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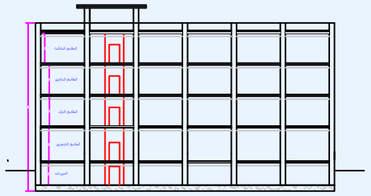
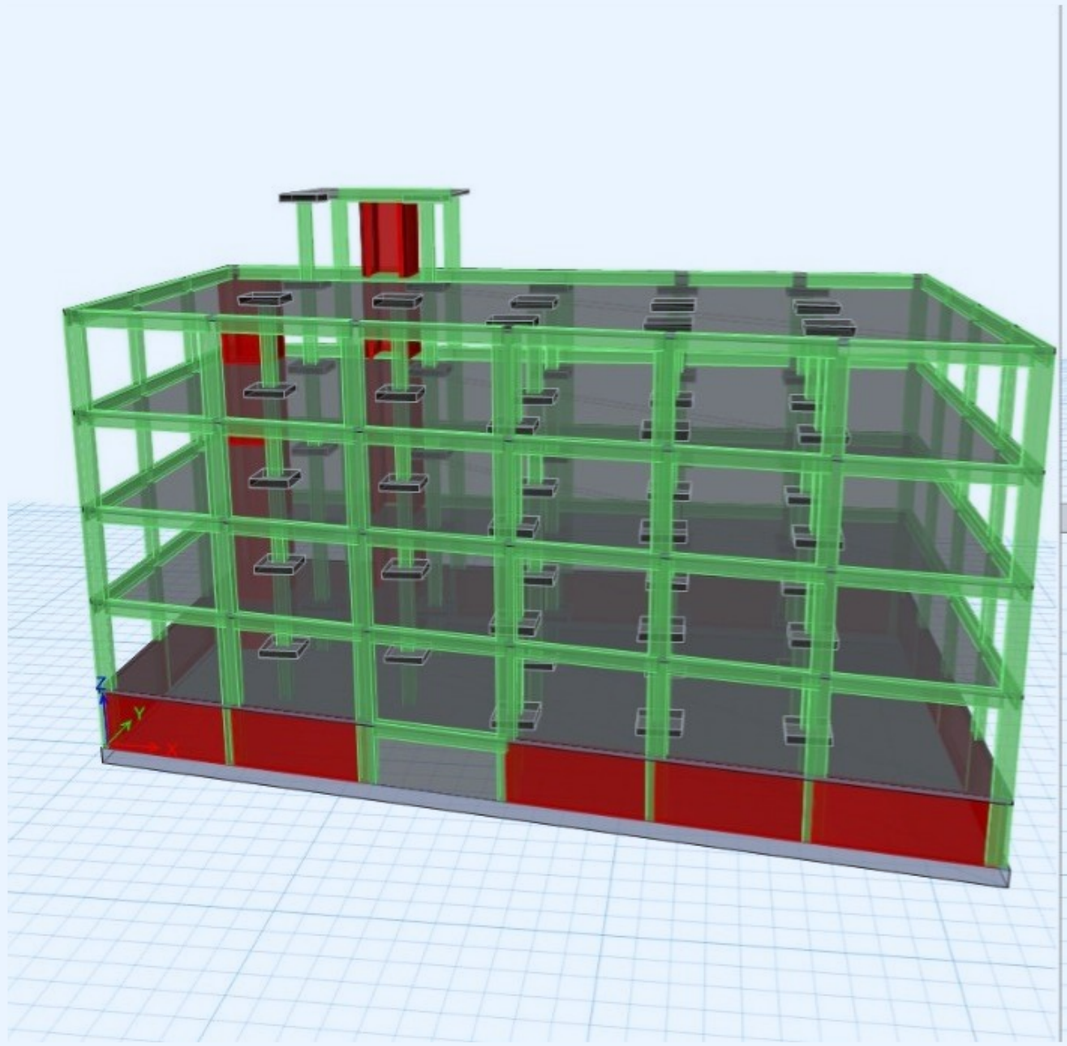
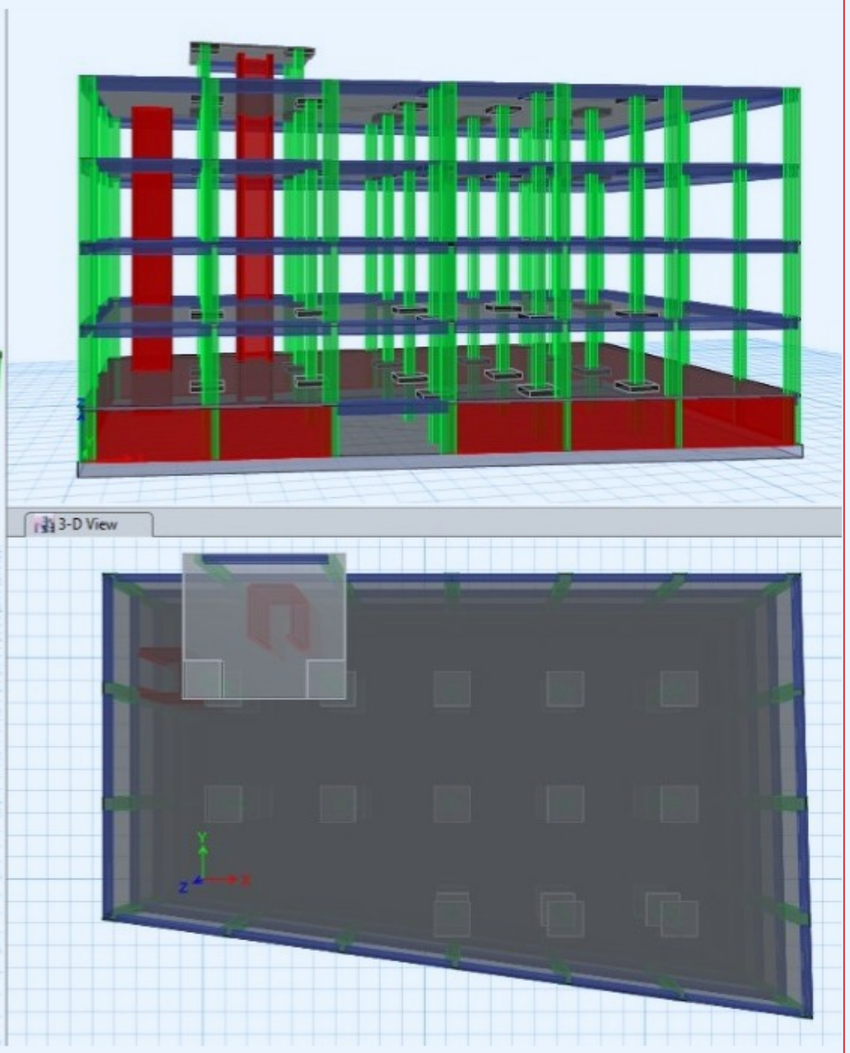
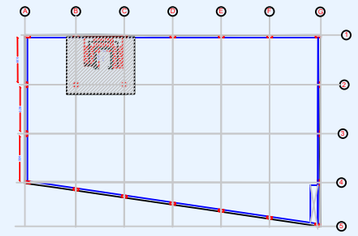








Notes

THE BUILDING SYSTEM WILL BE CONSIDER AS SHEAR WALL BUILDING WITH COLUMNS AND THE SLAB WILL BE AS FLAT SLAB WITH M. BEAMS.THE SOFTWARE USED IN DESIGN (CSI ETABS 2022, AND CSI SAFE 2022&PROKON) IS THE GENERAL PROGRAM USED IN THIS DESIGN

job title

Commercial building - hypermarket

Structural Drawings

DRWG. TITLE:

DESIGNED BY DR-Majid Albana
CHECKED BY
SCALE As Shown
DATE 4/2025
SHEET NO. Str. 1

GENERAL :-

1. ALL DIMENSIONS TO TAKE PRECEDENCE OVER SCALE SHOWN ON PLANS, SECTIONS AND DETAILS, (DO NOT SCALE FROM DRAWINGS).
2. ALL DIMENSIONS ARE IN MILLIMETRES AND ALL LEVELS IN METRES (UNO).
3. THE STRUCTURAL DRAWINGS SHOULD BE USED IN CONJUNCTION WITH THE ARCHITECTURAL, MECHANICAL,CIVIL,PLUMBING AND ELECTRICAL DRAWINGS.
4. ALL OPENINGS SIZE AND LOCATION SHOULD BE VERIFIED AND CHECKED WITH SERVICES DRAWINGS,WHERE OPENINGS SIZES ARE NOT SHOWN ON THE STRUCTURAL DRAWINGS, SITE ENGINEER SHALL INTRODUCE SUCH OPENINGS WITH PROPER FRAMING INCLUDING ANY REVISION TO THE SIZES SHOWN ON THE DRAWINGS.
5. DESIGN STANDARED & LOADS :-
   - DESIGN & CONSTRUCTION OF REINFORCED CONCRETE STRUCTURES MEMBERS SHALL IN ACCORDANCE WITH ACI-318-95 (ULTIMATE STRENGTH DESIGN METHOD).
   - ALL RETANING WALL STRUCTURE SHOULD BE AS BRITISH 8 97- 110 or ACI - 93 - 318.
   - MASONARY BRICK OR CONCRETE BLOCK ACCORDING TO B.S - 5628.
6. LOADING :-
   - MINIMUM DESIGN LOAD (LIVE LOAD) ACCORDING TO IBC-09.
   - SEISMIC LOAD ACCORDING TO IRAQI SEISMIC CODE 1997.
   - WIND LOAD ACCORDING TO ASCE-05.
7. FOR TYP. SECTIONS & DETAILS SEE ST-G2.

FOUNDATION AND EARTH WORK :-

1. FOUNDATION DESIGN BASED ACCORDING TO THE SOIL REPORT PREPARED BY THE & RESEARCH (( )2023\ \ \ ).
2. BEARING CAPACITY ACCORDING TO THE SOIL REPORT IS (70/ m²) AT DEPTH OF (-2.50m) BELOW THE EXISTING N.G.L.
3. A WELL COMPACTED SUB-BASE LAYERS OF A TOTAL THICK AS INDICATED IN THE DWG. SHOULD BE USED UNDER FOOTING WITH FOLLOWING SPECIFICATIONS :-
   - THE DIMENSION OF THE SUB-BASE LAYERS SHOULD BE LARGER THAN THE DIMENSIONS OF THE FOUNDATION FROM ALL SIDES BY 0.25m.
   - THE VALUE OF CALIFORNIA BEARING RATIO (C.B.R) SHALL NOT BE LESS THAN (35% ASTM D) 1883 AT 95% OF THE MAXIMUM DRY DENSITY ESTABLISHED ACCORDING TO (ASTM D)1557.
   - LIQUID LIMIT ≤ 25%.
   - PLASTICITY INDEX ≤ 6%.
   - ORGANIC MATERIAL ≤ 2%.
   - SO_3 ≤ 5%.
   - TOTAL SOLUBLE SALTS ≤ 5%.
   - GYPSUM CONTENT ≤ 10.75%.
   - RELATIVE COMPACTION 95% (MODIFIED PROCTOR).
4. SULPHATE RESISTANT CEMENT TYPE 5 SHOULD BE USED IN ALL CONCERET WORK IN CONTACT WITH EARTH OR BELOW D.P.C. LEVEL.
5. BACKFILL AROUND FOOTINGS AND UTILITY TRENCH WITHIN THE BUILDING AREA SHOULD BE DONE WITH APPROVED SELECTED CLASSIFIED MATERIAL FREE OF CLAY AND SHOULD BE MECHANICALLY COMPACTED IN LAYERS , NOT EXCEEDING 250mm LOOSE THICKNESS TO 90% OF MAXIMUM PROCTOR DENSITY.

CONSTRUCTION JOINT AND WATERPROOFING :-

1. CONSTRUCTION JOINT :-
   - CONSTRUCTION JOINT IN FLOORS SHOULD BE LOCATED WITHIN THE MIDDLE THIRD OF SPANS OF SLABS ,BEAMS & GIRDERS, JOINT IN GIRDER SHOULD BE OFFSET A MINIMUM DISTANCE OF TWO TIMES THE WIDTH OF INTERSECTING BEAMS.
   - AT CONSTRUCTION JOINTS SURFACES SHOULD BE ROUGHENED BY BROOMING OUT MORTAR, EXPOSING 12mm OF COARSE AGGREGATE TWO HOURS AFTER PLACING CONCRETE.
   - CONSTRUCTION JOINTS FOR STRUCTURAL SLAB / FOUNDATION / WALLS ETC . AND VOLUME OF CASTING IN A POUR SHOULD BE APPROVED BY THE ENGINEER.
   - CONSTRUCTION JOINTS SHOULD BE DOWELED, KEYED AND THOROUGHLY CLEANED , ALL CONSTRUCTION JOINTS SHOULD BE CONSTRUCTED IN ACCORDANCE WITH THE TYPICAL CONSTRUCTION JOINT DETAILS SHOWN ON THE STRUCTURAL DRAWINGS,CONTRACTOR HAVE TO PREPARE ANY MISSING DETAILS NOT COVERED IN THE STRUCTURAL DRAWINGS AND SUBMIT FOR ENGINEER'S APPROVAL.
2. WATERPROOFING :-
   - WATER STOPS SHOULD BE USED AT ALL CONSTRUCTION ,CONTRACTION & EXPANSION JOINTS,WHERE WATERPROOFING SYSTEM IS APPLIED ALL INTERSECTION PIECES OF WATER STOPS SHOULD BE FACTORY MOLDED.
   - ALL CONCRETE WORKS IN CONTACT WITH SOIL FOR NORMAL STRUCTURE SHOULD BE COATED WITH PROTECTIVE LAYER.

. all dim. from ARCH D.W.G.

REINFORCED CONCRETE :-

1. COMPRESIVE STRENGTH OF CONCRETE SHOULD BE DETERMIND BY THE TABLE BELOW :-

MEMBER TYPE \ LOCATIONS	MINIMUM 28 DAYS CUBE COMPRESSIVE STRENGTH (Fcu) (MPa)	AGGREGATE MAX. SIZE
SCREED	20	10 mm
BLINDING OR LEAN CONCRETE	20	20 mm
SLABS	40	20 mm
PILES	-	20-38 mm
FOUNDATIONS	40	20 mm
COLUMNS AND SHEAR WALLS	45	20 mm
SUSPENDED SLAB, BEAMS AND WALLS	40	20 mm
WATER RETAINING STRUCTURES	-	20 mm
PLAIN CONCRETE	25	20 mm

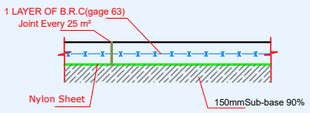
2. SULPHATE RESISTANT CEMENT TYPE 5 SHOULD BE USED IN ALL CONCERET WORK IN CONTACT WITH EARTH OR BELOW D.P.C LEVEL.
3. REINFORCMENT STEEL CONFORM TO ASTM A615 & A616 OR A617 BARS SHOULD BE GRADE 400 FY=410N/mm (60000psi).
4. PLACING OF REINFORCEMENT SHOULD BE ACCORDING TO ACI-315 DETAILING MANUAL.
5. MINIMUM BARS COVER :-

MEMBER	(mm)
SLABS	25
BEAMS & GIRDERS	40
COLUMNS	40
INTERIOR WALLS	25
EXTERIOR FACE OF WALL	40
FORMED FOUNDATION	50
NON-FORMED FOUNDATION	75

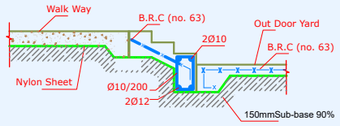
6. MINIMUM BARS SPACING :-
   - CLEAR SPACING BETWEEN PARA LLEL BARS SHALL NOT BE LESS THAN BAR DIAMETER OR 4/3 OF MAXIMUM AGGREGATE SIZE BUT NOT LESS THAN 25mm.
   - CLEAR SPACING BETWEEN LAYERS OF BARS TO BE NOT LESS THAN 25mm AND THE UPPER BARS SHOULD BE OVER THE LOWER BARS .
   - IN COLUMNS CLEAR DISTANCE BETWEEN LONGITUDINAL BARS SHOULD BE NOT LESS THAN 1.5 BAR DIAMETER NOR LESS THAN 40mm.
7. MINIMUM LAP LENGTH (UNLESS NOTED ON DRAWINGS) SHOULD BE AS TABLE BELWO :-

BAR DIA.(mm)	10	12	16	18	20	22	25
LAP LENGTH (mm) IN COLUMNS	400	500	600	650	700	800	900
LAP LENGTH (mm) IN ELSE WHERE	400	600	700	800	900	1000	1250

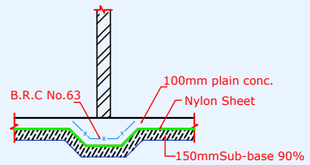
   - LAP LOCATION IN SLABS AND BEAMS :-
     * AT SUPPORT FOR BOTTOM BARS.
     * AT MID SPAN FOR TOP BARS.
   - LAP LOCATION IN FOUNDATION :-
     * AT SUPPORT FOR TOP BARS.
     * AT MID SPAN FOR BOTTOM BARS.
8. VERTICAL REINFORCEMENT IN COLUMN :-
   - WHERE COLUMN FACE ARE OFFSET 75mm OR MORE SPLICE OF VERTICAL BARS TO THE OFFSET FACE SHOULD BE MADE BY SEPARAT E DOWELS OVER LAP AS SPECIFIED ABOVE.
   - WHERE A LONGITUDINAL BARS ARE OFFSET AT SPLICE THE SLOPE OF INCLINED ADJACENT PORTION SHALL NOT EXCEED 1:6 (HORIZANTAL:VERTICAL).
   - CHANGING OF REINFORCEMENT BETWEEN FLOORS WHERE SUCH SITUATION OCCURS THE REINFORCEMENT OFF SHOULD BE CUT OFF AT DISTANCE 75mm BELOW FLOOR LEVEL SPACED 100mm AND PLACED BEFOR THE POINT OF BEND.
   - WHERE LONGITUDINAL BARS OFFSET,PROVIDE 4TIES.
9. HOT & COLD WETHERING SHOULD BE ACCORDING TO ACI-305R-99.
10. ALL REINFORCING BAR BENDS TO BE MADE COLD.
11. IN ONE-WAY SLAB, SHRINKAGE & TEMPERATURE REINF. STEEL EXTENDING IN THE LONG DIRECTION SHALL BE PLACED IN THE PLACE OF, AND TIED TO THE MAIN REINF. EXTENDING IN THE SHORT DIRECTION.
12. MIXING & PLACING CONCRETE SHOULD BE DONE ACCORDING TO ACI - 318M - 95 (CHAPTER 5) CONDUIT OR PIPE SIZE SHALL NOT EXCEED 30% OF SLAB THICKNESS UNLESS SPECIFICALLY DETAILED,OTHERWISE CONCENTRATIONS OF CONDUITS OR PIPES SHOULD BE AVOIDED EXCEPT WHERE DETAILED OPENINGS ARE PROVIDED,ALL SUBJECTED TO ENGINEER'S APPROVAL.



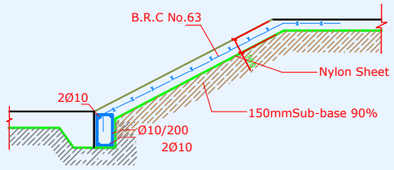
Typical Detail Of Out Door Yard



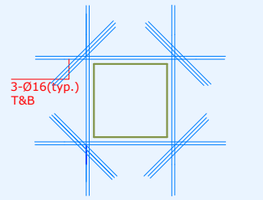
Typical Sec. For Stair On Earth



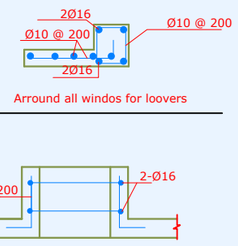
CONSTRUCTION OF PARTITION ON GROUND SLAB
provid construction joint for max.(5mx5m)



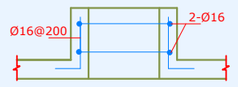
Typical Sec. Of Ramp



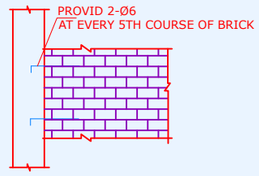
TYPICAL REINF. AROUND OPENNINGS UP TO 600



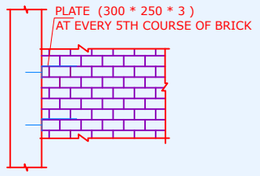
Arround all windos for loovers



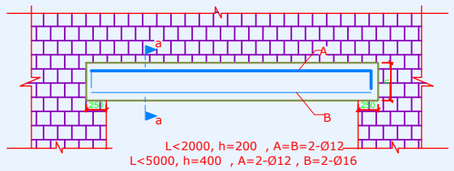
TYPICAL UP STAND DETAIL ROOF OPENNINGS



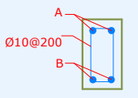
CONECTION BETWEEN BRICK WALL AND R.C. COLUMN
proposel 1



CONECTION BETWEEN BRICK WALL AND R.C. COLUMN
proposel 2



LINTEL REINFORCEMENT



SEC. (a - a)

ABBREVIATIONS :-

ADD	ADDITIONAL
ARCH	ARCHITECTURAL
B	BEAM
BOTT	BOTTOM
C1	COLUMN TYP C1
CANT	CANTILEVER
CJ	CONSTRUCTION JOIN
CL	CENTRE
C	COULMN
CONC	CONCRETE
DET	DETAIL
DIM	DIMENSION
DWG	DRAWING
D	DEPTH
E.A	EACH
E.F	EACH FACE
E.J	EXPANSION JOINT
ELEV	ELEVATION
E.W	EACH WAY
EXP	EXPANSION
F	FOOTING
F1	FOOTING TYPE-1
FDN	FOUNDATION
F.F.L	FINISH FLOOR LEVEL
GEN	GENERAL
GL	GRID LINE
LL	LIVE LOAD
MAX	MAXIMIM
MECH	MECHANICAL
MIN	MINIMUM
mm	MILLIMETRES
SEC	SECTION

no.	date	initials	revision

job title
(A)

drawing title
GENERAL NOTES

designed ENG . DR-Majid Albana | project manager
checked | scale | date
drawn | job no. | sheet no. 2
approved

EXCAVATION, BACK FILLING & FOUNDATION

1. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO INVESTIGATE OR TO CHECK THE SOIL GEOTECHNICAL PROPERTIES BY HAVING SPECIALIST AND AFTER COMMENCING OF THE UNDERGROUND WORK.
2. FOOTINGS FOR BUILDING SHALL BE FOUNDED ON UNDISTURBED SOIL.
   RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE ELEVATION OF FOOTING TO OBTAIN SUCH BEARING PRESSURE. UNDER NO CONDITION FOOTINGS SHOULD BE PLACED ON LOOSE, SOFT OR UNDESIRABLE MATERIAL. IF SUCH MATERIALS ARE ENCOUNTERED, THEY SHOULD BE REMOVED UNTIL FIRM LAYERS ARE ENCOUNTERED AND REQUIRED BEARING PRESSURE IS OBTAINED.
3. THE SITE SHOULD BE CLEARED OF ALL BOULDERS, DEBRIS, DECOMPOSABLE MATERIAL SUCH AS WOOD, GRASS, PLANTS, ...ETC. ALL EXISTING MISCELLANEOUS FILL SHOULD BE REMOVED FROM AREAS WHERE STRUCTURAL SUPPORT IS REQUIRED. ANY SOIL AT STRIPED LEVEL THAT SOFTENS DUE TO RAINFALL, GROUND WATER, DISTURBANCE OR ANY OTHER CAUSE SHOULD BE EXCAVATED AND REPLACED WITH CONTROLLED FILL. BOTTOM OF EXCAVATIONS SHOULD BE SMOOTH AND FREE OF LOOSE EARTH OR SAND. ANY LOOSE OR SOFT AREAS SHOULD BE COMPACTED TO THE REQUIRED DENSITY.
4. IF DURING CONSTRUCTION ANY SIGNIFICANT VARIATIONS FROM WHAT IS REPORTED IN THE GEOTECHNICAL SOIL REPORT, THE ENGINEERS SHOULD BE NOTIFIED TO VISIT THE SITE AND ASSESS THE SITUATION.
5. PRIOR TO PLACEMENT OF BLINDING CONCRETE FOR FOUNDATIONS, WHEREVER POSSIBLE, BOTTOM OF EXCAVATIONS SHALL BE COMPACTED BY HEAVY VIBRATORY ROLLER TO 95% MIN. OF MODIFIED PROCTER DENSITY FOR COHESIVE AND WELL GRADED SOILS. 100 MM BLINDING CONCRETE THICK E. BE POURED UNDER THE RAFT FOOTINGS.
6. PROVIDE A POLYETHYLENE FILM (0.2MM) BELOW ALL GROUND LEVEL SLABS. FILM TO BE FIRMLY ANCHORED TO GROUND AND ADEQUATELY LAPPED.
7. BEFORE ANY BACKFILLING, ALL FORMS SHOULD BE REMOVED BUT IN NO CASE LESS THAN 24HOURS AFTER PLACING CONCRETE. ALL DEBRIS SHOULD BE CLEANED OUT.
8. USE WELL GRADED, NON COHESIVE SOILS FOR BACKFILLING. BACKFILL MATERIALS SHOULD NOT CONTAIN ANY ROOTS, CONSTRUCTION DEBRIS, DELETERIOUS MATERIALS, ORGANIC MATTERS, COBBLES OR BOULDERS(SIZE>80MM). THE FINES PERCENTAGE SHOULD NOT EXCEED 15% AND THE SOIL SHOULD BE NON PLASTIC.
9. IT IS EXPECTED THAT THE LAND WILL BE GRADED AND LEVELED TO THE FINAL FINISHED GRADE.
10. CLEAN SAND, FREE OF SALTS AND ORGANIC MATERIALS, AND WITH LESS THAN 10% PASSING THE NO. 200 SIEVE, IS CONSIDERED SUITABLE MATERIAL. BACKFILL MATERIALS SHOULD BE PLACED IN LOOSE LIFTS HAVING THICKNESS OF NOT MORE THAN 25 cm COMPACTED TO THE REQUIRED DENSITY, USE VIBRATORY ROLLER FOR COMPACTING GRANULAR SOILS.

    TO AVOID STRESSING THE DUCT.
    ALL STRUCTURAL FILL MATERIAL SHALL BE COMPACTED TO A DRY DENSITY OF AT LEAST 95% OF THE MAXIMUM DRY DENSITY OBTAINED BY THE MODIFIED PROCTOR TEST, USE NUCLEAR DENSITY GAUGES AS PER ASTMD-2922 TO MONITOR COMPACTION WORKS. NO BACKFILLING SHALL BE PERFORMED BEFORE CASTING OF THE SLABS THAT SUPPORT THE RETAINING WALLS.
11. FOR WALLS HAVING FILL ON BOTH SIDES, BACK FILLING OPERATION SHALL PROCEED SIMULTANEOUSLY IN EQUAL LIFTS. DIFFERENTIAL ELEVATION OF TOP OF LIFTS BETWEEN EACH SIDE SHALL NOT EXCEED 50 cm.
12. ALL CONNECTIONS OF PIPING BETWEEN THE STRUCTURES AND THE EXTERIOR BE DELAYED TO A LATER STAGE OF CONSTRUCTION AFTER WHICH MOST OF THE SETTLEMENT WOULD HAVE TAKEN PLACE, UNLESS FLEXIBLE SLEEVES ARE USED.
13. ALL SERVICE LINES SHALL BE LAID OUT IN A CLEAN SAND BED COMPACTED TO THE REQUIRED DENSITY.
14. UTILITY TRENCHING SHALL BE SUCH THAT DUCT RUNS CAN BE MADE AS STRAIGHT AS POSSIBLE, BOTH HORIZONTALLY AND VERTICALLY, AND IF A DEFLECTION MUST BE MADE IN A DUCT LINE, THE DEFLECTIONS SHOULD BE ALONG A SMOOTH AND GRADUAL CURVE

6) CONSTRUCTION JOINTS AND CONTROL JOINTS:

1. CONSTRUCTION JOINTS IN FLOOR SHALL BE LOCATED WITHIN THE MIDDLE THIRD OF SPANS OF SLABS, BEAMS AND GIRDERS, U.N.O. ON DWGS.
2. BEAMS, GIRDERS AND HAUNCHES SHALL BE PLACED MONOLITHICALLY AS PART OF A SLAB SYSTEM, UNLESS OTHERWISE SHOWN IN DESIGN DRAWINGS OR SPECIFICATIONS.
3. CONTROL JOINTS IN SLAB ON GRADE SHALL BE SPACED AT 6.00 METERS (MAX.) INTERVAL ON BOTH DIRECTIONS. THE RESULTING PANEL SHOULD BE APPROXIMATELY SQUARE. A CHECKERED BOARD PATTERN.
4. IN WALLS HAVING FREQUENT OPENINGS, SPACING OF CONTROL JOINTS 6.00 METERS APART IS CONSIDERED MAXIMUM. THE SPACING IN WALLS WITHOUT WINDOWS SHOULD NOT BE MORE THAN 7.50 METERS AND A JOINT WITHIN 3.00 METERS OF EACH CORNER IS DESIRABLE.
5. VERTICAL CONSTRUCTION JOINT SPACING IN WALLS SHALL NOT BE MORE THAN 12.00 METERS AND LOCATED WITHIN THE MIDDLE THIRD OF THE SPAN BETWEEN COLUMNS.

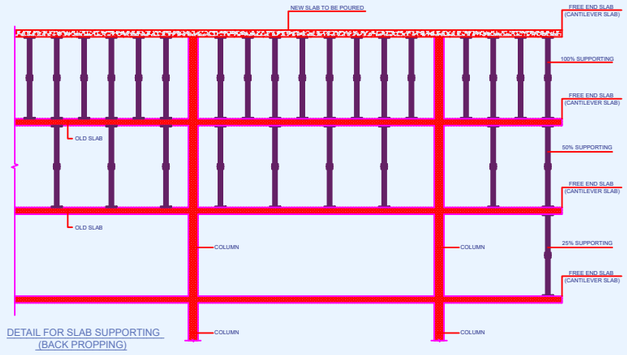
THE DESIGN LOADS

1) SUPER IMPOSED DEAD LOAD (SDL) :

FLOOR SCREED	0.80	KN/m²
TILES	0.20	KN/m²
False Ceiling & MECHANICAL DIVISIONS	0.50	KN/m²
EXTERNAL & INTERNAL PARTITION WALL Bricks	2.5	KN/m²
TOTAL ----------	4.00	KN/m²

2) LIVE LOADS:

RESIDENTIAL AREAS	3.0	KN/m²
STAIRCASE	4.0	KN/m²



DETAIL FOR SLAB SUPPORTING (BACK PROPPING)

3) WIND LOADS:

The main wind force resisting system (MWFRS) and all components and cladding (C&C) are determined in accordance to the ASCE (2016).
All other parameters related to wind load are estimated according to (UnifiedFacilities Criteria (UFC) 2013).
Based on aforementioned codes and standards, wind parameters for Baghdad city
Table 1.1: Wind Parameters for Baghdad that are Adopted in the Analysis.

Table 1.1

Wind Parameter	NOTATION	NOTATION	Reference
Basic Wind Speed	V	161 km/h	ASCE (2016), (Unified Facilities Criteria (UFC) 2013)
Exposure Category	B		ASCE (2016)
Topographic Factor	Kzt	1	ASCE (2016)
Gust-Effect Factor	G	0.85	ASCE (2016)
Directionality Factor	Kd	0.85	ASCE (2016)

4) SEISMIC LOADS:

Seismic Design Categories (SDCs) are adopted from ASCE (2016). All other parameters related to seismic zone are estimated according to (Iraqi seismic code (2017).
Table 1.2: Seismic Parameters for Baghdad that are Adopted in the Analysis.

Table 1.2

seismic Parameter	NOTATION	NOTATION	Reference
Seismic Design Category	D		ASCE (2016), the soil type has been Assumed
Response Modification Coefficient	R	5	ASCE (2016)
Topographic Factor	Kzt	1	ASCE (2016)
Overstrength Factor	Ω_o	2.5	ASCE (2016)
Importance Factor	I	1	ASCE (2016)
Mapped Maximum Considered Earthquake (MCER), 5% damped, spectral response acceleration parameter at short periods	Ss	0.30	Iraqi seismic code 2017
Maximum Considered Earthquake (MCER), 5% damped, spectral response acceleration parameter at a period of 1 s	S1	0.10	Iraqi seismic code 2017
Seismic coefficient	Ca	0.12	Soil investigation report
Seismic coefficient	Cv	0.18	Soil investigation report
Undrained shear strength kN/m2	Vs	53.70	Soil investigation report
Soil type"stiff soil"	SD		Soil investigation report

* Seismic Load assumed also According to the Iraqi Code 2016.
* Load Pattern assumed for Seismic (EX,-EX,+EX,EY,-EY,+EY)
* SS=0.30
* S1=0.1
* Soil Profile Type =E
* Occupancy Importance =1
* Response Modification R =5.00
* System Overstrength Omega =2.50
* Deflection Amplification Cd=4.5
* Soil Profile Type =E

GENERAL NOTES :-

Frameworks removal time :

Type of framework	Min. period before striking formworks
Vertical framework of the column	24 hrs
Vertical framework of the shear walls	2-3 days
framework of the slab and beam a. span up to 6 m a. span from 6-8 m	 14 days 20 days

drawing title

THE DESIGN LOADS

designed ENG :DR- Majid Albana	**project manager**	
checked	**scale** 1-100	**date** 4/2025
drawn	**job no.** 3	**sheet no.** ST/D/03
approved		

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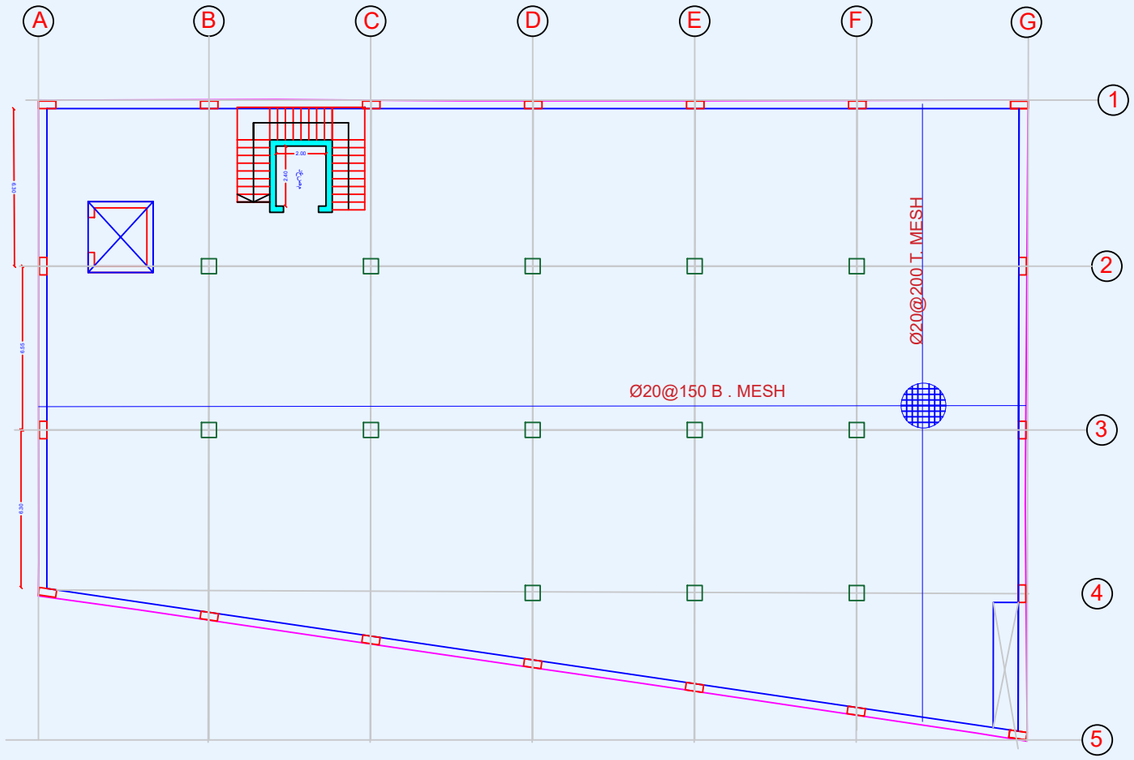
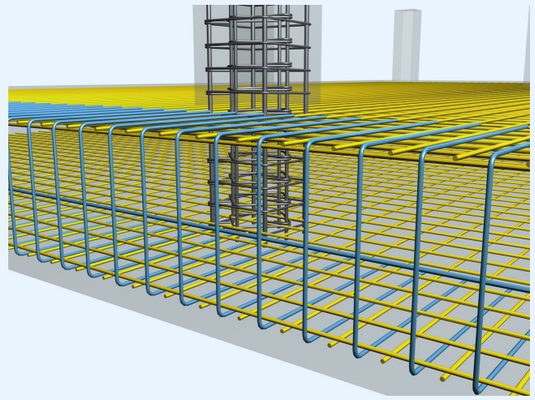




-Fcu = 40 N/mm2
-Fy = 420 N/mm2.

CONCRETE COVERS

-SLABS	= 25 mm
-BEAMS	= 40 mm
-COLUMNS	= 40 mm
-WALLS	= 25 mm
-SLAB ON GRADE	= 50 mm
-RAFT FOUNDATION	= 75 mm

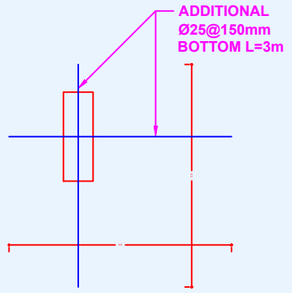
-THE BUILDING IS DESIGNED FOR BASEMENT + GROUND FLOOR + 3 FLOORS + PENT-HOUSE

Foundation Plan

THICK. = 800 mm

MINIMUM LAP LENGTH (UNLESS NOTED ON DRAWINGS) SHOULD BE AS TABLE BELWO :-

BAR DIA.(mm)	10	12	16	18	20	22	25
LAP LENGTH (mm) IN COLUMNS	400	500	600	650	700	800	900
LAP LENGTH (mm) IN ELSE WHERE	400	600	700	800	900	1000	1250



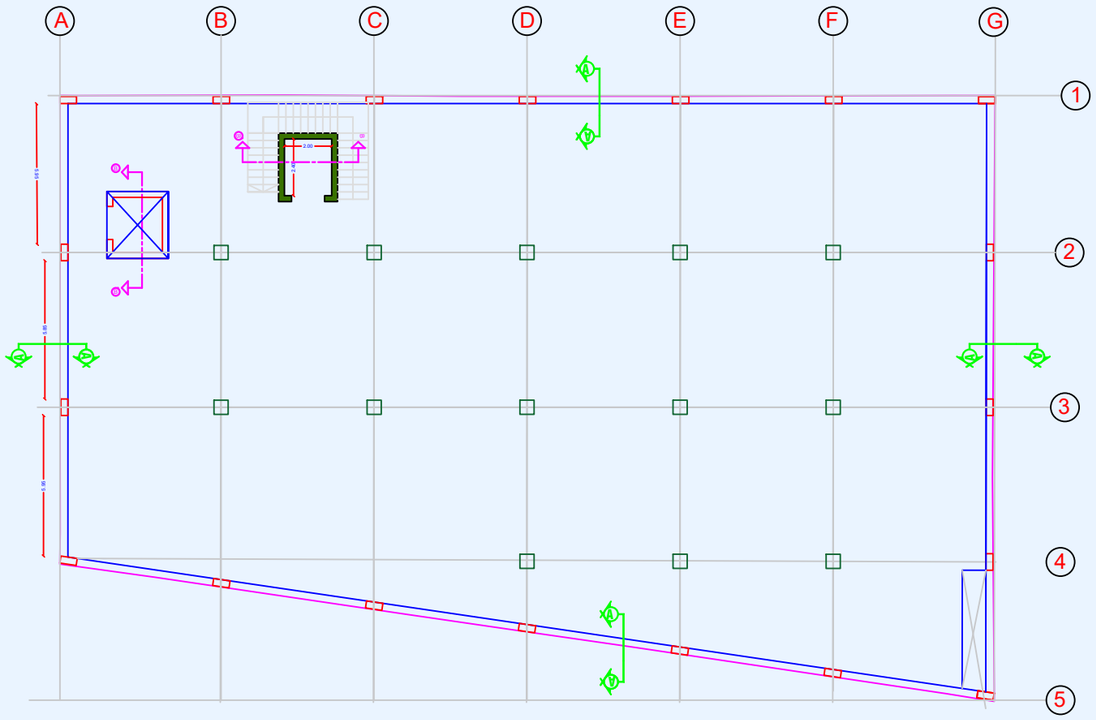
. all dim. from ARCH D.W.G.

no.	date	initials	revision

job title: (A)

drawing title: PLAN OF FOUNDATION REINFORCEMENT&SEC.

designed: ENG : DR-Majid Albana	project manager	
checked	scale: 1-100	date: 4 /2025
drawn	job no.: 4	sheet no.: ST/D/04
approved		



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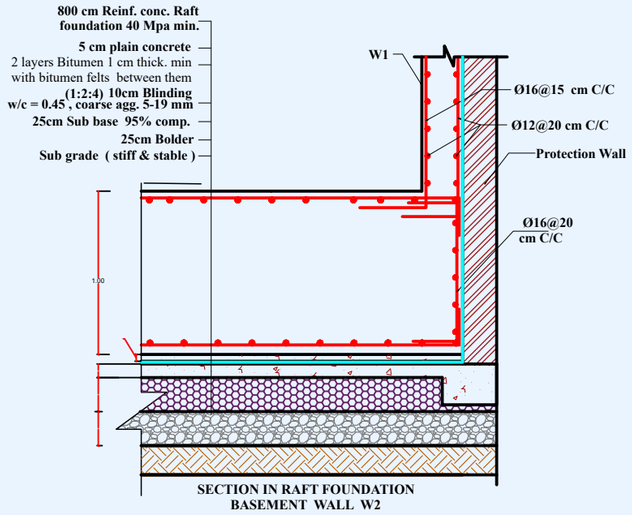
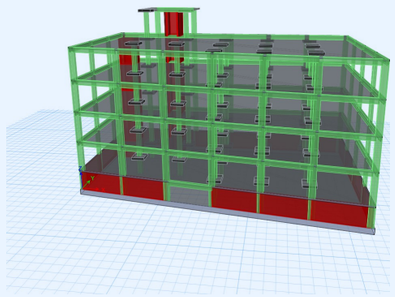
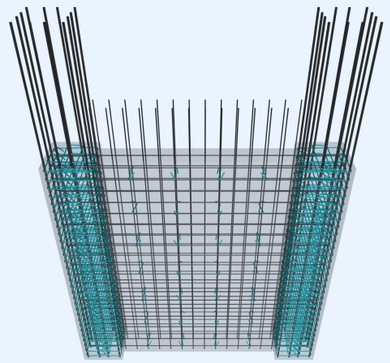


SECTION IN RAFT FOUNDATION
BASEMENT WALL W2

Typical Section (A-A) of raft foundation





Foundation Plan

THICK. = 800 mm

. all dim. from ARCH D.W.G.

no.	date	initials	revision

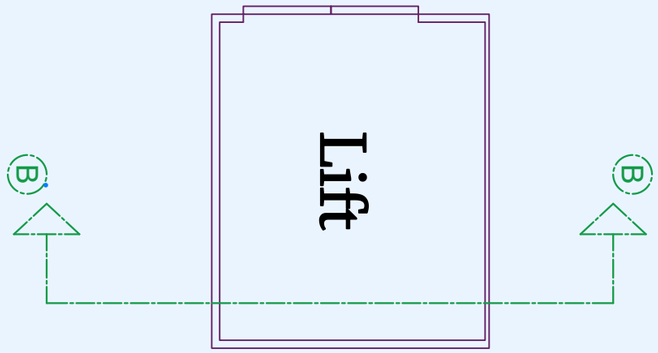
job title

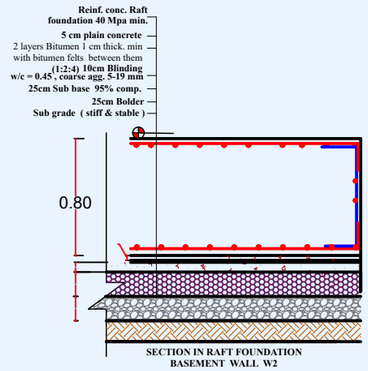
(A)

drawing title

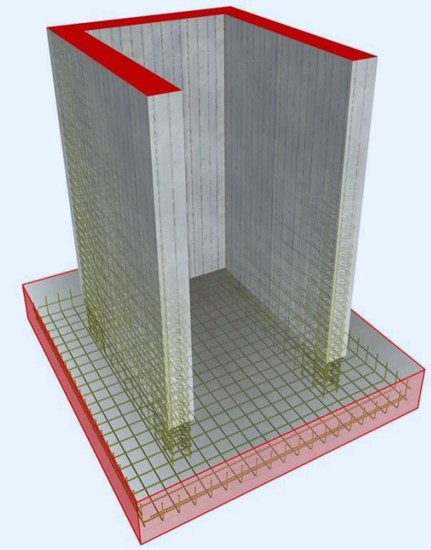
PLAN OF FOUNDATION
REINFORCEMENT&SEC.

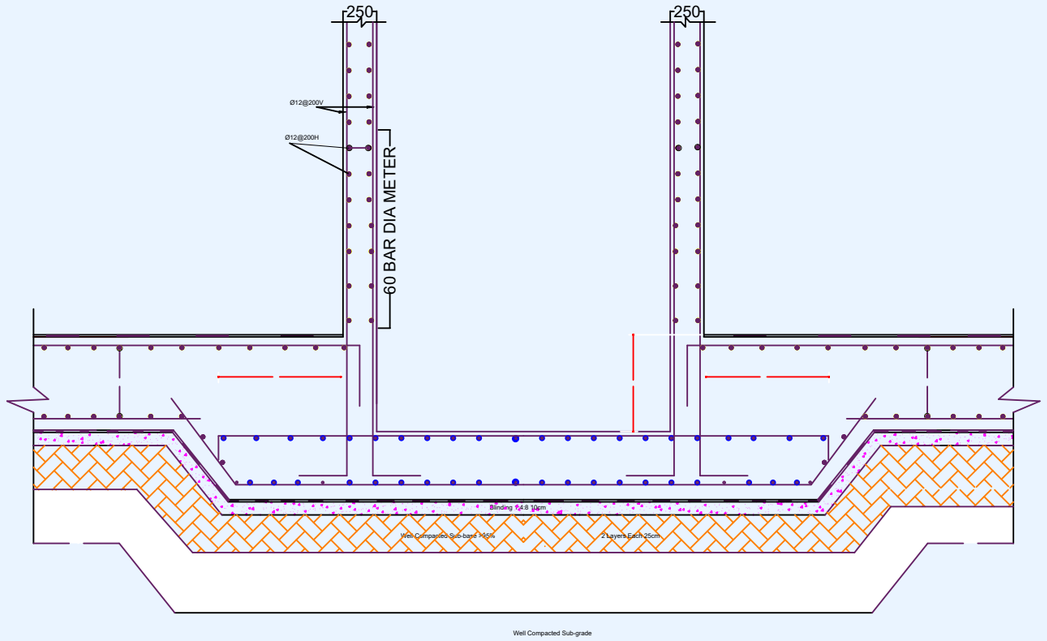
designed: ENG : DR-Majid Albana	project manager		
checked	scale: 1-100	date: 4 /2025	
drawn	job no. 5	sheet no. ST/D/05	
approved			



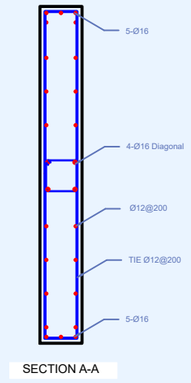


Typical Section (A-A) of raft foundation

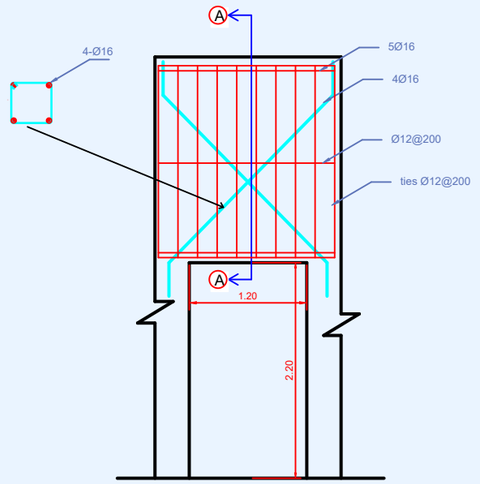




Section B'-B'



SECTION A-A



1 F4/ SPANDREL BEAM DETAILS
SCALE

no.	date	initials	revision

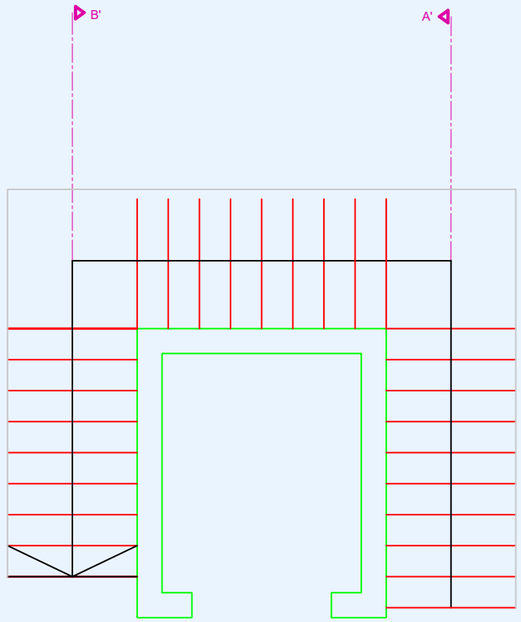
job title

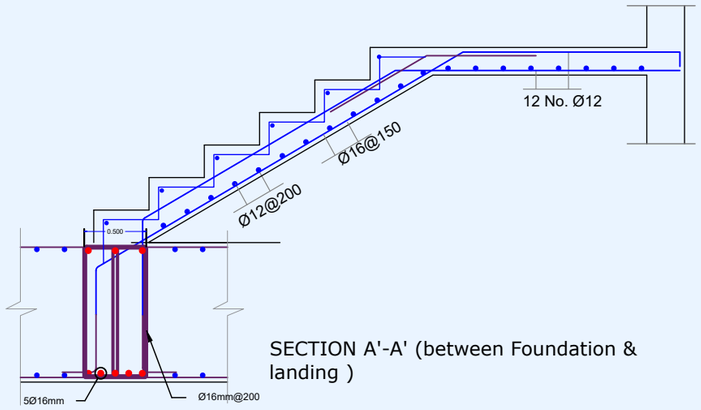
(A)

drawing title

Section A'-A' lift detail

designed ENG : Majid Albana	project manager
checked ENG : Majid Albana	scale 1-100 / date 4/2025
drawn ENG : Majid Albana	job no. 6 / sheet no. ST/D/06
approved	





SECTION A'-A' (between Foundation & landing)

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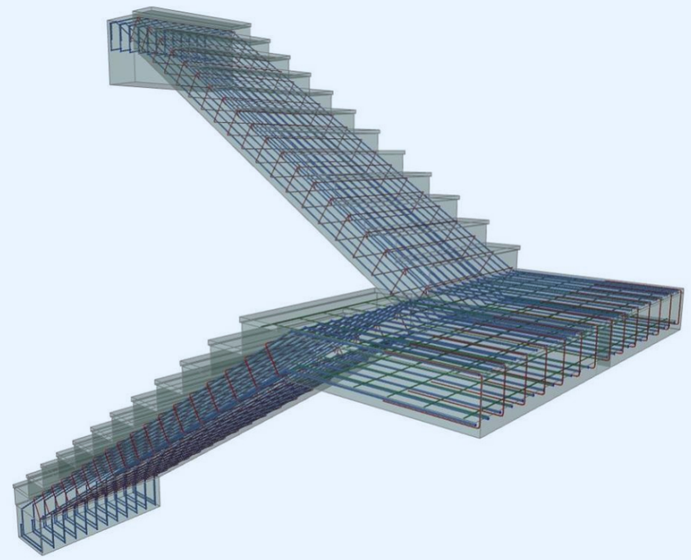
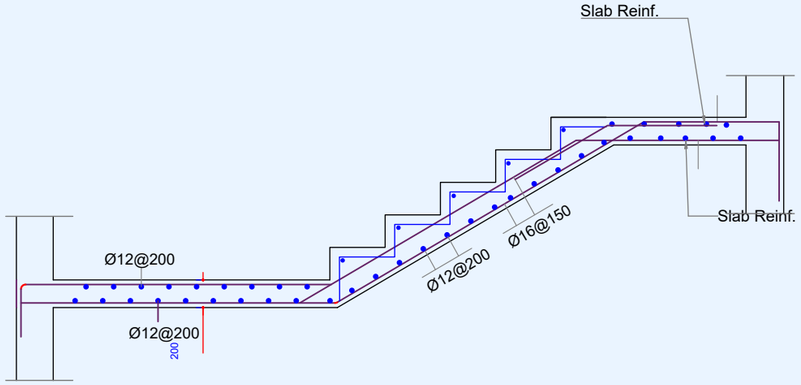




SECTION A'-A' (between slab & landing)

. all dim. from ARCH D.W.G.

-Fcu = 40 N/mm2
-Fy = 420 N/mm2.

CONCRETE COVERS

-SLABS	= 25 mm
-BEAMS	= 40 mm
-COLUMNS	= 40 mm
-WALLS	= 25 mm
-SLAB ON GRADE	= 50 mm
-RAFT FOUNDATION	= 75 mm

-THE BUILDING IS DESIGNED FOR BASEMENT + GROUND FLOOR + 6 FLOORS + PENT-HOUSE

no.	date	initials	revision

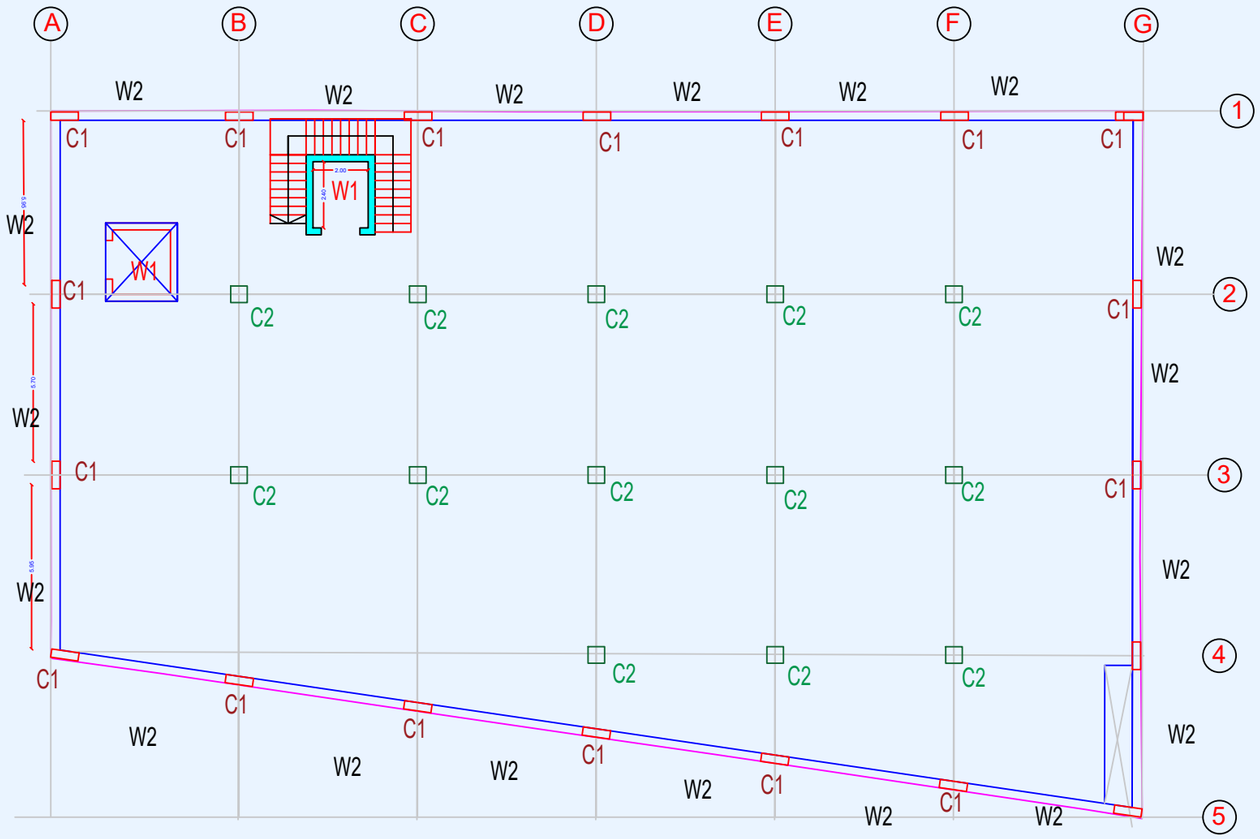
job title

(A)

drawing title

Stairs detail

designed: ENG : DR-Majid Albana		project manager
checked	scale: 1-100	date: 4/2025
drawn	job no.: 7	sheet no.: ST/D/07
approved		



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SCHEDULE OF COLUMNS AND WALLS

COLUMNS OR WALLS ID	SIZE		REMARK
	LENGTH (mm)	WIDTH (mm)	
C1	1000	300	just in basement
C2	600	600	
W1	250	2500	lift ☐
W2	300		just in basement

Notes

-Fcu = 50 N/mm2
-Fy = 420 N/mm2.

CONCRETE COVERS

-SLABS = 25 mm
-BEAMS = 40 mm
-COLUMNS = 40 mm
-WALLS = 25 mm
-SLAB ON GRADE = 50 mm
-RAFT FOUNDATION= 75 mm

COLUMNS & WALL KEY PLAN

. all dim. from ARCH D.W.G.

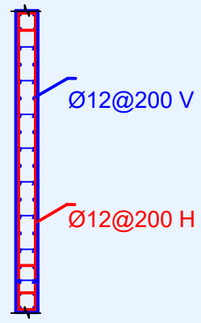
no.	date	initials	revision

job title
(A)

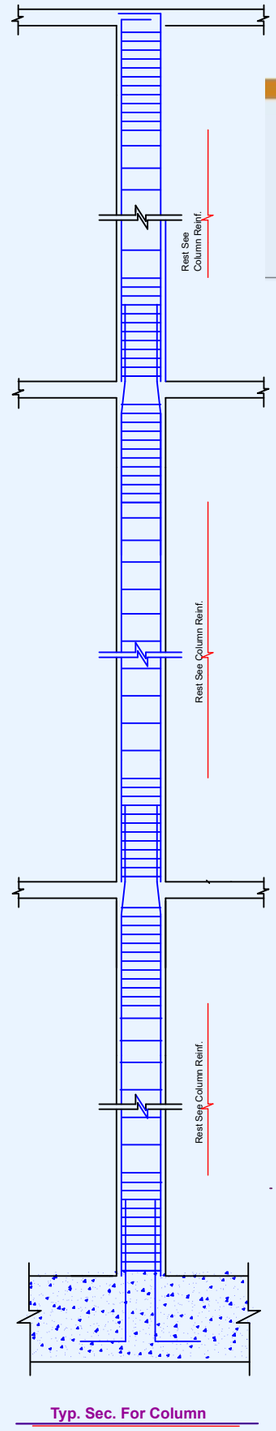
drawing title
COLUMNS & WALL KEY PLAN

designed ENG : DR-Majid Albana	project manager	
checked	scale 1-100	date 4 /2025
drawn	job no. 8	sheet no. ST/D/08
approved		

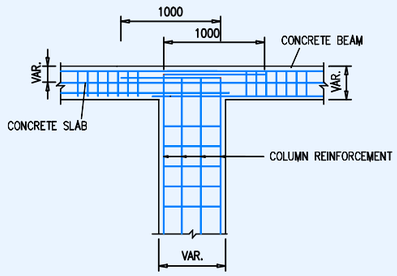
			24- Ø20	20- Ø25	20- Ø20
Main Bar	Roof Floor		Ø12@200 3Ties/Set	Ø12@200 3Ties/Set	Ø12@200 3Ties/Set
Ties					
Section		C 45			
	4rth Floor				
Main Bar	3 rd Floor		24- Ø20	20- Ø25	25- Ø20
Ties			Ø12@200 3Ties/Set	Ø12@200 3Ties/Set	Ø12@200 3Ties/Set
Section		C 45			
	Ground Level foundation level				
Dowels			24 - Ø25 C 1	20- Ø25 C 2	20- Ø20 C 3



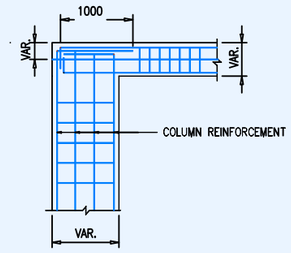
W1



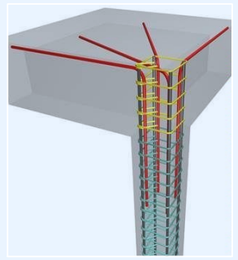
Typ. Sec. For Column



TYPICAL INTERNAL COLUMN TO BEAM DETAIL



TYPICAL EDGE COLUMN TO BEAM DETAIL



. all dim. from ARCH D.W.G.

no.	date	initials	revision

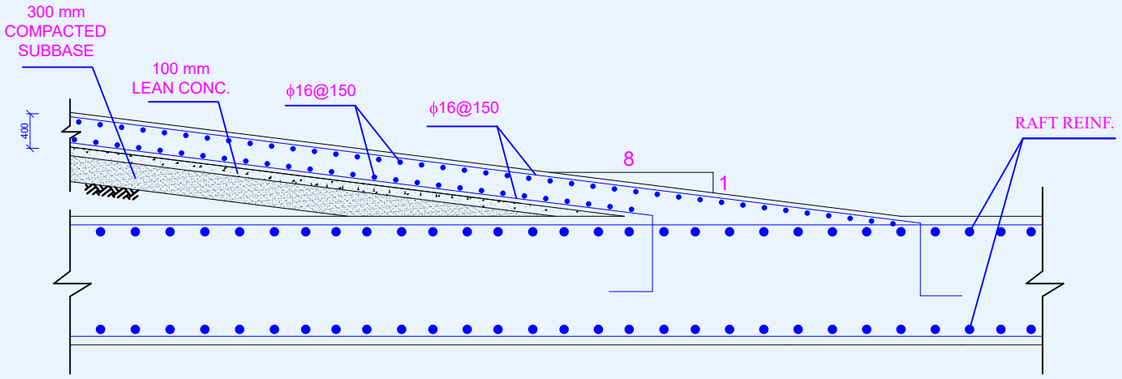
job title

(A)

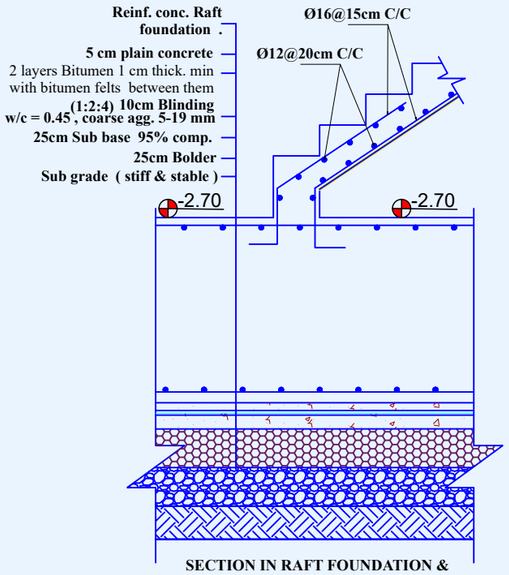
drawing title

SCHEDULE OF COLUMN

designed	ENG : DR-Majid Albana	project manager	
checked		scale	1-100
drawn		job no.	9
approved		date	4 /2025
		sheet no.	



SEC. J-J



SECTION IN RAFT FOUNDATION & STAIR NECK

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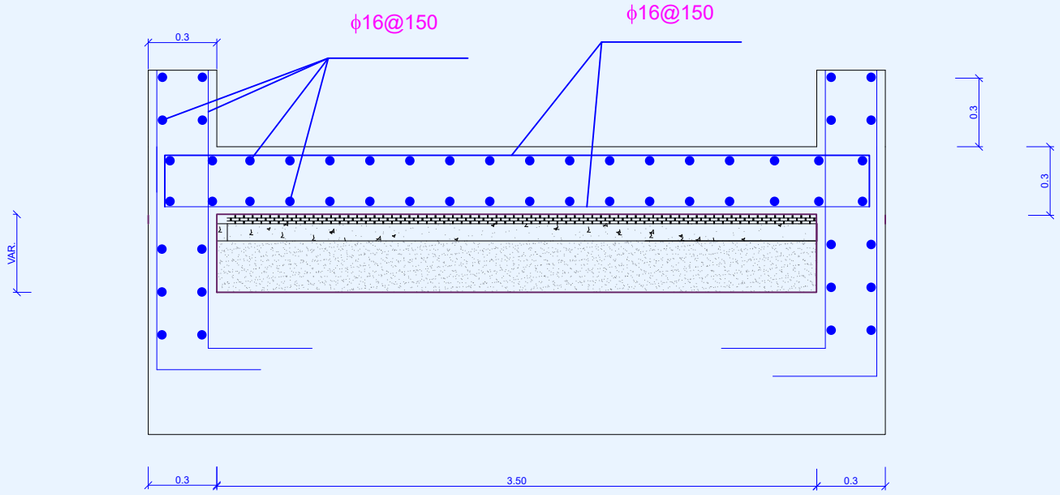
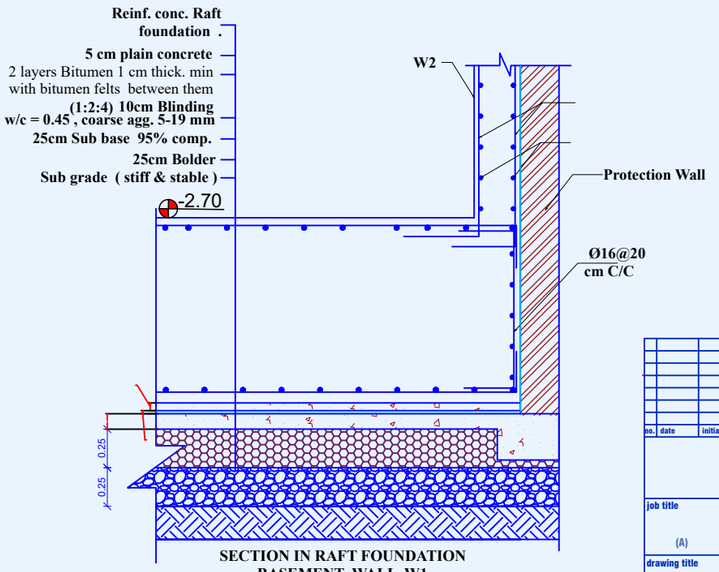


SEC. K-K



SECTION IN RAFT FOUNDATION BASEMENT WALL W1

no.	date	initials	revision

job title

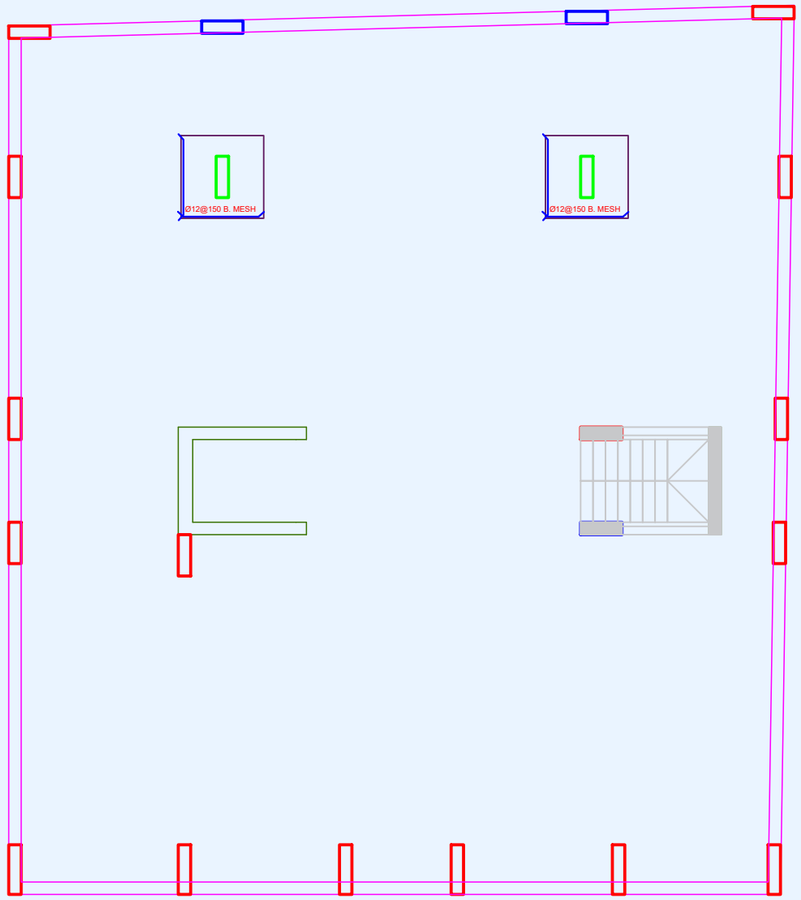
(A)

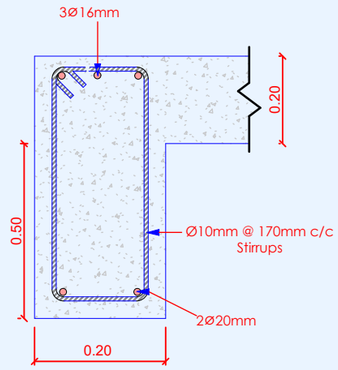
drawing title

RAMP

REINFORCEMENT&SEC.

designed: ENG : DR-Majid Albana	project manager	
checked	scale: 1-100	date: 4 /2025
drawn	job no.: 10	sheet no.: ST/D/10
approved		





B3 Detail

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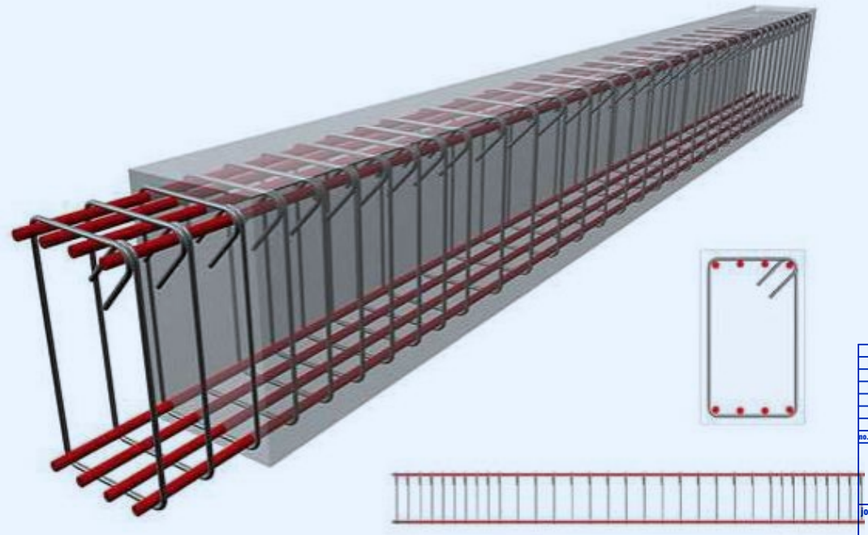
Notes

-Fcu = 40 N/mm2
-Fy = 420 N/mm2.

CONCRETE COVERS

-SLABS	= 25 mm
-BEAMS	= 40 mm
-COLUMNS	= 40 mm
-WALLS	= 25 mm
-SLAB ON GRADE	= 50 mm
-RAFT FOUNDATION	= 75 mm



BEAM KEY PLAN

. all dim. from ARCH D.W.G.

no.	date	initials	revision

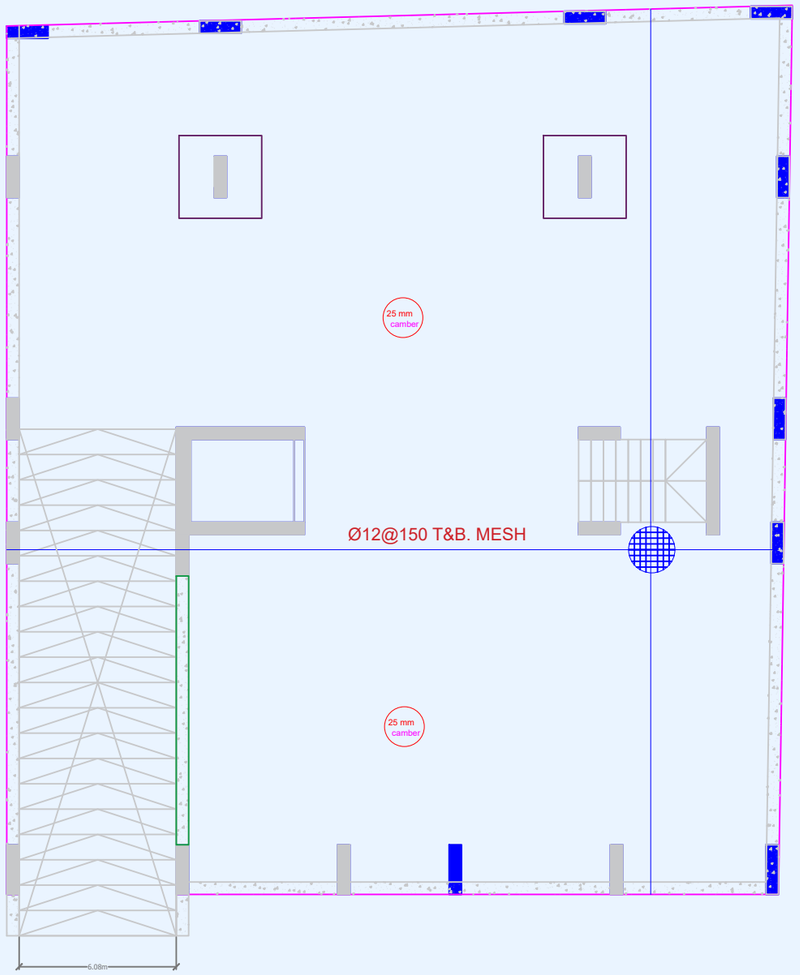
job title

(A)

drawing title

BEAM KEY PLAN

designed: ENG : DR-Majid Albana	project manager	
checked	scale: 1-100	date: 4/2025
drawn	job no. 11	sheet no. ST/D/08
approved		



DETAIL FOR SLAB SUPPORTING
(BACK PROPPING)

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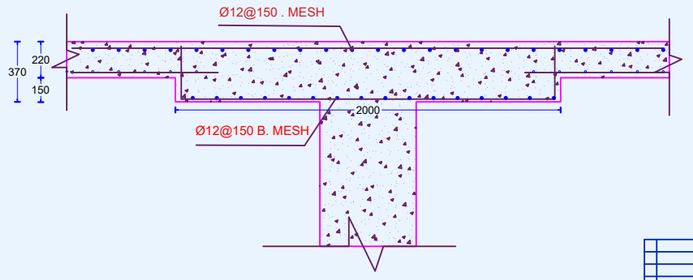
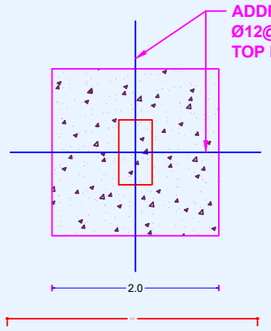
Notes

-Fcu = 50 N/mm2
-Fy = 420 N/mm2.

CONCRETE COVERS

-SLABS	= 25 mm
-BEAMS	= 40 mm
-COLUMNS	= 40 mm
-WALLS	= 25 mm
-SLAB ON GRADE	= 50 mm
-RAFT FOUNDATION	= 75 mm





SLAB REINFORCEMENT (BASEMENT FLOOR)

SLAB THICKNESS = 220 mm

MINIMUM LAP LENGTH (UNLESS NOTED ON DRAWINGS) SHOULD BE AS TABLE BELWO :-

BAR DIA.(mm)	10	12	16	18	20	22	25
LAP LENGTH (mm) IN COLUMNS	400	500	600	650	700	800	900
LAP LENGTH (mm) IN SLAB & BEAMS	400	600	700	800	900	1000	1250

. all dim. from ARCH D.W.G.

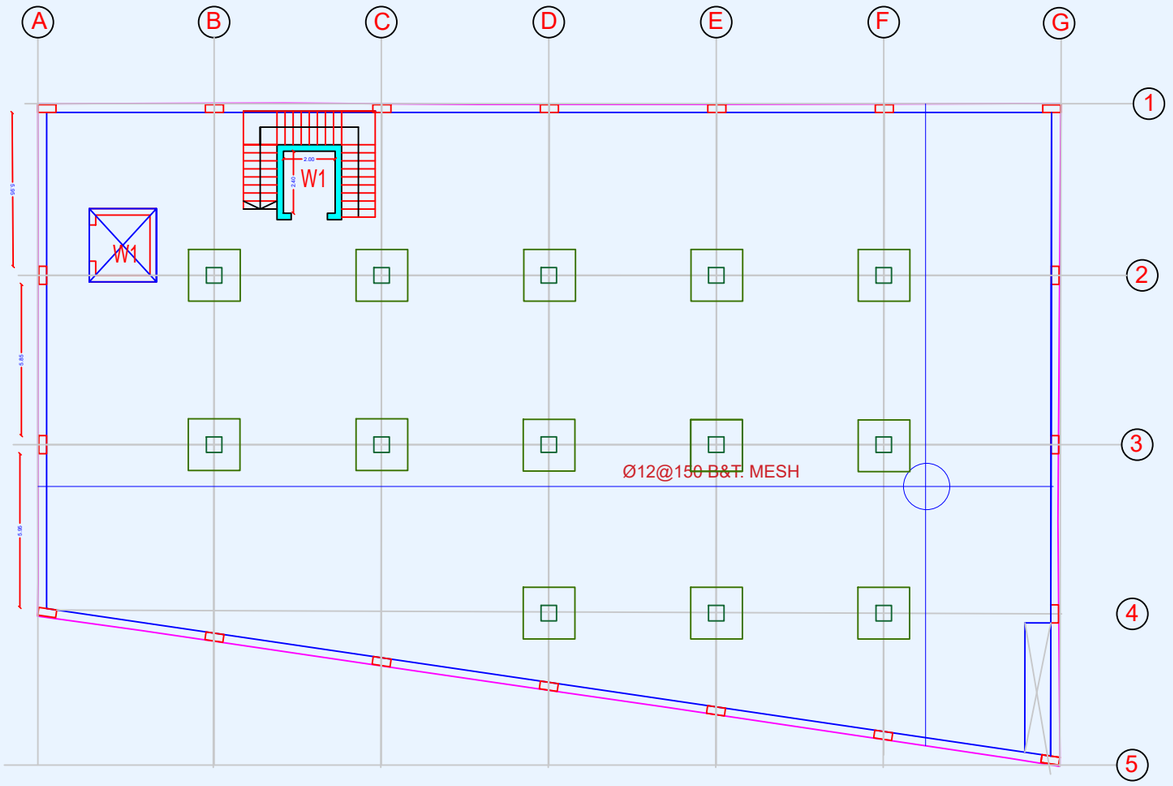
no.	date	initials	revision

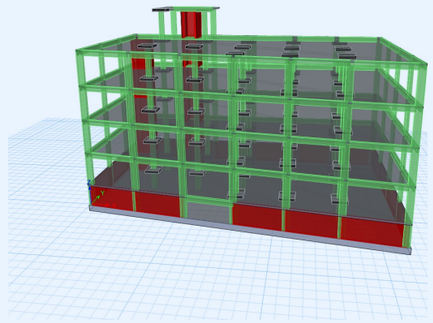
job title

(A)

drawing title
PLAN OF SLAB
REINFORCEMENT&SEC.

designed: ENG : DR-Majid Albana	project manager	
checked	scale: 1-100	date: 4 /2025
drawn	job no.: 12	sheet no.: ST/D/08
approved		





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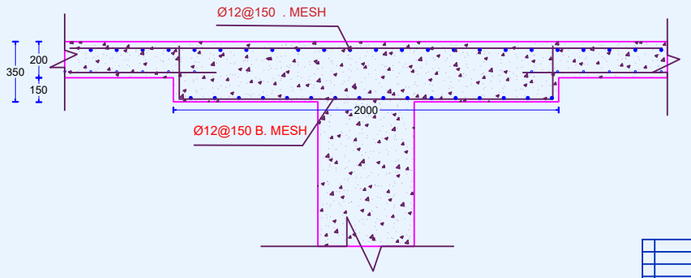
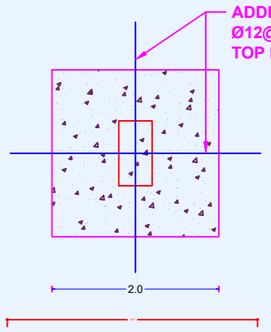
Notes

-Fcu = 50 N/mm2
-Fy = 420 N/mm2.

CONCRETE COVERS

-SLABS	= 25 mm
-BEAMS	= 40 mm
-COLUMNS	= 40 mm
-WALLS	= 25 mm
-SLAB ON GRADE	= 50 mm
-RAFT FOUNDATION	= 75 mm





SLAB REINFORCEMENT (BASEMENT,GR,1ST,2ND,3RD FLOOR)

SLAB THICKNESS = 200 mm

MINIMUM LAP LENGTH (UNLESS NOTED ON DRAWINGS) SHOULD BE AS TABLE BELWO :-

BAR DIA (mm)	10	12	16	18	20	22	25
LAP LENGTH (mm) IN COLUMNS	400	500	600	650	700	800	900
LAP LENGTH (mm) IN SLAB & BEAMS	400	600	700	800	900	1000	1250

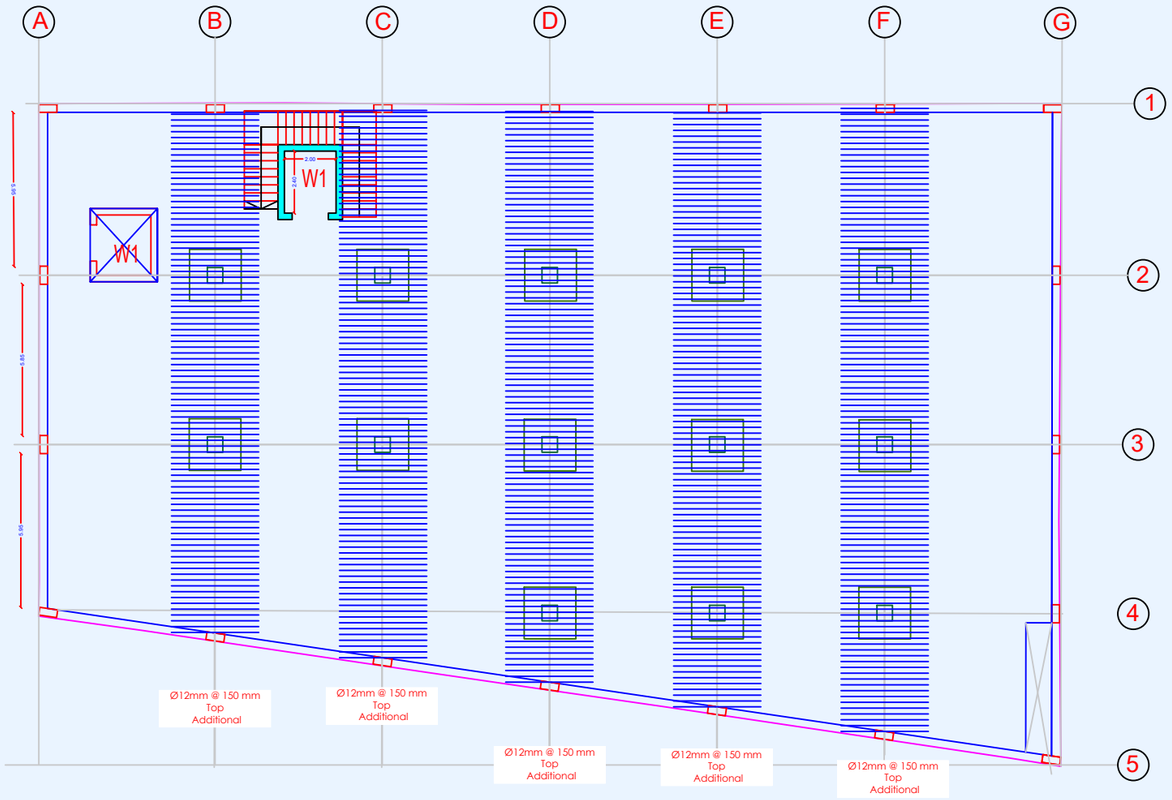
. all dim. from ARCH D.W.G.

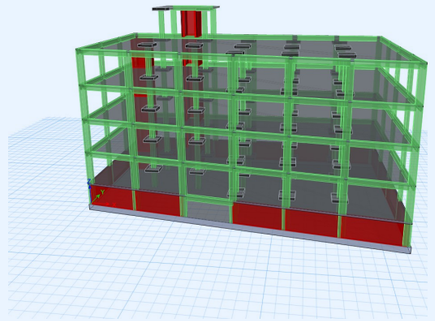
no.	date	initials	revision

job title
(A)

drawing title
PLAN OF SLAB
REINFORCEMENT&SEC.

designed	ENG : DR-Majid Albana	project manager	
checked		scale 1-100	date 4/2025
drawn		job no. 13	sheet no. ST/D/08
approved			





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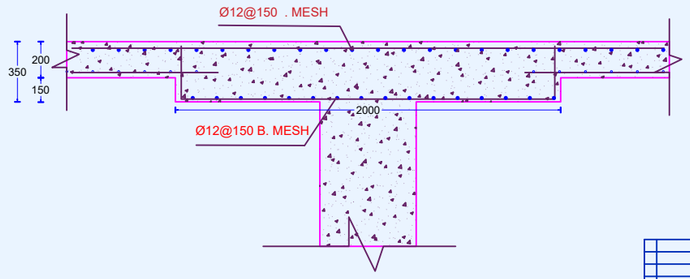
Notes

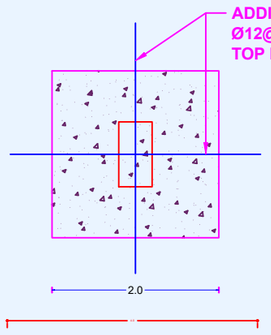
-Fcu = 50 N/mm2
-Fy = 420 N/mm2.

CONCRETE COVERS

-SLABS	= 25 mm
-BEAMS	= 40 mm
-COLUMNS	= 40 mm
-WALLS	= 25 mm
-SLAB ON GRADE	= 50 mm
-RAFT FOUNDATION	= 75 mm



Top Additional dir y



SLAB REINFORCEMENT (BASEMENT,GR,1ST,2ND,3RD FLOOR)

SLAB THICKNESS = 200 mm

MINIMUM LAP LENGTH (UNLESS NOTED ON DRAWINGS) SHOULD BE AS TABLE BELWO :-

BAR DIA.(mm)		10	12	16	18	20	22	25
LAP LENGTH (mm) IN	COLUMNS	400	500	600	650	700	800	900
LAP LENGTH (mm) IN	SLAB & BEAMS	400	600	700	800	900	1000	1250

. all dim. from ARCH D.W.G.

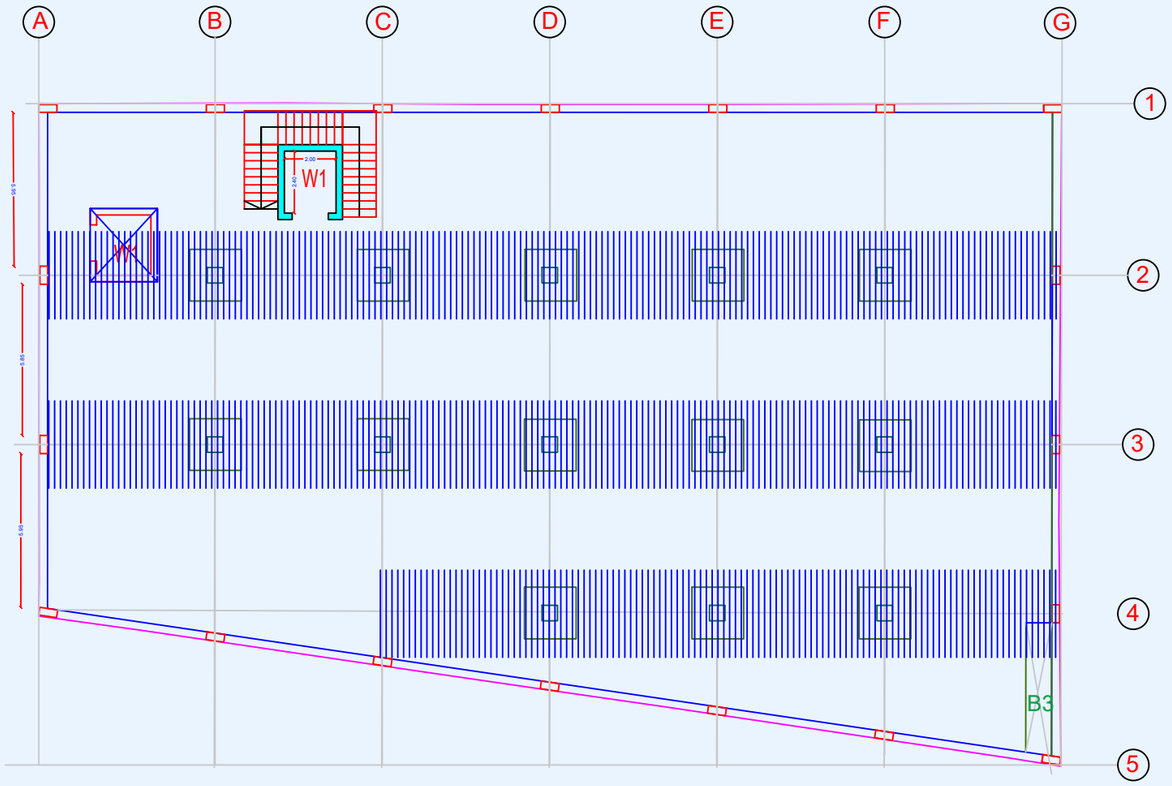
no.	date	initials	revision

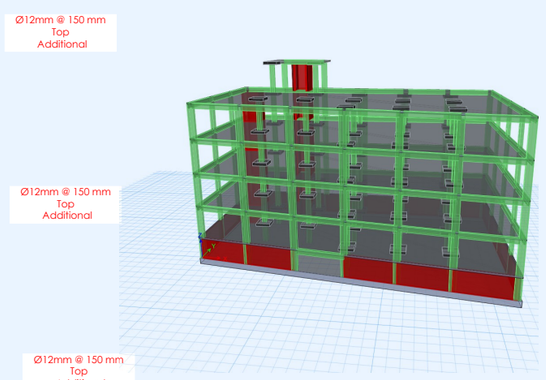
job title

(A)

drawing title
PLAN OF SLAB
REINFORCEMENT&SEC.

designed: ENG : DR-Majid Albana	project manager	
checked	scale: 1-100	date: 4 /2025
drawn	job no.: 14	sheet no.: ST/D/08
approved		





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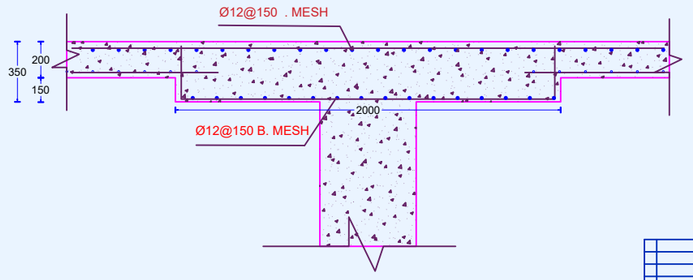
Notes

-Fcu = 50 N/mm2
-Fy = 420 N/mm2.

CONCRETE COVERS

-SLABS	= 25 mm
-BEAMS	= 40 mm
-COLUMNS	= 40 mm
-WALLS	= 25 mm
-SLAB ON GRADE	= 50 mm
-RAFT FOUNDATION	= 75 mm

DETAIL FOR SLAB SUPPORTING (BACK PROPPING)



Top Additional dir x

SLAB REINFORCEMENT (BASEMENT,GR,1ST,2ND,3RD FLOOR)

SLAB THICKNESS = 200 mm

MINIMUM LAP LENGTH (UNLESS NOTED ON DRAWINGS) SHOULD BE AS TABLE BELWO :-

BAR DIA.(mm)		10	12	16	18	20	22	25
LAP LENGTH (mm) IN	COLUMNS	400	500	600	650	700	800	900
LAP LENGTH (mm) IN	SLAB & BEAMS	400	600	700	800	900	1000	1250

. all dim. from ARCH D.W.G.

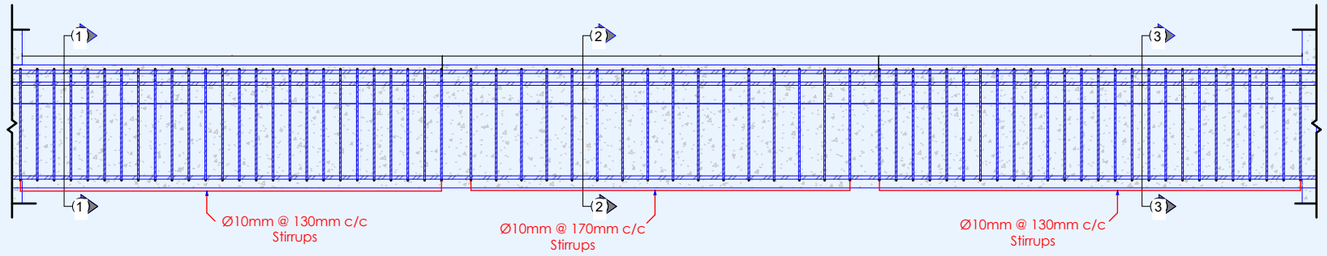
no.	date	initials	revision

job title

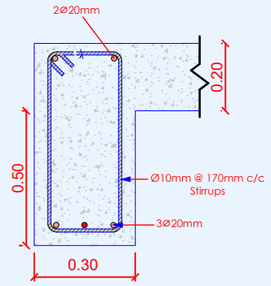
(A)

drawing title
PLAN OF SLAB
REINFORCEMENT&SEC.

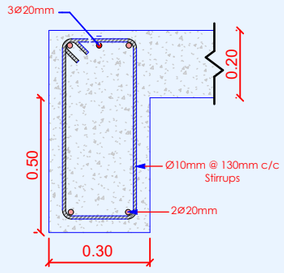
designed: ENG : DR-Majid Albana	project manager	
checked	scale: 1-100	date: 4 /2025
drawn	job no.: 15	sheet no.: ST/D/08
approved		



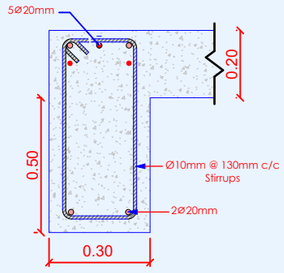
Beam1 - Longitudinal Section



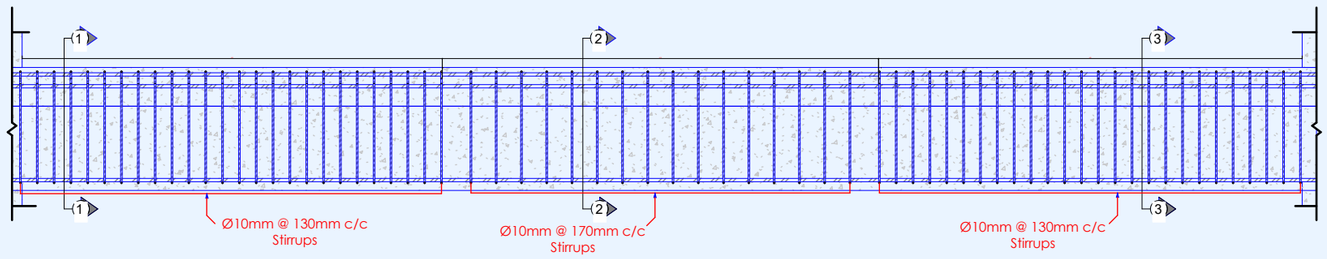
B2 Detail - at mid span



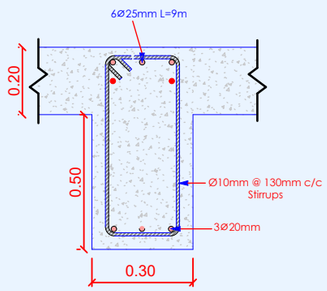
B2 Detail - at supports



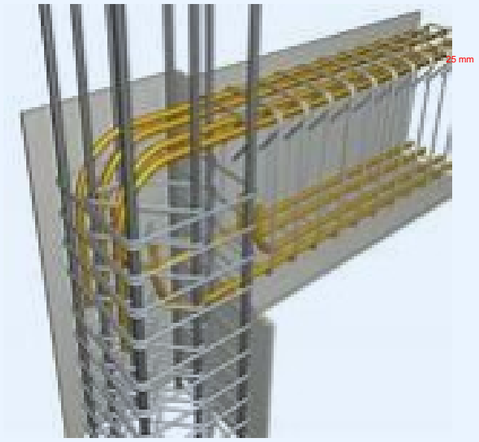
B2 Detail - at cantliver



Beam1 - Longitudinal Section



B1 Detail - at supports



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no.	date	initials	revision

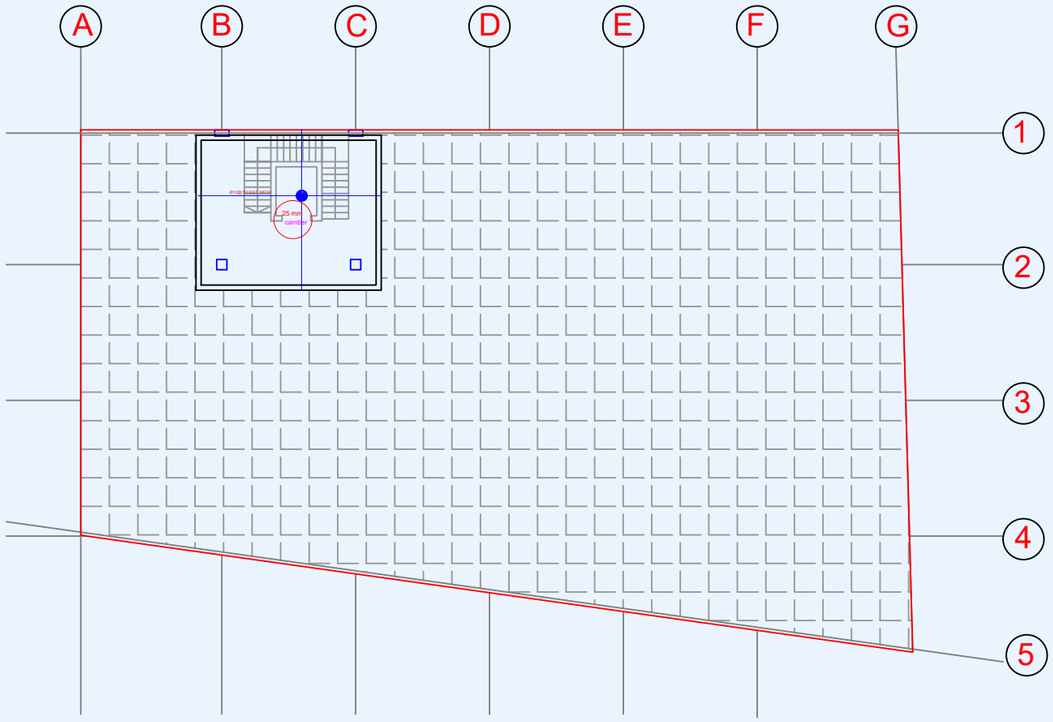
job title

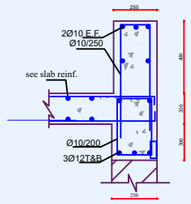
(A)

drawing title

BEAM REINFORCEMENT&SEC.

designed: ENG : DR-Majid Albana	project manager	
checked	scale: 1-100	date: 4 /2024
drawn	job no. 16	sheet no.
approved		





sec. b-b roof

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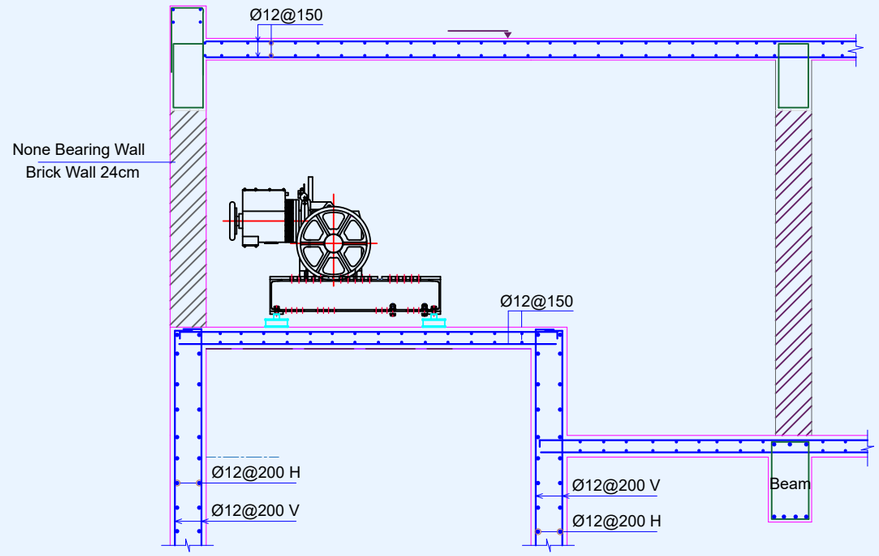
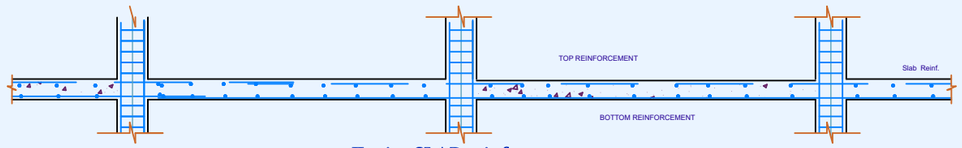


PENT HOUSE

SLAB REINFORCEMENT (3rd floor)

SLAB THICKNESS = 200 mm



Typica SLAB reinforcement

MINIMUM LAP LENGTH (UNLESS NOTED ON DRAWINGS) SHOULD BE AS TABLE BELWO :-

BAR DIA.(mm)		10	12	16	18	20	22	25
LAP LENGTH (mm) IN	COLUMNS	400	500	600	650	700	800	900
LAP LENGTH (mm) IN	SLAB & BEAMS	400	600	700	800	900	1000	1250

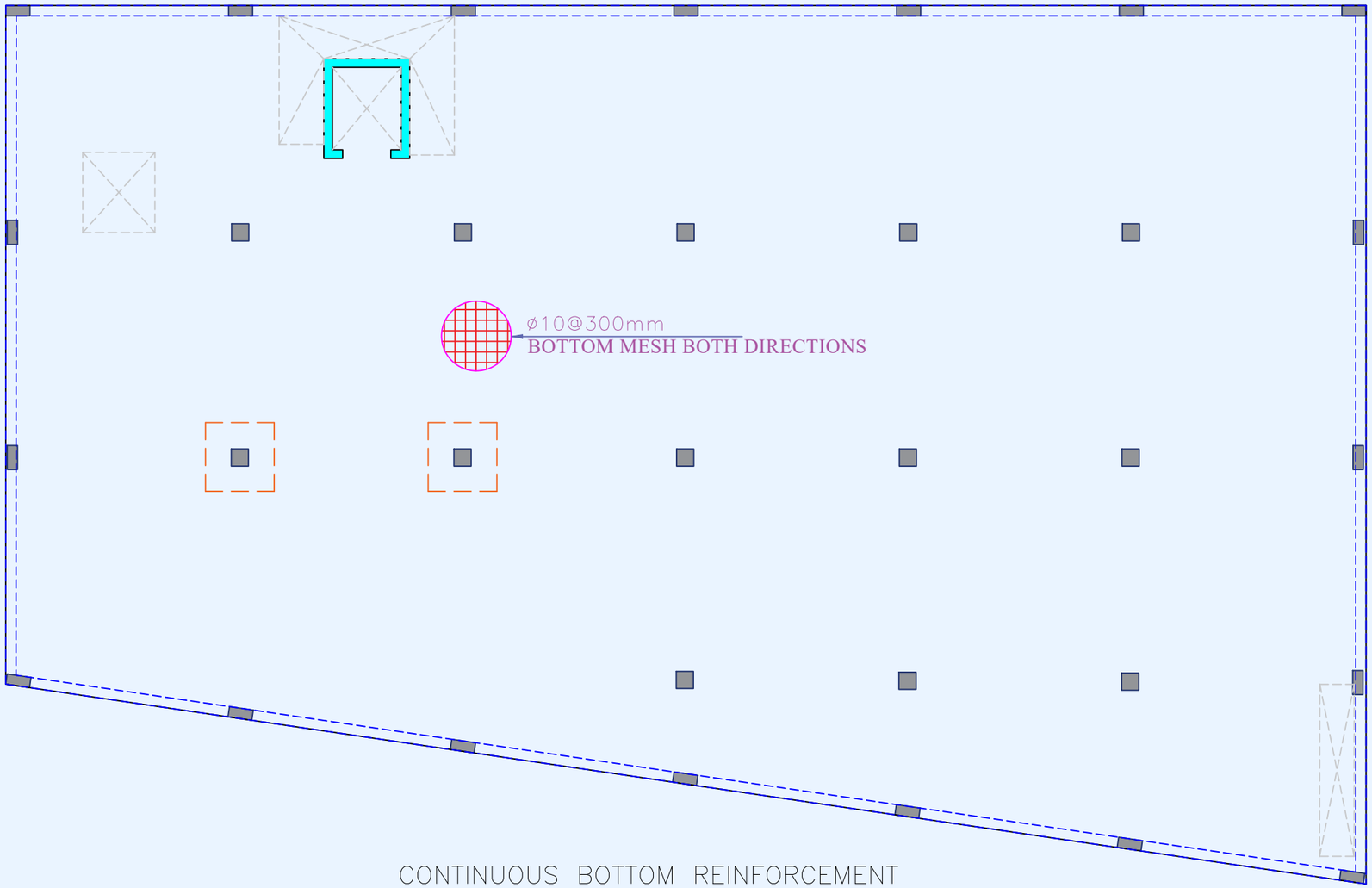
. all dim. from ARCH D.W.G.

no.	date	initials	revision

job title: (A)

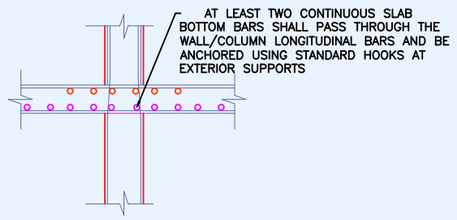
drawing title: PLAN OF SLAB REINFORCEMENT&SEC.

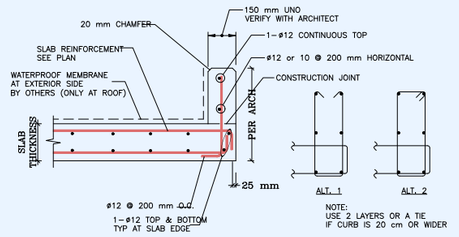
designed: ENG : DR-Majid Albana		project manager	
checked		scale: 1-100	date: 4/2025
drawn		job no.: 17	sheet no.: ST/D/12
approved			



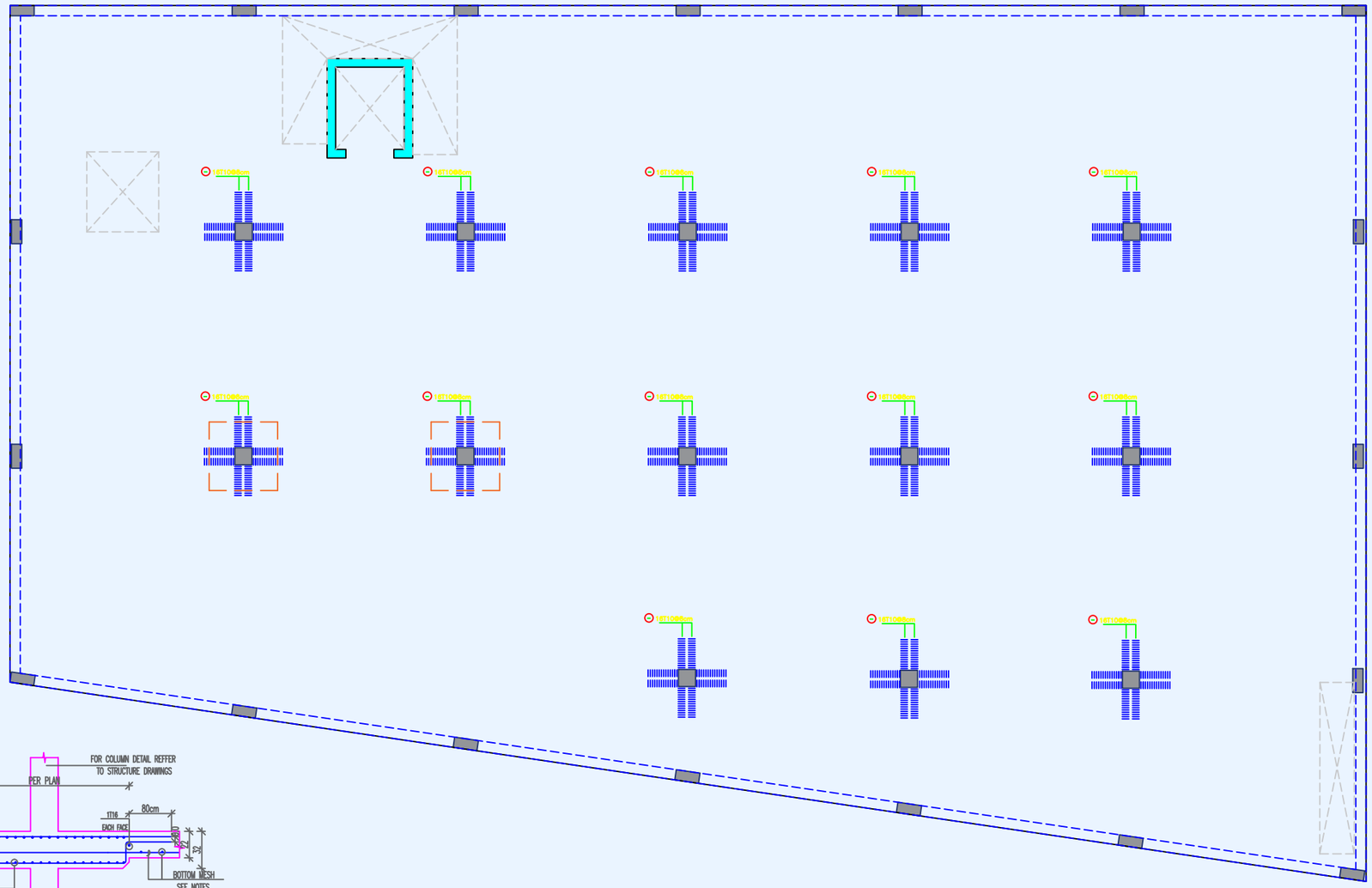
CONTINUOUS BOTTOM REINFORCEMENT

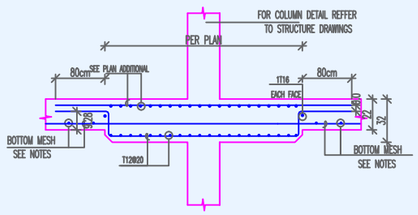
NOTES:
1. SLAB THICKNESS = 25 cm
1. FCU 40 MPA
2. TYPICAL CONCRETE CLEAR COVER = 20 mm.
3. LAP SPLICES SHALL BE CLASS B. THE LAP SPLICE LENGTH SHALL BE AS SHOWN IN THE LAP SPLICE TABLE FOR SLAB BARS
4. FORMWORK SHOULD NOT BE REMOVED FOR AT LEAST (2–FLOORS) IN ORDER TO GUARANTY THAT THE CONCRETE SLAB HAS GAINED SUFFICIENT STRENGTH.





CONCRETE CURB (PARAPET) AT SLAB EDGE

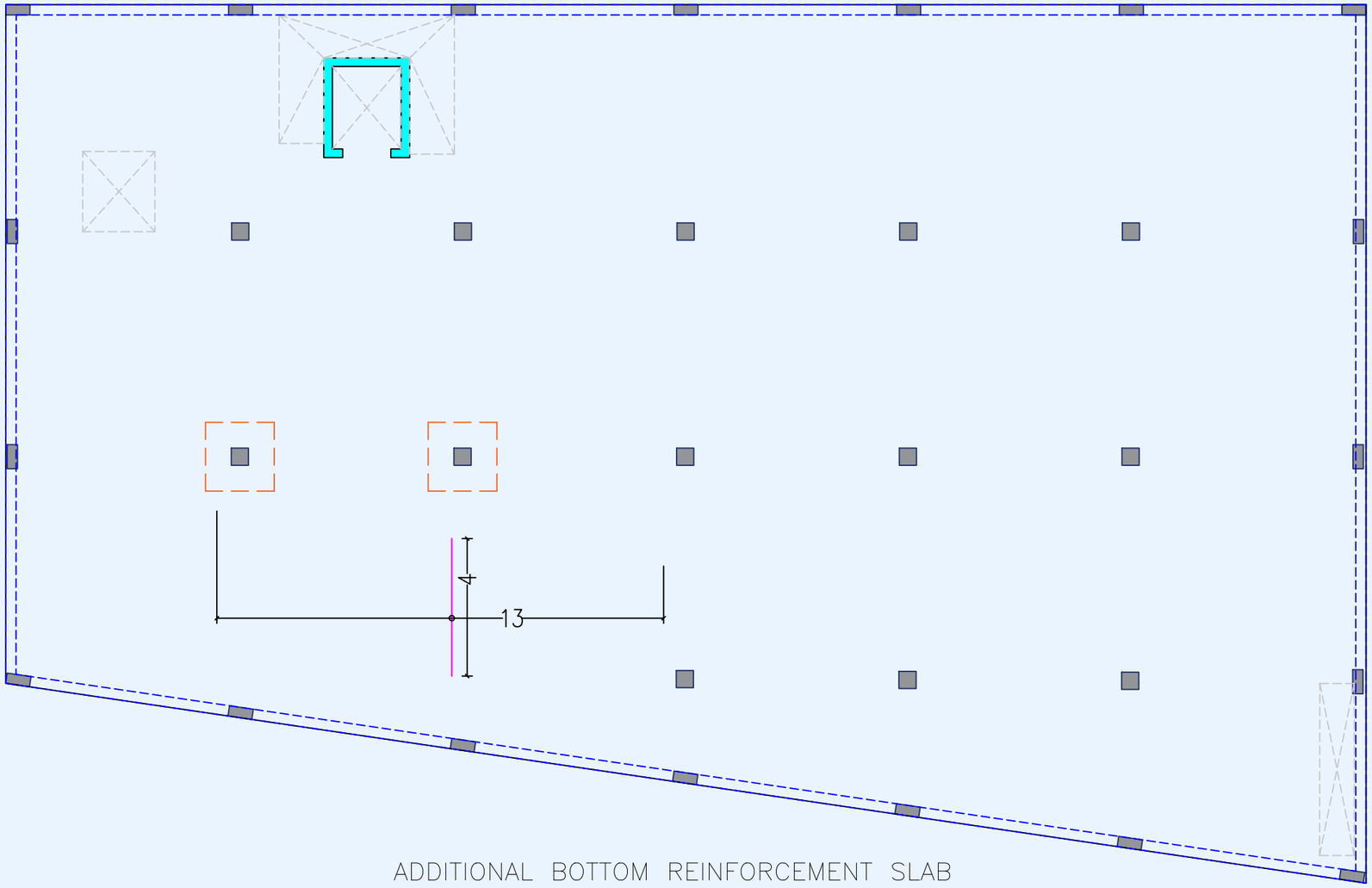




GENERAL DROP PANEL SECTION

DROP DETAIL REINFORCEMENT AND PUNCHING SHEAR REINFORCEMENT

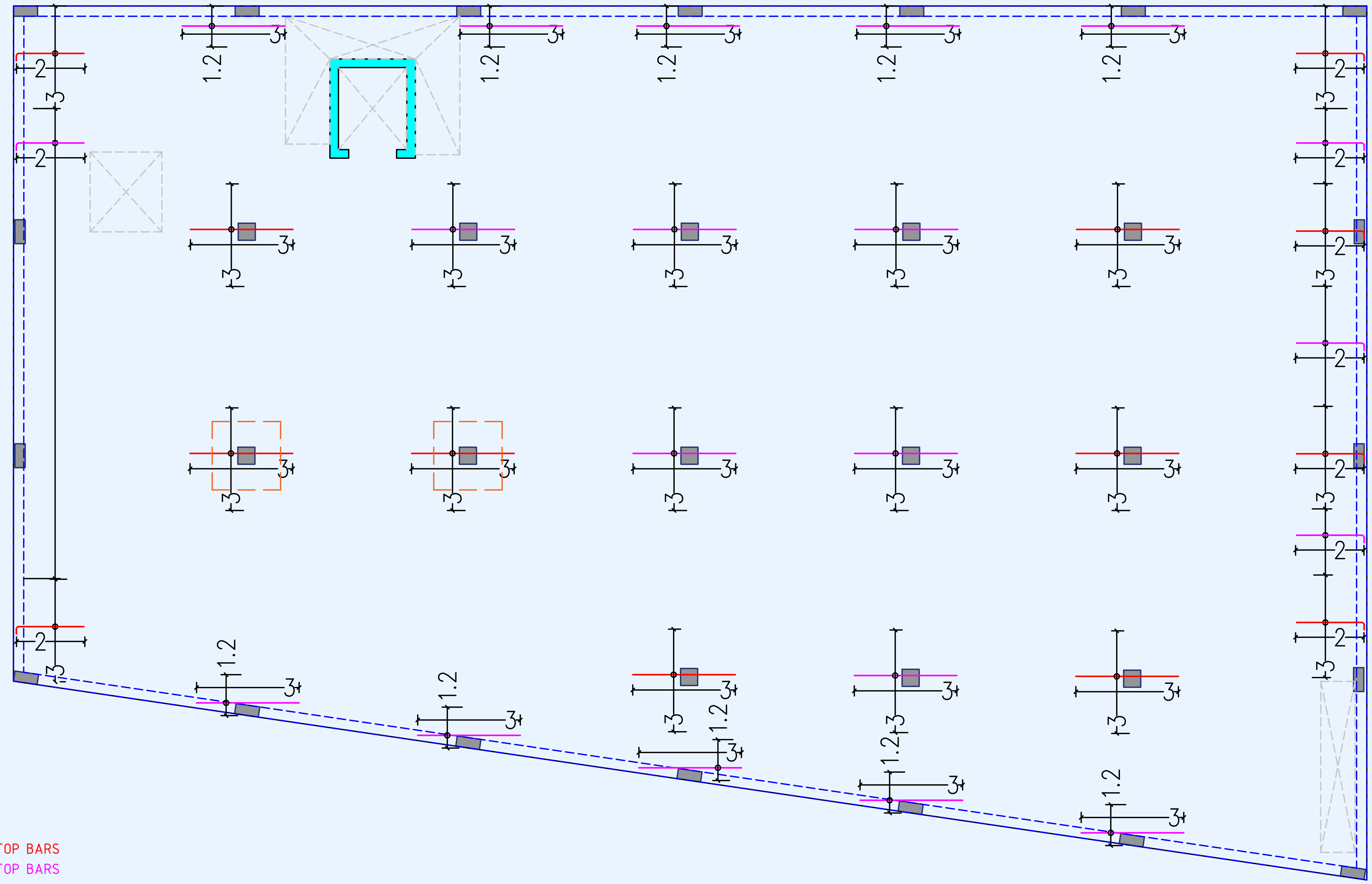
NOTES:
1. SLAB THICKNESS = 25 cm
1. FCU 40 MPA
2. TYPICAL CONCRETE CLEAR COVER = 20 mm.
3. LAP SPLICES SHALL BE CLASS B. THE LAP SPLICE LENGTH SHALL BE AS SHOWN IN THE LAP SPLICE TABLE FOR SLAB BARS
4. FORMWORK SHOULD NOT BE REMOVED FOR AT LEAST (2–FLOORS) IN ORDER TO GUARANTY THAT THE CONCRETE SLAB HAS GAINED SUFFICIENT STRENGTH.



ADDITIONAL BOTTOM REINFORCEMENT SLAB

ø10@30 cm BOTTOM ADD BARS

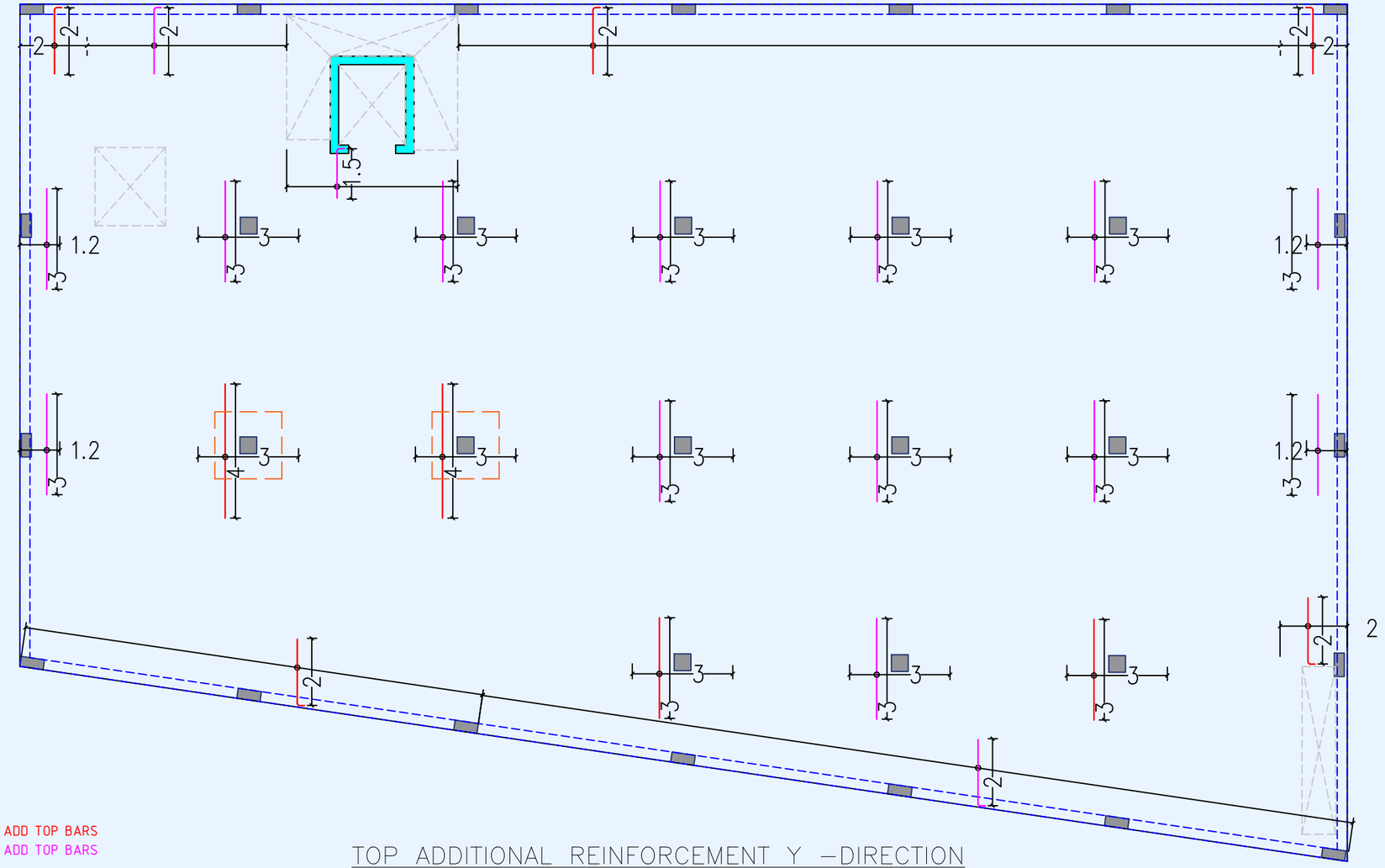
NOTES:
1. SLAB THICKNESS = 25 cm
1. FCU 40 MPA
2. TYPICAL CONCRETE CLEAR COVER = 20 mm.
3. LAP SPLICES SHALL BE CLASS B. THE LAP SPLICE LENGTH SHALL BE AS SHOWN IN THE LAP SPLICE TABLE FOR SLAB BARS
4. FORMWORK SHOULD NOT BE REMOVED FOR AT LEAST (2–FLOORS) IN ORDER TO GUARANTY THAT THE CONCRETE SLAB HAS GAINED SUFFICIENT STRENGTH.



ϕ16@20 cm ADD TOP BARS
ϕ12@20 cm ADD TOP BARS

TOP ADDITIONAL REINFORCEMENT X –DIRECTION

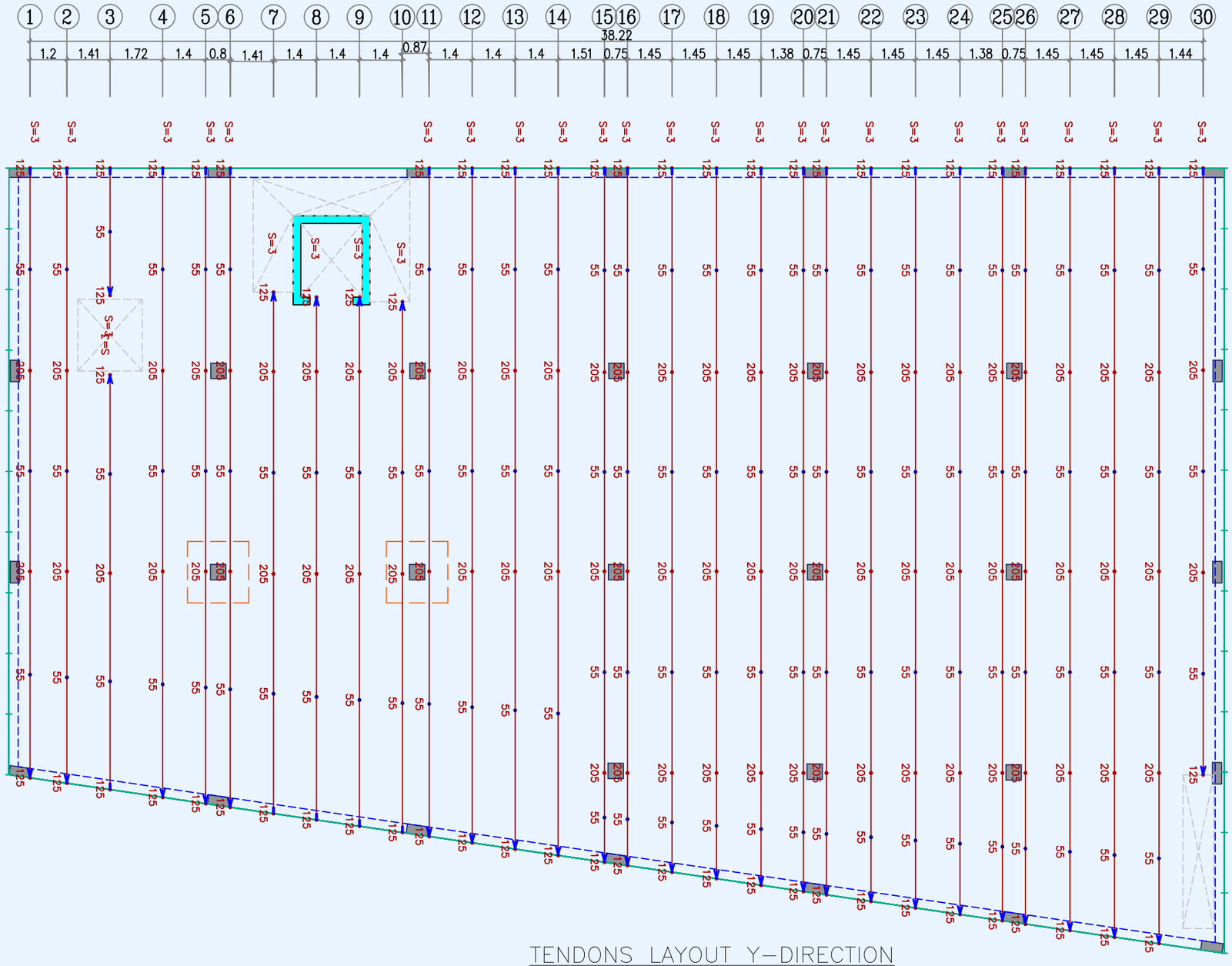
NOTES:
1. SLAB THICKNESS = 25 cm
1. FCU 40 MPA
2. TYPICAL CONCRETE CLEAR COVER = 20 mm.
3. LAP SPLICES SHALL BE CLASS B. THE LAP SPLICE LENGTH SHALL BE AS SHOWN IN THE LAP SPLICE TABLE FOR SLAB BARS
4. FORMWORK SHOULD NOT BE REMOVED FOR AT LEAST (2–FLOORS) IN ORDER TO GUARANTY THAT THE CONCRETE SLAB HAS GAINED SUFFICIENT STRENGTH.



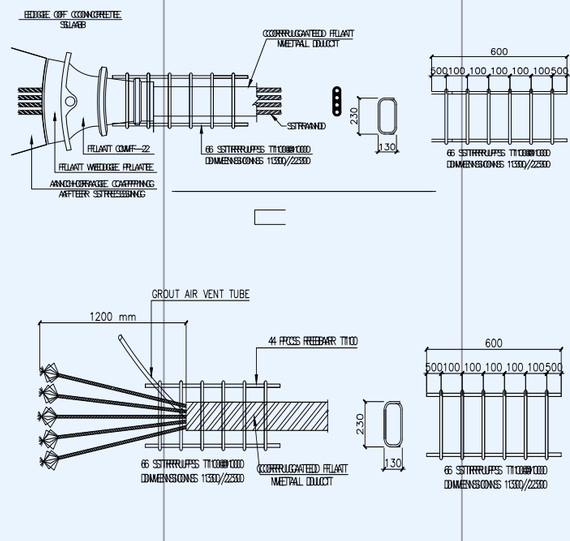
ϕ16@20 cm ADD TOP BARS
ϕ12@20 cm ADD TOP BARS

TOP ADDITIONAL REINFORCEMENT Y –DIRECTION

NOTES:
1. SLAB THICKNESS = 25 cm
1. FCU 40 MPA
2. TYPICAL CONCRETE CLEAR COVER = 20 mm.
3. LAP SPLICES SHALL BE CLASS B. THE LAP SPLICE LENGTH SHALL BE AS SHOWN IN THE LAP SPLICE TABLE FOR SLAB BARS
4. FORMWORK SHOULD NOT BE REMOVED FOR AT LEAST (2–FLOORS) IN ORDER TO GUARANTY THAT THE CONCRETE SLAB HAS GAINED SUFFICIENT STRENGTH.



TENDONS LAYOUT Y–DIRECTION



NOTES:

1. SLAB THICKNESS = 25 cm
1. FCU 40 MPA
2. TYPICAL CONCRETE CLEAR COVER = 20 mm.
3. LAP SPLICES SHALL BE CLASS B. THE LAP SPLICE LENGTH SHALL BE AS SHOWN IN THE LAP SPLICE TABLE FOR SLAB BARS
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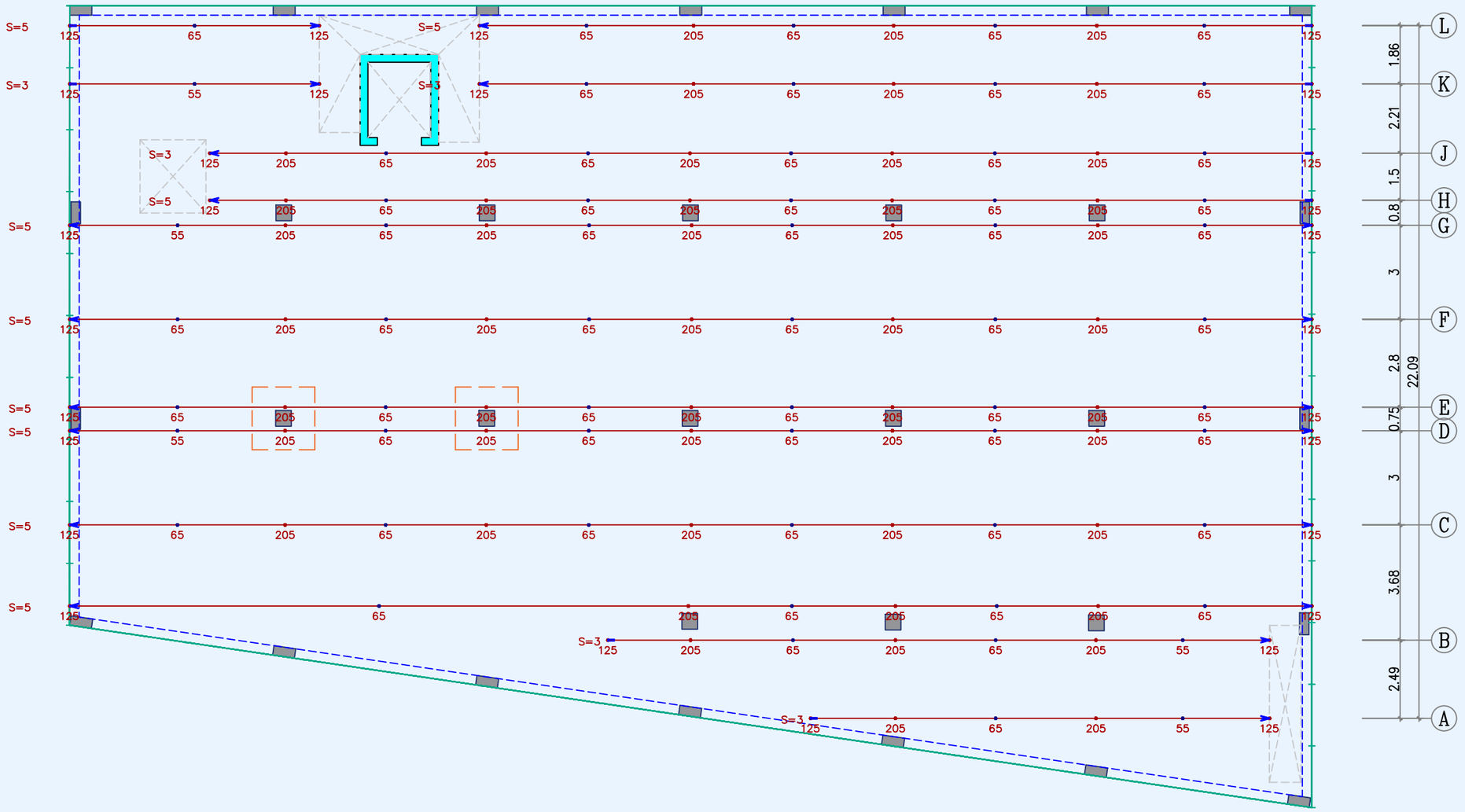
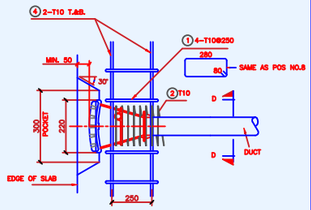


TENDONS LAYOUT X–DIRECTION

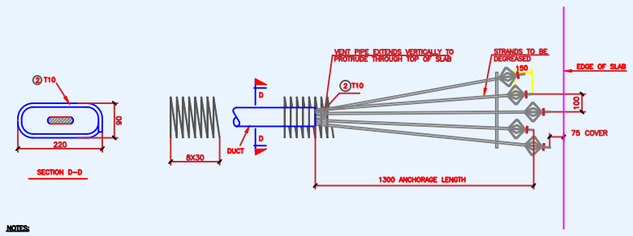
NOTES:

1. SLAB THICKNESS = 25 cm
1. FCU 40 MPA
2. TYPICAL CONCRETE CLEAR COVER = 20 mm.
3. LAP SPLICES SHALL BE CLASS B. THE LAP SPLICE LENGTH SHALL BE AS SHOWN IN THE LAP SPLICE TABLE FOR SLAB BARS
4. FORMWORK SHOULD NOT BE REMOVED FOR AT LEAST (2–FLOORS) IN ORDER TO GUARANTY THAT THE CONCRETE SLAB HAS GAINED SUFFICIENT STRENGTH.



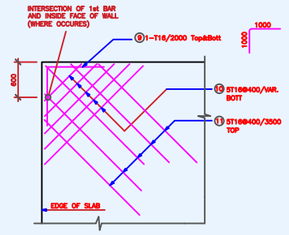
NOTES:
EXECUTE AROUND ALL THE SLAB PRIMETER.

1 TYPICAL ANCHOR DETAIL AT LIVE END

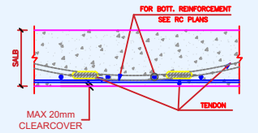


NOTES:
ANCHOR BLOCK TO BE FIXED TO FORMWORK PRIOR TO INSTALLATION OF ADJACENT REINFORCEMENT.

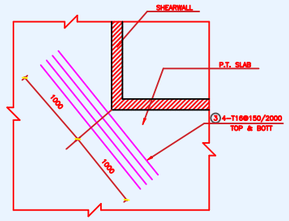
5 TYPICAL ANCHOR DETAIL AT DEAD END



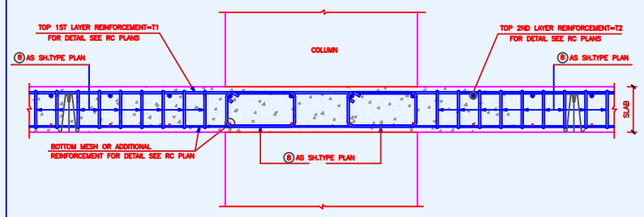
9 TRIM BARS AT UN SUPPORTED SLAB EDGES



13 TYPICAL SECTION THROUGH TENDON COVER

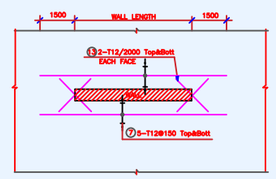


2 TYPICAL SLAB DETAIL AT CORE WALL CORNERS



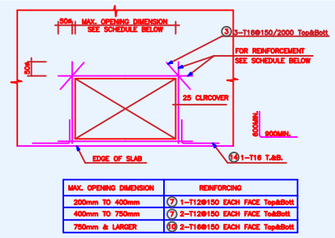
NOTES:
1. THIS DETAIL SHOULD BE EXCUTED IN COLUMN WITH DOUBLE STIRRUPS AND WIDTH BETWEEN 750 TO 1200 MILIMETER.
2. IN THIS SITUATION NUMBER OF FLEXURAL REINFORCEMENT ARE EVEN.

6 PUNCHING SHEAR REINFORCEMENT -- SECTION



NOTES:
1- FOR TOP 1ST OR 2ND LAYER REINFORCEMENT REFER TO DISTRIBUTED TENSION DIRECTION.

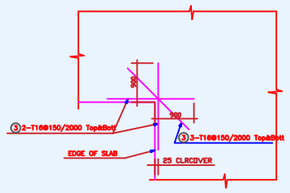
10 ADDED REBAR AT INTERIOR SHEAR WALLS



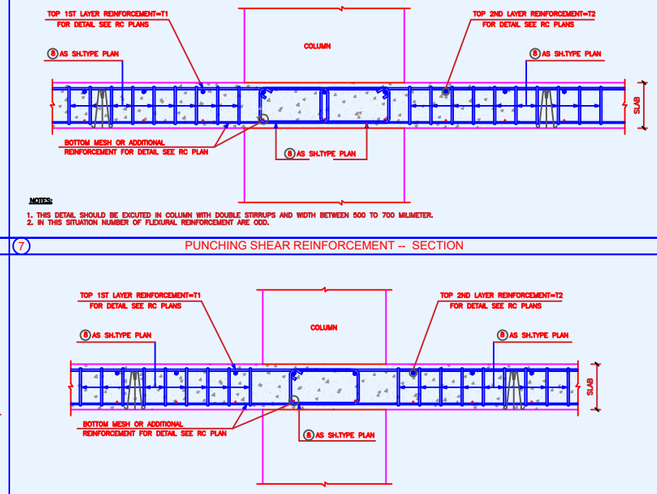
MAX. OPENING DIMENSION	REINFORCING
200mm TO 400mm	7 1-T12@150 EACH FACE Top&Bott
400mm TO 750mm	7 2-T12@150 EACH FACE Top&Bott
750mm & LARGER	14 2-T16@150 EACH FACE Top&Bott

NOTES:
1- ALL OPENINGS LARGER THAN 300mm SHALL BE TRIMMED AS SHOWN.
2- THESE BARS ARE IN ADDITION TO REBAR SHOWN ON PLANS.

14 TRIM BARS FOR OPENINGS AT SLAB EDGE

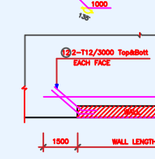


3 REBAR AT RE-ENTRANT CORNERS



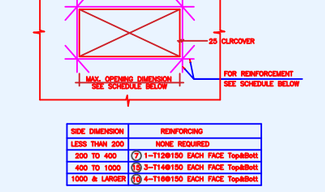
NOTES:
1. MUST BE INSTALL ON ALL COLUMN EXCEPT WHERE THE BEAM EXISTS.
2. PUNCHING SHEAR REINFORCEMENT ON PLAN HAS PREFERENCE OVER THIS DETAILS.
3. IN THIS SITUATION NUMBER OF FLEXURAL REINFORCEMENT ARE EVEN.

7 PUNCHING SHEAR REINFORCEMENT -- SECTION



NOTES:
1- FOR TOP 1ST OR 2ND LAYER REINFORCEMENT REFER TO DISTRIBUTED TENSION DIRECTION.

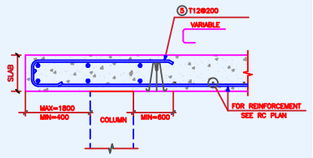
11 ADDED REBAR AT EXTERIOR SHEAR WALLS



SIDE DIMENSION	REINFORCING
LESS THAN 200	NONE REQUIRED
200 TO 400	7 1-T12@150 EACH FACE Top&Bott
400 TO 1000	13 3-T16@150 EACH FACE Top&Bott
1000 & LARGER	14 4-T16@150 EACH FACE Top&Bott

NOTES:
THESE BARS ARE IN ADDITION TO REBAR SHOWN ON PLANS.

15 TRIM BARS FOR INTERIOR OPENINGS IN SLAB



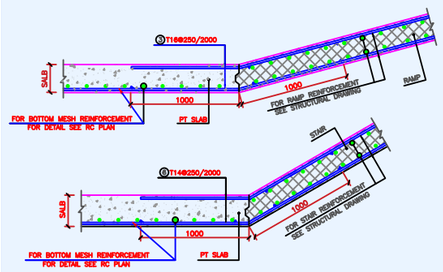
NOTES:
FOR OVERHANG GREATER THAN 1500mm REFER TO RC PLAN.

4 REINFORCEMENT AT CANTILEVER SLAB EDGE

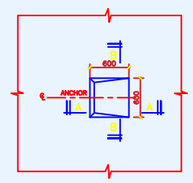
NOTES:
1. MUST BE INSTALL ON ALL COLUMN EXCEPT WHERE THE BEAM EXISTS.
2. PUNCHING SHEAR REINFORCEMENT ON PLAN HAS PREFERENCE OVER THIS DETAILS.
3. IN THIS SITUATION NUMBER OF FLEXURAL REINFORCEMENT ARE EVEN.

8 PUNCHING SHEAR REINFORCEMENT -- SECTION

SLAB THICKNESS	8 SHAPE
200 mm	230 / 80 / 150
220 mm	230 / 80 / 170
250 mm	230 / 80 / 200
270 mm	230 / 80 / 220
300 mm	230 / 80 / 250
320 mm	230 / 80 / 270
350 mm	230 / 80 / 300



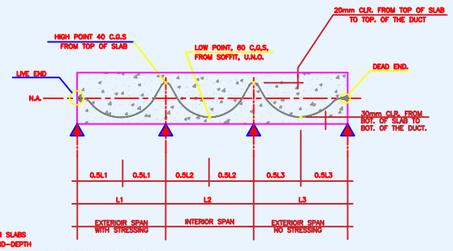
12 TYPICAL SECTION THROUGH SLAB AND RAMP/STAIRCONNECTION



NOTES:
1- AFTER POST TENSIONING CABLE HAS BEEN CUT AND SEALED, SCABBLE INSIDE FACE OF PAN RECESS AND CLEAN THOROUGHLY.

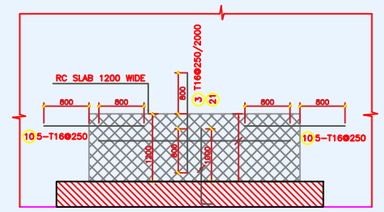
2- FILL RECESS WITH CONCRETE OF SAME GRADE AS SURROUNDING SLAB.

16 PLAN OF STRESSING SINGLE POCKET

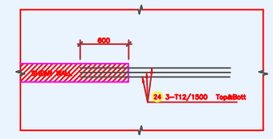


NOTES:
FOR UNIFORM SLABS
N.A. IS AT MID-DEPTH
C.G.S = THE CENTER OF GRAVITY OF STRAND (TENDON).
N.A. = NEUTRAL AXIS

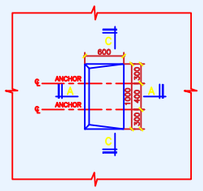
20 PROFILE FOR REVERSED PARABOLA DISTRIBUTED TENDONS



24 RC DETAIL - PLAN



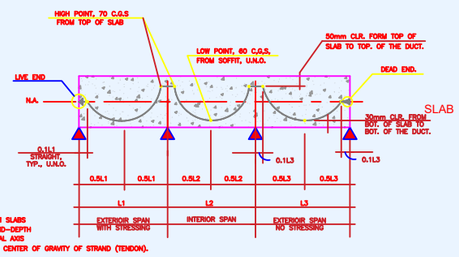
28 PLAN OF MINIMUM REINFORCEMENT AT EDGE OF SHEARWALL



NOTES:
1- AFTER POST TENSIONING CABLE HAS BEEN CUT AND SEALED, SCABBLE INSIDE FACE OF PAN RECESS AND CLEAN THOROUGHLY.

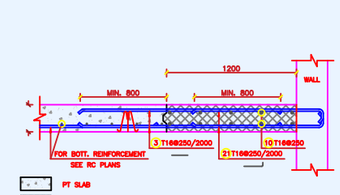
2- FILL RECESS WITH CONCRETE OF SAME GRADE AS SURROUNDING SLAB.

17 PLAN OF STRESSING DOUBLE POCKET



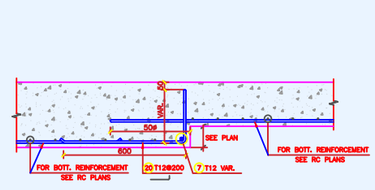
NOTES:
FOR UNIFORM SLABS
N.A. IS AT MID-DEPTH
N.A.= NEUTRAL AXIS
C.G.S = THE CENTER OF GRAVITY OF STRAND (TENDON).

21 PROFILE FOR PARTIAL PARABOLA BANDED TENDONS

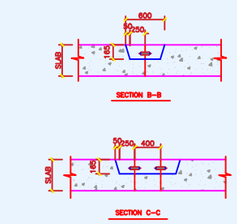


NOTES:
1- FOR TOP 1ST OR 2ND LAYER REINFORCEMENT REFER TO DISTRIBUTED TENDON DIRECTION.

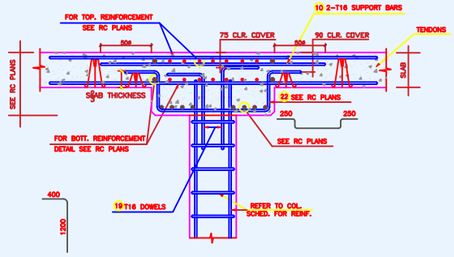
25 RC DETAIL SECTION WITH SHEAR WALL



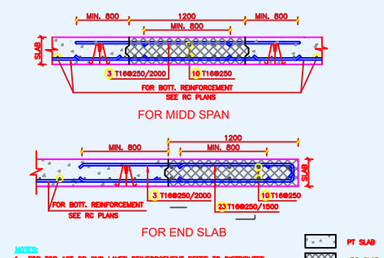
29 ADDED REBAR AT SMALL DROPS IN SLAB SOFFIT



18 POCKET SECTIONS

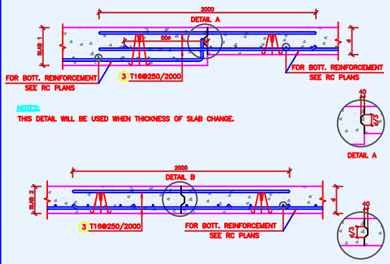


22 TYPICAL COLUMN SECTION DROP CAP AT BELOW

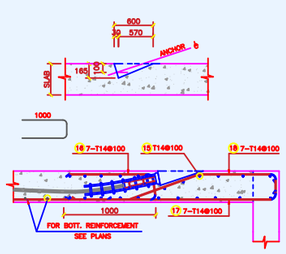


NOTES:
1- FOR TOP 1ST OR 2ND LAYER REINFORCEMENT REFER TO DISTRIBUTED TENDON DIRECTION.

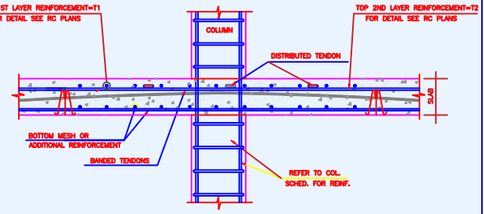
26 RC DETAIL - SECTION



30 ADDED REBAR AT CONSTRUCTION JOINT

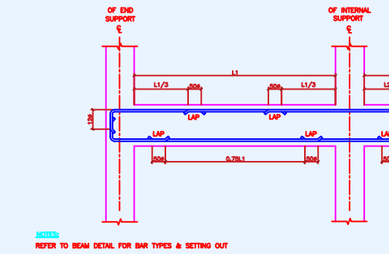


19 SECTION A-A



NOTES:
1- TENDONS TO BE NOMINALLY DISPLACED TO AVOID VERTICAL COLUMN REINFORCEMENT
2- SLAB COLUMN CONNECTION REINFORCEMENT TO BE NOMINALLY DISPLACED TO AVOID TENDONS IF NECESSARY

23 TYPICAL SECTION AT SLAB COLUMN CONNECTION



NOTES:
REFER TO BEAM DETAIL FOR BAR TYPES & SETTING OUT

27 TYPICAL ARRANGEMENT OF THE REINFORCEMENT IN BEAM