

Strategies for the Conservation and Continuation of Spatial Context in Urban Renewal of Macau's Historic Districts: A Case Study of the Barra & Manduco Area

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ABSTRACT

Amid the rapid urban development process, the preservation and revitalization of Macau's historic districts and cultural heritage face significant challenges. This study aims to explore strategies for organizing and preserving the spatial context of the Barra & Manduco area within the framework of Macau's urban renewal. Adopting an urban spatial perspective, the research analyzes the spatial characteristics of the district through the lenses of spatial power, spatial order, and spatial context. Based on the current state of the Barra & Manduco area, the study proposes strategies for the conservation and continuation of its spatial context from four aspects: street texture, visual control, integration of history and tourism, and local culture. These strategies aim to revitalize the historic district and reinvigorate its spatial and cultural vitality.

KEYWORDS

Urban Renewal; Spatial Context; Historic District; Macau.

1. INTRODUCTION

Macau's Historic Urban District was officially inscribed on the UNESCO World Heritage List in 2005, becoming China's 31st World Heritage Site (Yang Kaijing, 2017). The history of Macau belongs to the broader narrative of global cultural exchange, and its cultural heritage deserves examination from a higher and more inclusive perspective. Having witnessed intense interactions between diverse cultures, Macau's cultural identity is unique and unparalleled.

With the increasingly close cooperation between Zhuhai and Macau and the deep integration of the Hengqin Guangdong-Macao In-Depth Cooperation Zone, urban renewal in Macau has become both necessary and urgent. In this process, strategies for protecting and developing Macau's historic districts are central to urban planning and renewal efforts. The protection and revitalization of Macau's distinctive local culture face significant challenges. Urban memory resides within urban spaces, which are both ideological products and productive forces, representing context and spirit. The primary issue confronting the preservation of Macau's historic districts lies in reconciling the tension between "integrity" and urban development (Dan Jingjing, 2011; Wu Shabing & Zhang Wenjing, 2019). Therefore, research on the continuation of spatial context in Macau's historic districts offers valuable insights for urban renewal practices.

The concept of urban regeneration originated in the United States in the 1950s, often characterized by large-scale demolition and redevelopment. However, it also includes preserving existing structures and repurposing architectural heritage (Wang, H. et al., 2014). Urban regeneration is not merely about

large-scale reconstruction but involves redevelopment activities aimed at renewing outdated buildings (Chan, E. H., & Yung, E. H., 2004; Yan Ruogu, Zhou Suhong, & Yan Xiaopei, 2011; Peng, Y., Lai, Y., Li, X., & Zhang, X., 2015). Over time, urban districts develop distinct spatial characteristics, leading to layers of historical contexts within district spaces (Yan, L., 2016; Wu Hongyan, 2018). Rather than being frozen in a specific historical period, urban district spaces should integrate contemporary culture while preserving historical contexts to maintain vitality and contribute to urban development (Wang Fang et al., 2017). Historic districts are complex spatial and social systems. Their renewal strategies must address not only physical elements such as architectural forms and spatial configurations but also non-physical elements, including urban functions, social structures, lifestyles, and cultural connotations (Kang Mengdi, Zang Xinyu, & Chen Tian, 2017; Mao Mengwei, Wen Ting, & Mo Junchao, 2017). Many case studies illustrate the activation of heritage as locally distinctive heritage tourism sites (Li Leilei, 2002; Radley, A., Hall, T., & Harrison, M., 2002; Hankinson, G., 2005), art districts, urban public leisure spaces, retro-style restaurants, and other new venues. These approaches enhance regional appeal, cater to contemporary consumer preferences, and provide sustainable economic vitality for urban renewal areas (Pine, B. J., & Gilmore, J. H., 1998).

This study aims to explore strategies for organizing and preserving the spatial context of the Barra & Manduco area within the framework of Macau's urban renewal. Adopting an urban spatial perspective, the research analyzes the spatial characteristics of the district through the lenses of spatial power, spatial order, and spatial context. It seeks to identify how to prevent the loss or stagnation of Macau's historical culture during urban renewal, with a focus on the continuation of spatial context reflected in historic districts. Based on the current state of the Barra & Manduco area, this study proposes strategies for preserving the spatial context of Macau's historic districts in future renewal efforts. By deeply protecting and uncovering Macau's historical and cultural resources, this research aims to provide a reference for future urban renewal and tourism development in Macau.

2. ANALYSIS OF THE CURRENT STATE OF THE BARRA & MANDUCO AREA

This study takes the Barra & Manduco area on the Macau Peninsula as its research base. Since the 16th century, the Portuguese used "parish" as an administrative division, naming each parish after its representative church. The Barra & Manduco area belongs to the Parish of St. Lawrence, centered around the Church of St. Lawrence and its surrounding neighborhoods. Part of the Lower Inner Harbor is included in Macau's designated historic urban districts and serves as a traditional hub of commerce and industry. This area showcases a blend of European churches, traditional Lingnan-style residences, remnants of the Tanka waterborne community, and modern urban architecture. It is also a place where religious cultures such as Catholicism, Taoism (e.g., Mazu worship), and Buddhism coexist harmoniously. Notable landmarks include the Church of St. Lawrence, the Zheng Family Mansion, Kung Tak Lam Temple, and Guangfu Wai's network of streets and alleys.

As an old urban district, the Barra & Manduco area is distinguished by its architectural diversity, historical significance, and unique cultural heritage.

The Barra & Manduco area appeared on a Macau map as early as 1792, showing relatively few and irregularly arranged buildings. By 1912, maps archived by the Macau Archives indicate more structured buildings and clearer roads, resembling the current layout, though reclamation land had not yet been developed.

In the 1935 comprehensive map of Macau and the New Port, the district began expanding towards Wanzai with new streets. This trend intensified in the 1965 map of Macau Peninsula by the Public Works Bureau, showing a larger-scale expansion towards Wanzai while the internal spatial structure of the district remained similar to that of 1935. Maps from 1975 show no significant changes compared to 1965, and the 1986 Macau Peninsula map by the Cartography and Cadastre Department

revealed further expansion toward the bay area with the construction of the Inner Harbor Terminal. However, the internal spatial layout of the district remained relatively stable from 1986 onward.

2.1. Spatial Power Analysis of the Barra & Manduco area

The Barra & Manduco area appeared on Macau maps as early as 1792, though the buildings in the area were few and irregularly arranged at that time. According to maps archived in the Macau Archives, by 1912, the Barra & Manduco area featured more structured buildings and clearer roads. The building forms were similar to the current state but incomplete, and no reclaimed land was yet present. In the 1935 comprehensive map of Macau and the New Port, streets extending toward Wanzai appeared in the Barra & Manduco area. In the 1965 map of Macau Peninsula produced by the Public Works Bureau, the scale of expansion toward Wanzai had increased, though the internal spatial layout of the Barra & Manduco area showed little change compared to 1935. The 1975 Macau map revealed no significant changes in the area's overall spatial structure compared to 1965. The 1986 Macau Peninsula map, created by the Cartography and Cadastre Department, showed continued expansion toward the bay, including the construction of the Inner Harbor Terminal. However, the internal building layout of the area remained largely unchanged, indicating minimal spatial transformation in the Barra & Manduco area up to 1986.

Due to historical and institutional reasons, the land in the Barra & Manduco area mainly consists of Macau SAR government-owned land and privately held land. However, Macau has long lacked a publicly accessible, comprehensive urban land-use plan as a core part of urban planning. This has resulted in complex land ownership issues, with a significant proportion of private land increasing the difficulty of advancing urban renewal. The central part of the Barra & Manduco area comprises the core old neighborhoods, which historically housed a significant Chinese population. Its proximity to the industrial wharf at the Inner Harbor made it a key transportation hub before the completion of land reclamation in the Inner Harbor.



Figure 1. Macau Map from 1792



Figure 2. Macau Map from 1912

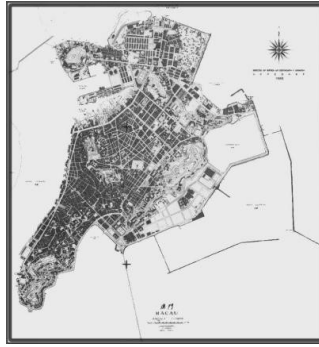


Figure 3. Macau Map from 1986

(Source: Cartography and Cadastre Bureau of Macau)

2.2. Spatial Order Analysis of the Barra & Manduco Area

The spatial order of urban spaces is reflected in their integrity and localization, shaped by elements such as urban texture, spatial form, transportation structure, and landscape structure. A well-structured spatial order helps define the spatial characteristics of individual blocks.

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From the perspective of urban texture (Figure 4), the overall texture of the Barra & Manduco area is relatively disorganized, with no distinct patterns. The building density is high, and the streets are compact and narrow. "Wai-li" (enclosed lanes) are the smallest road units in Macau, typically 4 to 8 meters wide and 10 to 15 meters long. These lanes are generally rectangular and often form "IUL" patterns, which are commonly found in the Barra & Manduco area. Moving westward from the central part of the district, the building texture gradually becomes more dispersed and relatively orderly. The process of urban renewal has significantly impacted the original street texture. A noticeable disruption occurs in the central area, where high-rise buildings like Kai Chuen Bay, exceeding 65 meters in height, have altered the overall architectural appearance of the district.

From the perspective of spatial form (Figures 5–7), the majority of buildings in the Barra & Manduco area range in height from 0 to 35 meters. Most residential buildings are 7-story structures. Influenced by modern architectural development and the local topography, taller buildings are concentrated in the eastern and northeastern parts of the district. In the past, due to land prices and policy constraints, many low-rise Macau-style tenement buildings (Tang Lou) could not meet the population growth and land demand of the Barra & Manduco area. As a result, many of these buildings were rapidly demolished and replaced with high-rise structures, disrupting the continuity of the spatial context.

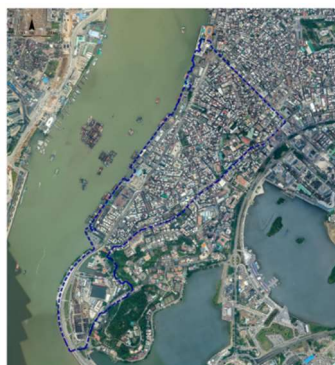


Figure 4. Overall Texture of the Barra & Manduco area (Redrawn by the Author)

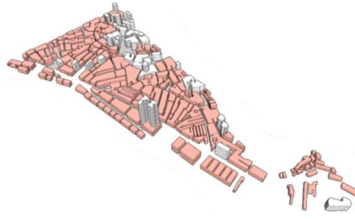


Figure 5. Distribution of Buildings with Heights of 0–35m

(Source: Drawn by the Author)

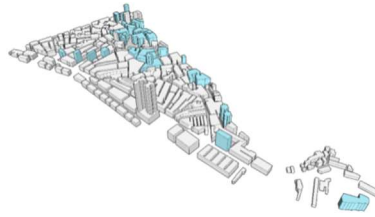


Figure 6. Distribution of Buildings with Heights of 35–65m

(Source: Drawn by the Author)

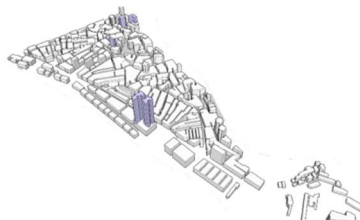


Figure 7. Distribution of Buildings with Heights Exceeding 65m

(Source: Drawn by the Author)

From the perspective of transportation structure, the road network in the study area is relatively comprehensive, with roads effectively covering the internal area. The Barra & Manduco area features distinct road hierarchies and a complex road configuration without a clear systematic structure. The main roads are the north-south-oriented Rua Nova à Beira-Rio and the east-west-oriented Avenida de Almeida Ribeiro, both of which are relatively straight. The secondary roads, however, lack regular distribution, with complex and irregular alignments. Overall, the road network aligns closely with the layout of the buildings. The Barra & Manduco area has 21 bus stops, ensuring nearly full coverage. Most bus stops are concentrated along Rua Nova à Beira-Rio. Additionally, the planned Mãe De Deus light rail station in the Barra & Manduco area is included in Macau's light rail development plan.

From the perspective of landscape structure, the Barra & Manduco area has limited greenery, with insufficient landscape features. Most green spaces consist of protected heritage trees, municipal parks, and roadside greenery. There are no prominent landscape corridors or nodes. While the roadside greenery along Rua Nova à Beira-Rio is relatively complete, other streets lack green features. Publicly accessible green spaces are minimal, and the waterfront is underutilized. The green spaces are scattered, and the area lacks an integrated green system.

2.3. Spatial Context Analysis of the Barra & Manduco area

Spatial context embodies a city's cultural context within its spaces, carrying the cultural memory of urban environments such as buildings and streets. The more intact the urban space, the clearer its

historical context, and the greater the possibility of preserving the physical environment (Miao Yang, 2005).

From the perspective of the overall cultural structure of the historic districts on the Macau Peninsula, the Barra & Manduco area is located in the southwestern part of the Macau Peninsula and is surrounded by Macau's Historic Urban District. Parts of the Barra & Manduco area are also within the boundaries of Macau's Historic Urban District. The Historic Urban District extends along the periphery of the Lower Inner Harbor from south to north, with much of the eastern area of the Lower Inner Harbor acting as a buffer zone. The Barra & Manduco area serves as a transitional zone for the Historic Urban District, forming an advantageous spatial relationship with it.

From the perspective of the historical and cultural structure of the Barra & Manduco area (Figure 8), historical landmarks within the district include the Zheng Family Mansion, A-Ma Temple, Lilau Square, St. Joseph's Seminary and Church, St. Lawrence's Church, Sir Robert Ho Tung Library, Dom Pedro V Theatre, and St. Augustine's Church. The main plazas and streets of the Barra & Manduco area are primarily located near these historical landmarks. Overall, the historical and cultural elements of the district are concentrated on its eastern side, creating a gradual cultural transition from east to west.

From the perspective of architectural historical and cultural features, the Barra & Manduco area contains numerous historical buildings. The architectural styles primarily include Portuguese and Lingnan characteristics. Churches and seminaries, for example, reflect Western styles, while the enclosed "Wai" streets and alleys are unique to Macau. The Macau-style tenement buildings (Tang Lou) in the Barra & Manduco area, which date from the mid-19th century to the 1960s, blend Chinese and Western architectural styles and exhibit strong Lingnan characteristics. The coexistence of diverse architectural styles, arranged in a mixed and interwoven manner, creates a visually heterogeneous landscape. Additionally, newer buildings interspersed among older ones disrupt the continuity of the area's historical spatial context.

From the perspective of social life in the Barra & Manduco area, its historical buildings are not prominent to visitors, making them difficult to identify. The streets lack resting points that encourage visitors to linger. Compared to other historic sites in Macau, the Barra & Manduco area is less attractive to tourists and serves more as a transit zone. The historical value of the streetscape is challenging to perceive. As the Lower Inner Harbor is not a key focus in Macau's tourism promotions, it primarily serves local residents. However, the distribution of public service facilities is uneven, and there is a lack of public spaces such as green areas and plazas. Despite these shortcomings, the area has a strong sense of everyday life, rich in local flavor. Residents continue to practice some traditional customs, giving the district a unique neighborhood character.



Figure 8. Distribution of Historical Landmarks in the Barra & Manduco area

(Source: Drawn by the Author)

3. ISSUES IN THE LOWER INNER HARBOR DISTRICT

The Barra & Manduco area retains many important historical buildings, and certain streets maintain a degree of historical context. However, the tightly packed streets in the district have gradually changed during the process of urban renewal and development. From east to west, the streets widen, and the small-scale urban texture transitions to larger-scale architectural forms along Rua Nova à Beira-Rio in the western part of the district. The originally enclosed spatial forms in the eastern area have given way to slab-style architectural forms in the west, leading to the fragmentation of the spatial context.

Some more recently constructed buildings are interspersed within the buffer zone of Macau's Historic Urban District, resulting in a mixed and inconsistent historical appearance in the Barra & Manduco area. Overall, the street texture is relatively chaotic, with a mix of old and new buildings. The historical buildings are not prominently highlighted, which weakens the continuity of the spatial context. As a result, the historic district within the Barra & Manduco area has not been able to effectively realize its potential value.

4. STRATEGIES FOR CONTINUING THE SPATIAL CONTEXT OF HISTORIC DISTRICTS IN THE BARRA & MANDUCO AREA

Based on the current state of the district, this paper proposes strategies for continuing the spatial context in future urban renewal efforts.

4.1. Continuation of Street and Alley Textures

The traditional "Wai" and "Li" street textures preserve integral heritage elements such as gateways, wells, and Earth God shrines. These streets possess clear spatial boundaries and represent a typical structure of Chinese residential communities, combining both transportation and living functions. In addition to preserving these heritage elements, more attention should be given to maintaining the texture of the streets and alleys. It is essential to retain the enclosed spatial forms with a single street entrance, avoiding widening, narrowing, or connecting streets in ways that disrupt their original scale and sense of space. A buffer zone can be established around the "Wai" and "Li" streets, which would alleviate the conflict between preservation and the need for additional building space. This buffer zone can also enhance community interaction functions. Urban design can employ a collage approach to reconcile the relationship between the old and the new.

4.2. Control of Surrounding Features

To maintain the contextual relationship between historical monuments and their surrounding environments, and to prevent interference or disruption from adjacent buildings, control measures should be implemented for the surrounding landscape. These controls also aim to ensure the structural safety, management, and maintenance of the monuments while enhancing the surrounding landscape quality and cultural experience. According to the Macau Historic Urban District Protection and Management Plan, zoning regulations should define the scope of surrounding features, and measures should control building height, volume, color, and facade design. Large-scale updates to building volume should be avoided, and the color and facade of buildings should align with the district's historical culture. During renewal projects, the colors and patterns of heritage buildings within the protected area should be preserved, while discordant surrounding buildings should undergo facade updates to harmonize with the historic district.

4.3. Integration of History and Tourism

Based on the historical monuments and landscapes in the Barra & Manduco area, renewal designs should integrate these cultural elements with tourist routes to form a historically cohesive system. This approach would create a loop of historical routes, clusters of heritage sites, and a harmonious living and cultural environment with comprehensive public service coverage. Historical and cultural landmarks in the Barra & Manduco area can be connected to official tourism routes, and these routes can extend to external attractions, offering tourists a narrative-rich travel experience. Natural and cultural landmarks, such as the waterfront and historical sites, can be leveraged to develop slow-traffic systems and recreational routes. This integration would create pedestrian-friendly streets and promote a landscape-based leisure experience.

4.4. Preservation of Local Culture

The Barra & Manduco area retains distinctive traditional commercial streets, such as those selling second-hand appliances, old books, vinyl records, and other vintage goods. Due to the absence of large-scale redevelopment, traditional foods have also been preserved, with street stalls and dai pai dong (open-air food stalls) becoming iconic locations for authentic local cuisine. Popular dishes include rice rolls, fish cakes, crab congee, and bamboo noodle soup. The area is characterized by old Macau-style tenement buildings (Tang Lou), large signage, and the nostalgic atmosphere of mid-20th-century Macau, vividly reflecting local culture. The high-density buildings and diverse street-side food and retail businesses contribute to the district's vibrant street life. Renewal designs should aim to protect and sustain this unique urban atmosphere by effectively utilizing space. A focus on exploring and promoting local culture should be central, with an emphasis on showcasing local cuisine and vintage goods. Given the decreasing number of Macau-style tenement buildings due to large-scale demolitions, their protection and renewal are urgent. Restoration of Tang Lou should follow their original materials, colors, and structures, while their interiors are updated with modern facilities to achieve a "historically preserved exterior with modern interiors," revitalizing them for contemporary living.

5. CONCLUSION

Macau has implemented relatively advanced policies and measures for the protection of its Historic Urban District. As early as the nomination process for its UNESCO World Heritage status, Macau designated buffer zones for the Historic Urban District and imposed controls on building heights. However, insufficient attention has been paid to areas outside the Historic Urban District. This oversight has resulted in a lack of focus on the unique street textures, cultural elements, and historical features of other districts, which has affected the spatial texture and order of the Barra & Manduco area.

Therefore, Macau's urban renewal efforts should place greater emphasis on the spatial context of districts outside the Historic Urban District, including their street textures, spatial forms, and social systems, with a focus on the protection and continuation of spatial context. By doing so, older neighborhoods can be revitalized while minimizing disruptions to the spatial texture and architectural features of the Historic Urban District.

This approach ensures the spatial continuity of Macau's historical and cultural context, highlights the distinctive characteristics of each district, and enhances the city's cultural identity. Ultimately, this will allow Macau's historical and cultural heritage to maintain its vitality and evolve with the times, achieving harmony between heritage preservation and contemporary urban development.

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