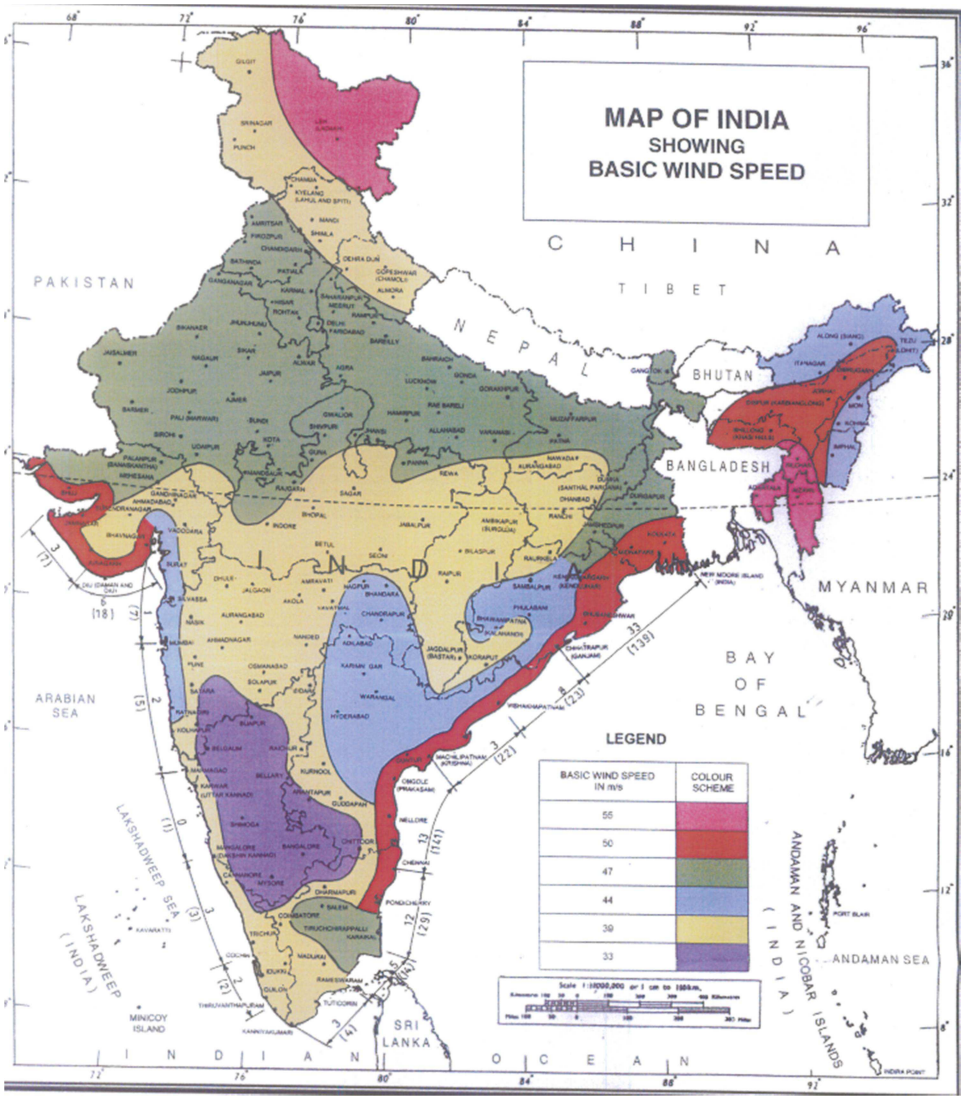
Block-2

Fundamental period of the building = Tax = 0.09H/(D)^0.5 = (0.09 x 19.5)/ $(17)^{0.5}$=0.4

Fundamental period of the building = Tay = 0.09H/(D)^0.5 = (0.09 x 19.5)/ $(14)^{0.5}$=0.42

Fundamental natural frequency 1/Ta = 1.6 >1.0

Dynamic wind analysis for the proposed building is not required, since the ratio of H/W (19.5m/30m) is 0.65 < 5. Also, the natural frequency of first mode is 1.6>1.0.



2.7 Seismic Lateral Force

Design of lateral force under seismic condition shall be as per IS1893 – 2016. Total lateral force (base shear) of the building shall be estimated as per clause 7.2.1 of IS1893 – 2016 which provides by

$$\text{Base shear} \quad V_b = A_h W$$

A_h is horizontal seismic coefficient and W is seismic weight of the building, Horizontal seismic coefficient depends on location of the building (Zone factor Z), usage of the building (Importance factor, I), building lateral resisting system (Response reduction factor, R) and design acceleration coefficient (Sa /g) which is based on subsoil condition and fundamental natural period (Ta).

For the proposed development is for residential use. Considering it, the seismic weight is summation of total dead load and 25% of live load where live load is less than 3 kN/sq.m

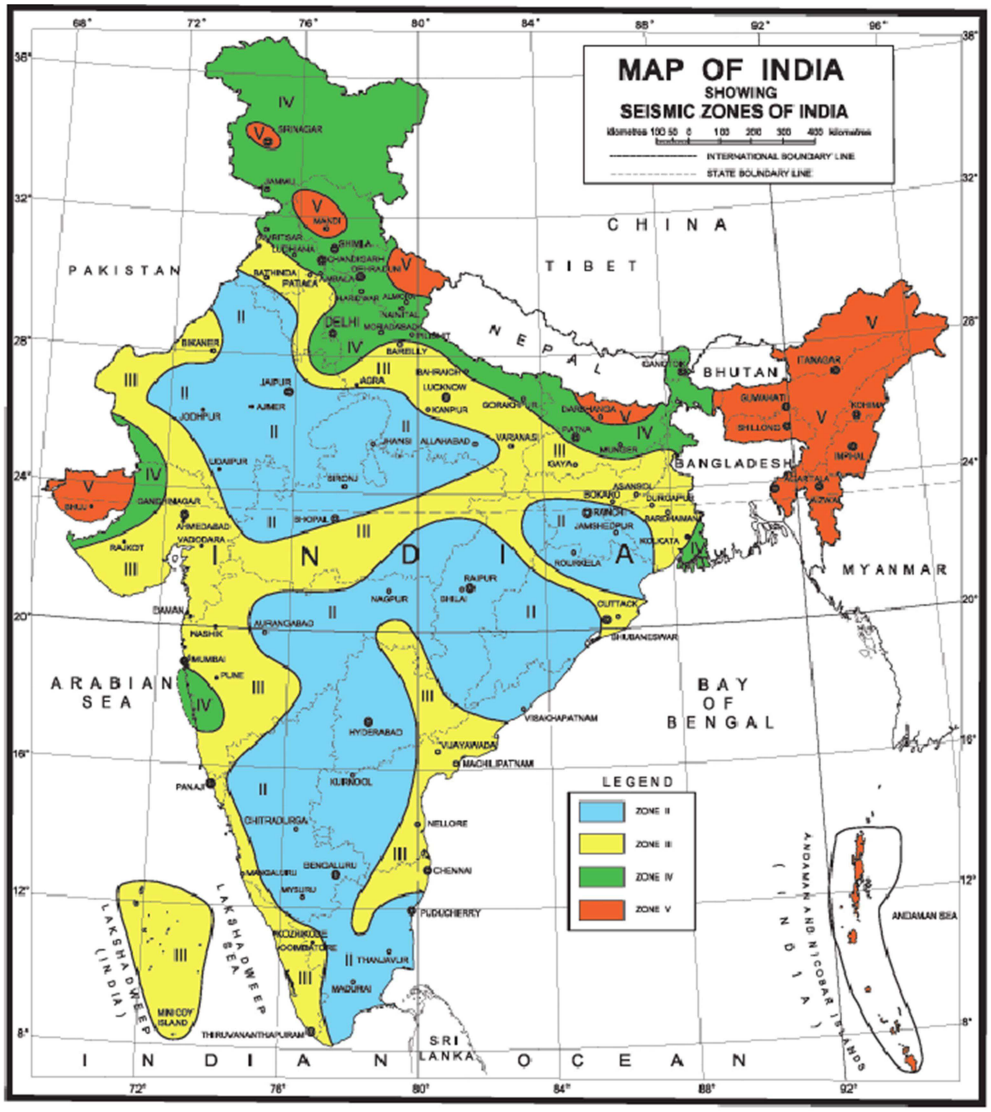
The fundamental natural period (Ta) for building

$$Ta = 0.09h/(d)^{0.5}$$

Where h- height of the building & d – width of the building under consideration of earthquake.

2.7.1 Design Parameters for estimation of seismic loading

Sl.No.	Description	Parameters as per IS-1893-2016
1.	Location - Chennai	Seismic zone III
2.	Seismic Zone Factor	0.16
3.	Response Reduction Factor	5.0
4	Importance factor	1.2
5	Type of Soil (Hard)	Type 1
6	Damping coefficient	5%



2.8 Base Shear

Height of the building (h) (measured from Stilt floor)
d (along the length of the building)
b (along the breadth of the building)

a) Block-1&2 Ta (along x) = 0.30 / 0.40 Refer - 2.6.1

b) Block-1&2 Ta (along y) = 0.42 Refer - 2.6.1

From IS 1893: 2002, Clause 6.4.2, Design horizontal seismic coefficient

$$Ah = \frac{Z}{2} \text{x} \frac{I}{R} \text{x} \frac{Sa}{g}$$

Where,

Z for Zone III = 0.16
I for Residential Building = 1.2 (Refer to IS 1893-2016, Table.9)
R for Structural wall system = 5.0 as per (Table 9)

Sa/g (For Rocky) x direction = (Refer to IS 1893-2016, page 13, Fig 1)

Sa/g (For Rocky) y direction = (Refer to IS 1893-2016, page 13, Fig 1)

2.9 Dynamic Analysis

Response spectrum method of Dynamic Analysis carried out with following parameters pertaining to dynamic analysis.

Time period	: Calculated with the assumption of wall system
Number of modes Considered	: 12 Numbers (Min)
Modal Combination Method Used	: Complete Quadratic combination (CQC).
Spatial Combination Method used	: Square root of the sum of Square (SRSS).
Modal case type	: Ritz vector Method
Orthogonal directional seismic effect	: Not applicable

3.0 Structural Analysis and design

3.1 Assumptions considered in the design

The assumptions for structural analysis and design are as below

- Elastic analysis (plane remains plane).
- Structure shall be analysed for the most adverse load conditions and envelope of forces shall be designed for.

3.2 Concrete Cover

Concrete cover to the reinforcement in structural elements is based on durability and fire rating. The fire rating of 2hrs is considered for structural elements for the commercial development.

Sl. No.	Structural Elements	Cover in mmm
1.	Footings	50
3.	Column	40
4.	Beams	30
5.	Slabs	25
6.	Basement Slab & Wall internal face	40
7.	Basement wall / Retaining wall Face in contact with soil(external)	40
8.	UG Tank Base Slab/Wall	40

3.3 Method for analysis

Computer-aided analysis using finite element method (FEM) shall be carried out for the design of structural elements. For 3D or 2D structural frame analysis latest version of software ETABS, SAFE shall be used, Prokon, RCDC and verified in-house spread sheets will be used for the design of reinforced concrete (RC) and steel elements in consideration of flexure, shear and axial forces.

3.4 Assumptions for 3D model analysis using ETABS

Column: Frame Element
Beam Element: Frame Element
Slab: membrane Element

The following are general parameters adopted in the analysis and design,

Modulus of Elasticity of Concrete -5000√fck

Consideration of Diaphragm - Rigid Diaphragm.

Slab element considered as membrane element

The following parameters and methods are adopted in creating ETABS 3D model for the buildings and design of structural elements.,

- The 3D ETABS model generated based on the preliminary floor plans (shuttering drawings) prepared using preliminary sizes.
- Sectional properties are assigned to all the structural elements as per the preliminary floor plans (shuttering drawings).
- External & Internal in fill wall loads are assigned as uniformly distributed line load on beams and as area load if the wall is intend to distribute on slab directly. These loads are assigned under SIDL type load case.
- Slabs are modelled as shell element. Beam-slab as floor system and slabs are assigned with horizontal diaphragms.
- Live Load reduction is considered in the design of Foundation and Column as per the Code: IS 875-1987 (Part-II), clause.3.2.1.
- Area design load i.e. Live load/SIDL or any other load is applied at floor relevant to its usage.
- All lateral loads & parameters are assigned as per Codes IS 1893-2016 & IS 875-2015.
- Temperature loads are applied on to the terraces and to areas directly exposed to sun.
- Beams under Torsion is required to maintain Equilibrium will be designed for Torsion in accordance with IS 456-2000, clause 41.1 to 41.4 and for all other beams torsional stiffness is neglected in the analysis by applying stiffness modifier as 0.0001 to torsional constant “J”. Hence no specific design for Torsion is required for these beams.
- Chennai falls under zone-III. Hence ductile detailing is required to follow in the design and detailing of structural elements.
- Concrete cover to reinforcement complied accordance with IS 456-2000, Tabl.16 & 16A.
- UG Sump is designed for 0.2mm and STP is designed for the crack width of 0.2mm.
- Secondary beams are not designed for ductile detailing.
- Long term deflections are checked by manual calculation using excel spread sheet wherever necessary. Crack width calculation will be done using spread sheet wherever necessary.

Area Load & Application: Applied as uniformly distributed area load with intensity proportionate to its usage as mentioned in the Loading items in the DBR.

Line (Wall) Load & Application: non load bearing or infill wall loads are calculated appropriately and Applied as uniformly distributed line load.

Lateral Load Resisting Systems: The proposed structure is designed to be a Framed system which resist the lateral loads that are interconnected to a conventional Beam-slab floor structural system.

4.0 LOAD COMBINATIONS

The various loads shall be combined in accordance with the stipulations in IS 875 (Part 5) 1987 and IS 456: 2000. The structure will be checked for serviceability Limit State and Ultimate Limit State (Limit State of Collapse) conditions. The load factors to be used for the load combinations are shown in the Table below. The structural elements shall be designed and checked for the critical forces from the combinations.

Load Combination	DL	IL	TL	Spec X	Spec Y	WX	WY
Serviceability Limit State- combinations							
LC1 (D.L +T.L.)	1.0	-	1.0	-	-	-	-
LC2 (D.L + I.L +T.L.)	1.0	1.0	1.0	-	-	-	-
LC3 (D.L + T.L + Spec X)	1.0	-	1.0	1.0	-	-	-
LC4 (D.L + T.L + Spec Y)	1.0	-	1.0	-	1.0	-	-
LC6 (D.L + T.L + W X)	1.0	-	1.0	-	-	1.0	-
LC7 (D.L + T.L – W X)	1.0	-	1.0	-	-	-1.0	-
LC8 (D.L + T.L + W Y)	1.0	-	1.0	-	-	-	1.0
LC9 (D.L + T.L – W Y)	1.0	-	1.0	-	-	-	-1.0
LC10 (D.L + I.L + T.L + Spec X)	1.0	0.8	1.0	0.8	-	-	-
LC11 (D.L + I.L + T.L + Spec Y)	1.0	0.8	1.0	-	0.8	-	-
LC12 (D.L + I.L + T.L + W X)	1.0	0.8	1.0	-	-	0.8	-
LC13 (D.L + I.L + T.L - W X)	1.0	0.8	1.0	-	-	-0.8	-
LC14 (D.L + I.L + T.L + W Y)	1.0	0.8	1.0	-	-	-	0.8
LC15 (D.L + I.L + T.L - WY)	1.0	0.8	1.0	-	-	-	-0.8
Ultimate Limit State – Combinations							
Comb1 (D.L +T.L)	1.5	-	1.0	-	-	-	-
Comb2 (D.L + I.L + T.L)	1.5	1.5	1.0	-	-	-	-
Comb3 (D.L + I.L + T.L ± Spec X/Spec XC / Spec XW)	1.2	1.2	1.0	1.2	-	-	-
Comb4 (D.L + I.L + T.L ± Spec Y/Spec YC / Spec YW)	1.2	1.2	1.0	-	1.2	-	-
Comb5 (D.L + I.L + T.L + W X)	1.2	1.2	1.0	-	-	1.2	-
Comb6 (D.L + I.L + T.L – W X)	1.2	1.2	1.0	-	-	-1.2	-
Comb7 (D.L + I.L + T.L + W Y)	1.2	1.2	1.0	-	-	-	1.2
Comb9 (D.L + I.L + T.L - W Y)	1.2	1.2	1.0	-	-	-	-1.2
Comb10 (D.L + T.L ± Spec X/Spec XC / Spec XW)	1.5	-	1.0	1.5	-	-	-
Comb12 (D.L + T.L ± Spec Y/Spec YC / Spec YW)	1.5	-	1.0	-	1.5	-	-
Comb13 (D.L + T.L ± Spec X/Spec XC / Spec XW)	0.9	-	1.0	1.5			
Comb14 (D.L + T.L ± Spec Y/Spec YC / Spec YW)	0.9	-	1.0		1.5		
Comb15 (D.L + T.L – Spec Y)	1.5	-	1.0	-	-1.5	-	-
Comb16 (D.L + T.L + W X)	1.5	-	1.0	-	-	1.5	-
Comb17 (D.L + T.L – W X)	1.5	-	1.0	-	-	-1.5	-
Comb18 (D.L + T.L + W Y)	1.5	-	1.0	-	-	-	1.5
Comb19 (D.L + T.L – W Y)	1.5	-	1.0	-	-	-	-1.5
Comb20 (D.L + T.L + W X)	0.9	-	1.0	-	-	1.5	-

Comb21 (D.L + T.L – W X)	0.9	-	1.0	-	-	-1.5	-
Comb22 (D.L + T.L + W Y)	0.9	-	1.0	-	-	-	1.5
Comb23 (D.L + T.L – W Y)	0.9	-	1.0	-	-	-	-1.5

5.0 ACCEPTANCE CRITERIA

Under Serviceability Limit State the limiting structural deflection shall be as follows.

Total deflection under all imposed loads including temperature, creep and shrinkage shall not exceed **L/250.**

In the above limiting value, the deflection contribution due to temperature, creep and shrinkage shall not be more than **L/350**.

Lateral deflection (sway) due to wind shall not exceed **H/500 (.002 H)** where H is the height of the building above ground.

5.1 Crack width Limits

The Limiting values of crack width as per clause 35.3 of IS: 456-2000 is followed in the design

- In general, for slabs crack width is limited to 0.3mm.
- For water retaining structures crack width is limited to 0.2mm

6.0 Design of Structural Elements and Foundation

For the proposed configuration of the structure the stratum below the stilt floor level is very weak in both shear and compressibility behaviour consideration. Hence adopt only pile foundation to prevent shear and settlement failure of the bearing stratum. The piles can be installed by drilling with direct mud circulation technique (Bored Cast In-situ Piles) and the recommended safe load carrying capacity of bored cast in-situ piles in compression, pull out and lateral for different diameters taken to a depth of 31.0m below the existing ground level and the pile shaft length will be around 2 to31m from Pile cut off level.

6.1. Column

RC Columns which is supporting both vertical loads and lateral forces are designed for the most adverse load conditions and envelope of the forces which will be the maximum for that structural element from the load combinations considered in the 3D analysis. RCDC, a design software or ETABS design platform itself will be used to design the element for the maximum forces obtained from the load combinations. As the buildings are located in Zone III, ductile details shall be followed.

6.2. Beams

Each Beam will be designed for maximum forces from the 3D analysis using ETABS or RCDC concrete design software shall be used to design of RC members. Also, the detailing shall be followed as per SP-34 & IS-456 etc.

6.3. Slabs

RC basement slab is designed using SAFE software and detailing will be followed as per the relevant code. Other slabs will be designed using in-house spread sheet.

6.4. Basement wall

Basement wall is designed for soil pressure at rest and water pressure as required. It is designed as retaining structure with limiting crack width to 0.2mm.

6.5. External works- Roads, Drainage and Compound wall

6.5.1 Road works

Road pavement can be flexible pavement or rigid pavement. Road pavement consists of subgrade, sub-base, base course, asphalt base course and asphalt wearing course. Subgrade is the soil layer at road formation level, sub-base and base course compacted approved graded aggregate or other suitable material and over which asphalt or Concrete will be laid. In the case of Asphalt road, the layer consists of asphalt base course and asphalt wearing course. For rigid pavement approved concrete mix laid over base course in the place of asphalt. Specification for works will be provided separately.

6.5.2 Drains

Depending on the layout of rain water drainage system, reinforcement details for drains and culverts as required will be provided.

6.5.3 Compound wall

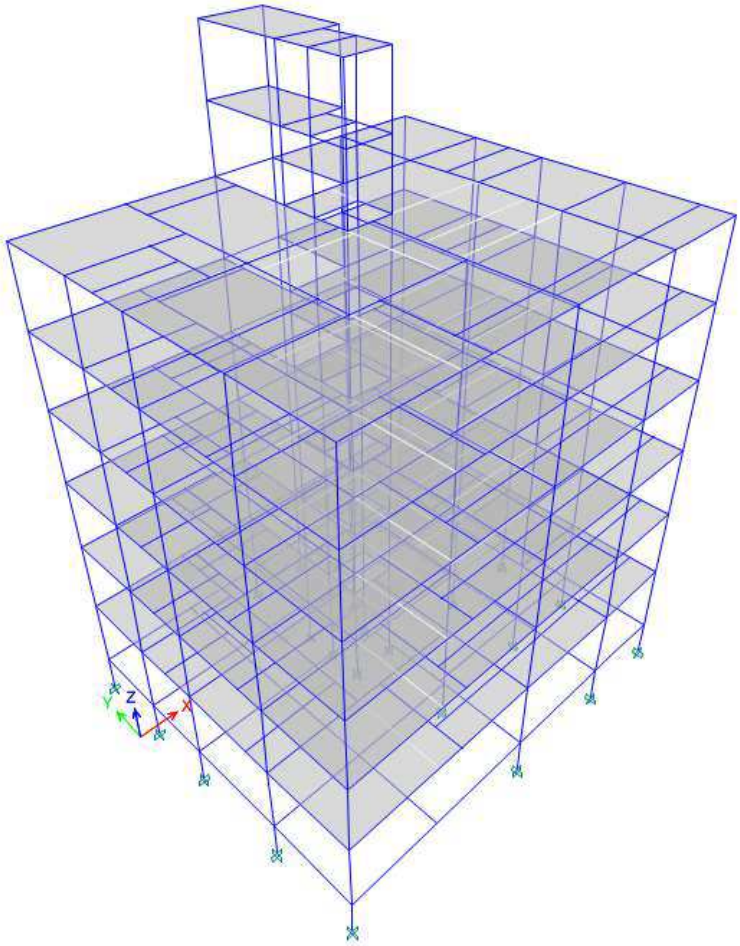
As per the architectural intend the compound wall will be designed. If it is required it will be designed to retain soil for certain height. It will also be designed for the lateral pressure. Foundation could be designed as “L” footing or with Short Pile taking the soil/site condition in to account.

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ANALYSIS SUMMARY REPORT-BLOCK-1

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ETABS®



User Report 1

Model File: ADYAR, Revision 0
14/07/2024

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1 Loads

This chapter provides loading information as applied to the model.

1.1 Load Patterns

Table 1.1 - Load Pattern Definitions

Name	Is Auto Load	Type	Self Weight Multiplier	Auto Load
Dead	No	Dead	1	
EQX	No	Seismic	0	IS 1893:2016
EQY	No	Seismic	0	IS 1893:2016
Live<3	No	Reducible Live	0	
Live>3	No	Reducible Live	0	
ROOF LIVE	No	Roof Live	0	
SDL	No	Super Dead	0	
TEMP	No	Other	0	
WALL	No	Super Dead	0	
WX	No	Wind	0	Indian IS 875:2015
WY	No	Wind	0	Indian IS 875:2015

1.2 Load Sets

Table 1.2 - Shell Uniform Load Sets

Name	Load Pattern	Load Value kN/m2
Electrical room	SDL	2.4
Electrical room	Live>3	5
LMR	SDL	15
LMR	Live<3	3
lobby	SDL	2.4
lobby	Live>3	4
Office	SDL	2.4
Office	Live>3	5
OHT	SDL	15
OHT	Live<3	3
Roof	SDL	15
Roof	Live<3	3
toilet	SDL	4.2
toilet	Live>3	4

1.3 Auto Wind Loading

Table 1.3 - Load Pattern Definitions - Auto Wind - Indian IS 875 2015 (Part 1 of 3)

Name	Exposure Set	Is Auto Load	Exposure Source	Top Story	Bottom Story	Include Parapet	Parapet Height m	Cp Windward	Cp Leeward	Wind Speed meter/sec
WX	1	No	Diaphragms	TERRACE	STILT	Yes	1.2	0.8	0.5	50
WX	1	No								
WX	1	No								
WX	1	No								
WX	1	No								
WX	1	No								
WX	1	No								

Table 1.3 - Load Pattern Definitions - Auto Wind - Indian IS 875 2015 (Part 1 of 3, continued)

Name	Exposure Set	Is Auto Load	Exposure Source	Top Story	Bottom Story	Include Parapet	Parapet Height m	Cp Windward	Cp Leeward	Wind Speed meter/sec
WX	1	No								
WY	1	No	Diaphragms	TERRACE	STILT	Yes	1.2	0.8	0.5	50
WY	1	No								
WY	1	No								
WY	1	No								
WY	1	No								
WY	1	No								
WY	1	No								
WY	1	No								

Table 1.3 - Load Pattern Definitions - Auto Wind - Indian IS 875 2015 (Part 2 of 3)

Name	Exposure Set	Terrain Category	Importance Factor	Risk Coefficient	Topography	Width Type	Direction Angle deg	Story	Diaphragm	Width m
WX	1	2	1.00	1	1	Auto	0	LMR	D1	6.52
WX	1							HR	D1	5.02
WX	1							TERRACE	D1	14.11
WX	1							5TH	D1	14.11
WX	1							4TH	D1	14.11
WX	1							3RD	D1	14.11
WX	1							2ND	D1	14.11
WX	1							1ST	D1	14.11
WY	1	2	1.00	1	1	Auto	90	LMR	D1	2.55
WY	1							HR	D1	2.55
WY	1							TERRACE	D1	16.77
WY	1							5TH	D1	16.77
WY	1							4TH	D1	16.77
WY	1							3RD	D1	16.77
WY	1							2ND	D1	16.77
WY	1							1ST	D1	16.77

Table 1.3 - Load Pattern Definitions - Auto Wind - Indian IS 875 2015 (Part 3 of 3)

Name	Exposure Set	X m	Y m
WX	1	9.43	-0.305
WX	1	9.43	0.445
WX	1	9.04	-4.1
WX	1	9.04	-4.1
WX	1	9.04	-4.1
WX	1	9.04	-4.1
WX	1	9.04	-4.1
WX	1	9.04	-4.1
WY	1	9.43	-0.305
WY	1	9.43	0.445
WY	1	9.04	-4.1
WY	1	9.04	-4.1
WY	1	9.04	-4.1
WY	1	9.04	-4.1
WY	1	9.04	-4.1

Table 1.3 - Load Pattern Definitions - Auto Wind - Indian IS 875 2015 (Part 3 of 3, continued)

Name	Exposure Set	X m	Y m
WY	1	9.04	-4.1

1.4 Auto Seismic Loading

Table 1.4 - Load Pattern Definitions - Auto Seismic - IS 1893 2016 (Part 1 of 3)

Name	Period Used sec	Coeff Used	Weight Used kN	Base Shear kN	Is Auto Load	X Dir?	X Dir Plus Ecc?	X Dir Minus Ecc?	Y Dir?	Y Dir Plus Ecc?	Y Dir Minus Ecc?
EQX	0.42	0.045714	22995.7056	1051.2323	No	Yes	No	No	No	No	No
EQY	0.4	0.048	22995.7056	1103.7939	No	No	No	No	Yes	No	No

Table 1.4 - Load Pattern Definitions - Auto Seismic - IS 1893 2016 (Part 2 of 3)

Name	Period Used sec	Coeff Used	Weight Used kN	Base Shear kN	Ecc Ratio	Top Story	Bottom Story	Period Type	User T sec	Z
EQX	0.42	0.045714	22995.7056	1051.2323	0	TERRACE	STILT	User Defined	0.42	0.16
EQY	0.4	0.048	22995.7056	1103.7939	0	TERRACE	STILT	User Defined	0.4	0.16

Table 1.4 - Load Pattern Definitions - Auto Seismic - IS 1893 2016 (Part 3 of 3)

Name	Period Used sec	Coeff Used	Weight Used kN	Base Shear kN	I	R
EQX	0.42	0.045714	22995.7056	1051.2323	1.2	5
EQY	0.4	0.048	22995.7056	1103.7939	1.2	5

IS 1893:2016 Auto Seismic Load Calculation

This calculation presents the automatically generated lateral seismic loads for load pattern EQX according to IS 1893:2016, as calculated by ETABS.

Direction and Eccentricity

Direction = X

Eccentricity Ratio = 0% for all diaphragms

Structural Period

Period Calculation Method = User Specified

User Period $T = 0.42\ sec$

Factors and Coefficients

Seismic Zone Factor, Z [IS Table 3] $Z = 0.16$

Response Reduction Factor, R [IS Table 9] $R = 5$

Importance Factor, I [IS Table 8] $I = 1.2$

Site Type [IS Table 1] = I

Seismic Response

Spectral Acceleration Coefficient, S_a/g [IS 6.4.2] $\frac{S_a}{g} = \frac{1}{T}$ $\frac{S_a}{g} = 2.380952$

Equivalent Lateral Forces

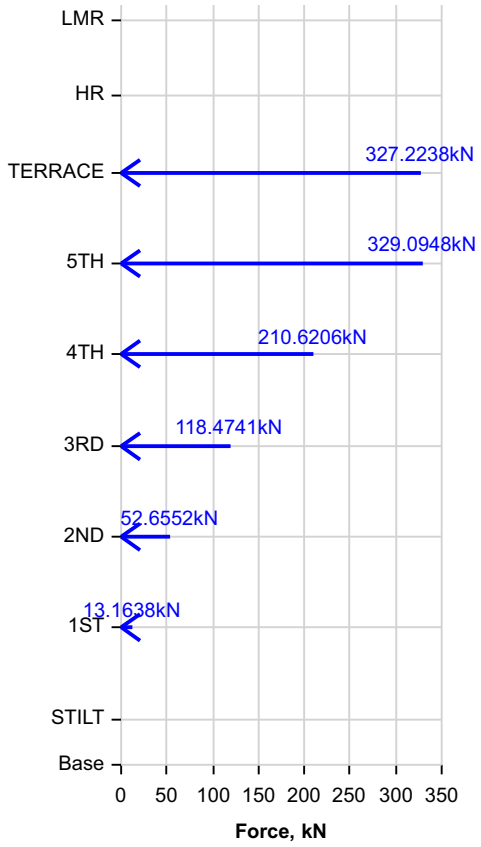
Seismic Coefficient, A_h [IS 6.4.2] $A_h = \frac{Z\, I \frac{S_a}{g}}{2\, R}$

Calculated Base Shear

Direction	Period Used (sec)	W (kN)	V_b (kN)
X	0.42	22995.7056	1051.2323

Applied Story Forces

Lateral Load to Stories - X



Story	Elevation	X-Dir	Y-Dir
	m	kN	kN
LMR	24.5	0	0
HR	22	0	0
TERRACE	19.5	327.2238	0
5TH	16.5	329.0948	0
4TH	13.5	210.6206	0
3RD	10.5	118.4741	0
2ND	7.5	52.6552	0
1ST	4.5	13.1638	0
STILT	1.5	0	0
Base	0	0	0

IS 1893:2016 Auto Seismic Load Calculation

This calculation presents the automatically generated lateral seismic loads for load pattern EQY according to IS 1893:2016, as calculated by ETABS.

Direction and Eccentricity

Direction = Y

Eccentricity Ratio = 0% for all diaphragms

Structural Period

Period Calculation Method = User Specified

User Period $T = 0.4\ sec$

Factors and Coefficients

Seismic Zone Factor, Z [IS Table 3] $Z = 0.16$

Response Reduction Factor, R [IS Table 9] $R = 5$

Importance Factor, I [IS Table 8] $I = 1.2$

Site Type [IS Table 1] = I

Seismic Response

Spectral Acceleration Coefficient, S_a/g [IS 6.4.2] $\frac{S_a}{g} = \frac{1}{T}$ $\frac{S_a}{g} = 2.5$

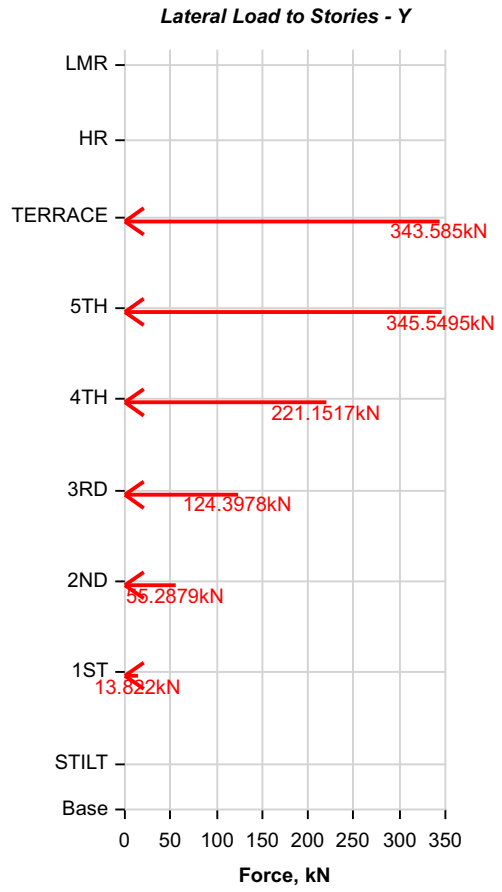
Equivalent Lateral Forces

Seismic Coefficient, A_h [IS 6.4.2] $A_h = \frac{Z\, I \frac{S_a}{g}}{2\, R}$

Calculated Base Shear

Direction	Period Used (sec)	W (kN)	V_b (kN)
Y	0.4	22995.7056	1103.7939

Applied Story Forces



Story	Elevation	X-Dir	Y-Dir
	m	kN	kN
LMR	24.5	0	0
HR	22	0	0
TERRACE	19.5	0	343.585
5TH	16.5	0	345.5495
4TH	13.5	0	221.1517
3RD	10.5	0	124.3978
2ND	7.5	0	55.2879
1ST	4.5	0	13.822
STILT	1.5	0	0
Base	0	0	0

1.5 Functions

1.5.1 Response Spectrum Functions

Table 1.7 - Functions - Response Spectrum - IS1893 2016

Name	Period sec	Value	Seismic Zone	I	Soil Type	R	Damping Ratio
RESP	0	0.0192	III	1.2	I	5	0.05
RESP	0.1	0.048					
RESP	0.4	0.048					
RESP	0.6	0.032					
RESP	0.8	0.024					
RESP	1	0.0192					
RESP	1.2	0.016					
RESP	1.4	0.013714					
RESP	1.6	0.012					
RESP	1.8	0.010667					
RESP	2	0.0096					
RESP	2.5	0.00768					
RESP	3	0.0064					
RESP	3.5	0.005486					
RESP	4	0.0048					
RESP	4.5	0.0048					
RESP	5	0.0048					
RESP	5.5	0.0048					
RESP	6	0.0048					
RESP	6.5	0.0048					
RESP	7	0.0048					
RESP	7.5	0.0048					
RESP	8	0.0048					
RESP	8.5	0.0048					
RESP	9	0.0048					
RESP	9.5	0.0048					
RESP	10	0.0048					

Table 1.8 - Functions - Response Spectrum - User Defined

Name	Period sec	Value	Damping Ratio
UnifRS	0	1	0.05
UnifRS	1	1	

2 Analysis Results

This chapter provides analysis results.

2.1 Modal Results

Table 2.1 - Modal Periods And Frequencies

Case	Mode	Period sec	Frequency cyc/sec	CircFreq rad/sec	Eigenvalue rad2/sec2
Modal	1	1.686	0.593	3.7272	13.8922
Modal	2	1.437	0.696	4.3739	19.1308
Modal	3	0.533	1.875	11.7836	138.8541
Modal	4	0.459	2.18	13.6961	187.5824
Modal	5	0.312	3.21	20.1683	406.7607
Modal	6	0.262	3.82	24.0013	576.0611
Modal	7	0.22	4.545	28.5566	815.4791
Modal	8	0.186	5.386	33.8436	1145.3891
Modal	9	0.148	6.767	42.5181	1807.7881
Modal	10	0.134	7.474	46.9605	2205.2908
Modal	11	0.126	7.928	49.8158	2481.6184
Modal	12	0.104	9.644	60.5941	3671.649

Table 2.2 - Modal Participating Mass Ratios (Part 1 of 2)

Case	Mode	Period sec	UX	UY	UZ	SumUX	SumUY	SumUZ	RX	RY
Modal	1	1.686	0.8115	0.0004	0	0.8115	0.0004	0	0.0001	0.1879
Modal	2	1.437	0.0004	0.823	0	0.812	0.8234	0	0.1759	0.0001
Modal	3	0.533	0.1034	0.0001	0	0.9153	0.8234	0	0.0004	0.5706
Modal	4	0.459	0.0001	0.1028	0	0.9154	0.9263	0	0.6083	0.0005
Modal	5	0.312	0.029	4.005E-05	0	0.9444	0.9263	0	0.0001	0.0534
Modal	6	0.262	4.081E-05	0.0285	0	0.9445	0.9549	0	0.0495	0.0001
Modal	7	0.22	0.0203	2.292E-05	0	0.9648	0.9549	0	4.779E-05	0.0618
Modal	8	0.186	7.438E-06	0.0145	0	0.9648	0.9694	0	0.0553	4.202E-05
Modal	9	0.148	0.0117	3.283E-06	0	0.9765	0.9694	0	1.348E-05	0.041
Modal	10	0.134	1.683E-06	0.0089	0	0.9765	0.9783	0	0.0313	3.913E-06
Modal	11	0.126	0	0.0007	0	0.9765	0.979	0	0.0026	0
Modal	12	0.104	0.0048	8.984E-07	0	0.9813	0.979	0	2.508E-06	0.0151

Table 2.2 - Modal Participating Mass Ratios (Part 2 of 2)

Case	Mode	RZ	SumRX	SumRY	SumRZ
Modal	1	0.0069	0.0001	0.1879	0.0069
Modal	2	7.071E-07	0.176	0.1879	0.0069
Modal	3	0.1218	0.1764	0.7585	0.1287
Modal	4	3.617E-06	0.7847	0.7591	0.1287
Modal	5	0.117	0.7848	0.8125	0.2457
Modal	6	0.0001	0.8343	0.8126	0.2458
Modal	7	0.0369	0.8344	0.8744	0.2828
Modal	8	0.0003	0.8897	0.8744	0.2831
Modal	9	0	0.8897	0.9154	0.2831
Modal	10	1.357E-05	0.921	0.9154	0.2831
Modal	11	0.0188	0.9237	0.9154	0.3019
Modal	12	0.0011	0.9237	0.9304	0.303

Table 2.3 - Modal Participation Factors

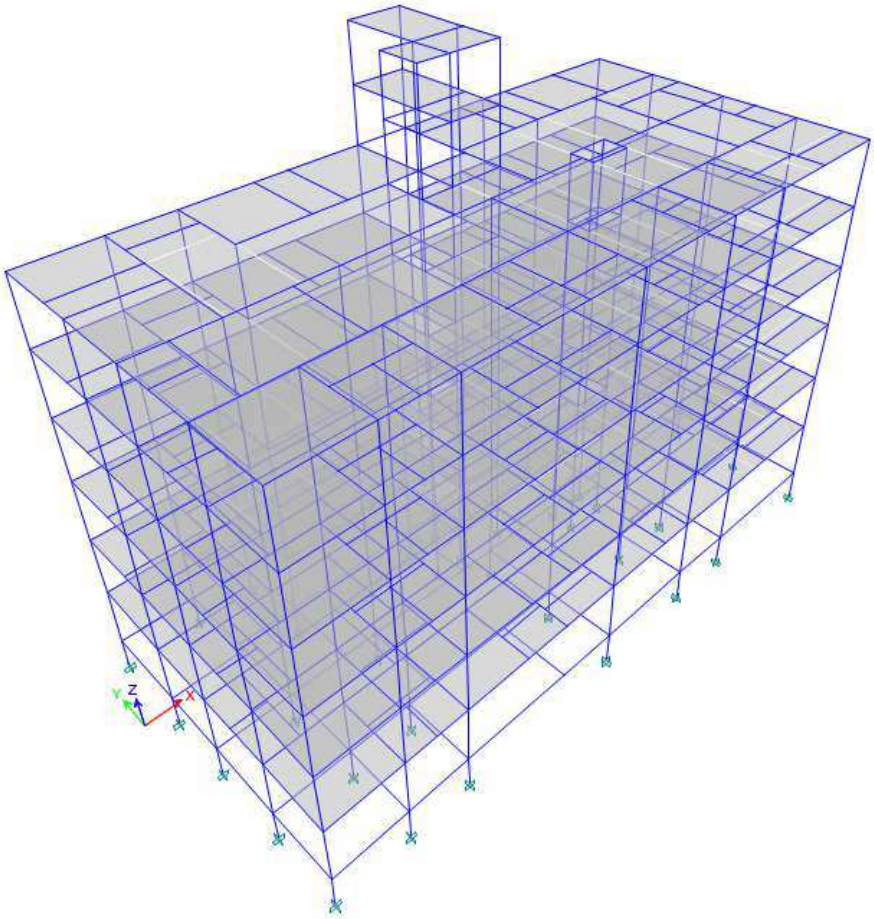
Case	Mode	Period sec	UX kN-m	UY kN-m	UZ kN-m	RX kN-m	RY kN-m	RZ kN-m	ModalMass kN-m-s2	ModalStiff kN-m
Modal	1	1.686	4.5E-05	-1E-06	0	0.002875	0.122362	-0.006118	1E-06	1E-05
Modal	2	1.437	1E-06	4.6E-05	0	-0.118391	0.00246	6.2E-05	1E-06	2E-05
Modal	3	0.533	-1.6E-05	4.862E-07	0	0.005921	0.213258	-0.025716	1E-06	0.00014
Modal	4	0.459	-4.57E-07	-1.6E-05	0	-0.220186	0.006525	0.00014	1E-06	0.00019
Modal	5	0.312	-9E-06	3.181E-07	0	0.003041	0.065265	0.025201	1E-06	0.00041
Modal	6	0.262	3.211E-07	8E-06	0	0.062812	-0.002153	0.000852	1E-06	0.00058
Modal	7	0.22	7E-06	-2.406E-07	0	-0.001952	-0.07017	0.014157	1E-06	0.00082
Modal	8	0.186	-1.371E-07	-6E-06	0	-0.066411	0.00183	0.001306	1E-06	0.00115
Modal	9	0.148	5E-06	-9.108E-08	0	-0.001036	-0.05714	-9E-06	1E-06	0.00181
Modal	10	0.134	6.521E-08	5E-06	0	0.049969	-0.000558	0.000271	1E-06	0.00221
Modal	11	0.126	0	-1E-06	0	-0.014445	-3.7E-05	0.010104	1E-06	0.00248
Modal	12	0.104	3E-06	-4.764E-08	0	-0.000447	-0.034653	-0.002452	1E-06	0.00367

Table 2.4 - Modal Load Participation Ratios

Case	ItemType	Item	Static %	Dynamic %
Modal	Acceleration	UX	100	98.13
Modal	Acceleration	UY	100	97.9
Modal	Acceleration	UZ	0	0

ANALYSIS SUMMARY REPORT-BLOCK-2

ETABS®



User Report 2

Model File: ADYAR, Revision 0
14/07/2024

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1 Loads

This chapter provides loading information as applied to the model.

1.1 Load Patterns

Table 1.1 - Load Pattern Definitions

Name	Is Auto Load	Type	Self Weight Multiplier	Auto Load
Dead	No	Dead	1	
EQX	No	Seismic	0	IS 1893:2016
EQY	No	Seismic	0	IS 1893:2016
Live<3	No	Reducible Live	0	
Live>3	No	Reducible Live	0	
ROOF LIVE	No	Roof Live	0	
SDL	No	Super Dead	0	
TEMP	No	Other	0	
WALL	No	Super Dead	0	
WX	No	Wind	0	Indian IS 875:2015
WY	No	Wind	0	Indian IS 875:2015

1.2 Load Sets

Table 1.2 - Shell Uniform Load Sets

Name	Load Pattern	Load Value kN/m2
Electrical room	SDL	2.4
Electrical room	Live>3	5
LMR	SDL	15
LMR	Live<3	3
lobby	SDL	2.4
lobby	Live>3	4
Office	SDL	2.4
Office	Live>3	5
OHT	SDL	15
OHT	Live<3	3
Roof	SDL	15
Roof	Live<3	3
toilet	SDL	4.2
toilet	Live>3	4

1.3 Auto Wind Loading

Table 1.3 - Load Pattern Definitions - Auto Wind - Indian IS 875 2015 (Part 1 of 3)

Name	Exposure Set	Is Auto Load	Exposure Source	Top Story	Bottom Story	Include Parapet	Parapet Height m	Cp Windward	Cp Leeward	Wind Speed meter/sec
WX	1	No	Diaphragms	TERRACE	STILT	Yes	1.2	0.8	0.5	50
WX	1	No								
WX	1	No								
WX	1	No								
WX	1	No								
WX	1	No								
WY	1	No	Diaphragms	TERRACE	STILT	Yes	1.2	0.8	0.5	50

Table 1.3 - Load Pattern Definitions - Auto Wind - Indian IS 875 2015 (Part 1 of 3, continued)

Name	Exposure Set	Is Auto Load	Exposure Source	Top Story	Bottom Story	Include Parapet	Parapet Height m	Cp Windward	Cp Leeward	Wind Speed meter/sec
WY	1	No								
WY	1	No								
WY	1	No								
WY	1	No								
WY	1	No								

Table 1.3 - Load Pattern Definitions - Auto Wind - Indian IS 875 2015 (Part 2 of 3)

Name	Exposure Set	Terrain Category	Importance Factor	Risk Coefficient	Topography	Width Type	Direction Angle deg	Story	Diaphragm	Width m
WX	1	2	1.00	1	1	Auto	0	TERRACE	D2	14.35
WX	1							5TH	D2	14.35
WX	1							4TH	D2	14.35
WX	1							3RD	D2	14.35
WX	1							2ND	D2	14.35
WX	1							1ST	D2	14.35
WY	1	2	1.00	1	1	Auto	90	TERRACE	D2	29.575
WY	1							5TH	D2	29.575
WY	1							4TH	D2	29.575
WY	1							3RD	D2	29.575
WY	1							2ND	D2	29.575
WY	1							1ST	D2	29.575

Table 1.3 - Load Pattern Definitions - Auto Wind - Indian IS 875 2015 (Part 3 of 3)

Name	Exposure Set	X m	Y m
WX	1	15.8625	-3.98
WX	1	15.8625	-3.98
WX	1	15.8625	-3.98
WX	1	15.8625	-3.98
WX	1	15.8625	-3.98
WX	1	15.8625	-3.98
WY	1	15.8625	-3.98
WY	1	15.8625	-3.98
WY	1	15.8625	-3.98
WY	1	15.8625	-3.98
WY	1	15.8625	-3.98
WY	1	15.8625	-3.98

1.4 Auto Seismic Loading

Table 1.4 - Load Pattern Definitions - Auto Seismic - IS 1893 2016 (Part 1 of 3)

Name	Period Used sec	Coeff Used	Weight Used kN	Base Shear kN	Is Auto Load	X Dir?	X Dir Plus Ecc?	X Dir Minus Ecc?	Y Dir?	Y Dir Plus Ecc?	Y Dir Minus Ecc?
EQX	0.3	0.048	38682.5423	1856.762	No	Yes	No	No	No	No	No
EQY	0.42	0.045714	38682.5423	1768.3448	No	No	No	No	Yes	No	No

Table 1.4 - Load Pattern Definitions - Auto Seismic - IS 1893 2016 (Part 2 of 3)

Name	Period Used sec	Coeff Used	Weight Used kN	Base Shear kN	Ecc Ratio	Top Story	Bottom Story	Period Type	User T sec	Z
EQX	0.3	0.048	38682.5423	1856.762	0	TERRACE	STILT	User Defined	0.3	0.16
EQY	0.42	0.045714	38682.5423	1768.3448	0	TERRACE	STILT	User Defined	0.42	0.16

Table 1.4 - Load Pattern Definitions - Auto Seismic - IS 1893 2016 (Part 3 of 3)

Name	Period Used sec	Coeff Used	Weight Used kN	Base Shear kN	I	R
EQX	0.3	0.048	38682.5423	1856.762	1.2	5
EQY	0.42	0.045714	38682.5423	1768.3448	1.2	5

IS 1893:2016 Auto Seismic Load Calculation

This calculation presents the automatically generated lateral seismic loads for load pattern EQX according to IS 1893:2016, as calculated by ETABS.

Direction and Eccentricity

Direction = X

Eccentricity Ratio = 0% for all diaphragms

Structural Period

Period Calculation Method = User Specified

User Period $T = 0.3\ sec$

Factors and Coefficients

Seismic Zone Factor, Z [IS Table 3] $Z = 0.16$

Response Reduction Factor, R [IS Table 9] $R = 5$

Importance Factor, I [IS Table 8] $I = 1.2$

Site Type [IS Table 1] = I

Seismic Response

Spectral Acceleration Coefficient, S_a/g [IS 6.4.2] $\frac{S_a}{g} = 2.5$ $\frac{S_a}{g} = 2.5$

Equivalent Lateral Forces

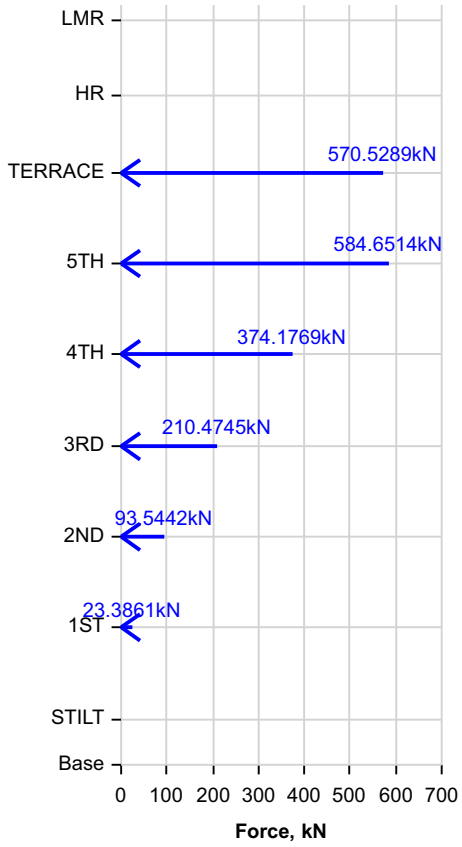
Seismic Coefficient, A_h [IS 6.4.2] $A_h = \frac{Z\, I \frac{S_a}{g}}{2\, R}$

Calculated Base Shear

Direction	Period Used (sec)	W (kN)	V_b (kN)
X	0.3	38682.5423	1856.762

Applied Story Forces

Lateral Load to Stories - X



Story	Elevation	X-Dir	Y-Dir
	m	kN	kN
LMR	24.5	0	0
HR	22	0	0
TERRACE	19.5	570.5289	0
5TH	16.5	584.6514	0
4TH	13.5	374.1769	0
3RD	10.5	210.4745	0
2ND	7.5	93.5442	0
1ST	4.5	23.3861	0
STILT	1.5	0	0
Base	0	0	0

IS 1893:2016 Auto Seismic Load Calculation

This calculation presents the automatically generated lateral seismic loads for load pattern EQY according to IS 1893:2016, as calculated by ETABS.

Direction and Eccentricity

Direction = Y

Eccentricity Ratio = 0% for all diaphragms

Structural Period

Period Calculation Method = User Specified

User Period $T = 0.42 \ sec$

Factors and Coefficients

Seismic Zone Factor, Z [IS Table 3] $Z = 0.16$

Response Reduction Factor, R [IS Table 9] $R = 5$

Importance Factor, I [IS Table 8] $I = 1.2$

Site Type [IS Table 1] = I

Seismic Response

Spectral Acceleration Coefficient, S_a/g [IS 6.4.2] $\frac{S_a}{g} = \frac{1}{T}$ $\frac{S_a}{g} = 2.380952$

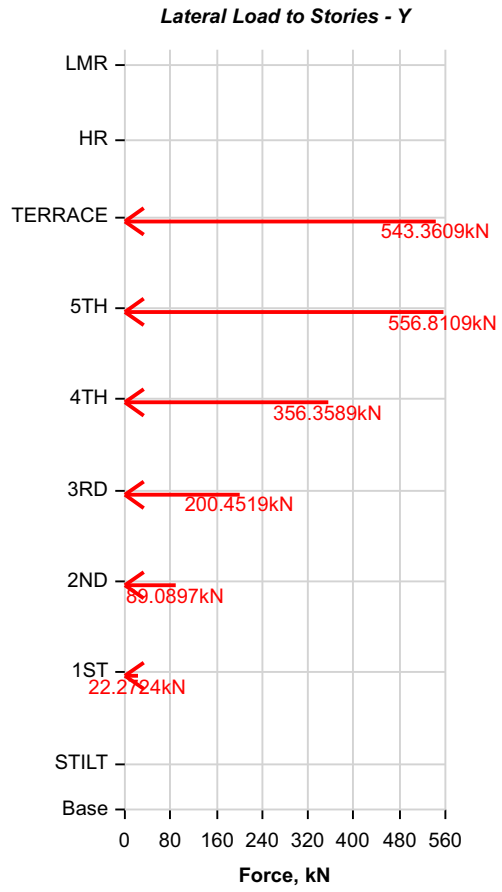
Equivalent Lateral Forces

Seismic Coefficient, A_h [IS 6.4.2] $A_h = \frac{Z I \frac{S_a}{g}}{2 R}$

Calculated Base Shear

Direction	Period Used (sec)	W (kN)	V_b (kN)
Y	0.42	38682.5423	1768.3448

Applied Story Forces



Story	Elevation	X-Dir	Y-Dir
	m	kN	kN
LMR	24.5	0	0
HR	22	0	0
TERRACE	19.5	0	543.3609
5TH	16.5	0	556.8109
4TH	13.5	0	356.3589
3RD	10.5	0	200.4519
2ND	7.5	0	89.0897
1ST	4.5	0	22.2724
STILT	1.5	0	0
Base	0	0	0

1.5 Functions

1.5.1 Response Spectrum Functions

Table 1.7 - Functions - Response Spectrum - IS1893 2016

Name	Period sec	Value	Seismic Zone	I	Soil Type	R	Damping Ratio
RESP	0	0.0192	III	1.2	I	5	0.05
RESP	0.1	0.048					
RESP	0.4	0.048					
RESP	0.6	0.032					
RESP	0.8	0.024					
RESP	1	0.0192					
RESP	1.2	0.016					
RESP	1.4	0.013714					
RESP	1.6	0.012					
RESP	1.8	0.010667					
RESP	2	0.0096					
RESP	2.5	0.00768					
RESP	3	0.0064					
RESP	3.5	0.005486					
RESP	4	0.0048					
RESP	4.5	0.0048					
RESP	5	0.0048					
RESP	5.5	0.0048					
RESP	6	0.0048					
RESP	6.5	0.0048					
RESP	7	0.0048					
RESP	7.5	0.0048					
RESP	8	0.0048					
RESP	8.5	0.0048					
RESP	9	0.0048					
RESP	9.5	0.0048					
RESP	10	0.0048					

Table 1.8 - Functions - Response Spectrum - User Defined

Name	Period sec	Value	Damping Ratio
UnifRS	0	1	0.05
UnifRS	1	1	

2 Analysis Results

This chapter provides analysis results.

2.1 Modal Results

Table 2.1 - Modal Periods And Frequencies

Case	Mode	Period sec	Frequency cyc/sec	CircFreq rad/sec	Eigenvalue rad2/sec2
Modal	1	1.495	0.669	4.202	17.6569
Modal	2	1.297	0.771	4.8454	23.4782
Modal	3	0.475	2.106	13.2339	175.1354
Modal	4	0.405	2.47	15.5169	240.7739
Modal	5	0.278	3.599	22.6112	511.2682
Modal	6	0.266	3.764	23.6487	559.2631
Modal	7	0.211	4.748	29.8351	890.1316
Modal	8	0.181	5.515	34.6529	1200.8248
Modal	9	0.152	6.599	41.4621	1719.1053
Modal	10	0.114	8.791	55.2327	3050.6538
Modal	11	0.114	8.798	55.2773	3055.5776
Modal	12	0.093	10.723	67.3726	4539.0668

Table 2.2 - Modal Participating Mass Ratios (Part 1 of 2)

Case	Mode	Period sec	UX	UY	UZ	SumUX	SumUY	SumUZ	RX	RY
Modal	1	1.495	1.198E-05	0.8269	0	1.198E-05	0.8269	0	0.1739	4.404E-06
Modal	2	1.297	0.8129	1.447E-05	0	0.8129	0.8269	0	1.312E-06	0.188
Modal	3	0.475	1.125E-05	0.1056	0	0.8129	0.9325	0	0.6192	4.204E-05
Modal	4	0.405	0.0988	1.183E-05	0	0.9117	0.9325	0	0.0001	0.5546
Modal	5	0.278	0.0002	0.0228	0	0.9118	0.9553	0	0.039	0.0005
Modal	6	0.266	0.0217	0.0002	0	0.9336	0.9554	0	0.0002	0.0467
Modal	7	0.211	4.908E-06	0.0139	0	0.9336	0.9693	0	0.0513	2.759E-06
Modal	8	0.181	0.0291	0	0	0.9626	0.9693	0	3.073E-06	0.0721
Modal	9	0.152	0	0.0082	0	0.9626	0.9776	0	0.0326	1.086E-06
Modal	10	0.114	0.0125	0.0002	0	0.9752	0.9778	0	0.0007	0.0471
Modal	11	0.114	0.0009	0.003	0	0.9761	0.9808	0	0.0095	0.0033
Modal	12	0.093	0	0.0008	0	0.9761	0.9816	0	0.0031	0

Table 2.2 - Modal Participating Mass Ratios (Part 2 of 2)

Case	Mode	RZ	SumRX	SumRY	SumRZ
Modal	1	2.051E-05	0.1739	4.404E-06	2.051E-05
Modal	2	0.0018	0.1739	0.188	0.0018
Modal	3	2.851E-05	0.7931	0.188	0.0018
Modal	4	0.0491	0.7932	0.7426	0.0509
Modal	5	0.0014	0.8323	0.7431	0.0522
Modal	6	0.0667	0.8325	0.7898	0.119
Modal	7	0.0003	0.8838	0.7898	0.1193
Modal	8	0.0044	0.8838	0.8619	0.1236
Modal	9	0.0001	0.9164	0.8619	0.1237
Modal	10	0.0002	0.9171	0.909	0.1239
Modal	11	0.0001	0.9266	0.9123	0.1241
Modal	12	1.558E-06	0.9297	0.9123	0.1241

Table 2.3 - Modal Participation Factors

Case	Mode	Period sec	UX kN-m	UY kN-m	UZ kN-m	RX kN-m	RY kN-m	RZ kN-m	ModalMass kN-m-s2	ModalStiff kN-m
Modal	1	1.495	-2.237E-07	5.9E-05	0	-0.146683	-0.000738	0.000563	1E-06	2E-05
Modal	2	1.297	-5.8E-05	-2.458E-07	0	0.000403	-0.152501	0.00522	1E-06	2E-05
Modal	3	0.475	-2.168E-07	2.1E-05	0	0.276783	0.00228	-0.000664	1E-06	0.00018
Modal	4	0.405	2E-05	2.223E-07	0	0.003122	-0.261932	0.02753	1E-06	0.00024
Modal	5	0.278	-1E-06	1E-05	0	0.069496	0.007948	0.00459	1E-06	0.00051
Modal	6	0.266	-1E-05	-1E-06	0	-0.005494	0.075995	0.032105	1E-06	0.00056
Modal	7	0.211	1.432E-07	-8E-06	0	-0.07967	-0.000584	0.002191	1E-06	0.00089
Modal	8	0.181	-1.1E-05	-4.27E-08	0	-0.000617	0.094459	-0.008201	1E-06	0.0012
Modal	9	0.152	-2.268E-08	6E-06	0	0.063468	0.000366	0.001295	1E-06	0.00172
Modal	10	0.114	-7E-06	-1E-06	0	-0.009195	0.076297	-0.001795	1E-06	0.00305
Modal	11	0.114	2E-06	-4E-06	0	-0.034307	-0.020323	0.001376	1E-06	0.00306
Modal	12	0.093	0	2E-06	0	0.019652	-3.4E-05	0.000155	1E-06	0.00454

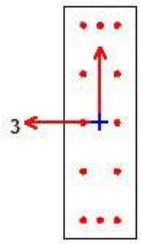
Table 2.4 - Modal Load Participation Ratios

Case	ItemType	Item	Static %	Dynamic %
Modal	Acceleration	UX	100	97.61
Modal	Acceleration	UY	100	98.16
Modal	Acceleration	UZ	0	0

COLUMN DESIGN

ETABS Concrete Frame Design

IS 456:2000 + IS 13920:2016 Column Section Design (Summary)



Column Element Details

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	LLRF	Type
STILT	C30	13	C-230X750	Comb12	0	1500	0.7	Ductile Frame

Section Properties

b (mm)	h (mm)	dc (mm)	Cover (Torsion) (mm)
230	750	60	30

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	f_y (MPa)	f_{ys} (MPa)
29580.4	35	1	500	500

Design Code Parameters

γ_c	γ_s
1.5	1.15

Axial Force and Biaxial Moment Design For P_u , M_{u2} , M_{u3}

Design P_u kN	Design M_{u2} kN-m	Design M_{u3} kN-m	Minimum M_2 kN-m	Minimum M_3 kN-m	Rebar Area mm²	Rebar % %
1461.4031	-29.2281	335.7929	29.2281	40.0424	2084	1.21

Axial Force and Biaxial Moment Factors

	K Factor Unitless	Length mm	Initial Moment kN-m	Additional Moment kN-m	Minimum Moment kN-m
Major Bend(M3)	0.68764	1200	134.3172	0	40.0424
Minor Bend(M2)	0.636295	1200	0.1698	0	29.2281

Shear Design for V_{u2} , V_{u3}

	Shear V_u kN	Shear V_c kN	Shear V_s kN	Shear V_p kN	Rebar A_{sv} /s mm²/m
Major, V_{u2}	97.3869	132.4476	63.4802	55.7241	254.94
Minor, V_{u3}	35.4744	116.9573	51.0006	35.4744	831.33

Joint Shear Check/Design

	Joint Shear Force kN	Shear V_{Top} kN	Shear $V_{u,Tot}$ kN	Shear V_c kN	Joint Area cm²	Shear Ratio Unitless
Major Shear, V_{u2}	N/N	N/N	N/N	N/N	N/N	N/N
Minor Shear, V_{u3}	N/N	N/N	N/N	N/N	N/N	N/N

(1.4) Beam/Column Capacity Ratio

Major Ratio	Minor Ratio
N/N	N/N

Additional Moment Reduction Factor k (IS 39.7.1.1)

A_g cm²	A_{sc} cm²	P_{uz} kN	P_b kN	P_u kN	k Unitless
1725	20.8	3498.4226	1151.2104	1461.4031	0.867846

Additional Moment (IS 39.7.1)

	Consider M_a	Length Factor	Section Depth (mm)	KL/Depth Ratio	KL/Depth Limit	KL/Depth Exceeded	M_a Moment (kN-m)
Major Bending (M_3)	Yes	0.8	750	1.1	12	No	0
Minor Bending (M_2)	Yes	0.8	230	3.32	12	No	0

Notes:

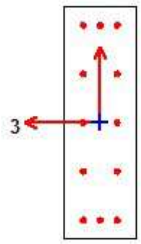
N/A: Not Applicable

N/C: Not Calculated

N/N: Not Needed

ETABS Concrete Frame Design

IS 456:2000 + IS 13920:2016 Column Section Design (Summary)



Column Element Details

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	LLRF	Type
1ST	C42	774	C-230X750	Comb14	0	3000	0.7	Ductile Frame

Section Properties

b (mm)	h (mm)	dc (mm)	Cover (Torsion) (mm)
230	750	60	30

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	f_y (MPa)	f_{ys} (MPa)
27386.13	30	1	500	500

Design Code Parameters

γ_c	γ_s
1.5	1.15

Axial Force and Biaxial Moment Design For P_u , M_{u2} , M_{u3}

Design P_u kN	Design M_{u2} kN-m	Design M_{u3} kN-m	Minimum M_2 kN-m	Minimum M_3 kN-m	Rebar Area mm²	Rebar % %
1269.1842	92.7323	-37.8217	25.3837	37.8217	2756	1.6

Axial Force and Biaxial Moment Factors

	K Factor Unitless	Length mm	Initial Moment kN-m	Additional Moment kN-m	Minimum Moment kN-m
Major Bend(M3)	0.946056	2400	-8.8449	0	37.8217
Minor Bend(M2)	1.2	2400	28.9532	20.3492	25.3837

Shear Design for V_{u2} , V_{u3}

	Shear V_u kN	Shear V_c kN	Shear V_s kN	Shear V_p kN	Rebar A_{sv} /s mm²/m
Major, V_{u2}	58.3198	148.3411	63.4802	58.3198	254.94
Minor, V_{u3}	46.1268	129.3201	51.0006	33.3331	831.33

Joint Shear Check/Design

	Joint Shear Force kN	Shear V_{Top} kN	Shear $V_{u,Tot}$ kN	Shear V_c kN	Joint Area cm²	Shear Ratio Unitless
Major Shear, V_{u2}	N/N	N/N	N/N	N/N	N/N	N/N
Minor Shear, V_{u3}	N/N	N/N	N/N	N/N	N/N	N/N

(1.4) Beam/Column Capacity Ratio

Major Ratio	Minor Ratio
N/N	N/N

Additional Moment Reduction Factor k (IS 39.7.1.1)

A_g cm²	A_{sc} cm²	P_{uz} kN	P_b kN	P_u kN	k Unitless
1725	27.6	3362.3202	1008.3506	1269.1842	0.889194

Additional Moment (IS 39.7.1)

	Consider M_a	Length Factor	Section Depth (mm)	KL/Depth Ratio	KL/Depth Limit	KL/Depth Exceeded	M_a Moment (kN-m)
Major Bending (M_3)	Yes	0.8	750	3.027	12	No	0
Minor Bending (M_2)	Yes	0.8	230	12.522	12	Yes	22.885

Notes:

N/A: Not Applicable

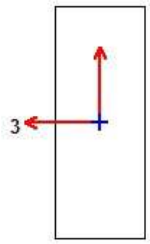
N/C: Not Calculated

N/N: Not Needed

BEAM DESIGN

ETABS Concrete Frame Design

IS 456:2000 + IS 13920:2016 Beam Section Design (Summary)



Beam Element Details

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	LLRF	Type
1ST	B4	59	B 230X600	Comb12	7125	7500	1	Ductile Frame

Section Properties

b (mm)	h (mm)	b_f (mm)	d_s (mm)	d_{ct} (mm)	d_{cb} (mm)
230	600	230	0	30	30

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	f_y (MPa)	f_{ys} (MPa)
27386.13	30	1	500	500

Design Code Parameters

γ_c	γ_s
1.5	1.15

Factored Forces and Moments

Factored M_{u3} kN-m	Factored T_u kN-m	Factored V_{u2} kN	Factored P_u kN
-300.9696	0.0006	188.6374	0

Design Moments, M_{u3} & M_t

Factored Moment kN-m	Factored M_t kN-m	Positive Moment kN-m	Negative Moment kN-m
-300.9696	0.0013	0	-300.9709

Design Moment and Flexural Reinforcement for Moment, M_{u3} & T_u

	Design -Moment kN-m	Design +Moment kN-m	-Moment Rebar mm²	+Moment Rebar mm²	Minimum Rebar mm²	Required Rebar mm²
Top (+2 Axis)	-300.9709		1500	0	1500	375
Bottom (-2 Axis)		0	750	0	15	750

Shear Force and Reinforcement for Shear, V_{u2} & T_u

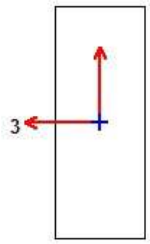
Shear V_e kN	Shear V_c kN	Shear V_s kN	Shear V_p kN	Rebar A_{sv} /s mm²/m
249.3441	0	249.3483	97.7222	1212.22

Torsion Force and Torsion Reinforcement for Torsion, T_u & V_{U2}

T_u kN-m	V_u kN	Core b_1 mm	Core d_1 mm	Rebar A_{svt} /s mm²/m
0.0006	188.6374	190	560	0

ETABS Concrete Frame Design

IS 456:2000 + IS 13920:2016 Beam Section Design (Summary)



Beam Element Details

Level	Element	Unique Name	Section ID	Combo ID	Station Loc	Length (mm)	LLRF	Type
5TH	B66	686	B 230X600	Comb12	450	8200	1	Ductile Frame

Section Properties

b (mm)	h (mm)	b_f (mm)	d_s (mm)	d_{ct} (mm)	d_{cb} (mm)
230	600	230	0	30	30

Material Properties

E_c (MPa)	f_{ck} (MPa)	Lt.Wt Factor (Unitless)	f_y (MPa)	f_{ys} (MPa)
29580.4	35	1	500	500

Design Code Parameters

γ_c	γ_s
1.5	1.15

Factored Forces and Moments

Factored M_{u3} kN-m	Factored T_u kN-m	Factored V_{u2} kN	Factored P_u kN
-235.2604	0.0004	157.9683	0

Design Moments, M_{u3} & M_t

Factored Moment kN-m	Factored M_t kN-m	Positive Moment kN-m	Negative Moment kN-m
-235.2604	0.0009	0	-235.2613

Design Moment and Flexural Reinforcement for Moment, M_{u3} & T_u

	Design -Moment kN-m	Design +Moment kN-m	-Moment Rebar mm²	+Moment Rebar mm²	Minimum Rebar mm²	Required Rebar mm²
Top (+2 Axis)	-235.2613		1078	0	1078	372
Bottom (-2 Axis)		0	539	0	0	539

Shear Force and Reinforcement for Shear, V_{u2} & T_u

Shear V_e kN	Shear V_c kN	Shear V_s kN	Shear V_p kN	Rebar A_{sv} /s mm²/m
211.843	0	211.8459	69.2625	1029.9

Torsion Force and Torsion Reinforcement for Torsion, T_u & V_{U2}

T_u kN-m	V_u kN	Core b_1 mm	Core d_1 mm	Rebar A_{svt} /s mm²/m
0.0004	157.9683	190	560	0

PILECAP DESIGN

Project : PANDAVS			
Location : CHENNAI	Made by	Date 14/Jul/24	Page 1
Subject : Pilecap Design	Checked by	Revision -	Job No

Marking : PC1

TYPE : **2-Pile Group**

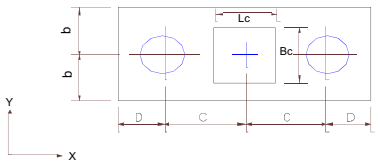
Material				Pile (1 = Rect, 2=Circular)				Column (1 = Rect, 2=Circular)			
fcu	=	30	N/mm^2	Pile type	=	2		Col. type	=	1	
fy	=	500	N/mm^2	Diameter	=	500	mm	Bc	=	230	mm
Cover	=	75	mm	Capacity	=	700	kN	Lc	=	600	mm
Reinfocement											
B1	=	16	mm								
B2	=	16	mm								

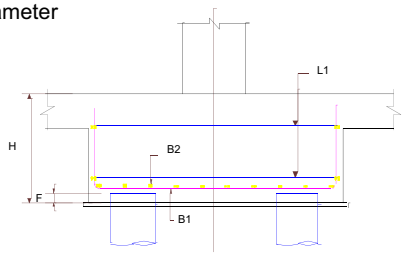
Load factor = **1.5**

Ultimate Column Load = **2100** kN

Pilecap Dimensions Pile spacing, S = 2.5 x pile diameter

B	=	400	mm
C	=	625	mm
D	=	400	mm
F	=	75	mm
H	=	1000	mm
L1	=	**3T12**	





Bending Moment & Rinforcement (By bending theory)

Choice of moment - 1 =column face, 2 = center of column: **1**

	About Y - Y axis						About X - X axis					
Moment arm(mm)			400									
Maximum Moment (kNm)			420									
Width, b			800									
Effective depth, d			917									
K = M/bd^{2}fcu			0.021									
Lever arm, Z			871				Provide min. reinf't = 0.12%bH					
As$_{req}$ (mm^2)			1108	or	1385	mm^2/m			2460	or	1200	mm^2/m
No. of bars & spacing required	6	T	16	@	127		13	T	16	@	157	
No. of bars & spacing provided	**6**	**T**	**16**	@	127	(B1)	**13**	**T**	**16**	@	157	(B2)
As$_{prov}$ (mm^2)	27		**1207**	or	1509	mm^2/m			2615	or	1276	mm^2/m

Shear Check

Shear force			1050	kN	
(100As/bd)			0.16		
(400/d)$^{1/4}$			1.00		
Allowable shear stress, v_c			0.29	mm^{-1}/m	
Shear span, a_v			250.00	mm	
Enhancement factor = 2d/a_v			7.34		
Enhanced shear stress (N/mm^2), v_c			2.13	mm^2/m	

i) Shear at column face

v = 1.38 < 3.50 ***ok!***

ii) Shear along a vertical section at 20% inside pile across the full width of pilecap

v = 1.43 < 2.13 ***ok!***

iii) Since pile spacing less or equal to 3 x pile diameter, no check is required

iv) Punching shear check

1.74	Punching Area
5328	Perimeter bo
0.43	Punching Shear Stress tv
1.369	Permissible shear stress
O.K	

Project : ISHA THIRUVANMIYUR	BURO ENGINEERS		
Location : CHENNAI	Made by	Date 14/Jul/24	Page 1
Subject : Pilecap Design	Checked by	Revision -	Job No BEI267

Marking : PC1

TYPE : **2-Pile Group**

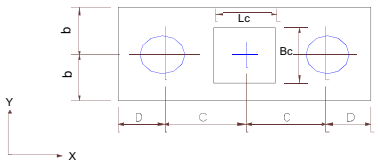
Material			Pile (1 = Rect, 2=Circular)			Column (1 = Rect, 2=Circular)		
fcu	=	30 N/mm^2	Pile type	=	2	Col. type	=	1
fy	=	500 N/mm^2	Diameter	=	600 mm	Bc	=	230 mm
Cover	=	75 mm	Capacity	=	1200 kN	Lc	=	600 mm
Reinfocement								
B1	=	20 mm						
B2	=	20 mm						

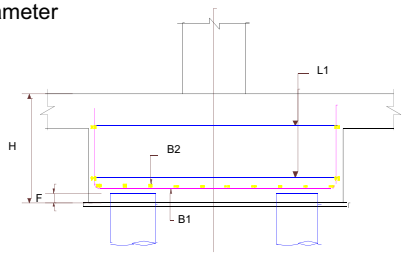
Load factor = **1.5**

Ultimate Column Load = **3600** kN

Pilecap Dimensions Pile spacing, S = 2.5 x pile diameter

B	=	450 mm
C	=	750 mm
D	=	450 mm
F	=	75 mm
H	=	1200 mm
L1	=	**3T13**





Bending Moment & Rinforcement (By bending theory)

Choice of moment - 1 =column face, 2 = center of column: **1**

	About Y - Y axis					About X - X axis				
Moment arm(mm)	525									
Maximum Moment (kNm)	945									
Width, b	900									
Effective depth, d	1115									
K = M/bd^{2}fcu	0.028									
Lever arm, Z	1059					Provide min. reinf't = 0.12%bH				
As$_{req}$ (mm^2)	2051	or	2279	mm^2/m		3456	or	1440	mm^2/m	
No. of bars & spacing required	7 T	20	@	122		11 T	20	@	223	
No. of bars & spacing provided	**7 T**	**20**	@	122	(B1)	**11 T**	**20**	@	223	(B2)
As$_{prov}$ (mm^2)	27	**2200**	or	2444	mm^2/m		3457	or	1440	mm^2/m

Shear Check

Shear force	1800	kN		
(100As/bd)	0.22			
(400/d)$^{1/4}$	1.00			
Allowable shear stress, v_c	0.3	mm^{-2}/m		
Shear span, a_v	345.00	mm		
Enhancement factor = 2d/a_v	6.46			
Enhanced shear stress (N/mm^2), v_c	1.94	mm^2/m		

i) Shear at column face

v = 1.94 < 3.50 ***ok!***

ii) Shear along a vertical section at 20% inside pile across the full width of pilecap

v = 1.79 < 1.94 ***ok!***

iii) Since pile spacing less or equal to 3 x pile diameter, no check is required

iv) Punching shear check

2.307	Punching Area
6120	Perimeter bo
0.528	Punching Shear Stress tv
1.369	Permissible shear stress
O.K	

SLAB DESIGN

PROJECT-PANDAVA

	DESIGN OF SLAB No: 3S125					
1.00	Grade of concrete			=	*25.00*	N/mm^2
2.00	Grade of steel			=	*500.00*	N/mm^2
3.00	Cover to reinforcement			=	*20.00*	mm
	Diameter of bar				*8.00*	mm
4.00	Aspect ratio $\frac{l_y}{l_x}$ =	*4.80*	4.90		1.485	< 2
		3.20	3.30			
5.00	Edge condition:	Two Adjacent Edges Discontinuous			Two way slab	
6.00	Modification factor assumed				*1.60*	
		89.70				
7.00	Depth required for deflection:			D =	*125.00*	mm
					125.00	mm
				d =	101.00	mm
8.00	Dead Load			=	3.00	kN/m^2
9.00	Live load			=	*2.00*	kN/m^2
10.00	Partitions & FF			=	*1.25*	kN/m^2
11.00	Total load			=	6.25	kN/m^2
12.00	Factored load			=	9.38	kN/m^2

STEP 1	Details 7S	S- SPAN			L-SPAN	
		(-ve) support(α_x)	(+ve) span(α_x)		(-ve) support(α_y)	(+ve) span (α_y)
	Co-efficent (IS:456, Table :26)	0.074	0.056		0.047	0.035
	M_u=Co-efficient*w* l_x^2	7.60	5.67		4.80	3.58
	K= Mu/bd2	0.74	0.56		0.47	0.35
	Percentage of steel required	0.18	0.13		0.11	0.08
	Ast required(in mm^2)	*179.34*	*132.63*		*111.76*	*82.74*
	Ast min (in mm^2)	150.00	150.00		150.00	150.00
	Ast to be provided (in mm2)	179.34	150.00		150.00	150.00
	Provided bars spacing (c/c)	280.39	335.24		335.24	335.24
	max spacing	250.00	250.00		250.00	250.00
	spacing	250.00	250.00		250.00	250.00
	Reqd bars spacing (c/c)	**250.00**	**250.00**		**250.00**	**250.00**
	Pvd bars spacing (c/c)	*200.00*	*200.00*		*200.00*	*200.00*
	Ast Provided(in mm^2)	**251.43**	**251.43**		**251.43**	**251.43**
	Percentage of steel provided	**0.25**	**0.25**		**0.25**	**0.25**
STEPII	F_s=0.58 *f_y * (Ast required/ Ast provided)					
	F_s				152.98	
	M.F				*1.60*	
	if assumed modification factor is less than or equal to					
	calculated the section is safe for deflection				safe	
	OVERALL DEPTH D **125.00** mm					
	EFFECTIVE DEPTH d **101.00** mm					

STEPIII	Crack width calculation			
	m	=	8.0	
	E_s	=	200000.0	
	Ec	=	25000.0	
	Pt	=	0.2	
	k	=	0.2	
	x	=	18.2	
	A_{st}	=	251.4	
	I_{cr}	=	15799512.70	
	M	=	5.7	
	f_{st}	=	237.7	
	ε_m	=	0.0	
	Spacing		200.0	
	a_{cr}	=	102.0	
	ω_{cr}	=	0.07	
			<	
			0.20	mm (safe)

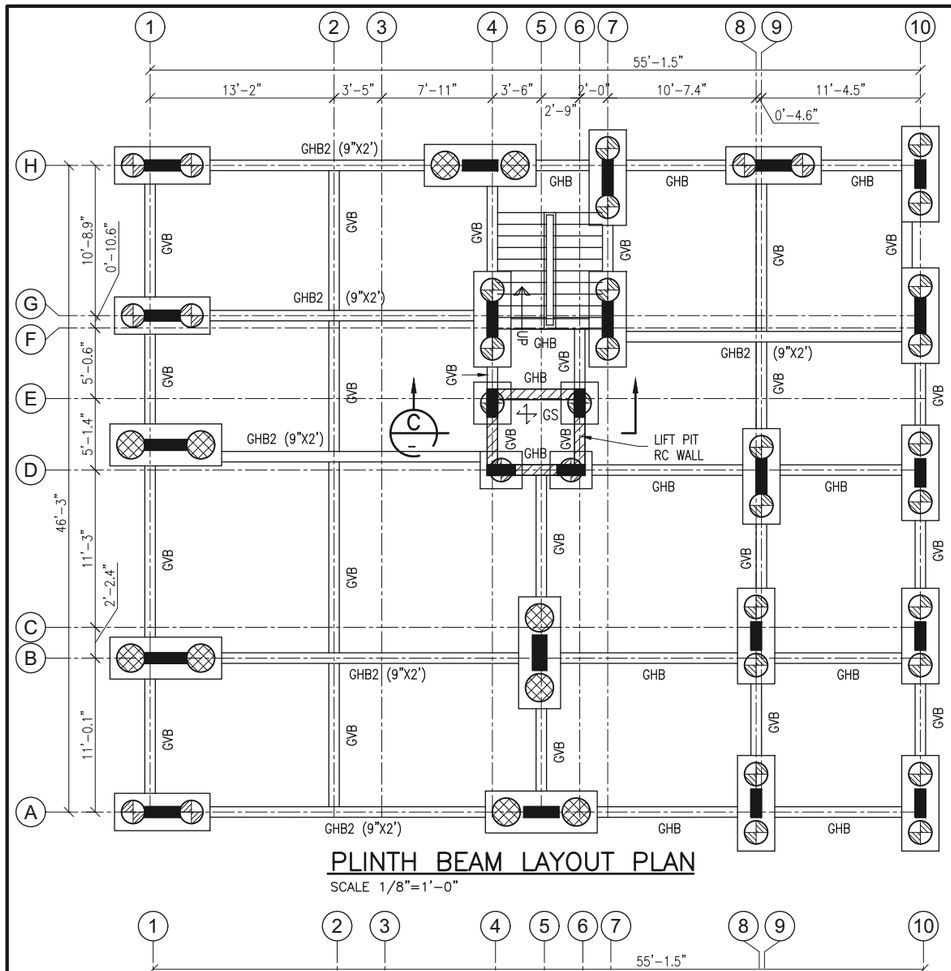
Case No: *4*

D+(C-D)*(E-A)/(B-A)

	Negative	Positive
A	*1.40000*	*1.40000*
B	*1.50000*	*1.50000*
C	*0.07100*	*0.05300*
D	*0.07500*	*0.05600*
E	*1.48470*	*1.48470*
Value	0.07439	0.05554

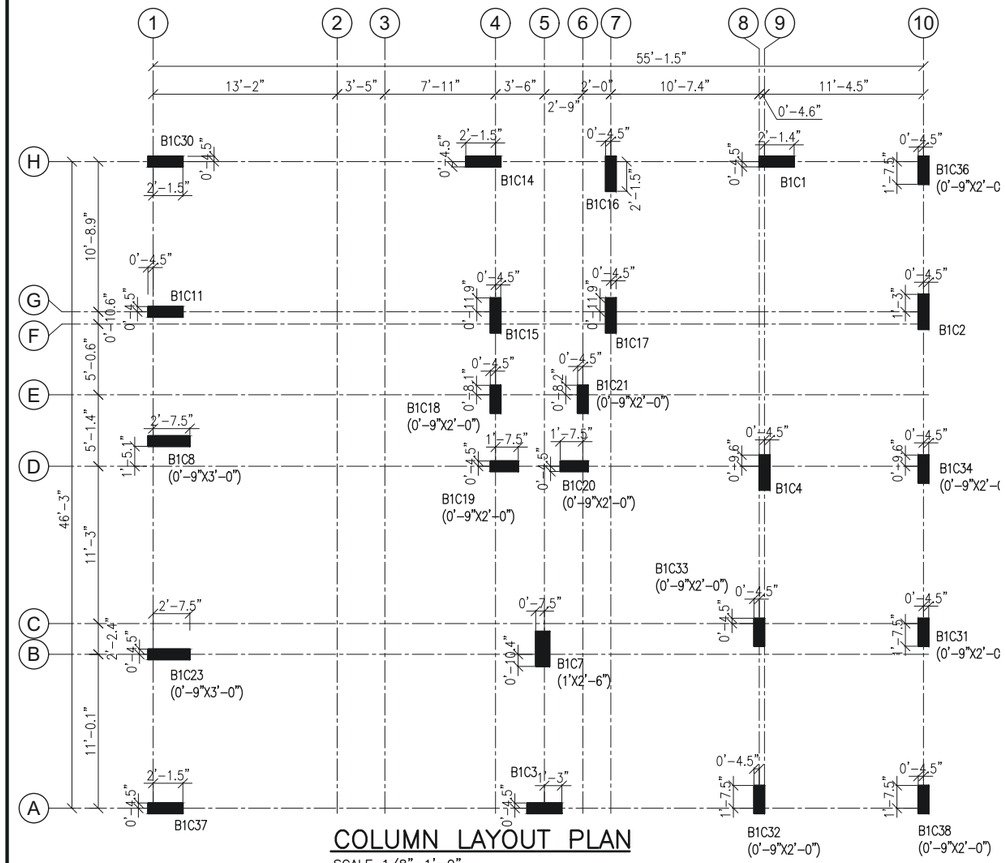
ok

M. PURUSOTHAMAN, M.E., (Struct.)
REGISTERED STRUCTURAL ENGINEER
CHENNAI METROPOLITAN DEVELOPMENT AUTHORITY
REGISTRATION No. SE/GR-I/19/03/036
NEW No. 31 (OLD No.14), BESANT AVENUE,
ADYAR, CHENNAI-600 020
E-Mail: mj.purusu@gmail.com
Mobile: +91 94445 77374



PLINTH BEAM LAYOUT PLAN

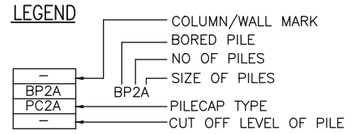
SCALE 1/8"=1'-0"

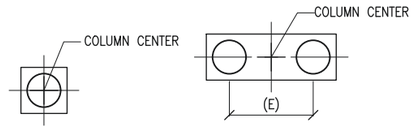


COLUMN LAYOUT PLAN

SCALE 1/8"=1'-0"

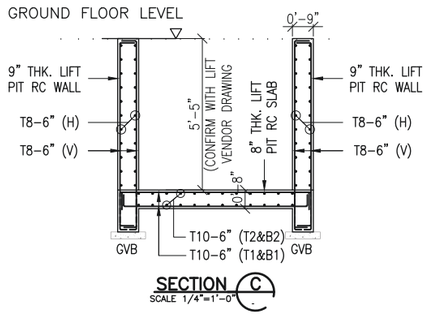
LEGEND





1 PILE GROUP
SCALE N.T.S

2 PILE GROUP
SCALE N.T.S



SECTION C
SCALE 1/4"=1'-0"

TABLE 1– BORED PILE (CAST–INSITU)

BORED PILE MARK / TYPE	SIZE	WORKING COMPRESSION CAPACITY (kN) (AS PER SOIL REPORT)	NO. OF PILES
TYPE A	1'–8"ø	900	34
TYPE B	2'–0"ø	1200	10

TABLE 2 (PILE SPACING)

BORED PILE MARK / TYPE	SIZE	2 PILE GROUP
		(E)
TYPE A	1'–8"ø	4'–2"
TYPE B	2'–0"ø	5'–0"

NOTES:

UNLESS OTHERWISE SPECIFIED

1. ALL THE DIMENSIONS ARE IN MM
2. GRADE OF CONCRETE:
   (a) M30 – FOR PILE & PILE CAP
   (b) M35 – FOR COLUMN, BEAM, SLAB & RC WALL
3. GRADE OF STEEL:
   (a) Fe500 – FOR ALL STRUCTURAL ELEMENTS
4. CLEAR COVER FOR COLUMN–40mm, BEAM–30mm, SLAB–25mm, PILE & PILE CAP–75mm AND RC WALL–30mm
5. UNLESS OTHERWISE SPECIFIED, LAP/DEVELOPMENT LENGTH SHALL NOT BE LESS THAN 50 X DIA OF BAR
6. THIS DRAWING TO BE READ IN CONJUNCTION WITH THE KEY PLAN, ARCHITECTURAL, AND ALL OTHER RELEVANT DRAWINGS.
7. STRUCTURE TO BE CONSTRUCTED IN ACCORDANCE WITH I.S.456–2000, NBC–2016 AND RELEVANT INDIAN CODE STIPULATIONS
8. ONUS OF CONSTRUCTION LIES WITH CONTRACTOR / PROMOTER / BUILDER / OWNER.

M. PURUSOTHAMAN, M.E., (Struct.)
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CHENNAI METROPOLITAN DEVELOPMENT AUTHORITY
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NOTES:

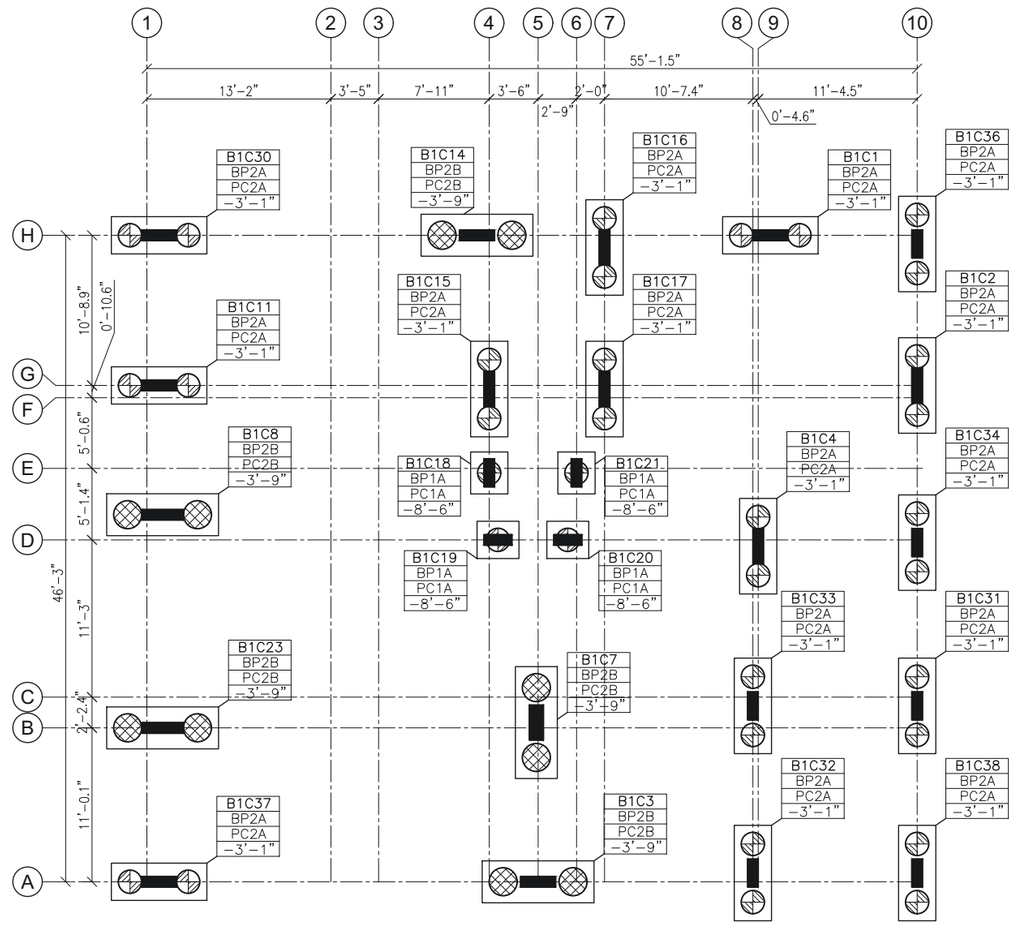
UNLESS OTHERWISE SPECIFIED

1. ALL THE DIMENSIONS ARE IN mm
2. ALL THE COLUMNS SIZE ARE TO BE 0'–9"X2'–6"
3. ALL THE BEAMS SIZE ARE TO BE 0'–9"X1'–6"
4. ALL THE SLAB THICKNESS ARE TO BE 0'–5"

LEGEND:

– BALCONY SUNK BY 4"

– TOILET SLAB SUNK BY 4"



PILING AND PILECAP LAYOUT PLAN

SCALE 1/8"=1'-0"

DRAWING NO : A1

REVISION NOTES :

NO.	DATE	REVISION

ARCHITECT

EMAARA DESIGNS
ARCHITECT & INTERIORS

Plot no.35, 100 feet, Taramani Link Rd, Ayodhya Colony, Velachery, Chennai 600042.

BUILDER CONSULTANTS

NARAIN PROMOTERS

STRUCTURAL CONSULTANTS

ELECTRICAL CONSULTANTS

PROJECT NAME

PANDAVAS APARTMENT

CLIENTS

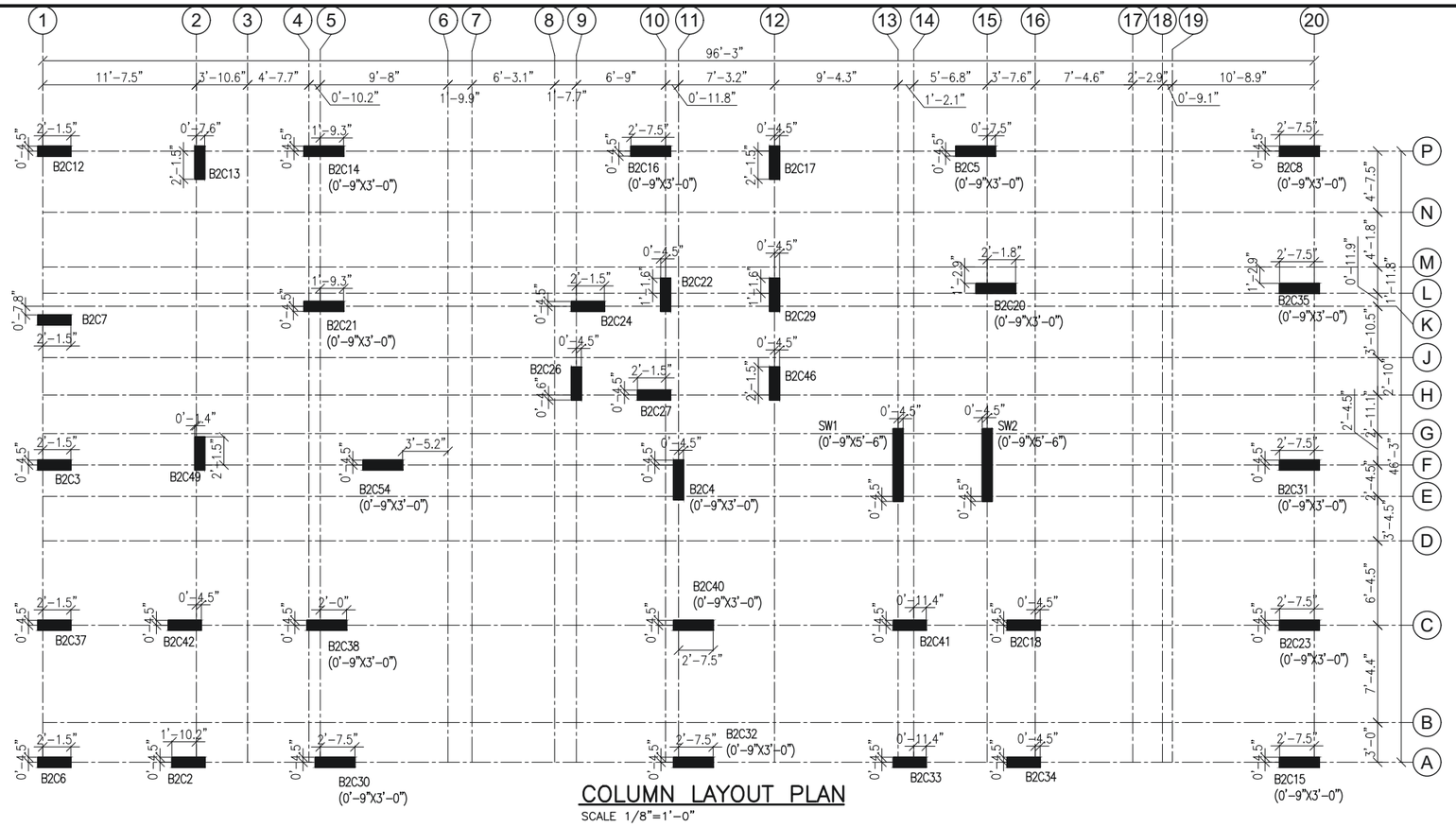
DRAWING TITLE:
COLUMN, PLINTH, PILING AND PILE CAP LAYOUT PLAN (BLOCK-01)

DEALT BY:	APPROVED BY:
CHKD BY:	
DATE: 04.06.22	

SCALE:
100 500 2000
200 1000 4000
GRAPHIC SCALE

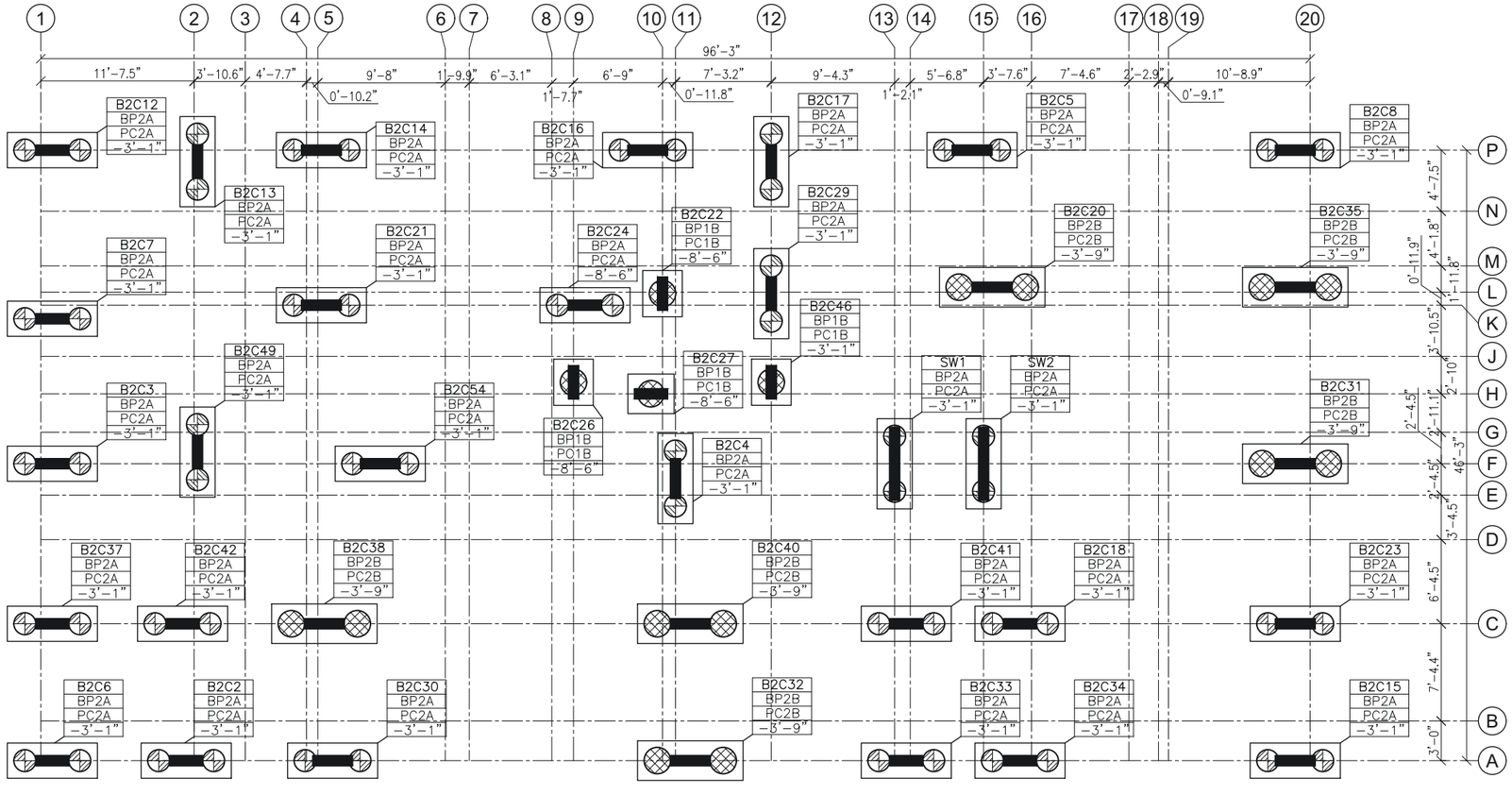
SIGN :
- ■ FOR CLIENT
- ☐ FOR TENDER
- ☐ FOR INFORMATION
- ☐ FOR EXECUTION
- ☐ FOR APPROVAL

N W E S



COLUMN LAYOUT PLAN

SCALE 1/8"=1'-0"



PILING AND PILECAP LAYOUT PLAN

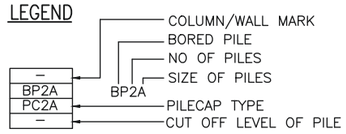
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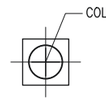
NOTES:

UNLESS OTHERWISE SPECIFIED

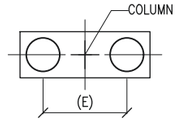
1. ALL THE DIMENSIONS ARE IN MM
2. GRADE OF CONCRETE:
   (a) M30 – FOR PILE & PILE CAP
   (b) M35 – FOR COLUMN, BEAM, SLAB & RC WALL
3. GRADE OF STEEL:
   (a) Fe500 – FOR ALL STRUCTURAL ELEMENTS
4. CLEAR COVER FOR COLUMN–40mm, BEAM–30mm, SLAB–25mm, PILE & PILE CAP–75mm AND RC WALL–30mm
5. UNLESS OTHERWISE SPECIFIED, LAP/DEVELOPMENT LENGTH SHALL NOT BE LESS THAN 50 X DIA OF BAR
6. THIS DRAWING TO BE READ IN CONJUNCTION WITH THE KEY PLAN, ARCHITECTURAL, AND ALL OTHER RELEVANT DRAWINGS.
7. STRUCTURE TO BE CONSTRUCTED IN ACCORDANCE WITH I.S.456–2000, NBC–2016 AND RELEVANT INDIAN CODE STIPULATIONS
8. ONUS OF CONSTRUCTION LIES WITH CONTRACTOR / PROMOTER / BUILDER / OWNER.

LEGEND





1 PILE GROUP
SCALE N.T.S



2 PILE GROUP
SCALE N.T.S

TABLE 1– BORED PILE (CAST–INSITU)

BORED PILE MARK / TYPE	SIZE	WORKING COMPRESSION CAPACITY (kN) (AS PER SOIL REPORT)	NO. OF PILES
TYPE A	1'–8"ø	900	56
TYPE B	2'–0"ø	1200	16

TABLE 2 (PILE SPACING)

BORED PILE MARK / TYPE	SIZE	2 PILE GROUP (E)
TYPE A	1'–8"ø	4'–2"
TYPE B	2'–0"ø	5'–0"

NOTES:

UNLESS OTHERWISE SPECIFIED

1. ALL THE DIMENSIONS ARE IN mm
2. ALL THE COLUMNS SIZE ARE TO BE 0'–9"X2'–6"
3. ALL THE BEAMS SIZE ARE TO BE 0'–9"X1'–6"
4. ALL THE SLAB THICKNESS ARE TO BE 0'–5"

LEGEND:

– BALCONY SUNK BY 4"

– TOILET SLAB SUNK BY 4"

DRAWING NO : A2

REVISION NOTES :

NO.	DATE	REVISION

ARCHITECT

EMAARA DESIGNS
ARCHITECT & INTERIORS
Plot no.35, 100 feet, Taramani Link Rd, Ayodhya Colony, Velachery, Chennai 600042.

BUILDER CONSULTANTS

NARAIN PROMOTERS

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Mobile: +91 94445 77374

ELECTRICAL CONSULTANTS

PROJECT NAME

PANDAVAS APARTMENT

CLIENTS

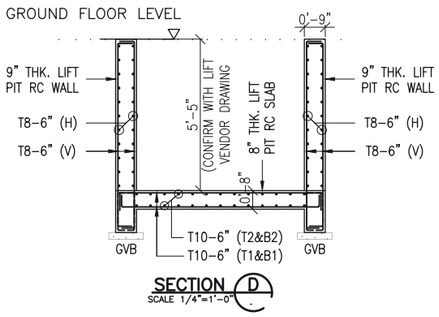
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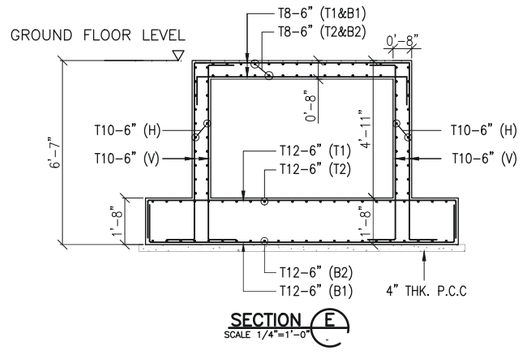
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CHKD BY:	
DATE: 04.06.22	

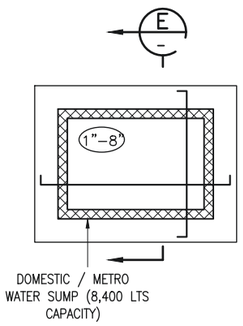
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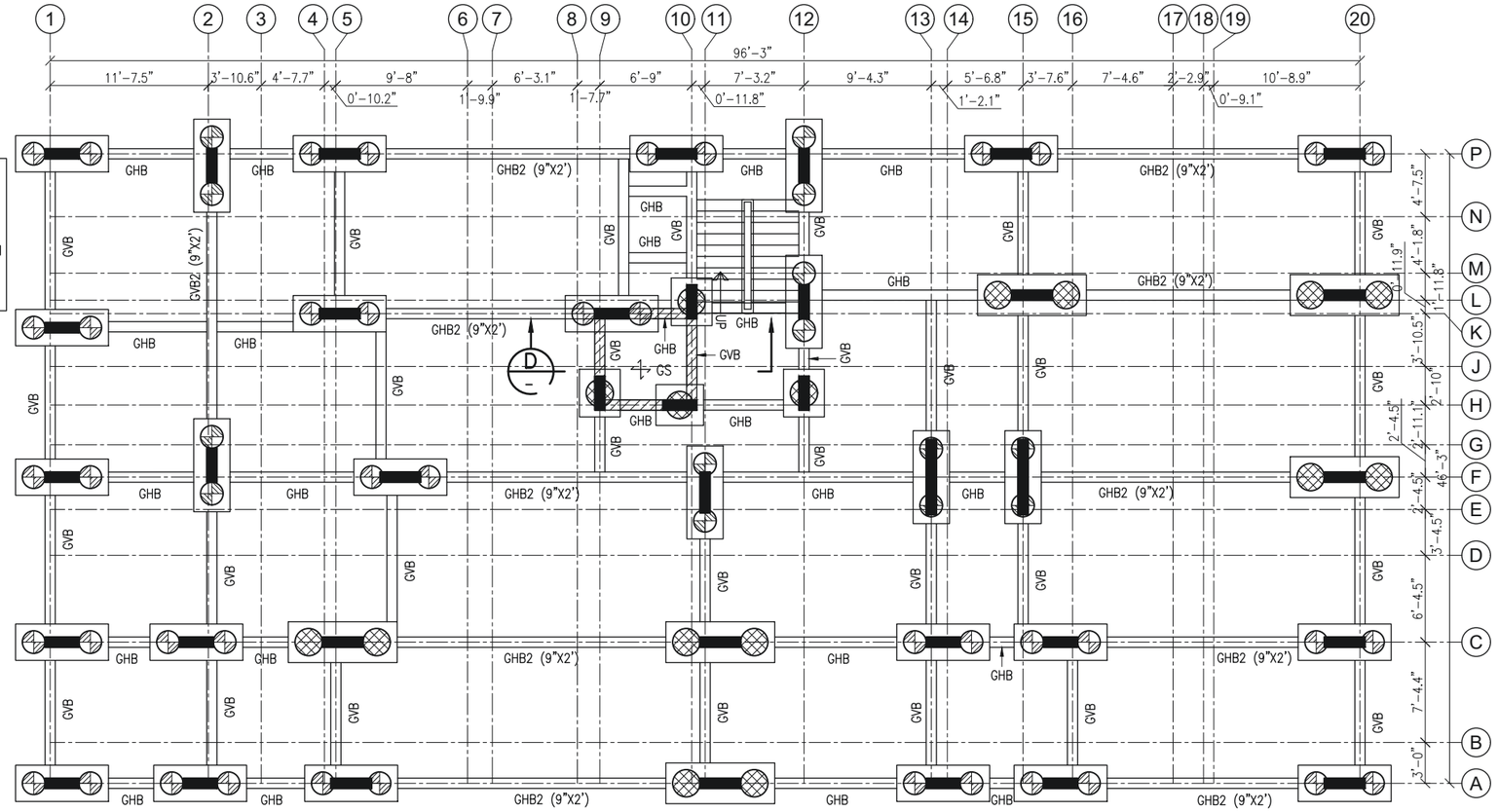
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- ☐ FOR TENDER
- ☐ FOR INFORMATION
- ☐ FOR EXECUTION
- ☐ FOR APPROVAL

N W E S









PLINTH BEAM LAYOUT PLAN

SCALE 1/8"=1'-0"

NOTES:

UNLESS OTHERWISE SPECIFIED

1. ALL THE DIMENSIONS ARE IN MM
2. GRADE OF CONCRETE:
   (a) M30 – FOR PILE & PILE CAP
   (b) M35 – FOR COLUMN, BEAM, SLAB & RC WALL
3. GRADE OF STEEL:
   (a) Fe500 – FOR ALL STRUCTURAL ELEMENTS
4. CLEAR COVER FOR COLUMN–40mm, BEAM–30mm, SLAB–25mm, PILE & PILE CAP–75mm AND RC WALL–30mm
5. UNLESS OTHERWISE SPECIFIED, LAP/DEVELOPMENT LENGTH SHALL NOT BE LESS THAN 50 X DIA OF BAR
6. THIS DRAWING TO BE READ IN CONJUNCTION WITH THE KEY PLAN, ARCHITECTURAL, AND ALL OTHER RELEVANT DRAWINGS.
7. STRUCTURE TO BE CONSTRUCTED IN ACCORDANCE WITH I.S.456–2000, NBC–2016 AND RELEVANT INDIAN CODE STIPULATIONS
8. ONUS OF CONSTRUCTION LIES WITH CONTRACTOR / PROMOTER / BUILDER / OWNER.

NOTES:

UNLESS OTHERWISE SPECIFIED

1. ALL THE DIMENSIONS ARE IN mm
2. ALL THE COLUMNS SIZE ARE TO BE 0'–9"X2'–6"
3. ALL THE BEAMS SIZE ARE TO BE 0'–9"X1'–6"
4. ALL THE SLAB THICKNESS ARE TO BE 0'–5"

LEGEND:

– BALCONY SUNK BY 4"

– TOILET SLAB SUNK BY 4"

DRAWING NO : A3

REVISION NOTES :

NO.	DATE	REVISION

ARCHITECT

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BUILDER CONSULTANTS

NARAIN PROMOTERS

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Mobile: +91 94445 77374

ELECTRICAL CONSULTANTS

PROJECT NAME

PANDAVAS APARTMENT

CLIENTS

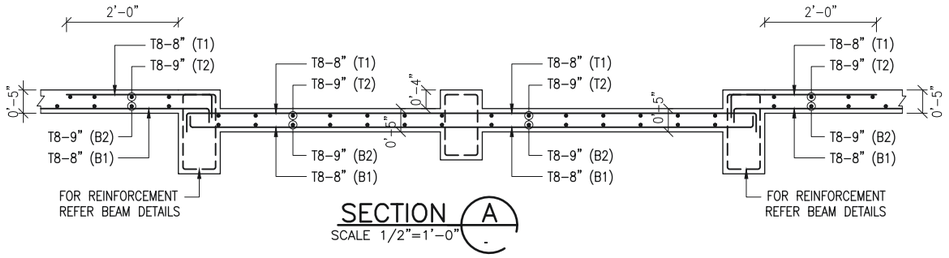
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PLINTH & FIRST FLOOR FRAMING PLAN (BLOCK-02)

DEALT BY:	APPROVED BY:
CHKD BY:	
DATE: 04.06.22	

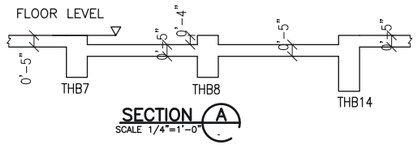
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- ■ FOR CLIENT
- ☐ FOR TENDER
- ☐ FOR INFORMATION
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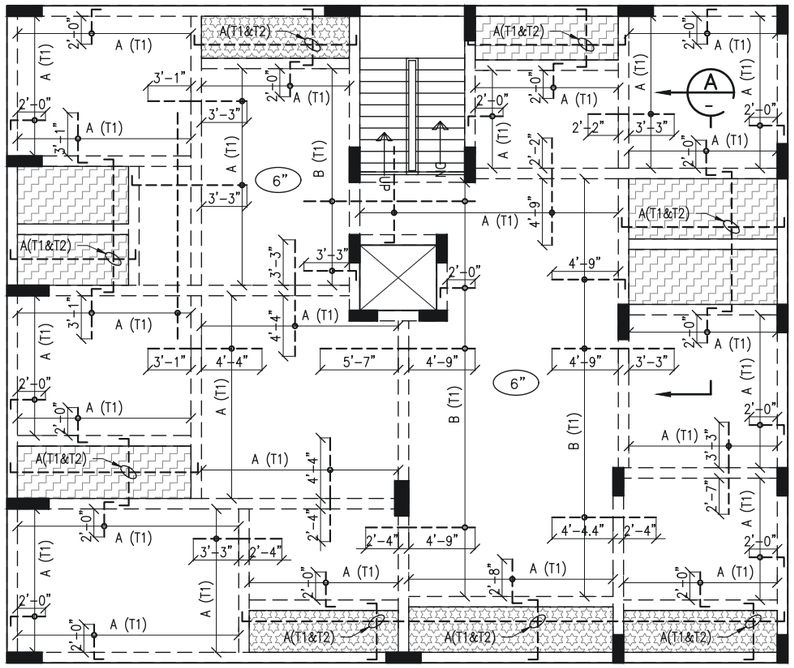
N W E S



SECTION A
SCALE 1/2"=1'-0"



SECTION A
SCALE 1/4"=1'-0"



TYPICAL FLOOR SLAB TOP REINFORCEMENT DETAIL
SCALE 1/8"=1'-0"

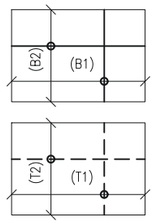
NOTES:
UNLESS OTHERWISE SPECIFIED

1. ALL THE DIMENSIONS ARE IN MM
2. GRADE OF CONCRETE:
   (a) M30 – FOR PILE & PILE CAP
   (b) M35 – FOR COLUMN, BEAM, SLAB & RC WALL
3. GRADE OF STEEL:
   (a) Fe500 – FOR ALL STRUCTURAL ELEMENTS
4. CLEAR COVER FOR COLUMN–40mm, BEAM–30mm, SLAB–25mm, PILE & PILE CAP–75mm AND RC WALL–30mm
5. UNLESS OTHERWISE SPECIFIED, LAP/DEVELOPMENT LENGTH SHALL NOT BE LESS THAN 50 X DIA OF BAR
6. THIS DRAWING TO BE READ IN CONJUNCTION WITH THE KEY PLAN, ARCHITECTURAL, AND ALL OTHER RELEVANT DRAWINGS.
7. STRUCTURE TO BE CONSTRUCTED IN ACCORDANCE WITH I.S.456–2000, NBC–2016 AND RELEVANT INDIAN CODE STIPULATIONS
8. ONUS OF CONSTRUCTION LIES WITH CONTRACTOR / PROMOTER / BUILDER / OWNER.

TABLE–2 REINFORCEMENT SCHEDULE

S.I No.	MARK	SIZE	SPACING
1	A	T8	0'–8"
2	B	T8	0'–6"

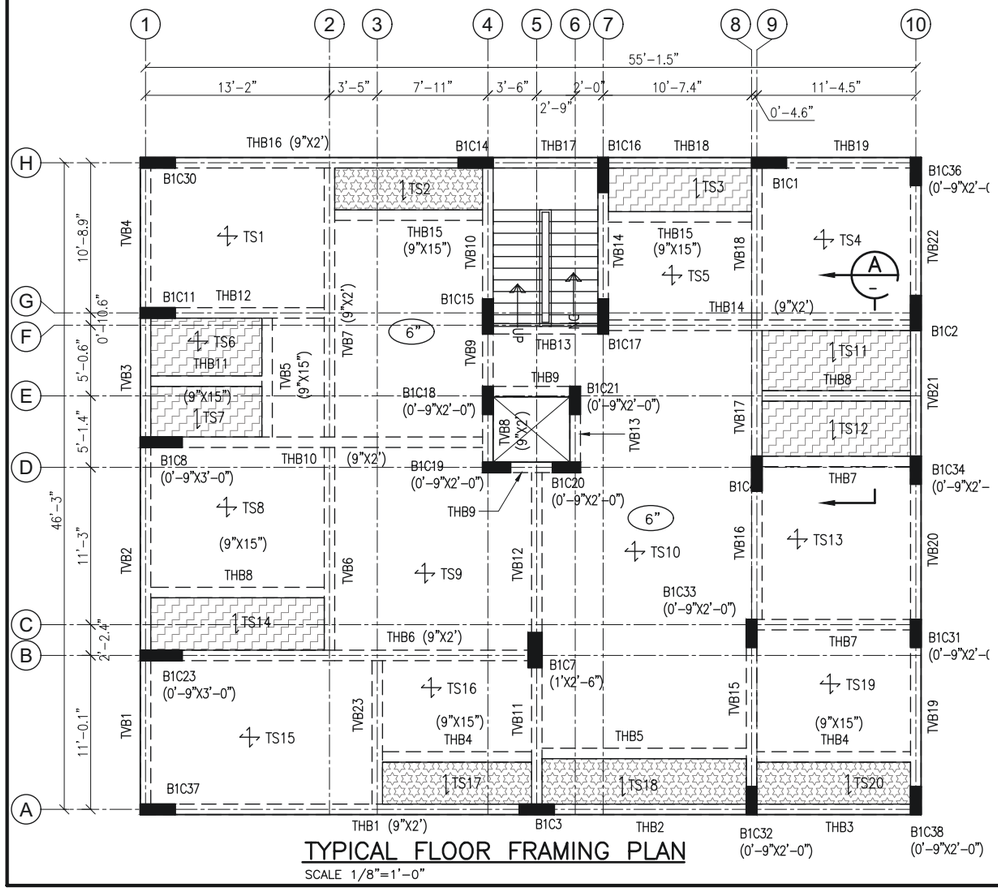
BAR LATING SEQUENCE



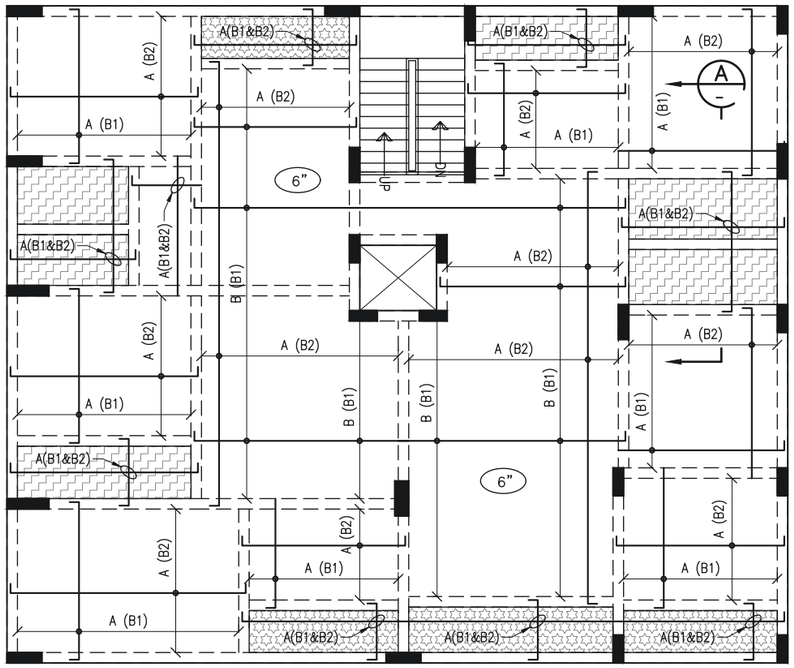
NOTES:
FOR CLARITY PURPOSE DISTRIBUTION BARS NOT SHOWN.
ALL DISTRIBUTION BARS ARE TO BE T8–0'–9" (T2 & B2) UNLESS OTHERWISE INDICATED

LEGEND:
- TOP REINFORCEMENT
- BOTTOM REINFORCEMENT

SLAB No. REFER FRAMING PLAN



TYPICAL FLOOR FRAMING PLAN
SCALE 1/8"=1'-0"



TYPICAL FLOOR SLAB BOTTOM REINFORCEMENT DETAIL
SCALE 1/8"=1'-0"

NOTES:
UNLESS OTHERWISE SPECIFIED

1. ALL THE DIMENSIONS ARE IN mm
2. ALL THE COLUMNS SIZE ARE TO BE 0'–9"X2'–6"
3. ALL THE BEAMS SIZE ARE TO BE 0'–9"X1'–6"
4. ALL THE SLAB THICKNESS ARE TO BE 0'–5"

LEGEND:
- BALCONY SUNK BY 4"
- TOILET SLAB SUNK BY 4"

DRAWING NO : A4

REVISION NOTES :

NO.	DATE	REVISION

ARCHITECT

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BUILDER CONSULTANTS

NARAIN PROMOTERS

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ELECTRICAL CONSULTANTS

PROJECT NAME

PANDAVAS APARTMENT

CLIENTS

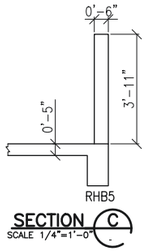
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TYPICAL AND FIRST FLOOR FRAMING PLAN AND TYPICAL FLOOR SLAB REINFORCEMENT DETAILS (BLOCK-01)

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CHKD BY:	
DATE: 04.06.22	

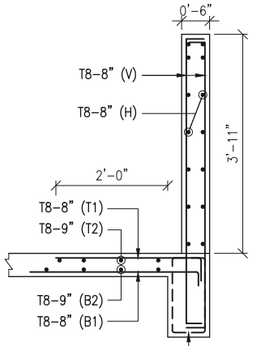
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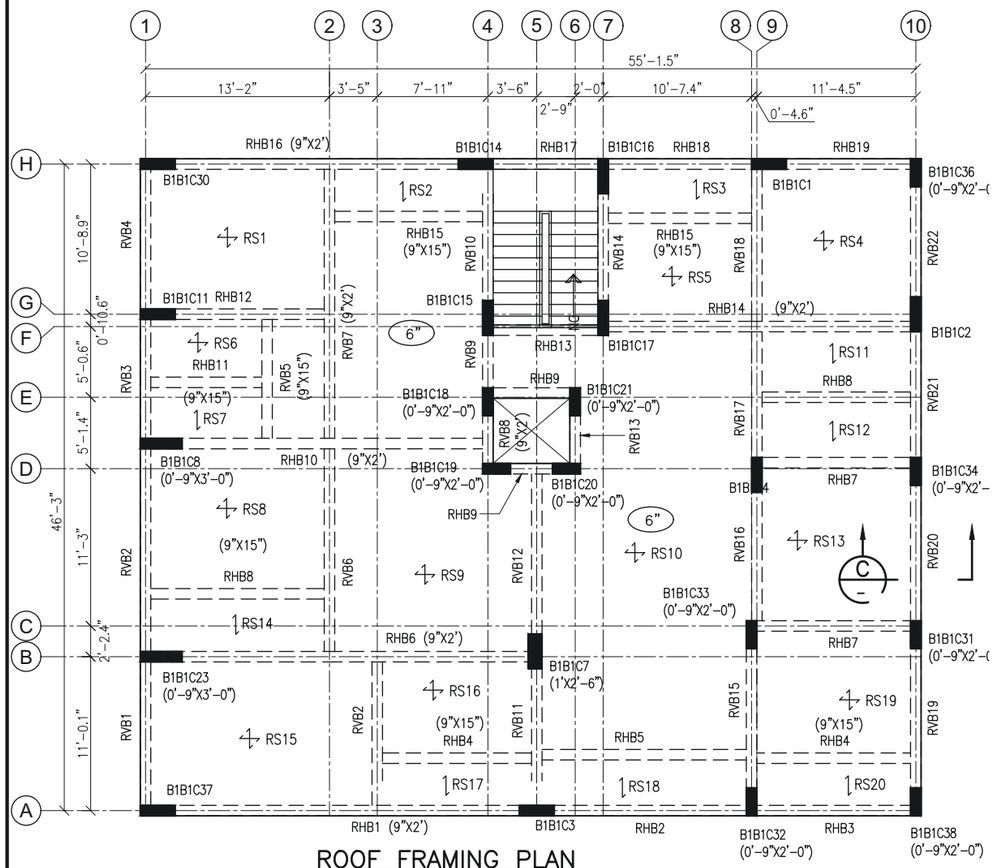
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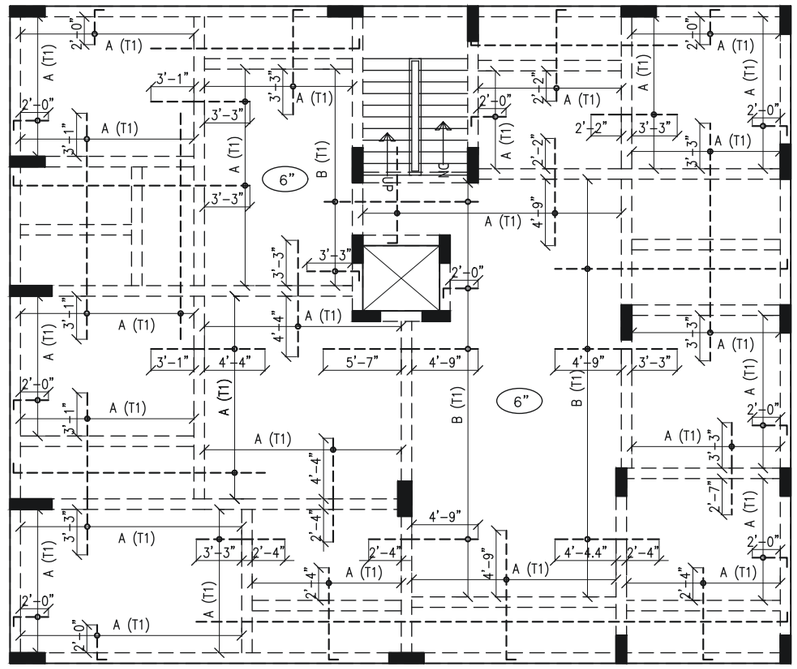
SECTION C
SCALE 1/4"=1'-0"



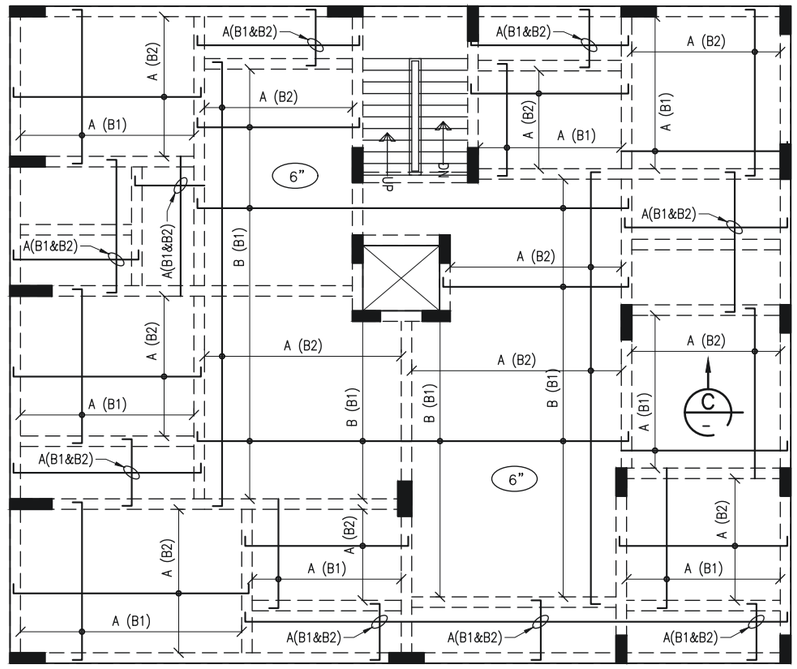
SECTION C
SCALE 1/2"=1'-0"



ROOF FRAMING PLAN
SCALE 1/8"=1'-0"



ROOF SLAB TOP REINFORCEMENT DETAIL
SCALE 1/8"=1'-0"



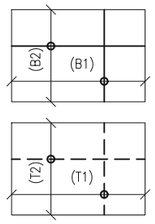
ROOF SLAB BOTTOM REINFORCEMENT DETAIL
SCALE 1/8"=1'-0"

NOTES:
UNLESS OTHERWISE SPECIFIED
1. ALL THE DIMENSIONS ARE IN MM
2. GRADE OF CONCRETE:
   (a) M30 – FOR PILE & PILE CAP
   (b) M35 – FOR COLUMN, BEAM, SLAB & RC WALL
3. GRADE OF STEEL:
   (a) Fe500 – FOR ALL STRUCTURAL ELEMENTS
4. CLEAR COVER FOR COLUMN–40mm, BEAM–30mm, SLAB–25mm, PILE & PILE CAP–75mm AND RC WALL–30mm
5. UNLESS OTHERWISE SPECIFIED, LAP/DEVELOPMENT LENGTH SHALL NOT BE LESS THAN 50 X DIA OF BAR
6. THIS DRAWING TO BE READ IN CONJUNCTION WITH THE KEY PLAN, ARCHITECTURAL, AND ALL OTHER RELEVANT DRAWINGS.
7. STRUCTURE TO BE CONSTRUCTED IN ACCORDANCE WITH I.S.456–2000, NBC–2016 AND RELEVANT INDIAN CODE STIPULATIONS
8. ONUS OF CONSTRUCTION LIES WITH CONTRACTOR / PROMOTER / BUILDER / OWNER.

TABLE–2 REINFORCEMENT SCHEDULE

S.I No.	MARK	SIZE	SPACING
1	A	T8	0'-8"
2	B	T8	0'-6"

BAR LATING SEQUENCE



NOTES:
FOR CLARITY PURPOSE DISTRIBUTION BARS NOT SHOWN.
ALL DISTRIBUTION BARS ARE TO BE T8–0'–9" (T2 & B2) UNLESS OTHERWISE INDICATED

LEGEND:
- TOP REINFORCEMENT
- BOTTOM REINFORCEMENT

SLAB No. REFER FRAMING PLAN

NOTES:
UNLESS OTHERWISE SPECIFIED
1. ALL THE DIMENSIONS ARE IN mm
2. ALL THE COLUMNS SIZE ARE TO BE 0'–9"X2'–6"
3. ALL THE BEAMS SIZE ARE TO BE 0'–9"X1'–6"
4. ALL THE SLAB THICKNESS ARE TO BE 0'–5"

LEGEND:
- BALCONY SUNK BY 4"
- TOILET SLAB SUNK BY 4"

DRAWING NO : A4

REVISION NOTES :

NO.	DATE	REVISION

ARCHITECT

EMAARA DESIGNS
ARCHITECT & INTERIORS
Plot no.35, 100 feet, Taramani Link Rd, Ayodhya Colony, Velachery, Chennai 600042.

BUILDER CONSULTANTS

NARAIN PROMOTERS

STRUCTURAL CONSULTANTS

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ELECTRICAL CONSULTANTS

PROJECT NAME

PANDAVAS APARTMENT

CLIENTS

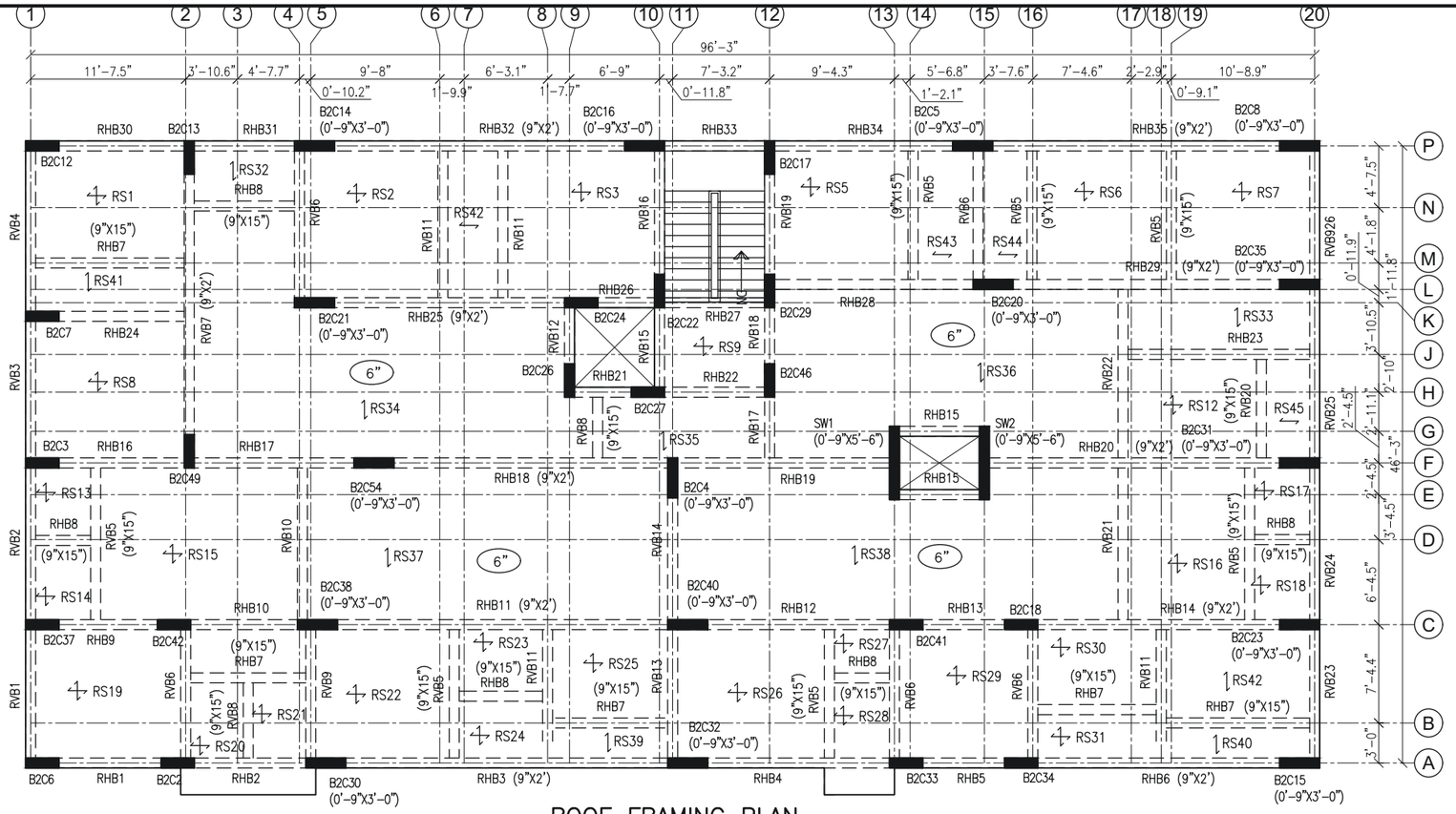
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ROOF FRAMING PLAN AND ROOF SLAB REINFORCEMENT DETAILS (BLOCK-01)

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CHKD BY:	
DATE: 04.06.22	

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GRAPHIC SCALE

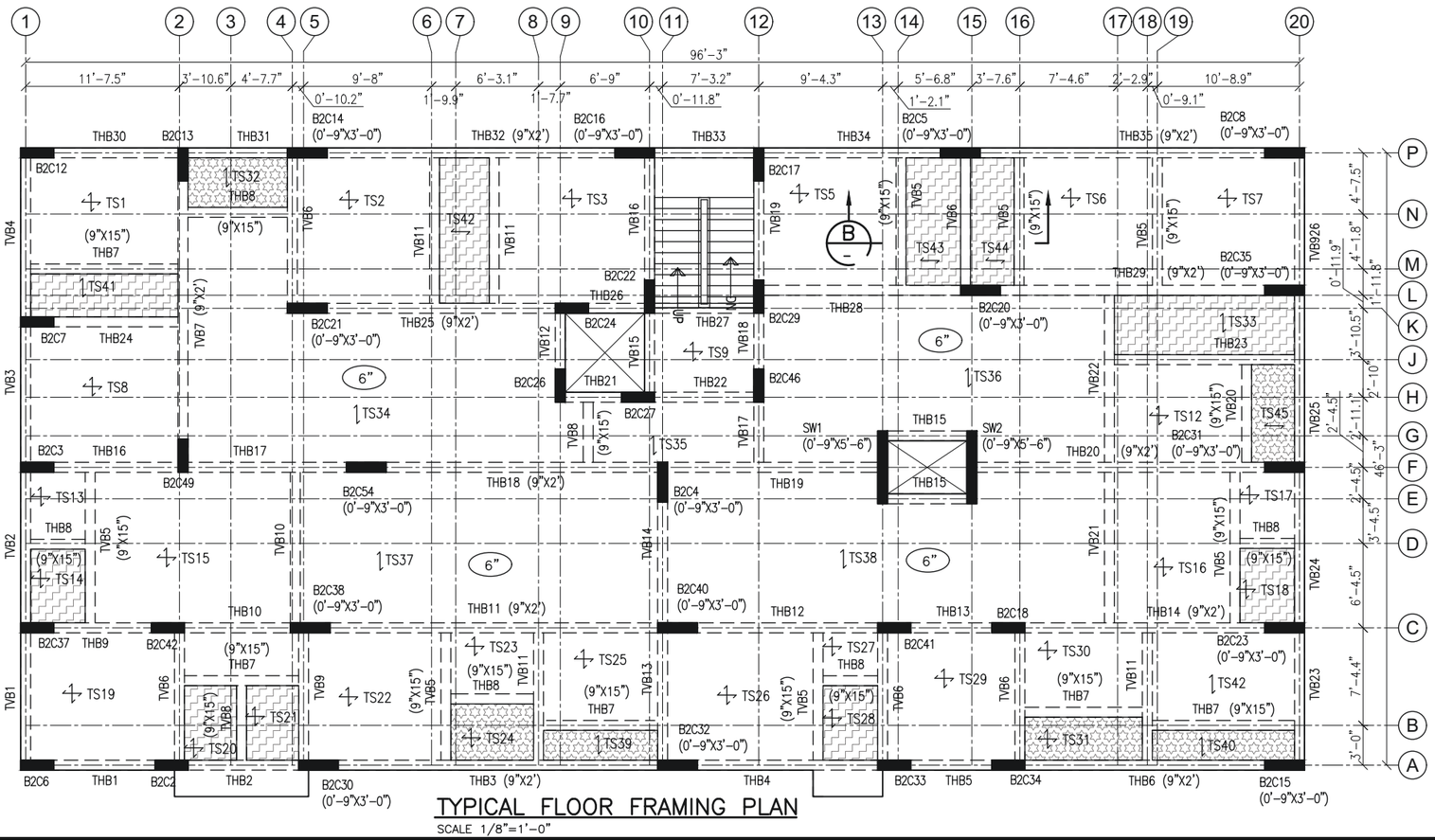
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- ☐ FOR TENDER
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- ☐ FOR EXECUTION
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N W E S



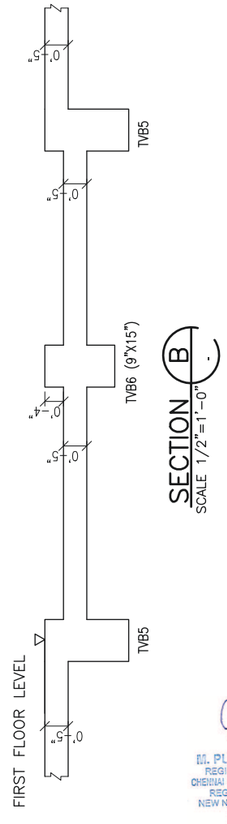
ROOF FRAMING PLAN

SCALE 1/8"=1'-0"



TYPICAL FLOOR FRAMING PLAN

SCALE 1/8"=1'-0"



NOTES:

UNLESS OTHERWISE SPECIFIED

1. ALL THE DIMENSIONS ARE IN MM
2. GRADE OF CONCRETE:
   (a) M30 – FOR PILE & PILE CAP
   (b) M35 – FOR COLUMN, BEAM, SLAB & RC WALL
3. GRADE OF STEEL:
   (a) Fe500 – FOR ALL STRUCTURAL ELEMENTS
4. CLEAR COVER FOR COLUMN–40mm, BEAM–30mm, SLAB–25mm, PILE & PILE CAP–75mm AND RC WALL–30mm
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7. STRUCTURE TO BE CONSTRUCTED IN ACCORDANCE WITH I.S.456–2000, NBC–2016 AND RELEVANT INDIAN CODE STIPULATIONS
8. ONUS OF CONSTRUCTION LIES WITH CONTRACTOR / PROMOTER / BUILDER / OWNER.

NOTES:

UNLESS OTHERWISE SPECIFIED

1. ALL THE DIMENSIONS ARE IN mm
2. ALL THE COLUMNS SIZE ARE TO BE 0'–9"X2'–6"
3. ALL THE BEAMS SIZE ARE TO BE 0'–9"X1'–6"
4. ALL THE SLAB THICKNESS ARE TO BE 0'–5"

LEGEND:

– BALCONY SUNK BY 4"

– TOILET SLAB SUNK BY 4"

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DRAWING NO : A5

REVISION NOTES :

NO.	DATE	REVISION

ARCHITECT

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BUILDER CONSULTANTS

NARAIN PROMOTERS

STRUCTURAL CONSULTANTS

ELECTRICAL CONSULTANTS

PROJECT NAME

PANDAVAS APARTMENT

CLIENTS

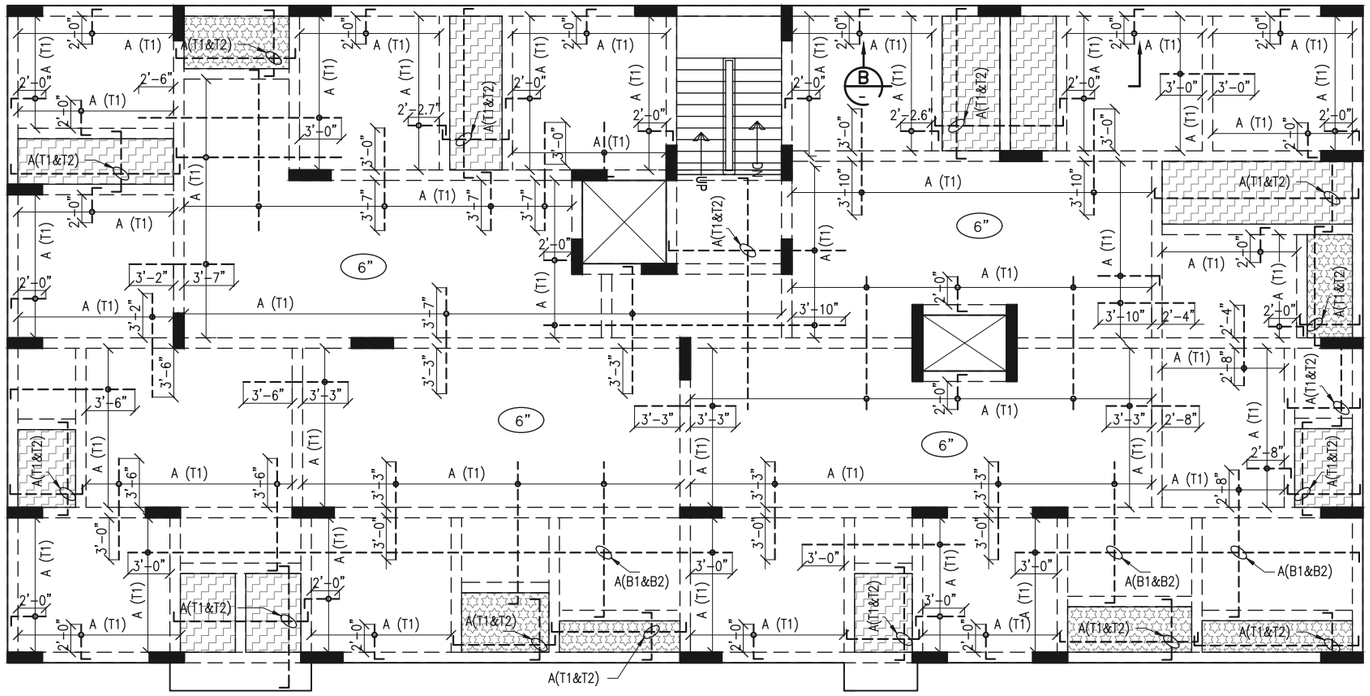
DRAWING TITLE:
TYPICAL FLOOR AND ROOF FRAMING PLAN (BLOCK-02)

DEALT BY:	APPROVED BY:
CHKD BY:	
DATE: 04.06.22	

SCALE:
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200 1000 4000
GRAPHIC SCALE

SIGN :
- ■ FOR CLIENT
- ☐ FOR TENDER
- ☐ FOR INFORMATION
- ☐ FOR EXECUTION
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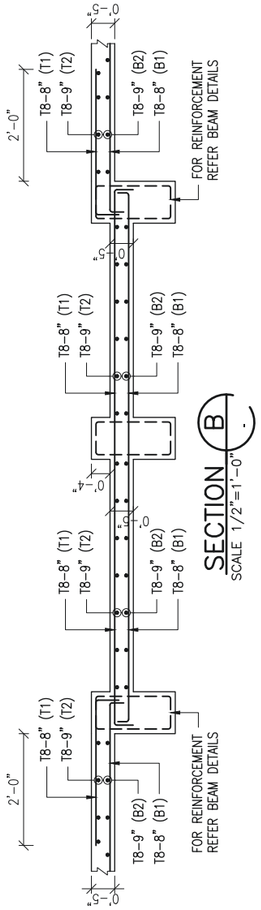


TYPICAL FLOOR SLAB TOP REINFORCEMENT DETAIL

SCALE 1/8"=1'-0"

TYPICAL FLOOR SLAB BOTTOM REINFORCEMENT DETAIL

SCALE 1/8"=1'-0"



SECTION B-B

SCALE 1/2"=1'-0"

NOTES:

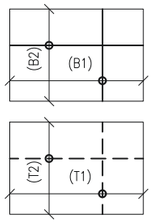
UNLESS OTHERWISE SPECIFIED

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2. GRADE OF CONCRETE:
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   (b) M35 – FOR COLUMN, BEAM, SLAB & RC WALL
3. GRADE OF STEEL:
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8. ONUS OF CONSTRUCTION LIES WITH CONTRACTOR / PROMOTER / BUILDER / OWNER.

TABLE–2 REINFORCEMENT SCHEDULE

S.I No.	MARK	SIZE	SPACING
1	A	T8	0'–8"
2	B	T8	0'–6"

BAR LATING SEQUENCE



NOTES:
FOR CLARITY PURPOSE DISTRIBUTION BARS NOT SHOWN.
ALL DISTRIBUTION BARS ARE TO BE T8–0'–9" (T2 & B2)
UNLESS OTHERWISE INDICATED

LEGEND:
- – – – TOP REINFORCEMENT
- ——— BOTTOM REINFORCEMENT

SLAB No. REFER FRAMING PLAN

M. PURUSOTHAMAN, M.E., (Struct.)
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CHENNAI METROPOLITAN DEVELOPMENT AUTHORITY
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DRAWING NO : A5

REVISION NOTES :

NO.	DATE	REVISION

ARCHITECT

EMAARA DESIGNS
ARCHITECT & INTERIORS
Plot no.35, 100 feet, Taramani Link Rd, Ayodhya Colony, Velachery, Chennai 600042.

BUILDER CONSULTANTS

NARAIN PROMOTERS

STRUCTURAL CONSULTANTS

ELECTRICAL CONSULTANTS

PROJECT NAME

PANDAVAS APARTMENT

CLIENTS

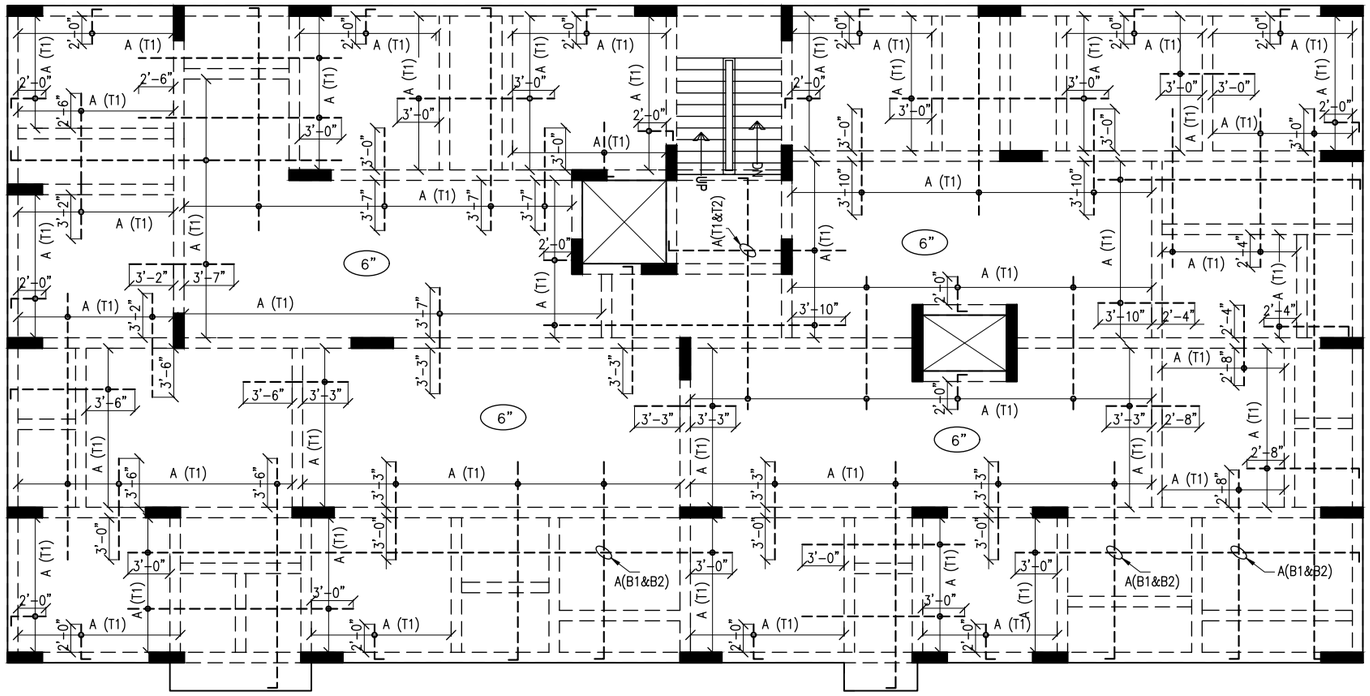
DRAWING TITLE:
FIRST AND TYPICAL FLOOR SLAB REINFORCEMENT DETAILS (BLOCK-02)

DEALT BY:	APPROVED BY:
CHKD BY:	
DATE: 04.06.22	

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200 1000 4000
GRAPHIC SCALE

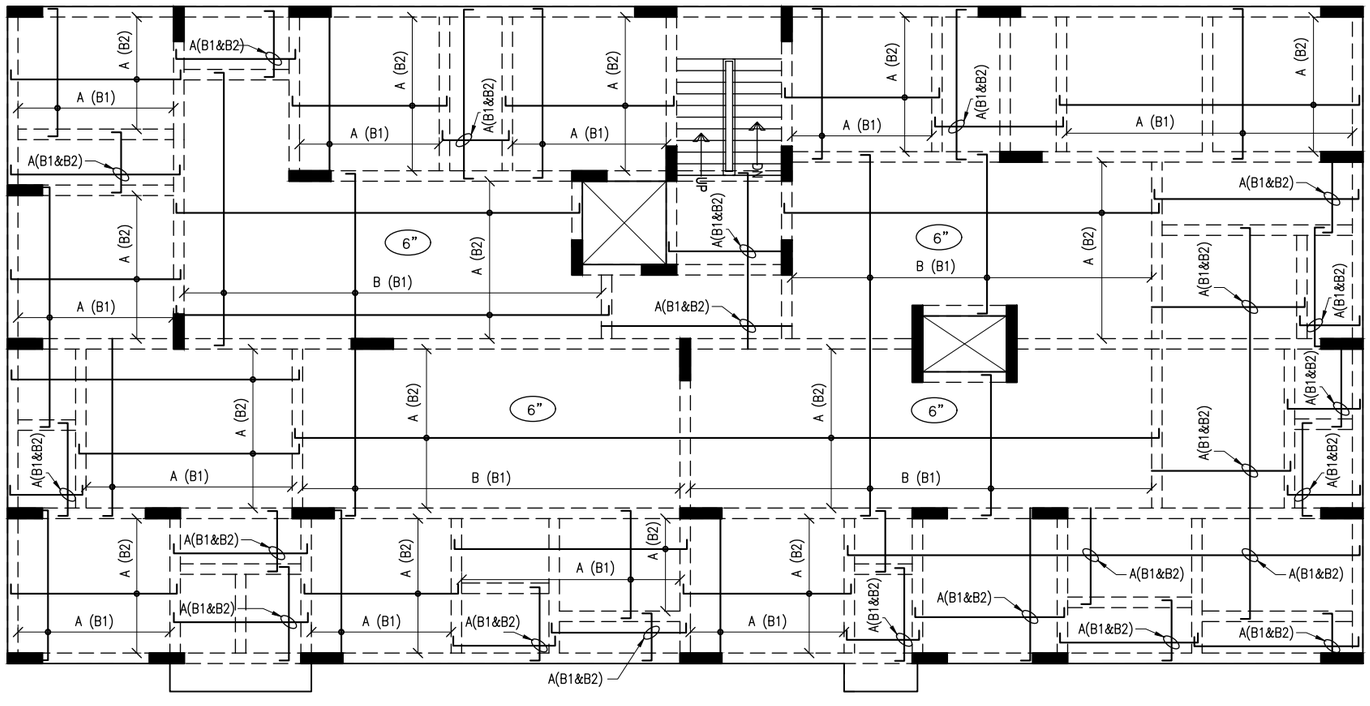
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- ■ FOR CLIENT
- ☐ FOR TENDER
- ☐ FOR INFORMATION
- ☐ FOR EXECUTION
- ☐ FOR APPROVAL

N W E S



ROOF SLAB TOP REINFORCEMENT DETAIL

SCALE 1/8"=1'-0"



ROOF SLAB BOTTOM REINFORCEMENT DETAIL

SCALE 1/8"=1'-0"

NOTES:

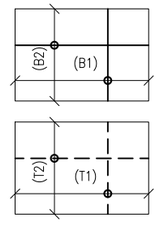
UNLESS OTHERWISE SPECIFIED

1. ALL THE DIMENSIONS ARE IN MM
2. GRADE OF CONCRETE:
   (a) M30 – FOR PILE & PILE CAP
   (b) M35 – FOR COLUMN, BEAM, SLAB & RC WALL
3. GRADE OF STEEL:
   (a) Fe500 – FOR ALL STRUCTURAL ELEMENTS
4. CLEAR COVER FOR COLUMN–40mm, BEAM–30mm, SLAB–25mm, PILE & PILE CAP–75mm AND RC WALL–30mm
5. UNLESS OTHERWISE SPECIFIED, LAP/DEVELOPMENT LENGTH SHALL NOT BE LESS THAN 50 X DIA OF BAR
6. THIS DRAWING TO BE READ IN CONJUNCTION WITH THE KEY PLAN, ARCHITECTURAL, AND ALL OTHER RELEVANT DRAWINGS.
7. STRUCTURE TO BE CONSTRUCTED IN ACCORDANCE WITH I.S.456–2000, NBC–2016 AND RELEVANT INDIAN CODE STIPULATIONS
8. ONUS OF CONSTRUCTION LIES WITH CONTRACTOR / PROMOTER / BUILDER / OWNER.

TABLE–2 REINFORCEMENT SCHEDULE

S.I No.	MARK	SIZE	SPACING
1	A	T8	0'–8"
2	B	T8	0'–6"

BAR LATING SEQUENCE



NOTES:
FOR CLARITY PURPOSE DISTRIBUTION BARS NOT SHOWN.
ALL DISTRIBUTION BARS ARE TO BE T8–0'–9" (T2 & B2)
UNLESS OTHERWISE INDICATED

LEGEND:
- TOP REINFORCEMENT
- BOTTOM REINFORCEMENT

SLAB No. REFER FRAMING PLAN

M. PURUSOTHAMAN, M.E., (Struct.)
REGISTERED STRUCTURAL ENGINEER
CHENNAI METROPOLITAN DEVELOPMENT AUTHORITY
REGISTRATION No. SE/GR-2/19/03/038
NEW No. 31 (OLD No.14), ESSANT AVENUE,
ADYAR, CHENNAI-600 020
E-Mail: mj.purusu@gmail.com
Mobile: +91 94445 77374

DRAWING NO : A5

REVISION NOTES :

NO.	DATE	REVISION

ARCHITECT

EMAARA DESIGNS
ARCHITECT & INTERIORS
Plot no.35, 100 feet, Taramani Link Rd, Ayodhya Colony, Velachery, Chennai 600042.

BUILDER CONSULTANTS

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STRUCTURAL CONSULTANTS

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PROJECT NAME

PANDAVAS APARTMENT

CLIENTS

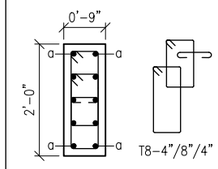
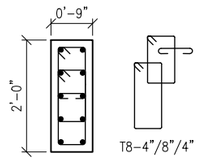
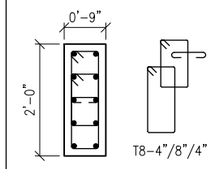
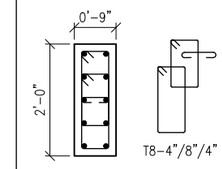
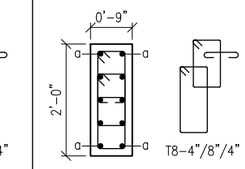
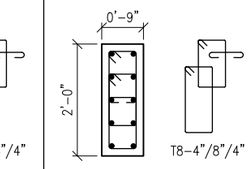
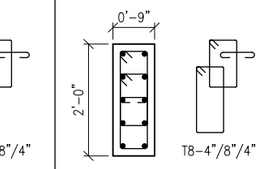
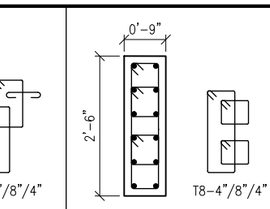
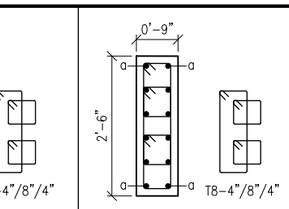
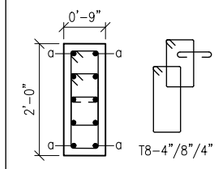
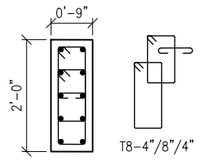
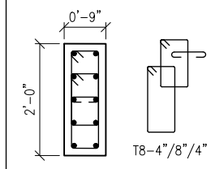
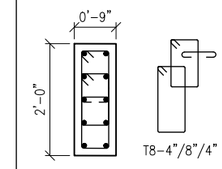
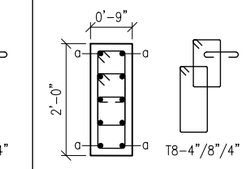
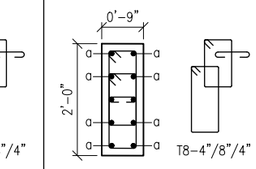
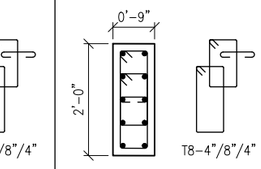
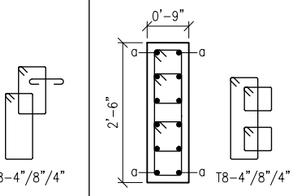
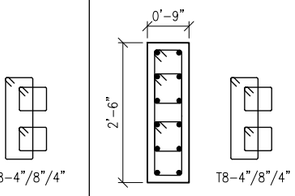
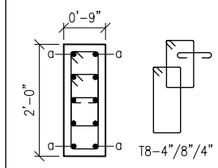
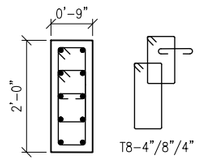
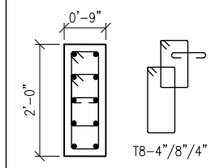
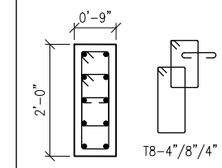
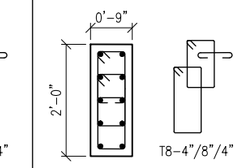
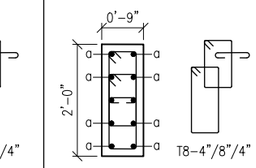
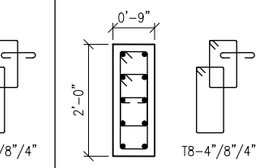
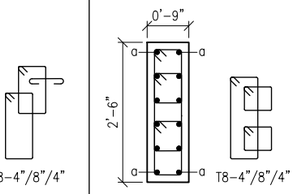
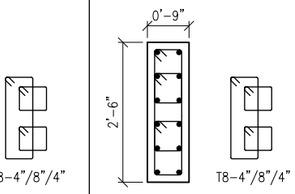
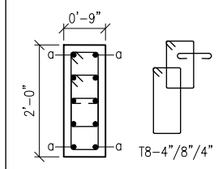
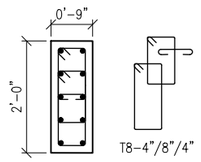
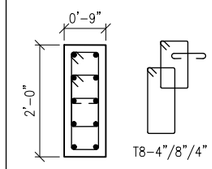
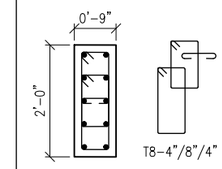
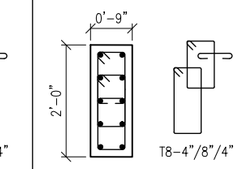
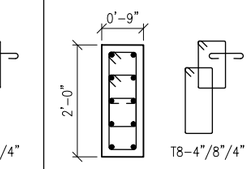
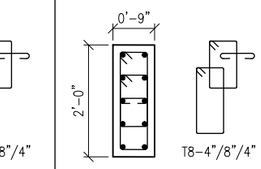
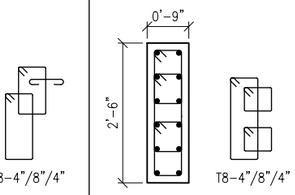
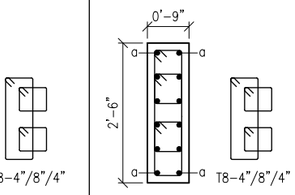
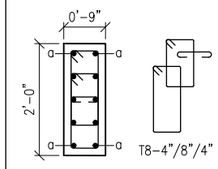
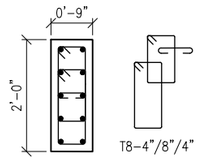
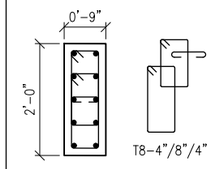
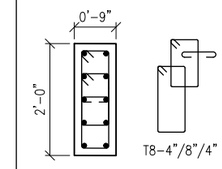
DRAWING TITLE:
ROOF SLAB REINFORCEMENT DETAILS (BLOCK-02)

DEALT BY:
CHKD BY:
DATE: 04.06.22
APPROVED BY:

SCALE:
100 500 2000
200 1000 4000
GRAPHIC SCALE

SIGN :
- ■ FOR CLIENT
- ☐ FOR TENDER
- ☐ FOR INFORMATION
- ☐ FOR EXECUTION
- ☐ FOR APPROVAL

N W E S

THIRD FLOOR LEVEL TO FOURTH FLOOR LEVEL									
SIZE	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-6"	0'-9"X2'-6"
CONCRETE GRADE/COVER	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm
REINFORCEMENT/STEEL GRADE Fe	4T20(a)+6T16/Fe 500	10T20/Fe 500	10T16/Fe 500	10T16/Fe 500	4T25(a)+6T20/Fe 500	10T20/Fe 500	10T16/Fe 500	12T20/Fe 500	4T25(a)+8T20/Fe 500
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500
SECOND FLOOR LEVEL TO THIRD FLOOR LEVEL									
SIZE	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-6"	0'-9"X2'-6"
CONCRETE GRADE/COVER	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm
REINFORCEMENT/STEEL GRADE Fe	4T20(a)+6T16/Fe 500	10T25/Fe 500	10T16/Fe 500	10T20/Fe 500	4T25(a)+6T20/Fe 500	8T25(a)+2T20/Fe 500	10T16/Fe 500	4T25(a)+8T20/Fe 500	12T25/Fe 500
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500
FIRST FLOOR LEVEL TO SECOND FLOOR LEVEL									
SIZE	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-6"	0'-9"X2'-6"
CONCRETE GRADE/COVER	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm
REINFORCEMENT/STEEL GRADE Fe	4T20(a)+6T16/Fe 500	10T25/Fe 500	10T16/Fe 500	10T20/Fe 500	10T25/Fe 500	8T25(a)+2T20/Fe 500	10T20/Fe 500	4T25(a)+8T20/Fe 500	12T25/Fe 500
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500
STILT FLOOR LEVEL TO FIRST FLOOR LEVEL									
SIZE	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-6"	0'-9"X2'-6"
CONCRETE GRADE/COVER	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm
REINFORCEMENT/STEEL GRADE Fe	4T20(a)+6T16/Fe 500	10T25/Fe 500	10T16/Fe 500	10T20/Fe 500	10T25/Fe 500	10T20/Fe 500	10T20/Fe 500	12T20/Fe 500	4T25(a)+8T20/Fe 500
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500
PILE CAP LEVEL TO STILT FLOOR LEVEL									
SIZE	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-6"	0'-9"X2'-6"
CONCRETE GRADE/COVER	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm
REINFORCEMENT/STEEL GRADE Fe	4T20(a)+6T16/Fe 500	10T25/Fe 500	10T16/Fe 500	10T20/Fe 500	10T25/Fe 500	10T20/Fe 500	10T20/Fe 500	12T20/Fe 500	4T25(a)+8T20/Fe 500
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500
COLUMN MARK	B1C34, B1C36, B1C31 & B1C38	B1C32	B1C33	B1C18	B1C19	B1C20	B1C21	B1C16	B1C15

DRAWING NO : A6

REVISION NOTES :

NO.	DATE	REVISION

ARCHITECT

EMAARA DESIGNS
ARCHITECT & INTERIORS

Plot no.35, 100 feet, Taramani Link Rd, Ayodhya Colony, Velachery, Chennai 600042.

BUILDER CONSULTANTS

NARAIN PROMOTERS

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E-Mail: mj.purusu@gmail.com
Mobile: +91 94445 77374

ELECTRICAL CONSULTANTS

PROJECT NAME

PANDAVAS APARTMENT

CLIENTS

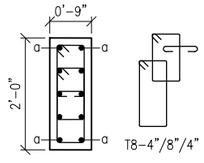
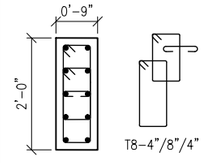
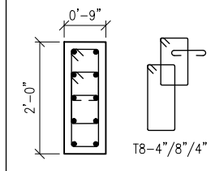
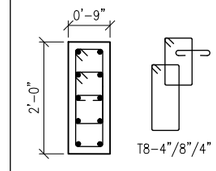
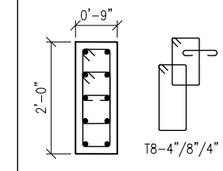
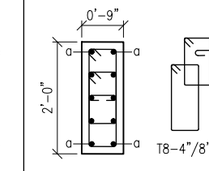
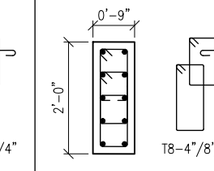
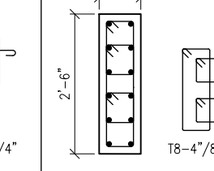
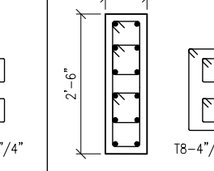
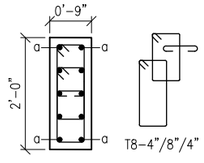
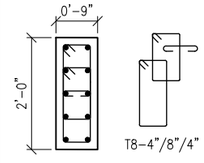
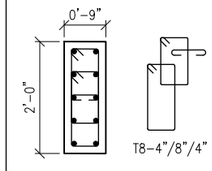
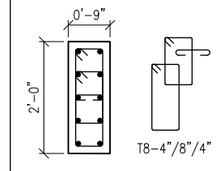
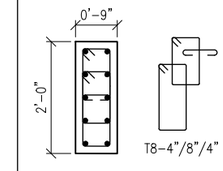
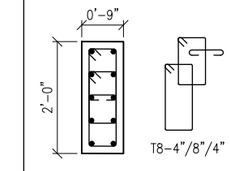
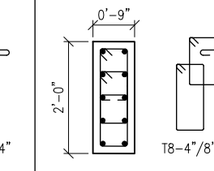
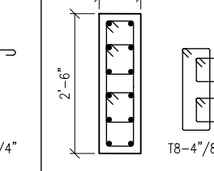
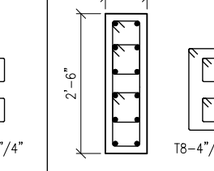
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COLUMN SCHEDULE (BLOCK-01)
(SHEET-01 OF 05)

DEALT BY: | APPROVED BY:
CHKD BY:
DATE: 04.06.22

SCALE:
100 500 2000
200 1000 4000
GRAPHIC SCALE

SIGN :
- [x] FOR CLIENT
- [ ] FOR TENDER
- [ ] FOR INFORMATION
- [ ] FOR EXECUTION
- [ ] FOR APPROVAL

N W E S

SIZE									
CONCRETE GRADE/COVER									
REINFORCEMENT/STEEL GRADE Fe									
LINKS/TIES/STEEL GRADE Fe									
SIZE									
CONCRETE GRADE/COVER									
REINFORCEMENT/STEEL GRADE Fe									
LINKS/TIES/STEEL GRADE Fe									
ABOVE ROOF LEVEL									
SIZE									
CONCRETE GRADE/COVER									
REINFORCEMENT/STEEL GRADE Fe									
LINKS/TIES/STEEL GRADE Fe									
FIFTH FLOOR LEVEL TO ROOF LEVEL									
SIZE	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-6"	0'-9"X2'-6"
CONCRETE GRADE/COVER	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm
REINFORCEMENT/STEEL GRADE Fe	4T20(a)+6T16/Fe 500	10T20/Fe 500	10T12/Fe 500	10T12/Fe 500	10T16/Fe 500	4T16(a)+6T12/Fe 500	10T12/Fe 500	12T20/Fe 500	12T12/Fe 500
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500
FOURTH FLOOR LEVEL TO FIFTH FLOOR LEVEL									
SIZE	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-0"	0'-9"X2'-6"	0'-9"X2'-6"
CONCRETE GRADE/COVER	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm
REINFORCEMENT/STEEL GRADE Fe	4T20(a)+6T16/Fe 500	10T20/Fe 500	10T12/Fe 500	10T16/Fe 500	10T16/Fe 500	10T20/Fe 500	10T12/Fe 500	12T20/Fe 500	12T16/Fe 500
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500
COLUMN MARK	B1C34, B1C36, B1C31 & B1C38	B1C32	B1C33	B1C18	B1C19	B1C20	B1C21	B1C16	B1C15

DRAWING NO : A6

REVISION NOTES :

NO.	DATE	REVISION

ARCHITECT

EMAARA DESIGNS
ARCHITECT & INTERIORS
Plot no.35, 100 feet, Taramani Link Rd, Ayodhya Colony, Velachery, Chennai 600042.

BUILDER CONSULTANTS

NARAIN PROMOTERS

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Mobile: +91 94445 77374

ELECTRICAL CONSULTANTS

PROJECT NAME

PANDAVAS APARTMENT

CLIENTS

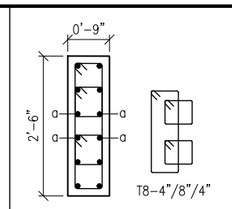
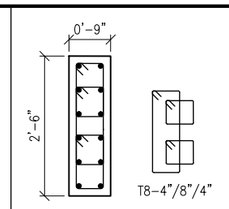
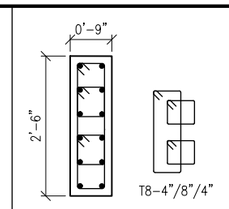
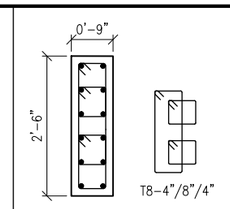
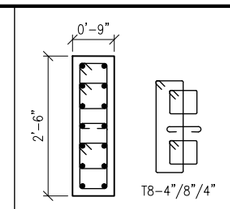
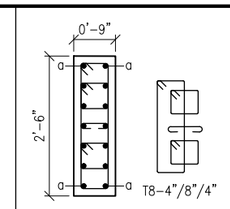
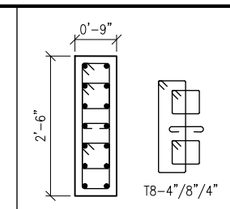
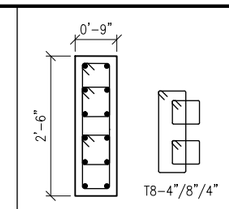
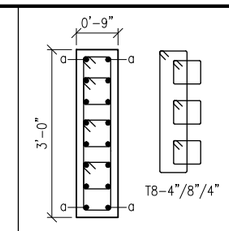
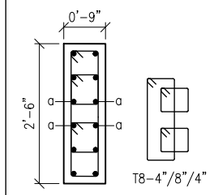
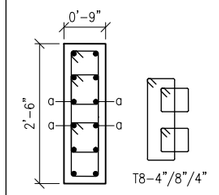
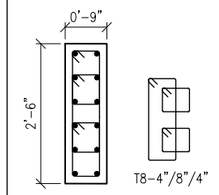
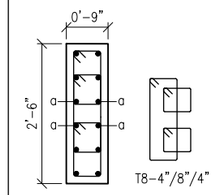
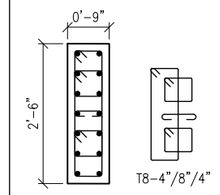
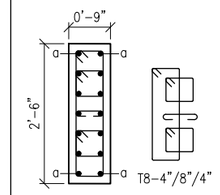
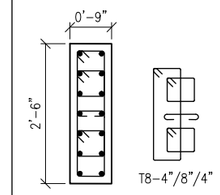
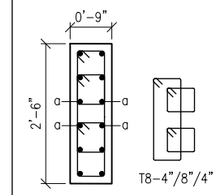
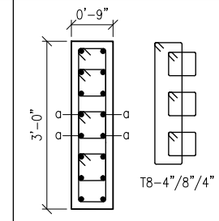
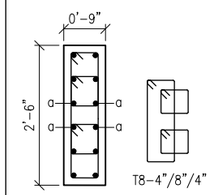
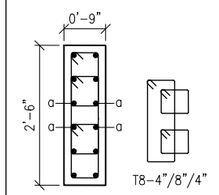
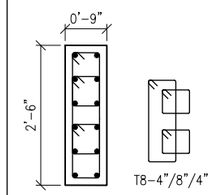
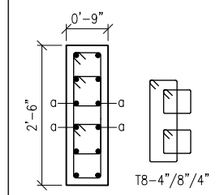
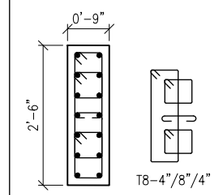
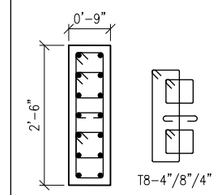
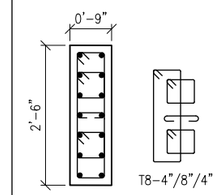
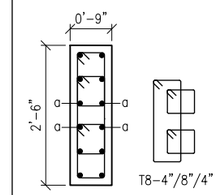
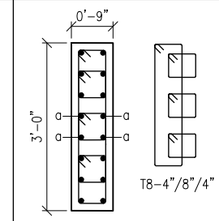
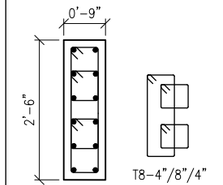
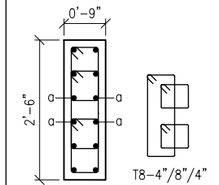
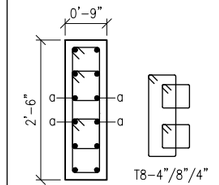
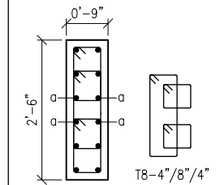
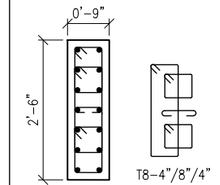
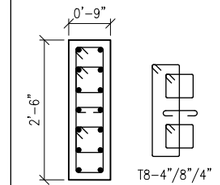
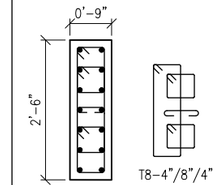
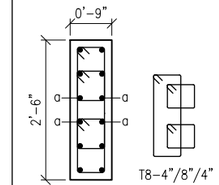
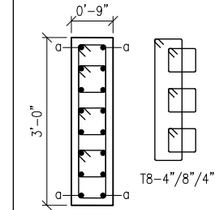
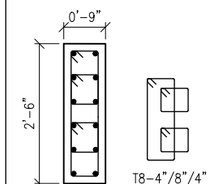
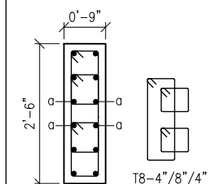
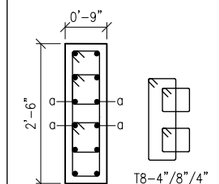
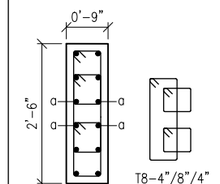
DRAWING TITLE:
COLUMN SCHEDULE (BLOCK-01)
(SHEET-02 OF 05)

DEALT BY:
APPROVED BY:
CHKD BY:
DATE: 04.06.22

SCALE:
100 500 2000
200 1000 4000
GRAPHIC SCALE

SIGN :
■ FOR CLIENT
☐ FOR TENDER
☐ FOR INFORMATION
☐ FOR EXECUTION
☐ FOR APPROVAL

N W E S

THIRD FLOOR LEVEL TO FOURTH FLOOR LEVEL									
SIZE	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X3'-0"
CONCRETE GRADE/COVER	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm
REINFORCEMENT/STEEL GRADE Fe	8T20+4T16(a)/Fe 500	12T20/Fe 500	12T20/Fe 500	12T16/Fe 500	14T25/Fe 500	4T25(a)+10T20/Fe 500	14T25/Fe 500	12T16/Fe 500	4T25(a)+12T20/Fe 500
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500
SECOND FLOOR LEVEL TO THIRD FLOOR LEVEL									
SIZE	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X3'-0"
CONCRETE GRADE/COVER	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm
REINFORCEMENT/STEEL GRADE Fe	8T20+4T16(a)/Fe 500	8T25+4T20(a)/Fe 500	12T25/Fe 500	8T25+4T20(a)/Fe 500	14T25/Fe 500	4T25(a)+10T20/Fe 500	14T25/Fe 500	8T20+4T16(a)/Fe 500	12T25+4T20(a)/Fe 500
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500
FIRST FLOOR LEVEL TO SECOND FLOOR LEVEL									
SIZE	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X3'-0"
CONCRETE GRADE/COVER	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm
REINFORCEMENT/STEEL GRADE Fe	8T20+4T16(a)/Fe 500	8T25+4T20(a)/Fe 500	12T25/Fe 500	8T25+4T20(a)/Fe 500	14T25/Fe 500	14T25/Fe 500	14T25/Fe 500	8T20+4T16(a)/Fe 500	12T25+4T20(a)/Fe 500
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500
STILT FLOOR LEVEL TO FIRST FLOOR LEVEL									
SIZE	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X3'-0"
CONCRETE GRADE/COVER	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm
REINFORCEMENT/STEEL GRADE Fe	12T20/Fe 500	8T25+4T20(a)/Fe 500	8T25+4T20(a)/Fe 500	8T25+4T20(a)/Fe 500	14T25/Fe 500	14T25/Fe 500	14T25/Fe 500	8T20+4T16(a)/Fe 500	4T25(a)+12T20/Fe 500
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500
PILE CAP LEVEL TO STILT FLOOR LEVEL									
SIZE	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X3'-0"
CONCRETE GRADE/COVER	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm
REINFORCEMENT/STEEL GRADE Fe	12T20/Fe 500	8T25+4T20(a)/Fe 500	8T25+4T20(a)/Fe 500	8T25+4T20(a)/Fe 500	14T25/Fe 500	14T25/Fe 500	14T25/Fe 500	8T20+4T16(a)/Fe 500	4T25(a)+12T20/Fe 500
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500
COLUMN MARK	B1C37 & B1C30	B1C11	B1C3	B1C4	B1C17	B1C14	B1C2	B1C1	B1C8 & B1C23

DRAWING NO : A6

REVISION NOTES :

NO.	DATE	REVISION

ARCHITECT

EMAARA DESIGNS
ARCHITECT & INTERIORS
Plot no.35, 100 feet, Taramani Link Rd, Ayodhya Colony, Velachery, Chennai 600042.

BUILDER CONSULTANTS

NARAIN PROMOTERS

STRUCTURAL CONSULTANTS

M. PURUSOTHAMAN, M.E., (Struct.)
REGISTERED STRUCTURAL ENGINEER
CHENNAI METROPOLITAN DEVELOPMENT AUTHORITY
REGISTRATION No. SE/GR-I/19/03/008
NEW No. 51 (OLD No.14), BESANT AVENUE,
ADYAR, CHENNAI-600 020
E-Mail: mj.purusu@gmail.com
Mobile: +91 94445 77374

ELECTRICAL CONSULTANTS

PROJECT NAME

PANDAVAS APARTMENT

CLIENTS

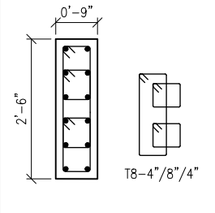
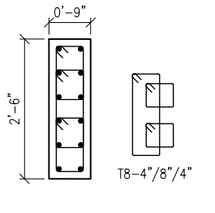
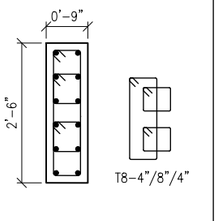
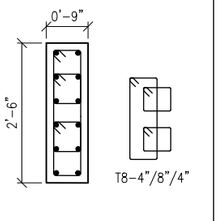
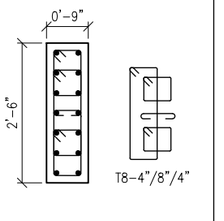
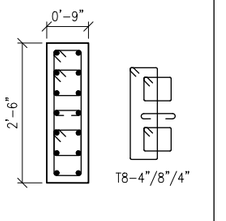
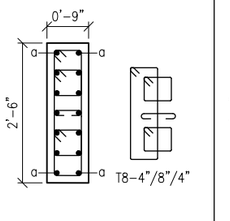
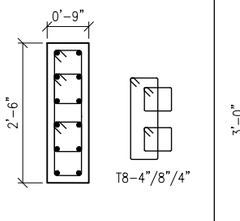
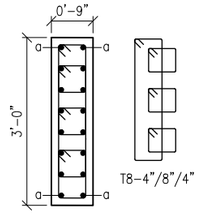
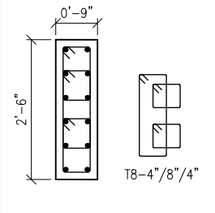
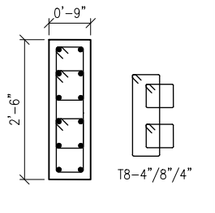
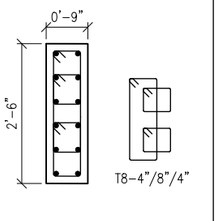
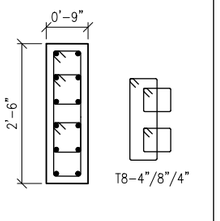
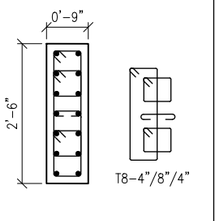
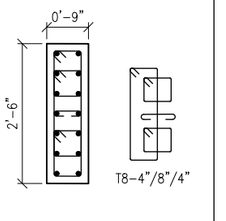
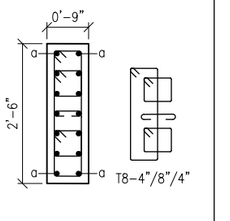
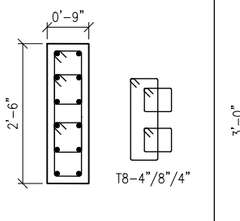
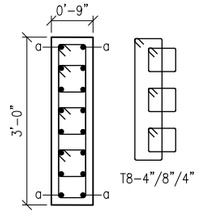
DRAWING TITLE:
COLUMN SCHEDULE (BLOCK-01)
(SHEET-03 OF 05)

DEALT BY: | APPROVED BY:
CHKD BY:
DATE: 04.06.22

SCALE:
100 500 2000
200 1000 4000
G R A P H I C S C A L E

SIGN :
- ■ FOR CLIENT
- ☐ FOR TENDER
- ☐ FOR INFORMATION
- ☐ FOR EXECUTION
- ☐ FOR APPROVAL

N W E S

SIZE									
CONCRETE GRADE/COVER									
REINFORCEMENT/STEEL GRADE Fe									
LINKS/TIES/STEEL GRADE Fe									
SIZE									
CONCRETE GRADE/COVER									
REINFORCEMENT/STEEL GRADE Fe									
LINKS/TIES/STEEL GRADE Fe									
ABOVE ROOF LEVEL									
SIZE									
CONCRETE GRADE/COVER									
REINFORCEMENT/STEEL GRADE Fe									
LINKS/TIES/STEEL GRADE Fe									
FIFTH FLOOR LEVEL TO ROOF LEVEL									
SIZE	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X3'-0"
CONCRETE GRADE/COVER	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm
REINFORCEMENT/STEEL GRADE Fe	12T16/Fe 500	12T20/Fe 500	12T20/Fe 500	12T16/Fe 500	14T20/Fe 500	14T16/Fe 500	4T25(a)+10T20/Fe 500	12T16/Fe 500	4T20(a)+12T16/Fe 500
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500
FOURTH FLOOR LEVEL TO FIFTH FLOOR LEVEL									
SIZE	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X3'-0"
CONCRETE GRADE/COVER	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm
REINFORCEMENT/STEEL GRADE Fe	12T16/Fe 500	12T20/Fe 500	12T20/Fe 500	12T16/Fe 500	14T20/Fe 500	14T16/Fe 500	4T25(a)+10T20/Fe 500	12T16/Fe 500	4T20(a)+12T16/Fe 500
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500
COLUMN MARK	B1C37 & B1C30	B1C11	B1C3	B1C4	B1C17	B1C14	B1C2	B1C1	B1C8 & B1C23

DRAWING NO : A6

REVISION NOTES :

NO.	DATE	REVISION

ARCHITECT

EMAARA DESIGNS
ARCHITECT & INTERIORS
Plot no.35, 100 feet, Taramani Link Rd, Ayodhya Colony, Velachery, Chennai 600042.

BUILDER CONSULTANTS

NARAIN PROMOTERS

STRUCTURAL CONSULTANTS

M. PURUSOTHAMAN, M.E., (Struct.)
REGISTERED STRUCTURAL ENGINEER
CHENNAI METROPOLITAN DEVELOPMENT AUTHORITY
REGISTRATION No. SE/GR-I/19/03/038
NEW No. 31 (OLD No.14), BESANT AVENUE,
ADYAR, CHENNAI-600 020
E-Mail: mj.purusu@gmail.com
Mobile: +91 94445 77374

ELECTRICAL CONSULTANTS

PROJECT NAME

PANDAVAS APARTMENT

CLIENTS

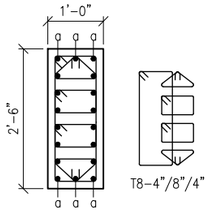
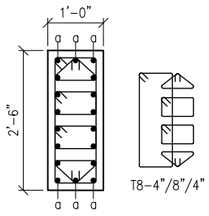
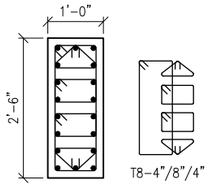
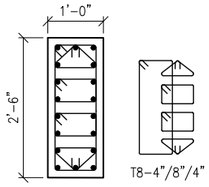
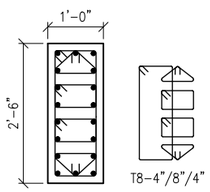
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(SHEET-04 OF 05)

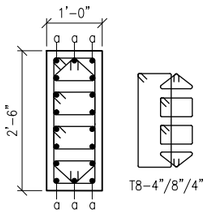
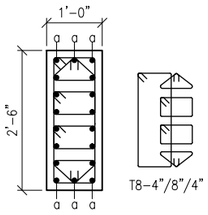
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CHKD BY:
DATE: 04.06.22

SCALE:
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GRAPHIC SCALE

SIGN :
- [x] FOR CLIENT
- [ ] FOR TENDER
- [ ] FOR INFORMATION
- [ ] FOR EXECUTION
- [ ] FOR APPROVAL

N W E S

THIRD FLOOR LEVEL TO FOURTH FLOOR LEVEL		
SIZE	1'–0"X2'–6"	
CONCRETE GRADE/COVER	M35/40mm	
REINFORCEMENT/STEEL GRADE Fe	6T25(a)+12T20/Fe 500	
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	
SECOND FLOOR LEVEL TO THIRD FLOOR LEVEL		
SIZE	1'–0"X2'–6"	
CONCRETE GRADE/COVER	M35/40mm	
REINFORCEMENT/STEEL GRADE Fe	6T25(a)+12T20/Fe 500	
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	
FIRST FLOOR LEVEL TO SECOND FLOOR LEVEL		
SIZE	1'–0"X2'–6"	
CONCRETE GRADE/COVER	M35/40mm	
REINFORCEMENT/STEEL GRADE Fe	18T25/Fe 500	
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	
STILT FLOOR LEVEL TO FIRST FLOOR LEVEL		
SIZE	1'–0"X2'–6"	
CONCRETE GRADE/COVER	M35/40mm	
REINFORCEMENT/STEEL GRADE Fe	18T25/Fe 500	
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	
PILE CAP LEVEL TO STILT FLOOR LEVEL		
SIZE	1'–0"X2'–6"	
CONCRETE GRADE/COVER	M35/40mm	
REINFORCEMENT/STEEL GRADE Fe	18T25/Fe 500	
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	
COLUMN MARK	B1C7	

SIZE		
CONCRETE GRADE/COVER		
REINFORCEMENT/STEEL GRADE Fe		
LINKS/TIES/STEEL GRADE Fe		
SIZE		
CONCRETE GRADE/COVER		
REINFORCEMENT/STEEL GRADE Fe		
LINKS/TIES/STEEL GRADE Fe		
ABOVE ROOF LEVEL		
SIZE		
CONCRETE GRADE/COVER		
REINFORCEMENT/STEEL GRADE Fe		
LINKS/TIES/STEEL GRADE Fe		
FIFTH FLOOR LEVEL TO ROOF LEVEL		
SIZE	1'–0"X2'–6"	
CONCRETE GRADE/COVER	M35/40mm	
REINFORCEMENT/STEEL GRADE Fe	6T25(a)+12T20/Fe 500	
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	
FOURTH FLOOR LEVEL TO FIFTH FLOOR LEVEL		
SIZE	1'–0"X2'–6"	
CONCRETE GRADE/COVER	M35/40mm	
REINFORCEMENT/STEEL GRADE Fe	6T25(a)+12T20/Fe 500	
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	
COLUMN MARK	B1C7	

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CHENNAI METROPOLITAN DEVELOPMENT AUTHORITY
REGISTRATION No. SE/GR-I/19/03/038
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DRAWING NO : A6

REVISION NOTES :

NO.	DATE	REVISION

ARCHITECT

EMAARA DESIGNS
ARCHITECT & INTERIORS
Plot no.35, 100 feet, Taramani
Link Rd, Ayodhya Colony,
Velachery, Chennai 600042.

BUILDER CONSULTANTS

NARAIN PROMOTERS

STRUCTURAL CONSULTANTS

ELECTRICAL CONSULTANTS

PROJECT NAME

PANDAVAS APARTMENT

CLIENTS

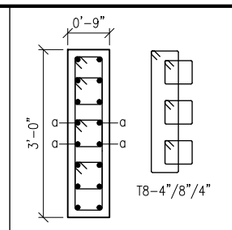
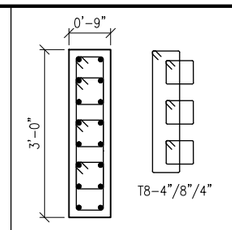
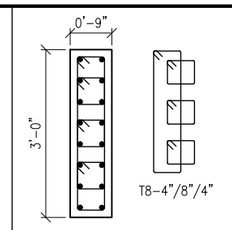
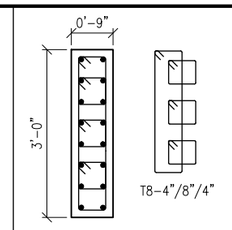
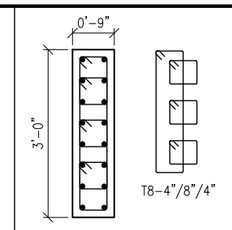
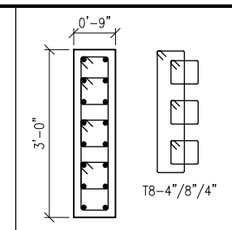
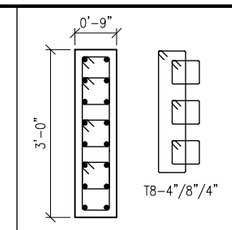
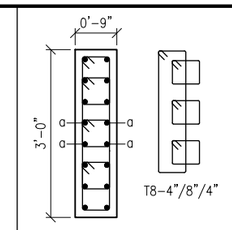
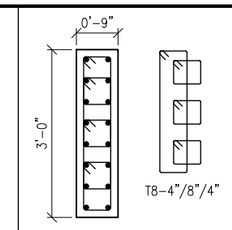
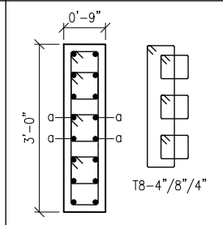
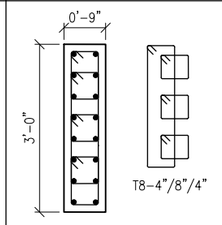
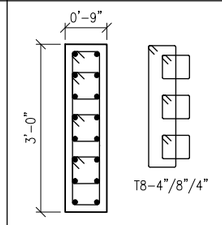
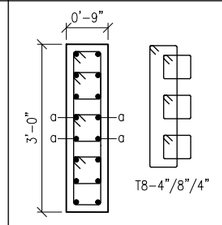
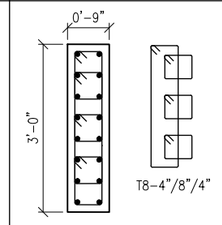
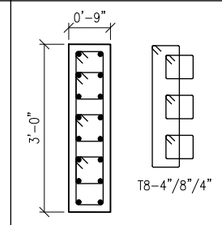
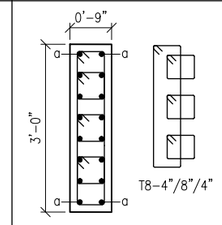
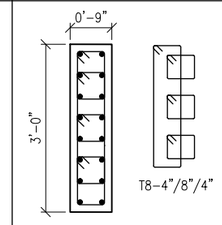
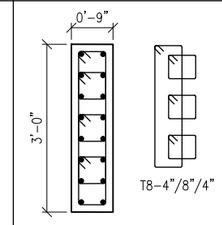
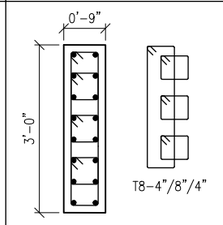
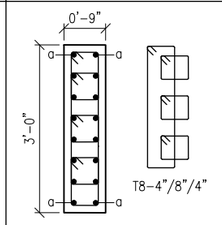
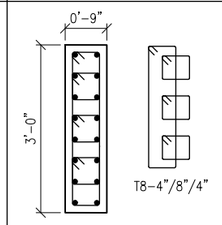
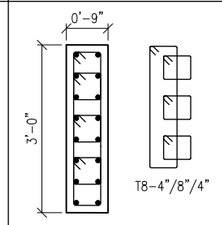
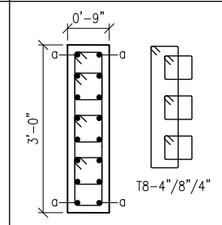
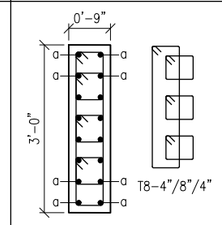
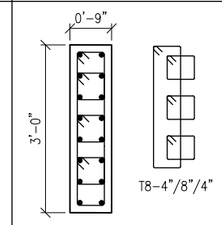
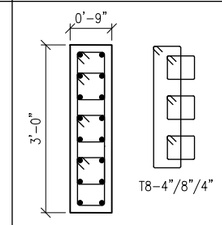
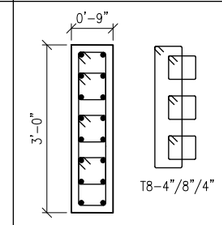
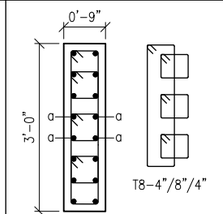
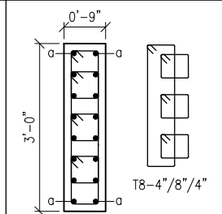
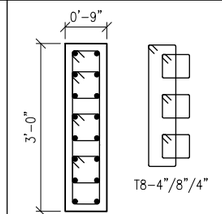
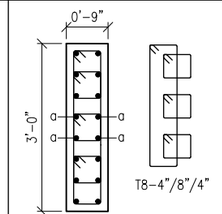
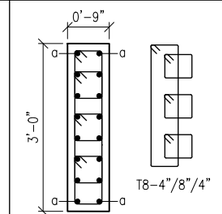
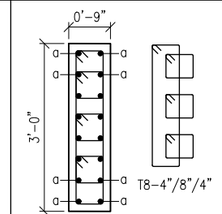
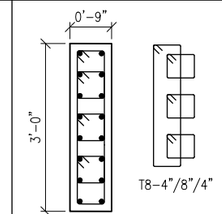
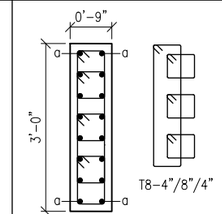
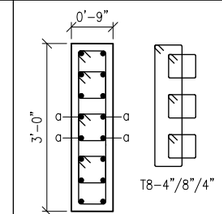
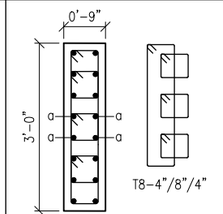
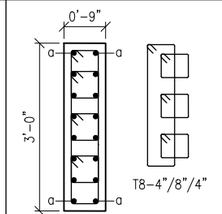
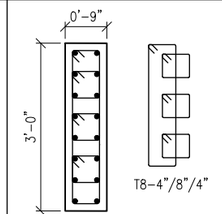
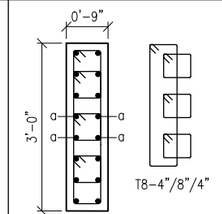
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COLUMN SCHEDULE (BLOCK-01)
(SHEET-05 OF 05)

DEALT BY:	APPROVED BY:
CHKD BY:	
DATE: 04.06.22	

SCALE:
100 500 2000
200 1000 4000
GRAPHIC SCALE

SIGN :
- ■ FOR CLIENT
- ☐ FOR TENDER
- ☐ FOR INFORMATION
- ☐ FOR EXECUTION
- ☐ FOR APPROVAL

N W E S

THIRD FLOOR LEVEL TO FOURTH FLOOR LEVEL									
SIZE	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"
CONCRETE GRADE/COVER	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm
REINFORCEMENT/STEEL GRADE Fe	12T20+4T16(a)/Fe 500	16T12/Fe 500	16T16/Fe 500	16T16/Fe 500	16T16/Fe 500	16T16/Fe 500	16T20/Fe 500	12T20+4T16(a)/Fe 500	16T16/Fe 500
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500
SECOND FLOOR LEVEL TO THIRD FLOOR LEVEL									
SIZE	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"
CONCRETE GRADE/COVER	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm
REINFORCEMENT/STEEL GRADE Fe	12T20+4T16(a)/Fe 500	16T12/Fe 500	16T16/Fe 500	12T20+4T16(a)/Fe 500	16T16/Fe 500	16T20/Fe 500	4T25(a)+12T20/Fe 500	16T25/Fe 500	16T20/Fe 500
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500
FIRST FLOOR LEVEL TO SECOND FLOOR LEVEL									
SIZE	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"
CONCRETE GRADE/COVER	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm
REINFORCEMENT/STEEL GRADE Fe	16T20/Fe 500	4T16(a)+12T12/Fe 500	16T16/Fe 500	16T20/Fe 500	4T20(a)+12T16/Fe 500	8T25(a)+8T20/Fe 500	16T25/Fe 500	16T25/Fe 500	16T20/Fe 500
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500
STILT FLOOR LEVEL TO FIRST FLOOR LEVEL									
SIZE	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"
CONCRETE GRADE/COVER	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm
REINFORCEMENT/STEEL GRADE Fe	12T20+4T16(a)/Fe 500	4T16(a)+12T12/Fe 500	16T16/Fe 500	12T20+4T16(a)/Fe 500	4T20(a)+12T16/Fe 500	8T25(a)+8T20/Fe 500	16T20/Fe 500	4T25(a)+12T20/Fe 500	12T25+4T20(a)/Fe 500
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500
PILE CAP LEVEL TO STILT FLOOR LEVEL									
SIZE	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"
CONCRETE GRADE/COVER	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm
REINFORCEMENT/STEEL GRADE Fe	12T20+4T16(a)/Fe 500	4T16(a)+12T12/Fe 500	16T16/Fe 500	12T20+4T16(a)/Fe 500	4T20(a)+12T16/Fe 500	8T25(a)+8T20/Fe 500	16T20/Fe 500	4T25(a)+12T20/Fe 500	12T25+4T20(a)/Fe 500
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500
COLUMN MARK	B2C2 & B2C35	B2C8, B2C15, B2C54 & B2C5	B2C23	B2C31	B2C14, B2C30 & B2C32	B2C38	B2C21	B2C40	B2C4

DRAWING NO : A10

REVISION NOTES :

NO.	DATE	REVISION

ARCHITECT

EMAARA DESIGNS
ARCHITECT & INTERIORS
Plot no.35, 100 feet, Taramani Link Rd, Ayodhya Colony, Velachery, Chennai 600042.

BUILDER CONSULTANTS

NARAIN PROMOTERS

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Mobile: +91 94445 77374

ELECTRICAL CONSULTANTS

PROJECT NAME

PANDAVAS APARTMENT

CLIENTS

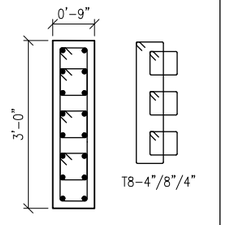
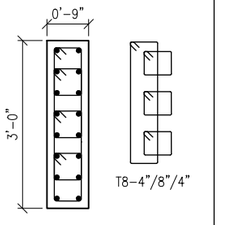
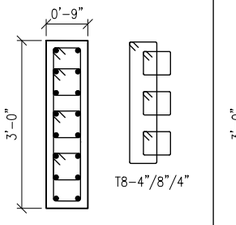
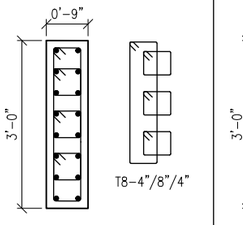
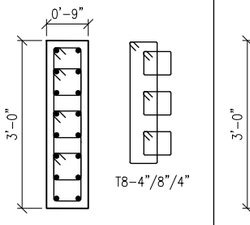
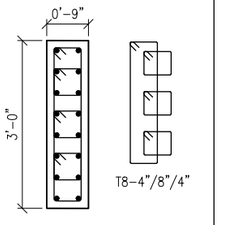
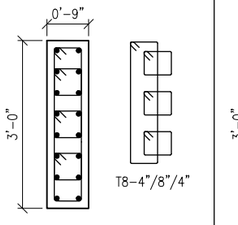
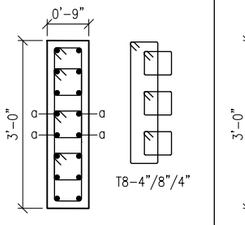
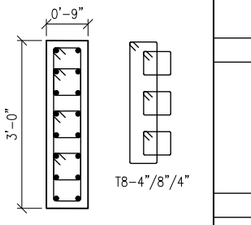
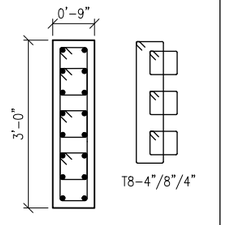
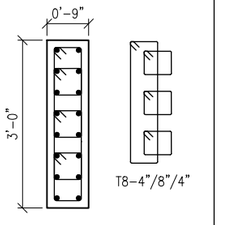
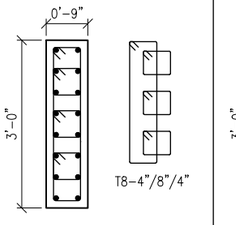
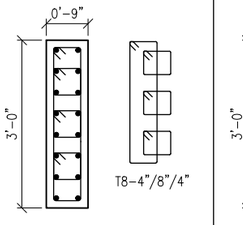
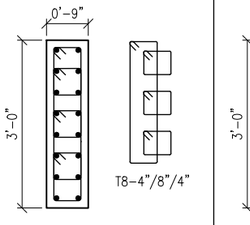
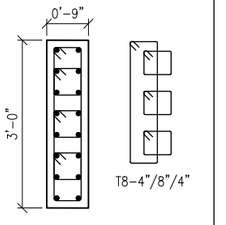
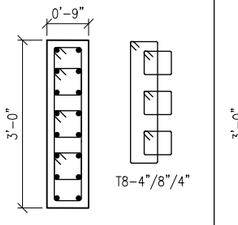
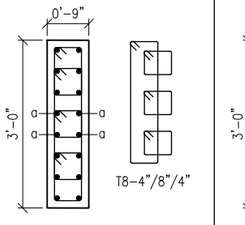
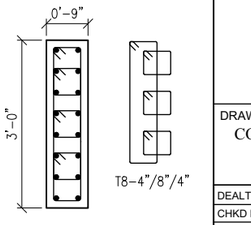
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COLUMN SCHEDULE (BLOCK-02)
(SHEET-01 OF 07)

DEALT BY:
APPROVED BY:
CHKD BY:
DATE: 04.06.22

SCALE:
100 500 2000
200 1000 4000
GRAPHIC SCALE

SIGN :
- ■ FOR CLIENT
- ☐ FOR TENDER
- ☐ FOR INFORMATION
- ☐ FOR EXECUTION
- ☐ FOR APPROVAL

N W E S

SIZE									
CONCRETE GRADE/COVER									
REINFORCEMENT/STEEL GRADE Fe									
LINKS/TIES/STEEL GRADE Fe									
SIZE									
CONCRETE GRADE/COVER									
REINFORCEMENT/STEEL GRADE Fe									
LINKS/TIES/STEEL GRADE Fe									
ABOVE ROOF LEVEL									
SIZE									
CONCRETE GRADE/COVER									
REINFORCEMENT/STEEL GRADE Fe									
LINKS/TIES/STEEL GRADE Fe									
FIFTH FLOOR LEVEL TO ROOF LEVEL									
SIZE	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"
CONCRETE GRADE/COVER	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm
REINFORCEMENT/STEEL GRADE Fe	16T16/Fe 500	16T12/Fe 500	16T16/Fe 500	16T16/Fe 500	16T12/Fe 500	16T12/Fe 500	16T16/Fe 500	12T20+4T16(a)/Fe 500	16T16/Fe 500
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500
FOURTH FLOOR LEVEL TO FIFTH FLOOR LEVEL									
SIZE	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X3'-0"
CONCRETE GRADE/COVER	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm
REINFORCEMENT/STEEL GRADE Fe	16T16/Fe 500	16T12/Fe 500	16T16/Fe 500	16T16/Fe 500	16T12/Fe 500	16T12/Fe 500	16T16/Fe 500	12T20+4T16(a)/Fe 500	16T16/Fe 500
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500
COLUMN MARK	B2C2 & B2C35	B2C8, B2C15, B2C54 & B2C5	B2C23	B2C31	B2C14, B2C30 & B2C32	B2C38	B2C21	B2C40	B2C4

DRAWING NO : A11

REVISION NOTES :

NO.	DATE	REVISION

ARCHITECT

EMAARA DESIGNS
ARCHITECT & INTERIORS
Plot no.35, 100 feet, Taramani Link Rd, Ayodhya Colony, Velachery, Chennai 600042.

BUILDER CONSULTANTS

NARAIN PROMOTERS

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Mobile: +91 94445 77374

ELECTRICAL CONSULTANTS

PROJECT NAME

PANDAVAS APARTMENT

CLIENTS

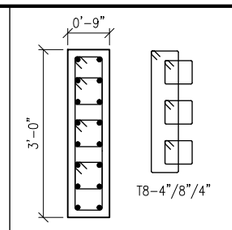
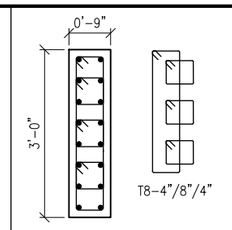
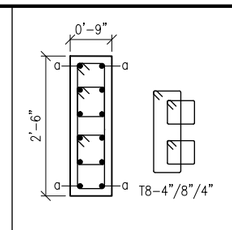
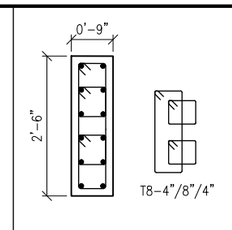
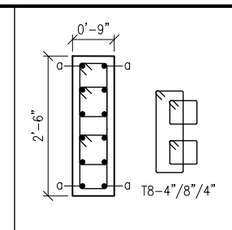
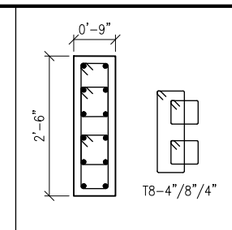
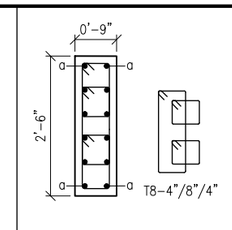
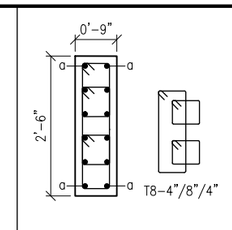
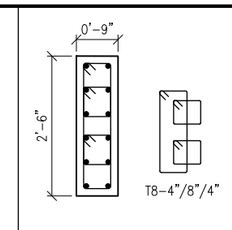
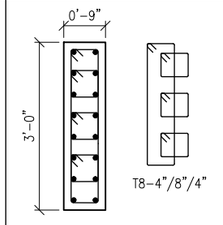
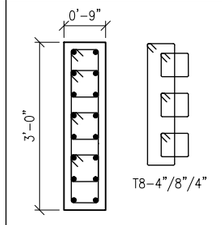
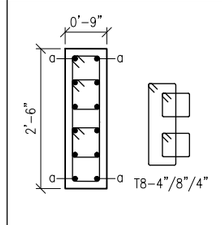
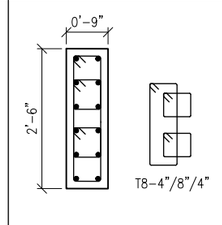
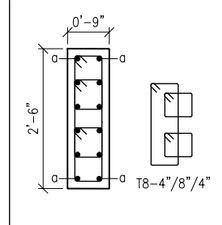
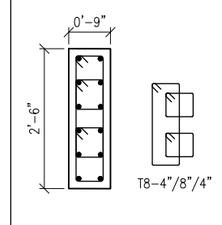
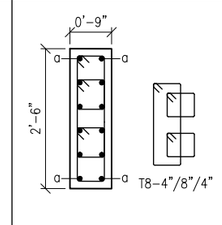
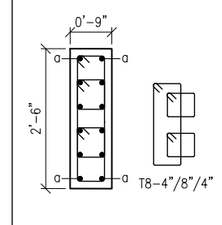
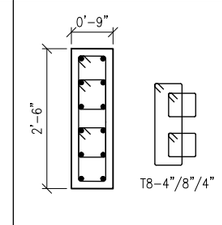
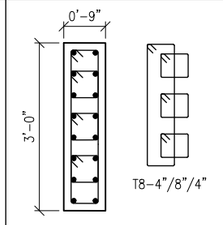
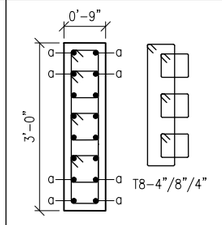
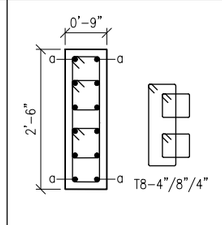
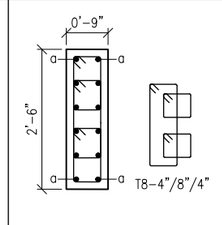
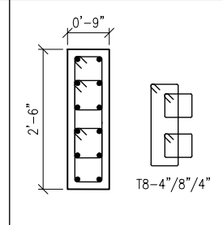
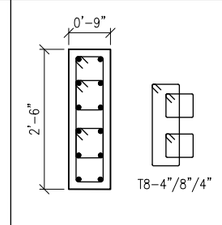
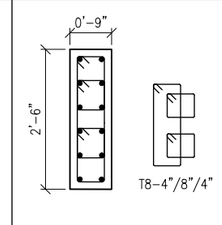
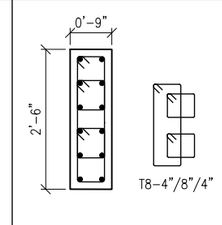
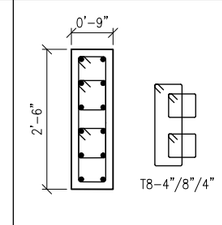
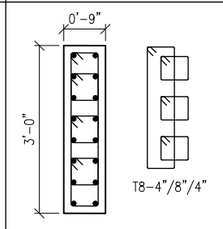
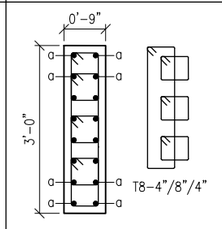
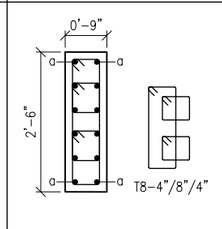
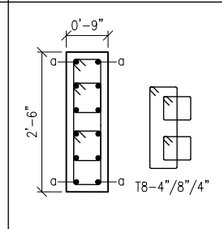
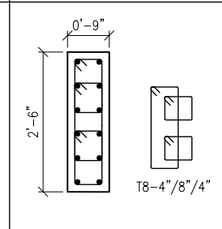
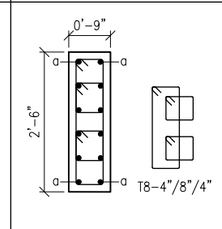
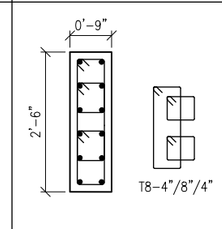
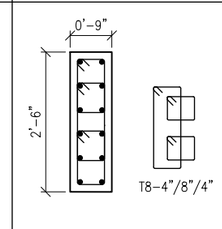
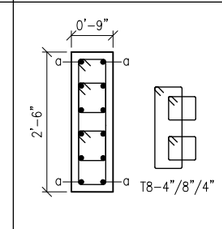
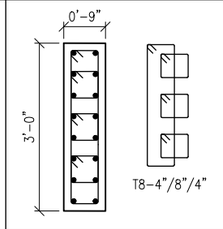
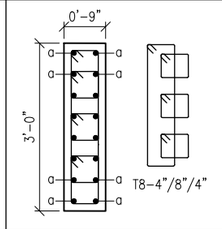
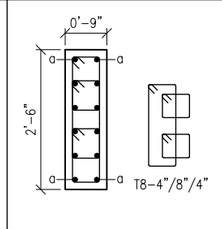
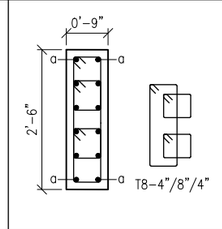
DRAWING TITLE:
COLUMN SCHEDULE (BLOCK-02)
(SHEET-02 OF 07)

DEALT BY:	APPROVED BY:
CHKD BY:	
DATE: 04.06.22	

SCALE:
100 500 2000
200 1000 4000
GRAPHIC SCALE

SIGN :
- ■ FOR CLIENT
- ☐ FOR TENDER
- ☐ FOR INFORMATION
- ☐ FOR EXECUTION
- ☐ FOR APPROVAL

N W E S

THIRD FLOOR LEVEL TO FOURTH FLOOR LEVEL									
SIZE	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"
CONCRETE GRADE/COVER	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm
REINFORCEMENT/STEEL GRADE Fe	16T12/Fe 500	16T20/Fe 500	4T16(a)+8T12/Fe 500	12T20/Fe 500	4T16(a)+8T12/Fe 500	12T16/Fe 500	4T16(a)+8T12/Fe 500	4T20(a)+8T16/Fe 500	12T16/Fe 500
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500
SECOND FLOOR LEVEL TO THIRD FLOOR LEVEL									
SIZE	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"
CONCRETE GRADE/COVER	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm
REINFORCEMENT/STEEL GRADE Fe	16T12/Fe 500	16T20/Fe 500	4T16(a)+8T12/Fe 500	12T20/Fe 500	4T16(a)+8T12/Fe 500	12T20/Fe 500	4T16(a)+8T12/Fe 500	4T20(a)+8T16/Fe 500	12T16/Fe 500
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500
FIRST FLOOR LEVEL TO SECOND FLOOR LEVEL									
SIZE	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"
CONCRETE GRADE/COVER	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm
REINFORCEMENT/STEEL GRADE Fe	16T16/Fe 500	8T25(a)+8T20/Fe 500	4T16(a)+8T12/Fe 500	4T25(a)+8T20/Fe 500	12T16/Fe 500	12T20/Fe 500	12T16/Fe 500	12T20/Fe 500	12T25/Fe 500
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500
STILT FLOOR LEVEL TO FIRST FLOOR LEVEL									
SIZE	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"
CONCRETE GRADE/COVER	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm
REINFORCEMENT/STEEL GRADE Fe	16T16/Fe 500	8T25(a)+8T20/Fe 500	4T16(a)+8T12/Fe 500	4T25(a)+8T20/Fe 500	12T16/Fe 500	4T25(a)+8T20/Fe 500	12T16/Fe 500	12T20/Fe 500	4T25(a)+8T20/Fe 500
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500
PILE CAP LEVEL TO STILT FLOOR LEVEL									
SIZE	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"
CONCRETE GRADE/COVER	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm
REINFORCEMENT/STEEL GRADE Fe	16T16/Fe 500	8T25(a)+8T20/Fe 500	4T16(a)+8T12/Fe 500	4T25(a)+8T20/Fe 500	12T16/Fe 500	4T25(a)+8T20/Fe 500	12T16/Fe 500	12T20/Fe 500	4T25(a)+8T20/Fe 500
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500
COLUMN MARK	B2C16	B2C20	B2C12, B2C6 & B2C2	B2C3, B2C7 & B2C37	B2C42	B2C13	B2C33	B2C34	B2C22

DRAWING NO : A12

REVISION NOTES :

NO.	DATE	REVISION

ARCHITECT

EMAARA DESIGNS
ARCHITECT & INTERIORS
Plot no.35, 100 feet, Taramani Link Rd, Ayodhya Colony, Velachery, Chennai 600042.

BUILDER CONSULTANTS

NARAIN PROMOTERS

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REGISTRATION No. SE/GR-I/19/03/038
NEW No. 31 (OLD No.14), ESSANT AVENUE,
ADYAR, CHENNAI-600 020
E-Mail: mj.purusu@gmail.com
Mobile: +91 94445 77374

ELECTRICAL CONSULTANTS

PROJECT NAME

PANDAVAS APARTMENT

CLIENTS

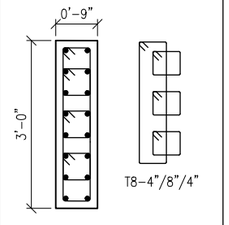
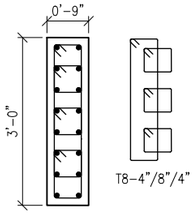
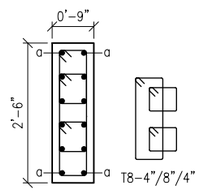
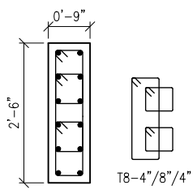
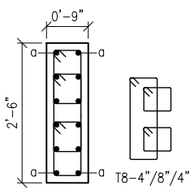
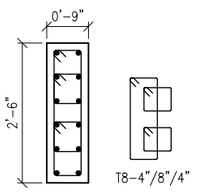
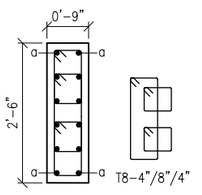
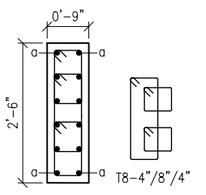
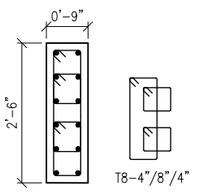
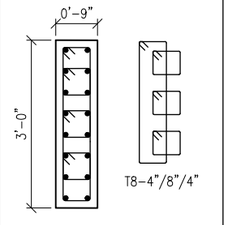
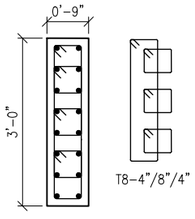
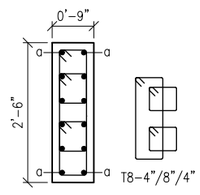
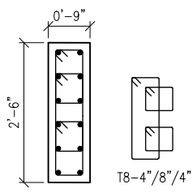
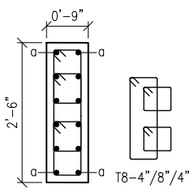
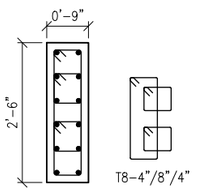
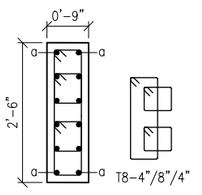
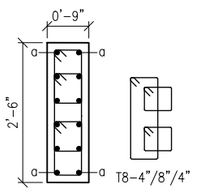
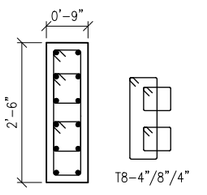
DRAWING TITLE:
COLUMN SCHEDULE (BLOCK-02)
(SHEET-03 OF 07)

DEALT BY: | APPROVED BY:
CHKD BY:
DATE: 04.06.22

SCALE:
100 500 2000
200 1000 4000
G R A P H I C S C A L E

SIGN :
■ FOR CLIENT
☐ FOR TENDER
☐ FOR INFORMATION
☐ FOR EXECUTION
☐ FOR APPROVAL

N W E S

SIZE									
CONCRETE GRADE/COVER									
REINFORCEMENT/STEEL GRADE Fe									
LINKS/TIES/STEEL GRADE Fe									
SIZE									
CONCRETE GRADE/COVER									
REINFORCEMENT/STEEL GRADE Fe									
LINKS/TIES/STEEL GRADE Fe									
ABOVE ROOF LEVEL									
SIZE									
CONCRETE GRADE/COVER									
REINFORCEMENT/STEEL GRADE Fe									
LINKS/TIES/STEEL GRADE Fe									
FIFTH FLOOR LEVEL TO ROOF LEVEL									
SIZE	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"
CONCRETE GRADE/COVER	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm
REINFORCEMENT/STEEL GRADE Fe	16T12/Fe 500	16T16/Fe 500	4T16(a)+8T12/Fe 500	12T20/Fe 500	4T16(a)+8T12/Fe 500	12T16/Fe 500	4T16(a)+8T12/Fe 500	4T16(a)+8T12/Fe 500	12T16/Fe 500
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500
FOURTH FLOOR LEVEL TO FIFTH FLOOR LEVEL									
SIZE	0'-9"X3'-0"	0'-9"X3'-0"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"
CONCRETE GRADE/COVER	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm
REINFORCEMENT/STEEL GRADE Fe	16T12/Fe 500	16T16/Fe 500	4T16(a)+8T12/Fe 500	12T20/Fe 500	4T16(a)+8T12/Fe 500	12T16/Fe 500	4T16(a)+8T12/Fe 500	4T16(a)+8T12/Fe 500	12T16/Fe 500
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500
COLUMN MARK	B2C16	B2C20	B2C12, B2C6 & B2C2	B2C3, B2C7 & B2C37	B2C42	B2C13	B2C33	B2C34	B2C22

DRAWING NO : A13

REVISION NOTES :

NO.	DATE	REVISION

ARCHITECT

EMAARA DESIGNS
ARCHITECT & INTERIORS
Plot no.35, 100 feet, Taramani Link Rd, Ayodhya Colony, Velachery, Chennai 600042.

BUILDER CONSULTANTS

NARAIN PROMOTERS

STRUCTURAL CONSULTANTS

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ELECTRICAL CONSULTANTS

PROJECT NAME

PANDAVAS APARTMENT

CLIENTS

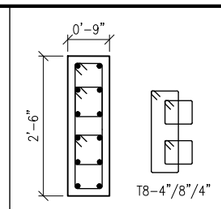
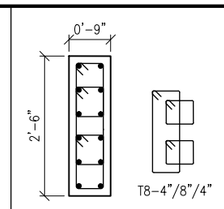
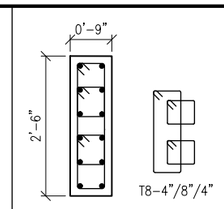
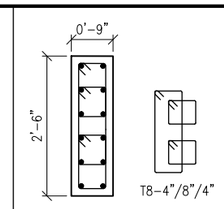
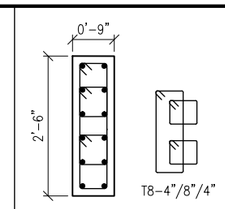
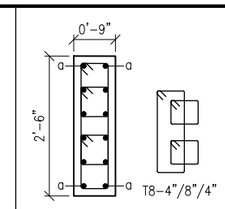
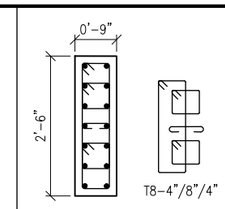
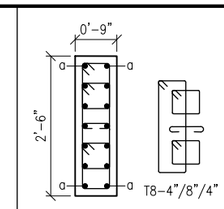
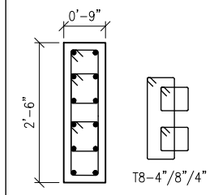
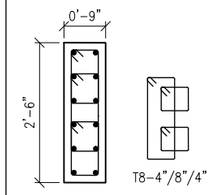
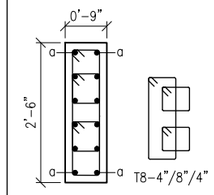
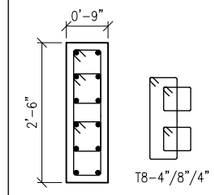
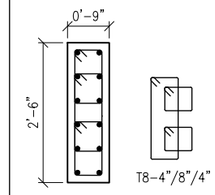
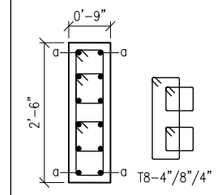
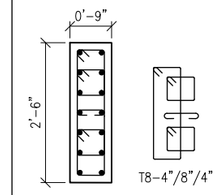
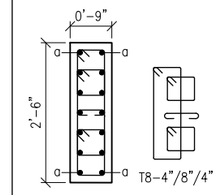
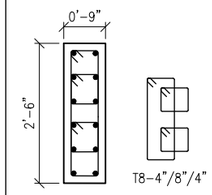
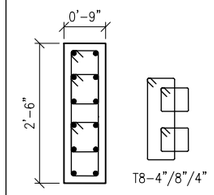
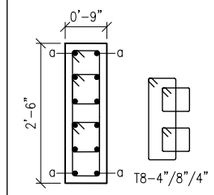
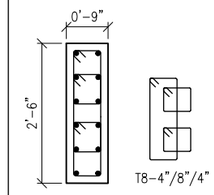
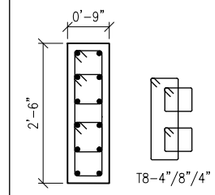
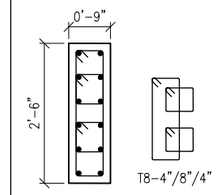
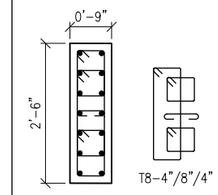
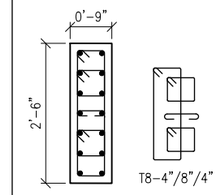
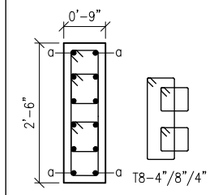
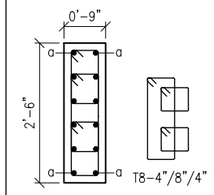
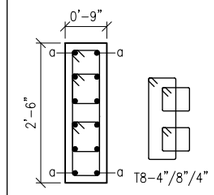
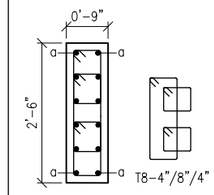
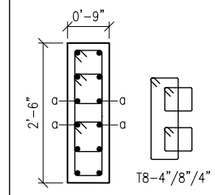
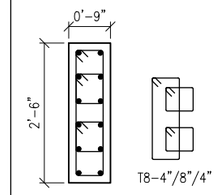
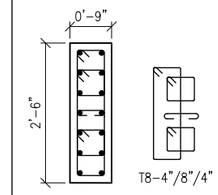
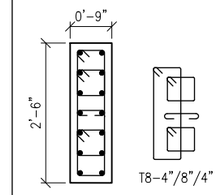
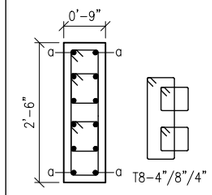
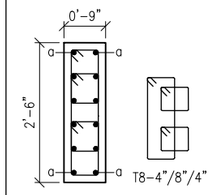
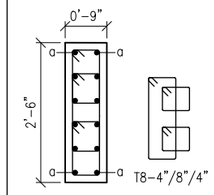
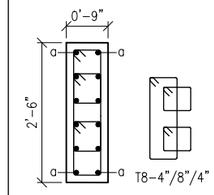
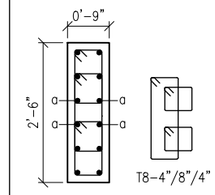
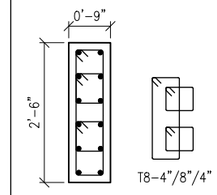
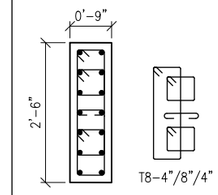
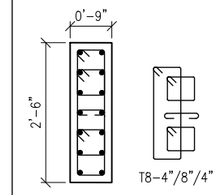
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(SHEET-04 OF 07)

DEALT BY:
APPROVED BY:
CHKD BY:
DATE: 04.06.22

SCALE:
100 500 2000
200 1000 4000
GRAPHIC SCALE

SIGN :
- [x] FOR CLIENT
- [ ] FOR TENDER
- [ ] FOR INFORMATION
- [ ] FOR EXECUTION
- [ ] FOR APPROVAL

N W E S

THIRD FLOOR LEVEL TO FOURTH FLOOR LEVEL									
SIZE	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	
CONCRETE GRADE/COVER	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	
REINFORCEMENT/STEEL GRADE Fe	12T16/Fe 500	12T16/Fe 500	12T16/Fe 500	12T16/Fe 500	12T12/Fe 500	4T16(a)+8T12/Fe 500	14T20/Fe 500	4T25(a)+10T20/Fe 500	
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	
SECOND FLOOR LEVEL TO THIRD FLOOR LEVEL									
SIZE	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	
CONCRETE GRADE/COVER	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	
REINFORCEMENT/STEEL GRADE Fe	12T16/Fe 500	12T20/Fe 500	4T20(a)+8T16/Fe 500	12T16/Fe 500	12T16/Fe 500	4T16(a)+8T12/Fe 500	14T20/Fe 500	4T25(a)+10T20/Fe 500	
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	
FIRST FLOOR LEVEL TO SECOND FLOOR LEVEL									
SIZE	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	
CONCRETE GRADE/COVER	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	
REINFORCEMENT/STEEL GRADE Fe	12T20/Fe 500	12T25/Fe 500	4T20(a)+8T16/Fe 500	12T16/Fe 500	12T16/Fe 500	12T20/Fe 500	14T25/Fe 500	14T25/Fe 500	
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	
STILT FLOOR LEVEL TO FIRST FLOOR LEVEL									
SIZE	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	
CONCRETE GRADE/COVER	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	
REINFORCEMENT/STEEL GRADE Fe	4T25(a)+8T20/Fe 500	4T25(a)+8T20/Fe 500	4T20(a)+8T16/Fe 500	4T25(a)+8T20/Fe 500	8T25+4T20(a)/Fe 500	12T20/Fe 500	14T20/Fe 500	14T25/Fe 500	
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	
PILE CAP LEVEL TO STILT FLOOR LEVEL									
SIZE	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	
CONCRETE GRADE/COVER	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	
REINFORCEMENT/STEEL GRADE Fe	4T25(a)+8T20/Fe 500	4T25(a)+8T20/Fe 500	4T20(a)+8T16/Fe 500	4T25(a)+8T20/Fe 500	8T25+4T20(a)/Fe 500	12T20/Fe 500	14T20/Fe 500	14T25/Fe 500	
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	
COLUMN MARK	B2C24	B2C26	B2C27	B2C17	B2C29	B2C46	B2C49	B2C41 & B2C18	

DRAWING NO : A14

REVISION NOTES :

NO.	DATE	REVISION

ARCHITECT

EMAARA DESIGNS
ARCHITECT & INTERIORS
Plot no.35, 100 feet, Taramani Link Rd, Ayodhya Colony, Velachery, Chennai 600042.

BUILDER CONSULTANTS

NARAIN PROMOTERS

STRUCTURAL CONSULTANTS

ELECTRICAL CONSULTANTS

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Mobile: +91 94445 77374

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PANDAVAS APARTMENT

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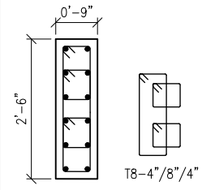
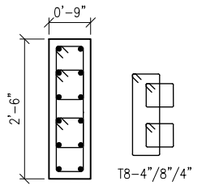
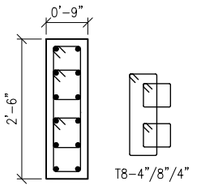
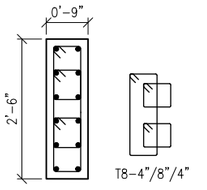
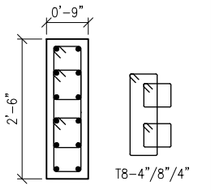
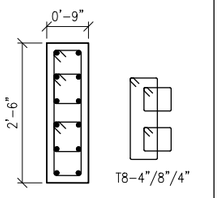
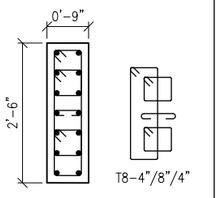
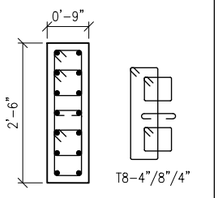
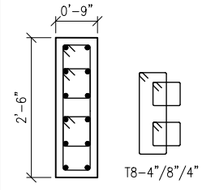
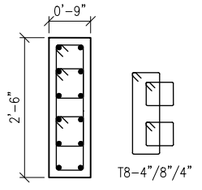
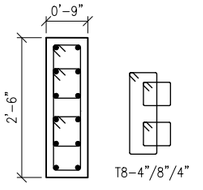
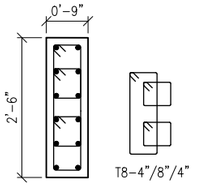
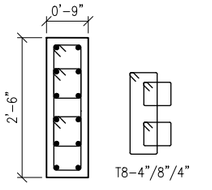
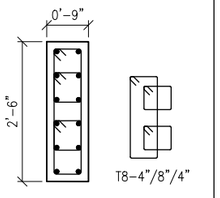
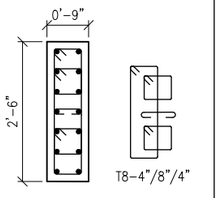
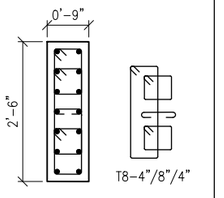
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COLUMN SCHEDULE (BLOCK-02)
(SHEET-05 OF 07)

DEALT BY:	APPROVED BY:
CHKD BY:	
DATE: 04.06.22	

SCALE:
100 500 2000
200 1000 4000
G R A P H I C S C A L E

SIGN :
- ■ FOR CLIENT
- ☐ FOR TENDER
- ☐ FOR INFORMATION
- ☐ FOR EXECUTION
- ☐ FOR APPROVAL

N W E S

SIZE									
CONCRETE GRADE/COVER									
REINFORCEMENT/STEEL GRADE Fe									
LINKS/TIES/STEEL GRADE Fe									
SIZE									
CONCRETE GRADE/COVER									
REINFORCEMENT/STEEL GRADE Fe									
LINKS/TIES/STEEL GRADE Fe									
ABOVE ROOF LEVEL									
SIZE									
CONCRETE GRADE/COVER									
REINFORCEMENT/STEEL GRADE Fe									
LINKS/TIES/STEEL GRADE Fe									
FIFTH FLOOR LEVEL TO ROOF LEVEL									
SIZE	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	
CONCRETE GRADE/COVER	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	
REINFORCEMENT/STEEL GRADE Fe	12T16/Fe 500	12T16/Fe 500	12T16/Fe 500	12T16/Fe 500	12T12/Fe 500	12T12/Fe 500	14T16/Fe 500	14T16/Fe 500	
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	
FOURTH FLOOR LEVEL TO FIFTH FLOOR LEVEL									
SIZE	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	0'-9"X2'-6"	
CONCRETE GRADE/COVER	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	M35/40mm	
REINFORCEMENT/STEEL GRADE Fe	12T16/Fe 500	12T16/Fe 500	12T16/Fe 500	12T16/Fe 500	12T12/Fe 500	12T12/Fe 500	14T16/Fe 500	14T16/Fe 500	
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	AS SHOWN/Fe 500	
COLUMN MARK	B2C24	B2C26	B2C27	B2C17	B2C29	B2C46	B2C49	B2C41 & B2C18	

DRAWING NO : A15

REVISION NOTES :

NO.	DATE	REVISION

ARCHITECT

EMAARA DESIGNS
ARCHITECT & INTERIORS
Plot no.35, 100 feet, Taramani Link Rd, Ayodhya Colony, Velachery, Chennai 600042.

BUILDER CONSULTANTS

NARAIN PROMOTERS

STRUCTURAL CONSULTANTS

M. PURUSOTHAMAN, M.E., (Struct.)
REGISTERED STRUCTURAL ENGINEER
CHENNAI METROPOLITAN DEVELOPMENT AUTHORITY
REGISTRATION No. SE/GR-3/19/03/038
NEW No.31 (OLD No.14), BESANT AVENUE,
ADYAR, CHENNAI-600 020
E-Mail: mj.purusu@gmail.com
Mobile: +91 94445 77374

ELECTRICAL CONSULTANTS

PROJECT NAME

PANDAVAS APARTMENT

CLIENTS

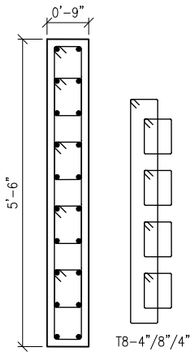
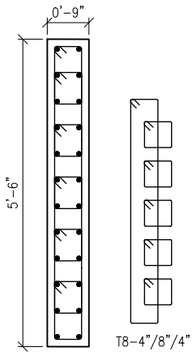
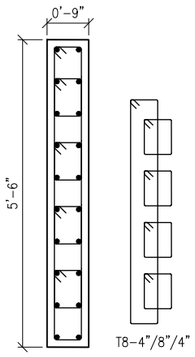
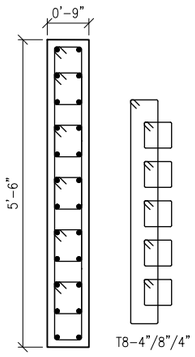
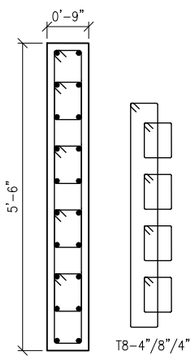
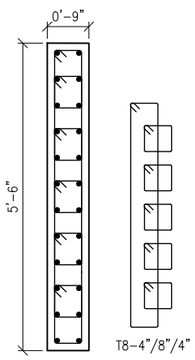
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COLUMN SCHEDULE (BLOCK-02)
(SHEET-06 OF 07)

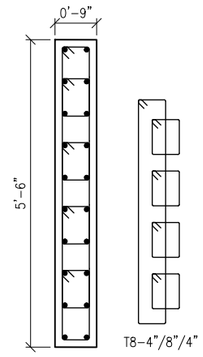
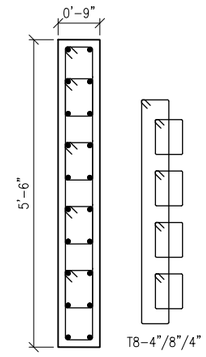
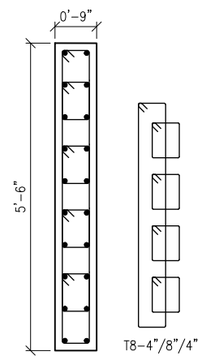
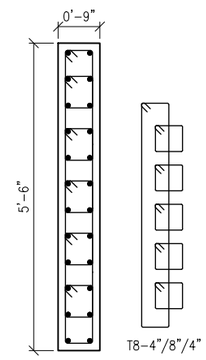
DEALT BY:	APPROVED BY:
CHKD BY:	
DATE: 04.06.22	

SCALE:
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200 1000 4000
GRAPHIC SCALE

SIGN :
- ■ FOR CLIENT
- ☐ FOR TENDER
- ☐ FOR INFORMATION
- ☐ FOR EXECUTION
- ☐ FOR APPROVAL

N W E S

SECOND FLOOR LEVEL TO THIRD FLOOR LEVEL		
SIZE	0'-9"X5'-6"	0'-9"X5'-6"
CONCRETE GRADE/COVER	M35/40mm	M35/40mm
REINFORCEMENT/STEEL GRADE Fe	20T20/Fe 500	24T20/Fe 500
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	AS SHOWN/Fe 500
FIRST FLOOR LEVEL TO SECOND FLOOR LEVEL		
SIZE	0'-9"X5'-6"	0'-9"X5'-6"
CONCRETE GRADE/COVER	M35/40mm	M35/40mm
REINFORCEMENT/STEEL GRADE Fe	20T20/Fe 500	24T25/Fe 500
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	AS SHOWN/Fe 500
PILE CAP LEVEL TO FIRST FLOOR LEVEL		
SIZE	0'-9"X5'-6"	0'-9"X5'-6"
CONCRETE GRADE/COVER	M35/40mm	M35/40mm
REINFORCEMENT/STEEL GRADE Fe	20T25/Fe 500	24T25/Fe 500
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	AS SHOWN/Fe 500
COLUMN MARK	B2SW1	B2SW2

ABOVE ROOF LEVEL		
SIZE		
CONCRETE GRADE/COVER		
REINFORCEMENT/STEEL GRADE Fe		
LINKS/TIES/STEEL GRADE Fe		
FOURTH FLOOR LEVEL TO ROOF LEVEL		
SIZE	0'-9"X5'-6"	0'-9"X5'-6"
CONCRETE GRADE/COVER	M35/40mm	M35/40mm
REINFORCEMENT/STEEL GRADE Fe	20T16/Fe 500	20T16/Fe 500
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	AS SHOWN/Fe 500
THIRD FLOOR LEVEL TO FOURTH FLOOR LEVEL		
SIZE	0'-9"X5'-6"	0'-9"X5'-6"
CONCRETE GRADE/COVER	M35/40mm	M35/40mm
REINFORCEMENT/STEEL GRADE Fe	20T16/Fe 500	24T20/Fe 500
LINKS/TIES/STEEL GRADE Fe	AS SHOWN/Fe 500	AS SHOWN/Fe 500
COLUMN MARK	B2SW1	B2SW2

DRAWING NO : A16

REVISION NOTES :

NO.	DATE	REVISION

ARCHITECT

EMAARA DESIGNS
ARCHITECT & INTERIORS
Plot no.35, 100 feet, Taramani Link Rd, Ayodhya Colony, Velachery, Chennai 600042.

BUILDER CONSULTANTS

NARAIN PROMOTERS

STRUCTURAL CONSULTANTS

M. PURUSOTHAMAN, M.E., (Struct.)
REGISTERED STRUCTURAL ENGINEER
CHENNAI METROPOLITAN DEVELOPMENT AUTHORITY
REGISTRATION No. SE/GR-2/19/03/038
NEW No. 31 (OLD No.14), BESANT AVENUE,
ADYAR, CHENNAI-600 020.
E-Mail: mj.purusu@gmail.com
Mobile: +91 94445 77374

ELECTRICAL CONSULTANTS

PROJECT NAME

PANDAVAS APARTMENT

CLIENTS

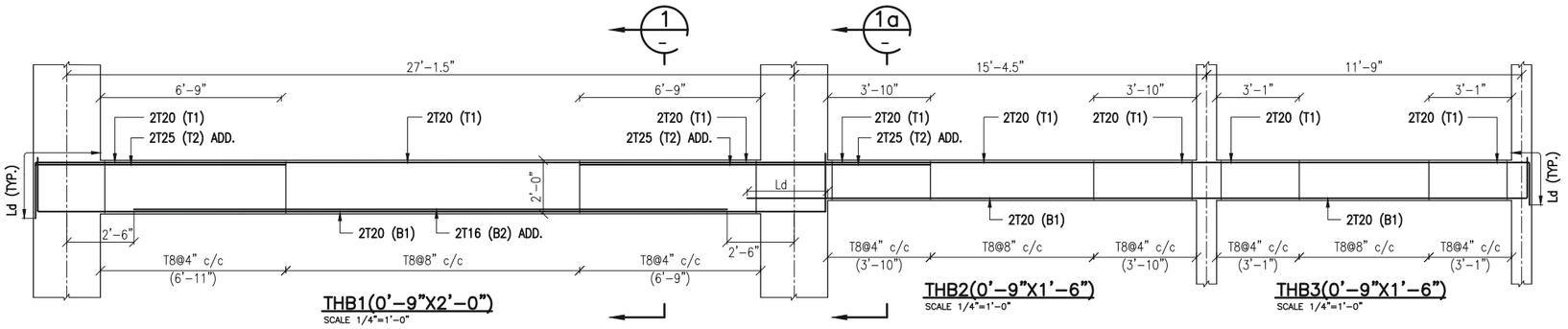
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COLUMN SCHEDULE (BLOCK-02)
(SHEET-07 OF 07)

DEALT BY:	APPROVED BY:
CHKD BY:	
DATE: 04.06.22	

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200 1000 4000
GRAPHIC SCALE

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- ■ FOR CLIENT
- ☐ FOR TENDER
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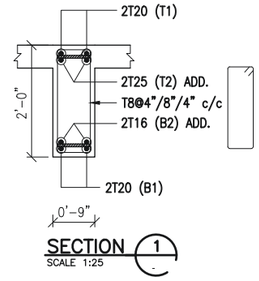
N W E S



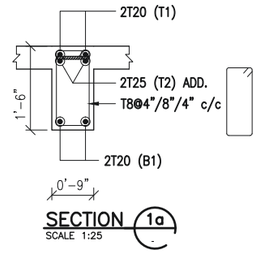
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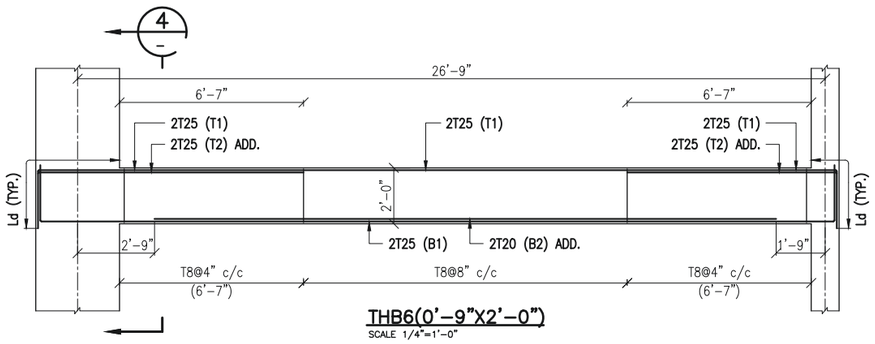
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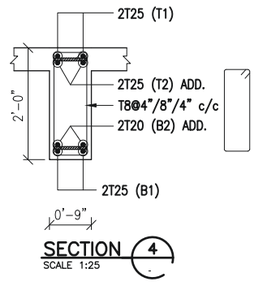
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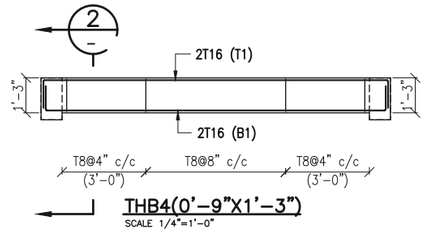
SECTION 1a
SCALE 1:25



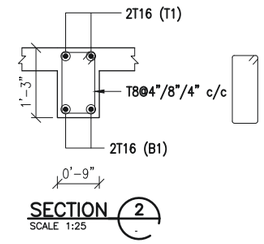
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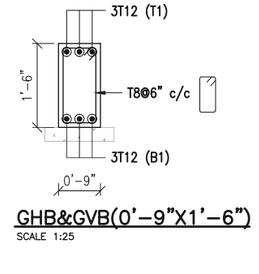
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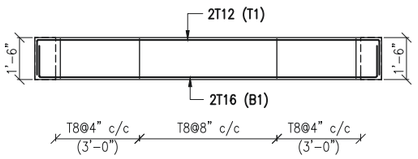
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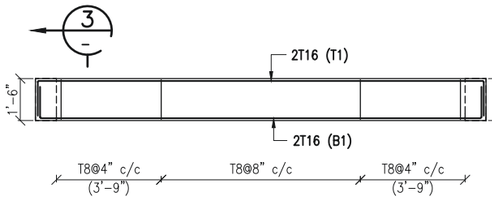
SECTION 2
SCALE 1:25



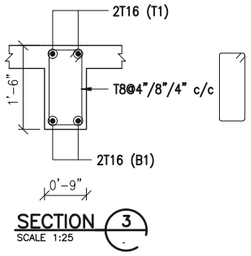
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SCALE 1:25



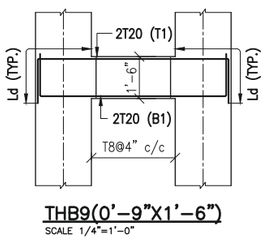
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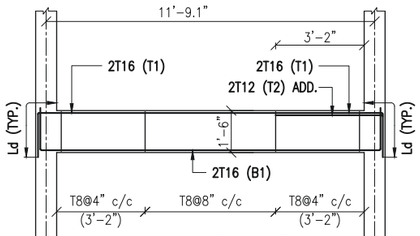
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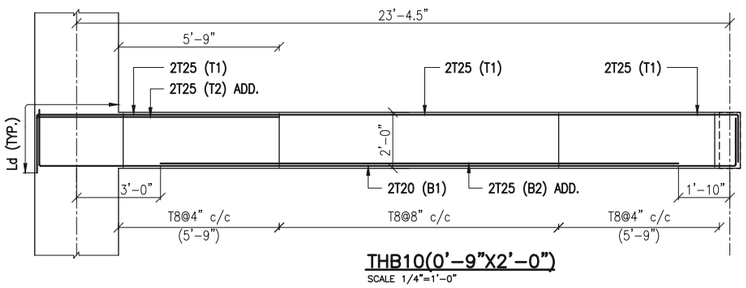
SECTION 3
SCALE 1:25



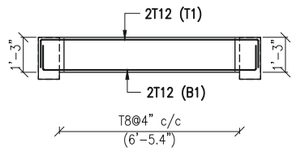
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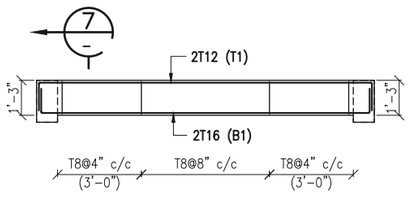
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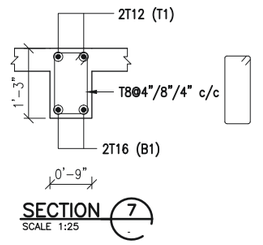
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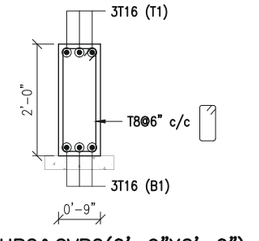
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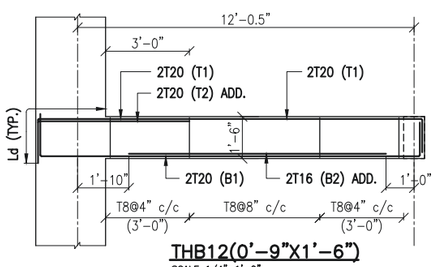
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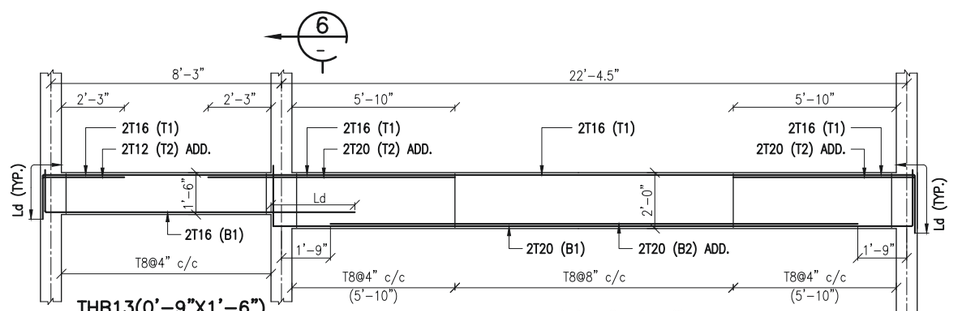
SECTION 7
SCALE 1:25



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SCALE 1:25

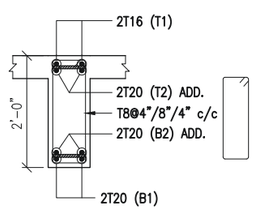


THB12(0'-9"X1'-6")
SCALE 1/4"=1'-0"

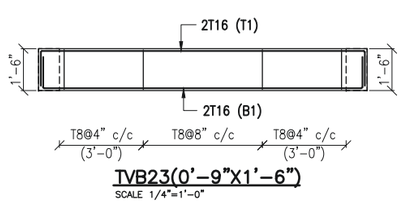


THB13(0'-9"X1'-6")
SCALE 1/4"=1'-0"

THB14(0'-9"X2'-0")
SCALE 1/4"=1'-0"



SECTION 6
SCALE 1:25



TVB23(0'-9"X1'-6")
SCALE 1/4"=1'-0"

DRAWING NO : A16

REVISION NOTES :

NO.	DATE	REVISION

ARCHITECT

EMAARA DESIGNS
ARCHITECT & INTERIORS
Plot no.35, 100 feet, Taramani Link Rd, Ayodhya Colony, Velachery, Chennai 600042.

BUILDER CONSULTANTS

NARAIN PROMOTERS

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M. PURUSOTHAMAN, M.E., (Struct.)
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REGISTRATION No. SE/GR.I/1/93/038
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ADYAR, CHENNAI-600 020
E-Mail: mj.purusu@gmail.com
Mobile: +91 94445 77374

ELECTRICAL CONSULTANTS

PROJECT NAME

PANDAVAS APARTMENT

CLIENTS

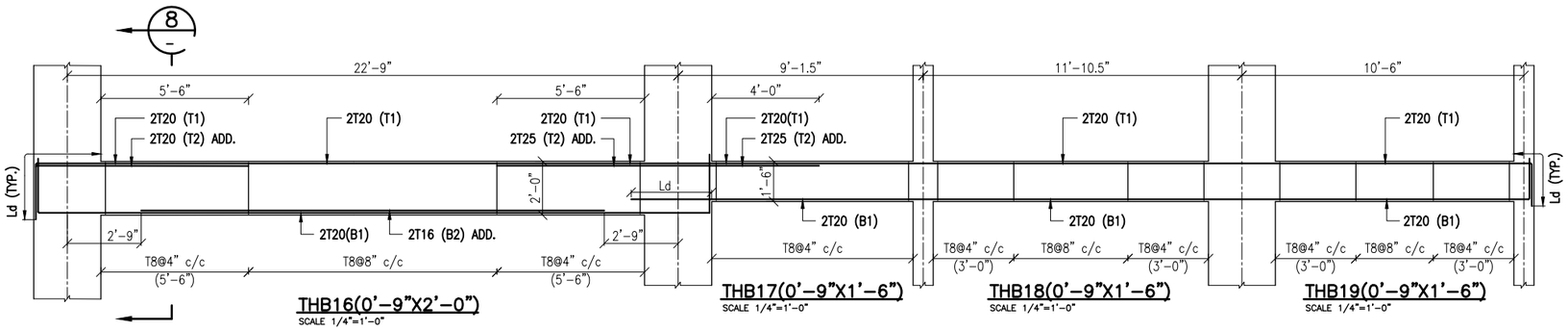
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FIRST AND TYPICAL FLOOR BEAM REINFORCEMENT DETAILS (BLOCK-01) (SHEET-01 OF 02)

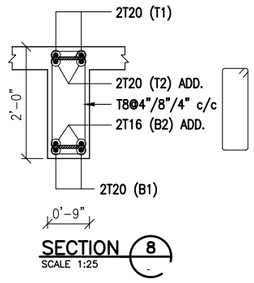
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CHKD BY:	
DATE: 04.06.22	

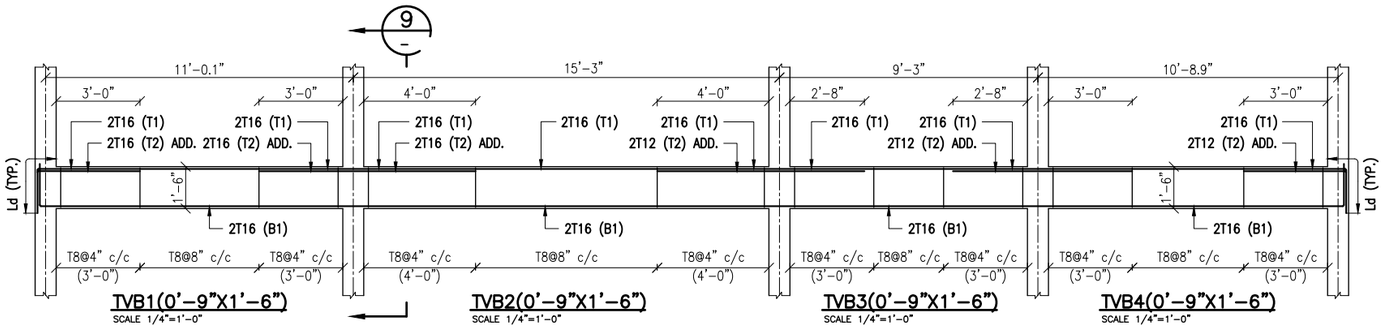
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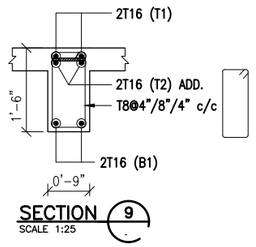
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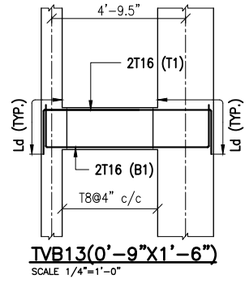
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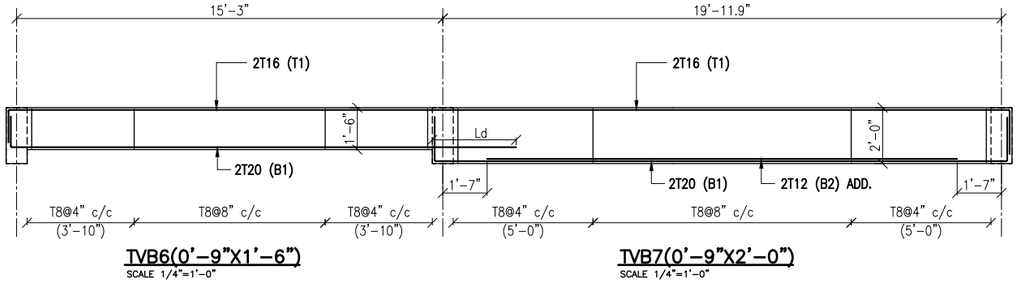


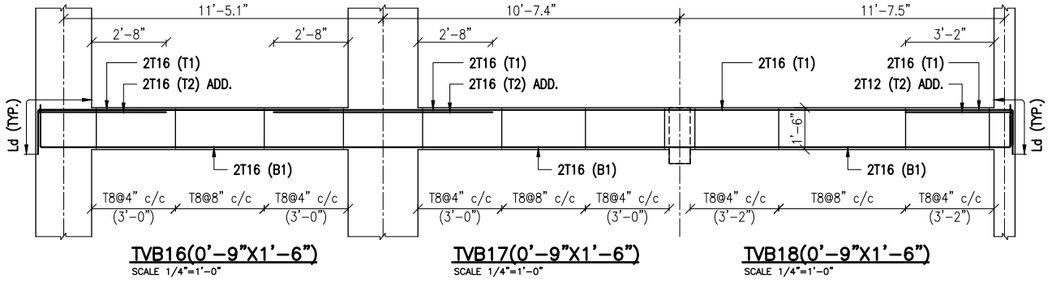


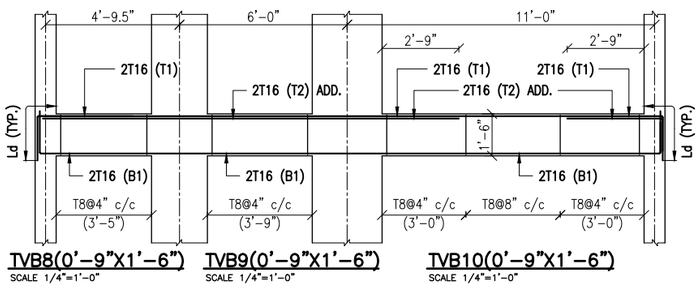


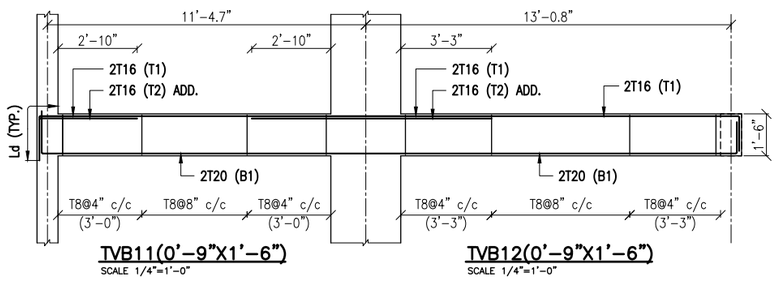


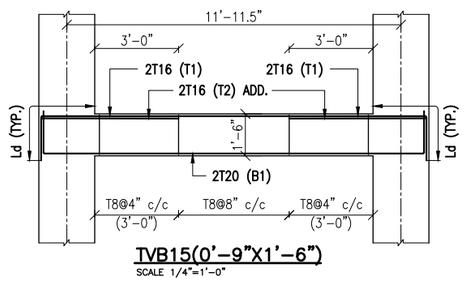


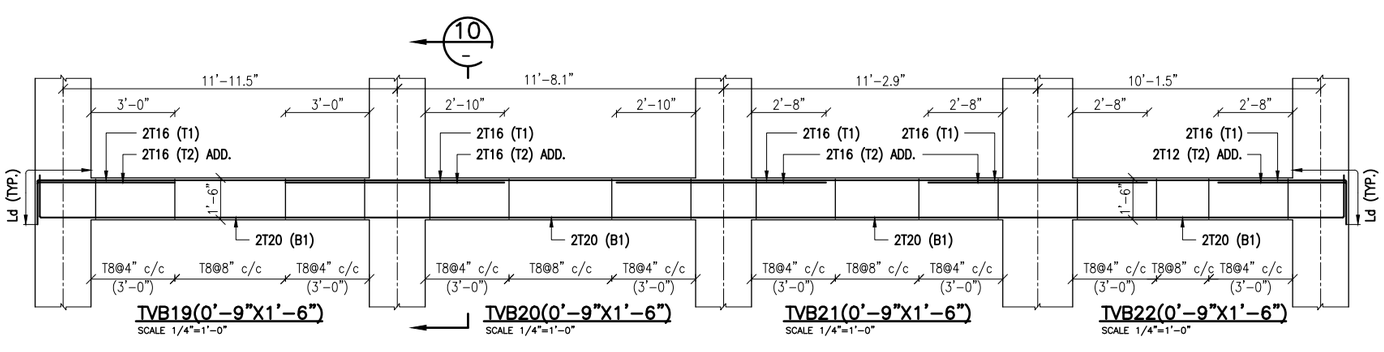


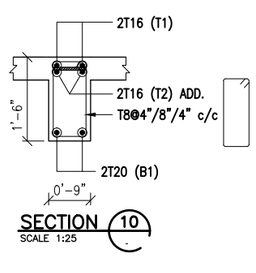


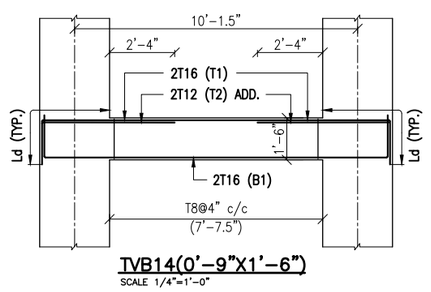












DRAWING NO : A16

REVISION NOTES :

NO.	DATE	REVISION

ARCHITECT

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ARCHITECT & INTERIORS
Plot no.35, 100 feet, Taramani Link Rd, Ayodhya Colony, Velachery, Chennai 600042.

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Mobile: +91 94445 77374

ELECTRICAL CONSULTANTS

PROJECT NAME

PANDAVAS APARTMENT

CLIENTS

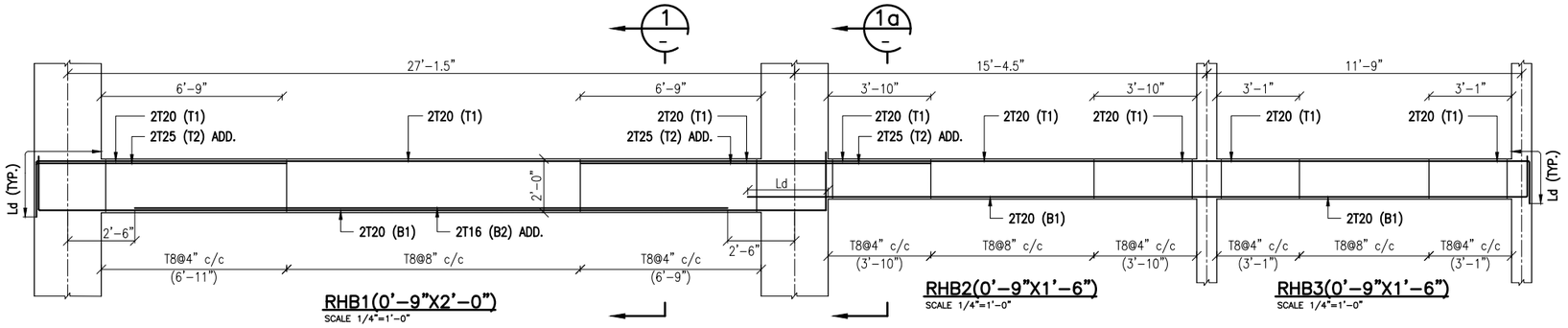
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FIRST AND TYPICAL FLOOR BEAM REINFORCEMENT DETAILS (BLOCK-01) (SHEET-02 OF 02)

DEALT BY:
APPROVED BY:
CHKD BY:
DATE: 04.06.22

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SIGN :
■ FOR CLIENT
☐ FOR TENDER
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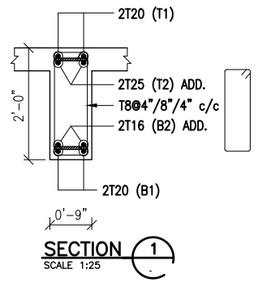
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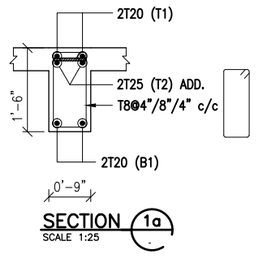
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SCALE 1/4"=1'-0"

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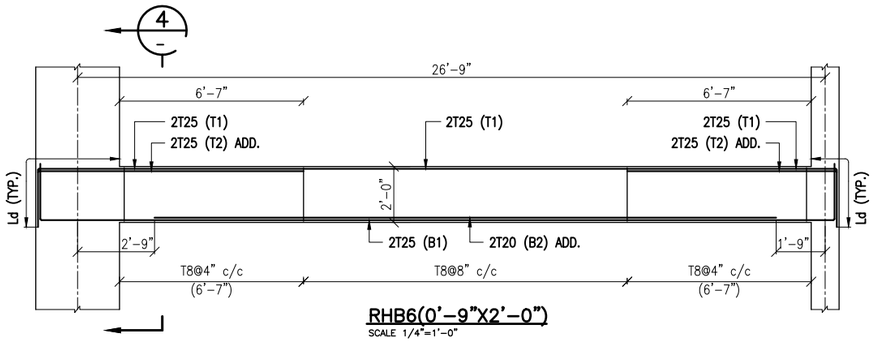
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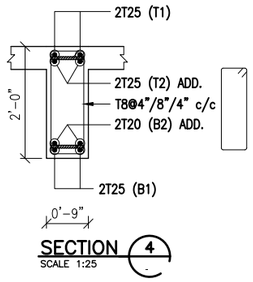
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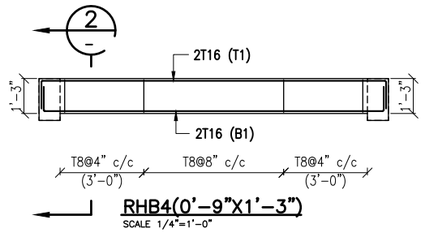
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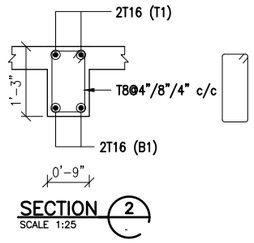
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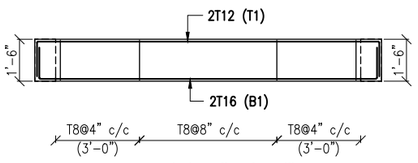
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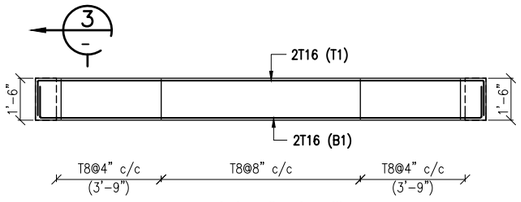
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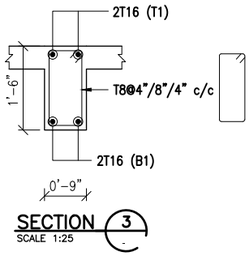
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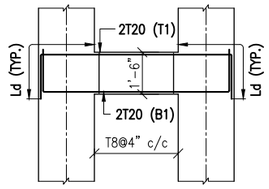
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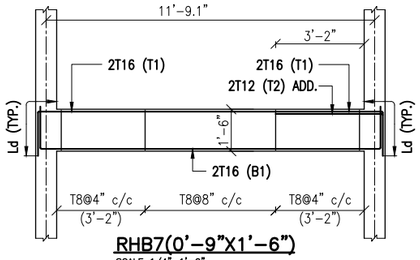
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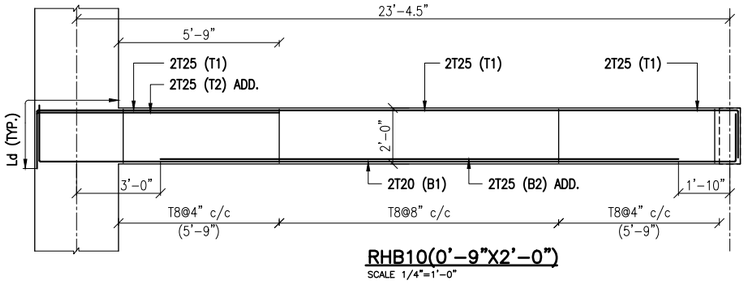
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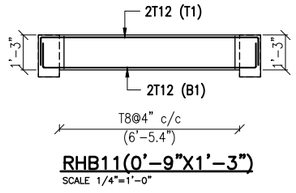
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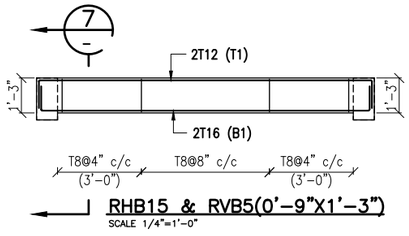
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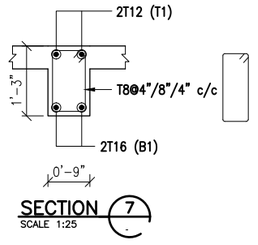
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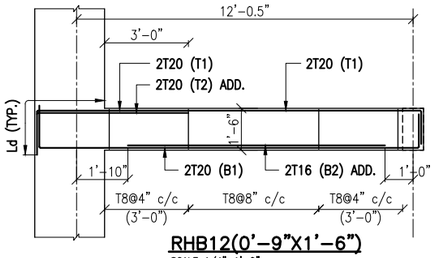
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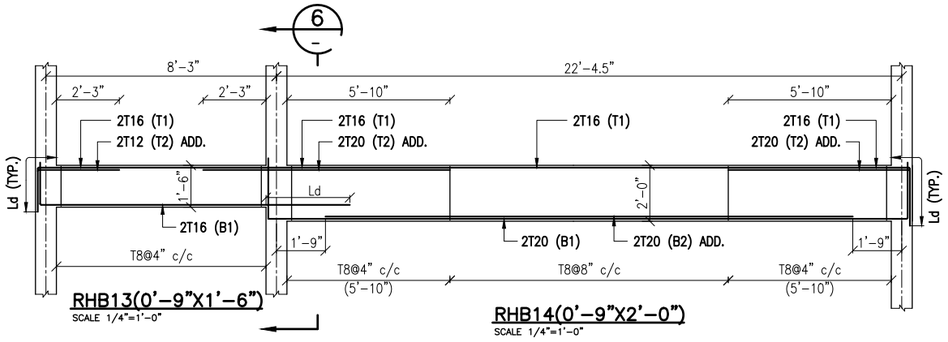
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SECTION 7
SCALE 1:25

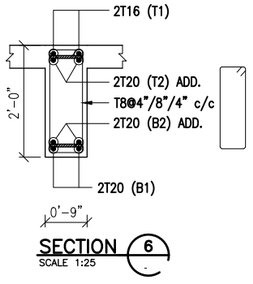


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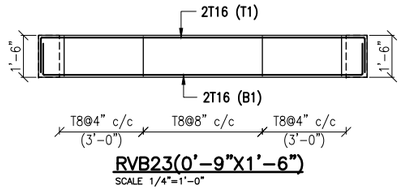


RHB13(0'-9"X1'-6")
SCALE 1/4"=1'-0"

RHB14(0'-9"X2'-0")
SCALE 1/4"=1'-0"



SECTION 6
SCALE 1:25



RVB23(0'-9"X1'-6")
SCALE 1/4"=1'-0"

DRAWING NO : A16

REVISION NOTES :

NO.	DATE	REVISION

ARCHITECT

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ARCHITECT & INTERIORS
Plot no.35, 100 feet, Taramani Link Rd, Ayodhya Colony, Velachery, Chennai 600042.

BUILDER CONSULTANTS

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Mobile: +91 94445 77974

ELECTRICAL CONSULTANTS

PROJECT NAME

PANDAVAS APARTMENT

CLIENTS

DRAWING TITLE:

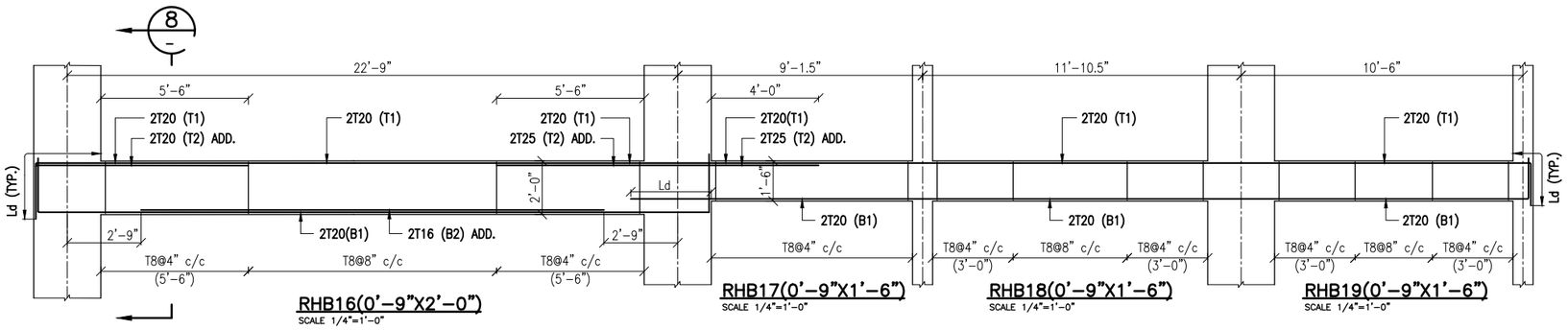
ROOF BEAM REINFORCEMENT DETAILS (BLOCK-01) (SHEET-01 OF 02)

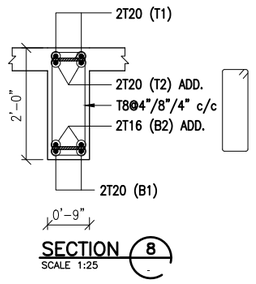
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DATE: 04.06.22	

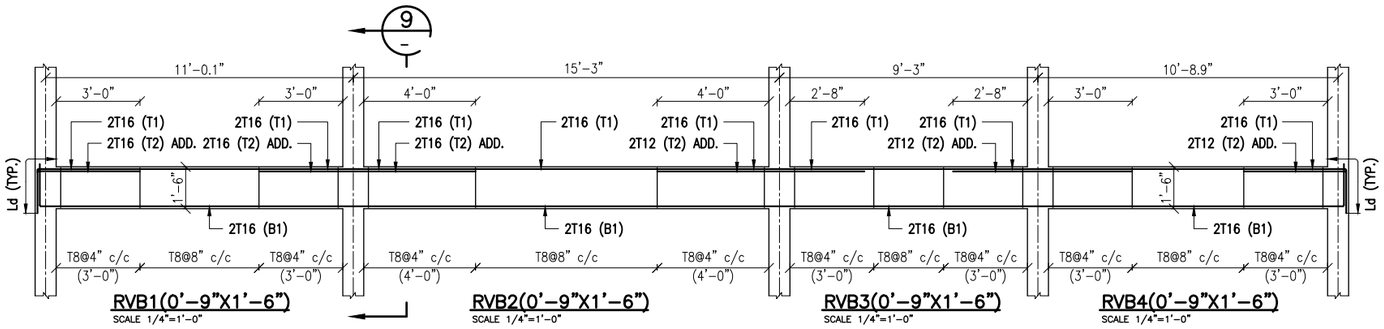
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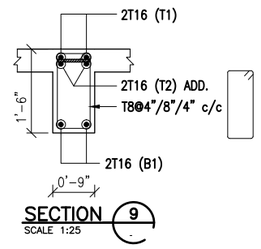
SIGN :
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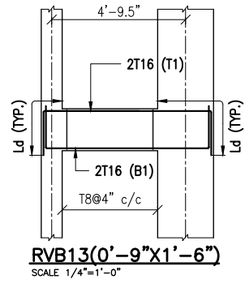
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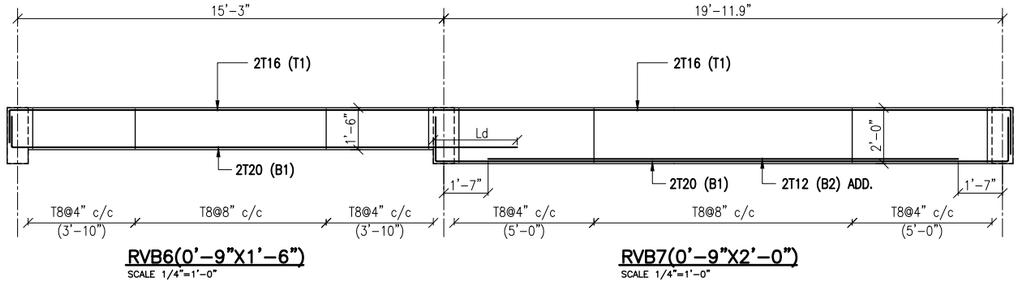


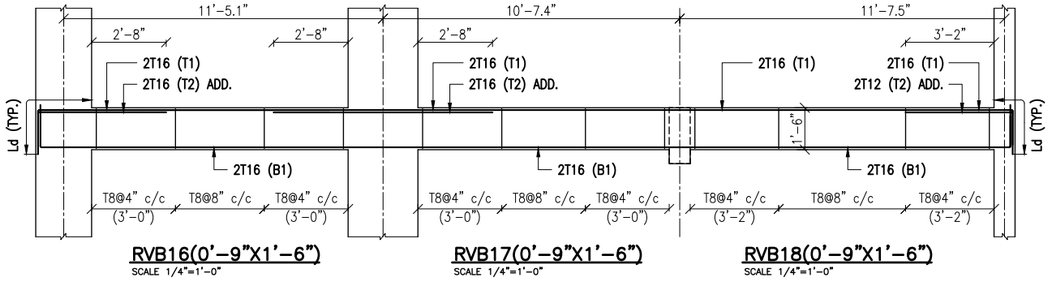


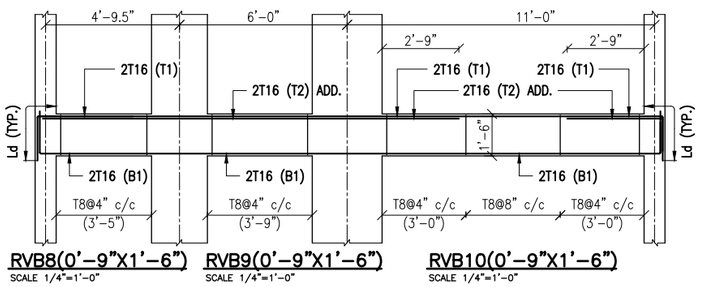


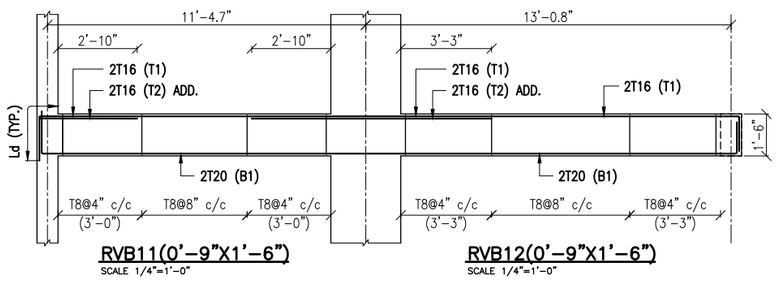


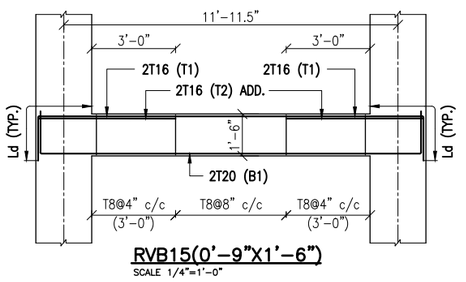


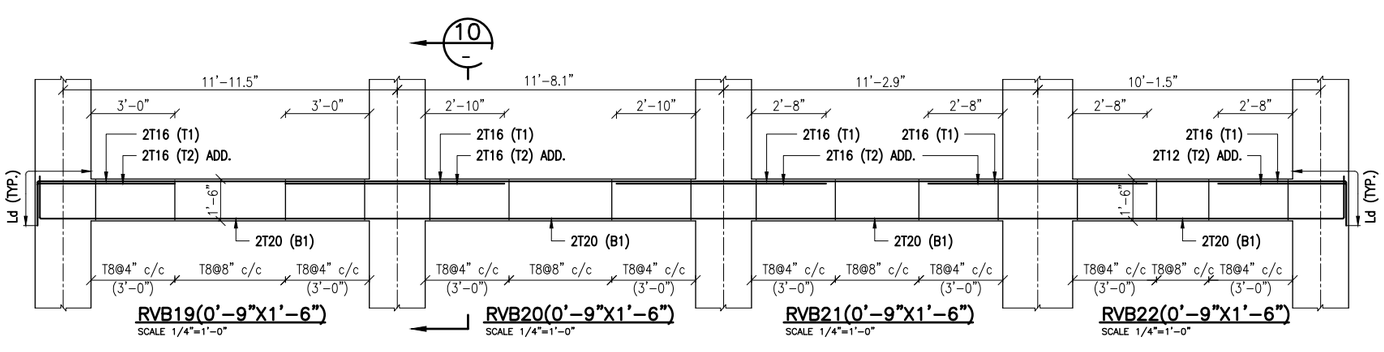


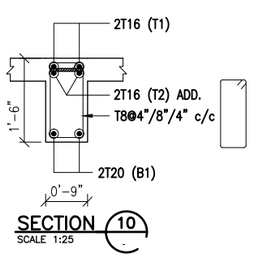


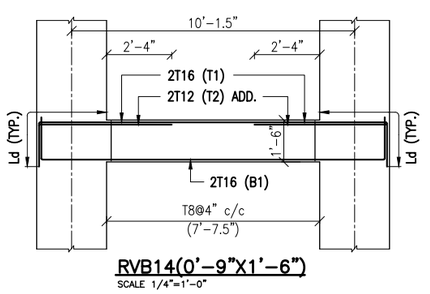












DRAWING NO : A16

REVISION NOTES :

NO.	DATE	REVISION

ARCHITECT

EMAARA DESIGNS
ARCHITECT & INTERIORS
Plot no.35, 100 feet, Taramani Link Rd, Ayodhya Colony, Velachery, Chennai 600042.

BUILDER CONSULTANTS

NARAIN PROMOTERS

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M. PURUSOTHAMAN, M.E., (Struct.)
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ELECTRICAL CONSULTANTS

PROJECT NAME

PANDAVAS APARTMENT

CLIENTS

DRAWING TITLE:

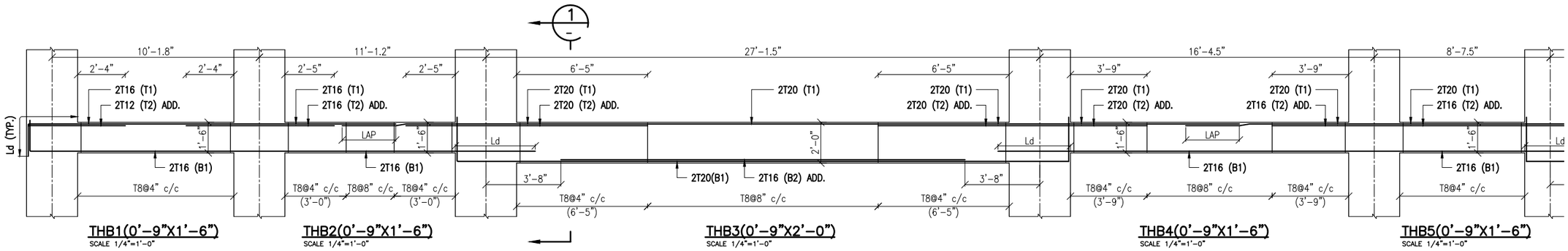
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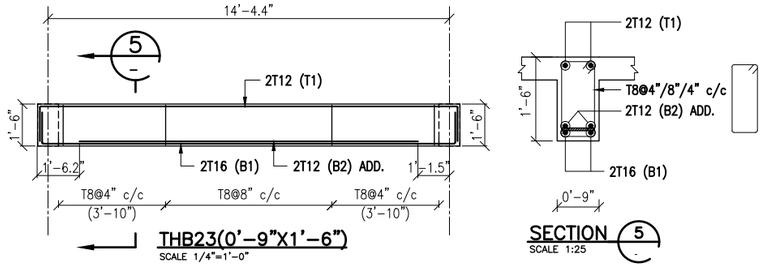
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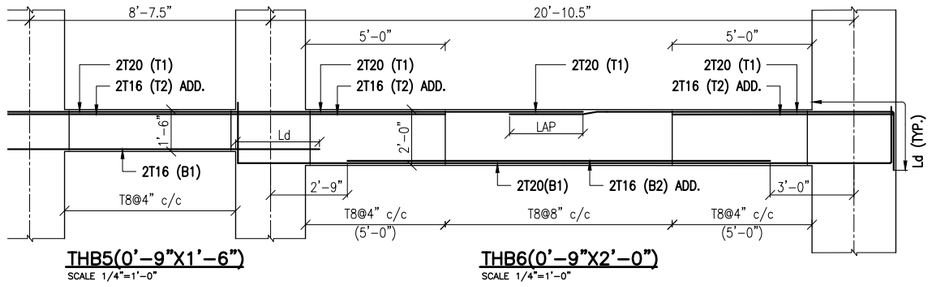
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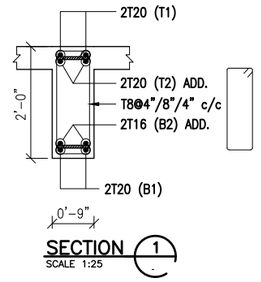
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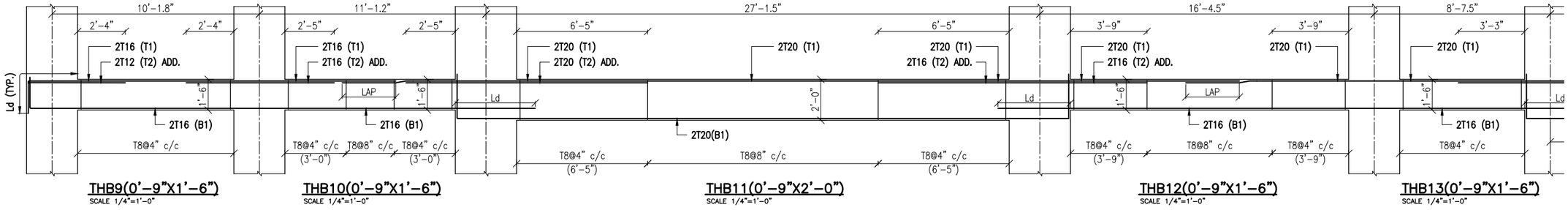
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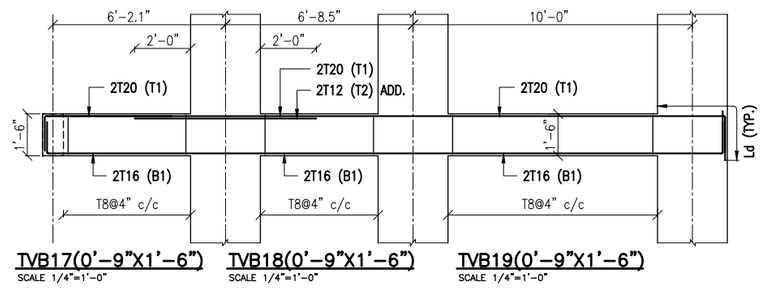


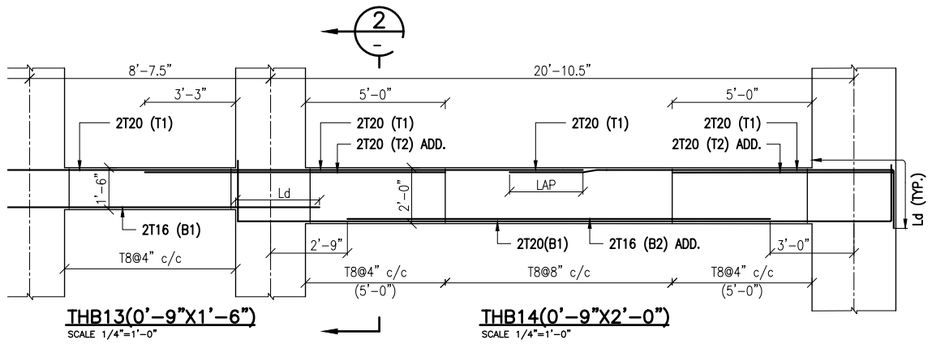


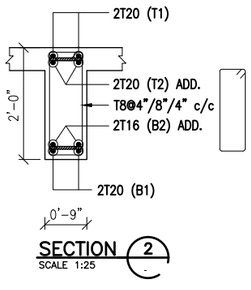


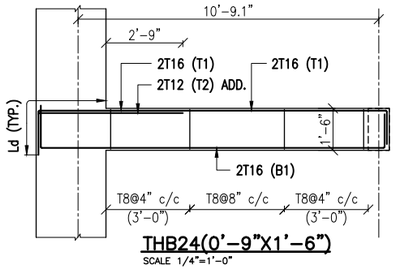


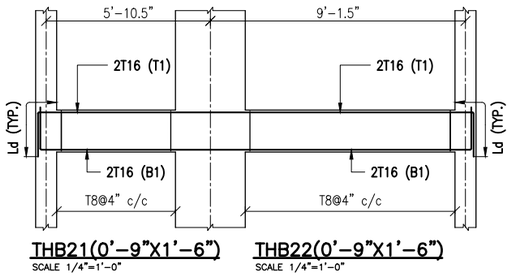


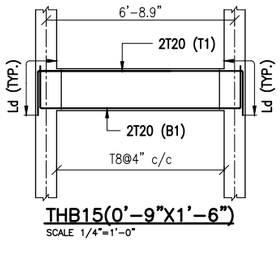


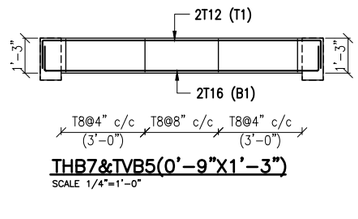


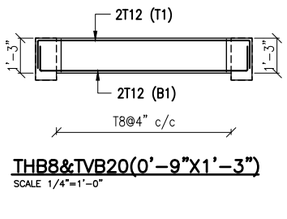












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Mobile: +91 94445 77374

ELECTRICAL CONSULTANTS

PROJECT NAME

PANDAVAS APARTMENT

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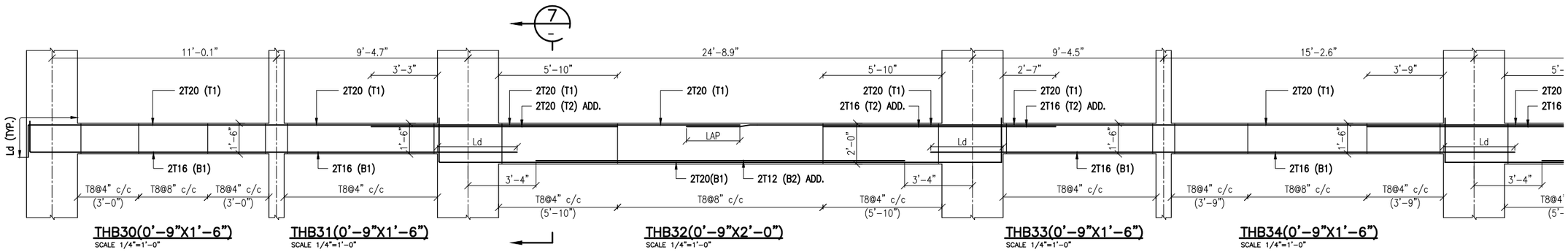
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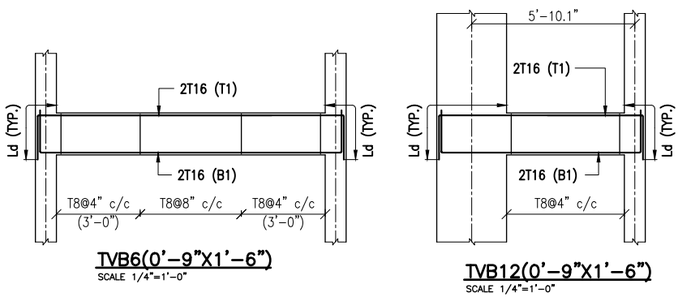
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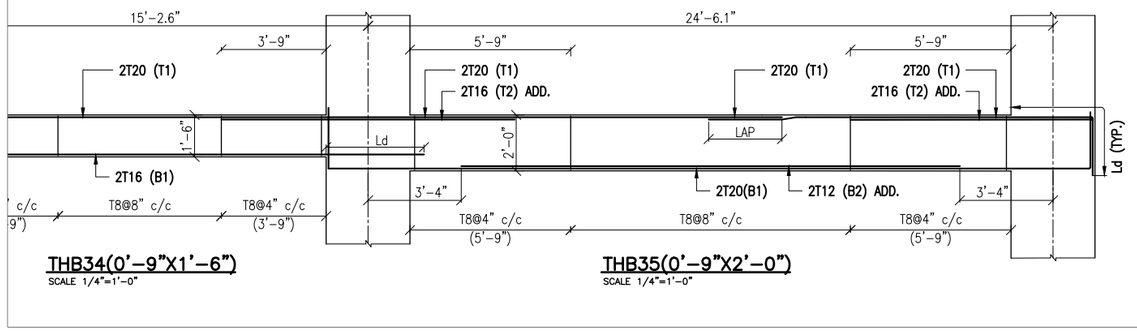
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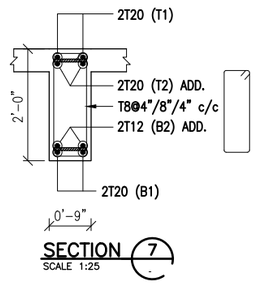
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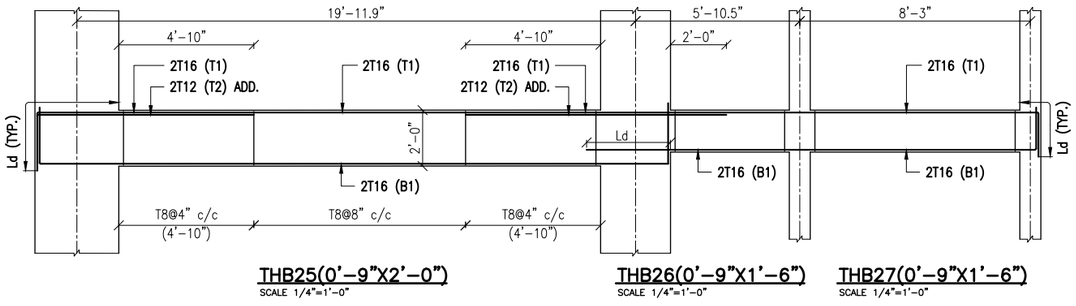
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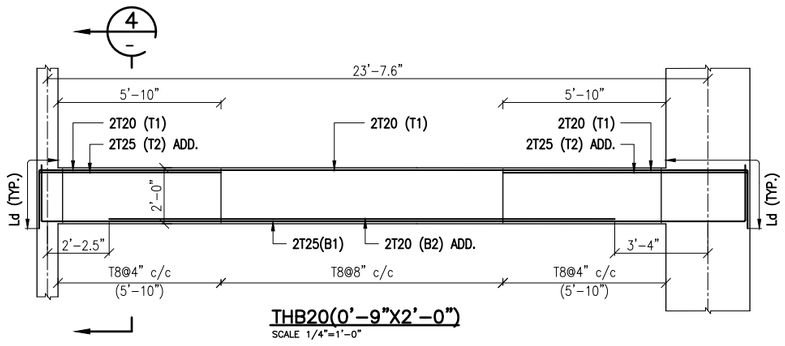


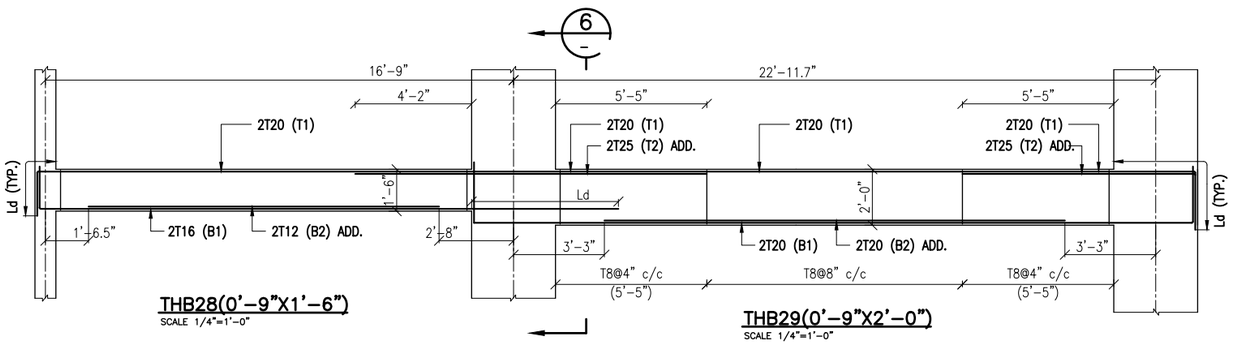


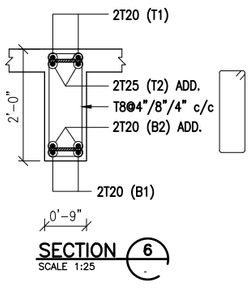


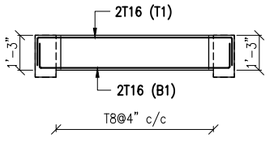


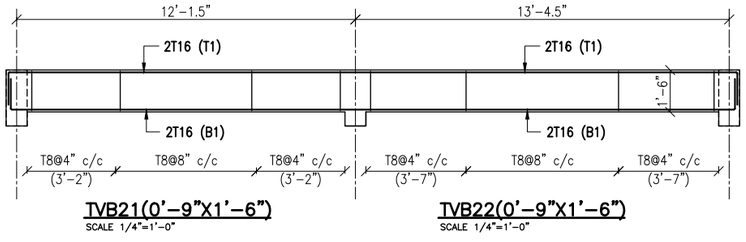


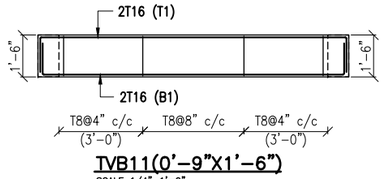












DRAWING NO : A16

REVISION NOTES :

NO.	DATE	REVISION

ARCHITECT

EMAARA DESIGNS
ARCHITECT & INTERIORS
Plot no.35, 100 feet, Taramani Link Rd, Ayodhya Colony, Velachery, Chennai 600042.

BUILDER CONSULTANTS

NARAIN PROMOTERS

STRUCTURAL CONSULTANTS

ELECTRICAL CONSULTANTS

PROJECT NAME

PANDAVAS APARTMENT

CLIENTS

DRAWING TITLE:
FIRST AND TYPICAL FLOOR BEAM REINFORCEMENT DETAILS (BLOCK-02) (SHEET-02 OF 03)

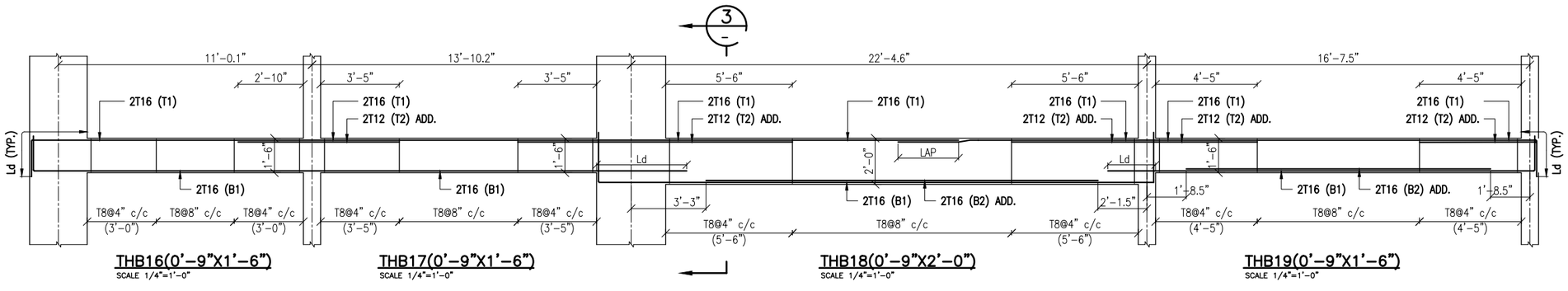
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CHKD BY:
DATE: 04.06.22
APPROVED BY:

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GRAPHIC SCALE

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- [ ] FOR TENDER
- [ ] FOR INFORMATION
- [ ] FOR EXECUTION
- [ ] FOR APPROVAL

N W E S

M. PURUSOTHAMAN, M.E., (Struct.)
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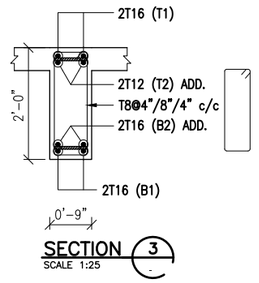


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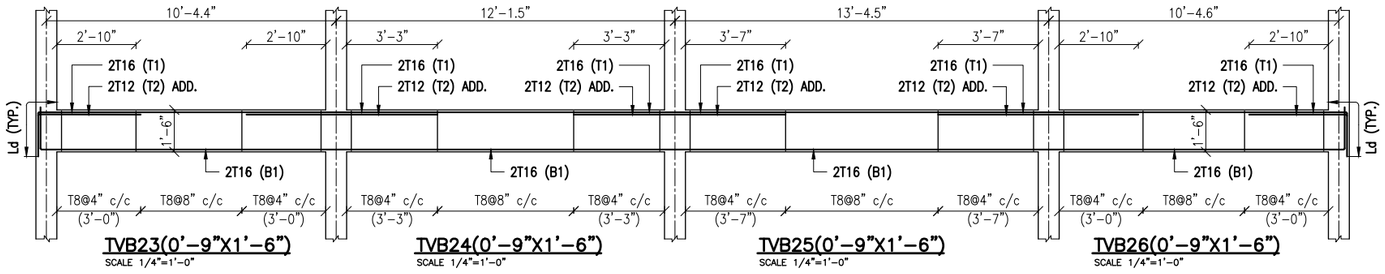
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SECTION 3
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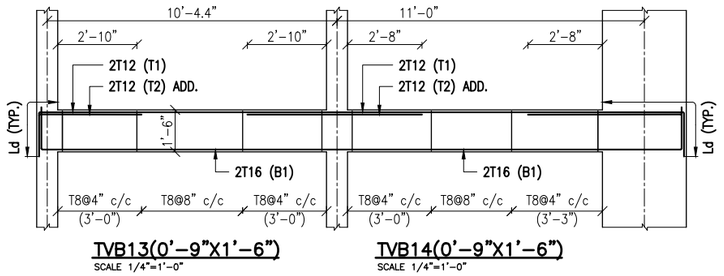


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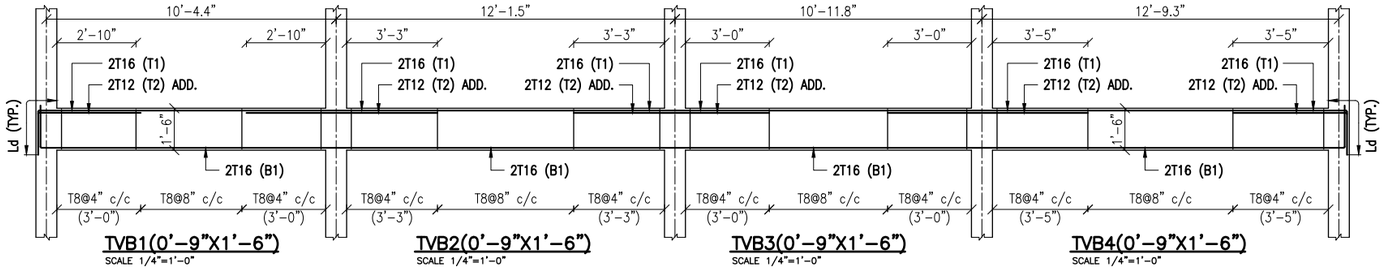
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TVB13(0'-9"X1'-6")
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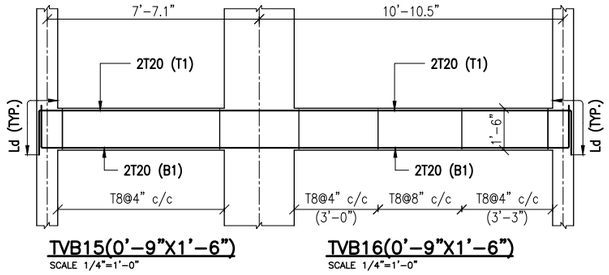


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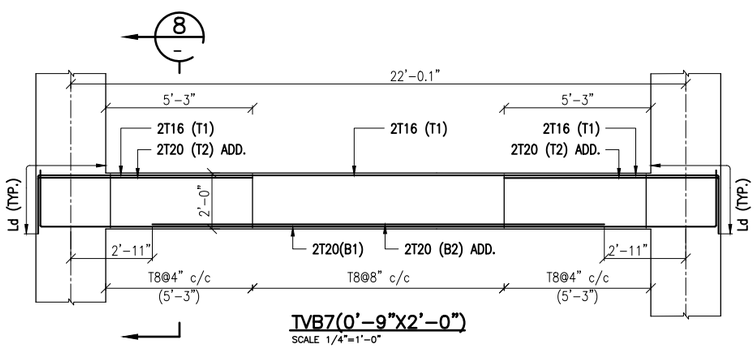
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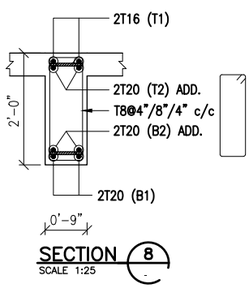


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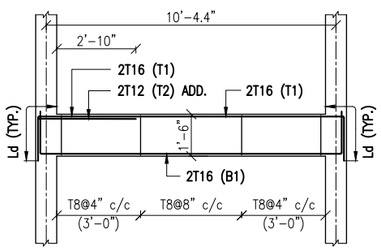
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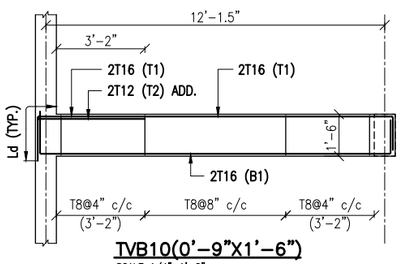
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SECTION 8
SCALE 1:25



TVB9(0'-9"X1'-6")
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TVB10(0'-9"X1'-6")
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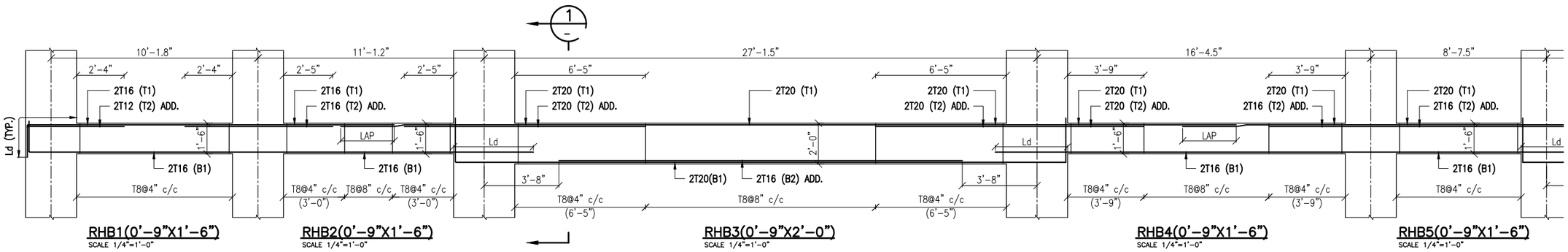
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FIRST AND TYPICAL FLOOR BEAM
REINFORCEMENT DETAILS
(BLOCK-02) (SHEET-03 OF 03)

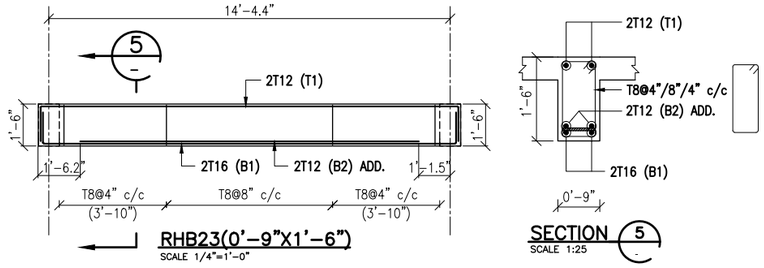
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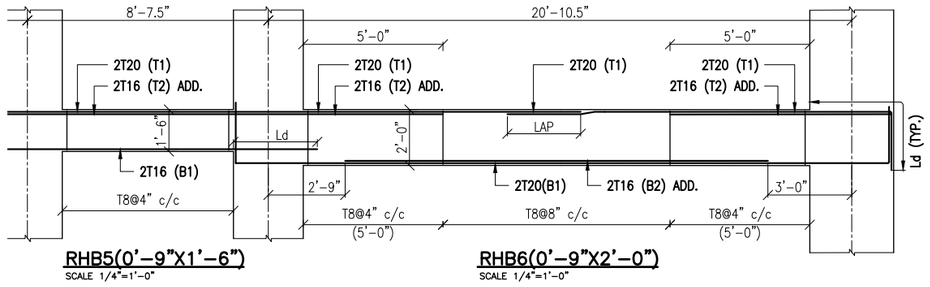
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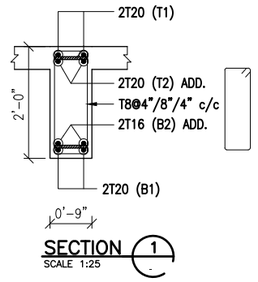
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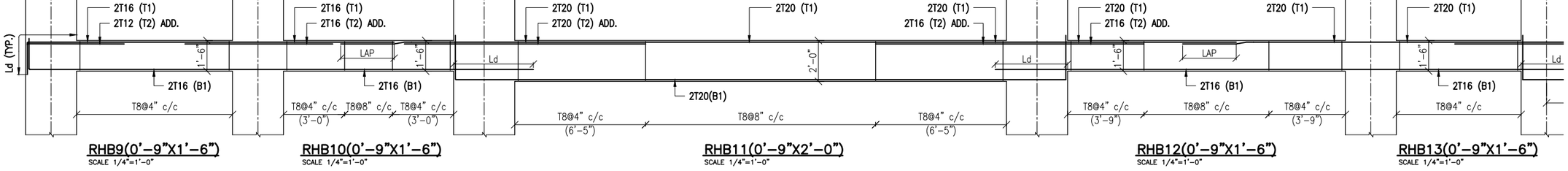
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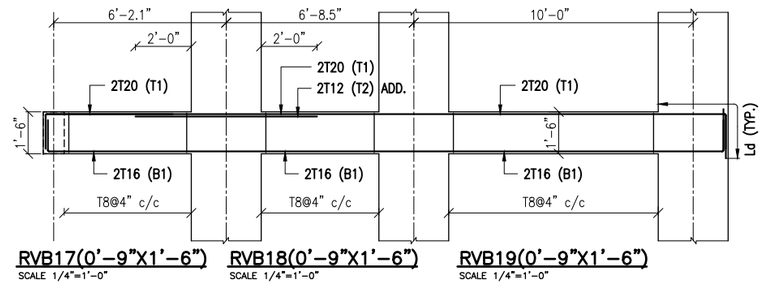


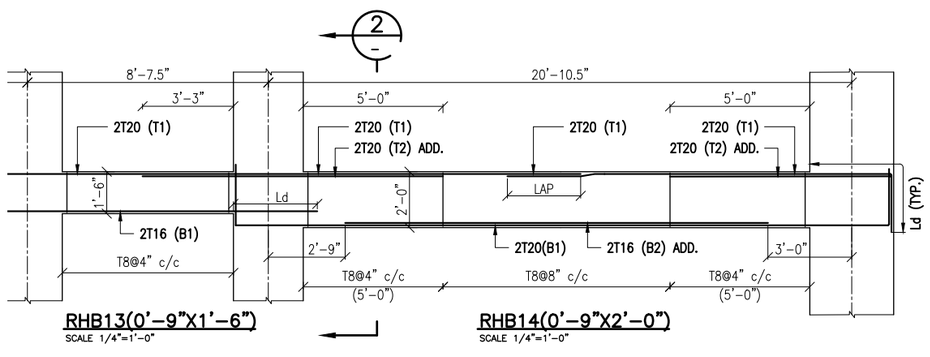


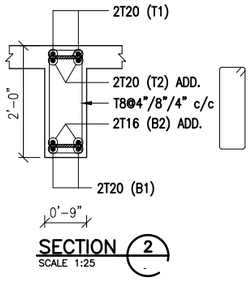


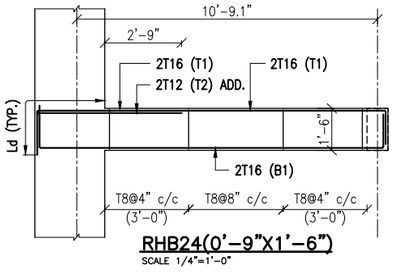


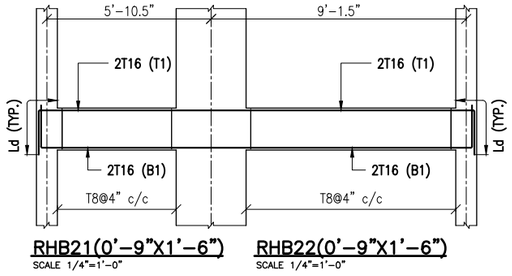


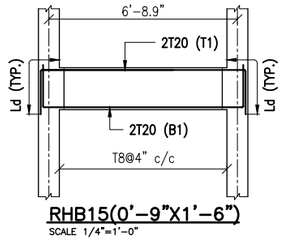


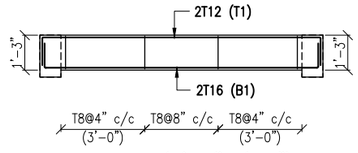


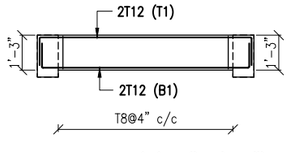












DRAWING NO : A16

REVISION NOTES :

NO.	DATE	REVISION

ARCHITECT

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PROJECT NAME

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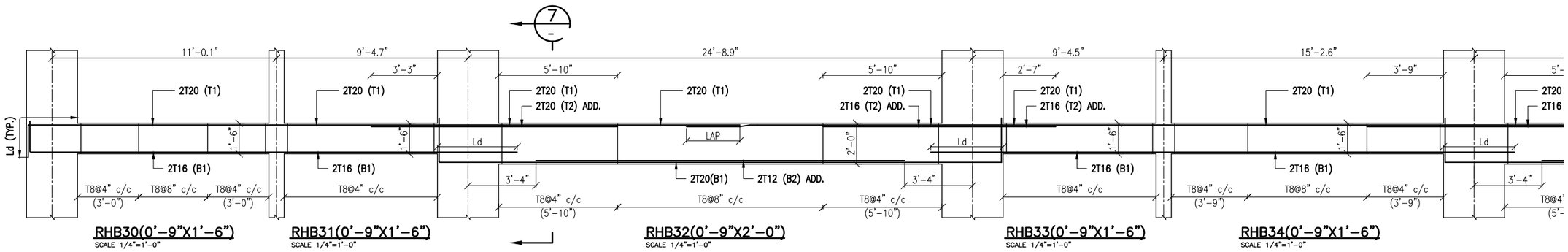
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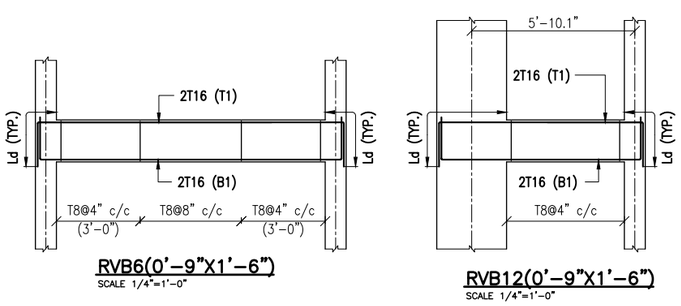
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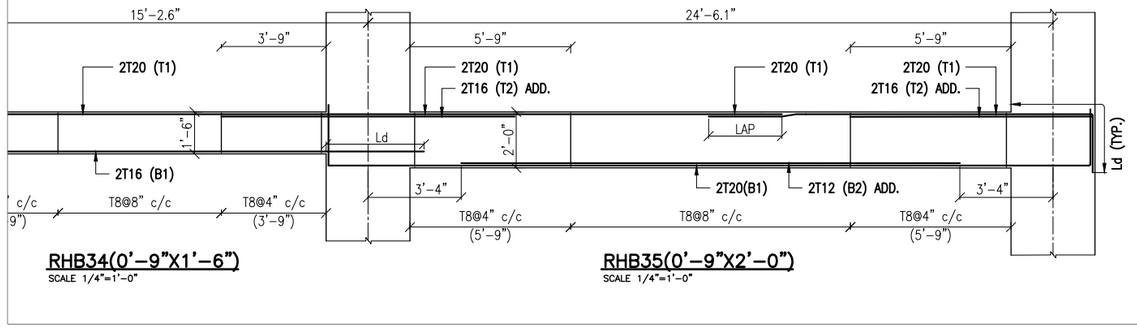
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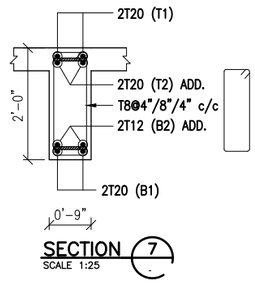
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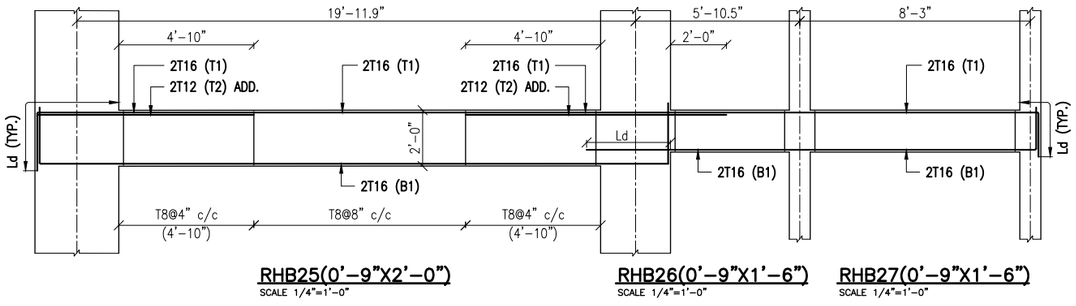
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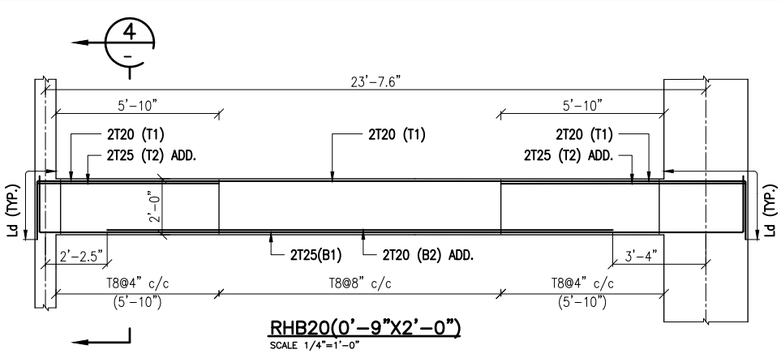


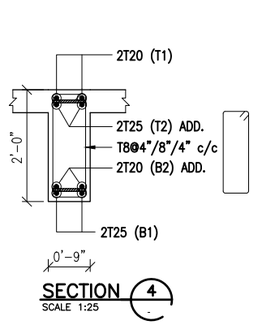


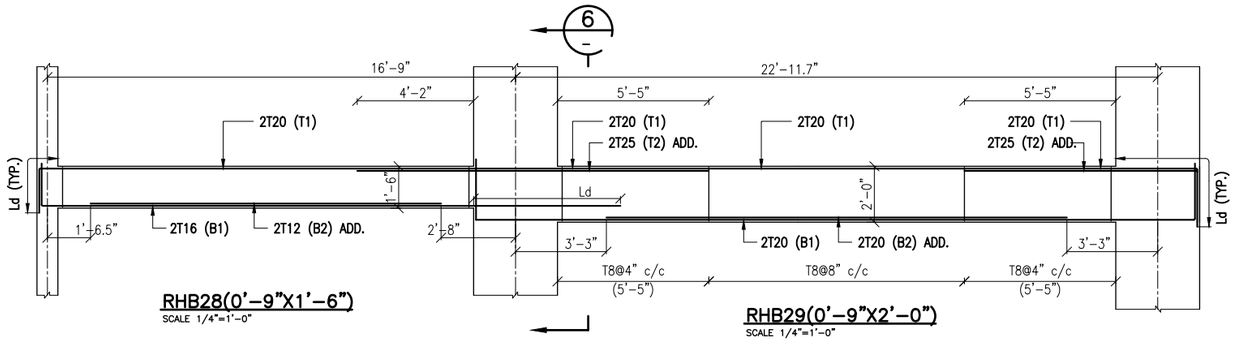


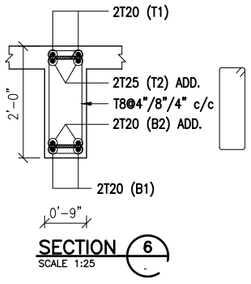


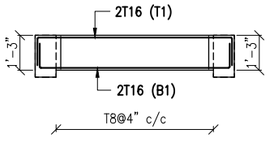


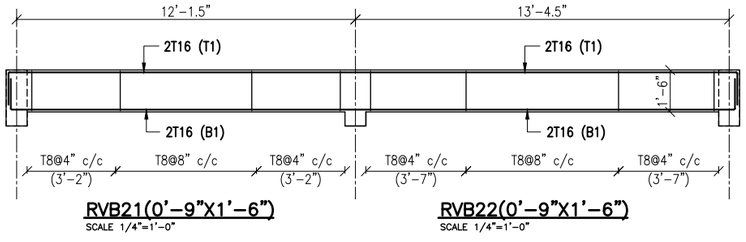


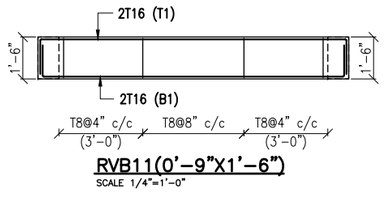












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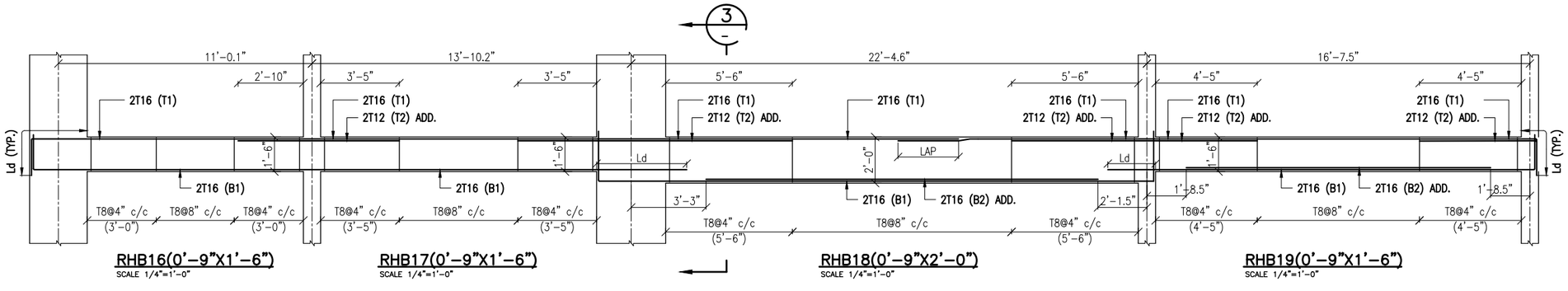
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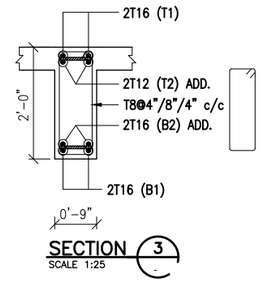
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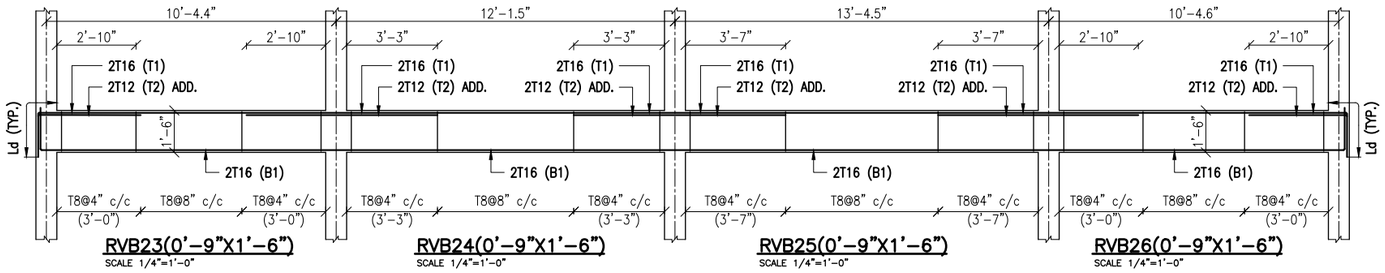
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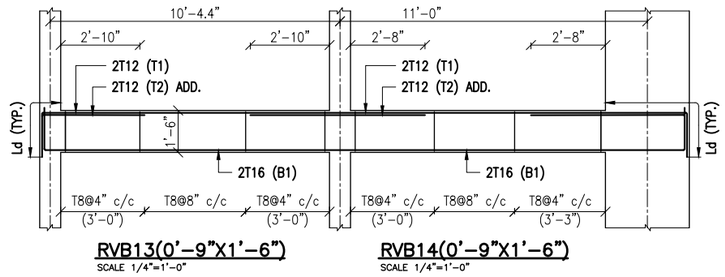
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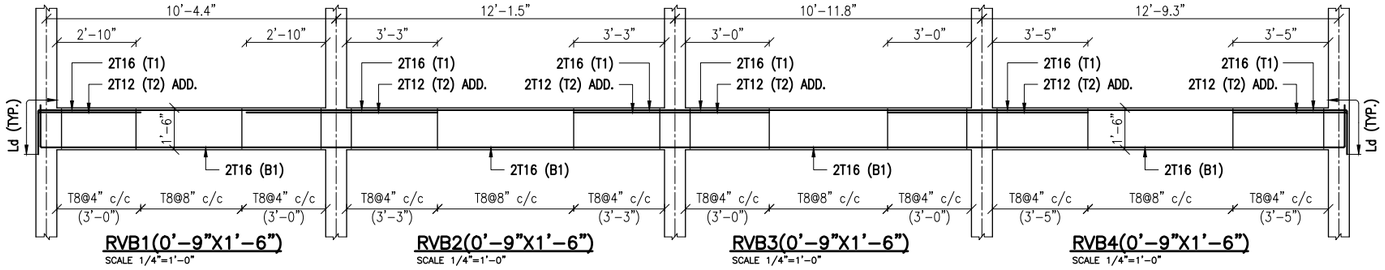
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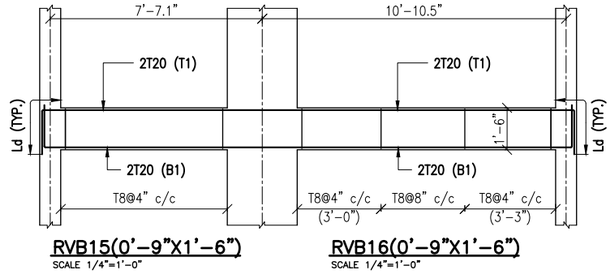


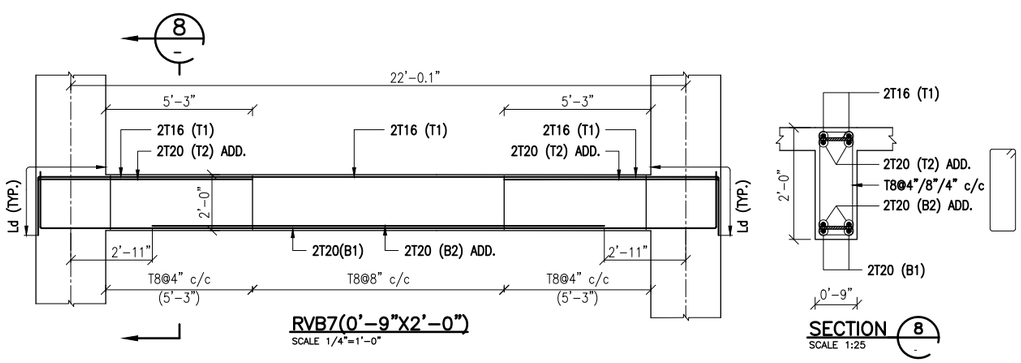


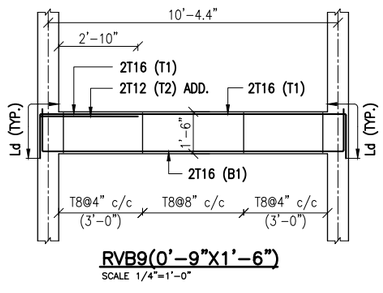


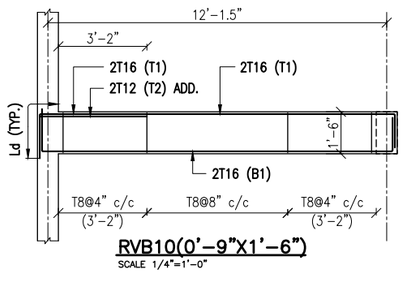












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DRAWING NO : A16

REVISION NOTES :

NO.	DATE	REVISION

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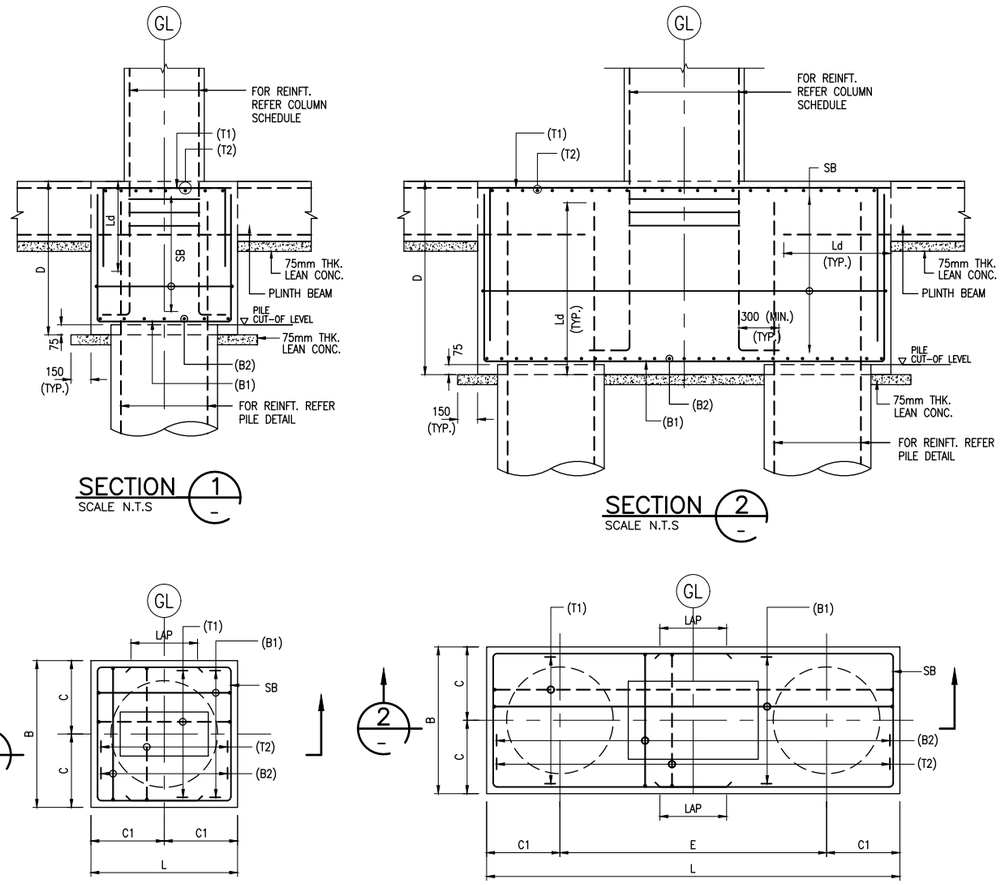
ROOF BEAM REINFORCEMENT DETAILS (BLOCK-02) (SHEET-03 OF 03)

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PILE CAP REINFORCEMENT DETAILS FOR SINGLE, TWO & THREE PILE GROUP

TYPE OF PILE	TYPE OF PILE CAP	PILECAP DIMENSIONS									PILECAP REINFORCEMENTS SCALE N.T.S									REMARKS
		B	L	D	C	C1	E	F	G	H	B1	B2	B1a	B2a	B1b	B2b	T1	T2	SB	
		(INCHES)	(INCHES)	(INCHES)	(INCHES)	(INCHES)	(INCHES)	(INCHES)	(INCHES)	(INCHES)										
SINGLE-PILE GROUP																				
BP1A	PC1A	2'-8"	3'-0"	3'-4"	1'-4"	1'-6"	–	–	–	–	T16-5"	T16-5"	–	–	–	–	T12-5"	T12-5"	T10-8"	–
BP1B	PC1B	3'-0"	3'-6"	3'-4"	1'-6"	1'-9"	–	–	–	–	T16-5"	T16-5"	–	–	–	–	T12-5"	T12-5"	T10-8"	–
TWO-PILE GROUP																				
BP2A	PC2A	2'-8"	6'-10"	3'-4"	1'-4"	1'-4"	4'-2"	–	–	–	T16-5"	T16-5"	–	–	–	–	T12-5"	T12-5"	T10-8"	–
BP2B	PC2B	3'-0"	8'-0"	4'-0"	1'-6"	1'-6"	5'-0"	–	–	–	T20-5"	T20-6"	–	–	–	–	T12-5"	T12-6"	T10-8"	–

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DRAWING NO : A20

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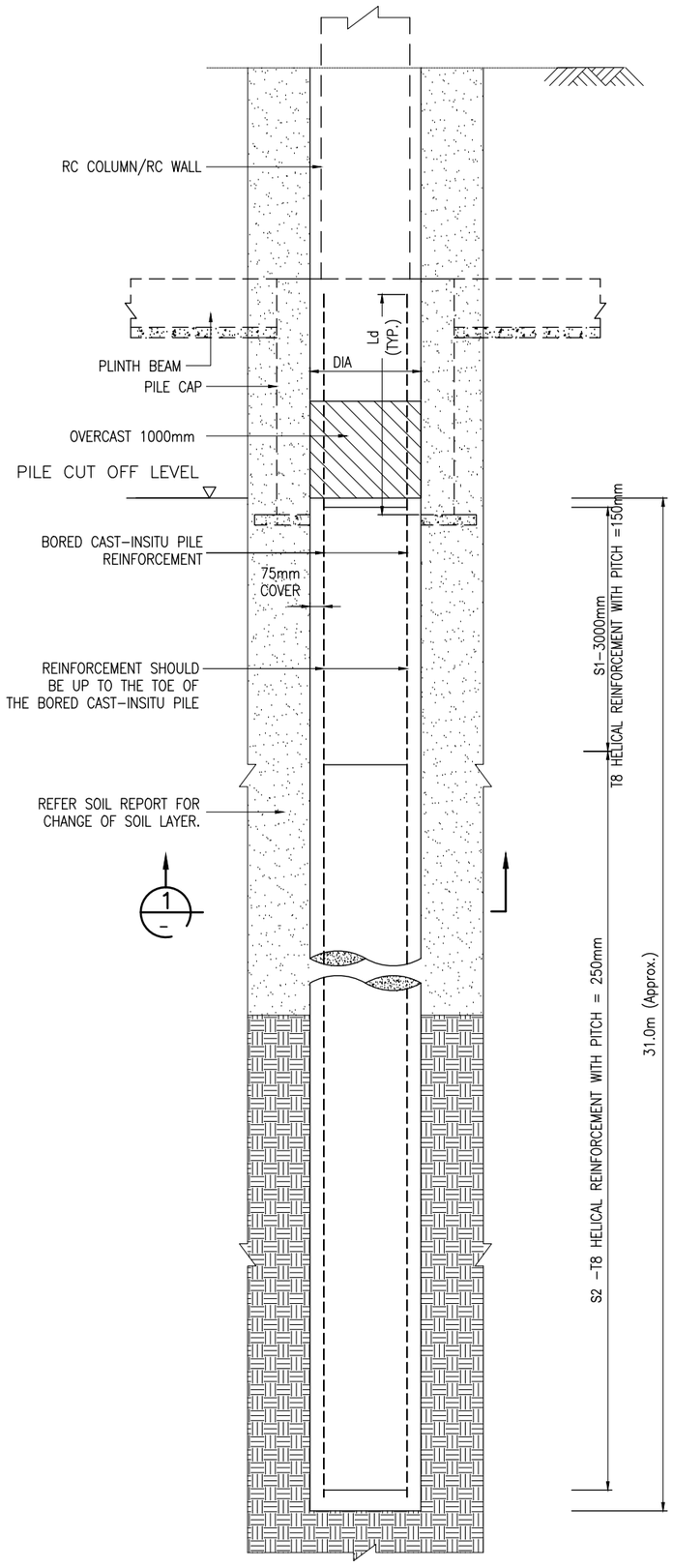
PILE CAP DETAILS

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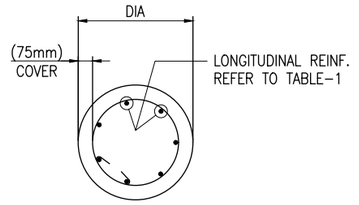
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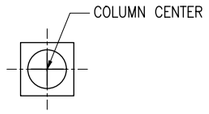


TYPICAL DETAIL OF BORED CAST-INSITU PILE
SCALE N.T.S

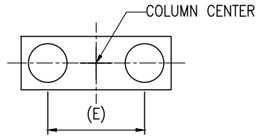


SECTION 1-1
SCALE N.T.S

C/S OF BORED CAST-INSITU PILE



1 PILE GROUP
SCALE N.T.S



2 PILE GROUP
SCALE N.T.S

GENERAL NOTES FOR PILING WORKS

1. The contractor shall verify all dimensions and levels on site and resolve any discrepancy with the Architect or Engineer before commencement of work.
2. A copy of pile setting out plan prepared by a Licensed Surveyor shall be submitted by the contractor to Architect and Engineer prior to the commencement of the work.
3. Reinforcement shall be high strength deformed bars(fy=500 N/mm2)
   a) Longitudinal reinforcement shall be extended up to the tip of the pile (Base of the pile).
   b) Stiffener bars are to be 16mmø min. @ interval of not more than 1.5m.
4. OPC cement shall be used for bored Cast-Instu piles of grade M30 (Fcu = 30mpa).The minimum cement content shall be 400kg/m³ .
5. All piles shall be installed to have an ultimate capacity of not less than 2.5 times the specified working load.
6. The piling contractor shall ensure that the piling rig mobilized for pile installation has capability to install piles into the weathered rock layer to a minimum socketing length is 4DIA. If the piling rig is unable to install the pile to the specified and required depth. The piling contractor shall mobilize suitable and capable rig for installation of piles at no additional cost to the contract.
7. The working piles shall be installed only upon successful completion of preliminary load test.
8. All piles shall have embedment in to weathered rock with the minimum socketing length is 4DIA. The pile length estimated to be 31.0m approx. from the pile cut-off level. The length of pile subject to change based on the pile load test results.
9. The maximum permissible deviation of pile centre of a group shall not be more than 75mm (3") in any direction from approved pile layout plan. In the case of single pile under a column the positional deviation should not be more than 50mm.
10. The format of the piling record shall be submitted to the Engineer's approval before commencement of work. Complete piling records shall be kept by the contractor during the installation of pile. The contractor shall submit the records of all piles as the work proceeds.
11. Upon completion of the piling work, the piling contractor shall submit as-built pile layout plan at cut-off level including with pile eccentricity of each pile prepared by a licensed surveyor.
12. Distance between centre to centre of the pile in a pile group shall be 2.5 times the diameter of the pile.
13. The contractor shall ensure and provide necessary protection,that the adjacent buildings are not affected and damaged during the installation of bored cast-insitu piles.
14. Working (Routine) load test to be carried out to a load of 1.5 times specified working load.
15. The piling contractor shall provide penetration depth for the piles to carry the specified working with a minimum factor of safety of 2.5. The piling contractor shall be responsible to ensure that each pile is installed to carry the specified load with required factor of safety.
16. The piling shall be installed from the EGL and the empty bore shall be filled with quarry dust or its equivelant for safety reason.

TABLE 1- BORED PILE (CAST-INSITU)

BORED PILE MARK / TYPE	SIZE	WORKING COMPRESSION CAPACITY (kN) (AS PER SOIL REPORT)	LONGITUDINAL REINFORCEMENT	LINKS		REMARKS
				S1	S2	
TYPE A	1'-8"ø	900	6T16	T8-6"	T8-10"	REFER TYPICAL VERTICAL SECTION AND CROSS SECTION FOR MAIN REINFORCEMENT ARRANGEMENT.
TYPE B	2'-0"ø	1200	8T16	T8-6"	T8-10"	REFER TYPICAL VERTICAL SECTION AND CROSS SECTION FOR MAIN REINFORCEMENT ARRANGEMENT.

TABLE 2 (PILE SPACING)

BORED PILE MARK / TYPE	SIZE	2 PILE GROUP
		(E)
TYPE A	1'-8"ø	4'-2"
TYPE B	2'-0"ø	5'-0"

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DRAWING NO : A21

REVISION NOTES :

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Guideline Value, Apartment Composite Value, Stamp Duty & Registration Fees Calculator, Building Value Calculator, Capital Gains Calculator, Area Unit Converter, Length Unit Converter

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Encumbrance Certificate (EC) Search, Find Your SRO, Temple Property Check, WAQF Property Check, View Patta/Chitta, View FMB, Patta Analyzer, EC Analyzer

Zoning & Land Use Analysis

Land Use Zone Finder, CRZ Zone Check, Aquifer Zone Check, CBA Check, EWS Check, Road Width Check, Proposed Road Widening Check, FSI Calculator

Property Documentation & Workflow Tools

Forms & Templates, Document Generator, Document Translation, Dictionary

Vastu & Property Management Tools

Home Vastu Shastra, Plot Vastu Shastra, Property Management

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