

## Accessibility Settlements at the Tallo River Estuary in Makassar City South Sulawesi Province

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**Abstract:** Land transfer functions of the settlements into warehouses and industrial estates have increased very strongly in the last 10-15 years of the Tallo River Estuary. Currently the Tallo River Watershed is directed as a strategic area of the water transport development. This research aims to: 1) identify the conditions of settlements and road networks at the Tallo River Estuary; 2) analyze the accessibility of land and river transportation services to reach the estuary and 3) propose the concept of integration between residential settlements and transportation network systems at the Tallo River Estuary. The research was conducted by survey technique, direct observation and interviews of residents within the estuary. This analysis is quantitative-descriptive and spatial. The research sites are located in the administrative area of Tallo sub-district and Buloa sub-districts in Makassar City. The analysis is divided into 3 segments: buildings on water, buildings on the river boundary (0-15 m from the riverbanks) and buildings located on land (15-270 m from the riverbank). The results of the analysis show that: 1) the condition of the settlement at the Tallo River Estuary, which is on the water, the shape of the building is a stage house served by the road network of the (wood/bamboo). The settlements within the river border area, the shape of the building is in the form of houses on stilts that have been built under the pavement, served by paving blocks, and settlements of the mainland, the form of stone houses on the ground, served by the paving block. 2) Access to the Tallo River Estuary settlement area, can be reached by land and river route. 3) The concept of integration can be directed by a modal displacement node in the space connecting the settlement with the road and dock networks.

**Keywords:** Accessibility, Settlement, Transportation, Tallo River

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### I. INTRODUCTION

Provision of regional infrastructure and structure of transportation should be able to provide increased accessibility and mobility of the community in supporting the improvement of regional economic development and local communities. Accessibility is a concept that incorporates a land use arrangement system with a transport network system. Accessibility is an interaction of inter-land use interacting with each other, and it can be assessed to be 'easy' or 'difficult' the location is achieved through a transport network system. Accessibility is a measure of ease of reaching a place [1].

The Tallo River has a function and a very important role in the development of Makassar city, so it must be preserved and improved river functions. For the land use at the river estuary in addition to the settlement there is a complex of Tallo King's Tomb which is a historical heritage used as a tourist attraction. As urban growth and population increases, new settlements grow uncontrollably along the river, so that some rivers lose their function and degrade their environmental quality [2,3].

The regulation of Public Works and Housing No. 28/PRT/M/2015 describes the determination of the river boundary line, that in the case of river utilization, the prohibition of building as protection of embankment that functions as flood control, but some facts show the development of fishermen settlements, embankment farmers and laborers informally in the area, with a disorganized and disorganized building structure. In addition, unsuitable land use, lack of service centers in residential areas and limited accessibility have become a problem in the estuary of the Tallo River [4,5].

Based on the description of the problem is important to study about the Accessibility of Settlements at the Tallo River Estuary, which aims to identify the condition of settlements and transportation accessibility in the settlement of the Tallo River Estuary. Expected to be a renewal in the management of Tallo River Watershed areas and become an input of the Government of Makassar as one of the solutions for the development of the Makassar Watershed Transportation System.

## II. METDHOLOGY

The location of the research was conducted on the settlements at the Tallo River Estuary, which is administratively located in Tallo and Buloa Sub-districts as shown in Figure 1.

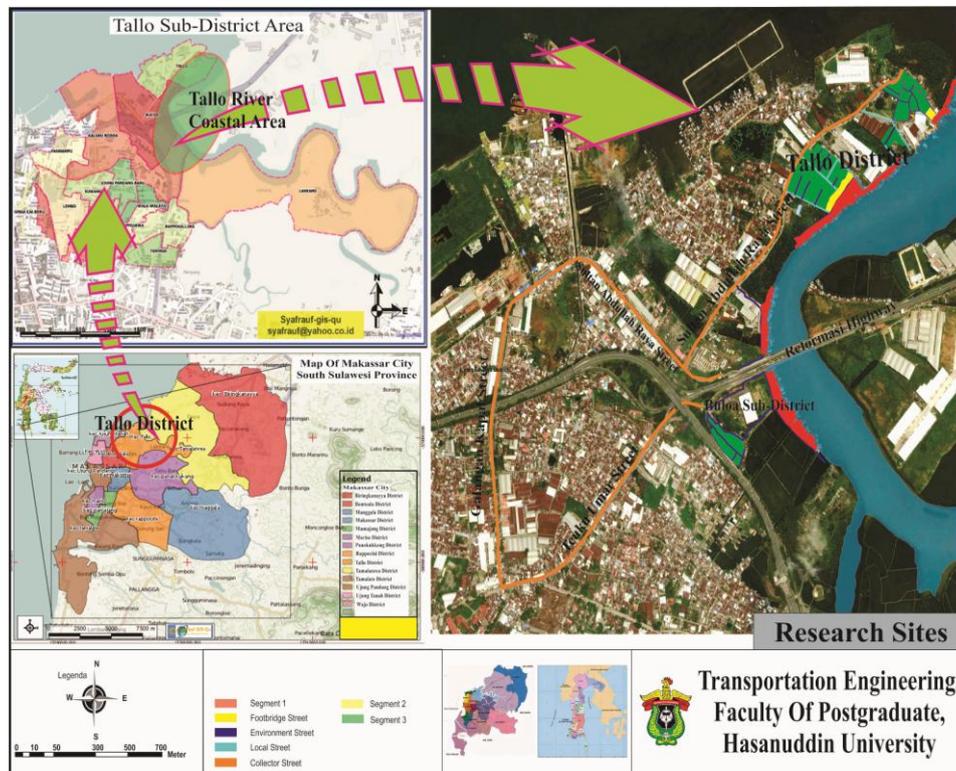


Figure 1. Research Sites

Source: The results of analysis, 2017

Data were obtained from survey techniques, direct observation and in-depth interviews of residents within the Tallo River estuary estates. Document data obtained from the related institution in the form of location data and status of Sub-District in Tallo District. The report of Action Plans for Settlement Environment Arrangements (APFSEA) is a Priority Area of Tallo sub-district, Spatial Plans of Makassar City and Local Transportation in Makassar City and Ministerial Regulation about the river boundary line. This research uses descriptive-quantitative analysis techniques and to identify the condition of settlements and road networks at the Tallo River Estuary. Spatial analysis and accessibility to identify land and river transport networks to reach Tallo River estuary settlements, and to direct the concept of integration between residential and transport network systems. The settlement of the Tallo River Estuary was analyzed by descriptive analysis and accessibility index.

## III. RESULTS AND DISCUSSION

### Identification of Settlement and Road Network Conditions of the Tallo River Estuary

The buildings that follow the Tallo River Estuary flow are resettlement of warehouse and industrial buildings built in the last 10-15 years. The type of building on the segment 1 (on the water), is 100% of the stage houses, with the hollow frame houses of concrete, wooden pillars, walls of wood and zinc, floor boards, zinc roofs. Housing is served by wooden and bamboo trails, with 40% good and 60% damaged condition, of fragile wood and not well structured, without drainage. Trash is discharged directly into the river, causing dirty environments and rivers and odors. Light in the house used as illumination along the footbridge street. Residents have difficulty getting clean water, so they have to buy clean water to other people who have drilled well water pumps at a cost of IDR. 3.000,- per cart (1 cart containing 6 to 9 jerrycan of 20 liters).

The type of building on the segment 2 (located in the river border) is 90% of the houses that have been built up, filled with rock material, foundation stone, wood and zinc walls, cemented floor of the house from cement, wooden floor platform and zinc roof. Housing is served by a path made of paving blocks with width of

1-2 m with good 100% road condition. There are drainage and street lights whose cables come from inside the house.

The type of building on the segment 3 (mainland) is 90% stone houses built above ground, brick wall, tile floor and zinc roof. The settlement is served by an environmental road made of paving block with the width of 1-3 m with good 100% road condition. There are drainage and street lights. In general the conditions of settlements and road networks can be seen in Table 2.

**Table 2.** Condition of settlements and road networks

Location	Type of building	Building materials	Road Type and Condition	Road Materials	Drainage	Lighting
Segment 1 (on the water)	100% house on stage	Frame under the house: Concrete Pole: Wood Wall: Wood and Zinc Floor: Board Roof: Zinc	Footbridge street, Condition 40% good, 60% broken	Wood / Bamboo	None	None
Segment 2 (River border)	10% of houses on stilts and 90% of houses that have been built under them	Household: stone Foundation: mountain rock Walls: wood and zinc Floor under the house: cement Floor stage: wood Roof: Zinc	Pathway, Condition 100% good	Paving Block	any	any
Segment 3 (mainland)	10% of houses that have been built up and 90% of stone houses	Wall : Brick Floor: tiles Roof: Zinc	Road Environment, Condition 100% good	Paving Block	any	any

**Source:** The results of the analysis, 2017

There is no service center such as education, health and office facilities in the settlement area at the Tallo River Estuary, so people tend to use public transport and private vehicles as the main transportation to reach the facility compared to walking.

### Accessibility of the Land and River Transport Service to Reach the Settlement Area at the Tallo River Estuary

Tallo District is 8.75 km<sup>2</sup>, with a population of 138,000, and population density of 15,771 people/km<sup>2</sup> (>5,000 souls/km<sup>2</sup>). The entire road length of Tallo District is 27.097 km, with the accessibility index of 3.09 so that it has qualified for the Minimum Service Standards (MSS) accessibility >1,5. This shows that the road network service in Tallo District has a high accessibility index, indicating the distance between the service centers and the condition of the road network infrastructure is very good. In general, the Tallo River Estuary settlement area is accessible by the land and river routes. The land route is served by two road networks of collectors, namely the road of Sultan Abdullah Raya and Teuku Umar Street. Both roads are traversed by city transport (public transport 'route C (Makassar Mall-Tallo)). The river route can be accessed through 4 docks in the Tallo watershed, serving as a location for inter-modal transportation (inland transport modes to the river transportation modes and otherwise). The settlements at the Tallo Estuary are served by Tallo Pier and Buloa Pier, by transport routes from the estuary of the Tallo River to Lakkang Island and Kera-Kera Island [6].

### Integration Concept

The settlements built on the water are not connected with transportation nodes is a pier. Therefore, it is needed the concept of integration between residential and pedestrian lines along the settlements that are directly related to the pier. The pedestrian width is adjusted to the circulation standard of a minimum pedestrian with a width of 1-1.2 m for 2 persons. Arranging the facade of the house facing the path of the bridge, in order to facilitate access in and out of each home and prevent the increase of house construction towards the watershed (Figure 2).

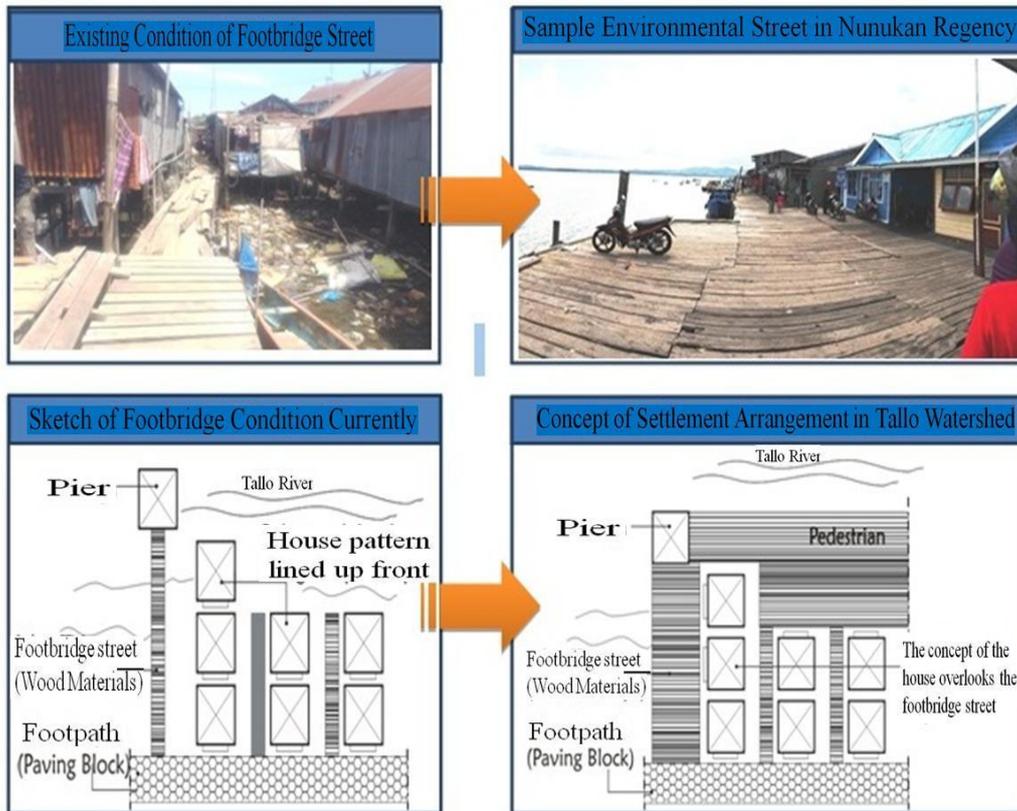


Figure 2. The concept of integration

According to the analysis, there are some access to the settlement, but there is no transportation as terminal or halt, which can facilitate the population to do the mode transfer, then the concept of improvement of transportation systems as shown in Figure 3, can be made a halt and signpost (location of tourism potential) So that people are more aware of the existence of a tourist attraction at the Tallo River Estuary in Makassar City.

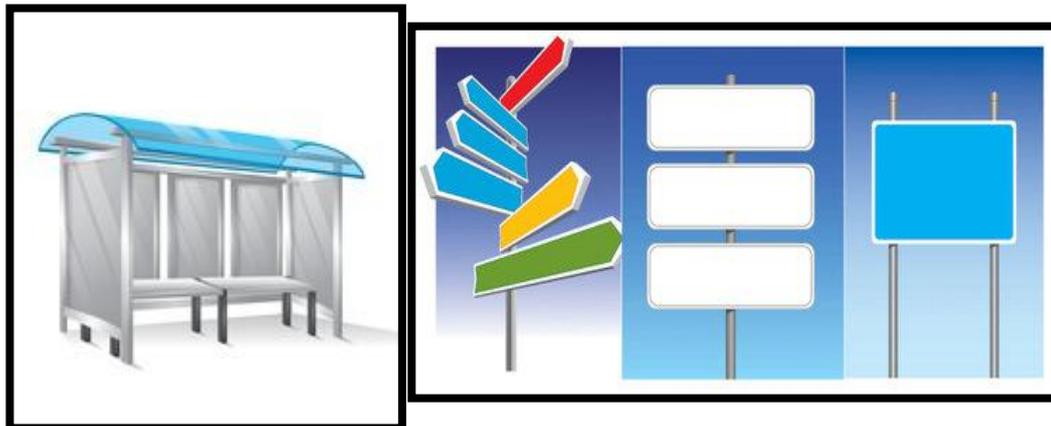


Figure 3. The concept of halts and signposts

#### IV. CONCLUSION

The results of the analysis show that: 1) there are 3 types of buildings in the settlement at the Tallo River estuary, i.e a building that is above the water, the shape of the building is a stage house served by the road network of foot bridge (wood/bamboo), building of the river border, stage that has been built under the paving blocks, and settlements in the mainland, the stone houses are on the ground, served by the paving block. 2) High accessibility index, indicating the distance between service centers close to the condition of road network infrastructure is very good, and access to the Tallo River Estuary settlement area, can be achieved by land and river route. 3) The concept of integration can be proposed with the node of modal displacement in the space

connecting the settlement with the road and pier network in the form of making pedestrian lines along the settlement and arranging the facade of the building facing the path of the bridge for easy access in and out of the house.

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