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# Long Tuyuq settlement: structuring of the border area of Mahakam Ulu Regency, Indonesia

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## ABSTRACT

The concept of regional development planning is creating and opening new settlements, which is a combination of Liu Mulang and Long Tuyuq, which became the new settlement of Long Tuyuq village. The concept of the new settlement using the concept of a garden house. Primary and secondary data-based research techniques. In its implementation, carried out by conducting a survey. People who are in an unorganized environment are the people lower-middle-class economy, so what is thought about is the concept of environmentally friendly settlement planning with providing facilities and infrastructure that are operationally able to

improve quality social and physical. The development of an area is getting better, far away from a seedy impression. The Government of Mahakam Ulu Regency in the spatial plan has been arranged settlement patterns for each village and sub-district. This pattern is stated in the spatial plan which is still in the process of ratification, considering the status of existing land.

**Keywords:** Village settlement, Structuring, Border area, Long tuyoq

## 1. INTRODUCTION

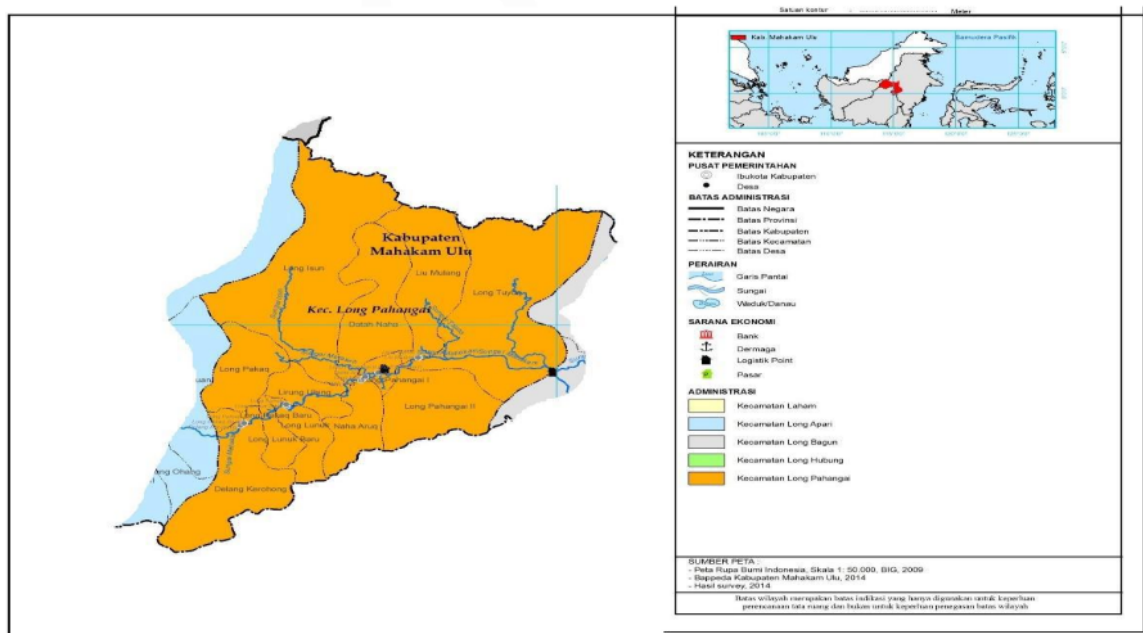
The development of a residential area that tends not yet orderly must be corrected for leading to new changes, and per community needs. The concept of environmentally sound planning is one approach planning to maintain the quality of residential space. That society in an unorganized environment is a class economy society middle to lower, so what is thought is the concept of planning environmentally friendly settlements by providing facilities and infrastructure which operationally can improve social quality and physical. So that the development of an area for the better, far from slums, and people who care about sustainability its settlement (Bamberger & Hewitt 1986).

The problem of residential areas is inseparable the dynamics that develop in people's lives and policies the government in managing the problem of existing residential areas. The issue of developing residential areas arises because of its existence policy gaps issued, thus impacting strategy planning that doesn't touch low-income people, so that finally a serious environmental problem occurs. Finally, the settlement environment that has not yet been arranged appears.

Slums as residential areas will only impoverish residents who are already poor and will not be able to improve quality community resources in the future, if the planning strategy and housing and settlement construction cannot be handled properly.

Discourse on debates on urban settlements, especially in developing countries in the context of planning urban spatial planning continues to experience development. Nurmandi (1993) states that this problem has arisen since the 19<sup>th</sup> century and until now this is still being debated, concerning increasing numbers of urban population caused by urbanization to the area suburbs. The same thing was expressed by Silas (1989) that urban development was raised as a problem that is associated with high population growth followed by the emergence of megacities.

Some big cities in Indonesia such as Jakarta, Surabaya, and Semarang based on the results of World Bank (1993) concluded that the high population growth was accompanied by the increasing number of slums, unorganized, and wild with conditions very poor environment. The same thing is found in the city while Banjarmasin and Palangka Raya, which are settlements on the banks of a dense river, show the environmental conditions cause for concern.



**Figure 1:** Map of Long Tuyoq Village (Long Pahangai District)

The explanation above shows that settlement development that has not yet been arranged, is shabby, with conditions that have not yet fulfilled the requirements of healthy settlements will become a serious problem, and in need attention to how to organize, organize, and monitor settlement development to optimize success in settlement spatial planning. Attention to implementation of development is to conduct an evaluation or evaluation with see the extent of the implementation of planning that has been done. This matter is a strategy to maintain development consistency Mahakam Ulu Regency (Figure 1).

To achieve community welfare in the Regency Mahakam Ulu, deemed necessary to arrange an adequate settlement for the community to be fulfilled the basic needs of the community. Needs this will be realized if the settlement area is arranged with well. Settlement is a first step in managing new civilization for society. Long Tuyuq settlement area is one of many settlements plans to be reorganized and was built by the government of Mahakam Ulu Regency. The extent of the territory is one of the advantages of the Regency Mahakam Ulu. The territory of Mahakam Ulu Regency was still relatively new (post-division from West Kutai Regency) in 2013.

Long Tuyuq village is located in Long Pahangai District total area of 126.95 m<sup>2</sup>. This village is estimated to have existed since 1898 and definitively established since 1914 under the Sultanate of Widana Long Iram (Dutch East Indies Government). Long Tuyuq village history does not apart from the history of the Dayak Bahau tribe which inhabits many regions edge of the Mahakam River to the Sarawak region (Malaysia). Amount the population in Long Tuyuq Village is 621 inhabitants and the population density is around 3.54 km per person. Administrative boundaries of Long Tuyuq Village are as follows (Table 1).

**Table 1:** Administrative Boundaries of Long Tuyuq Village

No.	The location	Borderline
1.	North	Malinau Regency, North Kalimantan Province
2.	East	Mamahak Ulu Village, Long Bagun District
3.	South	Mahakam River
4.	West	Liuq Mulang Village

Source: Central Bureau of Statistics of Mahakam Ulu Regency (2019)

In this regard, an effort to study planning is needed arrangement of Long Tuyuq village settlement area, to prepare comprehensive description of the spatial area of the village that has many benefits one of which is the auction document for implementation Development of the Long Tuyuq Settlement Area. So, after all the planning is complete, the final goal to be achieved is be a reliable reference answer and can achieve the implementation of these activities. Settlement planning needs to be seen from several aspects such: land capability analysis, disaster-prone areas, land feasibility analysis, planning concept, and housing development plan.

## 2. RELATED LITERATURE

### 2.1. Development Planning Theory

One of the causes of this condition is there is no link between knowledge and application or implementation (action). Failure to understand needs society is a sign of a crisis of planning theory. Many policies, programs, and projects have been implemented. Nevertheless needs the essentials of the poor are still untouched. This is because policies, programs, and projects are not capable translating the interests, aspirations, and needs of the community (Friedmann, 1987). The ideal planning theory is not only that able to accommodate the interests of community needs but also able to integrate various values from various interests involved (Sudharto, 2001).

### 2.2. Development Planning Theory

The meaning of planning is very dependent on the paradigm adopted. Rational paradigm perspective provides limits on planning as a process for determining the future through a sequence selection (Davidoff & Reiner, 1962; Robinson, 1972; Faludi, 1973). Planning is a process that prepares a set of decisions to do future actions (Dror, 1963).

Friedmann (1987) concluded that planning is a strategy for making previous decisions as an activity about decisions and implementation. There are several criticisms of rational planning. Some modifications and alternatives for improvements to rational planning have been proposed. The reactions to development outcomes were not desirable caused by an orientation towards economic growth. The participatory, advocacy, and radical planning model is a manifestation from reaction to rational planning (Flyvbjerg, 2004).

The development has a dual meaning, type the first development is more oriented to economic growth where the focus is on the quantitative problem of production and resource use. The second type, more development pay attention to changes and distribution of goods and increased social relations (Sudharto, 2001).

The second type is more oriented towards social development the focus is on qualitative and distribution of changes in the structure of society as measured by reduced discrimination and exploitation and increased equal opportunity and balanced distribution of the benefits of development for the whole community.

### 2.3. Housing and Settlement Development

Development, in general, is a series of activities for improve the welfare of the community in various aspects of life which is carried out in a planned and sustainable manner by utilizing and taking into account the ability of resources, information, and progress science and technology and pay attention to global capabilities.

One sector in development is the development sector housing and settlement (Turner, 1992). Process housing and settlement construction is carried out with two models. Conventional production systems (implemented centrally by formal institutions) referred to as Centrally Administered or Heteronomous Housing System. The housing construction process with this system, starting from the planning stage, implementation/development to the management stage is carried out by formal institutions (both government and private). The government and private sector play a very big role in the development process, while the occupants are considered as objects.

Unconventional production systems (carried out by the public) are called as Locally Self Governing or Autonomous Housing System. Planning, implementation, and management carried out by the community. In this approach more housing construction seen as a process that is interconnected between the house with its inhabitants, both in meeting social needs, such as the influence that it has on matters of well-being, way of life, health and so on. The role of government is more as an enabler.

### 2.4. Housing and Settlements

A house is a place where humans live to do their activities. Basically, the house is a basic need human, as a means of safety for themselves, giving peace of life and as a center of cultural activity. Home is not a place to cover their inhabitants like a fortress, but also must open themselves and fused as part of their environment.

Settlements according to the Law of the Republic of Indonesia number: 1 of 2011 are part of the environment outside of protected areas, whether in the form of urban areas or rural areas that function as neighborhoods or neighborhoods housing and activities that support life and livelihood. Settlements in this law have a scope certain, namely areas that are dominated by a residential environment with the main function as a residence that is equipped with infrastructure, environmental facilities and workplaces that provide services and job opportunities that provide services and limited job opportunities to support life and livelihood so that it functions these settlements can be effective and efficient.

Actions mandated by these rules are: (1) The right to occupy, enjoy, and own a decent home in an environment that is also responsive; (2) Increasing the role of the community in housing construction and settlements; (3) The local government and the community are making efforts implementation of a slum environment rejuvenation program; and (4) Efforts to accumulate funds by the government to provide assistance and facilities to the community through credit housing. Meeting the needs of settlements through scale development big.

The existence of settlements will have an impact on the welfare population, in the economic field, development of residential areas influence the absorption of capital and the creation of employment opportunities which is great, as a driving force for regional growth and in form physical as the implementation of regional spatial planning.

### 2.5. Settlements on the River Bank

Settlements on the banks of a river are floating buildings or a functioning stage as a place to live or a residence and means of family coaching, which located above the body of water in the form of rivers, lakes, swamps or beaches/sea with the nature in whole or in part always or at any time on the water, if there is water overflow from rivers, lakes, etc. As part of the environment outside the protected area means settlement part of the cultivation area. Criteria for residential areas is as referred to in Government Regulation of the Republic of Indonesia Number: 47 of 1997 (article 11, paragraph 8) concerning the Plan National Spatial Planning is areas that technically can be used for settlements safe from the dangers of natural and man-made disasters, healthy, and have access to business opportunities, and areas that can be used if settlements provides benefits (increase the availability of settlements and utilize them settlement infrastructure and facilities; increase the development of cross-sectoral development and sub-sectors and surrounding economic activities; does not interfere with the protection function, and efforts to preserve natural resources).



### 3. METHODOLOGY

#### 3.1. Planning Study Approach

To answer the problem of settlement, it is necessary the use of appropriate scientific research and research methods. Scientific method which is meant is an approach or method used in research science (Moeliono, 1993). The study method used is a research survey. The survey method is an investigation carried out to obtain the facts of the symptoms that exist and look for an explanation factually, about a group's social, economic, or political situation, and an area (Nazir, 1988).

According to Singarimbun (1991), research and field research with survey methods can be used to: (1) Exploratory; (2) Descriptive; (3) Explanation (confirmatory), i.e. explain causal relations and hypothesis testing; (4) Evaluating; (5) Predicting or predicting certain events in the future; (6) Operational research; and (7) Development of social indicators.

Therefore, survey research can also be linked to methods observation thing to do is take a sample from a population and using questionnaires as a primary data collection tool (Sairin, 2002). Related to the problems of this study, an investigation is needed to find the condition of the existence of settlements that are considered problematic, and approach the community life.

Residential communities are clients or consumers (user) space that gives character to the residential environment Long Tuyuq village. Besides the reference of the settlement planning plan created by the government of Mahakam Ulu Regency. The order point of view qualitative approach that relies on a description of the survey conducted to find the depth of a problem or look for a cause, then several study approaches are needed: (1) Quantitative approaches; (2) Data collection methods with surveys and observations; (3) Normative approaches; and (4) Assumptive approaches.

#### 3.2. Planning Indicators and Subjects

Indicators or in broader concepts are also commonly called variables is a concept that has a variety of values (Nazir, 1988). Variable is an object attached to the research process, or what is the point the attention of a study (Arikunto, 1998). From the results of the literature review, it can a restricted object of study of the form of socio-economic characteristics of a society, and community perception as the owner of the environment, and the relationship of the problem to the cause of the problematic conditions, so that there is a solution to the problem thinking about the continuity of this settlement.

#### 3.3. Stages of Planning Study

Based on the problem of the study area settlements, it is known physical, it is necessary to discuss in-depth with aspects related to the causal settlement planning process from incompatibility. From the results of this discussion will be directly carried out identification of problems contained in settlements, inventory problems that arise in settlements, analyze social characteristics the economics of the Long Tuyuq village settlement, mapping typologies relationship between the influence of characteristics and causes of settlement problems in river banks, who then look for alternative strategies that are following development of residential communities. By linking relationships between these processes, in the form of tracing problems due to and the cause, the resulting Regional Space Engineering Plan evaluation results (specifically Long Tuyuq Kampung Settlements), by concluding in stages the end of the research results and recommend some things that need to be followed up in this research.

#### 3.4. Method of Collecting Data

Because the data needed consists of primary and secondary data, then the data collection consists of data collection techniques primary secondary data. Its implementation, carried out by conducting a survey.

#### 3.5. Data Analysis Technique

As described in the stages of conducting research, analysis which will be used in this study using qualitative methods. This analysis method aims to make a picture or painting in a way systematic, factual, and accurate regarding the facts, properties, and relationships between phenomena investigated qualitatively (Nazir, 1988). In an implementation, this analysis method is divided into several analytical techniques.

Quantitative statistical techniques are used as a purposeful preliminary analysis to find out the characteristics of research, through variables researched. The analytical tool used is a diagram, frequency / percentage (Sugiyono, 2000). Descriptive analysis techniques are used to analyze the state of the object of study through description, understanding or good explanations measurable or not measurable (Widodo & Mukhtar, 2000).

Normative analysis techniques are used to analyze the circumstances that should follow certain ideal rules or guidelines. The rules can be a standard set by the agency certain or other foundation (Nazir, 1998). Visual analysis techniques aimed at analyzing

the state of the object of study with use a visual system / depicting objects directly. The analysis tools used in the form of photographs of objects and sketch drawings, so that they compare the existing conditions with the ideal (Achmadi & Cholid, 2001).

## 4. FINDINGS AND DISCUSSION

### 4.1. Land Capability Analysis

In planning a settlement must prepare several things, one of the land. Land issues are a major concern, both in terms of topography, security, strength, and land endurance to ability land. One that must get important attention is done land capability analysis.

Land capability analysis is an effort made to know the potential of the land. From this analysis, an assessment will be obtained of land potential which will later become a reference for determining land use and management. In addition, analysis of abilities land can also be used to support the process of preparing plans for land use in an area. According to the Regulation of the Minister of Public Works of the Republic of Indonesia Number: 20 of 2007 concerning Technical Analysis Guidelines for Physical, Environmental, Economic, Social and Cultural aspects in spatial planning, the data used in analyzing.

Slope stability aims to determine the level of slope stability in the region/area of development in accepting the burden. Stability slope means that the area can be said to be stable or not condition the land by looking at the slope of the land. If one area is called low slope stability, hence the condition of the region unstable. Unstable means easy to slide, easy to move meaning it is not safe to be developed for buildings or settlements and cultivation. This area can be used for forests, plantations, and water infiltration. Land capability in the Long Tuyuq Settlement including slope stability and hydrology.

Hydrological data is data related to the existing water system, both on the surface and in the ground/earth. The water system that is on the ground level can be shaped like open water Bodies Rivers, canals, lakes/springs, springs, and seas. While the water system located in the soil (geohydrology) can take the form of groundwater flow or even underground rivers. General hydrological data is commonly available is a map of the location of water bodies (rivers, lakes, seas) that can be seen from a map of the earth's appearance. From this map, you can usually get regional information rivers and watersheds, including their pattern and direction.

In the new planning area which is about 3 km from an initial village located in the Mahakam watershed with an area of 106.2 ha.

### 4.2. Disaster-Prone Areas

Villages from Long Tuyuq and Liu Mulang in the Mahakam watershed, it is very rare to get floods, even if they are on the banks of the Mahakam River due to the high topography. However, there are still annual floods, at least 1 to 2 times a year, but not every month due to rainwater, but rather caused the overflow of mahakam river discharge.

Based on the contour the planning area is in the range of 205 m<sup>2</sup> - 264 m<sup>2</sup> from the river's surface as seen from the land elevation map. Likewise, the potential for an earthquake, the planning area does not have the potential for earthquake disaster. Because the planning area is not located in fire rings and plates which have the potential for earthquakes, as well as areas with high volcanic activity.

However, other potential disasters still threaten the region the new settlement of Long Tuyuq is the Landslide. Avalanche is a symptom natural, which is a process of mass transfer of land or rock-forming slopes with an oblique direction from its original position, so that it is separated from its mass steady due to the influence of gravity, with the type of movement in the form of translation and/or rotation.

In general, areas prone to landslides are areas that have steep slope characteristics (more than 40%) and or prone areas the earthquake. Nevertheless, in the slope planning area, it is still below 25% and is not an earthquake-prone area.

The area where many waterways and springs are found in fertile valleys near rivers. Slopes at river bend, as a result of erosion or scouring by river flow at the foot of the slope. The region planning away from the Mahakam River which has swift currents. Slope bending area, i.e. transition between steep slopes and slopes ramps that have settlements inside. Locations like this is a zone of water accumulation that seeps from the slopes steeper Therefore the bending area of this slope is very sensitive experience an increase in pore water pressure which eventually weakens bonding between grains of soil particles and triggering landslides.

The area which is generally broken fault structure/fault is present occupancy. Characterized by a valley with steep slopes (above 30%), composed of tightly separated rock (cracks), and the appearance of springs in the valley. Rock cracks can be resulting in decreased slope stability, so that it can occur rock fall or glide when rainwater seeps in cracks or when vibrations occur on the slope.

### 4.3. Land Feasibility Analysis

Villages from Long Tuyuq and Liu Mulang in the Mahakam watershed, it is very rare to get floods, even if they are on the banks of the Mahakam River due to the high topography. However, there are still annual floods, at least 1 to 2 times a year, but not every month due to rainwater, but rather caused the overflow of mahakam river discharge.



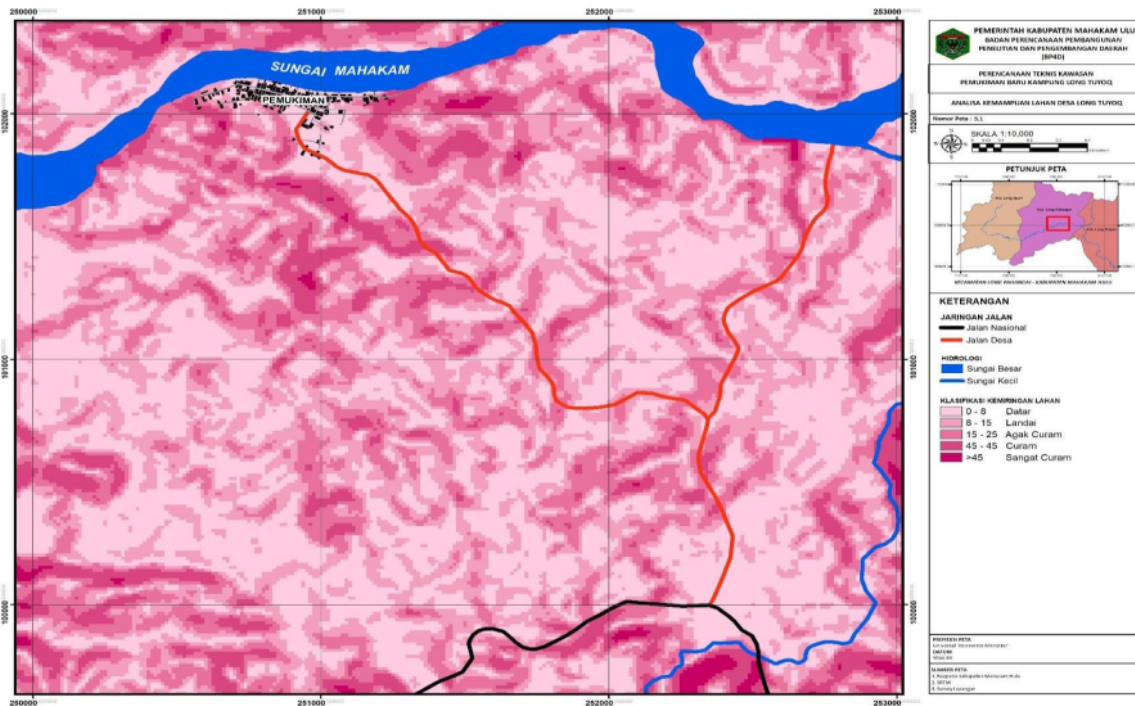


Figure 2: Land Capability Map of Long Tuyuq Village

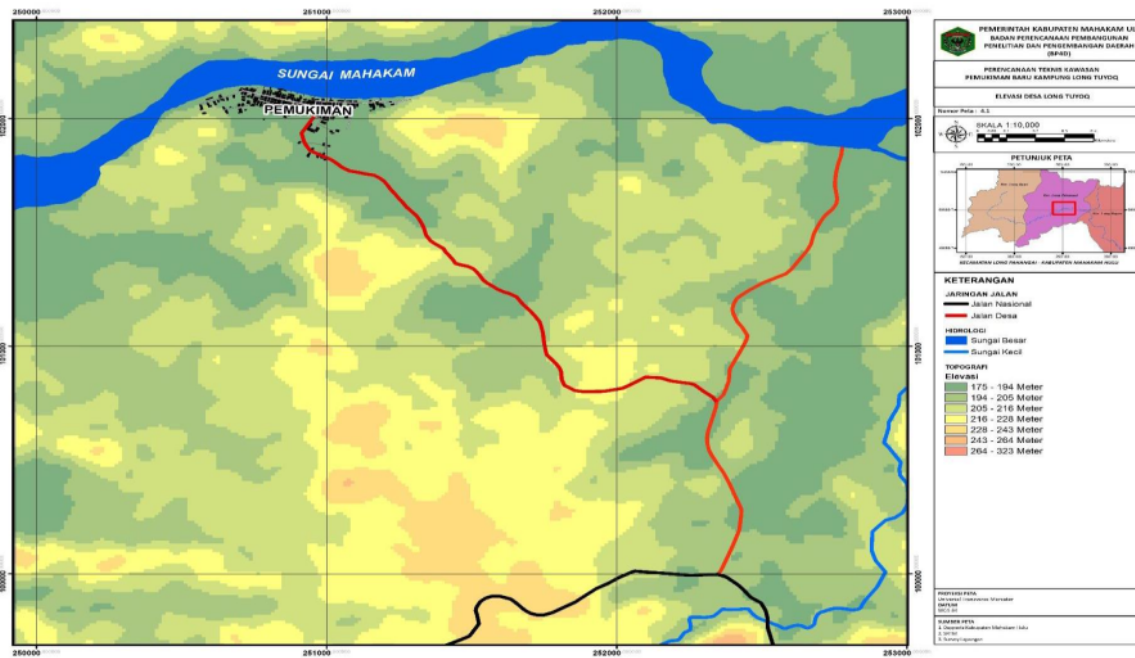


Figure 3: Map of Long Tuyuq Village Elevation

From overlay slope stability maps, hydrological maps, and natural disaster maps, we can analyze the feasibility of the existing land in Long Tuyuq's new settlement with an area of 106.2 ha is land worth developing by 81.23% or an area of 86.27 ha.

2

Conditionally feasible land is 18.12% or 19.24 ha. Areas with a slope of 15% until 40% prone to landslides. Then is the land that is not feasible to be developed by 0.65% covering an area of 0.69 ha. Area with slopes above 40% are very prone to landslides seen from Figures 2, Figure 3, and Figure 4.

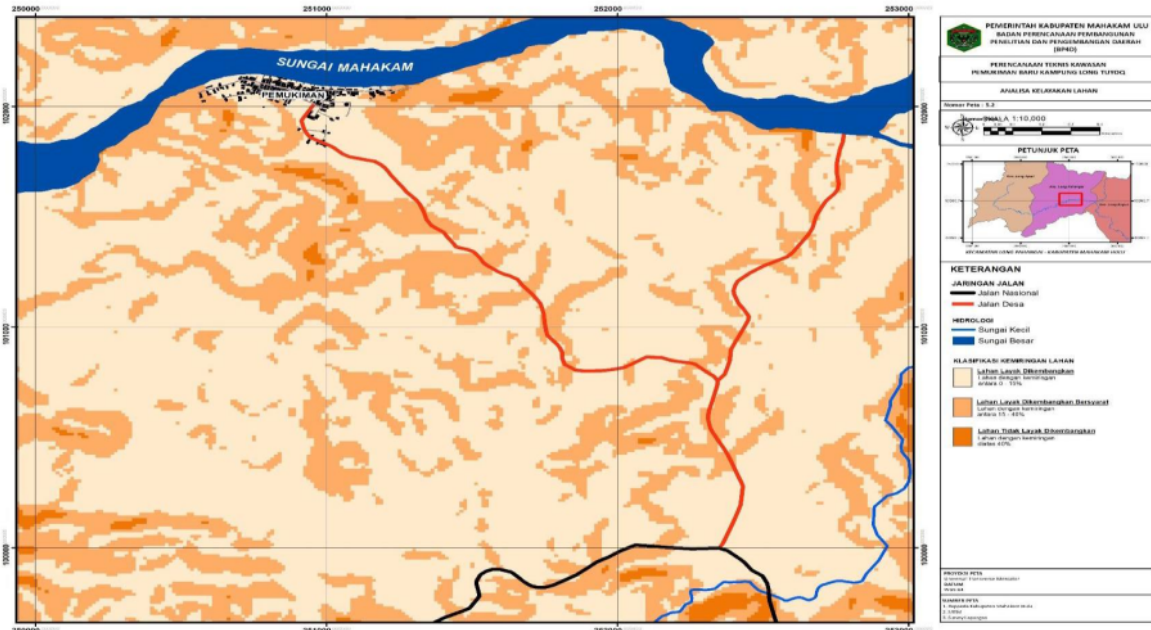


Figure 4: Map of Long Tuyuq Village Land Worth

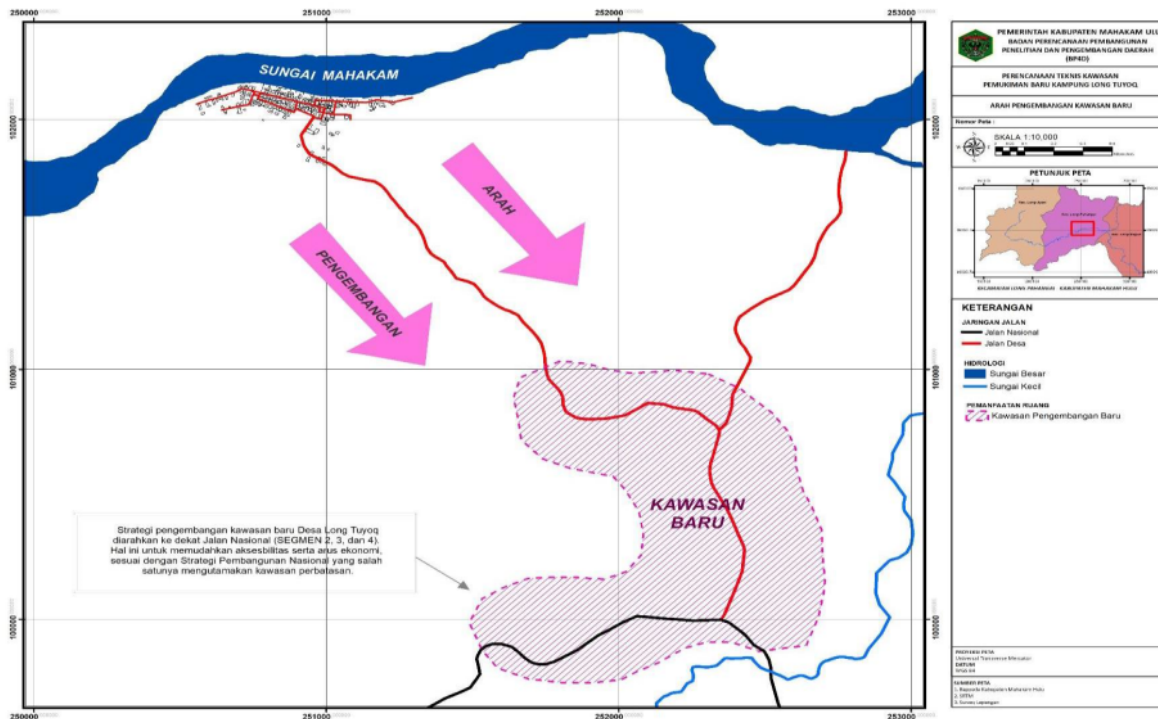


Figure 5: New Area Development Direction

#### 4.4. Planning Concept

In planning a site, zones or zones need to be made grouping based on the nature of each building include public zones, semi-public zones, and private zones. Public zones are general where anyone can access them without limitations. Public zone placement should be on location which is easily seen and accessed from both the front and back and can also be in the middle of the building as a center of circulation. In the zone, the public includes trade facilities, public service facilities, facilities transportation, sports facilities, cultural facilities, and green open spaces (Figure 5).

Semi-public zone, where everyone can be access or use it but there are certain conditions where people are can't freely use it. The private zone is very close where not just anyone may access or use it without permission from the owner. The division of zones within the site is as follows: (1) Settlement zone in the form of new settlement; (2) Trade zones are in the form of markets; (3) Office zones in the form of Koramil, Sector Police, sub-district offices and village office; (4) Educational zones in the form of high school / equivalent and integrated school; (5) Public service zones in the form of health centers, mosques, and churches; (6) Transportation zones in the form of terminals and ports; (7) Sports zone; (8) Cultural zones in the form of cultural parks; and (9) Green open zone is a city park.

The spatial structure leads to the access of the main road, namely the secondary local road as the center of regional activities with a public function (Figure 6).

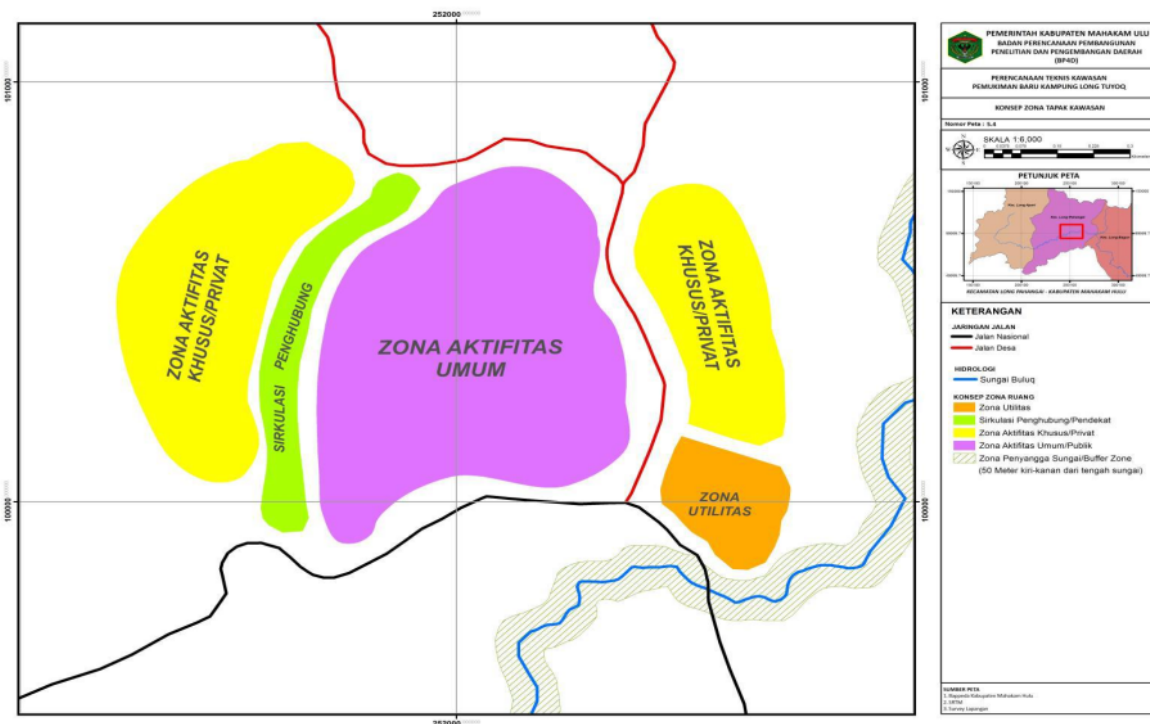


Figure 6: Regional Tread Zoning Concept

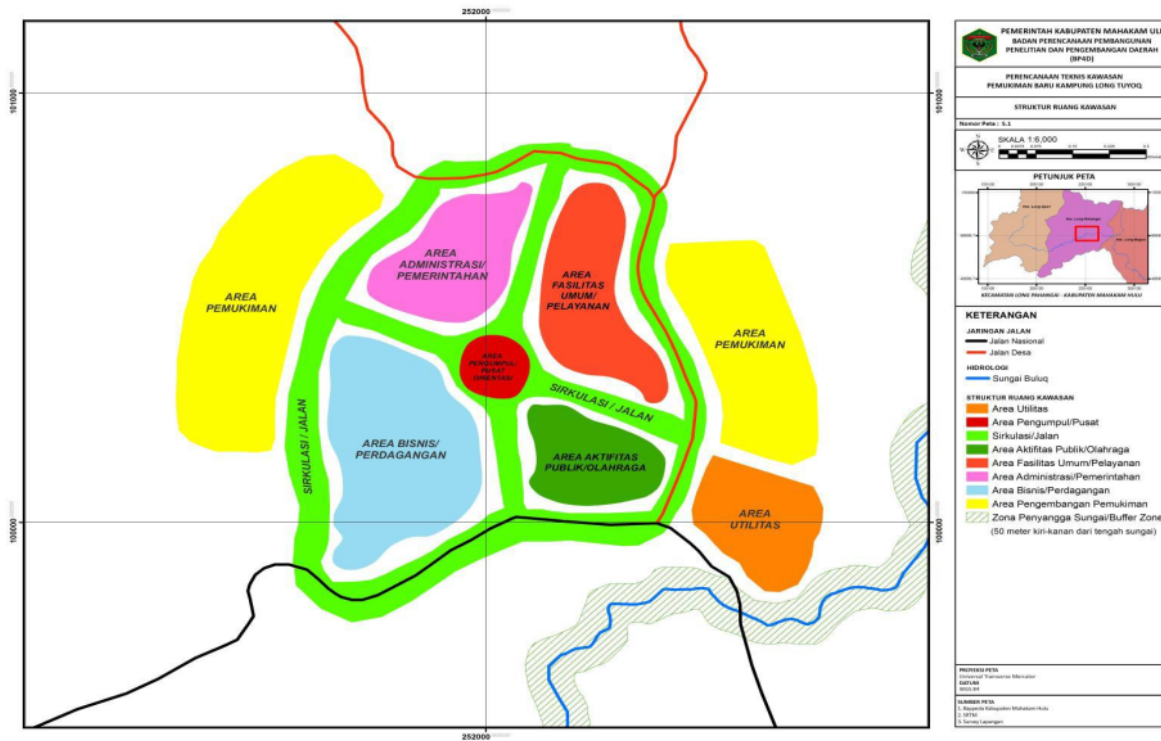
In the housing plan, there is a development plan housing support facilities include shopping facilities, facilities public and government services, educational facilities, facilities transportation, health facilities, social-cultural facilities, sports facilities, worship facilities and gardening facilities and green open spaces. Movement of the population towards housing and supporting facilities housing can pass through the main road that is a secondary local road (Figure 7).

#### 4.5. Housing Development Plan

In site plan, it is known that housing development plans are 245 units, plus a center of activity therein with an area of 1,062,418 m<sup>2</sup> or 106.2 ha. The mandate of the Law of the Republic of Indonesia Number: 1 of 2011 concerning Housing and Settlement Areas, stipulates that developers in building housing must realize housing with a balanced occupancy of 1:2:3, i.e. every 1 luxury home,



must be balanced with 2 medium houses and 3 simple houses, in one overlay, or not in one stretch but in one area Regency. From the calculations the results of the concept of balanced occupancy include 41 luxury housing units, 82 medium housing units, and 123 simple housing units.



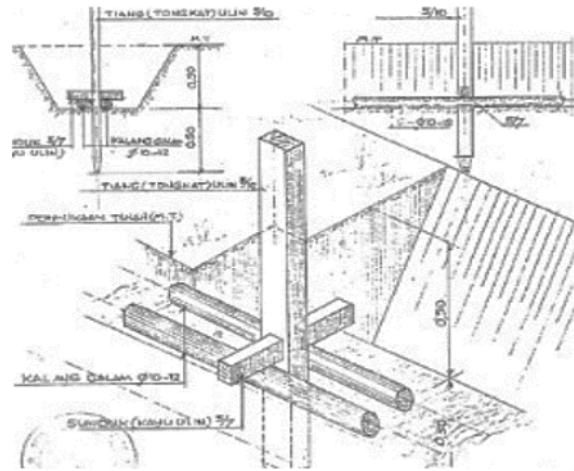
**Figure 7:** Regional Space Structure

There are two choices of housing, whether to use housing standards in the city with the main material is concrete or the second option home with wood raw materials, bearing in mind that wood raw materials are easily available on site planning and tends to be more affordable than concrete materials. Housing development must meet the criteria for a decent house.

Meet building-based safety requirements bottom structure / foundation. The provisions of the lower structure (foundation) include: (1) The foundation must be placed on solid soil, i.e. placed on hard soil, the foundation base is laid deeper than 45 cm below ground level; (2) All foundation bodies must be embedded in the ground; (3) The foundation must be connected to the foundation beam or spool, both on a local foundation and a continuous foundation; (4) The foundation beams must be anchored on the foundation; and (5) The foundation should not be placed too close to the cliff wall, to prevent landslides, cliffs are given a retaining wall made from a mate or plaster of bamboo or wood (Figure 8).

*Middle / column structure and log.* The structure provisions include: (1) Buildings must use columns as bearers, can be made of wood, reinforced concrete, or steel; (2) The column must be anchored on a foundation beam or the bond is continued on its foundation; (3) At the end of each column must be bound and joined with wooden beams, reinforced concrete or steel; (4) Building frames (columns, ring beams, and loops) must have a strong and sturdy relationship; (5) Columns / wooden poles must be equipped with stiffening blocks to resist the lateral force of the earthquake; and (6) In houses on stilts between wooden poles must be given a diagonal bond.

The above structure provisions include: (1) The frame of the horses must withstand the weight of the roof; (2) The frame of the horses must be anchored at their position (in the column or ring beam); and (3) In the elongated direction, the roof must be strengthened by adding bonds the wind between the frames of the horses.



**Figure 8:** Wooden House Foundation

With this design at Figure 9, can guarantee the health of lighting, ventilation, and sanitation, consisting of: (1) Adequate lighting for a livable house of at least 50% of the wall which deals with open space for living and minimal space 10% of the wall facing open space for space sleep; (2) Adequacy of occupancy of a decent house for a minimum of 10% of the floor area; and (3) Provision of sanitation at least 1 bathroom and latrine inside or outside the house building and equipped with buildings under the septic tank or with communal sanitation.



**Figure 9:** General Design of Long Tuyuq New Settlement Houses

Meet the minimum area adequacy of 7.2 m<sup>2</sup> per person up to 12 m<sup>2</sup> per person with the main function as a dwelling consisting of multipurpose space sleep and are equipped with a bathroom. Criteria for livable homes does not eliminate the use of technology and local area building materials according to local wisdom for using technology and building materials to build a decent home habitable.

## 5. CONCLUSION

The concept of regional developments planning is creating and opening new settlements, which is a combination of Liu Mulang Village and Long Tuyuq Village, became the new settlement of Long Tuyuq. The concept of the new settlement using the concept of a garden house. In the site plan, there are 245 housing development plans known the unit, plus an activity center inside, with an area of 1,062,418 square m<sup>2</sup> or 106.2 ha.

Based on the slope stability map overlay, hydrological maps and natural disaster maps obtained from the analysis of existing land feasibility in Long Tuyuq's new settlement with an area of 106.2 ha is as follows: (1) Land suitable for the development of



81.23% or 86.27 ha; (2) Land suitable for conditional development of 18.12% or an area of 19.24 ha. Areas with a slope of 15% until 40% prone to landslides; and (3) Land that is not feasible to be developed is 0.65% covering an area of 0.69 ha. An area with slopes above 40% is very prone to landslides.

Before thinking about borders it is important to think about the concept of exclusion, marginalisation and integration. The terms exclusion and marginalisation view society as a core society with a clear centre and a clear margin or border (Kokalanova, 2013). The importance of an efficient securities clearing and settlement system lies on the safer transfer of ownership of assets against payment. Such a system must be developed in away to minimize the risks involved on securities transactions, and it must still offer lower costs, which do not hinder the intention to acquire or dispose securities (Carvalho, 2004).

The Government of Mahakam Ulu Regency, to help direct the residents who already intend to move locations to immediately choose a location as desired, as well as making special rules for the villagers concerned site selection.

The location of the old settlement both Long Tuyuq Village and Liuq Mulang Village will be used as the main dock and green open space area beneficial for environmental health.

Buluq River will be the main source of clean water for Long Tuyuq Settlement, by sterilizing by determining the buffer zone (for protect core areas from negative impacts of human activities) more or less broadly 50 meters, to protect the upper catchment area of the Buluq River.

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### Conflicts of interest

None

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