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STABILITY CERTIFICATE

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

1. The detailed engineering and structure design of the proposed buildings comprising of Ground Floor, First Floor and Second Floor,(Blocks 1-23) and Amenities Block with Ground Floor and First Floor Building at SF No. 1074/1A2, 2A1, 2A2C, 2A2D, 2B1A & 2B3A, Kalapatti Village, Coimbatore North Taluk, Coimbatore District has been done by me based on the report of geotechnical investigation (soil test) done by GeoCare Engineering Consultancy Report No. 092432 Dated: 30.10.2024 and considering the functional requirement of the building.

2. It is certified that among other factors, the proposed building has been designed to resist earthquake. I have checked various parameters and found that the proposed building would be safe.

3. I further certify that:
   i. The minimum grade of concrete is M20
   ii. The design and analysis have been done using the code of practice for plain and reinforced concrete as per IS 456(2000) and SP 16 (1980), design loads as per IS Codes No. 875 – 1987 Part-1 to 5 and design of earthquake resistant structure as per IS Code No.1893(2016)

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

Stamp and Signature

Er. S. PRATHABAN, M.E.,Structural
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92A/41A,Bharathi Nagar,S.I.H.S. Colony,
Civil Aerodrome Post,Coimbatore-641 014.
Mobile: 99440 30620.

Encl.: Structural Design Calculation

DATE	12.04.2025	M/S GARNET VILLA
REV NO	00	

DESIGN BASIS

REPORT ON

GARNET VILLA

THE PROPOSED CONSTRUCTION OF GROUP HOUSING DEVELOPMENT AT S.F.No: 1074/1A2, 2A1, 2A2C, 2A2D, 2B1A & 2B3A, KALAPATTI VILLAGE, COIMBATORE NORTH TALUK, EAST ZONE, COIMBATORE CORPORATION

1. SCOPE

This specification covers the requirement for:

a) Analysis and design of 3D frame of M/S GARNET VILLA
b) Detailing of the structural members.

2. GENERAL

It is proposed to construct the residential building for M/S GARNET VILLA. The column is checked for Dead, live loads & Seismic. The reactions for the footing design is taken from the frame analysis that has been done by creating a geometrical model in the software.

All design calculations are carried out in SI system.

All the levels and dimensions indicated on the drawings are in Meters.

3. STANDARDS AND CODES

All the designs are in accordance with the latest editions of standards and code of practice mentioned below.

IS 456 (2000)	Plain and Reinforced Concrete - Code of Practice [CED 2: Cement and Concrete]
SP 16 (1980)	Design Aids for Reinforced Concrete to IS 456:1980 IS Code Book (Indian Standards)
IS 1893 (2016)	Recommendation for Earthquake Resistant Design of Structures (Indian Standards)

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4. LOADS

Loads and load combinations shall be generally as per IS 875 Part 1 – 5 unless otherwise specified.

4. a. DEAD LOADS

Dead loads shall be taken as per unit weight given in IS 875:1987

(Part 1). Unit weight of reinforced cement concrete is 25 kN/m^3

4. b. LIVE LOADS

Live loads shall be taken as suggested in IS 875:1987 (Part 2).

Live loads is considered as 2 kN/m^2

4 c. EARTHQUAKE LOADS

Earthquake loads shall be taken as suggested in

IS 1893:2016

5. LOAD COMBINATIONS

The load combinations producing the most critical conditions on the 3D frames are taken into account.

The load combinations indicated in IS 875:1987 (Part 5) are adopted for the design of the 3D framed structure.

The load combinations with appropriate load factor are given

below. Working stress

1. DL + 1.0 LL
2. DL + 1.0 LL + 1.0EQ X+
3. DL + 1.0 LL + 1.0EQ X-
4. DL + 1.0 LL + 1.0EQ Z+
5. DL + 1.0 LL + 1.0EQ Z-
6. 1.5 DL + 1.5 LL
7. 1.2 DL + 1.2 LL + 1.2EQ X+
8. 1.2 DL + 1.2 LL + 1.2EQ X-
9. 1.2 DL + 1.2 LL + 1.2EQ Z+
10. 1.2 DL + 1.2 LL + 1.2EQ Z-
11. 1.5 DL + 1.5EQ X+
12. 1.5 DL + 1.5EQ X-
13. 1.5 DL + 1.5EQ Z+
14. 1.5 DL + 1.5EQ Z-

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6. METHOD OF ANALYSIS

The 3D framed structure shall be analyzed and designed using computer program STAAD.Pro V8i or any other equivalent approved software. If required it shall be analyzed manually too.

7. METHOD OF DESIGN

The method adopted for the design of the 3D frame was as per IS 456 Limit state Method. The deflection check for the frame members was carried out as per IS 456 code book.

8. MATERIAL SPECIFICATIONS

Fe= 500 N/mm^2, Fck= 20 N/mm^2

9. DESIGN PHILOSOPHY

The proposed Residential building is formed by RCC Frame members. The structure is supported on the concrete pedestal. The structure was modeled as 3D framed structure based on the Staad.pro analysis report. All the load and load combinations confirming to latest Indian standard code of practice was used.

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DATE	12.04.2025	M/S GARNET VILLA
REV NO	00	

STAAD EDITOR

```
STAAD SPACE
START JOB INFORMATION
ENGINEER DATE
END JOB INFORMATION
INPUT WIDTH 79
UNIT METER KN
JOINT COORDINATES
3 7.17 0 0; 4 12.28 0 0; 5 0 0 3.28; 6 3.55 0 3.28; 8 12.28 0 3.28;
10 0 0 8.69; 11 3.55 0 8.69; 13 12.28 0 8.69; 14 7.13 0 8.69; 15 3.55 0 11.74;
16 7.13 0 11.74; 17 3.55 0 13.8; 18 12.28 0 13.8; 19 9.54 0 13.8;
20 -2.13 0 12.29; 21 0 3 0; 22 2.67 3 0; 23 7.17 3 0; 24 12.28 3 0;
25 0 3 3.28; 26 3.55 3 3.28; 27 12.28 3 3.28; 29 0 3 8.69; 30 3.55 3 8.69;
31 12.28 3 8.69; 32 7.13 3 8.69; 33 3.55 3 11.74; 34 7.13 3 11.74;
35 3.55 3 13.8; 36 12.28 3 13.8; 37 9.54 3 13.8; 38 -2.13 3 12.29;
39 2.67 3 3.28; 40 7.17 3 3.28; 41 2.06 3 8.69; 42 2.06 3 3.28; 43 8.69 3 8.69;
44 8.69 3 3.28; 45 8.69 3 6.76; 46 12.28 3 6.76; 47 7.13 3 13.8;
49 -2.13 3 8.69; 51 -2.13 3 13.8; 52 0 4.8 0; 53 2.67 4.8 0; 54 7.17 4.8 0;
55 12.28 4.8 0; 56 0 4.8 3.28; 57 3.55 4.8 3.28; 58 12.28 4.8 3.28;
60 0 4.8 8.69; 61 3.55 4.8 8.69; 62 12.28 4.8 8.69; 63 7.13 4.8 8.69;
64 3.55 4.8 11.74; 65 7.13 4.8 11.74; 66 3.55 4.8 13.8; 67 12.28 4.8 13.8;
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72 7.17 8.15 0; 73 12.28 8.15 0; 74 0 8.15 3.28; 75 3.55 8.15 3.28;
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104 8.7 8.15 8.69; 105 8.7 8.15 3.28; 106 8.7 8.15 6.76; 107 12.28 8.15 6.76;
108 -2.13 8.15 8.69; 109 -2.13 8.15 13.8; 110 0 11.5 0; 112 7.17 11.5 0;
113 12.28 11.5 0; 114 0 11.5 3.28; 115 3.55 11.5 3.28; 116 12.28 11.5 3.28;
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125 12.28 11.5 13.8; 126 9.54 11.5 13.8; 127 -2.13 11.5 12.29;
131 8.7 11.5 8.69; 135 8.7 11.5 3.28; 138 -2.13 11.5 13.8; 139 7.13 11.5 12.44;
140 12.28 11.5 12.44; 141 9.08 11.5 13.8; 142 9.08 11.5 12.44;
143 9.54 11.5 12.44; 144 12.28 12.09 13.8; 145 9.54 12.09 13.8;
146 12.28 12.09 12.44; 147 9.08 12.09 12.44; 148 12.28 14 13.8;
149 9.54 14 13.8; 150 12.28 14 12.44; 151 9.08 14 12.44; 152 2.06 4.8 3.28;
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179 -2.13 4.8 2.25; 180 -2.13 8.15 2.25; 181 -2.13 8.15 0; 182 4.47 0 0;
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188 0.89 3 0; 189 0.89 4.8 0; 190 0.89 8.15 0; 191 0.89 11.5 0;
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192 3.55 14 8.69; 193 7.13 14 8.69; 194 3.55 14 11.74; 195 7.13 14 11.74;
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MEMBER INCIDENCES
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257 52 189; 258 53 184; 259 54 55; 260 56 152; 261 57 153; 263 60 154;
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368 206 105; 369 159 206; 370 207 135; 371 206 207;
START GROUP DEFINITION
FLOOR

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_GRF_1W_5" 139 142 149 165 167 304 TO 306
_GRF_2W_5" 136 TO 140 142 TO 148 150 TO 152 154 TO 164 166 TO 175 306 331 -
339 360 368
_GRF_2W_6" 140 143 144 157 159 163 TO 165 168 169 304 368
_GFR_SUNKEN 151 166 TO 171 304 TO 306
_GFR_CB1 140 143 144 157 159 163 TO 165 168 169 304 368
_TRC_1W_1 196 198 203 TO 205 208 210 212 224 234 236 TO 240 333 351 352 370
_TRC_2W_2 194 197 198 201 TO 203 206 211 TO 213 223 224 226 227 230 TO 236 -
238 240 341 352 355 356 358 TO 360 370
_OHT_BOTTOM 245 247 248 362 365
_OHT_TOP 253 255 256 363 364
_SITOUT 148 149 172 323 TO 326
_HR 347 TO 350
END GROUP DEFINITION
DEFINE MATERIAL START
ISOTROPIC CONCRETE
E 2.17185e+07
POISSON 0.17
DENSITY 23.5616
ALPHA 1e-05
DAMP 0.05
TYPE CONCRETE
STRENGTH FCU 27579
END DEFINE MATERIAL
CONSTANTS
BETA 90 MEMB 4 5 7 9 TO 16 18 64 65 67 69 TO 76 78 82 83 85 87 TO 94 96 179 -
180 182 185 TO 191 193 241 243 249 251 315 TO 317 319 321 322 343 TO 346 -
353
MATERIAL CONCRETE ALL
MEMBER PROPERTY AMERICAN
3 5 7 9 13 TO 15 17 63 65 67 69 73 TO 75 77 81 83 85 87 91 TO 93 95 178 180 -
182 188 TO 190 192 242 243 250 TO 252 328 330 332 334 336 338 340 342 345 -
346 353 361 PRIS YD 0.3 ZD 0.23
4 6 10 11 16 18 64 66 70 71 76 78 82 84 88 89 94 96 179 181 185 186 191 193 -
241 249 343 PRIS YD 0.38 ZD 0.23
12 72 90 187 344 366 367 369 371 PRIS YD 0.45 ZD 0.23
19 TO 21 28 37 TO 39 41 43 52 148 150 158 160 194 196 197 245 247 248 253 -
255 256 266 268 269 275 278 280 289 291 307 308 327 333 335 341 351 352 362 -
363 TO 365 PRIS YD 0.3 ZD 0.23
22 23 25 TO 27 29 TO 35 40 42 44 TO 51 53 TO 55 57 58 60 136 TO 138 -
145 TO 147 154 TO 156 161 162 171 201 203 TO 206 208 211 TO 213 227 233 234 -
236 TO 240 257 TO 260 263 TO 265 267 270 TO 274 276 277 281 TO 284 -
286 TO 288 290 292 TO 295 306 310 312 TO 314 318 320 323 329 331 337 339 -
347 TO 350 355 358 PRIS YD 0.38 ZD 0.23
139 142 143 149 151 152 157 163 TO 165 170 173 TO 175 198 202 210 223 224
226 230 TO 232 235 261 279 285 305 324 TO 326 356 359 360 -
370 PRIS YD 0.45 ZD 0.23
MEMBER PROPERTY AMERICAN
140 144 159 166 TO 169 304 368 PRIS YD 0.53 ZD 0.23
MEMBER PROPERTY AMERICAN

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315 TO 317 319 321 322 PRIS YD 0.3
MEMBER PROPERTY AMERICAN
172 PRIS YD 0.15 ZD 0.23
SUPPORTS
3 TO 6 8 10 11 13 TO 20 174 177 182 187 205 FIXED
MEMBER RELEASE
41 43 46 49 52 54 58 158 160 162 165 168 171 172 174 236 239 278 280 283 286 -
289 291 294 306 358 360 START MZ
46 52 148 158 165 171 206 226 239 240 283 289 304 306 326 352 358 END MZ
243 361 START MX MY
DEFINE IS1893 2016 LOAD
ZONE 0.1 RF 5 I 1.2 SS 2 ST 1 DM 0.05 PX 0.168 PZ 0.112 DT 2
SELFWEIGHT 1
MEMBER WEIGHT
136 TO 140 144 145 147 TO 152 154 TO 157 159 161 162 164 166 TO 175 -
257 TO 261 263 TO 291 304 TO 306 329 331 337 339 368 UNI 12.3
LOAD 1 LOADTYPE Seismic TITLE EQ X+
1893 LOAD X 1
LOAD 2 LOADTYPE Seismic TITLE EQ X-
1893 LOAD X -1
LOAD 3 LOADTYPE Seismic TITLE EQ Z+
1893 LOAD Z 1
LOAD 4 LOADTYPE Seismic TITLE EQ Z-
1893 LOAD Z -1
LOAD 5 LOADTYPE Dead TITLE DL
SELFWEIGHT Y -1
MEMBER LOAD
19 TO 23 25 TO 35 37 TO 55 57 58 60 307 312 314 318 327 335 UNI GY -6
136 TO 140 144 145 147 TO 152 154 TO 157 159 161 162 164 166 TO 175 -
257 TO 261 263 TO 291 304 TO 306 329 331 337 339 368 UNI GY -12.3
201 203 211 213 245 247 248 362 365 UNI GY -11
293 UNI GY -12.3 0 1
194 196 204 TO 206 208 210 212 227 230 TO 233 235 237 333 341 351 352 355 -
358 359 UNI GY -4.2
ONEWAY LOAD
_GRF_1W_5" ONE -4.625 GY
FLOOR LOAD
_GRF_2W_5" FLOAD -4.625 GY
_GRF_2W_6" FLOAD -5.25 GY
_GFR_SUNKEN FLOAD -3.5 GY
_GFR_CB1 FLOAD -2 GY
ONEWAY LOAD
_TRC_1W_1 ONE -4.625 GY
FLOOR LOAD
_TRC_2W_2 FLOAD -4.625 GY
MEMBER LOAD
143 264 266 274 276 UNI GY -7
ONEWAY LOAD
_SITOUT ONE -4.625 GY
FLOOR LOAD

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_HR FLOAD -4.625 GY
MEMBER LOAD
136 TO 138 194 196 323 331 333 339 341 351 UNI GY -5.5
LOAD 6 LOADTYPE Live TITLE LL
ONEWAY LOAD
_GRF_1W_5" ONE -2 GY
FLOOR LOAD
_GRF_2W_5" FLOAD -2 GY
_GRF_2W_6" FLOAD -2 GY
ONEWAY LOAD
_TRC_1W_1 ONE -1.5 GY
FLOOR LOAD
_TRC_2W_2 FLOAD -1.5 GY
MEMBER LOAD
143 264 266 274 276 UNI GY -5
ONEWAY LOAD
_SITOUT ONE -2 GY
_OHT_TOP ONE -1.5 GY
FLOOR LOAD
_HR FLOAD -1.5 GY
ONEWAY LOAD
_OHT_BOTTOM ONE -10 GY
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LOAD COMB 8 1.5DL+1.5LL
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LOAD COMB 9 DL+LL+EQX+
5 1.0 6 1.0 1 1.0
LOAD COMB 10 DL+LL+EQX-
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LOAD COMB 11 DL+LL+EQZ+
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LOAD COMB 12 DL+LL+EQZ-
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LOAD COMB 13 1.5DL+1.5EQ X+
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LOAD COMB 14 1.5DL+1.5EQ X-
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LOAD COMB 16 1.5DL+1.5EQ Z-
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5 1.2 6 1.2 1 1.2
LOAD COMB 18 1.2DL+1.2LL+1.2EQ X-
5 1.2 6 1.2 2 1.2
LOAD COMB 19 1.2DL+1.2LL+1.2EQ Z+
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LOAD COMB 20 1.2DL+1.2LL+1.2EQ Z-
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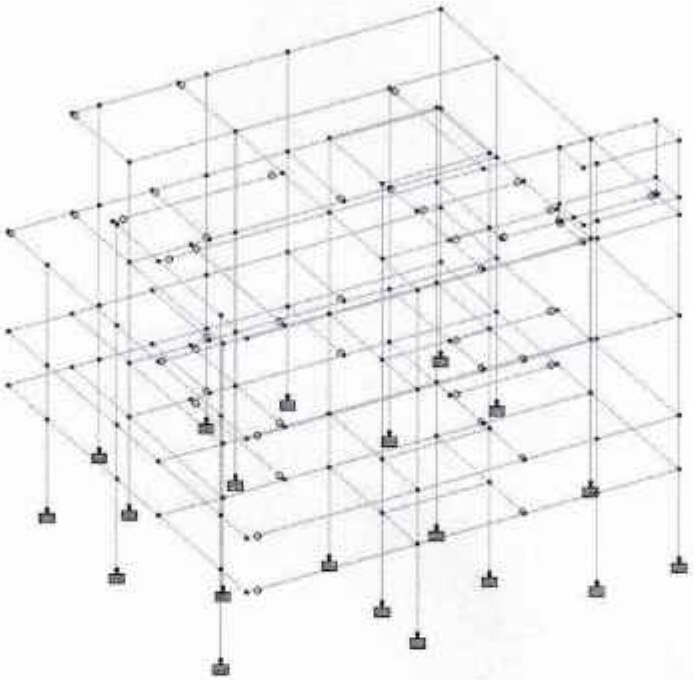
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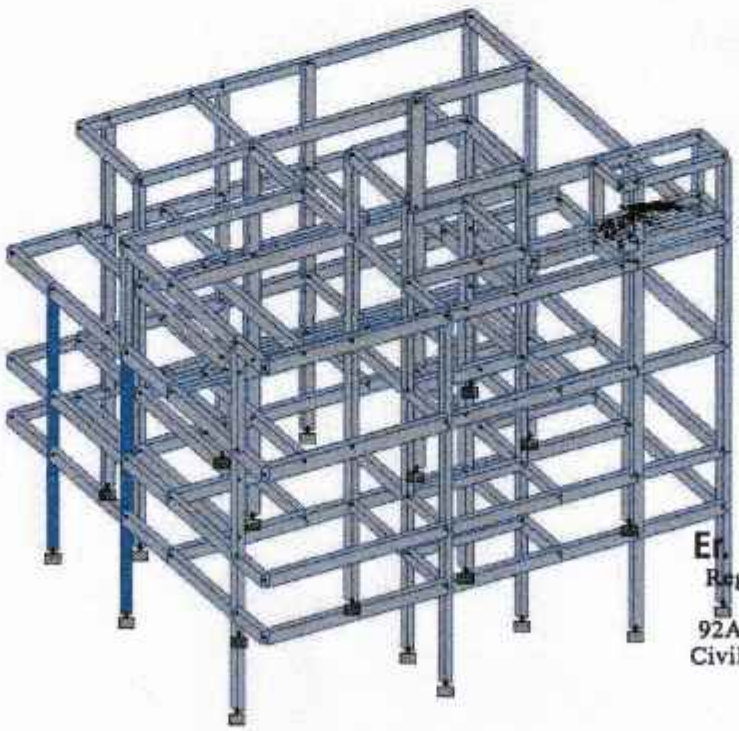
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PERFORM ANALYSIS
START CONCRETE DESIGN
CODE INDIAN
FC 20000 MEMB 3 TO 7 9 TO 18 63 TO 67 69 TO 78 81 TO 85 87 TO 96 178 TO 182 -
185 TO 193 241 TO 243 249 TO 252 315 TO 317 319 321 322 328 330 332 334 336 -
338 340 342 TO 346 353 361 366 367 369 371
FYMAIN 500000 MEMB 3 TO 7 9 TO 18 63 TO 67 69 TO 78 81 TO 85 87 TO 96 178 -
179 TO 182 185 TO 193 241 TO 243 249 TO 252 315 TO 317 319 321 322 328 330 -
332 334 336 338 340 342 TO 346 353 361 366 367 369 371
FYSEC 500000 MEMB 3 TO 7 9 TO 18 63 TO 67 69 TO 78 81 TO 85 87 TO 96 -
178 TO 182 185 TO 193 241 TO 243 249 TO 252 315 TO 317 319 321 322 328 330 -
332 334 336 338 340 342 TO 346 353 361 366 367 369 371
ULY 0.65 MEMB 369 371
ULZ 0.65 MEMB 369 371
DESIGN COLUMN 3 TO 7 9 TO 18 63 TO 67 69 TO 78 81 TO 85 87 TO 96 178 TO 182 -
185 TO 193 241 TO 243 249 TO 252 315 TO 317 319 321 322 328 330 332 334 336 -
338 340 342 TO 346 353 361 366 367 369 371
CONCRETE TAKE
END CONCRETE DESIGN
FINISH
```

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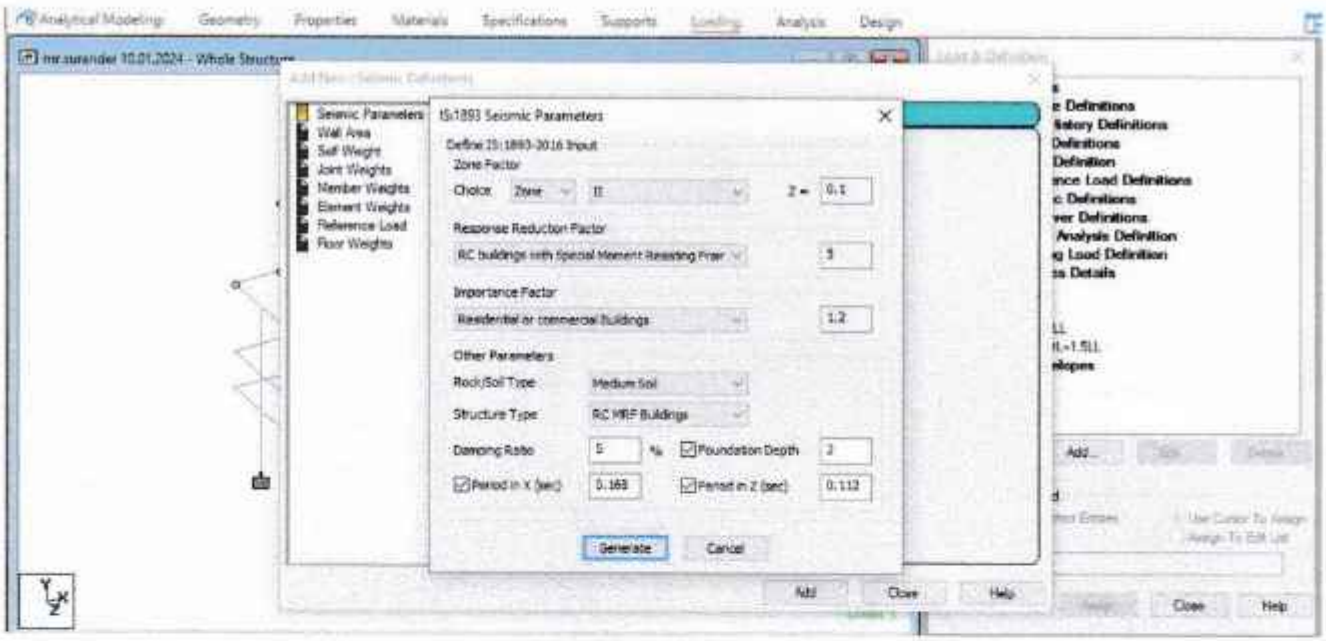
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REV NO	00	

PLAN VIEW OF STAAD MODEL

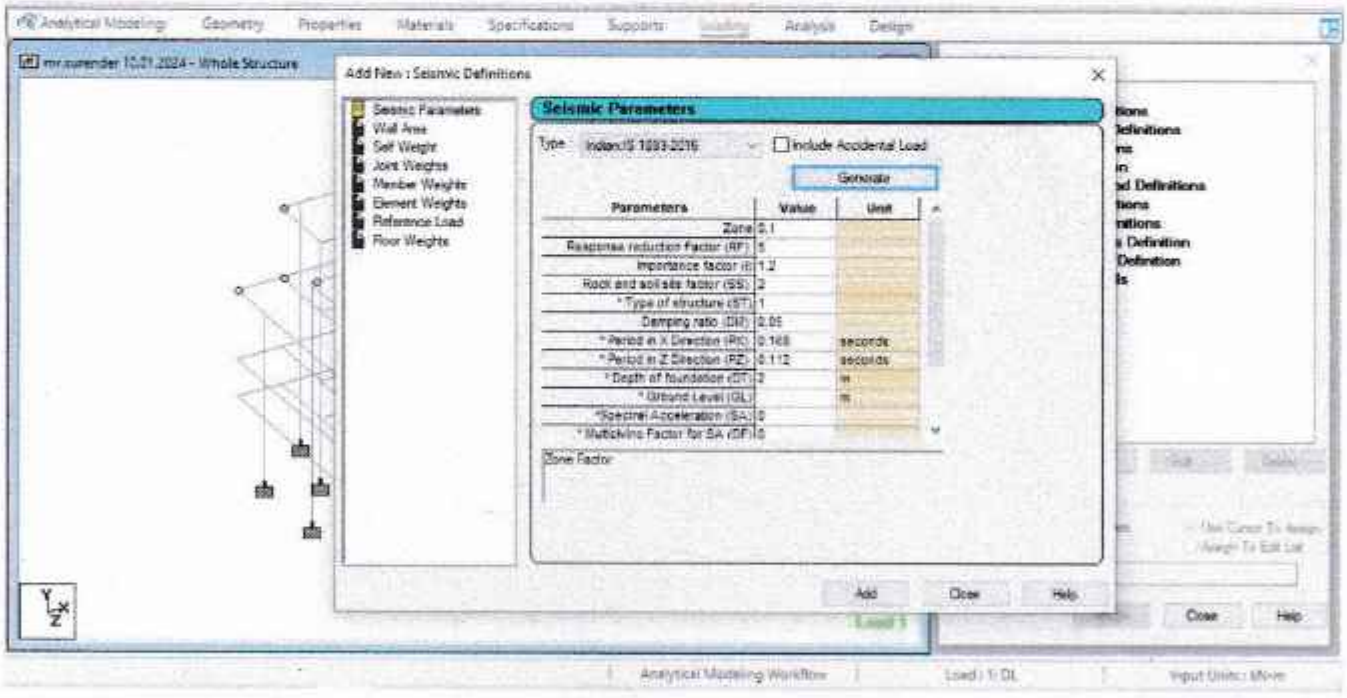




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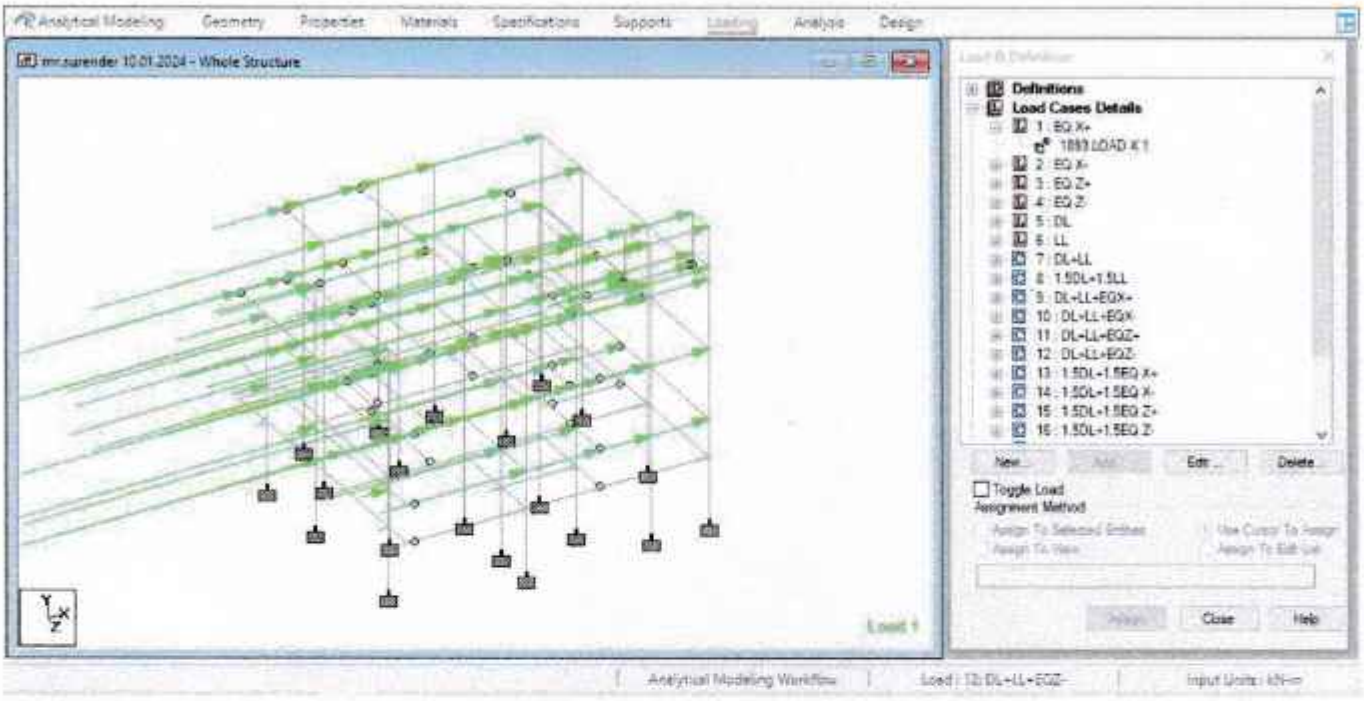
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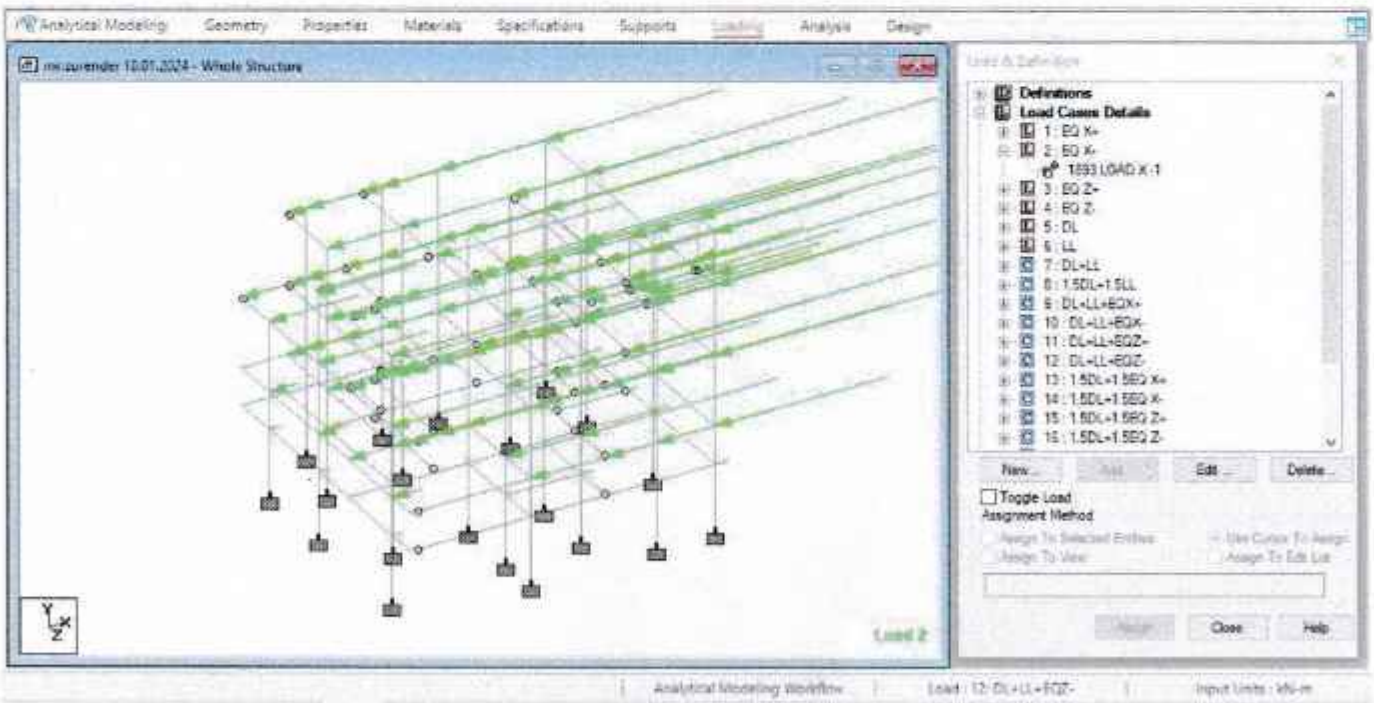
SEISMIC PARAMETERS

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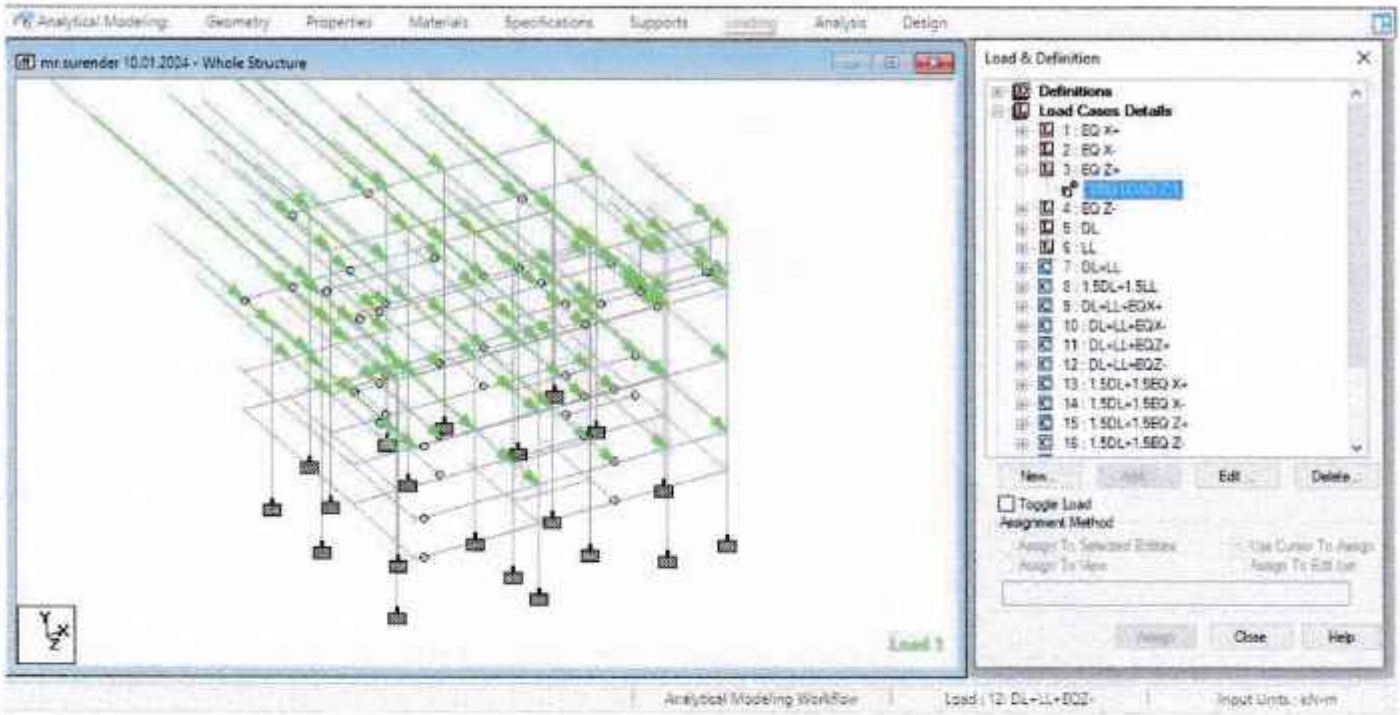


EARTHQUAKE EQ X+

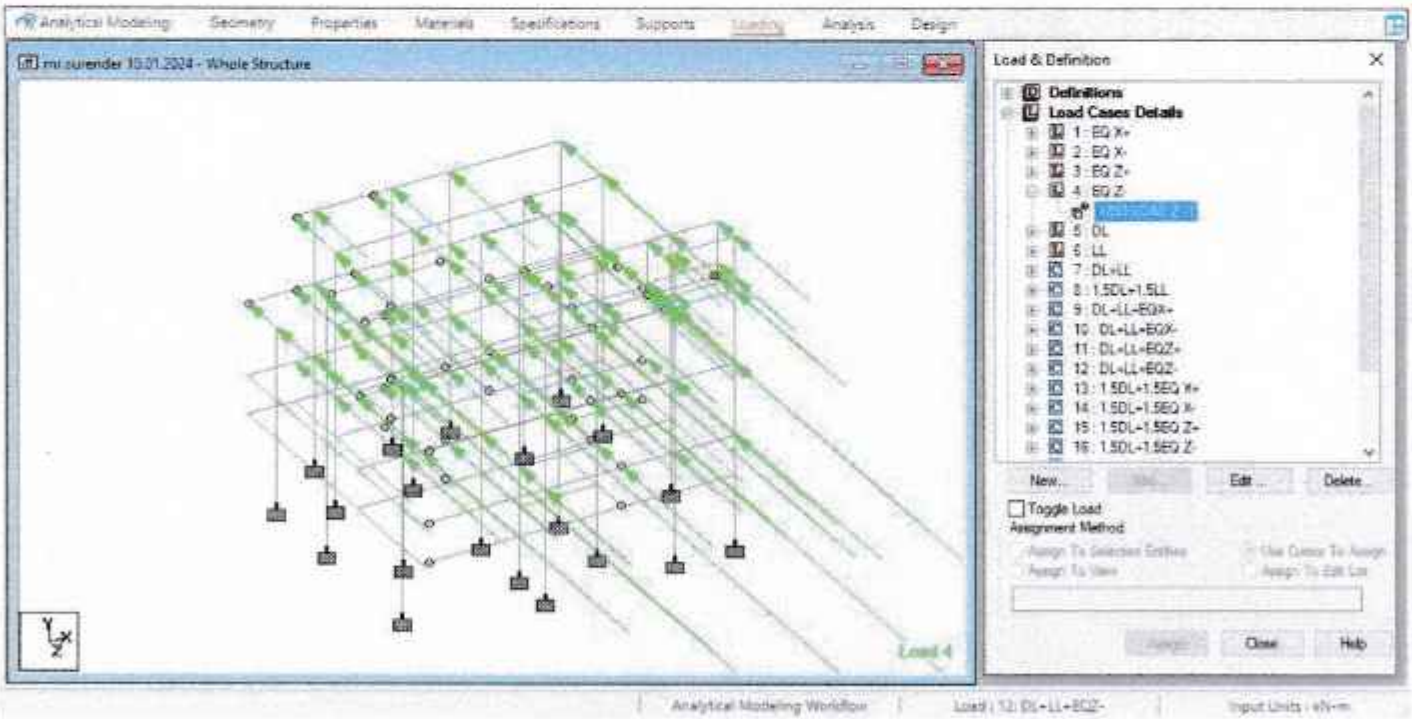


EARTHQUAKE EQ X-

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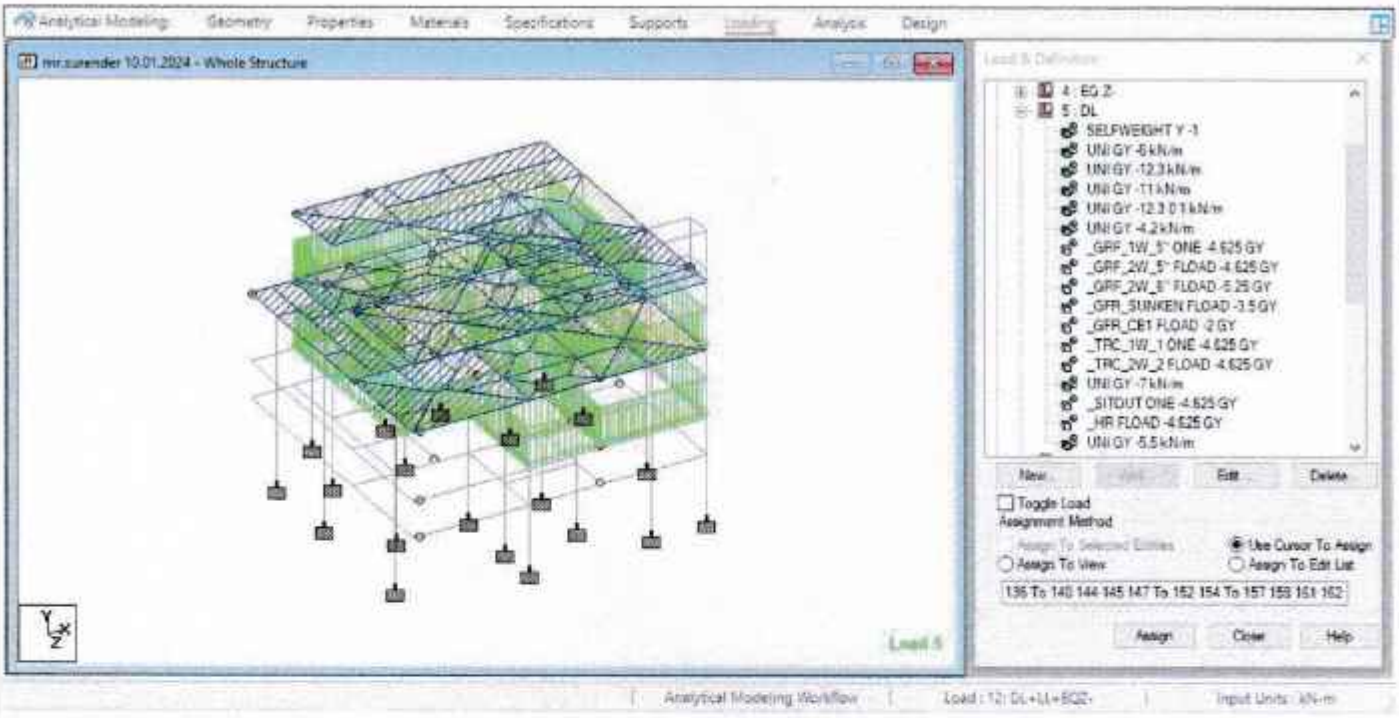


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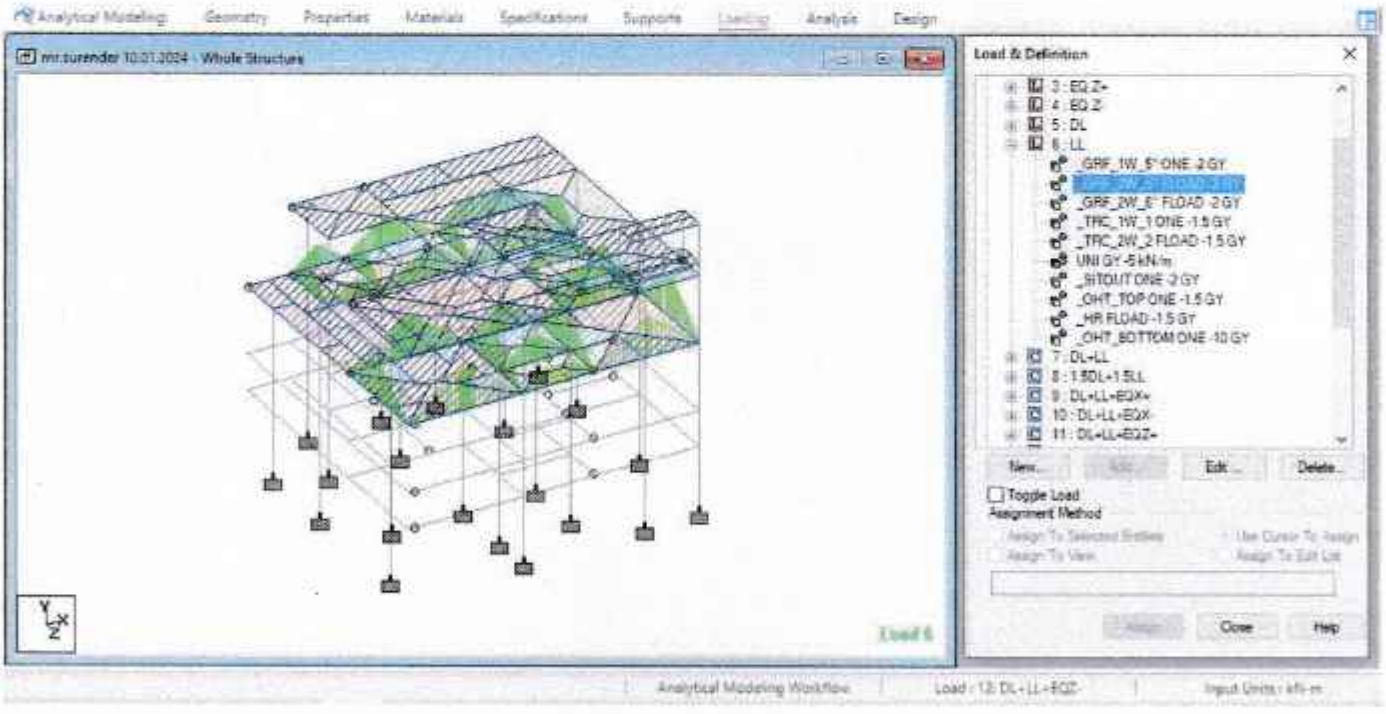


EARTHQUAKE EQ Z-

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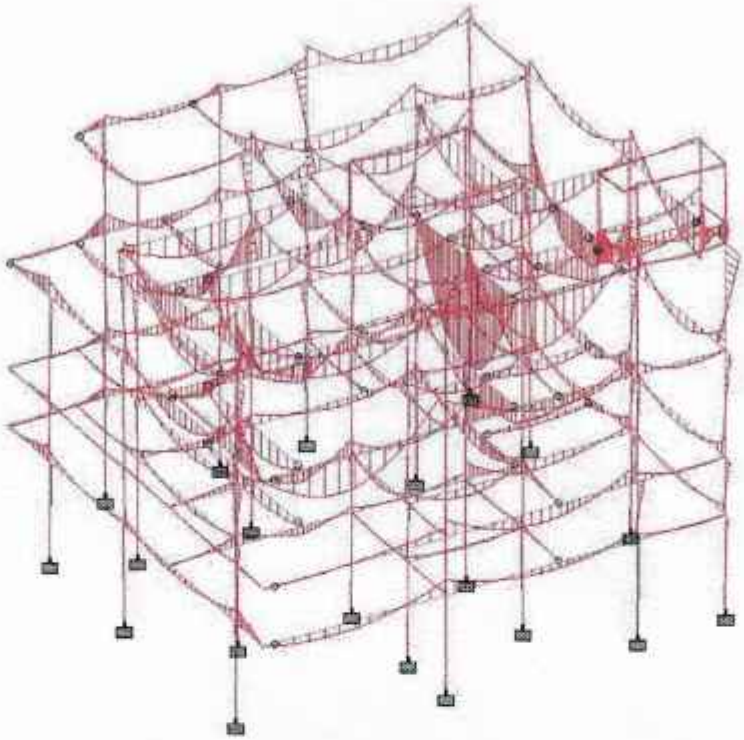


DEAD LOAD

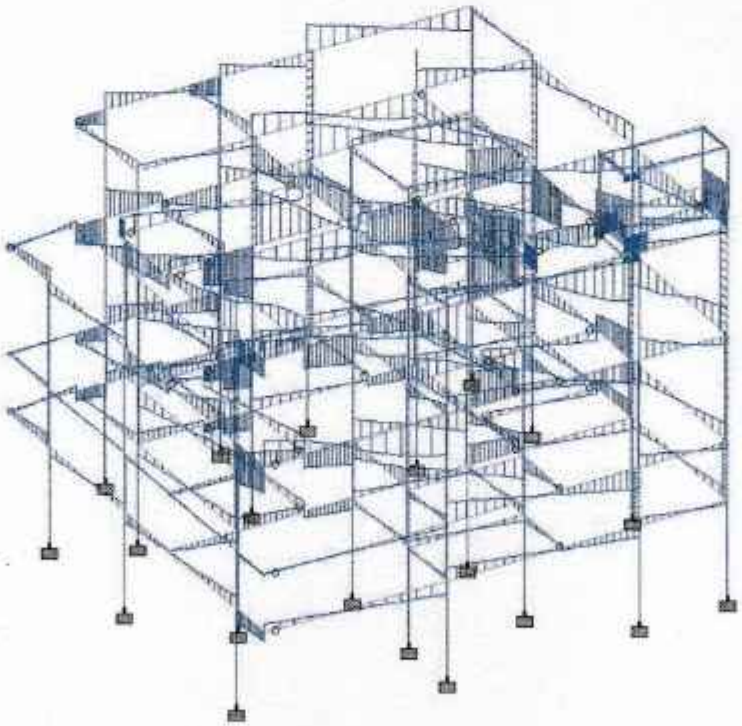


LIVE LOAD

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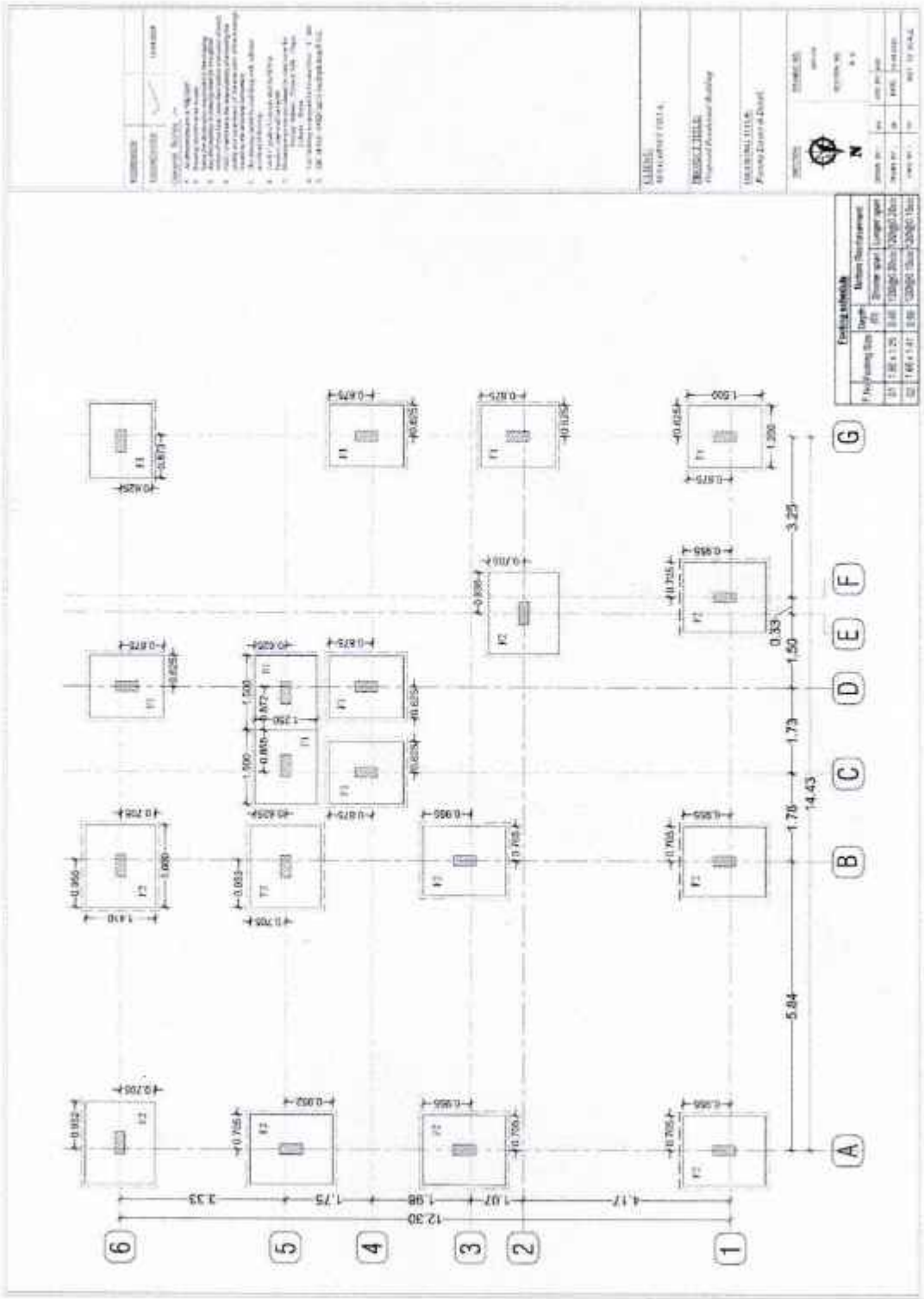
MOMENT DIAGRAM



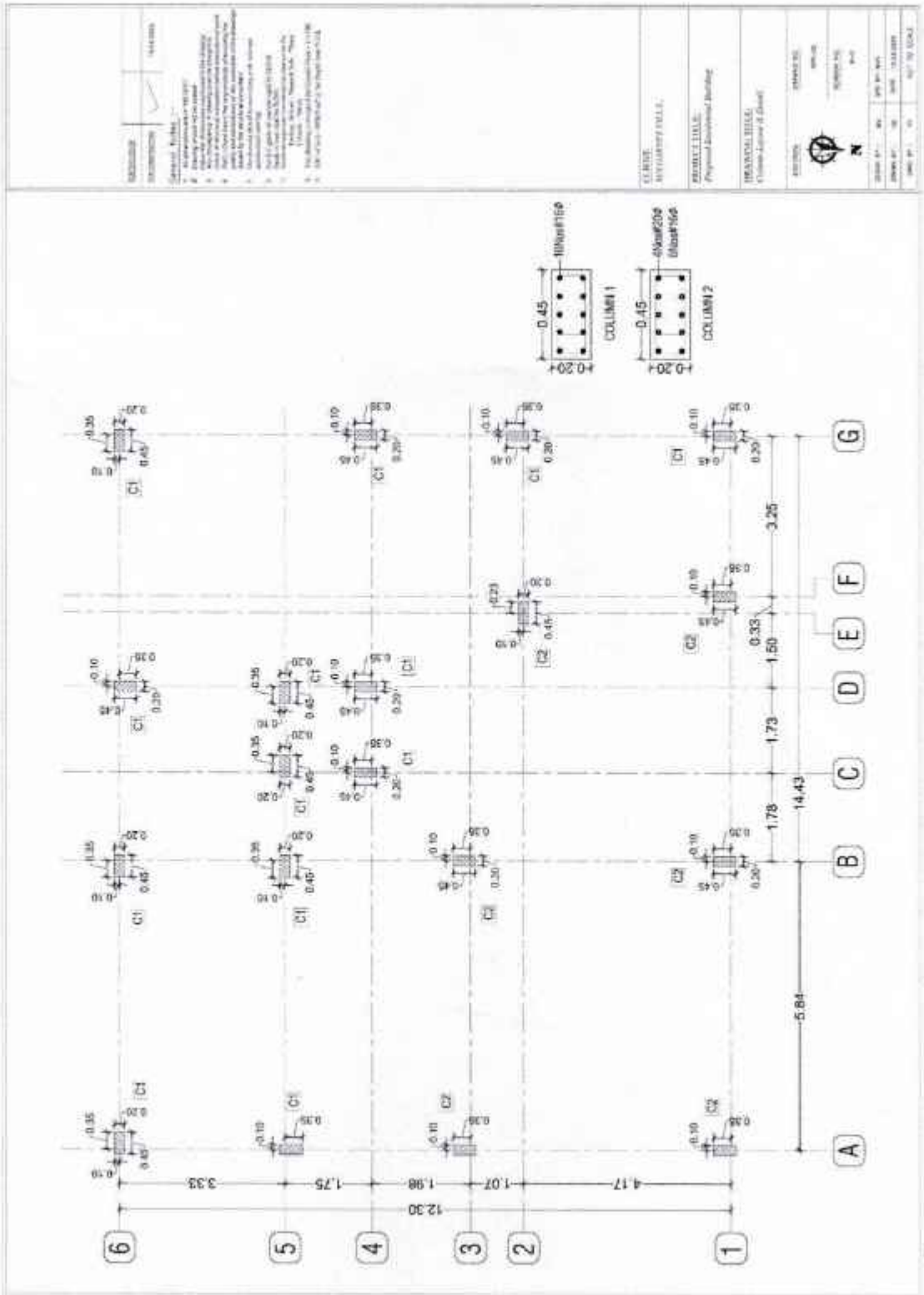
SHEAR FORCE DIADRAM

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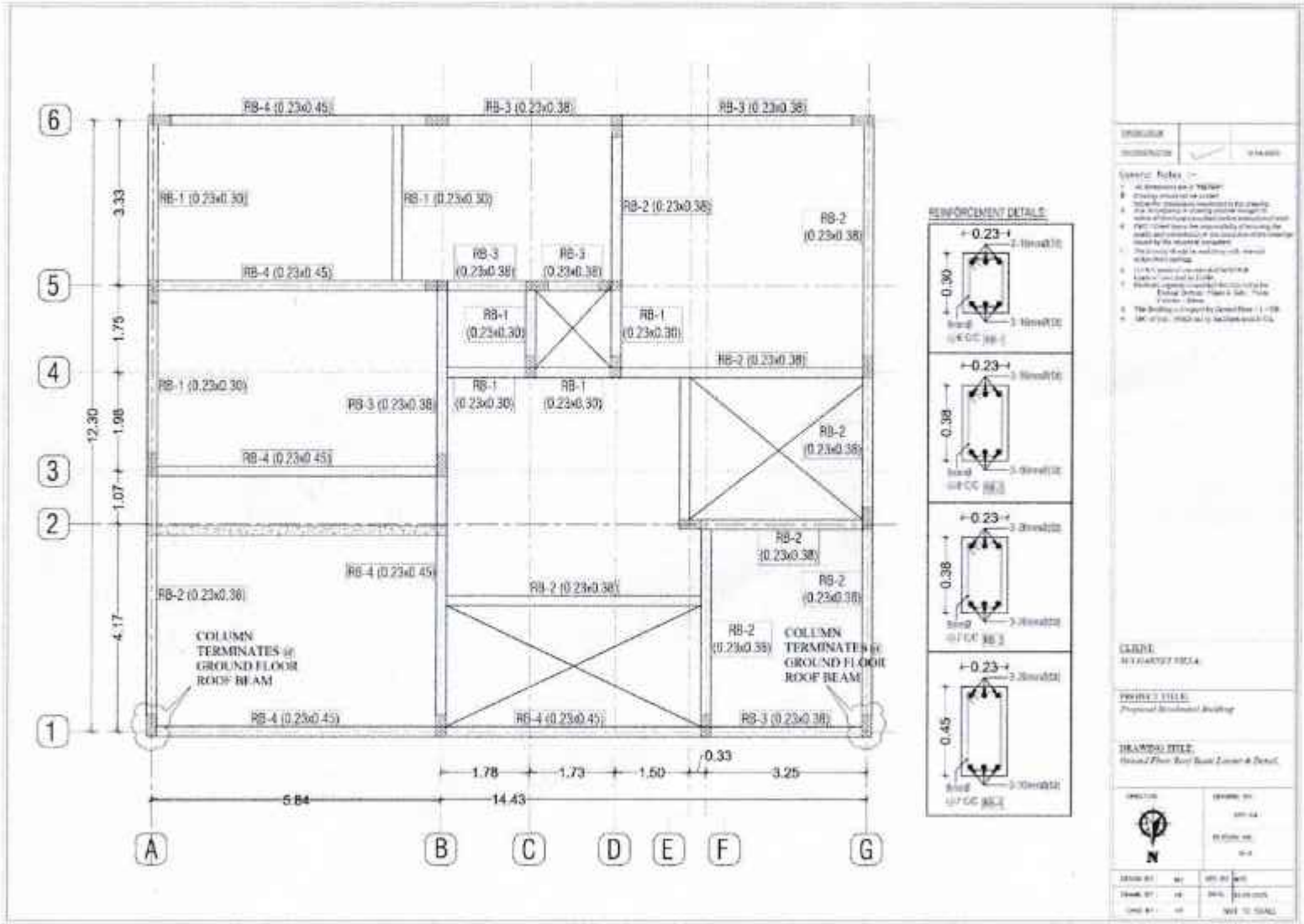


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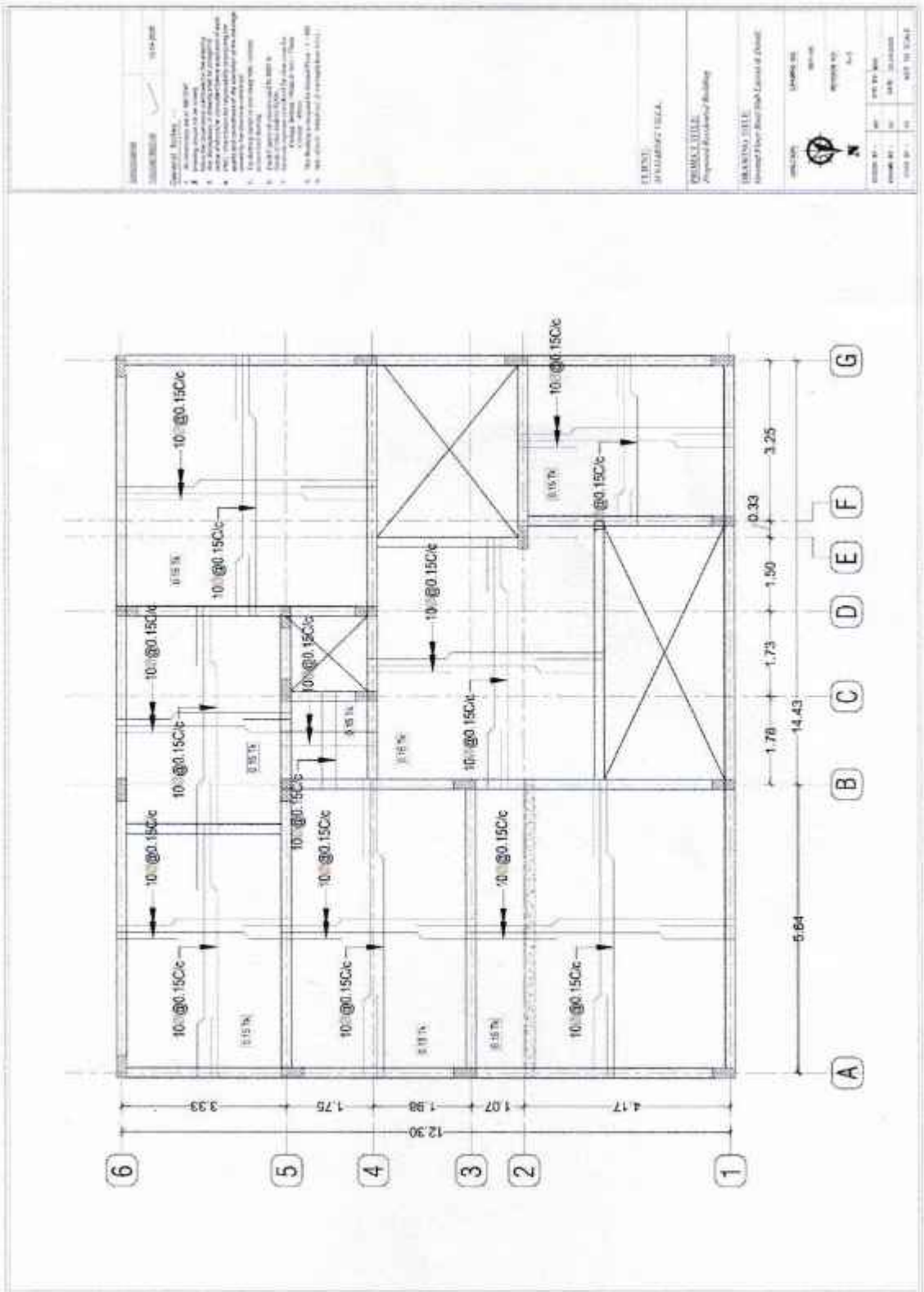


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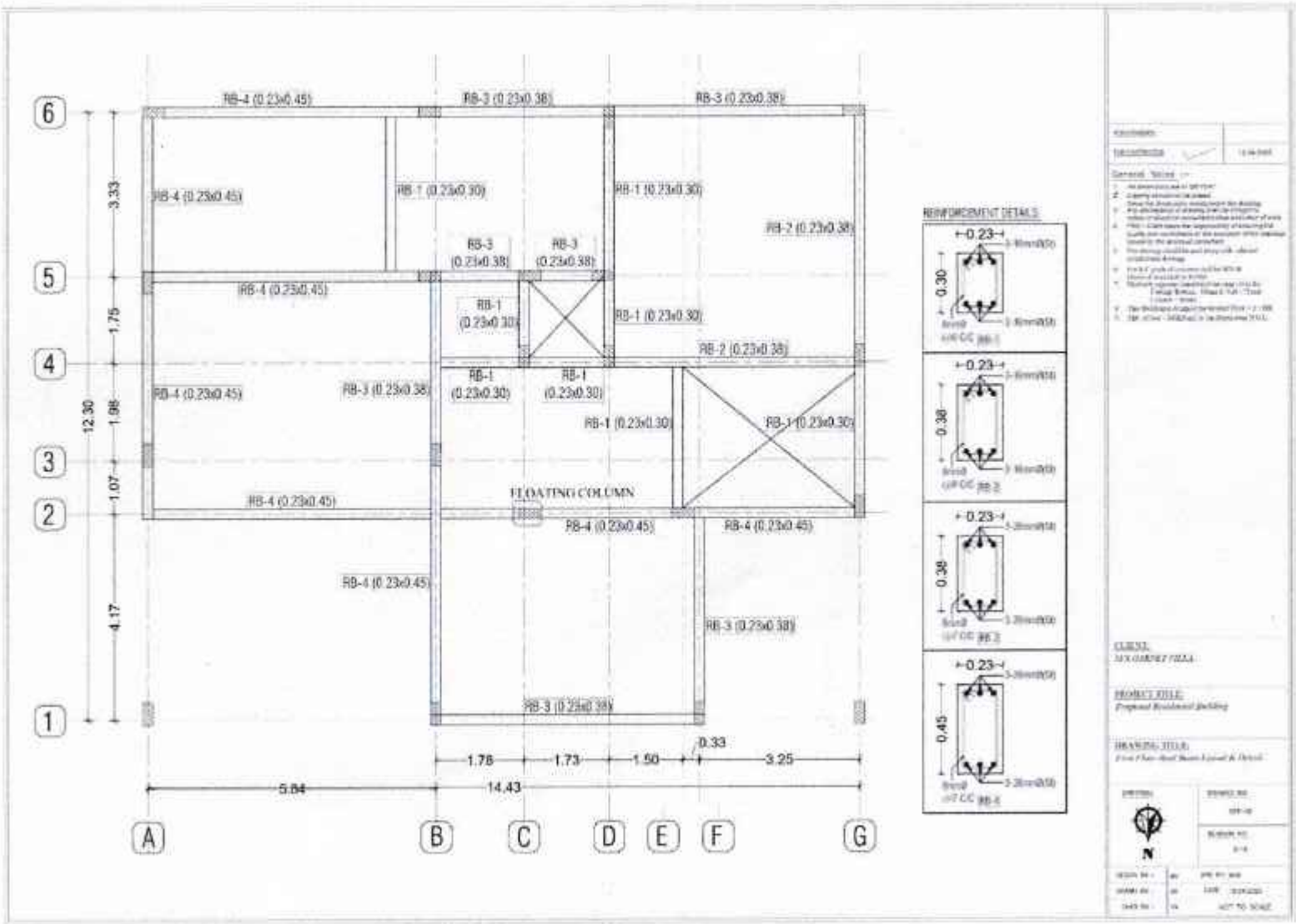
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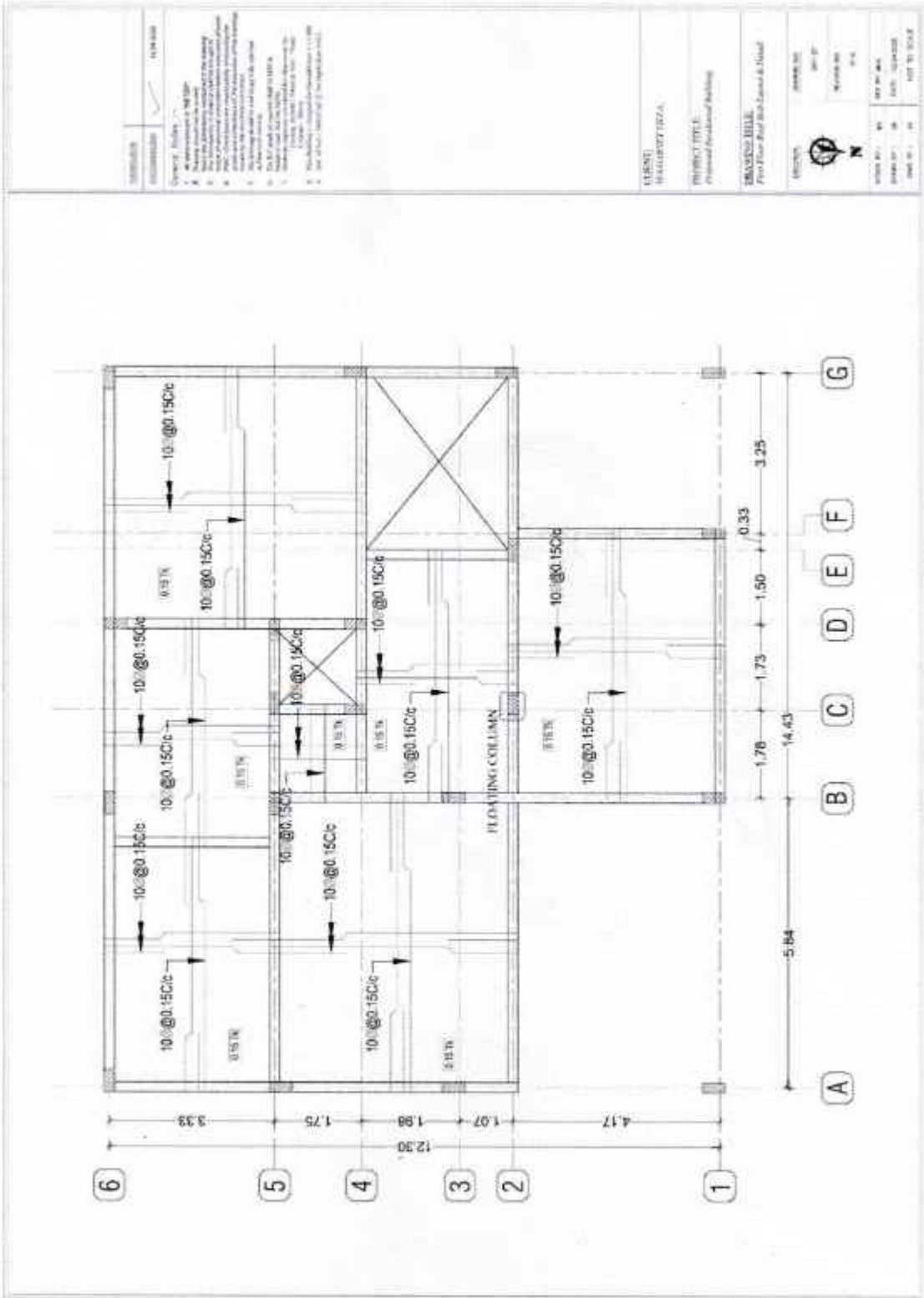
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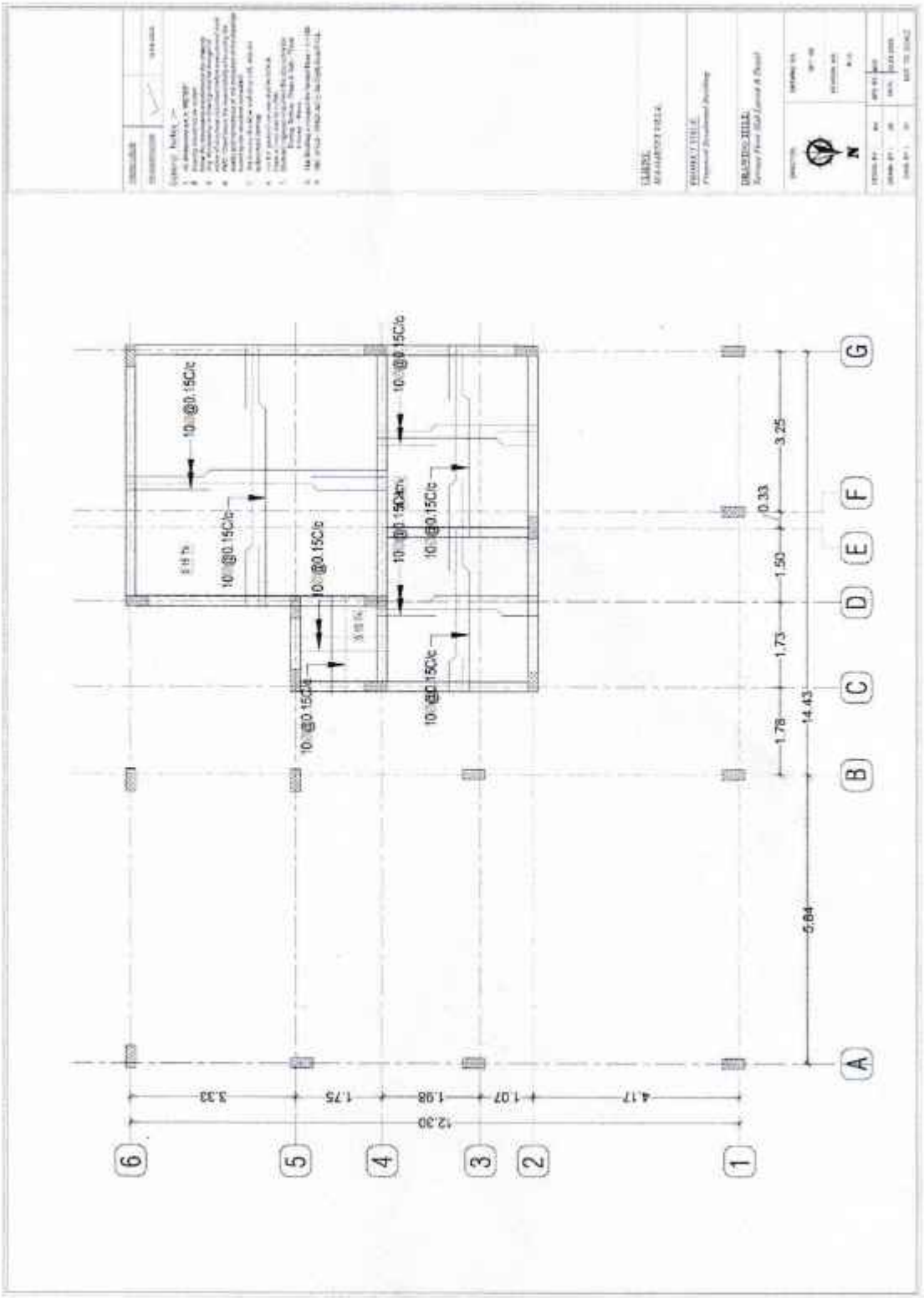


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