

02

EXPLORATORIUM: AN ARCHITECTURAL DESIGN PROJECT TO SAFEGUARD SARAWAK RAINFOREST AS THE NATIONAL NATURAL HERITAGE

Nazrin Pamnan & *Fadzidah Abdullah
International Islamic University Malaysia

ABSTRACT

This research explores the potential of architectural design solution to safeguard Sarawak Rainforest as the National Natural Heritage. Forest plays a significant role in maintaining the balance cycle of the global ecosystem. The rainforest in Malaysia has a rich biodiversity, but it is now in danger of disappearing due to excessive deforestation. The proposed architectural solution comes in the form of an “Exploratorium,” an architectural project integrated with a rainforest research centre. This proposed architectural solution will enable the general public to learn and understand the significance of preserving the rainforest by encouraging them to experience the tropical rainforest ecosystem.

The proposed Exploratorium will have facilities, such as interactive galleries, series of forest discovery spaces, treehouses, travel pods, and watchtowers. Indeed, designing the Exploratorium reconnects the division between humans and nature and responds to the call of SDG16, which is to protect, restore, and promote sustainable use of terrestrial ecosystems.

Keywords: *Deforestation, exploratorium, rainforest preservation, green architecture, architectural design, passive design*

*Corresponding author: fadzidah@iium.edu.my

INTRODUCTION

Deforestation has become a major global problem in the 21st century due to excessive exploitation of its resources. The World Wildlife Foundation (2021) states that between 2000 and 2010, Malaysia had the world’s highest rate of forest loss, which is 14.4%, equivalent to 47,278 square kilometres. Geographical Association (2021) reports that the declining forest cover is mainly due to urbanisation, agricultural fires, forest conversion for plantations and other forms of agriculture. Unsustainable logging has also depleted timber stocks and undermined the viability of traditional forestry management.

Deforestation has significant environmental impacts that include reduced biodiversity, the release of greenhouse gas emissions, forest fires, disrupted water cycles and increased soil erosion. To reduce further forest loss, in 2005, the Government of Malaysia signed an agreement called, Geneva Agreement to maintain the forest cover for at least 50% to have a sustainable environment. Currently, the total forest cover in Malaysia is about 55%, which is within the agreement.

Nevertheless, intensive effort from all walks of life to further decrease forest loss is needed to maintain Malaysian rich biodiversity from continually declining. Awareness of the importance of sustaining the rainforest should continually be inculcated to the general public, especially those adjacent to the community, whose lives depend much on the forest resources.

Thence, this research explores the potential of an architectural design solution to safeguard the Sarawak Rainforest as the National Natural Heritage. The design solution is to aid the general public to learn and understand the significance of preserving the rainforest by encouraging them to experience the proposed facilities in the Exploratorium.

DESIGN PROCEDURE

The research for the proposed architectural design solution for an Exploratorium has undergone several stages of activities. Exploration of the design process requires the following design procedures. First, in stage 1, the researchers conducted table research to explore the feasibility of case and precedents studies for the good practice of designing the Exploratorium. In stage 2, the researchers embarked on formulating the spatial requirement of the proposed project. In the third stage, exploring various design schemes were carried out for the best possible design solution for the Exploratorium. Eight design assessments were carried through at various level to get professional architects and other disciplines’ input on the proposed design scheme. Lastly, the final design was presented as part of the submission as an Architectural Design Thesis. The design procedure for this research is as shown in Figure 1.

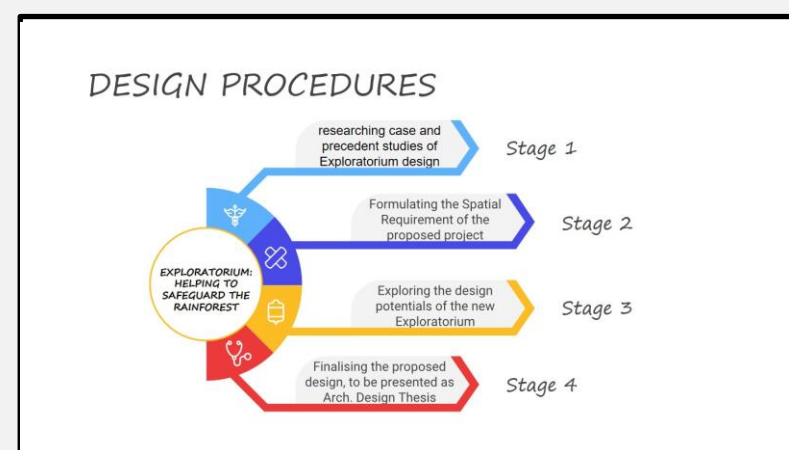


Figure 1: The Design Procedures

DESIGN IDEATION

The design of the Exploratorium was inspired by the statement of a great Ulama, Yusuff Qaradhawi, which states that the symbiosis of the relationship between God, man and nature would produce the "fruit of taqwa." He was referring to a Quranic verse on the subject as follows:

"And it is He who spread the earth and made in it firm mountains and rivers, and of all fruits, he has made in it two kinds; He makes the night cover the day; most surely there are signs in this for a people who reflect." (Al Quran, 13:3).

An Exploratorium is a museum or similar institution that encourages visitors to explore the exhibits interactively. The Oxford dictionary defines 'Exploratorium' as a science museum or similar centre where visitors is given the opportunity to handle exhibits, perform, and prearranged experiments.

The Exploratorium is designed to commemorate the significance of the Bidayuh people, believed to be the original indigenous inhabitants of Borneo. The Bidayuh's culture and architectural know-how are the results of long cultural improvements. The Bidayuh developed their complex vernacular architecture for centuries and passed down the skills and architectural heritage knowledge. Bidayuh architecture implements the tropical passive design strategies to ensure the comfort of the inhabitants. Hence, the same strategies applied for the design of this project: The Sarawak Rainforest Exploratorium and Research Centre. Figure 2 shows an example of a Bidayuh's dwelling, and figure 3 shows an elevation and plan of Bidayuh's dwelling called *Baruk*.



Figure 2: A Bidayuh's Dwelling

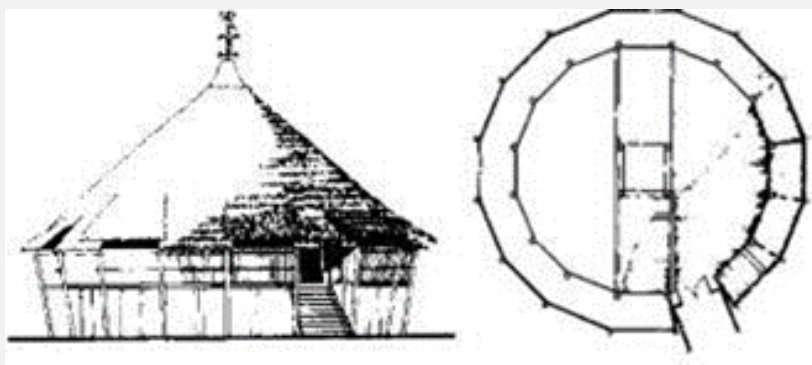


Figure 3: An Elevation and Plan of a *Baruk*
(Atta Idrawani Zaini et al.,2018)

THE PROPOSED PROJECT

The project, Sarawak Rainforest Exploratorium and Research Centre (SREC), is proposed through careful research and design decisions. The project, which is an architectural intervention, is proposed to educate and increase awareness of the importance of preserving the Malaysian rainforest among the community, especially those who live in proximity to the developed site.

THE SITE SELECTION

For the design and development of SREC, an appropriate site at Kubah National Park, located in Kuching, Sarawak, Malaysia, was selected. There are existing recreational activities in Kubah National park, such as trails, hiking, picnic, and nature observation. Surrounded by the Orang Asli settlements, including the Bidayuh people, the 20-acre site is located with Kubah National Park reserve forest managed by Lundu District Council. The Sarawak Forestry Corporation would develop the project. Figure 4 shows the site's layout, and figure 5 shows the sectional cut of the site.

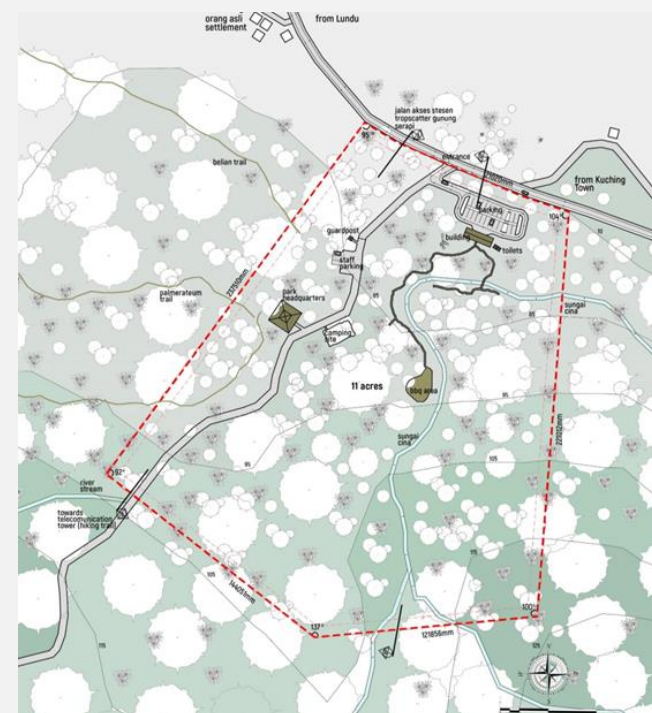


Figure 4: The Site Layout



Figure 5: The site section.

DESIGN CONCEPT

Forest symphony is the concept of the SREC project, where the dramatic composition of forest elements blends with the human's senses. This concept could stimulate human's feelings of excitement to learn more about nature and explore the hidden jewels of the rainforest. Once learning is amplified either individually or collaboratively, the community could extend the appreciation of nature by voluntarily aid to the efforts of safeguarding the national natural heritage. Simultaneously, the human could establish a better relationship between oneself with God. This scenario sparks the ideation of gaining the fruit of *Taqwa*, as suggested by the great *ulama*, Yusuff Qaradhawi. Figure 6 shows the conceptual relationship between God, Man, and nature to produce the Fruit of *Taqwa* (God-consciousness), and Figure 7 shows the authors' conceptual illustration of the relationship.

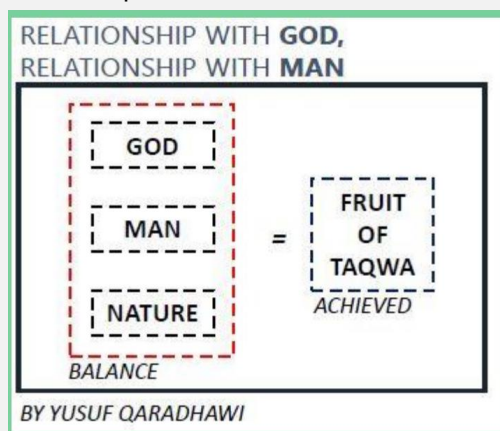


Figure 6: Fruit of Taqwa



Figure 7: SREC Conceptual Diagram

DESIGN APPROACH

Based on the research, the design of SREC has taken the approach of applying a careful selection of building materials and construction methods. The development used versatile natural materials such as bamboo and reclaimed timber for cladding. Meanwhile, modern building materials such as concrete, steel frames, and glass are utilised to construct public buildings for their long-lasting and constructability characteristics. The design reflects Bidayuh's indigenous architecture by building the structures on stilts: with the post and beams structural system, precast concrete flooring, and pre-fabricated steel structure for the roofing. Figure 8 shows the description of the design approach for the SREC development.

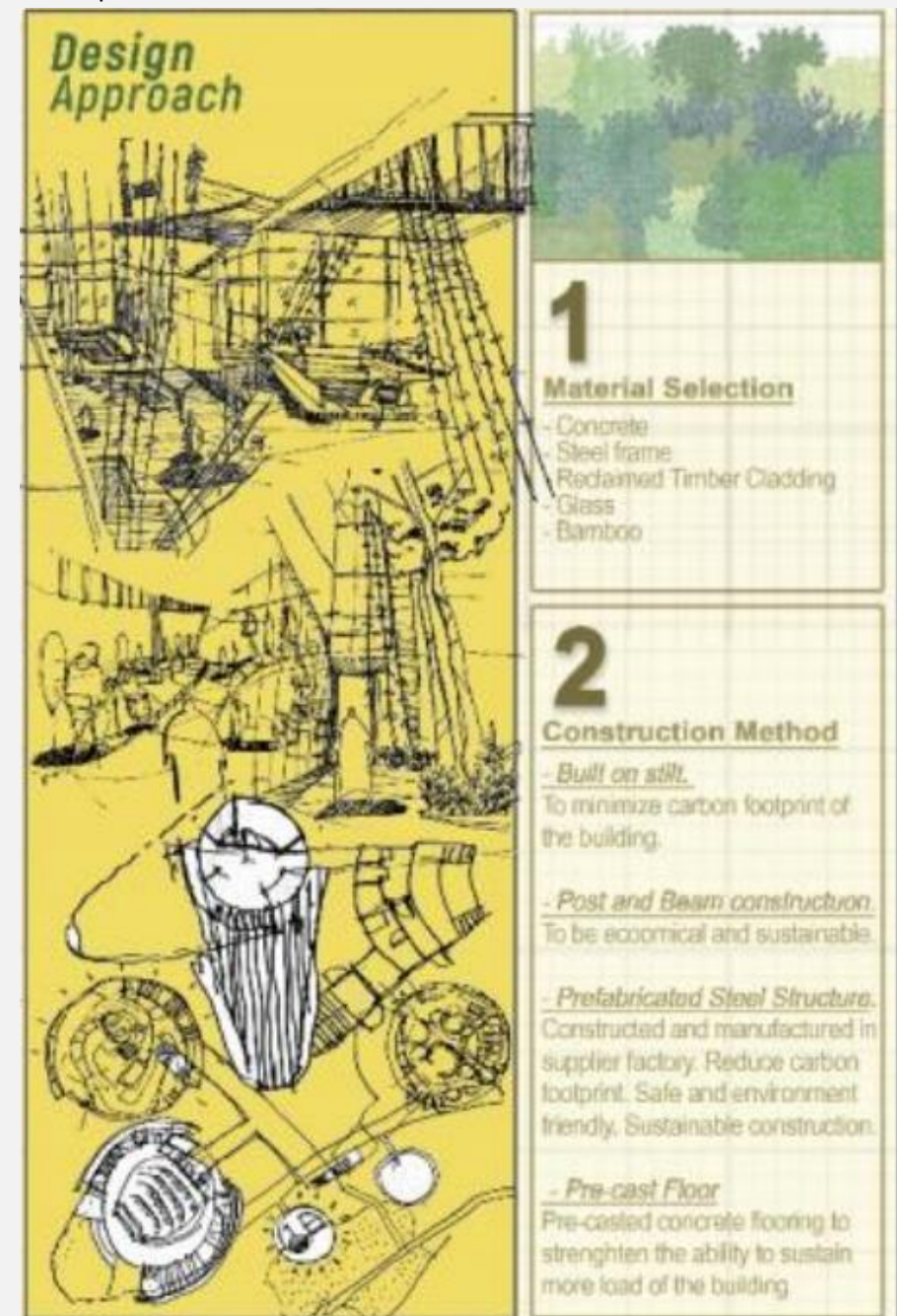


Figure 8: SREC Design Approach

DESIGN DEVELOPMENT

Exploring design is done with illustrations of ideas to envisage harmonious symbiosis between human-made and natural environments. In SREC's complex, buildings are designed not to overpower the visual horizon of the place but to blend and integrate with the natural green and hilly surroundings. Furthermore, the implementation of the "Forest Symphony" concept intertwine nature with human senses, where the facilities provided in the complex would create excitement among visitors to experience, explore and learn about nature. Figure 9 shows one of the sketches done in design exploration at the preliminary design phase.

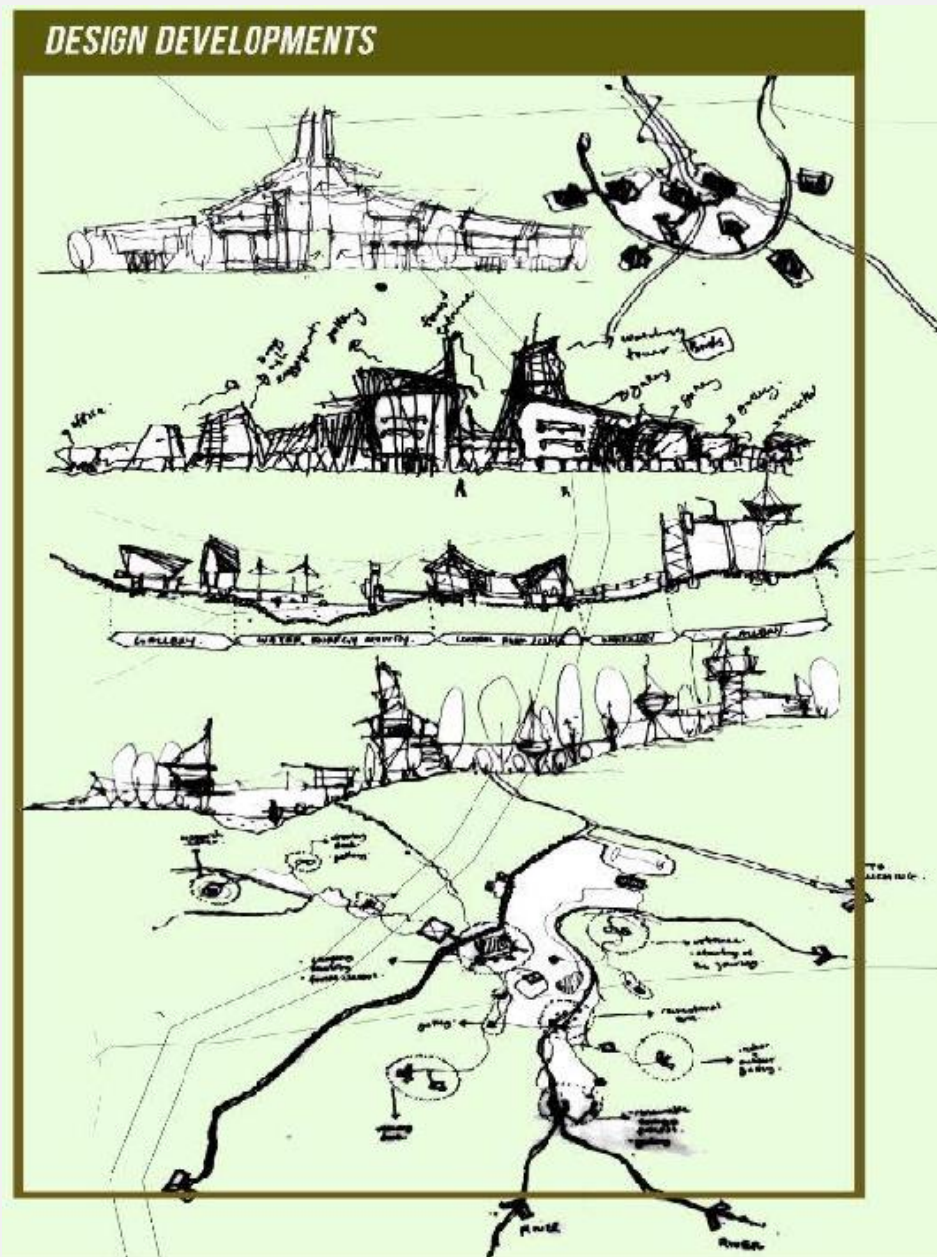


Figure 9 : Preliminary Design Scheme

FINAL DESIGN SCHEME

After eight stages of design critique sessions, the final design scheme is produced. The design was presented using numerous media- drawing printed on papers, research report, physical model, and computer-generated models of the buildings and site. The following illustrations show some of the products of the final design scheme for the project (figure 10-20).

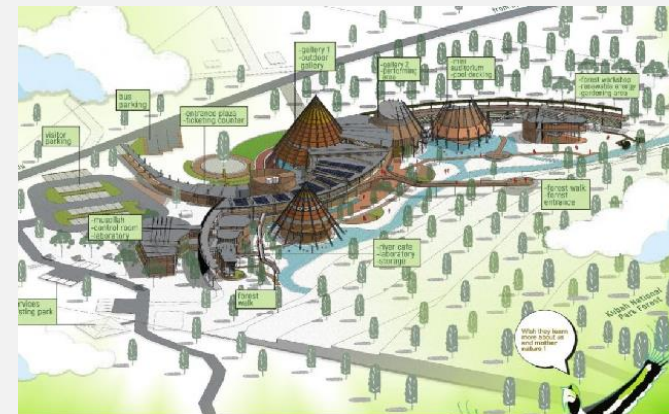


Figure 10: Overall view of the building complex

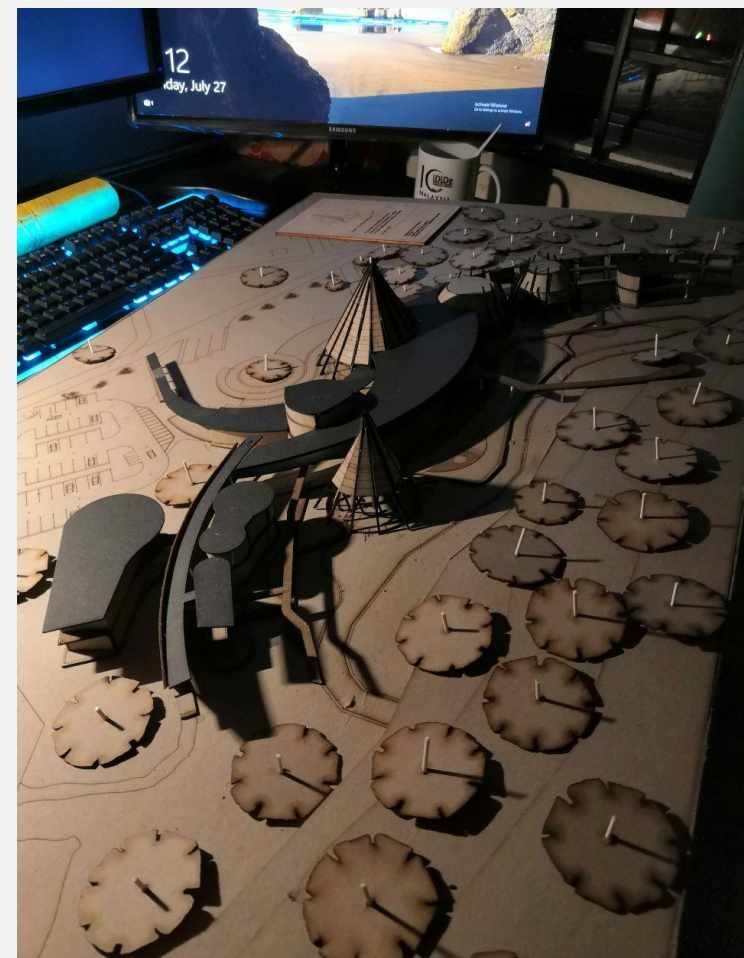


Figure 11: The model of the main building of SREC



Figure 12 : A part of the site plan



Figure 15 : A bird-eye view of the main complex

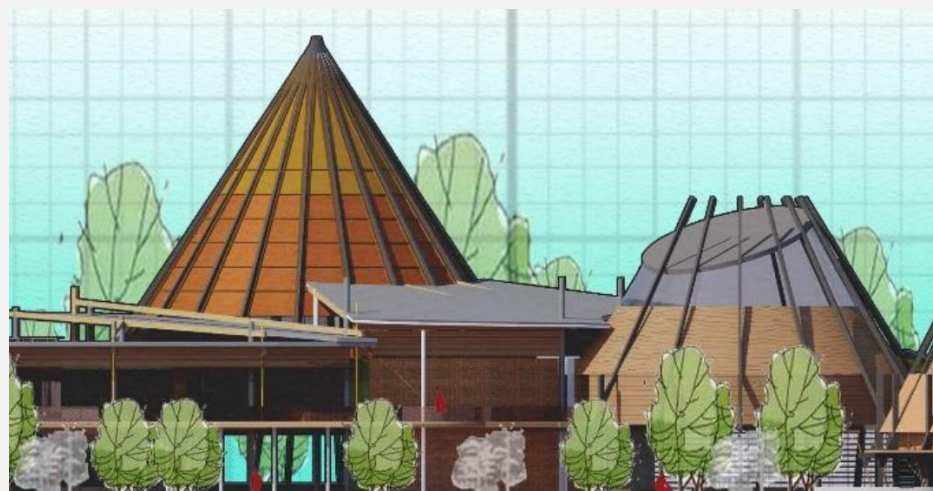


Figure 13 : Partial View of the North Elevation



Figure 16: Sectional perspective view of SREC's a gallery

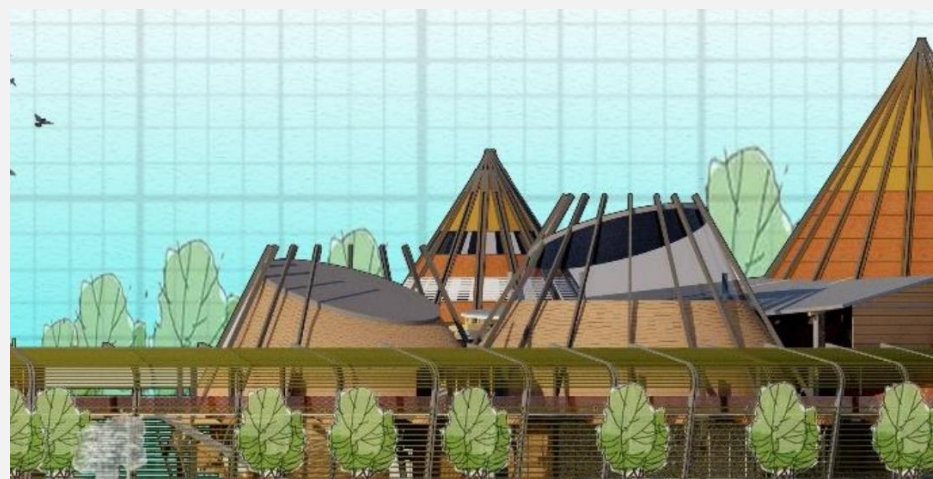


Figure 14 : Partial View of the South Elevation



Figure 17: Perspective View From the Green Yard



Figure 18: The Research Tower, as one of the building in the development of SREC

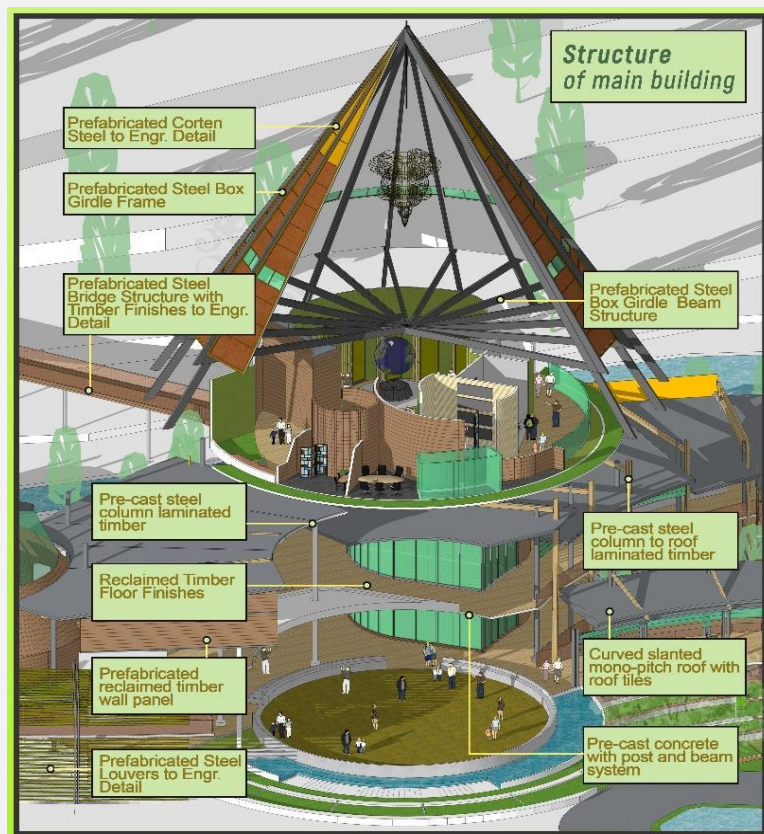


Figure 19: Structural Components of the Main Building



Figure 20 : View of the Main Entrance

CONCLUSION

The exploration of the architectural design of "Sarawak Rainforest Exploratorium and Research Centre" was completed to provide facilities that will enable the general public to learn and understand the significance of preserving the rainforest by encouraging them to experience the tropical rainforest ecosystem. Thence, this project offers a sustainable solution as an attempt to solve part of deforestation problems. Education is one of the approaches where awareness of preserving the precious rainforest can instil in all walks of life. The proposed rainforest Exploratorium and research centre also encourage the general public to understand the tropical rainforest ecosystem, to experience the culture of the natives, and to make new series of forest discoveries. Indeed, this proposed project provides opportunities to reconnect the gap between humans and nature - utilised as the centre for rainforest preservation, and further becomes a showcase project for the sustainable development goal (SDG).

ACKNOWLEDGEMENT

This design is a Master Design Thesis Project, Session 2019-2020, under the Department of Architecture, Kulliyah of Architecture and Environmental Design, International Islamic University Malaysia.

REFERENCES

- Qur'an 13:3 (2013). translated by Abdullah Yusuf Ali. Ware, Hertfordshire: Wordsworth Editions Limited.
- Atta Idrawani Zaini et al (2018). From sacred to secular: Baruk architecture on secular buildings in Sarawak , in IOP Conference Series: Earth and Environmental Science, Volume 21 3, *The 2nd International Conference on Sustainability in Architectural Design and Urbanism* 29 August 2018, Semarang, Indonesia.
- Geographical Association (2020). What are the environmental impacts of deforestation in Malaysia? Retrieved 13th Dec, 2020 from <https://www.geography.org.uk/teaching-resources/singapore-malaysia/What-are-the-environmental-impacts-of-deforestation-in-Malaysia>