Implementation green and low cost on landscape design of Manggarai Integrated Station, Jakarta

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Abstract. The Manggarai Integrated Station is the transit of various transportation modes. The Integrated Station located in Manggarai Jakarta and managed by PT. KAI. The Manggarai station is integrated and have terminal nature of transit areas (switching mode of transportation). There are several problems in the site, such as the problem of the site conditions in the urban area, topography, soil, vegetation, space, visual, users on the site can provide ideas for the concepts. The data was analyzed using the quantitative descriptive method. The purpose of this research is to design the integrated station atmosphere, not only can support the activities station users, but can also accommodate the needs of the community. It will “Green, Low cost” at the Manggarai integrated transport transit station in Jakarta. The potential that exists in this area is the lowest integrated from various areas of the mode of transportation that make the users to facilitate transit transportation to the other. The basic concept of this design refers to the “Green, Low Cost” which unite with theme “user friendly” land use on a more efficient and effective site. The result of this research is landscape design development of Manggarai integrated station. Its consists of landscape design in west and east area, transition area, parking area, solar panel area, and social interaction area.

Keywords: landscape design, open space, urban transit

1. Introduction
Jakarta's urban transportation was growing very rapidly due to the high mobility of its people who need vehicles. The increasing human population is also increasing the need for transportation causing an imbalance between roads and vehicles. Less support for road facilities provided by the government causes traffic congestion and violations by motor vehicle users. The problem occurs because many people prefer private vehicles compared to public transportation.

Data from Jakarta Central Bureau of Statistics [1] shows that the population growth rate from 2000 to 2010 in the capital reaches 1.40 percent per year. The rate of population growth should be adjusted with adequate means of transportation. To facilitate the movement or movement of people from and to various places, it is necessary a mode of transportation. For Jabodetabek, one alternative mode of transportation is the train. All the countries in the world recognize that developing rail transportation as the core of the urban public transportation system is the only way to solve the traffic problem in the city [2]. For service users who need access to Jakarta and outside Jakarta, the railway functions as an irreplaceable means of connecting [3]. This is due to the low cost and the ability to transport large numbers of passengers in a relatively short time.

Selection of Manggarai location because of the area is a strategic area which becomes the point of crossing several modes of transportation from various regions planned by the Provincial Government of...
DKI Jakarta. Manggarai Station which is one of the modes of transportation in the area, is one of the stations that can be categorized as a big station in Jakarta. Based on the planning of the Provincial Government of DKI Jakarta, Manggarai Station will be the final station for long-distance trains and airport railways (Soekarno-Hatta) integrated with TransJakarta Bus Stop and Manggarai Bus Terminal, the design of the integrated station will be designed around the Manggarai area.

The scope of these researchs is to design integrated Manggarai station landscape as a transport transit intermod. The design of the transit station landscape by providing a more organized Manggarai station atmosphere to be greener and to provide green space as a conservation area. Green transport is aimed to improve active mobility and public transit system with more integrated and convenient service [4]. The surrounding communities that use transportation services and which influence the inhospitable life in the Manggarai station are also considered in the design of the integrated Manggarai station landscape area, to provide facilities and circulation to avoid passengers accumulation at one point.

2. Research Method
The research was done at Manggarai station in the Centre of Jakarta. The wide of research was 9.4 ha. The border area: south at Jl Raya Utara, east at neighborhood, west at traditional Manggarai market, north at Jl Raya Balai Yasa. The method used in the design of the transit area of Manggarai Integrated Station transportation was quantitative descriptive method that consisted of five phases as follows;

2.1. Data collection
At this step the data collected in the form of primary data and secondary data, in the form of physical data and non physical site. It needs to be done to deepen and understand the physical and non physical conditions. Selection of appropriate data will help the next process required appropriate data and concerns about the potential and constraints.

2.2. Analysis
This step needs to be traversed to understand and pay attention to the potential or existing constraints of the tread, so that it can be known in terms of what needs to be maintained and improved. In-depth review also be done with literature studies and comparative studies. It is necessary to enrich references on the design of landscapes designed and facilitated area when creating a draft concept.

2.3. Programming Site Requirement
This step provides details of what needs to be applied to the site, such as the utility needs, facilities, and green requirements needed to minimize the problems at the site.

2.4. Draft Concept
Creating landscape design concepts that can minimize or reduce existing problems on the tread, already understood through the process of analysis that has been done.

3. Results and Discussion
3.1. Basic Design Concepts
For this design in accordance with the analysis and space needs of the transit area of transportation integrated Manggarai station landscape Jakarta. It has the basic concept of outer space pattern adapted to the potential and function of the area.

In accordance with the theme of "user friendly" it means that this region refers to one destination for the user. Users will feel comfortable if the security and comfort is well maintained, so that from one theme can be categorized as Green and Low cost. Plant configuration near the site should the principle of harmonization. Usually we choose different kind of plans, different planting methods and combine with the building to form an open or semi open area [2].
3.2. Landscape Design Development
The zoning system at the site is as follows:

3.2.1. West and East Entrance
There are 2 entrances at the site. The main entrance is the east entrance and the second entrance is the west entrance (Figure 1). At the main entrance, there is a circulation of vehicles and pedestrians for access to Manggarai station. These two entrances are distinguished by the distinction of a node in each area (east with sculpture, west part with fountain).

3.2.2. Transfer / Transition Area
The transition area is an area that serves as a transitional place for users of rail transport services. The transition area (Figure 2) is under a rail platform with a height of 12 m and an area of 13,724,832 m². This area contains only a few seats and a fountain pool as a point of view area. This area is designed to ease users to do transportation mode transfer.

3.2.3. Parking area
The parking area is under a railway platform (Figure 3), with an area of 360.52 m² [6]. Because this parking area is shaded by a massive roof in the form of rail platforms, so there is no need to add vegetation for shade.
3.2.4. Waiting Area
The waiting area (Figure 4) is used for transportation service users to wait for city bus or public transportation for a long time. The waiting area has a seating area, a smoking area and a fountain.

![Figure 4. Waiting area [4].](image-url)

3.2.5. Solar Panel Area
The solar panel area (Figure 5) consists of several solar panels that are used to capture solar thermal energy for use as electricity in the tread area. In addition to energy-efficient, using solar panels means spending on reduced station electricity (low cost concept). The function vegetation in This area are for buffer as barriers and to control climate [8].

![Figure 5. Solar panel area [4].](image-url)
3.2.6. Social Interaction Area
Social interaction area (Figure 6) has 2 function i.e for conservation (soil, water, air) and for social interaction (aesthetic). As a function for vegetation conservation, it uses stratified from ground cover, shrubs, shrubs, trees. Conservation areas are needed to minimize flooding, air pollution and noise pollution. While as function for social interaction prefer to use aesthetic vegetation, both the leaf canopy and the color that makes the users relax psychologically.

4. Conclusion
The basic concept of this design were the “green, low cost” which unite with theme “user friendly” land use on a more efficient and effective site. Landscape design of Manggarai integrated station transfer area consists of west and east entrance area, transition area, parking area, waiting area, solar panel area, and social interaction area. The system of outer space function on the site is generally as a transit area of a systemic nature. Other functions that exist in the tread is the function of space and function of supporting activities. The functional system is supported by facilities in each area as the main supporting subsystem. The activity of the transport mode is good from the train in the mode of transportation. Crowded atmosphere occurs during peak hours of community leave and go home to work. The unifying function of the space is accommodated by the receiving plaza and the connecting plaza. The plazas connect...
between one area and another. Urban rail transport plays an important role in the process of city development because of its obvious advantages. [3]. so the landscape design of station Manggarai as the transit of integrated transportation is very important.

References
[1] Hasil Sensus Penduduk Provinsi DKI Jakarta, accessed from http://jakarta.bps.go.id/index.php?bWVudT0yMjAwJnBhZ2U9cHVibGlrYXNpJmlkPTIw on Oktober 2, 2012 at 00:08.
[2] Ning Zhang; Meng Yuan Liu; Suming Guo, Analysis on the sub way station landscape o the southern Mount Zijin in Nanjing. IOP. Conference series; Earth and Environmental Bingyi. Liu, Landscape planning and design of city road. Southeast University Press. 2002
[3] Grava, Siguard. Urban Transportation System. USA: McGraw-Hill. 1999
[4] Baoping Mao, Planning and design of city rail traffic. China Communication Press.2006
[5] Chang, SK. Challenges for TOD in developing cities; Invited presentation in train the trainer SUMA. Program sponsored by ADB and GIZ, Beijing China. 2006
[6] H. Meilianti. Landscape Design of Manggarai Integrated Station Transit Area, Jakarta, Bachelor Degree of Landscape Architecture. 2014
[7] Philip L Carpenter, Theodore D Walker, Lampheaf F, Plant in the landscape.1975