The Split Frame - A Retrofit designed for the University of Hertfordshire's Science Building

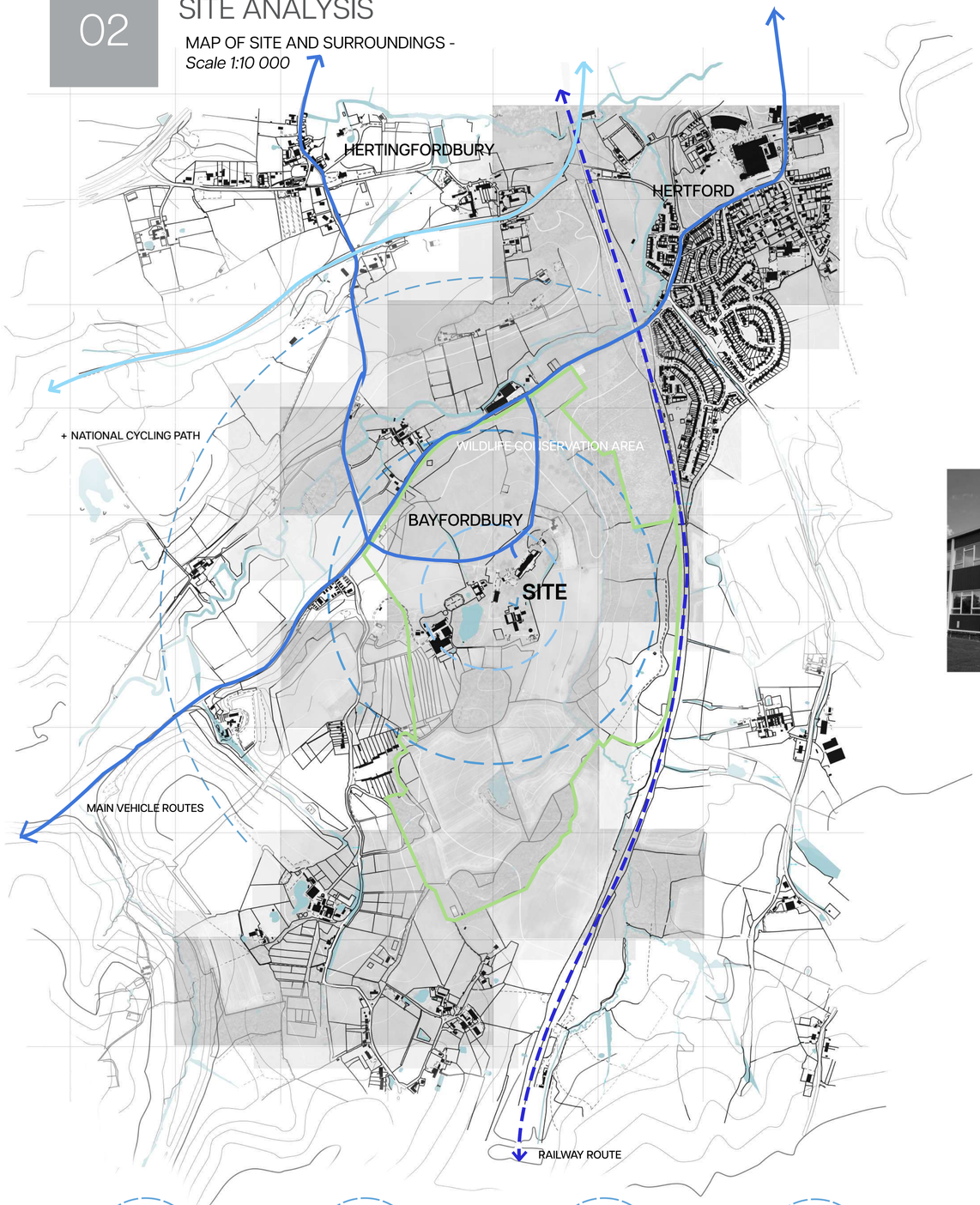
'Where structure becomes space - framing light, learning and renewal.'

ALARA SALIH | 23001973 | 6CTA2030-0901-2025
Design Studio 3.1: Retrofitting | University of Hertfordshire

02

SITE ANALYSIS

MAP OF SITE AND SURROUNDINGS -
Scale 1:10 000



HISTORY OF SITE

1759 - 1762 :
- Bayfordbury house constructed, home to the Baker Family
  Site was expanded and woodlands were established, and rare tree species were planted

Early 19th Century :
- House underwent improvements in Early 19th century which now holds the current architectural character

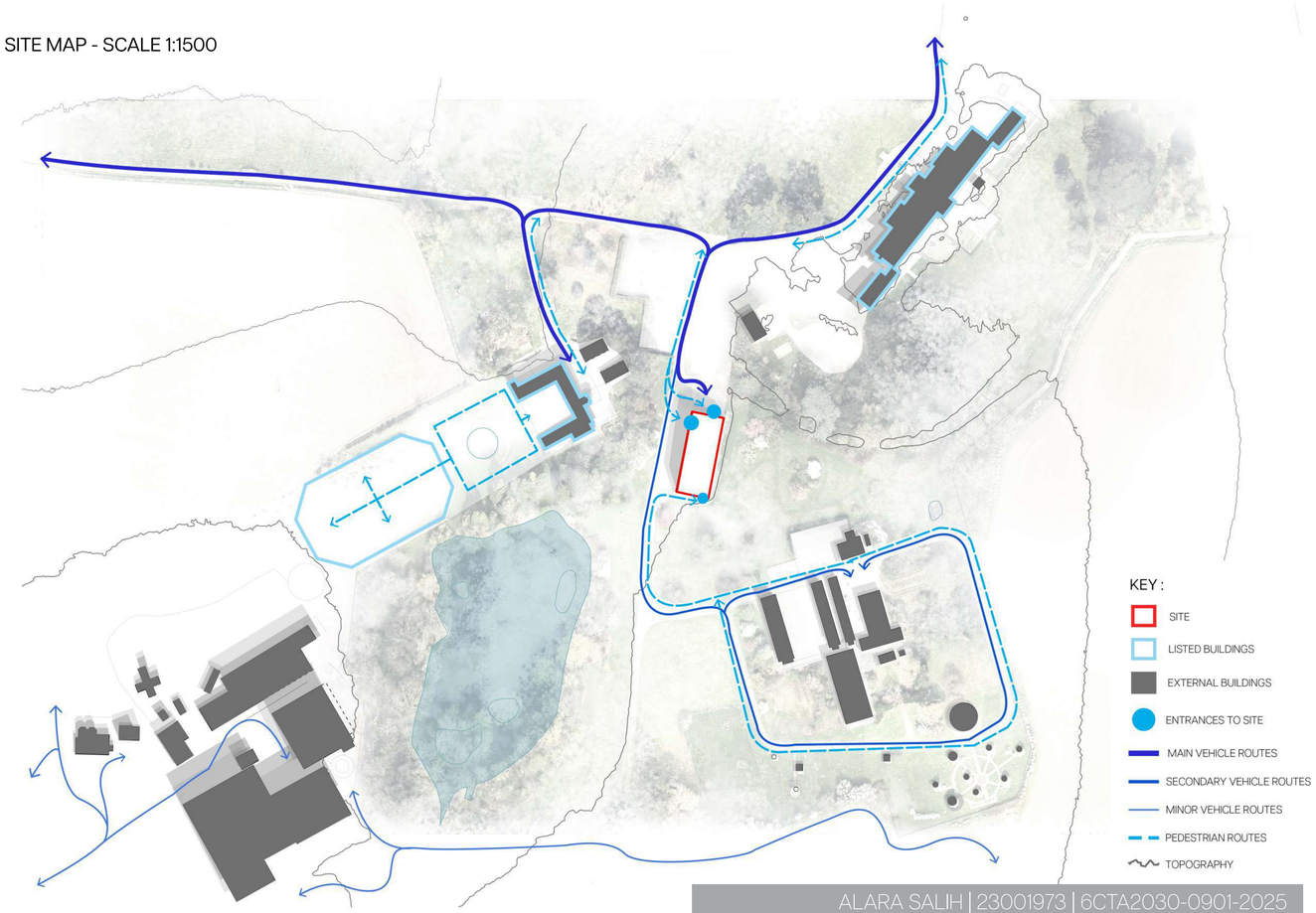
20th Century :
- Estate auctioned in 1945 and purchased by John Innes Horticultural Institution

1967 - 1970 :
- The estate is acquired by Herts Council
- Bayfordbury Observatory established

1992 - Present :
Bayfordbury becomes part of the University of Hertfordshire, and is used now a science centre for ; astrology, geology and biology

INSTAGRAM STORIES : EXPERIENCING THE SITE

SITE MAP - SCALE 1:1500



S W O T

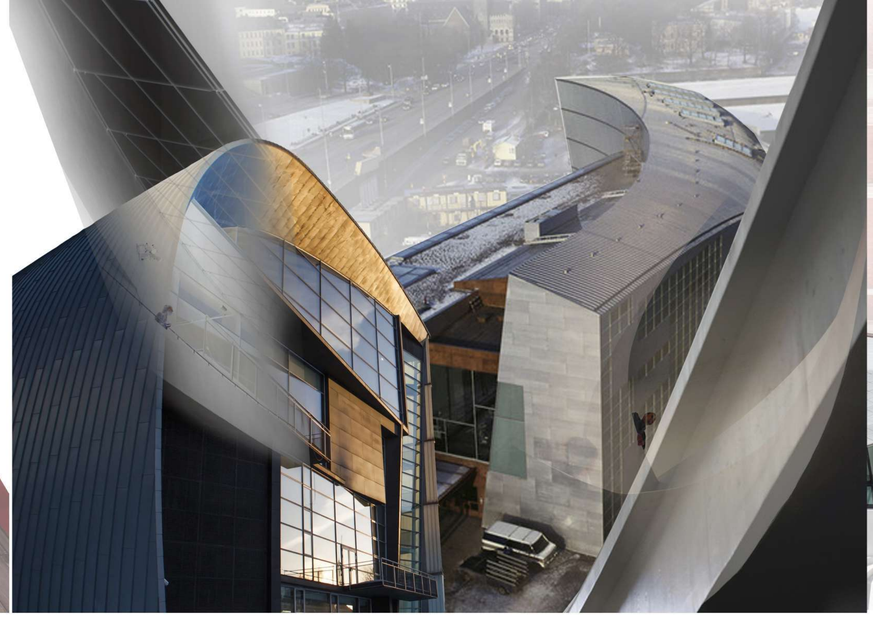
STRENGTHS
- No obstructing buildings
- Strong connection to nature
- Existing structure ; solid foundations and adaptable internal framework - strong base for retrofit
  Historical and contextual significance ; horticultural and scientific heritage - strong narrative

WEAKNESSES
Potential isolation from public / uni hub ; limited public access, possible accessibility problems
No clear pedestrian pathways
Topography and contours restrict adaption on rear
Increased carbon footprint due to location - not near to any urbanity

OPPORTUNITIES
Improvement in use and quality of space ; improve natural light
Contribute to community
Community engagement ; for uni and public
New design can help meet uni sustainability mission
Educational innovation ; redefine academic space typologies

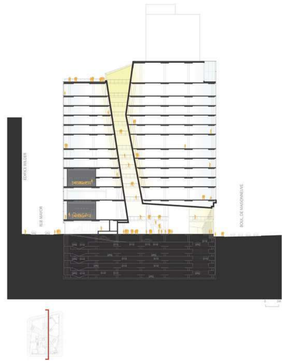
THREATS
Compliance with UK building standards can limit design
Budget pressure
Could cause scrutiny for conservation of nature being disrupted
Foundation quality could be weak

03 PRECEDENT ANALYSIS



ILOT BALMORAL

MONTREAL, CANADA - PROVENCHER_ROY

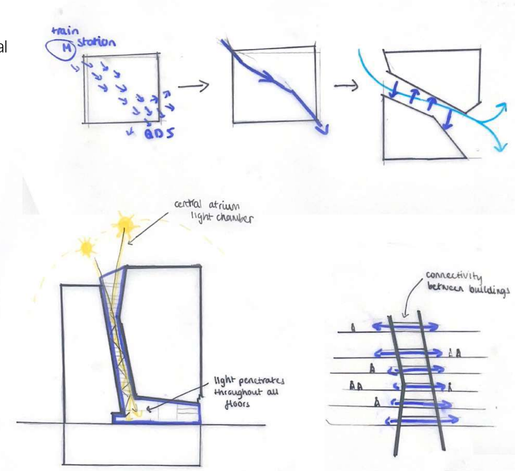


KEY FEATURES :

- Designed as a cultural and office building, organised around a diagonal glass atrium that divides the mass into two wings and improves daylight penetration.
- The atrium acts as a circulation and social core, linking the two blocks and guiding pedestrian movement between city streets.
  Public functions occupy the transparent ground floor, creating a visual and physical connection between interior spaces and the surrounding urban plaza.
  A steel and glass façade system expresses the building's geometry and promotes openness, reflecting its civic and institutional character.

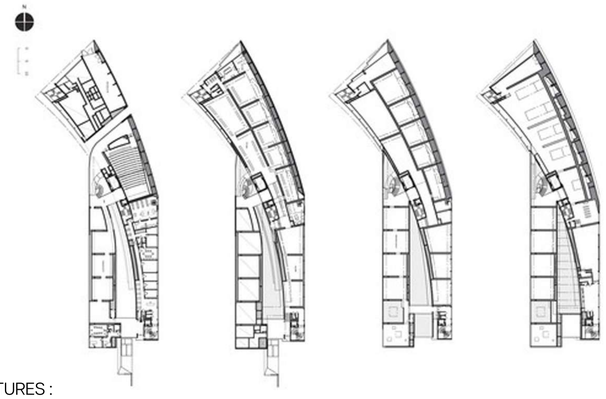
INSTAGRAM PICTURES :

Ilot Balmoral - bold geometry and material contrast mirroring the bustling, chaotic city of Montreal.
#sharp&angular #montrealarchitecture #glazing #light #shapecut



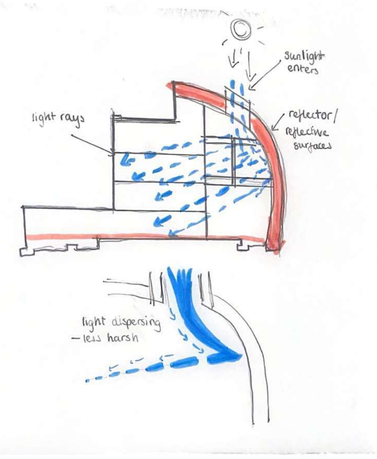
KIASMA MUSEUM OF CONTEMPORARY ART

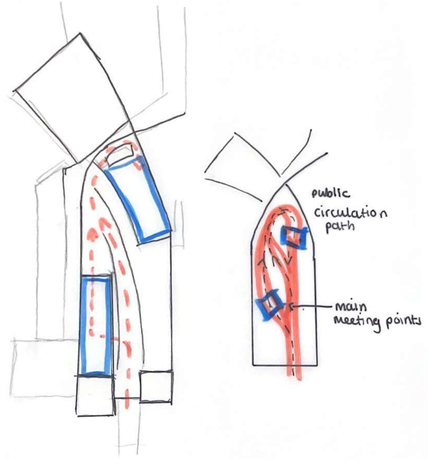
HELSINKI, FINLAND - STEVEN HOLL ARCHITECTS



KEY FEATURES :

- Conceived as a public museum where movement and light shape spatial form; galleries are arranged along a curved central spine.
- The atrium and main circulation ramp connect all levels, providing continuous visual links and intuitive navigation through exhibition spaces.
  Daylight is carefully filtered through roof openings and diffused glazing, creating balanced illumination across galleries.
  Constructed from concrete, glass, and zinc cladding, the building balances weight and fluidity to express modern cultural identity.



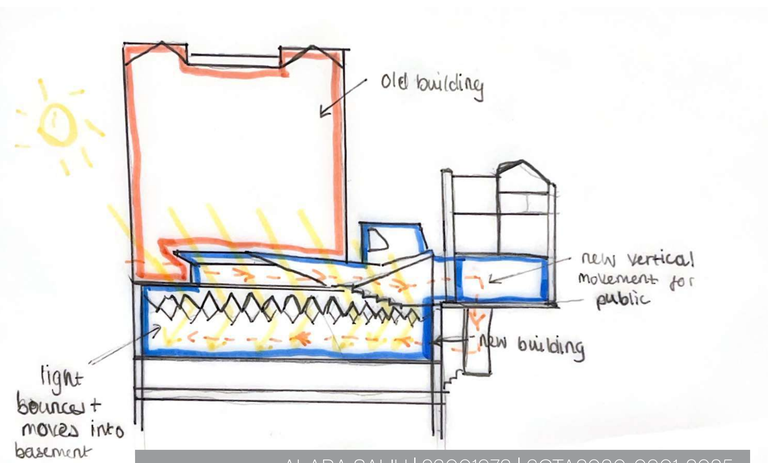


V&A MUSEUM COURTYARD

LONDON, UK - AL_A

KEY FEATURES :

- A cultural museum integrated into a park setting, designed with a focus on light, ventilation, and landscape connection.
- Organised around a central circulation axis and courtyard, allowing views through the building and access to outdoor spaces.
- The façade's perforated copper panels modulate light and temperature, reducing reliance on artificial systems. The structure and materials blend architecture, environment, and craft, creating a cohesive and climate-responsive form.



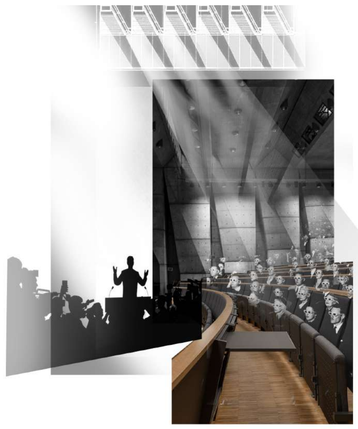
04

CREATING ‘THE SPLIT FRAME’

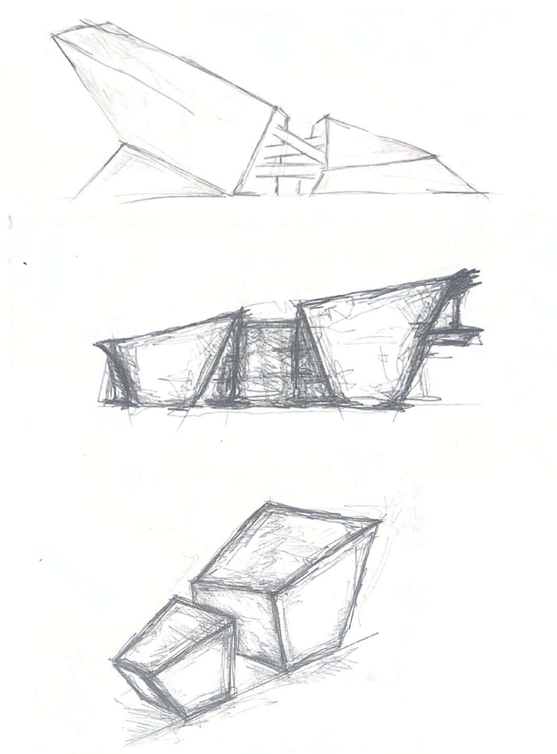
Design Development

Motto :
‘Where structure becomes space - framing light, learning and renewal’.

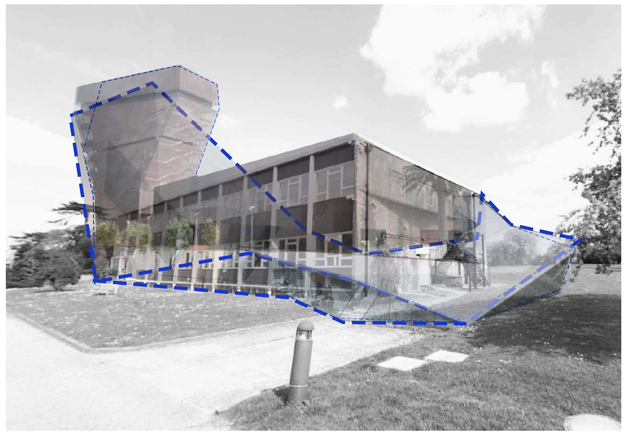
INTERIOR PERSPECTIVE COLLAGES

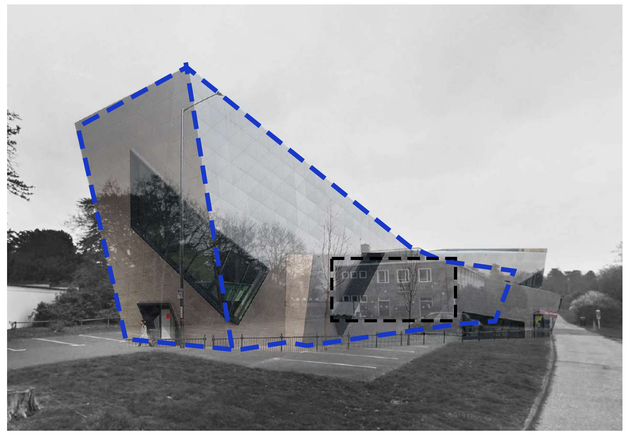


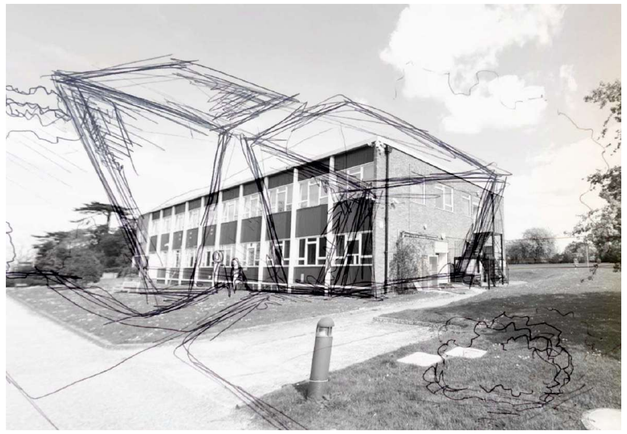
INITIAL SKETCHES

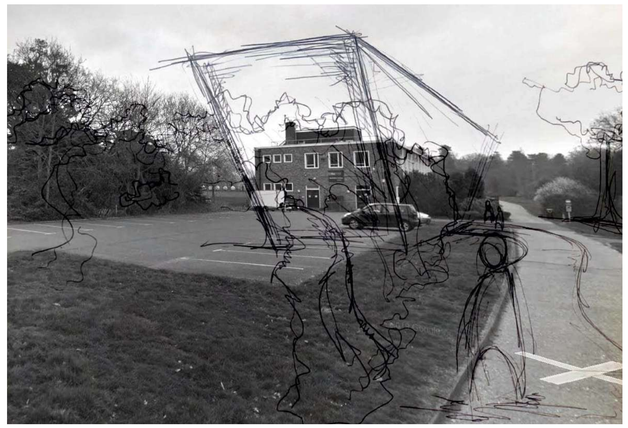


OVERLAY EXPERIMENTAL COLLAGES





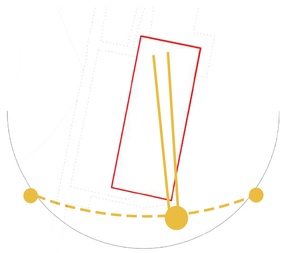




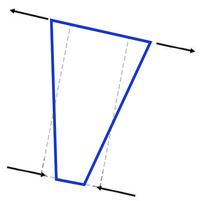
PART 1 : *Inspirational design, collages and initial sketches*
Collages have been creared through overlay of precedent studies, influencing a shape to be created. Then moved further into sketching the desired shape and imagining interior spaces through exploring interior collage perspectives.

PART 2 : *Zoning Diagrams*
Once an initial shape had been formed, the space was manipulated according to it’s surrounding site.

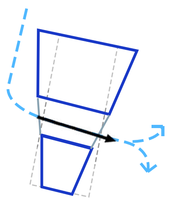
PLAN VIEW ZONING DIAGRAM



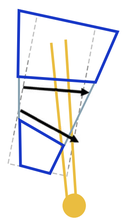
Existing building - analysing the sun path and how it affects the site.



Move south facing side inwards and north facing side outwards, allowing more sunlight across the facade and prevent blocking around the north area.

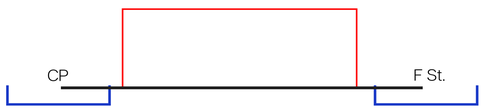


Movement of people through existing site. Cut through movement and replaced with glazing to connect people to nature.

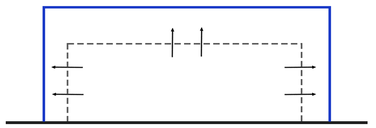


Opening south - west area of glazing in order to maximise natural light into building.

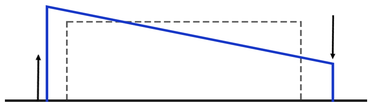
ELEVATION VIEW ZONING DIAGRAM



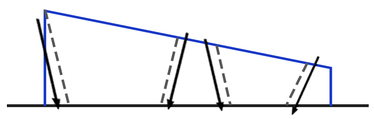
Existing building in elevation view, with car park located on the left, and existing fire escape stairs on the right.



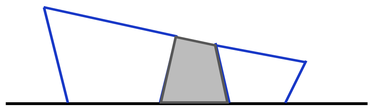
Extend outwards onto car park and existing space where stairs were - allows more space for expansion without affecting slope.



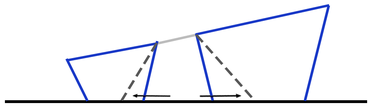
Reduce height of south-facing side of building (right), maximises sunlight throughout whole of building.



Cuts inward reduce ground floor space - less disruption to surrounding vegetation.



The cut in the central space is glazed and becomes ‘the space that doesn’t exist’.



At the back of the building, glazing is extended outwards, to maximise sunlight coming through and connecting the view of vegetation behind to the building

05

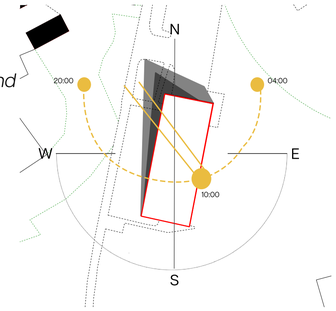
CREATING ‘THE SPLIT FRAME’ CONT.

Exploring Light through modeling

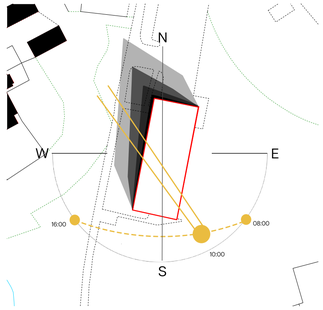
SUNLIGHT MOVEMENT AND SHADOW ANALYSIS

Paper models of the massing of the shape of the new proposal were created, and using the sun path, the way light and shadow moves throughout the day was analysed.

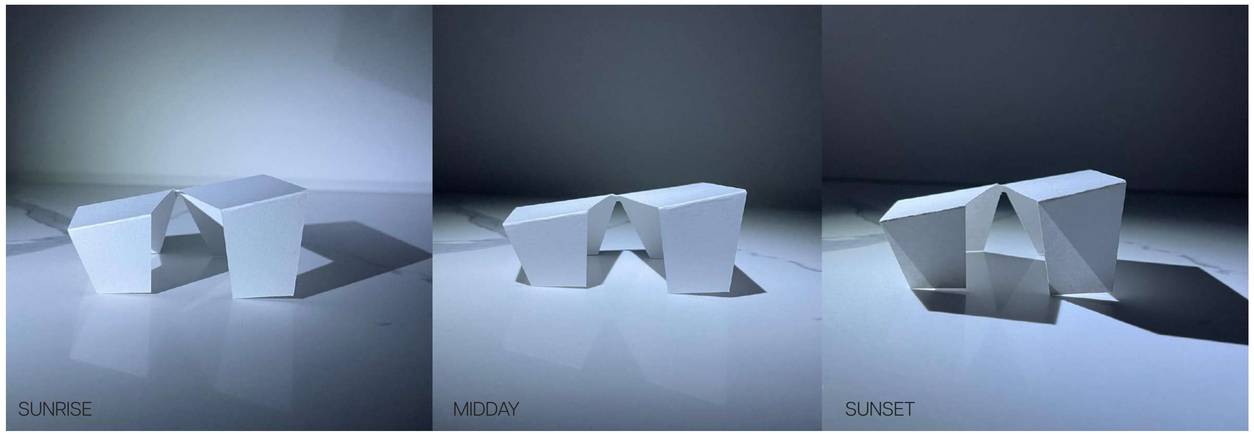
SUMMER SUN PATH



WINTER SUN PATH

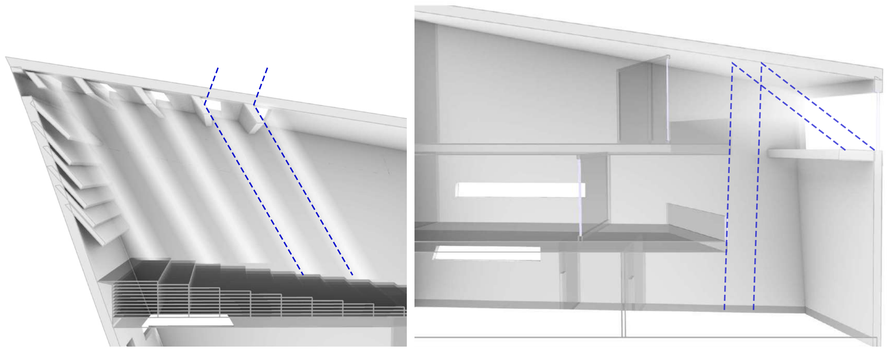


PAPER MASS MODELS



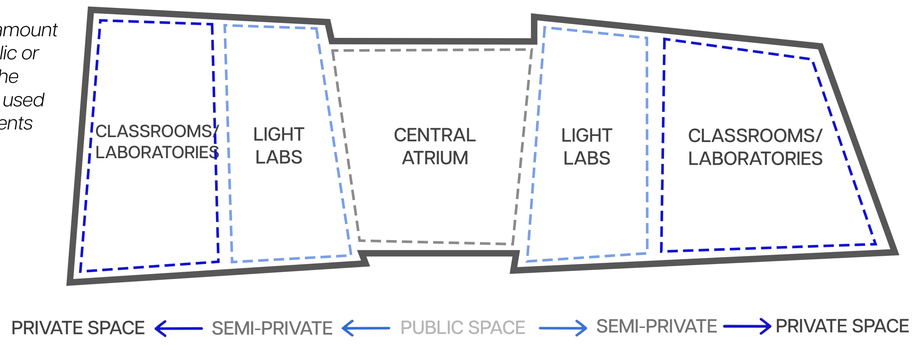
LIGHT POCKETS

For private spaces, light pockets are introduced to introduce natural light to the space without being too harsh - creating privacy and reducing the need for artificial lighting.

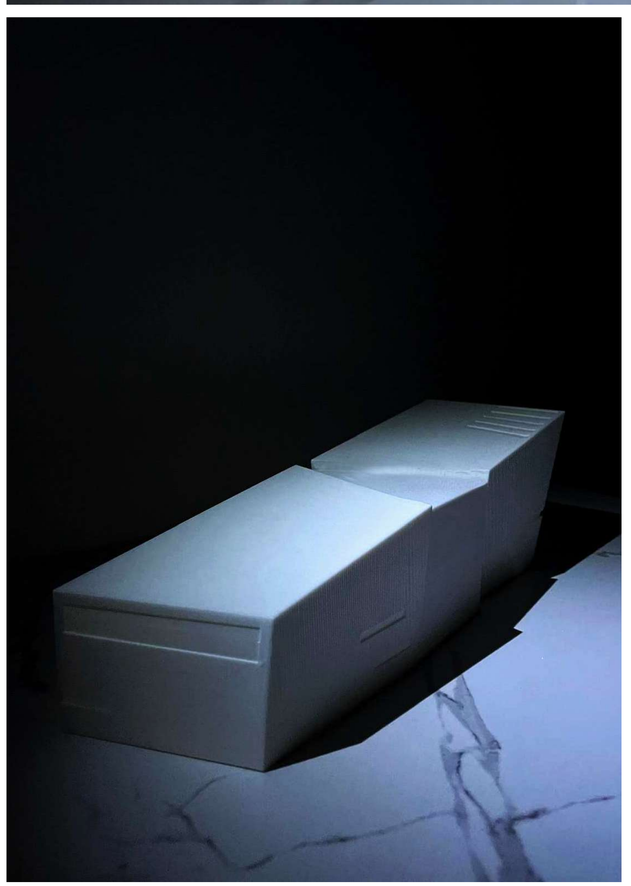


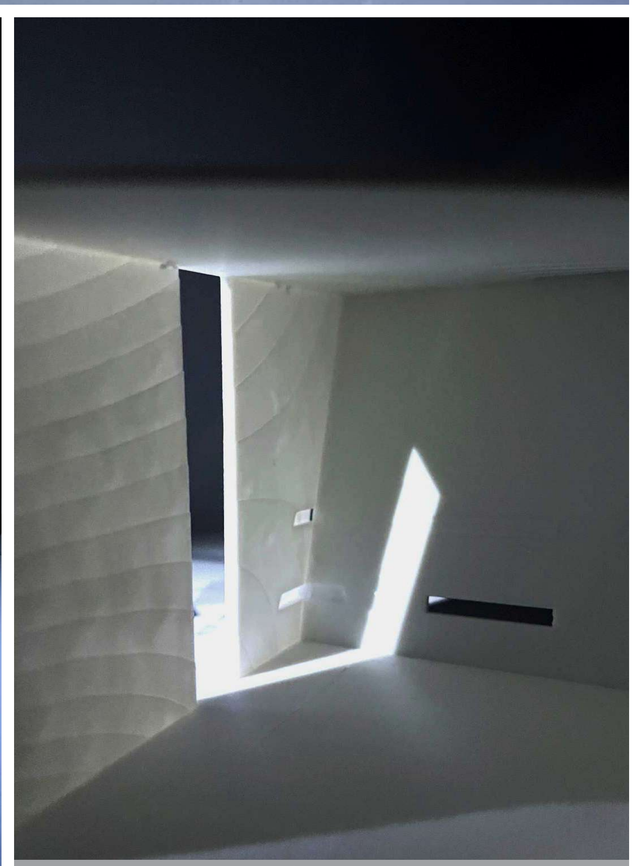
LIGHT REFLECTING SPATIAL PURPOSE

Throughout ‘The Split Frame’, the amount of light exposure dictates how public or private the space is. For example, the exposed central atrium is primarily used as public space for University students and the public.



FINAL PHYSICAL MODEL





06

DESIGN PROPOSAL : ISOMETRIC SECTION

Scale 1:100

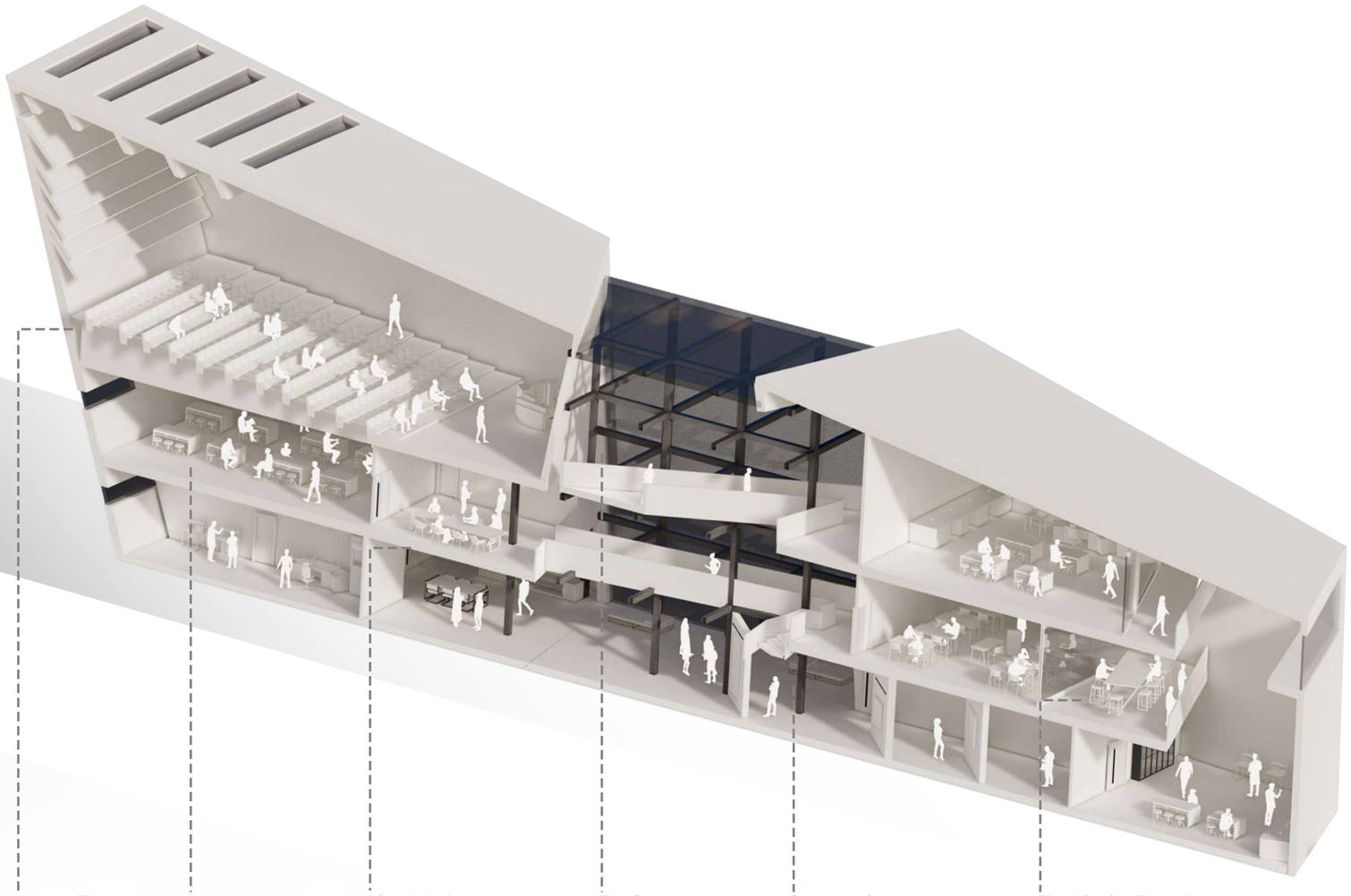
DESIGN STATEMENT

The Split Frame is a retrofit and extension of the existing Science Building at the Bayfordbury Campus, forming part of the University's wider ambition to renew its horticultural and scientific teaching facilities while responding to contemporary environmental, spatial, and pedagogical needs. The proposal is founded on the principle of adaptive reuse, retaining the existing building fabric wherever possible and introducing a clear architectural intervention that redefines how the building is experienced and inhabited.

The central move of the project is the introduction of a full-height glazed atrium that splits the existing structure to create a new social and spatial heart. This vertical void brings daylight deep into the plan, improves legibility and circulation, and establishes visual connections between learning, research, and informal occupation. Rather than competing with the existing building, the atrium exposes and celebrates its retained structure, allowing old and new to coexist through contrast and transparency.

The building accommodates a mixed-use programme of laboratories, classrooms, offices, informal learning spaces, and a new 150-seat lecture theatre extension designed for independent use. In addition to these formal spaces, the strategic use of daylight enables the creation of Light Labs, informal study, meeting, and observation spaces positioned along the atrium edge. These areas promote interaction, collaboration, and community by allowing learning to extend beyond enclosed classrooms and laboratories. Internally, learning terraces, bridges, and catwalks activate the atrium, encouraging interdisciplinary exchange and shared educational experience. Externally, the proposal respects the rural and heritage context of Bayfordbury while introducing contemporary glazing and lightweight structural elements.

Overall, The Split Frame transforms a closed institutional building into an open, connected environment where education, community, and light are central to the architectural experience.



Lecture Theatre
Private Learning Space

Laboratory
Private Learning Space

'Light Labs'
Informal study spaces located on the terrace of the central atrium.

The Space that does not exist

Central Atrium
Public multi-use space that holds connections to the rest of the building.

'The Viewing Frame'
A terraced space specifically designed as a viewing gallery for the main laboratory below and can be used as a light lab.

THE JOURNEY

When moving through the site, viewers experience a journey - watching 'The Split Frame' transform from an angular shape peeking above the trees to a landmark home to a centre of science, education and community.

Beginning

End

0 5 10 20

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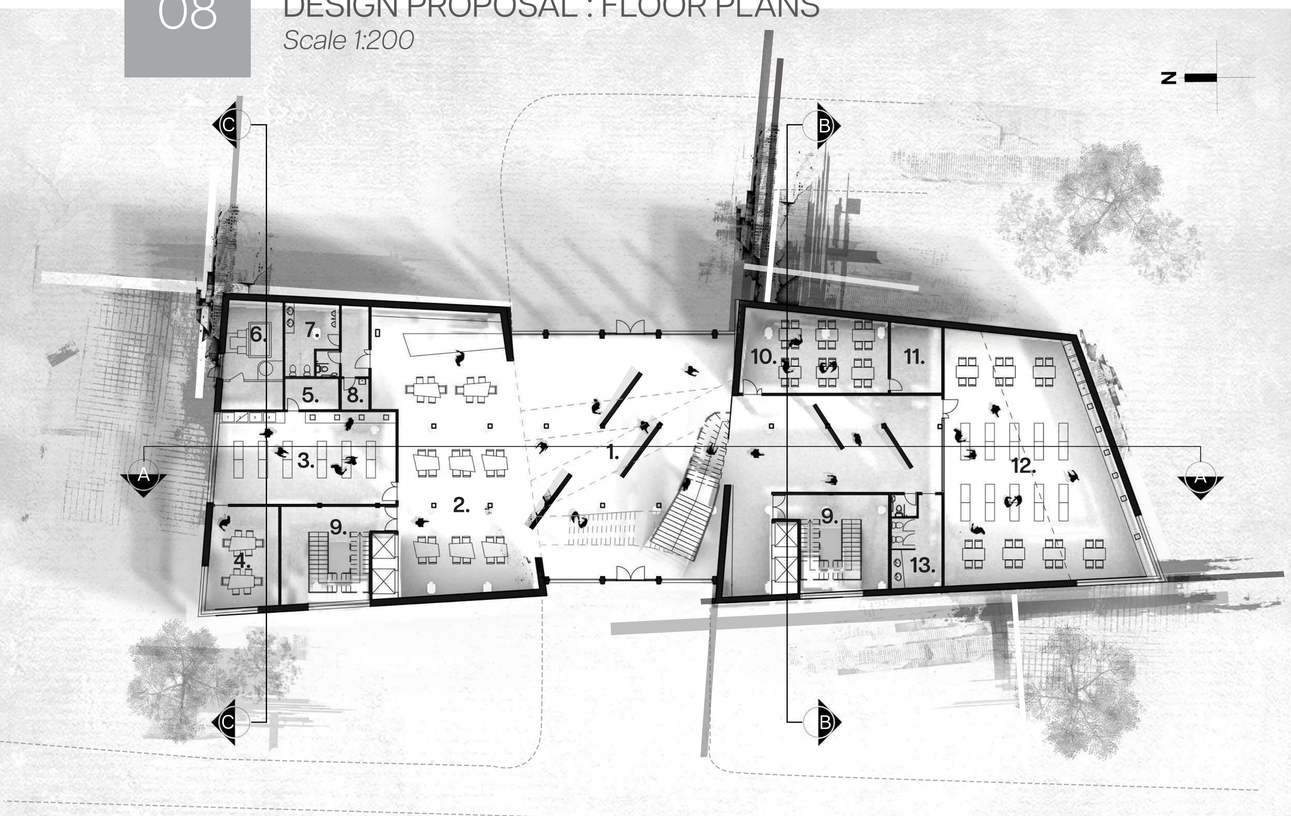
INTERIOR PERSPECTIVE VIEW :
Portraying the central atrium - a multi-use space exposing and celebrating the orginal structure of the building, creating 'the space that does not exist' -the heart of 'The Split Frame'.

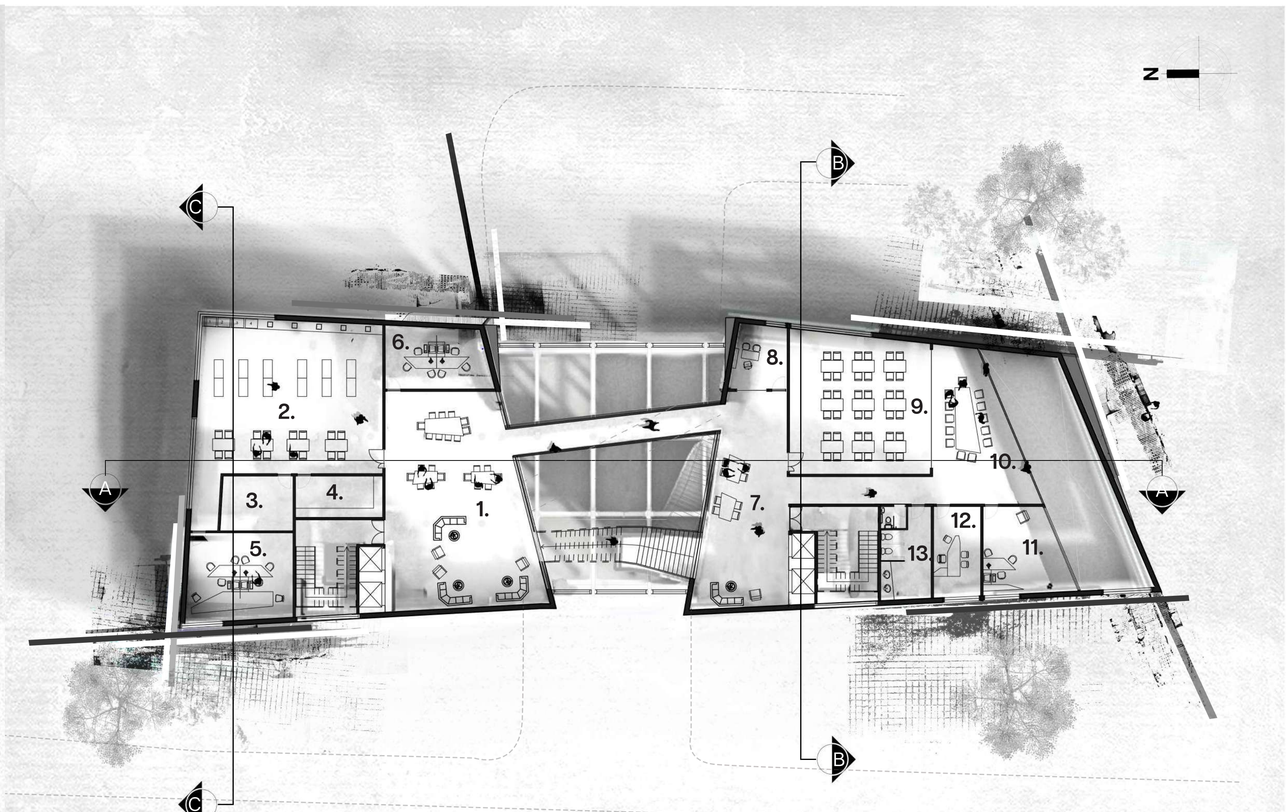
EXTERIOR PERSPECTIVE VIEW :
Portraying the front of the retrofit, showing the main entrance, and how the old has morphed with the new to create 'The Split Frame'.

DESIGN PROPOSAL : FLOOR PLANS

Scale 1:200



GROUND FLOOR



FIRST FLOOR

LEGEND :

Ground Floor :

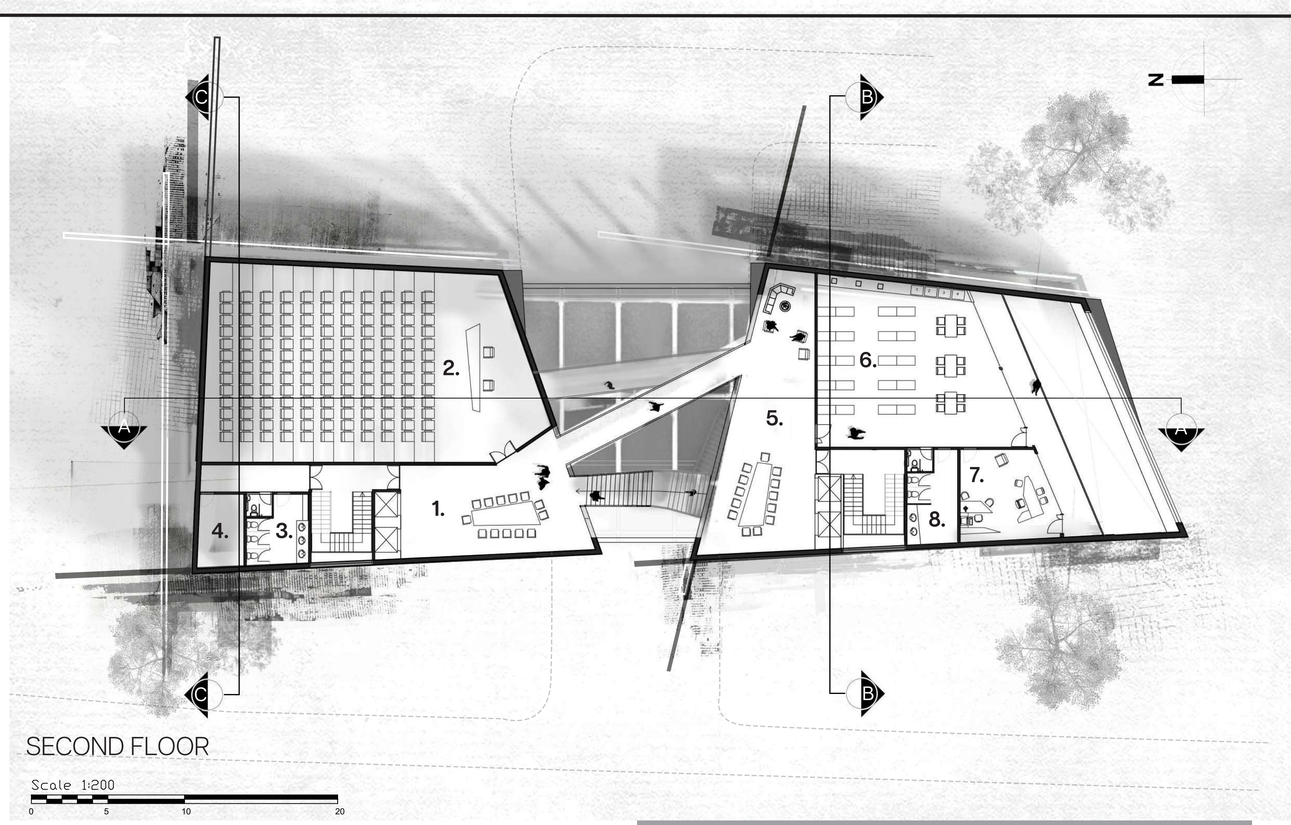
1. Reception / Multi-Use Space
2. Cafe
3. Laboratory
4. Office
5. Storage for Laboratory
6. Boiler House
7. Men's W/C
8. Cleaners
9. Core / Fire escape 1+2
10. Classroom
11. Storage for Classroom
12. Main Laboratory
13. Women's W/C

First Floor :

1. 'Light Lab' 1 - Informal learning/meeting area
2. Laboratory / Classroom
3. Storage
4. Analyst lab / Dark room
5. Office
6. Office
7. 'Light Lab' 2
8. Office
9. Classroom
10. 'The Viewing Frame' - an informal meeting space
    overlooking the laboratory below
11. Office
12. Office
13. Unisex W/C

Second Floor :

1. 'Light Lab' 3
2. Lecture Theatre
3. Unisex W/C
4. Switch Room
5. 'Light Lab' 4
6. Laboratory / Classroom
7. Office
8. Unisex W/C



SECOND FLOOR

Scale 1:200

0 5 10 20

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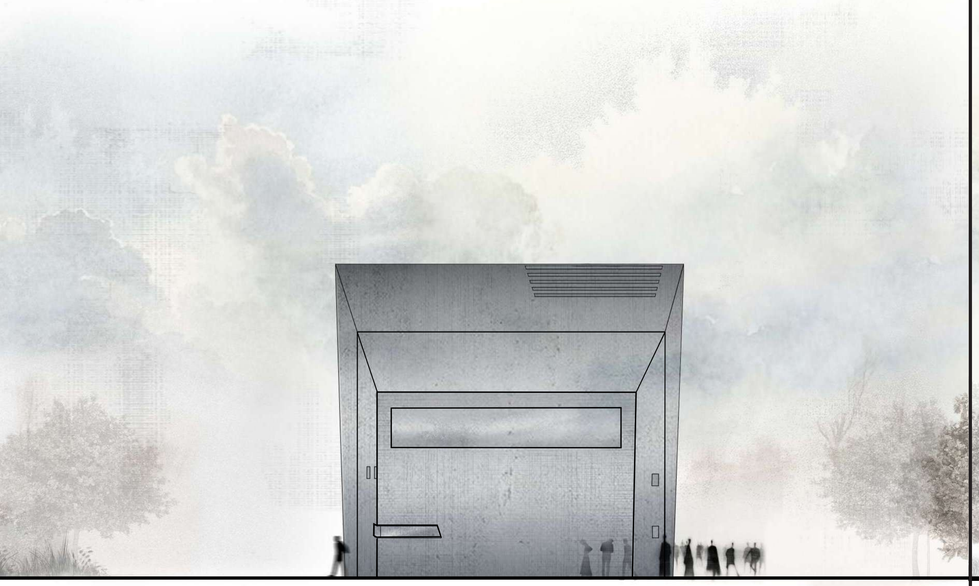
09

DESIGN PROPOSAL : ELEVATIONS

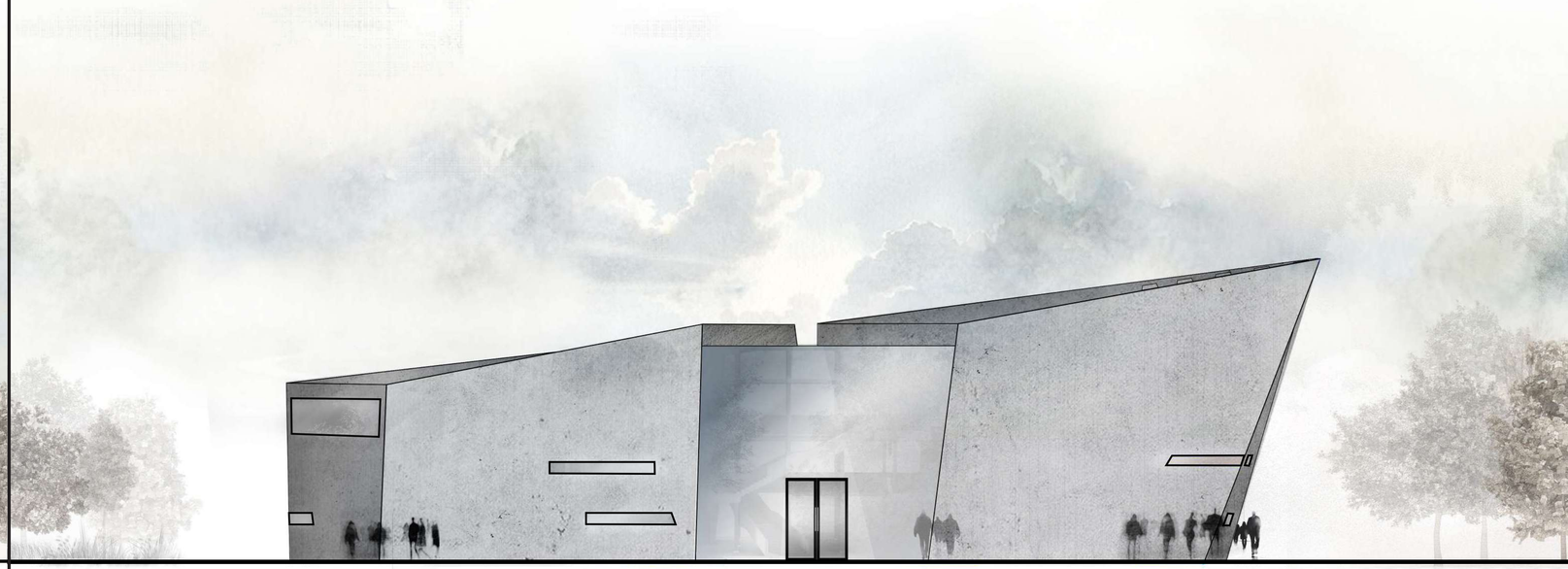
Scale 1:200

NORTH ELEVATION

WEST ELEVATION



SOUTH ELEVATION



EAST ELEVATION

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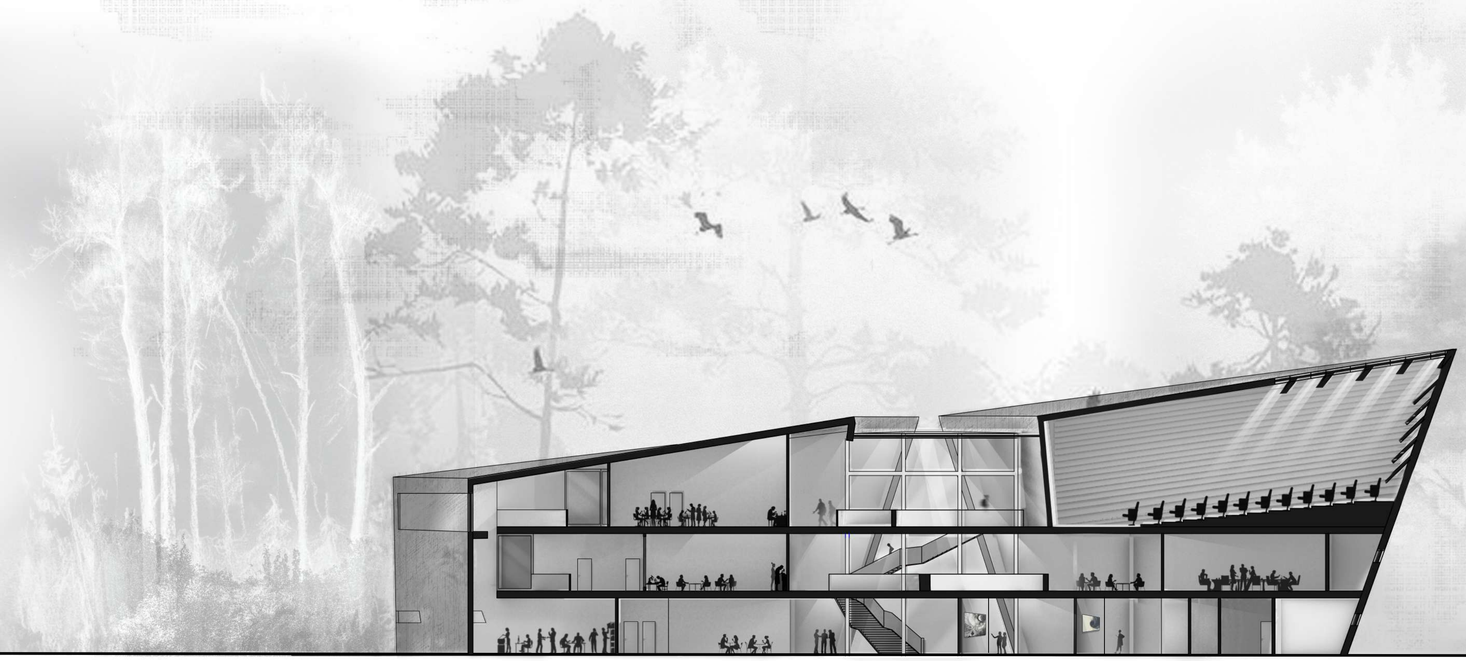
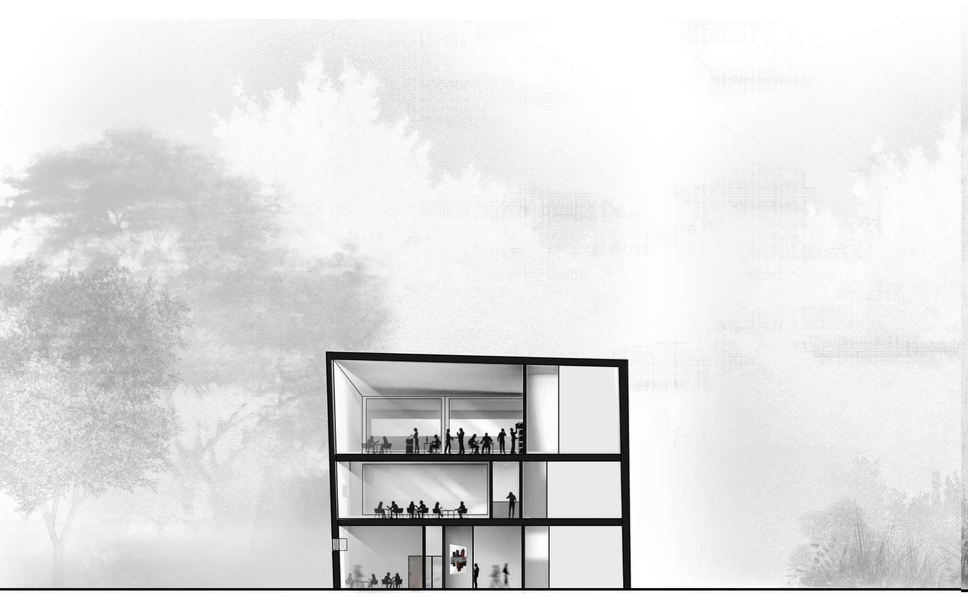
010

DESIGN PROPOSAL : SECTIONS

Scale 1:200



SECTION A



SECTION B

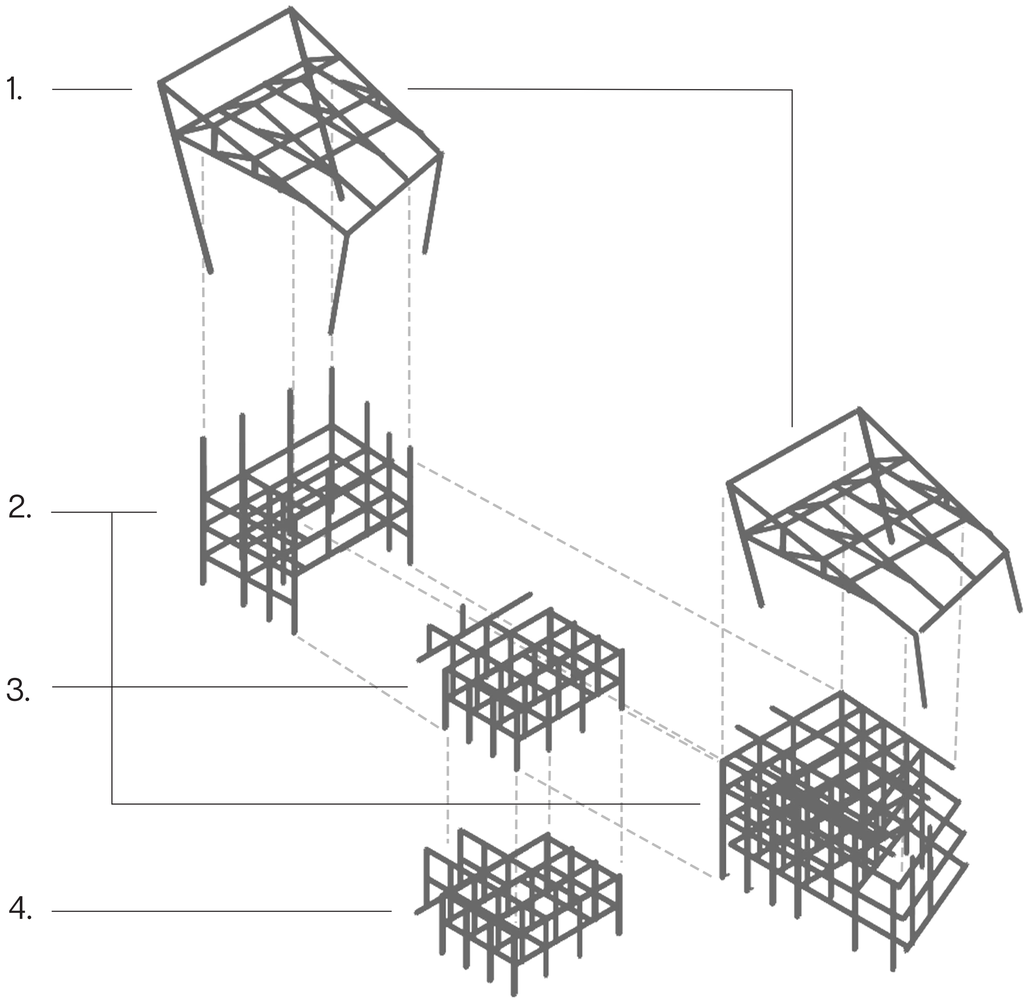
SECTION C

Scale 1:200

0 5 10 20

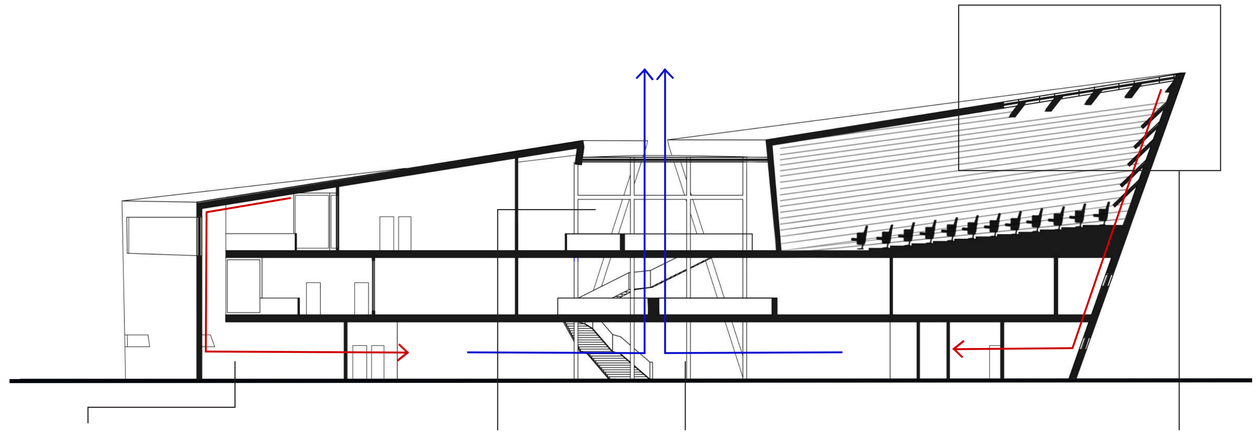
011 STRUCTURAL AND SUSTAINABILITY STRATEGIES

EXPLODED AXONOMETRIC OF STRUCTURAL COLUMNS AND BEAMS



KEY :
1. New Structuure - Mono Truss to support roof & Raker Beams to support exterior walls
2. New Structure - Main steel beams and columns used to support new confirguration of building
3. Reconfiguration of existing structure to be duplicated in use for new floors
4. Retained existing structure, now exposed in ‘the space that does not exist’

SUSTAINABILITY STRATEGY

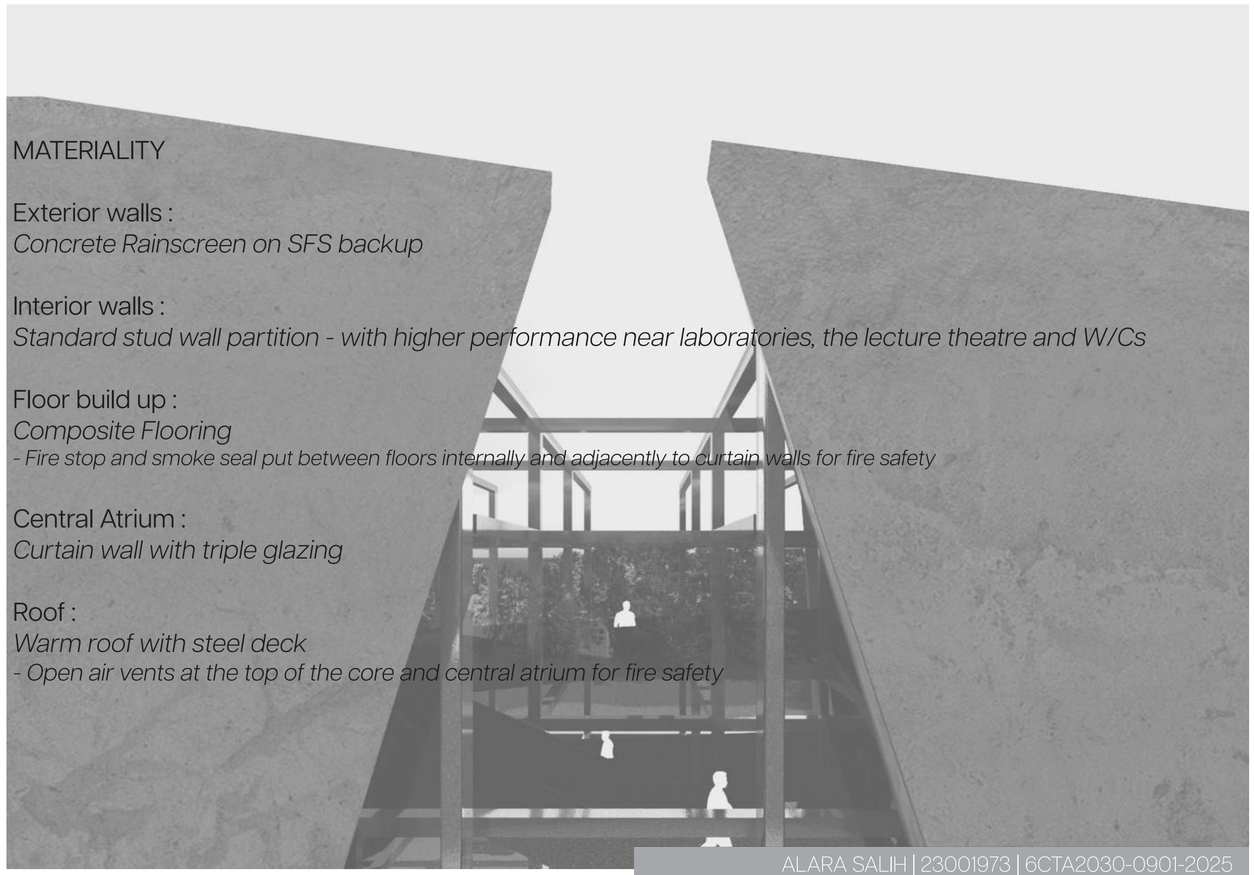


Using concrete as a material provides the building with a natural thermal mass, exposed internal concrete surfaces draw in heat during the day and releases at night, reducing the need for mechanical heating.

The building itself being a retrofit is sustainable due to the savings of embodied carbon.

Low openings on the ground floor and high level open air vents in both cores and the central atrium provides stable, natural ventilation.

The use of natural light & light pockets reduces need for artificial lighting through controllig daylight.



MATERIALITY

Exterior walls :
Concrete Rainscreen on SFS backup

Interior walls :
Standard stud wall partition - with higher performance near laboratories, the lecture theatre and W/Cs

Floor build up :
Composite Flooring
- Fire stop and smoke seal put between floors internally and adjacently to curtain walls for fire safety

Central Atrium :
Curtain wall with triple glazing

Roof :
Warm roof with steel deck
- Open air vents at the top of the core and central atrium for fire safety