

A house for a boat

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Approved:

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Pre-cast concrete

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Crew

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Abstract

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This thesis is the result of an exploration to develop an architectural series of modular units. It is my position that information regarding site and program are unnecessary when beginning an architectural project. This is clearly demonstrated through my process. In the beginning, these units were developed independently of any program or specific site information. After establishing a series of fundamental architectural ideas, they were used to address a specific program:

A boathouse for the Virginia Tech crew team. The facility, located on Claytor Lake State Park in southwest Virginia, is intended to serve the Virginia Tech Crew Club as well as independent rowers in the local community. The primary function is the storage of racing shells and associated equipment. The facility also provides a workout room, shower facilities and a meeting room. The majority of the building is an open-air pavilion.

The building that has resulted from this study is my response when given the task of joining these 'pre-program' ideas with the selected program. The result would have been completely different if another program was chosen, however the fundamental ideas would be the same in both. The majority of the boathouse is an assembly of large pre-cast concrete units. Each unit has a specific function and responsibility to the project, and is articulated accordingly. The project can most easily be seen through the relationship between the parts to the whole.

This presentation is organized to help support my approach and method. Starting with a photomontage of the site and finished building, followed by the architectural delineations of plans, elevations and sections. In order to establish the relationship between the parts and the tectonic whole, a chapter illustrating the building components follows. The work concludes with a series of sketches, drawings and studies outlining the development of a particular architectural position.

Title	i
Signatures	ii
Abstract	iii
Content	iv
Site	2
The Building	6
Plan	7
North Section	8
North Elevation	9
North Section 1	11
North Section 2	13
East Elevation	15
East Section 1	16
East Section 2	17
The Blocks	18
Roof Panels	19
Columns	20
Bearing Plates	21
Floor Tiles	22
Rain Trough	23
Story	24





Claytor Lake is located in the New River Valley of southwestern Virginia.



Aerial Imagery © 2002 Commonwealth of Virginia. The Site is located in a protected cove along the 4,500-acre, 21-mile long lake.

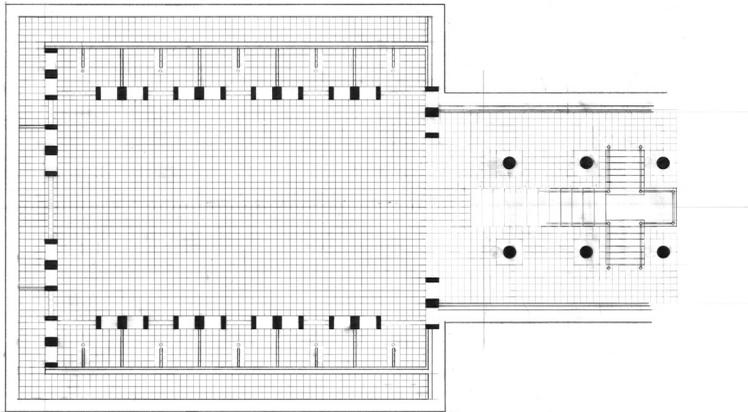


Aerial Imagery © 2002 Commonwealth of Virginia.

The building is situated perpendicular to the slope of the north-face shoreline and within close proximity to an existing public boat ramp.







Basement Floor Plan

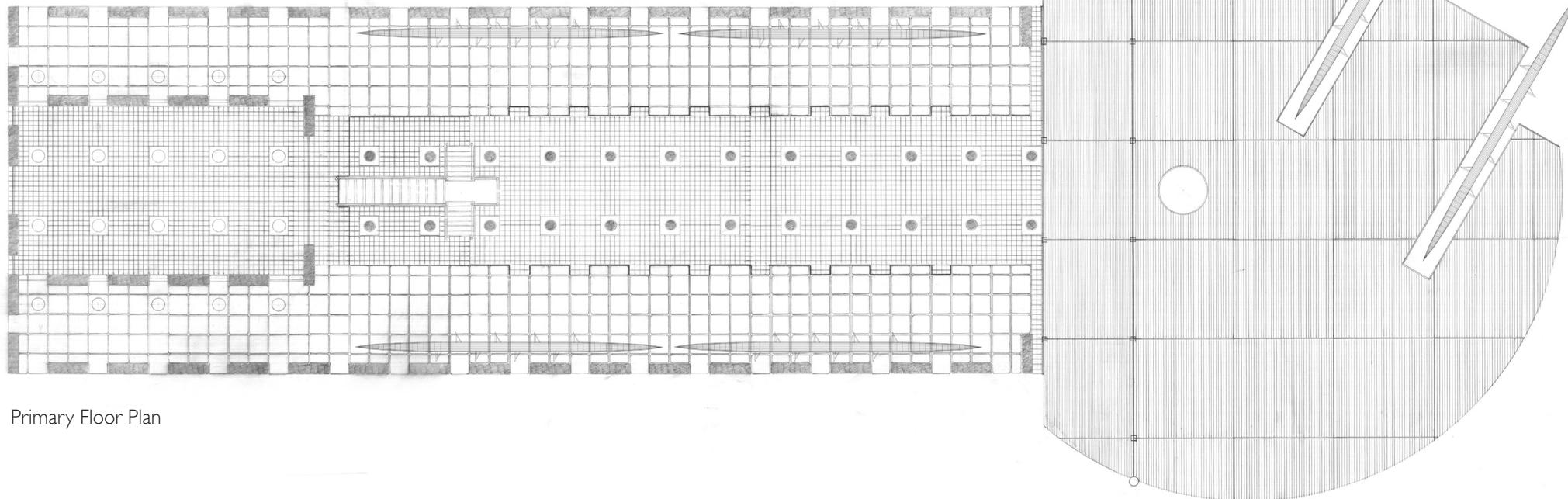
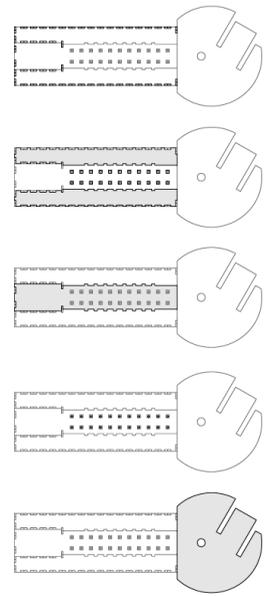
Perforated block wall establishes the perimeter and provides a backdrop for the racing shells.

Large concrete tile units make up the floor of the ramps, which provide access to the boat storage.

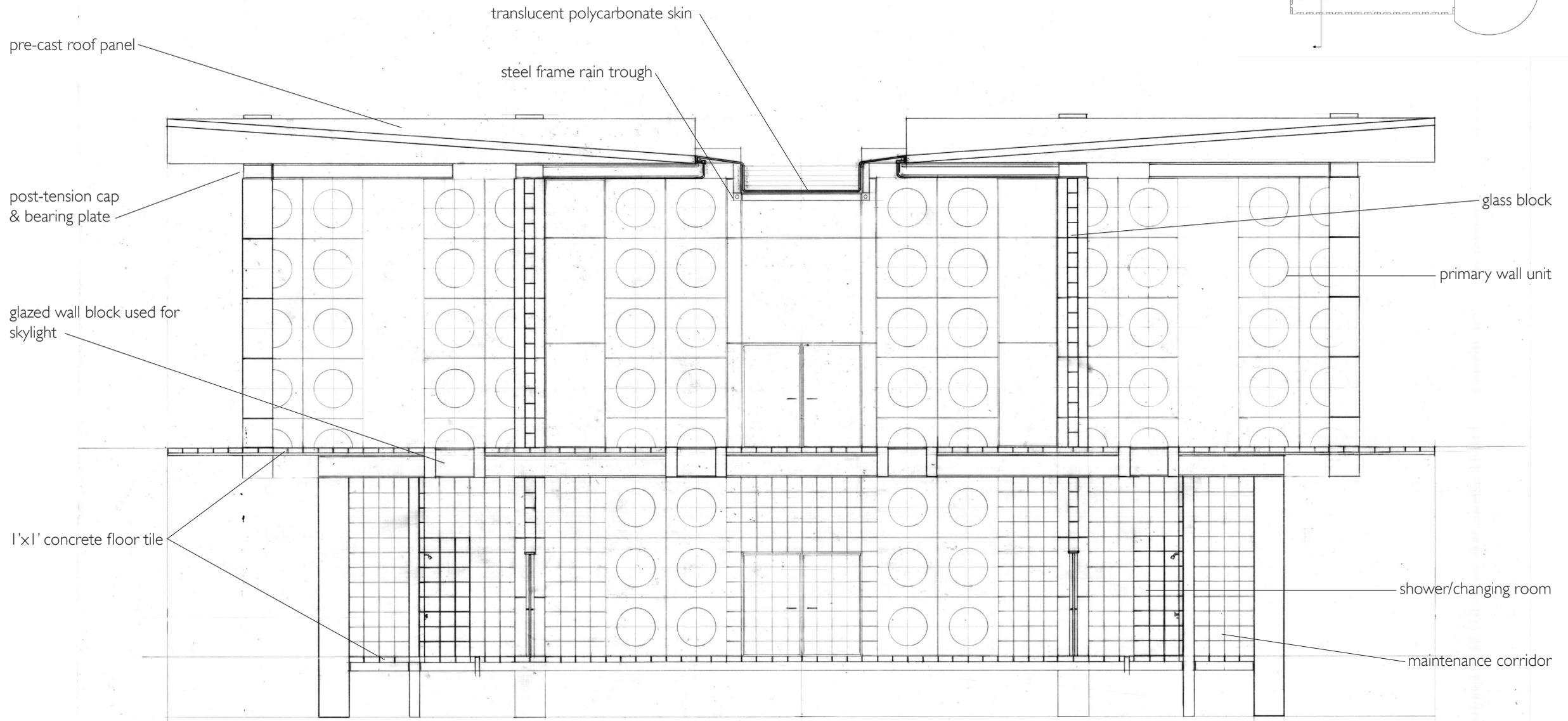
Small concrete tile units make up the floor of the interior corridor and clubhouse spaces.

Central columns provide support for roof panels and rain trough.

The floating teak dock provides a transition between the building and the water.



Primary Floor Plan



pre-cast roof panel

translucent polycarbonate skin

steel frame rain trough

post-tension cap & bearing plate

glazed wall block used for skylight

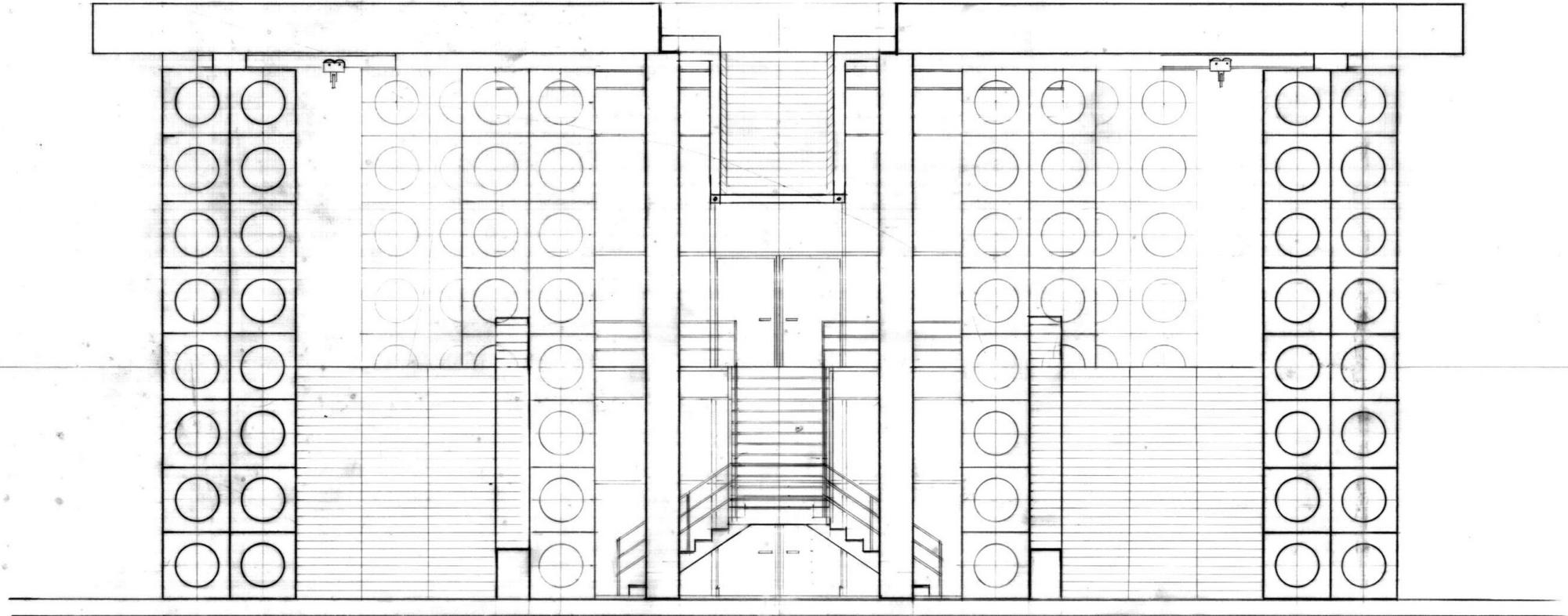
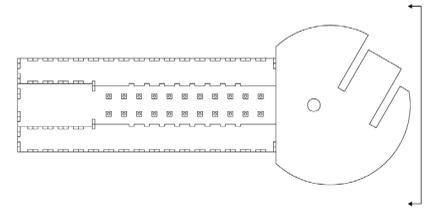
1'x1' concrete floor tile

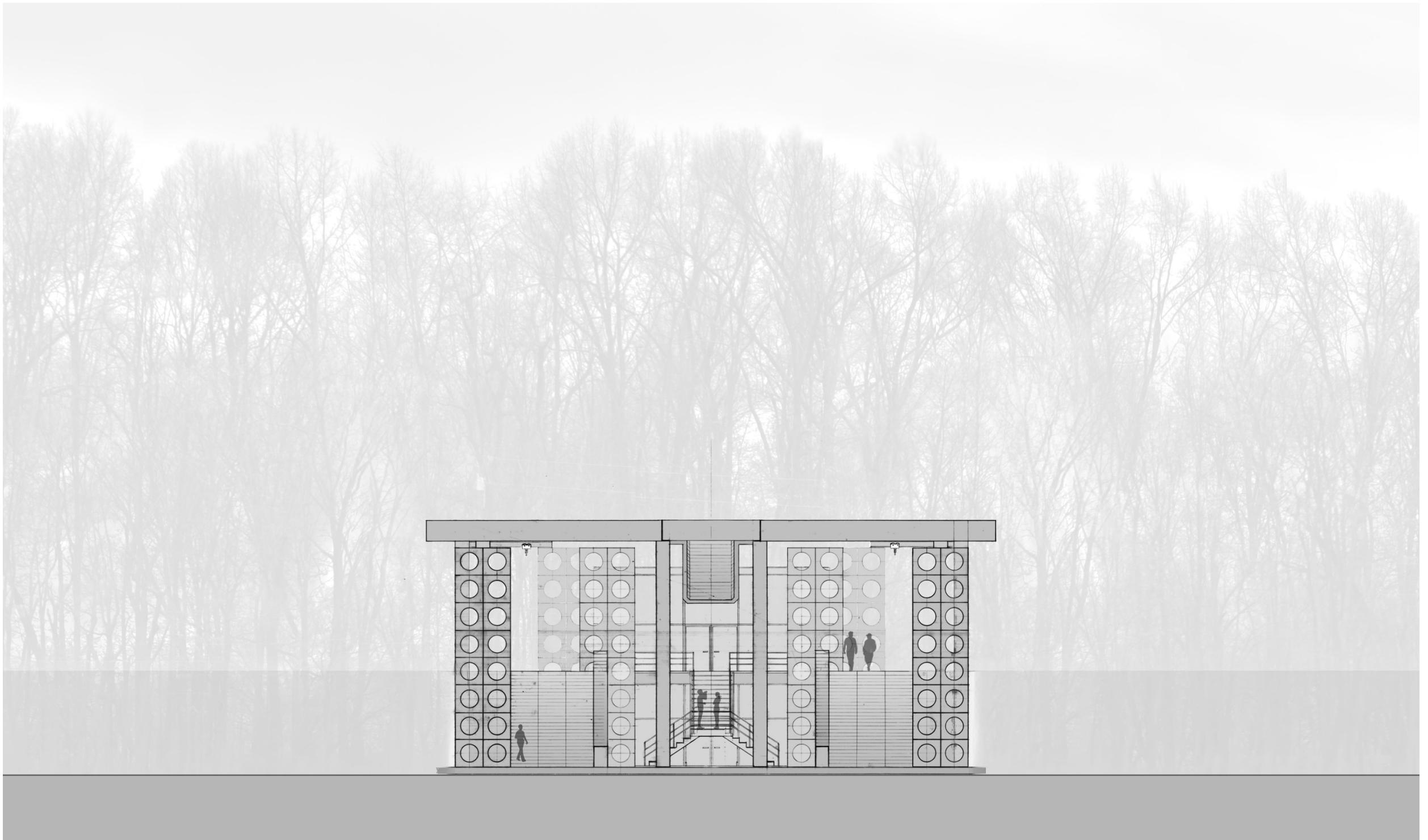
glass block

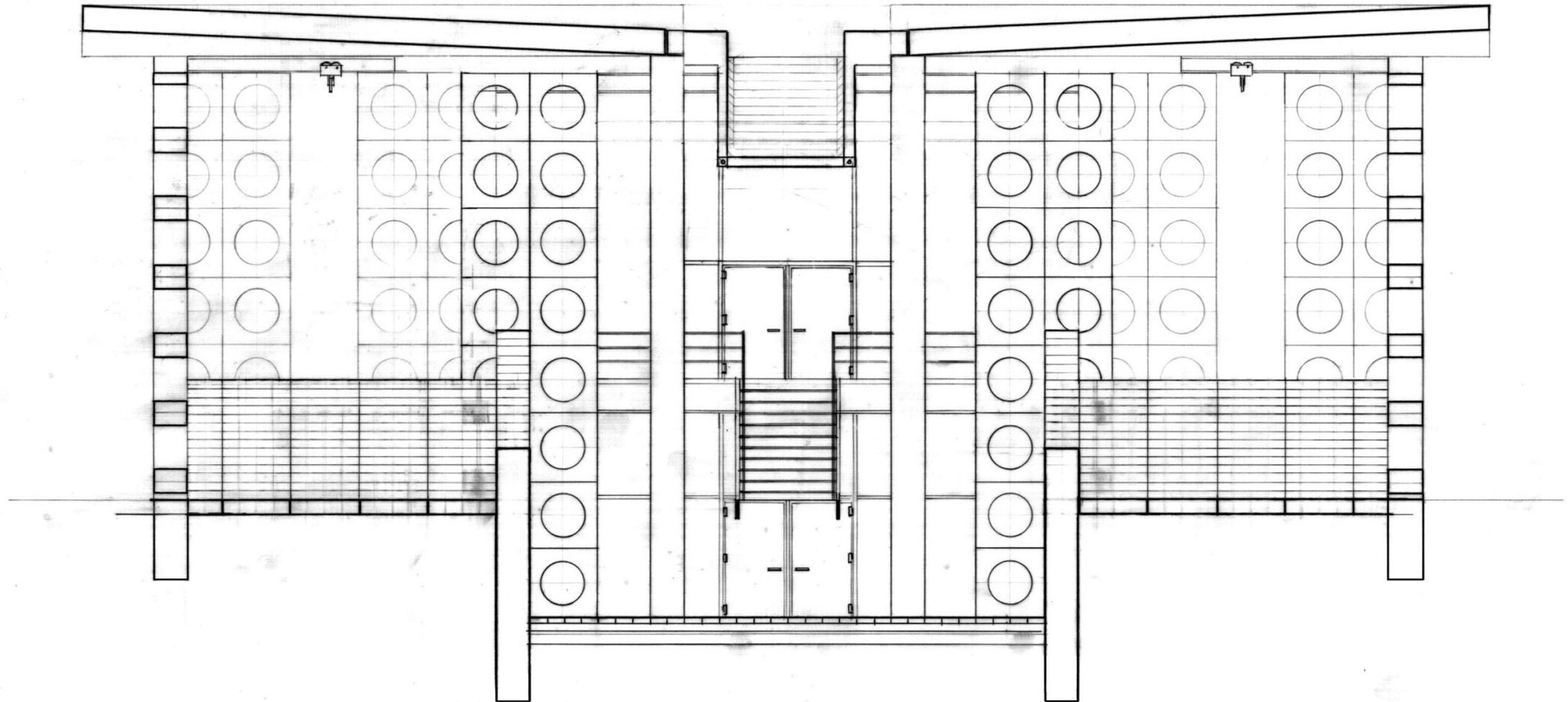
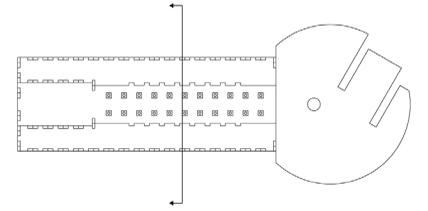
primary wall unit

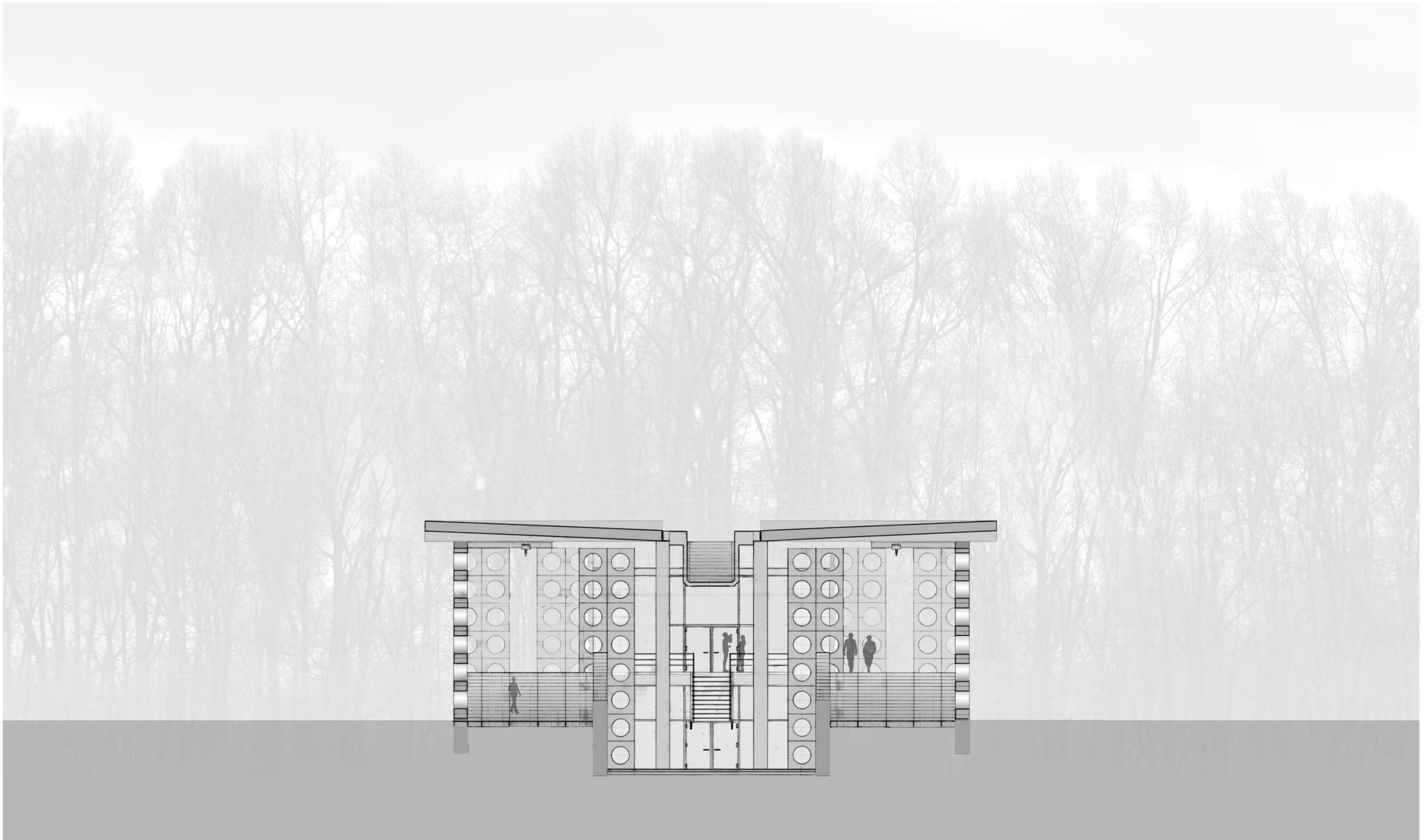
shower/changing room

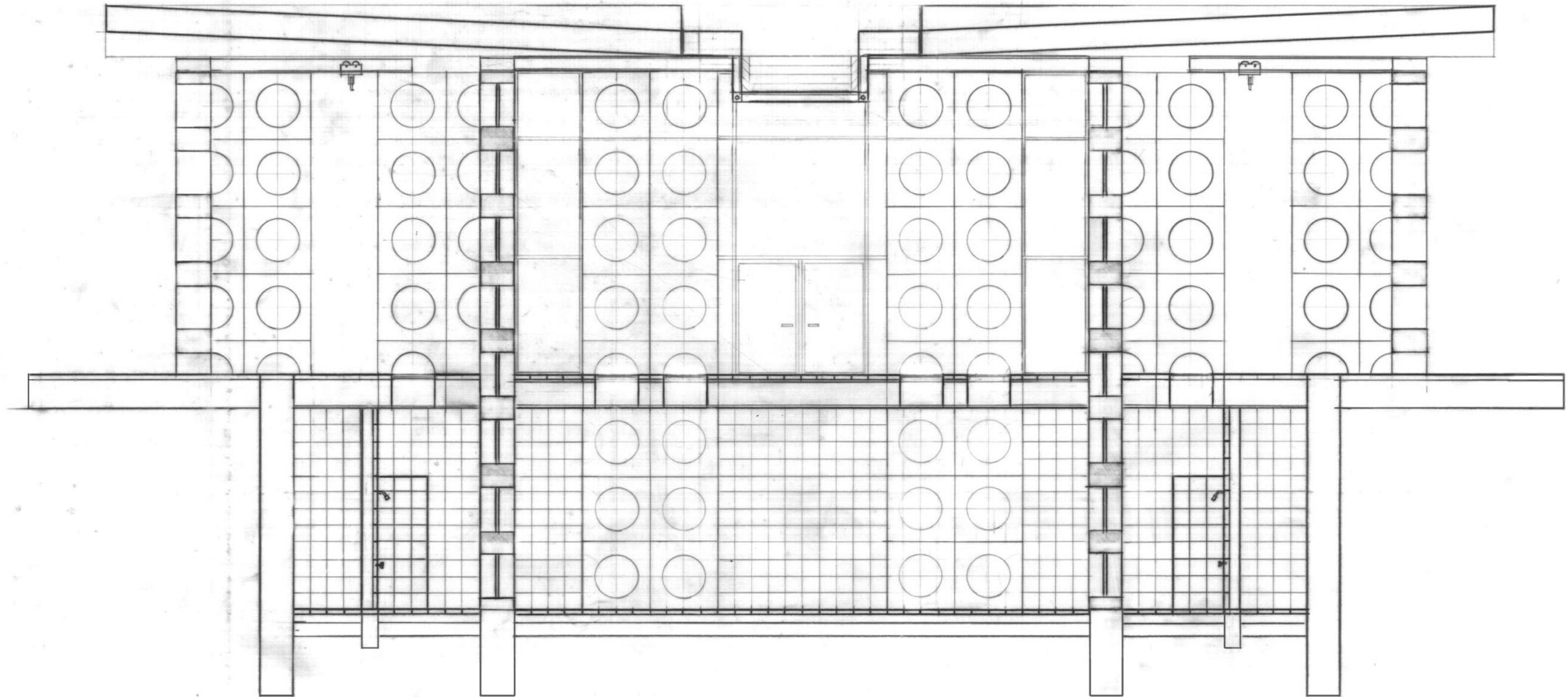
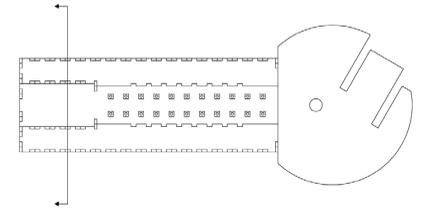
maintenance corridor

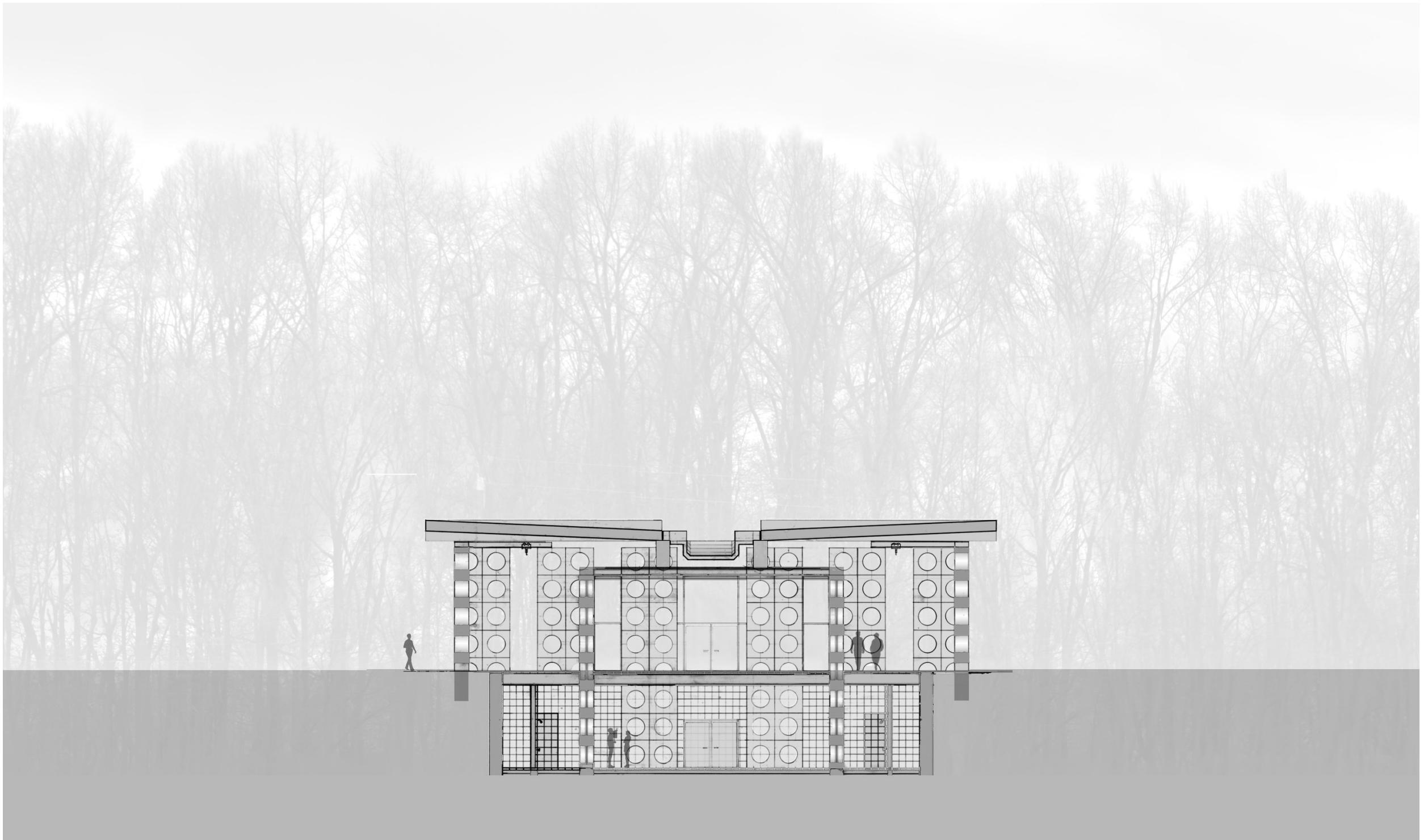


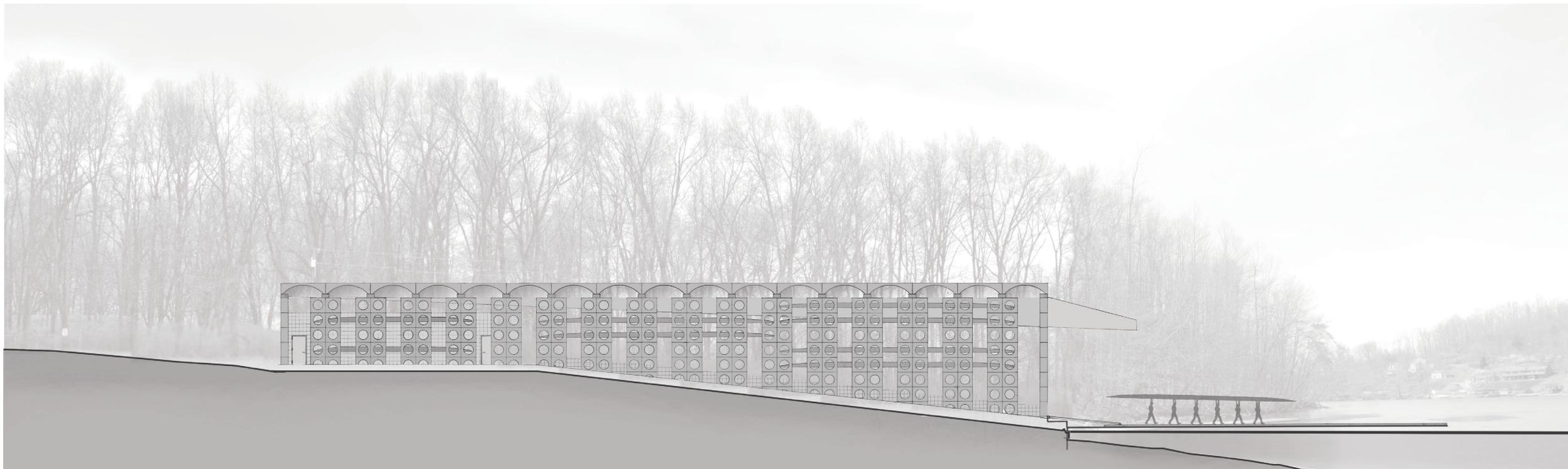
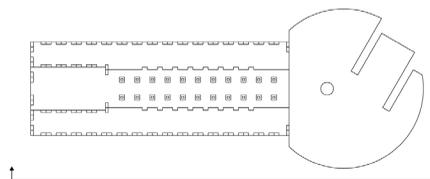
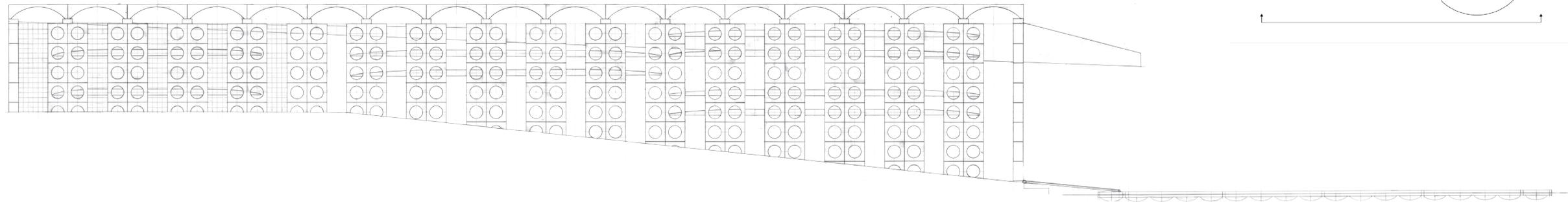


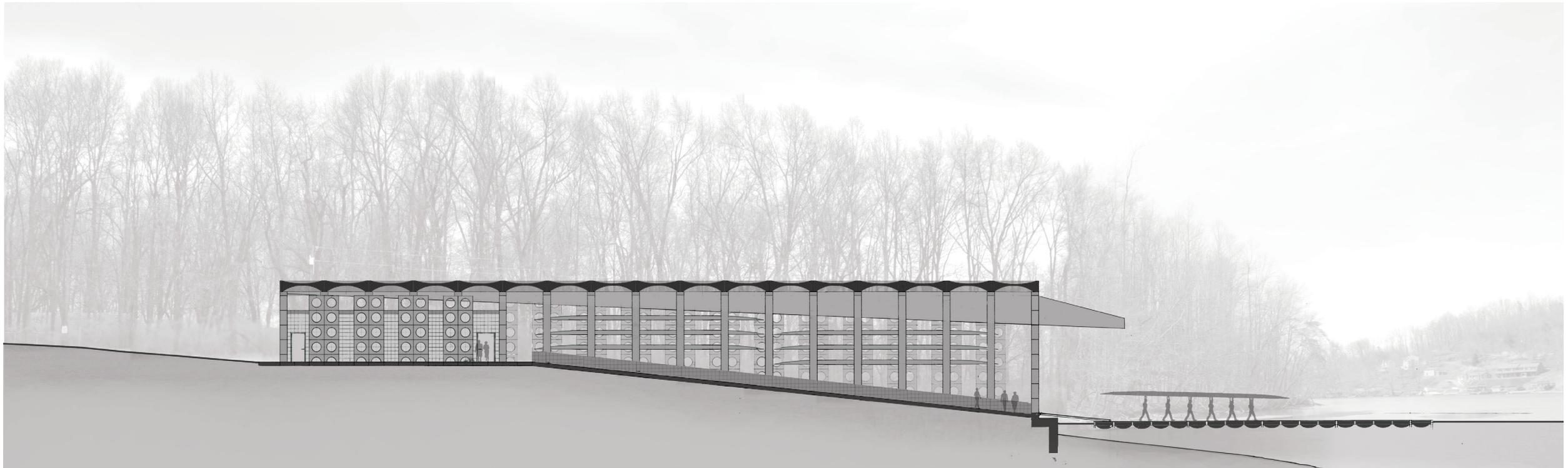
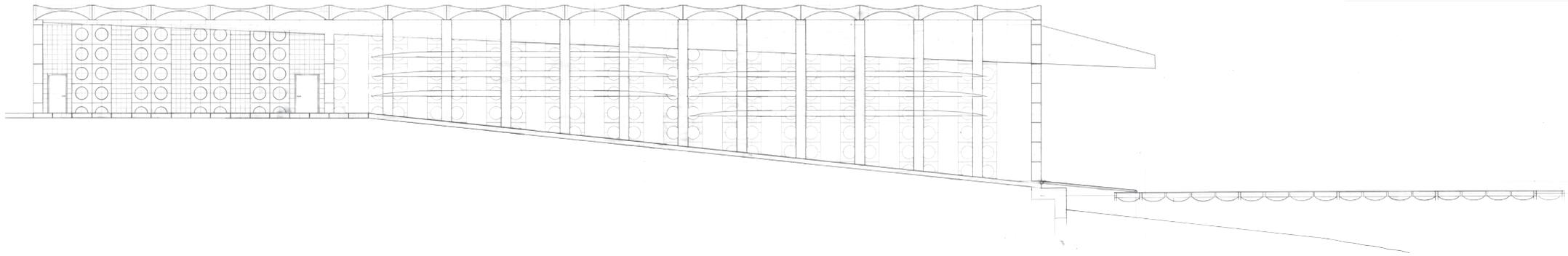
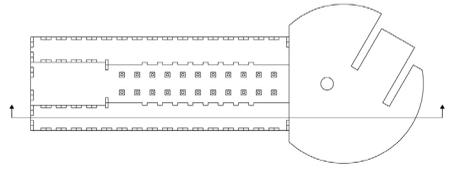


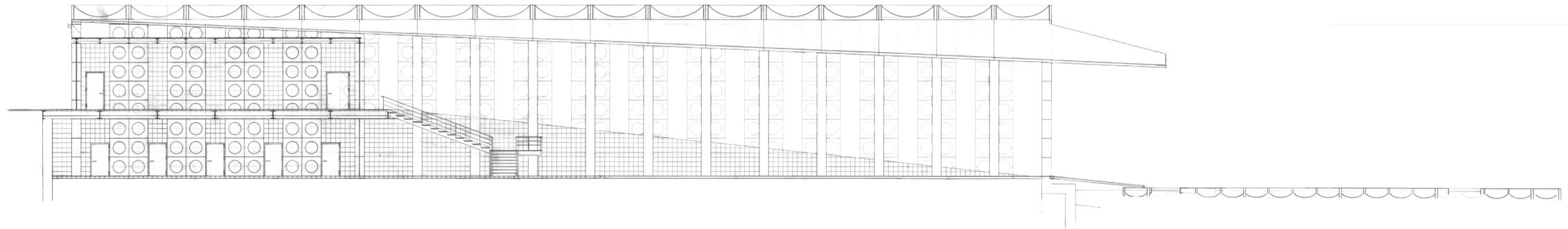
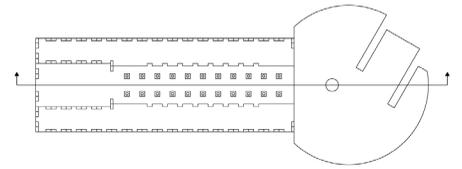


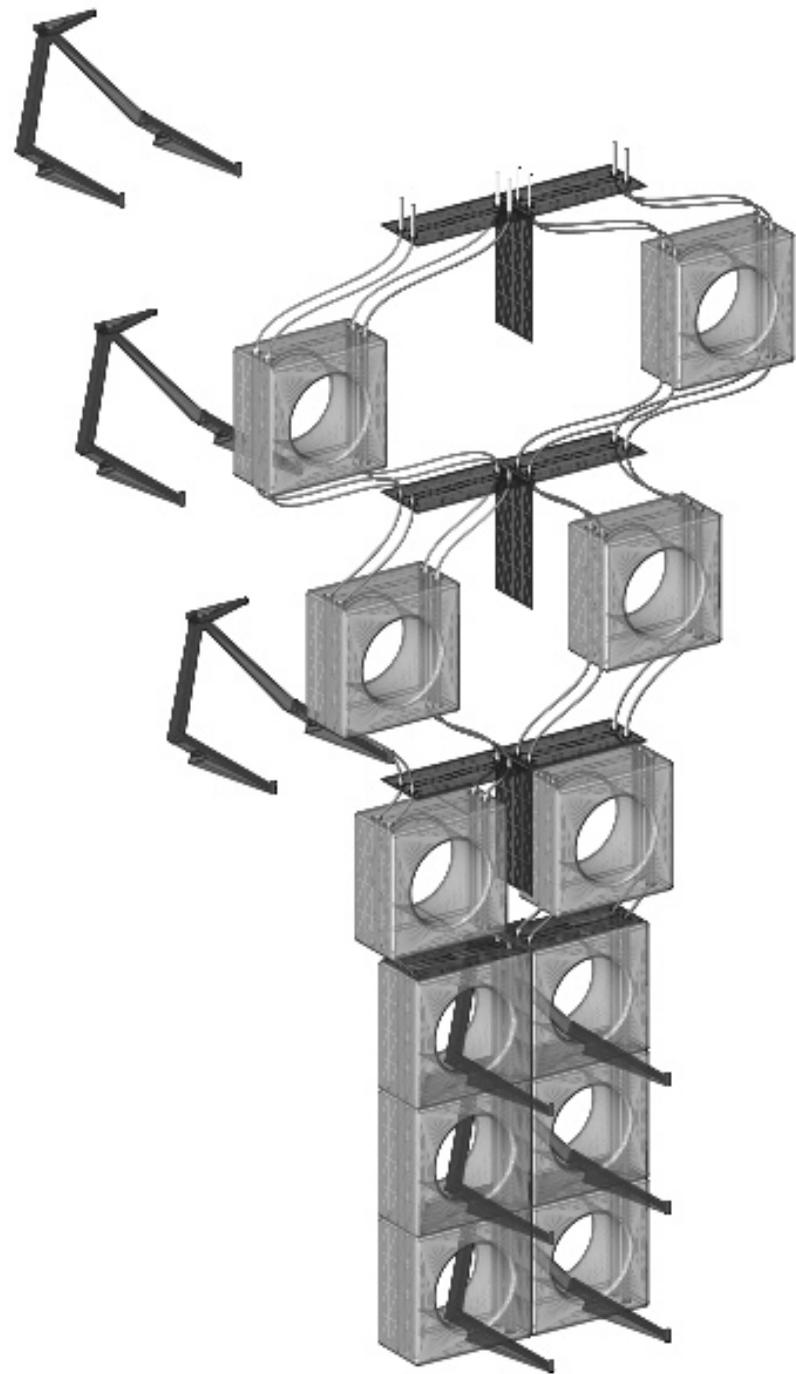






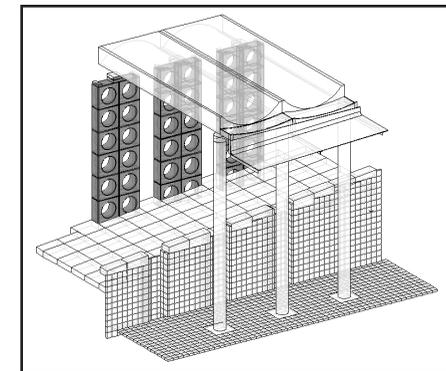




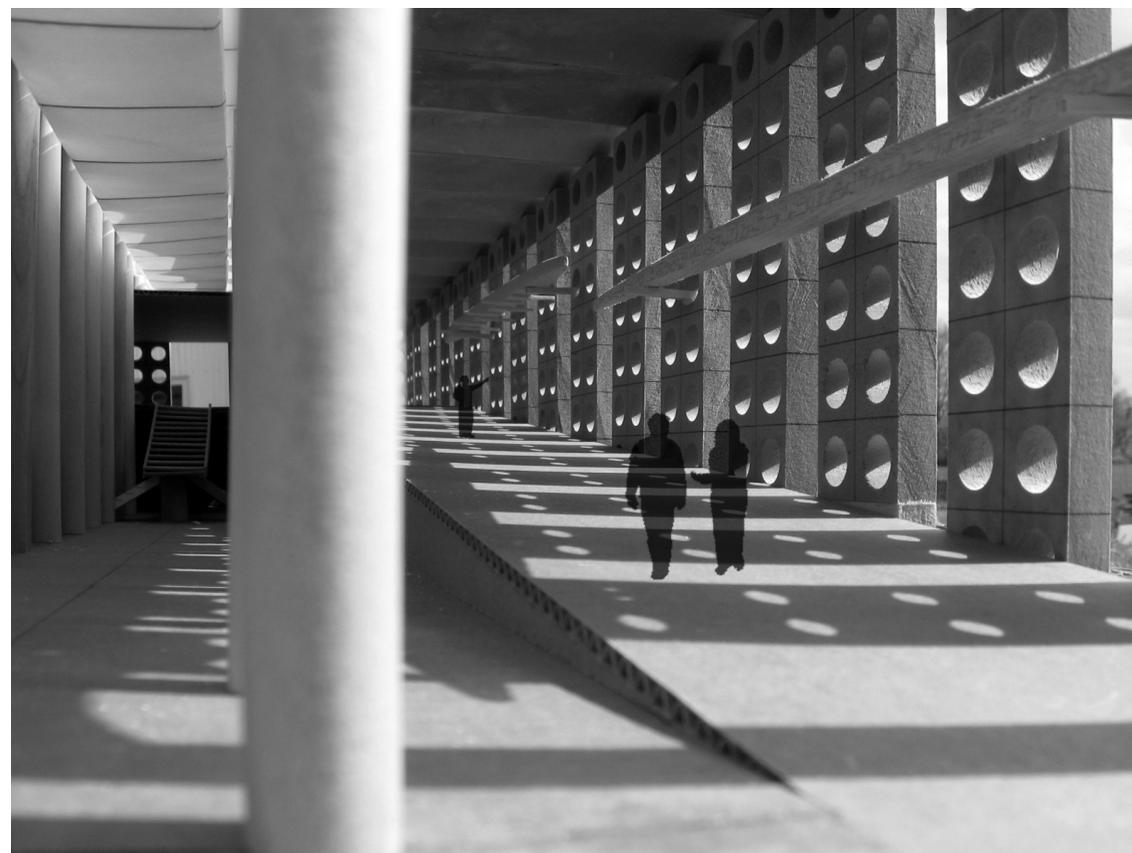


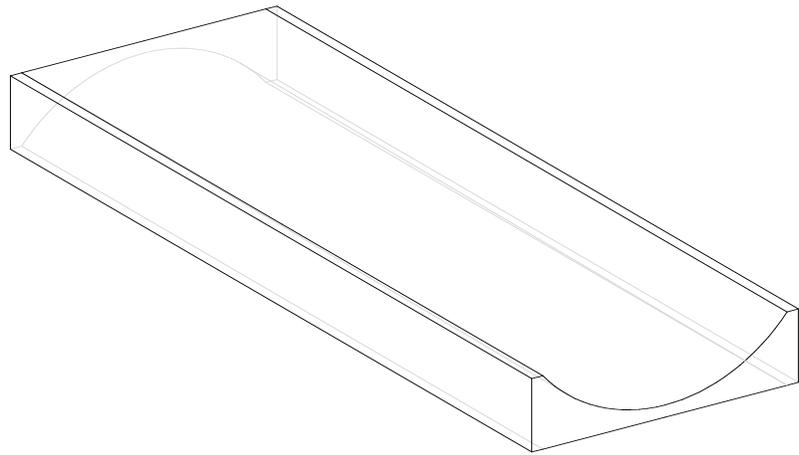
Construction:  
Pre-cast concrete  
Post-tension assembly

Function:  
Support roof panels  
Receive aluminum boat storage brackets



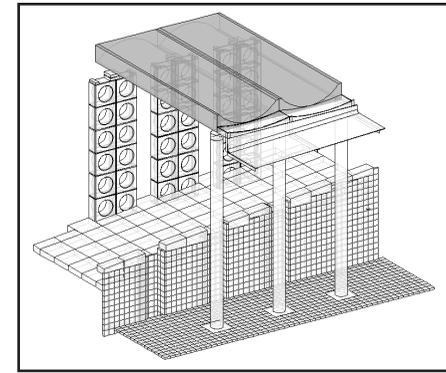
The tectonic nature of the perforated block walls marching through the landscape provides a contrasting backdrop for the storage of the elegant racing shells. There is a level of porosity established that allows this structure to fit in well with the density of the surrounding woodlands.





Construction:  
Pre-cast concrete  
Bolted to bearing plate

Function:  
Provide shelter from the elements  
Transport water to central rain trough



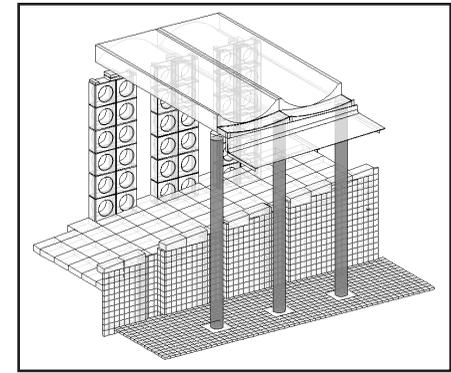
From the North and South the roof reads as a thick, flat slab, which is in proportion to the rest of the structure. The East and West elevations are where the playful nature of the roof panels is expressed. Each panel has an arch that reverses from one end of the panel to the other. This arch opens the building up to the exterior as well as providing drainage to the central rain trough.



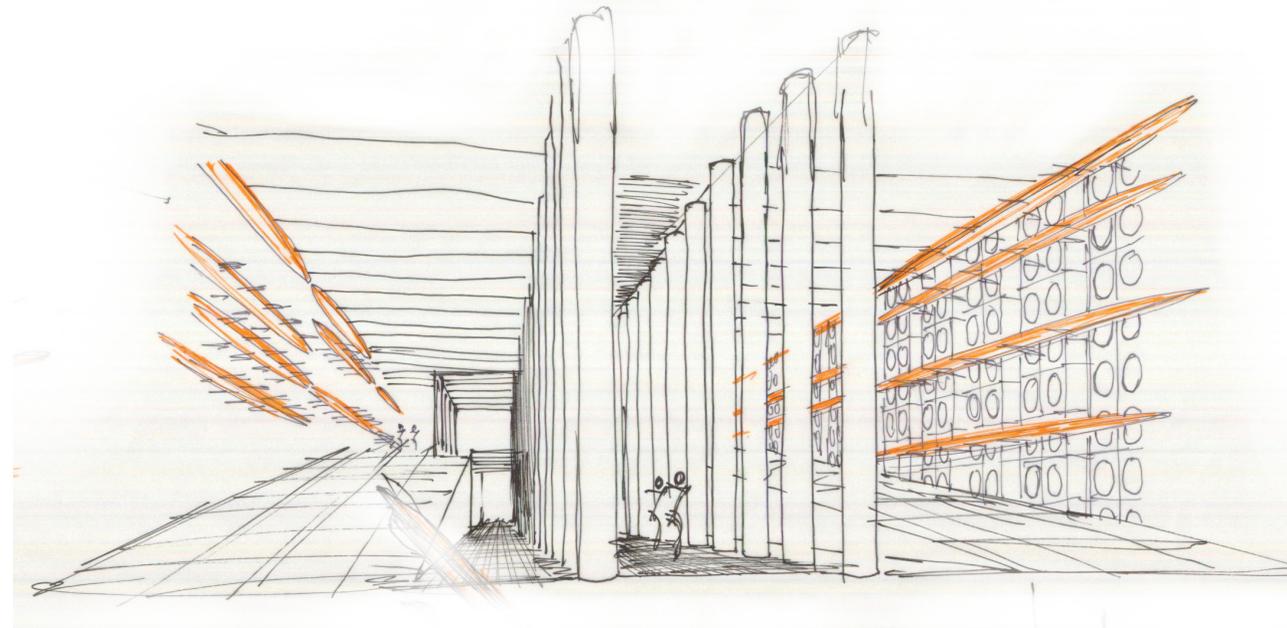


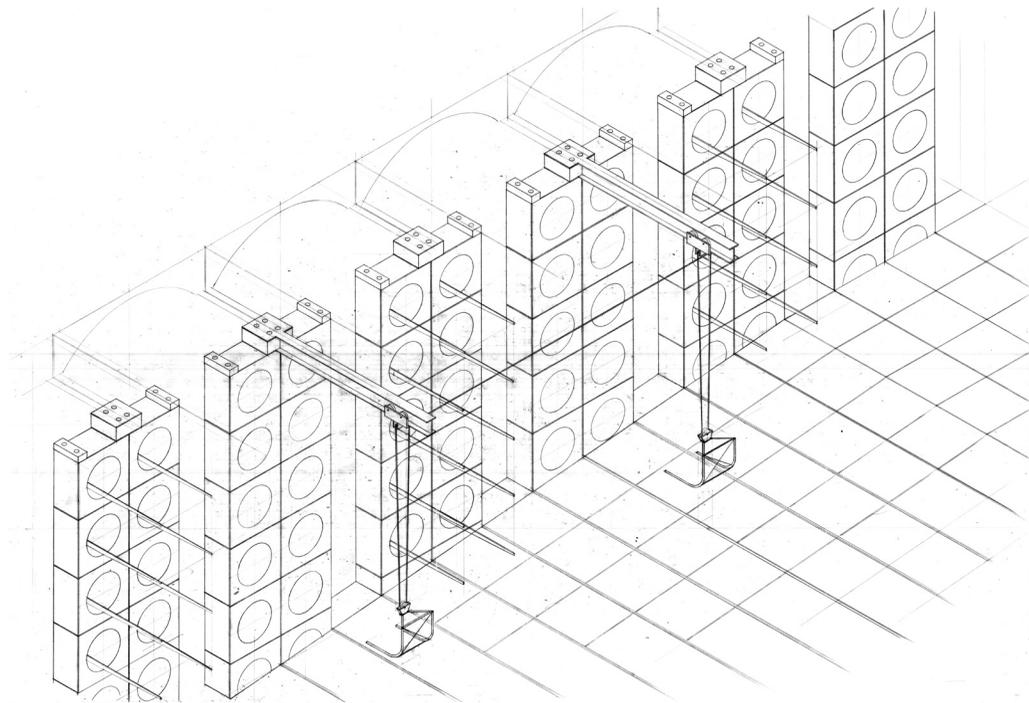
Construction:  
Cast in place concrete

Function:  
Support roof panels  
Support rain trough



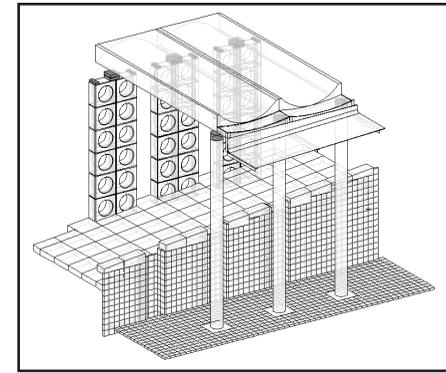
These round columns are used for the interior in place of the block walls. This was an effort to indicate an interior to the structure as well as bring the scale of the central corridor down to human scale. The space between the two rows of columns is a multipurpose space intended primarily for boat repair.



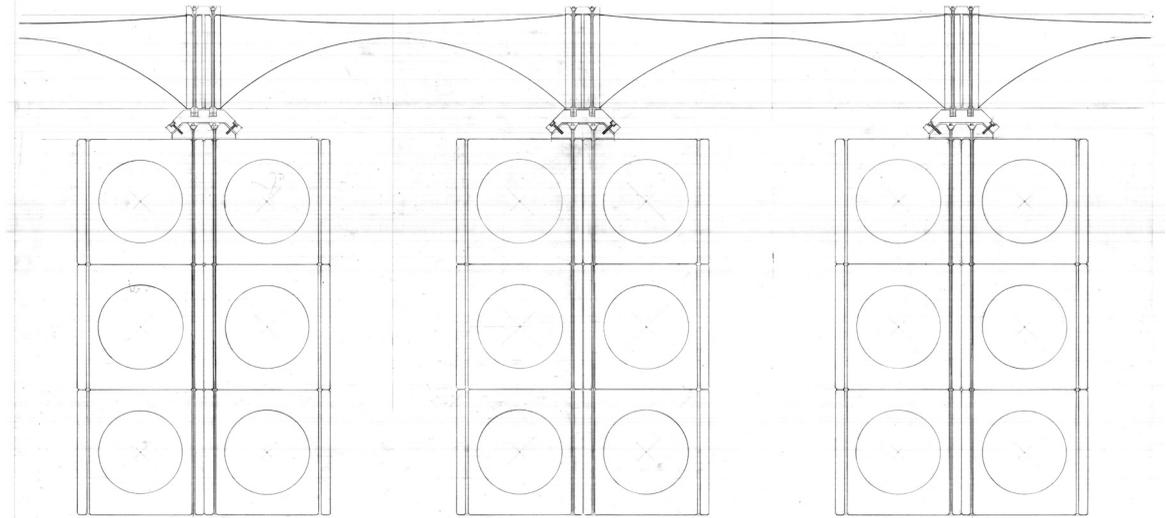
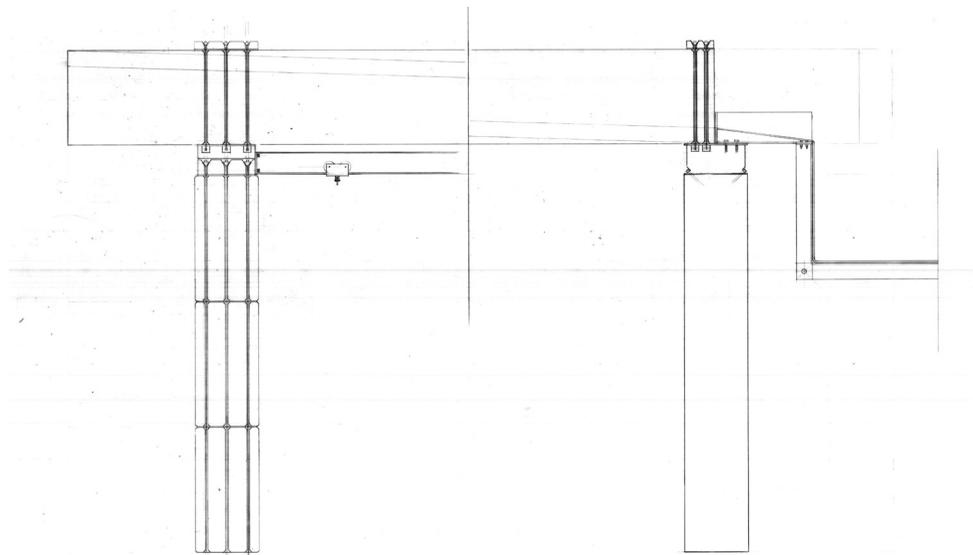


Construction:  
Extruded steel sections

Function:  
Post-tension plate for block walls  
Bearing plate for roof panels  
Track for pulley system

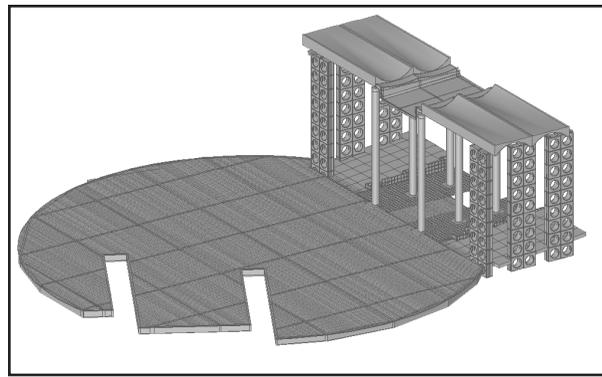


The form of these components was governed by function. These components are necessary; however do not have a significant impact on the experience of the space.



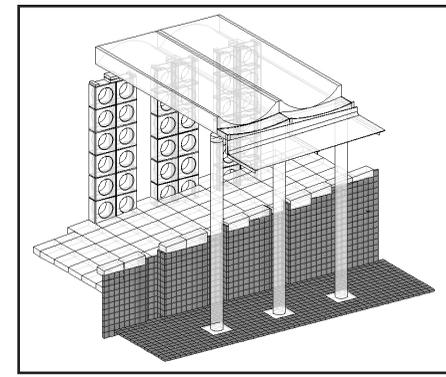
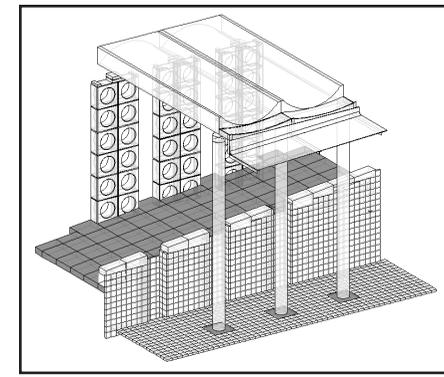
Construction:  
Wood framing  
Teak Decking

Function:  
Provide entrance to water



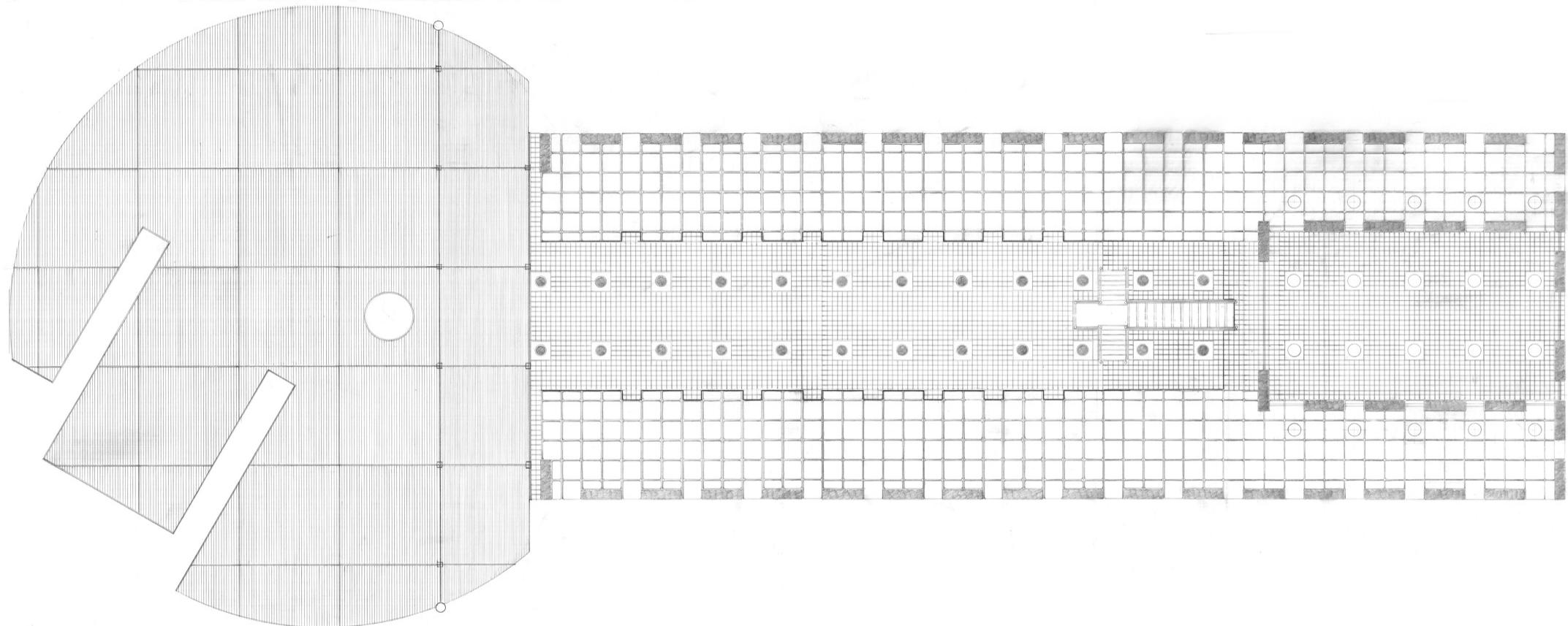
Construction:  
Pre-cast concrete tile

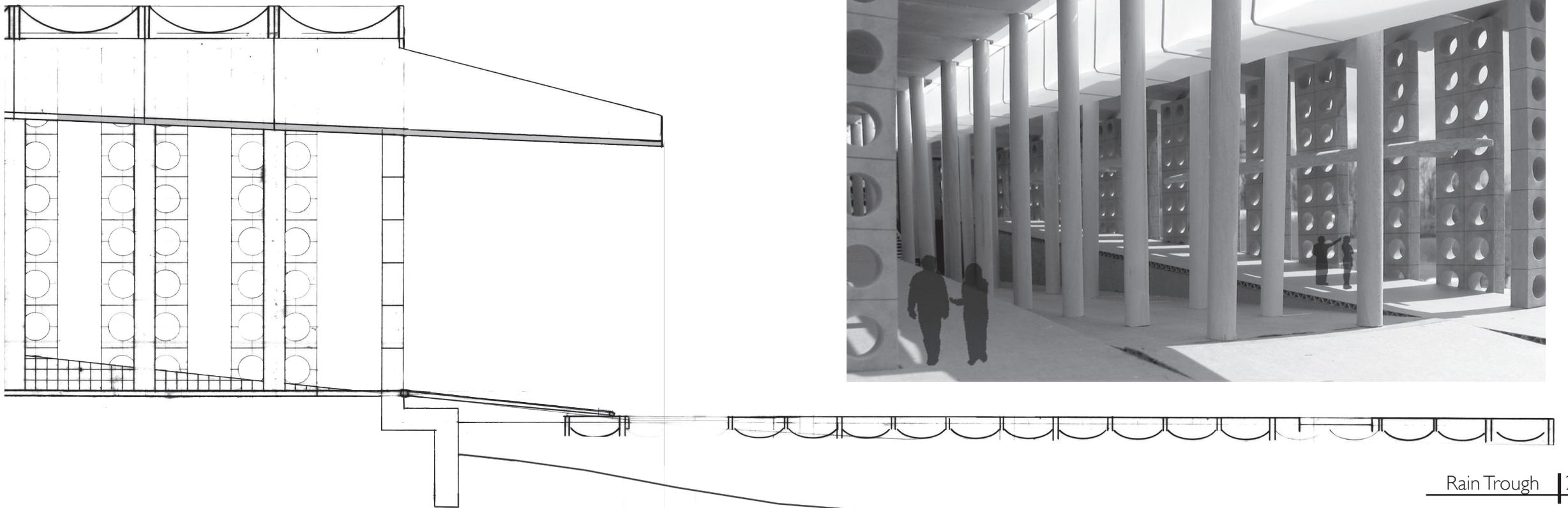
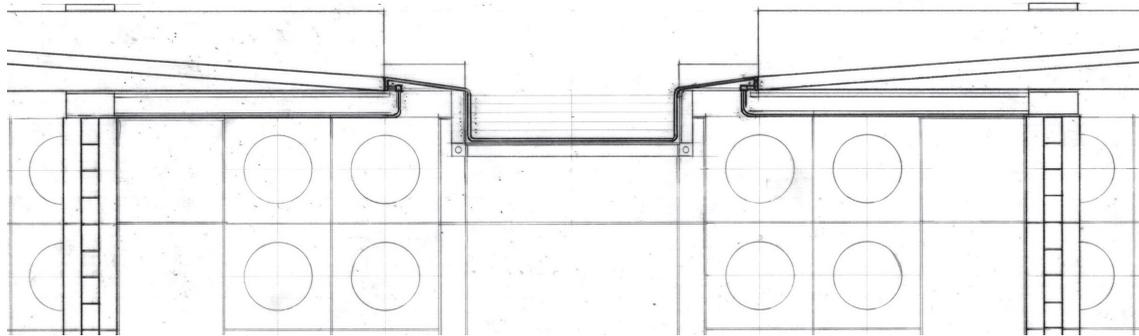
Function:  
Provide flooring



The Dock is a large circular floating platform accessible from every direction. Two slots are cut into the dock allowing the arrival and departure of the racing shells. A circular cut out allows rainwater from the roof to pass through the dock and into the lake.

Large tiles are used on the ramps towards the exterior of the building, and are of the scale of the block wall panels and racing shells. The smaller tiles are used along with the columns to bring down the scale of the building. These small tiles are used in the central corridor as well as the enclosed clubhouse spaces.



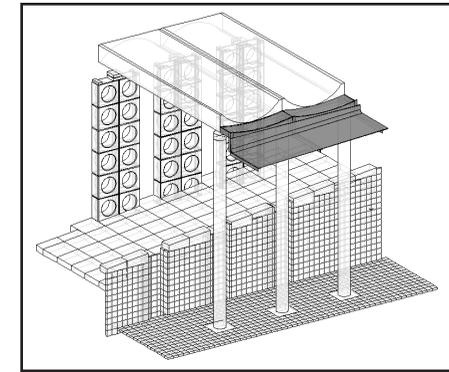


Construction:

- Steel frame
- Translucent polycarbonate skin

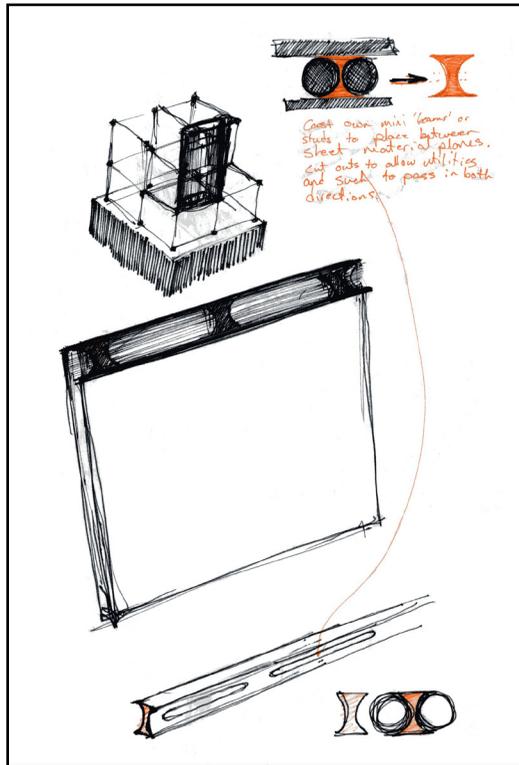
Function:

- Transport rainwater to the lake
- Animate the space with translucent light

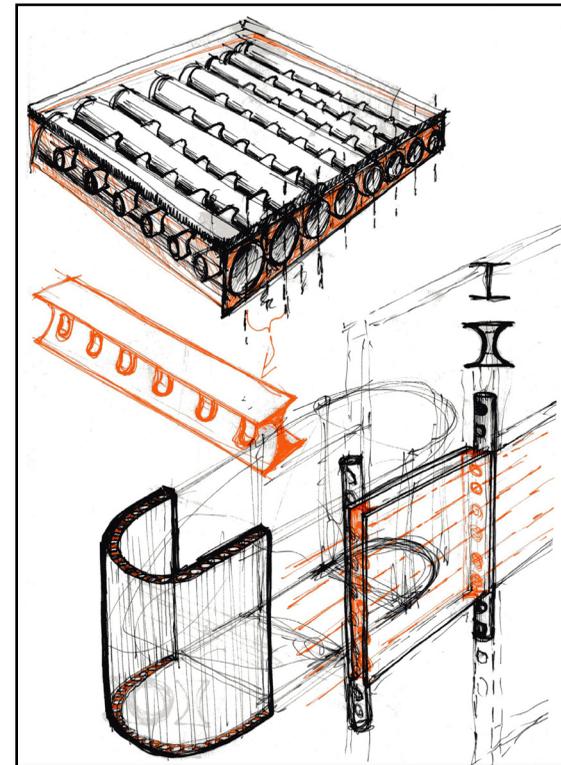
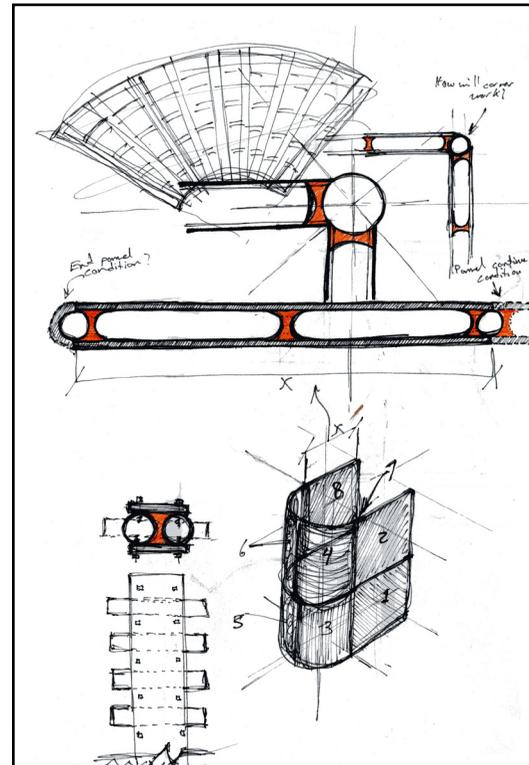


The combination of the steel ribs and the stressed skin provide a rigid, lightweight beam in contrast with the tectonic nature of the majority of the structure. This secondary element has always been in the project, yet its quality has changed from an opaque element to one that conducts light.

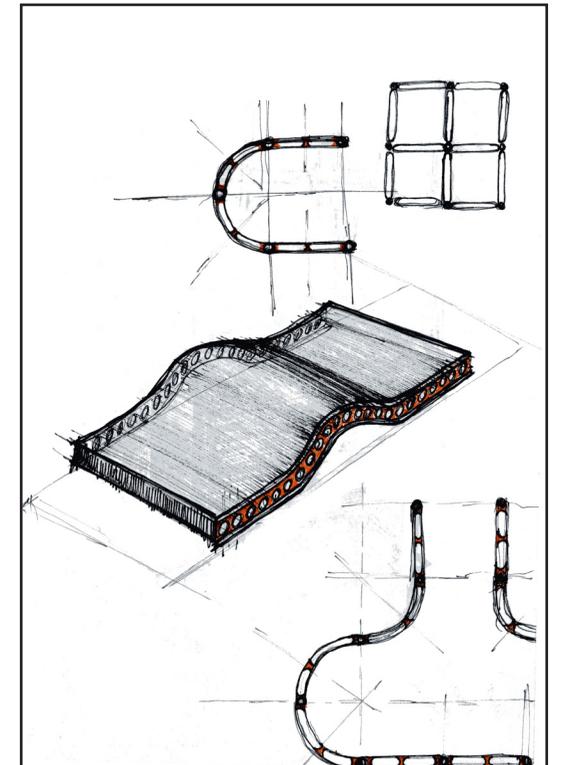


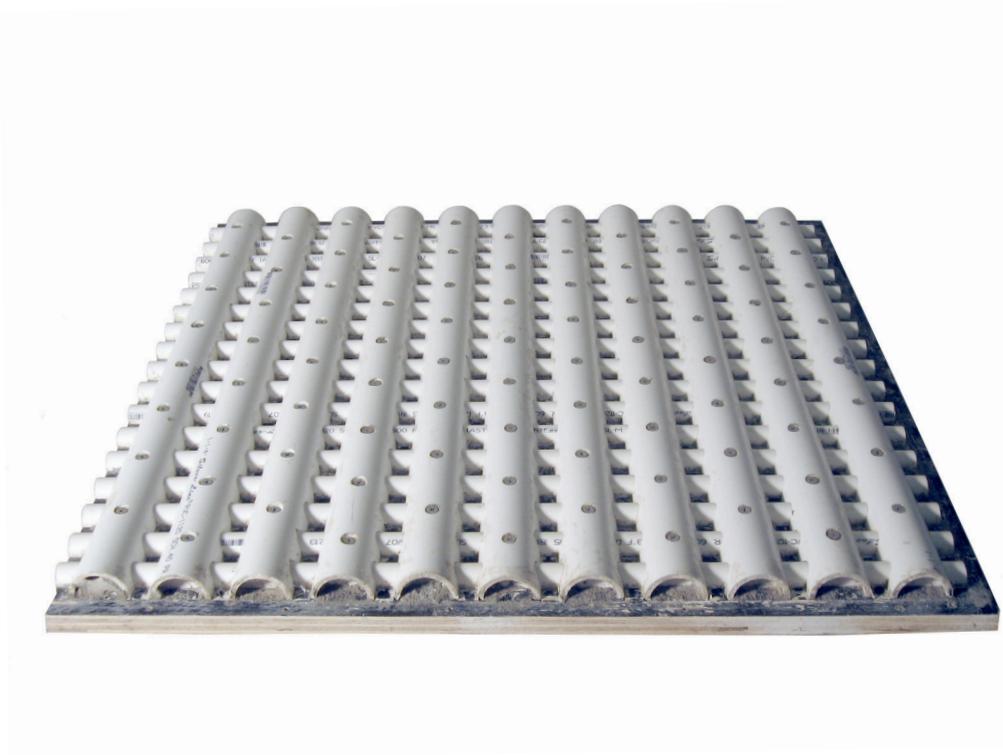


Stressed skin building panel studies.

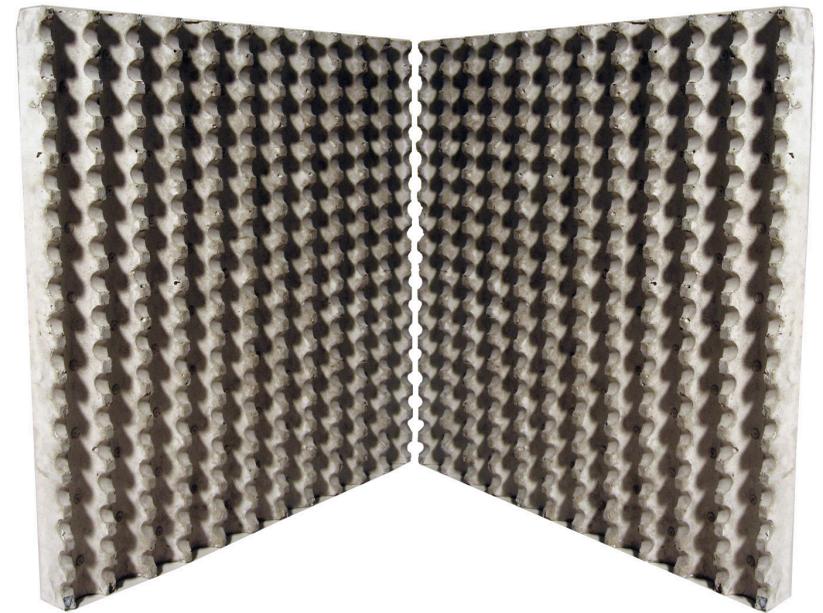


Formwork for multidirectional building panels.

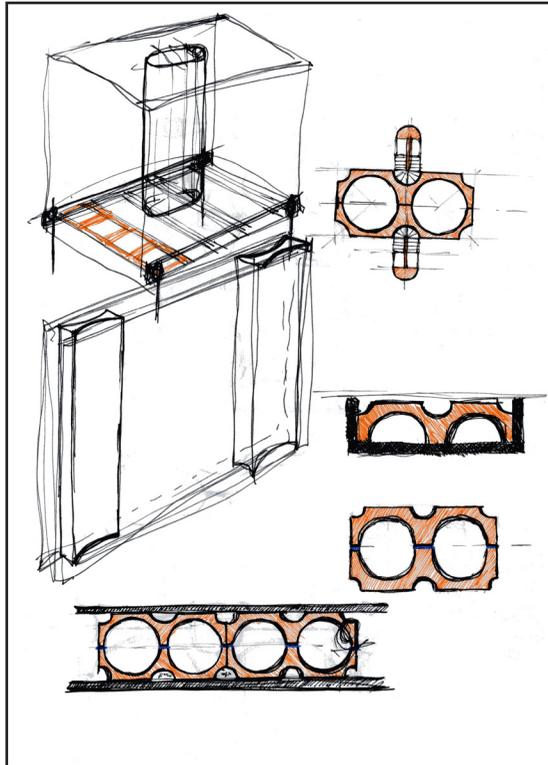




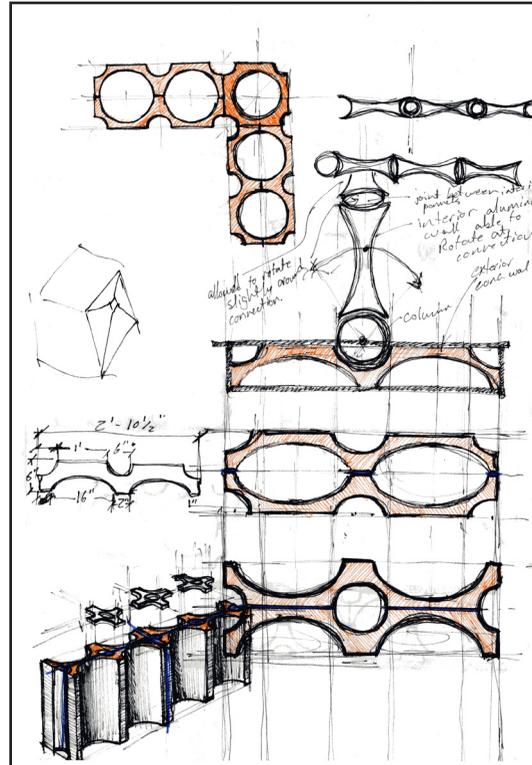
Formwork prototype developed from previous sketch.



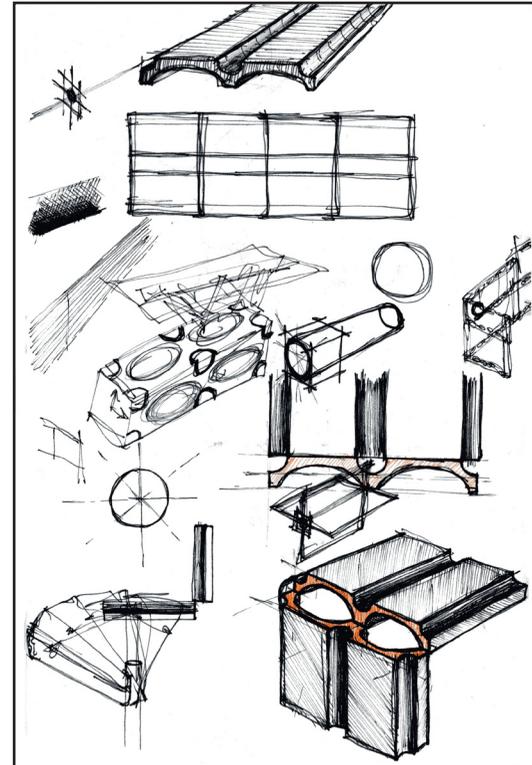
Two parts cast concrete to make one wall panel.



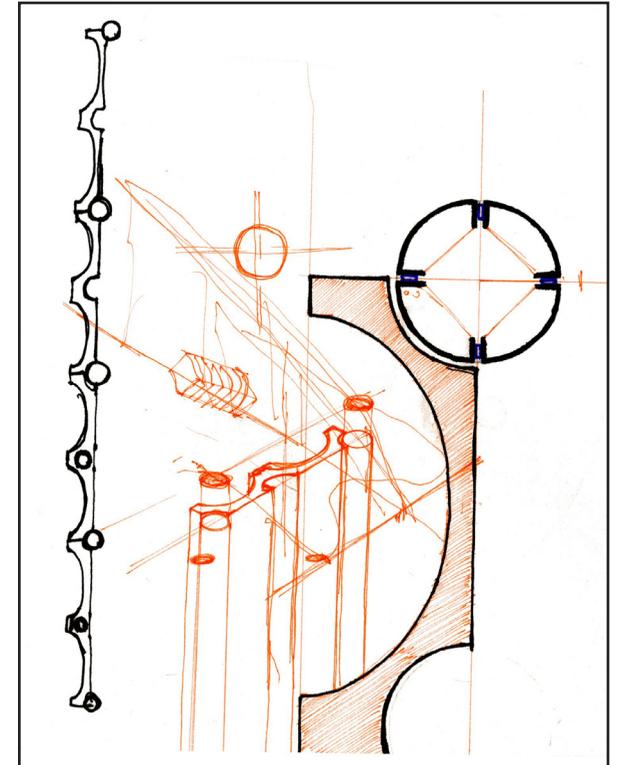
Considering a more appropriate form for concrete.



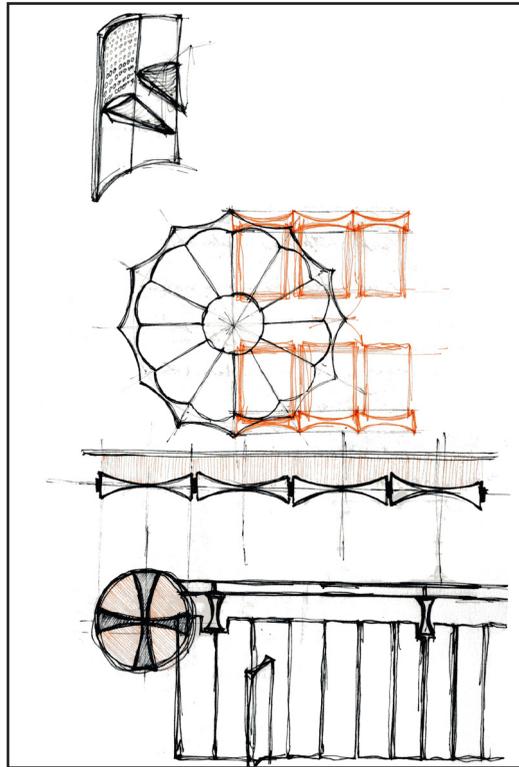
Panel assembly and other building components.



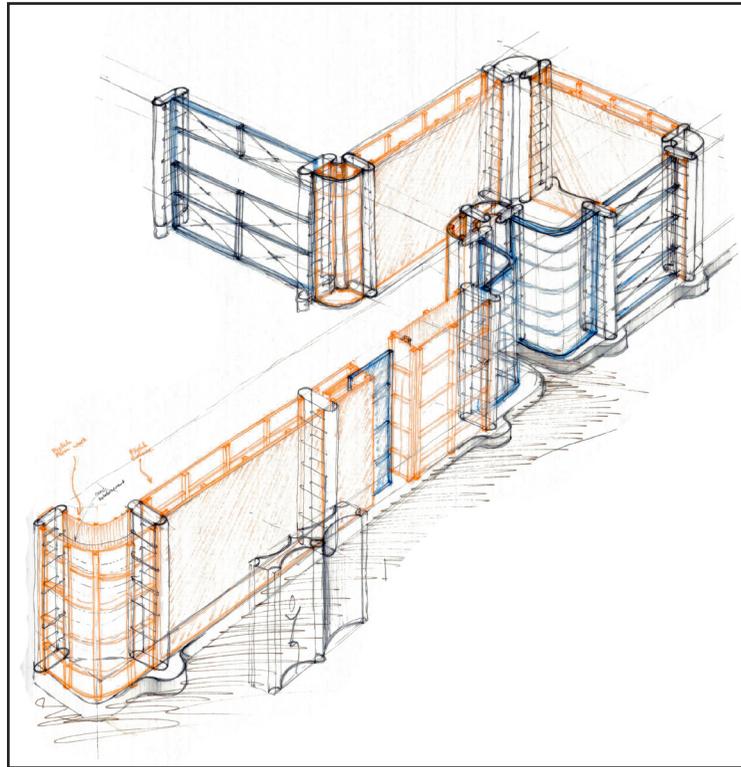
Same component used as spanning element.



Concrete wall panel with sheet metal column.



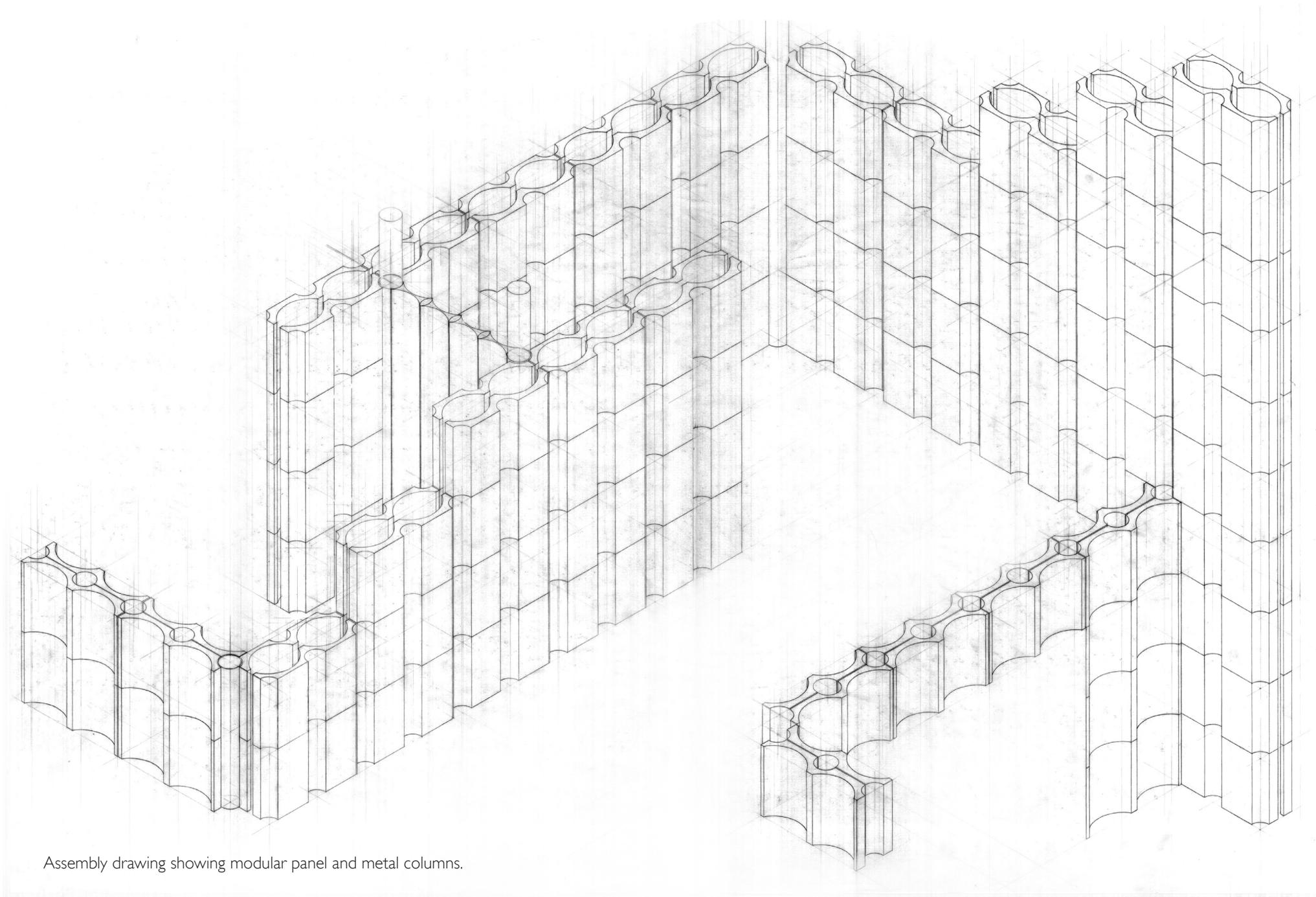
Secondary sheet metal component.



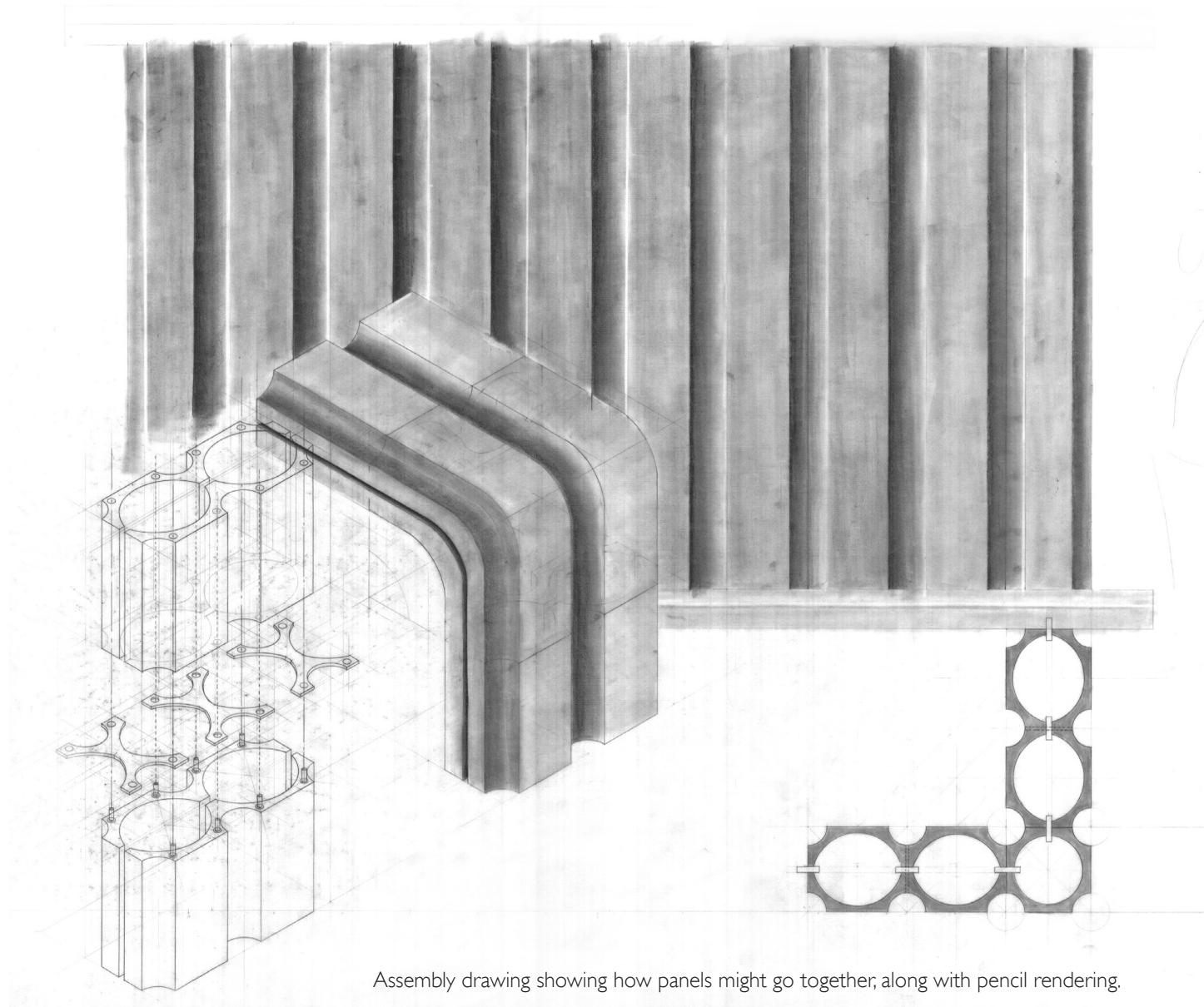
Sketch showing sheet metal columns and modular wall panels.



Metal column prototype.



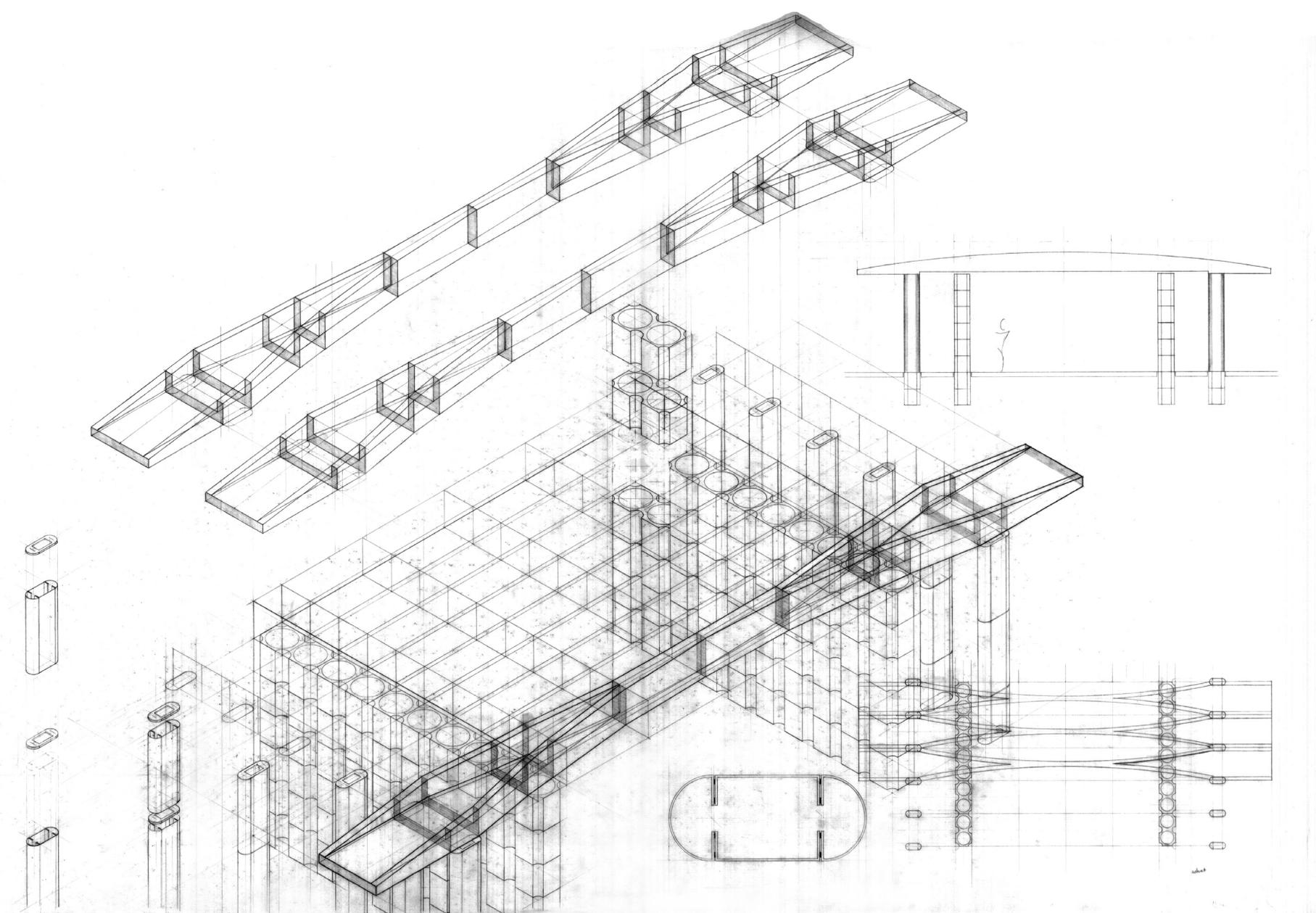
Assembly drawing showing modular panel and metal columns.



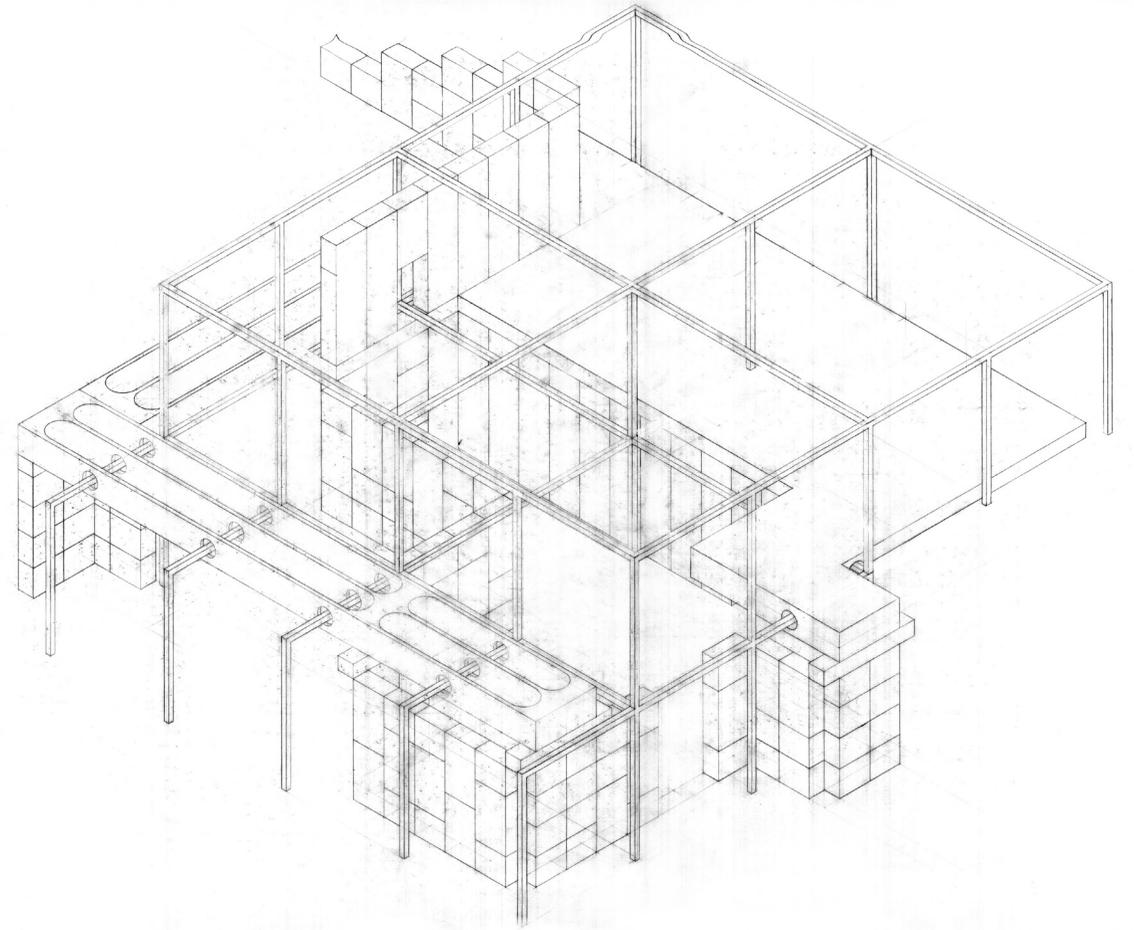
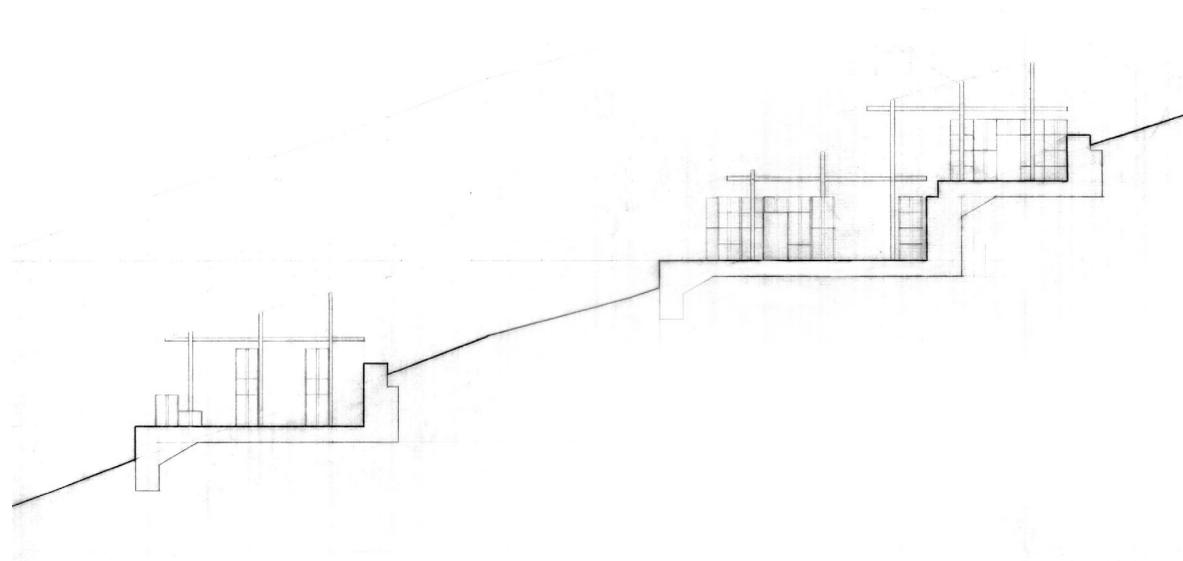
Assembly drawing showing how panels might go together, along with pencil rendering.



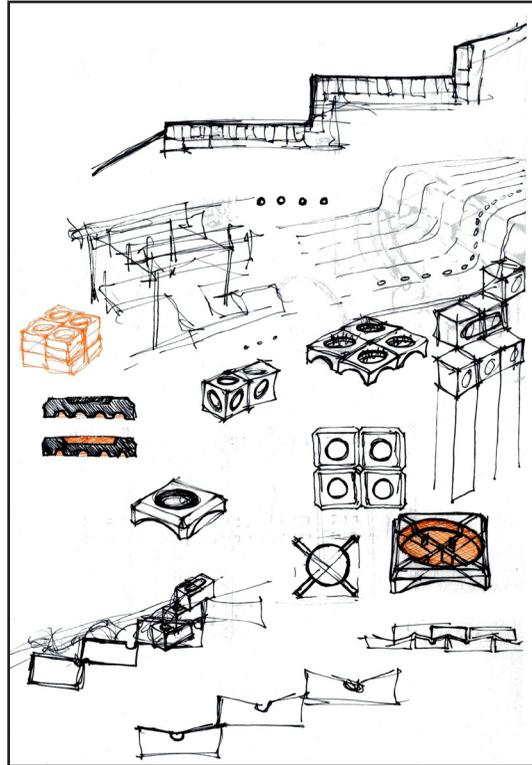
Full scale form work used to cast prototype concrete panel.



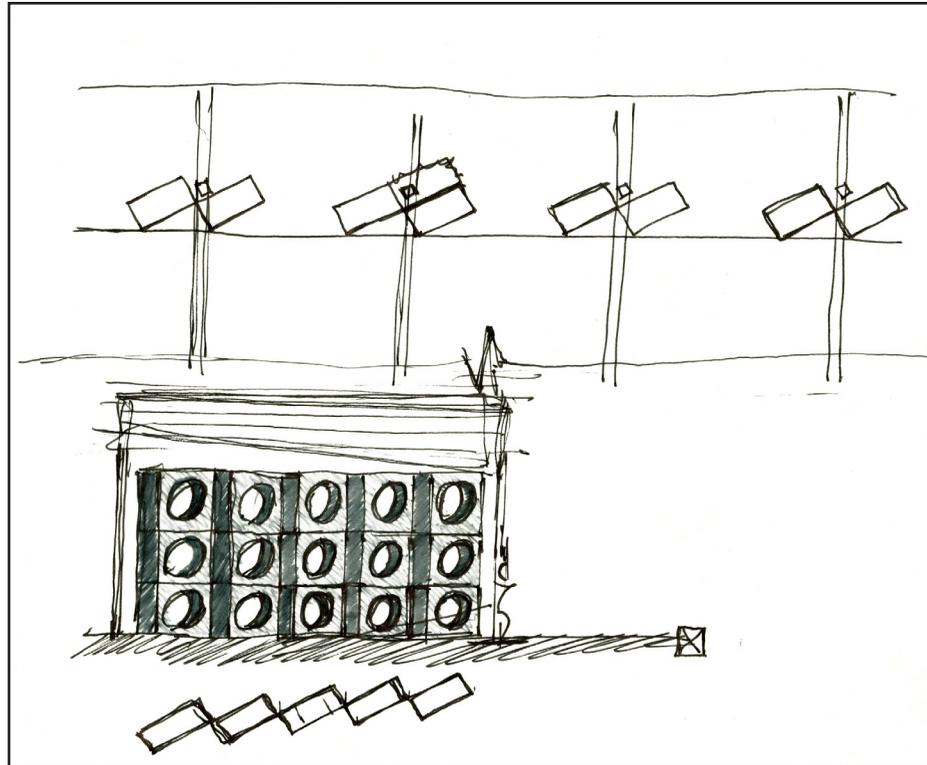
Assembly drawing showing considerations for concrete wall panels and metal columns supporting the pre-cast concrete beams.



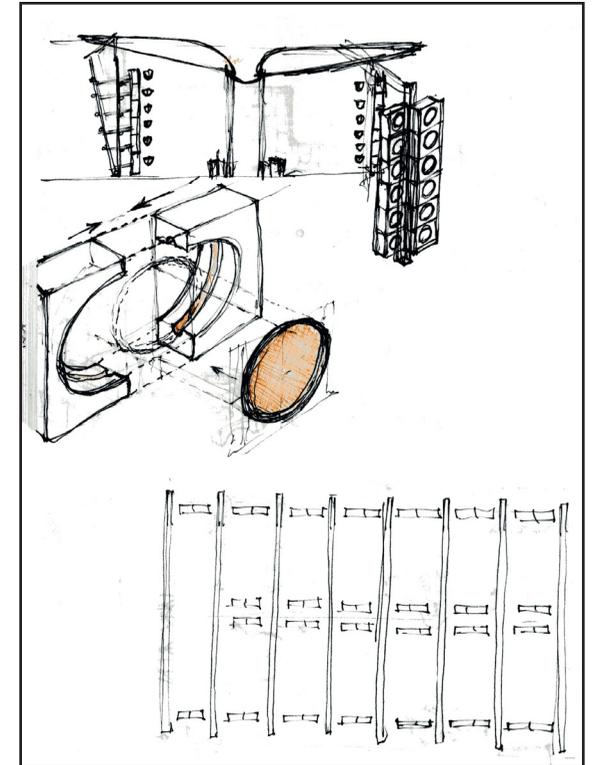
Section along with axonometric drawing illustrating the intent to use concrete building block walls and a secondary steel structure weaving through the block walls.

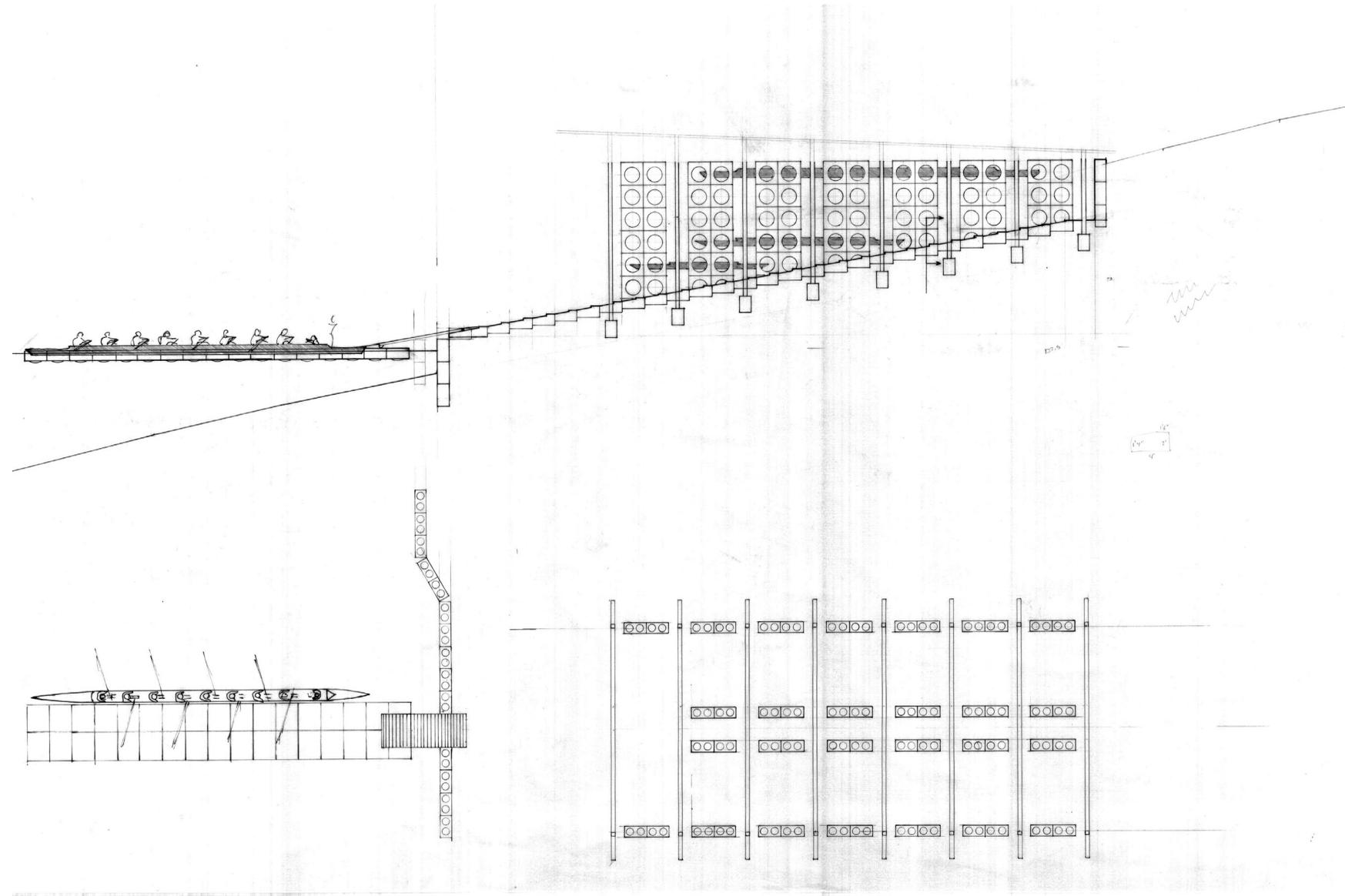


Concrete building block development.

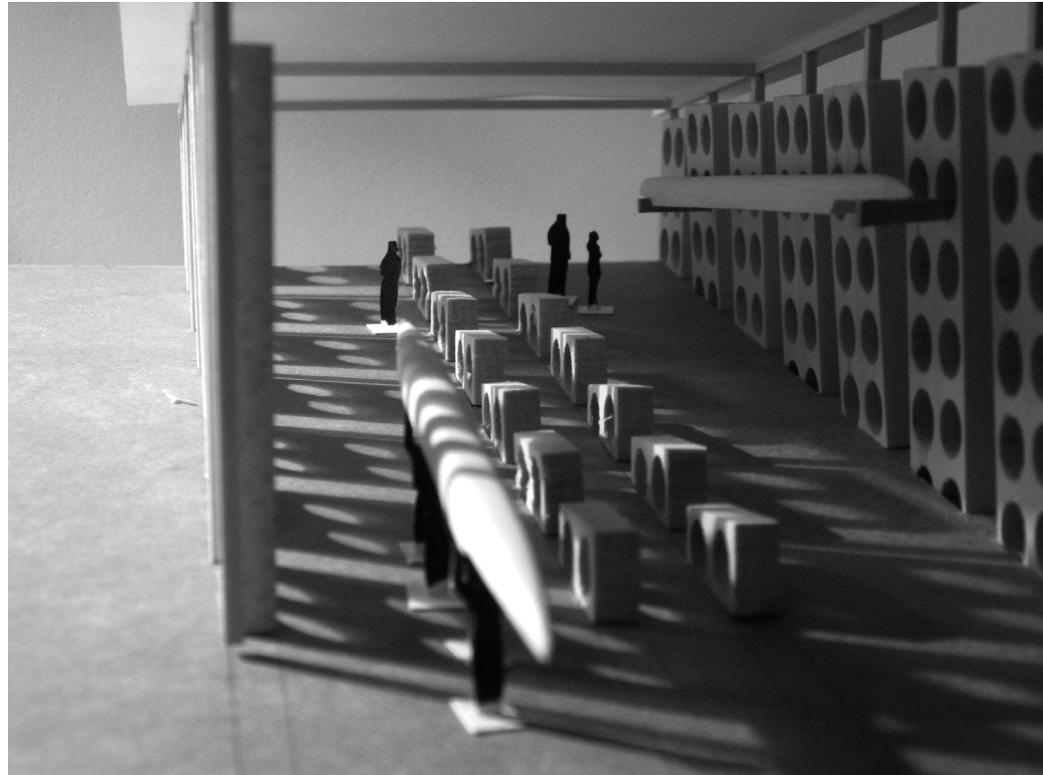


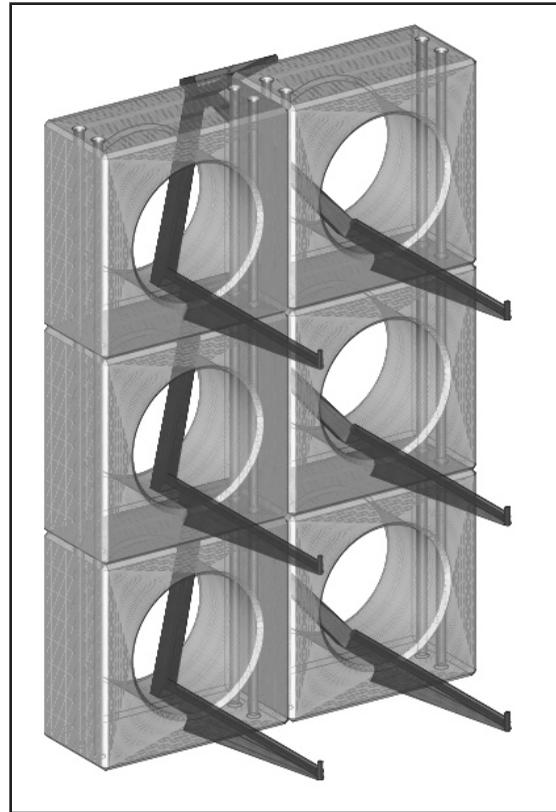
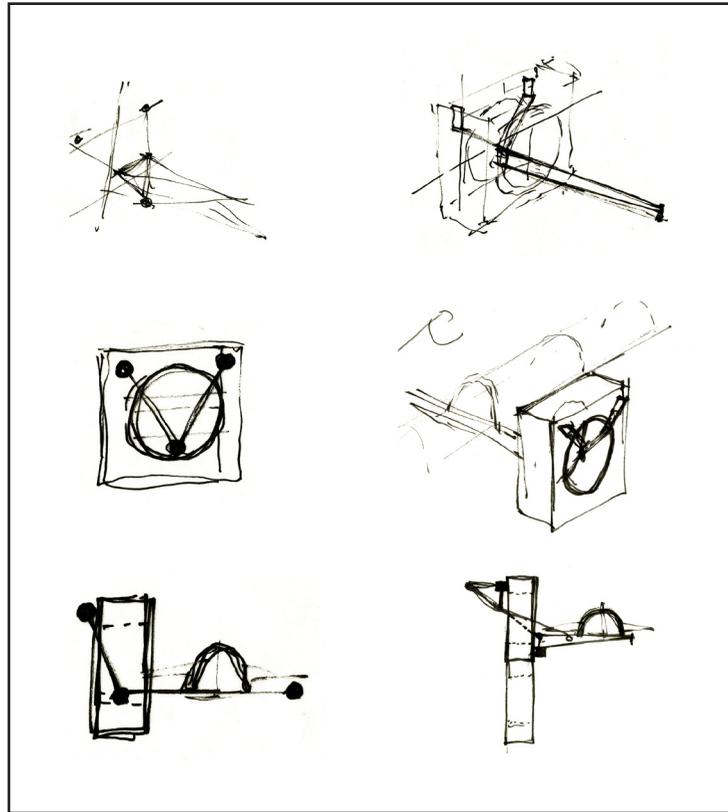
Programmatic considerations starting to inform the project.



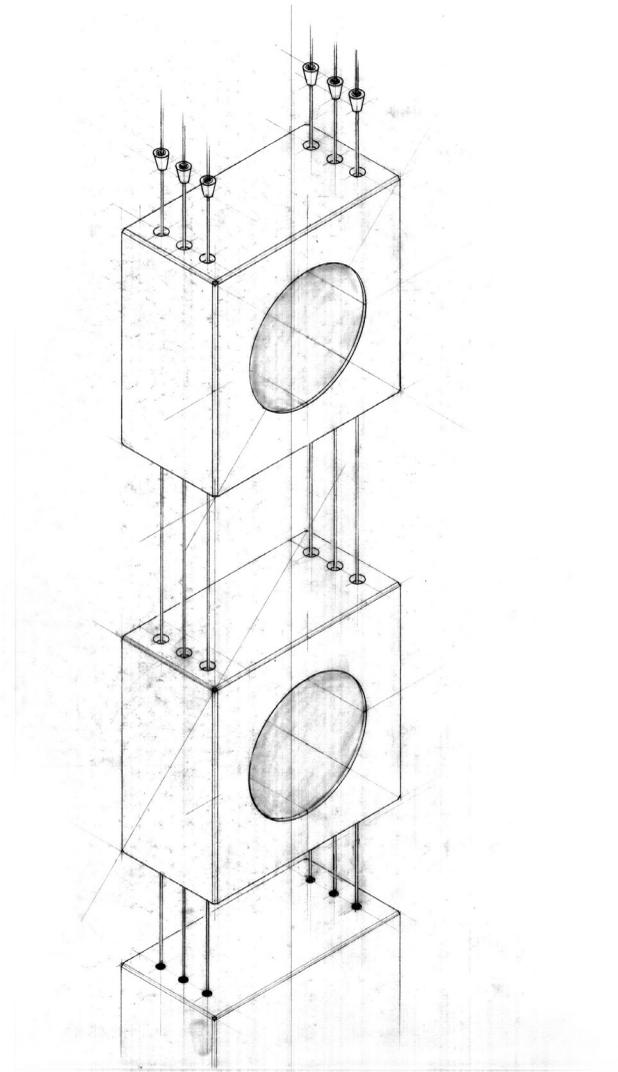


This early plan and section illustrate how the concrete blocks are beginning to address the functional requirements of a boathouse.

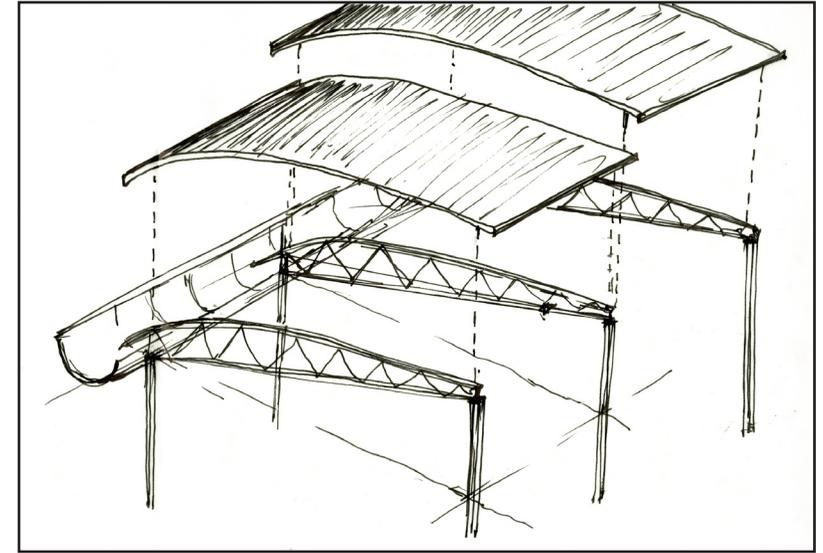
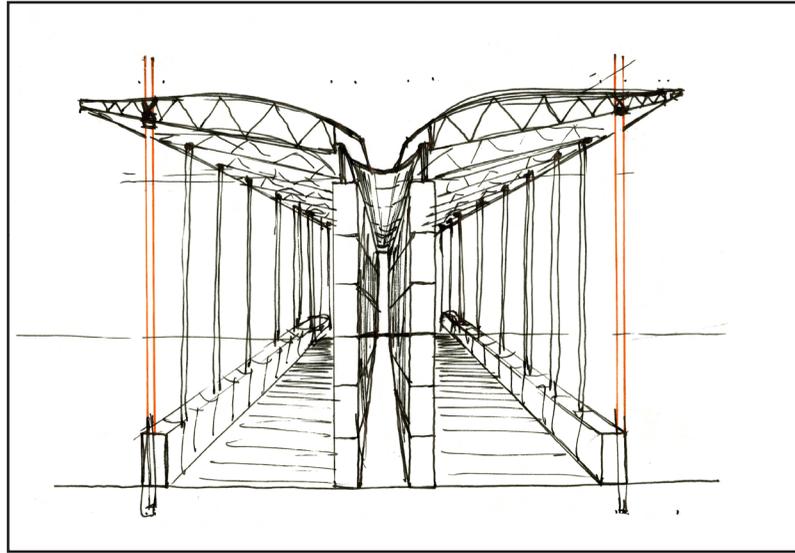
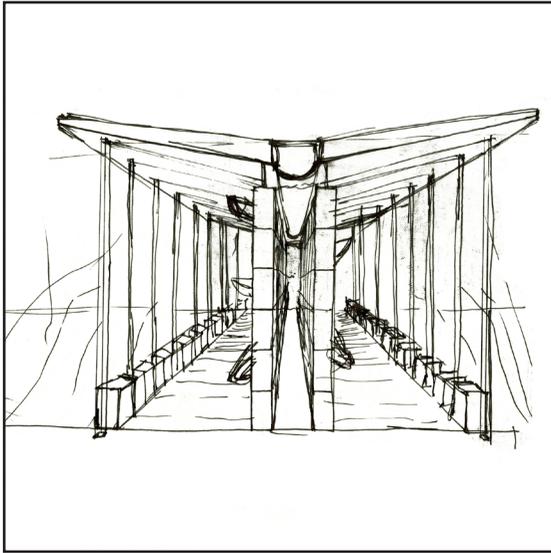




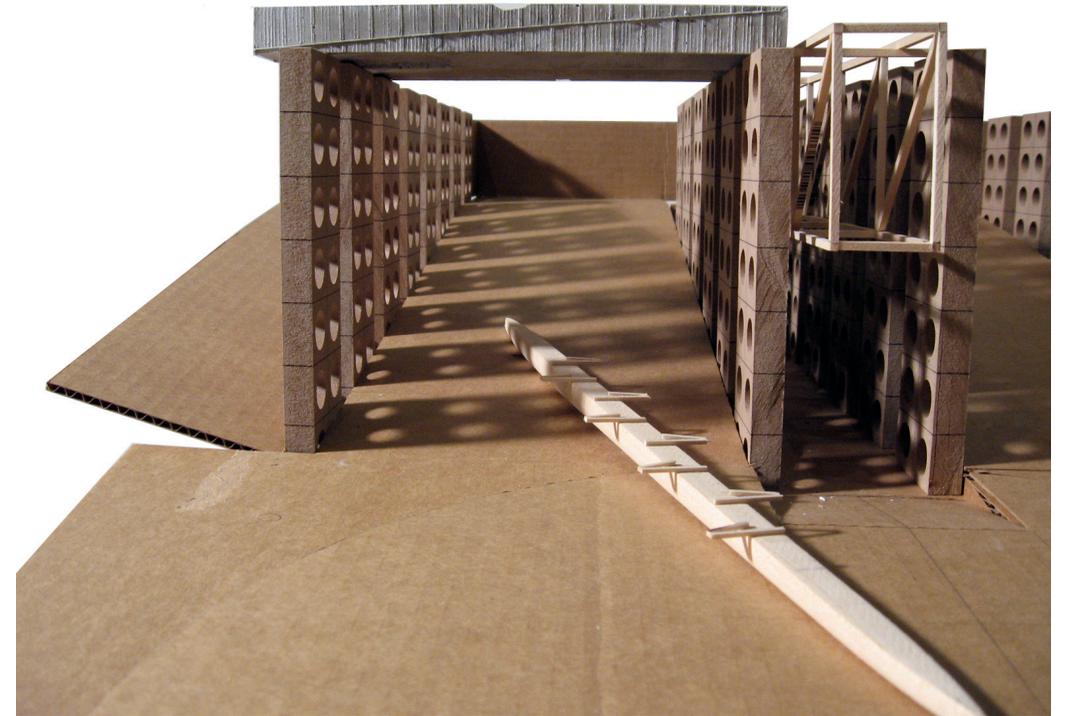
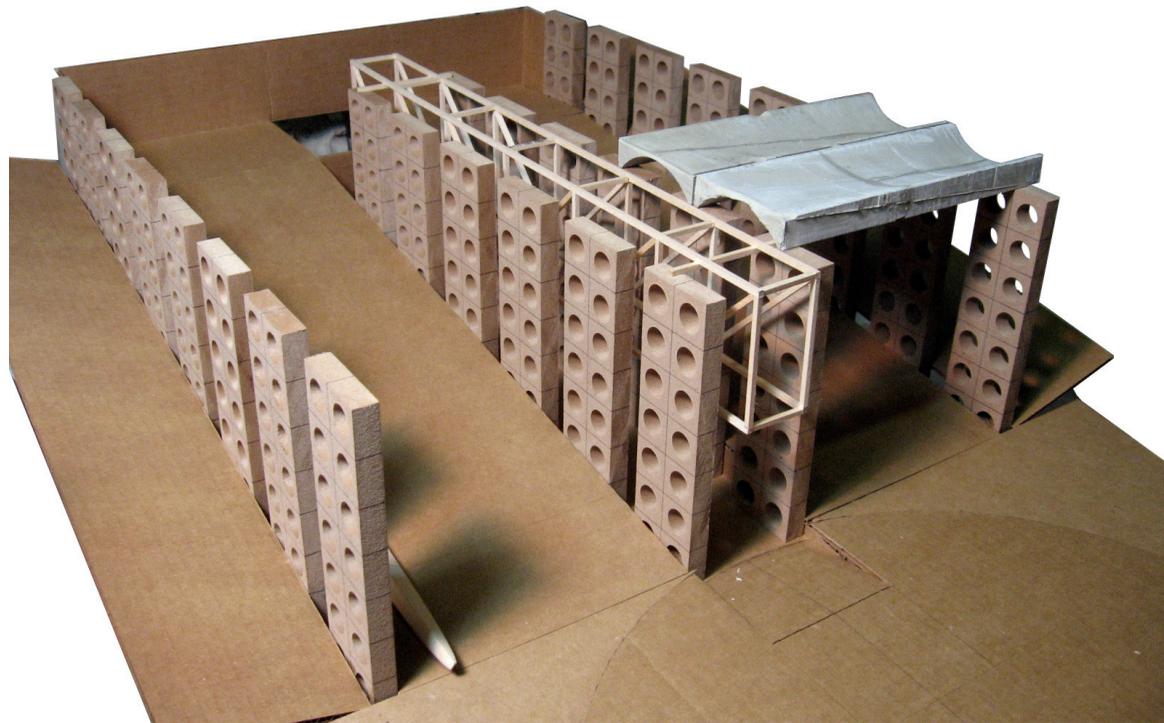
Bracket used to for boat storage.

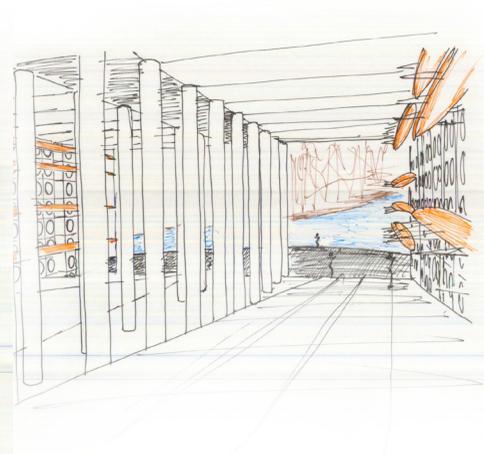
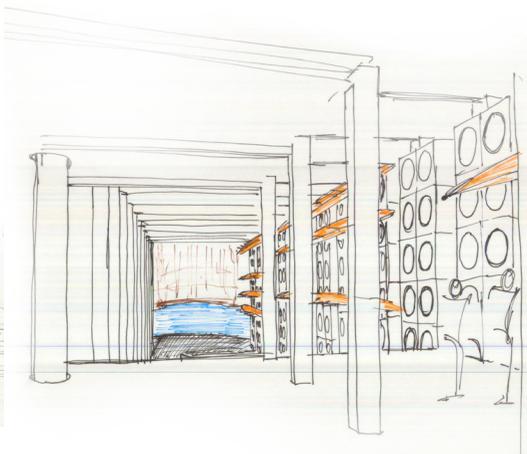
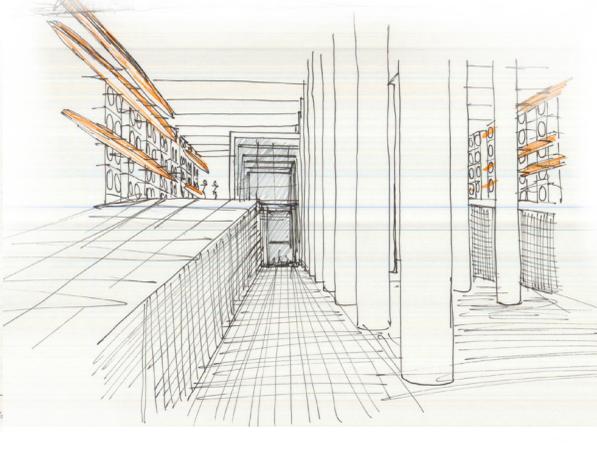
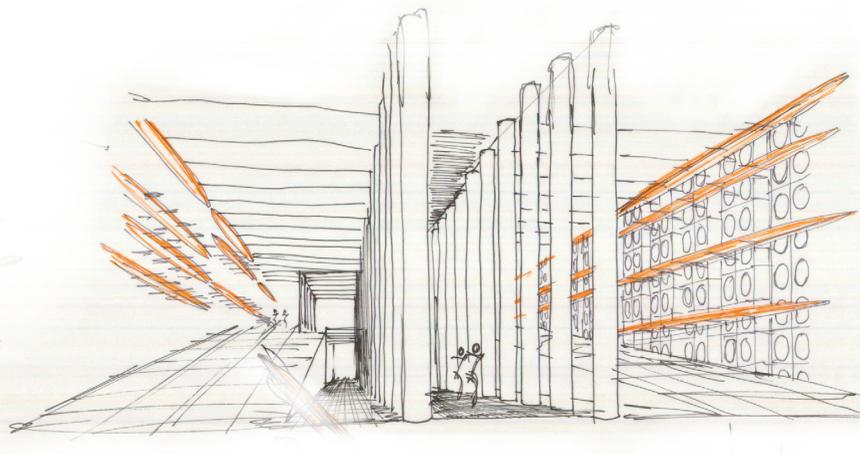
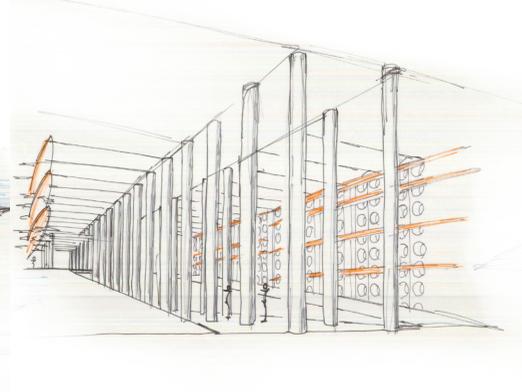
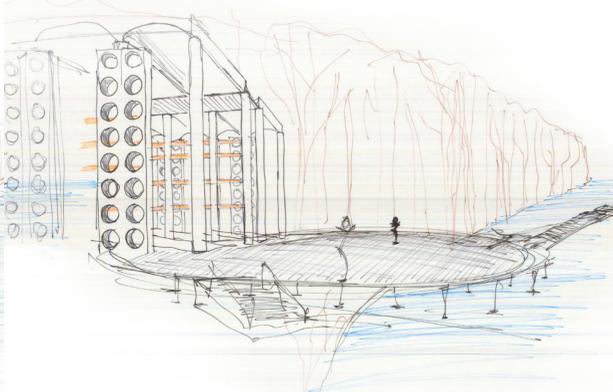
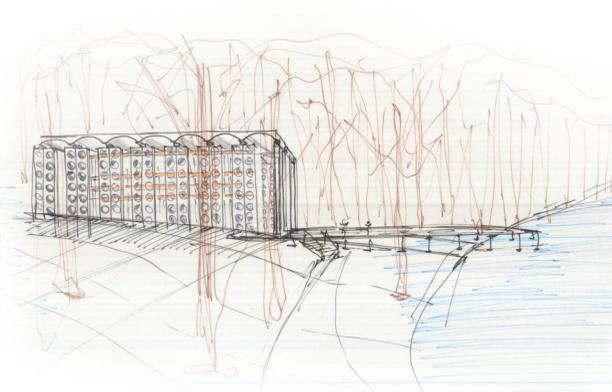


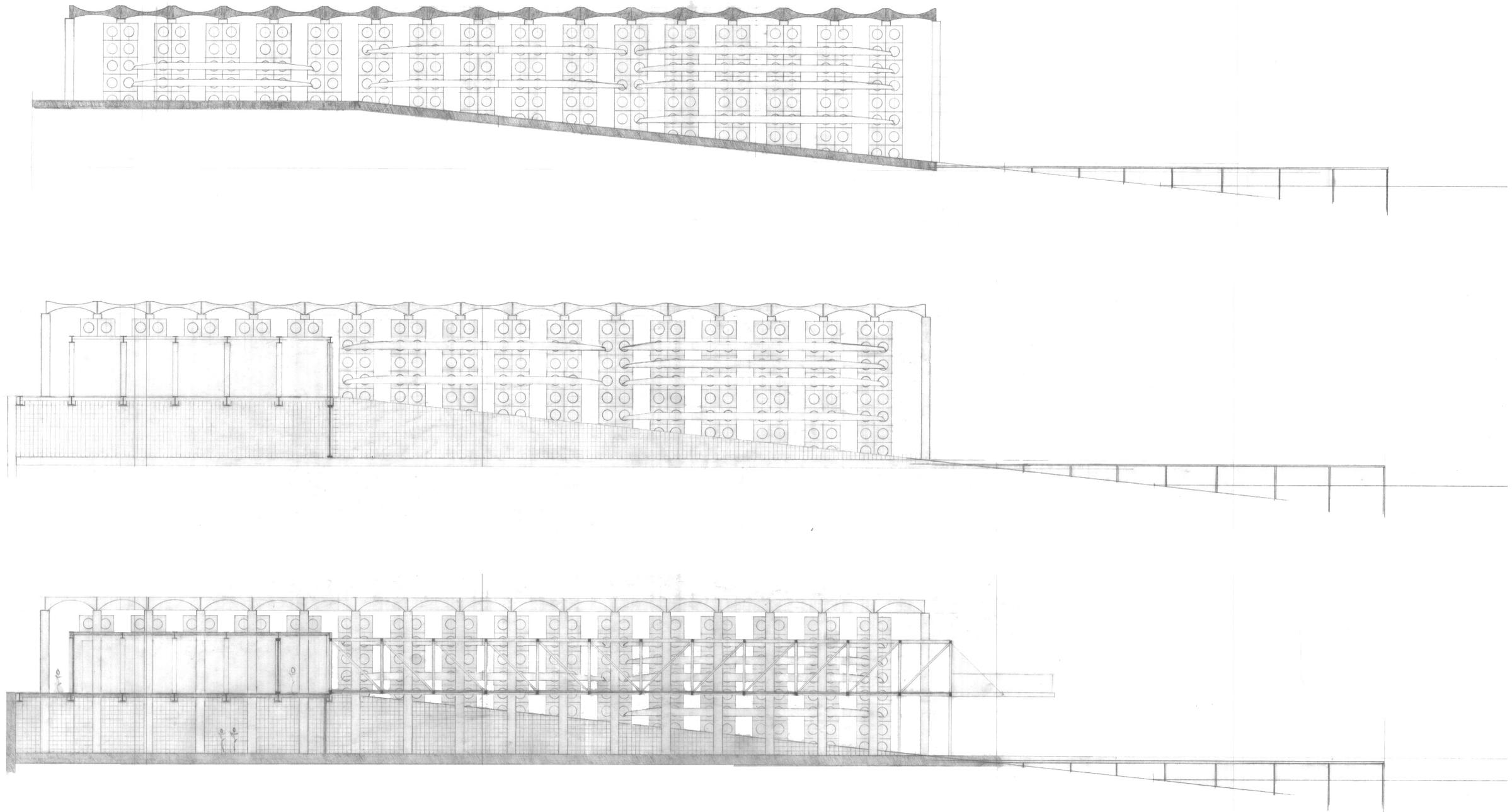
Assembly drawing illustrating post-tension construction.



Early roof studies using the secondary steel construction and stressed skin.







Sections showing near final representations of the different components.

This thesis project illustrates my approach and position towards architecture. The final building was only achieved through the search for a series of architectural components. Starting with a notion of one component, followed by the development of additional components, has resulted in a complete building in which nothing can be added nor taken away. This approach has allowed each component the ability to be self-expressive while also playing a role in the tectonic whole.

