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PLANNING OF ATHLETE'S VILLAGE IN WONOSOBO WITH A GREEN ARCHITECTURE APPROACH

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Abstract: This paper presents the planning of an Athlete's Village in Wonosobo, Central Java, using a green-architecture approach to deliver high-quality temporary housing and training facilities while minimizing environmental impacts. The study combines literature review, field observation, and comparative analysis of established athlete housing precedents (e.g., Kemayoran and Jakabaring) with site appraisal and space-requirement programming. The proposed scheme organizes the 1-ha site into clear functional precincts—accommodation and training, management and support, utilities and waste, and visitor/public interface—linked by legible, barrier-free circulation. Passive design is prioritized through cross-ventilation, daylighting, strategic orientation, and a robust green/open-space network; active systems are limited to targeted, high-efficiency equipment. Resource strategies include rainwater harvesting, low-impact materials, and waste-to-resource handling (segregation, hygienic collection, and landscape-based polishing). The outcome is a context-responsive layout that improves athlete comfort and performance, strengthens operational safety and maintainability, and positions Wonosobo as a competitive-sports hub that models environmentally responsible development. The work's contribution is a replicable planning framework for medium-scale athlete housing in Indonesian secondary cities, coupling spatial programming with green-infrastructure tactics that are feasible under local climatic, managerial, and budgetary constraints

Keywords: Residential, Environmentally Friendly, Sustainability Aspects

1. INTRODUCTION

The development of sports in Indonesia has experienced a significant setback over the past ten years. Indonesia faces three main obstacles in sports development. First, a lack of financial support. Second, a lack of frequency of competitions for athletes, and third, a lack of adequate sports facilities (Susi, 2026). The planning and design of the athlete's village in Wonosobo aims to create a rest area for athletes that accommodates rest and daily activities, as well as other sports competitions at the regional, national, and international levels. The athlete's village is designed as a building where athletes can stay, equipped with supporting facilities in the form of training and coaching facilities to improve athlete performance before competing (Ade, 2023). The athlete's village is a residence intended for athletes to support the implementation of sporting activities (Patel, 2019).

The planning of the Athlete's Village in Wonosobo adopts the concept of green architecture as the main approach in its architectural design. With the growing awareness of the importance of environmental sustainability, the application of green architecture offers an ideal solution to create buildings that are environmentally friendly, energy-efficient, and minimize negative impacts on the natural surroundings (Mauludi, 2020). This concept

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focuses not only on aesthetic and functional aspects but also on the wise management of natural resources and the integration of technologies that promote energy efficiency. The Athlete's Village in Wonosobo is designed to serve as an example of sustainable development, providing comfort for its inhabitants while supporting the broader goal of sustainable development in the region (Siaahan, 2017). Indonesia's sports development continues to face structural constraints—limited facilities, funding gaps, and low competition frequency—undermining athlete preparation and performance. In parallel, cities are under pressure to deliver event-capable accommodation that is safe, affordable, and operationally efficient without adding environmental burdens. Responding to these challenges, this study proposes an Athlete's Village in Wonosobo, a highland regency with strong tourism assets and abundant natural landscapes, to serve regional–national events while acting as a demonstrator of sustainable campus-scale planning. The site in Wonolelo offers sufficient land, manageable slopes, and separation from dense neighborhoods, enabling a calm, healthful environment for recovery and training.

Green architecture is adopted as the primary design lens, emphasizing passive environmental control (daylighting, cross-ventilation, shade and planting), prudent resource management (water harvesting, material selection, and waste minimization), and human-centered performance (thermal–visual comfort, accessibility, safety). Methodologically, the research integrates literature review, on-site observation, and comparative case studies of Indonesian athlete housing to derive space standards, adjacency requirements, and operational flows. These inputs are translated into a planning proposal with four mutually supporting precincts—public/visitor, accommodation and training, management/support, and utilities/waste—organized to maintain clean–dirty separation, universal access, and simple maintenance. The study contributes a context-specific, transferable framework for planning athlete villages in secondary Indonesian cities: a sequencing of passive-first strategies, compact programmatic zoning, and low-tech infrastructure that together elevate user comfort and operational performance while meeting sustainability goals.

2. METHOD

The data collection method in this study was carried out to obtain factual and relevant information from the field, covering various aspects such as location, site conditions, the surrounding environment, and user characteristics. The data obtained will be used as a basis for a deeper understanding of the situation in the field. Next, a comprehensive data analysis will be conducted, encompassing both primary data obtained directly from the field and secondary data obtained through literature studies and other sources. This analysis process aims to uncover information that can support more accurate planning and decision-making. In the design phase, the analysis results will be translated into a planning visualization form using professional design applications, such as AutoCAD for technical details and SketchUp for three-dimensional presentations. This design technique is expected to provide a clear and in-depth picture of the design plan to be implemented. This study applied a design-led, mixed-methods workflow comprising literature review, precedent benchmarking, field observation and site appraisal, user/program analysis, and passive-first environmental simulations, which were then translated into drawings and 3D visualizations using professional CAD tools. First, a literature review on athlete housing and green-architecture principles established the planning criteria for environmentally responsible, resource-efficient accommodation and training facilities in tropical settings. The review was complemented by comparative precedent analysis of established Indonesian athlete villages (e.g., Kemayoran and Jakabaring) to extract space standards, operational adjacencies, and hygiene/safety protocols that can be scaled to Wonosobo's context.

Second, field observations and site appraisal were conducted at the Wonolelo location in Wonosobo Regency to record boundaries, topography, existing access, and immediate environmental conditions. This step documented the site's gentle slope, separation from dense housing, and potential for calm recovery environments, forming constraints and opportunities for circulation, zoning, and landscape cooling. Third, a user and program analysis identified primary user groups—athletes, managers/staff, and visitors—and translated their needs into a space-requirement program with target capacities (beds, training rooms, storage, administration) and clean–dirty flow separation for biosecurity and maintenance. Program elements were then arranged through an adjacency matrix and bubble-diagramming into four mutually supporting precincts (public/visitor, accommodation & training, management/support, and utilities/waste), refined into a one-way internal circulation for people, materials, and services to reduce conflicts and non-value-added travel. Fourth, passive environmental strategies were prioritized and tested at concept level: building orientation for cross-ventilation and daylight access; shaded, permeable outdoor networks to enhance comfort and infiltration; and landscape buffers to control glare, dust, and noise. Resource measures included rainwater harvesting, low-impact material selection, and staged waste handling (segregation, hygienic collection, and landscape-based polishing), aligning with the green-architecture lens

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adopted in the manuscript. Finally, analysis outputs were translated into design visuals—plans, sections, and 3D views—using AutoCAD for technical drawings and SketchUp for three-dimensional communication, ensuring traceability from data and criteria to spatial decisions and implementation logic. This end-to-end pipeline (data collection → analysis → concept → visualization) followed the manuscript's stated approach to gather factual site information, synthesize it with secondary sources, and communicate a clear, buildable planning proposal.

3. RESULT AND DISCUSSION

Location / Site

The research site is located in Wonolelo, Wonosobo District, Wonosobo Regency, Central Java. The site has clear boundaries: to the north it borders vacant land, to the south it borders vacant land, to the east it also borders vacant land, and to the west it borders vacant land. These clear boundaries allow for precise identification of the site's location in the field, facilitating further planning and development (Wonosobo, 2019).

Fig 1. Location/Site

3.2 Activity Actors (Users)

At this location, there are several user groups involved in various activities. First, visitors who come to use the available facilities. Second, managers are responsible for facility management and administration. In addition, there are also other users who may interact with the facilities, such as cleaning staff or service providers who support activities on site.

3.3 Building Types

The planned buildings consist of several groups based on their function. The first group is the public facility building, which includes the parking area, fitness center, and public restrooms for use by visitors. The second group is the management building, which includes the parking area also needed by the management and space for administrative management. The final group is the service area, which includes the parking area, food storage area, and janitorial facilities to support the cleanliness and maintenance of the facility.

3.4 Site Accessibility

In determining the direction of accessibility, several criteria must be considered. The first is ease of use, which ensures that the location is easily accessible to all users. To this end, the main entrance must be located in a location that is easily visible and conveniently accessible. Second, security is crucial, which can be achieved by carefully positioning the main entrance to ensure it is safe from potential hazards, such as maintaining a safe distance from traffic intersections surrounding the building. Third, user comfort is also a priority, which can be achieved by designing a wider main entrance, allowing visitors to feel comfortable entering the area. The planned location for the Athlete's Village is in Wonolelo, Wonosobo District, Wonosobo Regency, with a land area of 10,000 m² and a gentle slope, far from densely populated residential areas, providing a comfortable and safe environment for visitors.

3.5 Contextual Aspect Approach and Concept

The contextual aspect aims to understand and analyze the location and spatial layout around the building, including existing green open spaces. This is crucial to ensure that the building can be strategically located and aligns with the needs of visitors and the surrounding environment. The main entrance will be located on the west side of the building, considered the most strategic location for primary access, making it easy for visitors to reach the facility.

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3.6 Basic Planning Concepts

The basic planning concept for this building embraces the principles of green architecture, which focuses on minimizing negative impacts on health, safety, and the environment. In this approach, elements such as landscaping and building interiors are designed harmoniously, forming a unity that supports sustainability in architectural design. The goal of this approach is to create buildings that are not only functional but also environmentally friendly, provide comfort for their occupants, and support environmental sustainability.

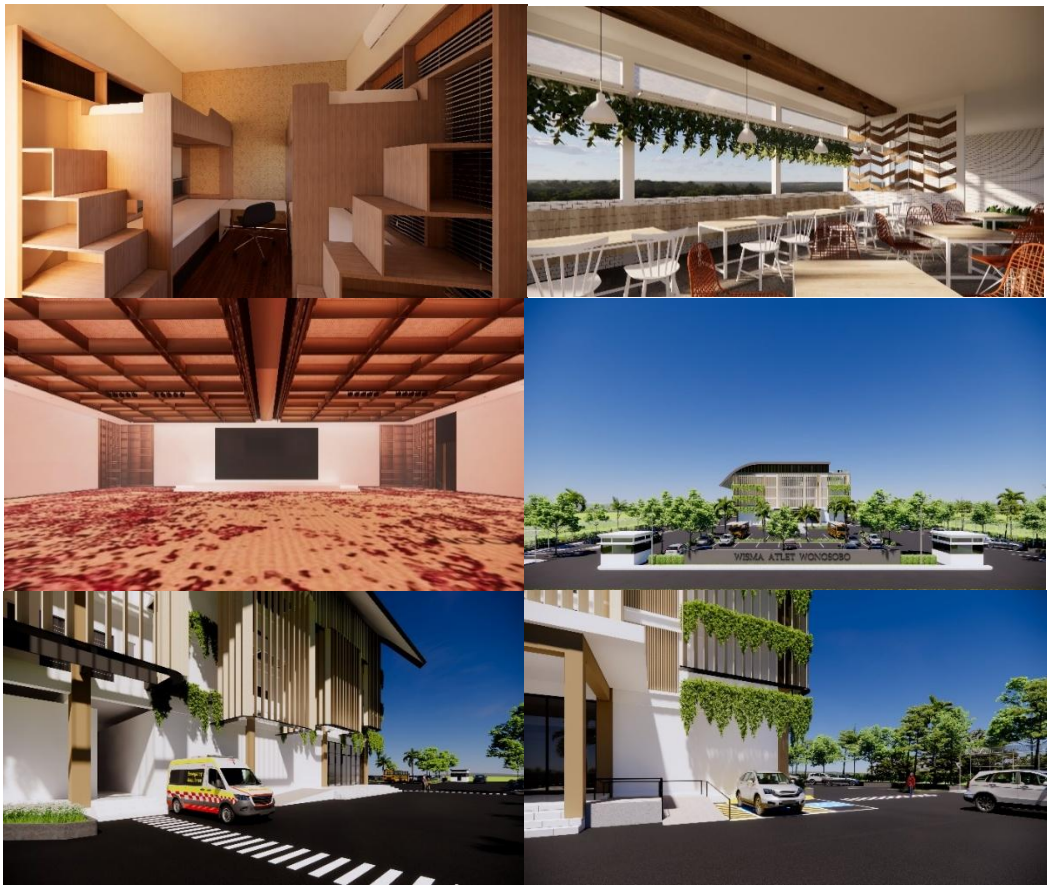

Fig 2. Building Drawings

The Planning of the Athlete's Village in Wonosobo with a Green Architecture Approach aligns with the regional development policies outlined in the Regional Regulation of Wonosobo Regency No. 4 of 2023 concerning spatial planning. This regulation emphasizes the importance of sustainable development, environmental conservation, and the integration of green infrastructure in urban planning (Rahmat, 2011). By adopting green architecture principles, the Athlete's Village project contributes to the realization of these policy objectives. The design incorporates energy-efficient buildings, water conservation systems, and the use of sustainable materials, which are in line with the environmental sustainability goals set forth in the regulation. Furthermore, the integration of green spaces and the promotion of eco-friendly transportation options support the creation of a livable and resilient urban environment, as advocated by the spatial planning policies of Wonosobo Regency. The Athlete's Village project not only provides state-of-the-art facilities for athletes but also serves as a model for sustainable development in Wonosobo, demonstrating the effective implementation of regional regulations in fostering environmentally responsible urban growth.

4. CONCLUSION

Sports play a vital role in shaping human character and quality. However, the development of sports in Indonesia is hampered by a lack of facilities, funding, and frequency of matches. The aim is to create an

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environmentally friendly and sustainable Athlete's Village design using a Green Architecture approach, providing rest, training, and daily necessities for both local and out-of-town athletes. The author is aware that this article is far from perfect. Therefore, the author is willing to accept constructive criticism and suggestions for future improvements. Readers who share the same design concept are expected to pay closer attention, especially to the principles within the overall planning concept.

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