PORTFOLIO

AIM INTEGRATED DESIGN

STRUCTURAL DESIGN

AIM INTEGRATED DESIGN



ABOUT US

AIM Integrated Design is a multidisciplinary vanguard bridging visionary conceptualization and operational reality. We engineer data-rich, build-ready solutions, synthesizing "integration without limits" into high-performance environments for global hospitality and healthcare.

Our practice asserts that unity catalyzes efficiency. By fusing Operational Intelligence with Technical Rigor, we leverage advanced building information modeling (BIM) to neutralize risk and ensure ergonomic precision. This synthesis ensures Future-Ready Scalability, delivering adaptable architectural ecosystems engineered to evolve alongside emerging technologies.

As Architects of Synchronization, we provide a unified nexus where architecture, engineering, and technology converge. Forged in precision and global adaptability, AIM is the definitive partner for stakeholders demanding innovative, high-velocity, and hyper-efficient built environments.

OUR MISSION

1. Objective

To pioneer an "integration without limits" philosophy by synchronizing architecture, engineering, and technology into a unified, high-performance design ecosystem.

2. Direction

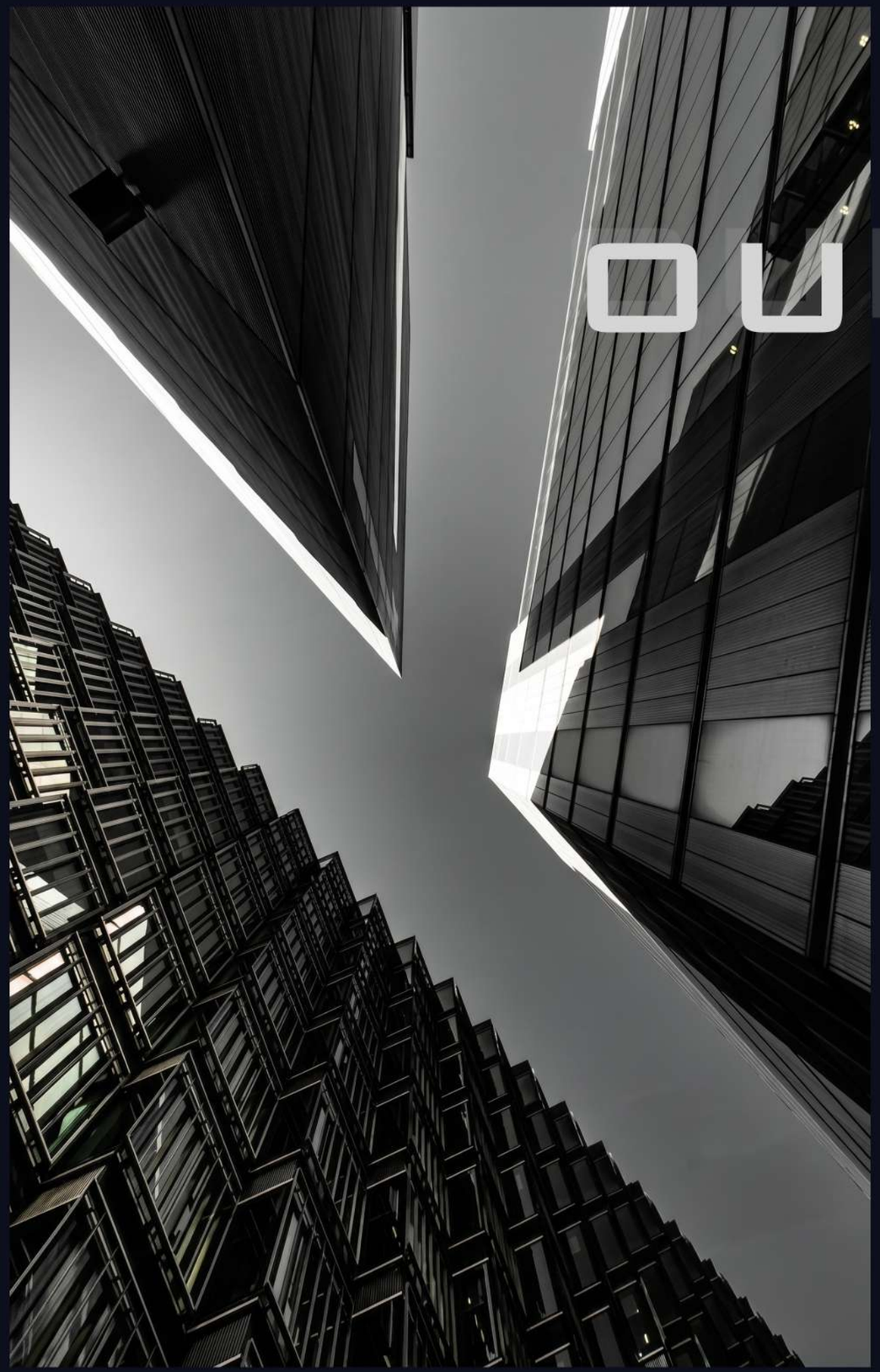
To evolve into a singular collaborative platform that redefines industry standards through intelligent, data-driven BIM workflows and seamless multidisciplinary execution.

3. Guiding Principles

We anchor our practice in technical precision, operational ergonomics, and uncompromising international compliance to ensure every project achieves peak efficiency.

4. Global Experience

Our portfolio spans diverse international sectors, navigating complex regulatory landscapes to deliver world-class design solutions across hospitality, commercial, and industrial markets.



OUR VISION

Future Aspiration

To architect a borderless, intelligent ecosystem where design, engineering, and construction converge into a singular, unified platform of innovation.

Strategic Outlook

To leverage advanced building information modeling (BIM)-centric workflows and multidisciplinary integration as the catalyst for smarter, data-driven, and hyper-efficient built environments.

Collective Dream

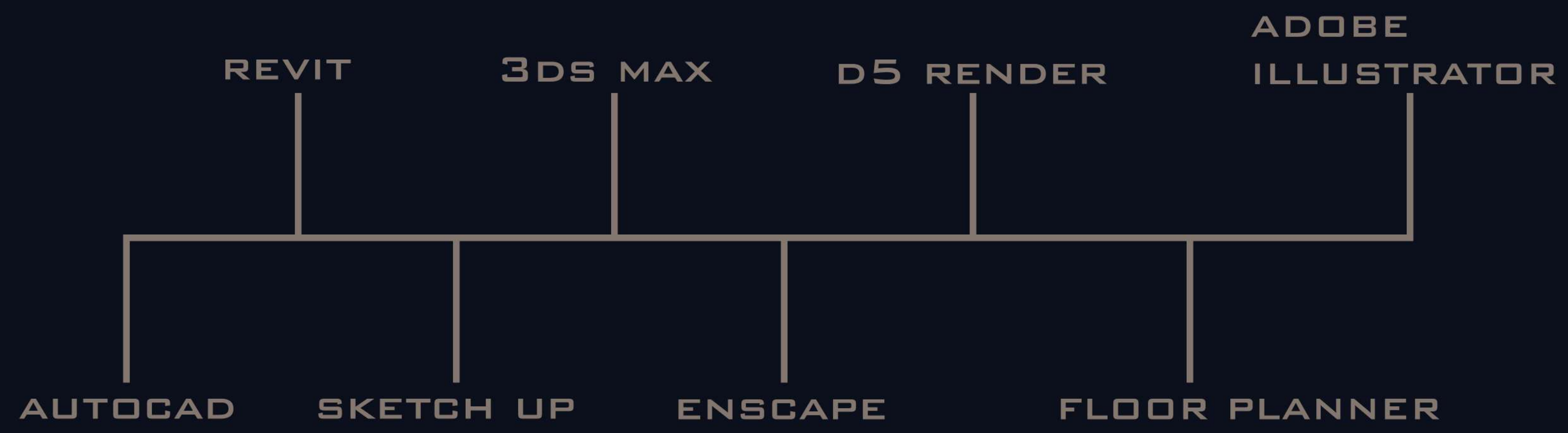
To dissolve industry silos by fostering a global collaborative culture where technology and human expertise harmonize to deliver limitless design possibilities.



WHY US

AIM Integrated Design HAS THE unrivaled ability to bridge the gap between visionary conceptualization and operational reality through "integration without limits." We provide a unified nexus where architecture, engineering, and technology converge, leveraging Technical Rigor and advanced building information modeling (BIM) to neutralize project risk before it reaches the site. By synthesizing Operational Intelligence with Future-Ready Scalability, we deliver high-performance, data-rich environments engineered for ergonomic precision and long-term technological evolution. Partner with us to transform complex design into a seamless, hyper-efficient, and build-ready asset.

SOFTWARE TECHNICALITY



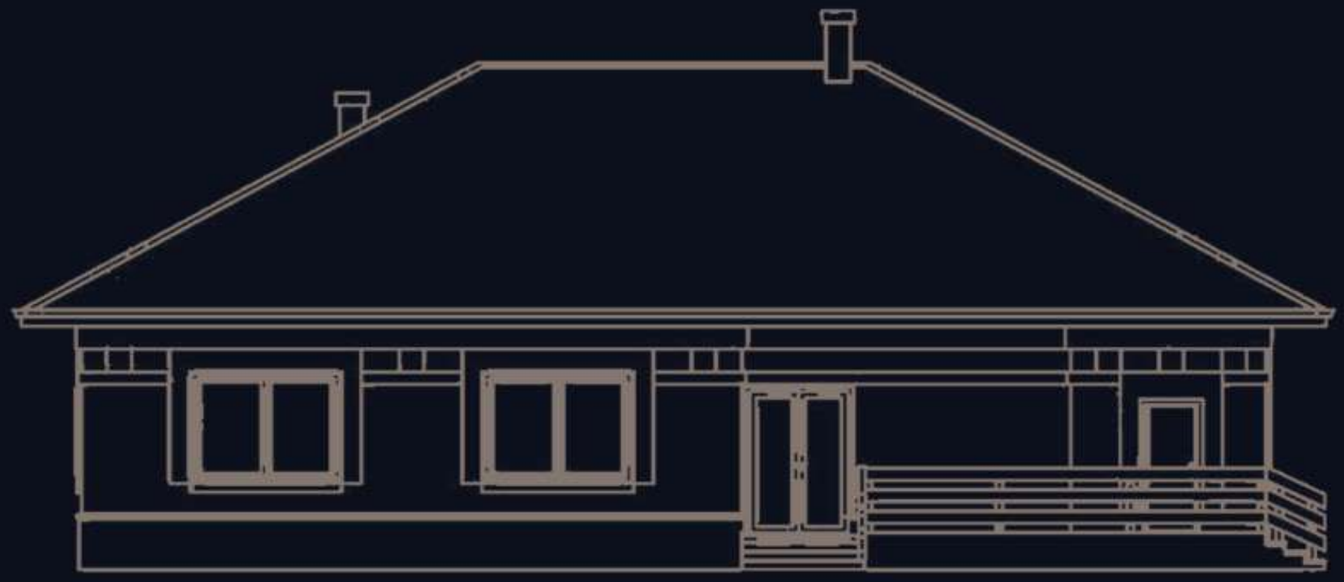
STRUCTURAL DESIGN PORTFOLIO

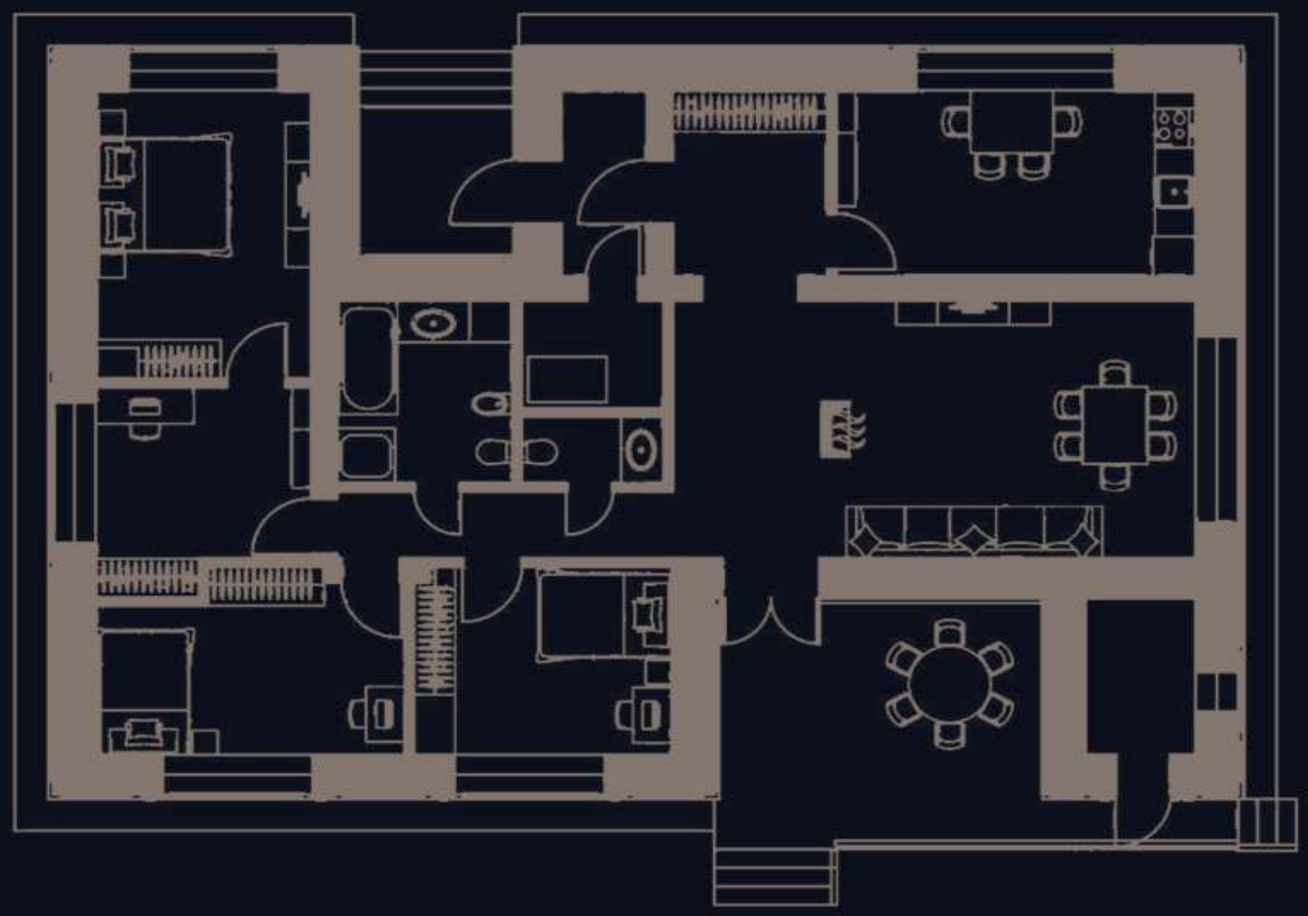


TABLE OF CONTENT

1.TITLE PAGE 01
2.ABOUT US 02
3.OUR MISSION 03
4.OUR VISION 04
5.WHY US 05
6.SOFTWARE TECHNICALITY 06
7.STRUCTURAL DESIGN PORTFOLIO 07
8.TABLE OF CONTENT 08
9.DRAWING/ MODEL AND DETAILING 09
• HOSPITAL (PAKISTAN) 10-15
• RESIDENTIAL PROJECT (UAE) 16-21
• RESIDENTIAL PROJECT (UAE) 22-26
• EIFFEL TOWER (PAKISTAN) 27-32
• CONTAINER COMPOUND (PAKISTAN) 33- 43
• KFC H-9 (PAKISTAN) 44-48
• COMMERCIAL PLAZA (PAKISTAN) 49-59
• MASTER VILLA (KSA) 60-65
• KANE TOBBACO (UAE) 66-73
• AGRICULTURE MALL (PAKISTAN) 74-77
• INDUSTRIAL SHED (PAKISTAN) 78-80
10.BOQ AND BOM ESTIMATE OF PROJECT (QUOTE) 81-86
• DESIGN REPORT OF STAIR CASE PROJECT (USA) 87-98
11.CONTACT INFORMATION

DRAWING/ MODEL AND DETAILING





HOSPITAL
PAKISTAN



GENERAL NOTES & SPECIFICATIONS

1. General

1.1. All structural drawings should be read in conjunction with Architectural, Civil, Mechanical, Electrical and other relevant drawings. The contractor should coordinate with Architectural and various service drawings for levels, sizes and location of all Structural members, Floors Walls and Pipes etc .

1.2. The contractor shall report all discrepancies, differences and conflicts, as soon as they are observed.

1.3. Safe working practices will be adopted, and no damage to any property or life will be ensured.

1.4. Prior approval of proposed method of work, sequence of jobs, location of block-outs and construction joints in concrete , location of all splices and proposed values of camber is required.

1.5. The structure is not designed against construction loads. The contractor is responsible for ensuring that all elements should remain supported during construction.

1.6. Prior to adopting finished levels of structural elements, proper allowances are to be maintained by the contractor.

2. Design

2.1. The Structural design of all concrete elements is based on Building Code Requirements for Structural Concrete (ACI 318-19) Reinforced Concrete Design, Concrete structure, mix Design, Durability and strength.

2.2.ASCE 7-22 (Design Loads).

2.3.ASCE 41 Seismic safety, Foundation Design, Structure design Loads

3.1 AISC 360 (Steel structures, AISC 341 Seismic if required.

3.1 ASTM standardsfor concrete, steel etc.

4. Materials

4.1. Concrete

4.1.1. Plain Concrete All Plain concrete shall have a cylinder strength of 1500 psi, at 28 days, unless noted otherwise.

Structural Concrete

a) The structural concrete for all columns shall have a minimum compressive cylinder strength of 4,000 psi, at 28 days.

b)All concrete work shall conform to Specifications for Structural Concrete for Buildings ACI 301-05 published by the American Concrete Institute, Farmington Hills, Michigan.

c) Unless Noted Otherwise all other structural concrete shall have a minimum compressive cylinder strength of 3,000 psi, at 28 days. Note that specified compressive strength shall be achieved through proper mix design and this design shall be sole responsibility of Contractor (or as specified in the contract documents).

4.2. Reinforcing Steel

4.2.1. Except as otherwise specified, all reinforcing steel shall conform to ASTM A615, Grade 60.

4.2.2. All steel for column ties and beam stirrups, shall conform to ASTM A615, Grade 60.

4.1.2. All steel for column ties and beam stirrups, shall conform to ASTM A615, Grade 60.

5. Clear Concrete Covers to Reinforcement

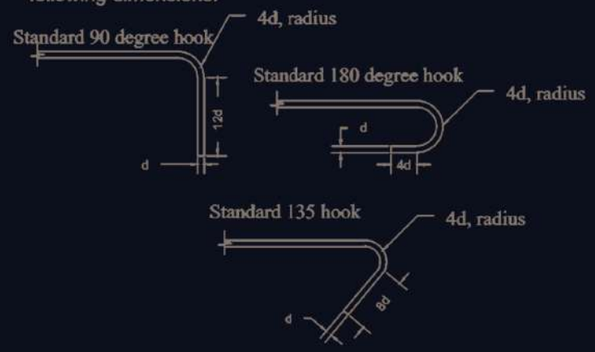
	Member	Cover
1)	Foundations	2"
2)	Columns	1½"
3)	Beams (with depth less than 10")	3/4"
4)	Beams (with depth greater than than 10")	1½"
5)	Slab	3/4"
6)	Walls Facing Soil	2"
7)	Walls Other	1"

5.1. In order to ensure the specified covers, bars must be secured in position, with the help of concrete spacer blocks, with embedded binding wire. 5.2. To support top bars, provide supporting rebars and standard ACI chairs.

6. Bar Development

6.1. Standard Hooks Unless otherwise shown in the drawings, standard ACI hooks shall shall be provided at the free ends of all bars.

6.2. Unless noted otherwise, the hooks will comply the following dimensions:



6.3. Development and Splice Lengths

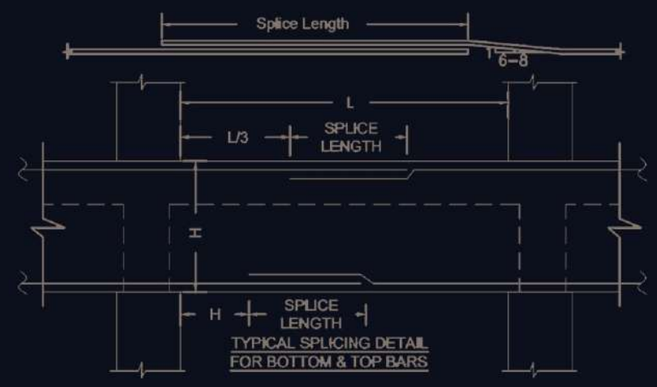
a. Splice length of reinforcing bars shall as follows.

Bar Designation	Splice lengths (in)	
	Concrete with cylinder strength of 3,000 psi at 28 days	
	Top bars* Splice Length	Other than top bars Splice Length
#3	30	24
#4	39	30
#5	48	36
#6	57	45
#8	93	72

Top bars are horizontal bars, with at least 12 in of fresh concrete below them.

b. For splicing unequal diameter bars, use smaller diameter for splice length determination

c. Where required, bar shall have a gradient between 1:6 to 1:8.



7. Construction Joints

a. Construction joints shall be located with the prior approval of the Engineer, if it is not indicated in the drawing.

b. On proposed construction joint surfaces, all fines shall be removed, on initial setting of concrete, but before its hardening. In order to achieve this, sand blasting or wire brushing could be used. Before placing the second-stage concrete, the joint surface shall be cleaned free of all loose material and washed. A bonding agent shall be applied to the surface and concrete placed within the period stipulated by the manufacturer.

8. Foundation

a. Foundation Should be executed in accordance with geotechincal investigation report of this project.

b. Procedure for placement of structural fill should be strictly followed as if recommended in geo technical report.

c. All footings should be concentric with the column centre line unless otherwise shown. be replaced with plain cement concrete.

d. Irregularity formed from loose strata under the footing shall

9. Terms & Abbrevations Following terms and abbreviations are used in all structural drawings.

a) UNO: Unless Noted Otherwise

b) NSL: Natural Surface Level

c) Typ: Typical

d) FFL: Finished Floor Level

e) C.Joint: Construction Join

NOTE:-

TOP BARS

BOTTOM BARS

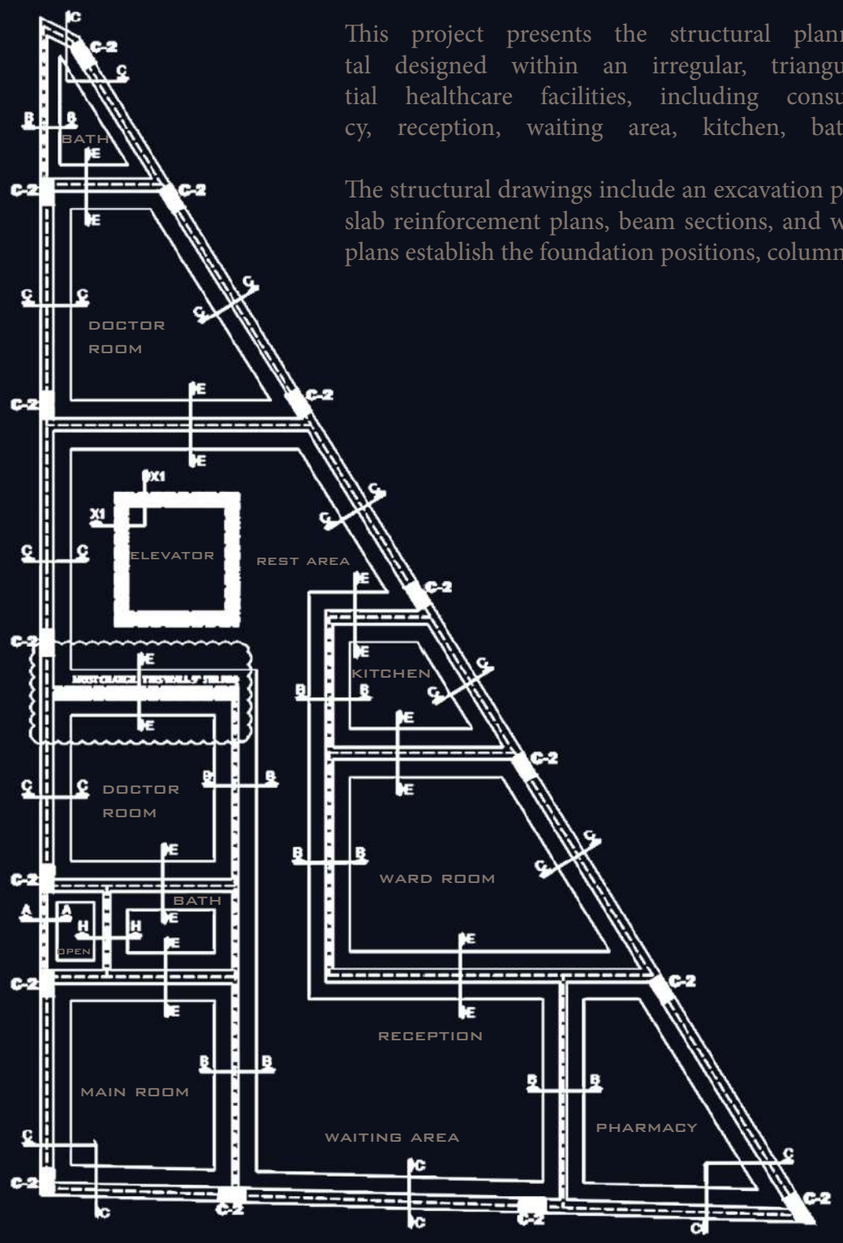
NAGITIVE BARS

All Slabs Are 6" Thick Unless Otherwise Mention

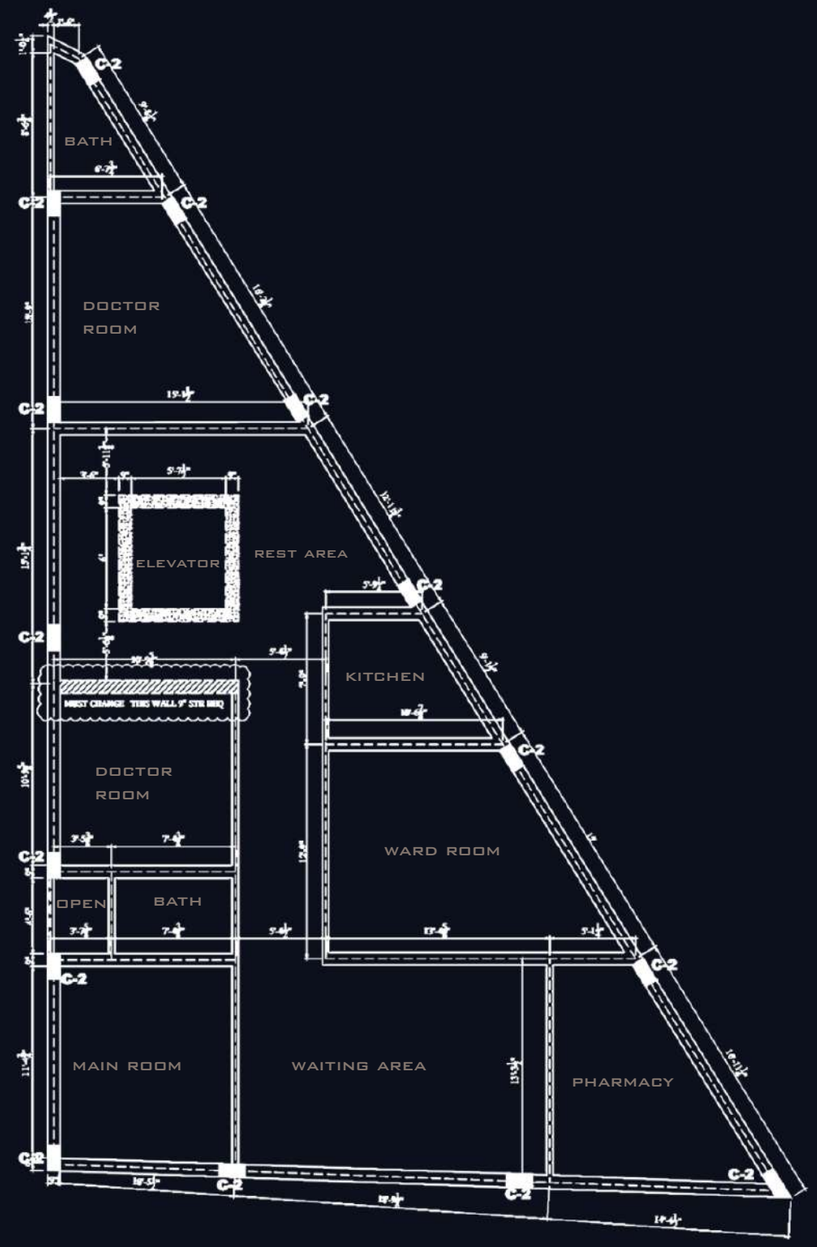
Provide 1" to 2" Camber in Every Beam

This project presents the structural planning and construction details of a hospital designed within an irregular, triangular site. The layout accommodates essential healthcare facilities, including consultation rooms, a patient ward, pharmacy, reception, waiting area, kitchen, bathrooms, and a centrally located elevator.

The structural drawings include an excavation plan, centre line plan, footing details, ground-floor slab reinforcement plans, beam sections, and water tank details. The excavation and centre line plans establish the foundation positions, column locations, structural alignment, and dimensions.



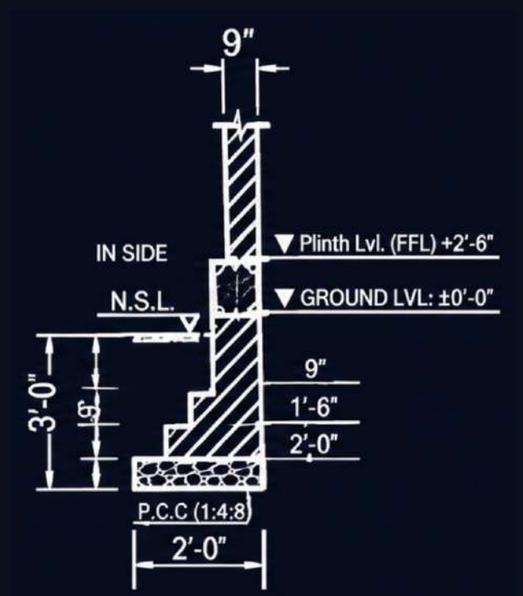
ESCAVATION PLAN



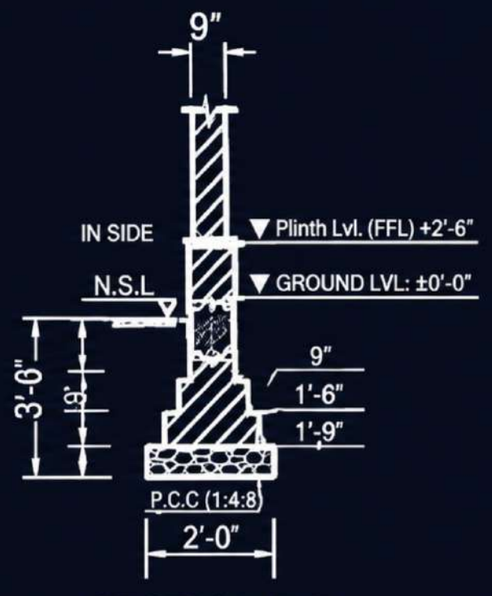
CENTER LINE PLAN

HOSPITAL PAKISTAN

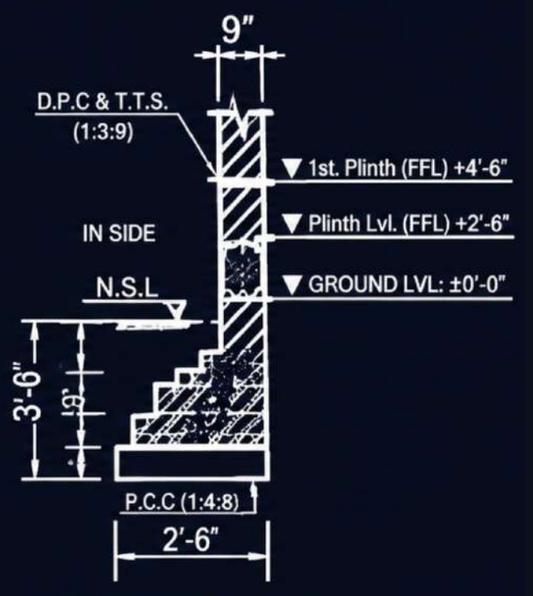
FOOTING SECTIONS



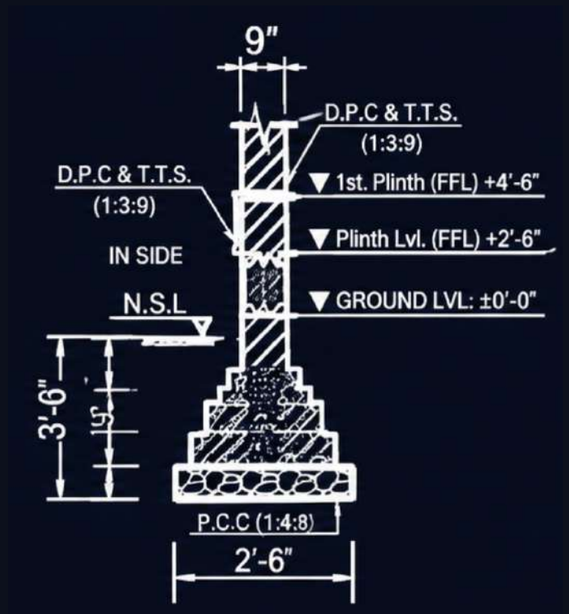
SECTION A-A



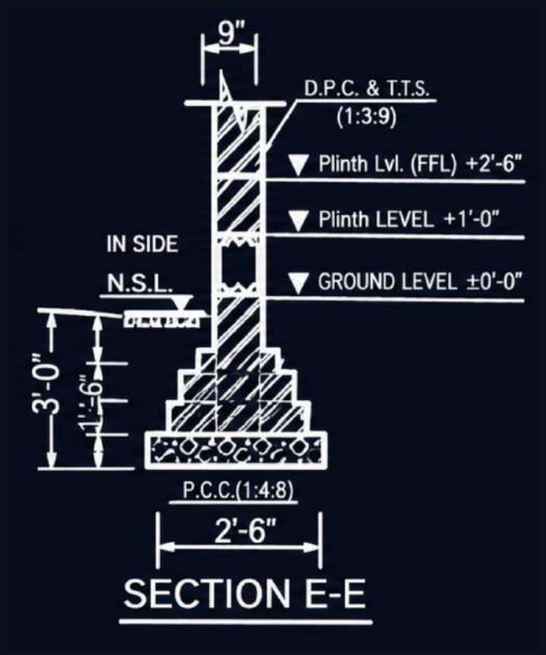
SECTION B-B



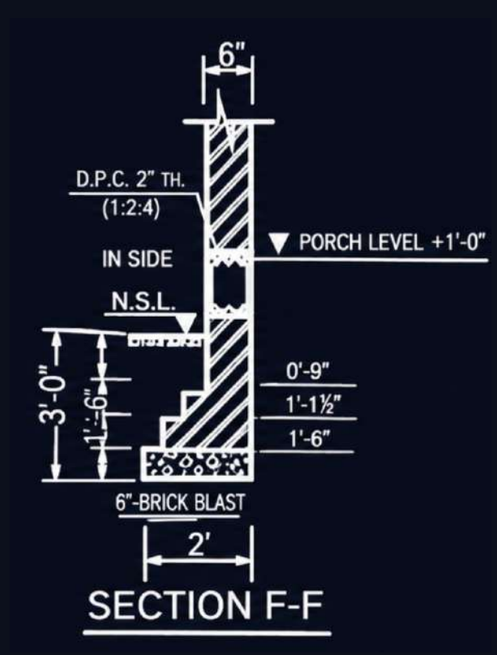
SECTION C-C



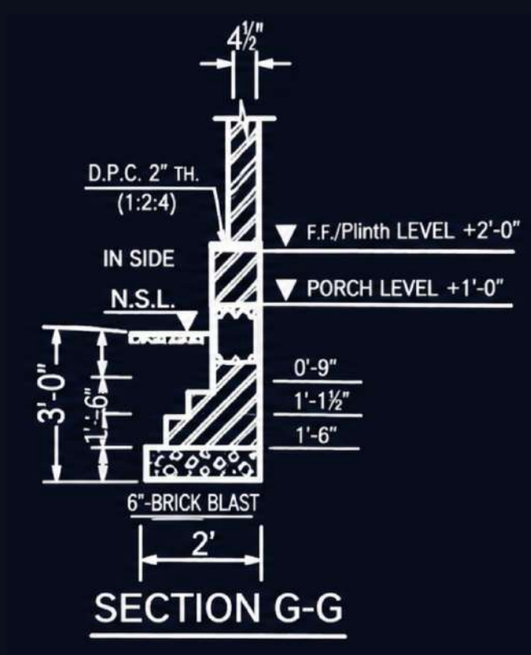
SECTION D-D



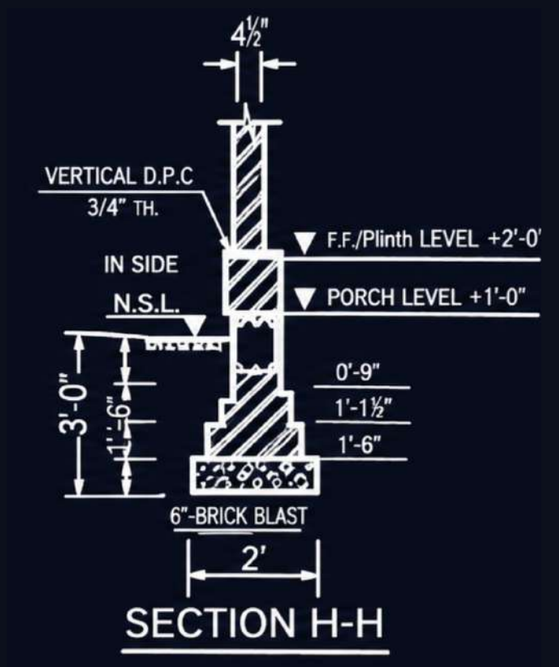
SECTION E-E



SECTION F-F



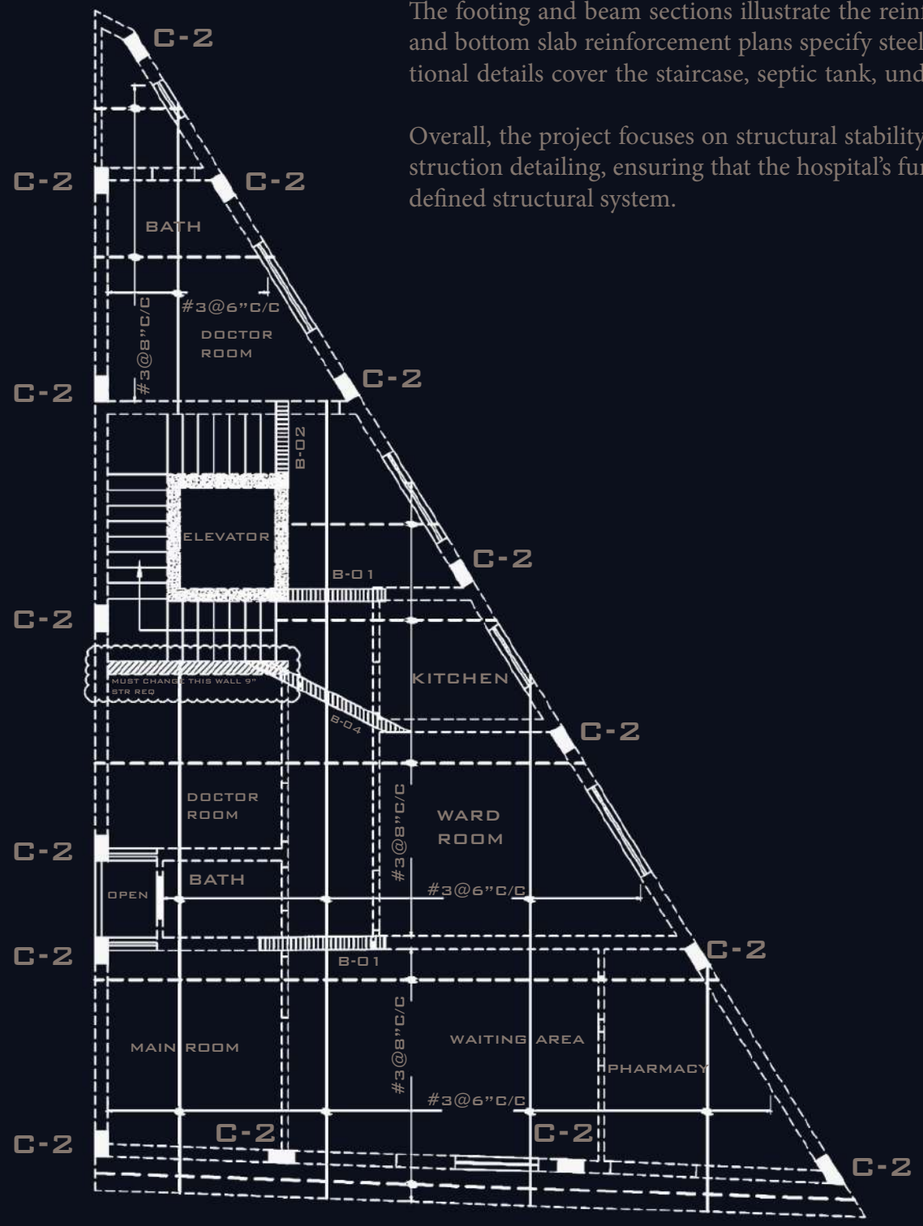
SECTION G-G



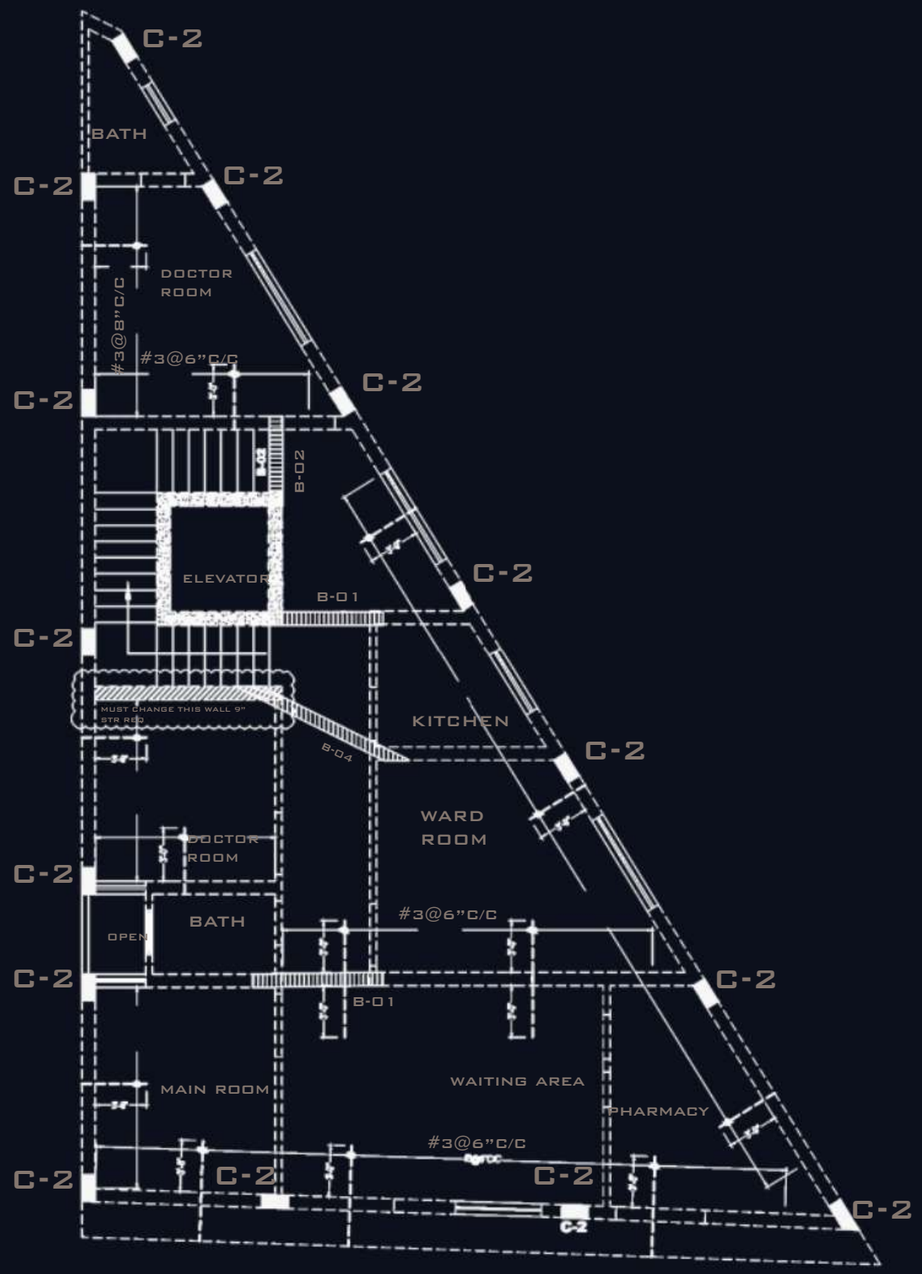
SECTION H-H

The footing and beam sections illustrate the reinforced concrete structural system, while the top and bottom slab reinforcement plans specify steel placement to support structural stability. Additional details cover the staircase, septic tank, underground water tank, and overhead water tank.

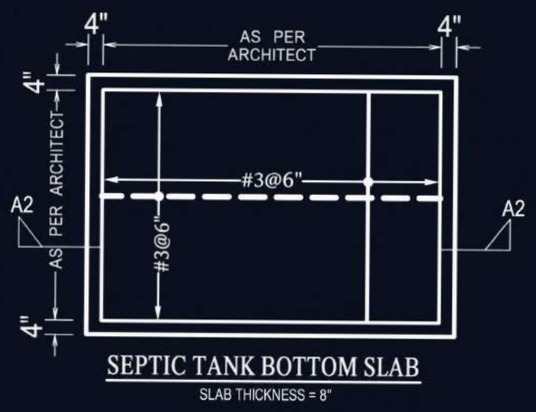
Overall, the project focuses on structural stability, efficient space planning, and coordinated construction detailing, ensuring that the hospital's functional requirements are supported by a clearly defined structural system.



GROUND FLOOR BOTTOM SLAB STEEL
SLAB TH-6''

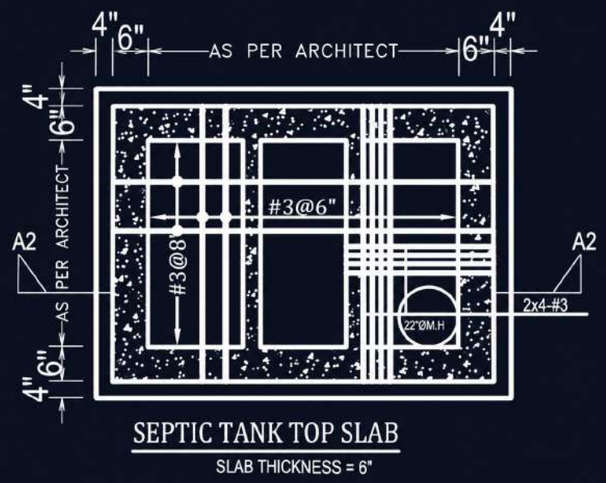


GROUND FLOOR SLAB TOP STEEL
SLAB TH-6''



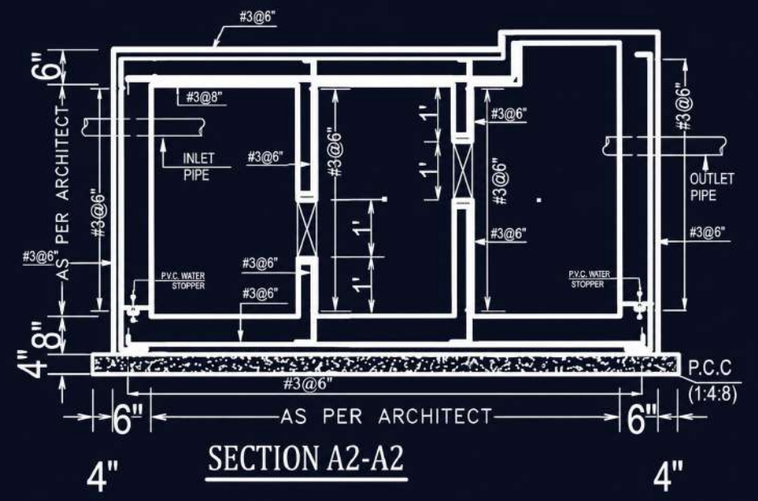
SEPTIC TANK BOTTOM SLAB

SLAB THICKNESS = 8"

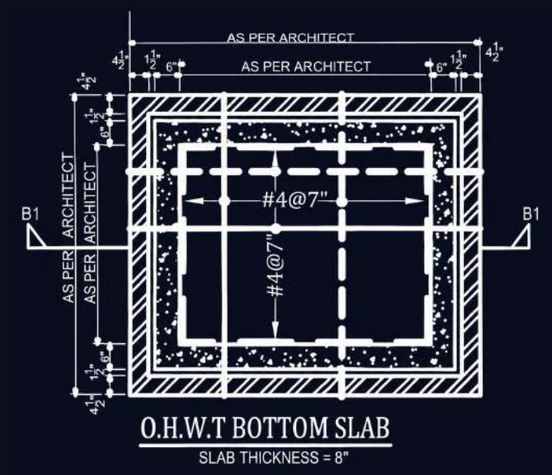


SEPTIC TANK TOP SLAB

SLAB THICKNESS = 6"

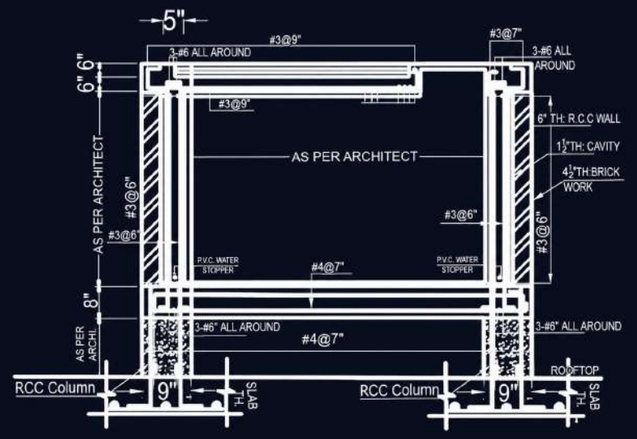


SECTION A2-A2

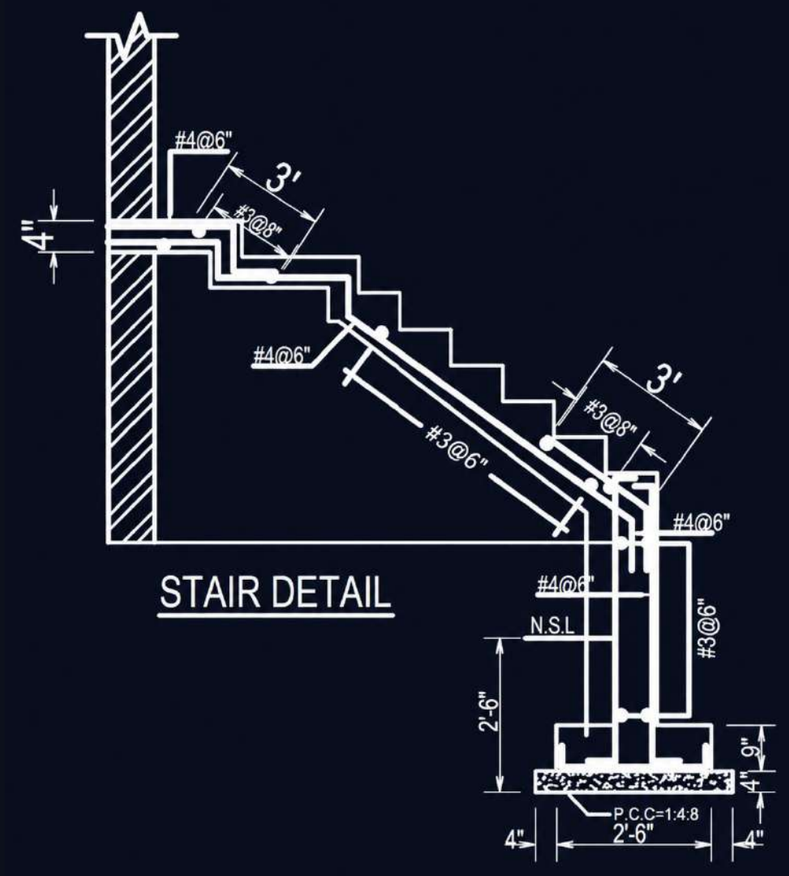


O.H.W.T BOTTOM SLAB

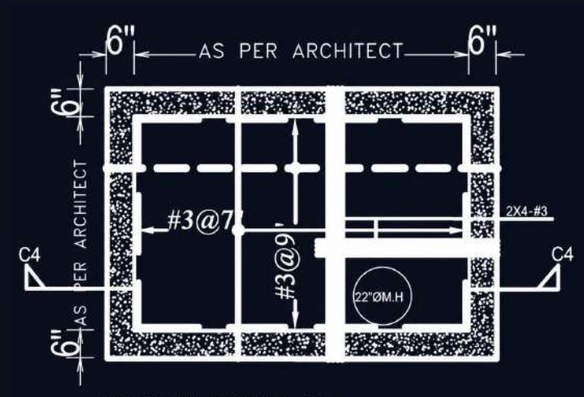
SLAB THICKNESS = 8"



SECTION B1-B1

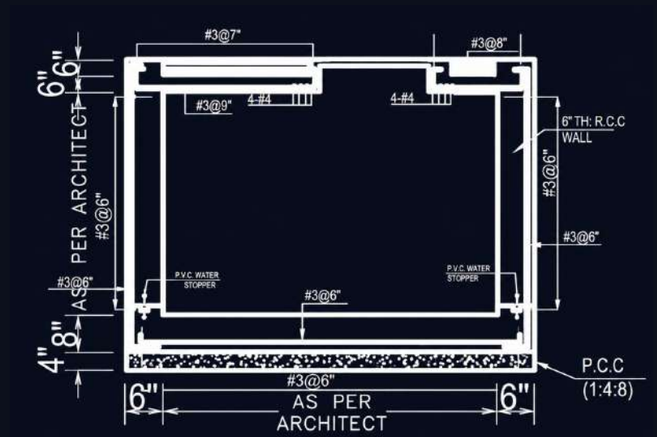


STAIR DETAIL



U.G.W.T TOP SLAB

SLAB THICKNESS = 6"



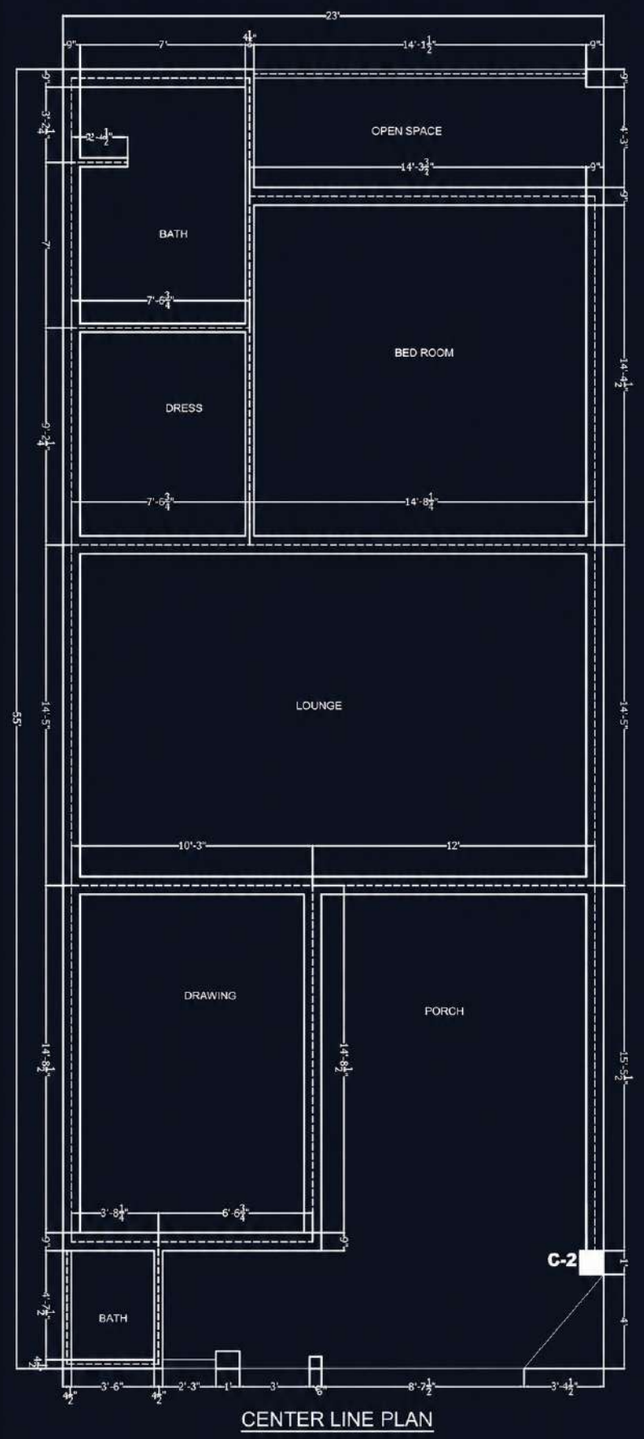
SECTION C4-C4

RESIDENTIAL
UAE

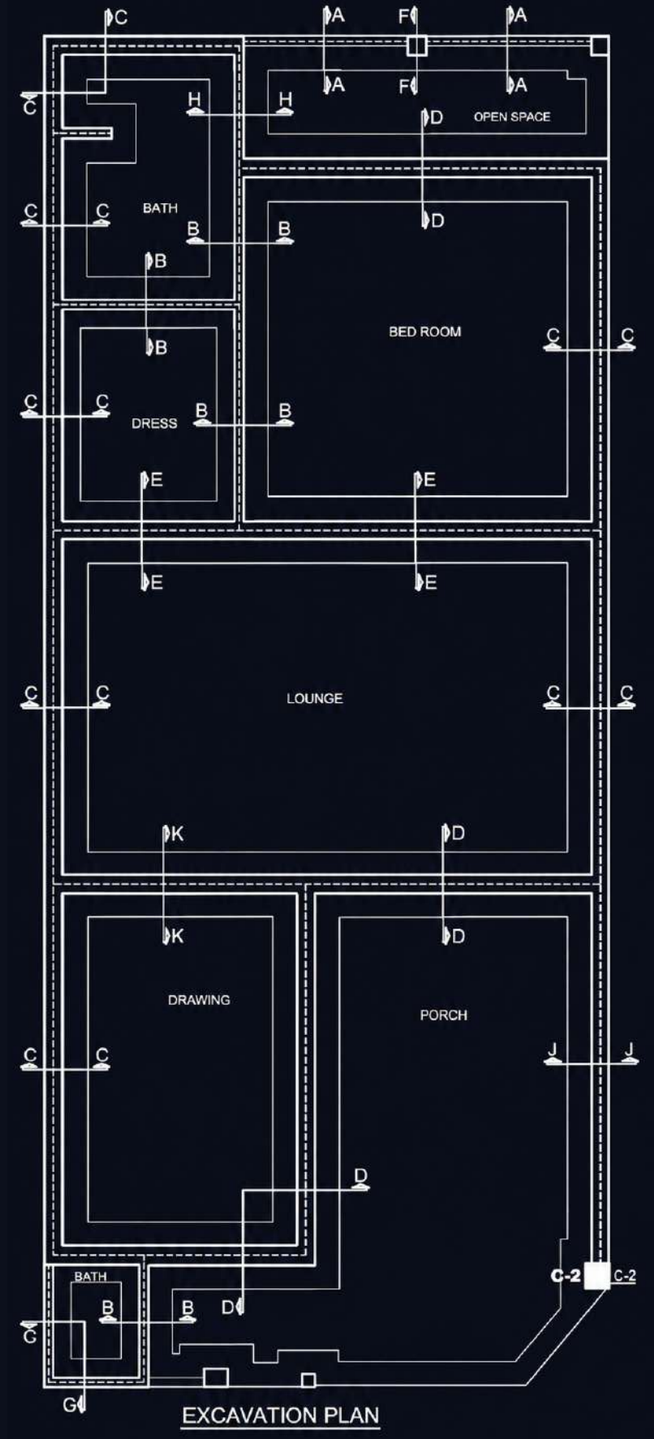


The project involves the structural planning and development of a multi-storey residential building on Plot P1-196. The design follows a linear arrangement of spaces, integrating bedrooms, lounges, drawing rooms, bathrooms, and service areas to create an organized residential layout.

The structural drawings illustrate the building's foundation system, excavation layout, reinforced concrete slabs, beams, columns, and staircase details. The project also incorporates open spaces, a porch, an accessible terrace, and water storage facilities, bringing together residential functionality and structural requirements.

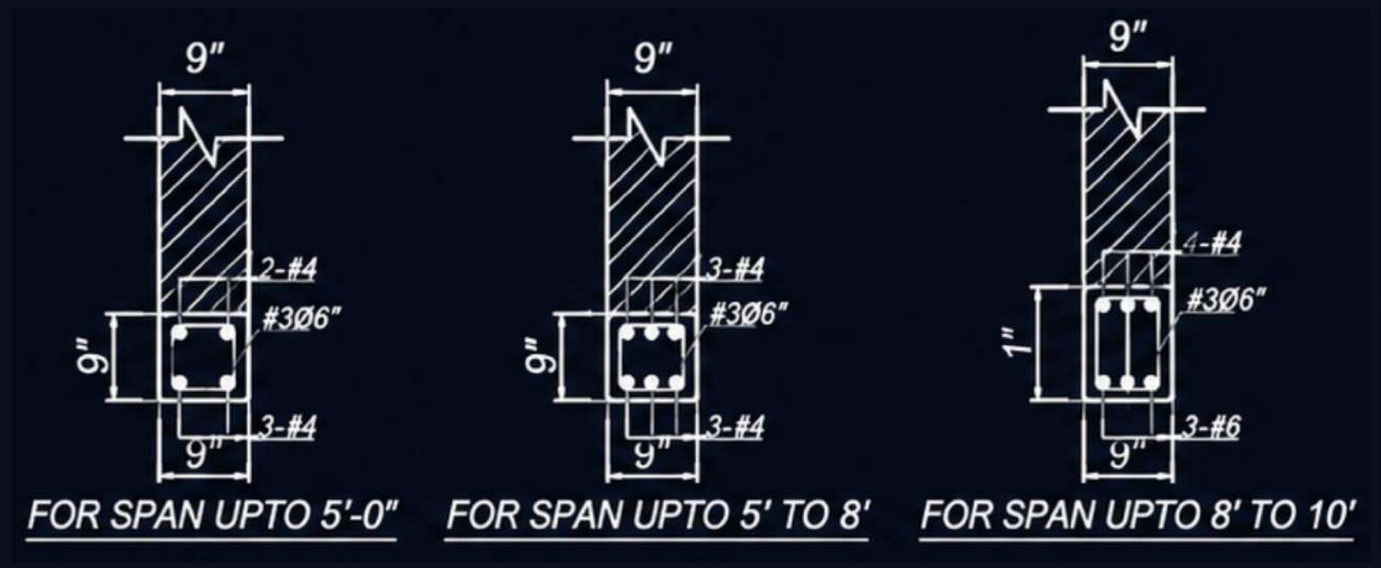


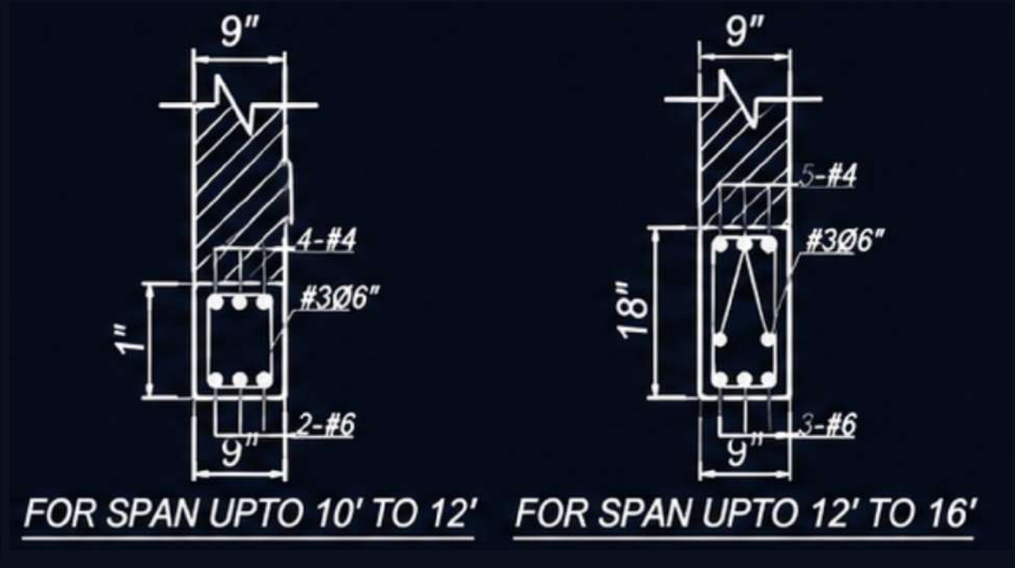
CENTER LINE PLAN

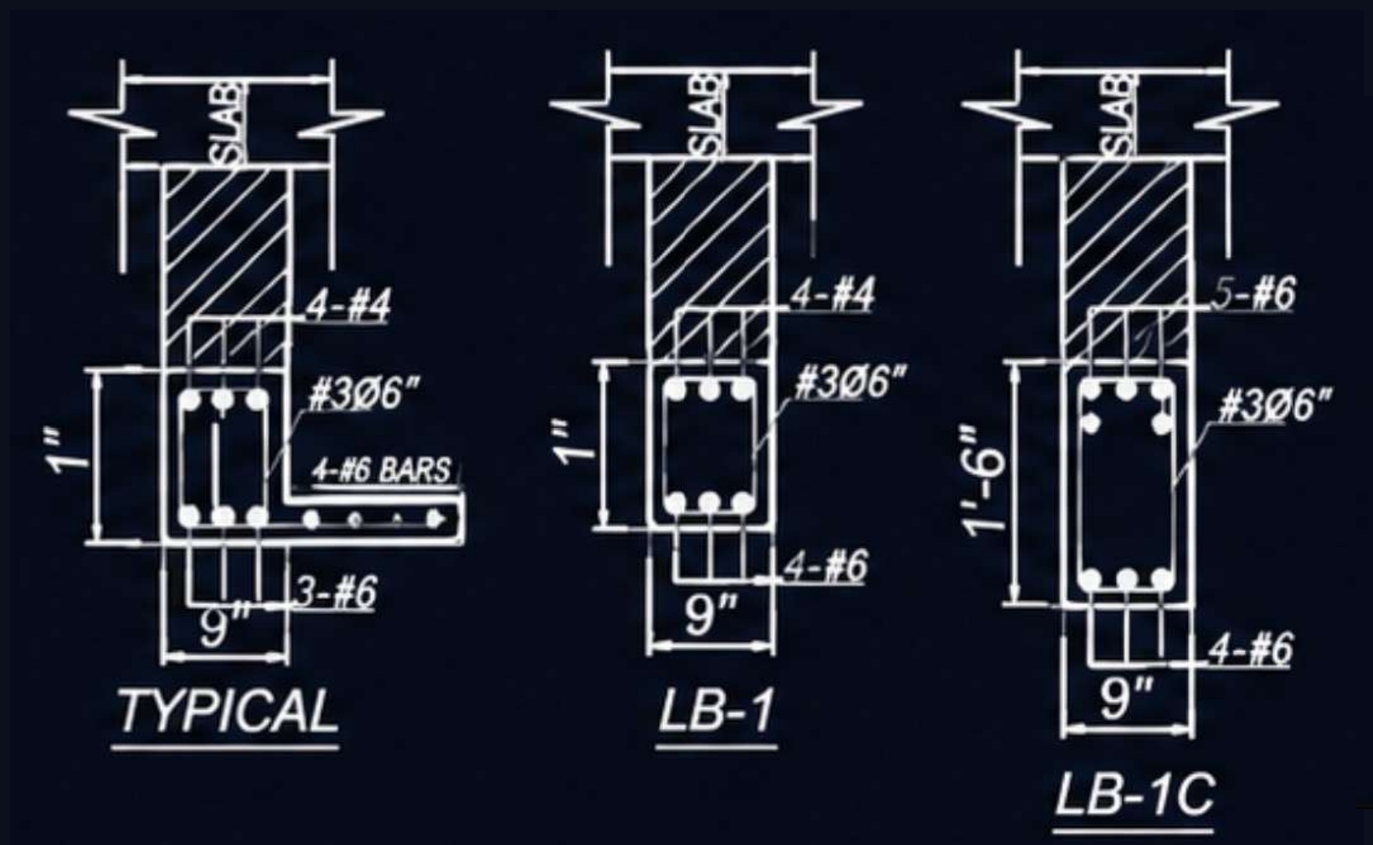


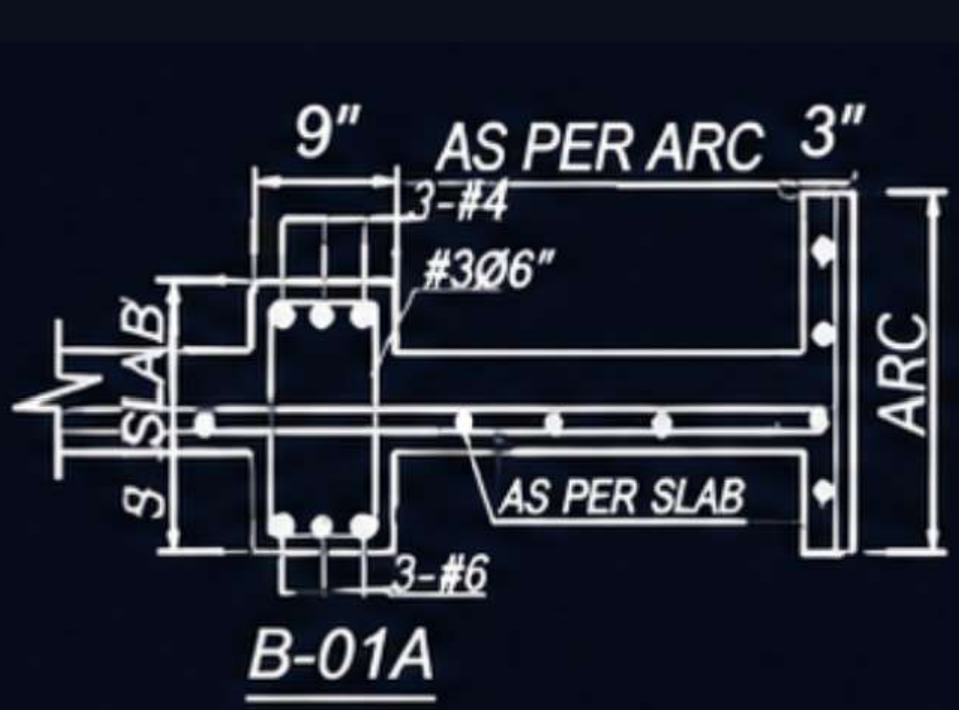
EXCAVATION PLAN

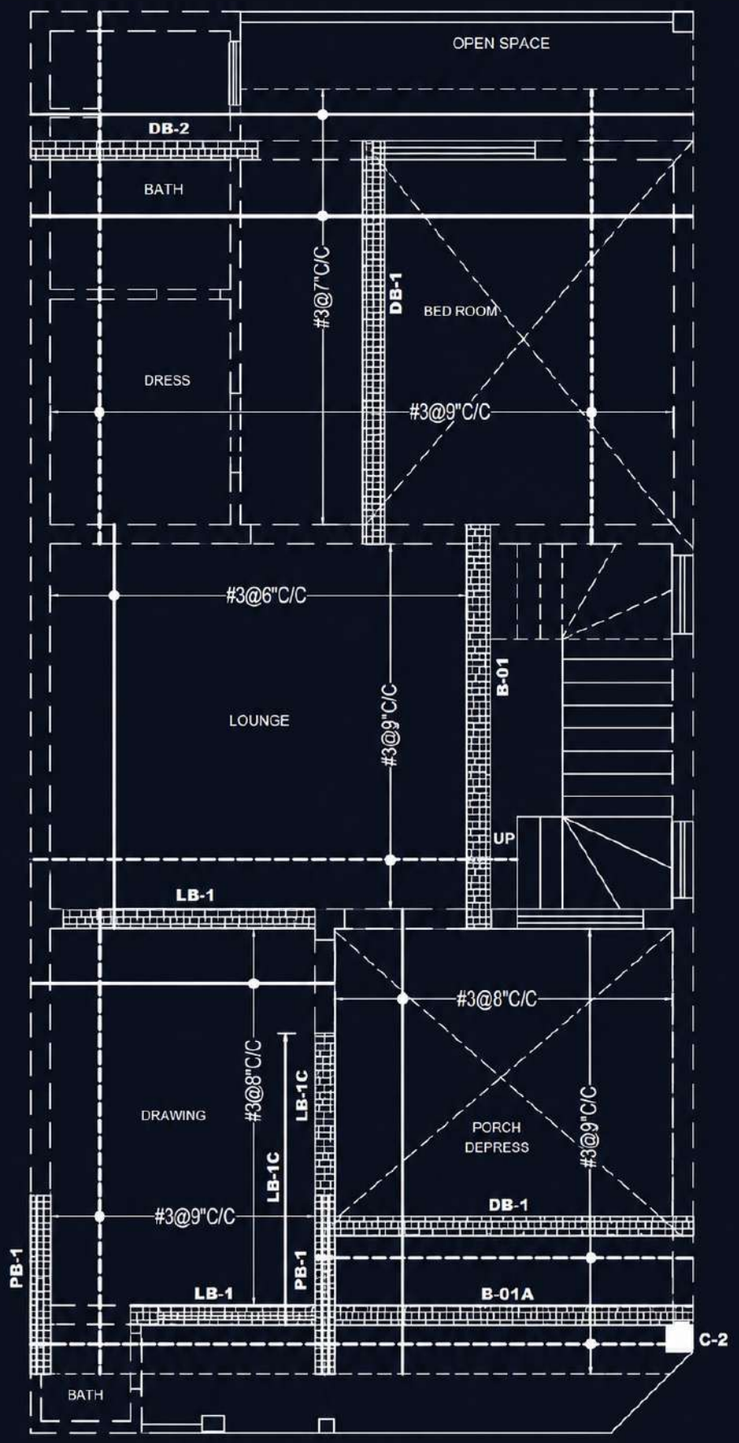
FOOTING SECTIONS



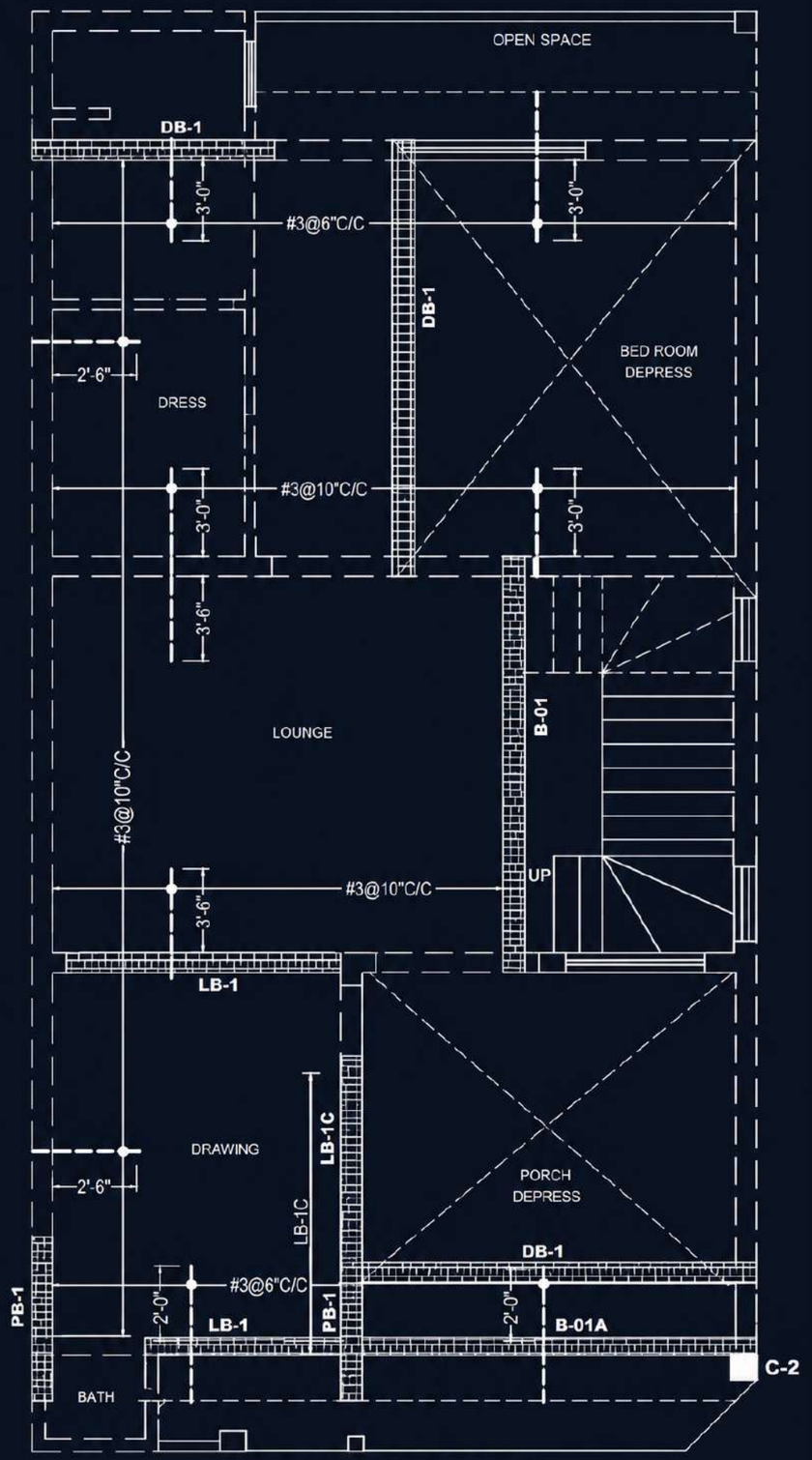








GROUND FLOOR BOTTOM SLAB STEEL
SLAB TH-5"



GROUND FLOOR SLAB TOP STEEL
SLAB TH-5"

Ground Floor Slab Plan

Defines the ground-floor structural layout, including the lounge, bedroom, drawing room, porch, and service areas. The drawings specify the reinforcement distribution, slab thickness, and beam positions.

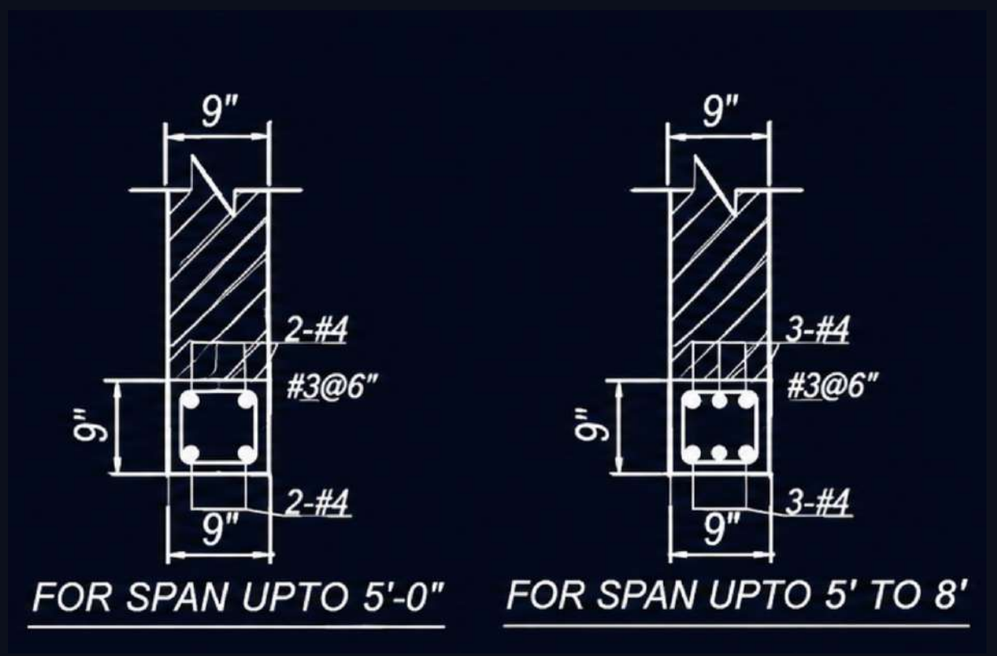
First Floor Slab Plan

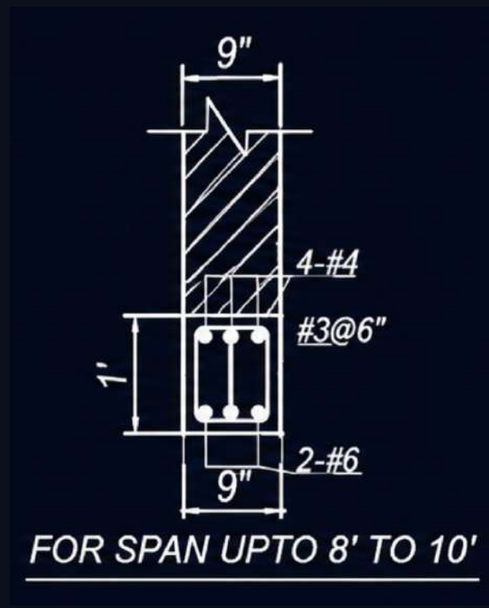
Shows the structural arrangement of the upper residential level, including bedrooms, a lounge, kitchen, bathrooms, and staircase circulation. Reinforcement and beam details establish the slab's structural framework.

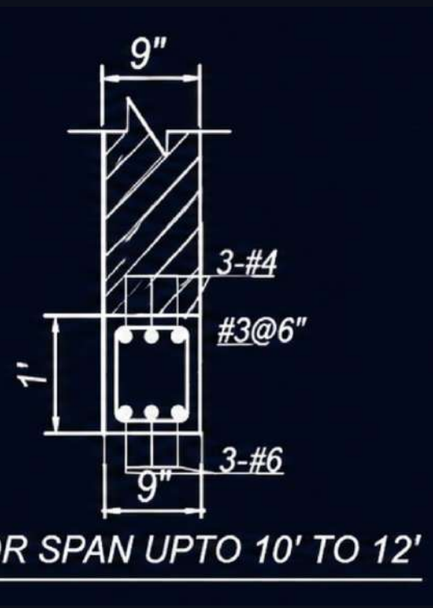
Mumty Floor & Roof Plan

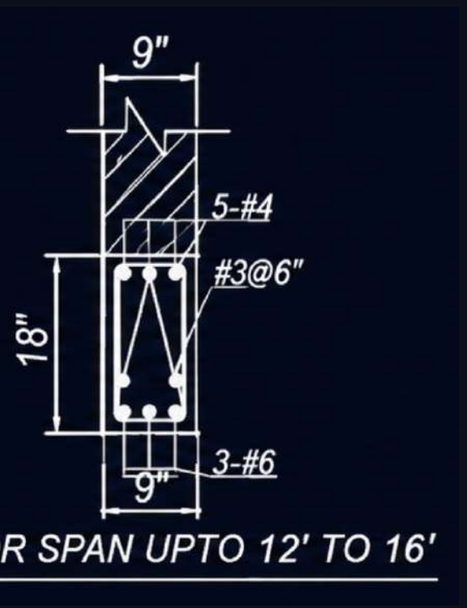
Illustrates the uppermost enclosed spaces, including a bedroom, kitchen, bathroom, and store, together with the open terrace. The drawings indicate the roof slab reinforcement and supporting beams.

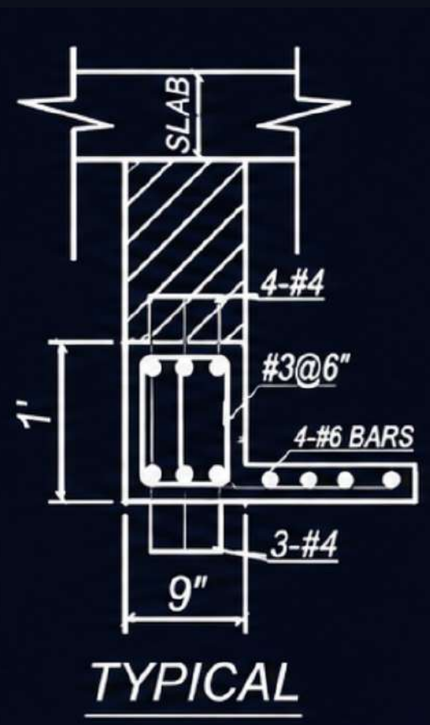
FOOTING SECTIONS

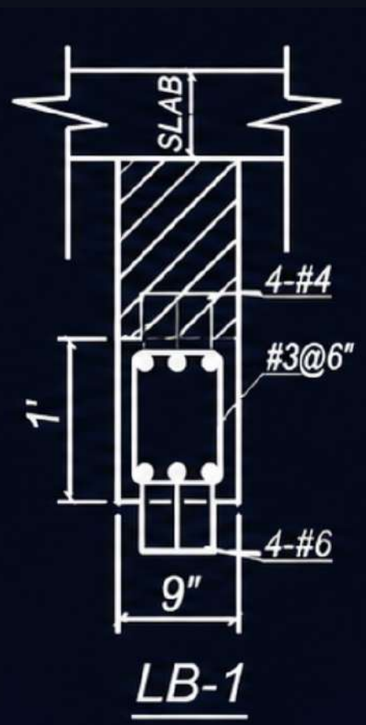


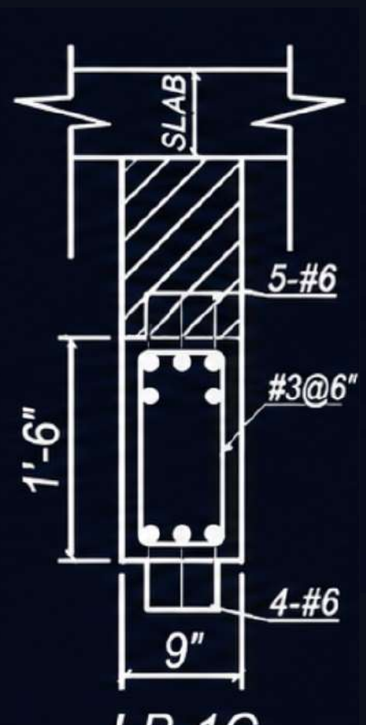


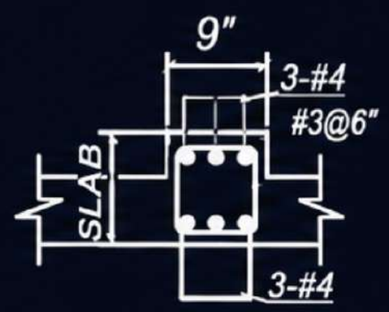


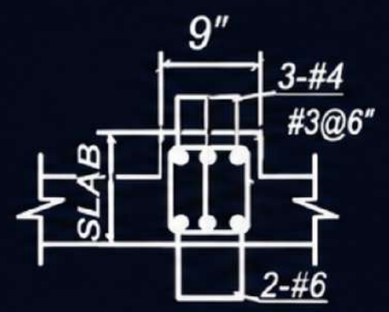


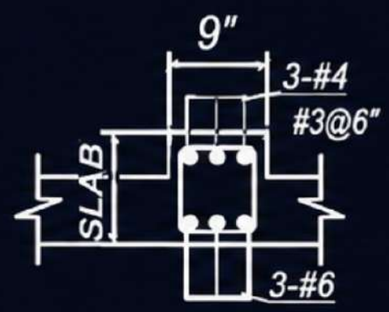




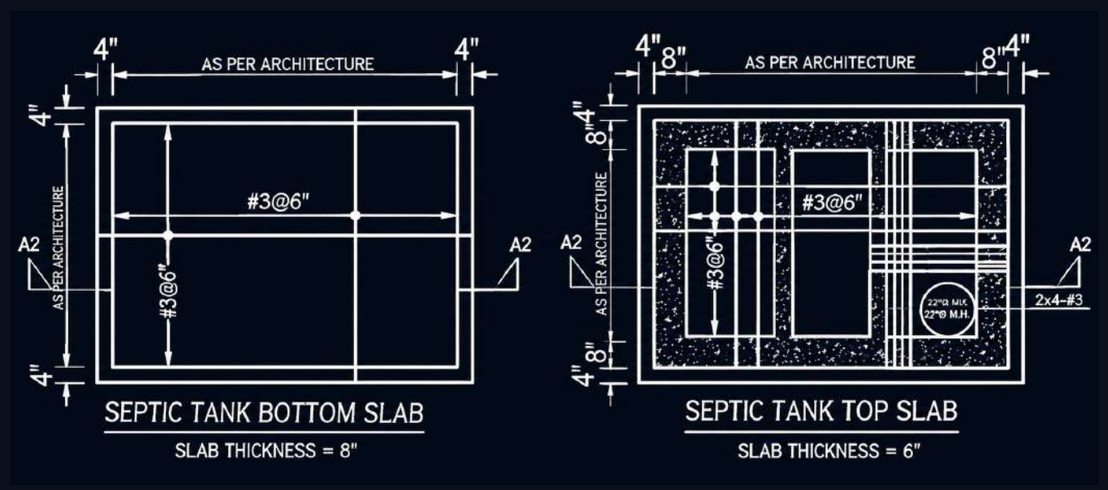


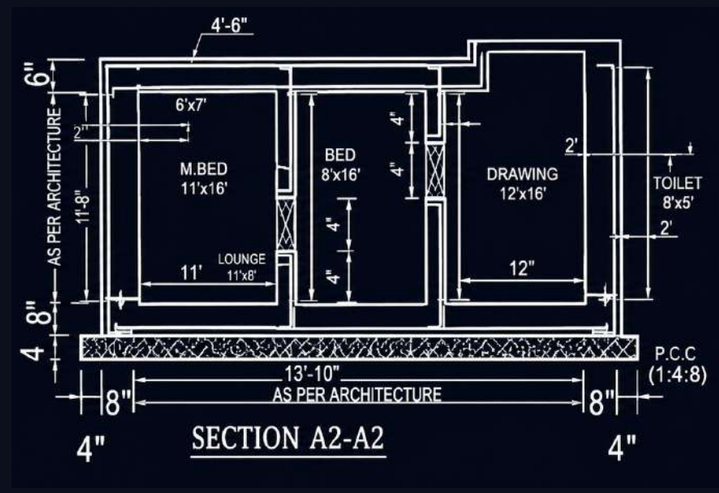


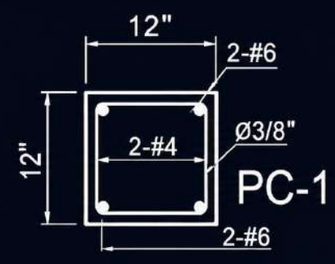


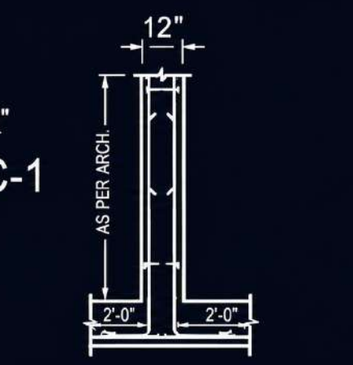


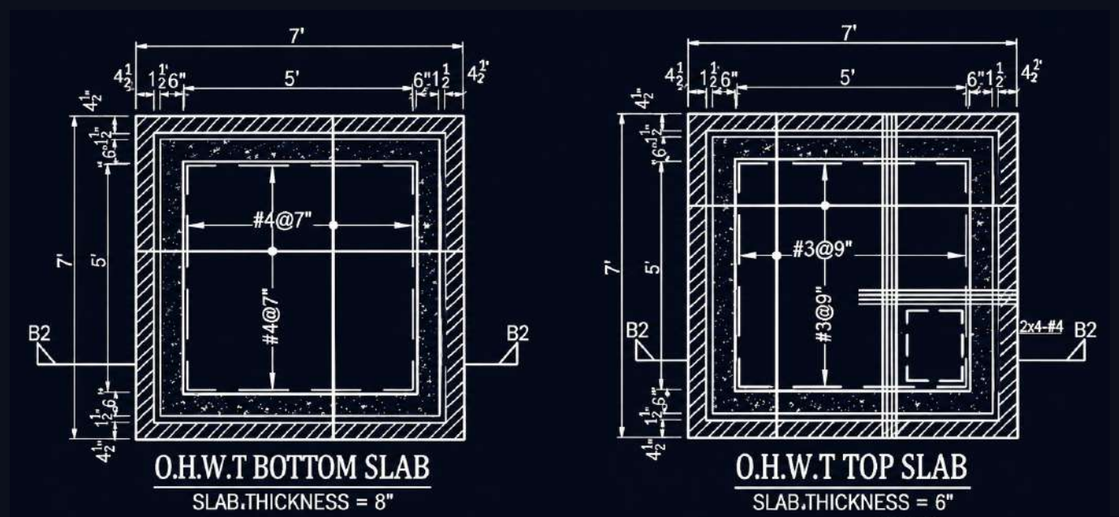
TANK SECTIONS

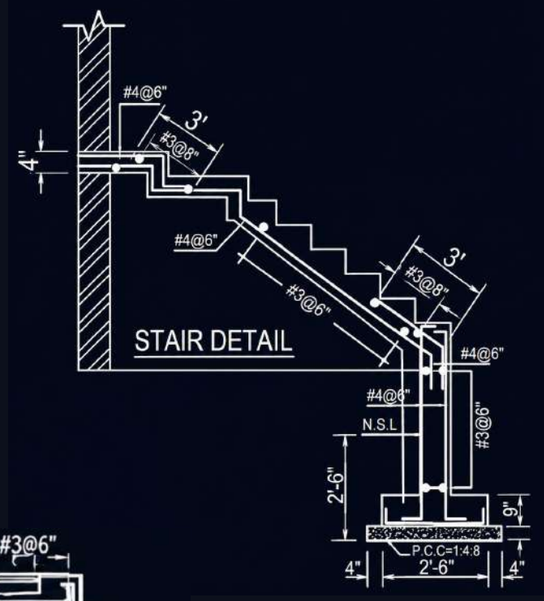


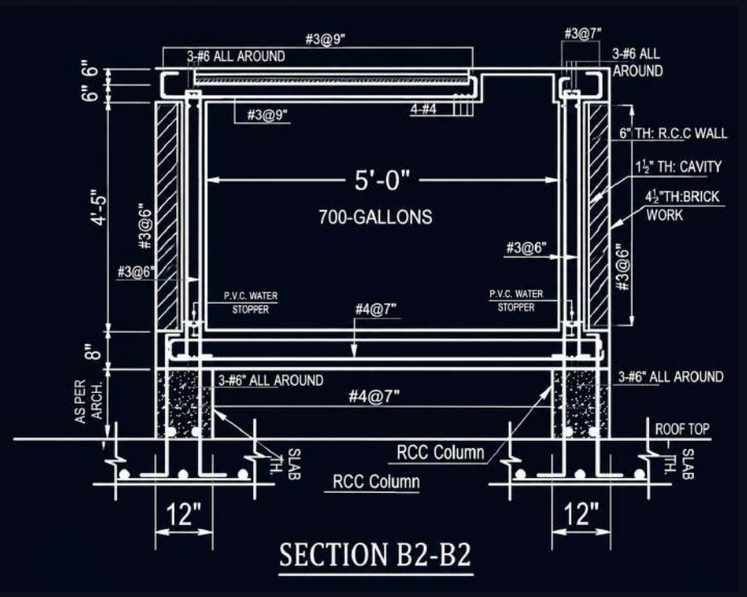




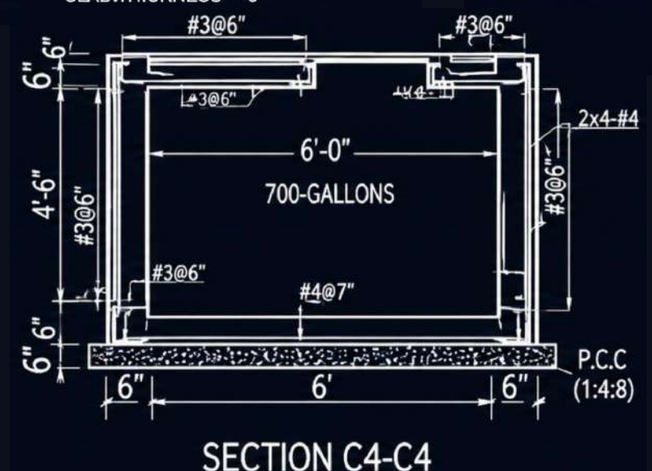










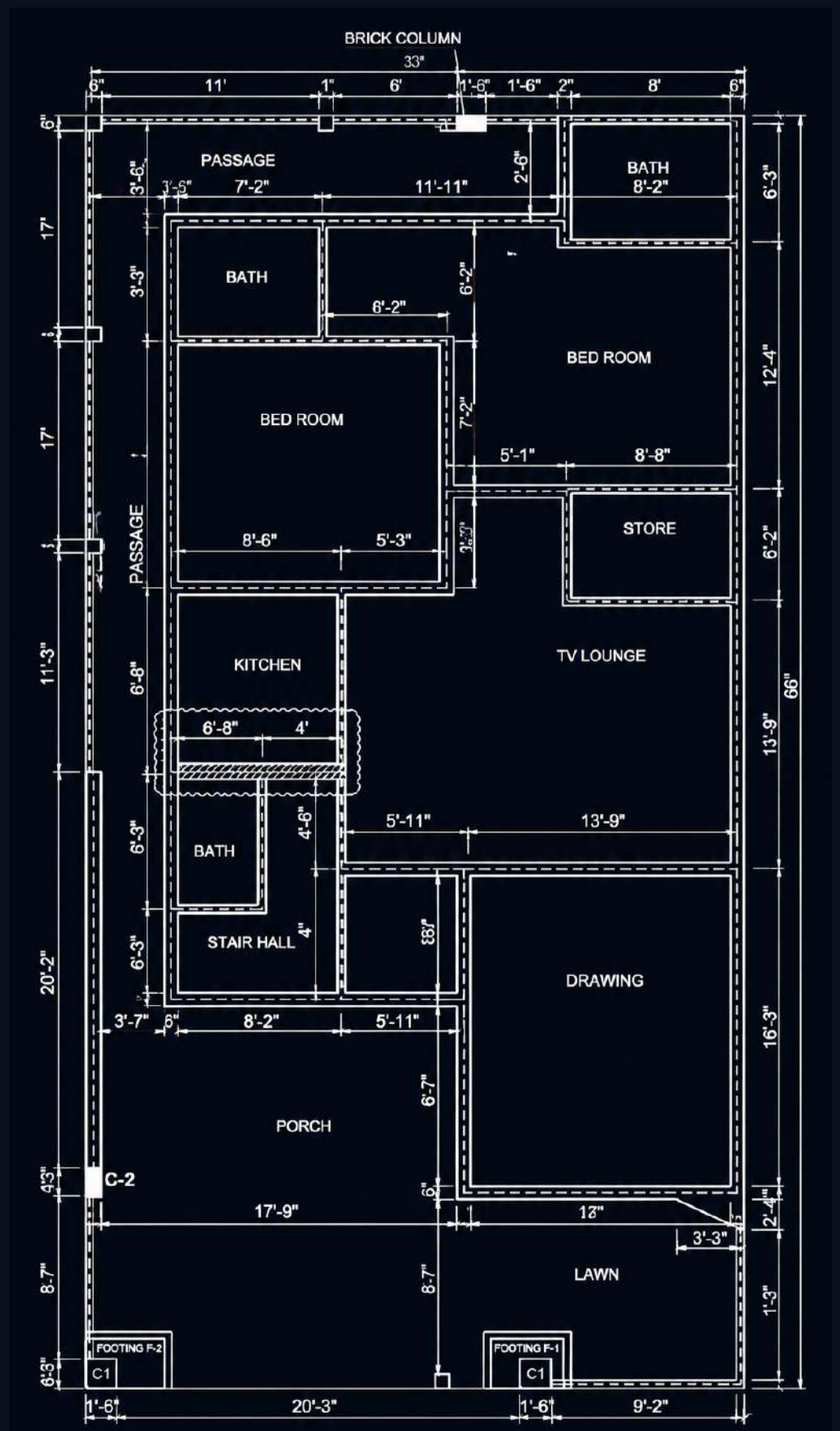


RESIDENTIAL UAE

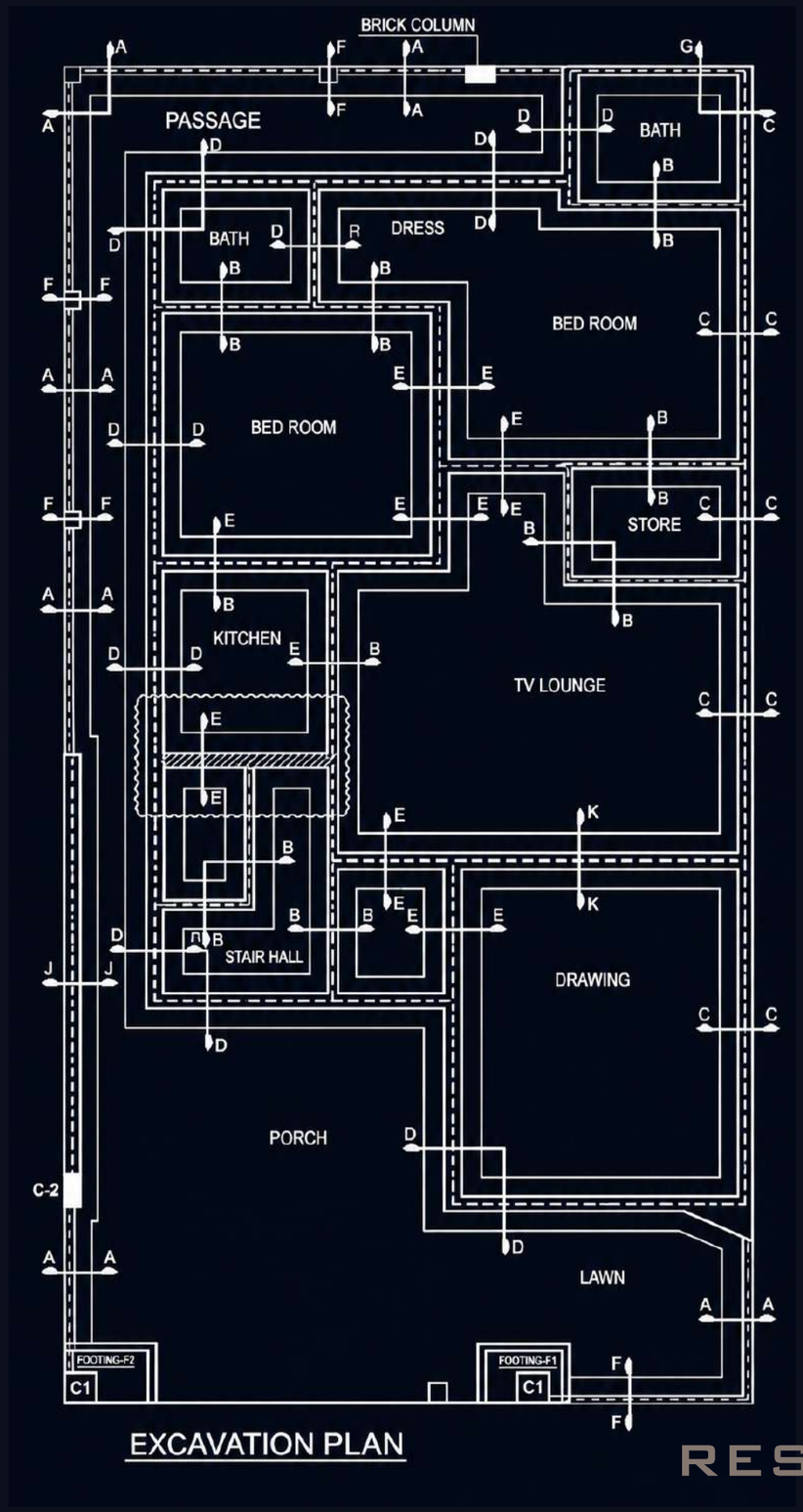
RESIDENTIAL

UAE





CENTER LINE PLAN



EXCAVATION PLAN

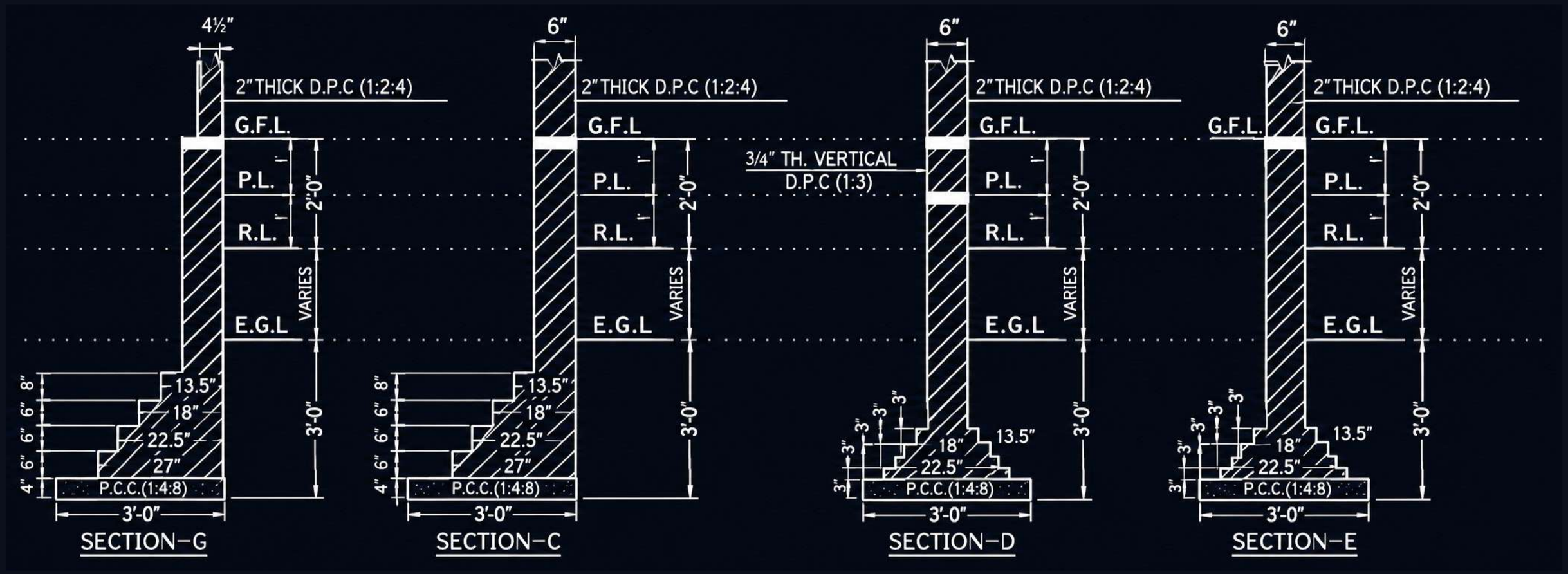
Defines the ground-floor structural layout, including the lounge, bedroom, drawing room, porch, and service areas. The drawings specify the reinforcement distribution, slab thickness, and beam positions.

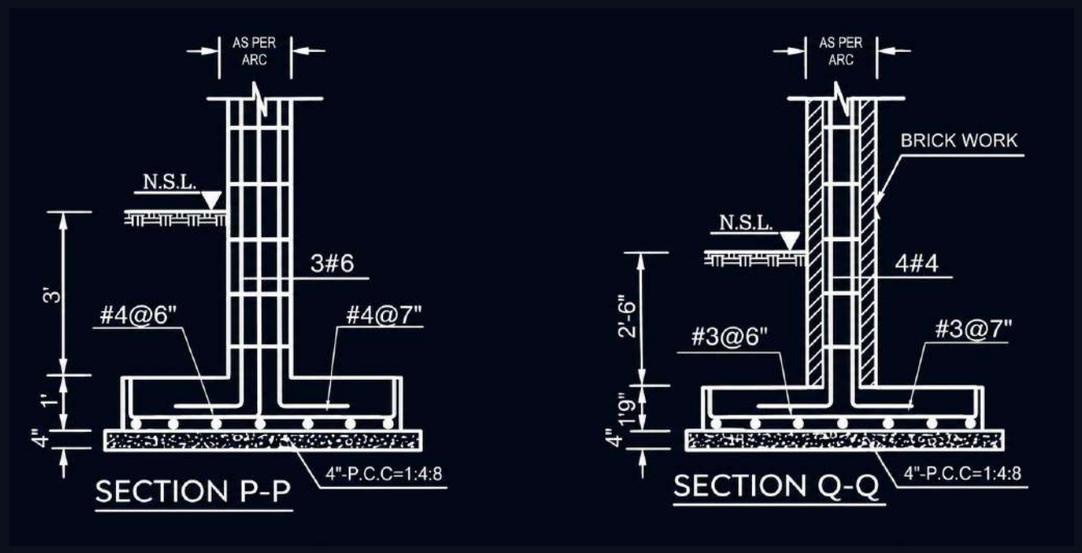
Shows the structural arrangement of the upper residential level, including bedrooms, a lounge, kitchen, bathrooms, and staircase circulation. Reinforcement and beam details establish the slab's structural framework.

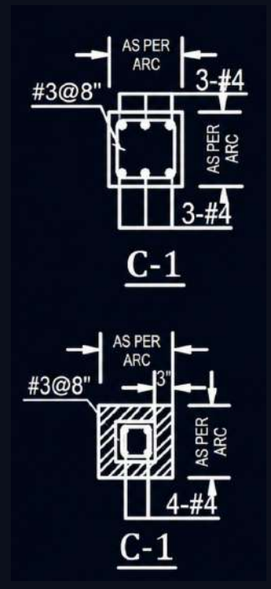
Illustrates the uppermost enclosed spaces, including a bedroom, kitchen, bathroom, and store, together with the open terrace. The drawings indicate the roof slab reinforcement and supporting beams.

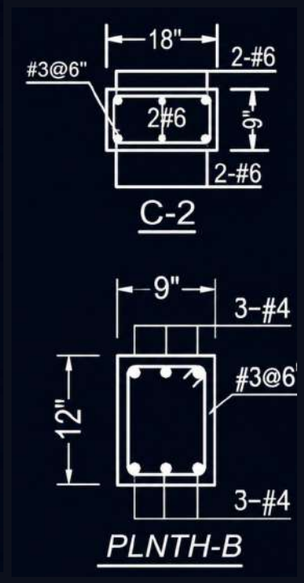
RESIDENTIAL UAE

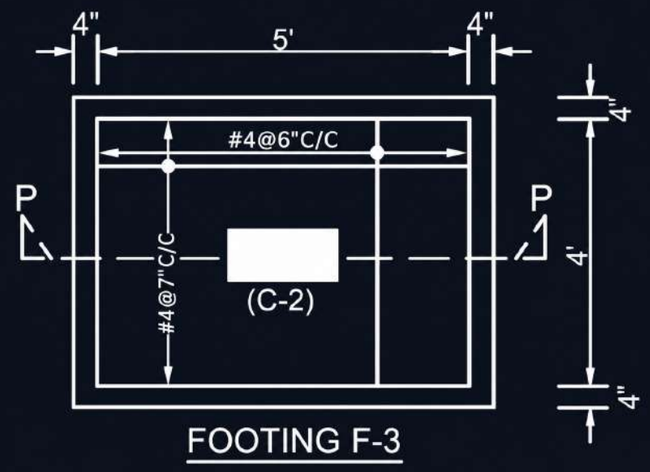
FOOTING SECTIONS



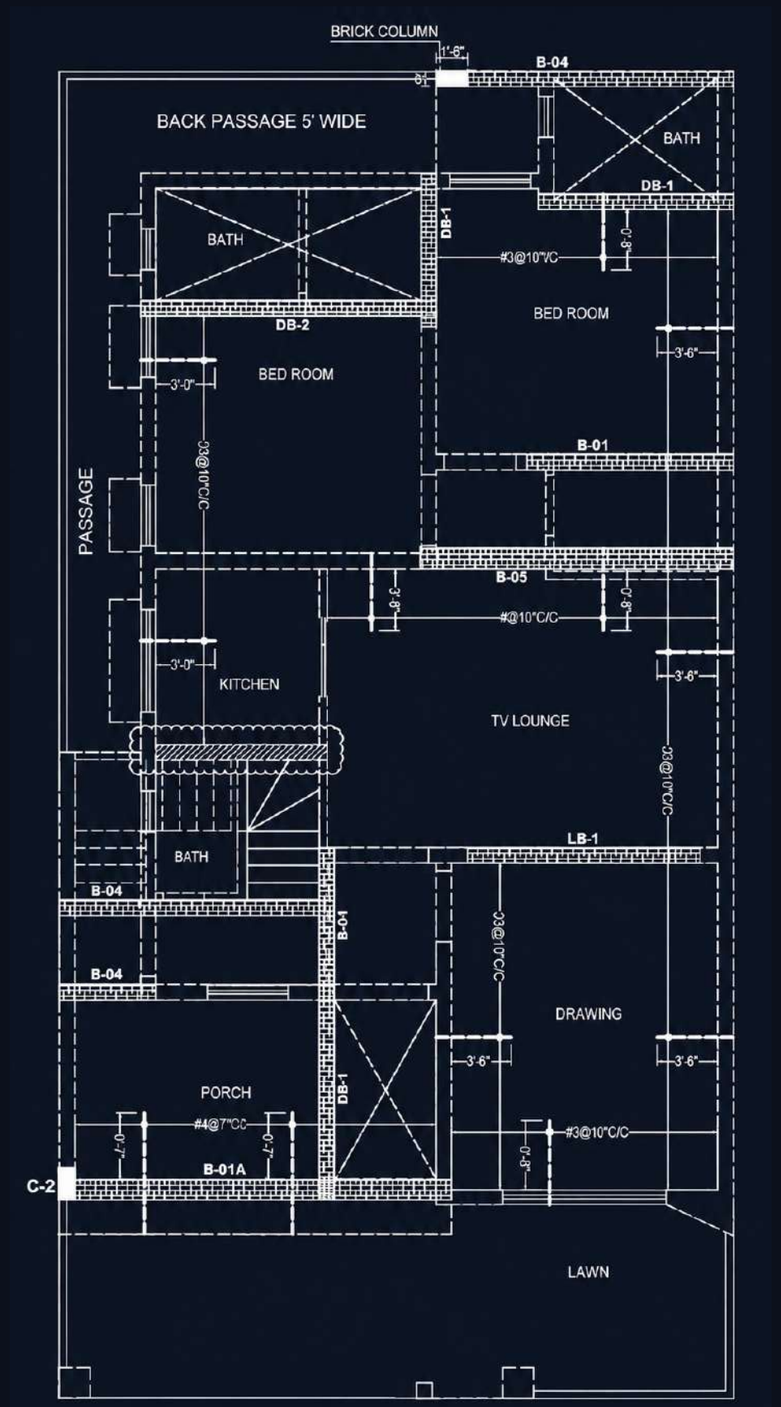




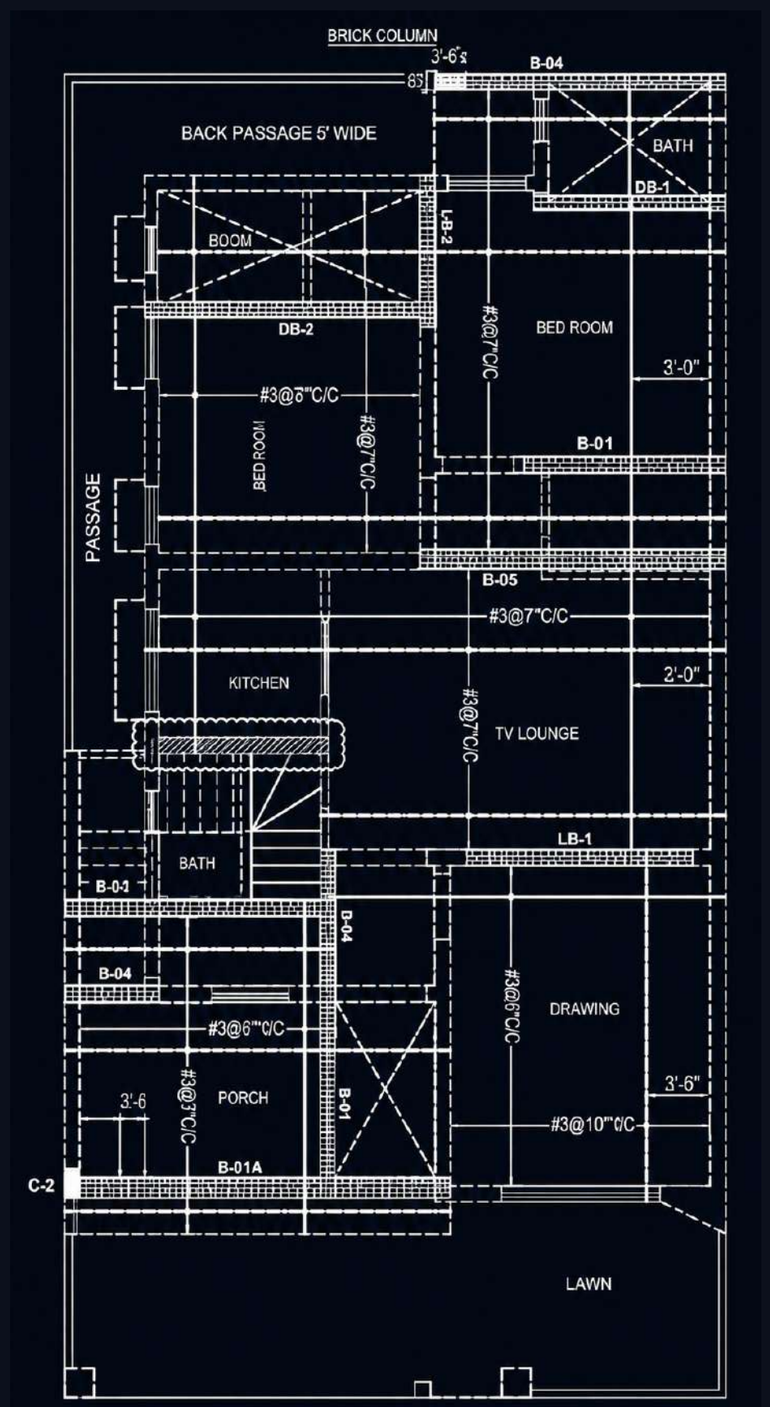




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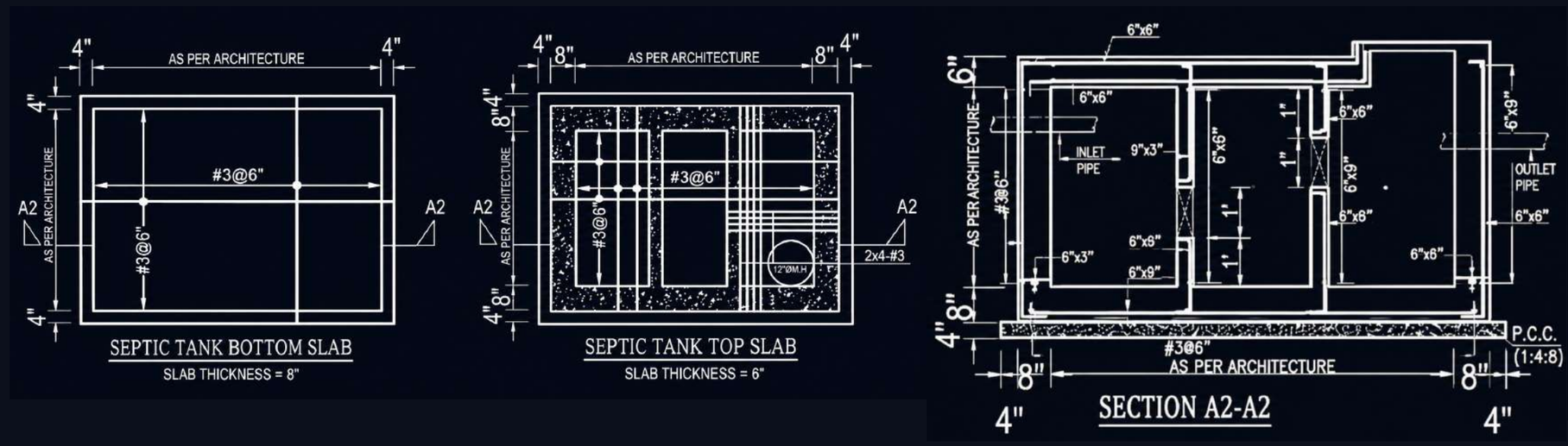
GROUND FLOOR SLAB TOP STEEL
SLAB TH-6"

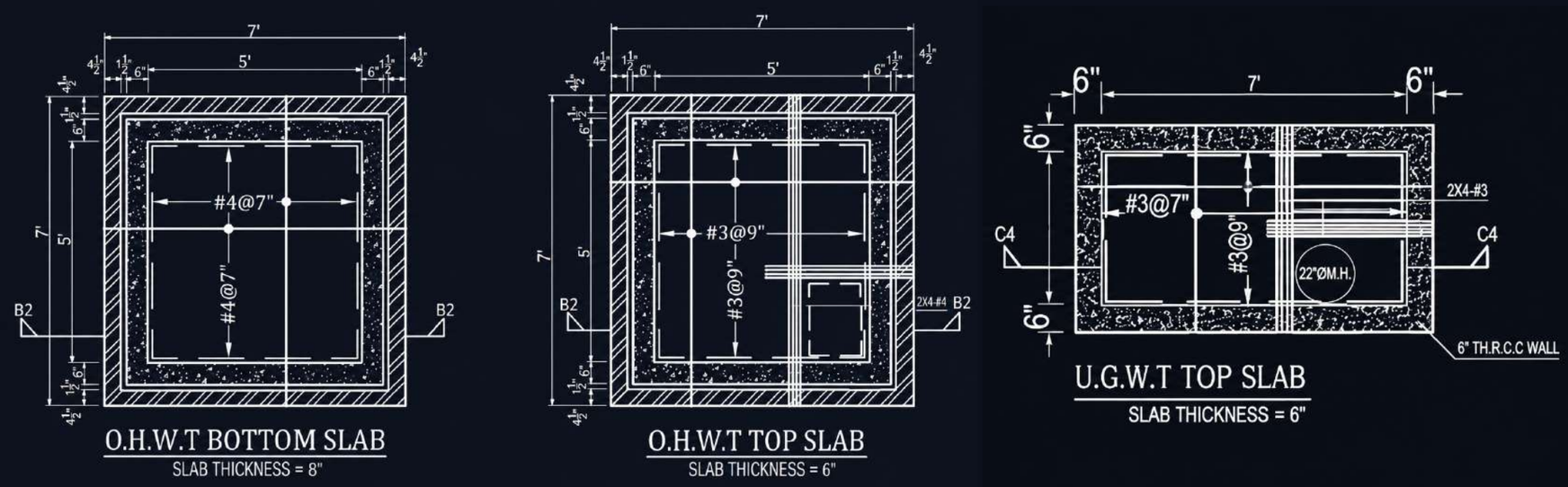


GROUND FLOOR BOTTOM SLAB STEEL
SLAB TH-6"

Ground Floor Slab:
Shows a 6-inch reinforced concrete slab with top and bottom steel reinforcement layouts.

TANK SECTIONS





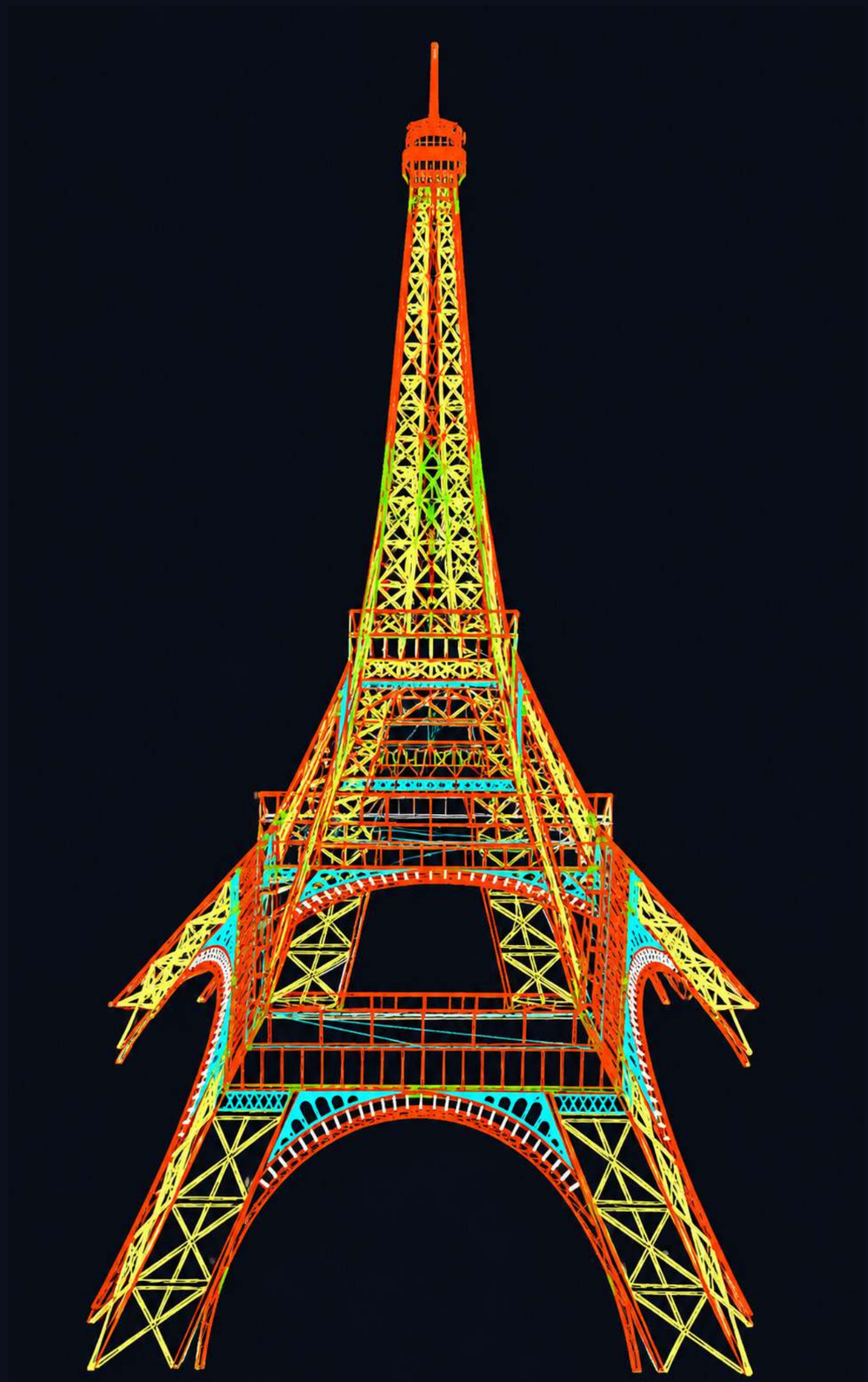
EIFFEL TOWER

PAKISTAN

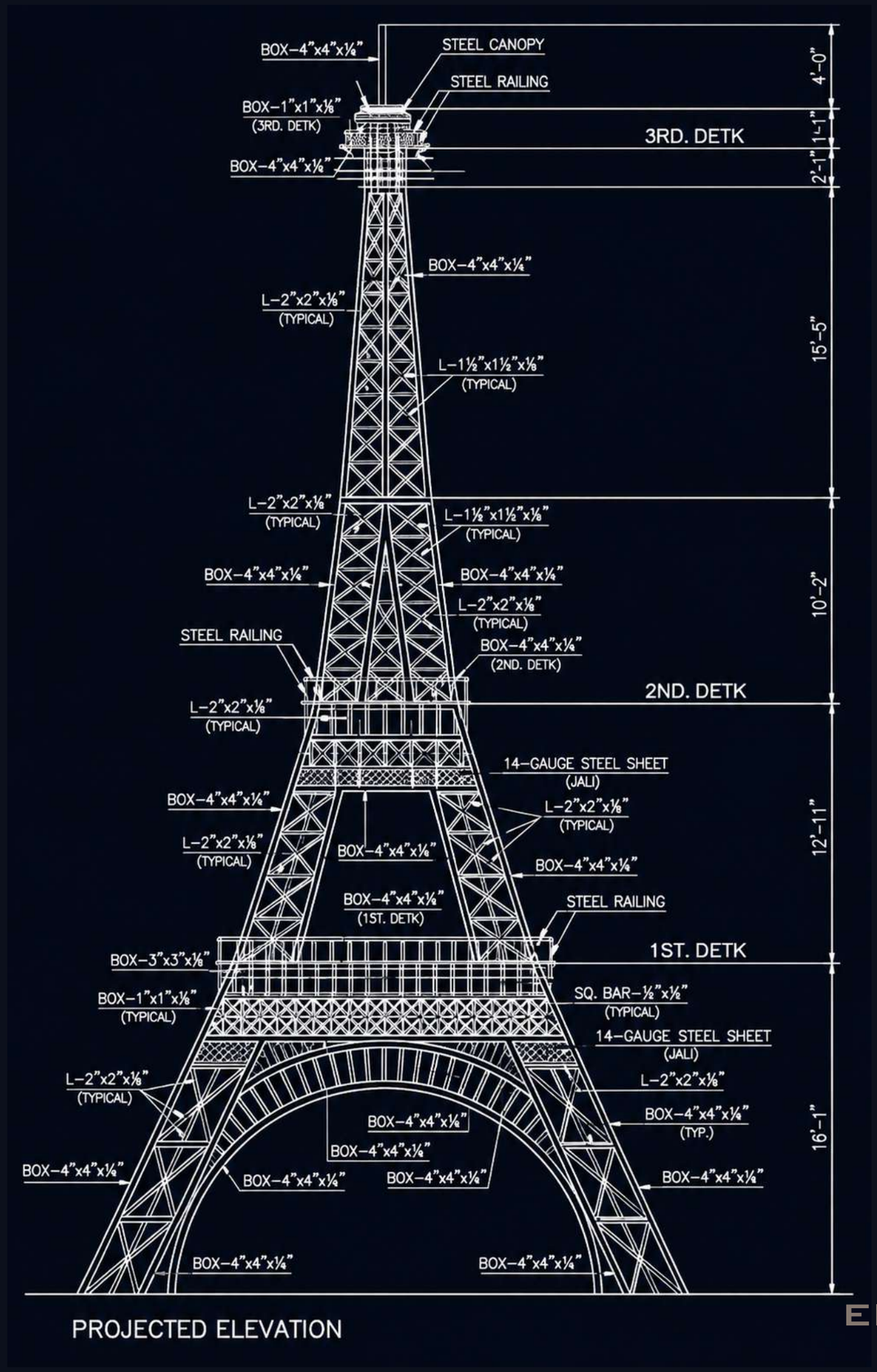
The project features a three-level steel observation tower inspired by the iconic Eiffel Tower structure. Its design incorporates a tapered lattice framework, diagonal cross-bracing, and arched structural supports, combining architectural character with structural stability.

The tower consists of three elevated decks with steel railings, supported by a network of steel box sections and angle members. Checkered steel plates form the deck surfaces, while decorative steel mesh panels enhance the overall appearance. A steel canopy completes the uppermost level.

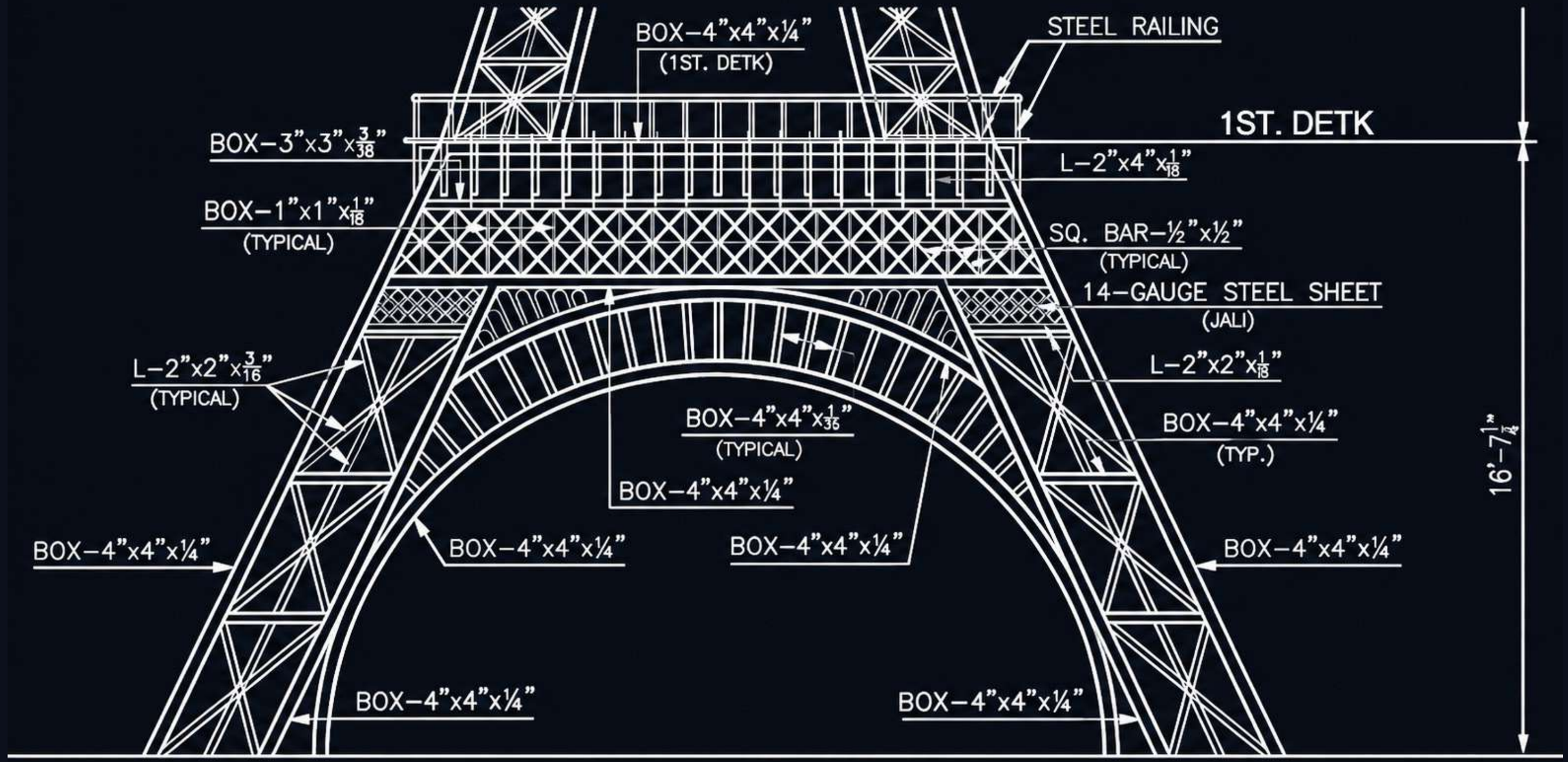
The structural drawings include detailed elevations, deck sections, and a foundation-level base plan, illustrating the tower's proportions, material specifications, and construction details.



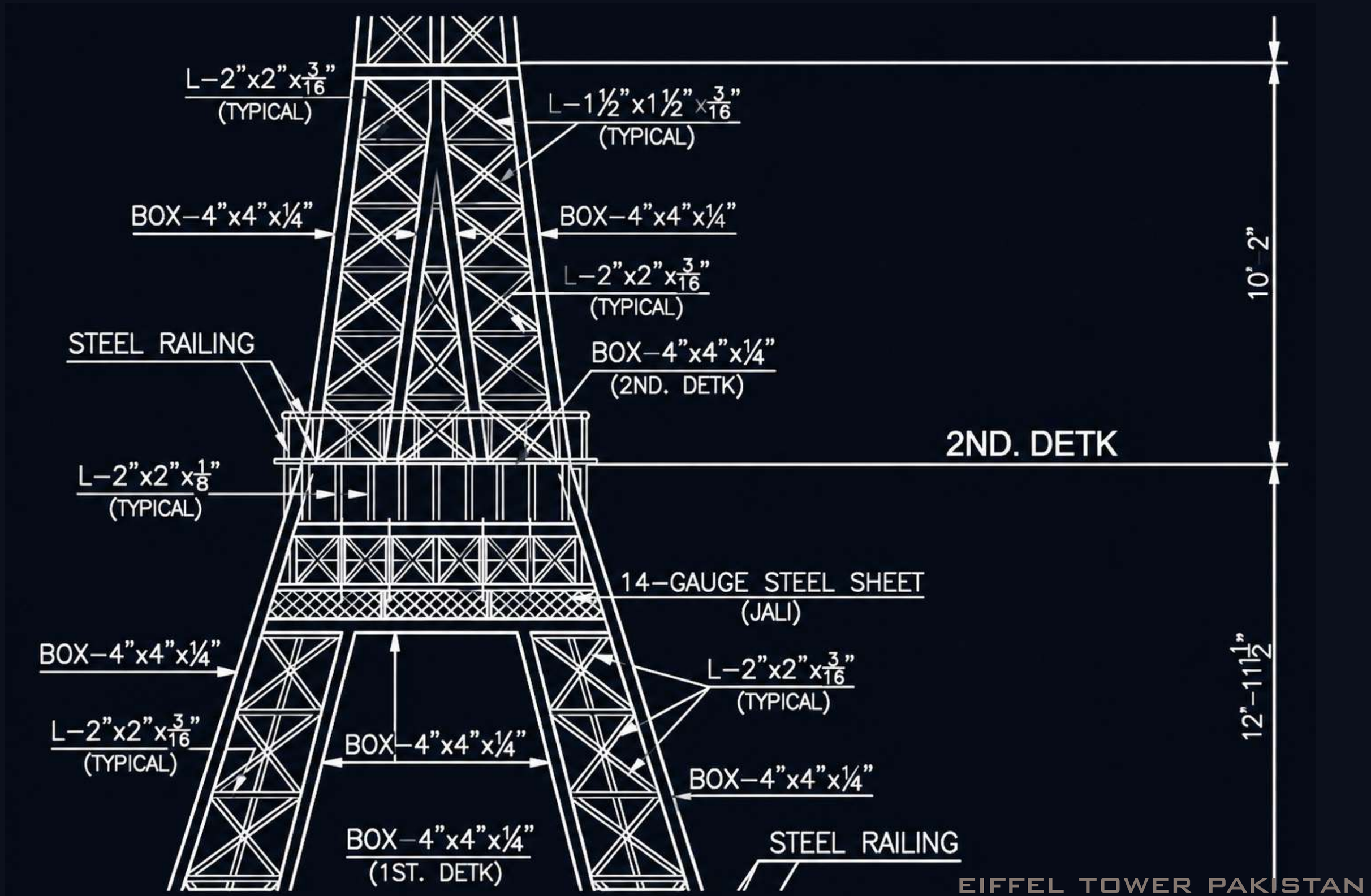
Structure



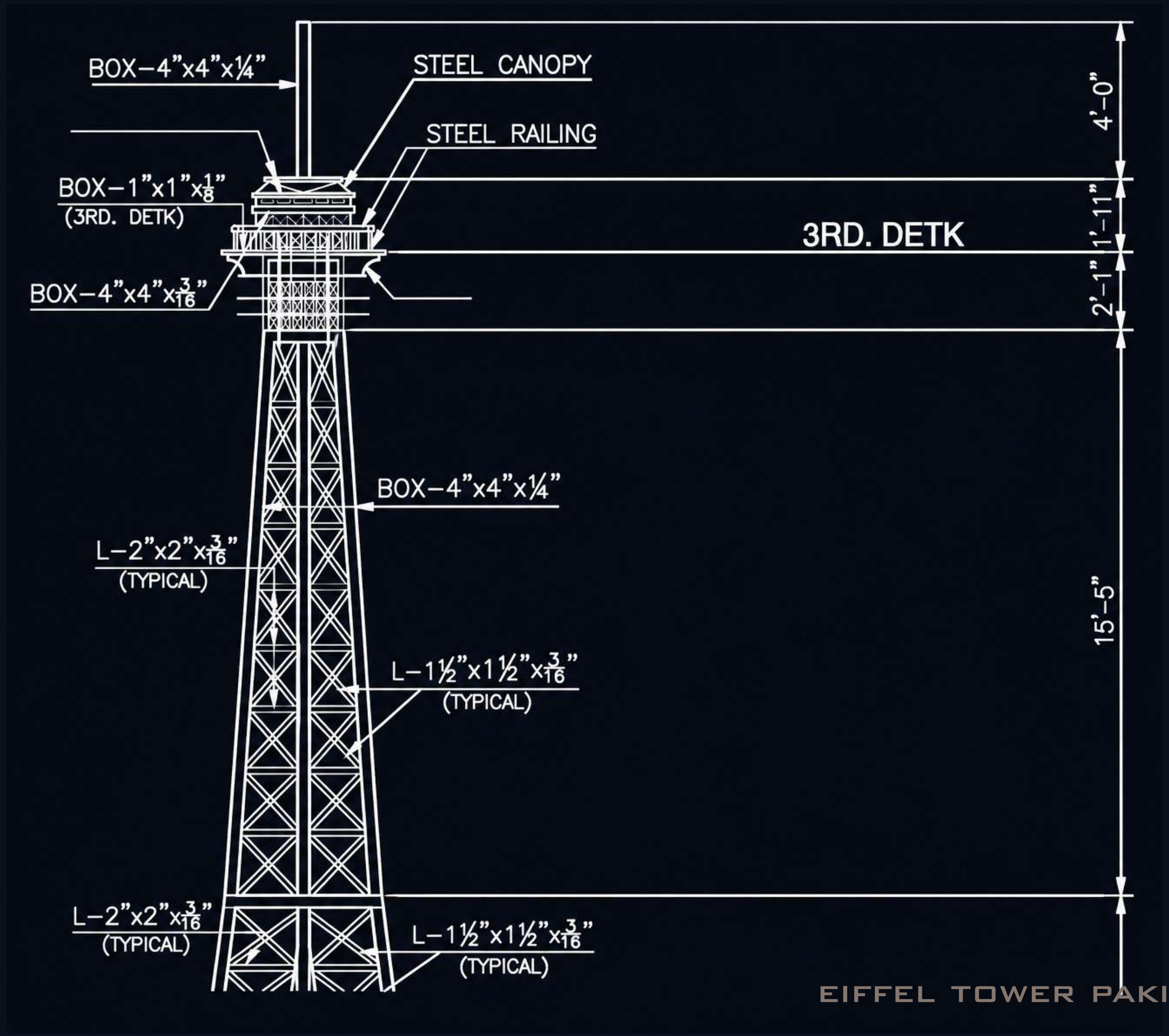
EIFFEL TOWER PAKISTAN



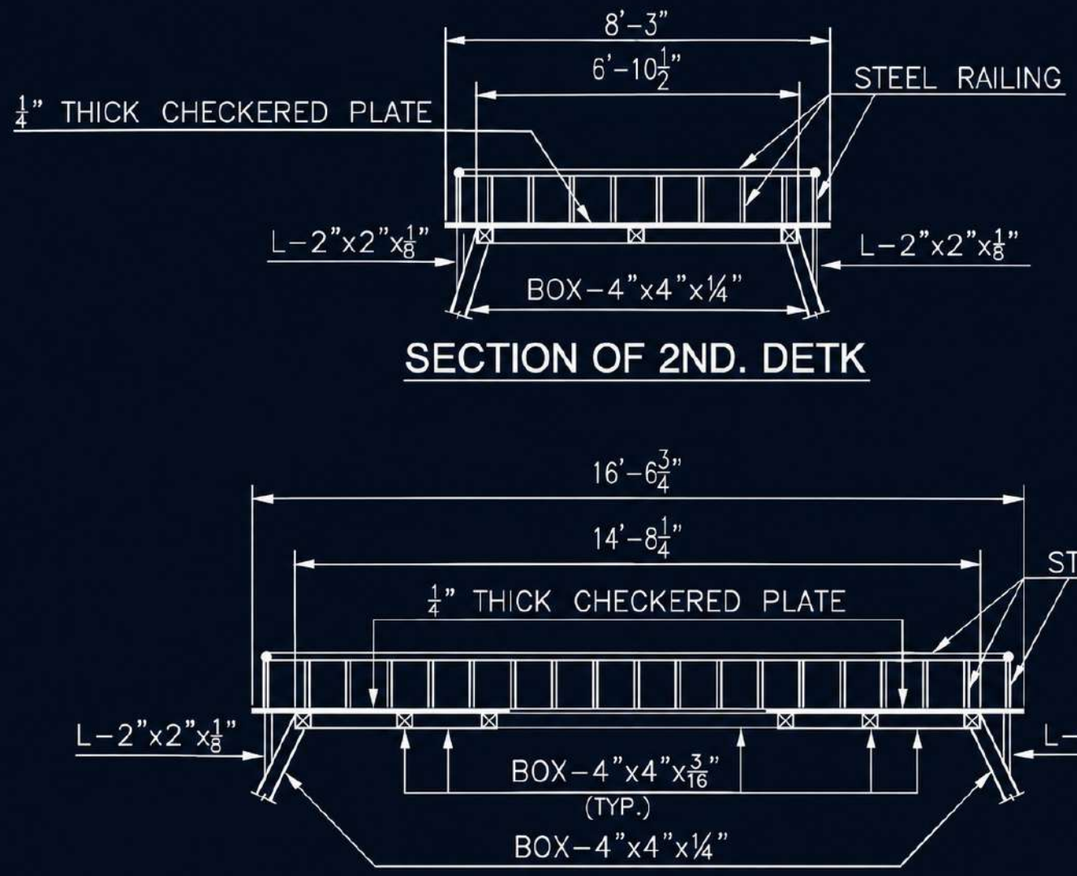
PROJECTED ELEVATION



EIFFEL TOWER PAKISTAN

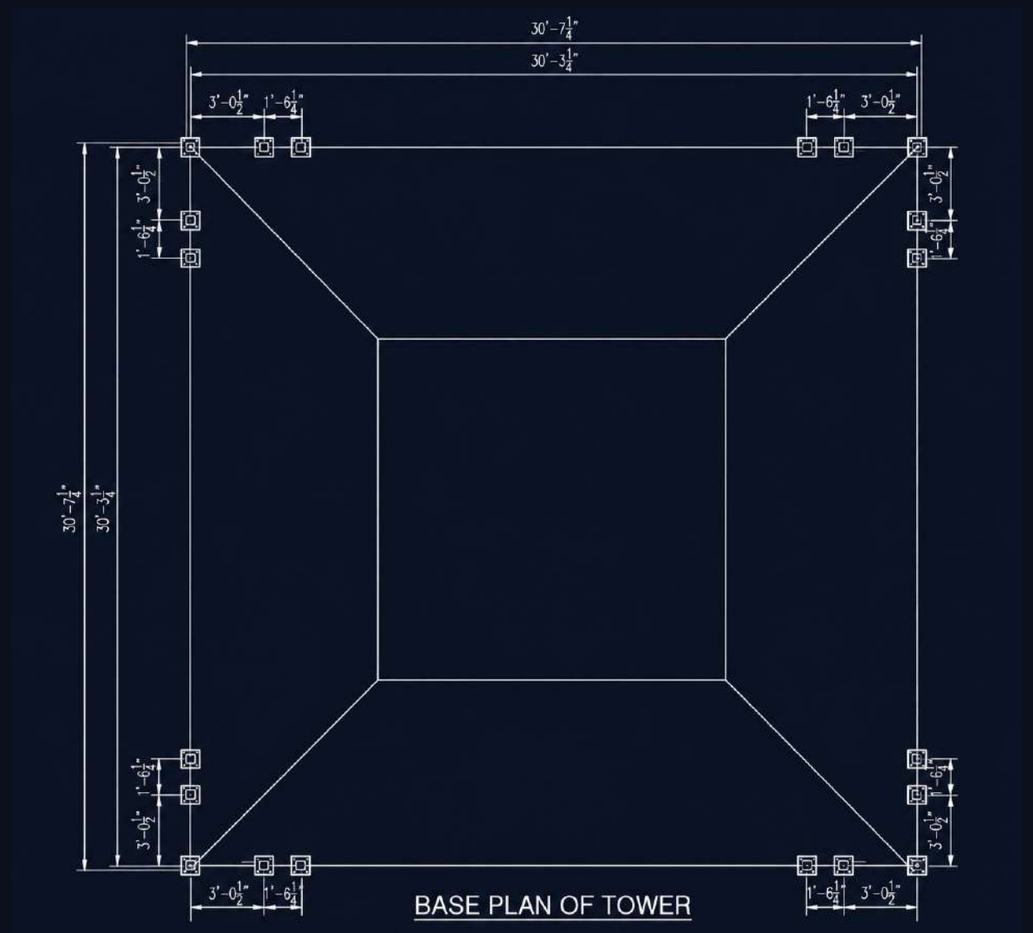


EIFFEL TOWER PAKISTAN



SECTION OF 2ND. DETK

SECTION OF 1ST. DETK



BASE PLAN OF TOWER

CONTAINER COMPOUND

PAKISTAN

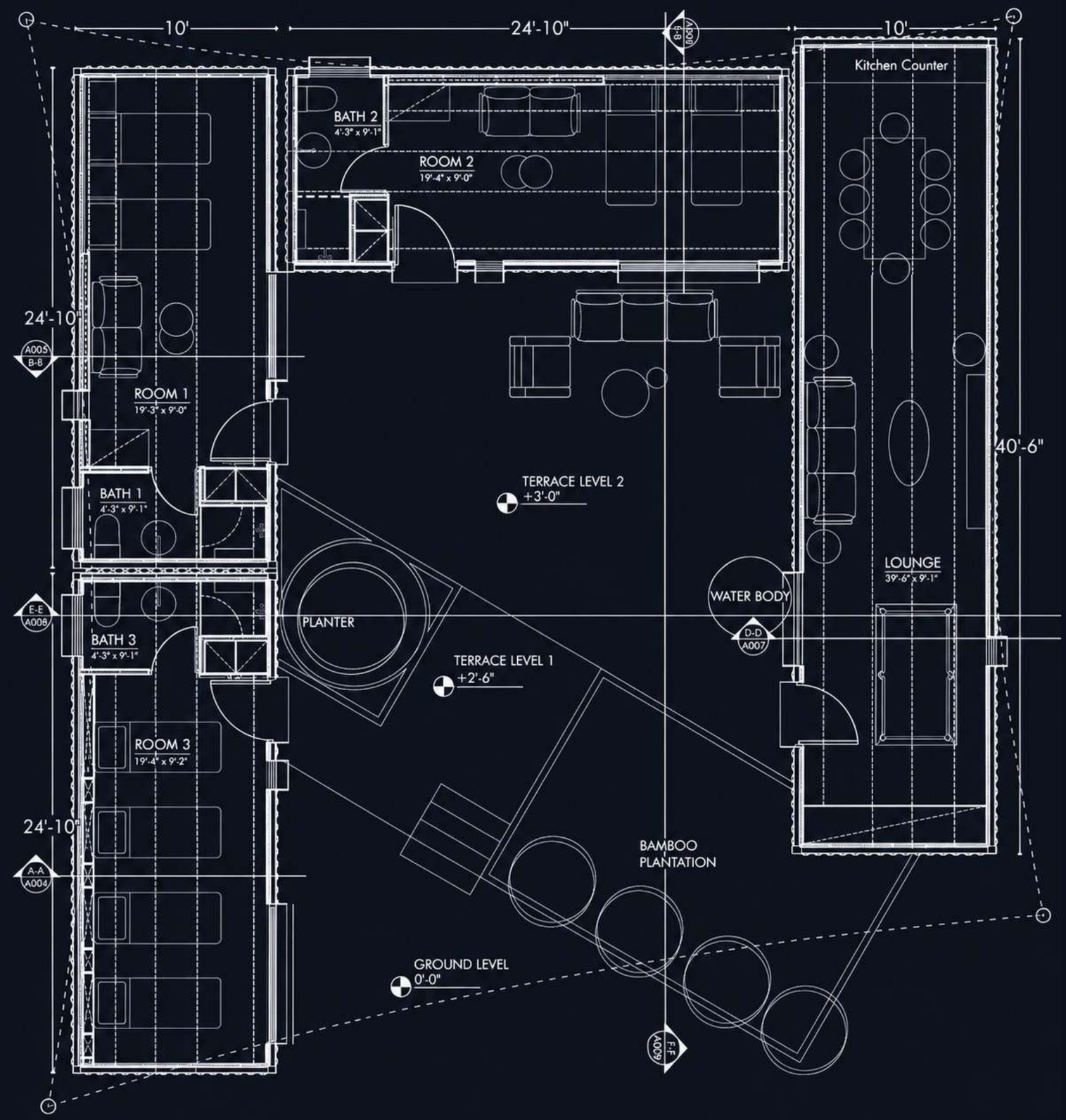


This project explores the adaptive reuse of shipping containers to create a contemporary hospitality and recreational space. The design features three private rooms with attached bathrooms, a shared lounge with a kitchenette, and a central open courtyard that connects the different spaces.

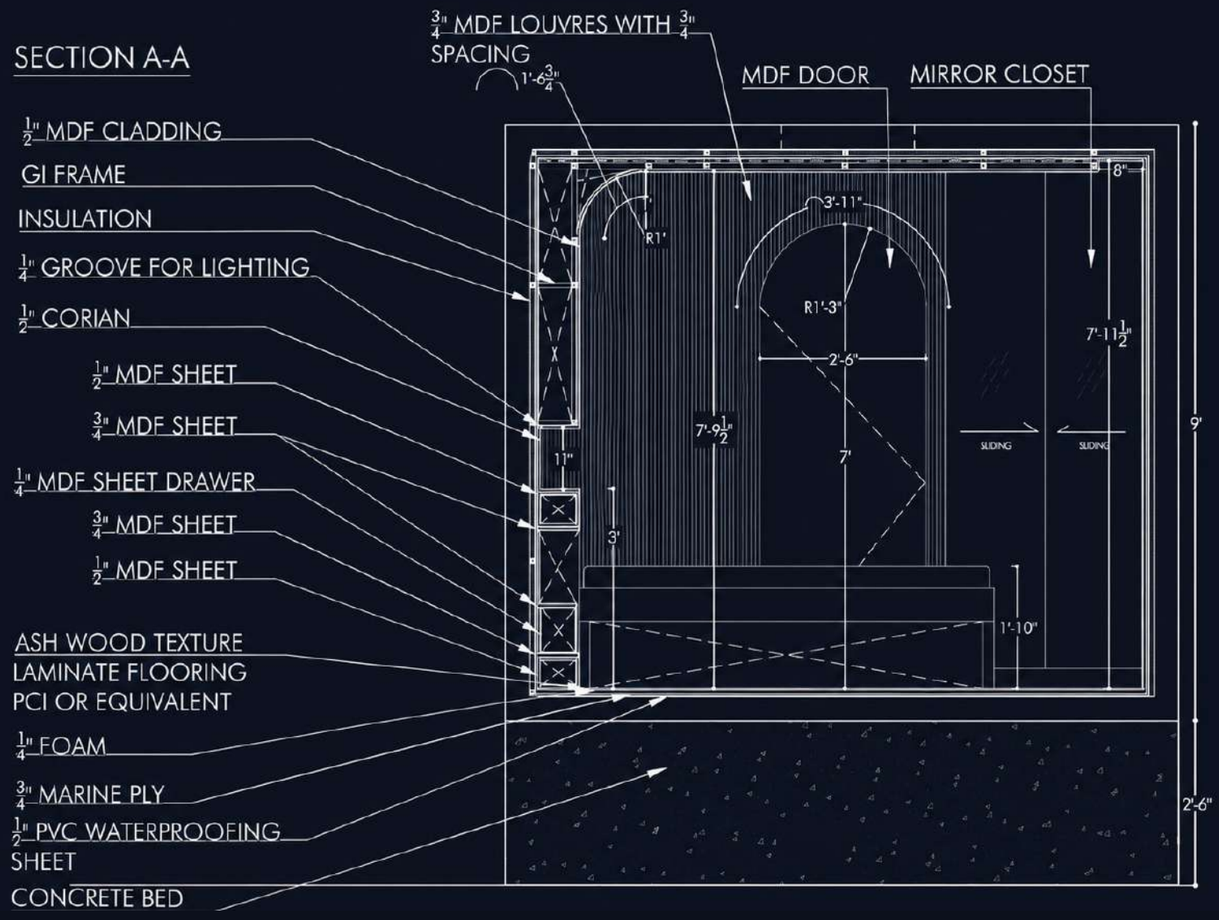
The courtyard acts as the heart of the compound, incorporating stepped terraces, landscaped planters, a water feature, and bamboo plantation to create an inviting outdoor environment. Lightweight tensile shading provides protection while maintaining an open and airy atmosphere.

The project combines modular construction, efficient spatial planning, and industrial aesthetics, transforming shipping containers into functional and comfortable spaces. Detailed architectural drawings, interior layouts, material specifications, and MEP plans demonstrate the integration of design and technical functionality.

PROJECT DESCRIPTION

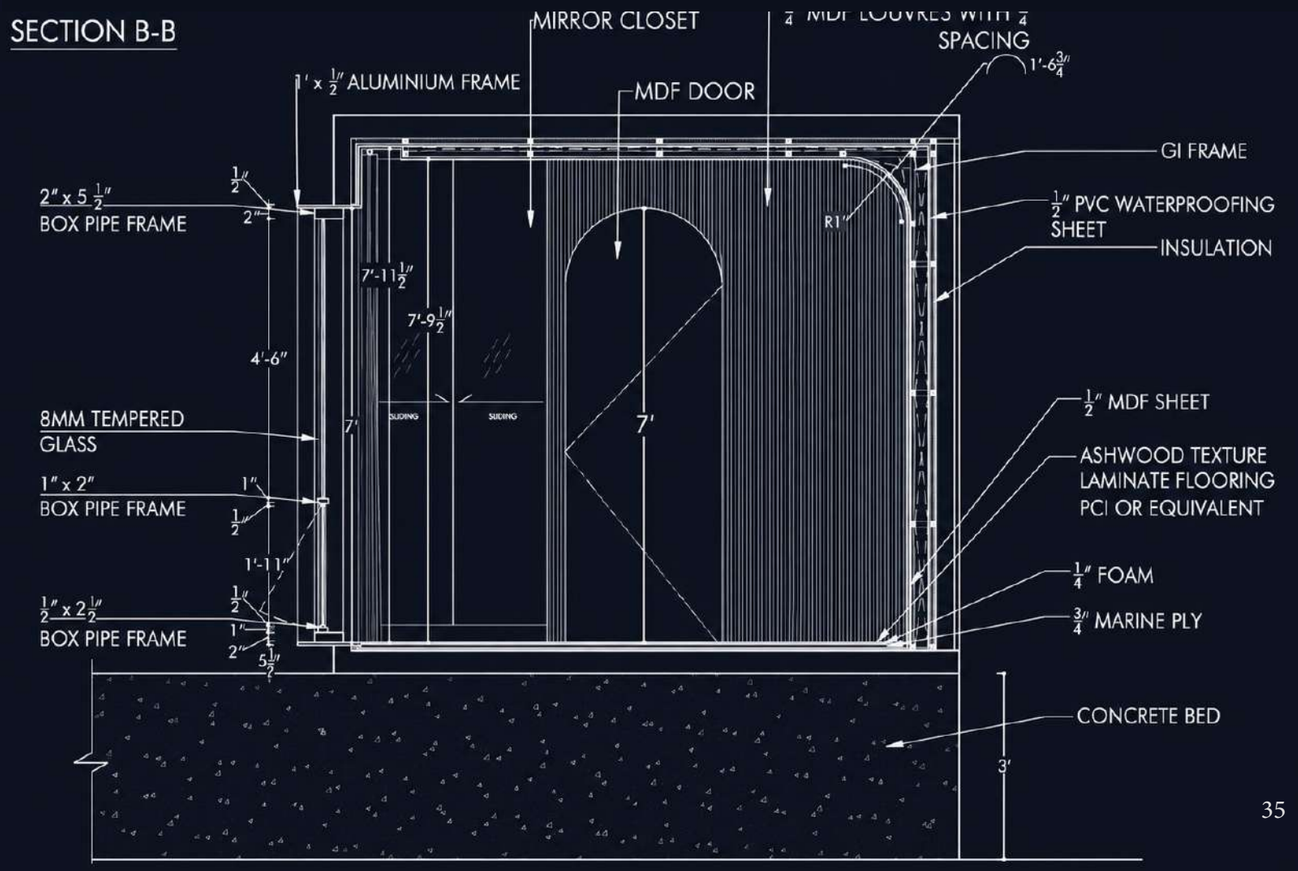


SECTION A-A



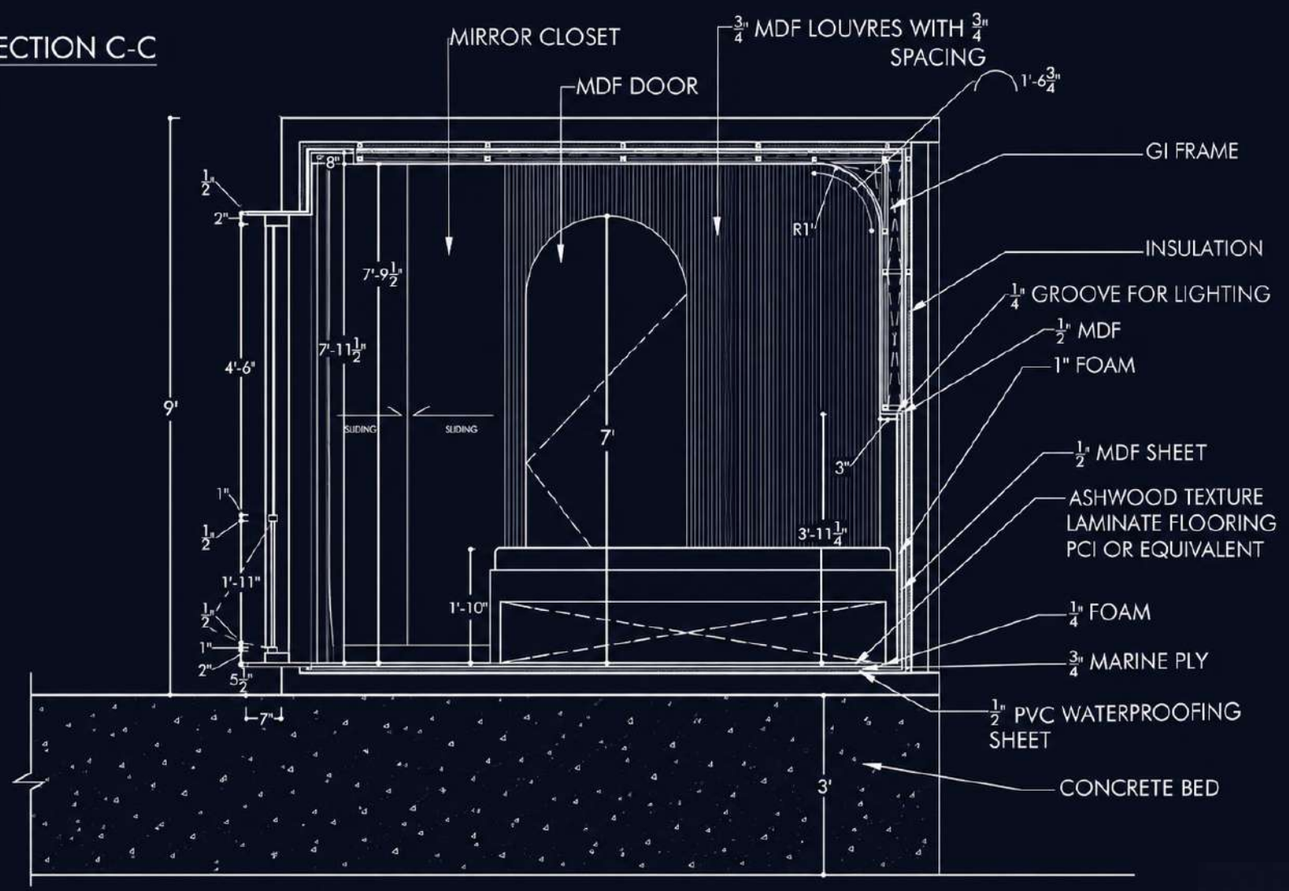
SECTION AA

SECTION B-B



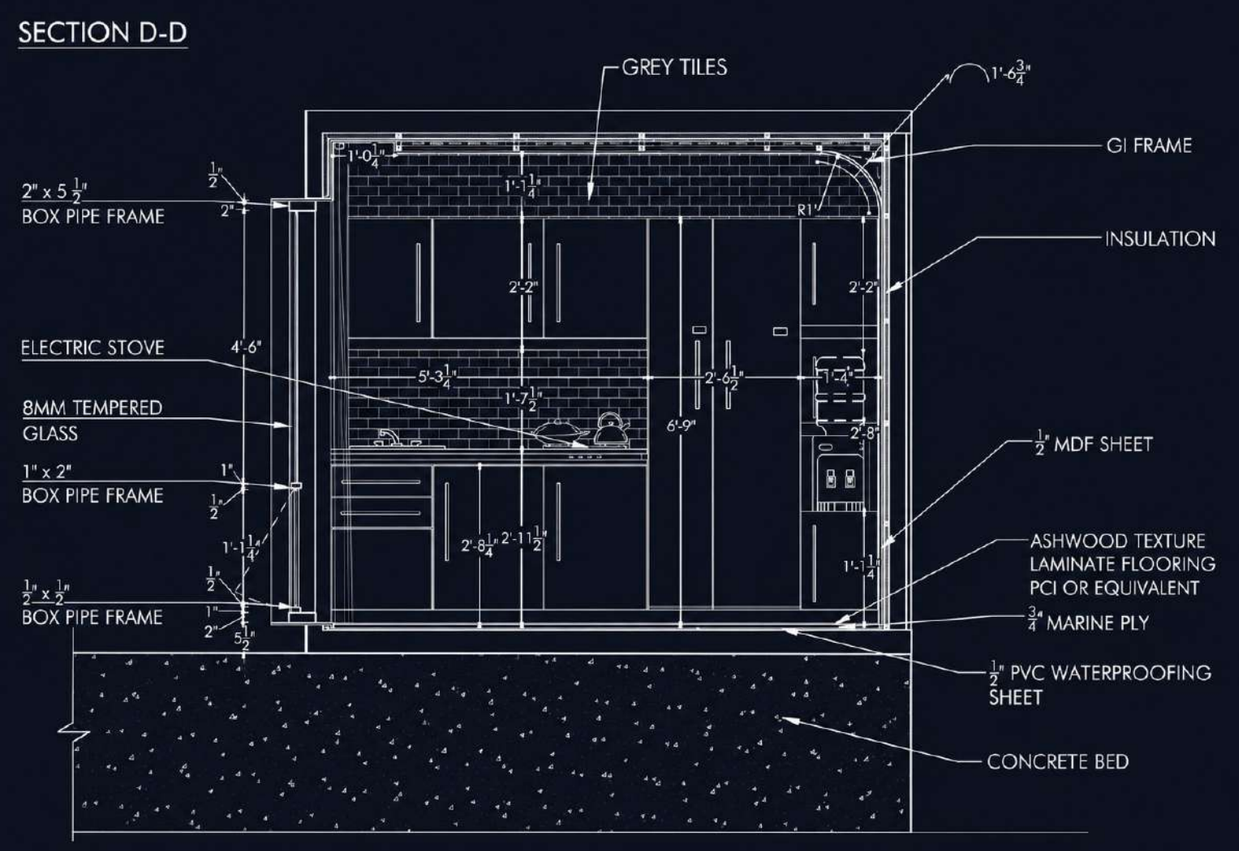
SECTION BB

SECTION C-C

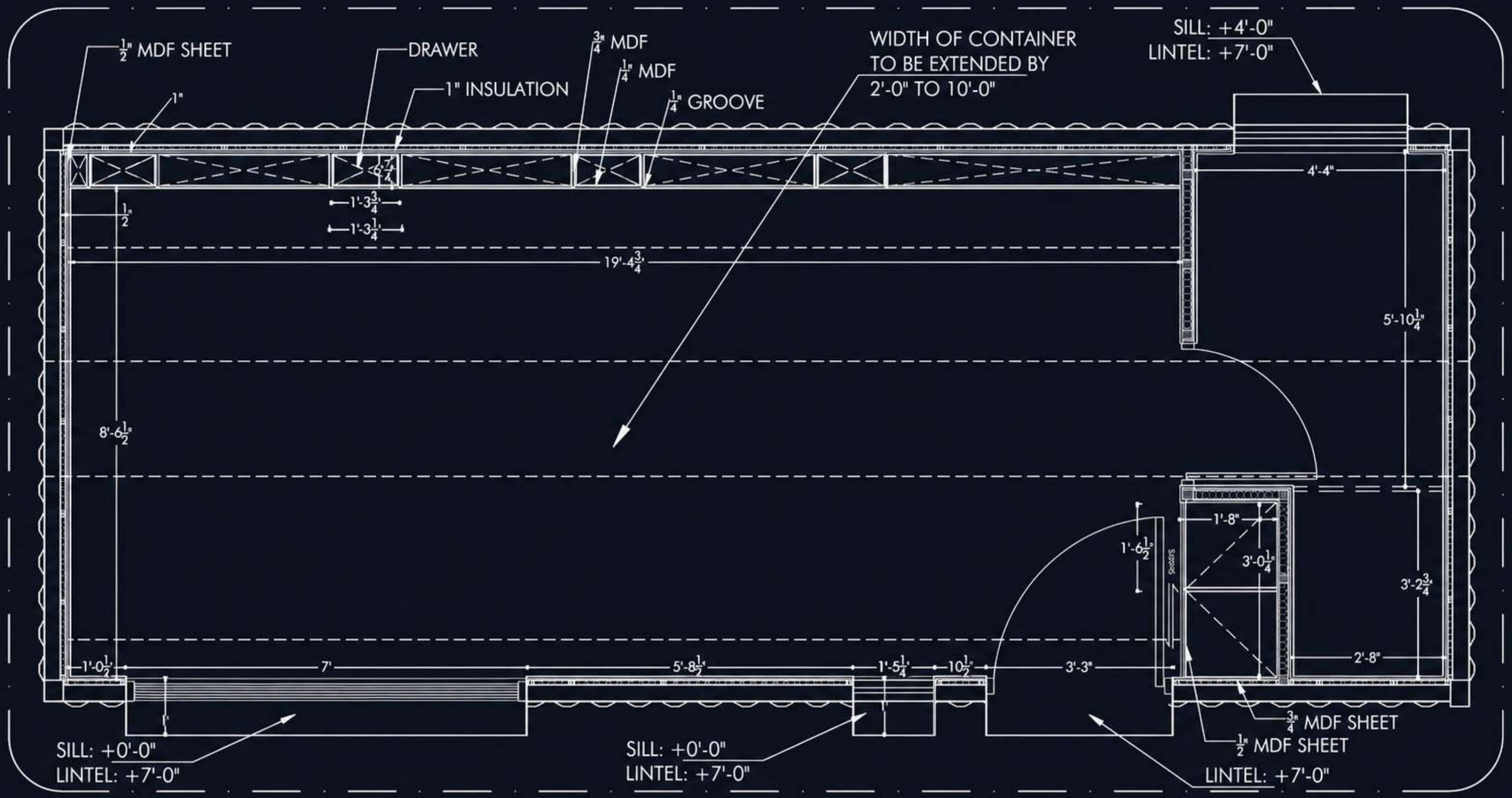


SECTION CC

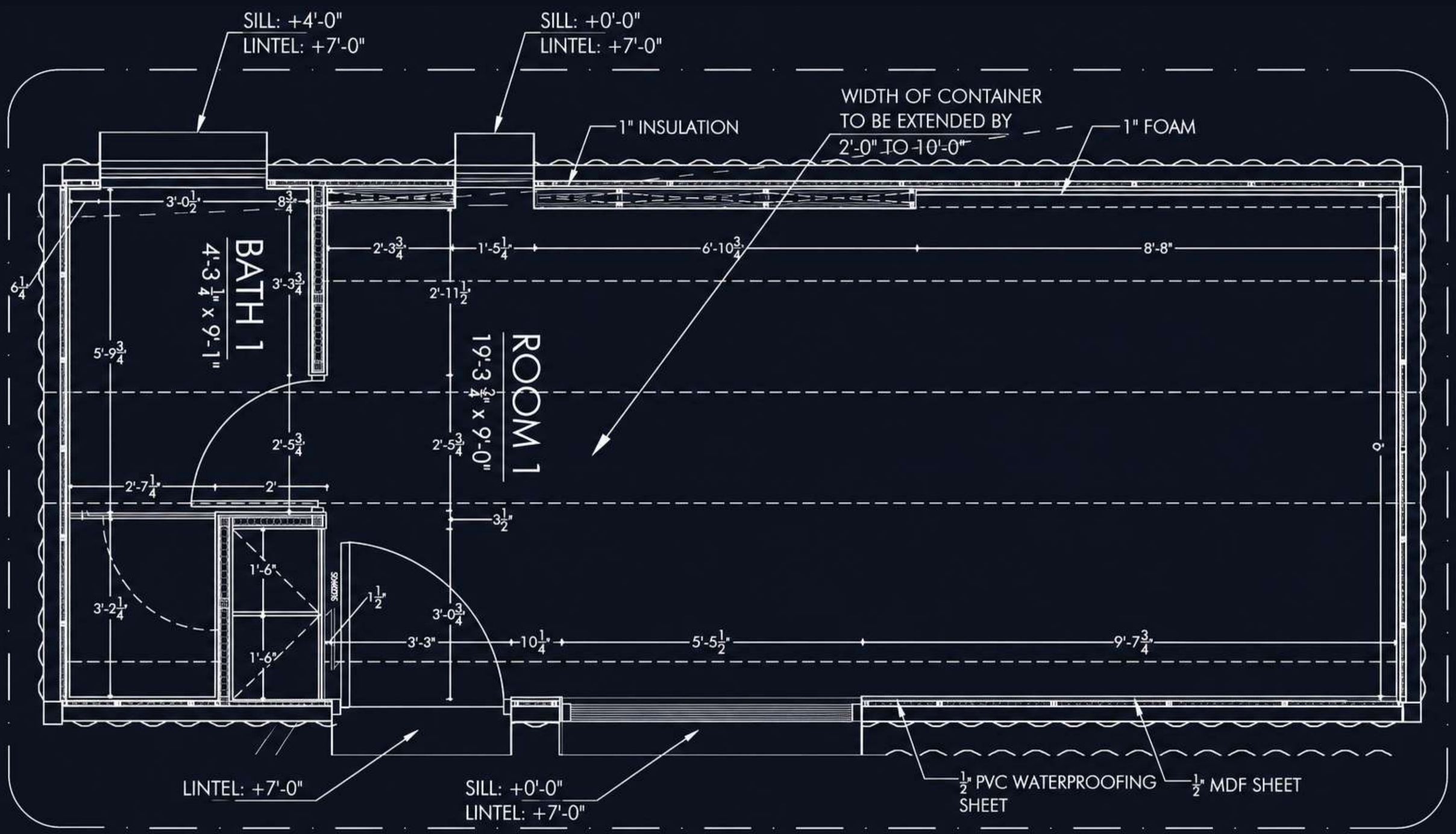
SECTION DD



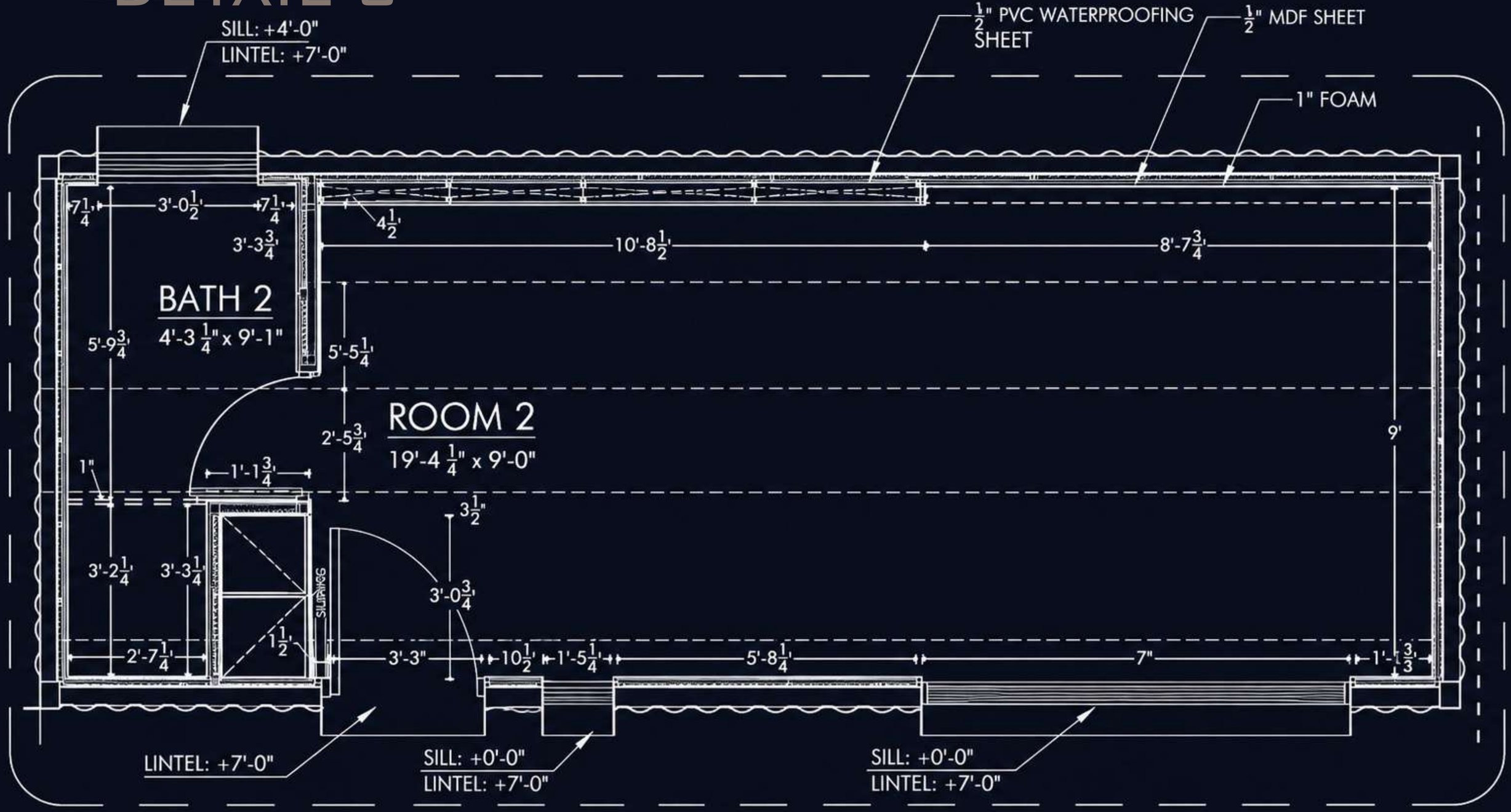
DETAIL A


½" MDF SHEET
DRAWER
1" INSULATION
¾" MDF
¼" MDF
¼" GROOVE
WIDTH OF CONTAINER
TO BE EXTENDED BY
2'-0" TO 10'-0"
SILL: +4'-0"
LINTEL: +7'-0"
1"
4'-4"
1'-3¾"
1'-3¼"
½"
19'-4¾"
5'-10¼"
8'-6½"
1'-8"
1'-6½"
3'-0¼"
3'-2¾"
2'-8"
1'-0½"
7'
5'-8½"
1'-5¼"
10½"
3'-3"
1'
¾" MDF SHEET
½" MDF SHEET
SILL: +0'-0"
LINTEL: +7'-0"
SILL: +0'-0"
LINTEL: +7'-0"
LINTEL: +7'-0"

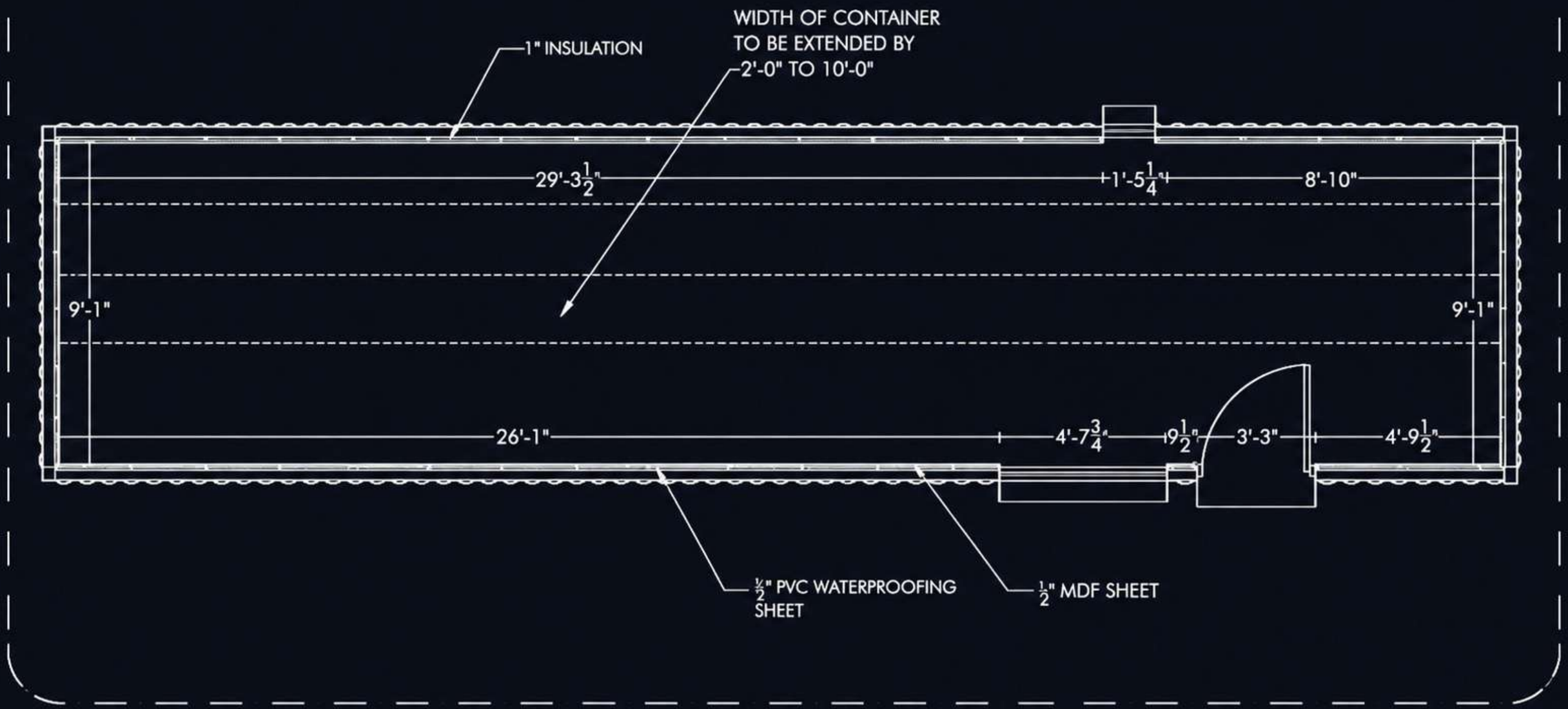
DETAIL B


SILL: +4'-0"
LINTEL: +7'-0"
SILL: +0'-0"
LINTEL: +7'-0"
1" INSULATION
WIDTH OF CONTAINER
TO BE EXTENDED BY
2'-0" TO 10'-0"
1" FOAM
BATH 1
4'-3 1/4" x 9'-1"
ROOM 1
19'-3 3/4" x 9'-0"
3'-0 1/2"
8 3/4"
2'-3 3/4"
1'-5 1/4"
6'-10 3/4"
8'-8"
6 1/4"
3'-3 3/4"
2'-11 1/2"
5'-9 3/4"
2'-5 3/4"
2'-5 3/4"
2'-7 1/4"
2'
3 1/2"
1'-6"
1'-6"
3'-2 1/4"
1 1/2"
3'-0 3/4"
3'-3"
10 1/4"
5'-5 1/2"
9'-7 3/4"
SIDEBOARDS
LINTEL: +7'-0"
SILL: +0'-0"
LINTEL: +7'-0"
1/2" PVC WATERPROOFING SHEET
1/2" MDF SHEET

DETAIL C

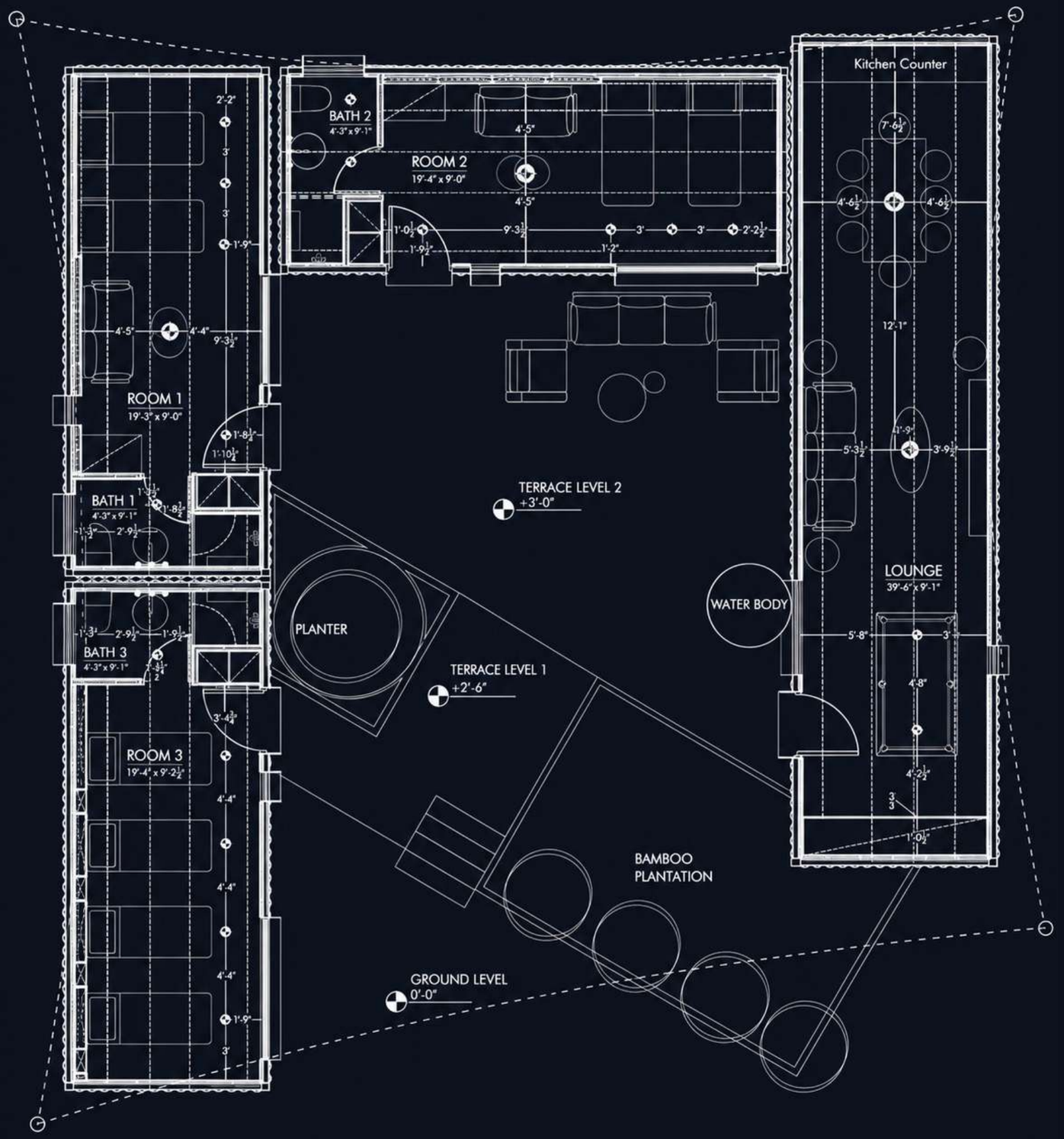

SILL: +4'-0"
LINTEL: +7'-0"
½" PVC WATERPROOFING SHEET
½" MDF SHEET
1" FOAM
7¼"
3'-0½"
7¼"
4½"
3'-3¾"
10'-8½"
8'-7¾"
BATH 2
4'-3 ¼" x 9'-1"
5'-9¾"
5'-5¼"
2'-5¾"
ROOM 2
19'-4 ¼" x 9'-0"
9'
1"
1'-1¾"
3½"
3'-2¼"
3'-3¼"
3'-0¾"
SILL: +0'-0"
LINTEL: +7'-0"
1½"
2'-7¼"
3'-3"
10½"
1'-5¼"
5'-8¼"
7"
1'-1⅜"
LINTEL: +7'-0"
SILL: +0'-0"
LINTEL: +7'-0"
SILL: +0'-0"
LINTEL: +7'-0"

DETAIL D

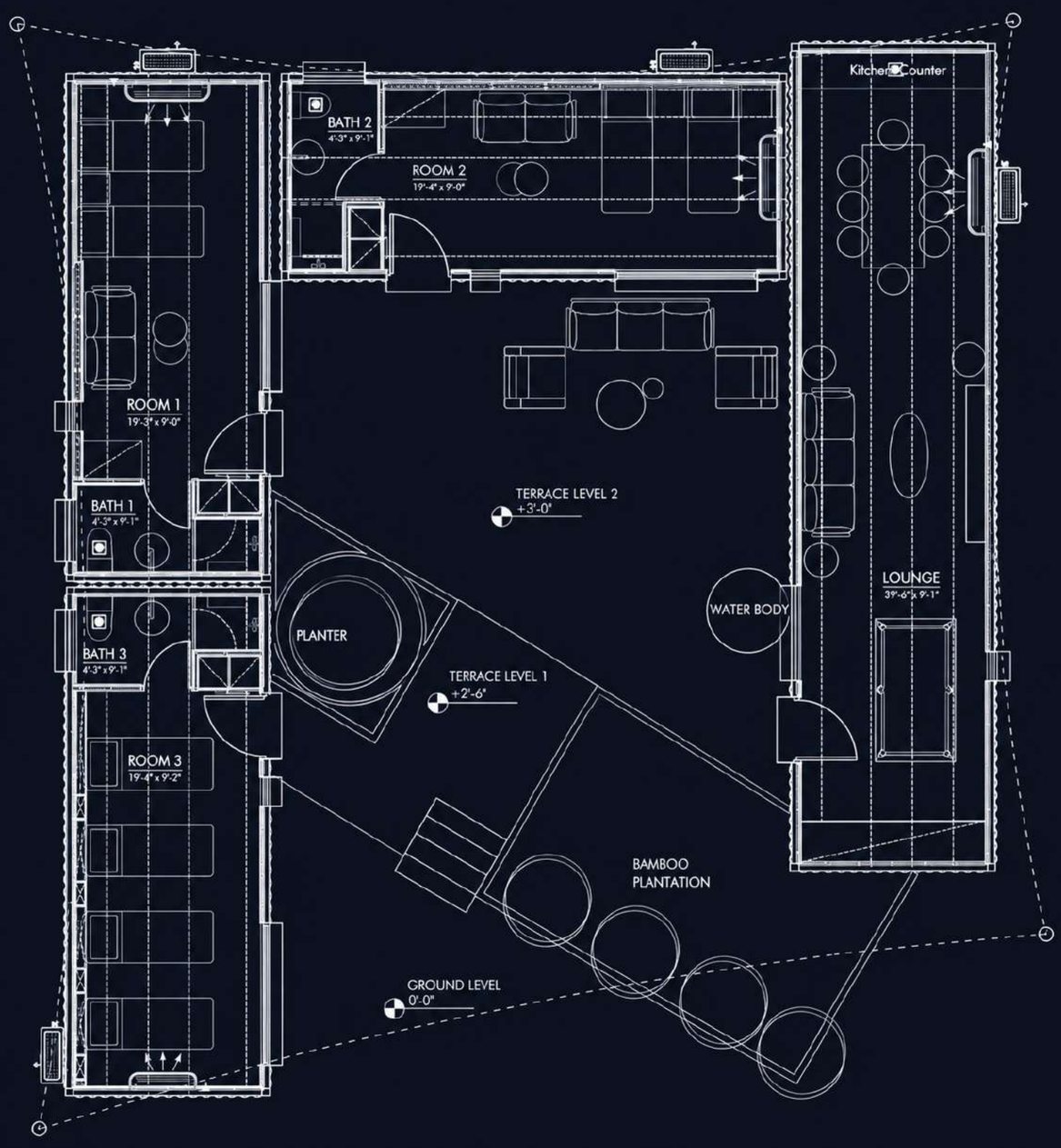

1" INSULATION
WIDTH OF CONTAINER
TO BE EXTENDED BY
2'-0" TO 10'-0"
29'-3 1/2"
1'-5 1/4"
8'-10"
9'-1"
9'-1"
26'-1"
4'-7 3/4"
9 1/2"
3'-3"
4'-9 1/2"
1/2" PVC WATERPROOFING
SHEET
1/2" MDF SHEET

LIGHTING PLAN

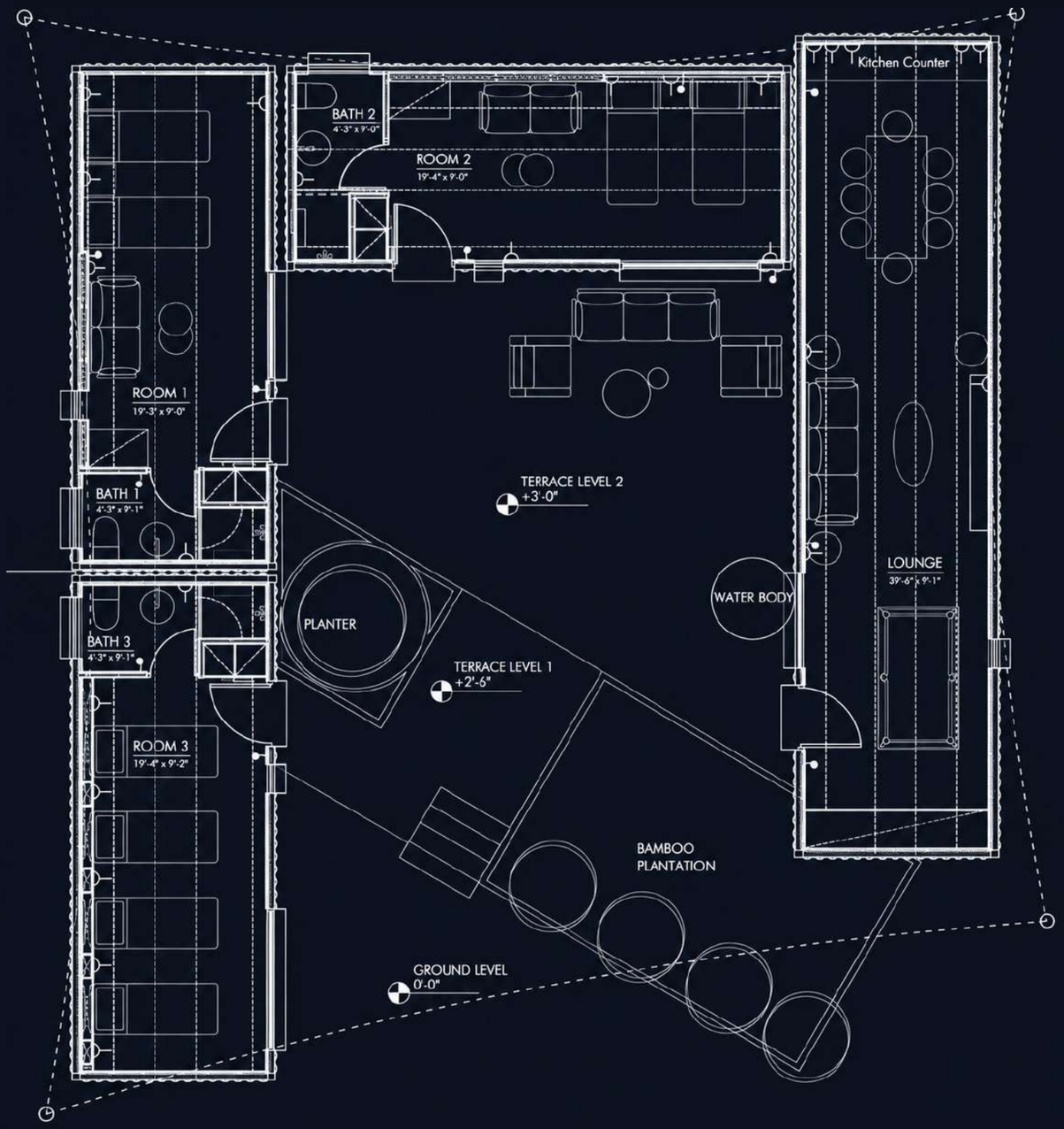
Sr.NO	DESCRIPTION	MOUNTING HEIGHT BOTTOM FROM F.F.L.	SYMBOL
1	SWITCH BOARD	4'-0"	
2	CEILING LIGHT	CEILING	
3	MIRROR LIGHT	7'-0"	
4	EXHAUST FAN	8'-0"	
5	FLOOR LIGHT	AS REQUIRED	
6	INSECT KILLER	AS REQUIRED	I.K
7	3-PIN 10 Amp:WALL SOCKET PLUG POINT.	1'-0"-3'-6"	
8	3-PIN 15 Amp:WALL SOCKET POWER PLUG POINT.	1'-0"-3'-6"	
9	TELEPHONE	1'-0"	
10	COMPUTER/DATA	1'-0"	
11	PLUG CCTV CAMERA	AS REQUIRED	
12	CCTV CAMERA	AS REQUIRED	
13	OUTDOOR UNIT	9'-0"	
14	POWER PULG FOR AC	7'-0"	
15	SPLIT AC	7'-0"	
16	CASSATE TYPE AC	CEILING	
17	SIGNAGE LIGHT	7'-0"	
18	WIFI POINT	CEILING	
19	SMOKE DETECTOR	CEILING	S
20	CEILING EXHAUST	CEILING	
21	CHANDILIER	CEILING	
22	GEYSER	CEILING	G



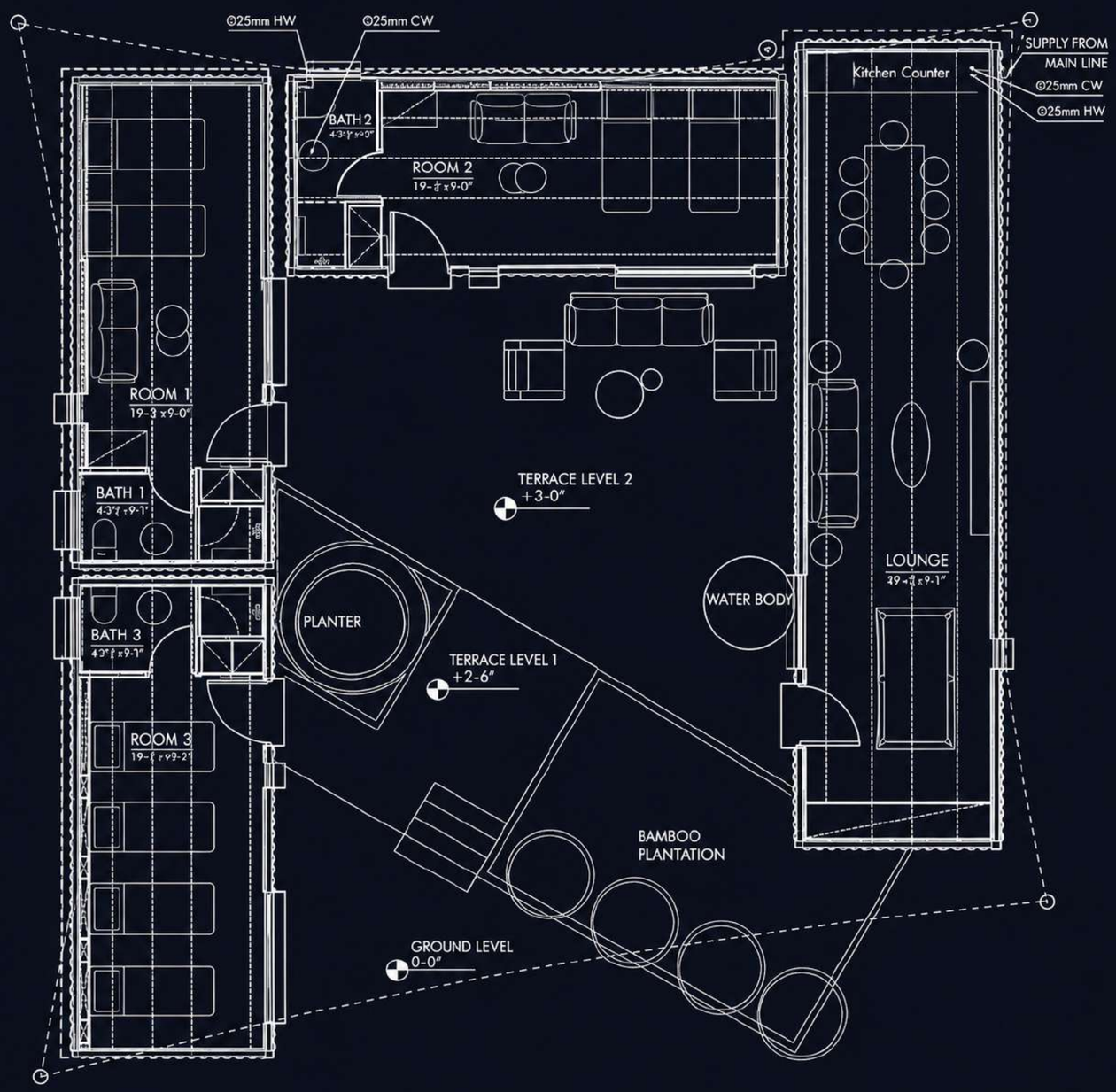
HVAC PLAN



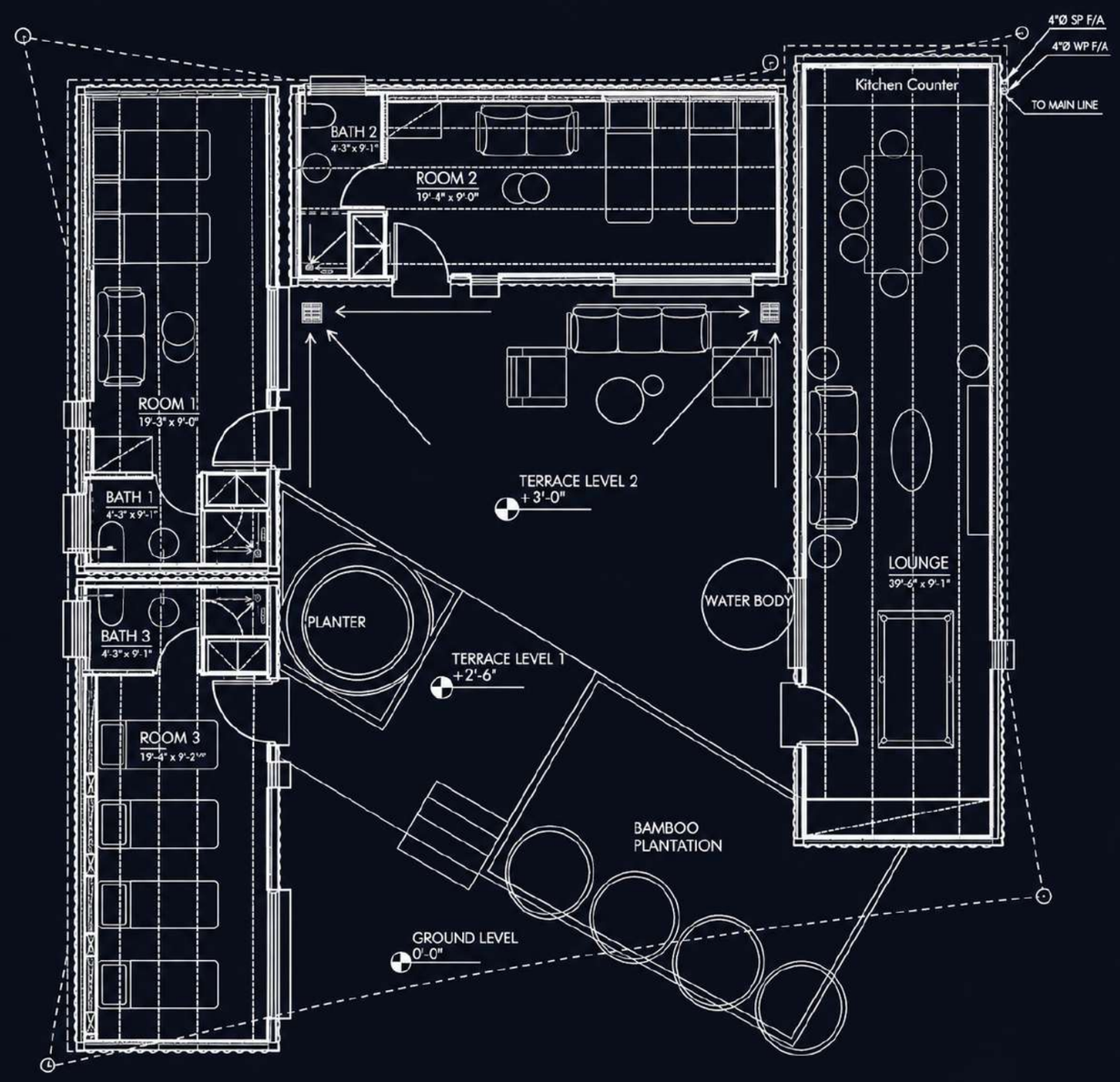
POWER PLAN



PLUMBING



DRAINAGE



KFC H-9

PAKISTAN

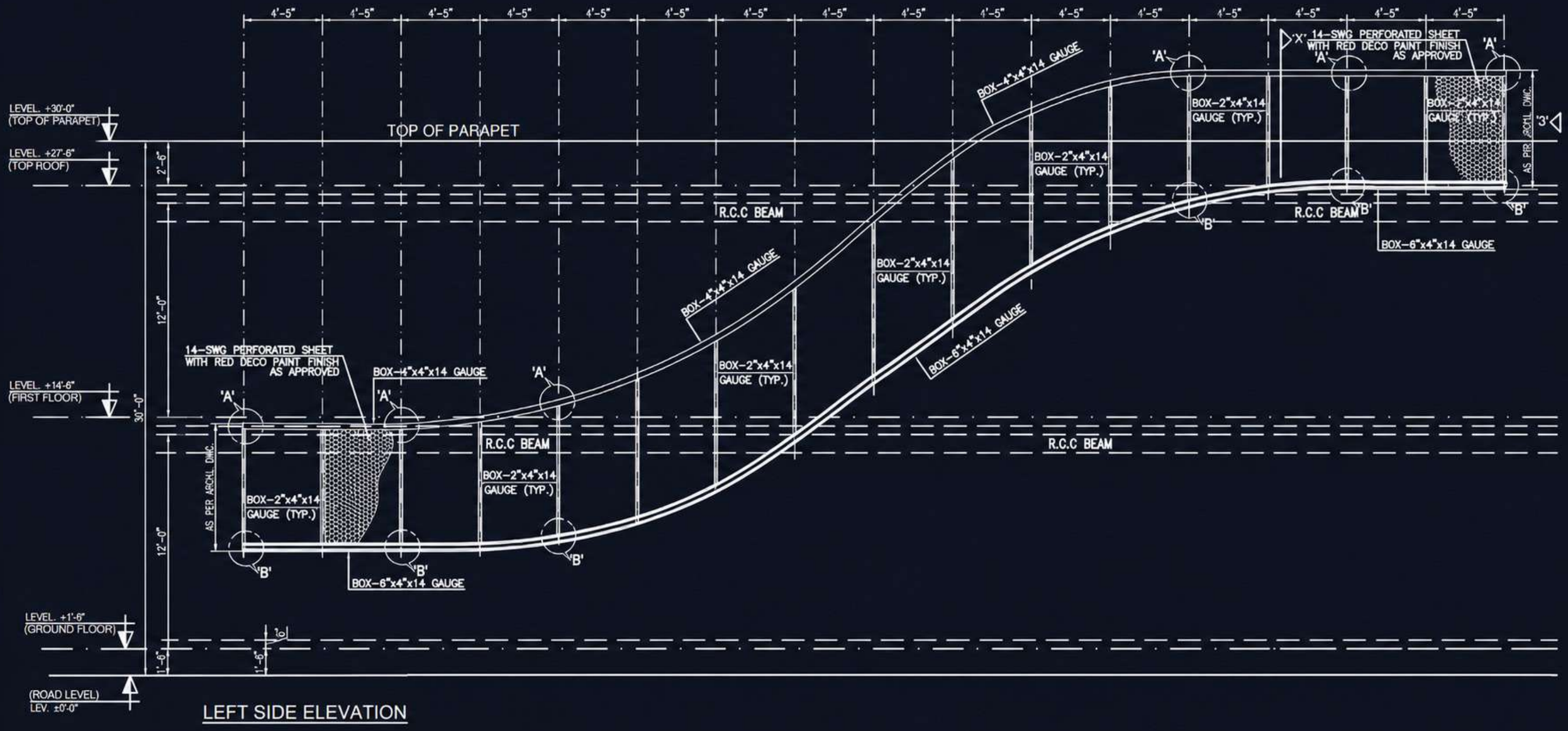
The project involves the structural design and detailing of a contemporary KFC restaurant facade located at H-9 Itwar Bazar, Islamabad. The design features a distinctive curved architectural profile, combining sweeping geometric forms with steel framing to create a visually striking commercial identity.

The facade incorporates structural steel box sections, curved framing members, and decorative screening elements to achieve the proposed architectural form. Particular attention is given to the integration of the new steel framework with the existing building through carefully detailed connections to concrete, brick masonry, floor slabs, and parapets.

The structural drawing package includes front and side elevations, entrance facade details, steel member specifications, anchoring arrangements, and connection details, translating the architectural concept into a practical construction framework.

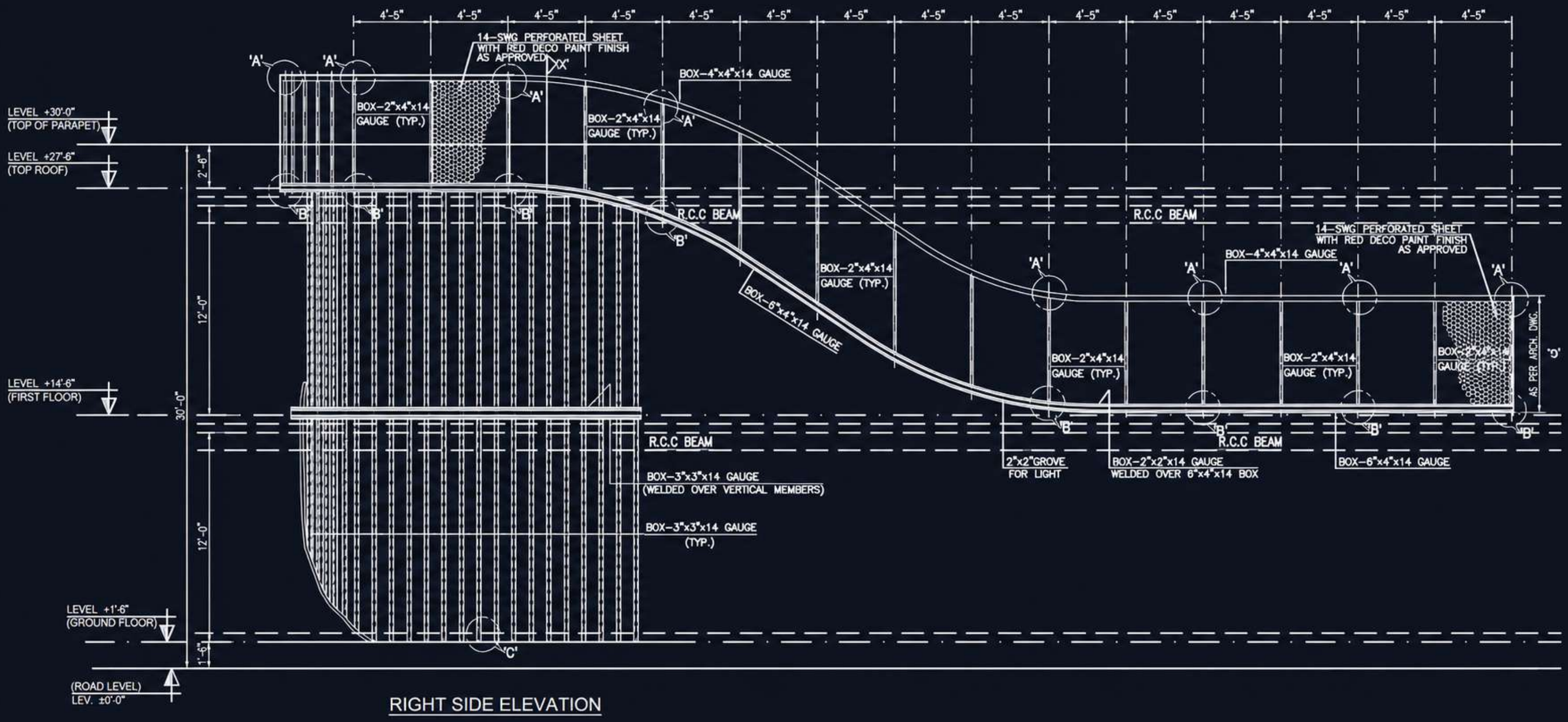


LEFT SIDE ELEVATION



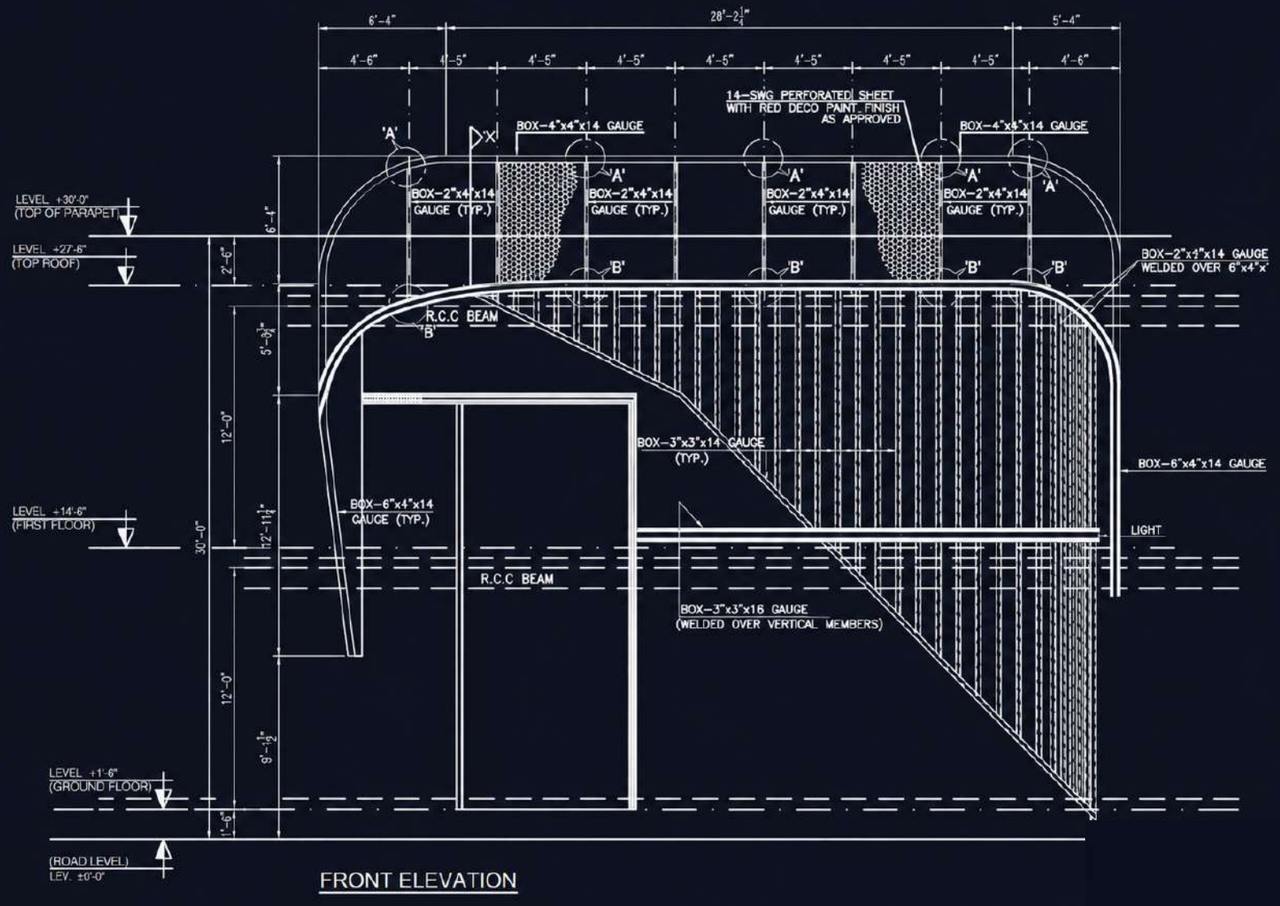
LEFT SIDE ELEVATION

RIGHT SIDE ELEVATION



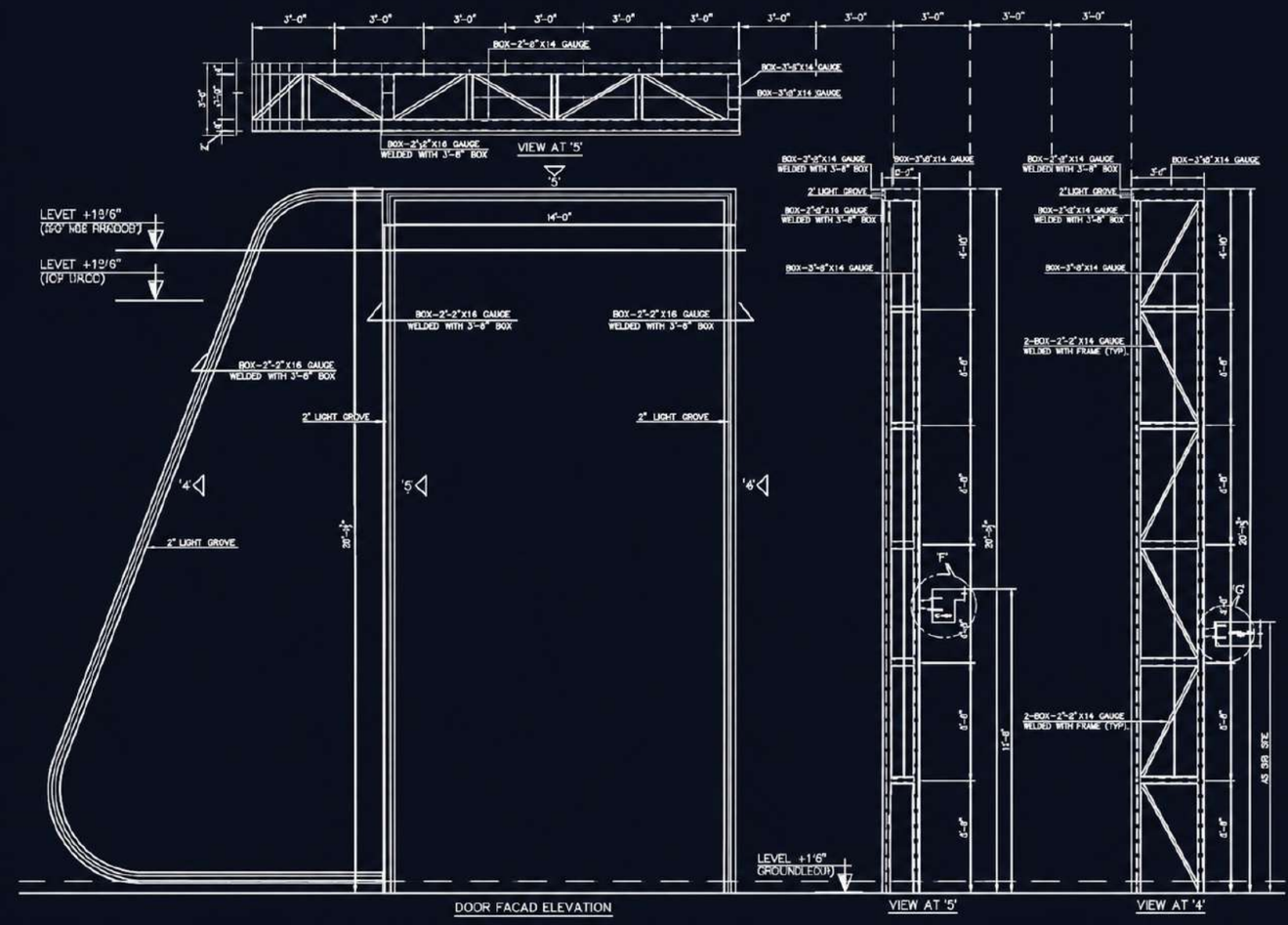
RIGHT SIDE ELEVATION

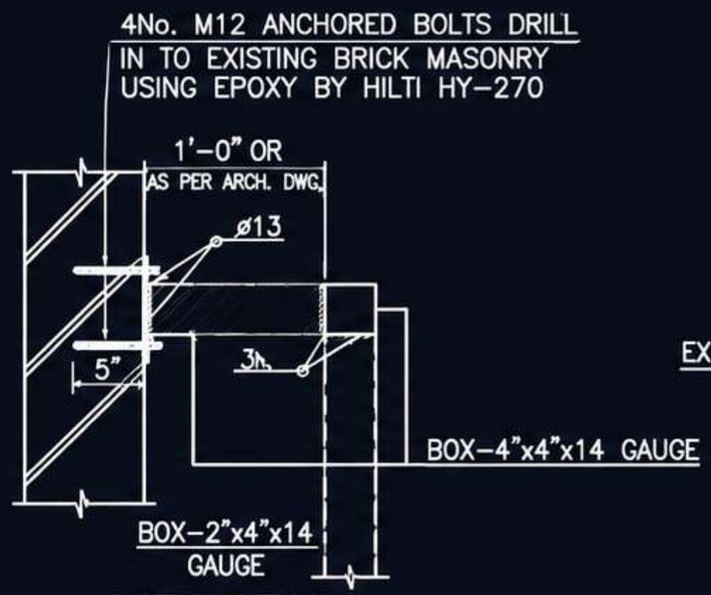
FRONT ELEVATION



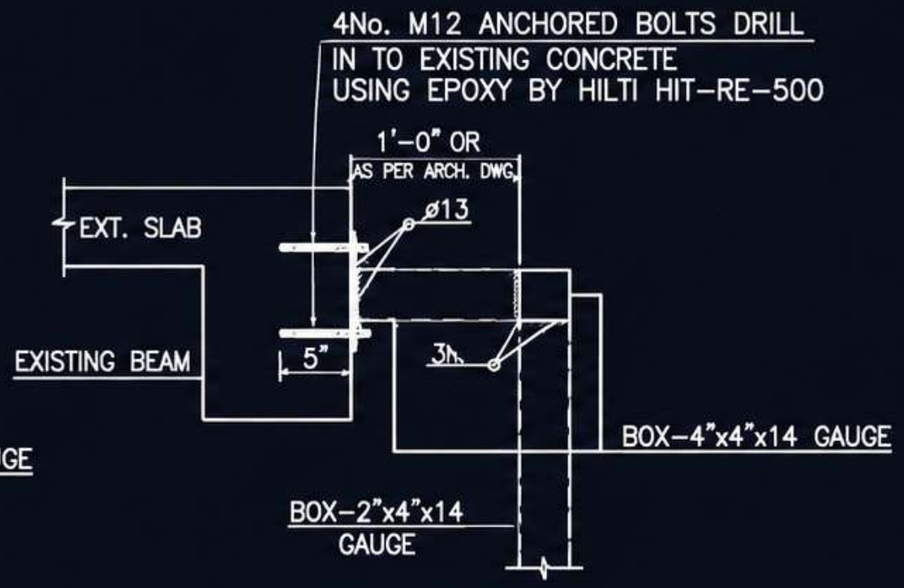
FRONT ELEVATION

DOOR FACADE ELEVATION

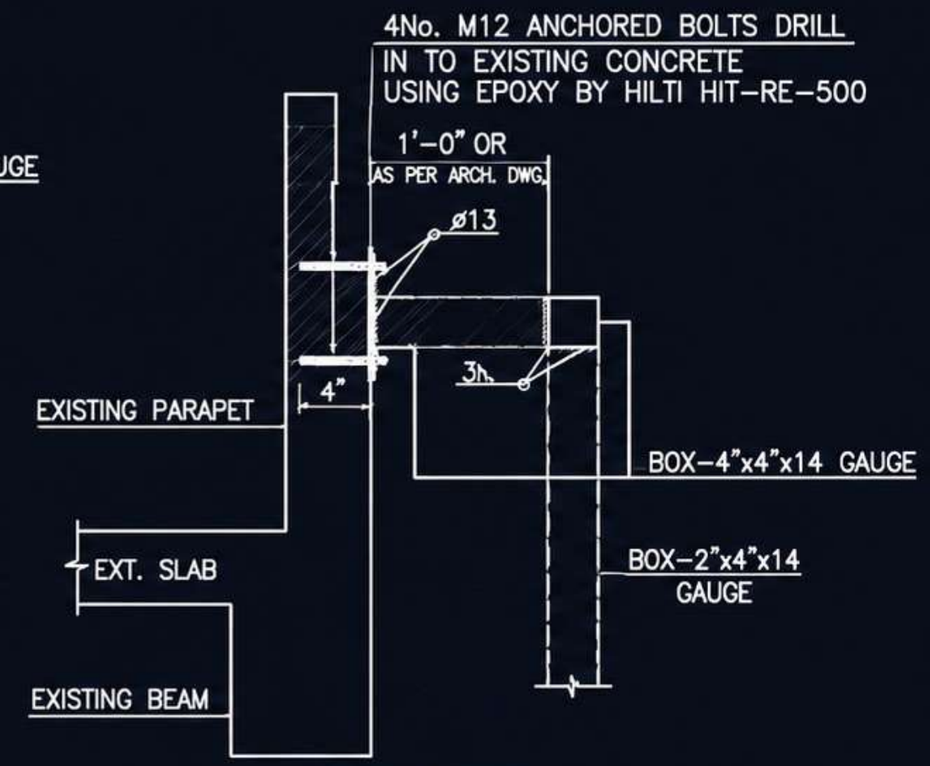




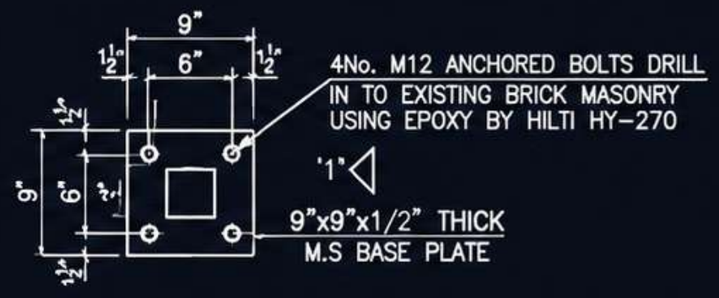
VIEW AT '1'
(CONNECTION DETAIL IN TO EXISTING BRICK MASONRY)



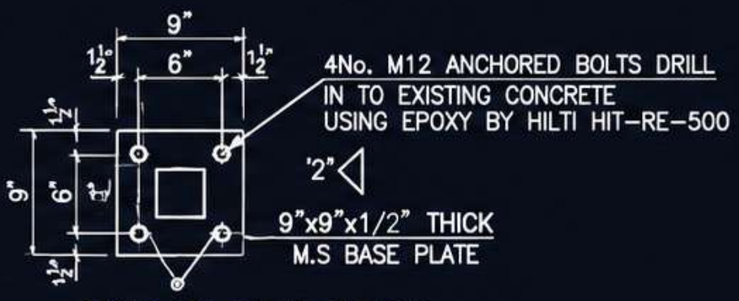
VIEW AT '2'
(CONNECTION DETAIL IN TO EXISTING CONCRETE)



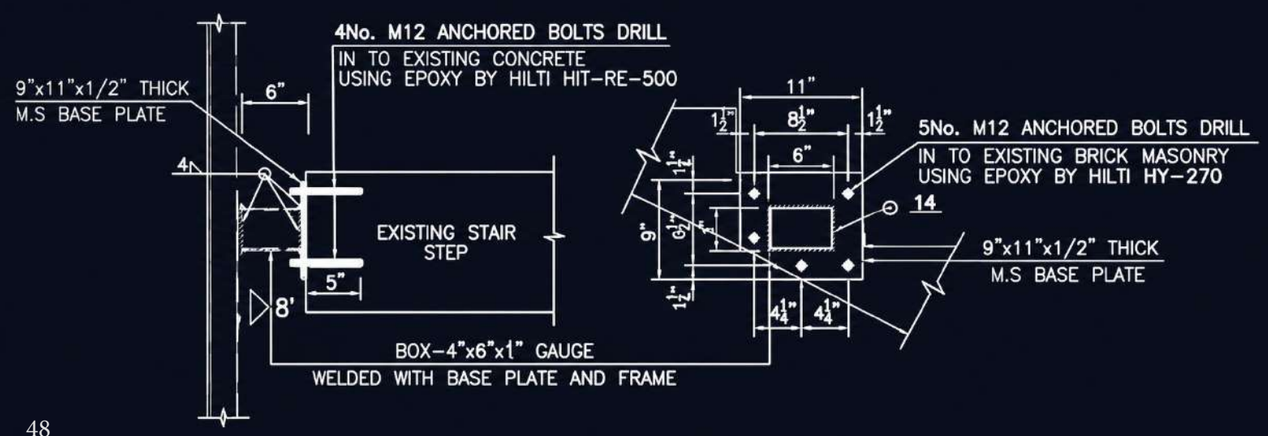
VIEW AT '2'
(CONNECTION DETAIL IN TO EXISTING PARAPET)



TYP. DETAIL AT 'A'
(CONNECTION DETAIL IN TO EXISTING BRICK MASONRY AT ALTERNATE VERTICAL MEMBER EXCEPT ENDS)

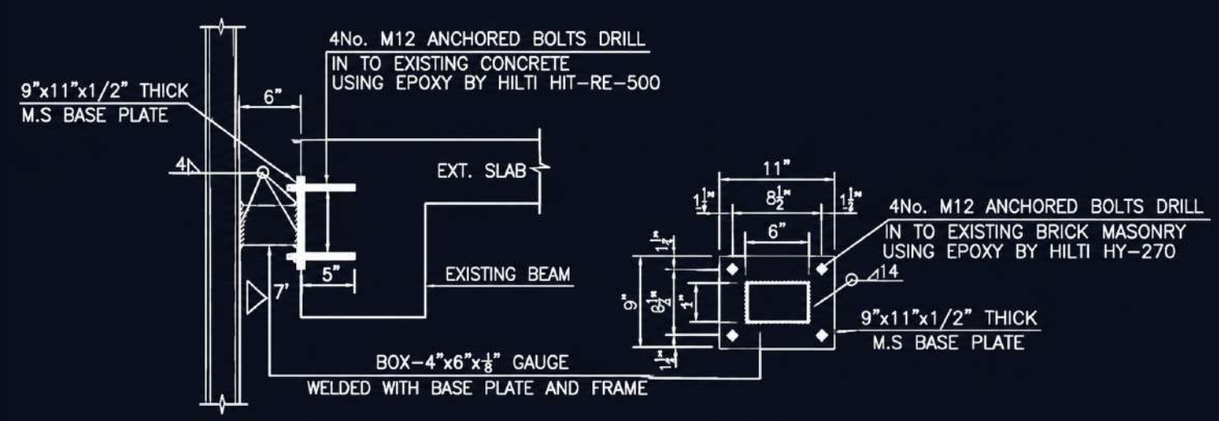


TYP. DETAIL AT 'A'
(CONNECTION DETAIL IN TO EXISTING CONCRETE AT ALTERNATE VERTICAL MEMBER EXCEPT ENDS)



DETAIL AT-'G'

VIEW AT-'8'



DETAIL AT-'F'

VIEW AT-'7'

COMMERCIAL PLAZA

Pakistan

The project involves the structural design and detailing of a multi-storey commercial plaza located at 114-B, DHA Phase VIII, Lahore. The building features a contemporary architectural facade with extensive glazing, clean geometric lines, and commercial spaces distributed across multiple floors.

The structural system incorporates reinforced concrete columns, beams, slabs, and raft foundations, designed to support the building's vertical and horizontal loads. The layout integrates a lift shaft and staircase for efficient vertical circulation while maintaining flexible commercial floor spaces.

The comprehensive structural drawing package includes foundation plans, floor-wise framing and slab reinforcement layouts, beam and column sections, staircase details, and overhead water tank specifications. These drawings establish a coordinated structural framework for the building's construction.



GENERAL NOTES:

01-USE GRADE 60 DEF. STEEL (CONFORMING TO ASTM A615 STANDARDS HAVING YIELD STRENGTH OF 60,000 PSI) FOR SLABS, BEAMS AND COLUMNS REINFORCEMENT.
02-USE GRADE 40 DEF. STEEL FOR RINGS OF BEAMS & COLUMNS.
03-USE CONCRETE AS FOLLOWING (USING OP CEMENT, MARGALLA CRUSH AND CHENAB SAND)

CONCRETE PART	MIX RATIO	CUBE COMP. STRENGTH(28 DAYS)	WATER CURING
i- FOUNDATION, R.C.C WALLS, SLABS & BEAMS	1:2:4	fu' = 3,000 PSI	28 DAYS
ii- R.C.C COLUMNS	1:11/2:3	fu' = 4,000 PSI	28 DAYS

04-PROVIDE SPECIFIED BELOW CONCRETE COVER TO MAIN BARS AND STIRRUPS:

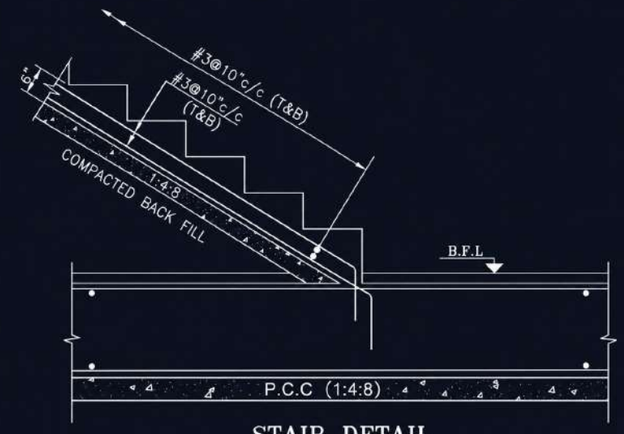
SLABS (BOT & TOP):
RCC WALLS (ALL SIDES): 2"
BEAMS (BOT, TOP & SIDES): 1 1/2"
FOOTINGS (BOT & SIDES):2"
COLUMNS (ALL SIDES): 1 1/2"
FOOTINGS (TOP):1.5"

05-PERFORM WATER & TERMITE PROOFING USING APPROVED CHEMICALS, CHIPSING OR TORCH APPLIED MEMBRANE.
06-REFER TO ARCHITECTURAL DRAWINGS FOR DIMENSIONING.
07-IT IS THE RESPONSIBILITY OF SITE INCHARGE TO ENSURE THAT ALL STRUCTURAL SPECIFICATIONS & DRAWINGS ARE FOLLOWED PRECISELY.
08-PROVIDE BAR OVERLAPS AS 50xØ FOR BARS UP TO #5 & 60xØ FOR BARS #6 AND ONWARDS.

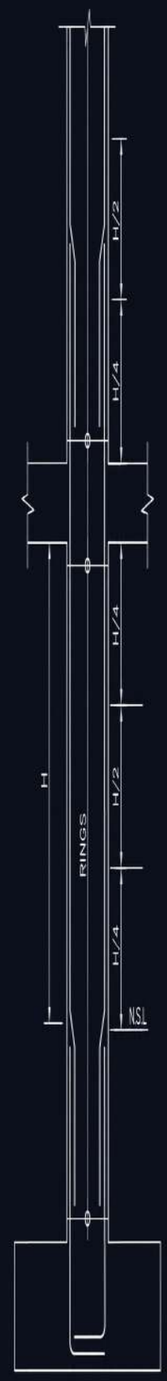
09-ABBREVIATIONS:

B	BOTTOM
BOT	BOTTOM
B.F.L	BASEMENT FINISH FLOOR LEVEL
B/F	BOTH FACES
C/C	CENTER TO CENTER
I/F	INNER FACE
O/F	OUTER FACE
P.C.C	PLAIN CEMENT CONCRETE
R.C.C	REINFORCED CEMENT CONCRETE
T	TOP

10-MAKE SURE THAT THERE IS PROPER WATER DRAINAGE SYSTEM DURING CONSTRUCTION AND NO WATER REMAINS STANDING ON SITE ESPECIALLY BACKFILL AREAS.
11-IT IS THE RESPONSIBILITY OF CLIENT TO ASK DESIGN ENGINEER TO VISIT THE SITE TO INSPECT WORK AND MATERIAL QUALITY BEFORECONCRETE POURING. WE ARE NOT RESPONSIBLE OF PHYSICAL BUILDING IN ANY CASE.
12-THESE DRAWINGS ARE NOT VALID FOR COURT.

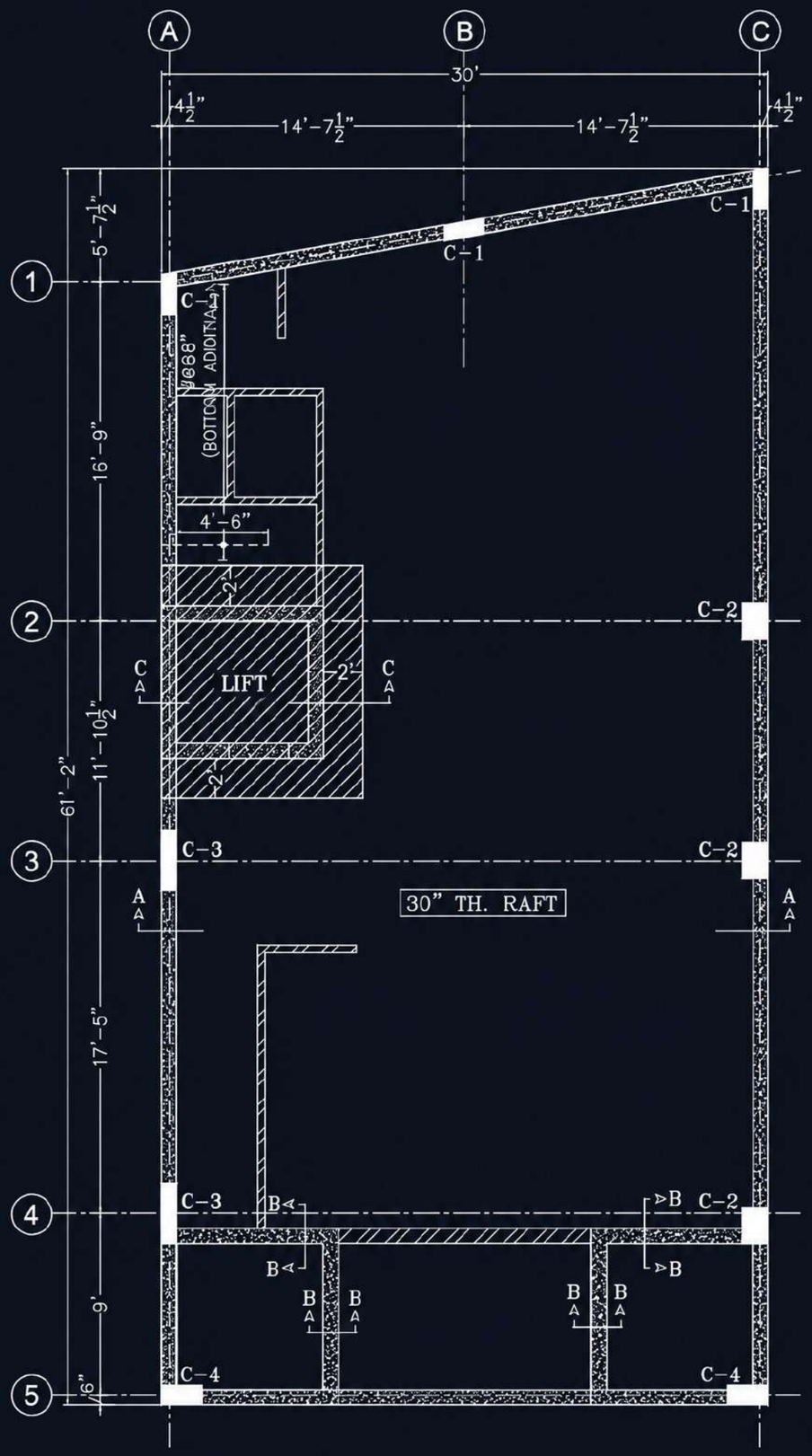


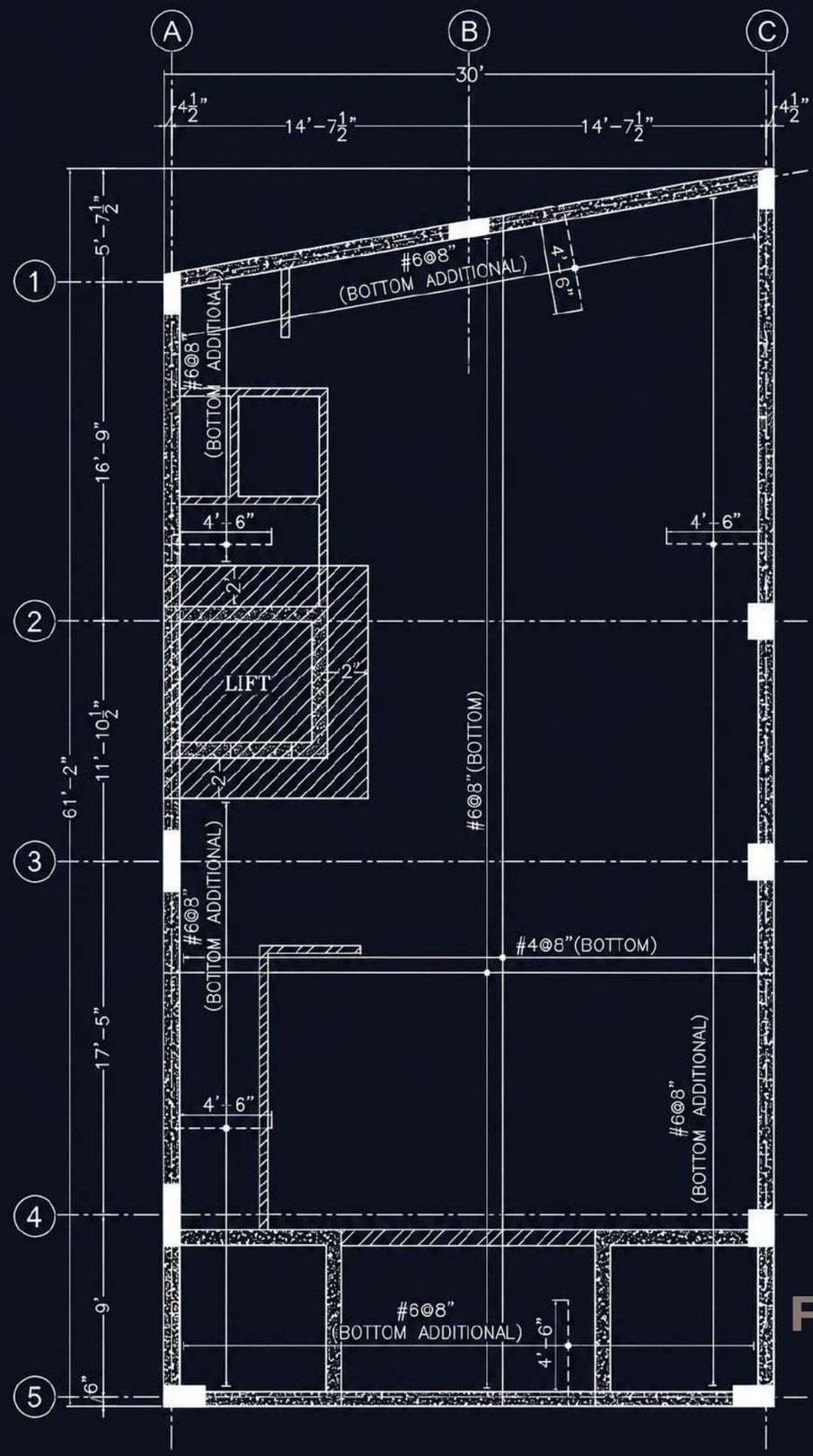
STAIR DETAIL



TYPICAL COLUMN
ELEVATION FOR RING

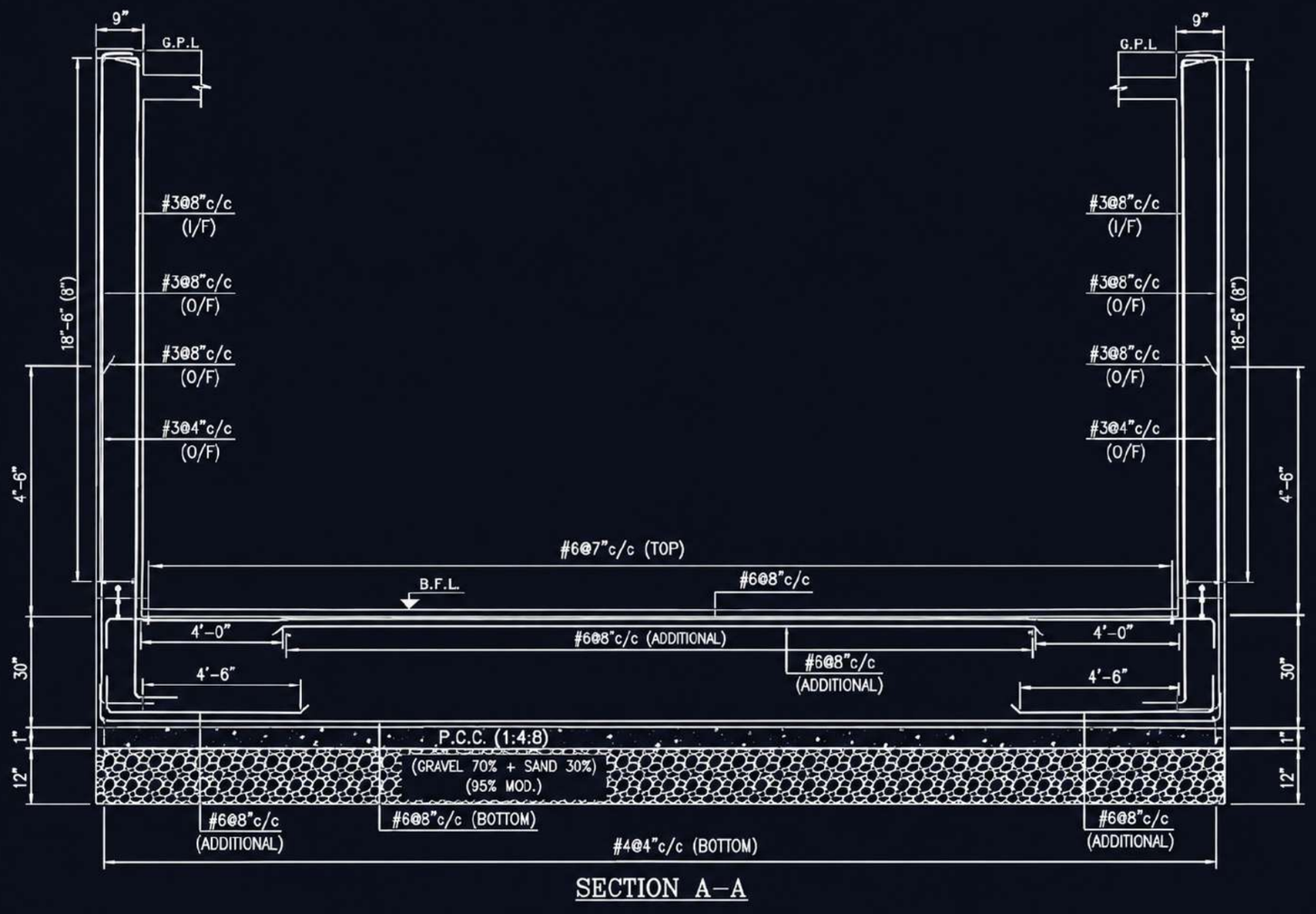
FOUNDATION DRAWINGS



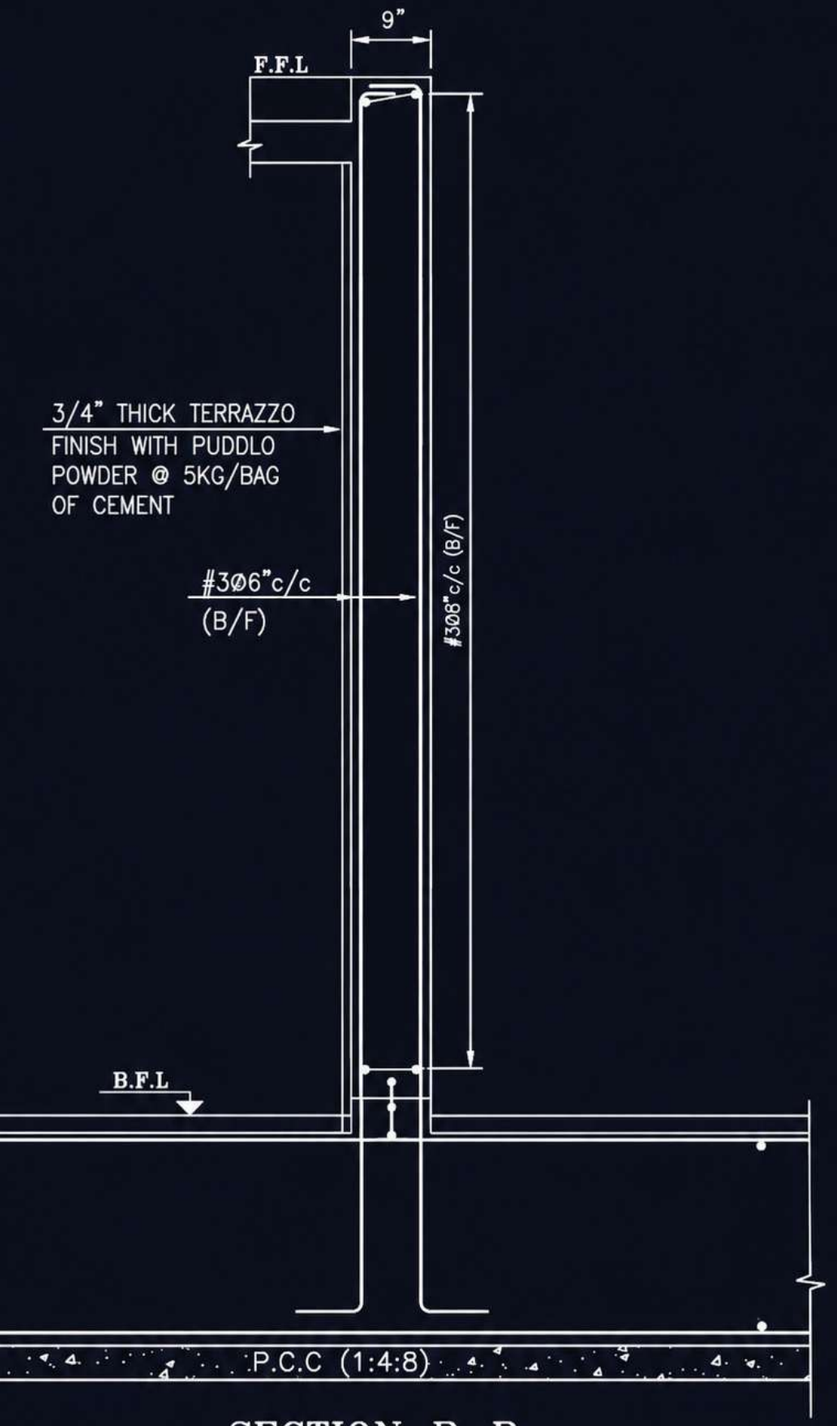


ESCAVATION PLAN

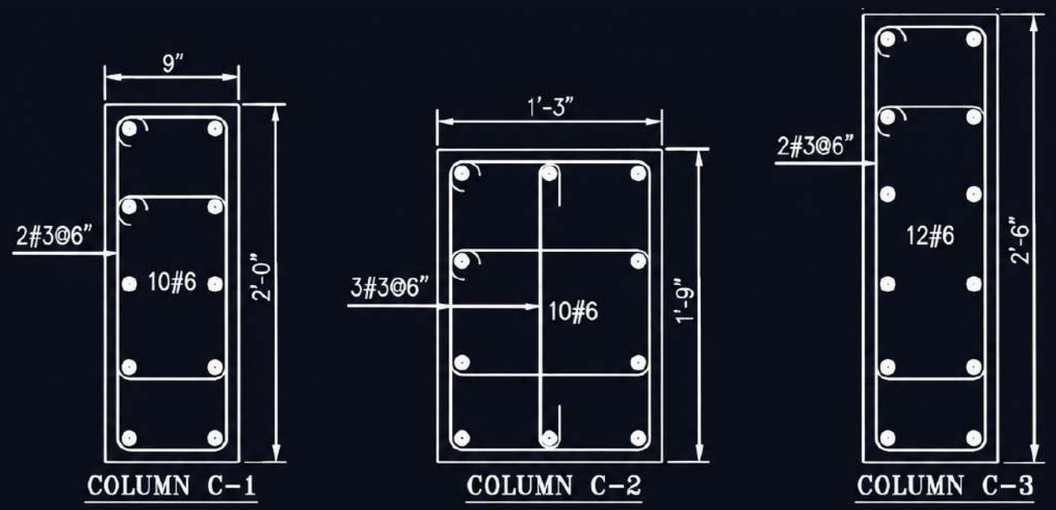
FOUNDATION DRAWINGS



SECTION A–A

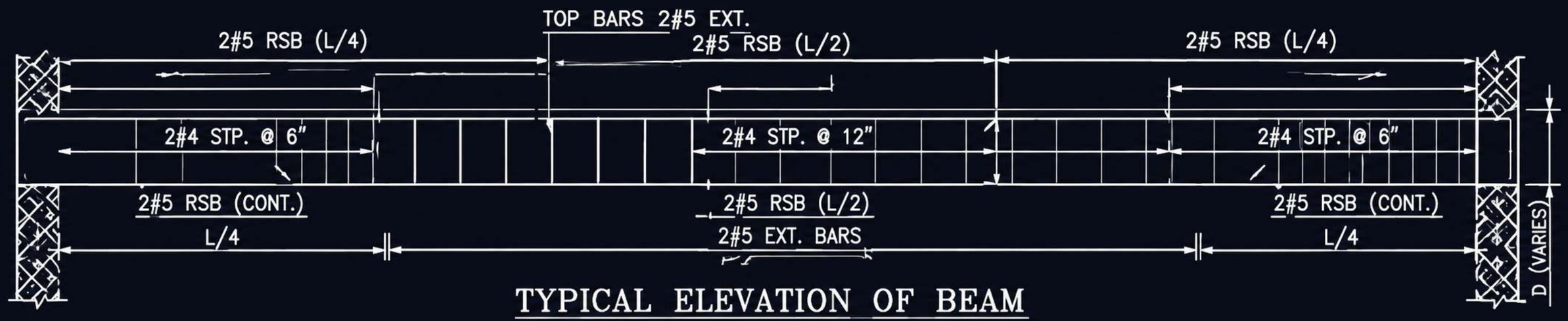


SECTION B–B

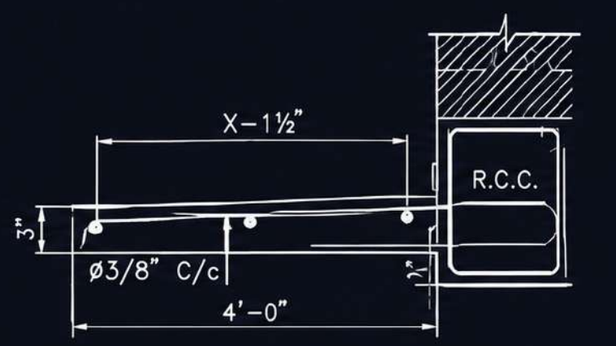


COLUMN C-1 COLUMN C-2 COLUMN C-3

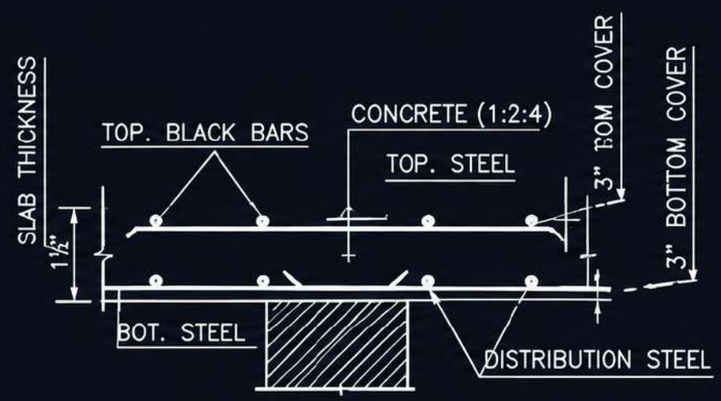
FOUNDATION DRAWINGS



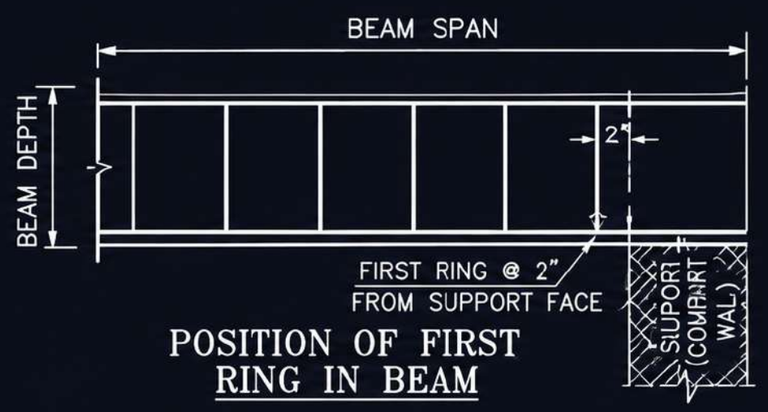
TYPICAL ELEVATION OF BEAM



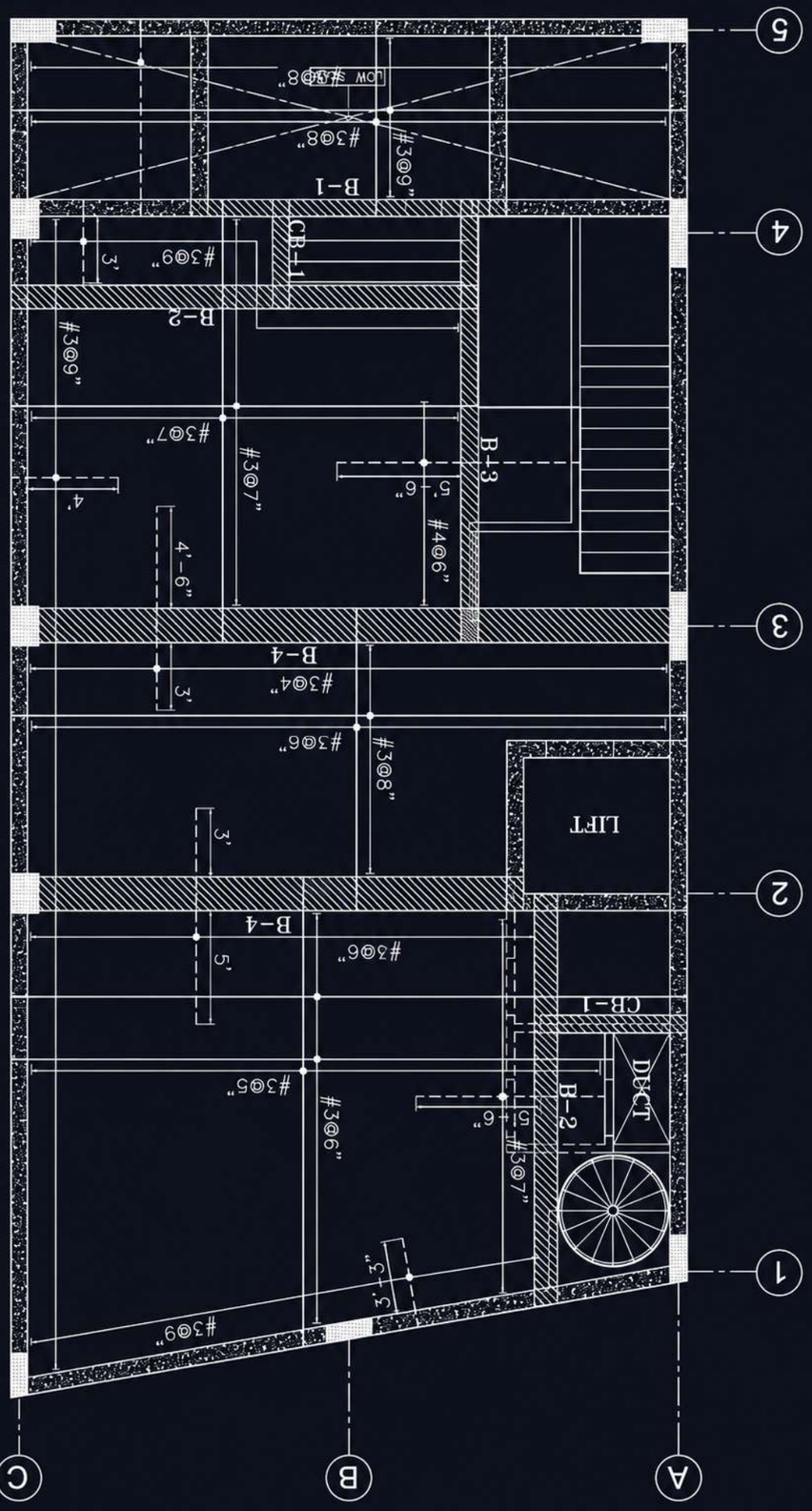
TYPICAL SUNSHADE DETAIL.

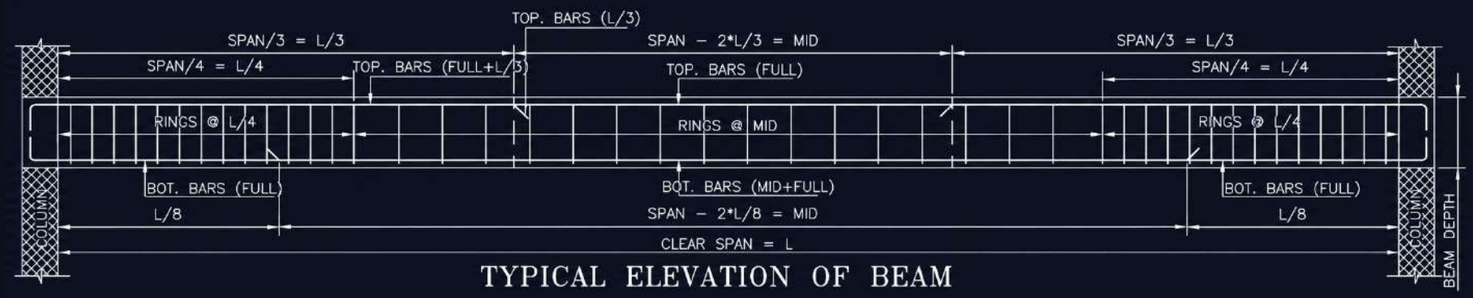


SLAB SECTION FOR CONCRETE COVER

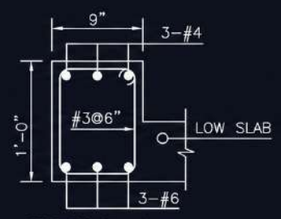


POSITION OF FIRST RING IN BEAM

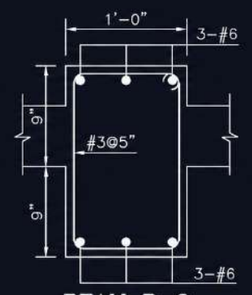




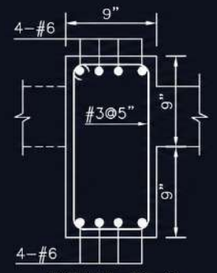
TYPICAL ELEVATION OF BEAM



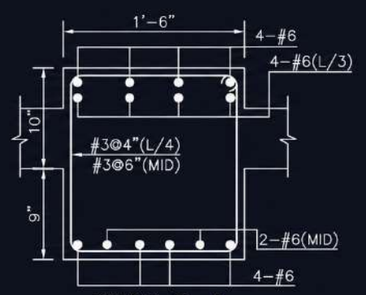
BEAM B-1



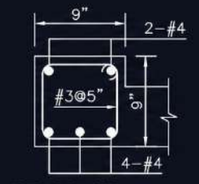
BEAM B-2



BEAM B-3

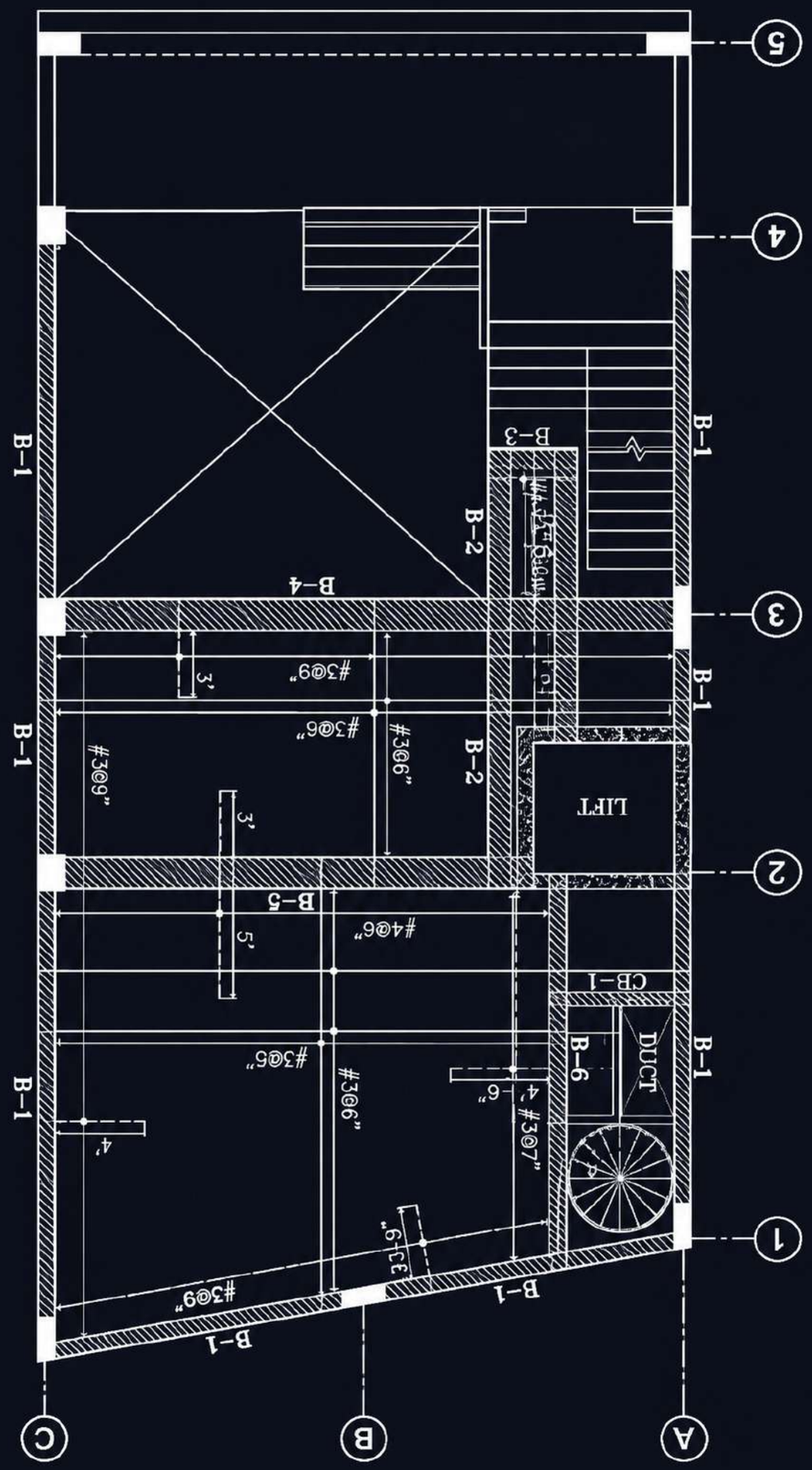


BEAM B-4



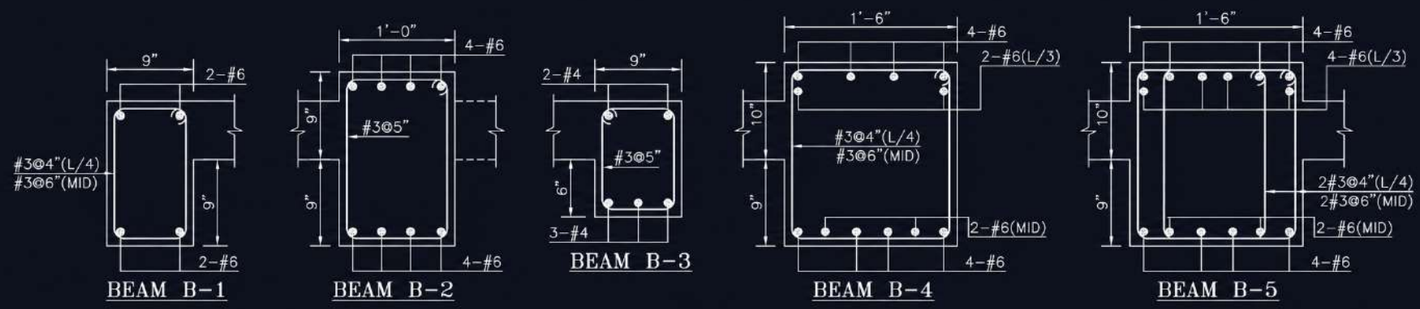
BEAM CB-1

STRUCTURAL DRAWINGS

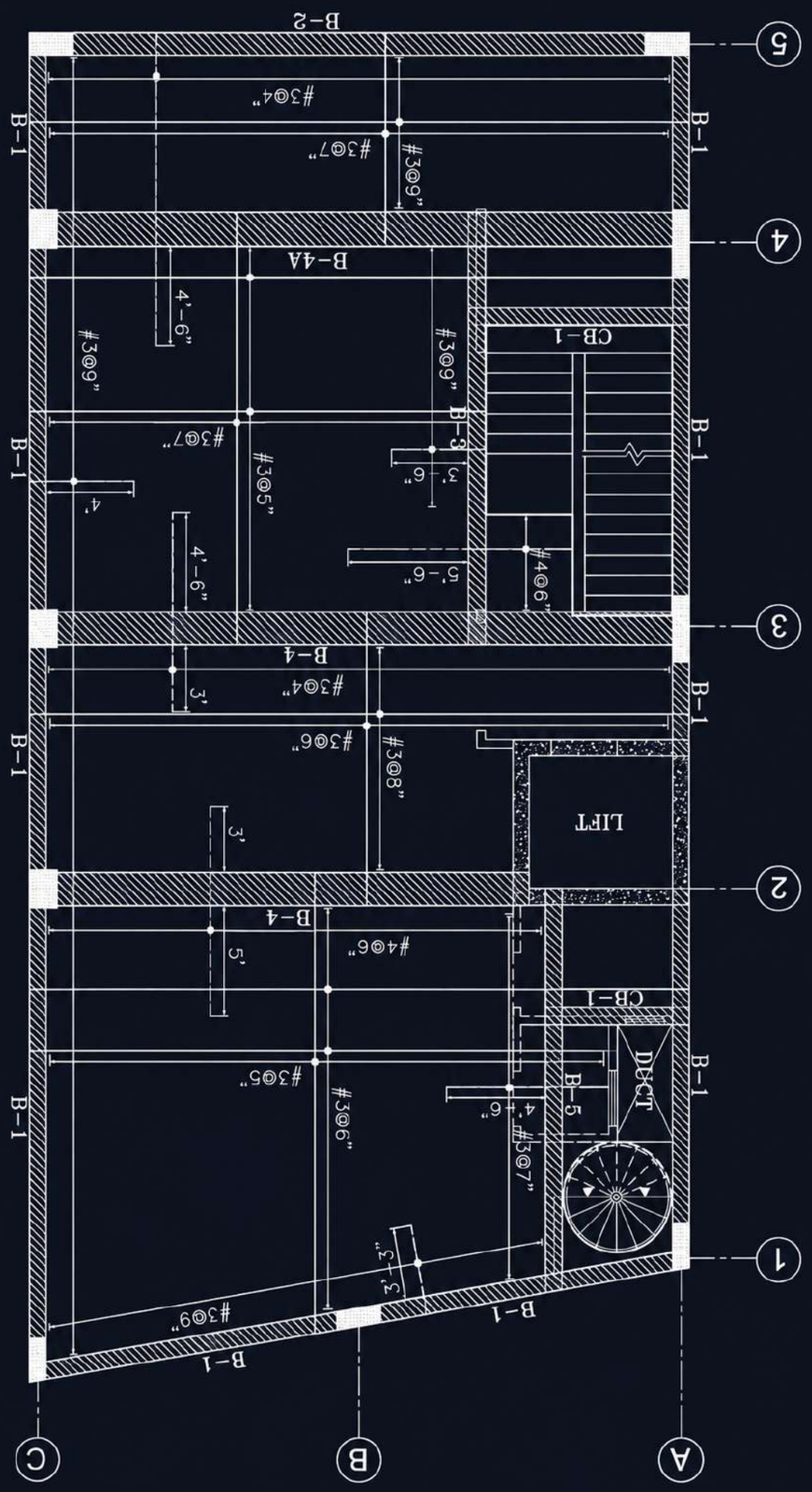


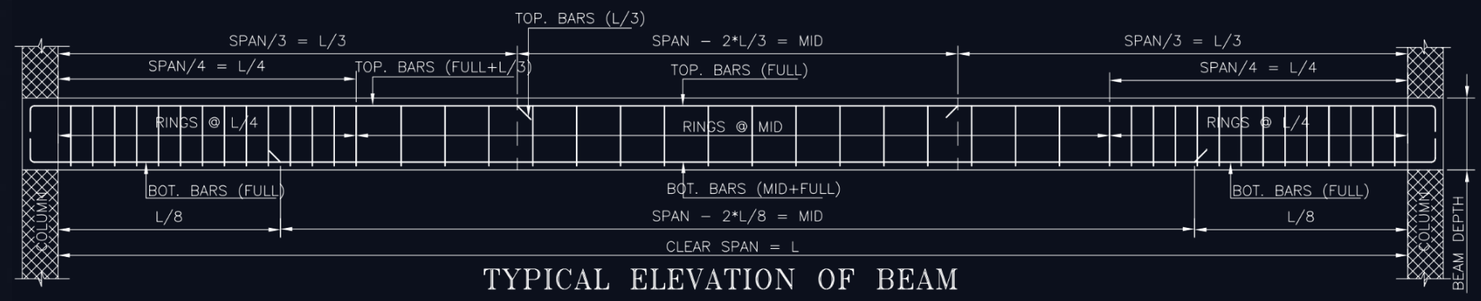


TYPICAL ELEVATION OF BEAM

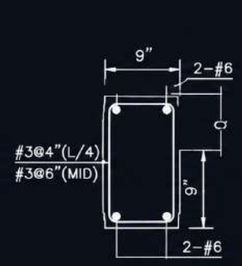


STRUCTURAL DRAWINGS

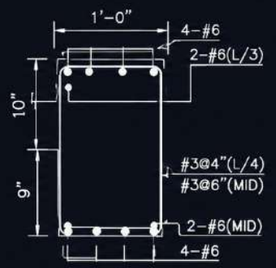




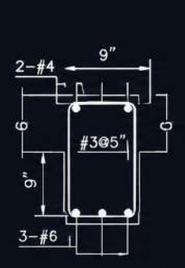
TYPICAL ELEVATION OF BEAM



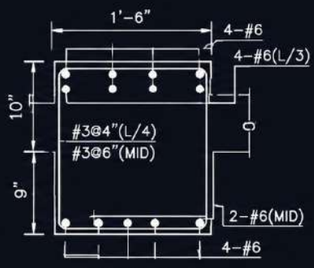
BEAM B–1



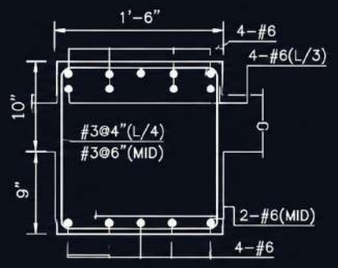
BEAM B–2



BEAM B–3

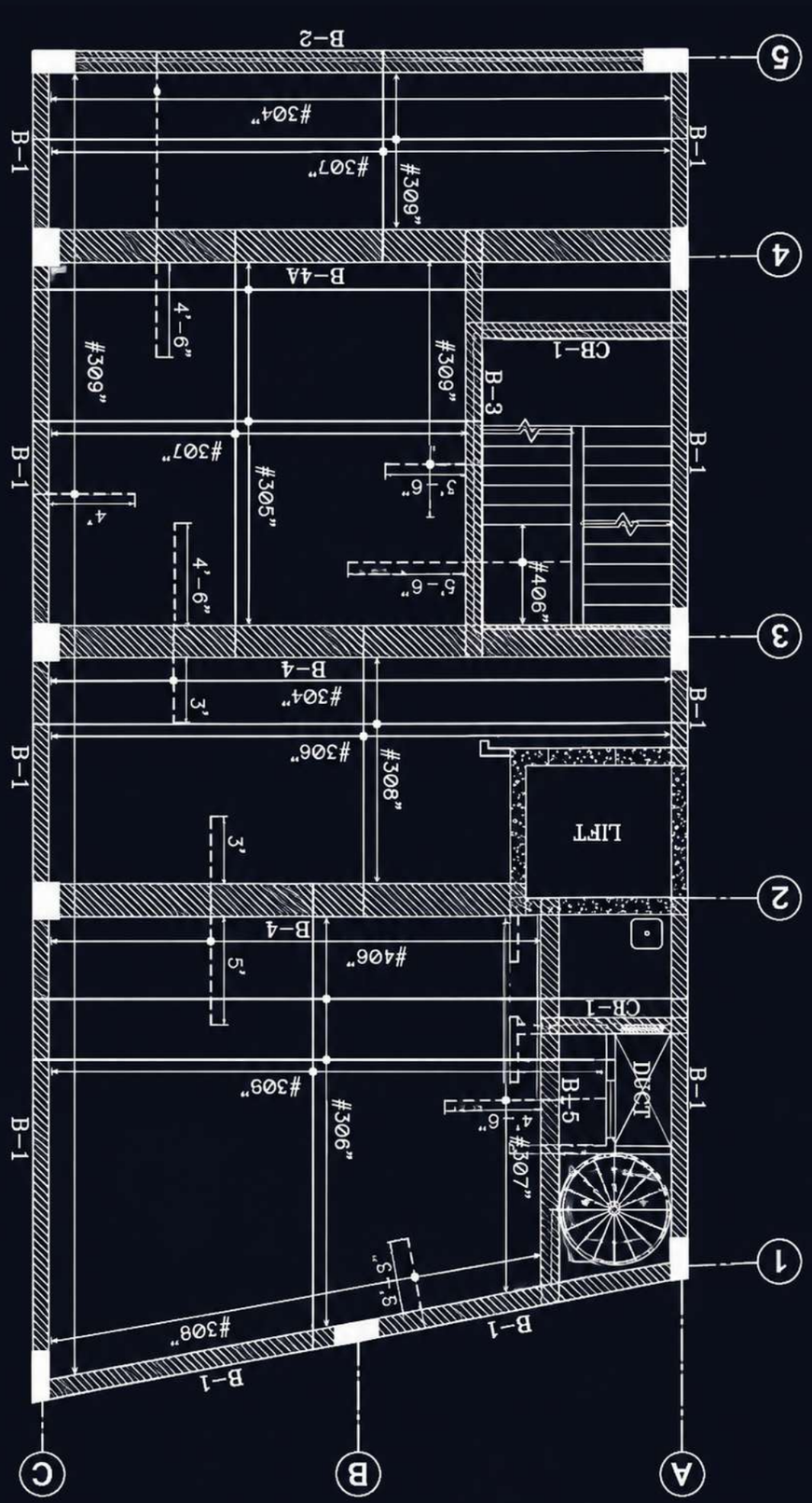


BEAM B–4



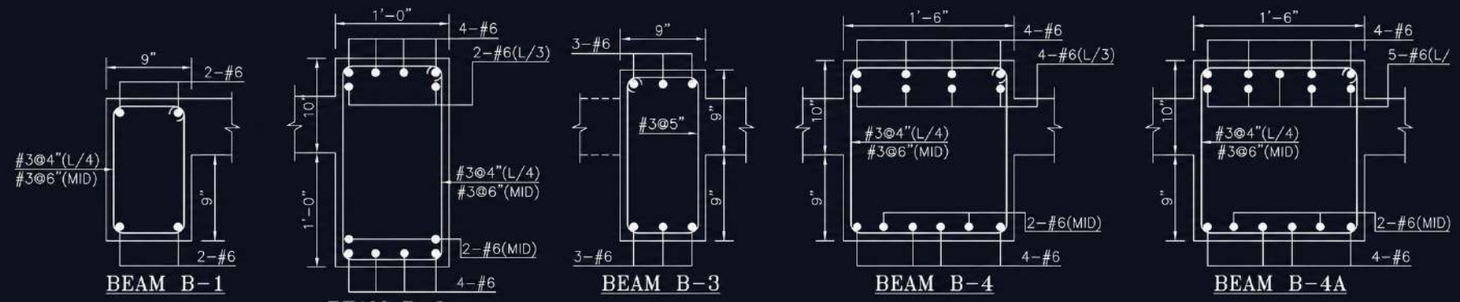
BEAM B–4A

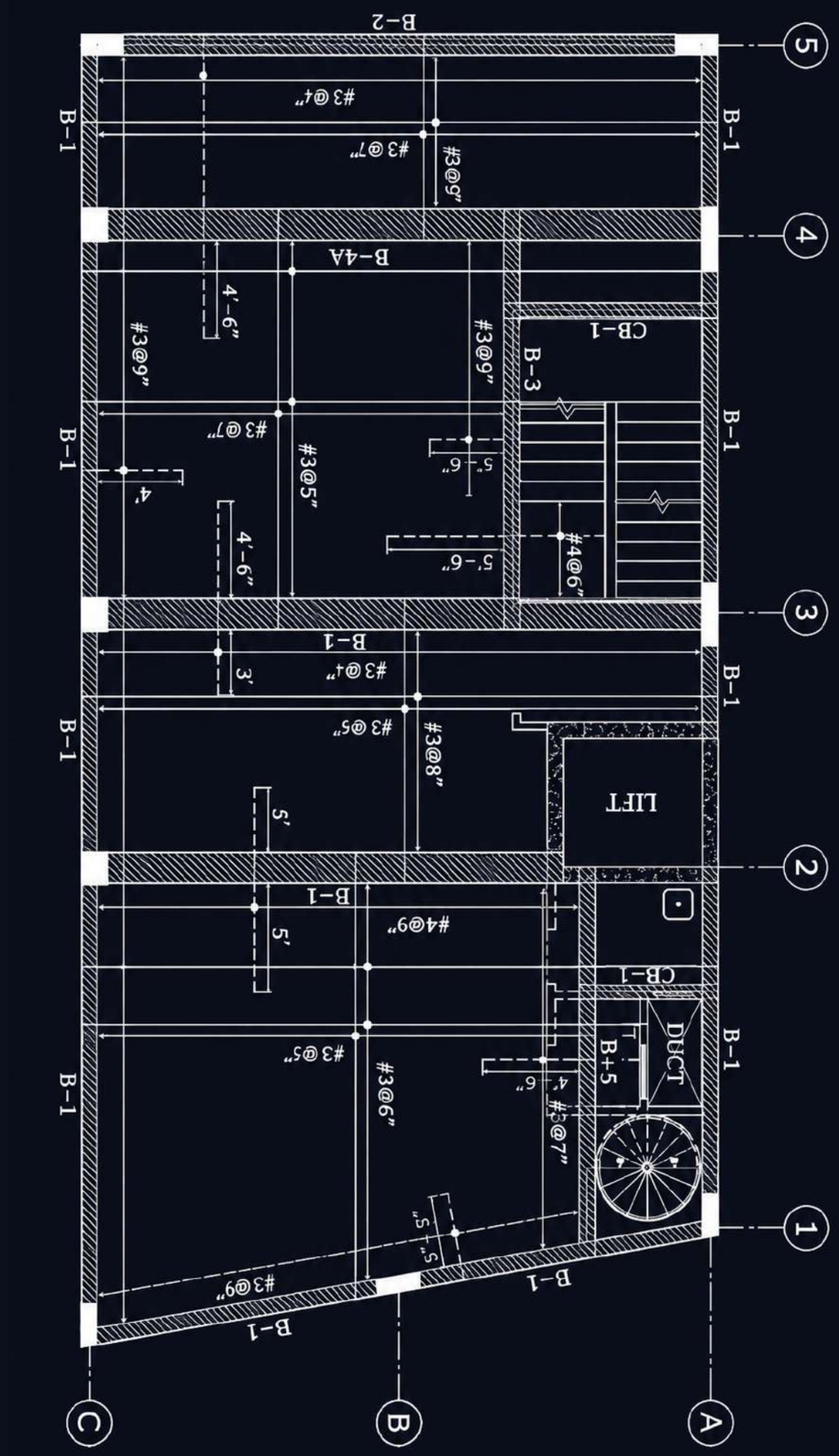
STRUCTURAL DRAWINGS

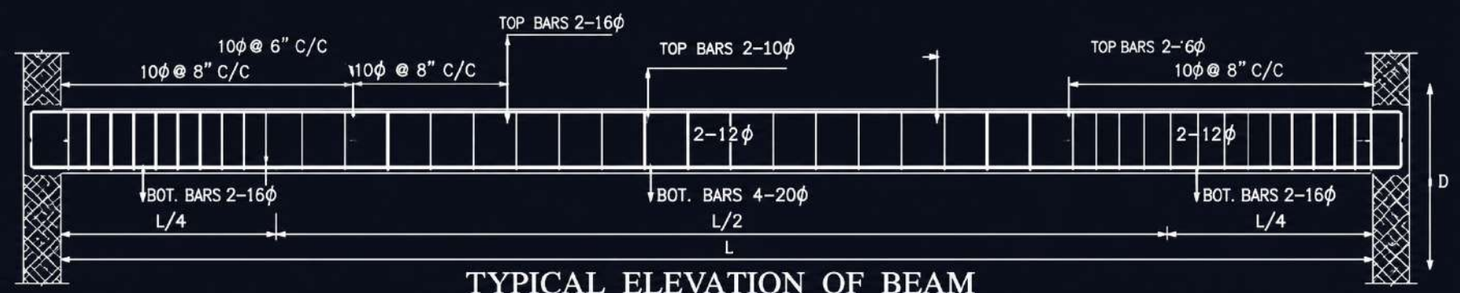




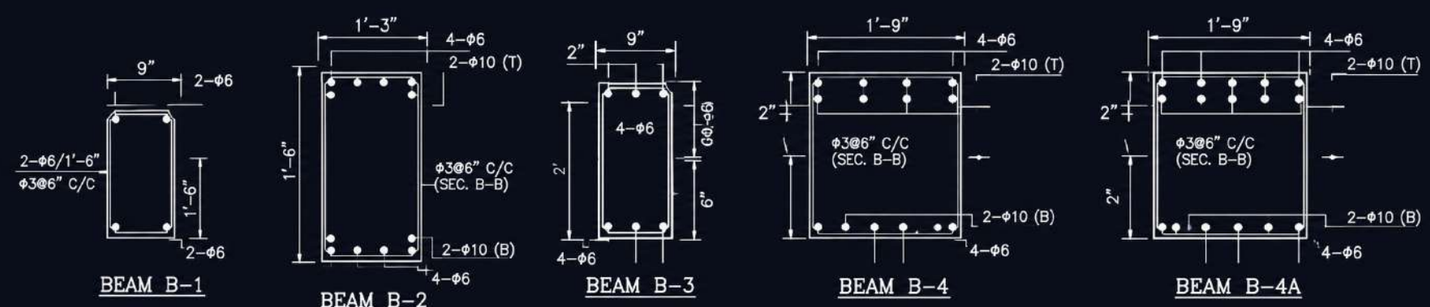
TYPICAL ELEVATION OF BEAM

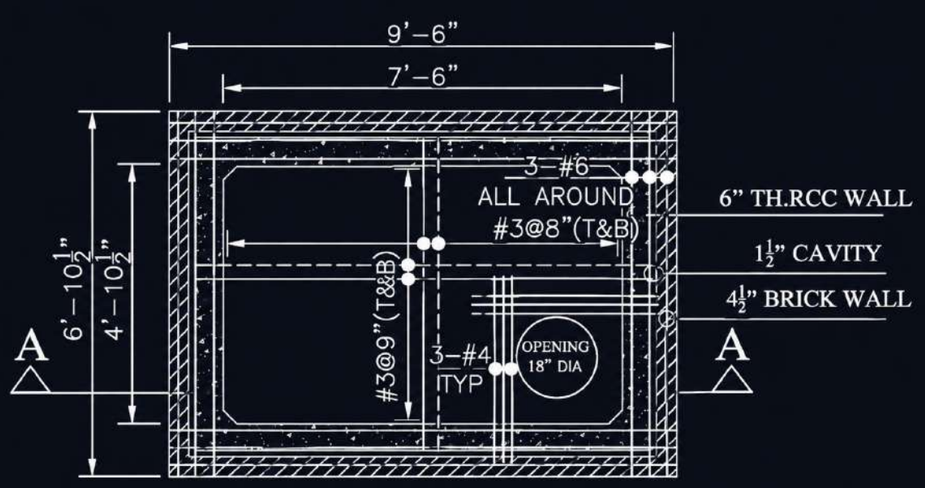






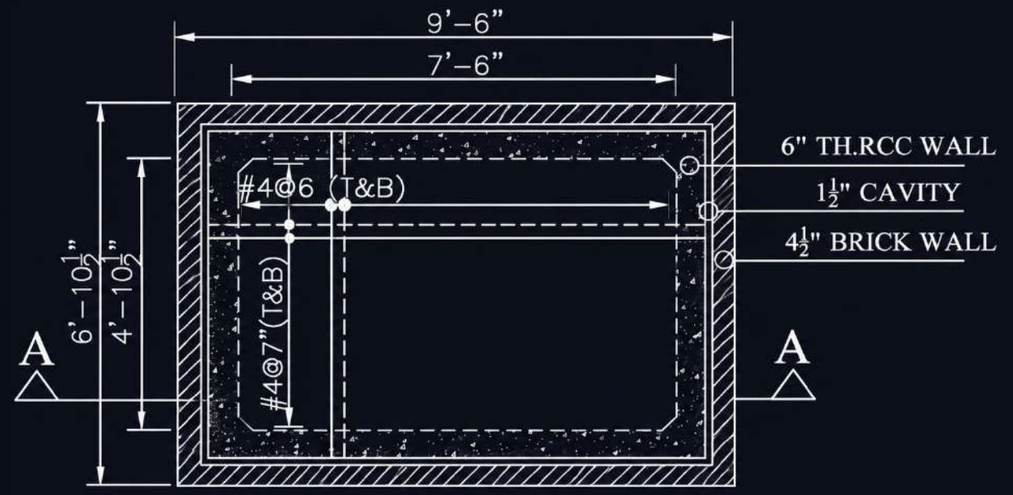
TYPICAL ELEVATION OF BEAM





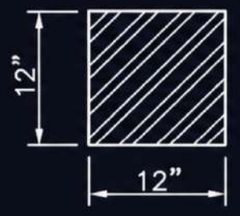
TOP SLAB OF O.H.W. TANK

SLAB THICKNESS 6"



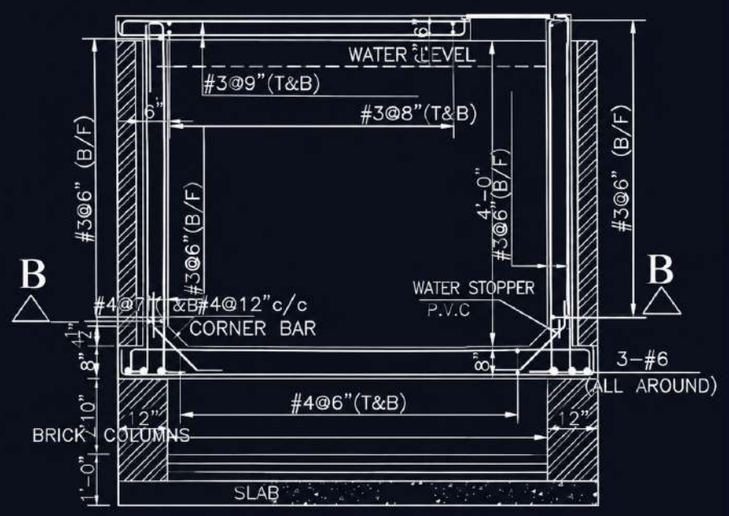
BOTTOM SLAB OF O.H.W. TANK

SLAB THICKNESS 8"

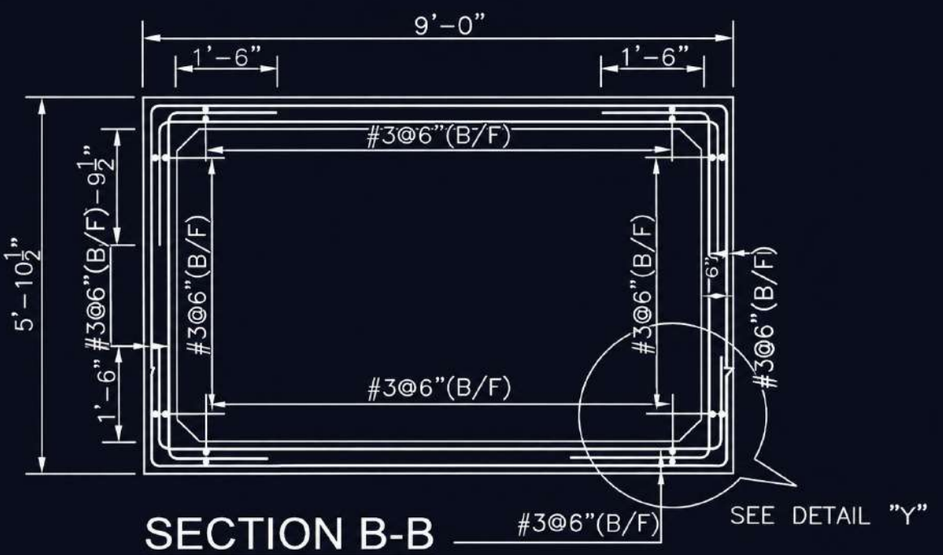


PICK UP BRICK COL

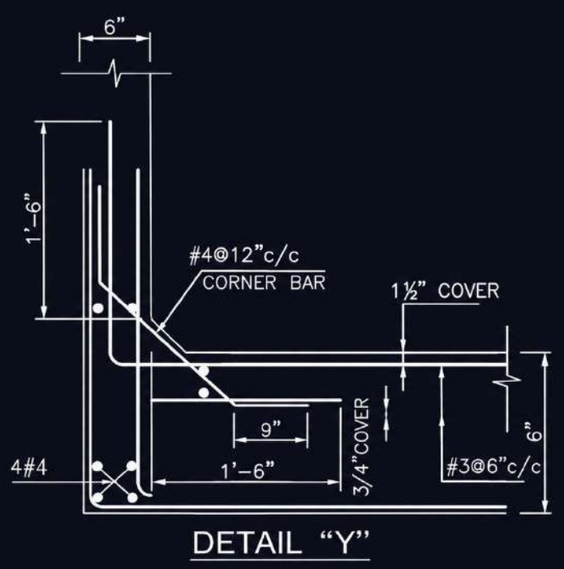
ON 1:3 BRICK MASONRY



SECTION A-A



SECTION B-B

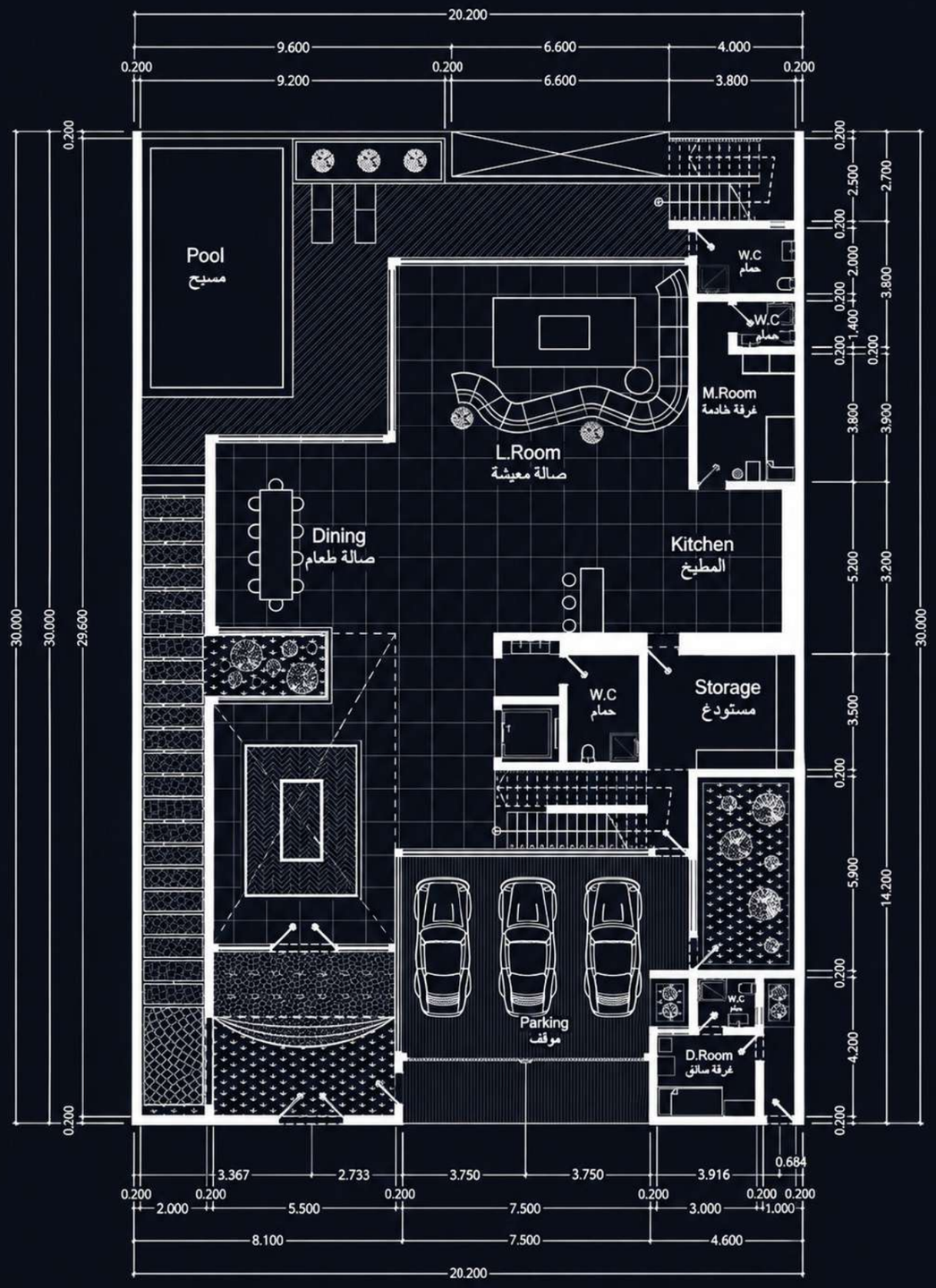


DETAIL "Y"

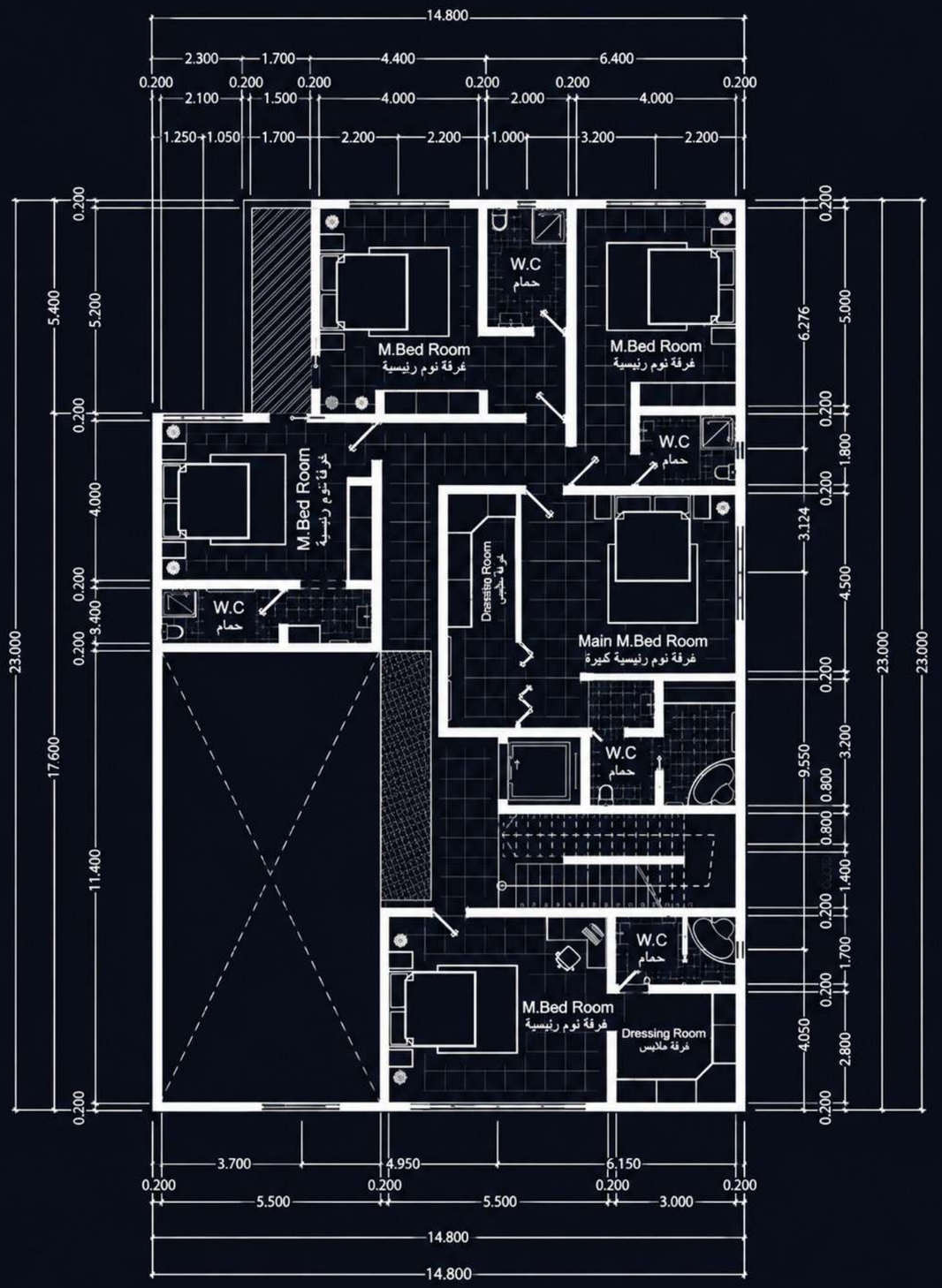
Master

Villa KSA

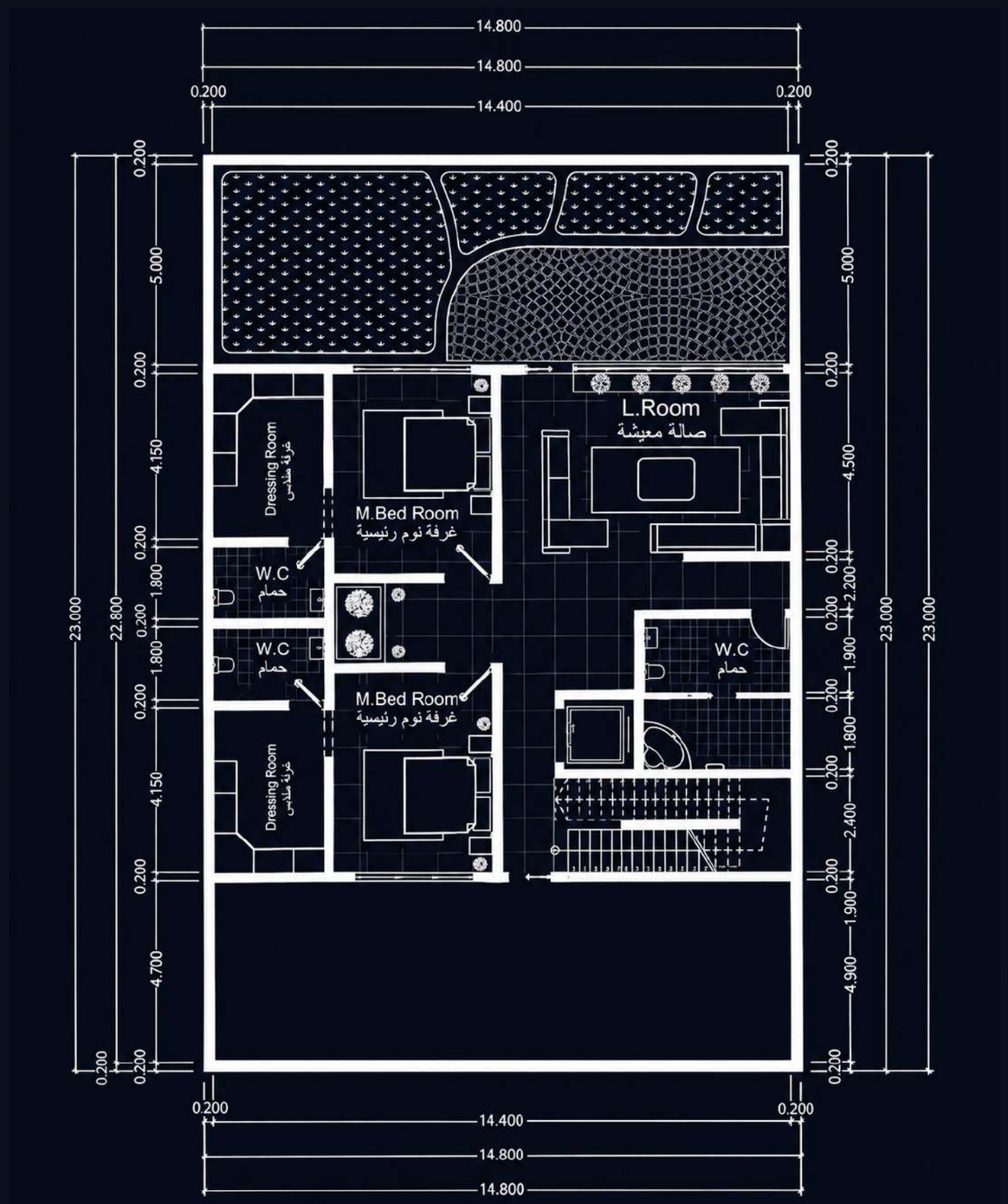




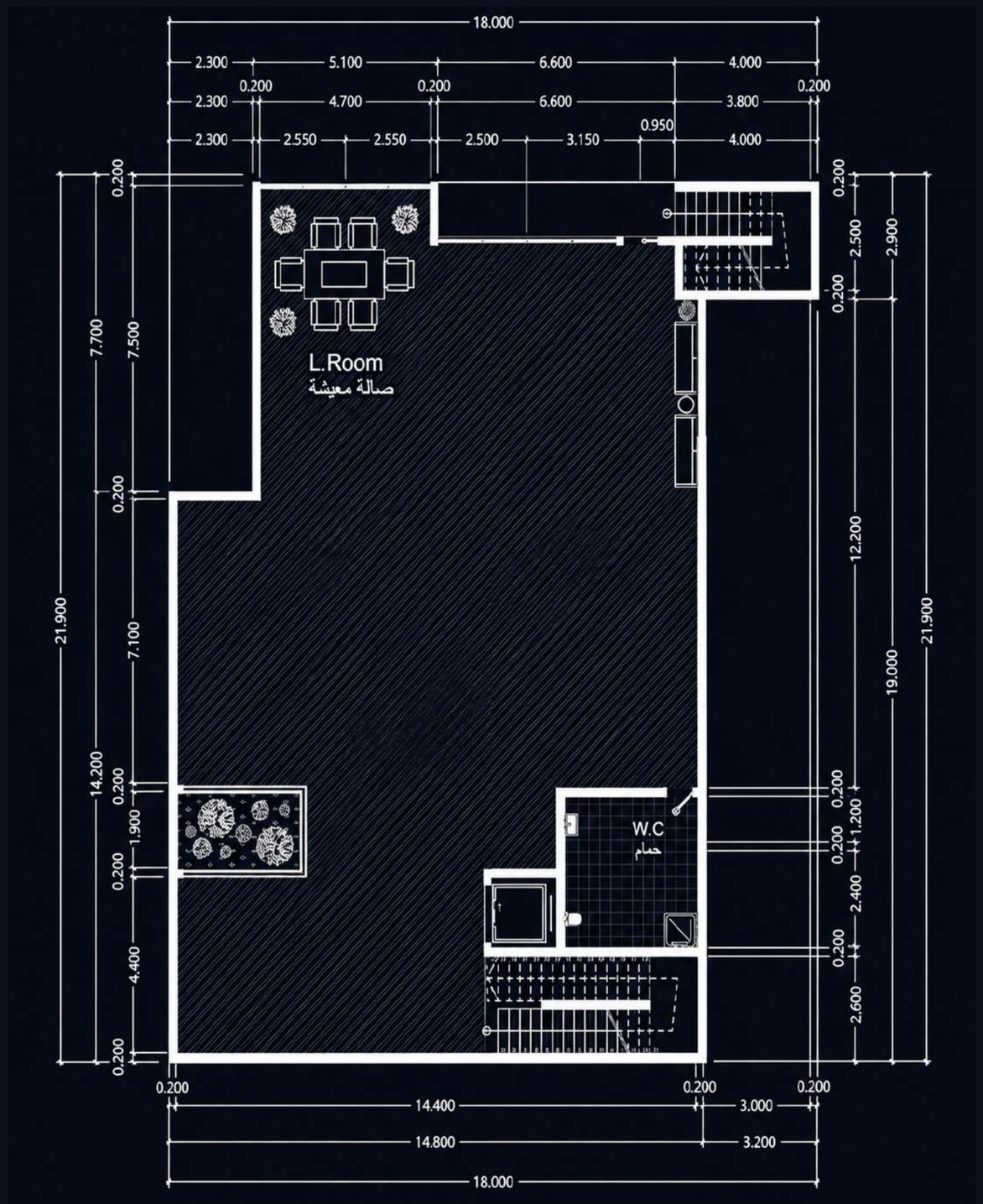
GROUND FLOOR



1ST FLOOR



3RD FLOOR

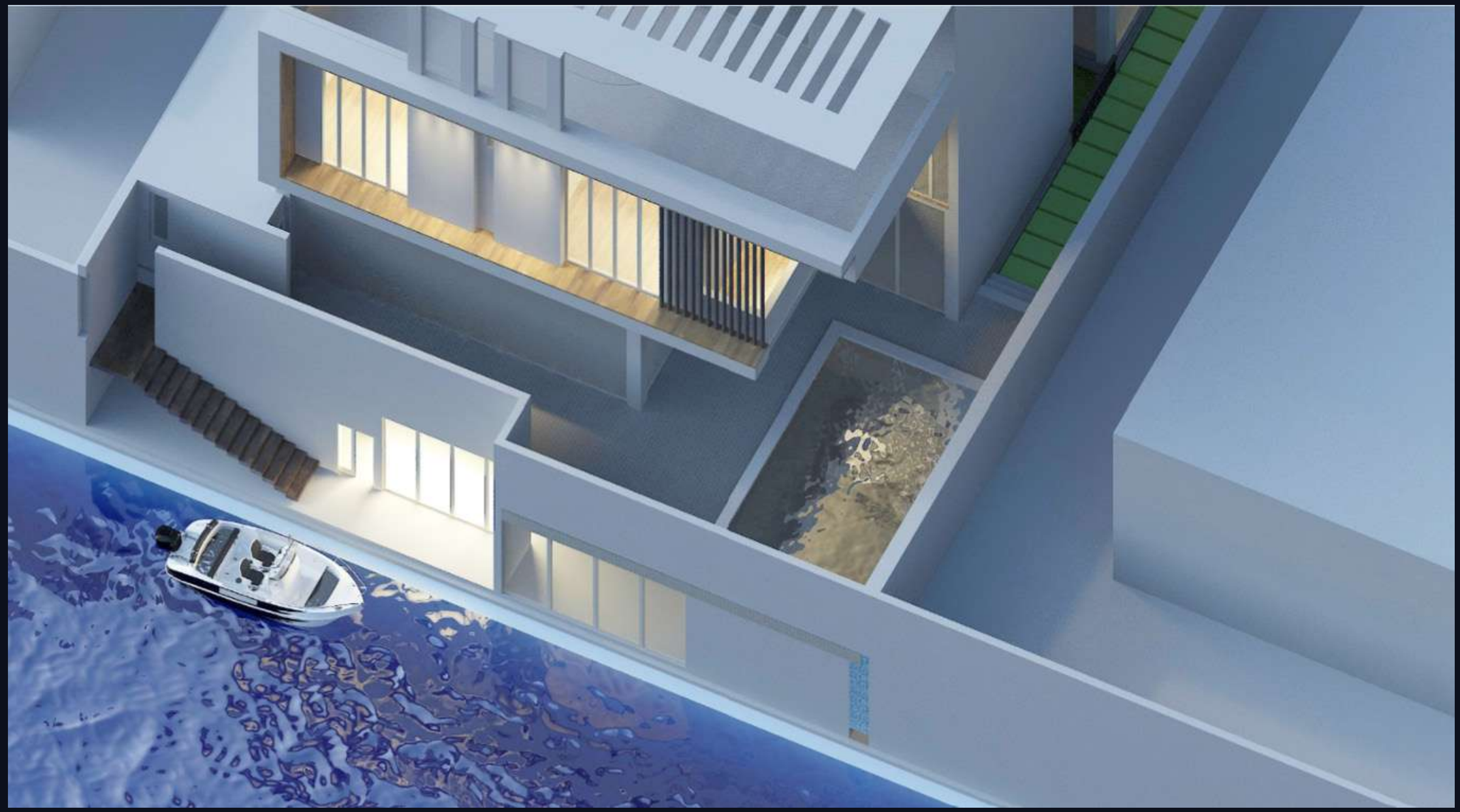


3RD FLOOR

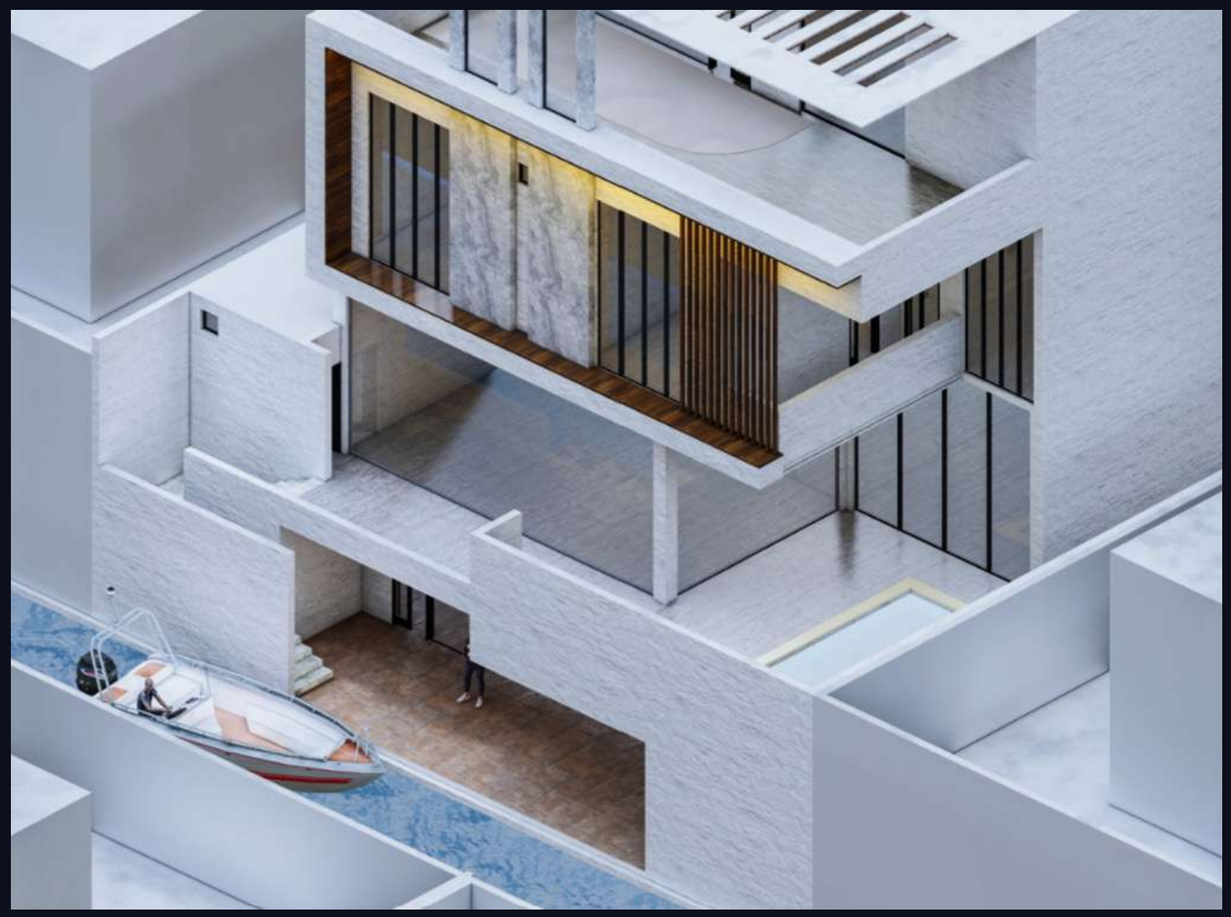




3D RENDERS

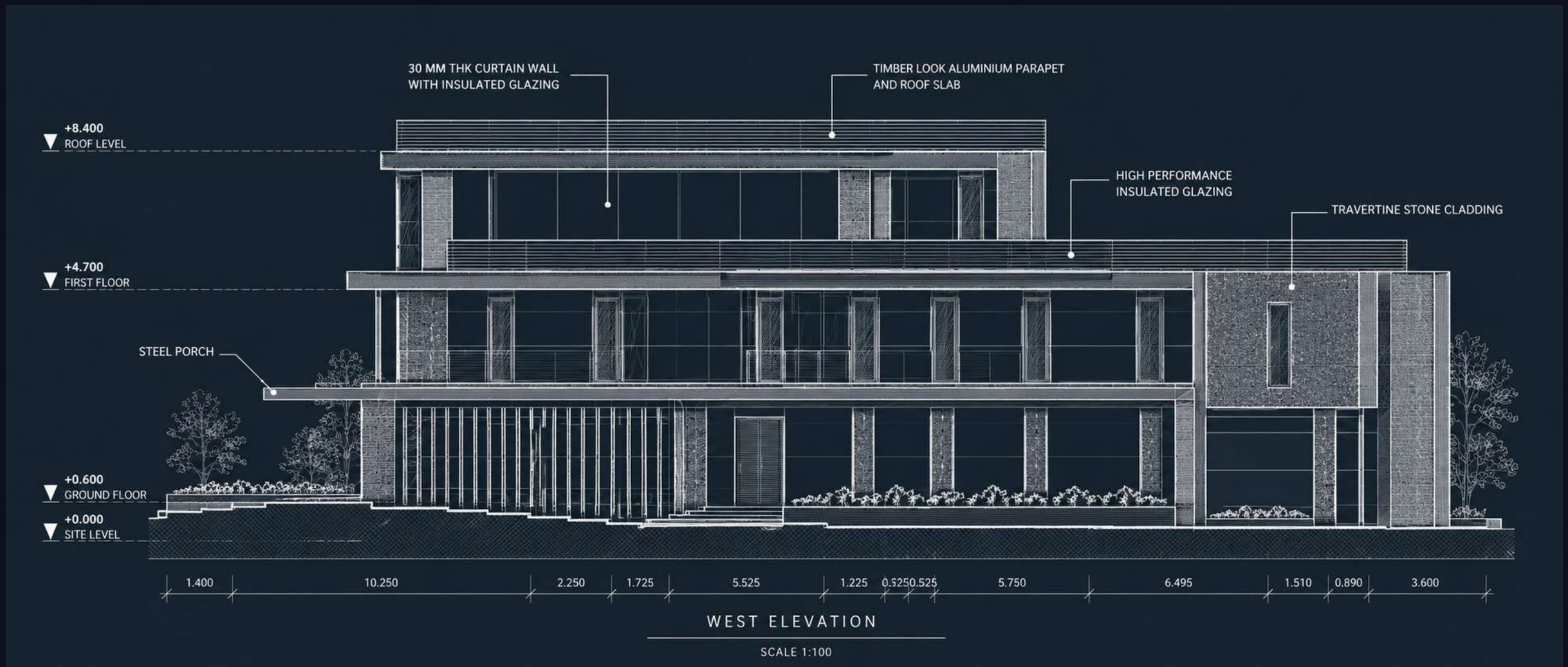


3D RENDERS





3D RENDERS

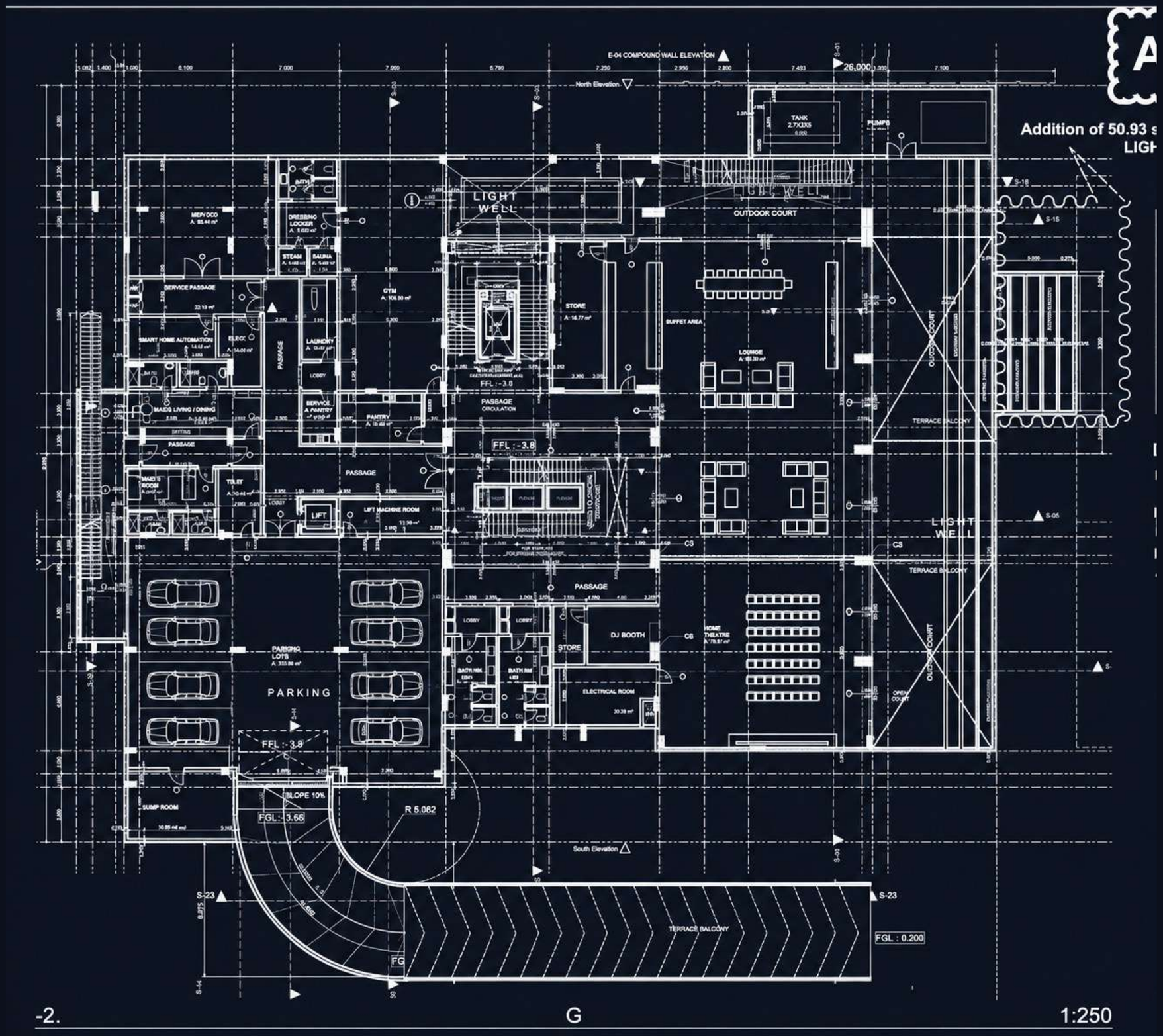


WEST ELEVATION

SCALE 1:100

KANE TOBBACO

UAE



BASEMENT AREA		
Building Material / Fill	**ID**	**Area**
A - USAGE		
	A-USABLE	11,650.2
		11,650.2 sq ft
C - SERVICES		
	C- SERVICES	13688.6
		13688.6 sq ft
D - CIRCULATION		
	D-CIRCULATION	3,111.8
		3,111.8 sq ft
TOTAL BUILT UP AREA		**28450.6 sq ft**

BASEMENT FAR CALCULATION

FAR AREA = A+D = 11650.2 +3111.8 = 14762 sq ft ,

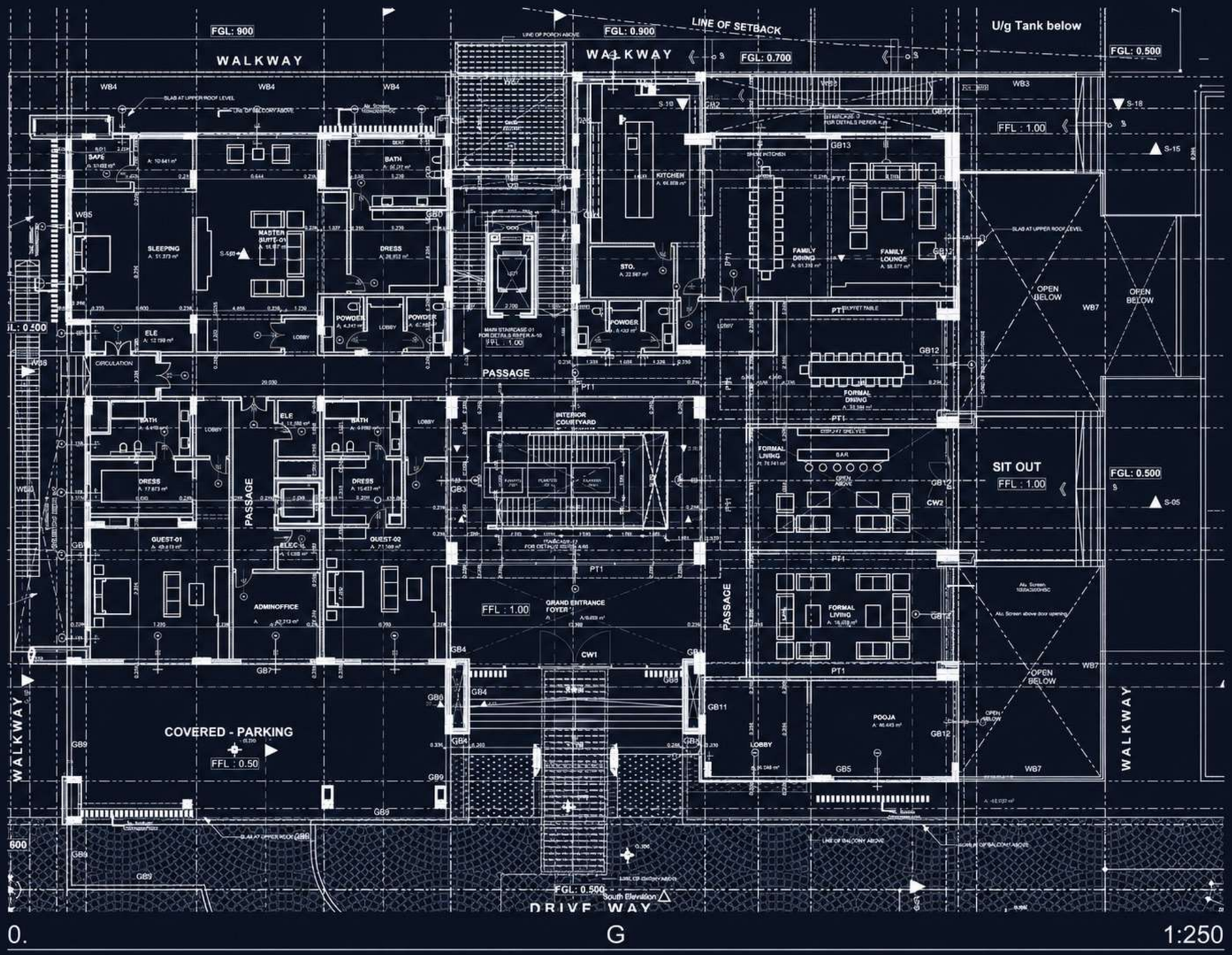
PLOT AREA : 68318 sq ft

FAR ALLOWED IN BASEMENT : 29% OF PLOT AREA

FAR ALLOWED IN BASEMENT : 19812.22 sq ft

14762 sq ft < 19812.22 sq ft

BASEMENT

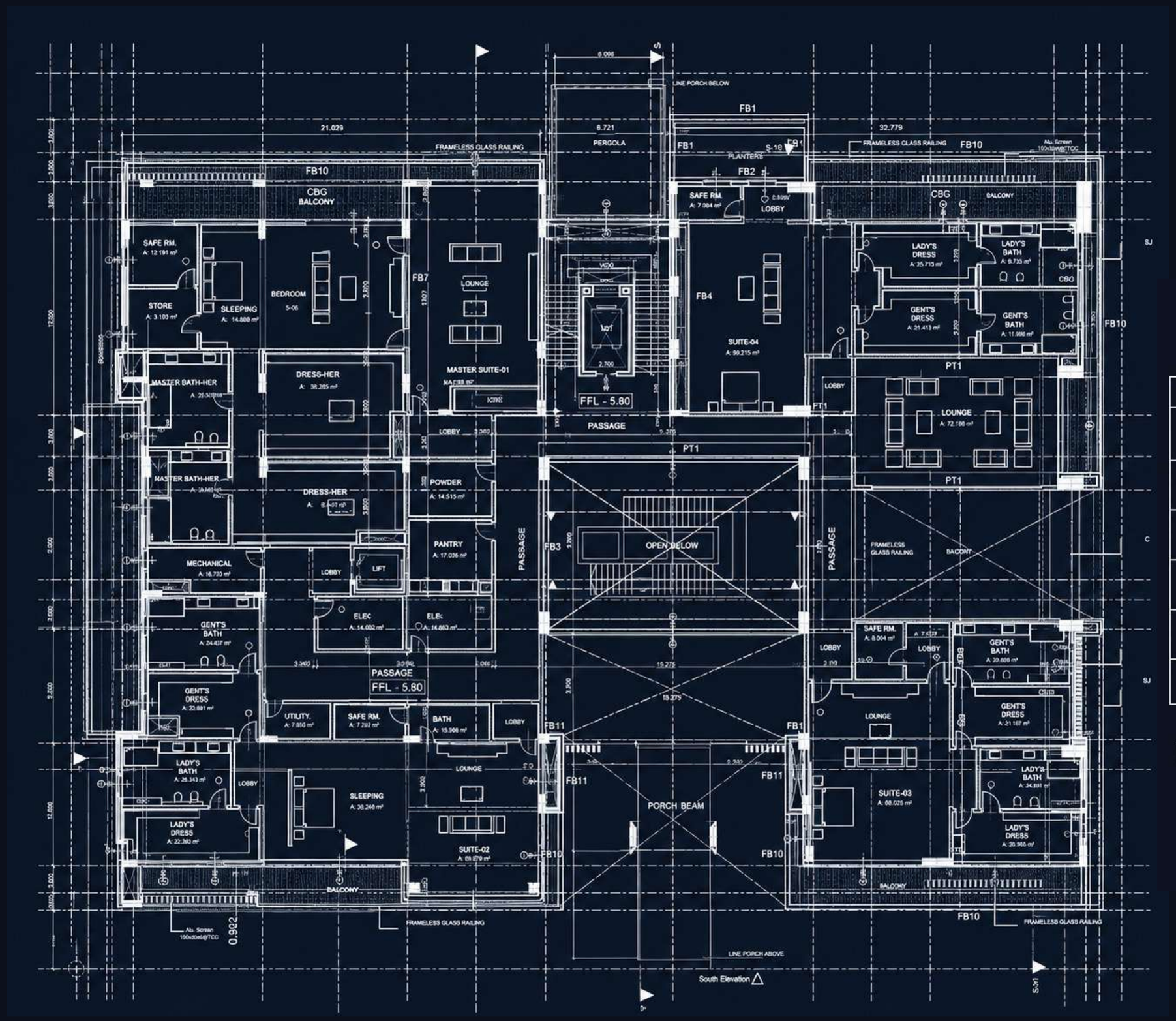


GROUND FLOOR AREA		
Building Material / Fill	Full Element ID	Surface Area
A - USAGE	A USAGE	12,578.3
		12,578.3 sq ft
B - BALCONY	B - BALCONY	4,112.7
		4,112.7 sq ft
C - SERVICES	C SERVICES	415.4
		415.4 sq ft
D - CIRCULATION	C- SERVICES	2,399.7
		2,399.7 sq ft
TOTAL BUILT UP AREA		**19,506.1 sq ft**

GROUND FLOOR FAR CALCULATION

FAR AREA = A + D = 12,578.3 + 2,399.7 = 14,978 sq ft ,

GROUND FLOOR

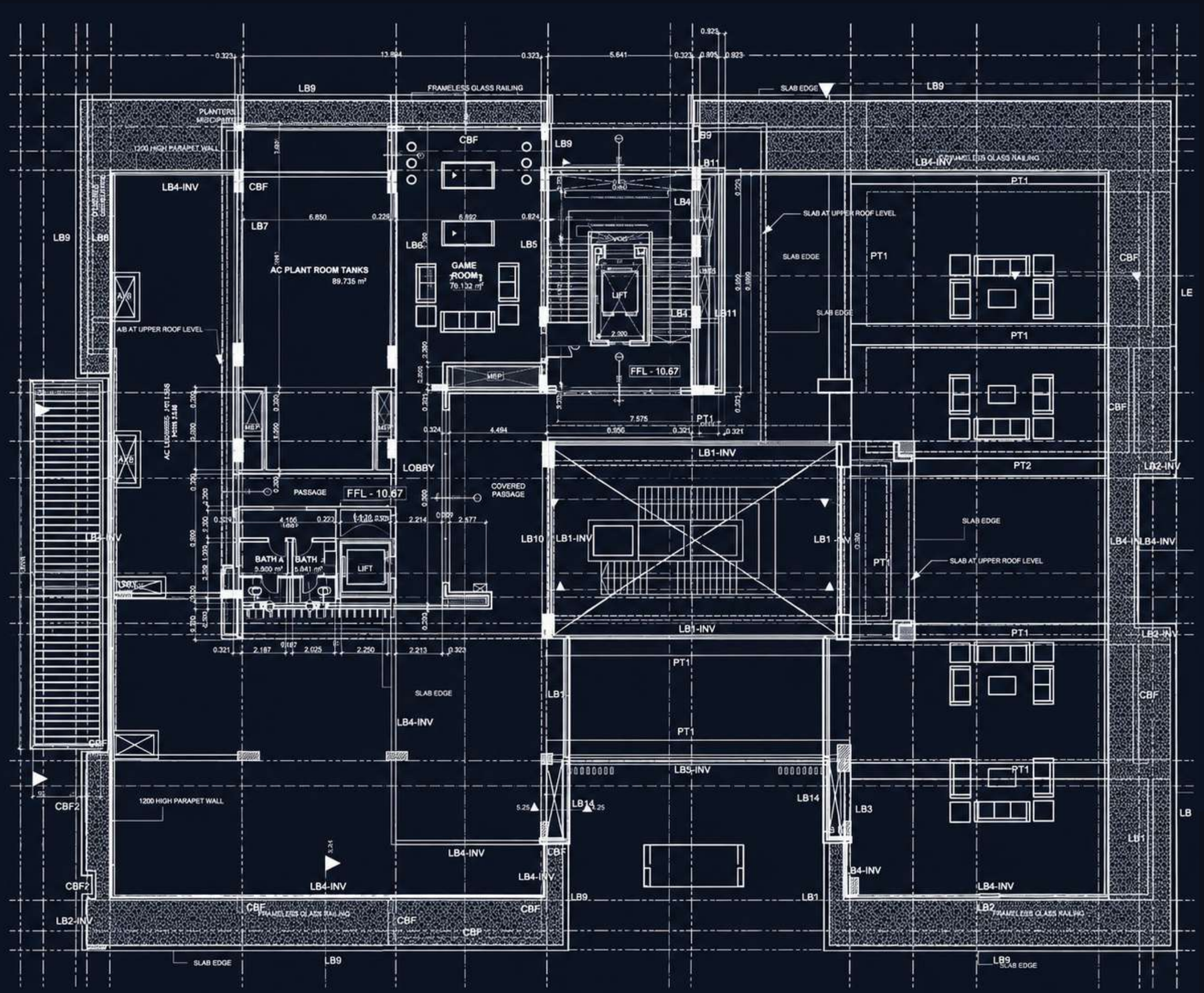


FIRST FLOOR		
Building Material / Composite / Profile / Fill	**Full Element ID**	**Surface Area**
A - USAGE	A USAGE	12,940.0 12,940.0 sq ft
B - BALCONY	B - BALCONY	3,632.2 3,632.2 sq ft
C - SERVICES	C SERVICES	543.7 543.7 sq ft
D - CIRCULATION	D CIRCULATION	2,522.9 2,522.9 sq ft
TOTAL BUILT UP AREA		19,638.8 sq ft

FIRST FLOOR FAR CALCULATION

FAR AREA = A + D = 12940 +2522.9 = 15462.9 sq ft

1 ST FLOOR



ROOF AREA		
Building Material / Composite / Profile / Fill	Full Element ID	Surface Area
A - USAGE	A USABLE	1,494.6
		1,494.6 sq ft
C - SERVICES	C SERVICES	3,765.9
		3,765.9 sq ft
D - CIRCULATION	D CIRCULATION	791.8
		791.8 sq ft
TOTAL BUILT UP AREA		6,052.3 sq ft

ROOF FAR CALCULATION

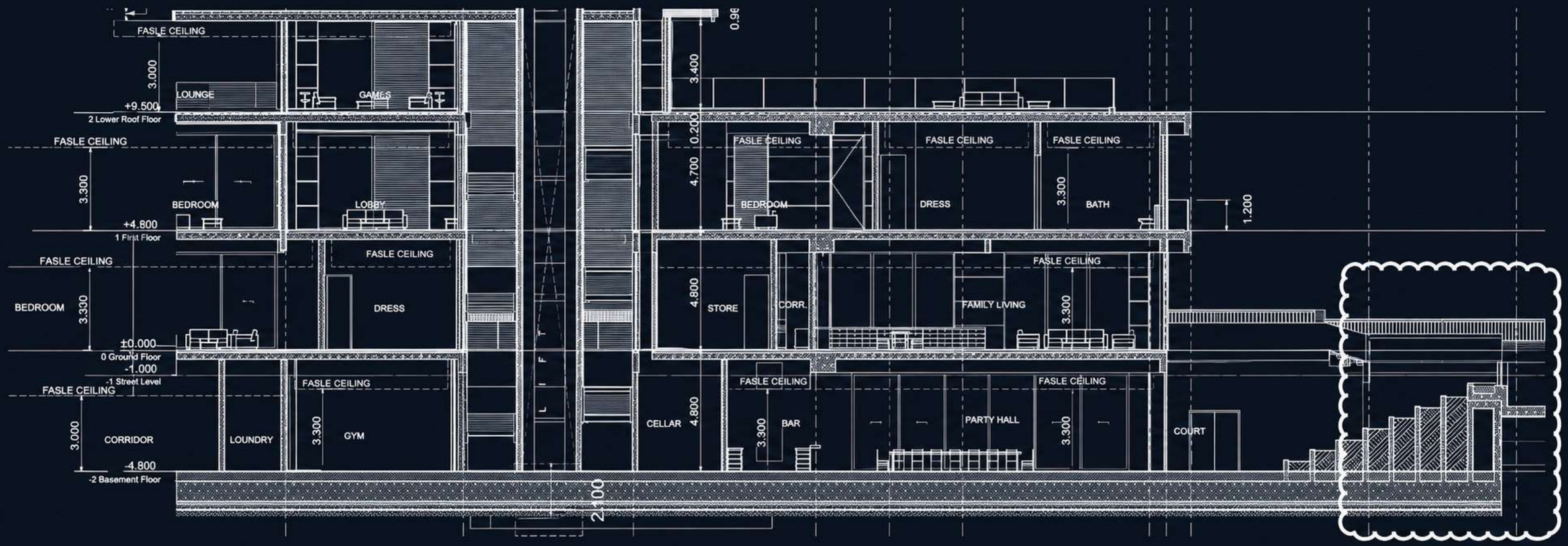
ROOF FAR AREA = A (usable area) = 1,494.6 sq ft .

FAR AREA FIRST FLOOR = 15,462.9 sq ft

ROOF FAR AREA PERCENTAGE

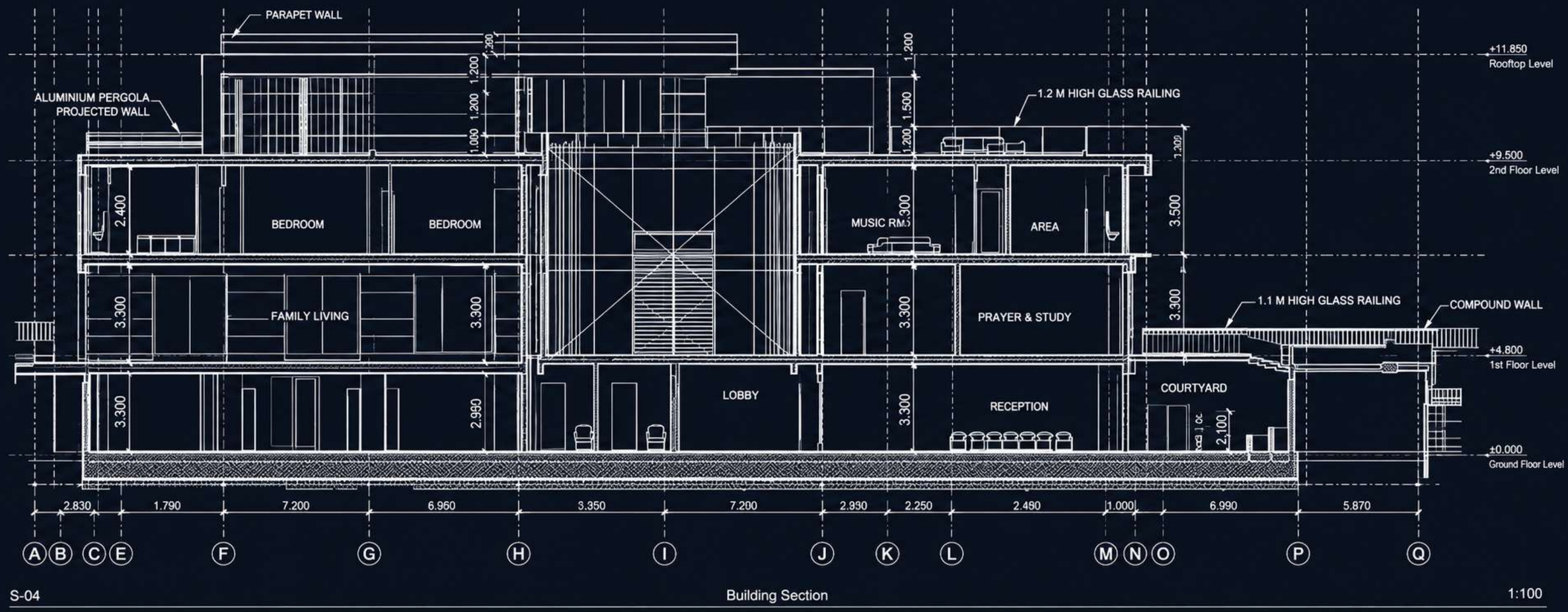
= 1,494.6 sq ft / 15,462.9 , (9.6 % of First floor area)

ROOF FLOOR



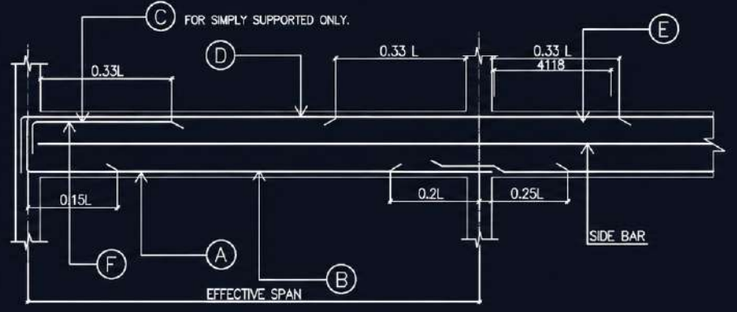
S-06 Building Section 1:100

SECTION

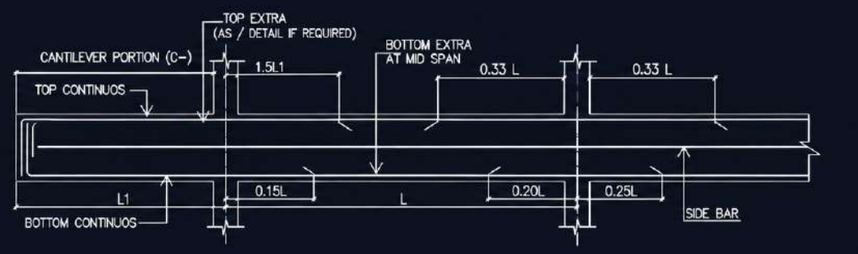


S-04 Building Section 1:100

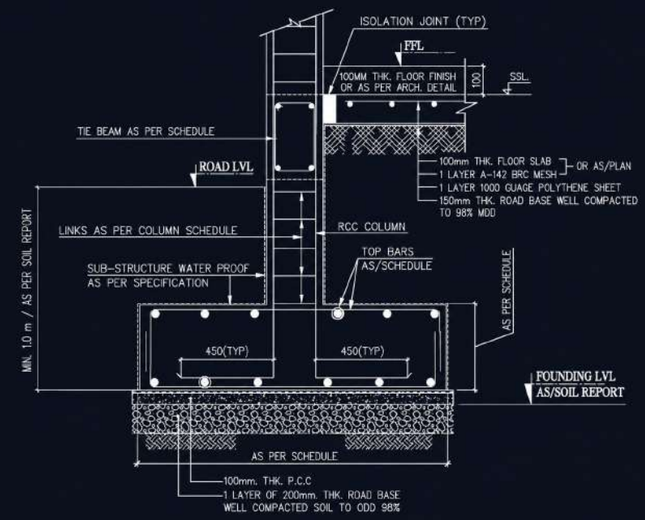
SECTION

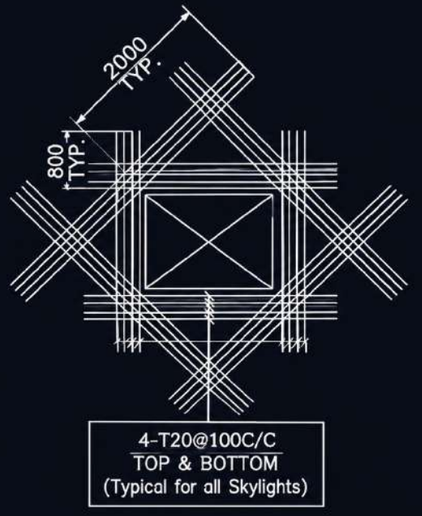


TYP. TIE-BEAM/ROOF BEAM & SLAB REINFORCEMENT

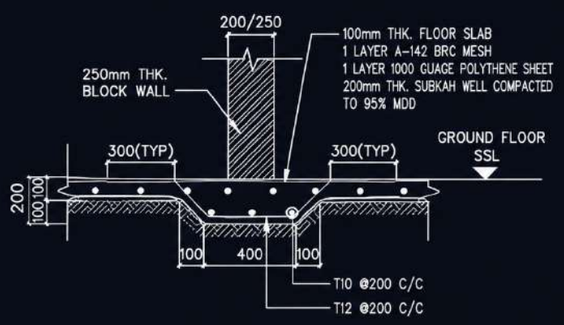


LONGITUDINAL SECTION FOR CANTILEVER BEAM & SLAB (TYP. FOR ALL FLOOR)

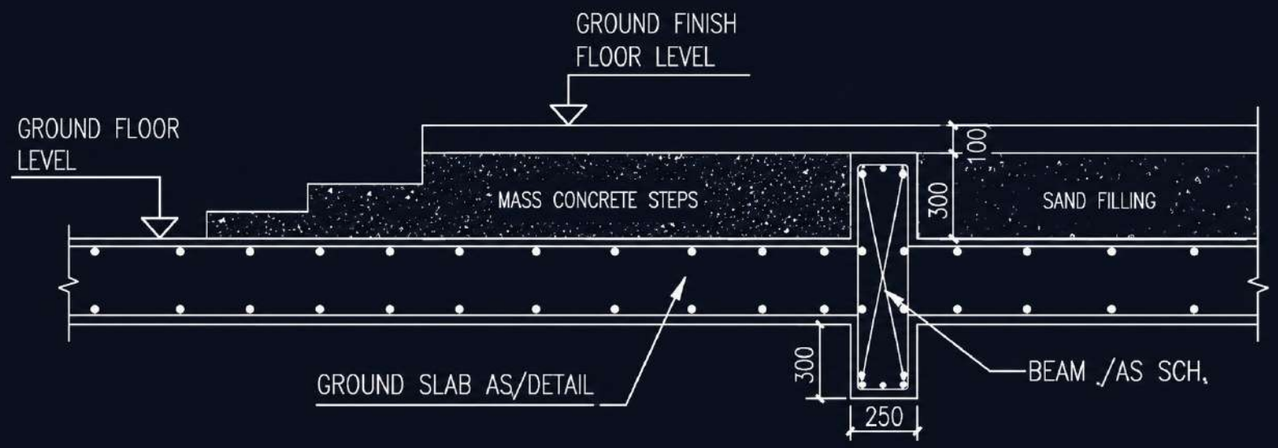




TYPICAL REINFORCEMENT
DETAILS FOR SKYLIGHTS



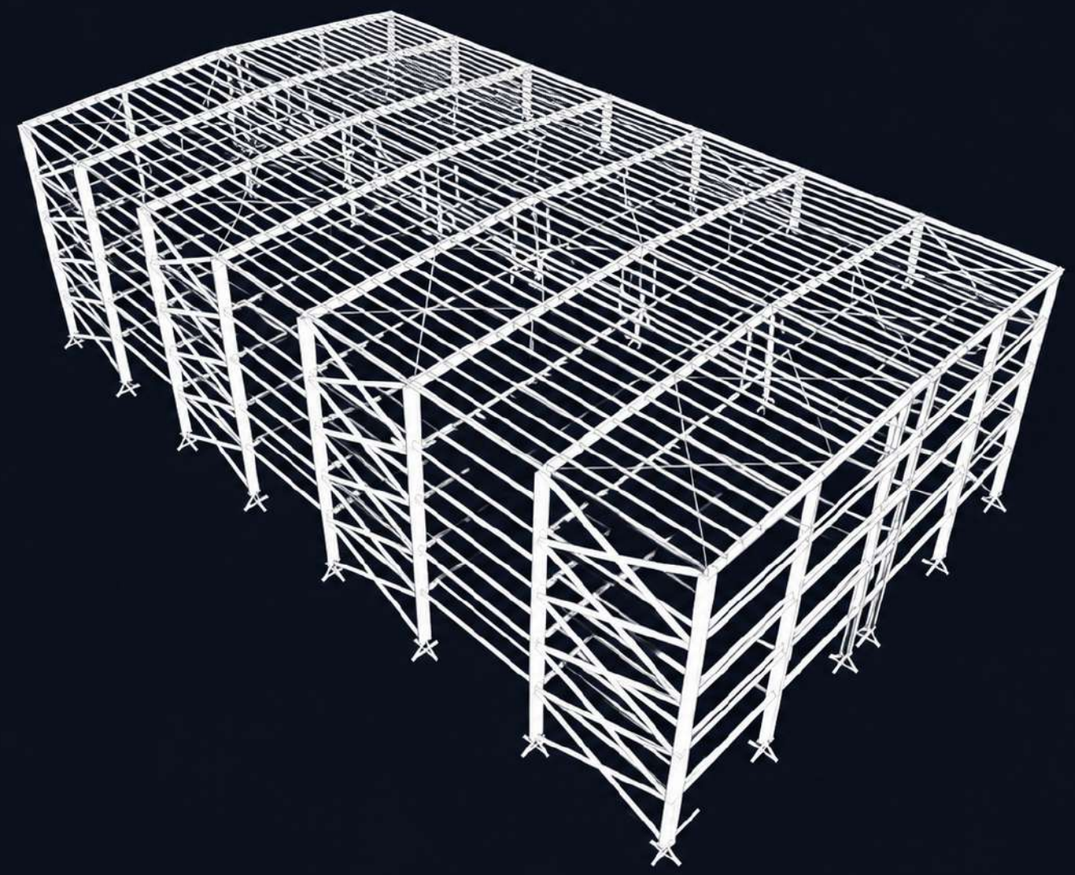
BASE THICKNING SECTION
(250 THK. BLOCKWALL)

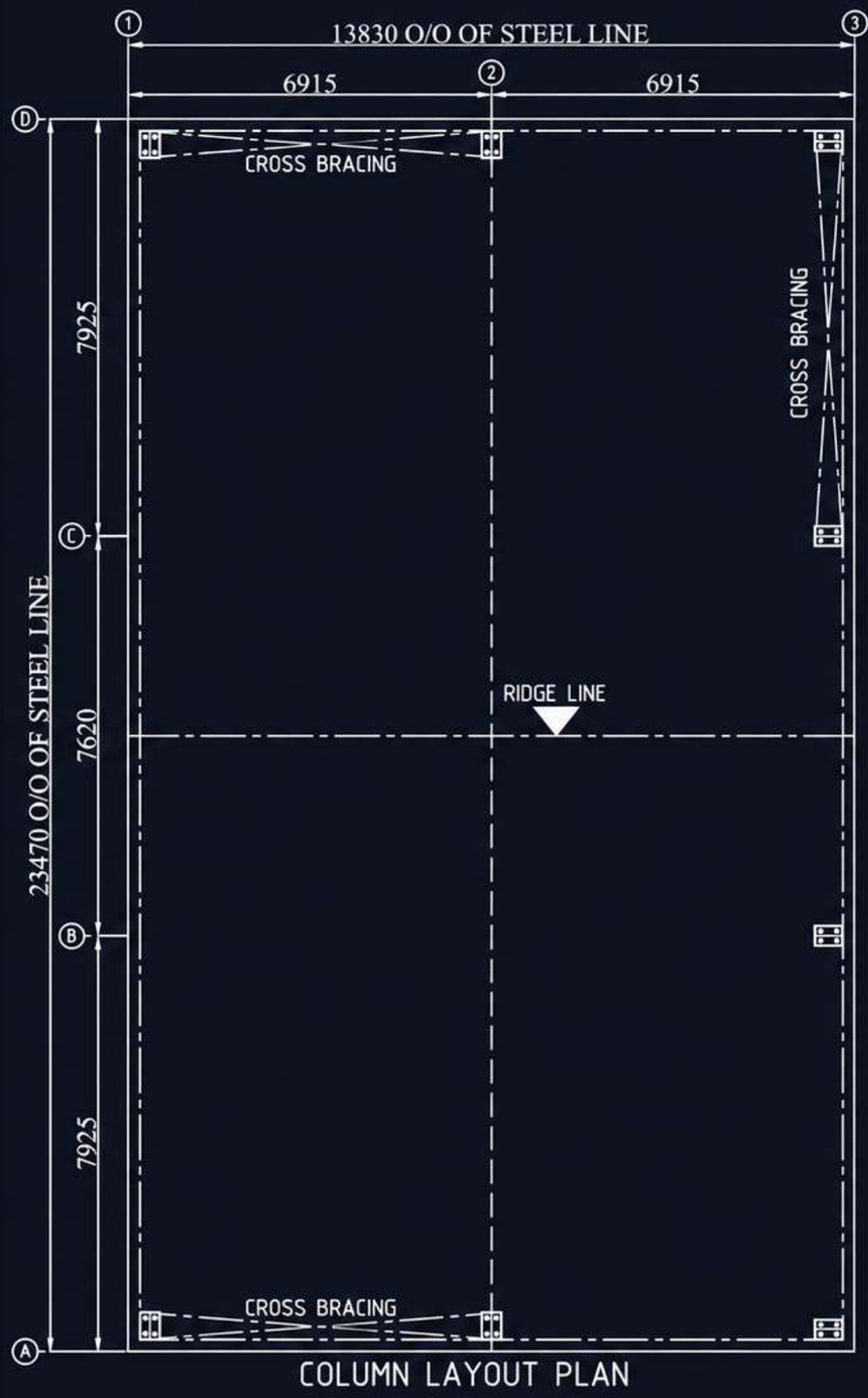


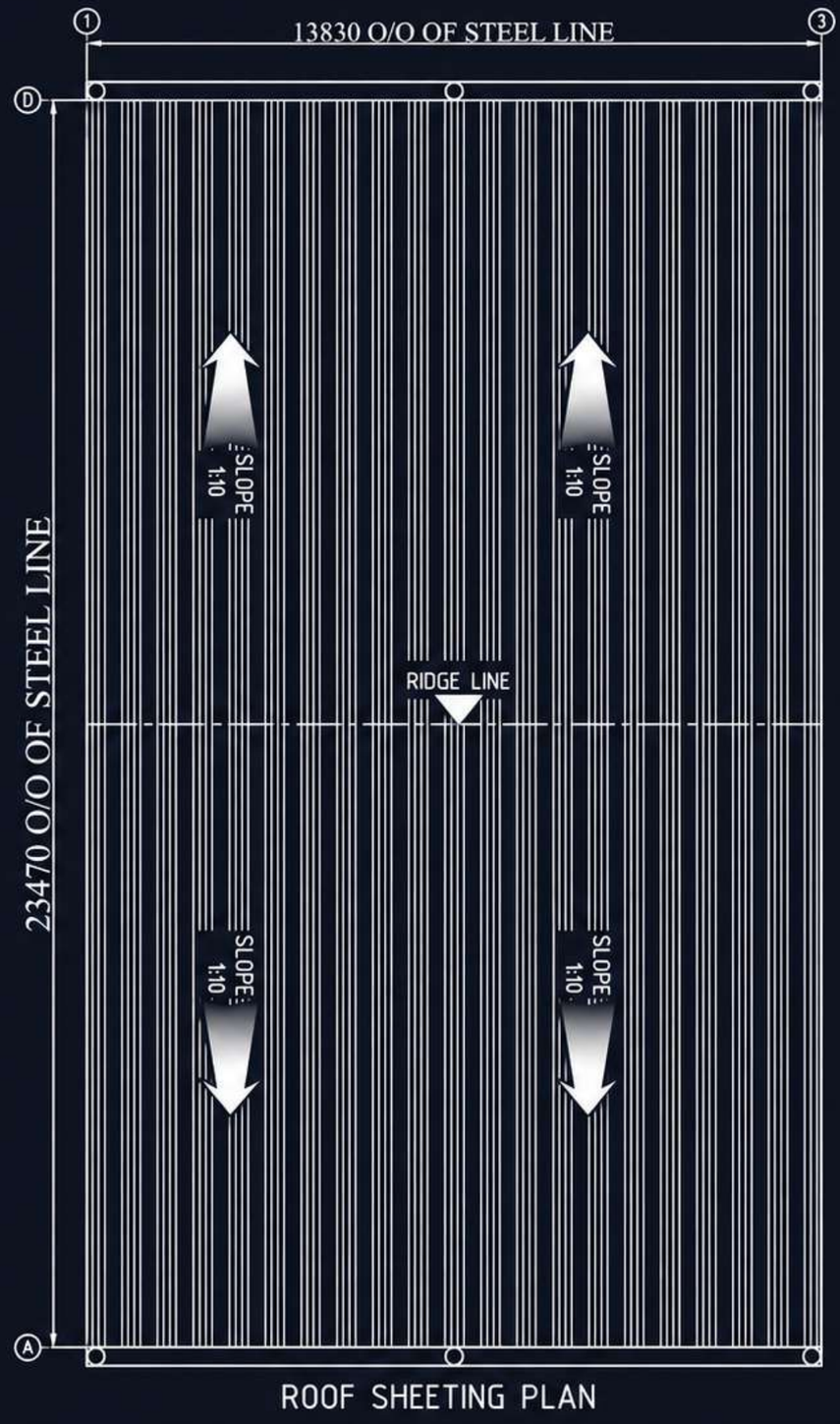
TYPICAL SECTION FOR EXTERNAL STEPS

SCALE 1:20

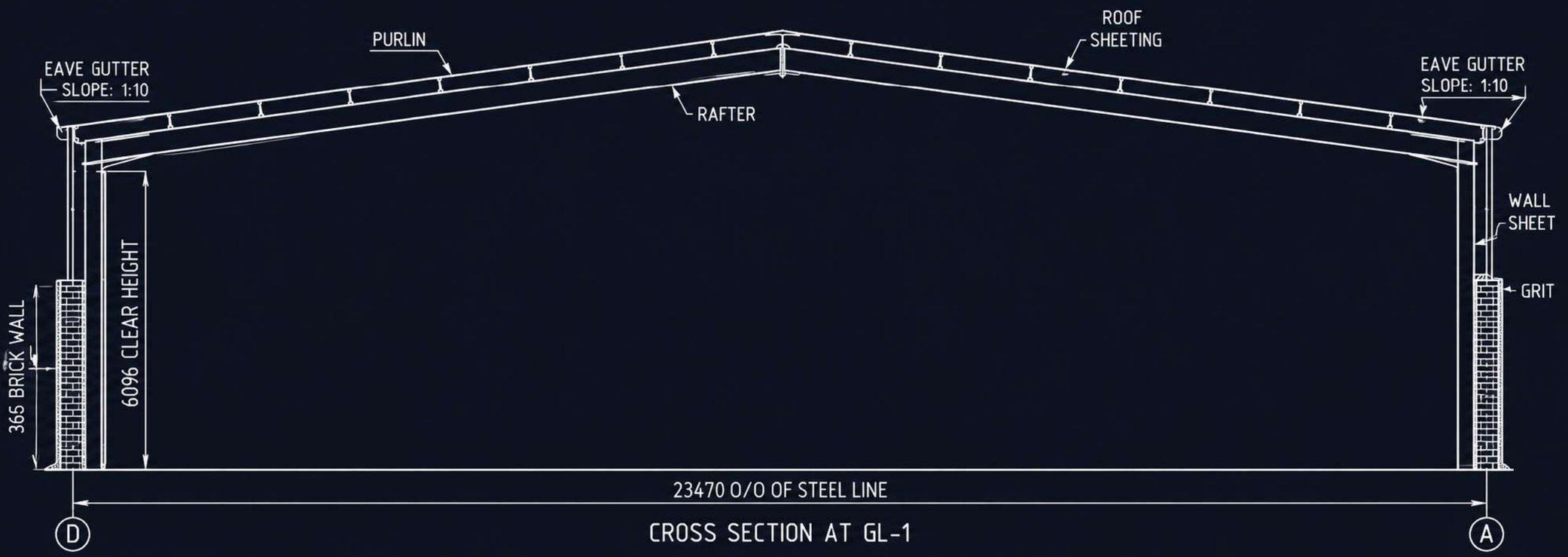
MODEL AGRICULTURE MALL PAKISTAN



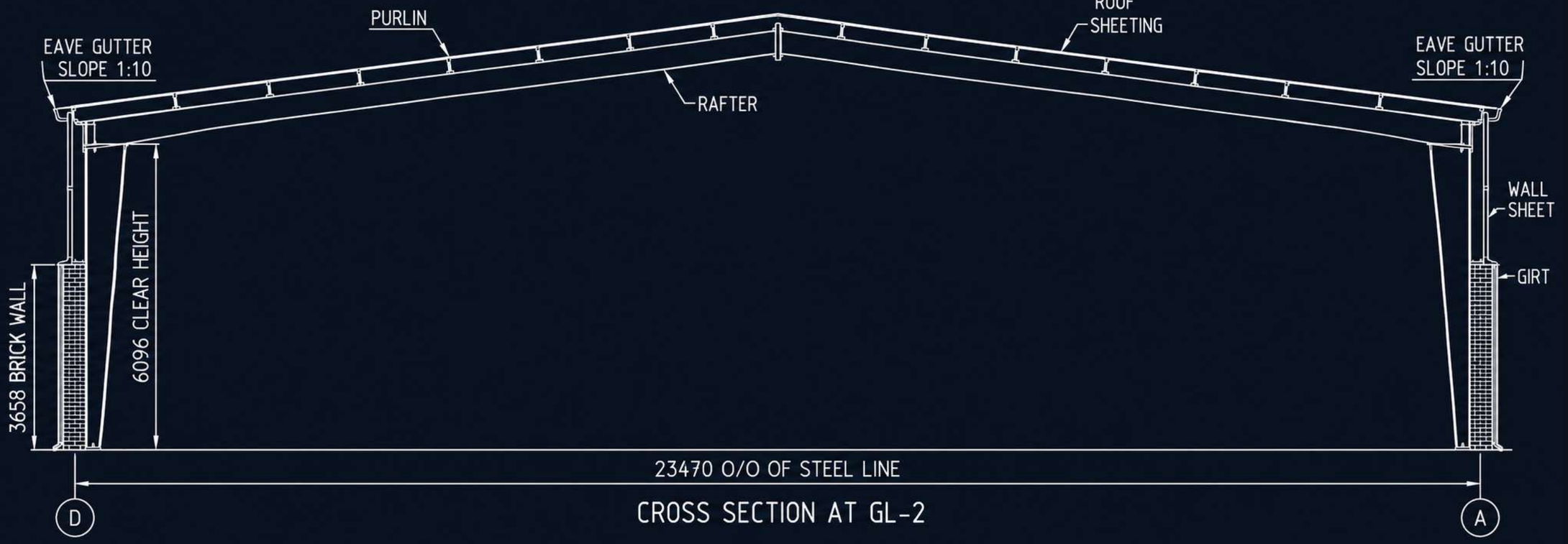




COLUMN AND ROOF SHEETING PLAN

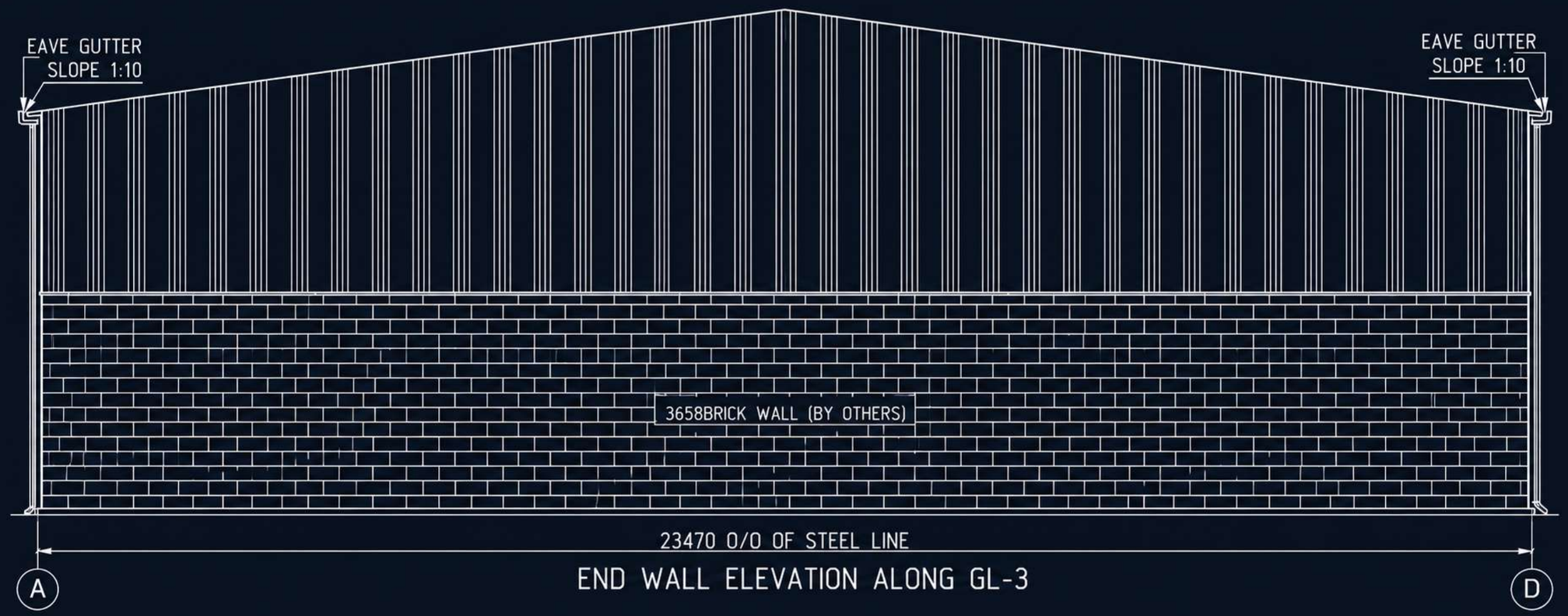


CROSS SECTION AT GL-1

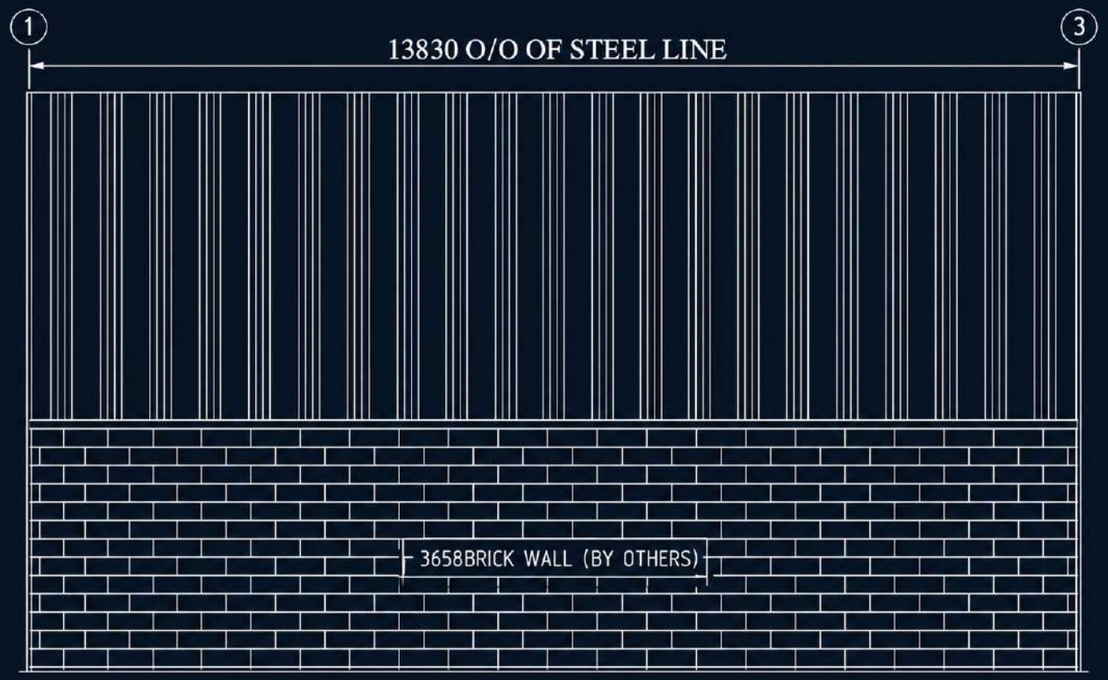


CROSS SECTION AT GL-2

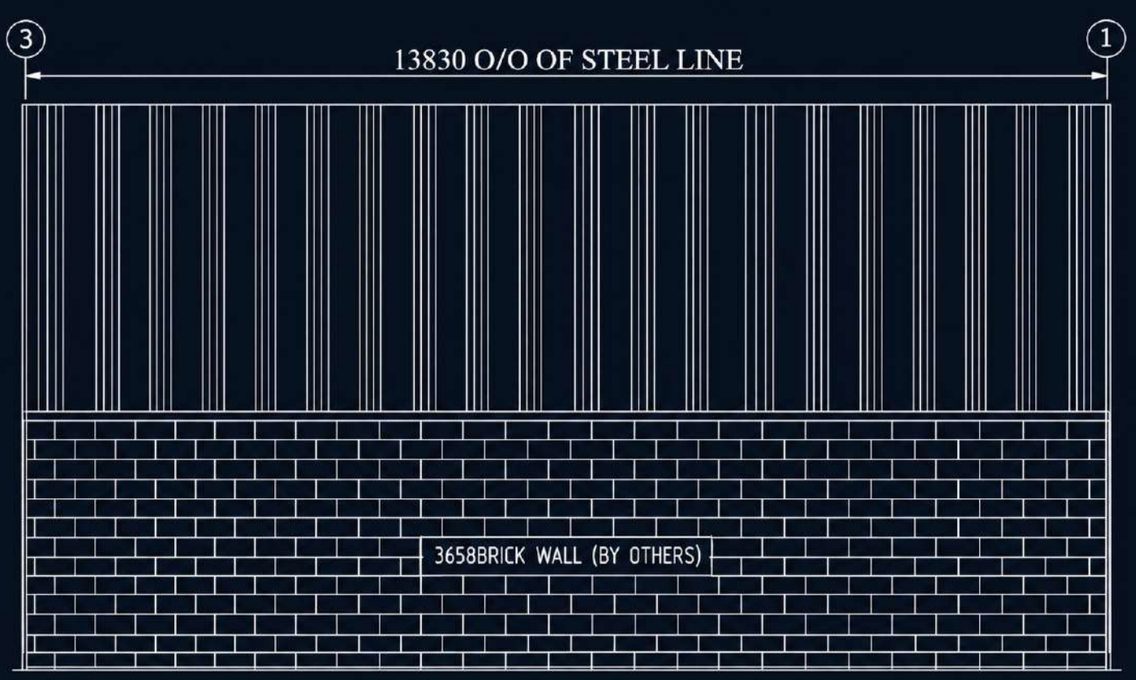
CROSS SECTION



END WALL ELEVATION ALONG GL-3

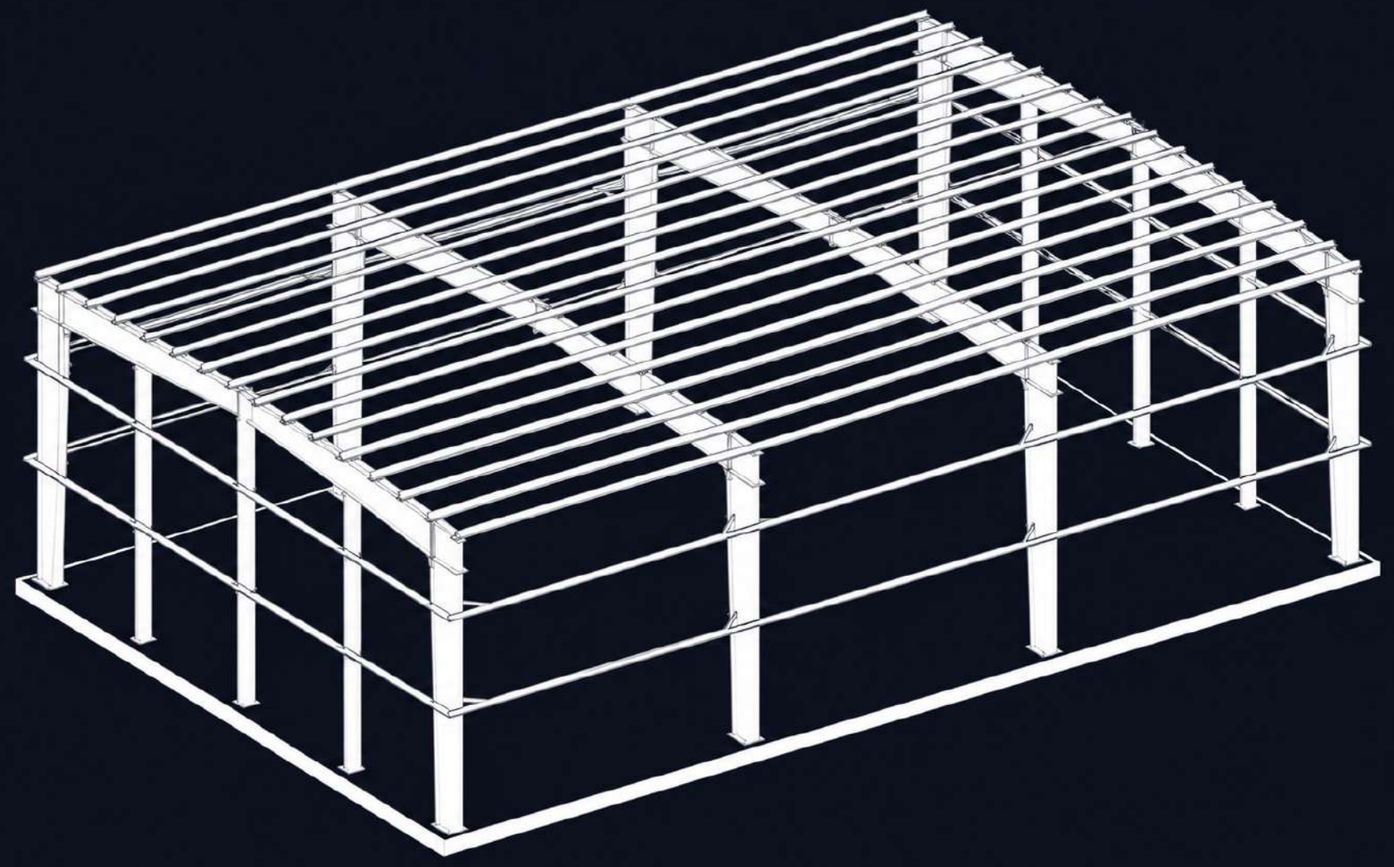


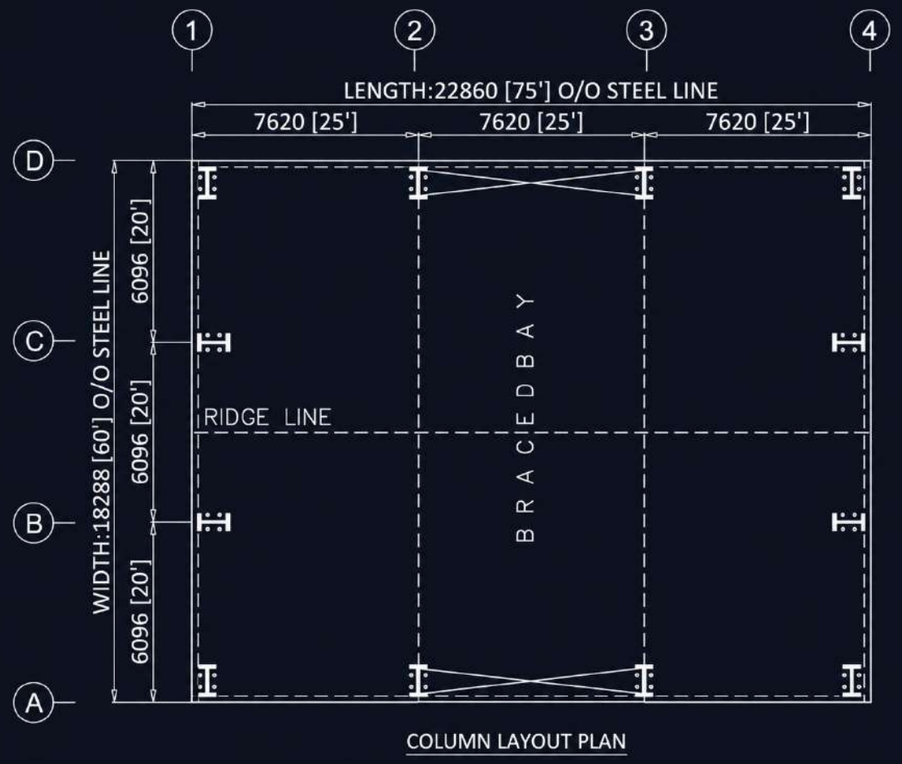
END WALL ELEVATION ALONG GL-A



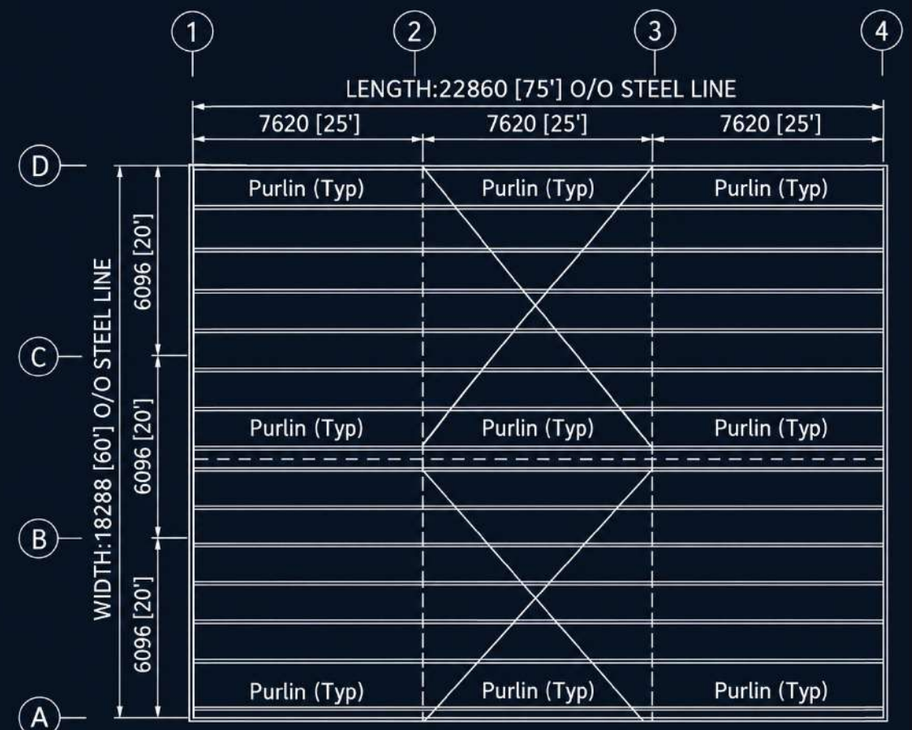
END WALL ELEVATION ALONG GL-D

INDUSTRIAL SHED PAKISTAN DRAWINGS

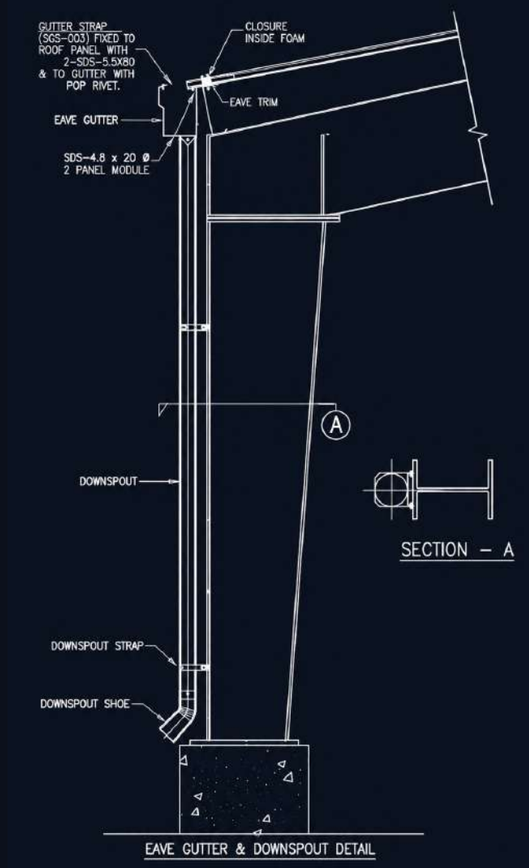




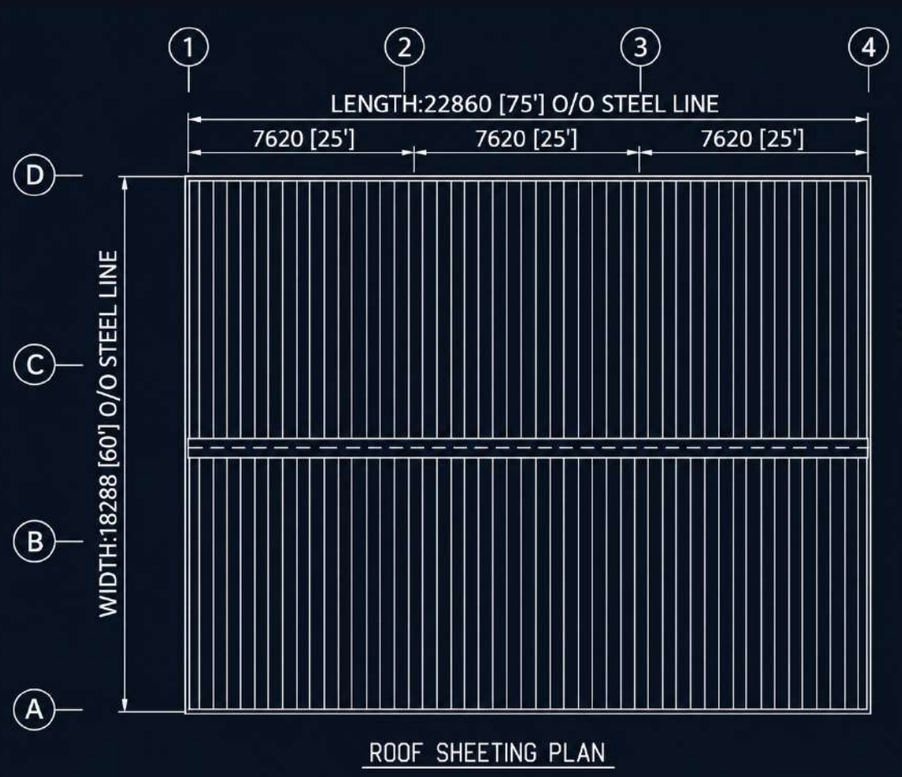
COLUMN LAYOUT PLAN



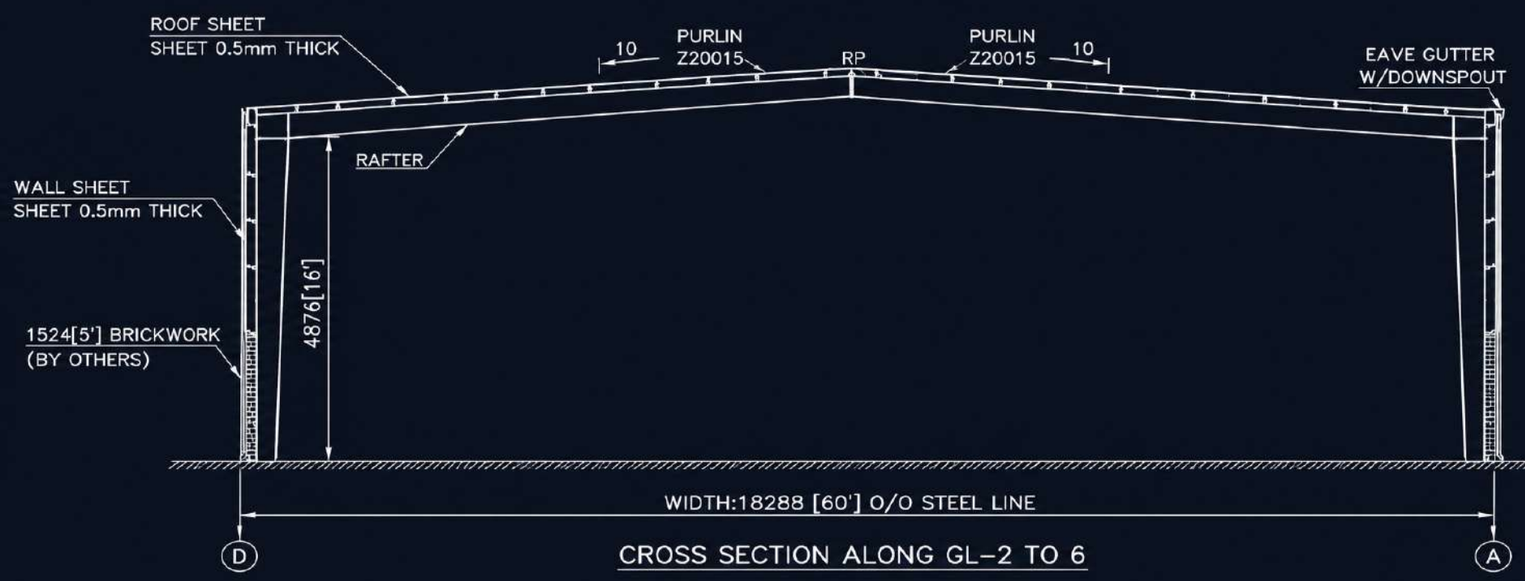
COLUMN LAYOUT PLAN



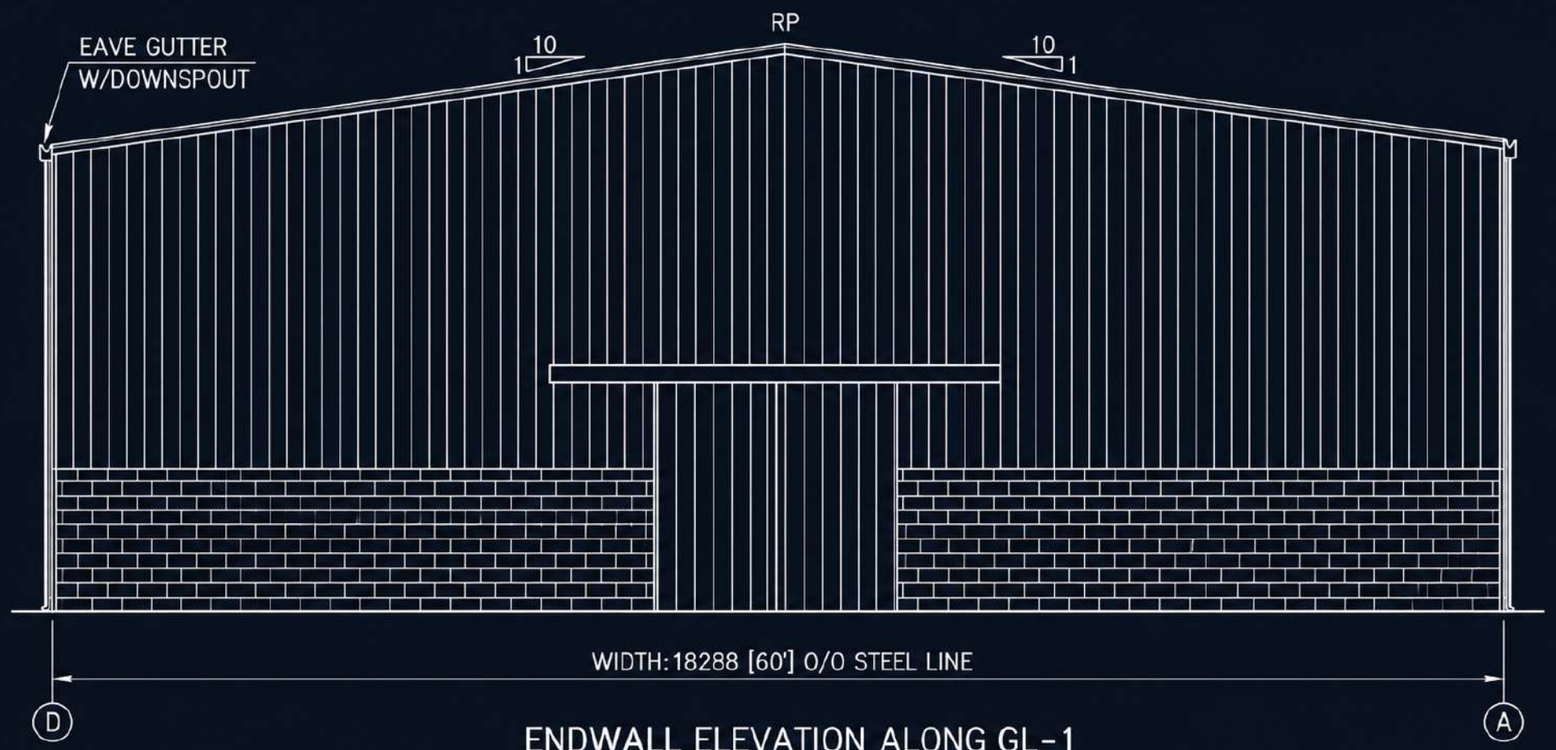
EAVE GUTTER & DOWNSPOUT DETAIL



ROOF SHEETING PLAN



CROSS SECTION ALONG GL-2 TO 6



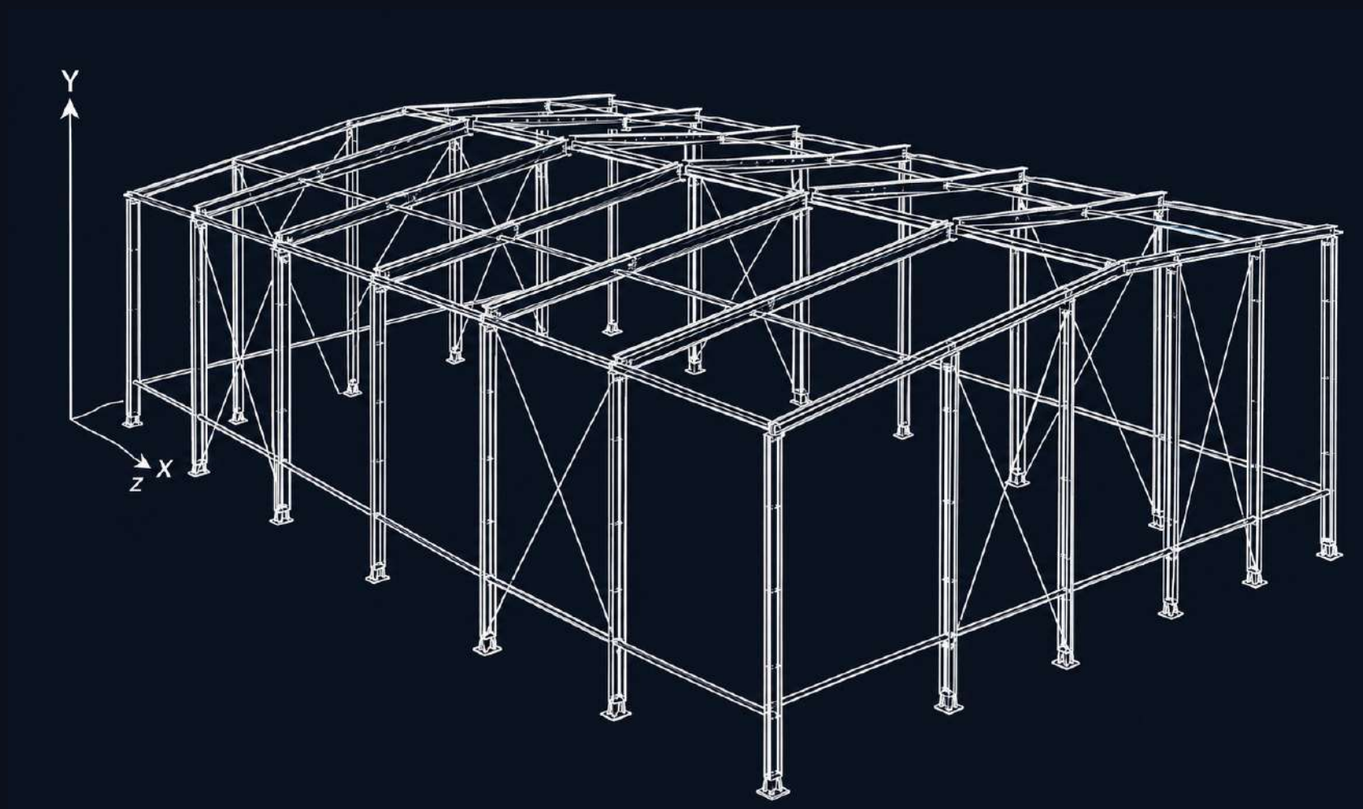
ENDWALL ELEVATION ALONG GL-1



ENDWALL ELEVATION ALONG GL-9

BOQ and BOM

Estimate of Project (Quote)



	Width (m)	Length (m)	Area (m^2)	Area (ft^2)	Total Wt. (MT)
	27.432	44.196	1,212	13,050	49.08

Sr. No.	Description	Size	Unit	Quantity	Weight (kg)
	A) Main Framing				
1	Main Frame	3,000	kg	5	15,000
3	Bearing Frame	3,000	kg	2	6,000
4	Cable Bracing	16	kg	26	416
5	Clips/Stiffeners	0.01	kg	105	105
6	Angle Bracing	1.0	m	183	444
7	Strut	8.60	m	4	454
8	A Bolts	1	#	80	200
9	Connection Bolts	1	#	456	274
10	**Sub-Total A**				**22,893**
	B) Secondary Framing				
11	Purlin	47.95	m	24	4,870
12	Girt SW	47.95	m	14	2,841
13	Girt EW	29.7	m	16	2,010
14	Gable & Eave Angles	1	m	143.3	291
15	Connection Bolts	1	#	2980	238
16	Sag Rods	1	#	219	355
17	**Sub-Total B**				**10,605**
	C) Cladding				
18	Roof Sheet (0.5	1	m^2	1249	5,744
19	Wall Sheet (0.5MM	1	m^2	1442	6,631
20	Ridge Panel	1	#	44.2	199
21	Trims: (i)Gable, (ii)Eave	1	m	143.3	236
22	(iii)Drip, (iv) Corner etc.	1	m	182.5	226
23	Eave gutter	47.3	m	2	266
24	Downpipes	13.8	m	14	308
25	Fasteners	1	#	13451	135
26	Foam Closure	1.0	m	232	5
27	Bead Mastic	1.22	m	88.4	6
28	Expansion Trims, Exp Bolts etc.	1	#	0	0
29	**Sub-Total C**				**13,756**
	D) Insulation				
30	Roof Thickness: 50	1	m^2	1355	840
31	Wall Thickness: 50	1	m^2	1586	983
32	**Sub-Total D**				**1,823**

Estimation Sheet of a Steel Project

Estimate for Quotation	MI Industries.	Width (m)	Length (m)	Area (m²)	Area (ft²)	Total Wt. (MT)	Unit Wt.	Cost Grand Total
		15.252	50.982	781	8,406	26.98	34.5	7,856,748
Date: 03/24/2021								
Reference: TBT-055-20		Rev. #	0					

Sr. No.	Description	Size	Unit	Quantity	Weight (kg)	Rate (PKR/kg)	Price (PKR)
Partian-01	**A) Main Framing** *(Grade 50)*						
1	Main Frame:G.L 2-4	874	kg	3	2,622	270	707,940
2	Main Frame:G.L 5-7	748	kg	3	2,244	270	605,880
3	Bearing Frame,	411	kg	1	471	270	127,170
4	Cable Bracing	16	kg	12	196	400	78,400
5	Clips/Stiffeners	1.00	kg	53	53	270	14,410
6	A Bolts with nut and washer.	1	#	64	196	350	68,768
7	Connection Bolts with nut and washer.	1	#	152	274	350	95,760
	Sub-Total A				**6,056**		**1,698,328**
Partian-02	**B) Secondary Framing** *(Grade 50)*						
8	Purlin 2002.0	54.73	m	21	6,244	225	1,404,317
9	Girt SW 20022.0	54.73	m	4	1,097	225	246,717
10	Girt EW 20022.0	16.8	m	2	186	225	41,952
11	C-Chansl Framed Opening.	0.0	m	0	0	225	0
12	Gsble & Eave Angles	1	m	132.5	269	225	60,505
13	Connection Bolts	1	#	3968	317	350	111,100
	Sub-Total B				**8,113**		**1,865,191**
Partian-03	**C) Hot Rolled** ***(Grade 36)***						
15	Angle Brscing L100X100X8	1.00	m	0	0	270	0
16	Tube/ Pipe Strute	1.00	m	0	0	270	0
17	Meesanine Edge Angle L100X100X8	1.00	m	0	0	270	0
18	Ssg Rods	1.00	#	290	473	300	141,840
	Sub-Total C				**473**		**141,840**
	D) Cladding						
20	Roof Sheet (0.5mm A2 uterkin) M35-250	1	m'	804	3,700	255	943,569
21	Roof Sheet (0.5mm A2 Liner) M35-250	0	m'	804	0	255	0
22	Wall Sheet (0.5mm A2) M35-250	1	m'	249	1,145	255	291,896
23	Wall Sheet (0.5mm A2 Liner) M35-250	0	m'	249	0	255	0
	Trim						
24	Ridge Panel, 0.5mm A2	0	#	51.0	0	290	0
25	Trim: (i)Gsble, (ii)Esve, 0.5mm A2	1	m	132.5	218	290	63,309
26	(iii)Drip, (iv) Corner etc., 0.5mm A2	1	m	117.0	145	290	41,922
27	Esve gutter 0.8mm Steel.	1.1	m	101.964	415	290	120,230
28	Downpipe 0.8mm Steel.	29.9	m	7	560	290	162,416
29	Gutter End Closure 0.8mm Steel.	1.0	#	2	2	290	580
30	Gutter Straps + D/Pipe holding clips	1.0	#	281	141	290	40,757
31	Expansion Trimz, Exp Bolts etc.	1	#	30	72	290	20,880
	Sub-Total C				**6,397**		**1,685,559**
	D) Insulation Rock Wool, 50kg/m3						
32	Roof Thickness: 50	1	m'	804	1,641	450	361,983
33	Wall Thickness: 50	1	m'	249	508	450	111,841
34	Double Face Tape 38mmx54m	1	#	3	5	450	4,243
35	Patching Tape	1	#	3	2	450	1,275
	Sub-Total D				**2,156**		**479,487**

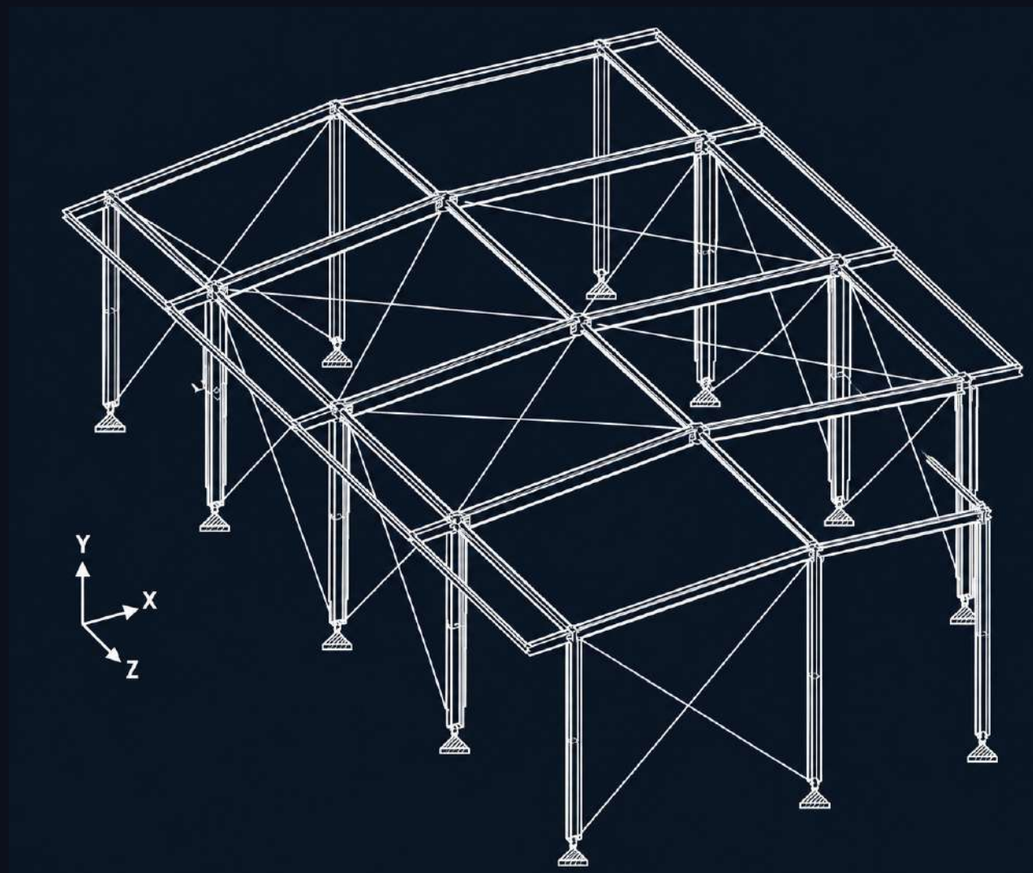
Standard Calculation Sheet for Steel Structure Design

MATERIALS ESTIMATE SUMMARY

PROPOSAL NUMBER		DEG-002-26					
SR	DESCRIPTION OF MATERIALS		UNIT	TOTAL WEIGHT	REMARKS	RATES	TOTAL RATES
1	**Main Frames (Red Steel Grade-36)**						
	Bearing Frames (A-36)		KGs	**23241.75**	All five Main Frames.	225	5223933.8
			KGs	**7828**	End Bearing Frames.	225	1761300
	Connections 14% (Connection Plates)		KGs	4,350		225	978697.13
	Mezzanine Joists		KGs	0			0
	b) Roof Monitor Frames		KGs	0			0
	c) Portal Frames		KGs	0			0
	d) Angle Bracings		KGs	0			0
	e) Pipe Bracings/ Strut Tubes (T 100 X 100 X 4) mm		KGs	707		300	212100
2	**Anchor Bolts**						
	a) 24x500		KGs	334		460	153824
3	**Connection Bolts & Screws**		KGs	**1,603**		500	816743.75
4	**Secondary Members (Grade-36)**						
	a) Roof Purlins 200 Z15		KGs	6,651		300	1995300
	b) Wall Girts 200 Z15		KGs	8,698			0
	c) P- Wall Girts 200 Z15		KGs	0			0
5	**Sheeting & Panels**						
	a) Roof Sheeting Panels (0.5mm)High Rib Profile		KGs	5,975		315	1882125
	b) Roof Sheeting Panels (0.5mm)Standing Seam		KGs	0			0
	c) Wall Sheeting Panels (0.5mm) High Rib Profile		KGs	7,460			0
	d) Mezzanine Deck 0.7mm GI		KGs	0			0
	e) Roof Monitor Wire Mesh		KGs	0			0
6	**Cable Bracings With Accessories**		FTs	1,444		170	245480
7	**Downspouts With Accessories**		KGs	300		500	150000
8	**Eave Gutters With Accessories**		KGs	160		425	68000
9	**TRIMS**		KGs	1,000		320	320000
10	**Miscellaneous Items (Clips for Standing Seam)**		KGs	0			0
11	**ANGLE BRACING**		KGs	1,000		250	250000
12	**GLASS WOOL**						

TOTAL WEIGHT OF PROJECT (KGs)	**KGs**	**83,628**		TOTAL	19427599
TOTAL WEIGHT OF PROJECT (TONs)	**TONs**	**84**		PRICE PER SFT	1488.7049
COVERED AREA	**SFT**	**13,050**			1212.8 m^2
UNIT WEIGHT	**KG/SF**	**6.41**			68.953 kg/m^2

STANDARD CALCULATION SHEET



Softwares Used:

1. SAP
2. STAADPRO
3. ETABS
4. MBS
5. CIVIL 3D

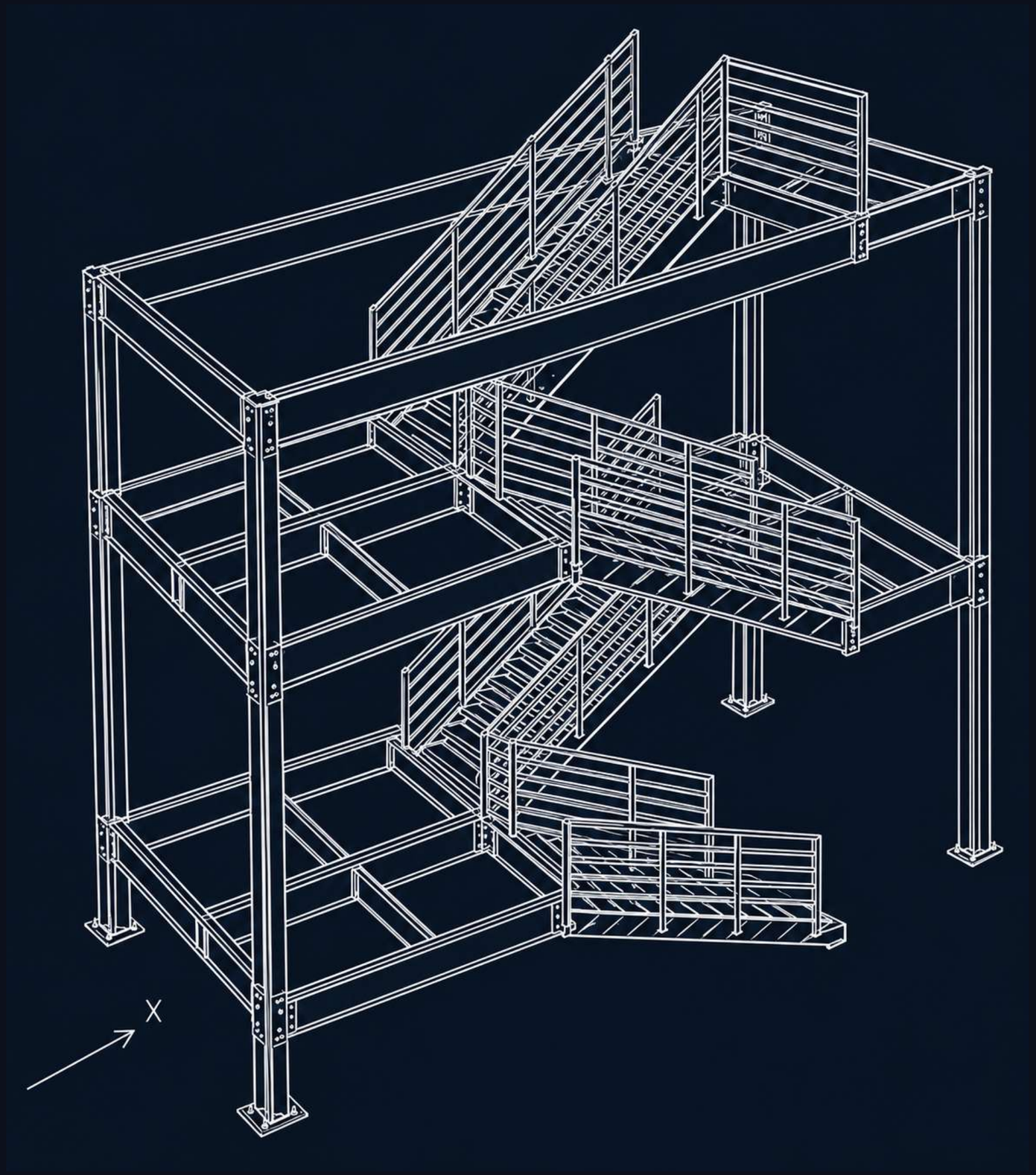




MATERIALS ESTIMATE SUMMARY

PROPOSAL NUMBER		DPEB-STEEL BRIDGE-HSN I FSD					
SR	DESCRIPTION OF MATERIALS	Section	LENGTH(M)	UNIT WEIGHT(KG/M)	QUANTITY(Nos.)	TOTAL WEIGHT(KG)	REMARKS
1	Main Frames (Red Steel Grade-36) Columns, C1	W:350X10Fs: 350X6	8.42	51.03	4.00	1804.45	Vertical Columns
	SECTION GIRDER, G1	W:300X6 Fs:200X1	19	45.53	4.00	3633.29	Long Main Beams
	SECTION GIRDER, G2	W: 200X5 F:125X4	3.6	15.70	13.00	771.50	Short Beams
	BRACE TUBE T 125X125X4	T125X4	49	15.19	1.00	781.53	Long Brace
	TUBE PURLIN+TOP PURLIN SUPPORT+ROOF BRACE T	T75X3	85	6.60	1.00	589.05	As per description
	End Wall Braces T88X88X3	T88X3	45.2	7.86	1.00	373.04	End Braces
	Base Plates/ Connections Plates	PL A36				795.29	Minor Connections
2	Anchor Bolts						
	a) 20/24x500	KGs		2.54	32	81.28	
3	Connection Bolts & Screws	KGs		0.02	400.00	7.20	
4	Secondary Members (Grade-36)						
	a) Roof Purlins 200 Z15	KGs		0.00			
	b) S. Wall Girts 200 Z15	KGs		0.00			
	c) E. Wall Girts 200 215	KGs		0.00			
5	Sheeting & Panels		AREA	WEIGHT(KG/M2)			
	a) Roof Sheeting Panels (0.5mm)	KGs	70.452	4.79	1.00	337.47	
	b) Roof Monitor Sheeting Panels	KGs		0.00			
	c) Wall Sheeting Panels (0.5mm)/High	KGs		0.00			
	d) P. Wall Sheeting Panels (0.5mm)	KGs		0.00			
	e) Roof Monitor Wire Mesh	KGs		0.00			
	f) Stitch Fastners for sheetings	KGs		0.00			
	g) Foam Clouser	KGs		0.00			
6	Cable Bracings With Accessories	KGs		0.00			
7	Downspouts With Accessories	KGs		0.00			
8	Eave Gutters With Accessories	KGs		0.00			
9	TRIMS AND MEZZNINE ANGLE	KGs		0.00			
10	Miscellaneous Items (Clips for	KGs		0.00			
11	Deck Panels	KGs	68.4	6.78	1.00	463.75	
	TOTAL WEIGHT OF PROJECT		KGs	9637.83			
	TOTAL WEIGHT OF PROJECT		TONs	9.638			
	COVERED AREA		SFT	1471.97			
	UNIT WEIGHT		KG/SF	6.55			

Design Report of Stair case project USA



2.1 SUMMARY OF RESULTS

SUBSYSTEM	GOVERNING CHECK	DCR	STATUS
Stair stringers MC12x14.3	Flexure — AISC 360-16 F2	0.13 – 0.30	ADEQUATE
Stringer deflection	L/360 — IBC Table 1604.3	0.08	ADEQUATE
Landing framing C8x11.5	Flexure — AISC 360-16 F2	0.28	ADEQUATE
Bolted connections	Shear and bearing — AISC 360-16 J3	0.06 – 0.14	ADEQUATE
Columns — gravity, braced condition	Combined forces — AISC 360-16 H1	0.23	ADEQUATE
Columns — gravity, as-detailed	Compression — AISC 360-16 E3	3.2	NOT ADEQUATE
Frame stability	Second-order effects — AISC 360-16 C2.1b	B2 < 0	UNSTABLE
Stability coefficient	ASCE 7-16 Section 12.8.7	0.336 > 0.167	NOT ADEQUATE
Seismic story drift	ASCE 7-16 Section 12.12	5.3	NOT ADEQUATE

SUBSYSTEM	GOVERNING CHECK	DCR	STATUS
Guardrail post at 5'-0" spacing	Flexure — AISC 360-16 F8	1.19	NOT ADEQUATE
Guardrail post weld	Base metal rupture — AISC 360-16 J4.2	1.52	NOT ADEQUATE
Column base anchorages	ACI 318-19 Chapter 17	Non computable	INFORMATION REQUIRED

5 REFERENCE DOCUMENTS

The following documents were made available and were used as the basis of this evaluation.

SHEET	TITLE	REV.	DATE
E1	First Floor Level Plan	A	11 Jul 2026
E2	Anchor Rod Settings	A	11 Jul 2026
E3	2nd Floor Framing Plan	A	11 Jul 2026
E4	3rd Floor Framing Plan	A	11 Jul 2026
E5	Roof Framing Plan	A	11 Jul 2026
E7	Stair Plans — Stair Elevations 1 and 2	A	11 Jul 2026
4, 5	Column Details	A	11 Jul 2026
6	Bollard and Ladder Details	A	11 Jul 2026
7, 8	Beam Details	A	11 Jul 2026
9 – 13	Stair and Rail Details	A	11 Jul 2026
14	Rail Details	A	11 Jul 2026
15	Pan Details	A	11 Jul 2026

RESULTS

REFERENCE	TITLE	APPLICATION
780 CMR, 10th Ed.	Massachusetts State Building Code	Governing building code
IBC 2021	International Building Code	Base code; live loads, egress dimensions, special inspections
ASCE/SEI 7-16	Minimum Design Loads and Associated Criteria for Buildings and Other Structures	Load combinations, seismic design, drift and stability limits
ANSI/AISC 360-16	Specification for Structural Steel Buildings	Member and connection design (ASD)
ANSI/AISC 341-16	Seismic Provisions for Structural Steel Buildings	Applicability assessed in Section 11
AISC Design Guide 34	Steel-Framed Stairway Design	Stair-specific detailing and vibration guidance
AISC Design Guide 11	Vibrations of Steel-Framed Structural Systems Due to Human Activity	Vibration serviceability
ACI 318-19	Building Code Requirements for Structural Concrete	Chapter 17 — anchoring to concrete
AWS D1.1	Structural Welding Code — Steel	Welding procedures, qualification and inspection
RCSC Specification	Specification for Structural Joints Using High-Strength Bolts	Bolt installation and pretensioning requirements
NAAMM AMP 510	Metal Stairs Manual	Industry practice reference
NDS 2018	National Design Specification for Wood Construction	Lag screw connections to wood backing

REFERENCES

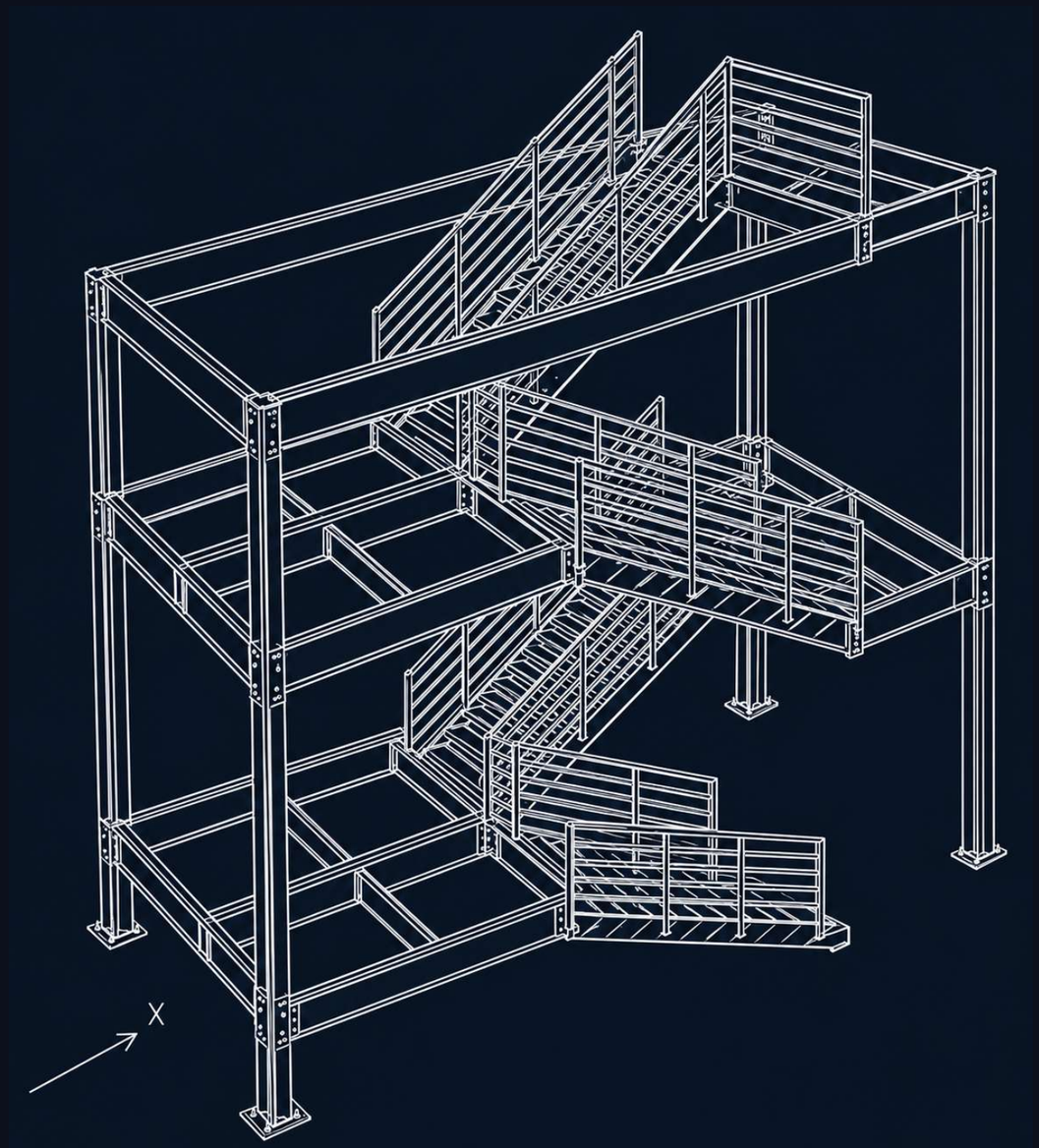
7 MATERIALS

Material designations were taken from the bill of material and general notes appearing on each shop drawing sheet.

COMPONENT	SECTION	SPECIFICATION	Fy (ksi)	Fu (ksi)
Support columns	HSS4x4x3/8	ASTM A500 Grade C	50	62
Stair stringers	MC12x14.3	ASTM A36	36	58
Landing beams	C8x11.5 / MC12x14.3	ASTM A36	36	58
Landing beams	W12x19	ASTM A992	50	65
Tread carriers	L1-1/2x1-1/2x3/16	ASTM A36	36	58
Connection angles and plates	Various	ASTM A36	36	58
Tread and landing pans	12 gauge / 3/32 in. plate	ASTM A36	36	58
Handrail and guardrail pipe	1-1/2, 1-1/4, 3/4 Std.	ASTM A53 Grade B	35	60
High-strength bolts	3/4 in. diameter	ASTM A325	—	120
Common bolts (railing)	3/4 in. diameter	ASTM A307	—	60
Anchor rods	3/4 in. diameter	ASTM F1554 Grade 36	36	58
Weld filler metal	—	E70XX	—	70
Concrete fill	5 in. thickness	f'c = 4,000 psi	—	—

GROUP	ELEMENT	SECTION MODELLED	MATERIAL
_4C1	Support columns	HSS4x4x3/8	A500 Grade C, Fy = 50 ksi
_9S1 / _11S1	Stair stringers	MC12x14.3	A36
_BEAM-9S1 / _BEAM-11S1	Stringer support beams	MC12x14.3	A36
_8B1 / _BEAM-1	Landing beams	W12x19	A992, Fy = 50 ksi
_8B3 / _8B5	Landing beams	C8x11.5 / MC12x14.3	A36
_TREAD	Tread carrier angles	L1-1/2x1-1/2x3/16	A36
_HANDRAIL	Guardrail and handrail	Pipe, Schedule 40	A53 Grade B, Fy = 35 ksi

No.	ASSUMPTION	LEVEL	VALIDATION REQUIRED
1	Uniform loads are applied on the horizontal projection of the stair, consistent with the basis of the IBC live load	A	None
2	Concrete fill of 5 in. applies to both treads and landings	A	Confirmed by owner
3	Column bases are pinned	B	Confirm against engineer-of-record details
4	Beam-to-column connections transfer shear only	A	Confirmed by shop drawing details
5	The unbraced length of the stringer compression flange is taken as the carrier angle spacing of 12.75 in., justified by the continuous pan and concrete fill	B	Requires independent validation per AISC Design Guide 34
6	No lateral support is provided to the tower by the primary structure	C	Requires engineer-of-record confirmation
7	The guardrail assembly does not contribute to the strength or stiffness of the stair	B	See Section 9.6
8	Composite action between the concrete fill and the steel pans is neglected	A	Conservative



LANDING FRAMING

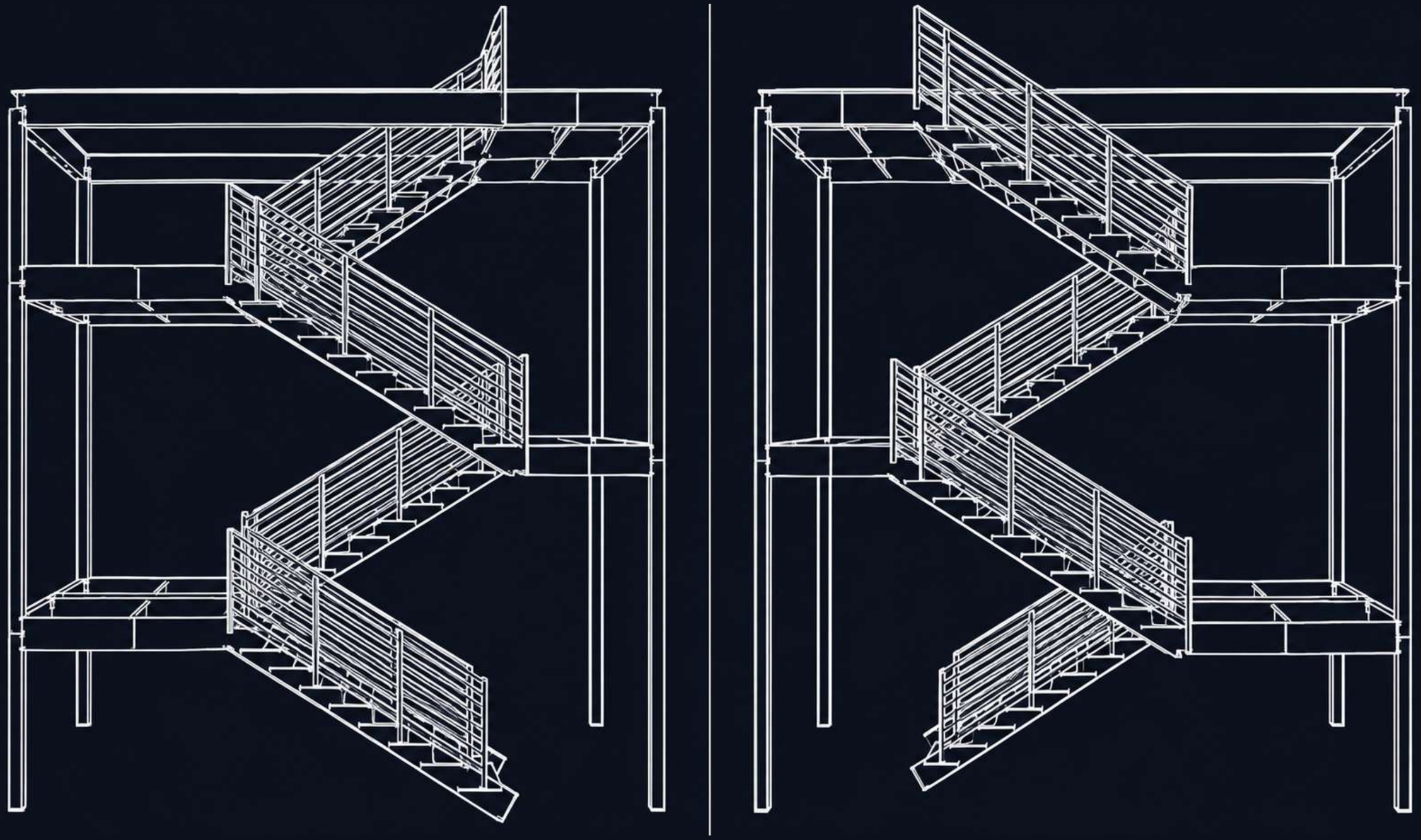
MEMBER	CHECK	DCR	STATUS
C8x11.5 landing beam	Flexure — AISC F2	0.28	OK
MC12x14.3 landing beam	Flexure — AISC F2	0.21	OK
W12x19 landing beam	Flexure — AISC F2	0.14	OK
Tread carrier angle	Flexure and weld	< 0.05	OK

STAIR STRINGERS

CHECK	REFERENCE	DEMAND	CAPACITY	DCR	STATUS
Flexure, braced (Lb = 12.75 in.)	AISC F2	3.02 kip-ft	23.3 kip-ft	0.13	OK
Flexure, fully unbraced	AISC F2	3.02 kip-ft	10.1 kip-ft	0.30	OK
Shear	AISC G2	1.58 kips	51.8 kips	0.03	OK
Live load deflection	IBC 1.1604.3	0.024 in.	0.303 in.	0.08	OK
Natural frequency	AISC DG34	Well above 5 Hz	5 Hz min.	—	OK

	OPTION A — DIAPHRAGM CONNECTION	OPTION B — DEDICATED BRACING
Concept	Drag connections from the stair tower to the floor diaphragms at +10'-8" and +21'-4"	Vertical bracing in the short-direction faces of the tower
Additional steel	Essentially none	Moderate — light angles or HSS
Response modification coefficient, R	3	3
Applicability of AISC 341-16	Does not apply	Does not apply
Resulting column DCR	0.23	Comparable
Prerequisite	Engineer-of-record drawings and concurrence	None; self-contained
Principal risk	Dependent on a third party	Verify no encroachment on the 44 in. clear width

STRUCTURAL REMEDIATION



STAIRCASE ELEVATIONS

Estimate for Quotation	Width (m)	Length (m)	Area (m^2)	Area (ft^2)	Total Wt. (MT)	Unit Wt. (kg/m^2)	Cost Grand Total (PKR)
	14.936	48.158	719	7,742	33.46	46.5	7,285,016

Date: 10/09/2026

Reference: TBT-146-19 **Rev.#** 0

Sr. No.	Description	Weight	Unit	Quantity	Total Weight (kg)	Rate (PKR/kg)	Price (PKR)
35	Gravity ridge vent. (0.3m x 3m)	1.00	m^2	0	0	341	0
36	DSD 6x6 with FO.	36	#	0	0	90	0
37	Turbine Ventilator	NA	#	0	0	300	0
38	Wooden Blocks	1	#	33	33	1000	33,458
39	Paintable Area (Built-Up & HR Members Only)	1	ft^2	5,006	NA	25	125,138
40	Additional Costs *(if any)*	-	-	-	-	-	0
41	**Sub-Total E**				**0**		**158,596**
	Total (A+B+C+D+E)				**33,458**		**6,281,278**
42	**F) Cost of Conversion**	NA	#	NA	33,458	30.00	1,003,739
	Total (A+B+C+D+E+F)				**33,458**		**7,285,016**
43	**G) Cost of Erection**	NA	#	NA	33,458	5	501,869
	Grand Total (A+B+C+D+E+F+G)				**33,458**		**7,786,886**

Building Data

Roof Slope:	0.100	(Gable)	
Bay Spacing (m):	7.501 + 4 @ 8.289 + 7.501		
Clear Ht (m):	7.925		
Base Condition:	Pinned		
Left End-wall Frame:	Bearing	(Columns spaced @ 7.489)	
Right End-wall Frame:	Bearing	(Columns spaced @ 7.489)	
Open Walls (m):	**NSW** 3.048	**LEW** 3.048	
	FSW 3.048	**REW** 3.048	

Live load (kN/m2):	0.57	**Wind (kph):**	135
Collateral (kN/m2):	0.2	**Seismic Zone:**	2B (UBC-97)

For Sales & Business Development Use:

Sr. No.	Description	Price (PKR)	PKR/ft^2	Applicable
1	Product Cost	7,285,016	1006	Y
2	GST (17%)	1,238,453	160	Y
3	Profit %	2,549,756	329	35%
	TOTAL	**11,073,225**	**1,495**	

Sr. No.	Description	Price (PKR)	PKR/kg	Applicable
1	Product Cost	7,285,016	233	Y
2	GST (17%)	1,238,453	37	Y
3	Profit %	2,549,756	76	35%
	TOTAL	**11,073,225**	**346**	

Exposure: B	**Codes:**	AISC-06;	MBMA-10;	AISI-02
	Other Info:	Enclosed;	I=1.0	

Assumptions and Deviations:

1	Grade 50 Steel (Yield Strength - 50ksi) is considered for main framing and cold formed Z sections.	**Checked By**	**Dsg & Filled By**
2	Cross Bracing is considered in end walls as well in interior column locations.	**HXN**	**NGN**

Structural Design Calculation Sheet

Technical Design Considerations:

1. The building is considered to be 70 ft x 40 ft to be current scope and it will be extended along 70 ft direction to further 150 ft for future. i.e. 40 ft width and total 150 ft length. Thus only longitudinal extension will be taken and no lateral extension is considered i.e it will be L = 150 ft x W = 40 ft after future extension. It means as per proposal drawings, the extension will be along Grid A-B/ 5-onward upto a total future length of 150 ft as per future planning. The frames at G.L 1 & 4, both are designed for future extensions along both directions i.e. 1/A-B & 4/A-B so either direction can be used safely.
This building is designed based on below following loadings based on ASCE 7-10/ BCP-2021 as Open Building Condition.

2. Design Dead Load : Self Weight of structure (Sheeting+Purlin+Frame Self Weight).
Design Live Load : 0.57 kN/m²
Design Collateral Load (Lighting/ HVAC) : 0.1 kN/m²
Design Wind Speed : 160 KPH, Exp. C
Seismic Co-Efficient/ Zone: Multan, BCP-2021

3. The building is designed based on below design codes.
American Institute of Steel Construction (AISC 360-10) for HR/ BU members design of portal frames.
North American Standards for Cold Formed Steel Framing (AISI 2001) for Cold Formed design.
American Welding Society (AWS) for design of welds for BU columns/ rafters sections.

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