

# Pattern of Public Green Open Space in Tembalang Settlement, Semarang

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**Abstract.** Public green open space is the use of green open space that is focused on the public interest and is under the ownership and management of local government or local community. However, the existence of green open spaces is reduced due to the rapid development of education, housing and trading areas in Tembalang Semarang. Besides that, the high demand for settlement area in Tembalang increased along with the increase of population growth. The main problem that is usually faced in the settlement is green open space available is very limited. The limitation of green open space in residential areas is also caused by the absence of planning green space. This research is identified public green open space like the green line on the side of the road and neighborhood space/park, where low carbon city is a way to make sustainable urban environment by make settlement area to be green.

Keywords: Public Green Open Space, Planned, Unplanned, Settlement, Tembalang

## 1 Introduction

Low carbon city can be defined as a city that comprises of societies related with green practices. Low carbon city is a way to make sustainable urban environment by make settlement area to be green [1]. Planning green space is a part of planning low carbon city for adaptation and mitigation approach to climate change for urban planners [2]. Open space is a land that is open and is part of a city or region where on a land that can be a region or path there is no building. Open space is also a space that does not have a physical roof and is in an environment in which the utilization can be used by humans as a place to perform various activities. In addition, open space is also a space in which there are areas for humans to travel and recreation, green areas of cultivation as conservation, as well as historical areas that can add to the beauty of the open space itself [3,4,5,6,7]. Open space consist of public green open space and the existence of it can also provide great benefits for the social conditions an urban area or settlement. Public green open space also can be a space for recreation, relax, and do other outdoor activities that can reduce the level of emotional and give peace to the minds of the people around him.[7,8,9,10]. However, the availability of green open space is currently declining, this is due to the needs of the community to have a place to live. The high demand for residential areas will increase along with the increase of population growth. The main problem that is usually faced in the settlement is green open space available is very limited.

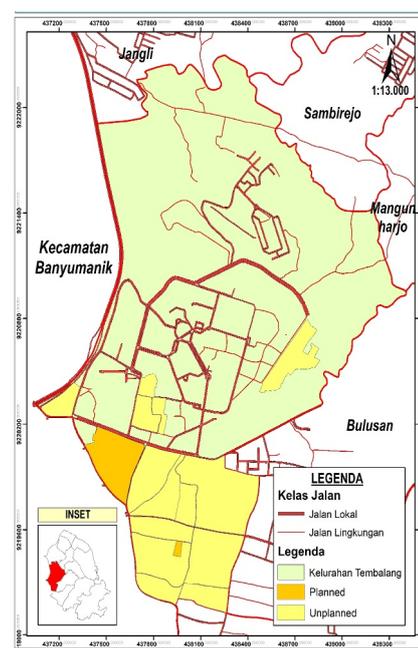


Fig.1. Map of Tembalang, Semarang

The limitation of green open space in residential areas is also caused by the absence of green open space planning. Therefore this research will identify the pattern of open green public spaces suitable for application to planned and unplanned settlements, especially in suburban areas. The scope of research area is settlement area located in Tembalang around Diponegoro University or around Prof. Soedharto street. Tembalang area is an area of rapidly growing education activities.

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Educational area is a urban space that has a function as a place to study knowledge that is supported by the availability of facilities. Activity systems in the education area affect the pattern of individual, family, agency, corporate activities that shape spatial patterns and have an impact on land use planning. The community as the actors of changing the function of space is influenced by their life guidance in determining alternative choice when changing the function of space. They can be categorized based on education, change of work status and perspective of space. [11,12]. It also affects the availability of green open spaces for public in residential areas as the educational area. The settlement location is divided into two characteristics; two (2) planned settlement (built by developers / government) and ten (10) unplanned settlement areas. (see figure 1)

## 2 Public Green Open Space

Public Green Open Space has a variety of benefits for the environment, among them [6,7,8,9,10,13,14]

- Public green open spaces can provide a major positive impact to the surrounding environment related to weather conditions, the air, and the temperature in an urban area.
- Vegetation contained in public green open space can absorb up to 85% air in the polluted environment and can be the preservation of plants and some species.
- Improved air circulation and shade provided by the vegetation or plants contained in public green open space can reduce the cost of energy supply in order to lower the air temperature in a room.
- Existence of public green open space will provide more appeal in a region in terms of aesthetics so as to attract newcomers and investors to reside in the area.
- Vegetation contained in green space can also reduce the rate of respiratory diseases as a result of improvements in air quality in the surrounding environment that impact on improving health and community productivity

There are twelve (12) typology of green open spaces that are grouped by type and sub-type adapted to the characteristics of each of the green open space. [15]

- Public park consists of public/central park, downtown park, commons, neighborhood park, mini/vest pocket park.
- Square and plaza include central square, corporate plaza, memorial
- Market or farmer markets is a open space or streets used for market often temporary.
- Streets consist of pedestrian sidewalks, pedestrian mall, transit mall, traffic restricted streets, town trails
- Playgrounds include playgrounds and school yards.
- Community open space in the form of community garden/park
- Greenways and parkways

- Atrium/indoor market place
- Neighbourhood spaces
- Waterfronts are beaches, harbor, riverfronts, lakefronts, pier

## 3 Planned and Unplanned Settlement

Settlement area is an area that is used as residential environment or residence; space for socialization and interaction activities in the community; or arrangement of areas whose purpose is to preserve life more easily and safely, and to provide opportunities for the full development of the human person; and has regularity in physical form. [16,17,18,19]. So it can be understood that the scope of settlement area is greater than the housing area which is often defined as a group of houses that become the environment of residence and equipped by facilities and infrastructure in it. [16]. Based on the characteristics of the settlements can be divided into two, formal/planned settlements and non-formal/unplanned settlements. [21,22].

### 3.1. Planned Settlement

Planned settlement is a residential area where the housing development system through planning, implementation and development process is carried out by formal institutions such as government or private developers. Planned settlement is implemented in accordance with the rules and standards and is supported by financing from formal institutions (banking), advanced technology and skilled builders. [21,22]. Planned settlement is built on the basis of clear rules so as to form a pattern of regularity in it and equipped by facilities and infrastructure built in accordance with the planning that has been made. [23]

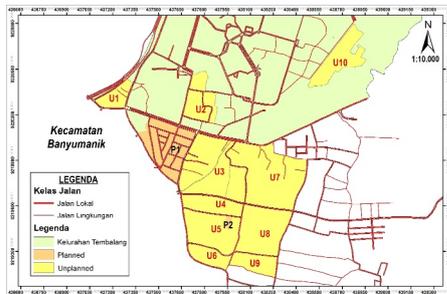
### 3.2. Unplanned Settlement

Unplanned settlement is a cycle of residential development that executes, and development is done by informal residents or institutions (Locally Governing or Autonomous Literature Systems). Unplanned housing is usually built individually without being fixed on standard and building standards depending on the capability and needs of the residents. [20,21].

Unplanned settlements can grow in various forms and can be found in the center or suburbs, in new or old conditions, in slums or directly adjacent to luxury housing areas. Informal settlements have a large share in providing labor to meet the demand of the entire city and have a considerable level of consumption. Informal settlements have a community that is ready or has a growing ability.[23]. Kampung is one of the unplanned settlements in Indonesia. Kampung is a low-income people's residence that has an irregular shape of space structure and is commonly located in the downtown and suburbs. [25].

## 4 Methodology

This study used descriptive analysis in relation to environmental conditions around planned and unplanned settlement locations, including map databases, aerial photographs, and observational data collected from field visits. This research area is divided into two characteristics that is planned and unplanned housing, as shown in the following figure 2.

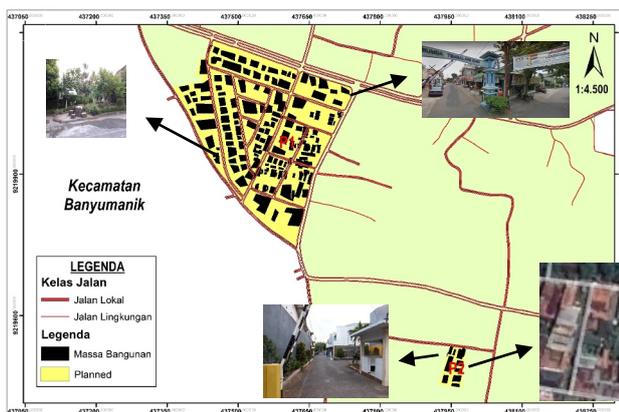


**Fig.2.** Map of Planned and Unplanned Settlement in Tembalang

## 5 Result and Analysis

### 5.1. Distribution of the use of space in planned and unplanned settlement

The use of space in planned and unplanned housing areas is largely in the form of residential areas and commercial areas. The main access of the residential area is usually used as a place of business such as shops and food stalls. Most of the planned and unplanned housing locations are located along Prof. Soedharto road which is the main access in reaching the university area. The description of the planned and unplanned settlement conditions in Tembalang can be seen in the following figure 3 and 4.



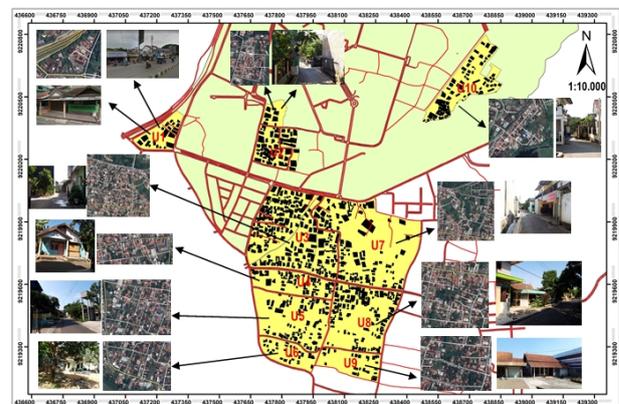
**Fig.3.** Distribution of the use of space in planned settlement

P1 is a settlement known as "Perumda" located between Prof Soedarto street, Jatisari street, Tembalang Baru street and Jalan Jati Mulyo. Perumda settlement areas have the use of space for residential and commercial areas.

The trade and service areas are located along the main roads, such as food stalls and printing/ photocopying places for university students. While the settlement was used as a family and housing for rent for university students.

P2 is a settlement known as "Nirwana Cluster" located between Prof Soedarto Street, Jatisari Street, and Jalan Jati Mulyo. This settlement area has the use of space for family and housing for rent for university students.

Distribution of the use of space in unplanned settlement can be divided into 2 (two ) characteristic. For U1, U3, U4, U7 and U10 all of these unplanned settlement areas have the use of space for residential and commercial areas. In other way for U2, U5, U6,U8 and U10 all of these settlement area have the use of space for family and housing for rent for university students.



**Fig.3.** Distribution of the use of space in planned settlement

U1 is a unplanned settlement located between Prof Soedarto Street, and Banyuputih Street. These unplanned settlement areas have the use of space for residential and commercial areas. The trade and service areas are located along the main roads, such as food stalls and printing/photocopying places for university students. While the settlement was used as a family and housing for rent for university students. U2 is a unplanned settlement located on Baskoro Street. This residential area has the use of space for residential areas that are used as family and housing for rent for university students.

U3 is a unplanned settlement located on Margoyoso Street. These unplanned settlement areas have the use of space for residential and commercial areas. The trade and service areas are located along the main roads, such as food stalls and printing/photocopying places for university students. While the settlement was used as a family and housing for rent for university students. U4 is a unplanned settlement located on Kolonel Imam Suprato Street. These unplanned settlement areas have the use of space for residential and commercial areas. The trade and service areas are located along the main roads, such as food stalls and printing/photocopying places for university students.

While the settlement was used as a family and housing for rent for university students. U5 is a unplanned settlement located on Nirwana Sari Street. This residential area has the use of space for residential areas that are used as family and housing for rent for university students. U6 is a unplanned settlement located on Tlogosari Street. This residential area has the use of space for residential areas that are used as family and housing for rent for university students.

U7 is a unplanned settlement located on Kolonel Imam Suprato Street and Sipodang Street. These unplanned settlement areas have the use of space for residential and commercial areas. While the settlement was used as a family and housing for rent for university students. The trade and service areas are located along the main roads, such as food stalls and printing/photocopying places for university students. U8 is a unplanned settlement located on Gang Iwenisari Street. This residential area has the use of space for residential areas that are used as family and housing for rent for university students.

U9 is a unplanned settlement located on Gang Iwenisari Street. This residential area has the use of space for

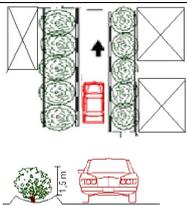
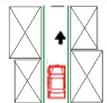
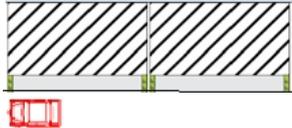
residential areas that are used as family and housing for rent for university students.

U10 is a unplanned settlement located on Kolonel Imam Suprato Street and Sipodang Street. These unplanned settlement areas have the use of space for residential and commercial areas. The trade and service areas are located along the main roads, such as food stalls and printing/photocopying places for university students. While the settlement was used as a family and housing for rent for university students.

## 5.2. Distribution of publik green open space

The provision of public green open space at the level of neighborhood in Tembalang area based on the population can not be fulfilled, because at this time Tembalang area has only 1 (one) neighborhood parks on P1(see table 1). Provision of public green open space based on the number of population required 70 neighborhood parks on Tembalang area, it is calculated that every 250 people needed 1 (satu) neighborhood park.[25].

**Table 1.** The arrangement of green spaces in planned and unplanned settlement

The green line on the side of the road	
Public green open space on the type of housing in planned settlement	The arrangement of green spaces
 <p>Green line on the side of the road as wide as <math>\pm 0.5</math> meters.</p> <p>Most of the green lanes have been changed by residents as parking lots and become non-green open spaces.</p>  <p>Most of the green track conditions are not maintained, only a few homes that do greening their environment using planter pack.</p>	 <p>Space limitations on the green line on the side of the road can be done by:</p> <ul style="list-style-type: none"> <li>• minimum planting 1 protective tree or shrub and or at least a ground cover / grass</li> <li>• Vertical garden such as; vines on housing fences or housing building walls.</li> <li>• Flower or small plants in planter pack can placed on the edge of the road or hanging on the wall</li> </ul>
The green line on the side of the road	
Public green open space on the type of housing in unplanned settlement	The arrangement of green spaces
 <p>Limitations of the existing open space in a residential area of the unplanned result in a limited supply of public green spaces</p>	 <p>Limited public open space in the unplanned housing area can be done by planting green vertical garden:</p> <ul style="list-style-type: none"> <li>• Vines on housing fences or housing building walls.</li> <li>• Flower or small plants in planter pack can placed on the edge of the road or hanging on the wall</li> </ul>
The green line on the side of the road	
Public green open space on the type of trade and service area in planned and unplanned settlement	The arrangement of green spaces
 <p>Green line on the side of the road as wide as <math>\pm 0.5</math> meters. Conditions of green open space in the area of trade and services planned and unplanned settlements has the same characteristics. Most of the green lanes have been changed as parking lots and become non-green open spaces</p>	 <p>Limited public open space in the trade and service area along main road area can be done by planting green vertical garden such as;</p> <ul style="list-style-type: none"> <li>• Vines on housing fences or housing building walls.</li> <li>• Flower or small plants in planter pack can placed on the edge of the road or hanging on the wall</li> </ul>

Neighborhood space/park	
Neighborhood space/park on Planned settlement	The arrangement of green spaces
  <p>Neighborhood park located on perumda - P1.</p> <p>Neighborhood park has an area of 250 m<sup>2</sup> but rarely people who use this park because it is not interesting</p>	<p>In order for this environmental park to attract the surrounding community to use it, based on the results of interviews with the community then;</p> <ul style="list-style-type: none"> <li>• Colorful plants, such as bougenville, tabebuya etc.</li> <li>• Increase child's play like a swing and a slide.</li> </ul>

Source: Semarang, 2018

## 6 Conclusions

From the discussion it can be concluded that there are two types of public green open space in Tembalang area: the green line on the side of the road and neighbourhood space/park. The type show that public green open spaces indicate in both settlements is very limited. This is due to the rapid growth of Tembalang area and the high increase of population, so the arrangement of green open space is ignored. Learning from that street patterns, land use, and population density will affect neighborhood activities, so the planner should more develop open space quality for promoting to achieve higher standards of living.

## 7 Acknowledgements

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