

Spatial Constraints and Urban Dwellings

Minimum Space Living in early 1960s' Macau, Hong Kong, and Singapore

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Abstract

The present paper focuses on socio-economic and architectural aspects of minimum space living format in Macau, Hong Kong, and Singapore's urban landscapes, during the early 1960s, looking to the ground of research of emerging forms of inhabiting spaces in contemporary urban territories. The main analysis encompasses the historical contexts, considering influence of colonial legacies and public policies on housing practices, presenting a set of case studies, aiming to unravel similarities and differences within their spatial constraints. The achievement of such goals is to be developed through a comparative analysis, in order to derive, on one hand, an amplitude equation of adopted theoretical matrix; and, on the other hand, to identify variations between housing typologies, collective spaces, spatial distributions, and technical systems. This proposal examines architectural behaviours shedding light on the evolution of high-density living conditions and public awareness regarding housing standards. Drawing on archival documents, photographic survey, and architectural records, this reflection investigates insights from first statements of architectural modernity in the field of modern housing in tropical climate conditions. Moreover, it provides a nuanced understanding of the complex interplay of architectural innovations in shaping Macau, Hong Kong, and Singapore's built environments during a pivotal period of their developmental history.

Keywords

Housing, Minimum Space Living, Modern Architecture, Heritage Urban Landscape.

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INTRODUCTION

Housing scenarios in Macau, Hong Kong, and Singapore during the mid-20th century were characterized by a confluence of colonial legacies, rapid urbanization, and social challenges. This era marked a pivotal period in the urban development of these regions. Burgeoning populations, economic transformations, and political transitions profoundly shaped housing demands and constraints.

As former colonies under European rule in Asian territory, Macau, Hong Kong, and Singapore inherited complex socio-economic structures and urban configurations, which influenced their approaches to housing provision and management. Moreover, the tropical climates, prevalent in these regions, posed unique challenges to architectural design, urban planning, and housing infrastructure.

Colonial legacies of Portuguese Macau, British Hong Kong, and British Singapore left enduring imprints on their housing systems. The administrations, during the early 20th century, prioritized economic activities such as trade and manufacturing, often at the expense of comprehensive urban planning and housing provision for local populations. In Macau, the Portuguese government maintained, for the first half of the century, a *laissez-faire* approach to urban development, leading to populated urban areas with not much adequate housing infrastructure. Similarly, British colonial policies in Hong Kong and Singapore favoured the interests of expatriates and commercial elites, resulting in stark socio-economic disparities and housing shortages among indigenous and immigrant communities.

The housing crisis during the mid-20th century was exacerbated by rapid population growth, rural-to-urban migration, and limited land availability; while the three concessions were hit by uncontrolled cross-border immigrants flew. Due to persistent socio-economic upheavals of southeast Asian countries and attraction from industrialization and economic opportunities, people from the neighbouring regions intermittently sought refuge by crossing borders into the colonies. Urban centers faced unprecedented pressure to accommodate housing needs

and the short available land of the islands, beyond the consolidated historical urban framework, was mostly occupied by improvised shelters and unorganized areas.

In Hong Kong and Macau, the influx of refugees from mainland China further strained an already overburdened housing market, exacerbating overcrowding and informal settlements in squatter areas. Similarly, Singapore experienced a surge in population due to post-war reconstruction efforts, leading to acute housing shortages and slum proliferation in urban peripheries.

Since the early 20th century, Eurocentric modern conception embarked upon ambitious initiatives oriented towards the metamorphosis of burgeoning industrial cities into refined, verdant urban hubs. Innovations in sanitation, public health infrastructure, and the establishment of social housing proved effective and valid potential in revitalizing unsanitary areas, thereby effecting a profound transformation of erstwhile inhospitable locations into emblematic bastions of modernity and civic advancement. Following the conclusion of World War II, the realm of

social housing experienced a notable surge, solidifying its presence on a global scale, albeit with variegated rates of expansion and implementation across diverse geographical contexts.

In summary, the housing situation in Macau, Hong Kong, and Singapore during the early 1960s, shaped by a complex interplay of colonial legacies and housing shortages, posed formidable challenges to experiment housing policies, dwellings design, and construction, underscoring the importance of sustainable and context-sensitive approaches to urban development. Understanding the historical dynamics of housing provision and environmental adaptation offers valuable insights for addressing contemporary housing challenges and fostering inclusive urban development in tropical regions.

Furthermore, the tropical climates of Macau, Hong Kong, and Singapore presented unique challenges to housing design and environmental sustainability. High temperatures, humidity, and occasional typhoons necessitated innovative architectural solutions and building materials to ensure comfort and structural resilience. Traditional vernacular architecture, characterized by open spatial layouts, elevated structures, and natural ventilation systems, provided valuable insights for modern housing developments in these regions.

The present paper aims to contribute to the study of built environments, minimum format living space and its design, considering three major projects where architects exemplify the capacity to interpret, comprehend, and enrich the modern paradigm, thereby engaging with a spectrum of physical and social contexts:

- Resettlement Housing Complex in Ilha Verde Area, by Arch. Manuel Vicente e Natalia Gomes – 1962
- Ming Wah Dai Ha Estate, by HKHS, Hong Kong Housing Society – 1962
- Queenstown New Town 45-48-49 Housing Blocks, by HDB, Housing Development Board-1960

Through their endeavours, they navigate multifaceted challenges, employing innovative methodologies to generate solutions that endure compelling and relevant contributions to the contemporary discourse.

THE CASE OF MACAU. RESETTLEMENT HOUSING OF ILHA VERDE. 1962

Architects Manuel Vicente and Natalia Gomes's Resettlement Housing Complex in Ilha Verde Area serves as a significant case study in the examination of minimum space living units during the 1960s in Macau. This project represents a remarkable response to the acute housing challenges faced by low-income population during the 1960s. The adopted architectural vision aimed not only to provide shelters but to redefine communal living in a constrained urban environment. The complex's design intricacies, including multi-functional spaces and efficient layout planning, reflect a forceful awareness of spatial optimization's needs. The project, characterized by its simple and effective design, aimed to maximize limited space while addressing socio-economic challenges faced by the local population.



Fig. 1. Resettlement Housing of Ilha Verde Area. Front Façade. © Niccolò A. Galliano, 2023.



Fig. 2. Resettlement Housing of Ilha Verde Area. Back Façade. © Niccolò A. Galliano, 2023.

Architects' approach combined functionality with a consideration for community well-being. The building aims to maximize the utilization of available space, encompassing a total of 90 apartments distributed across five stories. The project allocates 18 residential units per floor, characterized by rational distribution of space in both plan and section.

Vertical circulation is provided by a central core of walk-up stairs located at the centre of the rectangular perimeter, effectively dividing the structure into two wings. Horizontal circulation is managed by an exterior common gallery running along the back façade, allowing each unit to benefit from natural cross-ventilation. The design minimizes circulation space to maximize areas designated for living.

Each unit, approximately 25 m² in size, features integrated facilities within a single-compartment format. To delineate living and sleeping areas within the main space, the room is divided into two zones using a two-step stair and fixed furniture, rather than walls. The south-facing side of each apartment includes a balcony, extending the living space outdoors. This exterior area, created by a volume subtraction, provides diagonal sun protection, addressing hot and humid subtropical climates. For economic reasons, water facilities are designed to occupy minimal space, with shared plumbing and drainage systems between neighbouring units. The modestly equipped bathroom opens onto the balcony for hygienic purposes, including a concrete fixed washbasin integrated into the handrail. The kitchen, delineated by fixed wooden partitions, coordinates seamlessly interior and exterior household dynamics. Units' walls and ceilings are simply painted, while balconies' surfaces are covered in marleite for conservation and weather protection, reducing maintenance requirements.

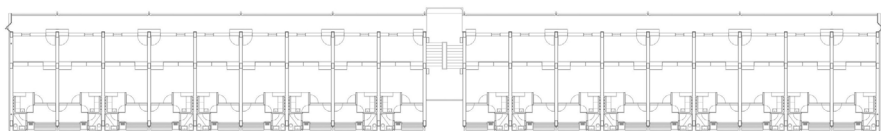


Fig. 3. Resettlement Housing of Ilha Verde Area. Floor Plan. Own elaboration based on CD-FAUP.

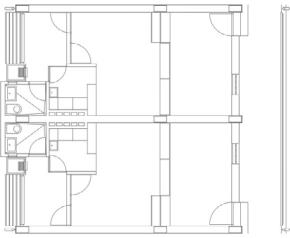


Fig. 4. Resettlement Housing of Ilha Verde Area. Unit's Floor Plan. Own elaboration based on CD-FAUP.

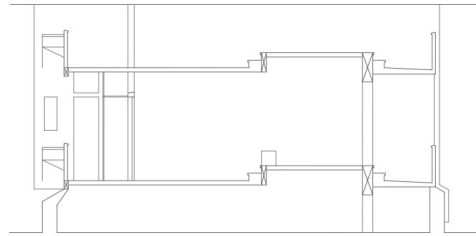


Fig. 5. Resettlement Housing of Ilha Verde Area. Unit's Section. Own elaboration based on CD-FAUP.



Fig. 6. Resettlement Housing of Ilha Verde Area. Front Façade. Own elaboration based on CD-FAUP.

The building's structural system consists of a reinforced concrete frame with concrete block infill panels forming double-wall partitions. The roof's ceiling slab is covered with fiber cement sloping panels. The inclined roof combines economical and efficient materials to withstand heavy subtropical rains and typhoons. Façade's design emphasizes the relationship between interior and exterior spaces, adopting light filters and maximizing functionality. The visual appeal is marked by the grid-like pattern of the white-painted structure, which highlights the modular units and contributes to a sense of simplicity and functionality. The setback of the open balconies and the central staircase core further enrich the building's rhythm of voids and volumes scheme.

From an architectural standpoint, the innovative use of elevated platforms to give proportions to the interior of the unit module counterbalances the inherent constraints of minimum space living available, mitigating the adverse effects of overcrowding. Additionally, the lived experiences of residents within this resettlement complex, shed light on how the designed spaces influenced their daily lives.

Despite its innovative character, featuring raw concrete, steel, and glass, the Affordable Housing Block of Ilha Verde currently presents severe disrepair and poor conservation status, exacerbated by numerous significant modifications. Economic considerations have often taken precedence over heritage values, placing this important architectural example in Macau's urban landscape at risk of fading over time.



Fig. 7. Resettlement Housing of Ilha Verde Area. Front Façade. © Niccolò A. Galliano, 2023.



Fig. 8. Resettlement Housing of Ilha Verde Area. Back Façade. © Niccolò A. Galliano, 2023.



Fig. 9. Ming Wah Dai Ha Estate. Façade. © Niccolò A. Galliano, 2023.



Fig. 10. Ming Wah Dai Ha Estate. Complex. © Niccolò A. Galliano, 2023.

THE CASE OF HONG KONG. MING WAH DAI HA ESTATE. 1962.

In Hong Kong, Ming Wah Dai Ha Estate stands as testament to the concerted efforts of the Hong Kong Housing Society to address the housing crisis in the 1960s. This Estate holds the distinction of being the oldest public housing project built by the Hong Kong Housing Society, designed by Szeto Wai, a leading architect in the region during that period. This case study displays the estate's design, emphasizing the collaborative approach between architects, policymakers, and the community.

The project initially encompassed thirteen blocks on a 37,811m² plot's site. This development was designed to accommodate 3,169 units, providing housing for approximately 15,000 residents. The original blocks of the project consisted of seven- to ten-storey buildings extending from the steep terrain to the south. The design of these blocks, mainly, aimed to promote public interaction and ensure hygienic living conditions.

The main floor plan hosts 22 residential units, and it is characterized by a rational space distribution. Vertical circulation is provided by sides and central cores of walk-up stairs. Horizontal circulation is made by a central corridor between rows of apartments. As a common gallery, it encouraged social interaction and it is characterized by floor subtractions in front of each interior's windows, providing privacy, natural light, cross-ventilation between up-down stories, and making it looks like suspended.

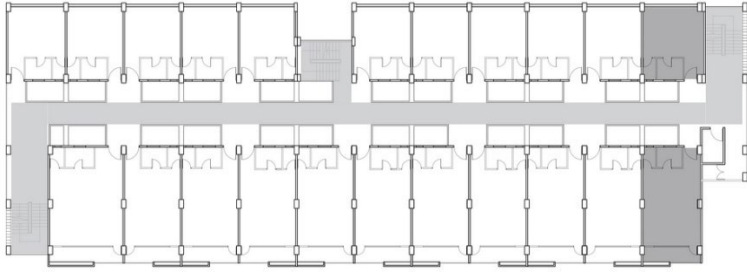


Fig. 11. Ming Wah Dai Ha Estate. Floorplan. Own elaboration based on HKHS.

The housing unit is characterized by a minimal design intention, providing single-room compartment format solutions integrating basic services and facilities. Kitchen and bathroom, equipped with modest installations, are located facing the internal corridor because of hygienic purposes, and are self-contained by thin dry walls. South-facing apartments are furnished with external balconies, obtained by a volume subtraction, while north-facing ones of wide window screens.

The urban character of the building grows on elevation following the mountain morphology, splitting access within vertical and horizontal distribution. The blocks are arranged in a north-south orientation along Kung Ngam Road and Shau Kei Wan, and approximately twelve-meter-wide strips of communal space were strategically positioned between the buildings to provide unobstructed views and facilitate through ventilation.

The façade of Ming Wah Dai Ha Estate proposes a simple but effective design strategy. The use of concrete, brick, and glass creates a durable and low-maintenance façade that is also visually appealing. The white-painted concrete frame is used for the main structure of the buildings, stating rational grid intentions on the façade scheme. External brick walls are painted in a variety of colours, such as white, yellow, blue, and green. This helps to break up the monotony of the façade, creating a sense of visual interest.

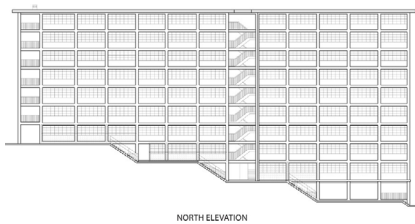


Fig. 12. Ming Wah Dai Ha Estate. Back Façade. Own elaboration based on HKHS. Fig

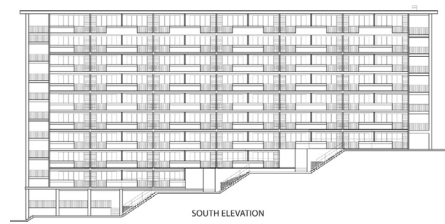


Fig. 13. Ming Wah Dai Ha Estate. Front Façade. Own elaboration based on HKHS.



Fig. 14. Ming Wah Dai Ha Estate. Playground. © Niccolò A. Galliano, 2023.



Fig. 15. Ming Wah Dai Ha Estate. Complex. © Niccolò A. Galliano, 2023.



Fig. 16. Ming Wah Dai Ha Estate. Vertical Access. © Niccolò A. Galliano, 2023.

Furthermore, the socio-economic impact of this housing project is a success in fostering sense of community and providing a dignified living environment for its inhabitants. The ground floor of every building is furnished of communitarian spaces and facilities such as kindergarten, youth centre or outpatient clinic. Social interactions are also encouraged by the provision of covered playgrounds and congregational urban green areas in the surroundings.

By combining historical context, valid landscape reading, healthy minimal unit module, and design philosophy, Ming Wah Dai Ha Estate's legacy contributes to a comprehensive understanding of the dynamics between urban planning and social welfare interventions during a critical period of Hong Kong's housing development.

During the beginning of the 21st century, the Hong Kong Housing Society undertook rehabilitation process of part of the Estate; while some blocks were demolished to give way to new housing projects with higher plot ratios, reflecting vertical living shifts towards higher-density development.

THE CASE OF SINGAPORE. QUEENSTOWN 45-48-49 HOUSING BLOCKS. 1960.

In Singapore, Queenstown New Town 45-48-49 Housing Blocks represent a pivotal project developed during the early phases of high-density public housing initiatives in the 1960s. The ambitious project, first completed complex by the newborn Housing and Development Board (HDB), aimed to accommodate the rapidly growing population and improve living standards.

Alongside the buildings on focus, the terrace houses onward Stirling Road, built by the previous public board, Singapore Improvement Trust (SIT), during the late 1950s, contrast with the nearby Blocks 45, 48, and 49. While SIT maintained a low population density plan with the terrace units, the HDB adopted a strategy of constructing higher blocks to optimize land use.



Fig. 17. Queenstown New Town 45-48-49 Housing Blocks. © Niccolò A. Galliano, 2023. Figure 18 -



Fig. 18. Queenstown New Town 45-48-49 Housing Blocks. © Niccolò A. Galliano, 2023.

The present case study displays the beginning of new urban planning behaviours and innovative approaches to Singapore's mass housing, reflecting both socio-economic needs of the population and architectural trends of the time, emphasizing HDB's commitment to create sustainable and healthy communities.

The 45-48-49 housing blocks in Queenstown were designed with a comprehensive range of facilities aimed to enhance quality of life's residents. The buildings were characterized by utilitarian and functional design, reflecting western modernist principles. The project employed an orthogonal grid layout, with rational plans and sections that facilitated efficient construction and maintenance.

Pretending to maximize the assessment of available space, with a total of 112 apartments distributed in 7 storeys per block, architects divided the main floor plan into 16 residential units. Vertical distribution is provided by two core of walk-up stairs and a slow lift located in the middle of the rectangular perimeter, dividing the volume into two main wings. Horizontal distribution is made by an exterior common gallery that walks along the building side on the street-facing façade, allowing each unit to benefit from private access and natural cross-ventilation.

Typology's conception of 45-48-49 housing blocks focused on maximizing the efficient use of limited space. Each unit was compact yet designed to accommodate essential family needs and arranged to enhance natural ventilation and lighting. Early designs featured shared facilities, such as communal kitchens and bathrooms, which were later modified to include private amenities as living standards and expectations evolved. The internal layout typically included multi-functional spaces, allowing residents to adapt rooms for various uses, reflecting the practical and flexible approach to housing design.



Fig. 19. Queenstown New Town 45-48-49 Housing Blocks. Floor Plan. Own elaboration based on HDB.

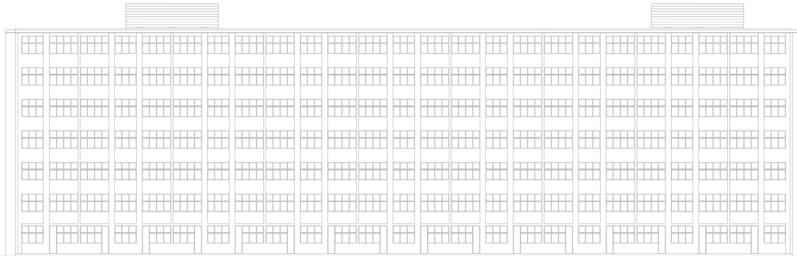


Fig. 20. Queenstown New Town 45-48-49 Housing Blocks. Back Façade. Own elaboration based on HDB.

The unit's scheme kept a flexible manner integrating three different combinations of living spaces, defined by the number of occupants, with simple and effective solutions. The main module unit, giving proportions to all complex metric arrangements, disposes of a single-compartment space solution. The main room is furnished of private sanitary facilities and a kitchen facing the back-side façade's large window. One-bedroom apartments follow an L-shaped format, occupying one and a half modules and crossing half of the side unit while living facilities remain unchanged. Located at both extremities of the building, the two-bedroom format solution, intended for larger families, occupies two modules following the same living facilities' scheme and dividing into two dormitories last peripheric available unit.

The building is supported by a structural frame of reinforced concrete and infill panels of brick walls. In the façade, the architects express a strong relation between the interior and exterior, showing light filters and maximum functionality. The visual portrait is marked by the adoption of the interior matrix and enriched by the two functional side windows.

Façades were typically plain and unadorned, emphasizing in grayscale tones the structural scheme. The use of repetitive unit modules not only streamlined the construction process but also provided a uniform appearance across the development. The use of raw concrete, steel, and glass gave 45-48-49 housing blocks in Queenstown an inevitable innovative character. The white-painted structure creates a grid-like pattern that emphasizes the modular fenestration of the building, while also providing a sense of simplicity and functionality. The overall result is an orthogonal plain minimal design that is both striking and functional.

By examining the socio-economic impact and community dynamics within Queenstown, the project seeks to assess the long-term implications of the HDB's intervention in shaping the urban landscape. 45-48-49 Housing Blocks, as first steps of Queenstown's new town, represent the new wave of Singapore's public policy ensuring the success of large-scale housing project, shedding light on the unique approach to address housing challenges during the 1960s.

CONCLUSIONS

The combined analysis of these three case studies aims to provide a nuanced understanding of the historical context, architectural innovations, and socio-economic implications of minimum space living units in Macau, Hong Kong, and Singapore during the 1960s.



Fig. 21. Queenstown New Town 45-48-49 Housing Blocks. Complex. © Niccolò A. Galliano, 2023.



Fig. 22. Queenstown New Town 45-48-49 Housing Blocks. Façade. © Niccolò A. Galliano, 2023.

Amidst the rapid urbanization, population growth, and economic transformation characterizing the housing scenario under analysis, this study's findings seek to enrich the broader discourse on complexities and opportunities involved in balancing transformation and preservation of relevant early modern housing initiatives and viable minimum space solutions.

By providing insights spanning from inaugural origins to contemporary housing challenges in the extremely densely populated former concessions, this article examines potential interpretations of domestic and urban comfort. It explores foundations and substantial evolutions of minimum space living formats, reshaping how individuals experience, inhabit, and intend comfortable spaces.

From an architectural standpoint, the three case studies reveal several notable similarities that underscore their shared design principles. Firstly, all façades adhere to corresponding metrics, predisposed by internal units' modules, that are both orthogonal and rational, ensuring coherent and structured visual rhythm in both plan and section. The orthogonal framework not only enhances aesthetic uniformity but also facilitates the efficient spatial organization and basic climate behaviours.

Moreover, each case study employs a similar unit module that is consistently repeated throughout the structures, establishing a standardization that simplifies construction and maintenance. Despite this commonality, the unit's interior distribution strategies differ significantly, reflecting varying approaches to optimize minimum spaces pursuing accurate proportions, functionality, and comfort.

The present historical comparison highlights a significant evolution in amenity provision: whereas the previous housing designs incorporated shared facilities to serve multiple units, 1960s modifications have transitioned towards privatized amenities. This shift from communal to private facilities indicates a broader change in residential design, emphasizing individual convenience and privacy. The juxtaposition of these elements within the case studies provides a rich context for understanding the dynamic interplay between architectural uniformity and adaptation to changing socio-cultural needs.

This comprehensive exploration intends to contribute with valuable insights to the broader discourse on urban development, housing policy, and the enduring impact of qualitative mid-20th-century interventions on contemporary urban landscapes.

The present reflection aims to demonstrate how the modern conception could be interpreted, understood, and enriched in terms of content, facing diverse physical and social conditions, experimenting innovative solutions which remain currently interesting and valid.

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