

**A STUDY OF TECTONIC FORM**  
*THE DESIGN OF A BAYSIDE MARKET*



**A STUDY OF TECTONICZ FORM**  
*THE DESIGN OF A BAYSIDE MARKET*

BY

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*THESIS SUBMITTED TO THE FACULTY OF  
THE VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY  
IN PARTIAL FULLFIMENT OF THE REQUIREMENTS FOR THE DEGREE OF*

**MASTER OF ARCHITECTURE**

APPROVED:

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HANS C. ROTT  
COMMITTEE CHAIR

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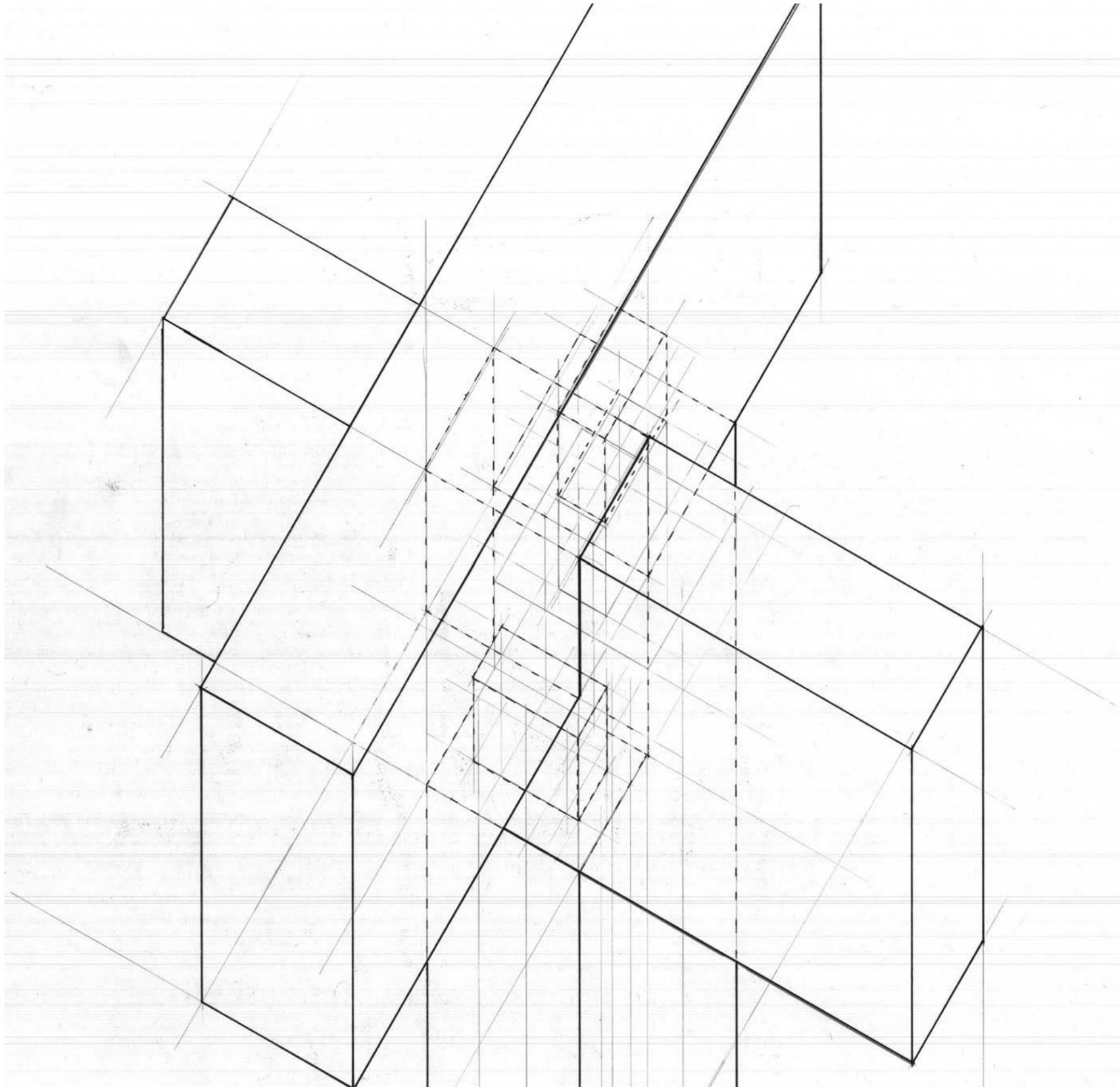
V. HUNTER PITTMAN  
DIRECTOR, SCHOOL ARCHITECTURE + DESIGN

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DAVID DUGAS  
CHAIR, GRADUATE ARCHITECTURE PROGRAM

MAY 2017





## **ABSTRACT**

*“... beauty is a certain agreement and harmony of parts within that to which they belong, with regard to a definite number, proportionality, and order, such as concinnity (i.e. the absolute and primary law of nature) demands.”*  
*(Alberti)*

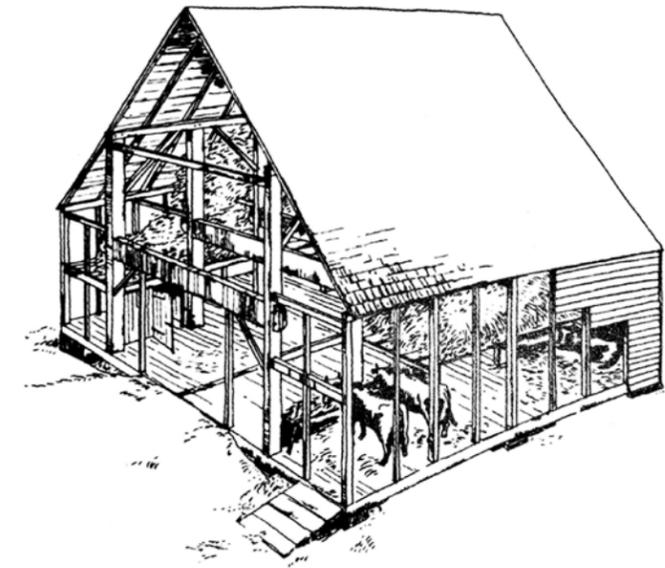
The aim of this thesis is to demonstrate a design process through the creation of an architectural form as a composition of elements, material focus and locality. The desire to work with a singular material drove the project from the study of early wood working techniques to the creation of a marketplace defined by its appreciation for tectonics and the history of the local region.



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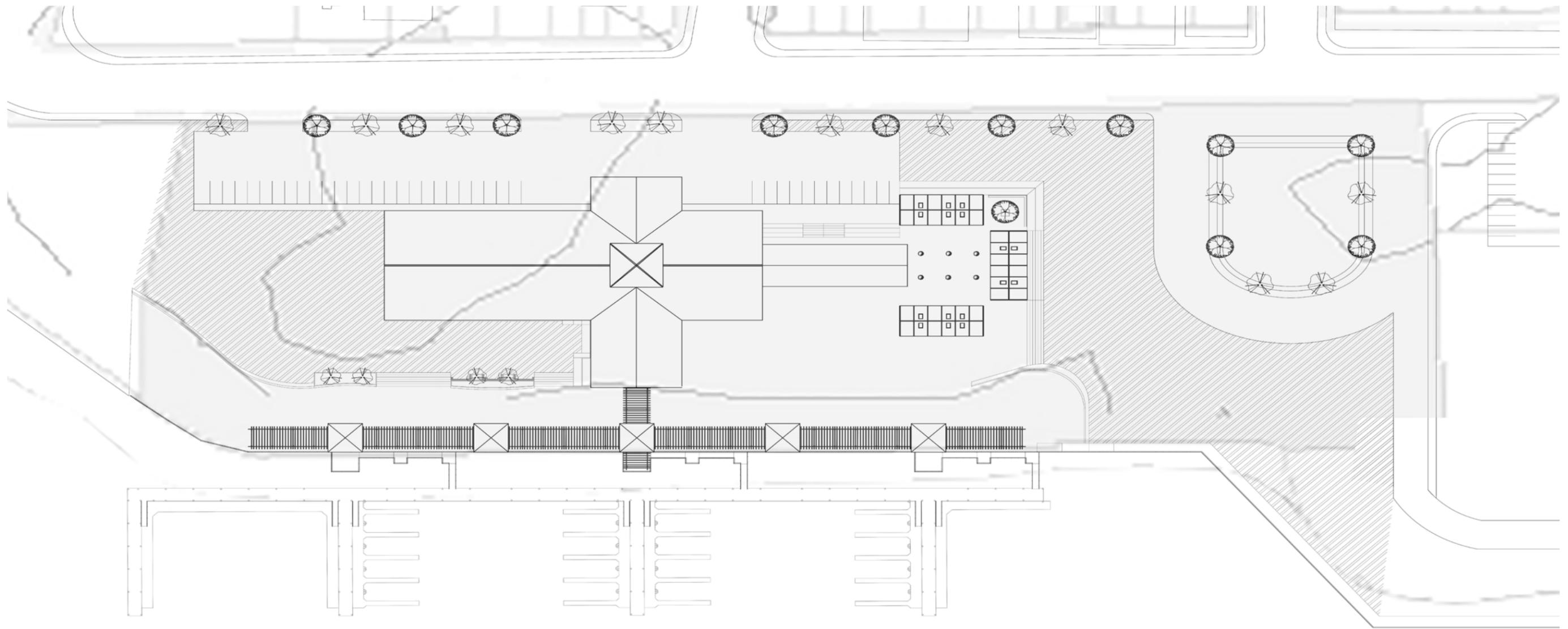
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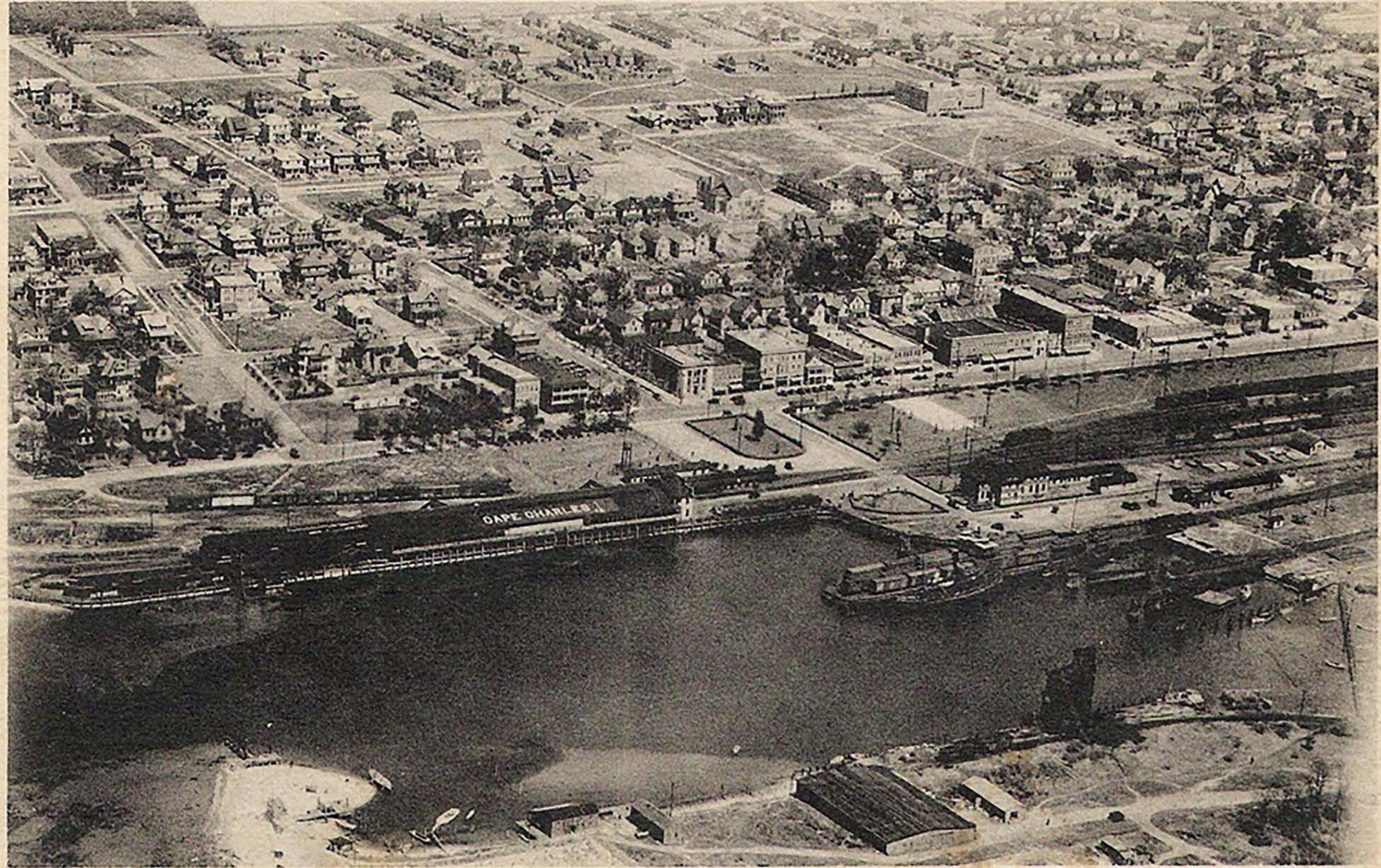


The origin of this project came from an initial intrigue with the idea that a building could be constructed from one singular material, wood. I began with a study in barn structures and nineteenth century joinery to understand the properties of wood and the forms it can yield. I was able to observe the subtle variations in form by constructing blind contour drawings from different barns types across the east coast. All rectangular in plan covered by a medium pitched roof. Although there are many applications for wood and wood products, studying the traditional forms became important to me in the understanding of tectonics and craftsmanship. By constricting the formal parameters, the development of a specific joint became much more manageable and served as the cornerstone of the project. The developed joint is defined by intersecting the vertical with two overlapping horizontals, later developed in three additional iterations.

*“In warm climates and in countries whose abundant yields could only be reaped by collective action, we see settlements no longer passive and defensive but active in their approach to nature. The wealth of the land had to be wrenched from the earth and water, hence there arose the need to unite for large communal works... A method of building developed as an antithesis to the but...”*



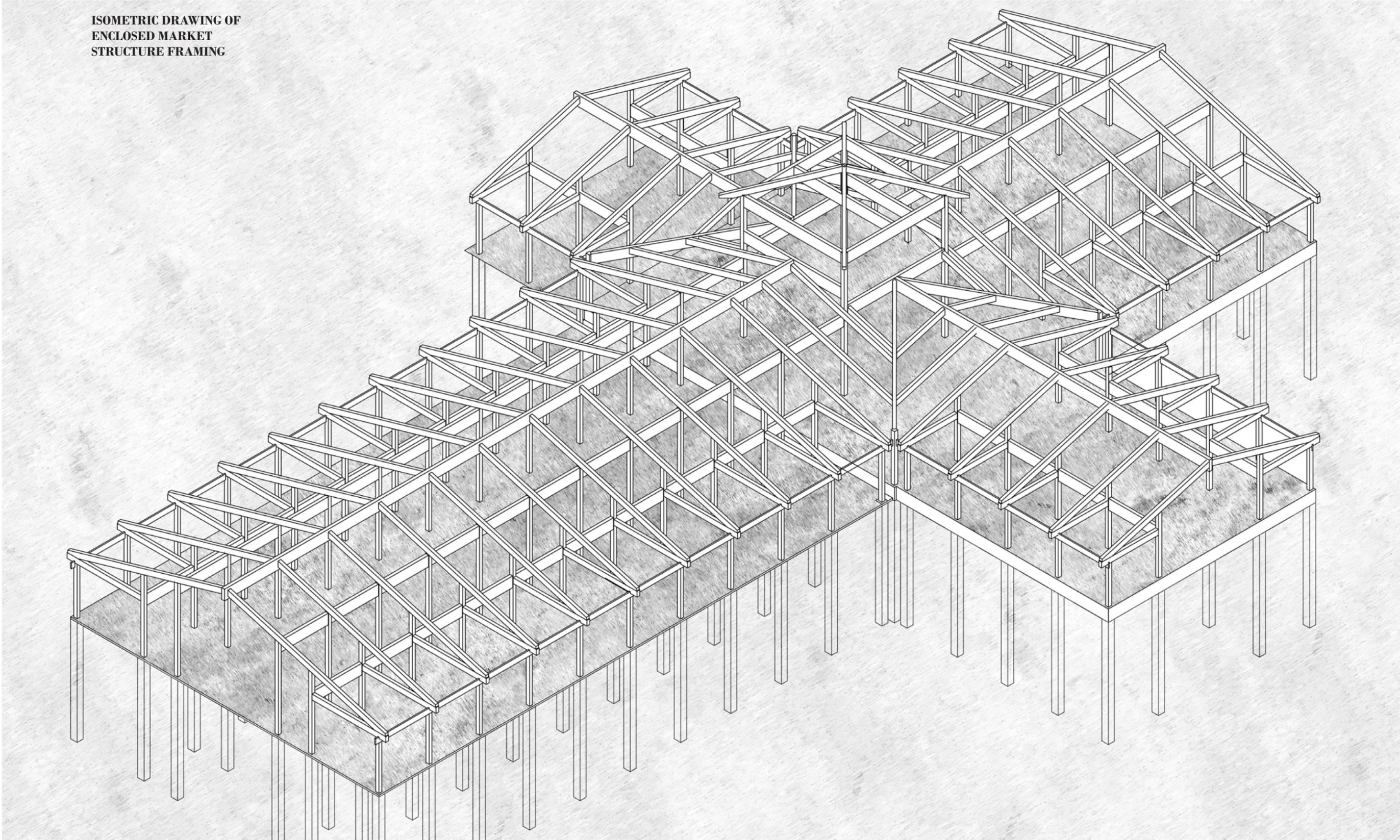
Having determined a formal expression, my next consideration was the development of a program and site. The study with barn structures piqued an interest in the repurposing and heritage of barn types, becoming the driving factor of the program. The determination of a site was narrowed by assessing areas where the original purpose of barn structures was a vital element; finding a locality which was heavily developed due to the local economy's dependency on agriculture became a key factor. The chosen site is based in a community which flourished due to local trade of agricultural products and fishing. Located in the heart of the township, between main street and the harbor. The large site was used in the early part of the 20th century as a hub for commercial fish processing and a ferry terminal. Since the vitalization of the area was dependent on the harvest from the land and water, and the addition of the railroad and ferry terminal, the location became the centerpiece of the emerging urban area.



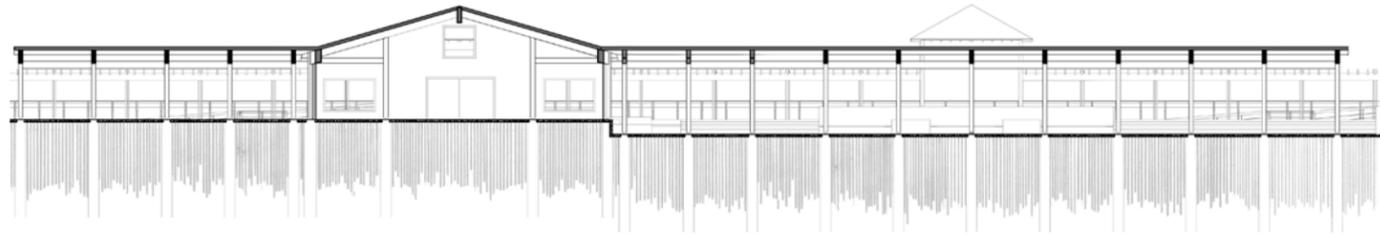
AERIAL PHOTOGRAPH OF CAPE CHARLES, VIRGINIA



**ISOMETRIC DRAWING OF  
ENCLOSED MARKET  
STRUCTURE FRAMING**



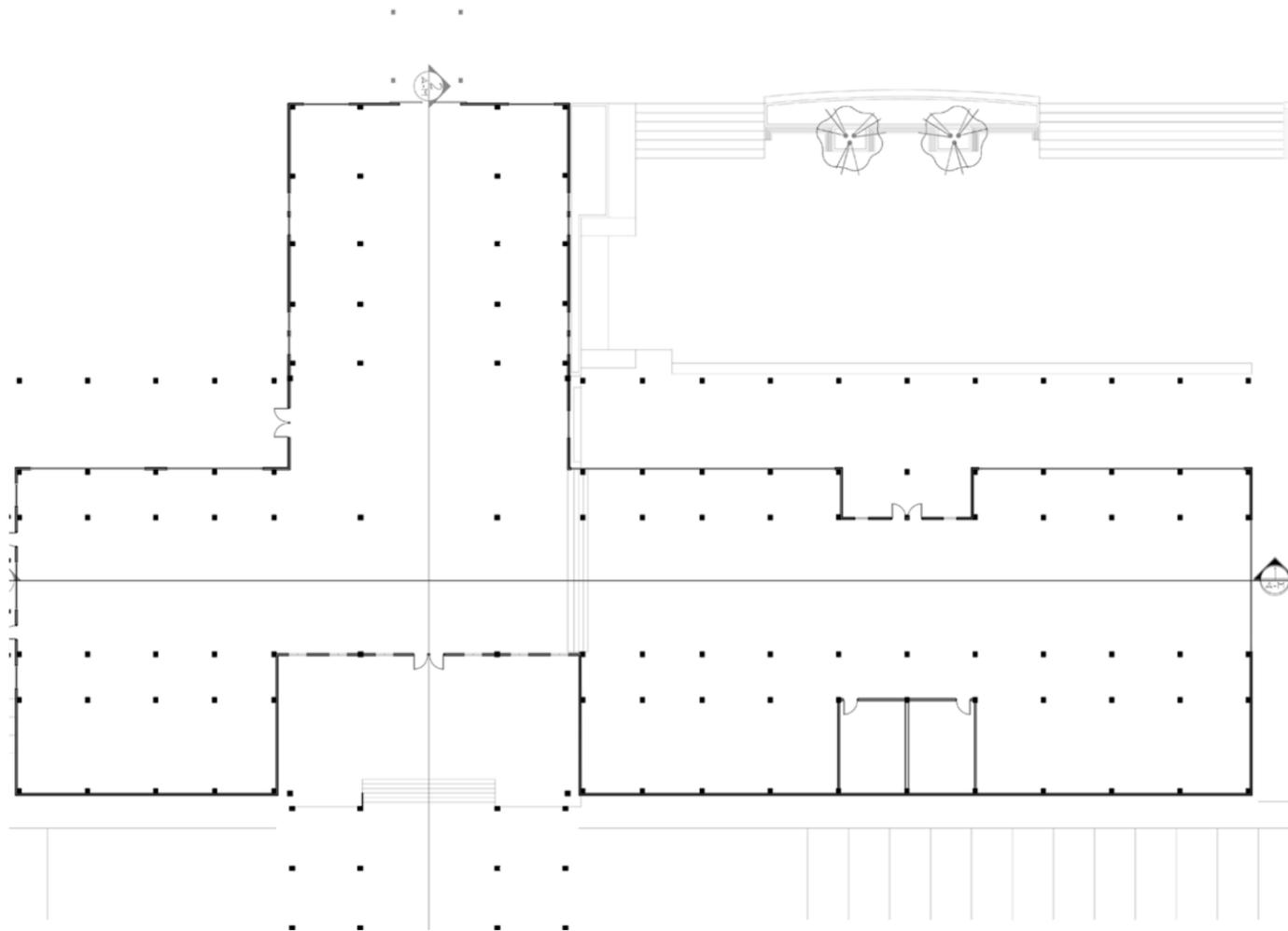
SECTION A-M 1



SECTION A-M 2



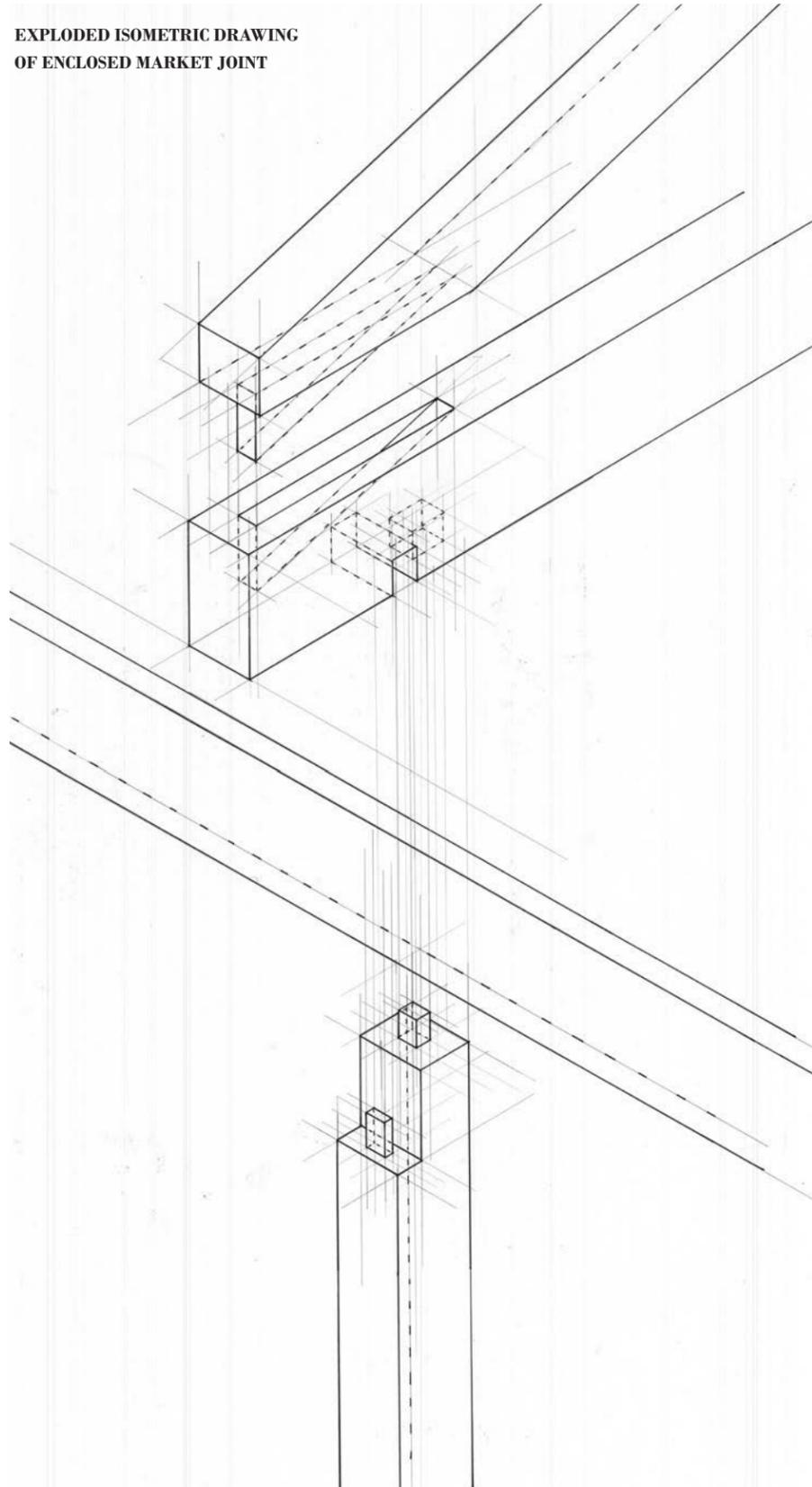
PLAN VIEW  
ENCLOSED MARKET STRUCTURE



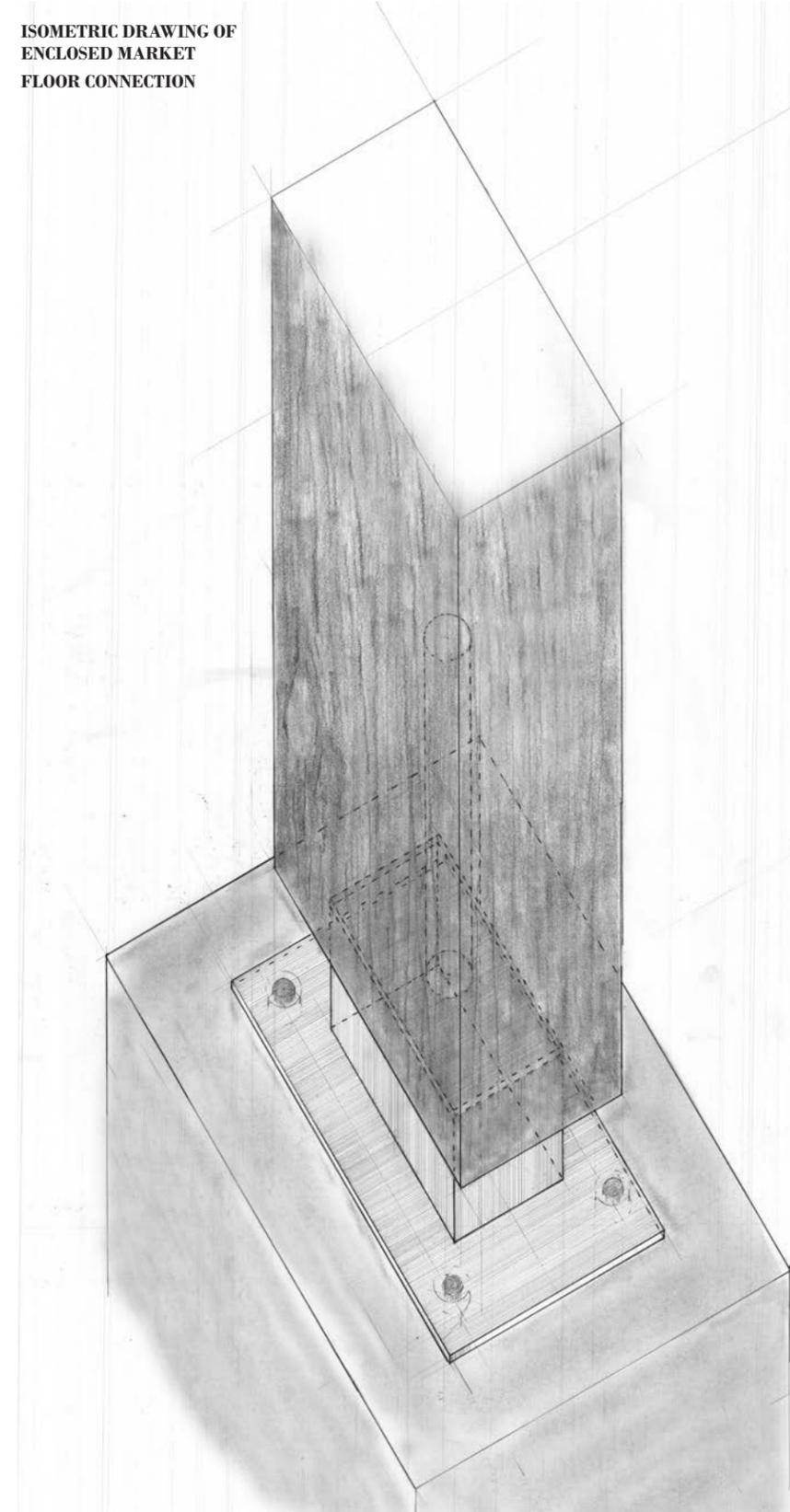
I wanted to acknowledge a program that was tied to the structure in a way that was not visible. Barns have often been considered a development of communal celebration. By using a form derived from barn structures, the idea of community became integral in the decision of a program. The second consideration was the site as a point of intersection between the land and bay. Due to its location and the rural community, a local market place was chosen as the program.

Having studied abroad and seen the great successes of markets, I designed the project in an effort to emulate the aesthetics of European markets and American farmer's markets, as opposed to the idea of a grocery store. The project developed to have two enclosed structure types, and two interstitial structures, as well as, courtyard areas and docks for pedestrian and commercial waterside access. The main enclosed market space is cruciform in plan allowing for ample space for various vendors. It is characterized by oversized wood columns and beams and views to the south of the bay and courtyards areas.

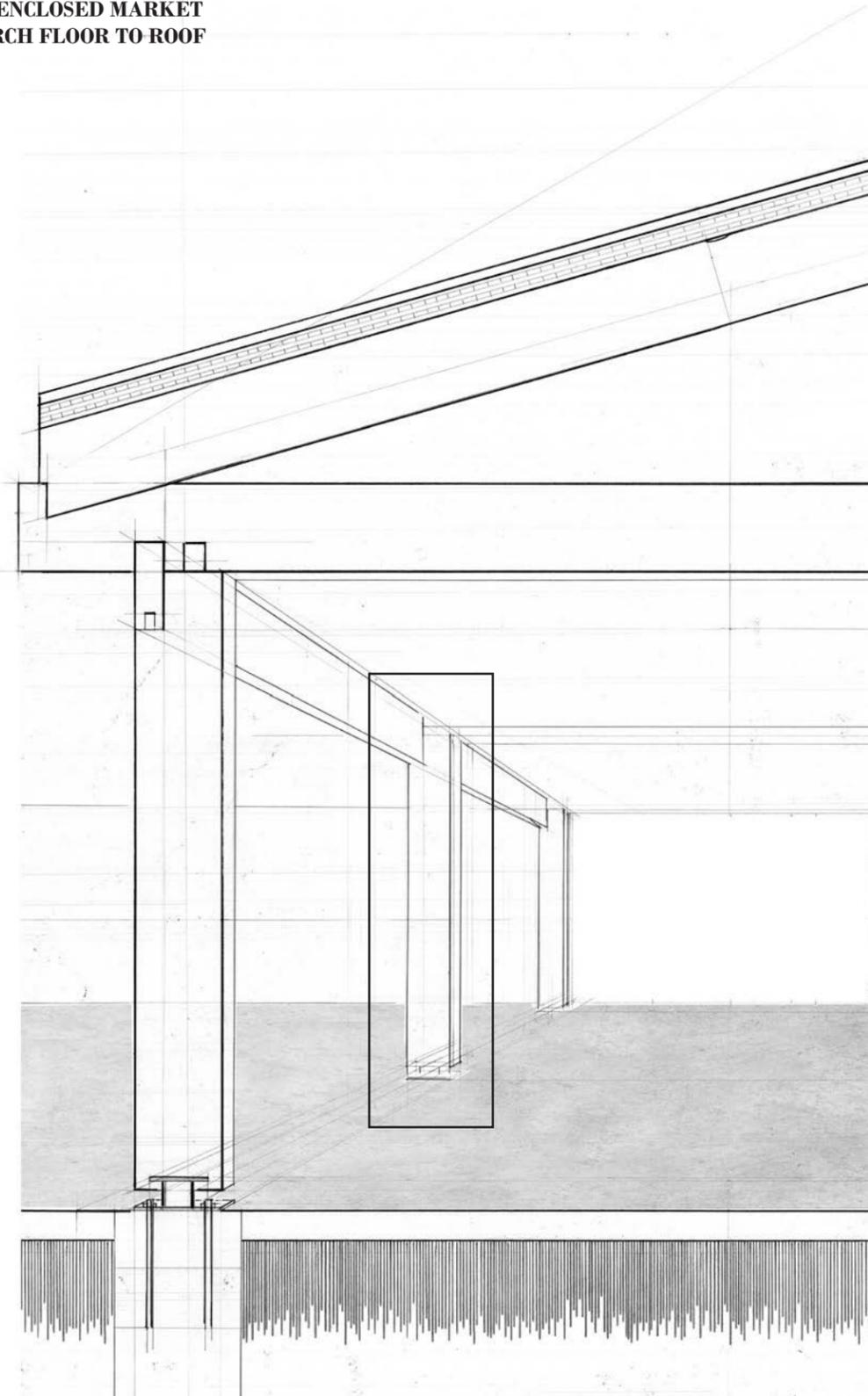
**EXPLODED ISOMETRIC DRAWING  
OF ENCLOSED MARKET JOINT**



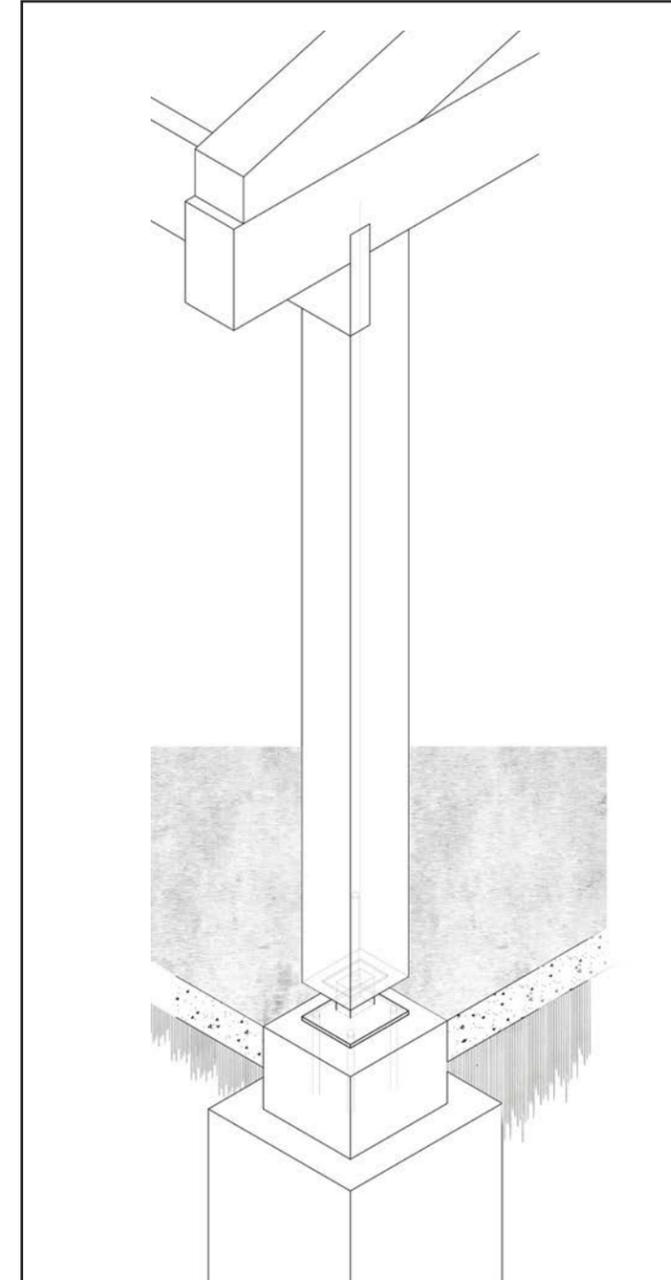
**ISOMETRIC DRAWING OF  
ENCLOSED MARKET  
FLOOR CONNECTION**



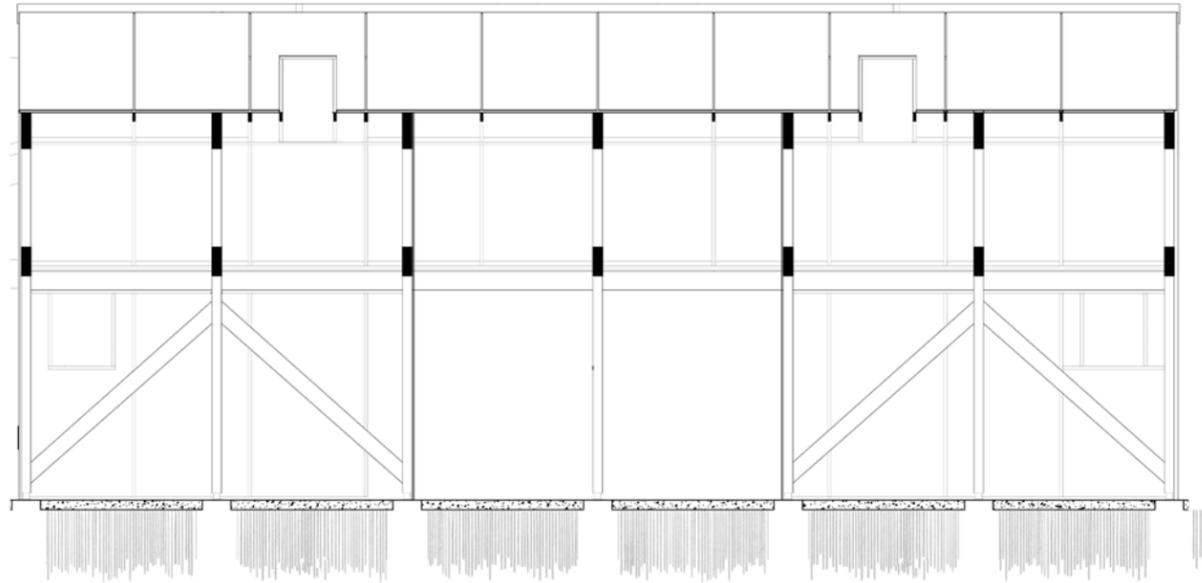
**SECTION PERSPECTIVE  
OF ENCLOSED MARKET  
PORCH FLOOR TO ROOF**



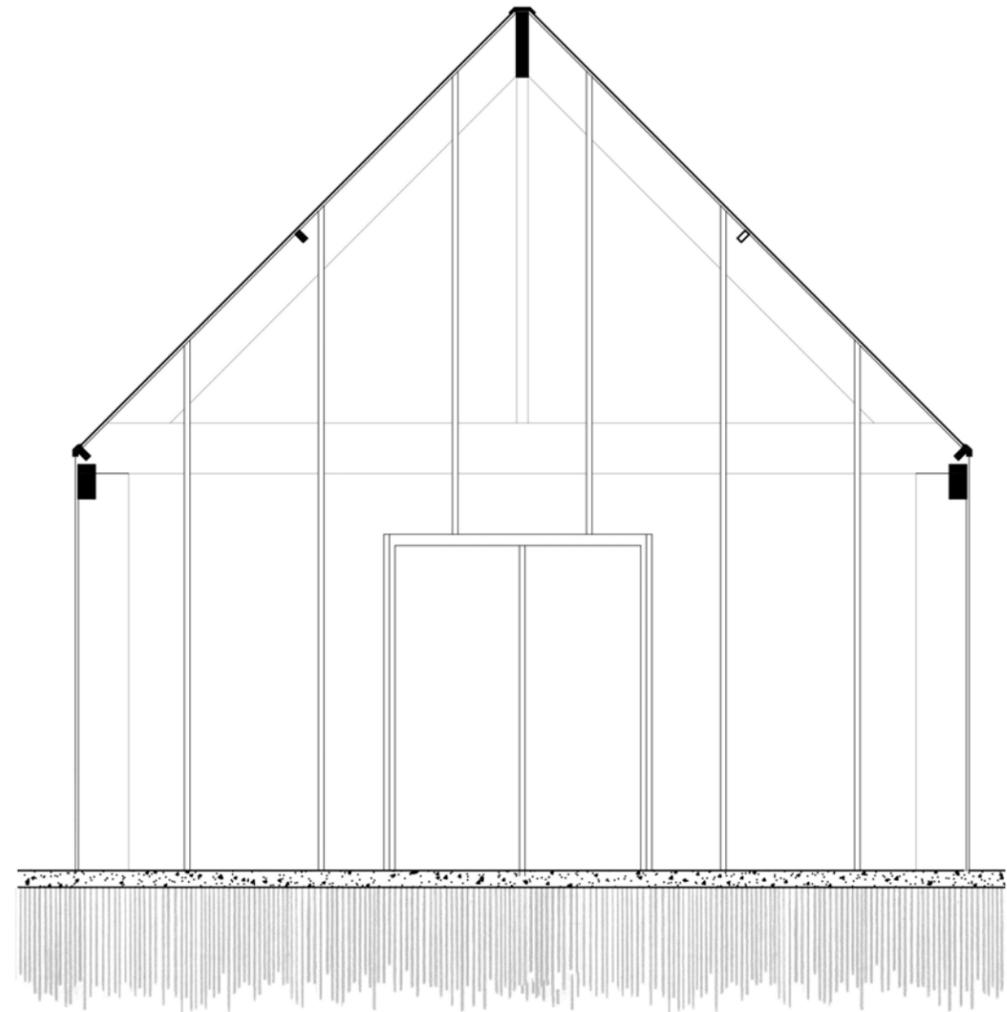
**ISOMETRIC DRAWING  
OF ENCLOSED MARKET  
CONNECTION FROM  
FLOOR TO ROOF**



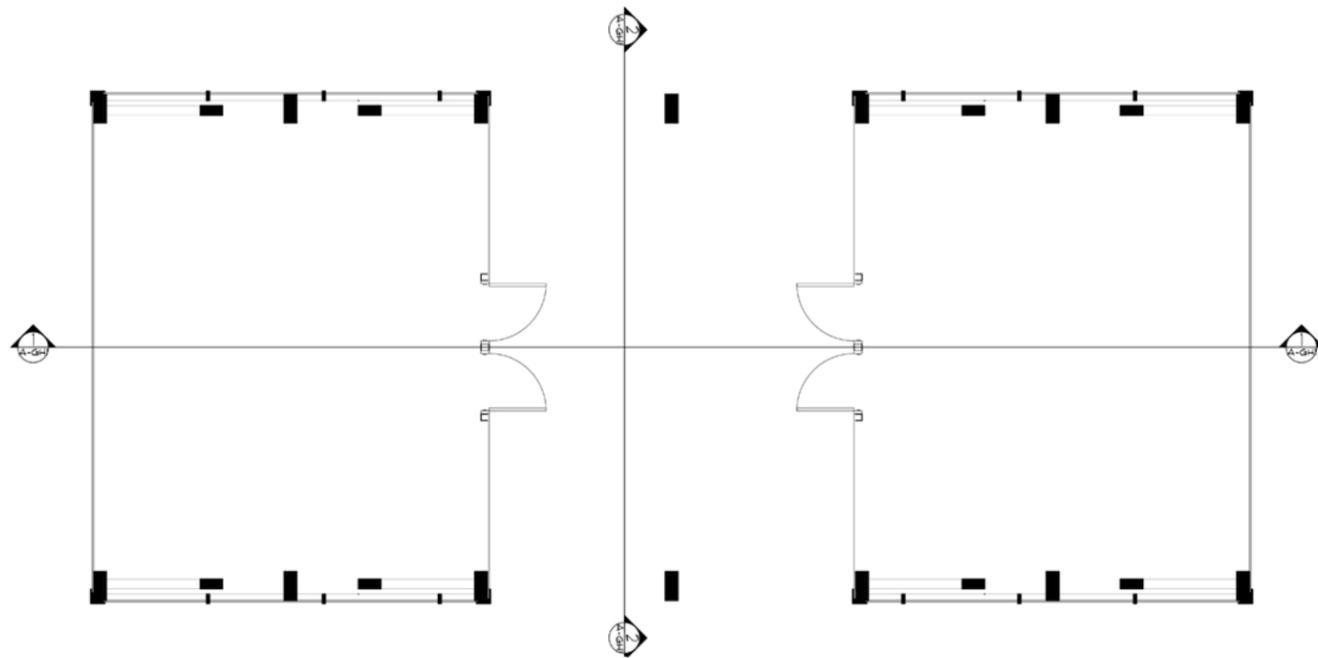
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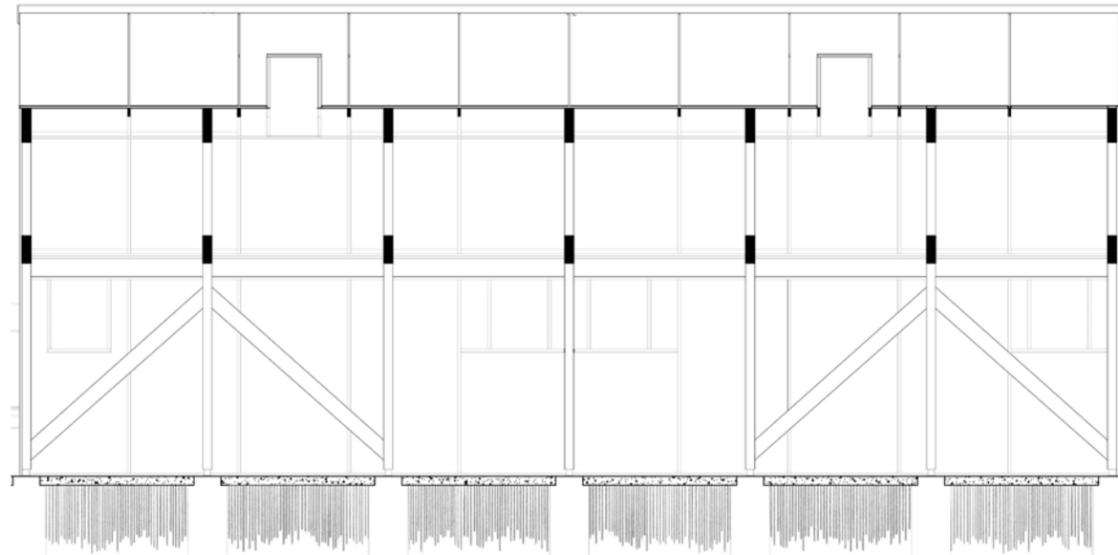
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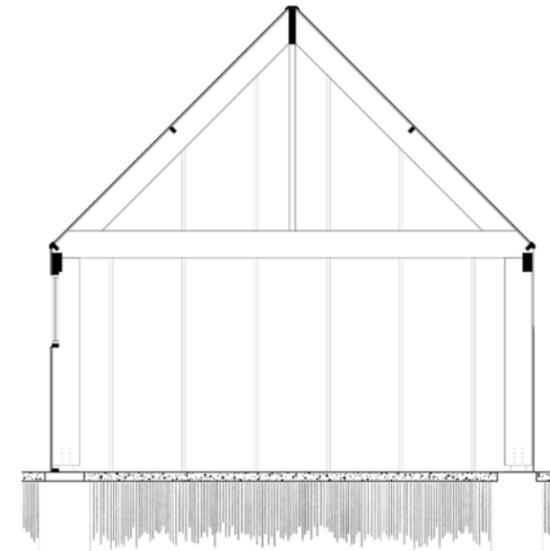
PLAN VIEW  
GREENHOUSE 1 STRUCTURE



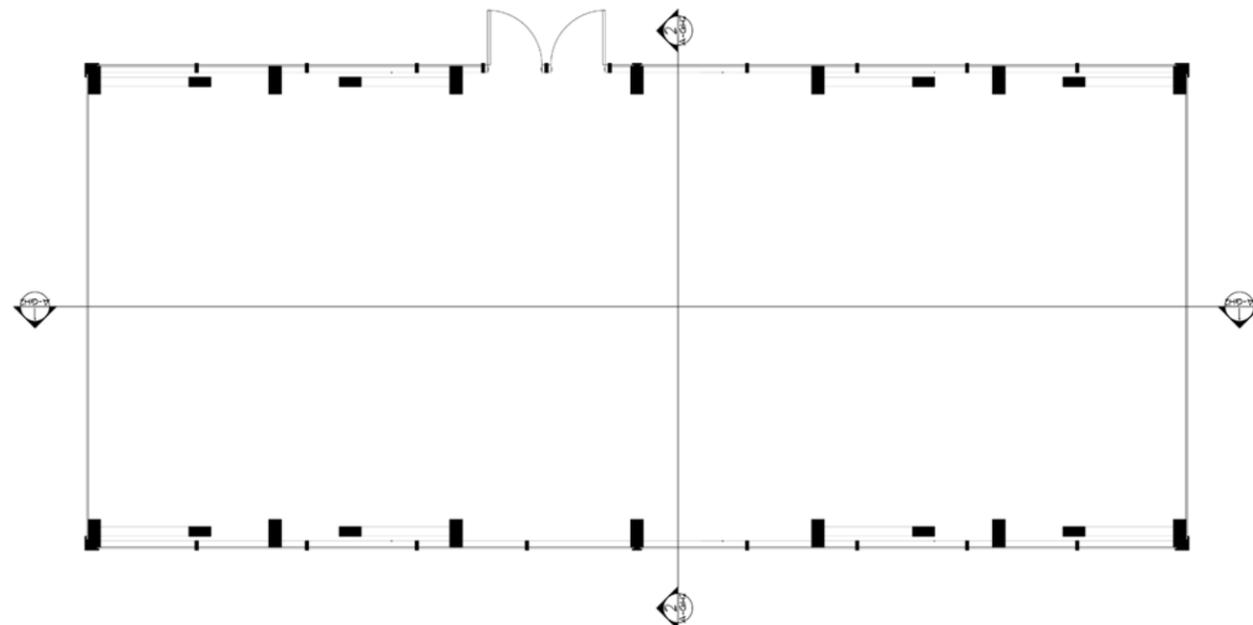
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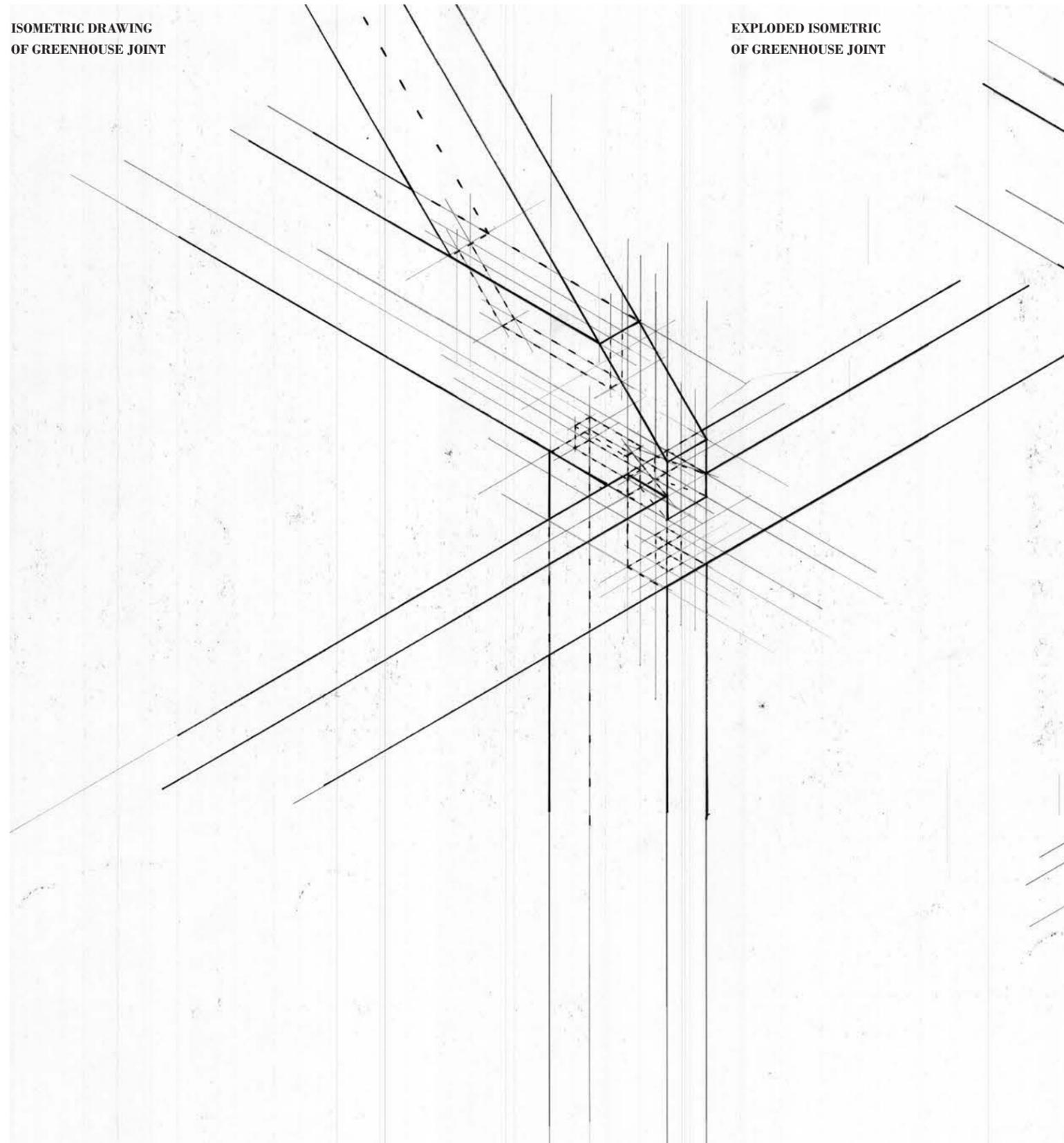


PLAN VIEW  
GREENHOUSE 2 STRUCTURE

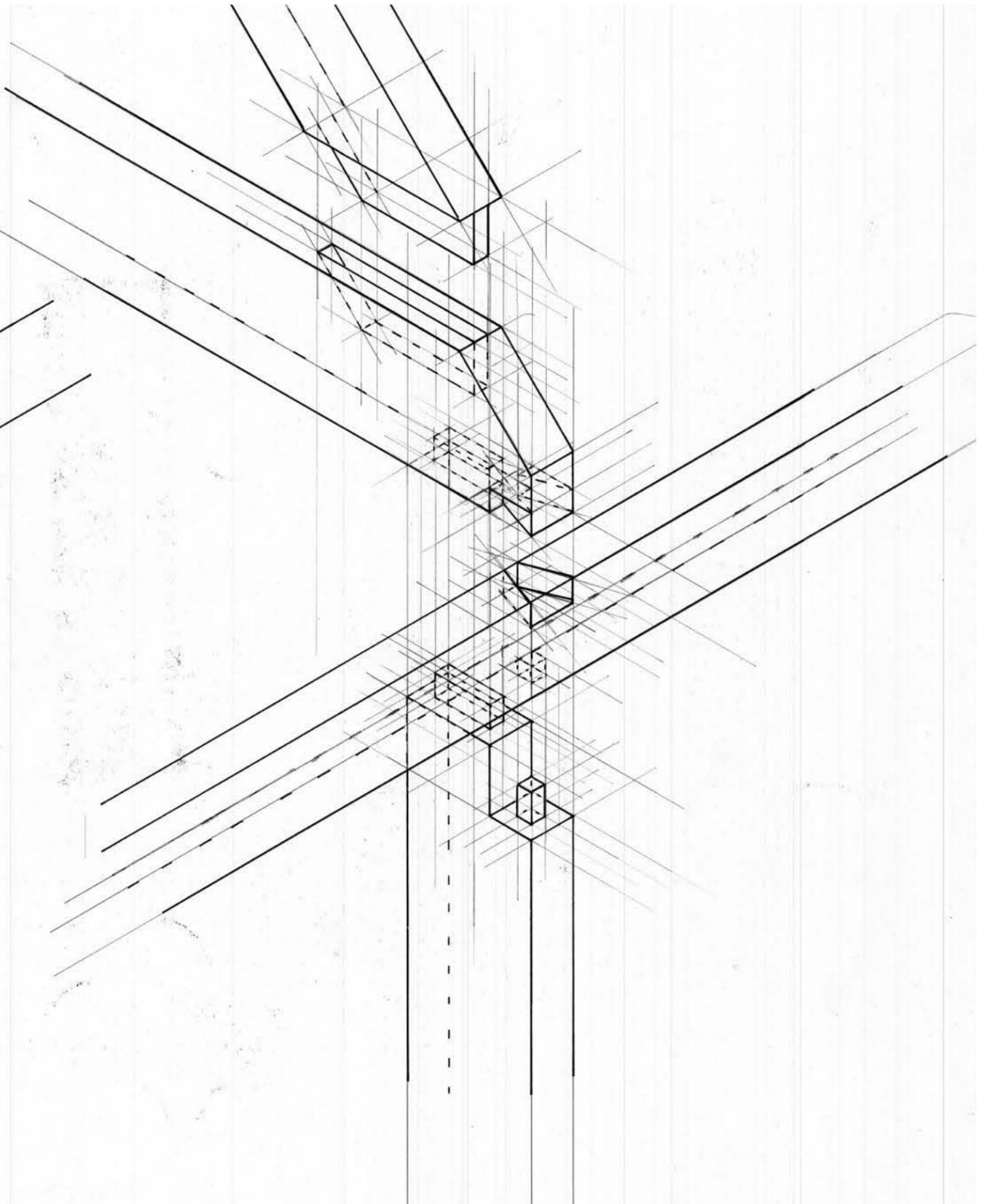


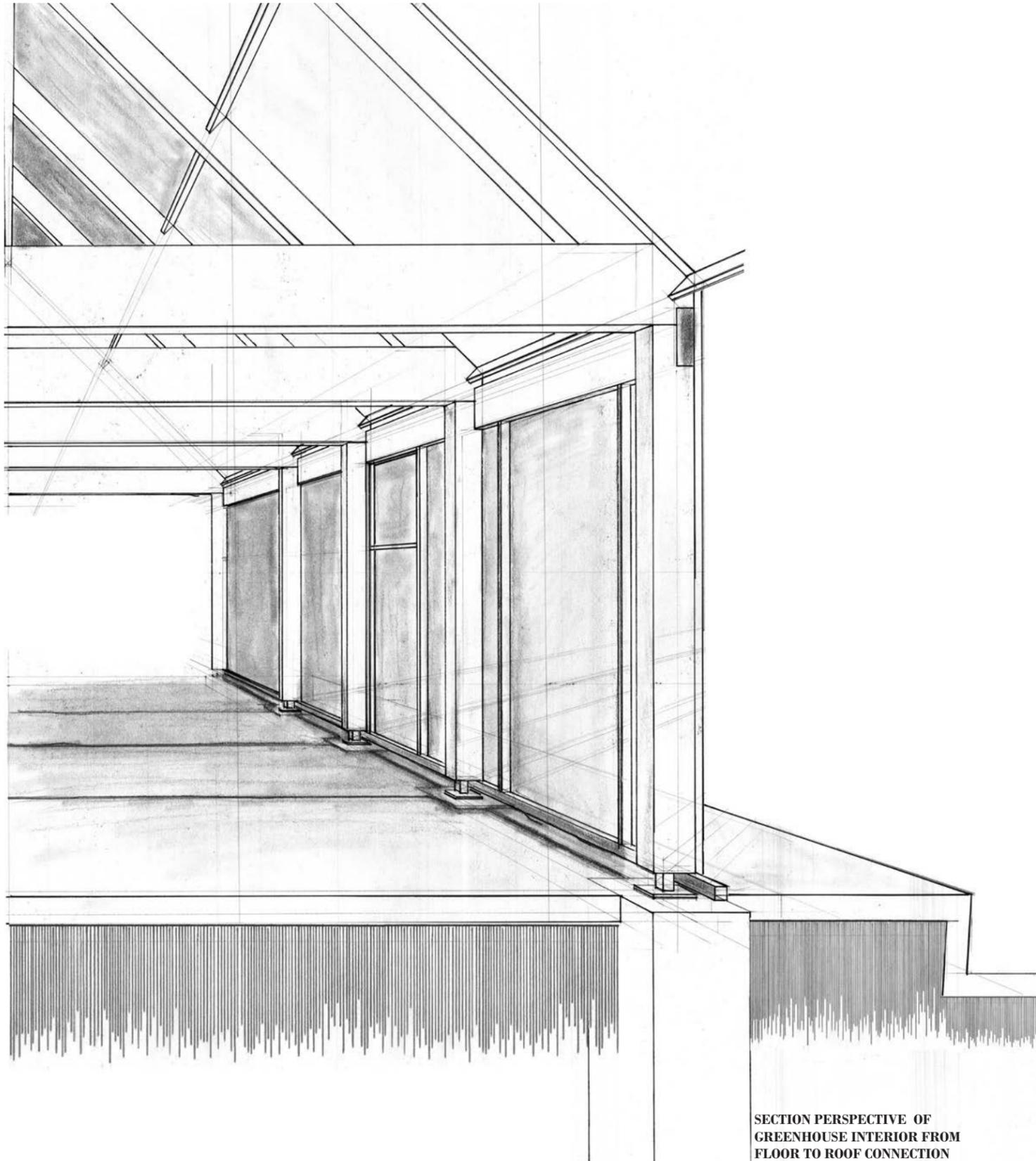
The need for the market to be sustainable year-round was answered in the development of greenhouse structures. The structures are based on another variation of the originally designed joint. Due to the exterior shell being transparent and the necessity to allow in the maximum amount of light, the joint had to be varied from having a roof overhang to a continuous line between post and roof pitch. The design differs from current commercial greenhouses which are structurally supported by aluminum posts or ribs. The designed greenhouses would not be able to produce the same high-yield harvests as commercial operations; however, they do serve as a reminder to market visitors of the abilities of the local community's production operations in times of year not conducive to agricultural production.

ISOMETRIC DRAWING  
OF GREENHOUSE JOINT

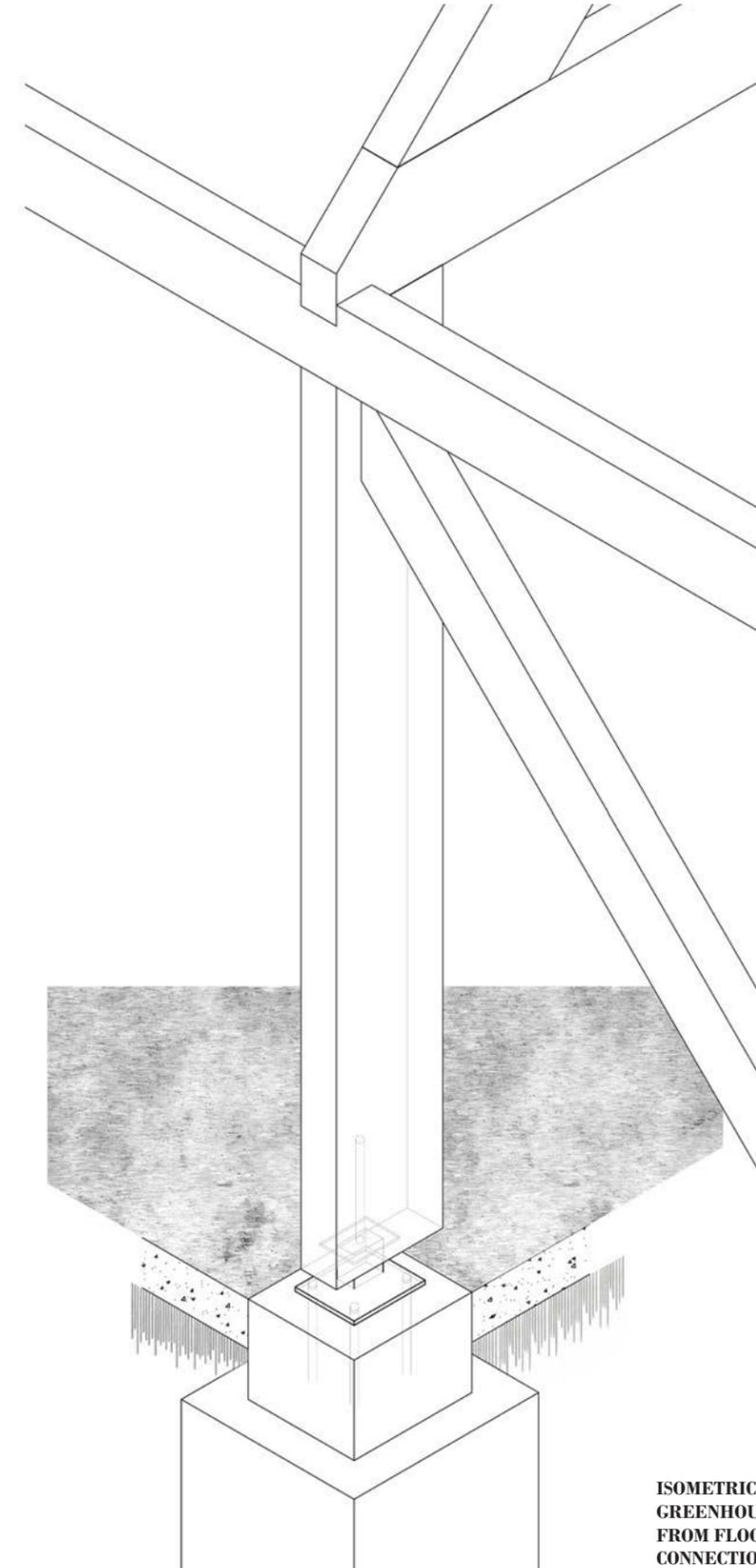


EXPLODED ISOMETRIC  
OF GREENHOUSE JOINT





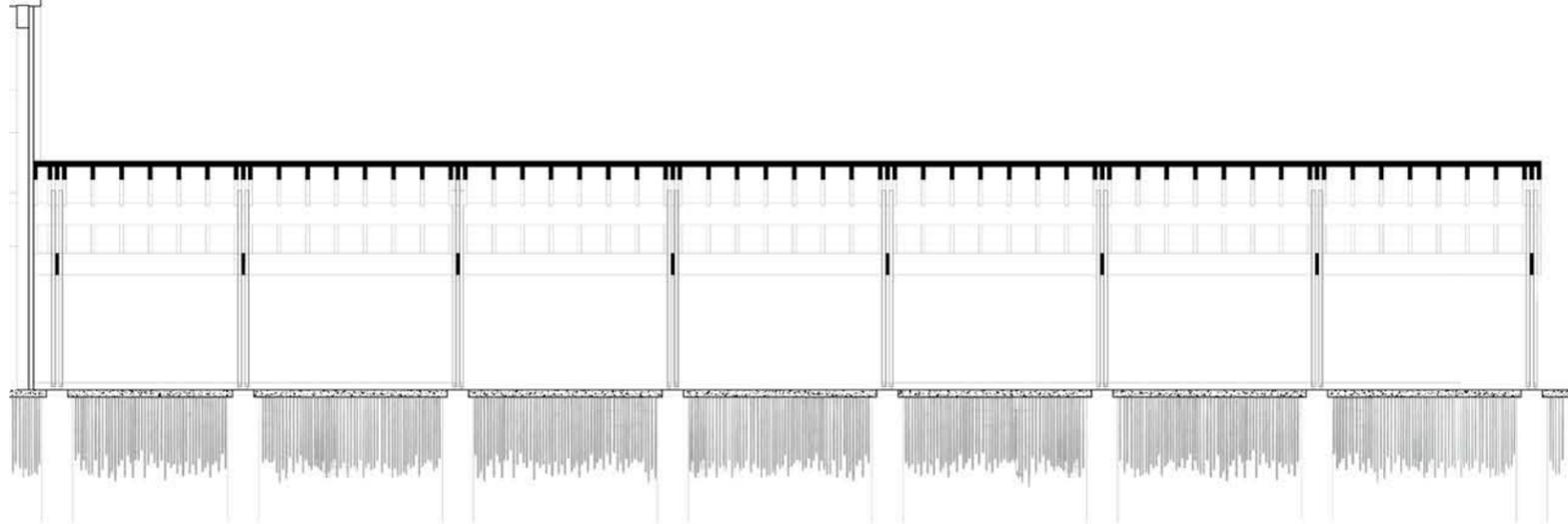
**SECTION PERSPECTIVE OF  
GREENHOUSE INTERIOR FROM  
FLOOR TO ROOF CONNECTION**



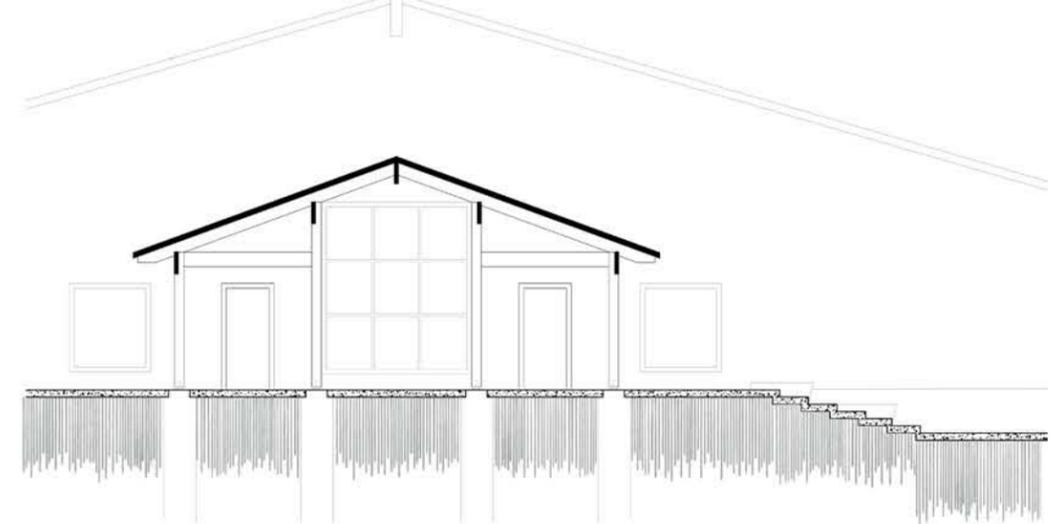
**ISOMETRIC DRAWING OF  
GREENHOUSE JOINT  
FROM FLOOR TO ROOF  
CONNECTION**



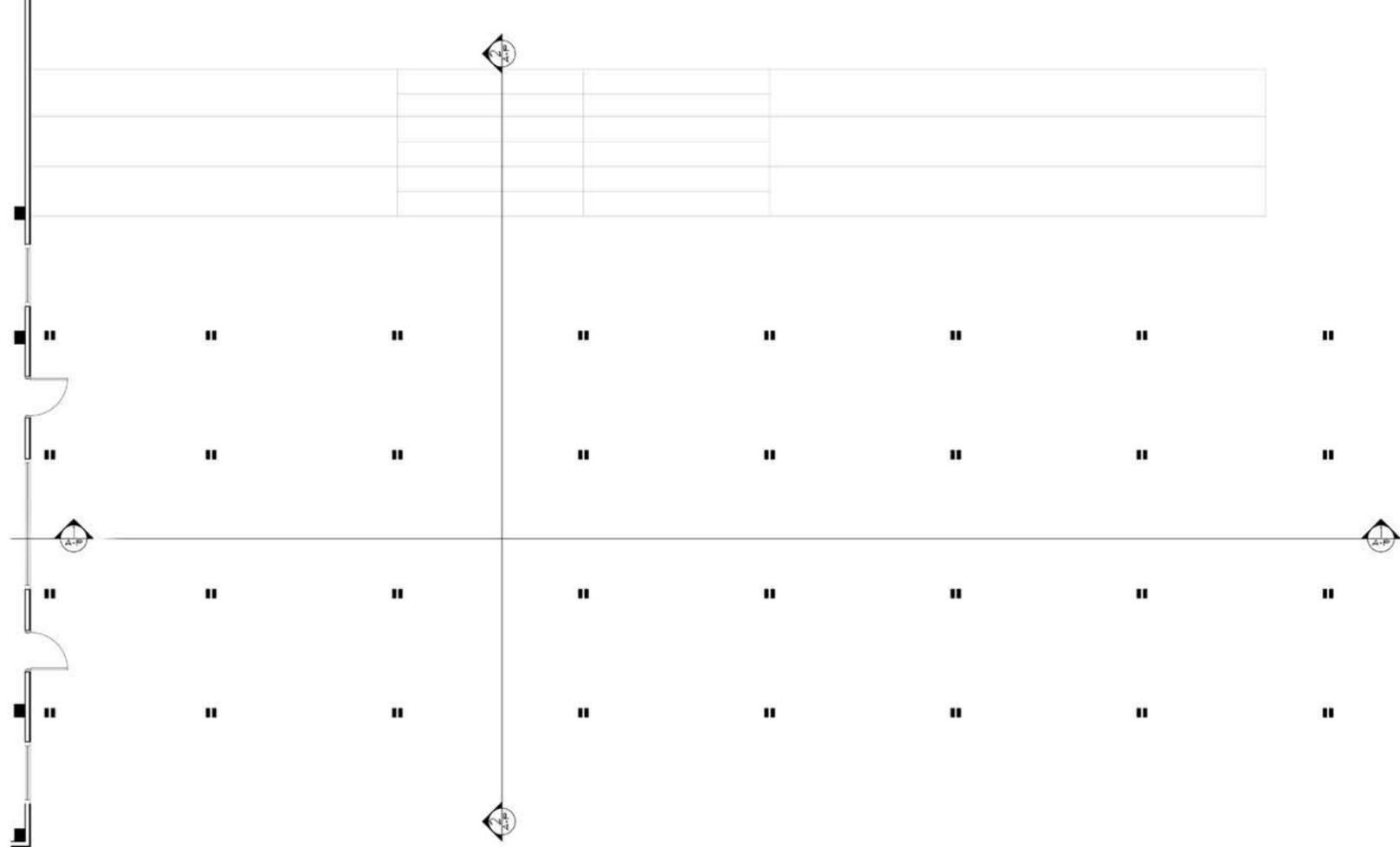
SECTION A-P 1



SECTION A-P 2

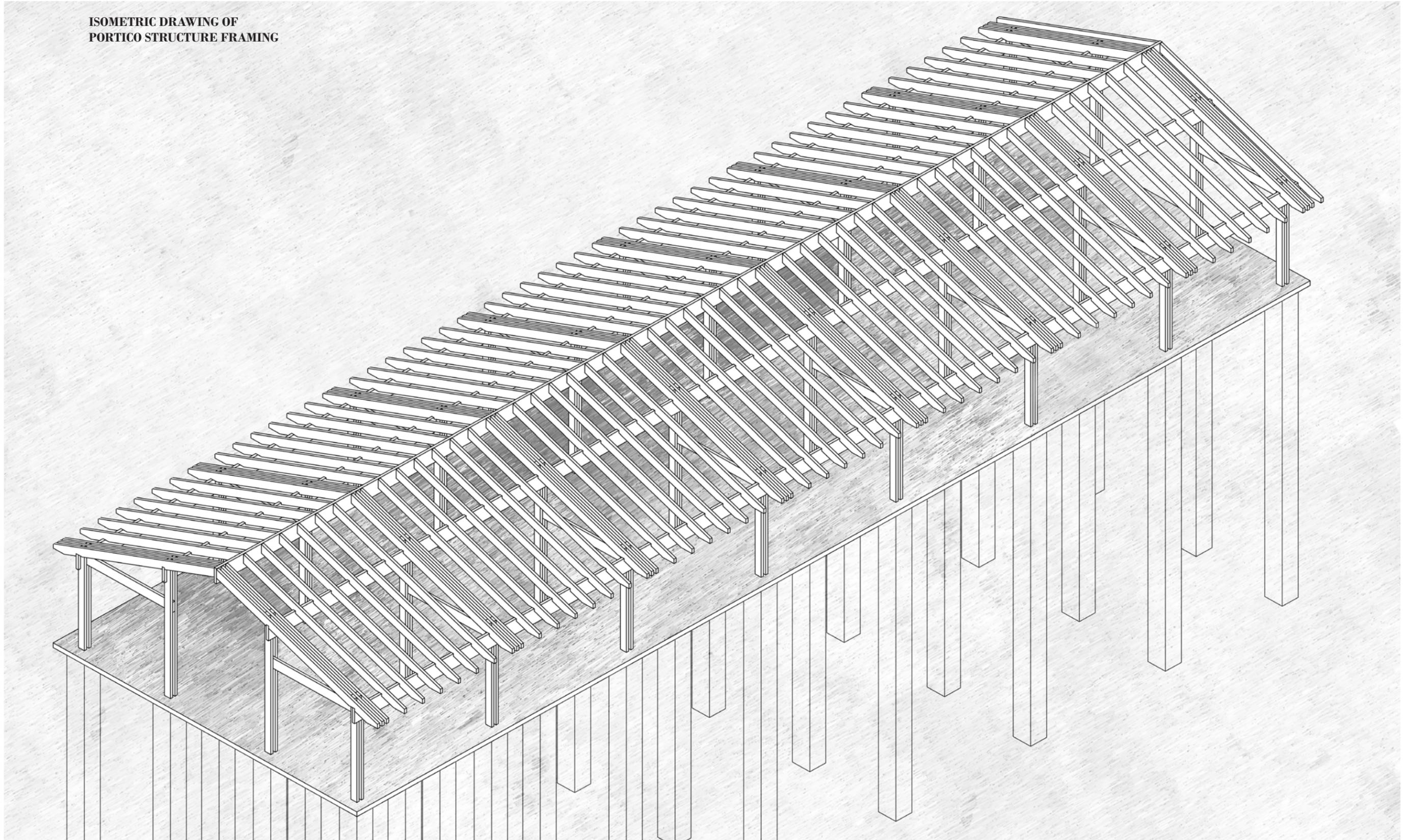


PLAN VIEW  
PORTICO STRUCTURE

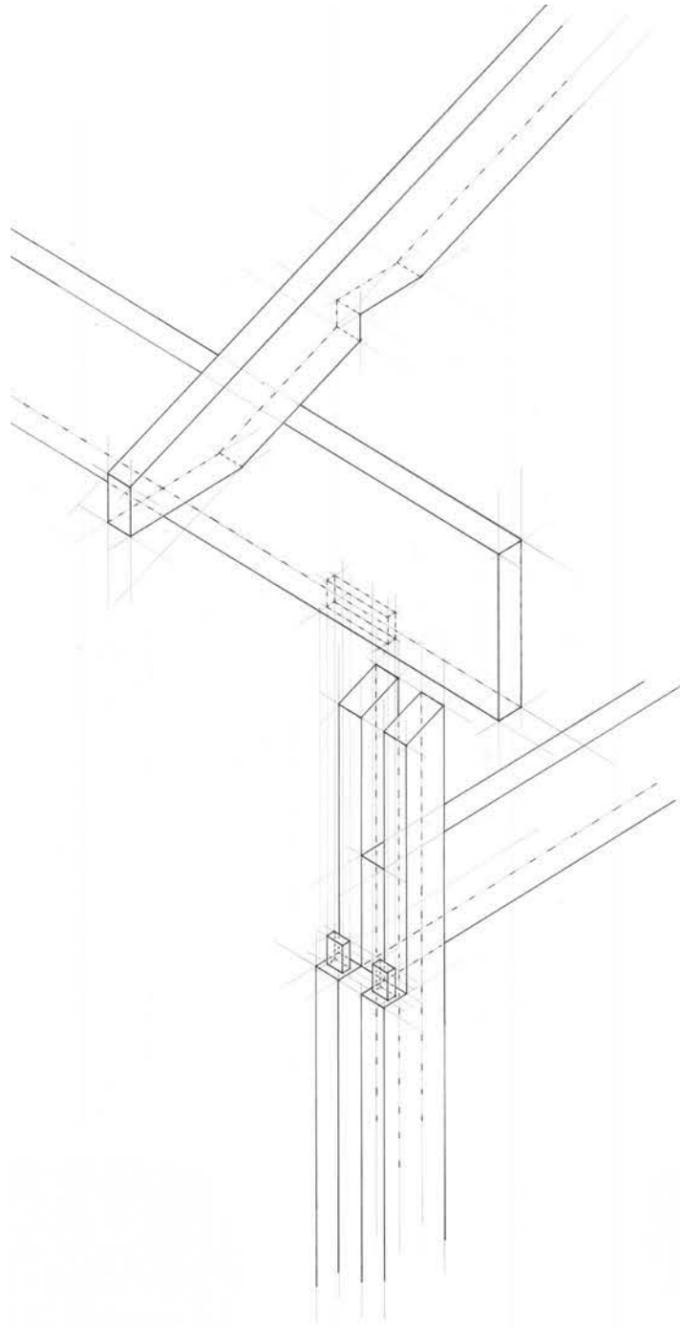


The placement of the greenhouses on the site created opportunity for an outdoor covered walkway (vendor area) and additional secluded areas for the market guests. Two additional structures were derived by the sites location, a small marina and breezeway connecting the enclosed structures to the docks.

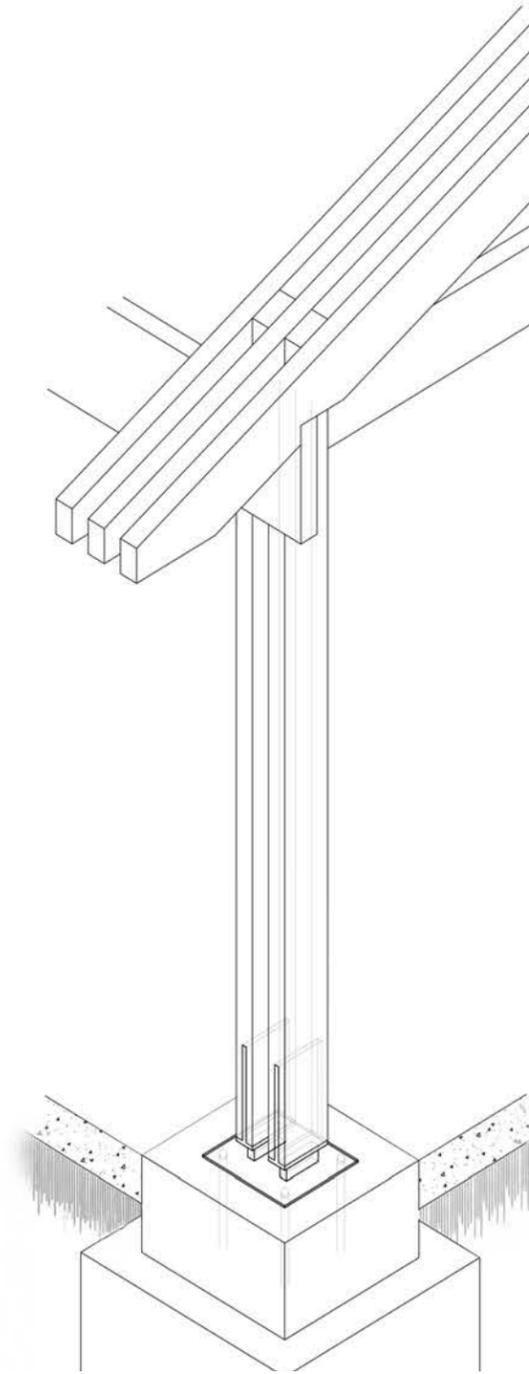
**ISOMETRIC DRAWING OF  
PORTICO STRUCTURE FRAMING**



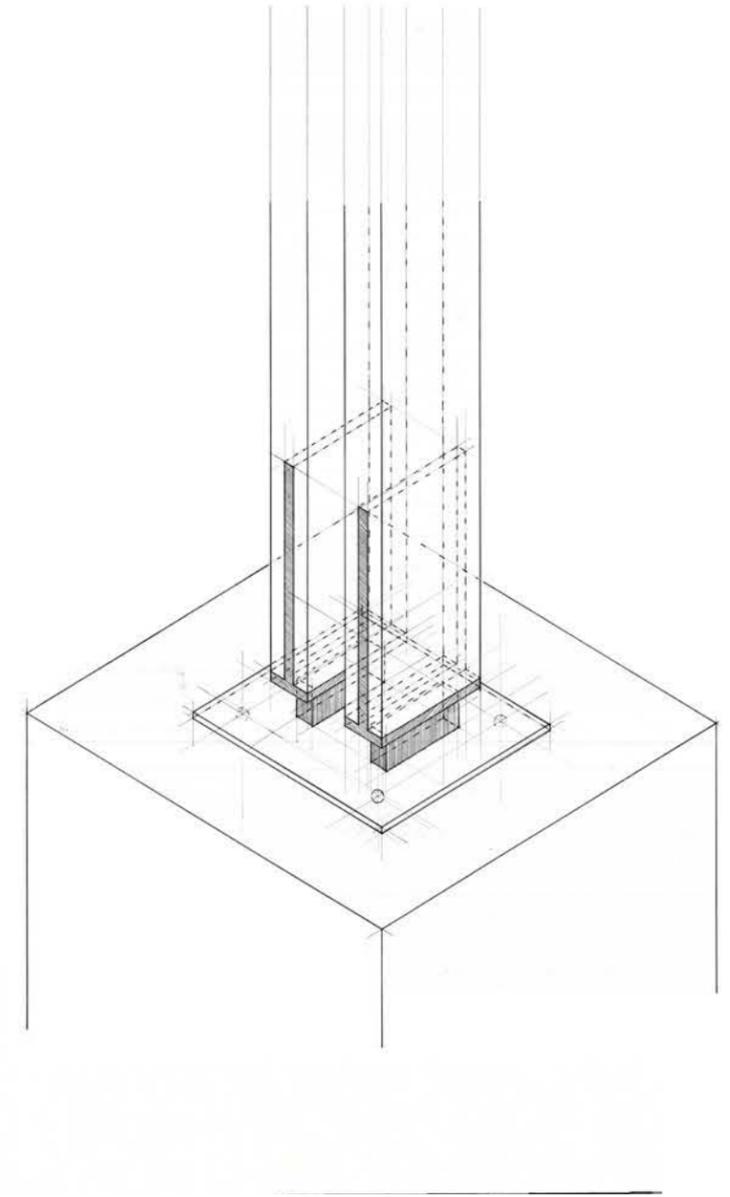
**EXPLODED ISOMETRIC DRAWING  
OF POTRICO JOINT**



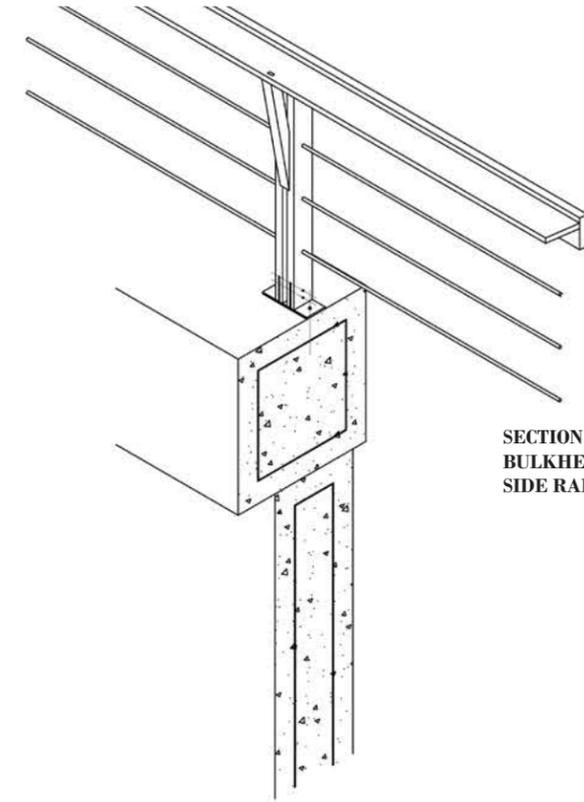
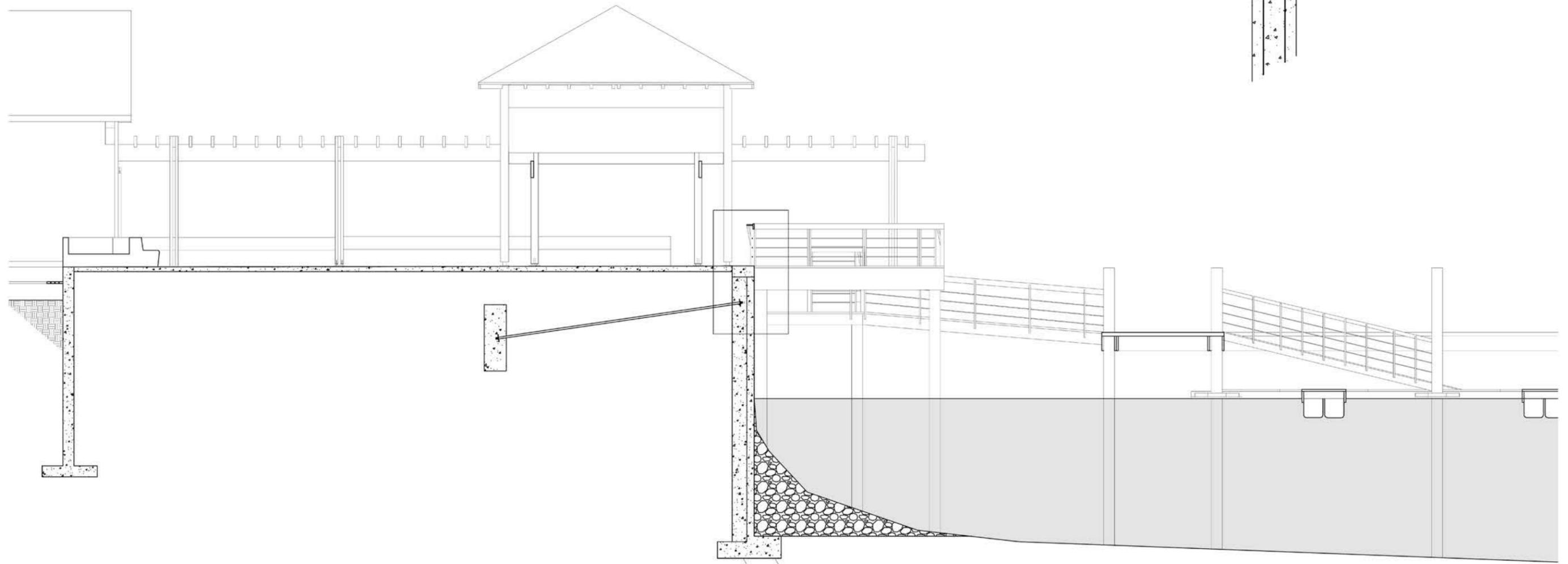
**ISOMETRIC DRAWING  
OF PORTICO CONNECTIONS  
FROM FLOOR TO ROOF**



**ISOMETRIC DRAWING OF  
PORTICO FLOOR CONNECTION**

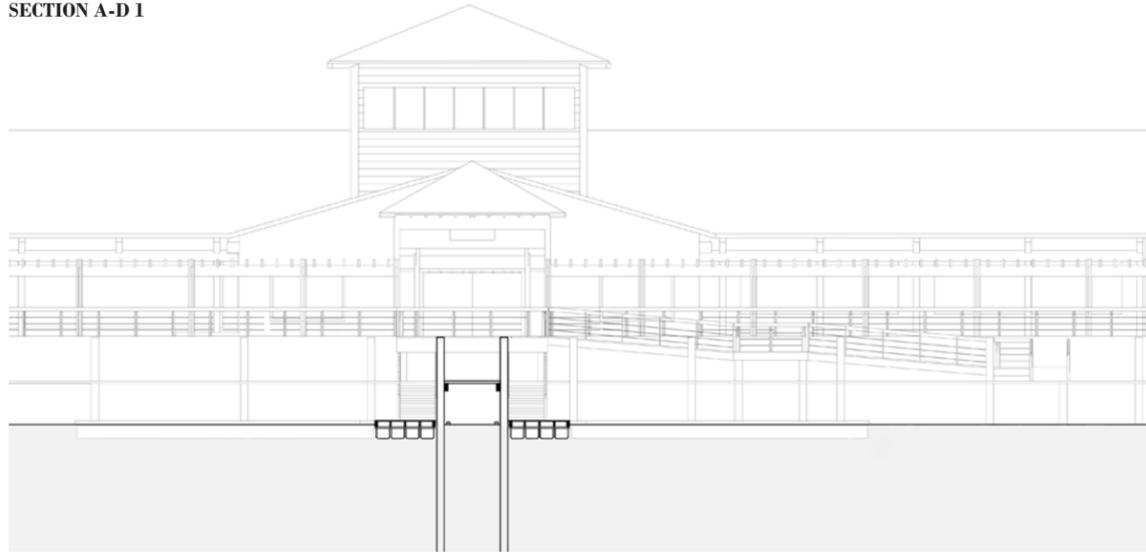


SECTION CUT THROUGH THE  
BULKHEAD AND BREEZEWAY

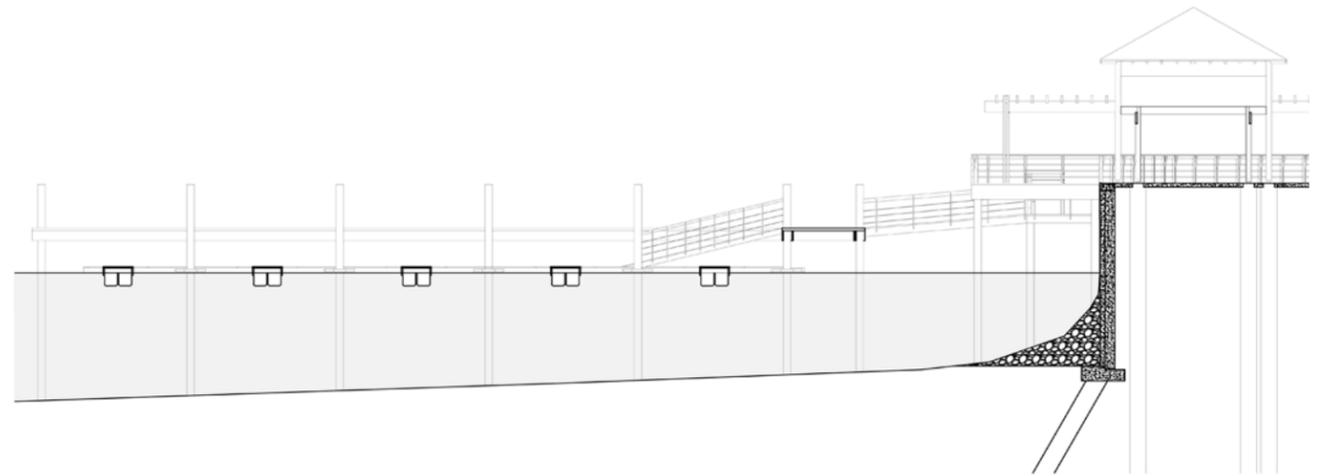


SECTION CUT THROUGH THE  
BULKHEAD SHOWING THE BAY-  
SIDE RAILING CONNECTION

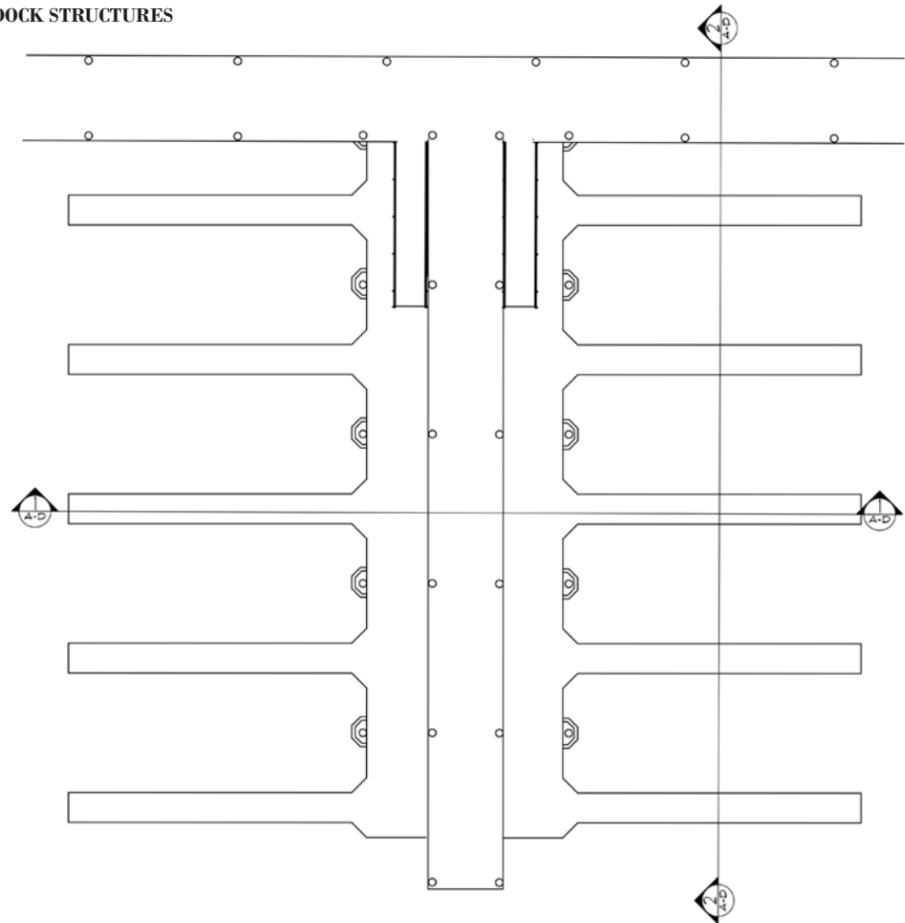
SECTION A-D 1



SECTION A-D 2



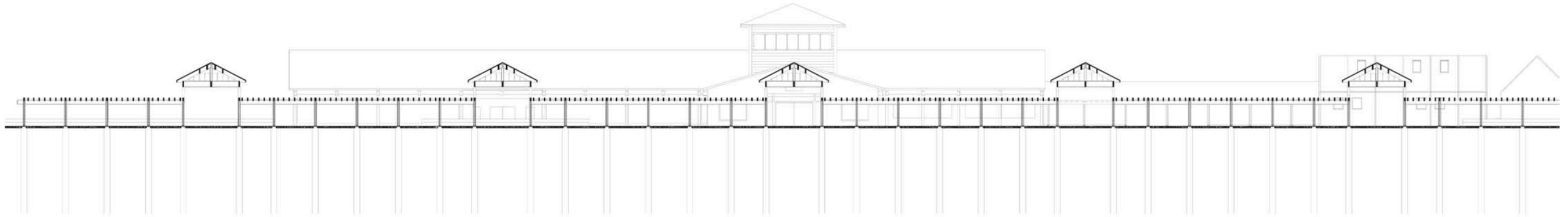
PLAN VIEW  
DOCK STRUCTURES



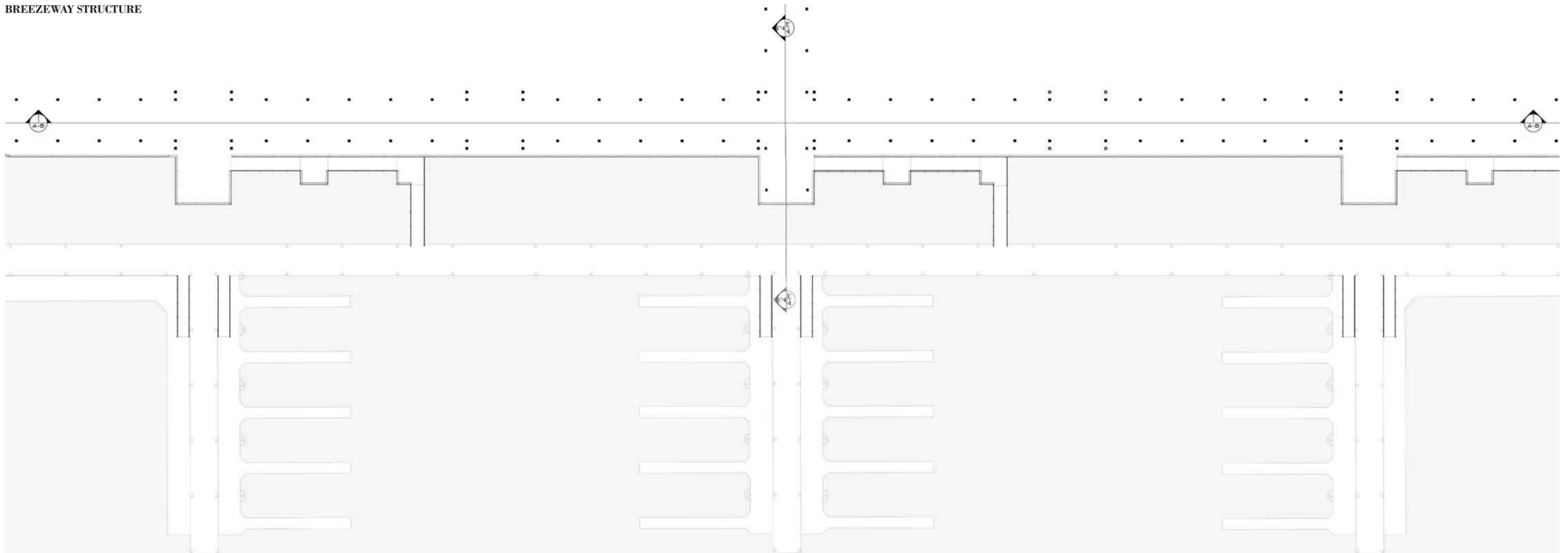
The docks allow for a variability of different boat types, including commercial boat slips up to forty feet in length and other private pedestrian boat traffic. The placement of the different structures was intended to create multiple opportunities for visitors to not only purchase goods, but also enjoy the communal and social aspects associated with a marketplace. Using the existing concrete footprint, left from the operations as a fishery and ferry terminal, a bench, spanning the length of the waterfront, was designed to create a safeguard to varying elevations and to create opportunities for guest to enjoy the natural beauty of the bay and serve as places of relaxation. It strategically aids in the separation of spaces, providing different interaction opportunities.

Each free-standing structure is an iteration of the original joint and structure used in the indoor market space. The project began with a hope to create a space constructed by one material of tectonic nature and developed into one that holds true to the original desire, with minimal variation for practical purpose. The result is a project developed from a single material idea that encompasses many site specific parts and serves as a place for the community.

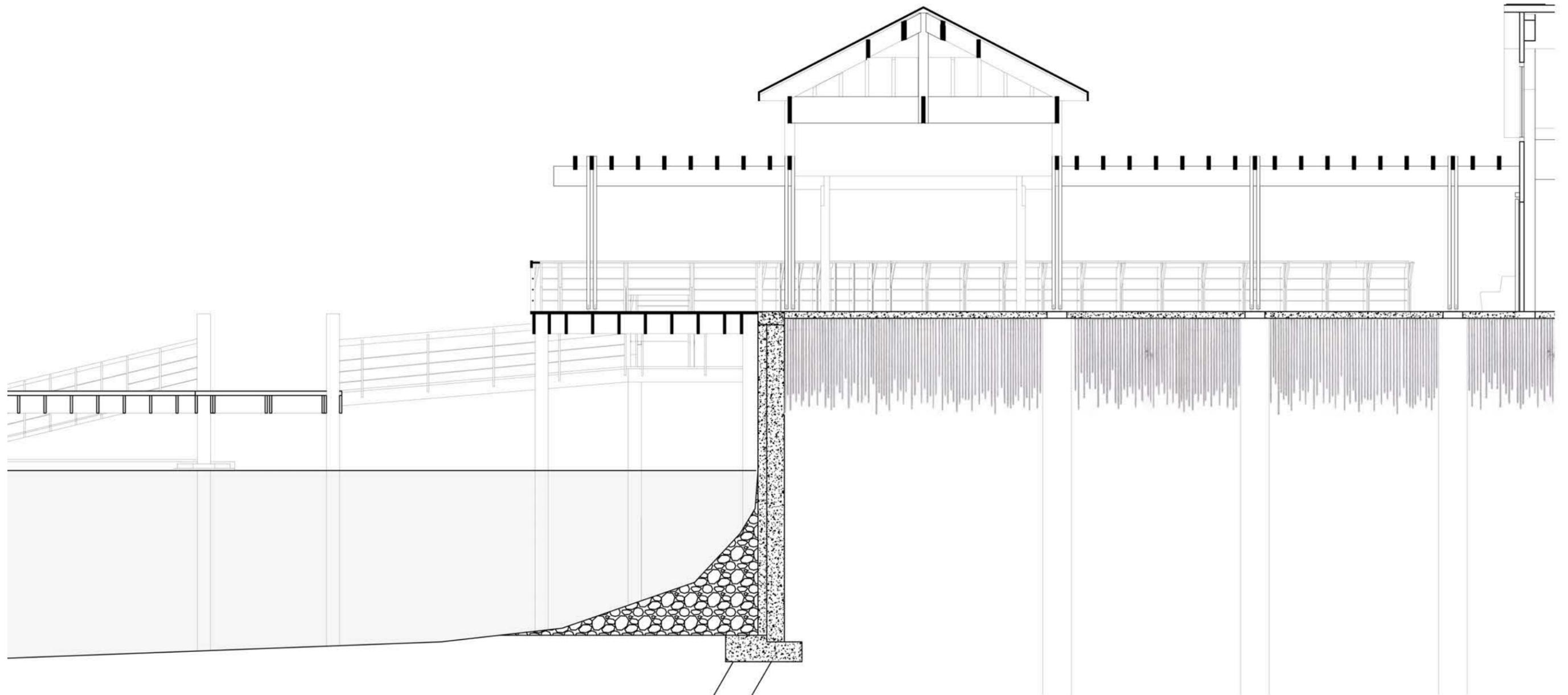
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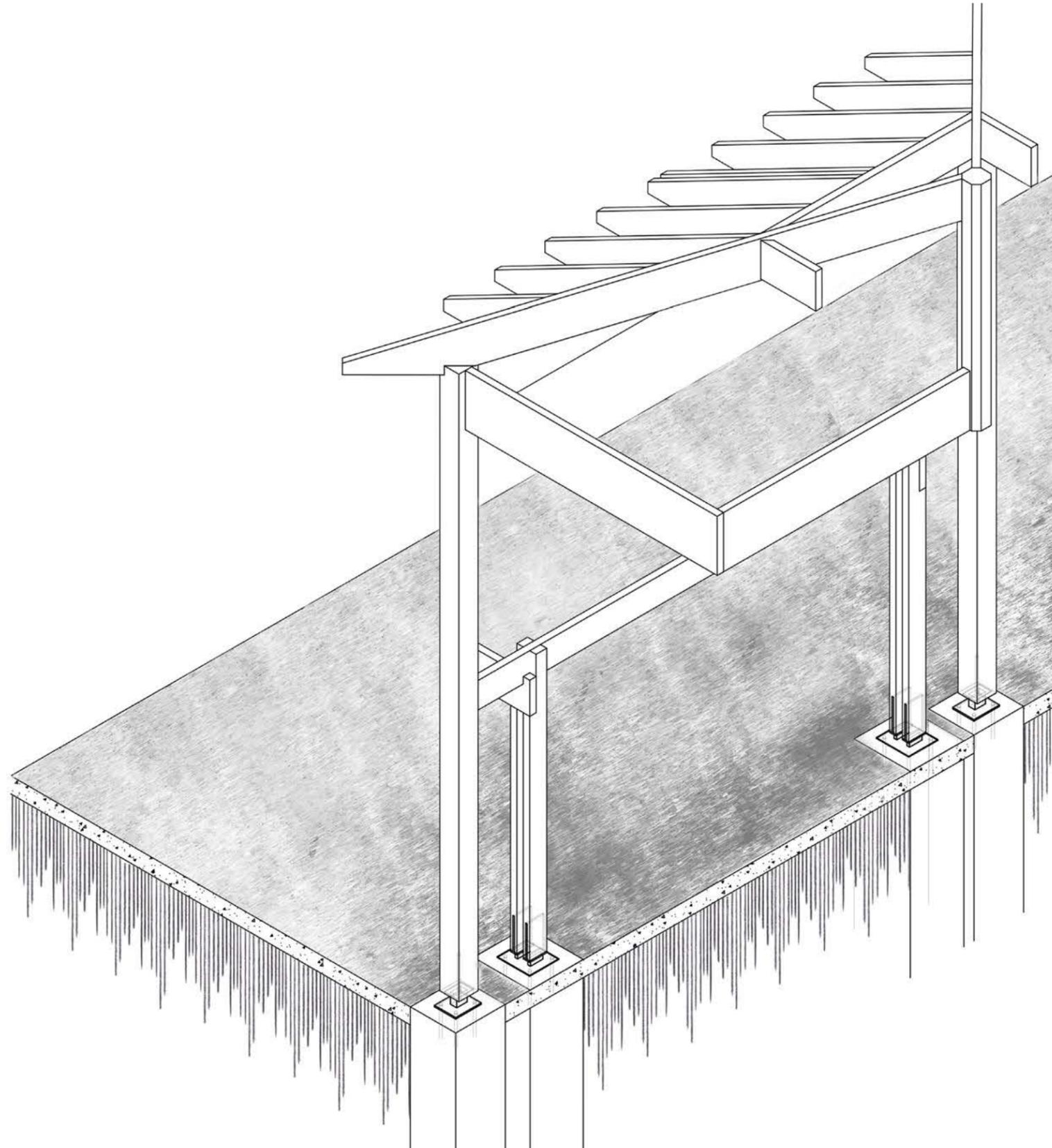
PLAN VIEW  
BREEZEWAY STRUCTURE



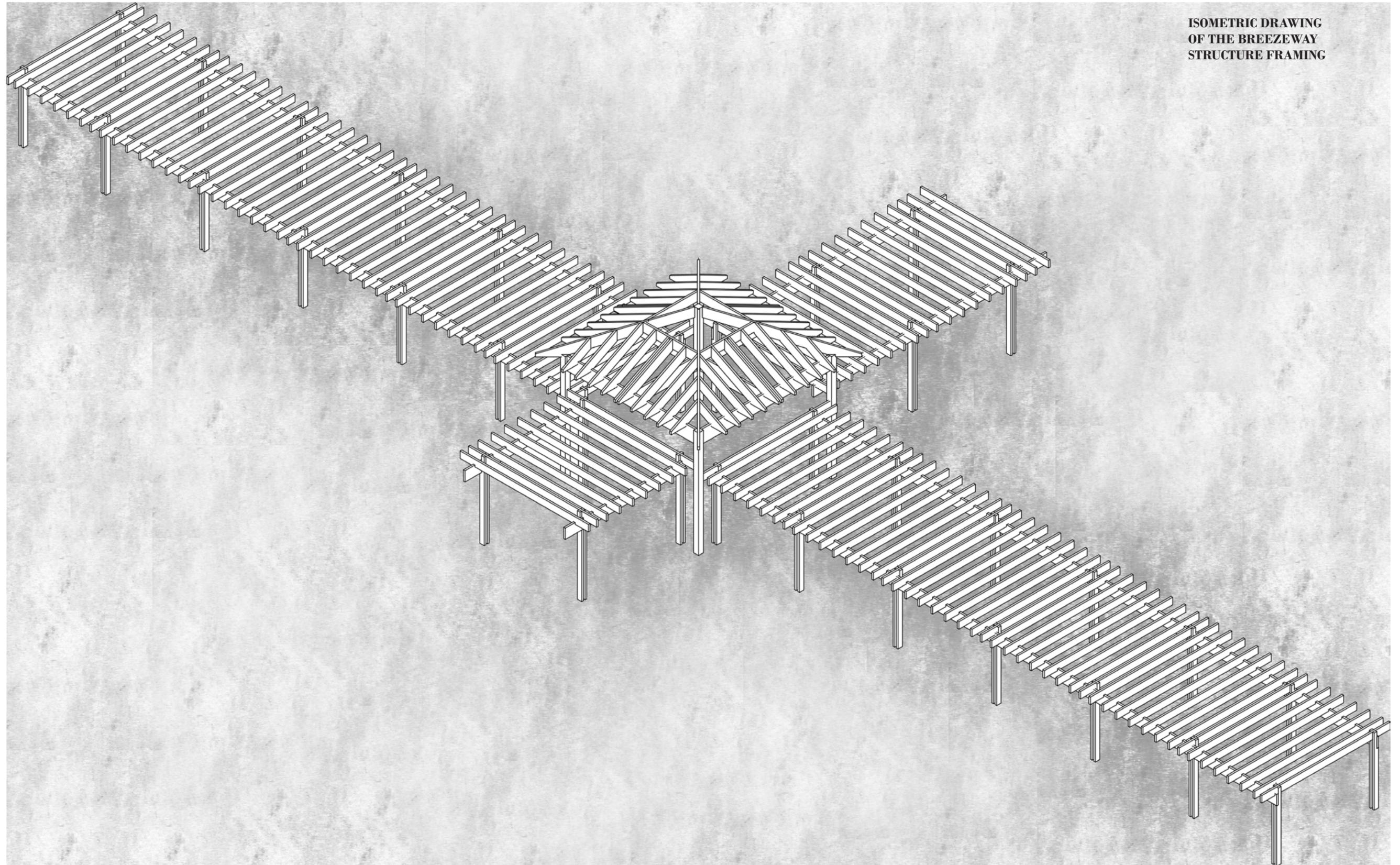
SECTION A-B 2



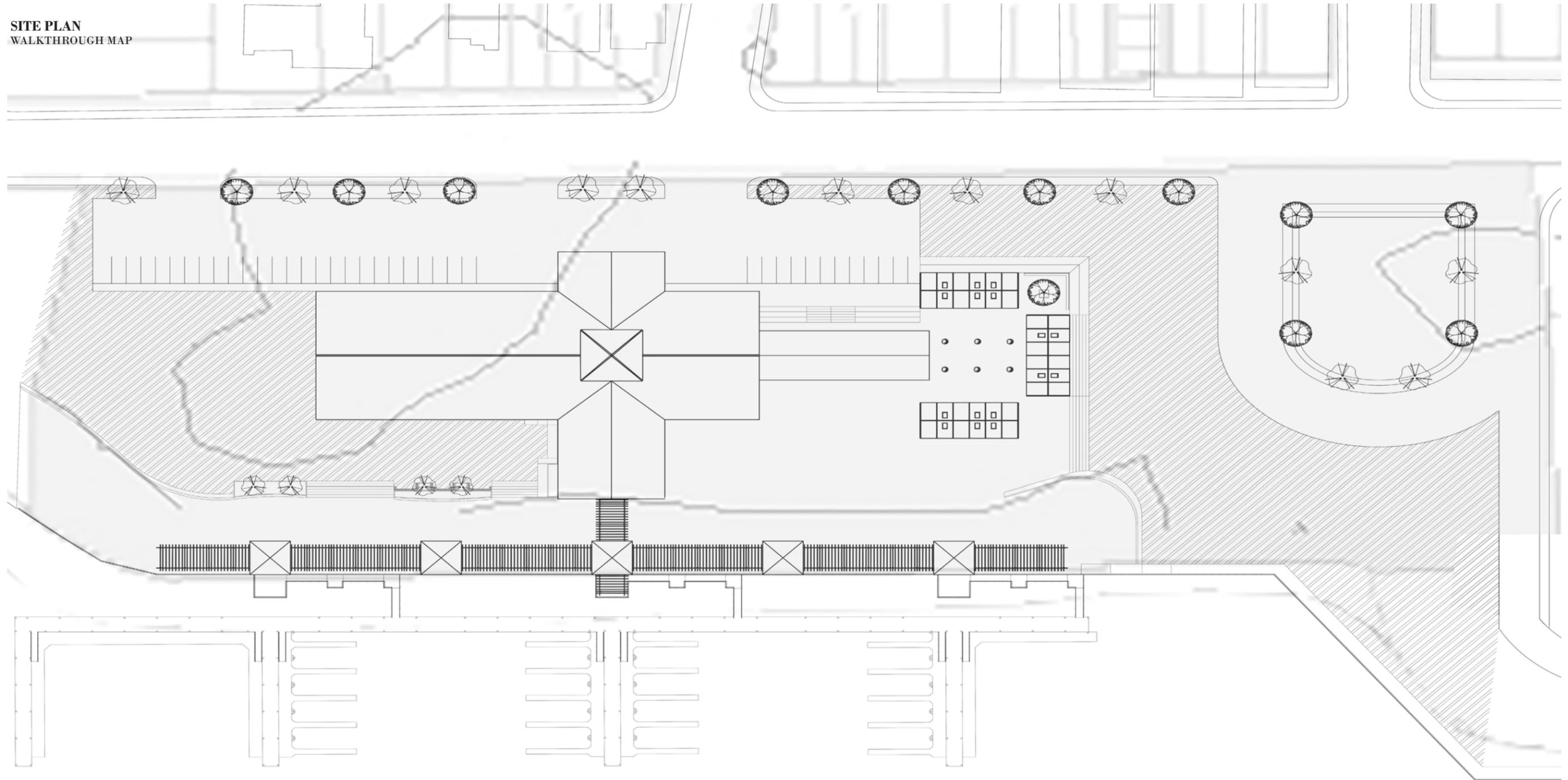
ISOMETRIC DRAWING OF THE BREEZEWAY  
CONNECTIONS FROM FLOOR TO ROOF

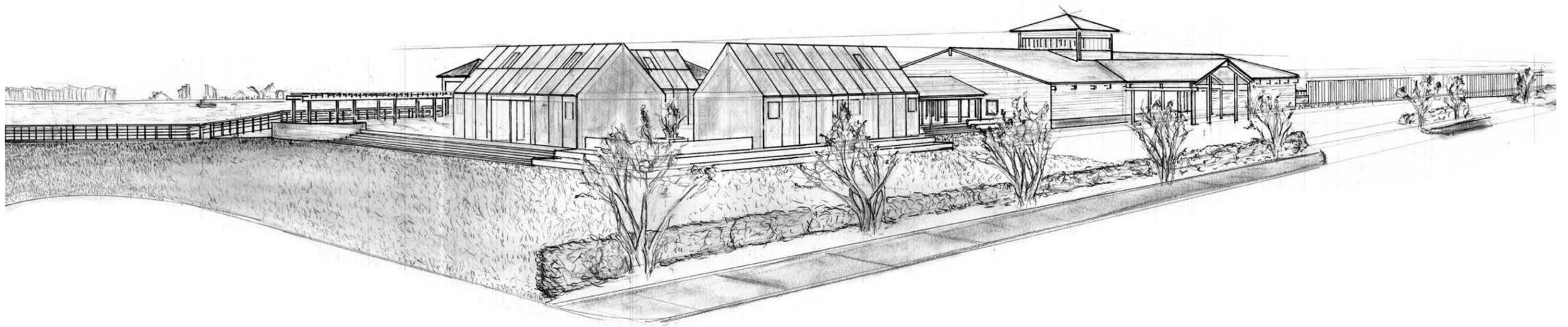


**ISOMETRIC DRAWING  
OF THE BREEZEWAY  
STRUCTURE FRAMING**

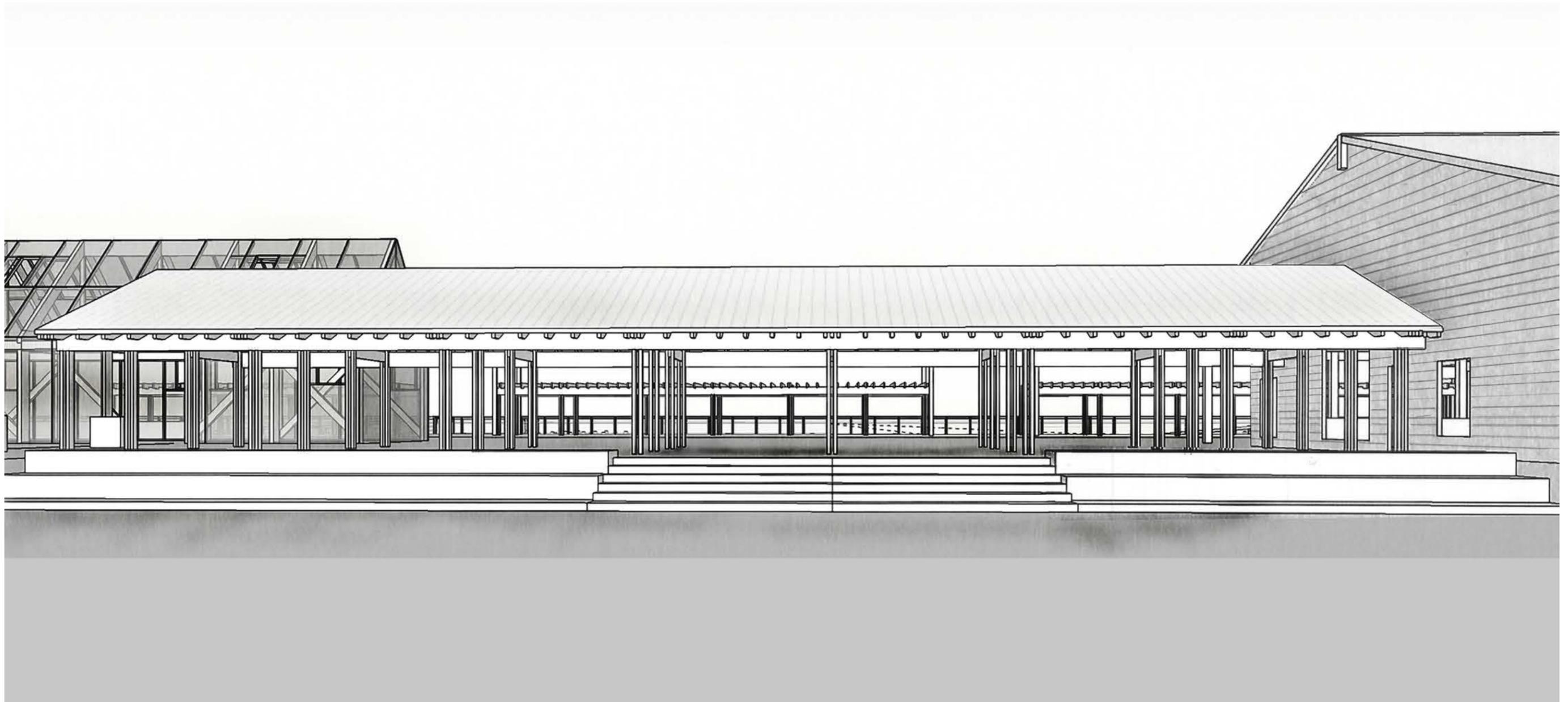


**SITE PLAN**  
**WALKTHROUGH MAP**

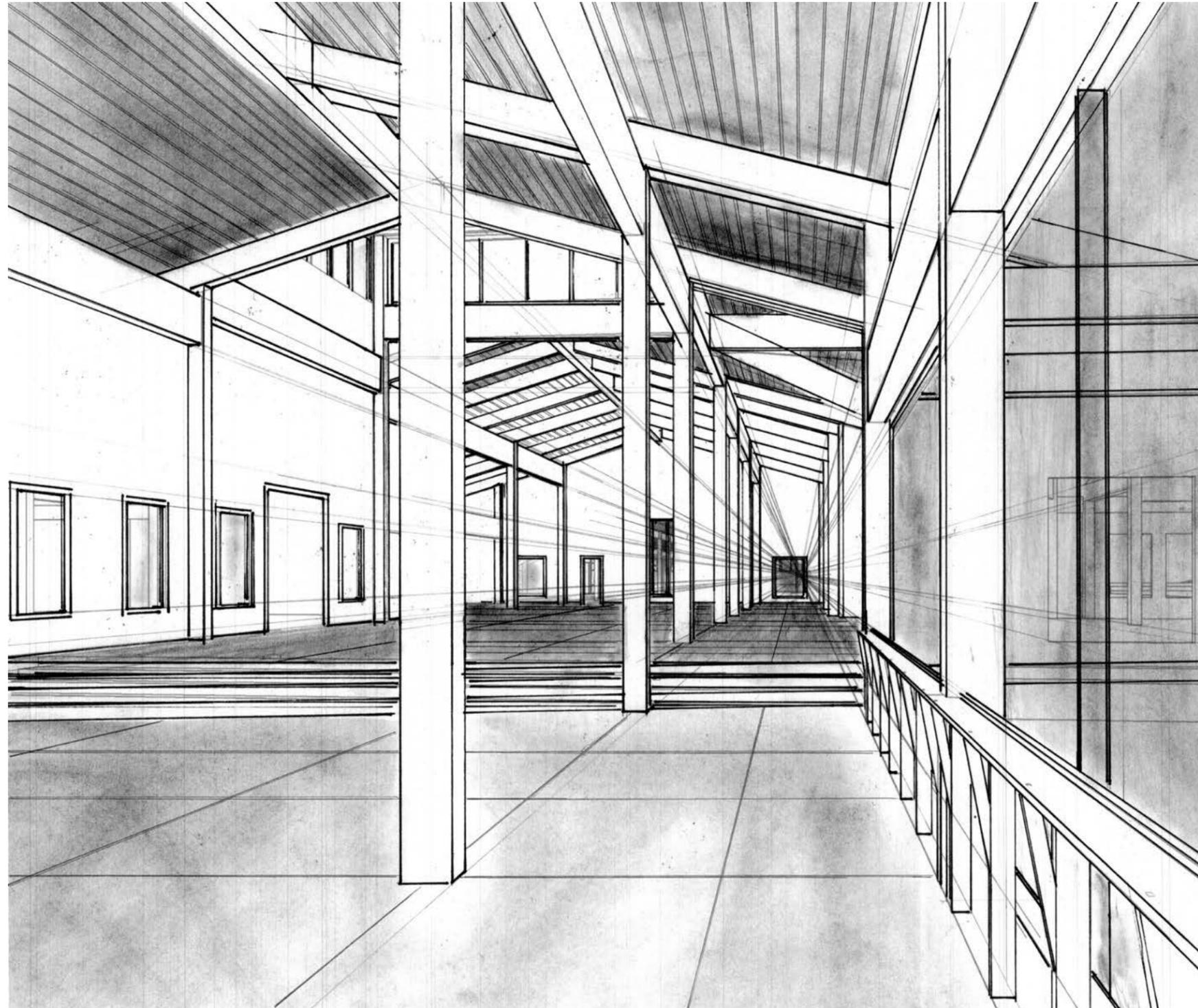




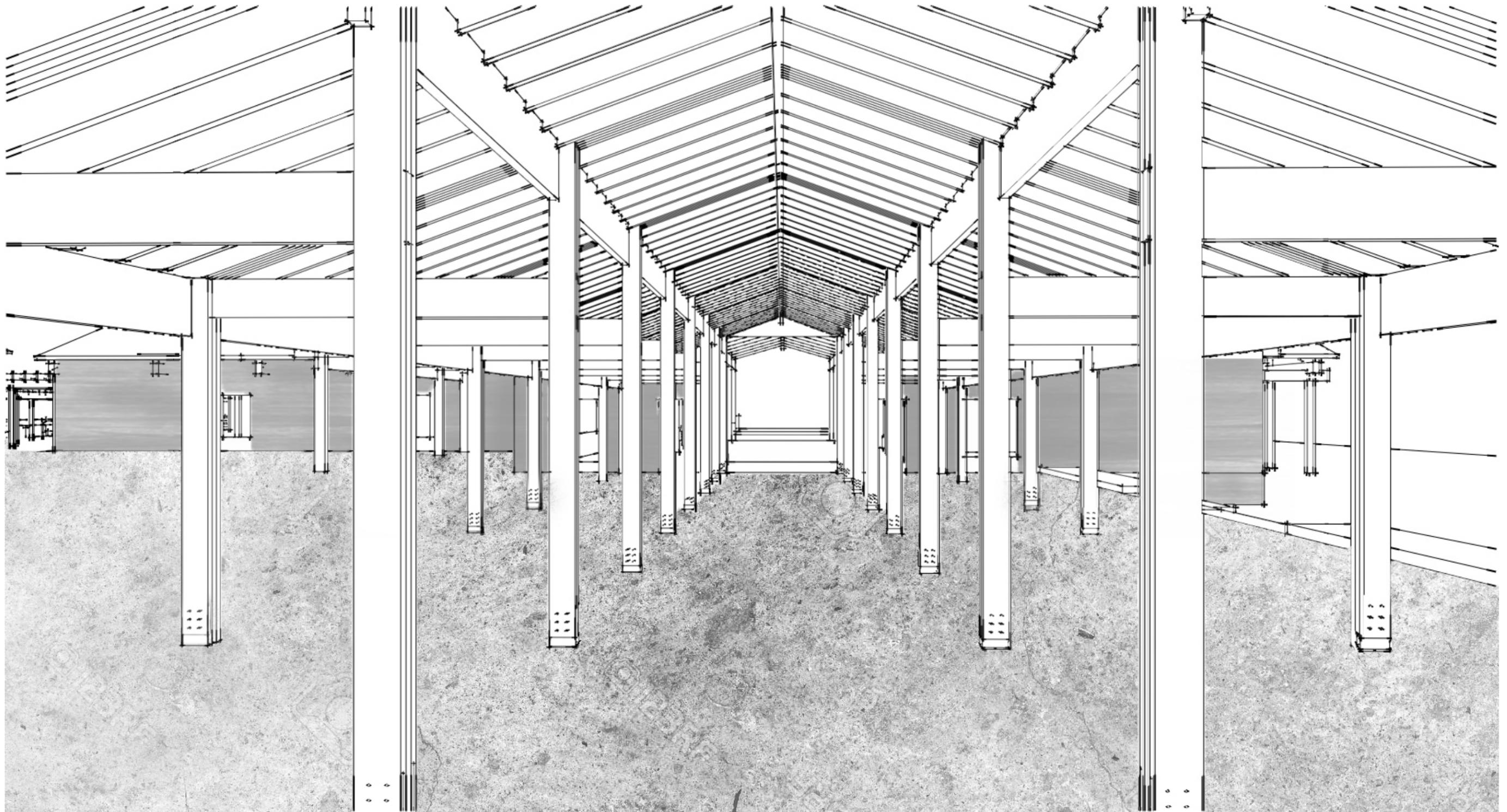
**STREET VIEW**



**STREET ENTRANCE TO PORTICO STRUCTURE**



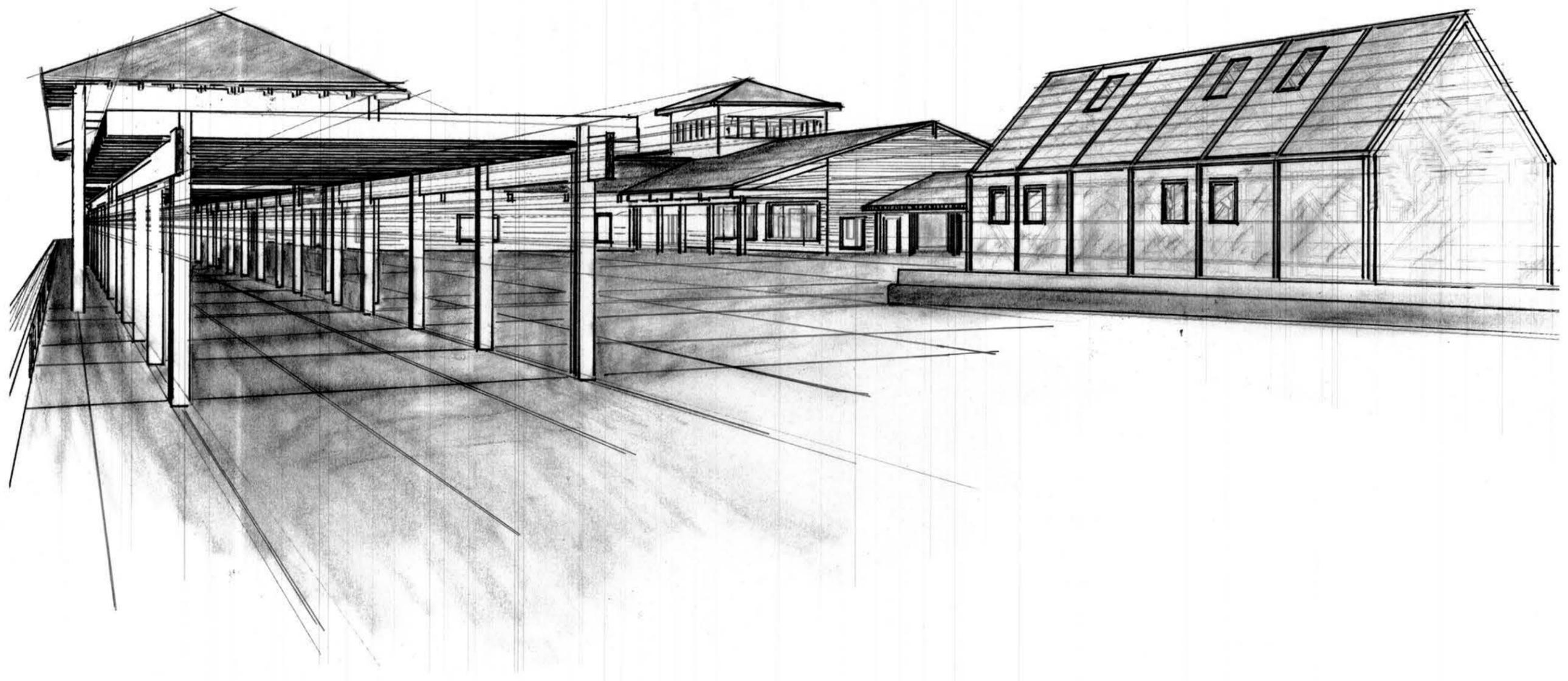
**INTERIOR PERSPECTIVE ENCLOSED MARKET STRUCTURE**



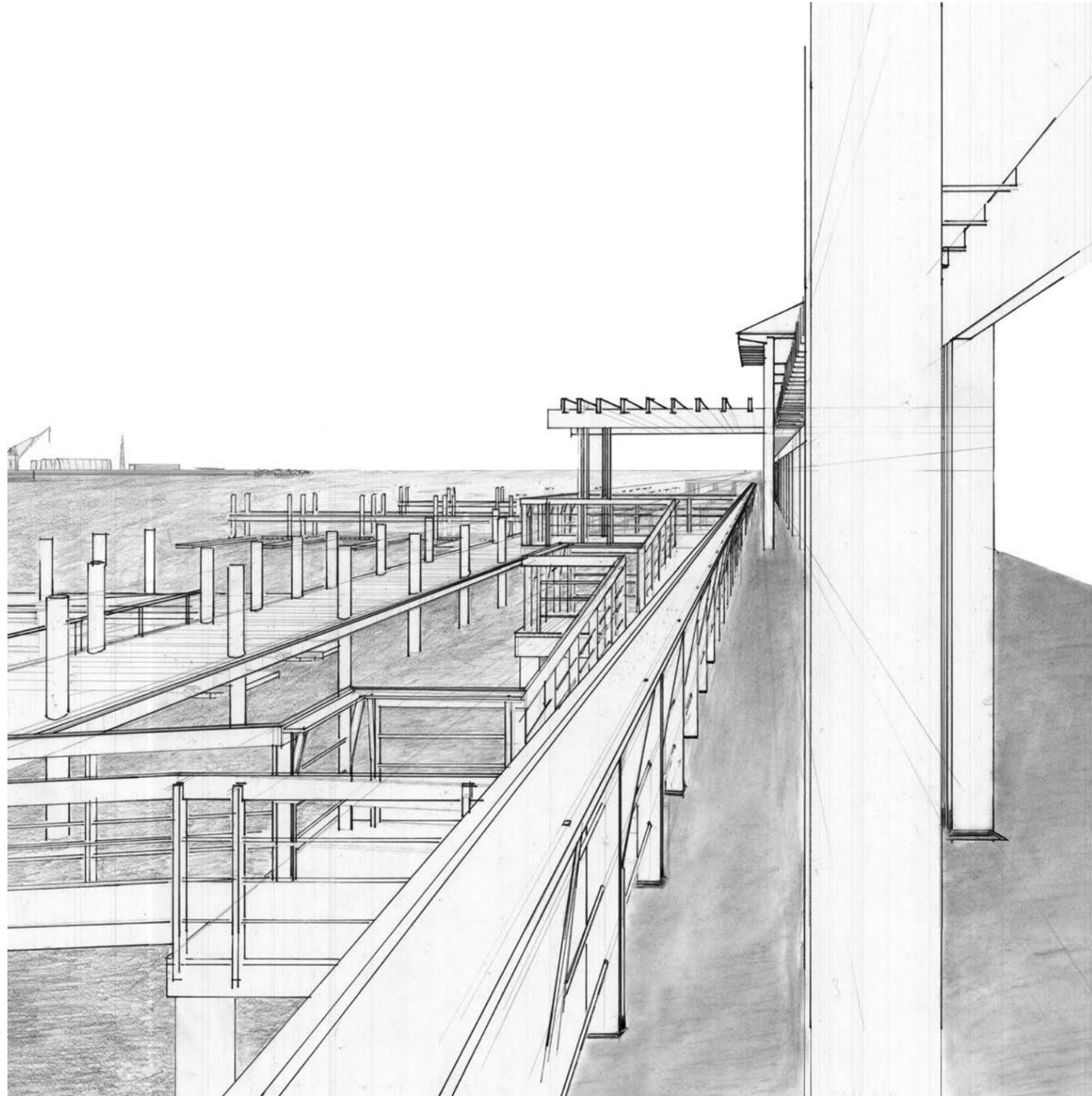
WEST FACING VIEW OF PORTICO STRUCTURE



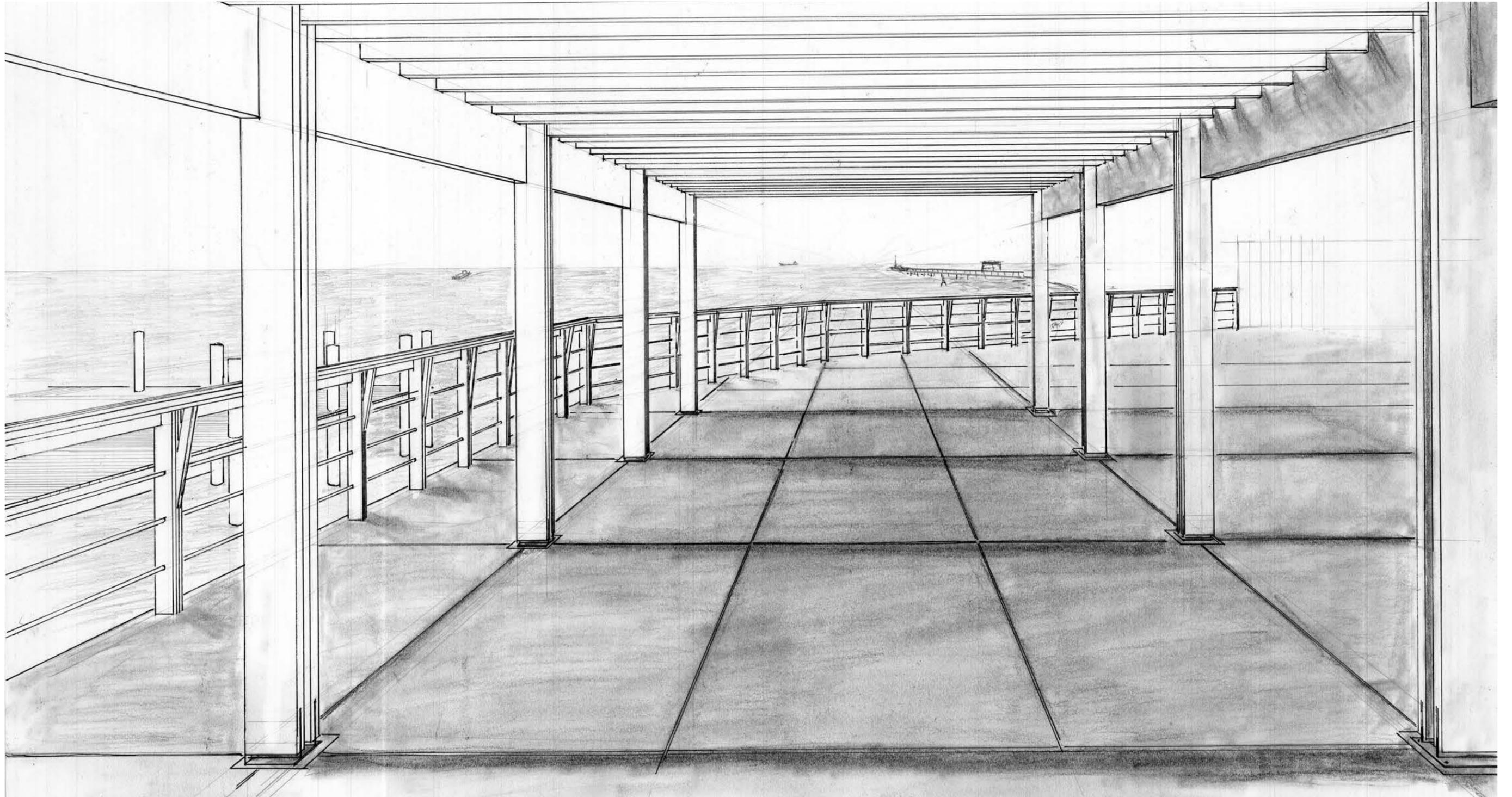
GREENHOUSE COURTYARD



EAST ENTRANCE TO MARKET



**WEST VIEW OF DOCK AND BREEZEWAY STRUCTURES**



**WATERWAY VIEW FROM BREEZEWAY**



SOUTHWEST COURTYARD