

LAND FUNCTION TRANSFER OF GREEN OPEN SPACE DESIGN IN RESIDENTIAL AREAS IN RANCASARI DISTRICT, BANDUNG CITY

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Abstract

The transfer of Green Open Space (GOS) land use in the Rancasari District Residential Area of Bandung City is carried out by assessing land availability based on land ownership, spatial planning regulations, GOS types, field observations, as well as GOS accessibility, services, and distribution. Land conversion, also known as land use change, is the change of part or all of the original function of land to another function, which affects the environment and the potential of the land itself. The provisions of green space parks explain the permitted uses, conditional uses, and prohibited uses with the aim of maintaining the function of green space in green space parks. The provision and utilization of green open spaces consider the following functional aspects: ecological, water absorption, economic, socio-cultural, aesthetic, and disaster management. The objective of this study is to collect accurate information and data on the current state of green open spaces. This data will be used as a basis for designing and developing green spaces that are in line with the needs of the community and the surrounding environmental conditions. The research methods used are quantitative methods based on positivism (concrete data) and Geographic Information System (GIS) methods or spatial geographic information data on green open spaces. The focus of the survey, research, and design of green open spaces (GOS) in the residential environment of Rancasari District, Bandung City, is on analyzing the current situation and the community's needs to create optimal and sustainable green open spaces (GOS).

Keywords: Green Open Space, Residential Park, Land Use Conversion, Rancasari Subdistrict.

1. Introduction

The development of infrastructure in Bandung City will somewhat reduce the percentage of Green Open Space (GOS) in urban areas. Any development carried out in open spaces can reduce the percentage of Green Open Space in Bandung City, so the establishment of Green Open Space (GOS) has been mandated to ensure the environment remains preserved for the prosperity and health of the community, in accordance with Law No. 26/2007 on Spatial Planning (Indonesia, 2007). At the urban level, GOS is mandated to be 30% of the total area. Based on Law No(Indonesia, 2014, 2019, 2022). 26 of 2007 concerning Spatial Planning, among other things, it has been explicitly mandated that 30% of the city/urban area must be in the form of Green Open Space (GOS) with a composition of 20% Public GOS and 10% Private GOS. If an urban area does not meet the applicable Green Open Space requirements and development continues, it can cause problems in the long term(Indonesia, 2011).

According to Superiyatno (1996:272), green spaces are an important element of cities in tempering urban temperatures, and the arrangement of green spaces in urban areas is an integral part of overall spatial planning(Ina, 2024a). The presence of plants can improve the quality of life for people in urban areas(Ina, 2024b). In order to improve the quality of life in urban areas, which includes the earth, water, space, and the wealth contained therein, efforts are needed to maintain and develop urban green areas(Ina & Achmad Saeful, 2020).

In Regulation of the Minister of Agrarian Affairs and Spatial Planning/Head of the National Defense Agency Number 14 of 2022, it is stated that in an effort to mitigate climate change and achieve the mission of net zero emissions, local governments are obliged to provide quality green open spaces (Dwiana & Amrifo, 2020; Nisrina F et al., 12 C.E.). One of the efforts to achieve the minimum green space target in Bandung City is by encouraging the creation of Urban Green Spaces, which includes identifying the availability of neighborhood parks as one of the public facilities in residential areas in Bandung City (Ana Ramdani, 2021).

The city of Bandung covers an area of 16,730 hectares, or 167.3 square kilometers. In 2015, the city's green open space totaled 2,032.21 hectares, or 12.15% of the city's total area. In 2021, the area of green open space in the City of Bandung reached 2,048.97 hectares, or just 12.25% of the city's total area. The City of Bandung still falls short by approximately 17% of meeting the minimum proportion of green open space required by law, which stipulates that green open space in a city must cover at least 30% of its total area. The Rancasari subdistrict has a total community park area of 1,422.20 m², consisting of 5 community parks that have completed the Handover Report (BAST) based on the Land Use Distribution Study for Infrastructure and Utility Facilities (Public Services and Utilities, PSU) in Residential Areas for Green Open Spaces (GOS) in Neighborhood Parks (Community Parks) in the City of Bandung (Ramli, 2022). The conversion of Green Open Space (GOS) land in the Rancasari Subdistrict of Bandung City was carried out by identifying land availability, taking into account land ownership status, spatial planning, GOS typology, field surveys, as well as the accessibility, serviceability, and distribution of GOS (Daniel Andrea, 2023; Ina, 2023). By considering all these aspects, the Green Open Space (GOS) Design Investigation Survey for the Residential Area in Rancasari Subdistrict, Bandung City, can identify the optimal location for the Community Park and ensure that the utilization of residential Public Service Facilities land is carried out effectively and in accordance with regulations (Adifa & Wala, 2023).

The research issue addressed in this study is how to identify the availability and ownership status of IFU (Infrastructure, Facilities, and Utilities) land in the residential area of Rancasari Subdistrict, Bandung City, in order to determine the optimal location for a Neighborhood Park by considering spatial planning requirements, green open space typology, as well as aspects of accessibility, serviceability, and distribution so that the land is utilized effectively and in accordance with applicable regulations (D. Wang, P.-Y. Xu, B.-W. An, 2024). The primary objective of the Green Open Space (GOS) Design Investigation Survey in the residential area of Rancasari Subdistrict, Bandung City, is to collect accurate data and information regarding the current condition of GOS (P. Herath, 2024). Identifying instances where land designated for Infrastructure, Facilities, and Utilities (IFU) is being used inappropriately land that should be utilized as green open space allows for mapping the ownership status and legal standing of the remaining land, which can then be re-optimized into green open space in accordance with urban service standards (Revayanti & Gunawan, 2025). This data will subsequently serve as the foundation for designing and developing green open spaces that align with community needs and local environmental conditions (Setiawan & Tonny Judiantono, 2025). The research, investigation, and design of green open spaces (GOS) in the residential area of Rancasari Subdistrict, Bandung City, focused on analyzing existing conditions and community needs for optimal and sustainable design of green open spaces (Ina & Avianti, 2026; Yaqub et al., 2013).

2. Method

The conversion of Green Open Space (GOS) in Rancasari Subdistrict began with a design investigation survey of Green Open Space (GOS) in the residential area of Rancasari Subdistrict, Bandung City, which was conducted using a quantitative approach based on primary and secondary data. The quantitative approach was carried out using a survey method to collect data on green open spaces in residential areas that had undergone asset transfers in Rancasari Subdistrict, through primary surveys or direct field surveys to obtain existing data, and secondary surveys based on existing data from stakeholders related to the distribution of green open spaces in neighborhood parks.

Data Sources

The data sources in this study are primary data, consisting of direct observations and interviews with relevant sources regarding green open spaces in Rancasari Subdistrict, and other secondary data, such as books, articles, and documentation from previous studies obtained from relevant stakeholders

Analysis Methods

The analysis of the conversion of Green Open Space (GOS) began with an investigative survey using quantitative research methods based on positivism (concrete data). The research data consisted of figures that were measured using statistics as a calculation tool, related to the issues being studied to produce a conclusion (Sugiyono, 2021). The activity is carried out by conducting a direct survey of existing conditions, which is then processed into spatial data based on geographic information, based on the aspect of emphasizing the fulfillment of the green open space distribution database in residential areas (Creswell, 2015). The Geographic Information System (GIS) method is a computer-based system used to store, collect, manipulate, retrieve, transform, process geographic information, and collect data on the Earth's surface for specific purposes. Spatial information on housing and settlements is needed as a tool for identification and as material for planning appropriate and sound development directions. The land-use change evaluation process is conducted through the delineation of land use in residential areas, beginning with a comparison of residential site plans with existing land-cover maps derived from the latest satellite imagery. These two maps are then analyzed using an overlay method to assess the extent of land-use changes, with the results presented in a user interface for easy comprehension. Specifically for residential and settlement areas, the scope of this study focuses on monitoring the availability of Infrastructure, Facilities, and Utilities (IFU) by referring to official site plan documents that have been submitted to the Bandung City Housing and Settlement Agency. With the Geographic Information System (GIS), it is hoped that it can assist in the analysis of the Green Open Space (GOS) Design Investigation Survey in the residential area of Rancasari Subdistrict, Bandung City, so that the distribution of green open spaces in residential areas can be mapped properly. This will enable green open spaces, as an important element of the city that maintains the quality of life of people in urban areas, to be planned for proper and appropriate development.



Figure 1 Flowchart of Land-Use Conversion for Green Open Spaces (GOS) in Residential Areas in Rancasari Subdistrict

3. Results And Discussion

3.1 Policy Review

Green spaces are elongated areas/pathways and/or clusters that are open to the public, where plants grow, either naturally or deliberately planted, taking into account ecological, water absorption, economic, socio-cultural, and aesthetic aspects (Law 11/2021, Article 1). The provision of Green Open Spaces can be achieved through the utilization of Green Open Spaces and Blue Open Spaces. Green Open Spaces and Blue Open Spaces are part of the provision of Green Open Spaces to enhance the quality of space. Green Open Spaces must constitute at least 30% of the total area of

a city or urban area, calculated both quantitatively (based on land area) and qualitatively (through the IHBI index).

Based on Regulation of the Minister of Agrarian Affairs and Spatial Planning/Head of the National Land Agency No. 14 of 2022 concerning the Provision and Utilization of Green Open Spaces, the functions of providing and utilizing green open spaces include: 1) Ecological, such as oxygen production, serving as the lungs of the city, regulating the microclimate, providing shade, absorbing rainwater, providing habitats for vegetation and wildlife, absorbing and filtering air, water, and soil pollution, blocking wind, and/or reducing noise. 2) Water absorption, providing areas for water absorption and groundwater recharge; and/or flood control. 3) Economic, giving assurance of increased land value, providing added value to the urban environment, providing space for agricultural, plantation, forestry, and/or nature tourism production. 4) Socio-cultural, namely preservation of historical aspects, provision of space for community interaction, provision of space for recreational and sports activities, provision of space for cultural expression, provision of space for creativity and productivity, provision of space and objects for education, research, and training; and/or provision of space to support health. 5) Aesthetics, namely improving environmental comfort, enhancing the beauty of the environment and the city landscape as a whole, shaping the identity of city elements; and/or creating a harmonious and balanced atmosphere between built and unbuilt areas. 6) Disaster management, namely reducing disaster risk, providing disaster evacuation space; and/or providing post-disaster recovery space.

3.2 Land Use

Based on satellite imagery, it can be seen that the residential areas in Rancasari Subdistrict have undergone significant changes. From year to year, the amount of land used for farming has decreased significantly, while the area designated for services, industry, and residential areas has increased. Each year brings changes, especially in the southern part of Rancasari Subdistrict, which still has a considerable number of freshwater ponds and farms compared to 2010. Residential areas are the largest land use in Rancasari Subdistrict, covering an area of 276.80 hectares or about 39.60% of the total subdistrict area, followed by rice fields covering an area of 101.10 hectares or about 14.46%. Meanwhile, land use as green space in Rancasari Subdistrict covers an area of 57.7 hectares or about 8.25%. Table 2 below outlines the area and percentage of land use changes in Rancasari Subdistrict;

Table 1 Land Use in Rancasari Subdistrict, 2024

No.	Land Use	Area (Ha)	Percentage (%)
Unbuilt Area			Unbuilt Area
1	Rice fields	101,10	14,46
2	Gardens or fields	46,30	6,62
3	Vacant land	86,40	12,36
4	Green open spaces	57,70	8,25
5	Freshwater ponds	13,70	1,96
Unbuilt Area		305,20	43,66
Built-Up Area			Built-Up Area
1	Commercial and Services	62,50	8,94
2	Residential and Housing	276,80	39,60
3	Industry	22,00	3,15
4	Offices	32,50	4,65
Built-up Area		393,80	56,34
Total Area		699,00	100,00

Source: Analysis, 2024.

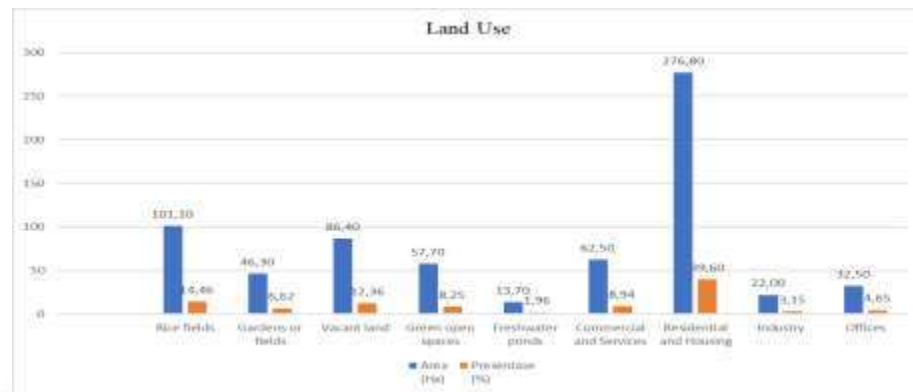


Figure 2 Land Use in Rancasari Subdistrict

The Rancasari subdistrict itself only has five neighborhood parks with a total area of 1,422.20 m². For more details, see the image below.



Source: On-site and Online Media Survey Results, 2024

Figure 3 RTH neighborhood park in Rancasari Subdistrict

3.3 Identification of Land Use Change in PSU Residential Areas (RTH Residence) in Rancasari Subdistrict

Based on data from the Regional Development Planning Agency (DPKP3) guided by the KPK's Monitoring Center for Prevention (MCP) and BPK's TLHP 2024 documents, changes in land use have been found in residential community facilities (PSU). These changes are more commonly seen in public spaces that should be Green Open Spaces (GOS) and public roads that have been converted into public parking areas, garages, or buildings controlled by individuals and institutions. These changes in the function of public service facilities land have occurred gradually and incrementally, even since the initial development of residential projects by developers. These changes are more prevalent in new clusters in the city of Bandung that are intended for the convenience of newcomers and are used as businesses by local residents.

Local residents often change the use of green open spaces (green spaces) for economic purposes. These green spaces are usually used as locations for street vendors or food stalls that suddenly appear along the road, motorcycle taxi stands, parking areas, and so on. However, there are also irregularities in the use of land outside of Greenery Areas, especially within residential areas

themselves. For example, dead-end streets in cul-de-sac housing areas are often used as garages by residents living nearby. This becomes a problem because they park their vehicles by adding roofs as protection for their vehicles.

Based on data from the Monitoring Center for Prevention (MCP) and the results of the team's survey, it was concluded that there had been land use changes in residential areas in Rancasari Subdistrict, including the Bandung Inten Indah Complex and the Panghegar Town House Complex.

Table 2 The land use change of land for public facilities and utilities in the Rancasari Subdistrict

No.	Residential	Existing	Coordinates	Changes	Area (m ²)	Changed/ Unchanged	Existing Conditions (photo)
1.	Bandung Inten Indah	Permanent warehouse building	6°57'44,826" S 107° 41' 7,572" T	TPS becomes a warehouse building	19,30	Changing	
2..	Bandung Inten Indah	Concrete ground field	6° 57' 48,09" S 107° 41' 6,276" T	RTH became a paved sports field	289,52	Changing	
3.	Bandung Inten Indah	Parking area	-6.963555, 107.683775	Green space becomes parking space	346,00	Changing	
4.	Bandung Inten Indah	Permanent Gazebo Structure	-6.963813, 107.685056	RTH becomes a Gazebo	1.041,00	Changing	
5.	Panghegar Town House	Roads and Permanent Buildings	'-6.944583, 107.665212	RTH becomes Roads and Permanent Buildings	41,40	Changing	
6.	Panghegar Town House	Roads and Permanent Buildings	-6.9434423, 107.664908	RTH becomes Roads and Permanent Buildings	51,30	Changing	
7	Panghegar Town House	Roads and Permanent Buildings	'-6.944504, 107.6652862	RTH becomes Roads and Permanent Buildings	59,50	Changing	

Source: Regional Development Planning Agency, 2024

3.3.1 Land Use Change in the Bandung Inten Indah Complex

The land use change in the Bandung Inten Indah Complex occurred from a park (Green Open Space) to a parking lot equipped with a permanent gazebo. Around the park area, there are signboards indicating that the area is public facilities and infrastructure for residences that are currently under development. The area appears to be quite spacious with several trees providing some shade for pedestrians, and the paving block road in the middle of the area looks flat and clean.

Regardless of the above conditions, there are indications of land use conversion in the Bandung Inten Indah Complex covering an area of 1,387.00 m², with the existing park area in the Bandung Inten Indah Complex covering only 40.94 m² and the residential public service area covering 16,632.51 m².

Table 3 Land usage of Bandung Intan Indah Complex

No.	Existing Land Usage	Area (m ²)
1	Industrial Buildings	10,14
2	School Buildings	297,59
3	Commercial and Service Buildings	0,69
4	Places of Worship	259,63
5	Residential Buildings	34.331,31
6	Roads	16.033,66
7	Ponds	265,77
8	Yards	14.294,57
9	Rice Fields	427,10
10	Scrubland	4.698,39
11	Rivers	75,65
12	Parks	40,94
13	Vacant Lots	17.972,20
14	Fields/Farmland	5.667,77
Total		94.375,40

Source: Analysis, 2024.

Table 4 Area of Bandung Intan Indah Complex Public Utilities

No.	Utilities (PSU)	Area (m ²)
1	School Buildings	297,59
2	Places of Worship	259,63
3	Roads	16.033,66
4	Parks	40,94
5	Commercial and Service Buildings	0,69
Total		16.632,51

Source: Analysis, 2024.



Figure 4 Park Area with Public Notice Board

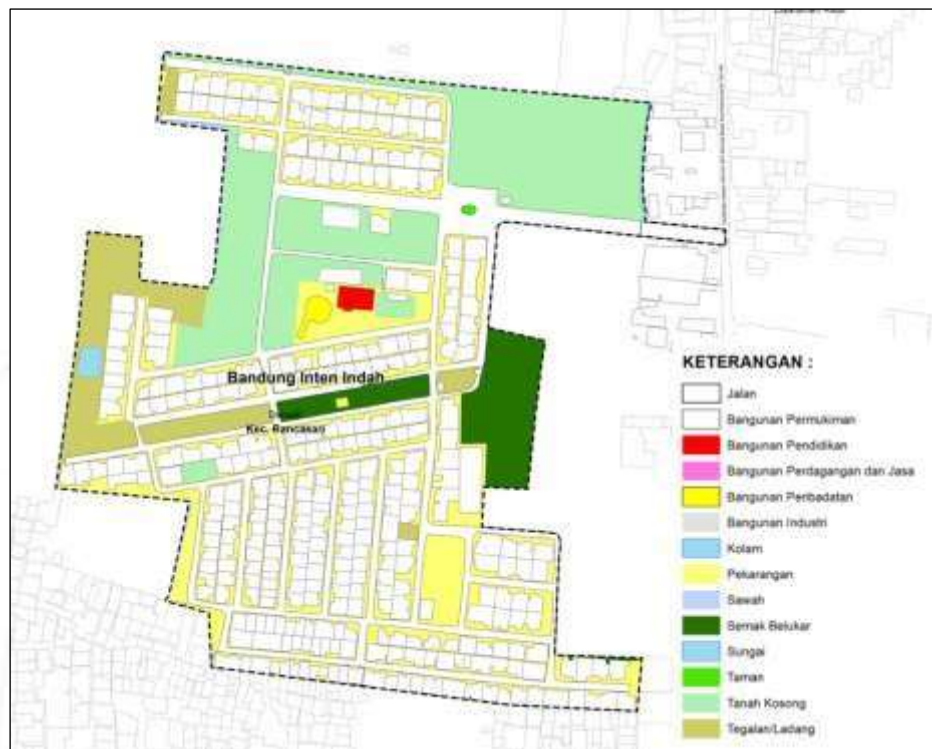


Figure 5 Site Plan and Land Usage Map of Bandung Intan Indah Complex



Figure 6 Map of Land Use Change in the Bandung Intan Indah Complex

3.3.2 Land Use Change of the Panghegar Town House Complex

The conversion of Public Service Utility land in the Panghegar Town House Complex occurred in three locations where green space was converted into roads and permanent buildings. On one of the converted green spaces, the housing management and residents who use the green space agreed to the installation of boundary markers but refused to allow the installation of information boards and continued to recognize the land as green space. Meanwhile, on other converted land, the housing management and residents changed the land by installing paving blocks to make it look neat and agreed to the installation of green space boundary markers. In addition, some green space has been converted and used as a sports field by residents of the Panghegar Town House Complex, and the housing management is willing to install public service information boards and request socialization regarding green space and public facilities for residents of the Panghegar Town House Complex. Indications of land use deviation in the Panghegar Town House Complex covering an area of 152.20 m², while the existing land use as land cover in the Panghegar Town House Complex covers an area of 5,607.67 m² and with a residential utility area of 1,002.03 m².

Table 5 Land usage of the Panghegar Town House Complex

No.	Existing Land Usage	Area (m ²)
1	Residential Buildings	2.515,13
2	Roads	986,28
3	Yards	1.814,81
4	Scrubland	131,82
5	Vacant Lots	15,75
6	Fields/Farmland	143,88
Total		5.607,67

Source: Analysis, 2024.

Table 6 Area of Panghegar Town House Complex Public Utilities

No.	Utilities (PSU)	Area (m ²)
1	Roads	986,28
2	Vacant Lots	15,75
Total		1.002,03

Source: Analysis, 2024.



Figure 7 Existing Location of Land Use Conversion for Public Utilities Panghegar Town House Complex

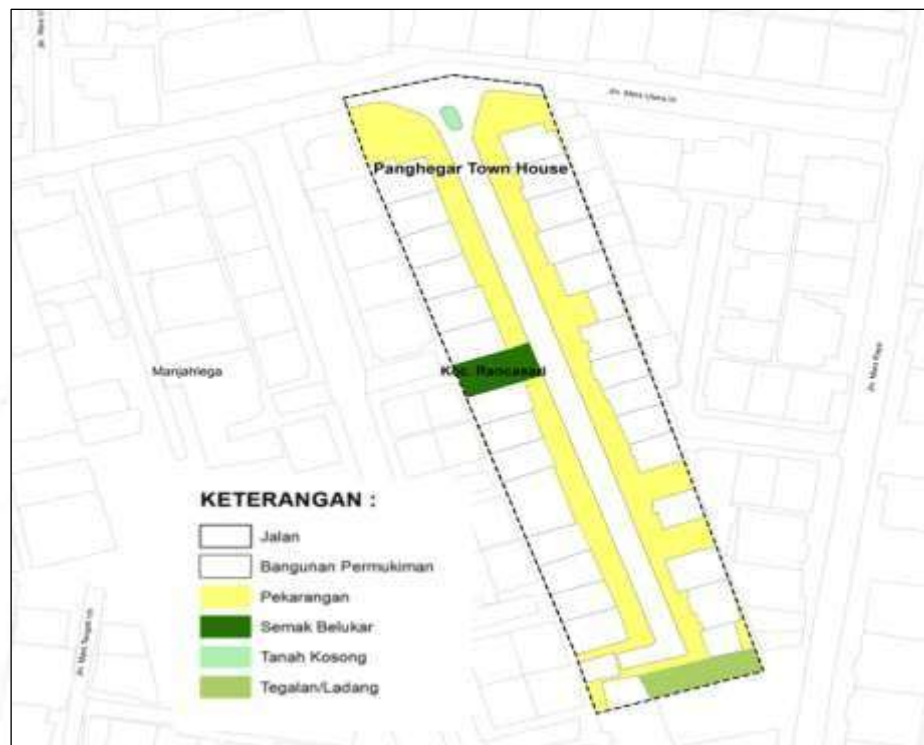


Figure 8 Site Plan and Land Usage Map of Panghegar Town House Complex



Figure 9 Map of Land Use Change in the Panghegar Town House Complex

3.3.3 Factors affecting the conversion of Public Service Utility (PSU) land

The limited availability of parking lots in the Bandung Inten Indah Complex, coupled with the increasing number of private vehicles that is not proportional to the size of garages in small-type homes, has forced residents or developers to use open spaces (greenery areas) as shared parking lots. This routine prompted a group of residents to build a parking lot equipped with a permanent gazebo structure as a communal gathering area. Meanwhile, in the Panghegar Town House Complex, the conversion of Green Open Spaces (GOS) into roads or parking areas typically occurs due to the pressing need for circulation space that was not accommodated in the initial housing design. The number of residents' vehicles exceeds the capacity of the home garages (carports), leading to the GOS being repurposed for parking. Residents often pave the garden area with paving blocks to allow vehicle access, which technically eliminates the area's water absorption function.

The impact of this land-use change in the residential area is a decrease in the Green Cover Coefficient (GCC), which reduces groundwater absorption capacity and triggers local flooding in residential areas. Additionally, violations of the site plan due to discrepancies with the documents submitted to the Bandung City Public Works and Housing Agency may hinder the administrative process of asset handover from the developer to the City Government. Another impact is that replacing vegetation with asphalt or concrete increases the microclimate temperature in residential areas. In the context of monitoring in Rancasari Subdistrict, these changes are typically detected during the satellite image overlay process, which reveals the loss of green hues at coordinates that should correspond to parks or green belts according to the site plan.

3.4 Misalignment of Land Use Conversion for Public Facilities in Rancasari Subdistrict

Land use conversion irregularities as land use conversion inconsistencies, particularly Green Open Space (GOS) in the Bandung Inten Indah Complex and Panghegar Town House Complex in Rancasari Subdistrict, reached 10.48% with a GOS area of 17,634.54 m² out of a total housing area of 99,983.07 m². This result is an accumulation of public service facility land use change to functions other than public service facilities for residential areas. The non-compliance of land use change that occurred in the Bandung Inten Indah Complex reached 10.19% of the residential public service facility area of 16,632.51 m², namely the conversion of green space into parking lots, permanent buildings, and gazebos. Meanwhile, the non-compliance that occurred in the Panghegar Town House residence reached 15.19% of the residential public service area of 1,002.03 m² with a residential area of 5,607.67 m², namely the conversion of green space into roads and permanent buildings.

In general, the suitability of public service facilities 2 residences in Rancasari Subdistrict, which have been identified as public service facilities land conversion, is still in accordance with the site plan that has been handed over to the Bandung City Government. Based on the results of the public service facility suitability analysis, a suitability typology was compiled based on the presentation results;

Table 7 Land Suitability Typology for Public Service Utilities

Suitability	Percentage (%)
Not suitable	0-33
Less suitable	34-67
Suitable	67-100

Source: Analysis, 2024.

Overall, the deviation in the conversion of public service facilities 2 residences in Rancasari Subdistrict was 10.48%, resulting in a land suitability rating of 89.52%. For more details on the deviation in the conversion of public service facilities residences, please refer to the graph and table below;

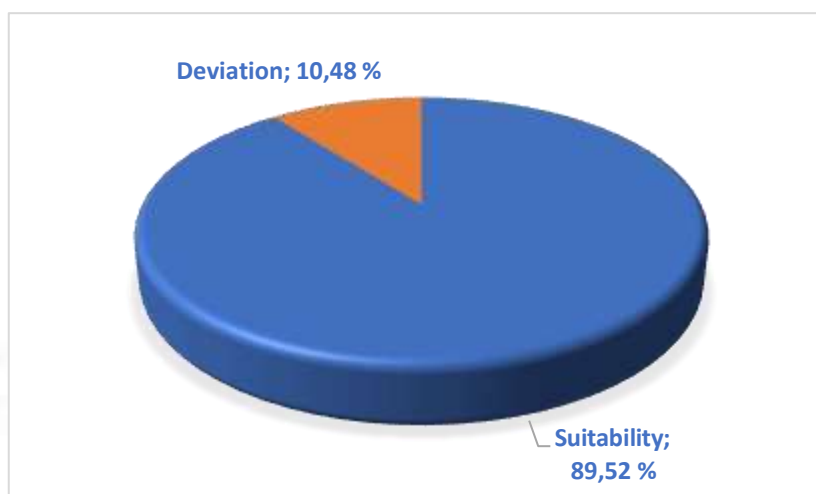


Figure 10 Percentage of Suitability of Public Facilities Land for Residences in Rancasari Subdistrict

Table 8 Land Use Change Deviations in public utility residential areas in Rancasari Subdistrict

No.	Residential	Change	Area (m ²)	Suitability	Percentage Change (%)	PSU area (m ²)	Residential Area (m ²)	Existing Conditions (photo)
1.	Bandung Inten Indah	Landfill becomes a warehouse building	19,30	Tidak Sesuai	0,12	16.632,51	94.375,40	
2.	Bandung Inten Indah	GOS became a paved sports field	289,52	Tidak Sesuai	1,74			
3.	Bandung Inten Indah	Green space becomes parking space	346,00	Tidak Sesuai	2,08			
4.	Bandung Inten Indah	GOS becomes a Gazebo	1.041,00	Tidak Sesuai	6,25			
Change of land use in Bandung Inten Indah			1.695,82		10,19			
5.	Panghegar Town House	GOS becomes Roads and Permanent Buildings	41,40	Tidak Sesuai	4,13	1.002,03	5.607,67	

No.	Residential	Change	Area (m ²)	Suitability	Percentage Change (%)	PSU area (m ²)	Residential Area (m ²)	Existing Conditions (photo)
6.	Panghegar Town House	GOS becomes Roads and Permanent Buildings	51,30	Tidak Sesuai	5,12			
7.	Panghegar Town House	GOS becomes Roads and Permanent Buildings	59,50	Tidak Sesuai	5,94			
Change of land use in Panghegar Town House			152,20		15,19			
Total land change in the Subdistrict of Rancasari			1.848,02		10,48	17.634,54	99.983,07	

Source: Analysis, 2024.

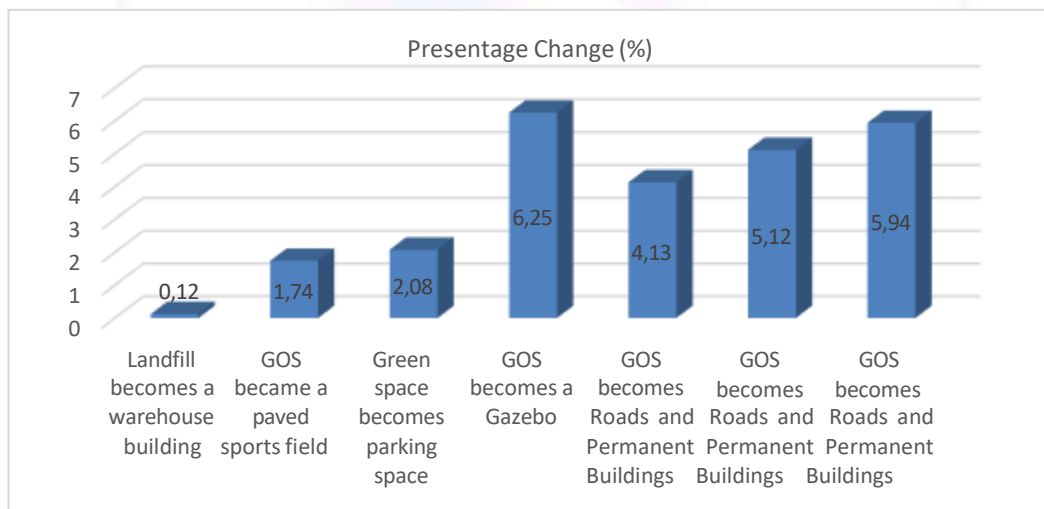


Figure 11 Percentage of Land Use Change Deviations in Public Residential Areas in Rancasari Subdistrict

3.5 Concepts and Strategies for Providing Green Open Spaces in Rancasari Subdistrict

The city of Bandung is an urban center that serves the surrounding area with more complete and higher quality facilities and services compared to other regional centers, including the provision of green open spaces, especially in residential areas. The development of green open spaces in Bandung is based on the blue-green concept, which draws on the potential of Bandung's residential areas, which have a naturally cool landscape, are located on high ground, and have many plants and lush, fertile green trees. The Blue-Green concept provides many benefits for the environment, ecology, social culture, and economy. The innovative Blue-Green approach to water management in cities aims to meet drainage and urban planning needs with integrated and consistent strategies. This approach also emphasizes the relationship and interaction between blue and green elements. Its main purpose is to restore the natural water cycle while improving the city's comfort by combining water management and green infrastructure. This is carried out by integrating and protecting the hydrological and ecological values of the urban environment, as well as providing resilience and flexibility measures to mitigate flooding.

The concept of realizing 30% green space in residential areas in Bandung is to build a green and blue ecological network. This green space development concept takes into account existing green elements, namely residential parks that can be utilized as part of green space. It also considers blue elements in the form of rivers in Bandung. These green and blue elements are connected through a green corridor network, which is a hierarchical road system that connects existing green open space areas.

The concept and strategy for providing green open spaces (GOS) at the subdistrict level is rooted in the mandate of Law No. 26 of 2007 on Spatial Planning. The provision of Green Open Spaces (GOS) in subdistricts involves integrating public GOS (urban/subdistrict parks) and private GOS (home/building yards) into spatial plans to achieve a minimum proportion of 30% of the city area, with 20% for public and 10% for private use. The strategy includes affirming the policy of controlling land use change, acquiring land for public Green Open Spaces, and implementing the Green City concept, including verticalization of Green Open Spaces if land is limited. Based on regulations and case studies, recommendations for the arrangement of Green Open Spaces (GOS) at the sub-district level must consider ecological and social functions, with an approach based on community participation.

A. The Concept of Green Space Provision

The concept of providing green space in subdistricts is based on ecological, social, and aesthetic functions, taking into account several things, including:

- a) Environmental balance, maintaining a balance between the natural environment and the built environment (built-up areas).
- b) Ecological Function, acting as the “lungs” of the city, water catchment areas, pollutant absorbers, air temperature regulators, and noise reducers.
- c) Social and Economic Function, providing space for community interaction, recreation, sports, and even agricultural/plantation production, which ultimately increases the added value of the environment and land.
- d) Green space typology, consisting of public green spaces (city parks, public cemeteries, green belts along roads/rivers/beaches) managed by local governments, and private green spaces (yards/buildings) managed by the community/private sector.

B. Strategy for Providing Green Spaces in Subdistricts

The strategy at the subdistrict level focuses on the implementation of regional spatial planning policies and involves multi-stakeholder collaboration, including:

- a) Inventory and analysis of existing land by mapping existing land use to identify the potential and availability of green spaces at present
- b) Integrated planning by incorporating detailed green space provision plans into subdistrict spatial planning technical documents, including determining optimal locations for public green spaces that are easily accessible to the community.
- c) Procurement of public green space land, through:
 - Land acquisition or lease, whereby community officials (at the neighborhood/village or subdistrict level) submit a request to the local government to allocate a budget for the purchase or lease of strategic land to be used as public green space.
 - Utilization of critical/abandoned land, by optimizing land along riverbanks, under bridges, or other neglected areas for use as green space.

C. Strategies for collaboration and community participation

- a) Education and socialization
Educate the community about the importance of green spaces, both ecologically and socially. This can raise awareness among residents to protect and plant trees in their neighborhood.
- b) Tree planting movement
Promote tree planting programs on a large scale in residential areas, involving all residents, developers, and the government.
- c) Joint green space management

Encourage the formation of communities or institutions responsible for managing and maintaining green spaces at the residential level, so that their functions are preserved.

d) Private and public partnerships

Open up opportunities for cooperation with the private sector and communities to obtain assistance in providing green space facilities and infrastructure, one example of which is the CSR (Corporate Social Responsibility) program.

4. Conclusion

Based on the results of the analysis, it was found that the use of land as green space in Rancasari Subdistrict covers an area of 57.7 hectares or around 8.25%. Rancasari Subdistrict has 5 neighborhood parks with an area of 1,422.20 m² originating from residences that have carried out the Official Handover Report of residential public facilities and utilities to the Bandung City Government. Identification of Land Use Change in Public Service Facilities for Residential Areas (Green Areas for Residential Areas) in Rancasari Subdistrict, there are two residential complexes that show indications of land use change in public service facilities, particularly in green areas for residential areas, namely the Bandung Inten Indah Complex and the Panghegar Town House Complex. Based on an overlay between existing imagery maps and the residential site plans, there are indications of inconsistencies in the conversion of public utility land, with a total area of 17,634.54 m² out of a total residential area of 99,983.07 m². There are indications of deviations in the conversion of public service use land with an area of 1,848.02 m² or 10.48%. Deviations in the use of public service use space occur in parks (green open spaces) that have been converted into parking lots, roads, gazebos, and buildings that are permanently constructed and controlled by individuals or groups.

Based on the suitability typology of public service utility land, the suitability of residential public service utility land is 89.52% or still suitable. Overall, the deviation is still within reasonable limits or classified as minor, but the conversion of this land must be returned to its original function in order to fulfill the need for infrastructure, facilities, and utilities for the public interest.

The recommendations suggested based on this study include the integration of planning in spatial planning as a measure of policy compliance with residential green space development plans to ensure optimal land availability and design. In addition, effective land use with optimization of narrow or limited space, such as the concept of vertical gardens on walls or roof gardens on buildings, and the design of shaded pedestrian and bicycle paths with trees along residential roads. In designing vegetation and ecological aspects, prioritize the planting of native plant species to support local biodiversity and a healthy ecosystem, plant large trees that can provide shade, absorb pollutants, and help regulate the microclimate in residential areas, and design green spaces to function as effective rainwater catchment areas to reduce the risk of local flooding.

Socialization or dissemination/information to the public about regional regulations concerning the handover of public service facilities and infrastructure and so on to meet the needs of public infrastructure and facilities in supporting daily activities. To prevent the conversion of public service facilities (especially green open spaces), information should be provided on prohibitions, appeals, and/or warnings regarding the use of space in certain areas or zones as public facilities. It is also necessary to tighten licensing related to spatial planning (location permits and principle permits) and increase control, as well as increase community participation in the supervision and control of spatial planning, especially in the supervision and control of the conversion of public service facilities, particularly green open spaces.

The study shows that the conversion of green open spaces into built-up areas results in significant deviations from the Detailed Spatial Plan (RDTR), leading to a decline in ecosystem quality, an increased risk of local flooding, and the loss of spaces for community interaction. This phenomenon underscores the urgency of strict spatial planning oversight through periodic audits of public facilities and the use of geographic information systems to detect irregularities early on. The tangible contribution of this research to urban planning can be seen as a database for formulating more responsive land-use control policies, where stricter sanctions for developers and the

strengthening of the infrastructure, facilities, and utilities (IFU) concession scheme are key to maintaining a balance between physical development and environmental sustainability.

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