

## **INFRASTRUCTURE MANAGEMENT TO SUPPORT LOGISTIC DISTRIBUTION AND ACCESSIBILITY OF DELTAMAS INDUSTRIAL ESTATE**

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### ***ABSTRACT***

Infrastructure management is a development from strategic management which is part of sustainable economic development. This study aims to determine the characteristics of movement, traffic performance on toll roads and main roads, cost savings associated with industrial activities in West Cikarang to West Karawang region to improve the logistic distribution and accessibility of the Deltamas Industrial Estate Area. The visum program was developed as effort to analyzed transportation network in the study area referring to survey results obtained. The results stated that every road network development there was an increase in speed and decrease in v/c ratio so as to improve network performance. In addition, the results of study also concluded that there were savings in the analysis of economic costs related to travel costs and experienced reduction in air pollution levels which can be improved logistic distribution. For this reason, strengthening network performance in encouraging increased accessibility is needed.

Keywords: accessibility; distribution; infrastructure management; visum

### **INTRODUCTION**

Strategic management is a part of sustainable economic development framework that requires mutual trust among stakeholders in order to benefit from the interactions carried out (Erkkilä-Välimäki et al. 2022), whereas infrastructure management is a development from strategic management. Regional development generally results in changes in movement needs. The influence of development on the occurrence of movement can be identified in magnitude of the generation and attraction of movement. Traffic generation is very dependent on the aspect of land use and the intensity of activity of land use. Land use potential is a measure of the scale of socio-economic activities that occur on particular land. A distinctive feature of land use is its ability or potential to generate traffic. Considering the existing circumstances, Indonesian industrial competitiveness still faces significant obstacles to being able to offer products and services in a competitive manner. The major issue is partially brought on by Indonesia's logistics industry's subpar performance. The underwhelming performance of the Indonesian logistics sector is most likely a result of the shortcomings in infrastructure support, particularly transport infrastructure (Setiawan 2018).

The development of transportation networks is one of efforts in which the availability of transportation facilities and infrastructure is continuously developed in order to keep up with the rate of population growth and demand from enthusiasts of transportation modes and infrastructure. The development of an area requires good transportation infrastructure planning (Raharjo, Sarjana, and Safitri 2022). In line with the development of transportation network, this study is used as one of the parameters considered because it directly has implications for the infrastructure management of the Jakarta-Cikampek toll road, as well as other roads that are the main access for vehicles in industrial areas. Assessment of transportation network performance has become problem that needs attention in order to make decisions that work on civil infrastructure systems where the important elements that distinguish transportation

networks from other built facilities include spatial distribution and connectivity of network components (Alipour and Shafei 2022). The need for development of transportation management to integrate various components of goods distribution effectively and efficiently to support business processes and supply chain systems (Sarjana et al. 2020).

In the plan to develop the Distribution and Accessibility of the Deltamas Industrial Estate area, there are several regional development plans, including the development of the Jababeka area of 5,600 hectares, the development of Lippo Cikarang covering an area of 3,000 hectares, and the development of Deltamas covering an area of 1,800 hectares. This development has a direct impact on the roads that are the access to or from the industrial area. Light Rapid Transit (LRT) is one of the breakthroughs in the transportation sector developed by the government in order to control public demand for transportation facilities. The LRT was built with the intention that people can leave private modes of transportation such as motorbikes and private cars. With the construction of the LRT, it is assumed that private vehicle users in the Jabodetabek area are reduced by up to 20%. LRT is a rapid transit system by collaborating with high capacity with relatively low investment costs so as to create a preferred system (Kepaptsoglou et al. 2020). The concept of developing LRT system has been adaptively applied to assist solutions in planning new transportation (Navarro-Ligero and Valenzuela-Montes 2022). LRT can be implemented by prioritizing improving the performance of private vehicles by reducing stop times (Ghanbarikarekani et al. 2020).

Therefore, there is a need for a study to improve the distribution and accessibility of national strategic areas in the form of the Infrastructure Management in Karawang and its surroundings, in order to find out the existing conditions of the areas concerned and as a planning concept to improve accessibility in the affected areas for development of KCIC area. Transit Oriented Development (TOD) is a planning, design, policy and implementation tool with the aim of integrating land use and transit systems (Maheshwari, Grigolon, and Brussel 2022). The objectives to be achieved in this study are to determine the characteristics of the movement, to determine the performance of traffic on toll roads and main roads and to find out the cost savings and pollution efficiency associated with industrial activities in the West Cikarang to West Karawang area so it can be used to improve the logistic distribution and accessibility of the Deltamas Industrial Estate Area.

## **METHOD**

The methodology developed in this study aims to determine the extent of the efforts made to overcome the level of traffic congestion in the West Cikarang and West Karawang corridors. The applied research methodology is expected to be able to integrate the entire work process in general with the aim of achieving research objectives. At the data collection stage, the researcher carried out the secondary data collection process including the utilization of the data that had been collected in the form of relevant studies and primary data collected independently. Based on the initial data, a preliminary survey was carried out which was intended to prepare everything related to the implementation of the primary survey. With the implementation of the preliminary survey, it is hoped that the primary survey can run smoothly and the data needed for the analysis phase can be obtained optimally. In conducting the preliminary survey, it is necessary to determine the location of the primary survey data collection to be carried out. The criteria considered include viewing angles, protected from the weather if it rains, there is a seat, and others as an important part to be able to obtain valid data. After conducting primary and secondary surveys, the next stage is the data processing stage.

Data processing is carried out to determine the performance of the existing road network. The next step is the analysis stage in an effort to overcome traffic congestion and its effect on network performance. Based on the results of the analysis, it can be seen the magnitude of the influence on infrastructure related to the increase in toll road capacity after the Cikampek elevated toll was built where the KCIC Fast Train which has stations located around West Karawang, as well as the LRT service plan with final stations around Cibatu. The preparatory steps include preparation of administrative work implementation, preparation of work organization and literature collection, preparation of study methodology and analysis plans, inventory of laws related to traffic impact analysis documents, and initial introduction of regional conditions and transportation networks at the study site. In any transportation planning process, the first step that must be done is to determine the area to be studied. In relation to the impact of the development of an area, the size of the study area is influenced by the characteristics of the object or area to be studied.

At the initial stage, the determination of the study area can be done based on a map of the road network system and land use. The map shows the existing road network and infrastructure as well as topographical conditions. Maps are an ideal medium to clearly show the boundaries of the area under study. The cordon line becomes an imaginary line that limits the study area on the map which is drawn around the study area on the map. Zone is a geographical area unit that has the same characteristics where the origin or destination of the trip is represented by the centroid point. Determination of traffic zones is very important in identifying the origin and destination of travel in order to determine travel patterns. The travel patterns that have been identified are outlined in a matrix of origin and destination of travel that can provide a quantitative description of the characteristics of travel in the study area.

Stages of data collection in the form of secondary data collection obtained from relevant agencies and primary data obtained through direct surveys in the field. Secondary data was obtained from related agencies which included the layout of the Cikarang Utama toll road to West Karawang, the Bekasi area spatial plan, administrative and population maps and road network data. Primary data collection is carried out directly in the field with the aim of obtaining information related to the performance of existing traffic. The primary data needed includes road geometric data obtained through an inventory survey of roads and toll gates, road vehicle volume data obtained through a traffic census survey, existing traffic conditions obtained using drones, and travel request data.

Data analysis is carried out related to the performance of sections, intersections and networks carried out. In carrying out the analysis of transportation used several models with Visum software. Visum can be applied in the development of transportation models (Sampaio et al. 2022). Visum software makes it possible to predict the effects of planned changes in the configuration of the transportation network, in traffic restrictions or the effects of changes in various spatial developments and can be applied to mode separation in passenger traffic taking into account various possible modes of movement, distribution of the type of transportation selected in the network. transportation and to research investment needs in the development of transport infrastructure (Jacyna et al. 2017). The resulting transportation model provides an overview of the traffic in the study area. From this model, trip generation, trip distribution, mode selection, and traffic assignment will be estimated in the study area. The travel charge in the study area is used to obtain the traffic load due to the construction of a new toll gate on the Jakarta - Cikampek toll road.

## RESULT AND DISCUSSIONS

### Traffic Performance Analysis

In the condition without the development of the zone coding where in this section it is divided into 9 zones which are used as zone coding data in this study. Zones are divided based on administrative boundaries that are formed to determine the origin of the destination or the characteristics of the community's journey in carrying out activities.

Table 1.  
 Area coverage zone in the study area

Zone	Area Coverage Zone	Remark
1	The external zone are West Cikarang, Ganda Mekar, Sukadanu, Gandasari and Jatiwangi areas	External
2	The internal zone consist of Pasir Gombong, Pasirsari, and Wangunharjo	Internal
3	The internal zone consist of Sukaresi and Jatiwangi	Internal
4	The internal zone consist of Cicau and Serang	Internal
5	The internal zone consist of Pasirpanji and Pasirtanjung	Internal
6	The internal zone consist of Wijayamukti and Pasirtanjung	Internal
7	The external zone is The West Karawang and Cikampek area	External
8	The internal zone consisting of Tamanmekar, and Wanakerta	Internal
9	TOD KCICK Internal Zone	External

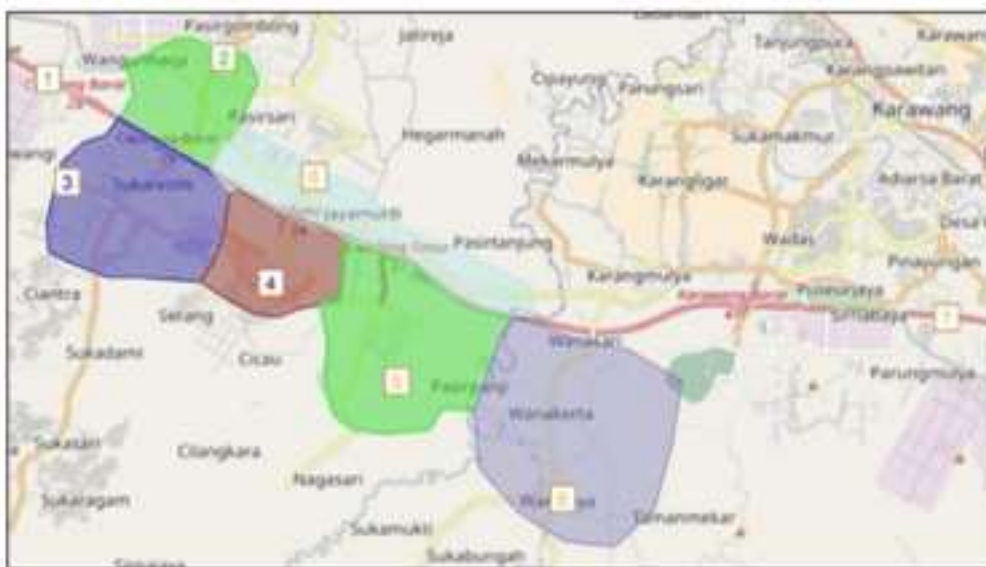


Figure 1. Zone code in the study area

The toll road section from the Cikarang Utama toll gate to the West Karawang toll gate is the main supporting road for Jakarta-Karawang. Along the toll road, the toll road has a type 8/2 D (eight lanes in both directions with a divider) with a road width per lane of 3.5 meters and a median width of 1 meter. The toll road section is equipped with a shoulder width of 1.5 meters. The types of land use around the toll road are rice fields and vacant land. The toll roads that are the study sites include West Cikarang, East Cikarang, Cibatu, and West Karawang.

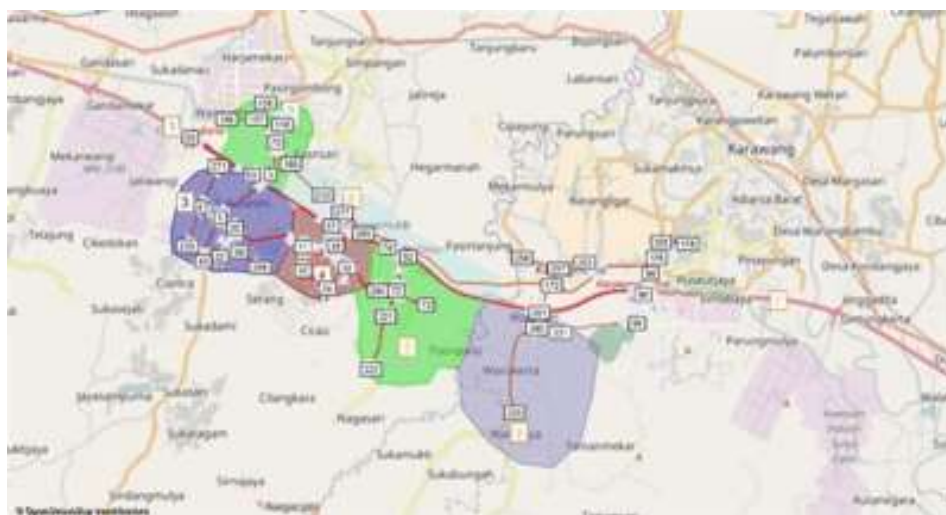


Figure 2. Road network coding

Traffic loading is carried out to compare the model used referring to the current conditions which will later be applied at the model validation stage. Before loading, it is necessary to code the road network by providing a number or code at each node point and each direction of traffic flow on all roads that are the object of study. The traffic conditions charged were at the time of the study. From the results of the traffic volume survey along the classified toll roads, the traffic volume on various types of vehicles every hour is obtained. To obtain the origin-destination matrix, Visum simulation model is used.

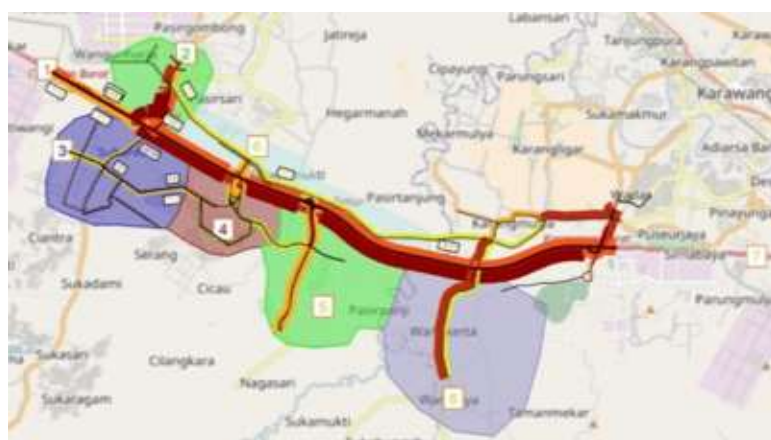


Figure 3. The Existing Condition of the Visum Simulation Model Results

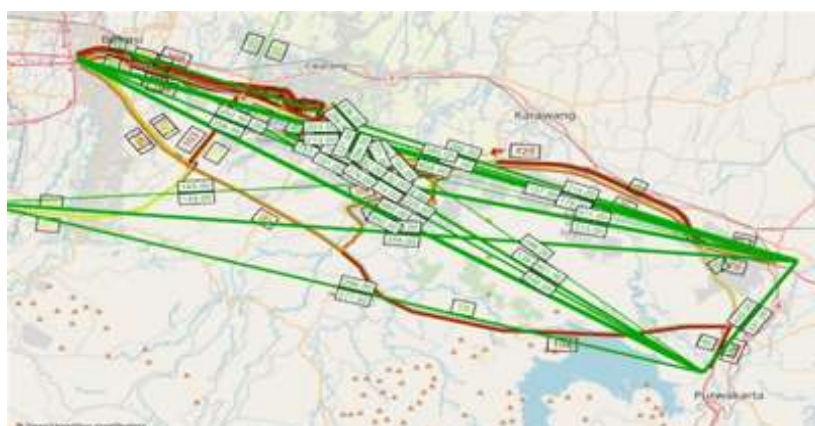


Figure 4. Desire line map in support of TOD KCIC

Table 2.  
 Origin-Destination matrix on TOD KCIC development

O/D	1	2	3	4	5	6	7	8	9	Pi
1	0	10016	10208	1408	12992	5408	26816	1056	15645	83549
2	76704	0	11424	13472	38912	1984	5184	10496	15812	173988
3	14208	7616	0	13088	1408	3648	2336	9504	15479	67287
4	6496	7232	944	0	27648	11712	77376	17216	16646	165270
5	7488	6656	3072	3968	0	11008	6752	10912	17313	67196
6	9312	3264	768	752	8128	0	10944	10368	15979	59515
7	6848	3264	7296	56	1392	15296	0	17344	15699	67195
8	27552	5504	9216	13216	5184	1248	43968	0	15522	121410
9	18649	18809	18656	19612	20254	18970	20083	19295	0	154327
Ai	16725	62361	61584	65572	115918	69274	193459	96191	128094	959709

Table 1 based on the origin-destination matrix table, it shows that the number of trips with the KCIC TOD reaches 959,709 trips per day. With a rise from Zone 9 (TOD KCIC) of 154,327 people per day and a pull of 128,094 people per day.

Based on the desire line map, referring to the distribution of the trip, the travel movement pattern is centered on zone 9 and its surroundings so that when the KCIC TOD is built it will burden the base road section as the closest access to the KCIC TOD. Therefore, the toll access gate at KM 41 will reduce the load from the base road and remove vehicles from access to the KM 37 and KM 47 toll gates. Regional development is one of the activities that have an impact on micro and macro traffic conditions. Because basically the activities of industrial estates greatly affect the pattern of traffic movement and the level of generation and attraction of travel, especially if the developed area has a location that is contrary to the on/off condition of the rump. The following are industrial areas that were developed under existing conditions including the development of the Jababeka Industrial Complex (KJI) covering the KJI III, KJI V, and KJI VI areas. KJI is an industrial area located north of the Jakarta–Cikampek toll road. The concepts developed in the development of the KJI III, KJI V, and KJI VI areas include industrial activities and residential residents. The area directly affects the performance of traffic and road networks because it causes large generation and attraction.

Meikarta is an independent city that was conceptually built to be south of the Jakarta – Cikampek toll road section, precisely at the on/off access of the Cibatu toll road. With the existence of this area, there is a fairly large attraction and generation that has the potential to add to problems on the Jakarta-Cikampek Toll Road. Activities developed in the Meikarta area are residential and commercial. The initial concept of the Meikarta development was intended as a new economic center because the location of the Meikarta development was near a developed area located in the Bekasi-Cikarang corridor. The Meikarta project is connected to Lippo Cikarang, Jababeka, MM2100, Delta Mas, and other areas. In addition, this project is also surrounded by industrial centers of national and multinational companies, such as Astra, Honda, Toyota, Suzuki, Mitsubishi, Isuzu, Toshiba, Samsung, Panasonic, and others. In terms of infrastructure, access to Meikarta is supported by access such as the Jakarta-Bandung high-speed train, the Jakarta-Cikampek Elevated Toll, Patimban port, Kertajati International Airport and monorail trains that unite a number of cities around Meikarta. Deltamas develops activities in the form of industrial, commercial, and residential. With the meikarta and deltamas development plans that increase the number of generation and attraction in the area related to road loading, both toll roads and roads around the development area.

Table 3.  
 Road Network Performance

LINK: NO	FROM_NOD E_NO	TO_NOD E_NO	TYPE_ NO	LEGHT	V0_PRT	VCUR_PRT YS(CAR)	VOLCAP_RATI O_PRT(AP)
2	50	4	13	3.012km	130km/h	110km/h	43
3	4	214	13	2.806km	130km/h	67km/h	96
4	214	239	13	0.738km	130km/h	87km/h	70
5	239	74	13	1.735km	130km/h	79km/h	80
6	74	77	13	0.592km	130km/h	100km/h	54
9	3	52	19	0.551km	80km/h	31km/h	98
10	52	4	19	0.501km	80km/h	13km/h	78
11	5	6	31	0.808km	100km/h	60km/h	80
18	5	14	31	0.033km	100km/h	60km/h	16
19	14	68	30	0.043km	100km/h	45km/h	54
20	68	9	31	1.896km	100km/h	27km/h	89
21	11	228	31	0.235km	100km/h	60km/h	78
22	228	231	31	0.106km	100km/h	60km/h	65
23	231	21	31	2.411km	100km/h	60km/h	64
24	21	28	30	0.020km	100km/h	70km/h	77
25	28	42	30	0.687km	100km/h	70km/h	56
26	42	5	30	0.014km	100km/h	70km/h	48
27	13	14	31	0.044km	100km/h	45km/h	76
28	14	41	31	0.017km	100km/h	60km/h	79
29	41	233	31	0.049km	100km/h	60km/h	67
30	233	20	31	0.608km	100km/h	60km/h	42
31	20	30	30	0.084km	100km/h	63km/h	77
32	30	230	31	2.382km	100km/h	60km/h	54
33	230	229	31	0.066km	100km/h	60km/h	56
34	229	15	31	0.265km	100km/h	60km/h	67
36	18	19	31	0.824km	100km/h	60km/h	74
43	26	25	31	1.026km	100km/h	60km/h	76
49	297	31	31	1.142km	100km/h	60km/h	87
50	32	297	31	0.018km	100km/h	60km/h	45
50	297	32	31	0.018km	100km/h	31km/h	65
52	35	36	31	0.531km	100km/h	60km/h	42
53	36	37	31	0.546km	100km/h	60km/h	76
60	40	232	21	1.893km	100km/h	57km/h	86
61	232	41	30	0.048km	100km/h	37km/h	88
62	41	42	31	0.031km	100km/h	60km/h	65
71	71	69	19	0.528km	80km/h	60km/h	57
72	69	51	19	0.010km	80km/h	58km/h	61
73	52	53	19	0.233km	80km/h	49km/h	80
76	57	217	19	0.391km	80km/h	24km/h	76

Table 3 from the performance of road, there are problems with the condition of road, including at the toll exit crossing to Deltamas via Fly Over which is parallel to the exit direction of toll road, there is build up of vehicles causing traffic jams up to V/C Ratio reaches 0.87 on weekdays and 0.94 on weekends.

Table 4 referring to the traffic performance table for the development of regional activities, it can be seen that the average V/C ratio of roads accompanied by the development of regional activities ranges from 0.69 to 0.85 with a level of service ranging from C to F.

Table 4.  
 Traffic Performance Development of Regional Activities

Road Name	DELAYREL (ALL)	SPEED (ALL)	V/C RATIO
Jakarta Cikampek Toll	86%	13.56	0.82
Cibatu-Cikampek Toll	56%	16.63	0.79
Cikarang Barat - Cikampek Toll	85%	22.53	0.66
Karawang Barat - Cikampek Toll	59%	30.62	0.68
Raya Kalimalang - Cikampek	56%	20.52	0.75
Raya Cibarusah - Toll	63%	26.92	0.69
Cikampek - Jakarta Toll	80%	36.45	0.85
Cikampek - Cibatu Toll	67%	47.51	0.74
Cikampek - Cikarang Barat Toll	80%	36.69	0.75
Cikampek - Karawang Barat Toll	78%	23.42	0.72
Cikampek - Raya Kalimalang	77%	25.12	0.72
Toll - Raya Cibarusah	78%	22.24	0.71



Figure 5. Existing Traffic Profile in 2032

### Economic Analysis

Economic analysis makes it easier to access Km 41 + 100 interchange as an effort to increase accessibility in national strategic areas referring to the TOD development for high speed rail in Karawang and its surroundings, carried out using the Pacific Consultant International (PCI) modelling approach. The modeling is used to calculate the cost of traffic travel in the study area under existing and operating conditions. This modeling can also be used to calculate the value of savings in interchange km 41. The calculation of traffic costs requires data as a basis for analysis. The data required includes data on vehicle volume at peak hours (pcu/hour), travel time (hours), fuel demand (liters), and time value. Furthermore, the estimated transportation demand is obtained through transportation modelling with a mathematical approach and previous studies, directions for regional development scenarios and primary survey data. The modelling is microsimulation using application software in the field of transportation.

The plan for the location of the activity points is connected by traffic infrastructure with an estimate of trip generation according to the type and characteristics of each space activity, including the pattern of trip generation and travel distribution in the form of desire line

movement between zones and between regions, directions and policies for the role of transportation modes, development plans traffic infrastructure including roads and intersections. After the model is developed and validated, the model is ready to be applied to estimate future transportation needs. Then the supply system needs in the form of road network requirements, location of node points, and the need for public and goods transportation modes as well as other traffic needs can be determined. Vehicle volume is obtained from the primary survey results in presenting the value of traffic volume on roads in the study area at km 41 + 100 Interchange as an effort to increase the accessibility of the transit-oriented development national strategic area for fast trains in Karawang and its surroundings.

Table 5.  
 Traffic Volume Existing Condition

Road Name	2022	2032
	Volume (pcu/hour)	Volume (pcu/hour)
Lippo Cikarang Acces	2153	3973
Jakarta-Cikampek Toll	4278	7556
Sriwijaya	1902	3527
Raya Cibirusah	1580	2767
Pasarjati	926	1705
Moh. H.Thamrin	1247	2296
Mataram	790	2980
Majapahit	1902	3527
Kalimalang	419	745
Kali Malang Jababeka	550	904

Table 5 the travel time obtained on the road segment in this study is obtained from the segment speed divided by the length of the road segment. In Table 6, the following is the travel time for each road segment.

Table 6  
 Existing Travel Time

Road Name	Volume (pcu/hour)	Speed (km/h)	Segment Length (km)	Travel Time (hour)
Lippo Cikarang Acces	2153	39.3	1.2	0.0311
Lippo Cikarang Acces	4278	31.5	36.5	1.1591
Jakarta-Cikampek Toll	1902	38.5	1.0	0.0267
Sriwijaya	1580	32.1	6.2	0.1932
Raya Cibirusah	926	30.0	2.6	0.0873
Pasarjati	1248	41.5	10.0	0.2414
Moh. H.Thamrin	791	28.0	1.1	0.0408
Mataram	1902	22.3	0.8	0.0370
Majapahit	419	51.6	8.4	0.1635
Kalimalang	550	36.8	5.7	0.1554

Table 7.  
 Travel Time for Do Something Conditions in 2032

Road Name	Volume (pcu/hour)	Speed (km/h)	Segment Length (km)	Travel Time (hour)
Lippo Cikarang Acces	3507	37	1.2	0.0437
Lippo Cikarang Acces	7123	56	36.5	0.8110
Jakarta-Cikampek Toll	2564	45	1.0	0.0270
Sriwijaya	2347	43	6.2	0.1435

Road Name	Volume (pcu/hour)	Speed (km/h)	Segment Length (km)	Travel Time (hour)
Raya Cibarusah	1545	46	2.6	0.0793
Pasarjati	1932	41	10	0.2427
Moh. H.Thamrin	2564	36	1.1	0.0336
Mataram	2398	43	0.8	0.0235
Majapahit	492	42	8.4	0.3014
Kalimalang	838	38	5.7	0.1774
41 Acces Toll	1226	45	8.57	0.1991

Table 7 in calculating the fuel needs, the approach used is PCI method. The following formula is an equation in finding fuel requirements that is applied in this study.

$$Y = 0.04376 \times S^2 \pm 4.94078 \times S + 207.0484$$

Y = Fuel consumption (liters/1000 km)

S = Speed (km/h)

After determining the approach used for calculating fuel consumption, the next step is to calculate fuel consumption for each road section. The results of calculation for fuel consumption on each road section are presented in the following table 8:

Table 8.  
 Fuel Needs Existing Condition

Road Name	Volume (pcu/hour)	Speed (km/h)	KBB (Liter/Segment)
Lippo Cikarang Acces	2153	39.3	0.10
Lippo Cikarang Acces	4278	31.5	3.46
Tol Jakarta-Cikampek	1902	38.5	0.08
Sriwijaya	1580	32.1	0.58
Raya Cibarusah	926	30.0	0.26
Pasarjati	1247	41.5	0.78
Moh. H.Thamrin	790	28.0	0.12
Mataram	1902	22.3	0.10
Majapahit	419	51.6	0.58
Kalimalang	550	36.8	0.48

Table 9.  
 Fuel Demand Existing Condition in 2032

Road Name	Volume (pcu/hour)	Speed (km/h)	KBB (Liter/Segment)
Lippo Cikarang Acces	3973	28	0.13
Tol Jakarta-Cikampek	7556	40	2.90
Sriwijaya	3527	38	0.08
Raya Cibarusah	2767	25	0.69
Pasarjati	1705	33	0.24
Moh. H.Thamrin	2296	41	0.78
Mataram	2980	33	0.10
Majapahit	3527	35	0.07
Kalimalang	745	22	1.01
Kali Malang Jababeka	904	30	0.56

Table 8 based on the results of the calculation of the economic cost analysis, at this time the existing condition of travel costs is Rp. 1,649,173,104/hour and when the condition is with the construction of the travel costs it is Rp. 933,049,695/hour so that there is a savings of Rp. 716,123,409 in rush hour units or Rp. 6,273. 241,059,075 in years. Based on the results of the calculation of the economic cost analysis for 2032 (OD Ultimate) the existing condition of the trip cost is Rp. 2,012,501,362/hour and when the condition is under construction the travel cost is Rp. 1,553,611,957/hour so that there is a savings of Rp. 1,030,213,967 in busy time or Rp. 9,024,674,347,665 in units of year. This research is applied to be able to provide important information for relevant stakeholders for the development of transportation routes that support distribution and accessibility of logistics and at the same time can be used for the development of green logistics and green supply chain management in the Deltamas industrial area. The developments presented in this study are relevant to previous research aimed at encouraging the business development of companies in industrial estates (Sarjana et al. 2018), there is a link between infrastructure and green logistics performance (Yingfei et al. 2022).

## CONCLUSIONS

The results of the traffic analysis can be seen for v/c in each network development on each road in the affected area. As for the speed is strongly influenced by v/c where if the v/c is high then the speed on the road will experience a slowdown and vice versa. Each network development experienced a significant decrease in v/c. The geometry of the base road to TOD, varies in width from 5-7 meters with a volume of 1,705 pcu/hour so that the average speed that can be travel is only 42 km/hour. If the distance travel is about 8.9 km, the travel time reaches 35 minutes, this is influenced by winding road conditions and there are many holes in some parts of the road so that there is a waste of travel time making the roads less effective. With the operation of elevated toll road and Km 41 toll gate, increasing vehicle speed and lowering the v/c ratio on the Jakarta-Cikampek toll road. The Km 41 toll gate helps the development of accessibility to support Fast Train Station - TOD Karawang and surrounding industrial area. With the opening of GT KM 41, the reach of target market for Fast Train Station and Karawang TOD will be closer. By paying attention to the time and distance of trips in and out of TOD KCIC, this can be used as main access from KM 41 because it can save travel time. Reduced travel time can be effective to improve logistic distribution and accessibility

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