



The Morphology of Pangururan District

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Abstract. This study discusses the morphology of the Pangururan District in terms of its forming factors, spatial expressions formed, solid-void patterns, and building typology. It is necessary because, as the capital of Samosir Regency, Pangururan District often experiences growth and development. So, it is essential to understand the morphology of this district to avoid collisions between the problem of physical form and the quality demands of urban planning. Using a qualitative descriptive research methodology approach, researchers collect the data needed by secondary data collection techniques, namely through related literature studies. The results showed that Pangururan District had fan-shaped cities and fragmented cities. Moreover, the configuration of the solid-void space forms an organic pattern. The typology of community settlements scattered alongside the waterfront adapts to the physical form of nature and nearby tradition.

Keyword: morphology, Pangururan, typology, waterfront

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1 Introduction

Pangururan is considered one of nine districts inside the Samosir Regency, also the regency's capital. The area of this region is 121.43 km². Geographically, Pangururan District is located at 2°32' - 2°45' North Latitude and 98°42' - 98°47' East Longitude. Simanindo District borders this district in the North, Palipi District in the South, Sianjur Mulamula District in the West, and Ronggur Nihuta District in the East. This district has 28 villages, namely Rianiate, Parmonangan, Huta Namora, Pintu Sona, Huta Tinggi, Pardomuan I, Pasar Pangururan, Tanjung Bunga, Siogung-Ogung, Parsaoran I, Sait Nihuta, Lumban Pinggol, Sianting-Anting, Parlondut, Aek Nauli, Pardugul, Panampangan, Sitoluhuta, Sinabulan, Siopat Sosor, Huta Bolon, Situngkir, Sialanguan, Parhorasan, Pardomuan Nauli, Lumban Suhi-suhi Dolok, Lumbang Suhi-suhi Toruan, and Parbaba Dolok. The map of the Pangururan District is shown in figure 1 [1].

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over the city, (7) Directional differentiation, namely various physical formations that are arranged harmoniously, and (8) Motion awareness, namely the ability to move emotionally namely comfortable and dynamic feelings [5].

The clash between the problem of physical formation and the demand for the quality of good urban design has led to the need to study cities specifically from a morphological aspect. This paper attempts to describe the morphology of the Pangururan District as an approach to understanding the district as a socio-spatial product through understanding the proper definition.

2 Literature Review

Morphology consists of two syllables, namely morph, which means shape, and logos which means science. Simply put, city morphology is the science that logically studies the products of the physical forms of cities. Morphology is an approach to understanding the logical structure of a city as a product of socio-spatial change. Because each socio-spatial characteristic in each place is different, the term morphology is very closely related to the term typology. In simple terms, Markus Zahn explains the term morphology as the formation of an object as a city on a broader scale. Morphology is usually used for city and regional scales [6].

Hadi Sabari Yunus focuses on morphological studies on the spatial existence of the characteristic forms of cities, namely the analysis of urban forms and the factors that influence them. These include (1) Compact form; the square cities, the rectangular cities, fan-shaped cities, rounded cities, ribbon-shaped cities, octopus/star-shaped cities, and unpatterned cities; (2) The shape is not compact; fragmented cities, chained cities, split cities, stellar cities; and (3) the process of spreading (urban sprawl); concentric propagation, longitudinal propagation, and jumping propagation (Figure 2). The city's shape influences landscape/geographical, social, economic, transportation, and regulatory aspects [7].

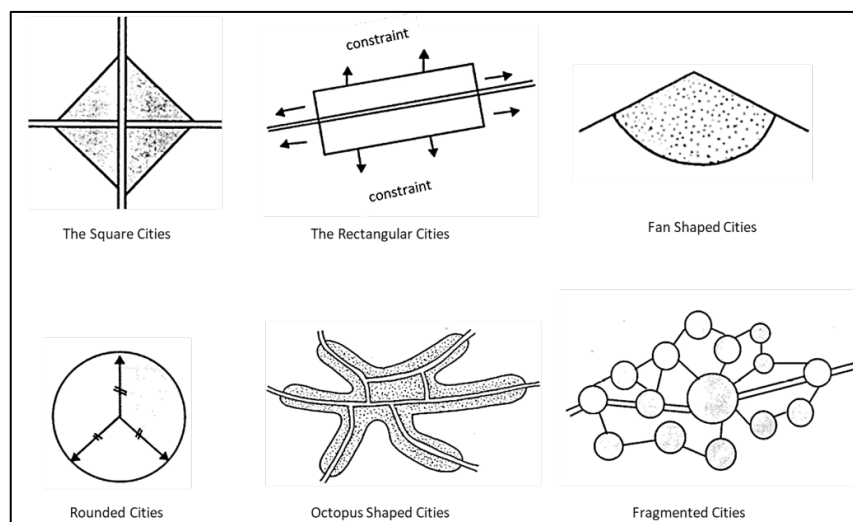


Figure 2 Some Examples of Urban Morphology Forms

Meanwhile, according to Herbert, the scope of the urban morphology study emphasizes the physical forms of the urban surrounding, which can be examined from their presence, including aspects of (1) the actual street system, (2) mass blocks, both the area of residential and non-residential (trade/industry), (3) single mass [8]. Meanwhile, Smailes affirmed the field of morphological studies, including (1) land use, (2) street motives, and (3) varieties of buildings (architectural style of buildings & their design) [9]. It is where the term Townscape first appeared. Meanwhile, Johnson (1981) focuses on the study of (1) the plan of streets, (2) building arrangements, and (3) the functional linkages of roads and buildings (Functions performed by its streets and buildings) [5].

In addition, there is also Rob Krier, who suggests the city as a spatial configuration [10]. It is grouped under figure-ground theory, which targets on the pertinence between the quotient of land covered by buildings as a solid mass (figure) with open voids (ground). These theories and methods include analysis of (1) patterns, (2) textures, and (3) solid voids as urban elements (Figure 3) [11].

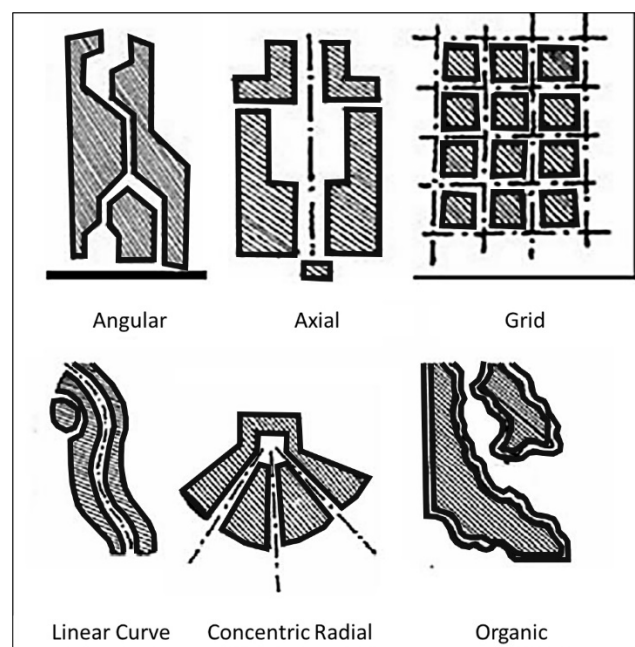


Figure 3 Building Mass (Solid) and Open Space (Void) Pattern

Meanwhile, Fumihiko Maki focuses on the study of collective linkage, derived from the lines that connect one element to another. This line is structured by roads, passerby paths, straight open spaces, or other continuous elements connected physically connecting parts of a center of activity in a city. The types of spatial linkage he disclosed include (1) Form of Composition, (2) Mega form, and (3) Form of Group (Figure 4). E. Bacon discusses linkage visually, including the aspects of (1) lines, (2) corridors, (3) edges, (4) axes, and (5) rhythm (Figure 5). While the structural linkage proposed by C. Rowe includes (1) additional elements, (2) connections, and (3) breaks (Figure 6) [12].

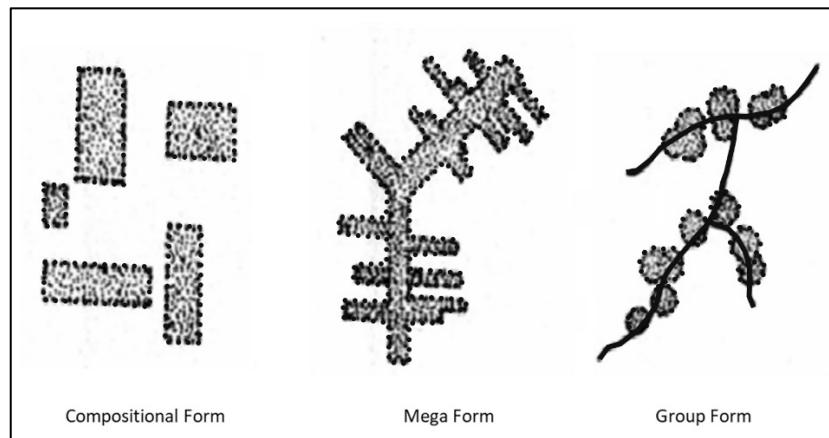


Figure 4 Spatial Linkage Types

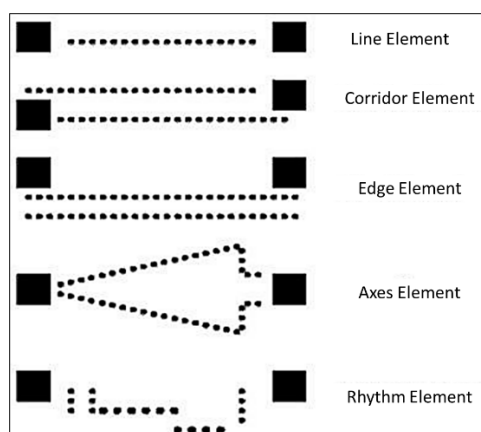


Figure 5 Visual Linkage Elements

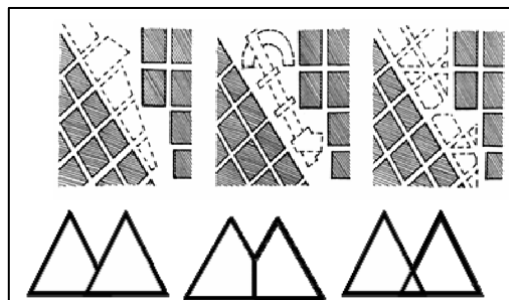


Figure 6 Structural Linkage Elements

In addition, there is a place theory that focuses on understanding the meaning of the place of the city, which consists of (1) the context of the city put forward by A.V. Eyck, further discusses the typology of static and dynamic spaces; (2) Kevin Lynch discusses city image with its five elements, namely paths, edges, districts, nodes, and landmarks [13]; (3) C. Sitte, G. Cullen discussed the aesthetics of the city, including orientation, position, and content. Markus Zahn tries to group the theories above into the theme of integrated urban planning, where the discussion of urban morphology is divided into three scopes, namely (1) Figure/ground, (2) linkage, and (3) Place (Figure 7) [14].

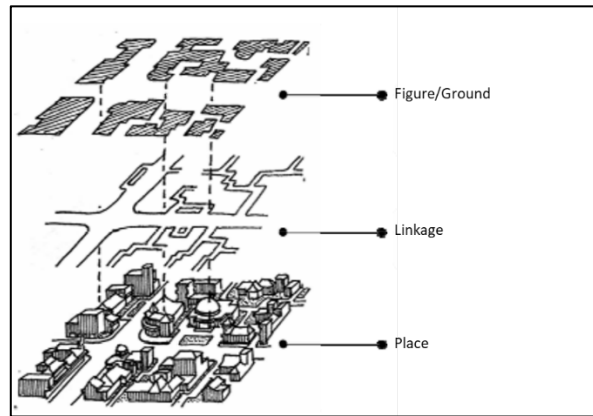


Figure 7 Diagram of Urban Morphology

3 Methodology

Researchers used a descriptive methodological approach to know and understand the morphology of the Pangururan District. This approach emphasizes collecting valid information in detail by describing the shape of the Pangururan District, identifying parts of the district that require review regarding land use, shape and type of buildings, and road networks, and conducting evaluations to obtain findings. Related aspects of the district are reviewed to be useful for policymakers in planning the future building layout and environment of the Pangururan District.

Researchers used secondary data collection techniques to collect information about the Pangururan District's morphology. The data presented in this study were obtained from literature studies related to urban morphological theories. The data collected was then analyzed by researchers qualitatively. It aims to understand the morphology of the Pangururan District following the morphological approach of the city chosen by the researcher. Furthermore, the collected data were analyzed qualitatively.

4 Result and Discussion

According to Hadi Sabari Yunus's theory, several factors influence the shape of cities, such as landscape/geographical, social, economic, transportation, and regulatory aspects [7]. The surveillance result shows that the form of the Pangururan District is dominantly leveraged by topographical factors, in this case, Lake Toba, and the estate of the land contour (Figure 8). It can be seen from the construction of primary/main roads, which are made to follow the line of Lake Toba, as well as secondary roads, which meander following the contour lines of the land.

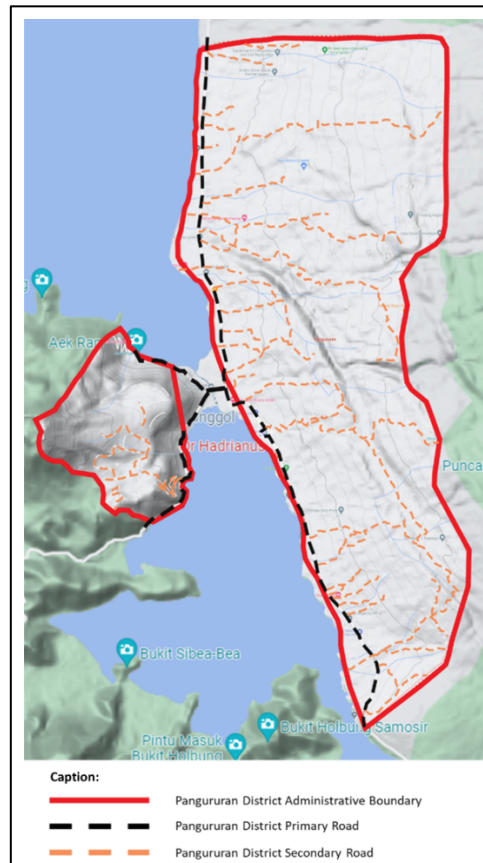


Figure 8 The Urban Morphology of Pangururan District Influenced by the Natural Factor

Based on these natural factors, it shows that the spatial expressions formed are compact and non-compact. The compact form formed is a fan-shaped city. This kind of shape is a part of a circle. In this case, outwardly, the city circle concerned has a relatively balanced development opportunity. Due to specific reasons, in other characteristics, there are some obstacles to the development of urban areas. In the case of Pangururan District, the barrier is a natural obstacle, namely Lake Toba (Figure 9).

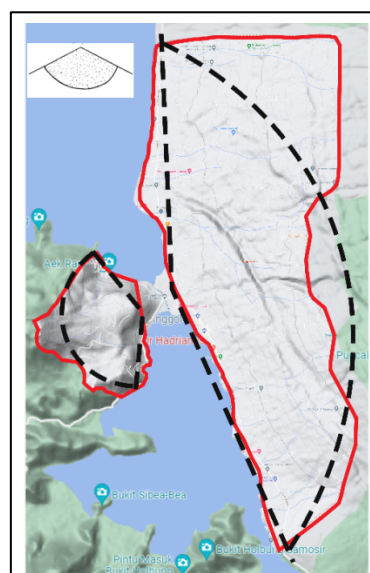


Figure 9 Fan Shaped Cities of Pangururan District

The non-compact shape formed can be seen from the existence of two compact forms separated and united by a road, in this case, the Tano Ponggol Bridge, which connects Samosir Island and Sumatra Island. This non-compact form is included in the classification of fragmented cities (Figure 10). At the beginning of its growth, this type of city had a compact shape on a small regional scale. In subsequent developments, the expansion of the newly created urban area did not immediately merge with the central city. This new urban appearance is connected with good transportation links [7].



Figure 10 Fragmented Cities of Pangururan District

According to Rob Krier's theory, which suggests the city as a spatial configuration, Pangururan District appears to form an organic solid-void pattern (Figure 11). In addition, open spaces in this sub-district (void) are much broader than built-up areas (solid). It indicates the magnitude of the natural potential of the Pangururan District, which can be developed in the future while still paying attention to sustainability aspects.

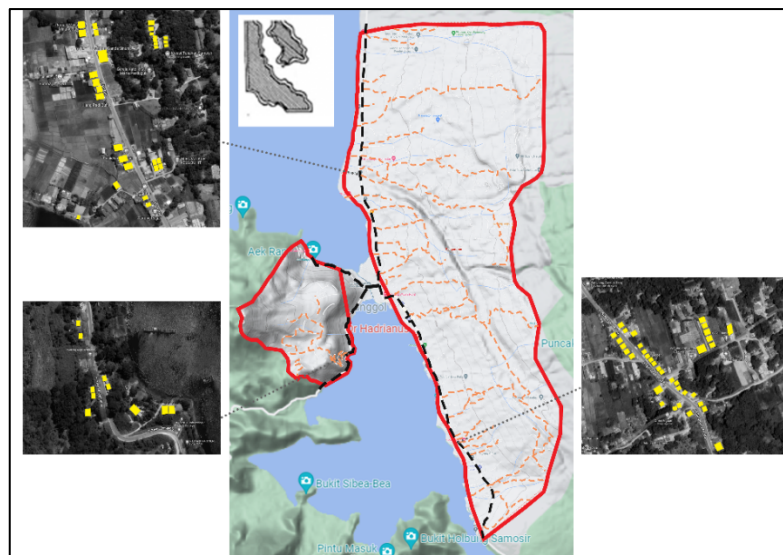


Figure 11 Building Mass (Solid) and Open Space (Void) Pattern in Pangururan District

From the significant vicinity, the town's increase broadens to form populous zone dispersed alongside the lakeside of the Pangururan District. Inhabitanancies are placed throughout water that is a root of existence requirements for the network. The emanation of inhabitanancies on the waterfront of Pangururan in Samosir Regency additionally conforms to the natural physicality and cultivation. The extraordinarily deflated contour at the lake's area, with a peak of 0 - 20m ($\pm 10\%$), is more straightforward to provide as inhabitanancies and horticultural land [15].

Pangururan District maintains to enlarge to the South and North alongside the lakeside of Lake Toba. Pangururan District is developing, marked by means of the emanation of traveller sights. natural tourism gadgets appear by paying attention to the capacity ecological elements of the Pangururan District. Resorts and accommodations also are increasingly more doping up to deal with tourism needs in Pangururan District (figure 12). The farther east from the city center, the greater hard it's far to locate inhabitanancies and network sports. Residents' houses are dispersed randomly, and just a few exist. Mostly, the those who stay are low-profits and work as growers.

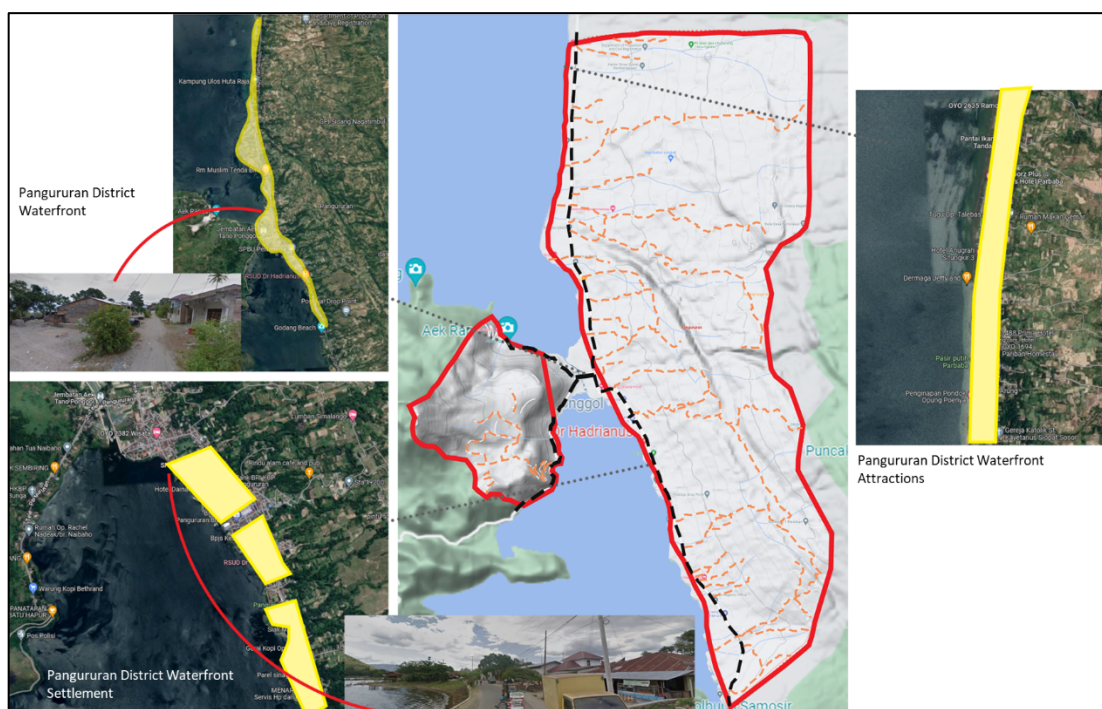


Figure 12 Pangururan District Lakeside Functions

5 Conclusion

The Pangururan District is a district whose urban morphology is formed by natural factors, namely Lake Toba and the condition of the land contour. It can be seen from the construction of primary roads, which are made to follow the line of Lake Toba, and secondary roads, which meander following the contour lines of the land. The spatial expressions formed are compact and non-compact based on these natural factors. The compact form formed is a fan-shaped city. The non-compact form that is formed is a fragmented city. It can be seen from the existence of two compact forms separated and united by a road, the Tano Ponggol Bridge, which connects

Samosir Island and Sumatra Island. The spatial configuration between the building mass (solid) and open space (void) in Pangururan District forms an organic pattern. From the pivotal area, the town's evolvement flourish to form populous zone dispersed throughout the lakeside that adapts to the physical model of the local landscape and cultivation.

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