

# New Form of Residential Waterfront Property Development

By Trenton Peterson



2012



Present



# Thesis Narrative

# Projects Goals

## Physical Goals

- Design the residential waterfront community in a way which does not negatively impact the environmental health of the body of water.
- Create a space where individuals and families can enjoy time with each other as well as the community.
- Create a system that will protect the community from:
  - Rising water or flooding
  - Traffic
  - Theft

## Theoretical Goals

- Bring knowledge to designers and architects of a new way to develop waterfront properties.
- Demonstrate importance of research-based design.

## Social Goals

- Identify how architecture can positively effect communities and create relationship throughout it.
- Identify how to allow more houses on waterfront properties and show how it improves the local community as well as the water life.



# Project Typology



Zero-lot-line housing



Cohousing



Resorts

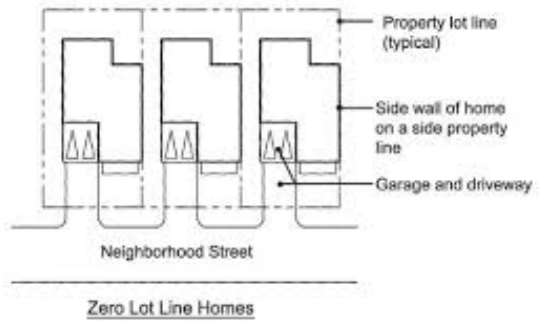


Waterfront Properties



# Research Results

## Zero-lot-line Housing



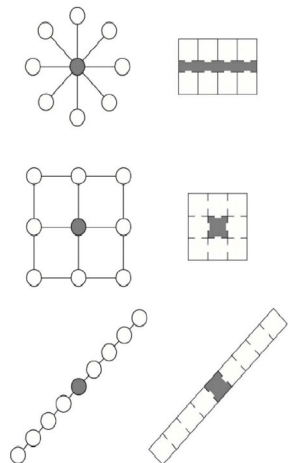
## Community Spaces



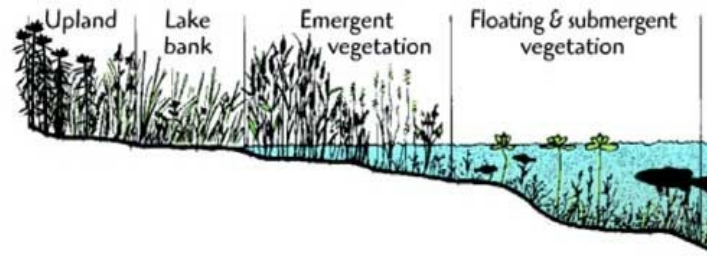
## Different Style Homes



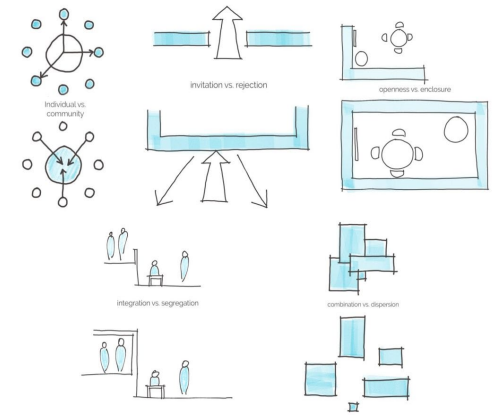
## Spatial Organization



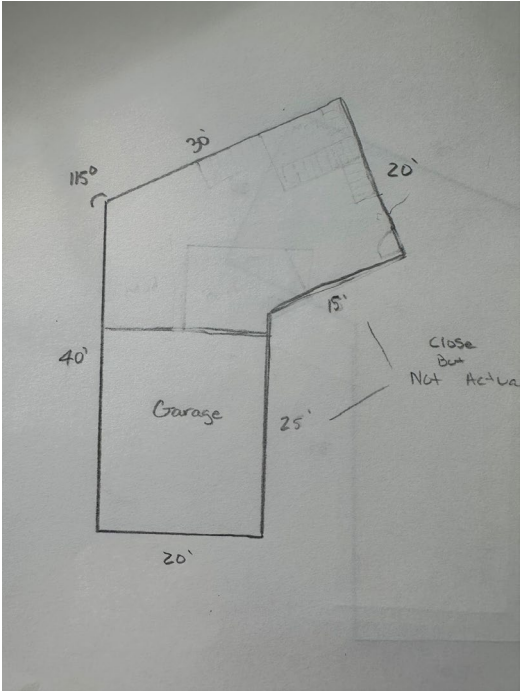
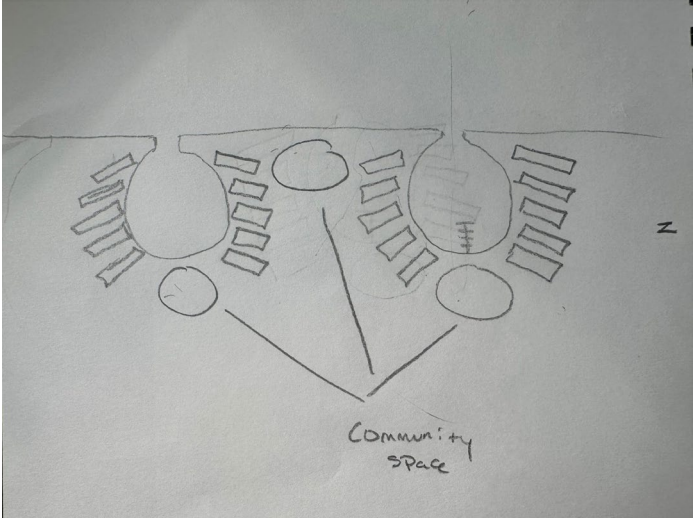
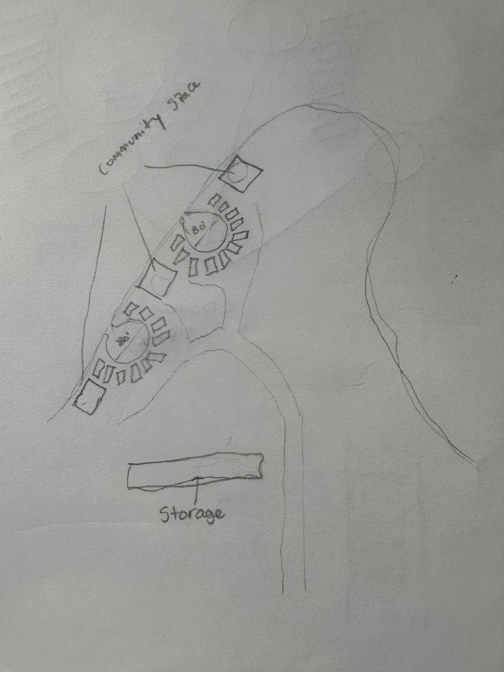
## Limit Disturbing the Shoreline



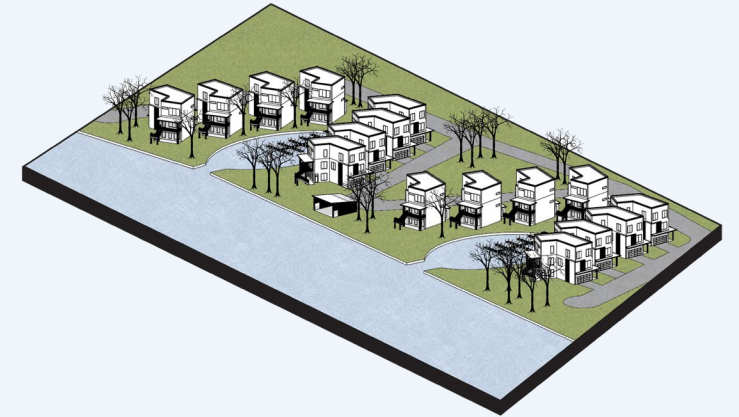
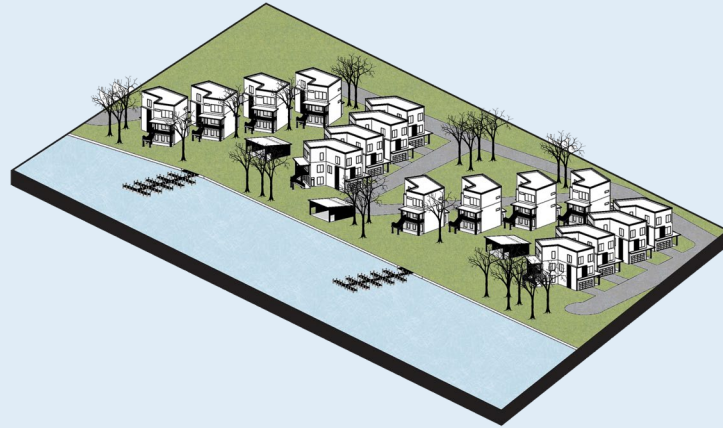
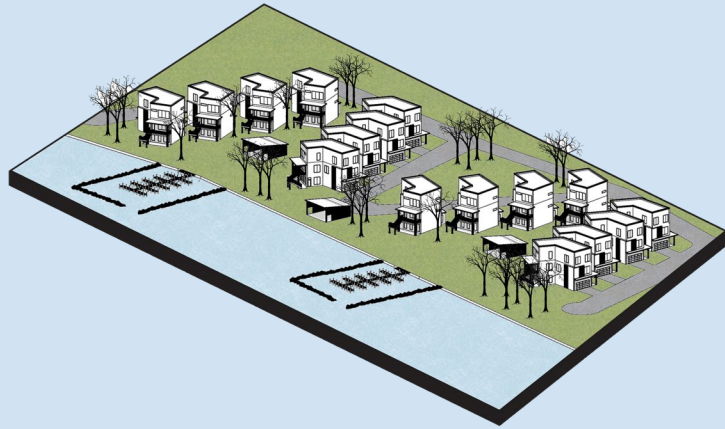
## Combined Spaces



# Concept Design

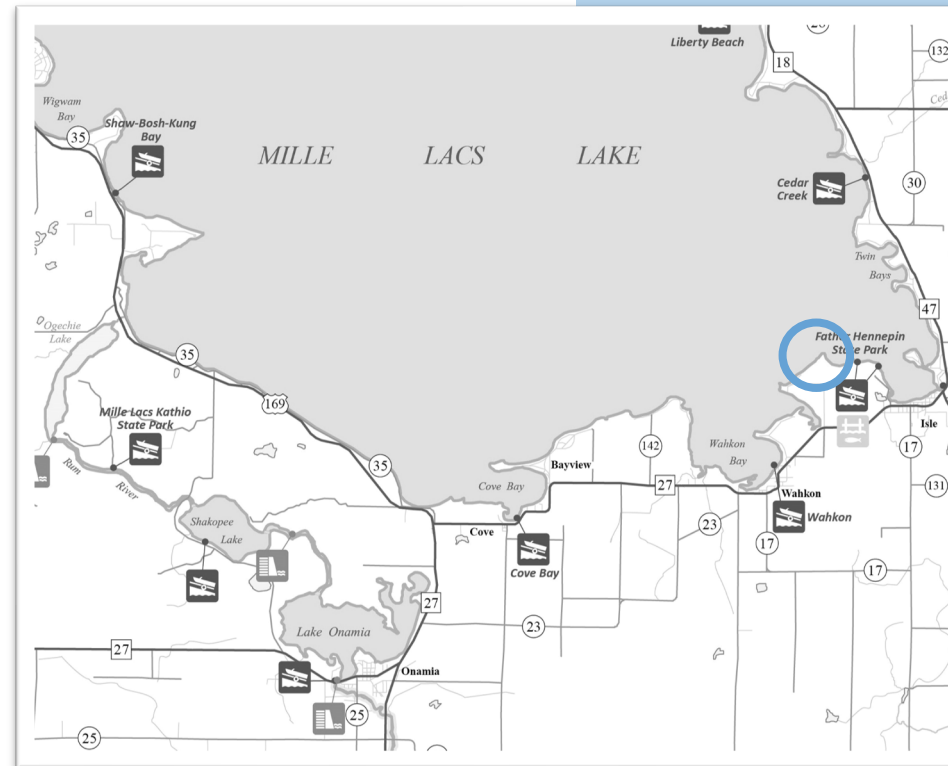


# Prototype Design





# Site



- **Region:** Midwestern United States
- **City:** Isle, Minnesota
- **Site:** On 45th Ave by Pope Point Lookout
- **Lake:** Mille Lacs Lake, MN

# Site



Top View



East View



West View



North View



Waterfront View



# Final Design

Site





# Community Spaces



Beach / Pavilion Area



Play Area



Community Gardens



Dock / Marina



Storage Unit

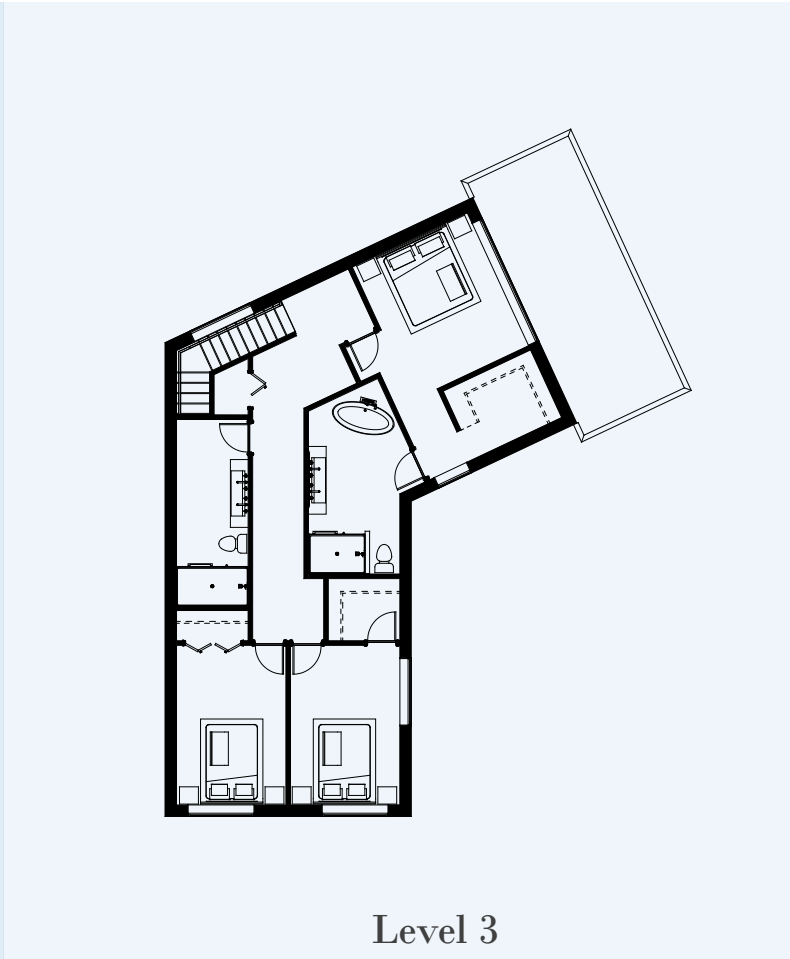
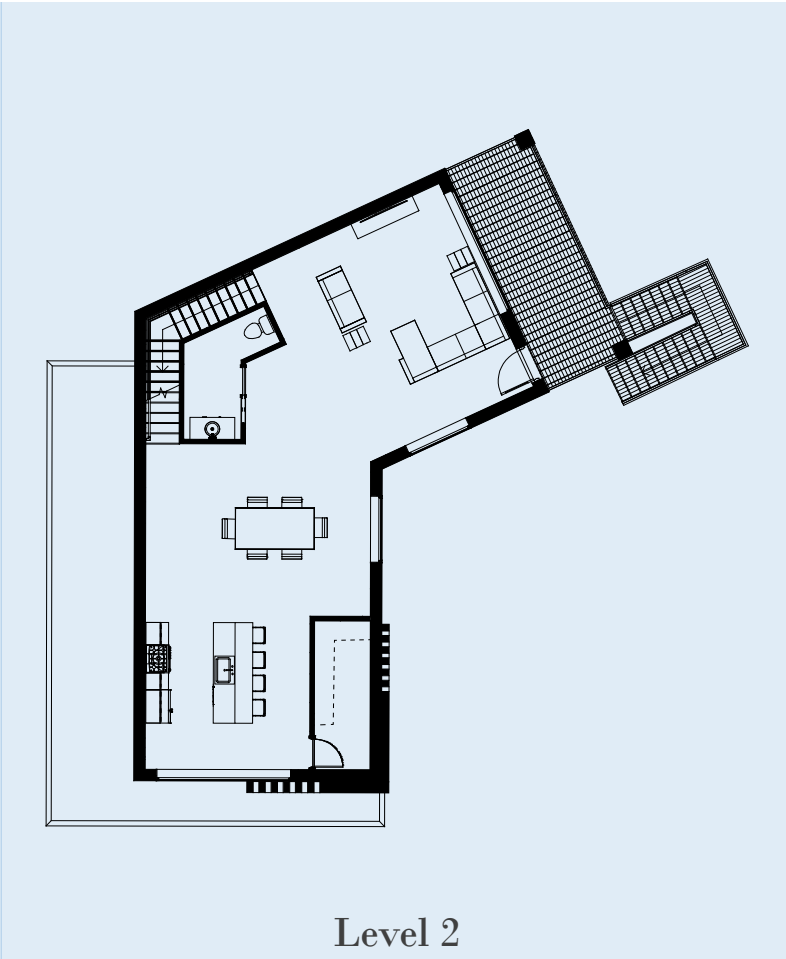
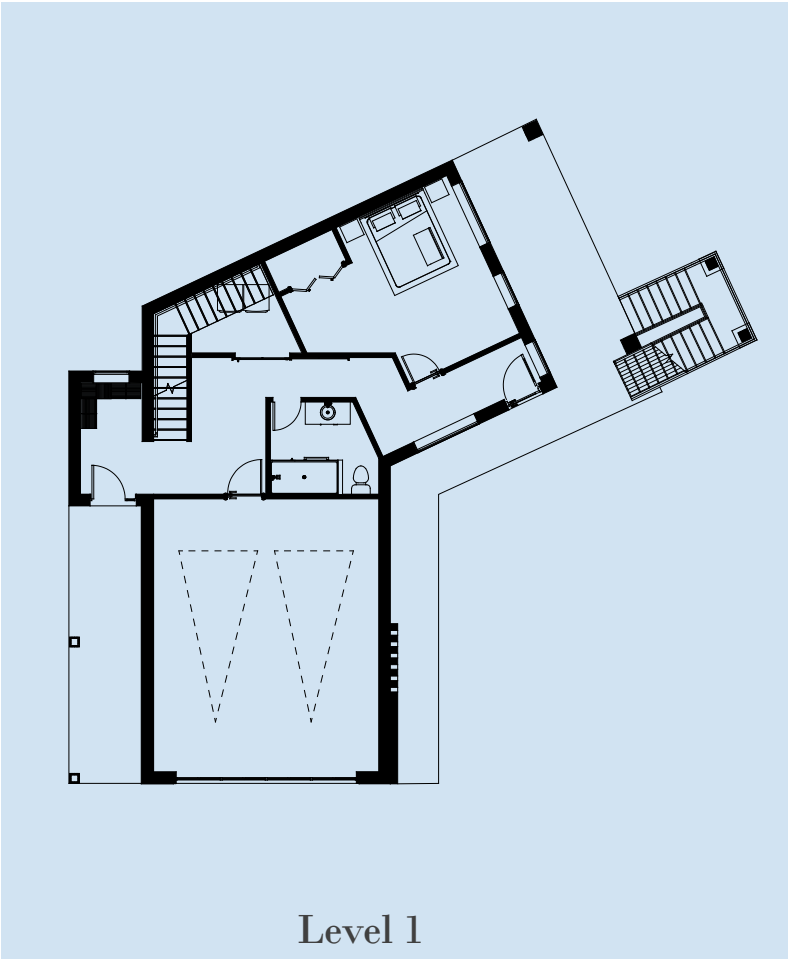


# Final Design

Residential Unit

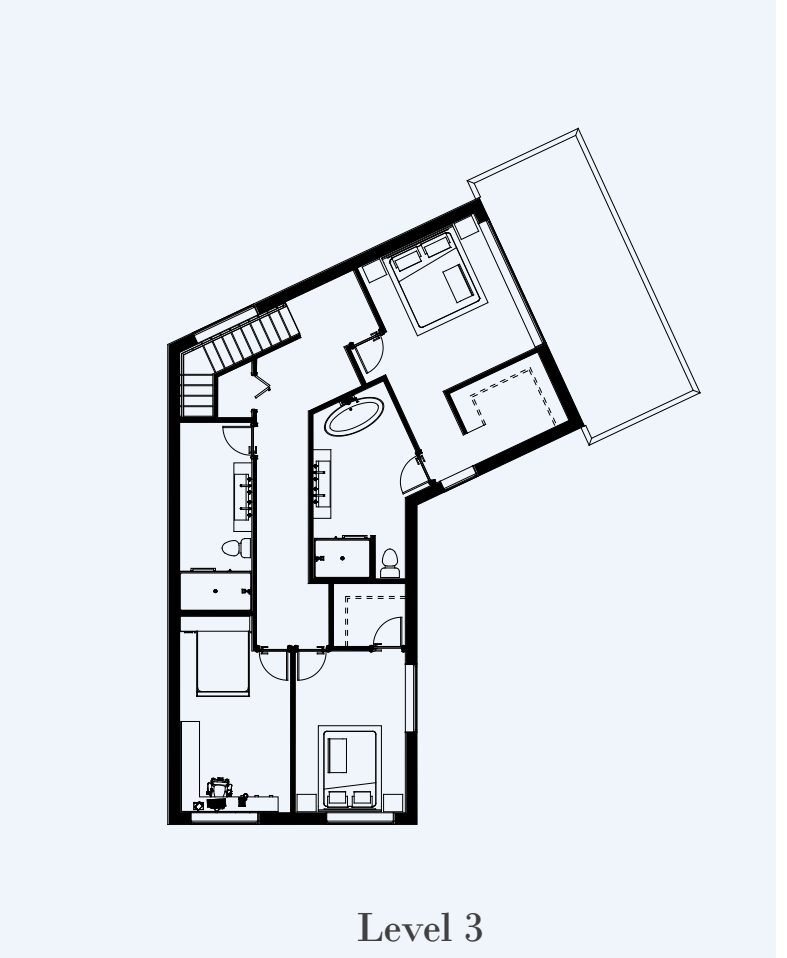
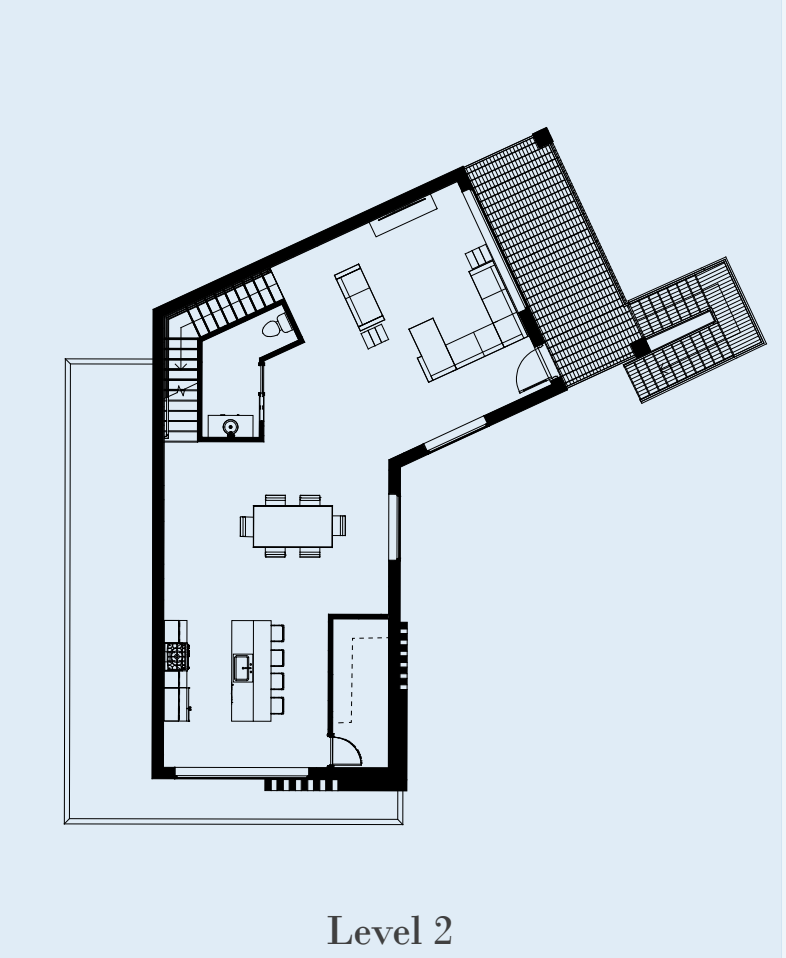
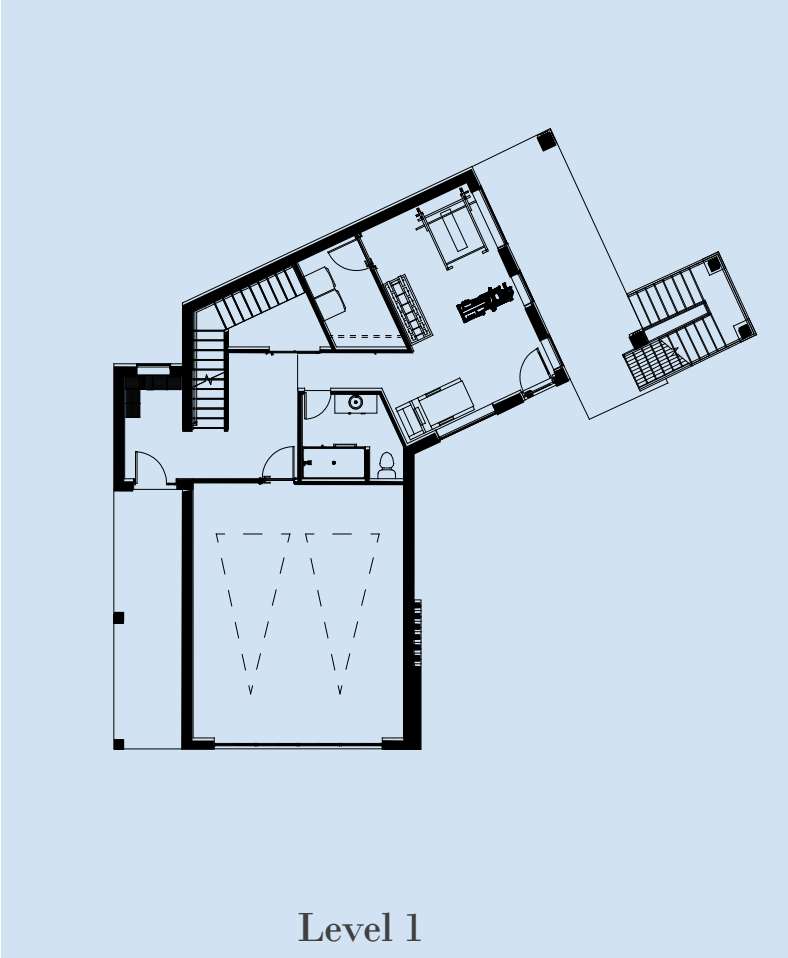


# Floor Plans





# Floor Plans



# Exterior Renderings



On the exterior of the residential units, the windows were placed strategically to not only optimize the view of the water, but to also allow privacy from other residential units. For example, the far right image shows that there are very limited windows, and that they are placed high up on each level. Those were placed to allow natural light into the structure but placed higher up on the floors and in certain places of the structure to still allow privacy in the home.

# Interior Renderings



Primary Bedroom



Dining Room / Kitchen



Living Room

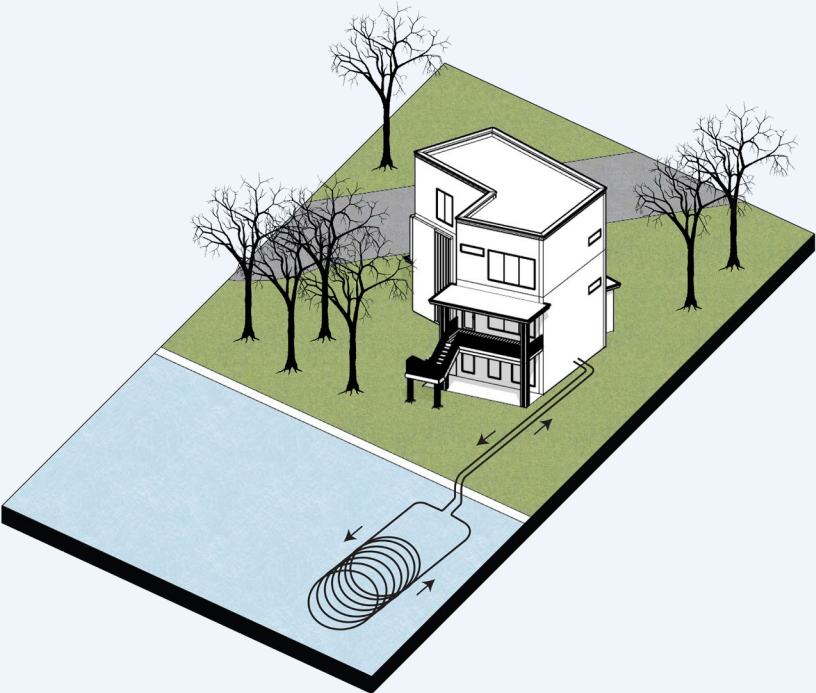
In the Interior of the residential units, the design focused on views, natural light, and compacting spaces. To allow for good views in the units, the main spaces within each unit were positioned with the best views of the water. To allow for good natural light there were windows added in spaces/positions that would create the best lighting for those areas. To help compact spaces in the unit the second level in the design used adjoining rooms.



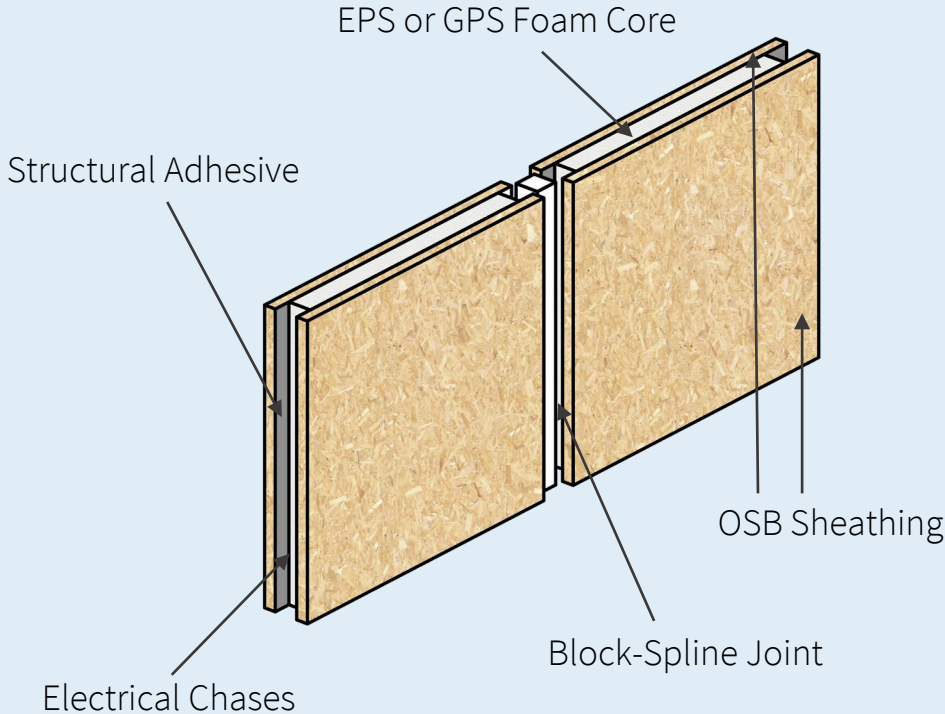
# Sustainable Strategies

## Geothermal Closed Loop System

Pond/Lake Ground Loop



## SIPs (Structural Insulated Panels)





# Final Product

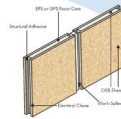


# Residential Waterfront Property Development



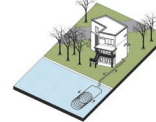
## Sustainable Strategies

### SIPs (Structural Insulated Panels)



The innovative panels consist of an insulating foam core sandwiched between two structural facings, typically oriented strand board (OSB). SIPs are known to be about 50% more energy-efficient than traditional timber framing. A SIP building envelope has minimal thermal bridging and delivers excellent airtightness, which lends itself ideally to LEED and net-zero-ready building standards.

### Pond/Lake Ground Loop

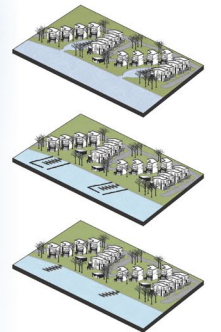


Closed loop systems constantly circulate heat-transfer fluid within buried or submerged plastic pipes. A supply line pipe is run underground from the building to the water and coiled into circles at least eight feet under the surface to prevent freezing. Geothermal ground loops can last 50+ years, even up to 100 years! Ground loops are maintenance-free and don't require cleaning or re-charging. These pumps generate 25 to 50 percent savings on heating and cooling costs compared to conventional fossil fuel systems. Creating a payback period between 5-10 years according to the Department of Energy.

## Floor Plans



## Prototype Designs



This Design uses Zero-lot-line housing in two U-shaped formations. This creates the best use of land, while still allowing each complex to have a great view of the water, and have privacy from other people in the community. This is a concept design so it will have to adapt to each site differently. The prototype designs show how the design may differ from large lakes, to small lakes, to the ocean. The site plan shows how you can manipulate the prototypes to move with the land and still create views, privacy, and an abundance of community spaces. Community spaces give a place to communicate, connect, play, and relax. While living in compacted spaces, it's good to have spaces where you can do things that you wouldn't be able to do in your own yard. It's great for kids to go run around in a safe place, adults can connect with other community members, it can also be used for large community or family gatherings to take place. There are so many benefits to community spaces. That is why this design has implemented five different community spaces throughout the community.



1. Beach/Pavilion Area
2. Marina/Dock
3. Community Garden
4. Playground
5. Storage Unit





# THANK YOU

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Professor : Cindy Urness

Spring / Fall Semester 2022 - 2023