Planning of Industrial Infrastructure Needs in Industrial Designation Areas of Balikpapan City

Anisah Azizah[1*], Syandy D. Kusuma[1], Muhammad Reza Saputra[1], and Tiffany P. Bleszynski[1]

[1]Architecture, Faculty of Engineering, Mulawarman University, Samarinda, Indonesia
anisahazizah@ft.unmul.ac.id

Abstract. Industrial estate development is vital in improving the regional economy by supporting industrial activities and providing adequate infrastructure. In Balikpapan City, infrastructure needs are the main focus in accelerating industrial growth and supporting various strategic industrial sectors. Therefore, it is necessary to identify the infrastructure needed to support the optimization of the Industrial Designation Area. The method used in this research is a descriptive qualitative method with potential and problem analysis, and the primary and secondary data that act as input in the planning process are then processed to be used in further analysis. Balikpapan City has great potential for developing the industrial sector, supported by natural resources. This is indicated by the industrial development plan in Balikpapan City, which specifies natural resources processing industries such as Oleofood, Oleochemicals, Chemurgy, Wood Goods, Furniture, Rubber, Upstream Petrochemicals, and Fish and Seafood Processing. Balikpapan City still needs various types of adequate infrastructure to support the industrial development plan; in this case, several recommendations for infrastructure needs need to be prioritized, such as improving transportation and logistics, providing essential utilities, developing telecommunications, supporting industrial facilities, environmental management systems, security and safety, regulations and supporting policies.

Keywords: Balikpapan, Industry Development, Infrastructure, Infrastructure Needs

1 Introduction

An Industrial Designation Area is an area or region precisely planned and designated for industrial activities. The government or related authorities usually allocate this area to support industrial development, be it manufacturing, processing, logistics, or other industry types. The primary purpose of determining an industrial designation area is to consolidate industrial activities in a particular area so that it can optimize infrastructure, manage environmental impacts, and improve operational efficiency. The presence of an Industrial Designation Area needs to be supported by adequate infrastructure to serve and meet demand optimally. Industrial infrastructure at least includes industrial land in the form of an Industrial Designation Area and/or Industrial Designation Area, energy

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and electricity network facilities, telecommunications network facilities, water resource network facilities, sanitation facilities and transportation network facilities.

Based on the East Kalimantan Provincial RTRW for 2023-2042 and the East Kalimantan Provincial Industrial Development Plan for 2019-2039, Balikpapan City has also been designated as one of the indications of the direction of the Provincial Strategic Area Zoning (KSP) from the perspective of economic growth interests, specifically the Kariangau industrial designation area in Balikpapan City [1, 2]. The indication of the zoning direction with one of the requirements is the provision of minimum facilities and infrastructure, including industrial infrastructure, supporting infrastructure, and land allocation for small and medium industries in the industrial designation area. In the Balikpapan City Industrial Designation Area (KPI), the Kariangau Industrial Designation Area is an area that already has an Industrial Designation Area business permit and direct construction investment facilities (KLIK), which is located in the Balikpapan Bay area with an area of 133 Ha. This area is directed to develop industries engaged in the upstream agro-industry sector, various industries, primary chemical industries based on oil and gas and coal, and the food industry [2].

The industrial designation area in Balikpapan City is one of the priorities of Industrial Designation Areas in East Kalimantan Province. Therefore, it is necessary to identify the infrastructure needed to support the optimization of the Industrial Designation Area. The problem of providing infrastructure in the industrial designation area in Balikpapan City needs to be studied. By the mandate of Law Number 3 of 2014 concerning Industry, Article 62 Paragraph (1) The Government and Regional Governments guarantee the availability of Industrial infrastructure, Paragraph (2) Provision of Industrial infrastructure is carried out inside and/or outside the Industrial designation area [3]. This legislation shows that the Government is responsible for planning industrial infrastructure that includes transportation, energy, telecommunications and other supporting facilities; the Government needs to allocate an adequate budget for the development and maintenance of industrial infrastructure, encourage partnerships between the public and private sectors to fund and manage infrastructure projects and evaluate the effectiveness of infrastructure programs and projects to ensure that goals and objectives are achieved.

This study intends to provide the results of identifying infrastructure needs in the context of accelerating, spreading, and zoning industry in Balikpapan City. The benefit of identifying infrastructure needs in the industrial designation area of Balikpapan City is to determine the amount of infrastructure needs that can be developed in the area so that the East Kalimantan Provincial Government as an infrastructure service provider can carry out further plans related to the development of Industrial Designation Area infrastructure to support the development of the area as one of the economic supporting areas.

2 Materials and Methods

This qualitative research is conducted within the scope of the study location, namely the industrial designation area in Balikpapan City, specifically the Kariangau Industrial

Designation Area and its surroundings. This research explains the infrastructure needs descriptively based on the primary and secondary data collection results, which are then processed using qualitative descriptive analysis and potential and problem analysis.

Data acts as input in the planning process and then is processed for further analysis according to needs. This study uses two types of data, namely primary data and secondary data. The primary data collection technique used is direct observation and interviews. Observations are carried out to find data related to the conditions of the study area, such as facilities and infrastructure, as well as infrastructure available in the Industrial Designation Area in Balikpapan City. Observations are carried out so that the data obtained can be accurate based on existing conditions in the field by using observations and documentation in the form of photos. Interviews are conducted to strengthen the problem issues obtained from observations. Interviews can be conducted with stakeholders in related agencies who know the condition of the Industrial Designation Area in Balikpapan City, starting from the condition of the land area to the existing infrastructure and the type of infrastructure that needs to be developed or improved to meet industrial needs.

Secondary data is obtained through research results or data collection from other people or agencies. The secondary data collection technique used is interviews. Namely, nine agencies are sources of secondary data in this study. In addition, secondary data collection is also carried out through document reviews and literature reviews.

The data requirements in this study are data related to the Industrial Designation Area and the infrastructure of the Industrial Designation Area in the Kariangau Industrial Designation Area, Balikpapan City. The basis for determining data requirements is Government Regulation Number 142 of 2015 concerning Industrial Designation Areas, namely the Government or Regional Government by their respective authorities provide industrial infrastructure and supporting infrastructure [4].

The analysis methods used in the study are qualitative descriptive analysis and potential and problem analysis. Qualitative descriptive analysis describes or fully exposes the problems or phenomena by describing several variables related to the problem or phenomenon [5]. Descriptive qualitative analysis is researching a group of people or objects, conditions, perspectives, and current phenomena that are arranged systematically, factually, and accurately regarding the phenomena that occur. This study made observations on the infrastructure and infrastructure conditions available in the Industrial Designation Area in Balikpapan City. The problems found in the observations were analyzed, specifically, that minimal infrastructure conditions can hinder industrial operations' growth and efficiency. Potential and problem analysis is an analysis that describes and explains the potential and problems in the study area. Based on the analysis of potential and problems carried out, the direction of infrastructure development that can be carried out in the Kariangau Industrial Designation Area in Balikpapan City can be produced.

3 Results and Discussions

The industry development in Balikpapan City has experienced relatively rapid growth, as seen from the economic prospects of Balikpapan City, which show significant conditions. It was recorded that in 2022, the industrial sector made the most enormous contribution to Balikpapan City's GRDP, which was 47.20%. Based on data from the Balikpapan City Land and Spatial Planning Service, the growth rate of the processing industry sector fluctuated with an average of 3.36% per year. The Balikpapan City processing industry is the base sector with the most significant value. According to the latest data, Balikpapan City is also the most critical contributor to the processing industry sector in East Kalimantan Province, supported by the development of the IKN, namely Balikpapan City acting as the "muscle" in the economic development of the Three Cities (IKN, Balikpapan City, and Samarinda City). Balikpapan City as a "muscle" is a term that means a city that is a centre for logistics and inter-regional trade as well as a centre for the petrochemical industry. Positive expectations, optimistic economic projections, and other factors, such as the availability of land and infrastructure, can attract investors, especially in the industrial sector. The industrial classification in Balikpapan City is divided into two types, namely macro and small industries (IMK) and medium and large industries (IBS). The number of IMK businesses in 2022 was 4,067 businesses, with the three largest sub-sectors including food 32.45%, beverages 12.45%, and ready-to-wear clothing 12.08% (Micro and Small Industry Profile of Balikpapan City, 2022). Meanwhile, 98 IBS companies are primarily spread across the North Balikpapan District 29.59% and the East Balikpapan District 27.55% [6].

3.1 The Potential Problem Identification

One of the strategies for developing the East Kalimantan industry in realizing the Vision of "Downstreaming the Renewable Natural Resource Commodity Industry" is to create the Industrial Growth Center Region (WPPI) through the growth and development of industrial populations with regional priorities, one of which is in the Balikpapan City KPI. Balikpapan City has great potential for developing the industrial sector, supported by natural resources. It is indicated by the industrial development plan in Balikpapan City, which is specified in the processing industry which is generally sourced from nature, such as Oleofood, Oleochemicals, Chemurgi, Wood Products, Furniture, Rubber Processing and Rubber Products, Upstream Petrochemicals, Fish and Seafood Processing.

The problem in the Balikpapan City KPI, specifically KPIK, is the minimal availability of supporting infrastructure in the area. It impacts the development of the industrial sector and investor interest in investment plans. Based on existing conditions and data that have been collected, several problems related to supporting infrastructure include:

- Unavailability of water resource management in the area
- Unavailability of integrated waste and sanitation management in the area.

- It indicates that several areas cannot yet be connected to telephone and internet networks.
- Indications that several road networks have not been comprehensively connected

3.2 Infrastructure Needs

By Government Regulation Number 142 of 2015 concerning Industrial Designation Areas, the development of Industrial Designation Areas will be carried out in the designated Industrial Designation Areas (KPI) by the Regional Spatial Plan (RTRW) [4]. Regional infrastructure that enables the acceleration, distribution, and growth of industrial areas is required to support regional expansion. Basic infrastructure that must be the plan's focus includes energy and electricity networks, telecommunications networks, water resource networks, guaranteed raw water supply, wastewater, and transportation networks. The development of industrial infrastructure is contained in the Regulation of the Minister of Industry No. 40 of 2016 concerning Technical Guidelines for the Development of Industrial Designation Areas because Industrial Designation Areas are part of KPI, so guidelines related to Industrial Designation Areas can also be used as a reference for fulfilling infrastructure needs in KPI [7].

The Energy and Electricity Network. The electrical network is an electrical system consisting of networks and devices that are connected to each other to distribute electrical energy. The availability of an electrical network is the most important requirement for industrial activities. This is because the production process of industrial activities requires electrical energy to actually operate production equipment. The electricity service standards for industrial activities are different from the service standards for household activities, which require absolute requirements for the stability of the electricity supply and voltage. The types of power plants in Balikpapan City consist of several types of power plants, including diesel power plants (PLTD), solar power plants (PLTS), and steam power plants (PLTU) which can be seen in detail in Fig. 1. In general, KPI uses steam power plants (PLTU). Based on the data that has been collected, the electricity network in KPI Balikpapan City is facilitated by two companies, namely PT. PLN Persero and Kariangau Power, which generally source their energy from coal. The condition of the availability of electricity supply in the last few years in KPI Balikpapan City has been surplus (excessive). So, it can be concluded that the infrastructure conditions in the energy and electricity network have no problems, but it is necessary to consider the projection of future electricity supply as the area develops so that users of the area can be well facilitated on the infrastructure network.

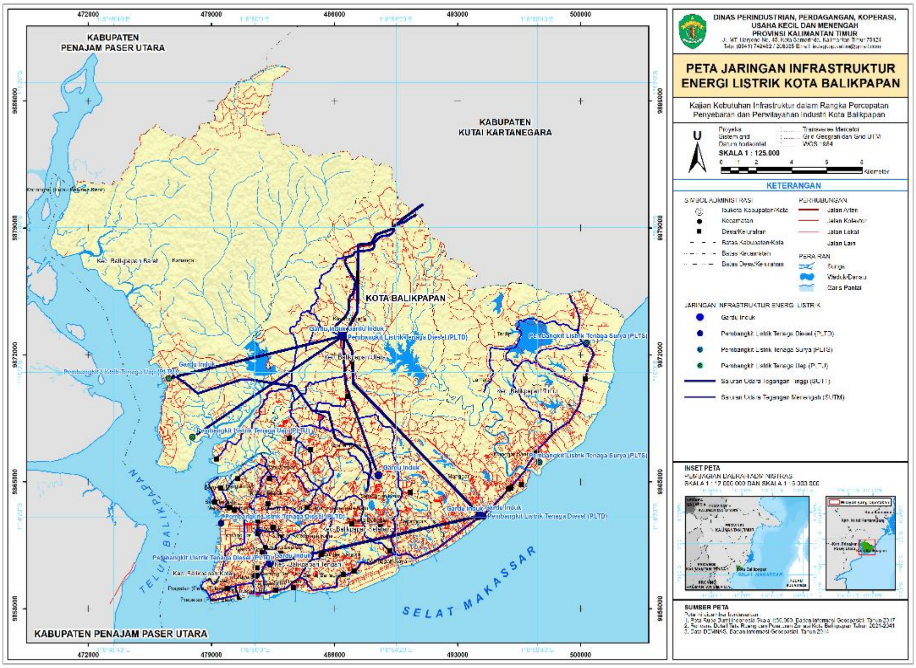

Fig. 1. Energy and Electricity Network Map

Telecommunication Network. Industrial activities must be distinct from business aspects regarding marketing and business development. Telecommunications networks are beneficial in accessing all kinds of more helpful information. In addition, the existence of telecommunications networks currently facilitates the implementation of communication activities. Therefore, telecommunications networks such as telephone, and the Internet have become basic for industrial companies to carry out their activities. Based on the Regulation of the Minister of Industry Number 40 of 2016 concerning Technical Instructions for the Development of Industrial Designation Areas, it is stipulated that each Industrial Designation Area must have a telecommunications network of 20-40 SST/Ha, including FAX/Telex [7]. On the other hand, the public telephone network in the Industrial Designation Area must provide at least 1 SST per 10 hectares.

Industrial Designation Areas are part of the KPI, so the guidelines related to the Industrial Designation Area can also be used as a reference for meeting infrastructure needs in the Balikpapan City KPI. Based on the data collected, the telecommunications network is facilitated by several commonly used providers such as Telkomsel, Indosat, XL, and so on. However, some points in KPI still need to be better facilitated, and some areas still need to be 'blank spots' that hamper the telecommunications process in the region. So, network infrastructure needs to be increased to help optimize the business development process, especially in the marketing sector.

Water Distribution Network and The Guarantee of Raw Water Supply. KPI must consider the distance to the water source, whether the source is a river, mountain, or other water source. This is because water sources play an essential role in industrial activities as a source of raw water.

Therefore, the distance to the water source must be considered regarding the constant ruction costs and the construction of water channels. In addition, the ideal planting distance also considers the river area's environmental sustainability (DAS) so that rivers and other water sources needed for industrial activities can be utilized without causing negative impacts on the environment from the water source itself.

Balikpapan City's water resources are generally facilitated by the regional water company, namely Perumda Tirta Manuntung, which is equipped with a network in the form of water transmission and distribution unit pipes, the details of which can be seen in Fig. 2. Referring to the data collected, KPI Balikpapan City, especially KPIK in the West Balikpapan District area, has yet to be facilitated by water resources and guaranteed raw water supply. This needs to be an essential point in the comprehensive. This must be essential in the comprehensive development of KPI Balikpapan City infrastructure.

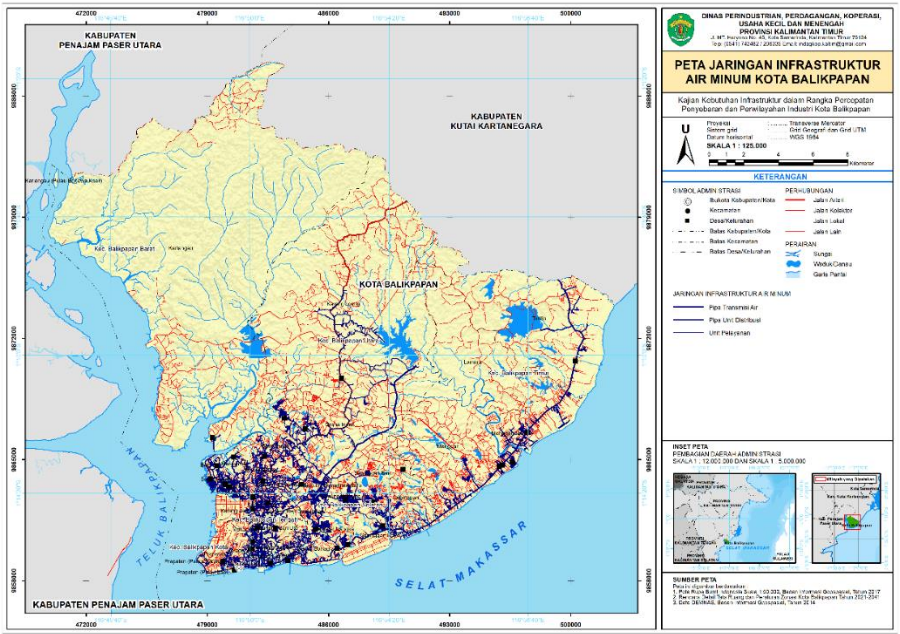

Fig. 2. Water Resource Network and Raw Supply Guarantee

Sanitary. Presidential Regulation No. 185 of 2014 explains, "Sanitation development is an effort to improve the quality and expansion of household waste services, domestic wastewater, and environmental drainage management in an integrated and sustainable manner through improved planning, institutions, implementation, and good supervision" [8]. The types of sanitation that will be discussed include drainage systems, waste management systems, and Wastewater Treatment Plants (IPAL). There is a study that focuses on sanitation, namely waste management and Wastewater Treatment Plants (IPAL).

Waste Management. In the KPI waste management system, sorting and collection techniques are applied based on the type of waste (organic and non-organic). Waste processing can be carried out by the Industrial Designation Area manager or the local government (Minister of Industry Regulation No. 40 of 2016) [7]. Waste management at KPI Balikpapan City is not yet available, but several companies in KPI have carried out waste management independently and transferred it to third parties such as PT. BES.

Wastewater Treatment Plant (WWTP). WWTP KPI is an industrial waste processing unit located in an area that is processed in an integrated manner. Wastewater processed in the WWTP area includes wastewater from industrial production processes, household activities (domestic), industry, offices, and housing. WWTP must be planned before construction in KPI. The central planned WWTP processing units include:
- An equalization unit
- A solid separation unit
- A biological unit
- A sludge processing unit

In planning an integrated WWTP system, it is determined by two main factors, namely, the maximum investment that the developer can provide to build an integrated WWTP system is linked to the Area of Industrial Designation Area so that the selling price of the land is still feasible to sell; Designation of the receiving body for liquid wastewater (stream), including in water bodies with water quality qualifications of class I, II, III or IV by Government Regulation Number 82 of 2001 concerning Water Quality Management and Water Pollution Control [9]. WWTP is planned and prepared by the area's management and must be included in the AMDAL for the Industrial Designation Area. Like waste management, several companies already in KPI have managed their waste independently, and some have been transferred to third parties such as PT. BES.

Transportation Network. The transportation network is divided into land, sea and air transportation. The land transportation network is in the form of a highway network. To create a road network suitable for industrial activities, the capacity and number of vehicles using the road must be considered so that the potential for damage and road congestion can be predicted from the start. This is important to note because, with an Industrial Designation Area in the area, the impact of industrial activities on traffic problems is challenging to predict. Based on the existing conditions of the transportation network in the form of roads in KPI Balikpapan City, especially KPIK, they still need to be fully connected. Many road networks are not yet connected, thus hampering the mobilization process and minimizing the area's accessibility. For example, several companies in KPIK still need land access, so they use the sea route as the main route to support industrial activities for supply and distribution processes. It is shown on the map (Fig. 3) that the West Balikpapan Area, especially KPIK, still has many roads that still need to be well connected. This hampers the area's development, which impacts the stagnation of industrial development. Therefore, the availability of road networks and interconnections between regions must be considered to support regional growth.

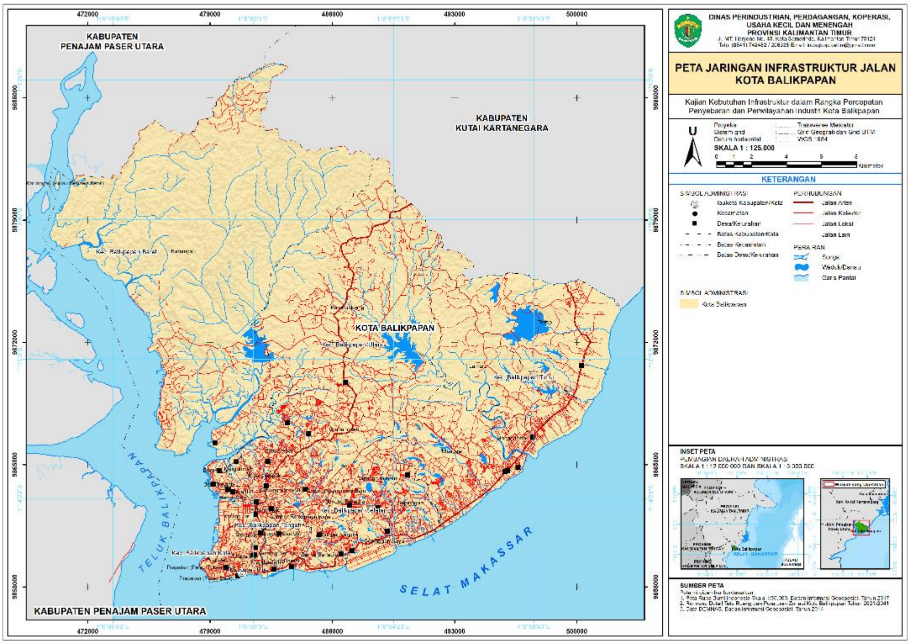

Fig. 3. Transportation Network

4 Conclusions

To support industrial growth in the industrial area in Balikpapan City, various types of adequate infrastructure are needed. The following are some critical infrastructure needs that must be met, including: (a) Transportation and Logistics in the form of Highways and Toll Roads: Good roads and adequate toll road access to facilitate the transportation of goods and workers, Ports: Efficient ports to support the export and import of goods. Kariangau Port has become a logistics center but needs further development. Airports: Improving the facilities and capacity of Sultan Aji Muhammad Sulaiman Airport to support air transportation. (b) Basic Utilities, in the form of Electricity: Stable and adequate electricity supply with sufficient capacity to support industrial operations; Clean Water: Availability of clean water for industrial needs, including a sound wastewater treatment system; and Gas: Reliable gas distribution for industrial energy needs. (c) Telecommunications, in the form of High-Speed Internet: Fast and stable Internet connections to support industrial operations that depend on information technology. Telecommunication Networks: Good communication networks facilitate business coordination and operations. (d) Supporting Facilities, in the form of Logistics Centers: Modern warehouses and distribution centers to support supply chain management, Training and Education Centers: Educational and training institutions to improve the skills of local workers according to industry needs, and Housing and Welfare Facilities: Adequate housing and welfare facilities such as hospitals and recreation centres for industrial workers. (e) Environmental Management Systems, in the form of Waste Management: Efficient waste management systems to reduce the environmental impact of industrial activities and Green Technology Application: Implementing environmentally friendly technologies to support industrial sustainability. (f) Security and Safety, in the form of Industrial Security: Good security systems, including surveillance and patrols to safeguard industrial assets and operations and Occupational Safety: Occupational safety facilities and training to protect workers and industrial assets. (g) Regulations and Policies, in the form of Pro-Business Policies: Regulations that support industrial growth, including investment incentives, ease of licensing, and legal protection, and Government Support: Cooperation between local governments and industry players to overcome obstacles and facilitate the development of Industrial Designated Areas.

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