

GRAND MARAIS MARITIME MUSEUM AND RESEARCH COMPLEX

FRAN DI CAPRIO

M.ARCH FALL 2022 DESIGN STUDIO
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PROJECT OVERVIEW

In the northern Minnesota town of Grand Marais, a small Coast Guard complex exists along an isthmus projecting into Lake Superior. The four buildings - a primary building with living quarters and offices, a garage, a small shed, and a boathouse - were officially decommissioned in the summer of 2022. As the community of Grand Marais was considering new uses for the land, my Fall 2022 studio instructors tasked me and my classmates with designing a maritime museum for the site.

My approach focused on welcoming the community back to the land now that the Coast Guard had turned the buildings over to the city. Three moves defined my approach. First, the parking lot that occupied much of the isthmus is removed and rewilded. Second, the existing buildings are gutted and converted into open air gathering and performance spaces. Third, several small scale new buildings housing the museum program are set lightly all along the length of the isthmus. Through these interventions, the entirety of the isthmus becomes a destination, instead of a liminal space for accessing the ends of the peninsula.



Site plan

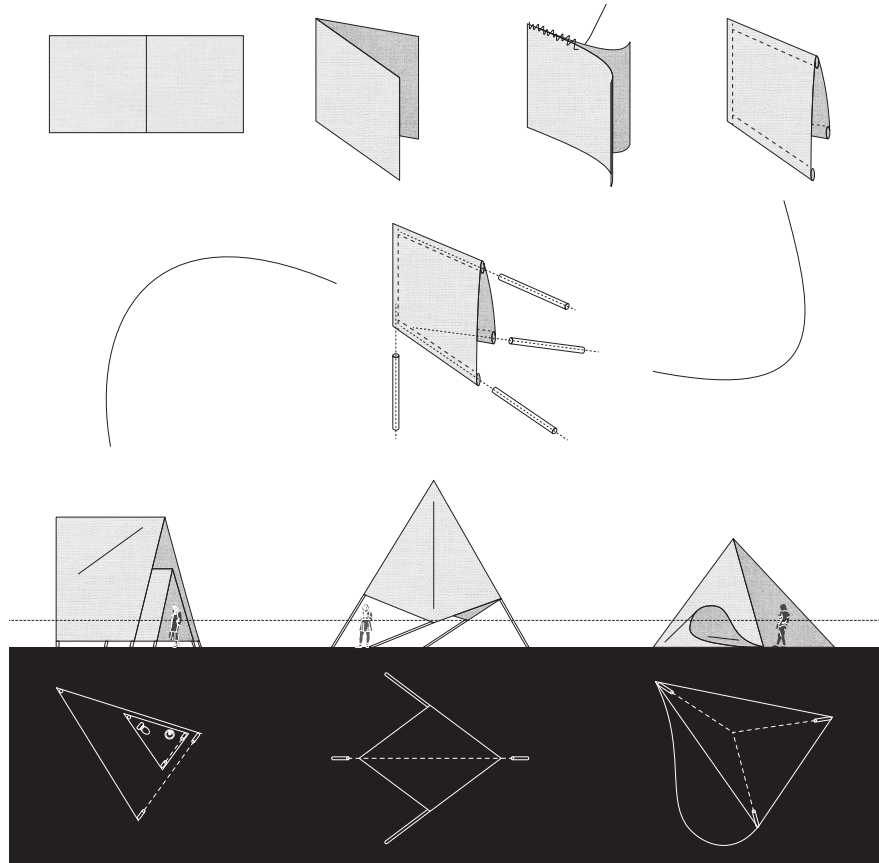
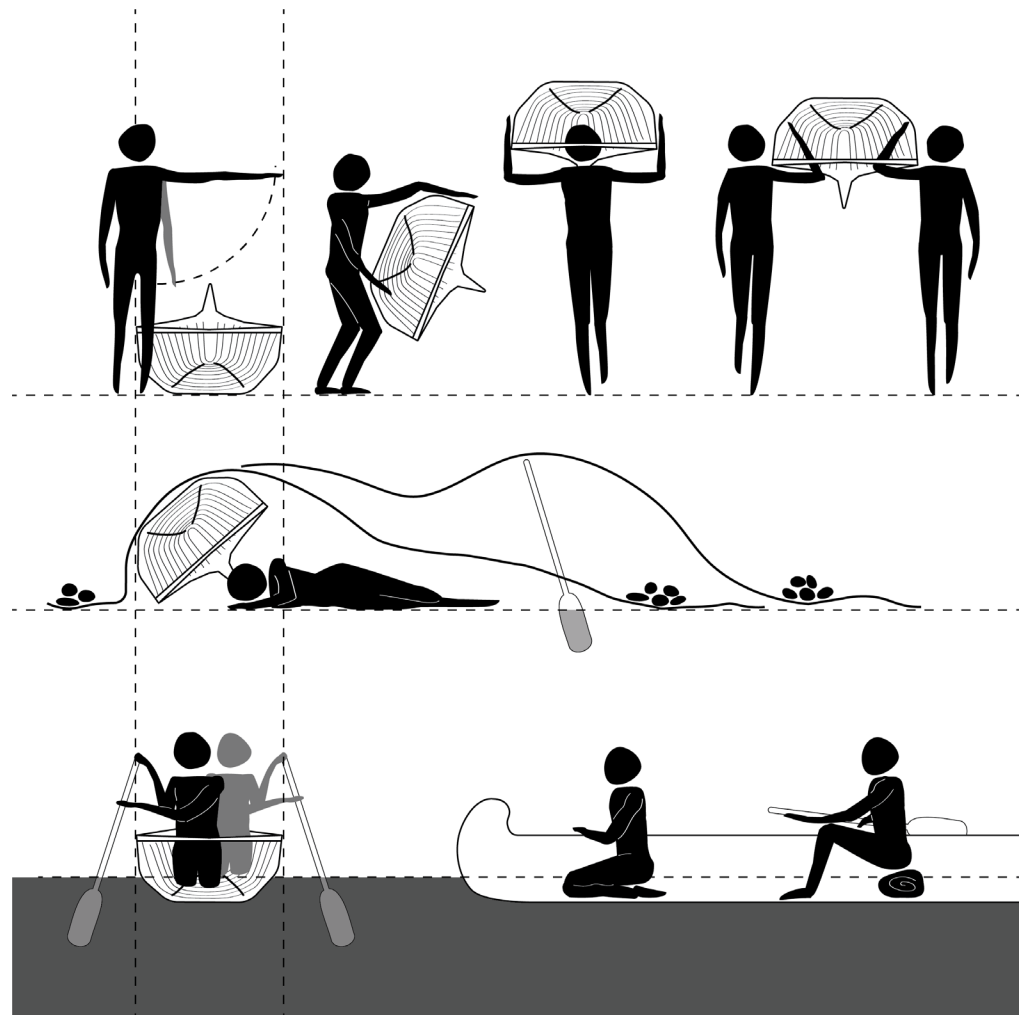
Site photos. Taken by various classmates.



INSPIRATION & CONCEPT

Design began by researching the history of maritime activity in the region. I studied the history of birchbark canoes, dating back to their use by the Anishinaabe people prior to European colonization. Canoe building is still practiced along the North Shore, a testament to the strength of the design. The flexibility of the canoe form, its use of local materials, and the ability for the form to scale to many lengths and sizes, all informed my design process. Experimental physical models inspired by canoe construction eventually led to a simple geometric form that carried through the rest of the project.

A visual analysis of canoe uses and ergonomics.



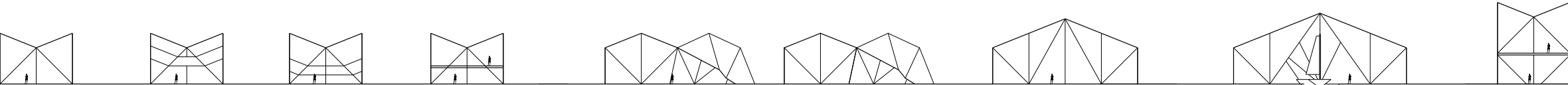
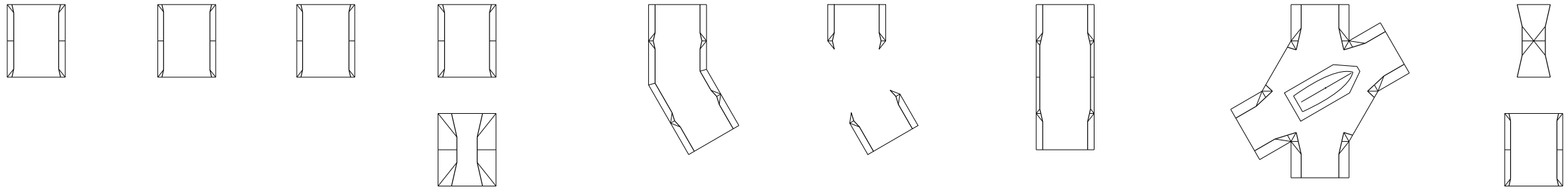
Physical models, inspired by canoe construction.

Diagram of physical model construction and 3 possible arrangements for human occupancy.

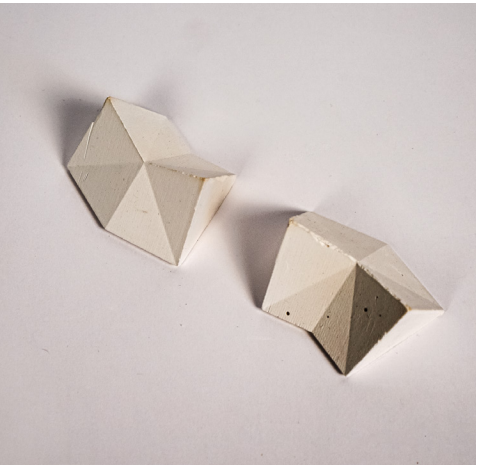
A conceptual photo collage, imagining how forms developed from physical modeling could be set upon the site.



BASE LOW WINDOW HIGH WINDOW 2 STORY BEND POINT CONNECTION HIGH CEILING CROSSING DIAMOND



The physical modeling efforts produced a base unit composed of two A-frames, connected by triangular panels. I explored the many possible arrangements and uses of this unit by making a typology of forms.

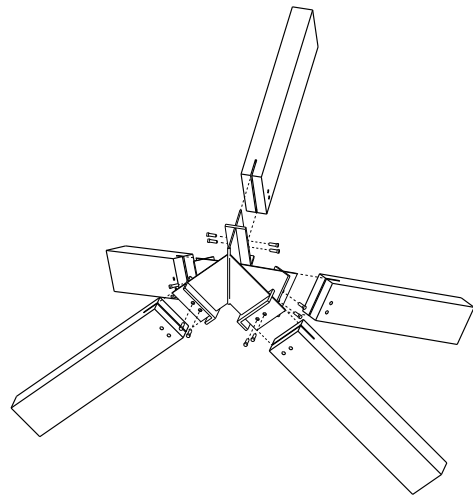


Plaster cast models

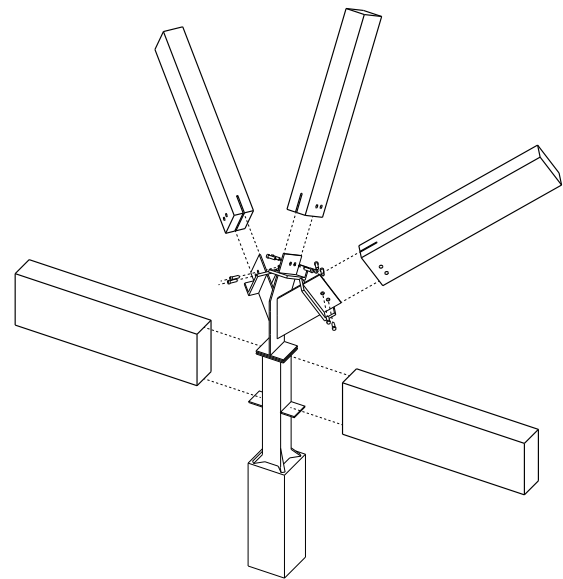
STRUCTURAL APPROACH

The structural system I settled on was a unique arrangement of interconnected A-frames, made from glue-laminated beams and joined together with custom steel plate and bolt connectors. By alternating A-frames of different heights across the length of the linear structures, a rising and falling roof shape is defined that reflects the jagged rockscape of the isthmus. Upon the glulam elements rests triangular dowel laminated timber panels. The entire structure is elevated off the ground upon steel supports, in deference to the natural landscape and in consideration of the tendency for the area to flood.

Axonometrics of the glulam connections

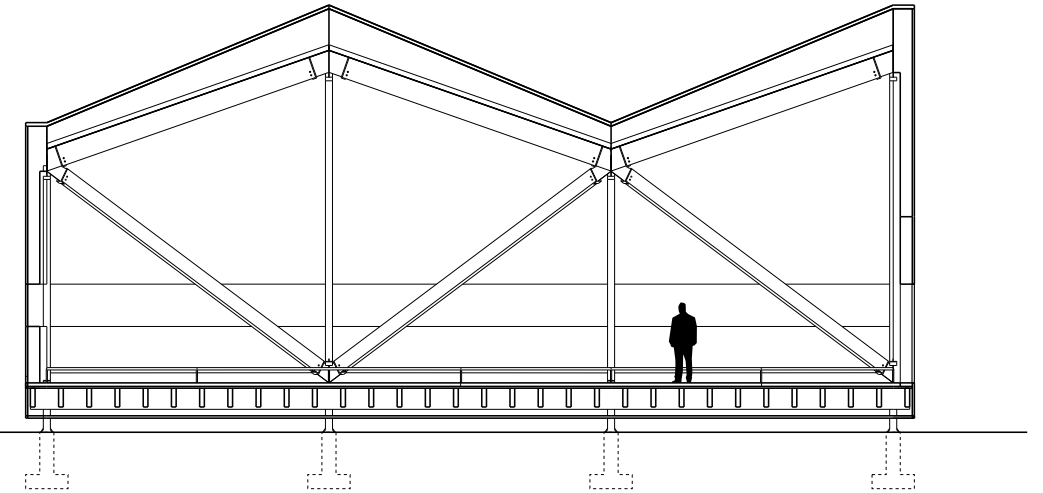
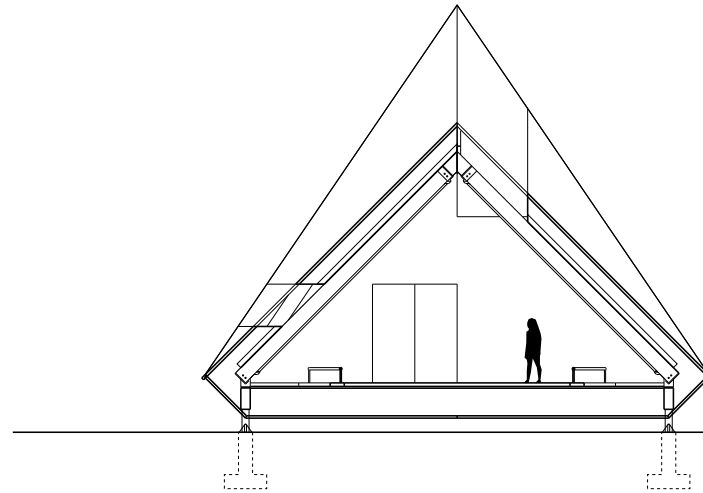
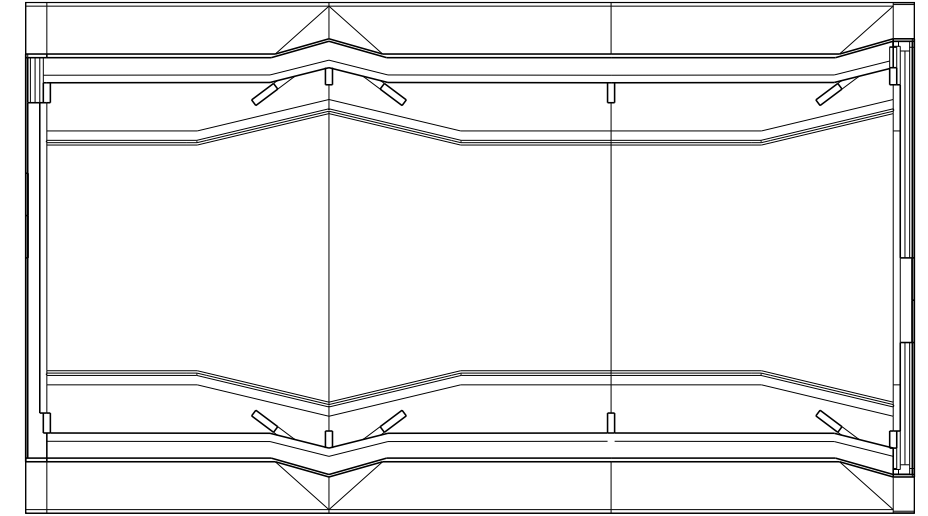
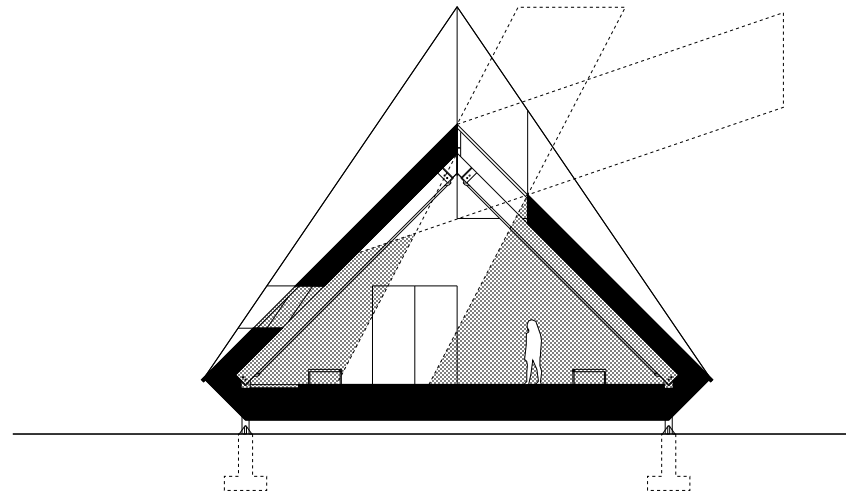


5-POINT ROOF CONNECTION

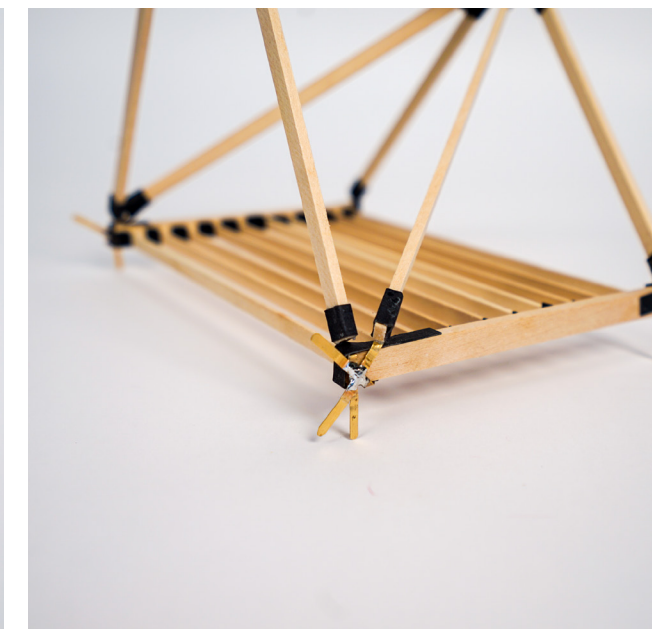
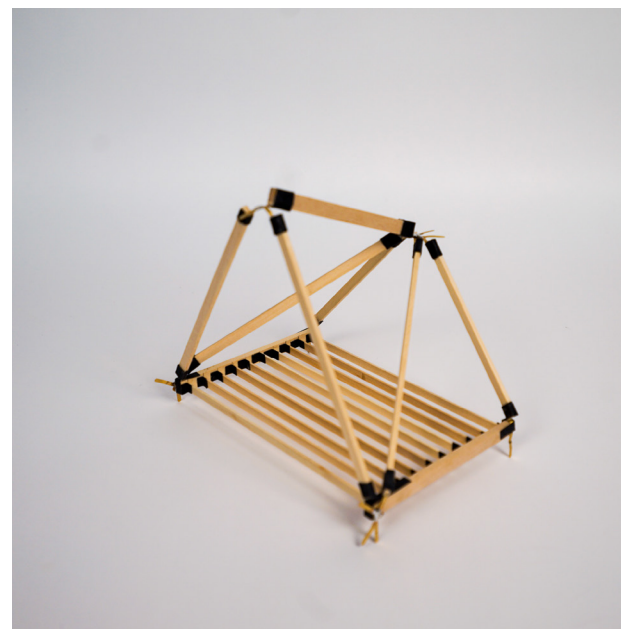


3-POINT FLOOR CONNECTION

Typical plans and sections



Structural physical model

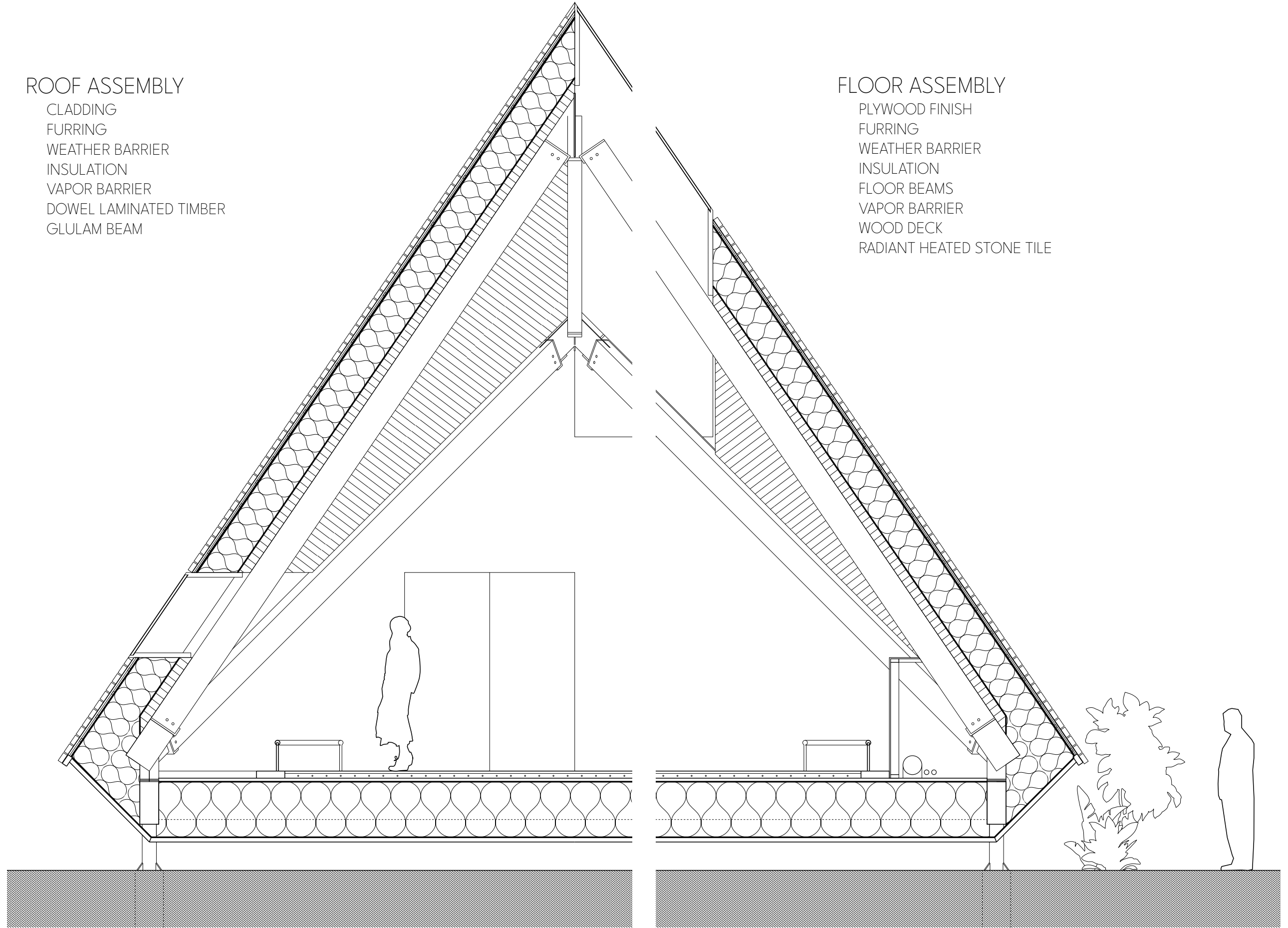


ROOF ASSEMBLY

- CLADDING
- FURRING
- WEATHER BARRIER
- INSULATION
- VAPOR BARRIER
- DOWEL LAMINATED TIMBER
- GLULAM BEAM

FLOOR ASSEMBLY

- PLYWOOD FINISH
- FURRING
- WEATHER BARRIER
- INSULATION
- FLOOR BEAMS
- VAPOR BARRIER
- WOOD DECK
- RADIANT HEATED STONE TILE



Roof and floor sections

SITE PLAN

The final site plan involved 8 new buildings, each with a distinct programmatic function. The buildings were arranged with three considerations in mind. First, a gradient of public to private from north to south. Second, orienting the buildings lengthwise toward the southern sun. Third, ensuring that visitors would have a direct view of the lake from any point on the isthmus.



Final building models for presentation.



Building models upon the site model.
Site model made in collaboration with classmates.

Site plan

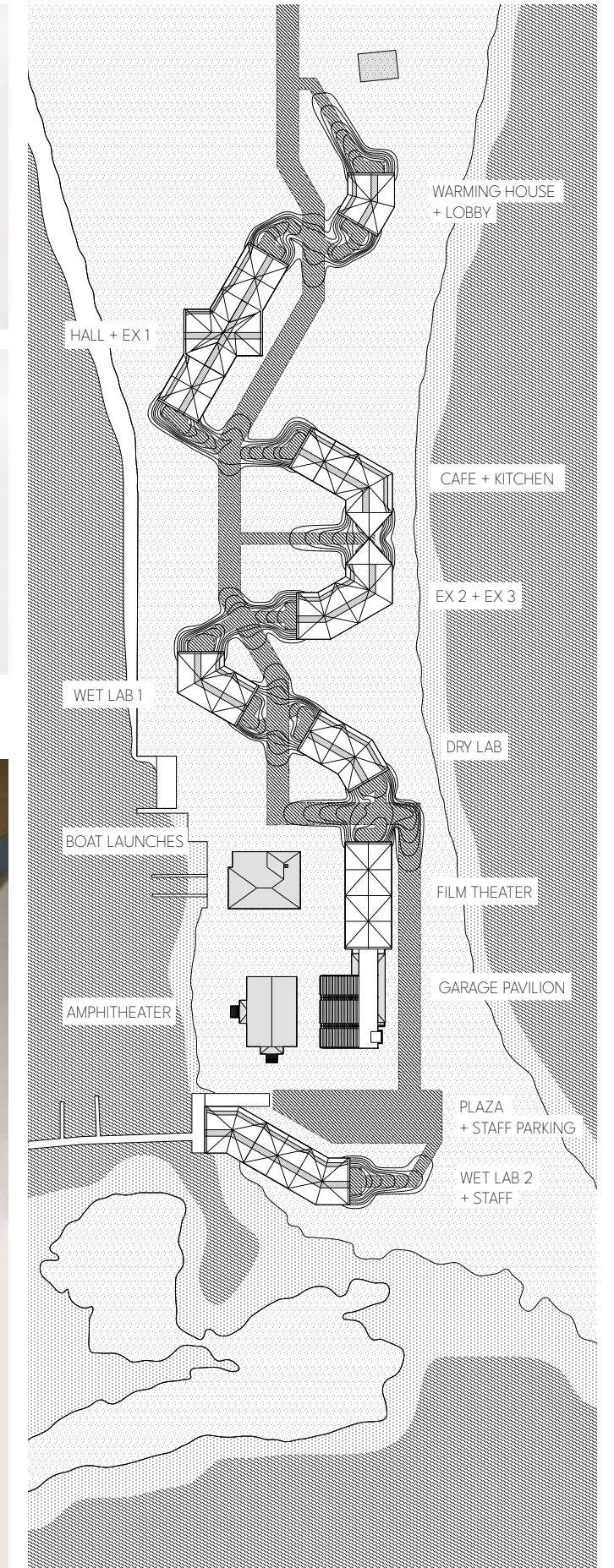


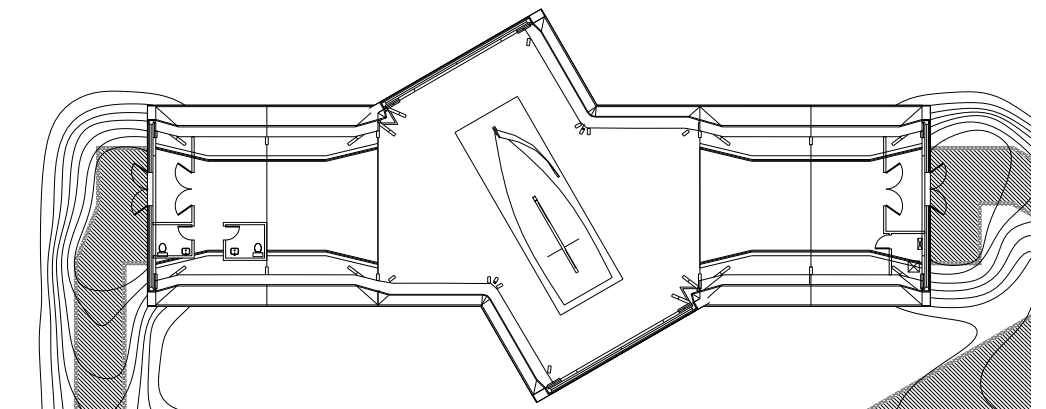
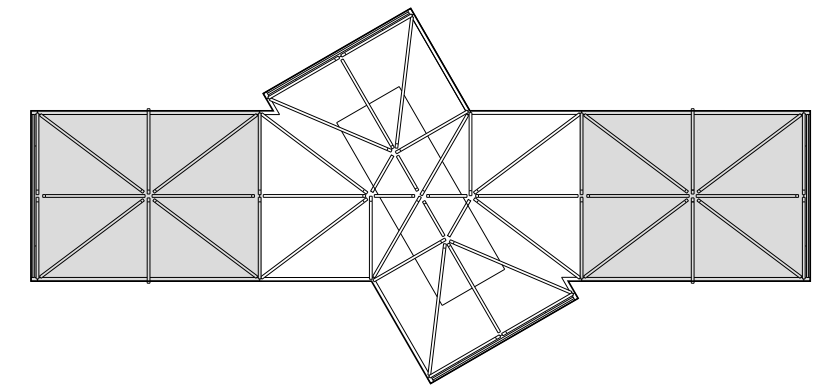
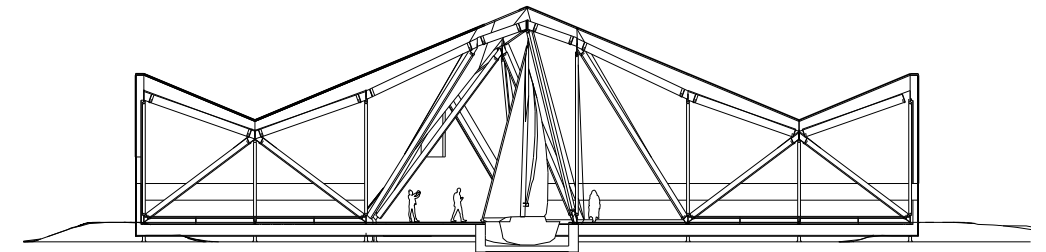
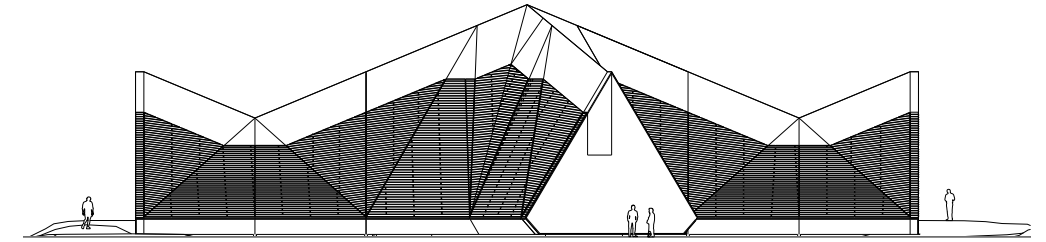
EXHIBIT HALL

The program called for housing a historic boat in the exhibit hall. A usually structural unit intersects itself and raises to a higher ceiling height in order to accommodate this unique condition.

Hall interior render



Elevation, section, structural plan, and floor plan for the Hall.



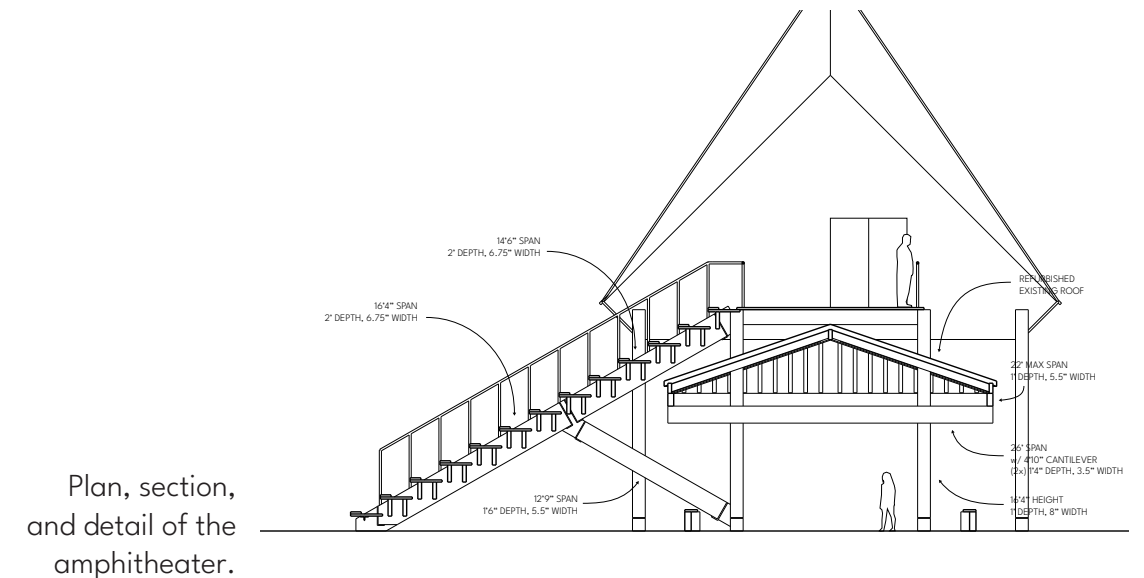
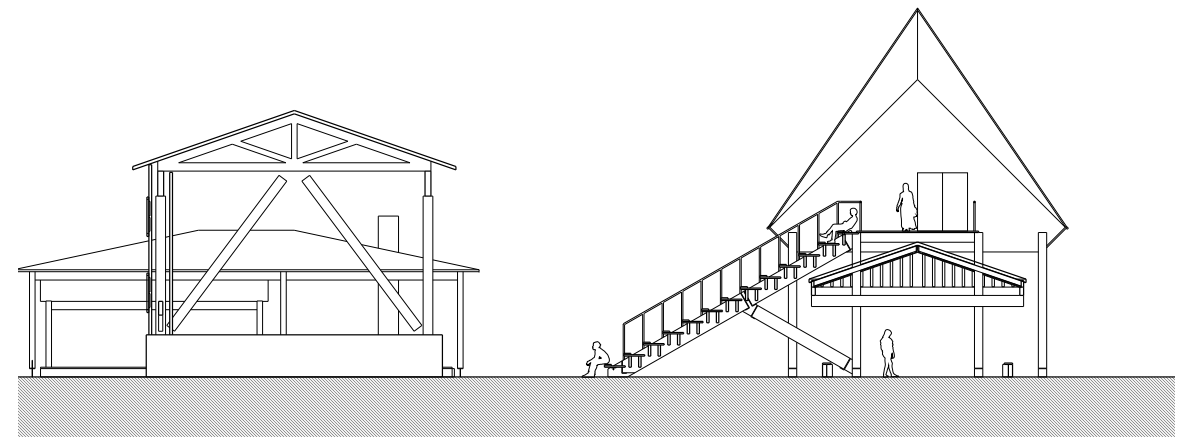
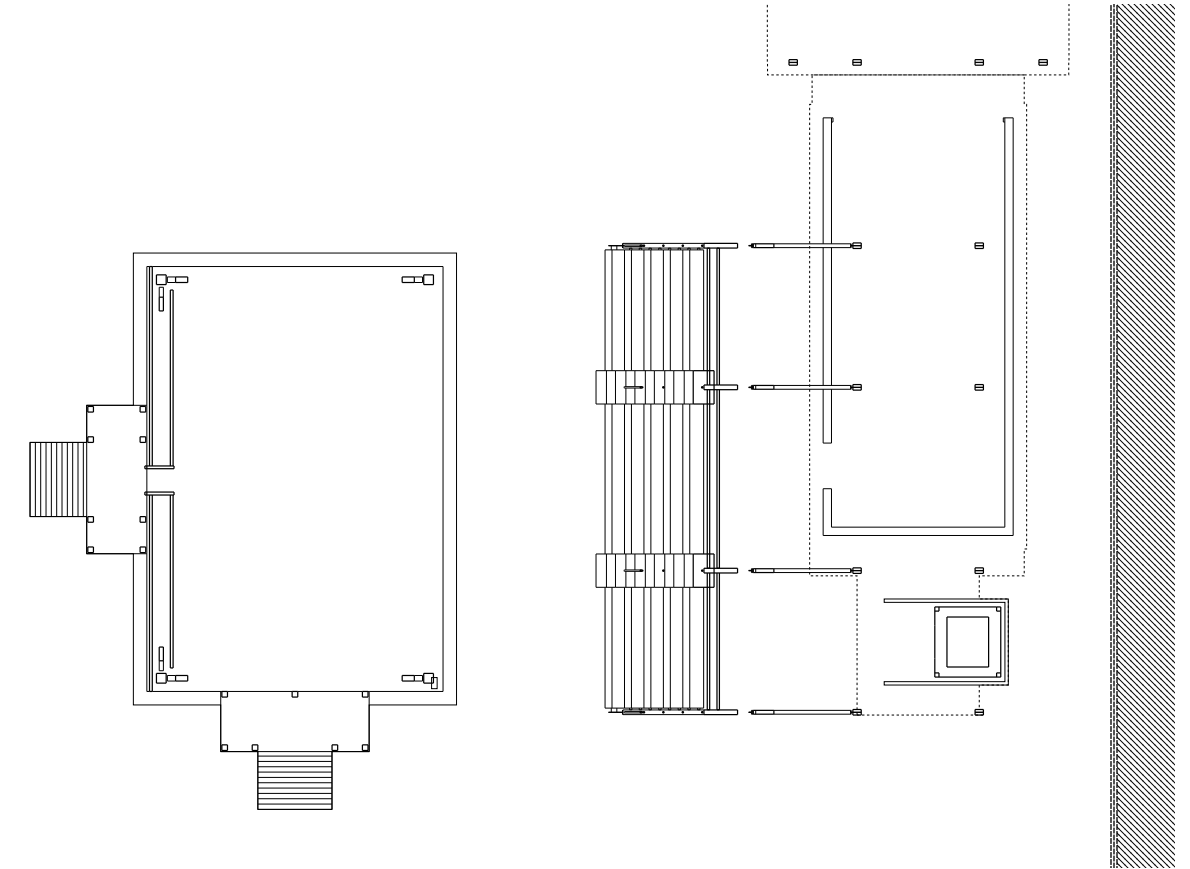
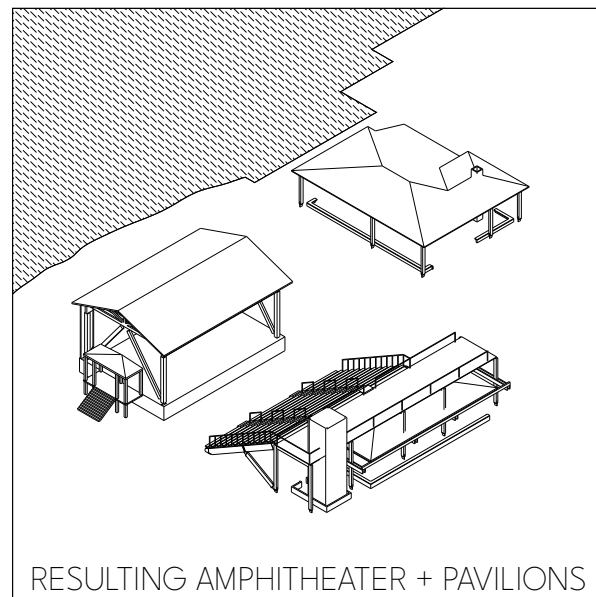
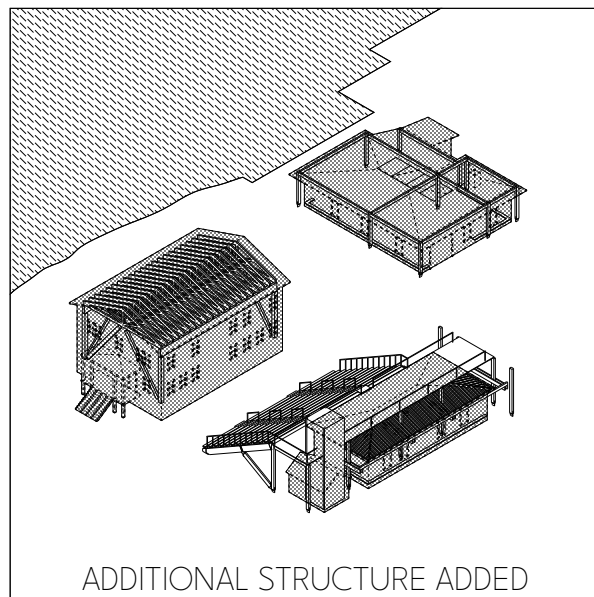
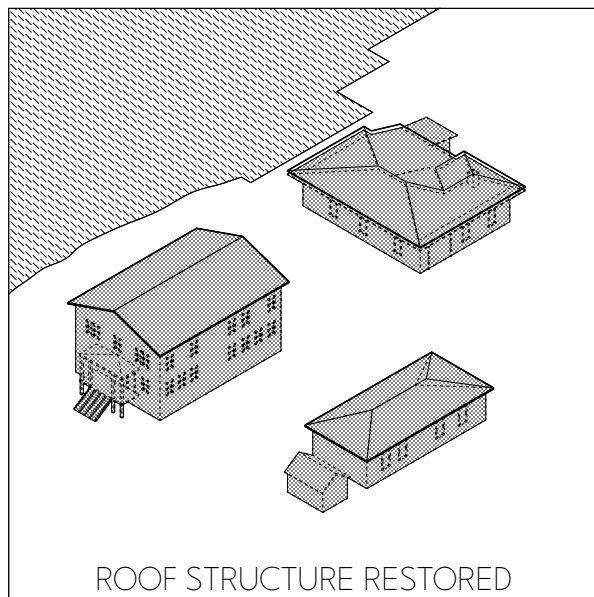
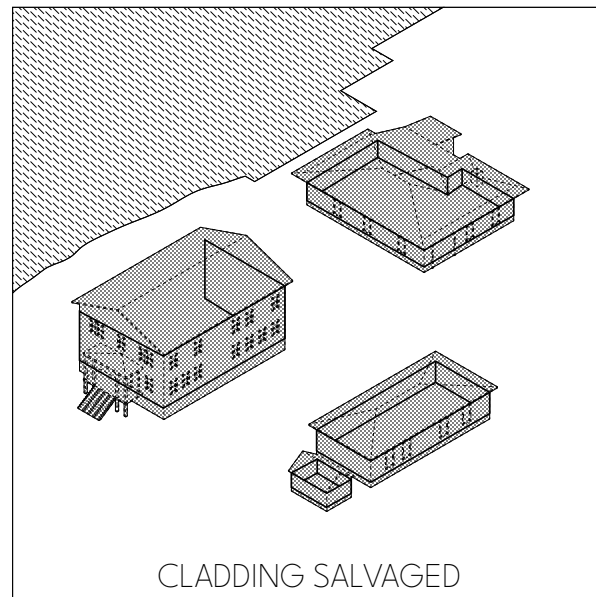
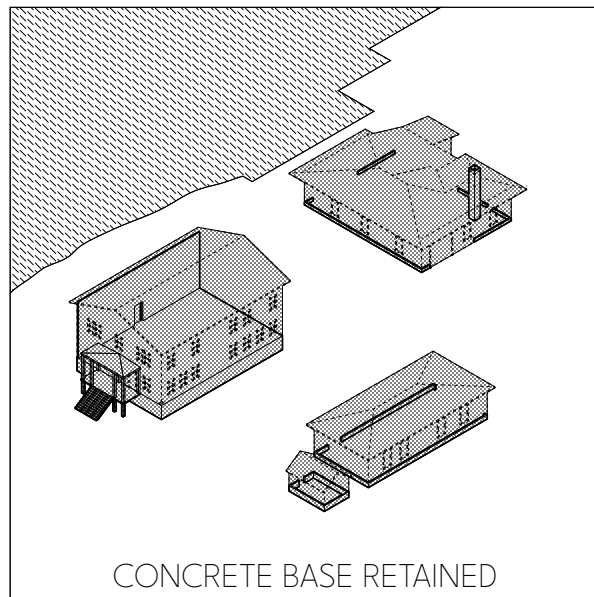
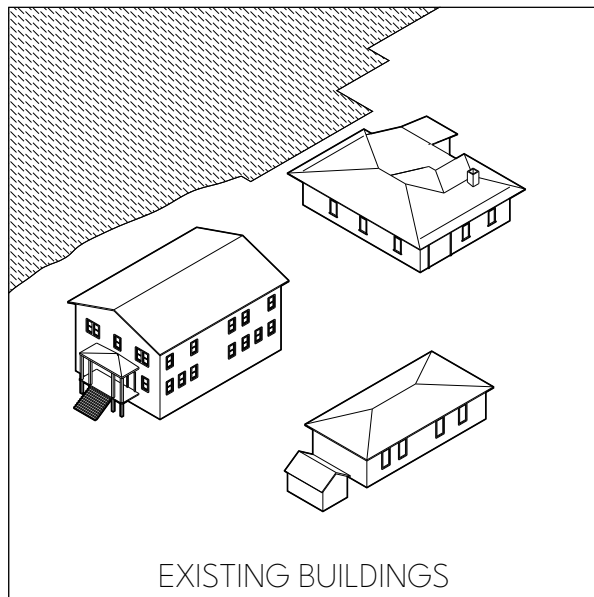
AMPHITHEATER

I wanted to present a fresh start for the community, one that moved beyond the history of European colonization in the region. A radical deconstruction of the Coast Guard building expressed this intent. The roofs, the concrete bases, and a single wall facing the town are preserved, with the remainders of the buildings converted into open air gathering spaces. The main building becomes the stage of an amphitheater with seating for it stretching over the remnant of the garage.



Photo of the existing conditions.

Diagram of the renovation approach to the existing Coast Guard buildings.



SITE ELEVATION

