Chapter 1

Introduction

1. Introduction

The terms-of-reference (TOR) for "The Study on Integrated Transport Master Plan for JABOTABEK (Phase I)" call for a review of the Jakarta Outer Ring Road (JORR) project, comprising some 65.1 km toll road located mainly in DKI Jakarta, with the alignment of a minor stretch going through Bekasi.[1] The history of the JORR concept goes back to the late 70s, when the Government of Indonesia (GOI) requested the Government of Japan (GOJ) to assist in the preparation of a master plan[2] for the JORR. The master plan study was subsequently followed-up by a planning[3] and a preliminary design study[4], both of which constituted the basis for further Government planning and JORR implementation. PP No.8/1990[5] paved the way for private sector participation in the construction and operations of toll roads. In fact, construction and operations of toll roads under BOT schemes commenced in 1994 in accordance with the then prevailing Government policy.

Concessions for the JORR toll way[6] were awarded to four private sector companies and Sections S and E2 were almost completely constructed. The sections were opened to traffic in August 1995. The 1997 financial crisis, which resulted in a severe economic and political crisis, brought full realization of the JORR under the then existing BOT-based concessionaire agreements to a practical standstill, due to the actual and/or legal bankruptcy of the concessionaires. Hence, the JORR, with the exception of Sections S and E2, remains uncompleted to date.

The JORR project, as a consequence of such unusual circumstances, has to therefore be classified as an "on-going" project, the realization of which has been suspended temporarily, due to unforeseen and unforeseeable circumstances. In fact, the GOI continues to attach high priority to the completion of the JORR, manifested in the fact that the it has requested the GOJ to assist in the JORR's realization through the provision of a "Special Yen Loan- SYL".

The Final Report (F/R) presents the results of an in-depth review and assessment of the JORR project from a technical, economic, and financial point of view, taking full account of the impacts caused by the special circumstances inhibiting any timely realization of the JORR.

The DFR is structured broadly along a standard format for road and/or toll road related feasibility studies. However, particular attention has been paid to:

1. Uncertainties in the political, economic, institutional and legal frameworks, which may constitute impediments to JORR realization

[1]) For a discussion of the JORR system configuration see later in Chapter 2 and Chapter 5.
[2]) Outer Ring Road Master Plan Study, JICA, 1978.
[3]) The Consulting Engineering Services for Jakarta Outer Ring Road Project, Phase I Report; OECF 1988
[4]) The Consulting Engineering Services for Jakarta Outer Ring Road Project, Phase II Report, OECF 1990. A more comprehensive list of relevant urban and public transport studies over the past two decades is attached in Annex 1-1.
[5]) PP stands for "Peraturan Pemerintah" or Government Decree, which has a status below law, but above Presidential or Governor Decrees.
[6]) For details see Chapter 2.

2. Uncertainties in Indonesia's short to medium-term economic performance prospects and their likely short, medium to long-term impact on traffic demand on the JORR, and

3. Short to medium constraints on public investment funds (development budget) in general and for road transport related infrastructure development in particular.

Chapter 2 presents an in-depth review of JORR project history, the JORR project profile, its current implementation status and the assessment approach adopted in this report. Chapter 3 identifies the problem hierarchy and the major obstacles, which have prevented further realization of the JORR since the 1997 crisis. It elaborates on major economic, financial and institutional factors, which must be taken into full account in interpretating the economic and financial viability results. Chapter 4 briefly introduces major socio-economic and the traffic demand parameter, which were used as the criteria in the viability assessment of the project. Chapter 5 reviews and evaluates JORR engineering aspects and Chapter 6 JORR environmental related issues. The deliberations in Chapters 5 and 6 are guided by the fact that major engineering and environment related issues were already decided and approved by GOI in the past. Chapter 7 assesses the economic and financial viability of the JORR. This chapter pays particular attention to the appropriate up-dating of unit costs, base prices and economic and financial net-benefits, in order to arrive at investment requirements, which are realistic and in line with "best-practice" engineering standards.

Chapter 8 elaborates on potential realization scenarios for the JORR taking into full account the results of the economic and financial viability calculations. The GOI has, as is almost always the case with infrastructure projects of JORR's nature, not unlimited, but only a maximum of four (4) options on how to proceed with the JORR, out of which three (3) are classified as rather unlikely or unrealistic. Other essential factors, which should go into the deliberations on the "pros & cons" of further speedy JORR realization, are related to a suitable long-term toll road policy, and an appropriate legal and institutional set-up, including such essential issues as toll levels and their adjustment mechanisms. The Chapter touches also briefly on issues of practical importance, such as the function(s) of the project implementing entity, the merits and demerits of different construction methods and the merits and demerits of alternative implementation options. Finally, the Chapter identifies the most suitable of these options, and recommends an implementation and time schedule tailored around that option.

Essential documents, statistical data and computation tables that are important to support the line of argumentation presented in this DF/R are attached to this document in various annexure.

Chapter 2

JORR Project History & Implementation Status

2. JORR Project History & Implementation Status

2.1 General JORR Background

The Indonesian economy grew over the 27-year period from 1970 to 1997 at a compound real growth rate of 6.6 percent. In 1997, the year in which the financial crisis was triggered, Gross Domestic Product (GDP) reached a level of Rupiah 624 trillion[1]. Per Capita GDP increased from US$ 400 in the seventies to a 1997 pre-crisis level of US$ 1,285[2].

Accelerated economic growth was accompanied by rapid urbanization and strong motorization processes. Urban population growth averaged 4.6 percent per annum, i.e. 2.9 percentage points above the country's natural population growth rate. The stock of the motor vehicle fleet at national level grew from a total of some 3.87 million vehicles in 1980 to about 16.54 million in 1997, equivalent to a compound growth rate of 8.92 percent per annum over that period.

DKI Jakarta is Indonesia's administration, education, service, financial and business center, and also her single largest urban agglomeration. DKI Jakarta in combination with Bogor, Tangerang and Bekasi forms the "Jabotabek" region, which in 1995 already had an urbanization level of about 83 percent and a population density per km^2 of 3,063 people. It is estimated that about 30 percent of the total national vehicle fleet operates within the Jakarta metropolitan area and its surroundings.

The GOI already recognized in the late 1970s the need to address the drastic increases in vehicle motor traffic in the Jabotabek region through the adoption of road infrastructure development measures. The GOI decided to develop the Jakarta-West Java Toll Road system, comprising radial toll roads in the major transportation corridors. The toll way and arterial road system in West Java is depicted in Figure 2.1.1. It was decided by the GOI to develop the corridors extending from Jakarta together with the inner ring road and the Jakarta Outer Ring Road (JORR). The existing toll roads in operations as of October 2000 within the Jakarta West Java Toll-road system, their respective lengths, toll rate system and presently prevailing ownership are summarized in Table 2.1.1.

Six toll roads within the toll road system network are directly relevant to the JORR. The Jakarta Intra Urban Toll Roads and the Jakarta Harbor Road, which together constitute the Jakarta Intra Urban Toll-road (JIUT or inner ring road), are located inside the JORR. DKI Jakarta and its outlying satellite cities of Bogor, Tangerang and Bekasi have a toll road network. On the western side of DKI Jakarta, there are the Cengkareng Access Toll Road connecting to Soekarno-Hatta International Airport and the Jakarta-Merak Toll Road connecting DKI Jakarta with Tangerang and Merak. On the south side there is the Jagorawi Toll Road connecting DKI Jakarta with Bogor. On the east side, there is the Cikampek Toll Road connecting DKI Jakarta with Bekasi and Cikampek. These four radial toll roads assume a connector function among the major urban centers in West Java.

[1]) Roughly equivalent to US dollar 260 billion at current prices and at a pre-crisis average exchange rate.
[2]) In current dollar terms and on a non purchasing-power-parity basis.

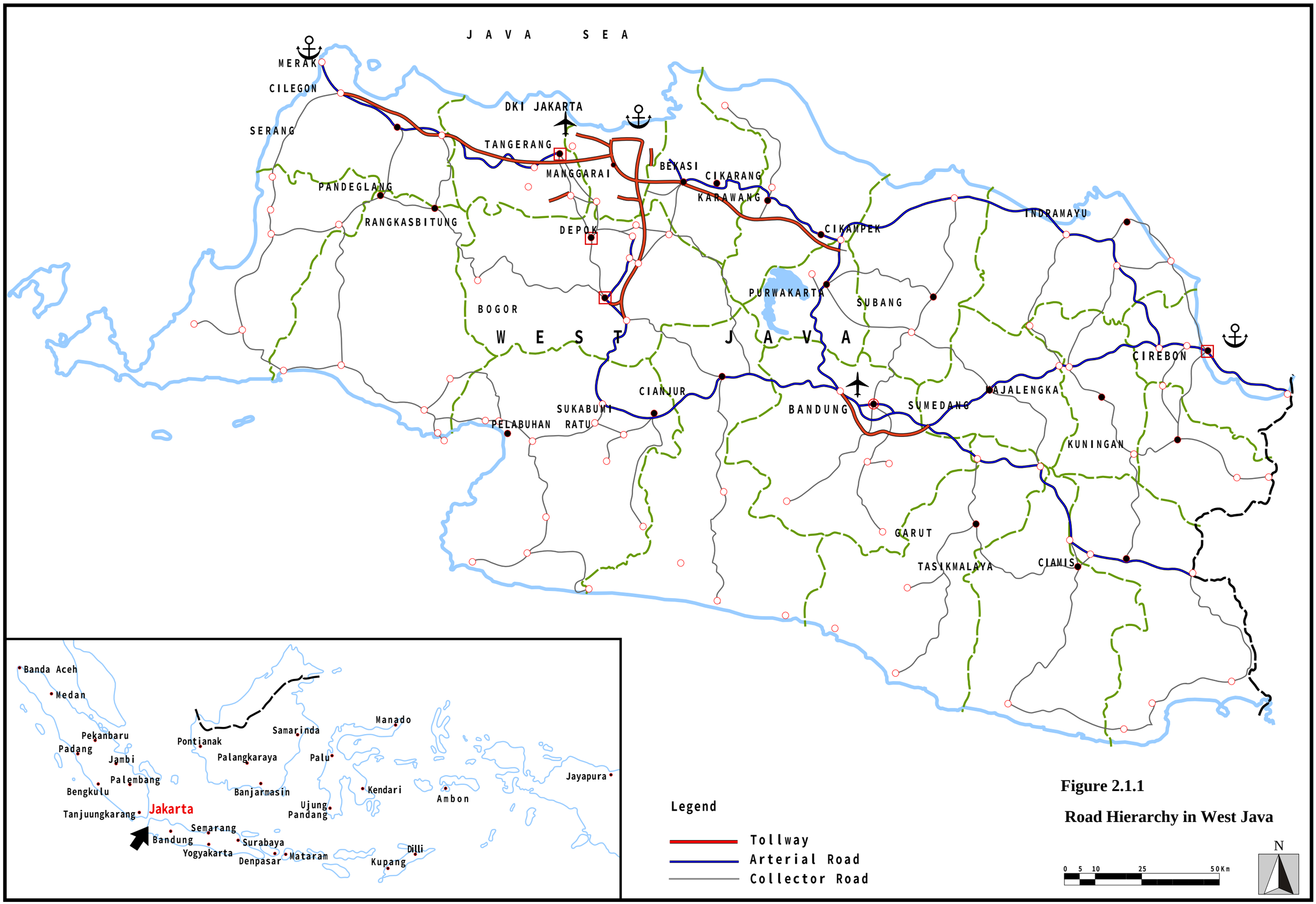

Figure 2.1.1

Road Hierarchy in West Java

The Jakarta Outer Ring Road (JORR) is a trunk toll way, which runs at a 10 to 13 km radius from the center of the City (defined as Monas Independence Square) encircling the metropolitan area around the west, south and east sides. The JORR is expected to play an integral part of the Jakarta-West Java Toll Road system as illustrated in Figure 2.1.2. The JORR has a length of approximately 64.4 km (Table 2.1.2 refers) and it is divided into seven sections that are connected with the toll roads of the West Java Toll Road Network at five junctions[3].

Table 2.1.1 Existing Operational Toll Ways

Toll Road Segment	Length [Km]	Date of Operations	Operator	Adopted Toll Rate System
Jakarta-Bogor-Ciawi (Jagorawi)	46	1978	PT Jasa Marga (Gvt.)	Distance proportional
Jakarta Tangerang	27	1984	PT Jasa Marga (Gvt.)	Distance proportional
Cengkareng Access	14	1985	PT Jasa Marga (Gvt.)	Flat by Sections
Jakarta Intra-Urban (Inner Ring)	40	1987-1996	Private Operator/Gvt.*	Flat in total stretch/by Sections
Jakarta-Cikampek	72	1988	PT Jasa Marga (Gvt.)	Distance proportional
JORR/S Section **	12.9	1995	Private Operator/Gvt.*	Distance proportional
JORR/E2 Section **	9.5	1995	Private Operator/Gvt.*	Distance proportional
Jakarta Harbor Road	15	1996	Private Operator/Gvt.*	Flat

Source: JICA Study Team Compilation
Note: *) In line with the existing regulatory framework, P.T. Jasa Marga is equity shareholder in the companies of the private toll road operator. Depending on the case, there is a revenue sharing formula between P.T. Jasa Marga and private investors ranging from 75 to 25 percent
**) These two sections from part of the JORR

Table 2.1.2 JORR Planned System Segments and Configuration

Section Identifier	Extent	Length (Km)	Comment
W1	Prof.Dr.Sediyatmo - Jakarta Merak Tollway	7.35	Not completed
W2	Jakarta Merak Tollway Jl. - Ciputat Raya	12.21	Not completed
S	Jl. Ciputat Raya - Jagorawi Tollway	12.90	Operational
E1	Jagorawi Tollway- Jakarta Cikampek Tollway	12.50	Not completed
E2	Jakarta Cikampek Tollway - Jl. Bekasi Raya	9.50	Operational
E3	Jl. Bekasi Raya - Section N	4.75	Not completed
N	Section E3 - Jakarta Harbor Road	5.20	Not completed
	Total	**64.4**	

Source: JICA Study Team compilation.

[3]) Please see Chapter 5 for further engineering details.

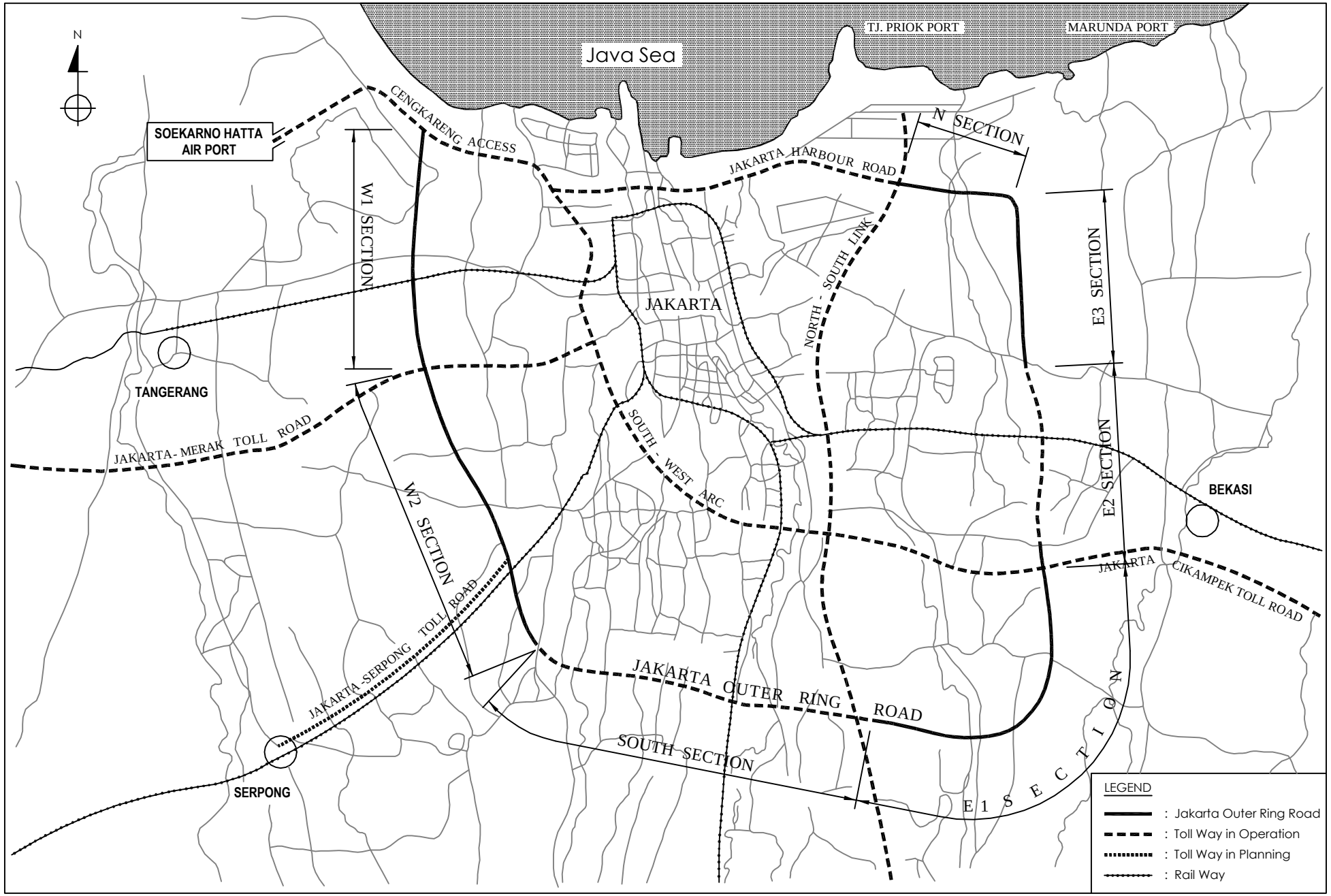

Figure 2.1.2 Jakarta Outer Ring Road Project Location Map

The JORR is expected to address the following principal functions:

1. To avoid serious traffic congestion, thereby contributing to a sustainable level of urban activities

2. To supplement the functions of radial toll roads and the Cengkareng Access, and

3. To support improved land use in the Jabotabek metropolitan area, namely DKI Jakarta, Bogor, Tangerang and Bekasi.

2.2 Evolution of JORR Planning and Progress in Realization

Milestones in the planning process and realization of the JORR were the two planning and one review studies as well as the Government Decree PP No.8 of March 1990, the major objectives of which are summarized in Table 2.2.1. In accordance with the Government's policy, construction had commenced as of 1994 under private sector BOT schemes. The concessions for the seven sections identified above were awarded to four private companies. The concessionaires employed consultants for design and supervision and contractors for construction. All contractors were selected by direct appointment and contract amounts were on a lump-sum basis and based on a definitive plan in case of one concessionaire.

Table 2.2.1 Milestones in JORR Planning and Implementation

Year	Type	Title	Comment
1988	Planning Study	The Consulting Engineering Services for Jakarta Outer Ring Road Project Phase I Report	Primary source for verification of planning parameter, economic & financial viability data
1990	Preliminary Design Study	The Consulting Engineering Services for Jakarta Outer Ring Road Project Phase II Report	Primary source for engineering & related data
1990	Government Decree	Government Decree PP No. 8 of March 1990	Allowed private capital to finance and operate toll roads
1999	Implementation Study	Implementation Program for the Jakarta Outer Ring Road (Special Yen Loan)	Prepared for supporting the GOI's official request for a SYL
2000	Valuation Study	Valuation study of Jakarta Outer Ring Roads	Prepared for IBRA to assess status of remaining works, historic & fair costs

The three other concessionaires concluded contracts with contractors based on the detailed design, while the contractor taken under contract by a definitive plan had to prepare a detailed design before commencement of construction (Design Built Contract - [DBC]). All detailed designs, except those for sections W1 and N, were approved by Bina Marga (Directorate General of Highways), which was responsible for supervising the design of the JORR, including the detailed design of the DBC. In fact, Sections S and E2 were constructed almost completely and

have been open for public use since August 1995, though some minor work still needs to be completed at both Sections[4].

Table 2.2.2 identifies the concessionaires, the concession period, and it provides summary information on the progress/status in land acquisition and construction, as well as other related issues which are important for the realization of the JORR[5].

The key characteristics of the realization status of the JORR as of October 2000 are:

1. Implementation of the JORR under the previous legal BOT arrangements has, for all practical purposes, come to a complete standstill

2. "The Indonesian Bank Restructuring Agency - IBRA" has officially been charged with resolving the pending financial issues regarding, inter alia, the previous concessionaire agreements. IBRA's main mandate is to recover non-performing loans through debt settlement/rescheduling schemes and/or the proceeds of asset sales of the defaulting parties

3. In fact, IBRA has commissioned a valuation study[6], in order to (a) analyze and confirm historical cost incurred by the relevant concessionaires; (b) evaluate and confirm "fair cost" as against cost actually paid, and (c) evaluate and confirm projected cost required to complete the remaining JORR works. This study allows for the identification of (a) March 2000 unit cost and (b) the value of works/structures (in other words assets) already completed

4. The sections already in operations, i.e. Sections S and E2, generates revenues[7]

5. The environmental impact assessment (EIA) has been completed for all JORR segments and legalized by the Central AMDAL Commission of the Ministry of Public Works. Therefore, the completion of the JORR will not require new and/or additional EIA's for the W1, W2, S, E1, E2, E3 and N sections

6. Land acquisition, compensation and construction completion in line with original concession agreements are at various stages of completion. Land acquisition for JORR section W1 is completed, but there is zero progress in terms of construction. Land acquisition for section W2 is completed to around 42 percent and some 16 percent of the construction works have been completed. Land acquisition for section S is completed to about 98 percent and construction to around 95 percent. Land acquisition for section E1 is completed to 70 percent and construction to 82 and 8 percent (for stage 1 and 2, respectively). Land acquisition for section E2 is completed to 98 percent and construction to around 49 percent. As regards section E3, land acquisition is completed to 100 percent and construction to some 39 percent.

[4]) Please consult Chapter 5 for details.

[5]) For further details and an in-depth discussion of individual details, please refer to the following Chapter 5.

[6]) Identified in Table 2.2.1 as "Valuation Study of Jakarta Outer Ring Road"; Jakarta, May 2000.

[7]) According to an interview with P.T. Jasa Marga, Section S generates already annual revenue of some 80 billion Rupiah which would be equivalent to an approximate traffic volume of 54,795 vehicles/day.

There has been no land acquisition for section N and progress in construction works is zero, and

7. Section W2 has already been placed under the responsibility and control of P.T. Jasa Marga.

Table 2.2.2 JORR Segments' Implementation Status

JORR Section Name	Section Length [Km]	Assigned Concessionaire	Concession Period	Implementation Status							Design Speed [Km/h]	Comments & Observations
				Previous Scheme	ROW [Meter]	Progress May-00 [%]	EIA **)	Construction Period	Planned Completion Date	Actual Progress [%]		
W1 Section *)	9.8	PT. Jakarta Lingkar Barat Satu	30 years 1997 - 2027	BOT	70	100	Yes	3 years 1997 to 2000	18-Aug.00	Zero	100	No construction
W2 Section*) **(W2' Section not included)**	11.2	PT Citra Mataram Satriamarga Persada	35 years 1996 to 2031	BOT	80-100	42	Yes	3 years (1997 to 1999)	15-Apr.99	16	100 [80]	Already placed Under the control of P.T. Jasa Marga
South-Section	14.8	PT Marga Nurindo Bhakti	33 years 1995 to 2028	BOT	90-100	100	Yes	6 years 1994 to 1999	26.Feb.99	95	80	In operation
E1-Section*)	11.9	PT Marga Nurindo Bhakti	33 years 1995 to 2028	BOT	90-100	67	Yes	Same	26.Feb.99	82/St.1 8/St.2	80	Partial compeltion
E2-Section*)	9.2	PT Citra Bhakti Margatama Persada	33 years 1995 to 2028	BOT	90-100	100	Yes	4 years 1996 to 2000	16.Dec.99	49	80	In operation
E3-Section*)	4.8	Same	33 years 1995 to 2028	BOT	90-100	98	Yes	Same	Same	39	80	Partial completion
N-Section*)	5.2	Same	Same	BOT	90	0	Yes	Same	Same	Zero	80	No construction

Source: JICA Study team Compilation from May 2000
IBRA Valuation Study

Notes: *) Agreement has been reached according to the Ministry of Public Works with the investors these sections to terminate their concessions via amicable settlement
**) AMDAL environment executed during 1995 to 1997. The studies have been legalized by the Central AMDAL Commission of the Ministry of Public Works

2.3 Status of JORR Project

The Government of Indonesia (GOI) attached in the past and continues to attach high priority to the full realization of the JORR project and the JORR was, therefore, included into the GOI's Blue Book 1999 as priority project proposal "Jakarta Outer Ring Road" (code no. 990323). An official G-to-G request for loan assistance was subsequently submitted by the GOI (Menko EKUIN) to the GOJ for consideration in the 5 Batch II project proposals for "Special Yen Loan (SYL)" funding. This official request was supported by the 1999 Implementation

Program (IP) prepared by the Ministry of Public Works (listed in the previous Table 2.2.1).

However, the project definition reflected in the 1999 Implementation Program of the Ministry of Public Works differs from the original 1988 JORR project configuration with regard to two major aspects:

1. The overall system configuration (Table 2.3.1 refers), and

2. An equipment component, namely a revenue sharing, traffic control and information system, was added to the JORR project definition as reflected in the 1999 Implementation Program.

The concept submitted in the IP prioritizes implementation sequencing of the unfinished and to be finished segments of the JORR, summarized together with related information in Table 2.3.1. Table 2.3.2 summarizes for information the major project components and features of the estimated investment cost (in mid-1999 prices) for the project definition as per 1999 Public Works Implementation Program.

Table 2.3.1 Ministry of Public Works 1999 Implementation Program (IP)

JORR Section Name	Section Length [Km]	Priority Level for Implementation*]	Traffic Demand (section wise) Forecast**]				Principal Management Entity ***]
				2005	2010	2015	
W1 Section	9.8	Priority Level 2	Option 1	40.3	56.6	83.1	P.T. Jasa Marga
			Option 2	41.8	50.9	61.8	
				2005	2010	2015	
W2 Section	11.2 [3.0]	Priority Level 1 ****]	Option 1	49.0	68.9	101.2	P.T. Jasa Marga
			Option 2	50.9	63.5	79.2	
				2005	2010	2015	
E1 Section	11.9	Priority Level 3	Option 1	29.3	41.2	60.4	P.T. Jasa Marga
			Option 2	35.1	45.7	58	
				2005	2010	2015	
E2 Section	9.2	Priority Level 4	Option 1	28.7	40.3	59.2	P.T. Jasa Marga
			Option 2	34.0	47.6	58.3	
				2005	2010	2015	
E3 Section	4.8	Priority Level 4	Option 1	23.8	33.4	49.1	P.T. Jasa Marga
			Option 2	27.8	31.0	41.1	
				2005	2010	2015	
Cilincing Access Roads *****]	7.7	Priority Level 4	Option 1	23.8	33.4	49.1	Local Government
			Option 2	27.8	31.0	41.1	

Source: JICA Study Team compilation from 1999 Public Works Implementation Program.

Notes:
*] Is based on the demand forecast in the IP.
**] The demand forecast adjusted the 1988 feasibility study forecasts using both a growth and elasticity approach reflected in the Option 1 and Option 2 figures. Demand is in vehicles/day.
***] P.T. Jasa Marga has, according to the prevailing legal framework, the authority to operate toll roads.
****] According to estimated traffic demand.
*****] These are: Jl. Jampea Cilincing and Jl. Cakung Cilincing Raya, which form access roads to the port.

Table 2.3.2 Major Feature of 1999 Special Yen Loan Request for IP

Parameter	Major Features
Project Components	1) a.) Completion of construction of unfinished sections of W1; W2; W2'; E1; E2 and E3, equivalent to about 49.9 km. b.) Upgrading of two Cilincing access roads for a total of about 7.7 km length 2) Installation of facilities & equipment for revenue sharing; toll collection; traffic information & control system, and communications system for about 65 km length 3) Provision of consultancy services to implement the project
Project Features	1) A unified toll collection system 2) A flat tariff system within the JORR
Implementing Entity	P.T. Jasa Marga
Financing Mechanism	Special Yen Loan for 85 percent of the investment cost
Construction Period	4 Years
Total Investment Cost	1) Total direct cost: 86,545,million Yen by Special Yen Loan of which FC Component: 46,185 million Yen LC Component: 40,360 million Yen 2) Total indirect cost: 25,713 million (for land acquisition, compensation; administrative overhead, taxes & duties)

Source: JICA Study Team compilation from 1999 IP.

The major differences in comparison to the 1988 JORR project configuration in terms of physical JORR configuration as reflected in the JORR request for Special Yen Loan assistance are:

1. Section W2 was given the highest priority level for implementation, and includes a new Section W2' of 3.0 km length from the Jakarta-Serpong toll road which is already under construction by PT Jasa Marga. After having included Section W2' into the system configuration for the SYL request, this section is now excluded again upon the request of the GOI

2. Section W1 remained unchanged. W1 was given the second highest priority level for implementation

3. Section E1 remained unchanged with a third priority level for implementation

4. Section E2, which is already open for traffic, was attached fourth priority level to complete the minor remaining works

5. Section E3 was also given a fourth priority level for implementation, and

6. Section N was replaced by the upgrading of Jl. Jampea Cilincing and Jl. Cakung Cilincing Raya[8]. The upgrading (actually resurfacing and widening) was given a fourth priority level.

[8]) For further details, please consult with Chapter 5.

The total investment cost for the system configuration reflected in the SYL request and the supporting 1999 Implementation Program document amounted to Y112,258 million (all resources, in mid-1999 prices and at an average 1999 exchange rate).

2.4 Assessment Approach

Completion of the JORR was interrupted as a result of the 1997 financial and subsequent economic crisis. Such circumstances are a sort of "force majeur" and the JORR is, therefore, an on-going project, the need for which has been established and confirmed and the implementation of which has been temporarily interrupted. Works and structures (or in economic terms "assets") are in place partly and their value has been determined by the May 2000 valuation study sponsored by IBRA. The GOI has already requested officially financial assistance from the GOJ. Furthermore, Indonesia's overall "enabling environment" for toll road development and operations is "in flux", due to recent political and policy changes[9].

The approach adopted for reviewing the JORR project request uses a three-step approach[10] and a comprehensive checklist[11]. There have been many studies relevant in one way or another to the JORR project[12] (the most important documents are listed in Annex 1). However, primary data sources for the present assessment exercise was the following two documents:

1. JORR Implementation Program, 1999 by the Ministry of Public Works, since this document supported the GOI's official request for financial SYL assistance, and

2. Valuation Study of the Jakarta Outer Ring Road, 2000 by IBRA, since this document provides invaluable latest data on unit cost, the value of the JORR works and structures already in place and the estimated completion cost for the JORR.

The nature of the project demanded that particular emphasis be placed in the assessment exercise on:

1. The implications for the implementing entity resulting from the JORR project's internal rate of return (IRR), taking into account the prevailing regulatory and legal demands and limitations

2. A realistic financing plan, and

3. Implications for the policy for overall toll road system integration, harmonization of toll structures and tariffs and identification of a suitable long-term institutional structure for toll road policy formulation, planning and operation and management.

[9]) This is, of course, not limited to toll road planning and development, but to the overall legal, institutional, planning and project execution set-ups.
[10]) See Chapter 2 of the Interim Report for details.
[11]) See Chapter 2 of the Interim Report for details.
[12]) Summarized in Table 2-2 of the Interim Report, page 2-3.

Chapter 3

JORR Project Definition

3. JORR Project Definition

3.1 Core Problems & Issues

It is necessary to understand the difficulties impeding the full realization of JORR and to identify the principal decision takers (actors) and the possible alternative courses of action, that they could take to address the difficulties and their implications. A simple diagram outlining the situation is illustrated in Figure 3.1.1, and the key factors are summarized below:

3.1.1 Core Problems and Target

Increased and increasing economic and social cost measured in terms of greater travel time, air pollution and lost economic activities is the core problem caused by the non-completion of the JORR. Most sections of the JORR with the exception of Section W1[1] were scheduled for completion in either early or late 1999. Traffic demand has, after a decline in 1998, already grown considerably[2]. Circumferential traffic in an east to west or north to south direction, which would have used the JORR, is therefore forced to use the JIUT or other non-toll arterial roads. In addition, works and structures at various levels of completion[3] are already in place, which form, regardless of the prevailing economic situation of the previous concessionaires, road infrastructure assets worth between 830,800 to 970,757 million Rupiah[4]. This amount and perhaps additional demolition costs would have to be written off, if the JORR remained uncompleted, in addition to the economic and social cost caused by JORR non-completion. It is estimated from the demand modeling exercise that completion of the JORR would generate in 2005 savings of some 58.04 million vehicle-hours/yr. and about 312.27 million vehicle-kms/yr. in that very year alone (on the basis of total vehicle fleet assigned to the network).

Therefore, the primary objective and target is to finalize the JORR on an "as soon as possible" basis, in order to alleviate potential costs and losses identified in item 1., and also to generate revenues collected from JORR users[5]. To complete the JORR on an "as soon as possible" basis is in line with the GOI position on this matter.

3.1.2 Principal Implementing Options

P.T. Jasa Marga is, under existing laws and the established regulatory framework, the only entity that has the clear legal mandate and the authority to operate toll ways at national level, though the regulations allow P.T. Jasa Marga to do so with "third parties" (Annex 2 summarizes the regulatory framework and provides an

[1]) Please refer to Table 2.2.2 in Chapter 2. Completion of Section W1 was scheduled for August 2000.
[2]) Please refer to Chapter 4 for more details.
[3]) Please refer to Table 2.2.2 in Chapter 2.
[4]) Based on the results of the May 2000 Valuation Study prepared for IBRA. The number quoted represents cost actually paid by the concessionaires, which would be equivalent to roughly US $ 132.1 million US dollars at the exchange rate of Rp. 7,350 used in the IBRA study. It is immaterial in this context that this amount may be over "fair cost" as assessed by this very study.
[5]) In-depth interview with P.T. Jasa Marga on September 20, 2000.

overview on the new road law presently under consideration)[6]. It is therefore only logical that P.T. Jasa Marga will be entrusted with the function of executing/implementing entity for the JORR project[7]. There are three major alternative courses of action or implementation options that P.T. Jasa Marga may pursue.

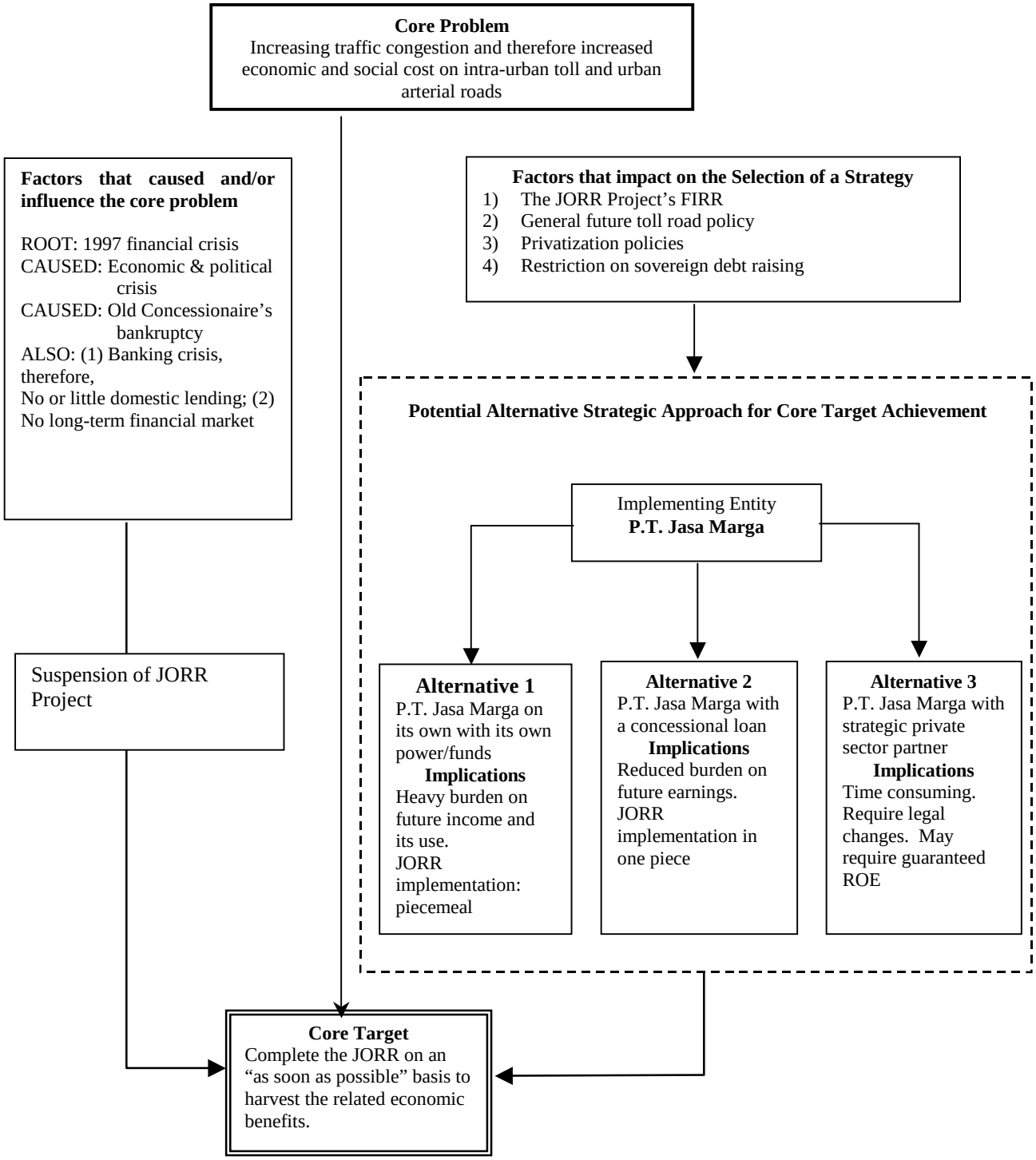

Figure 3.1.1 Core Problem and Key Issues

[6]) Please consult Appendix 2 for details.
[7]) There are, of course, some difficulties that need to be ironed out. This relates to the question of the liabilities of the old concessionaires.

Alternative 1. This alternative, P.T. Jasa Marga continues with the completion of the remaining JORR works using its own resources and its own capabilities to raise funds on the domestic Indonesian capital market. The operating revenues of P.T. Jasa Marga in 1999 amounted to 744,312 million Rupiahs and it had a net income amounted to around 153,710 million Rupiah[8]. The completion of the JORR would be very capital intensive[9] and taking this course of action would almost certainly entail:

- Implementation of the JORR in sections, or piecemeal, starting with the section with the highest traffic demand section in order to quickly generate toll revenues (the most likely candidate according to the 1999 Implementation Program is Section W2), and
- Securing of additional financing in the domestic market by either collateralizing future toll revenues or issuing bonds. Both methods are not without their problems especially when one takes into account of the impact they will have on future net income and operating expenses for fixed asset maintenance[10].

Alternative 2. Under this alternative, P.T. Jasa Marga takes advantage of a sovereign guaranteed loan that is on-lend by the appropriate Indonesian entity at flexible terms & conditions. This approach would, in principle, allow for the completion of the remaining JORR works in "one piece", thereby not only saving time, but also generating toll revenues on all completed JORR sections. This approach may also reduce the burden on the use of future P.T. Jasa Marga net income and/or any inappropriate retained earnings. JORR project risks could be hedged through an appropriate risk distribution strategy typical for public sector projects

Alternative 3. This alternative entails P.T. Jasa Marga to look aggressively for either a domestic or overseas private sector strategic partner. However, there are strong valid concerns about this approach:

(a) First, it is highly unlikely that any domestic and/or overseas private capital, even if it could be identified quickly, would enter into any long-term concession agreement in the order of thirty years without proper legislation regulation regarding the adjustment of toll road fares[11]. Passing such a law/regulation, even if political consensus on the mechanisms could be established quickly, could take around two years, and closure of the project would be impossible during this period.

(b) It is unlikely, given the huge capital investment needed, that such a domestic or overseas strategic partner could be found quickly. This is because in the case of a domestic partner, the large economically strong Indonesian business groups have not yet consolidated themselves since the crisis. As regards an overseas partner, this also seems unlikely in the short-term, due to the presently prevailing country risk factor

[8]) P.T. Jasa Marga Annual Report 1999, Statements of Income, page 98.
[9]) See Chapter 7 for details.
[10]) These issues are discussed in Chapters 7 and 8.
[11]) This issue is discussed later.

(c) An additional critical factor that hints against quick participation of potential domestic and/or overseas private capital is the unavailability of long-term financing in the Indonesian capital markets. It is essential that borrowing terms match the life span of the assets, in this case the toll road and toll road facilities for which a life-span of some 31 years is assumed (includes construction period). The longest term available now is eight to nine years for Government bonds at around 16.5 percent. Overseas private capital would have to borrow offshore in (most likely) US dollar terms and such borrowing would have to be collateralized with offshore assets of the private sector borrower. It is fair to say that this scenario seems to quite unrealistic taking all factors, such as country, foreign exchange and toll road inherent risk factors into account.

Absolute Factors. It cannot be stressed enough with respect to selecting among these scenarios that what constitutes a realistic course of action is determined to a very large extent by the JORR projects economic and financial viability (EIRR, IRR or ROI and FIRR). These essential and other related issues are discussed in detail in Chapter 7, including the results of the economic and financial viability investigation.

3.2 JORR Project Definition

It was essential for the review and assessment of the JORR project, in view of the dynamics in Indonesia's overall enabling environment and potentially conflicting positions of various Indonesian stakeholders, to ascertain the JORR project's scope or in other words the JORR's basic system configuration. Basic assumptions and related important indirect parameter were confirmed with the relevant authorities by employing a simple assumption matrix (reproduced in Appendix Figure AP 3.1).

The following components have been confirmed and constitute therefore the elements of the JORR project assessment exercise. They also constitute the major elements for base cost and subsequent investment cost calculations[12]:

1. **JORR system configuration**. The JORR remains defined, in principle, as being comprised of Sections W1, W2, S, E1, E2, E3 and N. The horizontal and vertical alignment of all sections has been confirmed
2. However, taking into account the progress achieved so far in terms of land acquisition, works and structures already completed, interconnectivity to the new Jakarta – Serpong Toll Road under construction by P.T. Jasa Marga, JORR completion time factors, anticipated problems in completing land acquisition and the need to generate toll revenues as soon as possible, the JORR segments to be covered by the financial assistance request have been confirmed as:

   W1

   W2

[12]) See Chapter 5 for the engineering aspects and Chapter 7 for the economic and financial viability considerations.

S

E1

E2

E3, and

Feeder roads Jl. Cakung Cilincing Raya, Jampea Cilincing Raya and Sulawesi (to guarantee proper excess to the JORR from the harbor area. The 1999 Implementation Program that supported the official SYL request contained in the system configuration also a 3km stretch of the new Jakarta-Serpong Toll Road identified as W2'. However, W2' has now been excluded upon the specific request of the GOI

3. Section N remains, in principle, part of the definition of the JORR. However, mainly due to anticipated problems in land acquisition, this section is to be excluded from the financial assistance request and replaced by the feeder roads referred to above. Section N is to be completed by a not yet determined point in the future
4. **Extra Works**. This cost item had to be introduced newly. It is needed for checking the design, testing existing structures and making provisions for repair or replacement of such structures.
5. **Toll collection system**. Is an integral part of the project definition.
6. **Toll road information and control system**. A "minimum" or "basic" toll road information and control system is to form an integral part of the project definition
7. **Communications system.** Forms an integral part of the project definition, and
8. **Engineering services.** They cover design and supervision services for the JORR itself and the installation, testing and supervision for the other three hardware components identified above. They form an integral part of the project definition.

All further considerations in this review and assessment exercise are based on the JORR project definition as outlined above.

Chapter 4

Socio-Economic and Toll Road Traffic Demand Profile

4. Socio-economic and Toll Road Traffic Demand Profile

4.1 Socio-economic Profile

In order to review and assess properly the results of past project viability considerations,[1] it is necessary to establish selected empirical socio-economic and traffic demand indicators at national and Jabotabek region levels that reflect to the extent possible 1997 post-crisis developments. These indicators are based either on the six-year period from 1995 to 2000, or where data for 2000 could not yet be estimated firmly, such indicators were based on the five-year period from 1995 to 1999[2].

Table 4.1.1 summarizes the national macro level key indicator, Table 4.1.2 establishes the national level road & rail transport sector indicator, Table 4.1.3 summarizes the Jabotabek level demographic and economic base data, Table 41.4 presents the selected Jabotabek road transport sector data and Table 4.1.5 the rail sector data[3].

The performance of these indicators over the indicated periods is summarized in the following actions.

4.1.1 GDP and RDP Growth

The elasticity between the national level GDP and the Jabotabek level GRDP growth ranged between factor 1.8 (highest) to factor 1.21 (lowest) for the period for which data are available. The factor was 1.46 on average.

4.1.2 Real Per Capita Movements

The elasticity between national level real per capita income growth (constant 1993 price base) and Jabotabek level real per capita income growth ranged, between factor 1.88 (highest) to factor 0.94 (lowest) for the period for which data is available. The factor was 1.40 on average.

The data suggests that, after a severe contraction in 1998[4], contraction in real per capita income halted in 1999 and positive growth started in 2000 again.

Real per capita income growth at national level is estimated at around 1.41 percent for 2000 and there may already be positive real per capita income growth in the Jabotabek region. Such trends would be fully consistent with the fact that the economic recovery has been fueled so far by consumption expenditures.

In addition, real per capita income levels in absolute terms in Jabotabek are over factor two (2) times the national average with real per capita income in Jabotabek growing faster than the national average. Real per capita contraction in Jabotabek during the crisis years was steeper than the national average. However, a reverse trend toward positive real per capita growth in Jabotabek would support the empirical data of only limited impact (in terms of duration) on growth in the vehicle fleet and traffic demand on toll roads (see below).

[1]) See Section 2.4 of Chapter 2 and Section 3.2 of Chapter 3.
[2]) See the relevant Chapters in Volume I for a comprehensive discussion on socio-economic features, impact of the financial and economic crisis, and so on. Such discussion does not need to be duplicated here.
[3]) Rail sector data are discussed in Volume I.
[4]) Real per capita income decline of –14.5 percent at national and –20.0 percent at Jabotabek level in 1998.

4.1.3 Motor Vehicle Production

Domestic motor vehicle production (excluding motorcycles), which peaked at 389,279 units in 1997, declined drastically to 58,079 units in 1998 for a negative growth rate of –85.1 percent. 1999 domestic production has grown again to 88,962 units and in 2000 to 122,639 units, thus achieving a growth rate of 111.2 percent between 1998 and 2000. The actual growth rate in production is higher than that, since year 2000 production figures are for the January to May 2000 period only.

Reliable actual sales data are not available. However, given the financial performance situation of motor vehicle manufacturers, the production data most likely reflects actual sales conditions. This is likely to be so, since companies cannot afford to produce for stock. In brief, domestic production data suggests that demand for motor vehicles is growing strongly, though from a small base.

4.1.4 Registered Motor Vehicles

The number of registered motor vehicles (including motorcycles) in the police territorial jurisdiction of DKI Jakarta[5] has grown from 3,021,166 units in 1995 to 3,909,497 units in 1999. This growth in stock is equivalent to a compound growth rate of 6.7 percent. A comparison of the structural composition of the motor vehicle stocks in 1995 and 1999 suggests a definitive trend toward increasing shares of passenger cars and motorcycles in the motor vehicle fleet composition.

The share of passenger cars in the total fleet grew from around 28.1 percent in 1995 to around 28.8 percent in 1999, equivalent to 849,939 units in 1995 and 1,125,334 units in 1999. This is equivalent to a compound growth rate of 7.3 percent for passenger car stock over the period, or 0.6 percentage points above the total growth of motor vehicle stock. The share of motorcycles[6] in the total motor vehicle stock has grown from 51.0 percent in 1995 to around 53.5 percent in 1999, equivalent to an absolute number of 1,540,825 units in 1995 and 2,092,053 units in 1999. This is equivalent to a compound growth rate of 7.95 percent over the period, or 1.25 percentage points above the growth of total motor vehicle fleet.

Growth in the bus fleet over the same period has been minimal at 0.13 percent. Hence, the share of buses in the total fleet has declined from around 10.3 percent in 1995 to roughly 8.0 percent in 1999.

The number of trucks has grown from 320,246 units in 1995 to about 380,353 units in 1999, equivalent to a compound growth rate of around 4.4 percent. The share in the total fleet has remained in a similar order of magnitude, 10.6 percent in 1995 and 9.7 percent in 1999.

[5]) Which is adopted as a proxy for the Jabotabek area as a whole.
[6]) Irrelevant for toll roads, but highly important for traffic movements and congestion levels on the road network as a whole.

Table 4.1.1 National Level Macro Data 1995 to 2000

(Unit: as indicated)

Parameter	Unit	Actual 1995	1996	1997	1998	1999 estim. *	2000 estim. *	Comments & Observations
NATIONAL MACRO LEVEL DATA								
1.) Absolute Population Size	Million people	194.8	198.3	201.4	204.4	207.4	210.5	The 1999 BPS estimate excludes the popu-
	Growth rate %	n.a.	**1.83**	**1.53**	**1.51**	**1.47**	**1.49**	lation for "Timor
2.) Gross Domestic Product - GDP	Billion Rupiah	452,380.9	532,568.0	627,695.5	1,002,333.0	1,107,291.1	**292,400.1**	**2000: first quarter only.**
(At current market prices)	Growth rate %	n.a.	**17.73**	**17.86**	**59.68**	**10.47**	**(...)**	
								The 2000 estimates are for first quarter
3.) Gross Domestic Product - GDP	Billion Rupiah	383,767.8	413,797.9	433,245.9	376,051.6	376,902.5	**96,985.6**	**only. If annualized they would result**
(At 1993 constant prices)	Growth rate %	n.a.	**7.83**	**4.7**	**-13.2**	**0.23**	**(...)**	**in 2.93% (including oil& gas). The ADB**
								estimates GDP growth for 2000 at 3.5%.
4.) Employment	Million people	80.11	n.a.	87.05	87.67	88.82	n.a.	Employment growth recorded by BPS is
	Growth rate %	n.a.	n.a.	n.a.	**0.71**	**1.31**	**(...)**	somewhat unusual for output contraction.
5.) Private consumption expenditures	Billion Rupiah	n.a.	257,016.2	277,116.1	267,912.7	271,867.3	n.a.	Private consumption and GFCF figures
(At 1993 constant prices)	Growth rate %	n.a.	n.a.	**7.82**	**-3.32**	**1.48**	**(...)**	are not yet available.
6.) GFCF	Billion Rupiah	n.a.	128,698.6	139,725.5	90,070.8	71,351.4	n.a.	
(At 1993 constant prices)	Growth rate %	n.a.	n.a.	**8.57**	**-35.54**	**-20.78**	**(...)**	
7.) Export Value	Billion Rupiah	n.a.	112,391.4	121,157.9	134,707.2	91,517.6	n.a.	Export & import values are available
(At 1993 constant prices)	Growth rate %	n.a.	n.a.	**7.80**	**11.18**	**-32.06**	**(...)**	the first quarter 2000. However,
8.) Import Value	Billion Rupiah	n.a.	121,862.8	139,796.1	132,400.7	78,252.3	n.a.	annualisation is difficult, due to different
(At 1993 constant prices)	Growth rate %	n.a.	n.a.	**14.72**	**-5.29**	**-40.9**	**(...)**	statistical format.
9.) Inflation	%	n.a.	6.47	11.05	77.63	2.01	**4.18**	**The 2000 estimation is annualized based**
								on 44 cities' in Indonesia.
10.) Per Capita Income '93 const.prices	Rupiahs	1,970,061	2,086,727	2,151,171	1,839,783	1,817,273	1,842,957	**Figures for 2000 are based on annualized**
	Growth rate %	n.a.	**5.92**	**3,09**	**-14.48**	**-1.22**	**1.41**	**GDP and population estimation.**

Source: Compilation by JICA Study Team.

Notes: 1) National level GDP data for 1995 are from "Statistics during 50 years Indonesian Independence"; BPS, Jakarta 1997. The data for the period 1996 to 1999 are from Yearbook 1999"; BPS; Jakarta; 2000. GDP for 1999 and 2000 are estimated by BPS. The year 2000 figure is for the first quarter only. GDP figures include oil & gas.

2) Population size data at national level are from "Statistical Yearbook of Indonesia 1999"; BPS, Jakarta, 2000. Data for 1995 are based on 1995 intercensal population 2000 population size data are based on BPS projections for the period 2000 to 2005; "Indikator Ekonomi"; BPS; Jakarta; Juli 2000.

3) Employment data are from "Statistical Yearbook of Indonesia 1999"; BPS; Jakarta; 2000.

4) Private consumption, GFCF, export and import values and inflation data for the period 1996 to 1999 are from "Statistical Yearbook of Indonesia 1999", BPS, Jakarta 2000. Data for the first quarter of 2000, where available, are from "Indikator Ekonomi", Juli 2000; BPS, Jakarta, 2000.

5.) Per capita income has been computed using parameter 1.) and 3.) data identified in this table.

n.a. = not (or not yet) available.

(…) Cannot be calculated, due to uncertainty of available data.

Table 4.1.2 National Level Road & Rail Transport Sector Data 1995 to 2000

(Unit: as indicated)

Parameter	Unit	Actual 1995	1996	1997	1998	1999 estim. *	2000 estim. *	Comments & Observations
NATIONAL LEVEL ROAD & RAIL TRANSPORT SECTOR DATA								
1.) Domestically assembled motor vehicles	Units	1,430,479	1,750,867	2,250,390	577,483	660,915	n.a.	
Jeeps	Units	6,079	5,598	4,081	1,257	1,287	n.a.	
Passenger cars	Units	39,839	35,303	55,102	8,401	5,974	n.a.	
Pick up	Units	275,552	220,681	267,367	43,194	69,454	n.a.	
Buses	Units	48,020	52,761	49,958	4,699	10,435	n.a.	
Trucks	Units	18,051	11,151	12,771	528	1,812	n.a.	
Motorcycles	Units	1,042,938	1,425,373	1,861,111	519,404	571,953	n.a.	
Sub-total 4-wheelers	Units	387,541	325,494	389,279	58,079	88,962	**122,639**	**Year 2000 data for 5 months only.**
2.) Imports of motor vehicles	units	20,895	33,432	38,946	17,173	4,128	n.a.	**See footnote 4.) for explanations.**
3.) TOTAL	Units	1,451,374	1,784,299	2,289,336	594,656	665,043	n.a.	
4.) Traffic volume toll roads	"000" vehicles/y	518,094	591,247	727,013	674,880	738,820	n.a.	
5.) Toll revenues by PT Jasa Marga	Million Rupiah	375,203	431,264	496,187	467,636	515,769	n.a.	
6.) Railway [Passenger-km]	Million	15,524	15,224	16,389	16,140	18,585	**8,326**	**2000 data are for 5 months only. If**
	Growth rate %	**23.07**	**-1.93**	**7.65**	**-1.52**	**15,15**	**(…)**	**annualized, total would be 19,982.**
7.) Railway [ton-km]	Million	4,174	4,700	8,213	4,960	5,035	**1,997**	**2000 data are for 5 months only. If**
	Growth rate %	**8.30**	**12.60**	**74.74**	**-39.61**	**1.51**	**(…)**	**annualized, total would be 4,793.**

Source: Compilation by JICA Study Team.

Notes: 1) Domestically assembled motor vehicles and motor vehicle imports are from "Statistical Yearbook of Indonesia 1999"; BPS; Jakarta, 2000.

2) Traffic volume on & toll revenues from toll roads (national level) are from "Annual Report 1999"; PT Jasa Marga (Persero).

3) The category "pick up" is likely to include Kijangs.

4.) Domestic vehicle production data for the period January to May 2000 from GAIKINDO database. If annualized they would amount to some 295,000 units, equivalent to a growth rate of 332% as against 1999 production levels. It is not possible to obtain actual sales data. However, giving economic circumstances, it is reasonable to assume that actual domestic production data are close to sales data For domestically produced vehicles, since on-stock production is likely to be minimal.

n.a. = not (or not yet) available.

(…) Cannot be calculated, due to uncertainty of available data.

Table 4.1.3 Jabotabek Level Demographic & Economic Base Data 1995 to 2000

(Unit: as indicated)

Parameter	Area	Unit	Actual 1995	1996	1997	1998	1999	2000	Comments
JABOTABEK LEVEL DEMOGRAPHIC & ECONOMIC BASE DATA									
1.) Absolute Population Size	**DKI Jakarta**	Million people	9.113	9.272	9.434	9.599	9.767	8.300	**See footnote 2).**
	Bogor	Million people	4.200	4.303	4.409	4.517	4.628	4.742	
	Tangerang	Million people	3.589	3.741	3.900	4.065	4.237	4.417	
	Bekasi	Million people	2.757	2.862	2.972	3.085	3.203	3.325	
	Botabek	Million people	10.546	10.906	11.281	11.667	12.068	12.484	
	Jabotabek	Million people	19.659	20.178	20.715	21.266	21.835	20.784	
2.) Gross Regional Domestic Product	**DKI Jakarta**	Billion Rupiah	60,648.7	66,164.8	69,543.3	57,283.5	56,638.2	n.a.	
(GRDP at 1993 constant prices)		Growth rate %	n.a.	**9.10**	**5.11**	**-17.63**	**-1.13**	**(...)**	
	Botabek	Billion Rupiah	21,311.10	27,327.10	29,232.10	23,816.60	n.a.	n.a.	
		Growth rate %	n.a.	**28.23**	**6.97**	**-18.53**	**(...)**	**(...)**	
	Jabotabek	Billion Rupiah	81,959.8	93,491.9	98,775.4	81,100.1	n.a.	n.a.	
		Growth rate %	n.a.	**14.1**	**5.7**	**-17.9**	**(...)**	**(...)**	
3.) Employment	**DKI Jakarta**	Million people	3.222	n.a.	n.a.	n.a.	n.a.	n.a.	
		Growth rate %	n.a.	**(...)**	**(...)**	**(...)**	**(...)**	**(...)**	
	Botabek	Million people	3.721	n.a.	n.a.	n.a.	n.a.	n.a.	
		Growth rate %	n.a.	**(...)**	**(...)**	**(...)**	**(...)**	**(...)**	
	Jabotabek	Million people	6.943	n.a.	n.a.	n.a.	n.a.	n.a.	
		Growth rate %	n.a.	**(...)**	**(...)**	**(...)**	**(...)**	**(...)**	
	DKI Jakarta	Rupiah	6,655,185	7,135,979	7,371,560	5,967,653	5,798,935	**(...)**	
4.) Per Capita Income '93 const.prices		Growth rate %	n.a.	**7.22**	**3.30**	**-19.04**	**-2.83**	**(...)**	
	Botabek	Rupiah	7,771,648	8,572,520	8,755,908	6,951,239	**(...)**	**(...)**	
		Growth rate %	n.a.	**10.31**	**2.14**	**-20.61**	**(...)**	**(...)**	
	Jabotabek	Rupiah	4,169,073	4,633,358	4,768,303	3,813,604	**(...)**	**(...)**	
		Growth rate %	n.a.	**11.14**	**2.91**	**-20.02**	**(...)**	**(...)**	

Source: Compilation by JICA Study Team.

Notes: 1) Absolute population size data are based on 1995 census data, projected based on adopted Jabotabek Demographic Framework.

2) Absolute population size data for DKI Jakarta for 2000 are based on preliminary results of the PBS population census.

3) GRDP and employment data are from Tables 2.10, 2.16 and 2.18, Interim Report. GRDP data for DKI Jakarta for 1999 are from BPS.

n.a. = not (or not yet) available. (…) Cannot be calculated, due to uncertainty of available data.

Table 4.1.4 Jabotabek Road Transport Sector Data 1995 to 2000

(Unit: as indicated)

Parameter		Unit	Actual 1995	1996	1997	1998	1999	2000	Comments
JABOTABEK ROAD TRANSPORT SECTOR DATA									
1.) Registered motor vehicles by police territorial jurisdiction DKI Jakarta		Units	3,021,166	3,397,770	3,842,785	3,876,563	3,909,497	n.a.	
		Growth rate %	**12.53**	**12.47**	**13.10**	**0.88**	**0.85**	**(...)**	
Passenger cars		Units	849,939	967,229	1,095,170	1,107,087	1,125,334	n.a.	
		Growth rate %	**12.77**	**13.80**	**13.23**	**1.09**	**1.65**	**(...)**	
Buses		Units	310,128	310,636	311,471	311,890	311,755	n.a.	
		Growth rate %	**5.81**	**0.16**	**0.27**	**0.13**	**-0.04**	**(...)**	
Trucks		Units	320,246	344,730	380,788	379,605	380,353	n.a.	
		Growth rate %	**9.24**	**7.65**	**10.46**	**-0.31**	**0.20**	**(...)**	
Motorcycles		Units	1,540,825	1,775,153	2,055,332	2,077,980	2,092,053	n.a.	
		Growth rate %	**14.58**	**15.21**	**15.78**	**1.10**	**0.68**	**(...)**	
2.) Average Annual Traffic Volume on Jabotabek Toll Roads (Vehicle Type I, IIA & IIB)	**Jagorawi**	Vehicles	1,975,677	2,186,421	2,539,441	2,434,918	2,616,276	925,504	2000: for Jan.;Feb. March; May only.
		Growth in %	n.a.	**10.67**	**16.15**	**-4.12**	**7.45**	**(...)**	
	Jakarta-Cikampek	Vehicles	2,309,116	2,435,293	3,021,417	2,846,940	3,026,092	1,076,437	2000: for Jan.;Feb. March; May only.
		Growth in %	n.a.	**5.46**	**24.07**	**-5.77**	**6.29**	**(...)**	
	Jakarta-Merak	Vehicles	1,779,504	1,988,650	2,237,870	2,345,771	2,571,476	925,382	2000: for Jan.;Feb. March; May only.
		Growth in %	n.a.	**11.75**	**12.53**	**4.82**	**9.62**	**(...)**	
	Cawang-Tomang	Vehicles	2,386,419	2,387,677	2,545,239	2,316,225	2,578,656	747,764	2000: for Jan.;Feb. March; May only.
		Growth in %	n.a.	**0.05**	**6.60**	**-9.00**	**11.33**	**(...)**	
	Cawang-Tg.Priok	Vehicles	739,667	1,026,615	1,388,256	1,225,304	1,425,389	521,242	2000: for Jan.;Feb. March; May only.
		Growth in %	n.a.	**38.79**	**35.23**	**-11.74**	**16.33**	**(...)**	
	Intraurban Tollway	Vehicles	3,126,404	3,414,292	3,933,492	3,541,528	4,004,043	1,450,424	2000: for Jan.;Feb. March; May only.
		Growth in %	n.a.	**9.21**	**15.21**	**-9.96**	**13.06**	**(...)**	
	Cengkareng	Vehicles	361,065	425,598	495,090	381,910	422,535	160,007	2000: for Jan.;Feb. March; May only.
		Growth in %	n.a.	**17.87**	**16.33**	**-22.86**	**10.64**	**(...)**	
	Kapuk	Vehicles	0	274,648	667,372	560,067	646,279	244,765	2000: for Jan.;Feb. March; May only.
		Growth in %	n.a.	n.a.	**142.99**	**-16.08**	**15.39**	**(...)**	
	TOTAL	Vehicles	9,551,448	10,724,902	12,894,685	###########	13,286,703	4,601,101	2000: for Jan.;Feb. March; May only.
		Growth in %	n.a.	**12.29**	**20.23**	**-6.08**	**9.71**	**(...)**	

Source: Compilation by JICA Study Team, based on PT Jasa Marga monthly traffic volume reports.

Notes: n.a. = not (or not yet) available. (…) Cannot be calculated, due to uncertainty of available data.

Table 4.1.5 Jabotabek Rail Transport Sector Data 1995 to 2000

(Unit: as indicated)

Parameter	Unit	Actual 1995	1996	1997	1998	1999	2000	Comments
JABOTABEK RAIL TRANSPORT SECTOR DATA								
1.) Rail Passenger Traffic Originating in DAOP1								
Long/Medium Distance Trains								
Number of Passengers	Thousand	8.414	8.117	8.545	8.758	9.854	**5.156**	2000: Jan.to June only.
	Growth in %	**10.61**	**-3.53**	**5.27**	**2.49**	**12.51**	**(...)**	
Passenger-km	Million	4.046	3.883	3.865	4.120	4.508	**2.323**	2000: Jan.to June only.
	Growth in %	**12.14**	**-4.03**	**-0.46**	**6.60**	**9.42**	**(...)**	
Local Economy Trains								
Number of Passengers	thousand	10.408	10.518	11.346	14.162	13.991	**7.608**	2000: Jan. to June only.
	Growth in %	**27.00**	**1.06**	**7.87**	**24.82**	**-1.21**	**(...)**	
Passenger-km	Million	379	431	457	528	627	350	2000: Jan.to June only.
	Growth in %	**36.33**	**13.72**	**6.03**	**15.54**	**18.75**	**(...)**	
Jabotabek Commuter Trains								
Number of Passengers	Thousand	85.378	100.008	104.074	107.899	117.670	59.816	2000: Jan.to June only.
	Growth in %	**30.06**	**17.14**	**4.07**	**3.68**	**9.06**	**(...)**	
Passenger-km	Million	2.948	3.154	3.307	3.285	n.a.	n.a.	2000: Jan.to June only.
	Growth in %	**31.31**	**6.99**	**4.85**	**-0.67**	**n.a.**	**(...)**	

Source: Compilation by JICA Study Team, based on DAOP1 data and reflecting "ticket sales" only.

Notes: n.a. = not (or not yet) available. (…) Cannot be calculated, due to uncertainty of available data.

It can be concluded that growth of the total motor vehicle fleet continues in spite of the financial and economic crisis, though the growth rate has slowed down. Such growth was driven mainly by the growth in the stock of motorcycles and passenger cars. Hence, congestion levels are unlikely to go down, though there may be relative shifts in the locations where such congestion occurs.

4.1.5 Traffic Volume on Jabotabek Toll Roads

Monthly traffic volume data collected by P.T. Jasa Marga indicate that the volume of vehicles on Jabotabek toll roads has increased from 9,551,448 vehicles (vehicle type GOL I, IIA and IIB) in 1995 to around 13,286,703 vehicles in 1999. Thus, the compound growth rate of vehicles (all allowed vehicle types) using the Jabotabek toll roads is around 8.6 percent over the period. The only year of traffic volume contraction on the toll roads was 1998, when the volume declined by around –6.1 percent compared to the 1997 level.

Traffic data for January, February, March and May in 2000 indicate a volume of 4,601,101 for these 4 months. If annualized, and disregarding any seasonal fluctuations, this would amount to an estimated total traffic volume of 13,803,303 vehicles in 2000, or a growth rate of 3.9 percent compared to 1999.

In summary, the traffic volume on Jabotabek toll roads is growing, in spite of the financial and economic crisis, although the pace has slowed down somewhat.

4.2 Future Vehicle Trip Patterns

Trip generation models were applied to forecast future levels of Jabotabek region demand for each zone, using as input the forecast distributions of the respective socio-economic and demographic variables[7]. Subsequent to trip distribution and modal split model application, vehicular matrices were synthesized and established for the base and planning years. Table 4.2.1 provides a summary of the total vehicle trip demand for 2000, 2005 and 2015; while Table 4.2.2 presents the implied average annual growth rates.

The results of the vehicle trip demand analysis suggest that the total Jabotabek motorized trips could grow from around 5.6 million vehicles per day in 2000 to 7.2 million and 12 million vehicles per day in 2005 and 2015, respectively. Vehicle trips are expected over the 15 year period to be more than double. The 'car' trip is expected to continue its dominant role, accounting for more than half of the total trips in 2015. The vast majority of Jabotabek trips have now at least one trip end in DKI Jakarta, a pattern that is expected to continue in the future.

Table 4.2.2 indicates a projected growth in vehicle trip demand of around 5 percent p.a. for the whole Jabotabek region over the 2000-2005 period. This growth is roughly within the corridor of vehicle ownership growth and per-capita income growth as indicated in Figure 4.2.1.

[7] Detailed zonal level summaries of the planning year trip ends are reported in a separate Working Paper, together with the forecast socioeconomic data from which these forecasts were prepared.

Table 4.2.1 Jabotabek Vehicle Trip Demand 2000-2005-2015

Total Vehicle Trips 2000 (veh/day)

	Motorcycle	*Car*	*Bus*	*Truck*	*Total*
Jabotabek	1,834,104	2,957,723	483,095	354,930	5,629,852
From DKI	1,160,993	1,973,751	305,574	243,855	3,684,173
From Botabek	669,376	962,309	176,800	75,384	1,883,869
Inside DKI	989,701	1,707,521	264,195	184,569	3,145,986
Inside Botabek	495,350	705,482	134,535	33,223	1,368,590
DKI-Botabek	341,584	501,845	82,954	69,131	995,514

Total Vehicle Trips 2005 (veh/day)

	Motorcycle	*Car*	*Bus*	*Truck*	*Total*
Jabotabek	2,324,492	3,867,637	614,869	416,740	7,223,738
From DKI	1,379,662	2,434,944	365,279	284,251	4,464,136
From Botabek	943,435	1,420,822	249,322	92,149	2,705,728
Inside DKI	1,148,185	2,073,533	308,627	214,532	3,744,877
Inside Botabek	715,778	1,075,638	193,518	43,122	2,028,056
DKI-Botabek	457,743	694,994	112,202	82,417	1,347,356

Total Vehicle Trips 2015 (veh/day)

	Motorcycle	*Car*	*Bus*	*Truck*	*Total*
Jabotabek	3,720,128	6,471,873	984,548	735,253	11,911,802
From DKI	2,082,550	3,851,096	550,826	504,363	6,988,835
From Botabek	1,629,813	2,575,741	432,223	156,690	4,794,467
Inside DKI	1,689,956	3,203,884	453,941	381,109	5,728,890
Inside Botabek	1,247,600	1,971,599	337,469	71,962	3,628,630
DKI-Botabek	767,040	1,207,259	190,209	140,795	2,305,303

Source: JICA Study Team
Note : - Car includes passenger cars, vans, taxis, and jeeps. Bus includes small, medium and large buses
Truck includes pick-ups and all trucks
- "From" DKI/Botabek means trips with at least one trip-end inside the region
- "Inside" DKI/Botabek means trips with both trip ends inside the region

Table 4.2.2 Vehicle Trip Demand Growth 2000-2005-2015

Vehicle Growth '00-'05 (% p.a.)

	Motorcycle	*Car*	*Bus*
Jabotabek	4.9%	5.5%	4.9%
From DKI	3.5%	4.3%	3.6%
From Botabek	7.1%	8.1%	7.1%
Inside DKI	3.0%	4.0%	3.2%
Inside Botabek	7.6%	8.8%	7.5%
DKI-Botabek	6.0%	6.7%	6.2%

Vehicle Growth '00-'15 (% p.a.)

	Motorcycle	*Car*	*Bus*
Jabotabek	4.8%	5.4%	4.9%
From DKI	4.0%	4.6%	4.0%
From Botabek	6.1%	6.8%	6.1%
Inside DKI	3.6%	4.3%	3.7%
Inside Botabek	6.4%	7.1%	6.3%
DKI-Botabek	5.5%	6.0%	5.7%

Source: JICA Study Team

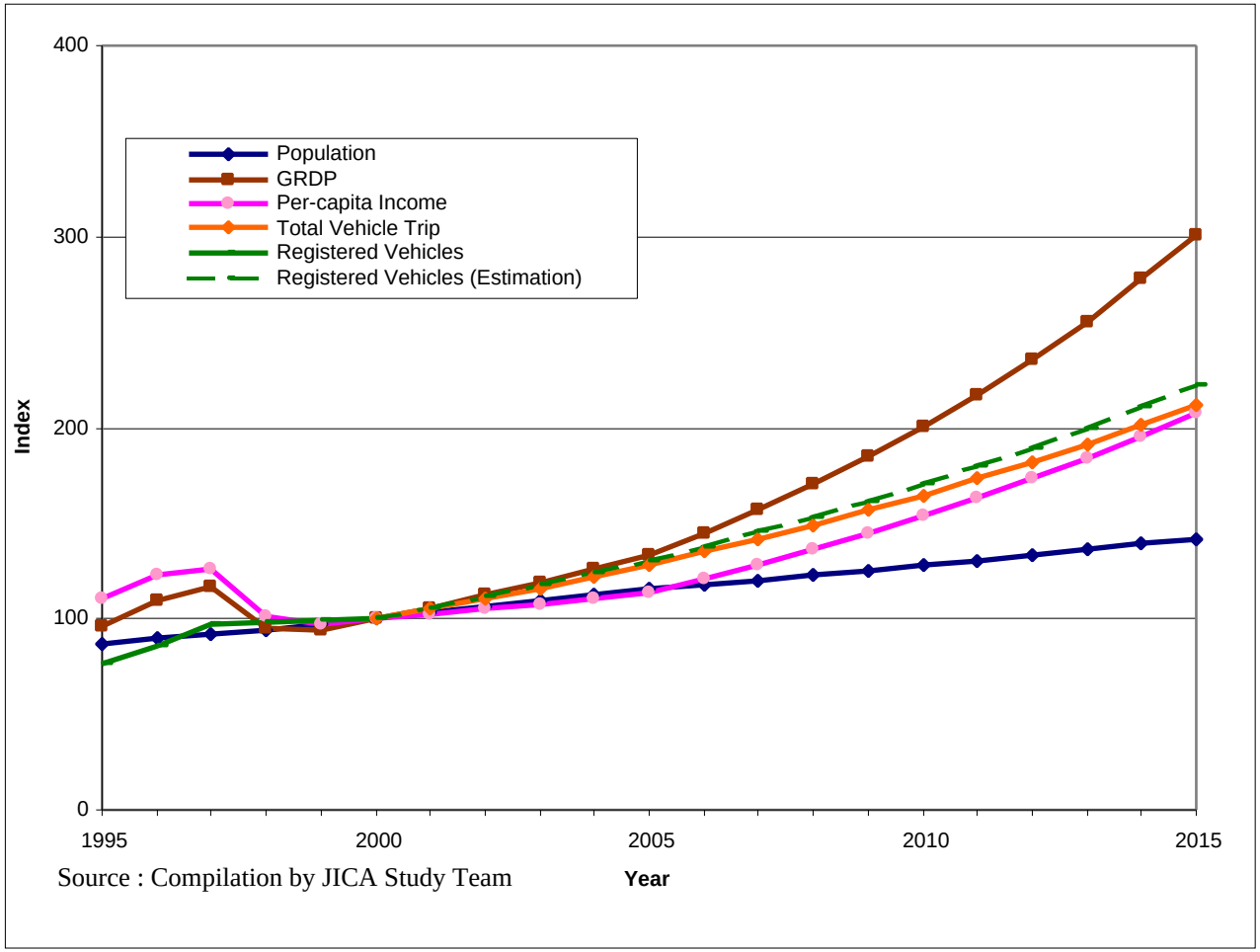

Figure 4.2.1 Jabotabek Sosio-Economic and Traffic Growth Comparison
(Indexed to Year 2000)

Botabek-related trips are forecast to have trip demand growths which are higher than those for DKI Jakarta. These differential growth rates are a direct reflection of the increasing activities within the Botabek area as well as the continued interaction between DKI Jakarta and Botabek.

Trip matrices were forecast for each of the design years; internal study area travel demand was prepared using the calibrated trip distribution models and separately modeled external trips were added to the internal trips to create total 2000, 2005 and 2015 vehicle trip matrices. These were converted to equivalent pcu matrices, that formed the basis for estimating travel demand.

The expected growth of traffic demand related to Botabek, which do not necessarily pass the central part of Jakarta, would augment the importance of the JORR because it will provide detour route for these trips.

4.3 Projected JORR Demand 2005 and 2015

4.3.1 Network Development

An important function of the transport model is the allocation of zone-to-zone movements to roadway facilities and to chosen routes. The road network encompasses a number of essential elements which include, in the most generic sense, arterial and tollway components. Each system will vary over time. Future year networks are thus based on the 2000 network adjusted by planned road improvements and new constructions; the arterial system in accordance with development plans promulgated by each local government in Jabotabek; and the tollway system in line with the probable schedule of implementation.

The following three networks were utilized for traffic demand forecasting on the road network in the Study area:

1. The 2000 network comprising of existing principal road facilities within Jabotabek,
2. The 2005 network encompassing the 2000 network and the inclusion of the Jakarta Outer Ring Road system; and
3. The 2015 network based on the DKI 2010 Plan and Botabek region road development plans as indicated in the respective master plans.

4.3.2 Projected Demand

The utilization of Jabotabek road facilities is, in line with increasing trip demand, expected to intensify in the future. Study area pcu-kilometers of travel are forecast to grow to 112.6 million in 2005 and 198.5 million by 2015. In other words, total trip activity by all road-based modes of transport is likely to almost double in a decade. The importance of higher-order, freeway-class roads in meeting this demand is indisputable.

The Jakarta Outer Ring Road Tollway is expected to absorb in future a considerable amount of traffic volume. Total on-ramp volume may reach around 465,000 vehicles per day in 2005 and it still continues to grow to 678,000 vehicles per day in 2015 (Table 4.3.1 and Figure 4.3.1). Interchanges in Section S are expected to evolve as the most heavily utilized ramps with demand increasing

from year 2000 level of around 78,000 vehicles per day to around 150,000 and 210,000 vehicles per day in the years 2005 and 2015 respectively. The dominant user population of these ramps is likely to be GoI-I vehicle class, similar to the present pattern.

Graphical representation of traffic loading in the area encircled by the Jakarta Outer Ring Road is presented in Figures 4.3.2 and 4.3.3 Despite the addition of arterial road networks, the 2015 loading is shown as being very congested in the majority of the principal roads.

Table 4.3.1 JORR On-Ramp Traffic Volume

Year	Section	On-Ramp Traffic Volume (veh/day) Total	GoI I	GoI IIA	GoI IIB
2005	W1	89,461	84,094	3,578	1,789
	W2	67,086	65,743	672	672
	S	149,587	146,596	1,496	1,496
	E1	55,963	54,844	558	558
	E2	74,088	63,716	7,409	2,963
	E3	28,924	16,486	1,446	10,992
	Total	***465,109***			
2015	W1	116,060	109,097	4,642	2,321
	W2	101,636	99,603	1,016	1,016
	S	208,502	204,331	2,084	2,084
	E1	94,250	92,364	942	942
	E2	98,613	84,807	9,861	3,945
	E3	59,566	33,953	2,978	22,635
	Total	***678,627***			

Source : JICA Study Team

Table 4.3.2 JORR Sectional Traffic Volume

Section	Average Sectional Volume (pcu/day - two way) Yr 2005	Yr 2015
W1	55,975	76,585
W2	39,831	63,214
S	71,339	108,203
E1	21,738	44,649
E2	62,080	89,567
E3	48,928	85,337

Source : JICA Study Team

Section S, is also forecast to carry the highest traffic volume of all JORR sections, with an average sectional volume of almost 71,000 and 108,000 pcu per day both ways in 2005 and 2015 respectively. The other JORR sections' volume in 2005 range between 21,000 and 62,000 pcu per day two way, while in the year 2015 the range would be between 44,600 to 89,500 pcu per day for both directions (Table 4.3.2 and Figure 4.3.4). The projected sectional volumes suggest that up to the year 2015 demand can, in principle, generally be adequately accommodated by a six-lane cross section.

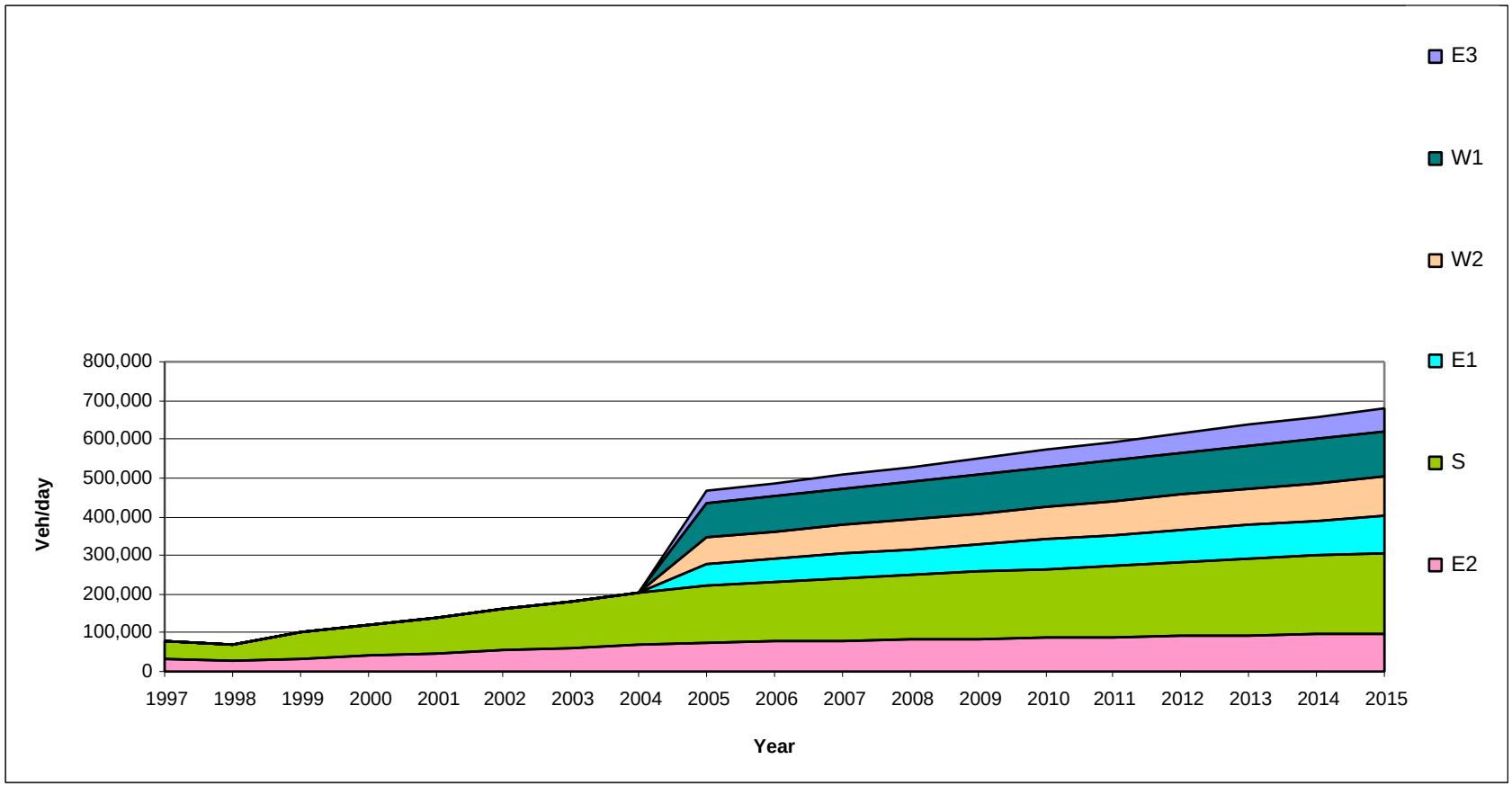

Figure 4.3.1 JORR Forecast On Ramp Volumes

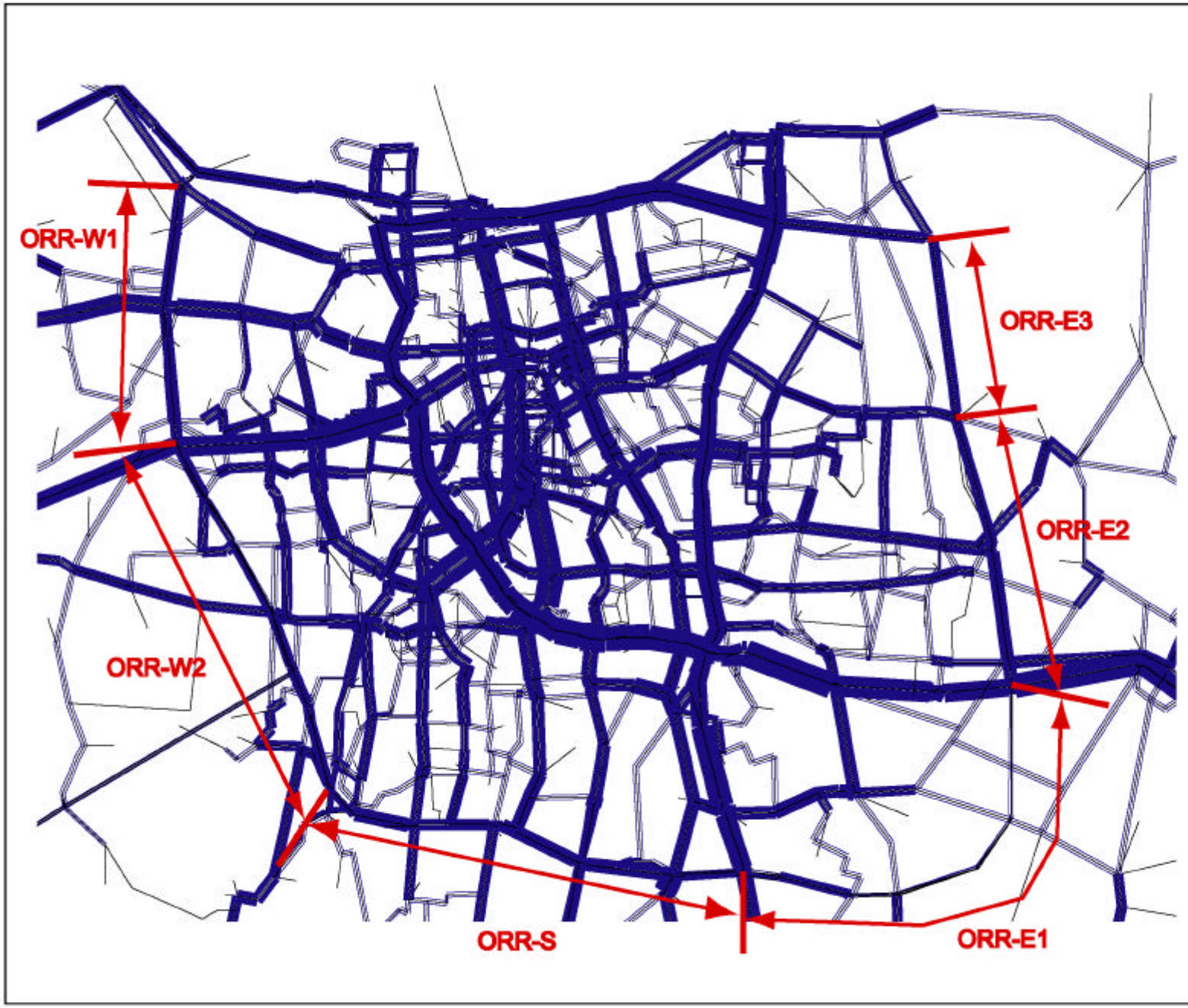

Figure 4.3.2
Traffic Assignment 2005

LEGEND

Unit:pcu/day/dir

10,000 30,000 50,000

SITRAMP JABOTABEK

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for JABOTABEK
(Phase I)

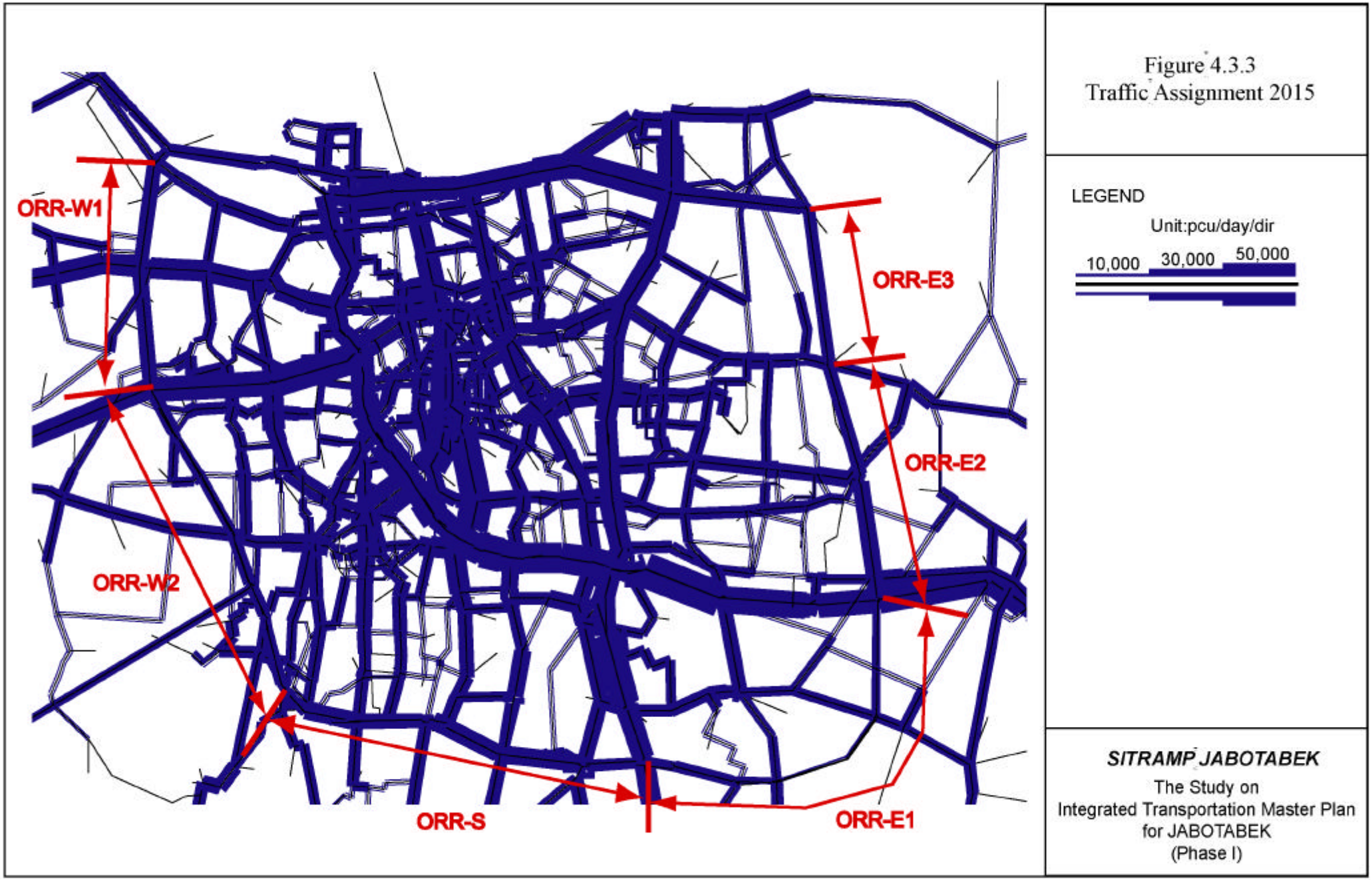

Figure 4.3.3
Traffic Assignment 2015

LEGEND

Unit:pcu/day/dir

10,000 30,000 50,000

SITRAMP JABOTABEK

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for JABOTABEK
(Phase I)

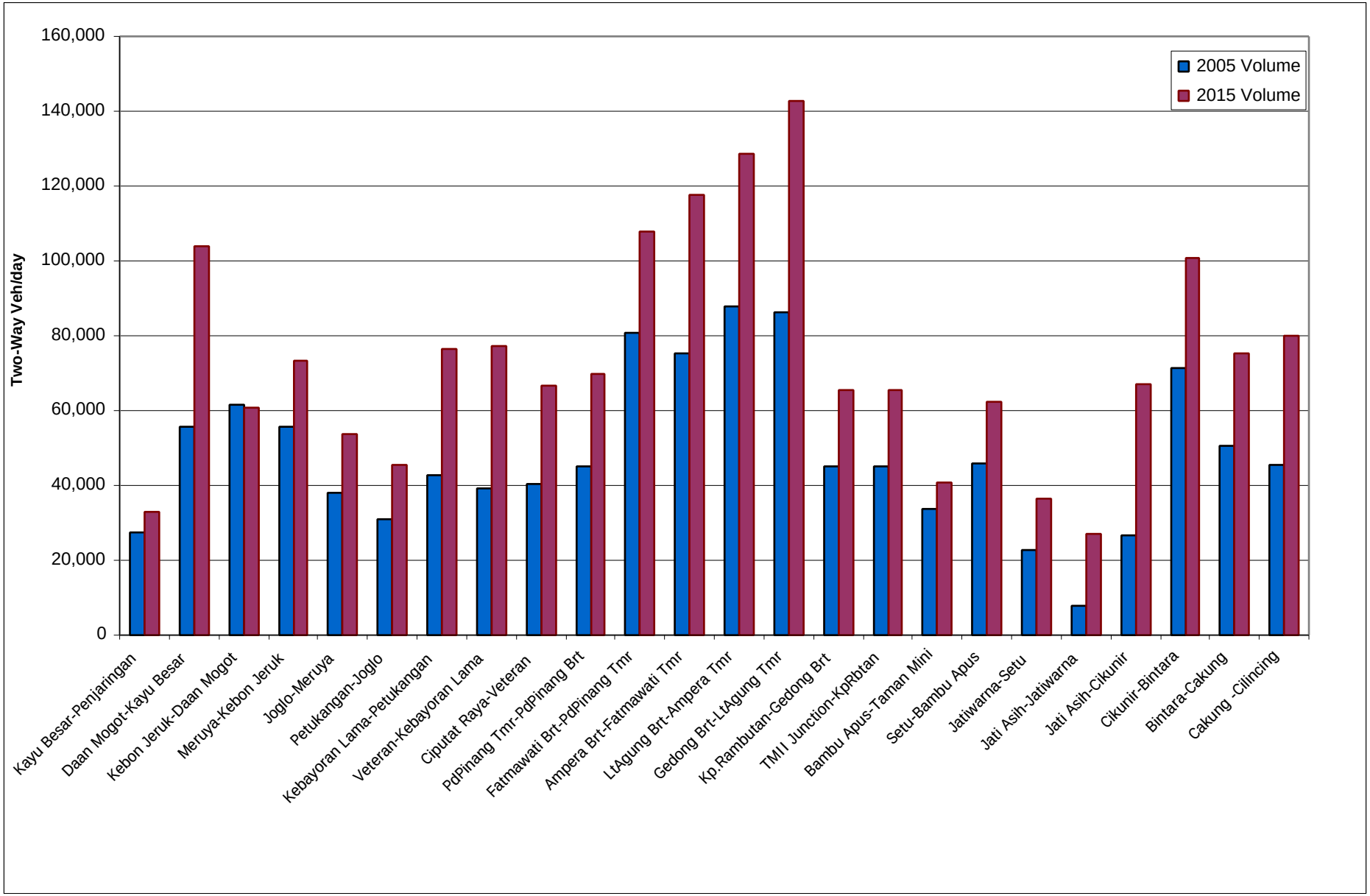

Figure 4.3.4 JORR Estimated Daily Section Flows

4.3.3 Necessity for Further Analysis on Toll Collecting System[8]

As was the case found in other JORR studies conducted in the past, traffic demand projection mentioned in section 4.3.2 above was forecast under the assumption that a closed toll collection system with distance proportional toll rate (i.e. the system currently operational in JORR sections S and E2) is applied to all future JORR sections.

The basic premise for the adoption of the distance proportional tariff was that this system would entail a fair treatment to tollway users, as drivers only pay for the distance traveled. However, it is apparent that without proper integration between JORR and the Jakarta Intra Urban Tollroad (JIUT), it would be difficult to expect an optimum distribution of traffic throughout the available tollway system.

Within the context of metropolitan Jabotabek transportation system, JORR is expected to bear the responsibility of satisfying both regional and urban travel functions. The facility must serve as a connector between regional tollways, offer linkage potential between regional and urban tollways, provide a bypass route for Jakarta and concurrently absorb shorter distance intra urban trips between activity presences located along Jakarta's periphery.

Results of traffic demand projection employing a closed system (see section 4.3.2) show that a considerable amount of traffic is absorbed by JORR, thereby relieving JIUT and the surrounding arterial roads from an excessive traffic loading. It is worth noting, however, that unexpected competition between JORR and the existing toll facilities could happen if tariff difference between parallel sections is too high. Such a situation is seen in section E1 of JORR (see Figure 4.3.2 and 4.3.3), whereby drivers opt to using the cheaper sections of Jakarta-Cikampek and Jagorawi tollroads rather than through JORR section E1. An equitable toll system is therefore necessary to ensure the effective function of JORR.

Current plans call for an evolution of toll structure into two cohesive system:

- The Jakarta Intra Urban Tollway (JIUT) will continue as a flat toll system, and
- All other tollroads (i.e. JORR and related regional tollroads) are likely to transition to an integrated system, either flat or distance proportional system, possibly with a uniform toll rate.

As a test case to examine traffic behavior towards different toll collection systems, an additional traffic demand projection was undertaken assuming a "double flat tariff system" for JORR. Under this system, both JORR and JIUT are assumed to employ a flat tariff at a certain toll rate. Prediction of the suitable toll rate for each tollway system is tricky, as it involves many factors. For presentation purposes, however, a similar toll rate of Rp. 3,000 per entry is adopted for both JORR and JIUT. Result of this exercise is presented in Figure 4.3.5 and 4.3.6 for the years 2005 and 2015 respectively.

[8]) See also Section 5.3.2 for further discussion on toll collection system.

Figure 4.3.5
Traffic Assignment 2005
Double Flat Tariff System

LEGEND

Unit : pcu/day/dir

10,000 30,000 50,000

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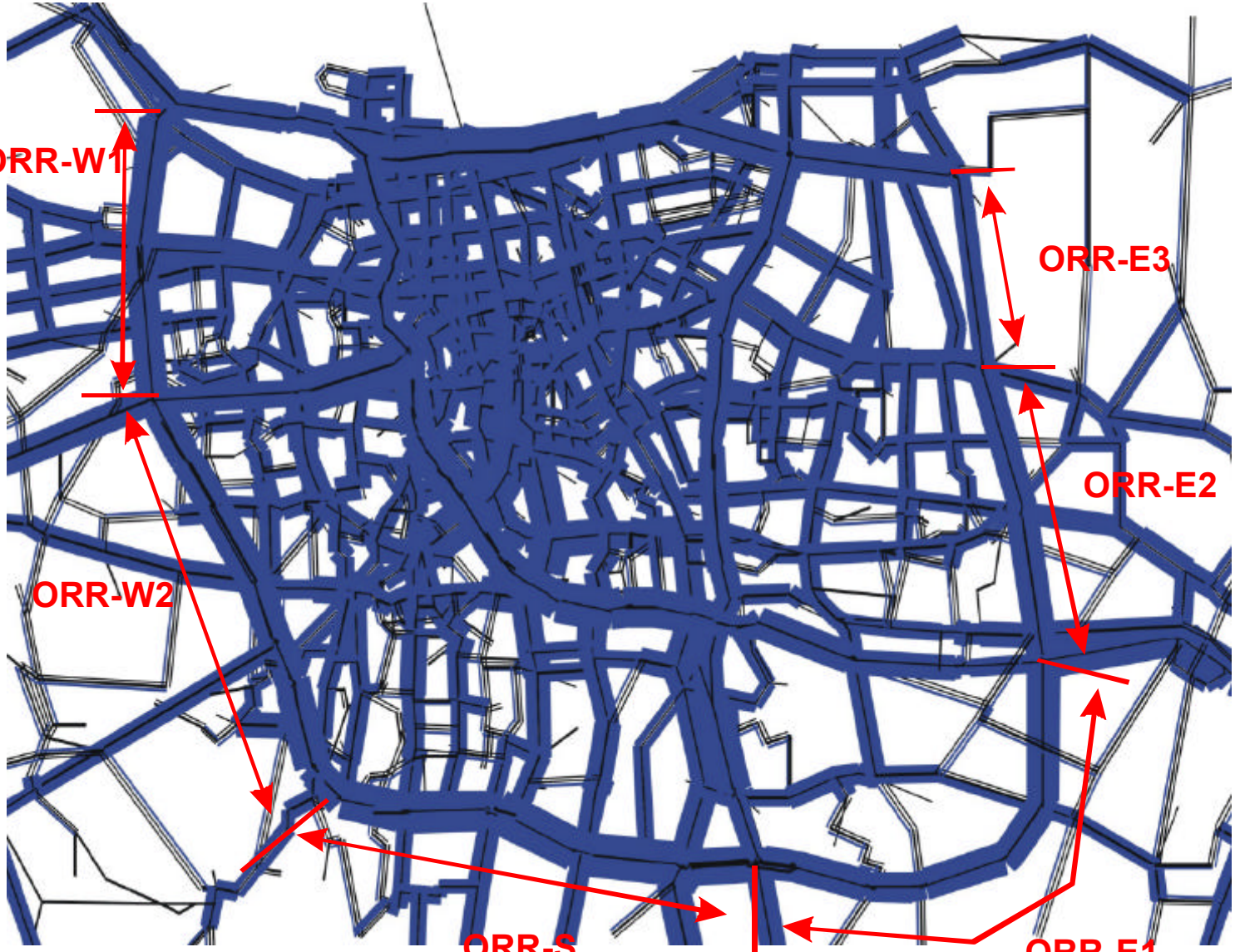

Figure 4.3.6
Traffic Assignment 2015
Double Flat Tariff System

LEGEND

Unit : pcu/day/dir

10,000 30,000 50,000

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As shown in Figure 4.3.5 and 4.3.6, the application of a Rp. 3,000 flat tariff on the entire stretch of JORR brings about relatively better utilization of JORR in terms of total traffic. Although drivers traveling short distances might avoid using JORR, the average trip length on JORR would become longer since drivers traveling long distances are attracted to use JORR because of relative benefit they could enjoy compared to competing routes. This has resulted in higher cross-sectional traffic volume. Under this system, Section E1 of JORR, for example, could attract much higher cross sectional traffic if compared to the closed system.

Needless to say that toll rate settings play an important role to achieve desirable traffic volume of JORR. While an Rp 3,000 flat tariff might produce better traffic, the net revenue collected from such a toll rate is not necessarily better than, for example, if the tariff is doubled or if a distance proportional tariff is adopted.

Thus, selection of the most suitable toll collection system is understandably not solely based on traffic demand. Factors influencing system selection could include, among others:

- Whether JORR will be implemented as “piece meal” or “single entity”;
- The availability of traffic control and tollway information system;
- Physical effects to tollway construction including toll related facilities;
- Financial effects to total revenue;
- Impact to overall road network in Jabotabek;
- Legal matters, and so forth.

To response to this challenge, a more in-depth examination is required through investigative, yet practical, approaches given the overall level of financial risk inherent to the project. It is concurrently recognized that the complexity of the project requires the formation of unique arrangements and fiscal/operational techniques to include cross-jurisdictional agreements, negotiated rates, pre-agreed settlements, cooperative ventures and potential sources of financing the project.

Comprehensive finalization of these items at this study review level is not expected, given the understandable difficulties of all parties involved to enter into fixed agreements at such tentative juncture. Nevertheless, findings from the current analysis permit the formation of a realistic framework within which the current financial analysis is performed.