Directorate General of Sea Transportation
Ministry of Transportation (DGST)
Republic of Indonesia

THE PREPARATORY SURVEY
ON
PATIMBAN PORT DEVELOPMENT PROJECT
IN
THE REPUBLIC OF INDONESIA

FINAL REPORT

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Japan International Cooperation Agency (JICA)

Ides Inc.
Oriental Consultants Global Co., Ltd. (OCG)
The Overseas Coastal Area Development Institute of Japan (OCDI)

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Exchange Rate as of January 2017

USD1.00 = Rp. 11,310.5

JPY 1.00 = Rp. 114.81

ABBREVIATIONS

ADPEL	Administrator Pelabuhan (Port Administrator)
AFTA	ASEAN Free Trade Area
ALOS	Advanced Land Observation Satellite; an observation satellite launched by JAXA (Japan Aerospace Exploration Agency) on 24 January 2006.
AMDAL	Analisis Mengenai Dampak Lingkungan (Environmental Impact Assessment)
ANDAL	Analisis Dampak Lingkungan (Environmental Impact Analysis)
APEC	Asia-Pacific Economic Cooperation
ASEAN	The Association of Southeast Asian Nations
ASTM	American Society for Testing and Materials
Aus-AID	Australian Agency for International Development
BAKOSURTANAL	Badan Koordinasi Survei dan Pemetaan Nasional; a governmental agency of Indonesia for land survey and mapping
BAPEDAL	Badan Pengendalian Dampak Lingkungan (Environmental Control Agency)
BAPPENAS	Badan Perencanaan Pembangunan Nasional (National Development Planning Agency)
BMKG	Badan Meteorologi Klimatologi dam Geofisika (Meteoroligical, Climatological and Geophysical Agency)
BPJT	Badan Pengatur Jalan Tol (Indonesian Toll Road Authority)
BPS	Badan Pusat Statistik (Indonesian Statistic Agency)
CBU	Completely Built-Up
CCTV	Closed Circuit Television
CDL	Chart Datum Level
CEPT	Common Effective Preferential Tariffs
CFC	Conversion Factor for Consumption
CFS	Container Freight Station
CFSL	Conversion Factor for Skilled Labor
CFUL	Conversion Factor for Unskilled Labor
CGI	Consultative Group on Indonesia
CIF	Cost, Insurance and Freight
CKR	Cikarang
CLM	Cilamaya
CMEA	Coordinating Ministry of Economic Affairs
CPO	Crude Palm Oil
CBU	Complete-Built-Unit
DAOP	Daerah Operasi (Operational Area)
DEL	Diesel Electric Locomotives
DENR	Department of Environment and Natural Resources
DGH	Directorate General of Highways

DGLC	Directorate General of Land Communications
DGPS	Differential Global Positioning System
DGR	Directorate General of Railways
DGST	Directorate General of Sea Transportation
DKI	Special Capital City District
DKP	Departemen Kelautan dan Perikanan (Ministry of Marine Affairs and Fisheries)
DL	Datum Level
DLT	Design Low Tide Level
DNIT	National Department of Transport Infrastructures
DTV	Daily Traffic Volume
DWT	Dead Weight Tons
EIA	Environmental Impact Assessment
EIRR	Economic Internal Rate of Return
FAO	Food and Agriculture Organization
FIRR	Financial Internal Rate of Return
FOB	Free On Board
GAIKINDO	Gabungan Industri Kendaraan Bermotor Indonesia (Association of Indonesian Automotive Industries)
GDB	Gedebage
GDP	Gross Domestic Product
GEA	Governmental Environmental Authority
GEIP	GHG (Greenhouse Gas)
GOI	Government of Indonesia
GOJ	Government of Japan
GPS	Global Positioning System
GRDP	Gross Regional Domestic Product
HHWL	Highest High Water Level
HWL	High Water Level
IBA	Important Bird Areas
ICB	Interlocking Concrete Block
ICD	Inland Container Depot
IPC II	Indonesia Port Corporation II
IEE	Initial Environmental Examination
IMF	International Monetary Fund
IMO	Infrastructure Maintenance and Operation
IRR	Internal Rate of Return
ISPS	International Ship and Port Facility Security
ITB	Institut Teknologi Bandung (Bandung Institute of Technology)
JBIC	Japan Bank for International Cooperation
JCT	Jakarta Container Terminal

JICA	Japan International Cooperation Agency
JICT	Jakarta International Container Terminal
JIS	Japan Industrial Standard
JIT	Jakarta Container Terminal
JIUT	Jakarta InterUrban Toll Road
JKABODETABEK	Greater Jakarta covering Jakarta, Bogor, Depok, Tangerang and Bekasi
JKABODETABEKPUNJUR	Greater Jakarta covering Jakarta, Bogor, Depok, Tangerang, Bekasi, Puncak and Cianjur
JORR	Jakarta Outer Ring Road
JORR2	second Jakarta Outer Ring Road
KA-ANDAL	Kerangka Acuan Analisis Dampak Lingkungan (Term of Reference for Environmental Impact Analysis
KfW	Kreditanstalt fur Wiederaufbau
KKPPI	Komite Kebijakan Percepatan Penyediaan Infrastruktur (National Committee on Acceleration of Infrastructure Provision)
KN	Kilo Newton
KOJA	one of Container Terminal Companies in Jakarta
LA	Loan Agreement
LCP	Laem Chabang Port
LL	Liquid Limit
LLWL	Lowest Low Water Level
LOA	Length Overall
MAL	Mustica Alam Lestari
MSL	Mean Sea Level
MT	Metric Ton
MTI	Multi Terminal Indonesia
MW	Megawatt
NKB	North Kalibaru area
NSW	National Single Window
O&M	Operation and Maintenance
OCR	Over Consolidated Ratio
OD	Origin and Destination
ODA	Official Development Assistance
ONWJ	Off Shore North West Jawa
PABX	Private Automatic Branch Exchange
PBI	Indonesian Standard
Pc	Pre-consolidation stress
PC	Pre-stressed Concrete
PCU	Passenger Car Unit
Pelindo	Indonesian Port Corporation

PIANC	Permanent International Association of Navigation Congress
PL	Plastic Limit
PLN	National Electric Corporation
PLTGU	Pembangkit Listrik Tenaga Gas Uap (Indonesian: Integrated Gasification Combined Cycle Plants)
POO	Pasoso
PPP	Public Private Partnership
PPP	Purchasing-power-parity
RPJMN	Rencana Pembangunan Jangka Menengah Nasional (National Medium-term Development Plan)
RPJPN	Rencana Pembangunan Jangka Panjang Nasional (National Long-term Development Plan)
PRT	Port Related Traffic Volume
PSO	Public Service Obligation
PT. KAI	PT. Kereta Api Indonesia (Persero), Indonesian Railways Corporation
PVD	Plastic Vertical Drain
QGC	Quay Gantry Crane
Rp.	Rupiah
RBD	Refined, Bleached and Deodorized
RBDPO	Refined, Bleached and Deodorized Palm Oil
RC	Reinforced Concrete
RKL	Rencana Pengelolaan Lingkungan (Environmental Management Plan)
RMCIP	Risk Management Committee on Infrastructure Provision
RMU	Risk Management Unit
ROE	Return on Equity
ROI	Return on Investment
ROW	Right of Way
RPL	Rencana Pemantauan Lingkungan (Environmental Monitoring Plan)
RTG	Rubber Tired Gantry crane
RTRW	National, Provincial and Regional/Municipal Spatial Plan
SCF	Standard Conversion Factor
SE	South-East
SEA	Strategic Environmental Assessment
SEZ	Special Economic Zone
SOE	State Owned Enterprises
SPM	Suspended Particulate Matter
SPP	Steel Pipe Pile
SPT	Standard Penetration Test
SRT	State Railway of Thailand
SSP	Steel Sheet Pile

STEP	Special Terms for Economic Partnership
SUPAS	Intercensal Population Survey
TAC	Track Access Charge
TEU	Twenty-foot Equivalent Unit
TgPA	Tanjung Priok Access Road
TIC	Tangerang International City
TJTR	Trans Java Toll Road
TPK	Terminal Petikemas (Container Terminal)
TSHD	Trailing Suction Hopper Dredger
TSP	Total Suspended Solids
TSS	Traffic Surveillance System
TTV	Through Traffic Volume
UKL/UPL	Upaya Pengelolaan Lingkungan - Upaya Pemantauan Lingkungan (Environmental Manageme nt Efforts - Environmental Monitoring Efforts)
ULCS	Ultra-Large Container Ships
UNDP	United Nations Development Program
UNPF	United Nations Population Fund
URTP	Urgent Rehabilitation Project of Tanjung Priok Port
VAT	Value Added Tax
VCR	Vehicle Capacity Ratio
VLCC	Very Large Crude Carrier

Contents

Chapter 1. INTRODUCTION

1.1 Background of the Project

In Indonesia along with the recent rapid economic growth there has been a sharp increase in the volume of cargoes handled in ports. The volume of containers handled at Tanjung Priok Port as the sole international port in the Grater Jakarta Metropolitan especially are increased, reaching container terminal capacity. To supplement the lack of container-handling capacity at the port in the metropolitan area, the construction of a new container terminal at North Kalibaru off Tanjung Priok Port has been started. On the other hand, there is chronic traffic congestion along the roads in and out Jakarta Metropolitan area, while population and industrial location in the east of Jakarta Metropolitan area are steadily increasing, consequently resulting in severe traffic congestion, it causes high logistic cost in accessing Tanjung Priok Port from West Java Province, where major industrial areas are located.

The current Joko government establishes a concept of 'maritime nation' and considers that the strengthening of connectivity by port development, and the improvement and expansion of traffic infrastructure is important and the mid-term national development plan (2015 – 2019) Government of Indonesia (hereinafter referred as to "GOI") puts a priority on the preparation of infrastructure to promote economic growth in national development. Under this policy, the vice president directed the Minister of Transportation to develop the ports to support industrial development and effectuate the logistic system in May 2015 and the Directorate General of Sea Transportation (hereinafter referred to as "DGST") of the Ministry of Transportation of GOI, conducted the study for selection of the new port construction site in West Java (August – December of 2015) (hereinafter referred to as "MOT F/S") to save the logistic cost and reduce the fuel consumption and increase of trucks by developing new port closer to the production site, to strengthen the economic resilience by providing backup outlet port, to lower the level of congestion in the capital by transferring some of the heavy freight traffic out of the territory and to secure the oil and gas exploitation and navigation safety.

In presidential decree No.47/2016, Patimbang Port Development in Subang Regency of West Java Province is decided as the national strategic project.

1.2 Outline of the Project

The project is named as "Patimbang Port Development Project", and aims at strengthening the function of logistics in Jakarta Metropolitan Area through the construction of a new port (container terminal, car terminal, etc.) at Patimban in Subang Regency of West Java Province and the consequential contribution to further economic growth through the improvement of the investment environment in Indonesia. The outline of the project components is port construction (dredging, breakwaters, seawalls, wharf, reclamation/soil

improvement, access roads and bridges within the port area, etc.) and consulting services (detailed design and supervision, etc.) stemming from the construction works.

1.3 Objectives of the Survey

The objectives of the survey are to conduct a study to review the feasibility study done by MOT, purpose, outline, project cost, organization for implementation of the project, operation/maintenance system, environmental and social considerations, etc. of the project expected to be financed through financial assistance of Japanese ODA Loan, necessary for the appraisal, so as to implement the project as a cooperative project with the ODA Loan (hereinafter referred to as “Phase 1”). The survey also includes the basic design of facility for Phase 1 and detailed design (draft) of the facility for soft opening expected in 2019 and preparation of tender documents (draft) for the construction of such part of the facilities. In addition the proposal of the access road preparation, the study on the perspective of the development of hinterland and the comprehensive traffic system including new roads and railways, etc. will be conducted. Figure below is shown the project area of the Survey.

Source: JICA Survey Team

Figure 1.3-1 Project Area of the Survey

1.4 Stages of the Survey

The entire survey is divided into the two stages, viz. [Stage I] for FS (basic design) (herein after referred to as "JICA F/S Study") and [Stage II] for D/D of a part of facility (hereinafter referred to as "JICA DD Study"), and [Stage II] is implemented and its target scope of work

is a part of the terminal to be opened with the target year of 2019 (hereinafter referred to as "Phase 1-1"):

The Survey is scheduled to be implemented in 16 months as shown in table below.

Table 1.4-1 Work Schedule of the Survey

		2016						2017									
		Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Work in Japan		□															□
Work in Indonesia	Stage I		■	■	■	■	■	■	■	■	■	■	■	■	■	■	
	Stage II							■	■	■	■	■	■	■	■	■	

Source: JICA Survey Team

Chapter 2. PATIMBAN PORT DEVELOPMENT PLAN

2.1 Background and Premises of Development Plan

2.1.1 Socio-economic Framework

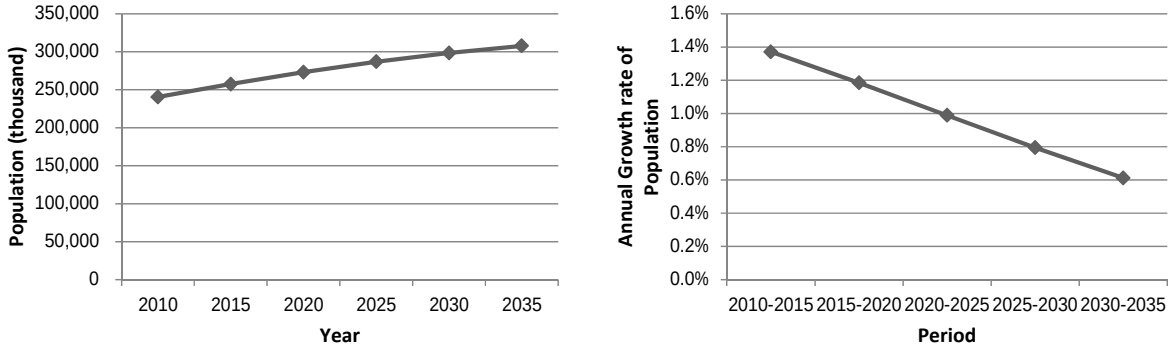
(1) Socio-economic Framework

1) Population

Population of Indonesia in 2010 is approximately 237.7 million according to the Population Census 2010 (May). In 2013, Indonesia Population Projection 2010-2035 is conducted based on the data in 2010 Population Census.

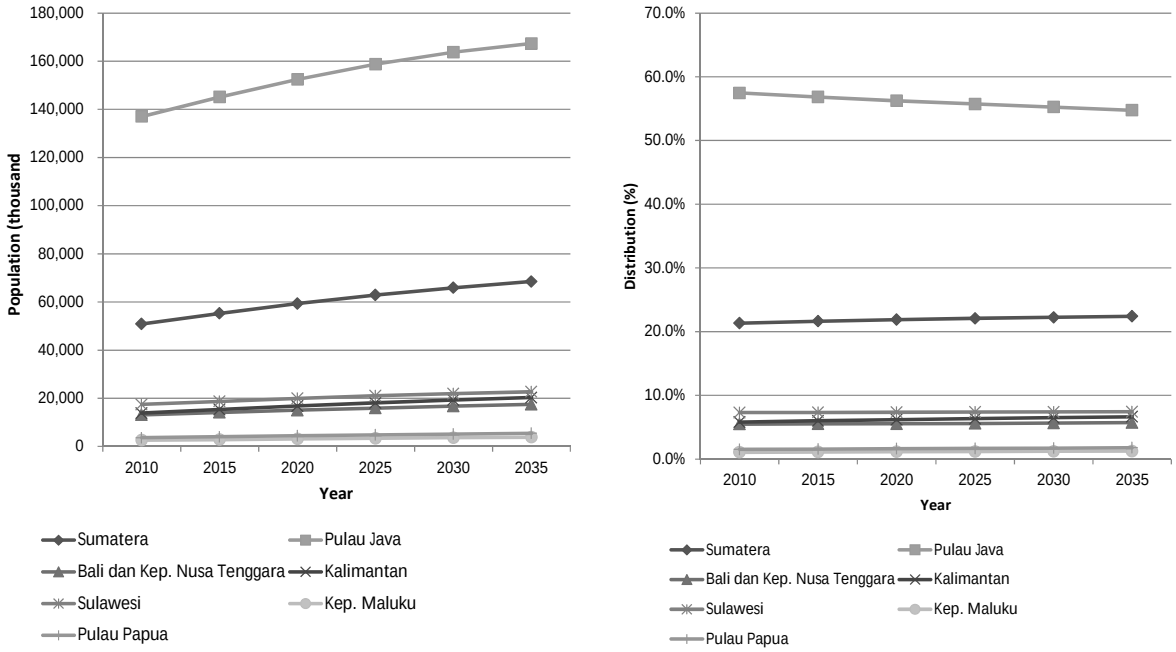
According to the projection, the total population of Indonesia will be around 296 million in 2030 and 305 million in 2035 though the growth rate of the population will decrease to 0.62% per annum during 2030 – 2035 from 1.38% per annum during 2010 – 2015 (see Figure 2.1-1).

In 2010, population of Java Island was 137 million which accounts for around 57.5% of national total and followed by Sumatera, 21.3%. Population of Java Island is estimated to be around 167 million in 2035 but its growth rate is estimated to decrease and its share will be around 54.7% in 2035 (see Figure 2.1-2).



Source: Indonesia Population Projection 2010-2035 BPS, the Survey Team

Figure 2.1-1 Projection of population and its growth rate of Indonesia

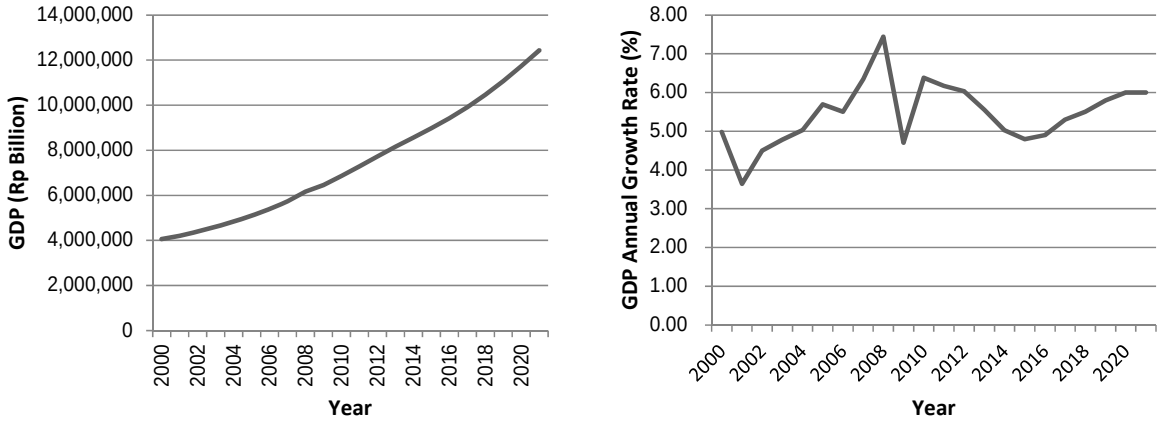


Source: Indonesia Population Projection 2010-2035 BPS, the Survey Team

Figure 2.1-2 Projection of population and distribution by region

2) GDP (Gross Domestic Product)

Historical trend of the GDP and its growth rate of Indonesia are shown in Figure 2.1-3. Indonesia was affected by the economic crisis so-called as Lehman Shock in 2009 but the extent of the shock was rather small compared with developed countries such as USA, Western Europe and Japan, etc. In 2010, the Indonesian economy showed quick recovery with annual growth rate of over 6%. For the last five years, annual growth rate of GDP of Indonesia has been decreased slightly but the IMF estimates that it will recover from recession by the year 2020.



Source: World Economic Outlook Database, April 2016 (IMF)

Figure 2.1-3 Historical trend of GDP and its annual growth rate of Indonesia

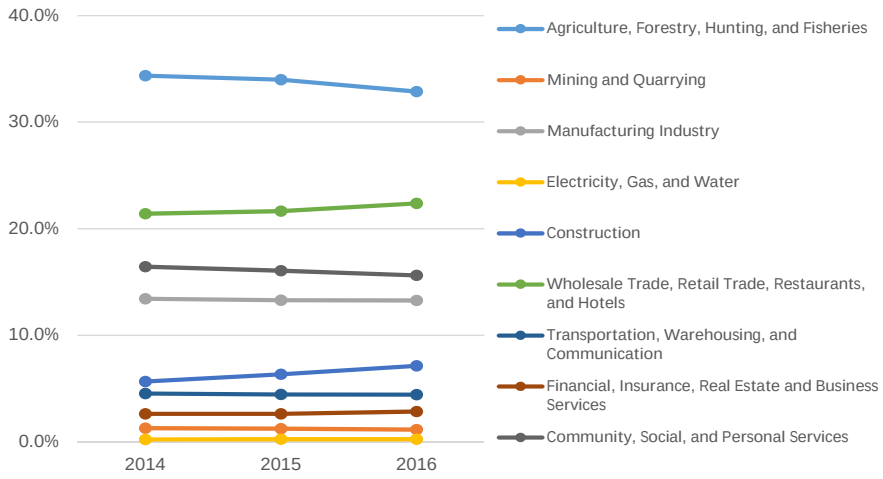
3) Labor Force Participation Ratio

Labor force participation ratio in Indonesia is at 33% in the sector of agriculture, forestry, hunting and fisheries, 22% in the sector of wholesale's trade, retail trade, restaurant and hotels, and 13% in manufacturing industry sector. The labor force participation in the service sector and construction sector is increasing but the primary industry sector and transportation sector is decreasing in those 3 years. According to labor statistics, labor force participation of manufacturing industry is concentrated in surrounding area of DKI Jakarta, approximately 40% of Indonesia, Java Barat has 25% share of the labor force participation. Table and figure below show the labor force participation ratio in Indonesia.

Table 2.1-1 Labor Force Participation

Industry	2014		2015		2016	
Agriculture, Forestry, Hunting, and Fisheries	38,068,254	34.4%	38,973,033	34.0%	37,748,228	32.9%
Mining and Quarrying	1,420,767	1.3%	1,436,370	1.3%	1,320,466	1.2%
Manufacturing Industry	14,883,817	13.4%	15,254,674	13.3%	15,255,099	13.3%
Electricity, Gas, and Water	250,945	0.2%	289,193	0.3%	288,697	0.3%
Construction	6,276,723	5.7%	7,280,086	6.4%	8,208,086	7.1%
Wholesale Trade, Retail Trade, Restaurants, and Hotels	23,737,236	21.4%	24,829,734	21.7%	25,686,342	22.4%
Transportation, Warehousing, and Communication	5,040,849	4.5%	5,113,188	4.5%	5,106,817	4.4%
Financial, Insurance, Real Estate and Business Services	2,912,418	2.6%	3,031,038	2.6%	3,266,538	2.8%
Community, Social, and Personal Services	18,213,032	16.4%	18,420,710	16.1%	17,938,926	15.6%
TOTAL	110,804,041	100.0%	114,628,026	100.0%	114,819,199	100.0%

Source: Statistics Indonesia 2014, 2015 and 2016



Source: Statistics Indonesia 2014, 2015 and 2016

Figure 2.1-4 Trend of Labor Force Participation Ratio

4) Investment in Indonesia

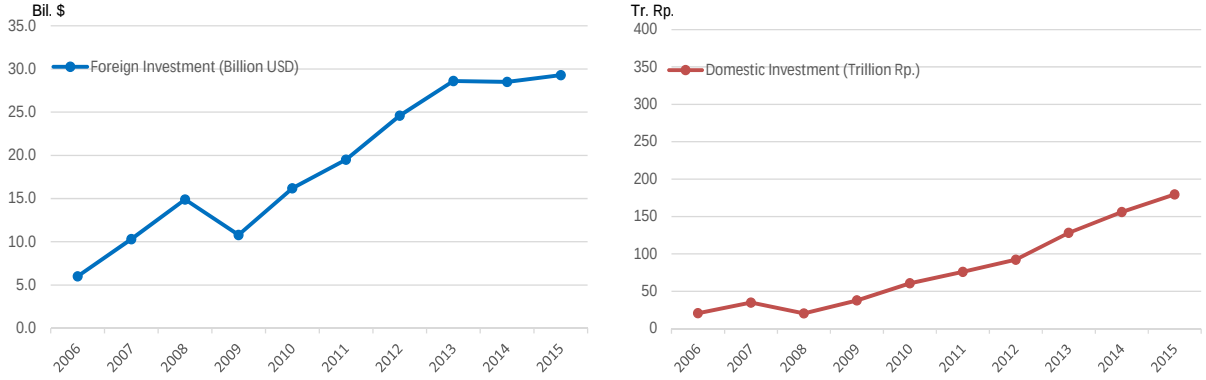
Foreign and domestic real investment value is shown both in table and figure below, respectively. Domestic investment in 2015 is Rp. 179.5 trillion and that of foreign is USD 29.3 billion. The foreign investment in 2009 and that of domestic in 2008 decreased caused

by recession of Leman shock compared to previous years, but they are consistently on a track to increase strongly.

Table 2.1-2 Foreign and Domestic Real Investment in Indonesia

INVESTMENT	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Domestic Investment (Trillion Rp.)	20.8	34.9	20.4	37.8	60.6	76.00	92.2	128.2	156.1	179.5
Foreign Investment (Billion USD)	6.0	10.3	14.9	10.8	16.2	19.5	24.6	28.6	28.5	29.3

Source: Statistics Indonesia 2016



Source: Statistics Indonesia 2016

Figure 2.1-5 Trend of Foreign and Domestic Investment in Indonesia

Table 2.1-3 Foreign and Domestic Investment by Sector in 2015

Industry	Domestic (Bil Rp.)		Foreign (Mil $)	
Agriculture, Forestry, Hunting, and Fisheries	13,112.9	7.3%	2,219.9	7.6%
Mining and Quarrying	3,946.8	2.2%	4,017.2	13.7%
Manufacturing Industry	89,045.3	49.6%	11,763.1	40.2%
Electricity, Gas, and Water	21,946.8	12.2%	3,028.9	10.3%
Construction	17,165.5	9.6%	954.5	3.3%
Wholesale Trade, Retail Trade, Restaurants, and Hotels	5,403.9	3.0%	1,275.3	4.4%
Transportation, Warehousing, and Communication	21,333.9	11.9%	3,289.9	11.2%
Financial, Insurance, Real Estate and Business Services	6,509.9	3.6%	2,433.6	8.3%
Community, Social, and Personal Services	1,000.9	0.6%	294.3	1.0%
TOTAL	179,465.9	100.0%	29,276.7	100.0%

Source: Statistics Indonesia 2016

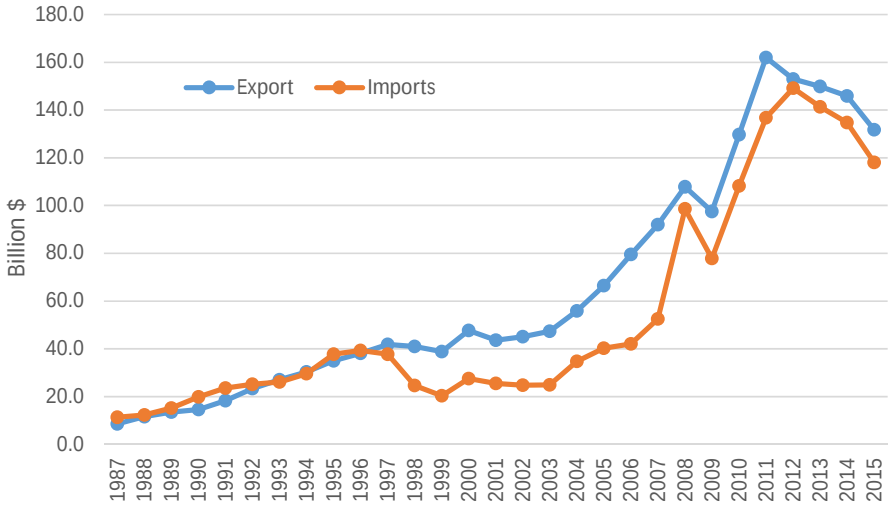
Table 2.1-4 Foreign and Domestic Investment by Region in 2015

Domestic Direct Investment					Foreign Direct Investment				
Rank	Location	Project	Value (Bil Rp.)	%	Rank	Location	Project	Value (Mil $)	%
1	Jawa Timur	615	35,489.8	19.8%	1	Jawa Barat	4497	5,738.7	19.6%
2	Jawa Barat	935	26,272.9	14.6%	2	DKI Jakarta	4463	3,619.4	12.4%
3	DKI Jakarta	316	15,512.7	8.6%	3	Jawa Timur	742	2,593.4	8.9%
5	Banten	367	10,709.9	6.0%	4	Banten	1737	2,542.0	8.7%
National Total		5100	179,465.9	100.0%	National Total		17738	29,275.9	100.0%

Source: Statistics Indonesia 2016

5) Trade

Figure below shows historical record of export and import value except oil and gas in Indonesia. Both of export and import have decreased since the year 2013. Indonesia economy has trade surplus continuously except oil and gas sector.

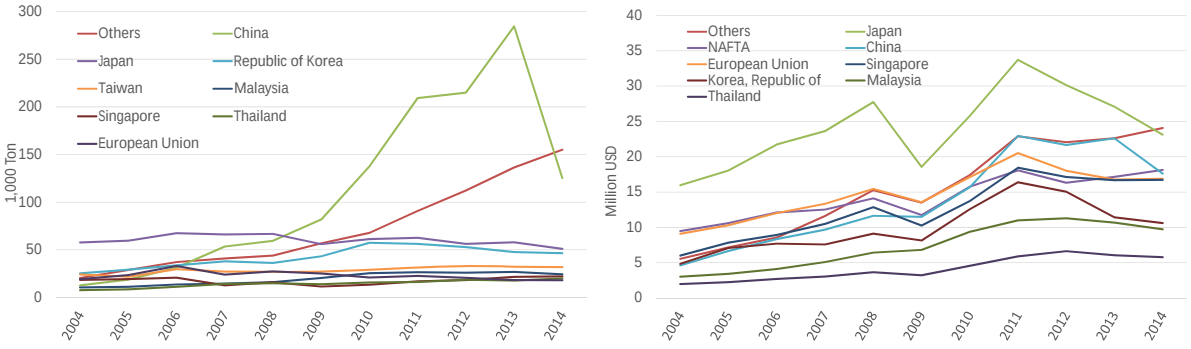


Source: Statistics Indonesia 2016

Figure 2.1-6 Export and Import Value without Oil and Gas in Indonesia

6) Main Trade Partner

Volume and value of export and import with major partner countries are shown in figure below. Export volume to China greatly decreased in 2014, however, that of ASEAN has increased at high rate since 2010. Import volume from China and Australia increased in 2014 but that of Malaysia decreased. Both value of export and import has decreased since 2012.



Source: Statistics Indonesia 2016

Figure 2.1-7 Export Partner of Indonesia (Volume and Value)

Table 2.1-5 Export Partner of Indonesia 2010~2014 (1,000 Ton)

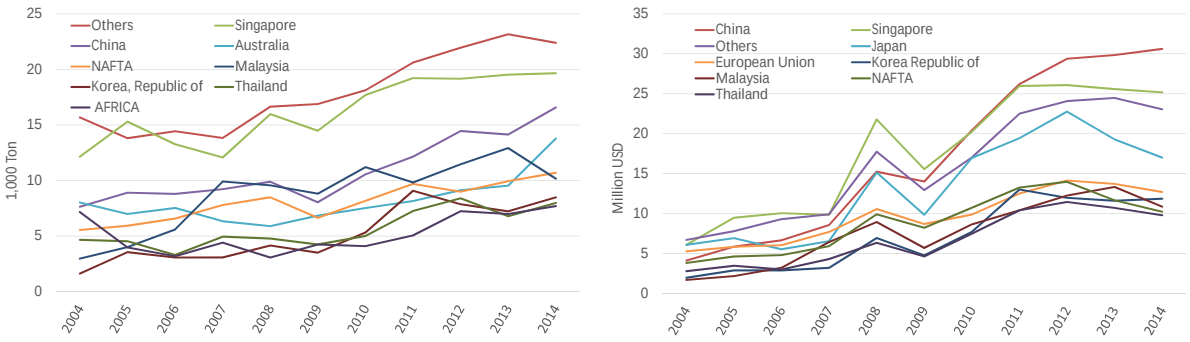
Country of Destination	2,010	2,011	2,012	2,013	2,014
Others	67,795	90,850	112,341	136,471	154,941
China	137,644	209,264	214,891	284,602	125,332
Japan	61,311	62,628	56,240	57,892	50,965
Republic of Korea	57,384	56,140	52,860	47,567	46,364
Taiwan	29,045	31,412	32,925	32,126	31,875
Malaysia	25,402	26,416	26,011	26,716	24,346
Singapore	13,424	16,848	18,141	21,530	22,058
Thailand	15,817	16,276	18,518	17,728	20,008
European Union	20,843	22,538	20,599	18,140	18,097

Source: Statistics Indonesia 2016

Table 2.1-6 Export Partner of Indonesia 2010~2014 (Million USD)

Country of Destination	2,010	2,011	2,012	2,013	2,014
Others	17,417	22,903	22,060	22,631	24,077
Japan	25,782	33,715	30,135	27,086	23,118
NAFTA	15,761	18,078	16,317	17,161	18,136
China	15,693	22,941	21,660	22,602	17,606
European Union	17,127	20,509	18,027	16,764	16,894
Singapore	13,723	18,444	17,135	16,686	16,728
Korea, Republic of	12,575	16,389	15,050	11,423	10,601
Malaysia	9,362	10,996	11,278	10,667	9,730
Thailand	4,567	5,897	6,635	6,062	5,783

Source: Statistics Indonesia 2016



Source: Statistics Indonesia 2016

Figure 2.1-8 Import Partner of Indonesia (Volume and Value)

Table 2.1-7 Import Partner of Indonesia 2010~2014 (1,000 Ton)

Country of Origin	2010	2011	2012	2013	2014
Others	18,121.2	20,615.0	21,959.0	23,173.9	22,395.1
Singapore	17,691.9	19,218.1	19,163.0	19,537.9	19,662.6
China	10,554.4	12,147.4	14,460.6	14,145.3	16,578.6
Australia	7,523.5	8,156.3	9,126.3	9,543.1	13,786.3
NAFTA	8,169.4	9,701.4	8,983.5	9,942.2	10,697.7
Malaysia	11,208.7	9,817.2	11,456.5	12,915.9	10,166.3
Korea, Republic of	5,315.4	9,074.2	7,871.2	7,223.5	8,483.1
Thailand	5,006.5	7,260.3	8,403.1	6,788.9	7,983.2
AFRICA	4,096.5	5,055.5	7,241.2	6,986.4	7,704.6

Source: Statistics Indonesia 2016

Table 2.1-8 Import Partner of Indonesia 2010~2014 (Million USD)

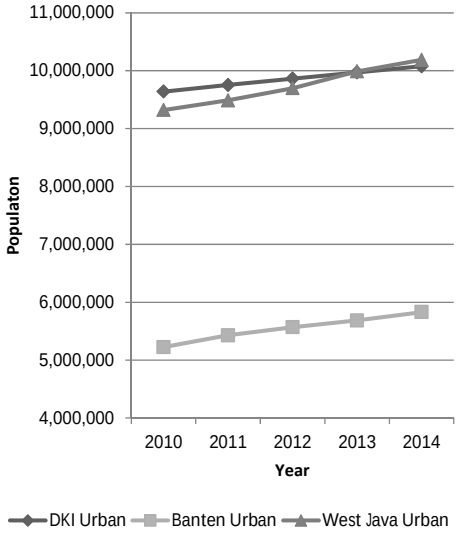
Country of Origin	2010	2011	2012	2013	2014
China	20,424.2	26,212.2	29,385.8	29,849.5	30,624.3
Singapore	20,240.8	25,964.7	26,087.3	25,581.8	25,185.7
Others	17,016.9	22,505.3	24,086.7	24,471.9	23,050.8
Japan	16,965.8	19,436.6	22,767.8	19,284.3	17,007.6
European Union	9,862.5	12,499.7	14,132.2	13,708.1	12,691.4
Korea Republic of	7,703.0	12,999.7	11,970.4	11,592.6	11,847.4
Malaysia	8,648.7	10,404.9	12,243.5	13,322.5	10,855.4
NAFTA	10,720.5	13,241.7	13,981.8	11,648.9	10,217.8
Thailand	7,470.7	10,405.1	11,438.5	10,703.1	9,781.0

Source: Statistics Indonesia 2016

(2) Regional Socio-economic Framework

1) Population

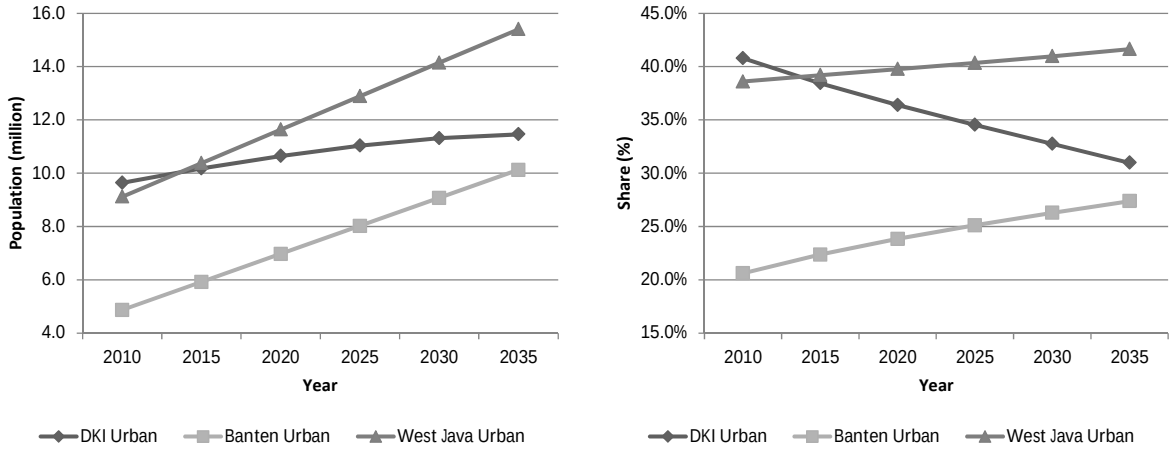
Population of Greater Jakarta Metropolitan area which consists of DKI Jakarta, Banten and West Java was 63.3 million in 2010, which accounts for 26.6% of total of Indonesia. When viewing the population of urban area only in those 3 provinces, it was 24.2 million which accounts for 10.1% in 2010. Where, “urban area” is defined as areas alongside the Cikampek Toll Road where densely populated and its population counts for basically 100% of Kota (City) and 50% of Kab. Tangerang, Kab. Serang and Kab. Karawang. Historical trend of the population in urban areas of those 3 provinces is shown in Figure 2.1-9. In 2013, the urban population of DKI Jakarta and West Java was around 9.97 million and 9.99 million respectively and the urban population of West Java became larger than the one of DKI Jakarta in the following year.



Source: Indonesia Population Projection 2010-2035, Banten in Figures 2010 – 2015 and West java in Figures 2010-2015

Figure 2.1-9 Historical trend of population in urban areas of DKI Jakarta, Banten and West Java (2010 – 2014)

Based on the trend during 2010–2014, the projected urban population in those provinces and its distribution until 2035 is shown in Figure 2.1-10. According to the projection, decrease in the DKI Jakarta's share is prominent and West Java is considered to be the largest followed by Banten in 2035.



Source: Indonesia Population Projection 2010-2035, Banten in Figures 2010 – 2015 and West java in Figures 2010-2015

Figure 2.1-10 Urban population and its distribution of DKI Jakarta, Banten and West Java

2) GRDP of Manufacturing Sector

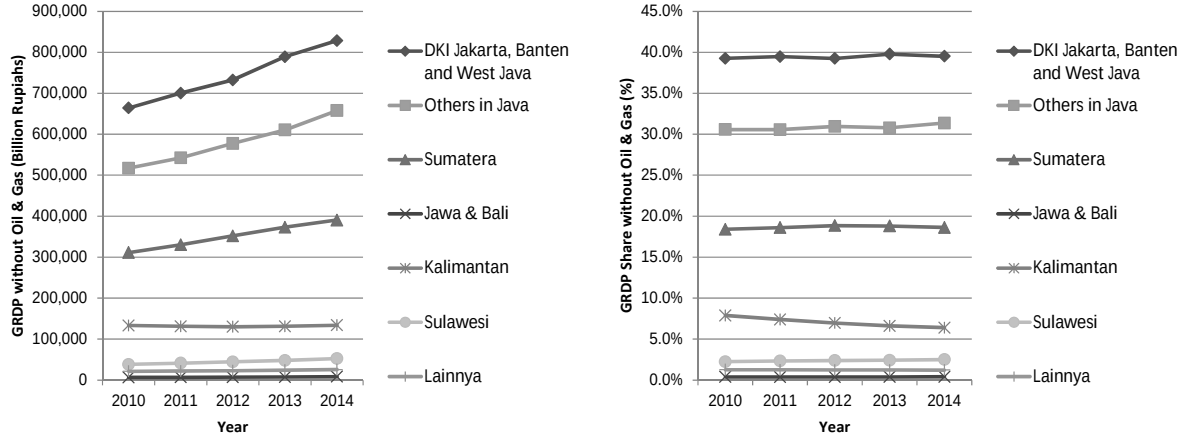
GRDP of Manufacturing Sector excluding Oil and Gas Sector at 2010 Constant Market Prices by Provinces of Indonesia (2010-2014) is shown in Table 2.1-9 and historical trends

of GRDP excluding Oil and Gas Sector by region and its share is shown in Figure 2.1-11. During 2010 to 2014, GRDP of the top 3 groups steadily increased without change of shares. The group consists of DKI Jakarta, Banten and West Java shows the largest share which accounts for around 39% through the period.

Table 2.1-9 Gross Regional Domestic Product except Oil & Gas at 2010 Constant Market Prices by Provinces, 2010-2014 (Billion Rupiahs)

Province	2010	2011	2012	2013	2014
DKI Jakarta, Banten and West Java	664,029	700,276	732,506	789,049	828,390
Others in Java	517,080	542,110	577,647	610,398	657,708
Sumatera	311,243	330,148	351,949	372,938	390,463
Jawa & Bali	6,563	6,621	6,967	7,565	8,237
Kalimantan	133,227	131,148	129,955	131,114	133,982
Sulawesi	38,097	41,369	44,561	47,995	52,487
Others	21,249	22,098	22,807	24,374	25,557
Indonesia	1,691,488	1,773,770	1,866,392	1,983,433	2,096,824

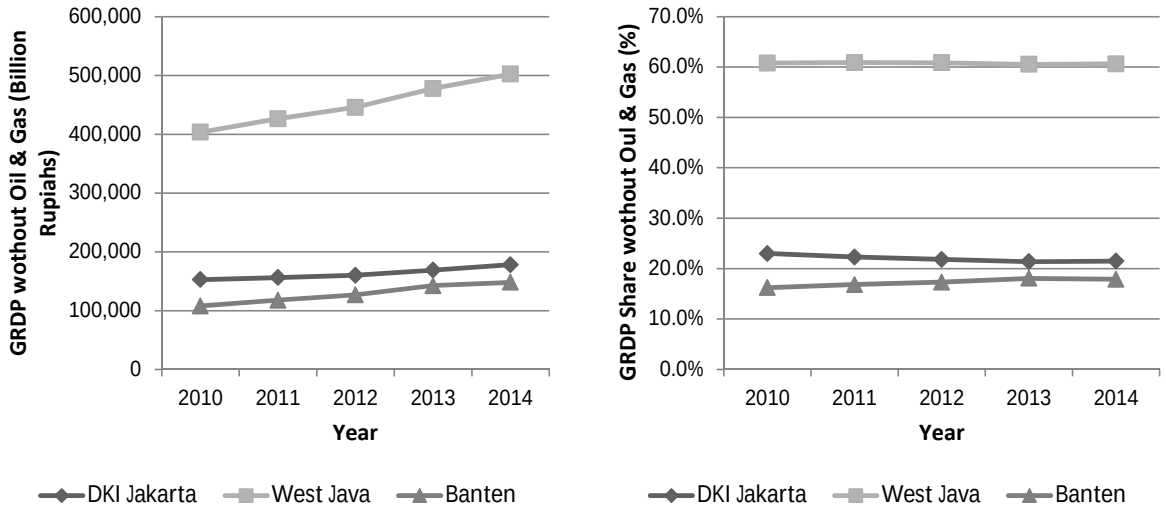
Source: Gross Regional Domestic Product of Provinces in Indonesia by Industry, 2010-2014, The Survey Team



Source: Gross Regional Domestic Product of Provinces in Indonesia by Industry, 2010-2014, The Survey Team

Figure 2.1-11 Historical trends of GRDP except Oil & Gas by region and its share (2010-2014)

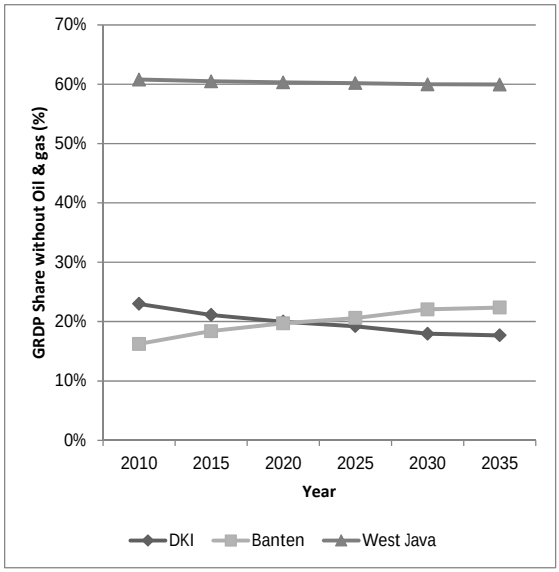
Among the group of the DKI Jakarta, Banten and West Java, historical trend of GRDP excluding Oil and Gas Sector and share of each province is shown in Figure 2.1-12. According to the figure, GRDP of West Java has steadily grown by increase of population and new manufacturing plant of makers in West Java during the period and kept its share at around 60% followed by DKI Jakarta.



Source: Gross Regional Domestic Product of Provinces in Indonesia by Industry, 2010-2014, The Survey Team

Figure 2.1-12 Historical trends of GRDP except Oil & Gas (DKI Jakarta, Banten and West Java) and its share（2010-2014）

Based on the trend during 2010-2014, GRDP and the shares of the 3 provinces until 2035 are projected as shown in Figure 2.1-13. According to the projection, West Java is estimated to have the largest share at around 60% while DKI Jakarta is estimated to be declined gradually and Banten is estimated to be the second largest in the vicinity.



Source: Gross Regional Domestic Product of Provinces in Indonesia by Industry, 2010-2014, The Survey Team

Figure 2.1-13 Projection of Share of GRDP without Oil & Gas 2010-2035 (DKI Jakarta, Banten and West Java）

Regarding GDP of the main trade partner countries as an indicator of demand forecast of export container, figure below shows historical GDP growth rate of ASEAN, Japan, China, Korea and EU of IMF World Economy Outlook on April 2016. All countries in the figure

recovered from Leman shock at 2010, and the GDP growth rate of ASEAN and China have been over 5%.

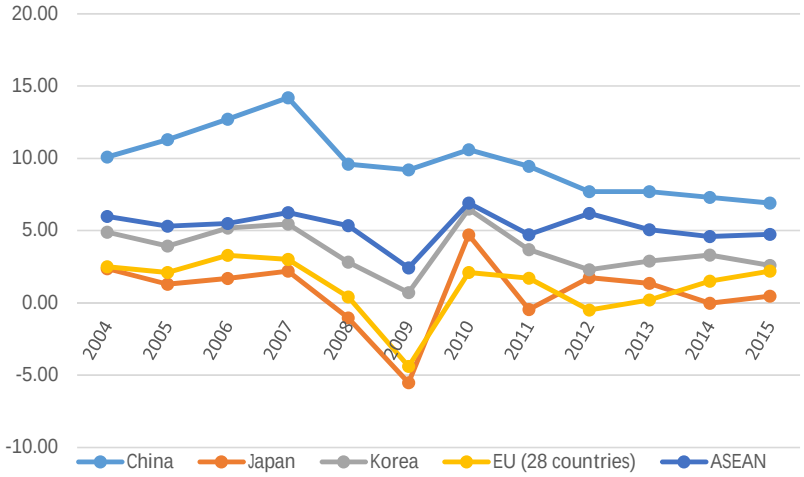


Figure 2.1-14 GDP Growth Rate of Main Trade Partner

3) Current Situation and Future Plan of Industrial Estates

As described in the previous section, it is obvious that the area covers DKI Jakarta, Banten and West Java, so-called JABODETABEK is the center of manufacturing excluding oil and gas.

Table 2.1-10 shows share of industrial estates (area) by region. Total area is around 95 thousand ha and the JABODETABEK accounts for around 46.4%.

Share of industrial estates (area) in JABODETABEK is shown in Table 2.1-11 and Figure 2.1-15. Karawang-West Java provides the largest industrial estates area in the region as large as 16,400 ha which accounts for 37.1%. Banten is the second largest (27.7%) followed by Bekasi (22.1%).

Table 2.1-10 Share of Industrial estates (area) by Region

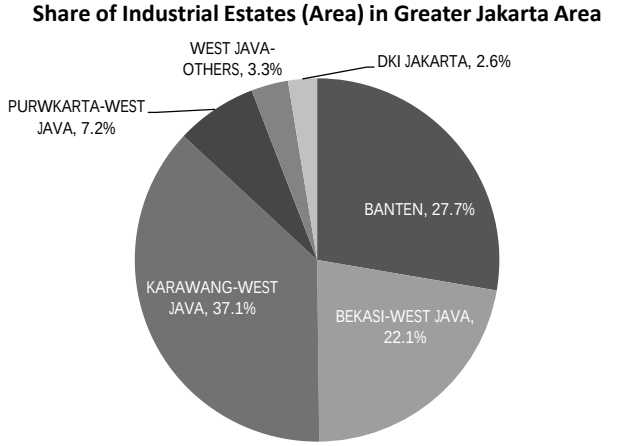
Region	Area (ha)	Share (%)
SUMATERA	6,090.00	6.4%
KEPULAUAN RIAU/RIAU/BINTAN	18,549.36	19.5%
AMBON/IRIAN/KALIMANTAN/SULAWESI	11,171.12	11.7%
BANTEN	12,233.64	12.9%
BEKASI-WEST JAVA	9,774.50	10.3%
KARAWANG-WEST JAVA	16,400.00	17.2%
PURWKARTA-WEST JAVA	3,187.00	3.3%
WEST JAVA-OTHERS	1,452.00	1.5%
DKI JAKARTA	1,132.20	1.2%
CENTRAL JAVA	4,411.00	4.6%
EAST JAVA	10,802.07	11.3%
Total	**95,202.89**	**100.0%**

Source : HKI Directory 2015-2016, The Survey Team

Table 2.1-11 Share of Industrial Estates (area)

Region	Area (ha)	Share (%)
BANTEN	12,234	27.7%
BEKASI-WEST JAVA	9,775	22.1%
KARAWANG-WEST JAVA	16,400	37.1%
PURWKARTA-WEST JAVA	3,187	7.2%
WEST JAVA-OTHERS	1,452	3.3%
DKI JAKARTA	1,132	2.6%
Total	**44,179**	**100.0%**

Source : HKI Directory 2015-2016, The Survey Team



Source : HKI Directory 2015-2016, The Survey Team

Figure 2.1-15 Share of Industrial Estates (area) in JABODETABEK

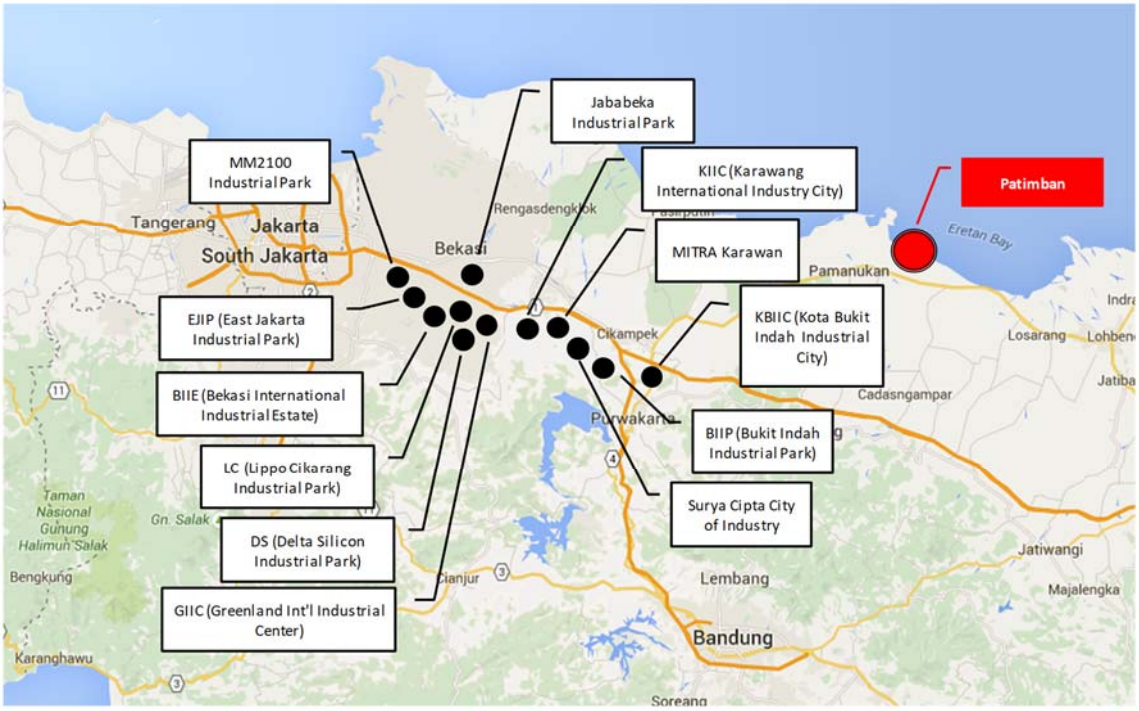
Figure 2.1-16 shows location of major industrial estates in Eastern Metropolitan Area covering Bekasi, Karawang and Purwakarta.

Industrial estates were developed initially in and around Bekasi during early 90's and expanded toward east to Karawang and Purwakarta. They are located alongside the Cikampek Toll Road at distance of around 30 km to 90 km from Jakarta.

Other than Bekasi, Karawang and Purwakarta, new industrial estate is under development in western area of Subang by a local land developer which already secured the lot as large as 2,000 ha (see Figure 2.1-17). According to its plan, 800 ha will be developed as Phase 1 by 2019 and auto parts supplier will be expected to construct a new plant in the industrial estate. And the toll road construction between Patimban Port and Subang IC will facilitate development of industrial area where textile sector is located. According to Bappeda of Subang Regency, an area of 7,500ha out of 11,000ha designated as industrial area by Subang Regency is rented out for makers plants.

Figure 2.1-18 shows location of finished auto manufacturers in Eastern Metropolitan Area. Plants of foreign companies especially in auto industry to Indonesia has been increased steadily. In recent years, major Japanese automakers have invested several billions of Japanese Yen in new plant development to expand production capacity. New plants are constructed in Karawang and Purwakarta.

Existing manufacturing plants operating since 1970s in Sunter of Jakarta area are scheduled to move out of the area due to expiration of the HGB (construction right) and urban redevelopment policy of the local government of DKI Jakarta. New plants are expected to be constructed in Karawang, Purwakarta and/or Subang since no available lot in the area around Jakarta is found.

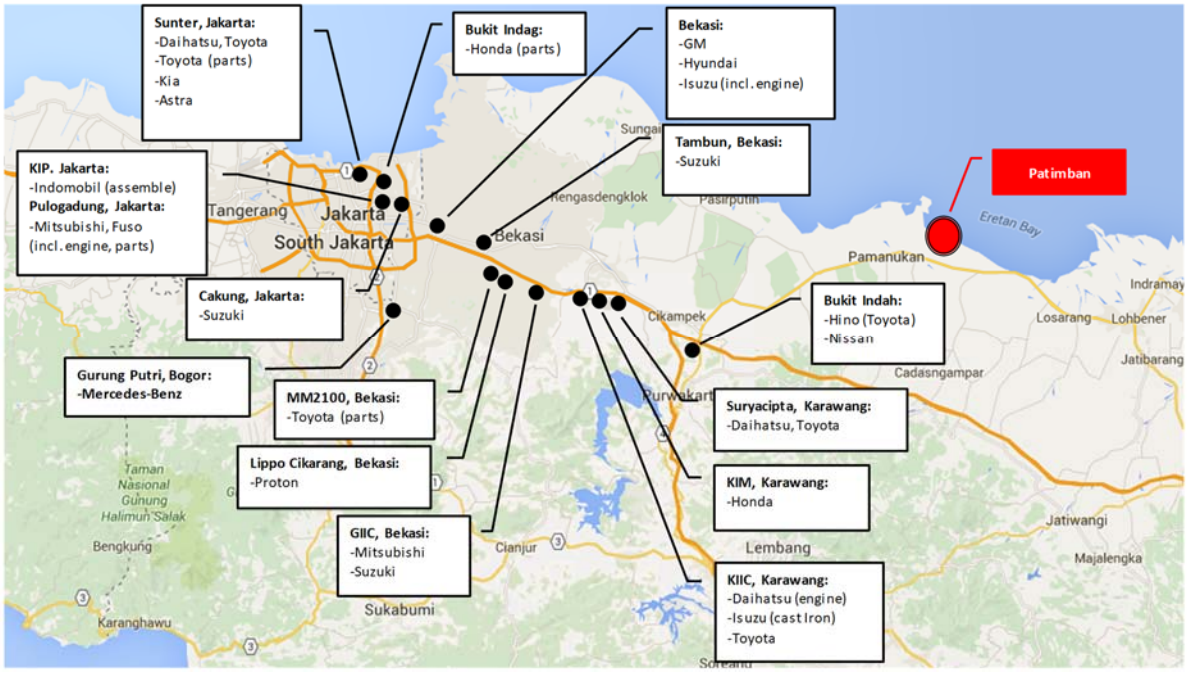


Source: The Survey Team

Figure 2.1-16 Location of Major Industrial Estates in Eastern Metropolitan Area

Source: The Survey Team

Figure 2.1-17 Location of Subang Industrial Park



Source: The Survey Team

Figure 2.1-18 Location of Finished Auto Manufacturers' Plant in Eastern Metropolitan Area

2.1.2 Issues and Expectation of Users of the Port in Major Industrial Zone in Hinterland

(Refer to Annex I which shows the details of interview survey)

(1) Overview of the Survey

1) Issue on Current Situation

Traffic congestion in DKI Jakarta and/or Cikanpek toll road causes delay and inefficient land transportation and it forces suppliers to take custody of excessive stocks to avoid interruption of a production line of their customers. Logistics companies operate their service at night time and manufacturing companies are forced to reschedule shift of labor to cope with such unfavorable condition. These countermeasures incur additional cost to the companies.

Most of manufacturing companies is struggling to reduce cost of even Rp. 100 of such as material, intermediate material, parts and wage in a severe global competitive markets. Logistics companies such as forwarder in the developed countries try to satisfy their customer's request for reducing cost by forming supply chain management (SCM) system on logistics stage and the logistics company solutions contribute a great deal in cost and time saving aspect to their customers. Traffic congestion in and around DKI Jakarta, however, incurs a lot of cost to logistics companies for operation to meet customers' requests for reliable and short time delivery. This undesirable situation leads to loss in maker's motivation to invest in Indonesia and it will be difficult to stimulate the economy of Indonesia and to play a central role of manufacturing industry in ASEAN.

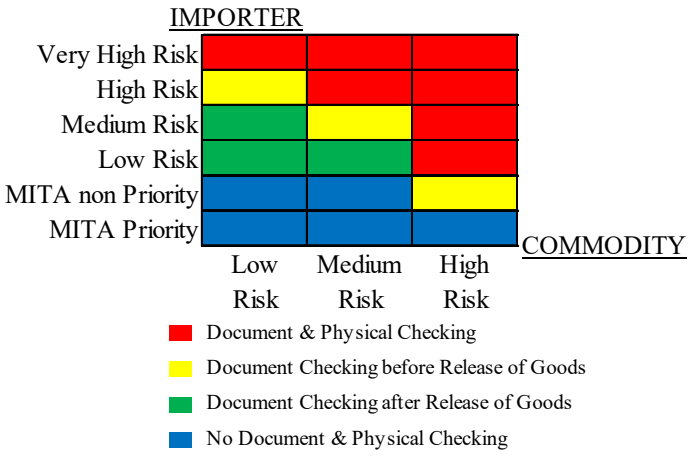
Regarding customs clearance of Indonesia, there is a few satisfied voice on its improvement but most of consignee and logistics companies complain unstable system and unacceptable additional charge of customs as well as short period (one day) of free charge of storage and high rates of the storage charge after expiry of free time, high cost of warehousing of private company outside of Tanjung Priok port. Table below shows the time required for customs clearance of ASEAN countries according to "Logistics Performance Index 2014" of the World Bank, and customs clearance time of neighboring countries is only 1 or 2 days even they conduct physical inspection. It is required to reduce the time for customs clearance in Indonesia from 5 days to 2 days with physical inspection or from 2 days to 1 day without physical inspection as done in Malaysia and/or in Vietnam.

Table 2.1-12 Time Required for Customs Clearance in ASEAN

	Singapore	Thailand	Malaysia	Vietnam	Indonesia
Physical Inspection	1 day	1 day	2 days	2 days	5 days
Non P/I	0 day	1 day	1 day	1 day	2 days

Source: The World Bank "Logistics Performance Index 2014"

In addition, potential companies to use Patimban Port which have a status of Green/Yellow channel require a succession of the status of import channel of customs clearance at Tanjung Priok port even after they move to Patimban port. If the companies with Green/Yellow channel status were forced to be reset as Red channel status when they use a customs of Patimban Port, it will discourage the companies to move to Patimban port from Tanjung Priok port.



Source: PRIORITY LINE and AUTHORIZED ECONOMIC OPERATOR, DGCE

Figure 2.1-19 Customs Clearance System of Indonesia

Interview survey found that 24-hour service does not sufficiently prevailed and online application does not function at the required level for delivery service. Confusion in delivery

information and/or delayed delivery of empty container has caused overtime work for employees.

As to the port services in Tanjung. Priok Port, lack of sufficient space of container yard and berthing facility has become critical issue to the customers and caused continuous traffic congestion in and around port and longer lead time. Furthermore, cargo damage during loading and/or unloading work is some other problem to the customer.

High tariff of container storage and pilferage of cargo within the port and difference in actual situation and in regulation are also complained.

2) Request on Patimban Port

Request on Patimban Port by potential users of the port is summarized as follows:

a.) Efficiency and function of the new port should be secured at the same level at least and hopefully much better than Tanjung. Priok. b.) New highway should be constructed to secure smooth access to the new port as soon as possible. c.) Customs clearance service should be provided with the same level at least or with more efficiency than Tanjung. Priok. d.) Backup area and hinterland should be developed along with the new port development. e.) 3 days free of charge storage service should be applied in the new port. f.) Sufficient number of gates should be provided in the new port. g.) Access railway is better to be constructed.

One comment is also delivered, e.g. there are high possibilities that shipper/consignee within 40km of DKI Jakarta will select Tanjung Priok port, Patimban port will, however, cover east of Karawan Regency.

Most of port users located east of Jakarta and West Java expects the transportation efficiency to be improved by the development of Patimban Port. Some of companies hopes terminal of Patimban Port to be operated by Japanese port terminal operator.

3) Suggestions on Demand Forecast Derived from Interview Survey

* Major commodity dealt by a logistic company: 60% to 70% is vehicle related cargo including primary material such as coil and wire for automobile which are imported from Thailand amounting about 1,200 to 1,500 boxes per year, 100 boxes or more per month with 40feet container. Export cargo of 50 to 60 boxes per month. Cargoes other than vehicle related cargo are food staff, daily goods and commercial goods and these are expected to be increased in near future excluding food staff which will be shifted to local production.

* Tariff rate of inland transportation of container is approximately 1.5~1.8 mil. Rp./40ft. container, and that of vehicle is almost the same.

* Demand for industrial estate increased in 2016 although it declined once in 1 to 2 years ago. Some of developer is implementing or planning expansion of industrial estate and there

is high possibility to develop new industrial estate in the east of Karawan. One developer has a plan of developing industrial estate of 2,000 ha in Subang Regency of which 800 ha as the first stage to be operational in 2019 and land acquisition of 360 ha was completed.

* Some of the car assembly factory located in Sunter are required to relocated to possibly to west Java Province by around 2023.

* According to the study by private company, the car sales in Indonesia is forecasted to reach 1.2 to 1.3 million cars in 2020.

* Preference for Patimban port to Tg. Priok of each industrial estate is as follows;

Jakarta/ Sunter:	4/10	(40%)
EJIP:	1/5	(20%)
MM2100:	4/5	(80%)
Jababeka IP:	1/2	(50%)
GIIC:	1/1	(100%)
KIIC:	4/6	(67%)
Mitra Karawang:	3/3	(100%)
Suryacipta:	2/3	(67%)
BIIP:	1/1	(100%)
Kota Bukit Indah:	2/2	(100%)
Bogor:	1/2	(50%)

* Supposing that the border of hinterland of each port is on around the location of EJIP, Preference rate for Patimban is counted as follows;

Jakarta/JKT Sunter＋EJIP＋MM2100＋Jababeka IP＋Bogor: 11/24 (45.8%)
GIIC＋KIIC＋Mitra Karawang＋Suryacipta＋BIIP＋Kota Bukit Indah: 13/16(81.3%)

2.1.3 Demand Forecast of Container in Greater Jakarta Metropolitan Area

As economic outlook of Indonesia, positive perspective is announced to the public. Firstly it is expected that a period of demographic dividend, which drives the high growth of economy, will continue to the year of 2044 according to World Population Prospects. Secondly, inquiries about industrial estate from foreign and domestic investors are increasing steadily, further more Indonesian developer proceeds the plan of construction of industrial estate in Subang. Thirdly GDP per capita of Indonesia in 2015 is only 60% of Thailand, 40% of China and Malaysia, and population forecast estimates to increase by 2 million per year, therefore, the number of middle/wealthy class in 2020 will be twice of 2012 by robust of domestic consumption. Therefore, demand of container cargo is expected to increase along with the economic growth of Indonesia in future.

(1) Historical Trend of Container Throughput at Tanjung Priok Terminal

The historical trend of container throughput at Tanjung Priok Terminal is shown in Table 2.1-13 and Figure 2.1-20.

As shown in the table and figure, the throughput of International containers considerably dropped in 2009, with 15.0% decrease from the preceding year, apparently affected by the Lehman shock in 2008. In the following year of 2010, it showed a sharp recovery with 24.1% in 2010 and then another 8.2% increase in 2011. During those 2 years it showed up and down in narrow range, 1.8% down in 2014 and 2.9% up in 2015, from the respective previous years.

Regarding domestic containers, although throughput was affected by the Lehman Shock in 2008 to some extent, over the following 3 years, its throughput showed a significant increase, i.e. 42.1% up in 2009, 13.5% up in 2010, 38.3% up in 2011 and 38.9% up in 2012. During last 3 years, year-on-year losses are recorded, especially showing sharp drop of 34.1% in 2015 from previous year due to shrink of Indonesia's domestic demand caused by weakened Rupia.

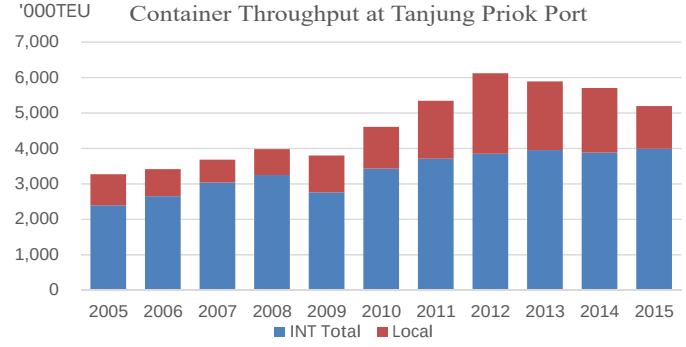
Regarding contents/commodity of container, both of bill of lading (BL) for import and declaration for export are not allowed to be disclosed to the third party by their confidential nature, therefore, any JICA study report of the past for Tanjung Priok port did not summarized the contents of container cargo.

Table 2.1-13 Historical Trend of the Number of Containers Handled at Tanjung Priok Port

Unit: '000 TEUs

Year	Annual Container Throughput					
	International		Domestic		Total	
2005	2,399	---	879	---	3,278	---
2006	2,653	10.6%	767	-12.8%	3,420	4.3%
2007	3,040	14.6%	649	-15.3%	3,690	7.9%
2008	3,253	7.0%	732	12.7%	3,984	8.0%
2009	2,765	-15.0%	1,040	42.1%	3,805	-4.5%
2010	3,432	24.1%	1,180	13.5%	4,613	21.2%
2011	3,715	8.2%	1,632	38.3%	5,347	15.9%
2012	3,857	3.8%	2,266	38.9%	6,123	14.5%
2013	3,957	2.6%	1,936	-14.5%	5,893	-3.8%
2014	3,886	-1.8%	1,824	-5.8%	5,710	-3.1%
2015	3,999	2.9%	1,202	-34.1%	5,201	-8.9%

Source: Pelindo 2



Source: Pelindo 2

Figure 2.1-20 Historical Trend of Container Throughput at Tanjung Priok Terminal

(2) Demand Forecast of International Container Throughput

1) Statistical Data applied to Forecast

Estimated GDP growth rates of Indonesia, ASEAN (exclusive of Indonesia), Japan, China, Korea and EU are shown in Table 2.1-14. Growth rates of ASEAN, Japan, China and Korea up to 2021 are quoted from IMF estimation and that of EU (up to 2018) is quoted from Eurosat data. Estimation of growth rate thereafter is of the Survey Team.

The Survey Team assumes that growth rates thereafter will continue to take same figure as of 2021 except China and Indonesia which shows rather high rate of growth in comparison with other countries. Growth rate of China and Indonesia from 2026 to 2030 is assumed to decrease 0.5% respectively and from 2030 to 2035 further to decrease 0.5%.

High Case is a plus 0.5% of growth rate to the Base Case after 2022 and Low Case is a minus 0.5% to the Base Case after 2022.

Table 2.1-14 GDP Growth Rate applied to Forecast (each case)

Base	2016	2017	2018	2019	2020	2021	2022~2025	2026~2030	2031~2035
Indonesia	5.1%	5.3%	5.5%	5.8%	6.0%	6.0%	6.0%	5.5%	5.0%
China	6.5%	6.2%	6.0%	6.0%	6.0%	6.0%	6.0%	5.5%	5.0%
Japan	0.5%	-0.1%	0.4%	0.7%	0.7%	0.7%	1.0%	1.0%	1.0%
Korea	2.7%	2.9%	3.1%	3.1%	3.1%	3.0%	3.0%	3.0%	3.0%
EU	1.6%	1.6%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
ASEAN	4.8%	5.1%	5.2%	5.3%	5.5%	5.5%	5.5%	5.5%	5.5%

High	2016	2017	2018	2019	2020	2021	2022~2025	2026~2030	2031~2035
Indonesia	5.1%	5.3%	5.5%	5.8%	6.0%	6.0%	6.5%	6.0%	5.5%
China	6.5%	6.2%	6.0%	6.0%	6.0%	6.0%	6.5%	6.0%	5.5%
Japan	0.5%	-0.1%	0.4%	0.7%	0.7%	0.7%	1.5%	1.5%	1.5%
Korea	2.7%	2.9%	3.1%	3.1%	3.1%	3.0%	3.5%	3.5%	3.5%
EU	1.6%	1.6%	1.5%	1.5%	1.5%	1.5%	2.0%	2.0%	2.0%
ASEAN	4.8%	5.1%	5.2%	5.3%	5.5%	5.5%	6.0%	6.0%	6.0%

Low	2016	2017	2018	2019	2020	2021	2022~2025	2026~2030	2031~2035
Indonesia	5.1%	5.3%	5.5%	5.8%	6.0%	6.0%	5.5%	5.0%	4.5%
China	6.5%	6.2%	6.0%	6.0%	6.0%	6.0%	5.5%	5.0%	4.5%
Japan	0.5%	-0.1%	0.4%	0.7%	0.7%	0.7%	0.5%	0.5%	0.5%
Korea	2.7%	2.9%	3.1%	3.1%	3.1%	3.0%	2.5%	2.5%	2.5%
EU	1.6%	1.6%	1.5%	1.5%	1.5%	1.5%	1.0%	1.0%	1.0%
ASEAN	4.8%	5.1%	5.2%	5.3%	5.5%	5.5%	5.0%	5.0%	5.0%

Source: Indonesia Statistics Yearbook 2016, IMF World Economic Outlook, Eurosat and Economic Watch

2) Forecast of Import Container

The multiple regression analysis is applied by correlating imported container volumes measured in metric tons with the gross domestic product (the national GDP), based on the statistical data from 2006 to 2015 (see Table 2.1-15).

Table 2.1-15 GDP of Indonesia and Import Volume (MT) at Tanjung Priok Port

Year	GDP (Trillion Rp)	Import Container Volume ('000 MT)
2006	5,394	13,492
2007	5,736	15,484
2008	6,163	18,105
2009	6,453	15,616
2010	6,864	18,612
2011	7,288	20,146
2012	7,727	20,915
2013	8,156	21,445
2014	8,566	21,073
2015	8,977	21,684

Source: Statistics Indonesia 2015 and Pelind 2, prepared by the Survey Team

The result of correlation by the multiple regression analysis is shown below:

$Yi = 2.8\ Xi - 2{,}288.8\ Ti - 687.3 \quad R2 = 0.909$

Where, Yi: Import container volume (MT)
Xi: GDP of Indonesia
Ti: Dummy valuable (Ti = 0 (2006~2013), Ti = 1 (2014, 2015))

Forecasted import container volumes measured by MT have been converted into the forecasted import container numbers expressed in TEUs based on average metric tons per TEU and empty container ratio.

$Zi = Yi / Mi / (1 - Ei)$

Where, Zi: Import container (TEU)
Mi: Conversion factor into TEU (MT / TEU, 11.4)
Ei: Empty ratio (5%)

3) Forecast of Export Container

The multiple regression analysis is conducted by correlating exported container volumes measured in metric tons and the weighted gross domestic product of major trade partner of export, by using the statistical data from 2006 to 2015 (see Table 2.1-16) and dummy valuable.

Table 2.1-16 Weighted GDP of Major Export Partner and Export Volume (MT) at Tanjung Priok Port

Year	GDP (Billion USD)	Export Container Volume ('000 MT)
2006	1,917	13,303
2007	2,271	13,195
2008	2,607	14,629
2009	2,725	12,980
2010	3,120	16,655
2011	3,605	18,028
2012	3,836	18,716
2013	4,040	19,199
2014	4,301	18,857
2015	4,325	19,405

Source: IMF and Pelindo 2, prepared by the Survey Team

The result of correlation by the multiple regression analysis is shown below:

Ye = 3.2 Xe – 905.5 Te + 6,103.8 (R2 = 0.920)
Where, Ye: Export container volume (MT)
Xe: Weighted GDP of major export partner
Te: Dummy valuable (Te = = 0 (2006~2013), Te = 1 (2014, 2015))

Forecasted export laden container volumes measured by MT have been converted into the forecasted export laden container numbers expressed in TEUs based on average metric tons per TEU.

Zel = Ye / Me
Where, Zel: Export laden container (TEU)
Me: Conversion factor into TEU (MT / TEU, 9.7)

For the estimation of empty container, it is assumed that the number of imported container and exported container is same considering closed characteristic of Java Island. Therefore, number of export empty container is calculated as follow:

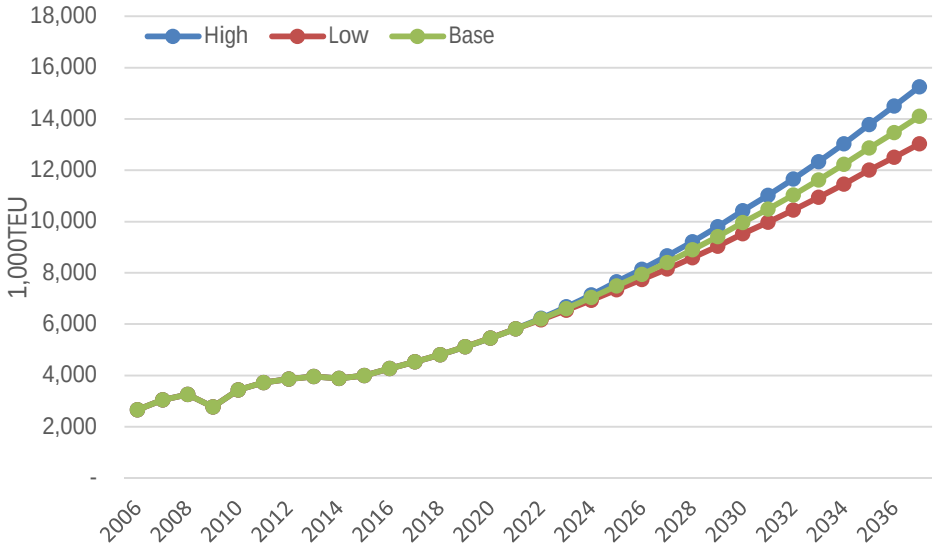
Ze = Zi, Zee = Ze Zel
Where, Ze: Export container (TEU)
Zee: Export empty container (TEU)

The result of the demand forecast of international container is summarized below:

Table 2.1-17 Forecasted International Container Throughput (each case)

Year	Export									Import									Year	TOTAL		
	Laden			Empty			Total			Laden			Empty			Total						
	High	Base	Low	High	Base	Low	High	Base	Low	High	Base	Low	High	Base	Low	High	Base	Low		High	Base	Low
2006																			2006		2,653	
2007																			2007		3,040	
2008																			2008		3,253	
2009																			2009		2,765	
2010																			2010		3,432	
2011																			2011		3,715	
2012																			2012		3,857	
2013																			2013		3,957	
2014																			2014		3,886	
2015																			2015		3,999	
2016		2,012			125			2,137			2,030			107			2,137		2016		4,273	
2017		2,113			151			2,264			2,151			113			2,264		2017		4,529	
2018		2,232			172			2,404			2,284			120			2,404		2018		4,808	
2019		2,372			187			2,559			2,431			128			2,559		2019		5,119	
2020		2,538			191			2,729			2,593			136			2,729		2020		5,459	
2021		2,711			198			2,910			2,764			145			2,910		2021		5,819	
2022	2,853	2,842	2,831	264	259	254	3,117	3,101	3,085	2,961	2,946	2,930	156	155	154	3,117	3,101	3,085	2022	6,233	6,201	6,169
2023	3,003	2,980	2,957	334	323	312	3,337	3,303	3,269	3,170	3,138	3,106	167	165	163	3,337	3,303	3,269	2023	6,674	6,606	6,539
2024	3,163	3,126	3,090	408	391	374	3,572	3,518	3,464	3,393	3,342	3,291	179	176	173	3,572	3,518	3,464	2024	7,143	7,035	6,929
2025	3,334	3,282	3,230	488	463	440	3,822	3,745	3,670	3,631	3,558	3,486	191	187	183	3,822	3,745	3,670	2025	7,643	7,491	7,340
2026	3,502	3,433	3,365	566	534	502	4,067	3,966	3,867	3,864	3,768	3,674	203	198	193	4,067	3,966	3,867	2026	8,135	7,933	7,734
2027	3,680	3,592	3,506	648	608	568	4,328	4,200	4,074	4,112	3,990	3,871	216	210	204	4,328	4,200	4,074	2027	8,656	8,399	8,149
2028	3,868	3,760	3,655	736	686	637	4,604	4,446	4,292	4,374	4,223	4,077	230	222	215	4,604	4,446	4,292	2028	9,208	8,891	8,583
2029	4,068	3,937	3,811	829	768	709	4,897	4,705	4,520	4,652	4,470	4,294	245	235	226	4,897	4,705	4,520	2029	9,794	9,411	9,040
2030	4,280	4,124	3,974	927	855	785	5,207	4,979	4,760	4,947	4,730	4,522	260	249	238	5,207	4,979	4,760	2030	10,414	9,958	9,519
2031	4,485	4,303	4,129	1,023	938	857	5,509	5,242	4,986	5,233	4,980	4,737	275	262	249	5,509	5,242	4,986	2031	11,017	10,484	9,973
2032	4,703	4,492	4,291	1,124	1,026	932	5,827	5,518	5,223	5,535	5,242	4,962	291	276	261	5,827	5,518	5,223	2032	11,653	11,035	10,446
2033	4,932	4,689	4,459	1,231	1,118	1,011	6,162	5,807	5,470	5,854	5,517	5,197	308	290	274	6,162	5,807	5,470	2033	12,324	11,615	10,941
2034	5,173	4,897	4,636	1,343	1,214	1,093	6,516	6,111	5,729	6,190	5,806	5,442	326	306	286	6,516	6,111	5,729	2034	13,032	12,223	11,458
2035	5,428	5,115	4,820	1,461	1,316	1,179	6,890	6,431	5,999	6,545	6,109	5,699	344	322	300	6,890	6,431	5,999	2035	13,779	12,861	11,998
2036	5,673	5,321	4,992	1,575	1,411	1,258	7,248	6,732	6,250	6,885	6,396	5,937	362	337	312	7,248	6,732	6,250	2036	14,496	13,465	12,500
2037	5,930	5,536	5,170	1,694	1,512	1,341	7,624	7,048	6,511	7,243	6,695	6,185	381	352	326	7,624	7,048	6,511	2037	15,248	14,095	13,022

Source: The Survey Team



Source: The Survey Team

Figure 2.1-21 Forecasted International Container Throughput (each case)

(3) Forecast Demand of Domestic Container Throughput

1) Forecast of Loading Interisland Container

The regression analysis is applied in correlating loading inter-island container volumes in metric tons and the GRDP except DKI Jakarta, Banten Province and Java Barat Province, based on the statistical data from 2006 to 2015 (see Table 2.1-18).

Table 2.1-18 GRDP except 3 Provinces and Loading Volume (MT) at Tanjung Priok Port

Year	GRDP (Trillion Rp)	Loading Interisland Container Volume ('000 MT)
2006	3,847	4,031
2007	4,087	5,433
2008	4,416	4,685
2009	4,519	5,244
2010	4,841	6,398
2011	4,914	8,848
2012	5,169	12,288
2013	5,438	10,500
2014	5,697	9,888
2015	5,970	6,518

Source: Statistics Indonesia 2015 and Pelindo 2, prepared by the Survey Team

The result of correlation by the multiple regression analysis is shown by formula below:

$Yl = 1.5\ Xl\ (R2 = 0.926)$

Where, Yl: Loading container volume (MT)
Xl: GRDP except of DKI Jakarta, Banten and West Java

Forecasted loading interisland container volume in MT is converted into the container numbers expressed in TEUs as follows;

$$Zll = Yl / Ml$$

Where, Zll: Loading interisland laden container (TEU)
Ml: Conversion factor into TEU (MT / TEU, 11.4)

The estimation method of loading interisland empty container is the same of export empty container, the number of empty loading container is calculated as follow:

$$Zl = Zu,\ Zle = Zl \quad Zll$$

Where, Zl: Loading interisland container (TEU)
Zle: Loading interisland empty container (TEU)

2) Forecast of Unloading Interisland Container

The multiple regression analysis is applied in correlating unloading interisland container volumes in metric tons and the gross regional domestic product (the GRDP) of DKI Jakarta, Banten Province and West Java Province, based on the statistical data from 2006 to 2015 (see Table 2.1-19) and by taking account of its discontinuity trend applying a dummy valuable.

Table 2.1-19 GRDP of 3 Province and unloading Volume (MT) at Tanjung Priok Port

Year	GRDP (Trillion Rp)	Unloading Interisland Container Volume ('000 MT)
2006	1,547	2,452
2007	1,649	2,795
2008	1,746	2,363
2009	1,933	2,417
2010	2,023	3,955
2011	2,374	5,470
2012	2,558	7,596
2013	2,719	6,491
2014	2,870	6,113
2015	3,007	4,029

Source: Statistics Indonesia 2015 and Pelindo 2, prepared by the Survey Team

The result of correlation by the multiple regression analysis is shown below:

$$Yu = 2.6\ Xu + 1{,}548.8\ Tu - 1{,}922.5\ (R2 = 0.726)$$

Where, Yu: Unloading interisland container volume (MT)
Xu: GRDP of DKI Jakarta, Banten and West Java
Tu: Dummy valuable (Tl = 1 for the years 2010 to 2012)

Forecasted unloading inter-island container volumes in MT is converted into container numbers in TEUs as follows;

$$Zu = Yu / Mu / (1 - Eu)$$

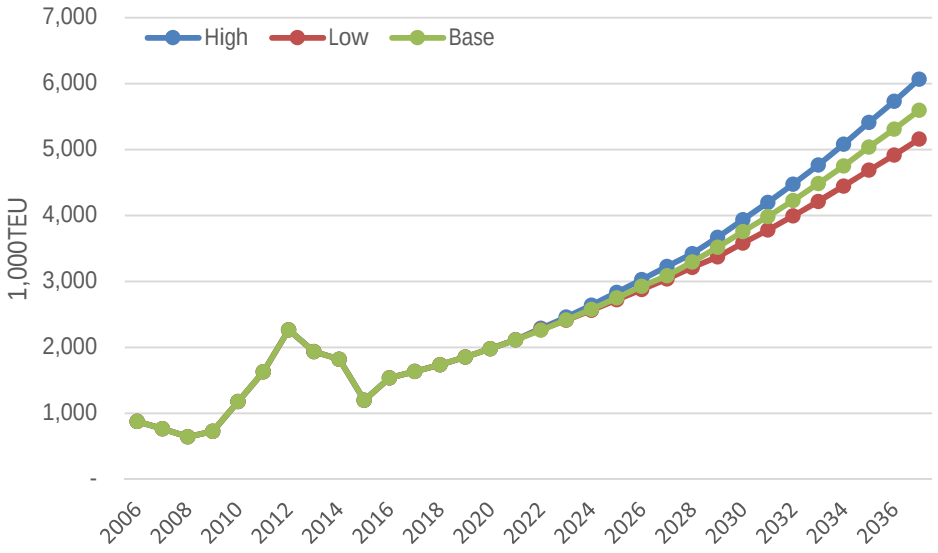
Where, Zu: Unloading interisland container (TEU)
Mu: Conversion factor into TEU (MT / TEU, 9.7)
Eu: Empty ratio (5%)

The result of the demand forecast of interisland container is summarized in table and figure below:

Table 2.1-20 Forecasted Interisland Containr Throughput (each case)

Year	Loading									Umloading									Year	TOTAL		
	Laden			Empty			Total			Laden			Empty			Total						
	High	Base	Low	High	Base	Low	High	Base	Low	High	Base	Low	High	Base	Low	High	Base	Low		High	Base	Low
2006																			2006		879	
2007																			2007		767	
2008																			2008		649	
2009																			2009		732	
2010																			2010		1,180	
2011																			2011		1,632	
2012																			2012		2,266	
2013																			2013		1,936	
2014																			2014		1,824	
2015																			2015		1,202	
2016		836			17			853			653			34			687		2016		1,540	
2017		878			18			896			702			37			739		2017		1,635	
2018		924			19			943			757			40			796		2018		1,739	
2019		975			20			995			817			43			860		2019		1,855	
2020		1,031			21			1,052			883			46			929		2020		1,981	
2021		1,090			22			1,113			953			50			1,003		2021		2,116	
2022	1,182	1,156	1,171	24	24	24	1,206	1,179	1,194	1,034	1,028	1,022	54	54	54	1,088	1,082	1,076	2022	2,294	2,261	2,270
2023	1,258	1,225	1,235	26	25	25	1,284	1,250	1,260	1,120	1,108	1,095	59	58	58	1,179	1,166	1,153	2023	2,463	2,416	2,413
2024	1,340	1,299	1,303	27	27	27	1,368	1,325	1,329	1,212	1,193	1,173	64	63	62	1,276	1,255	1,235	2024	2,644	2,580	2,564
2025	1,427	1,376	1,374	29	28	28	1,456	1,405	1,403	1,311	1,283	1,255	69	68	66	1,380	1,351	1,321	2025	2,837	2,755	2,724
2026	1,513	1,452	1,443	31	30	29	1,544	1,482	1,473	1,409	1,372	1,335	74	72	70	1,483	1,444	1,406	2026	3,027	2,926	2,878
2027	1,604	1,532	1,515	33	11	31	1,636	1,543	1,546	1,514	1,466	1,420	80	77	75	1,593	1,543	1,495	2027	3,230	3,087	3,041
2028	1,700	1,616	1,591	11	32	32	1,711	1,649	1,624	1,625	1,566	1,509	86	82	79	1,711	1,649	1,588	2028	3,421	3,297	3,212
2029	1,802	1,705	1,671	33	55	16	1,835	1,760	1,687	1,744	1,672	1,603	92	88	84	1,835	1,760	1,687	2029	3,671	3,520	3,374
2030	1,910	1,799	1,754	58	79	37	1,968	1,878	1,791	1,870	1,784	1,702	98	94	90	1,968	1,878	1,791	2030	3,937	3,756	3,583
2031	2,015	1,889	1,833	84	104	58	2,099	1,993	1,891	1,994	1,893	1,797	105	100	95	2,099	1,993	1,891	2031	4,198	3,986	3,783
2032	2,126	1,983	1,916	112	131	81	2,237	2,114	1,996	2,126	2,008	1,897	112	106	100	2,237	2,114	1,996	2032	4,475	4,228	3,993
2033	2,243	2,082	2,002	141	159	105	2,384	2,242	2,107	2,265	2,130	2,001	119	112	105	2,384	2,242	2,107	2033	4,769	4,484	4,214
2034	2,366	2,187	2,092	174	190	131	2,540	2,377	2,223	2,413	2,258	2,111	127	119	111	2,540	2,377	2,223	2034	5,080	4,754	4,445
2035	2,496	2,296	2,186	208	223	158	2,705	2,519	2,344	2,570	2,393	2,227	135	126	117	2,705	2,519	2,344	2035	5,410	5,038	4,688
2036	2,621	2,399	2,273	244	256	186	2,865	2,655	2,459	2,722	2,523	2,336	143	133	123	2,865	2,655	2,459	2036	5,730	5,311	4,918
2037	2,752	2,507	2,364	282	291	215	3,034	2,799	2,579	2,883	2,659	2,450	152	140	129	3,034	2,799	2,579	2037	6,069	5,597	5,158

Source: The Survey Team



Source: The Survey Team

Figure 2.1-22 Forecasted Interisland Container Throughput (each case)

(4) Summary of the Demand Forecast of Container

The result of demand forecast both of international and interisland container is shown in table below:

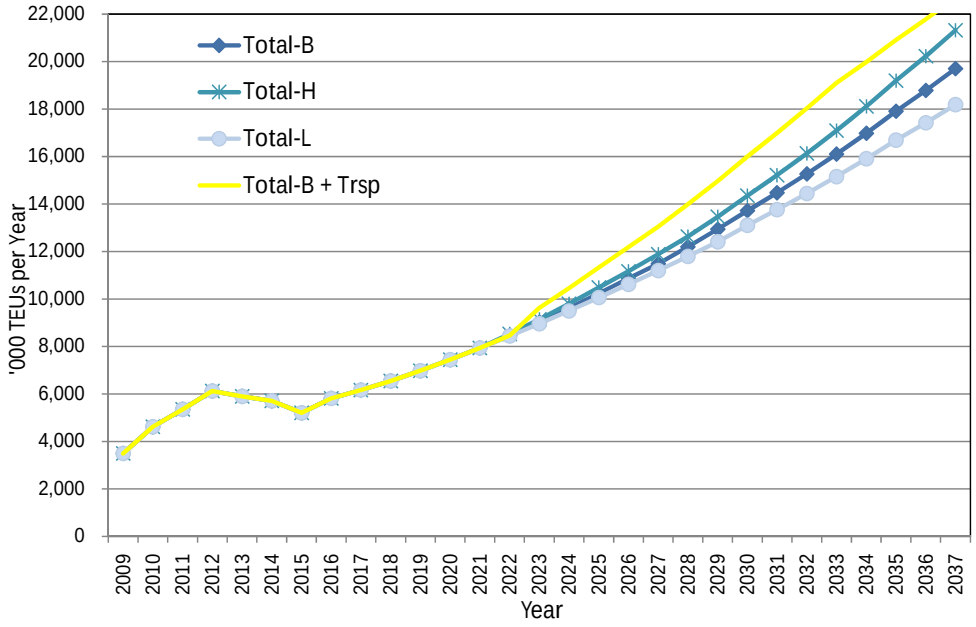
Table 2.1-21 Demand Forecast of Container (1,000TEU)

Year	High			Base			Low		
	Int'l	Domes	Total	Int'l	Domes	Total	Int'l	Domes	Total
2015	3,999	1,202	5,201	3,999	1,202	5,201	3,999	1,202	5,201
2020	5,459	1,981	7,440	5,459	1,981	7,440	5,459	1,981	7,440
2025	7,643	2,837	10,480	7,491	2,755	10,246	7,340	2,724	10,064
2030	10,414	3,937	14,351	9,958	3,756	13,715	9,519	3,583	13,102
2035	13,779	5,410	19,189	12,861	5,038	17,899	11,998	4,688	16,686
2037	15,248	6,069	21,316	14,095	5,597	19,693	13,022	5,158	18,180
2040	17,738	7,199	24,937	16,163	6,546	22,708	14,716	5,946	20,662

Source: The Survey Team

(5) Transshipment Container at Tanjung Priok Port as Scenario

Tanjung Priok Port has a plan to deepen berth depth to 20 m in 2023. It is considerable to handle transshipment container as reginal hub in ASEAN at Tanjung Priok port. Thus 600,000 TEUs of transship container in 2023 will be handled and increased to 3 million TEU in 11 years, 2033 at Tanjung Priok port. Figure below adds the scenario with total container throughput on Base case in Jakarta Metropolitan Area.



Source: The Survey Team

Figure 2.1-23 Forecasted Container Throughput with Scenario in Jakarta Metropolitan Area

2.1.4 Demand Forecast of Vehicle

(1) Historical Trend of Throughput of Vehicles at Tanjung Priok Port

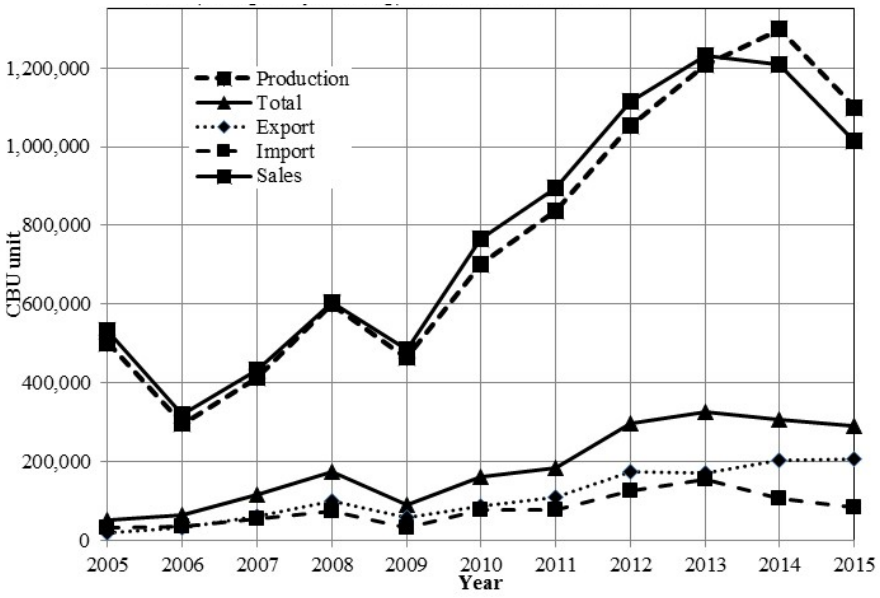
The number of imported and exported vehicles handled at Tanjung Priok Port, increased year by year till the year 2013 except the latest 2 years (see Table 2.1-22 and Figure 2.1-24).

Table 2.1-22 Historical Trend of Volumes of Sales and Foreign Trade of Vehicles in Indonesia

Unit: CBU

Year	Export*	Import*	Total	Sales**
2005	17,805	31,760	49,565	533,917
2006	30,974	33,663	64,637	318,904
2007	60,267	55,112	115,379	433,341
2008	100,982	72,646	173,628	603,774
2009	56,669	32,678	89,347	483,548
2010	85,796	76,520	162,316	764,710
2011	107,932	76,173	184,105	894,164
2012	173,371	124,835	298,206	1,116,230
2013	170,907	154,014	324,921	1,229,901
2014	202,273	104,503	306,776	1,208,028
2015	207,691	82,306	289,997	1,013,291

Source: GAIKIndo
Note1: * Import and Export means via Tanjung Priok Port mainly Car Terminal
Note2 ** Sales means the number of sold vehicles in Indonesia



Source: The Survey Team

Figure 2.1-24 Historical Trend of Sales, Production and Foreign Trade of Vehicles in Indonesia

(2) Forecast Demand of Foreign Trade of Vehicles

1) Import

The liner regression analysis is applied in correlating volume of vehicle sales in Indonesia and the GDP per capita in Indonesia by using the statistical data from 2006 to 2015 shown in table below.

Table 2.1-23 GDP per Capita of Indonesia and Volume of Sales

Year	GDP per capita (1,000 Rp)	Volume of Sales
2006	24,020	318,904
2007	25,185	433,341
2008	26,678	603,774
2009	27,540	483,548
2010	28,884	764,710
2011	30,115	894,164
2012	31,484	1,116,230
2013	32,781	1,229,901
2014	33,971	1,208,028
2015	35,140	1,013,291

Source: IMF GAIKINDO

The result of correlation by the liner regression analysis is shown below:

$Cs = 28.1\ Xp \quad (R2 = 0.935)$

Where, Cs: Volume of Sales
Xp: GDP per capita of Indonesia

Imported number of car in total volume of sales is found almost 9.6% to 10%. Then volume of car import is estimated firstly estimating volume of sales and the taking 10% of volume of sales is considered to be volume of import.

3 cases of forecast is implemented as base case, high growth rate of GDP/cap (+0.5% of base case) and low growth rate of GDP/cap (-0.5% of base case) and result of forecast is shown in Table 2.1-24

Table 2.1-24 Demand Forecast of Import of Vehicle

Year	Import		
	High	Base	Low
2020	120,773	120,773	120,773
2025	154,376	151,460	148,585
2030	193,599	185,447	177,602
2035	237,043	221,663	207,213
2037	254,576	235,766	218,265

Source: The Survey Team

2) Export

The liner regression analysis is applied to estimate export volume of vehicle using the weighted average GDP per capita (PPP base) of vehicle export partners, as the explanatory variable based on the statistical data from 2006 to 2015 (see Table 2.1-25).

Table 2.1-25 Weighted Average GDP per capita (PPP base) of Vehicle Export Partners and Export Volume of Vehicle

Year	Weighted Average GDP per capita (PPP base) (USD)	Export Volume of Vehicle
2006	22,926	30,974
2007	22,598	60,267
2008	22,329	100,982
2009	21,615	56,669
2010	22,497	85,796
2011	24,064	107,932
2012	25,143	173,371
2013	25,596	170,907
2014	26,137	202,273
2015	26,644	207,691

Source: IMF GAIKINDO

The result is shown below:

$Ce = 5.1\ Da\ (R2 = 0.851)$

Where, Ce: Export volume of vehicle

Da: Weighted average GDP per capita (PPP base) of partners

Table below shows the result of demand forecast of export of vehicle in each case. High case and low case are +0.5% and -0.5%, respectively of base case growth rate of weighted average GDP per capita (PPP base) of export partners.

Table 2.1-26 Demand Forecast of Export of Vehicle

Year	Export		
	High	Base	Low
2020	155,496	155,496	155,496
2025	187,610	184,026	180,493
2030	227,452	217,791	208,496
2035	275,755	257,751	240,844
2037	297,835	275,718	255,147

Source: The Survey Team

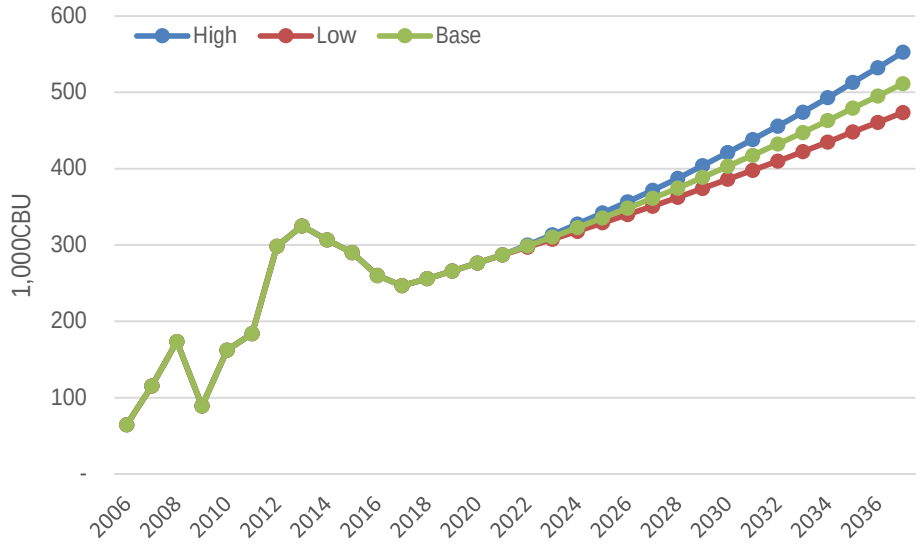
3) Summary of the Demand Forecast of Vehicle

The result of demand forecast of vehicle is shown in table and figure below:

Table 2.1-27 Result of Demand Forecast for Trade of Vehicle Volume

Year	CBU Demand								
	Import			Export			Total		
	High	Base	Low	High	Base	Low	High	Base	Low
2006		33,663			30,974		64,637	64,637	64,637
2007		55,112			60,267		115,379	115,379	115,379
2008		72,646			100,982		173,628	173,628	173,628
2009		32,678			56,669		89,347	89,347	89,347
2010		76,520			85,796		162,316	162,316	162,316
2011		76,173			107,932		184,105	184,105	184,105
2012		124,835			173,371		298,206	298,206	298,206
2013		154,014			170,907		324,921	324,921	324,921
2014		104,503			202,273		306,776	306,776	306,776
2015		82,306			207,691		289,997	289,997	289,997
2016		78,106			181,867		259,973	259,973	259,973
2017	106,133	106,133	106,133	140,704	140,704	140,704	246,837	246,837	246,837
2018	110,525	110,525	110,525	145,186	145,186	145,186	255,712	255,712	255,712
2019	115,427	115,427	115,427	150,372	150,372	150,372	265,799	265,799	265,799
2020	120,773	120,773	120,773	155,496	155,496	155,496	276,269	276,269	276,269
2021	126,368	126,368	126,368	160,824	160,824	160,824	287,192	287,192	287,192
2022	132,853	132,221	131,590	167,139	166,335	165,531	299,992	298,556	297,120
2023	139,671	138,346	137,027	173,702	172,034	170,375	313,373	310,380	307,402
2024	146,840	144,754	142,689	180,522	177,929	175,361	327,362	322,683	318,050
2025	154,376	151,460	148,585	187,610	184,026	180,493	341,986	335,486	329,078
2026	161,526	157,718	153,982	194,977	190,332	185,775	356,503	348,050	339,757
2027	169,009	164,235	159,575	202,633	196,854	191,212	371,642	361,089	350,787
2028	176,837	171,022	165,371	210,590	203,599	196,808	387,427	374,621	362,179
2029	185,029	178,089	171,377	218,858	210,575	202,568	403,887	388,664	373,945
2030	193,599	185,447	177,602	227,452	217,791	208,496	421,051	403,238	386,098
2031	201,599	192,183	183,165	236,383	225,254	214,598	437,982	417,437	397,763
2032	209,930	199,163	188,902	245,665	232,972	220,878	455,594	432,136	409,780
2033	218,604	206,397	194,818	255,311	240,955	227,342	473,915	447,352	422,161
2034	227,637	213,894	200,920	265,336	249,212	233,996	492,973	463,106	434,916
2035	237,043	221,663	207,213	275,755	257,751	240,844	512,798	479,414	448,057
2036	245,653	228,606	212,668	286,582	266,583	247,892	532,236	495,189	460,560
2037	254,576	235,766	218,265	297,835	275,718	255,147	552,411	511,484	473,412

Source: The Survey Team



Source: The Survey Team

Figure 2.1-25 Demand Forecast for Trade of Vehicle Volume

(3) Non-containerizable Break-bulk Cargoes for Car Production (Steel Coil)

The volumes of steel coil for car production as a main cargo of non-containerizable break-bulk are estimated at around 480,000 MT in 2020, 600,000 MT in 2025, 740,000 MT in 2030 and 940,000 MT in 2037, respectively, based on demand forecast of vehicle sales in Jakarta Metropolitan Area and ratio (approx. 40%) of steel coil (steel sheet) per CBU in MT.

2.1.5 Forecast Demand for Ports

(1) Basic Methodology

In order to forecast the cargo to be handled in Patimban Port, it is necessary to estimate the share of Patimban Port and Tg. Priok Port. Share of each port is estimated based on the concept of hinterland of each port. Hinterland border between Tg. Priok and Patimban is estimated as the border where the transport cost involving time value of transport caused by traffic jam from each port becomes equivalent.

Through the forecast of traffic jam expressed in VCR (vehicle Capacity Ratio) for each year from 2015 to 2035 is estimated and it is found that the equi-transport cost point is on around Bekasi.

For the container volume handled in each port is estimated based on the demand density of production goods and consumption goods in each hinterland and share of production goods and consumption goods of import and export, incoming and outcoming for inter-island transportation. Resulting share of international container is shown in Table 2.1-28 and that of domestic container is shown in Table 2.1-29. Calculation method and flowchart is mentioned and shown in Appendix 3.1 and 3.2.

Table 2.1-28 Share of Container Cargo Demand in Jakarta Metropolitan Area between Tanjung Priok Port and Patimban Port

2020 ~2032	Patimban Port	Tanjung Priok Port
Hinterland Share	36%	64%

Source: Estimated by the Survey Team

Table 2.1-29 Domestic Container Transport to Tanjung Priok Port and Patimban Port (2020~2032)

2020 ~2032	Patimban Port	Tanjung Priok Port
Hinterland Share	20%	80%

Source: The Survey Team

1) Container Throughput in Patimban Port and Tanjung Priok Port

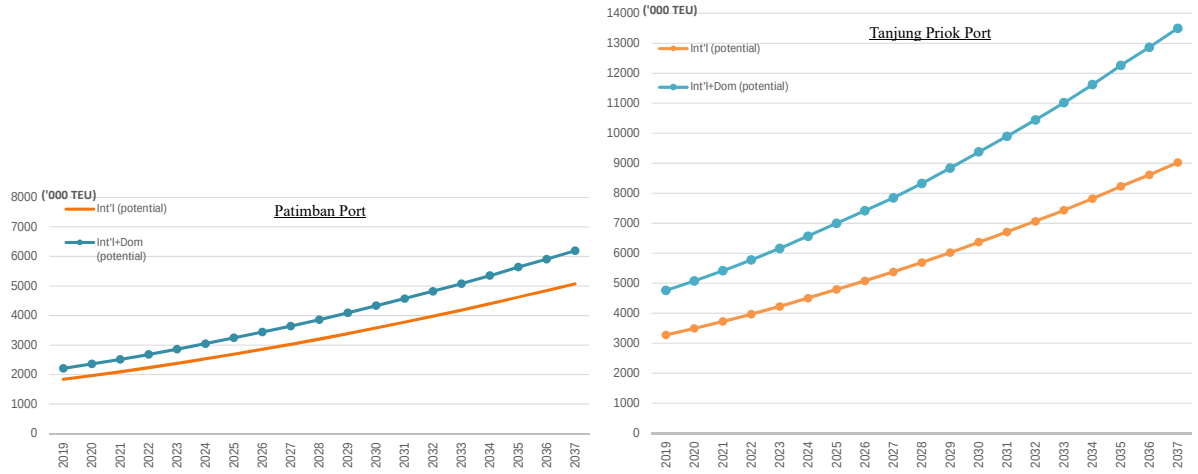
Estimated container throughput in Patimban Port and Tanjung Priok port based on hinterland share of international and inter-island container is shown in tables and figures below.

Table 2.1-30 Container Throughput of Patimban Port (left hand) and Tanjung Priok Port except Transshipment Container (right hand) (TEU)

PTM	International	Domestic	Total
2020	1,965,114	396,265	2,361,378
2025	2,696,599	551,016	3,247,616
2030	3,584,999	751,278	4,336,277
2035	4,630,059	1,007,600	5,637,659
2037	5,074,323	1,119,464	6,193,788

TgPk	International	Domestic	Total
2020	3,493,536	1,585,058	5,078,594
2025	4,793,954	2,204,066	6,998,020
2030	6,373,332	3,005,110	9,378,442
2035	8,231,216	4,030,400	12,261,616
2037	9,021,019	4,477,857	13,498,876

Source: Estimated by the Survey Team



Source: Estimated by the Survey Team

Figure 2.1-26 Container Throughput of Patimban Port and Tanjung Priok Port except Transshipment Container

(2) Vehicles Throughput of Patimban Port and of Tanjung Priok Port

1) Hinterlands of Tanjung Priok Port and the Patimban Port of Foreign Trade Car

Share of each port of foreign trade car is estimated based on the volume of car plants in each hinterland. Calculation method and flowchart is mentioned and shown in Appendix 3.3.

Table 2.1-31 Vehicle Transport to Tanjung Priok Port and Patimban Port (2020~2032)

2020 ~2032	Patimban Port	Tanjung Priok Port
Hinterland Share	68%	32%

Source: The Survey Team

2) Forecast Volume of Vehicles Loaded from the Ports to Local Area

The forecast volume of vehicles loaded from the ports in the Greater Jakarta Metropolitan Area including Patimban Port was estimated on the assumption that the percentage of loaded vehicles for the total sales is kept to be 20% for the future. This assumption was made based on the actual record of 21.3% in 2009 at Tanjung Priok Port. In addition, Tanjung Priok Port and Patimban Port will share 50% each in handling loaded vehicles.

3) Vehicle Demand at Patimban Port and Tanjung Priok Port

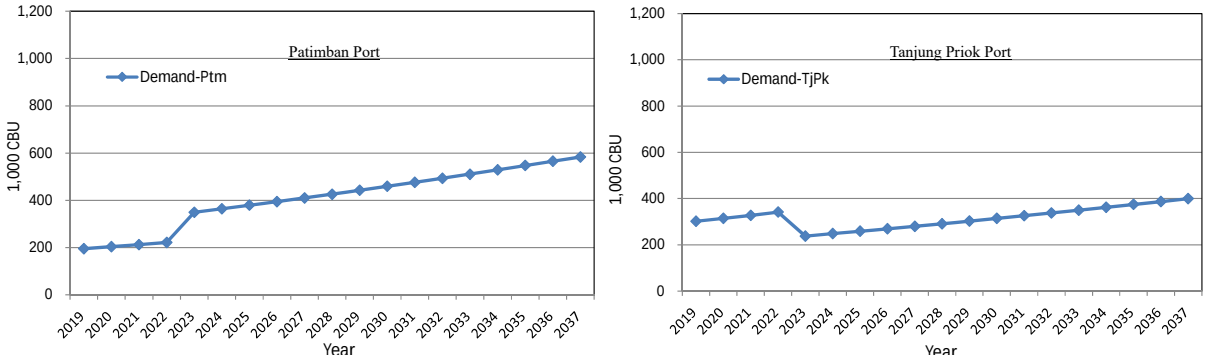
Estimated volume of vehicle in Jakarta Metropolitan Area are shown in table below.

Table 2.1-32 Vehicle Handling of Patimban Port (left hand) and Tanjung Priok Port (right hand)

CBU unit	Int'l	Domestic	Total
2020	82,881	120,773	203,654
2025	228,130	151,460	379,590
2030	274,202	185,447	459,649
2035	326,001	221,663	547,664
2037	347,809	235,766	583,575

CBU unit	Int'l	Domestic	Total
2020	193,388	120,773	314,162
2025	107,355	151,460	258,815
2030	129,036	185,447	314,484
2035	153,412	221,663	375,075
2037	163,675	235,766	399,441

Source: Estimated by the Survey Team



Source: Estimated by the Survey Team

Figure 2.1-27 Vehicle Handling of Patimban Port and Tanjung Priok Port

(3) Handling Break-bulk Cargoes (Steel Coils) for Car Production

It is proposed to receive break-bulk cargoes at the Patimban Port so as to support car production in the vicinity of the port. Typical cargo is steel coils used for car body.

The volumes of steel coil for car production as a main cargo of non-containerizable break-bulk allocated to Patimban Port are estimated at around 140,000 MT in 2020, 410,000 MT in 2025, 500,000 MT in 2030 and 640,000 MT in 2037, respectively, based on hinterland share mentioned in Table 2.1-31.

(4) Handling Petroleum Products

The berth for product tanker transporting bunker fuel and the installation of bunker fuel supply facilities with storage tanks was proposed behind the west breakwater.

(5) Summary of Cargoes to be Allocated to Patimban Port

Demand forecast at Patimban Port shown in Table 2.1-30 and 32 can be named as potential demand. On the other hand, it is said to take few years to reach the potential demand due to negotiation among related users, preparatory works of customs clearance, establishment of office and transfer of port call and logistics route from existing port to a new one. In this context, it is assumed that a realized container throughput demand at Patimban Port is limited at the commencement of operation as soft open in 2019. In addition, shipping line(s) and/or terminal operator(s) who have small lot of container have to collect container cargo from major shipper(s)/consignee(s). In the context, a realized container throughput demand may be need for more 5 years to reach the potential demand (see (5) of 2.3.4).

Taking above-mentioned into consideration, it is assumed the container throughput of Patimban Port reaches to potential demand in 10 years, 36% of hinterland share, on the other hand, the vehicle handling volume of Patimban Port reaches to potential demand, 68% of hinterland share in 2023 as of start full operation of Phase 1. Table below shows an allocated cargo handled at Patimban Port.

Table 2.1-33 Summary of Cargo Volumes Handled at the Patimban Port by Cargo Item

Year	Car International	Car Domestic	Steel Coil	Bunker Fuel	Container International	Container Domestic
	CBUs	CBUs	MT	MT	TEUs	TEUs
2019	79,740	115,427	138,512	---	255,930	55,641
2020	82,881	120,773	145,077	---	272,932	59,440
2025	228,130	151,460	411,970	463,364	1,123,583	220,407
2030	274,202	185,447	504,417	601,273	3,584,999	751,378
2035	326,001	221,663	602,179	785,988	4,630,059	1,007,600
2037	347,809	235,766	641,283	859,874	5,074,323	1,119,464

Source: The Survey Team

2.1.6 Roles and Function of Patimban Port and Tanjung Priok Port

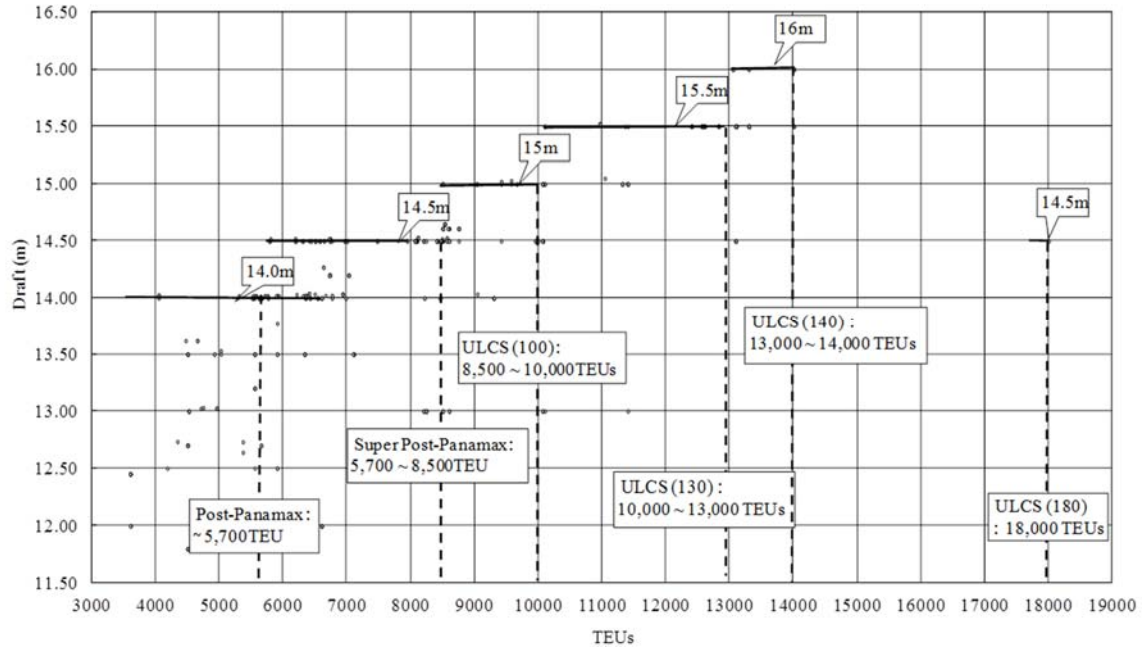
The roles and function of Patimban Port as a part of industrial development and logistics efficiency by port developments under the concept of 'maritime nation' are to support transportation of cargo of manufacturing to/from West Jave Province except Bekasi Regency. On the other hand, that of Tanjung Priok port is considered to handle cargo of urban activities to/from DKI Jakarta, Banten Province and Bekasi Regency.

2.2 Layout Plan of Port Facilities

2.2.1 Representative Principal Dimensions of Calling Vessels

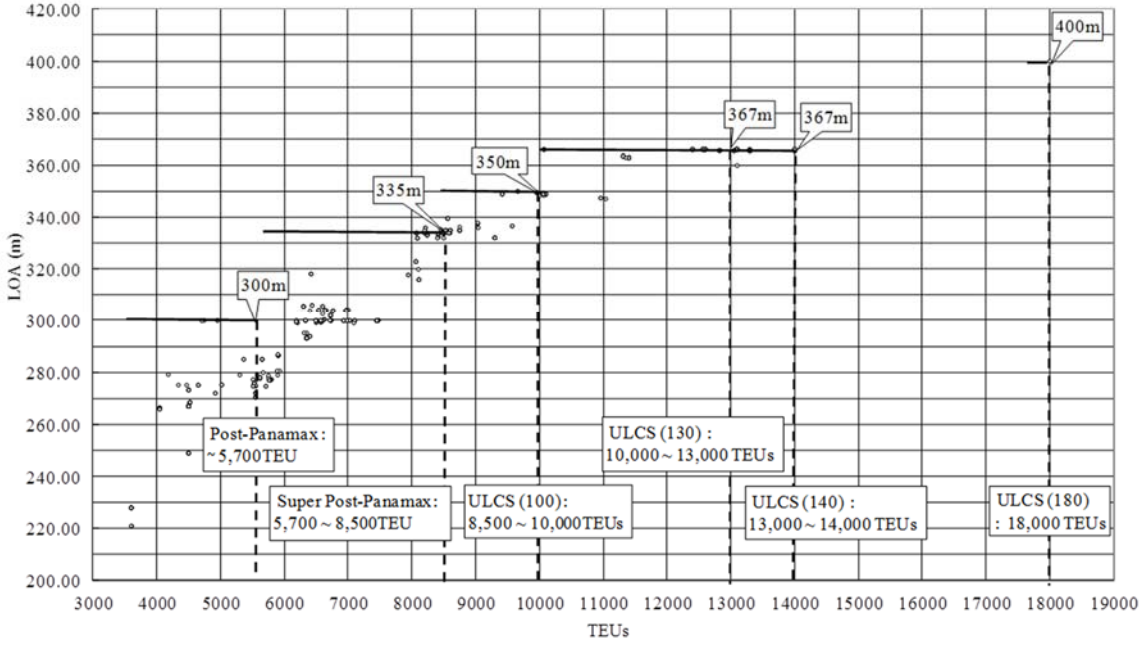
(1) Container Ships

Representative principal dimensions of large-sized container vessels potentially calling at Patimban Port have been summarized and shown in Figures 2.2-1~2.2-3. In those figures, all the container ships currently or soon in operations worldwide are covered.



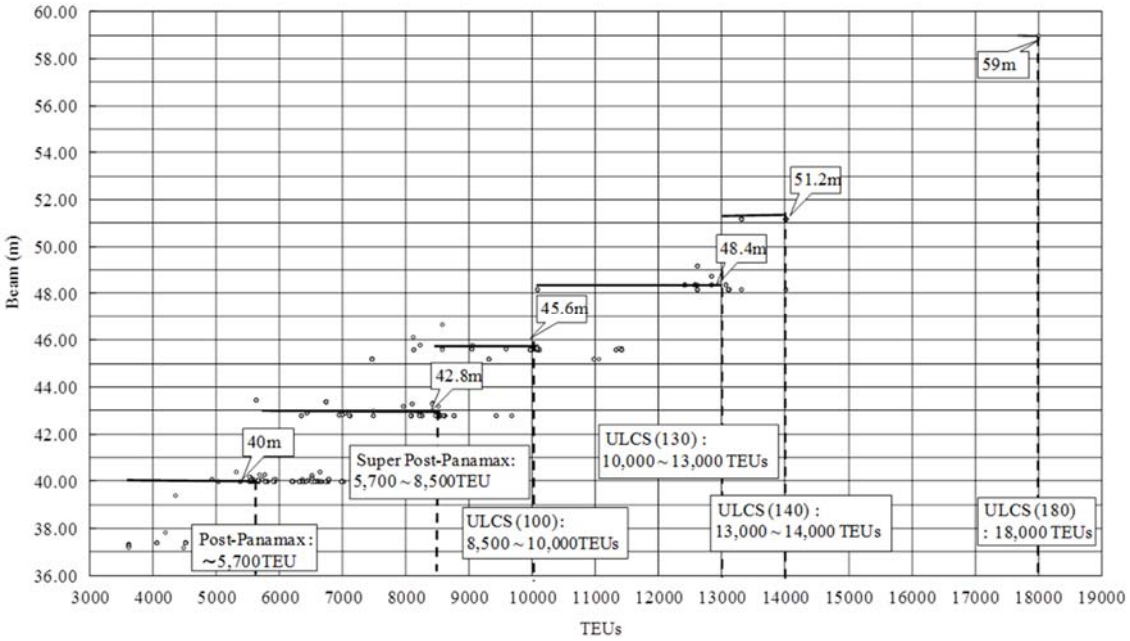
Source: Compiled by the Survey Team based on the data from Fairplay

Figure 2.2-1 Correlation between Laden Capacity (TEU) and Summer Draft of Large Container Ships



Source: Compiled by the Survey Team based on the data from Fairplay

Figure 2.2-2 Correlation between TEU and LOA of Large Container Ships

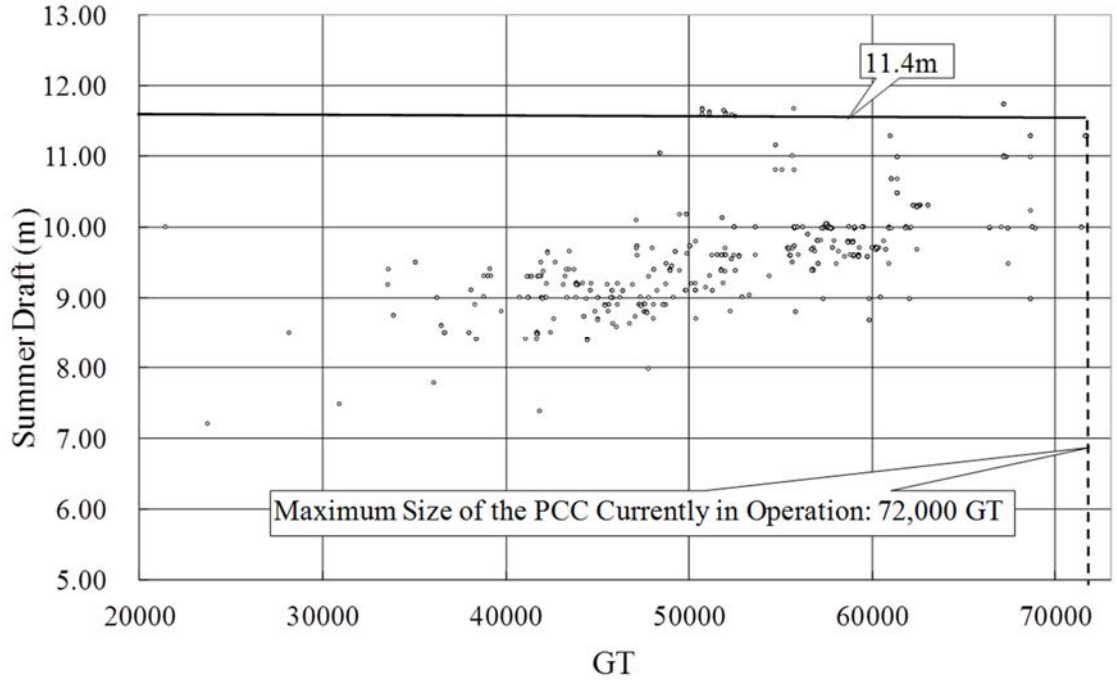


Source: Compiled by the Survey Team based on the data from Fairplay

Figure 2.2-3 Correlation between TEU and Beam Breadth of Large Container Ships

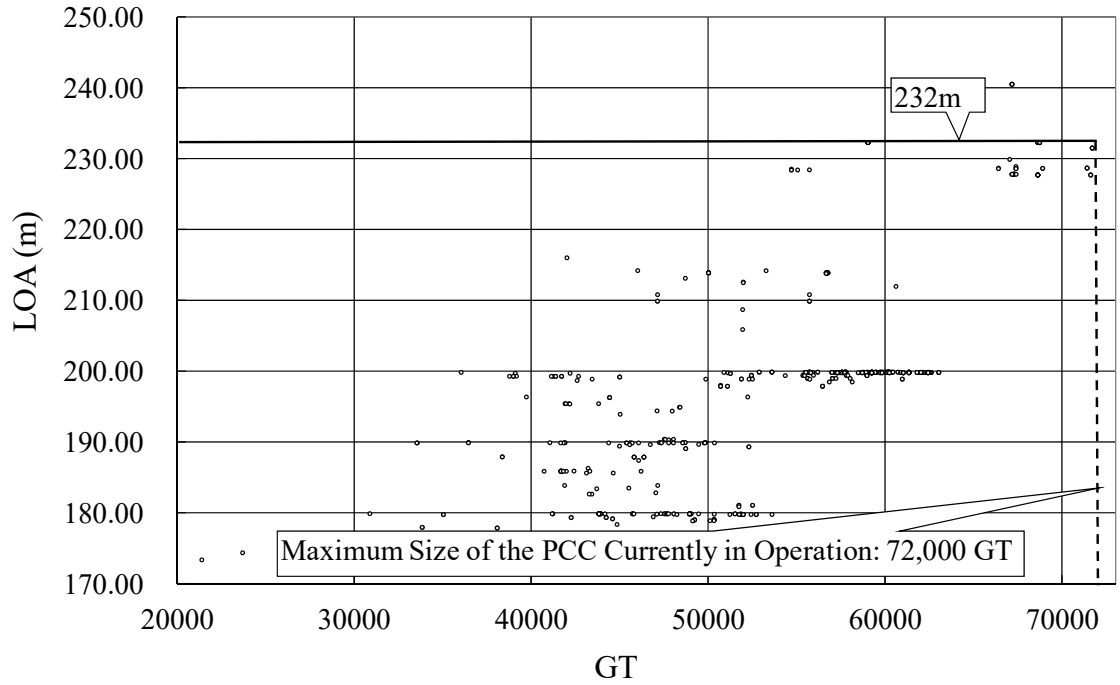
(2) Car Carriers (PCC)

Representative principal dimensions of car carriers (PCC) potentially calling at the Patimban Port have been summarized and shown in Figures 2.2-4~2.2-5. In those figures, all the car carriers or soon in operations worldwide are covered.



Source: Compiled by the Survey Team based on the data from Fairplay

Figure 2.2-4 Correlation between Summer Draft and Gross Tonnage of Car Carries (PCC)



Source: Compiled by the Survey Team based on the data from Fairplay

Figure 2.2-5 Correlation between LOA and Gross Tonnage of Car Carries (PCC)

(3) Summarized Principal Dimensions by Ship Type

Principal dimensions of container ship, car carrier, handy-size bulker for transport of steel coils, and product tanker for bunker fuel or aerial fuel by representative ship size are shown in Table 2.2-1.

Table 2.2-1 Summarized Principal Dimensions of Calling Vessels by Ship Type

Ship Type	Representative Ship Size	DWT	Principal Dimensions (m)		
			LOA	Beam	Draft
Container Ship	Small size(1,270 TEUs)	18,300	169	27.30	8.4
	Medium size (2,550 TEUs)	33,750	207	29.84	11.4
	Panamax (4,230 TEUs)	59,283	292	32.23	13.0
	Post-Panamax (5,700 TEUs)	73,000	300	40.00	14.0
	Super Post-Panamax (8,500	107,000	335	42.80	14.5
	ULCS (10,000 TEUs)	122,000	350	45.60	15.0
	ULCS (13,000 TEUs)	143,000	367	48.40	15.5
	ULCS (14,000 TEUs)	165,000	367	51.20	16.0
	ULCS (18,000 TEUs)	165,000	400	59.00	14.5
Pure Car Carrier	PCC (1,000 cars)	17,850	174	23.06	10.0
	PCC (6,100 cars)	21,424	200	32.26	10.3
	PCC (6,500 cars)	29,936	232	32.26	11.4
Bulker	Handy-size Bulker	45,423	190	30.50	11.3
Products Tanker	Handy-size Tanker	28,537	179	25.33	11.0

Source: Summarized by the Survey Team

2.2.2 Access Channel Plan

(1) Required Access Channel Dimensions

The bottom width of the planned two-way access channel is designed through applying the prevailing guidelines including PIANC. According to the PIANC Guidelines, the required channel width is estimated as 7.8 B (breadth of design vessel). In addition to PIANC guidelines, the deviation angle method is also applied assuming the angle of 15°. Required channel widths for large-sized container ships according to PIANC Guidelines and the Deviation Angle Method are shown in Table 2.2-2.

Table 2.2-2 Required Dimensions of Access Channel Corresponding to Representative Container Ship Sizes

Representative Container Ship Size	Principal Ship Dimensions (m)			Access Channel (m)	
	LOA	Beam	Draft	Depth	Width
Panamax (4,230 TEUs)	292	32.23	13.0	14.5	250
Post-Panamax (5,700 TEUs)	300	40.00	14.0	15.5	310
Super Post-Panamax (8,500 TEUs)	335	42.80	14.5	16.0	330
ULCS (10,000 TEUs)	350	45.60	15.0	16.5	360
ULCS (13,000 TEUs)	367	48.40	15.5	17.0	380
ULCS (14,000 TEUs)	367	51.20	16.0	18.0	400
ULCS (18,000 TEUs)	400	59.00	14.5	16.0	460

Source: Summarized by the Survey Team

(2) Comparison of Container Transport Cost by Water Depth of the Access Channel

Generally, unit container transport cost by using larger container ship is less than that by using smaller container ship. On the contrary, deeper container berth for larger container ship needs more construction cost than shallower container berth accommodating smaller container ship. Thus to determine the optimum water depth of a berth and access channel the total transport comprising ship transport cost and port construction cost is compared by different water depth corresponding to a ship size.

Container transport cost by water depth of the access channel was compared in the stage of Cilamaya F/S in details, and according to the comparison, the least transport cost is realized in the case of the water depth of 17m which accommodates Ultra Large Container Ship (ULCS) of 13,000 TEUs capacity. The result was followed by MOT F/S and the water depth of the access channel of Patimban Port. In this survey, the water depth of the access channel was set 17m based on the above mentioned sequence of events.

(3) Selection of Access Channel Water Depth at the Patimban Port

Although it was indicated that the total container transport is minimized in the case of a water depth of 17m of the access channel, the water depth of the access channel needs to be determined comprehensively by taking account of the strategic position of Patimban Port including the potentiality of local hub-port, the investment amount, the sound competition with Tanjung Priok Port, the intentions of potential operators and potential shipping companies to be linked to Patimban Port, and the maximum water depths of principal container ports in East Asia.

According to the comprehensive judgement mentioned above, the water depth of 17m is selected as a planned water depth of the access channel.

The maximum water depths of principal container ports in East Asia are shown as follows for a reference.

- Singapore Port: Pasir Panjang Terminal : -18m
- Shanghai Port: Yozan Terminal : -17.5m
- Busan Port: New Port : -18m
- Yokohama Port: South Honmoku : -18m
- Laem Chabang Port: D Terminal : -16m (MSL)
- Tanjung Priok Port: North Kalibaru : -18m (Plan)

(4) Numbers of Calling Vessels by ship type

Numbers of Vessels calling at Patimban Port in 2019 ~ 2037 by ship type corresponding to the volumes of port cargoes by cargo item shown in Table 2.1-33 were estimated by

dividing the cargo volume by average cargo lot by ship type. Average cargo lots were assumed as follows:

- PCC (International): 2,000 vehicles per vessel
- PCC (Domestic): 500 vehicles per vessel
- General Cargo Ship (Steel Coil): 20,000 MT per vessel
- Petroleum Tanker (Bunker Fuel): 2,000 MT per vessel
- Small Container Ship (Feeder service and Intra island): 2,600 TEUs per vessel (Average loading Ratio: 50%)
- Large Container Ship International direct call): 5000 TEUs per vessel (Average loading Ratio: 50%)

The resulting numbers of calling vessels by ship type are summarized in Table 2.2-3.

Table 2.2-3 Numbers of Calling Vessels by ship type at Patimban Port

Year	Number of Calling Ships per annum					
	PCC (International)	PCC (Domestic)	General Cargo Ship (Steel Coil)	Petroleum Tanker	Container Ship	
					Small Ship (Feeder+Domestic)	Large Ship (Direct)
2019	40	231	7	---	122	0
2020	41	242	7	---	130	0
2025	114	303	21	19	219	157
2030	137	371	25	24	716	502
2035	163	443	30	31	940	648
2037	174	472	32	34	1036	710

Source: The Survey Team

2.2.3 Terminal Plan

Location of terminals and berth numbers of container terminals and car terminal are shown in Figure 2.2-6.

(1) Container Terminal

1) Quay Length and Water Depth

Total berth length of container terminal is 4,320 m containing deep-sea water berth with water depth of 17 m and length of 3,360 m receivable for Ultra Large Container ship (ULCS) of 13,000 TEUs capacity, and container berth receivable for small-sized container ships with length of 930 m and water depth of 12.5 m.

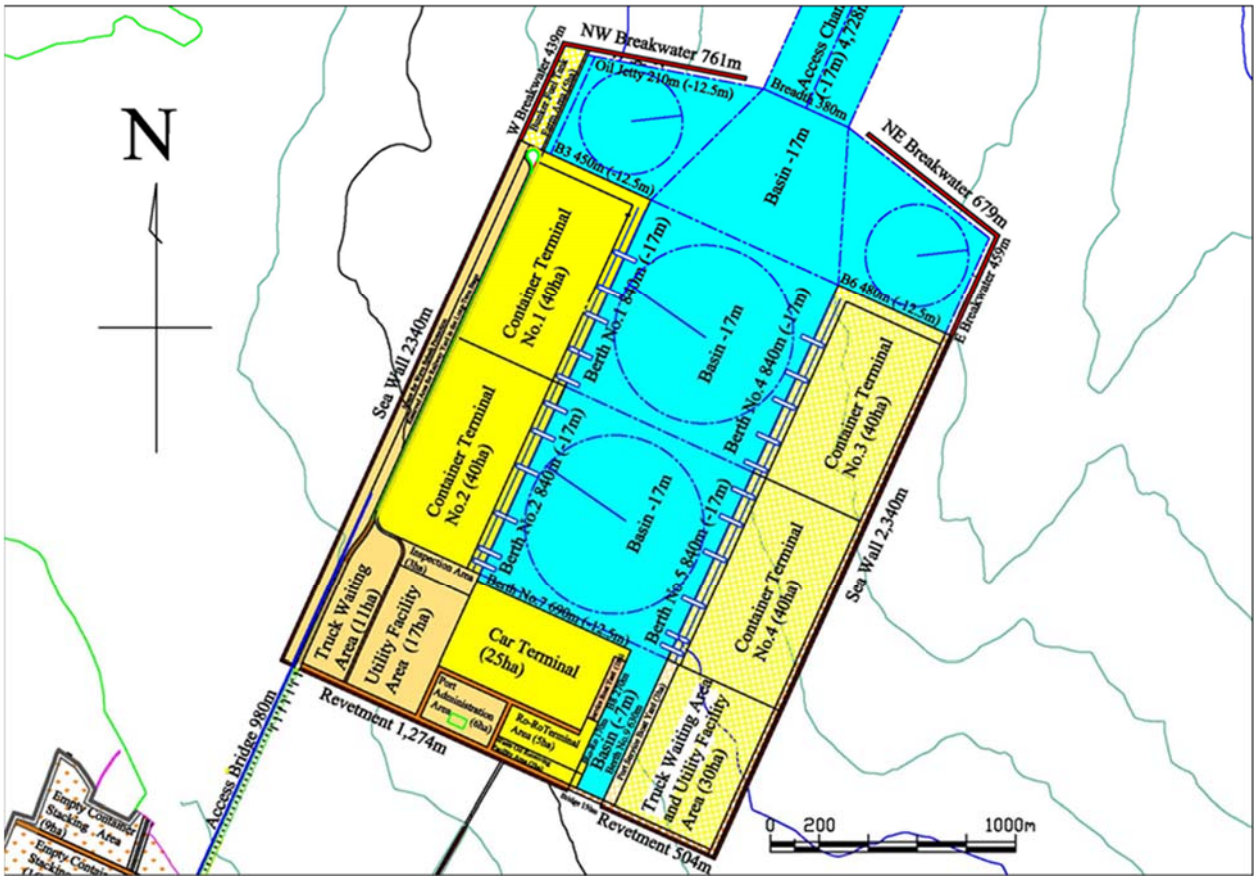
2) Terminal Area

No. 1, No. 2, No. 4, and No. 5 terminals have a berth with a length of 840m, backside distance of 480 m, and terminal area of 40 ha, respectively.

(2) Car Terminal

1) Quay Length and Water Depth

The berth length of the car terminal originally planned as Multi-purpose Terminal in Port Master Plan was planned to be 690 m long so as to handle vehicles in intra-island transport and steel products for car manufacturing, as well as vehicles in international trade (see Table 2.2-4).



Source: Prepared by the Survey Team

Figure 2.2-6 Terminal No. and Layout of Patimban Port

Table 2.2-4 Representative Sizes of Design Ships and Corresponding Dimensions of Quays

Ship Type	Representative Ship Size	DWT	Principal Ship Dimensions (m)			Quay Dimensions (m)	
			LOA	Beam	Draft	Depth	Length
Pure Car Carrier	PCC (1,000 cars)	17,850	174	23.06	10.0	11.0	200
	PCC (6,100 cars)	21,424	200	32.26	10.3	11.0	230
	PCC (6,500 cars)	29,936	232	32.26	11.3	12.5	260
Bulker	Handy-size Bulker	45,423	190	30.50	11.3	12.5	220

Source: Prepared by the Survey Team

Although the planned berth is a continuous berth with a total length of 690m, it is considered to be equivalent to 3 berths to accommodate calling vessels listed in Table 2.2-4.

In this regard, 3 berths is compared with 2 berths by the computer simulation by using the cargo amount shown in Table 2.1-33 so as to verify economic viability. The service level of 10% is used as the criterion in the comparison. The service level is defined by adopting off-shore ship waiting time as a numerator and turnaround time of a calling vessel from entering to departure at a port. In the case of 3 berths, the service level is estimated at 9.5%, whereas in the case of 2 berths, the level is estimated at 23.7%, and hence 3 berths is judged to be justifiable.

To accommodate large car carries (PCC) shown in Table 2.2-4, the berth with the water depth of 12.5 m is planned.

2) Storage Area

The required area to store the various cargoes shown in Table 2.1-33 in the year 2030 is estimated by using the computer simulation. The resulting required storages are shown as follows:

- International vehicles (Imports and Exports): 137,000 sq. m, Storage capacity of 6,200 CBU units
- Domestic vehicles (Intra-Island Transport): 59,000 sq. m, Storage capacity of 2,700 CBU units
- Steel coils: 9,000 sq., Storage capacity of 38,000 MT

3) Terminal Area

The total area and its breakdown of the car terminal are as follows:

- Storage area: 205,000 sq. m
- Apron: 34,500 sq. m (690 m x 50 m)
- Site for the administration: 6,200 sq. m
- Total area: 245,700 sq. m

(3) Petroleum Jetty and Tank Farm for Bunker Fuel

Bunker fuel is planned to be loaded/discharged at the petroleum berth to be placed behind the northwest breakwater and sent through pipeline to tank firm to be placed behind the west breakwater and stored.

The maximum receivable tanker size is the handy-size tanker of 28,500 DWT. The representative principal dimensions are as follows:

- LOA : 179m
- Breadth : 25.33m

- Summer draft : 11m

Quay dimensions corresponding to the above ship size are as follows:

- Quay length : 210m
- Water depth along the berth : 12.5m

(4) Ro-Ro Terminal

Upon the request of the Coordinating Ministry of Economic Affairs in the Cilamaya F/S, the terminal which will be able to receive Ro-Ro ships laden with cargo trucks is planned to be placed to the south of the yard for port service boats at Patimban Port.

Presently, although almost all the cargo transports between the west Java with a central focus on Jakarta and the east Java with a central focus on Surabaya are considered to be conducted by truck by land, the establishment of the new Ro-Ro Terminal could make a part of the said existing land transport convert into truck transport using a Ro-Ro ship.

Moreover, a part of the current cargo transport originating from the industrial areas in the province of West Java, being hauled to Tanjung Priok Port and then being destined to the ports in the islands such as Sumatra and Kalimantan could be converted to truck transport using a Ro-Ro ship through Patimban Port.

If that is the case, the road congestion and the burden on the environment by road transport within Java Island could be reduced, and hence, it is considered to be significant to provide the new transport mode at Patimban Port without massive investment.

1) Quay Length and Water Depth

Principal dimensions of large Ro-Ro ships serving for inter islands transport and currently calling at Tanjung Priok Port are shown in Table 2.2-5.

Table 2.2-5 Representative Principal Dimensions of Ro-Ro Ships Calling at Tanjung Priok Port

DWT	GT	Principal Dimensions（m）			
		LOA	Breadth	Summer Draft	Entering Draft
5,402	13,494	148.32	22.76	6.32	5.6
7,194	7,956	131.71	20.21	6.16	3.6
2,618	9,173	115.00	20.04	5.42	3.8

Source: Berthing records in 2009 obtained from PELLINDO 2

A Ro-Ro berth with a length of 150 and a water depth of 7m adjacent to the berth for port service boats (length of 350 and depth of 7m) is planned by referring to the principal dimensions of domestic Ro-Ro ships shown in Table 2.2-5. At the bottom of the Ro-Ro berth, a slope for receiving stern Ro-Ro ramp is planned to be placed.

2) Terminal Area

The breakdown of the Ro-Ro terminal area is as follows:

- Truck waiting yard: 40,000 m2（200m x 200m）
  Truck lading capacity of a Ro-Ro ship is assumed at 80 trucks, and the yard area is planned to receive 320 trucks equivalent to 4 ships capacity.
- Apron: 8,500 m2（170m x 50m）
- Total area: 48,500 m2

(5) Port Administration Area

The following facilities are located within the port administration area:

a. Port administration building
b. Navigation control tower building
c. Lighting facilities
d. Gate
e. Parking lot
f. Security facilities

(6) Utility Facilities Area

The following facilities are located within the utility facilities area:

a. Quarantine station
b. Animals and plants quarantine station
c. Fire station
d. Gate
e. Water tank
f. Transformer substation
g. Parking lot
h. Security facilities

(7) Truck Waiting Area

The following facilities are located within the truck waiting area:

a. Truck waiting lanes
b. Gate
c. Security facilities

2.2.4 Summarized Dimensions of Port Facilities

Dimensions of the port facilities corresponding to the phased development plan are shown in Table 2.2-6 and Table 2.2-7. Method of capacity calculation is mentioned in Section 2.3.1 to 2.3.3.

Table 2.2-6 Summarized Dimensions of Port Facilities of the Patimban Port

Lading Capacity of the Maximum Container Ship			13,000 TEUs			
Port Facility Item			Facility Dimensions by Phased Development			
			Project Total	Phase 1-1	Phase 1-2	Phase 2
Container-Handling Capacity		Mil. TEUs per annum	7.38	0.32	2.86/3.69	3.69
Access Channel		Width (m)	380	160	280	380
		Water Depth (m)	17	10	14	17
Container Terminal	Berth No.1	Water Depth (m)	17		14	17
		Quay Length (m)	840		840	
		Back Distance (m)	480		480	
	Berth No.2	Water Depth (m)	17	10	14	17
		Quay Length (m)	840	420	420	
		Back Distance (m)	480	480	480	
	Berth No.3	Water Depth (m)	12.5		12.5	
		Quay Length (m)	450		450	
		Back Distance (m)	50		50	
	Berth No.4	Water Depth (m)	17			17
		Quay Length (m)	840			840
		Back Distance (m)	480			480
	Berth No5	Water Depth (m)	17			17
		Quay Length (m)	840			840
		Back Distance (m)	480			480
	Berth No.6	Water Depth (m)	12.5			12.5
		Quay Length (m)	480			480
		Back Distance (m)	50			50
Car Terminal	Berth No.7	Water Depth (m)	12.5	10	12.5	
		Quay Length (m)	690	300	390	
		Back Distance (m)	380	380	380	
Port Service Boat Terminal	Berth No.8	Water Depth (m)	7		7	
		Quay Length (m)	270		270	
		Back Distance (m)	50		50	
	Berth No.9	Water Depth (m)	7			7
		Quay Length (m)	630			630
		Back Distance (m)	50			50
Ro-Ro ShipTerminal		Water Depth (m)	7		7	
		Quay Length (m)	170		170	
		Back Distance (m)	350		350	
Waste Oil Receiving Terminal		Water Depth (m)	7		7	
		Quay Length (m)	60		60	
		Back Distance (m)	350		350	
Petroleum Terminal		Water Depth (m)	12.5			12.5
		Quay Length (m)	210			210
Port Land Use Area Total (ha)			301	60	123	118

Note: Estimated terminal capacity is a capacity of physical maximum handling volume which is not considered economic aspects

Source: The Survey Team

Table 2.2-7 Summarized Dimensions of Road related to Patimban Port

Port Facility Item		Facility Dimensions by Phased Development			
		Project	Phase 1-1	Phase 1-2	Phase 2
Port Road within Backup Area	Lane No.	4	4		
	Lane Width (m)	21.5	21.5		
	Length (m)	1,700	1,700		
Access Road	Lane No.	4	4		
	Lane Width (m)	21.5	21.5		
	Length (m)	6,400	6,400		
	Traffic Capacity (PCU/day)	76,000	38,000	38,000	
Connecting Bridge	Lane No.	4	2	2	
	Lane Width (m)	25.00	14.25	10.75	
	Length (m)	995×2	995	995	

Source: prepared by the Survey Team

2.2.5 Port Facility Layout Plan

The following factors were considered when deciding the location of Patimban Port.

1) Location of the new port was decided in accordance with Presidential Decree (PM47-2016 dated 25th of May) to be Patimban District, Subang Regency, West Java Province.

2) MOT F/S (KP190/2016 dated 28th of March) shows that the south seawall of the new port locates perpendicular to the existing jetty administrated by DGST and being connected to the jetty. In that case, the distance from the east seawall to the river mouth of Ceu River is only around 500 m. Ceu River is the boundary between Subang Regency and Indramayu Regency . Thus, taking account of the possible affection on the river mouth by the construction of the new port, the new port should not be located further eastward from the existing jetty.

3) On the other hand, the protected forest of mangrove is designated by the West Java Government and hence the new port cannot be located further to the west of the existing jetty (see Figure 2.2-7).

4) The predominant wave direction is northeast, and the channel alignment needs to be allocated so as to avoid backward waves attacking the stern of entering ships.

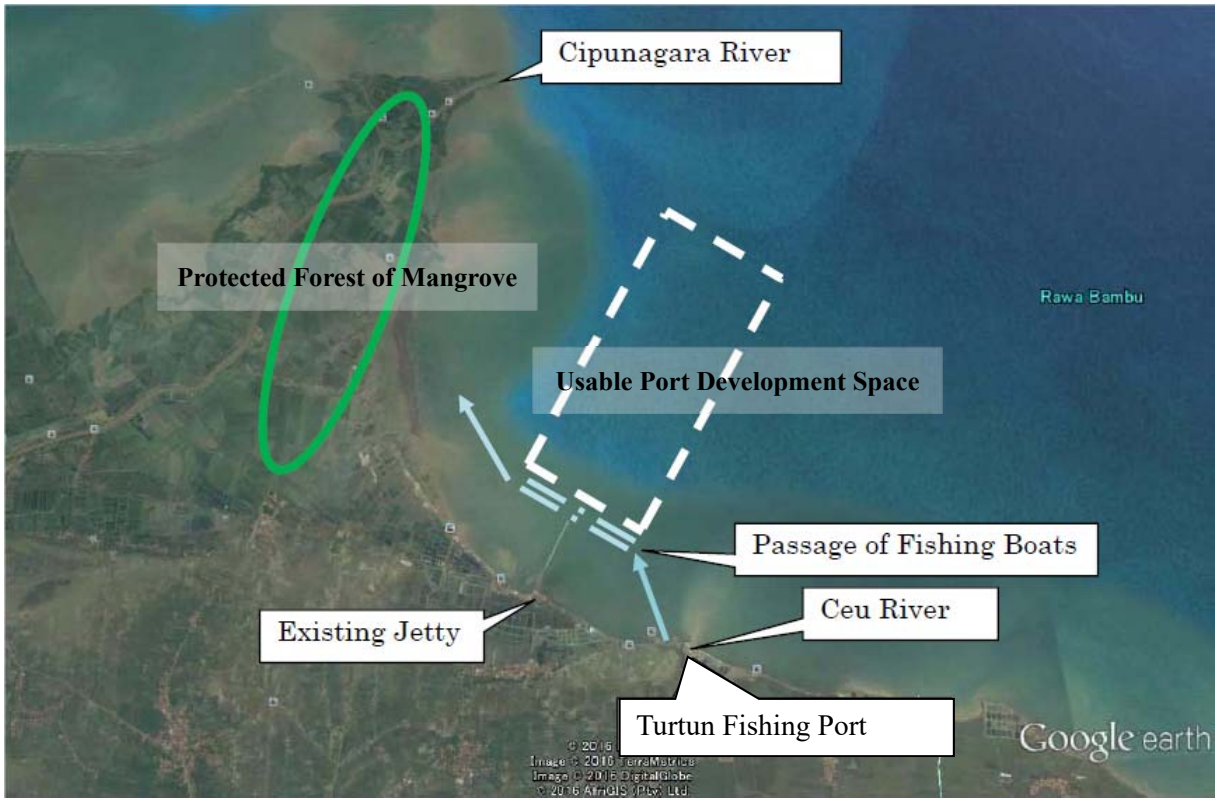
5) For ensuring the navigation passage for fishing boats, navigation channel for fishing boats is provided between the existing jetty and shoreline (see Appendix 3).

6) Navigation restricted water must be provided for avoiding any damages to Pertamina's facilities.

7) The access channel to the new port and the existing access channel for coal barges to Indramayu coal thermal power plant located in the vicinity of the project site of the new port should not interfere.

8) Affection by sedimentations in the access channel and inner basins and soils emitted from the mouths of rivers such as Cipunagara River must be taken account.

Spatial developable area is limited as shown in Figure 2.2-7, therefore, port facility layout was planned to optimize the use of spatial limitation.



Source: Made by the Survey Team

Figure 2.2-7 Spatial Conditions of Patimban Port

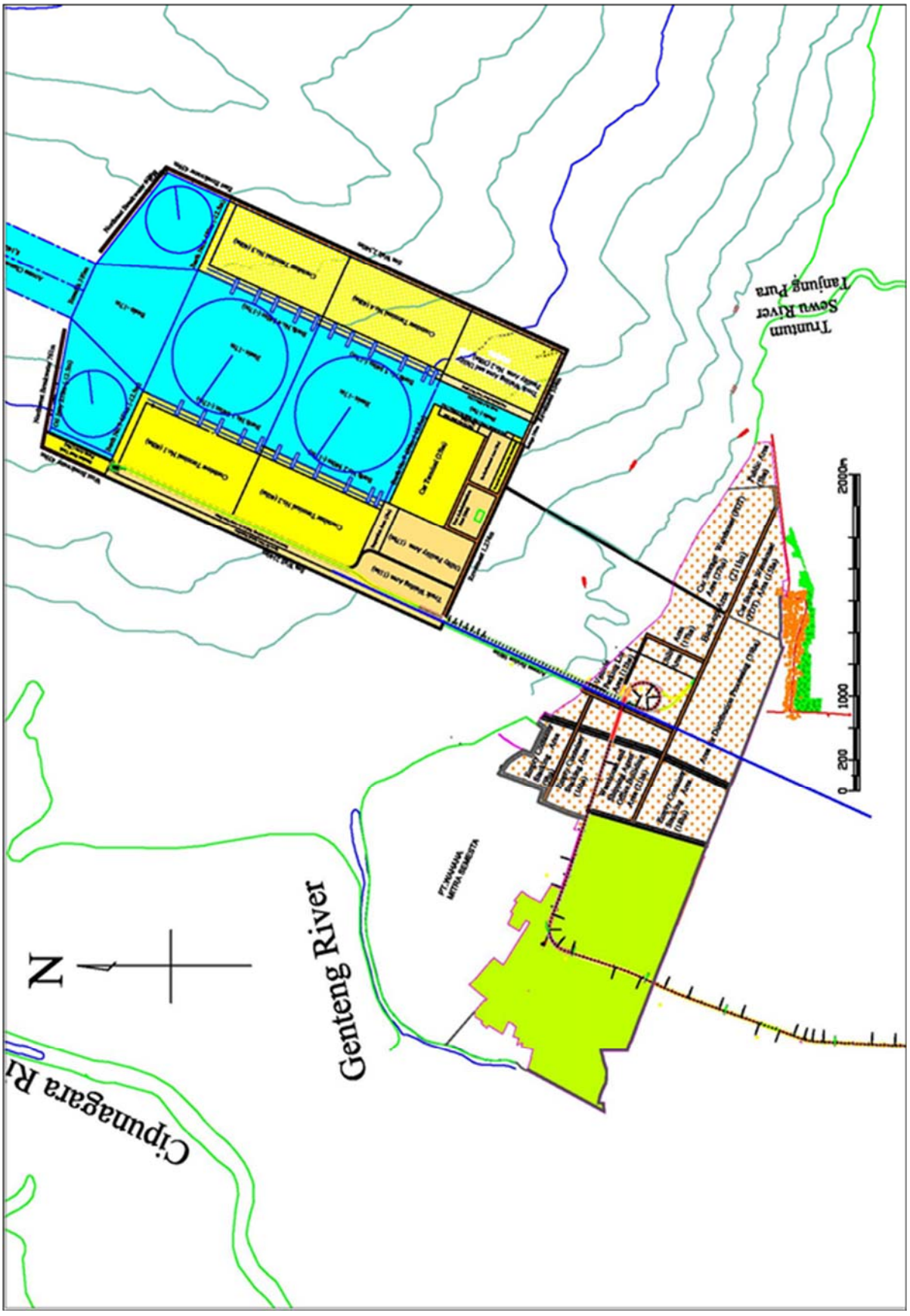
The berths for large container ships were arranged in parallel with the access channel so as to enable ships to berth easily in line with the Guideline of PIANC. At the stage of Phase 2, the concept of berth arrangement of container terminal is same as Phase 1. The car terminal berth is perpendicular to the container berths so as to connect the south ends of container berths. At the tips of large container berths, the berths for smaller container ships were arranged, resulting in the berth arrangement as shown in Figure 2.2-7. There are restrictions in further port development in westward and eastward directions, and taking account of the fact, the configuration of port facilities can be economical and feasible.

The total container handling capacity was estimated at 7.4 million TEUs per annum, and was forecast to be saturated in around the year 2037. After that year, the port development plan

will be of a ultra-long-term plan. Since the existing plan has restrictions in terms of expansion in both eastern and western directions, expandable water areas in ultra-long-term plan are supposed to be the water areas beyond Ceu River which is the boundary between the regencies of Subang and Indramayu and extending area to the coal thermal power plan of PLN.

The volumes of sediment in the access channel and inner basins were estimated at 135,000 m3 per annum and 26,000 m3, respectively by using a simulation model. Those volumes are so small that annual dredging seems to be unnecessary. Thus, the affection on the sedimentation in the access channel and inner basins by penetration waves and sediments from the rivers is small and it was judged that it is possible to maintain the depth of the access channel and inner basins (see Appendix).

Location of the port facility and back-up area are shown in Figure 2.2-8.

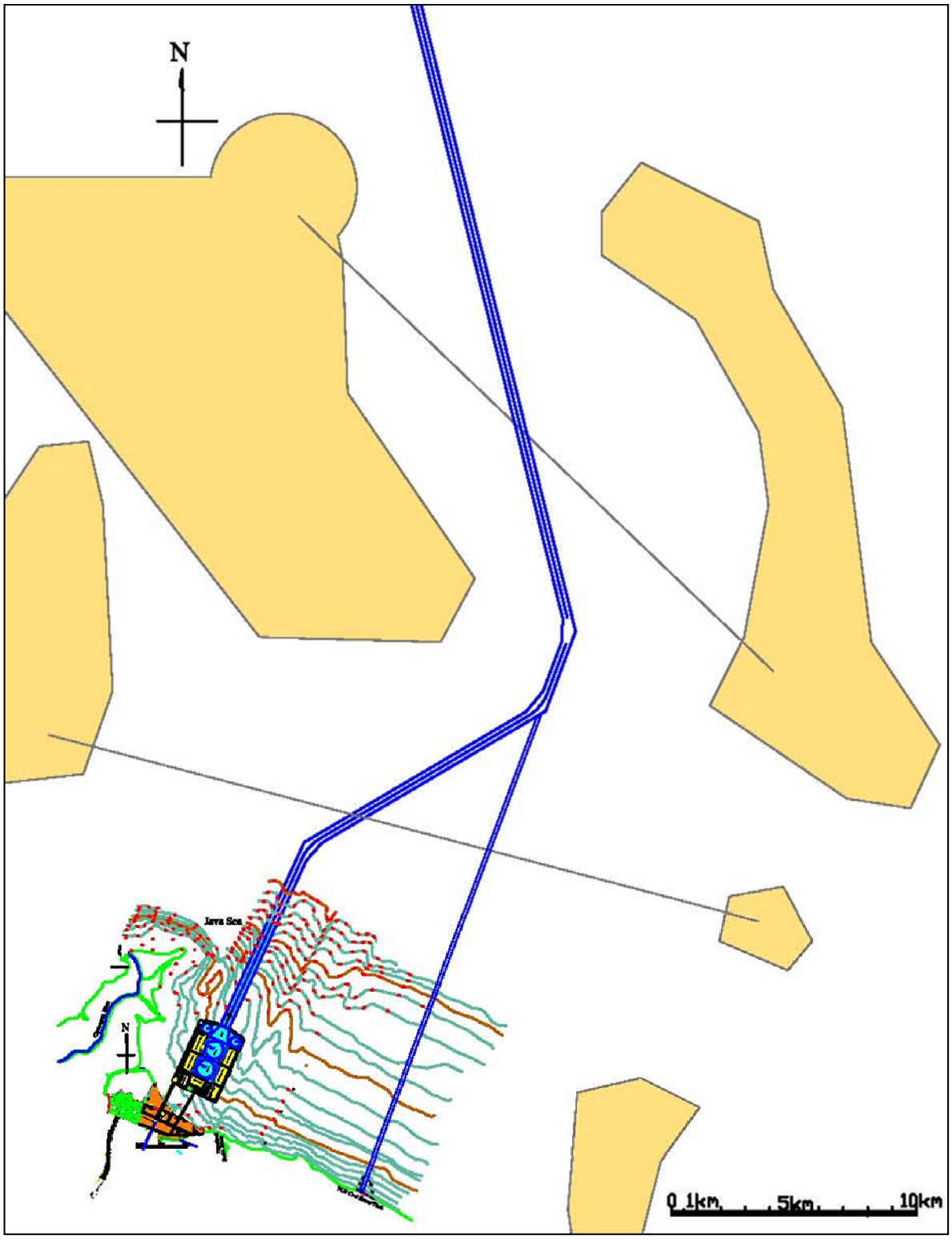


Source: Made by the Survey Team

Figure 2.2-8 Location of the Patimban Port and its Back-up Area

2.2.6 Alignment of the Access Channel

The alignment of Access Channel was determined by Directorate of Navigation through discussions with the Survey Team. Figure below shows the alignment of access channel.



Source: Made by the Survey Team

Figure 2.2-9 Alignment of Access Channel to Patimban Port

2.2.7 Treatment Facility of Waste Oil from Ship

In compliance with the decree No. 5, article 7, item d in 2009 of the Minister of Environment, public ports must prepare the facilities to accommodate ships equipped with sludge (oily residuals) tank. The said facilities mean sludge treatment facilities or tanks for temporarily storing sludge.

In the meantime, although the other provisions of the decree require to prepare the treatment facilities for oily cleaning waters generated from tanks or ship holds at the ports where crude oil, petroleum products, chemical products or bulk cargoes are shipped, this provision is not applied to Patimban Port.

In compliance with decree mentioned above, the land area for sludge treatment facilities with an area of 2ha is planned to be allocated next to the west of the berth for port service boats (No.8 berth).

In the case when ships calling at Patimban Port will request to collect its sludge, sludge will be received by a sludge collection boat alongside of the ship, landed at No.8 berth and then transported to the treatment facilities through pipeline or by tank lorry.

The operation of the waste oil treatment facilities is generally entrusted to private entities, and it is advisable to entrust the operations to private entities at the Patimban Port.

On the other hand, some operations of collecting boats are conducted by port authorities as a part of public port services, and in this context, there are two options, i.e. one option is that a port authority provides the service, and the other option is that a private entity carries out the operation.

2.2.8 Land Use Plan of Backup Area

(1) Allocated Facilities

In Port Master Plan Study, the backup area was allocated behind the Patimban Port to be constructed by reclamation. So as to ensure effective port activities of the new port, it is essential to prepare the backup area for the following facilities below:

a. Off-dock empty container stacking yard,
b. Off-dock storage for vehicles,
c. Warehouses for port cargoes and office buildings for shipping agencies
d. Parking lot for heavy vehicles for trucking companies,
e. Utilities facilities including water supply tank and electric transformer
f. Inner road within the backup area
g. Area for distribution processing
h. Site for waterways within the backup area

(2) Required Area by Facility

In the stage of the Master Plan with the target year of 2030 with the two phased plans, Phase 1 and Phase 2, the required area by listed facility are shown in Table 2.2-6. Those facilities have been allocated together with an inner road within the backup area with a total area of 213 ha. (DGST has a plan to extend the backup area to 356 ha).

(3) Off-dock empty container stacking yard

The required area is estimated at 43ha by using the result of the computer simulation. Its breakdown is shown below:

a. Required number of stored containers: 17,500 TEUs,
b. Number of ground slots: 4,800 GSLs
c. Stacking height: 5
d. Numbers of row and bay per block: 10 x 30
e. Number of block: 16
f. Area for container-stacking: 31 ha.
g. Area for storing container-handling machines and chassis, repair shop, office, etc.: 9 ha.

(4) Off-dock vehicle storage area

Off-dock vehicle storage area is planned to be used for storing vehicles after unloaded and stored at on-dock yard so as to store vehicles for a certain period in warehouse (PDT) in case of unloaded vehicles and vice versa in case of loaded vehicles. The required land area is estimated at 42ha by using the result of the computer simulation. Its breakdown is shown below:

a. Required number of stored vehicles: 18,400 CBUs,
b. Floor space: 400,000 sq. m
c. Number of stories: two-stories
d. Building to land ratio: 60%

(5) Warehouses for port cargoes and office building for shipping agencies

Warehouses for port cargoes have been planned to be used for storing conventional cargoes including steel coils after unloaded from a general cargo ship and stored at on-dock storage yard so as to store those cargoes for a certain period. Those warehouses could function as CFSs for LCL cargoes. The required land area is estimated at 10ha by using the result of the computer simulation. Its breakdown is shown below:

a. Floor space per warehouse:10,000 sq. m
b. Number of warehouses: 6
c. Building to land ratio: 60%

Office buildings for shipping agencies, etc. have been planned within the back-up area. The required land area is estimated at 1.9 ha. Its breakdown is shown below:

a. Number of stories: four-stories
b. Site area per building:2,500 sq. m
c. Number of buildings: 3
d. Building to land ratio: 40%

Area of 21ha for the above buildings is planned.

(6) Parking lot for heavy trucks for trucking companies

Parking lot for heavy trucks for trucking companies and passenger cars for visitors have been planned within the backup area. The required land area is estimated at 12ha. Its breakdown is shown below:

a. Parking capacity: 1,200 trucks

(7) Utilities including water supply tank and electric transformer

Utilities including water supply tank and electric transformer have been planned within the backup area. The required land area is estimated at 1 ha. Its breakdown is shown below:

a. Area for water supply tank with capacity of 5,000 MT: 60m x 50m = 3,000 sq. m
b. Area for a transformer: 25m x 25m = 625 sq. m
c. Area for others: 6,000 sq. m

Area of 18ha for the above utilities is planned.

(8) Inner road within the backup area

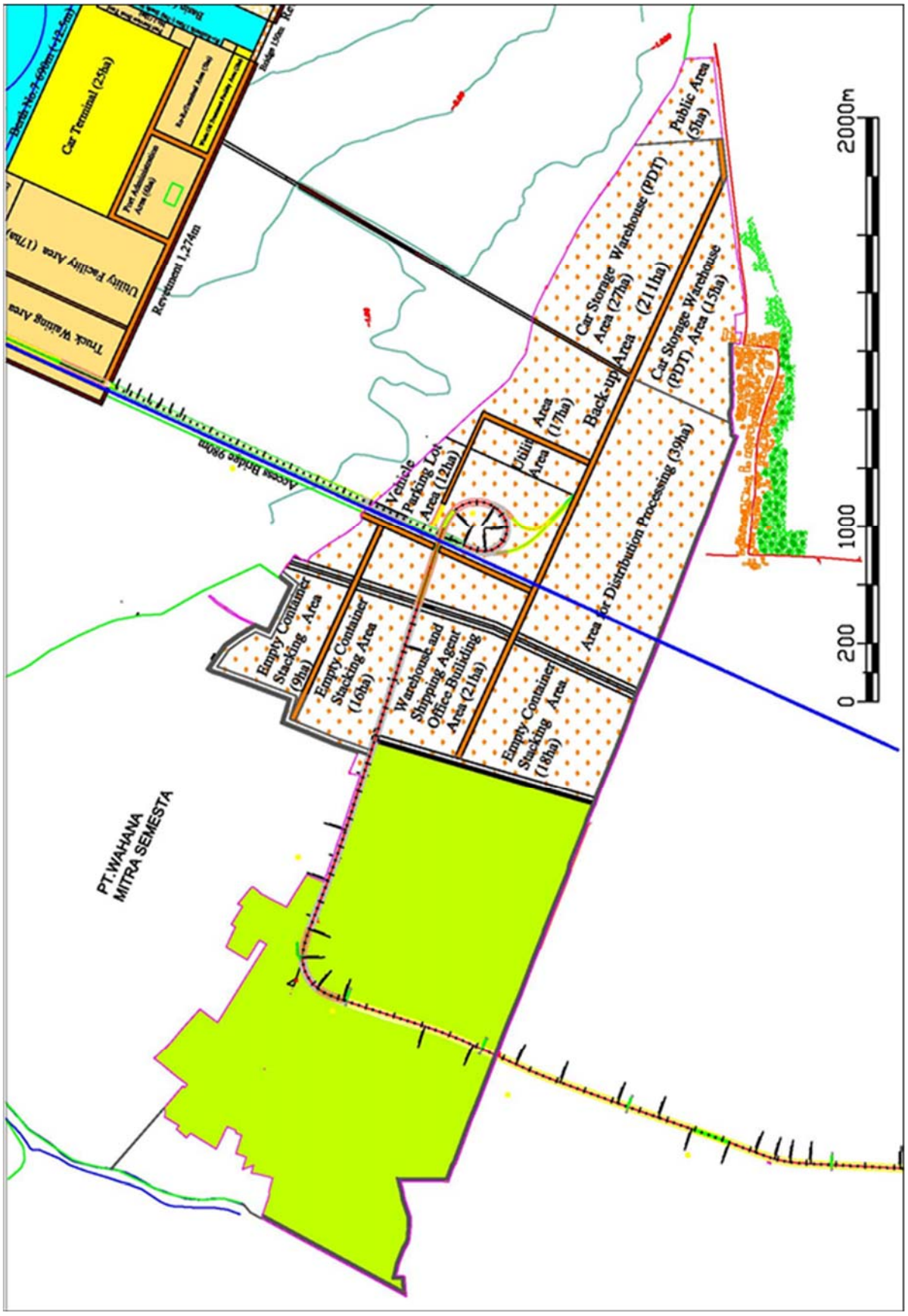
Area of 21ha for inner road within the backup including the area for flyover bridge is planned.

(9) Area for distribution processing

Area of 39ha for distribution processing is planned. Factories which are supposed to be located are those fabricating large-scale machineries, plants, etc., and after fabrication, their products are supposed to be loaded on to a ship equipped with ship cranes with heavy lifting capacity at the multi-purpose terminal (car terminal) and then to be transported to intra-island areas in Indonesia.

(10) Land Use Plan within the Backup Area

Land use plan within the backup area shown in Section 2.2.8 is shown in Figure 2.2-10.



Source: Made by the Survey Team

Figure 2.2-10 Land Use Plan of Back-up Area

2.3 Phased Development Plan of Port Facilities

2.3.1 Concept of Phased Development Plan

Phase 1-1 of Patimban Port as backup outlet port is partially opened in 2019 to fulfill the request of hinterland manufacturing companies in West Java Province. Phase 1-2 will be constructed by 2022 and opened in 2023 to handle increasing cargo demand of container and vehicle.

The facilities of Phase 2 is considered to be developed by BOT scheme by DGST, but Phase 2-1 needs to be completed in 2026 and opened in 2027 if container throughput demand increases as mentioned in Figure 2.3-1. Phase 2-2 is a facility to handle cargoes after 2030, however, studies to review cargo demand, development situation of hinterland and roles and function of Patimban Port at that time must be conducted to propose required facilities, size and capacity, and implementation schedule.

Phasing development plan mentioned below is based on Base case in demand forecast of container and vehicle.

2.3.2 Phase 1 Development Plan and Early Development Plan (Phase 1-1)

(1) Container Terminal

＊ Terminal No. 2 (Phase 1-1, to be completed and opened in 2019) (see Figure 2.2-6)

Berth capacity of Terminal No. 2 (the length of 420 m and the water depth of 10m) with 13ha container yard for early opening was estimated as follows.

Supposed container ship type: Small-sized container ship: 1,270 TEUs hold capacity
Average lot of loaded and unloaded containers per vessel (box/vessel): 810 box/vessel
Gross handling productivity (GHP)：36 box/hr/vessel (3units of ship crane)
Average berthing hour: 22hr
Frequency of services per week: 5 services/week/berth
Total service number per annum: 260 services per berth
Box, TEU ratio: 1.5
Yearly capacity：315,000TEUs/

＊ Terminal No. 1 & 2 (Phase 1-2, to be completed in 2022 and operated from 2023) (see Figure 2.2-6)

Berth and terminal capacity by berth was estimated as follows.

Unit berth length: 420m
Unit yard area per berth: 20ha
Average lot of loaded and unloaded containers per vessel (box/vessel): 1,620 box/vessel
Gross handling productivity (GHP)：72 box/hr/vessel (3 units of quay gantry crane)

Average berthing hour: 22hr
Frequency of services per week: 5 services/week/berth
Total service number per annum: 260 services per berth
Box, TEU ratio: 1.5
Unit berth capacity: 632,000TEUs/year/berth
Terminal No.1 Quay length: 840m
Terminal No. 1（2 berth units）capacity: 1,264,000 TEU/year
Water depth: 14m (Phase 1)
Container-handling capacity per meter of berth length: 1,500 TEUs/m
Total capacity of Terminal No. 1 and No. 2（berth length: 1,680m）: 2,528,000 TEUs

＊ Berth No. 3 (Phase 1-2, to be completed in 2022 and operated from 2023) (see Figure 2.2-6)

Berth No. 3 located at the tip of container terminal will be used for container feeder ships or small-sized domestic container ships for intra-islands.

Length of Berth No. 3 is 450m and equivalent to two berths for small-sized container ships. In case of accommodation domestic container ships, unit berth capacity was estimated as follows.

Average lot of loaded and unloaded containers per vessel (box/vessel): 840 box/vessel
Gross handling productivity (GHP): 42 box/hr/vessel (3 units of quay gantry crane)
Average berthing hour: 20hr
Frequency of services per week: 5 services/week/berth
Total service number per annum: 260 services per berth
Box, TEU ratio: 1.1
Yearly capacity: 240,000TEUs
Container-handling capacity per meter of berth length: 1,000 TEUs/m

In case of container feeder ship utilization, unit berth capacity was estimated at 330,000 TEUs/year.

(2) Car Terminal

The total vehicle-handling capacity of 3 berths of the car terminal with a total length of 690 m and car yard of 25ha was estimated at 600,000 vehicles per annum by using simulation model on the condition that the required service level is 10%, and steel coil is handled at the same berths of the car terminal.

At the stage of Phase 1-1, the berth length of 300m and 9ha car yard will be constructed. At that time, vehicle-handling capacity was estimated at 200,000 vehicles. At the stage of 1-2, the remaining berth with a length of 390m and 16ha car yard will be developed and then a vehicle-handling capacity will reach at 600,000 vehicles per annum.

2.3.3 Phase 2 (see Figure 2.2-6)

＊ Terminal No. 5 (Phase 2-1, to be completed in 2026 and operated from 2027) (see Figure 2.2-6)

Terminal No. 5 (2 berths unit） capacity：1,264,000 TEU/year
Water depth: 14m

＊ Terminal No. 4 (Phase 2-2, Cargo-handling facility after 2030) (see Figure 2.2-6)

Terminal No. 4（2 berths unit） capacity：1,680,000 TEUs/year
Container-handling capacity per meter of berth length: 2,000 TEUs/m
Water depth: 17m
At this stage, cargo-handling productivities at Terminals No. 1, No. 2 and No. 5 will be increased by the additional introduction of cargo-handling machines at the equivalent level of Terminal No. 4.

＊ Berth No. 6（Phase 2-2, Cargo-handling facility after 2030）(see Figure 2.2-6)

Equivalent to that of Berth No. 3.

2.3.4 Demand and Capacity of Patimban Port

(1) Time Lag to be Realized Demand

Demand forecast of container throughput at Patimban Port mentioned above was assumed that port users such as shipping companies and shippers/consignees transfer from Tanjung Priok port to Patimban Port immediately after Patimban Port starts its operation. This demand is hereinafter named as potential demand. On the other hand, it is said that it will take at least 1 or 2 years to negotiate the transfer of port call and logistics route from existing port to a new one among the port users. Preparatory works for customs clearance and container storage and an establishment of office at a new port will be proceeded in parallel with the negotiations, it is said that the preparatory works will take 1 or 2 years. In case of Patimban Port, it will take about 2 years for the preparatory works including building construction work due to lack of logistics function and/or office around Patimban Port. In this context, it is assumed that a realized container throughput demand at Patimban Port is limited at the commencement of operation as soft open in 2019.

From the viewpoint of port users, lower cost and more convenient service at Patimban Port will make a decision for transferring port. Therefore, it is not difficult for major shipping line(s) and/or mega terminal operator(s) to meet the user's demand because they have a high performance of container terminal operation in the world and can offer lower charges of container handling to customers at Patimban Port. Then a realized container throughput demand at Patimban Port will reach to the potential one within 2 years. However, shipping line(s) and/or terminal operator(s) who have small lot of container have to collect container

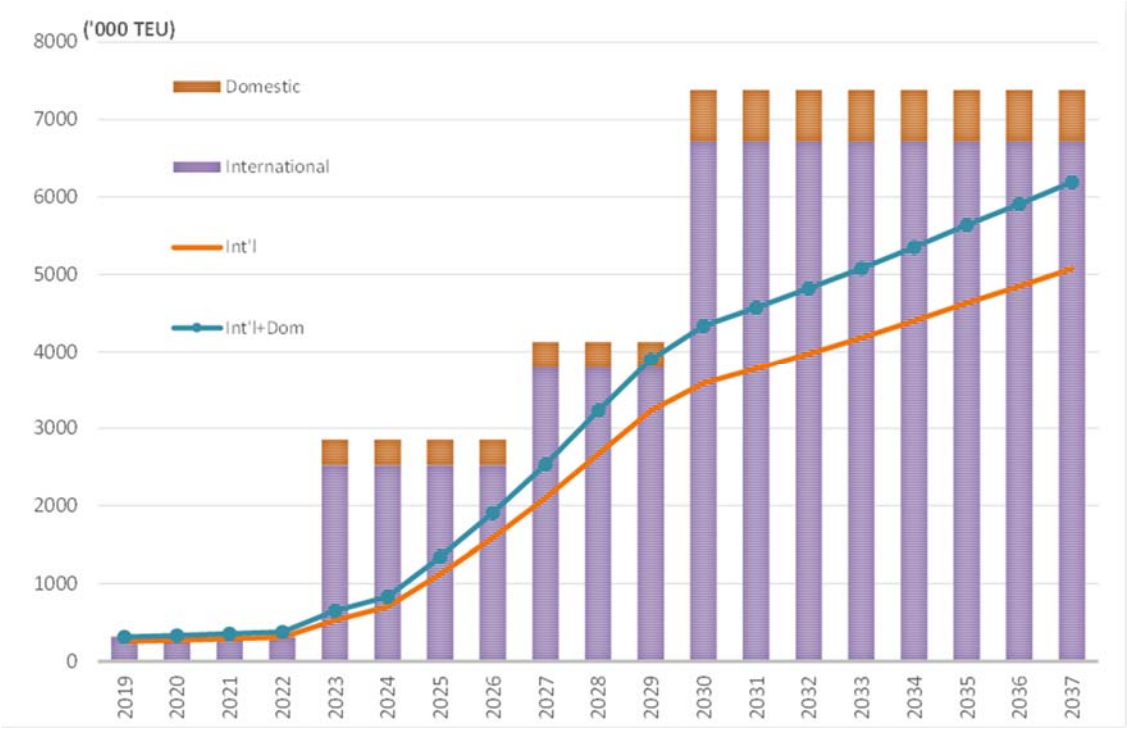
cargo from major shipper(s)/consignee(s). In the context, a realized container throughput demand may be need for 5 years to reach the potential demand (for example, Gwangyang port developed as Pusan Outer port).

Taking above-mentioned into consideration, it is assumed the container throughput of Patimban Port reaches to potential demand in 10 years, 36% of hinterland share, on the other hand, the vehicle handling volume of Patimban Port reaches to potential demand, 68% of hinterland share in 2023 as of start full operation of Phase 1. Table below shows a timing of phasing development plan of container and car terminal. Trend of demand and capacity is showed in Figure 2.3-1 and Figure 2.3-2.

Table 2.3-1 Phasing Development Plan of Patimban Port

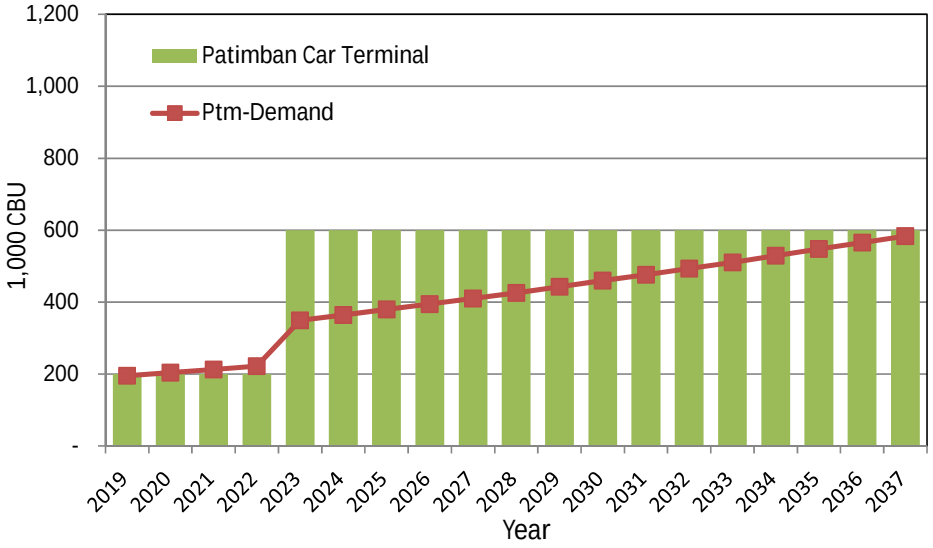
Phasing Development		Phase 1		Phase 2	
		Phase 1-1	Phase 1-2	Phase 2-1	Phase 2-2
	Period	2019~2022	2023~2026	2027~2029	2030~
Container ('000TEU)	Capacity (Int'l & Dom)	315	2,858	4,122	7,380
	Demand at Final Year of each Phase (Int'l & Dom)	378	1,908	3,774	6,194
Vehicle (CBU unit)	Capacity	200	600	600	600
	Demand at Final Year of each Phase (Int'l & Dom)	335	364	442	584

Source: The Survey Team



Source: JICA Survey Team

Figure 2.3-1 Container Throughput Demand and Capacity of Patimban Port



Source: The Survey Team

Figure 2.3-2 Vehicle Handling Demand and Capacity of Patimban Port

(2) Necessary Measures for Promotion of Utilization of Patimban Port

Most of port users located east of Jakarta and West Java Province expect the improvement of the transportation efficiency by development of Patimban Port. The improvement of transportation efficiency is essential to promote the use of Patimban Port.

Request on Patimban Port by potential port users is summarized as follows:

Efficiency and function of the new port should be secured with at least the same level and hopefully much better than Tanjung Priok port.

Sufficient area of yard and number of gates should be provided in the new port.

Customs clearance service should be provided with at least the same level of or with more efficiency than Tanjung Priok port; a succession of the status of import channel of customs clearance at Tanjung Priok port even if they move to Patimban port. .

Port security system should be established, implemented and managed to avoid a lost or stolen cargo.

New highway should be constructed to secure smooth access to the new port as soon as possible.

Directly connected access road to toll road and cargo vehicle lane should be constructed.

Inland container depot and access railway is better to be constructed.

Backup area and hinterland should be developed along with the new port development. 3 days free of charge storage service should be applied in the new port.

Container terminal operator(s) who have the abilities to collect large lots of cargo should be introduced at an early stage, and to be ensured transparency and fairness as well as reduction of tariff and/or charge on port activities.

2.3.5 Demand and Capacity of Tanjung Priok Port

(1) Capacity of Container Terminal of Tanjung Priok Port

- JICT I North, KOJA and MAL

These terminals are international container terminals totaling 6 terminals and their capacities were estimate as follows:

Average lot of loaded and unloaded containers per vessel (box/vessel): 1,270 box/vessel
Gross handling productivity (GHP): 63box/hr/vessel
Average berthing hour: 20hr
Frequency of services per week: 5services/week/berth
Total service number per annum: 260services per berth
Box, TEU ratio: 1.5
Total capacity: 2,970,000 TEUs/year
Total berth length 1,618m (730m（JICT North）, 630m (KOJA) , 258m (MAL))
Water depths: JICT North: 13m, KOJA: 13.5m, MAL: 12m
Container-handling capacity per meter of berth length: 1,840 TEUs/m

- JICT I West

There are 3 berths for handling international containers, and their capacities were estimated as follows:

Average lot of loaded and unloaded containers per vessel (box/vessel): 840 box/vessel
Gross handling productivity (GHP): 42box/hr/vessel
Total capacity：980,000 TEUs/year
Total berth length：870m
Water depth：11m
Container-handling capacity per meter of berth length: 1,130 TEUs/m

- Third Container Terminal East

There are 5 berths for handling international containers, and their capacities were estimated as follows:

Average lot of loaded and unloaded containers per vessel (box/vessel): 353 box/vessel
Gross handling productivity (GHP): 15box/hr/vessel
Average berthing hour: 23hr
Box, TEU ratio: 1.5
Total capacity：440,000 TEUs/year
Total berth length：820m (490m (OJA), 330m (TSJ))
Water depth：10m
Container-handling capacity per meter of berth length: 737 TEUs/m

- North Kalibaru

North Kalibaru Terminal is the international container terminal which has three phases as Phase I, II and III. Phase I opened a terminal in 2016. Quay length and container-handling capacity are said as follows:

Total Quay length: 900m (Phase I), 800m (Phase II) and 800m (Phase III) = 2,500m
Total capacity : 4,500,000 TEUs/year (2016~2019: 750,000TEUs/year, 2020~2022: 1,500,000TEUs/year, 2023: 3,000,000TEUs/year and 2024~: 4,500,000TEUs/year)
Container-handling capacity per meter of berth length: 1,800 TEUs/m

- MTI and JICT II

MTI is currently handling mainly international containers.

Quay length: 400m
Water depth : 9m
JICT II is international container terminal, however, it is not used now.
Quay length: 500m
Water depth : 9.5m

The total capacity of the two terminal was estimated as follows:

Total capacity : 900,000 TEUs/year
Container-handling capacity per meter of berth length: 1,000 TEUs/m

These two terminals were assumed to be converted into domestic container terminals around 2019 after the completion of Phase 1 terminal of North Kalibaru.

- Third Container Terminal West

There are 5 berths for handling domestic containers, and their capacities were estimated as follows:

Average lot of loaded and unloaded containers per vessel (box/vessel): 480 box/vessel
Gross handling productivity (GHP): 14box/hr/vessel
Average berthing hour: 34hr
Box, TEU ratio: 1.1
Total capacity : 390,000 TEUs/year
Total berth length : 1,000m
Water depth : 9m
Container-handling capacity per meter of berth length: 390 TEUs/m

- Quays for handling domestic containers at the First and the Second Wharves

Domestic container ships share the berths at the First and the Second Wharves with conventional ships. There are 21 berth for common use and their container handling capacity is estimated at 1,400,000 TEUs/year as a total.

Estimated international and domestic capacity of Tanjung Priok port is summarized in table below. Current total capacity of the port is 7.9 million TEU, international capacity: 6.1 million TEU and domestic capacity: 1.8 million TEU, respectively.

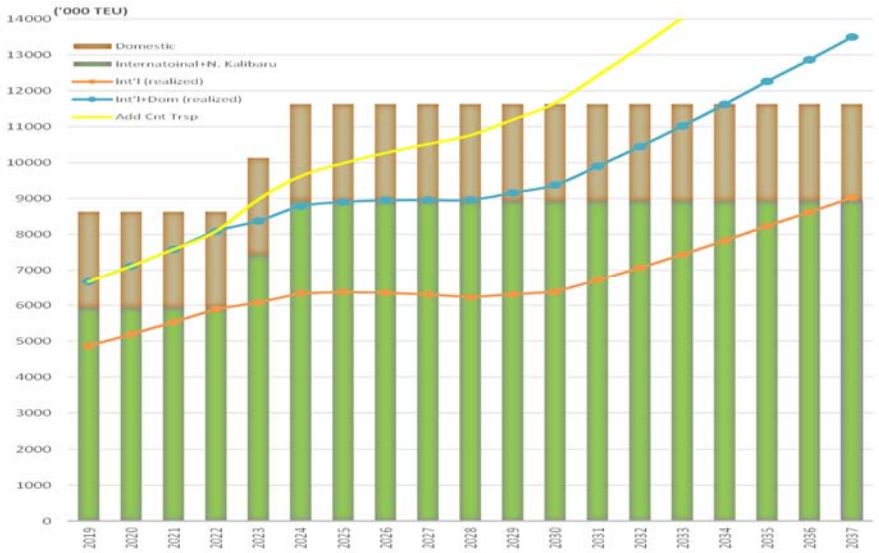
Table 2.3-2 Phasing Development Plan of Tanjung Priok Port

Year	International					Domestic				Total
	MTI, JICT-II	CNT-east3	JICT-I, Koja, MOL & west	North Kalibaru	Sub-total	MTI, JICT-II	Conventional as mixing container handling	CNT-west3	Sub-total	
2015	900	440	4,000		5,340	-	1,400	390	1,790	7,130
2016	900	440	4,000	750	6,090	-	1,400	390	1,790	7,880
2017	900	440	4,000	750	6,090	-	1,400	390	1,790	7,880
2018	900	440	4,000	750	6,090	-	1,400	390	1,790	7,880
2019	-	440	4,000	1,500	5,940	900	1,400	390	2,690	8,630
2020	-	440	4,000	1,500	5,940	900	1,400	390	2,690	8,630
2021	-	440	4,000	1,500	5,940	900	1,400	390	2,690	8,630
2022	-	440	4,000	1,500	5,940	900	1,400	390	2,690	8,630
2023	-	440	4,000	3,000	7,440	900	1,400	390	2,690	10,130
2024	-	440	4,000	4,500	8,940	900	1,400	390	2,690	11,630
2025	-	440	4,000	4,500	8,940	900	1,400	390	2,690	11,630
2026	-	440	4,000	4,500	8,940	900	1,400	390	2,690	11,630
2027	-	440	4,000	4,500	8,940	900	1,400	390	2,690	11,630
2028	-	440	4,000	4,500	8,940	900	1,400	390	2,690	11,630
2029	-	440	4,000	4,500	8,940	900	1,400	390	2,690	11,630
2030	-	440	4,000	4,500	8,940	900	1,400	390	2,690	11,630
2031	-	440	4,000	4,500	8,940	900	1,400	390	2,690	11,630
2032	-	440	4,000	4,500	8,940	900	1,400	390	2,690	11,630
2033	-	440	4,000	4,500	8,940	900	1,400	390	2,690	11,630
2034	-	440	4,000	4,500	8,940	900	1,400	390	2,690	11,630
2035	-	440	4,000	4,500	8,940	900	1,400	390	2,690	11,630
2036	-	440	4,000	4,500	8,940	900	1,400	390	2,690	11,630
2037	-	440	4,000	4,500	8,940	900	1,400	390	2,690	11,630

Source: The Survey Team

(2) Capacity and Demand of Container of Tanjung Priok Port

Trend of demand and capacity is showed in Figure 2.3-3.



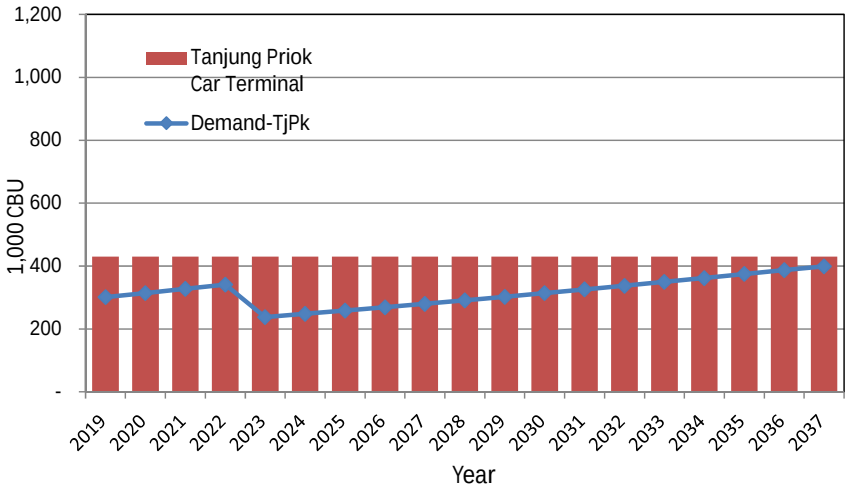
Source: The Survey Team

Figure 2.3-3 Container Throughput Demand and Capacity of Tanjung Priok Port

(3) Capacity and Demand of Car Terminal of Tanjung Priok Port

Vehicle handling capacity of the car terminal of Tanjung Priok port is estimated 430,000 CBU unit.

Trend of demand and capacity of vehicle handling is showed in Figure 2.3-4.



Source: The Survey Team

Figure 2.3-4 Vehicle Handling Demand and Capacity of Tanjung Priok Port