

At **Waters Edge**





**Evan Welch**

University of Detroit Mercy

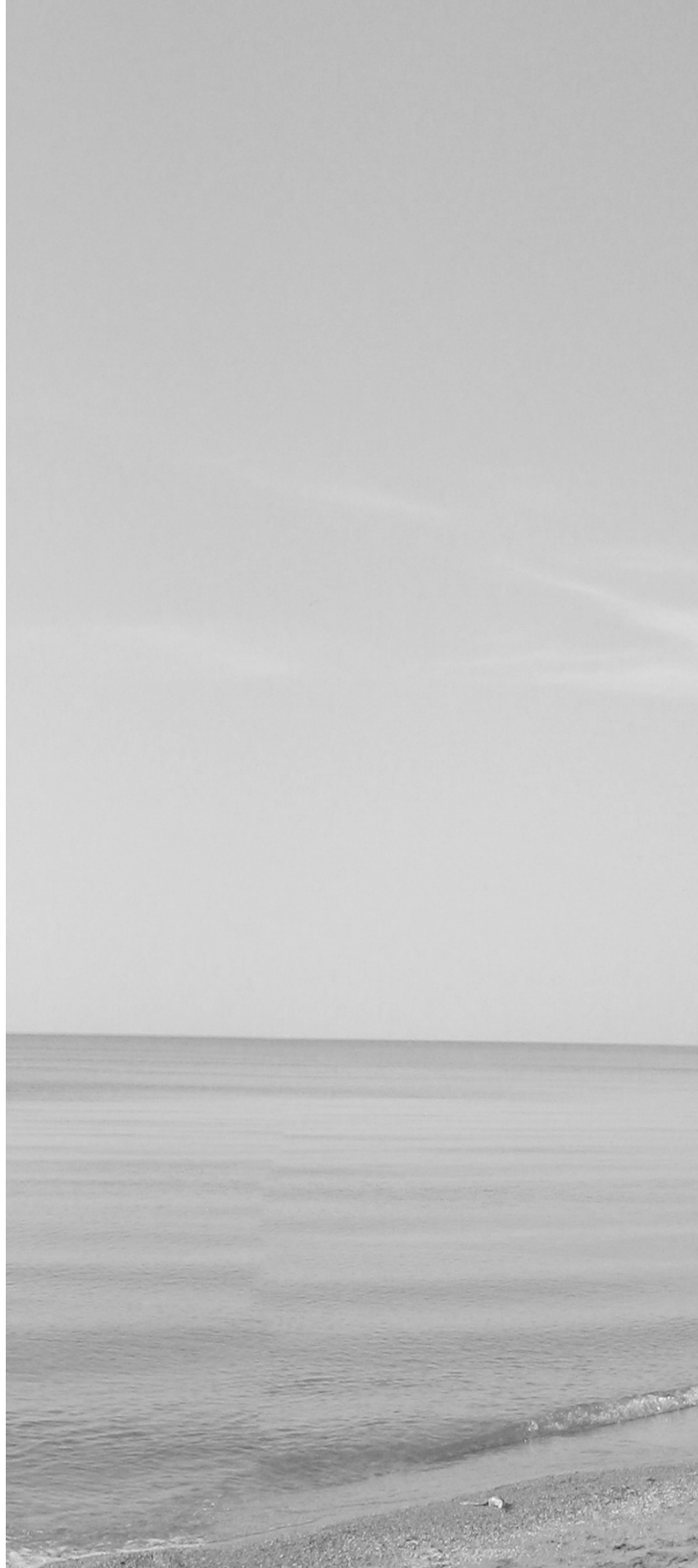
Master of Architecture

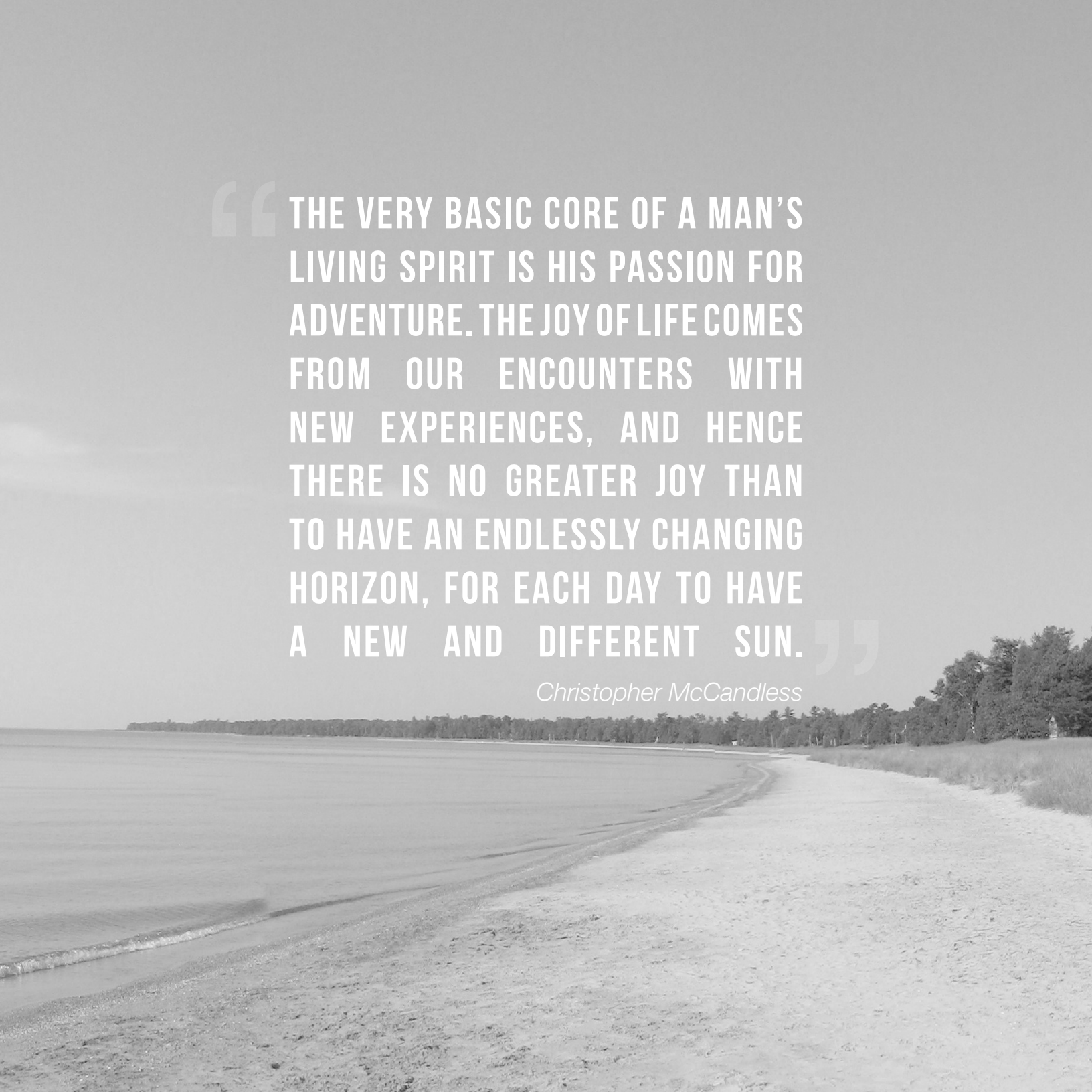
Arch 5100. 5110. 5200. 5210.

Fall 2012 - Spring 2013

Professor Noah Resnick

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“ THE VERY BASIC CORE OF A MAN’S  
LIVING SPIRIT IS HIS PASSION FOR  
ADVENTURE. THE JOY OF LIFE COMES  
FROM OUR ENCOUNTERS WITH  
NEW EXPERIENCES, AND HENCE  
THERE IS NO GREATER JOY THAN  
TO HAVE AN ENDLESSLY CHANGING  
HORIZON, FOR EACH DAY TO HAVE  
A NEW AND DIFFERENT SUN. ”

*Christopher McCandless*



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## ABSTRACT

The relationship between land and water has always been one of interest and importance to us; the allure of the serene and harmonious visual connection is paralleled by its natural production capabilities. The shorelines of Lake Michigan attract millions of people each year, through living, working, and recreational pastimes. Access to this vast body of fresh water has led to the progression of industrial production in cities and towns positioned throughout the Midwest. Muskegon is located on the eastern shores of Lake Michigan and boasts a rich lumbering history, which largely contributed to the reconstruction of Chicago after the 1871 fire. Establishing a boat building and restoration facility in Muskegon, reflecting the lumbering background and recreational factors displaying the intrinsic beauty of the restoration process and product. The architecture being created is meant to respond to the historical aspects of the location, while accentuating the natural visual connection between land and water. The natural sensory elements provided by the shoreline and its relationship offers a fitting background and opportunity to preserve the heritage, knowledge, craftsmanship and aesthetic qualities presented through boat restoration.



Although the transition from land to water can be described with a definitive term, the boundary itself is much more subdued. The elements simply fade into each other as an ever-changing stretch of perennial shoreline. Water, in and of its very nature is what physically transcends this boundary, shaped by the landscape carved out by glaciers retreating over the surface of North America thousands of years ago. “The waters only boundaries are those established by land” (Watanabe & Kuroyanagi). Lake Michigan is sustained by the surrounding terrain, but transforms with each and every wave that collapses upon the shore. Yet the large body of water still has an inherently static quality about it, the grand scale and distant horizon line seldom change, even as the shifting currents and receding water line ensure we are never looking at the same waterfront. This relationship between land and water has always been one of interest and importance, the allure of the serene and harmonious visual connection is paralleled by its natural production potential. Interacting with this natural transition point allows the user to engage every one of their senses. [The visual nature of the shoreline and fading horizon can be quite a powerful and inspiring experience,](#)

while reflections of yourself or closer objects give the lake a somewhat humanized scale. The rhythmic sound of the waves gently crashing into the shore offer a tranquil background to this environment, even as occasional rough seas remind us of the raw and unpredictable power these natural elements possess. The sensation of the water rushing across your skin as you dive in and feel completely weightless, escaping the constraints of gravity, if only for a few seconds. The smell and taste are just as influential to the experience; both can instill very powerful emotional responses within individuals, and tend to be more subjective. The aromas coming from this transition point can be enjoyable or rather unpleasant, depending on a number of different factors, but distinct nonetheless. Clinging to your skin like a gentle embrace, the scent seems to persist long after you've left the shoreline. This effect can be similarly accomplished through good, thought out design.



Lake Michigan Shoreline

Architecture can access this same notion of sensory expressiveness. When responsive to certain environment and contextual elements and distinctive characteristics, architecturally designed spaces become very influential and compelling to those inhabiting and interacting with the space. The architecture comes to represent more than the purely physical, but an idea the space intends to illustrate. Sensitivity to light, materials, volume, surrounding landscape, and any other sensory component allows for an active engagement and intrinsic connection to the site, the user, and the architecture itself. The architecture must possess sensitivity to this contextual waterfront relationship. Inspiration and creativity come from our reliance on the senses, for that purpose, the natural sensory elements provided by the shoreline and its inherent relationship offers an ideal background and opportunity to preserve the aesthetic and integral qualities of an architectural antecedence and programmatic response.



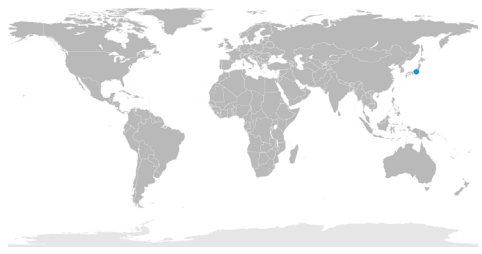
**Sulk Institute**  
Louis Khan, 1962

image courtesy of Cultural Connoisseur

Architecture's role in the development of the waterfront however, has been somewhat limited. Engagement of this boundary has had relatively few configurations.

**1** The first being a definite, solidified edge, essentially a barrier to keep the two environments separated. For example, the edge between a city and body of water is generally somewhat of an afterthought. As spatial issues arise, expansion seems easier to build out into the water, fabricating a context for the framework to rest on, creating a new intervention, but there tends to be no design consideration towards the relationship of the built and the natural body of water. This implementation makes it difficult to successfully capture the benefits each site's context has to offer.





## tokyo, japan

1 mile

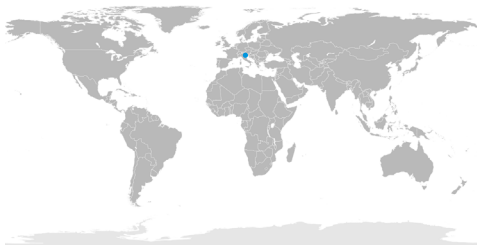
13,185,502 population

845 sq mi

16,060 | sq mi

## 2

The second configuration embodies more of an integrated relationship. The natural water and built environment are able to intercede further and benefit from the apparent design considerations. This condition can occur on a number of different scales, but one of the most successful examples would be the city of Venice. Located in northeast Italy and sited in the Venetian Lagoon, it comprises 118 smaller islands separated by an extensive canal system and linked by countless bridges. The city is renowned for its contextual and architectural relationship. Water becomes part of the designed landscape and truly integrated into the designed built environment and immensely successful considering the scale of this intervention.



## venice, italy

1 mile

---

270,660 population

160 sq mi

1,700 | sq mi

# 3

The third arrangement consists of a definitive gap between the built and the water environment. The span between these two conditions has not been designed for and exists as an element of progression. An example of this condition is residential building along bodies of water; homes meant to connect with their surrounding landscape are associated by the purely visual nature of the relationship and not much more. These conditions are successful in their own right, but fail to achieve the potential connection the site condition has to offer. “The relationship between the sea and a maritime structure is established directly by the structural form supporting it and indirectly by usage of the water in its purpose, function, scale, and design” (Watanabe & Kuroyanagi).



## muskegon, michigan

1 mile

38,401 population

18.12 sq mi

2,702 | sq mi





Site selection came from the Great Lakes region of the Midwest. The architectural response to the intention of this thesis required the site to be closely associated with a large body of water. As the shoreline totals of the Great Lakes are equal to almost 44 percent of the earth's circumference and just shy of 11,000 miles (GLIN), opportunity to locate the exact site conditions became a lot more prominent. Conditions that provided the site with direct access to the body of water, unobstructed views over the body of water and where the architectural form can have the most significant impact must also be considered. The orientation of Lake Michigan's north-south axis, as well as the visual connection meant to be captured from the sunrise and sunset over the horizon of the water lead to the originally chosen sites. Wisconsin's largest urban environment in Milwaukee, located along the western shores of Lake Michigan, and the smaller rural environment of Muskegon, Michigan, located midway on Lake Michigan's eastern shoreline. The site proved to be the strongest component of this thesis project initially, the natural connection of the sites and their respective context, along with the inherent transitional element lake Michigan itself proposed.

Each site would have to support a programmatic element that served as an instrument of engagement between land and water. While at the same time emphasizing the transition from site to Lake Michigan to the opposite site.

As the thesis project progressed, the realization to continue with only one site proved to be the suitable alternative. Muskegon was selected for its natural topography and location along the shores of Lake Michigan, the fresh water has inspired its growth and maintained the quality of life. Consisting of a population just shy of 40,000 people, Muskegon has developed from a primarily industrious background. Fur pelts, pine logs, and piston rings are just a few of the items the history of this city is known for exporting. Once called the “Lumber Queen” of the world, there was a time when the city of Muskegon boasted more millionaires than anywhere else in America (Muskegon-mi.gov). Tank engines manufactured in Muskegon were used to fight in both world wars and began to give Muskegon a reputation as a foundry town. The recreational and tourism factors are also an integral part of Muskegon’s economy, as millions of people visit the shores of Lake Michigan every year.



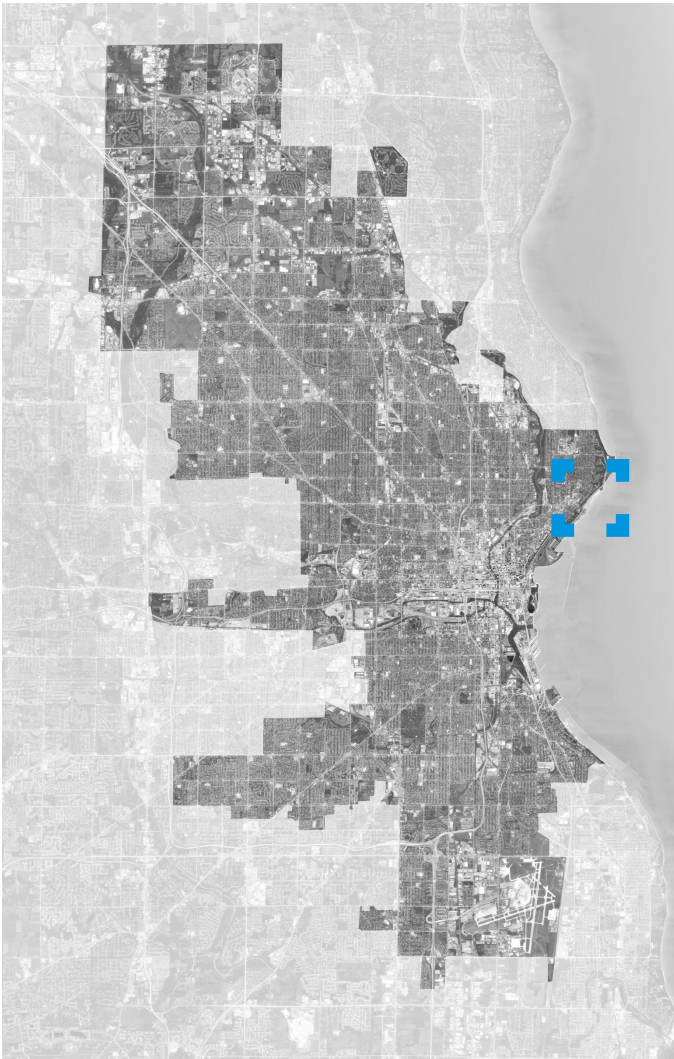


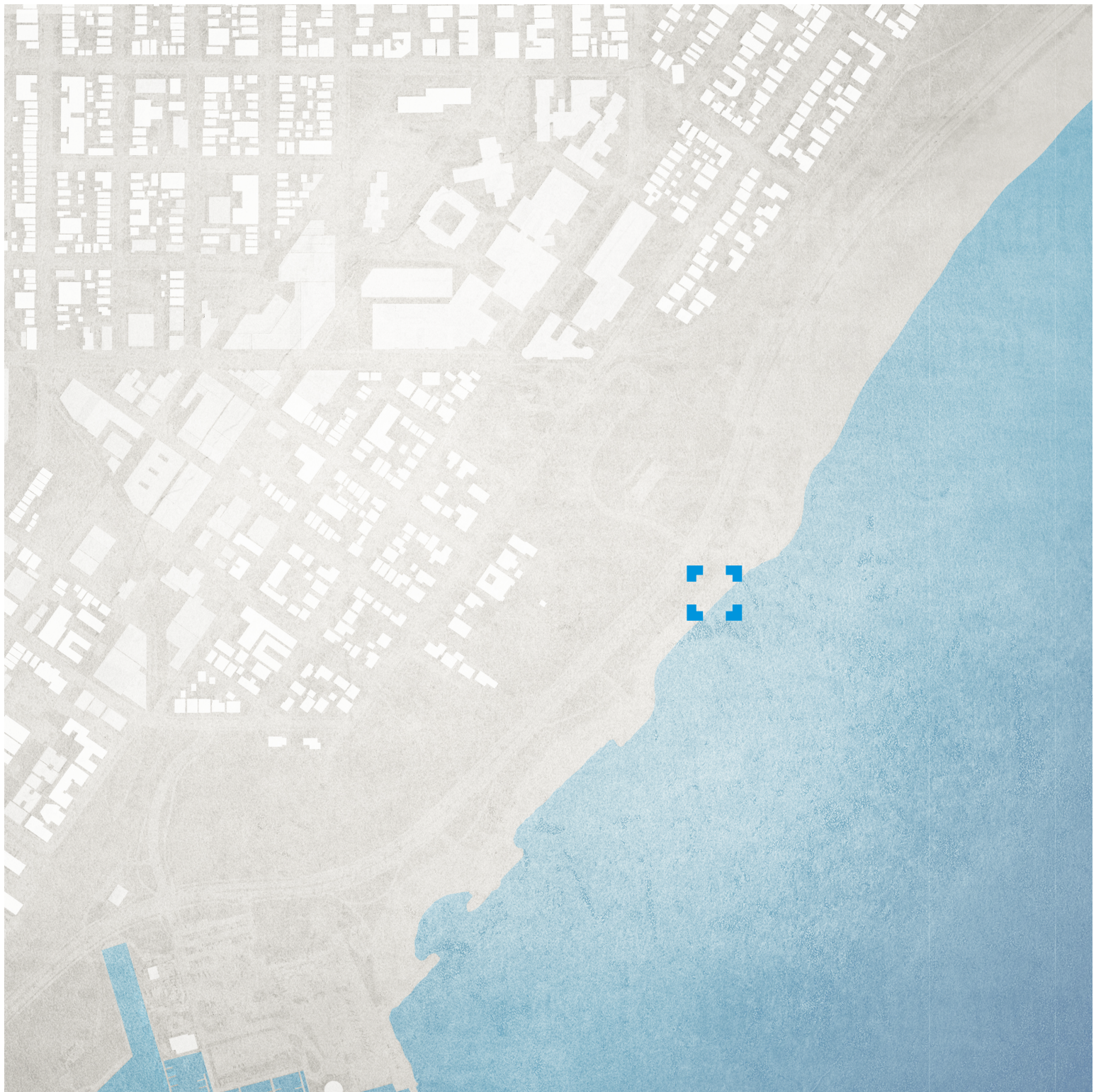
milwaukee | muskegon



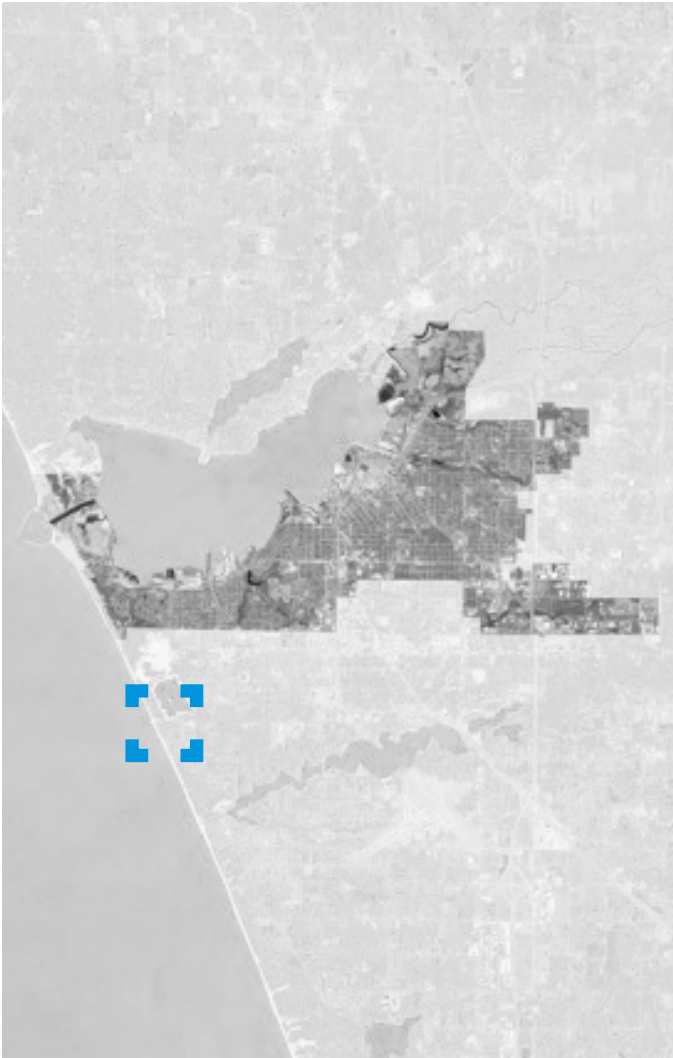


milwaukee | muskegon





milwaukee | muskegon

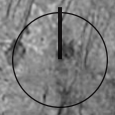




Home to the Great Lakes Naval Memorial and Museum, the city of Muskegon possess a rich sailing and boating heritage. Partnered with the industrious nature of the city and natural topographic composition, the setting of Muskegon is more than appropriate for an architectural response that reacts to the emphasis of site and craftsmanship characteristics.

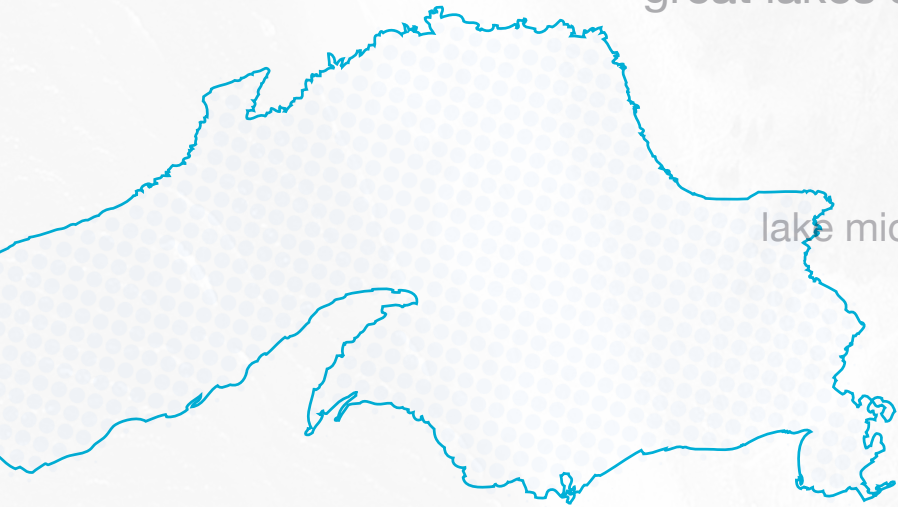
The specific site was selected for its existing intervention with the shoreline, the presence of small water pumping station provided a challenge and opportunity as it was incorporated into the new design. Which in turn began to critique the existing built and natural landscape, as a new design aimed to further engage this shoreline transition point.





site analysis

great lakes shoreline 10,900 miles

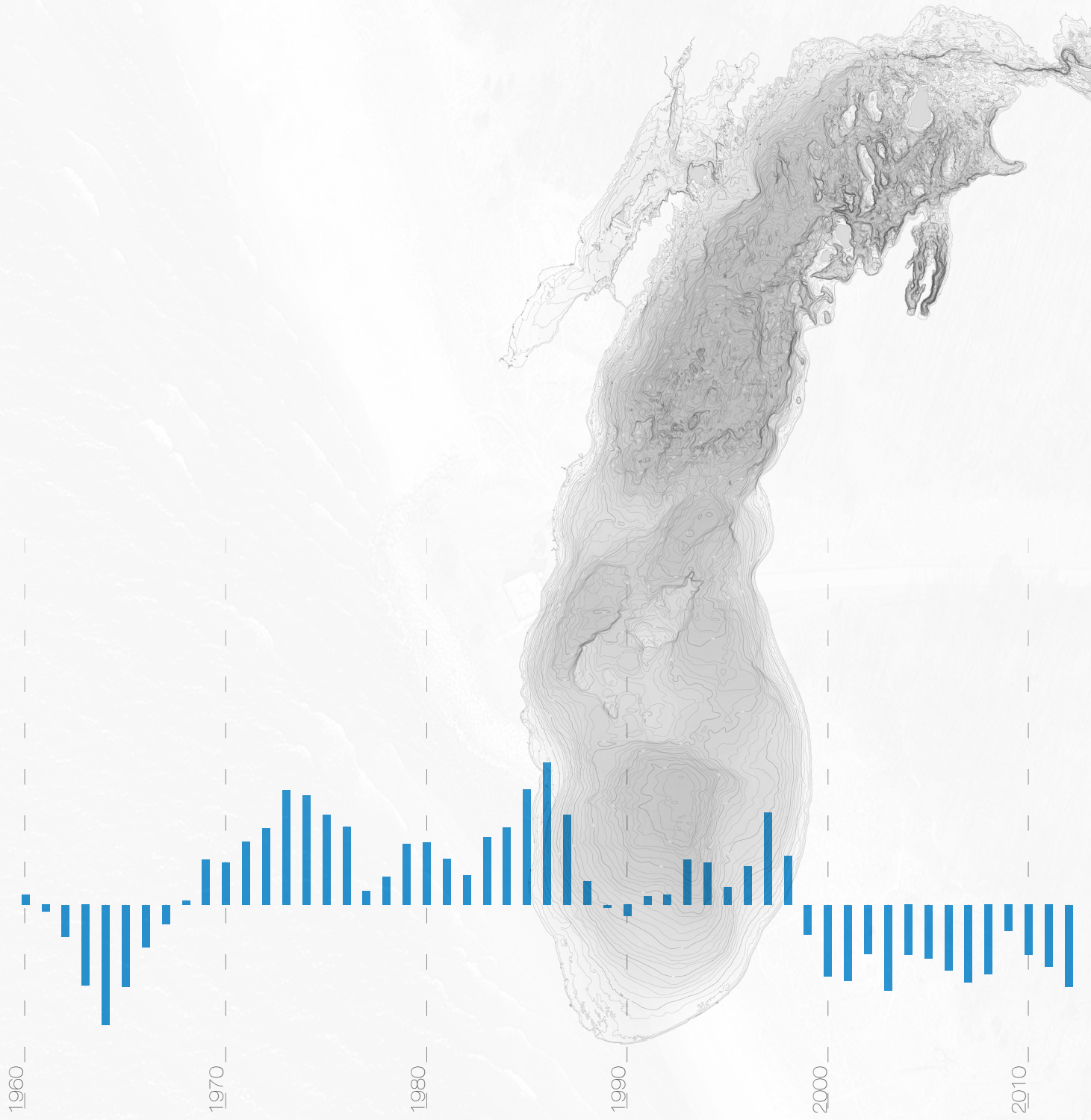


lake michigan shoreline 3,288 miles

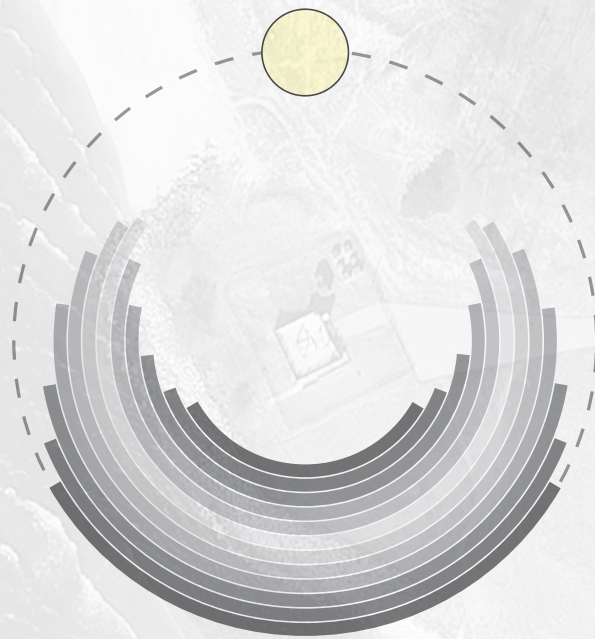
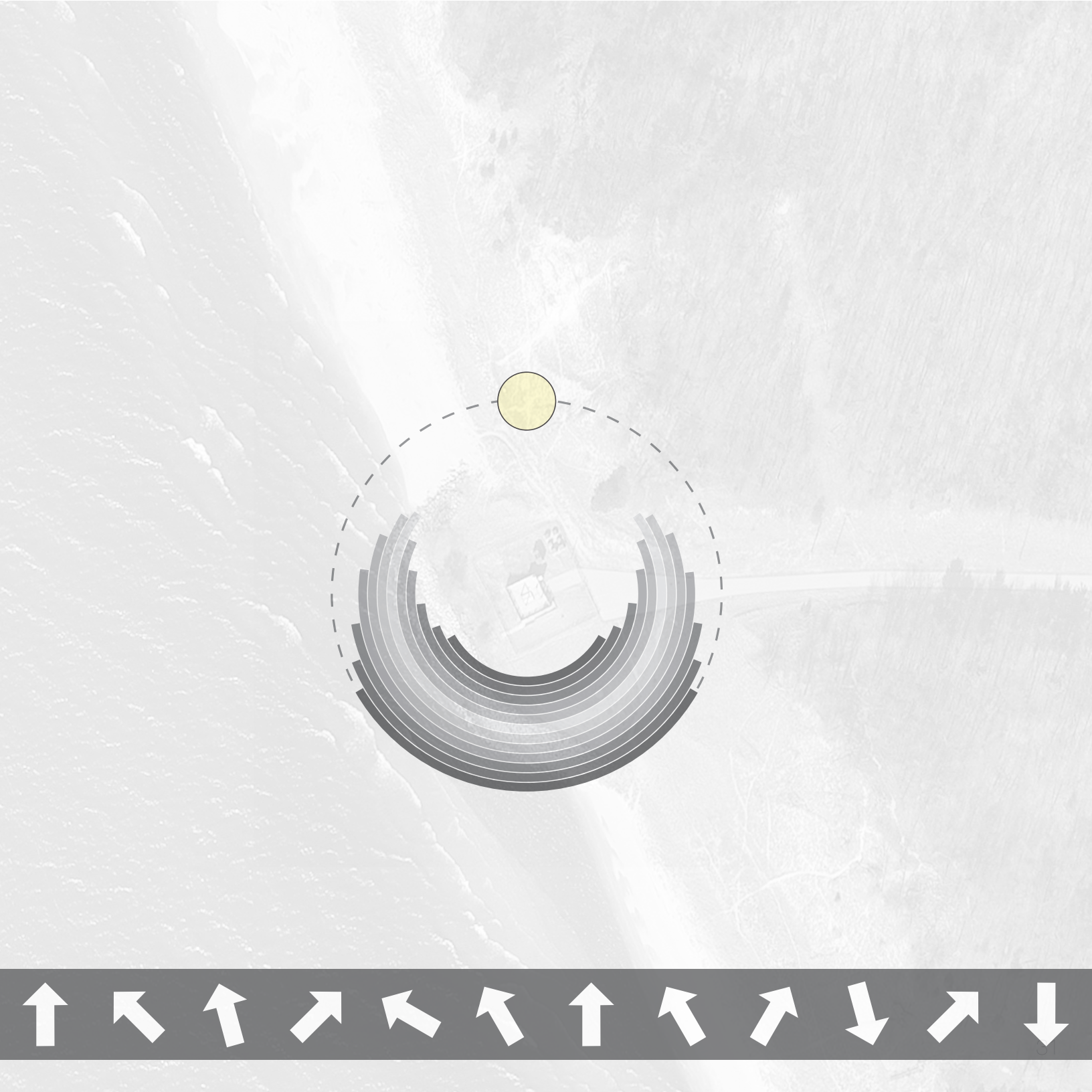
muskegon site .075 miles



lake michigan contours | water levels

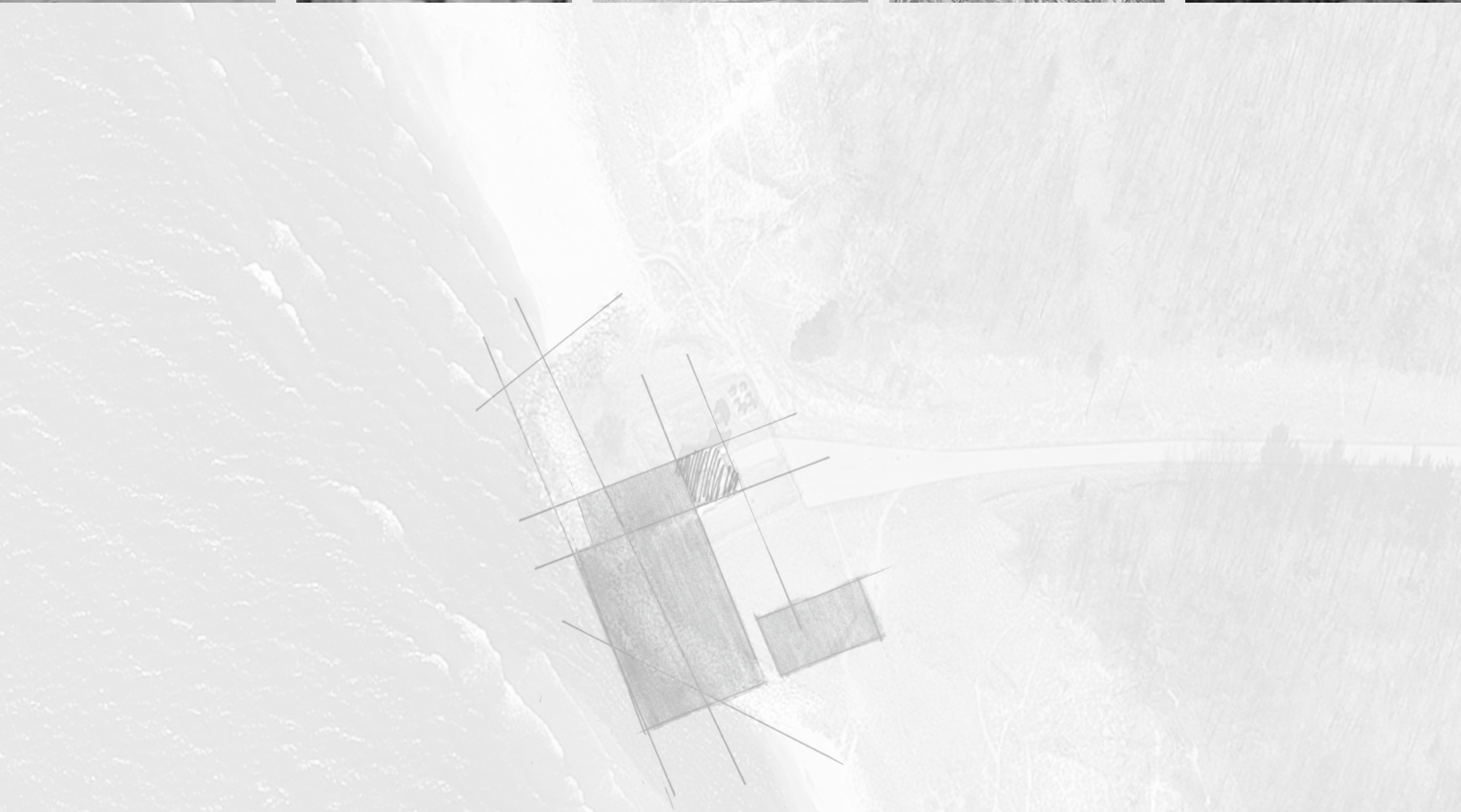


sun diagram | wind directions



site textures | seasonal composition







Informational text on a sign attached to the red and blue boat, including a title and several lines of text.

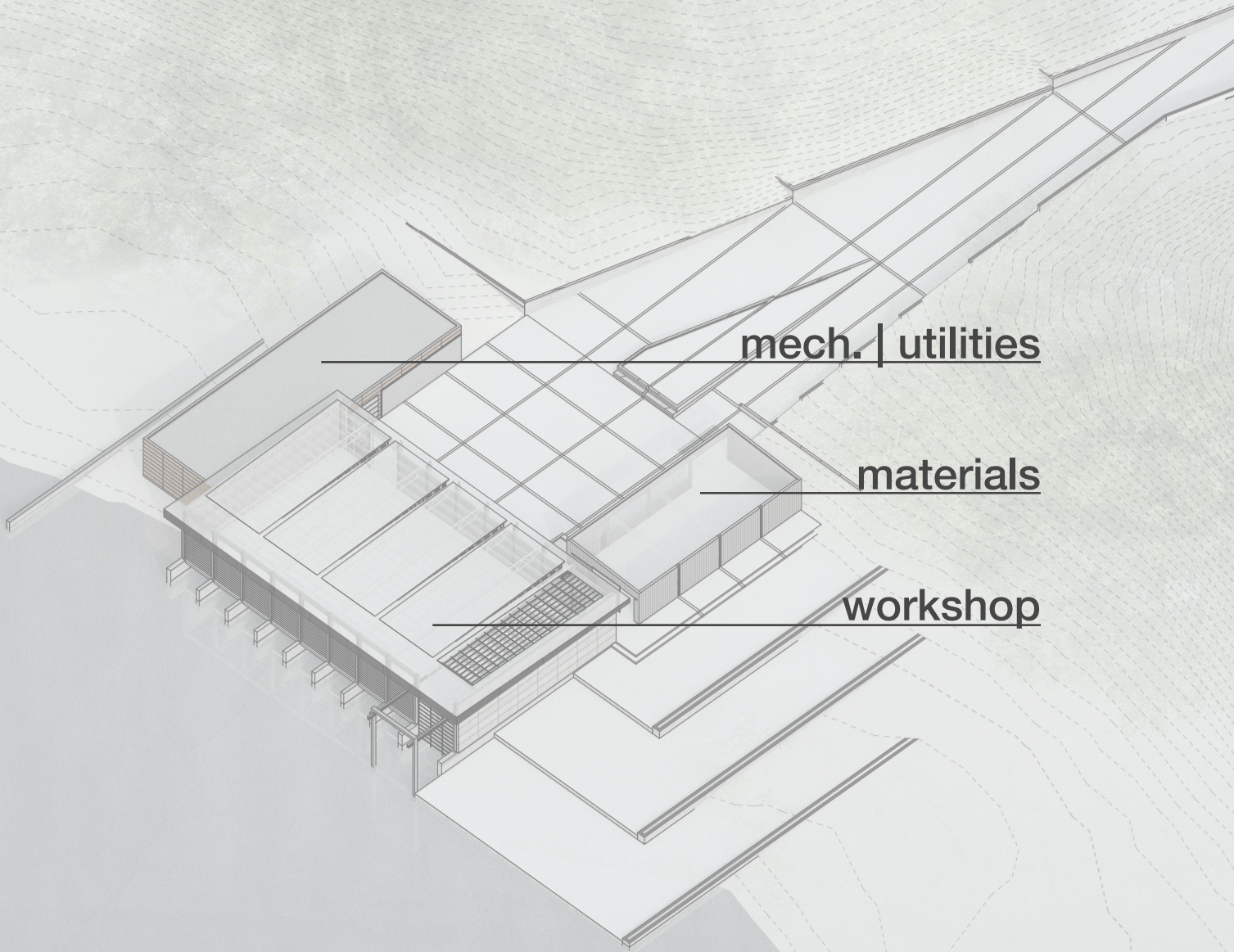
Informational text	
1	...
2	...
3	...
4	...
5	...
6	...
7	...
8	...
9	...
10	...

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## PROGRAM

A number of different architectural designs and programs have been considered throughout the selection of the programmatic requirements. However, the International Yacht Restoration School has provided the most substantial amount of information and served as a model for the program considerations of this thesis. “The IYRS boat building and Restoration program is about mastering a craft based on the fundamentals of wooden boatbuilding... The IYRS mission is to teach the skills, history, art, and science of building, restoring, and maintaining boats and their systems; to preserve the knowledge, heritage, craftsmanship and aesthetic genius inherent in these boats; to safeguard our site and historic buildings as an important part of America’s working waterfront; to show that honest work, integrity and mastery of a craft are among life’s great achievements” (IYRS).

Boat restoration is a programmatic response that allows the architecture to respond to the elements and characteristics described earlier of the site and surrounding context. There is meant to be a connection to craft and this cultural aspect of producing necessary goods. The instilled program is intended to mimic the one at the International Yacht Restoration School, but responding to the individual characteristics presented by the site in Muskegon. The core of the program is to develop fundamental wood working skills with the overall goal of restoring a plank on frame boat. Instilling the sensitivity to craft and construction process. By de-constructing and then reconstructing these boats, the user will begin to understand the techniques done historically, while developing finish and joinery work that accentuate the craft and art of making these wooden boats (IYRS).



mech. | utilities

materials

workshop

## **workshop**

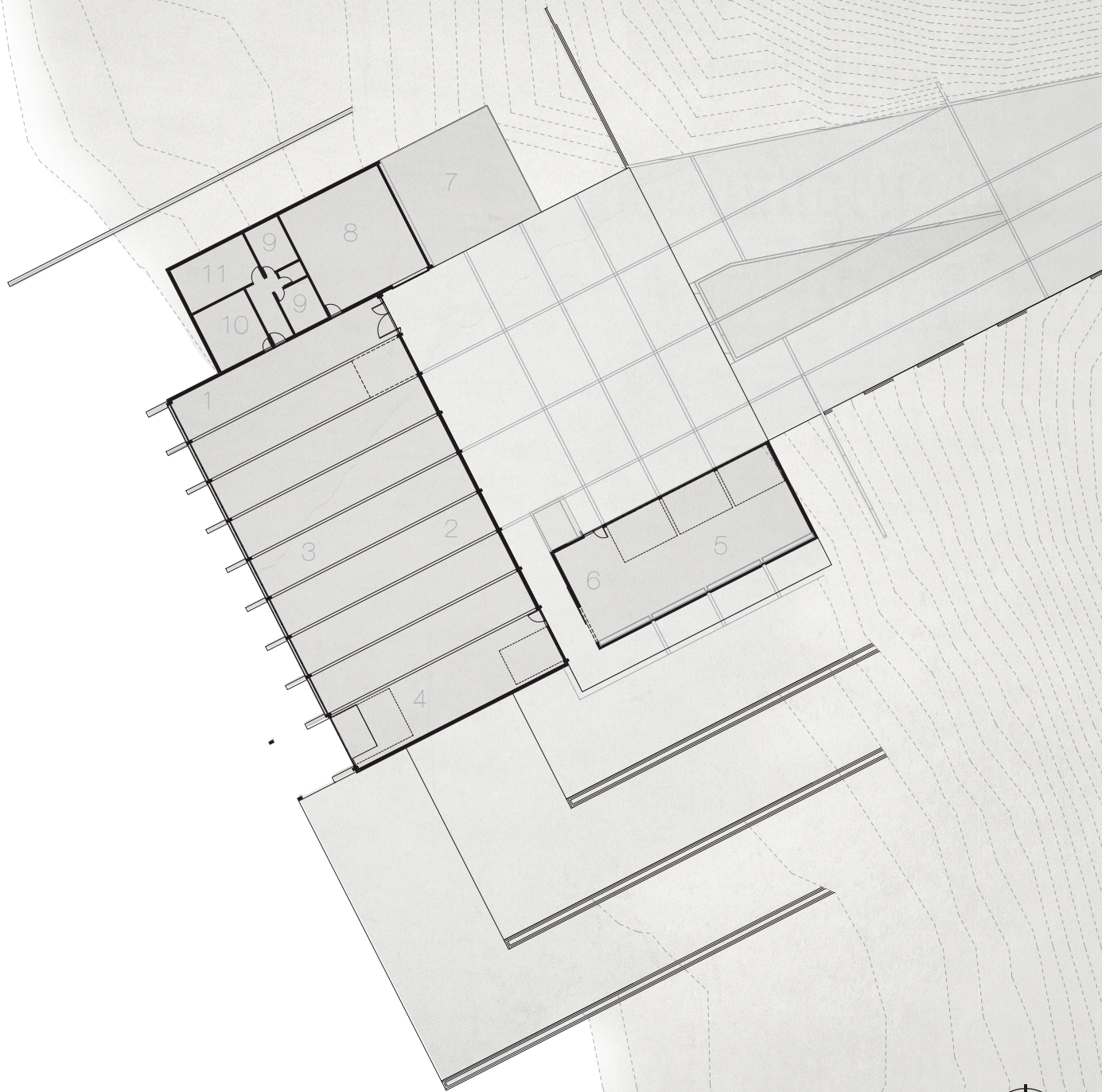
- 1 tool storage
- 2 machining areas
- 3 work | assembly space
- 4 boat crane

## **materials**

- 5 material storage (scale + frequency)
- 6 material inventory

## **mech. | utilities**

- 7 existing water pumping equipment
- 8 mechanical space
- 9 restrooms
- 10 administrative | office space
- 11 misc. storage







# PRECEDENTS



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International Yacht Restoration School 51



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White Arkitekter + Sprunt 55  
southend pier community center



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Anmahian Winton Architects 59  
community rowing boathouse



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Olson Kundig Architecture 65  
delta shelter  
shadowboxx





## International Yacht Restoration School

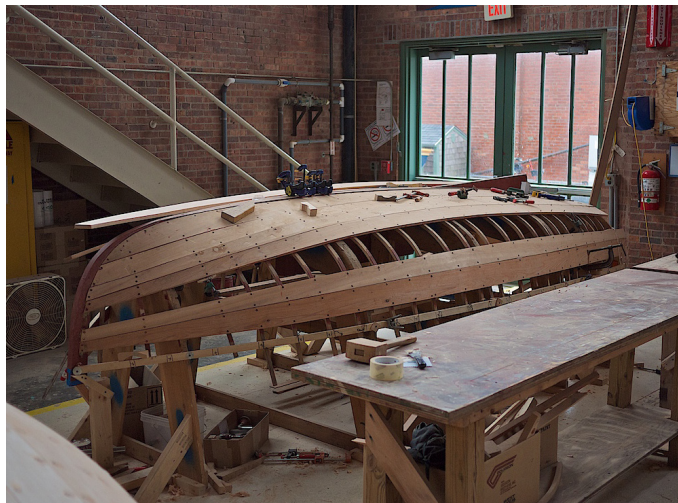
Newport, Rhode Island  
Founded in 1993

An 18,000 sq ft waterfront building serves as the school's main teaching facility. It has been completely refitted as an open space shop where students work on coursework and projects.

The YRS Boatbuilding & Restoration Program is based in our Newport campus. Set on Newport's historic waterfront, students work in buildings rich in maritime heritage while the shipping lanes and cruising waters just offshore remain busy with boats of every type.

The IYRS Boat building & Restoration Program is about mastering a craft based on the fundamentals of wooden boat building.

To teach the skills, history, art, and science of building, restoring, and maintaining boats and their systems. To preserve the knowledge, heritage, craftsmanship and aesthetic genius inherent in these boats. To safeguard our site and historic buildings as an important part of America's working waterfront; To show that honest work, integrity and mastery of a craft are among life's great achievements (IYRS).







## **Southend Pier Cultural Center**

white arkitekter + sprunt  
Southend, United Kingdom  
2012

The design requirement was to enhance the pier head to include a new cultural building, restaurant, outdoor display and performance space. Intended to recapture and redevelop the glories of this historic pier.

The sweeping geometric form and harmonizing palette of materials of the building celebrates the topography of the windswept site integrating it into the scenic landscape. The dynamic roof shape, which measures up to 9 metres from floor level, houses a large multi-purpose events space with floor to ceiling glazed elevations. Orientated South facing, the entrance façade is set back beneath the roof forming a sheltered entrance and café terrace from which to enjoy views out onto the water. Closely associated with the town and particularly to the typology of Southend's shoreline. The Cultural Centre brings new life to the promenade and reclaims the pier as the town's main attraction for both the town's residents and tourists.



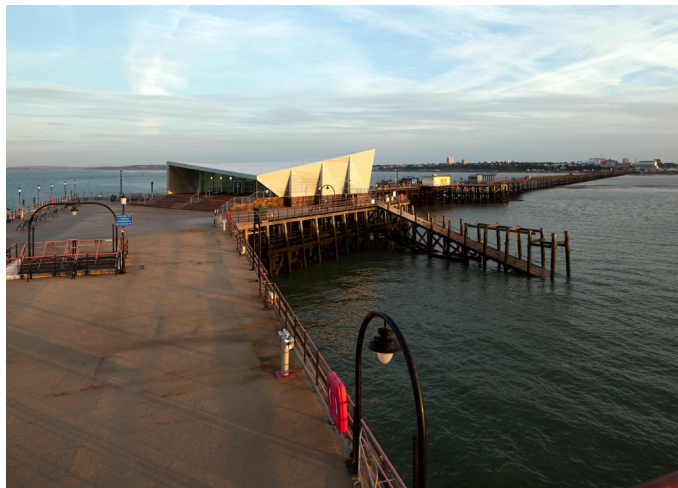
*Pier at sunset*



*Pier detail*



*View from end of pier*





HARRY PARKER BOATHOUSE



## **Community Rowing Boathouse**

**anmahian winton architects**

Boston, Massachusetts

2008

The 30,000 sq ft. facility for the Community Rowing Inc. provides equipment, storage, and instruction for rowers of all skill levels, including innovative programs for girls in the boston public schools, and adaptive rowing for the physically disabled.

As a site strategy, a long narrow footprint is divided to engender a public court that establishes both a visual connection to the riverfront, as well as a functional connection to the boathouse.

Enhanced occupant comfort and a significant reduction in energy consumption are achieved by the natural light and ventilation coming into the building through louvers, bi-folding operable vents, and glass shingles. While each type of cladding satisfies functional needs, their experiential effects are more varied: The surface of the building is intended to transform with one's movement around the building, not unlike the rhythmic punctuations in the fluid medium of the river.

*Main boat storage*



*Glass shingle boat storage*

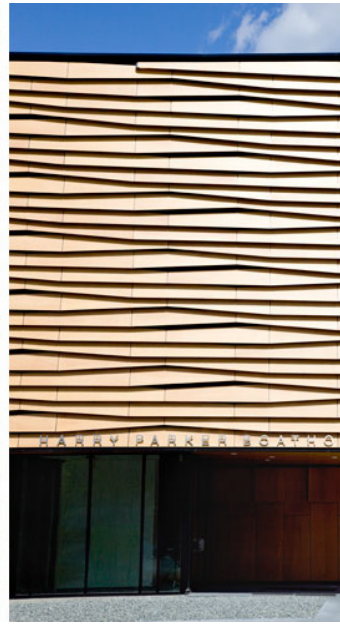
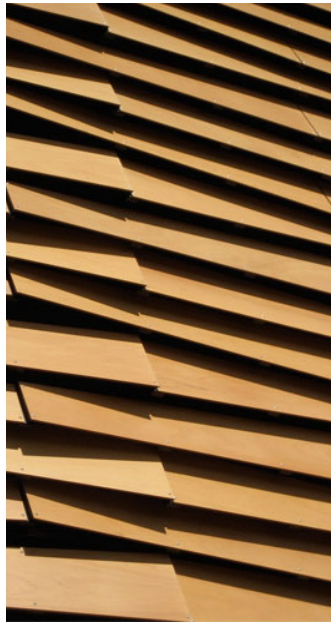


*View from Charles River*



The main building's skin is comprised of composite panels of phenolic resin and wood veneer, and is durable, lightweight, and natural. The panels operate as louvers, opening and closing to naturally ventilate the boat storage and provide both functionality and energy efficiency. The louver system is also highly iconic of New England's traditional covered bridges and tobacco barns, reflecting their proportions and cladding, and anchoring this new building more strongly to its environment.

*wooden panel detail*



*Louver panels closed*



*Louver panels open*









**Delta Shelter**  
**olson kundig architects**  
Mazama, Washington  
2005

The 1,000 square-foot cabin is essentially a steel-clad box on stilts that can be completely shuttered when the owner is away. Composed of three levels, the lowest level consists of the carport and utility/storage room; the middle level consists of the entry, two small bedrooms and bathrooms; the top level is one large space which includes living, dining and cooking areas.

The 200 square-foot footprint of the house rises above a 40-acre, 100-year flood plain adjacent to the Methow River. The verticality, coloring and raw nature of the materials used for construction directly respond to the wildness of the setting. The owner sought a compact, easy to maintain, virtually indestructible building to house himself and his friends for fun and adventure in the mountains. With an exterior of steel, the house is virtually indestructible.

All four shutters, which measure 10' x 18', can be opened and closed simultaneously by using a hand wheel that moves the shutters over the glazed portions of each façade. The shutters are operated by a series of mechanical devices including a hand wheel, drive shafts, u-joints, spur gears and cables. All windows are operable. No air conditioning is included in the project.

*mechanical detail*



*shutters closed*



*shutters open*







**Shadowboxx**  
olson kundig architects  
Lopez Island, Washington  
2010

Composed of several elements—living space, bathhouse, and private guest room—Shadowboxx sits in a natural clearing created by the strong winds that force back the trees from the rocky bank.

Shadowboxx responds to a desire to facilitate an intimate understanding of its setting and explores the tradition of gathering around a fire. Tucked between a thicket of trees and a rising bank, the house angles toward the bluff with its fifty-foot drop to the sea and view of the Olympic Mountains beyond. The building purposely confuses the traditional boundaries between a built structure and its surroundings. Its masses are modeled by winds off the water, exterior cladding is allowed to weather and rust, and shifting doors, shutters, walls, and roofs constantly modulate the threshold between inside and outside.

*mechanical detail*



*bathhouse roof closed*



*bathhouse roof open*



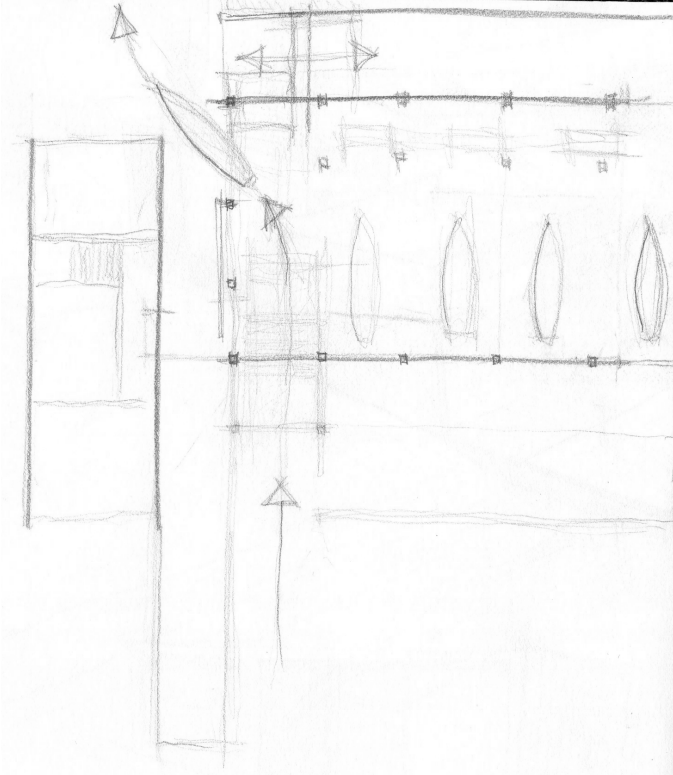
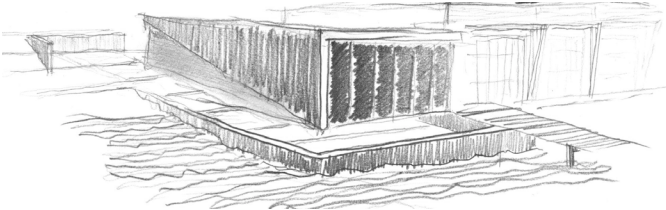


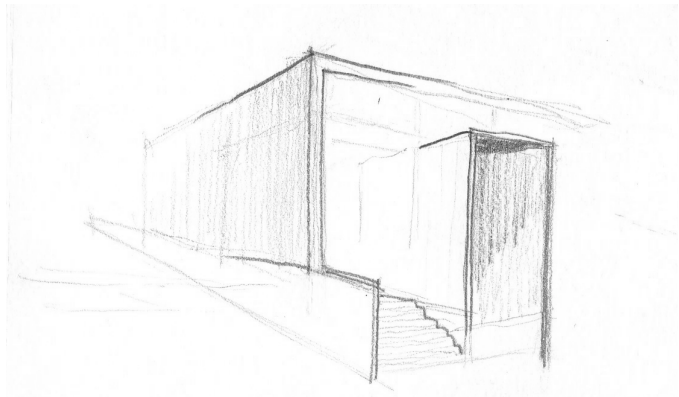
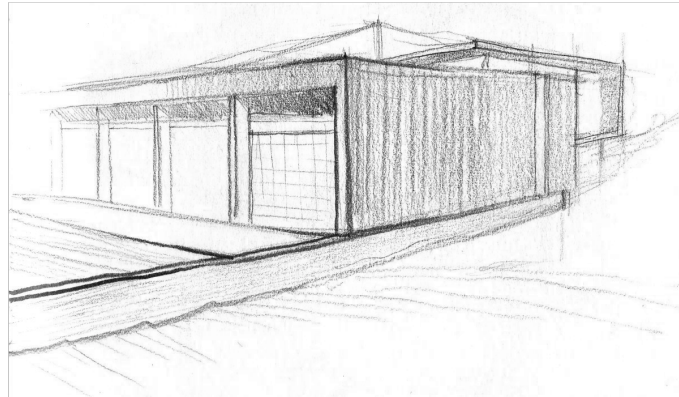
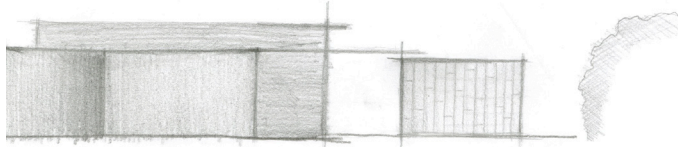
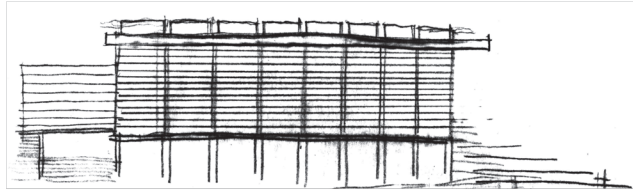


The intention of this architecture is to accentuate the intrinsic value of the site and the characteristics of boat restoration in the traditional sense. The architecture serves as the attraction point for the recognition of craftsmanship and acknowledgement of the contextual relationship. It's essential for the design to entice those who may not have initially given the program much consideration. The design must also serve as a catalyst for the recreational and artistry activities that are so predominately regarded in the area of Muskegon. The historical aspects of the city, the craft, and the architecture must all be properly reflected in the design of this facility commemorating the ideals of craft and context.

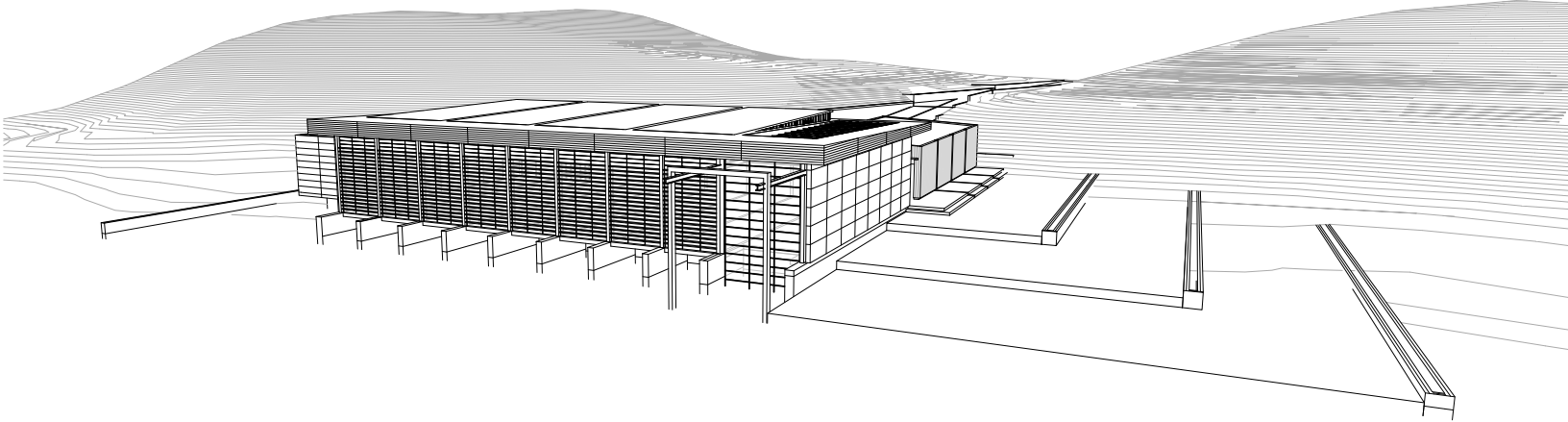
The created architecture is meant to respond to this contextual sensitivity and to reflect upon the historical aspects of the site. Accentuating the natural visual connection through designed space, the natural sensory elements provided by the shoreline and its relationship offers a fitting background and opportunity to preserve the heritage, knowledge, craftsmanship, and aesthetic qualities presented through boat restoration and an architectural response.

sketches





final composition



The intention of the architecture was to respond to the distant horizon line, accentuating the horizontal lines and simple form within the building composition. The interior space was designed around the idea of the restoration process, dividing it up as to highlight the separate steps of restoration, with the final step being the crane gently lowering the boat into the water. The building was meant to engage both the shoreline and lake michigan, pushing and pulling elements of each into the design of the building and surrounding landscape. The design is also meant to differentiate distinct workspaces that are being created. The first being the large interior workshop, the floor plane is set several feet above the water line with the intended affect feeling as though someone is working on the water. A courtyard workspace is also created, protected from the wind and other elements, where the user can hear and smell lake michigan, but unable to see it. And the final workspace occurs on the south side of the building through a series of platforms, allowing the user to work almost at water level, while sand from the surrounding dunes settles onto the platforms, as if they emerged from the existing landscape. Materiality was also important, utilizing a naturalistic, minimally invasive material palette to reflect the surrounding landscape.



northwest perspective

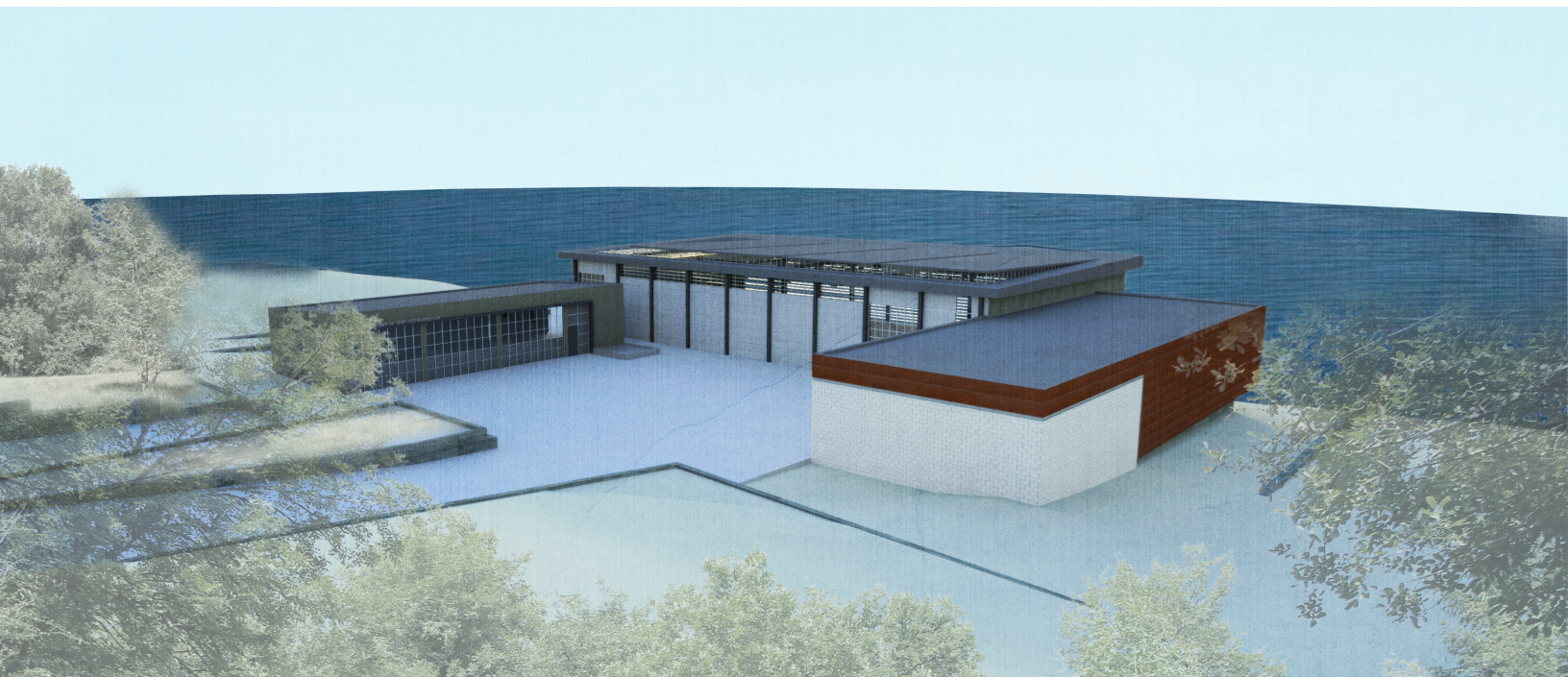
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northeast perspective

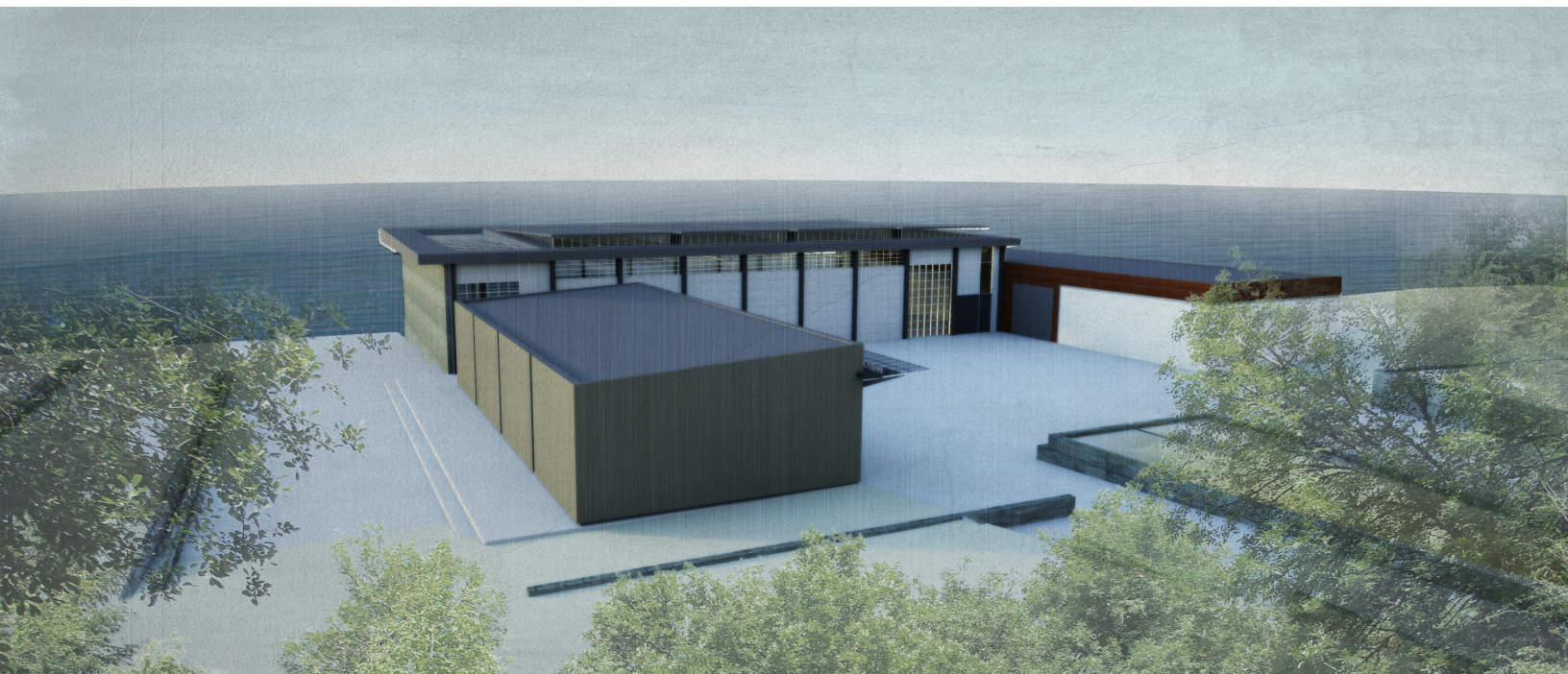
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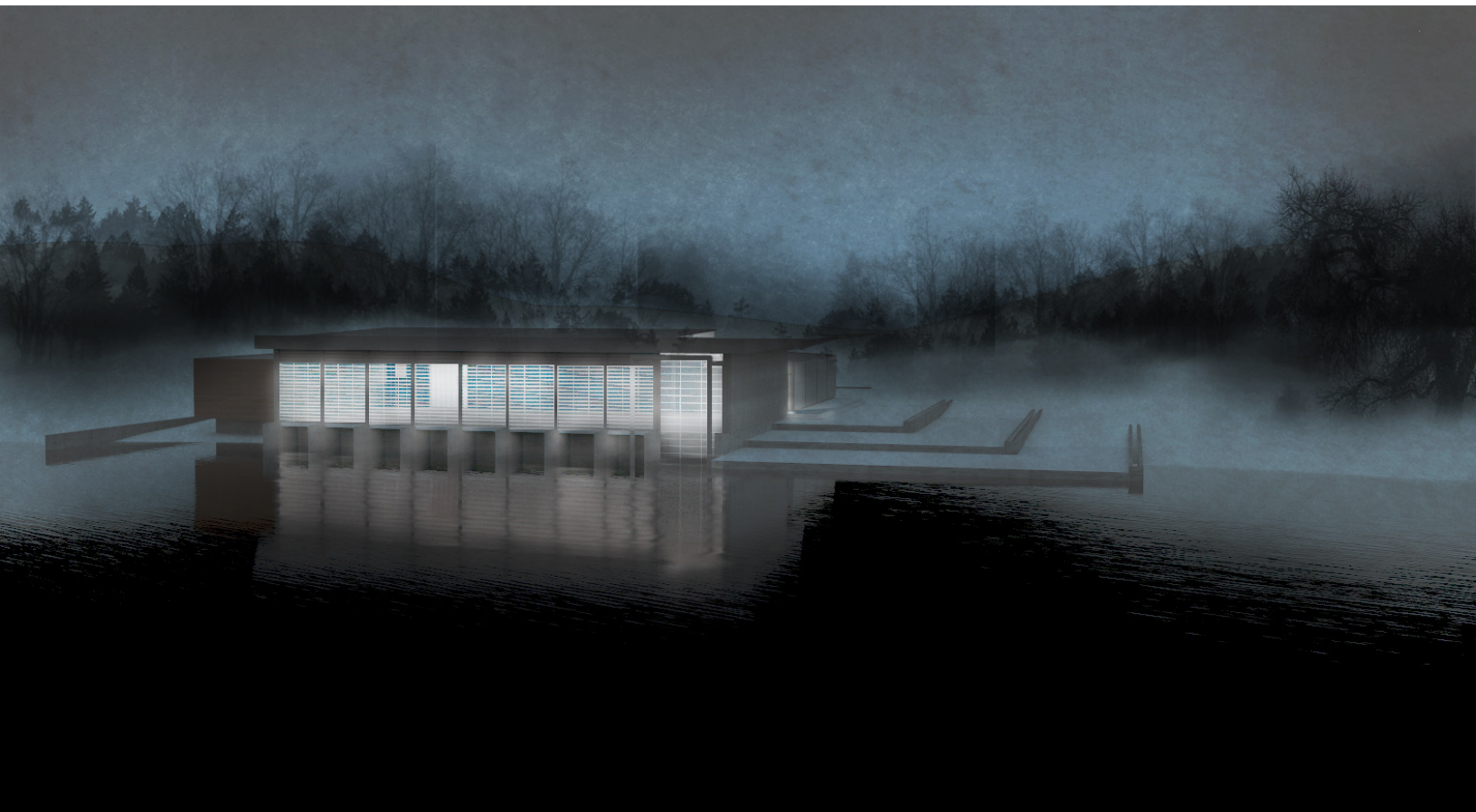
southeast perspective

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southwest night perspective

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entry drive perspective

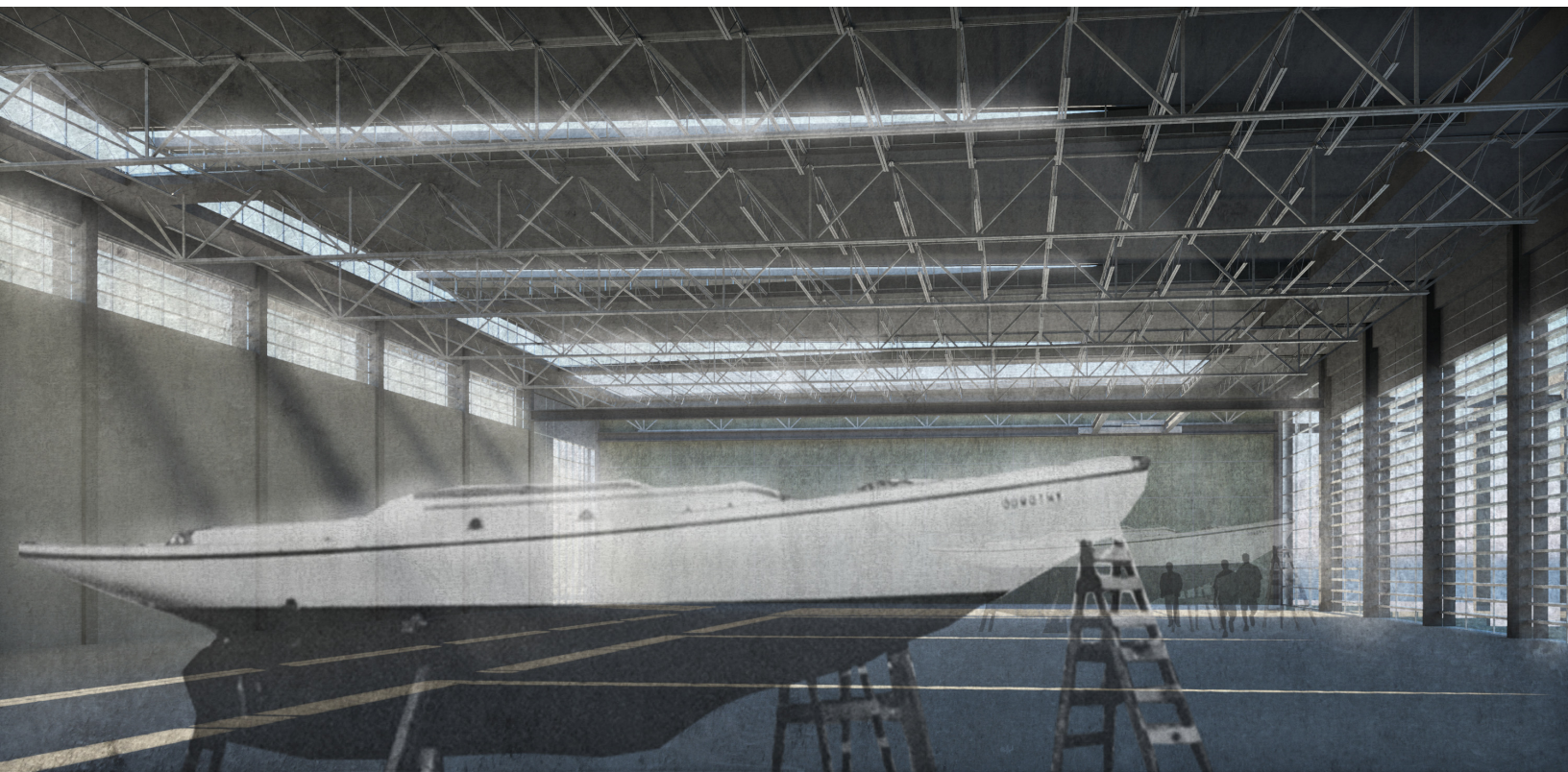
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interior workshop perspective

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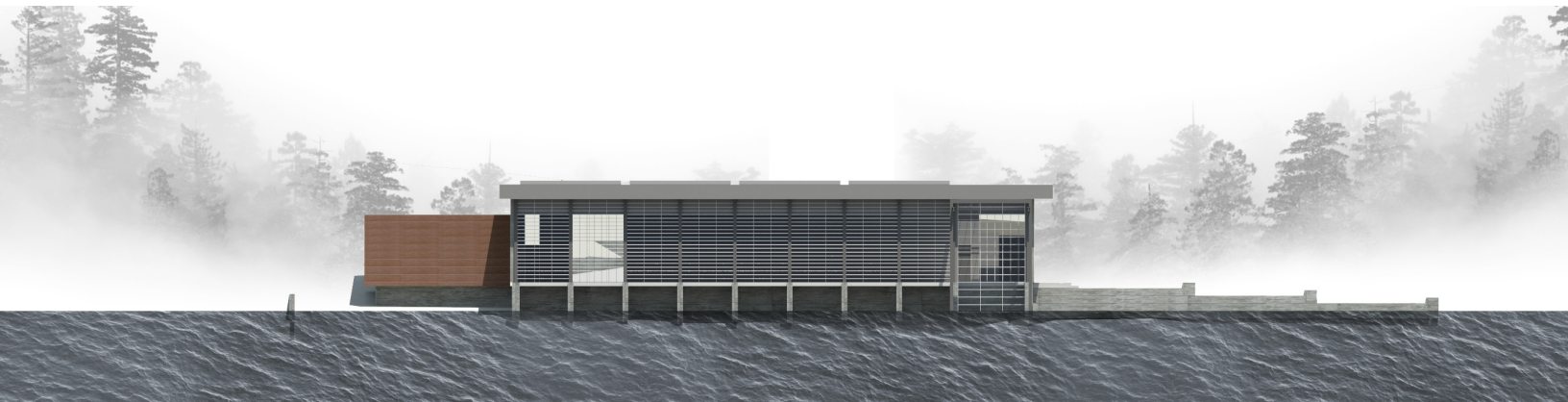
interior sunset perspective

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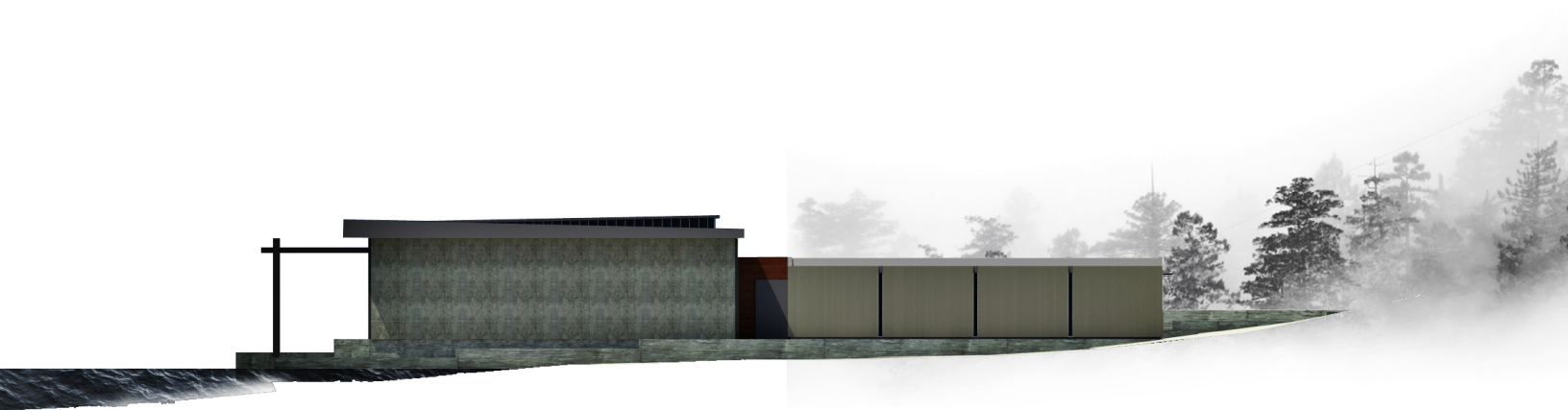
west elevation

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south elevation

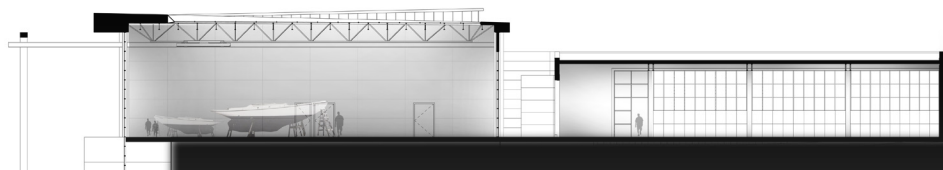
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south section

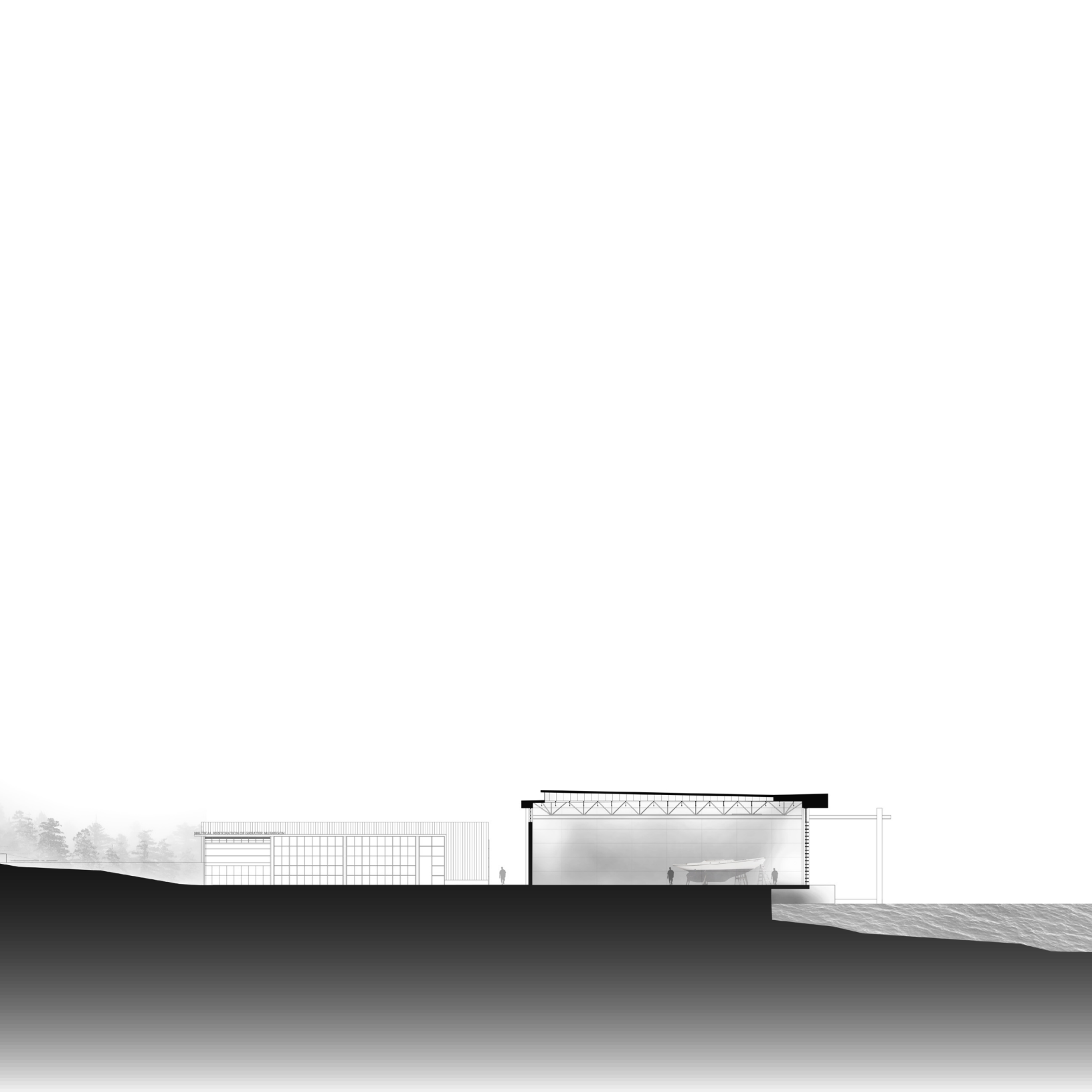
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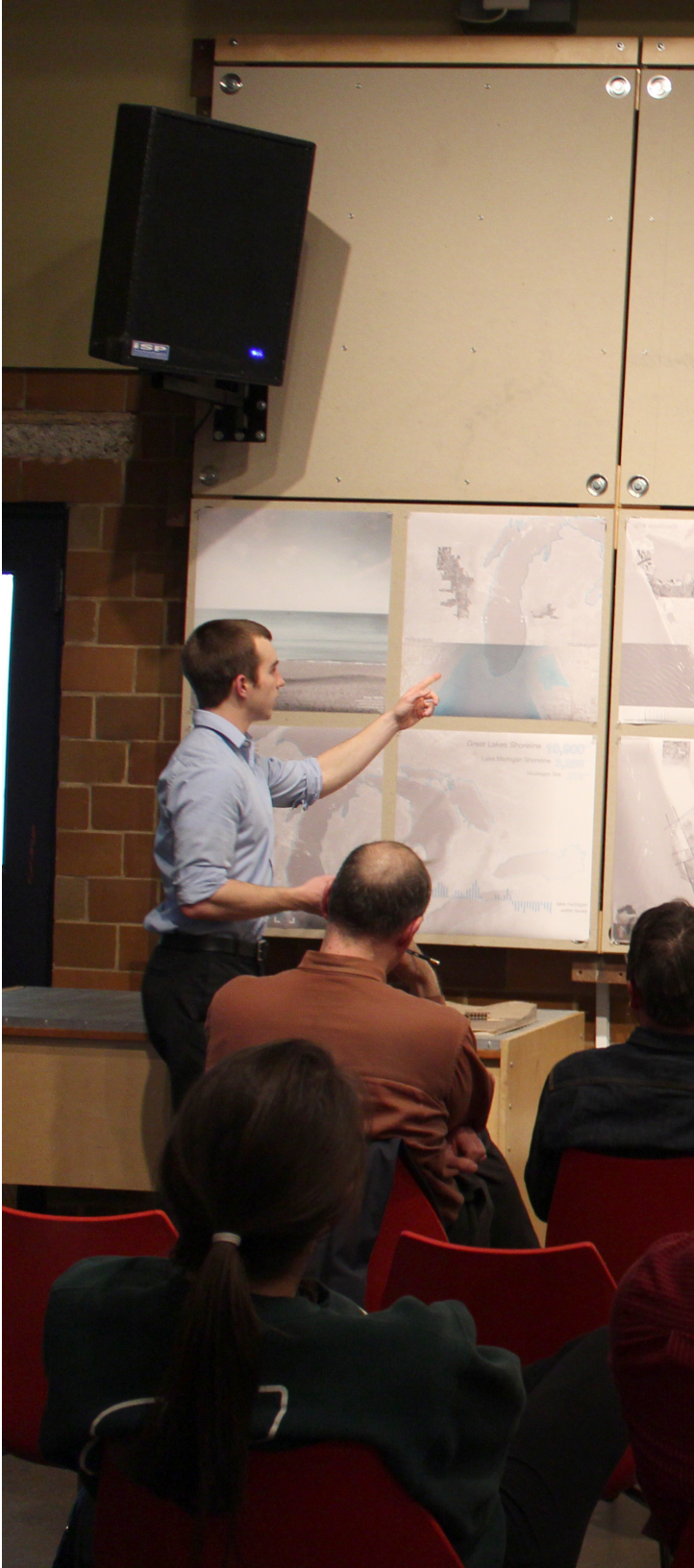


north section

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final presentation







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## CONCLUSION

This thesis allowed the exploration of this architectural opportunity on the shoreline to be further developed. The structural, aesthetic, and contextual fundamentals were all carefully considered for the selected environment. While the first half of the project has been primarily research based, the second half was dedicated to the physical design of the project. Consideration to a number of building techniques and materiality were carefully selected in order to accentuate this connection to craft and context, the selection of concrete, corten steel and wood as the three primary selections. Historical aspects of the boat itself were also considered when designing the facility for restoration and demonstration of traditional importance. How the design, structure, and materials accentuate the shoreline relationship was also paramount to the success of the architecture. The inherent allure of the scenic background would be heightened by the architecture responding to the sensory environment as well as the craft, allowing the user to clearly visualize what is being crafted, as well as where it will be utilized, an integral connection between site and program.





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## CITATION

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