Analyze of physical land use changes:  
Case study: Gagak Hitam Street, Medan

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Abstract. The Gagak Hitam Street was implemented in Sub-Regional Planning of Medan City. The Mayor's Decree changed the land use of Gagak Hitam Street from the special buildings to mix use area between shops and public buildings with a building setback from 15 meters changed to 10 meters. This research aims to determine how the process of physical change and the factors that cause physical land use changes at Gagak Hitam Street Medan in 2003, 2010 and 2017. Urban land use is classified as residential land, government and private offices, schools, health centers and industrial. The research uses qualitative methods with a case study approach that uses purposive sampling. The variables are land use, which can be measured by sub-variables such as land use function, type of activity, building intensity, building height, building setback and government regulations. Research conducted along Gagak Hitam Street is divided into three segments. The segment I (Gatot Subroto Street – Sunggal Street), segment II (Senegal Street - Bungan Asoka Street), segment III (Bunga Asoka Street- Setia Budi Street). This research indicates the process and results of physical land use changes on Gagak Hitam Street, which are used as data for development of the outer ring road area.

1. Introduction

In the Long Term Development Plan Of Medan City (2006 - 2025), the construction of the Central Medan City ring road of cities and urban areas to create an efficient movement system. According to the Medan City Spatial Planning and Building Agency, the initial planning of the outer ring road was applied to the designation of public buildings, special buildings and a green line of 60 meters to the left and right to secure the area along the ring road. Public buildings used are facilities provided for general activities such as schools, offices and hospitals. While special buildings or facilities provided for activities that are not included in the center or environmental center and special needs such as a building material store, repair shops, gas stations, and food stations. The typology of buildings on the outer ring
road is a single building so that the performance of the outer ring road is maximal with a building setback of 15 meters. Then, the width of the planned road is 48 meters with a 5 meter companion lane to the slow lane to the parking lane, and a parking lane width of 5 meters. The construction of an outer ring road that was built through several stages, land acquisition conducted in 1996, then physical construction which began around 1998. In addition, one of the residents who lived around the outer ring road, the Medan City Government began to do the construction of the outer ring road in 2004 then opened the outer ring road starting in 2005. And finally The Mayor's Decree changed the land use of Gagak Hitam Street from the special buildings to mix use area between shops and public buildings with a building setback from 15 meters changed to 10 meters. The road lane which was originally planned to be divided into fast lanes and slow lanes was also not realized. With this background, reviewed from the Republic of Indonesia Government Regulation about Concerning Roads, the outer ring road is a primary arterial road designed based on the lowest plan speed of 60 km/h with a road width of at least 11 meters with more capacity in terms of average traffic volume, long-distance traffic is not disrupted by shuttle traffic, local traffic, and local activities, but the fact that is happening now is not in accordance with planning, the designation of buildings along the Gagak Hitam Street which is a mix use function and commercial, the building setback should be 10 meters, but not all buildings comply with these regulations. This causes traffic volume to become congested and cause traffic congestion. As a result of changes in land use and road width that are not in accordance with planning, it affects the function of land and activities that occur at that location. Therefore the authors are interested in conducting research on the Analysis of Changes in Land Physical Land in Jalan Gagak Hitam Medan.

2. Method

The research process uses qualitative research with a case study approach. According to [1], qualitative research is a research procedure that produces descriptive data in the form of speech or writing and people who see. Case studies are part of a qualitative method that seeks to explore a particular case in more depth by involving the collection of various sources of information. The form of a case study can be described which aims to describe a symptom, fact, or reality. The data obtained is collected from various sources such as observations or written documents [2]. The variables are land use, which can be measured by sub-variables such as land use function, type of activity, building intensity, building height, building setback and government regulations. Research conducted along Gagak Hitam Street, which located on Gatot Subroto street until Setiabudi Street (Figure 1).

![Figure 1. Research Location](image-url)
2.1. Population and sample
Earl Babbie [3] in his book The Practice of Social Research (Fourteenth Edition), said: "Sampling is the process of selecting observations" (sampling is a process of assessment in behavior). The inspection process carried out in the process of getting a sample. Samples in qualitative research are not named respondents, but as resource persons, participants, or informants. Samples in qualitative research are also not called statistical samples, but theoretical samples because the purpose of qualitative research is to produce a theory. The results of the study do not generalize to the population because sampling is not taken randomly [4]. Therefore, the withdrawal of the sample used for the study of the Analyze Of Physical Land Use Changes in Gagak Hitam Street Medan is a sampling based on specific considerations and objectives (purposive sampling). This is because researchers feel the sample taken is the person who is most knowledgeable about the research problem.

3. Result and discussion
Changes in land use can be seen from the increase in building density caused by development with a variety of building functions such as trade and services, residential settlements, places of worship and other facilities. The Medan city government began work on the outer ring road, including Gagak Hitam Street in 2004. Then the condition of land use in the study area in 2003, only consisted of settlements and vacant land that had not been built, and several multi-function buildings (mix use) around Gatot Subroto Street and Sunggal Street. The construction of the ring road (including Gagak Hitam Street) began in 1999, but the construction began in mid-2005. Then on the map in 2010, the road that had been built from Gatot Subroto Street to Setiabudi Street was seen. Land use with more than the number of population settlements and also began to develop on the side of the Gagak Hitam Street. In 2017, more and more buildings were built in Gagak Hitam Street Medan. Land use is filled with new activities such as public shopping centers (malls) at each node of the intersection, such as Manhattan Mall, which is at the end of Gatot Subroto Street, Citywalk Ring Road, which is near the end of Sunggal Street, and Medan Focal Point at the intersection of Taman Setia Budi Indah housing complex. With respect to accompanying regulations and the land use functions, here are some sub-variables that we will discuss with the research.

3.1. Government Regulation
Medan City Spatial Planning and Building Agency, said that the initial planning of the outer ring road was applied to the designation of public buildings, special buildings and a green line of 60 meters to the left and right to secure the area along the ring road. Then, the width of the planned road is 48 meters with a 5 meter companion lane to the slow lane to the parking lane, and a parking lane width of 5 meters (Figure 2).

Figure 2. Initial Planning Of The Outer Ring Road
However, The Mayor's Decree of 2011 changed the land use of Gagak Hitam Street from the special buildings to mix use area with a building setback from 15 meters changed to 10 meters. The road that was originally planned to be divided into fast lanes and slow lanes, but the results of field research revealed that in the study area slowly experienced physical changes in aspects of land use and lanes and the original road width of 48m changed to 33m (Figure 3). Medan City Spatial Planning and Building Agency said, that affects the change in the width of the road from initial planning due to the problem of land relinquishment with local residents.

![Construction Of The Outer Ring Road](image_url)

**Figure 3. Construction Of The Outer Ring Road**

3.2. Land Use Function

By looking at the reasons for the population to choose to live in the research location, it was concluded that Gagak Hitam Street was a strategic location because it was close to the downtown. This complements the theory of [5], that land use has two types of patterns which are linear following the main road and clustering close to the main road. The theory of [6], also supports changes in land use functions that occur in Gagak Hitam Street Medan that changes from land that has not yet been built into land that has been built with trade and service functions and changes in mixed crop land into residential land, based on the need to own a house good in a convenient location. [5] states that land use change is also influenced by the availability of urban facilities and infrastructure as well as the presence of magnets or towers on the site. This can be seen also in the research locations, namely commercial buildings such as restaurants (green blocks) that line up near the settlement location and also the mall (the yellow block) located at each intersection node in a segment I and segment II the research location is a magnet or puller of the site. Land use function of Gagak Hitam Street can see on (Figure 4).

![Land Use Function of Gagak Hitam Medan](image_url)

**Figure 4. Land Use Function of Gagak Hitam Medan**
3.3. **Type of Activity**

According to Regional Regulation In The Long-Term Development Plan, Gagak Hitam Street Medan is a trading zone and trading sub-zone classification service (K1). After being analyzed according to the results of observations, interviews, theories, and regional regulations, the type of activity on Gagak Hitam Street, which was originally only in the form of vacant land and rice fields (map image in 2003), over time, has grown rapidly into trade and services (map images in 2010 and 2017). In accordance [7], the location of the research which is a strategic area is able to become a value added in the competition of shopping centers, therefore it is possible for more developers to build commercial buildings in this area. A striking activity is the construction of a mall that selects the location of each intersection node which is the most strategic location of the research location in the segment I (Manhattan Mall and Condominium) and segment II (Ring Road City Walk and Medan Focal Point).

![Figure 5. Shopping Centers on Gagak Hitam Street Medan](image)

3.4. **Building Intensity and Building Height**

According to the general provisions of zoning regulations that come from Spatial Planning and Building Management of the Medan City Government, the housing area has a maximum Building Coverage Ratio of 60% and a maximum Floor Area Ratio of 2.4. While the commercial area (trade and services) has a maximum Building Coverage Ratio provision of 70% for large single-unit buildings and 90% of shop buildings. Maximum Floor Area Ratio 35 for single-unit large-scale buildings and 4.5 for the mixed-use building. According to the results of interviews with 10 residential residents/shop owners as informants, the building’s intensity and height requirements were set by the building developer, the informants only lived in the finished building. After being analyzed according to the observations, the intensity and height of the building in Gagak Hitam Street Medan are in accordance with the Medan City Government regulations. In accordance with the theory of [8], the change in intensity that occurred in Gagak Hitam Street Medan which was originally a lot of vacant lands and then built many multilevel buildings is vertical, fortunately, can accommodate maximally the activities that occur on Gagak Hitam Street Medan.

![Figure 6. Building Intensity on Gagak Hitam Street Medan](image)
3.5. Building Setback
According to the Mayor of Medan, the land use allotment along the outer ring road starting from Setiabudi Street intersection to the intersection of Gatot Subroto Street (Gagak Hitam Street Medan) has a building setback which was originally 15 meters change to 10 meters. Commercial buildings such as surfaces (mix use buildings) and shopping centers (malls) have building setback of 5-10 meters, while government regulations state building setback on Gagak Hitam Street Medan is 10 meters, so the buildings at the research location have not all been in accordance with government regulations. Some commercial buildings that have a building setback of 5 meters. This was triggered by the many mixed use buildings, home offices, and other commercial buildings that were more concerned with the benefits of commercial business (profitable business) that occurred on land taken from the building boundary. It is different from shopping centers (malls) in segments I and segment II, if observed the building has followed the government regulation of building setback size of 10 meters, but what happens at the research location is that the mall is a new source of congestion. After field observations and data obtained, it turns out that causing congestion at each shopping center on Gagak Hitam Street Medan is due to a lack of parking (parking supply) provided by the builder which resulted in the visitor's vehicle not being fully accommodated by the mall. The consequences of these problems are detrimental to road users because of the supposed planned road conditions for the primary arterial pathway which is designed based on the lowest speed of 60km/h but the reality is that the volume of traffic is heavy and causes traffic congestion.

![Figure 7. Building Setback on Gagak Hitam Street Medan](image)

4. Conclusion
The Medan City Government began work on the outer ring road, including Gagak Hitam Street in 2004. Then the condition of land use in the study area in 2003, only consisted of settlements and vacant land that had not been built, and several multi-function buildings (mix use) around Gatot Subroto Street and Sunggal Street. The construction of the ring road (including Gagak Hitam Street) began in 1999, but the construction began in mid-2005. Then on the map in 2010, the road that had been built from Gatot Subroto Street to Setiabudi Street was seen. Land use with more than the number of population settlements and also began to develop on the side of the Gagak Hitam Street. In 2017, more and more buildings were built in Gagak Hitam Street Medan. Land use is filled with new activities such as public shopping centers (malls) at each node of the intersection, such as Manhattan Mall, which is at the end of Gatot Subroto Street, Citywalk Ring Road, which is near the end of Sunggal Street, and Medan Focal Point at the intersection of Taman Setia Budi Indah housing complex.

From the results of the research obtained several factors that cause physical land use changes that occur on Gagak Hitam Street are as follows:

1. Regulations
The city government has the authority to make regional zone regulations in each region.

2. Accessibility
Gagak Hitam Street was a strategic location because it was close to the city center.
3. Activity
Activity on Gagak Hitam Street, which was originally only in the form of vacant land and rice fields, over time, has grown rapidly into trade and services. The location of the research which is a strategic area, is able to become a value added in the competition of shopping centers, therefore it is possible for more developers to build commercial buildings in this area.

4. Building Intensity and Building Height
The change in intensity that occurred in Gagak Hitam Street Medan which was originally a lot of vacant land and then built many multilevel buildings is vertical, fortunately can accommodate maximally the activities that occur on Gagak Hitam Street Medan.

5. Building Setback
So many mixed use buildings, home offices, and other commercial buildings that were more concerned with the benefits of commercial business (profitable business) that occurred on land taken from the building boundary.

The concept of planning a ring road cannot be implemented because of the problem of land relinquishment by local residents. Therefore, the government changed the regulations regarding the ring road which should have been 48m wide, but changed to 33m the width of the road being built now. The built vehicle path is also not in accordance with the initial planning which has fast lanes and slow lanes. This has an impact on accessibility because there is no control of traffic flow.

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