International Journal of Architecture and Urbanism Vol. 08, No. 01 (2024) 94 – 100

International Journal of Architecture and Urbanism

Journal homepage: https://talenta.usu.ac.id/ijau

Application of Green Architecture In Athletes Guesthouse Sports Center

Adha Zulkhair*[1], Devin Defriza Harisdani[1]

[1]*Department of Architecture, Faculty of Engineering, Universitas Sumatera Utara, Medan, 20155, Indonesia*

*Corresponding Author: zulkhairadha@gmail.com

ARTICLE INFO

Article history:
Received 26-02-2024
Revised 07-03-2024
Accepted 16-03-2024
Available online 31-03-2024

E-ISSN: 2622-1640
P-ISSN: 2622-0008

How to cite:
Zulkhair, S and Harisdani, D. D. Application of Green Architecture In Athletes Guesthouse Sports Center. International Journal of Architecture and Urbanism. 2024. 8(1):94-100.

This work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International.
http://doi.org 10.32734/ijau.v8i1.14970

ABSTRACT

Sports-related health initiatives take the form of physical activity or exercise and aim to promote health. One of the fundamental requirements of daily living is physical activity or sport since it can improve the fitness required to perform their obligations as social animals. Exercise is a type of organized, controlled physical activity that involves repetitive body motions and is intended to improve physical fitness. Moving or physical activity is any bodily movement that improves energy and energy expenditure (calorie burning). One healthy living practice that contributes to sustaining and enhancing human health is the habit of exercising. Exercise culture in Indonesia is categorized under the category of interest in exercise, which is relatively high in a number of Indonesian locations. Sports enthusiasm will wane if there is insufficient infrastructure and facilities available. In general, Medan City's infrastructure and facility offerings are still insufficient and unable to compete with those of five-star hotels, which typically charge higher rates for the usage of their amenities. Sports fans can gather at the Sports Center in Medan. This project will accommodate sports-related activities in Medan, including the organization of competitions at the national level and public recreation facilities. Accommodation amenities, training facilities, competition facilities, and public facilities are all offered. The athlete's homestead is built with a natural ventilation system in mind. Because of how the buildings are arranged, the residential bulk is lifted on the ground floor to allow for wind circulation. This open area could serve as a tranquil meeting place.

Keywords: athletes, green architecture, sports center

1 Introduction

The design of the athlete is guesthouse uses an approach through a natural ventilation system. The layout of the adjacent buildings then the occupancy mass is elevated for wind circulation on the ground floor. This space can be used as a relaxing gathering room. With the Sports Center North Sumatra, Deli Serdang is expected to become a new icon of North Sumatra [1].

`Sports events with a large following around the world, particularly in Indonesia, are in high demand. Indonesia also has its own competition, the Pekan Olahraga Nasional (PON), which is hosted by the Komite Olahraga Nasional Indonesia every few years (KONI). North Sumatra and Nanggro Aceh Darussalam will host the forthcoming XXI/2024 National Sports Week, according to KONI is the implementation of the unique national sports conference on April 24, 2018. (PON). The North Sumatra Sports Center development project will be erected in the Deli Serdang Regency area, next to Kuala Namu Airport, and will be a significant undertaking for North Sumatra [2].

The development of the Sports Center in the new region of Deli Serdang, which is scheduled to be developed with international quality amenities, has the potential to become a new emblem of North Sumatra. This also has an impact on the area is economic development. Athletes must also pay attention to their health and comfort in a sports area that will be constructed to compete and prepare for them. As a result, having a decent athlete's home for the athletes who would compete later during the sports festival is essential [3].

The athlete's guesthouse was designed with a green architectural concept and a natural ventilation technique. The building's arrangement is adjacent, the residential mass on the ground floor is elevated for wind circulation, and there is an empty area that may be used as a gathering space to rest. Athletes Guesthouse has an understanding as a facility as well as temporary lodging for athletes who will participate during a sports week in North Sumatra, with the subject of green architecture at the Sports Center of North Sumatra, Deli Serdang.

Green architecture is a branch of architecture that focuses on building that is ecologically beneficial. Minimizing natural resource use, energy efficiency, innovative and sustainable water usage, and materials that are non-polluting and recyclable are just a few of the key elements [4]. Green architecture is another method to development planning that attempts to reduce environmental and natural harm in the structure itself. The characteristics of green architecture began to emerge in response to consumer's and architects' growing awareness of nature's limitations in processing materials that are rapidly depleting. Another benefit of the architecture is that it helps to maximize the site potential [5]

Green architecture is a movement that prioritizes energy efficiency or ecologically friendly construction to preserve nature and the environment. Green architecture is one of the architectural traditions that focus on environmentally friendly architecture. Some of its critical points include minimizing natural resource consumption, energy efficiency, wise and sustainable water use, and materials to be used non-polluting and recyclable [6]. Green architecture may be defined as a long-lasting building (durable), earth-friendly (environmentally friendly), and high-performing (buildings with good performance). An Architecture concept that seeks to resist bad influences to the natural and human environment and produce a place to live healthier, which is done by utilizing energy sources and natural resources efficiently [7]. In green architecture terms then developed various essential terms such as sustainable development or known as sustainable development. The term is famous as a development that can meet the needs of today's people without having to sacrifice natural resources that must be passed on to future generations [8].

2 Method

The following are the phases in deciding on a location for the athlete's guesthouse at the Deli Serdang Sports Center in North Sumatra: (1) The site was chosen based on the North Sumatra Government' intention to construct a Sports Area for the Pekan Olahraga Nasional (PON) event. (2) The location is checked using Google Earth to determine the location under the design. (3) Collecting data from supporting media to learn more about the site. This data analysis examines what occurred at the design site through the use of outdoor space analysis. This study is based on the site's potential as determined by a field survey, for it to create outputs or meet all of the requirements for the Sports Center design. This sports center's design location is Bandara Kualanamu Street, Batang Kuis Subdistrict, Deli Serdang Regency. Because of its strategic location and huge and area, which is still predominantly unoccupied, and proximity to the airport, this property is deemed appropriate for building a sports facility. Because the traffic flow in front of the property is the primary traffic to the airport, noise levels and vehicle movement are high. Architectural sciences and humanities are more detailed in their scope, and the text on the topic divides the method into one of two categories, qualitative and quantitative [9].

3 Results and Discussion

3.1 Project Description

This location serves as a hotel for athletes traveling from within and outside of North Sumatra. The Bandara Kualanamu Street, Sena Village, Batang Kuis District, Deli Serdang Regency, North Sumatra location for the North Sumatra Sports Center design. which has a 300ha planned size, of which 200ha will be used entirely as a sports center, while the remaining 100ha will be developed as a commercial area (Figure 1).

Figure 1. Project Location

Source: Google Earth [10].

This site is currently a plantation with rice fields. The North Sumatra Regional Government is the rightful landowner. Plantations are still present at the project site, while some of the property is already being used to build a sports complex. The location of the athlete's homestead is estimated to be about 7 hectares in size using data from satellite maps. With a total size of 2,497.72 Ha and 380 villages spread throughout 22 sub-districts, 380 villages, and 14 sub-districts, the topography of the Deli Serdang Regency area is made up of coastal areas, lowlands, and steep highlands. Four sub-districts—Hamparan Perak, Labuhan Deli, Percut Sei Tuan, and Labu Beach—make up the coastal plains. There are 64 villages/sub-districts total.

3.2 Mass Concept

The mass of the building is divided into three sections, namely, three building rooms that are each separated for the comfort of the athletes, and a public sports area. Some forms of this mass are influencers to get a good view of the garden (Figure 2).

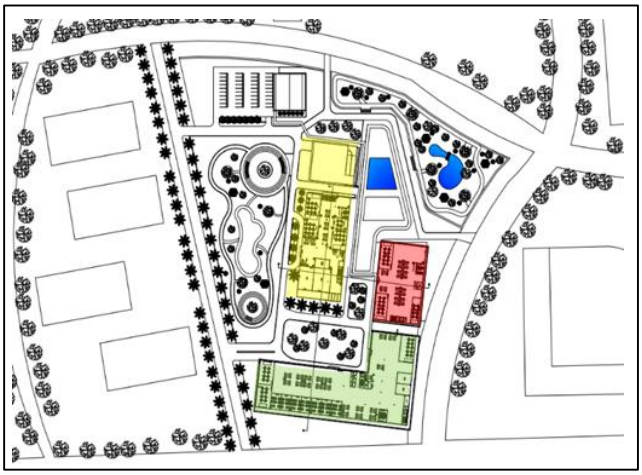

Figure 2. Site Plan Design Athletes' Guesthouse

The basic concept in designing Athletes' Guesthouse Sports Center Sumut applies the idea of green architecture. The application of the concept to the guesthouse is due to looking at the situation of the location

of the guesthouse by incorporating several elements, such as planting vegetation, using local materials such as wood, buildings that do not stick to the ground, using windows that can be open and closed, and ultimately not using air conditioning.

Here is the floor plan on the ground floor of each building that has similar functions such as restaurant, cafe, lobby, toilet, polyclinic, and lounge. And there is also the open space that has functioned as a sports facility, a garden, and a children's play area. There is also a recreation room for the public and a jogging track (Figure 3).

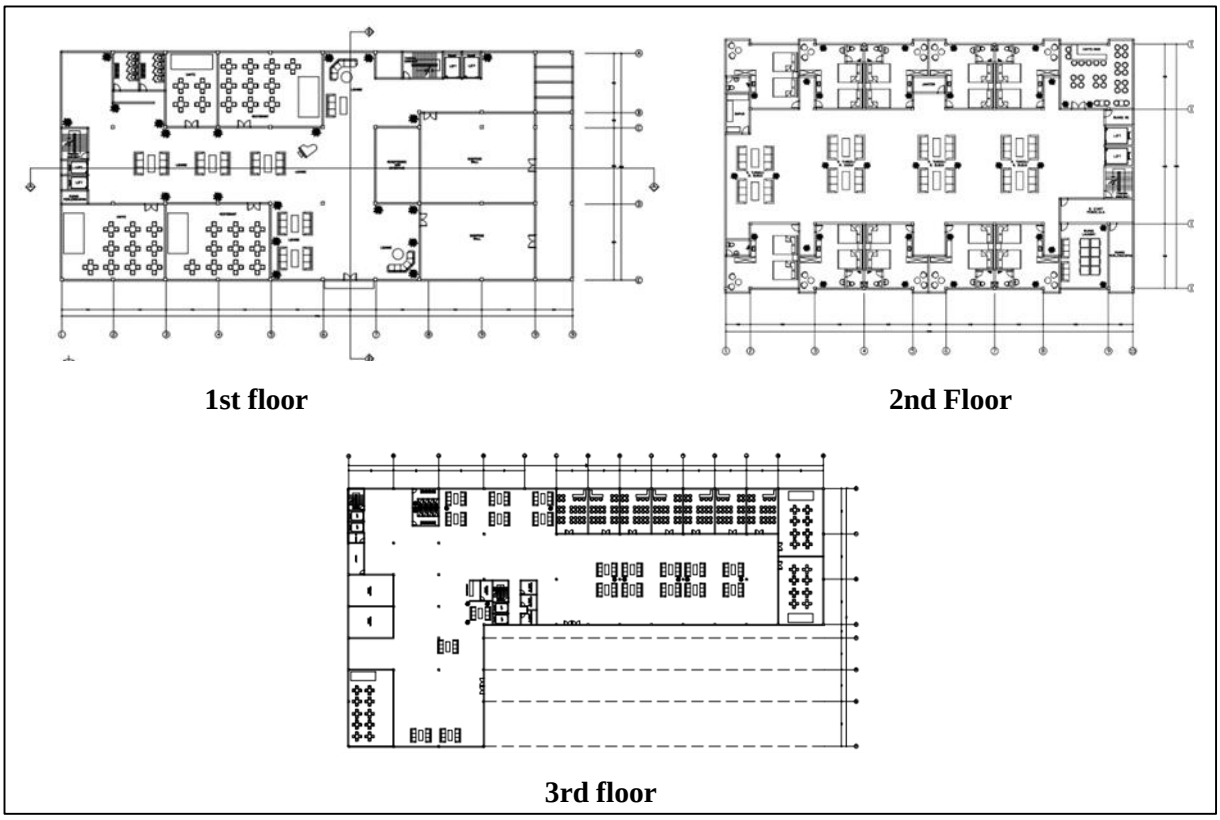

Figure 3. Floor Plan

3.3 Facade Concept

Natural ventilation is used in the athlete's farmhouse building as part of the design's utilization of a green architectural motif. This refers to the design of the mass and exterior of the building housing the athlete's residence. Based on consideration of the local climate and weather, the building mass is shaped. When maximizing the utilization of apertures, wind and sun are the primary references. Facade of the athlete's homestead building employing supplementary skin. A vertical garden constructed out of secondary skin can help to create a lovely and relaxing ambiance (Figure 4).

The inner layout relates to the approach of spatial user behavior that is a plan through the dimensions of the space in the form of proportions of length, width, and height. Then the size of the furniture, the use of colors and shapes create a comfortable impression for athletes who are supported by the material and texture. The function contained in the design of athlete's guesthouses is the group by type of activity and needs. The functions are as follows: (1) Shelters, inns. (2) Sports training center. (3) Polyclinics for athletes.

The design of the athlete's guesthouse echoes the theme of green architecture with the application of natural ventilation in the athlete's guesthouse building. Applied to the mass form and façade of the athlete's guesthouse building. The mass shape of the building is created based on sensitivity to climate and weather at the site. Where wind and sun are the primary references in maximizing the use of openings [11].

The use of secondary skin on the façade of the athlete's guesthouse building. The use of secondary skin in the form of a vertical garden is helpful in creating a beautiful and relaxed atmosphere (Figure 5).

Figure 4. Facade Design

Figure 5. Outdoor Display Design

3.4 Application of Green Architecture

Spatial criteria in buildings, especially in residential masses, aim for natural ventilation systems to be realized. The residential mass is design to apply a single loaded circulation pattern. One row of elongated rooms with corridors at the front is aimed at the movement of the wind. because the front and back are directly related to the outside air [12]. The concept of vegetation in applying this natural ventilation system directs the wind coming towards the site. So that the wind can enter the mass spaces of the athlete's guesthouse. On the tread, the dominant wind direction comes from the southeast and sometimes leans from the south. To direct the arrival of the wind, in the southern part of the site is made the concept of wind directing vegetation [13].

Window openings as building elements to insert air from outside the building into the building. The window opening type used is a vertical pivot type because it can open up to 90ºs so that it can deflect the coming wind [14]. The common area of natural ventilation openings refers to the Sni of the General Department which is 10% of the space area. Of the ten percent is the minimum area used as a direct reference of the opening area inlet danoutlet [15] (Figure 6).

Figure 6. Outdoor Display Design

4 Conclusion

It may be a stat that there are numerous solutions to the current challenges based on the background of the problem and the needs of the athletes for supporting facilities for sports activities in the Sports Center Area of North Sumatra. Some of the issues discovered included a lack of facilities for sports activities in North Sumatra, making it necessary for the athlete to obtain facilities in the form of Wisma Athlete's, which could accommodate and accommodate all activities and lodging while taking into account several environmental, social, and cultural aspects through the use of green principles architecture in the construction.

The following activities can be accommodated in the athlete's guesthouse : (1) Athlete accommodation, (2) Activities for athletes' insight and knowledge in the form of learning and training, (3) Sharia-compliant activities and muamalah to support Athletes' Guesthouse function, such as gym training, jogging paths, public facilities, and a polyclinic in the guesthouse [16]. With this Athletes' Guesthouse, athletes from all cities competing in the North Sumatra Sports Area will be comfortable participating in National Sports Week (PON) events and contests. It is also worth that tourists and the local community will come to this location for recreation and to learn about sports and excursions.

5 Acknowledgment

This project is a study of the design of implementing green architecture at the athlete's residence for sports arenas. This design aims to present a building that functions as a residence for athletes which has several supporting facilities that can support the activities and productivity of the athletes' residence. Department of Architecture, Faculty of Engineering, University of North Sumatra and all parties who have assisted in research and design, thank the author.

6 Conflict of Interest

The authors whose names are listed below certify that the manuscript does not have a conflict of interest.

Adha Zulkhair

This statement is signed by all the authors to indicate agreement that the above information is true and correct (a photocopy of this form may be used if there are more than 10 authors):

Author's name (typed)	Author's signature
Adha Zulkhair	

References

[1] "RRI Medan," Sumut Sport Center Jadi Ikon Baru, [Online]. Available: https://rri.co.id/medan/445-olahraga/932981/menpora-sumut-sport-centre-jadi-ikon-baru. [Diakses 11 November 2020].

[2] T. Fajriyah, "CNN Indonesia," Aceh–Sumatera Jadi Tuan Rumah PON 2024, 19 November 2020. [Online]. Available: https://www.cnnindonesia.com/olahraga/20201119121920-178-571816/aceh-dan-sumut-resmi-tuan-rumah-bersama-pon-2024. [Diakses 13 Oktober 2020].

[3] D. Hermawan, "IDN Times SUMUT," Sports Center Sumut Akhirnya Dibangun, 14 Agustus 2020. [Online]. Available: https://sumut.idntimes.com/sport/arena/doni-hermawan-1/sport-center-sumut-akhirnya-dibangun-edy-rahmayadi-ini-cita-cita. [Diakses 22 Agustus 2020].

[4] J. Priatman, Energi-efficient Architecture' paradigma dan manifestasi arsitektur hijau, Surabaya: Universitas Kristen Petra, 2002 .

[5] D. H. Rahmi, "Universitas Gadjah Mada," Pengaturan Penghawaan dan Pencahayaan pada Bangunan, Agustus 2015. [Online]. Available: http://arsitekturdanlingkungan.wg.ugm.ac.id/2015/08/27/arsitektur-hijau/. [Diakses 23 Agustus 2020].

[6] H. Siregar, "Pengembangan Kawasan Pasar Sei Sikambing Medan," *Jurnal Arsitektur dan Perkotaan "Koridor",* vol. 1, no. 3, pp. 70-76, 2012.

[7] F. H dan T. H. Mulyani, Arsitektur Ekologis, Kanisius: Yogyakarta, 2006.

[8] M. Crosbie, Green Architecture: A Guideto Sustainable Design. Rockport Massachusetts, Rockport Publisher, 1981.

[9] John Wiley and Sons, "Architectural Research Method," New York, Nexus Network Journal, 2002, pp. 51-53.

[10] "Google Earth," [Online]. Available: https://earth.google.com/web/search/Desa+Sena,+Jalan+Bandara+Kualanamu,+Desa+Sena,+Kecamatan+Batang+Kuis,+Kabupaten+Deli+Serdang,+Sumatera+Utara. [Diakses 23 September 2023].

[11] G. A. Sjarifudin, Perpustakaan Pusat Ilmiah Keolahragaan, Jakarta, 1981.

[12] P. Satwiko, Fisika Bangunan, Yogyakarta: Andi, 2009.

[13] R. F. P. Anugra, H. Sufianto dan W. Iyati, "Perancangan Wisma Atlet di Kota Malang dengan Penerapan Sistem Ventilasi Alami," *Studentjoural Universitas Brawijaya,* 2017.

[14] D. H. Rahmi, Pengaturan Penghawaan dan Pencahayaan pada Bangunan. Arsitektur Dan Lingkungan, 2015.

[15] M. Weliem, "Sports center di Yogyakarta," *Jurnal Universitas Atma Jaya Yogyakarta.*

[16] Diktat Pengetahuan Olahraga, Hal 12 Undang-Undang Republik Indonesia No.3 Tahun 2005, Jakarta, 1971.