

Water and Architecture



From Floating Houses to a more Sustainable Future: Adaptive and Aesthetic Housing Models

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Global Knowledge Exchange Event on Floating & Resilient Development

Convened by: The Water Adaptation Community of the September 29, 2022

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- History and inspiration

-The idea of living and working on water itself is neither new, nor innovative. Examples go back to Noah's Arc and the first Sumerian in the swamps of Mesopotamia. The incentives were generally practical reasons such as protection from enemies, the availability of water and food, and living on a commercial transport waterway. The result was the emergence of floating structures within contexts where space was traditionally limited due to cultural and environmental conditions.



- History and inspiration



- History and inspiration



Floating Architecture: Passion - Fashion - Solution?



- History and inspiration



Jelly-fish 45
Floating home with underwater view
Vancouver, Canada, 2002



FronD Village 30
Innovative floating resort
Tahiti, Polinesia, 2004



- History and inspiration

- Industrial and commercial development in the early 20th century saw a need to use bodies of water for living in urban agglomerations. Rising urban density and land prices were responsible for a growing pressure to seek alternative homes on the water.
- The consequence was improvised and “unhealthy” solutions in urban water spaces without any suitable sewage systems. World War II created the conditions for the development of the houseboat culture of the Netherlands. In the 1960s and 1970s, however, there was a decisive change in the perception of this form of architecture. The proper hippie movement even created illegal floating settlements in the United States and in Canada.
- Floating architecture was for the first time used as a visible expression of individualism. The floating communities in Sausalito / San Francisco or in Vancouver exist today as legal settlements and changed their characters from improvisational to a more civil style.



Highlights on the paper "Floating Building Opportunities for Future Sustainable Development and Energy Efficiency Gains" by Shahryar Habibi

- This paper presents the study concerning floating buildings in terms of energy efficiency performance and improving awareness to build them. It includes their capacity to deal with climate change by leading the use and implementation of innovative technologies in the built environment. This paper shows that construction of floating buildings not only have environmental benefits but also conserve offshore energy resources resulting in economic benefits. This paper highlights that floating buildings can be an interesting way to combine sea energy resources and floating architecture.



Floating Building Opportunities for Future Sustainable Development and Energy Efficiency Gains

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Abstract

This paper presents the study concerning floating buildings in terms of energy efficiency performance and improving awareness to build them. It includes their capacity to deal with climate change by leading the use and implementation of innovative technologies in the built environment. Comparing floating buildings with land-based buildings reveals several advantages including the use of renewable energy sources and embarks on developing new settlement planning. This paper presents a review of the principal features of floating buildings that have a direct impact on global energy supplies and alternative renewable energy sources. Development of floating buildings needs the implementation of new technology, social and community knowledge. The new knowledge and experience gained in floating buildings can lead to optimum future approaches. This paper presents guidelines for developing sustainability strategies or decision-making frameworks for offshore renewable energy facilities. It will analyze example projects built on the seas in relation to offshore wind energy, wave energy and photovoltaic cells. The development and assessment of sea energy sources should be considered as renewable energy source. It also provides new strategies and methods to reduce climate crisis regarding floating architecture and promoting offshore energies as renewable energy resources. This paper highlights the importance of relevance to floating buildings as strategies for adapting to climate change and clarifies that offshore renewable energy resource should be focused in the study of future sustainable development and energy efficiency targets.

Keywords: Floating buildings; Energy efficiency; Built environment; Renewable energies

Introduction

As it is known environmental issues such as rapid growth of human population, depletion of the energy sources, global warming and increasing water level have affected the ecosystems and biological diversity which need to be considered with sustainable design strategies and innovative solutions. The efficient use of energy in buildings requires understanding a series of questions and issues in relation to the built environment and also seeks new concepts and forward-looking visions. Energy consumption has environmental impacts and plays a key role in addressing challenges of assessment in the built environment. Non-renewable energy sources are being consumed at staggering rates which can lead to major environmental challenges and concerns.

Due to environmental and energy-related concerns, the architectural community needs to consider these issues and associated risks. The concept of floating architecture can be introduced as an innovative solution to climate change challenges in the built environment rather than hypothesis. Not only does floating architecture can create new architecture style but also connect an interface between the offshore renewable energy and the built environment. The idea of living and working on water itself is neither new nor innovative. In fact, there are many instances of floating buildings in the Sumerian period which were built by the Madan people in the swamps of Mesopotamia. Figure 1 [1] shows an example of floating houses in Asia which has a much longer history of floating architecture, in which people are still living.

There are major categories of design methodologies for floating buildings. In order to implement appropriate methods and techniques in design process for developing floating buildings, hydrothermal use of water and mechanical and thermal properties of materials should be taken into consideration prior to other factors. For example, due to temperature difference between the water and the



Figure 1: One example of floating houses in Asia.

outdoor air, hydrothermal use of the water can play a significant role in providing energy source which can be used both for cooling and heating. Therefore, the main infrastructures to maximize the use of water should be provided before establishing a new project. Material selection is another main step in the process of designing any floating building. Although, materials selected should be suitable for

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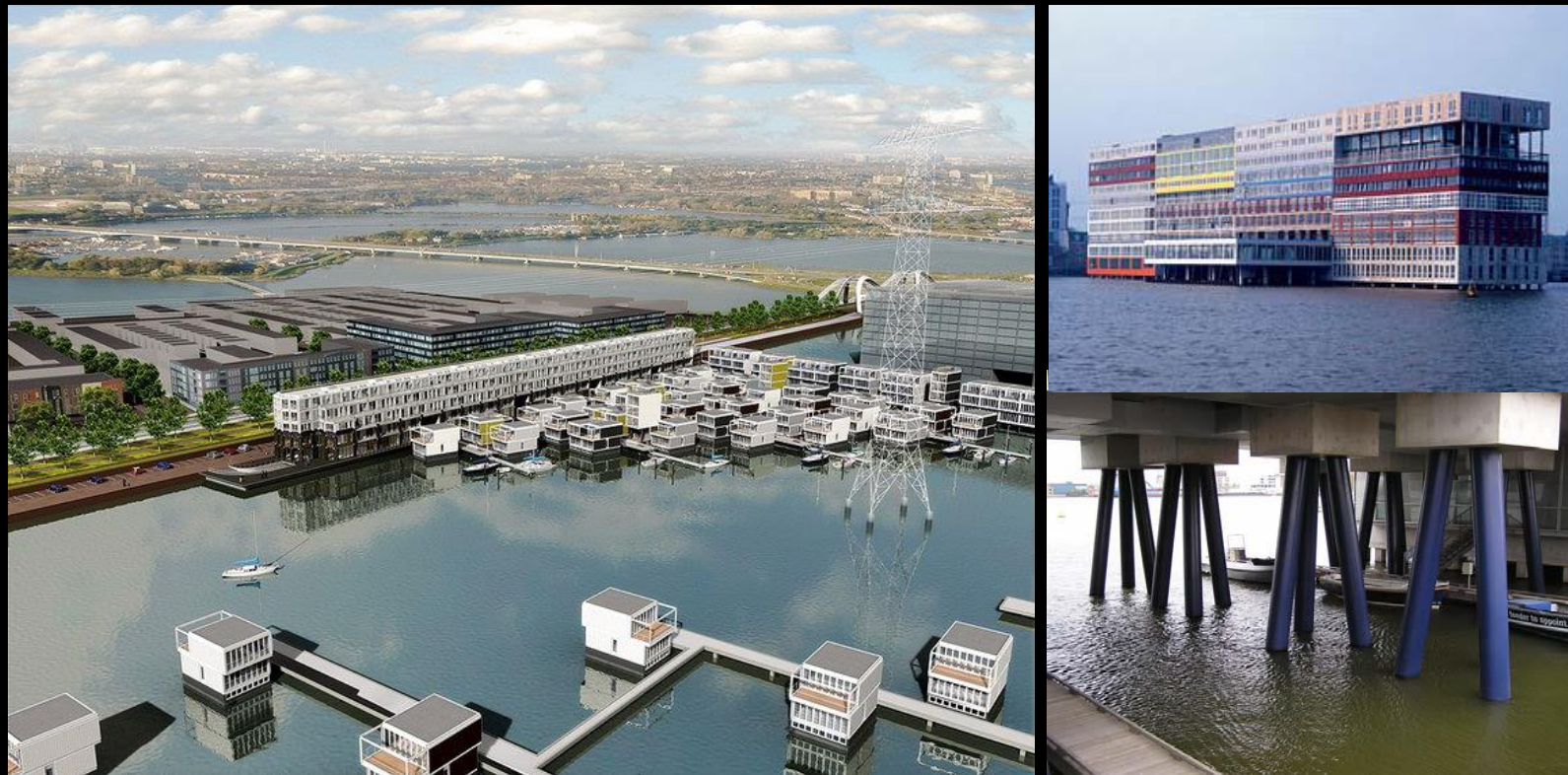
Received April 28, 2015; Accepted May 18, 2015; Published May 29, 2015

Citation: Habibi S (2015) Floating Building Opportunities for Future Sustainable Development and Energy Efficiency Gains. J Archt Eng Tech 4: 142. doi:10.4172/2168-9717.1000142

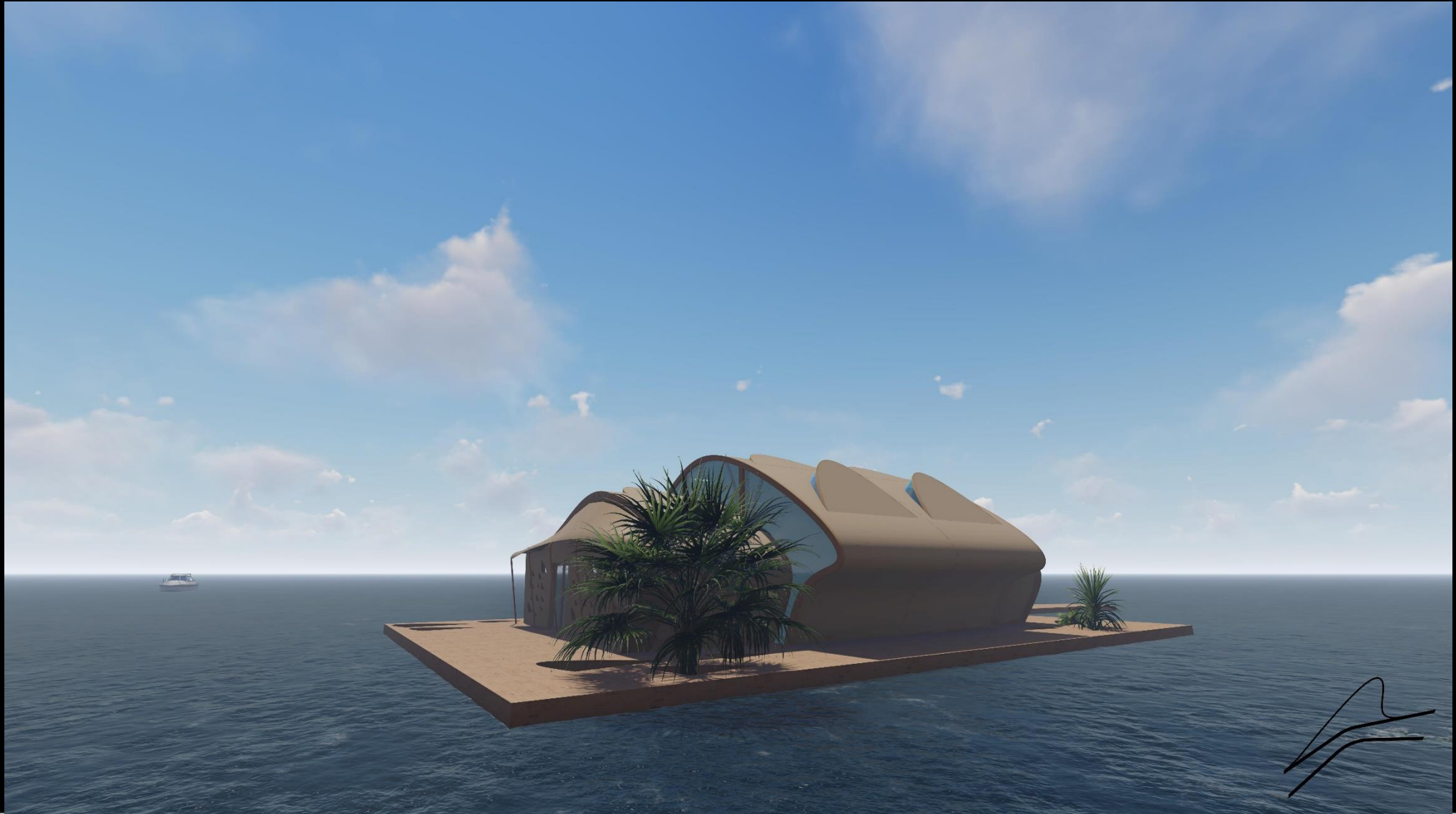
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-Future research/new research directions

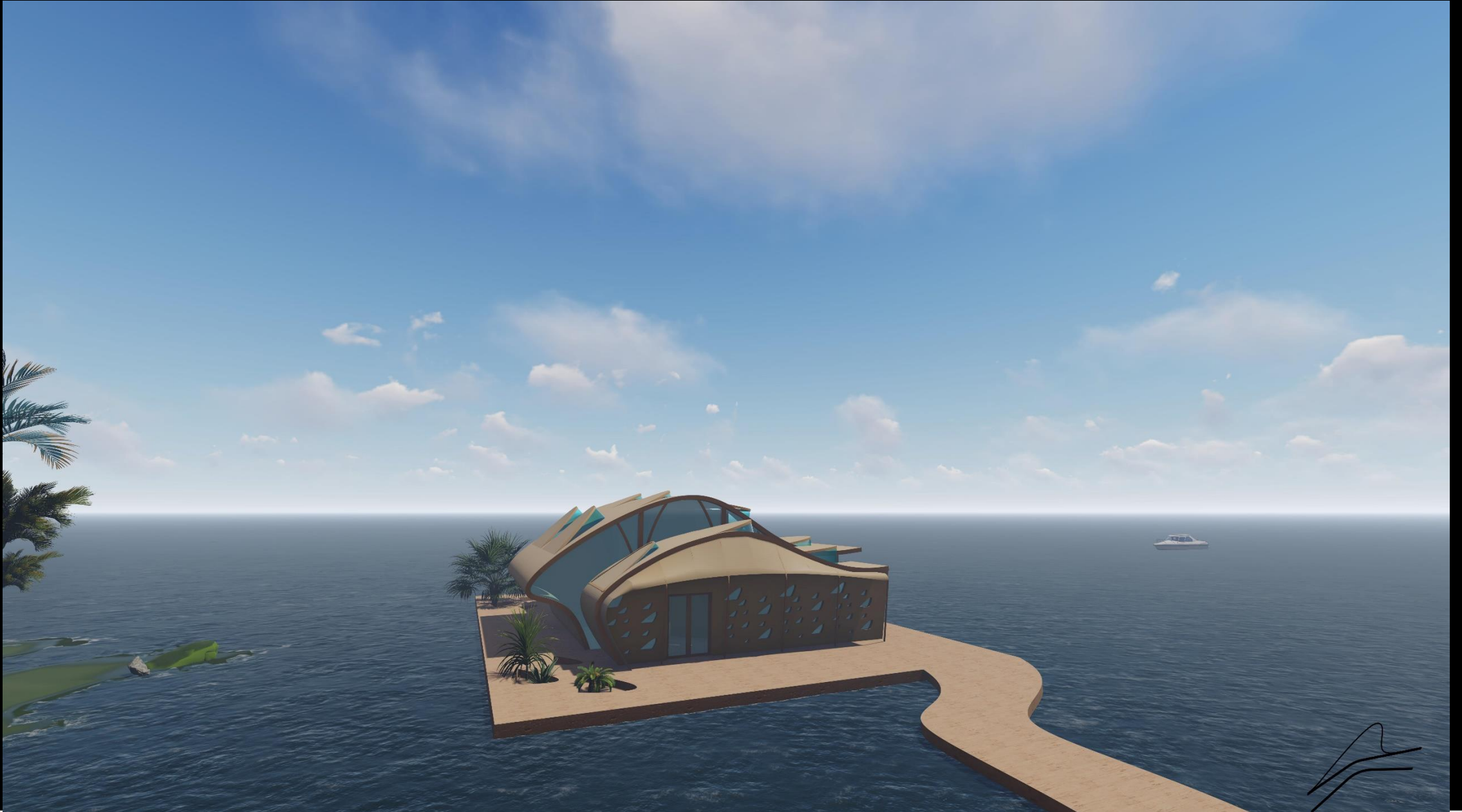
- There are indications that the idea of living on the water is gradually losing its “freak” label and is increasingly being seen as an attractive option of living and working in a water environment. This means that floating architecture is now on its way to becoming integrated in construction culture as a conventional alternative to ground-based housing.



- Purpose and architectural details of the floating architecture projects of Shahryar Habibi Architecture firm
 - A case study of the probability of floating houses as a concept design for improving climate risk management in the Pacific Islands region-Kiribati.



- Purpose and architectural details of the floating architecture projects of Shahryar Habibi Architecture firm



- Purpose and architectural details of the floating architecture projects of Shahryar Habibi Architecture firm

- This project presents a new philosophy of architecture for designing floating houses that are needed in order to obtain an objective overview of the sea-level rise issue and its long-term environmental impacts. Linking architecture-philosophy with sustainable development strategies allows to improve vision and promote the development of affordable aesthetic housing that can contribute to application of climate change adaptation approaches.



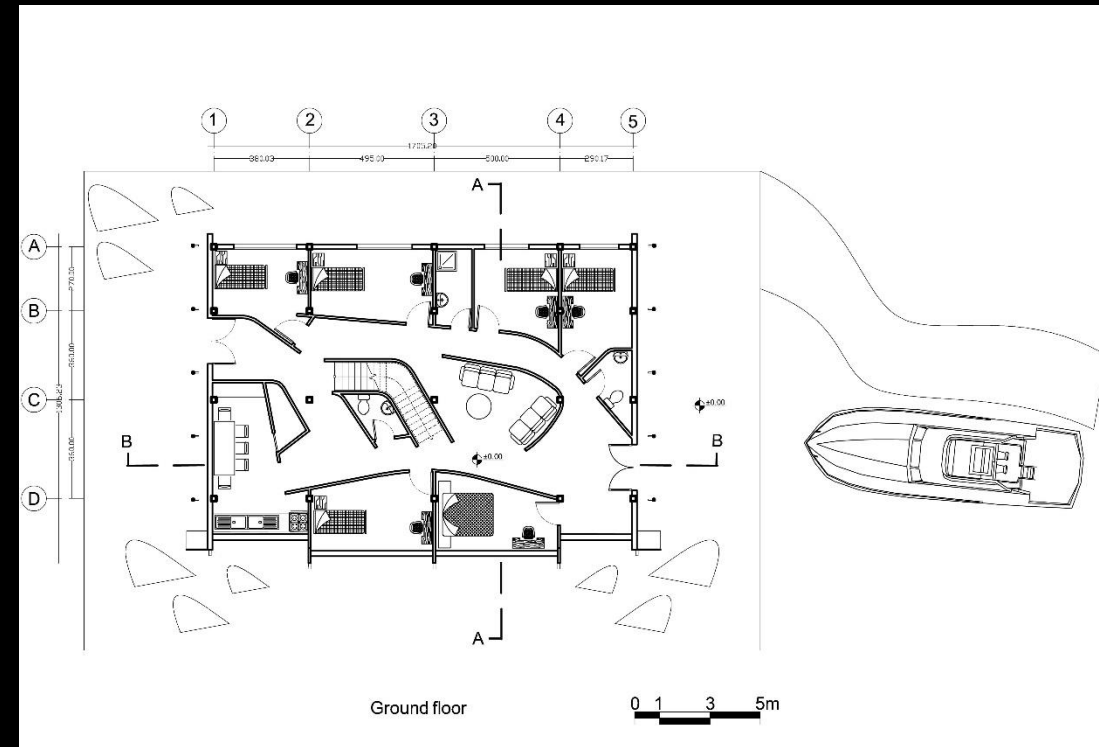
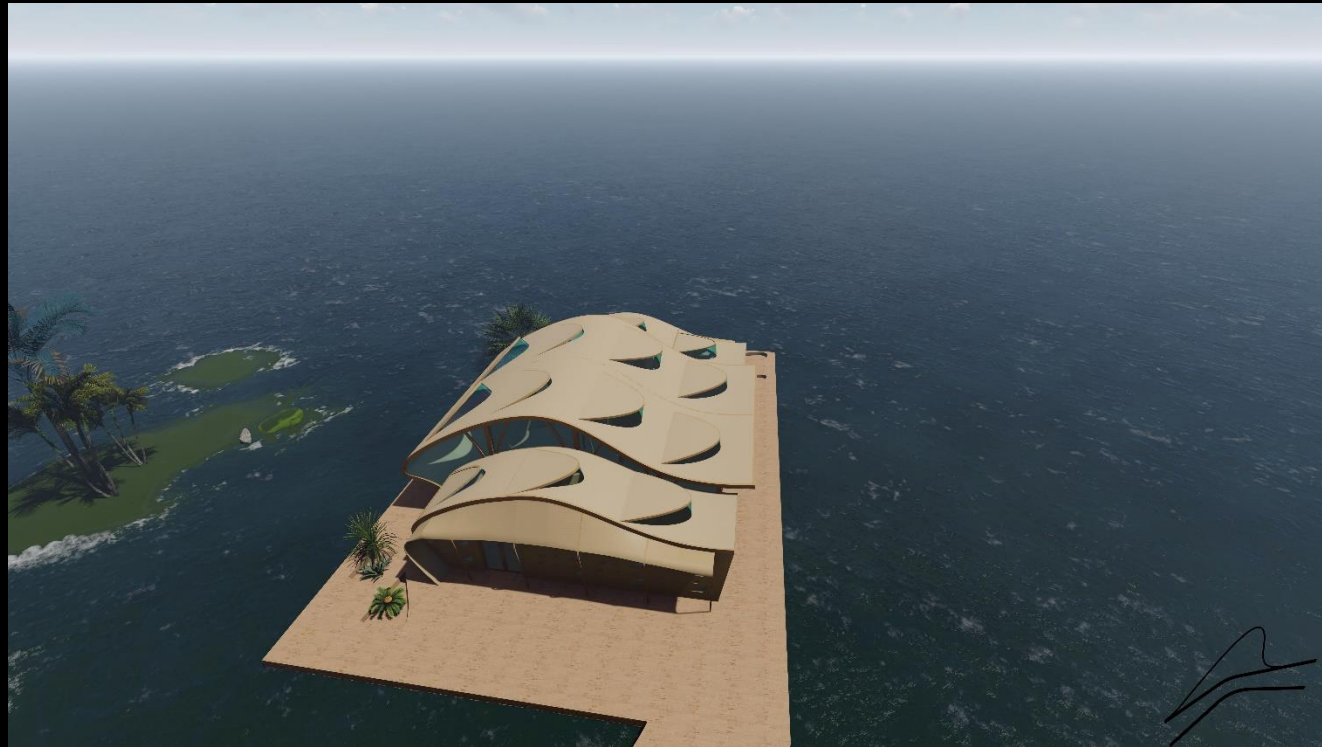
- Purpose and architectural details of the floating architecture projects of Shahryar Habibi Architecture firm

- The concepts presented in this project are the results of the preliminary effort by the designer to formulate a specific style and design philosophy. This project aims to introduce the floating houses to bring deep architectural insights that can lead to innovative ideas for a sustainable future. For this purpose, designer envisions considering design philosophies and criteria such as fluidity, green, clarity, integrity, gravity-defying, fragmentary, and innovative and disruptive can be included in the development of a sustainable floating house.

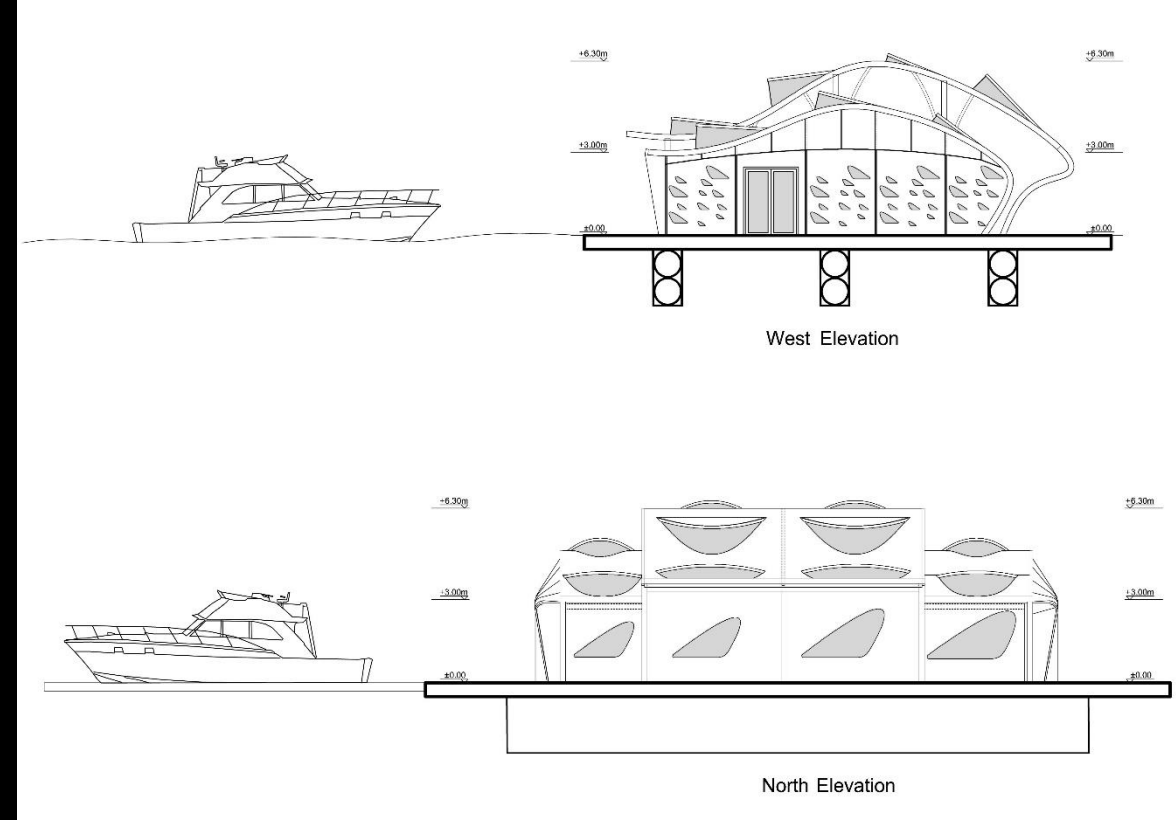
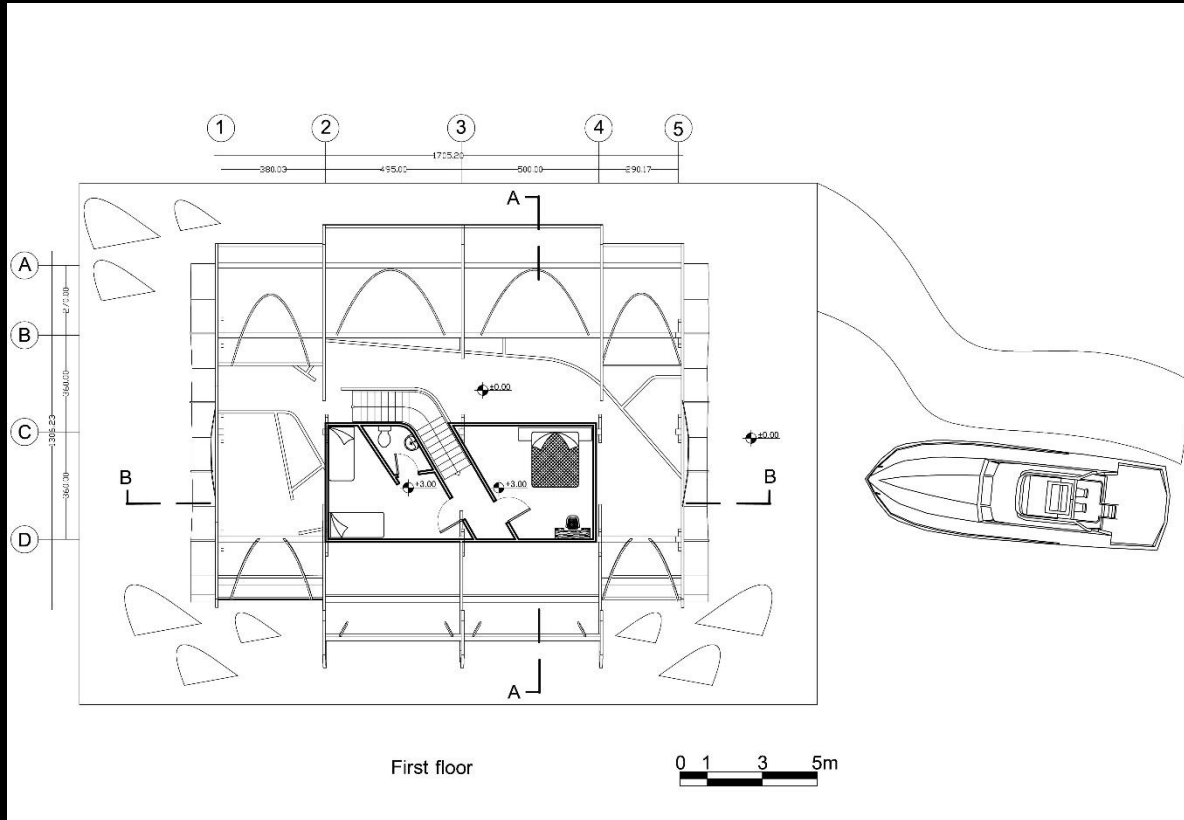


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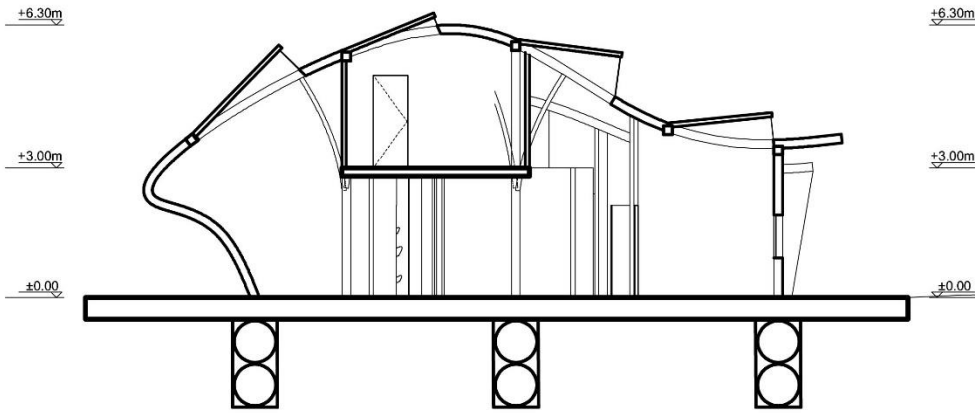
- This project also indicates that sustainable development plans for the floating houses should be prepared along with a design philosophy focused on the importance of aesthetics. These types of houses will have to be large dwellings in order to accommodate entire family units minimum 16 people. The proposed floating house is fully developed by bamboo and palm trees.



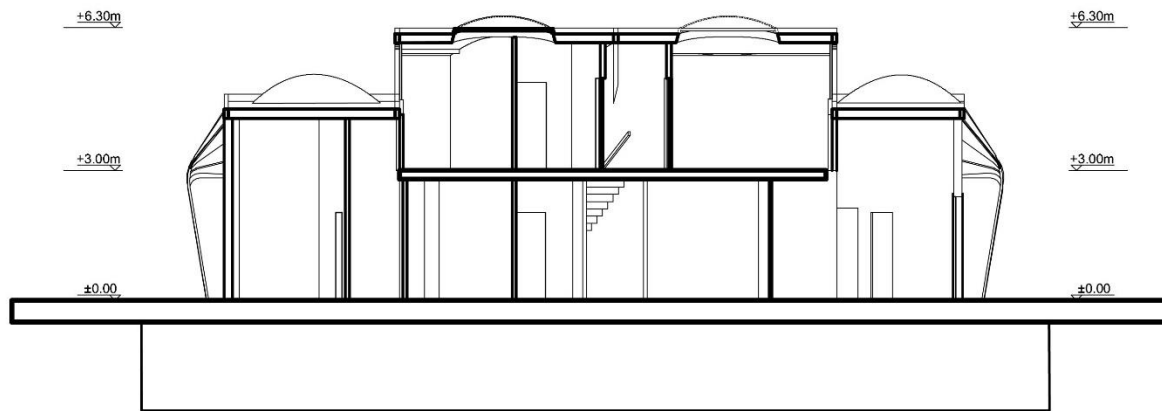
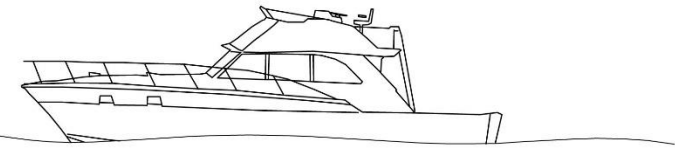
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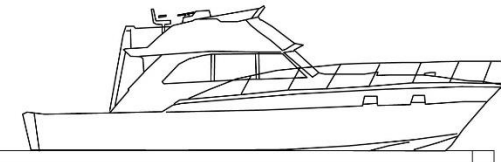
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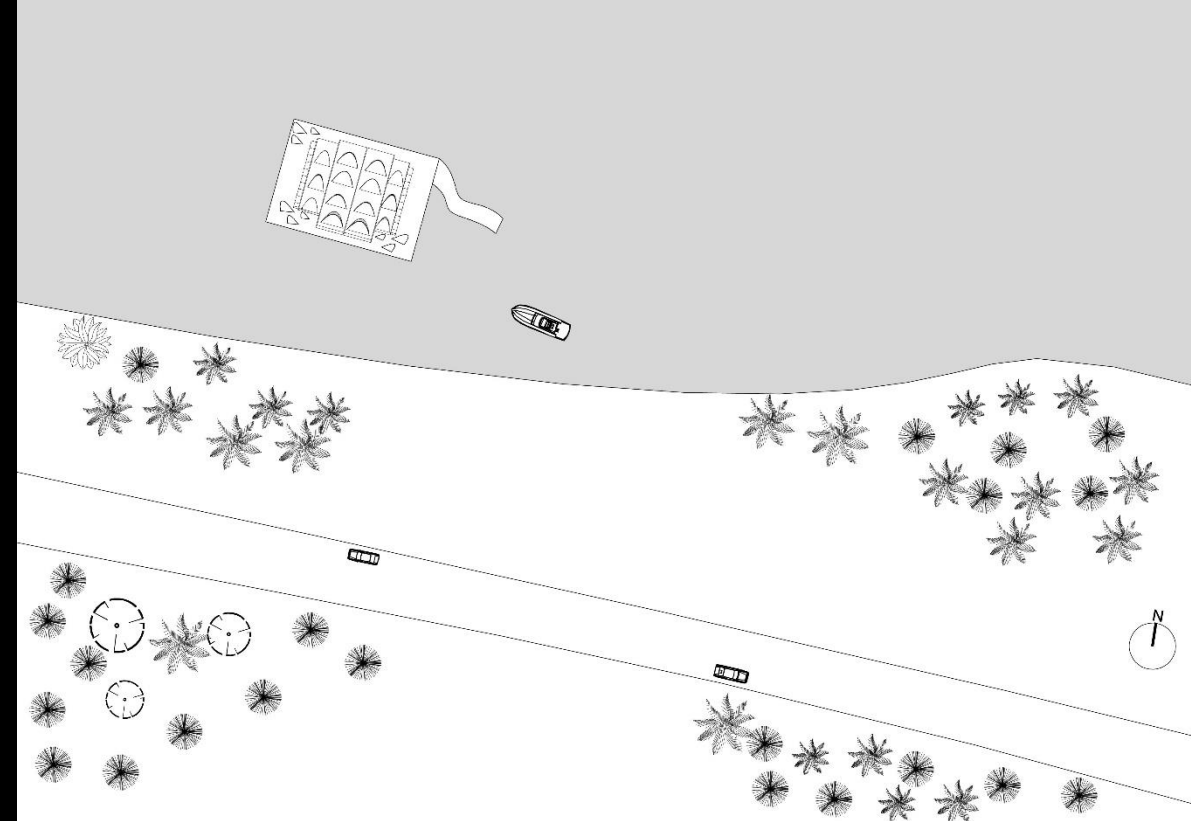
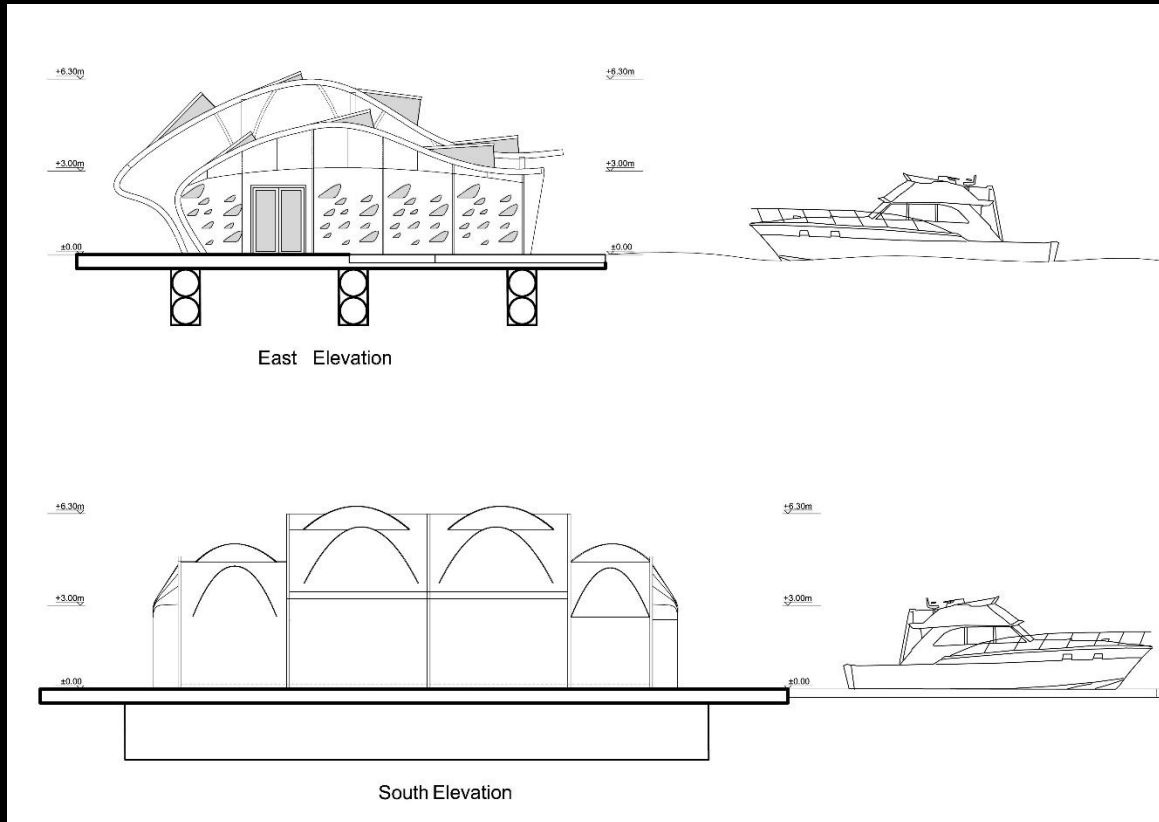
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B-B Section

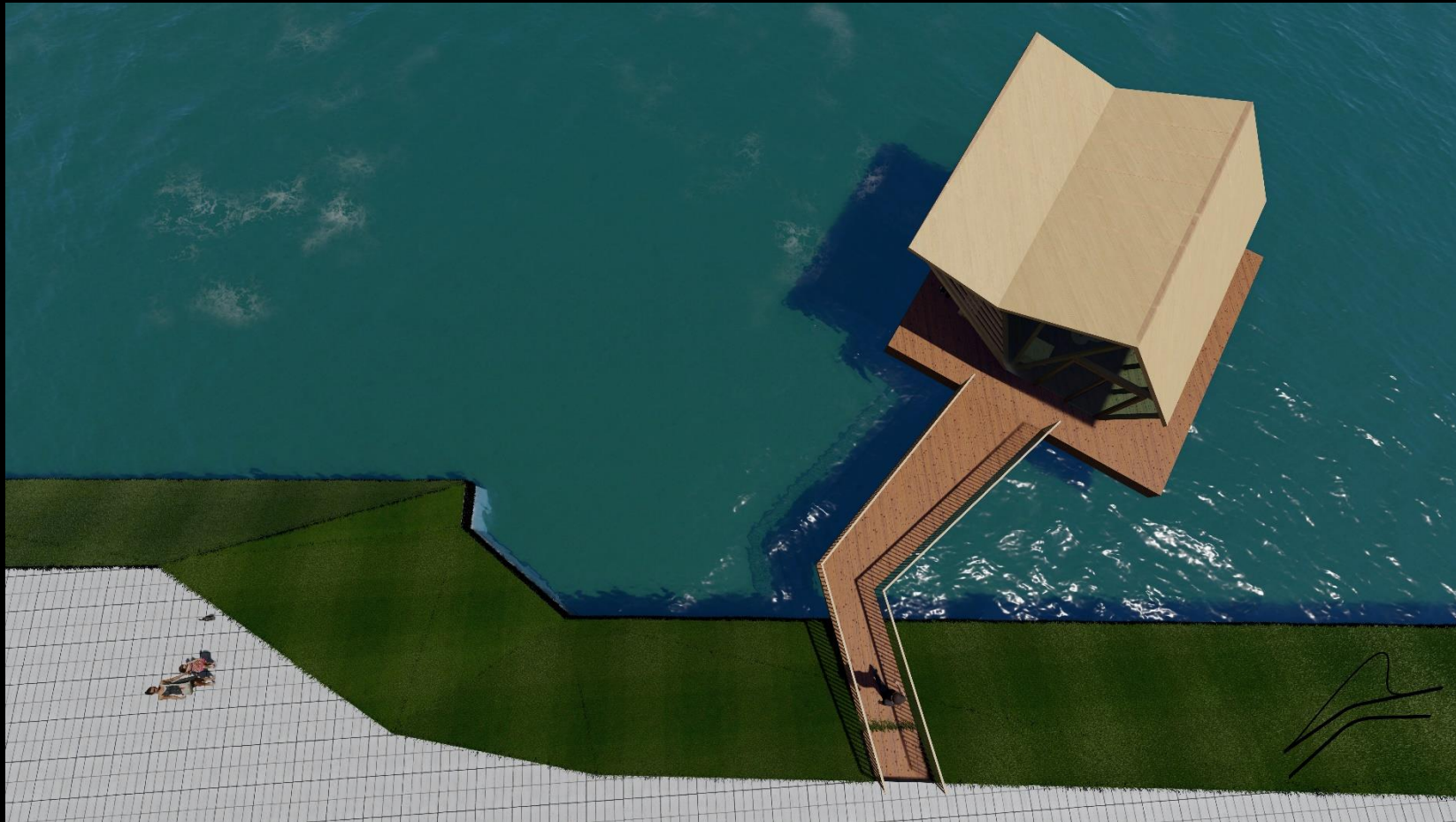


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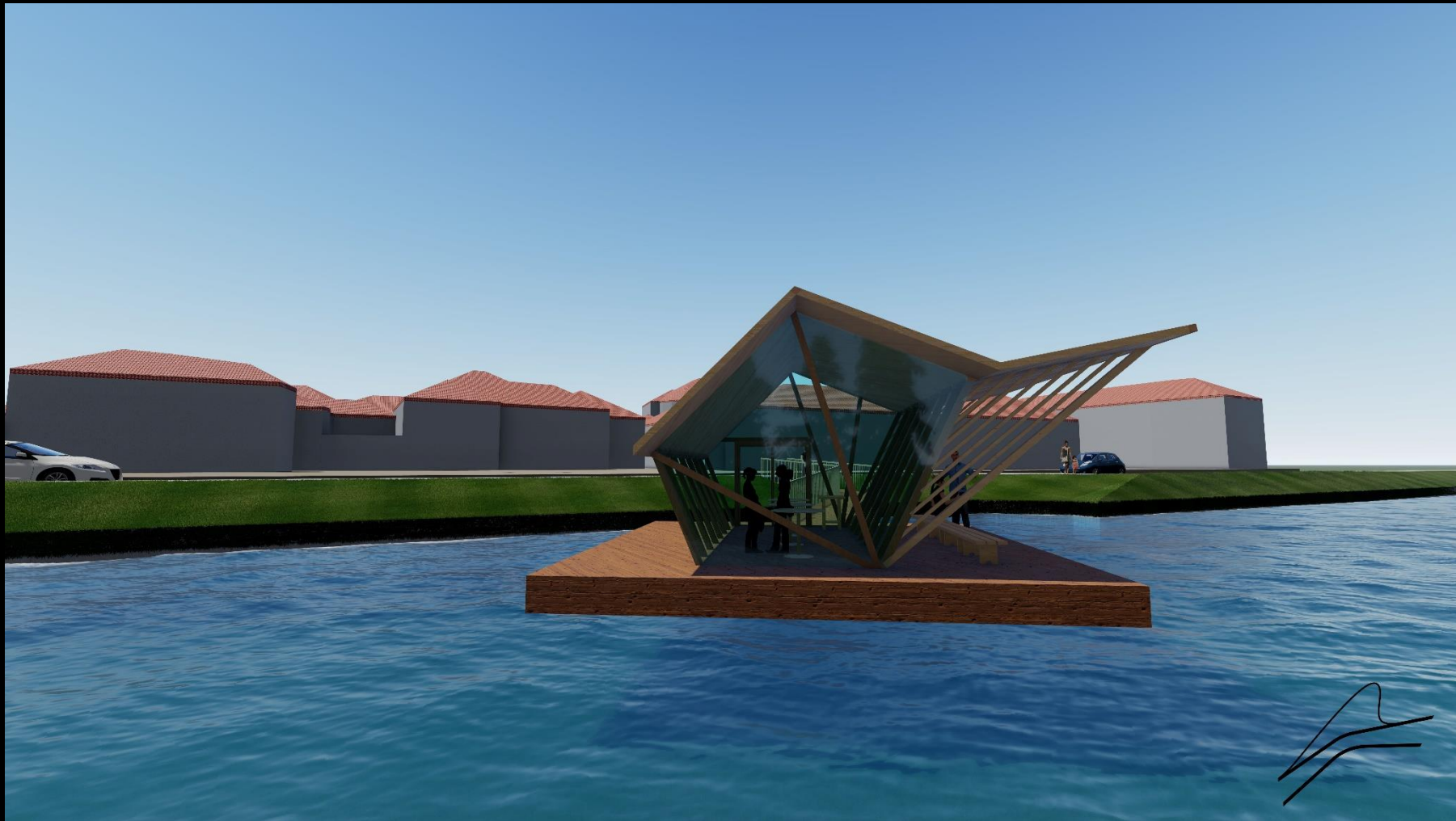
- Purpose and architectural details of the floating architecture projects of Shahryar Habibi Architecture firm

- Competition Floating Pavilion on the Drava River. Competitors were asked to design a floating pavilion on the Drava River, which would serve as a small stage and a place for contemplation by the river. The idea behind a competition floating pavilion on the Drava River is related to the rich history of rafting in the city of Maribor-Slovenia.



- Purpose and architectural details of the floating architecture projects of Shahryar Habibi Architecture firm

- The pavilion should be mounted onto a floating raft of dimensions 8 x 8 m. The overall height of the pavilion should not exceed 4 m, due to the need to float below bridges. In this context, Shahryar Habibi Architecture imagined the pavilion and its outside areas as a sequence of the city sidewalk: The 'bridge', the 'platform', and the 'observatory'.



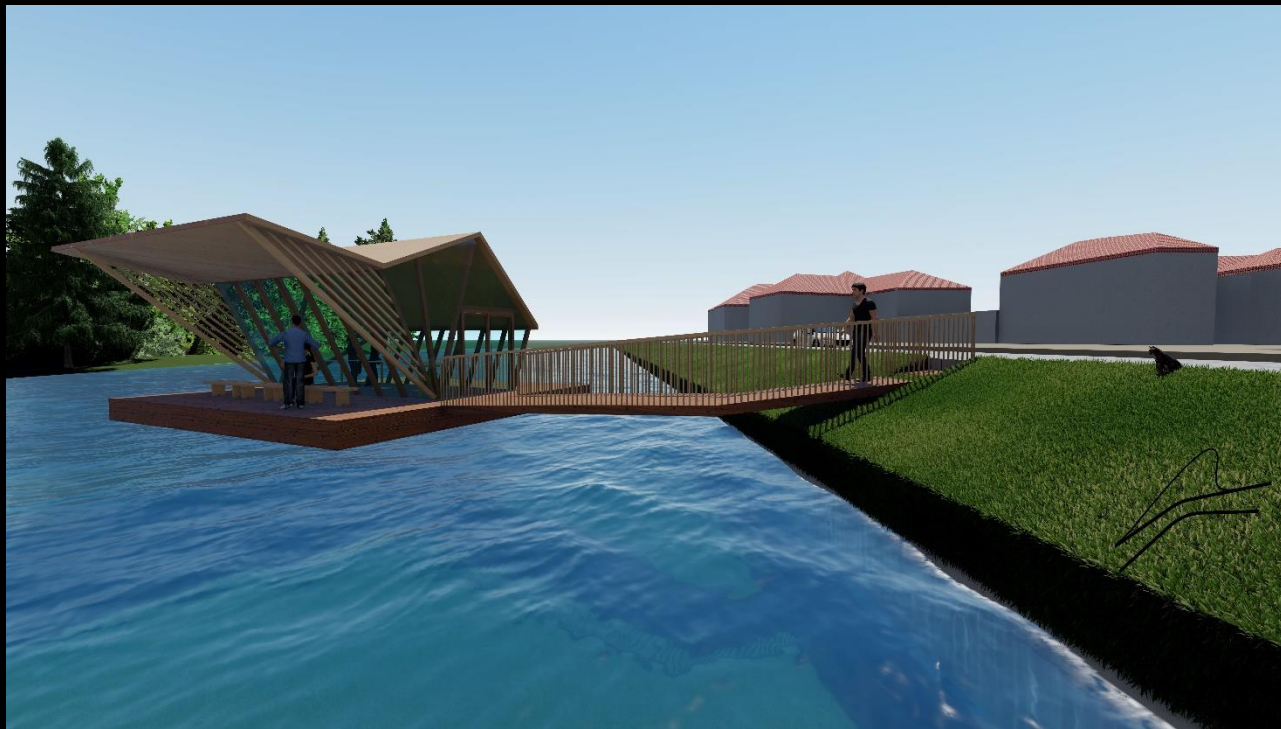
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- The bridge invites visitors to experience the feeling of staying on water, where human-space, human-human interaction can be displayed, music played, and birds and plants observed from the platform. This project functions as a public space on the water, where one can get rid of loneliness and become happy. The observatory, a closed space, can put visitors in a fun mood no matter the weather.



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- The construction is mainly made from wood. It is possible that the pavilion will be moved from one location to another, which is why it should be ensured that the platform, as part of the pavilion, can be easily, unobtrusively and practically folded.



"People who know what they're talking about don't need PowerPoint"

Steve Jobs (1955 – 2011)

I would like to express my deep thanks to you for listening.

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