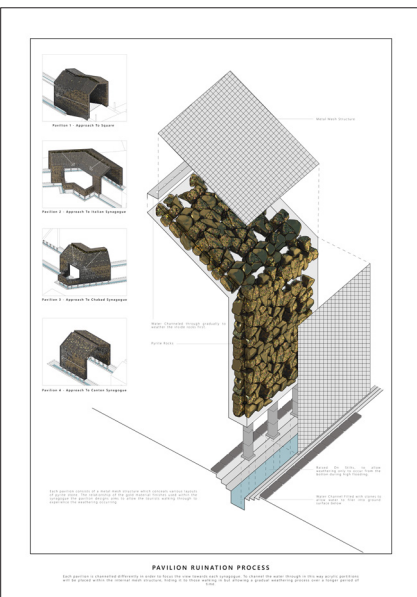
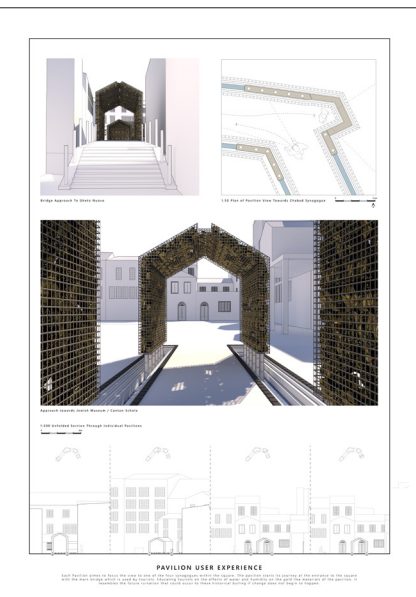
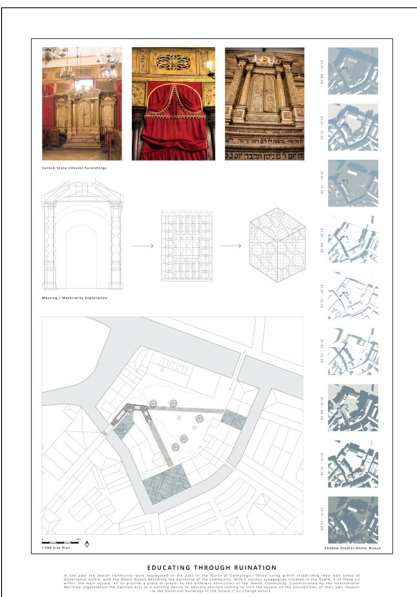
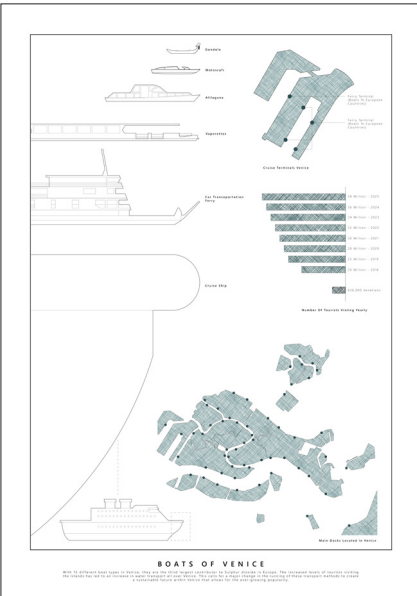
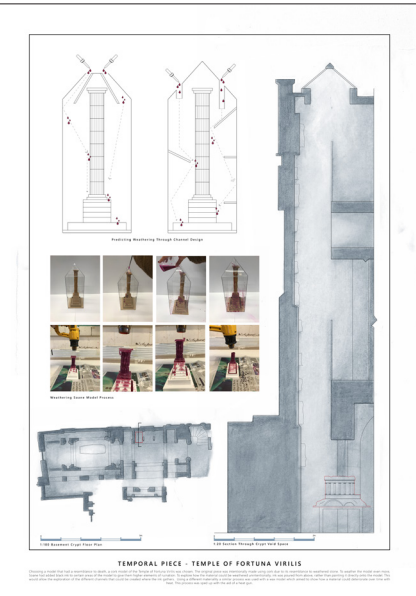
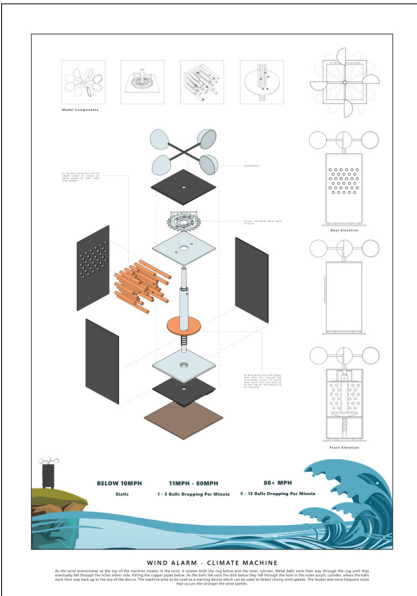
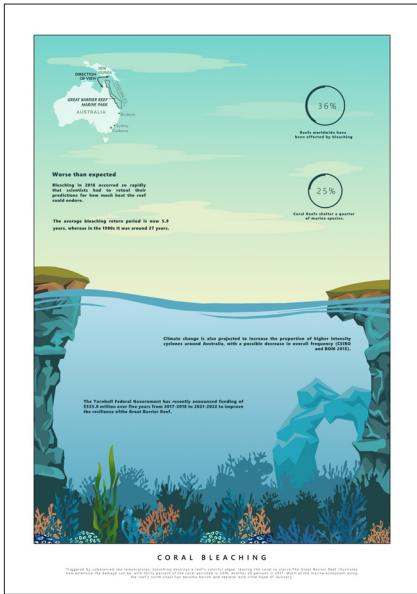


ARCHITECTURE PORTFOLIO

CHANDNI PATEL

DESIGN 5B & TECH 5

Design 5A Summery 4 - 5
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Even though cruise and shipping companies are polluting more and more every year, they are currently exempt from the Paris agreement on climate change and have largely unregulated pollution levels. All other transport types have regulations in place for emissions, yet boats have remained unscathed by policies for years.

Previous work in Design 5A explored the impacts of large boat transportation on a local scale, exploring its impacts to the city of Venice, due to its increased tourism to the island. With the final pavilion design task aiming to educate on the impacts of climate change through creating a piece that explored ruination through changes to climate. The process of controlling ruination through channelling were used from ideas taken from temporal task earlier in the term.

Using materials that represented important architectural typologies that the pavilion was located in, it explored the volumetric and finishes of the various synagogues of the Jewish Gheto creating a pavilion that focused views towards these buildings in order to make reference to the direct impacts climate change are having on them. Using materials that reacted to changes in sulphur dioxide and water from increased rainfall and acqua alta's, pyrite stones and steel mesh were used to gradually weather over time.

Moving forward into design 5B the issues surrounding boat travel would be investigated in the area of Westminster in London. The possibilities of the use of steel mesh as a main material element would be explored further, as a use of both structural and decorative elements to the design. Aimed at creating a similar sense of education to the impacts of the changing climate conditions through direct ruination, the themes of creating controlled ruination through channelling would be tested further.

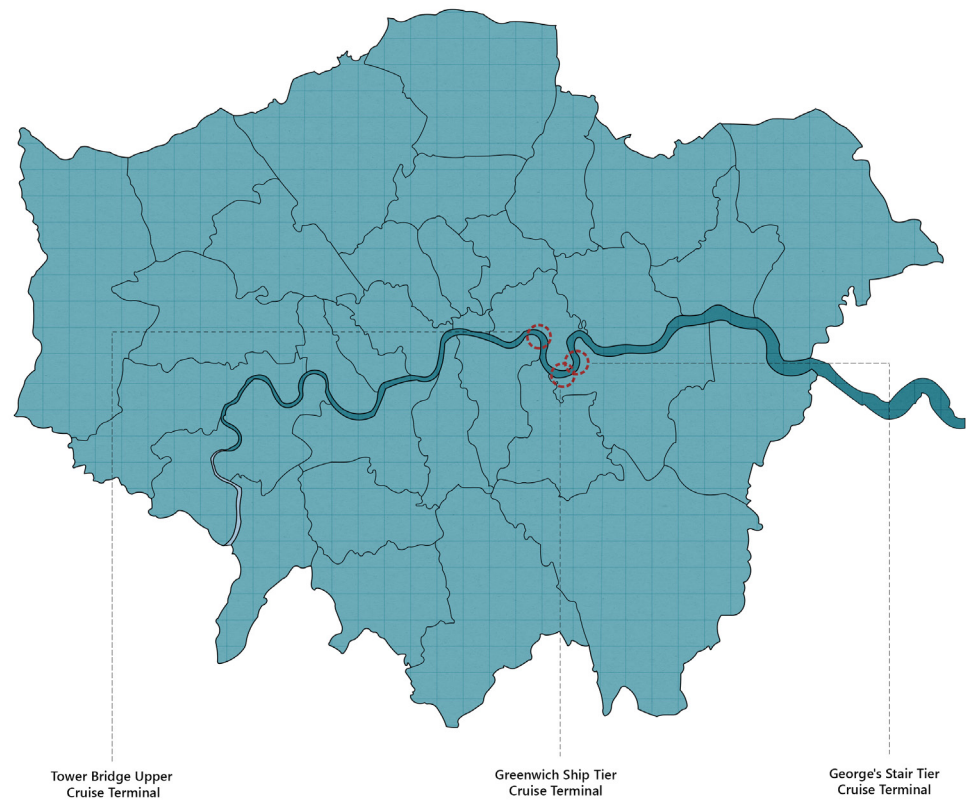
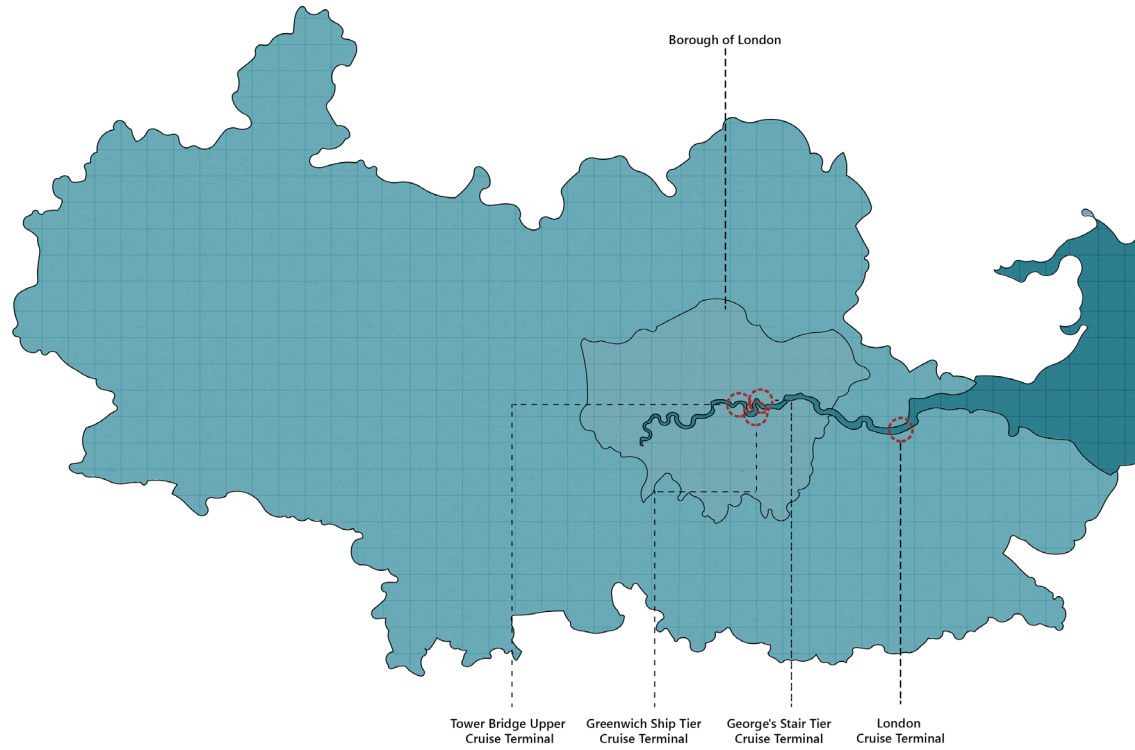


- WESTMINSTER MAPPING -

With London being a large tourist destination, in recent years there has been a sufficient rise in the number of people visiting the city. With Cruise ships becoming a more popular mode of transport for tourist holidays, London currently houses four cruise ship terminals.

Though most large-scale boats only dock at the tip of the River Thames, in Gravesend, Kent, some boats carrying up to 1000 passengers travels all the way into Tower Hill, London at least once a month.

With stricter emission rules being placed on other modes of Transport in London, such as cars and buses, the use of boat travel through London is being encouraged more as a new mode of transport for both Tourists and Commuters. Even though this will ease emissions from road transportation, most boats that run on the river emit far more carbon and sulphur dioxide into both the river and atmosphere. It is key to find a sustainable boating solution to cope with the ever growing popularity of the City.



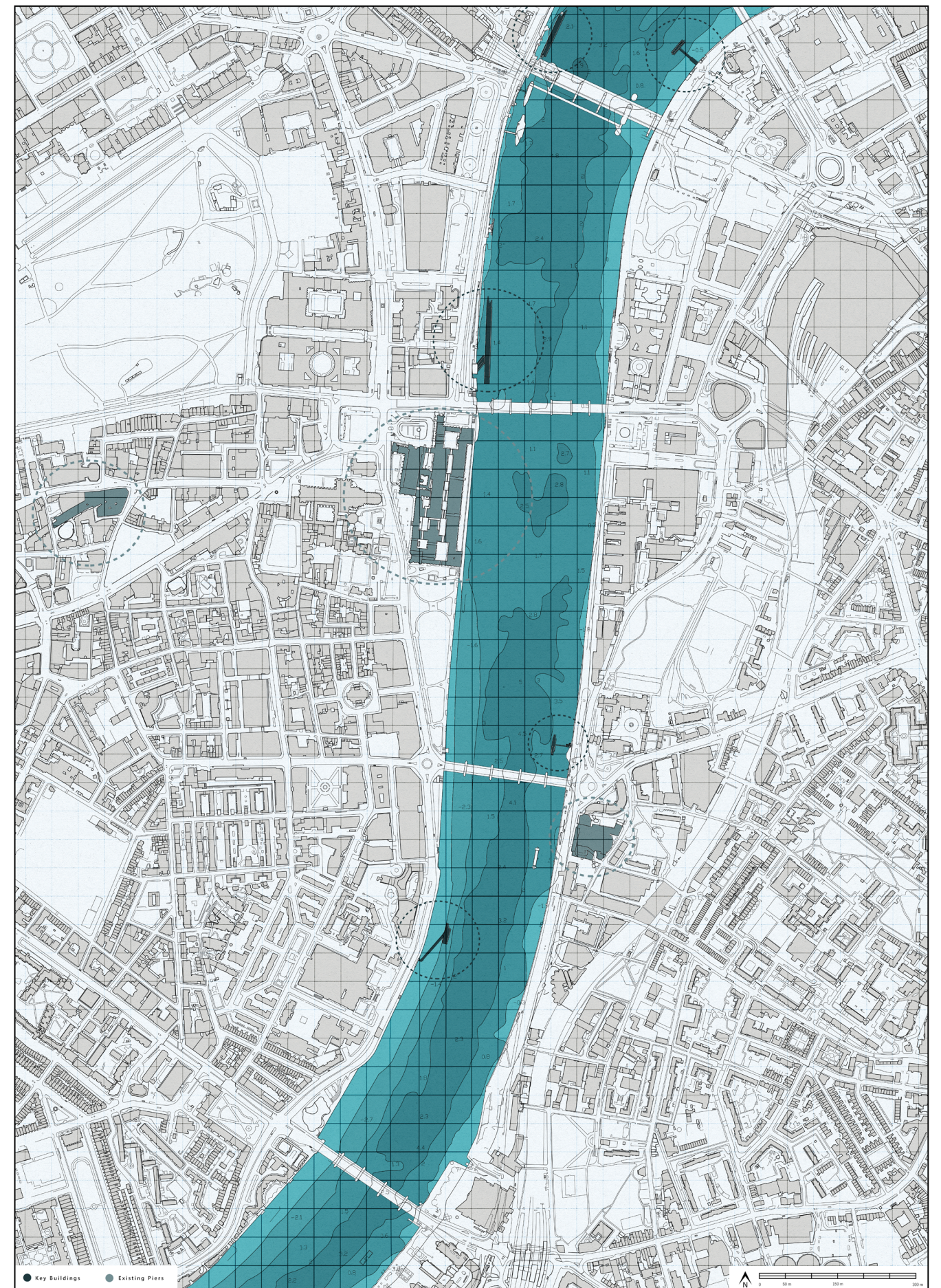
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With the intention of introducing a new sustainable boating solution to the City Of London, the existing bathymetric data of the river surrounding the Borough Of Westminster was explored to understand the changes to the depth of the river, as well as establishing the maximum sized boat that is able to dock in certain areas of the river.

Currently there are 5 Public piers/docks situated on both sides of the river in Westminster. All of varying uses, and size. Each hosts a small docking facility for boats to stop as well as public access to the land. Most are situated in deeper parts of the river, those which aren't have longer bridge links to allow the dock facility to be in the deepest part of the river in the chosen locations.



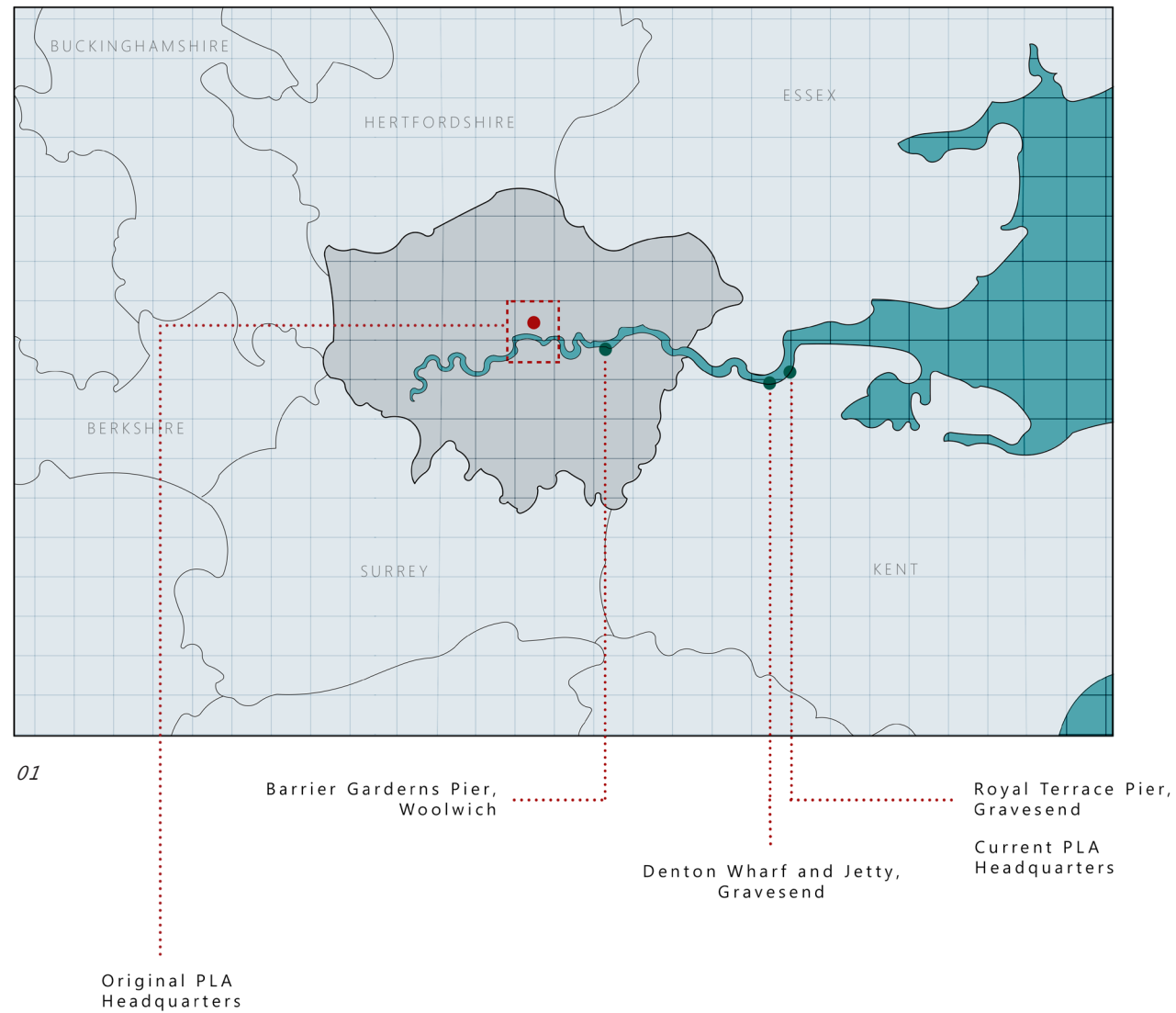


- THE CLIENT -

The Port of London Authority (PLA) have looked after the River Thames since 1909. Working to keep commercial and leisure users safe, they aim to protect and enhance the environment. With the impacts of Climate change occurring at an alarming rate PLA have introduced the UK's first green tariff that exceeds standards set by the International Maritime Organisation.

As PLA strives to encourage the use of the river for both trade and travel, they have been at the forefront of encouraging a new sustainable boating solution in order to accommodate, an increase in boat travel across the city in the future.

My own project aims to combat this issue with a new sustainable boating centre, which houses a new electric boating dock facility and public PLA archive, as well as a new administration office for the PLA Planning and Environment department, to directly manage the use of the new boating on the river.

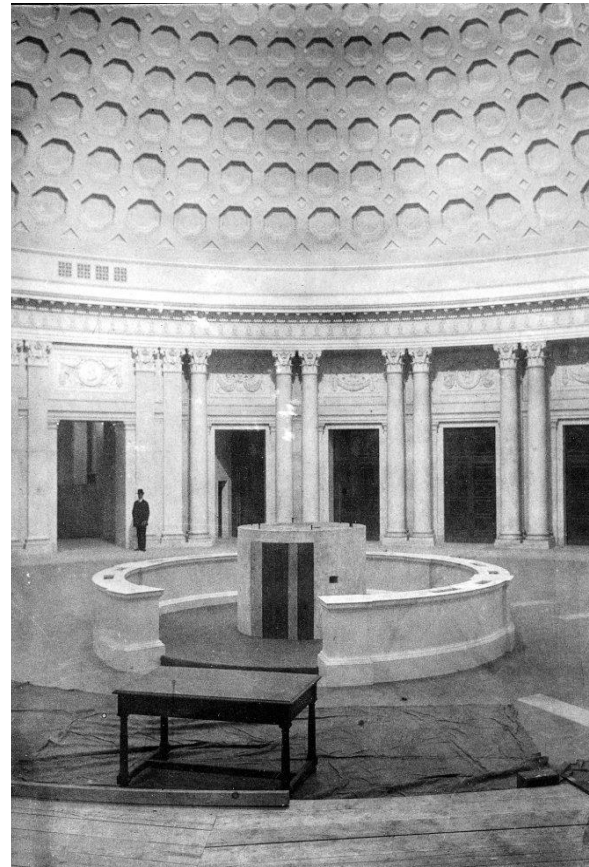


Although, The Port Of London Authority is responsible for the management and movement of goods along the whole of the River Thames, their once prominent presence in Central London has been lost, with their main Head Offices now being located in Gravesend, Kent near the main shipping terminal.

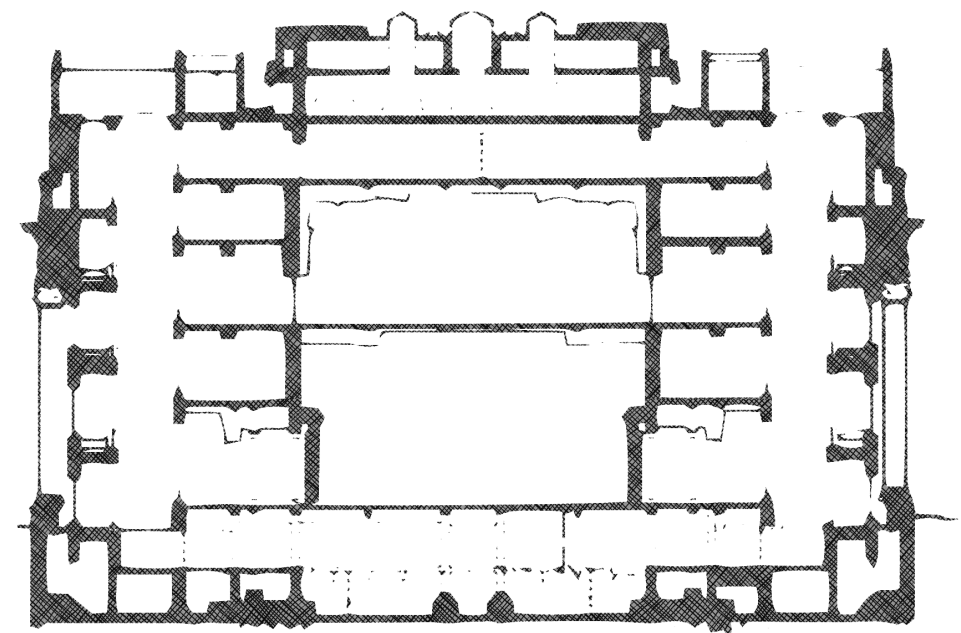
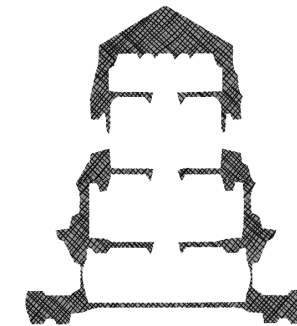
Over the years, most of the piers along the riverside have become privatised, with PLA only having ownership of three piers, two of which are also situated near their current Head Offices.

In order for the PLA to make a greater change in the Borough of London, their presence must be bought back into the main area of Governance space within London; situating them in Westminster.





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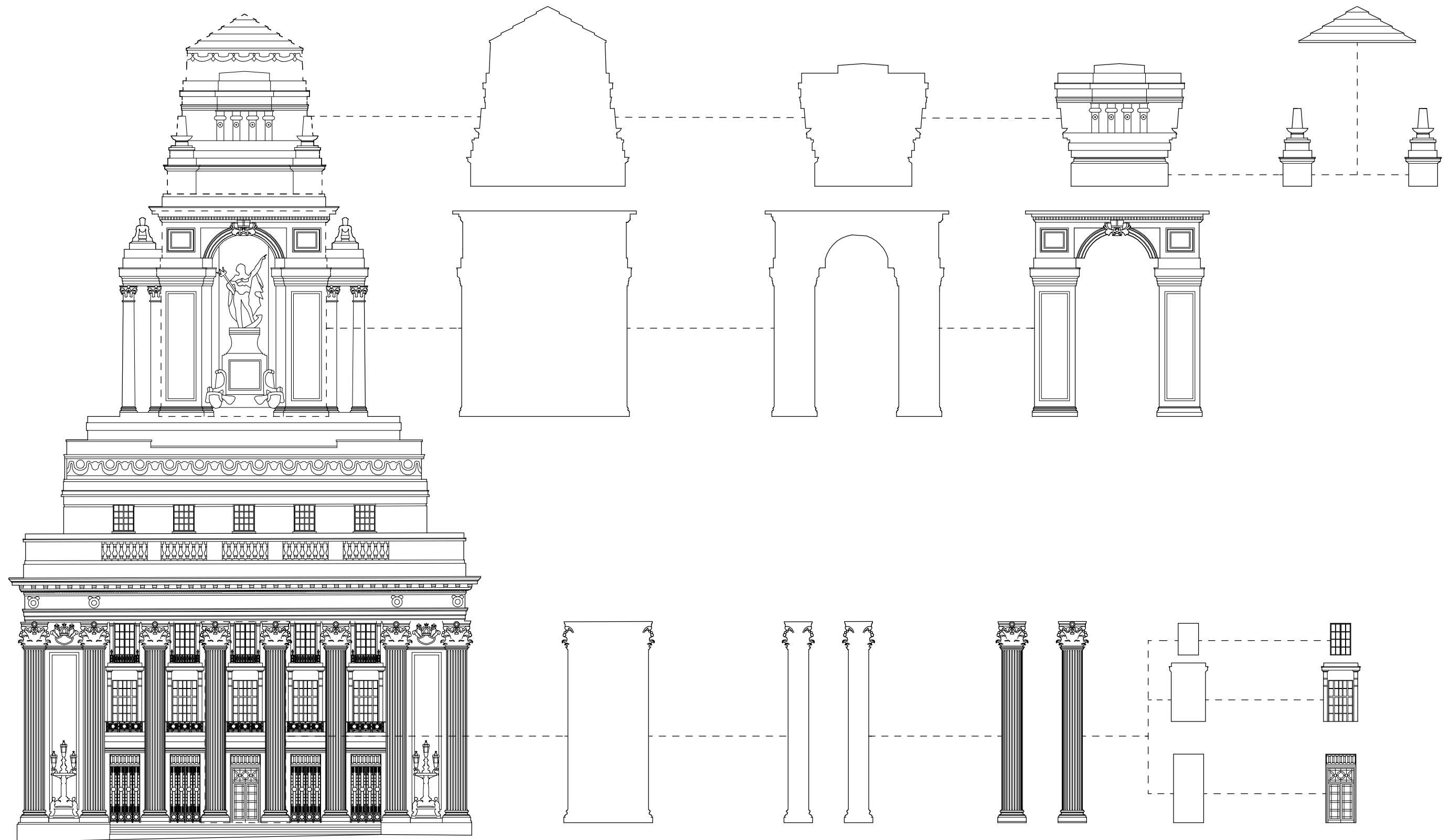
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With the start of the Port of London Authority, a headquarters building was built in 1922. The Beaux Arts structure was designed by Sir Edwin Cooper and built by John Mowlem & Co as the new base of the Port of London Authority. Opened by David Lloyd George, then the British Prime Minister, in the presence of the architect and Lord Devonport, the Authority's first chairman. At the time, it was one of the city's tallest buildings.

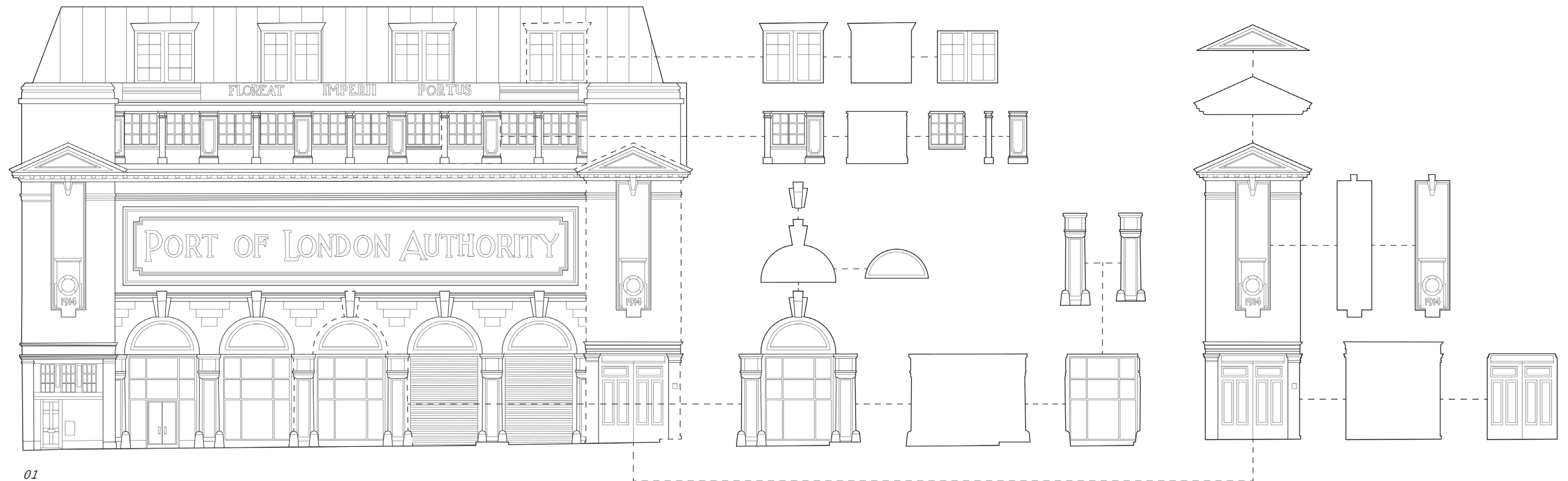
In the peak days of the Port of London Authority, more than 1,200 people each day came to the

rotunda to pay port dues for all the boats that were arriving in London. Such was the importance of the building that, in 1946, the General Assembly of the United Nations held its inaugural reception here, in what is now known as the UN Ballroom.

During the Blitz in World War II, Ten Trinity Square was badly damaged by enemy bombing and the domed rotunda was destroyed. In the 1970s, after the Port of London Authority moved to its current location in Tilbury.



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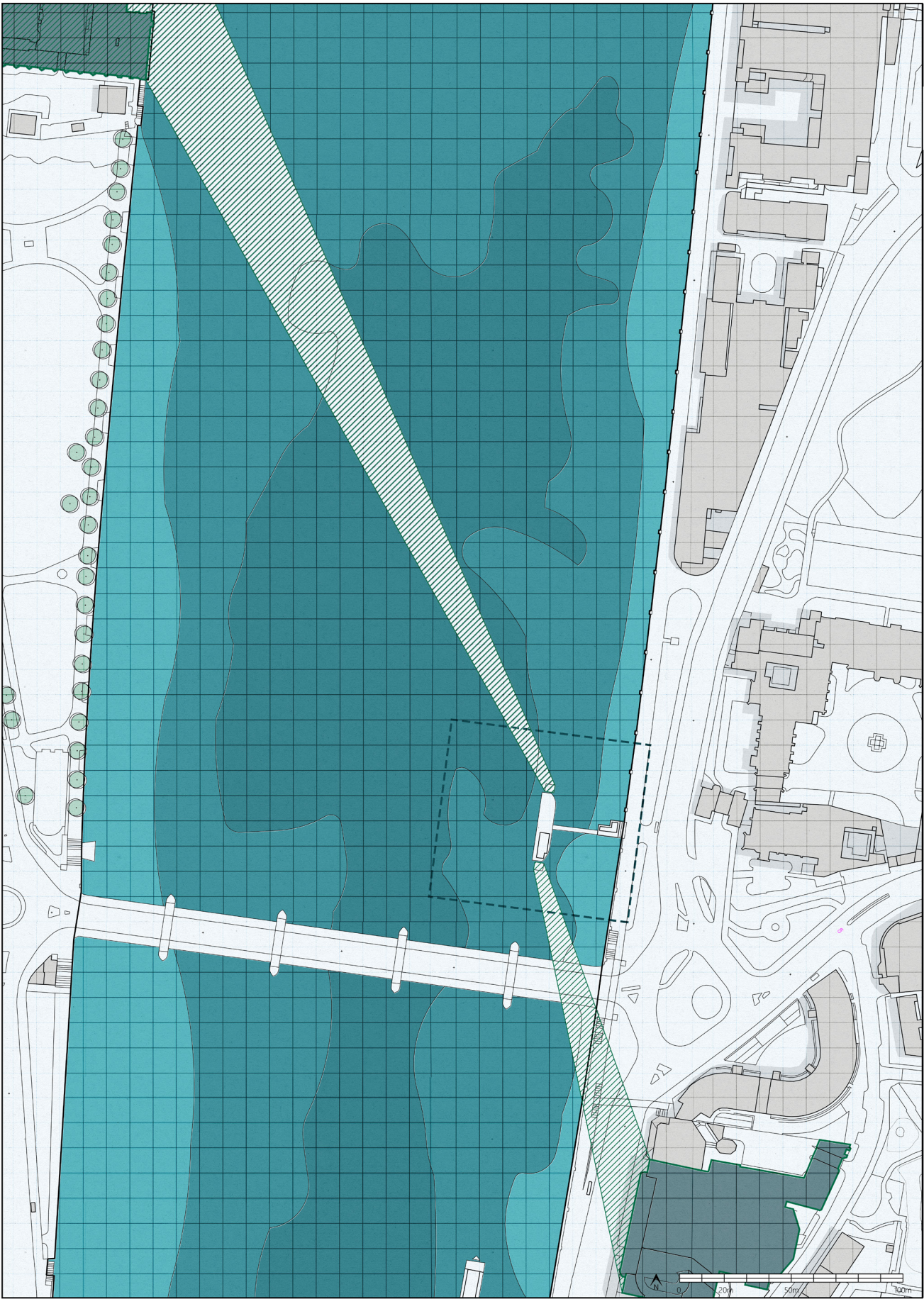


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- CHOOSING THE SITE -

When choosing a site for location of The Port Of London's New Boating Transportation Facility, it was important to situate the location nearest to the main sense of Governance to the city; The Palace of Westminster, along with The International Maritime Organisation.



Choosing the location of Lambeth pier, it is located in a part of the river where the river is quite deep, which would allow for a larger area to be built in the river that would not extend out too far into the middle of the river.

Currently used as a private dock for pleasure cruises, PLA's new ownership of the facility will intend to some extent reflect a similar usage for the public, as well as educating on the environmental agendas that the Authority are taking to improve emission levels in the city of London.



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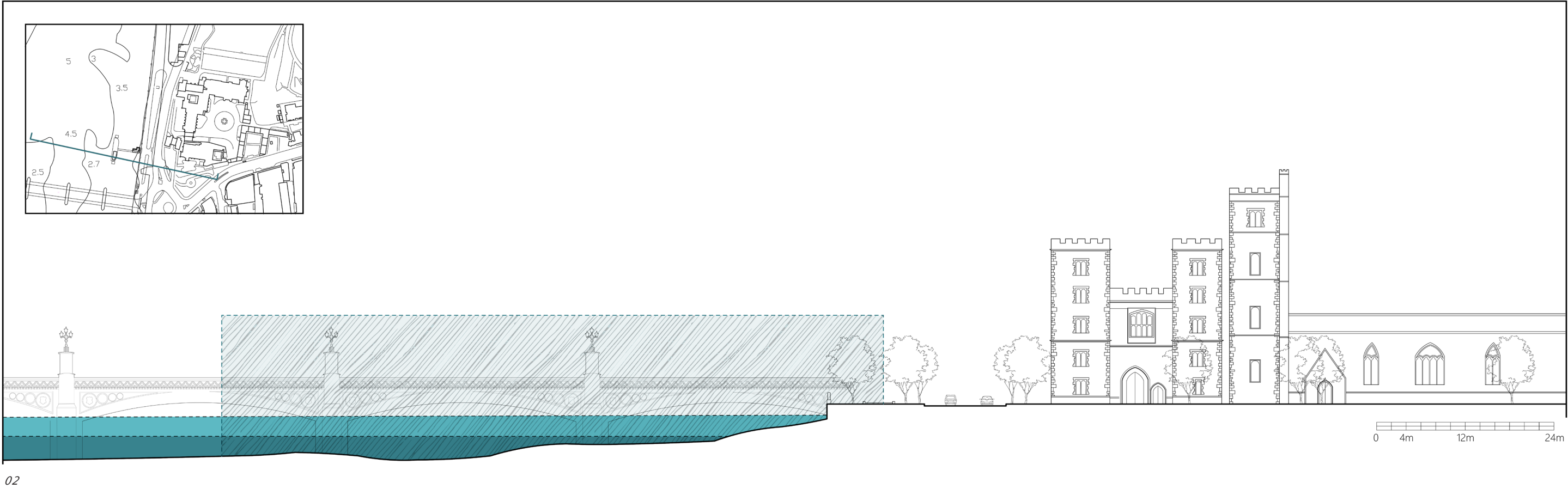
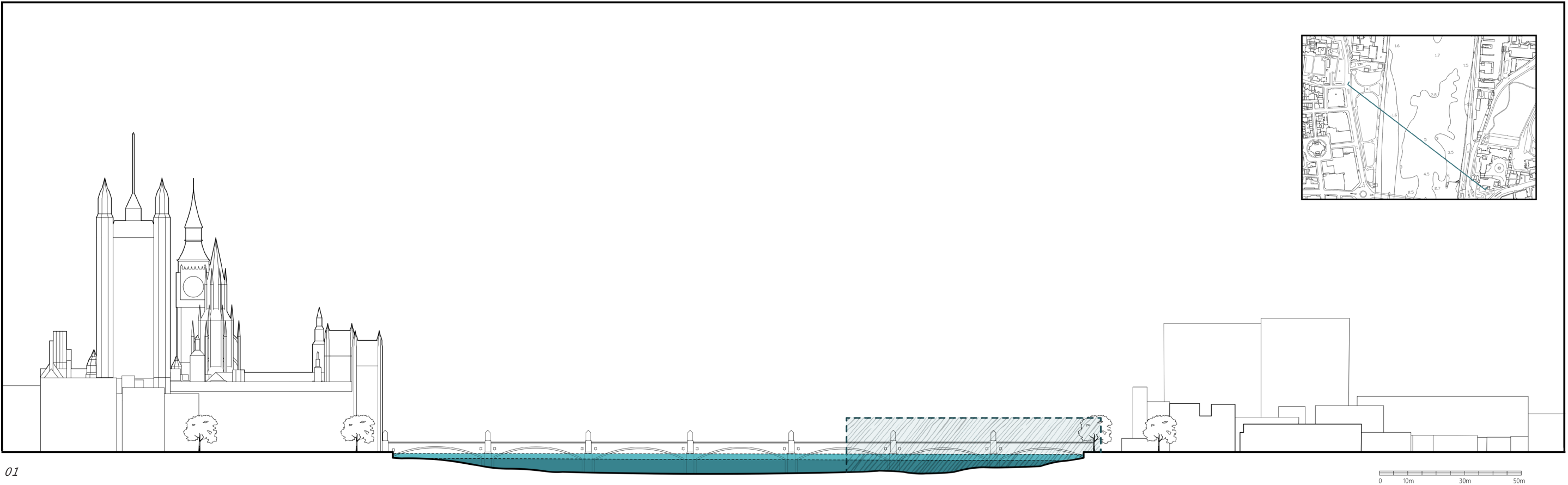
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65 LONDON S. W. - Lambeth Palace from Lambeth Bridge - LL.

There has been a landing facility for boats here since Roman Britain. It became the primary crossing point between Lambeth Palace and Westminster Palace for the Archbishop of Canterbury.

Lambeth pier had been part of a ferry service up to the mid-18th century, and now serves pleasure rides and cruises along the river. However, in its history, the location has seen a number of different docking facilities, and bridge links built in the past years.

One element that always continued to remain the same on site is a floating pontoon deck within the river, with a pivoting bridge link that changed to accommodate the changing river tide levels.

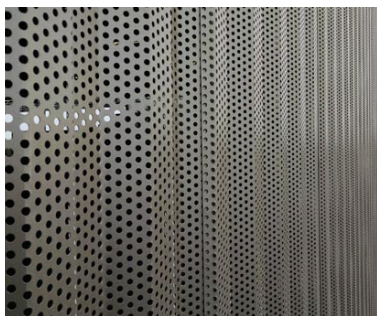


- INITIAL APPROACHES TO DESIGN -

With the construction, maintenance and operation of buildings contributing to 45% of the UK's total carbon emissions. It would be essential to also consider the sustainability of the built materials at the early stages of the project.

Acknowledging the flexibilities of using steel mesh for both decorative and structural elements, which were explored in my Climate Pavilion of Design 5A, further experimentations would be explored on its potential to be used as the main material throughout the site in the new proposed PLA buildings.

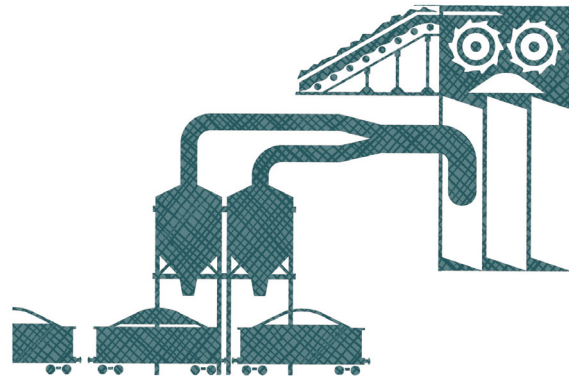
Once built, Steel offers the need for little maintenance as well as a long life, both of which are contributors to enabling a lower carbon footprint from the construction of a new build.



01

In order to make construction as sustainable as possible, the use of steel would be maximised, and the waste products produced from the construction process of steel would be also used to reduce any unused products.

Ground Granulated Blast-furnace Slag is a waste produce of the blast furnace process of the steel industry which is readily available, and would be



02

taken from the production of the metal works for the proposed buildings on site.

Using recycled steel from the deconstruction of existing structures on site, the use of steel would be applied to various different elements, using it in multiple ways; steel mesh structure elements, perforated cladding, pontoon piling & roof cladding.



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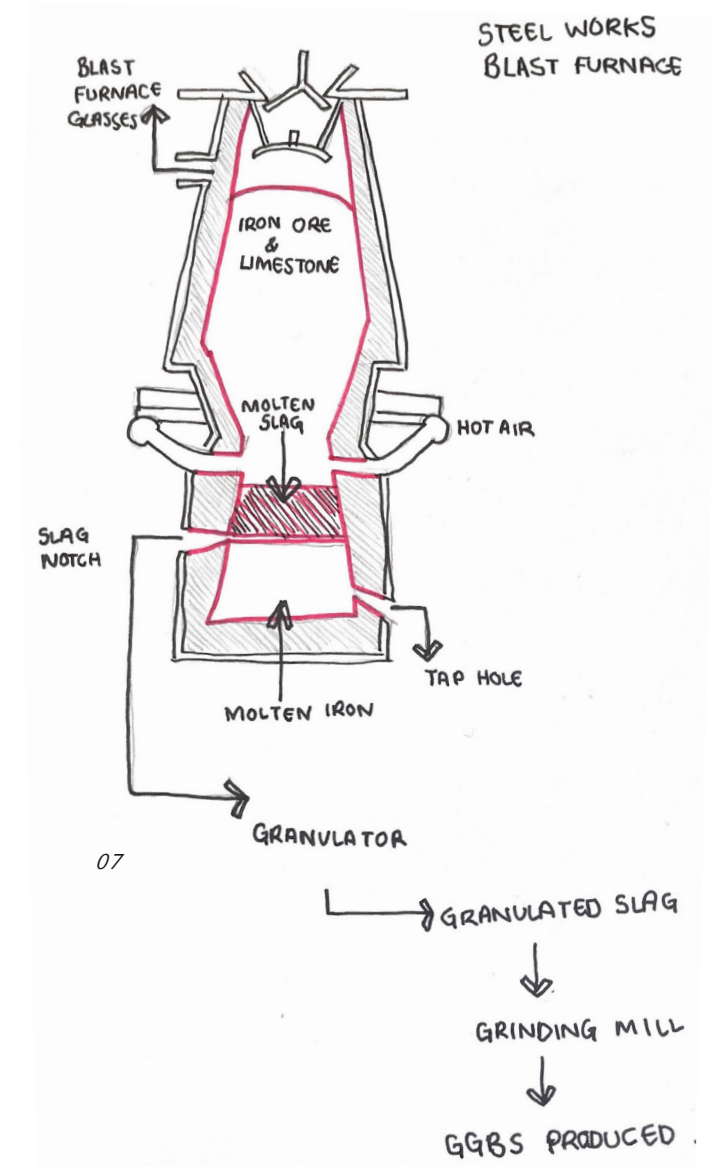
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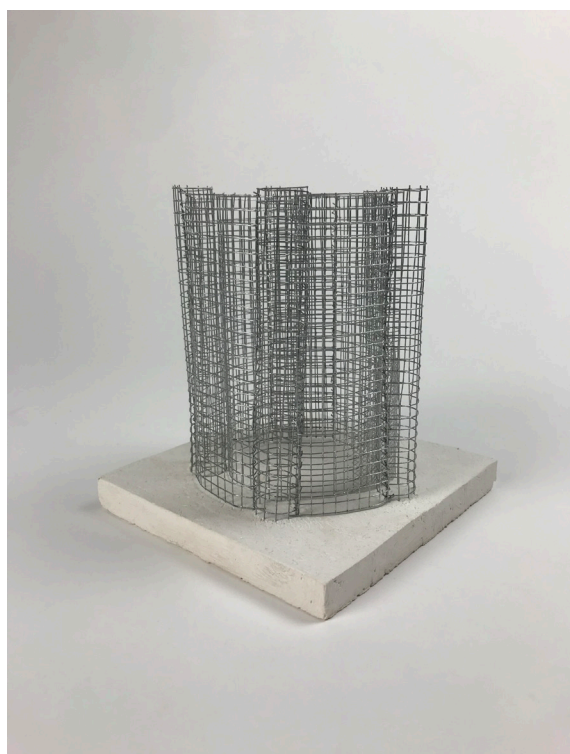
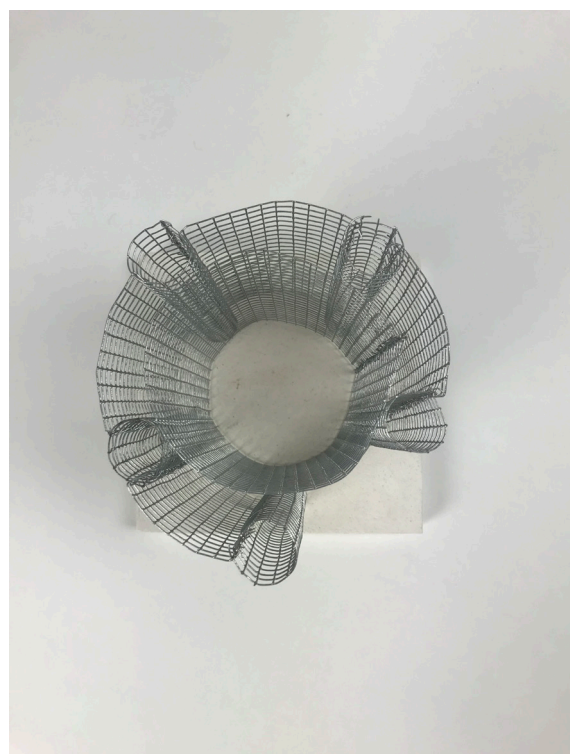
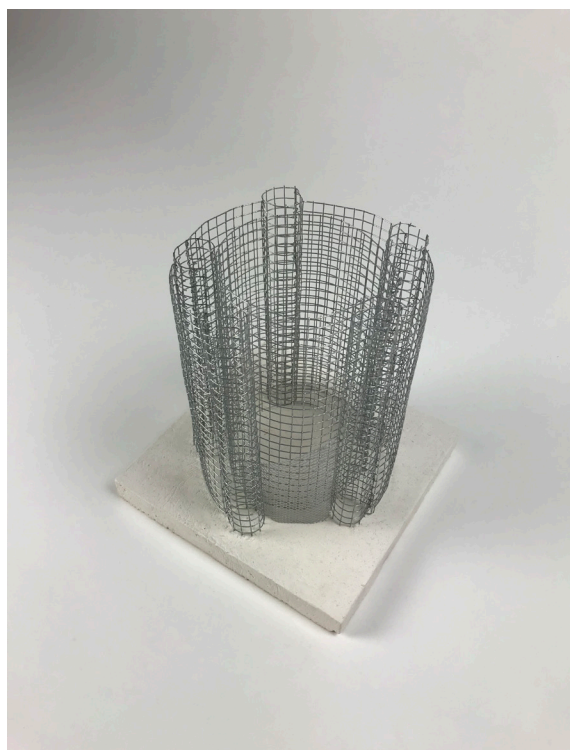
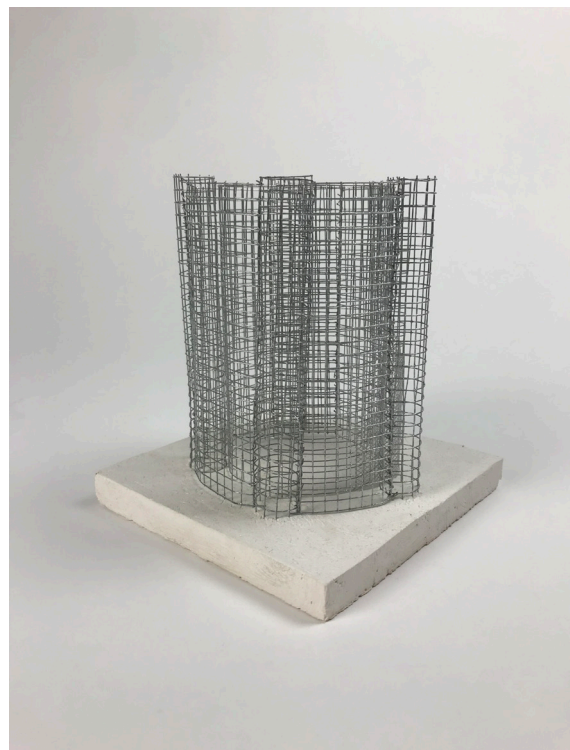
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GGBS acts as a replacement to cement in the concrete mixture. By comparison with Portland cement, manufacture of GGBS requires less than a fifth the energy and produces less than a fifteenth of the carbon dioxide emissions.

Although GGBS and aggregate concrete mix requires a longer setting time, the proposal of using sprayed concrete would be used to allow for thinner coats to be applied in the required areas. The use of sprayed concrete

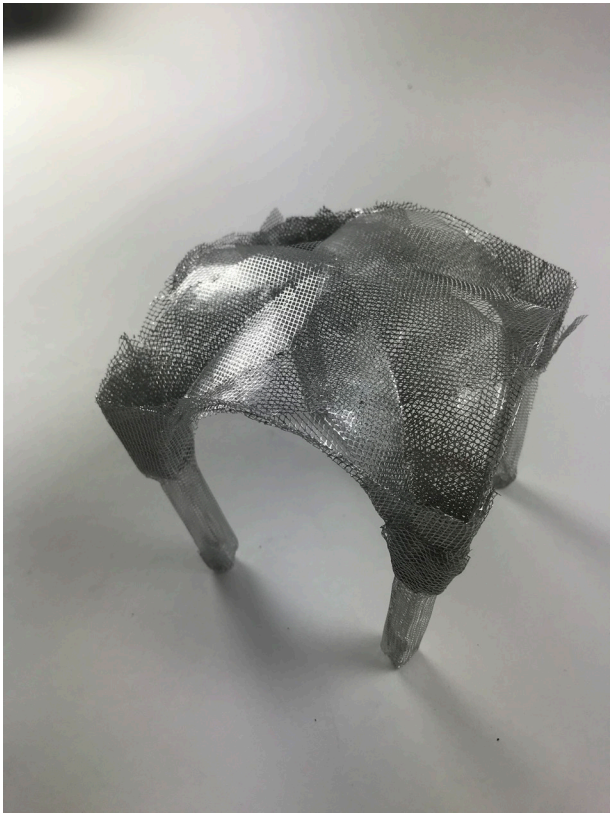
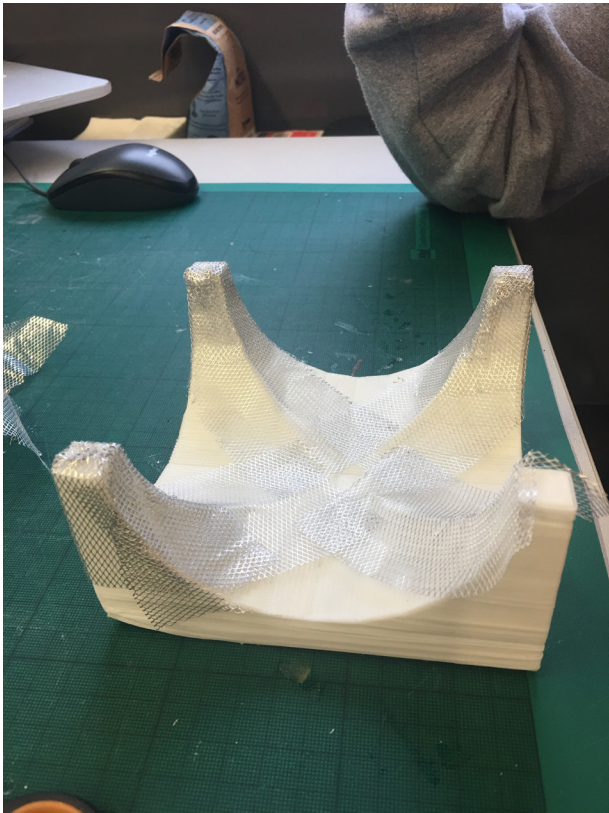
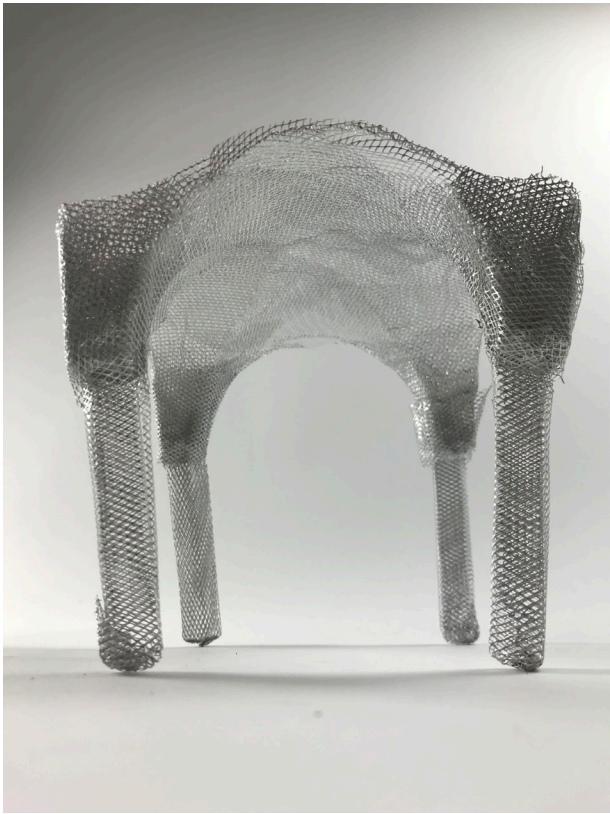
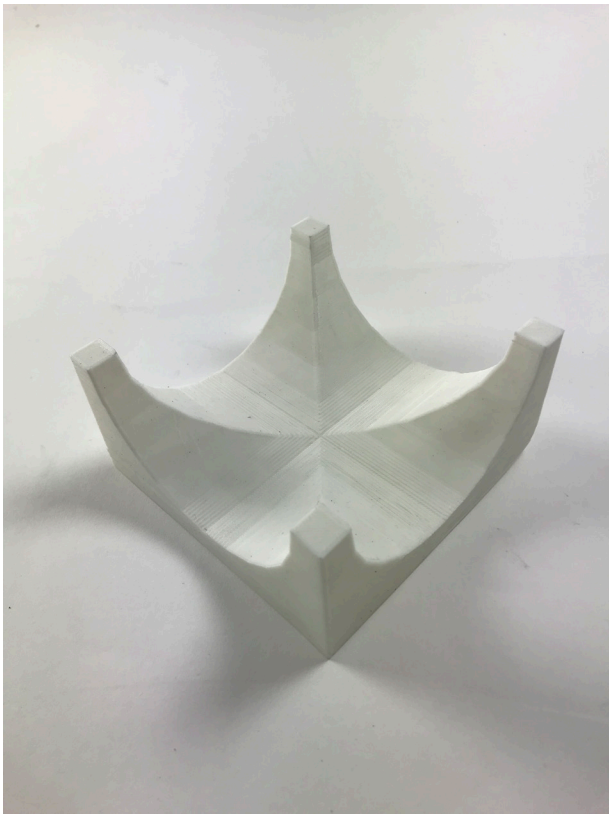


elements in areas that need to be enclosed, allows for less weight load on the pontoons whilst construction is occurring as a the concrete would be piped from a separate pontoon next to site.



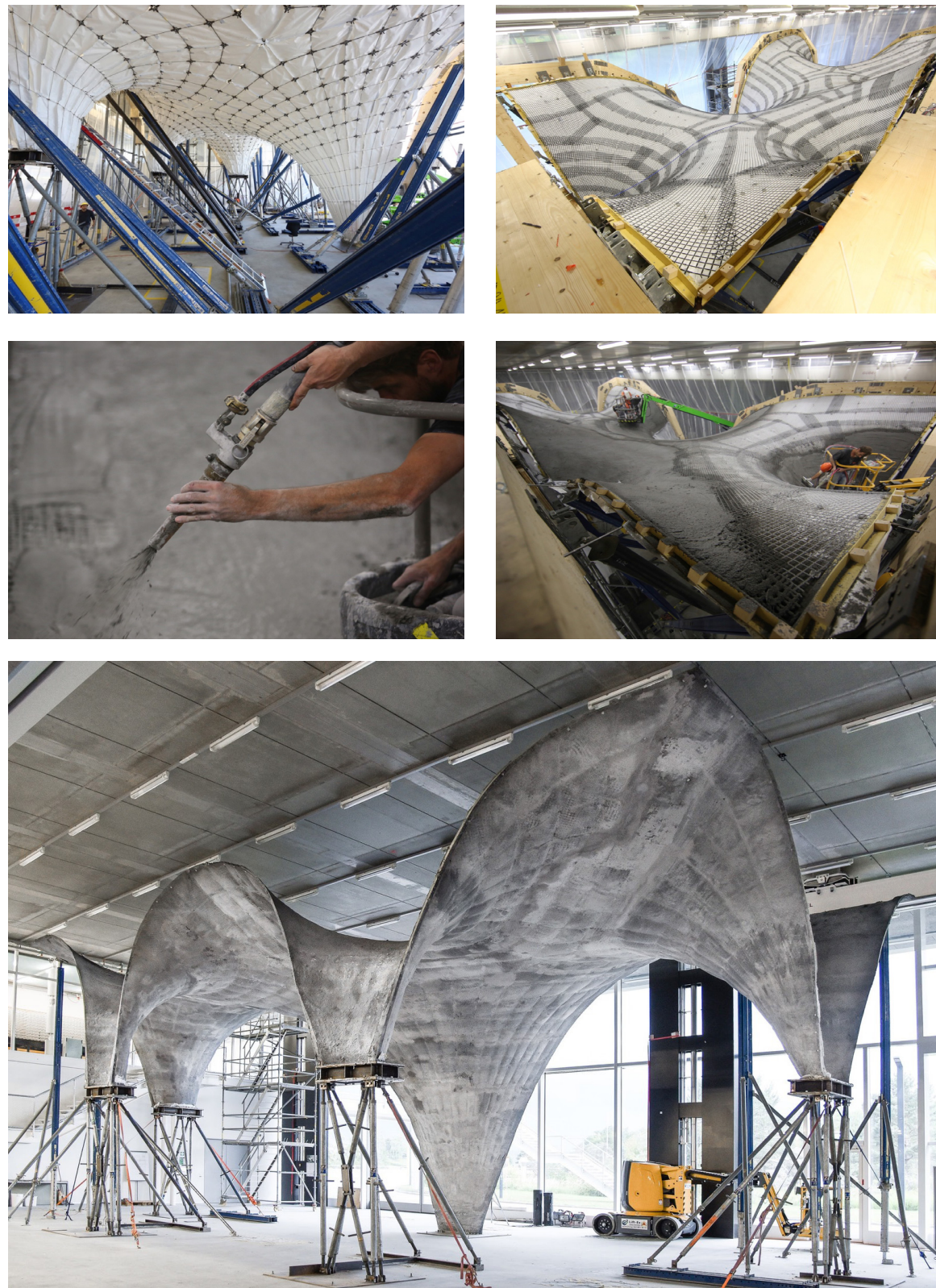
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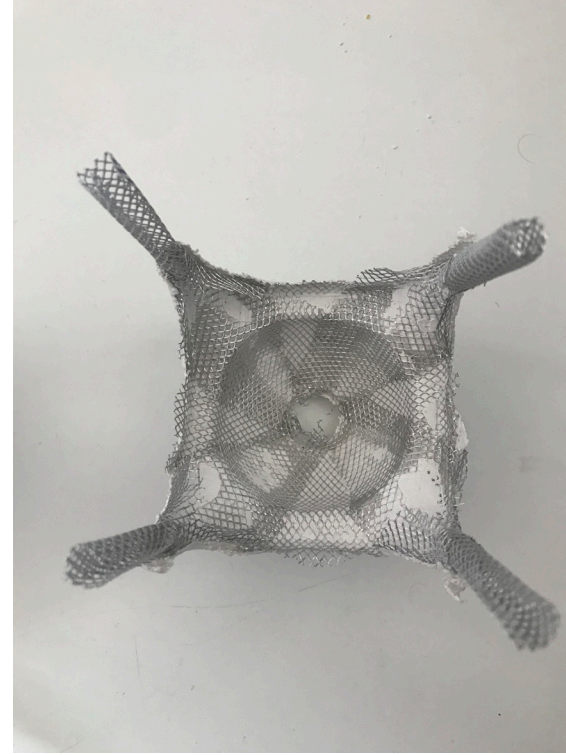
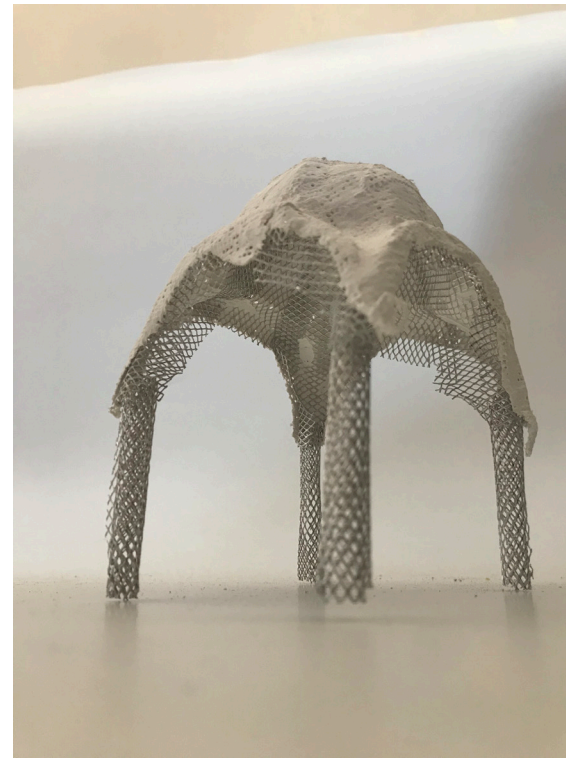
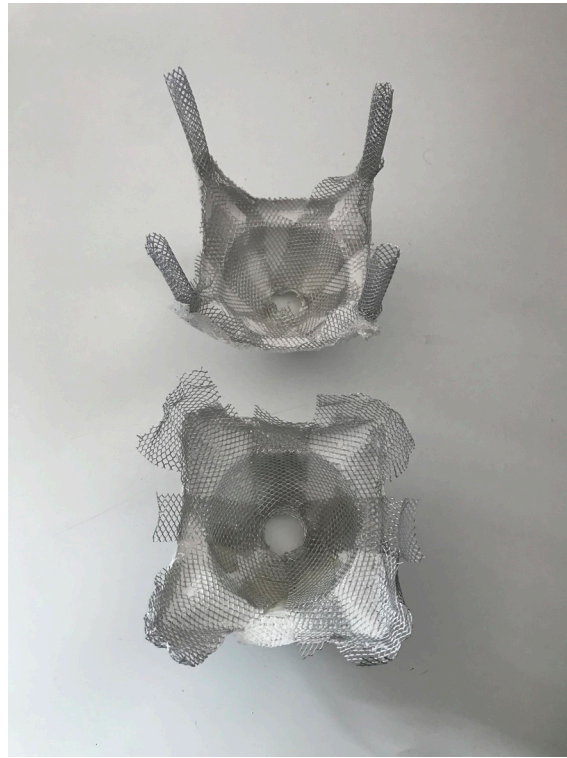


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01. Exploring Sprayed Concrete Vaulted Roofs - ETH Zurich 's Thin Concrete Vaulted Roof Structure
02. 1:100 Model Process Tests of Mesh Vaulted Oculus Roof

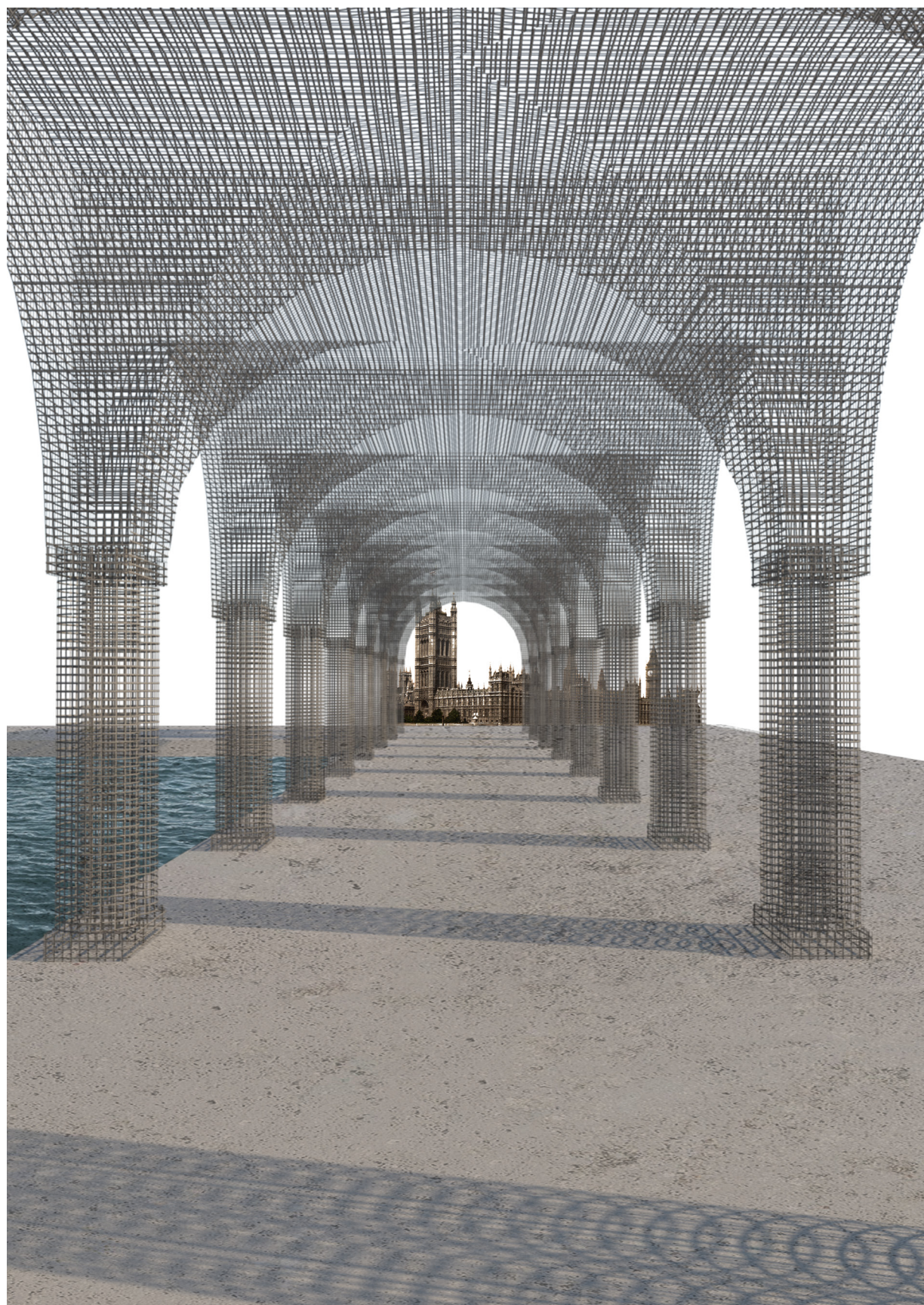


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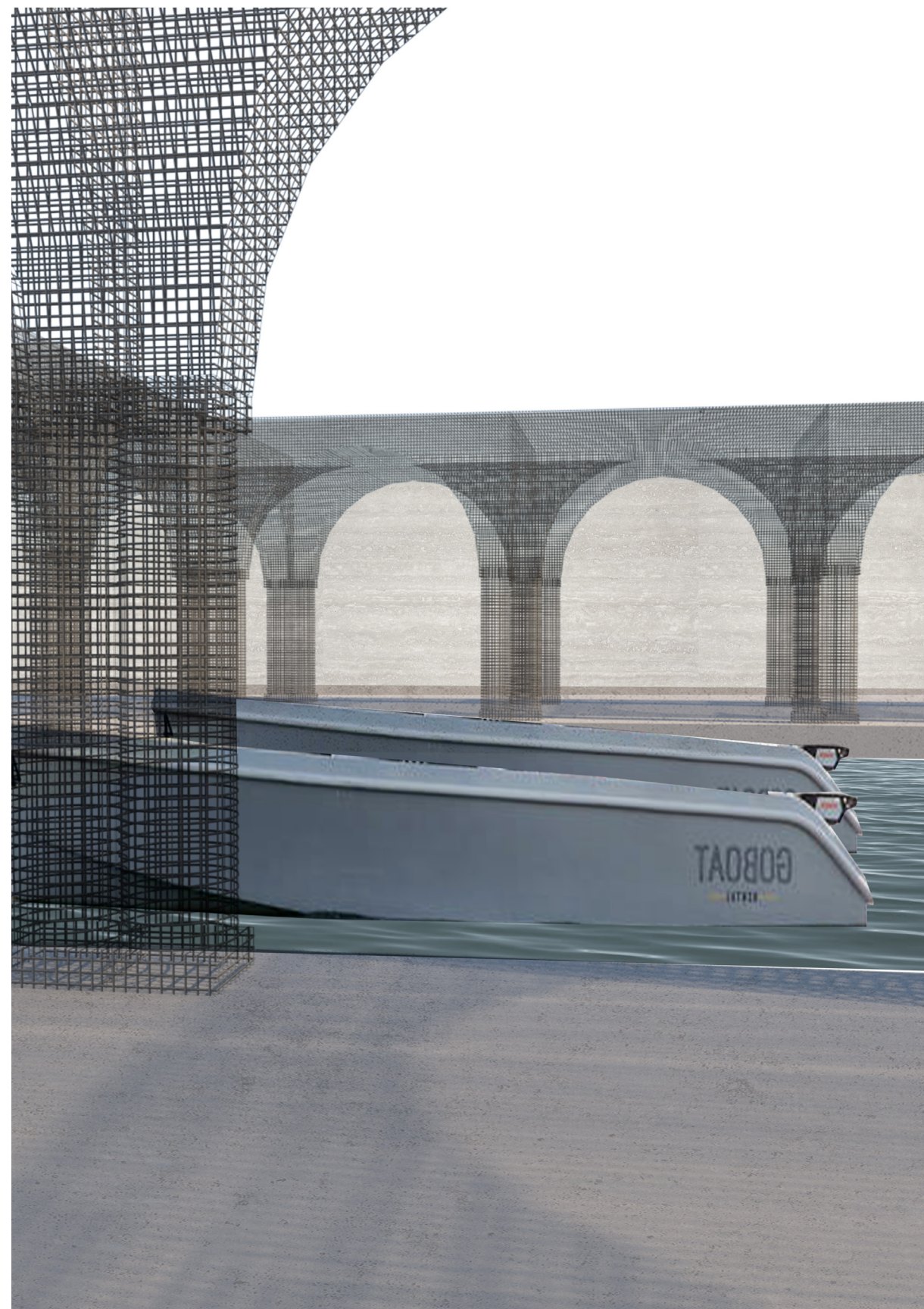


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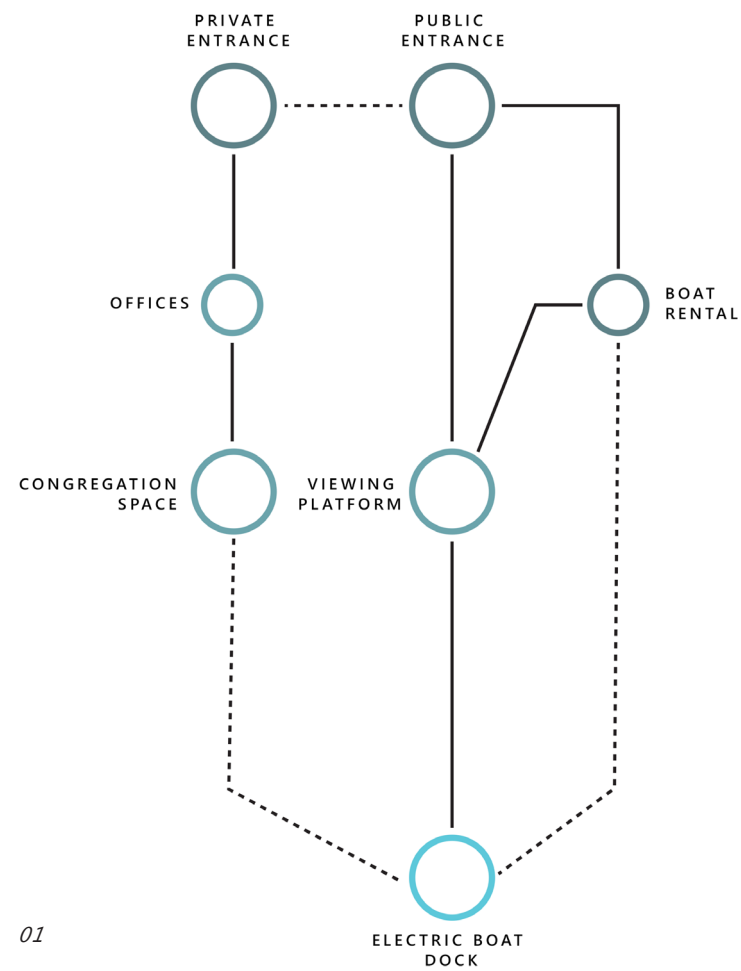
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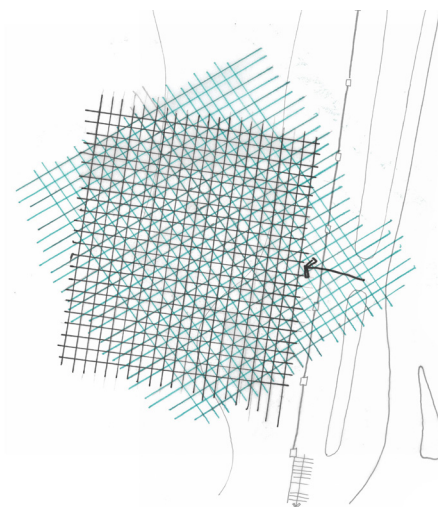
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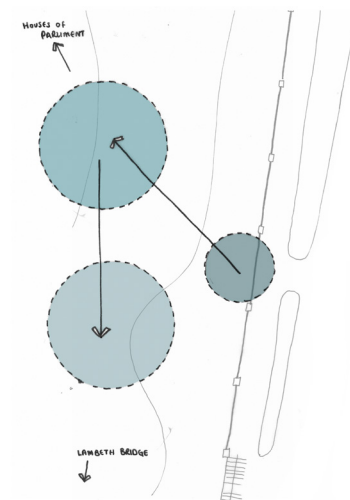
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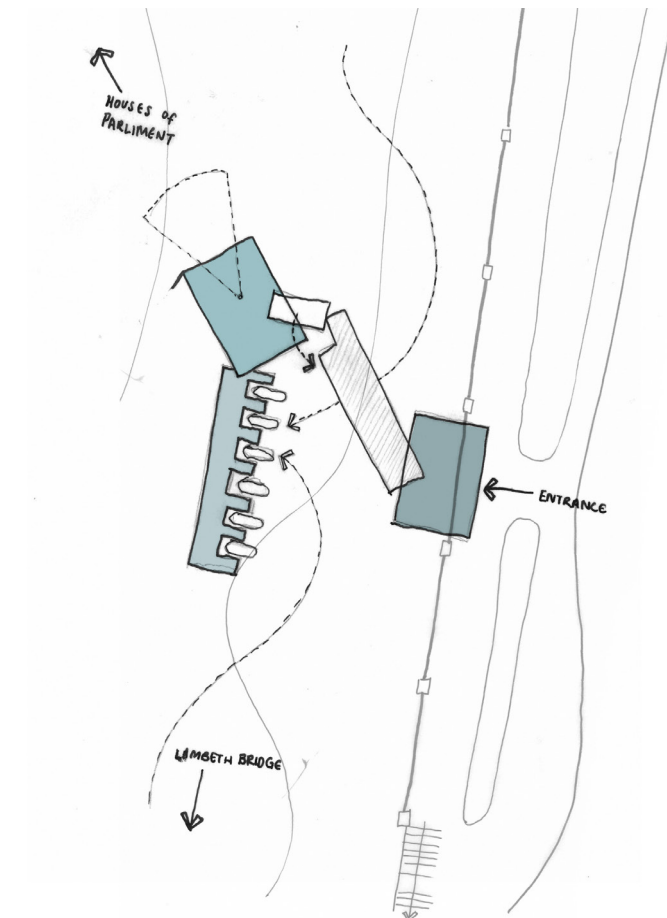
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Port of London Authority's main aim sets out to create a new electric boat facility which links with Transport for London's current river services. With PLA's environmental & Planning team creating new green agenda's with the International Maritime Organisation and Transport For London, the proposed plan of spaces also includes a series of private

offices as well as a congregation space.

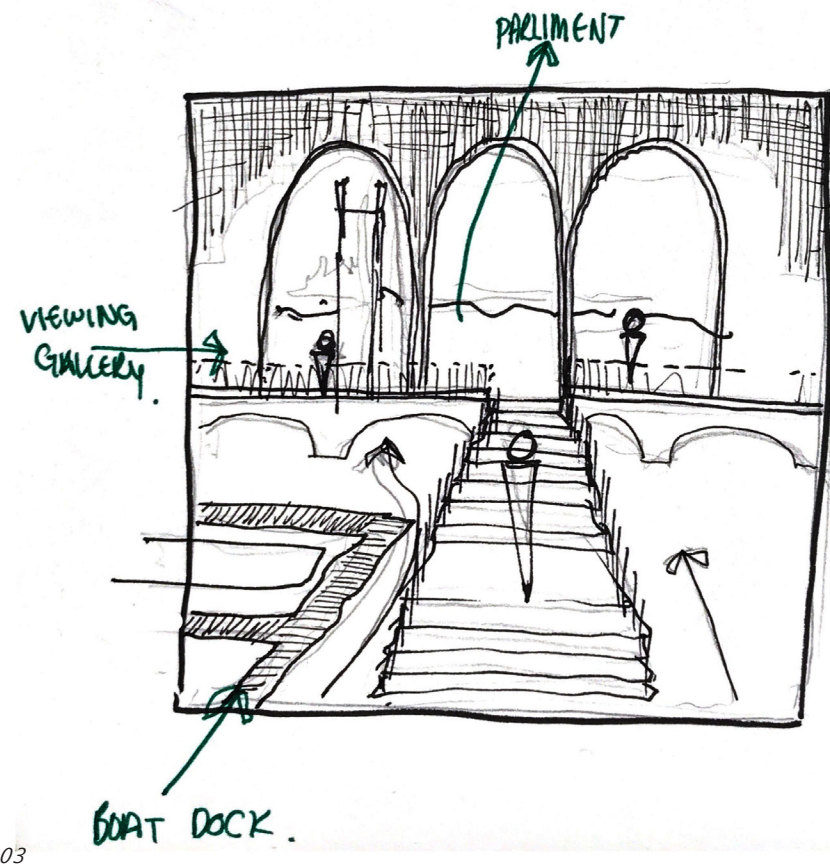
Through various public spaces and viewing galleries out to the river, PLA will intend to also educate the public through an archive and exhibition on the works they are currently undertaking to lead towards a greener and more vibrant usage of the river.



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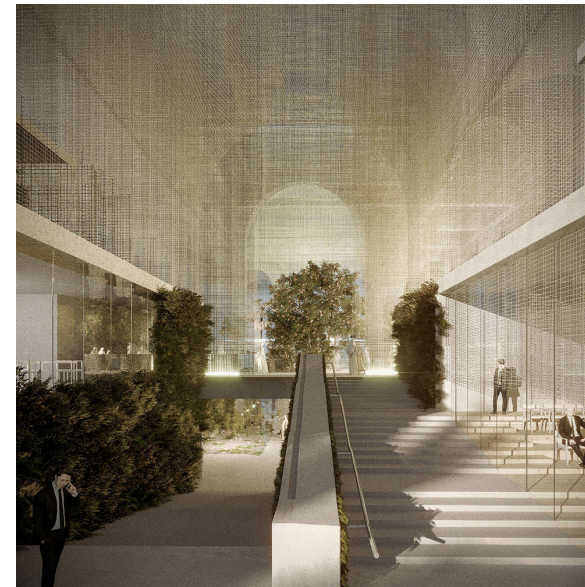
As the Palace of Westminster signifies the most important sense of governance, the location of site allows for the potential to create a unique framed view of Houses of Parliament.

With the use of steel mesh as the main materiality it allows for the structure to feel more lightweight and transparent. Aiming to emulate a similar atmospheric quality as seen in the Italian Pavilion design by Dodi Moss, the use of sprayed concrete would be used on lower levels of the proposed buildings to give a more lightweight top and roof structure to the main buildings.

01. Framing River Views - Windermere Jetty Museum by Carmody Groarke 02. Framing River Views - The Floating Kayak Club by FORCE4 Architects

03. Initial Sketch of Viewing Gallery Approach 04 & 05. Mesh Italian Pavilion design by Dodi Moss

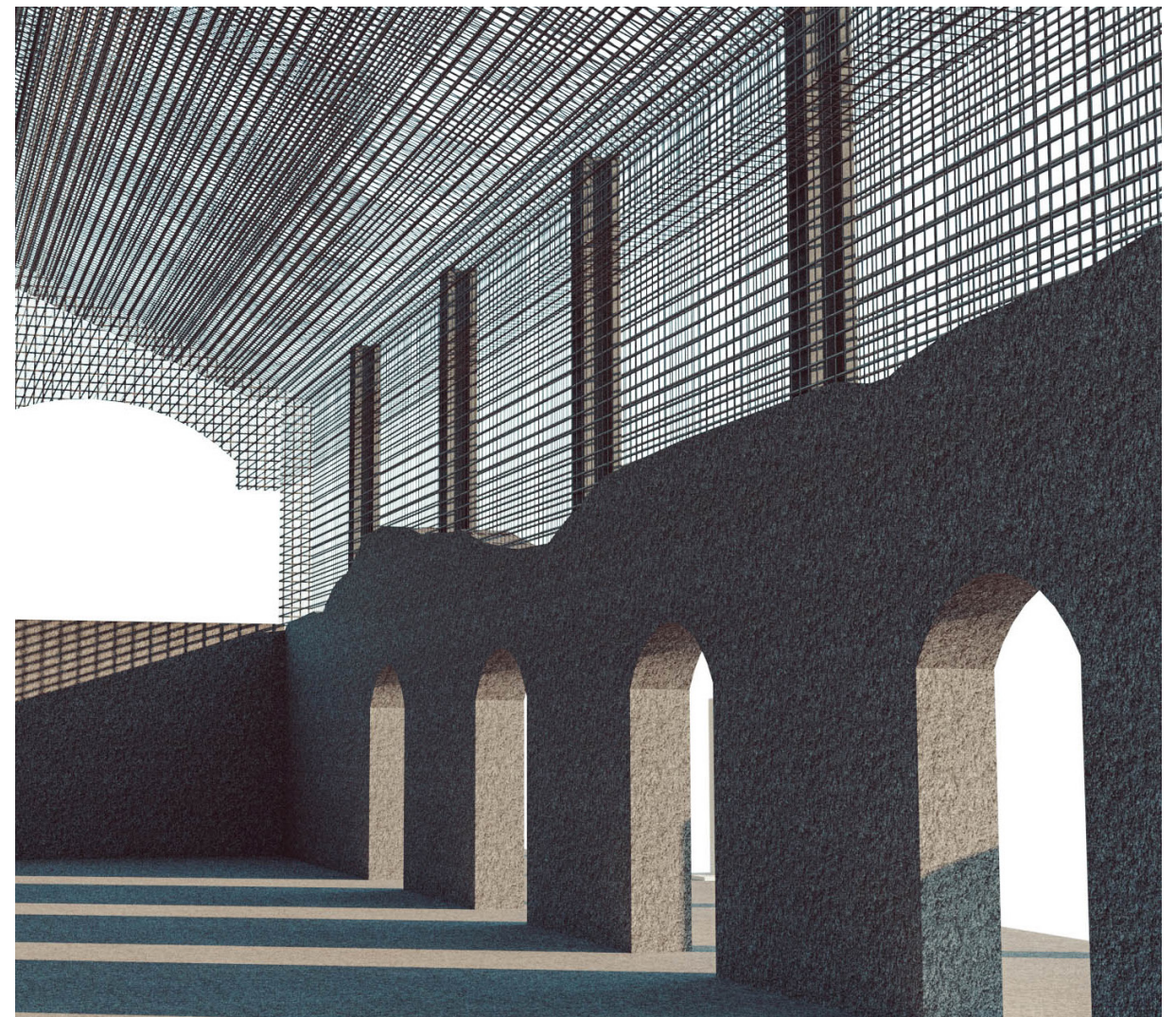
06. Initial Test Render of Mesh & Concrete Walls



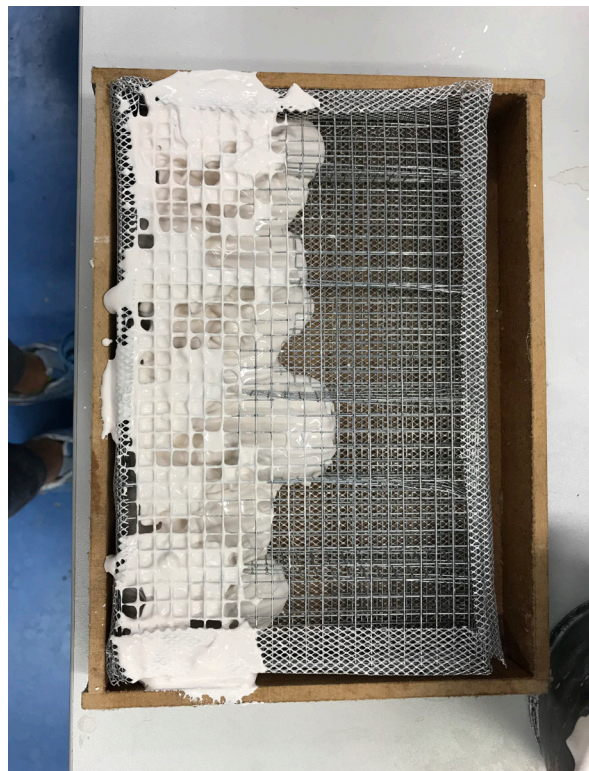
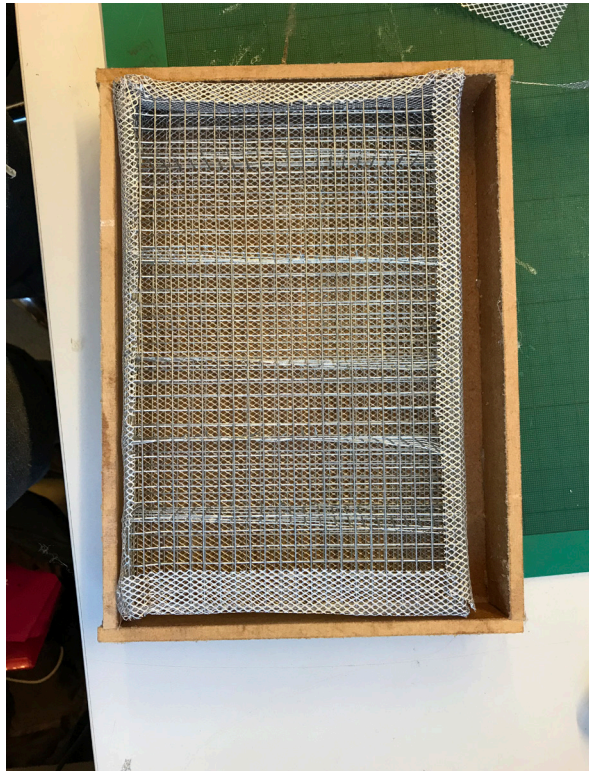
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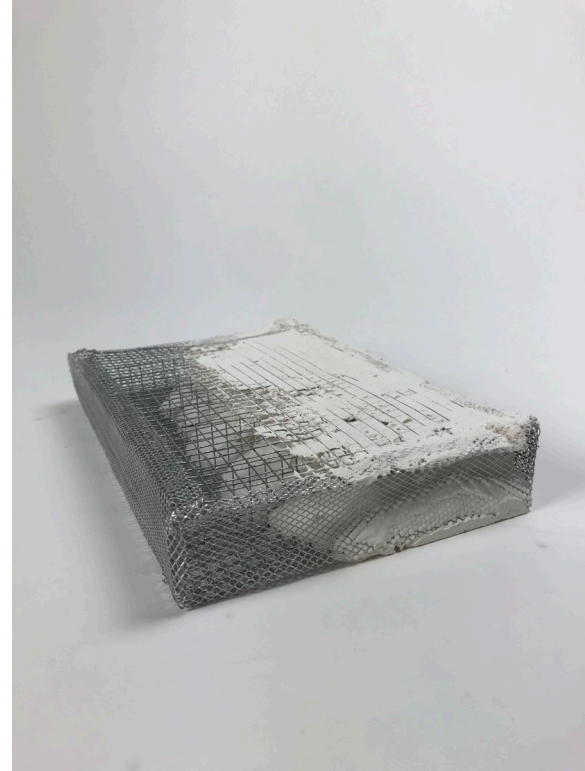
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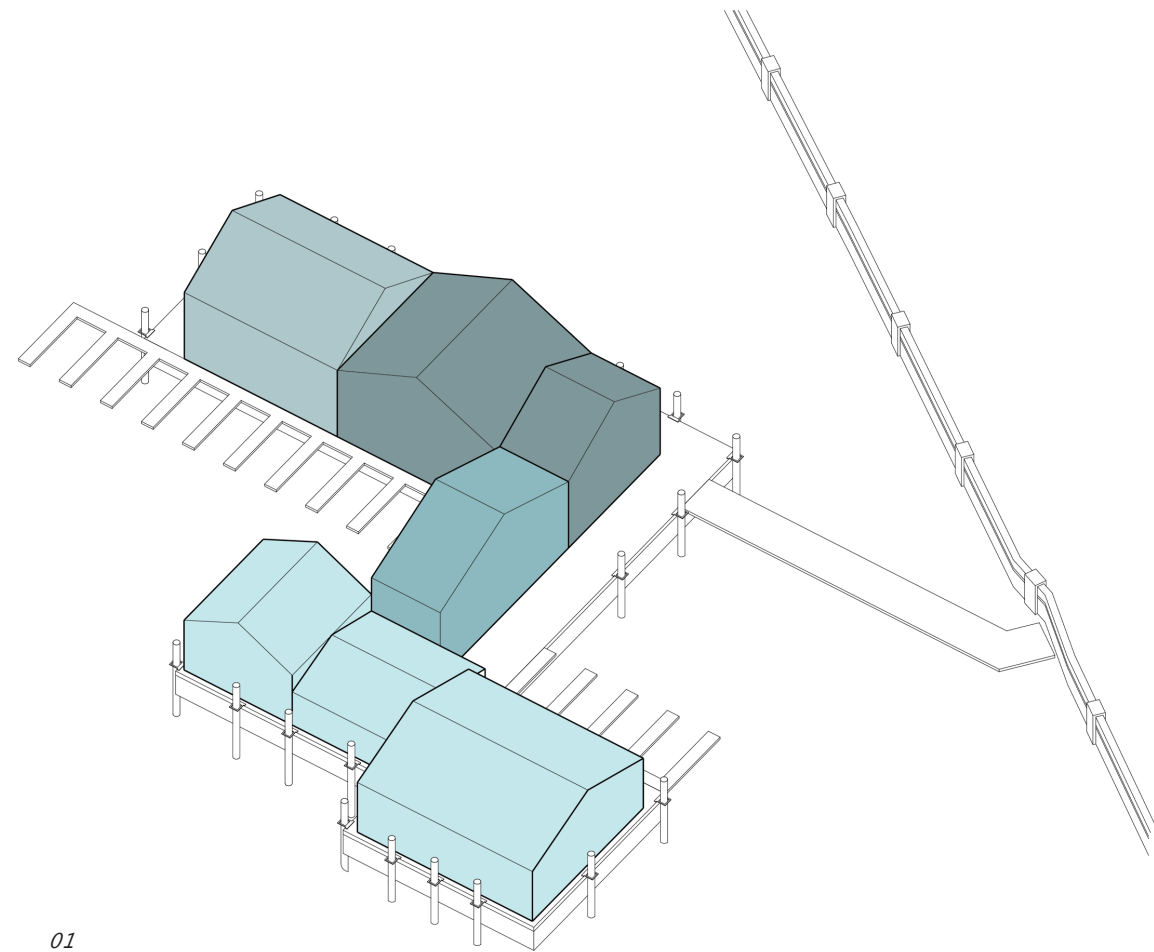


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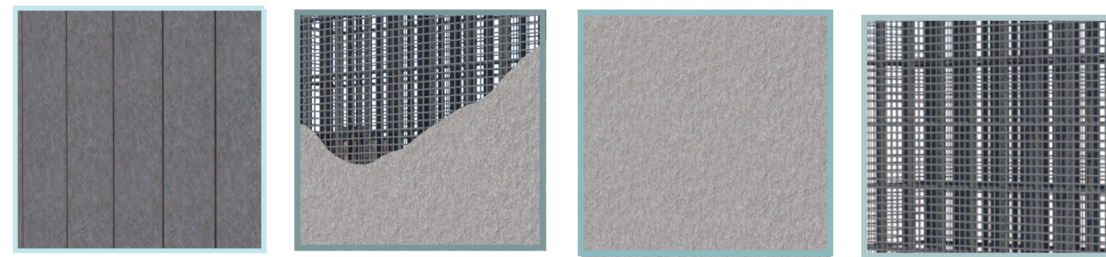


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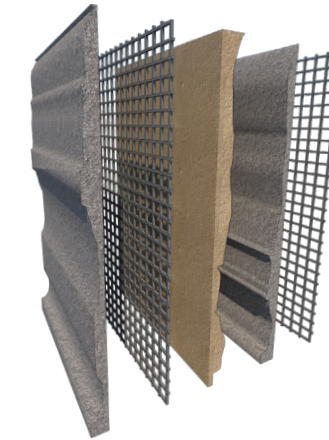


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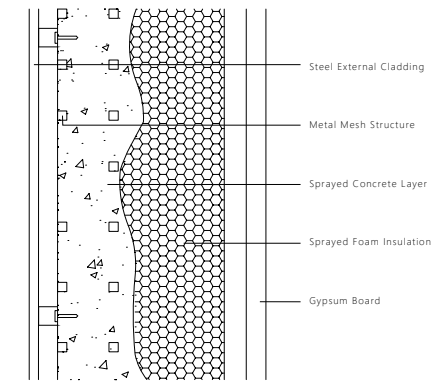


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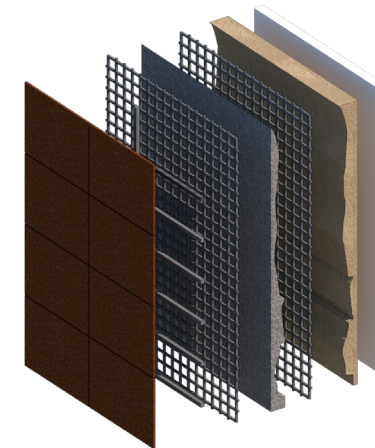
01. Initial Proposed Site Massing. 02. Materiality Of Building Components 03. Initial Sprayed Concrete Wall Build Up
04. Initial Sprayed Concrete Wall Detail 05. Initial Steel Cladding Wall Build Up 06. Initial Steel Cladding Wall Detail



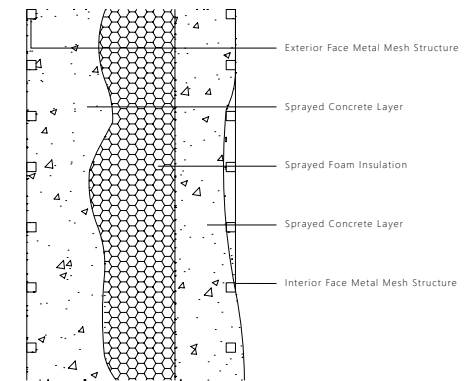
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For areas which need to be thermally insulated, sprayed concrete would be applied both externally and internally with an insulation layer in between.

As the concrete would be sprayed onto a vertical wall, there is possibility for there to be irregularities in the wall, and to ensure all areas in between are insulated correctly, sprayed foam insulation would be used and then trimmed to give a flat edge.

This wall make up exposes the steel mesh structure, and would be used in areas which are semi-private, but require to be thermally enclosed.

For areas which need to be thermally insulated, with a smooth finish, Steel external cladding will be used. The concrete would be sprayed in a similar way, with metal cladding being applied once the form-work is removed.

The aim is to create a steel form work which can be reused as the external panels

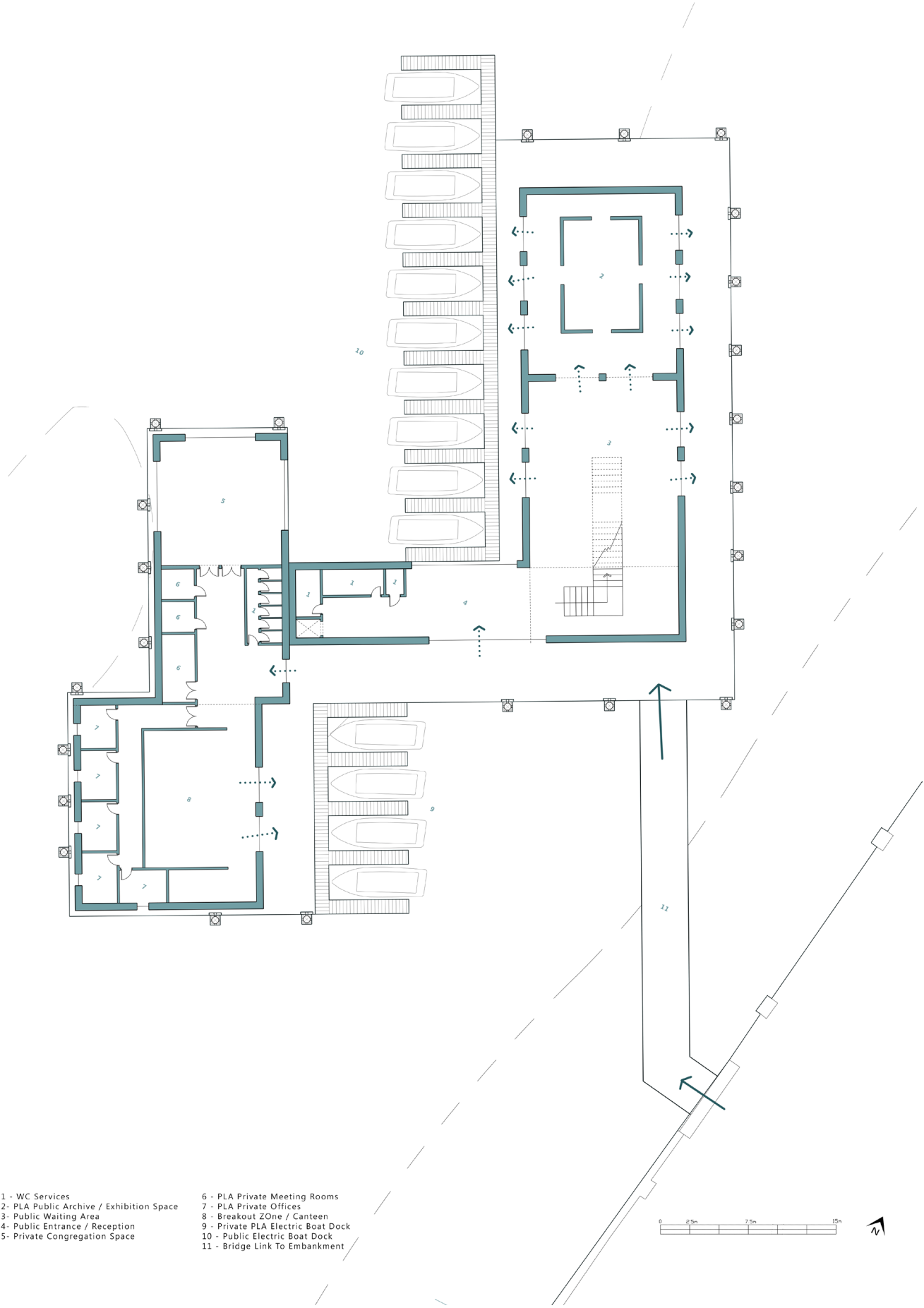
This wall make up conceals the mesh structure within.



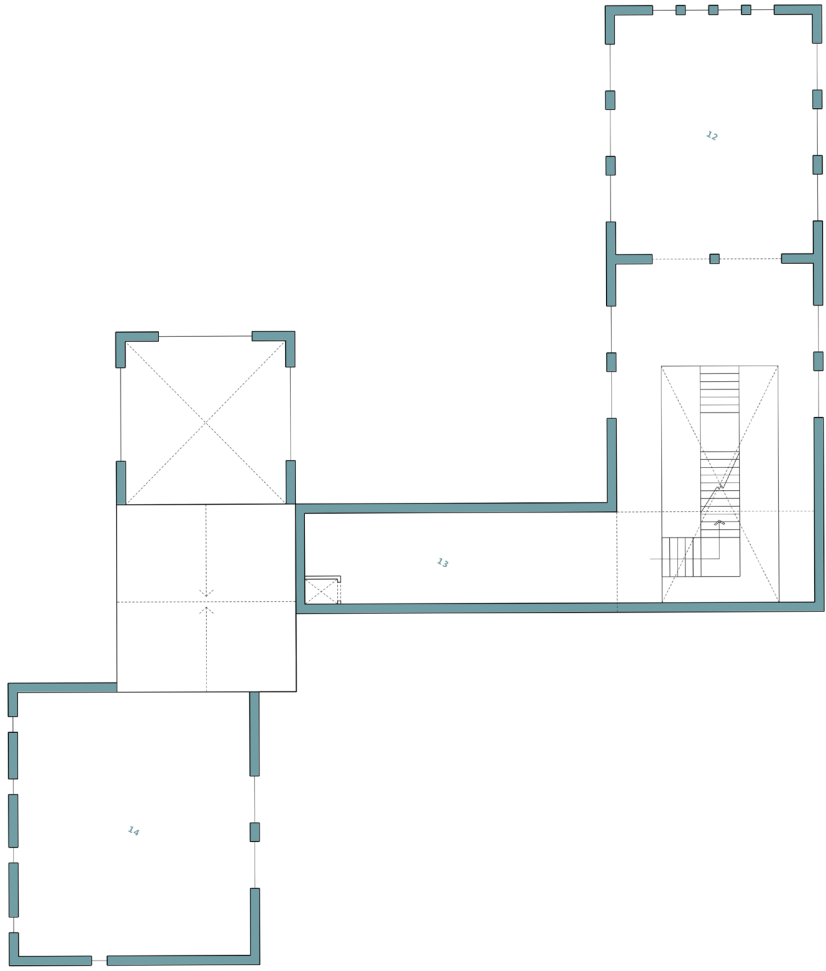
- FURTHER DESIGN DEVELOPMENTS -

Moving onto further detailed development of the project, more technical elements would be explored, understanding weight calculations and movement systems needed to allow the proposed design to float.

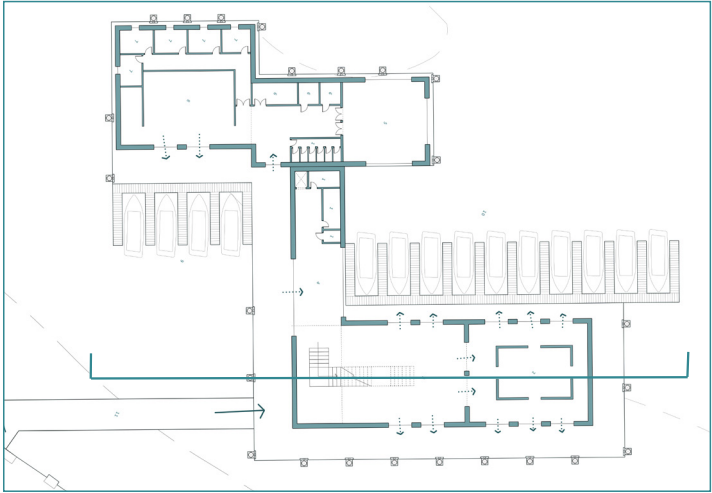
Steel mesh and decorative interior elements to create intricate vaulted roofing, explored earlier through model experimentations would be explored more.



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PLA Office Buidling & Private Dock

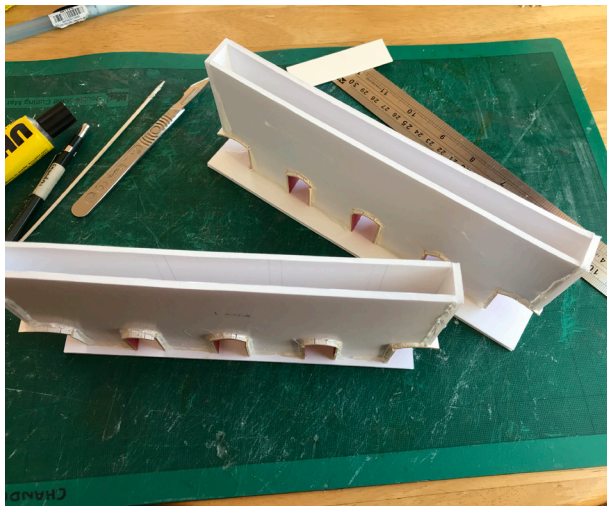
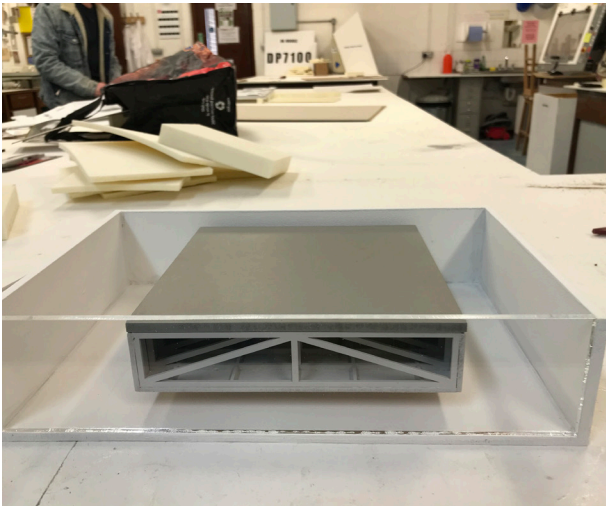
Public Boat Docking Centre

River Waterline

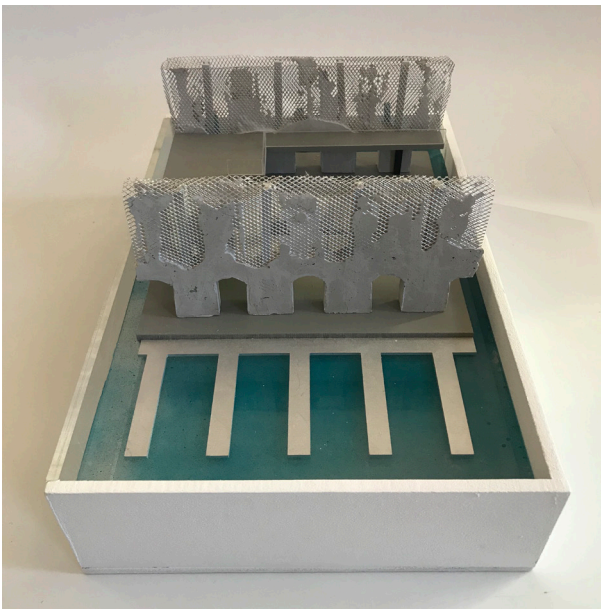
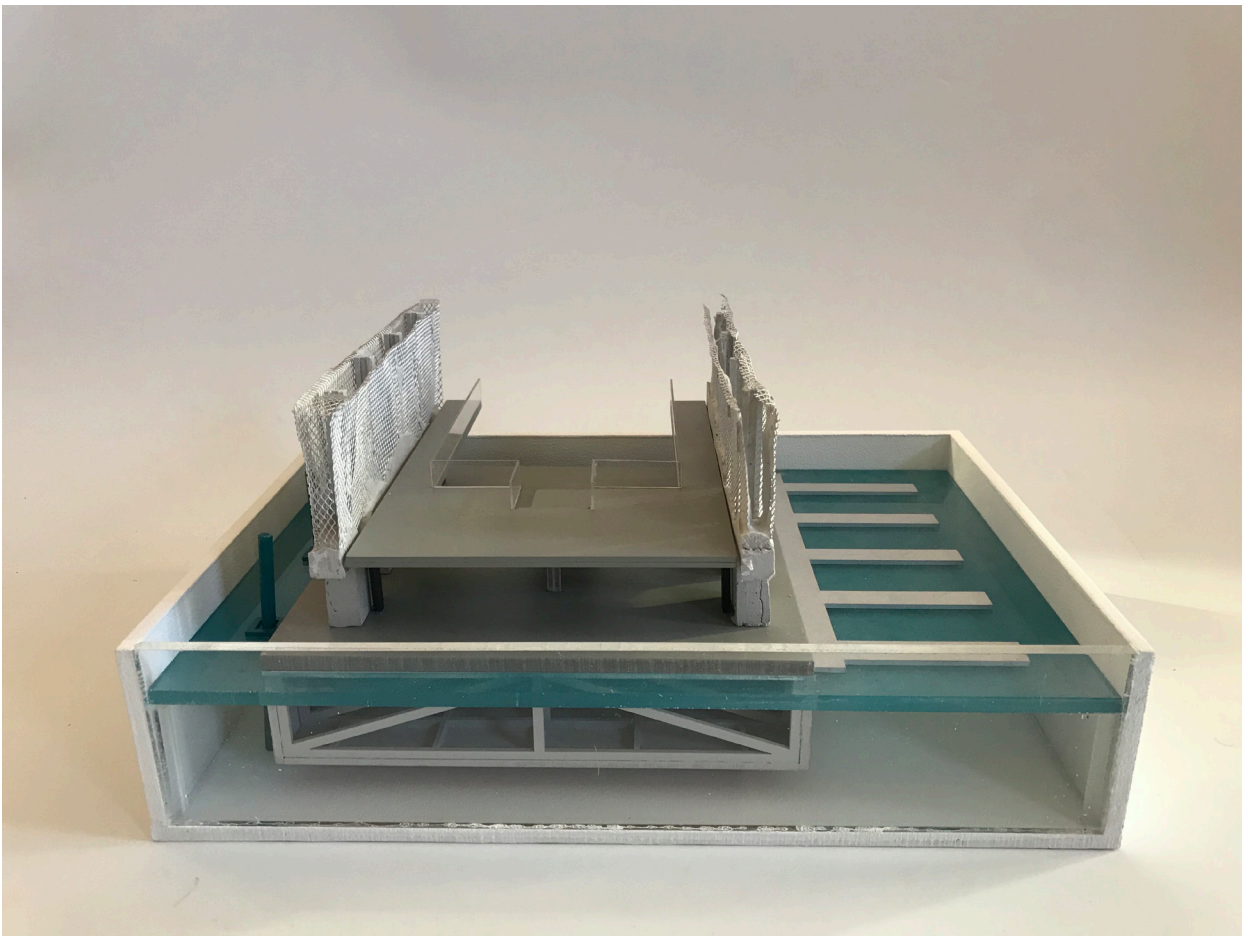
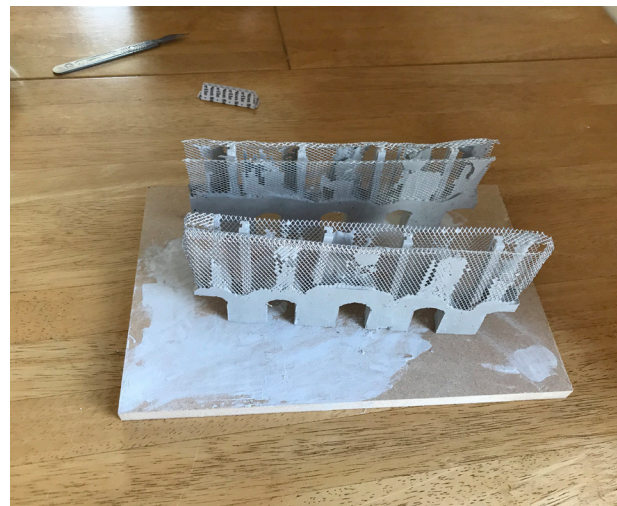
Public Boat Dock

River Bed

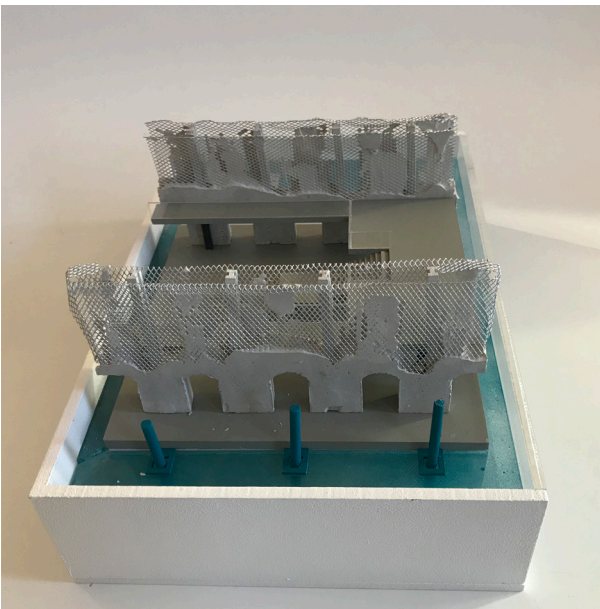
Steel Pontoon



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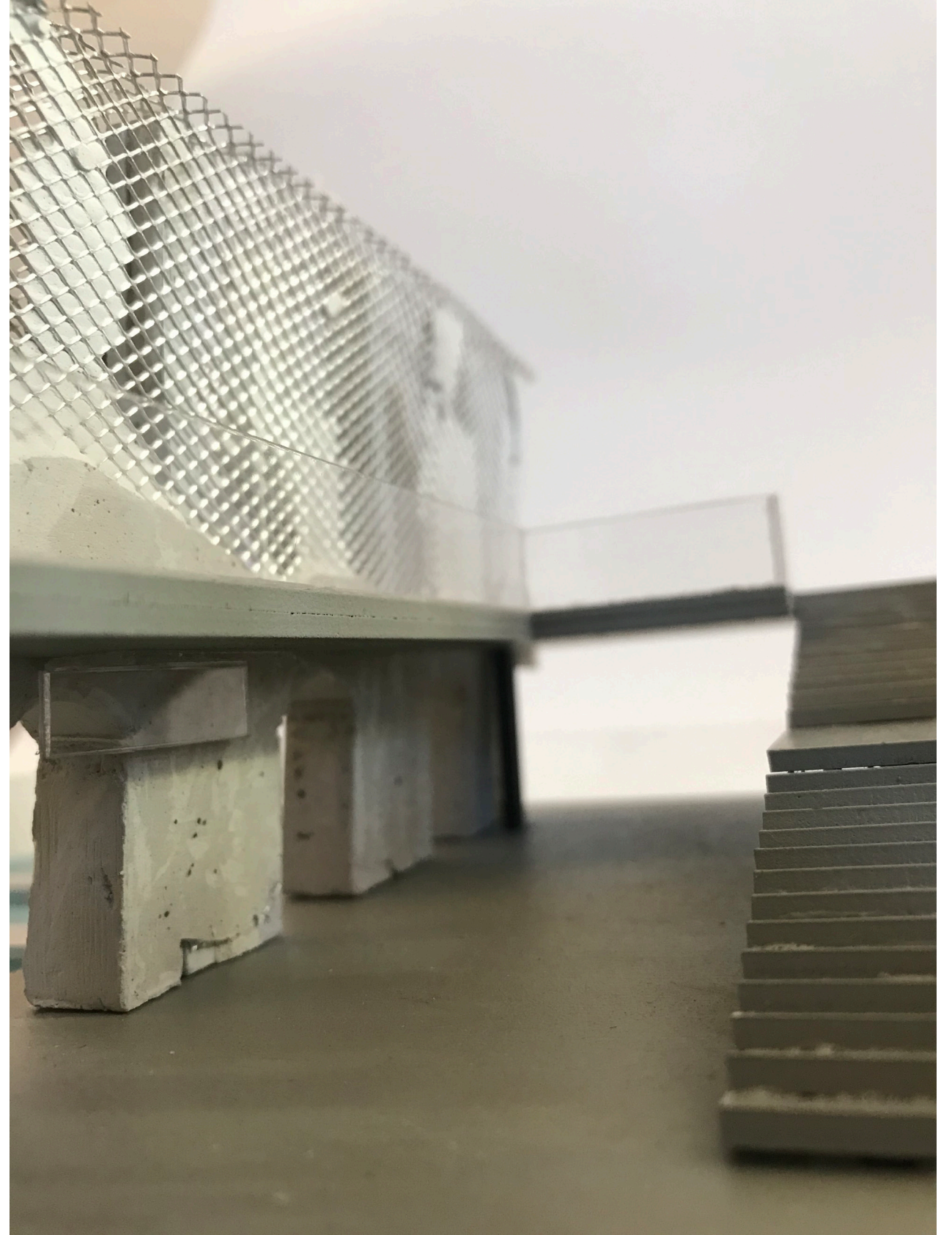


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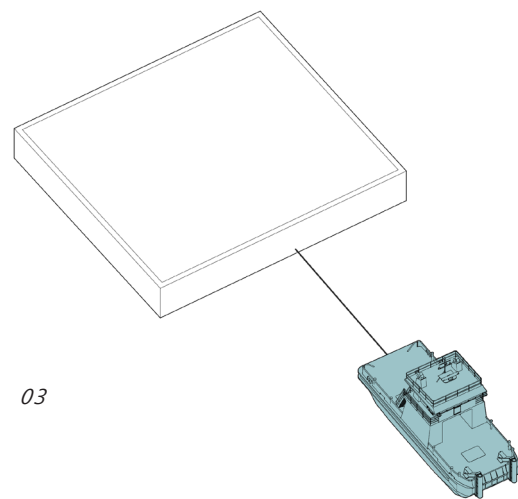
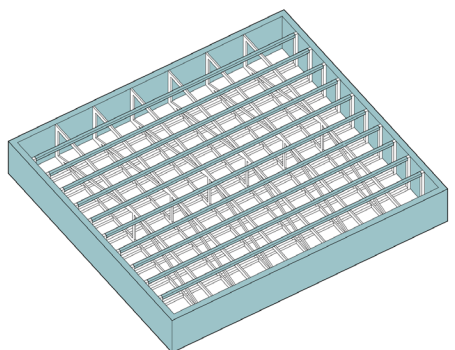
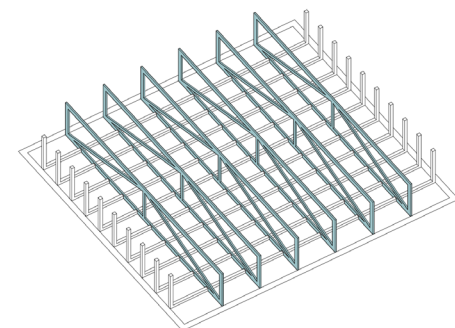
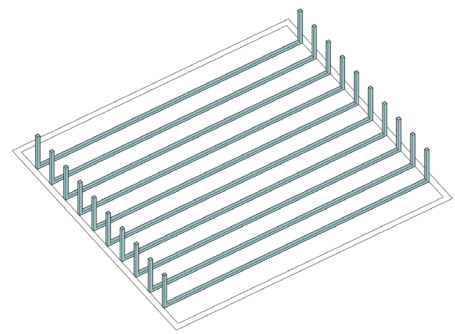




01



02



03



01

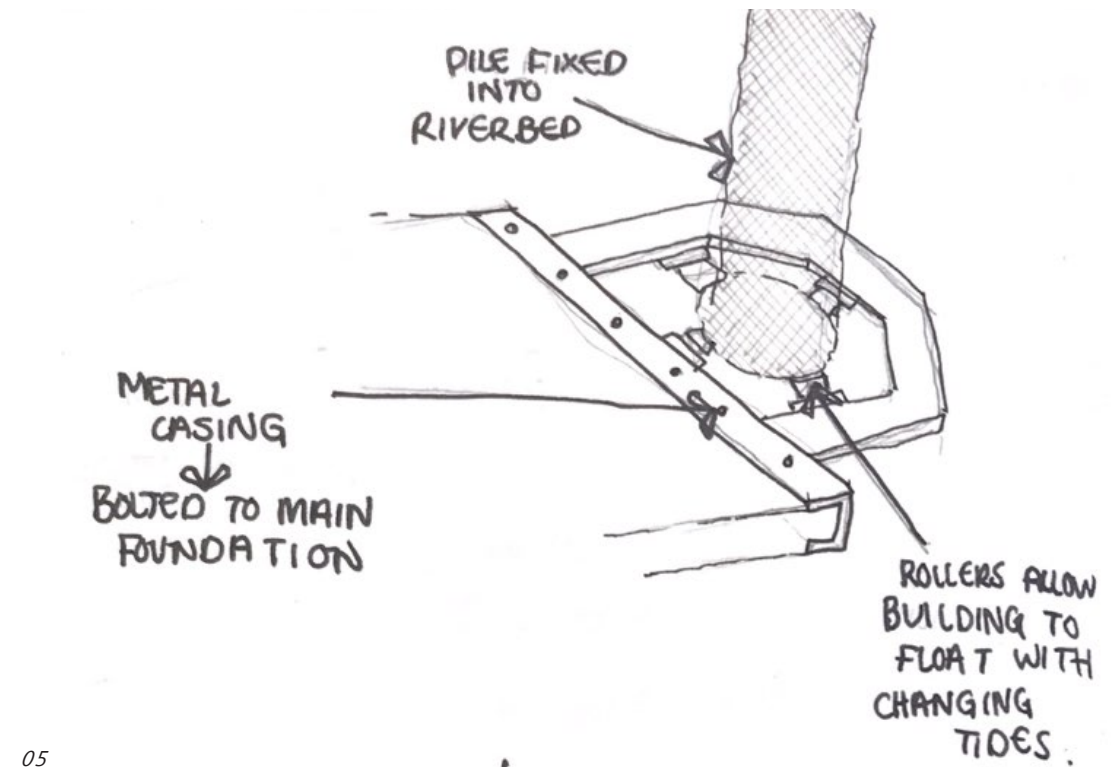
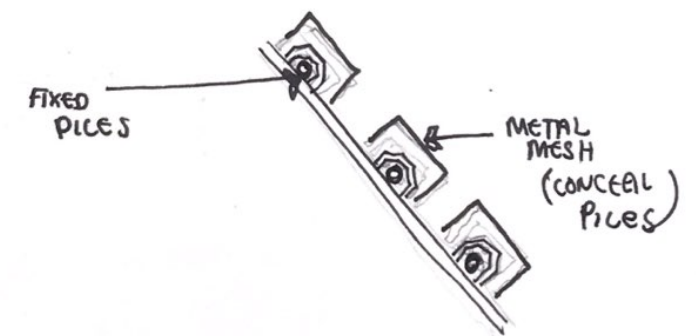


02

- Primary steel structure assembled
- Secondary structural cross beams assembled
- Final tertiary structural beams and outer layers assembled.
- Individual pontoons dragged onto site down river, pulled by tug boat, and bolted together.



04

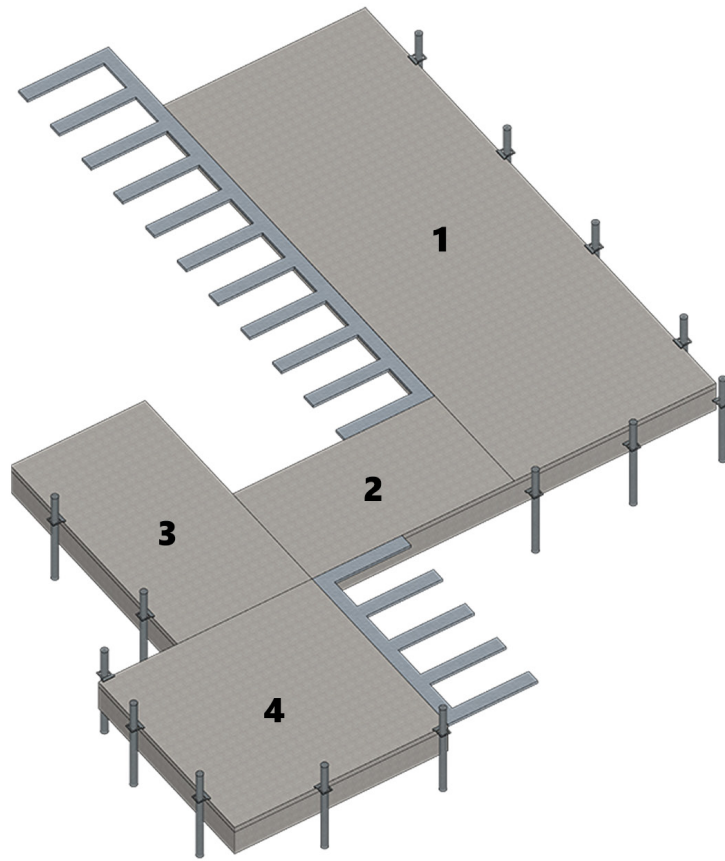


05

Taking inspiration from steel barge and shipping construction,. To allow for all built elements to float within the river, a large pontoon would be constructed to allow for the buildings to sit on top. Using a similar construction process to steel barges, a series of smaller pontoons will be erected off site, on land and pulled onto site down the river by PLA's tug boats.

To allow for the pontoon to float with the changes in river tide, a series of pile guides would be attached to the fixed piling that surrounds site, which anchor the pontoon into a fixed place, but with a series of rollers, allows the pontoon to move vertically with the changing river levels.

01



Calculating Buoyancy Force:

- For 300mm Submerged with No Weight = 87%
- Calculate 87% of total volume
- This is multiplied by the density of the river water (1020Kg/M³) and gravity (9.81N) to give total Buoyancy Force

Calculating Total Estimated Weight Of Barge:

- Work out rough volume of barge, where steel occurs only
- Multiply this figure by the rough density of Steel (7850Kg Per M³)

Does The Barge Float?:

- Buoyancy Force – Density of Barge = As Long as the number is positive, it will float.

How Much Load Can Be Applied?:

- Total Barge Force / Gravity Force

Estimate Current Load:

- Using current materials, an estimated weight of the buildings can be calculated. This will determine whether more pontoon area is needed to support the weight of the proposed floating buildings.



$$1986 \times 0.87$$

$$= 1727.82 \text{ (M}^3\text{)} = \text{TOTAL VOLUME FLOATING}$$

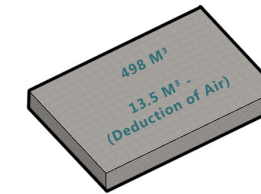
$$1727.82 \times 1020 \times 9.81$$

$$= 17288912.5 \text{ (N)} = \text{BOUYANCY FORCE}$$

$$17288912.5 - 235500$$

$$= 17053412.5 \text{ (N)} - \text{TOTAL BARGE MASS}$$

$$17053412.5 / 9.81 = \underline{\underline{1,738,370.29\text{KG LOAD CAPACITY}}}$$



$$498 \times 0.87$$

$$= 433.26 \text{ (M}^3\text{)} = \text{TOTAL VOLUME FLOATING}$$

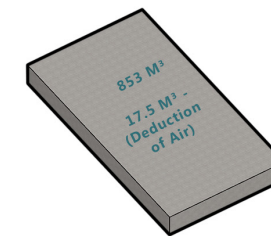
$$433.26 \times 1020 \times 9.81$$

$$= 4335286.21 \text{ (N)} = \text{BOUYANCY FORCE}$$

$$4335286.21 - 105975$$

$$= 4229311.21 \text{ (N)} - \text{TOTAL BARGE MASS}$$

$$4229311.21 / 9.81 = \underline{\underline{431,122.448\text{KG LOAD CAPACITY}}}$$



$$853 \times 0.87$$

$$= 742.11 \text{ (M}^3\text{)} = \text{TOTAL VOLUME FLOATING}$$

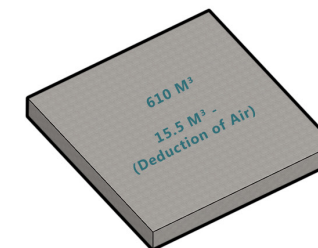
$$742.11 \times 1020 \times 9.81$$

$$= 7425701.08 \text{ (N)} = \text{BOUYANCY FORCE}$$

$$17288912.5 - 137375$$

$$= 7288326.08 \text{ (N)} - \text{TOTAL BARGE MASS}$$

$$7288326.08 / 9.81 = \underline{\underline{742,948\text{KG LOAD CAPACITY}}}$$



$$610 \times 0.87$$

$$= 530.7 \text{ (M}^3\text{)} = \text{TOTAL VOLUME FLOATING}$$

$$530.7 \times 1020 \times 9.81$$

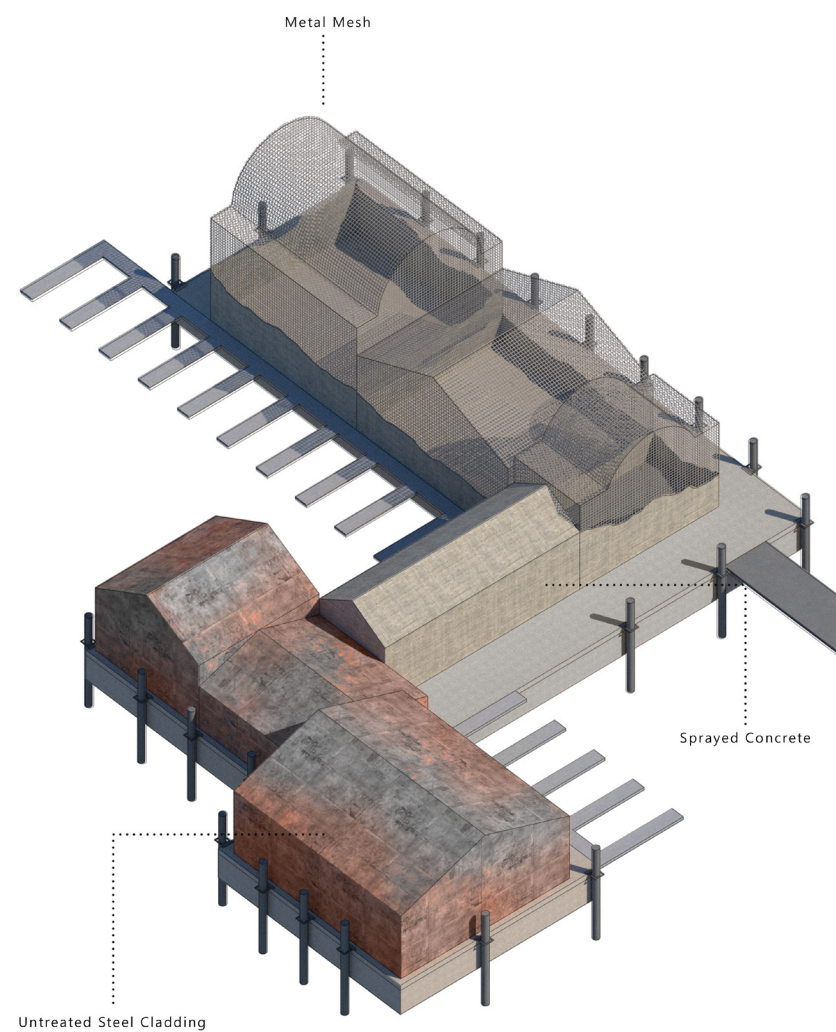
$$= 5310290.34 \text{ (N)} = \text{BOUYANCY FORCE}$$

$$5310290.34 - 121675$$

$$= 5188615.34 \text{ (N)} - \text{TOTAL BARGE MASS}$$

$$5188615.34 / 9.81 = \underline{\underline{528,910.84\text{KG LOAD CAPACITY}}}$$

02



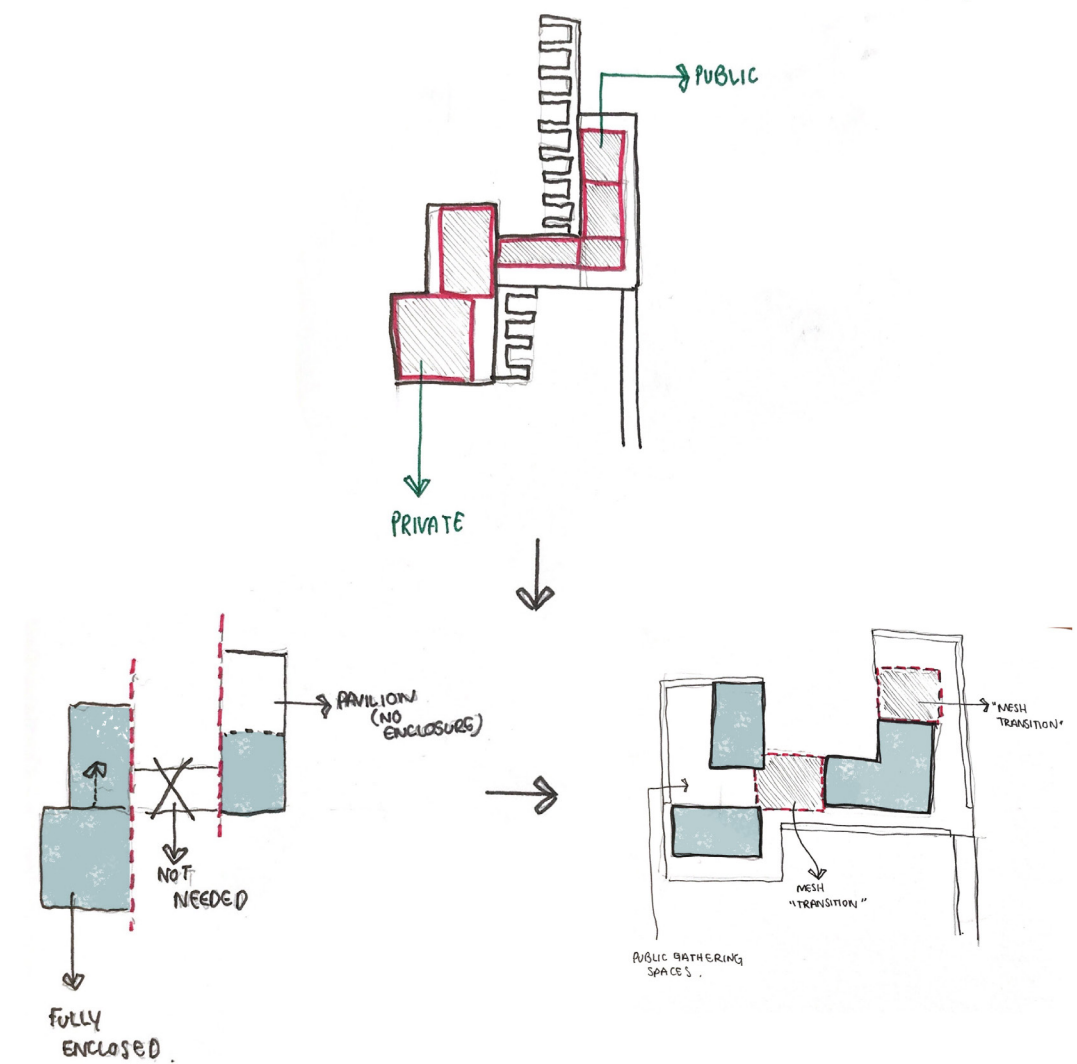
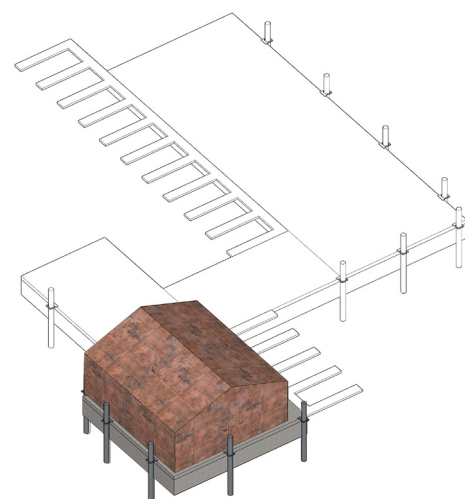
Pontoon 4 - Total Load Capacity: [528,910.84 KG](#)

Taking weight figures listed in The Building Construction Handbook, an estimate of the existing proposed mass on Pontoon 4 can be estimated to check whether it has the correct load capacity to allow the pontoon to still float on the river.

Taking the rough present materials of the structure:

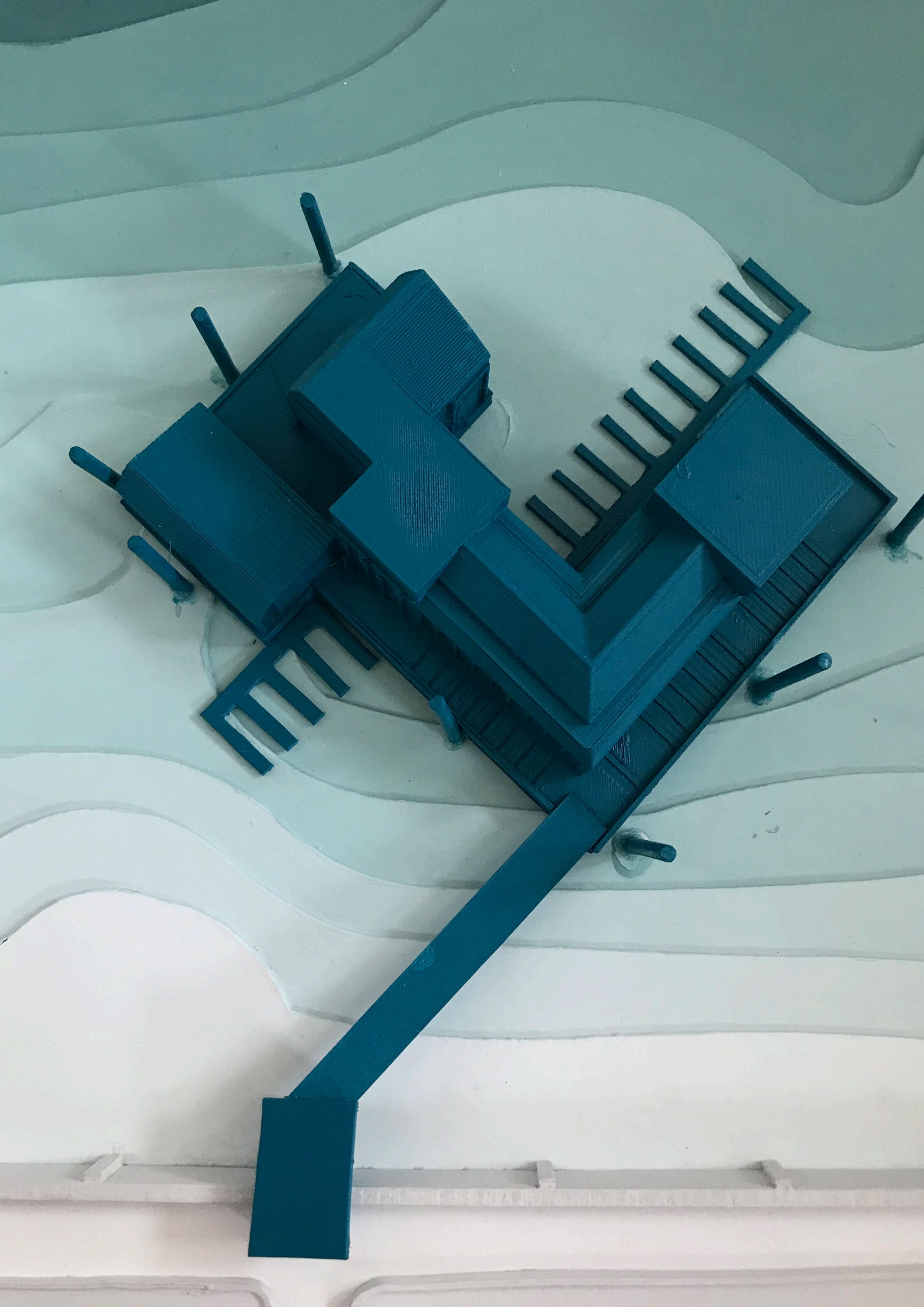
Steel Clad Roofing: $308\text{M}^2 \text{ Area} \times 4.88 = 1503.04\text{KG}$
 Floor Slab: $288\text{M}^2 \times 600 = 172800\text{KG}$
 Exterior Walls : $456\text{M}^2 \text{ Area} \times 78 = 35568\text{KG}$
 Steel Mesh Structure = $1860\text{M}^3 \times 22.8 = 42408\text{KG}$

Total Estimated Load (Exterior Shell Only) = [252,279.04KG](#)



Even though current weight calculations proved that the current proposal would allow for the structures to float, the current volumetric provided little recognition between public and private spaces. In order to allow for this to be more evident, more mesh only structures would be used

to allow for more 'transitional' spaces of private and public. With the use of more of these spaces, would also allow for the use of more landscape area surrounding the buildings, as currently this does not occur, particularly in the more private areas on site.



- FINAL DESIGN DEVELOPMENT -

Following the Interim Critique, facade elements would be explored further, as well an experimentation into adding controlled weathering through water channelling systems of the main facade.



01



02



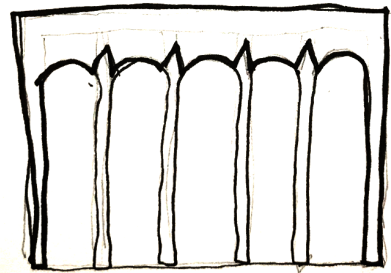
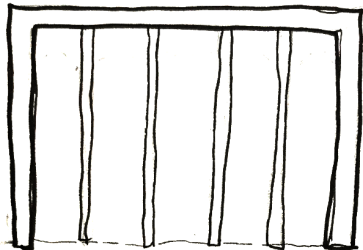
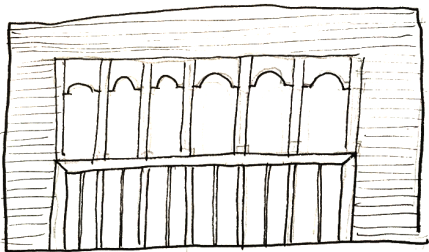
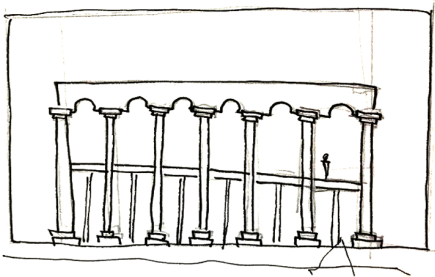
03



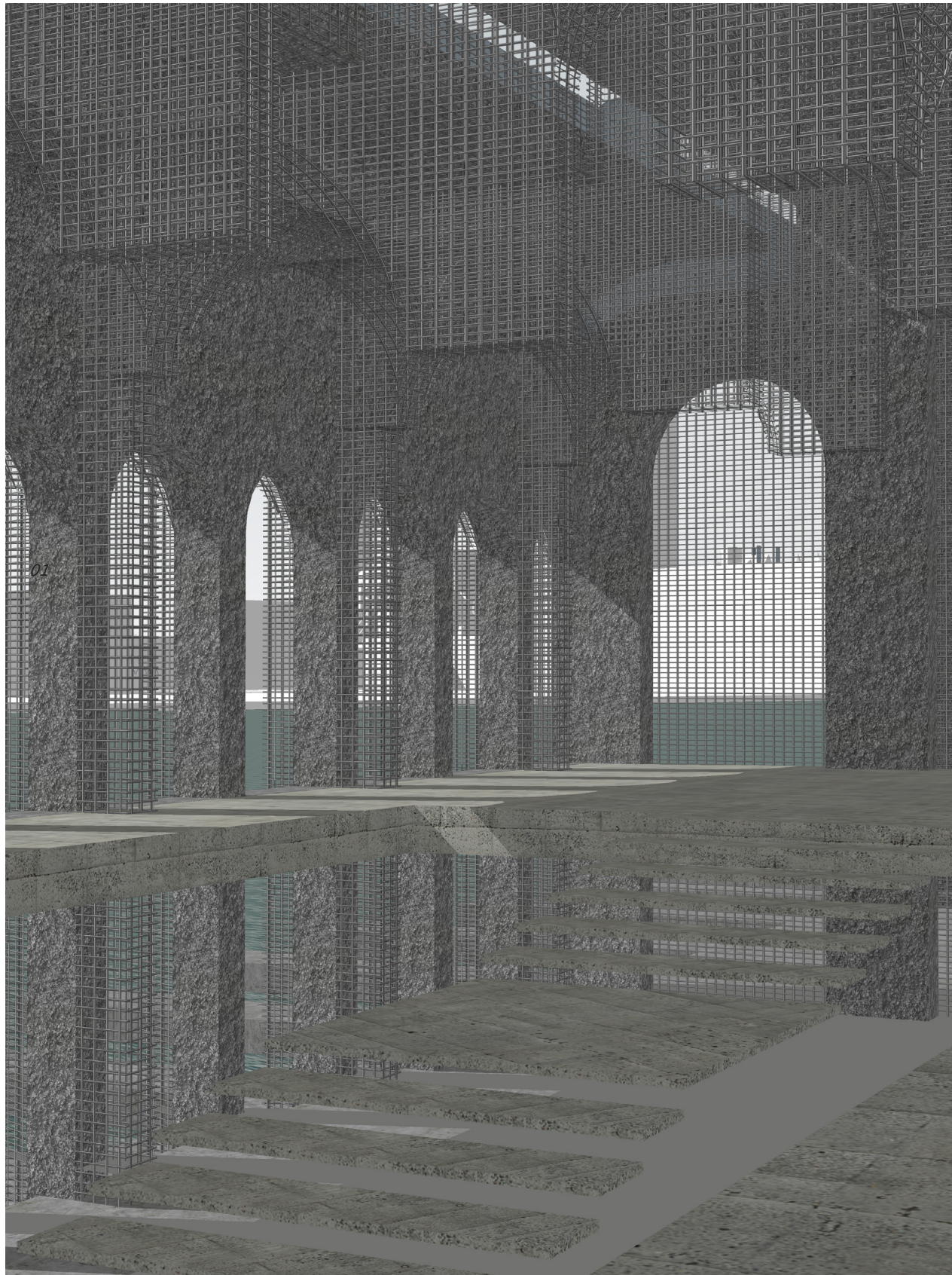
04

Like many transportation buildings, a sense of continuous rhythm is applied to the facade design. Taking example from the facade design of the Port Of London Authority

building façades, as well as their interior beaux arts style interiors a similar sense of continuity to openings would be applied to the main facade.



05

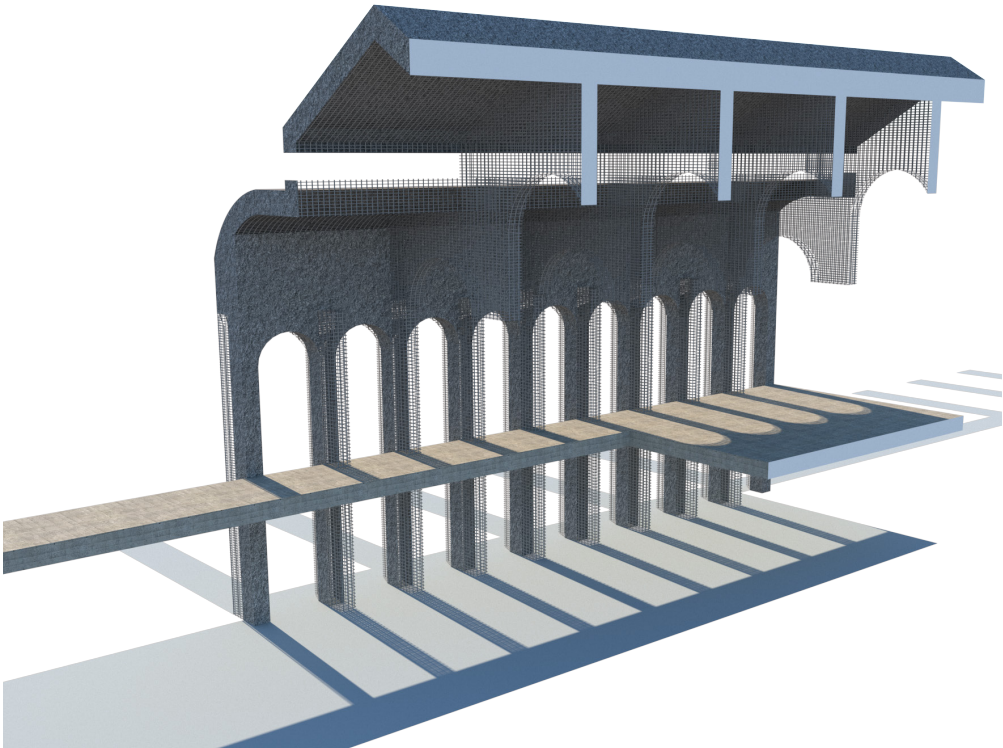


01

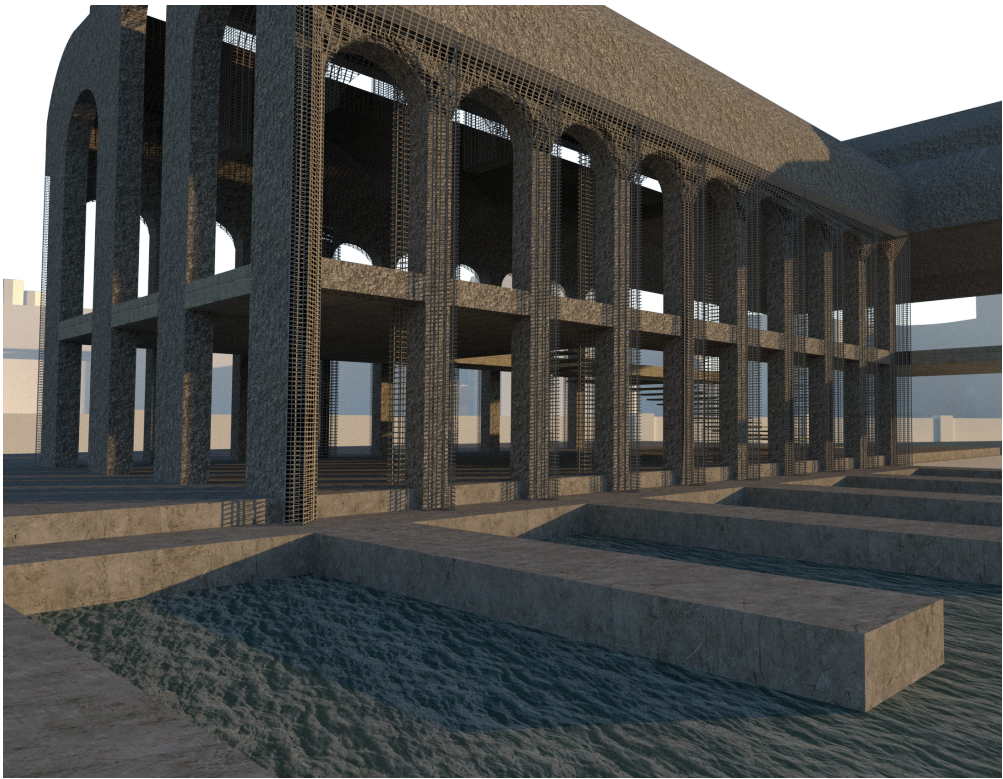
01. Test 1st Floor Interior Render View

02. Development Sectional Axonometric of Double Height Void Spaces

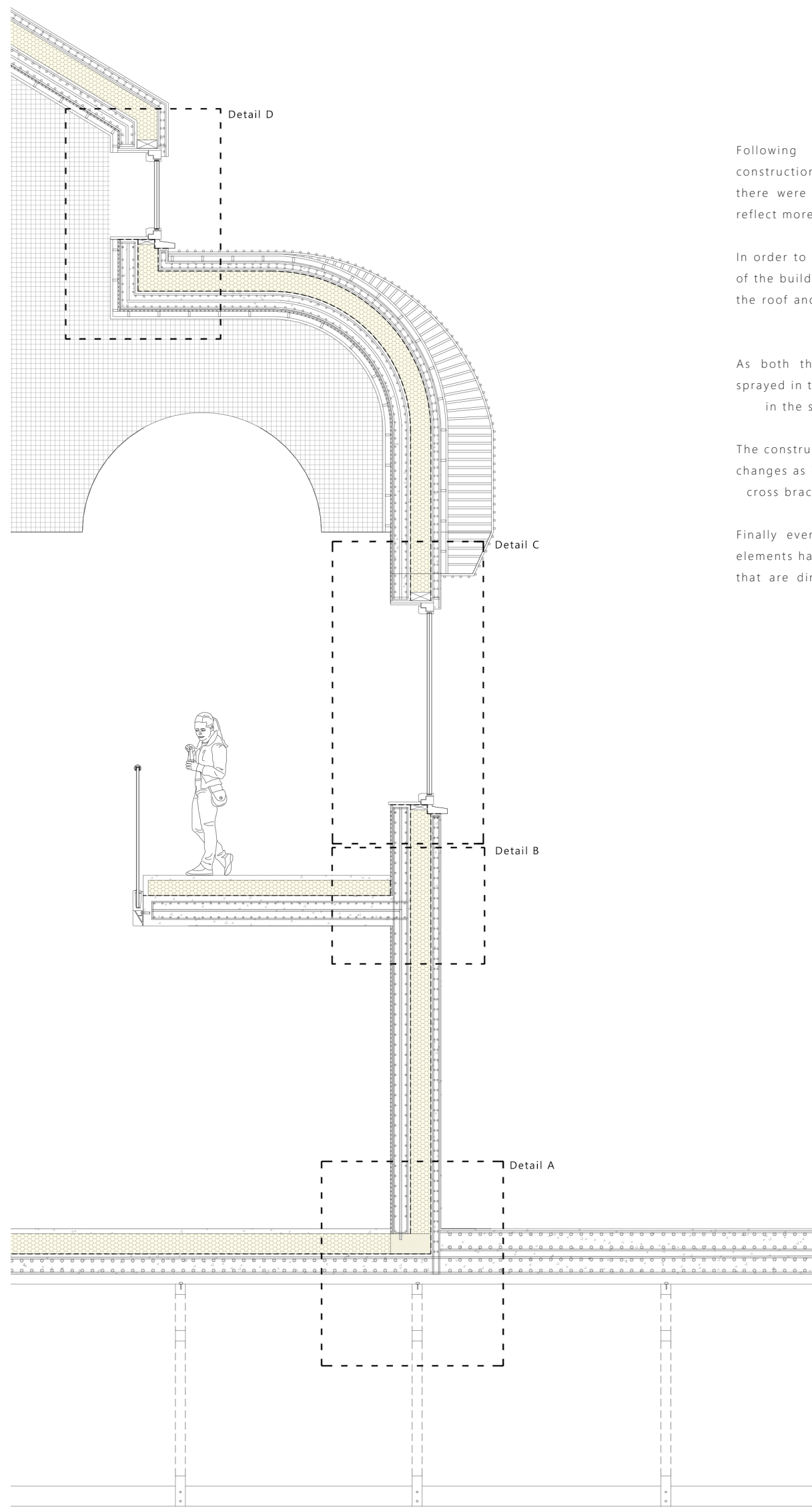
03. Development Render of Portal Framed Façades



02



03



01

Following feedback after the first iterations of the construction detailing of the main Boat waiting building, there were amendments that were required to be done to reflect more of the earlier test model material developments.

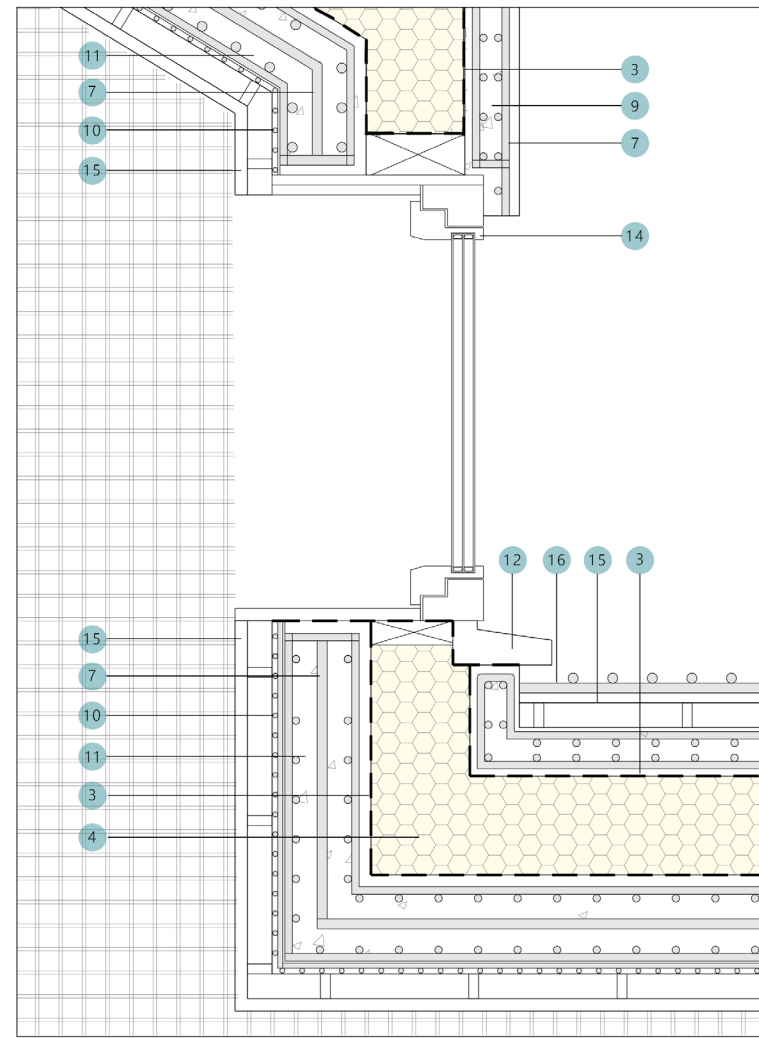
In order to allow for only a solid base on the lower portion of the building the concrete elements would be removed on the roof and upper first floor to give the building more of a lightweight feel.

As both the concrete and insulation elements would be sprayed in the detail drawing it would show the irregularities in the sprayed elements, not leaving a smooth finishing.

The construction detailing of the pontoon would also require changes as it did not correctly illustrate the right amounts of cross bracing that would occur in the pontoon for stability.

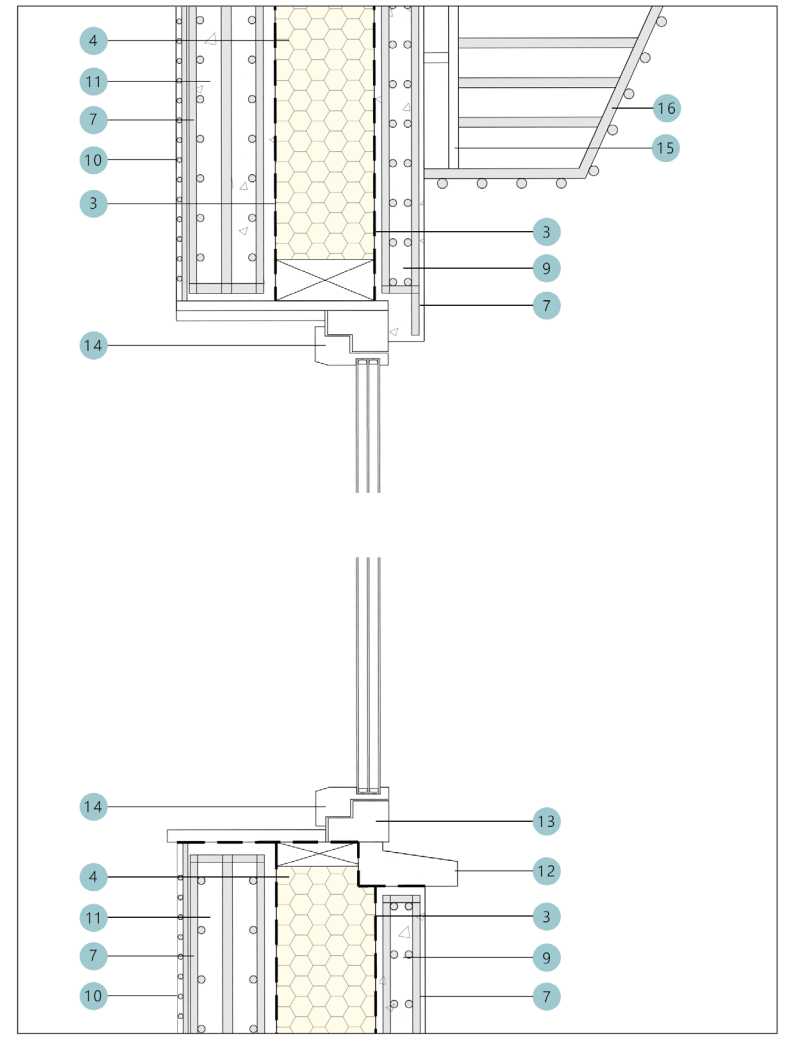
Finally even though the steel reinforcement rebar mesh elements have been placed in the right locations only parts that are directly cut through in section would need to be shown.

- | | | |
|-------------------------------------|--|--------------------------------------|
| 3. Damp Proof Membrane | 10. Decorative Interior Steel Mesh Rebar | 14. Triple Glazed Operable Window |
| 4. Sprayed Foam Insulation | 11. Sprayed Interior concrete | 15. Steel Mesh Support Rail |
| 7. Structural Steel Wall Mesh Rebar | 12. Concrete Cill | 16. Exterior Steel Mesh Portal Frame |
| 9. Sprayed Exterior Concrete | 13. Steel Window Frame | 17. Interior Hung Steel Mesh |



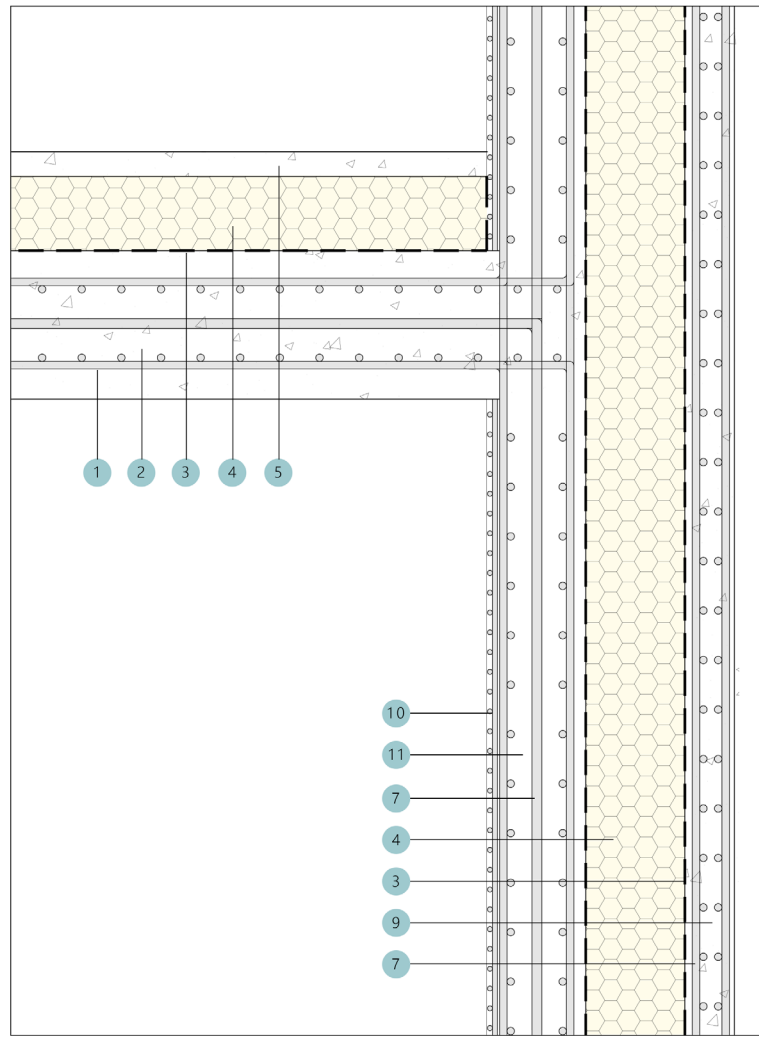
02

- | | | |
|-------------------------------------|--|--------------------------------------|
| 3. Damp Proof Membrane | 10. Decorative Interior Steel Mesh Rebar | 14. Triple Glazed Operable Window |
| 4. Sprayed Foam Insulation | 11. Sprayed interior concrete | 15. Steel Mesh Support Rail |
| 7. Structural Steel Wall Mesh Rebar | 12. Concrete Cill | 16. Exterior Steel Mesh Portal Frame |
| 9. Sprayed Exterior Concrete | 13. Steel Window Frame | |



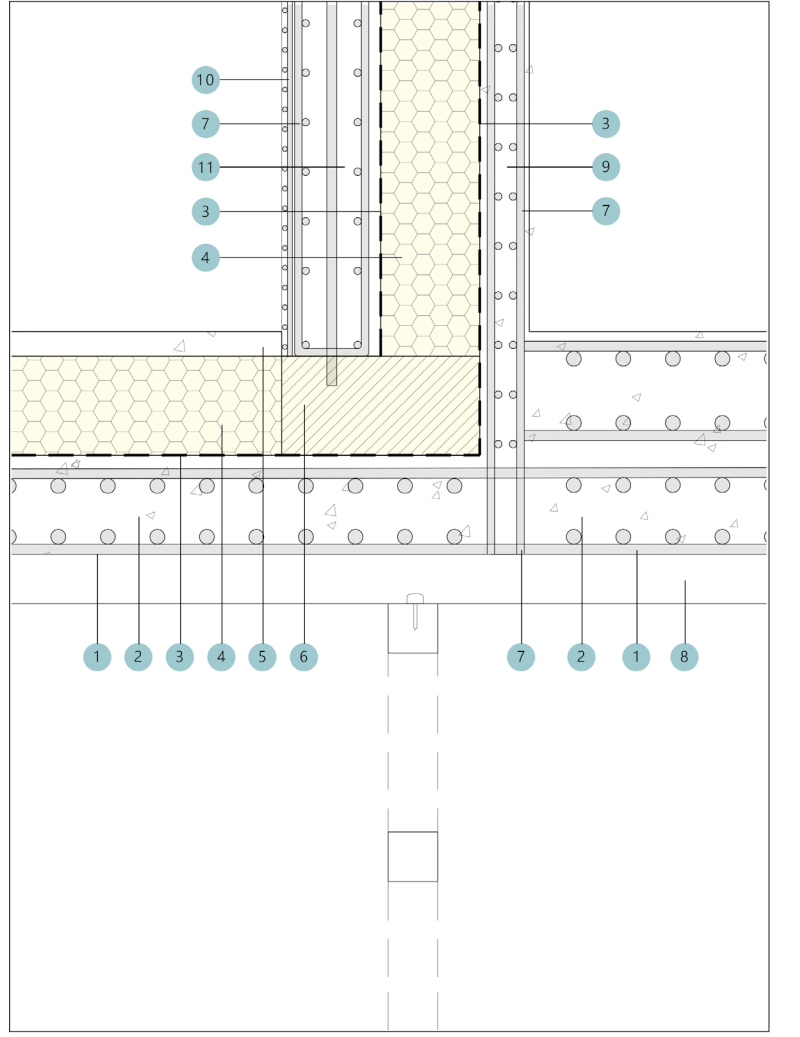
03

- | | | |
|--------------------------------------|-------------------------------------|--|
| 1. Structural Steel Floor Mesh Rebar | 4. Sprayed Foam Insulation | 9. Sprayed Exterior Concrete |
| 2. Concrete Ground Slab | 5. Concrete Screed Finish | 10. Decorative Interior Steel Mesh Rebar |
| 3. Damp Proof Membrane | 7. Structural Steel Wall Mesh Rebar | 11. Sprayed Interior Concrete |

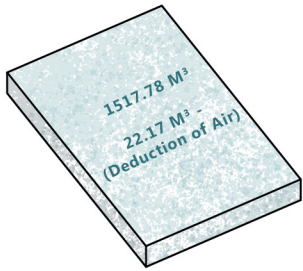


04

- | | | |
|--------------------------------------|--|--|
| 1. Structural Steel Floor Mesh Rebar | 5. Concrete Screed Finish | 9. Sprayed Exterior Concrete |
| 2. Concrete Ground Slab | 6. Thermal Load-bearing Block Insulation | 10. Decorative Interior Steel Mesh Rebar |
| 3. Damp Proof Membrane | 7. Structural Steel Wall Mesh Rebar | 11. Sprayed Interior Concrete |
| 4. Sprayed Foam Insulation | 8. Steel Pontoon Top Deck | |



05



$$1517.78 \times 0.87$$

$$= 1320.47 \text{ (M}^3\text{)} = \text{TOTAL VOLUME FLOATING}$$

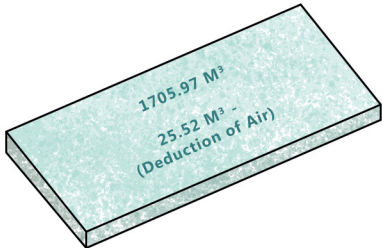
$$1320.47 \times 1020 \times 9.81$$

$$= 13212872.91 \text{ (N)} = \text{BOUYANCY FORCE}$$

$$13212872.91 - 174050$$

$$= 13038822.71 \text{ (N)} = \text{TOTAL BARGE MASS}$$

$$13038822.71 / 9.81 = \underline{1,329,135.85\text{KG LOAD CAPACITY}}$$



$$1705.97 \times 0.87$$

$$= 1484.19 \text{ (M}^3\text{)} = \text{TOTAL VOLUME FLOATING}$$

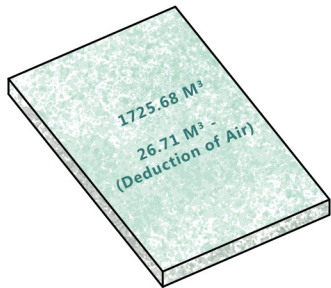
$$1484.19 \times 1020 \times 9.81$$

$$= 14851175.82 \text{ (N)} = \text{BOUYANCY FORCE}$$

$$14851175.82 - 200319.44$$

$$= 14650856.38 \text{ (N)} = \text{TOTAL BARGE MASS}$$

$$14650856.38 / 9.81 = \underline{1,493,461.41\text{KG LOAD CAPACITY}}$$



$$1725.68 \times 0.87$$

$$= 1501.34 \text{ (M}^3\text{)} = \text{TOTAL VOLUME FLOATING}$$

$$1501.34 \times 1020 \times 9.81$$

$$= 15022753.05 \text{ (N)} = \text{BOUYANCY FORCE}$$

$$15022753.05 - 209689.99$$

$$= 14813063.06 \text{ (N)} = \text{TOTAL BARGE MASS}$$

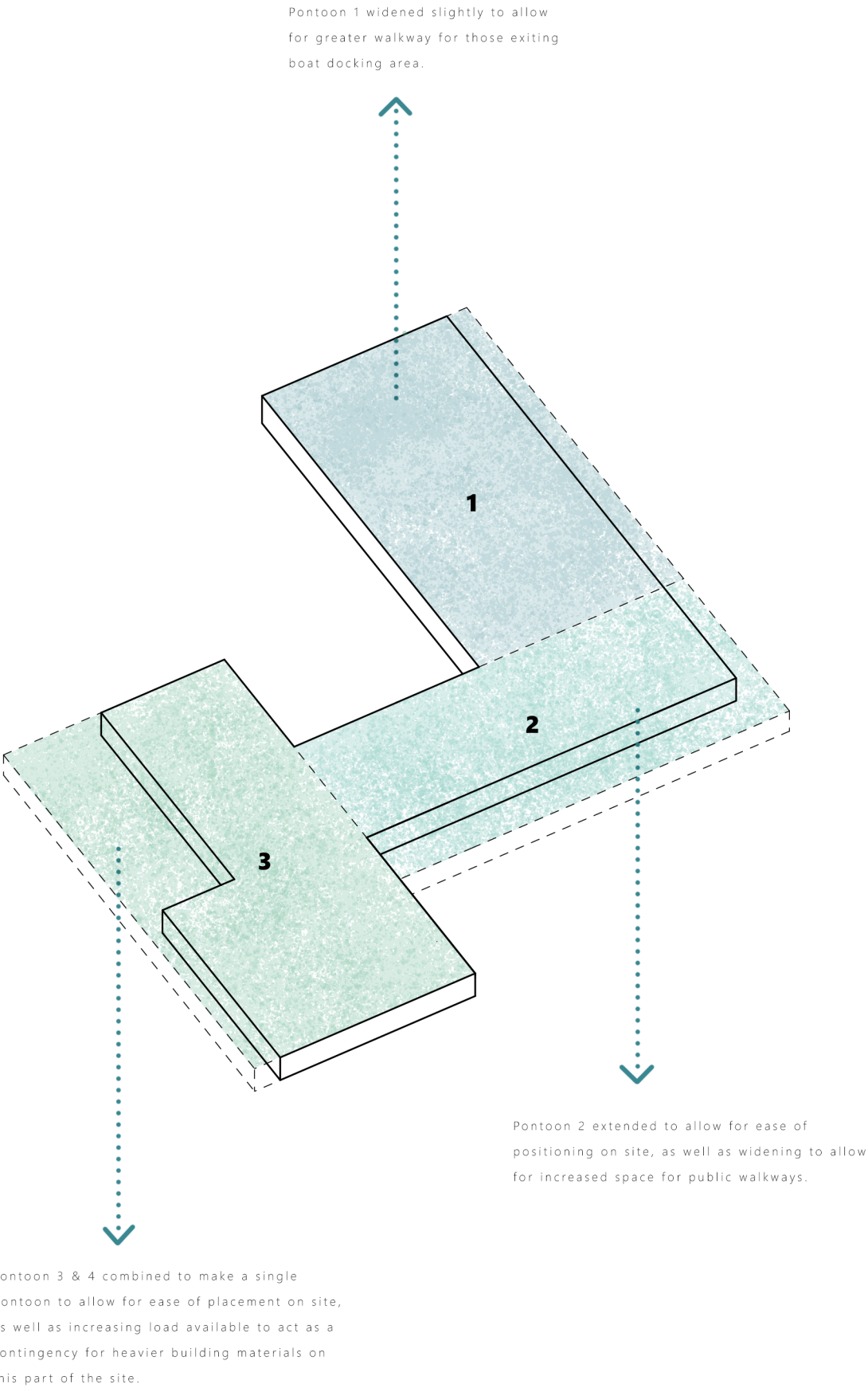
$$14813063.06 / 9.81 = \underline{1,509,996.24\text{KG LOAD CAPACITY}}$$

01

Amendments to current arrangements of the pontoons was required to be altered to allow for an easier construction assembly.

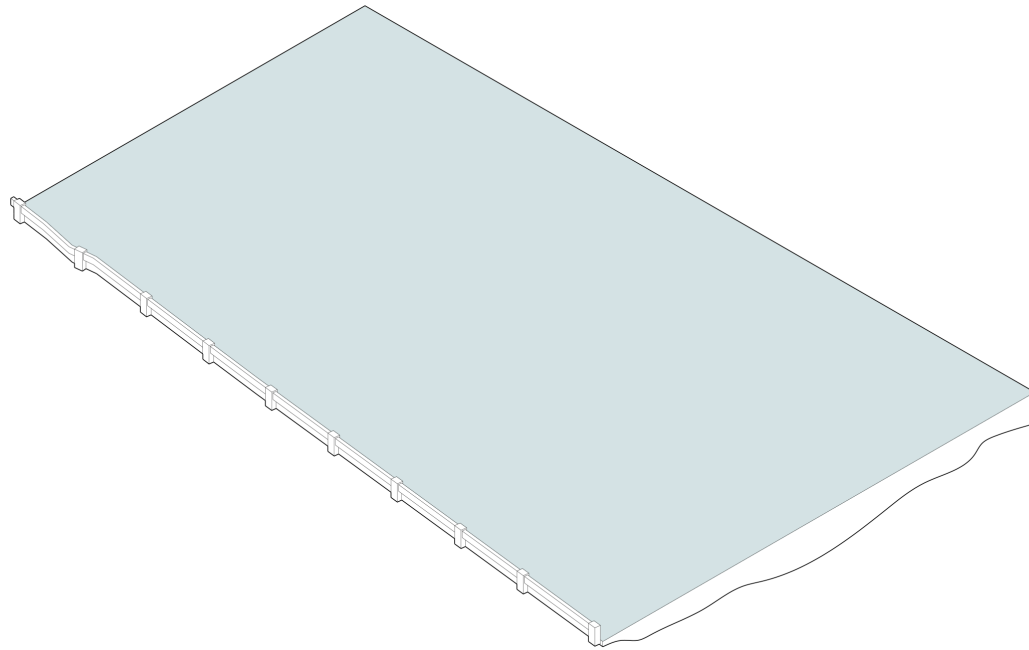
In addition to allow for a more distributed weight load, the pontoons have increased in size to allow for the opportunity of more open spaces within the pontoons.

Even though the previous dimensions of the proposed pontoon would be able to sustain the weight load of the buildings placed, by increasing the sizing it allows for extra contingency to ensure the buildings on site do not reach near the maximum load capacities.



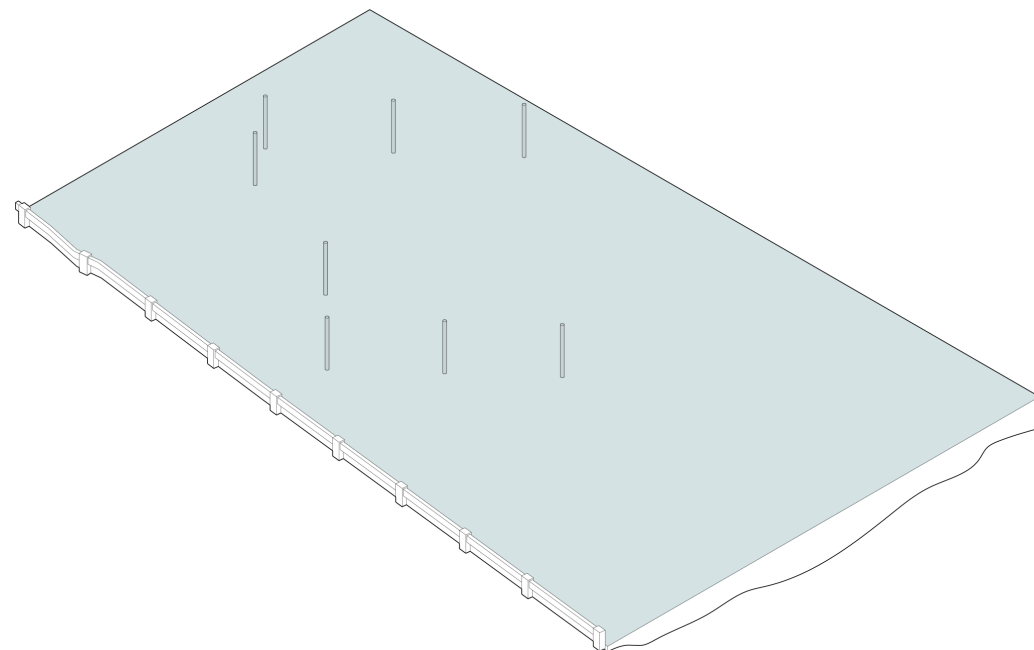
02

01



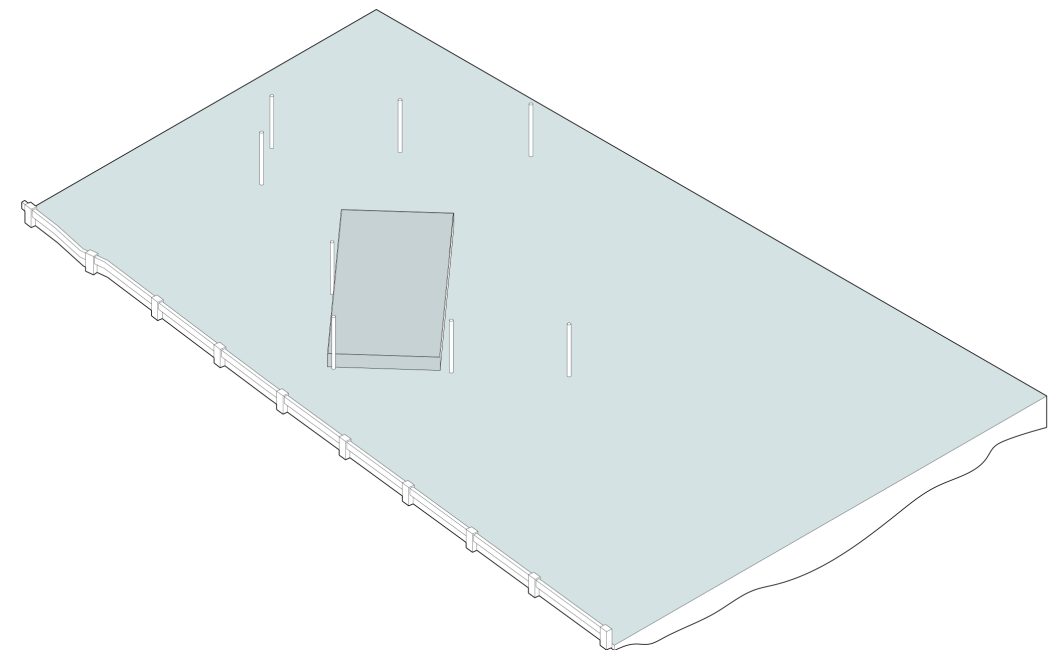
- River Site - Assessment of River Conditions
- Prep guides for pile location.

02



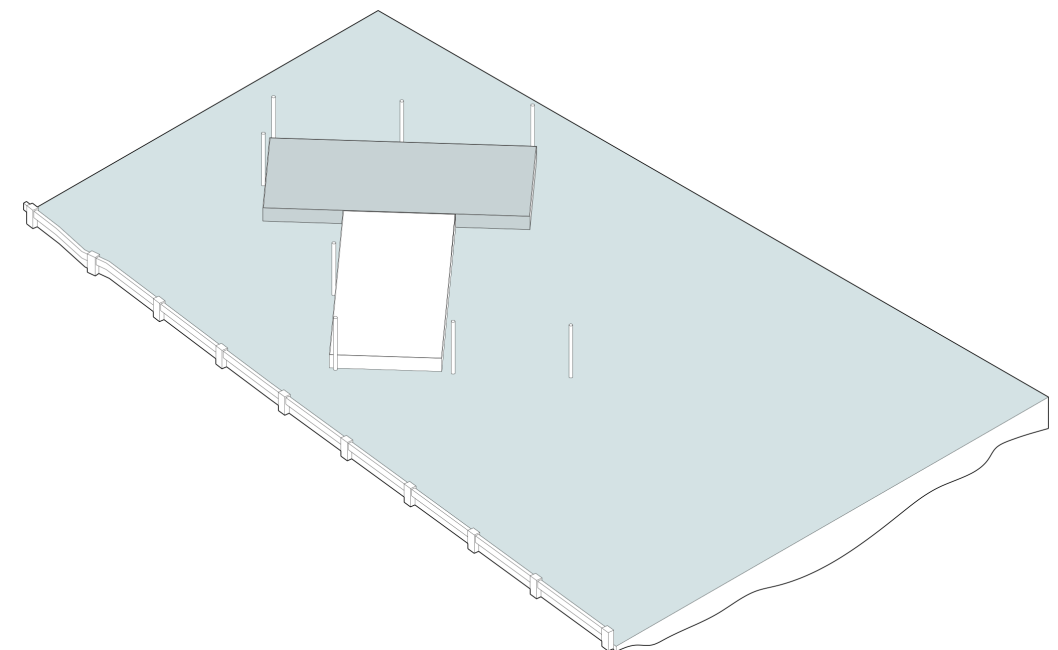
- Piling systems drilled into River Bed.

03



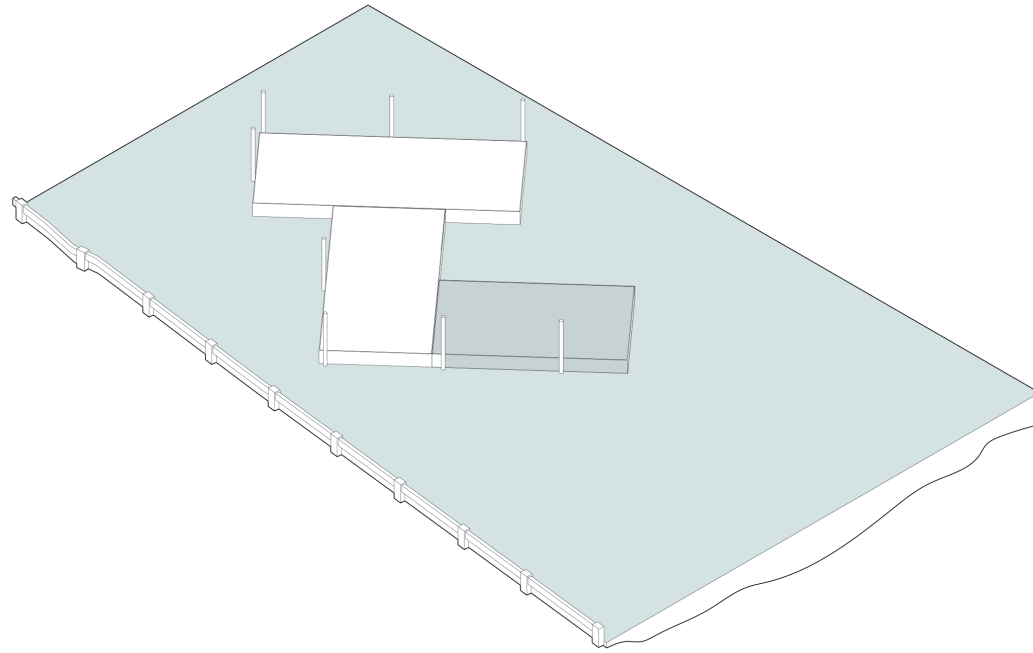
- First pontoon pulled to site location by tugboat.
- Pontoon secured in place with pile rollers attachments.

04



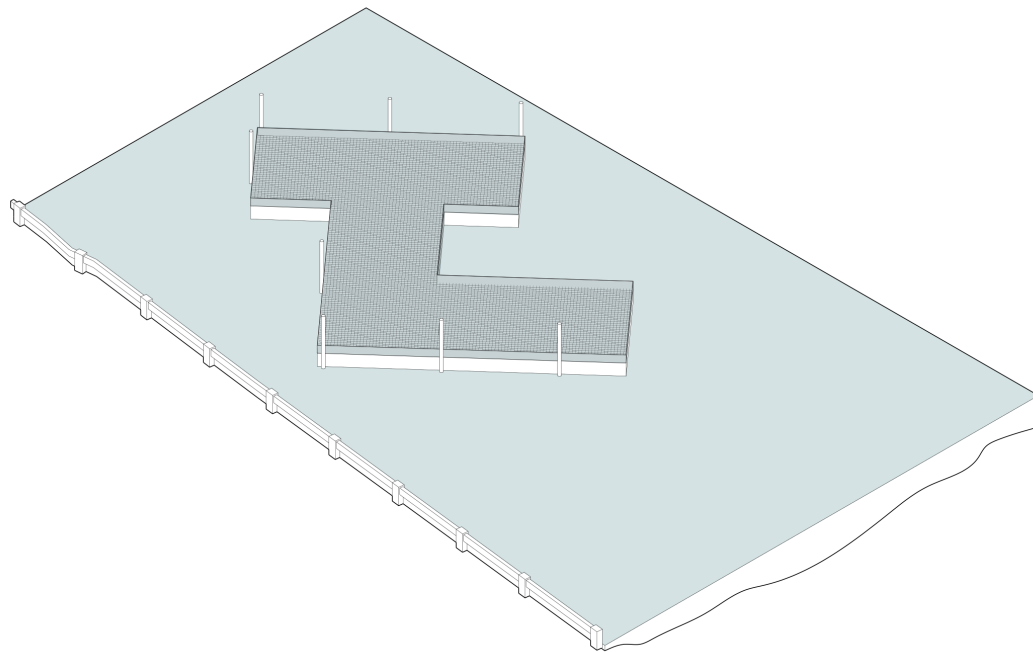
- Second pontoon pulled to site location by tugboat.
- Pontoon secured in place with pile rollers attachments.
- Pontoons 1 & 2 bolted together

01



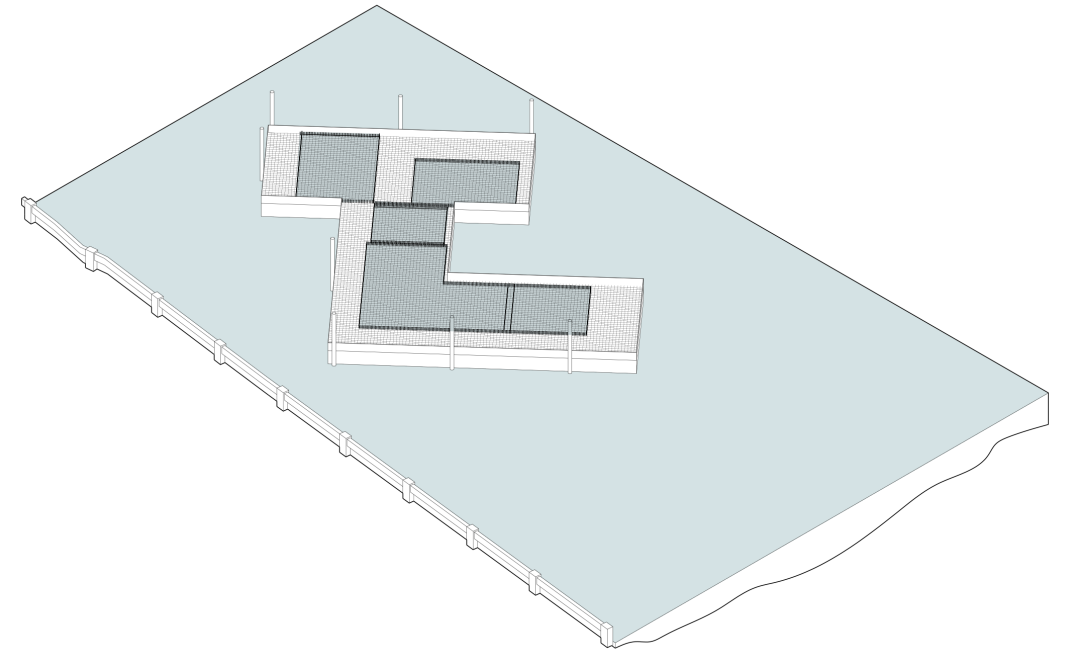
- Last pontoon pulled to site location by tugboat.
- Pontoon secured in place with pile rollers attachments.
- pontoons 1 & 3 bolted together

02



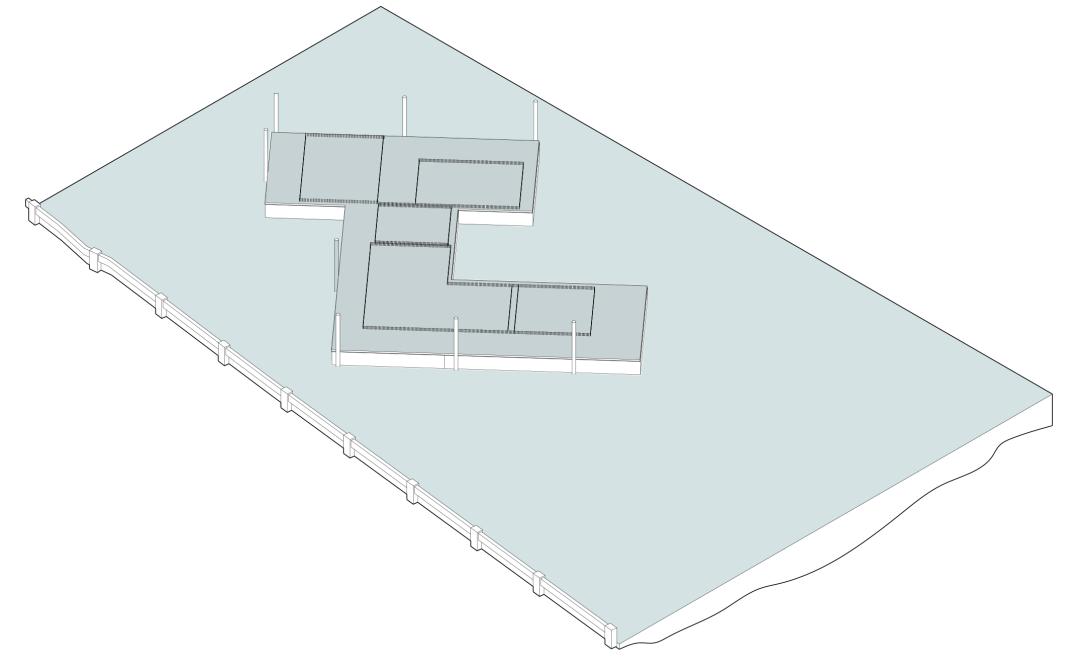
- Form-work built around pontoon for concrete slab casting.
- Structural steel mesh rebar placed in grid formations on steel deck in preparation for ground slab casting.

03



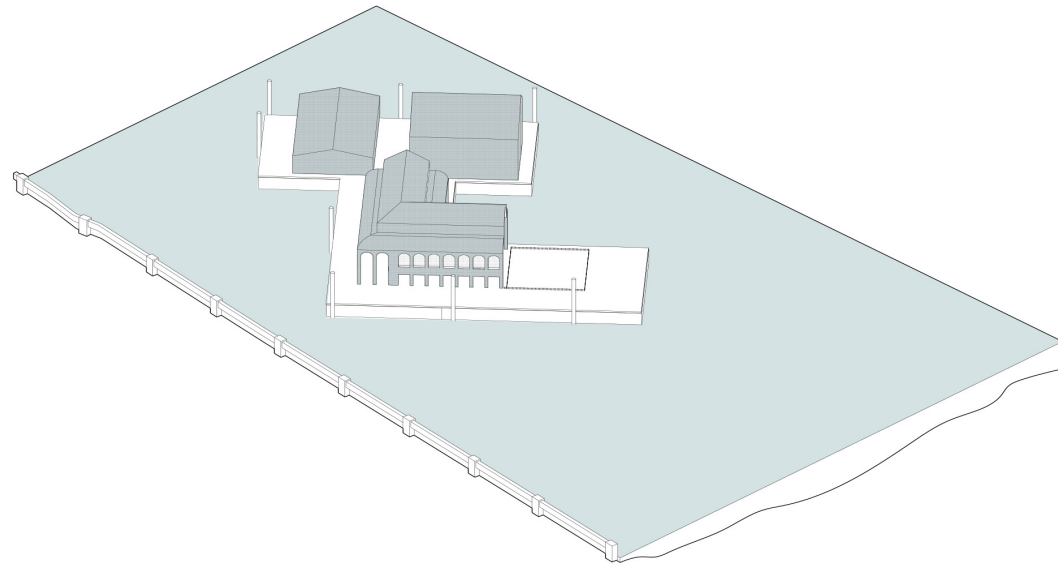
- Vertical steel rebar starter bars of exterior walls tied to ground mesh work.
- Decorative mesh starter vertical bars tied to main structural rebar.

04



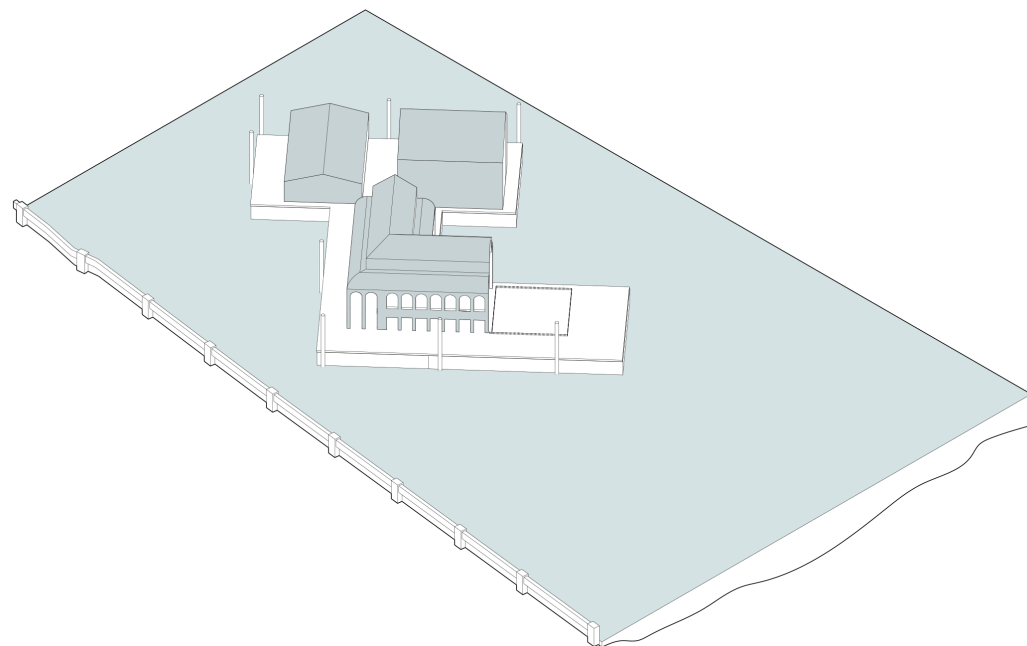
- Pontoon concrete slab is cast using sprayed concrete to reduce load on pontoon during construction.

01



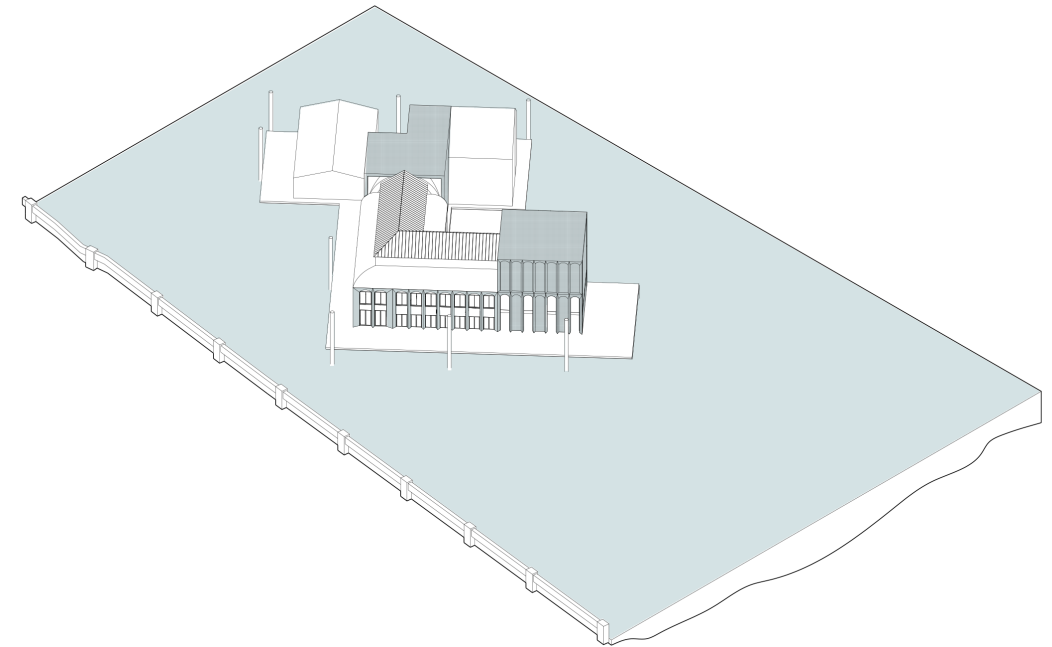
- Primary steel mesh rebar structures erected.

02



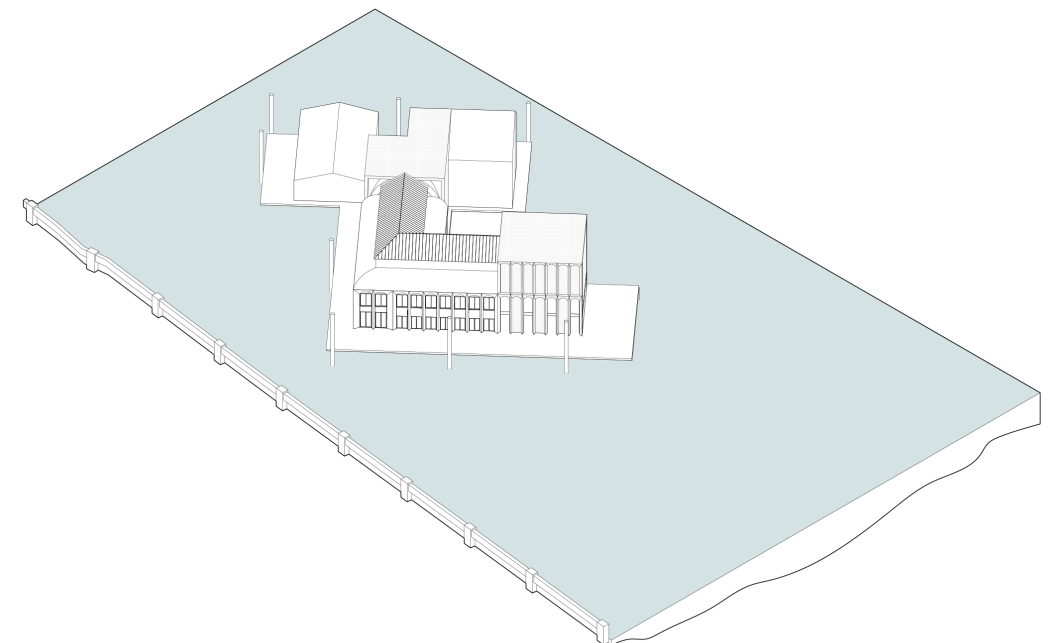
- Polymer fabric stretched across exterior steel mesh structure to act as form-work.
- Insulation is sprayed from the interior .
- Concrete is then sprayed to ground floor areas of all main buildings

03

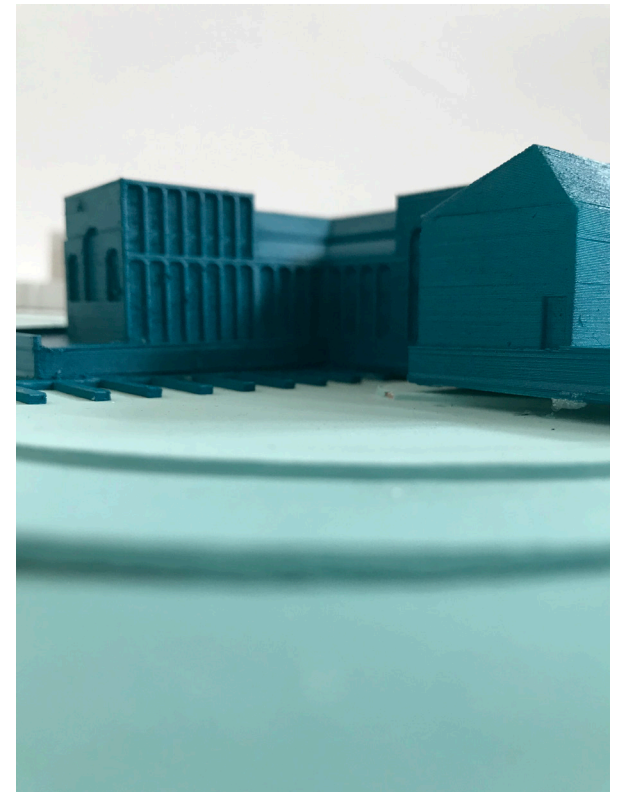
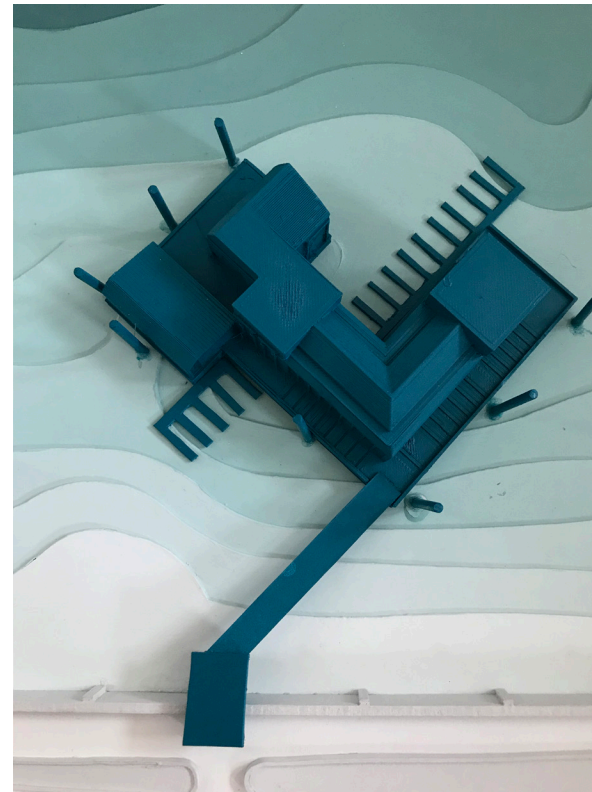
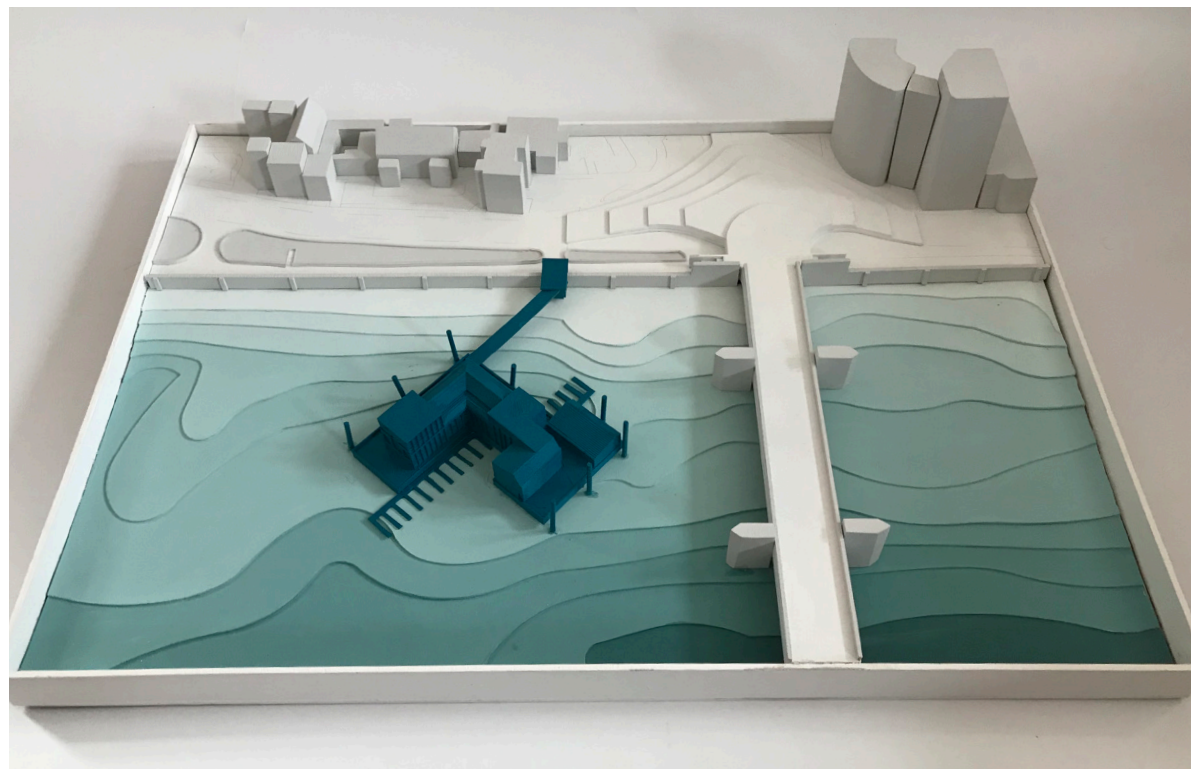
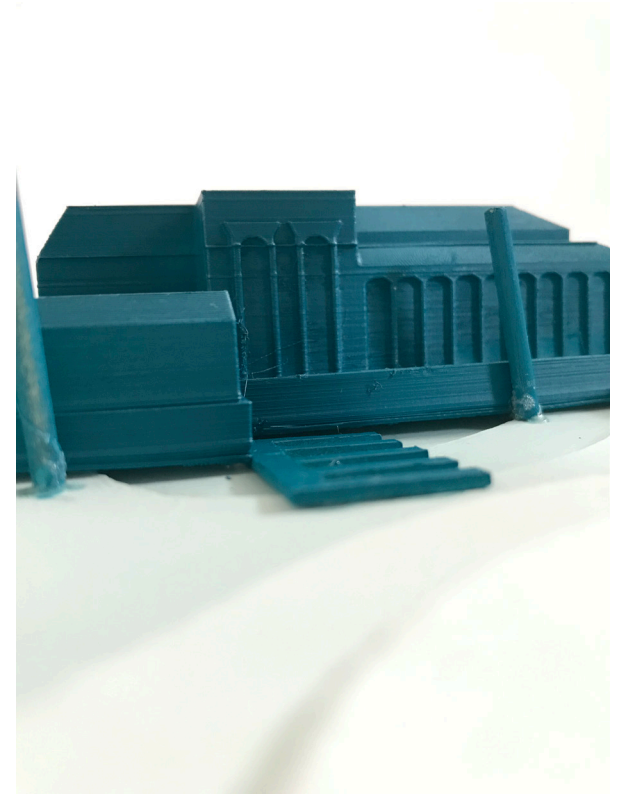
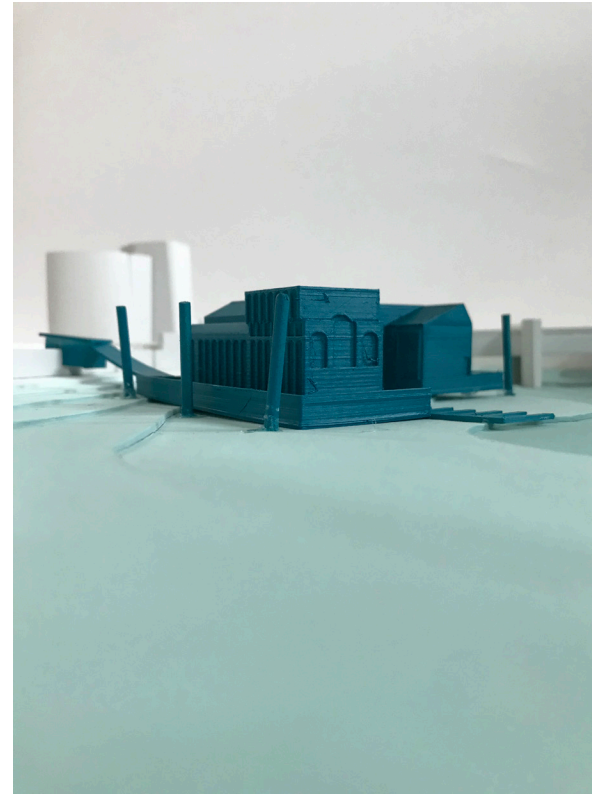
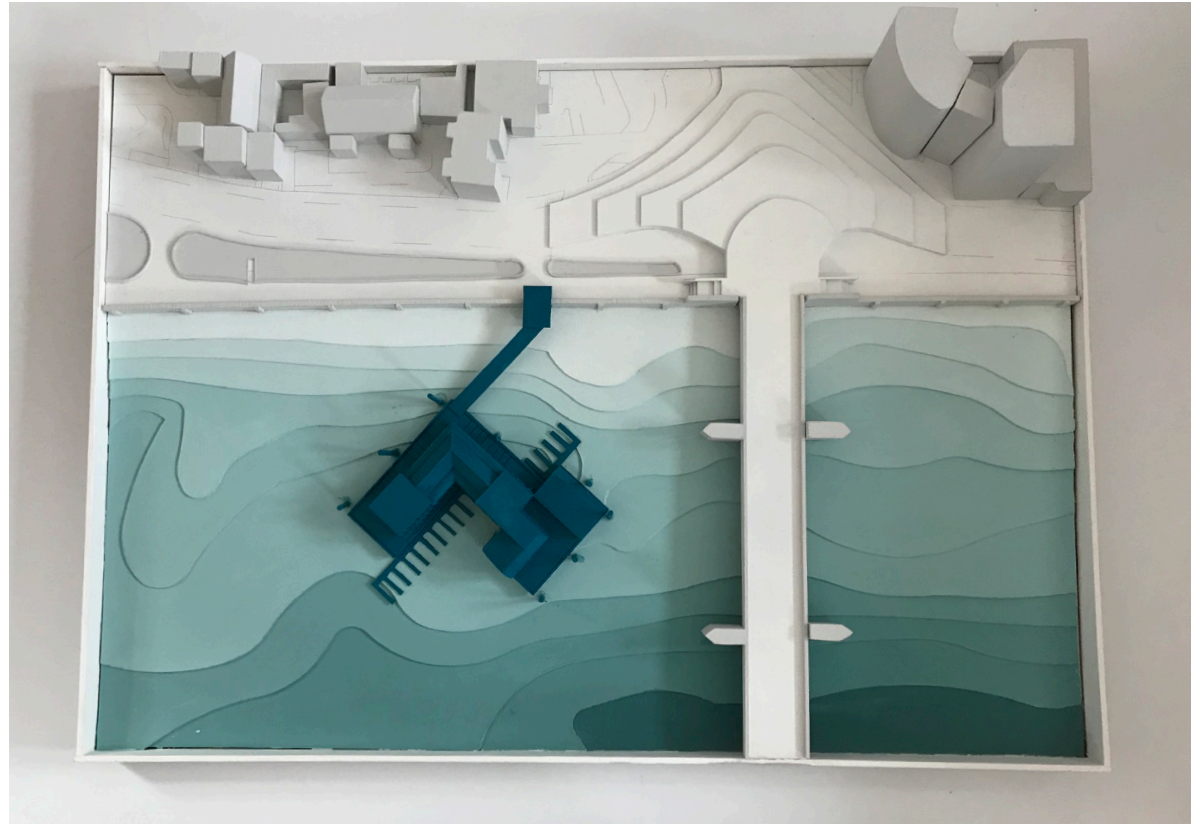


- Form-work is removed.
- Sprayed finishing pigmented concrete is applied to certain areas.
- Secondary mesh pavilion structures are erected.
- Portal frames around main boat waiting area are built.

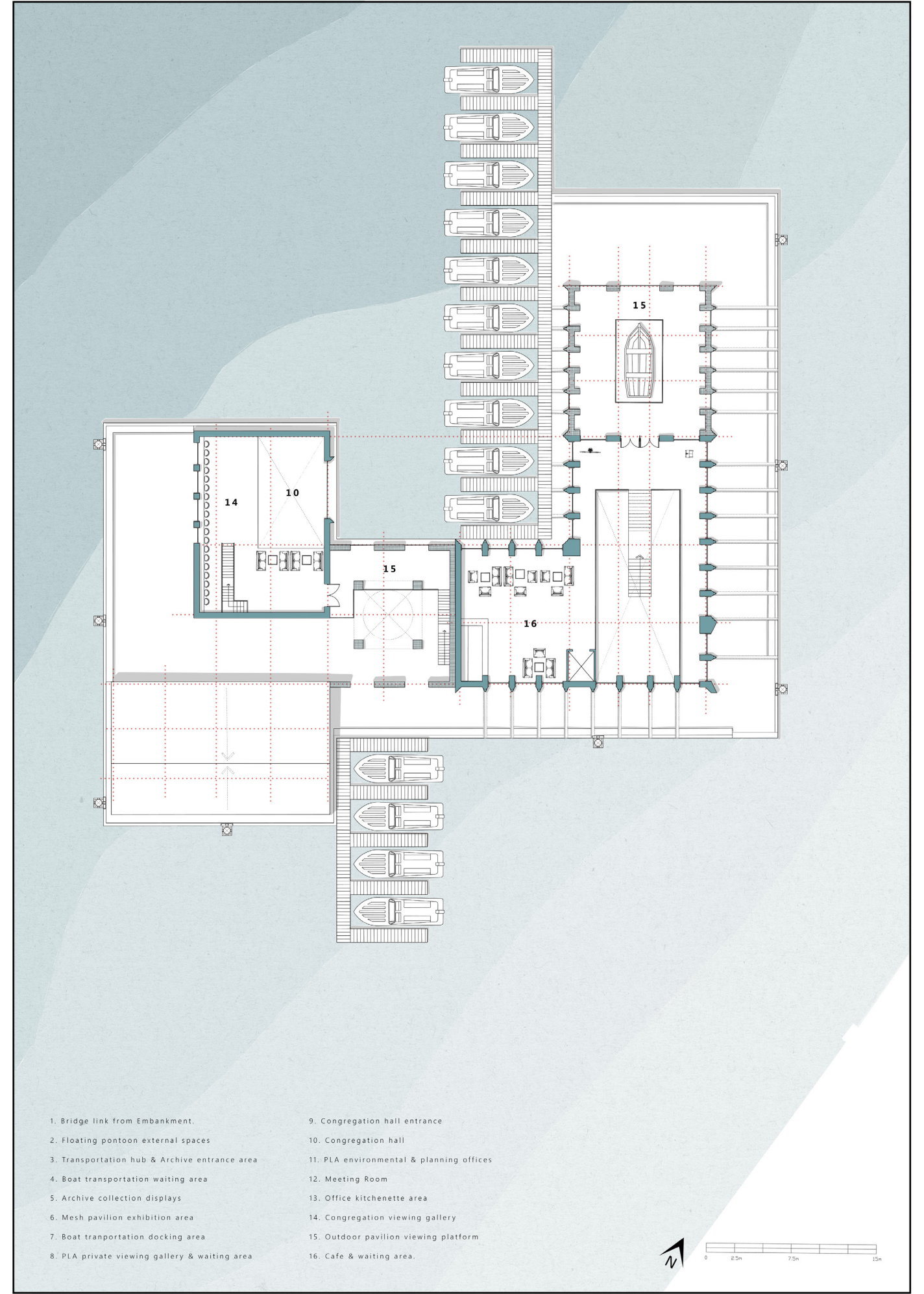
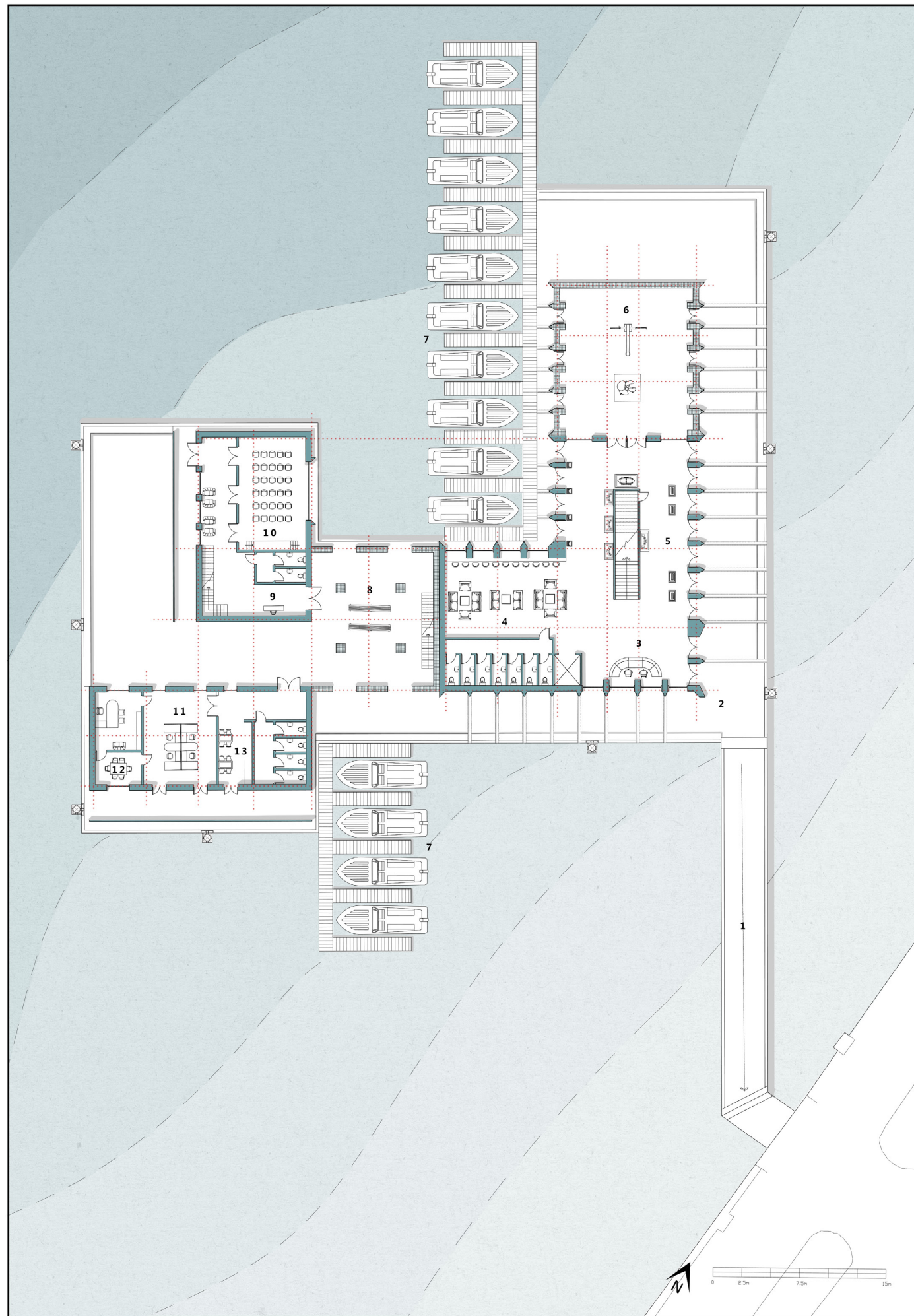
04



- Final Cladding elements added.
- Roof cladding attached.
- All windows and doors placed into position.
- Steel boat dock walkways bolted to pontoon edges
- Pin jointed bridge walkway to embankment constructed.

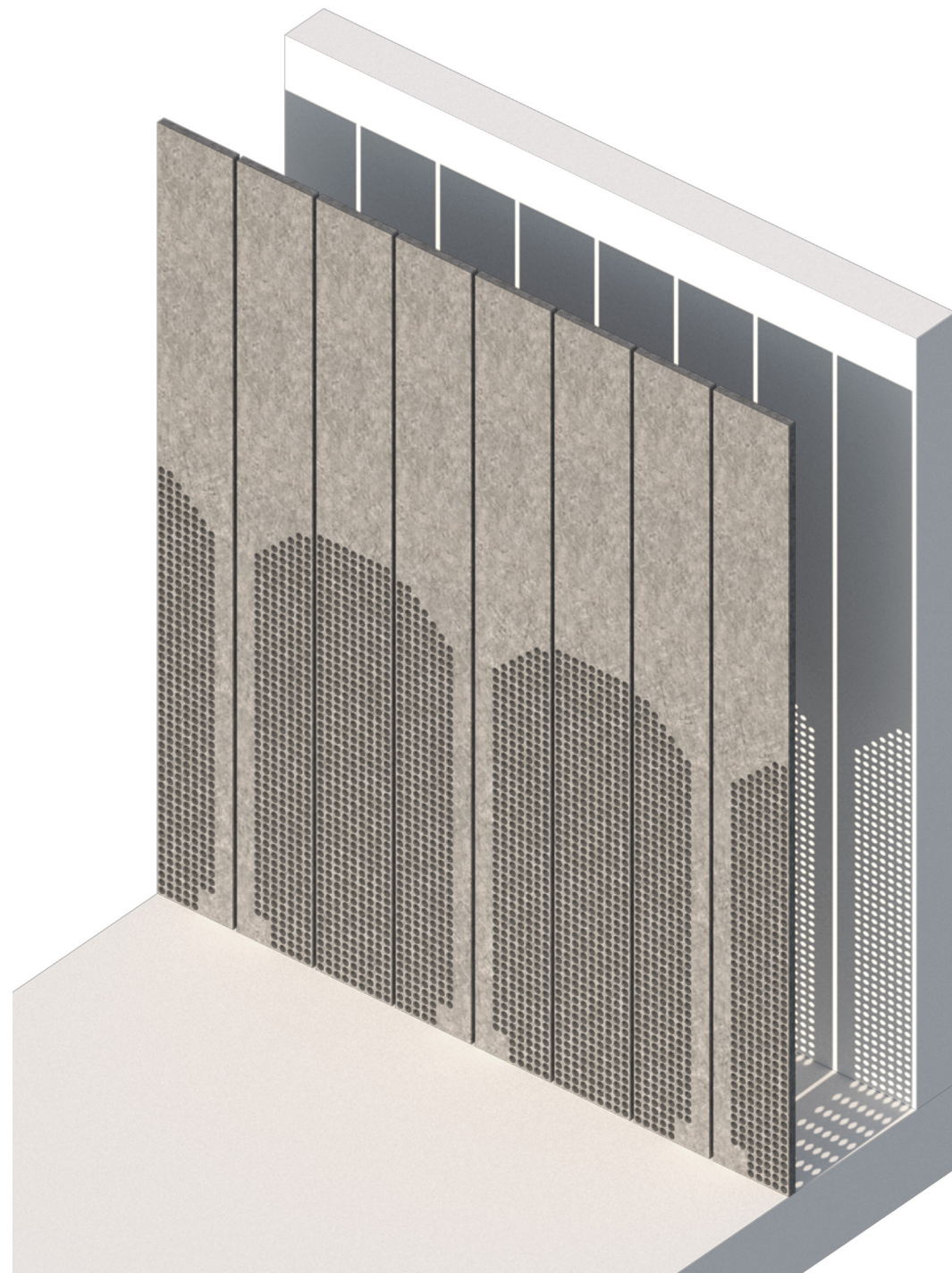






- | | |
|---|--|
| 1. Bridge link from Embankment. | 9. Congregation hall entrance |
| 2. Floating pontoon external spaces | 10. Congregation hall |
| 3. Transportation hub & Archive entrance area | 11. PLA environmental & planning offices |
| 4. Boat transportation waiting area | 12. Meeting Room |
| 5. Archive collection displays | 13. Office kitchenette area |
| 6. Mesh pavilion exhibition area | 14. Congregation viewing gallery |
| 7. Boat transportation docking area | 15. Outdoor pavilion viewing platform |
| 8. PLA private viewing gallery & waiting area | 16. Cafe & waiting area. |





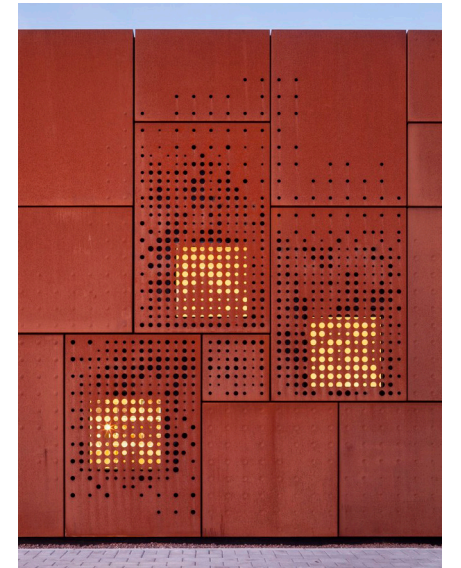
01

Exploring the use of uses of perforated sheet cladding as seen in City Library Bruges by Studio Farris Architects, they utilise a perforated pattern as a method of shading for main window openings.

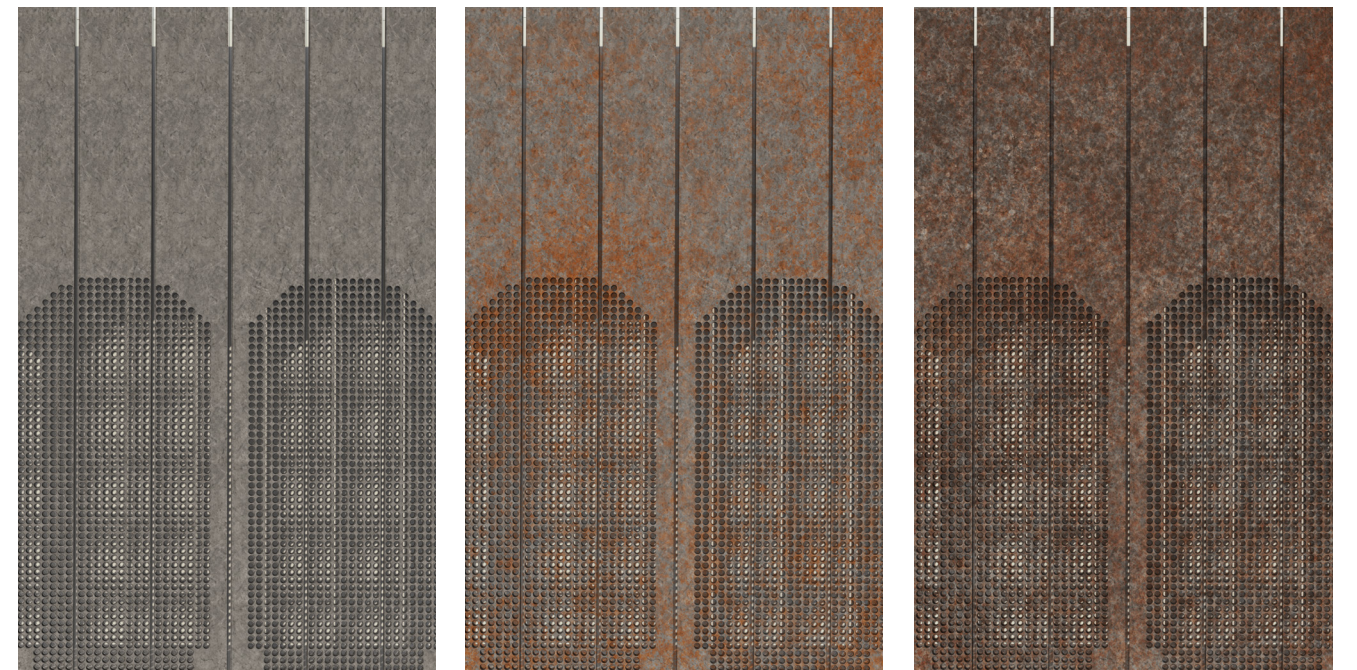
As the PLA offices and congregation space have rooms that utilise south facing openings, there is the potential risk of overheating in the summer months. Aiming to keep to the existing materials used elsewhere on site, steel cladding would be used in areas that require more shading from direct sun-lighting. .

Using archway openings as the pattern for the perforated panels, it allows a similar typology rhythm to be used in the various buildings that sit on site.

The use of untreated steel will also allow for gradual weathering overtime, and an experiment to the ruination process can be seen below.

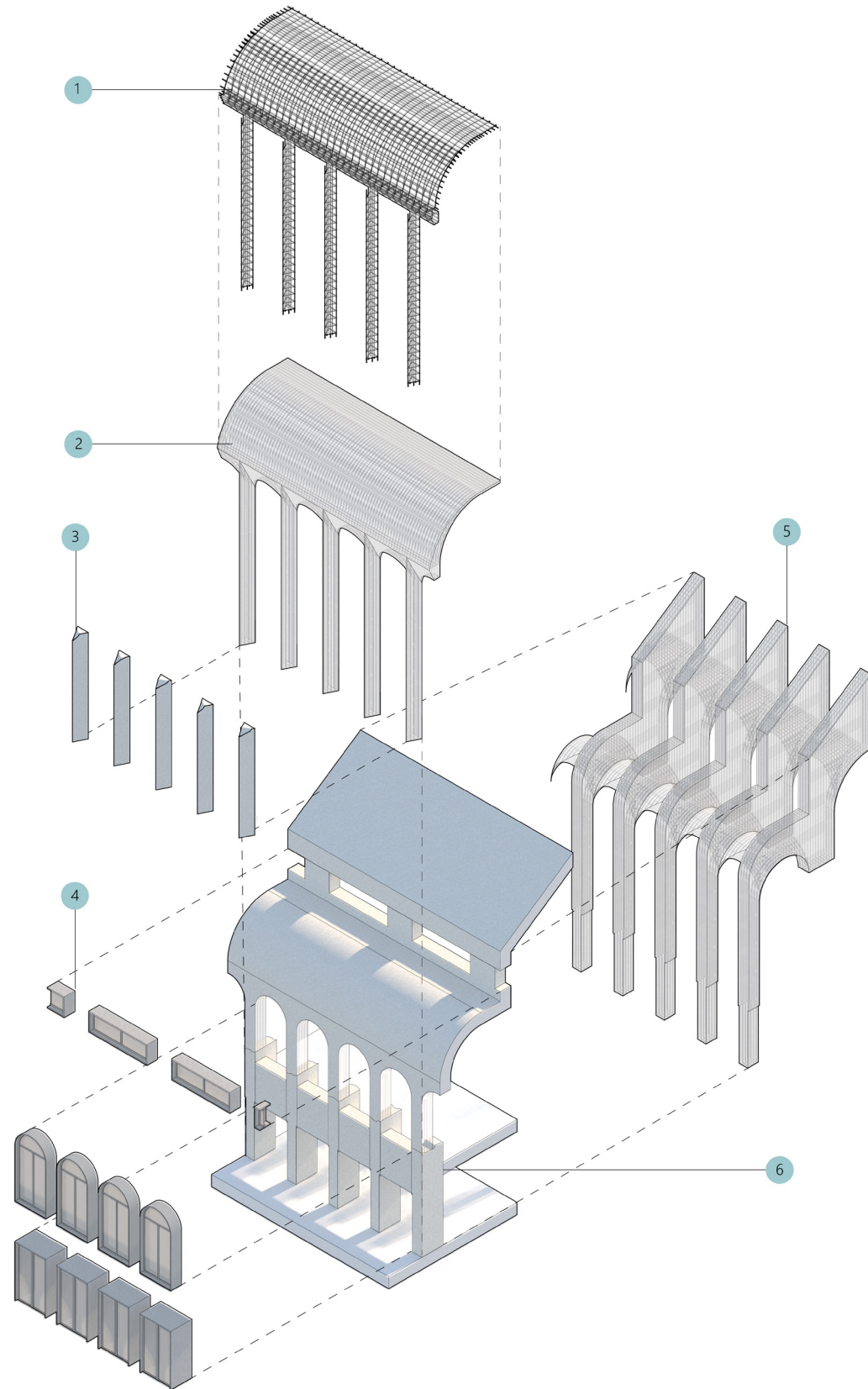


02



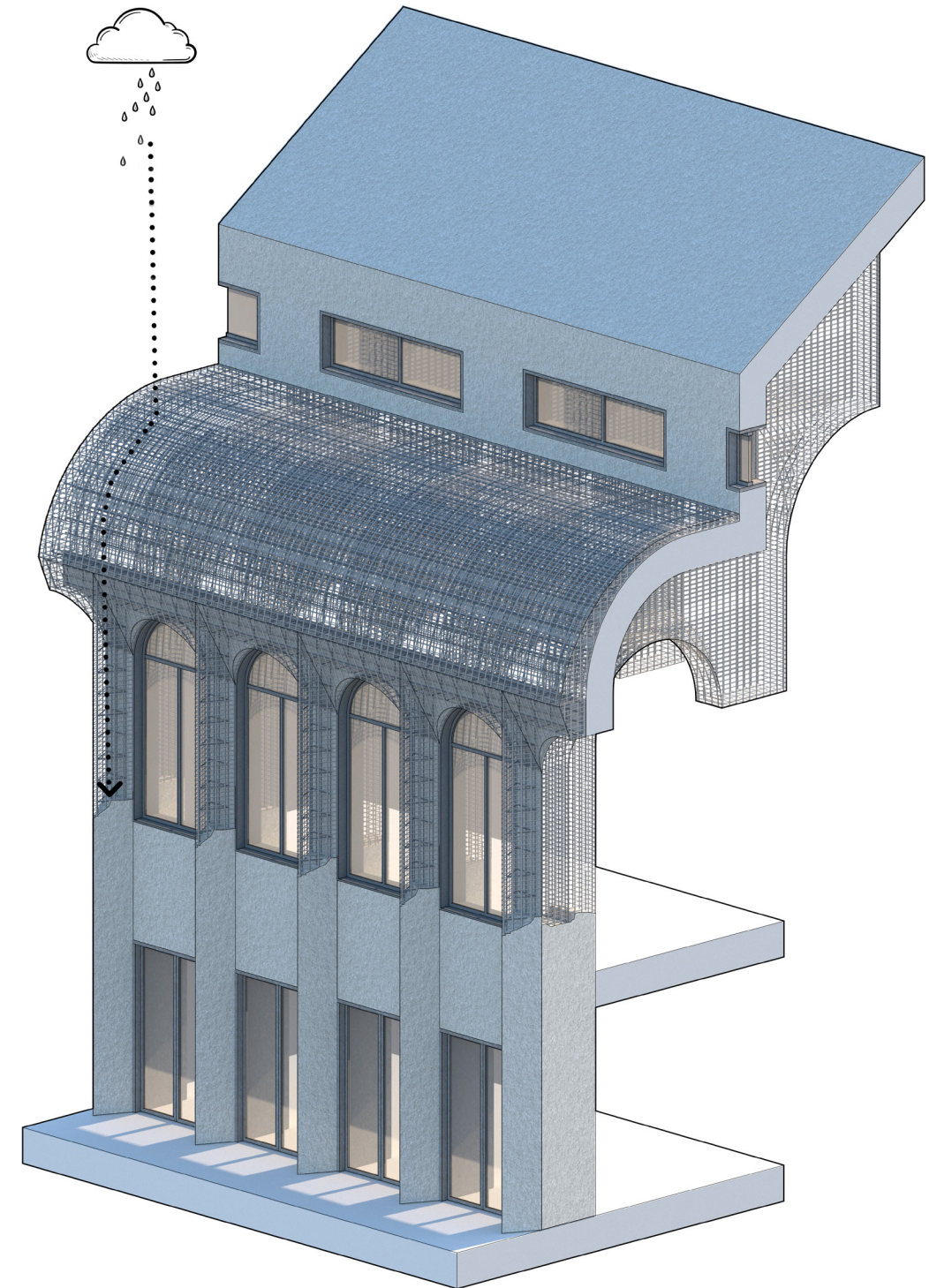
03

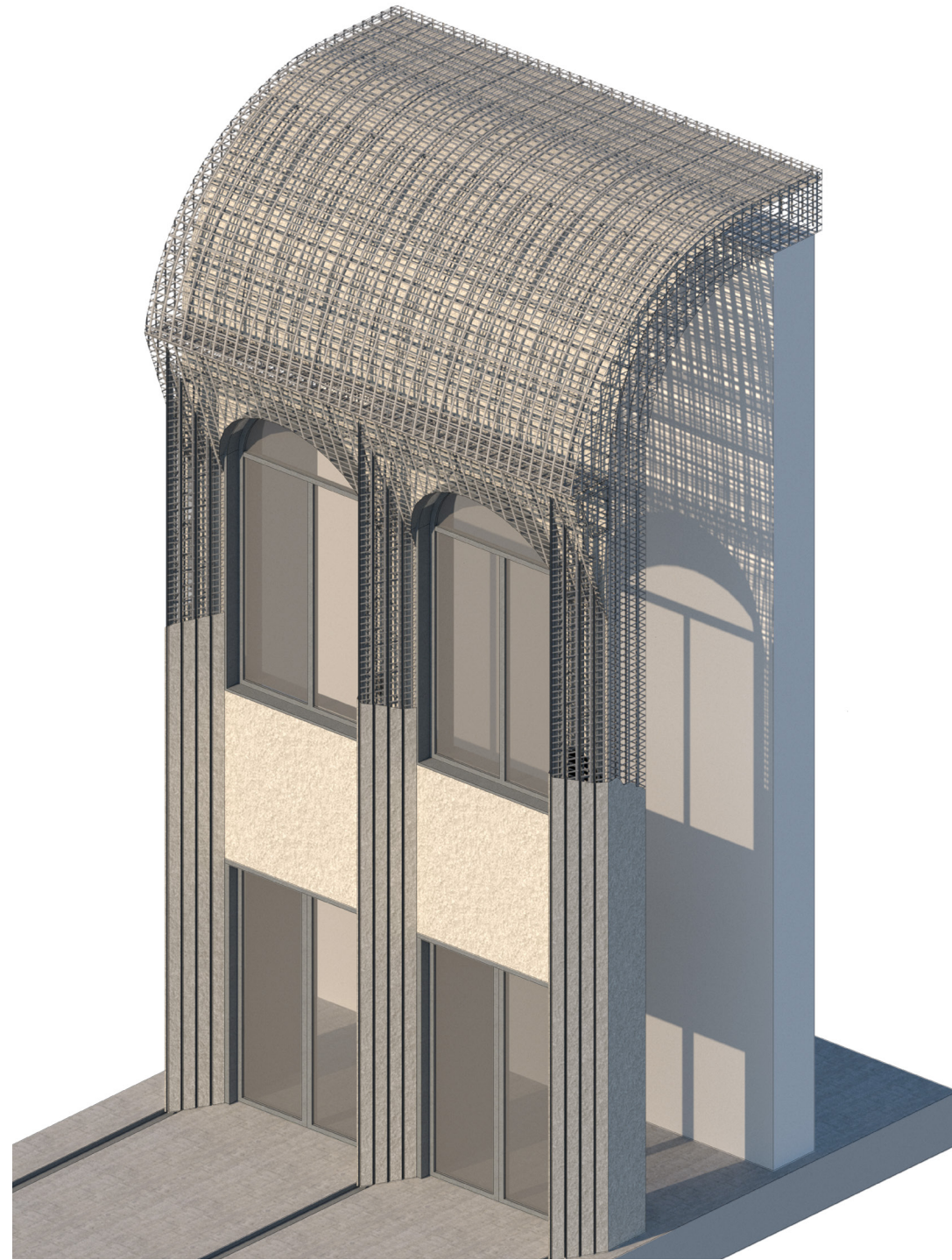
1. Structural Steel Rebar Framing
2. Decorative Steel Mesh Framing
3. Sprayed Concrete Filled Portal Frames
4. Steel Framed Window Openings
5. Decorative Mesh Interior Framing
6. Main facade - Steel Mesh Framing With Sprayed Concrete Finishing



01. Exploded Axonometric Diagram Of PLA Transport Hub Facade Material Build Up 02. Axonometric of PLA Transport Hub Facade & Control of Weathering

Allowing for weathering to occur to upper elements of the building, as well as the portal frame openings, a wrapping of mesh would be applied up to the roof of the building to allow for water from the pitched elements to directly drop onto the exposed mesh structures. The density of the mesh will allow for a gradual flow of water to be channelled through, onto the mesh and concrete portal frames below, over time staining the solid lower façades of the building.





01

Although the previous iteration of the portal framing allows for gradual channelling of water to flow down the front façades, in order to allow for greater sense of control of water, ideas would be taken from explorations made in Design 5A. With controlling the flow of water through various channels, in the John Soane piece, a similar approach has been applied to add greater control to the weathering process of the main façades of the PLA transport hub.

In order to channel the water down the columns in a particular way, indents have been made with a steel water U channels to guide the water down the columns, some of which continuing into the main ground surface.

This will allow for a minimal ruination to the concrete finish elements, with the mesh structure and steel channels receiving most of the weathering over time.

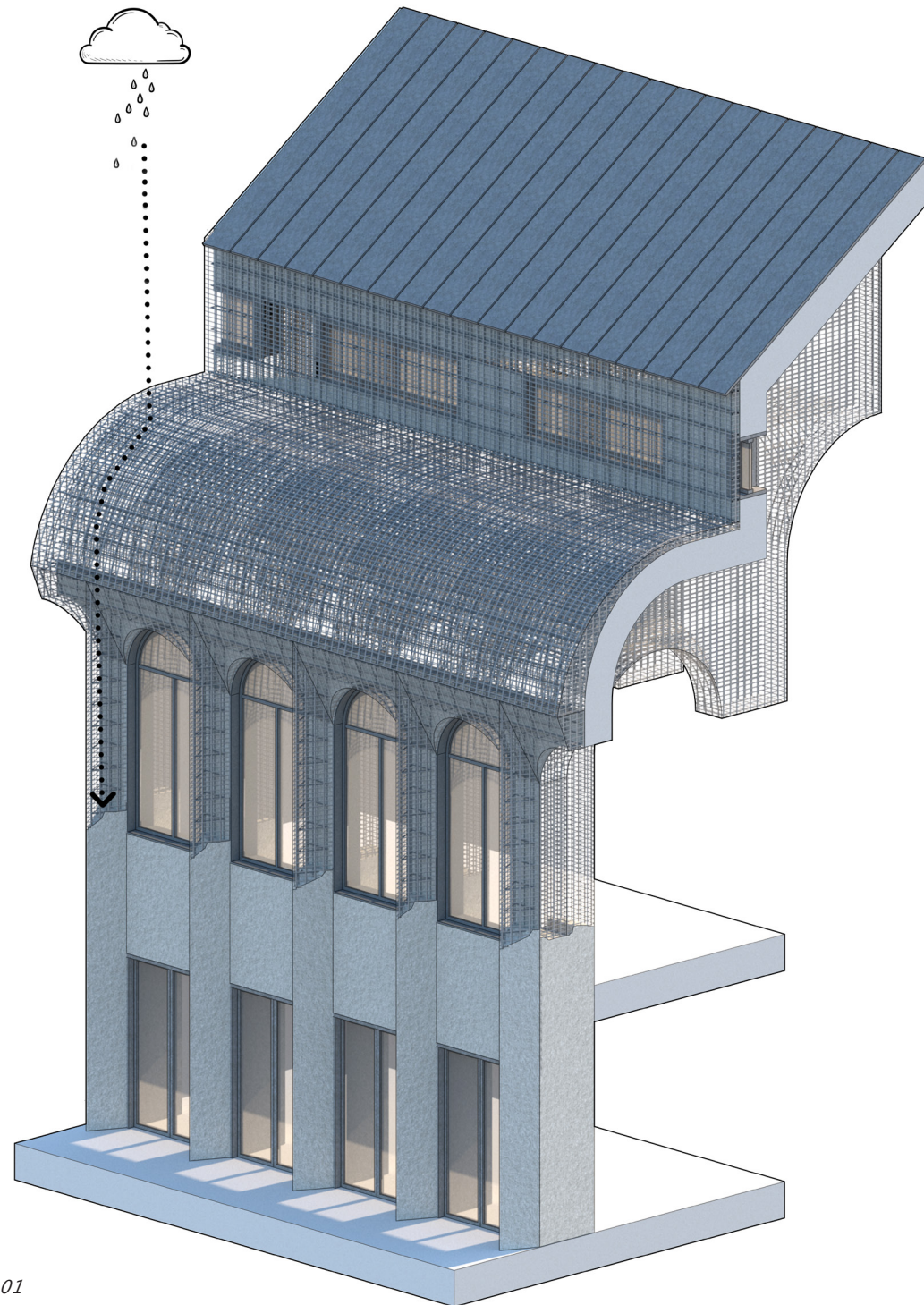


02



03

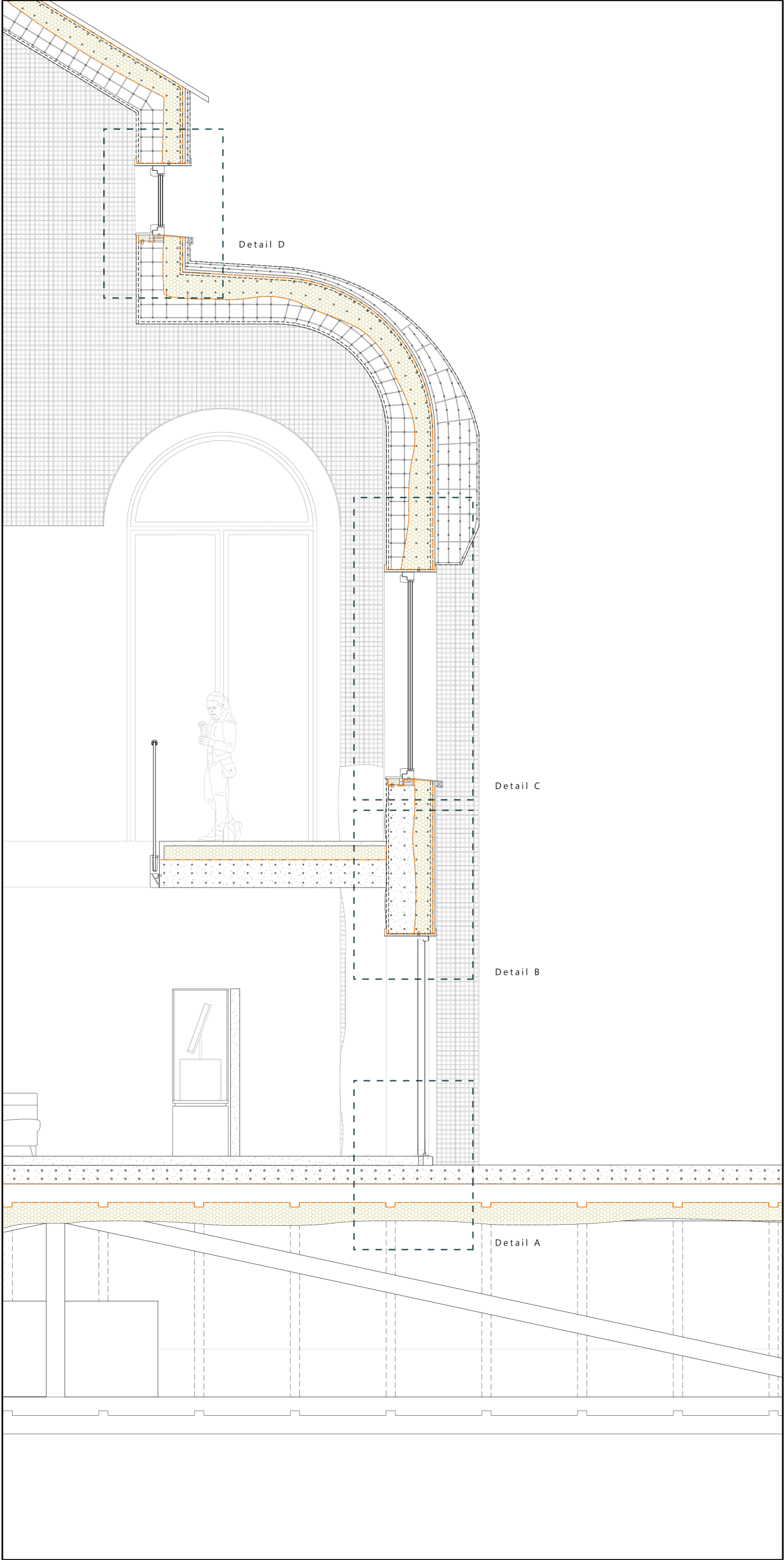
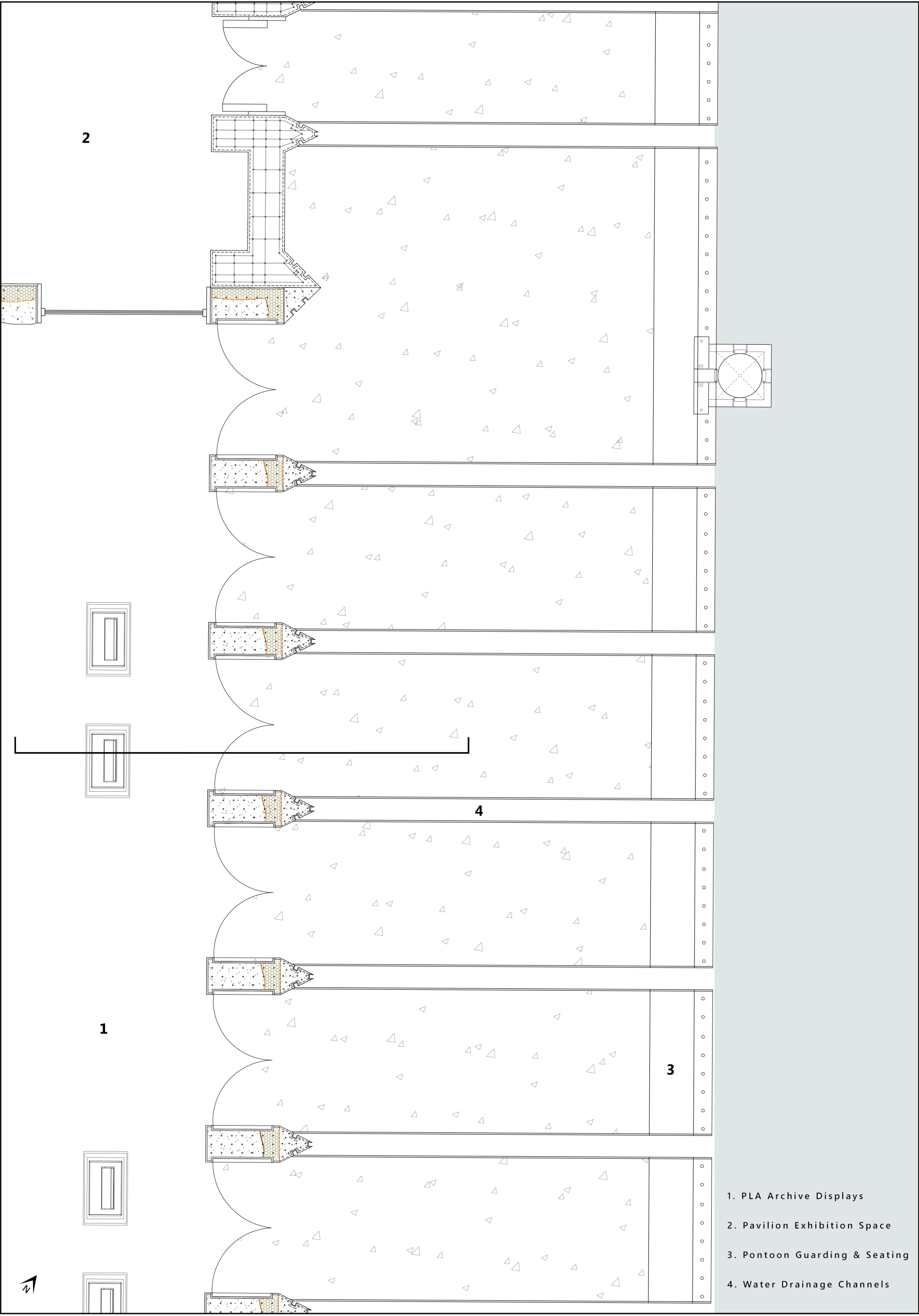
In order to allow for the design to appear more lightweight on the upper floors, the mesh elements on the exterior have been extended to meet the steel clad roof. In order to also create diffused lighting into the internal spaces, the mesh has been extended to also cover the top window openings.



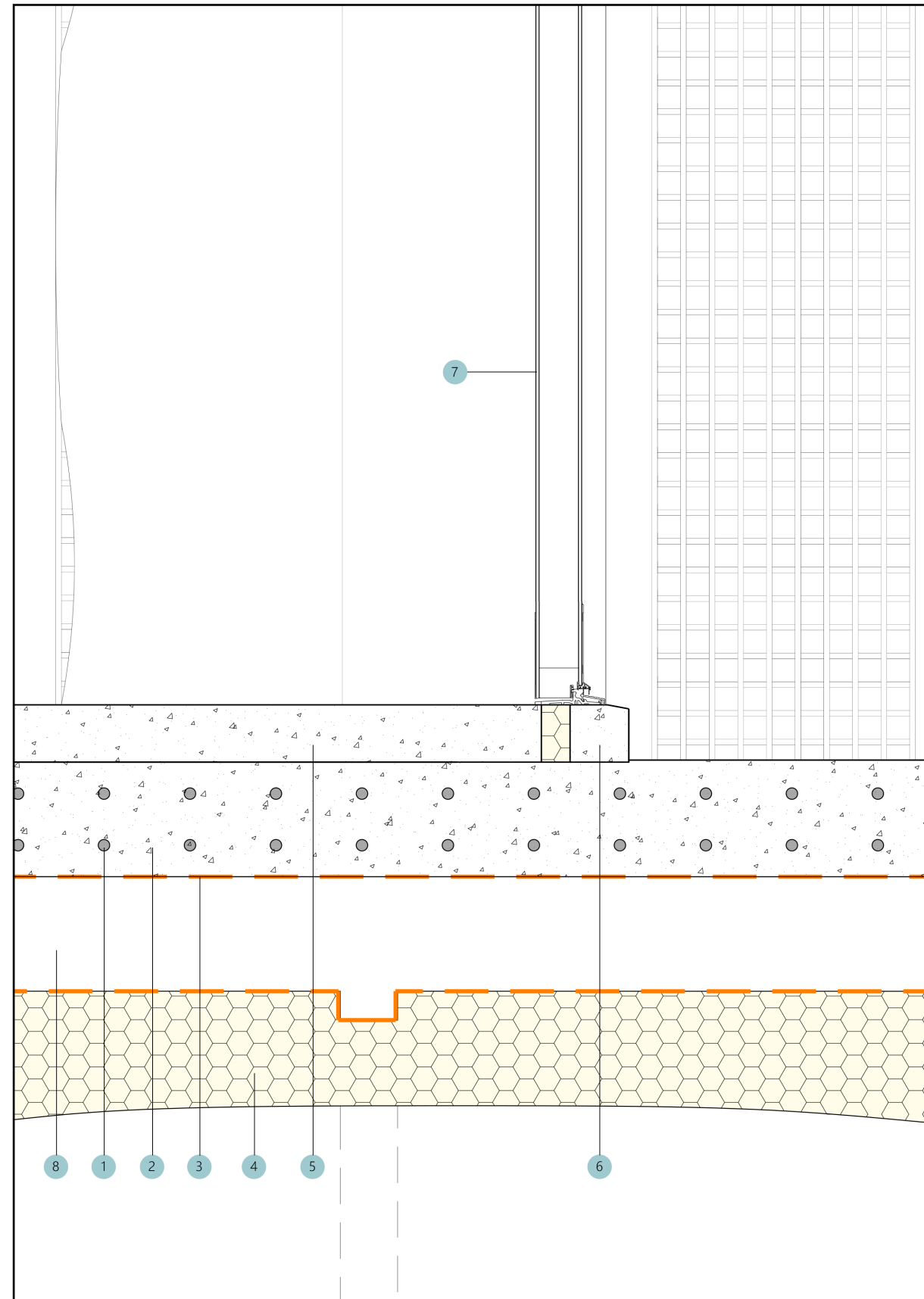
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02

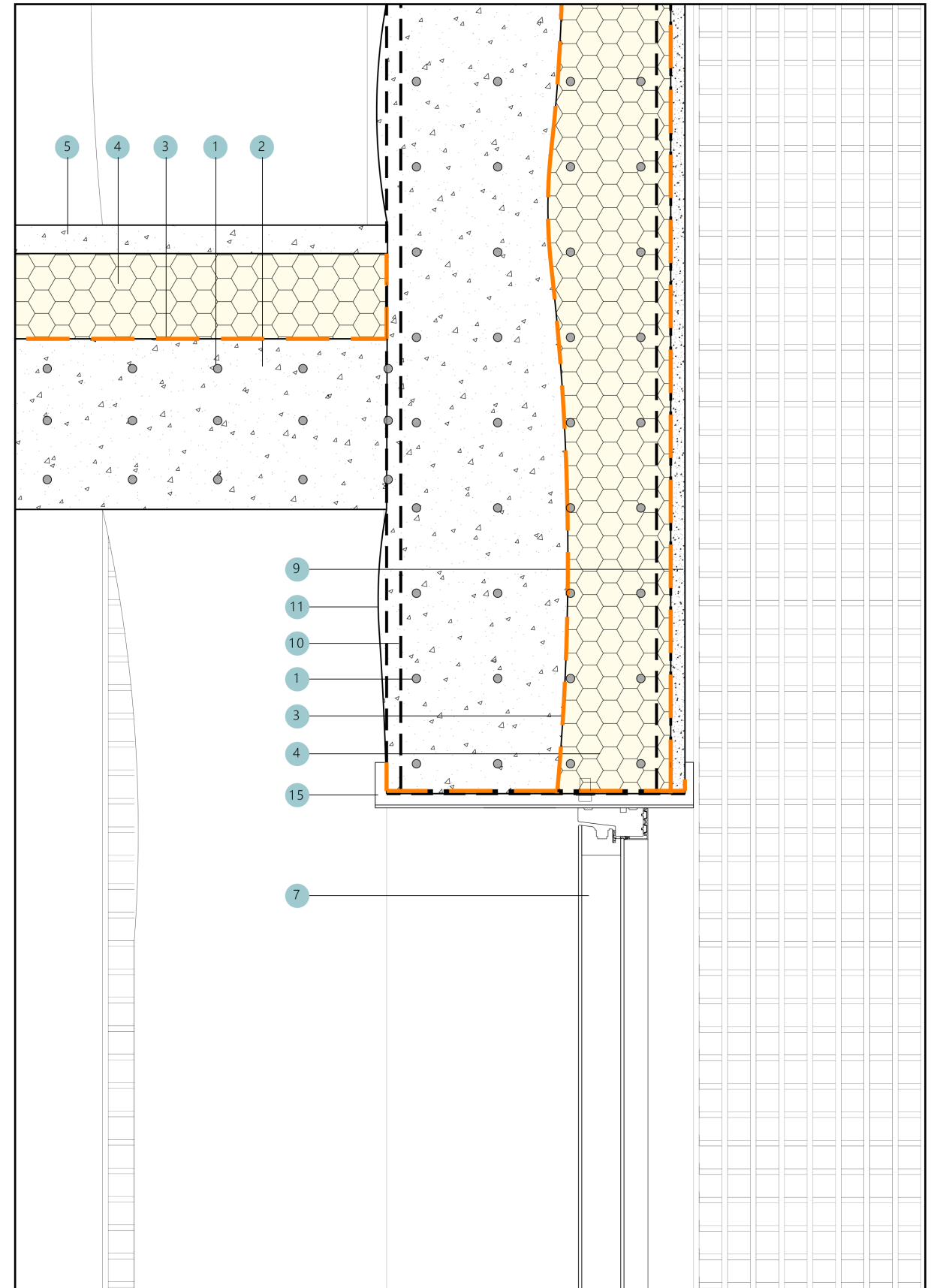


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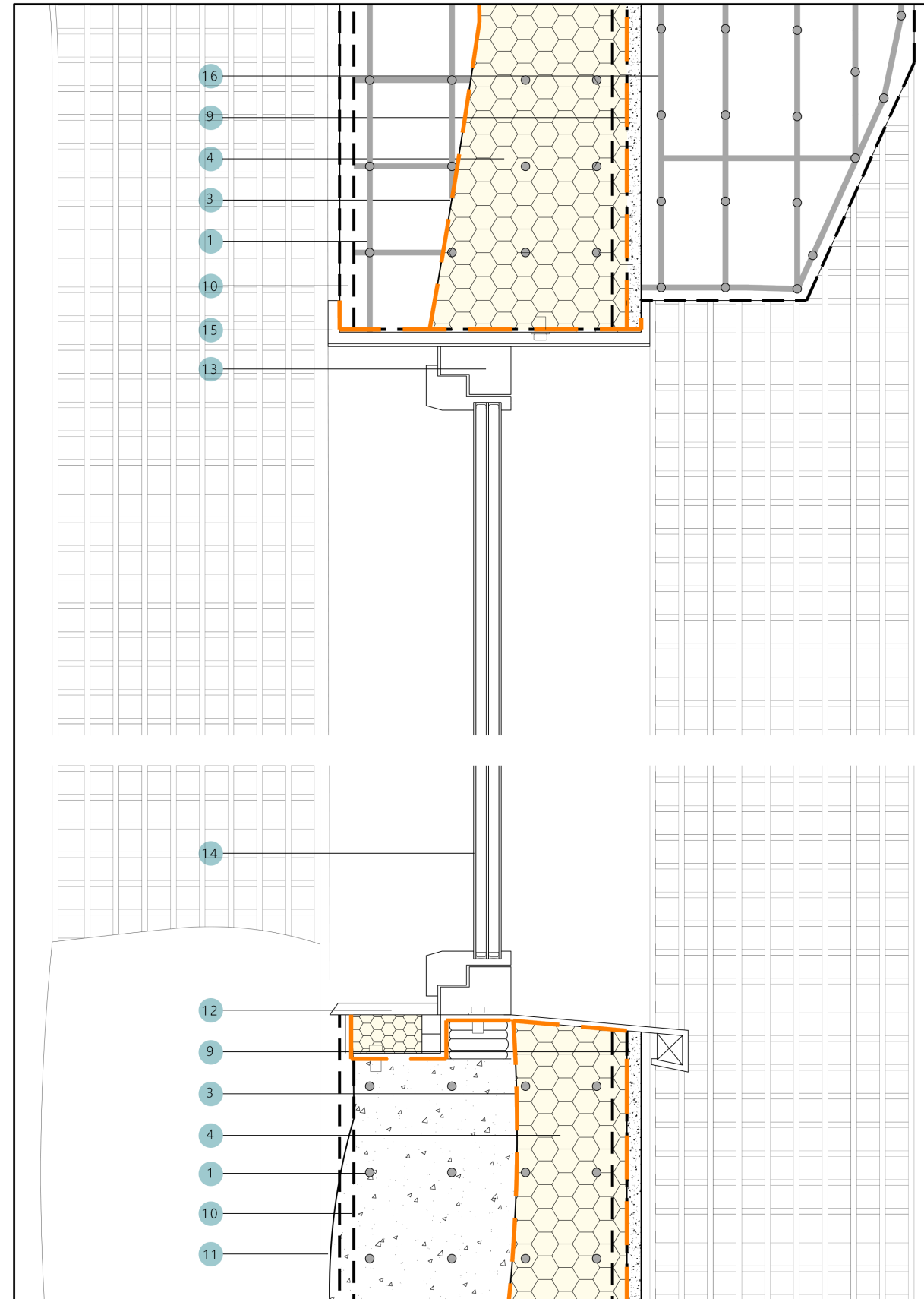
- 1. Structural Steel Floor Mesh Rebar
- 2. Concrete Ground Slab
- 3. Damp Proof Membrane
- 4. Sprayed Insulation
- 5. Concrete Screed Finish
- 6. Concrete Cill
- 7. Inward Opening Glazed Door
- 8. Steel Pontoon Top Deck

02



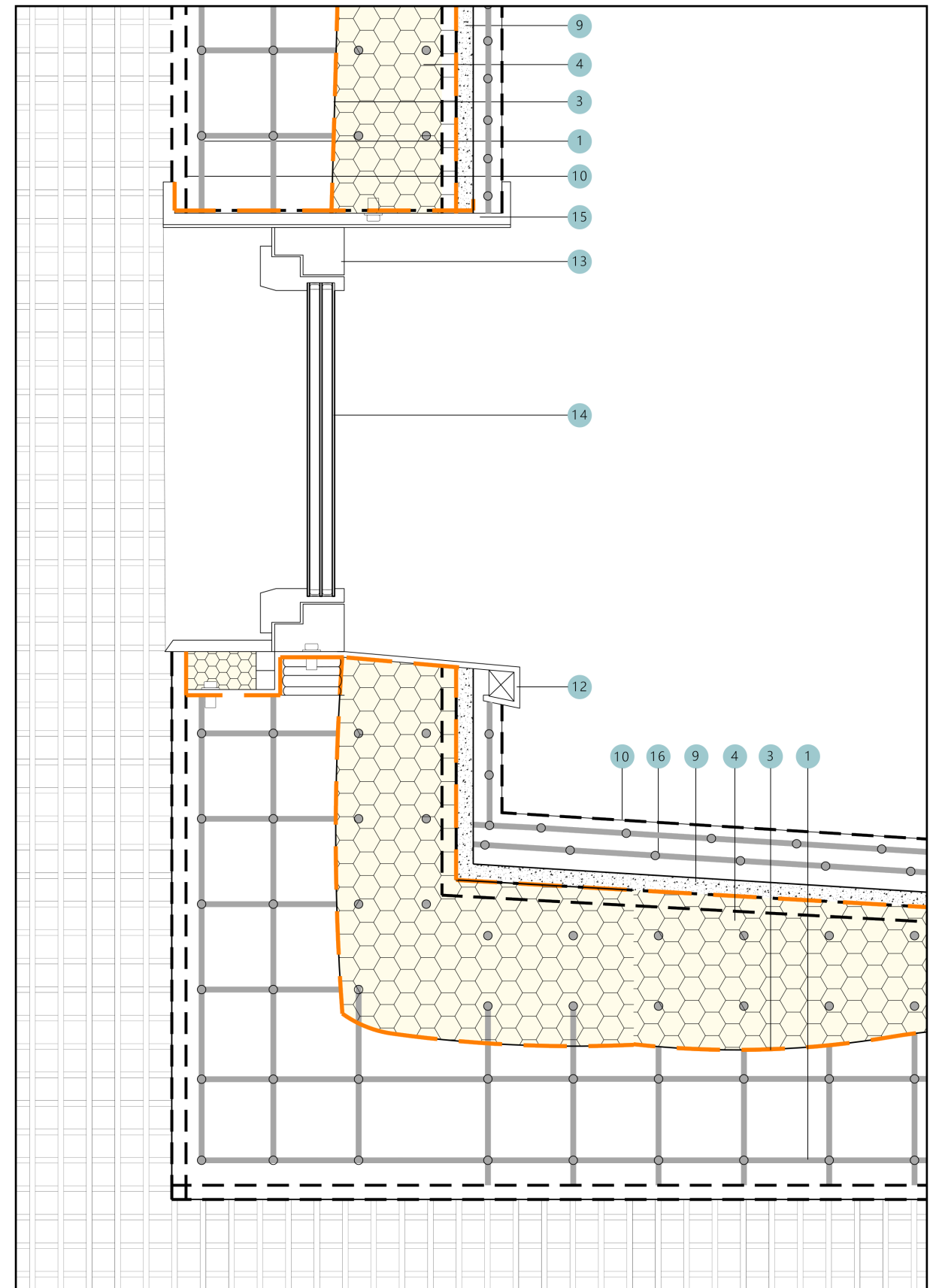
- 1. Structural Steel Mesh Rebar
- 2. Concrete Floor Slab
- 3. Damp Proof Membrane
- 4. Sprayed Insulation
- 5. Concrete Screed Finish
- 7. Inward Opening Glazed Door
- 9. Exterior Pigmented Sprayed Concrete Finish
- 10. Decorative Interior Steel Mesh
- 11. Sprayed Interior Concrete
- 15. Steel Frame Capping

01



- | | | |
|--------------------------------|---|---|
| 1. Structural Steel Mesh Rebar | 9. Exterior Pigmented Sprayed Concrete Finish | 13. Steel Window Frame |
| 3. Damp Proof Membrane | 10. Decorative Interior Steel Mesh | 14. Triple Glazed Inward Opening Window |
| 4. Sprayed Insulation | 11. Sprayed Interior Concrete | 15. Steel Frame Capping |
| 5. Concrete Screed Finish | 12. Steel Cill | 16. Exterior Steel Mesh Portal Frame |

02



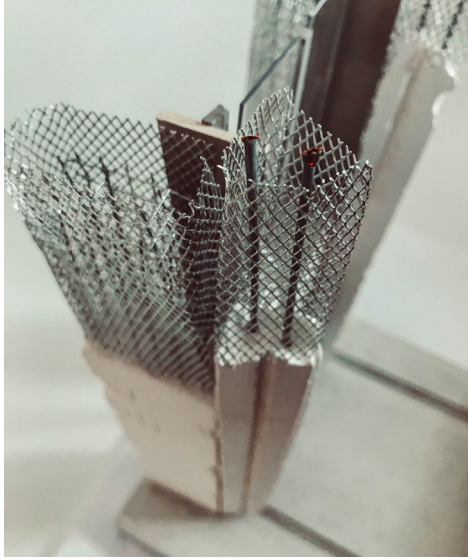
- | | | |
|--------------------------------|---|---|
| 1. Structural Steel Mesh Rebar | 9. Exterior Pigmented Sprayed Concrete Finish | 14. Triple Glazed Inward Opening Window |
| 3. Damp Proof Membrane | 10. Decorative Interior Steel Mesh | 15. Steel Frame Capping |
| 4. Sprayed Insulation | 12. Steel Cill | 16. Exterior Steel Mesh Portal Frame |
| 5. Concrete Screed Finish | 13. Steel Window Frame | |



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01. 1:20 Sectional Facade Model Fragments

02. 1:20 Sectional Facade Model Side Elevation View



02

Roof-lights Deliberately not placed on pitched roofing, to avoid direct summer sun lighting. Also has

Openings allow for South Westerly Wind to provide a source of cooling to the building.

The sun's maximum angle is around 63 degrees above the horizon in the Westminster area of London. Mesh Portal Roof / Wall Framing allows for a reduced amount of direct summer sun entering through the large arched window openings, with the creation of deeper window reveals.

With all windows able to be opened it allows for a natural cross ventilation to occur to maintain a cool indoor environment when needed.

The use of pigmented sprayed concrete finishing to give a light external finish helps to reflect sunlight as opposed to keep the buildings cool internally

Higher thermal mass in concrete slab absorbs heat during the day. To prevent the building overheating at night when heat is released, roof-lighting windows can allow for cooler night air to enter and be opened warm air within the building to be released.

In order to keep the load weight as low as possible, a thick insulation layer has been used to absorb and protect heat generated within the building.

The maximised triple glazed window allow for as much sunlight to enter the building in the lower winter sun, which allows for heat absorption particularly in the concrete cast ground floor areas.

Even with a mesh structure, the concrete cast lower levels and increased sprayed insulation on the interior allow for heat to be slowly absorbed from the winter sun.

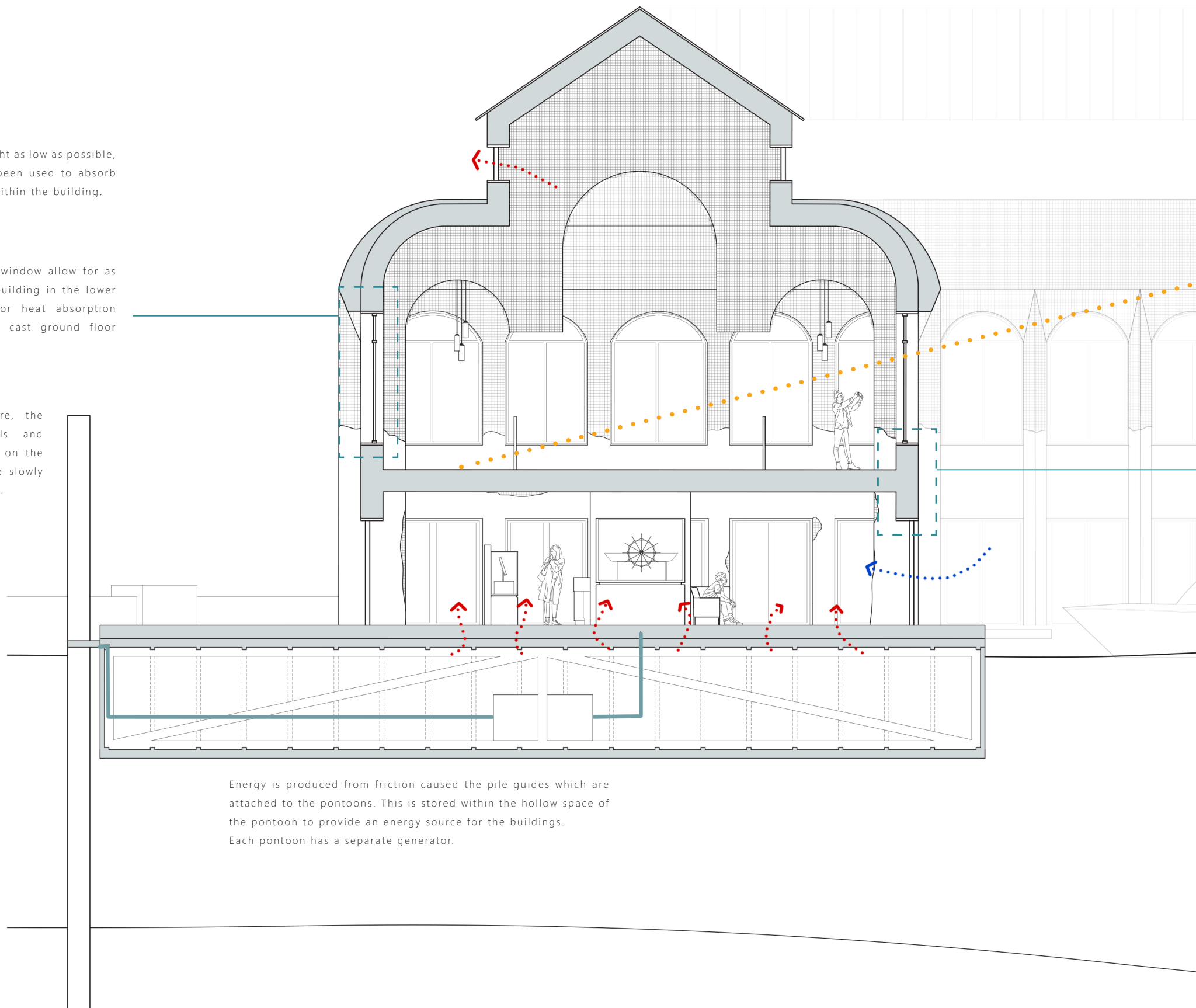
The lower winter sun angle (14 degrees) allows for daylighting to directly enter the spaces.

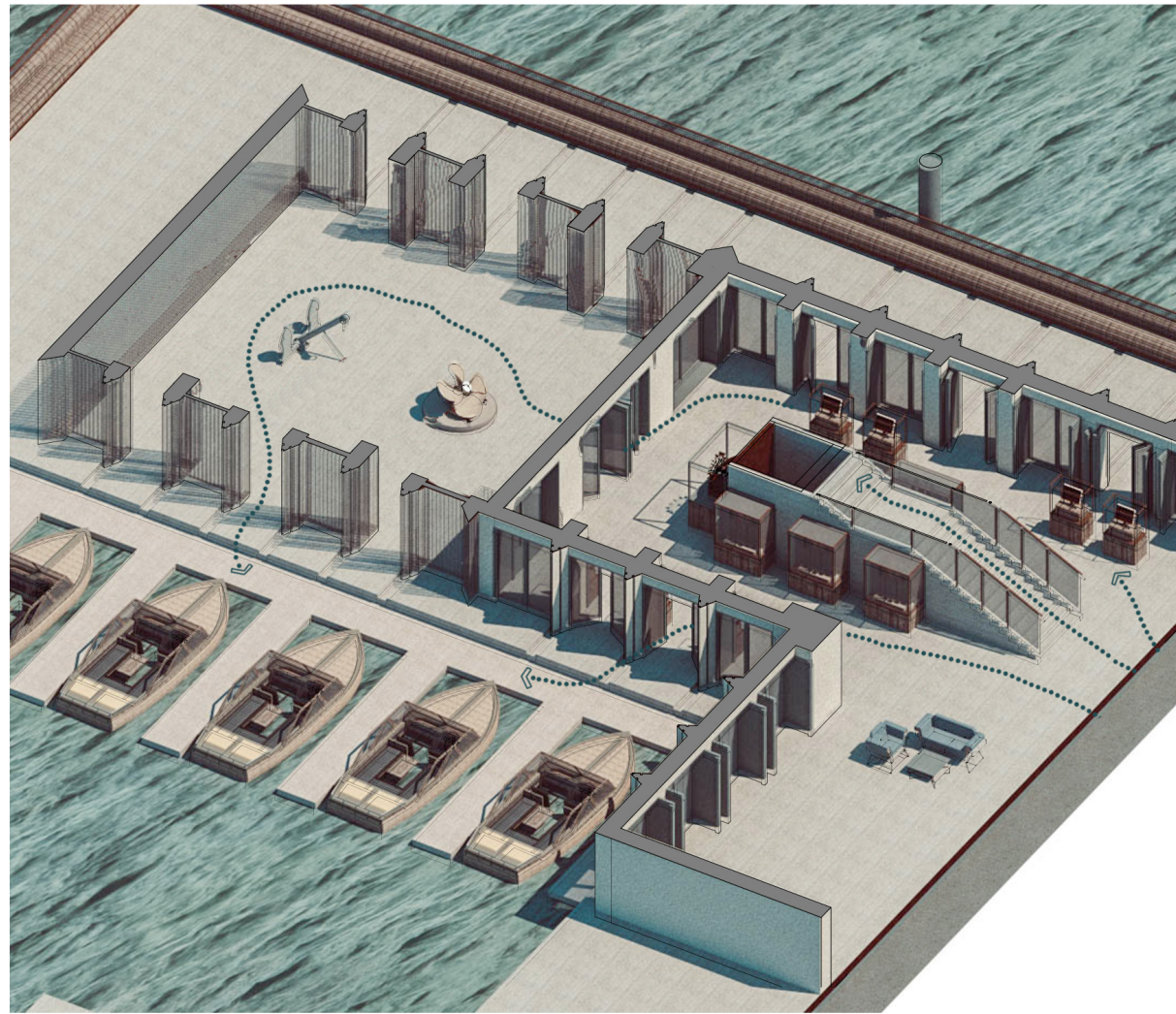


Thermal mass of lower walls and floor slab keeps the temperature regulated allowing for a consistent internal thermal environment, gradually releasing the heat slowly during night periods that are cooler.

Higher thermal mass in concrete slab absorbs heat during the day. To prevent the building overheating at night when heat is released, roof-lighting windows can allow for cooler night air to enter and be opened warm air within the building to be released.

Energy is produced from friction caused the pile guides which are attached to the pontoons. This is stored within the hollow space of the pontoon to provide an energy source for the buildings. Each pontoon has a separate generator.





01



02

Once members of the public have purchased their boat ticket and await their boat arrival, the ground floor offers a display of artefacts and a historic archive. Aimed at educating on the history of the operations of the Port of London Authority, as well as informing those visiting on the current works the PLA are trying to achieve with sustainable boat travel along the River Thames.

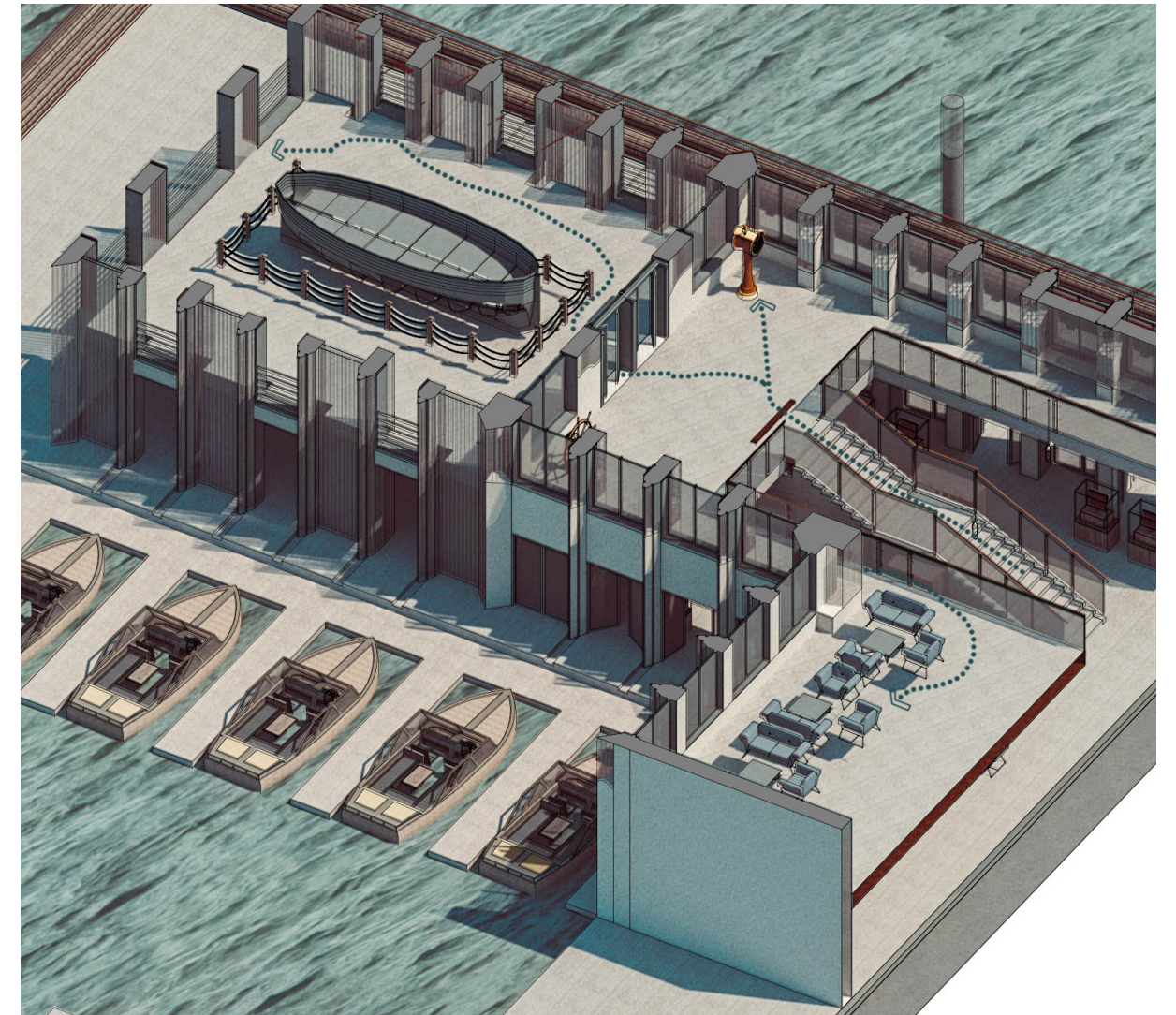
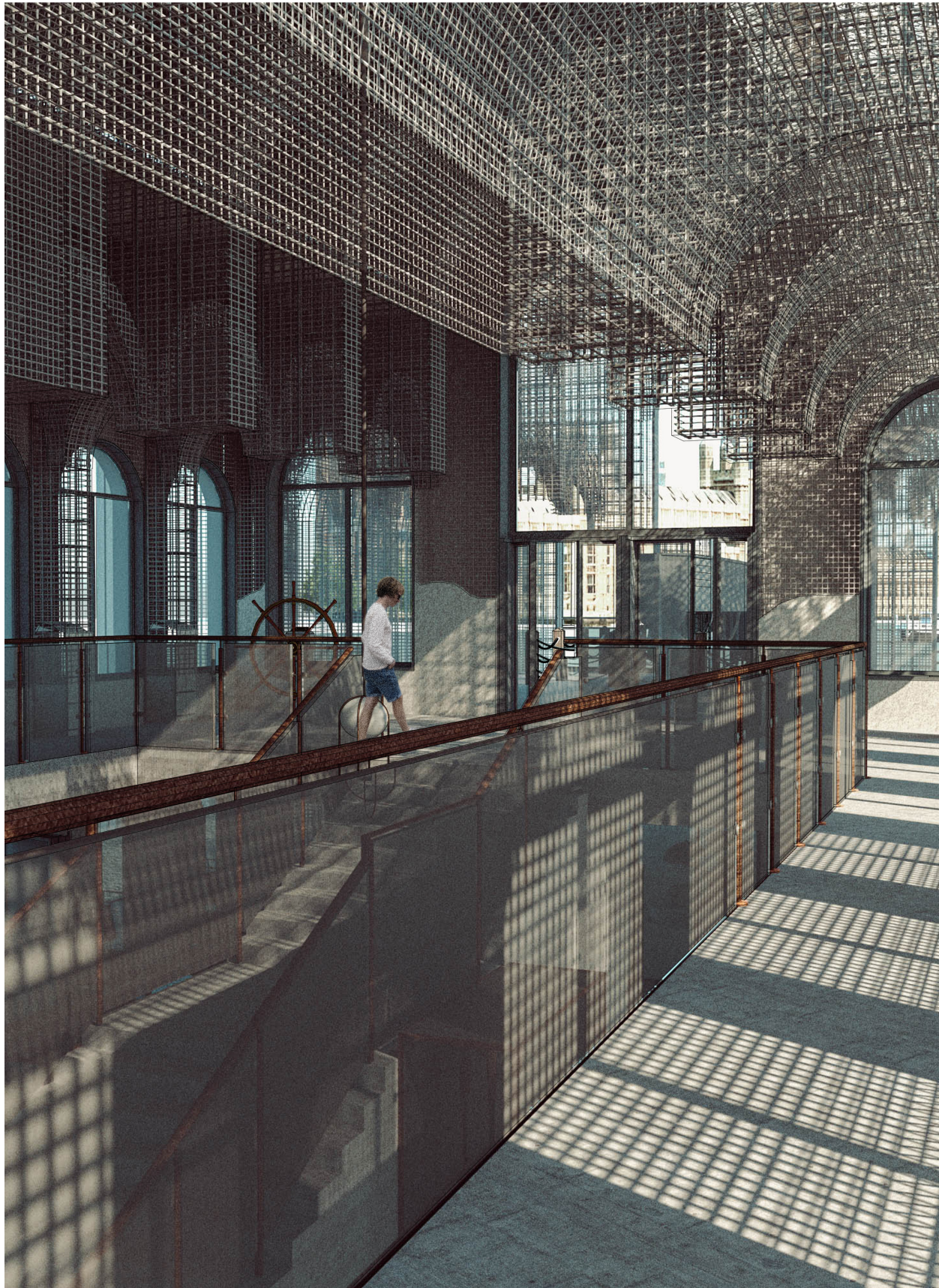
During operational hours spaces would be open to all member of public to explore freely, but with the use of doors in both the main building and pavilion area allows protection to items on display if needed.



03



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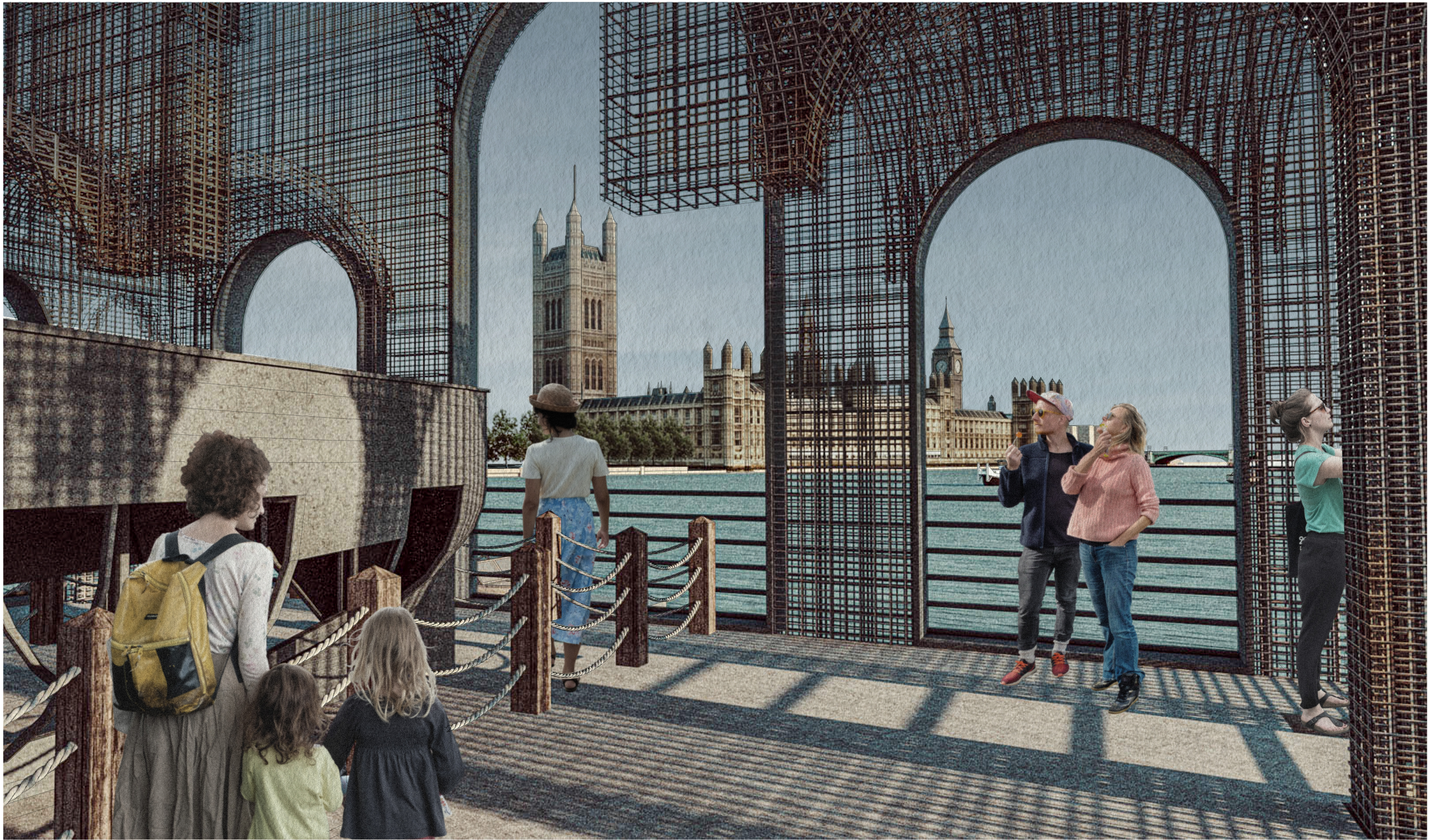


02

With the orientation of the proposed design, the first floor offers a unique view towards the Palace of Westminster. Only available to those visiting the building, the first floor viewing gallery spaces frames prominent features of the palace through a series of complex mesh vaulted forms.

With the use of mesh vaulted roofing and deep window reveals, allows for sunlight to penetrate and reflect throughout the day into the double height spaces all day.

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