PLANNING, DESIGN & ESTIMAION OF A G+2 RESIDENTIAL APARTMENTS WITHIN A COMPLEX AT HANMAKONDA

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Abstract –

The structural planning and design requires both creative energy and applied reasoning along with sound information of investigation of structural building, ongoing design codes by laws, instinct and appropriate judgment. In this present investigation G+ 2 private loft for a private complex at Pipulpati More, Hanmakonda. Utilizing AUTOCAD and STAAD-Pro programming. Likewise the estimation of different things of works along with rate analysis with late timetable of PWD is finished.

The encircling course of action and column area of the building were given dependent on engineering and structural prerequisites. This report covers the design procedure in the accompanying request. The bearing limit of soil of that specific site at Pipulpati was observed to be 150kN/m2. The topographical guide of that site is additionally given in this examination.

Keywords: Apartment Design at Pipulpati, G+2 private undertaking

1. INTRODUCTION

Buildings are the living structures which arrives in a wide measure of shapes and capacities the design and estimation process totally relies upon the kind of building, it's multifaceted nature and number of stories. It requires creative ability and reasonable reasoning as well as sound information of study of structural designing. Here in this report, the design of each structural component is done based on the statements given by Indian standard to guarantee wellbeing and economy. In this present investigation all the concerned illustrations of AUTOCAD and STAAD Pro are given. Additionally the design and the screen capture of the land position of the site is given. Right off the bat, the structural illustrations of the buildings are examined, and after that relying on the determined measure of Dead Load and Live Load mix, the sectional sizes and support are designed.

1.1 AREA STATEMENT

- Area of Plot – 2200 m2
- Area of each building unit – 210 m2
- Floor-Area proportion - 0.38

1.2 SURVEY DATA

- RL of Point A=7.592 m above MSL
- RL of Point B=7.625 m above MSL
- RL of Point C=7.765 m above MSL
- RL of Point D=7.766 m above MSL
- Length of AB =70.52m
- Length of DC =72.36m
- Length of DA=67.69m

- Length of BC=56.70m

Area of plot=1/2 X AB X{(DA+CB)/2}

=1/2 X 70.52 X{(67.69+56.70)/2} =2192.99m2

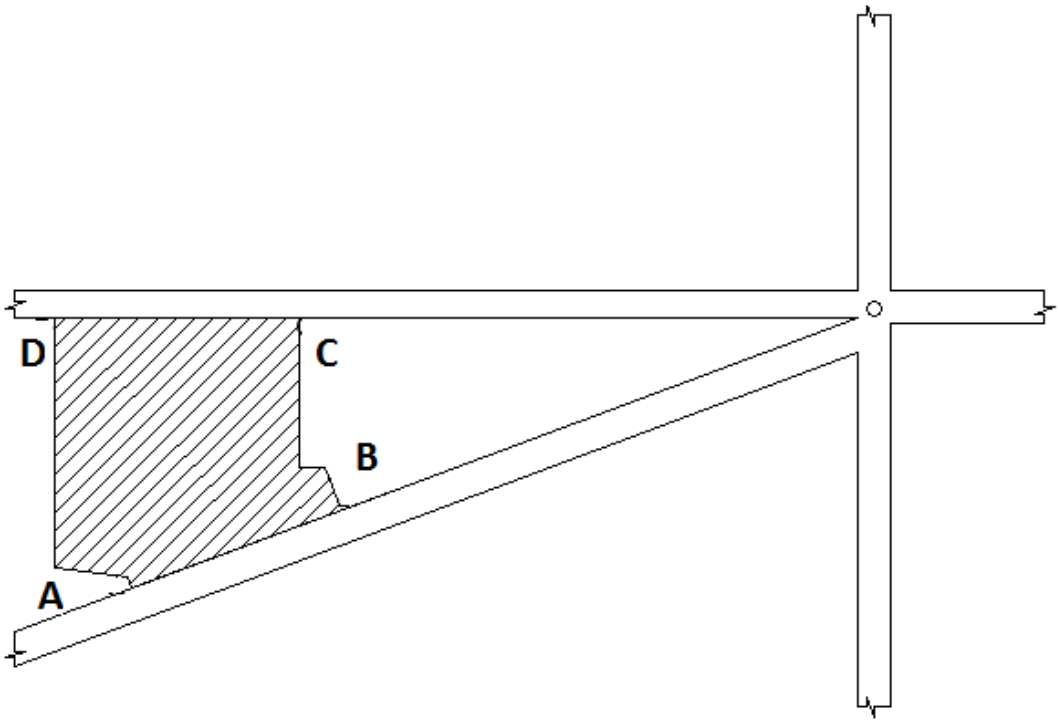

Fig - 1: Plot area of the land

Fig - 2: Geographical layout of the plot

2.0 METHODOLOGY

2.1 GEOMETRY OF THE BUILDING

The building is ordinary in plan with bended surface at the two side closures and in rise having story tallness of 3.3m where all story's are of a similar stature. The ground floor is utilized as the parking spot for the clients. The building comprise of four bayous along the two level bearings of shifting straight length. The building comprise of square and roundabout columns, straight and bended beams of width 0.25m and piece thickness of 100mm. the measure of column is steady all through all story and the extent of beam is consistent all through every story.

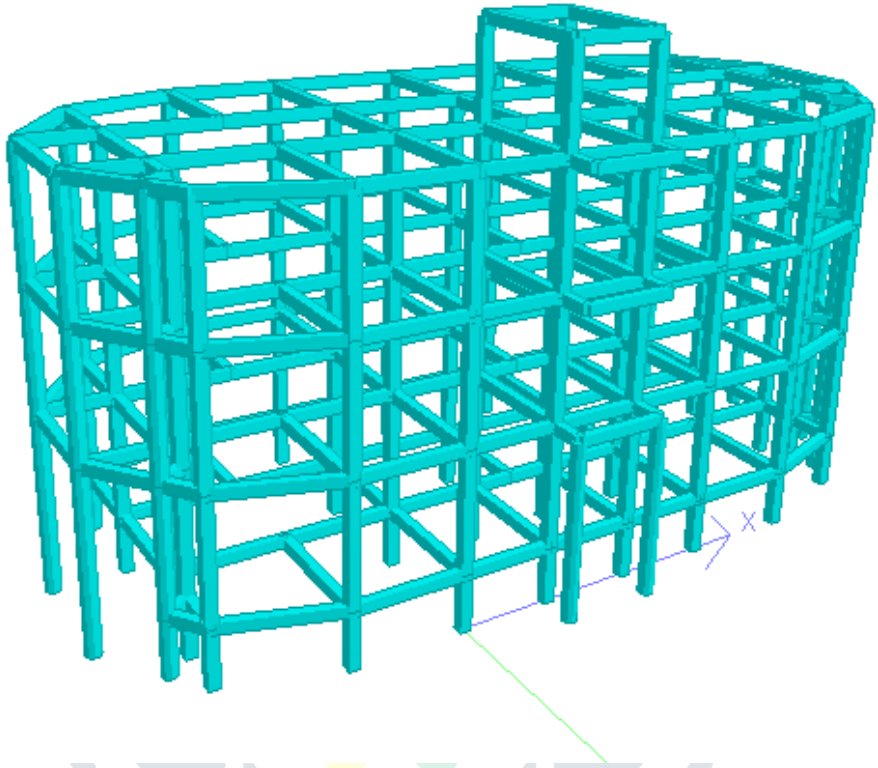

Fig - 3: 3-D demonstrating perspective on STAAD-Pro

2.2 DESIGNING OF CRITICAL SLAB PANEL (S1)

In this present paper two sorts of chunks are designed to be specific rooftop section and floor piece. Rooftop section is a constant piece on the highest point of the building which is otherwise called porch. For the most part patio has less live burden and it is unfilled in more often than not aside from at certain events. In designing the rooftop piece dead loads (i.e., because of water proofing=2.5KN/m2, self-weight of the slab= 0.1x1x25 = 2.5KN/m2) and live loads (roof=1KN/m2) are considered. For rooftop piece primary steel is given along the short range just and the heap is exchanged to two inverse backings as it were. The steel along the long range just goes about as dispersion steel and isn't designed for exchanging the heap however to circulate the heap and to oppose shrinkage and temperature stresses. For floor piece live burden is more when contrasted with the rooftop section. Thusly in designing of floor chunk dead loads (i.e., because of floor complete = 1KN/m2, clean squares including filling = 2KN/m2 and self-weight of the section = 0.1×1×25) and Live loads (i.e., Sanitary squares open = 3KN/m2) are considered. The designing is pursued IS:456-2000. The subtleties of support gave in sections are given table.1Table.1 Details of reinforcement provided in critical slab panel for G+2 Apartment

TABLE 1 : Reinforcement details in slab

Sl. No	Short Span Steel	Long Span Steel	Slab Thickness	Remarks
S1	8mm Ø @ 250mm c/c alternate cranks	8mm Ø @ 250mm c/c alternate cranks	100mm	Two-Way

2.3 DESIGNING OF CRITICAL BEAM (FB2)

A reinforced concrete beam should be able to resist tensile compressive and shear stresses induced in it by the loads on the beam. Firstly, the DL and LL from the slab is calculated assuming the trapezium-triangular distribution of the primary load. Secondly, the geometrical diagram is generated using STAAD Pro software and the BMD is taken out finally depending upon the BMD value of the critical beam & then reinforcement is designed as per the clauses of IS:456-2000. The reinforcement arrangement of the critical beam is shown in Fig 4.

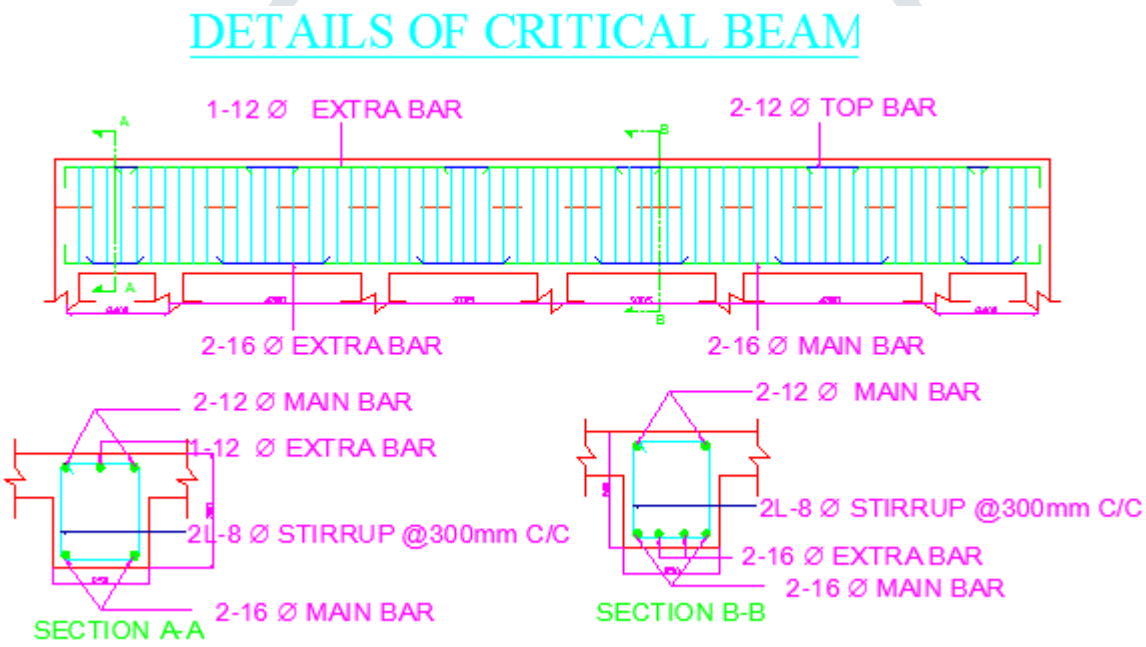

Fig -4: Reinforcement detailing of critical beam FB2

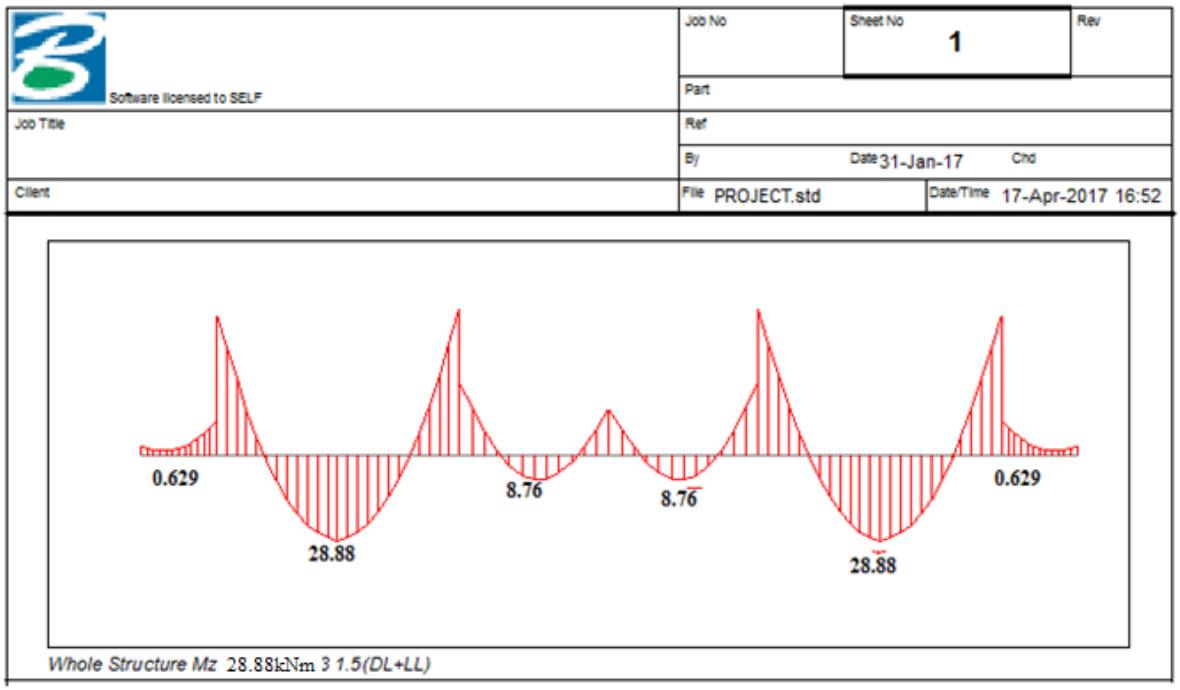

Fig -5: BMD from STAAD

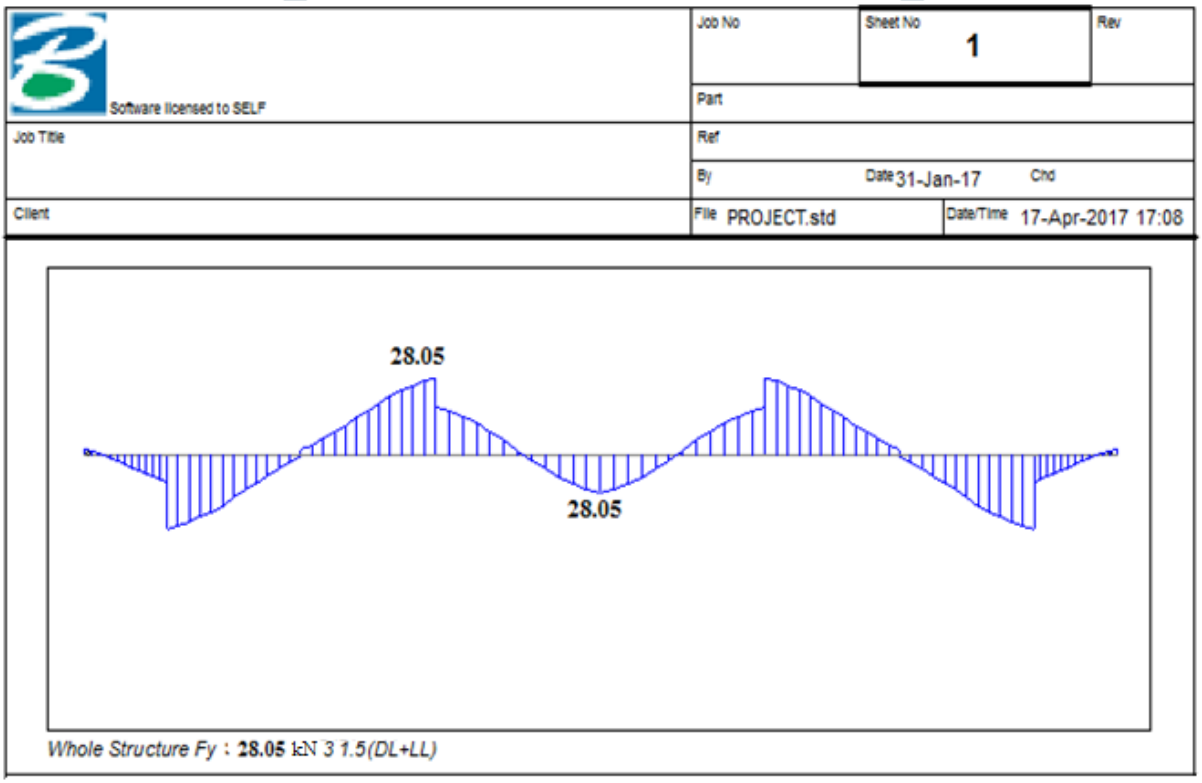

Fig -6: SFD from STAAD

2.4 DESIGNING OF CRITICAL COLUMNS (C2 & A1)

A column in general may be defined as a member carrying direct axial load which causes compressive stresses of such magnitude that these stresses largely control its design. Here square as well as circular section of column is designed. All the columns are designed as long column and the columns are designed on the basis of SP16. The design moment is followed IS456:2000 code. The schedule of columns are given in Table.2

TABLE 2 Column schedule

Colum Type	Mix	Size	Main Steel	Tie Lateral/Spiral
C2	M-20	300x300	8Nos 20Ø bars	8mm Ø @200mm c/c
A1	M-20	400Dia	6Nos 20Ø bars	8mm Ø @25mm c/c

2.5 STOREY WISE NODAL LOAD ON CRITICAL COLUMN

Table.3 Beam schedule

Beam	L/C	Node	Fx kN
354	3 1.5(DL+LL)	132	120.26
272	3 1.5(DL+LL)	101	507.69
190	3 1.5(DL+LL)	70	806.36
108	3 1.5(DL+LL)	32	1215.89

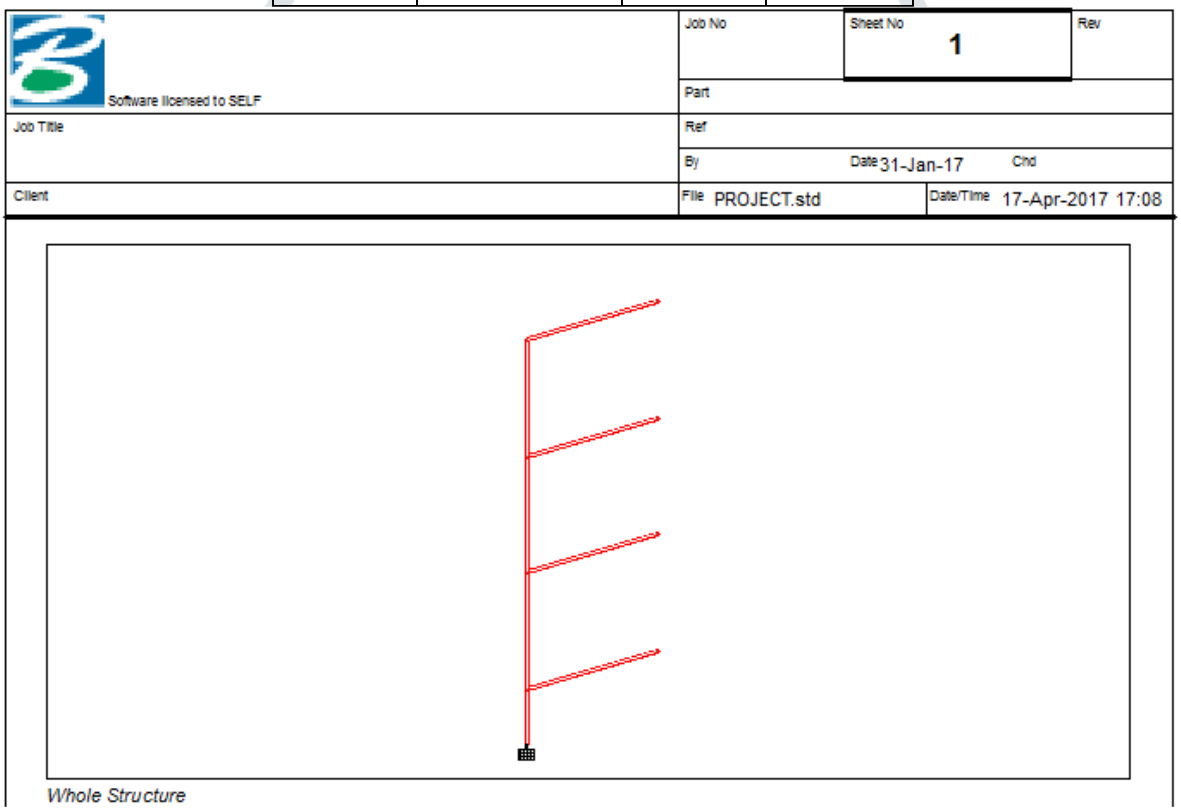

Fig -7: Storey details from STAAD

2.6 DESIGNING OF FOUNDATION

Foundation design includes a dirt report to set up the most suitable kind of foundation and a structural design to decide balance measurements and required measure of support. Since compressive quality of the dirt is commonly a lot more fragile than that of the solid, the contact area between the dirt and the balance is a lot bigger than that of the columns and walls. The present investigation shows that the site is situated in stone shake which is reasonable for solid foundation. To decide the bearing limit of soil, tests of soil are tried in the research facility and found that the Safe bearing limit of soil is 150KN/M2 at a profundity of 1.2m. Contingent upon the bearing limit of soil and designing of structure confined square footings and consolidated balance of M-20 blend and strengthened with HYSD bars of Fe-500 is designed according to May be :456-2000. Along these lines the balance is segregated rectangular inclined balance with platform. The incline is given to diminish the solid in the development which results into financial development. A platform is utilized to help the heaps from metal columns through the floor and soil to the balance when the balance is at some profundity in the ground. What's more, a secluded column balance exchanges the heaps from a solitary column to the supporting soil. The balance is designed for flexure, punching or two-way shear, and flexural or single direction shear. The passable soil bearing weight decides the span of the balance, and the punching shear administers the profundity of the balance. The calendar of footings in the site are recorded in Table.3 and general balance plan and platform balance plan is appeared in Fig.8.

Table.4 Schedule of isolated column footing

TABLE 3 Schedule for footing

Footing Type	Mix	Size	Main Steel
F1	M-20	300x300	12 Ø @ 250mm c/c bothways

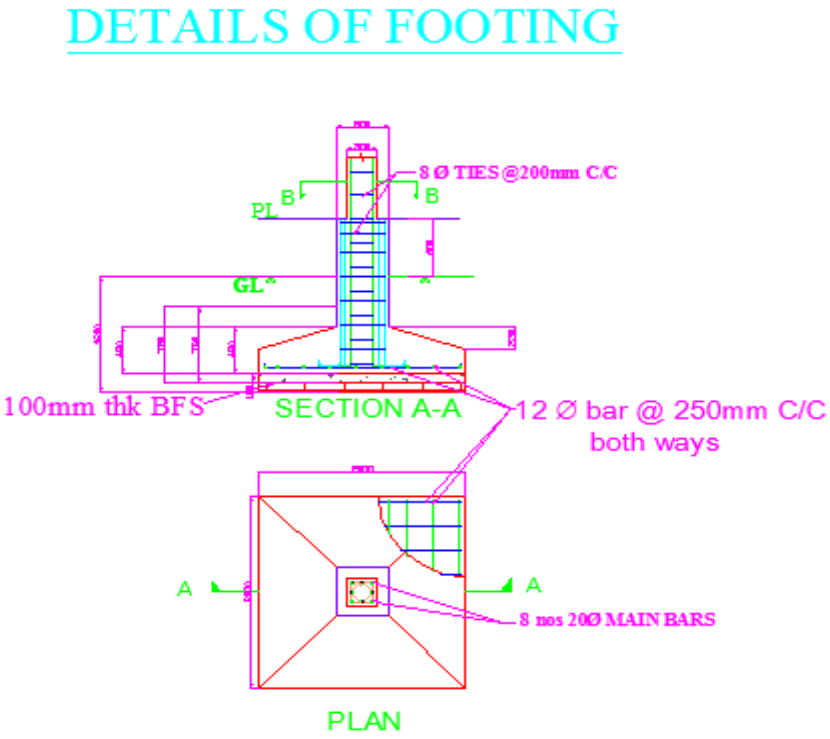

Fig 8 Detailing for footing

2.5 OTHER NECESSARY DRAWINGS

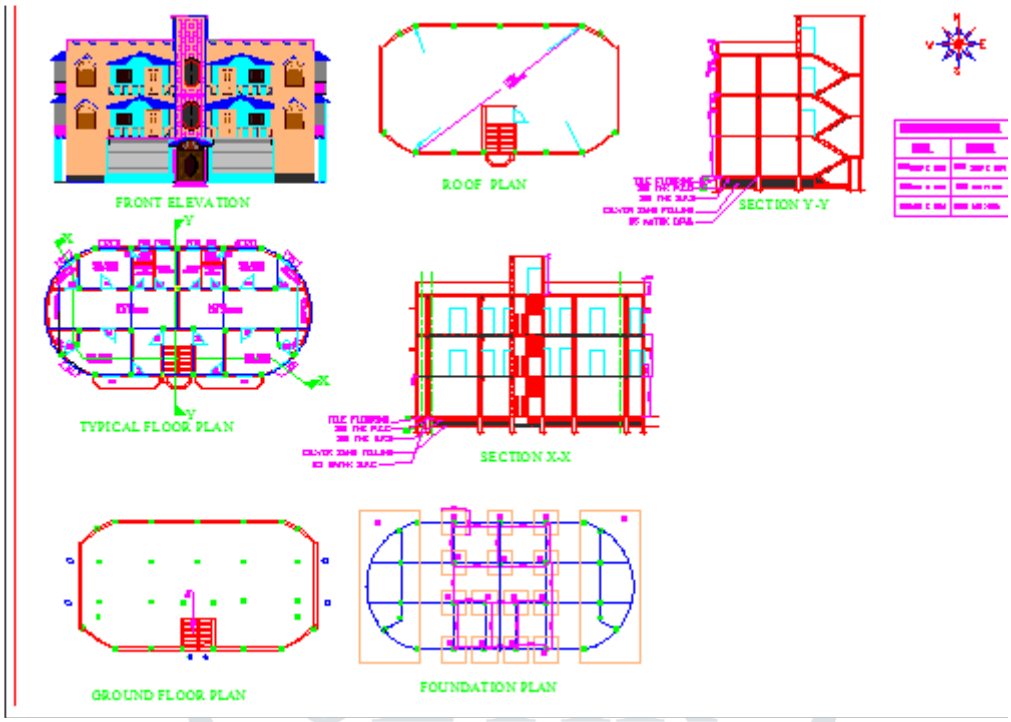

Fig -9: Architectural drawing sheet

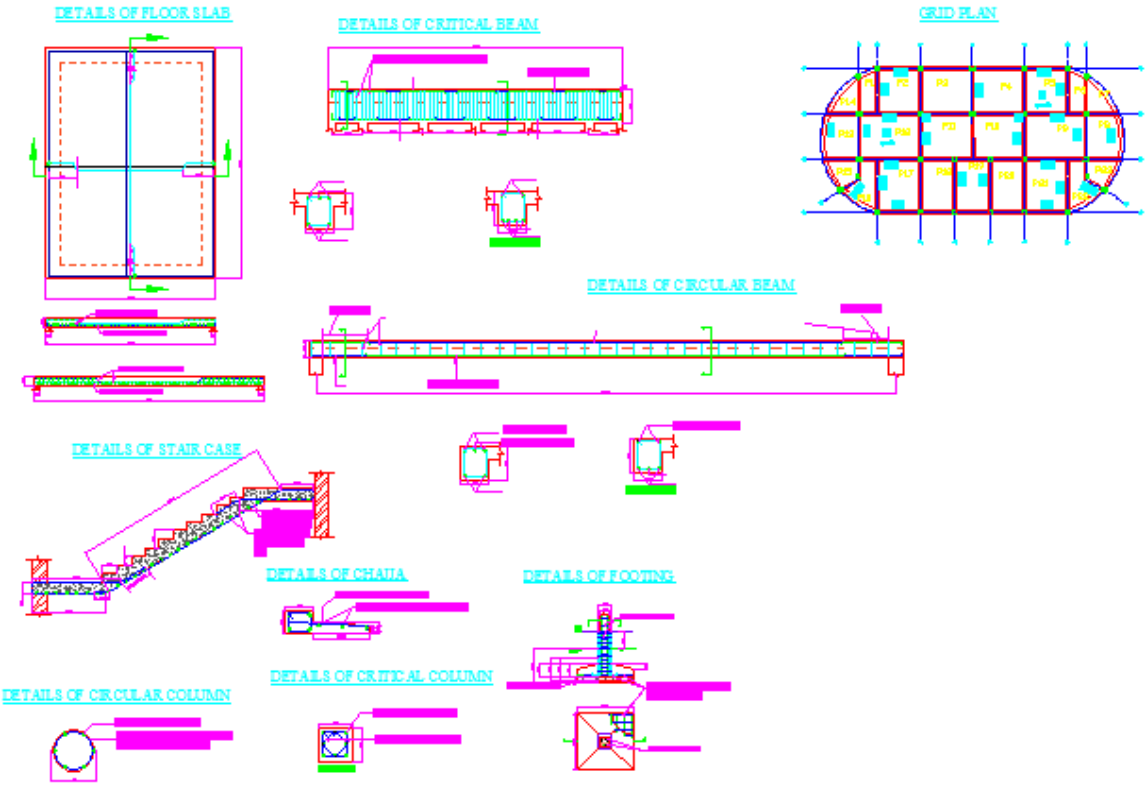

Fig -10: Structural drawing sheet

Fig -11: Layout plan

2.6 ABSTRACT OF ESTIMATES AND RATE ANALYSIS

Table.5 Abstract and rate analysis

Item No	Quantities	Total Amount
Concrete	296 cuM	Rs. 1042861/-
Steel	24M	Rs. 1206909/-

3.0 CONCLUSION

While examining and executing our venture "Planning, Designing and Estimation of G+2 private condo Building" one will almost certainly get familiar with the best possible use of all "Designing Subject" contemplated till now along with this one will likewise have the capacity to become familiar with the successful utilization of IS: 456-2000, IS: 875(part-1), SP: 16, SP: 34, Building bye laws, PWD plan for different building materials, with this undertaking. We have taken in the different parts of planning a building, we had the capacity to see how to find the position and fix the standard element of different segment portions of a building keeping the building bye laws of area in region flawless, use of AUTO-CAD additionally the relative analysis is finished by STAAD Pro.

We have taken in the design of different structure portions of a building utilizing limit state method of design and following the best possible determinations required from IS:456, IS:875, SP:16, SP:34. We were additionally ready to get acquainted with the standard elements of above things received in real field practice.

We had the capacity to get familiar with the technique of assessing the complete consumption of any building task by ascertaining nature of individual work done and singular building material utilized and there by applying the PWD planned cost.

REFERENCES

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6 Pabba Mounika, Maroju Navya and Syed Viqar Malik. "Design of Residential Building and Analysis with STAAD Pro." International Journal for Scientific Research and Development 3.11 (2015): 33-39.

7 SP:34

8 SP:16

9 Revised rate schedule of PWD of building works.