

Architectural and Functional Integrity of the Al Wahhab Mosque in Bontang in Relation to Cultural Heritage

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ABSTRAK

Masjid Tua Al-Wahhab di Kota Bontang, yang didirikan pada tahun 1789, merupakan situs cagar budaya yang mencerminkan akulturasi budaya Jawa, Bugis, Kutai, dan Banjar melalui arsitektur atap tumpang tiga serta penggunaan kayu ulin. Kajian ini penting untuk memahami tantangan pelestarian yang muncul akibat perubahan material pada renovasi tahun 2002, yang menggantikan kayu ulin dengan beton dan baja ringan sehingga mengancam keutuhan arsitektural bangunan.

Penelitian ini menggunakan pendekatan kualitatif melalui observasi lapangan, wawancara mendalam dengan pengelola masjid, serta analisis dokumen sejarah untuk mengevaluasi perubahan bentuk dan strategi konservasi. Hasil penelitian menunjukkan bahwa pertimbangan biaya dan kepraktisan menyebabkan terjadinya pelanggaran terhadap prinsip intervensi minimal dan reversibilitas, meskipun proses restorasi tersebut tetap mendukung fungsi keagamaan masjid.

Strategi konservasi ke depan sebaiknya memprioritaskan pemertahanan material asli, penerapan desain yang bersifat reversibel, serta kesesuaian antara elemen lama dan tambahan baru. Kajian ini menegaskan pentingnya keseimbangan antara pelestarian warisan budaya dan adaptasi fungsional agar Masjid Al-Wahhab tetap relevan sebagai warisan hidup bagi masyarakat Bontang.

Keywords: *pelestarian cagar budaya, integritas arsitektur, Masjid Al-Wahhab, akulturasi budaya, desain reversibel*

ABSTRACT

The Old Al-Wahhab Mosque in Bontang, established in 1789, is a cultural heritage reflecting Javanese, Bugis, Kutai, and Banjar acculturation through its three-tiered roof architecture and ulin wood material. This study is significant for understanding preservation challenges due to material changes during the 2002 renovation, which replaced ulin wood with concrete and light steel, threatening architectural integrity. Employing a qualitative approach through field observations, in-depth interviews with mosque caretakers, and analysis of historical documents, this research evaluates form changes and preservation strategies. Findings reveal that cost and practicality considerations led to violations of minimum intervention and reversibility principles, despite supporting religious functions. Future preservation strategies should prioritize retaining original materials, reversible design, and compatibility of new additions. This study underscores the importance of balancing heritage preservation with functional adaptation to ensure the Al-Wahhab Mosque remains relevant as a living heritage for the Bontang community.

Keywords: *heritage preservation, architectural integrity, Al-Wahhab Mosque, cultural acculturation, reversible*

1. INTRODUCTION

The Old Al-Wahhab Mosque, established in 1789 by Tuan Rajak and Habib Ahmad Al Habsyi, is not only a symbol of the spread of Islam along the eastern coast of Kalimantan but also plays a significant role as a center for religious and social activities within the community. Its existence documents the rich cultural acculturation, reflected in its architecture, which combines a three-tiered roof inspired by the Demak Grand Mosque with wooden carvings featuring floral geometric motifs characteristic of Javanese, Bugis, Kutai, and Banjar cultures. The use of local materials such as ulin wood in the mosque's main structure also demonstrates adaptation to the tropical climate and local wisdom in utilizing natural resources. The significance of this mosque lies not only in its historical and architectural value but also in the emotional, cultural, and functional values it holds as a shared heritage of the Feilden(2003). community

The revitalization of the mosque in 2002 by the government and local community marked a turning point in the restoration of its religious function, although it was marred by material changes that

threatened its architectural integrity. Material changes during the 2002 renovation, although aimed at enhancing the building's durability, have the potential to erode the principles of *architectural integrity* that emphasize the preservation of original elements. The practice of replacing traditional materials (ironwood) with concrete and lightweight steel was carried out without considering the principles of minimal intervention required and reversibility as outlined by Feilden (2003). Interviews with mosque administrators revealed that cost considerations and practicality were the dominant reasons for choosing modern materials, a phenomenon that can be categorized as one of the "*Man-made causes of decay*" (human-induced causes of deterioration), such as negligence or improper repairs. This aligns with the challenges in *adaptive reuse* highlighted by Ababssi et al. (2024), where projects may be driven more by economic motives than heritage preservation. A study by Wee Kah Man (2023) on the preservation of old towns in Malacca shows that adaptive reuse that considers the authenticity of buildings can strengthen local cultural identity and enhance community involvement in preservation. These findings align with the context of Masjid Al-Wahhab, where the success in preserving cultural heritage depends not only on the physical aspects but also on the emotional connection of the community to the building. This phenomenon reflects a common challenge in the preservation of ancient mosques in Indonesia, where contemporary needs often overlook historical value and fundamental conservation ethics as outlined by Feilden (2003).

To mitigate the threat of historical value degradation, the preservation of Al-Wahhab Mosque needs to adopt a strategy based on a balance between the preservation of original materials and adaptation to contemporary needs, a process described as the search for harmony between humans, history, the past, the present, and the future (Ababssi et al., 2024). The principle of *retention of original fabric* from Douglas (2006) can be implemented by preserving the ulin wood in the remaining main structure, while additional parts are designed using *reversible design* techniques such as structures that can be removed without damaging the original parts, in line with Feilden's (2003) recommendation not to compromise future interventions. Other recommendations include replicating traditional wooden carvings and using local materials such as ulin wood shingles for building extensions.

This study applies a qualitative method by conducting field observations, in-depth interviews, and historical document analysis to formulate strategies that ensure mosques remain a relevant *living heritage* for the people of Bontang, a concept also emphasized by Feilden (2003) that (conservation is always facilitated by the use of buildings for beneficial social purposes).

2. LITERATURE REVIEW

Architectural integrity, as a principle of cultural heritage conservation, emphasizes three fundamental aspects: authenticity of physical form, authenticity of materials, and preservation of cultural meaning (2003). This principle not only preserves the physical aspects of the structure but also protects the associated historical and spiritual values, as seen in the Old Al-Wahhab Mosque, which serves as a symbol of cultural acculturation between Javanese, Bugis, Kutai, and Banjar cultures. In the context of Islamic heritage, the UNESCO World Heritage Centre (2017) emphasizes that architectural integrity requires a balance between preserving the original design and adapting contemporary functions, such as adding sanitation facilities or accessibility, without compromising the building's main character. Feilden (2003) further elaborates that the objective of conservation is to extend the lifespan of cultural heritage and, if possible, clarify the artistic and historical messages within it without losing authenticity and meaning. Feilden (2003) also categorizes various levels of intervention, ranging from damage prevention, preservation of existing conditions, consolidation of fabric, restoration, to rehabilitation, each of which has different implications for the integrity of the building.

Douglas (2006) reinforces this concept through five holistic principles that form the basis of sustainable conservation. First, the principle of *retention of original fabric* emphasizes the importance of preserving original elements such as structure, materials, and ornamentation as representations of historical identity. At the Al-Wahhab Mosque, this principle is relevant for preserving the ulin wood on the triple-layered roof and traditional carvings that reflect cultural acculturation. A study by the Indonesian Institute of Sciences () Kamarudin et al., (2025)) shows that the preservation of heritage wooden buildings such as stilt houses or ancient mosques requires special attention to the natural properties of wood as the primary material. They emphasize the importance of visual documentation, monitoring humidity conditions, and community-based maintenance to

ensure that wood like ulin can continue to function without being replaced by concrete. Second, *minimum intervention* mandates that interventions are only carried out on critically damaged parts, without altering the main form or function; a core ethical principle in conservation according to Feilden (2003). This phenomenon also occurred during the renovation of the Al-Wahhab Mosque in 2002 and is often driven by what Feilden (2003) refers to as "*man-made causes of decay*," including inappropriate repairs. Third, *reversibility* requires that any modifications be reversible, such as the use of *reversible* techniques. Feilden (2003) emphasizes that interventions should not compromise the possibility of future interventions. Fourth, *compatibility of new additions* ensures that new additions are visually and materially harmonious with the original structure, where Feilden (2003) adds that new additions should be "less noticeable than the original material but still identifiable by an expert observer."

In the case of the Al-Wahhab Mosque, the incompatibility between the main building (ironwood) and the additions (asbestos/brick) presents a challenge that must be addressed through compatible design. Finally, *sustainability and adaptation* emphasize that functional adaptation must be carried out wisely so that the building remains relevant without losing its cultural significance. The concept of *adaptive reuse*, as defined by Ababssi et al., (2024), is "transforming unused or underutilized buildings into structures that serve new functions" while maintaining "connections across time and space and preserving memory." Douglas (2006), as cited in Ababssi et al. (2024), emphasizes the importance of a two-way relationship between cultural aspects (considering the community and their memories) and architectural aspects (enhancing physical aspects and design in *adaptive reuse* projects. Feilden's (2003) approach on rehabilitation also supports this, stating that historic buildings can continue to function if adaptations are made while respecting their intrinsic values. Research by Idrus et al., (2024) highlights the importance of an integrative approach in redesigning heritage buildings, namely combining local cultural values with modern functional needs. In the context of the Al-Wahhab Mosque, this means that preservation does not have to reject change, but should be directed toward maintaining cultural essence through an integrated design approach.

Therefore, the approaches of Douglas (2006) and Feilden (2003) serve as a critical foundation for evaluating the extent to which

restoration has adhered to the principles of *minimum intervention* and *reversibility*, as well as for formulating conservation strategies that prioritize a balance between physical preservation, functional adaptation, and broader conservation values.

3. RESEARCH METHOD

This study applies a qualitative approach through case study methods to examine the preservation and utilization strategies of the Old Al-Wahhab Mosque as cultural heritage from a *heritage management* perspective. The qualitative approach was chosen for its ability to explore the experiences and perspectives of individuals involved in the transformation of the space (Ababssi et al., 2024). The research location is in Bontang City, East Kalimantan. This study adopts a similar approach to the adaptation study of the Caringin Mosque in Pandeglang by Syahid et al. (2024)), which employed a community-based participatory method through direct observation, focused group discussions, and historical building-based schematic design. This approach demonstrates that the preservation of old mosques is more effective when involving local stakeholders and considering the chronology of existing historical values.

Data collection was conducted through field observations to directly observe the physical condition of the building, including structural elements, overlapping roof shapes, and other architectural details that reflect the cultural acculturation of the Bugis, Kutai, and Banjar cultures. In addition, in-depth interviews were conducted with sources involved in the restoration process and those with historical knowledge about the mosque, such as mosque administrators, community leaders, and representatives from relevant agencies. To support primary data, documentation and archival studies were also conducted by examining old photographs, building plans, and historical records from various sources. A similar approach was used in the study of the adaptation of historical buildings in Palembang by Armarieno et al., (2021) , which combined literature review, design simulation, and site studies to generate adaptive reuse scenarios. This practice can be applied to the Al-Wahhab Mosque to assess the potential for space utilization without violating conservation principles. The use of photography and measured drawings is also an important part of field data recording (Feilden, 2003).

Information analysis was conducted using qualitative methods based on the *heritage management* approach and Douglas's (2006)

theory of historic building preservation, particularly the principles of *retention of original fabric*, *minimum intervention*, and *compatibility of new additions*. This analytical framework will be enriched with conservation ethics principles and intervention levels outlined by Feilden (2003), as well as the concepts of cultural and architectural integrity in the context of *adaptive reuse* discussed by Ababssi et al. (2024) based on Douglas (2006). Through this method, the study aims to produce a comprehensive evaluation of the changes in the form and structural strength of the mosque, as well as provide appropriate conservation strategy recommendations to ensure that the historical, architectural, and functional values of the Old Al-Wahhab Mosque are preserved sustainably and contextually with the development of Bontang City.

4. RESULTS AND DISCUSSION

Profile of the Old Al-Wahhab Mosque and Its History



Figure 1.

Al Wahhab Mosque in Bontang City

Source: Personal Documentation, 2025

This mosque was built in 1789 by Tuan Rajak and Habib Ahmad Al Habsyi, and it's a symbol of the early spread of Islam on the east coast of Kalimantan. The mosque has other functions, like being a center for religious and social activities for the community. Its unique architecture, like the triple roof and use of ironwood, shows the cultural mix of Javanese, Bugis, Kutai, and Banjar cultures. According to architectural integrity theory, the integrity of Masjid Al-Wahhab lies in the authenticity of its physical form, the authenticity of its materials, and the preservation of its cultural meaning. However, this study found that material changes during the 2002 renovation have threatened these principles, particularly in terms of preserving original elements.

Changes in Form and Restoration Process

Based on interviews conducted with Mr. Iwan, it was found that in the 1960s, this mosque, known as the " ," experienced a period of neglect, resulting in the loss of worshippers and the deterioration of the building.



Figure 2.
The abandoned Al Wahhab Mosque in Bontang City

Source: Mosque Documentation, 2025

In 2002, the community and local government collaborated to restore the Old Al Wahhab Mosque to restore its function as a mosque. However, material changes such as replacing ironwood with concrete in the additional buildings and lightweight steel raised questions about compliance with the principles of *minimum intervention* and *reversibility*. Further interviews with mosque administrators revealed that cost considerations and practicality were the primary reasons for selecting modern materials. The transformations carried out on the building have created visual disharmony between the core structure and the additions, contradicting the principle of *compatibility of new additions*. This study indicates that the restoration failed to adequately consider the historical and architectural value of the mosque, necessitating a more holistic conservation strategy.



Figure 3.
Al Wahhab Mosque in Bontang City today
Source: Personal Documentation, 2025

Some original elements have been replaced or updated, such as the roof, which has been reinforced with a lightweight steel structure, while the main building retains its traditional roof material. The floors of the main building at remain made of ulin wood, while the additional buildings use ceramic materials. New ornaments have been added to the mihrab and walls. A study by Hamzić et al. (2025) indicates that the use of TLS technology and numerical modeling is effective for detecting structural damage in mosque towers caused by tilting and water infiltration. These findings are relevant for the Old Al-Wahhab Mosque, which also faces structural degradation due to age and reconstruction, making similar approaches applicable to support data-driven conservation and strengthen architectural heritage management.

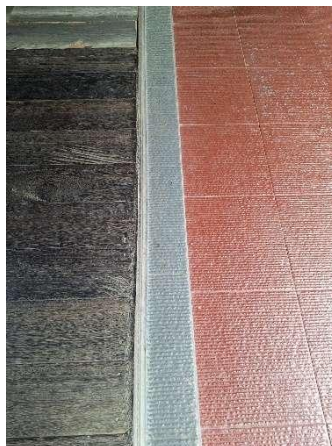


Figure 4.
**Wooden materials in the main building and ceramic materials in the additional
buildings**

Source: Personal documentation, 2025

The Al-Wahhab Old Mosque has also undergone various additions to accommodate the growing needs of its congregation. A study on (Yetti, 2018) indicates that community-based preservation is effective in maintaining the sustainability of heritage areas. This reinforces the importance of involving the congregation and community leaders in the decision-making process for the renovation of Al-Wahhab Mosque to ensure that its social and historical values are preserved. Based on field data and interviews with mosque administrators, the expansion was carried out gradually starting in early 2002, including the construction of a new ablution area, an additional porch, and a multipurpose room on the eastern side of the mosque. A case study on the Sang Cipta Rasa Mosque by D et al. (2021) also shows that gradual changes to old buildings can be accepted as long as they maintain harmony in form and adhere to the principle of minimal intervention. This reinforces the importance of a phased strategy in the restoration of the Al-Wahhab Mosque, which preserves the main structure while accommodating additional functions in a balanced manner. These additions were made with the aim of expanding the mosque's capacity and improving the comfort of worshipers. Mutmainah et al., (2024) emphasize that revitalizing the function of mosques through a circular economy approach not only expands their religious significance but also strengthens community involvement as part of living heritage. This reinforces that the addition of multipurpose spaces and social facilities at Masjid Al-Wahhab can be understood as part of the adaptive transformation of the mosque's role in response to the times.

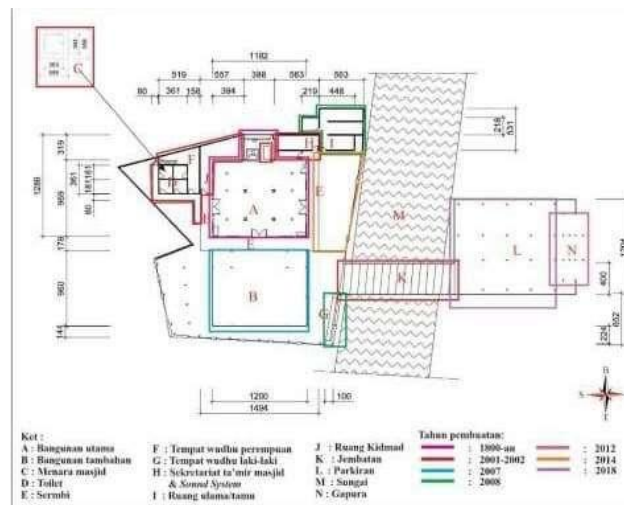


Figure 4.
Expansion of the Al Wahhab Mosque area
Source: Mosque Documentation, 2025

The physical changes to the mosque, as shown in the floor plan above, indicate spatial dynamics reflecting responses to the needs of the congregation and the evolving functions of the mosque over time. The following table identifies the stages of construction based on the theory of James Douglass and Bernard Feilden:

No.	Building Element Change	Building Image	Year	Description of Change	Theoretical Correlation Results
1	Main Building (A)	 Source: Arifin, 2023  Source: Arifin, 2023	Before 1980	Core structure of the mosque with a triple-layered roof and original ulin wood material	Original elements were preserved as the main identity of the building.
2	Additional Building (B).		1980–1999	Addition of supporting	Additions are functional and do

No.	Building Element / Change	Building Image	Year	Description of Change	Theoretical Correlation Results
	Minaret (C), Toilet (D), Porch (E)	 Source: Personal Documentation, 2025  Source: Arifin, 2023		functions without altering the main structure	not interfere with the main character.
3	Men's Ablution Area (G) & Women's Ablution Area (F), Secretariat (H), Sound System, Main Guest Room (I), Service Room (J)	 Source: Personal Documentation, 2025  Source: Personal Documentation, 2025	2000–2002	Adjustments made to accommodate modern religious and administrative needs	Additions made to accommodate contemporary needs without altering the primary function.
4	Khatib Room (A)	 Source: Personal Documentation, 2025	2007	Special room added to support khutbah activities	Design materials are harmonious, principles are met.

No.	Building Element Change	Building Image	Year	Description of Change	Theoretical Correlation Results
5	Connecting Bridge (K)	 Source: <i>Personal Documentation, 2025</i>	2008	Connecting two building masses due to site conditions	Responding to site conditions by adjusting the shape and materials to the main structure.
6	Parking Area (L)	 Source: <i>Personal Documentation, 2025</i>	2	Addition of parking space to accommodate vehicles of worshippers	Adaptation efforts to accommodate increased pilgrim activities without directly impacting the main structure.
7	Gate (N)	 Source: <i>Personal Documentation, 2025</i>	2018	Symbolic elements as markers of the mosque gate	Features a harmonious design consistent with the original architectural style.
8	Additional Material Changes (ceramic, asbestos) (B, D, E, F, G)	 Source: <i>Personal Documentation, 2025</i>	2002–2018	Used in additional structures, contrasting with ironwood in the main structure	Has a high value for minimizing changes due to its incompatibility with traditional materials and forms.
9	Addition of modern materials (I)		After 2002	Addition of modern materials to the additional building	This constitutes a violation of the principles of minimal intervention and

No.	Building Element / Change	Building Image	Year	Description of Change	Theoretical Correlation Results
		 Source: Personal Documentation, 2025			reversibility, as changes to the building additions involve the use of modern roofing materials, specifically zinc.

Based on the results of the discussion in the table above, the physical changes that have occurred to the Old Al-Wahhab Mosque, as well as the efforts to preserve and restore the mosque, have a strong connection to the theory of cultural heritage management proposed by James Douglas and Bernard Feilden.

In James Douglass' theory, there are five important principles in preservation, namely maintaining the original elements of the building, making minimal intervention or changes, allowing changes to be reversed, maintaining harmony between new additions and old structures, and harmonizing the building with current demands without neglecting cultural significance. These theories are also supported by other studies, such as Ababssi et al. (2024), who cite Douglas (2006) to highlight the importance of preserving historical and cultural value in *adaptive reuse* projects. Idrus et al. (2024) emphasize the integration of local cultural values with modern needs to preserve the cultural essence of buildings. In the study by Kamarudin et al. (2025), the focus is on preserving original wooden materials such as ulin wood through documentation and maintenance. The concept of "*living heritage*" by Feilden (2003), which means that historic buildings must remain useful to the community, is further reinforced by the research of Syahid et al. (2024) and Yetti (2018) on community-based preservation.

However, the application of these principles often poses problems, as seen in the Old Al-Wahhab Mosque in Bontang. Although the 2002 revitalization aimed to keep the mosque functional,

the replacement of the original ironwood with concrete and lightweight steel threatened its architectural authenticity. This violates the principles of minimal intervention and reversibility outlined by Douglas (2006) and Feilden (2003). The new materials, which are visually incompatible with the original structure, also demonstrate a lack of adherence to the principle of harmony in new additions. The reasons behind these changes are cost considerations and practicality, which, according to Ababssi et al. (2024) and Feilden (2003), often prioritize economic aspects over the preservation of cultural heritage.

Masji Al Wahhab also has a principle of preserving original elements and maintaining the basic structure of the main building, such as the three-tiered roof and the use of ironwood flooring. However, violations of the principles of minimal intervention and reversibility of changes are very clear in the addition of buildings using modern materials such as ceramic, zinc, and metal sand tiles, which do not consider the possibility of removal or restoration to their original form. Additionally, there are numerous additional elements that are incompatible in form and material with the main building, thereby failing to adhere to the principle of harmony in the design of additional elements.

However, according to Bernard Feilden's perspective, preservation should not hinder the role of buildings in social life. In this context, the addition of a wudhu area, a secretariat room, and a parking lot are forms of adaptation to the needs of today's congregation. This principle of preservation emphasizes that historic buildings must remain functional and useful to the community, without neglecting their historical and cultural value.

Thus, it can be concluded that the preservation efforts of the Al-Wahhab Mosque have strived to fulfill the principles of cultural heritage preservation, although there are still some shortcomings in its implementation. Therefore, a more comprehensive and wise preservation strategy is needed in the future so that this mosque remains a living, intact, and meaningful cultural heritage for the people of Bontang City.

5. CONCLUSION

A study on the preservation of the Old Al-Wahhab Mosque (1789) in Bontang City shows the challenges of balancing contemporary needs with heritage preservation. The 2002 revitalization, which involved replacing traditional ironwood with concrete and lightweight steel based on cost and practicality, has the potential to erode the architectural and cultural integrity of the mosque. This practice contradicts core conservation principles such as minimal intervention and reversibility, as outlined Douglas (2006) and Feilden (2003).

These changes, although intended to ensure the functional sustainability of the site as *living heritage*, are not in line with the principle of *compatibility of new additions* and demonstrate that practical considerations often override fundamental conservation values (Ababssi et al., 2024; Feilden, 2003). To preserve the identity of Masjid Al-Wahhab, future conservation strategies must prioritize a balance between the preservation of the original fabric and functional adaptation, by employing reversible design techniques and the use of compatible materials.

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