The Residential Villa

June 2021

MHE Engineers consultancy are pleased to have this opportunity
to redesign the villa by using the vertical panel system
wish to thank you for the invitation.
We are confident that our proven expertise will ensure that
this key project fully contributes to the success of the vision.
After carefully considering your vision for this new project,
this booklet contains our Concept Design proposals which we
look forward to developing further with you in order to fully
realize your objectives and achieve your goals.

Ali & Sons
SINCE 1979

M.HOFMANN
ENGINEERING
CONSULTANCY

PROJECT BRIEF

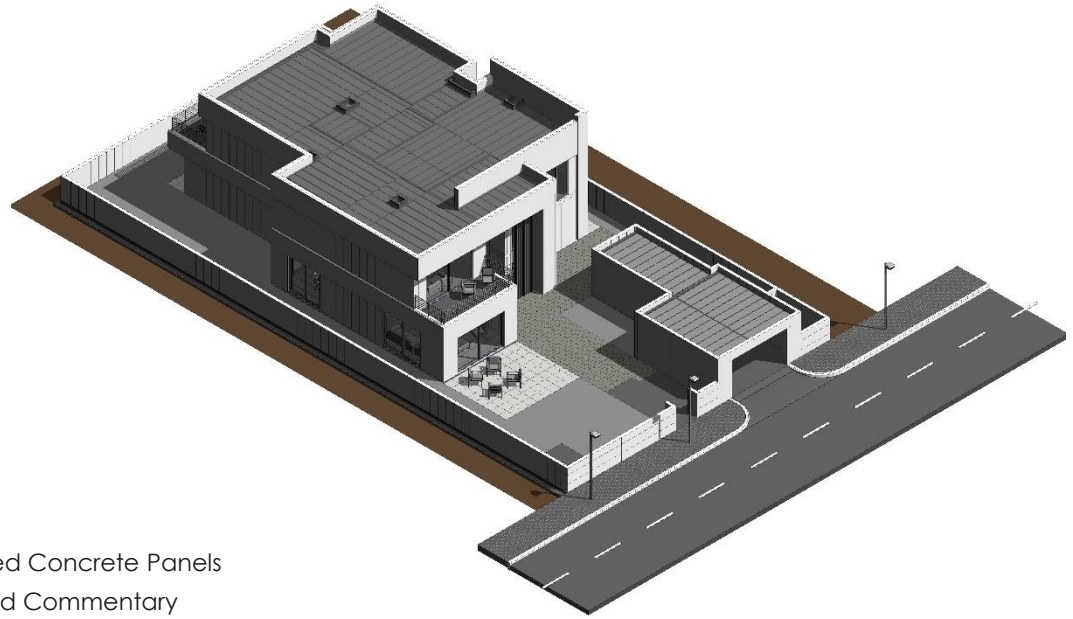
INTRODUCTION:

This document in hand is the inception report of redesign existing design by using AAC panels for the residence villa in Abu Dhabi

LOCATION:

The site is located on prime land in Abu Dhabi
Plot reference XXXXXX - ADM Reference XXXX/XXXX
The site area is approximately XXX Sqm and the design criteria are:

- No. of Floors : Floor (G+1+RF)
- GFA Approx. :450m2
- Land use : Residence villa
- Set Backs : xxx



CODES AND REGULATION:

National & international Building code Regulation
ADM Building Regulation
UAE Civil Defense
National Fire Protection Association Code(NFPA)
Abu Dhabi Water & Electricity Authority

ACI 523.4R-09:Guide for Design and Construction with Autoclaved Aerated Concrete Panels

ACI CODE 318-08: Building Code Requirements for Structural Concrete and Commentary

ACI CODE-530/530.1-13: Building Code Requirements and Specification for Masonry Structures and Companion Commentaries

DESIGN CONSIDERATION

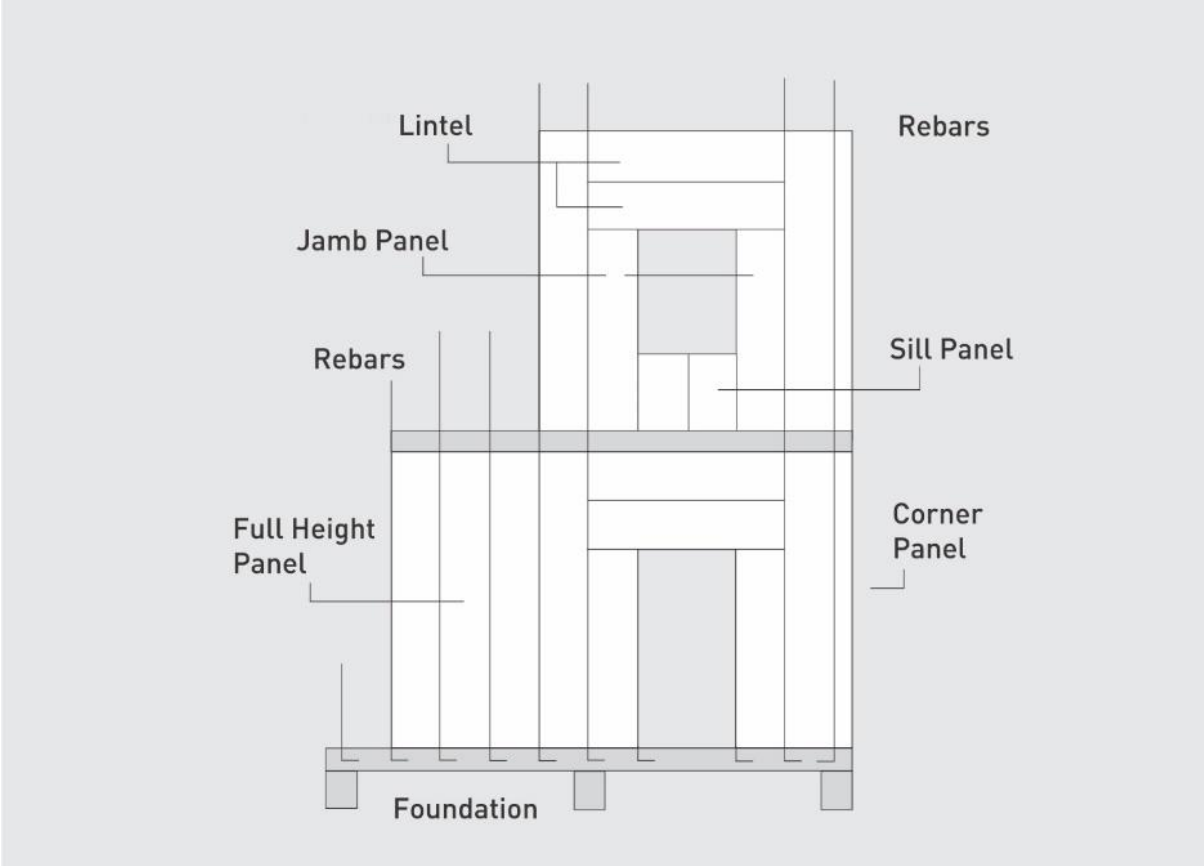
General Consideration:

The AAC Vertical Load- Bearing Wall P anel system includes the following components:
Full height loadbearing wall panels (60mm wide),
Jamb Panels (adjacent to a window, door or mechanical opening which supports a lintel panel),
Lintels Panels (load bearing or non load bearing panel over window or door openings) and Sill Panels (located below a window or mechanical opening)

Wall Panels used as structural load-bearing and shear walls and designed
in compliance with safety and specified by ACI 318-08 and guidelines of ACI 523.4/R-09 and ACI 530-13.

The design of AAC Load Bearing wall panel considered wind loads according to
Local Building Codes.

Vertical grooved joints between panels require reinforcement
according to structural design .vertical reinforcement as per the structural calculation



wall panels system elements.

ARCHITECTURAL DESIGN PRINCIPLES

Vertical wall panels, floor, roof slabs panels and lintels combine to form complete precast systems as loadbearing structure buildings.

The maximum span of AAC panels is 6m which means clear span dimensions between the load bearing walls should not exceed 5.80m.

A steel or concrete beam must be used to support the slabs if the clear span is more than 5.80m.

Direct support of wall panels on floor slabs is not allowed without steel or concrete beam support. However, a 10cm thickness non-bearing partition
wall can be directly placed taking into account its land property.

3 m storey heights are preferred to ensure full mould utilization and cost effective solutions. However, other heights are possible.

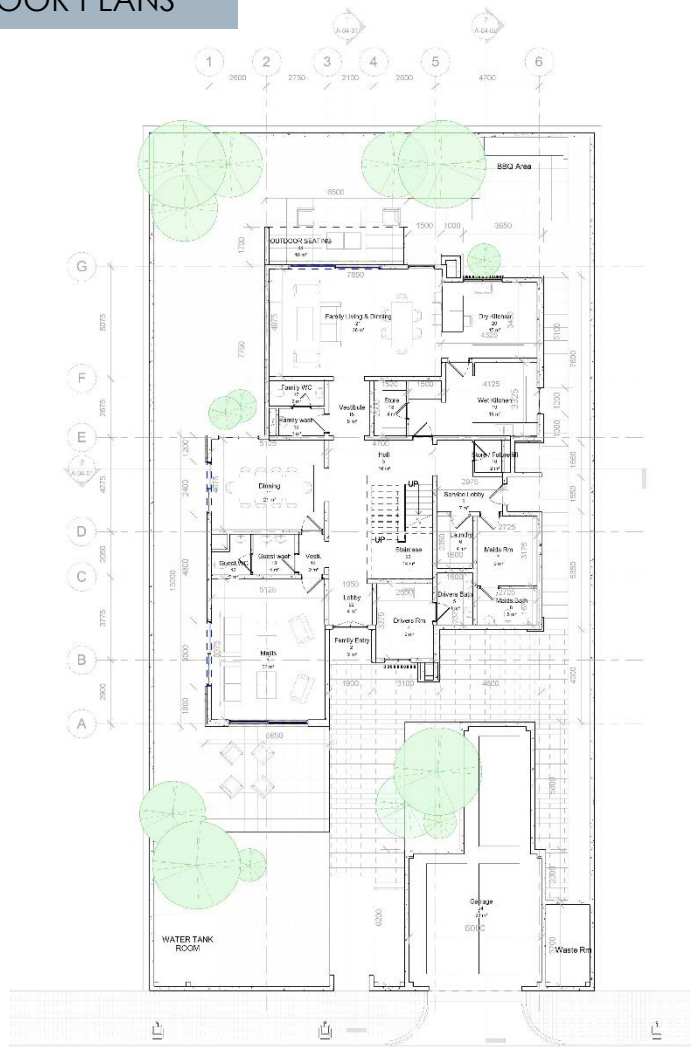
Designs should aim to use 600mm modules for zone dimensions or for windows openings, which means multiples of 1000mm for room sizes and
windows in plan.

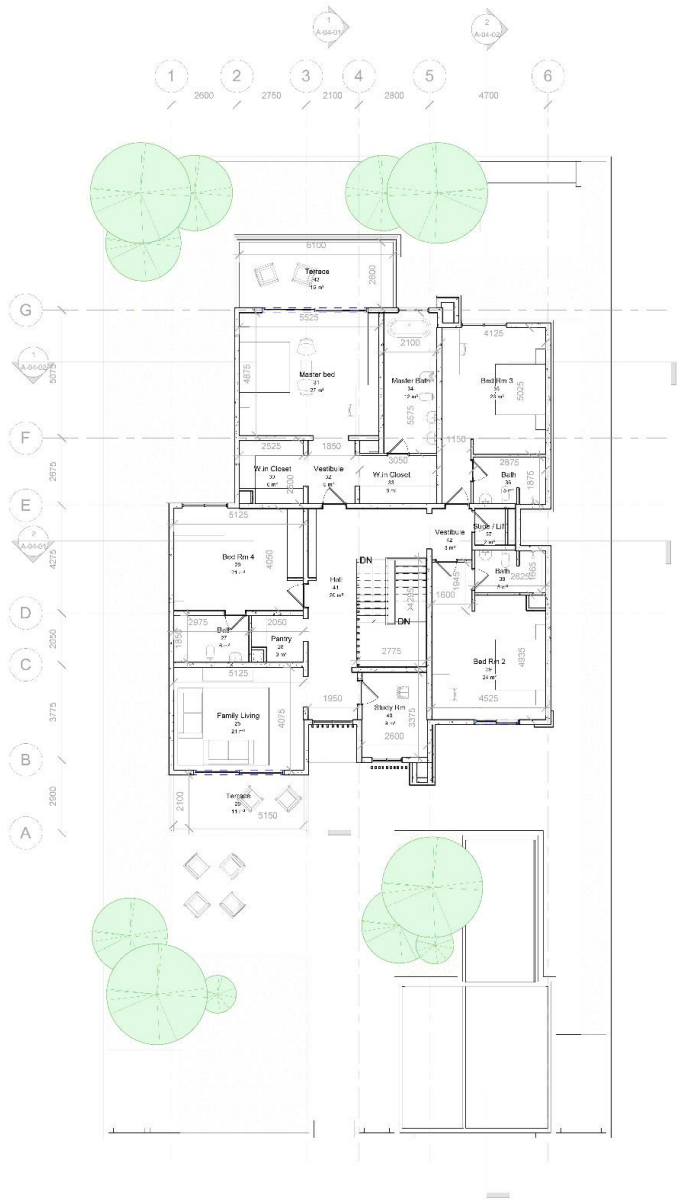
Non-modular window opening widths can be formed with cut panels, preferably widths of 300mm in addition to the standard multiple of 600mm.

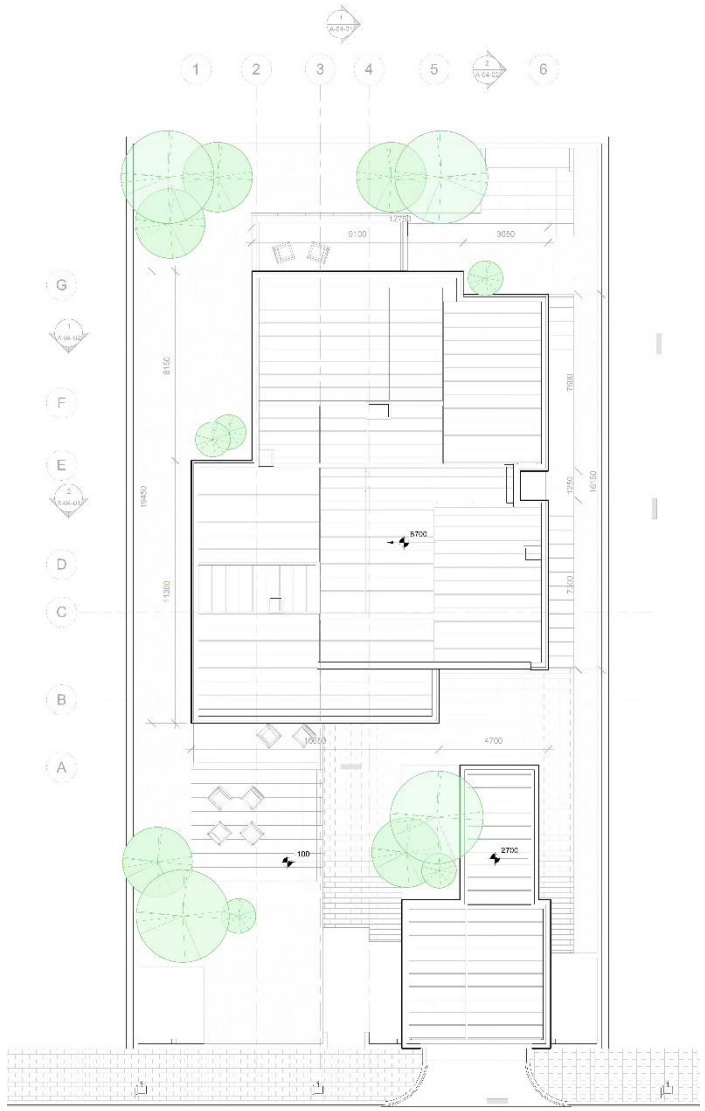
A.C. units are normally wider than 600mm and pass through (between) wall panels, as this is the most effective and easiest positioning.

Exhaust fan ducts are best centered on wall panel joints.

POPOSED FLOOR PLANS







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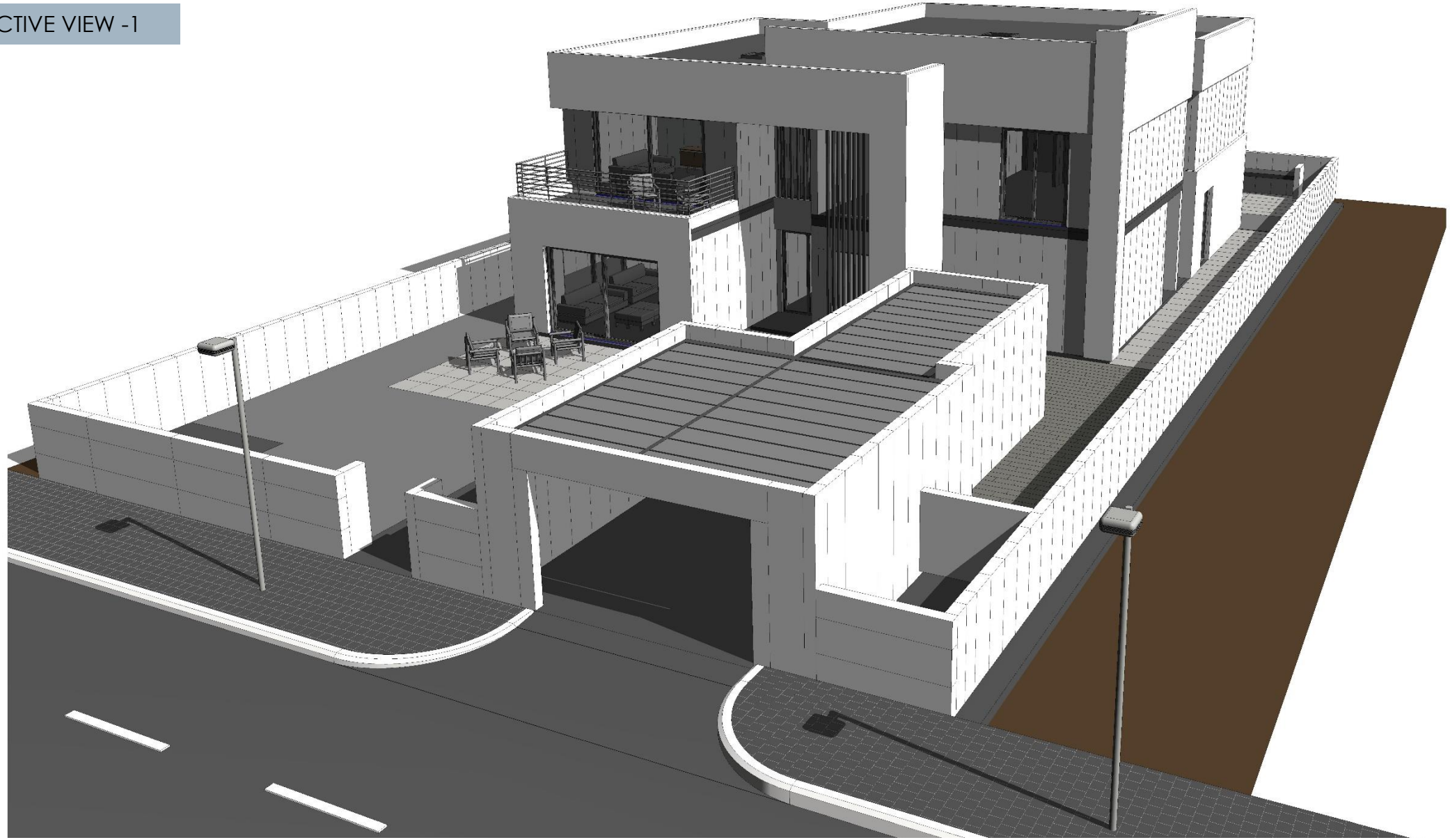
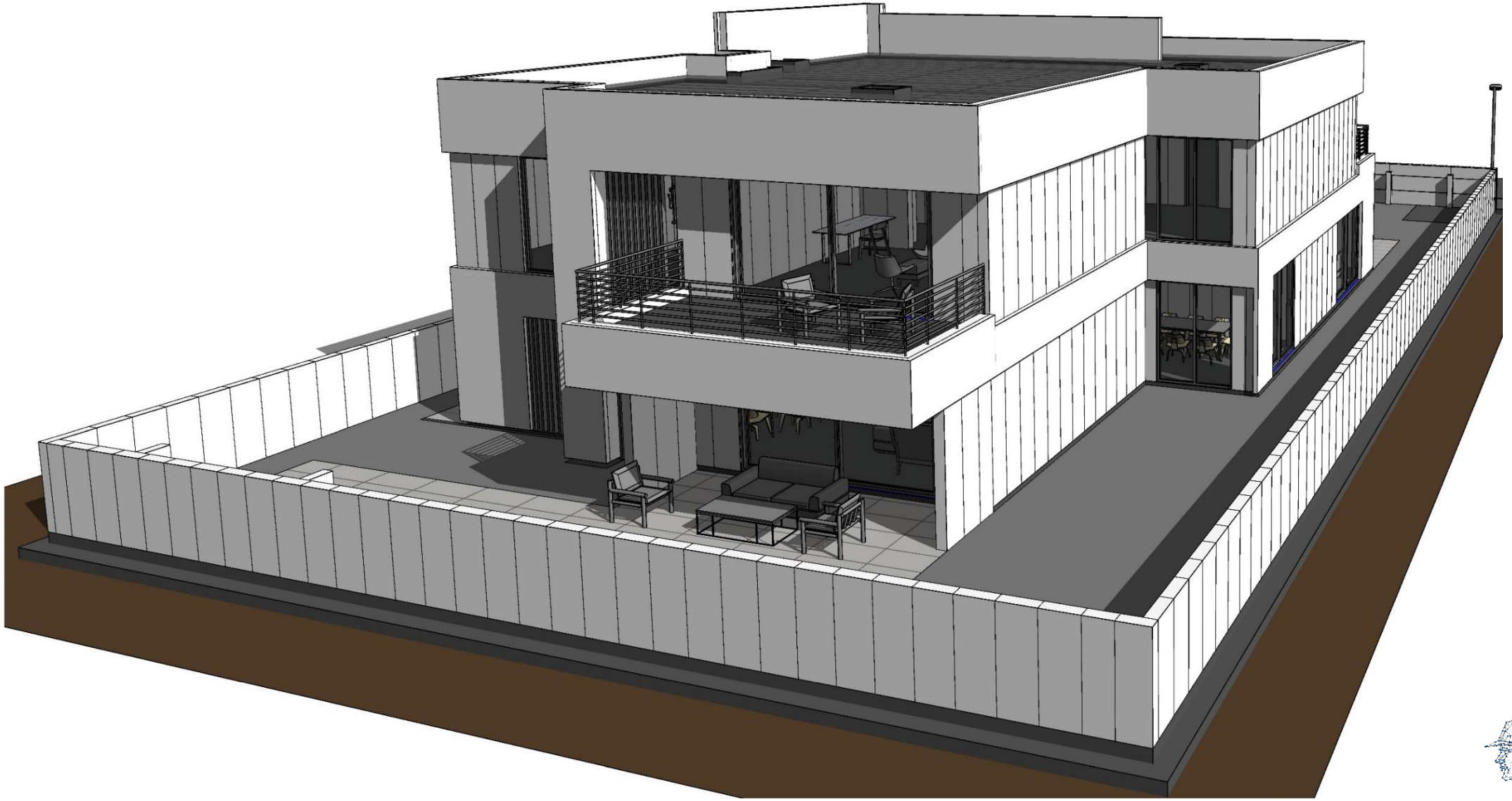
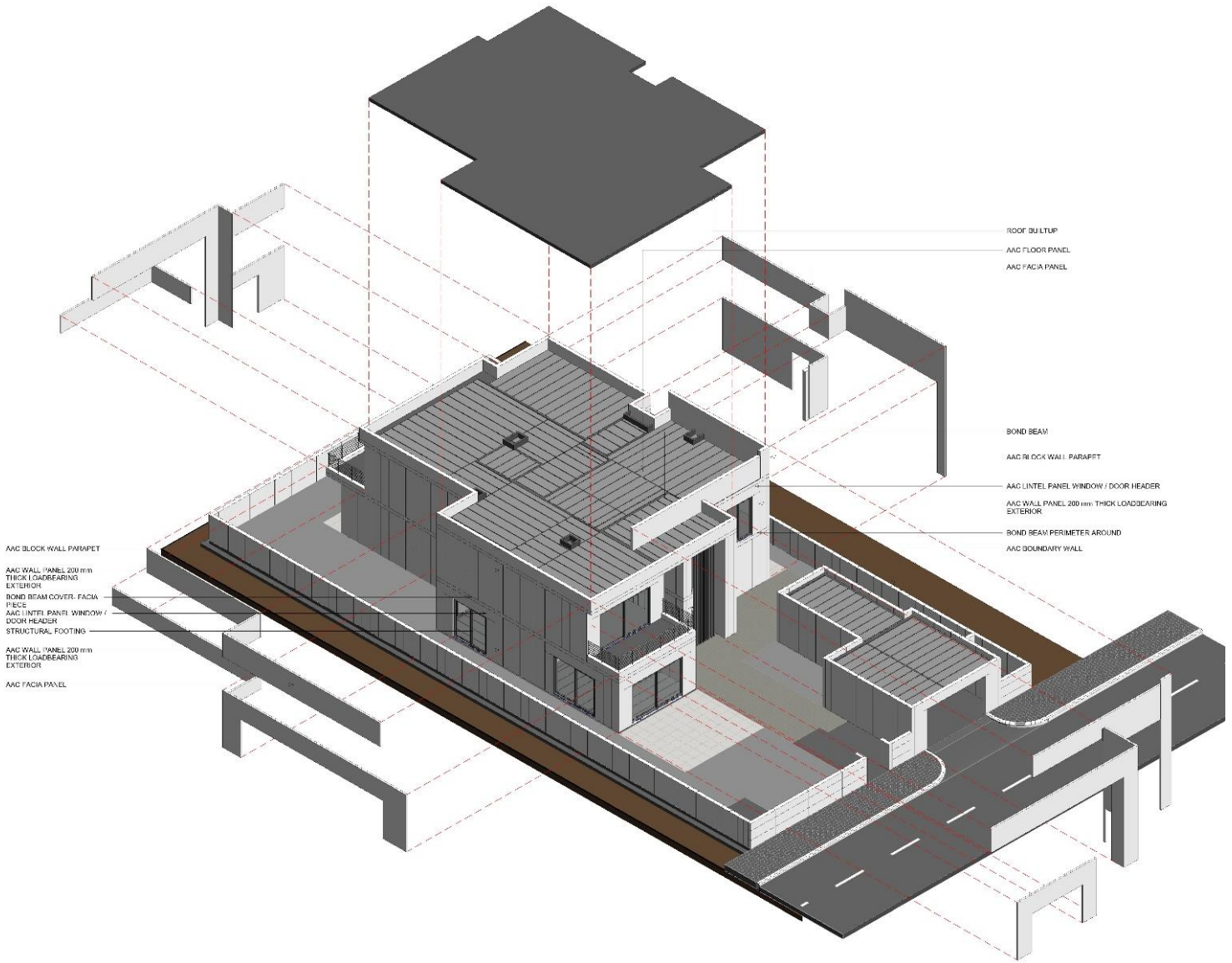
PROPECTIVE VIEW -1



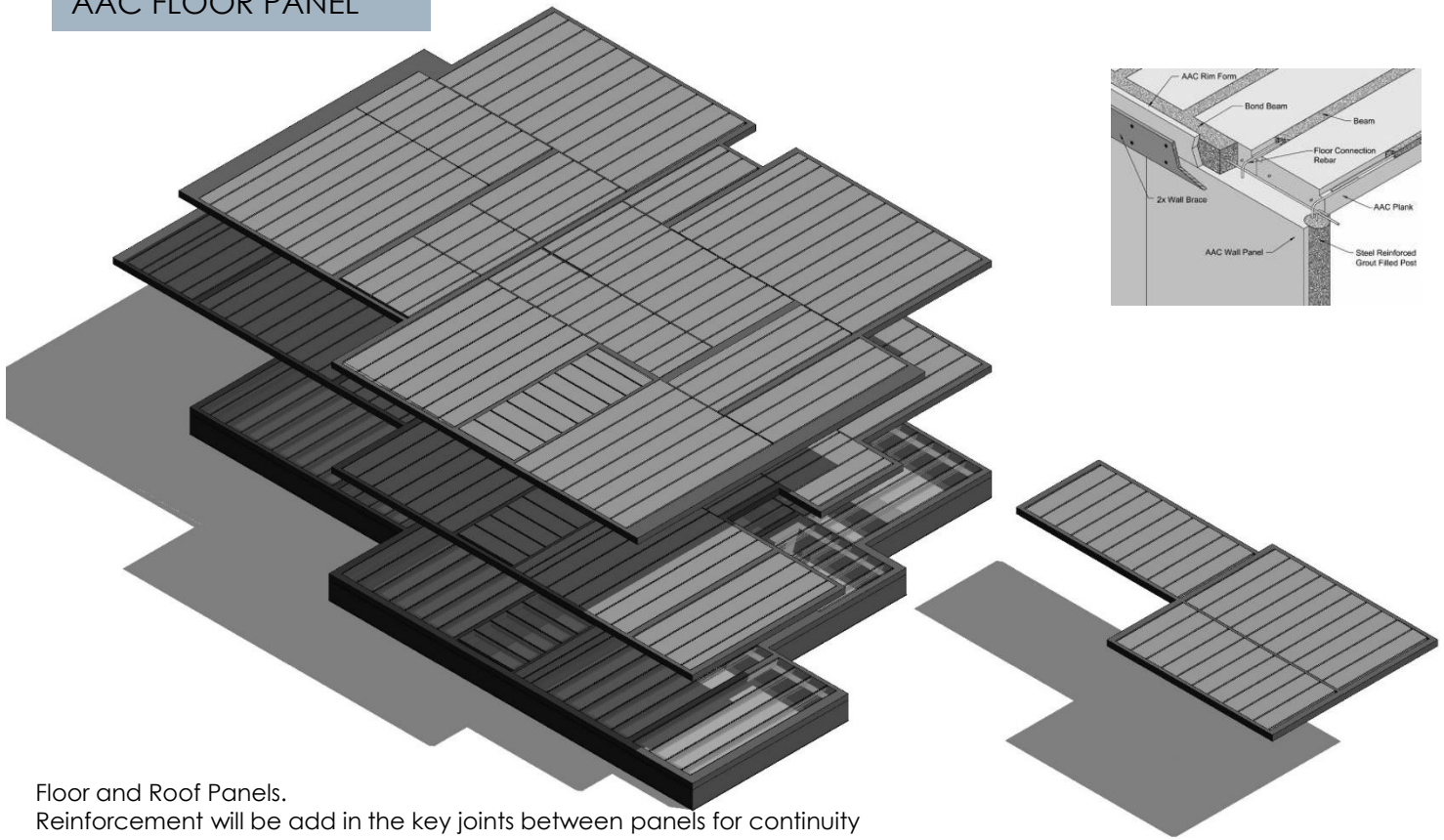
PROPECTIVE VIEW -2

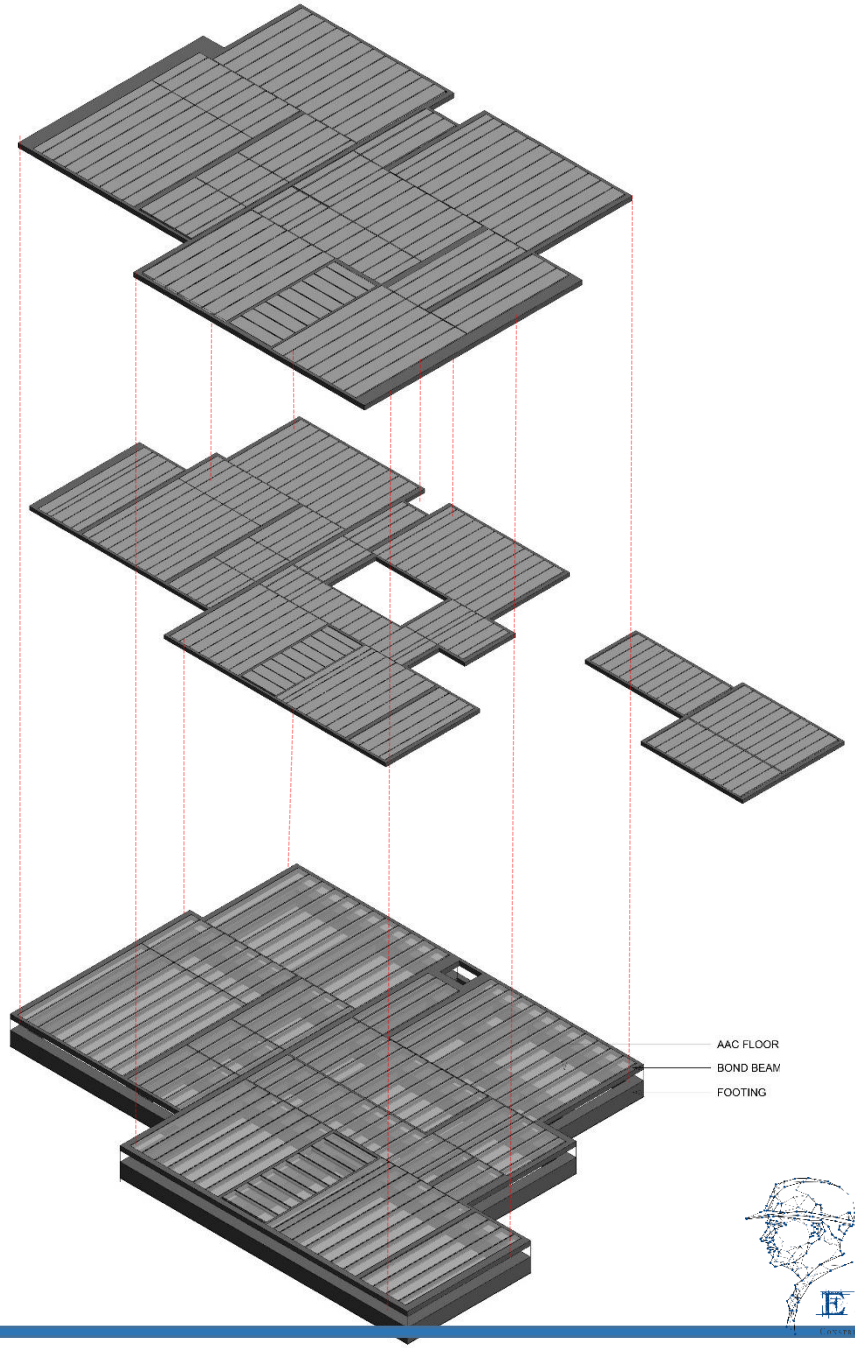


DISPLACMENT VIEW



AAC FLOOR PANEL





Floor and Roof Panels.
Reinforcement will be add in the key joints between panels for continuity and diaphragm performance

AAC floor panels are typically 600mm wide and cut to length in the factory. They must have a minimum of 40mm of bearing on each wall, although more may be required by floor loads or other factors. Floor planks are manufactured with integral steel reinforcing, have no camber, and usually require no bracing

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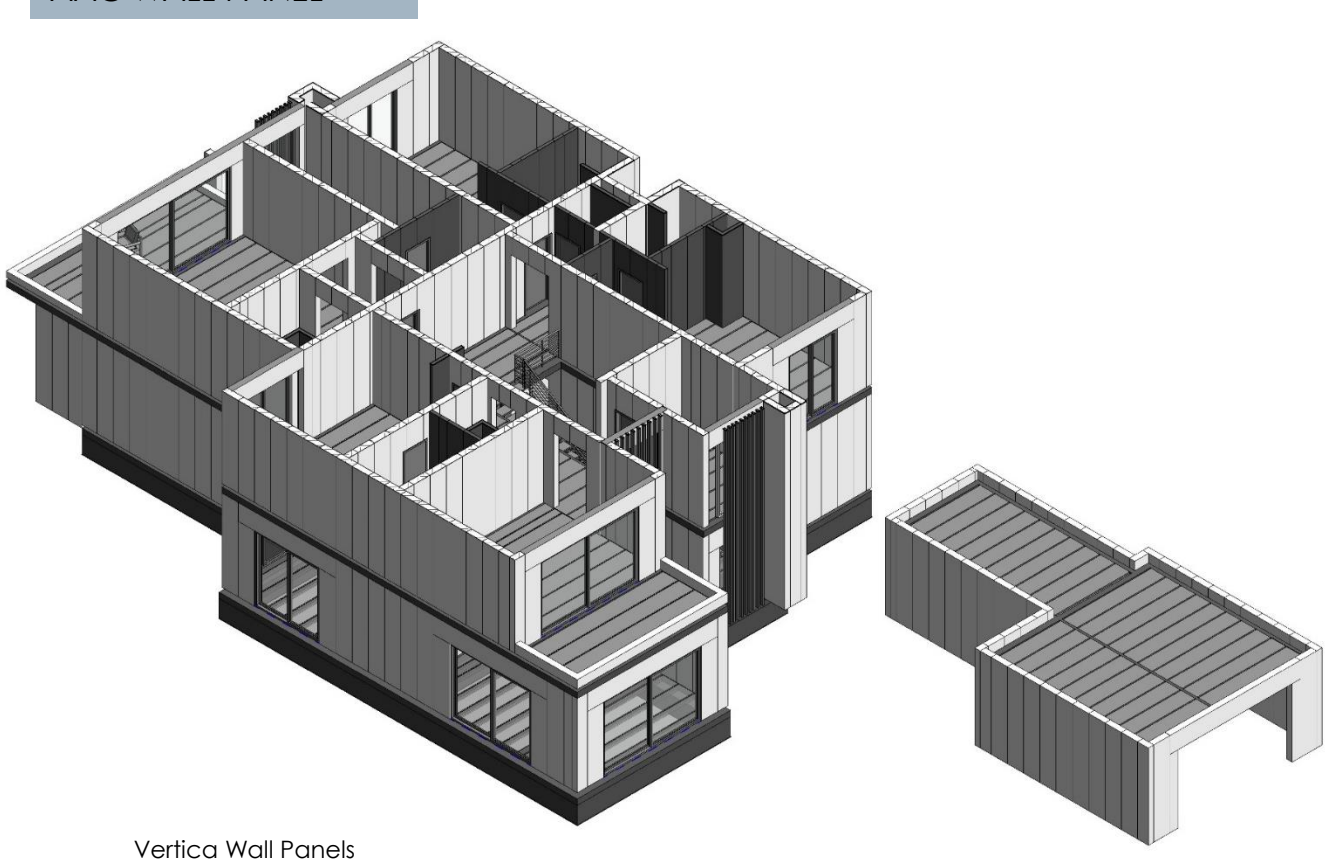
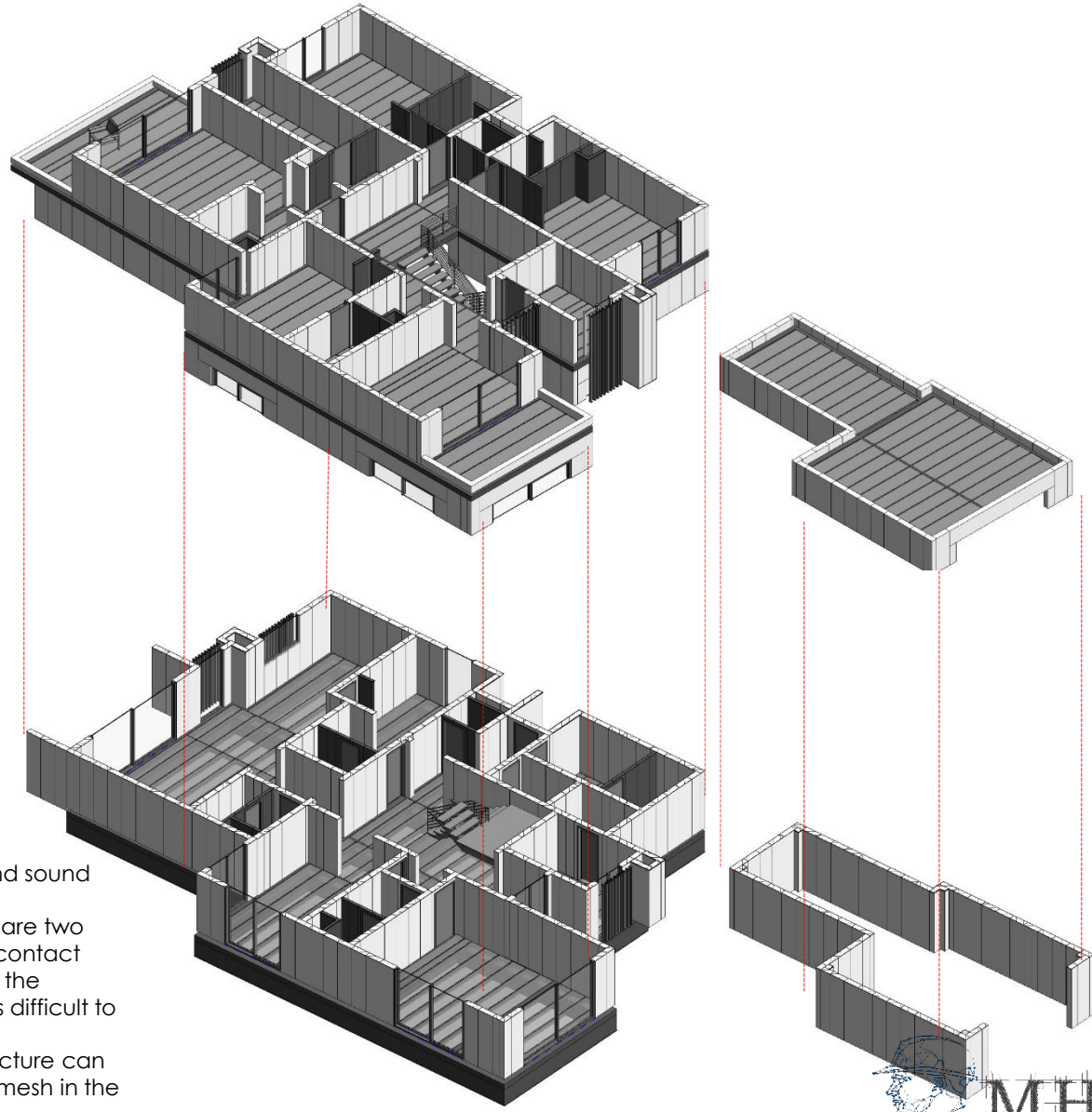
AAC WALL PANEL





Vertica Wall Panels
LOADBEARING WALLS – NON LOAD BEARING PARTITION WALLS

- 150mm thick aerated concrete lightweight wallboard meets the heat preservation, heat insulation and sound insulation indexes of 200mm thick aerated concrete block.
- the crack resistance performance of the wall board is more obvious than that of the block wall there are two layers of two-way steel mesh inside to strengthen and restrict its expansion and contraction, and the contact parts of the whole wall and beam column are filled with special binder, and few cracks appear; With the passage of time, the settlement of the wall will produce more cracks in the wall and wall side, and it is difficult to deal with the cracks once they occur.
- high seismic performance, after the relevant seismic load failure test, the plate in the engineering structure can resist 8.0 earthquake to the wall does not fall, even if the fracture, due to the connection of the steel mesh in the plate, but also to break and do not collapse;
- The fire resistance limit of 100mm thick can reach more than 3.5 hours.

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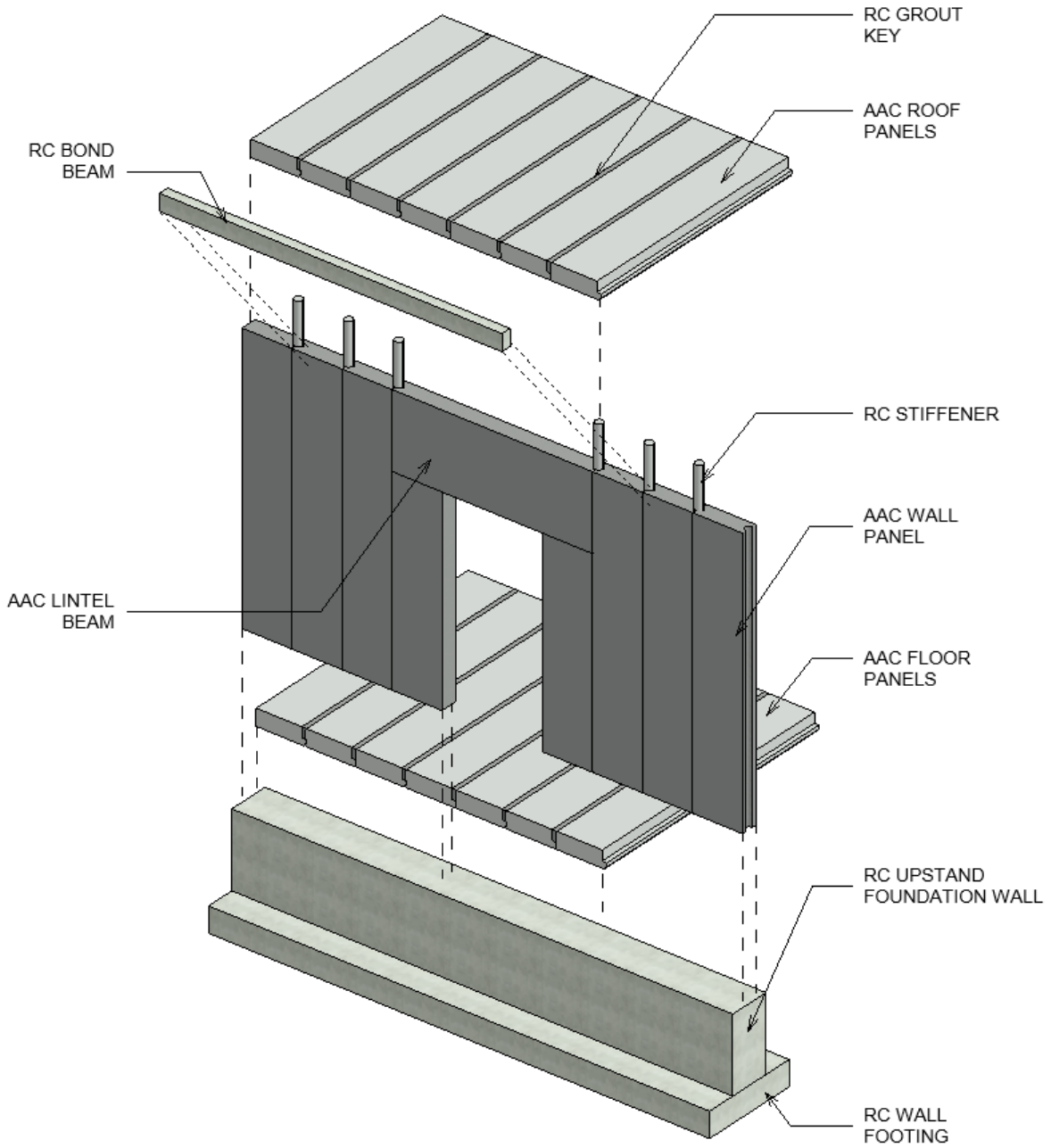
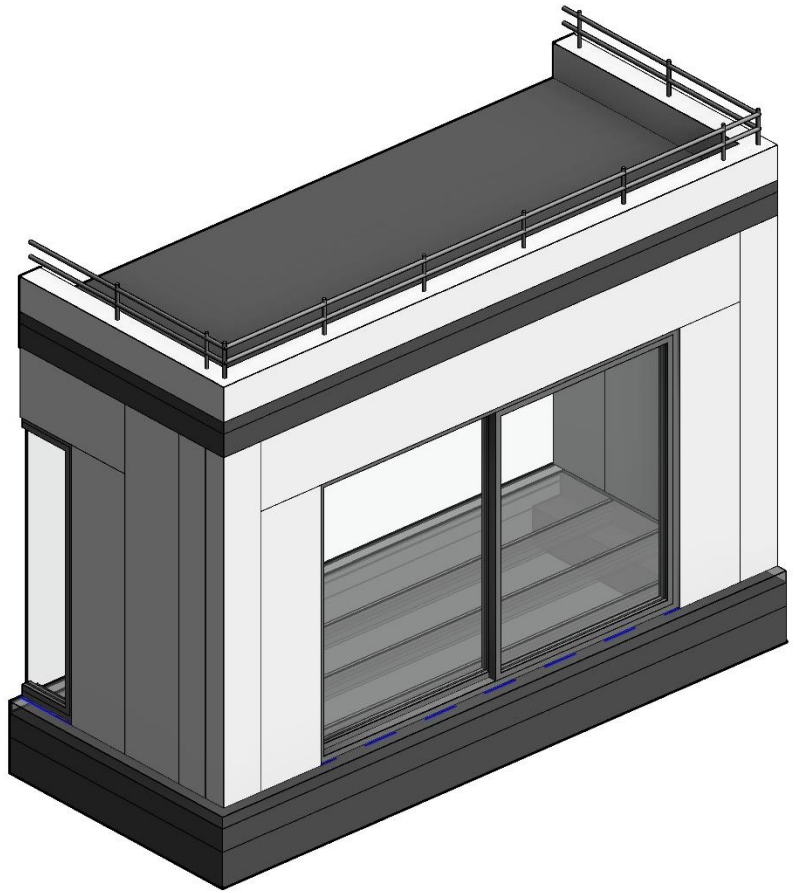
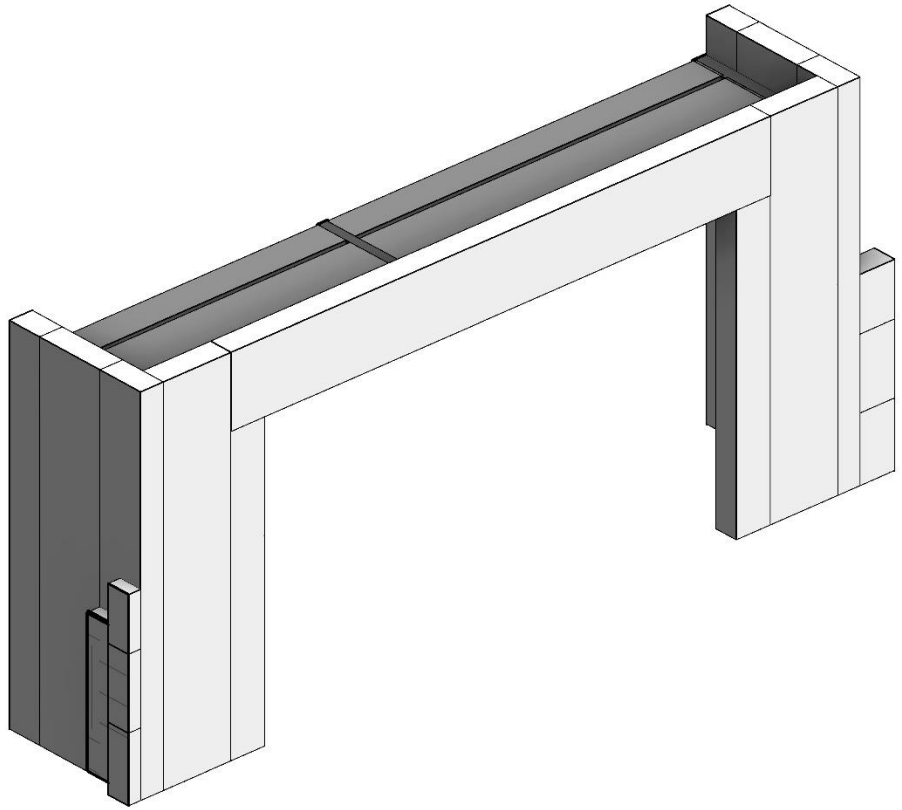
STRUCTURAL ARRANGEMENT DETAIL



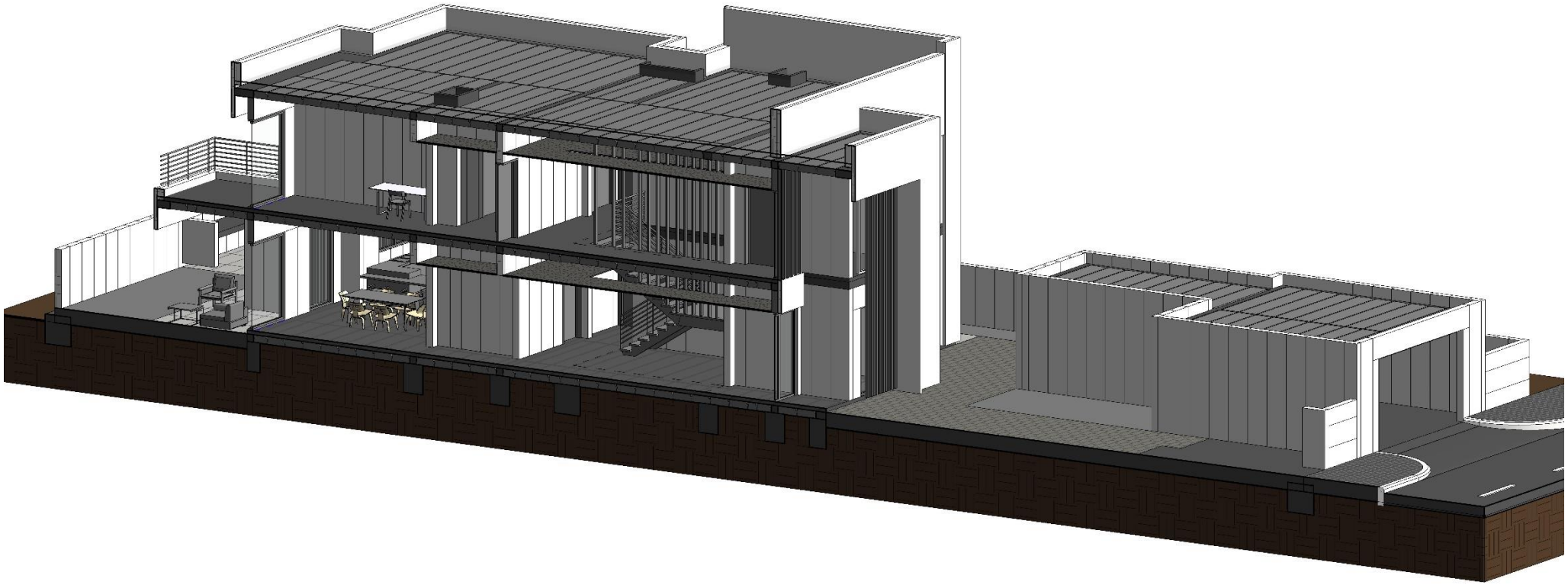
TYPICAL LINTEL AREA SECTION CUT



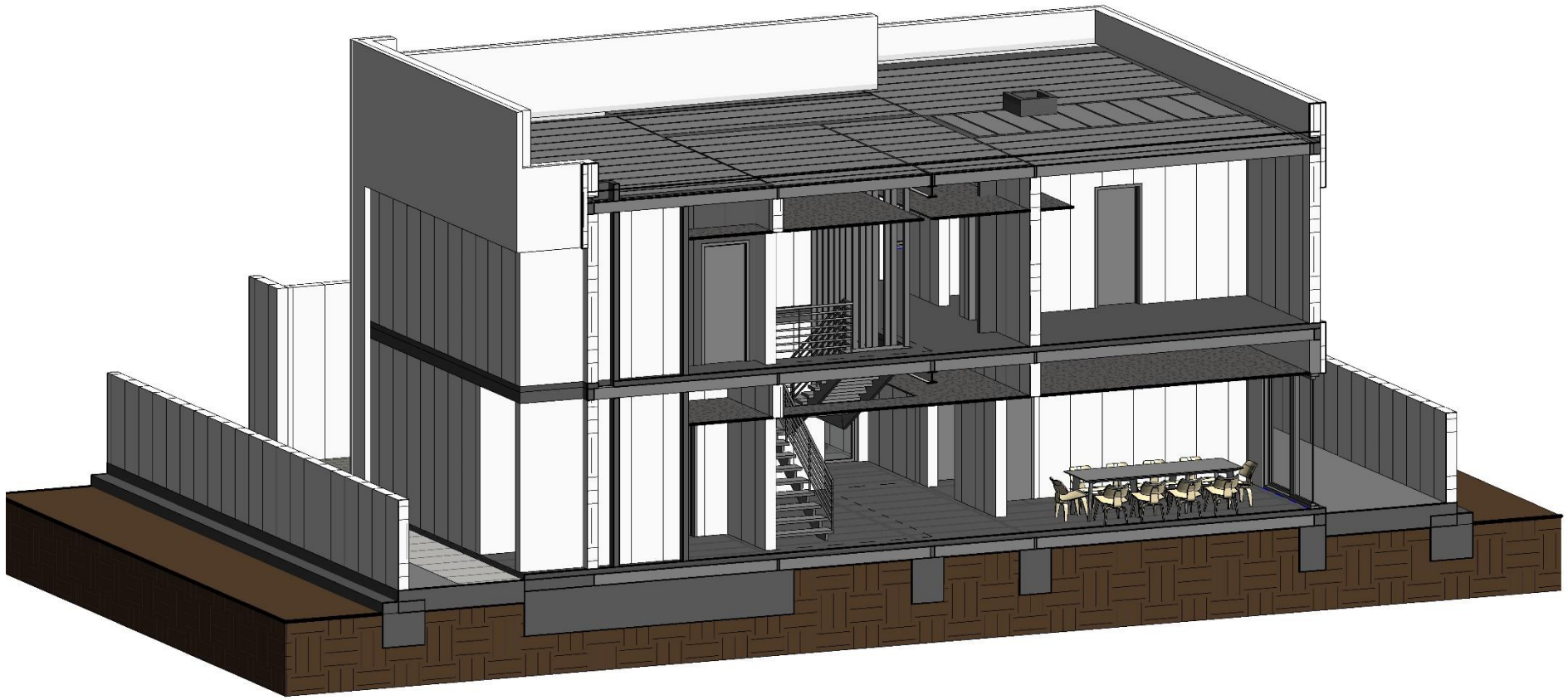


Lintels are used as load bearing members over window and door openings for external or interior walls

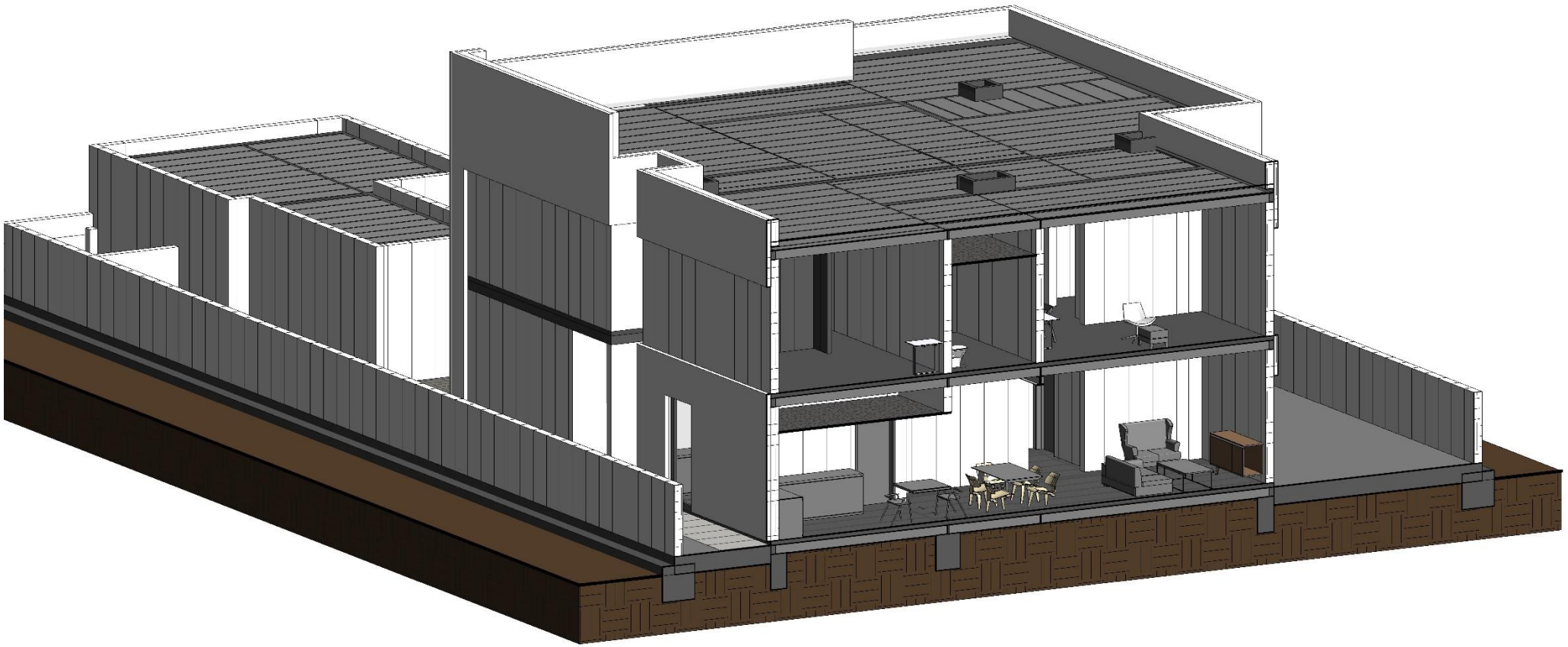
BUILDING SECTION -1



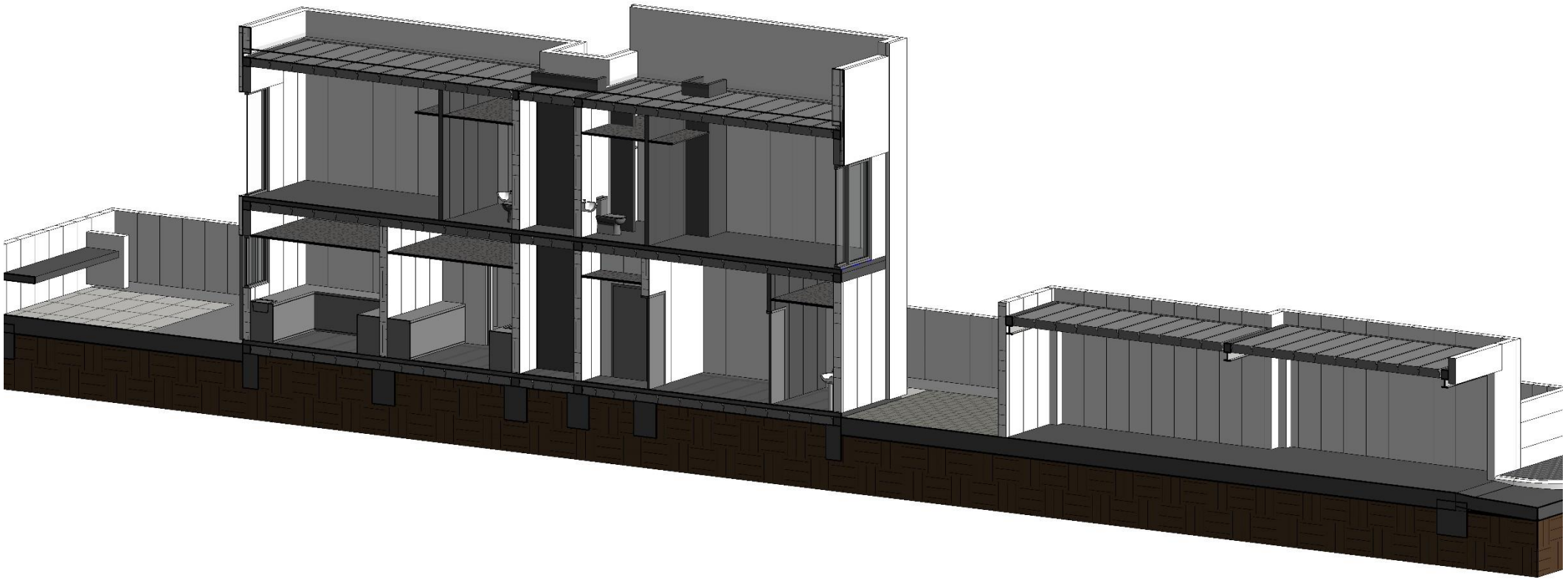
BUILDING SECTION 2



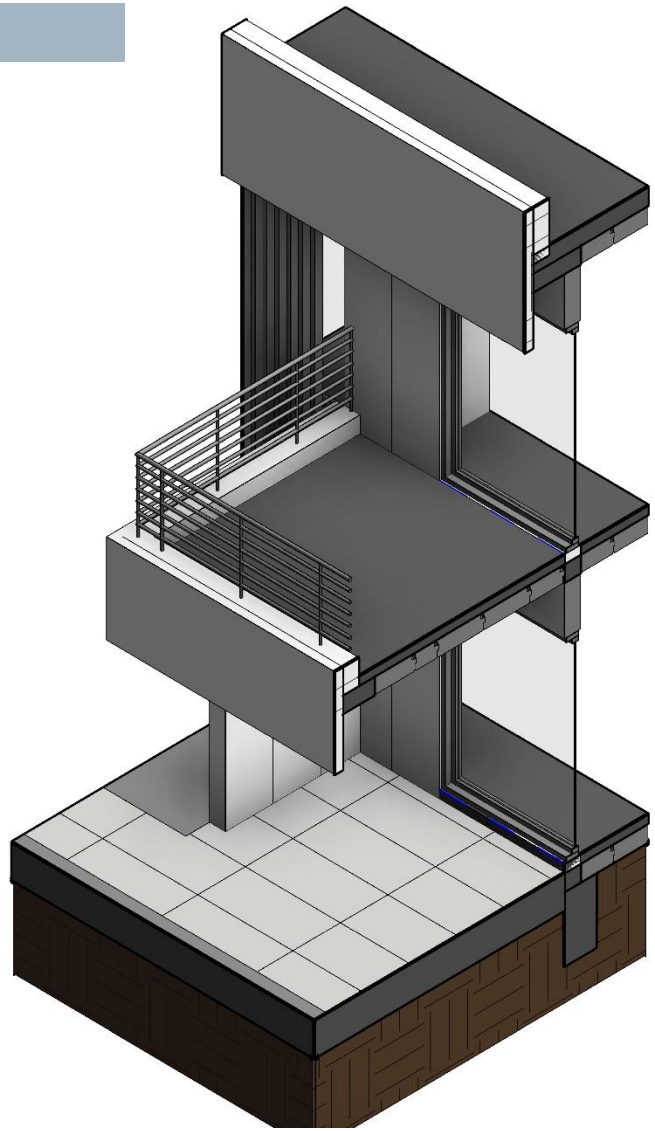
BUILDING SECTION 3

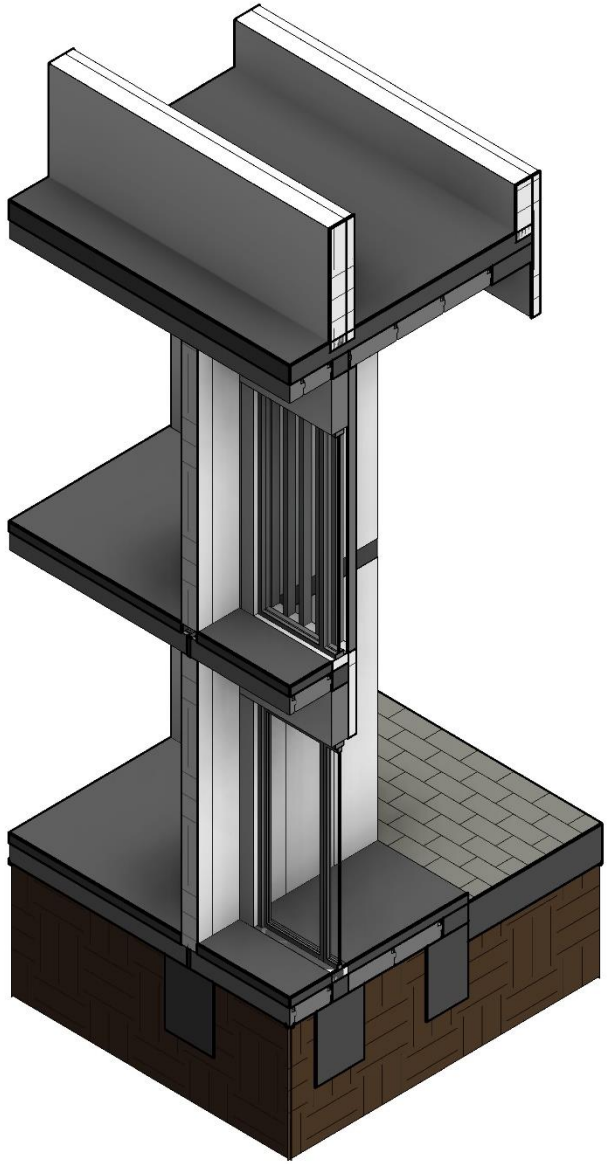


BUILDING SECTION 4



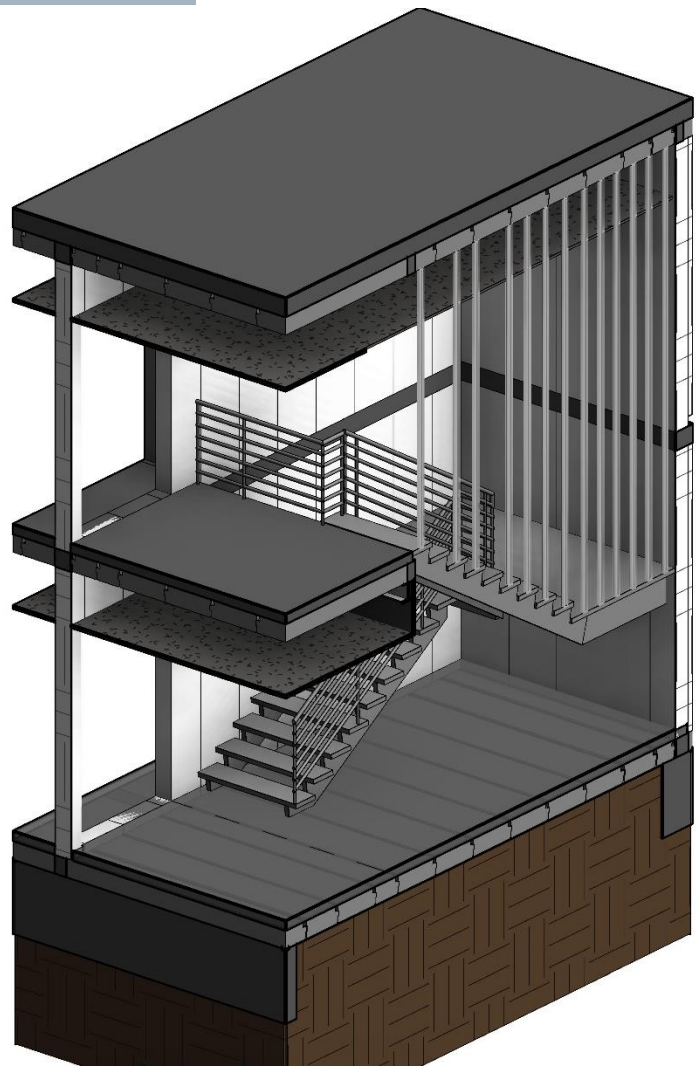
Wall sections

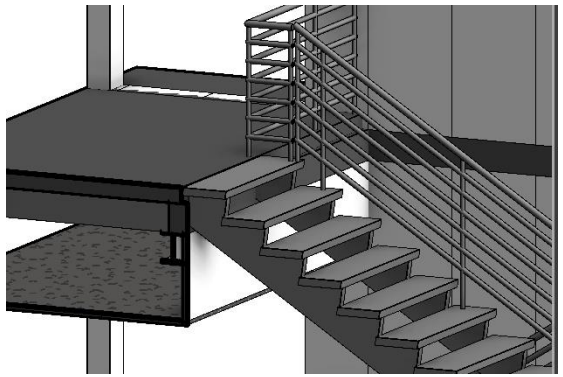


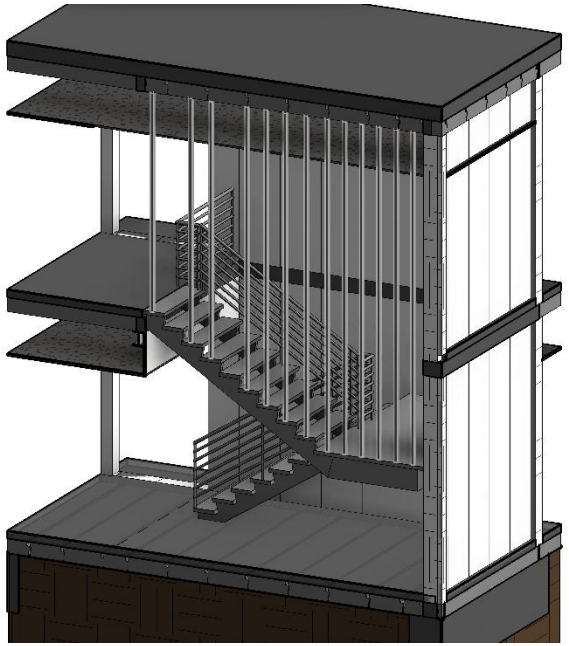


Staircase Sections

Proposed steel staircase







AREA SCHEDULE

Areas are indicative and rounded up for concept ,
A detailed exercise shall be made once we start to develop the project.

JOB NUMBER	MHE052021
CLIENT	ALI & SONS HOLDING
STATUS	CONCEPT STAGE
PROJECT	AUH-VILLA RESIDENTIAL

DOCUMENT NUMBER	MHE-AU-DOC-SOA-xx

	DATE OF ISSUE
REVISION	A
DAY	13
MONTH	08
YEAR	2021
ISSUER	MHE

DISTRIBUTION TO:		NO OF COPIES/ TYPE	
CLIENT			
PURPOSE OF ISSUE	Proposal		

	ROOM NAME	CARPET AREA (mm)	BUILTUP AREA (mm)
1	Family Living	21	
2	Terrace	11	
3	Bath	6	
4	Pantry	3	
5	Bed Rm 4	21	
6	W.in Closet	6	
7	Master bed	27	
8	Vestibule	5	
9	W.in Closet	6	
10	Master Bath	12	
11	Bed Rm 3	23	
12	Bath	5	
13	Stroe / Lift	2	
14	Bath	5	
15	Bed Rm 2	24	
16	Study Rm	9	
17	Hall	21	
18	Vestibule	3	
19	Terrace	16	
SERVICE BLOCK			
1	Watert Tank Room	9	9
2	Refuse Room	7	9
3	Garrage	53	56

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PURPOSE OF ISSUE	Proposal		

	ROOM NAME	CARPET AREA (mm)	BUILTUP AREA (mm)
GROUND FLOOR		225	261
1	Majlis	33	
2	Family Entry	3	
3	Hall	15	
4	Drivers Rm	9	
5	Drivers Bath	4	
6	Laundry	4	
7	Maids Rm	9	
8	Maids.Bath	5	
9	Service Lobby	7	
10	Store / Future lift	2	
11	Dinning	21	
12	Guest.WC	3	
13	Guest wash	4	
14	Vesti.	2	
15	Vestibule	5	
16	Family wash	3	
17	Family WC	3	
18	Store	4	
19	Wet Kitchen	18	
20	Dry Kitchen	15	
21	Family Living & Dinning	38	
22	Lobby	4	
23	Staircase	14	
FIRST FLOOR		199	259

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YEAR	2021		
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CLIENT			
PURPOSE OF ISSUE	Proposal		

	ROOM NAME	CARPET AREA (mm)	BUILTUP AREA (mm)
Grand total		493 CARPET AREA	594 BUILTUP AREA

EXTERNAL DEVELOPMENT DATA			
1	TOTAL CART PRKING		3NOS
2	PEDESTRAIN GATE		1NOS