

5. RE-FEASIBILITY STUDY ON OUTER-OUTER RING ROAD

5.1 GENERAL

(1) Project

Outer-outer Ring Road (2nd JORR), which was proposed as one of the road development components in the integrated transportation master plan of SITRAMP, is the project for pre-feasibility study. The total length of the project road is as long as around 110 km (refer to Figure 5.1.1).

(2) Background and Objective

The project aims not merely to meet future traffic demand in the region but also to promote sub-center developments, which was proposed in SITRAMP as a preferable regional development policy in Jabodetabek. The project ring road is considerably long in total length, as long as 110 km, and several local governments are involved in the project. In addition, traffic volume would vary from section to section. These facts lead to a variety of implementation method such as introduction of private-sector participation scheme including BOT, public investment and combination with regional development along the road.

Furthermore, as 2nd JORR is assumed to be a national road, it is necessary to clarify the role of the central government and relevant local governments. Although all the local governments are eager to participate in this large-scale project, they have not had much experience in toll road development projects. The administrative capability of the local governments is therefore insufficient to handle such a project.

On the other hand, only a partial development of the project roads, where sufficient traffic demand is estimated, would not achieve the expected function of distributors of a ring road. In this regard, formulation of a ring road without a missing section in the middle is required regardless of types of roads; either toll road or ordinary road.

Considering these conditions, the study should not focus on technical issues but on implementation scheme at this stage in order to ensure the implementation of the project.

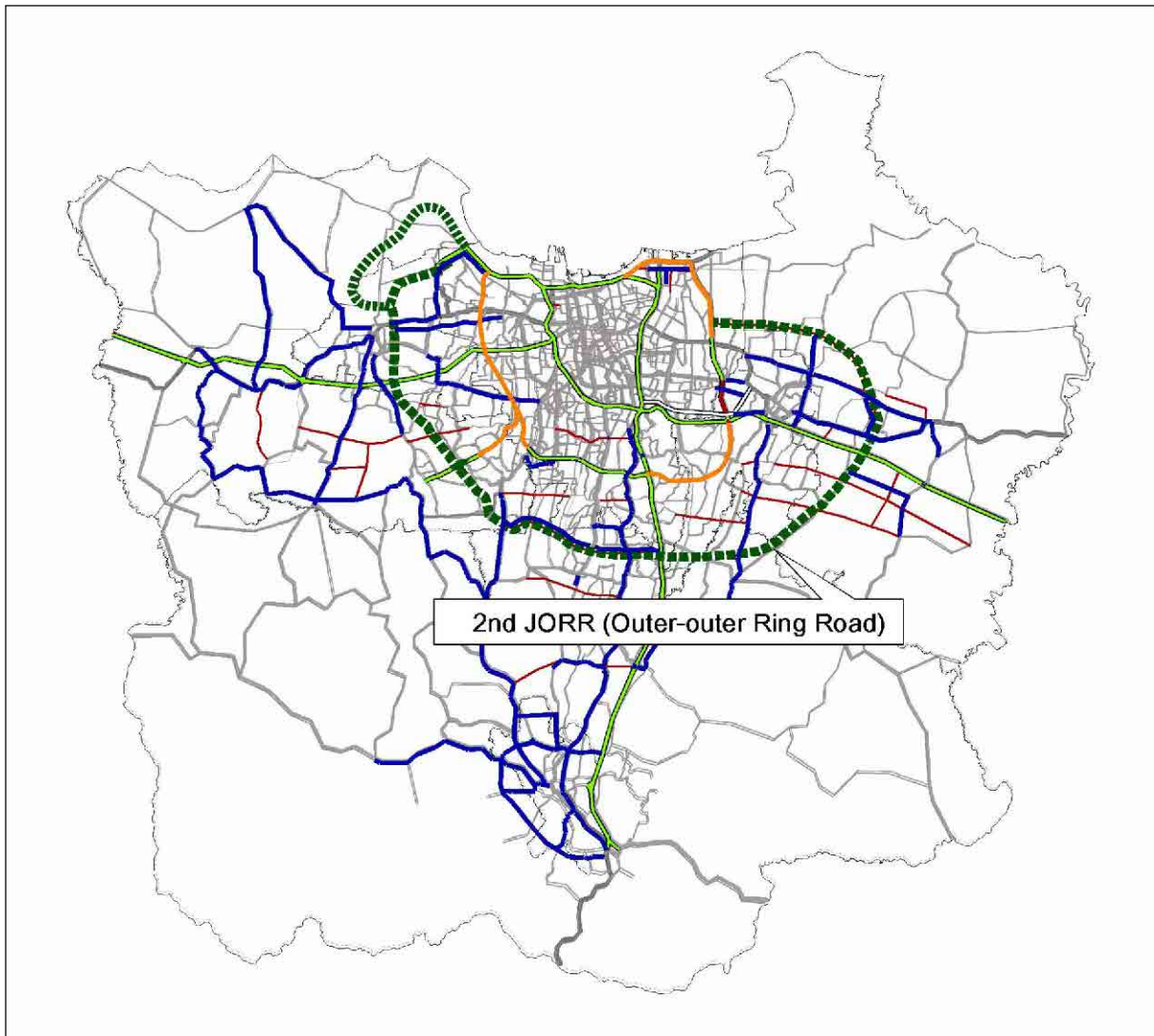


Figure 5.1.1 Location of 2nd JORR

5.2 EXISTING CONDITION ALONG 2ND JORR

5.2.1 Socio-economic Conditions

(1) Population and Employment

a. Division of Areas

The whole of 2nd JORR was divided into six (6) sections according to the regional and road network characteristics as shown in Table 5.2.1 (refer to Figure 5.2.1).

Table 5.2.1 Area Division

Area	Location	Representative Cities
1	Eastern area between DKI Jakarta and Kota Bekasi	Babelan
2	Area around central area of Kota Bekasi	CBD of Kota Bekasi
3	Area between Cikampek Toll Road and Jagorawi Toll Road	Setu and Cileungsi
4	Area between Jagorawi Toll Road and Jl. Ciputat Raya	CBD of Kota Depok and Ciputat
5	Area between Serpong Toll Road and Jl. Daan Mogot	Serpong and CBD of Kota Tangerang
6	Westside of the Soekarno Hatta International Airport	Teluknaga

(2) Demographic Characteristics by Section

1) Population

Population and population density by section are summarized in Table 5.2.2. Areas 1, 2, 4 and 5 have been already urbanized with population density of more than 40 persons per ha, while Areas 3 and 6 can be categorized in rural area with lower population density at less than 30 persons per hectare.

Table 5.2.2 Population and Density by Area

Area	Population		Population Density	
	2002	2020	2002	2020
1	324,650	427,367	56.6	72.5
2	628,025	851,991	40.3	54.7
3	672,445	896,499	23.0	30.5
4	1,774,127	2,447,623	66.6	91.9
5	1,335,750	1,821,502	65.0	88.6
6	571,591	710,277	28.4	35.3
Total	5,306,589	7,155,259	45.5	61.3

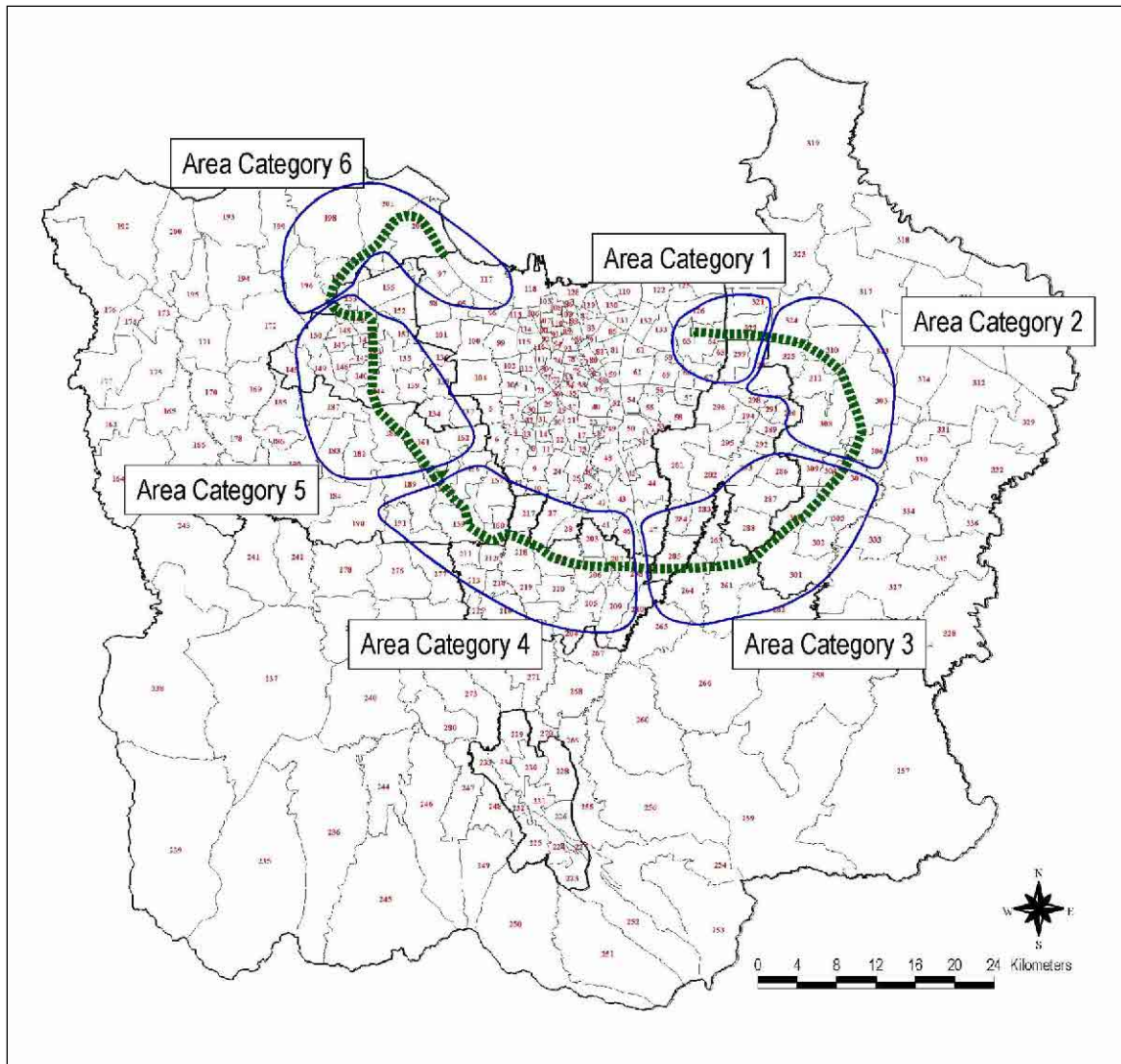


Figure 5.2.1 Division of Areas

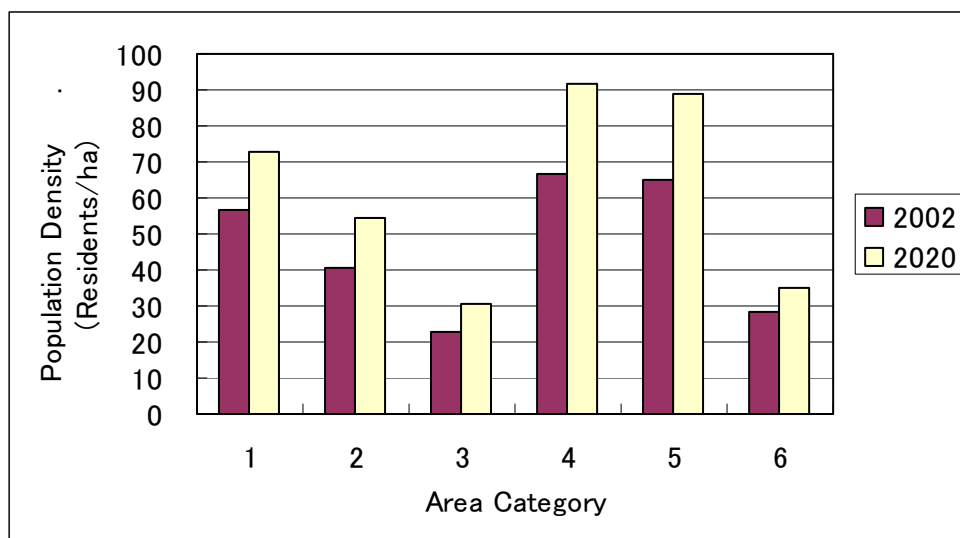


Figure 5.2.2 Population Density in 2002 & 2020

2) Employment

Table 5.2.3 and Figure 5.2.3 show the number of jobs and job density by area. Job densities by area show almost the same tendency as the population density. Area 3 indicates a relatively high job density of 7.1 jobs /ha in 2002, although population density in this area is as low as 23.0 persons /ha in 2002. This is attributable to the fact that this area includes several industrial estates in Cikarang. In addition, there are many industrial factories located along Jl. Siliwangi in this area.

Table 5.2.3 Number of Jobs and Job Density by Area

Area	Number of Jobs		Job Density (Jobs/ha)	
	2002	2020	2002	2020
1	40,662	77,205	10.7	21.1
2	150,147	340,884	8.6	21.2
3	194,460	446,233	7.1	17.2
4	276,747	701,111	10.2	26.2
5	285,424	633,721	13.7	30.7
6	124,881	226,579	5.1	10.6
Total	1,072,321	2,425,733	9.0	21.3

Note: Jobs are secondary and tertiary only.

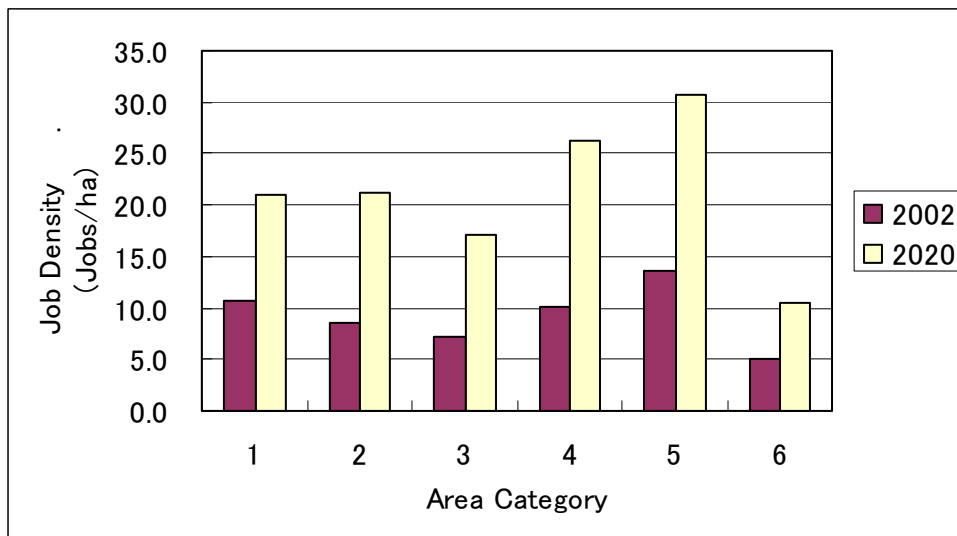


Figure 5.2.3 Job Density in 2002 & 2020

Figures 5.2.4 and 5.2.5 show job density by small zone along 2nd JORR from the year 2002 to 2020. Sub-center development around Kota Tangerang, Kota Depok and Kota Bekasi can be clearly observed.

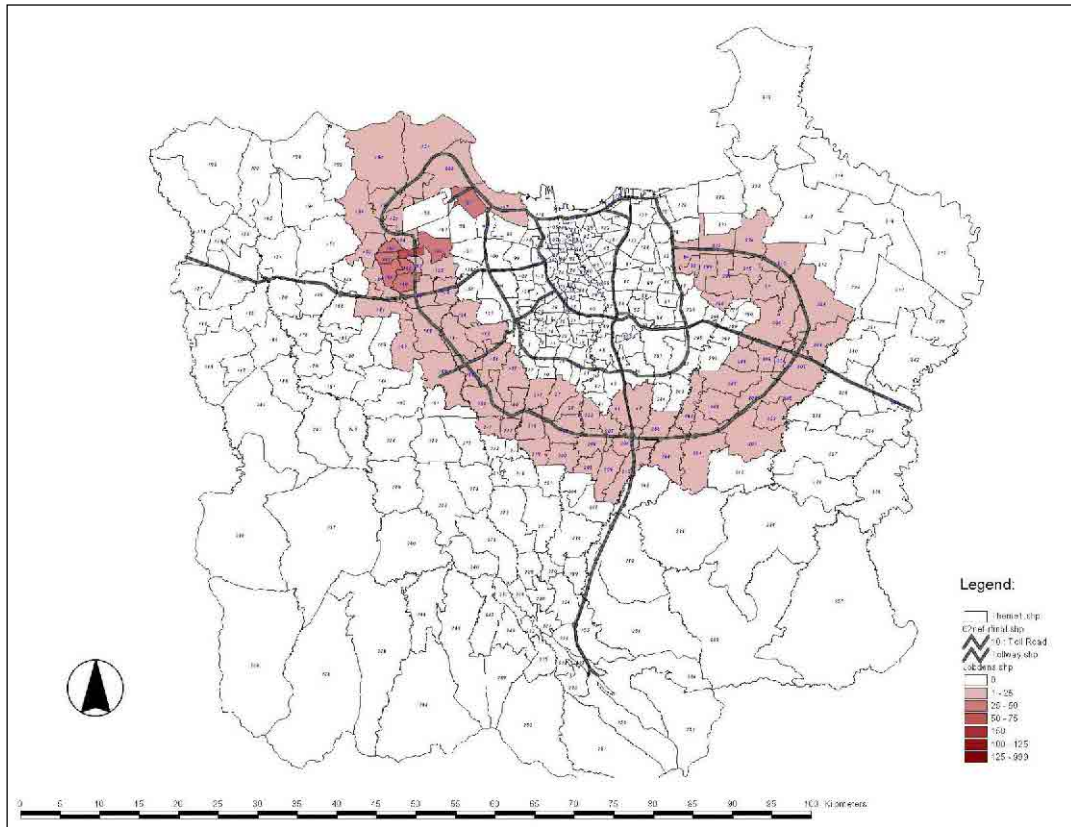


Figure 5.2.4 Job Density in 2002

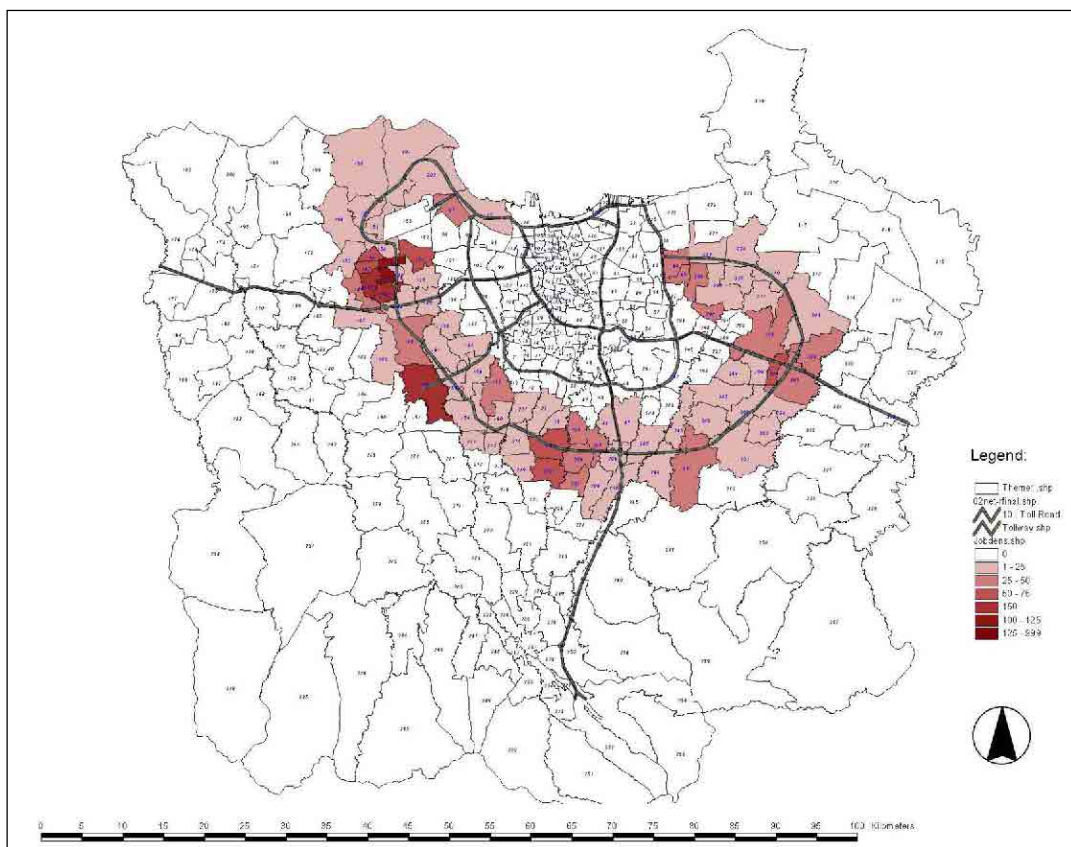


Figure 5.2.5 Job Density in 2020

(3) Trip Production and Attraction

1) Features by Area

Areas 2, 3 and 6 have low trip density as shown in Figure 5.2.6 since population and job densities of Areas 3 and 6 are not so high. On the other hand, low vehicular trip density of Area 2 can be attributable to higher dependence on public transportation in the area because Kota Bekasi has a major railway station as well as a large bus terminal.

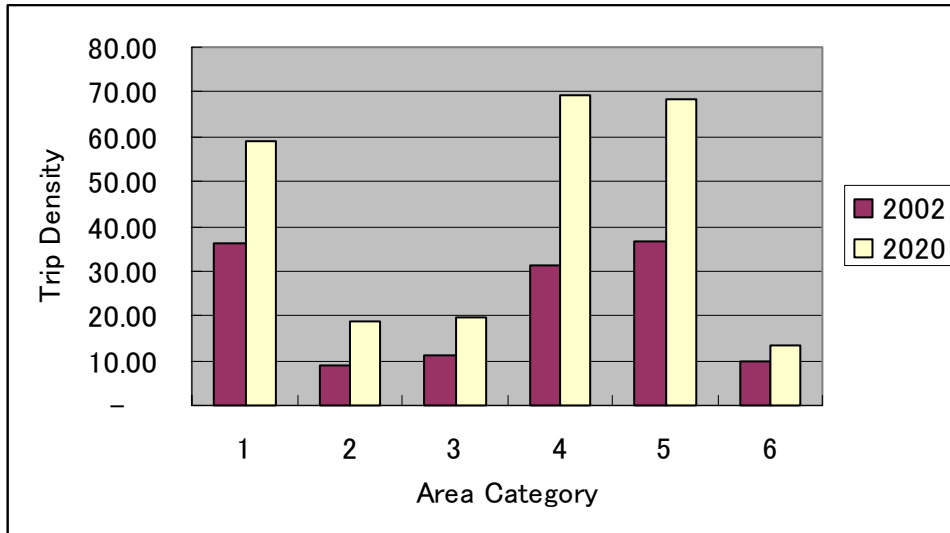


Figure 5.2.6 Trip Density by Area

2) Trip Growth

Table 5.2.4 shows growth of trip-ends from 2002 to 2020.

Table 5.2.4 Trip Growth by Area

Area	2002	Growth (2020/2002)
1	36.04	1.64
2	8.80	2.12
3	11.31	1.73
4	31.10	2.23
5	36.44	1.88
6	9.92	1.35
Total	20.82	1.94

The following are the features of trip growth:

- Area 1 has low trip growth due to matured urbanization;
- Area 2 has high trip growth because current trip density is low due to low progress in development except the surrounding area of CBD in Kota Bekasi. On the contrary, this

area has high potential due to proximity to the existing CBD;

- Area 3 has low trip growth due to low area-development potential;
- Areas 4 and 5 have similar characteristics showing existing high trip density and high trip growth rate. The reason is that these areas have been currently developed and have still high development potential; and
- Area 6 has low trip density and low trip growth due to vacant area and some limitations on land development due to its proximity to the airport.

5.2.2 Existing Land Use

Figure 5.2.7 shows existing land use along the corridor. The following are major features of the existing land use along 2nd JORR.

(1) Large-Scale Housing Estate

In the western part of the 2nd JORR, there are some large-scale housing estates such as Bintaro Jaya, Lippo Karawaci and BSD (Bumi Serpong Damai). Although several housing estates can be observed in the east side of JORR in DKI Jakarta, Kota Depok, Kota Bekasi and Kabupaten Bekasi, all are not so large in comparison to those in the western part of the 2nd JORR. Another feature is that any large-scale housing estates cannot be seen in the area between Cikampek Toll Road and Jagorawi Toll Road.

(2) Industrial Estate

Although housing estate development is concentrating on rather south and western areas at this moment, large-scale industrial estates can be observed only in the east area of 2nd JORR except some agglomerations between Merak Toll Road and Serpong Toll Road.

Other industrial estates are found alongside of Jl. Siliwangi. Large-scale estates can seldom be seen but many medium size industrial factories are distributed along Jl. Siliwangi.

(3) Commercial Area

The area along 2nd JORR has limited commercial accumulation inside the large-scale housing estates such as Lippo Karawaci and BSD. Although some commercial accumulation can be observed in the eastern part of JORR, these are one of fringe area, which are continuously developed from the CBD of DKI Jakarta. Conspicuous commercial function has yet to be developed in the area along 2nd JORR at present.

(4) Characteristics of Areas along 2nd JORR

Table 5.2.5 summarizes characteristics of areas along 2nd JORR by area.

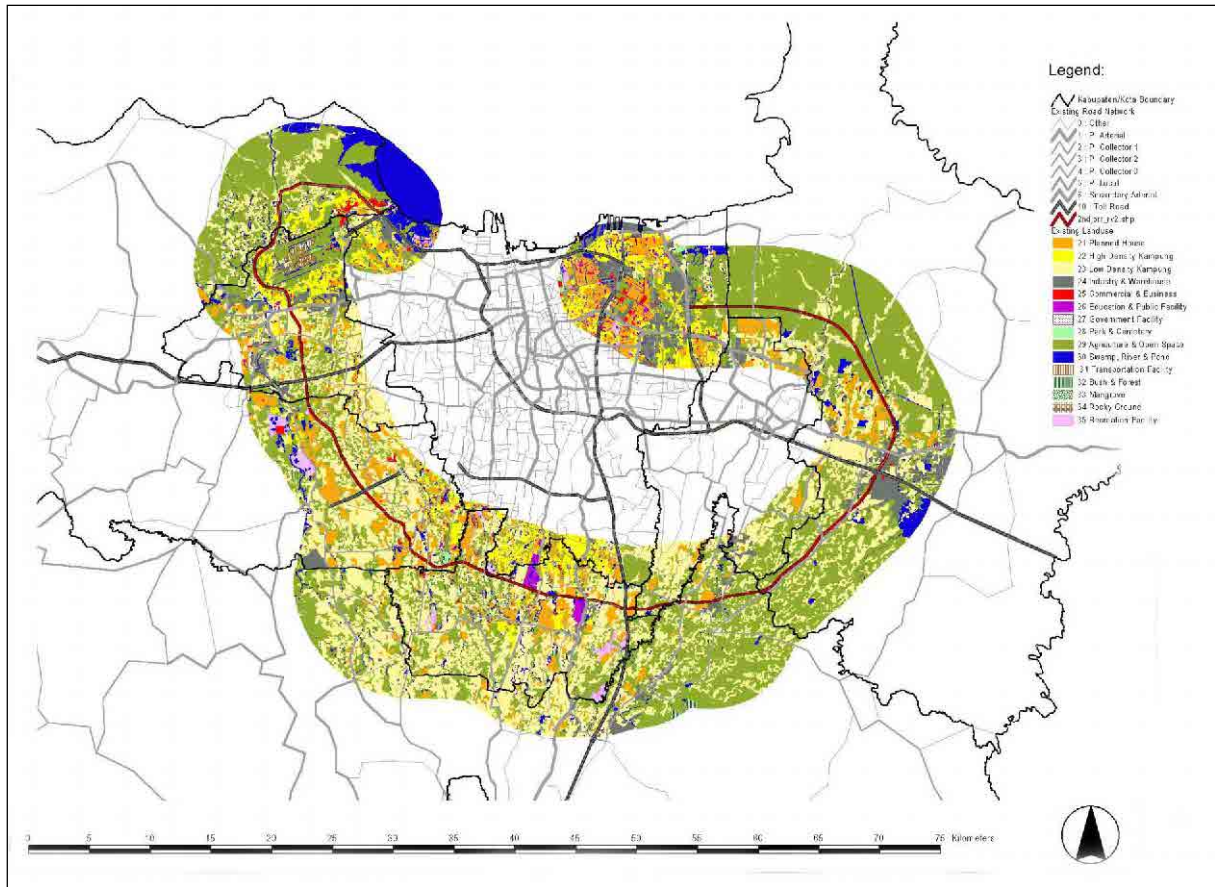


Figure 5.2.7 Existing Land Use Along 2nd JORR

Table 5.2.5 Characteristics and Development Potential of Areas along 2nd JORR

Area	Characteristics and Development Potential of Area
1	Part of eastern section (E2 section) of Jakarta Outer Ring Road (JORR) has been open to public. This area is located crossing the boundary of Jakarta and Bekasi, and is already highly populated and urbanized with agglomerated factories and a small commercial area.
2	This area is located at the eastside of CBD of Kota Bekasi, which constitutes the center of surrounding region. The area has a rather high area-development potential.
3	Although small and medium scale factories have been accumulated along Jl. Siliwangi, main land use of this area consists of agricultural land with low population density and scattered villages at present except some industrial areas. Area development has been left behind.
4	This area includes the center of Kota Depok and is characterized as university town or satellite town to absorb population pressure from DKI Jakarta.
5	There are many housing estates such as BSD in the area. Residential, business and commercial functions have been located. Large-scale new town development will be extended in the future.
6	This area is located around the international airport and has some limitation on construction of high, multi-story buildings in area development. Only industrial and recreational development can be expected.

5.3 STRUCTURAL EXAMINATION

5.3.1 Geometric Standard

(1) Alignment

1) History of Alignment

A development concept of 2nd JORR could be found in the past transportation study such as Arterial Road System Development Study II (ARSDS II), which was conducted in 1993. In addition, a preliminary feasibility study on 2nd JORR was carried out by the Ministry of Public Works in 1996/97. This study included some other road network alternatives such as new radial toll and north coastal road (Pantura) in combination with 2nd JORR. The alignment of 2nd JORR in the studies mentioned above was planned far south side, passing through Cibinong and Parung, in comparison with the currently proposed alignment.

2) Current Planned Alignment

All the local governments, through which 2nd JORR is planned to pass, recently agreed on the new alignment of 2nd JORR. The new alignment passes along the gas pipeline installed by Pertamina in the boundary of Kota Depok and also passes near milestone-15 km of Merak Toll Road and near Cibitung Interchange of Cikampek Toll Road. All the local governments concerned are going to revise their spatial plan to meet the agreed new alignment.

(2) Typical Cross Section

According to the traffic demand forecast, the number of lanes required to meet traffic volume in 2020 by section is listed in Table 5.3.1.

Table 5.3.1 Required Number of Lanes by Major Section

Major Stretches		Number of lanes/both directions
From	To	
Cengkareng Access	Daan Mogot	2 (west route)
Daan Moggot	Merak Toll road	4
Merak Toll road	Serpong Toll road	4
Serpong Toll road	Cinangka Raya	4
Cinangka Raya	Jagorawi Toll road	4
Jagorawi Toll road	Cikampek Toll road	2 – 4
Cikampek Toll road	East Section of JORR	2

A four-lane road for both directions is basically required to meet the future traffic demand in 2020 from a viewpoint of design standard, which describes that the necessary number of lanes shall be to meet the traffic volume after 15 or 20 years. In other words, it is not realistic and

efficient to provide many lanes to prepare for unpredictable traffic from the beginning. Staged construction has to be taken into consideration for long-term perspective. In this context, the following typical cross section is prepared for the toll road stretches.

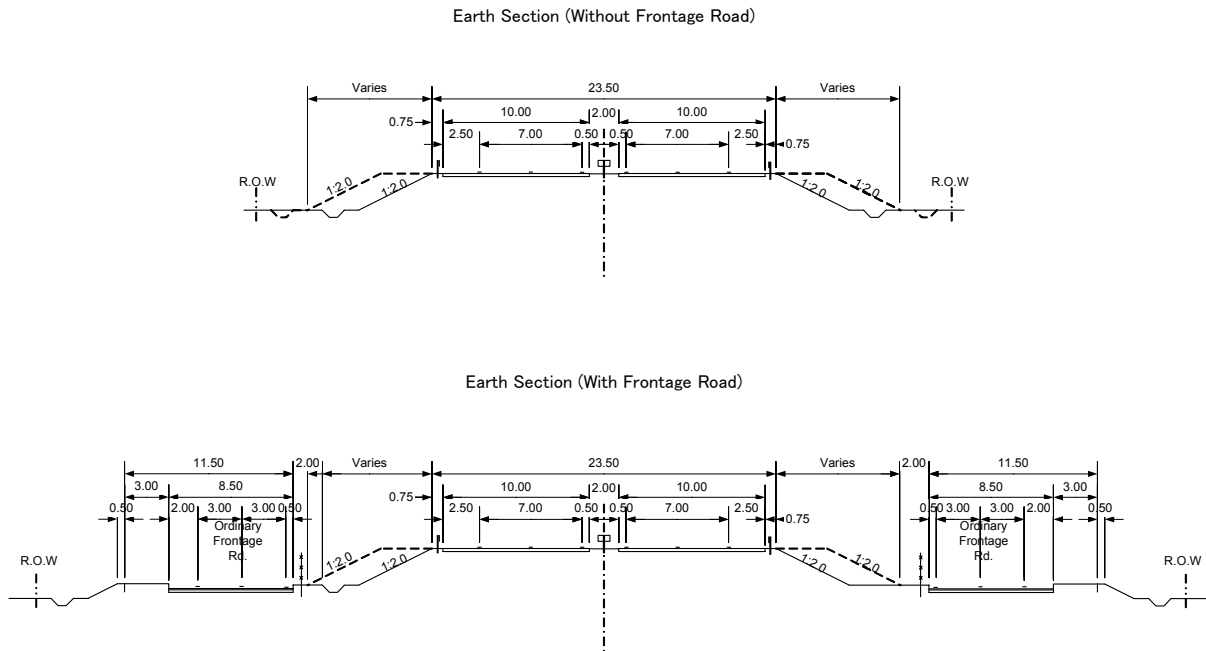


Figure 5.3.1 Typical Cross Section for Toll Road

(3) Vertical Alignment

Vertical alignment has not been deeply examined in the Study because there is no topographic map available for discussing the vertical alignment except some parts of Kota Depok. However, structural conditions such as average height of embankment, flyovers/underpasses, have been roughly studied at several important points as preconditions to estimate the project cost.

(4) Arrangement of Frontage Road

With regard to frontage road, there is an important issue prior to the discussion on location or stretches; that is, the responsibility of construction of frontage roads. According to the current climate, toll road private investors are not likely to take responsibility for the construction because it will inevitably lower the financial viability. Local governments have no intention to construct the frontage road due to shortage of budget. Some roads may be, however, provided by developers even after completion of 2nd JORR, if an integrated area development is induced along 2nd JORR in the future.

Taking these situations into consideration, the following minimum arrangement of frontage road is provided in the Study from a viewpoint of promotion of area development and alleviation of splitting community along 2nd JORR.

- Between Jl. Cinangka Raya and Jagorawi Toll Road, excluding new road financed by ADB, which has already been completed.

(5) Arrangement of Frontage Road

1) Basic Principle for Provision of Interchanges and Junctions

Junctions and interchanges are planned based on the following principles:

- Junctions are planned at every existing toll road;
- Interchanges are planned to connect all existing and future radial arterial roads;
- Minimum interval between interchanges is more than 2 km to avoid conflict of traffic flows, and is less than around 10 km to extend service area; and
- Short intervals are accepted in Kota Depok to promote sub-center development.

2) Location of Junctions and Interchanges

Following the principle mentioned above, locations of the junctions and interchanges on the 2nd JORR were determined as listed in Table 5.3.2.

Table 5.3.2 Location of Junctions and Interchanges

Code	JC/IC	Type	Supplementation
A	Cengkareng Access	JC	
B	Jl. Teluknaga	IC	To cover the urban center
C	Jl. Daan Mogot	IC	Connection to primary arterial road
D	Merak Toll Road	JC	
E	Jl. Serpong Raya	IC	To serve Alam Sutera area
F	Serpong Toll Road	JC	
G	Jl. Cinangka Raya	IC	Connection to primary collector 2
H	Jl. Meruyung	IC	To promote area development at Limo
I	Jl. Margonda	IC	Connection to primary collector 1
J	Jl. Bogor Raya	IC	Connection to primary arterial
K	Jagorawi Toll Road	JC	
L	Jl. Trace Yogie	IC	Connection to primary collector 2 to Jonggol
M	Jl. Siliwangi	IC	Connection to primary collector 2
N	Setu/Jl. Parman	IC	Connection to primary local
O	Cikampek Toll Road	JC	
P	New Road in Cikarang	IC	Connection to planned busway route
Q	Jl. Babelan	IC	Connection to primary local
R	JORR E Section	JC/IC	Connection to JORR and frontage road of KORR

Note: JC: Junction. IC: Interchange. JC/IC: Junction and interchange

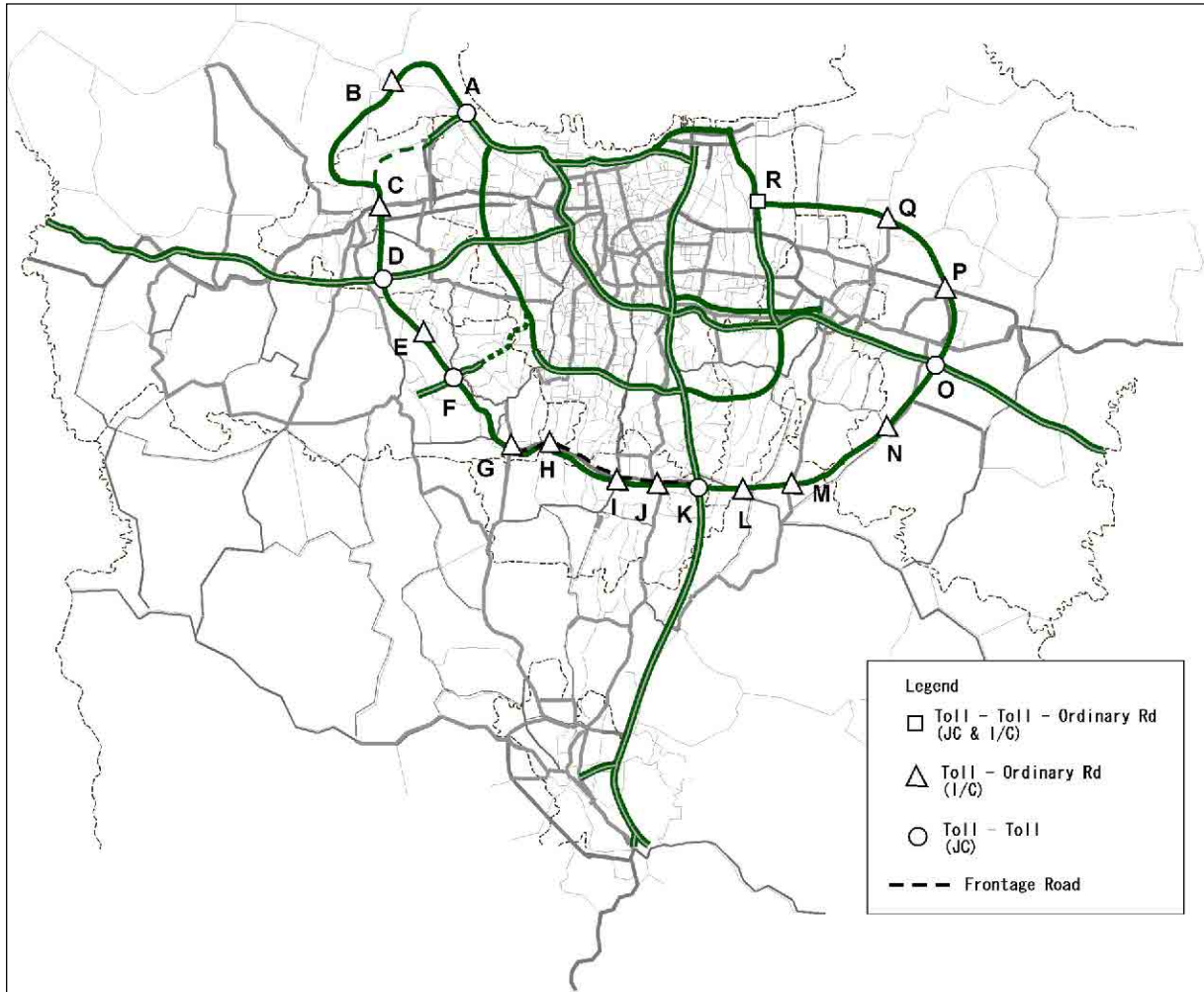


Figure 5.3.2 Location of Junctions and Interchanges

5.3.2 Major Structures

(1) River Bridges

2nd JORR needs pass some wide rivers that are listed in Table 5.3.3.

The lengths of the river bridges were taken from those of the existing bridges, and the cross-sectional components shown in Figure 5.3.3 were adopted.

Table 5.3.3 Major Rivers and Lengths of Existing Bridges

Station	River Name	Existing Bridge Length (m)	Note
47+550	Ciliwung	75	
61+000	Cileungsi	50	
96+620	Bekasi	60	

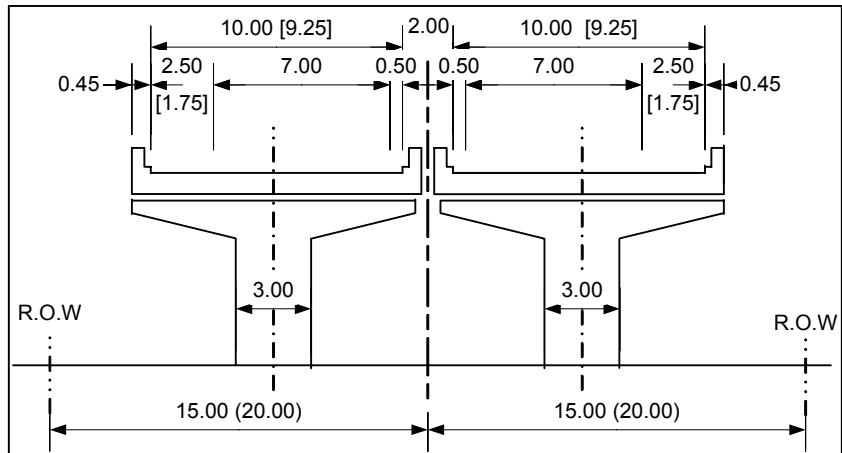


Figure 5.3.3 Typical Cross Section of the Bridge¹ (Initial 4-lane stage)

(2) Flyovers/underpasses

Flyovers/underpasses are planned where the 2nd JORR cross ordinary arterial roads. Typical cross section of the flyover/underpass is the same as the one of the river bridge.

(3) Piled Slab

Piled Slab has been adopted as a typical road construction method in the soft ground section in the Jabodetabek region having learned from past experience. Since there is no available foundation data near the planned route, the soft ground sections were assumed by using the 1/100,000 geologic map and the design outcome from the JORR.

Consequently, Piled Slab sections are considered northern side of Jl. Daan Mogot and northern side of Jl. Imam Bonjol, and a 20 m pile, of which length is adopted in JORR, is assumed.

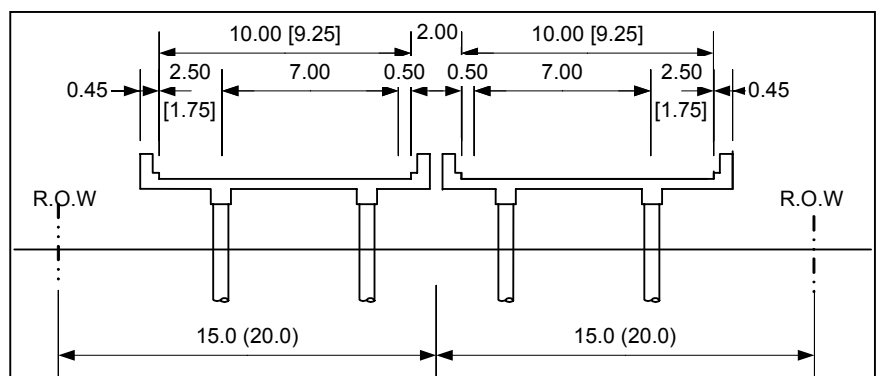


Figure 5.3.4 Typical Piled Slab Section¹ (Initial 4-lane stage)

¹ Dimension in [] was applied when structure length was more than 50m.

5.4 ALTERNATIVE ROUTES

5.4.1 East side of the Soekarno Hatta International Airport

The west side of the Soekarno Hatta International Airport has scattered area with cultivation and small villages because there are some limitations to construct high, multi-story buildings due to the aviation control regulation. Although Kabupaten Tangerang has resort development plan in the spatial plan, there is no concrete framework at present. Taking these situations into consideration, it is easily supposed that the route passing through west side of the Soekarno Hatta International Airport would not have sufficient traffic demand for a toll road development. The traffic volume estimated in SITRAMP is as low as 600 pcu in 2020 reflecting these circumstances.

On the other hand, the route east side of the airport is expected to have much traffic volume comparing to that of the west side. In addition, this eastside route will be an alternative toll road to the Soekarno Hatta International Airport from Merak Toll Road, against the existing Cengkareng Access Road, which was disrupted two years ago by flooding in rainy season (see Figure 5.4.1).

Considering these situations, the east-side route was regarded as an alternative route for short-term solution in the Study and the west-side route of the airport is recognized as a long-term one depending on the progress of coastal area development including resort and seaport development.

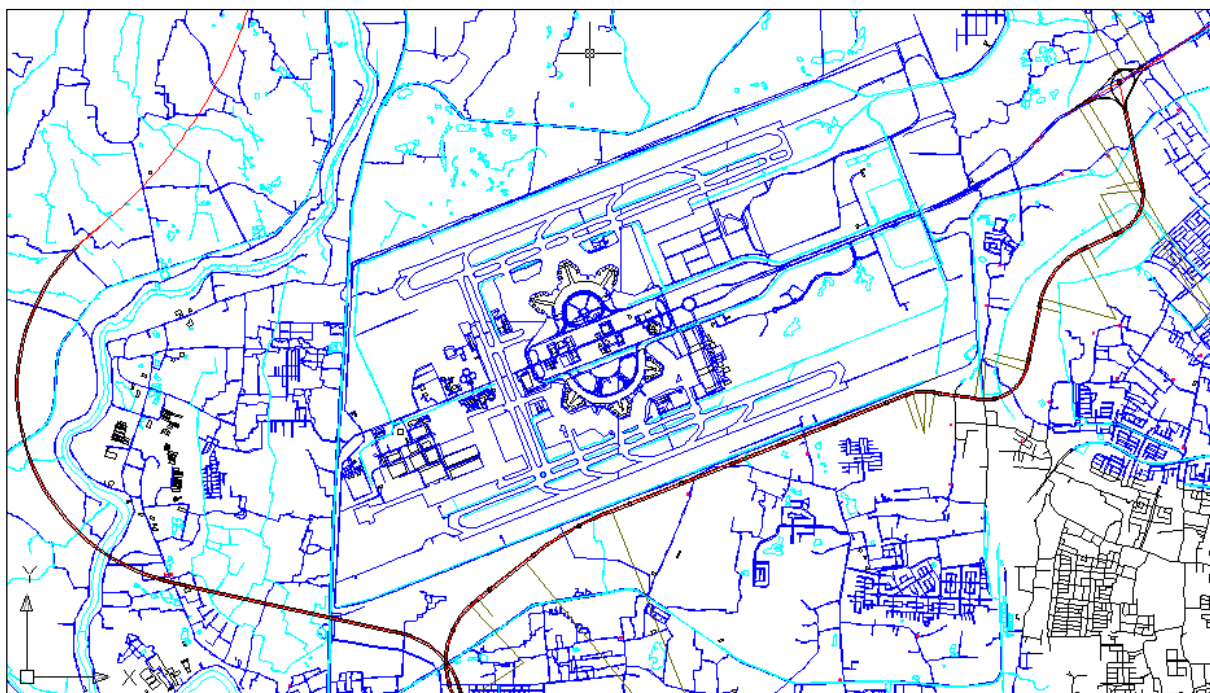


Figure 5.4.1 Alternative Route at the East side of the Airport

5.4.2 Route through the Area Category 4

As mentioned before, the southern route through Kabupaten Bogor was originated from the past studies on arterial road network development in Jabodetabek. It is, however, better to dismiss this original route as an alternative route because all the related local governments agreed on the alignment along the gas pipeline in Kota Depok. The original southern route contradicts to restriction of area development in southern area of Jabodetabek in order to prevent the central area of Jakarta from serious flooding downstream, land subsidence and contamination of drinking water.

In this study, one more alternative was proposed. This alternative is a compromise plan between the original route and the route which was agreed upon by the local governments. And this alternative was prepared in case the plan of agreed route would be frustrated because of the difficulty of the land acquisition.

Table 5.4.1 shows a route comparison between the agreed route (Route-1) and proposed alternative route (Route-2).

5.4.3 Route through the Area Category 3

The section that would be examined lays on mainly Kabupaten Bogor and there is a developed area along the Wisata Utama. Since the agreed route would separate this area, two alternative routes were prepared. Table 5.4.2 shows the routes comparison.

Regarding this section, government negotiation with the developer has yet to start. Thus, the recommended Route-2, of which alignment was shifted to the south from the agreed route, is thought of as a realistic option, and further study would be needed based on the field survey data.

5.4.4 Section Crossing the Cikampek-Toll road

In this section, the following two major factors must be considered to decide on the route:

- Driving-safety
- Temporary restriction

Regarding driving-safety, it has been recognized that a minimum interval length of 4 kilometers is required between two interchanges/junctions from the viewpoints of control of the weaving traffic and reorganization of the traffic sign. In addition to the interval length between existing interchanges that are the Cibitung Interchange and Cikarang Interchange, which is 6.6 km, traffic volume on this section is considerable. Therefore, it is recommended that no interchange would be added between the existing ones

On the other hand, temporary restriction might occur during the reconstruction work on Cibitung Interchange, in case the recommended route will be adopted. However, detail engineering, to find out whether the restriction will be applied or not, could not be conducted, because of the lack of field data. Therefore, further study must be needed to decide the best-suited route and the aforementioned route that uses the existing interchange was recommended in this study.

The merits and demerits of the two alternative routes are summarized in Table 5.4.1 - 5.4.3.