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Green Space and Housing Morphology Analysis in Medan Helvetia District: An Urban Environmental Study

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ABSTRACT

The growth of the population and urban areas will persist, leading to increased demands for housing. Yet, this expansion lacks the creation of green spaces and a balanced environment, which can adversely affect urban living conditions. The aim of this study is to evaluate the existence of green spaces and the arrangement of housing in the Medan Helvetia area, so as to gain insight into the dynamics of the urban environment. A descriptive and qualitative approach is utilized for this study, where data collection occurs through two methods; primary data is gathered via observation and documentation, while secondary data is obtained from literature reviews, satellite images from Google Earth, regulations (RDTR and Ministry Regulations), and other relevant resources. Findings from the study reveal that the green spaces in Helvetia still fall short of standards, particularly regarding public green areas. This is attributed to high population density and improper land use, which also hinders the ecological functions and increases the risk of flooding in the area. In relation to housing structure, this subdistrict is classified within a medium to highdensity zone featuring a grid road layout. The grid system is not merely linear; it represents a complex interaction among social, economic, and spatial requirements. Nonetheless, ongoing developments should adhere to established policies, necessitating continued government oversight. This research suggests creating public green areas such as community parks, vertical greenery, and designs for adaptable living environments. As a result, it provides useful suggestions to improve city planning and the distribution of green areas.

Keywords: green spaces, morphology

1. Introduction

A city always experiences development from time to time [1] which certainly causes changes, such as changes in material usage, appearance, building functions, and the number of building masses. These changes are certainly also caused by several things, including population growth, changes in lifestyle, economic growth, and social status [2]. Studying the ups and downs of this development can be done through morphology; in a settlement, the morphology can be seen from the shape, function, and layout of the building, where precisely the impact of these changes can also be seen through changes in public facilities, electricity and networks, roads and bridges, and drainage [3]. Morphology consists of two words: morph, which means form, and logos, which means science. Urban morphology is the science that logically studies physical forms' products [4]. In general, urban morphology can also be stated as an applied science that studies the history of the formation of a city pattern or the science that studies the development of a city's growth. Studying the morphology of an urban area it is hoped that can help the city to see the mistakes that occur in the development of an urban area so that it can avoid problems and, at the same time, can be a lesson from the experience of past failures and successes as one of the processes of forming the morphology of an urban area [5].

The occurrence of changes in urban morphology caused by the development of housing and settlements will certainly also affect the availability of land, which is decreasing. Housing and settlements are problems that will continually develop in line with population growth. The increasing intensity of city development causes the need for land for housing and settlement development to increase. The development of housing and settlements has the most significant physical impact on urban growth. Housing demand will increase yearly [4]. The increasingly narrow land and increasing activities will reduce environmental quality [6]. In addition, the availability of green spaces is sometimes less profitable than physical development, which is considered more profitable and tends to be oriented towards economic interests. The need for green spaces that focus on the sustainability of ecological functions is less accommodated and, of course, can have an impact on the problem of increasingly high land prices, so some people prefer to build tall buildings such as buildings rather than green spaces which are large areas [7]. City parks and green areas offer numerous advantages for the community. Recognizing how the features of public urban green spaces connect with aspects of human health can assist in planning and designing these green spaces for the future [8].

Many Indonesian cities, especially those with high population density, continue to struggle with providing green spaces [9]. Medan City faces challenges when it comes to having enough green areas. Research has shown that certain subdistricts in Medan City fall short of the recommended standards for green areas, and Medan Helvetia is one of them [10]. Along with the lack of sufficient Green spaces, particularly Public Green spaces, another significant issue in this subdistrict is its vulnerability to flooding. Previous studies [11] have indicated that the flooding in Medan Helvetia is linked to an insufficient amount of open land that can allow water to infiltrate; this absence of waterabsorbing areas means the soil cannot effectively absorb rainwater during heavy downpours, leading to flood risks. To address these challenges and build upon previous studies, the researcher selected Medan Helvetia District for this investigation, focusing on the accessibility of green space and the housing design within the area. The goal of this study is to explore the present condition of Green spaces and housing morphology and how they impact the quality of the urban environment in Medan Helvetia District.

2. Methode

2.1. Research Location

Related to selecting research locations based on the purposive method, this technique intentionally determines the research location based on specific considerations. Some considerations that are the basis for selecting the location include green spaces that does not meet standards, high population density, and frequent flooding. The selection of green spaces samples is based on the Green Spaces Zone and its existence close to residential areas, and settlement morphology is selected based on several criteria, including the location in a medium-high population density zone, variations in house types, social and economic status, and experiences morphology (**Figure 1**).

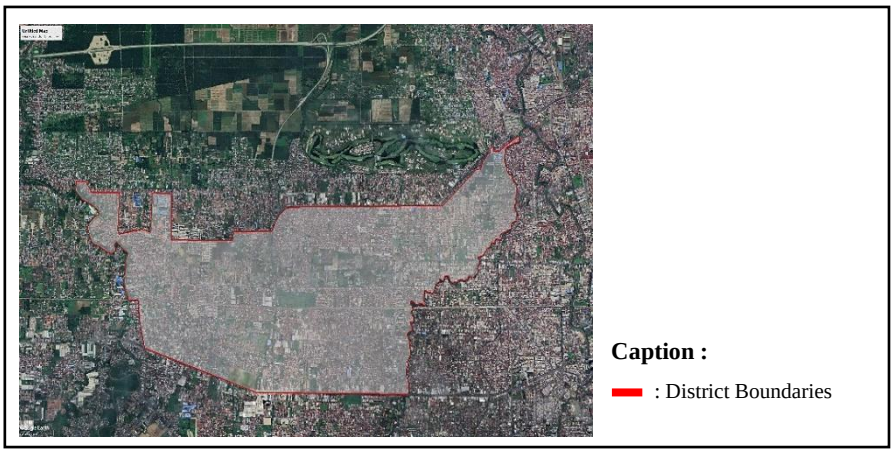

Figure 1 Medan Helvetia Distict

Medan Helvetia District is one of the Medan City districts with an area of 13.04 km2. This district consists of 7 (seven) sub-districts, including Helvetia Village (0.95 km²), Central Helvetia (1.97 km²), East Helvetia (2.61 km²), Dwi Kora (1.62 km²), Sei Sekambing CII (1.20 km²), Cinta Damai (1.95 km²), and Tanjung Gusta (2.74 km²) (**Figure 2**) Of the 7 sub-districts in Medan Helvetia District, Tanjung Gusta Village has the largest area of 2.74 km2. Meanwhile, Helvetia Village has the smallest area , 0.95 km2. The boundaries of this sub-district are as follows, to the north, it borders Deli Sedang Regency, to the south, it borders Medan Sunggal District, to the east, it borders Medan Barat and Petisah Districts, to the west, it borders Medan Sunggal District. According to information from the Medan City Population and Civil Registration Service, the number of people living in Medan Helvetia District totals 170,551. The population density varies across the seven subdistricts, with Helvetia Tengah Subdistrict having the highest density at 17,046 people per square kilometer, while Cinta Damai Subdistrict has the lowest density at 10,266 people per square kilometer [12].

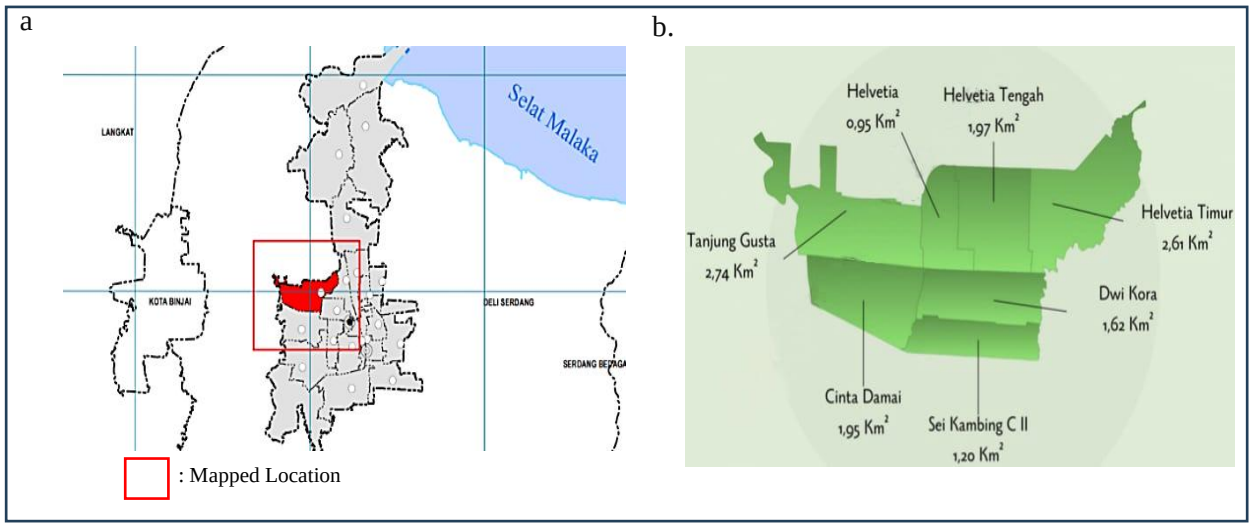

Figure 2 (a) Medan Helvetia District; (b) Sub-district of Medan Helvetia District

2.2. Data Collection Techniques

In this research, two sources were used for gathering data, which included both primary and secondary information. For the primary data, two approaches were utilized: Observation and Documentation. This approach consists of closely watching the research subjects to understand the state and use of Green spaces and the living conditions in the Medan Helvetia District area.Observations are made to ensure that the data obtained is more accurate and relevant. Meanwhile, the documentation method involves collecting data and information through photos, videos, and other documentation that can be used as research evidence. Documentation collection is carried out by taking data related to green spaces and land use of housing built in Medan Helvetia District. This documentation is needed to support other data. Secondary data is obtained through literature studies, satellite imagery from Google Earth, Regulations (RDTR and Ministerial regulation), and supporting websites related to Green Spaces and Housing Morphology. Literature studies were conducted through accredited journals for 10 years, from 2014 to 2024. At the same time, Google Earth retrieves data in the form of maps.

2.3. Data Analysis Techniques

In this study, there are two types of analysis. In the first analysis, the researcher collected a literature review from similar literature. The literature consists of several sources, including journals, books, and reports on the problem to be solved. This technique allows researchers better to understand various sources and relevant perspectives from similar studies. After the data was collected, the researcher analyzed using a qualitative method. The use of this method refers to previous studies of a similar nature, with discussions that are related to green spaces and morphology (**Table 1**).

Table 1 Similar Research

Topics	References	Method
Green Spaces	- Urgensi Ketersediaan Ruang Terbuka Hijau sebagai Ruang Publik dalam Tata Kota Berwawasan Lingkungan Hidup [13] - Analisis Ketersediaan Ruang Terbuka Hijau dan Dampaknya Bagi Warga Kota DkI Jakarta [16]	Qualitative Descriptive
Morphology	- Studi Pola Morfologi Kecamatan Medan Helvetia [11] - Morfologi Dari Kampung Nelayan Menjadi Kampung Bahari [22], - Settlement Pattern Morphology of Ampera Village [23]	

To address the problem presented in the study regarding how the current state of green space availability and housing design impacts the quality of the urban environment in the Medan Helvetia District, a descriptive qualitative approach was selected to examine and outline the relevant findings. Before obtaining the findings and conclusions, the data will be validated using this method. Validation of this qualitative research data is carried out to show the validity of the data in the study. The researcher made these steps into a research flow diagram to find out more clearly. This diagram explains how the researcher carried out the descriptive qualitative method chosen to solve the formulation of the problem in the study, starting from data collection to getting results, conclusions, and recommendations **(Figure 3).**

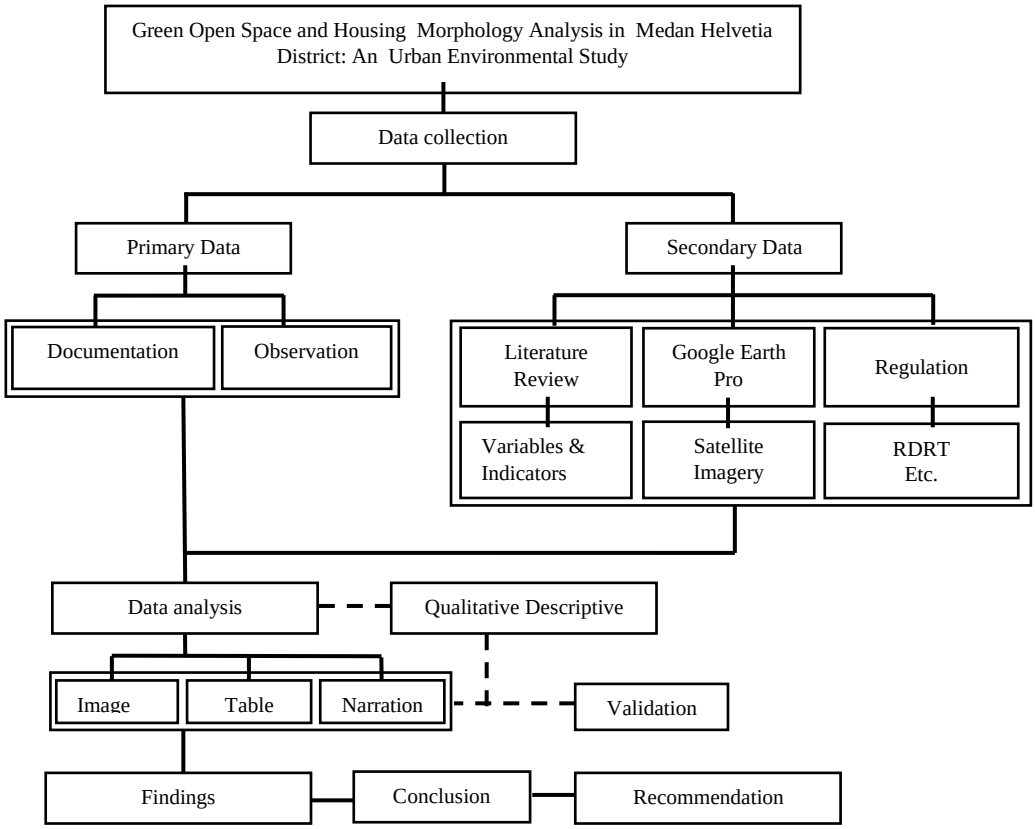

Figure 3 Research Methode Framework

3. Result and Discussion

3.1. Green spaces

Regarding the Green spaces Zone mentioned in the Regional Regulation Number 2 of 2015 for Medan City about the Detailed Spatial Plan and Zoning Regulations from 2015 to 2035, this zone aims to improve pathways and clusters. It allows for a more adaptable use, providing a space where various plants can flourish, including those that grow on their own and those that are purposely planted. The zone is divided into two types with a specified area, namely the Private Zone covering an area of ± 6,501.33 ± 22.26% of the area, including village parks, city parks, public cemeteries, tourist areas, city forests, sports fields, and green road lanes. The Public Zone with a minimum area of ± 2,920.49 or ± 10% of the area includes Green spaces for Yards and Green spaces for Building Roofs. The regulation has also determined each Green spaces zone in Medan Helvetia District, including the following [24].

According to [17] , green spaces should make up at least 30% of the area in a city. It is divided into 20% allocated for Public Green spaces and 10% designated for Private Green spaces. Meanwhile, if referring to the regulation, Medan Helvetia District is stated as needing to meet the standards for the availability of green spaces (**Figure 4**). This problem is supported by previous research that examined the availability of green spaces in Medan City, stating that 14 districts have not met the proportion of green spaces from the regulations that have been set, especially green spaces in Medan Helvetia City is still very minimal or has not met the standards, namely 14.17% of the area of the district [10].

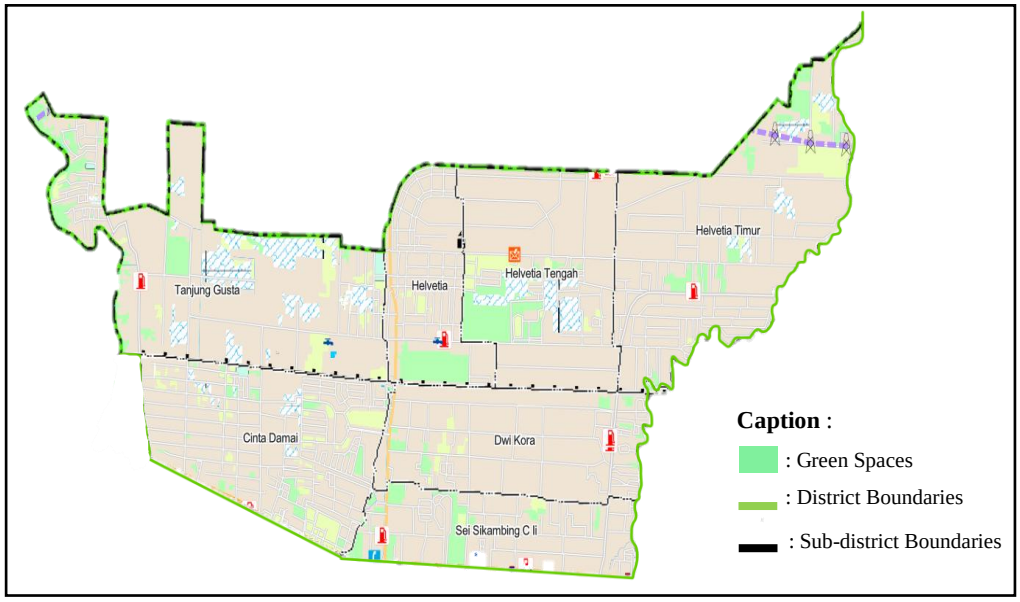

Figure 4 Availability of green spaces in Helvetia District

Likewise, based on the results of observations and observations carried out by researchers through satellite imagery, it can be seen that this sub-district is an area that is classified as having a reasonably high density, especially in the residential zone. Besides that, this area will undoubtedly continue to experience growth and development, so the availability of green spaces will decrease (**Figure 5**) . Thus, population density is an important factor in identifying environmental characteristics. Moreover, this high population density reflects the existing land and space limitations because every available land has been used for residential purposes [25].

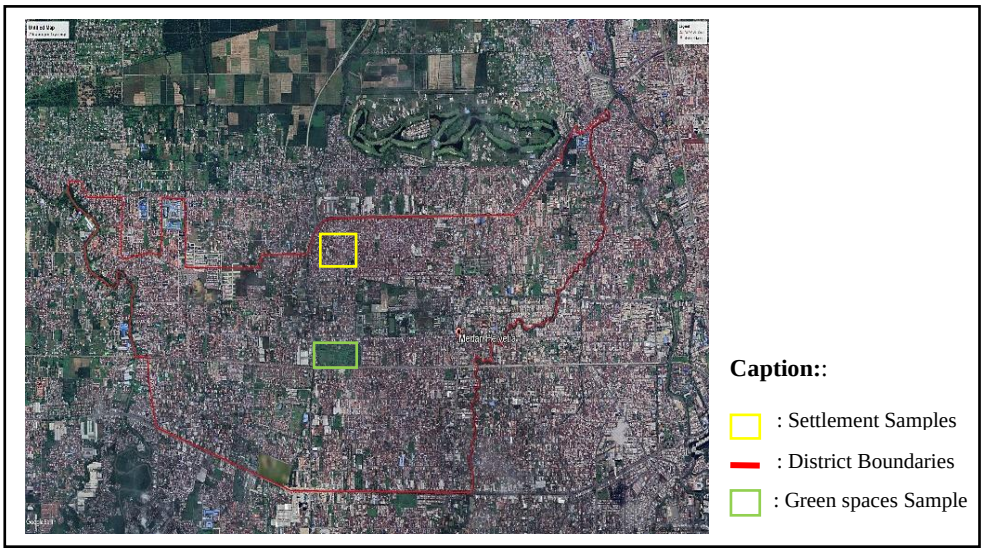

Figure 5 Development of green spaces in Helvetia District

As a result of the growth and development of population density, it also has an impact on land abuse, where based on the results of the analysis, differences were found between the RDTR regulations and existing conditions. Based on [17], the area is designated as a Green spaces Zone, but if you look at the existing conditions, the zone is already filled with residential houses. This problem is certainly also something that needs to be followed up, because with the occurrence of land abuse, it certainly also has an impact on the reduction of Green spaces in Medan Helvetia District (**Figure 6**).

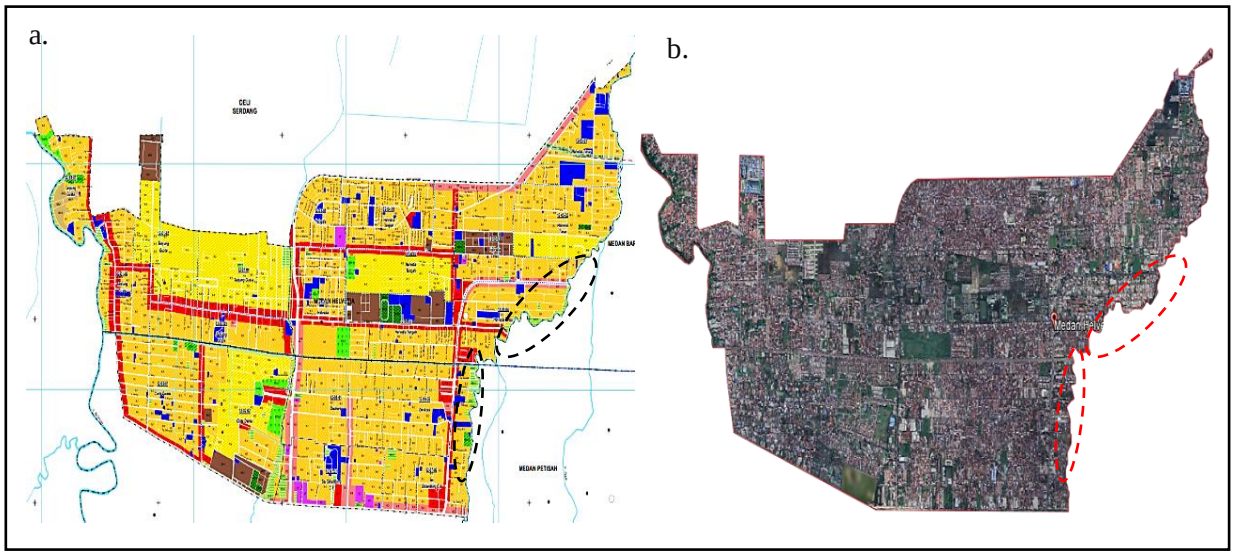

Figure 6 (a) Detailed Spatial Planning Map; (b) Existing Map

The reduced availability of green open land certainly also significantly impacts the surrounding environment, especially the reduction in water catchment areas. So that when it rains continuously, there is a risk of flooding. Along with the characteristics of the Medan Helvetia District, where highdensity building types are prevalent (Building Coverage Ratio > 70%), there is a requirement for additional water catchment regions. This necessity is evident in areas that are susceptible to flooding, such as Perumnas Helvetia, Cinta Damai Village, and Tanjung Gusta Village [11]. Likewise, with the recent flood in 2024 in Medan City, Medan Helvetia was one of the areas affected by the flood. Based on news quotes from [26], it is known that recently, in 2024, there was a flood disaster in Medan Helvetia District, which was monitored relatively high, with water levels reaching 20-30 cm. Another problem experienced by Medan Helvetia is that it is an area with high population density, unoptimized yard land ownership, and low community income levels [27].

At the same time, there is an ample amount of green spaces. Such areas can help reduce and avert disasters like floods, due to their ecological role in water absorption. Beyond their ecological duties, green spaces also serve other important purposes that must be met to ensure they correspond with set criteria. These purposes include functions related to water retention, economic benefits, social and cultural engagement, visual appeal, and disaster management. A common example of a green spaces is a city park. A city park provides open space that supports social and cultural activities, as well as aesthetic enjoyment, functioning as a location for recreation, education, and various community activities aimed at serving the inhabitants of a city or urban area. Moreover, it serves as a habitat for numerous plant species and supports biodiversity, acts as a water collection zone, regulates microclimates, and facilitates community gatherings. The service area radius is about 5,000 meters, with a minimum size of 50,000 square meters, and at least 85% of the green space is covered by vegetation, while the remainder is made up of environmentally sustainable nonvegetative surfaces [12].

As a result, city parks are crucial among various green areas because they help stabilize water resources and reduce flooding by allowing plants to absorb water effectively , thereby minimizing direct runoff into rivers. Additional significant responsibilities of this particular entity include its role as an educational facility and its contribution to the preservation and sustainability of fauna habitats. In addition, this place also functions as a place for sports, recreation, and several other purposes [10]**.** However, in reality, the city parks in this District are also below the expected standards.

Based on the [17] , It is recognized that the City Park is one of the green areas located in the Medan Helvetia subdistrict , which is located around Jl. Balai Desa, Helvetia Village. However, based on the existing park, it is better known as the Balai Desa Field, with an area of 10,416 m² (**Figure 8**). This park is usually used for sports, gatherings, socializing, and recreation by the surrounding community and visitors outside the Medan Helvetia sub-district. This park is surrounded by vegetation and has several elements or facilities such as sports fields, jogging tracks, sports equipment, seating, pandoro, and children's play areas. In addition, the park is equipped with trash cans so that visitors who come there do not litter because it is known that in addition to local facilities, there are usually also traveling traders selling food around this park. However, if referring to Ministry of Agrarian Affairs and Spatial Planning/National Land Agency, the city park in Medan Helvetia District can be said to have not met one of the requirements of a City Park, namely having an area of at least 50,000 m2 [18], while the park in Medan Helvetia has an area of 10,416 m². Thus, it can be concluded that the park has not met the standards of a city park in Medan City.

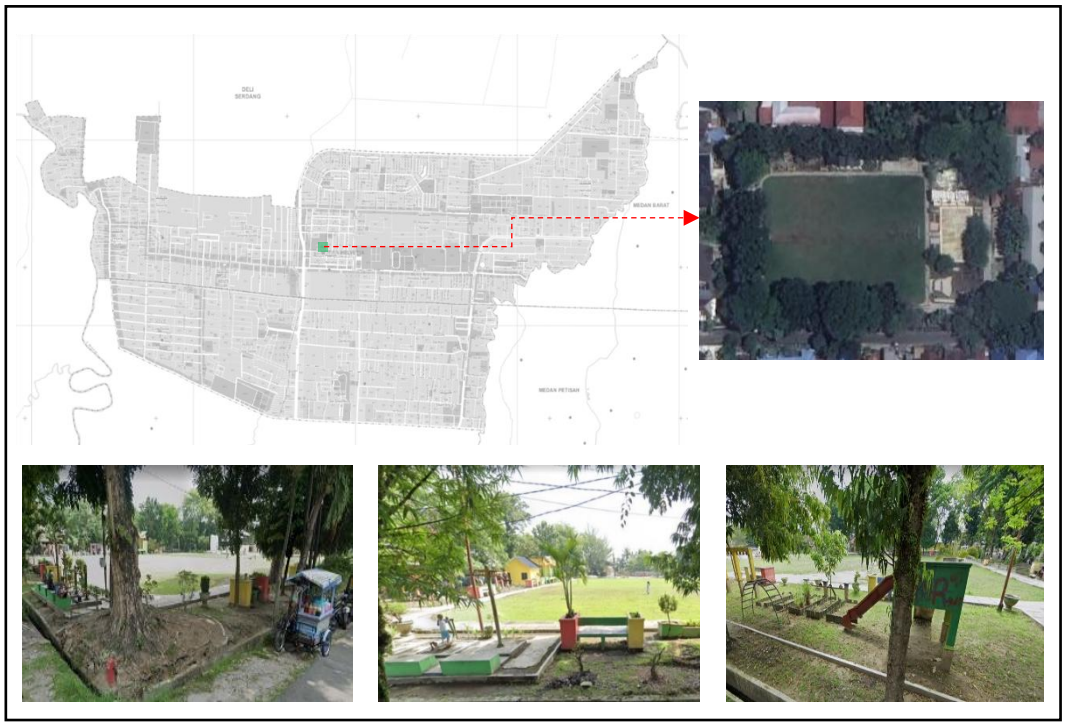

Figure 7 City Park in Medan Helvetia District

3.2. Housing Morphology

The emergence of morphology in settlements is caused by many factors such as the influence of cultural changes and economic growth, as well as internal factors such as innovation and population growth in the area itself, as well as external factors such as the number of immigrants from outside the area, both permanent and temporary [3]. There are various morphological components from previous studies [22; 23; 24; 2], including land use (soil type), road network (road network pattern), and building system (building density and house type).

3.2.1. Land Use

One component of urban morphology is land use. The land use pattern consists of various types: housing, industry, trade, and services. In its development, land use will also affect the existing network pattern [20]. The land use pattern in Medan Helvetia District illustrates a complex urban transformation. It is not just a reflection of physical development but of the socioeconomic dynamics of Medan's urban community.

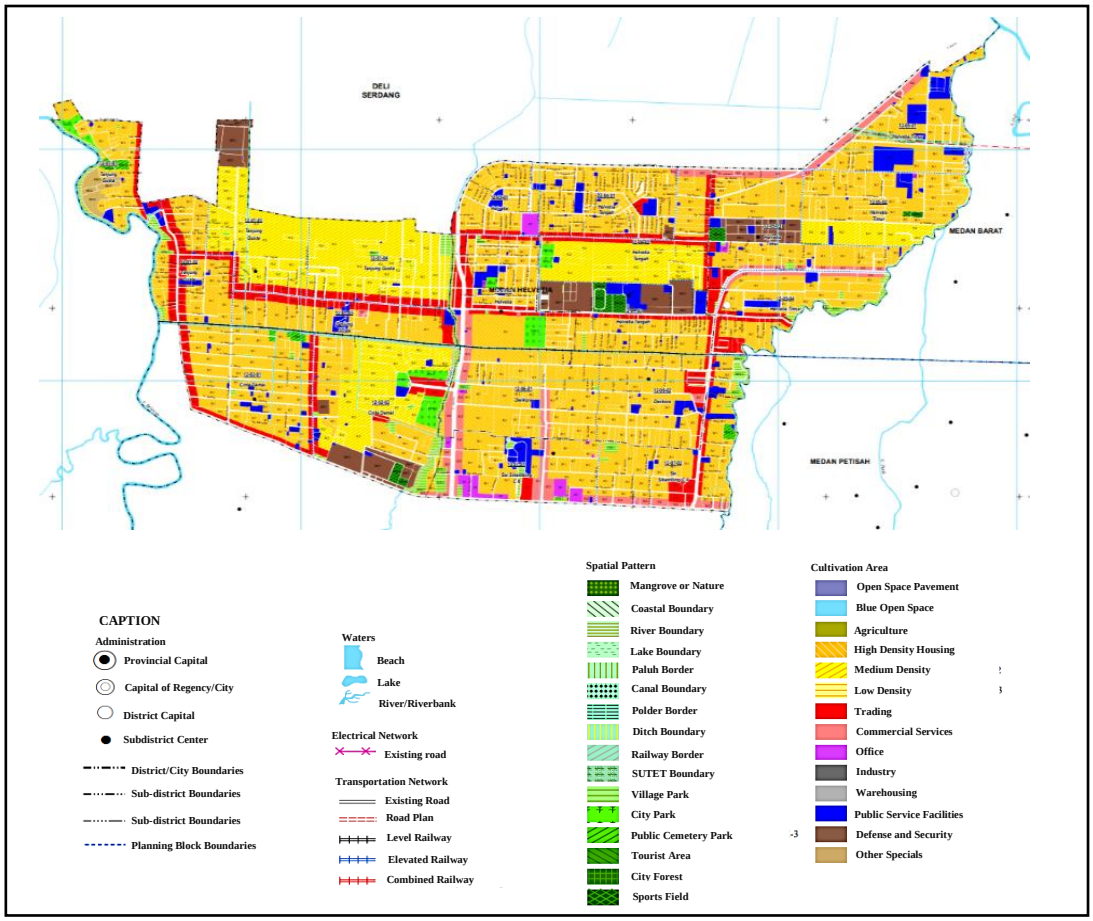

Figure 8 The Land Use Pattern in Medan Helvetia District

The land use pattern in Medan Helvetia reflects the characteristics of a developing urban area with mixed functions, with a mixture of residential areas, commercial areas, and public facilities. Commercial areas include trade and service centers along the main roads, shophouses, shops, and traditional and modern markets. Public amenities include educational institutions such as schools and universities, healthcare services like clinics and health centers, areas for worship, as well as parks and public outdoor spaces (**Figure 8**).

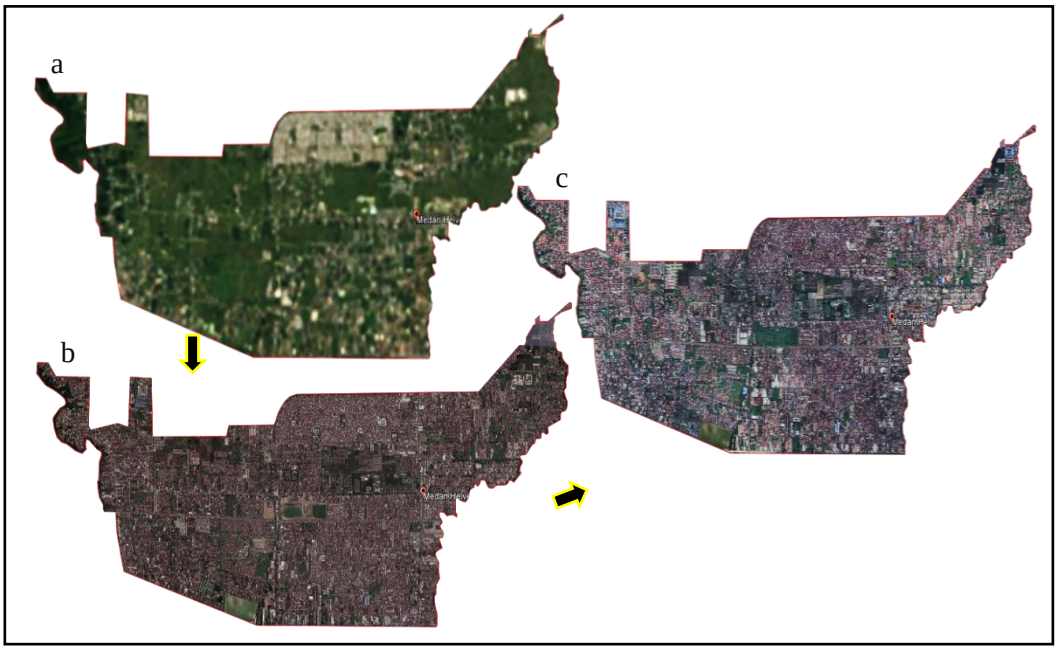

Figure 9 (a) Medan Helvetia District 1985; (b) Medan Helvetia District 2014; (c) Medan Helvetia District 2024

The development in Medan Helvetia District certainly causes changes to the morphology of the urban area itself; this can be seen and proven through the image above. The real implications of the growth and development of the dynamic city are physically marked by the appearance of land through land use patterns [23]. The demand for land, particularly for housing, will influence how many green spaces are available. Back in 1985, there were still many green spaces in the Medan Helvetia District (**Figure 9 a**), and the area will undoubtedly experience development. As a result, the initially empty land will be filled with buildings, especially residential buildings (**Figure 9 b**), until 2024. The need for housing will undoubtedly continue to develop from time to time due to the influence of the increasingly developing era; significantly, if the empty land is left continuously, it will harm investors because considering the more the era develops, the more the price of a plot of land will also develop (**Figure 9 c**).

Thus, land use and housing needs affect the morphology of the area. In addition, the effects of converting vegetation land into built-up land, which often occurs in urban areas, also contribute significantly to the factors that affect thermal comfort. The increasing density of built-up land causes a reduction in green spaces, which should function as temperature balancers and pollutant absorbers. This conversion not only changes the aesthetic and ecological functions of urban areas but also directly impacts the urban microclimate, namely increasing air temperature and decreasing thermal comfort for city residents. This condition emphasizes the importance of sustainable urban planning and green spaces to maintain environmental balance and the comfort of living in the city [28]**.**

3.2.2. Road Network Pattern

In addition to land use, morphology is also related to the road network pattern; this network supports the sustainability of community life, and its existence is essential because it is vital for a settlement [25]. The road network pattern (layout of streets) is the appearance of the road structure that forms a particular order. Determination of the periodization of city formation can be seen in actual manifestation through road patterns. There are six road patterns: concentric radial, radial ring, grid, spinal, hexagonal, and delta [20].

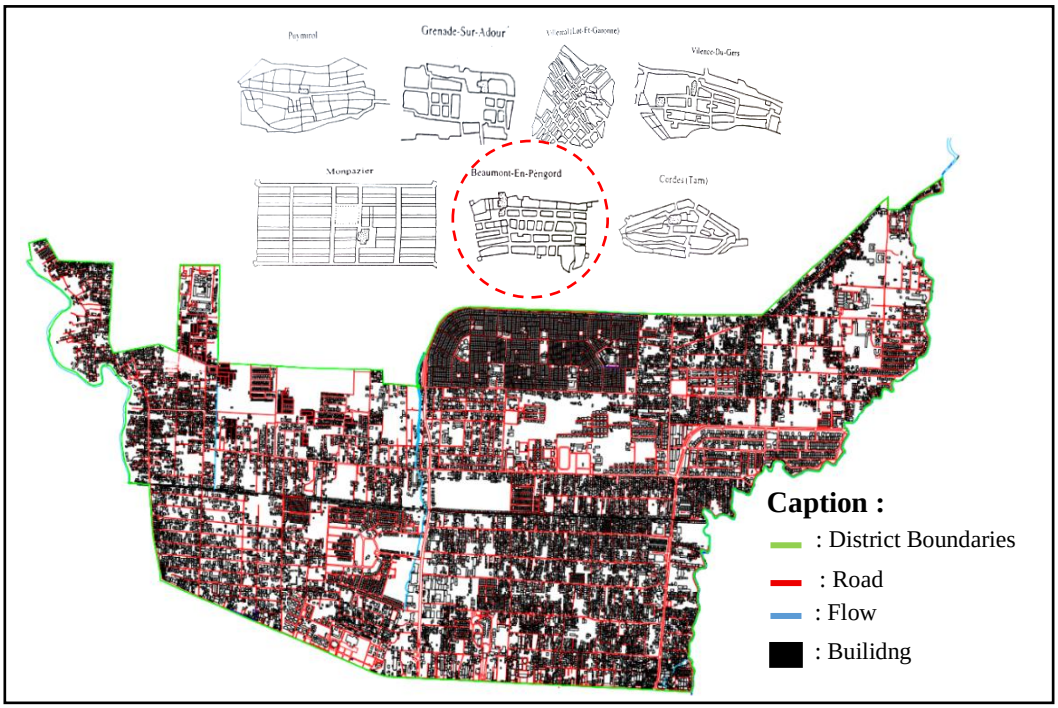

Figure 10 Road Structure in Medan Helvetia District

According to the findings from the study carried out by the researcher, the road layout in the Medan Helvetia District appears to follow a grid pattern (**Figure 10**). This observation is also backed by the outcomes of earlier studies [11] The statement indicates that the Medan Helvetia District features a transportation network made up of primarily straight lines or grid patterns, and it has a structure that is capable of further growth. Housing development has a significant role in forming and changing road structures with a grid pattern. The grid concept was initially developed as an efficient urban planning method, allowing for regular land division and systematic space organization. According to [1], in his book entitled "Struktur Ruang Kota," states that the grid structure, or what is known as the form of fortress cities, is a system of street patterns in which the city is divided into rectangular blocks with parallel longitudinal and transversal streets forming right angles. Many cities have used this grid system in their city planning. On the other hand, by using this grid system, the city's development will look more orderly by following the pattern that has been formed. Other advantages are the shortest dimension on the street side, growing more loss sheet frontage, and easier assembly of individual lots into large units.

Meanwhile, considerations of accessibility of new housing encourage the opening of new access roads, extending or branching off the existing grid. This results in initially rigid grid pattern variations, creating a more complex yet organized road network. Due to the need for housing, settlers could build access to their settlements or road networks around their homes. Meanwhile, regarding the road structure, according to [24] explain the types of road structures. These include Arterial Roads, Collector Roads, and Local Roads (**Table 2**).

Table 2 Road Structure of Medan Helvetia District

Road Type	Street Name
Primary Artery	- Gatot Subroto
	- Asrama
	- Kapten Sumarsono
Secondary Arteries	- Kapten Muslim
	- T. Amir Hamzah
Secondary Collector	- Gaperta
	- Danau Singkarak
	- Bakti Luhur

Road Type	Street Name
	- Budi Luhur - Setia Luhur - Amal Luhur - Cempaka / Jalan Pantai Barat
Primary Local	- Kelambir 5

3.2.3. Building System

The components of a building include building density and pattern [5]. In addition to building density and pattern, building typology is also significant to the building itself, especially as time goes by; an area will also experience changes, including alterations in material usage, visual aspects, building function, and the amount of building mass, this occurs due to population growth, changes in lifestyle, economic growth and changes in social status [2]**.** The most significant influence of typology in this study is the building typology element, so it can be concluded that the existence of typology can be used as a material for morphological studies based on the elements or components of the morphology itself [23].

Based on the results of the researcher's observations, the Medan Helvetia District area has diverse building typology characteristics, ranging from residential and commercial buildings to public facilities. However, the typology the researcher will discuss only focuses on housing typology. The most commonly found residential buildings are houses with types 36-45, both stand-alone and in the form of closed cluster houses. In addition, shophouses (ruko) are widely used as residences and commercial activities on the ground floor. The architectural characteristics of residential buildings in this district are also quite diverse, and some use a modern minimalist style. However, some cl and some still maintain a traditional feel. Regarding materials, in general, they have used a mixture of concrete, wood, tiles, zinc, glass, and aluminum. For residential buildings, the average height is around 1-2 floors, except for shophouses, which can reach three floors and so on.

Generally, the density pattern of residential buildings in Medan Helvetia District also varies from medium-density housing (R-2) to high-density housing (R-1), but R-1 is more dominant. Both certainly have pretty significant differences, which can be seen from the distance between buildings, where the distance between buildings in dense housing areas is usually relatively closer or even has no distance at all, while planned housing areas or those with medium density usually have a relatively large distance between buildings. Dense areas are usually found along main roads and around markets. Meanwhile, medium-density areas can be found in planned housing and mixed areas. Regarding the orientation of the building, generally, many face the main road for easy access. Based on the studies conducted, there are several case studies that researchers have chosen to better understand the morphology of housing in Medan Helvetia District. The selection of this location is based on several considerations, namely the medium-high population density zone, covering variations in house types, social and economic status, and experiencing morphology.

Table 3 Case Study Analysis

Location	Description
1. Helvetia Housing Estate 	a. Land Use: It is located in a Housing zone with a minimum width of 5 m, a minimum length of 6 m, side and rear boundaries of 1.5 m, and a ground floor area of 36 m². b. Road Structure Pattern: This housing uses a grid-like road structure pattern. In general, the building facade faces the local road. c. Building System The building system consists of a density pattern and building typology. - Density Pattern

Location	Description
Figure 11 High- Density Housing Zone  **Figure 12** Grid Pattern  **Figure 13** Building Typologi	This housing is located in a High-Density Housing Zone (**Figure 11**). The buildings are arranged in rows, forming a linear pattern with a row length of around 10-18 houses per grid (**Figure 12**). The houses are arranged in blocks at a reasonably close distance so that land use is more optimal. - Building Typology The buildings in Perumnas Helvetia function as houses that apply a local or conventional architectural style, and some already use a modern style with an average height of 1 floor, with prominent characteristics, namely a simple flat or sloping roof shape with tile or zinc material. Meanwhile, the building facade is dominated by functional concrete, glass, wood, and aluminum materials with little decoration. This can be seen in the elements of the building facade, such as reinforced concrete structures for foundations, columns, and beams, plastered and painted bricks or concrete blocks, walls and window frames, and doors made of wood or aluminum (**Figure 13**).
2. Tata Alam Asri Housing, East Helvetia  **Figure 14** Medium Density Housing Zone a.  b.  **Figure 15** (a) Asri Natural Housing Estate (2003); Asri Natural Housing Estate (2024)	a. Land Use: It is located in a Housing zone with a minimum width of 6 m, a minimum length of 7 m, side and rear boundaries of 1.5 m, and a ground floor area of 45 m². b. Road Structure Pattern This housing uses a grid-like road structure pattern. In general, the building facade faces the local road. c. Building System The building system consists of a density pattern and building typology. - Building Density Pattern This housing is located in a Medium Density Housing Zone. The buildings are arranged in rows, forming a linear and spaced pattern (**Figure 14**). - Building Typology The building typology in the housing area also varies; some consist of 2 floors, and some are 1-story housing buildings. The building design in Tata Alam Housing generally applies a modern architectural style, with an average use of shield roofs. The materials used in the building are mixed materials such as tiles for the roof, wood for doors and windows, iron for fences, concrete for walls, columns, and others. Based on historical images on Google Maps, this housing area has changed; the empty land that was initially grass has now been turned into a housing building. The typology changes in the Tata Alam Asri Housing Estate show the natural evolution of the housing area that responds to the dynamics of the needs of its residents (**Figure 15; Figure 16**). This transformation brings positive impacts and challenges that must be anticipated in planning future area development. The impacts of the typology changes include increasing property values, optimizing space

Location	Description
a.  b.  **Figure 16** (a) Existing Housing Complex of Tata Alam Asri (2017); (b) Existing Housing Complex of Tata Alam Asri (2024)	functions, improving residents' quality of life, and diversifying economic activities.

From the two case study examples, it can be concluded that each housing has a different zone density, some are medium and some are high, and each zone also has different building rules and typologies (**Table 3**).

4. Conclusion

Based on the researcher's analysis results, it can be concluded that Medan Helvetia District is one of the areas in Medan City, North Sumatra, that has experienced relatively rapid development in the last few decades, especially in the housing sector. This development directly impacts the availability of green spaces in the area. It is known that the availability of green spaces in Helvetia District still needs to meet the standards of Medan City's green spaces, especially public green spaces. This is due to population density and land misuse. As a result, the ecological function needs to be fulfilled, and the area is prone to flooding. Meanwhile, based on a review of the area's physical conditions, the housing morphology in Medan Helvetia District shows mixed characteristics ranging from residential areas with medium density (R-2) to high density (R-1). The road structure pattern is a grid. The grid road structure is a linear process and a complex dialogue between social, economic, and spatial needs. Meanwhile, accessibility considerations to new housing encourage the opening of new road access, extending or creating branches from the existing grid. This results in initially rigid grid pattern variations, creating a more complex yet organized road network. Due to the need for housing, settlers could build access to their settlements or road networks around their homes. However, the developments must also refer to the policies that have been determined; therefore, the government must continue to monitor the developments. This research suggests that the local government examine the accessibility of green areas, particularly public green spaces in the Helvetia District of Medan City. and confirm the applicable policies, in addition to optimizing the median road and the path along the road as a green lane, additional methods can include clearing land in communities, and it is also essential for residents to take part in the planning and upkeep of green spaces, this can include a study of participatory approaches that have been used in other cities and how they can be applied in Medan. Therefore, this research offers practical suggestions for enhancing city planning and the allocation of green areas.

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5. Conflict Of Interest

The individuals whose names appear below confirm that there is no conflict of interest related to the manuscript.

All authors have signed this statement to confirm that the information provided above is accurate and correct. If there are more than 10 authors, a photocopy of this form may be used.

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