EVALUATION MAPPING TO ASSESS URBAN PARK SUITABILITY ELEMENTS

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ABSTRACT

Urbanization, characterized by dense populations and demanding lifestyles, necessitates a commensurate emphasis on urban planning that prioritizes livability. Green spaces, particularly urban parks, are fundamental to this endeavor, serving as vital counterpoints to the built environment and fostering social interaction while promoting well-being. This study investigates Ulin Urban Park in Kutai Kartanegara Regency, East Kalimantan, a region grappling with mental health challenges, including instances of suicide linked to depression, some occurring within the park itself. Recognizing the crucial role of accessible and well-designed green spaces in mitigating such issues, this research employs an evaluative mapping approach to analyze the park's landscape elements. By assessing the availability and quality of these elements against established standards and suitability indicators, the study aims to identify areas for improvement in Ulin Urban Park's design and infrastructure. Field observation through photo taking was done to collect the existing condition of the park's landscape elements in supporting users' activities. The findings highlight specific areas where the park's soft and hard character elements, furniture, circulation, utilities, microclimate, and management of noise and odor require improvement and attention. The diversity of vegetation that enhances biodiversity could improve the attractiveness, while the quality of seating areas and other structures will improve comfort and aesthetic appeal. Such improvement in the pathways for both segments will also support the flow and accessibility.

Keywords: *Healthy Environment, Green Infrastructure, Landscape Elements, Urban Park*

INTRODUCTION

Green open spaces are urban areas that are undeveloped and planted with vegetation, essential for environmental protection and offering various benefits. According to the Ministry of Agrarian Affairs and Spatial Planning Regulation No. 14 of 2022, green open spaces include areas with natural or planted vegetation, with a minimum of 20% public green open spaces and 10% private green open spaces in a city . Public green open spaces are managed by the government for public interest, while private green open spaces are owned by individuals or institutions for private use. Urban parks, as the most common type of public green open space in the urban area, has to be equipped with facilities recreational facilities such as children's playgrounds, flower gardens, and designated areas for the elderly, to accommodate various social activities (Ministry of Public Works, 2008). Regarding public park elements, landscape is defined as a part of the Earth's surface characterized by its soil or area, encompassing all natural and human-made elements within it. The urban landscape is shaped by spatial arrangements that reflect the daily activities of society in managing its environment to meet its living needs. This encompasses outdoor spaces of both natural and human-made origin, including both hardscape and *softscape* elements (Simonds and Starke, 2006). The elements of hardscape in the landscape include structures such as buildings, gazebos, seating, fences, and materials like wood, stone, and metal. Their primary function is to enhance aesthetic value, create a comfortable atmosphere, and support recreational activities (Hakim, 2018). The standards for Green Open Space facility requirements in urban parks emphasize the use of environmentally friendly materials, such as porous materials for sports fields, multifunctional plazas, and parking areas. Children's play facilities utilize local materials and safe materials to protect users from potential hazards. Softscape elements in the landscape comprise vegetation such as trees, shrubs, and grasses, which exhibit living and growing characteristics. According to Minister of Public Works Regulation No. 5 of 2008, their functions include ground cover plants for soil covering, boundary and directional plants, roof plants for shading, and ornamental filling plants. The vegetation standards for urban Parks emphasize non-toxic, non-thorny plants with strong branches and non-disruptive roots, capable of absorbing air pollutants and supporting bird habitat.

Landscape furniture as the supporting elements that facilitate the user’s activities should be installed or placed within a landscape to enhance human comfort, excluding vegetation (Winarna, Bawole and Hadilinatih, 2021). This category includes amenities such as trash receptacles, lighting fixtures positioned at minimum intervals of 10 meters and heights of at least 4 meters, fire hydrants spaced no more than 150 meters apart and positioned at least 3.00 meters from road edges and restroom facilities. Factors influencing comfort are integral to the Anatomy of Parks, encompassing elements that contribute to a positive physical and psychological human experience within the space: vehicular and pedestrian circulation; natural climatic elements such as sunlight, wind, rainfall, and temperature; noise levels; fragrances and odors; the design of park furniture elements; considerations of safety, cleanliness, and aesthetic appeal (Molnar and Rutledge, 1992).

To create a healthy and safe environment, the need of Biophilic Design emerges to emphasize the importance of human interaction with nature, which can enhance physical, emotional, and intellectual well-being (Azizah and Jaya, 2016). Biophilic Design can be applied through three categories: Nature in the Space Patterns, Natural Analogue Patterns, and Nature of the Space Patterns. Biophilic design represents a deliberate effort to integrate an understanding of the intrinsic human connection to nature into environmental design (Wilson, 1984; Kellert and Wilson, 1993). The primary objective of this approach is to reduce stress, enhance well-being, and expedite healing by leveraging our innate affinity for nature. As urbanization intensifies, the significance of these qualities becomes increasingly evident. Theorists, scientists, and design practitioners have diligently worked over several decades to identify the key aspects that most profoundly influence our satisfaction with built environments. The concept of "14 Patterns of Biophilic Design," introduced by TERRAPIN Bright Green, encapsulates the relationship between nature, human biology, and the built environment. These patterns, categorized into three groups—nature in space, natural analogs, and the nature of the space—provide a comprehensive framework for incorporating the benefits of biophilia into the design.

The relationship between a healthy urban space and environmental psychology is essential because the interaction of human behavior and the physical are mutually influencing. This connection acknowledges the dual influence wherein the environment shapes human behavior while individuals, in turn, impact and adapt to their surroundings (Iskandar, 2016). Urban environments are often associated with complex challenges such as unemployment, poverty, pollution, noise, crime, and juvenile delinquency, contributing significantly to environmental stress. Factors contributing to this stress include high population density and sudden disruptive events such as evictions or accidents. Individuals employ diverse coping mechanisms, including engaging in outdoor recreational activities, to alleviate urban stressors. The research underscores a higher prevalence of mental health disorders in urban settings compared to rural areas, underscoring the importance of effective coping strategies in addressing urban environmental stressors. Psychological disorders, which can impair cognitive functioning, emotional regulation, and behavioral patterns, are prevalent. Anxiety and depression are particularly prevalent, affecting a significant proportion of the global population. In 2019, nearly one in eight individuals worldwide experienced a mental disorder, with a substantial increase noted in anxiety (26%) and severe depression (28%) in 2020 (WHO, 2022). Depression manifests as persistent sadness or loss of interest, while anxiety is characterized by heightened apprehension and excessive worry.

Ulin Urban Park Green Open Space serves ecological, water infiltration, aesthetic, and socio-cultural functions. Hence, Ulin Urban Park Green Open Space must meet the minimal facilities and infrastructure requirements of urban parks based on its specific park functions. Despite renovations, Taman Ulin was deemed non-inclusive and inaccessible in the 2024 evaluation by the Indonesian Ministry of Women's Empowerment and Child Protection. The scope of this study encompasses the assessment of landscape elements of Ulin Park that support the utilization of the

park as a community space that positively influences emotions, moods, and preferences of urban residents in Tenggarong District, Kutai Kartanegara Regency.

THEORY / RESEARCH METHODS

The characteristics and functions of green open spaces vary depending on the specific zone or area. Generally, despite differences in size and scope, all green spaces serve as areas for vegetation growth, microclimate regulation, and spaces for social activities. Environmentally friendly green and non-green coverage requirements are also implemented to maintain ecological balance within each type of green open space. Urban parks represent the largest green areas within urban environments, accommodating a wide range of community social activities. With a service radius of up to 5,000 meters and a minimum area of 50,000 square meters, urban parks must be equipped with adequate facilities to ensure optimal use by residents. Essential facilities include open fields, sports courts, jogging tracks, playgrounds, outdoor furniture, restrooms, and parking areas (Ministry of Agrarian Affairs and Spatial Planning Regulation, 2022).

The ecological function of urban parks is supported by the provision of vegetation that aligns with the existing land ecosystem and serves as a water absorption area. Additionally, the economic function of the park is facilitated through the inclusion of markets, nurseries, and urban farming. The social and cultural functions are achieved through the provision of sports facilities, multifunctional plazas, and playgrounds. In terms of outdoor furniture materials, the use of locally sourced, environmentally friendly materials enhances the park's ecological objectives. Another crucial aspect of creating a public space that is accessible to all users is the application of safe finishes that are free from harmful substances.

According to Hakim (2018), softscape elements serve multiple functions based on architectural or visual artistic aspects, including visual control, physical barriers, climate regulation, erosion control, wildlife habitats, and providing aesthetic value. In contrast, the Ministry of Public Works Regulation No. 5 of 2008 specifies that softscape functions as a space-shaping element, encompassing ground cover plants, hedge plants, canopy or shade plants, and space-filling plants. On the other hand, landscape furniture refers to facilities such as restrooms, open stages, playground equipment (e.g., swings, slides, seesaws, climbing frames, and balance beams), roofed spaces/gazebos, guard posts, prayer rooms, park benches, garden lamps, trash bins, and fire hydrants (Ministry of Public Works, 2008).

This research applies a rationalistic qualitative approach, emphasizing thorough understanding through theoretical conceptualization and literature review as the framework for testing, analyzing, and discussing research issues related to landscape design elements (Groat and Wang, 2013). This study addresses the landscape elements of Ulin Urban Park through mapping analysis, qualitative descriptive analysis, and comparative analysis. The purpose of these analyses is to determine the appropriate concept for landscape redesign. Primary data collection methods include direct approaches such as interviews and observations. The

research utilizes observational and interview methods for data collection. Observations are directed at assessing landscape elements and the accessibility of park facilities at Ulin Urban Park, conducted during both weekdays and weekends. Semi-structured interviews are employed to explore how biophilic design principles accommodate the needs of park users, specifically individuals exhibiting symptoms of depression and anxiety.

In analyzing the landscape elements of Ulin Urban Park as an urban Park, the study employs mapping analysis that integrates a series of sketch maps created by users to develop a collective view of an environment, including landscape elements (Ministry for the Environment New Zealand, 2020). This analysis involves examining the landscape elements at Ulin Urban Park, including mapping through paper notes or simple sketches, as well as digital systems that depict the research site's conditions and analyze spatial design elements (Figure 1). The specific analyses conducted in this research encompass human and vehicular circulation; utility networks such as electricity, water supply, waste management, and drainage systems; microclimate factors including sunlight, wind, noise, and odor sources; softscape elements such as trees, shrubs, ground cover plants, and water features; hardscape components like pavements and rocks; and landscape furniture including toilets, open stages, playground equipment, gazebos, guard posts, prayer rooms, park benches, and garden lights.

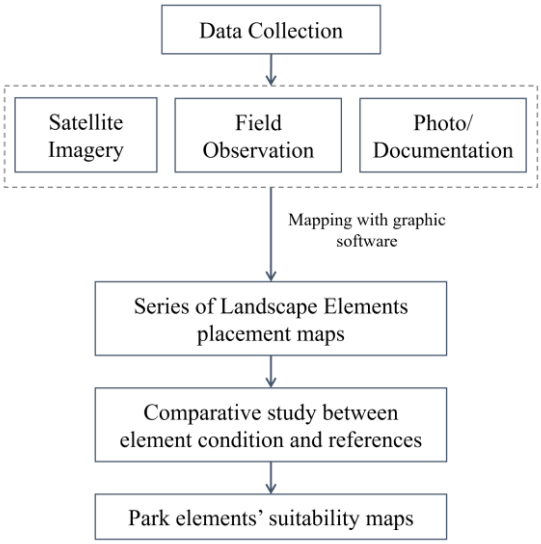

Figure 1. Mapping Analysis Steps

RESULTS AND DISCUSSION

Ulin Urban Park, located on Jalan Mawar 3, Sukarame Subdistrict, Tenggarong District, Kutai Kartanegara Regency, was established in the 1990s, encompassing an

area of approximately 9451.62 m². Initially, the park featured play equipment predominantly made of ironwood (ulin), although renovations have since altered these features. The park is square-shaped, adorned with fences bearing shield motifs characteristic of the Dayak tribe. This park is part of the regional planning program in Kutai Kartanegara Regency aimed at achieving 30% green open space. This park is frequently visited by the community, including children, the elderly, adults, families, communities, and individuals with disabilities, particularly in the morning and afternoon. Situated in the old city center of Tenggarong, the park offers strategic access to educational facilities, recreational areas, and residential neighborhoods. It is bounded by a primary school and a special school designed for children with disabilities to the north. Upon the completion of the city market relocation project, commercial access around the park will be further enhanced, facilitating visits and activities for Tenggarong residents and visitors from outside the area.

In the analysis process to achieve the objective of redesigning Ulin Urban Park in Tenggarong District, Kutai Kartanegara Regency, with a biophilic design approach, analyzing the spatial zoning scheme was done based on the 14 patterns in the biophilic design matrix, and formulating the design concept based on the biophilic design criteria. The initial identification of Ulin Urban Park divides it into two segments (Figure 2): the first segment, which serves passive and aesthetic functions, and the second segment, which serves active functions and includes play areas. Even though the two segments have significant differences in the layout, the utilization of the two segments is relatively balanced.

Figure 2. Ulin Park's Segments

In general, the investigation of softscape elements (Figure 3) shows that there is various vegetation, including trees, shrubs, and grasses. In segment 1, the vegetation tends to spread in a scattered pattern, except the outer border completed with a lining shrub in a regular pattern. Wide trees are placed in the lawn area and the sitting area to provide shading, while the medium trees are planted around and inside the pathway. On the other hand, segment 2 has fewer big trees because of the play area. Decorative plants are planted around the pedestrian path and a few shaded trees are located around the sitting area. A series of trees and bushes also line up in the connection between the two segments.

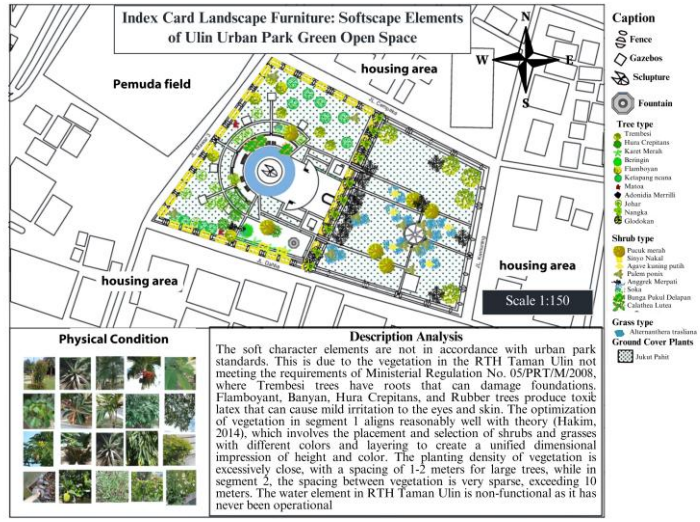

Figure 3. Index Card Landscape Furniture: Softscape Elements of Ulin Urban Park Green Open Space

Overall, the hard-scape elements of the park are in good condition, while the distribution of the pathway followed a geometric linear and radial pattern (Figure 4). Regarding hardscape elements, the park uses several types of pavements as the circulation route and presents some sculptures as decorative elements. The hardscape types are focused on enhancing the accessibility of the user, using both natural and artificial materials such as cement, paving blocks, wood, and gravel.

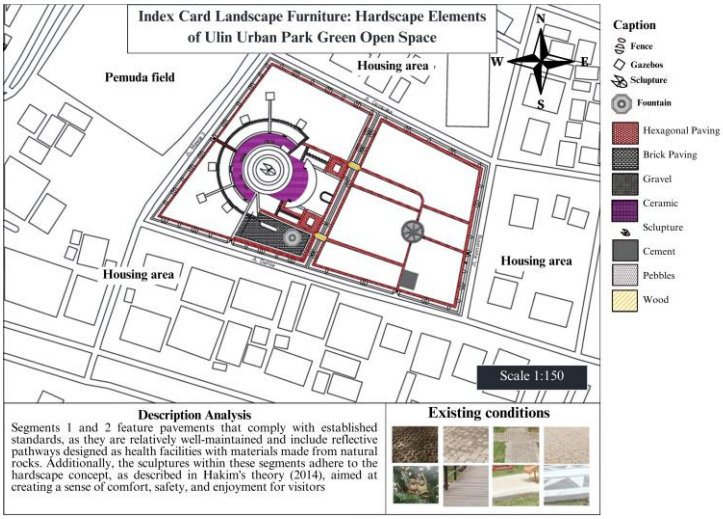

Figure 4. Index Card Landscape Furniture: Hardscape Elements of Ulin Urban Park Green Open Space

Public toilets are one landscape furniture that is provided in the middle part of the park (Figure 5). According to its position, this facility will support both segments and visitors that are relatively low in number. Despite its existence that accommodates separate male and female visitors, two toilets are locked and inaccessible. This condition becomes the weak point of the park, in terms of supporting facilities.

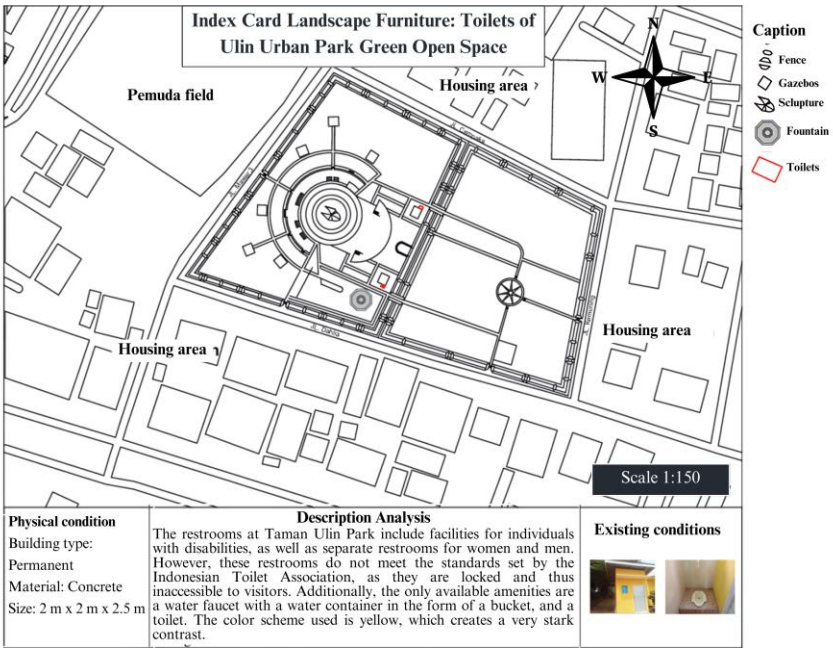

Figure 5. Index Card Landscape Furniture: Toilets of Ulin Urban Park Green Open Space

To accommodate public events, this park is equipped with an open stage that is designated for performances or other outdoor activities. It is located in the center part of the park, facing the radial pattern of pathway (Figure 6), and hosts various activities such as concerts, and theater performances, providing a natural and open atmosphere for visitors to enjoy the events. Its position differentiates between the two segments because the stage's direction is inaccessible to Segment 2.

As shown in Figure 7, the playground area is designated in Segment 2 as a play area, equipped with various features, including swings, seesaws, slides, and other physical stimulation devices. This part of the area is dedicated to supporting particular functions of the park to serve children user recreational activities. Compared to the standard, the overall condition of the facilities suits the requirement and presence in supporting safe outdoor activities.

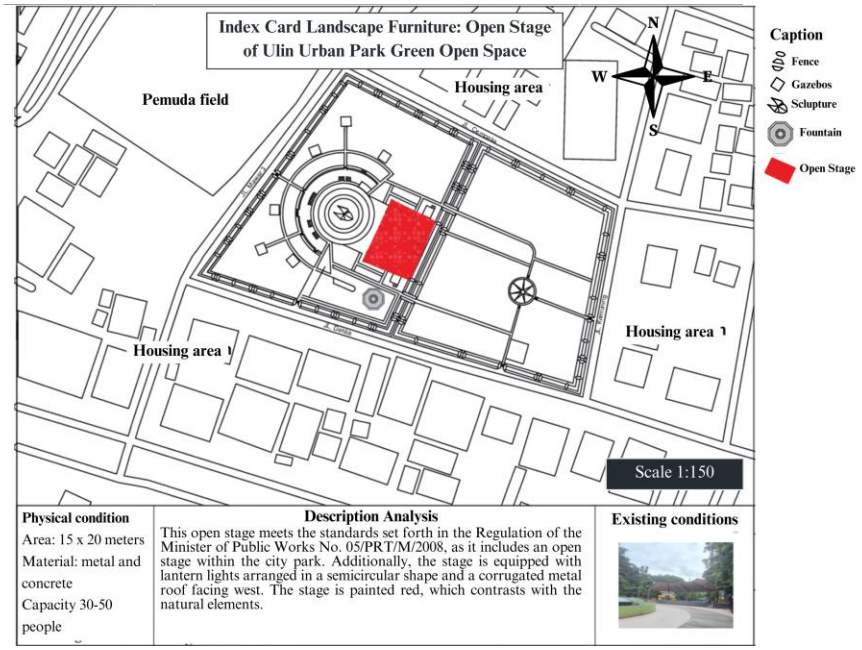

Figure. 6. Index Card Landscape Furniture: Open Stage of Ulin Urban Park Green Open Space

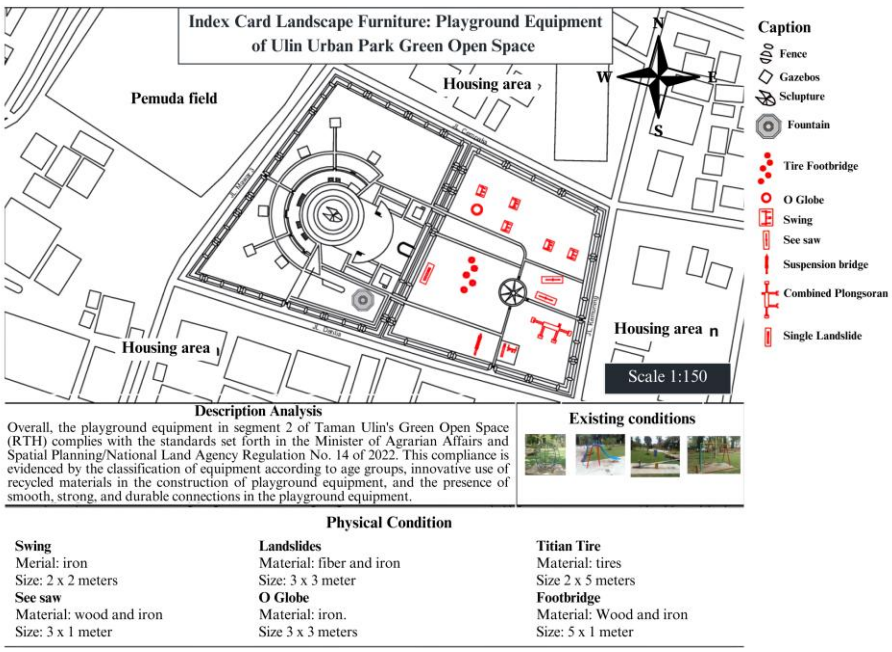

Figure 7. Index Card Landscape Furniture: Playground Equipment of Ulin Urban Park Green Open Space

Social interaction within the park is supported by several gazebos that were placed outside the radial pattern of the pathway in segment 1 (Figure 8). To ensure comfort, the gazebos are designed with a roof and sitting area, facing the stage area. In contrast, the absence of gazebos in Segment 2 shows that there is a clear difference in the segment's objective. Compared to the total area of the park, the dedicated shaded sitting area is provided in a quite small number. The diverse activities and the accommodation of various user groups are not matched by the provision of seating areas, particularly in active zones.

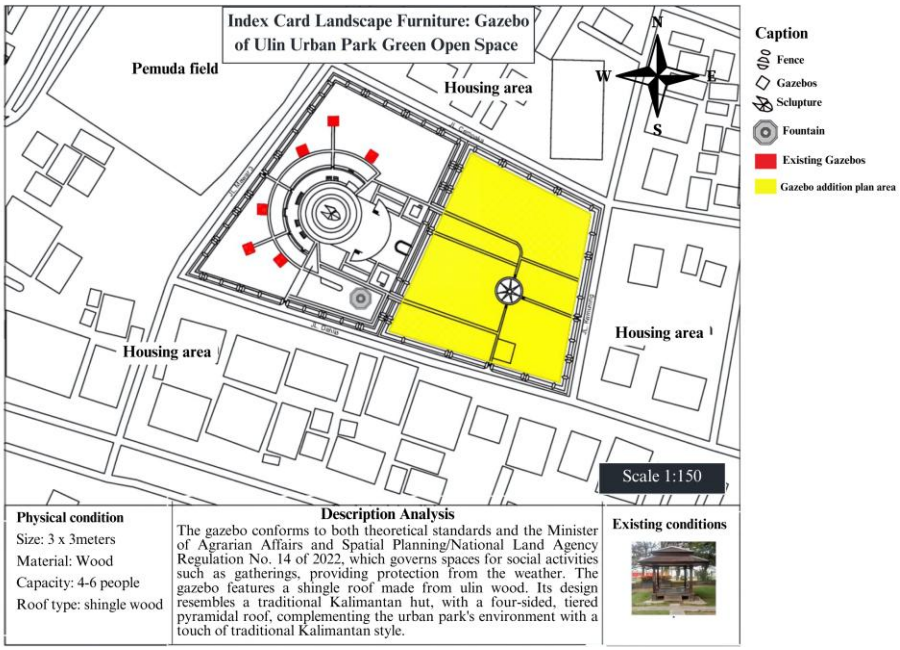

Figure 8. Index Card Landscape Furniture: Gazebo of Ulin Urban Park Green Open Space

Strategically located in spacious and comfortable areas of the park (Figure 9), a library is provided in the central part of the park. The library is an enclosed room in a building that was connected to the women's restroom. Despite the limited capacity of the room, the library is equipped with a diverse collection of reading materials catering to various age groups. The presence of this space supports the overall activity of the park, which enhances the user's diversity and the employment of the park.

To accommodate the user's activities, several benches are provided along the pedestrian path in the park. According to field observation, the overall condition of the benches is good and has met the standard requirement, however, the number of benches is uneven. Figure 10 illustrates the adequate symmetrical distribution of the benches in Segment 1 which focuses on the area in front of the stage, while in Segment 2, the benches are grouped at the park entrance.

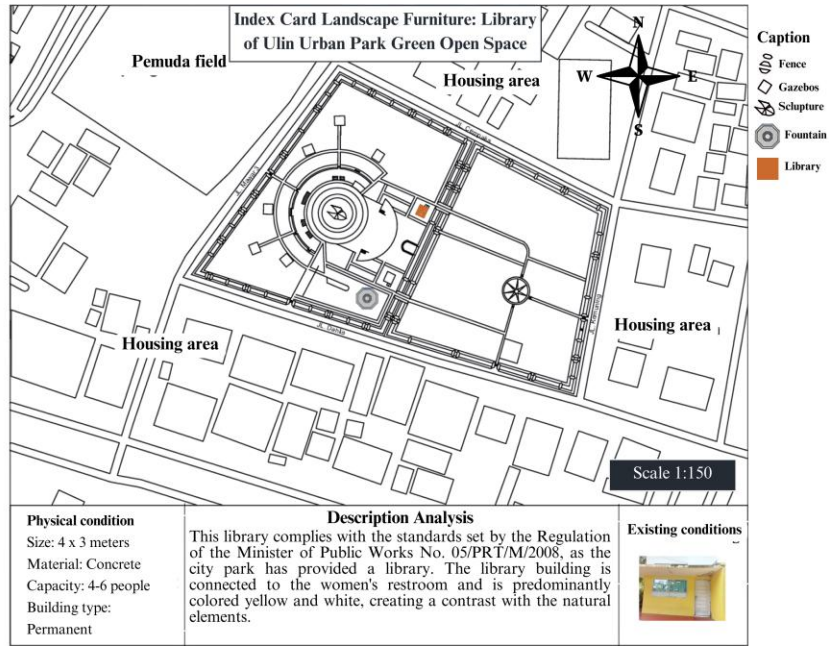

Figure. 9. Index Card Landscape Furniture: Library of Ulin Urban Park Green Open Space

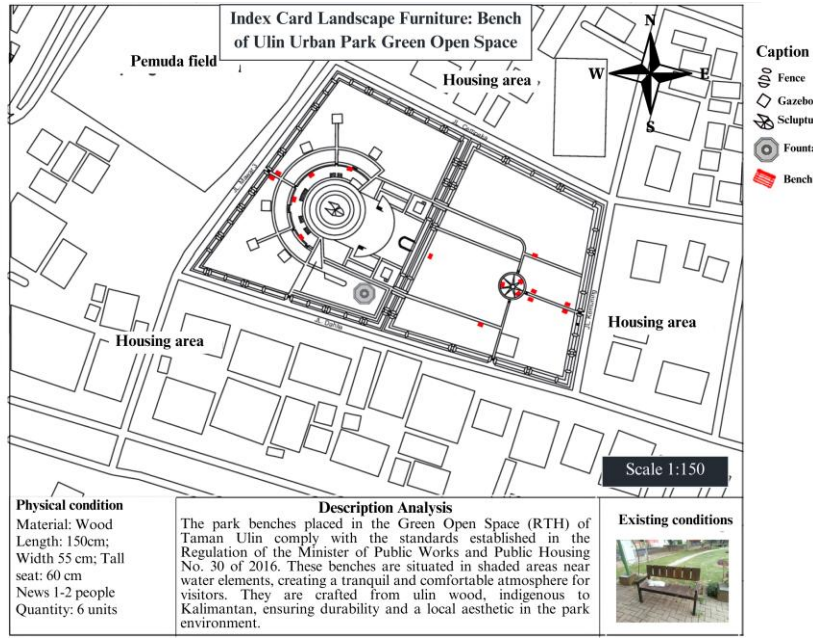

Figure. 10. Index Card Landscape Furniture: Park Bench of Ulin Urban Park Green Open Space

Other open-space furniture that is provided in the lawn area are garden lamps. Despite the quite adequate number, the majority of the lamps are inappropriate for use. This condition does not support park user activities during nighttime, resulting in the park being underutilized and generally quiet during the evening hours (Figure 11). Furthermore, lighting is only provided in the lawn areas, while pedestrian access pathways remain inadequately illuminated.

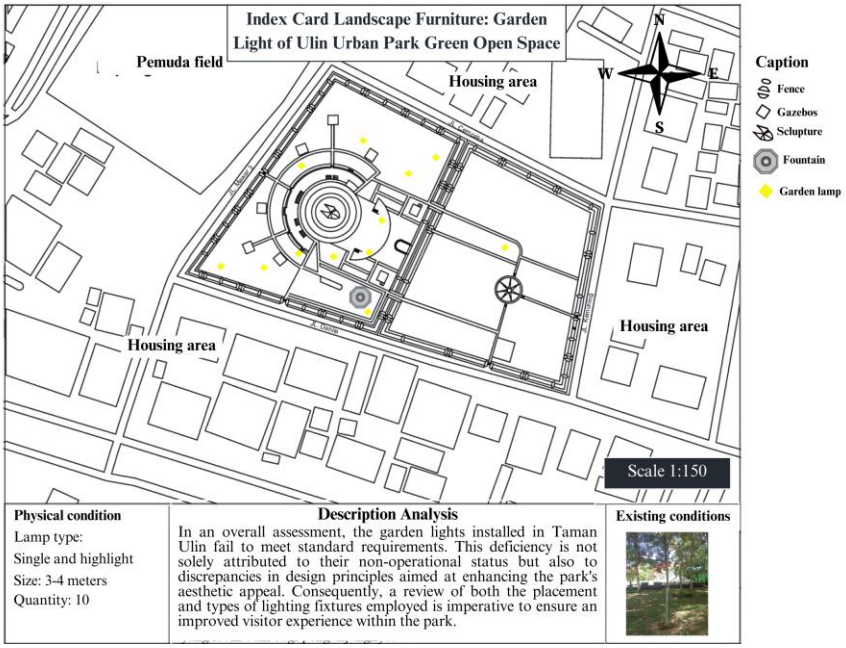

Figure 11. Index Card Landscape Furniture: Garden Light of Ulin Urban Park Green Open Space

Regarding trash receptacle fixtures, trash bins are placed along paved pathways and specific areas to temporarily collect waste (Figure 12). Most trash bins are found at segment 1, while a small number of them are provided at the southeast entrance of the park. There are regulations or standards governing the provision of trash bins to accommodate waste produced by the community. However, in Taman Ulin, the provision of trash bins does not fully comply with the applicable standards. Further analysis on this matter can be found in the following analysis.

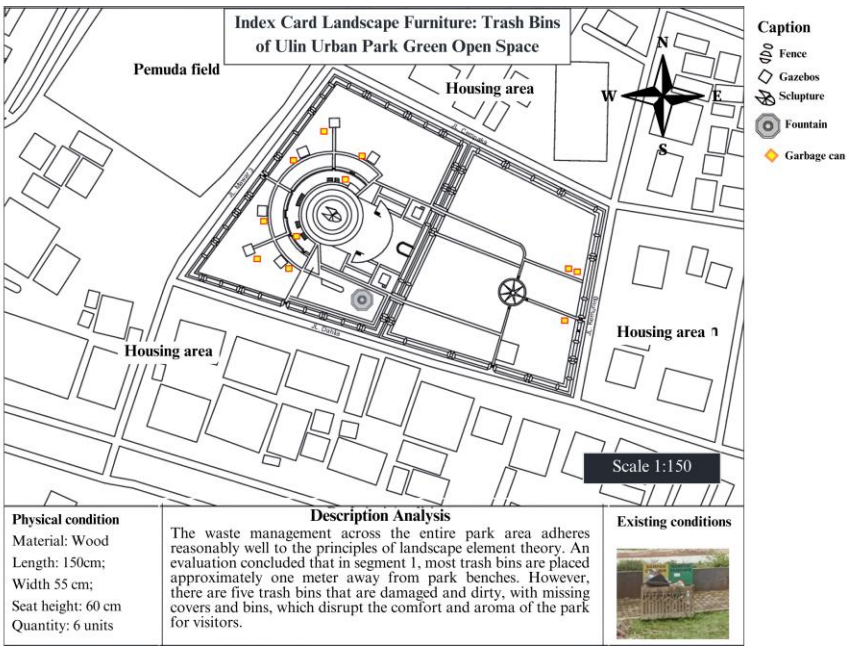

Figure 12. Index Card Landscape Furniture: Trash Bins of Ulin Urban Park Green Open Space

Another important safety facility in open spaces is the fire hydrant, which serves as a crucial landscape fixture, especially in areas with flammable amenities and a high number of users. Ulin Urban Park does not meet the SNI 03-1733-2004 standard regarding the fire safety system, as mandates the provision of fire hydrants in urban areas. If not feasible, alternative options such as hydrant faucets or fire wells should be available. Consequently, it can be concluded that the provision of fire hydrants in Ulin Urban Park Green Open Space does not comply with the regulations.

Figure 13. Overlay map results for the park's landscape elements

The mapping analysis results indicate several landscape design elements that do not meet the standards of landscape theory, as well as Regulation No. 14 of 2022

from the Ministry of Agrarian Affairs and Spatial Planning/National Land Agency, and Regulation No. 5 of 2008 from the Ministry of Public Works. For instance, there are still toxic vegetations and non-functional water elements. Several facilities such as toilets, libraries, and guard posts are also unusable. Overlay mapping of landscape design elements facilitates the identification of deficient areas (Figure 13). Even though the site is divided into two segments, with reasonably good utility, the provision of facilities and the elements' quality are uneven and inappropriate. This imbalance can lead to uneven usage patterns within the park and create discomfort in certain areas, thereby undermining the park's overall success, which is often measured by the level of user engagement. Consequently, this affects users' overall perception of the park. Decorative elements, such as vegetation, serve multiple supportive functions, including acting as boundaries, providing shade, and enhancing the park's aesthetic appeal, thereby creating a comfortable atmosphere for all users. Meanwhile, functional elements like lighting, restrooms, and libraries support a variety of user activities, contributing to a lively and dynamic environment throughout the day and night. The combination of these elements is integral and interdependent, working together to promote user interaction in urban public spaces.

CONCLUSIONS

The results of the mapping analysis indicate that several landscape design elements do not meet the standards outlined in landscape theory, the Ministry of Agrarian Affairs and Spatial Planning/National Land Agency Regulation No. 14 of 2022, and the Ministry of Public Works Regulation No. 5 of 2008. For instance, there are still toxic plants, vegetation that damages pavement, and non-functional water features. Additionally, certain facilities such as restrooms, the library, and the guard post are inaccessible.

The evaluation of existing open space facilities serves as a critical analysis of the realization of predetermined development or design objectives. A comprehensive assessment of the condition and quality of constituent elements enables a thorough examination of the functional aspects of the location. This evaluation subsequently provides a foundation for future maintenance or enhancement strategies. Furthermore, a meticulous investigation of facilities that do not effectively support the intended purpose of the park can serve as a basis for future redesign initiatives. Urban parks, as vital green spaces and public interaction hubs, necessitate the provision of supporting attributes that adhere to established regulations. The findings of this discourse underscore a significant evaluation of park facilities, revealing inadequacies and a lack of adherence to established standards. The availability of these facilities must be complemented by consistent high quality to prevent functional decline, which could hinder the overall utilization of public space.

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