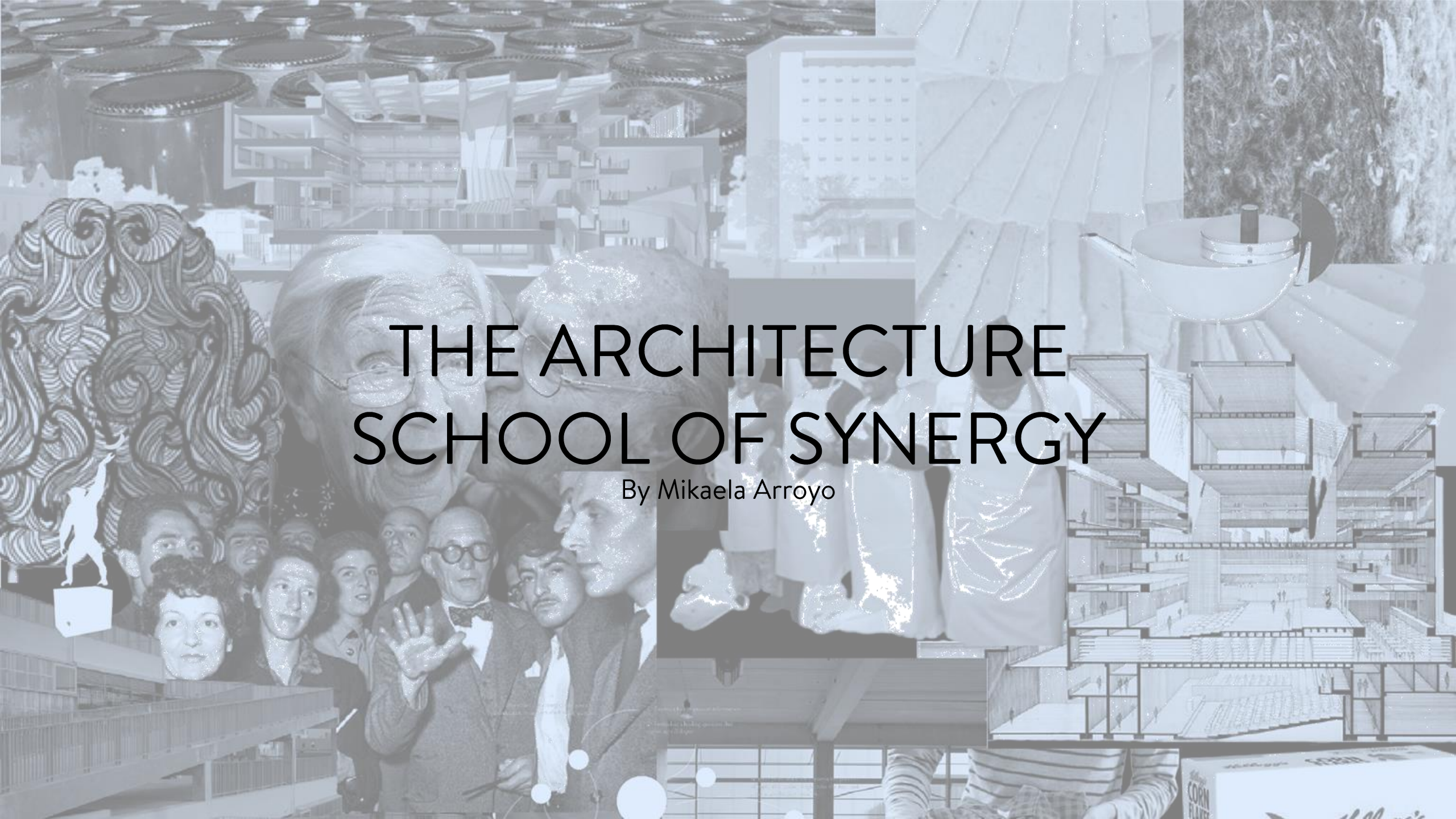


THE ARCHITECTURE SCHOOL OF SYNERGY

By Mikaela Arroyo

FINAL WORK

Individually Produced

THE ARCHITECTURE SCHOOL OF SYNERGY

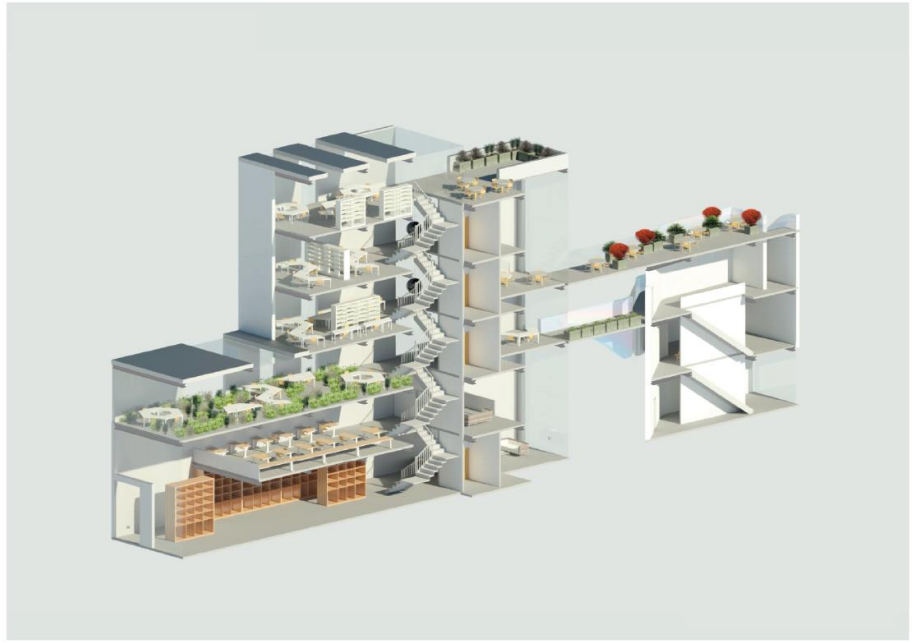
Mikaela Arroyo

A brief filled with stimulating components, added to an unknow site with challenging constrains, uncanny learning conditions and a deep desire to return to our 'normal lives' were the starting point of a design process that rooted from one question: What should an Architecture School be?

I am convinced that an Architecture School should be a space for interaction with other branches of knowledge that go beyond architectural acquaintance. A building dedicated to different types of intelligence among generations. What from Monday to Friday is an Architecture School, on the weekends offers workshops to the elderly of Newry. It is also a space for people to celebrate their creativity and stimulate their expression capacity via public lectures, photographic displays, art exhibits and ultimately showcase the work of future architects to the wider community. An Architecture school does also engage with the environment. Starting with a sustainable construction and followed by participating in the upcycling of unwanted materials.

With this in mind, I have designed a building that can accommodate all three purposes in a synergistic environment while questioning the classic profile of an Architecture School. Following the Socratic teaching method, I have replaced the conventional lecture theatre for discussion spaces - inside an indoors garden - that can be rearranged depending on the amount of participants. I have also created several social areas that interconnect with the Gallery through suspended bridges. The Workshop Area - as well as the materials disposed in the Collection Point- will be shared by students at the Architecture School and the Upcycle Centre, which pursues the aspiration of a collaborative environment.

Moreover, the materials' palette is either easily recyclable or sources from recycled materials. Aesthetically, the main body of the school is cladded in aluminium while the more exposed to the public Gallery mimics the iridescence of the water body adjacent to the site thanks to the façade's finishing. The steel frame structure supporting this building can be demounted, meaning that its lifespan is doubled and allows for a 'movable building'.



01

PRECEDENT RESEARCH

FINAL WORK

Individually Produced

THE UNEXAMINED LIFE IS WORTHLESS

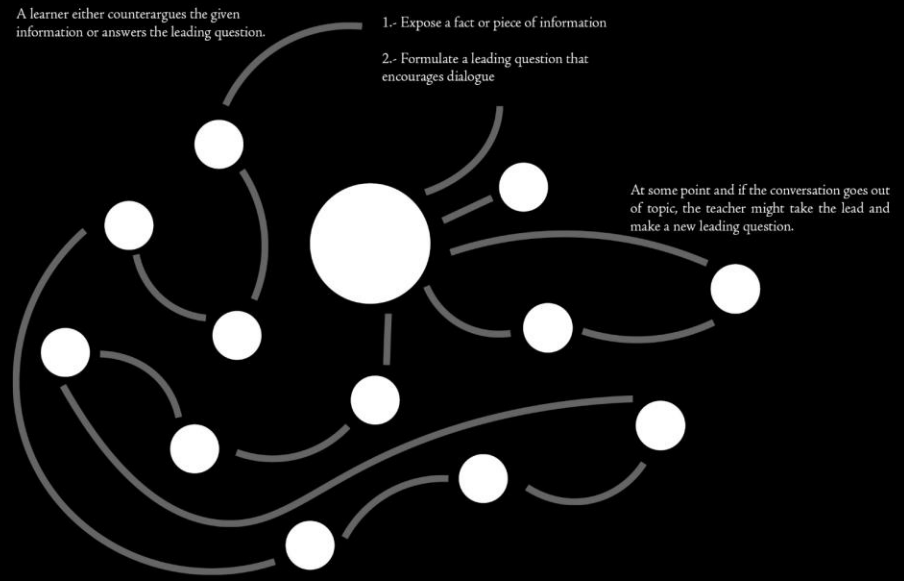
Socrates
(469-399)

Socrates is not only considered the founder of western philosophy but is also the creator and developer of the Socratic or Dialectical method. His teaching strategy is based on a multilateral and persistent questioning of the imparted knowledge, which is usually a preestablished doctrine or preconceived thoughts. The key to a successful Socratic teaching relies on the honesty and self-examination as well as the recognition of self-ignorance and presenting counterarguments towards other's points of view, including the teachers'.

Nowadays, this approach is used as an alternative to the traditional lecture format. The function of a teacher is to guide the student's trough leading question and the students are encouraged to dialogue.

WHO DO WE LEARN FROM? No one is fully apt for being an absolute source of knowledge and neither is capable of being a self-sufficient learner. Everyone is someone we can learn from. e aim is to progressively make the learner a good teacher.
WHEN DO WE LEARN? Whenever there exists two or more people willing to dialogue and recognize their faults. Learning can only occur as a result of constant questioning.

WHERE DO WE LEARN? Wherever people can gather, there exist a learning possibility, a fixed learning facility is not absolutely necessary.
The concept of critical consciousness is that the best learning starts with action, reconsidered with the reflection the action, and gives the richest further action.



FINAL WORK

Individually Produced

YALE BUILIDING PROJECT

Yale School of Architecture, USA
(1967 -)

All M.Arch students of Yale School of Architecture since 1967 have been taking part in the design and construction of housing in underprivileged neighbourhoods.

During the spring semester the class is split in smaller groups who present complete proposals, only one project proposal is picked to be built over the summer; all students must participate in the fabrication and assembly of same. Thee teaching method aims to inspire trough the building process, to expose different realities and to commit with a greater social cause.

The students gain experience with dealing with clients from different background, must respond to the occupants' necessities while respecting the surroundings and prioritizing cost efficiency and structural stability.

This project has proved to create a greater social responsibility, to the extent of student desiring to be part of a social change in their future careers.

With the help of partnerships with non-profit organizations, this project has become a feasible way of improving living condition of unprivileged US-Americans and giving architecture students an'out-of-studio' experience.

FINAL WORK

Study of Precedents that shaped my final design.

THE REDISCOVERY CENTRE

The Rediscovery Centre is the National Centre for the Circular Economy in Ireland. The movement connects people, ideas and resources that support a more sustainable living. Artists, scientists, designers and craftspeople use their skills and knowledge to give unwanted materials an added value. They want to nurture the ideas that lead to a circular economy and environmental integrity that are led by creativity and innovation.
The centre offers interactive workshops to students that are interested in a sustainability agenda. Additionally, the centre counts with a Eco Store where they sell produces from over 20 independent Irish suppliers and also the final products fabricated in the workshops.

THE CIRCULAR ECONOMY ACADEMY

Free mentoring programme that assists Irish social enterprises and community organizations to transfer their activities towards a circular economy. The academy proved guidance and strategies that are specifically designed depending on the business. The Academy also supports organization that want to replicate the Redescovery Centre successful reuse initiatives.

UPSICLE

REDESIGN

REUSE

REMANU-FACTURE

REDISCOVER PROGRAMME

These four branches of the Rediscover Programme wants to reinforce a circular economy. The aim is to repurpose old materials that otherwise would have become waste. In all the different branches, the enterpirse creates training oportunities for long therm unemployed. Additionally, the products are sold in the Eco Store and all the revenue generated from the products is reinvested in the enterprise.

REDISCOVER FASHION

REDISCOVER FURNITURE

REDISCOVER CYCLING

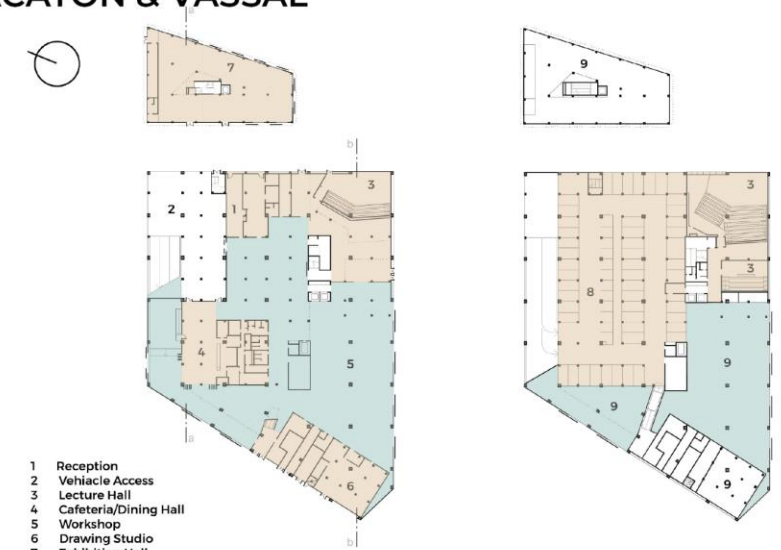
REDISCOVER PAINT

Mikaela Arroyo
40251584

FINAL WORK

Study of Precedents that shaped my final design.

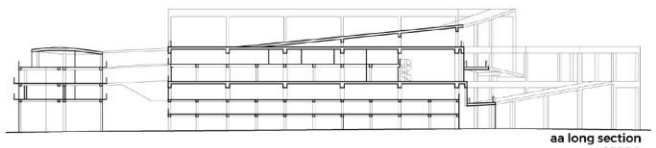
FACULTY OF ARCHITECTURE BUILDING, NANTES
LACATON & VASSAL



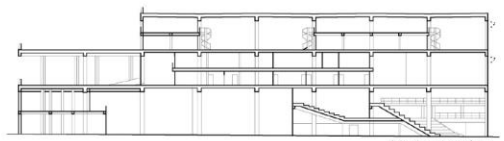
Ground floor 1:1500

First Floor 1:1500

Sixth Floor 1:1500



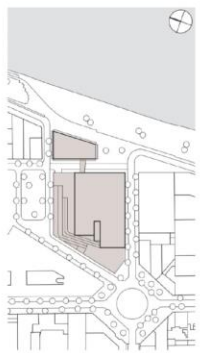
aa long section 1:1000



bb short section 1:1000

1.
Base Drawings and photograph sourced at https://inspiration.detail.de/faculty-of-architecture-building-in-nantes-103544.html

Mikaela Arroyo
Grace Carney



The Architectural School of Nantes has been designed with a multipurpose functionality in mind. The architects have employed a concrete superstructure that allows huge spans of uninterrupted free space as well as double height ceiling spaces. Ramps run continuously between floors to create a building that adapts to the users and their needs.

The concept sees the building as a 'work in progress', reflecting the main idea behind the design: creating a building that meets the demands of the architecture students today as well as the unpredictable necessities of its future users. Lacaton and Vassal have consciously prolonged the use of the building by designing it as a blank canvas to be appropriated by the user. This negates the need for demolition or significant redesign thanks to this spatial planning; what today is an architecture school might have a completely different use in a couple of years.

Moreover, the building itself became a pedagogic instrument to the students and teachers of the architectural school, the large spaces and easy transportation routes allowing further experimentation with large-scale prototypes and models. Additionally, the building became a symbol of low-cost architecture, where a minimal budget translates in to the optimisation of space, increasing the usable surface from 12,500 sqm to 26,000 sqm.

This new conceptualisation of architecture embeds a dynamism within the building and how the subject is taught as well as deepening the bonds between the school and its immediate context in the heart of Nantes.

Front Elevation 1:1000

FINAL WORK

Study of Precedents that shaped my final design.

PRECEDENT STUDY AND MATERIAL SELECTION:
Museum of Contemporary Art, Cleveland - USA

- Its twisting architectural form shifts from a compact hexagonal base to a rectangular roof, creating a new public plaza, a soaring atrium and a dynamic double-decker staircase.

-Its mirror-finish black stainless-steel envelope reflects the urban surroundings, changing in appearance with differences in light and weather.

- One of thefacades is clad in transparent glass, flank a new public plaza which serves as a public gathering place and links MOCA to Uptown attractions and amenities, including the expanded Cleveland Institute of Art and new commercial space and residential units.

- A grand, 'double-decker' staircase inverts the typical linearity of stairs by providing ten different ways to ascend, connecting the floors and reflecting the importance of transience and flexibility. An enclosed, descending egress stair doubles up as a sound gallery and is entirely painted yellow to transcend the boundaries of vision. Ascending from the atrium, the upper levels reveal themselves slowly: the stair leans forward as it climbs following the profile of the building, wide landings provide social spaces and the open route plays out as a panorama.

Mikaela Arroyo
40251584

FINAL WORK

Study of Precedents that shaped my final design.

LOUIS VUITTON'S FLAGSHIP STORE IN GINZA, TOKYO

By Jun Aoki & Associates and Peter Marino

Japanese studio Jun Aoki & Associates has created a distinctive flagship store for Louis Vuitton in Tokyo's Ginza shopping district. Aoki aims to refresh the building's façade, so it resembles the vibrant atmosphere of Ginza. The pearlescent finishing of the exterior resembles the iridescence and reflectiveness of water, that in this case reflects the hectic live of people in Tokyo.

The facade was constructed from two layers of glass that curve and ripple like water, which was covered with a dichroic film to create a pearlescent colouring. The building projects a monolithic yet fluid appearance, this can be to some level attributed to the lack of openings- besides the main entrance at street level which is fully transparent so the newest collections can be displayed- which is a common marketing strategy used in retail; when costumers lose the notion of time due the lack of natural light, they tend to shop more.

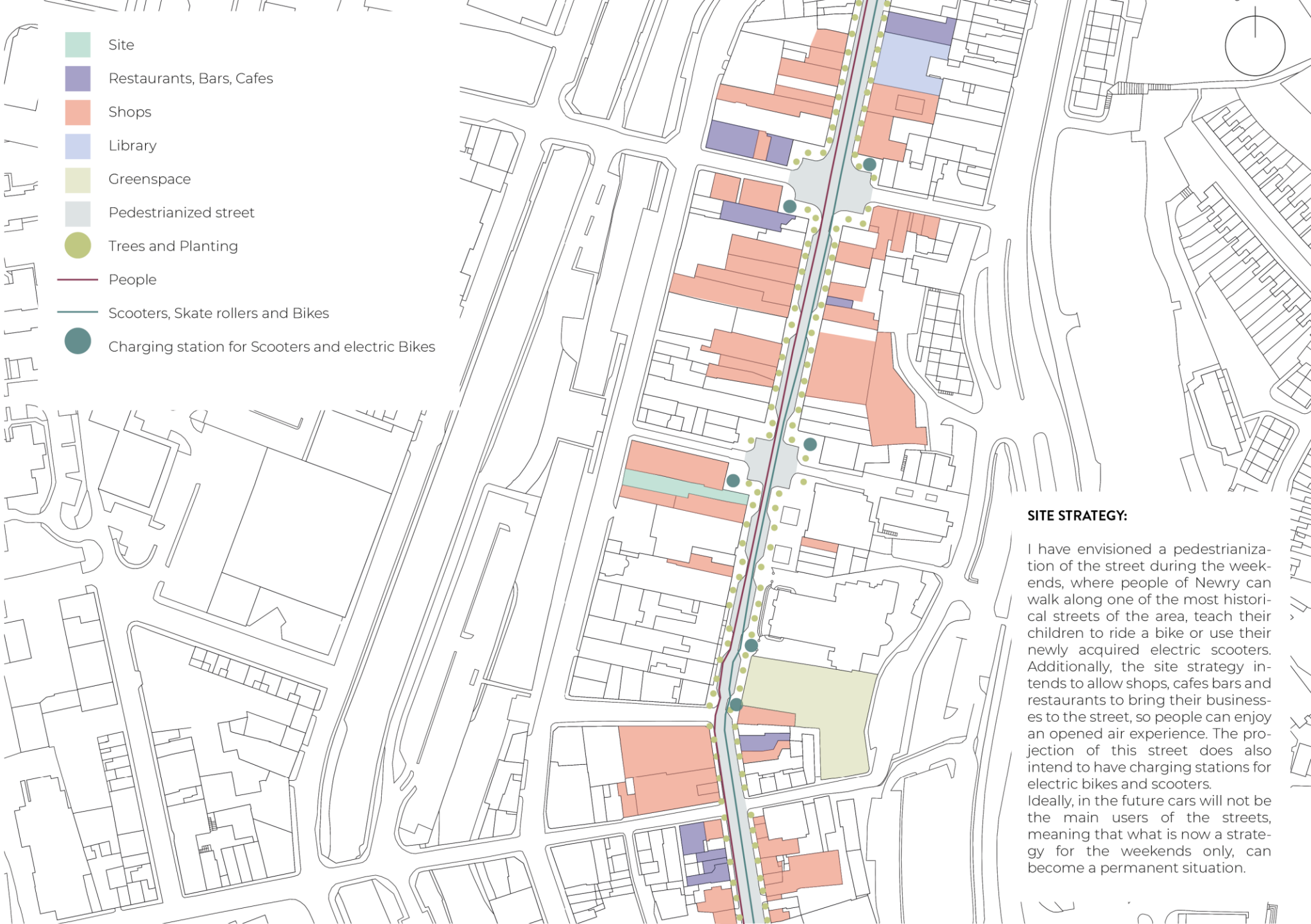
Mikaela Arroyo
40251584

02

SITE ANALYSIS AND DEMOGRAPHICS

FINAL WORK

A 1.1000 Site plan that explores possible strategies to improve the environment of the surrounding of the site.

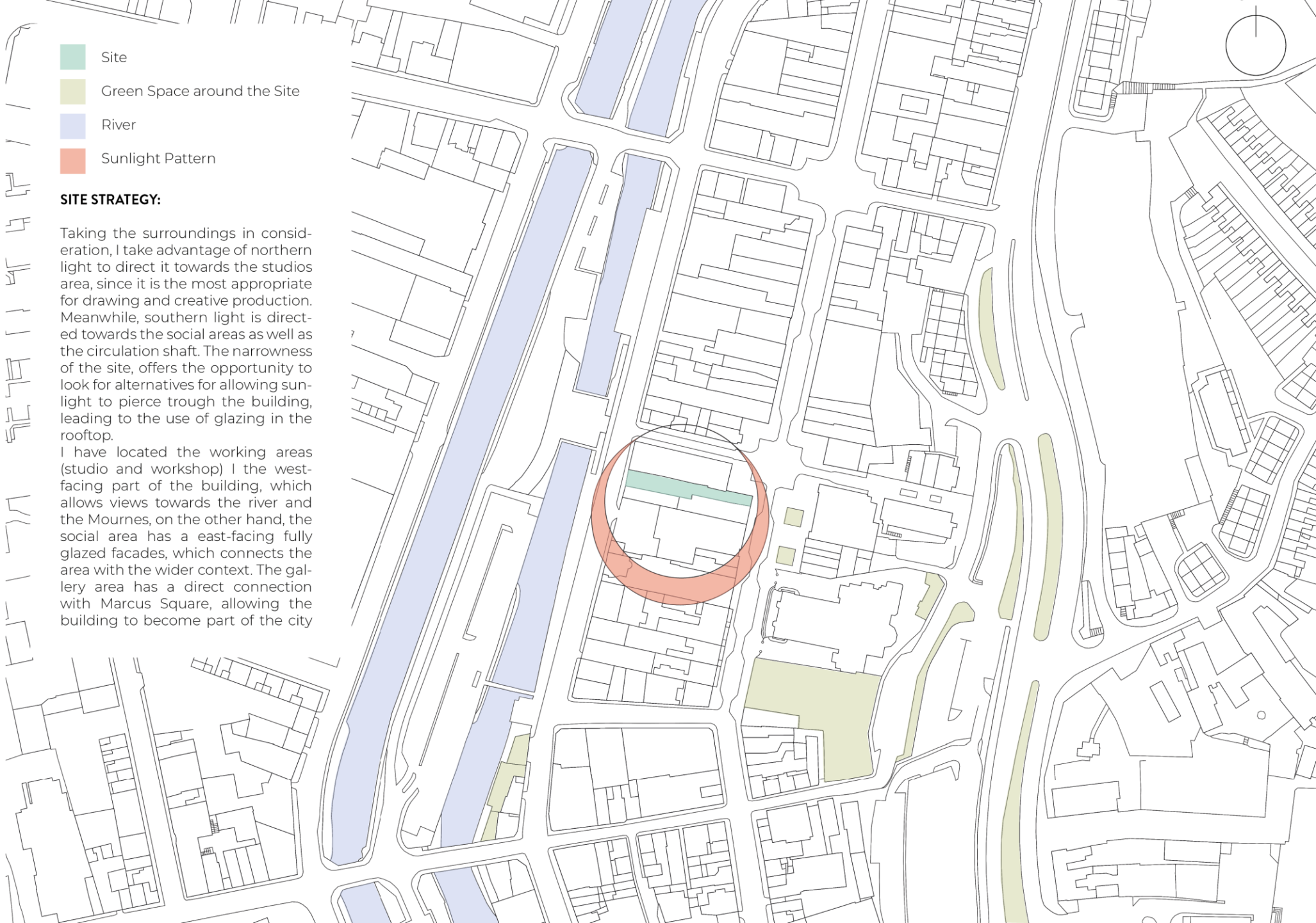


SITE STRATEGY:

I have envisioned a pedestrianization of the street during the weekends, where people of Newry can walk along one of the most historical streets of the area, teach their children to ride a bike or use their newly acquired electric scooters. Additionally, the site strategy intends to allow shops, cafes bars and restaurants to bring their businesses to the street, so people can enjoy an opened air experience. The projection of this street does also intend to have charging stations for electric bikes and scooters.
Ideally, in the future cars will not be the main users of the streets, meaning that what is now a strategy for the weekends only, can become a permanent situation.

FINAL WORK

A 1.1000 Site plan that portrays geographic characteristics that informed the building's design.



SITE STRATEGY:

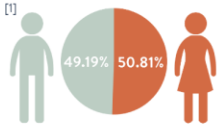
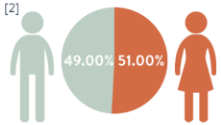
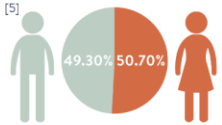
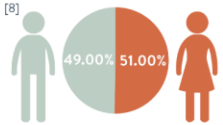
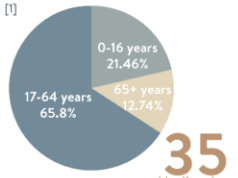
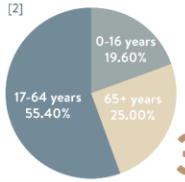
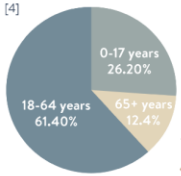
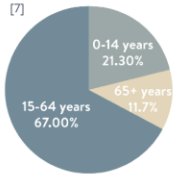
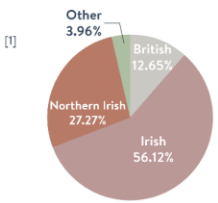
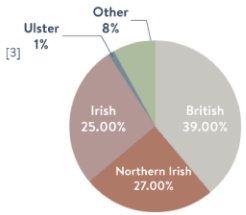
Taking the surroundings in consideration, I take advantage of northern light to direct it towards the studios area, since it is the most appropriate for drawing and creative production. Meanwhile, southern light is directed towards the social areas as well as the circulation shaft. The narrowness of the site, offers the opportunity to look for alternatives for allowing sunlight to pierce trough the building, leading to the use of glazing in the rooftop.

I have located the working areas (studio and workshop) I the west-facing part of the building, which allows views towards the river and the Mournes, on the other hand, the social area has a east-facing fully glazed facades, which connects the area with the wider context. The gallery area has a direct connection with Marcus Square, allowing the building to become part of the city

FINAL WORK

Individually Produced

CURRENT DEMOGRAPHIC DATA:

	NEWRY	NORTHERN IRELAND	DUNDALK	IRELAND
Total Population	[1] 26.967	[2] 1,810,863	[4] 39,004	[7] 4,761,865
Male and Female Rate	[1] 	[2] 	[5] 	[8] 
Age Groups and Median Age	[1]  35 Median Age	[2]  38.5 Median Age	[4]  35.4 Median Age	[7]  37.4 Median Age
Disability Rate	[1] 21.74%	[2] 21.00%	[6] 13.14%	[9] 13.50%
National Identity	[1] 	[3] 	Does not Apply	Does not Apply
Knowledge of Irish	[1] 19.60%	[2] 11.00%	[4] 34.00%	[7] 39.80%

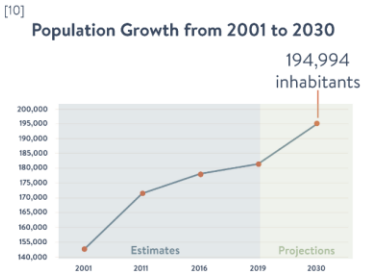
FINAL WORK

Individually Produced

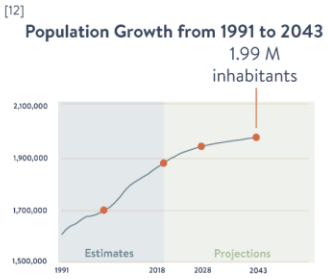
FUTURE DEMOGRAPHIC DATA:

Population Growth

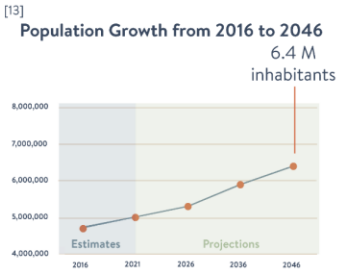
[10]



[12]

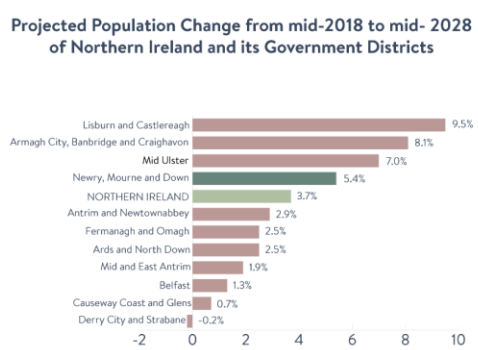


[13]

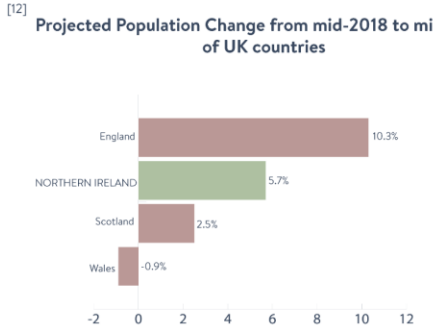


Population Change Comparisson

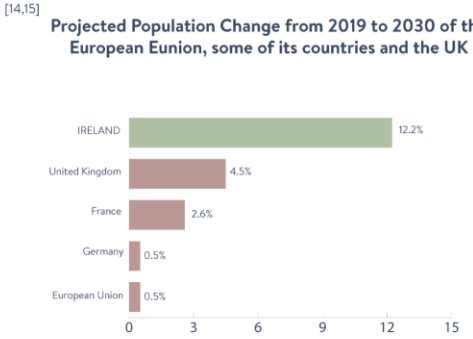
[11]



[12]



[14,15]



Population Change by Age Group

[10]

14.75% in 2015
to
20.3% by 2030

22.37% in 2015
to
20.94% by 2030

[12]

21.84% in 2018
to
45.66% by 2068

19.72% in 2018
to
16.45% by 2068

[13]

13.4% in 2016
to
23.8% by 2051

21.2% in 2016
to
16.8% by 2051

FINAL WORK

Individually Produced

SOURCES:

[1] Norther Ireland Statistics and Research Agency (NISRA) - Census 2011 Population Statistics for Newry Settlement
https://www.ninis2.nisra.gov.uk/public/AreaProfileReportViewer.aspx?FromAPAddressMulipleRecords=Newry@Exact%20match%20of%20location%20name:%20@Exact%20Match%20Of%20Location%20Name:%20%20Newry@23?

[2] Norther Ireland Statistics and Research Agency (NISRA) - Statistcal Bulletin, Census 2011: Key Statistics for Northern Ireland
https://www.nisra.gov.uk/sites/nisra.gov.uk/files/publications/2011-census-results-key-statistics-statistics-bulletin-11-december-2012.pdf

[3] Norther Ireland Life and Times (NILT) - 2019 National Identity Questionnaire
https://www.ark.ac.uk/nilt/2019/Community_Relations/NINATID.html

[4] City Population.de - Duldalk (Ireland)
https://www.citypopulation.de/en/ireland/towns/louth/0388__dundalk/

[5] Admin Sta Ireland - Municipality of Dundalk south
https://ugeo.urbistat.com/AdminStat/en/ie/demografia/dati-sintesi/dundalk-south/132/4

[6] Census 2011 Results - Area profile for town Dundalk Legal Town
http://census.cso.ie/areaprofiles/PDF/ST/dundalklegaltownanditsenvirons.pdf

[7] Census 2016 - Summary Results Part 1
https://www.cso.ie/en/media/csoie/newsevents/documents/pressreleases/2017/prCensussummarypart1.pdf

[8] Census 2011 - Key Statistics for Gender
http://www.niassembly.gov.uk/globalassets/documents/raise/publications/2015/general/3415.pdf

[9] NDA Factsheet I - Disability Statistics
http://nda.ie/Resources/Factsheets/NDA-Factsheet-1-Disability-Statistics-briefing-information.pdf

[10] Newry, Mourne and Down Local Development Plan 2030
https://www.newrymournedown.org/media/uploads/nmd_local_development_plan_2030_pop_medium_web_version.pdf

[11] 2018-based Population Projections for Areas within Northern Ireland Statistical Bulletin Charts - Figure 4
https://www.nisra.gov.uk/publications/2018-based-population-projections-areas-within-northern-ireland-statistical-bulletin

[12] NISRA Statistical Bulletin - 2018-based Population Projections for Northern Ireland
https://www.nisra.gov.uk/sites/nisra.gov.uk/files/publications/NPP18_Bulletin.pdf

[13] Population and Labour Force Projections 2017 - 2051
https://www.cso.ie/en/releasesandpublications/ep/p-plfp/populationandlabourforceprojections2017-2051/populationprojectionsresults/

[14] Eurostat - Population on 1st January by age, sex and type of projection
https://ec.europa.eu/eurostat/databrowser/view/proj_19np/default/table?lang=en

[15] Office for National Statistics - National population projections: 2018-based
https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/bulletins/nationalpopulationprojections/2018based

03

DESIGN PROPOSAL

FINAL WORK

This collage was the first materialization of the key concepts to be introduced alongside the design development.

FINAL WORK

Description of the functions of the building.

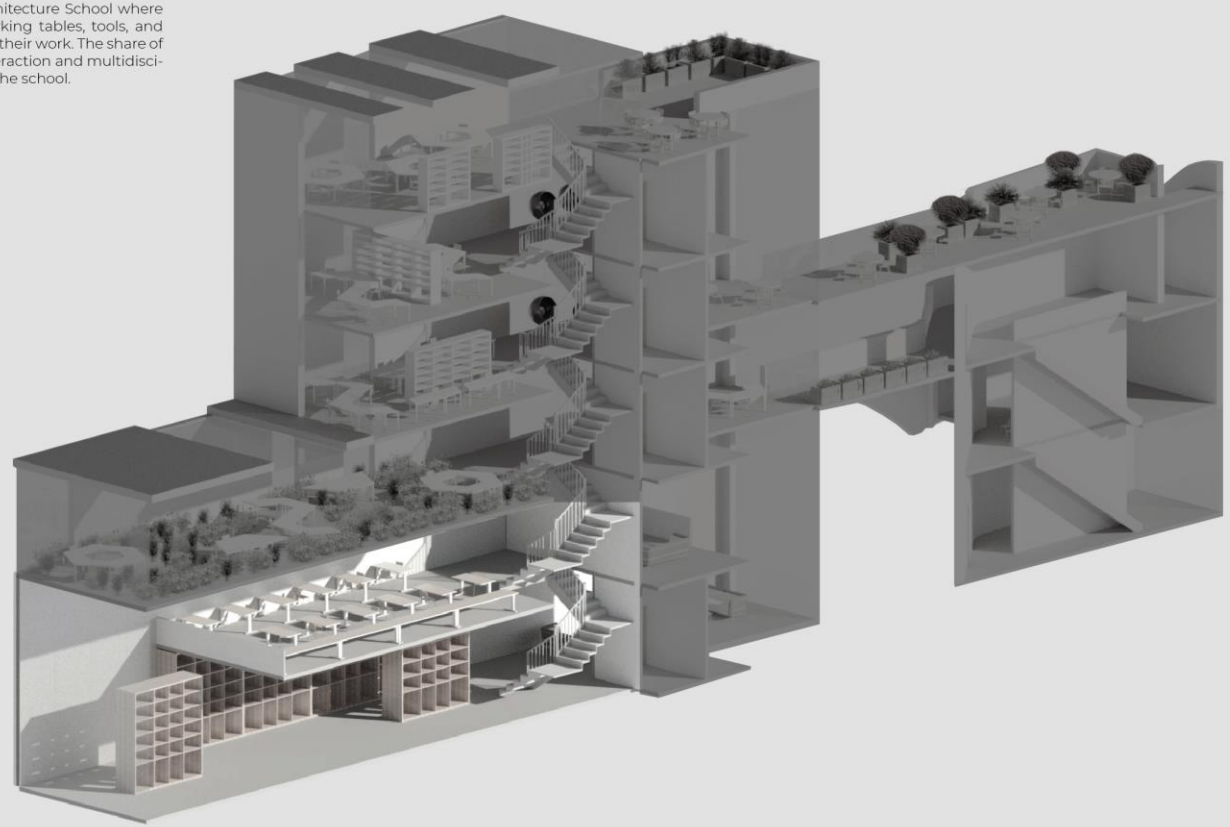
PROGRAM OF THE ARCHITECTURE SCHOOL

The School aims to go beyond architectural teaching, becoming almost a social hub that has 3 principal functions:

THE UPCYCLE CENTRE

The Upcycle Centre wants to create a network of people if Newry that are interested in giving waste materials an added value. This can be achieved trough workshops and courses offered. There is also a collection point of specific waste material such as cardboard, paper, old furniture, tires, soft plastics, bottles and glass. Organic residues will not be accepted.
The collection point is opend for anyone to leave their waste materials and as the Centre grows, collection points could be installed in different parts of the city.
Moreover, what is produced in the workshops of the Upcycle Centre can either be sold in the Upcycle store in the 1st floor or displayed as art pieces in the gallery.

WORKSHOP:
The workshop is an area that is shared between the Centre and the Architecture School where students can share working tables, tools, and resources for producing their work. The share of space reinforces the interaction and multidisciplinary environment of the school.



FINAL WORK

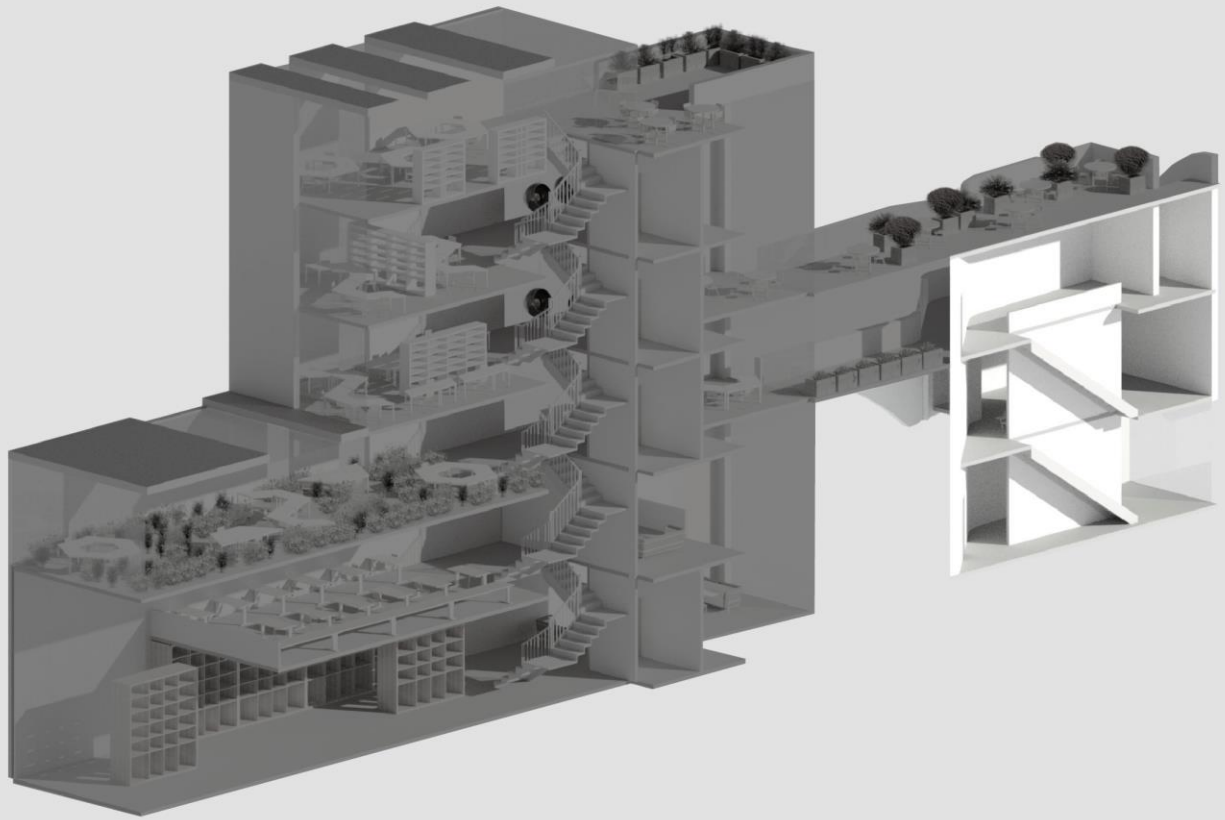
Description of the functions of the building.

PROGRAM OF THE ARCHITECTURE SCHOOL

The School aims to go beyond architectural teaching, becoming almost a social hub that has 3 principal functions:

ART GALLERY

An exposition area is incorporated to allow students to display the work they have done during the semester in an End of Semester Cocktail Party. They will have the opportunity to celebrate their designs with their friends and family as well as leaving it as a temporary exhibition. This way, people of Newry can visit the gallery and learn about what is beeing done in the Architectural School while the End of Semester exhibition is not taking place.
The Art Gallery could be an excellent place for local artists to display their photographs, paintings, sculptures, etc. Additionally, as a result of the workshops of the Up Cycle Centre, art made of recycled material can surge too and can be exhibited and sold in the gallery as well.



FINAL WORK

Description of the functions of the building.

PROGRAM OF THE ARCHITECTURE SCHOOL

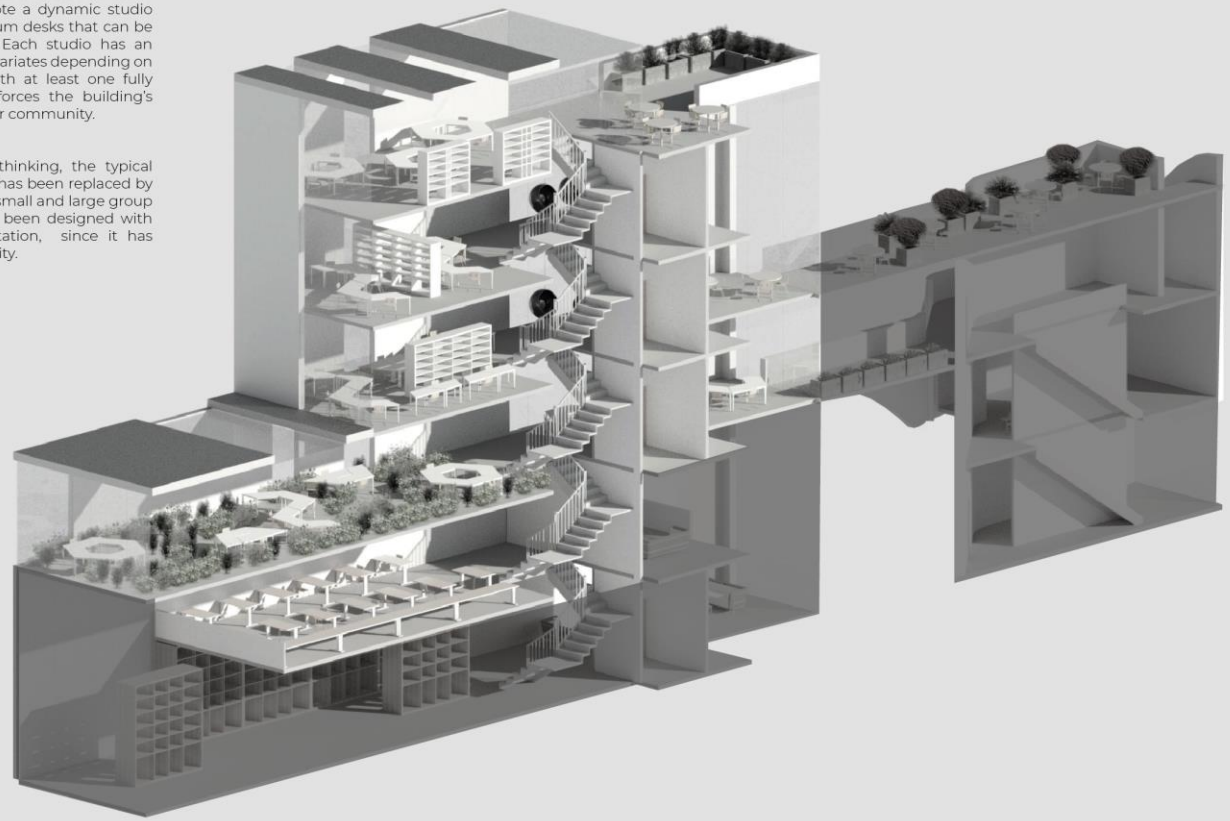
The School aims to go beyond architectural teaching, becoming almost a social hub that has 3 principal functions:

THE ARCHITECTURE SCHOOL

A comfortable and diverse space for students to learn, prioritizing a Socratic teaching; where the dialogue and interchange of ideas is the main learning approach. Spacious workplaces with high ceiling and windows will be provided for individual work as well as areas designed for small and big group discussions.
The programme would also bring forward some concepts from the Portfolio School; a new education methodology applied in primary and secondary education designed by Nancy Otero, where the learning sources from the curiosity of the students. In this Architecture School, during the first semester of every year, the students will be able to become experts in topics they feel resemble their interest the most. The newly acquired knowledge must then be applied in the design projects of the upcoming semesters.

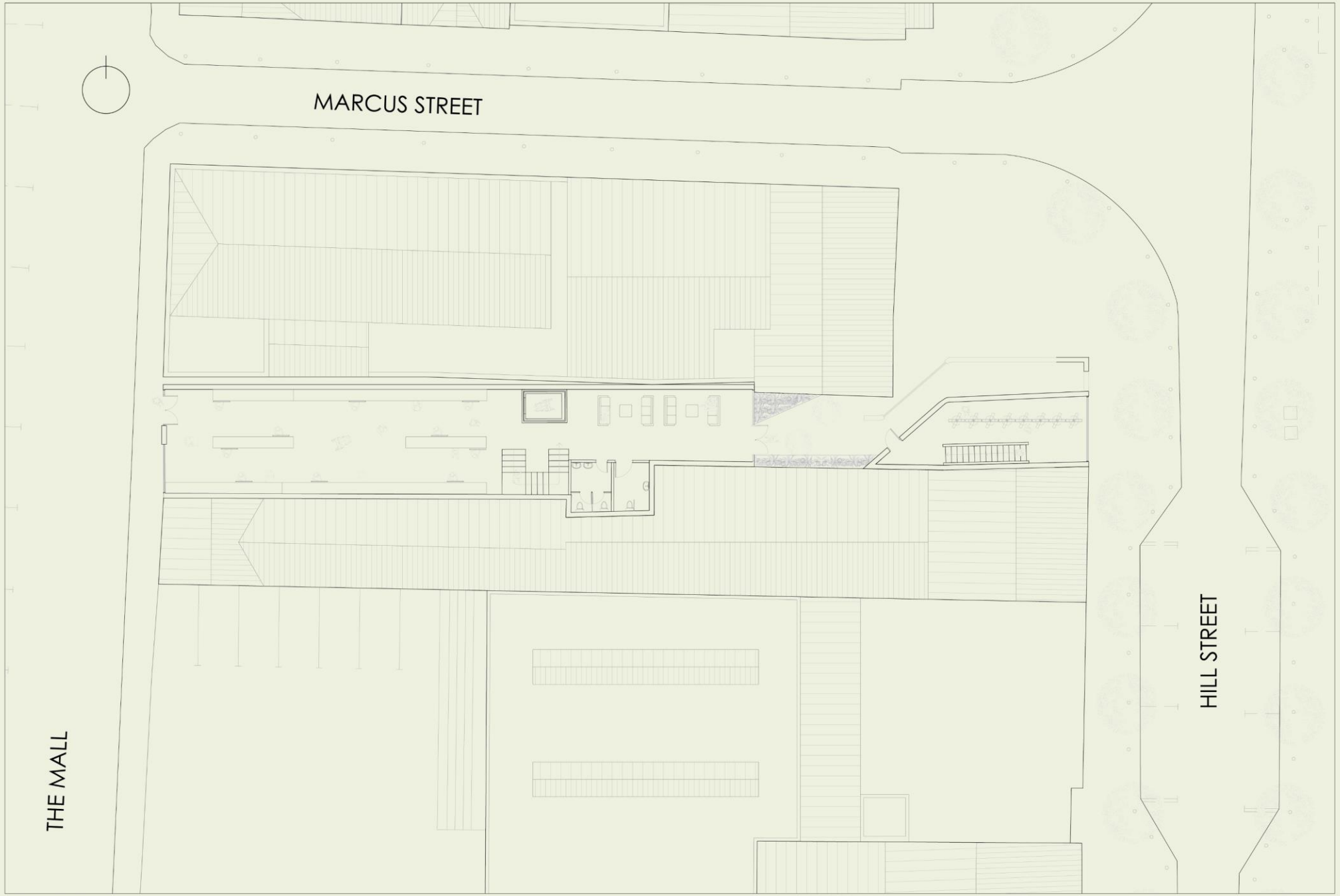
STUDIO
The three studios will have sufficient openings for an adequate natural illumination. The studios' configurations promote a dynamic studio culture thanks to trapezium desks that can be rearranged as required. Each studio has an adjacent social area that variates depending on the floor, all of them with at least one fully glazed façade that reinforces the building's connection with the wider community.

CONFERENCE ROOM
Based on the Socratic thinking, the typical format of a lecture room has been replaced by a more suited format for small and large group discussion. This area has been designed with great amounts of vegetation, since it has proved to increase creativity.



FINAL WORK

Orthographic Drawings – Plans.

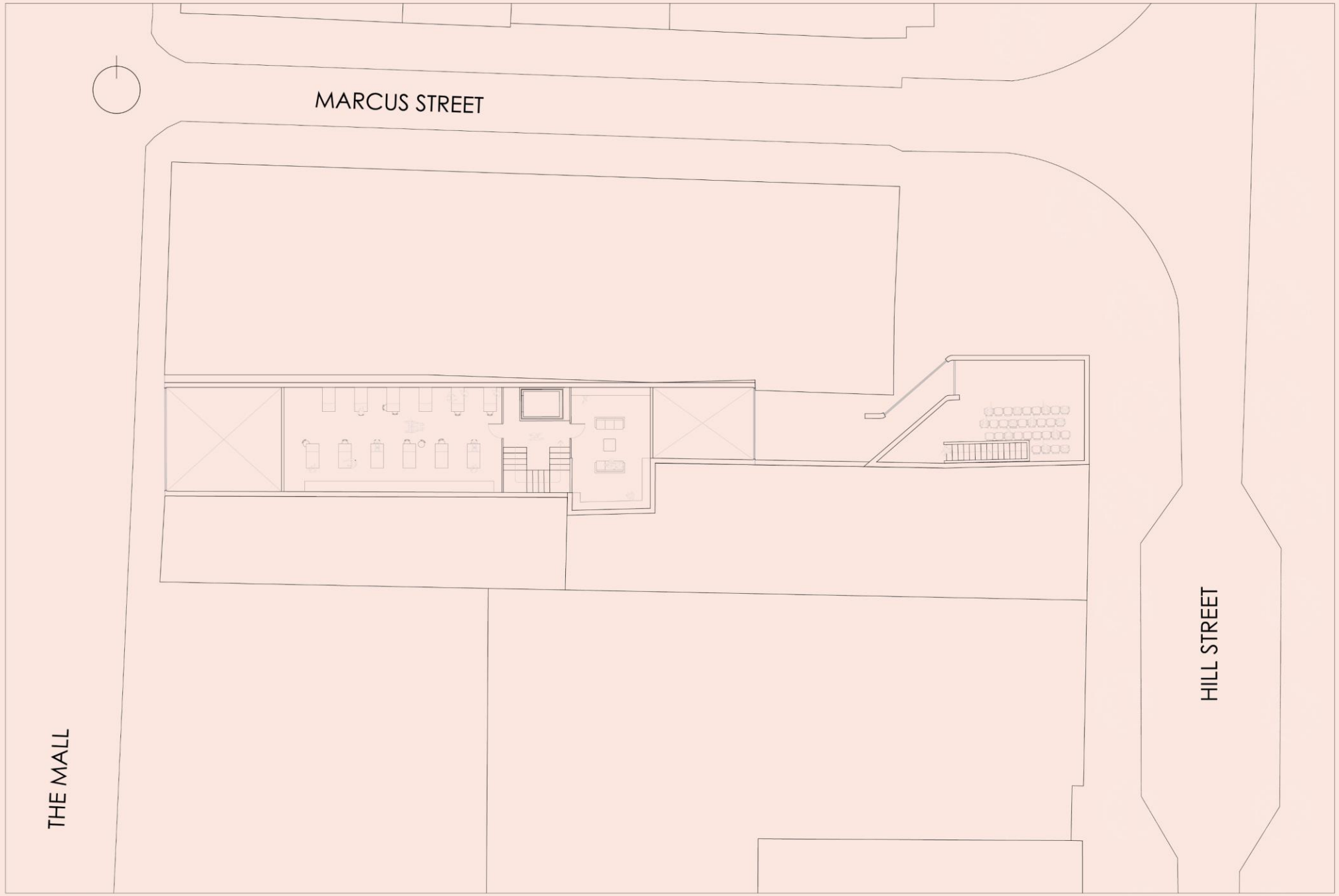


GROUND FLOOR in context
1.100

Mikaela Arroyo
40251584

FINAL WORK

Orthographic Drawings – Plans.

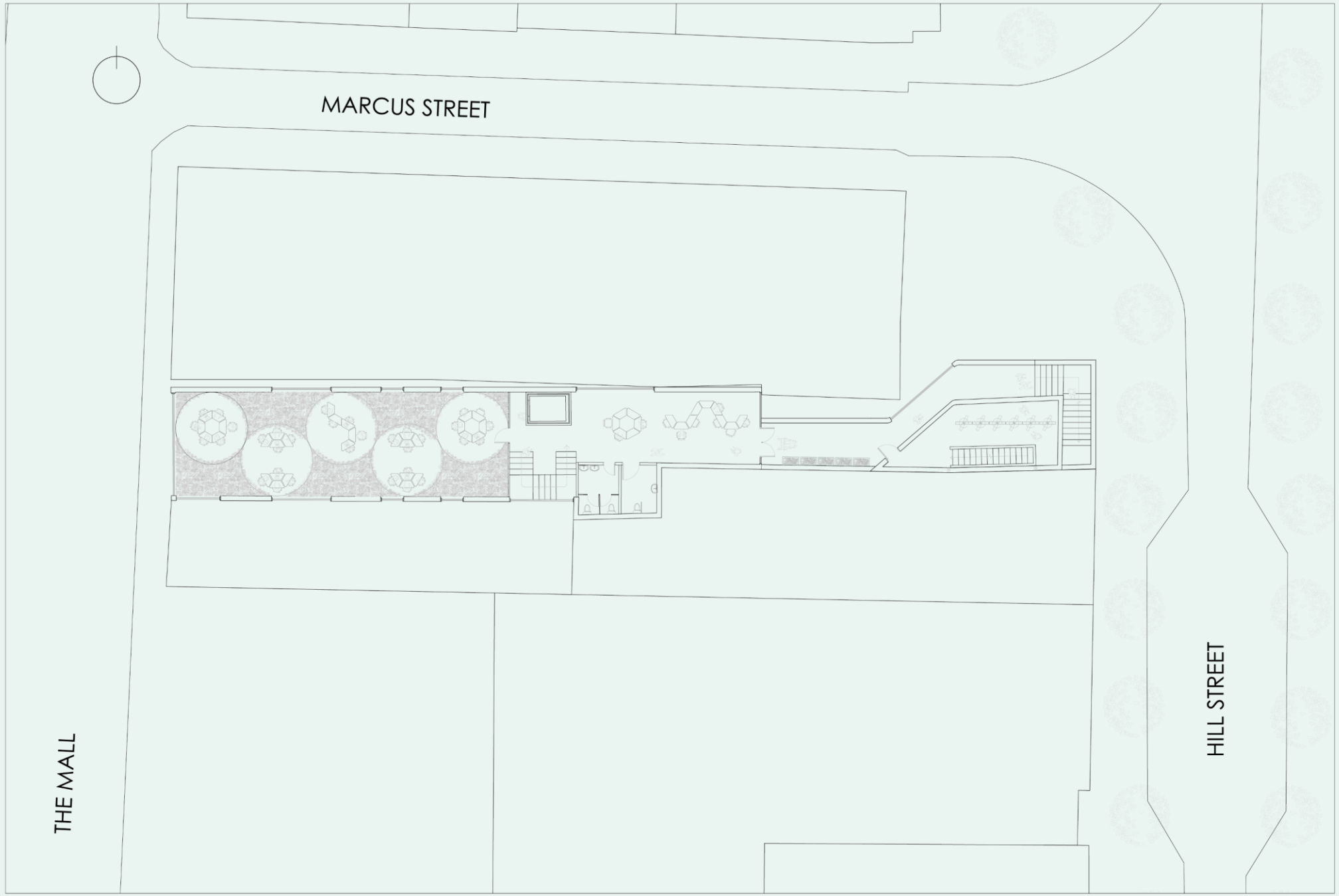


FIRST FLOOR
1.100

Mikaela Arroyo
40251584

FINAL WORK

Orthographic Drawings – Plans.

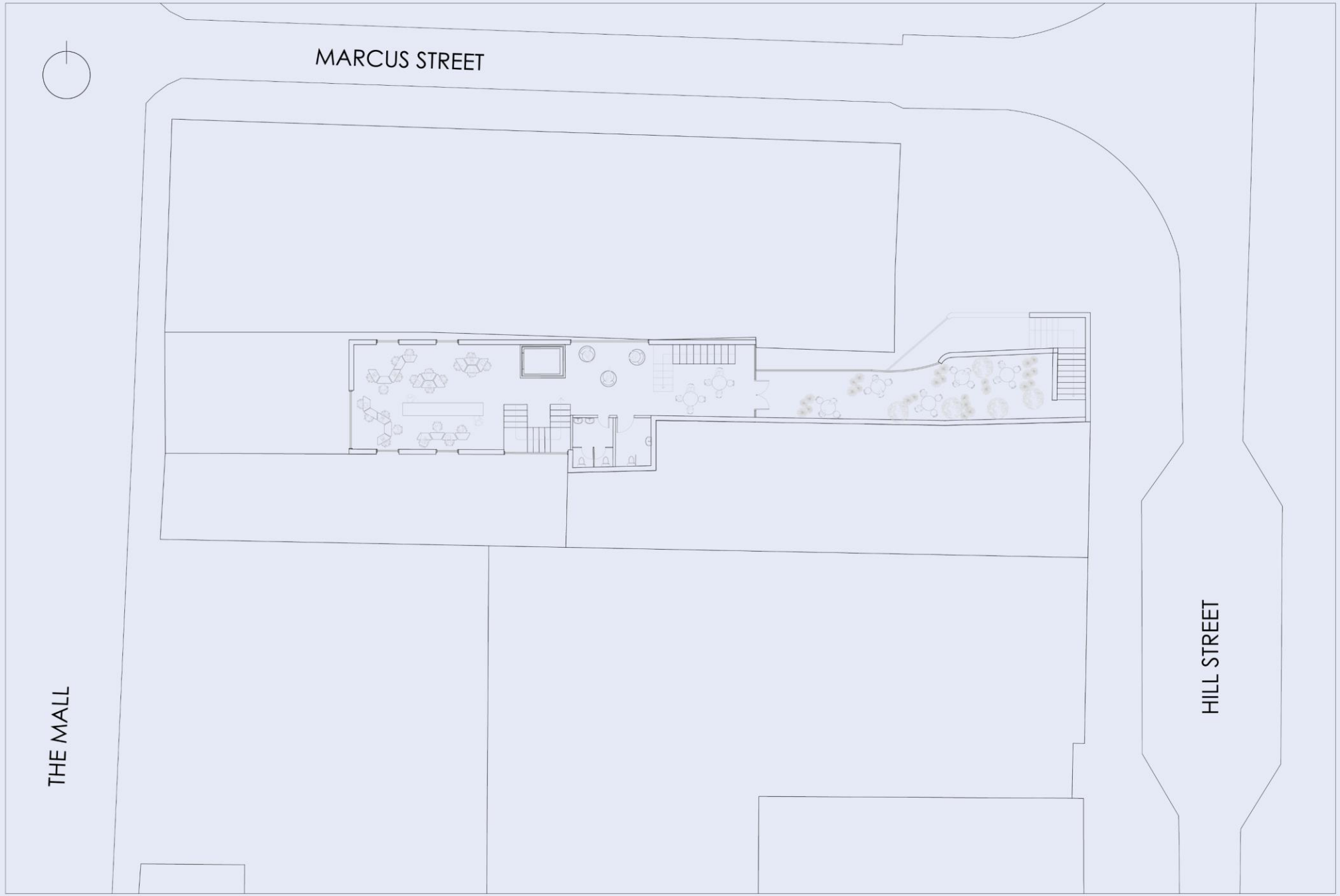


SECOND FLOOR
1.100

Mikaela Arroyo
40251584

FINAL WORK

Orthographic Drawings – Plans.



THIRD FLOOR
1.100

Mikaela Arroyo
40251584

FINAL WORK

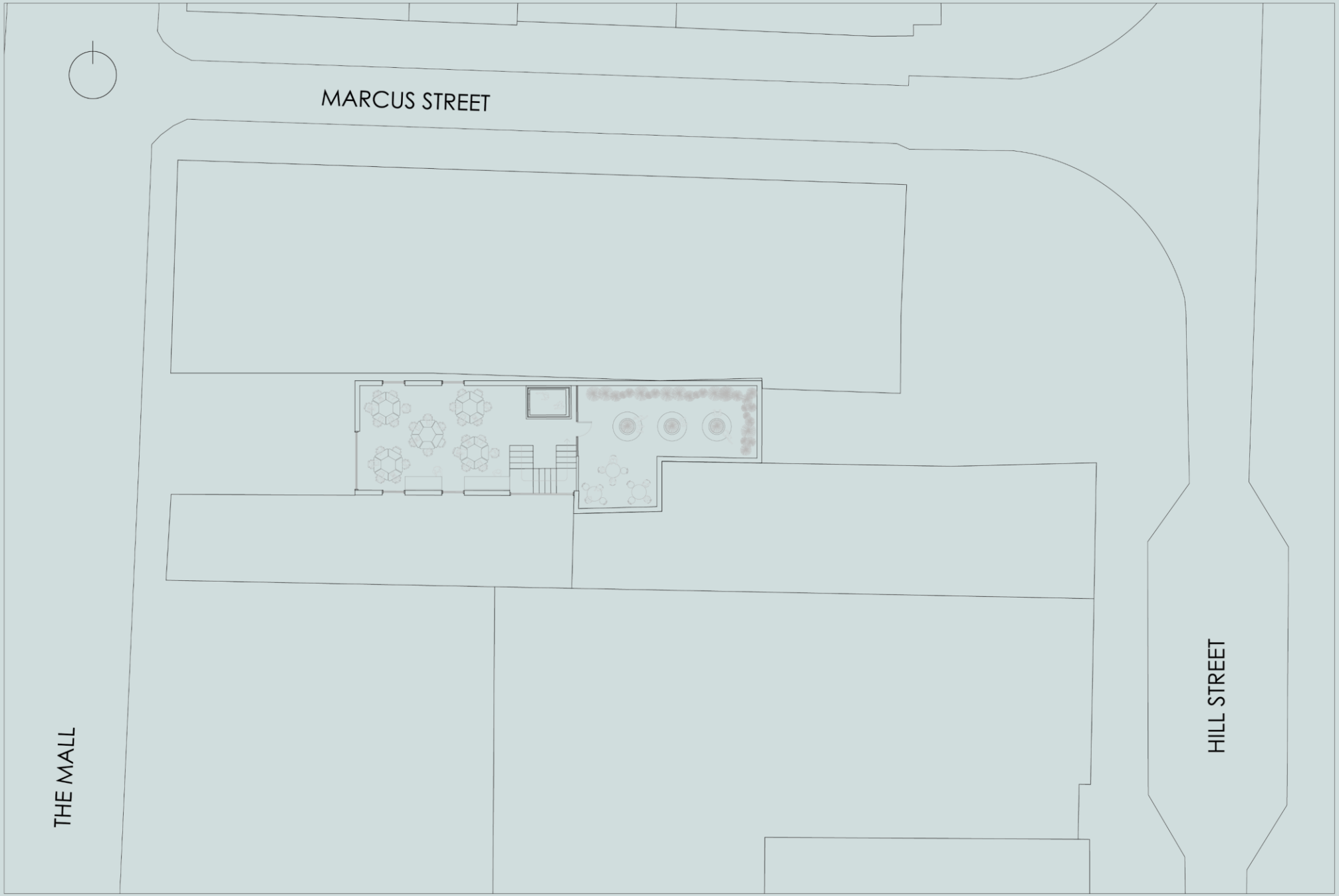
Orthographic Drawings – Plans.

FOURTH FLOOR
1.100

Mikaela Arroyo
40251584

FINAL WORK

Orthographic Drawings – Plans.



FIFTH FLOOR
1.100

Mikaela Arroyo
40251584

FINAL WORK

Orthographic Drawings – Elevations.

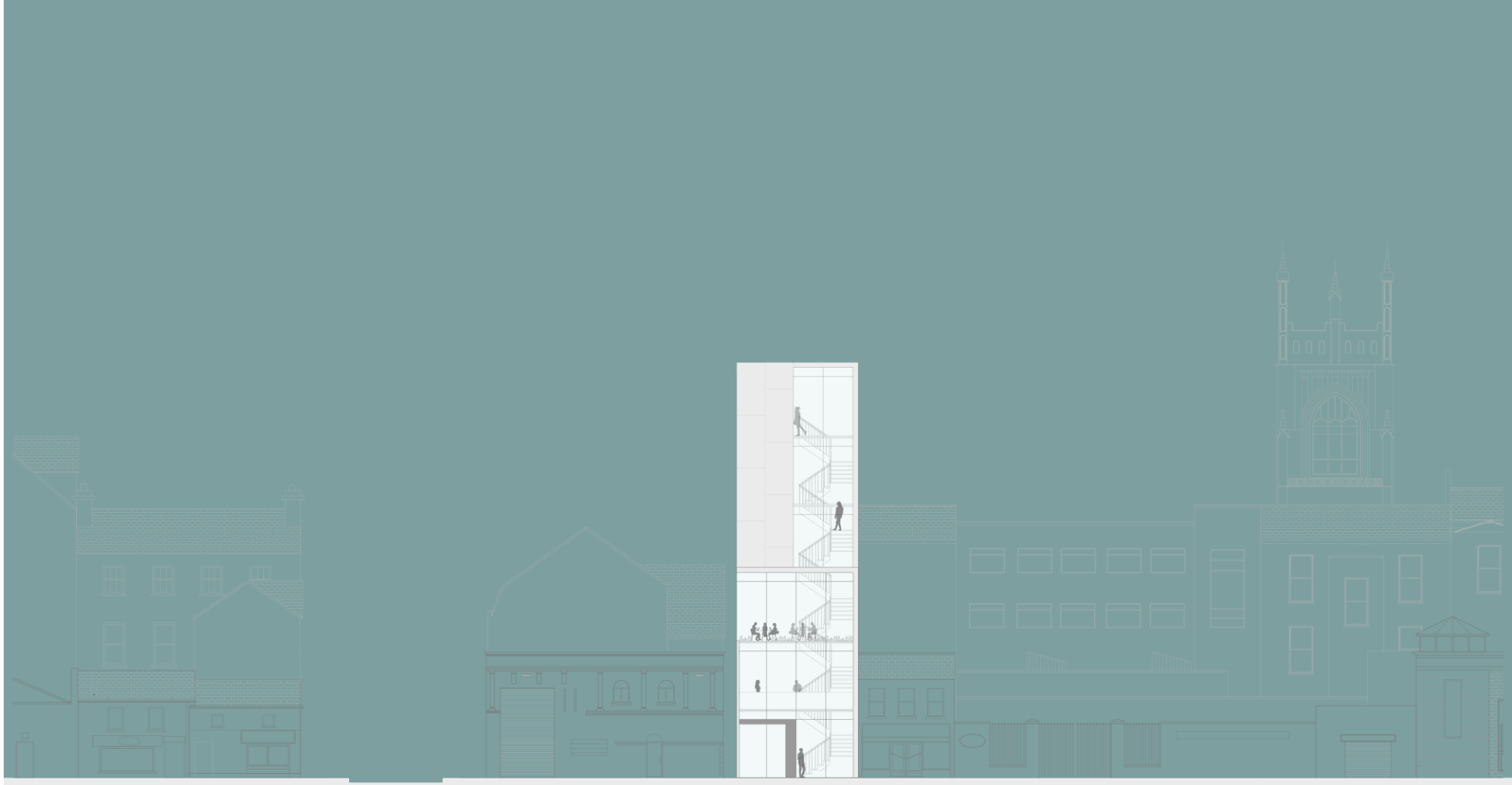
ELEVATION
Hill Street
1.100

1 5 10

Mikaela Arroyo
40251584

FINAL WORK

Orthographic Drawings – Elevations.



ELEVATION
The Mall Street
1.100

1 5 10

Mikaela Arroyo
40251584

FINAL WORK

Orthographic Drawings – Section.

SECTION
Long- North Facing
1.100

1 5 10

Mikaela Arroyo
40251584

FINAL WORK

Renders to showcase the external appearance of the Architecture School.

RENDERED IMAGES

External façades; building in context

View from Hill Street

View from Hill Street and Marcus Street Intersection

Mikaela Arroyo
40251584

FINAL WORK

Renders to showcase the external appearance of the Architecture School.

RENDERED IMAGES

External façades; building in context

View from The Mall Street and Marcus Street Intersection

View from The Mall Street

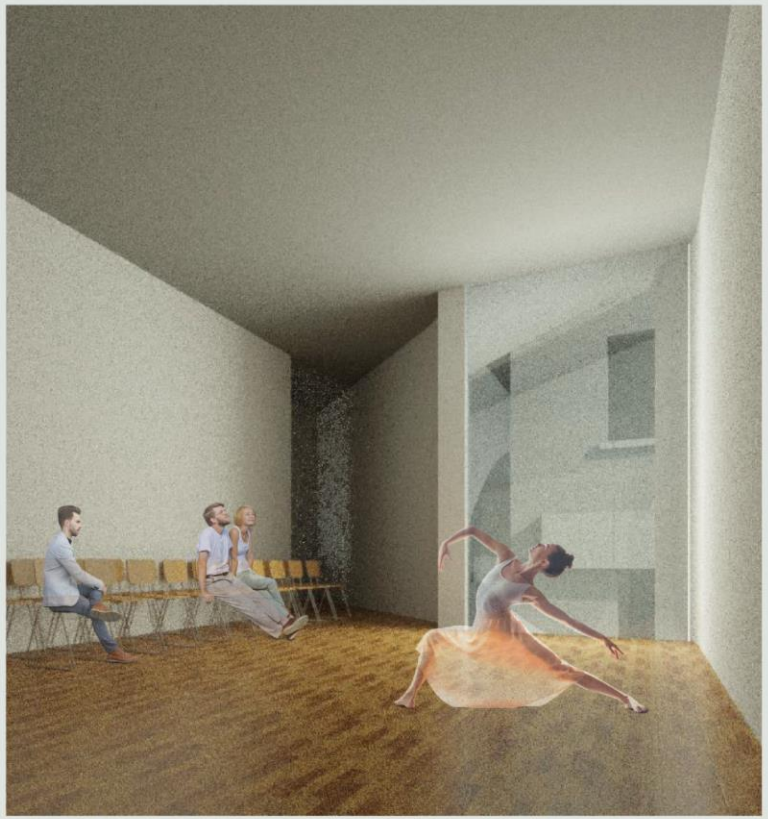
Mikaela Arroyo
40251584

FINAL WORK

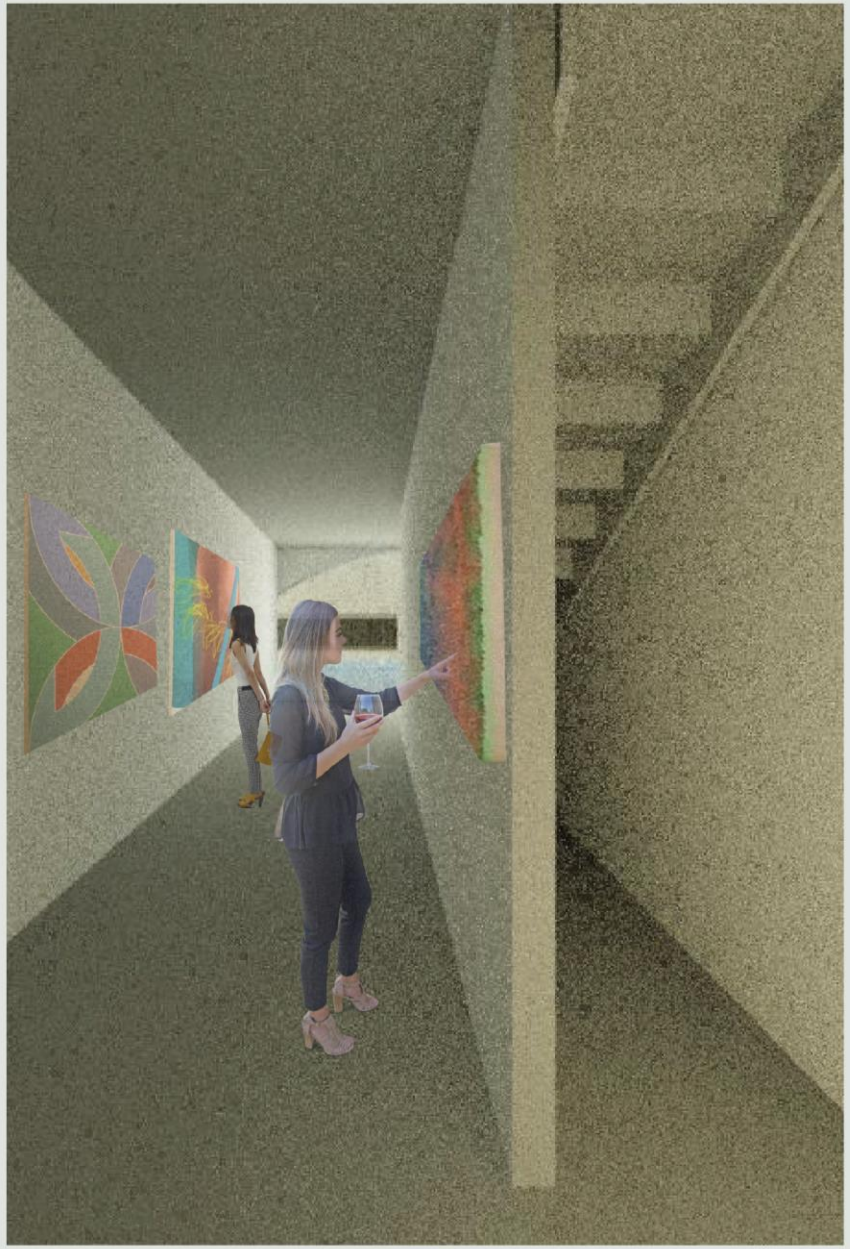
Renders to showcase the internal spaces of the Architecture School.

RENDERED IMAGES

Interior view; Art Gallery



View of the performance area; first floor



View of the gallery area; ground floor

Mikaela Arroyo
40251584

FINAL WORK

Renders to showcase the internal spaces of the Architecture School.

RENDERED IMAGES

Interior view; key areas of the main building

Mikaela Arroyo
40251584

View of the meeting point area; second floor

View of the collection point; ground floor

View of the studio area; third, fourth and fifth floors

FINAL WORK

Aerial renders to showcase the interaction of the building with the city context.

RENDERED IMAGES

Aereal view; building in context

View emphasizing the south-eastern façades

View emphasizing the nort-western façades

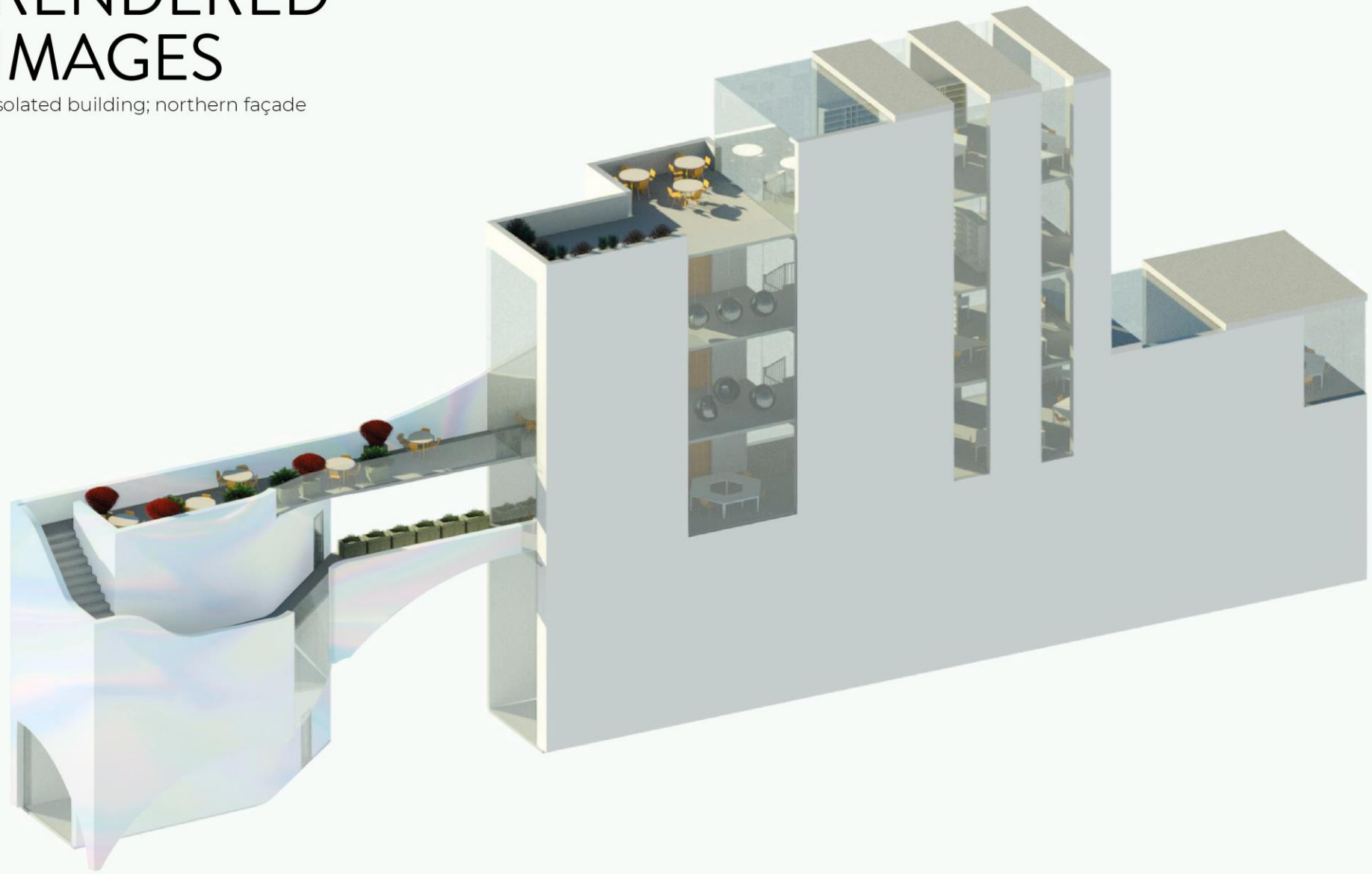
Mikaela Arroyo
40251584

FINAL WORK

Renders to showcase the Architecture School's façades.

RENDERED IMAGES

Isolated building; northern façade



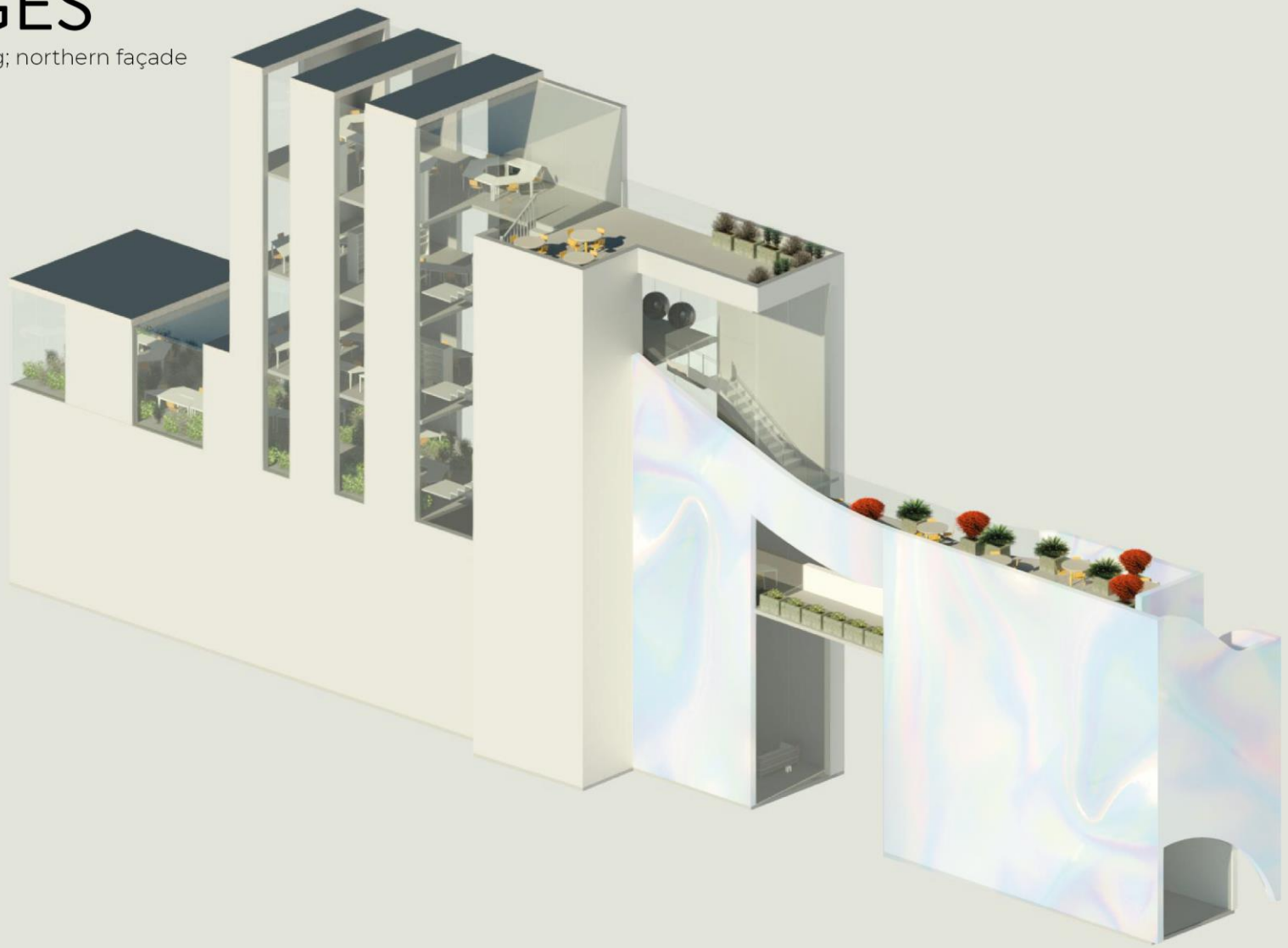
Mikaela Arroyo
40251584

FINAL WORK

Renders to showcase the Architecture School's façades.

RENDERED IMAGES

Isolated building; northern façade



Mikaela Arroyo
40251584

FINAL WORK

Render to showcase the Architecture School's internal arrangement and its interaction between elements.

RENDERED IMAGES

Isolated building; section perspective

Mikaela Arroyo
40251584

FINAL WORK

Materials' Palette.

Mikaela Arroyo
40251584

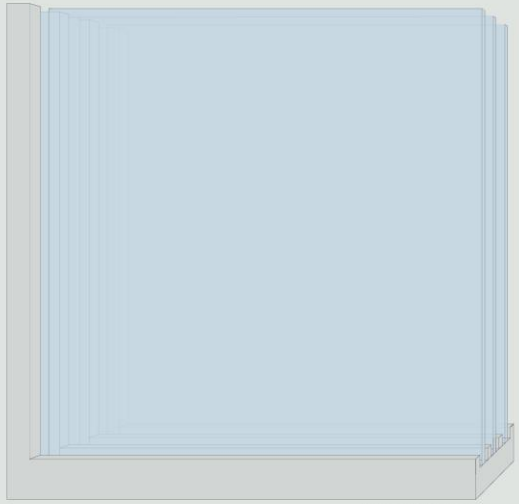
MATERIALS PALETTE

Steel Frame Structure

Precast Concrete Pannels

Recycled Plastic Pannels covered in Dichroic Film

Vegetation and Soil



Triple Glazing

Recycled Denim as Thermal Insulation

Mineral Wool as Acoustic Insulation

Aluminium Pannels Cladding

Recycled MDF boards

Bamboo Flooring

White Oak MDF Board

FINAL WORK

Materials choice:
Structure.

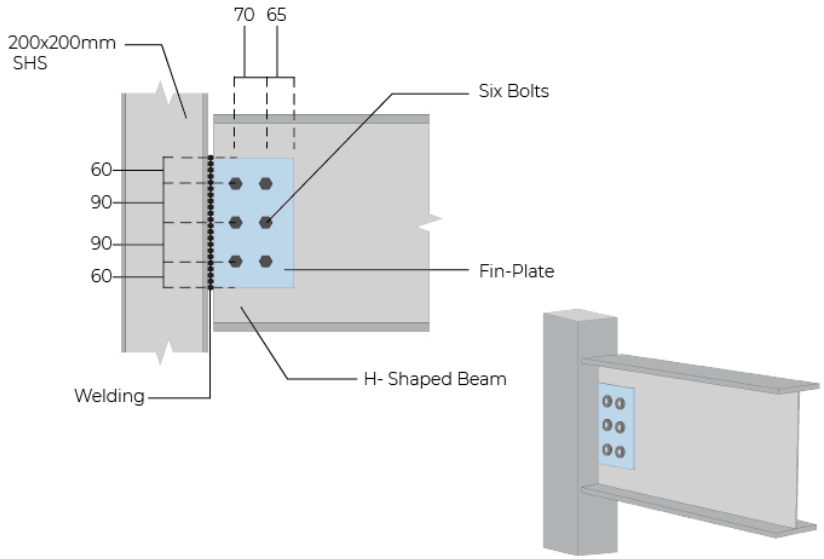
CONSTRUCTION METHODE DETAILS:
Based on ‘A demountable structural system of multi-storey building’ by Girindra Maheninggalih

Materials: Steel Frame structure and concree precast slabs

These materials’ combination offers several advantages since they complement each other; concrete has an efficient performance in compression while steel in tension. Additionally, this composition facilitates the reuse and demount ability of the structure as well as a rapid erection time.

Column to Beam Joint: Simple beam-column connection using fin-plate

Loads that are carried by the composite floor beam are transferred to column through a simple fin-plate joint. The width and thickness of the fin plate is 200mm and 10mm respectively with Six bolts of M24 with grade 10.9.



Slab to Beam Joint: Bolted shear connector with single embedded nut

This type of shear connector are the ones thar represent the most advantages in comparison to its other three variants. To mount the concrete deck to the steel beam, it is only needed to fasten on one side. Notwithstanding, both construction and deconstruction processes need a careful execution since the bolt is permanently embedded to the concrete deck. The disadvantage of the method is the difficulty in the replacement of a damaged bolt, resulting in the damage of the concrete deck if the bolt is damaged. In order to protect the concrete for a successful demounting, the edge of the deck has a steel sheeting to minimize the repercussion of impact.

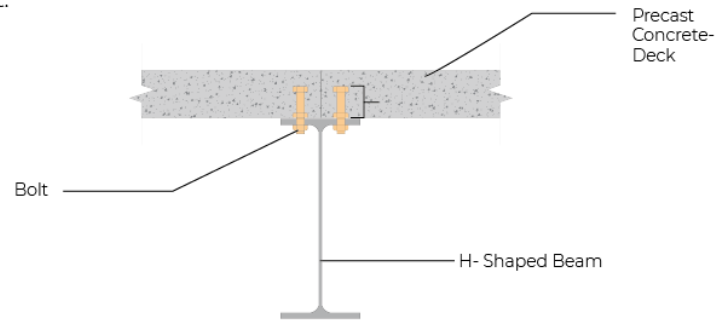
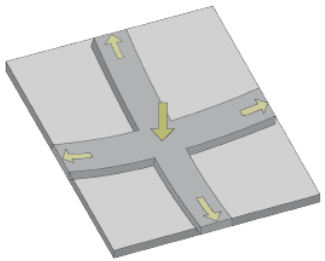


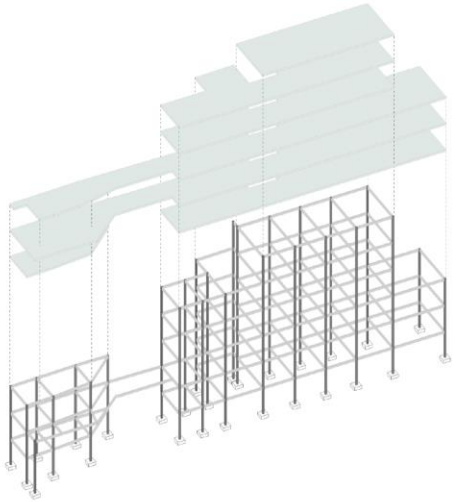
Plate Structure: Concrete Slabs

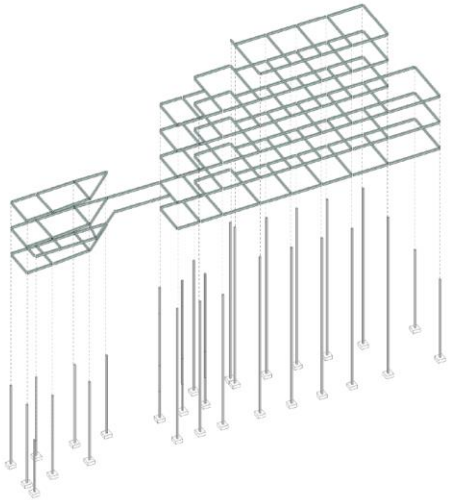
Reinforced concrete slabs, are the most common example of a plate structure. This type of structure allows for the loads to disperse in a multidirectional pattern where load automatically follow the shortest and stiffest path.



FINAL WORK

Materials choice:
Structure.





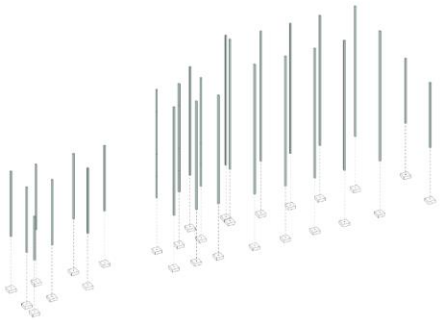
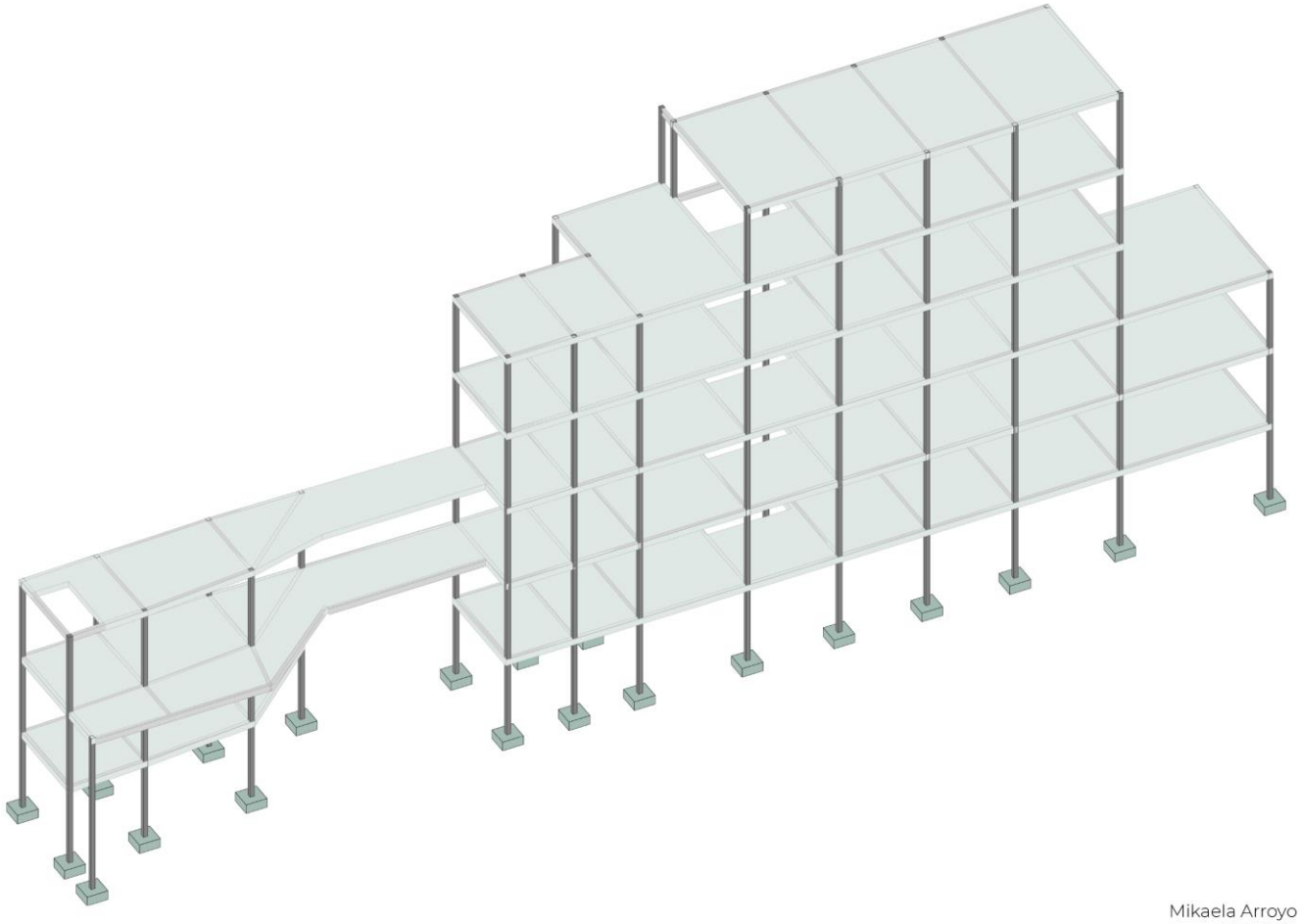


DIAGRAM OF THE PRIMARY STRUCTURE
Demountable steel frame and concrete panels structure



Mikaela Arroyo
40251584

FINAL WORK

Materials choice: cladding.

VENTILATED ALUMINIUM CLADDING PANELS

Choice of material for the main building; advantages and disadvantages

Mikaela Arroyo
40251584

The versatility and high performance of this materials allows for it to be an excellent choice for cladding. Aluminium does not require maintenance other than cleaning. Additionally, the natural process of this material is to reinforce its oxide film on the surface, increasing its hardness, anti-corrosion quality and absorption resistance, offering a long life span.
More than half of the aluminium currently produced in the European Union originates from recycled raw materials, and this trend is on the increase. As the energy required to recycle aluminium is about 5% of that needed for primary production, it offers clear ecological benefits of recycling.

Advantages

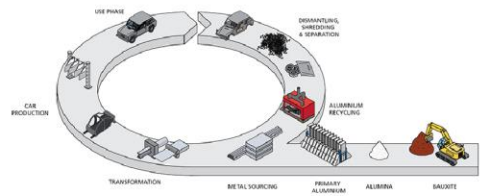
Durability:
-Its natural aging process makes the material even more durable over time
-Low maintenance
-Weatherproof, corrosion-resistant and immune to the harmful effects of UV rays

Sustainability:
- It can be repeatedly recycled without any loss of value or properties
- Only 5% of the energy that was required for its initial production is needed for the recycling process
- Aluminium is a good conductor of heat

Appearance:
- It very malleable and can be customized
- Variety of finishing and colours that do not inhibit its capacity to be recycled

Disadvantages

- The mechanical and physical conditions of aluminium alone are not suitable for building construction, notwithstanding, this can be improved by the addition of alloying elements such as copper, manganese, magnesium, zinc, etc...



The ventilated facade is an enclosure system that allows an insulating layer and an outer leaf to be placed on top of an inner leaf by means of a supporting structure.

The separation distance between the layers allows a current of air to pass between the insulation and the coating, generating a “chimney effect” that creates natural ventilation.

This effect, through heat transfer by convection, makes the ventilated facade warm in summer and circulates the air inside the chamber, replacing the warm air with colder air. On the other hand, during the winter months the air in the chamber is heated, but not enough to circulate and renew itself.

RECYCLED PVC PLASTIC AS FACADE ELEMENT

Choice of material for the front gallery; advantages and disadvantages

Mikaela Arroyo
40251584

FINAL WORK

Materials choice: cladding.

The world produces around 359 million tonnes of plastics each year, which has led to a consensus that plastics are an unsustainable material. And yes, plastics are certainly an enormous problem, but they don't necessarily have to follow the linear economic model. As architects we can upcycle it and give plastic a use in construction.

In this case, the plastic panels will not be exposed, but covered by dichroic film, similarly to the Louis Vuitton's Flagship store in Ginza, Tokyo. This efect will resamble the water body near the site as well as giving the building a 'distorted mirror- like' appereance for people passing by.

Advantages

Durability and Mantainance:
- Waterproof, corrosion resistant and lightweight
- Weatherproof, resists extream winds, and damp
- Easy to mantain
- In the unlikely event of a panel getting damaged, its easy to replace or repair

Appearance:
- Easy to mould to the desired shape and holds it despite weather and time
- Costumizable in terms of texture and colour

Sustainability and Cost:
- Used plastic can be upcycled to create the panels, emphasizing a circular econimic model
- Cost effective, compared to other traditional cladding materials

Disadvantages

- Not the most adequate for very high temperatures
- PVC stands for Polyvinyl Chloride; it contains chlorine which is a volatile element. Minimal particles can be released overtime eventough it is not a hazard to public health.

FINAL WORK

Materials choice:
Insulation.

RECYCLED DENIM THERMAL INSULATION

Choice of material for thermal insulation; advantages and disadvantages

Mikaela Arroyo
40251584

The current fashion industry uses high quantities of non-renewable resources, including petroleum and water, extracted to produce clothes that are often used only for a short period of time, after which the materials are largely lost to landfill or incineration; making the fashion industry responsible of around 10% of all greenhouse gas emissions in the world and 20% of global waste water. According to the BBC; More than two tonnes of clothing are bought each minute in the UK, more than any other country in Europe. Globally, around 56 million tonnes of clothing are bought each year, and this is expected to rise to 93 million tonnes by 2030 and 160 million tonnes by 2050. The recycling process of clothing to create new garments is very complicated because creating a piece of clothing means using different types of treads, zippers, tags and dyes; less of 1% of new garments are made from recycled fabric.
Alternatives have been investigated, and recycled denim can be used in construction as thermal insulation. This high-performance insulation material is made from scraps and clippings from the manufacture of denim clothing as well as old denim pieces of clothing that have been outworn or discarded already. Buttons, zippers and other metallic pieces are removed before the denim pieces are cut into smaller pieces to then be shredded into cotton candy- like fibre blocks. Unlike other type of clothing, denim is usually done of 100% cotton, meaning it can be broken down and repurposed very easily.

Advantages

Sustainability
- 100 percent recyclable at the end of the insulation's usable life
- requires much less energy than the manufacturing of fiberglass insulation
- waste free manufacturing process

Performance and Installation
-Excellent thermal performance
-Denim insulation's acoustic ratings are about 30 percent higher than those for traditional insulation
-Contains no volatile organic compounds or formaldehyde, which call pollute air indoors.
-does not irritate the skin or the respiratory tract as other insulation materials do

Disadvantages

-On its own, the material is not fire, pest, mildew and mould resistant, notwithstanding, treatment can be added to the manufacturing process to make it resistant to these
-Can be difficult to cut into the proper width, therefore manufacturers have added perforated seems to facilitate this
-It can cost twice as much as fiberglass for similar insulation effectiveness

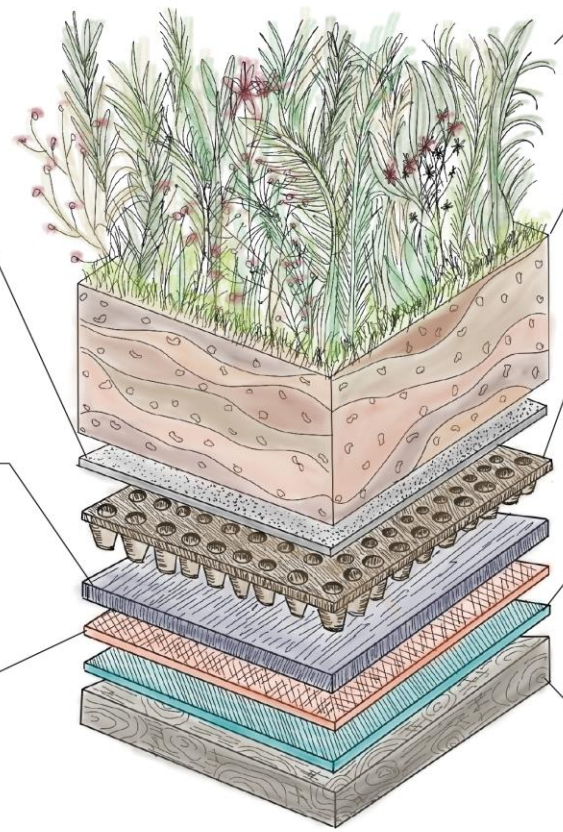
Mikaela Arroyo
40251584

FINAL WORK

Materials choice:
Vegetation.

INDOORS GARDEN:
Construction layers detail

Indoors gardens are not only an excellent way of bringing nature in to the building as an aesthetic and design tool, but they will also convert CO2 emissions, reduce costs of cooling and heating costs and minimize water runoffs.



Vegetation

Growing medium

- The soil must be of high nutritional quality to nurture the plants.
- This layer must be of at least 15-20 cm thick to provide a good growing medium.

Drainage Layer

-Made out of rot-proof material
-Essential for the durability of the garden

Waterproof Memebrane

-Protection membrane for the main structure from the moistness of the garden
-Crucial for avoiding leaks or humidity filtrations that can damage the construction under-

Structural Support

Filter Fabric/Root Repellent

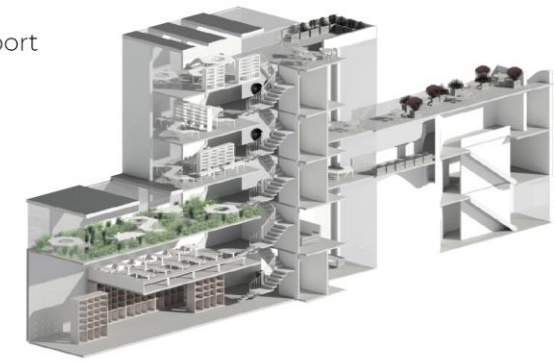
-Prevents the loss of soil while keeping it in place
-Allows moisture flow to the drains and keeps them unclogged
-Root barrier, protects the roof membrane

Insulation Layer

-Durable enough to resist heavy weight
-Moisture resistant - from a structural, not a thermal perspective
-Styrofoam is often used

Protection Board

-Serves as the protective barrier of the membrane during garden construction
-Protects the waterproofing membrane from damage by garden tools and mechanical equipment
-Remains in place and becomes an integral part of the completed system



FINAL WORK

Materials choice:
Vegetation.

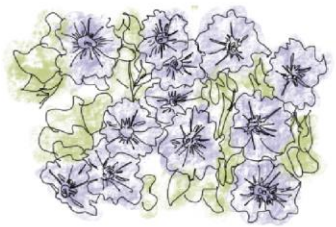
VEGETATION CATALOGUE

Shrubs and flowers that do perform well in an environment with parcial sun.

Geraniums

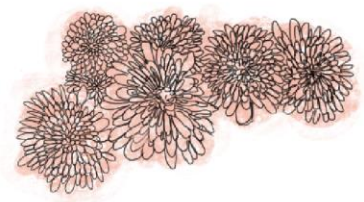
- If provided with enough light, they can bloom indoors all year long
- Up to 10cm – 121 cm tall

Petunias



- Bloom from spring to winter in many colours and patterns and prefer plenty sun exposure
- Up to 15cm – 45 cm tall

Chrysanthemums

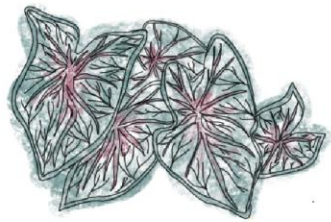


- Will grow in partially shaded areas, direct sun exposure should be avoided
- Up to 10cm – 50 cm tall

Daffodils

- Require full or partial sun and grow well in between shrubs
- Up to 15cm – 30 cm tall

Caladium



- Foliage plants for shady or semi-shady spaces
- Up to 15cm – 30cm tall

Ferns

- Very tolerant to winter temperatures and prefer shaded areas
- Up to 30cm – 180 cm tall

Coleus

- Most of the varieties prefer partial shade
- Up to 15cm – 30 cm tall

Monstera Deliciosa

- Grow trying to reach towards dark areas in search of something to climb on
- Up to 18 m tall

Mikaela Arroyo
40251584

FINAL WORK

Materials choice: 1.20 detailed section.

1.20 SECTION DETAIL

Specification of construction materials as well as the reason why they have been chosen.

1 -10 mm Bamboo Flooring
Shares similarites with traditional wood in terms of apearance and performance, notwithstanding it is not wood but grass. Its regenerative quality (5-7 years to reach harvesting maturity) as well as its recyclability and biodegradability, make these material a environmentaly friendly alternative.
-70 mm Screed
-Vapour Barrier Membrane
Placed next to the insulation layer to reduce moisture flow into the building, preventing damaging levels of condensation and subsequently protecting timber from decay and metal to corrod.
-100 mm Recycled denim thermal insulation*
Recycled denim is an excelent alternative for a circular economy. As the fashion industry aims to go green, a good alternative is a business model where costumers who return their old denim items, recieve a discount on the store and the clothing is forwarded to a different entity so it's transforemed into insulation. Additionally, It provides higer acoustic insulation than traditional insulation materials, has a waste-free manufacturing process and does not contain harmful volatile components.
-Ply Sealing Layer
-200 mm reinforced concrete slab*

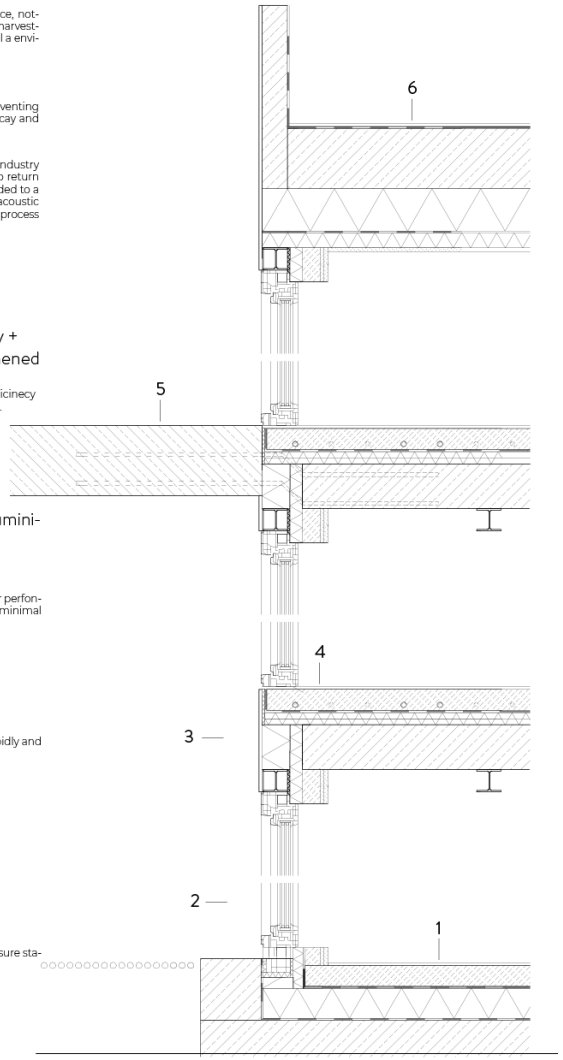
2 -Triple glazing: 4 mm toughened glass + 14 mm cavity + 4 mm toughened glass + 14 mm cavity + 4 mm toughened glass inPVC-aluminium frame
The reduction of heatlos as well as the thermal which lead to a higher energy efficinecy and the deminishing of external noise make triple glazing ideal for this building.

3 -25mm Aluminium exterior cladding*
-200 mm Reinforced concrete slab*
-140 mm Recycled denim thermal insulation with aluminium foil lamination vapour barrier
-200mm x 180mm Steel frame structural beams*
-50 mm Mineral wool acoustic insulation
Mineral wool's excellent thermal and acoustic insulation is accompanied by other perfonmance advantages such as its resistance to fires, inmunity to mould formations, minimal ecological footprint and complete recyclability.
-2× 12,5 mm spackled gypsum board

4 -10 mm Bamboo flooring
-70 mm Screed with underfloor heating
Underfloor heating allows rooms to reach comfortable interior temperatures rapidly and using less energy, it is an efficinet alternative for the conventional radiators.
-0.2mm PE foil
polyethylene foils are suitable as a moisture barrier as a separating layer.
-20 mm Mineral wool acoustic insulation
-20 mm Recycled denim thermal insulation*
-240 mm reinforced concrete slab*
-200mm x 180mm Steel frame structural beams*

5 - 240mm Reinforced concrete Slab with steel bars
The steel bars allow the external concrete slab to join with the internal slab to assure stability

6 - 10mm UV protected bamboo flooring
-Ply bituminous roof sealing layer
This highly viscous form of petroleum is frequently used in construction thanks to its waterproofing qualities
-200 mm reinforced concrete slab*
-140 mm Recycled denim with aluminium foil laminate*
-Vapour barrier
-50 mm Mineral wool acoustic insulation
-12,5 mm Gypsum board



* Further specification will be provided in other pages

Mikaela Arroyo
40251584

3.2

WEEKLY PROGRESS

From week 4 to week 12

WEEK 4

THE REDISCOVERY CENTRE

The Rediscovery Centre is the National Centre for the Circular Economy in Ireland. The movement connects people, ideas and resources that support a more sustainable living. Artists, scientists, designers and craftspeople use their skills and knowledge to give unwanted materials an added value. They want to nurture the ideas that lead to a circular economy and environmental integrity that are led by creativity and innovation.
The centre offers interactive workshops to students that are interested in a sustainability agenda. Additionally, the centre counts with a Eco Store where they sell produces from over 20 independent Irish suppliers and also the final products fabricated in the workshops.

THE CIRCULAR ECONOMY ACADEMY

Free mentoring programme that assists Irish social enterprises and community organizations to transfer their activities towards a circular economy. The academy proved guidance and strategies that are specifically designed depending on the business. The Academy also supports organization that want to replicate the Redescovery Centre successful reuse initiatives.

UPSICLE

REDESIGN

REUSE

REMANU-FACTURE

REDISCOVER PROGRAMME

These four branches of the Rediscover Programme wants to reinforce a circular economy. The aim is to repurpose old materials that otherwise would have become waste. In all the different branches, the enterpirse creates training oportunities for long therm unemployed. Additionally, the products are sold in the Eco Store and all the revenue generated from the products is reinvested in the enterprise.

REDISCOVER FASHION

REDISCOVER FURNITURE

REDISCOVER CYCLING

REDISCOVER PAINT

NEUROARCHITECTURE

LIGHTING

Insufficient natural lighting can alter our synchronization of the circadian rhythms and can cause that the hormonal segregation is insufficient or out of schedule. Additionally, the amount as well as the source and colour of light affect our mood and activity. An intense white light activates our brain while warm lighting conveys relaxation.

Research has shown that staff that worked in an office without any natural light sleep 46 minutes less than people who do work where there is natural light. However, in some countries during winter tie, people are only exposed to sunlight while they are working. This causes psychological alterations such as SAD (Seasonal Affective Disorder), anxiety, stress and fatigue.

COLOUR

The effects of colour in our brain go far beyond personal taste or cultural values but have rather a deep connection with our emotions and capability of retaining information. Each colour acts on a different area of our brain. Studies have shown that pink for example calms our nerves and reduces anger levels, while warm colours that can be linked to nature improve our productivity and concentration and red tones are more likely to catch the attention of the receptor.

TEMPERATURE

A well-balanced temperature is important for creating comfortable surroundings, given that our brain is very sensitive to sudden temperature changes which may impede cognitive performance and, on an emotional level, result in hostility.

GEOMETRIES

Our brain reacts significantly to the geometry of a room or the elements in it. Round edges help us to relax while sharp angles activates our brain and induces us to a state of productivity and alertness.
Additionally, to boost our creativity, facilitate concentration and improve our problem-solving capability; large rooms with high ceilings and natural light are preferable. On the other hand, low ceilings favour routine or detail-oriented work.

The WHO calculated that it's between 80% and 90% of the time that we are awake during the day that we spend it inside a building. Neuroarchitecture wants to create an environment that has a positive impact in the users' behaviour, health and performance by understanding how certain architectural elements influence our thinking processes and neuronal behaviour.

PROGRAM OF THE ARCHITECTURE SCHOOL

The School aims to go beyond architectural teaching, becoming almost a social hub that has 3 principal functions:

1.- ARCHITECTURE SCHOOL

Create a comfortable and diverse space for students to learn, prioritizing a Socratic teaching where the dialogue and interchange of ideas is the main learning approach. Spacious workplaces with high ceilings and windows will be provided for individual work as well as areas designed for small and big group discussion.

STUDIO:
It would be located in the upper floor for a better natural light exposure. It aims to have a working space for each student as well as a wall dedicated to the 'errors and trials'. A display of the experiments, the work in progress and models that did not made it to the final review.

CONFERENCE ROOM:
A whole level dedicated to discussion and debate. A big span of interrupted space where the furniture can be arranged in different ways to facilitate a big group discussion, small groupwork or peer review. The user can adapt the space as suitable depending on the activity.

WORKSHOP:
An area where students can find materials and tools for creating models. This could potentially be located on the ground floor.

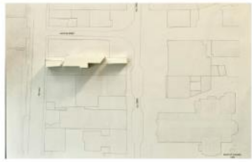
2.- ART GALLERY

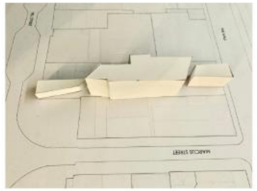
An exposition area is incorporated to allow students to display the work they have done during the semester in an End of Semester Cocktail Party. They will have the opportunity to celebrate their work with their friends and family. While the end of semester exhibition is not taking place, this could be an excellent place for local artists to display their photographs, painting, sculptures, etc.

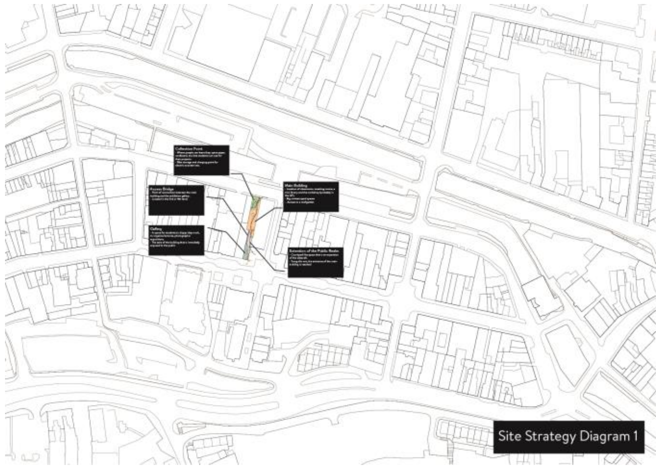
3.- COLLECTION POINT

The aim of having a collection point is for the students to have recycled materials to use for the initial stages of their work such as cardboard. The students could also fabricate their own sketchbooks by fabricating recycled paper. Additionally, the space could have a designated area for storing the bikes of students, teachers and visitors.

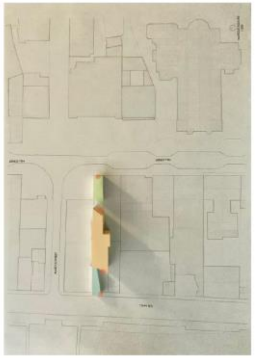
BUILDING PROPOSAL 1

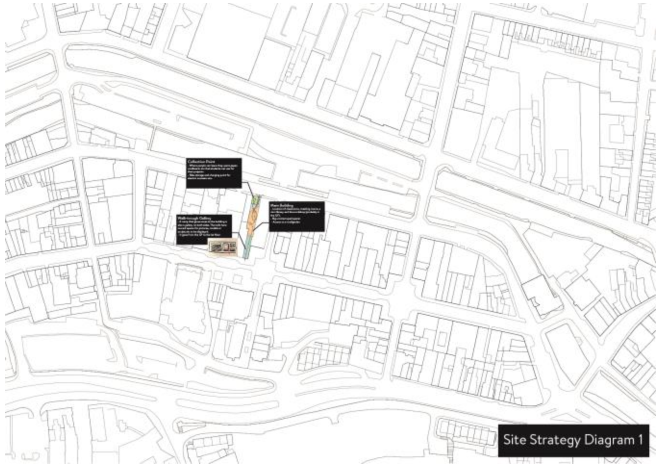




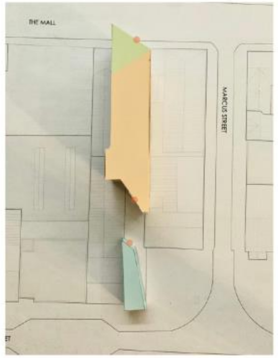


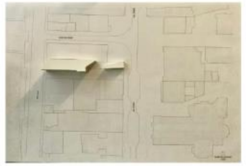
BUILDING PROPOSAL 2

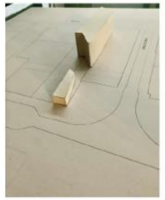


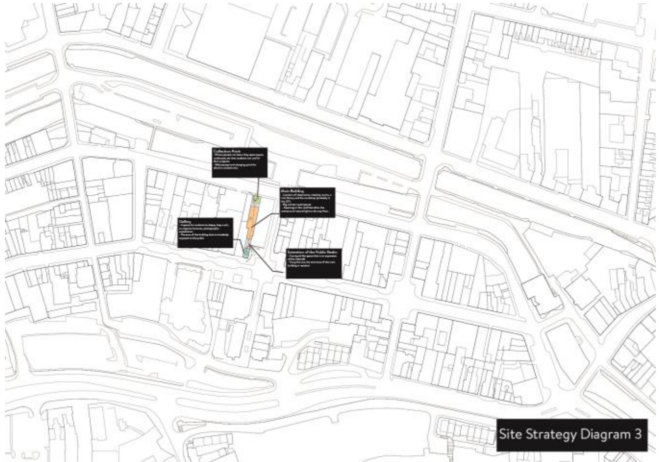


BUILDING PROPOSAL 3

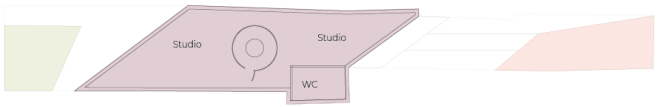




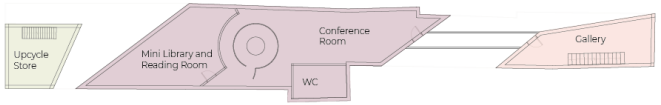




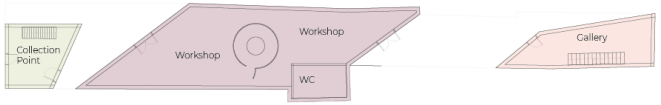
WEEK 4



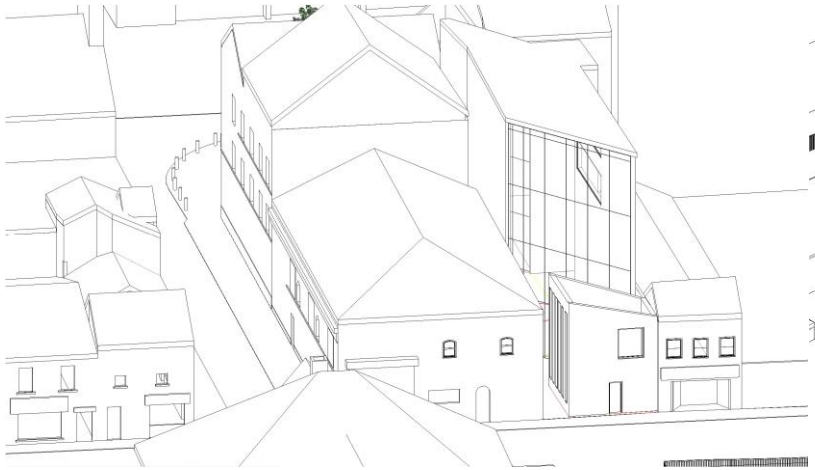
Second Floor



First Floor



Ground Floor



WEEK 5

PRECEDENT STUDY AND MATERIAL SELECTION:
Museum of Contemporary Art, Cleveland - USA

- Its twisting architectural form shifts from a compact hexagonal base to a rectangular roof, creating a new public plaza, a soaring atrium and a dynamic double-decker staircase.

-Its mirror-finish black stainless-steel envelope reflects the urban surroundings, changing in appearance with differences in light and weather.

- One of thefacades is clad in transparent glass, flank a new public plaza which serves as a public gathering place and links MOCA to Uptown attractions and amenities, including the expanded Cleveland Institute of Art and new commercial space and residential units.

- A grand, 'double-decker' staircase inverts the typical linearity of stairs by providing ten different ways to ascend, connecting the floors and reflecting the importance of transience and flexibility. An enclosed, descending egress stair doubles up as a sound gallery and is entirely painted yellow to transcend the boundaries of vision. Ascending from the atrium, the upper levels reveal themselves slowly: the stair leans forward as it climbs following the profile of the building, wide landings provide social spaces and the open route plays out as a panorama.

PRECEDENT STUDY AND MATERIAL SELECTION:
Library Delft University of Technology, Delft - Netherlands

- The iconic library of TU Delft, designed with the digital transition in mind, still meets expectations more than two decades after its opening.

- A vast lawn opposite the Brutalist concrete auditorium is tilted at one point; the library slides into the resulting space underneath. A cone, the symbol of technical engineering, pierces the lawn and library, attaching them like a pushpin.

- Daylight enters the building through the climate-controlled glass facades, as well as through the cone whose base forms the focal point of the central space. Moreover, the cone shapes different reading rooms on the upper floors.

- The main hall of the library is defined by its spaciousness. It has a cathedral-like effect: imposing and inviting.

DEMOUNTABLE STRUCTURES:
Reuse-Stru system

One of the main sectors of the economy with the greatest business potential within the circular economy is the building sector due to its massive impact on the resource consumption, waste generation and environmental emissions. In order to tackle this, demountable steel and concrete structural systems can enable the reuse of structural materials at the end of the life of the building.

Opposed to conventional steel and concrete joints (Fig 1), pre-tensioned High-Strength Friction-Grip Bolts (HSFGB) connect the steel beam to the solid precast concrete slabs (Fig 2) promoting the reuse of all the structural elements at the end of the lifespan of the building.

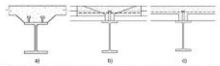


Fig. 1. Welded headed studs applied as shear connectors in profiled decking system (a), hollow core sections (b) and solid slab with topping (c)

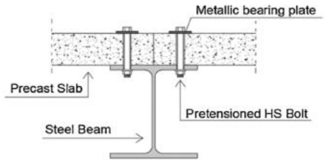


Fig. 2. Steel concrete composite beam with HSFG bolts.

Usually, the process after the demolition of a building is to aim to recycle the structural elements. Steel can be recycled to a higher, lower depending of the process that is undertaken. Concrete on the other hand can is crushed durning demolition and can be used as aggregate for fresh concrete or fill material for several applications in construction elements.

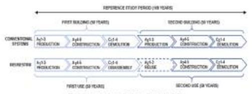


Fig. 5. Reference study period and system boundaries of LCA.

To avoid the risk of a structural detereoration of materials by extreme load bearin condition can be prevented by incorporating precast hollow core concrete slabs.

depth of the slab (m)	spanning capacity (m
0.20	8.53
0.25	10.67
0.30	12.19
0.40	15.24

PROGRAM OF THE ARCHITECTURE SCHOOL

The School aims to go beyond architectural teaching, becoming almost a social hub that has 3 principal functions:

1.- ARCHITECTURE SCHOOL

Create a comfortable and diverse space for students to learn, prioritizing a Socratic teaching where the dialogue and interchange of ideas is the main learning approach. Spacious workplaces with high ceilings and windows will be provided for individual work as well as areas designed for small and big group discussion.
The programm would also bring forward some concepts from the Portfolio School; a new education methodology applied in primary and secondary eduaction designed by Nancy Otero, where the the learning sources from the curiosity of the students. In this Architecture School, during the first semester of every year, the students will be able to become experts in topics they feel resamble their interests the most.

This investigation can range from innovative construction methodes, alternative incorporation of materials or avant-garde architectural styles. This newly accquired knowledge must then be applied in the design projects of the upcoming semesters.

STUDIO:
It would be located in the upper floor for a better natural light exposure. It aims to have a working space for each student as well as a wall dedicated to the 'errors and trials'. A display of the experiments, the work in progress and models that did not made it to the final review.

CONFERENCE ROOM:
A whole level dedicated to discussion and debate. A big span of interrupted space where the furniture can be arranged in different ways to facilitate a big group discussion, small groupwork or peer review. The user can adapt the space as suitable depending on the activity. The building will not have a lecture room.

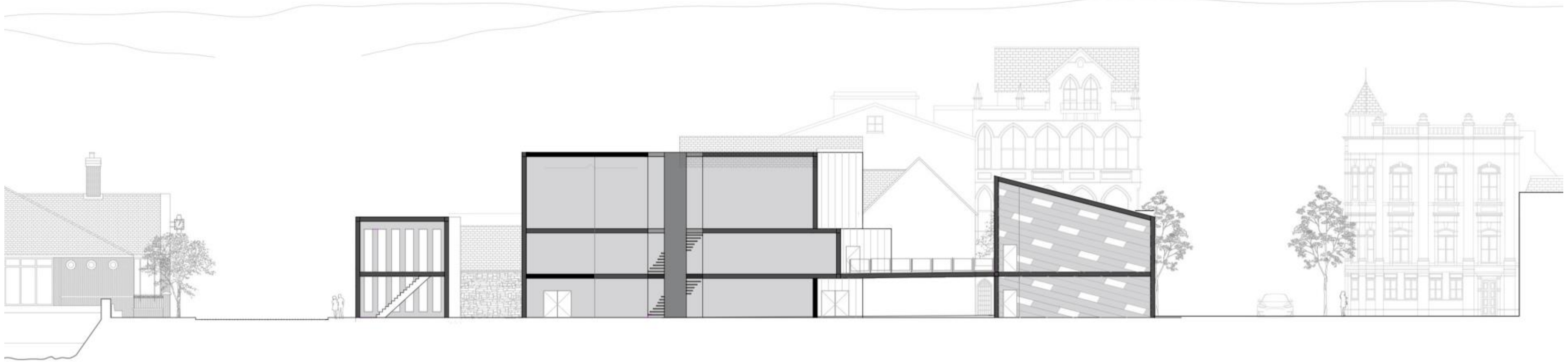
WORKSHOP:
An area where students can find materials and tools for creating models. This spaces will be shared with the Upcycle Centre and the collection point. The workshop could potentially be located on the ground floor.

2.- ART GALLERY

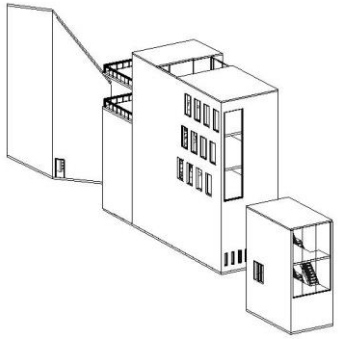
An exposition area is incorporated to allow students to display the work they have done during the semester in an End of Semester Cocktail Party. They will have the opportunity to celebrate their work with their friends and family as well as leaving their work as a temporary exhibition so people of Newry can visit the gallery and learn about what is beeing done in the school While the End of Semester exhibition is not taking place, this could be an excellent place for local artists to display their photographs, paintings, sculptures, etc, which will be for sale. As a result of the workshops offered in the Upcycle Centre, many people can transform waste materials into Art pieces, which will be dispayed in the gallery as well.

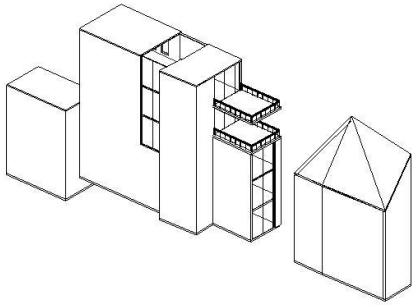
3.- THE UPCYCLE CENTRE

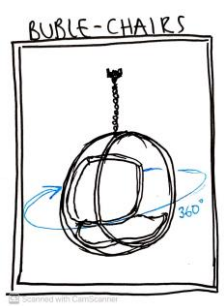
The Upcycle Centre wants to create a network of people if Newry that are interested in giving waste materials an added value. This can be achieved trough workshops and courses offered. There is also a collection point of specific waste material such as cardboard, paper, old furniture, tires, soft plastics, bottles and glass. Organic residues will not be accepted.
The collection point is opend for anyone to leave their waste materials and as the Centre grows, collection points could be installed in different parts of the city.

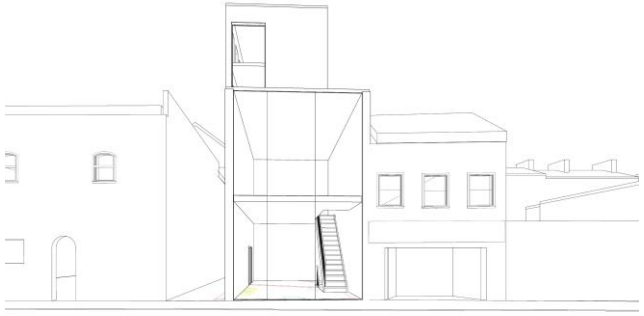


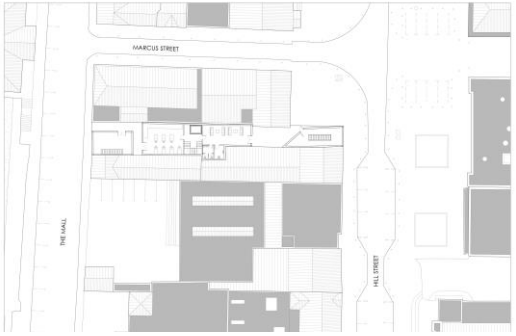
WEEK 6

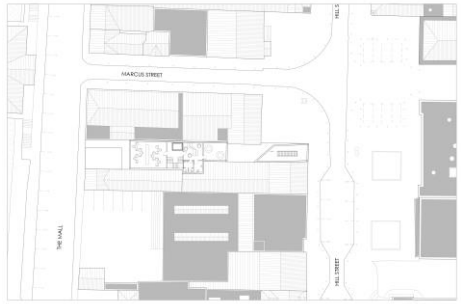


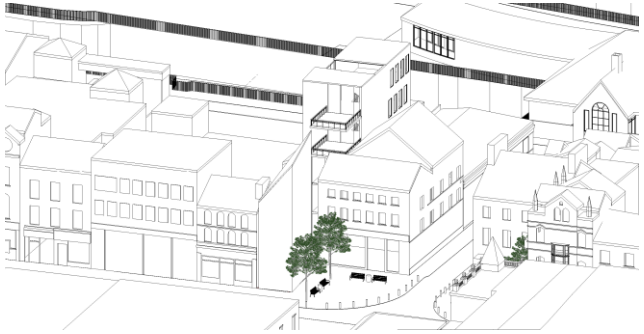


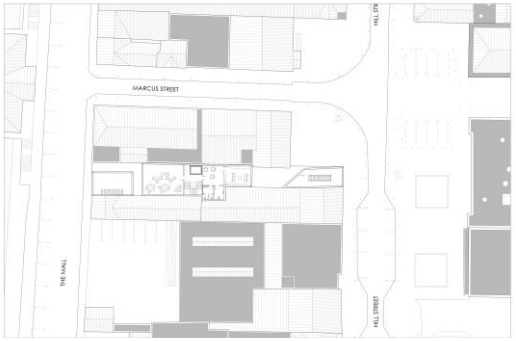


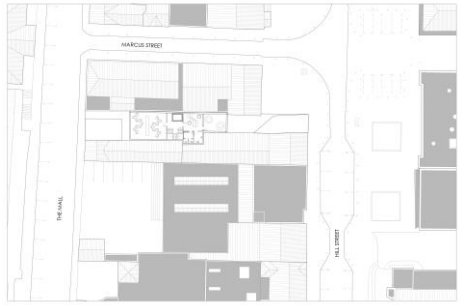


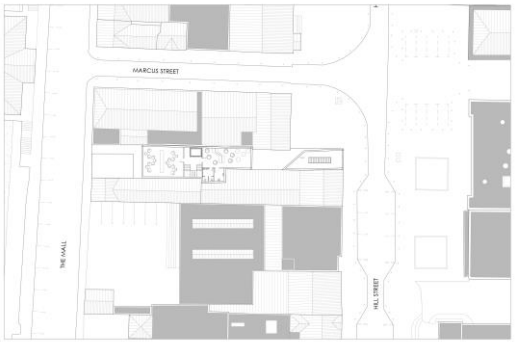






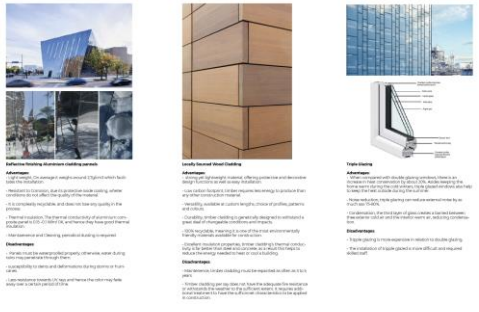




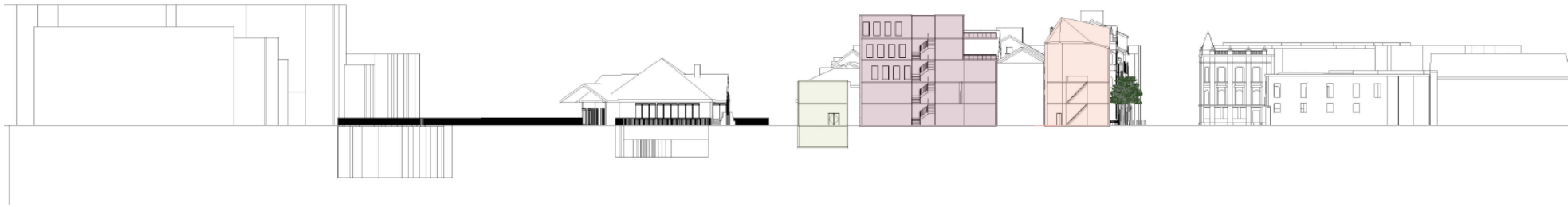


MATERIALS CHOICE:

Exterior Cladding



WEEK 6



WEEK 7


MARCUS STREET
HILL STREET
THE MALL
MARCUS SQUARE
1:200


MARCUS STREET
HILL STREET
THE MALL
MARCUS SQUARE
1:200

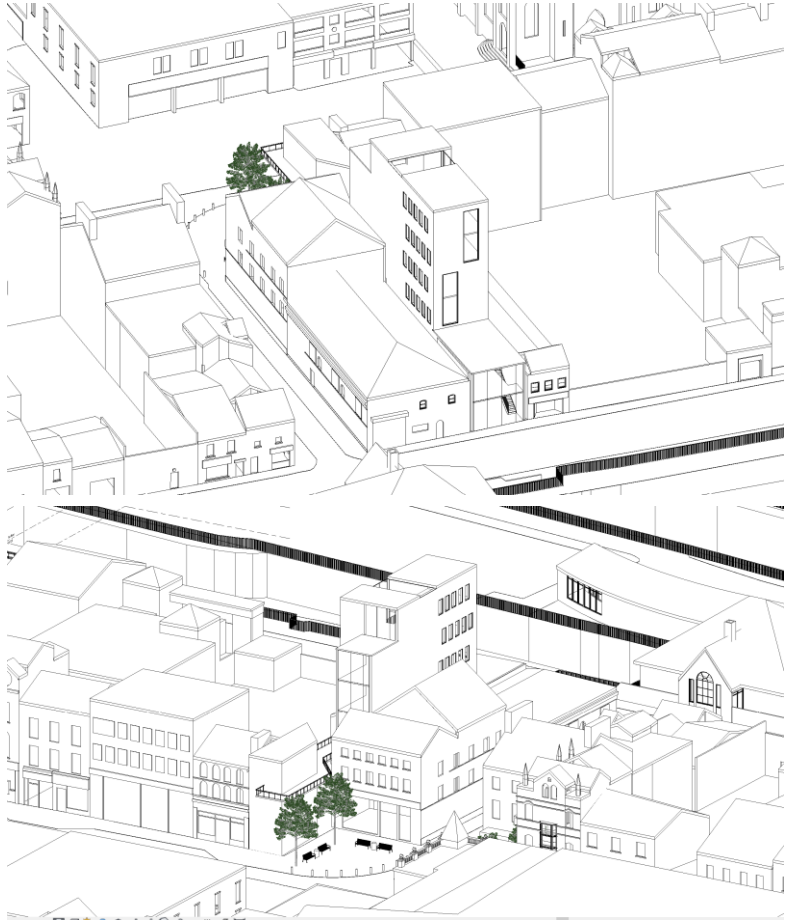

MARCUS STREET
HILL STREET
THE MALL
MARCUS SQUARE
1:200

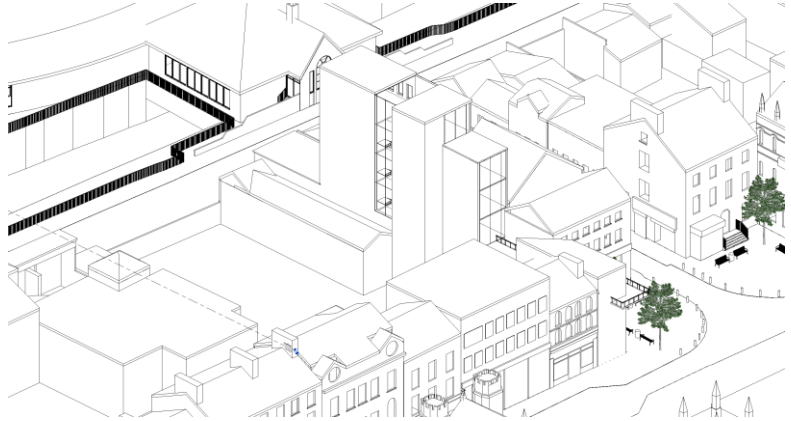

MARCUS STREET
HILL STREET
THE MALL
MARCUS SQUARE
1:200

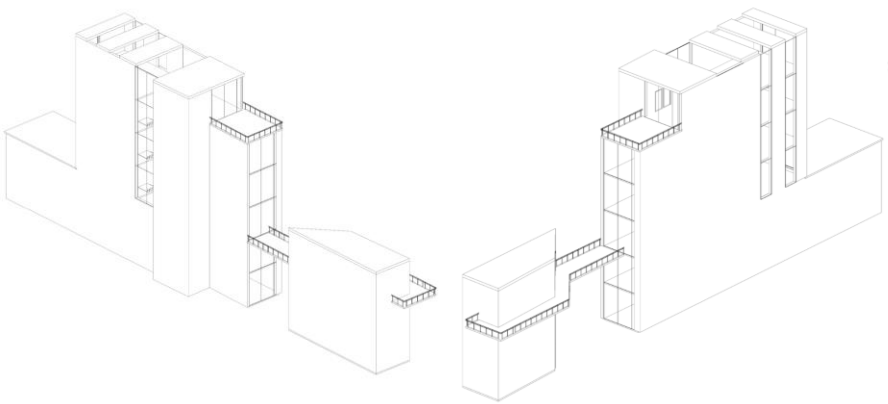

MARCUS STREET
HILL STREET
THE MALL
MARCUS SQUARE
1:200

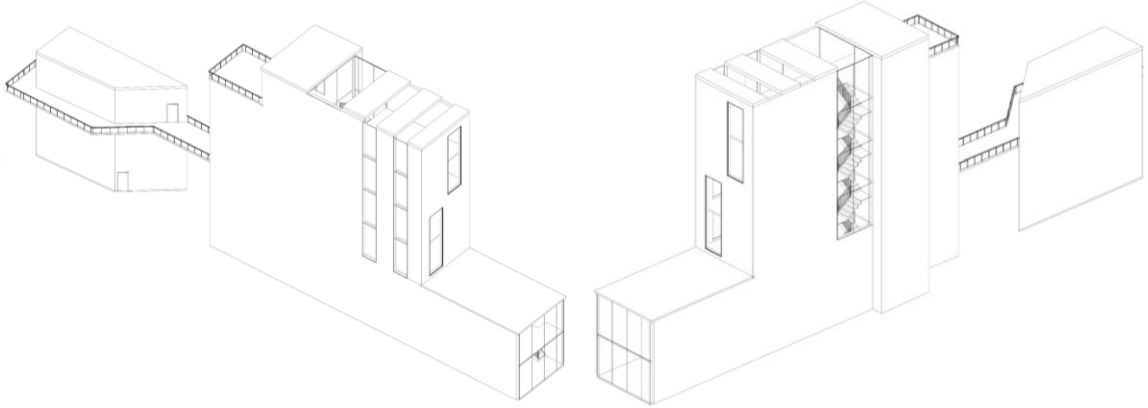

MARCUS STREET
HILL STREET
THE MALL
MARCUS SQUARE
1:200

WEEK 7



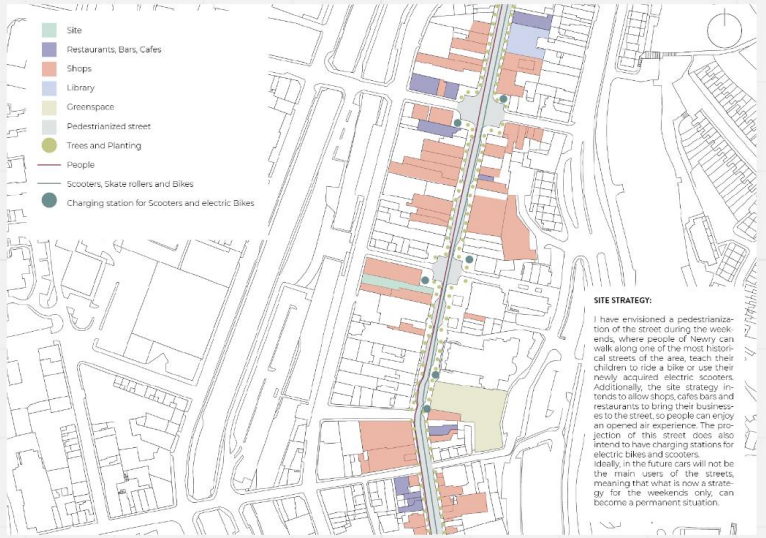


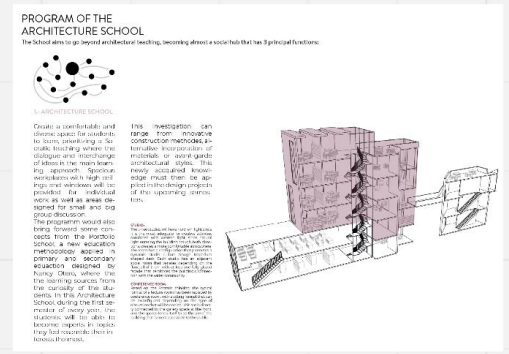


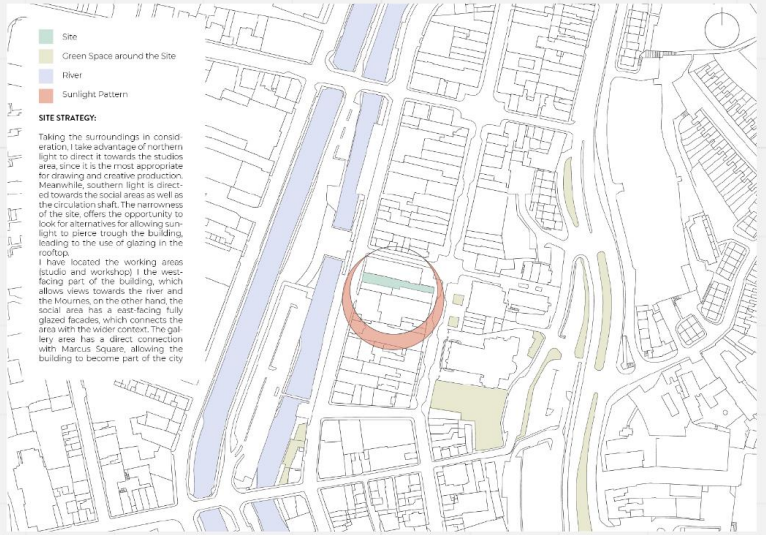


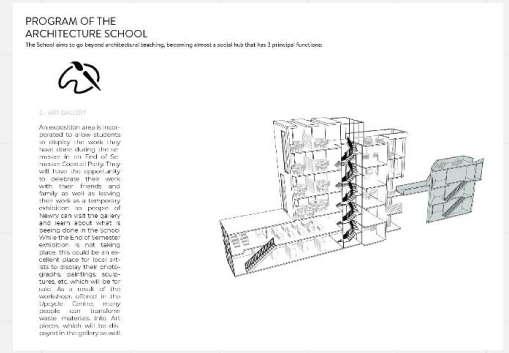
WEEK 8

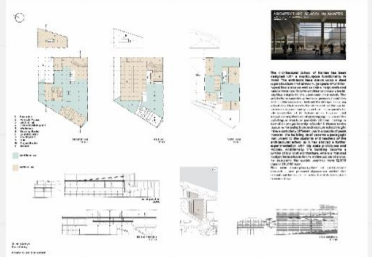
Interim Review

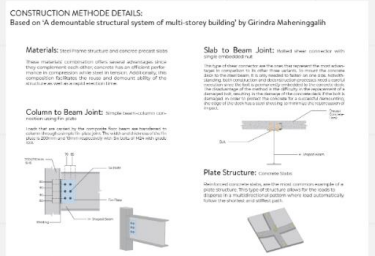


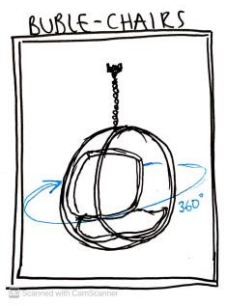






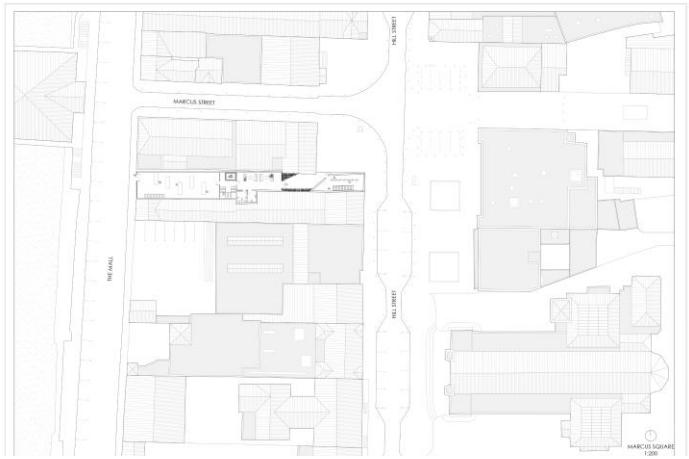






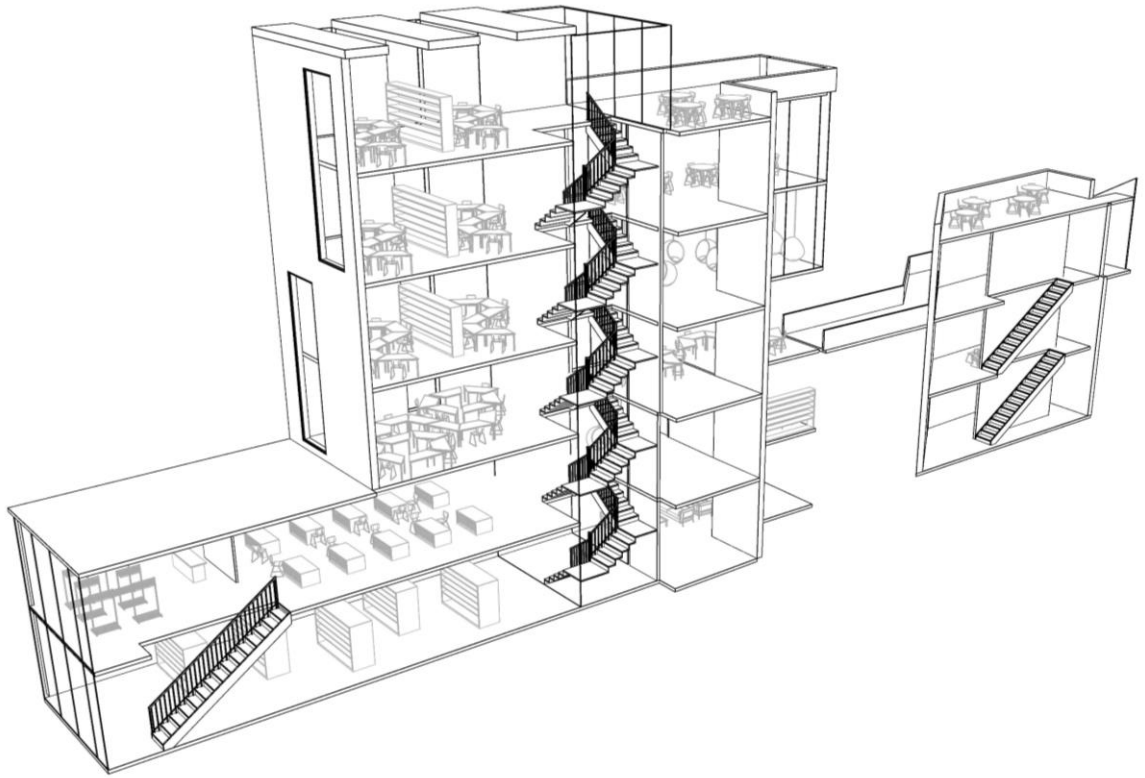
WEEK 8

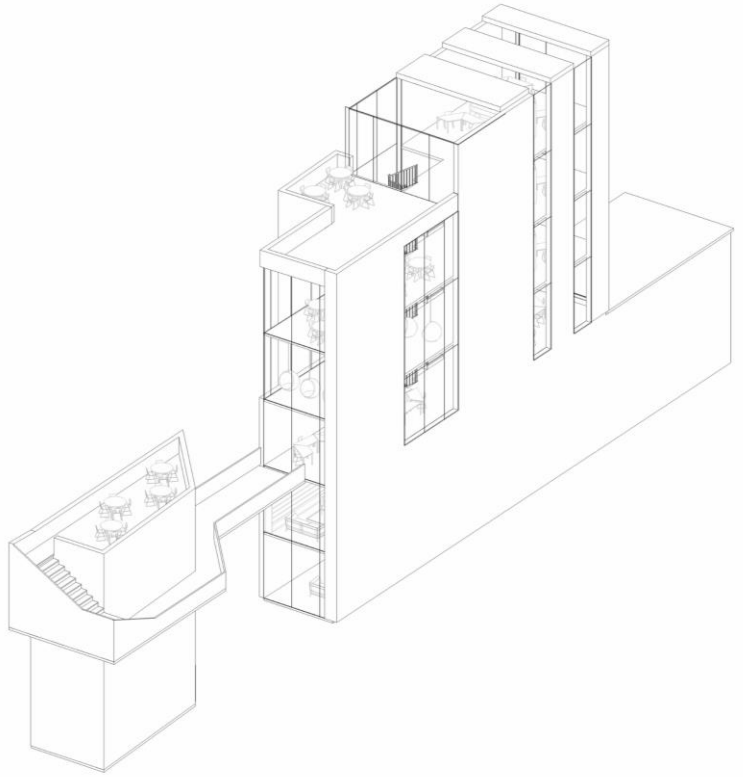
Interim Review

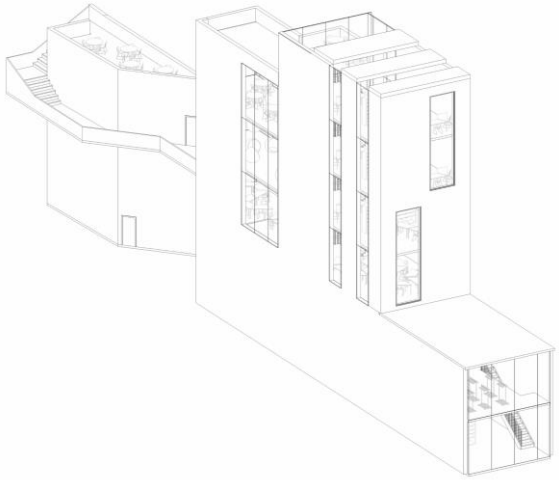


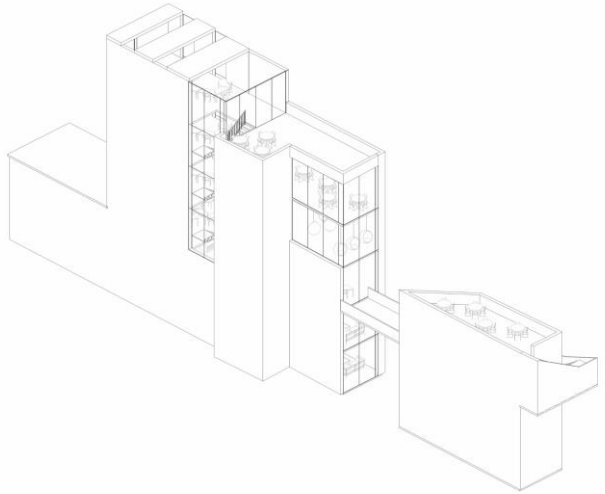
WEEK 8

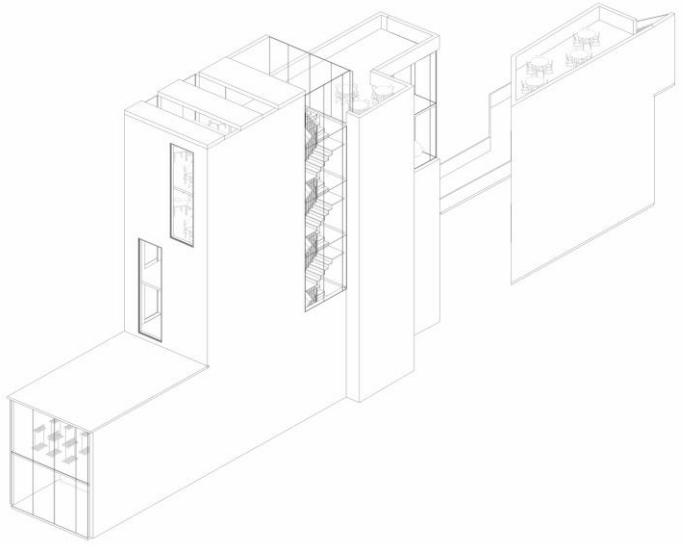
Interim Review



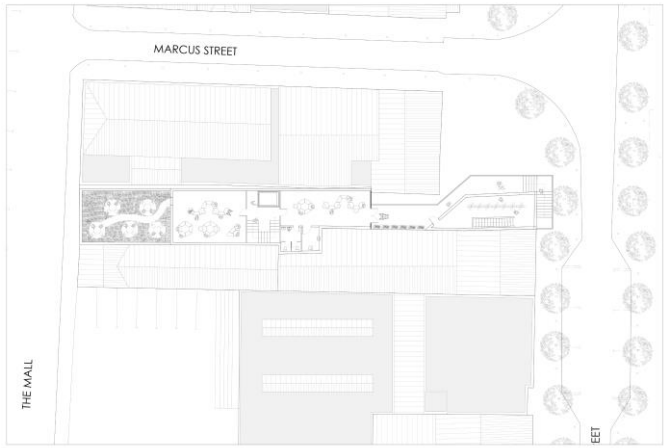


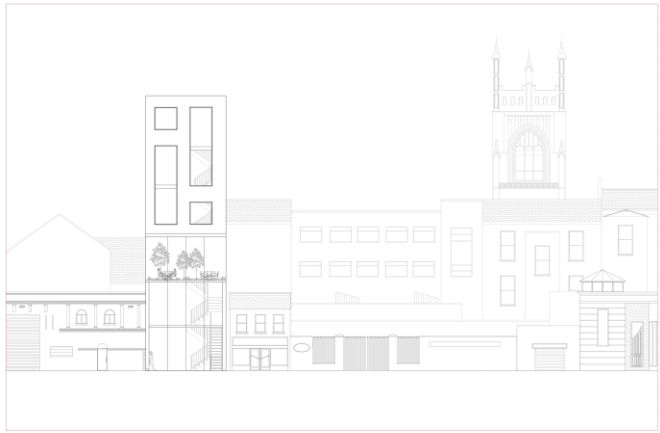


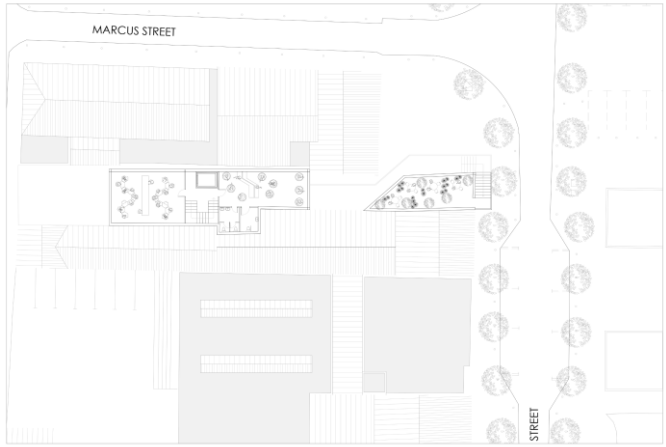


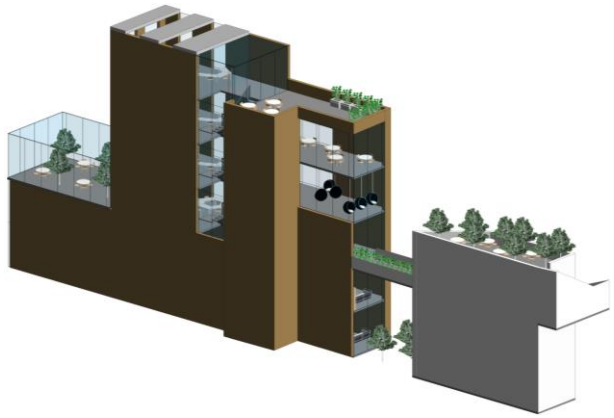


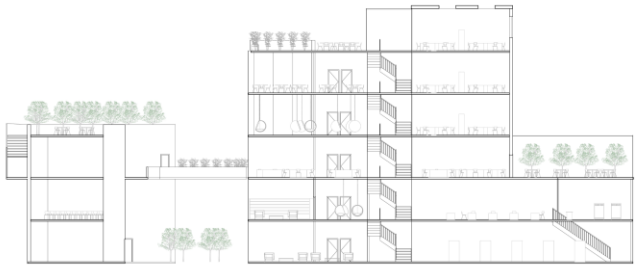
WEEK 9





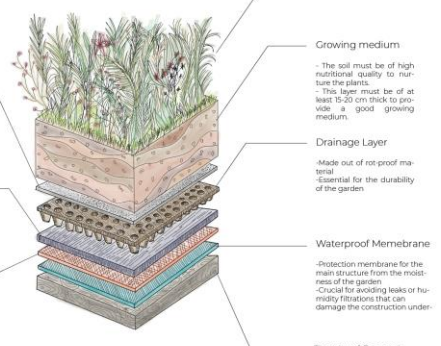






ROOFTOP GARDEN:
Construction layers detail

Rooftop gardens are not only an excellent way of bringing nature in to the building as an aesthetic and design tool, but they will also convert CO2 emissions, reduce costs of cooling and heating costs and minimize water runoffs.



Vegetation

Growing medium

- The soil must be of high nutritional quality to nurture the plants.
- This layer must be of at least 15-20 cm thick to provide a good growing medium.

Drainage Layer

-Made out of rot-proof material
-Essential for the durability of the garden

Waterproof Memebrane

-Protection membrane for the main structure from the moistness of the garden
-Crucial for avoiding leaks or humidity filtrations that can damage the construction under-

Structural Support

Filter Fabric/Root Repellent

-Prevents the loss of soil while keeping it in place
-Allows moisture flow to the drains and keeps them unclogged
-Root barrier, protects the roof membrane

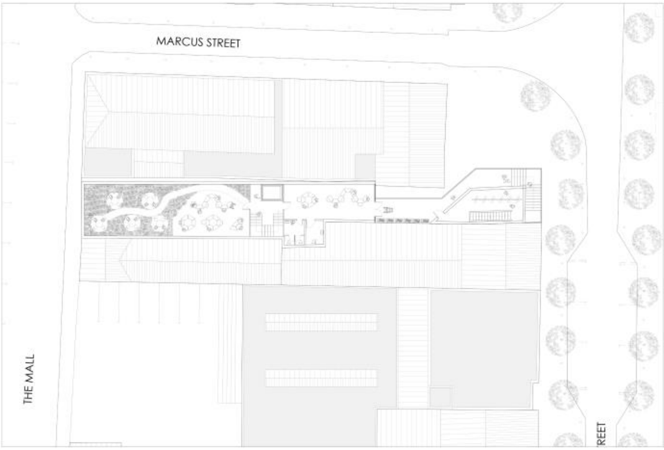
Insulation Layer

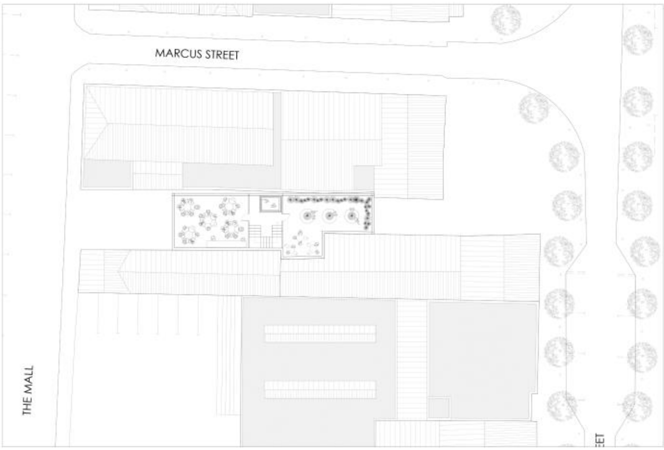
-Durable enough to resist heavy weight
-Moisture resistant - from a structural, not a thermal perspective
-Styrofoam is often used

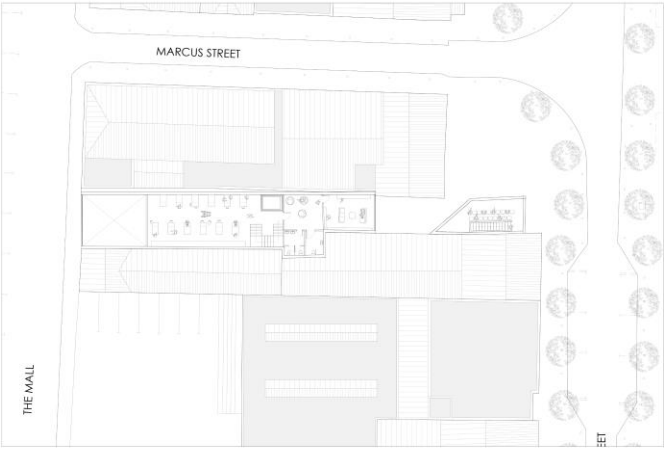
Protection Board

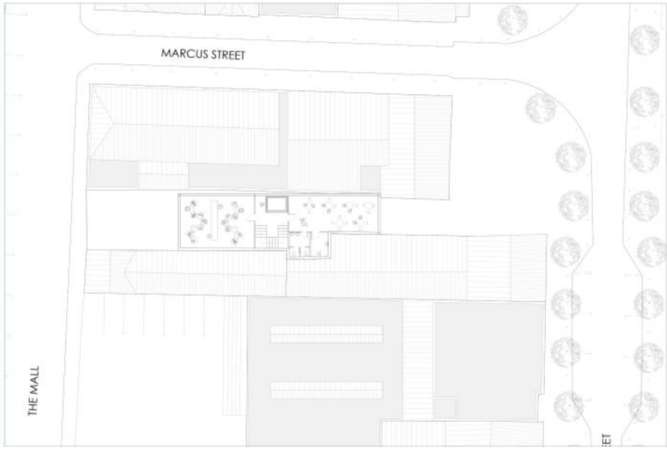
-Serves as the protective barrier of the membrane during garden construction
-Protects the waterproofing membrane from damage by garden tools and mechanical equipment
-Remains in place and becomes an integral part of the completed system

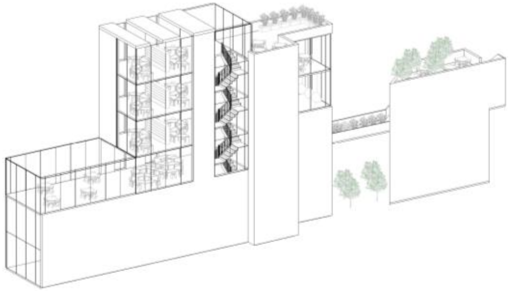
WEEK 10

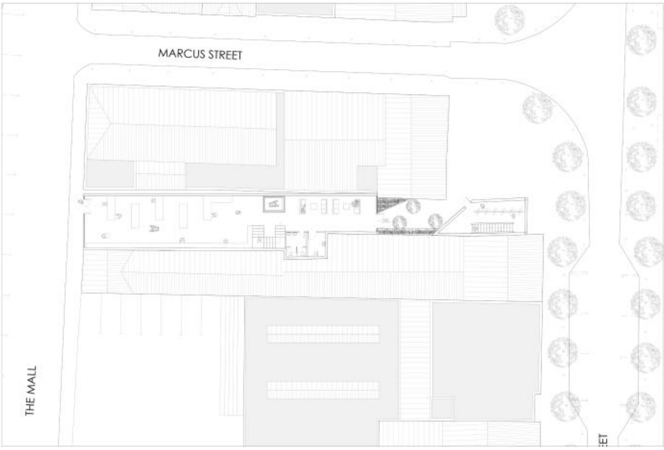

MARCUS STREET
THE MALL

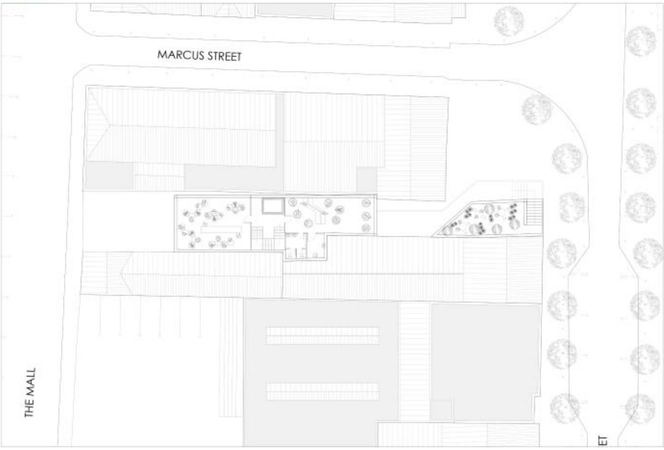

MARCUS STREET
THE MALL

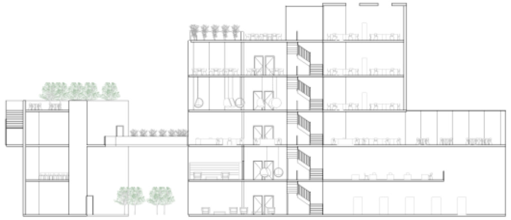

MARCUS STREET
THE MALL


MARCUS STREET
THE MALL




MARCUS STREET
THE MALL


MARCUS STREET
THE MALL



WEEK 10

VENTILATED ALUMINIUM CLADDING PANELS

This material will be used for the external cladding of the gallery.

The versatility and high performance of this materials allows for it to be an excellent choice for cladding. Aluminium does not require maintenance other than cleaning. Additionally, the natural process of this material is to reinforce its oxide film on the surface, increasing its hardness, anti-corrosion quality and absorption resistance, offering a long life span.
More than half of the aluminium currently produced in the European Union originates from recycled raw materials, and this trend is on the increase. As the energy required to recycle aluminium is about 5% of that needed for primary production, it offers clear ecological benefits of recycling.

Advantages

Durability:
- Its natural aging process makes the material even more durable over time
- Low maintenance
- weatherproof, corrosion-resistant and immune to the harmful effects of UV rays

Sustainability:
- It can be repeatedly recycled without any loss of value or properties
- Only 5% of the energy that was required for its initial production is needed for the recycling process
- Aluminium is a good conductor of heat

Appearance:
- It very malleable and can be customized
- Variety of finishing and colours that do not inhibit its capacity to be recycled

Disadvantages

- The mechanical and physical conditions of aluminium alone are not suitable for building construction, notwithstanding, this can be improved by the addition of alloying elements such as copper, manganese, magnesium, zinc, etc..

The ventilated facade is an enclosure system that allows an insulating layer and an outer leaf to be placed on top of an inner leaf by means of a supporting structure.

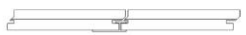
The separation distance between the layers allows a current of air to pass between the insulation and the coating, generating a "chimney effect" that creates natural ventilation.

This effect, through heat transfer by convection, makes the ventilated facade warm in summer and circulates the air inside the chamber, replacing the warm air with colder air. On the other hand, during the winter months the air in the chamber is heated, but not enough to circulate and renew itself.

'PLASTIC WOOD' CLADDING PANELS

This material will be used for the external cladding of the main building

This material has been chosen not only due its wood-like aesthetic, but also because of its 50 year + life span without the requirement of maintenance, but also due cost effectiveness and environmental performance. It is easy to clean, does not require paint and keeps its durability and look despite harsh weather conditions.
Both horizontal and vertical mounting is possible. The panels are mounted by means of an aluminium H profile which not only provides invisible fixing but will also allow for natural expansion and contraction.



Advantages

Durability:
- will not rot, warp, crack or splinter - unlike wood
- impervious to water and therefore frost proof
- UV stable – maintains its colour despite sun or rain exposition

Sustainability:
- Made from recycled plastic, mostly crushed CD cases
- Can be recycled after its lifespan

Appearance:
- Mimics wood panels
- Its size can be easily customized depending on the desired length and width
- Large range of colours

Disadvantages

- It' s instalation cost is significantly higher in relation to timber cladding

VEGETATION CATALOGUE FOR THE GREENHOUSE

Shrubs and flowers that do perform well in a greenhouse-like environment have been taken in concideration

FLOWERS

Geraniums
- If provided with enough light, they can bloom indoors all year long
- Up to 10cm – 121 cm tall

Impatiens
- Easy to grow in any moist, well-drained soil in a shady or semi-shady location
- Up to 15cm – 75 cm tall

Petunias
- Bloom from spring to winter in many colours and patterns and prefer plenty sun exposure
- Up to 15cm – 45 cm tall

Chrysanthemums
- Will grow in partially shaded areas, direct sun exposure should be avoided
- Up to 10cm – 50 cm tall

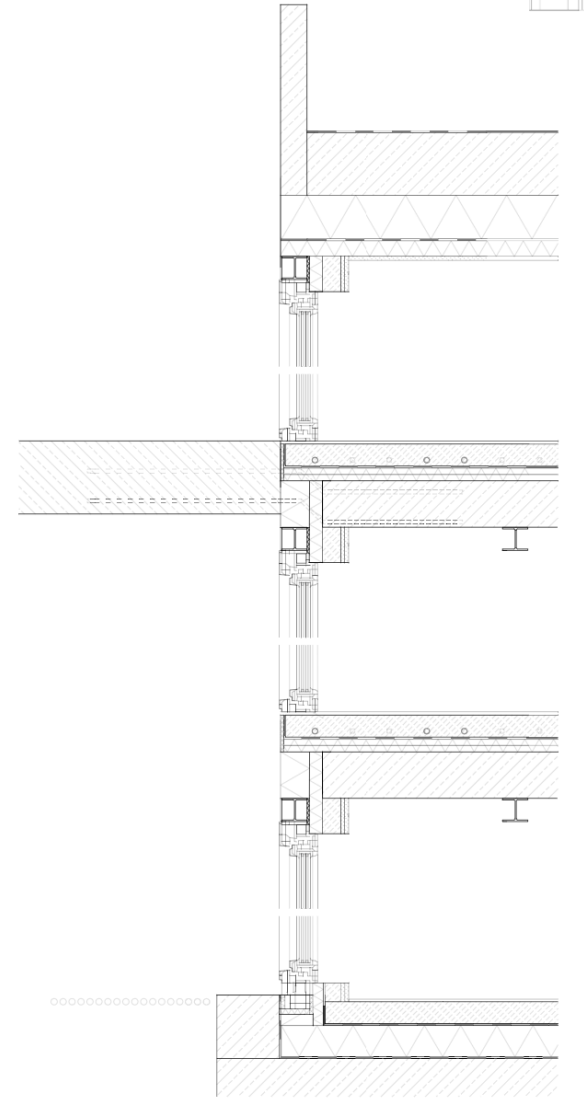
Daffodils
- Require full or partial sun and grow well in between shrubs
- Up to 15cm – 30 cm tall

Caladium
- Foliage plants for shady or semi-shady spaces
- Up to 15cm – 30cm tall

Ferns
- Very tolerant to winter temperatures and prefer shaded areas
- Up to 30cm – 180 cm tall

Coleus
- Most of the varieties prefer partial shade
- Up to 15cm – 30 cm tall

Monstera Deliciosa
- Grow trying to reach towards dark areas in search of something to climb on
- Up to 18 m tall



WEEK 11

Final Review

PRECEDENT STUDY AND MATERIAL SELECTION:
Museum of Contemporary Art, Cleveland - USA



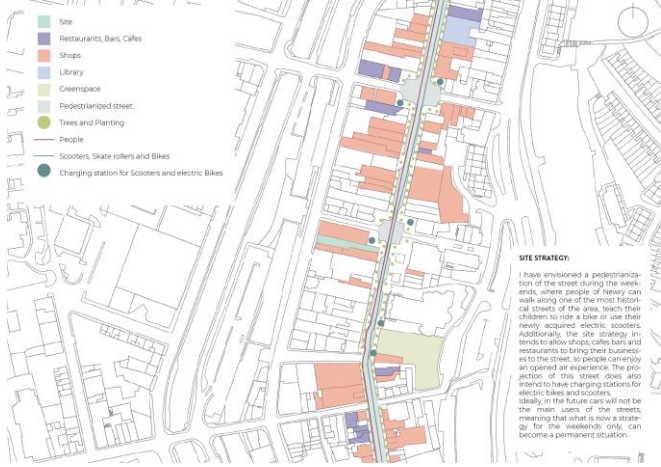


- Its twisting architectural form shifts from a compact hexagonal base to a rectangular roof, creating a new public plaza, a soaring atrium and a dynamic double-decker staircase.

-Its mirror-finish black stainless-steel envelope reflects the urban surroundings, changing in appearance with differences in light and weather.

- One of thefacades is clad in transparent glass, flank a new public plaza which serves as a public gathering place and links MOCA to Uptown attractions and amenities, including the expanded Cleveland Institute of Art and new commercial space and residential units.

- A grand, 'double-decker' staircase inverts the typical linearity of stairs by providing ten different ways to ascend, connecting the floors and reflecting the importance of transience and flexibility. An enclosed, descending egress stair doubles up as a sound gallery and is entirely painted yellow to transcend the boundaries of vision. Ascending from the atrium, the upper levels reveal themselves slowly: the stair leans forward as it climbs following the profile of the building, wide landings provide social spaces and the open route plays out as a panorama.



THE REDISCOVERY CENTRE

The Rediscovery Centre is the National Centre for the Circular Economy in Ireland. The movement connects people, ideas and resources that support a more sustainable living. Artists, scientists, designers and craftspeople use their skills and knowledge to give unwanted materials an added value. They want to nurture the ideas that lead to a circular economy and environmental integrity that are led by creativity and innovation.
The centre offers interactive workshops to students that are interested in a sustainability agenda. Additionally, the centre counts with a Eco Store where they sell produces from over 20 independent Irish suppliers and also the final products fabricated in the workshops.

THE CIRCULAR ECONOMY ACADEMY

Free mentoring programme that assists irish social enterprises and community organizations to transfer their activities towards a circular economy. The academy proved guidance and strategies that are specifically designed depending on the business. The Academy also supports organization that want to replicate the Redescovery Centre successful reuse initiatives.

UPSICLE

REDESIGN

REUSE

REMANU-
FACTURE

REDISCOVER PROGRAMME

These four branches of the Rediscover Programme wants to reinforce a circular economy. The aim is to repurpose old materials that otherwise would have become waste. In all the different branches, the enterprise creates training oportunities for long therm unemployed. Additionally, the products are sold in the Eco Store and all the revenue generated from the products is reinvested in the enterprise.



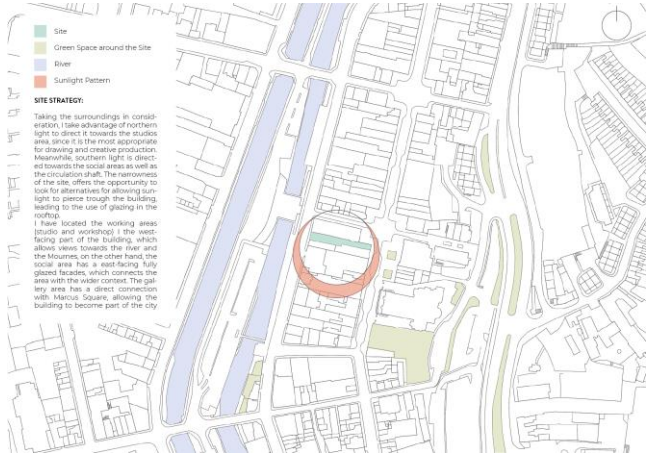

REDISCOVER FASHION · REDISCOVER FURNITURE · REDISCOVER CYCLING · REDISCOVER PAINT

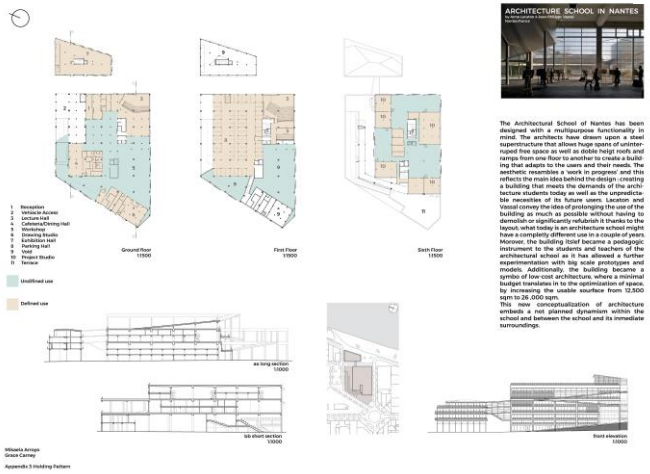
LOUIS VUITTON'S FLAGSHIP STORE IN GINZA, TOKYO

By Jun Aoki & Associates and Peter Marino

Japanese studio Jun Aoki & Associates has created a distinctive flagship store for Louis Vuitton in Tokyo's Ginza shopping district. Aoki aims to refresh the building's façade, so it resembles the vibrant atmosphere of Ginza. The pearlescent finishing of the exterior resembles the iridescence and reflectiveness of water, that in this case reflects the hectic live of people in Tokyo.

The facade was constructed from two layers of glass that curve and ripple like water, which was covered with a dichroic film to create a pearlescent colouring. The building projects a monolithic yet fluid appearance, this can be to some level attributed to the lack of openings- besides the main entrance at street level which is fully transparent so the newest collections can be displayed- which is a common marketing strategy used in retail; when costumers lose the notion of time due the lack of natural light, they tend to shop more.



CONSTRUCTION METHODE DETAILS:

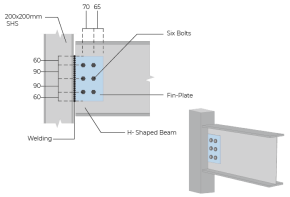
Based on 'A demountable structural system of multi-storey building' by Girindra Maheninggalih

Materials: Steel Frame structure and concree precast slabs

These materials' combination offers several advantages since they complement each other; concrete has an efficient performance in compression while steel in tension. Additionally, this composition facilitates the reuse and demount ability of the structure as well as a rapid erection time.

Column to Beam Joint: Simple beam-column connection using fin-plate

Loads that are carried by the composite floor beam are transferred to column through a simple fin-plate joint. The width and thickness of the fin plate is 200mm and 10mm respectively with Six bolts of M24 with grade 10.9.



Slab to Beam Joint: Bolted shear connector with single embedded nut

This type of shear connector are the ones thar represent the most advantages in comparison to its other three variants. To mount the concrete deck to the steel beam, it is only needed to fasten on one side. Notwithstanding, both construction and deconstruction processes need a careful execution since the bolt is permanently embedded to the concrete deck. The disadvantage of the method is the difficulty in the replacement of a damaged bolt, resulting in the damage of the concrete deck if the bolt is damaged. In order to protect the concrete for a successful demounting, the edge of the deck has a steel sheeting to minimize the repercussion of impact.

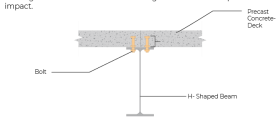
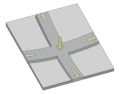


Plate Structure: Concrete Slabs

Reinforced concrete slabs, are the most common example of a plate structure. This type of structure allows for the loads to disperse in a multidirectional pattern where load automatically follow the shortest and stiffest path.



WEEK 11

Final Review

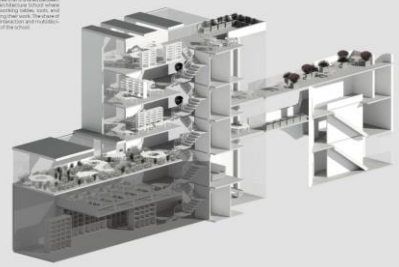
PROGRAM OF THE ARCHITECTURE SCHOOL

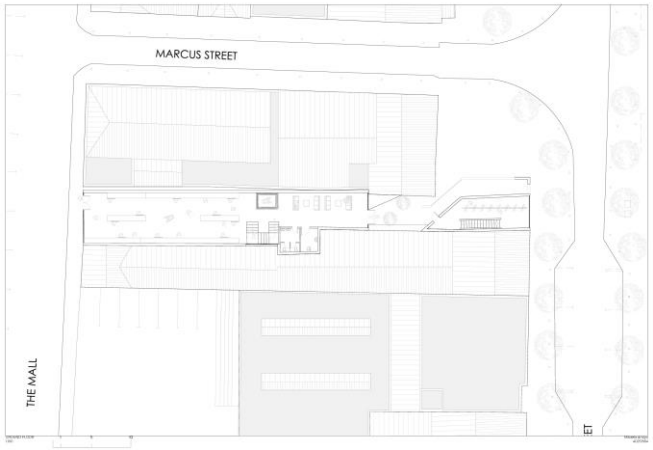
The School aims to go beyond architectural teaching, becoming almost a social hub that has 3 principal functions:

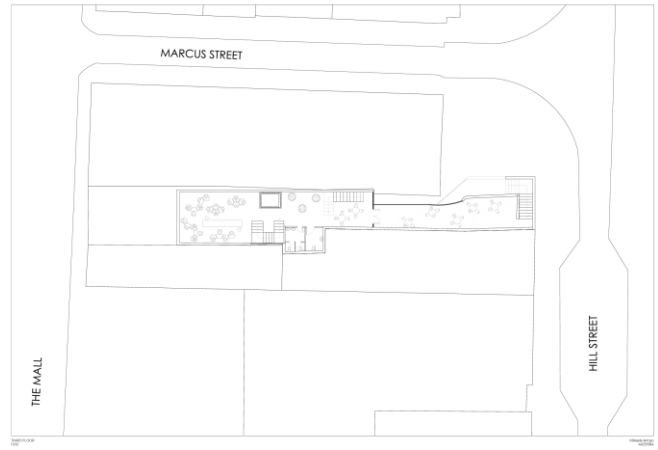
THE UPCYCLE CENTRE

The Upcycle Centre wants to create a network of people if Newry that are interested in giving waste materials an added value. This can be achieved trough workshops and courses offered. There is also a collection point of specific waste material such as cardboard, paper, old furniture, tires, soft plastics, bottles and glass. Organic residues will not be accepted.
The collection point is opend for anyone to leave their waste materials and as the Centre grows, collection points could be installed in different parts of the city.
Moreover, what is produced in the workshops of the Upcycle Centre can either be sold in the Upcycle store in the 1st floor or displayed as art pieces in the gallery.

WORKSHOP:
The workshop is an area that is shared between the Centre and the Architecture School where students can share working tables, tools, and resources for producing their work. The shared space reinforces the interaction and multidisciplinary environment of the school.





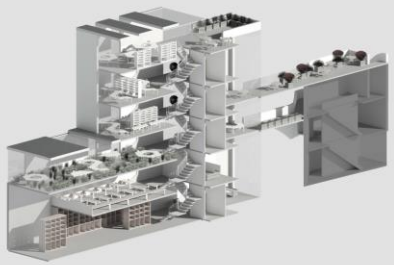


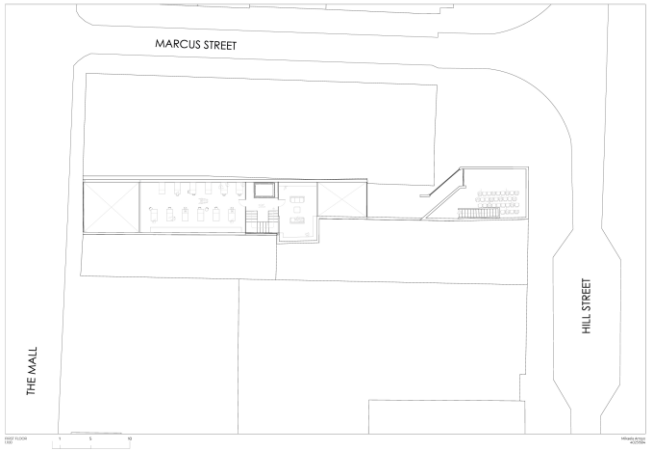
PROGRAM OF THE ARCHITECTURE SCHOOL

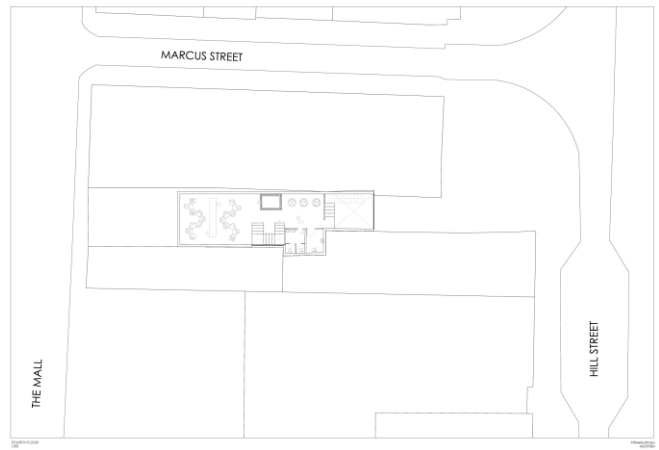
The School aims to go beyond architectural teaching, becoming almost a social hub that has 3 principal functions:

ART GALLERY

An exposition area is incorporated to allow students to display the work they have done during the semester in an End of Semester Cocktail Party. They will have the opportunity to celebrate their designs with their friends and family as well as leaving it as a temporary exhibition. This way, people of Newry can visit the gallery and learn about what is beeing done in the Architectural School while the End of Semester exhibition is not taking place.
The Art Gallery could be an excellent place for local artists to display their photographs, paintings, sculptures, etc. Additionally, as a result of the workshops of the Up Cycle Centre, art made of recycled material can surge too and can be exhibited and sold in the gallery as well.







PROGRAM OF THE ARCHITECTURE SCHOOL

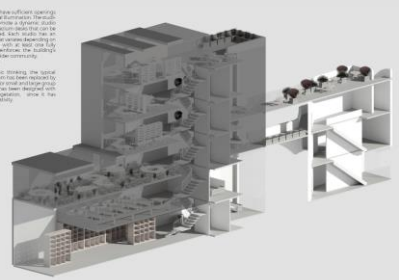
The School aims to go beyond architectural teaching, becoming almost a social hub that has 3 principal functions:

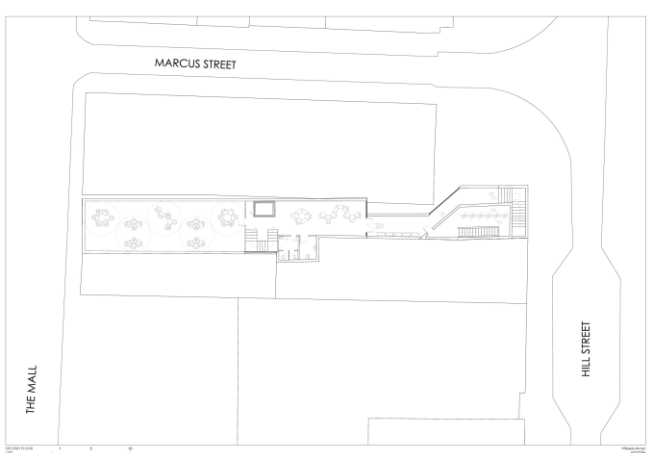
THE ARCHITECTURE SCHOOL

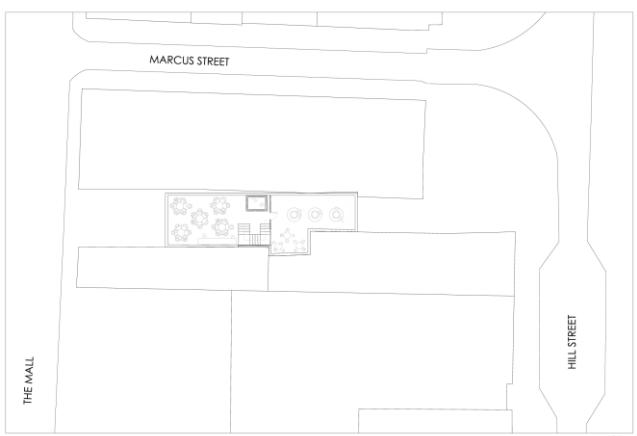
A comfortable and diverse space for students to learn, prioritizing a Socratic teaching, where the dialogue and interchange of ideas is the main learning approach. Spacious workplaces with high ceiling and windows will be provided for individual work as well as areas designed for small and big group discussions.
The programme would also bring forward some concepts from the Portfolio School, a new education methodology applied in primary and secondary education designed by Nancy Otero, where the learning sources from the curiosity of the students. In this Architecture School, during the first semester of every year, the students will be able to become experts in topics they feel resemble their interest the most. The newly acquired knowledge must then be applied in the design projects of the upcoming semesters.

STUDIO:
The three studios will have sufficient openings for an adequate natural illumination. Periodical configurations promote a dynamic studio culture. Furniture and partitions can be rearranged as required. Each studio has an adjacent social area that varies depending on the floor, all of them with at least one fully glazed façade that reinforces the building's connection with the wider community.

CONVENIENCE ROOM:
Based on the Socratic thinking, the typical format of a lecture room has been replaced by a more informal space for debate and discussion. This area has been designed with great amounts of vegetation, since it has proved to increase creativity.

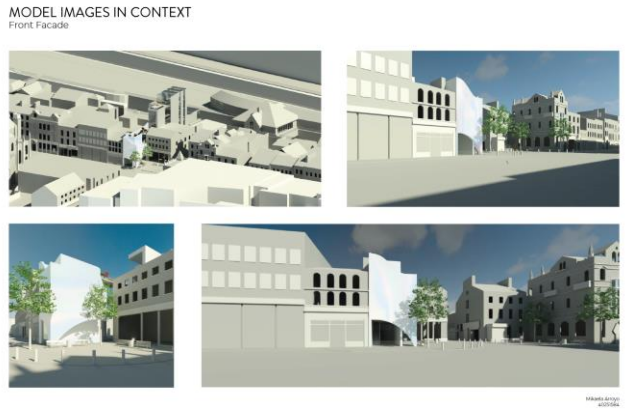


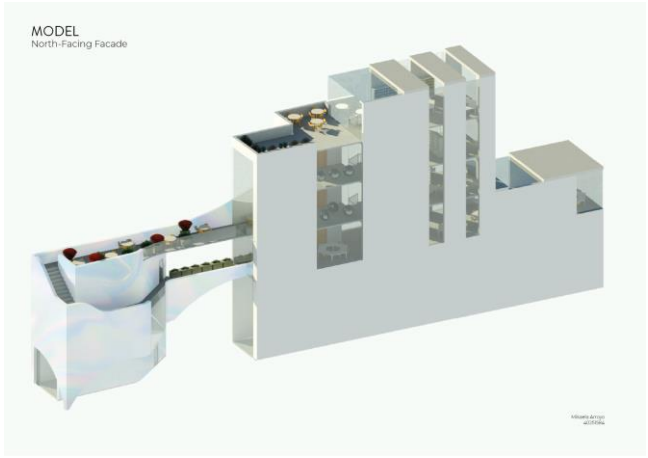


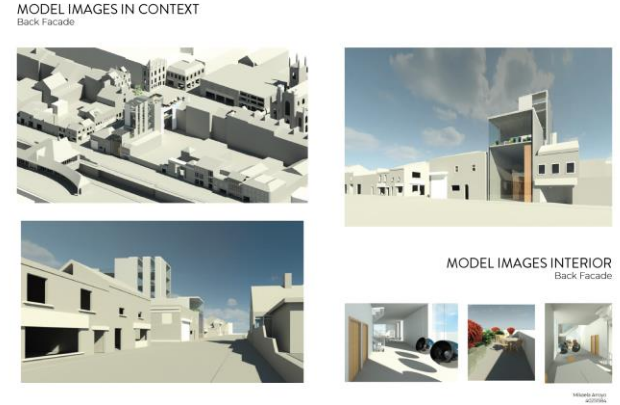


WEEK 11

Final Review







WEEK 11

Final Review

VEGETATION CATALOGUE FOR THE GREENHOUSE

Shrubs and flowers that do perform well in a greenhouse-like environment have been taken in concideration

FLOWERS

Geraniums

- If provided with enough light, they can bloom indoors all year long
- Up to 10cm – 121 cm tall

Impatiens

- Easy to grow in any moist, well-drained soil in a shady or semi-shady location
- Up to 15cm – 75 cm tall

Petunias

- Bloom from spring to winter in many colours and patterns and prefer plenty sun exposure
- Up to 15cm – 45 cm tall

Chrysanthemums

- Will grow in partially shaded areas, direct sun exposure should be avoided
- Up to 10cm – 50 cm tall

Daffodils

- Require full or partial sun and grow well in between shrubs
- Up to 15cm – 30 cm tall

Caladium

- Foliage plants for shady or semi-shady spaces
- Up to 15cm – 30cm tall

Ferns

- Very tolerant to winter temperatures and prefer shaded areas
- Up to 30cm – 180 cm tall

Coleus

- Most of the varieties prefer partial shade
- Up to 15cm – 30 cm tall

Monstera Deliciosa

- Grow trying to reach towards dark areas in search of something to climb on
- Up to 18 m tall

RECYCLED PLASTIC AS FACADE ELEMENT

The use of plastic waste as cladding panels

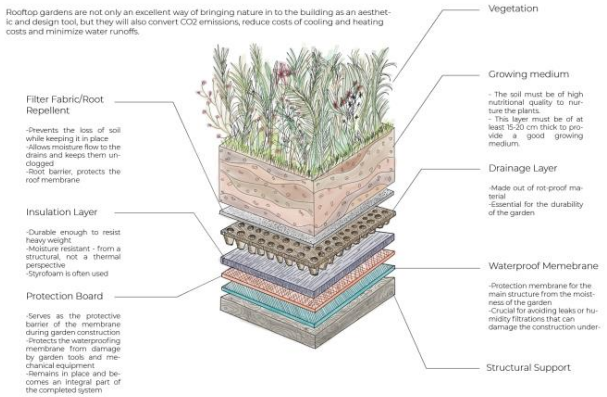
The world produces around 359 million tonnes of plastics each year, which has led to a consensus that plastics are an unsustainable material. And yes, plastics are certainly an enormous problem, but they don't necessarily have to follow the linear economic model. As architects we can upcycle it and give plastic a use in construction.Plastics are strong, durable, waterproof, lightweight, easy to mould, and recyclable, key properties for construction materials.

In this case, the plastic panels will not be exposed, but covered by dichroic film, similarly to the Louis Vuitton's Flagship store in Ginza, Tokyo. This efect will resamble the water body near the site as well as giving the building a 'distorted mirror- like' appereance for people passing by. The gallery does not require too much lighting, therefore some gaps between the panels will be left to allow minimal lighting.

ROOFTOP GARDEN:

Construction layers detail

Rooftop gardens are not only an excellent way of bringing nature in to the building as an aesthetic and design tool, but they will also convert CO2 emissions, reduce costs of cooling and heating costs and minimize water runoffs.



VENTILATED ALUMINIUM CLADDING PANELS

This material will be used for the external cladding of the main buildong.

The versatility and high performance of this materials allows for it to be an excellent choice for cladding. Aluminium does not require maintenance other than cleaning. Additionally, the natural process of this material is to reinforce its oxide film on the surface, increasing its hardness, anti-corrosion quality and absorption resistance, offering a long life span.
More than half of the aluminium currently produced in the European Union originates from recycled raw materials, and this trend is on the increase. As the energy required to recycle aluminium is about 5% of that needed for primary production, it offers clear ecological benefits of recycling.

Advantages

Durability:
- Its natural aging process makes the material even more durable over time
- Low maintenance
- weatherproof, corrosion-resistant and immune to the harmful effects of UV rays

Sustainability:
- It can be repeatedly recycled without any loss of value or properties
- Only 5% of the energy that was required for its initial production is needed for the recycling process
- Aluminium is a good conductor of heat

Appearance:
- It very malleable and can be customized
- Variety of finishing and colours that do not inhibit its capacity to be recycled

Disadvantages

- The mechanical and physical conditions of aluminium alone are not suitable for building construction, notwithstanding, this can be improved by the addition of alloying elements such as copper, manganese, magnesium, zinc, etc...

The ventilated facade is an enclosure system that allows an insulating layer and an outer leaf to be placed on top of an inner leaf by means of a supporting structure.

The separation distance between the layers allows a current of air to pass between the insulation and the coating, generating a "chimney effect" that creates natural ventilation.

This effect, through heat transfer by convection, makes the ventilated facade warm in summer and circulates the air inside the chamber, replacing the warm air with colder air. On the other hand, during the winter months the air in the chamber is heated, but not enough to circulate and renew itself.

1.20 SECTION DETAIL

Specification of construction materials as well as the reason why they have been chosen.

1 -10 mm Bamboo Flooring
Shares similarities with traditional wood in terms of apearance and performance, notwithstanding it is not wood but grass. Its regenerative quality (5-7 years to reach harvesting maturity) as well as its recyclability and biodegradability, make these material a environmentaly friendly alternative.
-70 mm Screed
-Vapour Barrier Membrane
Placed next to the insulation layer to reduce moisture flow into the building, preventing damaging levels of condensation and subsequently protecting timber from decay and metal to corrod.
-100 mm Recycled denim thermal insulation*
Recycled denim is an excelent alternative for a circular economy. As the fashion industry aims to go green, a good alternative is a business model where costumers who return their old denim items, recieve a discount on the store and the clothing is forwarded to a different enstity so it's transformed into insulation. Additionally, it provides higer acoustic insulation than traditional insulation materials, has a waste-free manufacturing process and does not contain harmful volatile components.
-Ply Sealing Layer
-200 mm reinforced concrete slab*

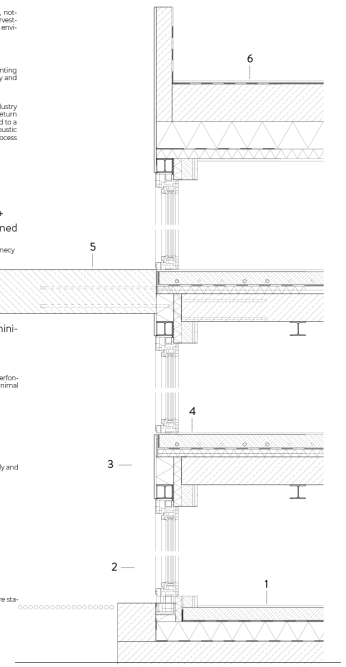
2 -Triple glazing: 4 mm toughened glass + 14 mm cavity + 4 mm toughened glass + 14 mm cavity + 4 mm toughened glass inPVC-aluminium frame
The reduction of heatloss as well as the thermal which lead to a higher energy efficinecy and the deminishing of external noise make triple glazing ideal for this building.

3 -25mm Aluminium exterior cladding*
-200 mm Reinforced concrete slab*
-140 mm Recycled denim thermal insulation with aluminium foil lamination vapour barrier
-200mm x 180mm Steel frame structural beams*
-50 mm Mineral wool acoustic insulation
Mineral wool's excellent thermal and acoustic insulation is accompanied by other performance advantages such as its resistance to fires, inmunity to mould formations, minimal ecological footprint and complete recyclability.
-2× 12,5 mm spackled gypsum board

4 -10 mm Bamboo flooring
-70 mm Screed with underfloor heating
Underfloor heating allows rooms to reach comfortable interior temperatures rapidly and using less energy. It is an efficinet alternative for the conventional radiators.
-0,2mm PE foil
polyethylene foils are suitable as a moisture barrier as a separating layer.
-20 mm Mineral wool acoustic insulation
-20 mm Recycled denim thermal insulation*
-240 mm reinforced concrete slab*
-200mm x 180mm Steel frame structural beams*

5 - 240mm Reinforced concrete Slab with steel bars
The steel bars allow the external concrete slab to join with the internal slab to assure stability

6 - 10mm UV protected bamboo flooring
-Ply bituminous roof sealing layer
This highly viscous form of petroleum is frequently used in construction thanks to its waterproofing qualities.
-200 mm reinforced concrete slab*
-140 mm Recycled denim with aluminium foil laminate*
-Vapour barrier
-50 mm Mineral wool acoustic insulation
-12,5 mm Gypsum board



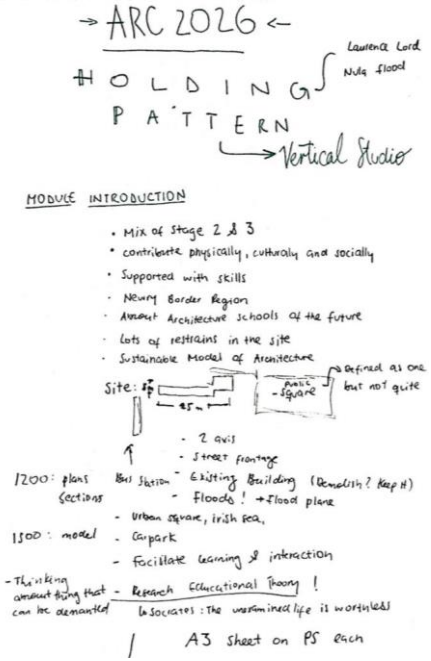
* Further specification will be provided in other pages

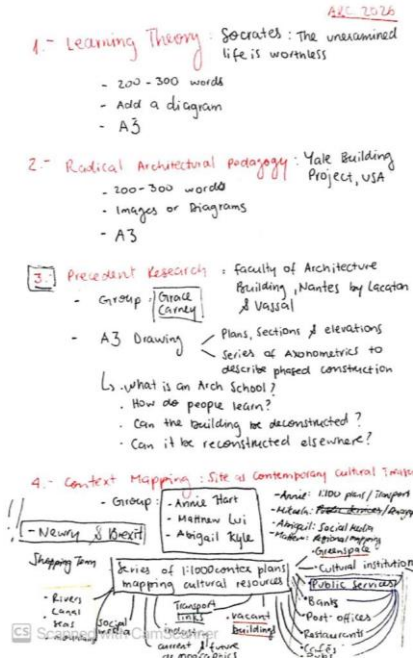
Mikaela Arroyo
40291584

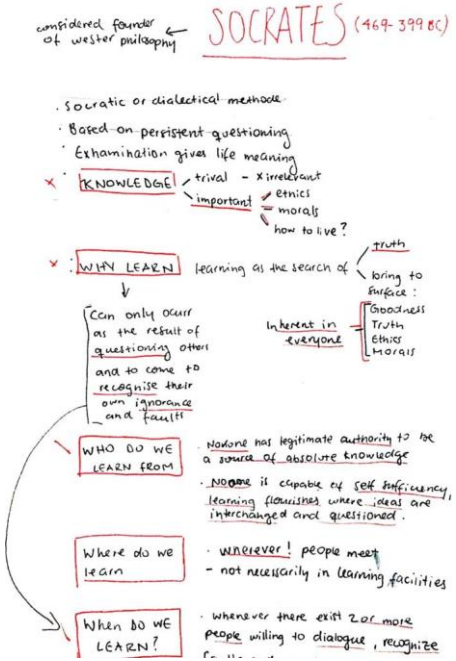
04

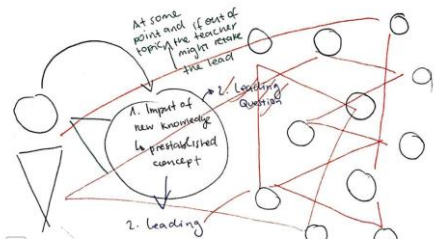
IDEAS IN PROGRESS

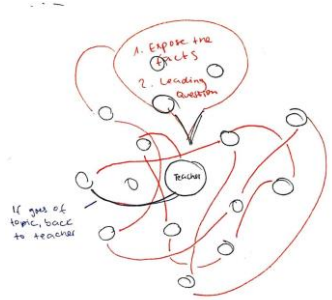
SKETCHES AND NOTES

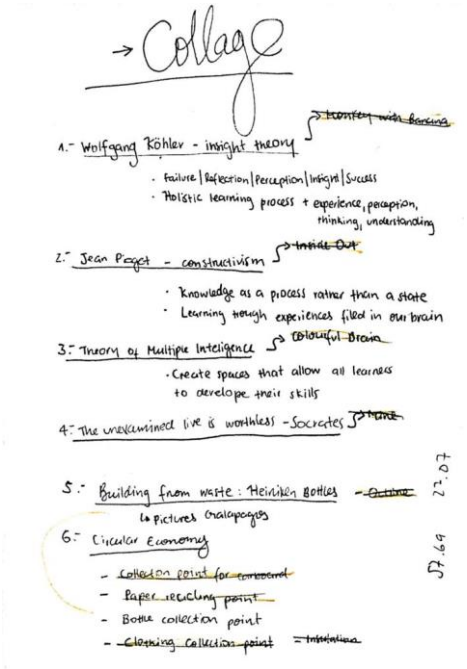




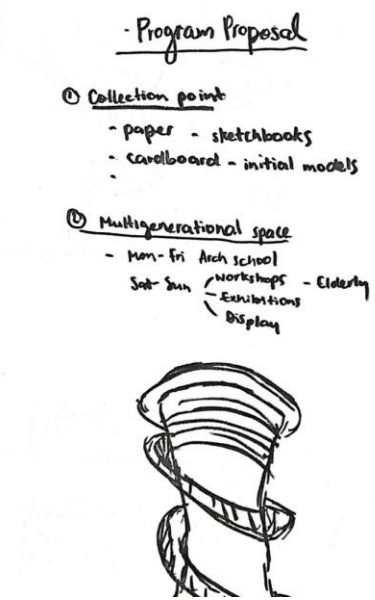


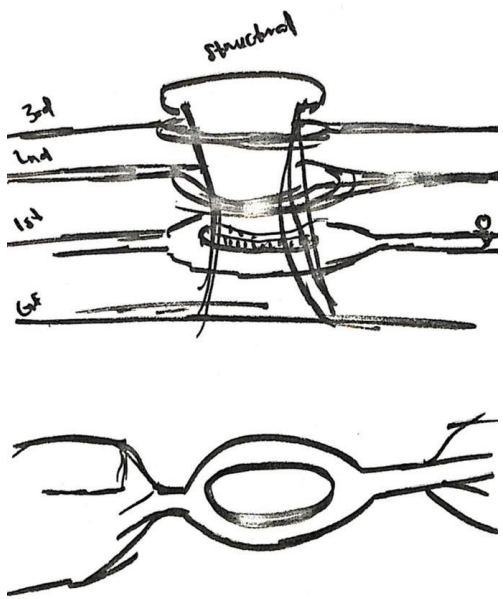


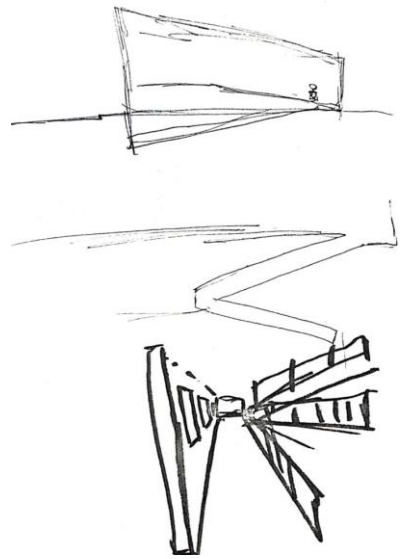


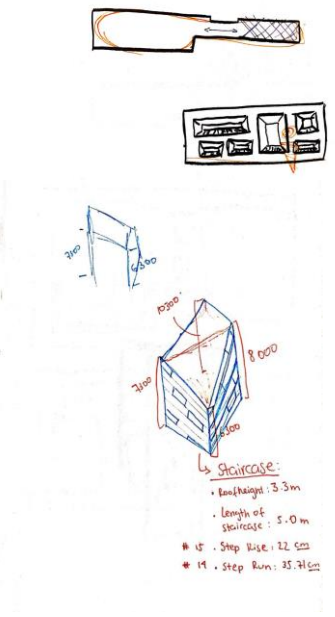


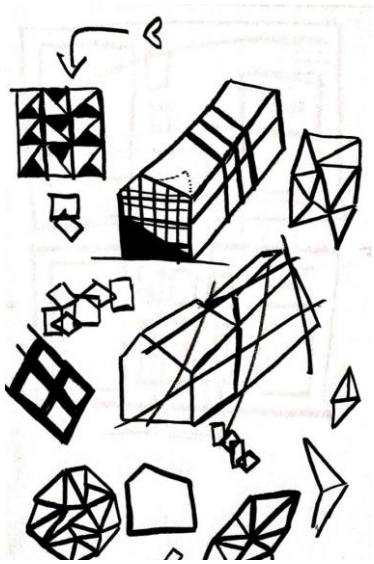
SKETCHES AND NOTES

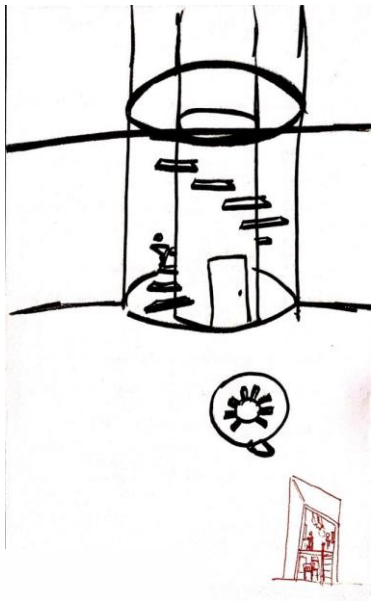


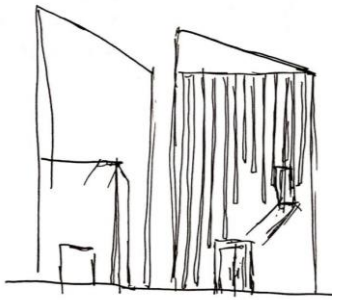


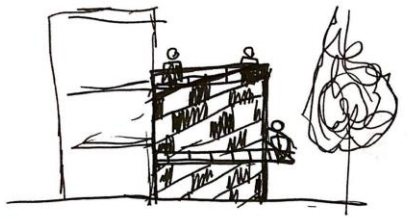


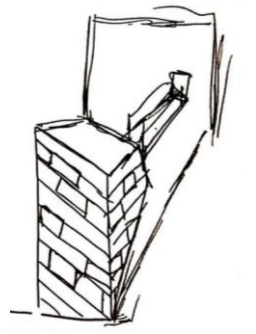


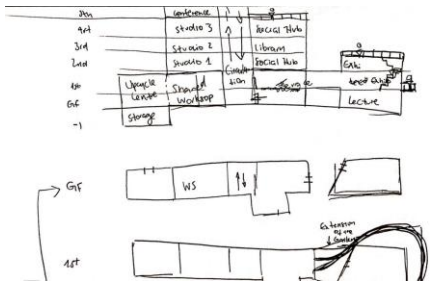




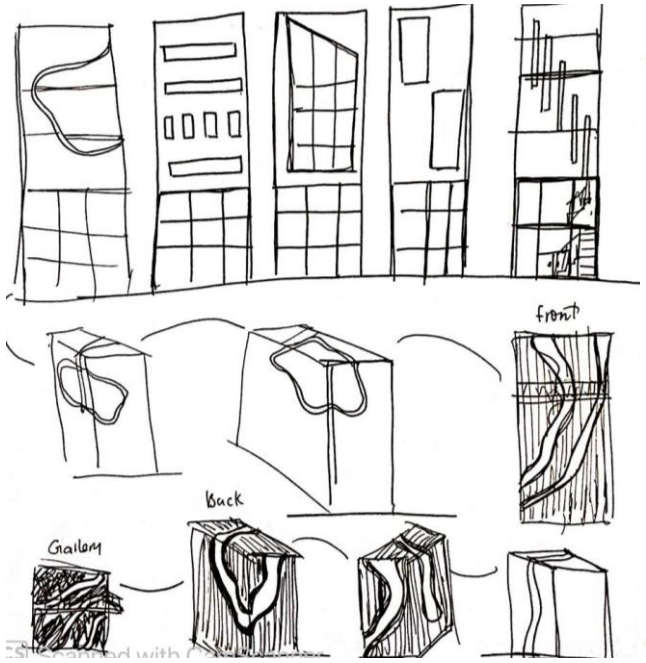


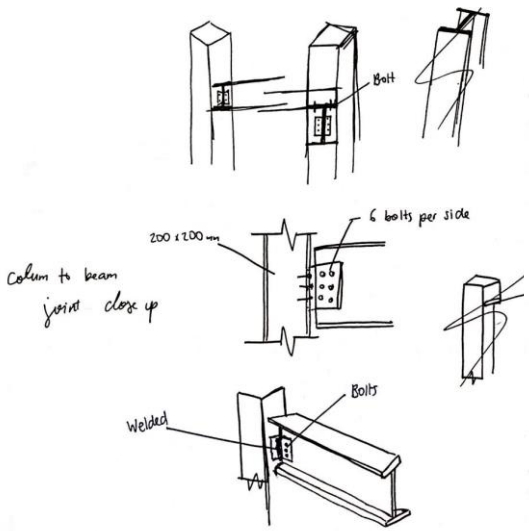


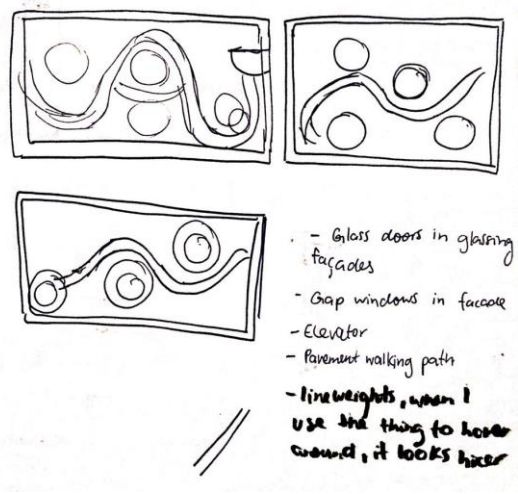


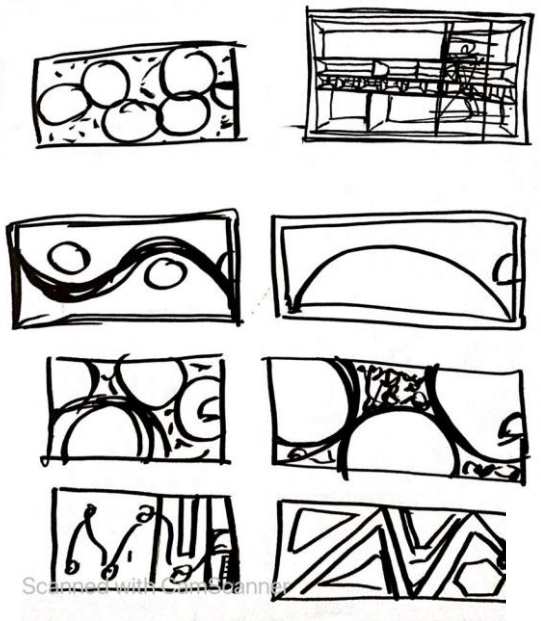


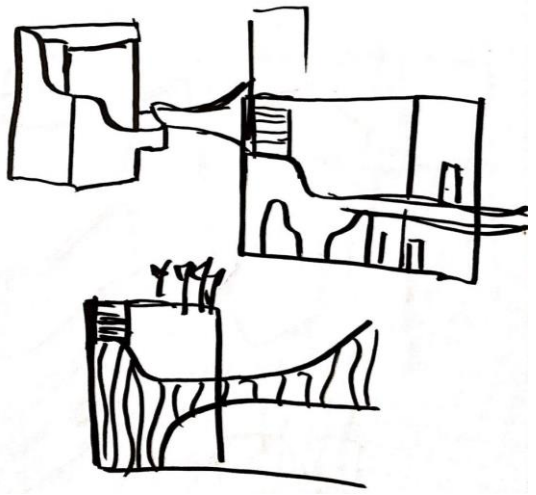
SKETCHES AND NOTES











SKETCHES AND NOTES