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MINISTRY OF COMMUNICATIONS

THE REPUBLIC OF INDONESIA

NO. 82

THE STUDY ON THE MASTER PLAN OF CONTAINER CARGO HANDOLING PORTS, DRY PORTS AND CONNECTING RAILWAYS IN THE REPUBLIC OF INDONESIA

FINAL REPORT
VOL.1 SUMMARY

JULY 1995

...E OF JAPAN (OCDI)

FINAL REPORT THE STUDY ON THE MASTER PLAN OF CONTAINER CARGO HANDLING PORTS, DRY PORTS AND CONNECTING RAILWAYS IN THE REPUBLIC OF INDONESIA VOL.1 JUL

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JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

THE STUDY

ON THE MASTER PLAN OF

CONTAINER CARGO HANDLING PORTS,

DRY PORTS AND CONNECTING RAILWAYS

IN THE REPUBLIC OF INDONESIA

FINAL REPORT

Volume 1

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Part 2: Feasibility Study of Container Cargo Handling Facilities of Ujung Pandang Port

Part 3: Feasibility Study of Container Cargo Handling Facilities of Gedebage Dry Port and Connecting Railway

JULY, 1995

The Overseas Coastal Area Development Institute of Japan (OCDI)
Japan Railway Technical Service (JARTS)
Pacific Consultants International (PCI)

PREFACE

In response to a request from the Government of the Republic of Indonesia, the Government of Japan decided to conduct a study on the Master Plan of Container Cargo Handling Ports, Dry Ports and Connecting Railways in the Republic of Indonesia and entrusted the study to the Japan Cooperation Agency (JICA).

JICA sent to the Republic of Indonesia a study team three times between March 1994 and July 1995, which was headed by Mr. Takashi Hashikawa the Overseas Coastal Area Development Institute of Japan (OCDI) and composed of members from OCDI, Japan Railway Technical Service (JARTS) and Pacific Consultants International Co., Ltd. (PCI).

The team held discussions with the officials concerned of the Government of Indonesia and conducted field surveys at the study area. After the team returned to Japan, further studies were made and the present report was prepared.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the Republic of Indonesia for their close cooperation they extended to the team.

July, 1995

Kimio FUJITA
President
Japan International Cooperation Agency

LETTER OF TRANSMITTAL

July 1995

Mr.Kimio FUJITA
President
Japan International Cooperation Agency

Dear Mr. Fujita,

It is my great pleasure to submit herewith the Report for the Study on the Master Plan of Container Cargo Handling Ports, Dry Ports and Connecting Railways in the Republic of Indonesia.

The Study Team which consists of the Overseas Coastal Area Development Institute of Japan (OCDI), Japan Railway Technical Service (JARTS) and Pacific Consultants International (PCI) conducted surveys in Indonesia from March 1994 to July 1995 as per the contract with the Japan International Cooperation Agency.

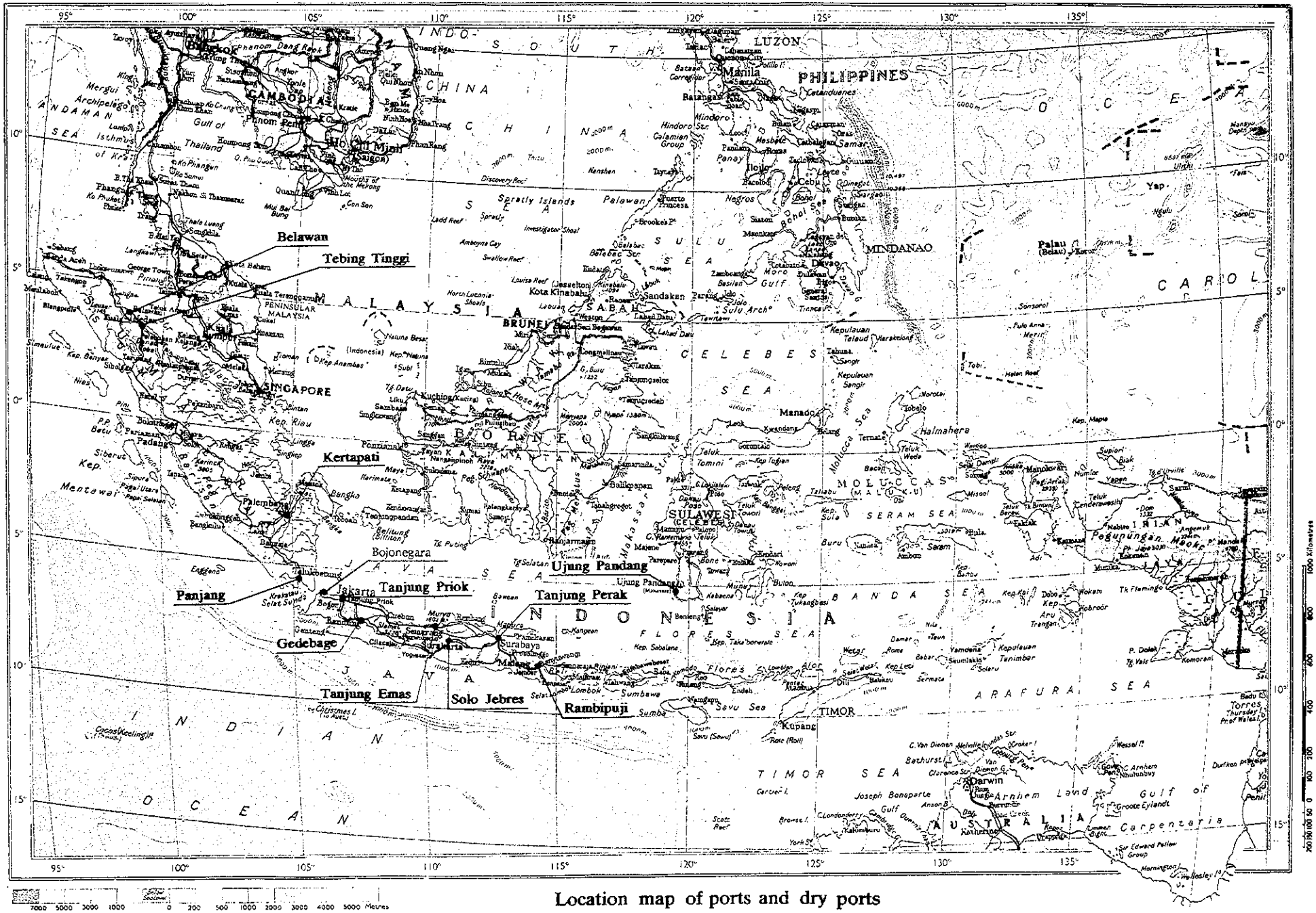
The findings of this survey were fully discussed with the officials of the Ministry of Communications of Indonesian Government and other authorities concerned to formulate the Master Plan for the period up to the year 2010 and to formulate and examine the feasibility of the Short-term Plan of Container Cargo Handling Facilities of Ujung Pandang Port, Gedebage Dry Port and Connecting Railway for the period up to the year 2003, and were then compiled into this report.

On behalf of the study team, I would like to express my deepest appreciation to the Government of Indonesia, the Ministry of Communications and other authorities concerned for their brilliant cooperation and assistance and for the heartfelt hospitality which they extended to the study team during our stay in Indonesia.

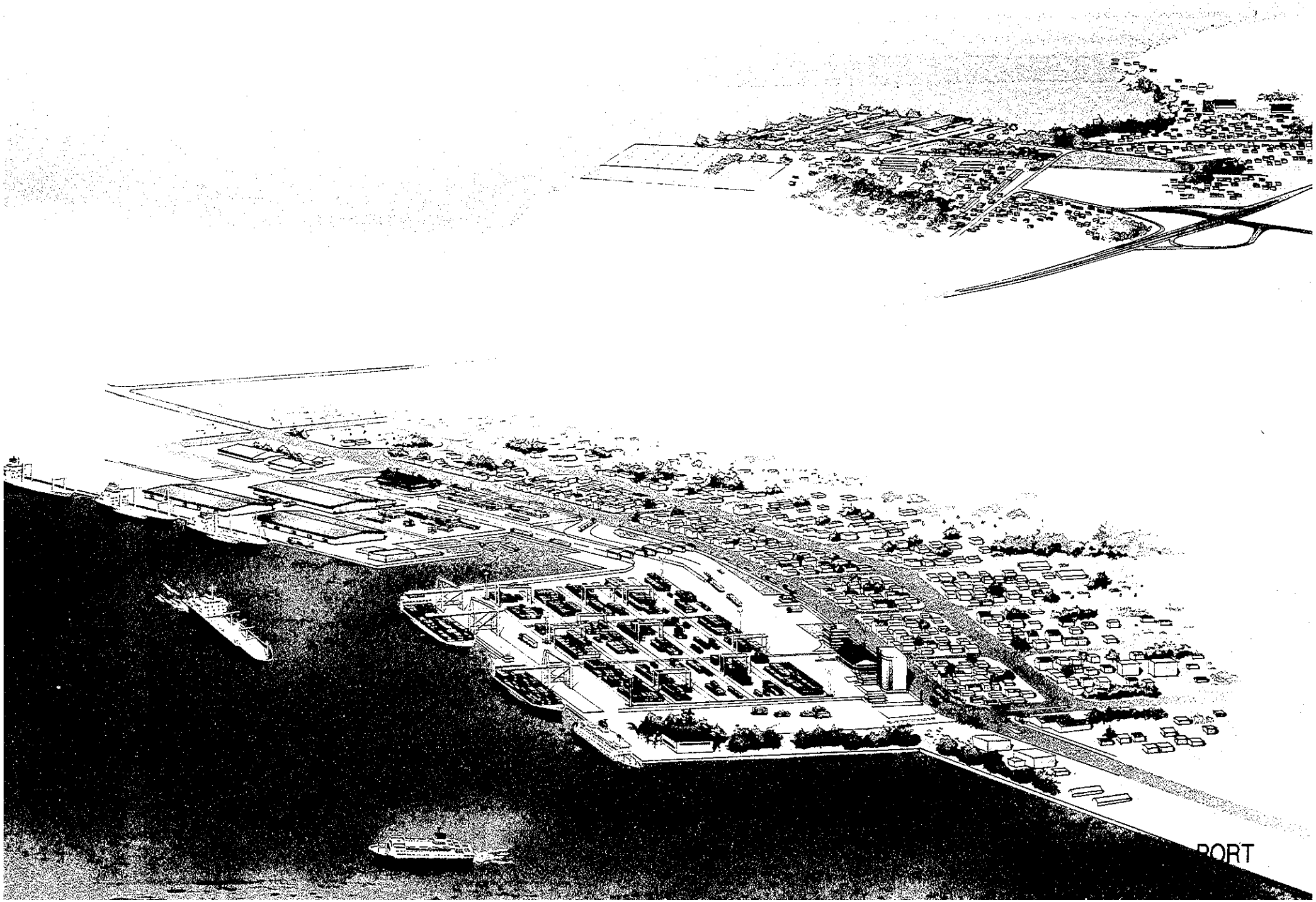
I am also greatly indebted to the Japan International Cooperation Agency, the Ministry of Foreign Affairs, the Ministry of Transport and the Embassy of Japan in Indonesia for giving us valuable suggestions and assistance during the preparation of this report.

Yours faithfully,

Takashi Hashikawa
Leader of the Study Team for the Study on the Master Plan of Container Cargo handling Ports, Dry Ports and Connecting Railway in the Republic of Indonesia.



Location map of ports and dry ports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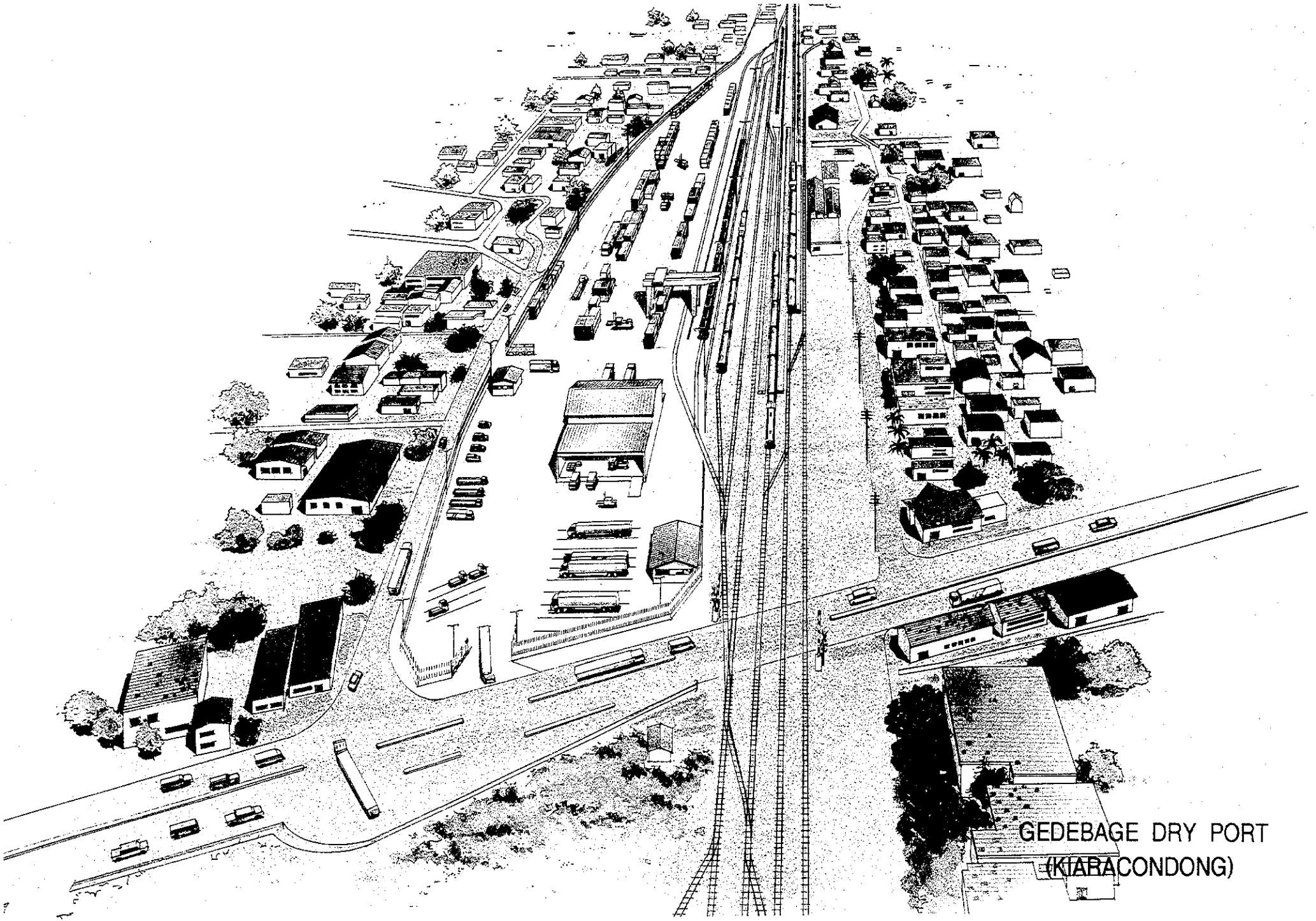
GEDEBAGE DRY PORT
(KIARACONDONG)

ABBREVIATION

AMDAL	:	Environmental Assessment Committee (Indonesian)
ANDAL	:	Environmental Impact Analysis (Indonesian)
CFC	:	Conversion Factor for Consumption
CFL	:	Conversion Factor for Labor
CIF	:	Cost Insurance and Freight
CFS	:	Container Freight Station
CT	:	Container Terminal
CY	:	Container Yard
DGLT	:	Directorate General of Land Transportation and Inland Waterways
DGSC	:	Directorate General of Sea Communication
DWT	:	Dead Weight Tonnage
EIA	:	Environmental Impact Assessment
EIRR	:	Economic Internal Rate of Return
EL	:	Elevation
FIRR	:	Financial Internal Rate of Return
FOB	:	Free on Board
F/S	:	Feasibility Study
GDP	:	Gross Domestic Products
GRDP	:	Gross Regional Domestic Products
GT	:	Gross Tonnage
HP	:	Horse Power
ICD	:	Inland Container Depot
ICT	:	International Container Terminal
IEE	:	Initial Environmental Examination
IKI	:	Indonesian Ship Industry PT. Industri Kapal Indonesia

ISO	:	International Organization for Standardization
INCT, ITC	:	Inland Container Terminal
JICA	:	Japan International Cooperation Agency
JR	:	Japanese Railways
KIMA	:	Makassar Industrial Estate
LOA	:	Length Overall
L.S	:	Lump Sum
LWS	:	Low Water Spring
MGA	:	Meteorological and Geophysical Agency
MOC	:	Ministry of Communications
MOT	:	Ministry of Trade
MOF	:	Ministry of Finance
M/P	:	Master Plan
MSL	:	Mean Sea Level
O/D	:	Origin destination (Survey)
PERUMKA	:	Indinesia Railway Public Corporation (PERUSSAHAAN UMUM KERETA API)
PELABINDO	:	Indonesia Port Public Corporation (P.T. Pelabuhan Indonesia)
PDAM	:	Water Supply Enterprise
PLN	:	National Electric Company
PLTU	:	Thermal Power Plant
REPELITA	:	Five Year Development Plan
RTG	:	Rubber Tired Gantry Crane
SCF	:	Standard Conversion Factor
St.	:	Station
S/W	:	Scope of Work
TEU	:	Twenty Feet Equivalent Unit

TCT	:	Tanjung Priok Container Terminal
TCT III	:	Tanjung Priok Container Terminal III
TOR	:	Terms of Reference
TPU	:	Public Waste Incineration
TRCT	:	Through Container Train
VAT	:	Value Added Tax

Abbriviation of the names of ports and railway stations

Tg. Emas	Tanjung Emas
Tg. Perak	Tanjung Perak
Tg. Priok	Tanjung Priok Port
Uj. Pandang	Ujung Pandang

Bd	:	Bandung
Bks	:	Bekasi
Ckp	:	Cikampek
Gdb	:	Gedebage
Jak	:	Jakarta Kota
Jng	:	Jatinegara
Kac	:	Kiaracondong
Kpb	:	Kampung bandan
Mri	:	Manggarai
Pdl	:	Padalarang
Pwk	:	Purwakarta
Thb	:	Tanahabang
Tpk	:	Tanjung Priok
Tg. Priok	:	Tanjung Priok
Prp	:	Parugpanjang

1. EXECUTIVE SUMMARY

EXECUTIVE SUMMARY
PROJECT FOCUS, DESIGN AND RATIONALE

1. Historically, the economy of Indonesaia has relied heavily on the export of primary products such as petroleum, natural gas, coal, ore and agricultural products. A principal theme of the government has thus been to promote various industries other than oil related ones as a means to reduce its excessive dependence on petroleum export and other primary products.

2. In 1969, the government of Indonesia set forth its First Long-term Economic Development Plan (1969 - 1994), which comprises from the First through the Fifth Five Year Development Plan. In early stages of the Long-term Development Plan, emphasis was given to the promotion of manufacturing industries to reduce imports of consumable products. The second stage focused on prompting exports of industrial products. Owing to these policies and efforts of the government, percentage of petroleum in the total export amount has been drastically reduced from 82% (in value) in 1981 to 43% in 1990. In conjunction with the development of other industries, the Gross Domestic Product (GDP) has been growing at a fairly high rate. In fact, during the period from 1988 through 1994, the GDP growth rate ranged from six (6) to seven (7) percent.

3. The population of Indonesia grew from 119 million in 1971 to 147 million in 1980 with an average annual growth rate of 2.39%. In 1990, the population reached 179 million, and the population growth rate per annum between 1981 and 1990 was 1.97%. Thus, a substantial decline in the population growth rate has been observed in recent years. Statistics of 1990 reveal that 60% of the population is concentrated in Java Island which has only 7% of total land area of the country. Accordingly, the island also has the largest share of GDP (55.5%; including oil and 63.2% excluding oil, in 1993).

4. In 1994, the government of Indonesia launched the Second Long-term Economic Development Plan (1994 - 2018) together with the Sixth Five Year Development Plan (REPELITA VI, 1994 - 1998). The Plan estimates that the population will reach 218.4 million in 2003 and 238.7 million in 2010, respectively. The Plan aims to drive the Indonesian Economy to the stage of take-off. The Main themes are: (1) to equally distribute the output of development, (2) to maintain sustainable development, and (3) to ensure social stability.

5. Under these circumstances, the Government has also launched a new investment policy, known as the Foreign Investment Reform Package (PP 20/1994), to promote the growth of non-oil industries further. With this new policy, foreign investors can enter into the some sectors which were previously closed to them: among them there are transportation related industries such as sea ports, shipping, airlines and railway.

6. Owing to the rapid economic growth of Indonesia, the container traffic has also been dramatically increasing for the past five years. The Government has been making great efforts to upgrade the container handling facilities not only at sea ports but also at various inland cargo terminals of railways. In line with this policy, a dry port has been established to promote the transportation of containers by railways in each of the five major economic regions: North Sumatra, South Sumatra, West Java, Central Java and East Java.

7. Based on the national and regional setting and considering the development potential of the whole country, the major development goal of the Master Plan is integration of the container cargo handling ports and container transportation by railways. The conceptual plan for the development is formulated as follows:

(1) The six major ports, namely, Belawan, Panjang, Tanjung Priok, Tanjung Emas, Tanjung Perak and Ujung Pandang, will maintain their role as the major outlets for the international trade of the respective hinterlands. Among these, Tanjung Priok (Jakarta) and Tg. Perak (Surabaya), which are presently the two largest ports, will remain as the principal ports. The container handling facilities of these two ports should be developed immediately in line with the existing development plans.

(2) To comply with the requirement to meet the container cargo traffic anticipated in 2010, Tanjung Priok, Tanjung Emas (Semarang) and Ujung Pandang ports need future development plans.

(3) Among the five dry ports which presently exist, Gedebage is the sole dry port which is identified as having enough traffic demand for expansion. Solo Jebres Dry Port is identified to have a potential container traffic sometime in 2008. The potential container traffic at all others is thought to be insufficient to plan further expansion.

(4) On the basis of the above mentioned master plan, the following two projects were selected for further study (short-term development plan and the feasibility study):

a. Container Cargo Handling Facilities of Ujung Pandang Port, and
b. Container Cargo Handling Facilities of Gedebage Dry Port and Connecting Railways

8. It should be noted that the Project area **a.** was chosen because the port needed a future expansion plan urgently while no plan has been prepared yet. The Project **b.** was chosen because the container traffic at the dry port has been reaching its capacity and thus needs future development plan while the container terminal at Tanjung Priok has been prepared and construction has recently been initiated.

9. The Short-term Development Plan of the Container Handling Facilities of Ujung Pandang Port focuses on the effective utilization of the 670 meter long New Hatta Quay, of which construction will be completed in 1997, for container cargo handling. The principal objective of the Short-term Development Plan is to provide an adequate capacity for the handling of projected container traffic demand until 2003, by installing handling equipment to the container terminal at the quay and developing an inland container terminal (INCT), including enough space for container freight stations (CFS), Stock Yards, Parking area etc.

10. The Proposed Project, therefore, includes the following components:

(1) installation of the following handling equipment in the container terminal at the quay;

Gantry cranes	3	units,
Transfer cranes	9	units,
Tractor head	27	units,
Chassis	54	units,
Forklift	5	units(7 ton), 3 units (3.5 ton)
Reachstacker	2	units(45 ton)
Computer & Software	10	units.

(2) construction of an INCT having an area of 9.1 ha. with the following items;

Access road	150	meters (4 lanes)
CFS	2	units (total 9,000 sq. meters),
Folk lift	2	units (7 ton), 6 units (3.5 ton), and

Open Yard storage 2.7 ha.

(3) construction of new access navigation channel 200 meter wide and 1 km meter long.

11. The cost of the Project **a.** is estimated at 129 billion rupiahs of which 106 billion will be the foreign currency cost and 23 billion rupiahs will be the local currency cost which is to be met from the Government's own resources.

12. The Project **a.** results in significant economic benefits. The installation of the handling equipment and the construction of INCT will reduce the berth waiting cost of ships, and hence, it will promote economic activities of the hinterland of the port.

13. The economic internal rate of return for the Project **a.** is estimated at 15.6 per cent and the financial internal rate of return at 8.6 per cent. Therefore, the Project is viable.

14. The Short-term Development Plan of the Gedebage Dry Port and connecting railway focus on increasing the handling capacity at Gedebage Dry Port to provide an adequate capacity for the handling of projected traffic demand until 2003, by establishing an additional terminal at Kiaracondong, which is located 5.2 km away from Gedebage Dry Port and will be given such functions as handling empty containers, and an automatic signalling or doubling the rail track between these two terminals. In the same strategy, increasing the handling capacity is planned for the railway container terminal at the Container Terminal III at Tanjung Priok (TCT III) in Jakarta.

15. The proposed Dry Port project, therefore, includes the following major components:

(1) Construction of additional storage sidings, and widening container depot at Gedebage Dry Port,

(2) Civil and track work, widening of road and purchase of one (1) unit of forklift having the capacity of 10 ton at Kiaracondong Terminal,

(3) Installation of automatic signaling system, electric circuit, and telecommunication units between Gedebage St. and Kiaracondong St..

(4) Procurement of rolling stock.

16. The cost of the Project **b.** is estimated at 62.5 billion rupiahs during Short-term

Development Plan (until 2003) of which 43.1 billion will be the foreign currency cost and 19.4 billion rupiahs will be the local currency cost which is to be met from the Government's own resources.

17. The Project **b.** results in significant economic benefits. The installation of the handling equipment and the capacity increase at the INCT will promote socioeconomic activities in the hinterland of the INCT. In addition, by shifting the container transportation from truck to rail, the amount of exhaust gas can be reduced and, hence, the adverse impact of the development on the environment is also considerably weakened.

18. The economic internal rate of return for the Project **b.** is estimated at 29 to 32 per cent and the financial internal rate of return at 5 to 10 per cent at base cases. Therefore, the Project is viable.

2. SUMMARY

Part 1

Master plan of Container Cargo Handling Ports, Dry Ports and Connecting Railways

SUMMARY

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Part 1

1. INTRODUCTION

1. The overall objectives of the Study are defined by the Scope of Work agreed upon in July 1993 between the Ministry of Communications (MOC) and the Japan International Cooperation Agency (JICA) as follows:

(a) To formulate a master plan for development of nationwide container cargo handling ports, dry ports and connecting railways;

(b) To conduct a feasibility study on selected project(s) within the framework of the master plan.

2. The study has been carried out under close cooperation between the Indonesian agencies concerned and the Japanese side for the period from March 1994 through July 1995. The Indonesian side consists of representative personnel of the MOC and the agencies under the ministry: the Directorate General of Sea Communication (DGSC), the Directorate General of Land Transportation (DGLT), the Indonesia Port Corporation (PELABINDO) I, II, III and IV, and Indonesia Railway Corporation (PERUMKA). The study had been carried out stage by stage in the following manner:

i) Analysis of the existing situations from April through July 1994; formulation of basic strategies and preparation of the Nation-wide Master Plan for the container handling ports, dry ports and connecting railways from September through November 1994. The ports studied were Belawan, Panjang, Jakarta, Semarang, Surabaya and Ujung Pandang, and the dry ports were Tebing Tinggi, Kertapati, Gedebage, Solo Jebres and Lambipuji,

ii) Formulation of Short-term Development Plan and its feasibility study from November 1994 through March 1995;

iii) Finalization of the study from May through July 1995.

3. The Steering Committee headed by Mr. Muchtardin Siregar, Secretary General of MOC through Mr. Soetjahjo Reksoprodjo, Head of Planning Bureau, MOC, guided the general direction of the study, under which the JICA Study Team and its Indonesian Counterpart Team worked to fulfill the above objectives. The study results could form a base for the policy making of MOC and the development work of the DGSC, DGLT, PELABINDO I through IV and PERUMKA in due course.

4. The Final Report comprises four volumes:

Volume 1: Executive Summary and Summary of Vol. 2 - 4
Volume 2: Master Plan of Container Cargo Handling Ports, Dry Ports and Connecting Railways
Volume 3: Feasibility Study of Container Cargo Handling Facilities of Ujung Pandang Port
Volume 4: Feasibility Study of Container Cargo Handling Facilities of Gedebage Dry Port and Connecting Railway

5. Members of the Indonesia Steering Committee, the Counterpart Team and JICA Study Team are as follows:

(1) Steering Committee

Chairmen: Secretariat General, Ministry of Communications
Deputy Chairman: Head of Planning Bureau, Ministry of Communications
Member:

1. Secretary, Directorate General of Sea Communication (MOC)
2. Secretary, Directorate General of Land Transportation (DGLT)
3. Head, Directorate Facility Support System, DGLT
4. Head, Directorate Port and Dredging, Directorate General of Sea Communication (DGSC)
5. Chief Director, Indonesia Public Port Corporation I (PELABINDO I)
6. Chief Director, Indonesia Public Port Corporation II (PELABINDO II)
7. Chief Director, Indonesia Public Port Corporation III (PELABINDO III)
8. Chief Director, Indonesia Public Port Corporation IV (PELABINDO IV)
9. Chief Director, Indonesia Railway Public Corporation (PERUMKA)

(2) Counterpart Team

Chairman: Chief of for Planning Subdivision, Planning Bureau, MOC
Deputy Chairman: Chief of Evaluation and Report Division, Planning Bureau, MOC
Deputy Chairman: Chief of Technical Operation and Foreign Aid, Planning Bureau, MOC
Secretary: Ir. Kemal Heryandri, Dipl. H.E. Planning Bureau, MOC
Members:

a. Managing Group:

1. Ir. P. Tarigan, MSTr. Planning Bureau, MOC
2. Drs. Mangatas Hutagalung Planning Bureau, MOC
3. Drs. Buchori Mas'ud Planning Bureau, MOC
4. Ir. Petrus A. Wismadi,MSc. Planning Bureau, MOC
5. Ir. Herman M Kaharmen,Msc. Planning Bureau, MOC

6.	Drs. Imam Hambali	Planning Bureau, MOC
7.	Ir. Mulyadi Hadikusumo	DGLT
8.	Ir. Mardio Wibowo	DGLT
9.	Ir. Marnalom H, MSTr.	DGLT
10.	Drs. Tjipto TH.	DGLT
11.	Ir. Adolf Richard, Msc.	DGLT
12.	Ir. Wahyudi	PERUMKA
13.	Ir. Emil A, R, MSC.	PERUMKA
14.	Drs. Helmy Azis	PERUMKA
15.	Ir. Imran Iskandar MSTr.	PT. PELABINDO I
16.	Capt. Syaifuddin	PT. PELABINDO II
17.	Ir. Husen Latif MSc.	PT. PELABINDO II
18.	Drs. Herry Wuwungn	PT. PELABINDO III
19.	Ir. Alfred Natsir	PT. PELABINDO IV

b. Working Group:

1.	Ir. Paulus Raga, MSTr.	Planning Bureau, MOC
2.	Ir. Triyono	Planning Bureau, MOC
3.	Ir. M. Zaki	DGLT
4.	Ir. Hanggoro W.	DGLT
5.	Herman Suhaya	DGLT
6.	Ir. Harry Budiarto	DGSC
7.	Drs. Eko H, MBA.	DGSC
8.	Drs. Achmad Asnaw	DGSC
9.	Ir. Iman AS, MSc.	PT. PELABINDO I
10.	Zaitul Azhar	PT. PELABINDO I
11.	Ir. Syamsurizal	PT. PELABINDO II
12.	Drs. Hary Sutanto	PT. PELABINDO II
13.	Drs. Hamdi, MBA.	PT. PELABINDO II
14.	Drs. Lalu Suwardaningrat	PT. PELABINDO III
15.	Johny Saryowan	PT. PELABINDO III
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19.	Ir. Arief Wahyudi	PERUMKA
20.	Drs. Patoria	PERUMKA
21.	Ir. Amien Abdurachman	PERUMKA
22.	Drs. Paryastini	PERUMKA
23.	Ir. Subagio	PERUMKA
24.	Ir. Bambang Parintis	PERUMKA

(3) JICA Study Team

1.	Takashi Hashikawa	Team Leader
2.	Koji Kobune	Port Planning/Environmental Consideration
3.	Hiromichi Nagano	Container Demand Forecast/Economic Analysis
4.	Masayuki Nakamura	Container Management and Operation/Financial Analysis (Port sector)
5.	Masao Ichinose	Container Facility and Equipment Planning
6.	Hideo Yokota	Railway and Dry Port Facility Planning
7.	Hitoshi Arai	Railway Transportation Planning
8.	Toshiaki Shinnou	Signal and Communication Facility Planning
9.	Takayuki Yamashita	Rolling Stock Planning
10.	Taro Iwata	Financial Analysis (I)
11.	Naoyasu Hayashi	Financial Analysis (II)
12.	Masaaki Goshima	Container Port Facility Design
13.	Isao Shichinohe	Railway and Facility Planning
14.	Hiromi Namiki	Construction Method and Cost Estimate
15.	Masakazu Ikehara	Natural Conditions Investigation
16.	Akinori Sato	Environmental Survey (I)
17.	Tsukasa Kishimoto	Environmental Survey (II)
18.	Chitose Kawakami	Coordination (I)
19.	Koji Yamada	Coordination (II)
20.	Hisashi Ishikawa	Coordination (III)

2. BACKGROUND

A. National and Regional Setting

6. Historically, the economy of Indonesia has relied heavily on the export of primary products such as petroleum, natural gas, coal, ore and agricultural products. A principal theme of the government has thus been to promote various industries other than oil related ones as a means to reduce its excessive dependence on petroleum export and other primary products.

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11. Owing to the rapid economic growth of Indonesia, the container traffic has also been dramatically increasing for the past five years. The Government has been making great efforts to upgrade the container handling facilities not only at sea ports but also at various inland cargo terminals of railways. In line with this policy, a dry port has been established to promote the transportation of containers by railways in each of the five major economic regions: North Sumatra, South Sumatra, West Java, Central Java and East Java.

B. The Transportation Sector

(1) Shipping and Ports

a. Shipping

12. In the sea routes connecting the three major economic regions, i.e., North America, Far East and Europe, shipping lines tend to employ container carriers of larger size, namely, Post Panamax Container Carrier, and limit the number of their calling ports in each region in the course of the voyage: Southeast Asia, West Asia, Mid East and Mediterranean **(see Fig. 1)**.

13. With the recent of the introduction of Post Panamax Carrier into the North America - Far East - Europe Route, it is quite possible that the container carriers of Panamax size, i.e. the container carriers of the third generation which are presently engaged in the above mentioned route, will be used in the sea routes associated with the international trade of Indonesia, such as the sea routes between Indonesia and Far East, Australia/New Zealand, and others **(see Fig. 2)**.

14. As for domestic cargo traffic at present, large portion of the domestic cargoes are transported in the form of general cargo, and the share of the container cargoes still

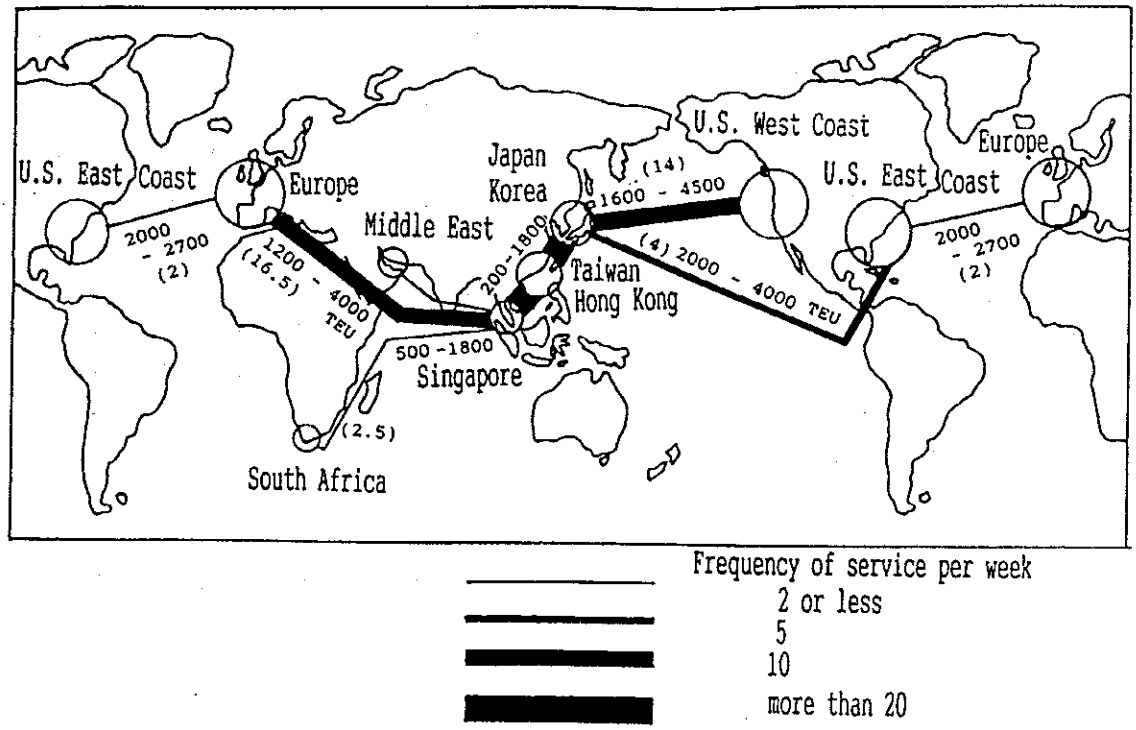


Fig. 1 Mother vessel service with feeder service to Indonesia (Ship size in TEU capacity)

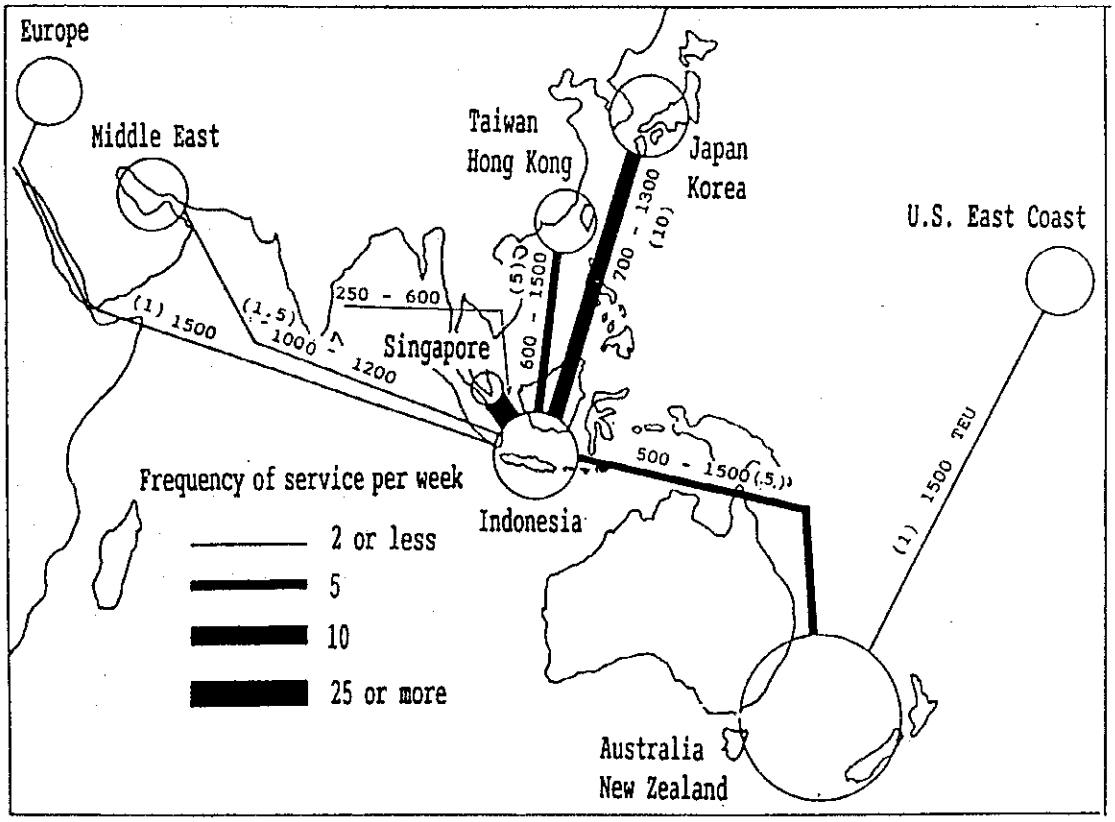


Fig. 2 Direct service routes and frequency of service (ship size in TEU capacity)

remain low. However, domestic containers are handled in many ports and domestic liner services are available in various domestic sea routes. Weekly container services bound for Tanjung Priok are available at Pontianak, Banjarmasin, Semarang, Surabaya, Bitung and Ujung Pandang. Between Surabaya and Ujung Pandang, a weekly container service is also available. Tanjung Priok Port and Tg. Perak Port, thus, serve as hub-ports for the ports in Karimantan, Sulawesi, and other ports in the eastern part of Indonesia.

b. Ports

15. Ports in Indonesia are classified into three types according to the managing entities: Public Ports, Special Ports and Fishing Ports.

i) Public Ports

16. The Public ports in Indonesia are classified into two categories: commercial ports, which are managed by Port Corporations, and non-commercial ports, which are directly managed by the governmental offices at various locations (KANPEL). In addition to these commercial and non-commercial ports, there are about 600 fishing ports which are administrated by the Ministry of Agriculture.

17. There are commercial ports which handle international and major domestic trades. These ports have been divided into four groups according to their geographical location; thus four Indonesia Port Public Corporations have been established in correspondence to these groups to observe management and operation. These commercial ports are further divided into five classes according to the cargo handling volume and the scale of facilities.

18. The non-commercial ports handle local commodities for local industries and residents in their relatively small hinterlands. The non-commercial ports are also further divided into two categories: namely the mother ports and the working units. At present, there are about 550 non-commercial ports and most of them are located in isolated areas and small islands.

ii) Special port and Special berths

19. Some private ports and wharves are constructed and operated by such sectors as agriculture mining,manufacturing Industry,forestry and tourism under the permission of the Ministry of Communication (MOC). These ports and wharves are exclusively used to handle specific commodities such as oil, fertilizer, flour, timber, coal, and so on (raw materials and their products). It should be noted that the new Maritime Act prohibits the public use of special ports except in special circumstances such as natural disasters, in which case the government may grant permission.

iii) International ports

20. As a part of the Presidential Instruction 4/1985 (INPRES 85), which called for a set of deregulation measures, the so-called Four Gateway System policy was replaced by a new policy. With this new policy, 117 ports (both public and private) were opened to international trade on the basis of the decrees of MOC, Ministry of Trade and Finance,(MOFT), Ministry of Finance (MOF). As of 1994, there are 129 international ports, comprising 80 public ports and 49 special ports.

iv) Organization and management

21. The four Port Corporations, nemely, PELABINDO I, II, III and IV, have been developing 110 commercial ports. These ports are under the management of respective PELABINDOs through their 71 branch offices. Their services cover pilotage, loading and unloading service, and leasing of space and facilities of the ports.

(2) Railways and Dry Ports

22. The total length of railway track in Indonesia extends 6,491 km, including unused sections of 1,440 km. Currently, the service covers 3,663 km in Java Island and 1,388 km in Sumatra Island. The length of double track sections is 206 km, and electrified sections are 157 km long. Whole tracks are narrow gauge (1,067 mm). The railway network in Java Island is interconnected and has three trunk lines. One is the Northern Trunk Line stretching 726 km between Jakarta: National Capital, and Surabaya: the state capital of West Java, via Cikampek, Cirebon, Semarang. The other two are the Southern Trunk Line: 610 km long line from Cirebon to Surabaya via Yogyakarta, and

the Bandung Line: 337 km long line from Cikampek to Kroya via Bandung: the state capital of West Java. In Sumatra Island, there are three railway networks, i.e., Western, northern, and southern networks. These three networks are not connected each other. (See Fig. 3)

23. The Indonesia Railway Public Corporation (PERUMKA) is the sole entity responsible for operating the railway networks. PERUMKA has four local branches: one in Java and three in Sumatra.

24. In 1993, PERUMKA carried 95.36 million passengers and 12,224 million passenger-kilometers (pass-km) and 15.68 million tons of cargoes or 3,956 million ton-kilometers (ton-km). The revenue through passenger and cargo services amounted to 243.0 billion and 144.9 billion rupiahs, respectively.

25. Container cargo does not occupy a large share in the railway freight traffic. However, a steady increase since 1990 can be observed. In 1993, the container transport recorded 796,000 tons, having achieved a fourfold. (See **Table 1**).

26. The handling volume at each of the five dry ports is shown in **Table 2** Gedebage Dry Port occupies 95% of the total, while the volumes handled at the other ports are considerably small. It should be noted that there has been no handling at Kertapati since 1992, when the container service by ship started between Palembang and Singapore.

Table 1 Share of Container Cargo in the freight between Bandung and Railway Freight Traffic by Items

	1990	1993	Ratio '93/'90
Total freight (1,000 t)	12,474	15,682	126
Container Cargo (1,000 t)	200	796	399
Share of Container cargoes (%)	1.6	5.1	

(FACTS AND FIGURES 1990)
(Materials supplied by related dry ports)

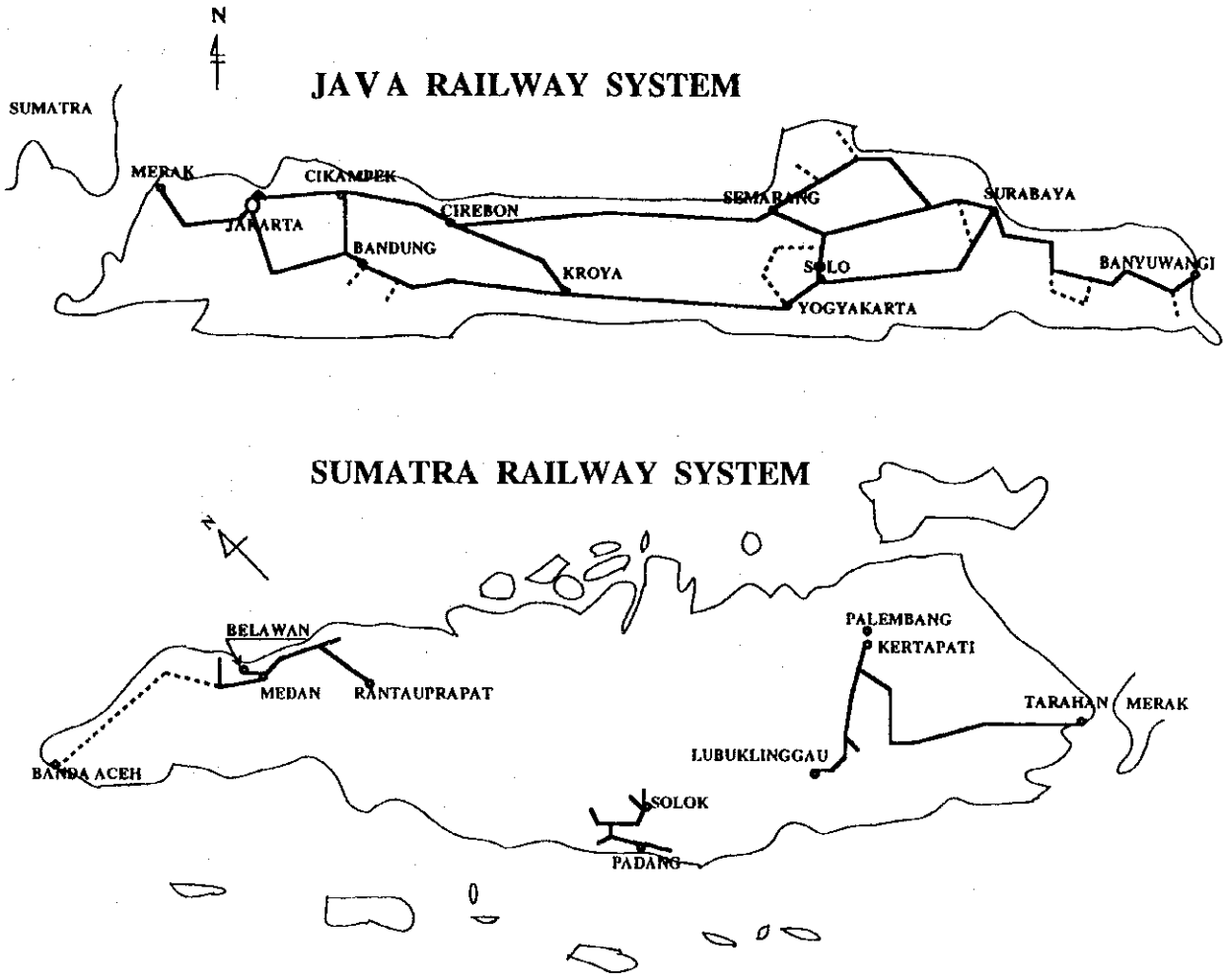


Fig. 3 PERUMKA RAILWAY SYSTEM

Table 2 Container Transport at Dry Ports

Dry Ports		1989	1990	1991	1992	1993	Share
Tebing Tinggi	TEU	80	380	1,304	1,360	592	0.8
	ton	880	4,180	14,344	14,960	6,512	
Kertapati	TEU	104	1,134	174			
	ton	814	8,853	1,292			
Gedebage	TEU	14,807	23,065	35,836	52,008	60,918	94.8
	ton	102,991	170,992	232,003	322,778	754,494	
Solojebres	TEU	52	1,302	2,181	2,122	2,152	2.1
	ton	442	11,252	16,773	17,714	16,687	
Rambipuji	TEU	518	648	706	1,036	2,516	2.2
	ton	3,108	4,278	4,699	6,693	18,024	
Total	TEU	15,561	26,529	40,201	56,526	66,178	100.0
	ton	108,235	199,555	269,111	362,145	795,717	

27. The container transport between Tanjung Priok Port and Gedebage Dry Port, where the container handling volume is the largest among the existing Dry Ports, has achieved an average annual growth rate of 38% over the past five years from 1988 through 1993. This growth rate is seven (7) % higher than that achieved by Tanjung Priok Port during the same period.

28. In order to carry these container cargoes, Through Container Trains (TRCTs) are operated between Gedebage and Tanjung Priok, where TRCT is defined as that train which carries only container cargoes and whole loads are transported between the origin and the destination. At the other dry ports, containers are carried by conventional freight trains where container wagons and ordinary freight cars are connected.

C. The Project Area

(1) Potential area

29. The Study area associated with the Master Plan will cover the nationwide container cargo handling ports, dry ports and connecting railways. Locations of the commercial ports and dry ports are shown in **Map - 1**. The following ports are those which are presently handling a large share of the container traffic in the Indonesian trade and are constituents of the national container handling port network:

Ports	Connecting Dry Ports
Belawan(Medan, North Sumatra),	Tebing Tinggi
Panjang(Lampung, South Sumatra),	Kertapati
Tanjung Priok(Jakarta, West Java),	Gedebage
Tanjung Emas (Semarang, Central Java),	Solojebres
Tanjung Perak (Surabaya, East Java),	Rambipuji
Ujung Pandang (South Sulawesi),	No existing Dry Port.

(2) Container traffic at the major ports and dry ports

30. The container cargo traffic at the above listed ports and their dry ports observed in 1993 are summarized in **Table 3**. Of the 15.87mil. tons of foreign container cargoes of the six (6) ports, Tg. Priok Port handled 60% and Tg. Perak handled 25%. On the other hand Uj. Pandang and Tg. Perak handled 45% and 41% of the domestic container cargo, respectively.

31. Among the five (5) dry ports, Gedebage, which is the dry port of Tg. Priok, handled 95% of total railway container cargoes. The share of the container cargo transported by railways is the highest at Tg Priok, where 8.2% of export cargoes and 1.6% of import cargoes at the port were transported by the railway. At the other ports, the share of the railway container cargoes in the container cargoes at the port is fairly small.

32. The existing situation of port, dry port and connecting railways are briefly described in **Appendix A** of this summary.

Table 3 Cargo Movement (General Cargo, Container, ton) in 1993

Port of Entry			Belawan	Panjang	Tg.Priok	Tg.Emas	Tg.Perak	Uj.Pandang	Total
Port	Foreign Trade	Potential Export	1,515,773	431,825	5,181,443	738,291	3,583,462	260,377	11,711,171
		(Containerized)	1,039,865	311,925	4,291,156	417,752	2,601,078	6,500	8,668,276
		Container ratio	68.6%	72.2%	82.8%	56.6%	72.6%	2.5%	74.0%
		Import	1,045,123	110,759	8,242,524	641,097	4,444,245	23,114	14,506,862
		(Container)	308,503	17,267	5,238,786	289,318	1,342,813	5,579	7,202,266
		Container ratio	29.5%	15.6%	63.6	45.1	30.2%	24.1%	49.6%
		Total Potential Cargo	2,560,896	542,584	13,423,967	1,379,388	8,027,707	283,491	26,218,033
		(Share in 6 ports)	9.8%	2.1%	51.2	5.3	30.6%	1.1%	100.0%
		Container	1,348,368	329,192	9,529,942	707,070	3,943,891	12,079	15,870,542
		(Share in 6 ports)	8.5%	2.1%	60.0%	4.5%	24.9%	0.1%	100.0%
	Domestic Trade	Poten. Loading Cargo	683,502	569,985	1,448,408	178,092	3,564,965	586,467	7,031,419
		(Containerized)	0	0	59,423	0	178,000	110,499	347,922
		(Container Ratio)	0.0%	0.0%	4.1%	0.0%	5.0%	18.8%	4.9%
		Poten. Unload Cargo	1,331,883	617,775	1,518,588	1,296,661	4,362,508	1,222,830	10,350,245
		(Containerized)	0	0	62,302	0	182,000	282,036	526,338
		(Container Ratio)	0.0%	0.0%	4.1%	0.0%	4.2%	23.1%	5.1%
		Total Poten. Cargo	2,015,385	1,187,760	2,966,996	1,474,753	7,927,473	1,809,297	17,381,664
		(Share in 6 Ports)	11.6%	6.8%	17.1%	8.5%	45.6%	10.4%	100.0%
		Total Container	-	-	121,725	-	360,000	392,535	874,260
		(Share in 6 Ports)			13.9%		41.2%	44.9%	100.0%
Dry Port	Container Cargo (ton)	Export Container	5,920	-	423,570	13,225	15,508	-	458,223
		(Share in 5 D/P)	1.3%		92.4%	2.9%	3.4%		100.0%
		Import container	-	-	134,115	1,316	-	-	135,431
		(Share in 5 D/P)			99.0%	1.0%			100.0%
		Total container Cargo	5,920	-	557,685	14,541	15,508	-	593,654
		(Share in 5 D/P)	1.0%		93.9%	2.4%	2.6%		100.0%
	Share of Dry Port Container	to Port Export Cargo	0.39%	-	8.17%	1.79%	0.43%	-	3.91%
		to Port Import Cargo	-	-	1.63%	0.21%	-	-	0.93%
		to Port Foreign Cargo	0.23%	-	4.15%	1.05%	0.19%	-	2.26%
		to Port For. Container	0.44%	-	5.85%	2.06%	0.39%	-	3.74%

3. MASTER PLAN FOR THE PORTS, DRY PORTS AND CONNECTING RAILWAYS

A. Container Cargo Traffic Forecast

(1) Three scenarios for Container Cargo Traffic Forecast

33. Container cargo traffic forecast both for the ports and dry ports on the basis of three scenarios drawn to the socioeconomic framework up to 2018.

Scenario 1; Moderate economic growth;
The growth planned in the Second Long-term Development Plan, which was published by BAPPEDA, would be realized.

Scenario 2; Optimistic economic growth;
The trend of growth rate is modified in consideration of those of other countries in Asia.

Scenario 3; Conservative economic growth;
A constant growth rate of 6% is used as a conservative forecast.

34. **Figure 4** shows the GDP Growth Rates employed in forecasting the container cargo traffic of the whole country, while **Fig. 5** shows the yearly increase of international container cargo traffic.

(2) Container cargo traffic at the Major Ports and the Dry Ports

35. Hereunder is the discussion on the Master Plan under Scenario 1 which assumes a moderate economic growth. **Table 4** indicate the forecast results of the international container cargos of the whole country for the years 2003 and 2010, broken down into exports and imports. For the container cargo traffic forecasts for the six ports, the GDP Growth Rate per respective regions was employed (see **Table 5**).

36. The international, the domestic and the total container cargo throughput of the six ports, namely, Belawan, Panjang, Tanjung Priok, Tanjung Emas, Tanjung Perak and Ujung Pandang are shown in **Table 6** for the year 2003, 2010 and 2018 with the breakdown for international and domestic containers. The yearly variation is exhibited in **Fig. 6** (International Containers), **Fig. 7** (Domestic containers) and **Fig. 8** (Total

containers), and **Table 6.**

37. In 2010, compared with the actual traffic observed in 1993, the international and the domestic container cargo throughput of the whole country will reach the levels of 4.3 times (see **Fig. 6**) and 16 times(see **Fig 7**)) of those observed in 1993, respectively.

Table 4 Cargo Traffic of the Country (Scenario 1)

			Cargo Volume		
			1993	2003	2010
Export million ton	Total Cargo Volume	Incl. oil	143.0(100)	178.4(125)	223.6(156)
		Excl. oil	51.0(100)	74.1(145)	103.6(203)
	Potential Container Cargo		14.9(100)	26.5(178)	42.0(282)
	Container Cargo		9.1(100)	21.9(241)	35.6(391)
	Container cargo (1,000 TEU)	Loaded	823(100)	2,194(266)	3,558(432)
		Empty	130(100)	286(220)	416(320)
		Total	953(100)	2,481(260)	3,974(417)
Import million ton	Total Cargo Vol.		37.2(100)	59.7(160)	89.3(240)
	Potential Container Cargo		13.4(100)	23.9(178)	38.3(286)
	Container Cargo		7.9(100)	19.4(246)	32.2(408)
	Container Cargo (1,000 TEU)	Loaded	676(100)	1,937(287)	3,221(476)
		Empty	221(100)	544(246)	752(354)
		Total	897(100)	2,481(277)	3,974(443)
Total million ton	Total Cargo Vol.		180.2(100)	238.1(132)	312.8(174)
	Potential Container Cargo		28.3(100)	50.5(178)	80.3(284)
	Container Cargo		17.0(100)	41.3(243)	67.8(399)
	Container Cargo (1,000 TEU)	Loaded	1,499(100)	4,132(276)	6,779(452)
		Empty	351(100)	830(236)	1,168(333)
		Total	1,850(100)	4,962(268)	7,947(430)

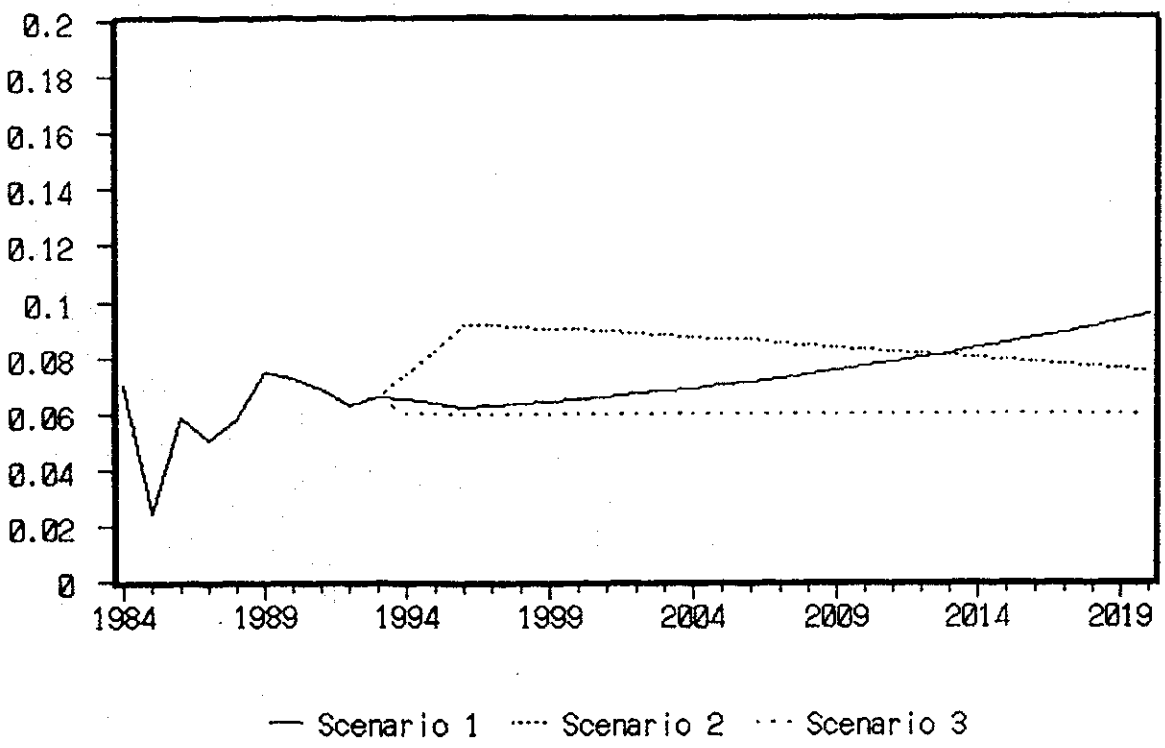


Fig. 4 GDP Growth Rate employed for the Container Cargo Traffic (Scenario 1, 2 and 3)

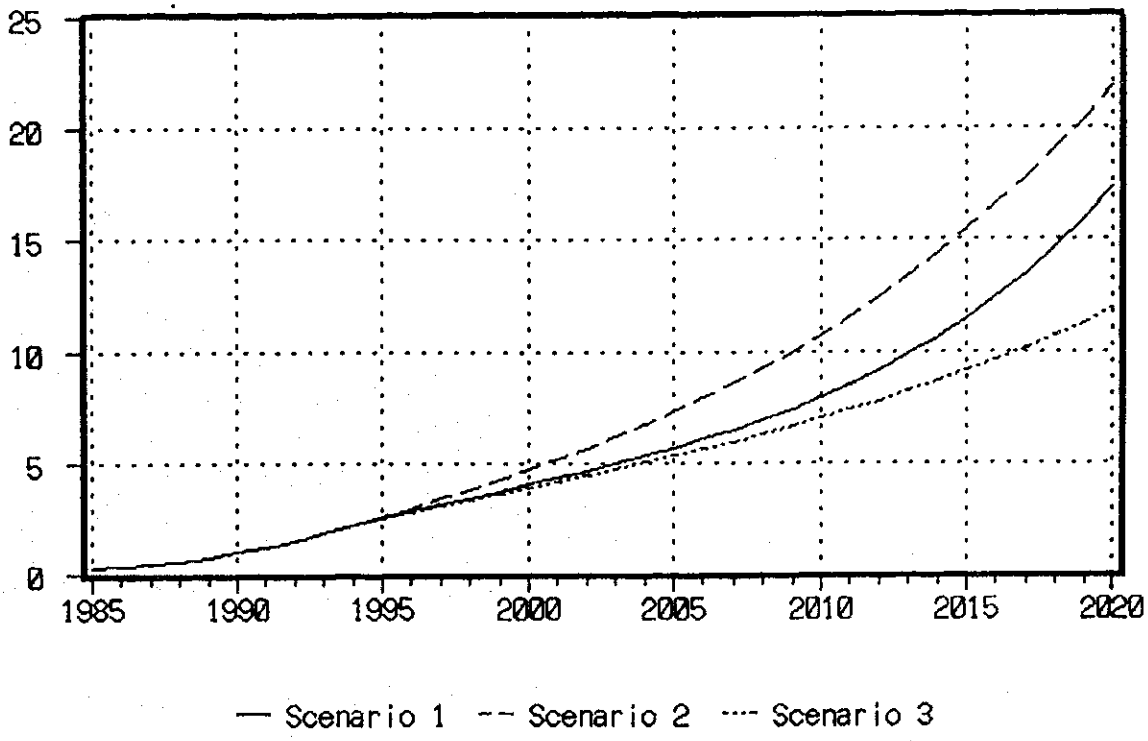


Fig. 5 Projected Container Traffic (International Container, Unit: Million TEU)

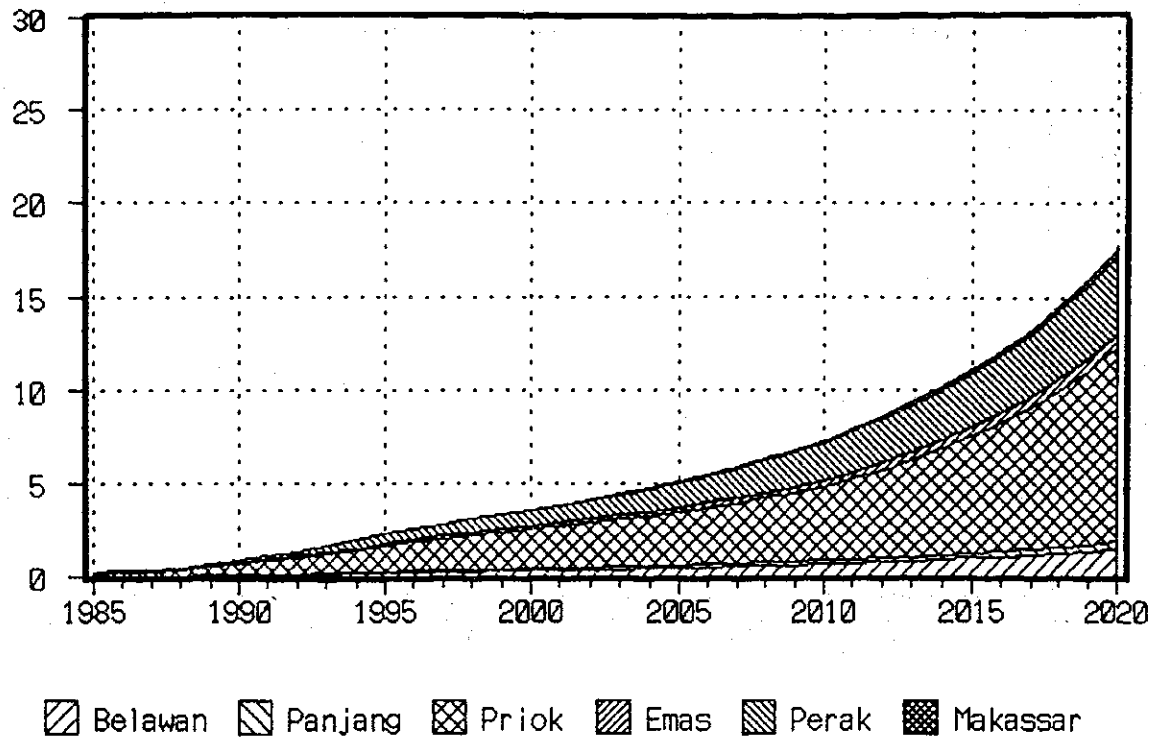


Fig. 6 Projected International Container Traffic at Six Ports (Scenario 1, Unit: Million TEU)

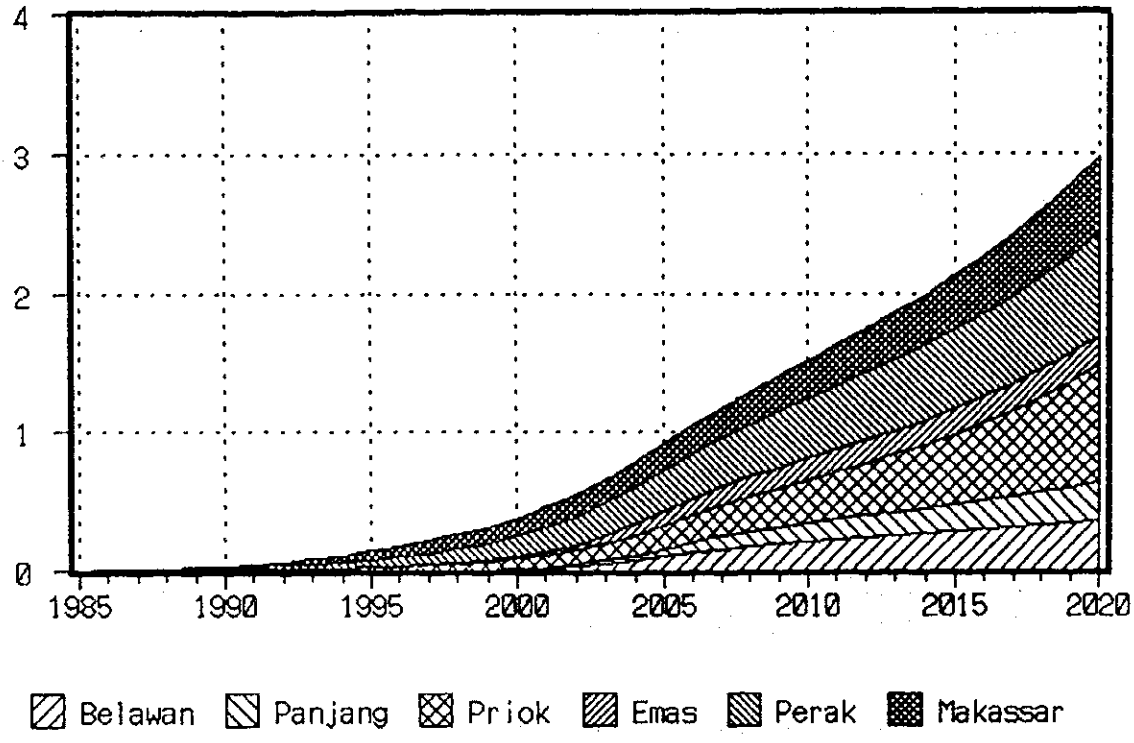


Fig. 7 Projected Domestic Container Traffic at Six Ports (Scenario 1, Unit: Million TEU)

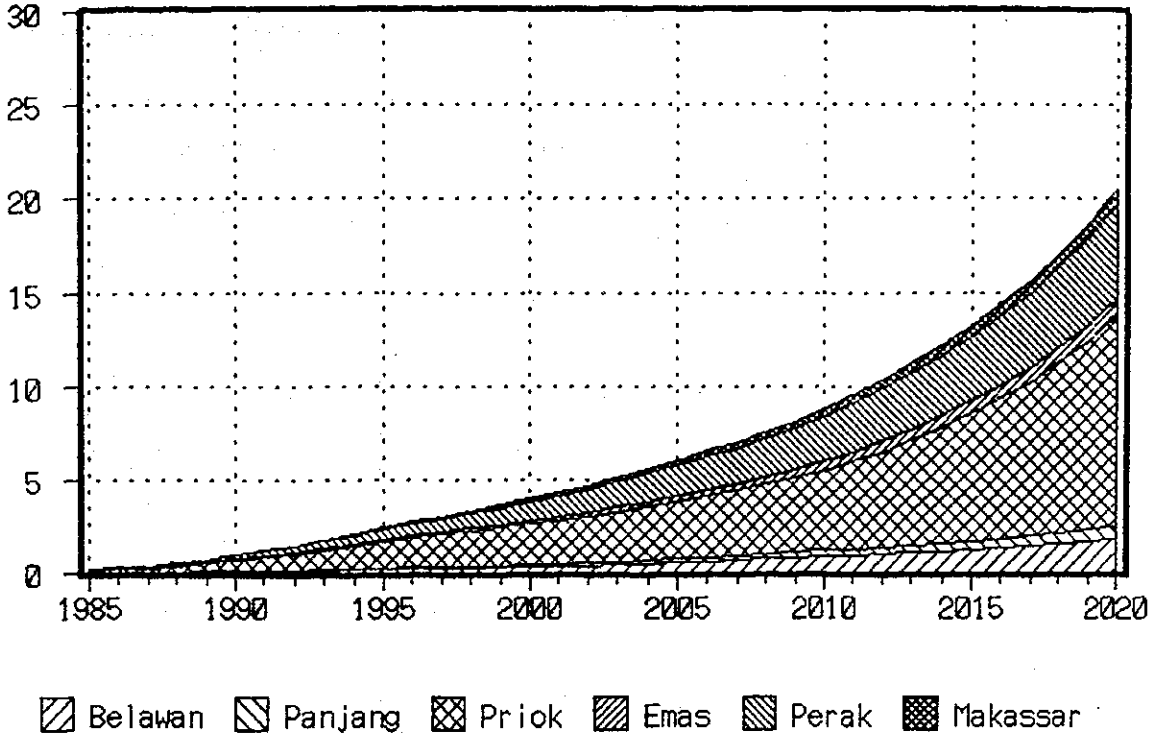


Fig. 8 Projected Total Container Traffic at Six Ports (Scenario 1, Unit: Million TEU)

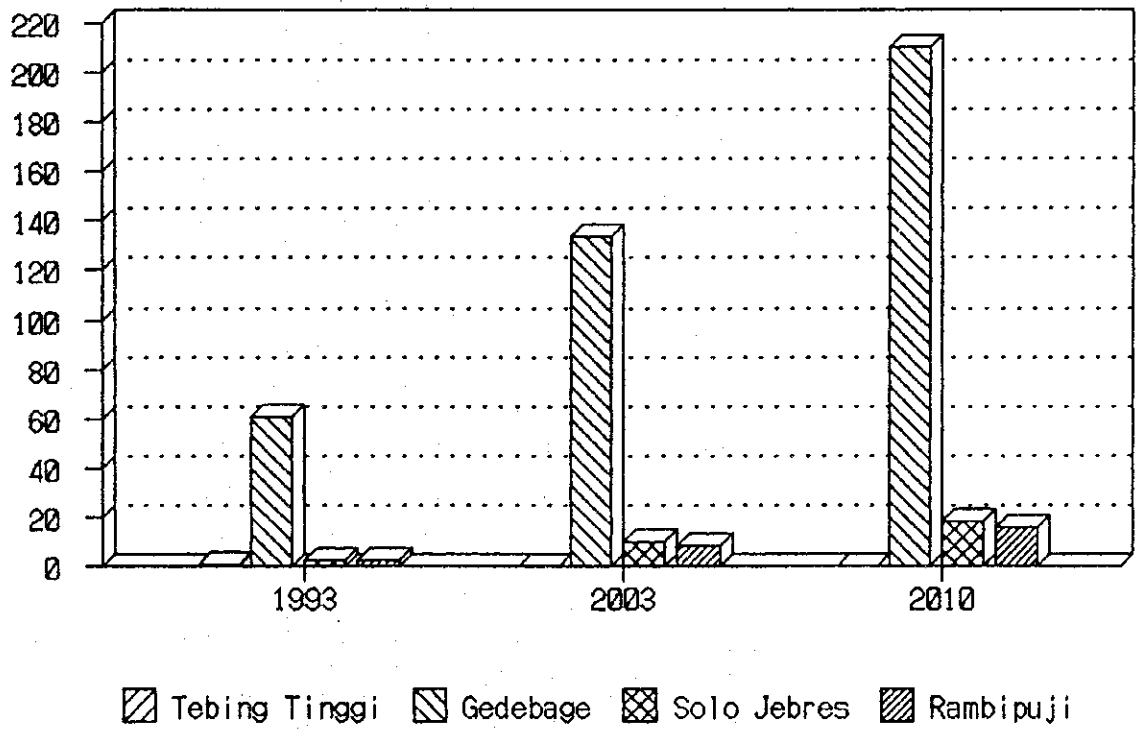


Fig. 9 Projected Container Cargo Traffic at Dry Port (Scenario 1, Unit: 1,000 TEU)

Table 5 GDP Growth Rate of the hinterland of the ports (Scenario 1)

GDP Growth Rate	1994-1998	1999-2003	2004-2008	2009-2013	2014-2018
Nation	6.2	6.6	7.1	7.8	8.7
Belawan	8.4	9.6	9	9.6	10.3
Panjang	7.5	8.1	8.1	8.1	8.2
Tg. Priok	7.9	8.4	8.9	8.1	10.6
Tg. Emas	6.5	7.1	7.2	7.2	7.2
Tg. Perak	6.1	6.6	6.8	7.1	7.5
Ujung Pandang	6.8	7.1	7.1	7.1	7

Table 6 Container Cargo Forecast for the Six Ports

Port	Classification	Container Cargo Traffic (1,000 TEU)			
		1993	2003	2010	2018
Belawan	International	152	396	668	1,298
	Domestic	0	44	208	320
	Total	152	439	876	1,618
Panjang	International	40	124	213	400
	Domestic	0	24	132	240
	Total	40	148	345	640
Tg. Priok	International	1,043	2,552	3,950	8,442
	Domestic	13	126	308	682
	Total	1,056	2,678	4,258	9,124
Tg. Emas	International	79	210	348	610
	Domestic	0	54	154	202
	Total	79	264	502	812
Tg. Perak	International	377	1,024	1,938	3,686
	Domestic	34	238	434	664
	Total	412	1,262	2,372	4,350
Uj. Pandang	International	2	78	142	250
	Domestic	46	164	270	470
	Total	47	242	412	720
Total	International	1,694	4,384	7,259	14,686
	Domestic	92	650	1,506	2,578
	Total	1,787	5,034	8,765	17,264

38. The forecast container cargo traffic throughput at the four Dry Ports, i.e. Tebing Tinggi, Gedebage, Solo Jebres, and Rambipuji, are shown in **Table 7**. It should be noted that the role of Dry Port Kertapati as dry port was over when Port of Palembang started to handle containers. **Figure 9** shows the expected increase of the container cargos at these four Dry Ports for years 2003 and 2010. It is observed that the increase of the container cargos at Gedebage Dry Port is remarkable: the railway container cargo traffic between Gedebage and Tanjung Priok will be 3.4 times the volume in 1993.

Table 7 Container cargo traffic at Dry Ports

Dry Port	Railway Container Cargo		
	1993	2003	2010
Tebing Tinggi	0.59	0	0
Gedebage	60.9	134	210
Solo Jebres	2.2	10	18
Rambipuji	2.5	8.5	16

Unit: 1,000 TEU

(3) Future World Container Network

39. In the sea routes connecting the three major economic regions, i.e., North America, Far East and Europe, shipping lines tend to employ container carriers of larger size, namely, Post Panamax Container Carrier, and limit the number of their calling ports in each region in the course of the voyage: Southeast Asia, West Asia, Mid East and Mediterranean (see **Fig. 1**).

40. With the tendency of the introduction of Post Panamax Carrier into the North America - Far East - Europe Route, it is quite prospective that the container carriers of Panamax size, i.e. the container carriers of the third generation which are presently engaged in the above mentioned route, will be used in the sea routes associated with the international trade of Indonesia, such as the sea routes between Indonesia and Far East, Australia/New Zealand, and others(see **Fig. 2**).

B. Master Plan for the Ports, Dry Ports and Connecting Railways

(1) Development Goals

41. Based on the national and regional settings and considering the development potential of the study area, the major development goals of the Nation-wide Master Plan of Container Cargo Handling Ports and Dry Ports and Connecting Railways are set as follows:

i) to propose a policy for the development of National Network of Container Cargo Handling Ports to fulfill the container cargo traffic anticipated in 2010,
ii) to formulate standard criteria of the size and equipments which fulfill the requirements for the realization of the National Network,
iii) to formulate, on the basis of above policy and criteria, a strategic development plan of container handling Ports and Dry Ports and Connecting Railways, and identify the priority ports and Dry Ports for further study of Short-term Development Plans and the feasibility analyses.

(2) Ports

a. Development Strategy for National Container Port Network

42. In the light of the following:

i) container cargo traffic volume expected in 2010 in Indonesia, which is referred to in A. (2) above,
ii) the trend of the world container network in prospect, which is referred in A. (3) above, and
iii) the existing role of Tg. Priok and Tg. Perak in the Indonesian Trade both in the direct container service and the feeder container services (see Fig. 9),

it is recommended that both Tg. Priok and Tg. Perak should be given the priority in the development policy of the National Container Port Network of Indonesia toward the first decade of the 21st century.

43. At the same time, it is worth mentioning that other major container ports, i.e., Belawan, Panjang, Tg. Emas and Ujung Pandang also be given priority in the development of the National Container Port Network. These ports will function as gateways of the regions for the international container cargos to and from major ports in Far East and Southeast Asia, as well as accommodate the oceangoing container carriers which directly call on them.

44. All the six major container ports will function as the transhipment ports between the international and the domestic container cargos (see Fig. 10).

45. On the basis of the above proposed network policy, the container ports of Indonesia are categorically classified as shown in **Table 8**.

Table 8 Classification of Container Ports

Category of Port	Port	Max. Size (in TEUs)
a. Principal Container Ports	Tg. Priok, Tg. Perak	3,000 TEUs
b. Major Container Ports	Belawan, Panjang, Tg. Emas, Uj. Pandang	1,500 TEUs
c. Local Container Ports	Other Ports	500 TEUs
d. International Hub Port	Batam	Post Panamax

b. Development Plan of Port Facilities

i) Criteria of container terminal

46. In accordance with the classification of the ports shown in **Table 8**, the berth criteria **A-1** through **A-3** and **B-1** and **B-2** are introduced. Berth Types **A-1**, **A-3** and **A-3** are intended to accommodate international container carriers of different sizes. **Types B-1** and **B-2** are intended to be a standard dimension of the domestic container berths: Type **B-1** is for the hub ports, i.e. the Principal and the Major Container Ports, and Type B-2 is for the domestic container berth of the Local Container Ports. The difference among **A-1**, **A-2** and **A-3** is the Maximum size of the container carriers which can berth, and the difference between B-1 and B-2 is the handling capacity at the berth: B-1 is

equipped with a couple of gantry crane while B-2 is not. The maximum ship size, berth dimensions are listed in **Table 9**.

Table 9 Type of berths, ship and berth dimensions

Type	TEU	DWT	Ship			Berth	
			Length	Beam	Draft	Length	Depth
A-1	3,000	40,000	250	32	11.6	300	-13.5
A-2	1,500	25,000	195	28	10.3	250	-12.0
A-3	750	15,000	162	24	8.7	200	-10
B-1 & B-2	500	10,000	137.5	21	7.5	175	- 9

47. The container cargo handling capacities for each type of berth are estimated as shown in **Table 10**. The container handling equipments needed for respective container berths are listed in **Table 11**. These criteria of the Berth and Equipment are schematically exhibited in **Fig. 12**.

48. The container cargo handling capacity of the existing facilities of the major container ports are estimated on the basis of the same assumption as that is used for the above mentioned Berth Criteria. The results are shown in **Table 12**.

c. Implemantaion plan of the facilities.

49. On the basis of the container cargo traffic forecast (**Table 6**) and the criteria of container berths (**Table 10**), the necessary number of container berths are calculated for the several stages of development: for the years of 1998, 2003 and 2010. The results are shown in **Table 13**. In the case of Tanjung Priok, four alternative plans are proposed (see **d. i)** Layout plan). Numbers of new berths and yard space needed in addition to those presently existing are exhibited in **Tables 14** and **15**, respectively. The number of berth which will be required in 2010 at other local container ports are shown in **Table 16** together with the container cargo traffic expected in 2010.

50. The construction schedule to meet the growth of the container traffic at the six ports are exhibited in **Fig. 13-(1)** through **13-(6)**.

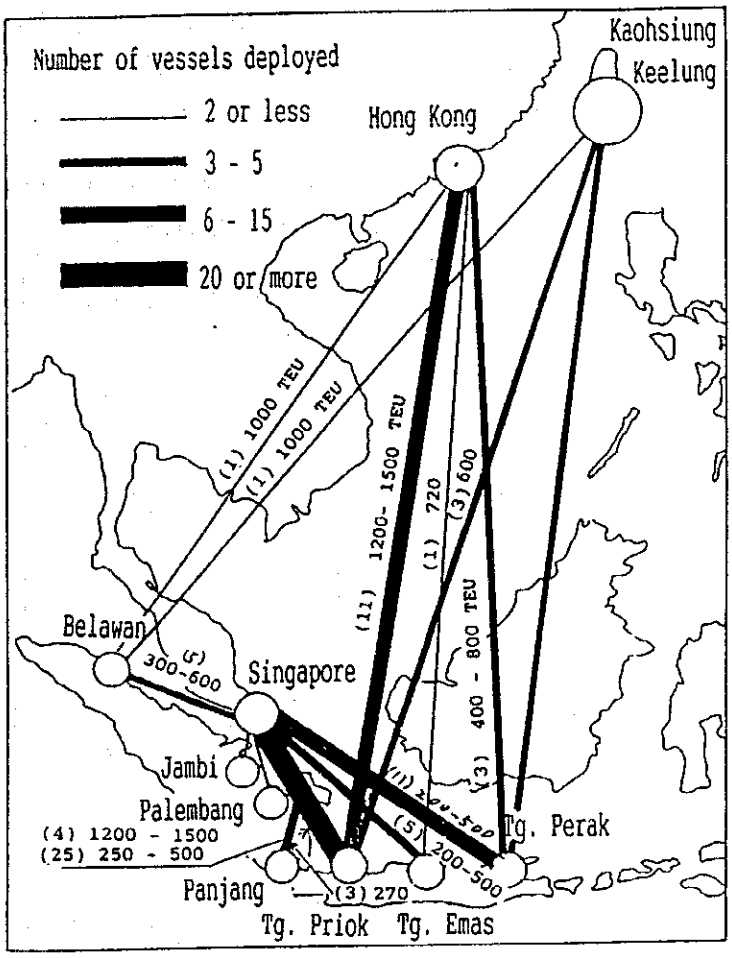


Fig. 10 Feeder service routes for International containers and number and size of ships deployed

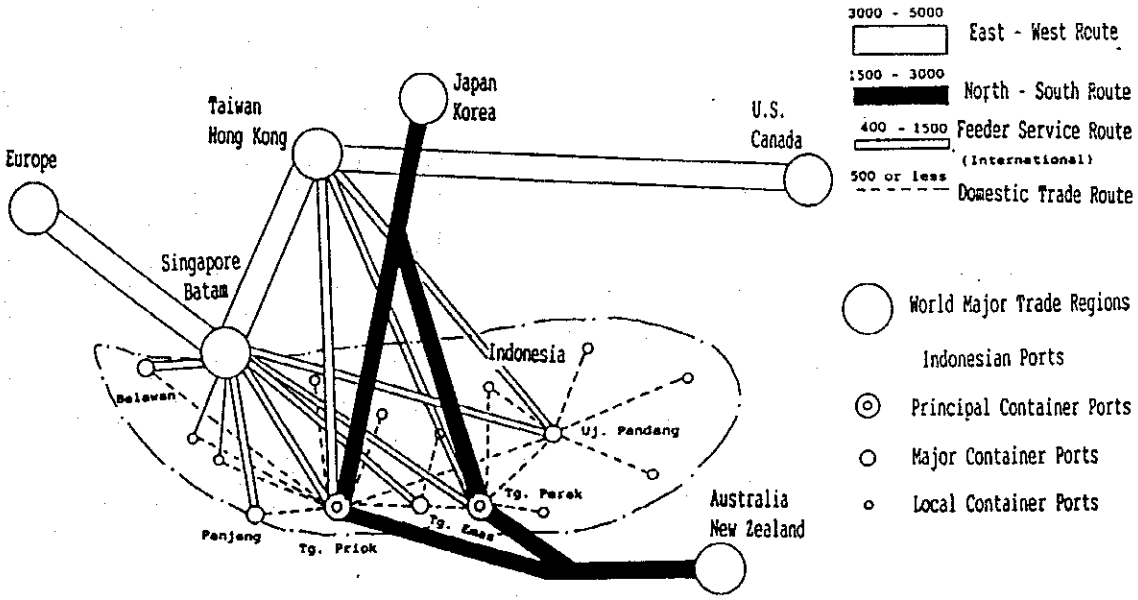


Fig. 11 World Container Service New Work with relation to Indonesian Trade and Ship Sizes Anticipated in 2010

Table 10 Criteria of Cargo handling capacity at berth and required Yard and CFS area

Type	Ship Capacity	Berth		Handl. Capa. at berth(1,000TEU/Y)	Terminal area (ha)	Yard area(ha)	CFS Area (sqm)
		Length(m)	Depth(m)				
International							
A-1	3000 TEU, 40,000 DWT Japan-Indonesia	300	-13.5	332	12.3	10.5	18,000
A-2	1500 TEU, 25,000 DWT Intra Asia feeder	250	-12.0	274	9.9	8.5	14,000
A-3	750 TEU, 15,000 DWT Singapore feeder	200	-10.0	183(1 berth only) 211(2 or more)	6.9 8.0	5.9 6.9	10,000 11,000
Domestic							
B-1	500 TEU Full Container	170	- 9.0	162	5.4	4.6	8,000
B-2	500 TEU Multi purpose berth	170	- 9.0	79	4.7	4.0	7,000

Table 11 Criteria of Container Cargo handling equipments

Berth Type		Number of Units				
		Gantry Crane	Yard Transfer crane	Sidelifter	Tractor Head	Chassis
International Container Terminal						
A-1		3	9.0	2.2	11.8	23.6
A-2		2	6.6	1.8	9.8	19.5
A-3	2 berth	2	5.4	1.5	8.1	16.3
	1 berth	2	4.4	1.2	6.7	13.4
Domestic Container Terminal						
B-1		2	4.2	2.2	7.3	14.3
B-2		-	3.4	0.8	2.6	5.3

Table 12 Handling Capacity of Existing Facilities

Ports	Container Handling Facilities	Handling Capacity(x 1,000)	Stand up to
Belawan(Existing)	Berth:500m, Crane:2, Yard:9.46 ha	127 Box(184 TEU)/Yr	1994
Panjang(New Terminal)	Berth:300m,Crane:2,Yard:6.55ha	116 Box(145 TEU)/Yr	2003-2010
Tg. Priok(Existing)	CT-1:Berth;820m,Crane;8,Yard:19.5 ha CT-2:Berth;360m,Crane;4,Yard;8.42 ha	CT-1: 578 Box (809 TEU)/Yr CT-2: 261 Box (344 TEU)/Yr Total:839 Box(1,153 TEU)/Yr	1993
Tg. Emas(New Terminal)	Berth:345m,Crane:2,Yard:5.4 ha	140 Box(196 TEU)/Yr	1999-2004
Tg. Perak(Existing)	Berth:500m,Crane:3,Yard:12.47ha	254 Box(368 TEU)/Yr	1992
Uj. Pandang(New Terminal)	Berth:490m,Crane:2,Yard:5.02 ha	116 Box(145 TEU)/Yr	1999-2002

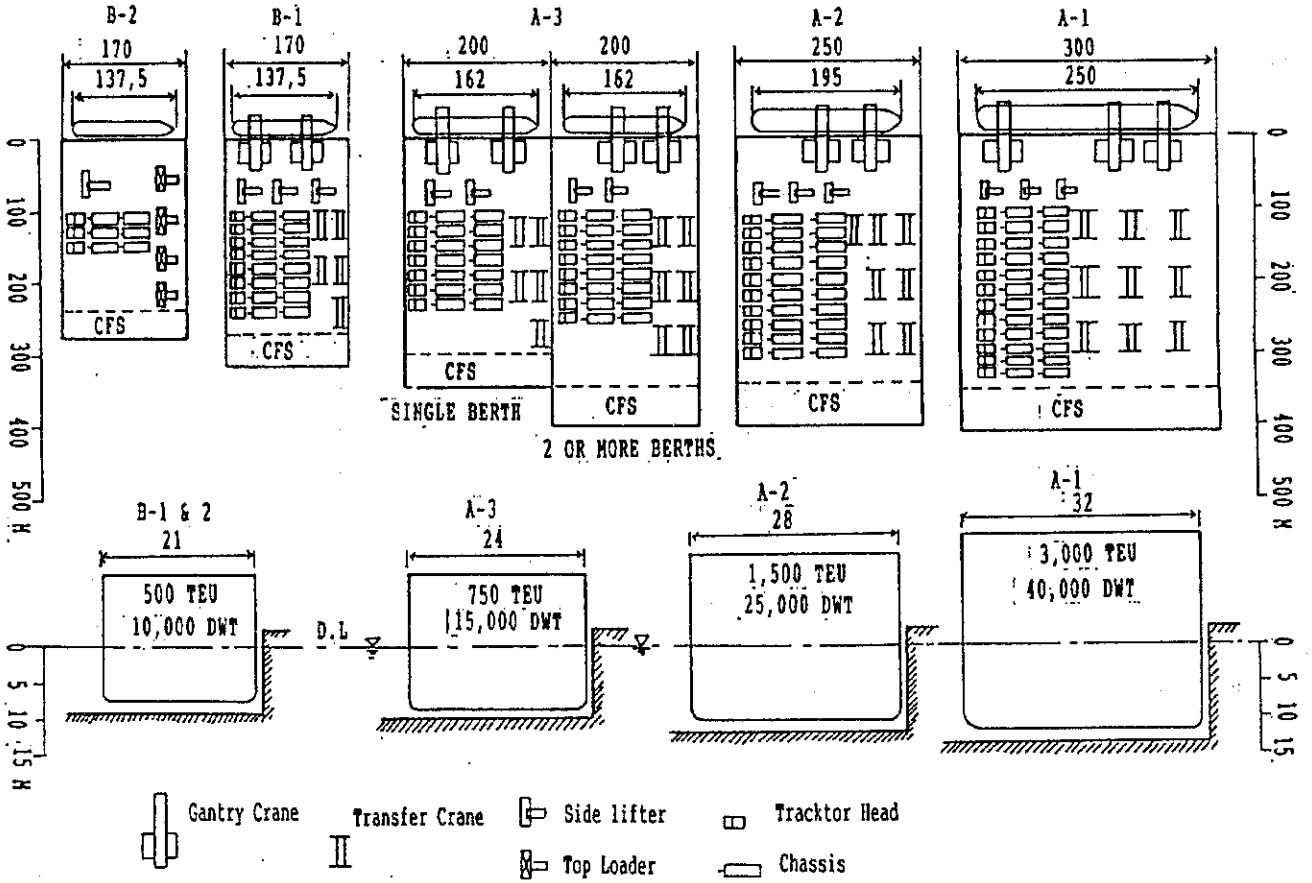


Fig. 12 Criteria of Container Berths

Table 13 Necessary number of berths, Yard and CFS Area

Ports	Berth number, Yard, CFS area and total terminal area															
	1993				1998				2003				2010			
	Berth Type:No	Yard (ha)	CFS 1000 sqm	Total ha	Berth Type:No	Yard ha	CFS 1000 sqm	Total ha	Berth Type:No	Yard ha	CFS 1000 sqm	Total ha	Berth Type:No	Yard ha	CFS 1000 sqm	Total ha
Belawan International	A-3:1	5.9	10	9.9	A-3:2	13.8	22	16.0	A-2:1	8.5	14	9.9	A-2:2	17.0	28	19.8
									A-3:1	5.9	10	6.9	A-3:1	5.9	10	6.9
									Total 2	14.4	24	16.8	Total 3	22.9	38	26.7
Domestic	-				-				Conv. 1				B-1:1	4.6	8	5.4
													B-2:1	4.0	7	4.7
													Total 2	8.6	15	10.1
Panjang International	B-2:1	4.0	7	4.7	A-3:1	5.9	10	6.9	A-3:1	5.9	10	6.9	A-2:1	8.5	14	9.9
Domestic	-				-				B-2:1	4.0	7	4.7	B-1:1	4.6	8	5.4
Tanjung Priok Alternative 1 & 2 International	A-2:1	8.5	14	9.9	A-2:4	34.0	56	39.6	A-2:6	51.0	84	59.4	A-1:3	31.5	54	36.9
	A-3:5	34.5	55	40.0	A-3:4	27.6	44	32.0	A-3:5	34.5	55	40.0	A-2:6	51.0	84	59.4
	Total 6	43.0	69	49.9	Total 8	61.6	100	71.6	Totl 11	85.5	139	99.4	A-3:6	41.4	66	48.0
													Totl 15	123.5	204	144.3
Domestic	Conv. 1				B-2:1	4.0	7	4.7	B-2:2	8.0	14	9.4	B-1: 2	9.2	16	10.8
Tanjung Priok Alternative 3 International	A-2:2	17.0	28	19.8	A-2:4	34.0	56	39.6	A-2:5	42.5	70	49.5	A-2:7	59.5	98	69.3
	A-3:3	20.7	33	24.0	A-3:4	27.6	44	32.0	A-3:2	13.8	22	19.8	A-3:4	27.6	44	32.0
	Total 5	37.7	61	43.8	Total 8	61.6	100	71.6	Total 7	56.3	92	69.3	Totl 11	87.1	142	101.4
Domestic	-				-				B-1:1	4.6	8	5.4	B-1:1	4.6	8	5.4
													B-2:1	4.0	7	4.7
													Totl 2	8.6	15	10.1
Bojonegara International									A-2:2	17.0	28	19.8	A:1:3	31.5	24	36.9
									A-3:2	13.8	22	16.0	A-2:1	8.5	14	9.9
									Total 4	30.8	50	35.8	Total 4	40.0	38	46.8
Domestic									B-2:1	4.0	7	4.7	B-1:1	4.6	8	5.4

Table 13(Continuation) Necessary number of berths, Yard and CFS Area

Ports	Berth number, Yard, CFS area and total terminal area															
	1993				1998				2003				2010			
	Berth Type:No	Yard (ha)	CFS 1000 sqm	Total ha	Berth Type:No	Yard ha	CFS 1000 sqm	Total ha	Berth Type:No	Yard ha	CFS 1000 sqm	Total ha	Berth Type:No	Yard ha	CFS 1000 sqm	Total ha
Tanjung Priok	A-2:2	17.0	28	19.8	A-2:4	34.0	56	39.6	A-2:3	25.5	42	29.7	A-2:3	25.5	42	29.7
Alternative 4	A-3:3	20.7	33	24.0	A-3:4	27.6	44	32.0	A-3:4	27.6	44	32.0	A-3:4	27.6	44	32.0
International	Total 5	37.7	61	43.8	Total 8	61.6	100	71.6	Total 7	53.1	86	61.7	Total 7	53.1	86	61.7
Domestic	Conv. 1				B-2:1	4.0	7	4.7	B-1:1	4.6	8	5.4	B-1:1	4.6	8	5.4
													B-2:1	4.0	7	4.7
													Total 2	8.6	15	10.1
Bojonegara	-				A-3:2	13.8	22	19.8	A-2:2	17.0	28	19.8	A-1:3	31.5	54	36.9
InterNational									A-3:2	13.8	22	16.0	A-2:3	25.5	42	29.7
									Total 4	30.8	50	35.8	A-3:2	13.8	22	19.8
													Total 8	70.8	118	86.4
Domestic	-				B-2:1	4.0	7	4.7	B-2:1	4.0	7	4.7	B-1:1	4.6	8	5.4
Tg. Emas	B-2:1	4.0	7	4.7	A-3:1	5.9	10	8.0	A-2:1	8.5	14	9.9	A-2:1	8.5	14	9.9
International													A-3:1	5.9	10	6.9
													Total 2	14.4	24	16.8
Domestic	-				Conv. 1				B-2:1	4.0	7	4.7	B-1:1	4.6	8	5.4
Tg. Perak	A-3:2	13.8	22	16.0	A-2:1	8.5	14	9.9	A-2:2	17.0	28	19.8	A-1:1	10.5	18	12.3
International					A-3:2	13.8	22	16.0	A-3:3	20.7	33	24.0	A-2:4	34.0	56	39.6
					Total 3	22.3	36	27.9	Total 5	37.7	61	43.8	A-3:3	20.7	33	24.0
													Total 8	62.5	107	75.9
Domestic	B-2:1	4.0	7	4.7	B-2:2	8.0	14	9.4	B-1:2	9.2	16	10.8	B-1:3	13.8	24	16.2
Uj. Pandang,	B-2:1	4.0	7	4.7	A-3:1	5.9	10	6.9	A-3:1	5.9	10	6.9	A-2:1	8.5	14	9.9
International &									B-2:1	4.0	7	4.7	A-3:1	5.9	10	6.9
Domestic									Total 2	9.9	17	11.6	Total 2	14.4	24	16.8

Table 14 Berth requirement

Port		Existing & under construction		2003				2010			
		Berth		Required			Need	Required			Need
		Length(m)	Depth(m)	Length(m)	Depth(m)	Unit		Length(m)	Depth(m)	Unit	
Belawan		500 350*	-11 -10	250 200 170	-12 -10 - 9	1 1 1	Deepening of A-2 berth Construction of 1 domestic berth w/o crane	250 200 170	-12 -10 - 9	2 1 2	200m extension for A-2 berth & 2 domestic berths: one domestic w/crane
Panjang		300	-12	250 170	-12 - 9	1 1	none	250 170	-12 - 9	1 1	one domestic berth w/crane
Tg Priok Alternative 1 & 2	Tg. Priok	820 360	-11 - 8	250 200 170	-12 -10 - 9	6 5 2	New berths:250mx-12x6, 200x- 10x2, w/cranes, and exising 360x- 8 converted to 2 domestic berths w/o cranes	300 250 200 170	-13.5 -12 -10 - 9	3 6 6 2	new berths: 300mx13.5x3, 250mx- 12x6 w/cranes, and 2 domestic berths w/cranes
Tg Priok Alternative 3	Tg. Priok	820 360	-11 - 8	250 200 170	-12 -10 - 9	2 1 1	New Berths:250mx-12x2, 200mx-10x1 and one domestic berth w/crane	250 200 170	-12 -10 - 9	4 1 2	New berths:250mx-12x4, Domestic berths: one w/crane, one w/o crane
	Bojonegara	-	-	250 200 170	-12 -10 - 9	2 2 1	New berths:250m-12x2, 200mx-10x2 and 1 Domestic berth w/o crane	300 250 170	-13.5 -12 - 9	3 1 1	New berths: 300mx-13.5x3, 250mx-12x1 and 1 domestic berth w/crane
Tg. Priok Alternative 4	Tg. Priok	820 360	-11 - 8	250 200 170	-12 -10 - 9	3 4 1	New berths:250mx-12mx3 exist. 360mx-8 converted to 2 domestic berths	250 200 170	-12 -10 - 9	3 4 2	New berths: 250mx-12x3, Cranes for a domestic berth
	Bojonegara	-		250 200 170	-12 -10 - 9	3 2 1	New berths: 250mx-12x3, 200mx-10x2 and one domestic berth w/o crane	300 250 200 170	-13.5 -12 -12 - 9	3 3 2 1	New berths:300mx-13.5mx3, 250mx-12mx3 and 200mx-10mx2 One domestic berth w/crane
Tg. Emas		345 605*	-10	250 170	-12 - 9	1 1	none	250 200 170	-12 -10 - 9	1 1 1	new berth: 250m x -12x1, and 1 domestic berth w/crane
Tg Perak		500	-11	250 200 170	-12 -10 - 9	2 3 2	250mx-12x2, 200mx-10x1 and 2 domestic berths w/crane	300 250 200 170	-13.5 -12 -10 - 9	1 4 3 3	300mx-13.5x1, 250mx-12x4 200mx-10x1, and 3 domestic berths w/cranes
Uj Pandg		490	-10	250 200	-12 -10	1 1	none	250 200	-12 -10	1 1	none

Note: * in the column of existing berth denotes the berth lengths of multi-purpose wharves.

Table 15 Requirement of yard and CFS area

Port		Existing & under construction		2003			2010		
		Yard		Required		Need	Required		Need
		Yard(ha)	CFS(sqm)	Yard(ha)	CFS(sqm)		Yard(ha)	CFS(sqm)	
Belawan		9.46 -	6,240 -	14.4 -	24,000 -	Yard expansion 4.94ha	22.9 8.6	38,000 15,000	Yard expansion 13.44 ha and 8.6 ha for Domestic yard
Panjang		10.05 -	24,400 -	5.9 4.0	10,000 7,000	enough area is available both for yard and CFS	8.5 4.6	14,000 8,000	need 3.05 ha for domestic yard
Tg Priok Alternative 1 & 2	Tg. Priok	28 -		85.5 8.0	139,000 14,000	Yard expansion 57.5 ha and domestic yard 8.0 ha	123.5 9.2	204,000 16,000	Yard expansion 95.5 ha domestic yard 9.2 ha
Tg. Priok Alternative 3	Tg. Priok	28 -		56.3 4.6	92,000 8,000	Yard expansion: 28.3 ha Domestic yard 4.6 ha	87.1 8.6	142,000 15,000	Yard expansion 59.1 ha Domestic yard 8.6 ha
	Bojonegara	- -	- -	30.8 4.0	50,000 7,000	Yard construction 30.8 ha Domestic yard 4.0 ha	40.0 4.6	38,000 8,000	Yard expansion to 40.0 ha Domestic yard 4.6 ha
Tg Priok Alternative 4	Tg. Priok	28 -		53.1 4.6	86,000 8,000	Yard expansion 25.1 ha domestic yard 4.6 ha	53.1 8.6	86,000 15,000	Yard expansion 25.1 ha, and domestic yard 8.6 ha
	Bojonegara	-	-	30.8 4.0	50,000 7,000	Total 34.8 ha is needed	70.8 4.6	118,000 8,000	Total 70.8 ha is needed
Tg. Emas		8.34 -		8.5 4.0	14,000 7,000	Yard expansion 4.16 ha for Domestic yard	14.4 4.6	24,000 8,000	Yard expansion 6.06ha and domestic yard 4.6 ha
Tg Perak		15.4 -		37.7 9.2	61,000 16,000	Yard expansion 22.3 ha and domestic yard 9.2 ha	62.5 13.8	107,000 24,000	Yard expansion 47.1 ha and domestic yard 13.8 ha
Uj Pandg		5.02		9.9	17,000	Yard expansion 4.88 ha	14.4	24,000	Yard expansion 9.38 ha

Upper row: International Container Terminal
Lower row: Domestic Container Terminal

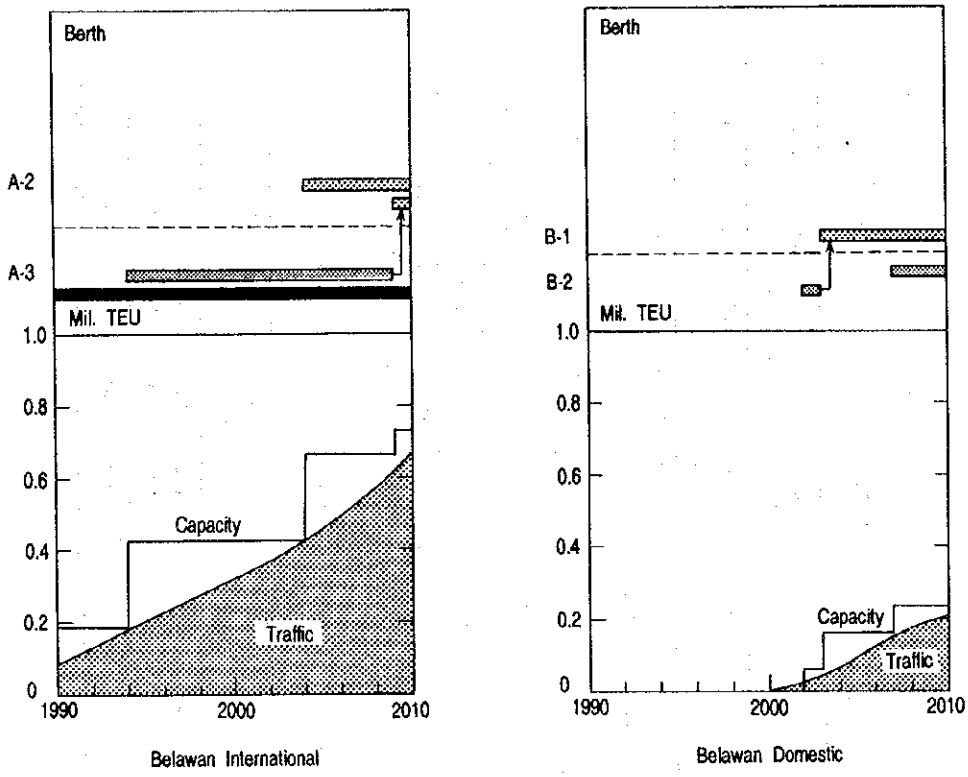


Fig. 13(1) Container Cargo Traffic and Container Berth Construction Plan (1): Belawan

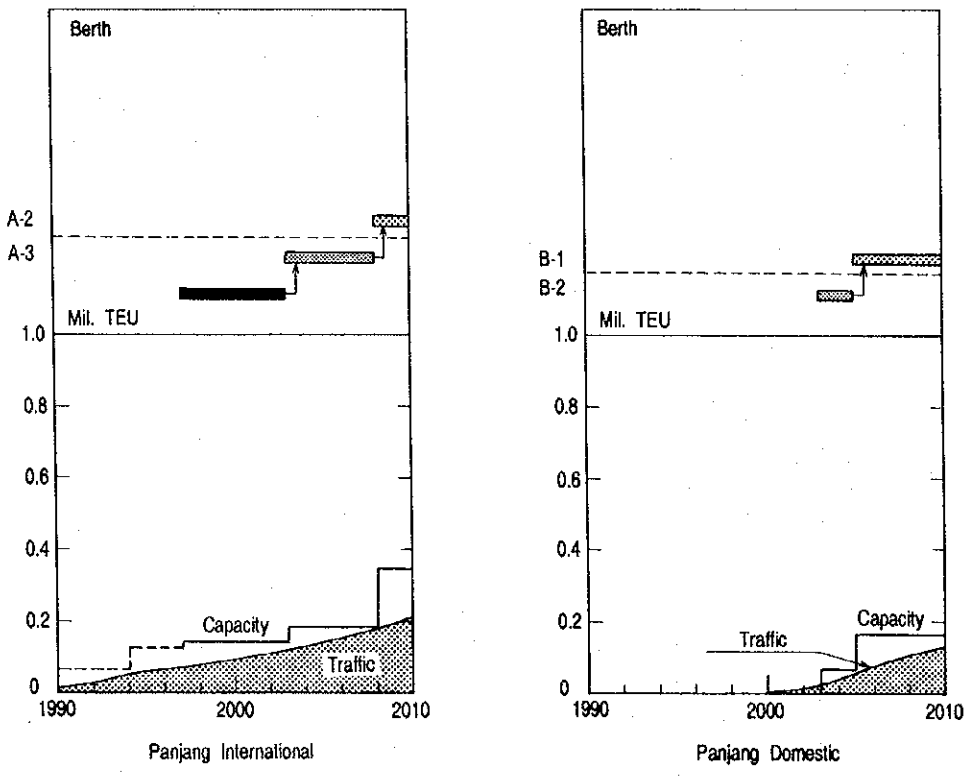


Fig. 13(2) Container Cargo Traffic and Container Berth Construction Plan (2): Panjang

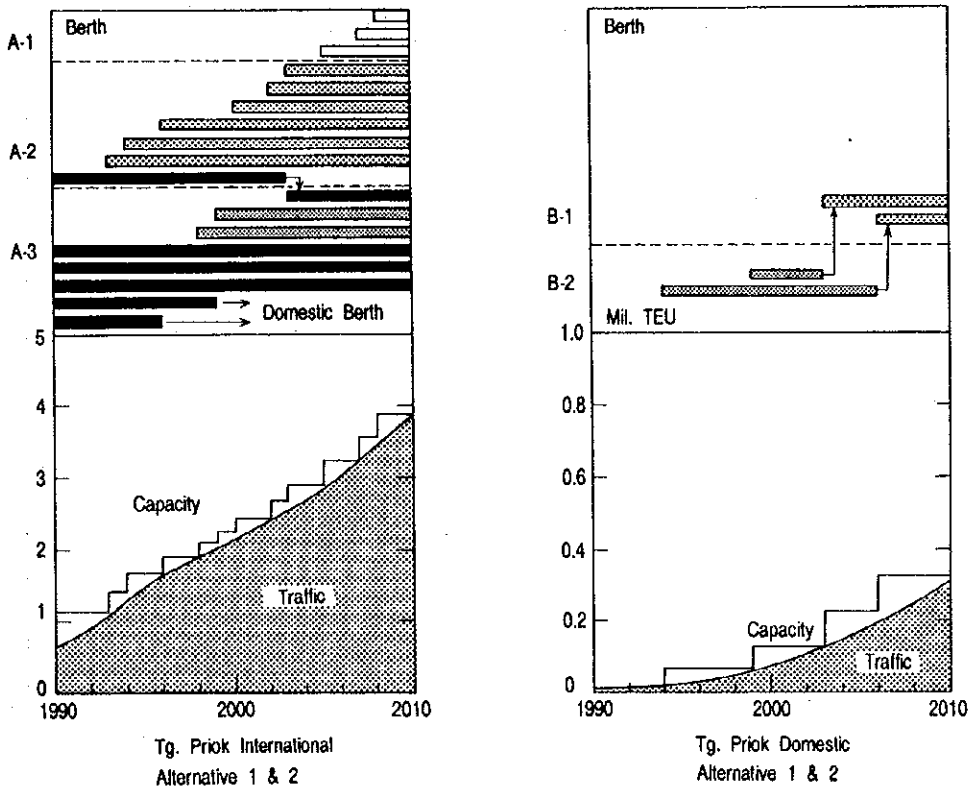


Fig. 13(3)-1 Container Cargo Traffic and Container Berth Construction Plan (3-1): Tanjung Priok (Alternative 1 & 2)

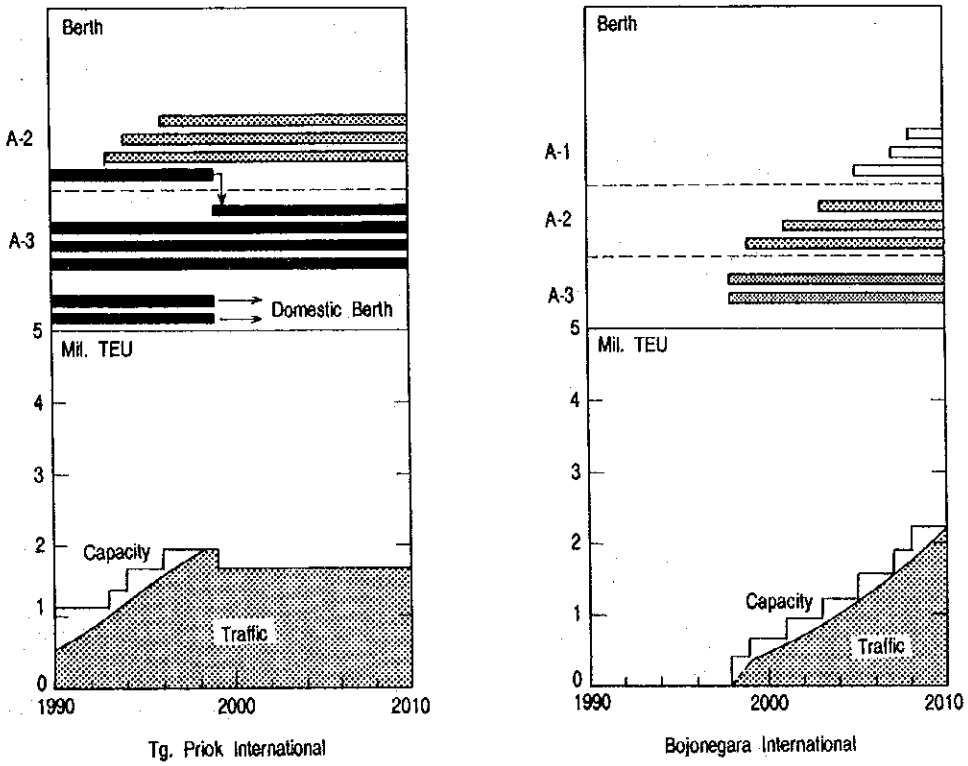


Fig. 13(3)-2 Container Cargo Traffic and Container Berth Construction Plan (3-2): Tanjung Priok in Combination with Bojonegra Port (Alternative 3)

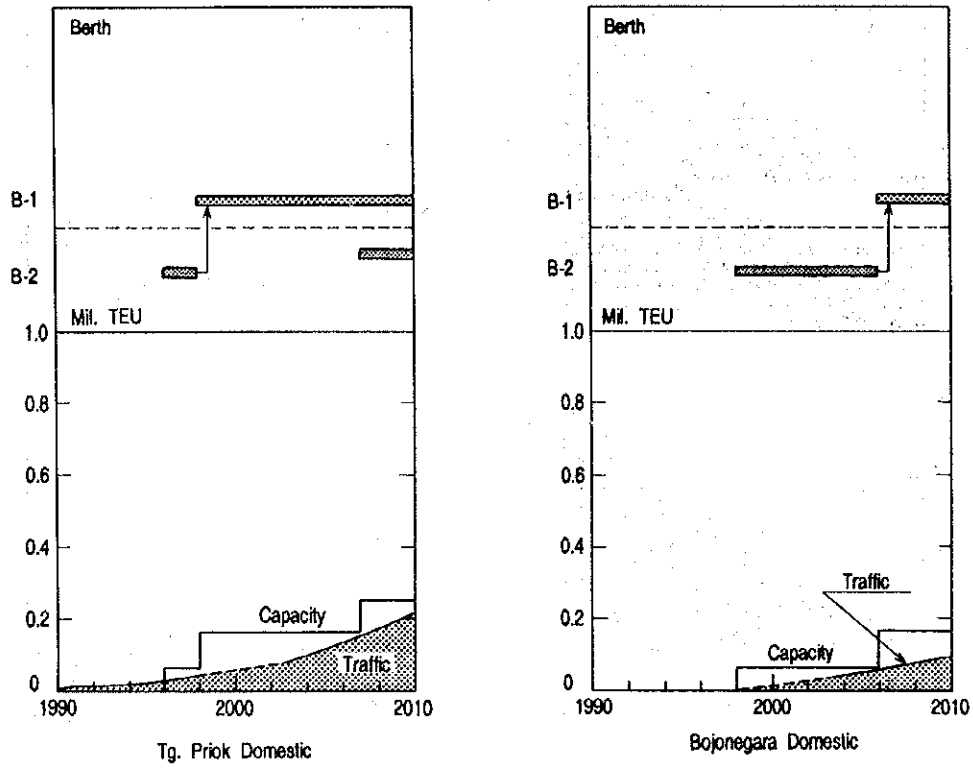


Fig. 13(3)-3 Container Cargo Traffic and Container Berth Construction Plan (3-4): Tanjung Priok in Combination with Bojonegara Port (Domestic Berths for Alternative 3 & 4)

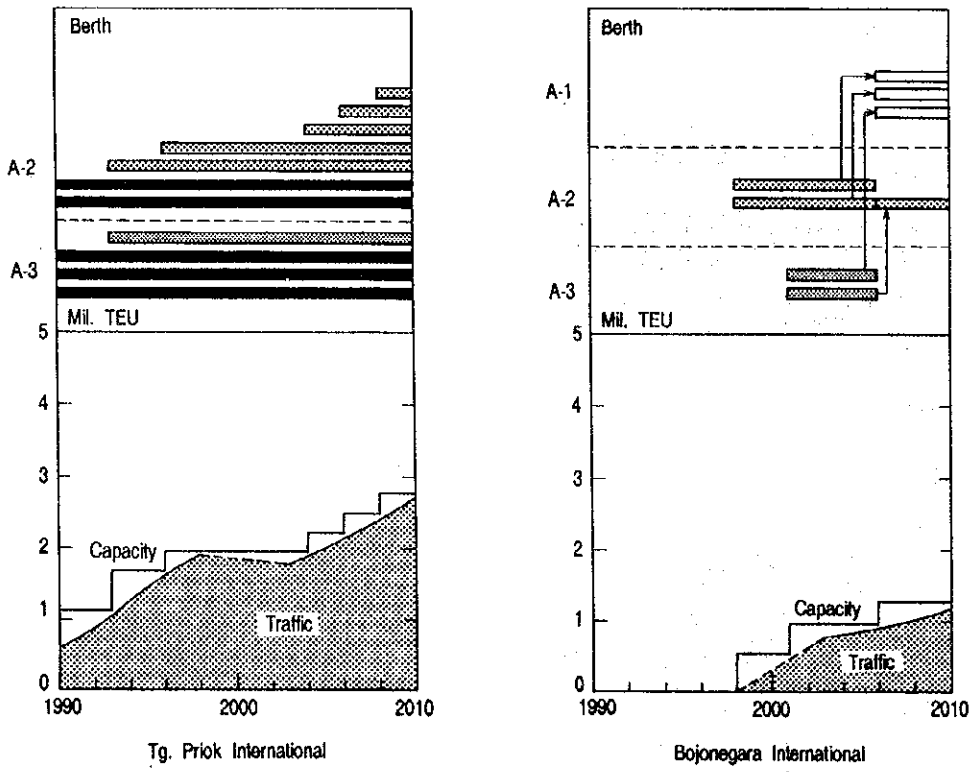


Fig. 13(3)-4 Container Cargo Traffic and Container Berth Construction Plan (3-3): Tanjung Priok in Combination with Bojonegara Port (Alternative 4)

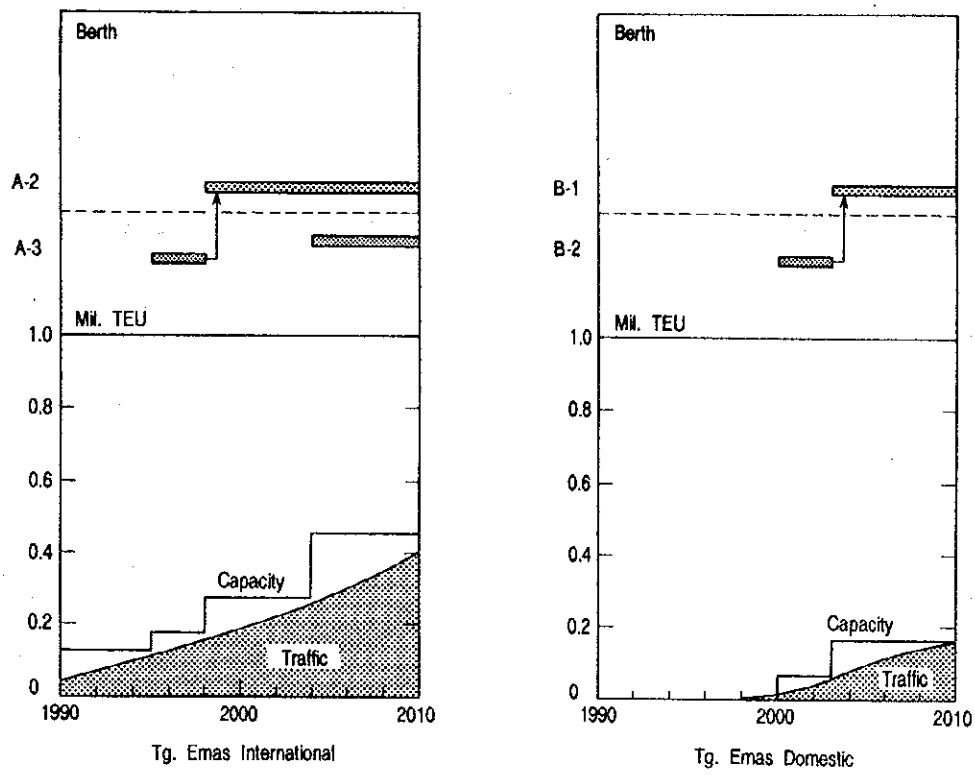


Fig. 13(4) Container Cargo Traffic and Container Berth Construction Plan (4): Tanjung Emas

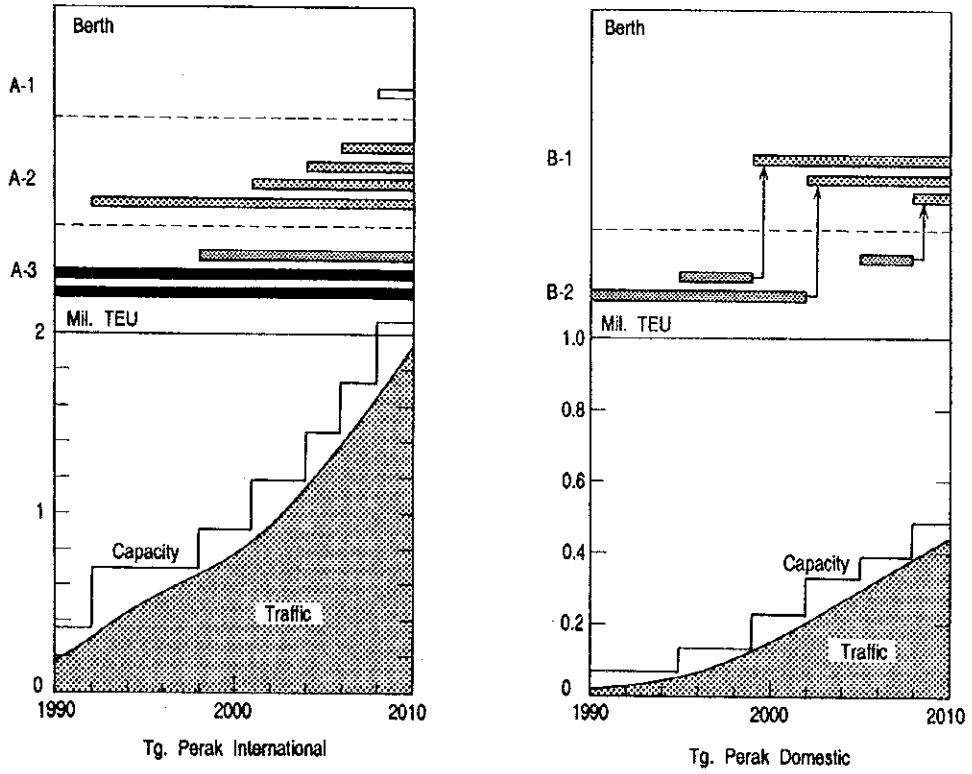


Fig. 13(5) Container Cargo Traffic and Container Berth Construction Plan (5): Tanjung Perak

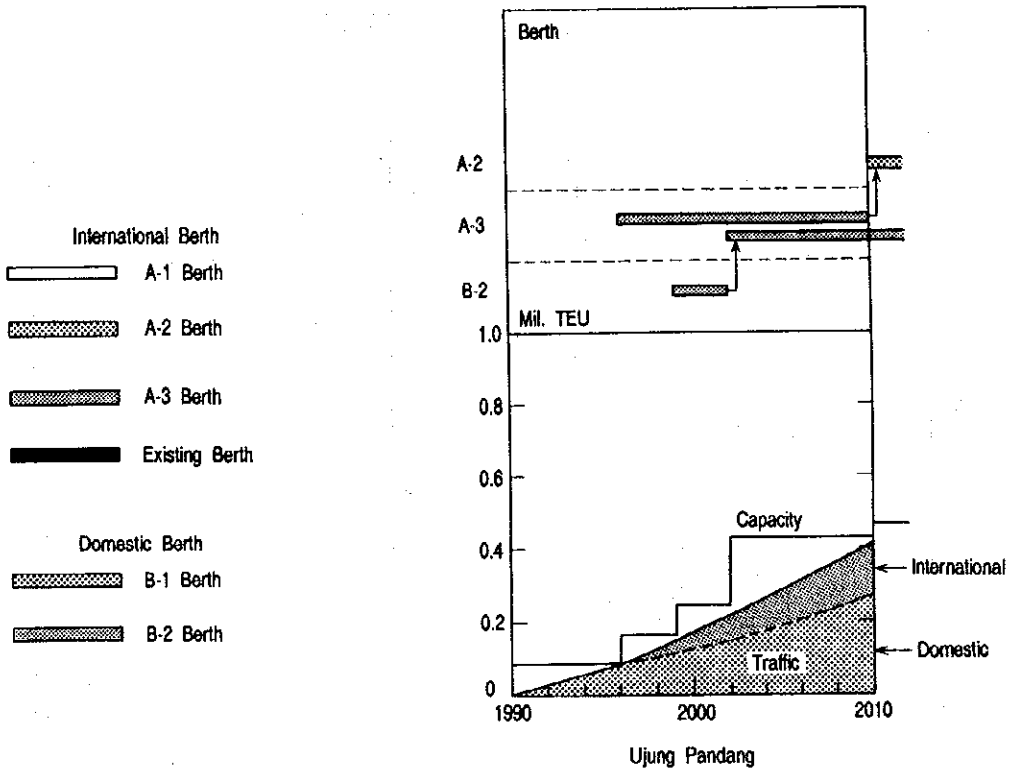


Fig. 13(6) Container Cargo Traffic and Container Berth Construction Plan (6): Ujung Pandang

Table 16 Container cargo Traffic and required berths in 2010 in Local Container Ports

Region	Port	Container Traffic Vol. (TEU)	Required Berths, Yard, CFS and Total Terminal area			
			Berth	Yard (ha)	CFS (sqm)	Total (ha)
Sumatra	Palembang	87,864	B-2:1	4.0	7,000	4.7
	Dumai, Teluk Bay	202,680	B-2:3	12.0	21,000	14.1
	Jambi Benkulu	60,322	B-2:1 Conv.	4.0	7,000	4.7
Java	Cilacap, Cirebon	14,224	Conv.	-	-	-
Kalimantan	Banjarnasin, Balikupapan, Samarinda	388,168	B-2:5	20.0	35,000	23.5
	Pontianak	81,399	B-2:2	8.0	14,000	9.4
Sulawesi	Pare-pare, Pantroan, Kendar	108,096	B-2:2	8.0	14,000	9.4
	Bitung	33,470	Conv.	-	-	-
Nusa Tenggara	Lamber, Kupang, Dili	110,268	B-2:2	8.0	14,000	9.4
Maluku & Irian Jaya	Ternate, Ambon, Solong, Biak, Jayapura	47,338	Conv.	-	-	-
Total		1,130,829	B-2:16	64.0	112,000	75.2

d. Preliminary design and Cost estimate

i) Layout Plan

51. The following are brief explanations of the layout plans and the results of the Preliminary Design drawn as a part of the Master Plan for the year 2010 for six (6) Major Ports.

a) Scale of port facilities

52. Based on the study results from the long term development plan, the scale of container port facilities required to be built for the year 2010 are summarized in **Table 17**. The size of the Container ships and the relevant berth dimensions are the same as those in **Table 9**.

Table 17 Required Berth Extension

Name of Port	Berth Type	Berth Number	Berth Length	Berth Width	Quay Depth	Structure
Belawan	A-2	1	250m	30m	-12m	Deck on Pile
	B-1	1	170m	25m	-9m	Deck on Pile
Panjang	B-1	1	170m	25m	-9m	Deck on Pile
Tanjung Priok	A-1	3	300m	30m	-13.5m	Deck on Pile
Alternative 1	A-2	6	250m	30m	-12m	Deck on Pile
Alternative 2	A-3	2	200m	30m	-10m	Deck on Pile
Tanjung Priok Alternative 3	A-2	7	250m	30m	-12m	Deck on Pile
and Bojonegara	A-1	3	300m	30m	-13.5m	Deck on Pile
	A-2	1	250m	30m	-12m	Deck on Pile
	B-1	1	170m	25m	-9m	Deck on Pile
Tanjung Priok	A-2	3	250m	30m	-12m	Deck on Pile
Alternative 4	A-1	3	300m	30m	-13.5m	Deck on Pile
and Bojonegara	A-2	3	250m	30m	-12m	Deck on Pile
	A-3	2	200m	30m	-10m	Deck on Pile
	B-1	1	170m	25m	-9m	Deck on Pile
Tanjung Emas	A-2	1	250m	30m	-12m	Deck on Pile
	B-1	1	170m	25m	-9m	Deck on Pile
Tanjung Perak	A-1	1	300m	30m	-13.5m	Deck on Pile
	A-2	2	250m	30m	-12m	Deck on Pile
	A-3	3	200m	30m	-10m	Deck on Pile
	B-1	3	170m	25m	-9m	Deck on Pile
International Port	A-1	4	1200m	30m	-13.5m	
	A-2	10	2500m	30m	-12m	
	A-3	5	1000m	30m	-10m	
Sub-total		19	4700m			
Domestic Port	B-1	6	1020m	25m	-9m	
Total		25	5720m			

b) Design criteria

53. In Indonesia, particularly at the six (6) objective port areas, natural phenomena such as seismic force, wave action and wind pressure are generally moderate except for the soil conditions at Belawan, Tg. Priok, Tg. Emas, and Tg. Perak where very thick soft soil strata exists this results in relatively high construction costs for berth structures, reclamation, and building foundations. Subsequently, due to the existence of a broad offshore shoal spread at Belawan, Tg. Priok, Tg. Emas and Tg. Perak, large volumes of dredging are required not only for initial construction but also for maintenance of the navigation channels. The Ports of Belawan and Tg. Perak have 12 km and 46 km long navigation channels respectively. The discrepancies in design standards between Indonesia and other countries were also considered in this Study, as described in following sections.

54. As a result the of preliminary design, and taking the above conditions and economical aspects into consideration, concrete deck on pile type structures were recommended for the expansion of the berths, except for Ujung Pandang where a gravity type might be adopted.

c) Proposed layout plans

55. Based on above mentioned "Scale of port facilities", layout plans for individual ports were prepared. For Tg. Priok Port, among others, four (4) alternative layout plans in combination with the Bojonegara Port site were determined (**See APPENDIX B**).

d) Navigation channel

56. Width of navigation channel

To determine the width of the navigation channels, the Indonesian Design Criteria requires [(4B to 7B) + 30m,] where B=Beam of objective ship, while the Japanese design Standard calls for [Lto1.5L] where L=length of objective ship]. Taking the natural phenomena and operation conditions of individual ports into consideration, 1.0XL was recommended in this Study for the width of the navigation channels.

57. Depth of the navigation channel and relevant dredging volume

Two(2) alternative depth criteria for navigation channels and port basins were considered:

(a) Required water depth determined below LWS(Low Water Spring), and
(b) required water depth determined below MSL(Mean Sea Level).

58. The required dredging volumes for individual ports using the by above alternative depths are summarized in **Table 18** below.

e) Scale of handling equipment

59. The required numbers of container cargo handling equipment to be purchased is summarized in **Table 19.**

ii) Cost estimate

60. Based on the aforementioned scale of port facilities, including on-land facilities utilities and container cargo handling equipment, the project cost was estimated for individual ports and is summarized in **Table 20** and **Fig. 14.** The costs of the four alternatives plans of Tg. Priok Port including Bojonegara are summarized Separate in **Table 21** and **Fig. 15.**

Table 18 Summary of dredging Volume

(x 1,000 cu. m)

Name of Port		Dredging volume by depth below	
		(A) L.W.S.	(B) M.S.L.
Belawan		11,890	5,190
Panjang		0	0
Tg. Priok	(Ail. I) Off-shore	8,280	7,540
	(Alt. II) West side	11,810	10,980
	(Alt. III) Tg. Priok	5,140	3,450
	(Alt. IV) Tg. Priok	3,960	2,950
	(Alt. III) Bojonegara	3,040	2,700
	(Alt. IV) Bojonegara	4,120	3,700
Tg. Emas		12,860	11,720
Tg. Perak		13,670	6,740
Uj. Pandang		685	438

61. The following items are not included in the above cost estimation.

a) Belawan:
Cost for transfer and demolition of the existing Pertamina oil pier

b) Tg. Priok (Alternatives I and III):
1) Construction cost for the approach road connection between the container yard and the new Harbor Road (Toll way).
(See **Fig. 16**)
2)-1. Transfer cost of the Bogasari flour mill factory and the Pertamina oil berths.
It should be noted that the proposed bridge connecting between the existing land and the proposed artificial island is a low level (approx.3.5 to 4 m above LWS) trestle, and thus large ships will not be able to pass.
2)-2. Dredging cost for the east navigation channel and construction cost for an extension of the breakwater or groin for the east channel.
3) Construction and land acquisition costs for railway facilities.

c) Tg. Priok (Alternative II):
1) Construction cost for the approach road connecting between the container yard and new the Harbor Road (Toll way) (See **Fig. 16**).
2) Cost of countermeasures for the cooling water discharged by PLTU electric power plant located along the seashore of the proposed site of Alternative II.
3) Cost of relocation of the existing Naval Base at Pulau Payung (Payung Is.) along the West Breakwater.

d) Bojonegara (Alternative III and IV):
- Development costs for fundamental infrastructures such as an access road between the Jakarta-Merak toll way and the port site (approx 15 km), an electric power supply trunk line, a water supply line, a telecommunication line, and so on, all out-side the port area.

e. Management and operation of container terminal

i) Key issues in the privatization of container terminal management and operation

62. It is a matter of course that the privatization of certain elements of the port activities is indispensable for the modernization of the ports. However, in the process toward the realization of the privatization program, the interest of the private sector and the benefit of the public should be carefully coordinated. This is because the former often tends to pursue benefits of individuals rather than those of the public.

ii) Alternatives schemes of the management and operation of the container terminal

63. For the realization of the privatization of a part or whole of the container terminals, there are several alternative schemes classified from the viewpoint of three elements:

a) whether the container terminal facilities are owned by public or private sector,
b) whether the services are open to the public or exclusive to specific clients, and
c) whether the management and operation of the terminal are done by public or private sector.

64. By the combination of these elements, total seven possible alternative schemes can be proposed as shown in **Table** 22.

iii) Management and operation of container terminal of the six major ports

65. In accordance with the development master plan of the container terminals of the six major ports, the alternative schemes recommendable for the management and operation of respective ports are summarized in **Table** 23.

66. There are several alternatives for each port vis-a-vis the stages of development of the facilities. The most appropriate management and operation scheme should be determined by taking into consideration of the future cargo volumes, the situation of respective port, and the stages of development.

67. In introducing the exclusive terminal use scheme, it is very important to choose the best entity to ensure an appropriate operation of the terminal. The following are the suggested criteria in evaluating perspective operators:

a) Companies which are able to provide efficient container cargo handling service to satisfy the demand of the customers,
b) Companies which are capable to collect an adequate quantity of container cargos maintaining a sound financial position,
c) Companies which are capable to provide reliable services over the entire term of the lease.

Table 19 Procurement of Handling Equipment

Name of Port	Name of Equipment	Procurement Number	Remarks
Belawan	Rail Mounted Gantry Crane	6	Required quantity=8 (Existing =2)
	Rubber Tired Gantry Crane	15	For 3 Container Berth
	Yard Hustler	27	For 3 container berth and 1 multi purpose berth
	Chassis	53	"
	Top-Loader	4	For 1 multi purpose berth
	Side-Lifter	6	For 3 container berth and 1 multi purpose berth
Panjang	Rail Mounted Gantry Crane	2	Excluding the on-going project
	Rubber Tired Gantry Crane	5	"
	Yard Hustler	8	"
	Chassis	15	"
	Top-Loader	0	
	Side-Lifter	3	"
Tanjung Priok (Alternative 1) (Alternative 2)	Rail Mounted Gantry Crane	25	For New Constructing Berth including CT III
	Rubber Tired Gantry Crane	78	"
	Yard Hustler	108	"
	Chassis	221	"
	Top-Loader	0	
	Side-Lifter	21	"
Tanjung Priok (Alternative 3)	Rail Mounted Gantry Crane	14	"
	Rubber Tired Gantry Crane	47	"
	Yard Hustler	69	"
	Chassis	137	"
	Top-Loader	0	
	Side-Lifter	13	"
and Bojonegara	Rail Mounted Gantry Crane	13	For New Construction Berth
	Rubber Tired Gantry Crane	38	"
	Yard Hustler	53	"
	Chassis	105	"
	Top-Loader	0	
	Side-Lifter	12	"
Tanjung Priok (Alternative 4)	Rail Mounted Gantry Crane	6	For New Constructing Berth including CT III
	Rubber Tired Gantry Crane	20	"
	Yard Hustler	30	"
	Chassis	59	"
	Top-Loader	0	
	Side-Lifter	6	"
and Bojonegara	Rail Mounted Gantry Crane	21	For New Construction Berth
	Rubber Tired Gantry Crane	62	"
	Yard Hustler	89	"
	Chassis	177	"
	Top-Loader	0	
	Side-Lifter	16	"
Tanjung Emas	Rail Mounted Gantry Crane	4	For new construction berth
	Rubber Tired Gantry Crane	11	"
	Yard Hustler	18	"
	Chassis	34	"
	Top-Loader	0	"
	Side-Lifter	4	"
Tanjung Perak	Rail Mounted Gantry Crane	19	"
	Rubber Tired Gantry Crane	73	"
	Yard Hustler	78	"
	Chassis	155	"
	Top-Loader	0	"
	Side-Lifter	17	"
Ujung Pandang	Rail Mounted Gantry Crane	3	For the on-going construction berth
	Rubber Tired Gantry Crane	14	"
	Yard Hustler	54	"
	Chassis	108	"
	Top-Loader	6	"
	Side-Lifter	14	"
Total	Rail Mounted Gantry Crane	59	
	Rubber Tired Gantry Crane	196	
	Yard Hustler	293	
	Chassis	586	
	Top-Loader	10	
	Side-Lifter	65	

Table 20 Summary of Project Cost

Name of Port	Description	Quantity	Cost Million Rp	Engineering Fee and Physical Contingency	Remarks
Belawan port	Berth Construction	L.S	51,273	10,255	
	Yard Construction	L.S	149,773	29,955	
	Facilities Construction	L.S	41,298	8,260	
	Dredging and Disposal				
	Case "A"	11,890,000m3	107,010	21,402	
	Case "B"	5,195,000m3	46,755	9,351	
	Procurement Cost	L.S	158,580	4,757	
	(Total) Case "A"			582,562	
	(Total) Case "B"			510,256	
Panjang Port	Berth Construction	L.S	21,862	4,372	
	Yaed Construction	L.S	3,735	747	
	Facilities Construction	L.S	0	0	
	Dredging	80,000m3	1,838	368	
	Procurement Cost	L.S	47,300	1,419	
	Total Cost			81,640	
Tanjung Priok Port Alternative I	Berth Construction	L.S	361,054	72,211	
	Yard Construction	L.S	626,174	125,235	
	Facilities Construction	L.S	234,120	46,824	Excluding the Access
	Dredging and Disposal			0	Road to Highway
	Case "A"	8,280,000m3	74,520	14,904	
	Case "B"	7,540,000m3	67,860	13,572	Excluding the East
	Procurement Cost	L.S	685,680	20,570	Channel Dredging
	(Total) Case "A"			2,261,292	
	(Total) Case "B"			2,253,300	
Tanjung Emas Port	Berth Construction	L.S	53,298	10,660	
	Yard Construction	L.S	81,048	16,210	
	Facilities Construction	L.S	39,528	7,906	
	Dredging and Disposal			0	
	Case "A"	12,864,350m3	115,779	23,156	
	Case "B"	11,724,620m3	105,522	21,104	
	Procurement Cost	L.S	109,930	3,298	
	(Total) Case "A"			460,812	
	(Total) Case "B"			448,503	
Tanjung Perak Port	Berth Construction	L.S	329,094	65,819	
	Yard Construction	L.S	361,464	72,293	
	Facilities Construction	L.S	159,502	31,900	
	Dredging and Disposal			0	
	Case "A"	13,670,000m3	136,700	27,340	
	Case "B"	6,740,000m3	67,400	13,480	
	ProcurementCost	L.S	564,680	16,941	
	(Total) Case "A"			1,765,743	
	(Total) Case "B"			1,682,583	
Ujung Pandang Port	Berth Construction	L.S	0	0	
	Yard Construction	L.S	24,822	4,964	
	Facilities Construction	L.S	14,577	2,915	
	Dredging and Disposal				
	Case "A"	685,000	8,288	1,658	
	Case "B"	438,000	5,300	1,060	
	Procurement Cost	L.S	128,858	3,866	
	Land Acquisition	L.S	164	0	
	(Total) Case "A"			190,112	
	(Total) Case "B"			186,525	
Total	Berth Construction			979,897	
	Yard Construction			1,496,419	
	Facilitie Construction			586,830	
	Dredging and Disposal				
	Case"A"			579,475	
	Case"B"			351,404	
	Procurement			1,697,170	
Grand Total (Alternative I)	Case "A"			5,339,792	
	Case"B"			5,111,721	

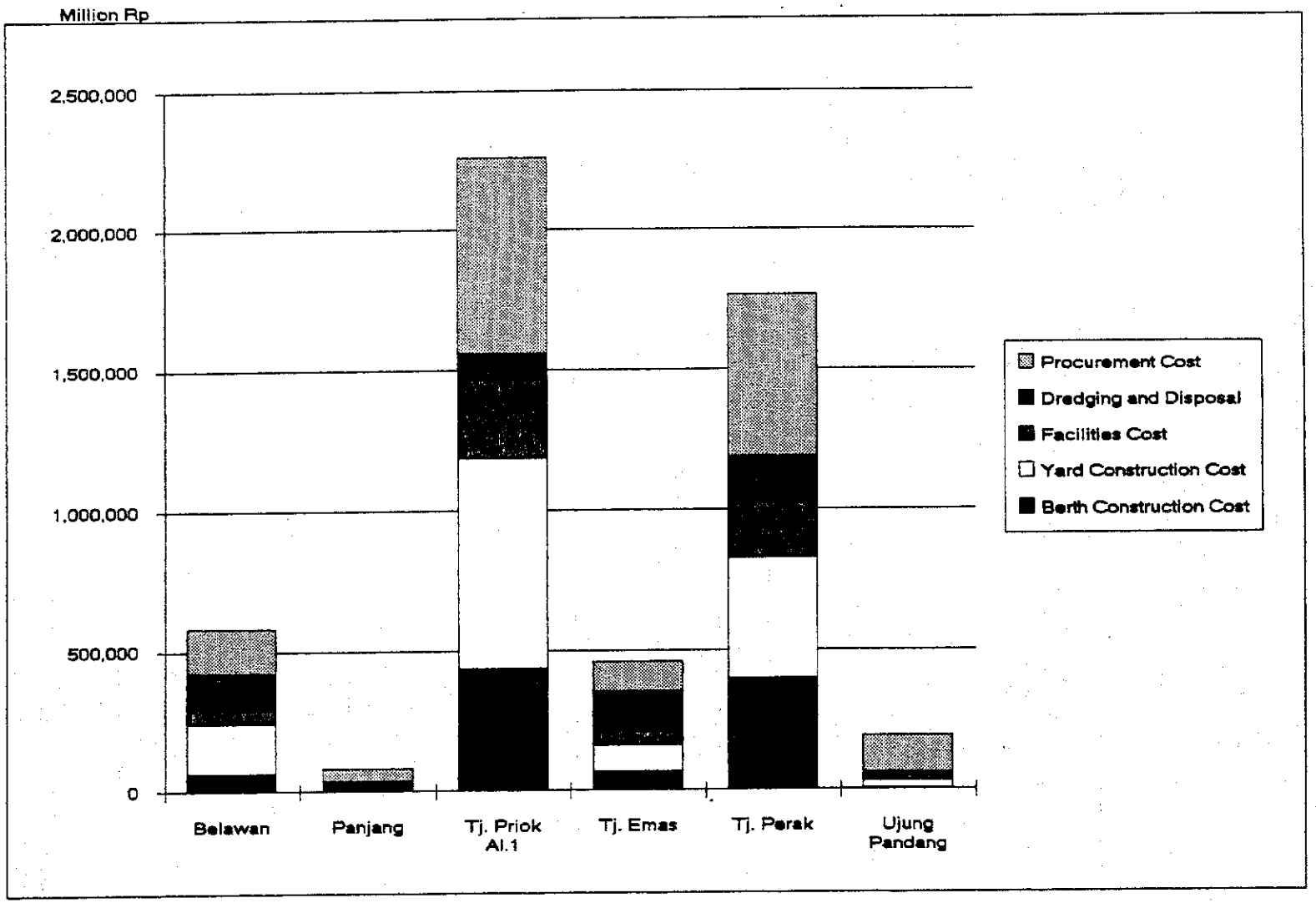


Fig. 14 PROJECT COST FOR MASTER PLAN

Table 21 Project Cost of Tanjung Priok Port

Name of Port	Description	Quantity	Cost Million Rp	Engineering Fee and Physical Contingency	Remarks
Tanjung Priok Port Alternative I	Berth Construction	LS	361,054	72,211	
	Yard Construction	LS	626,174	125,235	
	Facilities Construction	LS	234,120	46,824	Excluding the Access
	Dredging and Disposal			0	Road to Highway
	Case "A"	8,280,000m3	74,520	14,904	
	Case "B"	7,540,000m3	67,860	13,572	Excluding the East
	Procurement Cost	LS	685,680	20,570	Channel Dredging
	(Total) Case "A"			2,261,292	
	(Total) Case "B"			2,253,300	
Tanjung Priok Port Alternative II	Berth Construction	LS	328,705	65,741	
	Yard Construction	LS	710,012	142,002	
	Facilities Construction	LS	234,120	46,824	
	Dredging and Disposal			0	
	Case "A"	11,810,000m3	106,290	21,258	
	Case "B"	10,980,000m3	98,820	19,764	
	Procurement Cost	LS	685,680	20,570	
	(Total) Case "A"			2,361,203	
	(Total) Case "B"			2,352,239	
Tanjung Priok Port Alternative III	Berth Construction	LS	224,350	44,870	
	Yard Construction	LS	290,778	58,156	
	Facilities Construction	LS	150,928	30,185	Excluding the Access
	Dredging and Disposal			0	Road to Highway
	Case "A"	5,140,000m3	46,260	9,252	
	Case "B"	3,450,000m3	31,050	6,210	Excluding the East
	Procurement Cost	LS	392,030	11,761	Channel Dredging
	(Total) Case "A"			1,258,568	
	(Total) Case "B"			1,240,316	
Bojonegara Alternative III	Berth Construction	LS	129,666	25,933	
	Yard Construction	LS	108,334	21,667	
	Facilities Construction	LS	122,540	24,508	Excluding the Access
	Dredging and Disposal			0	Road to the Highway
	Case "A"	2,240,000m3	16,464	3,293	
	Case "B"	1,900,000m3	13,965	2,793	Excluding the Water
	Procurement Cost	LS	350,400	10,512	and Power Supply to the site
	(Total) Case "A"			814,517	
	(Total) Case "B"			811,518	
Total Alternative III	Case "A"			2,073,085	
	Case "B"			2,051,834	
Tanjung Priok Port Alternative IV	Berth Construction	LS	82,587	16,517	
	Yard Construction	LS	43,705	8,741	
	Facilities Construction	LS	64,886	12,977	
	Dredging and Disposal			0	
	Case "A"	3,960,000m3	35,640	7,128	
	Case "B"	2,960,000m3	26,560	5,310	
	Procurement Cost	LS	168,310	5,049	
	(Total) Case "A"			445,541	
	(Total) Case "B"			434,633	
Bojonegara Alternative IV	Berth Construction	LS	213,566	42,711	
	Yard Construction	LS	201,639	40,328	
	Facilities Construction	LS	192,896	38,579	
	Dredging and Disposal			0	Excluding the Access
	Case "A"	720,000m3	5,292	1,058	Road to the Highway
	Case "B"	300,000m3	2,205	441	
	Procurement Cost	LS	561,070	16,832	Excluding the Water and Power Supply to the site
	(Total) Case "A"			1,313,962	
	(Total) Case "B"			1,310,257	
Total Alternative IV	Case "A"			1,759,503	
	Case "B"			1,744,890	

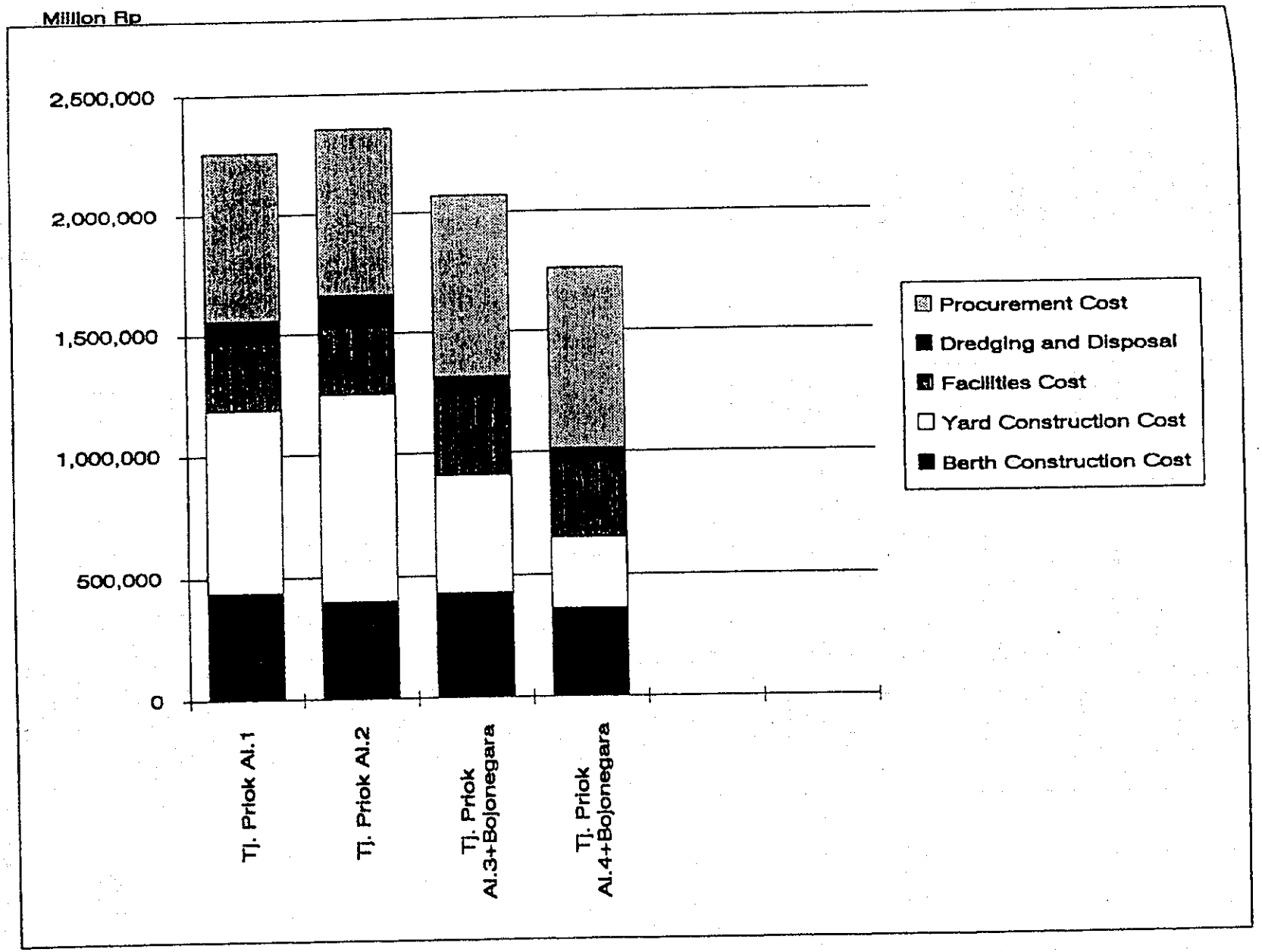


Fig. 15 Alternatives for Tg. Priok

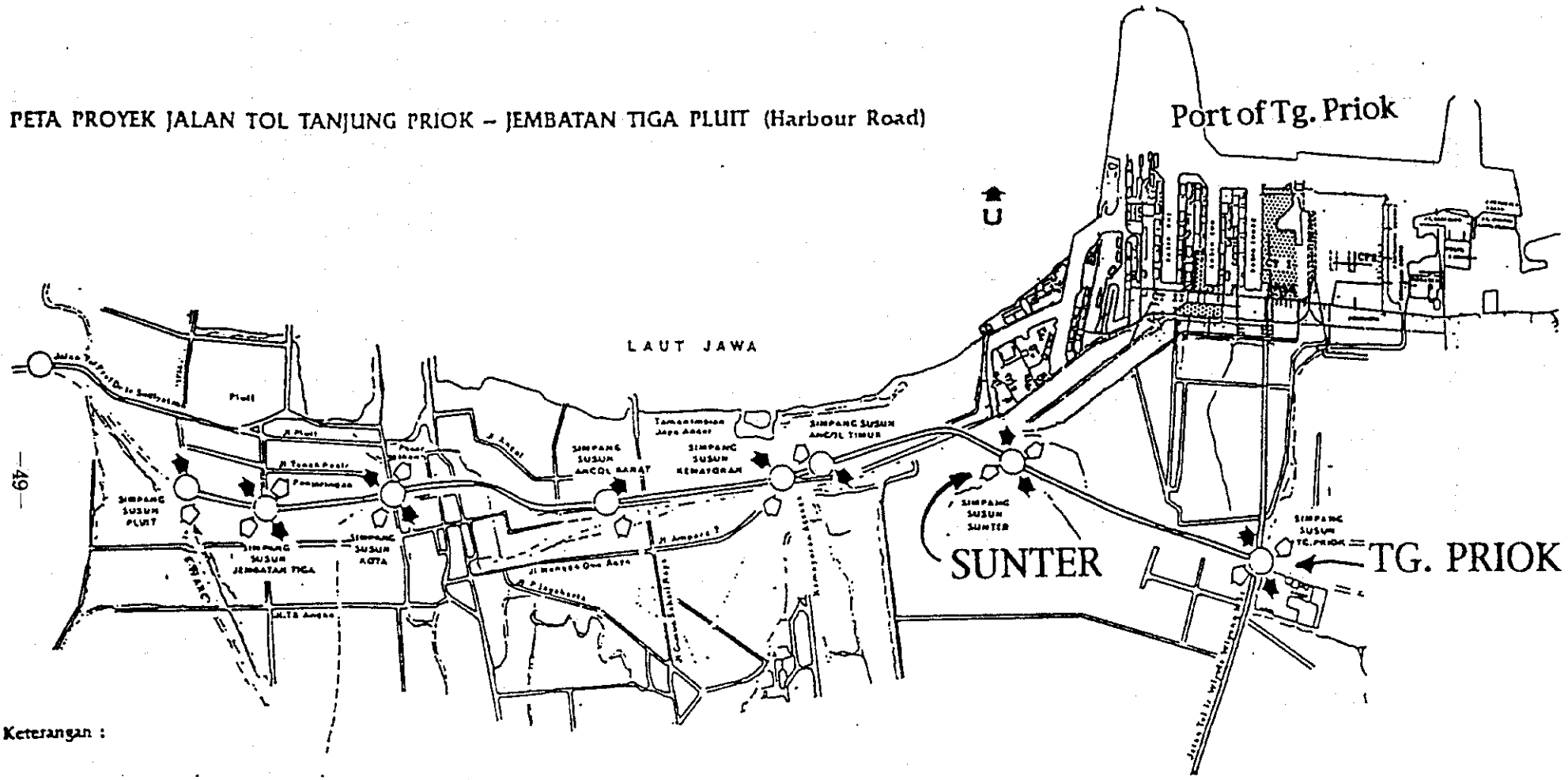


Fig. 16 Access to Port of Tg. Priok

Table 22 Case of Container Terminal Management and Operation

No.	Method	Port Facilitities Owned by	Provide Service for	Container Terminal Operated by
1	U.C	Port Authority	Open	Port Authority
2	T	Port Authority	Open	P.A & P.C
3	C	Port Authority	Open	P.A & P.C
4	M.C	Port Authority	Open	Private Company
5	L	Port Authority	Exclusive	Private Company
6	BOT	Private Company	Exclusive	Private Company
7	P	Private Company	Exclusive	Private Company

Note : U.C: Under Control, T: Trust, C: Cooperation,
M.C: Management Contract, L: Lease
BOT: Build Operate Transfer, P: Private

Table 23 Alternatives of Container Terminal Management and Operation in Main Ports.

Port	Existing 1994	1998	Short-term Development Plan Target year of 2003	Master Plan Target year of 2010
Belawan				
F.T	-		A-2 2,3,4	A-2 2,3,4
		A-3 2,3	A-3 2,3,4	A-3 2,3,4
D.T	-	1,2	2,3	2,3
Panjang				
F.T	-			A-2 2,3
		A-3 2	A-3 2,3	
D.T	1	1,2	2	2
Tg.Priok				
F.T	1 & 2		A-1 2,3,4 & 5,6	A-1 2,3,4 & 5,6
		A-2 2,3,4 & 5,6	A-2 2,3,4 & 5,6	A-2 2,3,4 & 5,6
		A-3 2,3,4	A-3 2,3,4	A-3 2,3,4
D.T	1 & 2	2,3	2,3,4	2,3,4
Tg.Emas				
F.T	-		A-2 2,3,4	A-2 2,3,4
		A-3 2,3		A-3 2,3
D.T	1	1,2	2	2
Tg.Perak				
F.T	1		A-1 2,3,4 & 5,6	A-1 2,3,4 & 5,6
		A-2 2,3,4	A-2 2,3,4 & 5,6	A-2 2,3,4 & 5,6
		A-3 2,3	A-3 2,3,4	A-3 2,3,4
D.T	1	2,3	2,3,4	2,3,4
Uj.Pandang				
F.T	-		A-2 2,3,4	A-2 2,3,4
		A-3 2,3	A-3 2,3,4	A-3 2,3,4
D.T	2	2,3	2,3,4	2,3,4

NOTE: A-1 : new constructed berth type
1,2,... : case number in Table iv-1

(3) Dry Ports and Connecting Railways

a. Development Strategy for National Network of Dry Ports

68. The policy of the government is as follows;

69. The government is anxious about increase of the traffic congestion, environmental trouble and traffic accident due to increase of container transportation by trailer, from view point of the present traffic situation. And the government was thinking as a national policy about the shift from road to railway for the container transportation, in order to cover the strength problem of the road and bridge and reduce the increase of maintenance cost and to increase the transportation efficiency. The government regulates already the container transportation on some roads. In order to promote the above modal shift, the government tried to arrange the Dry Ports and connecting railways for some main regions and is promoting the shift from road to railway for the container transportation.

i) Methodology

70. The Master Plan (M/P) described in this paper is not a new construction plan, but an improvement plan for existing facilities, and the study for each route should subsequently follow the order listed below.

a) Assessing present facilities and the utilization condition,
b) Studying problems and the priorities, and
c) Devising countermeasures to prepare for the future.

71. The M/P attempts to contemplate the necessity for investment spanning to the year 2010. Therefore, priorities for investment are synthetically decided by considering not only containers and individual dry port characteristics but also the growth in other fields of passenger and cargo transport.
A dry port and its connecting railway for the F/S are selected by comparing the results of these surveys.

ii) Criteria for the viability of railway container transportation

72. Transportation cost per unit distance has to be less expensive, in general, than

that of truck transportation. However, the railway transportation is burdened by the task of transferring containers from trailers to railway wagon and vice versa at both ends of the railway transportation, i.e., at the dry ports and the terminal in the ports. This handling requires an additional cost which should be paid for by low transportation cost of railway in order to make the railway transport competitive against trucks. Thus, there is the certain minimum transportation distance beyond which the total transportation cost by railway is less expensive than that of trucks. On the basis of the cost analysis, the study concludes that the minimum travel distance required to compensate the additional cost should be about 100 km or longer (Refer to **Chapter 3 of Vol. 2**).

73. For effective service, at least one, hopefully more than two, TRCT(s) per day must be operated between the dry port and the port.

74. Container cargo traffic should be large enough to require more than two TRCTs per day in order to make it financially viable to employ heavy handling equipment in the dry ports (See **Appendix C of Vol. 2**).

75. A yard system, which is designed for relaying and shunting conventional freight trains, is not suitable to provide prompt and punctual service operations of the container trains maintaining the interface with the shipping schedules at the port. The handling platform and the sidings should be next to the container marshalling yard of the port.

76. Customer services such as documentation (for tariffs, banks, etc.) and empty container delivery should be completed in one office in or near the dry port to promote the railway container transportation.

77. This plan will be practical as far as background and the industries can provide enough demand for mass transport. In general, the export oriented industries making major resource of the demand, are normally located around ports. So they are found in inland regions as special case.

iii) Summary of the observations by the study team in the field survey for M/P

78. Gdb - Tpk route necessitates not only station improvement but also doubling track works owing to the number of trains and the growth rate of them. The other

routes are local lines, and will be bearable to container demand in 2010 as it is. Because not only number of trains and the growth rate of them but also potential resources are small and they would not be easy to reach the situation that needs a through train until 2010.

79. The improvement for container platform at each dry port has completed with enough platform length and width bearable to handle through trains if only heavy handling machines are installed. The problem is on the unbalance between handling cost and investment cost during the long initial stage before reaching the expected full scale stage.
Accordingly, the purchase of handling machines will be needed even if the deficit is anticipated, in case the handling containers increase and reach the stage unable to handle them with manual power at the Dry Ports.
The introduction time of handling machines becomes a key point.

80. The arrangement of infrastructure is necessary for the North trunk line in Sumatra Island more than anything else.
One wagon one TEU transportation would not be payable even for direct operation cost caused by such ineffectiveness.

81. Gdb facilities should be enough capable in accordance with the set up of TCT III.
Gdb has no staying sidings even now, so that the improvement is urgent.

b. Implementation Plan of Dry Port Facilities (Existing issues and countermeasures)

i) Tebing Tinggi Dry Port and Connecting Railways

82. Existing issues at Tebing Tinggi Dry Port and Connecting Railway are as Follows

a. Dry Port
i) No Dry Port function
ii) Tariff does not form one package
iii) No heavy loading machine
iv) Defeated in competition with road transportation

b. Connecting railway

i) Gabion Port and railway terminal is 2 Km apart, and connected by road transportation.

ii) As axle is limited to 11 tons, only one 20' container can be loaded on one wagon. 40' cannot be transported.

iii) Superannuation of track is advancing.

iv) Number of locomotives is in shortage.

Countermeasures to be considered are as follows.

83. The result of the demand forecast in 2010 year shows less than only 5 TEUs per day and one way and it would not be on the level as a normal dry port. Positive investment for the Dry Port should refrain from planning, and it is judged that the Dry Port should watch the economic situation during the term, and be improved according to increase of the demand.

84. As well on the connecting railway, it is desirable to implement the countermeasures such as increase of the allowable axle load to 15t that can transport two 20' containers or one 40' container per wagon, arrangement of the locomotives, direct connecting to the Gabion Port by railway etc. according to increase of the demand.

ii) Kertapati Dry Port and Connecting Railways

Existing issues

85. The new establishment of direct container transportation route to Singapore has invited structural damage on the railway containers. The container resource exists only around the Palembang port, neither goods to fill container boxes are produced nor remarkable consumer cities exist in inland cities.
They are out of basic conditions of dry port.

iii) Gedebage

Issues

86. Not only the container train operation will increase from four trains a day on usual time (five trains a day on busy time) at present operation plan to nine trains on usual time (ten trains on busy time) by 2010, but also other train operation will increase as well (refer to Table 52. Part 3). The above will invite the following issues:

a) The increase of container trains necessitates the increase of locomotives and wagons.

b) The transportation route between Cikampek and Padalarang will fall in remarkable shortage of the track capacity owing to other kinds of trains which are growing in number like Parahyangan (limited express train).

c) In the container terminal at Gedebage the gantry crane would have to stop the work in future, because the three strata stacks of containers below the gantry crane are occurring considerably even now. It is necessary to remove imported containers from marshalling yard below the crane as soon as possible.

d) Storage sidings at Gedebage are in shortage owing to the increase in number of container trains.

e) The improvement of Pasoso and the new installation of platform for loading and unloading at TCT III is necessary, in accordance with the increase of transportation volume.

f) The route between Tg. Priok and Cikampek includes the section between Jatinegara and Bekasi where will be used not only by intercity but by commuter and freight.
The track capacity on the above section will be not enough, so that would make the increase of the container trains uneasy.
Which transportation route should we select, using the same route as it is or taking advantage of another project like new line construction, as the countermeasure after 2000 year when TCT III is set up ? (The team needs the more study in the F/S concerning the above, **Fig. 17**).

g) The drainage facilities at Gdb. District is not arranged yet and the track maintenance is not enough. Therefore, the submergence to the main tracks sometimes occurs.

Countermeasure

87. This project should consider the handling facilities corresponding to the completion of TCT III and countermeasure for the transportation route between

Jatinegara and Bekasi. (Refer to the design content in F/S)

88. Improvement plan due to step by step is as follows;

(a) Urgent plan

a) Improvement at Gdb. St.

* To provide the storage sidings
* To provide the electronic interlocking devices in the station yard
* To increase the paved area for container storage yard
* The concaved main track level is arranged as it was.

89. And then Kac. and Gdb. St. are functionally separated, The former handles imported empty containers and the latter handles exported ones and imported full ones.

b) Improvement at Kac. St.

* To change a siding to an arrival and departure track
* To Separate the inlet and outlet to relax the traffic congestion
* To provide the electronic interlocking devices in the station yard
* To purchase a forklift (10t)

And then start the handling of arriving empty containers

c) To provide automatic signalization between Kac and Gdb

d) Purchase of rolling stock

* To purchase three locomotives

(b) F/S Plan

a) Improvement at Gdb. St.

* To provide the additional arrival and departure tracks

And then handle all the exported containers

b) Improvement at Kac. St.

* To provide an additional arriving and departure track
* To pave the terminal yard and to provide the CFS
* To provide a gantry crane

And then handle all the arriving containers

c) Improvement at Tpk and Pasoso St.

* To provide the additional two sidings at Pasoso
* To start the TCT III platform

d) To provide doubling track between Kac and Gdb

(c) M/P Plan

* To purchase five locomotives and 68 wagons

(d) Plan after 2010

a) Pasoso changes to PERUMKA St. for arrival and departure trains via new Bekasi line, so that the branch line joined with the Bekasi line is constructed with elevated structure as well as Bekasi line.

b) Two shunting tracks are multiplied at TCT III, the set up of an anticipated new dry port.

iv) Solojebres

Issues and Countermeasures

90. Under present loading work, the handling capacity at the lengthwise platform is limited to max. 14 TEUs per day, and total handling capacity including the loading work by man power at another platform will be limited to max. 22 TEUs per day. Based on the demand forecast, full container handling volume will be over the 14 TEUs being handling capacity at the lengthwise platform in 2003, and over the 22 TEUs in 2008. Therefore, it is necessary to provide the heavy handling machine for full container in 2003 when the handling capacity at the lengthwise platform will be over the limit, though container handling volume will not reach the profitable volume.

91. It is the most serious problems at Solojebres that the freight volume is small and the container delivery by trailers from and to the Dry Port is regulated by the local government.
The team expects the above regulation is alleviated in accordance with the increase of transportation demand due to economic growth.

92. Therefore, the transportation volume cannot expect rapid increase as long as the above stated conditions exist. The normal transportation system that the team expects, would be realized at some time in future as long as containers are increasing,
However, the acceleration to shift the transportation from road to railway will be possible not only by providing with low service fare and extending effective marketing activities, but by adopting the countermeasure such as introduction of heavy handling machine, decrease of delivery time, and deregulation for container carrying path.

93. The additional railway facilities will not be required, but the locomotive, container wagons and container handling equipment will be purchased during the subject period of M/P.

v) Rambipuji

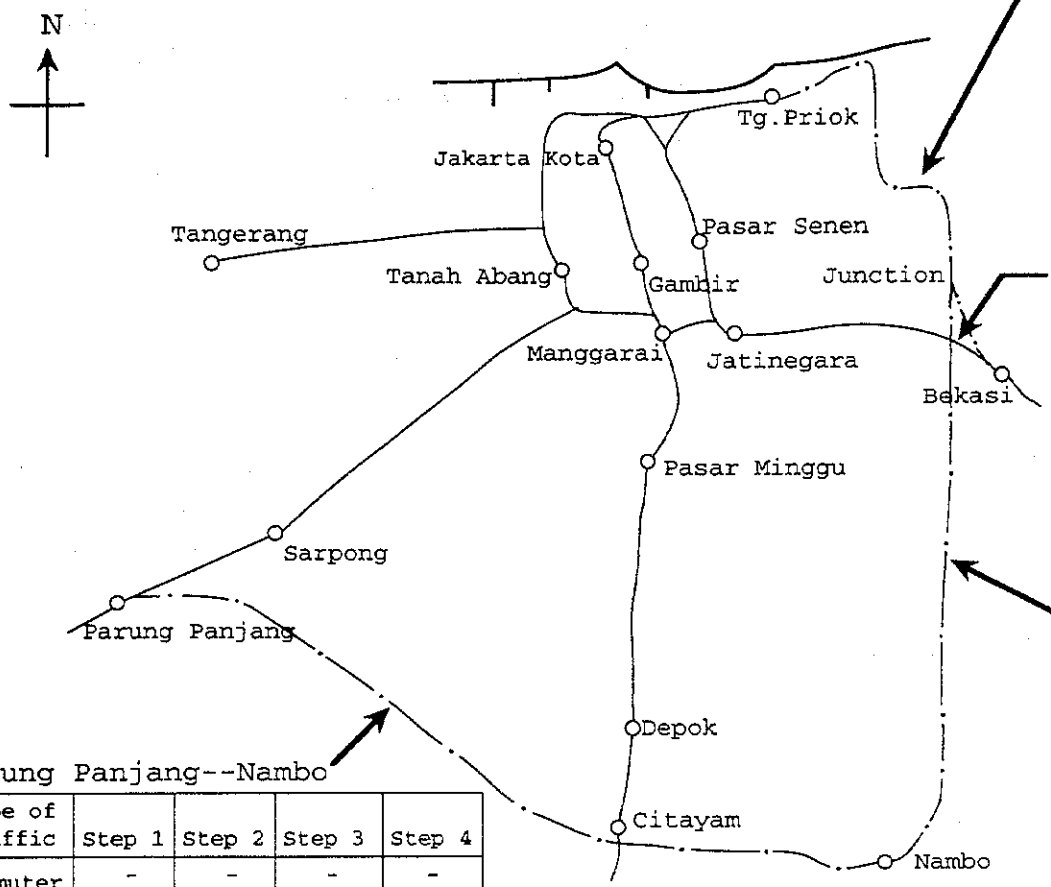
Issues and countermeasures

94. At the Rambipuji dry port, the improvement for container platform has completed with the enough platform length and width bearable to handle through trains if only heavy handling machines are installed. The volume of container freight handled at Rambipuji is too small to efficiently utilize heavy machines for 40 ft containers.

95. The adoption time of handling machines should be determined by watching transport result around the year 2000 when the rate of non-regular container train operations exceeds 50%, because the max operation ability by manual power is not explicit.

96. Container platform next to Perak CT has enough facilities, it is a little apart from the container yard, but is no problem as container handling.

97. Multiplication of the locomotive and the container wagons will be required at the time when the operation of a TRCT is required every day.
It would be about the year 2006.



Tg.Priok--Junction

Type of Traffic	Step 1	Step 2	Step 3	Step 4
Commuter	-	-	-	-
Middle P.	-	0	0	0
Long P.	-	35	39	44
Freight	-	26	28	33
Total	-	61	67	77

Junction--Bekasi

Type of Traffic	Step 1	Step 2	Step 3	Step 4
Commuter	41	51	67	77
Middle P.	32	40	49	53
Long P.	30	36	41	47
Freight	21	27	28	30
Total	124	154	185	207

Nambo--Junction

Type of Traffic	Step 1	Step 2	Step 3	Step 4
Commuter	-	-	-	-
Middle P.	-	-	-	-
Long P.	-	-	-	-
Freight	-	15	18	21
Total	-	15	18	21

Parung Panjang--Nambo

Type of Traffic	Step 1	Step 2	Step 3	Step 4
Commuter	-	-	-	-
Middle P.	0	0	0	0
Long P.	0	0	0	0
Freight	11	19	22	23
Total	11	19	22	23

*Per direction per day

*The Above does not include container trains.

Fig. 17 Stepwise Train Operation Plan for the New Line

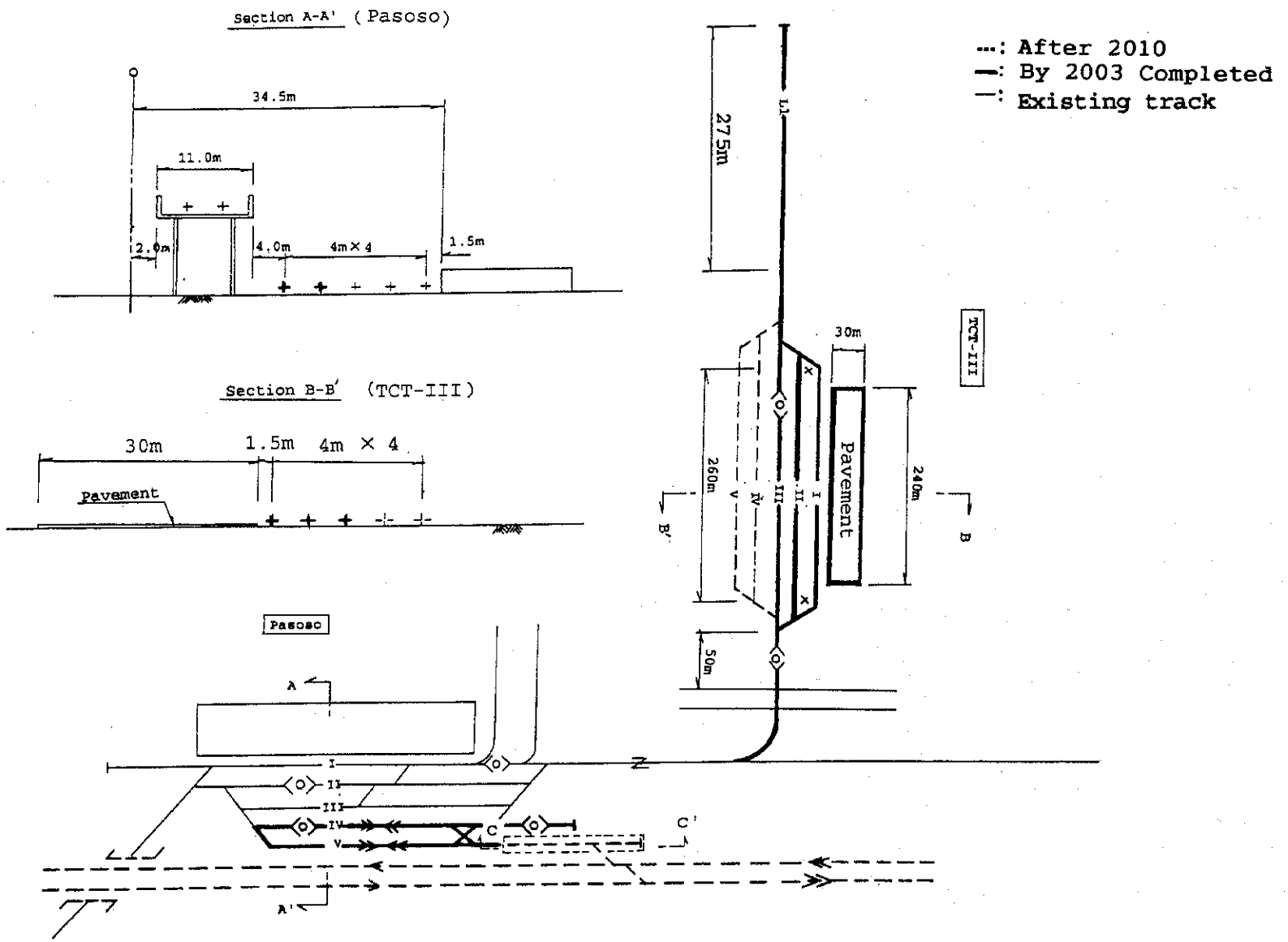


Fig. 18 Track layout at Tg.Pirok (Pasoso, TCT-III)

c. Cost Estimate

98. The construction cost is summarized in the Table below.

Table 24 Estimated cost needed for the Long-term Development Plan up to 2010 for Dry Ports and Railways

		Cost (Mil.Rp.)	Remarks
Tebing Tinggi			No expansion is needed
Kertapati			D/P Function is over
Gedebage	Facilities	53,100 +(8,530)*	Civil works, etc. (after 2010)*
	Utilities	19,890 +(3,340)*	Signal, etc. (after 2010)*
	Loco(8)and Wagon(68)	39,200	
	Handling machines	8,200	
	Sub total	120,390 +(11,870)*	Total <132,260>
Solo Jebres	Locomotive (1)	3,586	
	Wagon (16)	2,464	
	Handling Machine(1)	1,540	
	Sub total	7,590	
Rambipuji	Locomotive (2)	7,172	
	Wagon (23)	3,542	
	Sub total	10,714	
	Total Cost	138,694	

Note: * denotes the construction cost of the branch line connecting to the proposed Bekasi Line and the additional two shunting tracks at TCT III after 2010.

99. The detailed cost of the work related to Gedebage Dry Port is shown in **Table 25.**

Table 25 Total Cost amount for M/P (GEdebage dry port and connecting railway)

Unit : Billion Rp

Stage	Item	Facilities (Civil etc)	Utilities (Signal etc)	Locomotive and Wagon	Handling Machine	Total	Remarks
F/S	i) Urgent Plan at Gdb and Kac	7.24	12.77	6.52	0.30	26.83	2 storage tracks, Pavement2, 920m2
	ii) Improvement at Gdb and Kac	17.22	3.36		7.15	27.73	4 sub-main tracks, Pavement23, 350m2
	iv) Improvement at Pasoso	2.49				2.49	2 storage tracks
	v) Improvement at TCT-III	3.71				3.71	3 storage tracks
	vi) Rolling Stock			3.30		3.30	
	vii) Management Cost 10%	3.07	1.61	0.98	0.75	6.41	
	Sub Total	33.73	17.74	10.80	8.20	70.47	
After 2003	i) Doubling Track (Gdb---Kac)	17.61	1.95			19.56	L=3,935m
	ii) Improvement at Pasoso	(6.48)	(3.04)			(9.52)	1 sub-main tracks, (After 2010)
	iii) Improvement at TCT-III	(1.27)				(1.27)	2 storage tracks, (After 2010)
	iv) Rolling Stock			25.82		25.82	
	v) Management Cost 10%	1.76 (0.78)	0.20 (0.30)	2.58		4.54 (1.08)	(After 2010)
	Sub Total	19.37 (8.53)	2.15 (3.34)	28.40	0.00	49.92 (11.87)	
Total		53.10 (8.53)	19.89 (3.34)	39.20	8.20	120.39 (11.87)	
<Grand Total>		< 61.63 >	< 23.23 >	< 39.20 >	< 8.20 >	< 132.26 >	Include after 2010

Note : ( ) Shows After 2010

(4) Initial Environmental Evaluation

100. An Initial Environmental Examination (IEE) was made for each individual container port, dry port and connecting railway, considering the following major environmental impacts and was summarized in **Tables 26, 27 and 28.** The following are the items which were identified as the potential elements that might cause impacts on the environment and need to be further investigated during the stage of the feasibility study.

a. Major environmental impacts for container ports

i) Water pollution from dredging work,
ii) Water pollution and soil contamination from the disposal of the dredged soil,
iii) Water pollution from hazardous materials,
iv) Impact on the ecosystem, fisheries and land property values from the activities,
v) Erosion of the proposed container wharves and reclamation area,
vi) Traffic congestion and pollution such as air pollution and noise problem due to the increased traffic volume, and
vii) Resettlement and socioeconomic aspects, increased employment opportunities and economic activities.

b. Major environmental impacts for dry ports and connecting railways

i) Water pollution in the drains and river from surplus soil, hazardous materials,
ii) Impact on the ecosystem, land property values from the activities,
iii) Traffic congestion and pollution such as air pollution, noise and vibration problems due to increased traffic volume,
iv) Resettlement problems caused by the doubling, of railways and the expansion of station facilities, and
v) Impact on socioeconomic aspects, increased employment opportunities and economic activities.

Table 26 Environmental impact matrix of each project sites

Ports

Project Areas/Phases		Physical/Chemical																	Biolog		Socio-Economic										
Environmental Components		Climate	Slope stabilities	Land subsidence	Soil erosion	Soil contamination	Coastal Erosion	Coastal Sedimentation	Hydrology	Water quality	Ground water use	Groundwater quality	Air pollution	Noise	Vibration	Offensive odor	Natural disaster	Aesthetic	Terrestrial Flora/Fauna	Aquatic Flora/Fauna	Land Use	Coastal Use	Resettlement	Economic activities	Traffic	Infrastructures	Split of communities	Employment	Archaeology/Cultural sites	Public Health	Recreation
Belawan	Pre-Construction																														
	Construction			-				-	-	-			-	-	-				-	-										-	
	Service and Maintenance			-				-	-	-			-	-	-				-	-	+	+		+	-			+		-	
Panjang	Pre-Construction																														
	Construction									-			-	-	-				-	-											
	Service and Maintenance												-	-	-				-	-	+	+		+	-			+		-	
Tanjung Priok	Pre-Construction																														
	Construction			-				-		-			-	-	-				-	-											
	Service and Maintenance			-				-		-			-	-	-				-	-	+	+		+	-			+		-	
Tanjung Emas	Pre-Construction																														
	Construction			-				-		-	-		-	-	-				-	-											
	Service and Maintenance			-				-		-	-	-	-	-	-				-	-	+	+		+	-			+		-	
Tanjung Perak	Pre-Construction																														
	Construction			-				-	-	-			-	-	-				-	-											
	Service and Maintenance			-				-	-	-			-	-	-				-	-	+	+		+	-			+		-	
Ujung Pandang	Pre-Construction																														
	Construction				-			-		-			-	-	-				-	-											
	Service and Maintenance							-		-			-	-	-				-	-	+	+		+	-			+		-	

+: Positive Environmental Impact – : Negative Environmental Impact

Table 27 Environmental impact matrix of each project site

Dry Ports

Project Areas/Phases		Physical/Chemical																	Biological		Socio-Economic										
Environmental Components		Climate	Slope stabilities	Land subsidence	Soil erosion	Soil contamination	Hydrology	Water quality	Ground water use	Groundwater quality	Air pollution	Noise	Vibration	Offensive odor	Natural disaster	Aesthetic	Terrestrial Flora/Fauna	Aquatic Flora/Fauna	Land Use	Resettlement	Economic activities	Traffic	Infrastructures	Split of communities	Employment	Archaeology/Cultural sites	Public Health	Recreation
Tebing Tinggi	Pre-Construction																														
	Construction																														
	Service and Maintenance																														
Kertapati	Pre-Construction																														
	Construction																														
	Service and Maintenance																														
Gedebage	Pre-Construction																			-											
	Construction						-	-			-	-	-			-	-	-			-	+	-		+		-					
	Service and Maintenance										-	-	-						+-			+	-		+							
Solo Jebres	Pre-Construction																														
	Construction																														
	Service and Maintenance																														
Rambipuji	Pre-Construction																														
	Construction																														
	Service and Maintenance																														

+: Positive Environmental Impact – : Negative Environmental Impact

Table 28 Environmental impact matrix of each project sites

Railways

Environmental Components		Physical/Chemical																Biological		Socio-Economic										
Project Areas/Phases		Climate	Slope stabilities	Land subsidence	Soil erosion	Soil contamination	Hydrology	Water quality	Ground water use	Groundwater quality	Air pollution	Noise	Vibration	Offensive odor		Natural disaster	Aesthetic	Terrestrial Flora/Fauna	Aquatic Flora/Fauna	Land Use	Resettlement	Economic activities	Traffic	Infrastructures	Split of communities	Employment	Archaeology/Cultural sites	Public Health	Recreation	
Sumatra	Pre-Construction																													
	Construction																													
	Service and Maintenance																													
Tanjung Priok	Pre-Construction																				-									
-	Construction			-		-	-	-			-	-	-					-	-			+	-			+		-		
Gedebage	Service and Maintenance										-	-	-							+-		+	-			+				
Semarang	Pre-Construction																													
-	Construction																													
Solo Jebres	Service and Maintenance																													
Surabaya	Pre-Construction																													
-	Construction																													
Rambipuji	Service and Maintenance																													

+: Positive Environmental Impact – : Negative Environmental Impact

(5) Summary of the Master Plan of National Net work

101. The components of the Mater Plan of the Nation-wide Container Cargo Handling Ports, Dry Ports and Connecting railways are summarized in **Table 29.** In the Table, the capacities of the existing facilities, including those under construction, and the term when the container traffic would exceed the capacities are also indicated. With respect to Tg. Priok Port and Gedebage Dry Port, the development stages up to 2010 are exhibited.

Table 29 Handling Capacity of Existing Facilities

Port & Dry Port	Port					Dry Port and Connecting Railways	
	Present facilities and on-going plan			Existing Master Plan and other plans		Dry Port	Connecting Railways
	Container Terminal	Capacity(1000)	Stand up to	Container Terminal	Stand up to	Action to be taken before 2010	
Belawan and Tebing Tinggi D/P	Berth:500m, Crane: 2 Yard:9.46ha	127 Box/Yr 184 TEU/Yr	1994	In line with Review Master Plan (1992) Berth:250m(F), Crane:4, Berth:170m(D), Crane: 2, Yard:22 ha	2010	Fully equipped Dry Port is not recommended	Reinforcement of infrastructure is necessary
Panjang and Kertapati D/P	Berth:300m, Crane: 2 Yard:6.55ha	116 Box/Yr 145 TEU/Yr	2003- 2010	In line with Master Plan(1992) Berth:170m, Crane:2, Yard: 3ha	2010	The role of Dry Port was taken over by Palembang Port	No expansion is recommended for container transportation
Tg. Priok and Gedebage Dry Port	CT-1 Berth:820m Crane: 8 Yard:19.5ha CT-2 Berth:360m Crane: 4 Yard:8.42ha	CT-1 578 Box/Yr 809 TEU/Yr CT-2 261 Box/Yr 344 TEU/Yr Total 839 Box/Yr 1,153 TEU/Yr	1993	1. (Urgent plan) Inland CT Yard 28.8 ha 2. (On-going New CT-3) Berth:750m,Yard:40.6ha,Crane:2(CT-2) 3.(In line with M/P REVIEW, 1991) in addition to CT-3 Berth:750m, Yard:25.5ha 4. (In line with M/P REVIEW, 1991) in addition to 3. Berth(F):900m, Crane:9, Yard:31.5ha Berth(D):340m, Crane:4, Yard:9.2ha	1. 1995-1997 2. 2000 3. 2003 Need up-date 4. 2010 Need up-date	1. Urgent (Up to 5 TRCT/Day) Siding Tracks at Gdb. 2. Establish Kac. INCT (Up to 6 to 7 TRCT/Day) Arr./Dep. Track at Kac. 3. (Up to 8 TRCT /Day) Additional Tracks: (Gdb),(Kac), (TCT III, Pasoso), and Crane: 1(Kac) 4. Additional Tracks: (TCT III, Pasoso) (after 2010)	1. Automatic Signal or Double Track Gdb. - Kac. Locomotive: 3 3. Access Track to TCT-III in Tg. Priok Rolling stock : to be increased step by step 4. Bekasi line is operational (after 2010)
Tg. Emas and Solo Jebres D/P	New Terminal Berth:345m,Crane:2 Yard:5.4ha	140 Box/Yr 196 TEU/Yr	1999-2004	No Master Plan beyond 2000 Site selection survey is being under taken	Need Master Plan	One toplifter will be required. No other expansion is needed before 2010	Locomotive: 1, Wagon: 16 will be required by 2008
Tg. Perak and Rambipuji D/P	Berth:500m,Crane: 3 Yard:12.5ha	254 Box/Yr 368 TEU/Yr	1992	Master Plan up to 2010 and Short-term Plan up to 2000 has just been completed.		No expansion is needed	Locomotive:2, Wagon:23 will be required by 2010
Uj. Pandang	New Terminal Berth:490m,Yard:5.0ha	116 Box/Yr 145 TEU/Yr	1999-2002	Neither authorized Master Plan or Short-term Plan beyond 1997 has been prepared	Need development plan urgently	Need a dry port for full operation the container berths at Hatta Quay	No railway exists. Need connecting road, instead

4. CONCLUSIONS AND RECOMMENDATIONS

A. Conclusions

(1) Traffic Forecast and Project Principle

a. Traffic Forecast

102. In order to forecast future container traffic, three scenarios are set up for medium, high and conservative growth cases as scenario I, II and III, respectively. The socioeconomic frame of scenario I is estimated based on those in Repelita VI and the Long-term Development Plan II.

103. Based on these projections, in the target year 2003 and 2010, the volume of international container traffic in scenario I will increase by approximately 2.7 times(5.0 million TEU) and 4.3 times(7.9 million TEU), respectively over the present value. While the domestic traffic by approximately 7.1 times(0.7 million TEU) and 16 times(1.5 million TEU), respectively.

104. The volume of containers carried by railways between Tg. Priok and Gedebage will expand by approximately 2.2 times(134 thousand TEU) in 2003 and 3.4 times(210 thousand TEU) over the present volume.
The other traffic on railways connecting ports with dry ports will also increase, but this volume will still not reach to economic container transport volume via railway.

b. Development Strategy for National Container Port Network

105. Taking into account both the volume of container traffic and the future international container network, direct service to Indonesia by mother ships will mainly cover the Far East/Japan, Australia/New Zealand and Middle East routes. Foreign trade with Europe and North America by Post Panamax carriers will be connected to Singapore/Batam by feeder ships with transhipment of containers.

106. However it is not likely that the major routes for Europe and North America will be only served by Post Panamax carriers, because some shippers may choose to provide more frequent services using smaller vessels. In this case, container ships loading around

3,000 TEUs (smaller than Post Panamax) may continue to serve these routes, and they are expected to call directly at Indonesia ports.

107. The network proposed above are composed of six (6) container ports, Tg. Priok, Tg. Perak, Belawan, Panjang, Tg. Emas and Uj. Pandang which are to be given priority for development.

108. The network connected to the world will be also linked to the proposed domestic network through the six container ports and the local container ports.

109. On the basis of the network proposed above, the container ports in Indonesia are categorically classified as shown in **Table 30**:

Table 30 Functional classification of container ports

Category of Port	Function of Category	Port	Max. Ship Size
a. Principal Ports	National Gateway	Tg. Priok Tg. Perak	3,000 TEUs
b. Major Port	Regional Gateway	Belawan Panjang Tg. Emas Uj. Pandang	1,500 TEUs
c. Local Ports	Local Gateway	Other Ports	500 TEUs
d. International Hub Port	International Transit Port	Batam	Post Panamax

110. The strategy studied above is entitled "The Development Strategy for the National Container Ports Network of Indonesia".
The major characteristic of the strategy is that container ports forming the Network will be directly and indirectly open to the world. Thus, this strategy is also referred to as the "**Multi-gate Container Network (MUGNET) Policy**".

c. Capacity of the Existing Port Facilities

111. The container cargo handling capacity of the existing facilities of the major container ports are estimated as well as the saturation year of the capacity on the basis of the assumed berth criteria and the cargo traffic forecast. The results are shown in

Table 31.

Table 31 Handling capacity of existing facilities and the estimated saturation year

	Handling Capacity (x 1,000)	Saturation Year
Belawan(Existing)	127 Box (184 TEU)/Yr.	1994
Panjang(New Terminal)	116 Box (145 TEU)/Yr.	2003 - 2010
Tg. Priok (Existing)	839 Box(1,153 TEU)/Yr.	1993
Tg. Emas(New Terminal)	140 Box (196 TEU)/Yr.	1999 - 2004
Tg. Perak(Existing)	254 Box (368 TEU)/Yr.	1992
Uj. Pandang(New Terminal)	116 Box (145 TEU)/Yr.	1999 - 2002

d. Criteria for the Viability of Railway Container Transportation

112. There is certain minimum transportation distance beyond which the total transportation cost by railway is less expensive than that of trucks. On the basis of the cost analysis, the study concludes that the minimum travel distance required to compensate the additional cost to be about 100 km or longer.

113. For prompt service, at least one, desirablly two TRCTs per day must be operated between the dry and sea ports. Further more, container cargo traffic should be large enough to require more than two TRCTs per day, in order to make it financially viable to employ heavy handling equipment in the dry ports.

e. Comparison of Individual Dry Port and Connecting Railway

114. Priorities for future expansion of the five proposed dry ports and connecting railways are analyzed from the viewpoint of development factors. The most recommendable route as priority project is Gedebage - Tg. Priok one and the next is Solo - Semarang one.

115. **Table** 32 shows the comparison based on the result of individual routes analyzed in **Chapter 6 of Vol. 2**, where each item is scored.
Gedebage is obviously superior. However, we can see little difference between Solo and Rambipuji. The reason would be that background factors (potential demand) are underestimated in a strict sense.

f. Priority Projects for the Feasibility Study

116. The following two projects were selected for further the study(short-term development plan and the feasibility study):

i) Container Cargo Handling Facilities of Uj. Pandang Port, and
ii) Container Cargo Handling Facilities of Gedebage Dry Port and connecting railway

(2) Implementation Plan of Port Facilities

a. Required Facilities

117. In order to respond the projected increase in international and domestic container traffic in scenario I, the facilities listed **Table-14** to **16** will be required for accepting container ships and handling containers. The requirements are summarized in **Table** 33. The program presented in the Table should be implemented during the period of 1995 and 2010.

Table 32 Evaluation of Dry Ports

Item	Tebing Tinggi		Gedebage		Solo Jebres		Rambipuji	
Socioeconomy in Hinterland	X	Agricultural zone Slow growth	○ ○	Industrial zone, Municipal population:1.8 million	○	Industrial zone, Municipal Population: 0.5 million	X	Agricultural zone Slow growth
Transportation Distance	○	104 km	○ ○	187 km	○	112 km	○ ○	194 km
Location of Railway Terminal at port	X	2 km away from C.T.	X	900 m away from C.T.	○ ○	Next to M.Y. after installation	X	500 m away from C.Y.
Degree of facility utilization by train	X	No container train	○ ○	Ten container trains required in 2010	○	One container train required in 2008	○	one irregular container train is operated
Degree of Machinery utilization	○	No investment on machinery is required	○ ○	Sufficient utilizing machinery	X	Requires machinery expansion	○	No investment on machine needed
Competitiveness	X	Toll Highway is available	X	Toll Highway is available	X	Toll Highway is planned	X	Toll Highway is partially available
Procedures services	X	No service is available at D/P	○ ○	Complete service is provided at Dry Port	○	Possible in the same city	○	Possible in the same city
Overall Evaluation	2		10		6		5	

Note: ○ ○; 2 points, ○; 1 point, and X; 0 point

Table 33 Berths, Yard and CFS requirements (up to 2010)

	No. of container berths	Yard (ha)	CFS (1,000 sq.m)
International container ports	25	211	451
Local container ports	16	68	112

b. Cost Estimate

118. The projected cost to provide facilities listed in Table **14** and **15** including procurement cost of related equipment is estimated as shown in **Table 34.**

Table 34 Total project cost

Item	Estimated cost (Billion Rupiah)
Civil works (berths, yard, dredging, building, and etc.)	3,653
Equipments	1,638
Total	5,291

Note: (1)Construction case: Alternative I of Tg. Priok
(2)Including Contingency and Engineering Fee

(3) Implementation Plan of Dry Ports and Connecting Railways

a. General

119. The dry ports might be planned under the assumption that the government would entirely regulate road transport by trailer. However:

i) Extreme regulation was not implemented. Otherwise, trucks might carry instead of trailers to the ports obeying economic principles.
ii) Regulations will be ineffective if expressways replace regular highways.

iii) When the absolute volume of total demand is overestimated, the railway transport of containers, which was to increase by conversion, seems to lose the attraction. Therefore, the facility utilization was forced to be inefficient.

120. These factors might have undermined the above expectations.
As the conclusion, the most recommendable route as priority project is Gedebage - Tanjung Priok route and the next is Solo -Semarang route. The other routes are on the cradle stage, where enough economic growth adaptable for railway transportation or modernization of railway before hand, is desirable. The team is expecting big economic growth in future for container transportation.

b. Gedebage Dry Port and Connecting Railway

121. The container train operation between Bandung and Tg. Priok Port will increase from the present plan of 4 - 5 trains per day to 9 -10 trains per day by 2010 to accommodate increased container cargo.

122. In order to deal with the increase in train operation, the following countermeasures are required:

i) Improvement of Gedebage Dry Port(Gdb)
ii) Expansion of Kiaracondong(Kac)
iii) Doubling track between Gdb and Kac
iv) Improvement of Pasoso Terminal at Tg. Priok
v) Construction of new Tg. Priok Container Terminal(TCT)
vi) Purchase of rolling stock: locomotive; 8 wagon; 68

123. The total cost to provide the facilities and equipment for the countermeasures listed above is estimated as shown in **Table 35.**

Table 35 Total cost required for the improvement of railway facilities

	Cost(Bil. Rp.)	Remarks
Facilities	53.10	Civil works, etc.
Utilities	19.89	Signal, etc.
Loco and Wagon	39.20	
Handling machines	8.20	
Total	120.39	
Foreign currency portion	(73.70)	

c. Other Dry Ports and Connecting Railways

124. The other dry ports will not reach the level to establish the financial feasibility of TRCT operation, due to small volume of container cargo in 2010.

B. Recommendations

(1) General

125. The Master Plan should be reviewed and revised periodically taking the changes in the socioeconomic conditions in Indonesia and worldwide into consideration.

(2) Container Handling Ports

126. Based on the results of the Master Plan study, feasibility studies for short-term development plan should be urgently implemented on the following ports:

i) Tg. Priok including Bojonegara
ii) Tg. Emas

127. The government is planning and implementing several port development projects. These projects should be closely coordinated with the development of related facilities such as highways, railways and urban utilities, in order to achieve effective and efficient port operation.

128. Taking into consideration the public role of ports as a main pillar of socioeconomic development, the privatization into a port development field should be carefully introduced to ensure stable, continuous port operations.

129. Additional container yards should be urgently provided inside the proposed TCT area of Tg. Priok Port, if possible, or outside the Port as inland depots to be operated as a part of the port facilities prior to the completion of TCT.

130. The establishment of comprehensive database for all national port activities including container traffic is urgently needed as an essential tool for the effective supervision, planning and operation of ports by all the parties and organizations concerned.