

**Connecting - Engaging - Exploring**



***UNDERWATER***

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AR 510 & AR 520...Professor John Mueller... 28 April 2008**

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# ● Thesis Abstract

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What is archaeology? Does it mean history? Finding the unknown? Searching for meaning? On land or by sea? On land, most of the history of a site can be found and an archaeologist is more likely to search there. By sea, people are more reluctant to search the water because of the unknown. Underwater may not be the first place a person may think of when it comes to archaeology. Archaeology is not always about land and earth but it is also can be about water and the history that has been submerged in water over time. With this said, there are artifacts that have been discovered underwater and give clues of lost cities. The question is can these lost cities be found? Once found, how do you restore them without losing the history of the city? With research it can be found how the architecture of the civilization was arranged and constructed before the water completely submerged it.

Also, another architectural aspect is how the materials that were used have reacted to the water after being submerged for a long period of time. The new material appearance may be a key to reviving the architecture of the civilization that once lived. Reviving, used in the manner of restoring the ancient civilization and connecting it with the present. On the other hand, there may be a challenge to bring out the history of ancient civilization and make a connection with the current civilization that has developed around it, above water. Research may find that the architecture in the region in the present may have changed significantly from the ancient architecture that has been submerged in water. There may be a chance that the architecture on land in the same region as the aquatic site may have repeated history with its architecture without knowing. Only research can answer these questions and solve the issue of connecting a historical site submerged in water with the current site on land. Also there must be a way to connect life on land with life in the sea.

# ●● Thesis: *The Statement*

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The title of this project is *Connecting, Engaging and Exploring Underwater*. Connecting could mean “association with or development of something observed, imagined, discussed”. From those various meanings, the meaning closely related to this thesis is “development of something observed”. For engaging, the various meanings are “the act of interlocking, occupying or participating”. From those meanings “interlocking and occupying” could be used for this thesis. Lastly, for exploring the meanings are “to travel through unfamiliar territory, to travel in for discovery, looking, investigating”. The chosen definitions were “to travel through unfamiliar territory” and “looking”. With these definitions the thesis statement is made to be:

**“Connecting human life on land with life in the sea through engaging and exploring underwater.”**

This statement means human life can connect with life in the sea by observing and this observation can take place when humans engage and explore to get an understanding of what is unknown about the sea.

There are many questions that may arise about the thought of exploring and engaging underwater. One question is what is meant by humans exploring and engaging? Should people actually submerge themselves underwater to get an understanding of life underwater? What is the purpose of going in the sea?



# ●● Thesis: *The Statement*

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Captain Jacques Yves Cousteau, who is known for his underwater explorations, addresses these questions.<sup>1</sup> He makes a statement of how practical people may ask ‘Why in the world would you want to go down into the sea?’ He answered it with a statement from George Mallory, who was asked a similar question about climbing Mt. Everest, which was ‘Because it is there’. Captain Jacques Yves Cousteau also felt that<sup>2</sup>:

“We are obsessed with the incredible realm of oceanic life waiting to be known. The level of habitation on land, the home of all animals and plants, is a thin tissue shorter than a man. The living room of the oceans, which average twelve thousand feet in depth, is more than a thousand times the volume of the land habitat.”

This statement can bring up thoughts about not exploring underwater because of how large of a territory that has to be covered as well as the danger of not knowing what is in the sea. This territory belongs to the sea creatures and it is known that humans belong on land; but who is to say people are not allowed to go in the sea? This question is not really the question that arises. The main question is who dares to go into the sea? Some people may be very afraid of the sea because there are so many creatures that may harm us that no one knows about. There must be a way to explore underwater without endangering lives. One way is through submarine exploration. With this method a person is submerged in the water but at the same time inside a structure that protects from any harmful sea animals or elements. The downfall of this method is that people may argue that a person is not really engaging the water by not being physically submerged. Scuba divers do not have the issue of being afraid of submerging in the water. For people that are afraid, there must be a structure that helps them explore underwater with the illusion of being submerged in the water.

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# ●● Thesis: *The Site*

There is major challenged faced when choosing a site that encompasses the idea of connecting human life with life in the sea. The site must have intriguing qualities, be attractive and have a historical element, since the site must be archaeological. Lastly, the site has to relate to marine archaeology. By definition, marine archaeology is:

“the study of human interaction with the sea through the remains of vessels, underwater shipwrecks, remains of harbors and ancient cities that are now covered with water”.<sup>1</sup>

The site that had all of these components is Iseki Point off the coast of Yonaguni Island, Japan.



Iseki Point was discovered in 1987 by a local scuba diver named Keyachiro Iratake, who was at the time searching for hammer head sharks. Instead he stumbled upon a massive monument that appeared to be manmade.





# ●● Thesis: *The Site*

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Keyachiro Aratake named the monument Iseki Point, which means “Ruins” Point. The monument itself is approx. 200ft out to sea, 100ft. deep in the sea, 90ft. wide North to South, 240ft. East to West and 90ft high. The features of the monument will be described later in the book. Since his discovery there have been many people interested in exploring the monument. In a documentary shown by the history channel as part of their “Ancient Marvels” series, named “Japan’s Mysterious Pyramids”, Keyachiro talks finding a way to attract more visitors to the island. This monument may just do what Keyachiro wanted.

The problem with attracting more visitors to the island is that the only people that are allowed to see the monument are those people that are trained and liscensed to dive. With this said it leads to the design challenge.....

# ●● Thesis: *Design Challenge*

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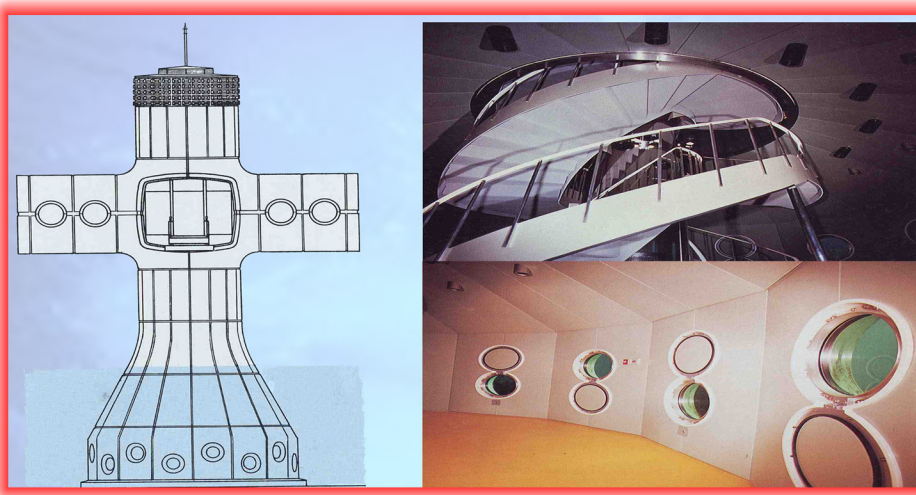
Now that the site has been established, there are many design challenges that need to be addressed. First, is to attract the visitors to the island, which is done when more people are aware of Iseki Point. Second, is to find a way to get people that are not licensed divers into the water to view the monument. There must also be a structure that connects with the monument. Lastly, there must also be other ways for the visitors to engage the island as well. With these design challenges in mind a successful connecting, engaging, and exploring center can be designed on Yonaguni Island.

Once trying to incorporate all these elements, the idea of going underwater to reach the site is a dominating idea that will impact the design greatly. The design must also pay attention to the natural features of the site. The monument is located off the coast of a mountainous island and right at that cliff the mountains are steep. The tides can be very strong in this area as well. A few other minor issues that will impact the design are that the main road does not reach this area of the island so, a new road has to be created, the community is strong in fishing and scuba diving, and having a view of the tropical underwater life may be an added reason for tourists to want to be underwater. There are many ways to address these issues through design but as the design develops the more issues develop.



# Precedent Analysis

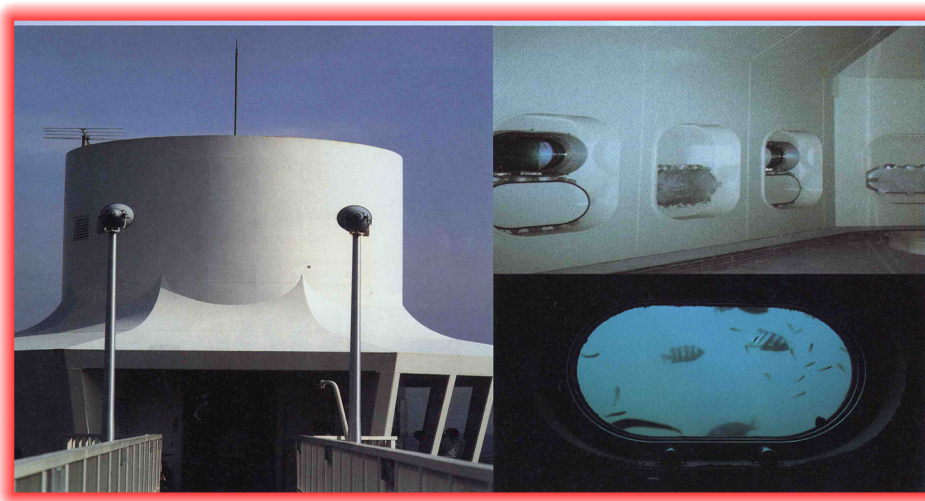
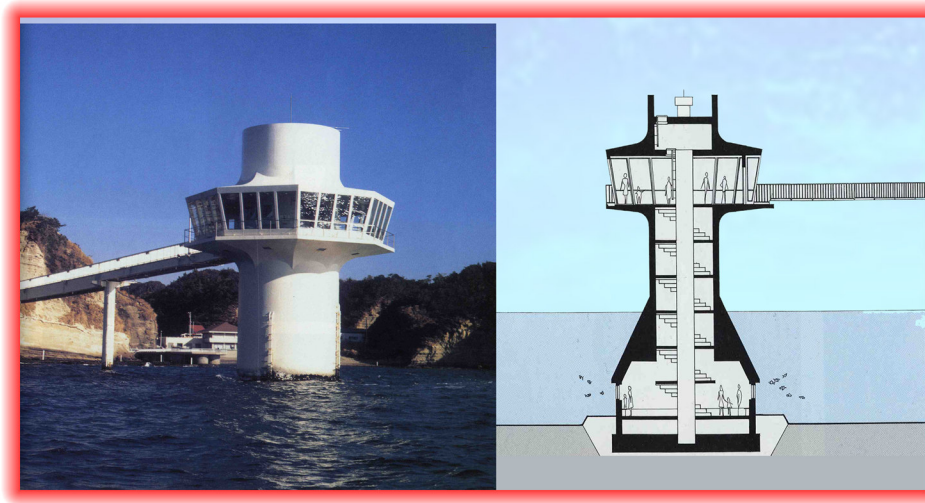
**Ashizuri Under Sea Observation Tower in Couchi, Japan  
Designer and Constructors: Kawasaki Heavy Industries, Ltd.**



**This observation tower is an example of a submerged structure that allows people to view underwater life. There are windows underwater as well as above water. It is about 70ft high and 20ft is submerged in the water.**

# Precedent Analysis

**Katsura Under Sea Observation Tower in Chiba, Japan**  
**Designer: Gakken, Inc., Ltd.**



**This observation tower is an example of a submerged structure that allows people to view underwater life. This tower is submerged in 34ft of water and has about 30 double pane windows. The bridge connects the tower to the shore.**



# Precedent Analysis

## Ithaa Undersea restaurant at the Hilton Maldives Resort



**This structure shows example of a human inhabited underwater space. It is made from a prefabricated tunnel that has been placed inthe water.**

# Precedent Analysis

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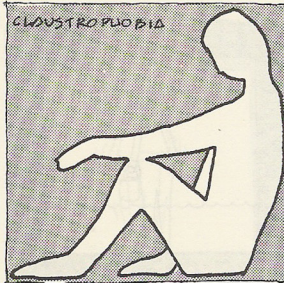
## Norwegian Concept of Floating Bridge



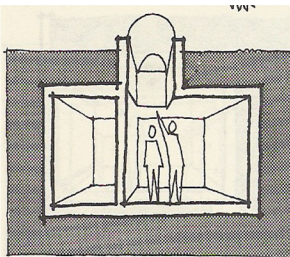
**This structure gives an example of the structure that could be used to support an underwater bridge and does not interfere with underwater activities such as scuba diving.**

## Building underground

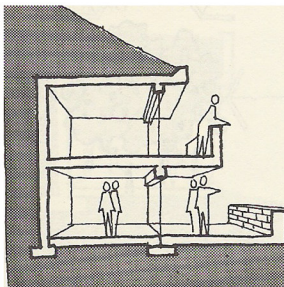
### Psychology



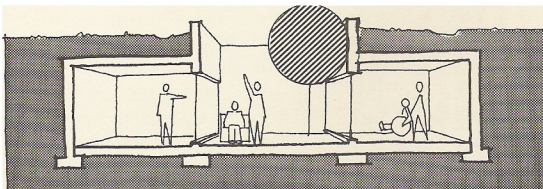
**Claustrophobia - “ Some people have a fear of being in enclosed, cramped, windowless spaces.”<sup>4</sup>**



**“in earth sheltered design, correctly positioning skylights, glass panels, and courtyards will help cope with these feelings...”**



**“A central atrium, with working and living spaces around offers natural light and outdoor rooms.”**



**“The same principle can be applied to sloping sites through semi-enclosed courts and/or balconies.”**



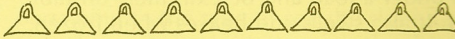


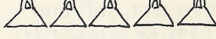
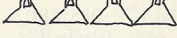
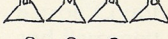
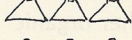
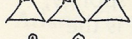


## Building underground

### Environmental Impacts

	stability when loaded	stability when frozen	drain-age	erosion hazard
clean gravel	+	-	+	○
silty/clayey gravel	+	○	-	+
clean sand	+	+	+	+
silty-clayey sand	○	-	-	+
nonplastic silt	○	-	-	+
plastic silt	-	-	-	+
organic silt	-	-	-	○
nonplastic silt	○	-	-	+
plastic/organic clay	-	○	-	○
peat/muck	-	○	○	-

**Soil implications - indicating good, fair, or poor conditions.<sup>5</sup>**

**Yonaguni Island may be composed of organic silt.**

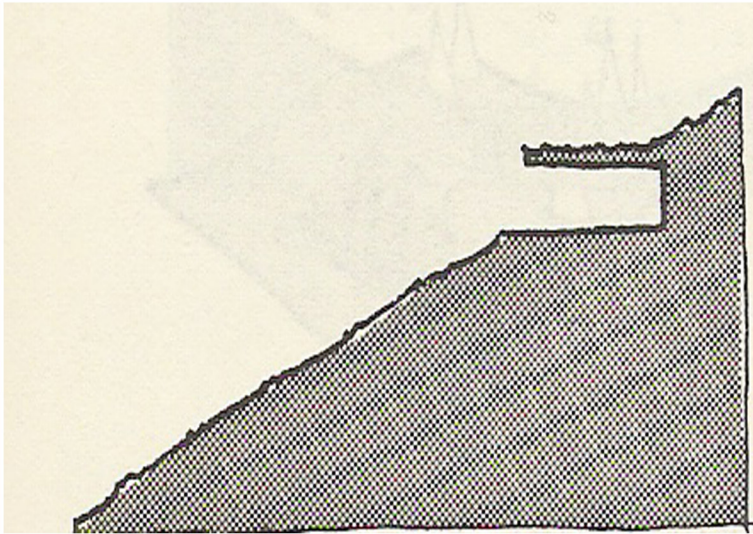
Material	Allowable bearing capacity in tons/ft <sup>2</sup>
Sedimentary rock	
Dry clay	
Gravel; compact	
Sand; compact	
Sand; coarse & loose	
Sand; fine & loose	
Medium stiff clay	
Medium soft clay	
Soft clay	
Peat & organic soils	

**Soil implications - “Structural integrity depends on soil type and its bearing capacity.”**

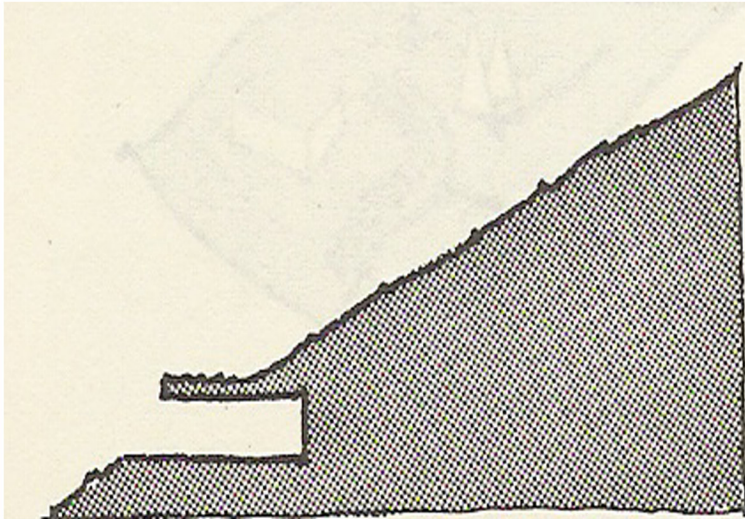
**Yonaguni Island may be composed of sedimentary rock.**

## Building underground

### Environmental Impacts



**Steep Slope - Top Site**  
10-30% slope<sup>6</sup>



**Steep Slope - Bottom Site**  
10-30% slope



## Building underground

### Building Materials



**“In many underground facilities the natural rock walls are exposed. These irregular, highly textured walls are visually interesting and emphasize the unique nature of being underground.”<sup>7</sup>**



# Site Analysis: *Yonaguni Island, Japan*

**Population:** Approx. 1,850

**Size:** Approx. 2.5 miles wide and 6.5 miles long



**Yonaguni, Island is the westernmost island of Japan. It is part of the Ryukyu Island chain in the Pacific Ocean.**

# Site Analysis: *Yonaguni Island, Japan*







## Monument Features



### The Basin



### The Turtle Figure





**Monument Features**



**South Face Perspective**



**Megalithic entrance tunnel**



**Parallel Megalithic Blocks**





# Site Analysis: *Yonaguni Island, Japan*

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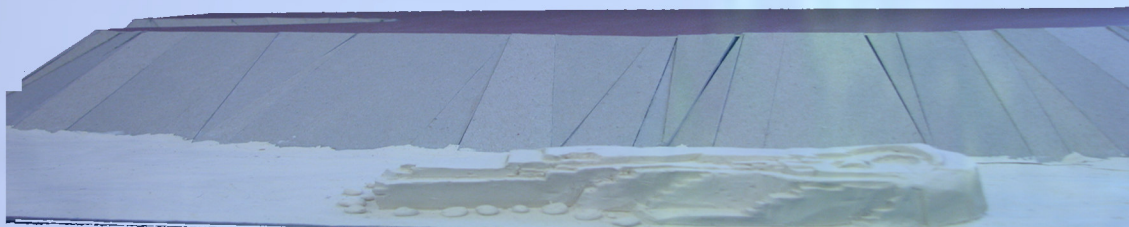
As mentioned before “Iseki Point” was discovered by a local scuba diver named Keyachiro Iratake in 1987. The site began to gain popularity in the mid 90s. There were many researchers of the site that were trying to figure out if the site was manmade or a natural feature. This structure was above water about 10,000 years ago. With this known, researchers are not sure what civilization could have made this structure. There are four qualified researchers that have dived at this site. These researchers are Dr. Masaaki Kimura, a Professor of Marine Geology at the University of the Ryukyus in Okinawa, Dr. Robert Schoch , a professor at Boston University, Dr. Wolf Wichmann, a German science writer, and Graham Hancock. There have also been many other divers to the site since its discovery. Graham Hancock has written a book about the site and he continues to argue that the monument is manmade despite its unique features.

**The program for this building is:**

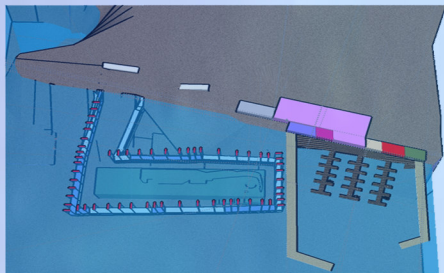
- \* **Souveneir/Gift Shop**
- \* **Offices for scuba diving community**
- \* **Swimming pool**
- \* **Marina**
- \* **Marina Lounge**
- \* **Restaurant**
- \* **Iseki Point Museum**



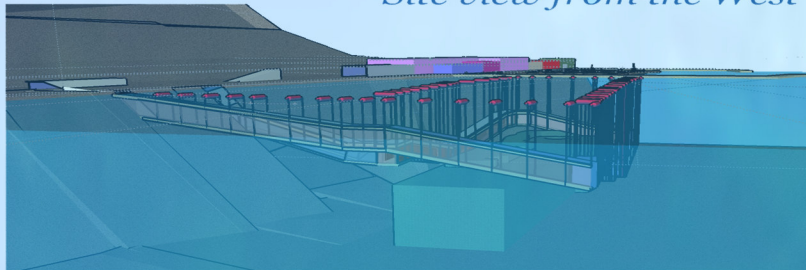
# Design Process



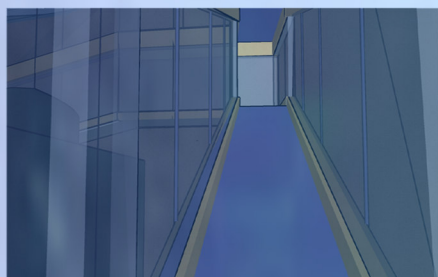
*Site aerial view*



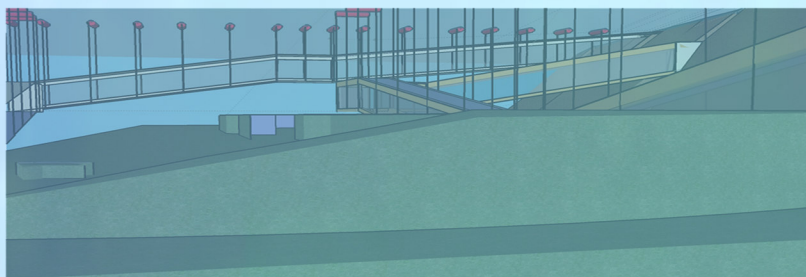
*Site view from the West*



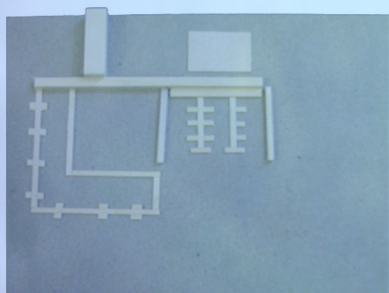
*View from inside bridge*



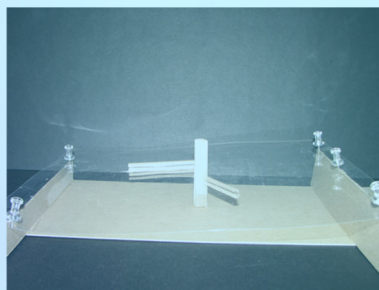
*View from inside bridge looking West*



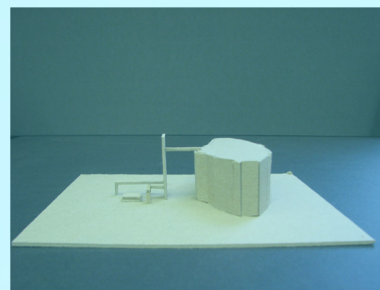
## Initial Design Concepts

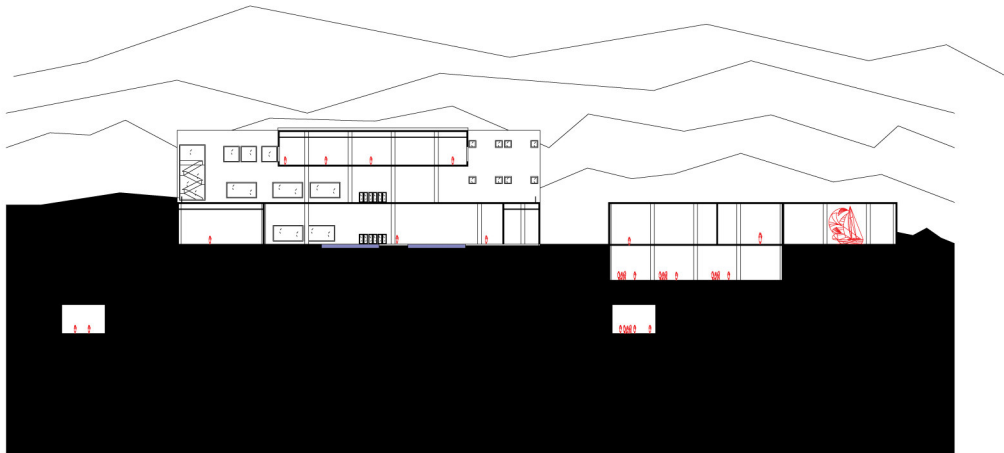
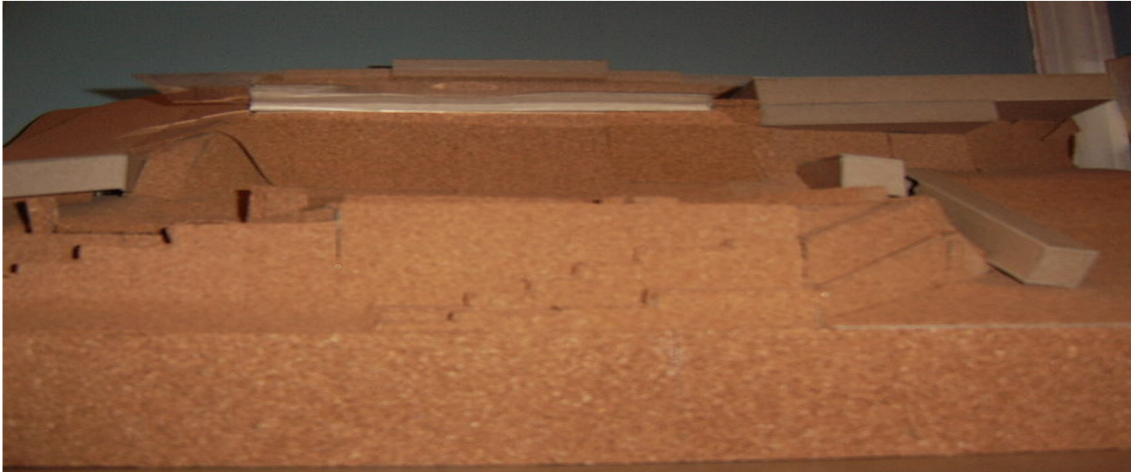


**Overall Site**

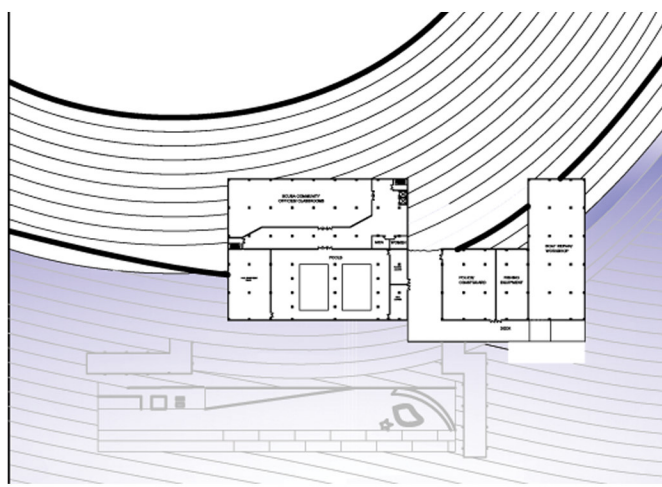
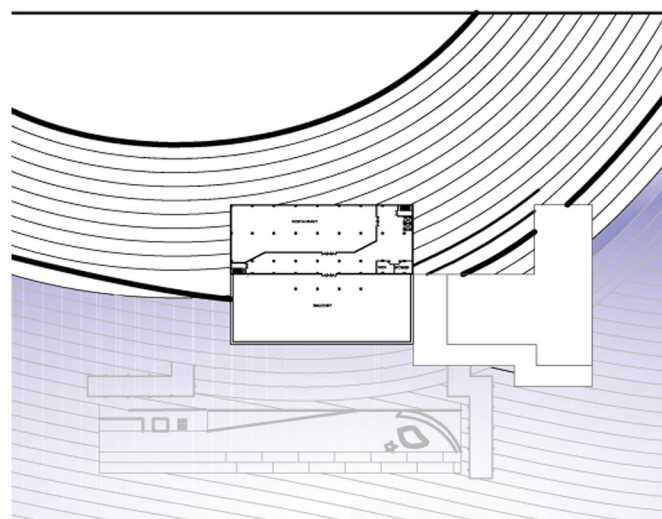
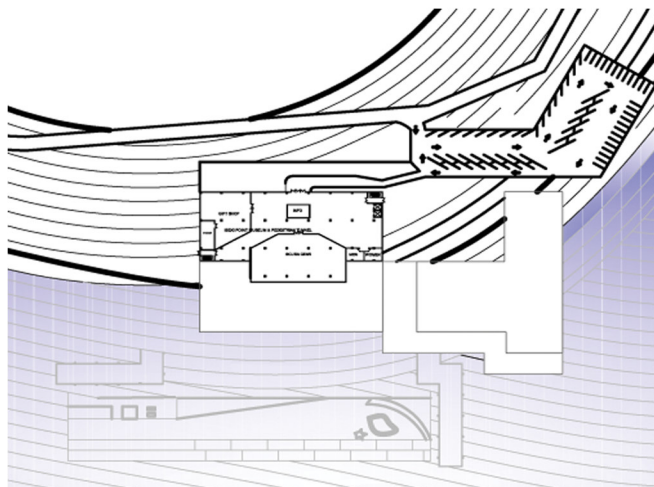


**Observation Tower**



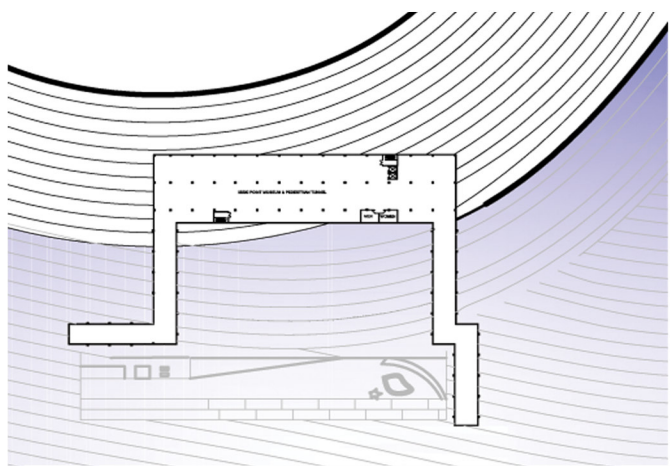
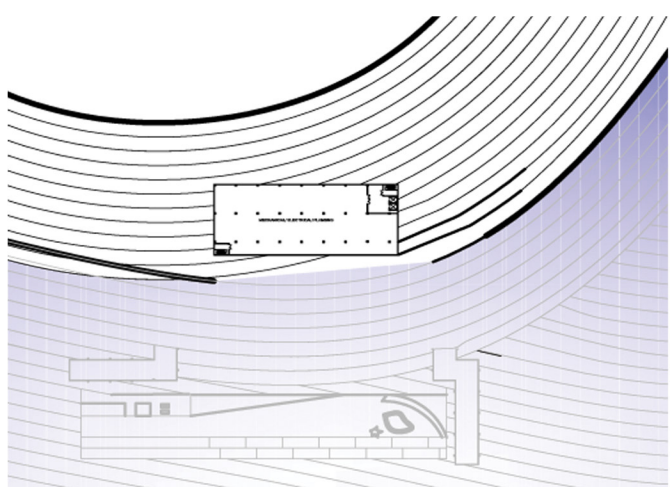
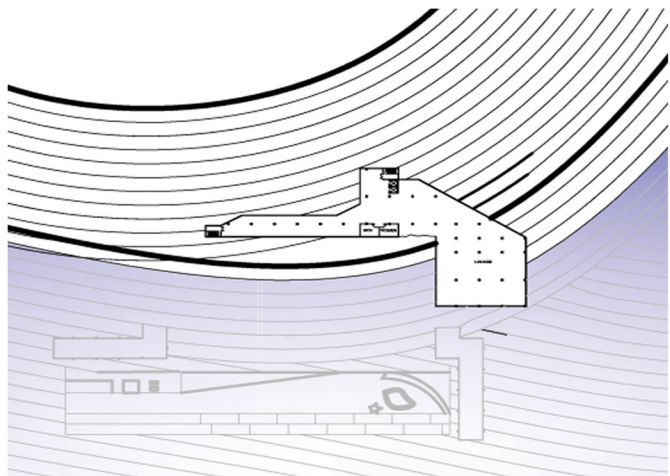


## Sections

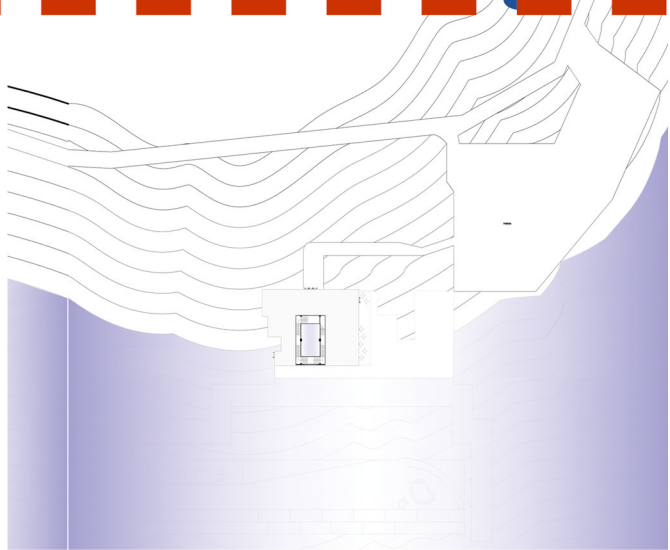


Levels 1-3

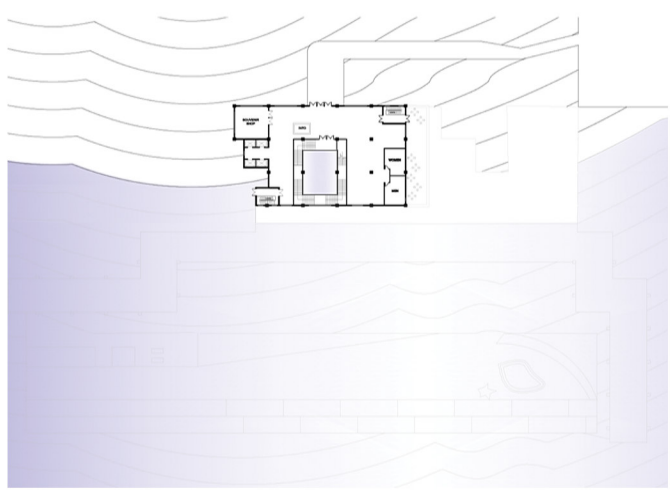




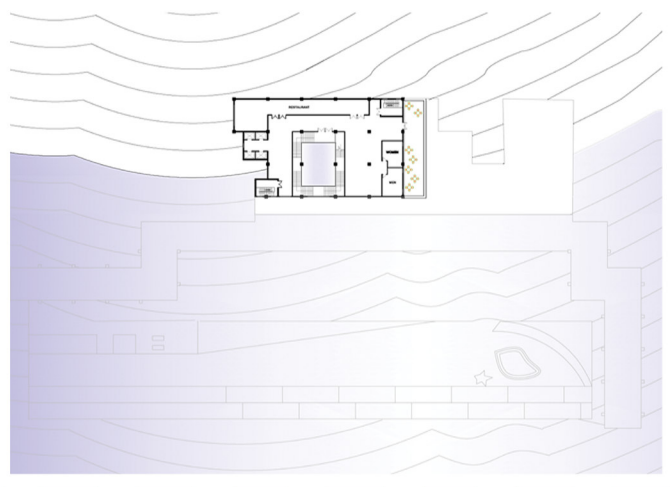
Levels 4-6



Site



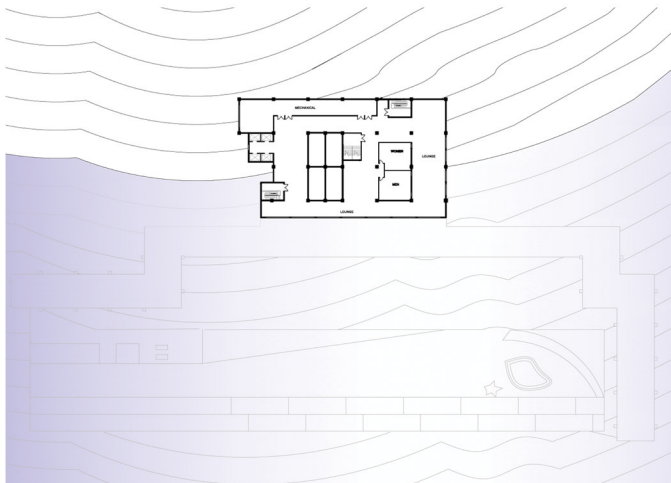
Level One



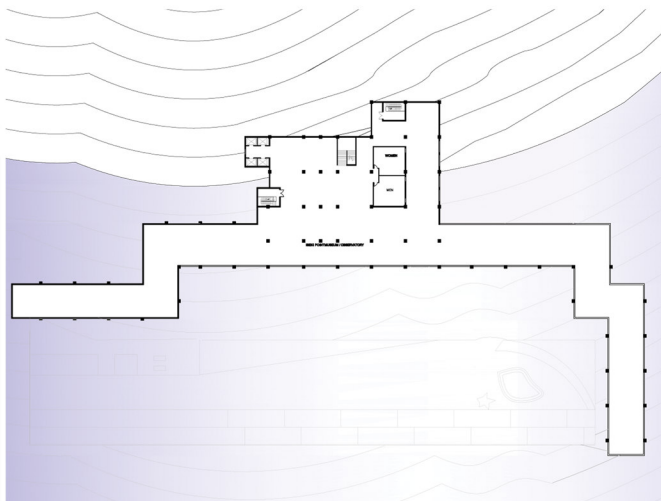
Level Two



Level Three

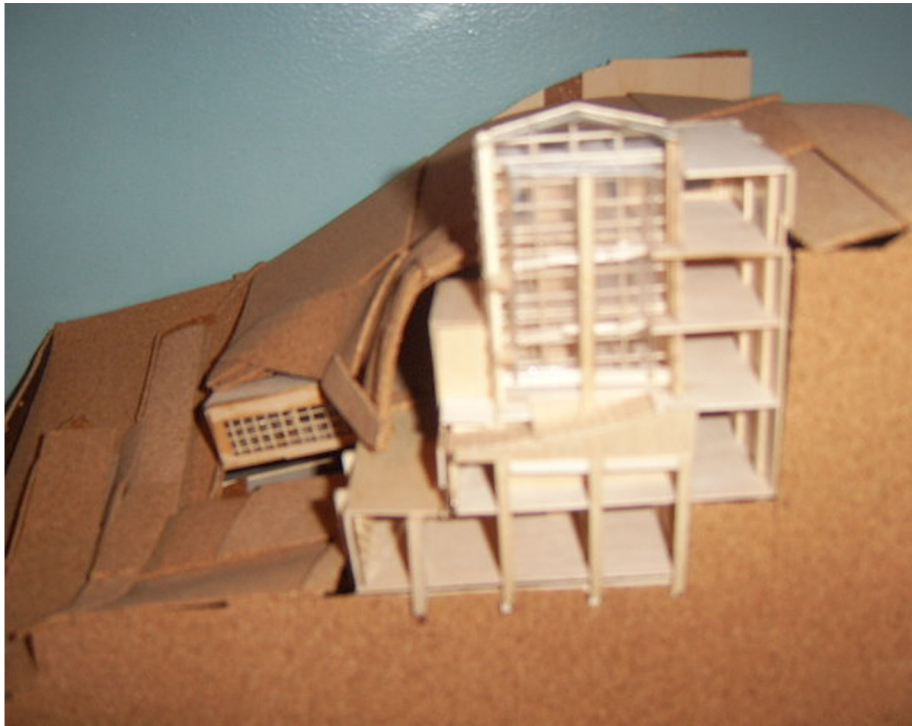


Level Four

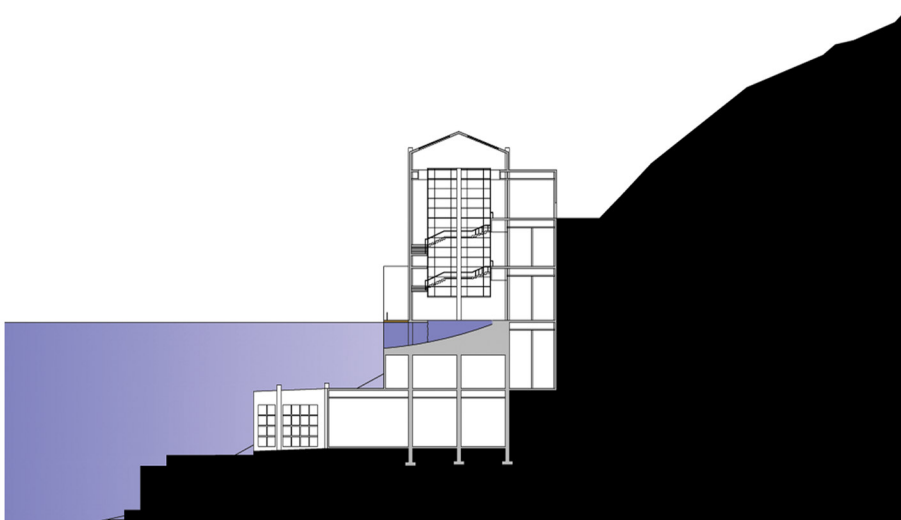


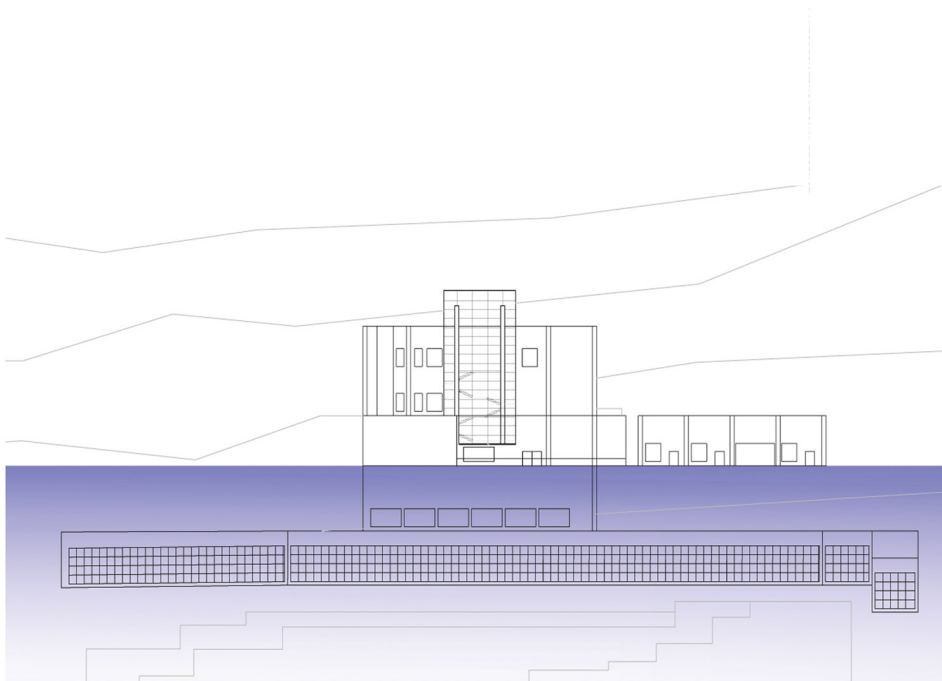
Level Five



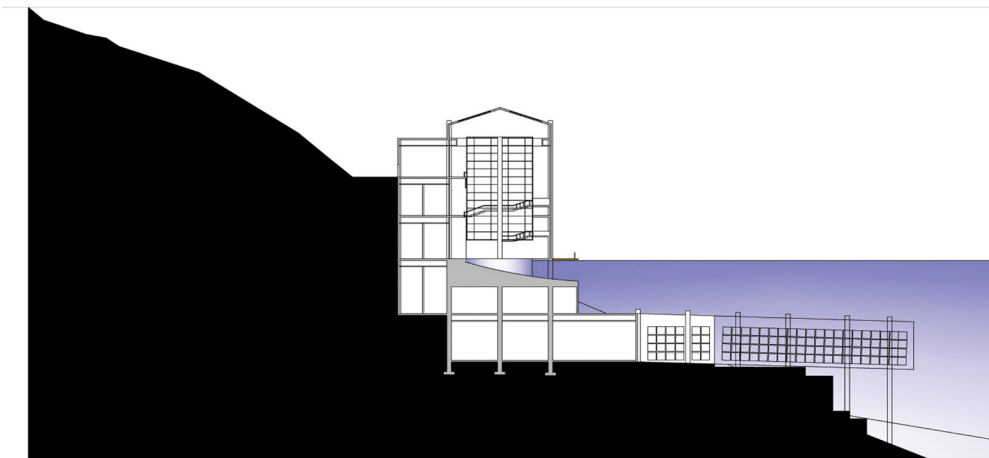


N-S Section Looking West





**W-E Section Looking North**



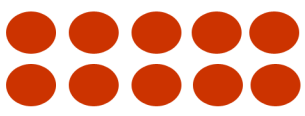
**N-S Section Looking East**



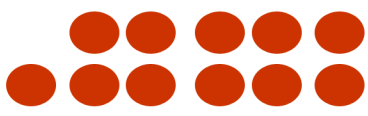
# Conclusion

In conclusion, this project has many challenges that were attempted to be solved. With more research most of the issues may be resolved. There is still the issue of how the people circulate through the building. There needs to be a continuous winding down underground to get a sense of going underwater and underground. There is also the issue of how to resist the strength of the tide especially since the water is penetrating the building at the third level. With continued research and investigation these issues will be resolved and a more elaborate design can emerge.





- 1 Statement from *The Silent World* Epilogue written by Captain Jacques Yves Cousteau**
- 2 Statement from *The Silent World* Epilogue written by Captain Jacques Yves Cousteau**
- 3 Definition from website-  
<http://wwwunderwaterarchaeology.com/marinearchaeology.htm>**
- 4 From page 3 of *The Earth Shelter Handbook***
- 5 From pages 22-23 of *The Earth Shelter Handbook***
- 6 From page 25 of *The Earth Shelter Handbook***
- 7 From page 239 of *Underground Space Design***



# Bibliography

**Carmody, John and Raymond Sterling. Underground Space Design: A Guide to Subsurface Utilization and Design for People in Underground Spaces. Van Nostrand Reinhold: New York, 1993.**

**Hancock, Graham. Underworld: The Mysterious Orgins of Civilization. Three Rivers Press: New York, 2002.**

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**[http://www.nsft.no/the\\_floating\\_tunnel\\_features.html](http://www.nsft.no/the_floating_tunnel_features.html)**

**[http://www.nsft.no/the\\_floating\\_tunnel\\_SFT\\_options.html](http://www.nsft.no/the_floating_tunnel_SFT_options.html)**

**[http://www.th.gov.bc.ca/Publications/reports\\_and\\_studies/fixed\\_link/fixed\\_link.htm](http://www.th.gov.bc.ca/Publications/reports_and_studies/fixed_link/fixed_link.htm)**

**Tri/Arch Associates. The Earth Shelter Handbook. Tech/Data Publications: Milwaukee, 1980.**