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ADAPTIVE REUSE GUIDELINES ON WARENHUIS MEDAN AND URBAN HERITAGE ENVIRONMENT

PEDOMAN *ADAPTIVE REUSE* PADA WARENHUIS MEDAN DAN LINGKUNGAN WARISAN BUDAYA KOTA

Denny Winata[1], Rumiati Rosaline Tobing[2], Rahadhian Prajudi Herwindo[3]
[(1)(2)(3)]Department of Architecture, Faculty of Engineering, Universitas Katolik Parahyangan, Bandung, Indonesia
[1]ddennywinata@gmail.com, [2]rumi@unpar.ac.id, [3]dodo@unpar.ac.id

Abstract : Heritage buildings indicate the rich history of Indonesian civilization by its relation to history, culture, politics, and economics. Warenhuis as a class A heritage building within Medan's historic district, play an important role in trading commodity. It possesses immense historical and cultural significance despite being poorly maintained and neglected. The building suffered serious damage due to a fire outbreak and has not been revitalized. Furthermore, the adaptive reuse approach provides development guidelines that preserve and optimize the historic building's tangible and intangible qualities. Urban regeneration guidelines for the surrounding heritage environment also need to be maintained to maintain the spatial quality of Warenhuis Medan. Adaptive reuse is implemented in the revitalization of historical architecture and the regeneration of Medan's Warenhuis environment. This qualitative study uses case studies research method to produce revitalization guidelines on Medan's Warenhuis and development guidelines on its historical urban spaces. Theoretical foundations, such as building adaptation theory, heritage regulations, and trading city concept are used to dissect case studies. Battersea Arts Centre and Beloit College Powerhouse. Objectives of this research are to formulate and to implement adaptive reuse concept in the revitalization of Warenhuis architecture and the development of its historic environment. Theoretical reference in this study includes building adaptation theory and heritage law that are used to analyse case studies Battersea Arts Centre and Beloit College Powerhouse. The objectives are to formulate and to adapt adaptive reuse in revitalizing Warenhuis and its surrounding environment. The objectives were achieved by identifying Warenhuis' urban context and heritage characteristics based on four factors in adaptation building: legal & economy, culture & social, and built environment. Research findings generates 7 points of heritage revitalization guidelines on Warenhuis and 12 points of guidelines in its urban regeneration.
Keywords : *adaptive reuse, building adaptation, heritage, Medan's Warenhuis.*

Abstrak : Bangunan cagar budaya merupakan salah satu bukti kekayaan sejarah Indonesia yang menginformasikan pengetahuan dengan asosiasinya terhadap sejarah, budaya, politik, dan ekonomi tempat bangunan berada. Warenhuis merupakan bangunan cagar budaya golongan A Kota Medan dengan gaya kolonial transisi Belanda. Bangunan ini menjadi bukti kemajuan perdagangan dan komoditas masyarakat, namun keadaan bangunan dan lingkungan sekitarnya terlantar. Kondisi bangunan pasca kebakaran yang tidak dibenahi juga semakin memicu kekumuhan arsitektur dan lingkungan sekitar. Belum terdapatnya pedoman khusus yang mengatur revitalisasi bangunan Warenhuis Medan dapat mengakibatkan semakin hilangnya karakteristik fisik dan nonfisik bangunan. Pedoman terhadap peremajaan lingkungan sekitar juga diperlukan guna menjaga kualitas ruang historis Warenhuis Medan yang relevan dengan kebutuhan zaman. Pendekatan *adaptive reuse* digunakan dalam upaya revitalisasi arsitektur cagar budaya Warenhuis Medan dan lingkungan sekitarnya. Penelitian bersifat kualitatif dengan metode pendekatan studi kasus, guna menghasilkan pedoman revitalisasi Warenhuis Medan dan pengembangan lingkungan yang kontekstual terhadap ruang historis. Landasan teoretis penelitian mencakup teori adaptasi bangunan dan pranata cagar budaya yang digunakan sebagai alat bedah kasus studi Battersea Arts Centre dan Beloit College Powerhouse. Tujuan penelitian ini adalah merumuskan dan menerapkan konsep *adaptive reuse* dalam revitalisasi arsitektur Warenhuis dan pengembangan lingkungannya. Kajian diperoleh melalui identifikasi kualitas kontekstual kawasan dan karakter arsitektur *heritage* berdasarkan empat faktor adaptasi bangunan – aspek legalitas & ekonomi,

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budaya & sosial, arsitektur, dan lingkungan binaan. Temuan penelitian menghasilkan 7 butir pedoman perancangan berbasis *adaptive reuse* pada arsitektur Warenhuis Medan dan 12 butir pedoman peremajaan lingkungan bersejarah Warenhuis.
Kata kunci : *adaptive reuse, adaptasi bangunan, cagar budaya, Warenhuis Medan.*

1. INTRODUCTION

The development of cities in Indonesia cannot be separated from a series of historical events. The colonialism period, national independence, and other significant moments contributed to the cities' spatial morphology and architecture. Furthermore, history is a valuable tool for understanding the evolution of civilization and lifestyles in the context of architecture. It is understood that heritage architecture plays an important role in the history and culture of a city or nation. Therefore, its preservation is crucial for extending life expectancy (Mehr, 2019), protecting its tangible - intangible quality (Plevoets & Van Cleempoel, 2019), and being non-renewable asset to the civilization (Pintossi et al., 2021). The utilization of heritage buildings in modern urban activities needs to be further investigated, hence, their revitalization to suit the needs of modern civilization may be one strategy to promote awareness of heritage architecture.

Adaptive reuse is a revitalization concept in reactivating historical buildings with new programmatic development that benefits the current urban needs and economy (Brooker & Stone, 2018). It applied building adaptation principles to promote resource efficiency, low construction cost, and shortened construction phases (Aigwi et al., 2018). Furthermore, it uses the adaptation principles to effectively integrate resources, lower construction costs, and shorten restoration phases (Bullen, 2007).

Warenhuis has been a vital part in Medan's economic scene since Dutch colonial era. Its existence within Kesawan Old Town has been intriguing in understanding its historical characteristics and sensible ways to preserve its existence along with urban growth. As one of the key historical building in Medan, its condition is apprehensive. The historical building has been neglected and worsen after a fire breakout in 2013. The effort to reuse heritage building strengthen their existence as a part of urban public space (Birer & Çalışır Adem, 2022). This relationship between historical space and modern needs may construct distinct qualities in an urban setting. Effort in restoring its historical value is also in conjunction with raising awareness to the urban public (Assi et al., 2020). This means education on perception around the historical complex and the importance of living alongside heritage building/environment. Previous studies suggest importance of historical background and environment in revitalizing Warenhuis (Hasibuan & Fitri, 2021) while others attempt to propose interpretations on revitalizing Warenhuis (Firdaus, 2017; H Rajagukguk et al., 2021). This study aims to formulate design guidelines in revitalizing Warenhuis based on reference to its historical properties and context. The benefits are to identify Warenhuis' tangible and intangible building qualities and to enrich the reactivating methods of heritage buildings as a part of modern society.

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A. Building Adaptation

Building adaptation in literature and practices possess extensive terminologies, such as refurbishment, retrofitting, rehabilitation, renovation, restoration, modernization, conversion, adaptive reuse, and material reuse (Shahi et al., 2020). Utilization of adaptive reuse (Arfa et al., 2022; Lanz & Pendlebury, 2022; Li et al., 2021) combines conservation principles with efficiency of natural resources, less construction cost, and shorten construction time (Almeida et al., 2018). Its application preserves and strengthen historical and cultural quality through building conversion that enable the historic building's new potential. Building regeneration promotes sustainability that integrates contemporary aspects in a historic building, thus increasing its architecture value (Ros-García, 2022).

Theoretical reference in this study is based on building adaptation theory (Wilkinson, 2011) , which elaborates 8 factors in building adaptation: (1) regulatory and legal, (2) government incentives, (3) environmental, (4) risks, (5) social, (6) economic and costs, (7) location and site, and (8) physical condition of building. These factors have multiple relationship with one another that relates to internal and external aspects of a revitalizing historic building.

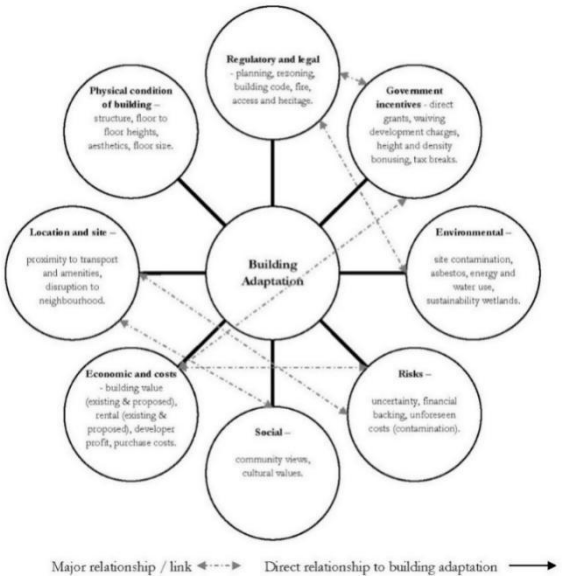

Figure 1. Factors related in building adaptation
Source: (Wilkinson, 2011)

B. Case Studies

Battersea Arts Centre in London and Beloit College Powerhouse in USA are two heritage architectures that were conserved through new intervention on the old buildings. Revitalization of the historical buildings were done through conversion, integration of material composition, and contemporary detail application in homage to the existing building.

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1). Battersea Arts Centre, London

Adapting a 3.800 sqm ex-town hall into an arts centre requires thorough planning and intricate engineered drawing to revive the damaged heritage building. A major fire in 2015 destroyed most part of its iconic Great Hall's barrel-vaulted roof and ceiling, thus careful planning to integrate the new into the existing structure is critical. Revitalization process includes reconstruction of roof and ceiling on the Great Hall, reparation of corridor, and other structure elements of the building. Contemporary method, like CNC cutting on plywood are used to revive the old building through modern interpretation while respecting its historical values. Through this revitalization, building function is also restructured with new function to introduce a contemporary performance setting in the historical environment. Performance spaces are integrated with public spaces while administrative spaces are placed in the upper floor.

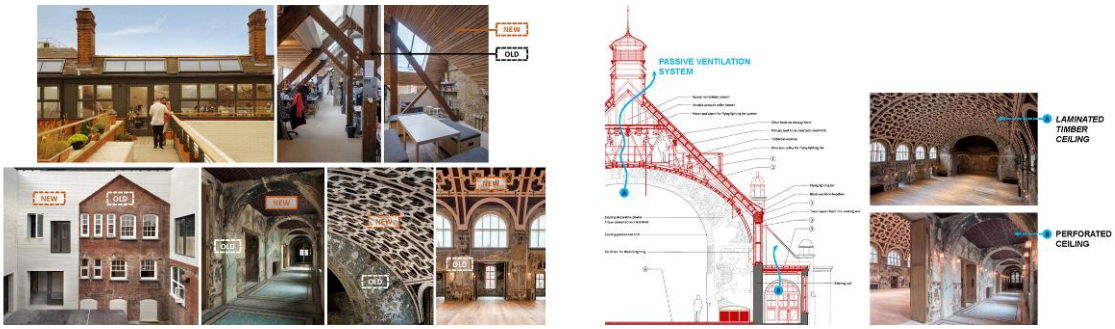
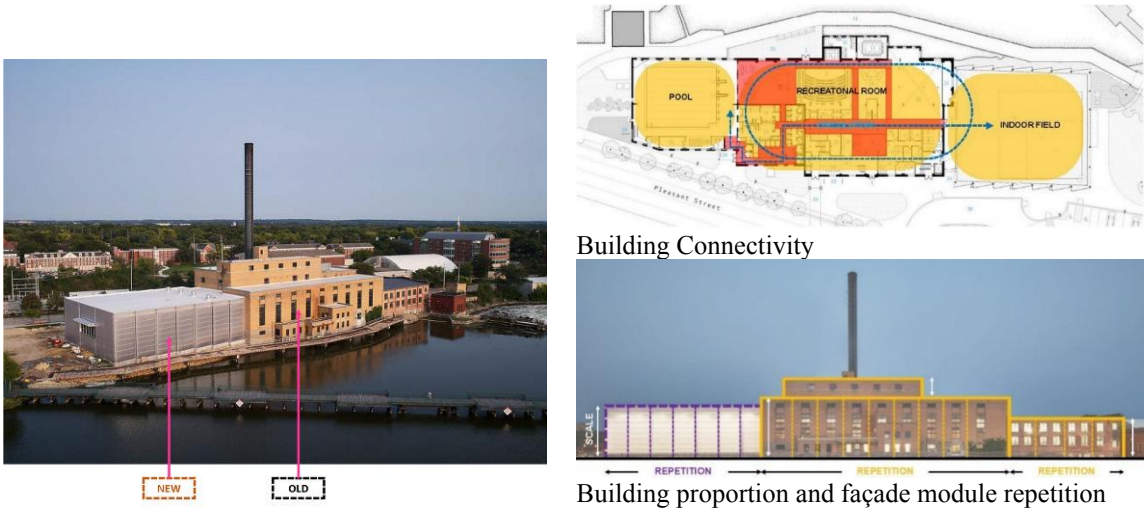


Figure 2. Adaptive reuse application on Battersea Arts Centre.

2). Beloit College Powerhouse, Wisconsin, USA

Beloit College Powerhouse or, in short, The Powerhouse was previously a historic Blackhawk Generating Station. It was transform into Beloit College wellness campus by adapting its old building with new function and additional building mass.



Building Connectivity

Building proportion and façade module repetition

Figure 3. Adaptive reuse application on Beloit College Powerhouse.
Source: (Gibson, 2020; Studio Gang, 2018)

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The original architecture possess characteristics and identity in which its components are kept and reuse in the new establishment. Components, such as coal funnel, overhead crane, and 175 feet chimney. Building are segmented into 3 main zoning: swimming pool, running track, and field house. Pool is located at the south, running track at the centre, and field house at the north in the new extension. Part of building where the old meet the new extension exhibit contrast in material usage. New extension of Powerhouse uses translucent polycarbonate façade which allow it to glow at night. Moreover, modern intervention on Powerhouse involve sustainability aspects in energy efficiency. As the site is located on the side of Rock River, water from river are utilized as heat and cool energy for the building.

2. METHODS

This study explores utilization of adaptive reuse in conservation practices (Wilkinson, 2011) and the relevance of heritage buildings in urban development. The concept of adaptive reuse attempts to regenerate heritage architecture, such as Medan's Warenhuis, through program conversion and relevant development that complies with current needs. Building adaptation starts with a comprehensive understanding of heritage architecture's history, typology, concept, and materials. This aspect of knowledge may be useful for extracting architectural elements as a basis for building conservation and further development.

The first step used in this study was to identify the characteristics of Medan's Warenhuis colonial architecture including building mass, interior planning, and architectural elements. The identification process was conducted by on-site observation, technical drawing from *Beranda Warisan Sumatra*, video archive from mass media (Mowiee Indonesia, 2020), and pictorial archive from other studies (Firdaus, 2017). Second, the demarcation of Medan's Warenhuis development potential based on adaptive reuse and within the Medan City government planning program to improve its cultural heritage district (Pemerintah Provinsi Sumatera Utara, 2019) . Third, formulation of Medan's Warenhuis architectural design guidelines.

Warenhuis, originally designed as a department store in 1920, stopped its operation in 1942 and changed function numerous times before becoming inhabited. The building signifies the early development of commercial trade in Medan. The object study was selected for two reasons, namely (1) previous functions and illegal occupancy exacerbates the physical condition of Warenhuis, which proves the need for architectural revitalization, and (2) Warenhuis can be a prototype for integrating modern activity within an urban heritage environment. Processed google maps and Sketchup programs were used to observe the study object and produce architecture perspectives.

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Figure 4. Warenhuis location in Kota Lama Kesawan.

3. RESULT AND DISCUSSION

The architecture style of Warenhuis can be regarded as transitional colonial even though it was design in 1918 and open in 1920, which are:

a. symmetrical layout with open space in the centre and terraces along its perimeter,
b. Greek style column are not found on its elevation,
c. possess unique building elements, like tower on entrance and gevel on roof,
d. building construction system uses concrete structure and arch profile,
e. roof structure, door, and window uses wood material, and
f. its roof uses gable shape with clay tile as roof covering material.

Figure 5. Characteristics of transitional colonial style in Warenhuis architecture

The condition of Warenhuis are analysed by its structural and non-structural building component which are described in table 1. Apart from internal factors, there are external factors including environment surrounds Warenhuis that need to be further elaborate as listed in table 2.

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Table 1. Warenhuis Existing Condition Analysis

WARENHUIS MEDAN EXISTING CONDITION		
NO	**STRUCTURAL**	**NON-STRUCTURAL**
1	**Structure**	
	 Figure 6. Column and beam structure	
	From external observation, the concrete column are in good condition, while beam uses steel I-beam 200. Structure strength after the fire incident cannot be confirmed as it requires forensic engineering to further analyse its building strength.	Moss can be found on concrete column, while rust can be found on steel beam.
2	**Roof structure and covering**	
	 Figure 7. Roof structure and covering	
	Indications of fire can be seen from the condition of damaged wooden frame and its black colour from carbon residue.	Roof covering layer of clay tile has been partially destroyed while the remaining are still attached, however, their quality needs to be examined.
3	**Main staircase**	
	 Figure 8. Main staircase and railing	
	Structure: It is made of wooden structures. Their condition has been mostly damaged, leaving	Timber on thread and riser has been non-existent.

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	some of landing frame and steps on the upper section of staircase.	
	Railing and mezzanine: There are only small portion of railing left on mezzanine.	The remaining railings are still in good condition that replication can follow the existing details.
4	**External and internal walls**	

Figure 9. Exterior and interior of Warenhuis

	External and internal walls area made of bricks.	The white paintwork has faded and covered in moss. The exterior walls are covered heavily in moss because they are exposed on sun and rain.
5	**Gevel**	

Figure 10. Gevel on roof

	Roof gevel frames are made from wood and still intact to the building. Its structural quality needs to be further examined.	Paintwork on wood has faded, while glass covering has been broken.
6	**Terrace**	

Figure 11. Terrace and window on Warenhuis

	Material on terrace are brick and ventilation block. Some of the window frame and roof covering have been destroyed.	Moss grows on brick walls and ventilation block. The paint on the walls, ventilation block, and window frames have faded.
7	**Glass partition and window**	

Figure 12. Interior partition and façade of Warenhuis

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	Internal partition frames and windows on facades are made of wood. Some of the frames are still standing, but others are badly damaged. The strength and durability of the frame structure need to be further examined.	Paint on the wood frame is faded, while stained glass covering has been damaged.
8	**Floor covering**	

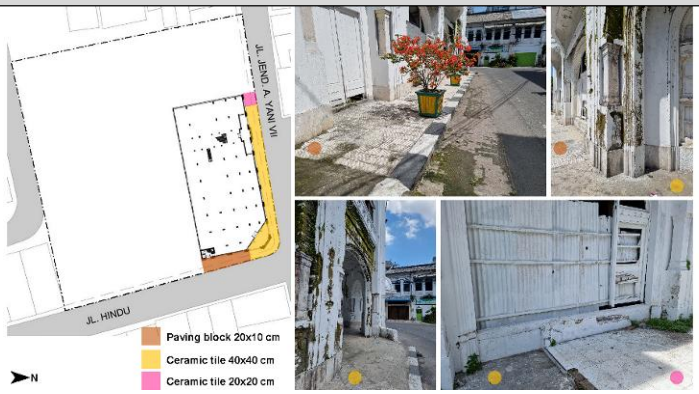

Figure 13. First floor covering

	First floor: -	Pedestrian floor is covered with a combination of paving block measuring 20x10 cm and ceramic tiles. The interior floor is covered with ceramic tiles measuring 40x40 cm. Most of the floor covering of both areas have been damaged leaving a layer of cement.

Figure 14. Floor framework on mezzanine level

	Mezzanine: The floor uses steel structure as the main beam and a wooden structure as the joist. Distance between beams is 48cm.	Mezzanine floor is covered with wooden planks which currently cannot be found in the building.
9	**Ceiling**	

Figure 15. Asbestos ceiling on Warenhuis building

	Asbestos ceiling: Most of the building frames cannot be found. The existence of ceiling only remains on the mezzanine floor, while first floor ceiling and the rest of mezzanine floor cannot be found.	Most of ceilings used in this building are asbestos based materials. Moss can be found on the remaining asbestos ceilings.

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Figure 16. Stained glass ceiling at the atrium

	Stained glass ceiling: Ceiling in the atrium uses a special stained glass material with a wooden frame. The wooden frame is still attached to the building but its structural strength needs to be further reviewed through forensic engineering.	Stained glass on atrium ceiling has been completely damaged.

Table 2. Contributing factors toward revitalization of Warenhuis

	Factors	Description
1	Local government policies on cultural heritage architecture	Protection through law: - government effort in protecting heritage architecture by creating law, such as: *Peraturan UU RI Nomor 11 Tahun 2010 tentang Cagar Budaya* and *Peraturan Daerah Kota Medan Nomor 2 Tahun 2012 tentang Pelestarian Bangunan dan/atau Lingkungan Cagar Budaya.*
		Appreciation of historical architecture by: - registration of heritage architecture - determination of heritage identity - architectural preservation and maintenance - revitalization of heritage architecture
2	Revitalization act on Warenhuis Medan	- clean building from dust and non-original elements - repair building with appropriate joints and/or reconstruction - renewal of materials based on the latest building standards - adjustment/changes in function without changing the building's original shape - assessment of architectural, functional, and structural conditions through forensic engineering actions
3	Warenhuis architecture in relation to its city planning	- There are high-rise building along Deli River and the main road - The development of Warenhuis environment is possible with a scenario of adding high-rise buildings that have the potential to form a city skyline

Figure 17. Building mass and green space around Warenhuis

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4	Green zone in the city centre	Green open space and urban greening are currently only at open fields like Merdeka, Benteng, and along Deli River
5	Road circulation around Warenhuis	Traffic volume is high, but the main road only has 6-10 meter width

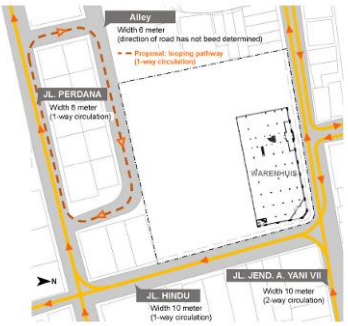

Figure 18. Existing and proposed circulation around Warenhuis

6	Parking facility	Only 1 parking lane (combine with pedestrian walkway) which is not ideal

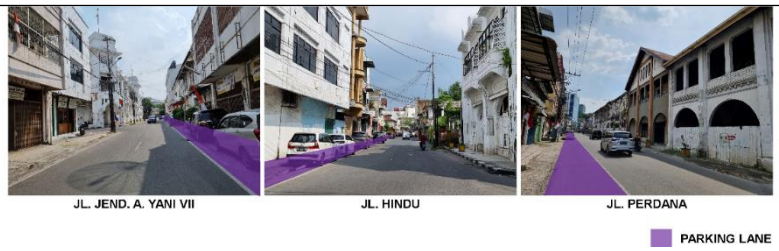

Figure 19. Existing parking lane around Warenhuis

Based on above elaborations, the principles of adaptive reuse (Wilkinson, 2011) are applied to analyse Warenhuis architecture in three building adaptation aspects, namely tangible, intangible, and external risks. The tangible aspects comprise regulatory & legal, government incentives, economy & cost, and social. The intangible comprises environment, location & land use, and physical building condition. Meanwhile, the external risks include the event of force majeure, the risks of design & technology, as well as project management.

A. Regulatory & Legal - Heritage

The Indonesian Heritage Bill requires Class A heritage buildings to undergo full-scale restoration, which includes using materials with a similar character to fit the original building ornaments (Republik Indonesia, 2010) . This particularity of needs demands professional expertise in architecture and construction. Program conversion is one of the key steps in building adaptation, yet adjustment to the layout will result from different needs and standards of the proposed function. However, this modification must be done sensitively to respect the originality of heritage buildings (Jäger, 2010). In addition to the regulation on restorative activity, the revitalization of Warenhuis needs to comply with the land use.

B. Regulatory & Legal – Building

The land use of Warenhuis suggests that the plots in the city centre should be developed to maximize their potential. The district's image may undergo a change due to high-rise

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development near heritage buildings. Public perception of the heritage district can change with the development of contemporary high-rise structures with a distinct building scale than Warenhuis. However, the regulation arranges future development to allocate a minimum of 20% of green areas as an ecological contribution to lowering air pollution in the city centre (Pemerintah Kota Medan, 2015).

Table 3. Warenhuis land use directives

Land Use	Coefficient
Building Covered Ration (BCR)	max 80%
Floor Area Ratio (FAR)	max 8
Green Base Coefficient	min. 20%
Height	max 10 storey / 42 meter
Green Open Space (GOS)	min 13% (land)
	min 20% (rooftop)
Basement Floor Coefficient	max 75% for > 25 storeys

Source: RDTR Kota Medan Tahun 2015-2035

The development of high-rise architecture relates to the flight safety protocol of KKOP (Badan Standarisasi Nasional, 2005). Table 3 shows the technical regulation of KKOP.

Table 4. KKOP technical regulation

KKOP	Building height limit from the lowest runway threshold
Landing and take-off area	-
The area of possible accident danger	(45 + H) meter
The area following the transition surface	(45 + H) meter
The following horizontal surface area	(150 + H) meter
The area along with the surface of the cone	(45 + H) meter until (80 + H) or (100 + H) or (105 + H) or 120 + H) or (145 + H) meter
The area along with the horizontal-outer surface	(45 + H) meter

Source: SNI 03-7112-2005 Kawasan Keselamatan Operasi Penerbangan (Badan Standarisasi Nasional, 2005)

The location of Warenhuis in reference to Kualanamu Airport restricts the development of the building floor efficiency coefficient. Meanwhile, its location to Soewondo Air Force Base placed Warenhuis on the area along with the surface of the cone. The Air Force Base has a runway of 2,900 meters in width, resulting in the code number 4 runway categorization (Republik Indonesia, 2013) . Its proximity to KKOP Soewondo limits the development of high-rise buildings in the Warenhuis area to 145+H meters from the lowest runway threshold.

There is a need for appropriate building lines and distance between new developments and Warenhuis. This ensures safety from fire and minimal disturbances to the heritage building structure. Furthermore, the new development must allocate off, on-street, or separate parking facilities.

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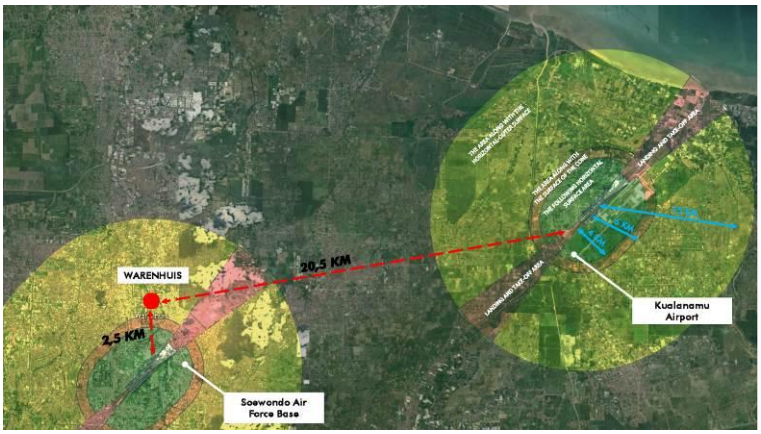

Figure 20. Location of Warenhuis based on KKOP.

C. Government Incentives

The government support in increasing public enthusiasm for property investment can be achieved through incentives in property taxes. These taxes can boost buying power, which correlates to maximizing the development of Warenhuis and its surroundings. In addition, Warenhuis can be equipped with supporting functions that benefit the district's economic value. Developers can gain profit from constructing small to medium-scale properties. It can also create job opportunities, thereby reducing the rate of unemployment. Different sectors are interrelated in a circular manner (Ali, 2021) that involvement of stakeholders and proper planning might be beneficial for both heritage architecture and civilization.

D. Economic & Cost

Restoration tends to have a high cost due to its nature, such that the process of selecting a new function needs to seamlessly adapt to Warenhuis' architecture typology. In an attempt to adapt to the open plan interior, program conversion needs to make minor adjustments to the existing architecture. The revitalization process can be built in phases by prioritizing the restoration of the original architecture to restore the value of buildings and their surrounding environment. The next phases include cultivating Warenhuis' immediate environments by combining functions that can create a viable ecosystem by shared building management and services (Foster, 2020) . Diversifying public and private functions might contribute to the economic sustainability of the development.

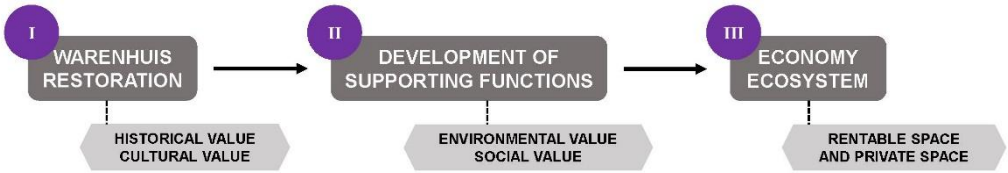

Figure 21. Warenhuis development scheme.

E. Social

Building adaptation aims to strengthen architectural characteristics through the building's cultural and historical qualities. Revitalizing heritage buildings such as Warenhuis needs to

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involve community planning (Lam et al., 2022). Community planning, in this sense, can be achieved by implementing primary human needs to give chance of integrating heritage in social setting. Involving heritage buildings as part of society's daily activities might present beneficial advantages to both, as an asset to humanity and a way of keeping the heritage (Jurkovic et al., 2019). This can be a sustainable approach to make heritage space relevant in the modern context. Functions such as library, cultural centre, public parks and other public centric functions that can restore its social value while introducing relevant functions.

F. Environment

Adaptive reuse might be the answer to make relevant of heritage building to the current social needs and support the act of sustainability (Abdulameer & Abbas, 2020). Repurpose Warenhuis for a new function may extend its life and contributing to further development by minimizing the needs material consumption. Other than external contribution, the internal environment does play vital role including thermal comfort, internal air quality, and usage of hazardous building material. Furthermore, the building adaptation of Warenhuis needs to adapt to the existing typology and planning. Spatial placement needs an additional boundary to compartmentalize workable space and strategically comply with the existing airflow mechanisms.

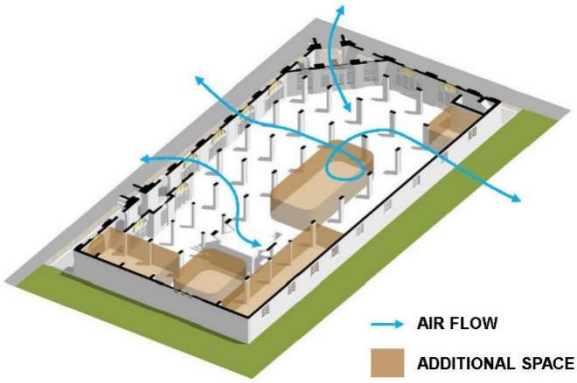

Figure 22. Adaptation to original building characteristics.

Warenhuis' indoor air quality is a major concern because the building has experienced fire and weathering over the years. Ash and carbon residue can be an alarming factor necessitating building assessment. The usage of hazardous materials, such as asbestos on the ceiling, needs to be updated with alternatives such as gypsum boards or GRC boards.

G. Location & Land Use

The study area has a total of 7,259 sqm, which comprises Warenhuis with 1,546 sqm and a plot of land with 5,713 sqm. Based on the distance between buildings toward the road and Warenhuis, the area is 3,870 sqm. Warenhuis and surrounding shophouses show strong planning in relation to the road network (Rao et al., 2018), as illustrated in Figure 5.

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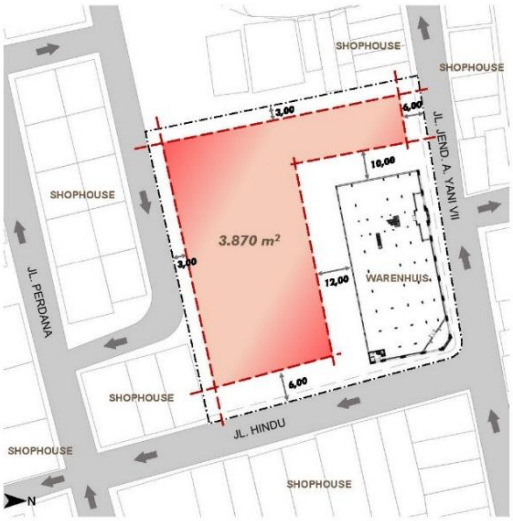
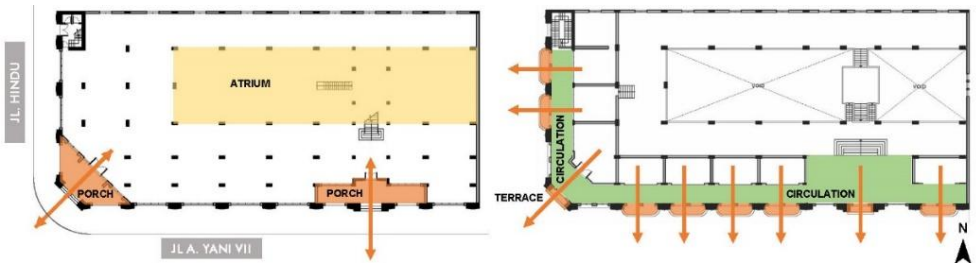


Figure 23. Warenhuis development scheme.

With the land use regulation directing its high-rise development, Warenhuis might be beneficial in increasing its heritage value and surroundings. The conversion is based on its potential and relevance to the government's development plan for Kesawan, which is a cultural hub, creative industry hub, and culinary hub in Medan. Increasing public activity within heritage spaces may not only increase understanding and awareness of its importance to future civilization but also act as key assets in reviving Kesawan heritage district (Sidabutar et al., 2018).

H. Physical Building Condition

The architectural planning of Warenhuis presented an effort to adapt colonial buildings to tropical climates. Furthermore, spatial orientation with a close relationship to the environment is in the form of tower elements in the entrance, circulation along the façade, and terraces on the second storey. The architectural form of Warenhuis can be divided into the head (roof), body, and feet (foundation). Warenhuis is a colonial building that adopts the application of sloping roofs and openings on facades as a response to create thermal comfort in the interior.



First Storey Plan Mezzanine Plan

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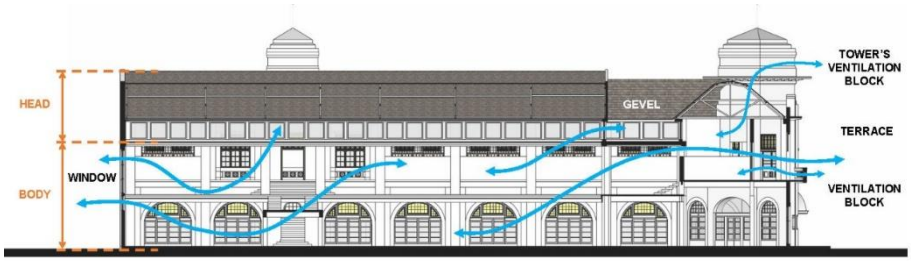

Natural Ventilation Scheme

Figure 24. Tropical characteristics on Warenhuis.

In addition to heritage districts, the sensitive and integrated planning of heritage architecture may include building itself. The adaptation process needs to refer to the original quality of the building, such as axis, mass proportion, and repetition of façade elements. This is studied in reference to Beloit College Powerhouse in the USA (Gibson, 2020; Studio Gang, 2018) . Integrating old and new buildings may result in a material contrast, with the new building serving as an additional layer. Cross-circulating new programs in the area might further strengthen the connection between both entities. Furthermore, Warenhuis façade indicates a similar configuration that shows rhythm by the composition of windows, tower elements, and columns. The composition also runs vertically by the diminishing scale of openings toward the upper level, similar to The Powerhouse (figure 3).

The original design of the Warenhuis heritage building lacked universal design standards, specifically for disabled users. Different elevations in the building make it difficult to be approached by assisted wheelchair. Adding a ramp and lift might be the appropriate support for those needs, however, they need to be constructed to minimally disturb the original heritage building. Furthermore, the material used on those new elements needs to be different from the heritage buildings to differentiate between old and new.

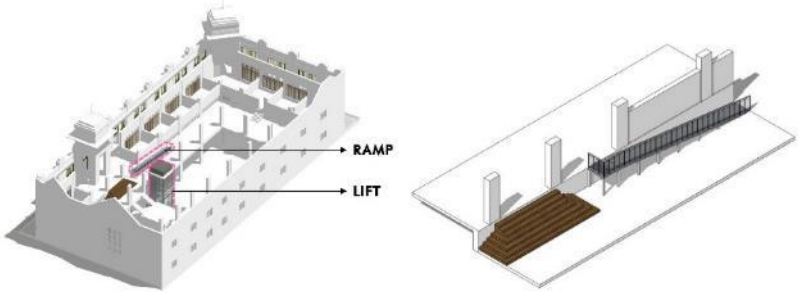

Figure 25. Insertion of universal design element to the existing architecture.

The restoration process of an unrecoverable part of the original building can be in the form of a new replica with a contemporary interpretation. This new interpretation still needs to respect the ornamental quality of the heritage architecture but with a new material and construction technology. Similar restoration techniques can be found in Battersea Arts Centre, London (Pintos, 2021). Its original barrel-vaulted ceiling, made of plaster and fibre, cannot be reinstated from fire. The new interpretation adapts its ornate detail with laminated timber, resulting in new ceilings with historical quality (figure 2). As this

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reflects modern measures to restore its tangibility, experiential quality that adhere to heritage architecture need not to be neglected (Zhou & Pu, 2022) . In the process of reviving heavily damaged heritage architecture such as Warenhuis, data management along with detailed documentation are essential (Abdallah, 2018; Rebec et al., 2022).

4. ADAPTIVE REUSE DESIGN GUIDELINES ON WARENHUIS DEVELOPMENT

The analysis of Warenhuis' potential to be developed produces design guidelines categorized into the restoration of Warenhuis as a heritage architecture and its neighbourhood development. The design guidelines are as follows:

1. The restoration and reconstruction process must adopt similar architectural detail and material as the original.

Figure 26. Revitalization of Warenhuis through restoration and reconstruction.

2. Program conversion adapts the characteristics of the building layout, such as an open plan on the first storey and a cubicle on the mezzanine storey.

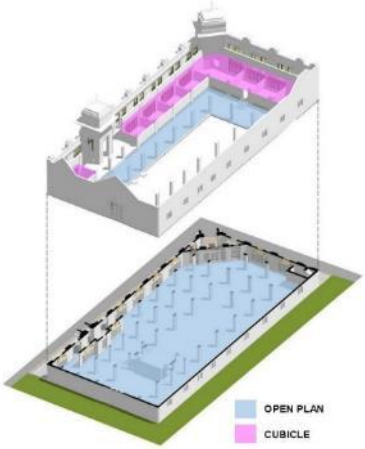

Figure 27. Interior characteristics.

3. Program conversion supports sustainability aspects of the heritage building, such that it is necessary to be developed with parameters. These include: the new functions may intensify the historical and cultural value and improve social value through increasing public activities in historical spaces.
4. The building meets the universal design standards, such as adding ramps, lifts, and disabled toilets.

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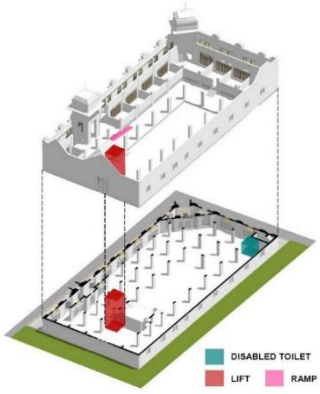

Figure 28. Universal design element.

5. The addition of building elements needs to showcase a clear difference from the original architecture. This can be achieved through material and construction techniques that minimize disturbance to the original building.

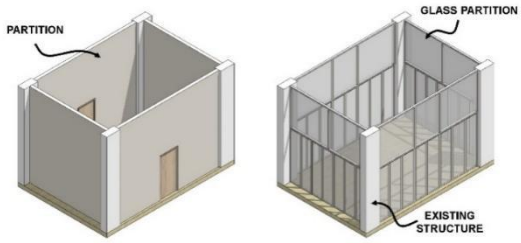

Figure 29. New intervention in the heritage building.

6. Adding new building elements must be compatible with the air circulation.
7. Hazardous materials, such as asbestos need to be replaced.

The design guidelines for developing the Warenhuis neighbourhood are as follows:

1. New developments need to be in line with *Rencana Tata Bangunan dan Lingkungan (RTBL)*, which include lines and distance between buildings, land use, and height regulation.
2. High-rise development is not allowed to be over 145+H meters from the lowest runway.

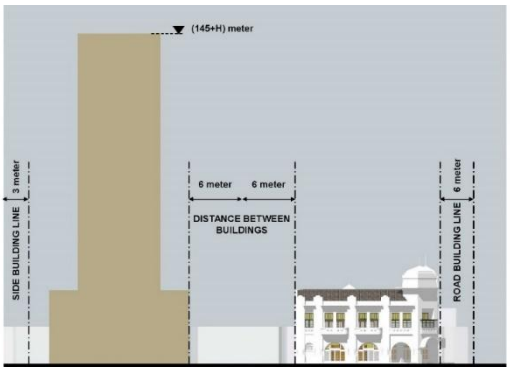

Figure 30. Building line and height limit.

3. New developments must have a strong orientation towards the road and have public connectivity to Warenhuis.

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4. Warenhuis neighbourhood is to be developed with a function that supports the conversion of heritage architecture to ensure connectivity and an economic ecosystem.
5. Drop off need to have an appropriate length to prevent traffic congestion.

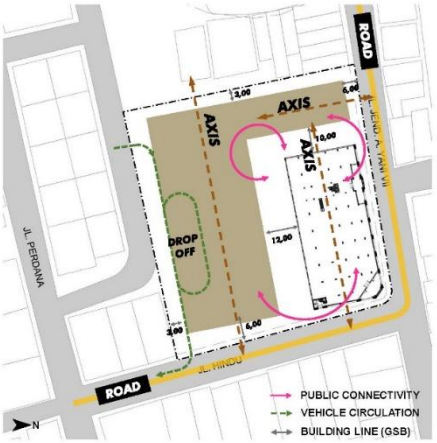

Figure 31. Site orientation and connectivity.

6. Architectural planning may adapt natural ventilation systems and thermal comfort in buildings.

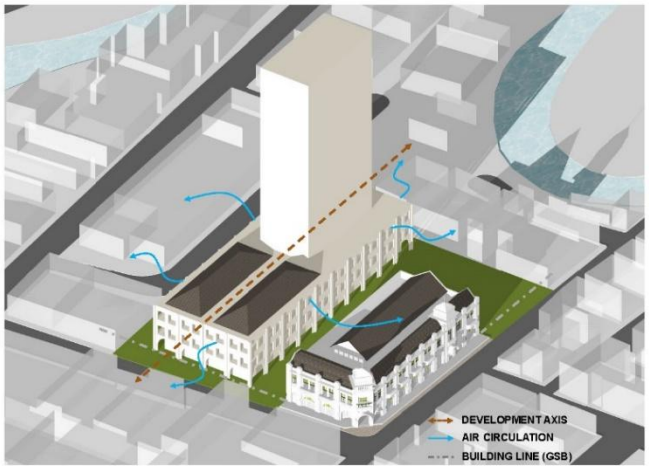

Figure 32. Building axis and adoption of a natural ventilation system

7. Building mass planning has a basic shape with a clear axis and symmetrical plan, in reference to Warenhuis.
8. Building form adapts the relationship of head – body – feet, an adaptation of colonial architecture in Indonesia.
9. Area planning must provide parking facilities in the form of on and off-street parking or a separate structure.

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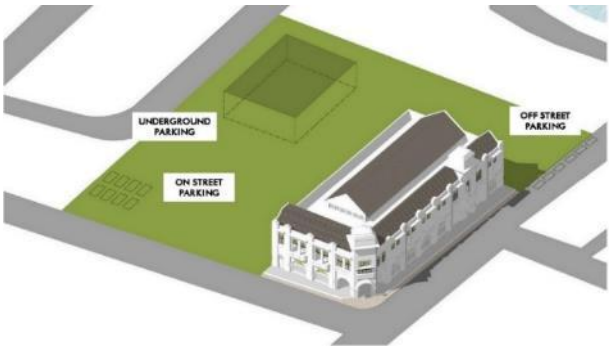

Figure 33. Parking facility.

10. The architectural datum of Warenhuis and the neighbouring development must apply similar façade composition in scale, shape, repetition, and hierarchy (tower).
11. Use of local material to support energy efficiency in construction.
12. Material and building ornaments of Warenhuis can be an inspiration to contemporary interpretations.

Figure 34. Datum on architecture façade.

5. CONCLUSION

The historic department store has the potential to be revitalized despite years of weathering and neglect. The application of adaptive reuse can be effective in maintaining its tangible and intangible qualities. The key to reviving its functionality is extensive and contextually integrated development. Furthermore, heritage restorations are applied with the conversion of Warenhuis with relevant programs to the current public needs starting from the basic needs. This creates a relationship between public activities and historical spaces as a solution for sustaining heritage architecture in a contemporary context.

In conclusion, applying adaptive reuse in Warenhuis heritage development produces 7 directives of design guidelines in restoring its architecture, cultural, historical and social values. It also produces 12 directives regarding adaptive reuse in developing its neighbourhood that interpret Warenhuis' characteristics in an integrated heritage district.

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