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TERMINAL BUILDING WITH ECO-FUTURISTIC DESIGN IN TRANSIT ORIENTED DEVELOPMENT (TOD) MEDAN LABUHAN

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ABSTRACT

This final project's background is the Medan Council's program to develop a Transit Oriented Development (TOD) in Medan Labuhan. This project aims to design a hub consists of terminal building, commercial, office building and some other public functions focusing on mobility of workers in Kawasan Industri Medan (Medan industrial area) in Medan Labuhan. The terminal building accommodates several transportation modes such as local buses, MRT and inter-regional buses. This project applies the principles of eco-futuristic architecture to gain some futuristic form to indicate the future of Medan.

***Keywords**: TOD, terminal building, eco-futuristic architecture, Medan*

INTRODUCTION

The city of Medan, with a population of approximately 2.5 million people, is listed as the sixth most congested city in Indonesia. Just like any other cities in Indonesia, Medan, which has many industrial areas, ports, and terminals, keeps increasing its economic growth and at the same time increases its number of vehicle users, both motorcycles and cars and create congestion [1].
According to Medan guideline planning called RUDTR 2015 – 2035 Chapter III Article 8 No. 20, the purpose of Medan Labuhan district is to serve as a centre for services and activities, trade, transportation service centres, health service centres, and industrial activities [2].

Therefore, Medan Labuhan was appointed as the location of this project. Based on the 2006-2031 General City Spatial Plan, the Government Medan City is the focal point of TOD City development in the North region of Medan, including the Medan Labuhan area, which is located at the Labuhan, where the facilities and infrastructure in a TOD is one of them are terminals [3].

Located close to Kawasan Industri Medan, the design of this terminal is expected to accommodate a passenger capacity exceeding the average number of local residents so that migrant workers in the KIM area can also enjoy the facilities of this terminal. The rejuvenation of public transportation is also an effort to improve the transportation facilities available at the terminal that will be designed. Adding the latest public transportation modes such as MRT / LRT will also attract workers to choose the closest transportation to go home near their houses. The FAR (Floor Area Ratio) must also be considered so as not to change the main focus of travellers who want to visit Medan Labuhan to find Malay history at the Al-Osman Mosque, so it is hoped that it will be more than four floors.

The design of the Terminal in Medan Labuhan was carried out as a solution. As the high number of private vehicle users and also to realize the facilities and infrastructure included in the TOD area. The selection of the Eco-Futuristic Architecture concept in this design is expected so that later the terminal will not only focus on aspects of not only modern but also consider other aspects such as environmental aspects and socio-cultural aspects are also taken into account in the design.

In contrast to research conducted by other researchers who designed terminals in order to create a container as a gathering place for transportation modes, in this study, the researcher not only designed a place for public transportation modes to gather but also updated the system and habits that characterize the terminal in order to create a terminal that is Ecologist and also Futuristic which can be seen from the renewal of public transportation modes of transportation into inter-regional buses [4]. Therefore, in the design of this type c terminal, the city bus will be given a schedule of departures and arrivals, places to stop according to the bus stop and make a ticket purchase for each trip so that no transactions at every stop [5].

So the development of the TOD area in Medan Labuhan in the field of facilities and functions can be realized by designing a terminal, where the terminal will be the only centre for gathering public transportation modes which will be the starting and turning point for the surrounding community and workers in the KIM area. So the use of private vehicles will be reduced so that the congestion that usually occurs in the Medan Labuhan area can be reduced so that a true TOD will be realized that can overcome the problems caused by the area itself.

METHOD

Based on a location survey conducted in November 2020, the researcher took an analysis that the RUTR in Medan Labuhan had been carried out long ago, as evidenced by the existence of clusters carried out by the government, for example, industrial areas may only be located on the west side of Medan Labuhan while residential areas may locate other than the west area.

For this reason, it is not easy to reach residential areas to industrial areas. Therefore, people choose to use private vehicles, which are easier to reach all areas, so it has become a habit in the Medan Labuhan. The points are (1) Flexibility and Capability. (2) Using Technology (Figure 3). (3) Environmental, Social, Cultural and Technological Unity [6].

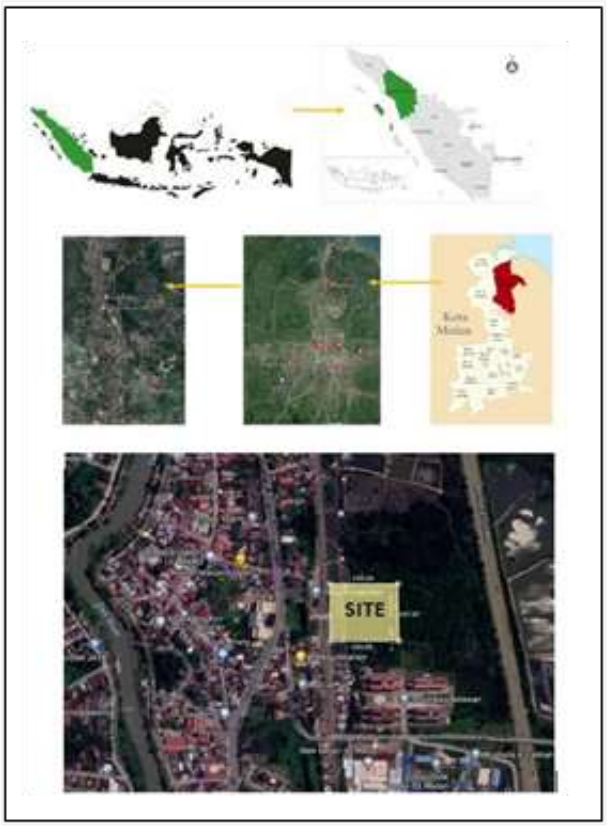

Figure 1. Project location

RESULTS AND DISCUSSION

The central point of congestion in Medan Labuhan, which is a discussion of this research, is the project site which is located in Kol. Yos Sudarso St., Medan Labuhan, Medan City. The macro design area is located between the Belmera Highway and Labuan Train Station (Figure 1). This area is also the centre point of the TOD area, which is planned for RDTR 2006-2031. For this reason, a terminal will be built at this location as a place for structured, modern and futuristic public transportation modes so as to increase public interest in using public transportation to carry out their activities.

Main Concept

The design of this terminal starts from the TOD focus that exists in this area, namely: congestion. Then the design of a terminal is considered a response to reduce this problem by creating a platform for providing public transportation facilities with supporting facilities to attract public interest to start using public transportation such as buses and trains.
A TOD area will definitely be designed in such a way as to make it easier, more comfortable and solve the environmental problem of an area. For the Medan Labuhan area, the city arrangement that has been arranged by cluster will be made it easier for the community to reach other areas, for example, by foot. The sidewalk facilities will be designed to go to the centre of the transportation modes or not. Reach between neighbourhoods A to others will be facilitated with a comfortable sidewalk. Reach between area X and area Y, it will be easier with buses between areas. Reach between district A to another district will be facilitated by MRT / LRT. In addition, the absence of a proper, safe and convenient terminal function for passengers in the city of Medan is expected to be created by designing a Terminal in Medan Labuhan (Figure 2).

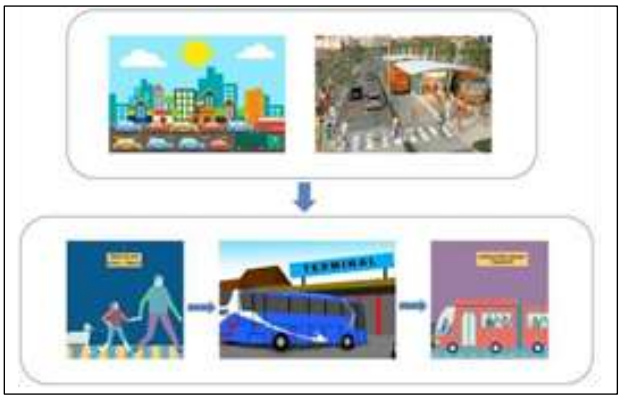

Figure 2. Main Concept

Station, then the original condition of Labuhan Station will be maintained by the provisions of cultural heritage. Therefore, the mass of the building will adapt to environmental conditions and also the socio-cultural area of Medan Labuhan with its distinctive heritage. In addition, because the design location is located right behind Labuhan.

By using the eco-futuristic concept, the transportation system will be developed because it is based on eco-futuristic principles that refer to aesthetics and modernization of the times so that it can support the operation terminals effectively. Especially with the implementation of TOD in the region, Medan Labuhan will further show the operating system of this terminal is different from other terminals because it is directly connected to the station train so that it can make it easier for people to reach two types of transportation to within and outside the city effectively and comfortably.

Figure 3. The Application of Eco-Futuristic on Building

Local and out-of-town passengers coming from the train station can continue the journey using the intercity bus, which is in front of the plaza or close to the MRT exit access at the plaza. Meanwhile, if you want to use the city bus or MRT, passengers can go to the terminal by passing through the plaza and then entering the terminal and going down to the underground floor. And if you are going to use the LRT, passengers can go to the 3rd floor and pass the connecting bridge between the terminal and light rail station. Once in the Terminal building, passengers can also go down to the 1st floor to go to the passenger waiting area while waiting for the scheduled city bus departure. Transport drivers who have reached 8 hours of work can change shifts with other drivers and can rest in the fleet mess provided terminal on the 4th floor. Passengers using private vehicles or Taxis that will go to the terminal can park or drop off directly at the door to enter the terminal building.

Which is on the 1st floor. Then from the entrance, it will directly reach the terminal lobby to view the schedule of departure information and the arrival of city transportation, and there are several retail for souvenirs and foods.

The public zone includes the terminal lobby area, parking and kiosks, and green open spaces. The semi-public zone is a terminal waiting area, departure and arrival platforms, and pedestrian bridges to the station. The private zone is a fleet mess and terminal office (Figure 4).

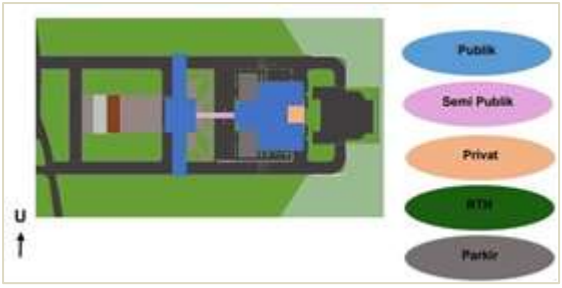

Figure 4. Zoning Concept

The mass composition used in the design of the type c terminal This is a centred pattern (the centre point is in the terminal lobby) according to the standard of a terminal as mentioned in SPM (Minimum Service Standards) Public Transportation in 2012 [7].

Figure 5. Mass Composition Concept

This mass arrangement pattern is expected to provide convenience for circulation activities, vehicles and passengers in the terminal (Figure 5). Mass orientation at the design site is adjusted to the conditions that have been analyzed and their functions, such as the lobby area placed facing west because it is the main area of the terminal, so it must face the main road, which is on the west. The main access to Medan Labuhan Terminal is at Kol. You Sudarso Street, which is on the west side. On the side, North is Labuan Station Road which is a secondary entrance towards the terminal. On the south side is a secondary exit terminal (Figure 6).

Accessibility

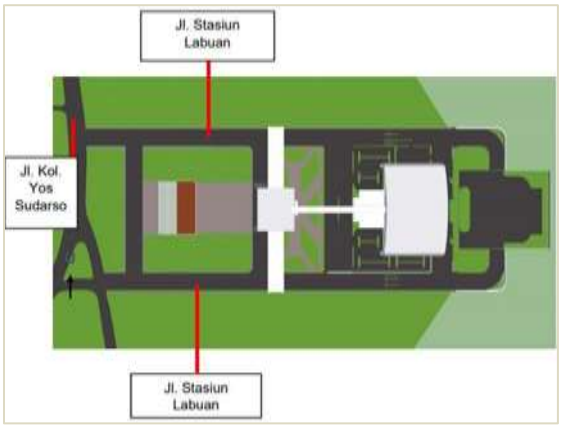

Figure 6. Accessibility to Type C Terminal

The following are some of the access achievements to the entrance terminal type c using the vehicle:

- Private vehicles, taxis, city buses, intercity buses, and airport buses coming from Kol Yos Sudarso Street, you will enter the main entrance of the terminal, namely Labuan Station Road on the left side (because the right side is heading towards Labuan Railway Station). For intercity buses, you will immediately turn to the intercity bus stop in front of the plaza or close to MRT exit access.
- After that, private 4-wheeled vehicles and taxis will immediately turn to the right to go to the parking area or drop-off area on the 1st-floor terminal. Meanwhile, 2-wheeled vehicles must go straight and pass through an automatic doorstop, then park in 2-wheel parking.
- Meanwhile, city buses and airport buses must go straight and pass through the automatic doorstop will then descend to the underground terminal floor to the departure/arrival platform area and the city/airport bus parking.

Then all the vehicles will head to the side of Labuan Station Road right to exit to Jalan Seruwai. The following are some of the access achievements to the terminal exit entrance use vehicle:

- City buses and airport buses coming from the platform or parking area must get out of there by going to the 2nd floor, then go straight until you find derivatives and will exit via Jalan Seruwai.
- Private vehicles and taxis originating from the parking area or drop-off area will find intersection three, then turn right to go down from the 2nd floor to the 1st floor to get to the exit terminal and will exit via Seruwai Street.

Circulation

Circulation is divided into two, namely vehicle circulation and circulation pedestrian circulation.

Vehicle Circulation

There are two circulation vehicles at Terminal Type C in Medan. The ports are differentiated based on the type of incoming vehicle:

City Bus Circulation

City bus circulation is designed to have the same entrance site as private vehicles/taxis but located at the back of the building's main terminal to avoid the number of encounters or conflicts with other vehicles or even pedestrians if placed in the front (Figure 7).

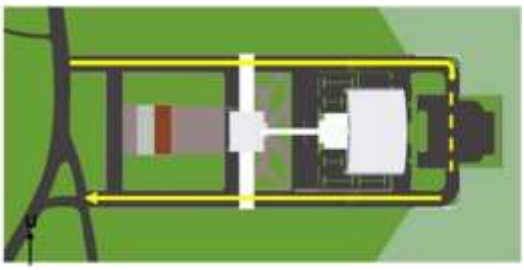

Figure 7. City Bus Circulation Concept

Private Cars & Taxies

Private vehicle circulation is designed to have an entrance site that is the same as city vehicles but located in front of the main terminal building to make it easier for passengers escorted using private vehicles and managers to the entrance to the building so that their activities are more efficient. Besides that, those taxi vehicles and the like are easier to drop off passengers (Figure 8).

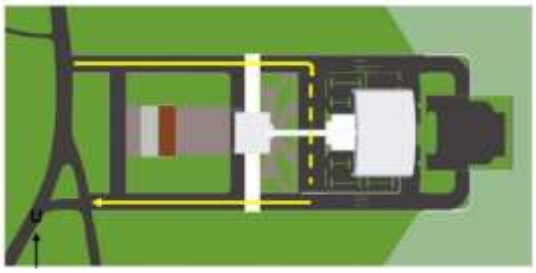

Figure 8. Private Cars & Taxies Circulation

Pedestrian Circulation

Pedestrians coming from Labuan Station will cross towards the plaza and then walk towards the Terminal building. In comparison, pedestrians from Kol Yos Sudarso Street can enter the Terminal building through the pedestrian who is on the right main entrance (Figure 9).

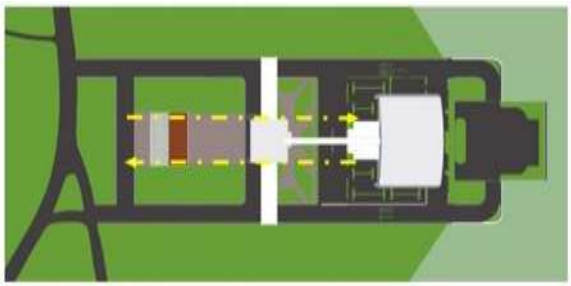

Figure 9. Pedestrian Circulation

Parking

Based on vehicle circulation (Figure 10), vehicle parking is divided into three because they have different users.

1. City bus parking
2. Passenger parking
3. Terminal manager/employee parking

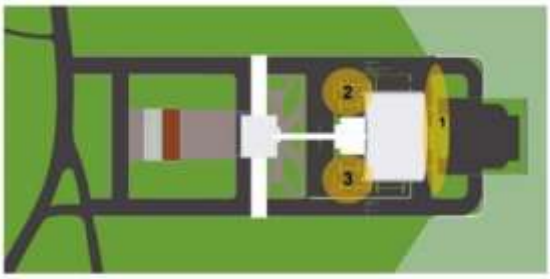

Figure 10. Parking Concept

Landscape

Figure 11. Plaza Terminal

The green area at the design location serves as a barrier between the site area and the off-site area. In addition, it also functions as a green open space based on the provisions of the Medan

City RTRW Labuhan by 20% (minimum) and also as a noise neutralizer originating from Jalan Kol. You Sudarso (front of the building) and Tol Belmera (back of the building). The design of the green planning area will also add aesthetics to the Terminal building.

Facade

The shape of the building is a combination of two rectangles where one of the rectangles is divided into two to put on the right and left sides of the first rectangle with the facade arched (Figure 12).

Figure 12. Facade Concept

- The orientation of the facade of the building faces west but will not be affected by direct sunlight during the day because it is covered by the Labuhan Station building (Figure 13).

Figure 13. Mass Oriented

• On the facade, you can see the pedestrian bridge to the station LRT to integrate between other transit centres (Figure 14).

Figure 14. Bridge to LRT Station

• The bridge that connects Terminal Building and LRT Station would help and guide passengers who are using LRT.

Building Structure

The design of this Terminal Building will use a footplate foundation it's because this building is a middle-rise building that still able to withstand the dead load and live load of the building. And for the main structure uses a rigid frame because it can withstand horizontal and vertical loads at the building and is efficient in laying the room using this structure so that it is easy to organize [8].

Interior

The concept of interior layout is a space zoning designed to adjust the SPM (General Service Standards) of a terminal that is centred where the centre is the lobby which is the centre of the entrance and passenger interaction, and also applies eco-futuristic principles that take advantage of technology in parts of the room that need its modernization of the space.

This terminal is designed to be 3 floors and 1 underground, where each floor has different purposes and functions. Outline, the concept of interior layout in this terminal covers several needs commercial functions such as public services, trade in goods and services, and offices that integrate directly with the main functions of the terminal to become a transit centre with Labuan Station. The Underground Floor is designated as a departure area and the arrival of city buses and MRT, waiting rooms, and some retail and salon (Figure 15).

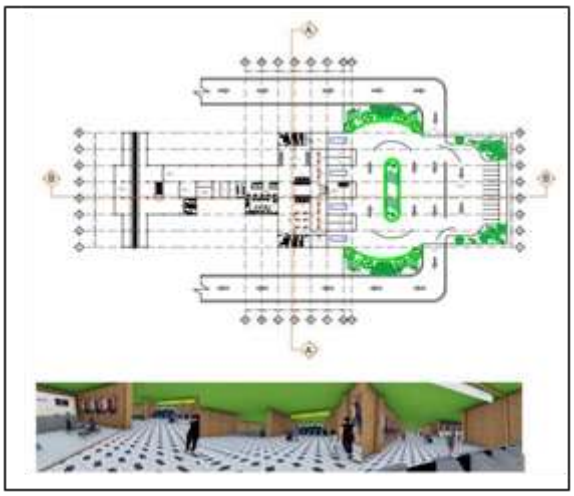

Figure 15. Interior of Underground Floor

The designation of the First Floor (Figure 16) is as the centre point of the terminal, namely the lobby, which serves to direct passengers to their activities. A number of Its functions are the waiting room area for private vehicles and taxis, an information centre, foodcourt area and kiosks, atm centre, money changer, registration letter room Covid-

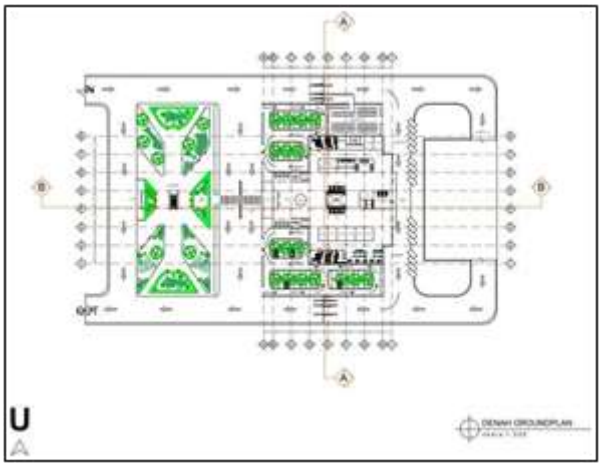

Figure 16. First Floor Concept

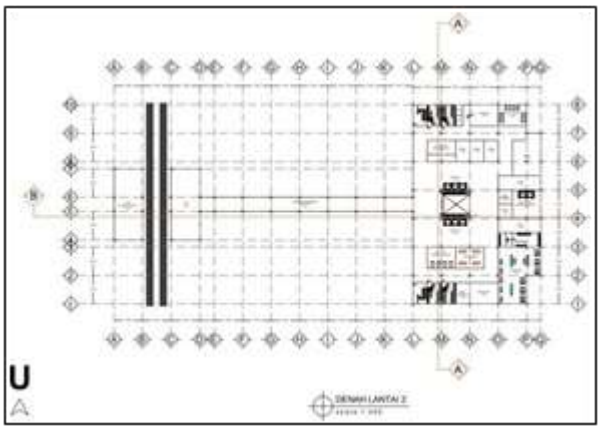

Figure 17. Second Floor Concept

19, service and parking. The designation of the Second Floor (Figure 17) is as area LRT departures, food retailers, waiting areas, vending machine areas, toilet, Covid-19 registration room, etc. The designation of the Third floor (Figure 18) is as follows: terminal management centre that requires a more private area than the area of employee offices and fleet mess.

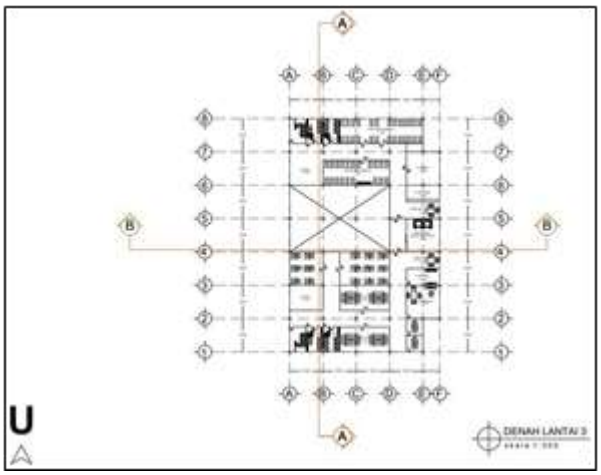

Figure 18. Third Floor Concept

CONCLUSION

The design of the terminal building with an eco-futuristic approach in Medan Labuhan is expected to reduce the congestion in the area of Medan Labuhan and also, at the same time, maximize the function of TOD. The embodiment of an organized, comfortable, and good terminal will increase public interest in using public transportation on every journey and remove the negative stigma on a terminal that is famous for the social issues around it. The application of the eco-futuristic concept to this terminal shows an impression of modern, effectiveness, clean, and easy to reach in terms of available services and models of transportation.

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